RF TEST REPORT

Prepared For :	Jinzhou Electroacoustic Co., Ltd.
Product Name:	Bluetooth Speaker
Model :	LF-BT602
Prepared By :	Shenzhen BATT Testing Technology Co., Ltd. 11F, Bldg.B, Xinbaoyuan, Xinanhu Commercial city, Bao'an D Shenzhen, Guangdong, China. Tel: 86-755-27753991 Fax: 86-755-27754182
Test Date:	September 18, 2012 to September 26, 2012
Date of Report :	September 28, 2012
Report No.:	BATT20120925065FCC

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1 TEST CERTIFICATION

Product:	Bluetooth Speaker
Model:	LF-BT602
Applicant:	Jinzhou Electroacoustic Co., Ltd. LiShui Road #2,SanWang Industrial Zone,HuangZe Town,ShengZhou City,ZheJiang.Province
Factory:	Jinzhou Electroacoustic Co., Ltd. LiShui Road #2,SanWang Industrial Zone,HuangZe Town,ShengZhou City,ZheJiang.Province
Trade Mark:	JINZHOU
Tested:	September 18, 2012 to September 26, 2012
Test Voltage:	DC5V Powered by power supply or DC3.7V by battery
Operational Frequency Range:	2402-2480MHz
Modulation Type:	GFSK
Antenna:	PCB Antenna with Gain 0 dBi
Power Supply:	Model: K-E70501000U1; Input: 100-240V~, 50-60Hz, 0.15A Max; Output: DC5V,1A
FCC ID:	QBBLF-BT602
Applicable Standards:	FCC Part 15.247

The test report was prepared by Shenzhen BATT Testing Technology Co., Ltd.and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Prepared by : Hellen Xiao

Hellen XiaoAssistant

Reviewer : Mike Yong

Mike Yong/Supervisor

Approved & Authorized Signer : Jones Song

Jones Song/ Manager

2.0	Test Equipments				
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	RS	ESPI 3	100379	2012-04-21	2013-04-20
Absorbing Clamp	RS	MDS-21	100126	2012-04-21	2013-04-20
TWO Line-V-NETW	RS	EZH3-Z5	100294	2012-04-21	2013-04-20
TWO Line-V-NETW	RS	EZH3-Z5	100253	2012-04-21	2013-04-20
Ultra Broadband ANT	RS	HL562	100157	2012-04-21	2013-04-20
ESDV Test Receiver	RS	ESDV	100008	2012-04-21	2013-04-20
4-WIRE ISN	RS	ENY 41	830663/044	2012-04-21	2013-04-20
GG ENY22 Double 2-Wire ISN	RS	ENY22	83066/016	2012-04-21	2013-04-20
Impuls-Begrenzer	RS	ESH3-Z2	100281	2012-04-21	2013-04-20
System Controller	CT	SC100	-	2012-04-21	2013-04-20
Printer	EPSON	PHOTO EX3	CFNH234850	2012-04-21	2013-04-20
FM-AM Signal Generator	JUNG.JIN	SG-150M	389911177	2012-04-21	2013-04-20
Color TV Pattern Generator	PHILIPS	PM5418	LO621747	2012-04-21	2013-04-20
Computer	IBM	8434	1S8434KCE99BLXLO*	-	-
Oscillator	KENWOOD	AG-203D	3070002	2012-04-21	2013-04-20
Spectrum Analyzer	HAMEG	HM5012	-	-	-

Power Supply	LW	APS1502	-	-	-
5K VA AC Power Source	California Instruments	5001iX	56060	2012-04-21	2013-04-20
CDN	EM TEST	CDN M2/M3	-	2012-04-21	2013-04-20
Attenuation	EM TEST	ATT6/75	-	2012-04-21	2013-04-20
Resistance	EM TEST	R100	-	2012-04-21	2013-04-20
Electromagnetic Injection Clamp	LITTHI	EM101	35708	2012-04-21	2013-04-20
Inductive Components	EM TEST	MC2630	-	2012-04-21	2013-04-20
Antenna	EM TEST	MS100	-	2012-04-21	2013-04-20
Signal Generator	RS	SMT03	100029	2012-04-21	2013-04-20
Power Amplifier	AR	150W1000	300999	2012-04-21	2013-04-20
Field probe	Holaday	HI-6005	105152	2012-04-21	2013-04-20
Bilog Antenna	Chase	CBL6111C	2576	2012-04-21	2013-04-20
Loop Antenna	EMCO	6502	00042960	2012-04-21	2013-04-20
ESPI Test Receiver	RS	ESI26	838786/013	2012-04-21	2013-04-20
3m OATS	--	--	N/A	2012-04-21	2013-04-20
Horn Antenna	RS	BBHA 9170	BBHA9170265	2012-04-21	2013-04-20
Horn Antenna	RS	BBHA 9120D	9120D-631	2011-08-04	2012-08-03

3.0 Technical Details

3.1 Summary of test results

The EUT has been tested according to the following specifications:

Requirement	CFR 47 Section	Result	Notes
Antenna Requirement	15.203, 15.247(b)(4)	PASS	Complies
Maximum Peak Out Power	15.247 (b)(1), (4)	PASS	Complies
Carrier Frequency Separation	15.247(a)(1)	PASS	Complies
20dB Channel Bandwidth	15.247 (a)(1)	PASS	Complies
Number of Hopping Channels	15.247(a)(iii), 15.247(b)(1)	PASS	Complies
Time of Occupancy (Dwell Time)	15.247(a)(iii)	PASS	Complies
Spurious Emission, Band Edge, and Restricted bands	15.247(d),15.205(a), 15.209 (a),15.109	PASS	Complies
Conducted Emissions	15.207(a)，15.107	PASS	Complies
RF Exposure	15.247(i), 1.1307(b)(1)	PASS	Complies

4.0 Test LAB Details

Radiated Emissions and Restrict band Tests Performed at

Name: Shenzhen Emtek Co., Ltd.

Address: Bldg. 69, Majialong Industry Zone,,Nanshan District,Shenzhen, Guangdong, 518052China

FCC Registration Number: 406365

Note: All other tests were done at SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD

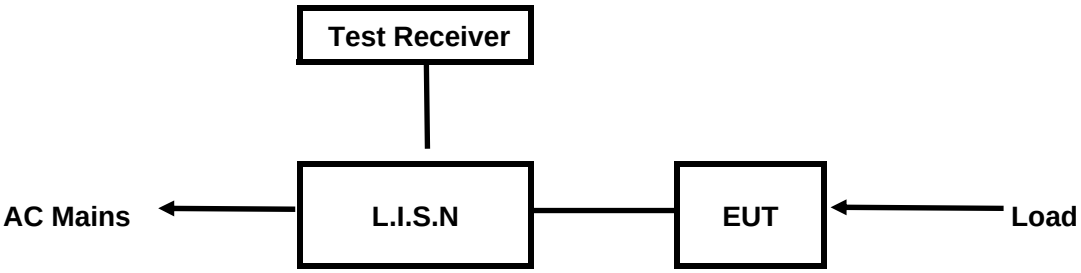
Name: SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD

Address: 5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District, Shenzhen,CHINA.

FCC Registration Number: 899988

5. Power Line Conducted Emission Test

5.1 Schematics of the test

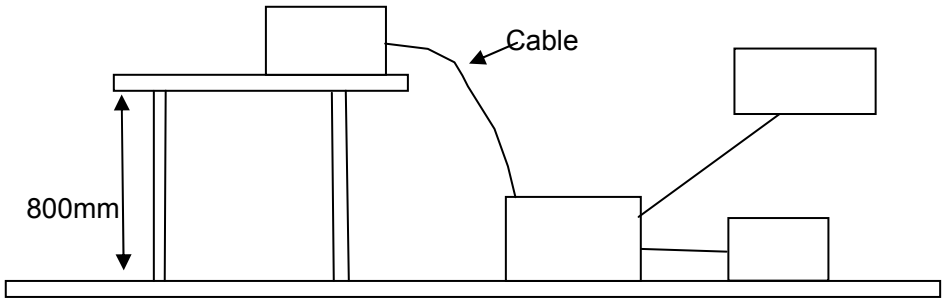


EUT: Equipment Under Test

5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.4-2003.The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.4 –2003.

Block diagram of Test setup



5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2003. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

79 channels are provided to the EUT

A. EUT

Device	Manufacturer	Model	FCC ID
Bluetooth Speaker	Jinzhou Electroacoustic Co., Ltd.	LF-BT602	QBBLF-BT602

B. Internal Device

Device	Manufacturer	Model	FCC ID/DOC
N/A			

C. Peripherals

Device	Manufacturer	Model	FCC ID/DOC	Cable
--	--	--	--	--

5.4 EUT Operating Condition

Operating condition is according to ANSI C63.4 -2003.

A Setup the EUT and simulators as shown on follow

B Enable AF signal and confirm EUT active to normal condition

5.5 Power line conducted Emission Limit according to Paragraph 15.107, 15.207

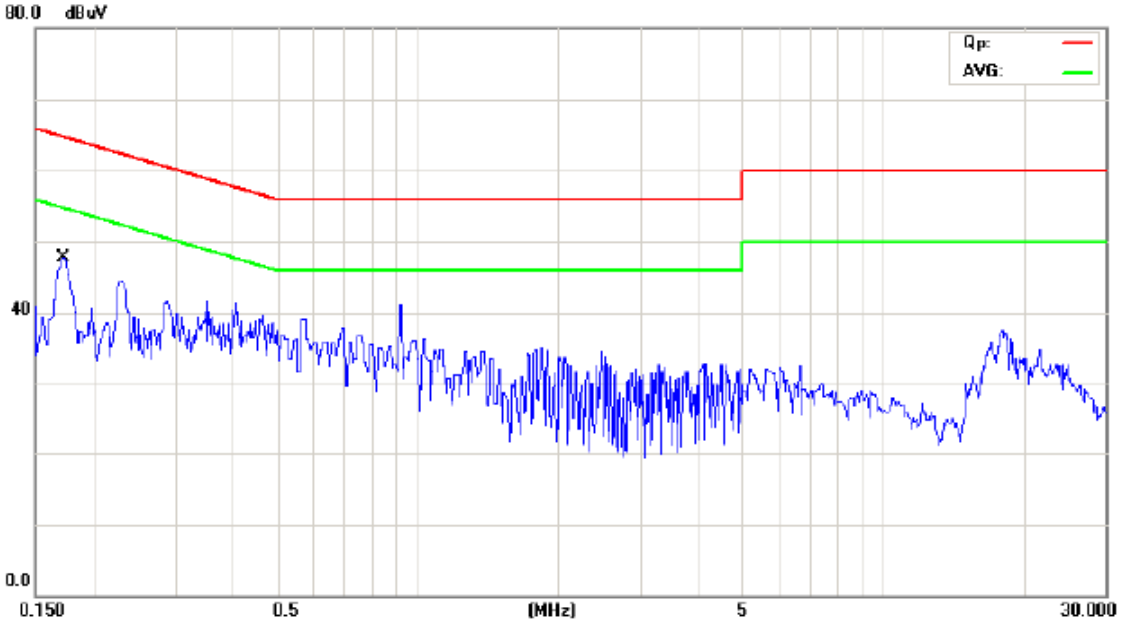
Frequency (MHz)	Class A Limits (dBμV)		Class B Limits (dBμV)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ～ 0.50	79.0	66.0	66.0～56.0*	56.0～46.0*
0.50 ～ 5.00	73.0	60.0	56.0	46.0
5.00 ～ 30.00	73.0	60.0	60.0	50.0

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

2. The tighter limit shall apply at the transition frequencies

5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.



