







ISO/IEC17025Accredited Lab.

Report No: FCC 1307070 File reference No: 2013-07-29

Applicant: BoConcept A/S

Product: Active Speaker With Bluetooth

Model No: Occa5620

Trademark: BoConcept

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 C63.4&FCC Part 15 Subpart C, Paragraph 15.247 regulations for the evaluation of

electromagnetic compatibility

Approved By

Jack Chung

Jack Chung Manager

Dated: July 29, 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

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

Tel (755) 83448688 Fax (755) 83442996

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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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Photo of Test Setup and EUT View.

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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: BoConcept A/S

Address: Morupvej 16 7400 Herning Denmark

Telephone: +45 7013 1366 Fax: +45 7013 1367

1.3 Description of EUT

Product: Active Speaker With Bluetooth

Manufacturer: Sonicstar (Guangzhou) Electronics Co., Ltd

Address: No.13 Taoyuan West Street, Shima, Junhe, Baiyun District, Guangzhou, 510440,

China

Brand Name: BoConcept Model Number: Occa5620

Additional Model Name N/A
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 Integral antenna, the antenna gain is 2dBi

1.4 Submitted Sample: 1 Sample

1.5 Test Duration: 2013-07-15 to 2013-07-29

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

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1.6 Test Uncertainty

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

1.7 Test Engineer

Terry Tang

The sample tested by

Print Name: Terry Tang

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2.0		Test Equip	ments		
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	CT	SC100	-	2012-08-21	2013-08-20
Printer	EPSON	РНОТО ЕХЗ	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

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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

4.0 EUT Modification

No modification by Shenzhen Timeway Technology Consulting Co., Ltd

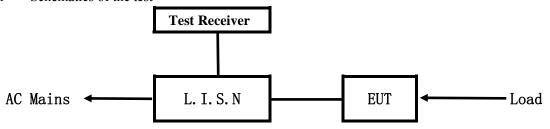
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5. Power Line Conducted Emission Test

5.1 Schematics of the test

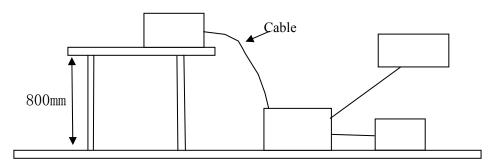


EUT: Equipment Under Test

5.2 Test Method and test Procedure

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

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
Active Speaker With	Sonicstar (Guangzhou) Electronics	Occa5620	2AAN6OCCA5620
Bluetooth	Co., Ltd	Occa3620	

B. Internal Device

Device	Manufacturer	Model	Rating

C. Peripherals

Device	Manufacturer	Model	FCC ID/DOC	Cable
Power	Dongguan City	YJS0368-	VOC	
Supply	Yingju Electronics	2401500D		
	Co., Ltd			
Mobile	SASUNG	GALAXY X4	FCC ID:	
Phone			A3LGTI9500	

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 ~ 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

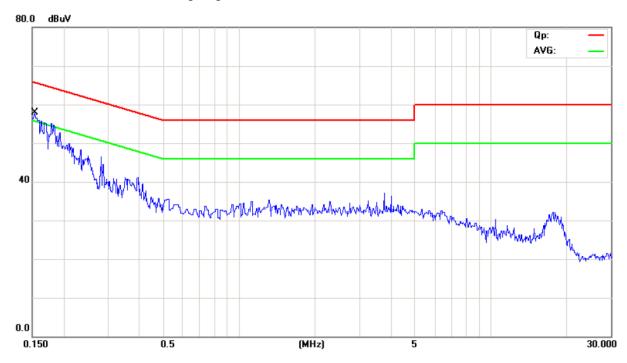
Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Keep Transmitting

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



Frequency	Line	Reading(dBμV)	Limit(dBμV)
(MHz)		Quasi-peak	Average	Quasi-peak	Average
0.153	Live	52.50	22.90	65.79	55.79

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

EUT Operating Environment

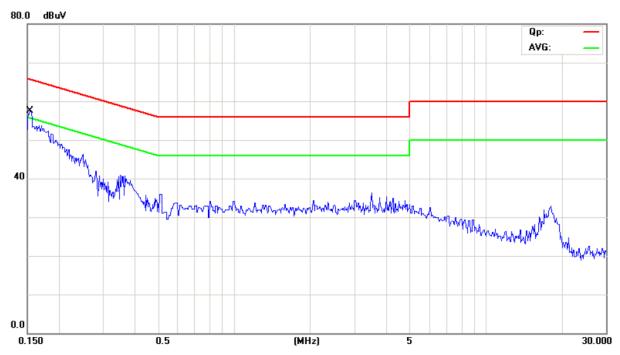
Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Keep Transmitting

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



Frequency	Lina	Reading(dBμV)	Limit(dBμV)
(MHz)	Line	Quasi-peak	Average	Quasi-peak	Average
0.153	Neutral	53.50	20.50	65.80	55.80

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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.

