

1 N.T



Report No:	FCC	1307045	
File reference No:		2013-07-15	
Applicant:	Dongguan Taide Industrial Co.,	I td	
Applicant.	Dongguan Talde industrial Co.,	Ltd	
Product:	Bluetooth Speaker		
Model No:	BT020A, BT3000SLV,	BT3000BLU,	BT3000RED,
	BT3000BLK		
Trademark:	N/A		
Test Standards:	FCC Part 15 Subpart C, Paragra	aph 15.247	
T (1)	It is herewith confirmed an	nd found to cor	nply with the
Test result:	requirements set up by ANSI	C63.4&FCC Part	15 Subpart C,
	Paragraph 15.247 regulation	ons for the	evaluation of
	electromagnetic compatibility		
Approved By			

Jack Chung

Jack Chung Manager

Dated: Ju

July 15, 2013

Results appearing herein relate only to the sample tested The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD

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Special Statement:

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAS-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 899988

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.:899988.

IC- Registration No.: IC5205A-02

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration No.: IC 5205A-02.

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1.0 General Details

1.1 Test Lab Details

Name : SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD
Address: 5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District, Shenzhen,CHINA.
Telephone: (755) 83448688
Fax: (755) 83442996
Site on File with the Federal Communications Commission – United Sates
Registration Number: 899988
For 3m & 10 m OATS
Site Listed with Industry Canada of Ottawa, Canada
Registration Number: IC: 5205A-02
For 3m & 10 m OATS

1.2 Applicant Details

Applicant:	Dongguan Taide Industrial Co., Ltd
Address:	Taide Industrial Park, Phase 2 Jinfenghuang Indust, Fengguang Town, Dongguang City, China
Telephone:	0769-82691925
Fax:	0769-82691910

1.3 Description of EUT

-	
Product:	Bluetooth Speaker
Manufacturer:	Dongguan Taide Industrial Co., Ltd
Address:	Taide Industrial Park, Phase 2 Jinfenghuang Indust, Fengguang Town, Dongguang
	City, China
Brand Name:	N/A
Model Number:	BT020A
Additional Model Name	BT3000SLV, BT3000BLU, BT3000RED, BT3000BLK
Additional Trade Name	N/A
Type of Modulation	GFSK, Л/4QPSK, 8DPSK
Frequency range	2402-2480MHz
Number of Channel	79
Frequency Selection	By software
Antenna type	PCB Printed antenna, the antenna gain is 1.0dBi
Submitted Sample: 1 Sam	nle

1.4 Submitted Sample: 1 Sample

1.5 Test Duration: 2013-07-02 to 2013-07-15

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1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB Radiated Emissions Uncertainty =4.7dB

1.7 Test Engineer

Terry (ang

The sample tested by

Print Name: Terry Tang

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2.0	Test Equipments				
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	2012-08-21	2013-08-20
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100294	2012-08-21	2013-08-20
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100253	2012-08-21	2013-08-20
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	2012-08-21	2013-08-20
ESDV Test Receiver	ROHDE&SCHWARZ	ESDV	100008	2012-08-21	2013-08-20
Impuls-Begrenzer	ROHDE&SCHWARZ	ESH3-Z2	100281	2012-08-21	2013-08-20
System Controller	СТ	SC100	-	2012-08-21	2013-08-20
Printer	EPSON	PHOTO EX3	CFNH234850	2012-08-21	2013-08-20
Computer	IBM	8434	1S8434KCE99BLXL O*	-	-
Loop Antenna	EMCO	6502	00042960	2012-08-21	2013-08-20
ESPI Test Receiver	ROHDE&SCHWARZ	ESI26	838786/013	2012-08-21	2013-08-20
3m OATS			N/A	2012-08-21	2013-08-20
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170265	2012-08-21	2013-08-20
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-631	2012-08-21	2013-08-20
Power meter	Anritsu	ML2487A	6K00003613	2012-08-21	2013-08-20
Power sensor	Anritsu	MA2491A	32263	2012-08-21	2013-08-20
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2012-08-21	2013-08-20
LISN	AFJ	LS16C	10010947251	2012-08-21	2013-08-20
LISN (Three Phase)	Schwarebeck	NSLK 8126	8126453	2012-08-21	2013-08-20
9*6*6 Anechoic			N/A	2012-08-21	2013-08-20
EMI Test Receiver	RS	ESCS30	100139	2012-08-21	2013-08-20

2.1	Auxiliary Equipment
-----	---------------------

Name	Model No.	Serial No.	Manufacturer	Cable	FCC ID/DOC
PC	R4		IBM		DOC
					FCC ID:
iPhone	A1387		Apple Inc		BCG-E2330A
	GA90SC1-				
Switch Power Supply	194730		Great Wall		VOC

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3.0 **Technical Details**

3.1 Summary of test results

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	15.247(d),15.205(a),	PASS	Complies
Restricted bands	15.209 (a),15.109		
Conducted Emissions	15.207(a), 15.107	PASS	Complies
RF Exposure	15.247(i), 1.1307(b)(1)	PASS	Complies

3.2 **Test Standards**

FCC Part 15 Subpart & Subpart C, Paragraph 15.247

4.0 **EUT Modification**

No modification by Shenzhen Timeway Technology Consulting Co., Ltd

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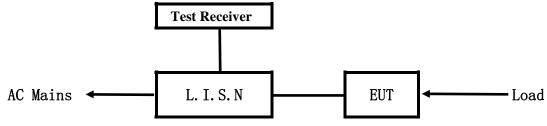
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5. Power Line Conducted Emission Test

5.1 Schematics of the test

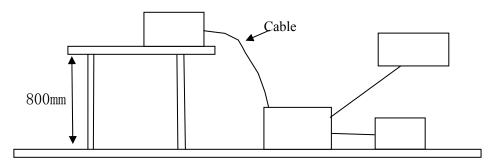


EUT: Equipment Under Test

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 500hm/50uH as specified by section 5.1 of ANSI C63.4 –2003. Test Voltage: 120V~60Hz

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

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A. EUT

Device	Manufacturer	Model	FCC ID
	Dongguan Taide	BT020A, BT3000SLV,	OYCBT020A
Bluetooth Speaker	Industrial Co., Ltd	BT3000BLU, BT3000RED,	
		BT3000BLK	

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	Class A Limits (dB µ V)		Class B Limits (dB µ V)			
(MHz)	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level		
$0.15~\sim~0.50$	79.0	66.0	66.0~56.0*	56.0~46.0*		
$0.50~\sim~5.00$	73.0	60.0	56.0	46.0		
$5.00 \sim 30.00$	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.

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A: Conducted Emission on Live Terminal (150kHz to 30MHz)

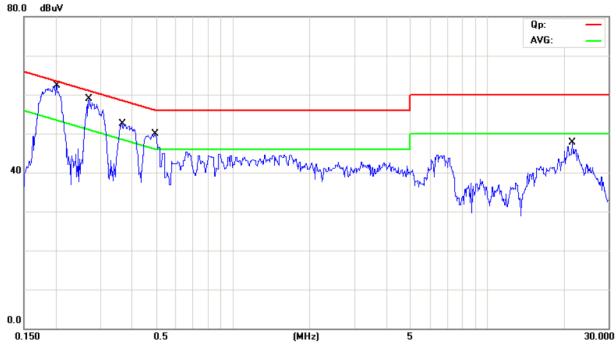
EUT Operating Environment

Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Charging and Keep Transmitting Equipment Level: Class B

Results: PASS

Please refer to following diagram for individual



Frequency	Line	Reading(dBµV)	Limit(dBµV)		
(MHz)	Line	Quasi-peak	Average	Quasi-peak	Average	
0.200	Live	58.73	46.25	63.59	53.59	
0.270	Live	54.94	44.03	61.10	51.10	
0.362	Live	50.27	39.08	58.68	48.68	
0.492	Live	47.85	37.11	56.13	46.13	
21.562	Live	45.63	33.31	60.00	50.00	

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B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)

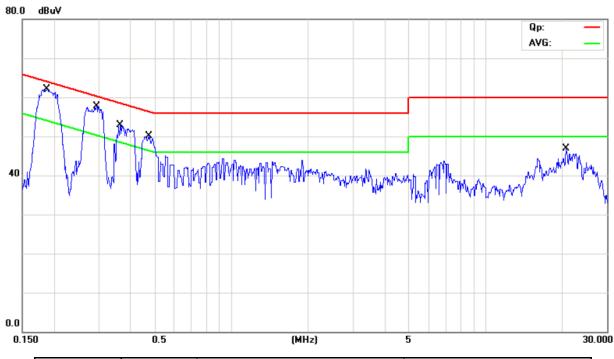
EUT Operating Environment

Temperature: 26°CHumidity: 65%RHAtmospheric Pressure: 101 KPaEUT set Condition: Charging and Keep Transmitting

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



Frequency	Line	Reading(dBµV)	Limit(dBµV)		
(MHz)	Line	Quasi-peak	Average	Quasi-peak	Average	
0.187	Neutral	58.07	47.38	64.15	54.15	
0.294	Neutral	54.20	45.00	60.40	50.40	
0.363	Neutral	48.48	41.33	58.65	48.65	
0.470	Neutral	45.36	36.57	56.51	46.51	
20.687	Neutral	43.64	31.70	60.00	50.00	

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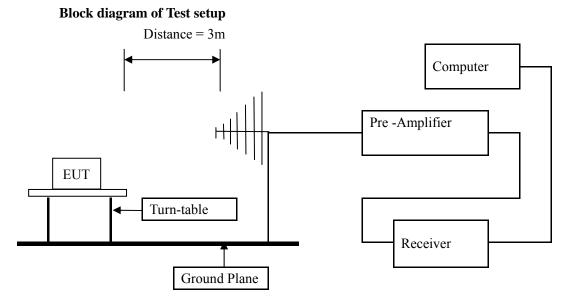
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6 Radiated Emission Test

6.1 Test Method and test Procedure:

- (1) The EUT was tested according to ANSI C63.4 –2003. The radiated test was performed at Timeway Laboratory. This site is on file with the FCC laboratory division, Registration No.899988
- (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.