Site site #1 Phase: *L1* Temperature: 26

Limit: FCC Part15B Class B Conduction(QP) Power: AC 120V/60Hz Humidity: 65 %

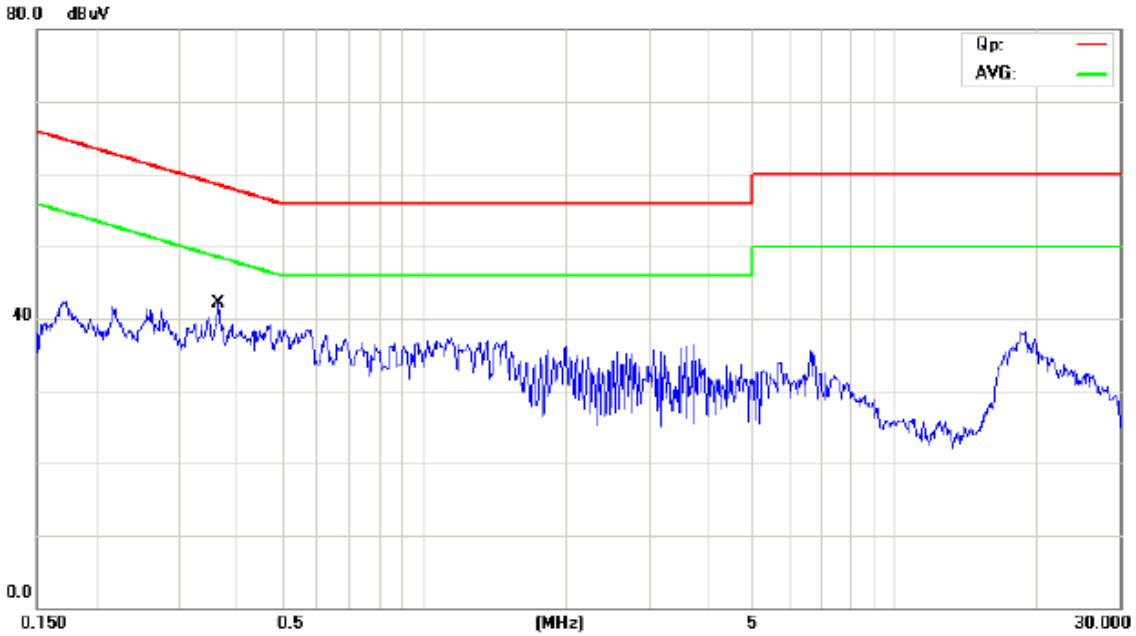
EUT: Bluetooth Speaker

M/N:

Mode: Charging Mode

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1725	33.20	11.02	44.22	64.84	-20.62	QP	
2		0.1725	19.70	11.02	30.72	54.84	-24.12	AVG	



Site site #1 Phase: N Temperature: 26

Limit: FCC Part15B Class B Conduction (QP) Power: AC 120V/60Hz Humidity: 65 %

EUT: Bluetooth Speaker

M/N:

Mode: Charging Mode

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.3630	26.83	11.23	38.06	58.66	-20.60	QP	
2		0.3630	15.85	11.23	27.08	48.66	-21.58	AVG	

6 Radiated Emission Test

6.1 Test Method and test Procedure:

(1) The EUT was tested according to ANSI C63.4 –2003. The radiated test was performed at Shenzhen Emtek Co., Ltd.. This site is on file with the FCC laboratory division, Registration No.406365

(2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2003.

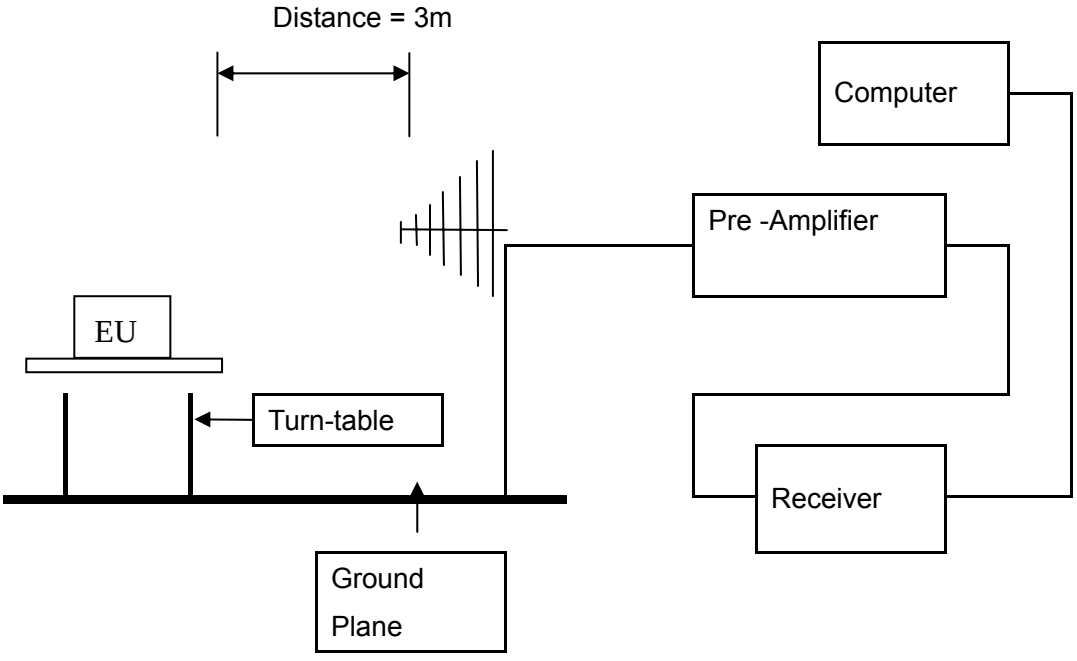
(3) The frequency spectrum from 30 MHz to 1 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz. For measurement above 1GHz, peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector. Measurements were made at 3 meters.

(4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.

(5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "**QP**" in the data table.

(6) The antenna polarization: Vertical polarization and Horizontal polarization.

Block diagram of Test setup



6.2 Configuration of The EUT

Same as section 5.3 of this report

6.3 EUT Operating Condition

Same as section 5.4 of this report.

6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

Frequencies in restricted band are complied to limit on Paragraph 15.109. 15.209

Frequency Range (MHz)	Distance (m)	Field strength (dBμV/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note: 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)

2. In the Above Table, the higher limit applies at the band edges.

3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT

4. This is a handhold device. The radiated emissions should be tested under 3-axes position (Lying, Side, and Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.

5. Battery was fully charged during the radiated test.

6. After pre-scan, BDR mode was the worse case and it was selected to conduct the radiated emission tests.

6.5 Peripherals

Device	Manufacturer	Model	FCC ID/DOC	Cable
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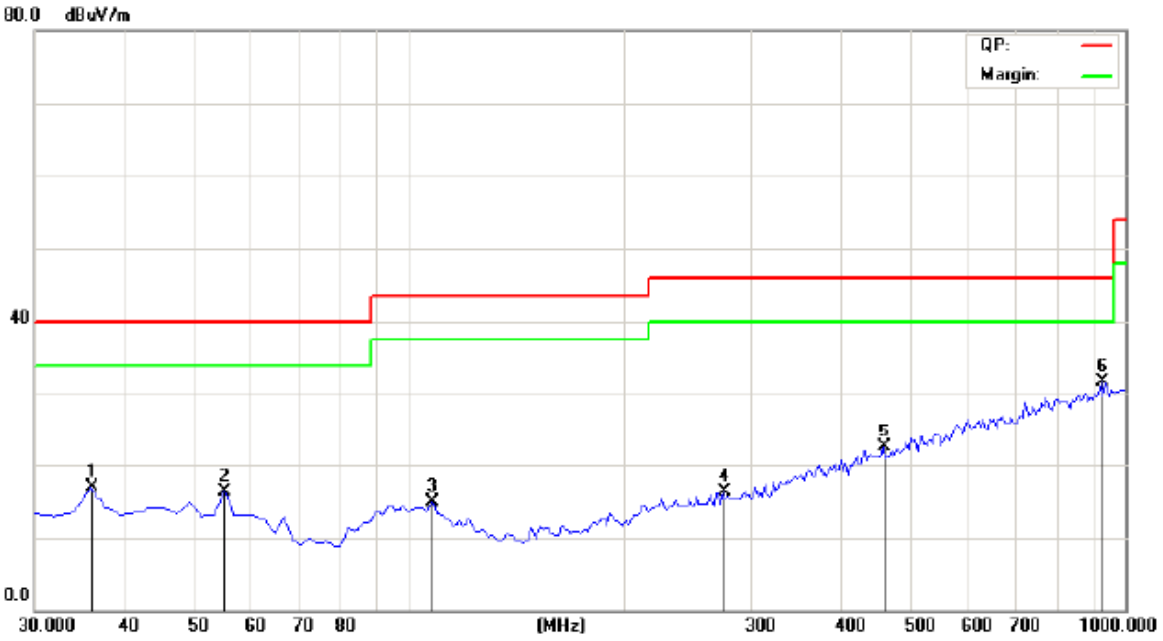
Test result

General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Horizontal (30MHz----1000MHz)

EUT set Condition: Charging and Keep Transmitting

Results: **Pass**



Site site #1 Polarization: *Vertical* Temperature: 26

Limit: FCC Class B 3M Radiation Power: AC 120V/60Hz Humidity: 56 %

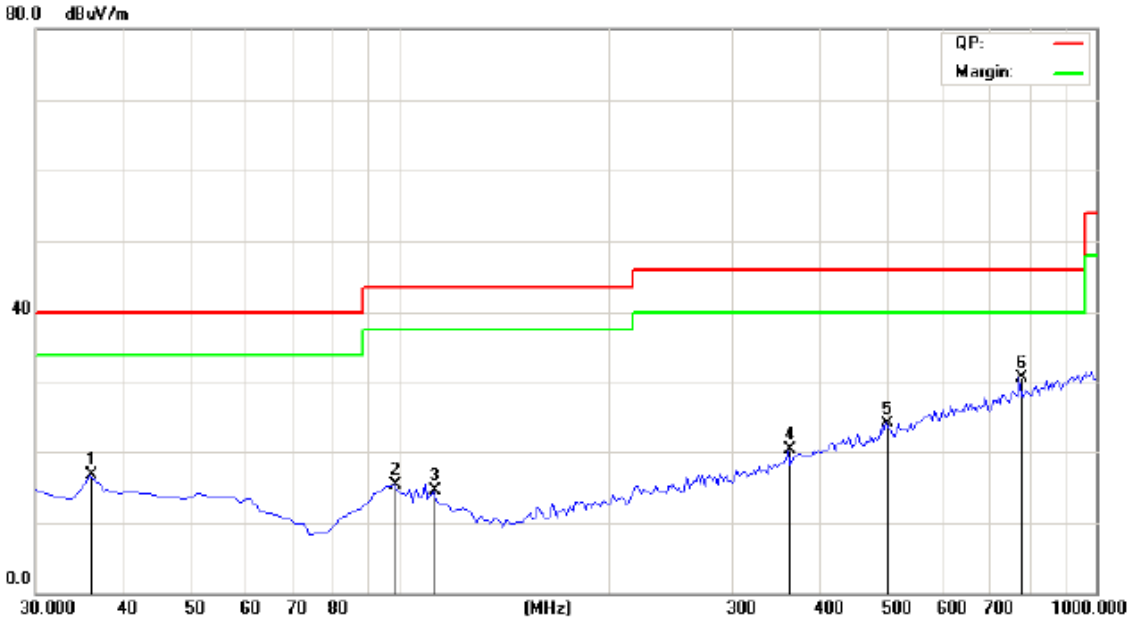
EUT: Bluetooth Speaer Distance: 3m

M/N:

Mode: Chaging and Keep Transmitting

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		35.8316	29.77	-12.81	16.96	40.00	-23.04	peak		0	
2		55.2705	28.14	-11.86	16.28	40.00	-23.72	peak		0	
3		107.7555	26.70	-11.80	14.90	43.50	-28.60	peak		0	
4		274.9300	25.20	-8.90	16.30	46.00	-29.70	peak		0	
5		459.5992	26.77	-4.32	22.45	46.00	-23.55	peak		0	
6	*	928.0762	27.00	4.66	31.66	46.00	-14.34	peak		0	



Site site #1
Limit: FCC Class B 3M Radiation
EUT: Bluetooth Speaker
M/N:
Mode: Charging and Keep Transmitting
Note:

Polarization: *Horizontal*
Power: AC 120V/60Hz
Distance: 3m

Temperature: 26
Humidity: 56 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		35.8316	29.43	-12.81	16.62	40.00	-23.38	peak		0	
2		98.0361	26.46	-11.22	15.24	43.50	-28.26	peak		0	
3		111.6433	26.69	-12.27	14.42	43.50	-29.08	peak		0	
4		362.4048	26.36	-6.15	20.21	46.00	-25.79	peak		0	
5		500.4208	27.10	-3.08	24.02	46.00	-21.98	peak		0	
6	*	778.3968	28.32	2.39	30.71	46.00	-15.29	peak		0	

Operation Mode: Transmitting under Low Channel (2402MHz)

Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
2402	86.13 (PK)	H	Fundamental Frequency
2402	87.02(PK)	V	
4804	--	H	74(Peak)/ 54(AV)
4804	--	V	74(Peak)/ 54(AV)
7206	--	H/V	74(Peak)/ 54(AV)
9608	--	H/V	74(Peak)/ 54(AV)
12010	--	H/V	74(Peak)/ 54(AV)
14412	--	H/V	74(Peak)/ 54(AV)
16814	--	H/V	74(Peak)/ 54(AV)
19216	--	H/V	74(Peak)/ 54(AV)
21618	--	H/V	74(Peak)/ 54(AV)
24020	--	H/V	74(Peak)/ 54(AV)

Operation Mode: Transmitting g under Middle Channel (2441MHz)

Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
2441	87.46 (PK)	H	Fundamental Frequency
2441	88.85 (PK)	V	
4882	--	H	74(Peak)/ 54(AV)
4882	--	V	74(Peak)/ 54(AV)
7323	--	H/V	74(Peak)/ 54(AV)
9764	--	H/V	74(Peak)/ 54(AV)
12205	--	H/V	74(Peak)/ 54(AV)
14646	--	H/V	74(Peak)/ 54(AV)
17087	--	H/V	74(Peak)/ 54(AV)
19528	--	H/V	74(Peak)/ 54(AV)
21969	--	H/V	74(Peak)/ 54(AV)
24410	--	H/V	74(Peak)/ 54(AV)