Block diagram of Test setup Distance = 3m Computer Pre -Amplifier Furn-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 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. 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

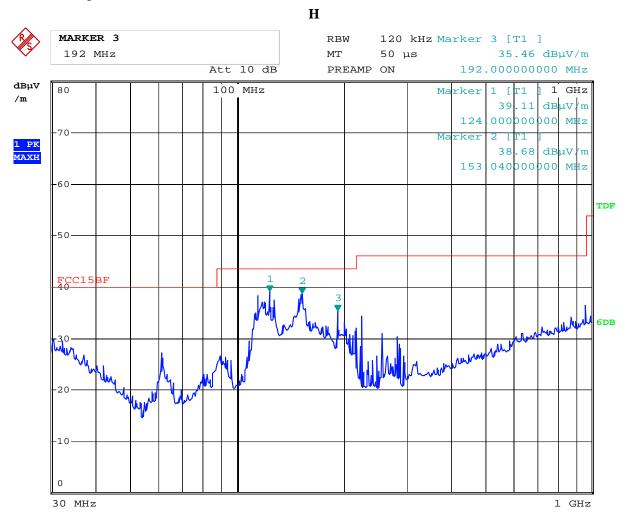
Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB \mu V/m)
192.000	35.46	Н	43.50
124.000	39.11	Н	43.50
153.04	38.68	Н	43.50
96.000	33.24	V	43.50
126.200	38.00	V	43.50
154.960	39.20	V	43.50
607.880	38.52	V	46.00

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Test Figure:



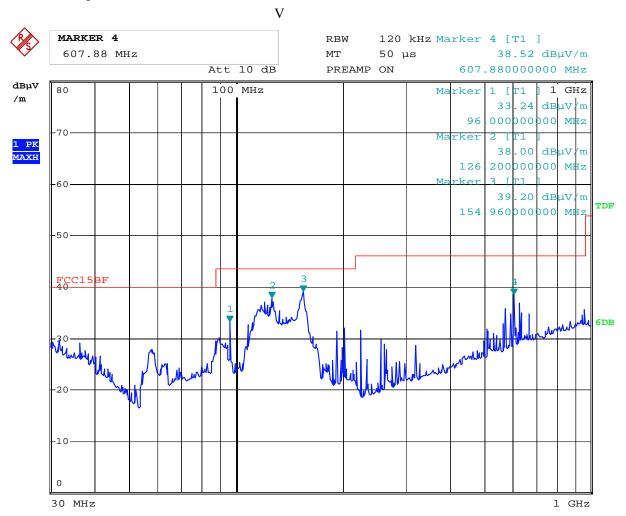
Date: 22.JUL.2013 10:32:30

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Test Figure:



Date: 22.JUL.2013 10:40:29

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Operation Mode: Transmitting under Low Channel (2402MHz)

Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB \u03b4 V/m)
2402	88.42 (PK)	Н	Fundamental Frequency
2402	88.87 (PK)	V	Tundamental Frequency
4804	-	H/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)

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 \mu V/m)
2441	89.50 (PK)	Н	Fundamental Frequency
2441	89.86 (PK)	V	Tundamental Frequency
4882		H/V	74(Peak)/ 54(AV)
7323	1	H/V	74(Peak)/ 54(AV)
9764	-	H/V	74(Peak)/ 54(AV)
12205	-	H/V	74(Peak)/ 54(AV)
14646	1	H/V	74(Peak)/ 54(AV)
17087	1	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 \(\mu \)V/m)
2480	90.55 (PK)	Н	Fundamental Frequency
2480	90.68 (PK)	V	Fundamental Frequency
4960.		H/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

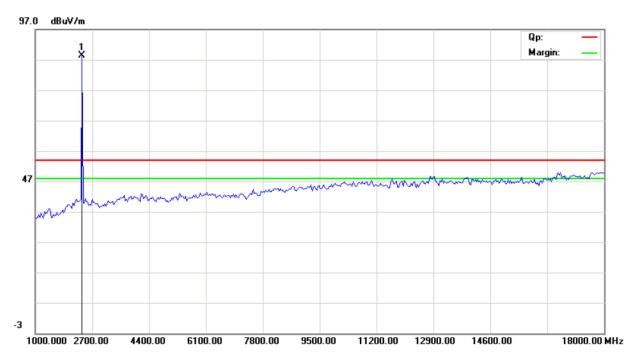
^{2.} Remark "---" means that the emissions level is too low to be measured