- 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.

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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:

Frequency Range (MHz)	Distance (m)	Field strength (dB μ V/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. After pre-scanning, GFSK was the worse case. The test data of this mode was recorded.

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Test result General Radiated Emission Data and Harmonics Radiated Emission Data

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

EUT set Condition: Keep Transmitting

Results:

Pass

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB µ V/m)
81.640	37.79	Н	40.00
237.040	30.23	Н	46.00
83.080	38.38	V	40.00
123.280	32.76	V	43.50
317.480	33.50	V	46.00

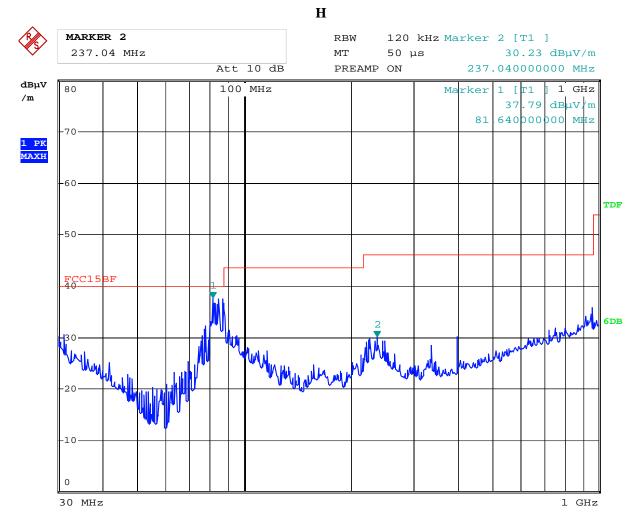
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Test Figure:



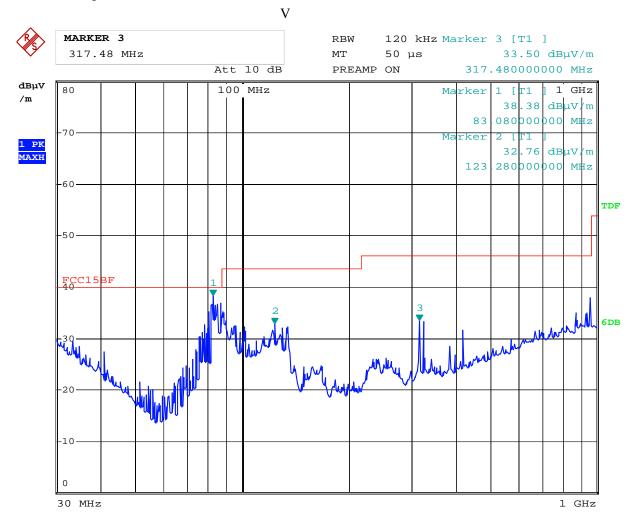
Date: 4.JUL.2013 18:40:48

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Test Figure:



Date: 4.JUL.2013 18:34:44

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_	_		
Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB µ V/m)
2402	86.98 (PK)	Н	Fundamental Frequency
2402	2402 86.08 (PK)		Fundamental Frequency
4804	47.31 (PK)	Н	74(Peak)/ 54(AV)
4804	48.04 (PK)	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 under Low Channel (2402MHz)

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

• • • • • • • • • • • • • • • • • • • •	Transmitting 5 under milda		·)
Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB µ V/m)
2441	87.78 (PK)	Н	Eurodomontal Eraguanay
2441	2441 87.02 (PK)		Fundamental Frequency
4882		Н	74(Peak)/ 54(AV)
4882	48.04 (PK)	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)

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

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Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB µ V/m)
2480	87.56 (PK)	Н	Fundamental Frequency
2480	2480 88.07 (PK)		Fundamental Frequency
4960	47.39 (PK)	Н	74(Peak)/ 54(AV)
4960	46.69 (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)

Operation Mode: Transmitting under High Channel (2480MHz)

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

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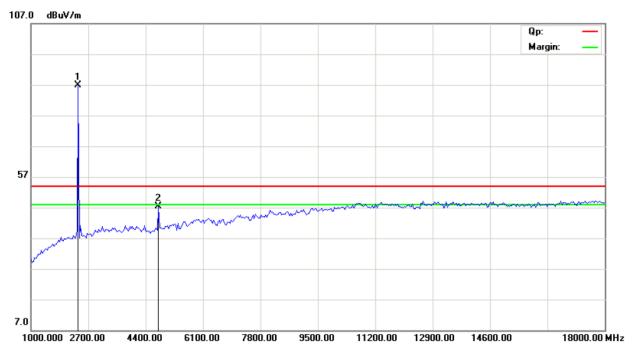
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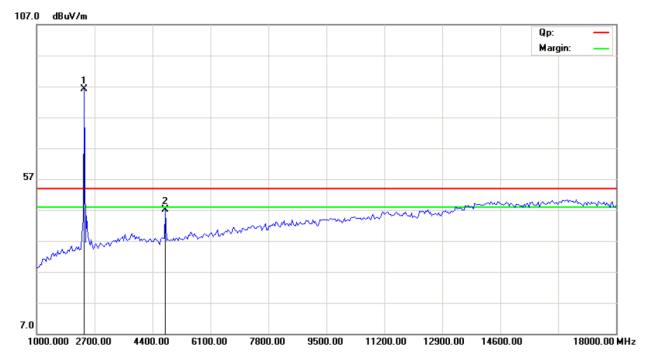


Please refer to the following test plots for details:

Low Channel: Horizontal



Low Channel : Vertical

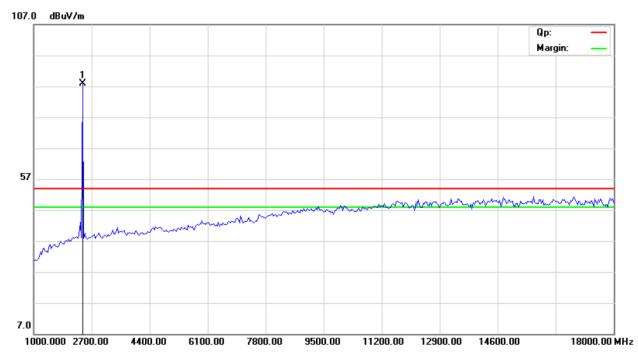


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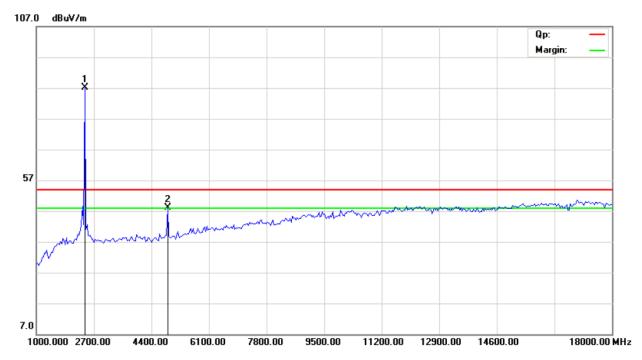
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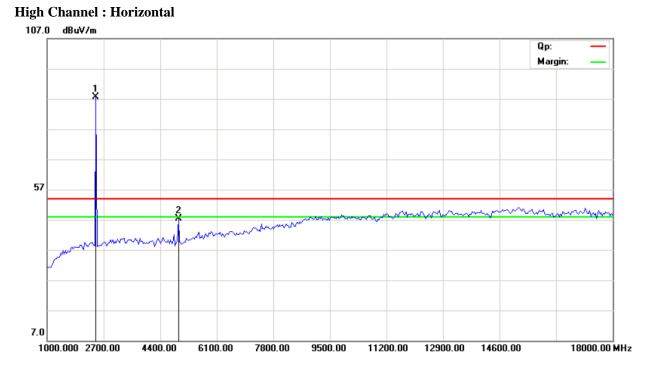
Middle Channel :: Vertical



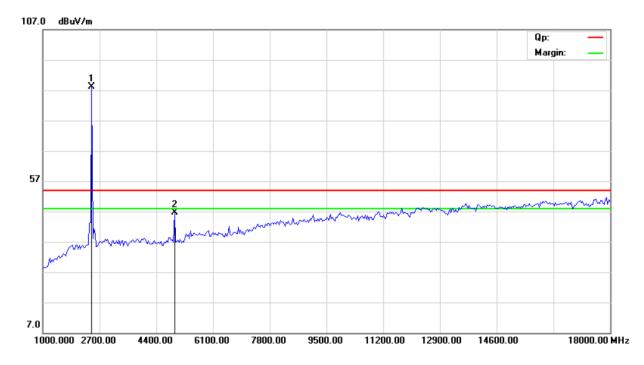
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High Channel : Vertical



Note: for the radiated emissions above 18G, it is the floor noise.

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7.0 20dB Bandwidth Measurement

7.1 Regulation

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.