Operation Mode: Transmitting under High Channel

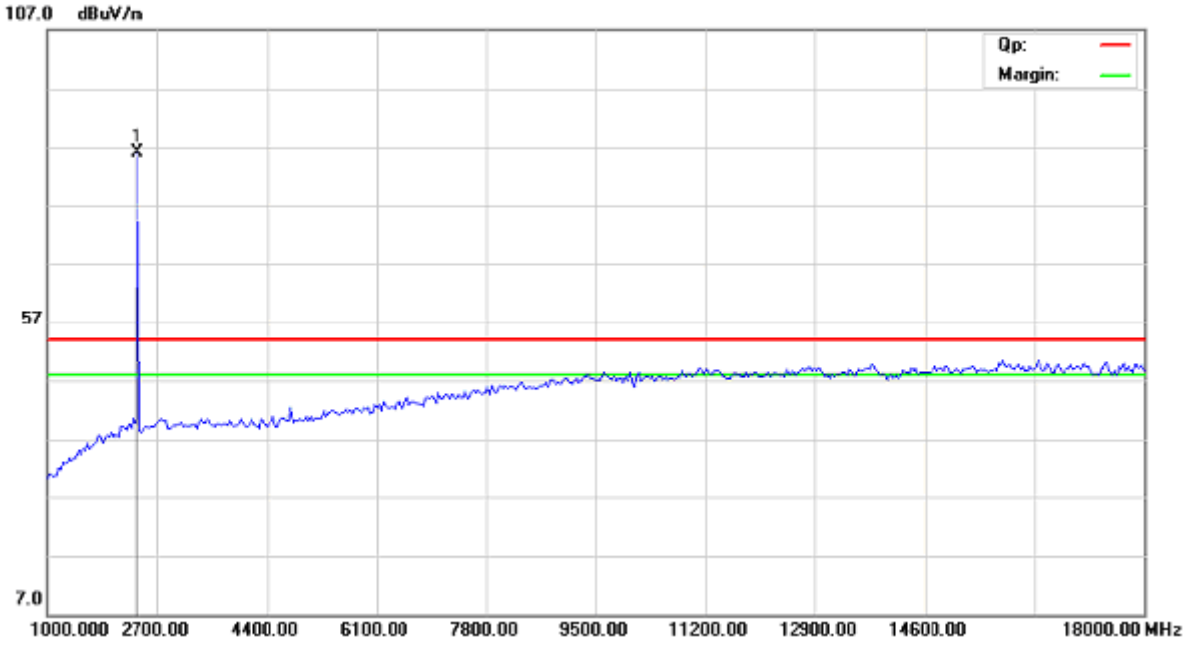
Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
2480	96.68 (PK)	H	Fundamental Frequency
2480	87.69(PK)	V	
4960.	46.42(PK)	H	74(Peak)/ 54(AV)
4960.	48.84(PK)	V	74(Peak)/ 54(AV)
7440	--	H/V	74(Peak)/ 54(AV)
9920	--	H/V	74(Peak)/ 54(AV)
12400	--	H/V	74(Peak)/ 54(AV)
14880	--	H/V	74(Peak)/ 54(AV)
17360	--	H/V	74(Peak)/ 54(AV)
19840	--	H/V	74(Peak)/ 54(AV)
22320	--	H/V	74(Peak)/ 54(AV)
24800	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

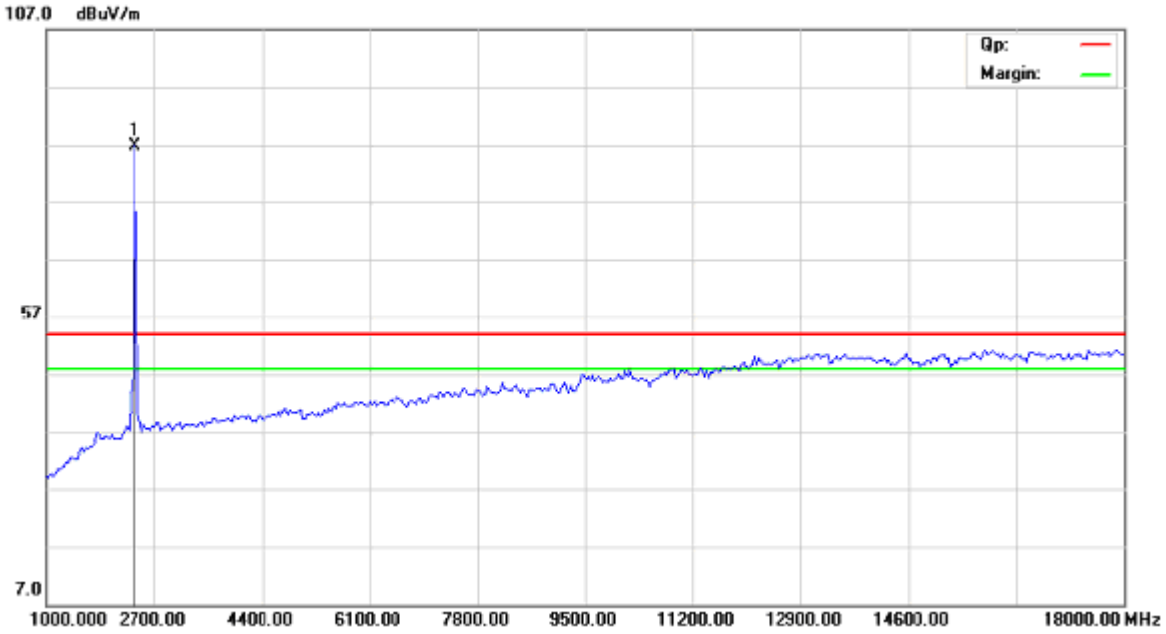
2. Remark “---” means that the emissions level is too low to be measured

Please refer to the following test plots for details:

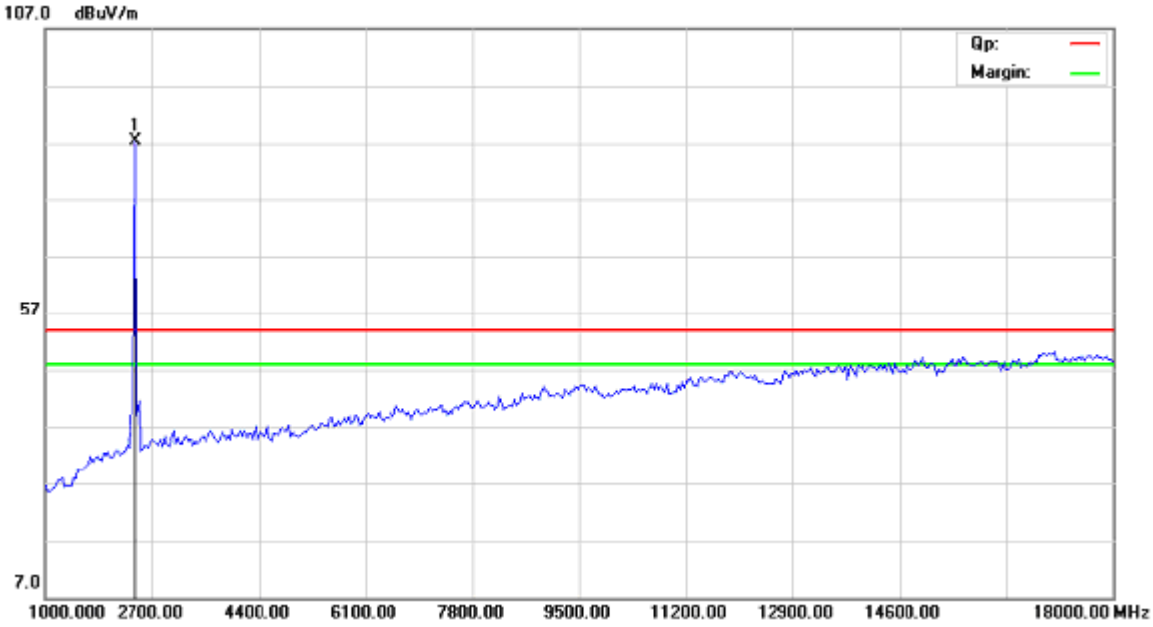
Low Channel: Horizontal



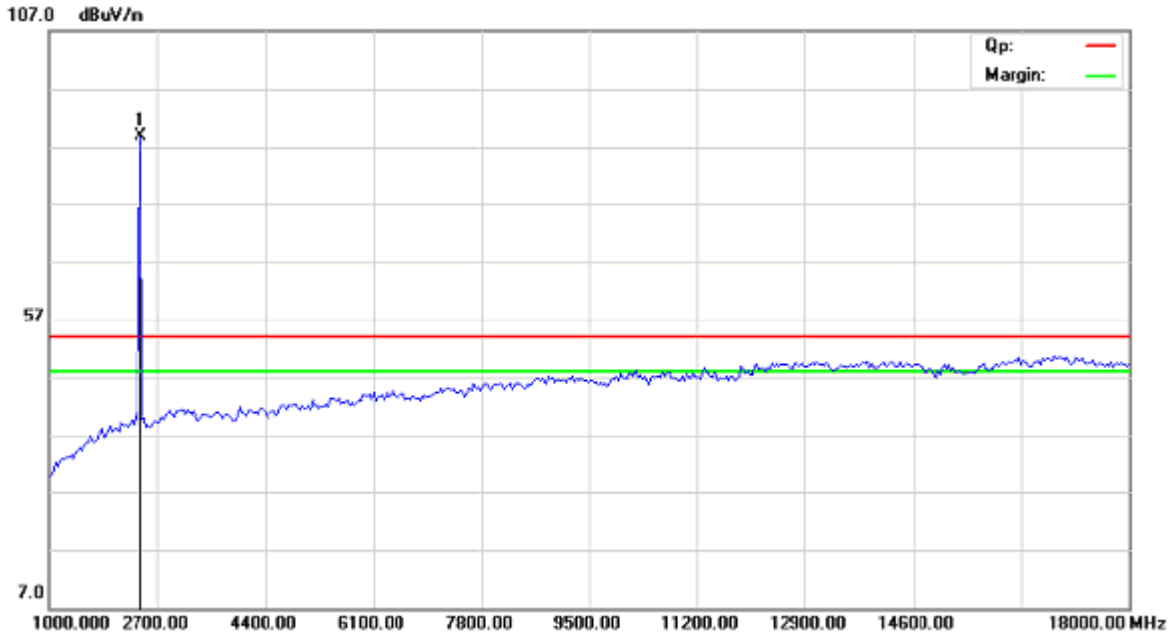
Low Channel : Vertical



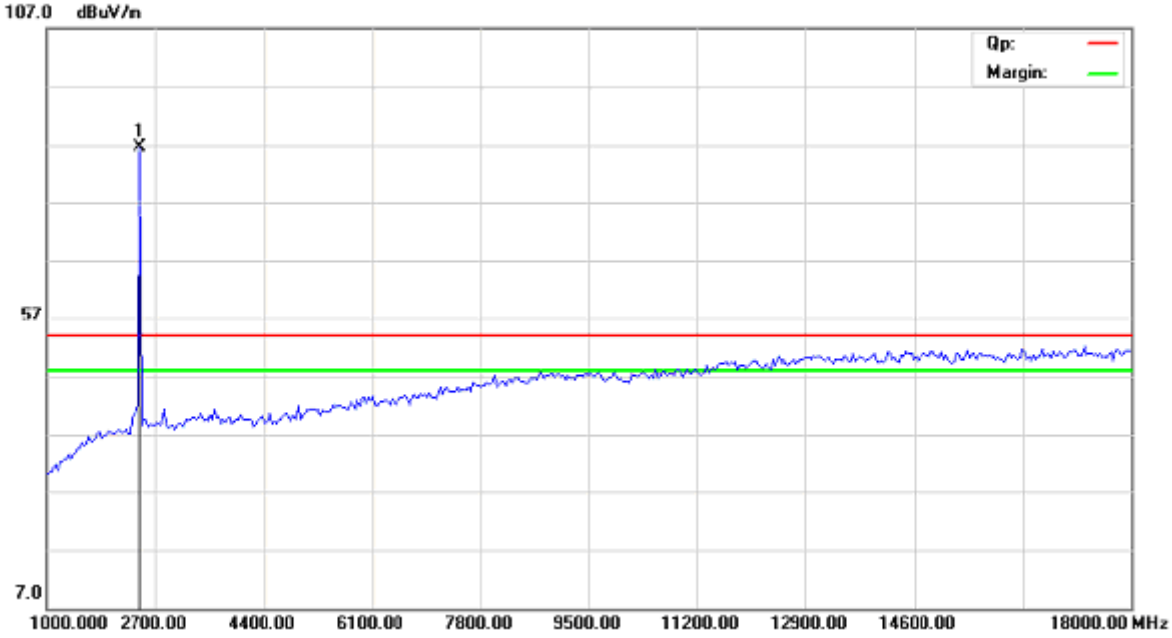
Middle Channel : Horizontal



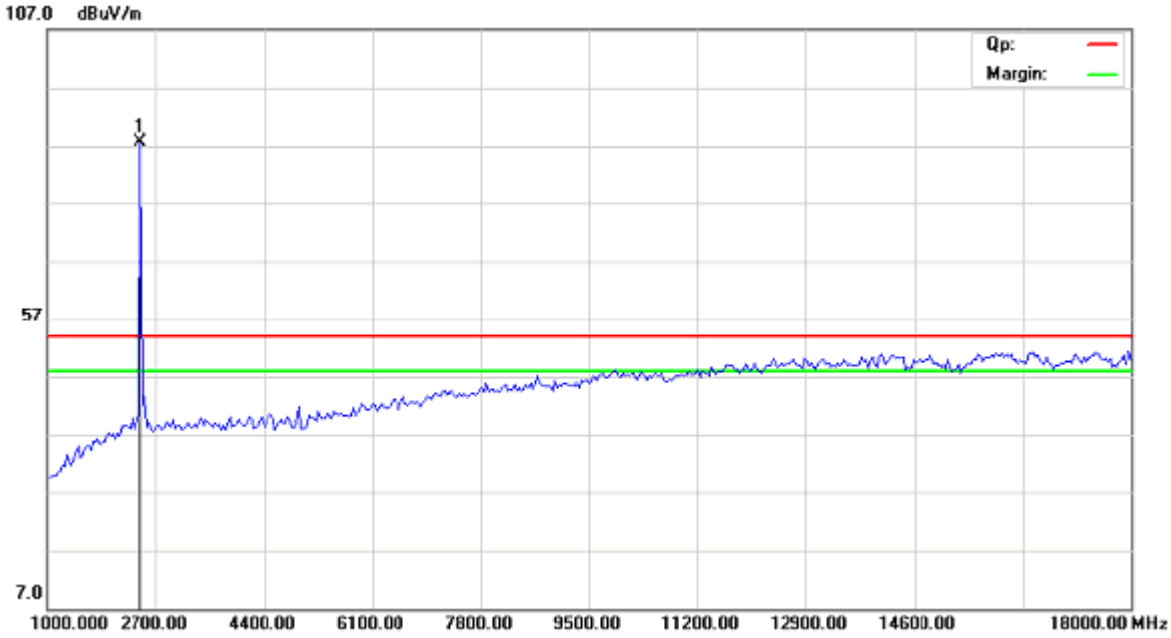
Middle Channel :: Vertical



High Channel : Horizontal



High Channel : Vertical



Note: For the radiated emissions from 18GHz-25GHz, it is the floor noise that meets the requirement of FCC rule.

7.0 20dB Bandwidth Measurement

7.1 Regulation

According to §15.247(b)(1), 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. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

7.2 Limits of 20dB Bandwidth Measurement

N/A

7.3 Test Procedure.

1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.

2. Set the spectrum analyzer as follows: Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel RBW > the 20 dB bandwidth of the emission being measured VBW ≥ RBW Sweep = auto Detector function = peak Trace = max hold

3. Measure the highest amplitude appearing on spectral display and record the level to calculate results.

6. Repeat above procedures until all frequencies measured were complete.

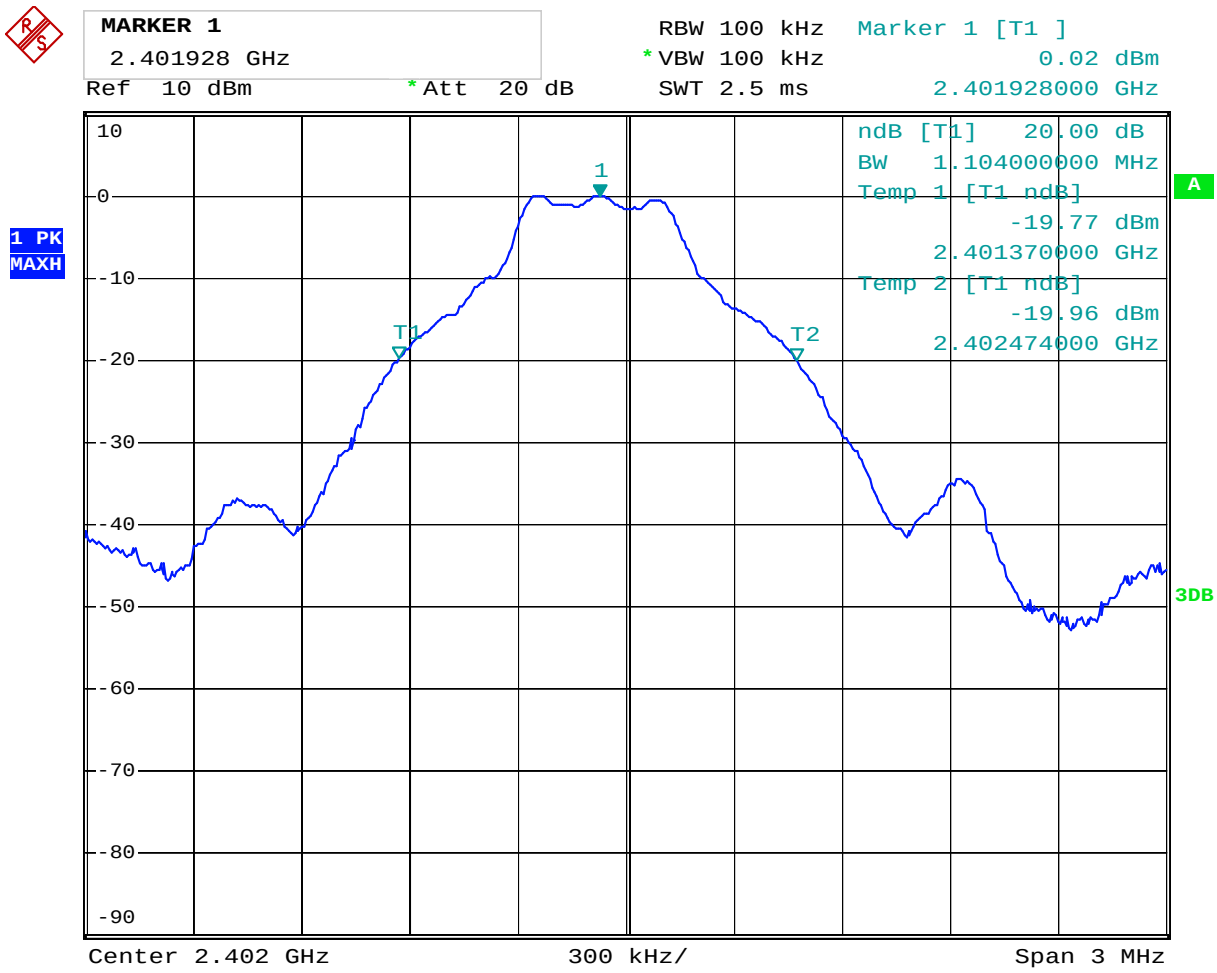
7.4 Test Result:

EUT	Bluetooth Speaker	Model	LF-BT602
Mode	Keep Transmitting	Input Voltage	DC5V
Temperature	24 deg. C,	Humidity	56% RH

Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Pass/ Fail
Low	2402	1104	--	Pass
Middle	2441	1110	--	Pass
High	2480	1110	--	Pass

Test Figure:

1. Condition: Low Channel



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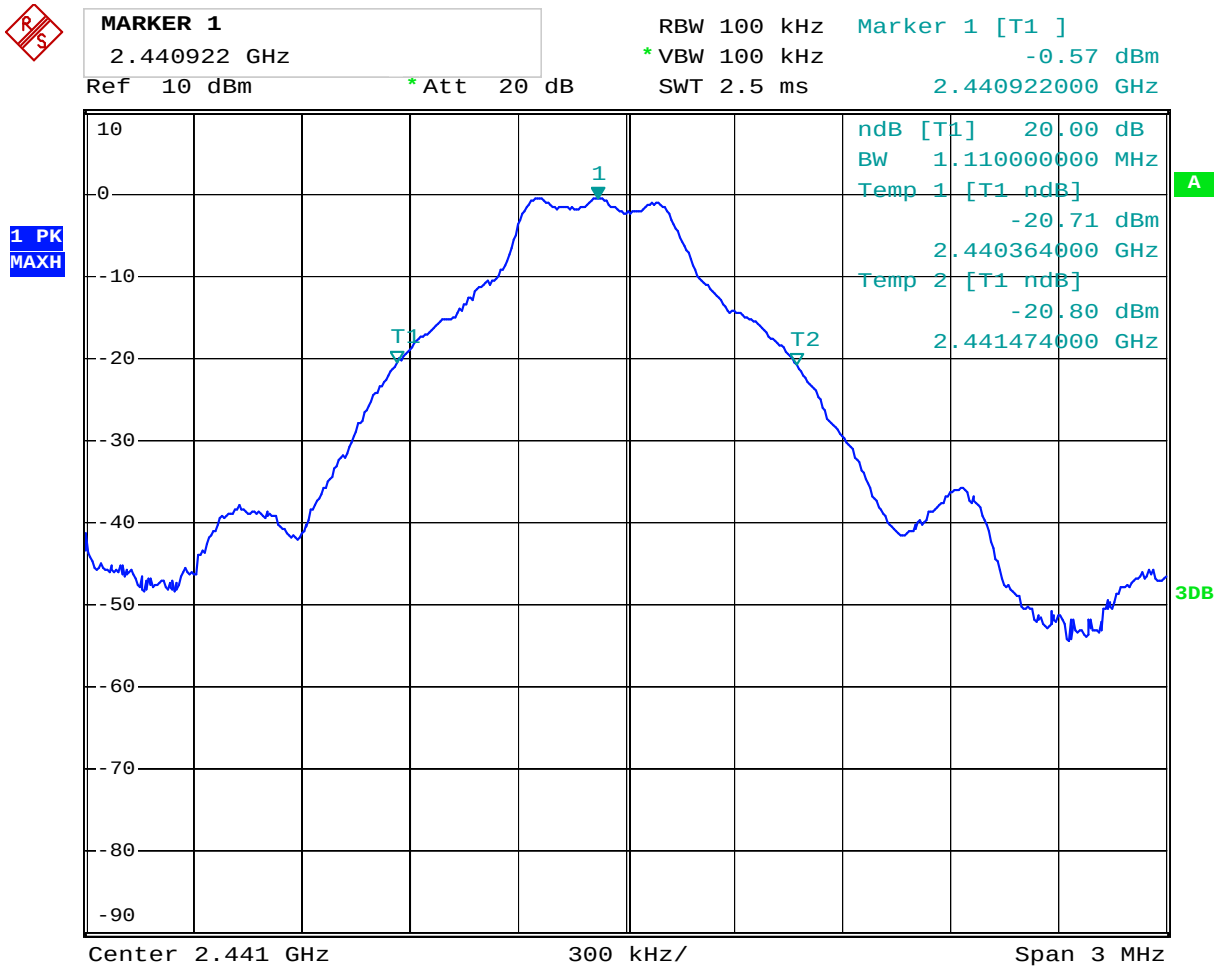
2. Condition: Middle Channel



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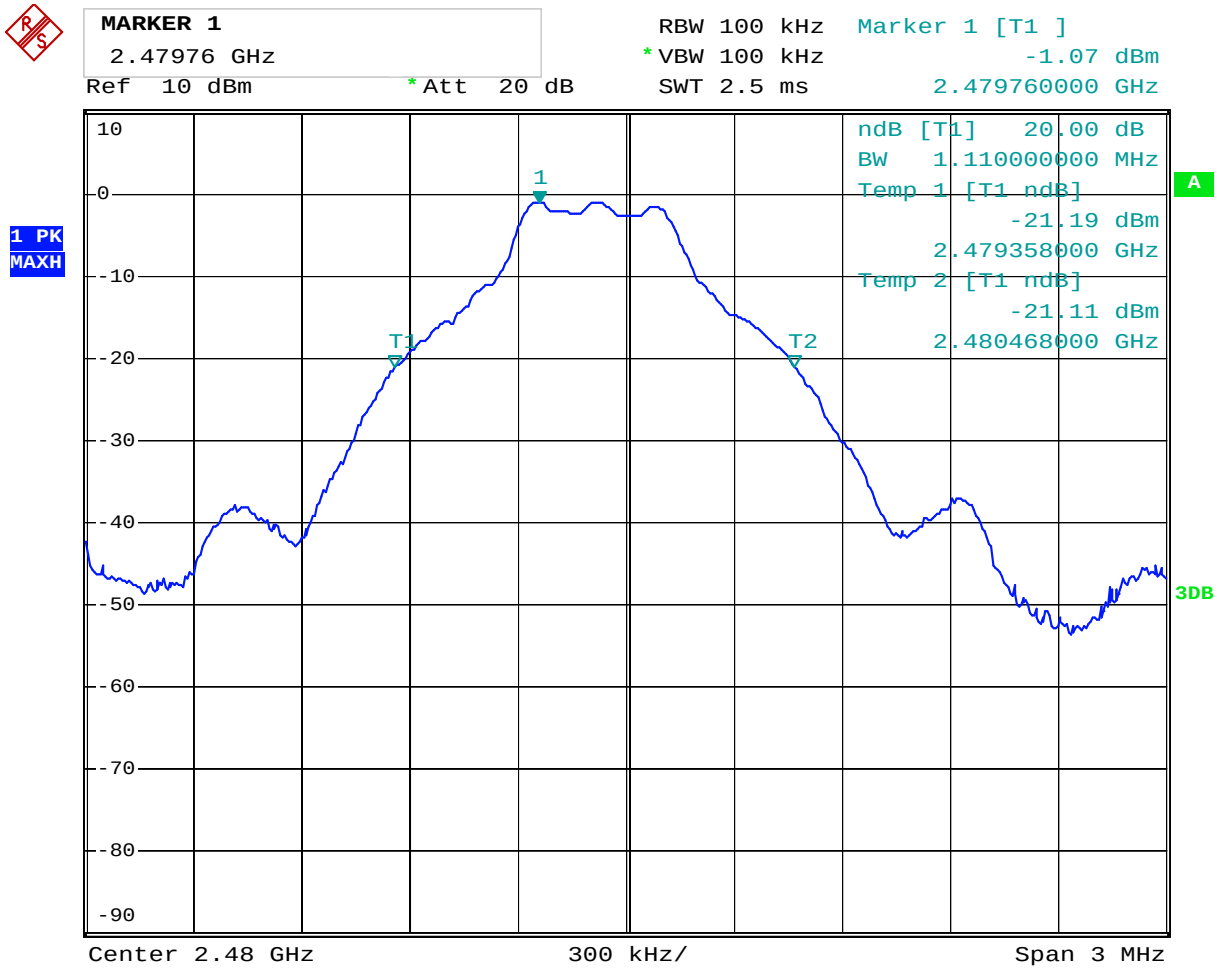
3. High Channel



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8. Maximum Peak Output Power

8.1 Regulation

According to §15.247(b)(1), 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 2400-2483.5MHz band:0.125 watts. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

8.2 Limits of Maximum Peak Output Power

The Maximum Peak Output Power Measurement is 30dBm.