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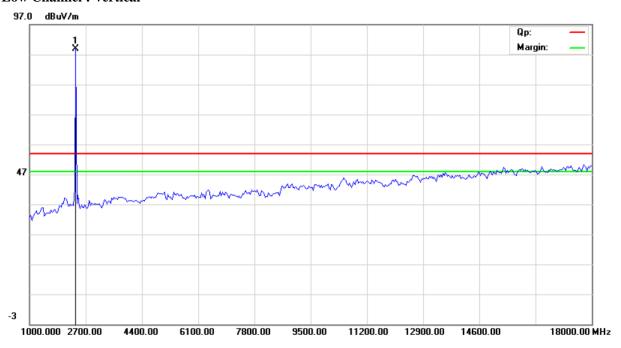


Please refer to the following test plots for details:

Low Channel: Horizontal



Low Channel: Vertical



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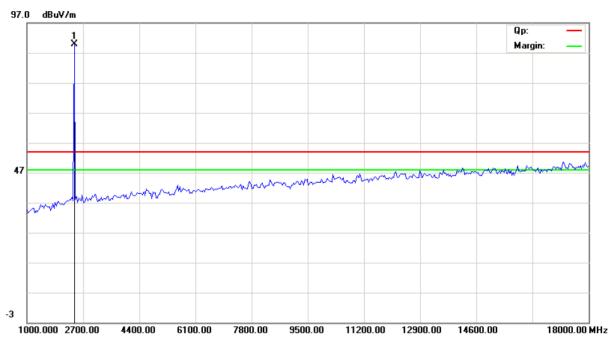
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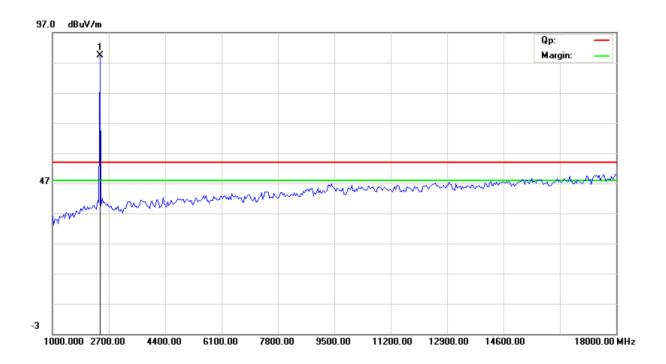
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Middle Channel: Horizontal



Middle Channel :: Vertical



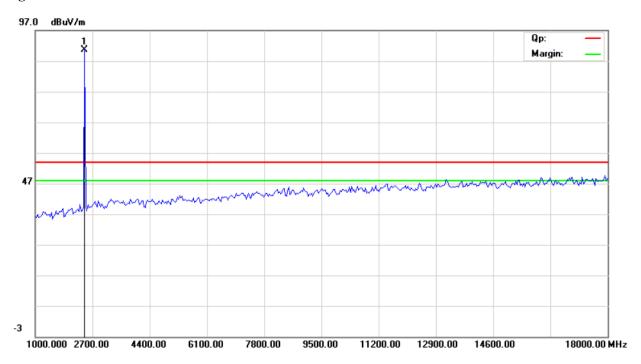
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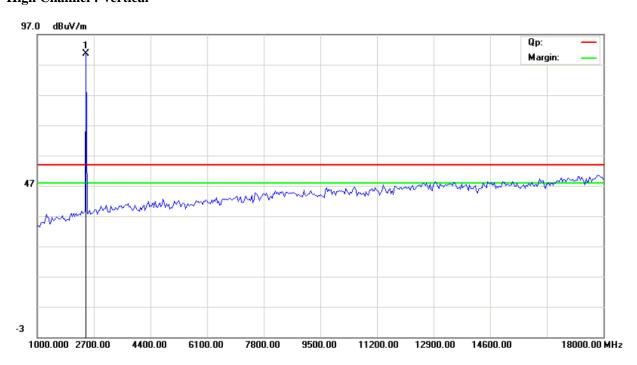
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High Channel: Horizontal