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 =5MHz, VBW =30 kHz, RBW=100 kHz, 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

Type of Modulation: GFSK

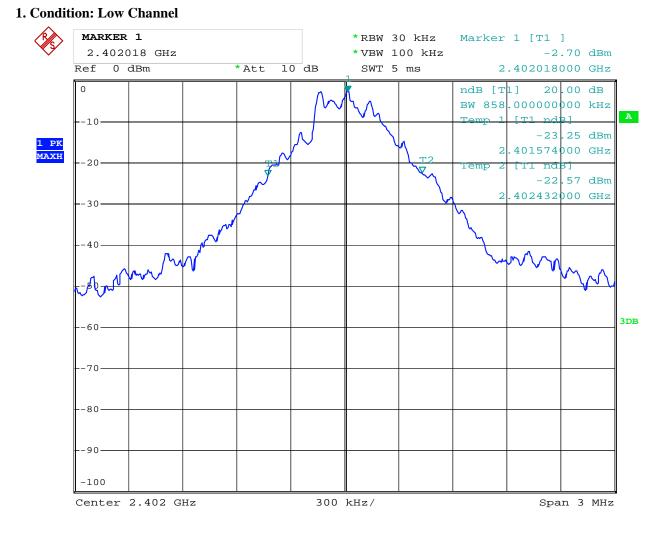
EUT	Bluetooth	Speaker	Model		-	BT3000SLV, BT3000BLU, 00RED, BT3000BLK	
Mode	Keep Trans	eep Transmitting Input Voltage			DC3.7V		
Temperat	ure 24 deg	. C,	C, Humidity		56% RH		
Channel	Channel Frequency (MHz)		Bandwidth (kHz)	Ma	ximum Limit (kHz)	Pass/ Fail	
Low	2402		858			Pass	
Middle	2441		846			Pass	
High	2480	864				Pass	

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Test Figure:



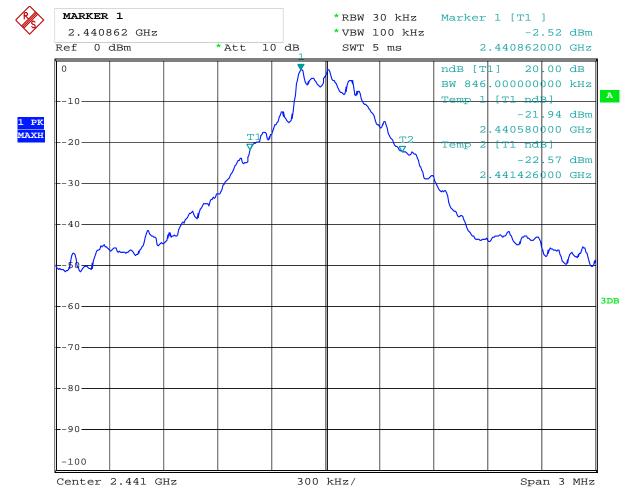
Date: 5.JUL.2013 15:07:55

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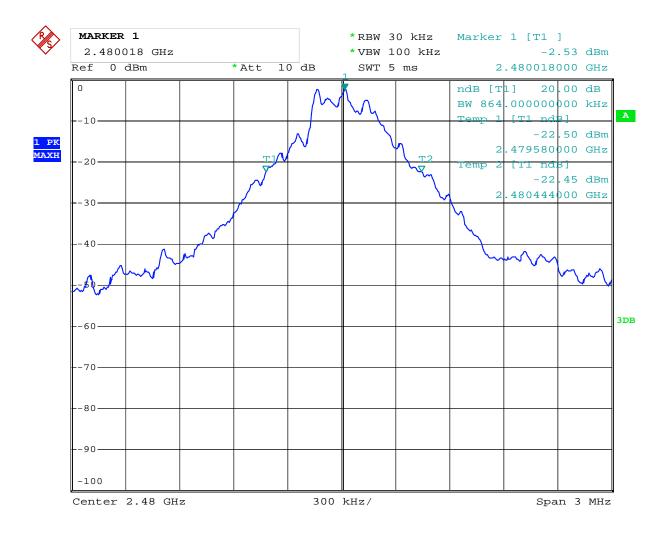
Date: 5.JUL.2013 15:11:48

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3. High Channel



Date: 5.JUL.2013 15:12:24

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Test Result Type of Modulation: Л/4QPSK

EUT		Bluetooth Speaker		Model		BT020A, BT3000SLV, BT3000BLU,		
			BT3000RED, BT3000BLK					
Mode		Keep Transmittir	ıg	Input Voltage		DC3.7V		
Temperature		24 deg. C,		Humidity		56% RH		
Channel	Cł	nannel Frequency (MHz)	20 dB Bandwidth (kHz)		М	laximum Limit (kHz)	Pass/ Fail	
Low		2402	1266				Pass	
Middle		2441	1266				Pass	
High		2480		1218			Pass	

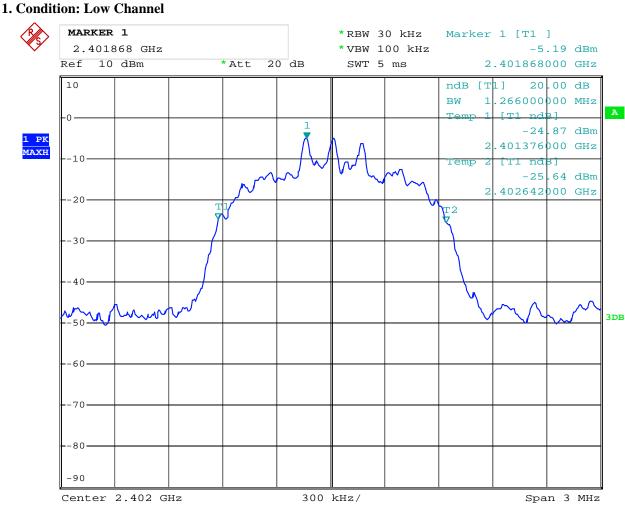
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Test Figure:

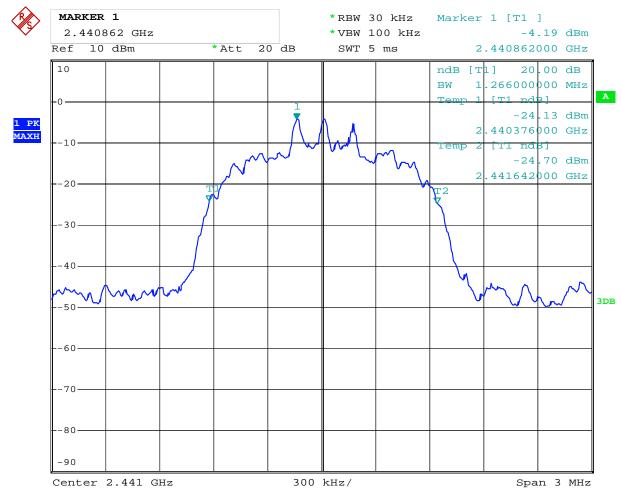


Date: 6.JUL.2013 12:37:18

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2. Condition: Middle Channel

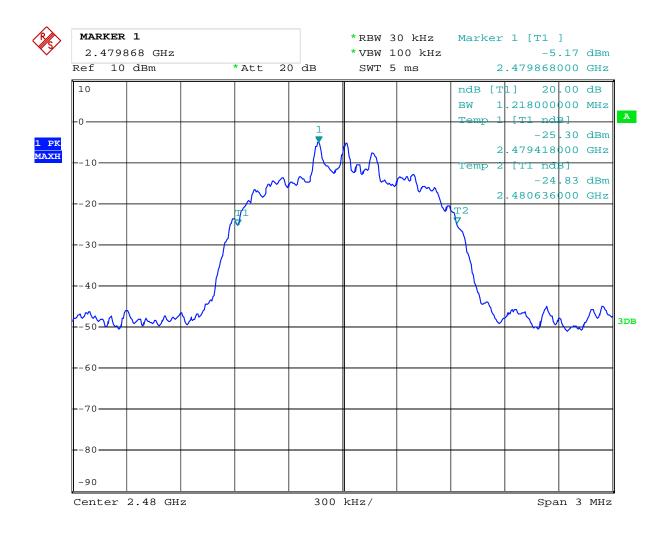
Date: 6.JUL.2013 12:37:54

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3. High Channel



Date: 6.JUL.2013 12:38:34

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Test Result Type of Modulation: 8DPSK

EUT	Bluetooth	Speaker	Mode	1		A, BT3000SLV, BT3000BLU, T3000RED, BT3000BLK
Mode	Keep Tran	nsmitting	Input Voltage		DC3.7V	
Temperat	ure 24 de	g. C,	Humidity 56% RH		56% RH	
Channel	Channel Frequency (MHz)	20 42 2			n Limit z)	Pass/ Fail
Low	2402	12	230			Pass
Middle	2441	1236				Pass
High	2480	1218				Pass

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Test Figure:

1. Condition: Low Channel ndB DOWN VALUE *RBW 30 kHz Marker 1 [T1] 20 dB VBW 100 kHz -3.28 dBm Ref 10 dBm * Att 20 dB SWT 5 ms 2.402018000 GHz 10 [T1] 20.00 dB ndB 230000000 MHz BW 1 А -0 -23.14 dBm 1 PK MAXH 2 401394000 GHz -10 remp nđ Т . ^ -23 42 dBm 402624000 GHz 2 20 30 40 3DB 50 60 -70 -80 -90 Center 2.402 GHz 300 kHz/ Span 3 MHz

