







ISO/IEC17025Accredited Lab.

Report No.: FCC 1506074
File reference No.: 2015-06-19

Applicant: Shenzhen BETRUE Technology Co., Ltd.

Product: Bluetooth Speaker

Model No.: BTS10

Trademark: N/A

Test Standards: FCC Part 15 Subpart C, Paragraph 15.247

Test result:

It is herewith confirmed and found to comply with the

requirements set up by ANSI C63.10&FCC Part 15 Subpart C, Paragraph 15.247 regulations for the evaluation of

electromagnetic compatibility

Approved By

Jack Chung

Jack Chung Manager

Dated: June 19, 2015

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 TESTING LABORATORIES

Room 512-519, 5/F., East Tower, Building 4, Anhua Industrial Zone, Futian District, Shenzhen, Guangdong, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timewaytech.com

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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 TESTING LABORATORIES.

Address: Room 512-519,5/F., East Tower, Building 4, Anhua Industrial Zone, Futian District, Shenzhen,

Guangdong 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: Shenzhen BETRUE Technology Co., Ltd.

Address: 4F, 1C Building, Hongpai Technology Park, TianFu Road, Qiaotou, FuYong Street, Baoan

District, Shenzhen City, Guangdong Province, P.R China

Telephone: 0755-61504566 Fax: 0755-61504570

1.3 Description of EUT

Product: Bluetooth Speaker

Manufacturer: Shenzhen BETRUE Technology Co., Ltd.

Address: 4F, 1C Building, Hongpai Technology Park, TianFu Road, Qiaotou,FuYong

Street, Baoan District, Shenzhen City, Guangdong Province, P.R China

Model Number: BTS10
Additional Model Number: N/A
Brand Name: N/A
Additional Brand Name: N/A

Type of Modulation GFSK, Л/4DQPSK, 8DPSK

Frequency range 2402-2480MHz

Number of Channel 79

Frequency Selection By software

Antenna type PCB Antenna used, the antenna gain is 0dBi

1.4 Submitted Sample: 1 Sample

The report refers only to the sample tested and does not apply to the bulk.

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1.5 Test Duration:

2015-06-09 to 2015-06-18

Test Uncertainty

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

Test Engineer 1.7

Terry lang

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	R&S	ESPI 3	100379	2014-08-21	2015-08-20
TWO Line-V-NETW	R&S	EZH3-Z5	100294	2014-08-22	2015-08-21
TWO Line-V-NETW	R&S	EZH3-Z5	100253	2014-08-22	2015-08-21
Ultra Broadband ANT	R&S	HL562	100157	2014-08-23	2015-08-22
ESDV Test Receiver	R&S	ESDV	100008	2014-08-22	2015-08-21
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2014-08-21	2015-08-20
System Controller	CT	SC100	-		
Printer	EPSON	РНОТО ЕХЗ	CFNH234850		
Computer	IBM	8434	1S8434KCE99BLXLO*	-	-
Loop Antenna	EMCO	6502	00042960	2014-08-22	2015-08-21
ESPI Test Receiver	R&S	ESI26	838786/013	2014-08-22	2015-08-21
3m OATS			N/A	2014-08-21	2015-08-20
Horn Antenna	R&S	BBHA 9170	BBHA9170265	2014-08-23	2015-08-22
Horn Antenna	R&S	BBHA 9120D	9120D-631	2014-08-23	2015-08-22
Power meter	Anritsu	ML2487A	6K00003613	2014-08-22	2015-08-21
Power sensor	Anritsu	MA2491A	32263	2014-08-22	2015-08-21
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2014-08-23	2015-08-22
LISN	AFJ	LS16C	10010947251	2014-08-21	2015-08-20
LISN (Three Phase)	Schwarebeck	NSLK 8126	8126453	2014-08-22	2015-08-21
9*6*6 Anechoic			N/A	2014-08-21	2015-08-20
EMI Test Receiver	RS	ESCS30	100139	2014-08-22	2015-08-21

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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	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, ANSI 63.4:2009 and ANSI 63.10:2009.

4.0 **EUT Modification**

No modification by Shenzhen Timeway Technology Consulting Co., Ltd

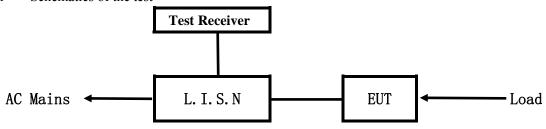
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5. Power Line Conducted Emission Test

5.1 Schematics of the test

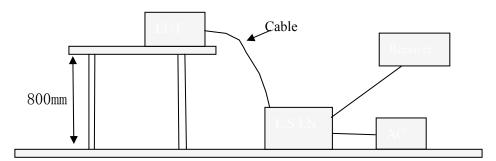


EUT: Equipment Under Test

5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2009. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.10-2009.

Test Voltage: 120V~60Hz Block diagram of Test setup



5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.10-2009. 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
Bluetooth Speaker	Shenzhen BETRUE Technology Co., Ltd.	BTS10	2AA7L-BTS10

B. Internal Device

Device	Manufacturer	Model	FCC ID/DOC
N/A			

C. Peripherals

Device	Manufacturer	Model	FCC ID/DOC	Cable
Power	RCL	RCL091500	VOC	
Supply				

5.4 EUT Operating Condition

Operating condition is according to ANSI C63.10-2009.

- 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 Lim	its (dB µ V)	Class B Limits (dB \(\mu \)		
(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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Conducted Emission on Live Terminal (150kHz to 30MHz) A:

EUT Operating Environment

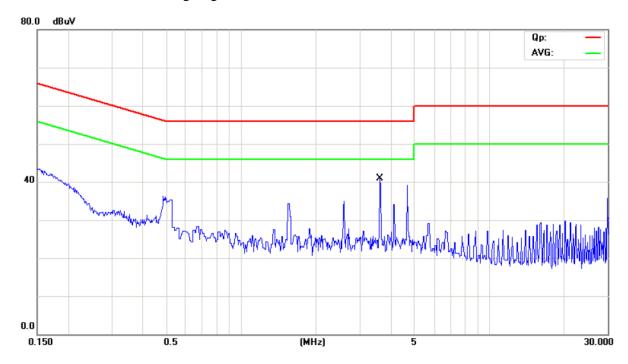
Humidity: 65%RH Atmospheric Pressure: 101 KPa Temperature: 26°C

EUT set Condition: Charging and Keep Bluetooth Transmitting

Equipment Level: Class B

Results: PASS

Please refer to following diagram for individual



No. Mk.	Freq.	Reading Level		Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	3.6018	1.50	12.94	14.44	56.00	-41.56	QP	
2 *	3.6018	-0.80	12.94	12.14	46.00	-33.86	AVG	

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

EUT Operating Environment

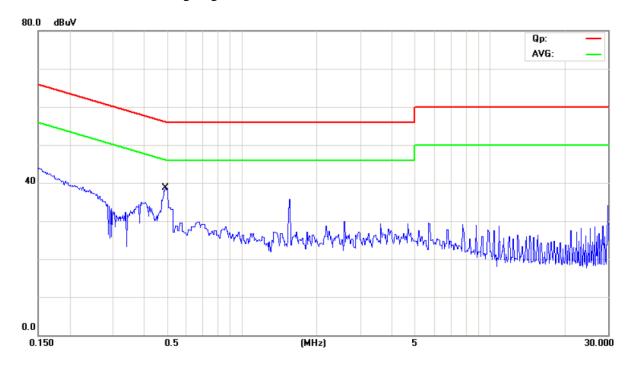
Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Charging and Keep Bluetooth Transmitting

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



No. Mk.	Freq.			Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.4881	24.00	11.36	35.36	56.20	-20.84	QP	
2 *	0.4881	19.30	11.36	30.66	46.20	-15.54	AVG	

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6 Radiated Emission Test

- 6.1 Test Method and test Procedure:
- (1) The EUT was tested according to ANSI C63.10-2009. 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 C63.10-2009.
- (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 Distance = 3m Computer Pre -Amplifier EUT Turn-table Receiver

- 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:

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

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 $(dBuV) = 20 \log RF \text{ Voltage } (uV)$
- 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/ In Vertical (30MHz----1000MHz)

EUT set Condition: Charging and Keep Bluetooth Transmitting

Results: Pass

Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB \(\mu \) V/m)
394.520	34.89	Н	46.00
946.400	40.81	Н	46.00
354.800	35.10	Н	46.00
31.520	31.24	Н	40.00
148.520	35.60	V	43.50
891.080	44.63	V	46.00
378.120	38.28	V	46.00
70.920	36.09	V	40.00

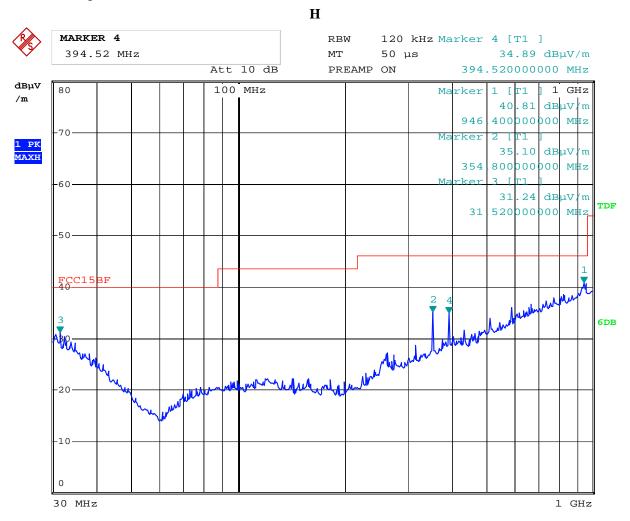
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Test Figure:



18.JUN.2015 09:47:22 Date:

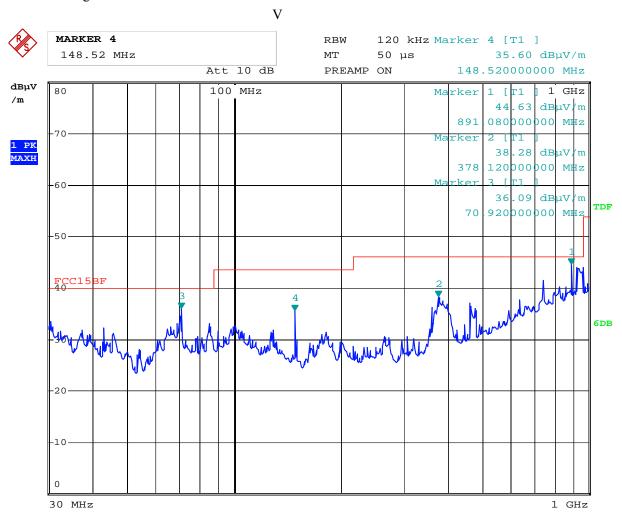
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Test Figure:



18.JUN.2015 09:58:19 Date:

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Operation Mode: Transmitting under Low Channel (2402MHz)

Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB \(\mu \)V/m)
	Level@3m (db # v/m)	Antenna I Olarity	
4804		Н	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	1	H/V	74(Peak)/ 54(AV)
21618		H/V	74(Peak)/ 54(AV)
24020		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

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

Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB \u03b4 V/m)
4882	-	Н	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)

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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Operation Mode: Transmitting under High Channel (2480MHz)

Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB µ V/m)
4960.		Н	74(Peak)/ 54(AV)
4960.		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

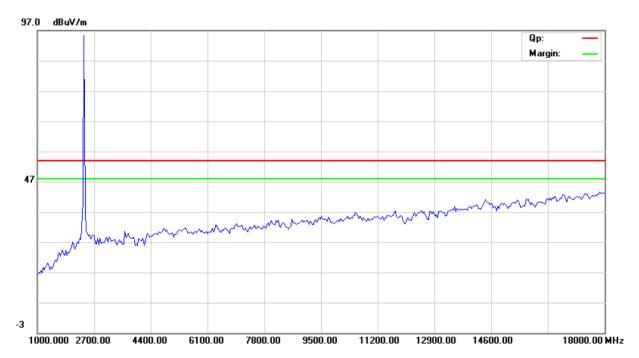
^{2.} Remark "---" means that the emissions level is too low to be measured

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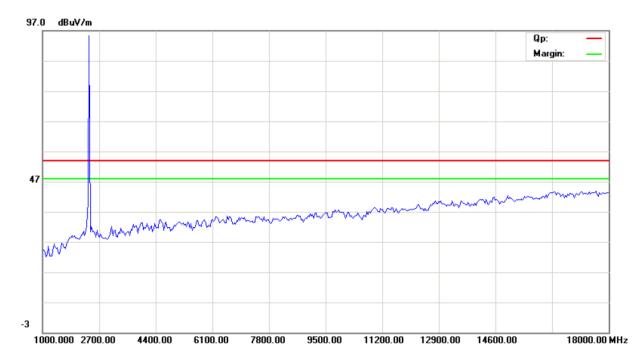


Please refer to the following test plots for details:

Low Channel: Horizontal



Low Channel: Vertical



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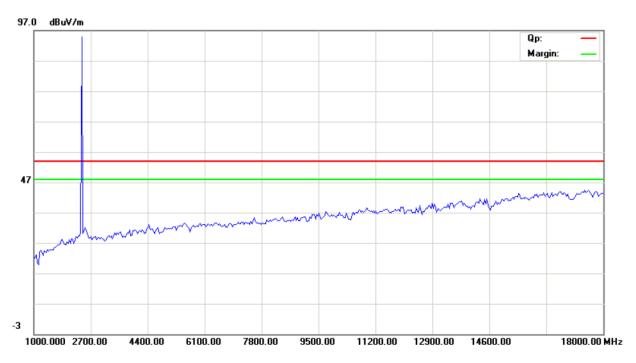
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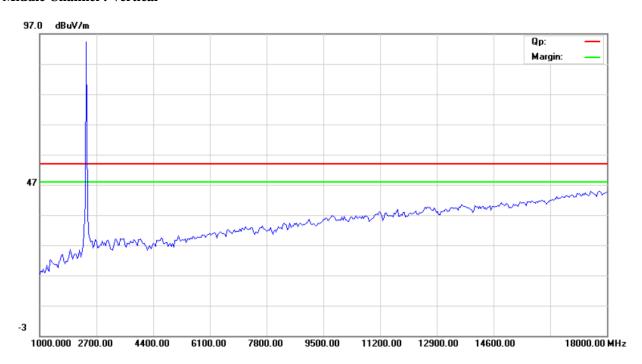
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Middle Channel: Horizontal



Middle Channel: Vertical



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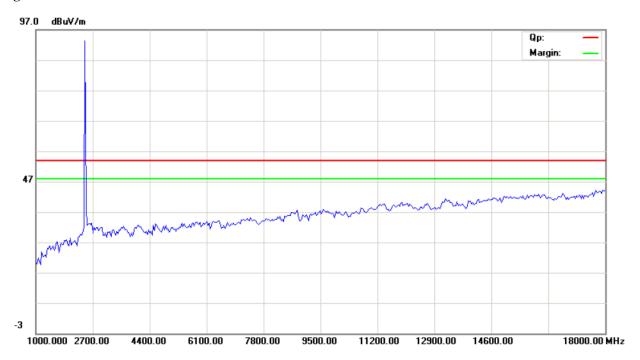
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adopt any other remedies which may be appropriate.

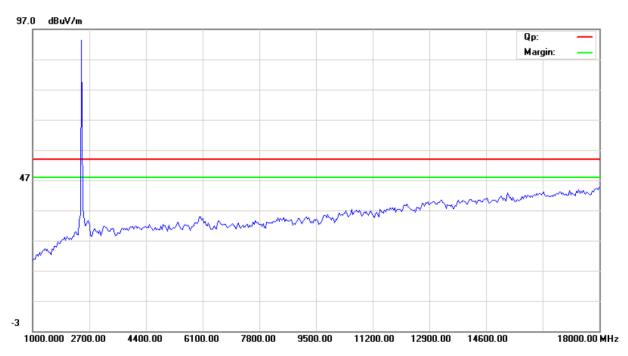
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High Channel: Horizontal



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 =3MHz, RBW =30 kHz, VBW=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

J1	2) Po of 1:20 and 1:2					
EUT	В	Bluetooth Speaker		BTS10		
Mode	Ko	Keep Transmitting		DC3.7V		
Temperat	ure	24 deg. C,		56% RH		
Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Pass/ Fail		
Low	2402	937.88		Pass		
Middle	2441	937.88		Pass		
High	2480	943.89		Pass		

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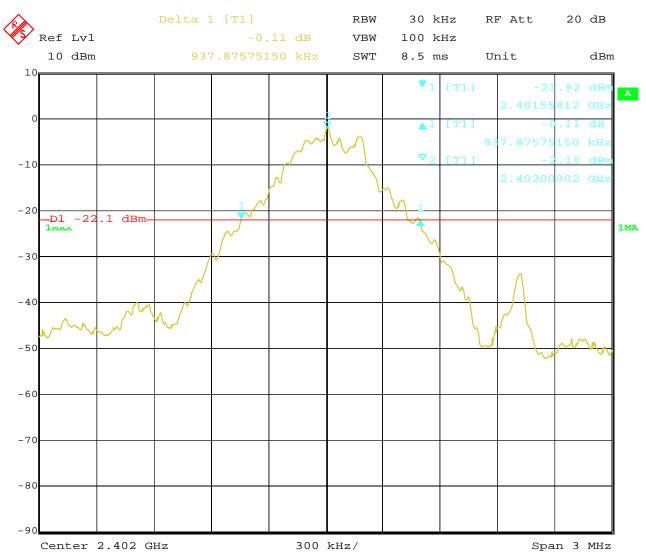
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Test Figure:

1. Condition: Low Channel



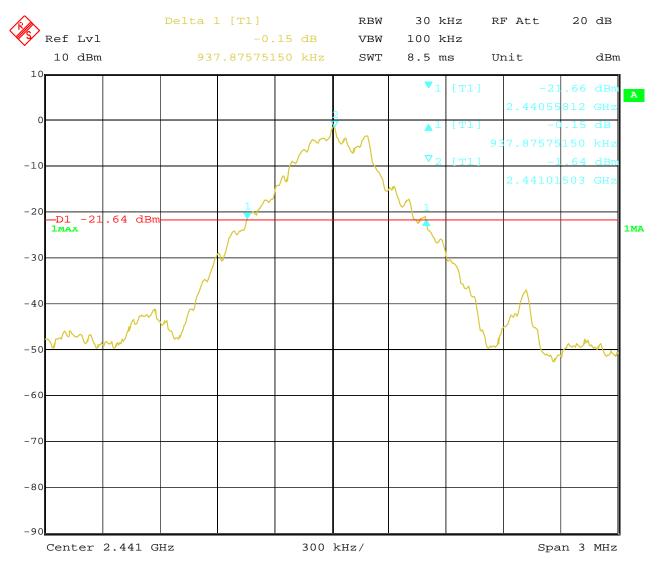
17.JUN.2015 14:58:47 Date:

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2. Condition: Middle Channel



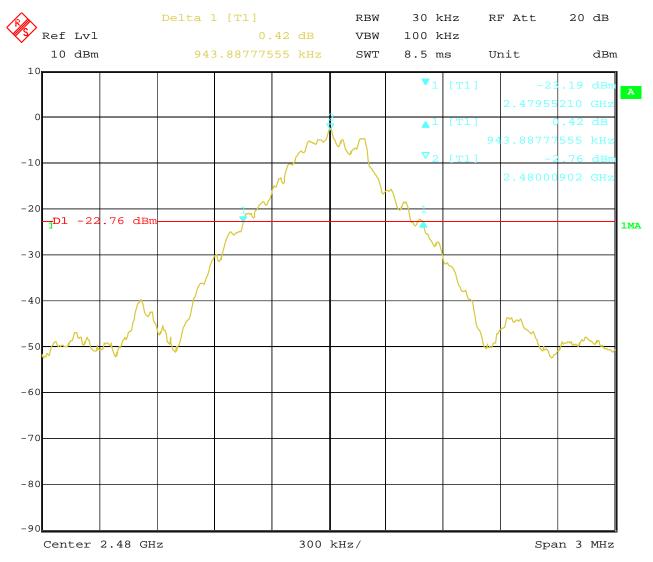
17.JUN.2015 14:56:48 Date:

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3. High Channel



17.JUN.2015 14:55:33 Date:

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Test Result

Type of Modulation: Л/4DQPSK

EUT	В	Bluetooth Speaker		BTS10		
Mode	Ko	Keep Transmitting		DC3.7V		
Temperat	ure	24 deg. C,		24 deg. C, Humidity		56% RH
Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Pass/ Fail		
Low	2402	1268.54		Pass		
Middle	2441	1262.53		Pass		
High	2480	1262.53		Pass		

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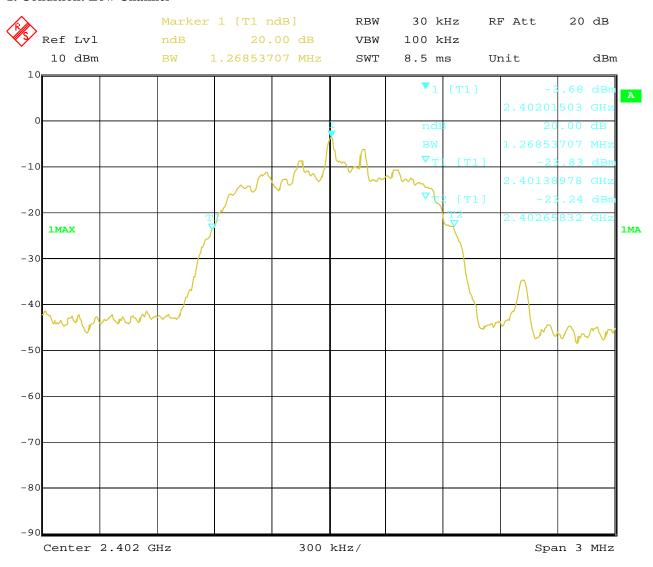
Report No: FCC1506074

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Test Figure:

1. Condition: Low Channel



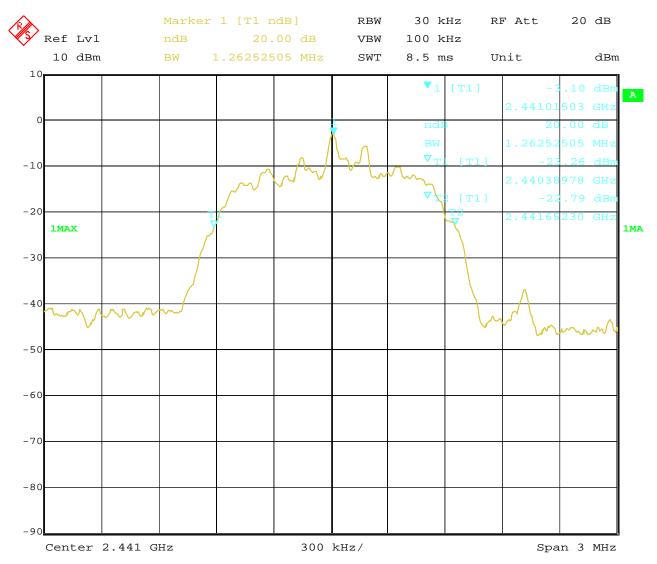
17.JUN.2015 15:07:58 Date:

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2. Condition: Middle Channel



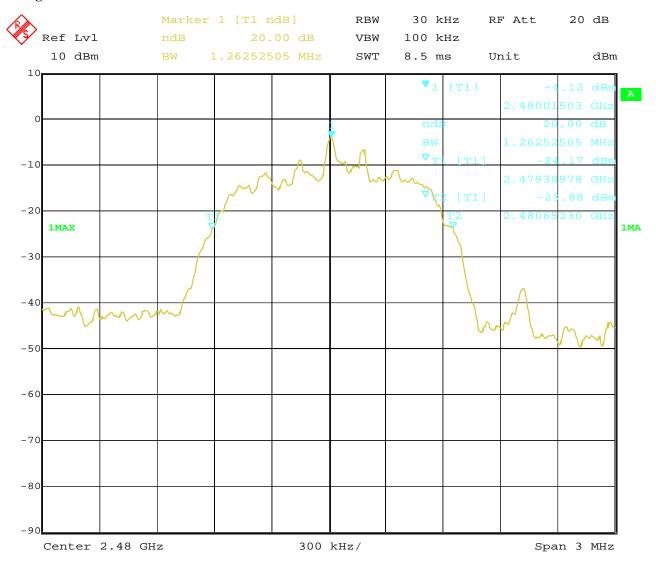
17.JUN.2015 15:09:24 Date:

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3. High Channel



17.JUN.2015 15:10:17 Date:

Date: 2015-06-19



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Test Result

Type of Modulation: 8DPSK

EUT	Bl	Bluetooth Speaker		BTS10
Mode	Ke	Keep Transmitting		DC3.7V
Temperat	ure	24 deg. C,		56% RH
Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Pass/ Fail
Low	2402	1286.57		Pass
Middle	2441	1280.56		Pass
High	2480	1280.56		Pass

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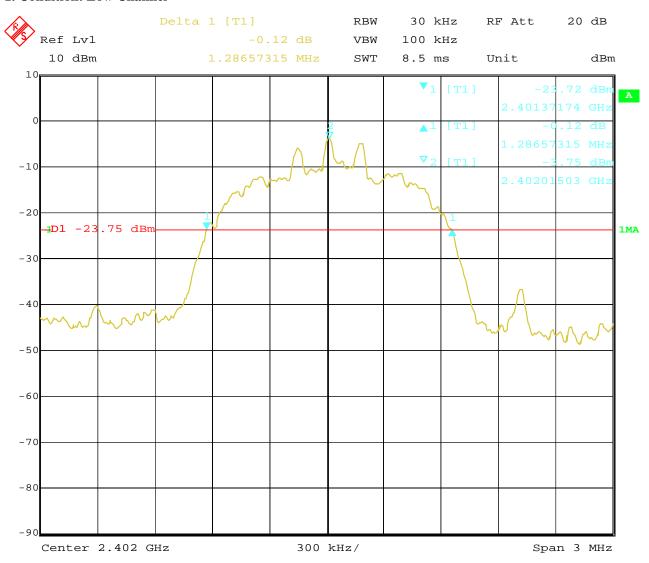
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Test Figure:

1. Condition: Low Channel

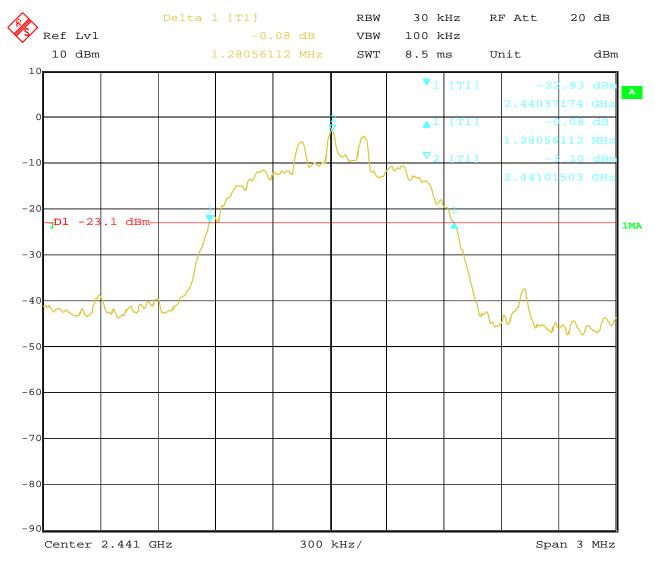


Date: 17.JUN.2015 15:18:23 Report No: FCC1506074 Page 32 of 79

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2. Condition: Middle Channel