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 =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	Active Speaker With Bluetooth		Model	Occa5620
Mode	le Keep Transmitting		Input Voltage	AC120V
Temperat	rature 24 deg. C,		Humidity	56% RH
Channel	annel Channel Frequency (MHz) 20 dB Bandwid		Maximum Limit (kHz)	Pass/ Fail
Low	2402	864		Pass
Middle	2441 876			Pass
High	2480 864			Pass

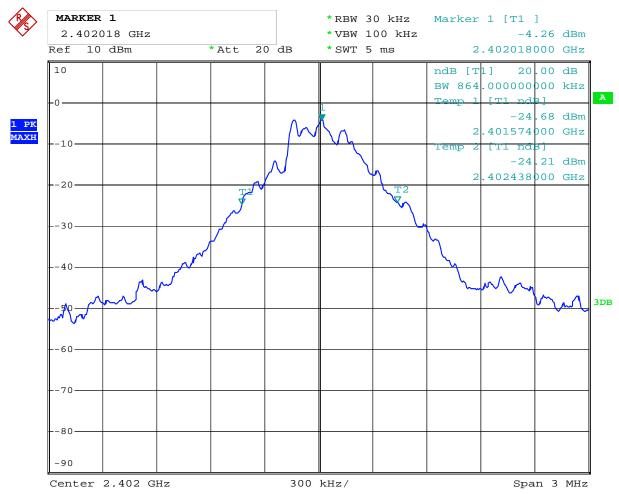
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Test Figure:

1. Condition: Low Channel



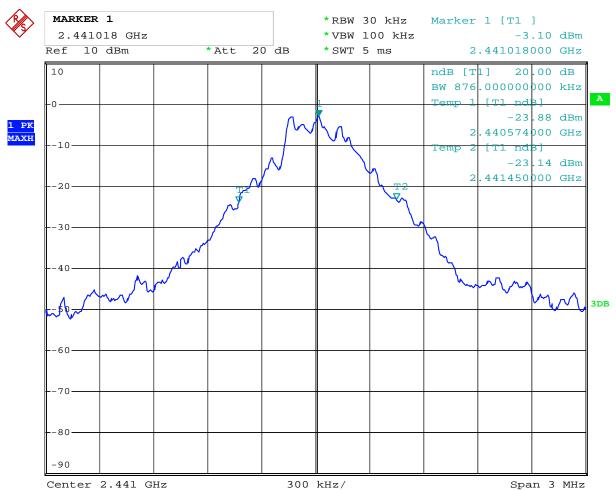
Date: 16.JUL.2013 12:09:15

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2. Condition: Middle Channel



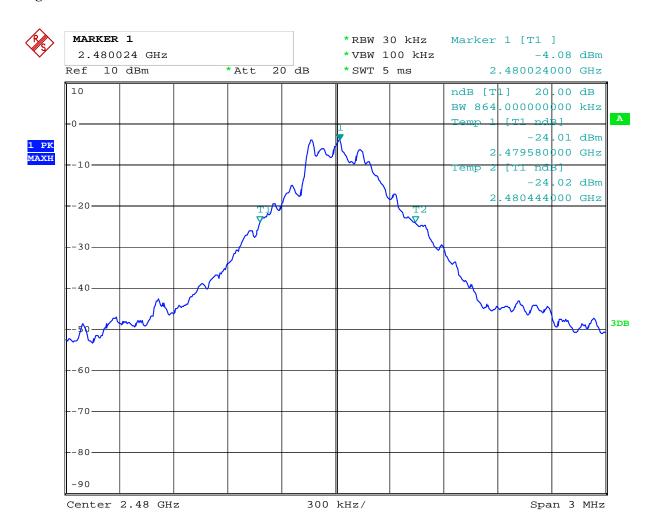
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3. High Channel



Date: 16.JUL.2013 12:14:21

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Test Result

Type of Modulation: JI/4QPSK

EUT	Active Speaker With Bluetooth		Model	Occa5620
Mode	Keep Transmitting		Input Voltage	AC120V
Temperat	rature 24 deg. C,		Humidity	56% RH
Channel	hannel Channel Frequency (MHz) 20 dB Bandwidth (kHz)		Maximum Limit (kHz)	Pass/ Fail
Low	2402	1230		Pass
Middle	2441	1236		Pass
High	2480 1230			Pass