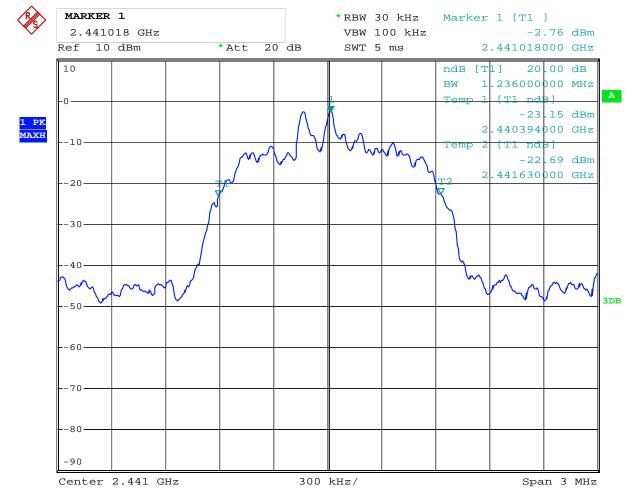
Date: 6.JUL.2013 11:05:07

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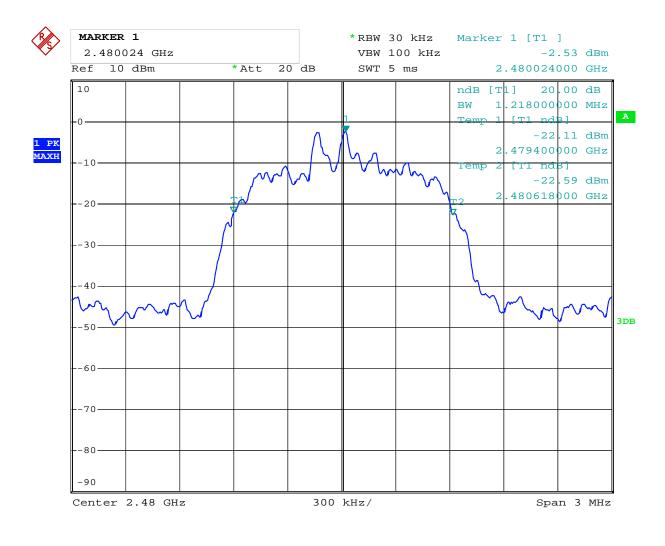
Date: 6.JUL.2013 11:09:20

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3. High Channel



Date: 6.JUL.2013 11:14:26

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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=3MHz; 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.

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8.4Test Results Type of Modulation: GFSK

EUT Bluetooth Sp		oeaker	Model	BT020A, BT3000SLV, BT3000BLU, BT3000RED, BT3000BLK		
Mode	Keep Transn	nitting	Input Voltage	DC3.7V		
Temperatur	re 24 deg. (Ζ,	Humidity	56% RH		
Channel	Channel Frequency (MHz)	Peak	Power Output (dBm)	Peak Power Limit (dBm)	Pass/ Fail	
Low	2402	-1.07		30	Pass	
Middle	2441	-0.84		30	Pass	
High	2480		-1.00	30	Pass	

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

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

Type of Modulation: Л/4QPSK

pe of Modulation. 31/4QFSK									
EUT		Bluetooth Speaker		Model		BT020A, BT3000SLV,			
						BT3000BLU, BT3000RED,			
						BT3000BLK			
Mode		Keep Transmitting		Input Voltage		DC3.7V			
Temperature		24 deg. C,		Humidity		56% RH			
Channel	Cł	Channel Frequency		Peak Power Output Peak		Power Limit	Pass/ Fail		
		(MHz)		(dBm)	(dBm)				
Low	2402		-3.53		30		Pass		
Middle	le 2441		-2.54		30		Pass		
High	High 2480			-3.60		30	Pass		

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

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

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Type of Modulation: 8DPSK

EUT		Bluetooth Speaker		Model		BT020A, BT3000SLV, BT3000BLU,		
						BT3000RED, BT3000BLK		
Mode		Keep Transmitting		Input Voltage		DC3.7V		
Temperature		24 deg. C,	Humidity			56% RH		
Channel	Cł	Channel Frequency (MHz)		Peak Power Output (dBm)		k Power Limit dBm)	Pass/ Fail	
Low		2402	-1.84			30	Pass	
Middle		2441	-1.24			30	Pass	
High		2480		-1.36		30	Pass	

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

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

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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) $\geq 1\%$ of the span; Video (or Average) Bandwidth (VBW) $\geq RBW$; 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.

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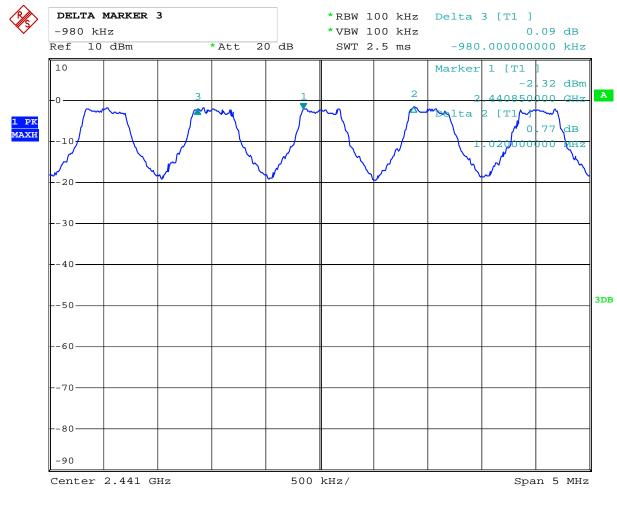


9.4Test Result

Type of Modulation: GFSK

EUT	Bluetooth Speaker		Model	BT020	A, BT3000SLV, BT3000BLU,
				В	T3000RED, BT3000BLK
Mode	Keep Transmitting]	Input Voltage		DC3.7V
Temperature	24 deg. C,		Humidity		56% RH
Carrier I	Frequency Separation		Limit		Pass/ Fail
980kHz			≥ 25 kHz or 2/3 of 20		Pass
			dB bandwid	lth	

Test Plots



Date: 5.JUL.2013 15:47:27

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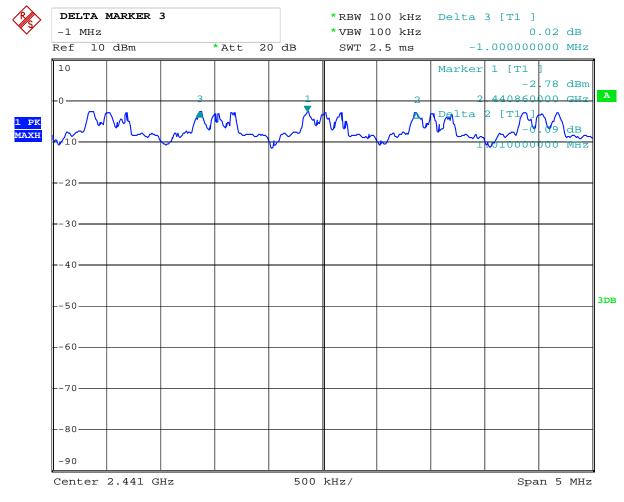
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Type of Modulation: Π /4QPSK

		1	N / 1 1	DTOO		
EUT	Bluetooth Spe	aker	Model	B1020	0A, BT3000SLV, BT3000BLU,	
			В	BT3000RED, BT3000BLK		
Mode	Keep Transmit	tting	Input Voltage		DC3.7V	
Temperature	24 deg. C,	, Humidity			56% RH	
Carrier I	Frequency Separation		Limit		Pass/ Fail	
	1000kHz	≥ 25 kHz or 2	2/3 of 20 dB bandy	width	Pass	

Test Plots



Date: 6.JUL.2013 12:10:51

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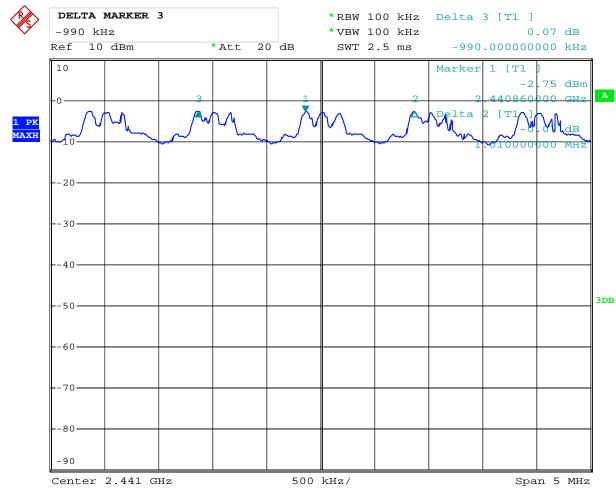
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Type of Modulation: 8DPSK

EUT	Bluetooth Spe	Model	BT020	0A, BT3000SLV, BT3000BLU,			
			В	BT3000RED, BT3000BLK			
Mode	Keep Transmit	ting	Input Voltage		DC3.7V		
Temperature	24 deg. C,	Humidity			56% RH		
Carrier I	Carrier Frequency Separation		Limit		Pass/ Fail		
	990kHz	≥ 25 kHz or 2	/3 of 20 dB bandy	width	Pass		

Test Plots



Date: 6.JUL.2013 12:00:59

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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=100 kHz, VBW= 100 kHz;