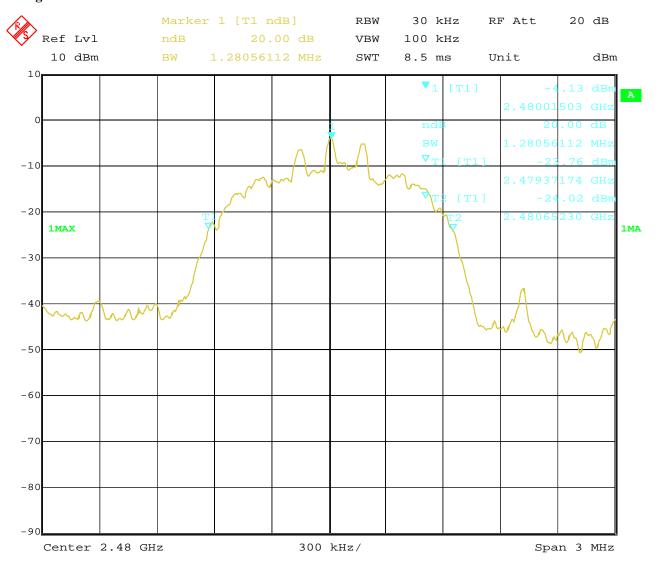
17.JUN.2015 15:16:54 Date:

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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=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	Bl	Bluetooth Speaker		BTS10
Mode	Ke	Keep Transmitting		DC3.7V
Temperatu	re	24 deg. C,		56% RH
Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass/ Fail
Low	2402	-1.81	30	Pass
Middle	2441	-1.31	30	Pass
High	2480	-2.40	30	Pass

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

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

2. Worse case was recorded

Type of Modulation: √1/4DQPSK

EUT	Bl	Bluetooth Speaker		BTS10
Mode	Ke	Keep Transmitting		DC3.7V
Temperatur	re	24 deg. C,		56% RH
Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Lin (dBm)	nit Pass/ Fail
Low	2402	-2.68	30	Pass
Middle	2441	-2.16	30	Pass
High	2480	-3.28	30	Pass

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

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

2. Worse case was recorded

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Type of Modulation: 8DPSK

EUT	Bl	Bluetooth Speaker		BTS10
Mode	Ke	Keep Transmitting		DC3.7V
Temperatu	re	24 deg. C,		56% RH
Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass/ Fail
Low	2402	-2.56	30	Pass
Middle	2441	-2.05	30	Pass
High	2480	-3.04	30	Pass

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

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

2. Worse case was recorded

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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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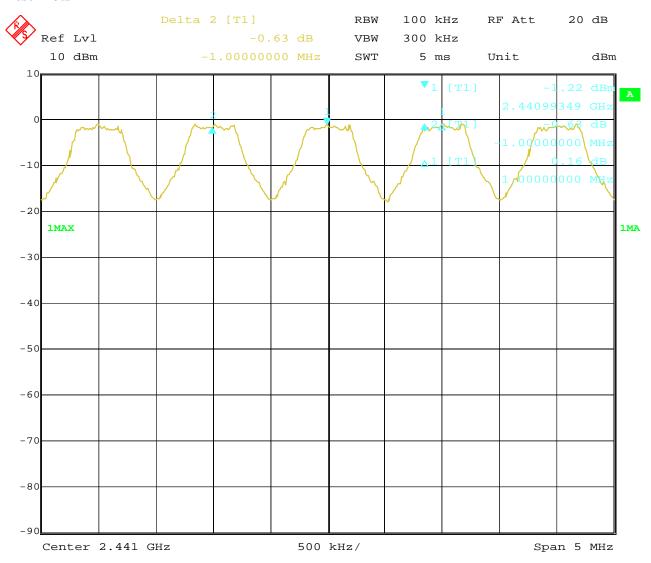


9.4Test Result

Type of Modulation: GFSK

EUT	Bluetooth Spe	Model		BTS10		
Mode	Hopping On		Input Voltage		DC3.7V	
Temperature	24 deg. C,		Humidity		56% RH	
Carrier Frequency Separation			Limit		Pass/ Fail	
1000kHz		≥ 25 kHz or 2	2/3 of 20 dB bands	width	Pass	

Test Plots



Date: 17.JUN.2015 12:24:08

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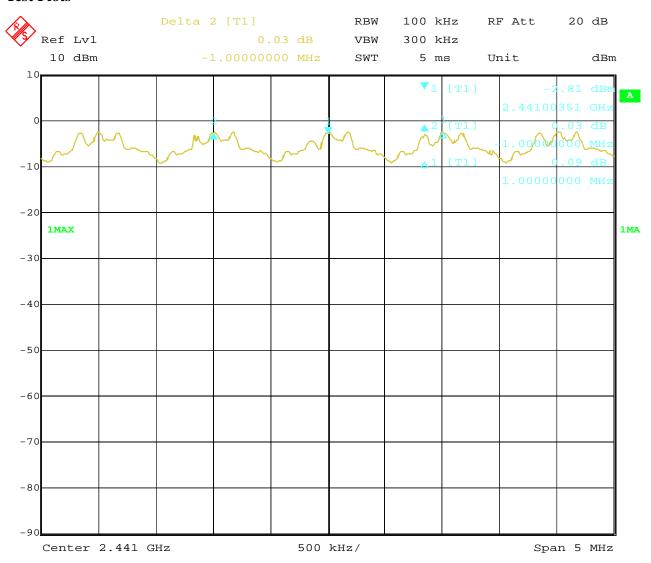
Report No: FCC1506074

Date: 2015-06-19



EUT	Bluetooth Spe	Model		BTS10	
Mode	Hopping On		Input Voltage		DC3.7V
Temperature	24 deg. C,		Humidity		56% RH
Carrier Frequency Separation			Limit		Pass/ Fail
1000 kHz		≥ 25 kHz or 2	2/3 of 20 dB bandy	width	Pass

Test Plots



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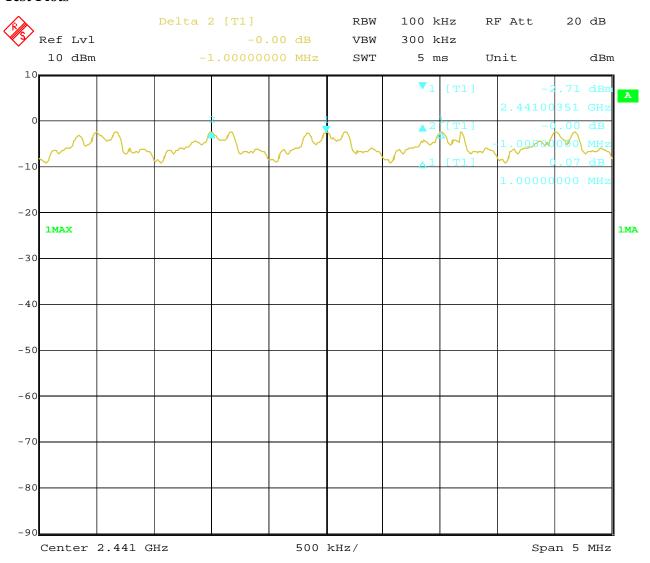
Date: 2015-06-19



Type of Modulation: 8DPSK

EUT	Bluetooth Spe	Model		BTS10	
Mode	Hopping On		Input Voltage		DC3.7V
Temperature	24 deg. C,		Humidity		56% RH
Carrier Frequency Separation			Limit		Pass/ Fail
1000 kHz		≥ 25 kHz or 2	2/3 of 20 dB bandy	width	Pass

Test Plots



17.JUN.2015 11:38:59 Date:

Date: 2015-06-19



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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= 300 kHz;

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

3. Record the number of hopping channels.

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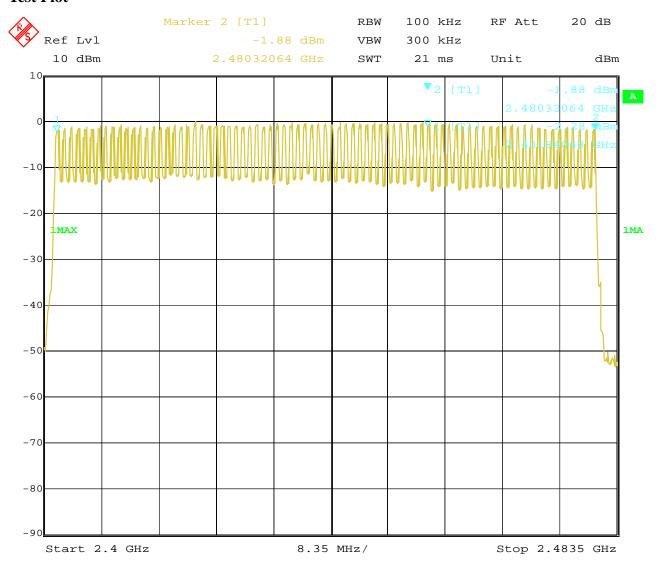


10.4Test Result

Type of Modulation: GFSK

EUT	Bluetooth Speaker		M	odel		BTS10
Mode	Hopping On		Input	Voltage		DC3.7V
Temperature		24 deg. C,	Humidity			56% RH
Operating Frequ	Operating Frequency Number of hopp channels		ing	Lin	nit	Pass/ Fail
2402-2480MHz		79		≥ 1	15	Pass