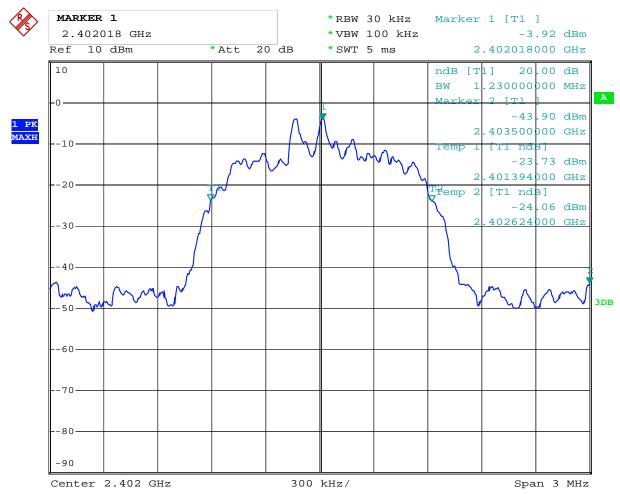
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Test Figure:

1. Condition: Low Channel



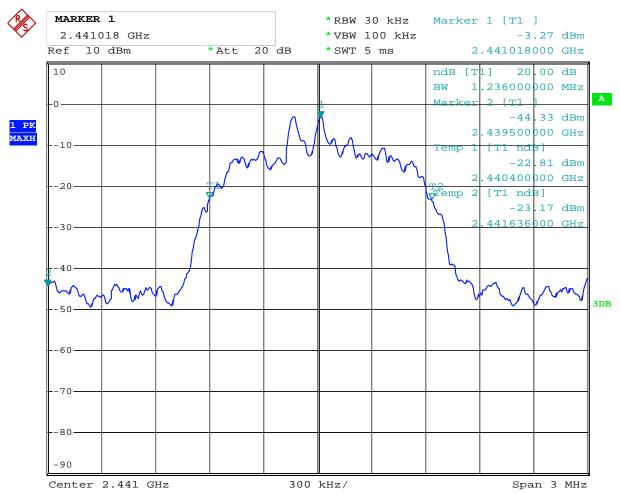
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2. Condition: Middle Channel



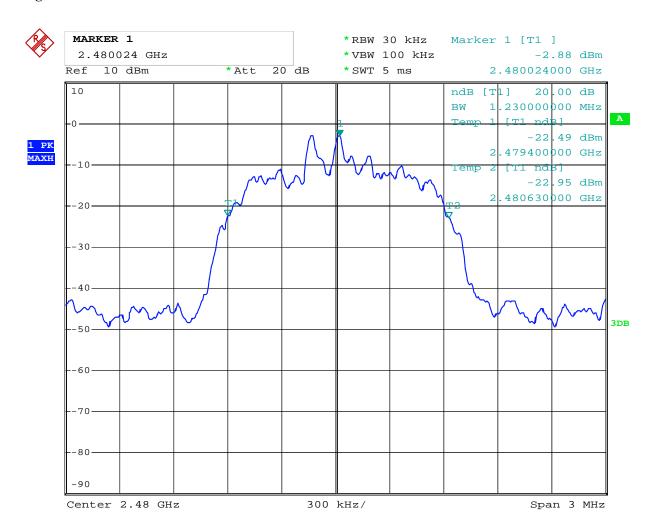
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3. High Channel



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Test Result

Type of Modulation: 8DPSK

EUT	Active Speaker With Bluetooth		Model	Occa5620
Mode	e Keep Transmitting		Input Voltage	AC120V
Temperat	rature 24 deg. C,		Humidity	56% RH
Channel	Channel Frequency (MHz) 20 dB Bandwidth (kHz)		Maximum Limit (kHz)	Pass/ Fail
Low	2402	1212		Pass
Middle	2441	1218		Pass
High	2480 1212			Pass

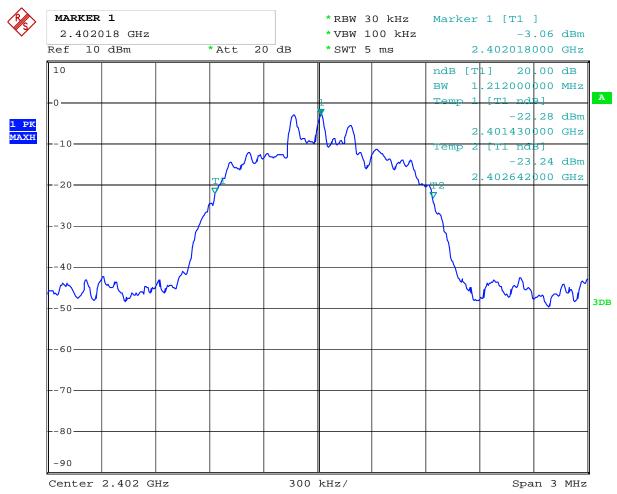
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Test Figure:

1. Condition: Low Channel



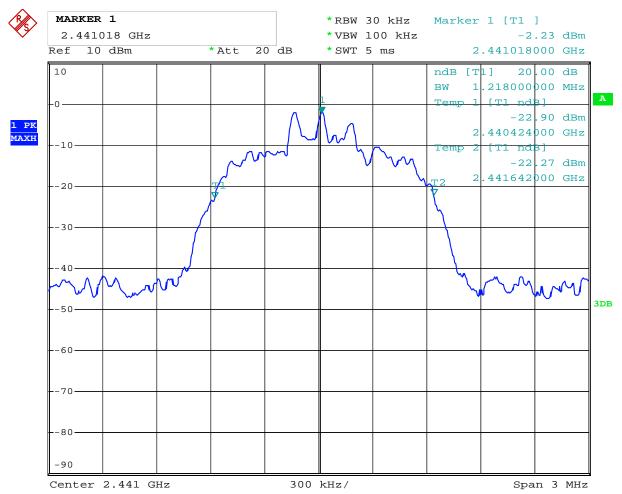
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2. Condition: Middle Channel



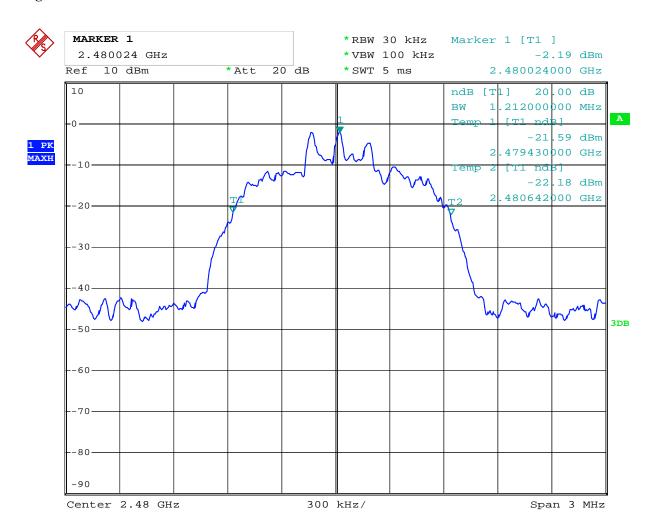
Date: 17.JUL.2013 10:26:04

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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	EUT Active Speaker With Bluetooth		Model		Occa5620
Mode	Ke	eep Transmitting Inp		it Voltage	AC120V
Temperatur	erature 24 deg. C,		Humidity		56% RH
Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass/ Fail
Low	2402	-2.30		30	Pass
Middle	2441	-1.14		30	Pass
High	High 2480 -2.30			30	Pass

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

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

2. The test voltage varied from AC102V-138V. The worse case was recorded

Type of Modulation: J\(J\)/4OPSK

	7.62.02				
EUT	EUT Active Speaker With Bluetoo		Model		Occa5620
Mode	Ke	ep Transmitting	Input Voltage		AC120V
Temperatur	ure 24 deg. C, Humidity		umidity	56% RH	
Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass/ Fail
Low	2402	-2.15		30	Pass
Middle	2441	-1.41		30	Pass
High	2480	-1.05		30	Pass

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

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

2. The test voltage varied from AC102V-138V. The worse case was recorded

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Type of Modulation: 8DPSK

EUT	Active S _I	Active Speaker With Bluetooth		Model	Occa5620
Mode Kee		eep Transmitting Inp		ıt Voltage	AC120V
Temperatur	perature 24 deg. C,		Нι	umidity	56% RH
Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass/ Fail
Low	2402	-1.75		30	Pass
Middle	2441	-1.14		30	Pass
High	2480	-0.80		30	Pass

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

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

2. The test voltage varied from AC102V-138V. The 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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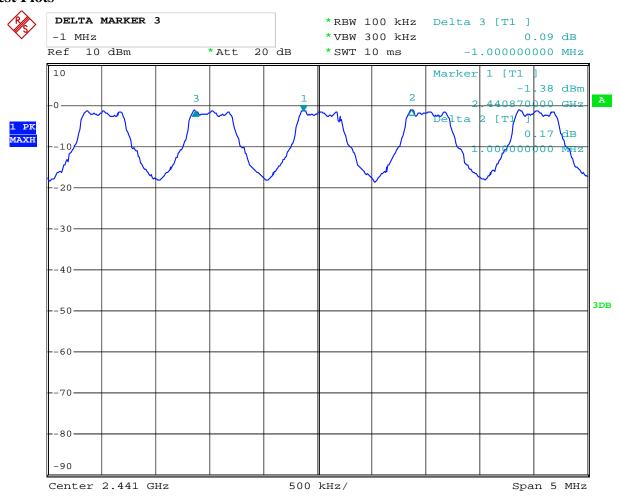