Sweep = auto; Detector function = peak; Trace = max hold

3. Record the number of hopping channels.

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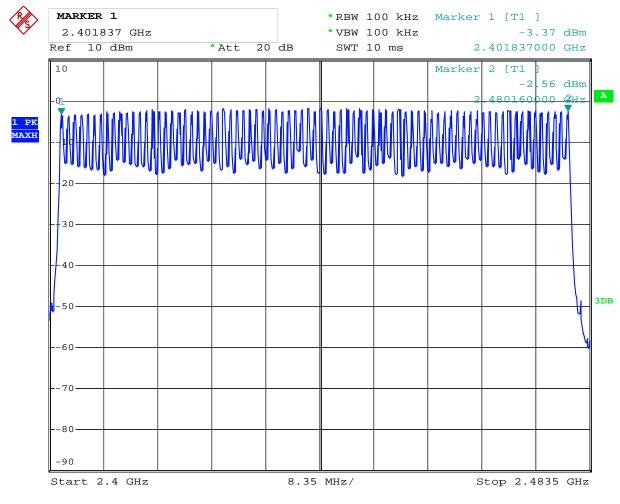


10.4Test Result

Type of Modulation: GFSK

EUT	Bluetooth Speaker		Model	BT020A, BT3000SLV, BT3000BLU,			
				BT3000RED, BT3000BLK			
Mode		Keep Transmitting	Input Voltage	DC3.7V			
Temperature		24 deg. C,	Humidity	56% RH			
Operating Frequ	iency	Number of hop	pping channels		Limit	Pass/ Fail	
2402-2480MHz		79	9		≥15	Pass	

Test Plot



Date: 5.JUL.2013 15:40:46

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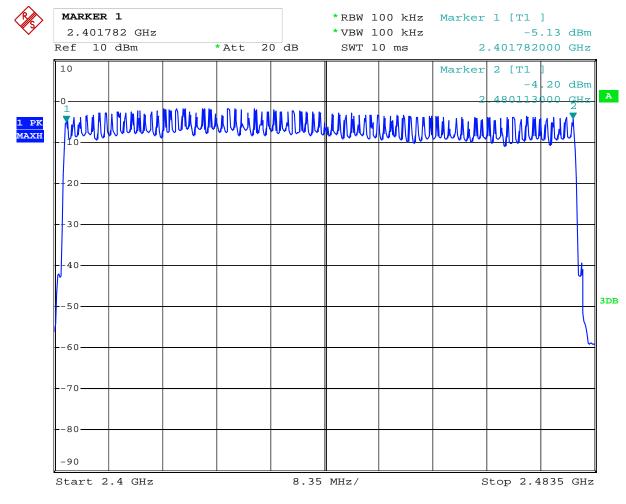
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Type of Modulation: Π /4QPSK

EUT	Bluetooth Speaker		Model	BT020.	BT020A, BT3000SLV, BT3000BLU,			
				B	BT3000RED, BT3000BLK			
Mode	Keep Transmitting		Input Voltage		DC3.7V			
Temperature		24 deg. C,	Humidity		56% RH			
Operating Frequ	iency	Number of	hopping channels	5	Limit	Pass/ Fail		
2402-2480MHz			79		≥15	Pass		

Test Plot



Date: 6.JUL.2013 12:18:45

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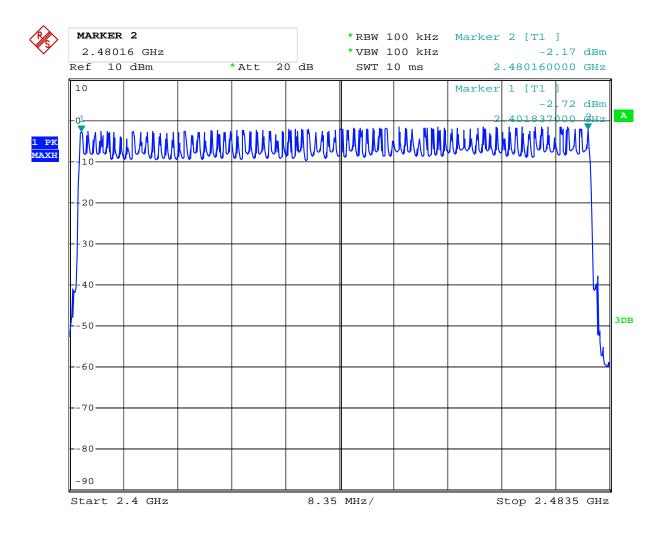
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Type of Modulation: 8DPSK

EUT	Blueto	ooth Speaker	oth Speaker Model		BT020A, BT3000SLV, BT3000BLU,
					BT3000RED, BT3000BLK
Mode	Mode Keep Transmitting Input Voltage		DC3.7V		
Temperature	24	deg. C,		Humidity	56% RH
Operating Frequency		Number of h	Limit		Pass/ Fail
2402-2480MHz		79		≥15	Pass

Test Plot



Date: 6.JUL.2013 11:41:58

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11. Time of Occupancy (Dwell 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

 \geq 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.

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11.4 Test Result

Type of Modulation: GFSK

EUT		Bluetooth Speaker	Model	Model		BT020A, BT3000SLV, BT3000BLU,		
						BT3000RED, BT3000BLK		
Mode		Keep Transmitting	Input Voltag	Input Voltage		DC3.7V		
Temperatu	re	24 deg. C,	Humidity		56% RH			
Channel		Reading	Hoping Rate		Actual	Limit		
Low		2.98	266.667 hop/s		0.318	0.4s		
Middle	Middle 2.96		266.667 hop/s		0.316	0.4s		
High 3.00		3.00	266.667 hop/s		0.320	0.4s		

Actual = Reading × (Hopping rate / Number of channels) × Test period, Test period = 0.4 [seconds / channel] × 79 [channel] = 31.6 [seconds] NOTE: The EUT makes worst case 1600 hops per second or 1 time slot has a length of 625µs with 79 channels. A DH5 Packet needs 5 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 266.667 hops per second with 79 channels.

Note: DH5 was the worse case

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Test Plots: Low Channel: DELTA MARKER 2 RBW 1 MHz Delta 2 [T1] 2.98 ms *VBW 1 MHz 0.26 dB 10 dBm Ref * Att 20 dB SWT 10 ms 2.980000 ms 10 Marker 1 [T1 -68 78 dBm 340000 0 m SGL 1 PK MAXH -10 -20 -30 -40 3DB -50 -60 hannah IM. -70 -80 -90 Center 2.402 GHz 1 ms/

Date: 5.JUL.2013 15:35:18

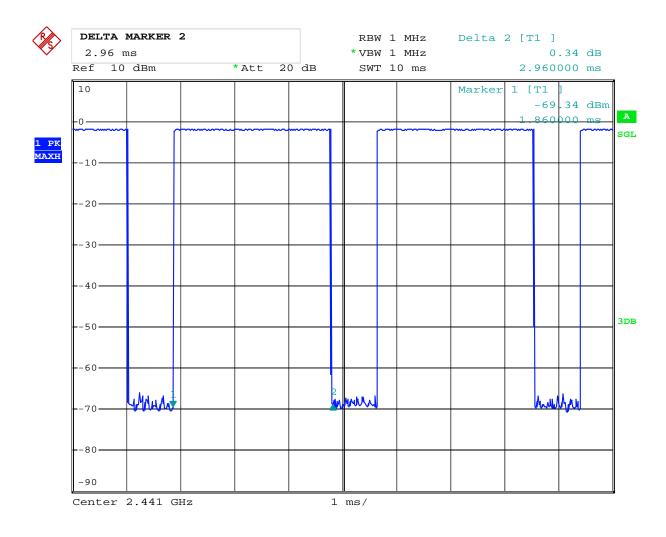
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Middle Channel:



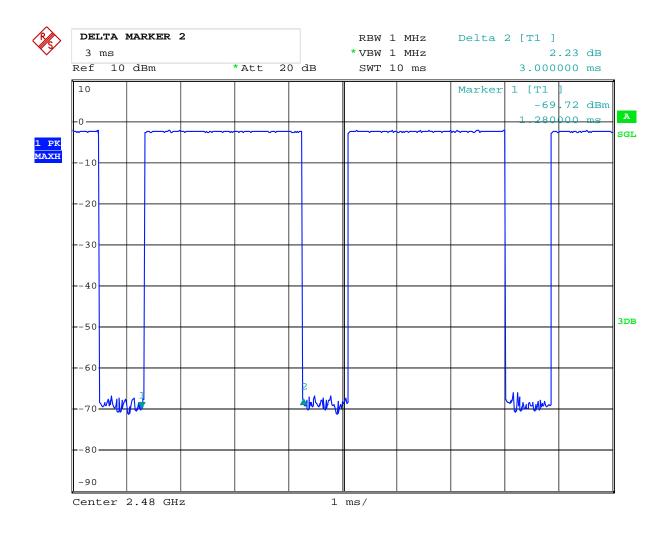
Date: 5.JUL.2013 15:36:13

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High Channel



Date: 5.JUL.2013 15:37:07

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Test Result

Type of Modulation: Π /4QPSK

EUT		Bluetooth Speake	r	Model		BT020A	, BT3000SLV, BT3000BLU,
						BT.	3000RED, BT3000BLK
Mode		Keep Transmitting	g	Input Voltag	e	DC3.7V	
Temperatu	re	24 deg. C,		Humidity			56% RH
Channel		Reading]	Hoping Rate		Actual	Limit
Low		2.96	2	66.667 hop/s		0.316	0.4s
Middle		3.02	266.667 hop/s			0.322	0.4s
High		2.96	2	66.667 hop/s		0.316	0.4s

Actual = Reading × (Hopping rate / Number of channels) × Test period ,Test period = 0.4 [seconds / channel] × 79 [channel] = 31.6 [seconds] NOTE: The EUT makes worst case 1600 hops per second or 1 time slot has a length of 625µs with 79 channels. A DH5 Packet needs 5 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 266.667 hops per second with 79 channels.