8.3 Test Procedure

1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
2. Set the spectrum analyzer as follows: Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel； RBW > the 20 dB bandwidth of the emission being measured； VBW ≥ RBW； Sweep = auto； Detector function = peak； Trace = max hold
3. Measure the highest amplitude appearing on spectral display and record the level to calculate results.
4. Repeat above procedures until all frequencies measured were complete.

8.4Test Results

EUT	Bluetooth Speaker	Model	LF-BT602
Mode	Keep Transmitting	Input Voltage	DC5V
Temperature	24 deg. C,	Humidity	56% RH

Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass/ Fail
Low	2402	0.55	30	Pass
Middle	2441	0.67	30	Pass
High	2480	1.13	30	Pass

Note: 1. the result basic equation calculation as follow:

Peak Power Output = Peak Power Reading + Cable loss + Attenuator

9. Carrier Frequency Separation

9.1 Regulation

According to §15.247(a)(1), 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.

9.2 Limits of Carrier Frequency Separation

The Maximum Power Spectral Density Measurement is 25kHz or two-thirds of the 20dB bandwidth of the hopping Channel which is great.

9.3 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Set the spectrum analyzer as follows: Span = wide enough to capture the peaks of two adjacent channels: Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span; Video (or Average) Bandwidth (VBW) ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold
3. Measure the separation between the peaks of the adjacent channels using the marker-delta function.
4. Repeat above procedures until all frequencies measured were complete.

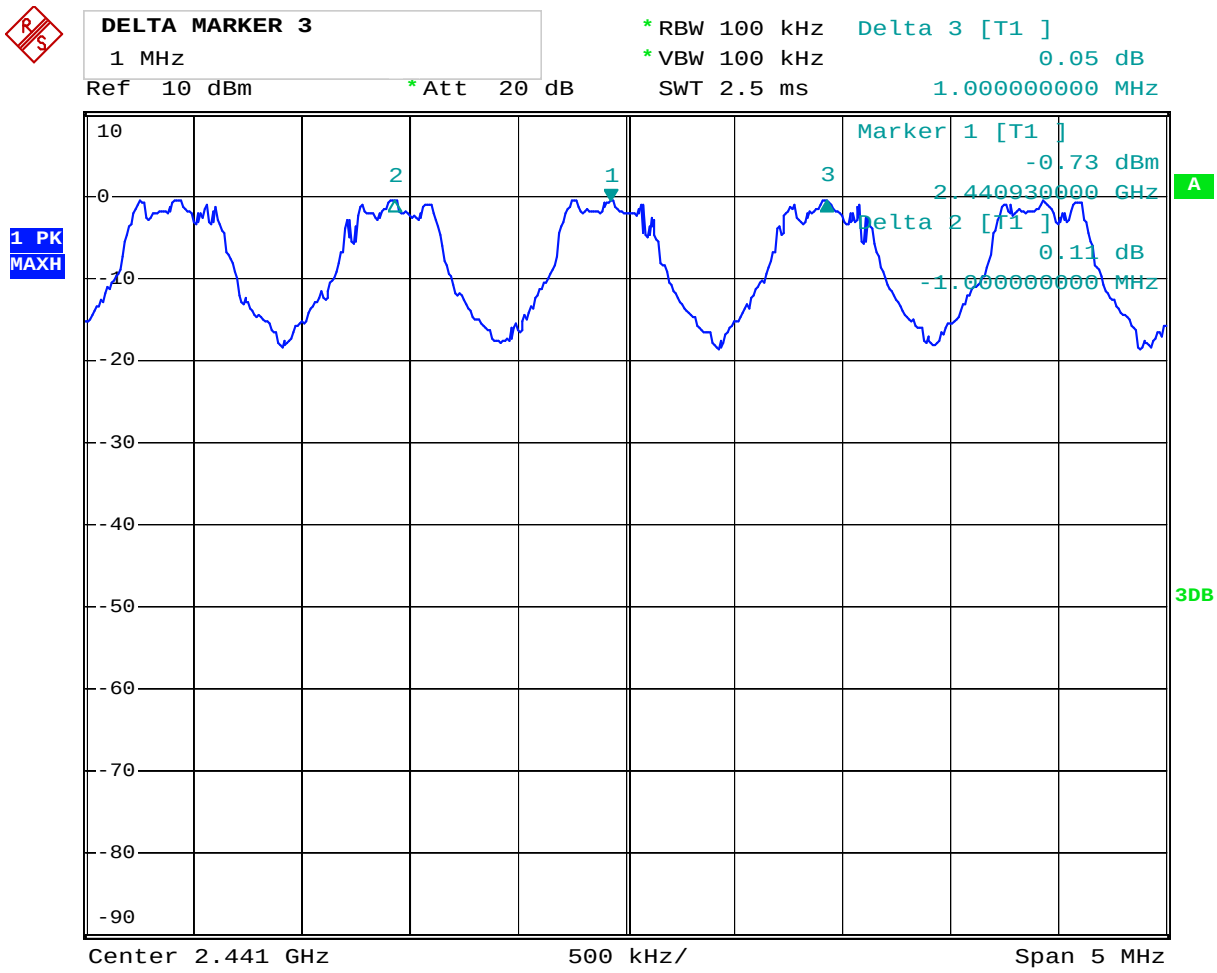
9.4Test Result

EUT	Bluetooth Speaker	Model	LF-BT602
Mode	Keep Transmitting	Input Voltage	DC5V
Temperature	24 deg. C,	Humidity	56% RH

Channel	Channel Frequency (MHz)	Carrier Frequency Separation	Limit	Pass/ Fail
Middle	2441	1000kHz	≥ 25 kHz or two-thirds of 20 dB bandwidth	Pass

Test Plots (BDR MODE)

Middle Channel



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10. Number of Hopping Channels

10.1 Regulation

According to §15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used. According to §15.247(b)(1), 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.

10.2 Limits of Number of Hopping Channels

The frequency hopping systems in the 2400-2483.5MHz band shall use at least 15 channels.

10.3 Test Procedure

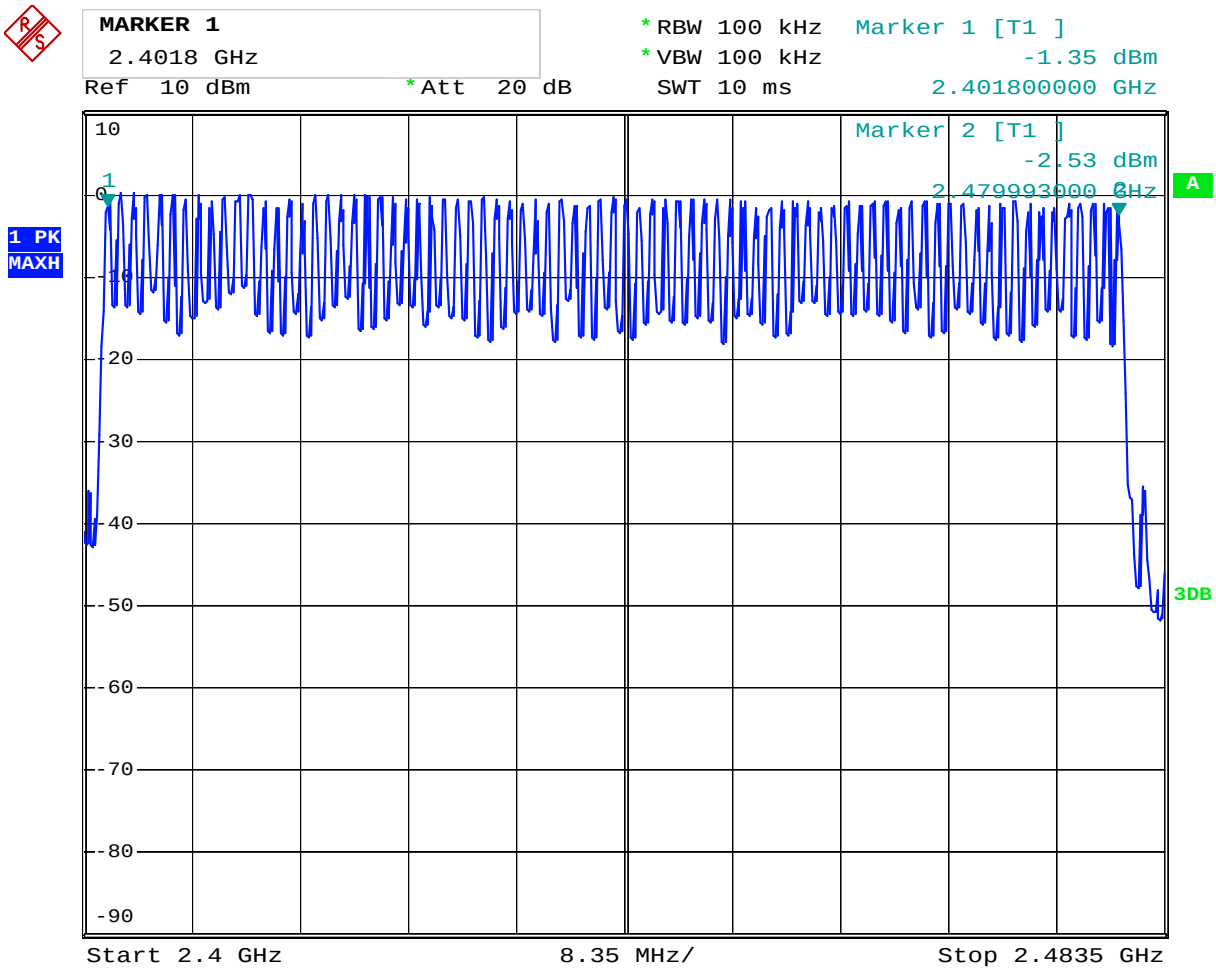
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Set the spectrum analyzer as follows: Span = the frequency band of operation; RBW ≥ 1% of the span; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold
3. Record the number of hopping channels.

10.4Test Result

EUT	Bluetooth Speaker	Model	LF-BT602
Mode	Keep Transmitting	Input Voltage	DC5V
Temperature	24 deg. C,	Humidity	56% RH

Operating Frequency	Number of hopping channels	Limit	Pass/ Fail
2402-2480MHz	79	≥ 15	Pass

Test Plot (BDR MODE)



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11. Time of Occupancy (Dewell Time)

11.1 Regulation

According to §15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

11.2 Limits of Carrier Frequency Separation

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed

11.3 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Set the spectrum analyzer as follows: Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW ≥ RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold
3. Measure the dwell time using the marker-delta function.
4. Repeat above procedures until all frequencies measured were complete.
5. Repeat this test for different modes of operation (e.g., data rate, modulation format, etc.), if applicable.