9.4Test Result

Type of Modulation: GFSK

EUT	Active Speaker With	peaker With Bluetooth Model Occa5620			Occa5620		
Mode	Hopping O	n	Input Voltage		AC120V		
Temperature	24 deg. C,		Humidity		56% RH		
Carrier Frequency Separation			Limit		Pass/ Fail		
	1.000MHz	≥ 25 kHz or 2	2/3 of 20 dB bands	vidth	Pass		

Test Plots



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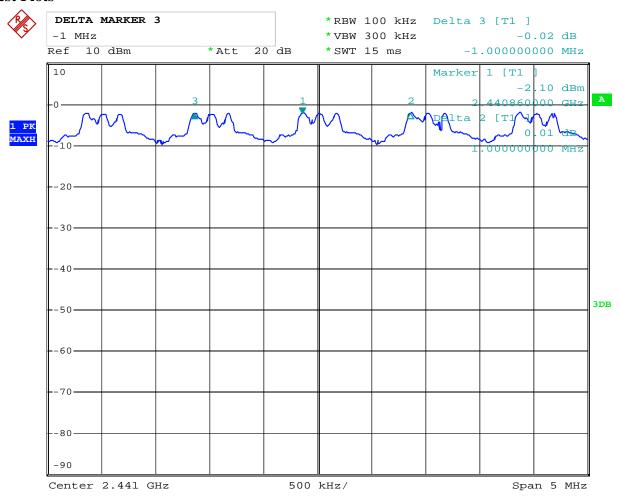
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Type of Modulation: JI/4QPSK

EUT	Active Speaker With	ctive Speaker With Bluetooth Model Occa5620			Occa5620	
Mode	Hopping O	n	Input Voltage		AC120V	
Temperature	24 deg. C,		Humidity		56% RH	
Carrier Frequency Separation		Limit			Pass/ Fail	
1.000MHz		≥ 25 kHz or 2/3 of 20 dB bandwidth		Pass		

Test Plots



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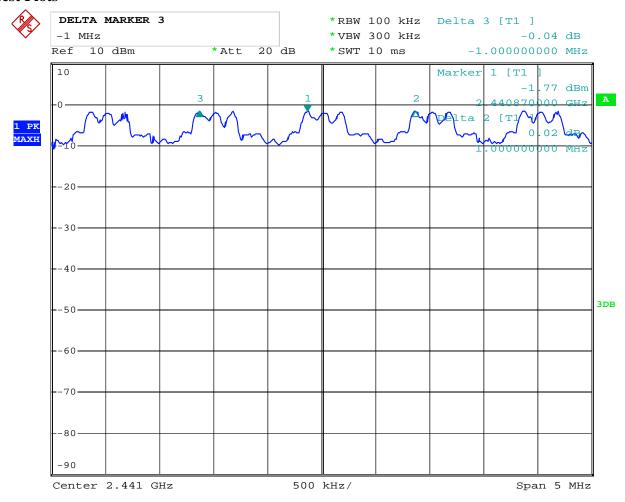
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Type of Modulation: 8DPSK

EUT	Active Speaker With Bluetooth Model			Occa5620		
Mode	Mode Hopping On		Input Voltage		AC120V	
Temperature	24 deg. C,		Humidity		56% RH	
Carrier Frequency Separation			Limit		Pass/ Fail	
1.000MHz		≥ 25 kHz or 2/3 of 20 dB bandwidth		Pass		

Test Plots



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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=VBW=100 kHz; Sweep = auto; Detector function = peak; Trace = max hold
- 3. Record the number of hopping channels.