Note: DH5 was the worse case

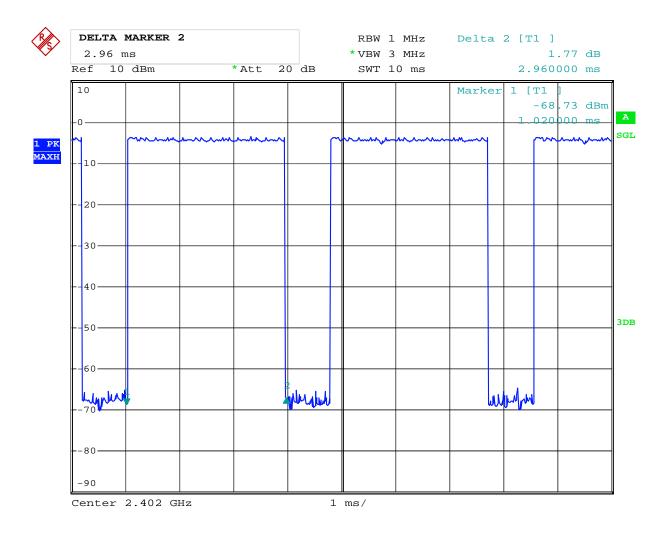
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Test Plots: Low Channel:



Date: 6.JUL.2013 12:41:36

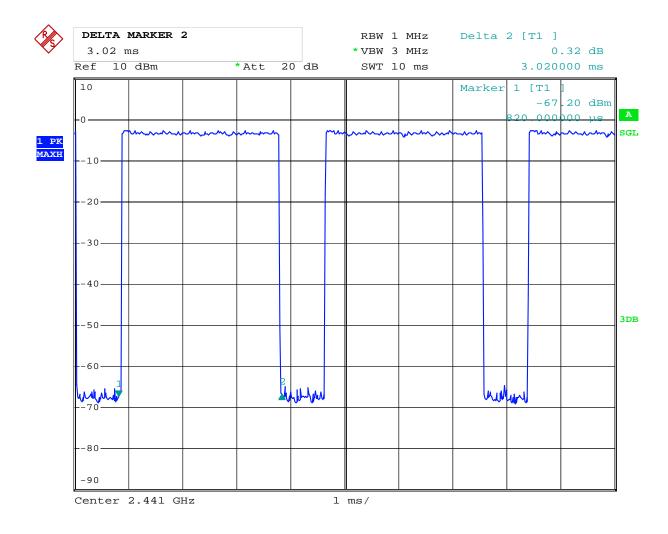
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Middle Channel:



Date: 6.JUL.2013 12:42:19

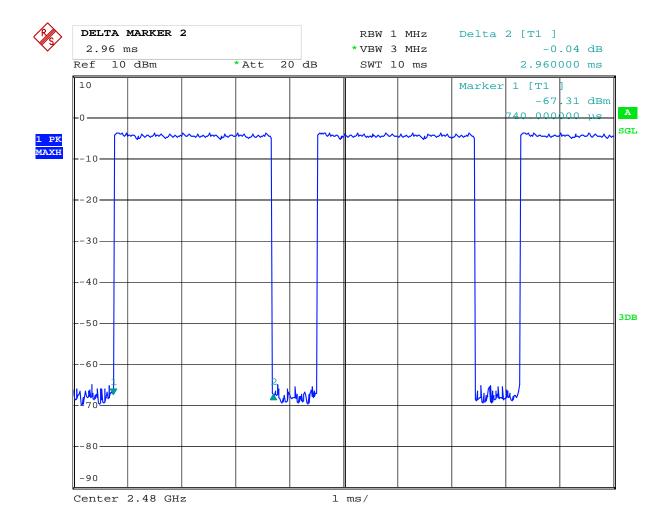
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High Channel



Date: 6.JUL.2013 12:42:57

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Type of Modulation: 8DPSK

EUT		Bluetooth Speaker	Model		BT020A, BT3000SLV, BT3000BLU,		
					BT3000RED, BT3000BLK		
Mode		Keep Transmitting	Input Voltage		DC3.7V		
Temperatur	re	24 deg. C,	Humidity		56% RH		
Channel		Reading	Hoping Rate	Hoping Rate A		Limit	
Low		2.98	266.667 hop/s	0	.318	0.4s	
Middle	Middle2.98High2.96		266.667 hop/s	0	0.318 0.4s		
High			266.667 hop/s	0	.316	0.4s	

Actual = Reading × (Hopping rate / Number of channels) × Test period, Test period = 0.4 [seconds / channel] × 79 [channel] = 31.6 [seconds] NOTE: The EUT makes worst case 1600 hops per second or 1 time slot has a length of 625µs with 79 channels. A DH5 Packet needs 5 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 266.667 hops per second with 79 channels.

Note: DH5 was the worse case

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Test Plots:



Low Channel: DELTA MARKER 2 RBW 1 MHz Delta 2 [T1] 2.98 ms *VBW 1 MHz 0.39 dB 10 dBm Ref * Att 20 dB SWT 10 ms 2.980000 ms 10 Marker 1 [T1 -68.15 dBm 760000 0 SGL 1 PK MAXH -10 -20 -30 -40 3DB -50 -60 Mhrh. Mulin MIN -70 -80 -90 Center 2.402 GHz 1 ms/

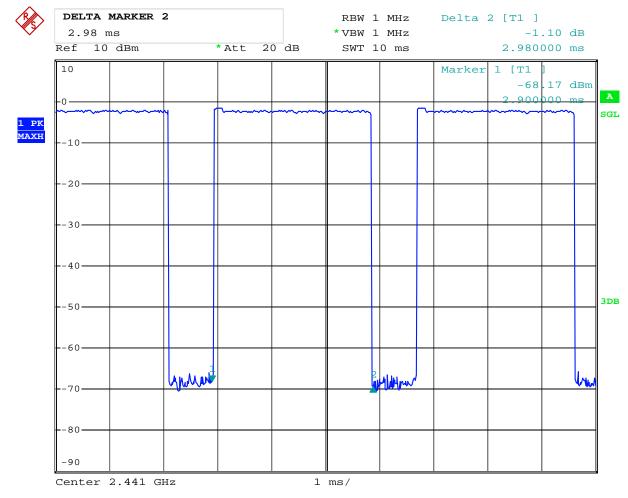
Date: 6.JUL.2013 11:20:01

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Middle Channel:

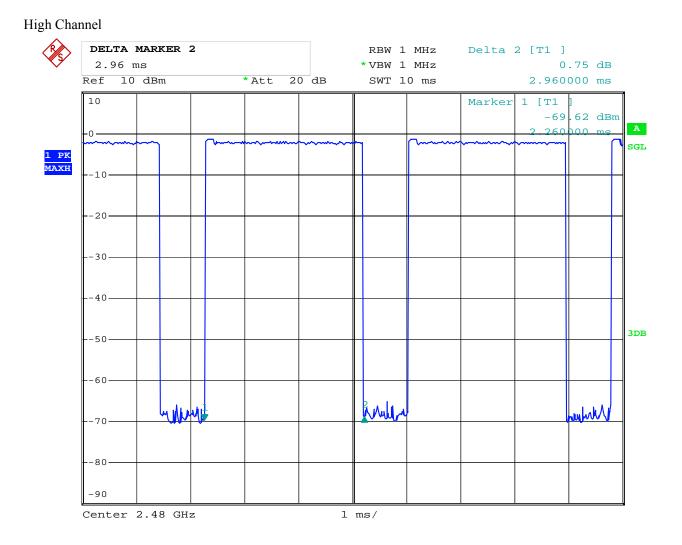


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Date: 6.JUL.2013 11:22:05

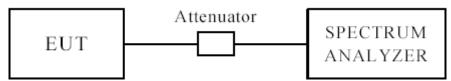
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12 Out of Band Measurement

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. For bandage test, the spectrum set as follows: RBW=VBW=100 kHz. A conducted measurement used

Note: 1. For band-edge measurement, the frequency from 30MHz-25GHz was tested. And It met the FCC rule.

2. 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.