11.4 Test Result

EUT	Bluetooth Speaker	Model	LF-BT602
Mode	Keep Transmitting	Input Voltage	DC5V
Temperature	24 deg. C,	Humidity	56% RH

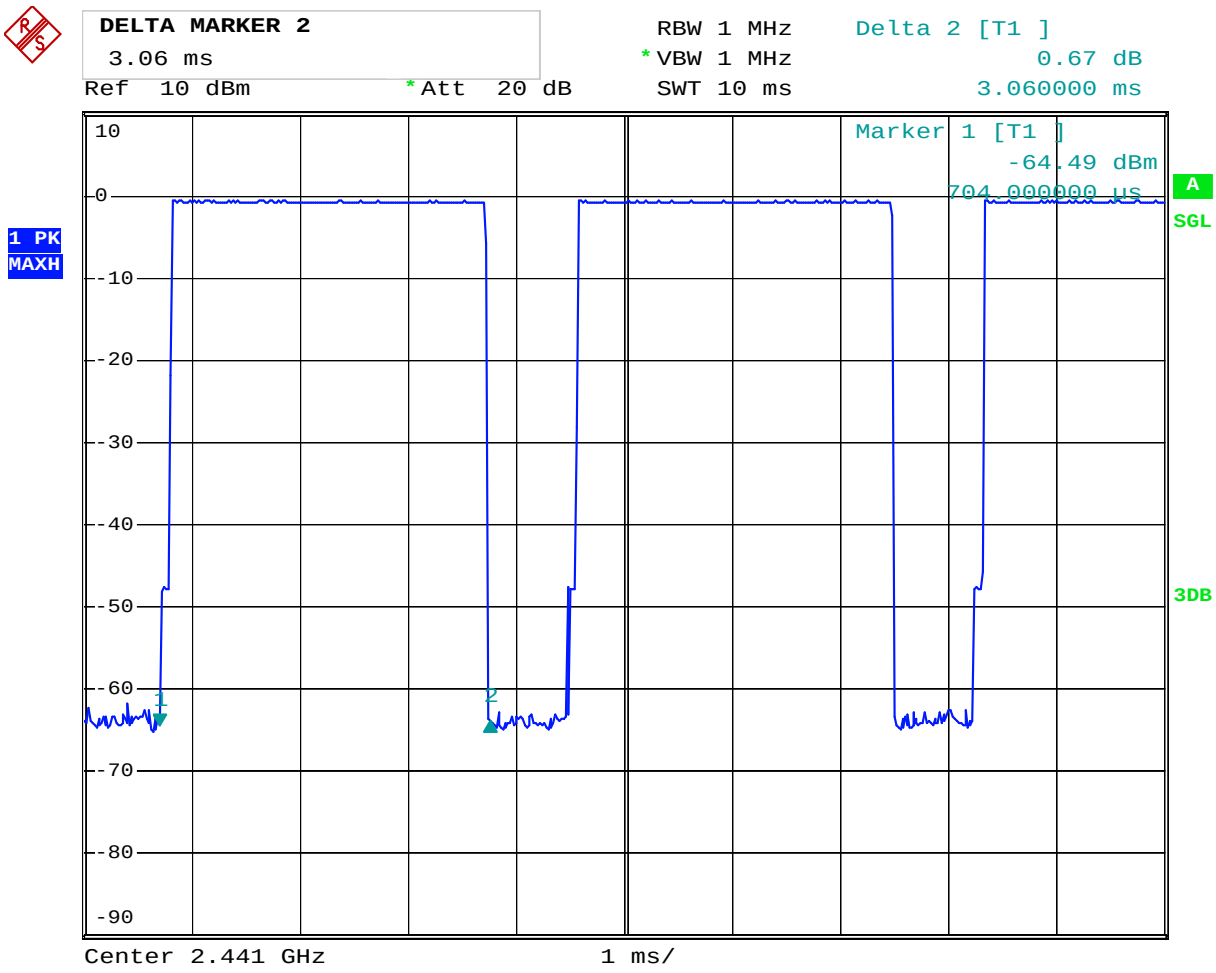
Reading	Actual	Limit
3.05ms	0.329s	0.4s

Actual = (0.4*79)/5 * 3.06 * 17 = 329ms=0.329s

DH5 is the worse case.

Test Plots:

DH5 (Hopping mode)



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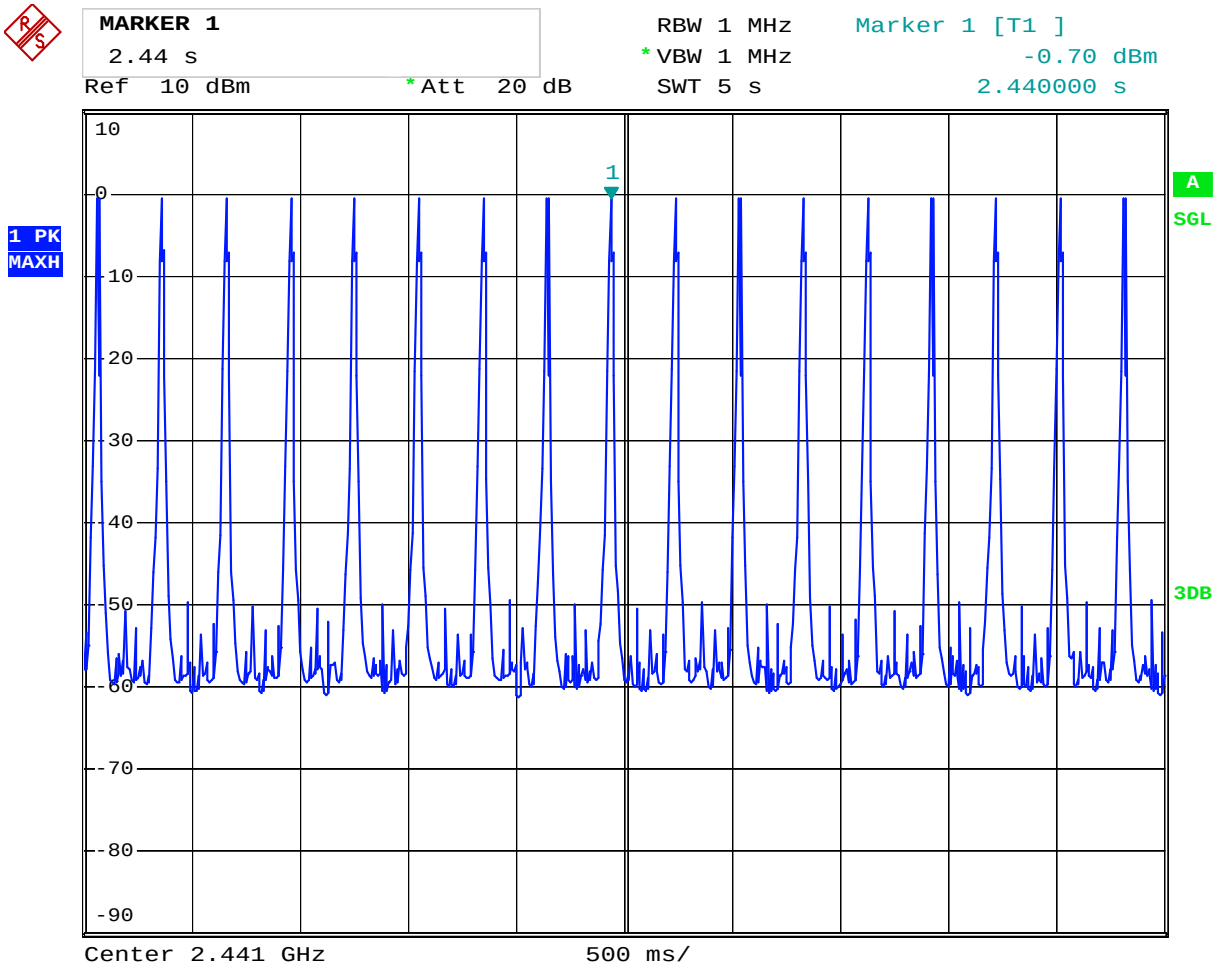

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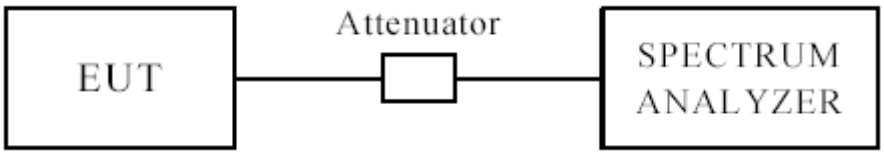
12 Out of Band Measurement

12.1 Test Setup



The restricted band requirement based on radiated emission test; please see the clause 6 for the test setup

12.2 Limits of Out of Band Emissions Measurement

1. Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

12.3 Test Procedure

For signals in the restricted bands above and below the 2.4-2.483GHz allocated band a measurement was made of
radiated emission test. (Peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector)
For bandedge test, the spectrum set as follows: RBW=VBW=100 kHz. A conducted measurement used

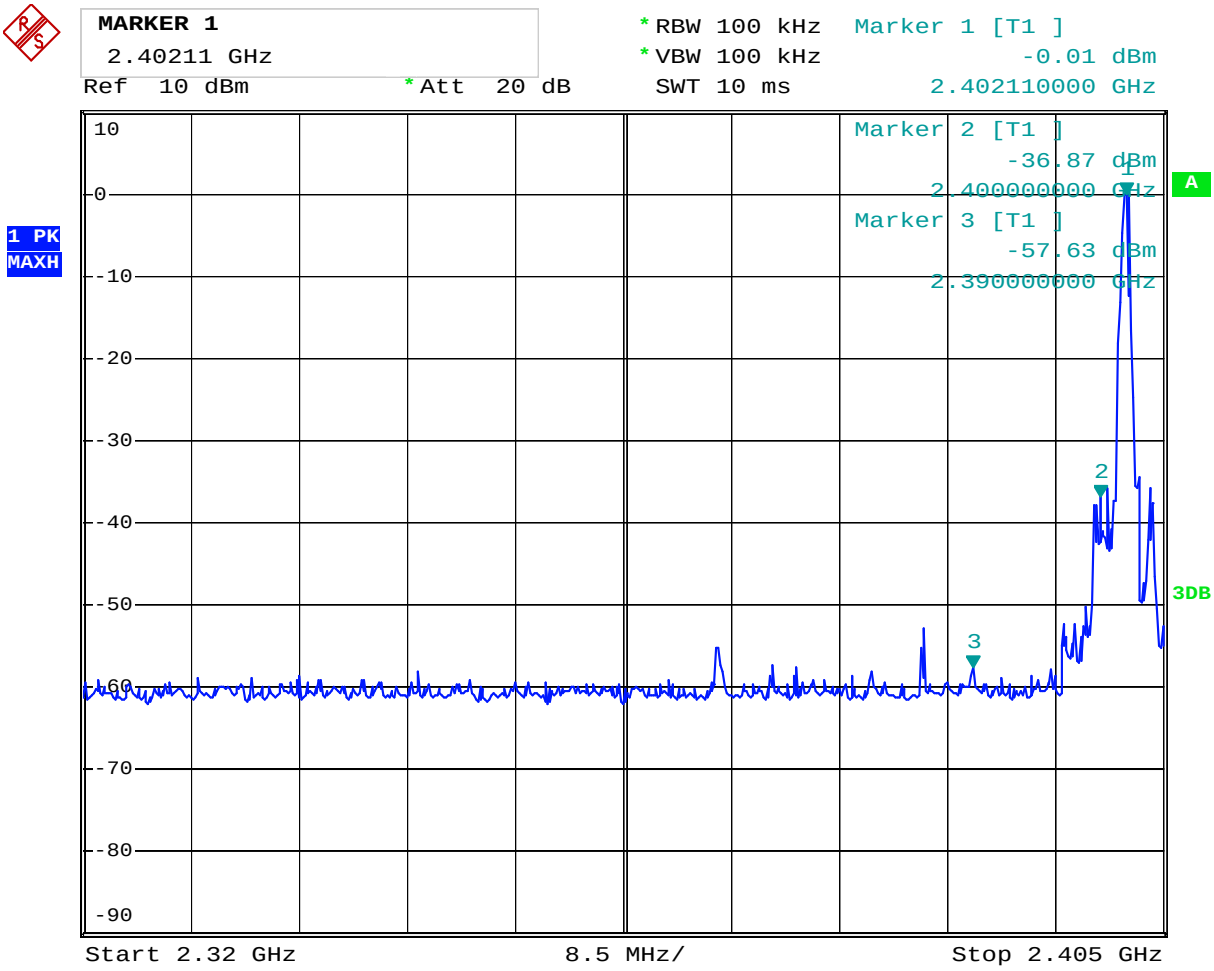
Note: 1. for bandedge test, we have tested from 30MHz to 25GHz under Low, Middle and High channel, the conducted spurious emission level was below 20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth). So it met the FCC rule.
2. We have tested all restriction band from 30MHz to 25GHz under Low, Middle and High channel，only listed the worse case as below:

Test result:

12.4 Out of Band and Restrict band Test Result

Product:	Bluetooth Speaker		Test Mode:	Low Channel
Mode	Keeping Transmitting		Input Voltage	DC 5V
Temperature	24 deg. C		Humidity	56% RH
Test Result:	Pass		Detector	PK
The Max. FS in Restrict Band 2390MHz	PK (dBμV/m)	41.3(V)/40.6(H)	Limit	74(dBμV/m)
	AV(dBμV/m)	--		54(dBμV/m)

Test Figure:



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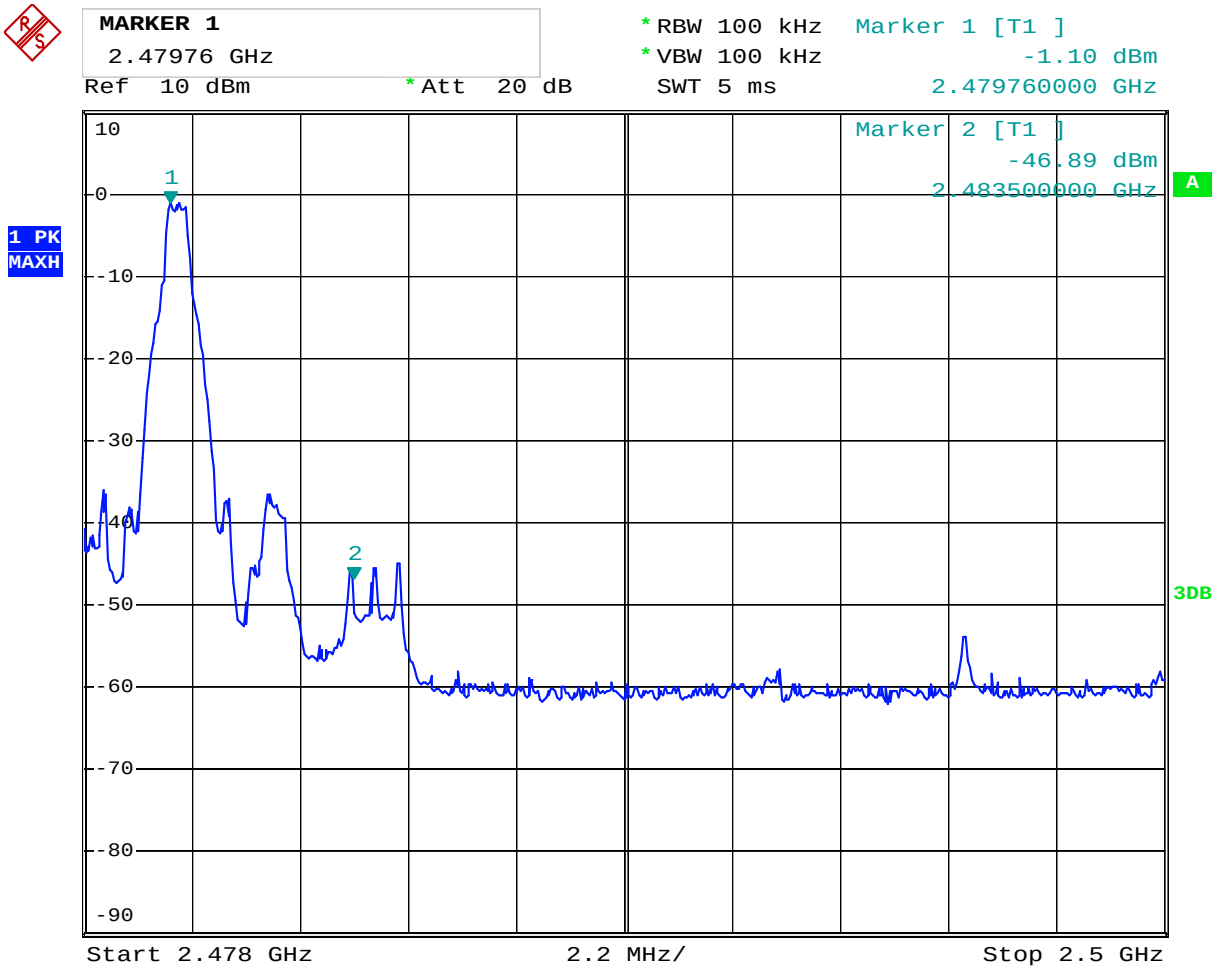
Note: The Max. FS in Restrict Band are measured in conventional method.

12.4 Out of Band and Restrict band Test Result

Product:	Bluetooth Speaker		Test Mode:	High Channel
Mode	Keeping Transmitting		Input Voltage	DC3.7V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
The Max. FS in Restrict Band 2483.5MHz	PK (dBμV/m)	40.7(V)/39.2(H)	Limit	74(dBμV/m)
	AV(dBμV/m)	--		54(dBμV/m)

Test Figure:



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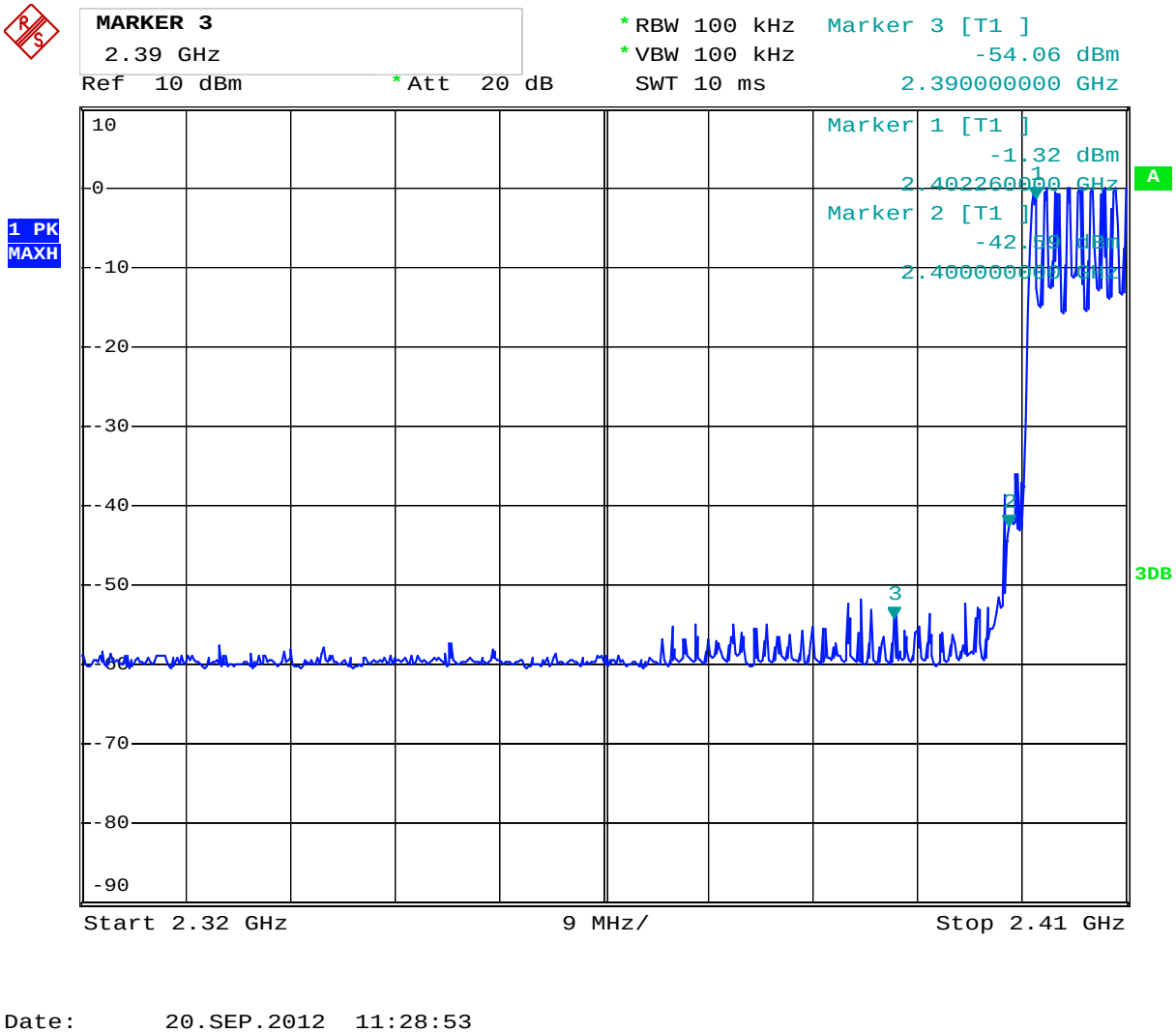
Note: The Max. FS in Restrict Band are measured in conventional method.

12.4 Out of Band and Restrict band Test Result **(Hopping Mode)**

Product:	Bluetooth Speaker		Test Mode:	Low Channel
Mode	Hopping Mode		Input Voltage	DC5V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
The Max. FS in Restrict Band 2390MHz	PK (dBμV/m)	40.7(V)/39.1(H)	Limit	74(dBμV/m)
	AV(dBμV/m)	--		54(dBμV/m)

Test Figure:

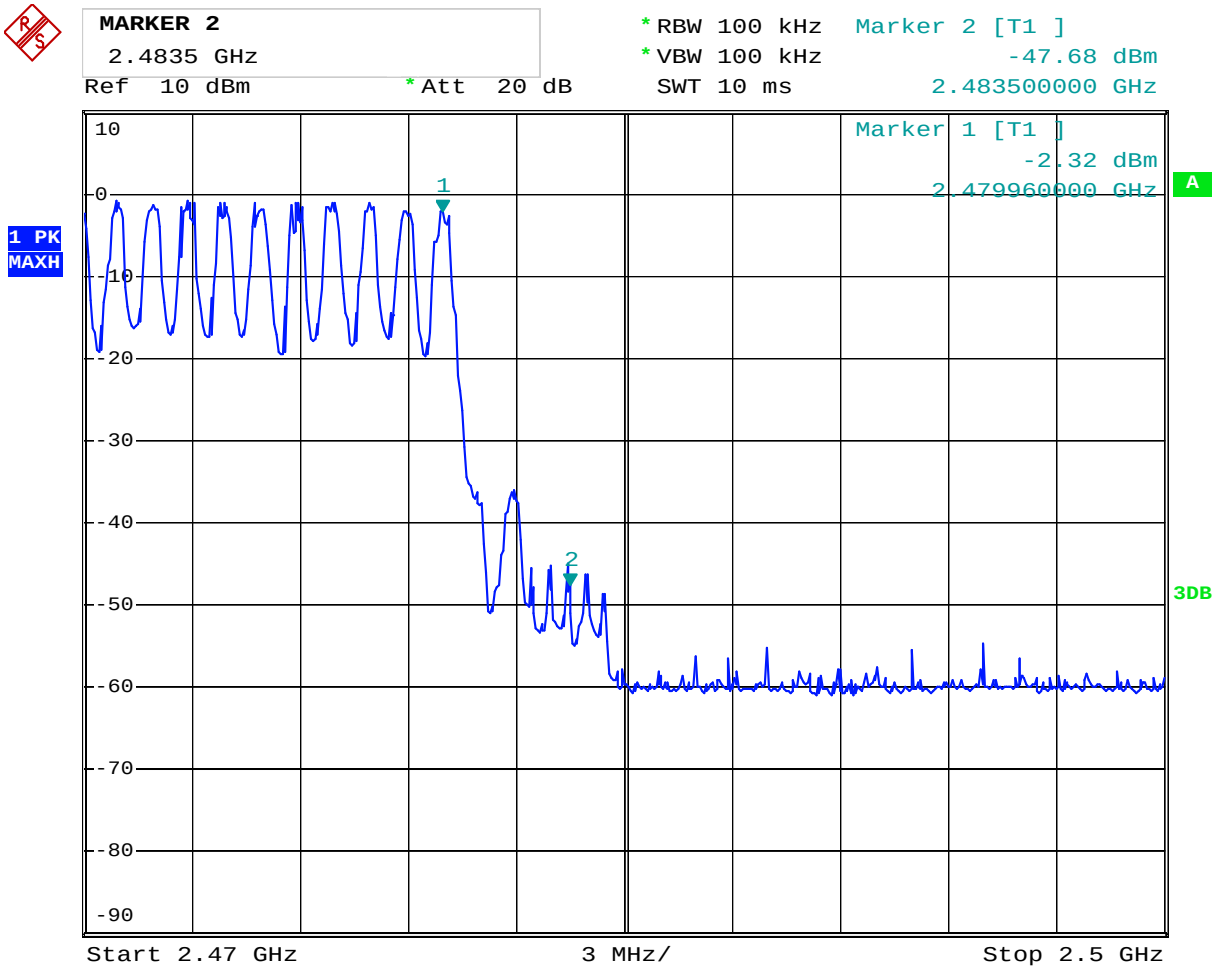


Note: The Max. FS in Restrict Band are measured in conventional method.

12.4 Out of Band and Restrict band Test Result **(Hopping Mode)**

Product:	Bluetooth Speaker		Test Mode:	High Channel
Mode	Hopping Mode		Input Voltage	DC5V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
The Max. FS in Restrict Band 2483.5MHz	PK (dBμV/m)	41.4(V)/39.8(H)	Limit	74(dBμV/m)
	AV(dBμV/m)	--		54(dBμV/m)

Test Figure:



Note: The Max. FS in Restrict Band are measured in conventional method.

13.0 Antenna Requirement

13.1 Standard Applicable

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 transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the mount in dB that the directional gain of the antenna exceeds 6 dBi.

13.2 Antenna Connected construction

There is a PCB printed antenna, and the maximum Gain of this antenna is 0dBi.