Test Plot



Date: 17.JUN.2015 10:31:24

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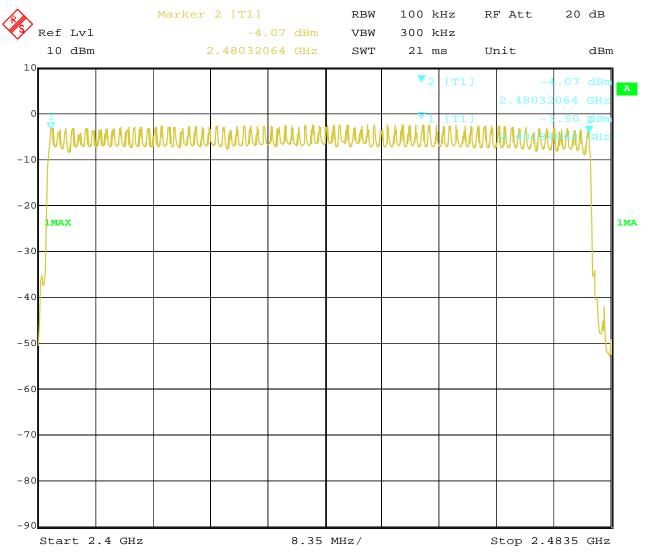
Date: 2015-06-19



Type of Modulation: Л/4DQPSK

EUT	Bluetooth Speaker		Model			BTS10	
Mode	Hopping On		Input Voltage			DC3.7V	
Temperature		24 deg. C,	Humidity			56% RH	
Operating Frequ	Number of hopp channels		ing	Lin	nit	Pass/ Fail	
2402-2480MHz		79		≥ 1	15	Pass	

Test Plot



17.JUN.2015 10:44:35 Date:

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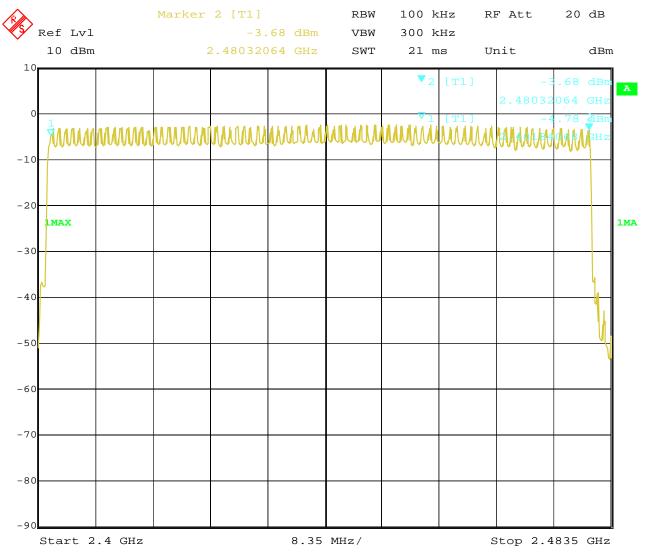
Date: 2015-06-19



Type of Modulation: 8DPSK

EUT	Bluetooth Speaker		Bluetooth Speaker Model			BTS10	
Mode	Hopping On		Input Voltage			DC3.7V	
Temperature		24 deg. C,	Humidity		56% RH		
Operating Frequ	quency Number of hopp channels		ing	Lin	nit	Pass/ Fail	
2402-2480MHz		79		≥ 1	15	Pass	

Test Plot



17.JUN.2015 10:57:32 Date:

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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 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		BTS10
Mode		Keep Trans	ansmitting Input Volt		oltage	DC3.7V
Temperature	e	24 deg. C,		Humidity		56% RH
Channel		Reading	Hoping Ra	ate	Actual	Limit
Low		3.07ms	266.667 ho	p/s	0.327s	0.4s
Middle		3.09ms 266.667 ho		p/s	0.330s	0.4s
High		3.07ms	266.667 ho	p/s	0.327s	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

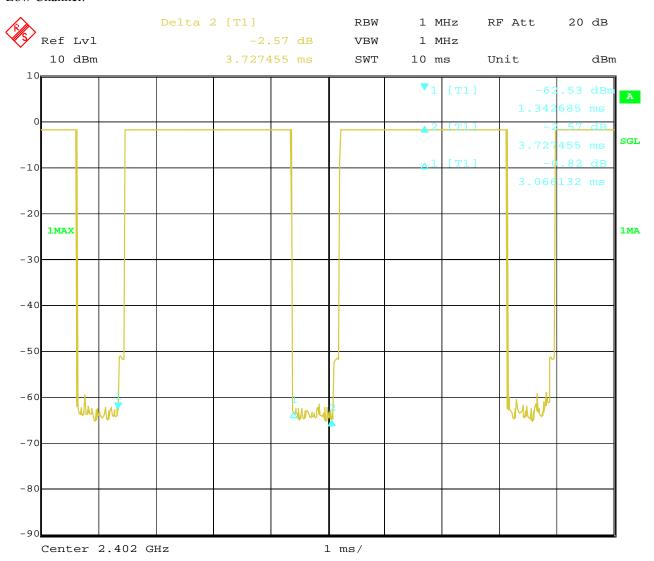
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Test Plots: Low Channel:



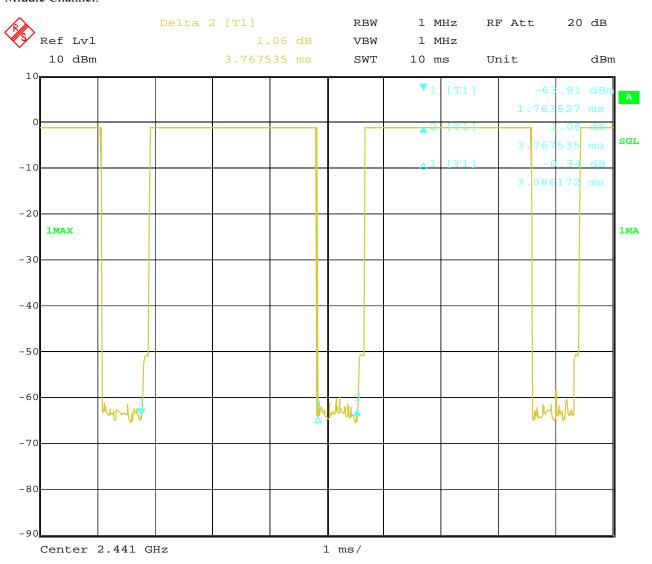
Date: 17.JUN.2015 15:02:56

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Middle Channel:



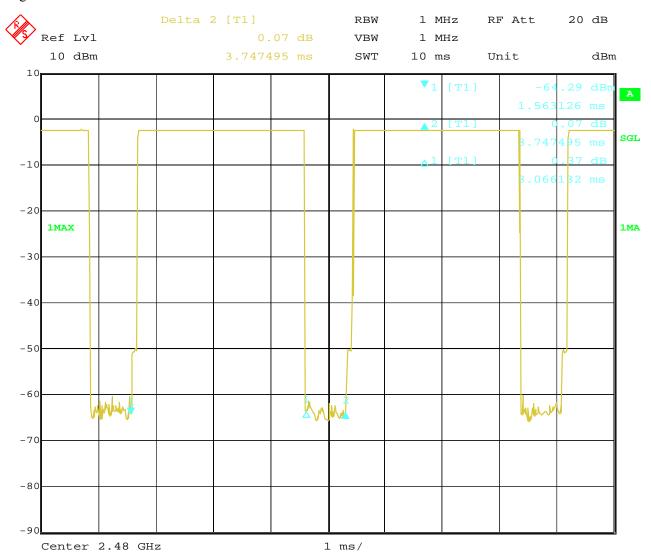
17.JUN.2015 15:02:16 Date:

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High Channel



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Test Result

Type of Modulation: Л/4DQPSK

EUT	Bluetooth	Bluetooth Speaker		odel	BTS10
Mode	Keep Tran	Keep Transmitting		/oltage	DC3.7V
Temperature	e 24 deg	g. C,	C, Humidity		56% RH
Channel	Reading	Hoping Ra	ate	Actual	Limit
Low	3.11ms	266.667 ho	p/s	0.332s	0.4s
Middle	3.07ms	3.07ms 266.667 ho		0.327s	0.4s
High	3.11ms	266.667 ho	p/s	0.332s	0.4s

Actual = Reading \times (Hopping rate / Number of channels) \times Test period, Test period = 0.4 [seconds / channel] \times 79 [channel] = 31.6 [seconds] NOTE: The EUT makes worst case 1600 hops per second or 1 time slot has a length of 625 μ s 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

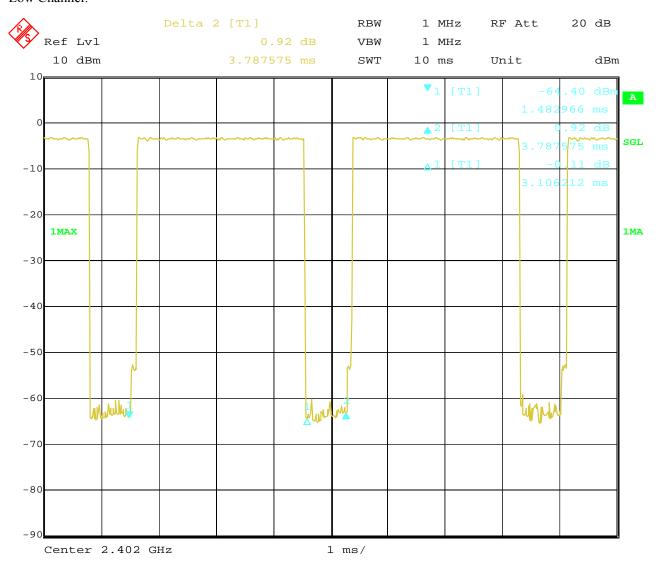
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Test Plots: Low Channel:



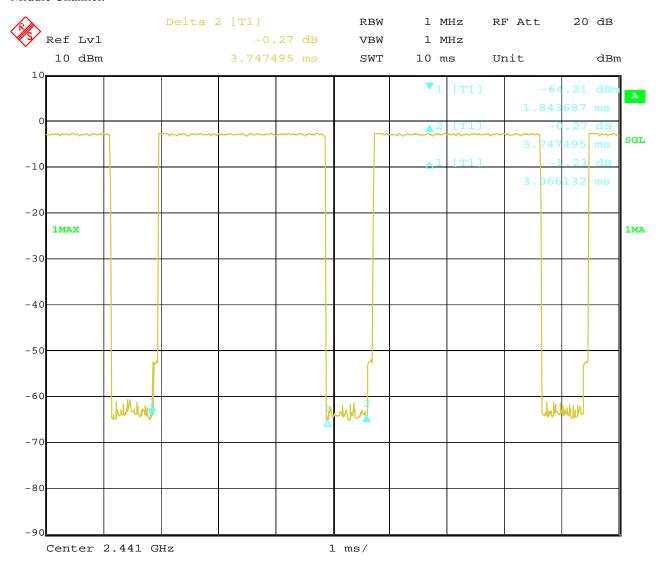
Date: 17.JUN.2015 15:03:48

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Middle Channel:



17.JUN.2015 15:04:41 Date:

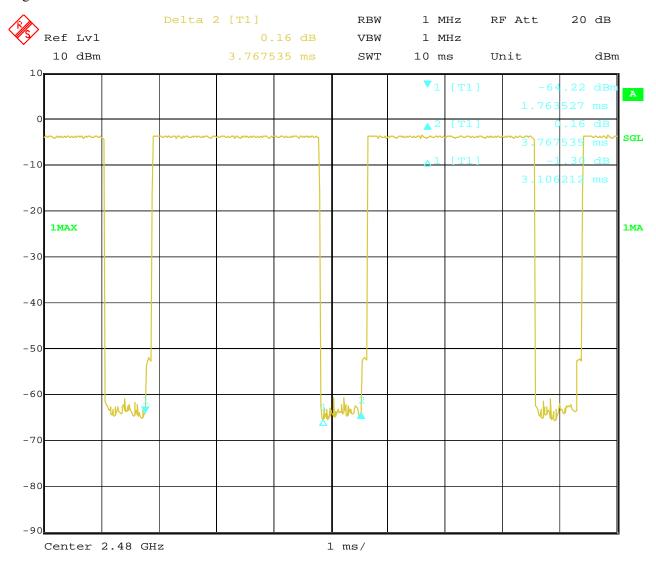
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High Channel



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Type of Modulation: 8DPSK

EUT		Bluetooth Speaker		Model		BTS10
Mode		Keep Trans	mitting	Input V	/oltage	DC3.7V
Temperature	e	24 deg.	24 deg. C,		ity	56% RH
Channel		Reading	Hoping Ra	ate	Actual	Limit
Low		3.07ms	266.667 hc	p/s	0.327s	0.4s
Middle		3.09ms 266.667 ho		p/s	0.330s	0.4s
High		3.11ms	266.667 hc	p/s	0.332s	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

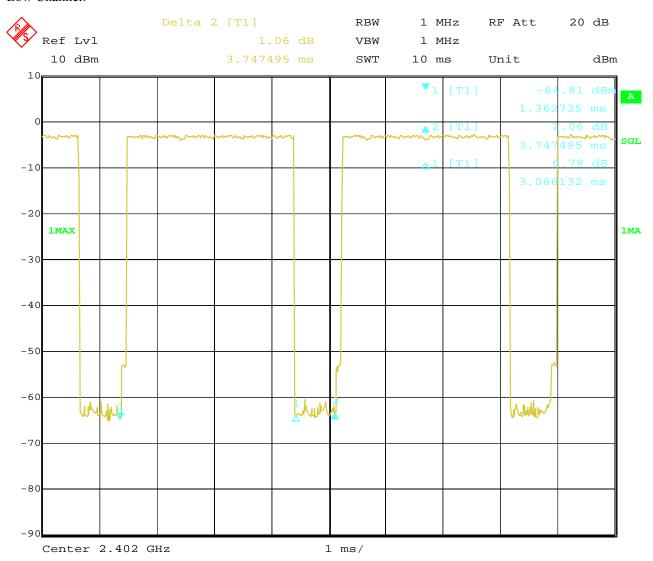
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Test Plots: Low Channel:



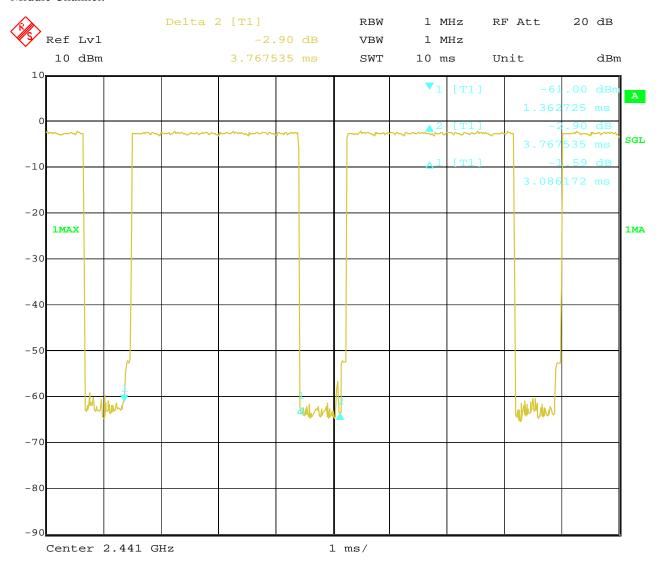
Date: 17.JUN.2015 15:24:16

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Middle Channel:



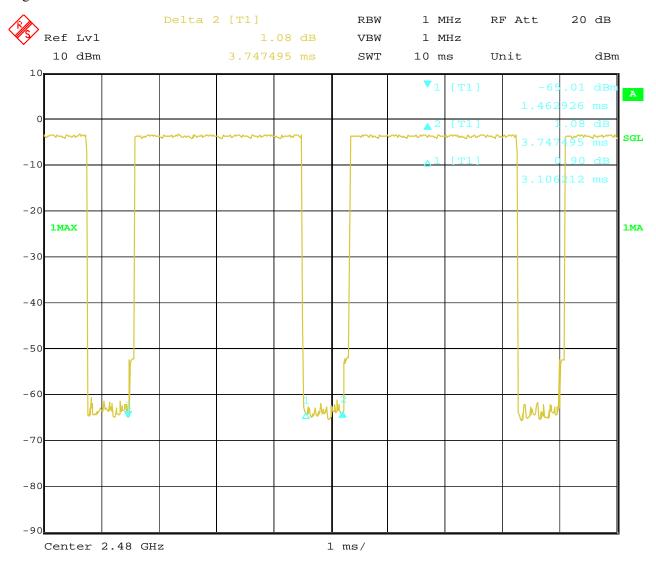
17.JUN.2015 15:23:06 Date:

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High Channel



17.JUN.2015 15:22:27 Date:

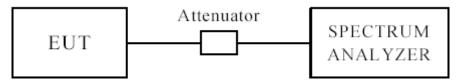
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12 Out of Band Measurement

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=100 kHz, VBW=300 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.

Date: 2015-06-19

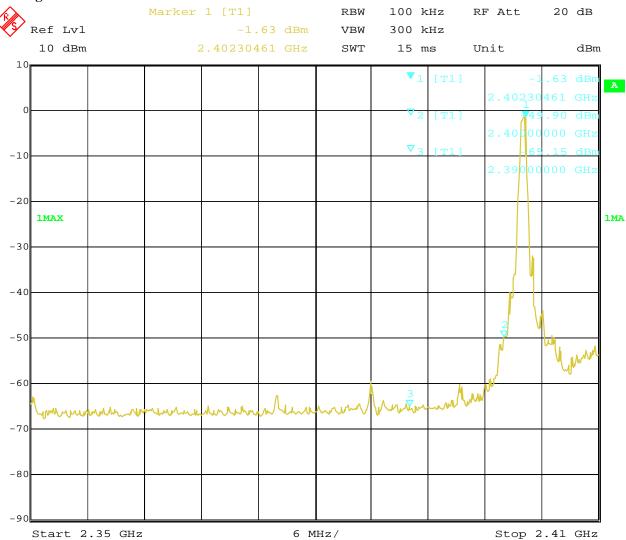


Type of Modulation: GFSK

Out of Band Test Result

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

Test Figure:



17.JUN.2015 14:47:39 Date:

Date: 2015-06-19

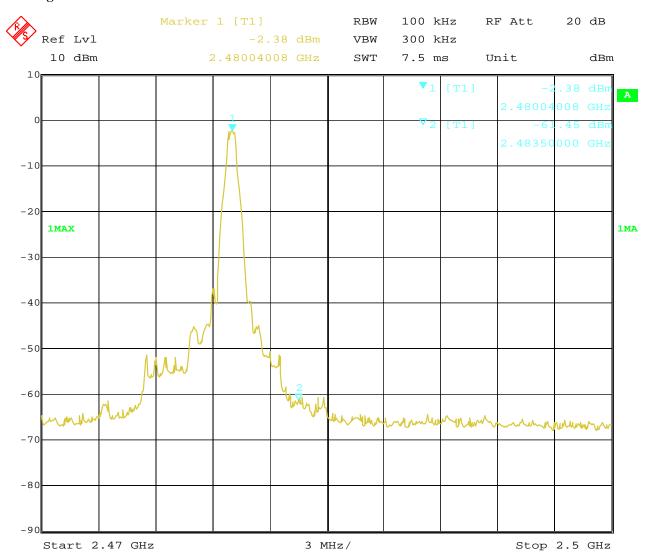


Type of Modulation: GFSK

Out of Band Test Result

Product:	Bl	uetooth Speaker	Test Mode:	High Channel
Mode	Kee	ping Transmitting	Input Voltage	DC3.7V
Temperature		24 deg. C,	Humidity	56% RH
Test Result:		Pass	Detector	PK
The Max. FS in	PK (dBμV/m)	37.1		$74(dB\mu V/m)$
Restrict Band	$AV(dB\mu V/m)$		Limit	$54(dB\mu V/m)$
2483.5MHz				

Test Figure:



17.JUN.2015 14:53:28 Date:

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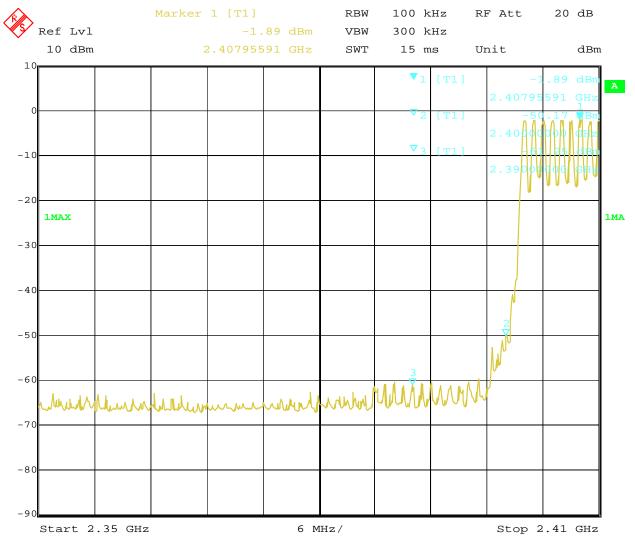


Type of Modulation: GFSK

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	PK
The Max. FS in	PK (dBμV/m)	37.9		$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	$54(dB\mu V/m)$
2390MHz				

Test Figure:



17.JUN.2015 12:59:31 Date:

Date: 2015-06-19

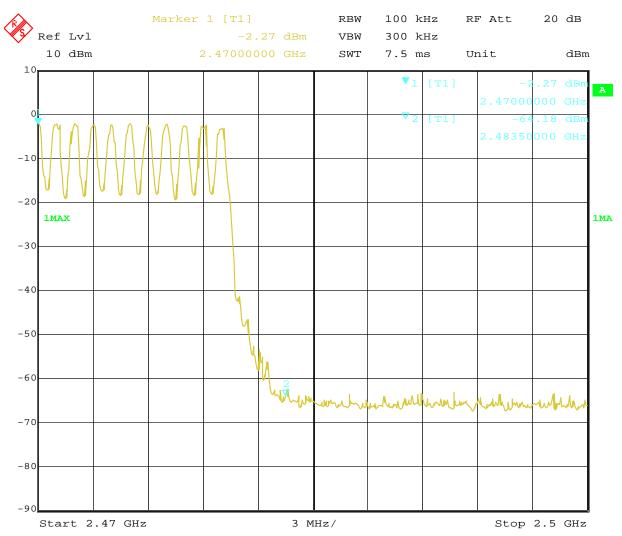


Type of Modulation: GFSK

Out of Band Test Result 12.4

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	PK
The Max. FS in	PK (dBμV/m)	38.3		$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	$54(dB\mu V/m)$
2483.5MHz				

Test Figure:



Date: 17.JUN.2015 12:25:39

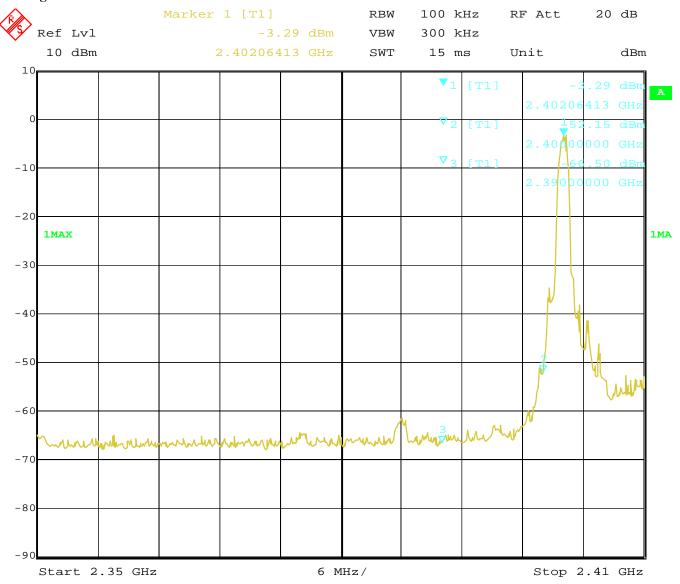
Date: 2015-06-19



Out of Band Test Result 12.4

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	PK
The Max. FS in	PK (dBμV/m) 36.4			$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	54(dBμV/m)
2390MHz				

Test Figure:



17.JUN.2015 14:48:35

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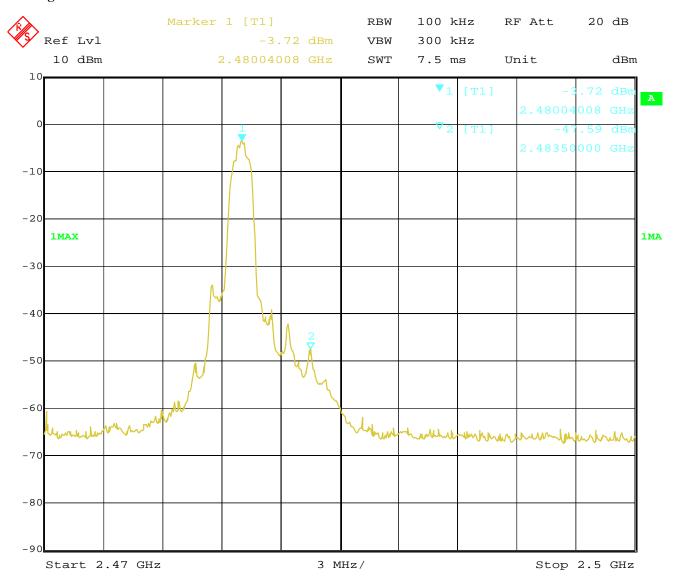
Date: 2015-06-19



Out of Band Test Result 12.4

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	PK (dBμV/m) 37.2			$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	$54(dB\mu V/m)$
2483.5MHz				

Test Figure:



Date: 17.JUN.2015 14:51:21

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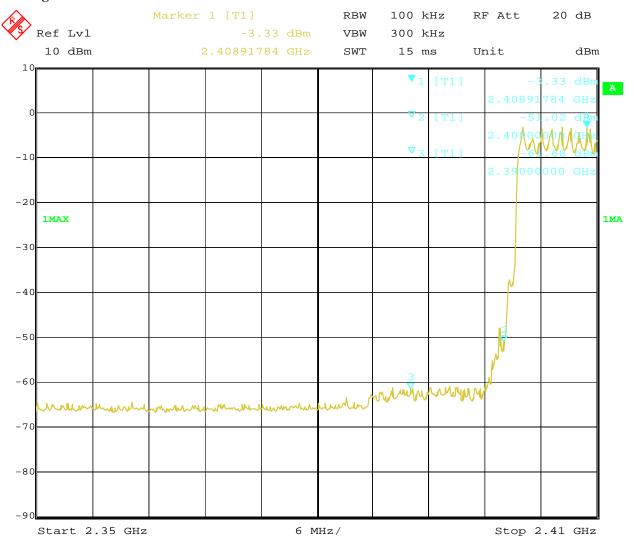
Date: 2015-06-19



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	PK
The Max. FS in	PK (dBμV/m) 37.6			$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	54(dBμV/m)
2390MHz				

Test Figure:



Date: 17.JUN.2015 12:56:58

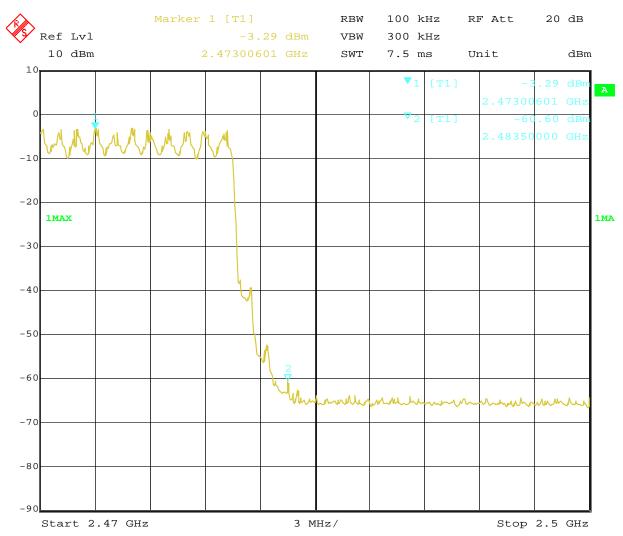
Date: 2015-06-19



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	PK
The Max. FS in	PK (dBμV/m)	37.5		$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	54(dBμV/m)
2483.5MHz				