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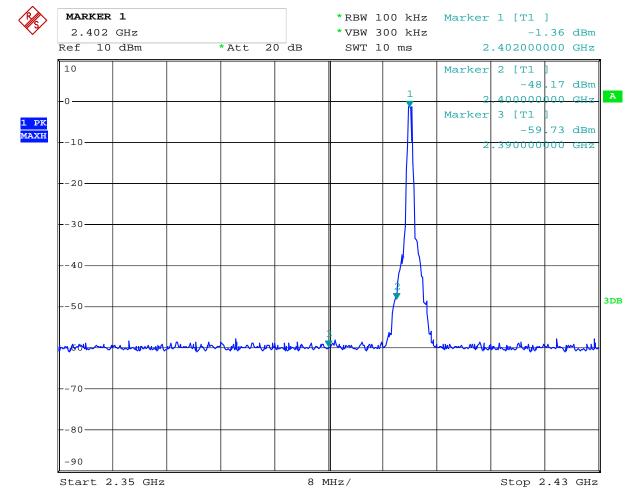


Type of Modulation: GFSK

12.4 Out of Band Test Result

Product:	Blu	uetooth Speaker	Test Mode:	Low Channel
Mode	Keej	ping Transmitting	Input Voltage	DC3.7V
Temperature		24 deg. C	Humidity	56% RH
Test Result:		Pass	Detector	РК
The Max. FS in	PK (dBµV/m)	35.6		74(dBµV/m)
Restrict Band	$AV(dB\mu V/m)$		Limit	54(dBµV/m)
2390MHz				

Test Figure:



Date: 5.JUL.2013 15:26:35

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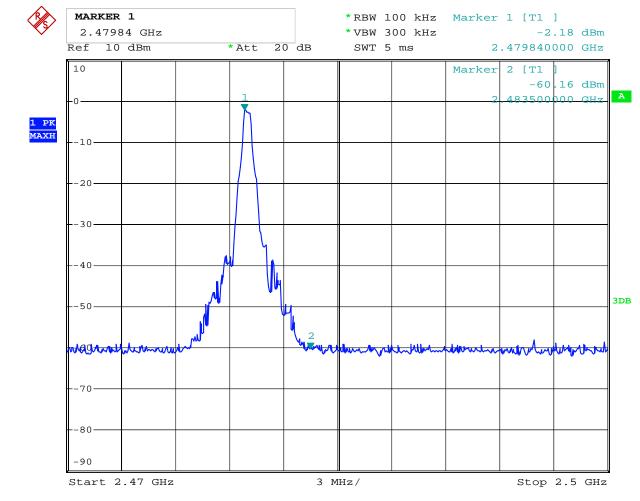


Type of Modulation: GFSK

12.4 Out of Band Test Result

Product:	Bl	uetooth Speaker	Test Mode:	High Channel
Mode	Keej	ping Transmitting	Input Voltage	DC3.7V
Temperature		24 deg. C,	Humidity	56% RH
Test Result:		Pass	Detector	РК
The Max. FS in	PK (dBµV/m)	39.1		74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2483.5MHz				

Test Figure:



Date: 5.JUL.2013 15:32:57

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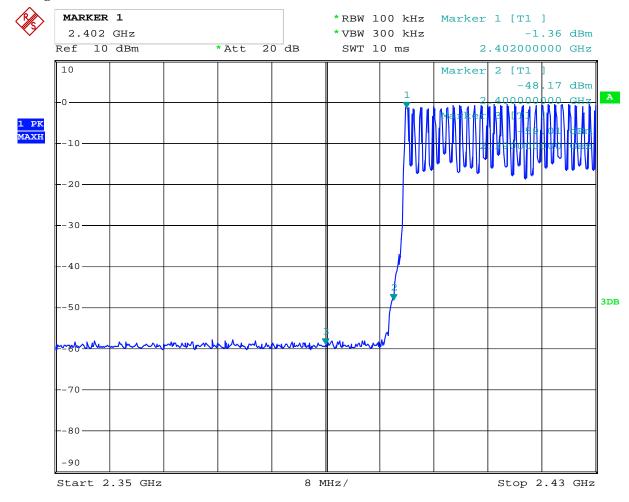


Type of Modulation: GFSK

12.4 Out of Band Test Result

Product:	Bl	uetooth Speaker	Test Mode:	Hopping mode
Mode		Hopping on	Input Voltage	DC3.7V
Temperature		24 deg. C,	Humidity	56% RH
Test Result:		Pass	Detector	РК
The Max. FS in	PK (dBµV/m)	35.9		74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2390MHz				

Test Figure:



Date: 5.JUL.2013 15:29:10

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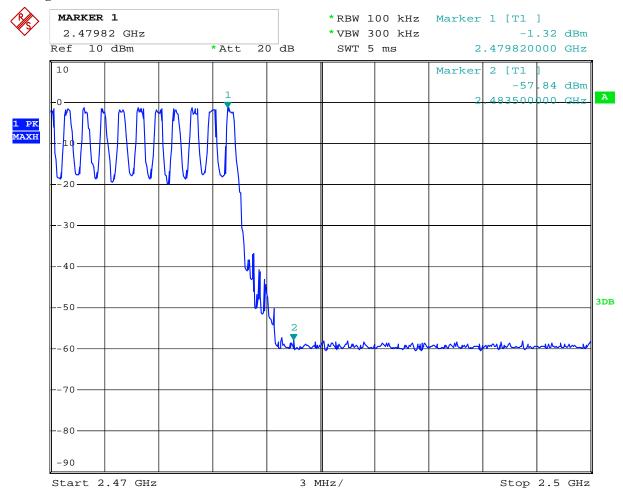


Type of Modulation: GFSK

12.4 Out of Band Test Result

Product:	Bluetooth Speaker		Test Mode:	Hopping mode
Mode	Hopping on		Input Voltage	DC3.7V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	РК
The Max. FS in	PK (dBµV/m)	40.3		74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2483.5MHz				

Test Figure:



Date: 5.JUL.2013 15:32:16

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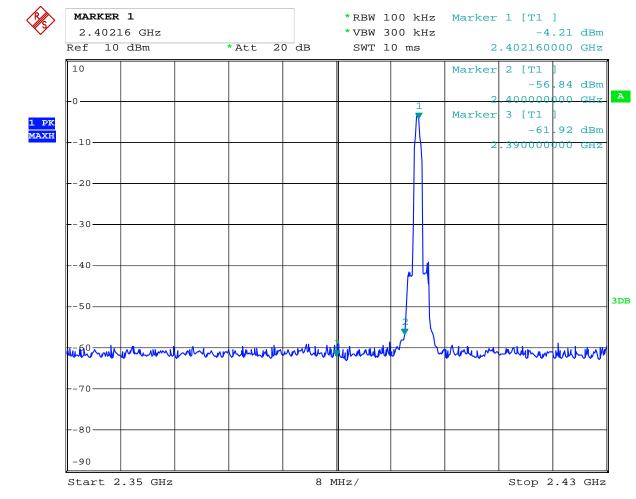


Type of Modulation: $\Pi/4QPSK$

12.4 Out of Band Test Result

Product:	Bluetooth Speaker		Test Mode:	Low Channel
Mode	Keeping Transmitting		Input Voltage	DC3.7V
Temperature	24 deg. C		Humidity	56% RH
Test Result:	Pass		Detector	РК
The Max. FS in	PK (dBµV/m) 36.3			74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2390MHz				

Test Figure:



Date: 6.JUL.2013 12:25:26

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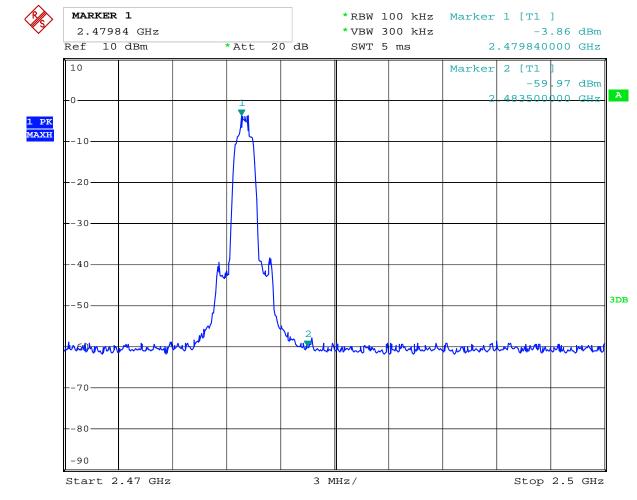


Type of Modulation: $\pi/4QPSK$

12.4 Out of 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	РК
The Max. FS in	PK (dBμV/m) 39.8			74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2483.5MHz				

Test Figure:



Date: 6.JUL.2013 12:26:34

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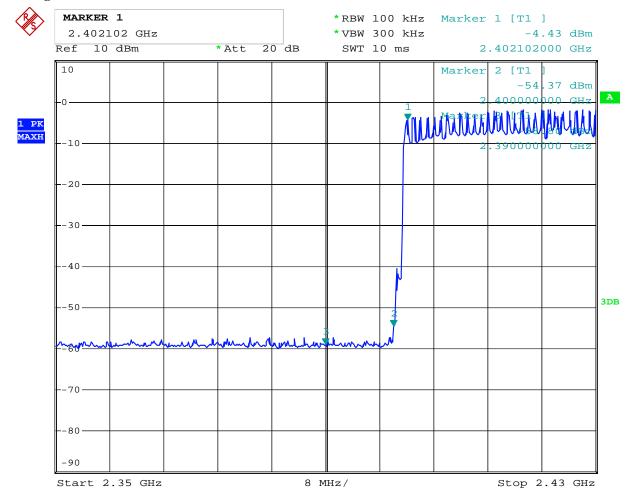


Type of Modulation: $\pi/4QPSK$

12.4 Out of Band Test Result

Product:	Bluetooth Speaker		Test Mode:	Hopping mode
Mode	Hopping on		Input Voltage	DC3.7V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	РК
The Max. FS in	PK (dBμV/m) 36.1			74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2390MHz				

Test Figure:



Date: 6.JUL.2013 12:24:48

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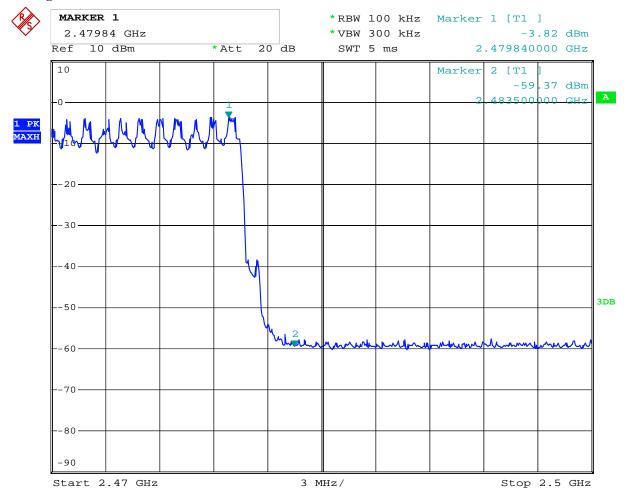