14.0 RF Exposure

Applicable Standard

According to §1.1307(b)(5), systems operating under the provisions of this section shall be oper-ated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline. This is a Portable device. **KDB616217 was used as the guidance.**
According to §1.1310 and §2.1093 RF exposure is calculated.

Measurement Result

This is a Bluetooth Speaker and the conducted output power is 1.13dBm (1.297mW)，so the EIRP is 1*1.297=1.297mW which is lower than low threshold 60/fGHz mW (60/2.480GHz= 24.19 mW), and the antenna is 0.0dBi which is less than 6dBi.

The SAR measurement is not necessary.

15.0 FCC ID Label

QBBLF-BT602

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

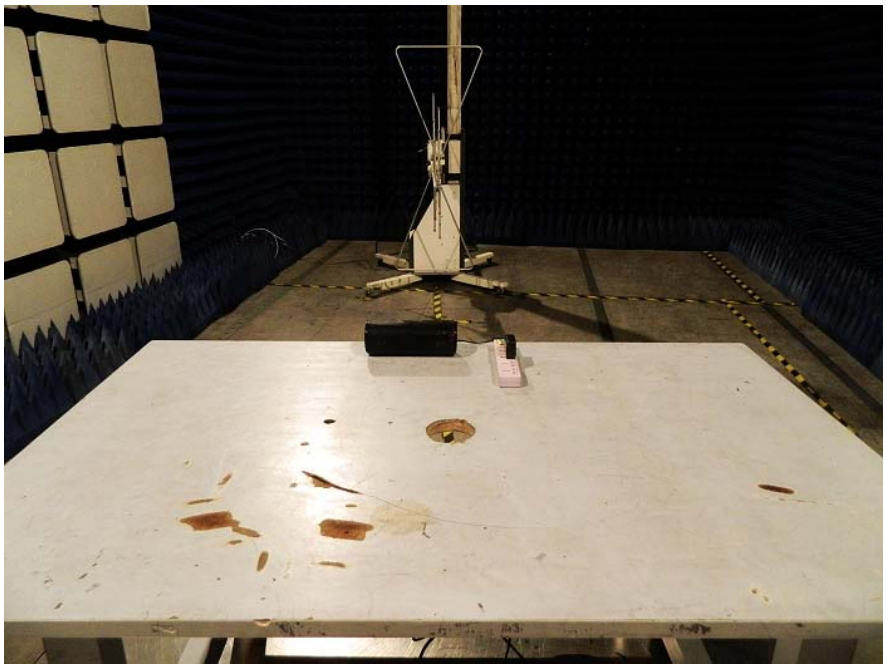
The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Mark Location:

16 PHOTOGRAPHS OF THE TEST CONFIGURATION

RADIATED EMISSION TEST

RADIATED EMISSION TEST



PHOTOGRAPHS OF EUT

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

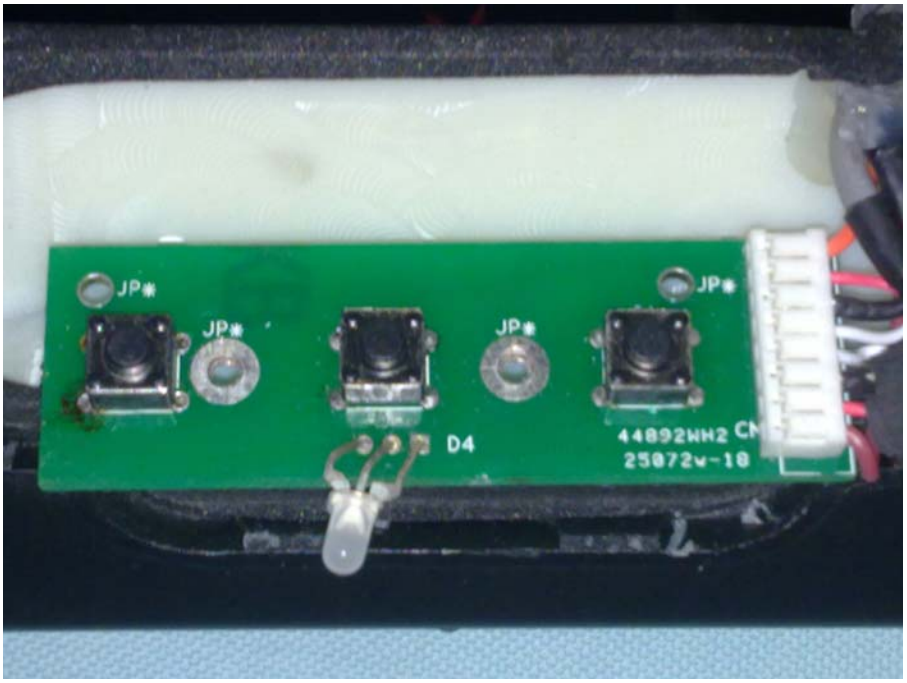


Photo 6

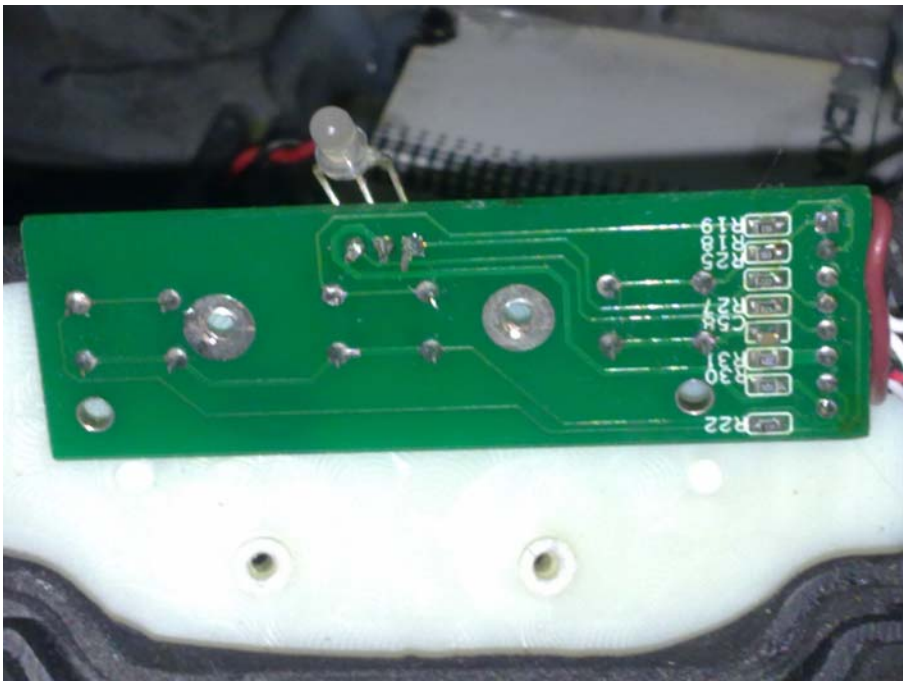


Photo 7

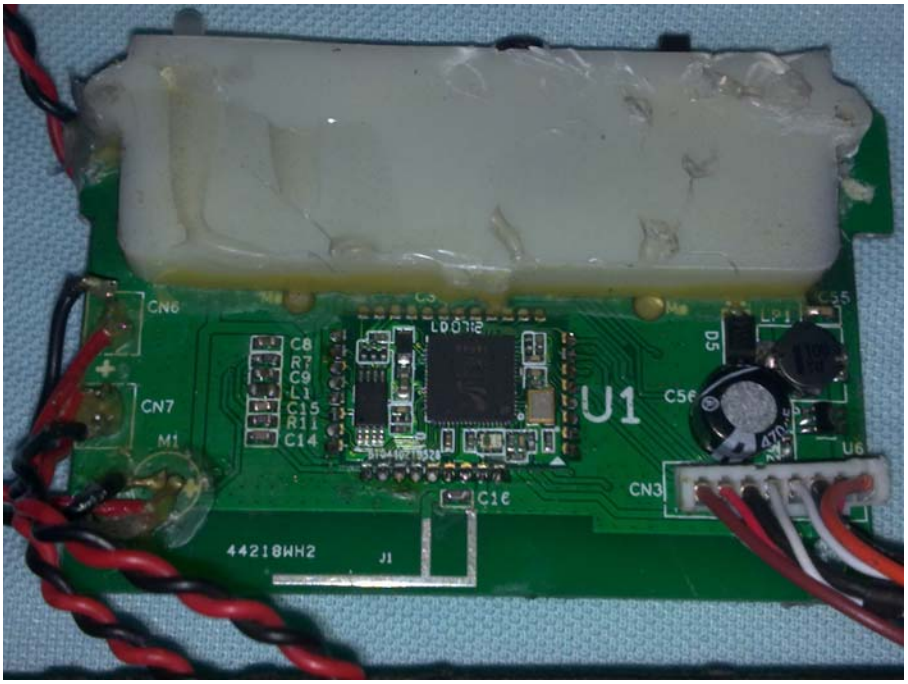


Photo 8

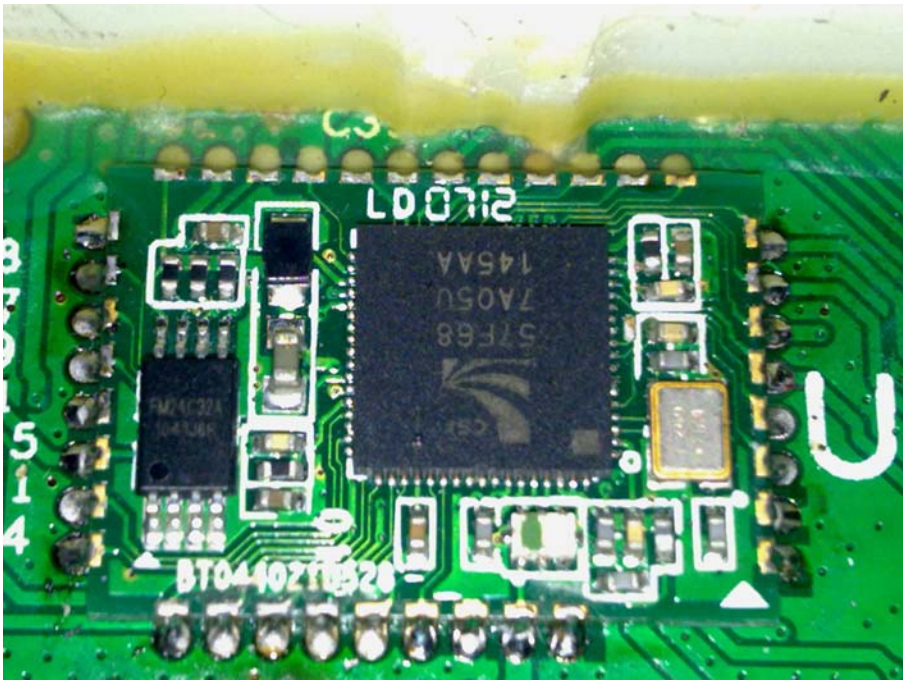


Photo 9

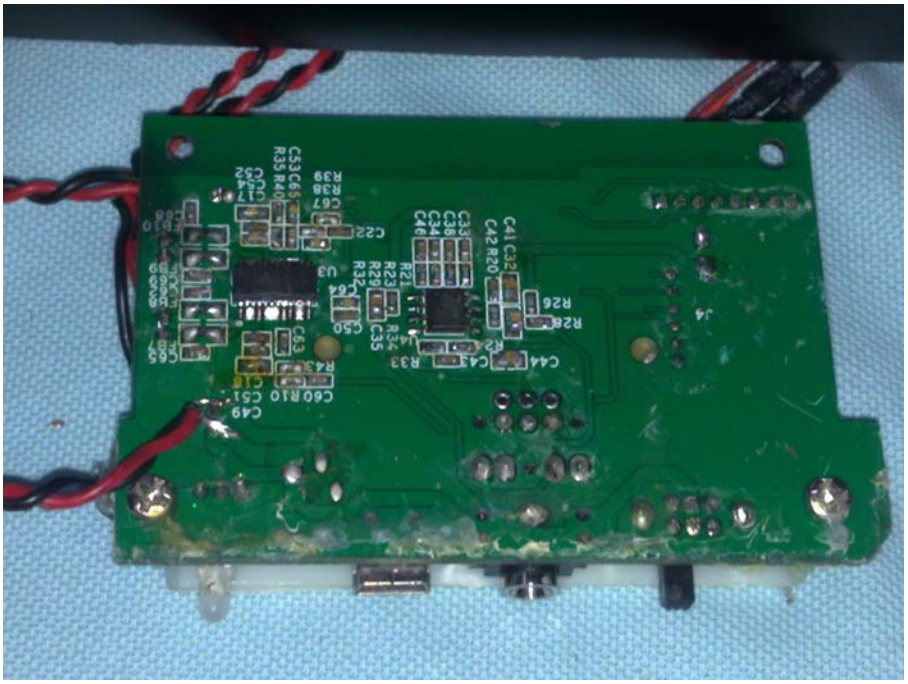


Photo 10

Photo 11

Photo 12

Photo 13

The Report End