Test Figure:



Date: 17.JUN.2015 12:30:46

Date: 2015-06-19

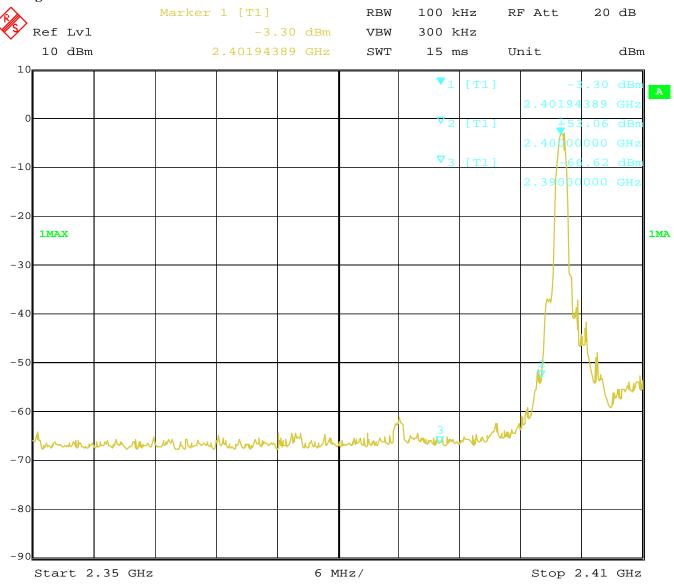


Type of Modulation: 8DPSK

Out of Band Test Result 12.4

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	PK
The Max. FS in	PK (dBμV/m) 37.7			74(dBμV/m)
Restrict Band	AV(dBμV/m)		Limit	54(dBµV/m)
2390MHz				

Test Figure:



17.JUN.2015 14:49:12 Date:

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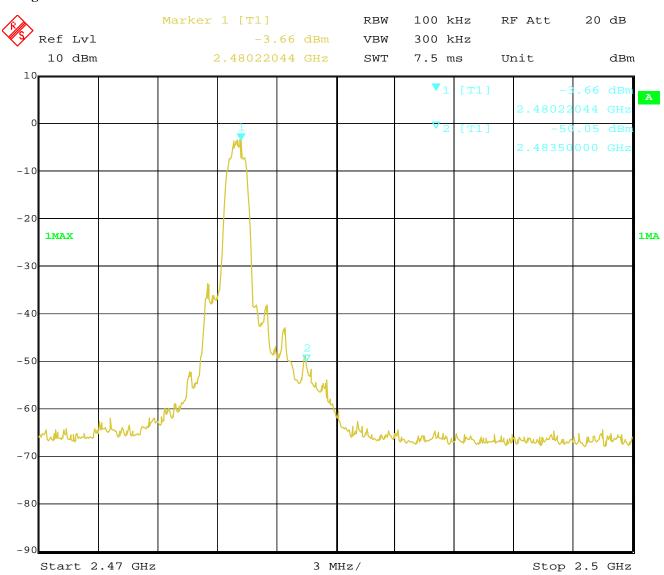


Type of Modulation: 8DPSK

Out of Band Test Result 12.4

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	PK (dBμV/m) 38.4			$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	$54(dB\mu V/m)$
2483.5MHz				

Test Figure:



17.JUN.2015 14:50:13 Date:

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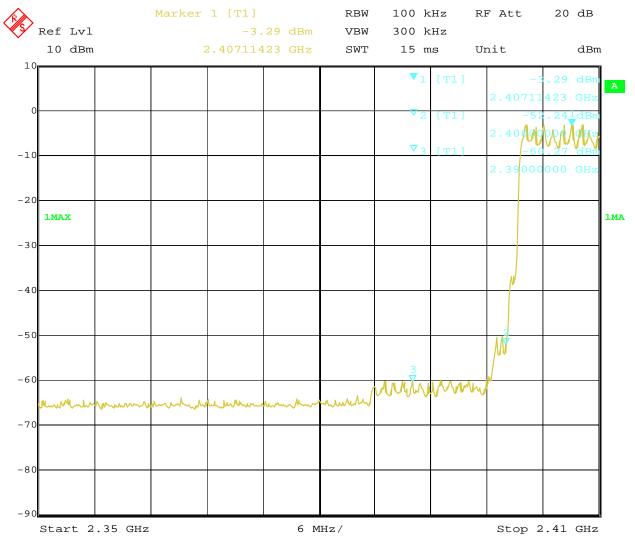


Type of Modulation: 8DPSK

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	PK
The Max. FS in	PK (dBμV/m) 37.8			$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	54(dBμV/m)
2390MHz				

Test Figure:



Date: 17.JUN.2015 12:54:06

Date: 2015-06-19

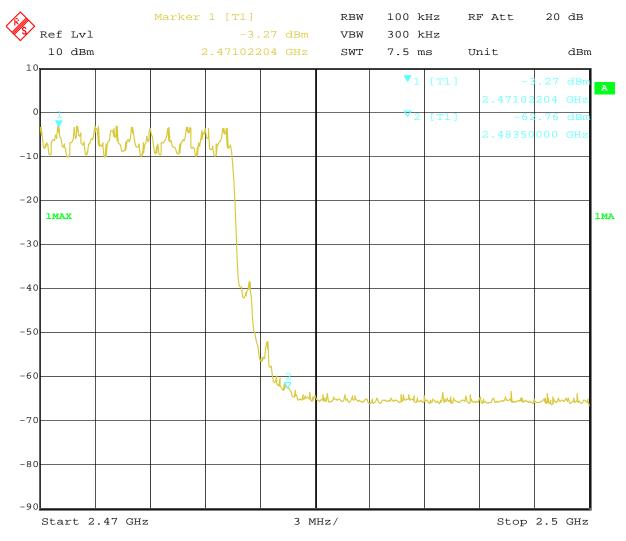


Type of Modulation: 8DPSK

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	PK
The Max. FS in	PK (dBμV/m) 39.6			$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	54(dBμV/m)
2483.5MHz				

Test Figure:



Date: 17.JUN.2015 12:47:59

Date: 2015-06-19



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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

PCB Antenna used. The maximum Gain of this antenna is 0 dBi

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Date: 2015-06-19



14.0 FCC ID Label

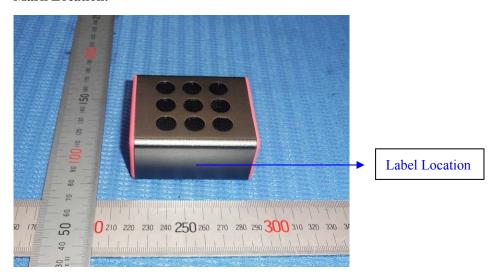
FCC ID: 2AA7L-BTS10

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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Date: 2015-06-19



15.0 Photo of testing

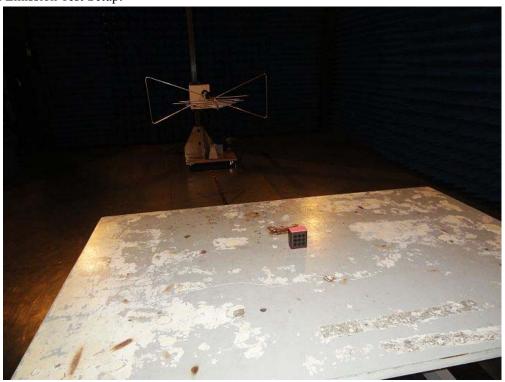
Conducted Emission Test Setup:



Date: 2015-06-19



Radiated Emission Test Setup:





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Outside view





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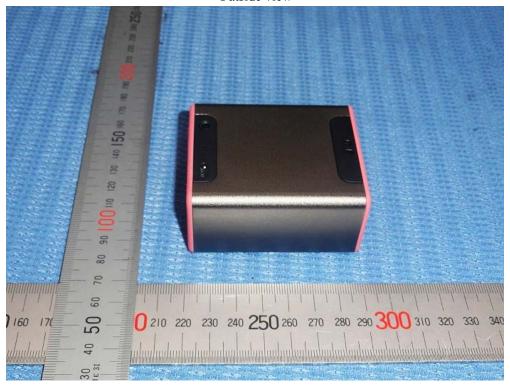
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Outside view





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Inside view





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Inside view





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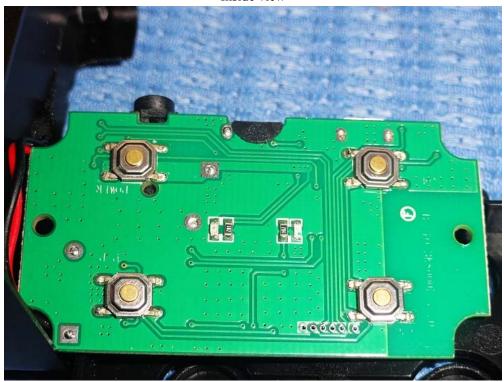
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Inside view





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