Type of Modulation: $\Pi/4QPSK$

12.4 Out of Band Test Result

Product:	Bluetooth Speaker		Test Mode:	Hopping mode
Mode	Hopping on I		Input Voltage	DC3.7V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	РК
The Max. FS in	PK (dBµV/m)	38.9		$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	54(dBµV/m)
2483.5MHz				

Test Figure:



Date: 6.JUL.2013 12:31:03

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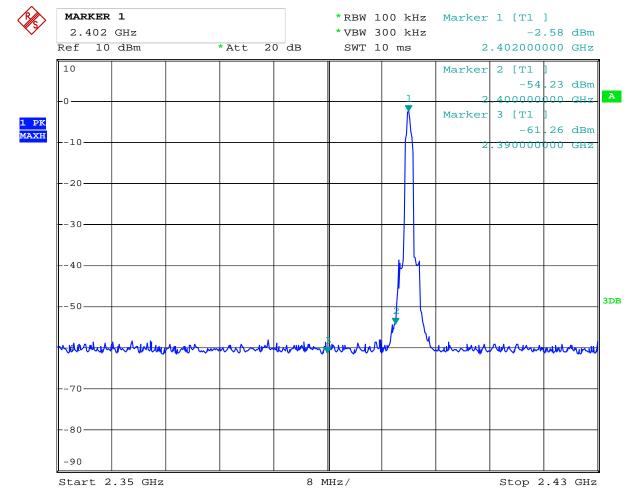


Type of Modulation: 8DPSK

12.4 Out of Band Test Result

Product:	Bluetooth Speaker		Test Mode:	Low Channel
Mode	Keeping Transmitting		Input Voltage	DC3.7V
Temperature	24 deg. C		Humidity	56% RH
Test Result:	Pass		Detector	РК
The Max. FS in	PK (dBμV/m) 36.7			74(dBµV/m)
Restrict Band	AV(dBμV/m)		Limit	54(dBµV/m)
2390MHz				

Test Figure:



Date: 6.JUL.2013 11:23:16

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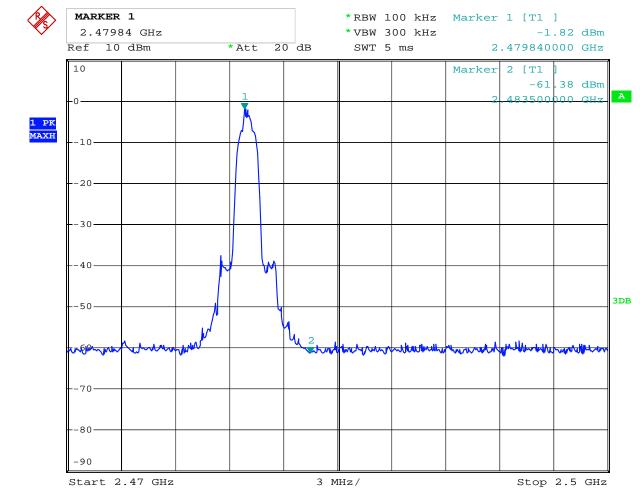


Type of Modulation: 8DPSK

12.4 Out of 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	РК
The Max. FS in	PK (dBμV/m) 40.5			74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2483.5MHz				

Test Figure:



Date: 6.JUL.2013 11:35:31

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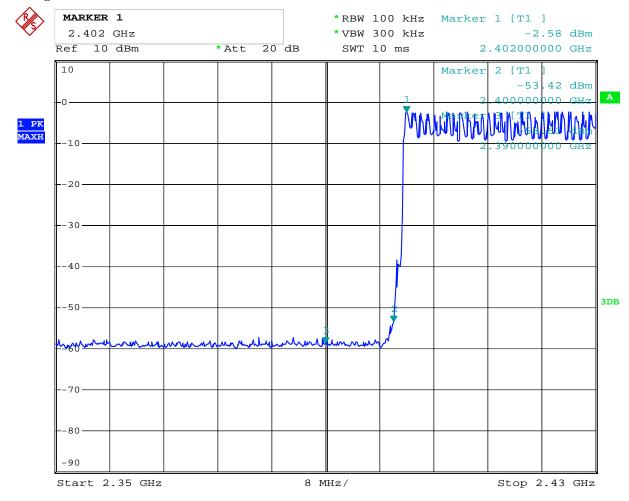


Type of Modulation: 8DPSK

12.4 Out of Band Test Result

Product:	Bluetooth Speaker		Test Mode:	Hopping mode
Mode	Hopping on		Input Voltage	DC3.7V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	РК
The Max. FS in	PK (dBµV/m)	37.0		74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2390MHz				

Test Figure:



Date: 6.JUL.2013 11:29:46

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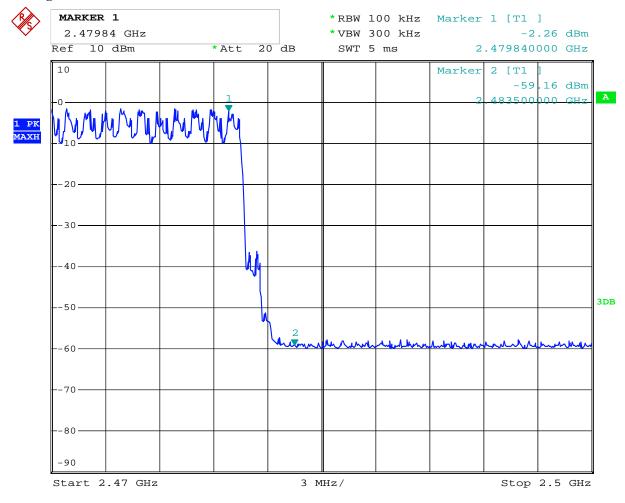


Type of Modulation: 8DPSK

12.4 Out of Band Test Result

Product:	Bluetooth Speaker		Test Mode:	Hopping mode
Mode	Hopping on 1		Input Voltage	DC3.7V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	РК
The Max. FS in	PK (dBµV/m)	41.2		74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2483.5MHz				

Test Figure:



Date: 6.JUL.2013 11:34:54

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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 constructions

The antenna is PCB Printed antenna. The maximum Gain of this antenna is 1.0dBi

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14.0 FCC ID Label

FCC ID: OCYBT020A

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:



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15.0 Photo of testing

Conducted Emission Test Setup:



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Radiated Emission Test Setup:





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Photo for the EUT



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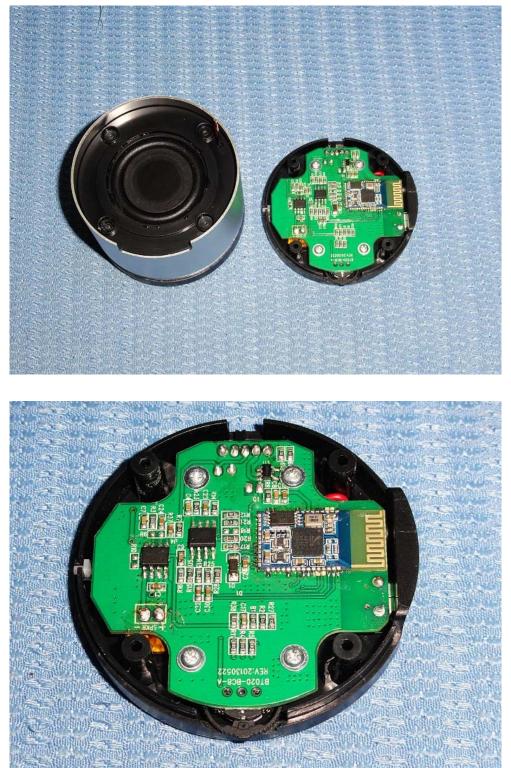


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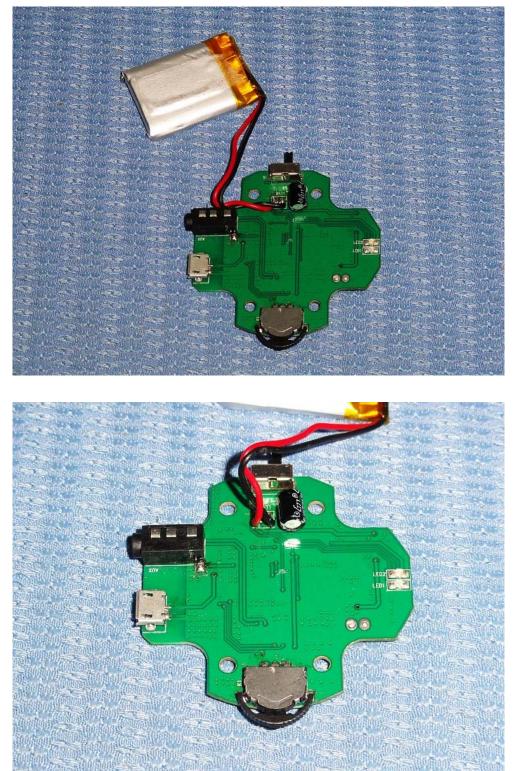
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