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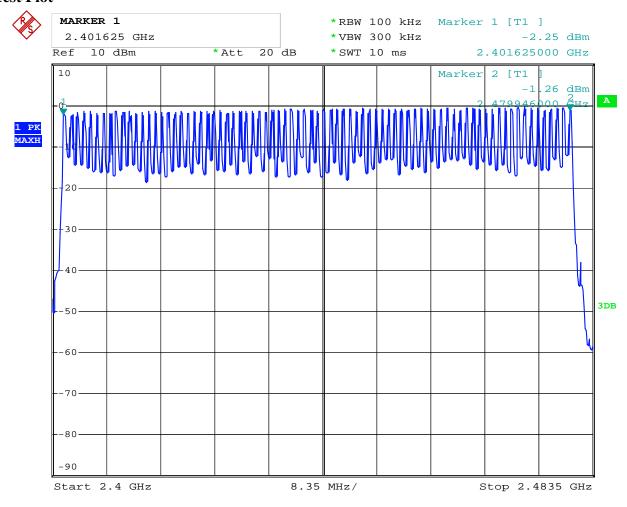


10.4Test Result

Type of Modulation: GFSK

EUT	Active Speaker With Bluetooth			Model		cca5620	
Mode	Hopping On Inp			Input Voltage		AC120V	
Temperature		24 deg. C,			5	6% RH	
Operating Frequ	iency	Number of hopping channels		Limit Pass/ I		Pass/ Fail	
2402-2480M	Hz	79		≥ '	15	Pass	

Test Plot



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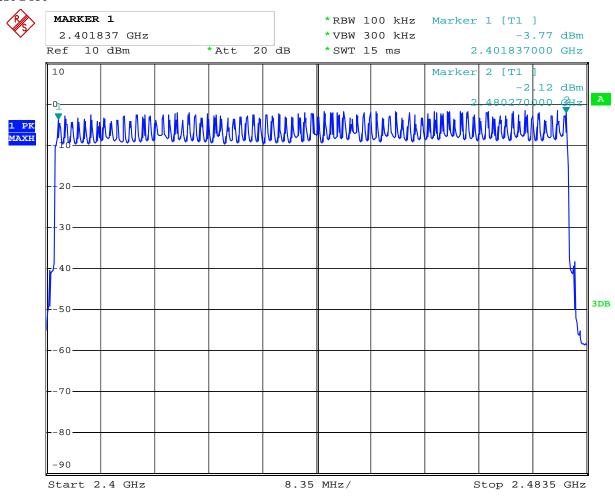
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Type of Modulation: JI/4QPSK

EUT		Active Speaker With Bluetooth Model Occa56				
Mode		Hopping On Input Voltag				C120V
Temperature		24 deg. C,	Hun	nidity	50	6% RH
Operating Frequ	iency	Number of hopping channels		Limit		Pass/ Fail
2402-2480M	Hz	79	≥ 15			Pass

Test Plot



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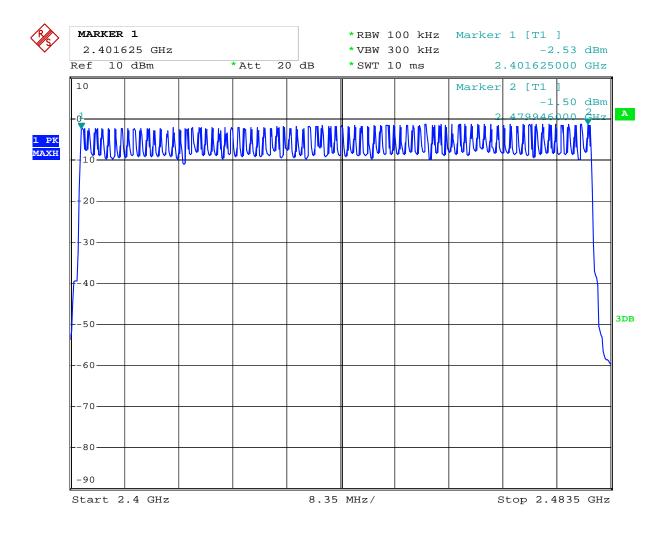
Date: 2013-07-29



Type of Modulation: 8DPSK

EUT	Active Speaker With Bluetooth Model					eca5620
Mode		Hopping On Input				C120V
Temperature		24 deg. C,			50	6% RH
Operating Frequ	iency	Number of hopping channels	Limit		Pass/ Fail	
2402-2480M	Hz	79		>1	15	Pass

Test Plot



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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

Trace = max hold

- 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;
- 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		Active Sp	eaker With Bluetooth		Mode	1	Occa5620
Mode		Ke	ep Transmitting		Input Vol	tage	AC120V
Temperatu	re		24 deg. C,		Humidity		56% RH
Channel		Reading	Hoping Rate	A	Actual		Limit
Low		2.98	266.667 hop/s	(0.318		0.4s
Middle		2.98 266.667 hop/s 0.		0.318		0.4s	
High		3.02	266.667 hop/s	(0.322		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

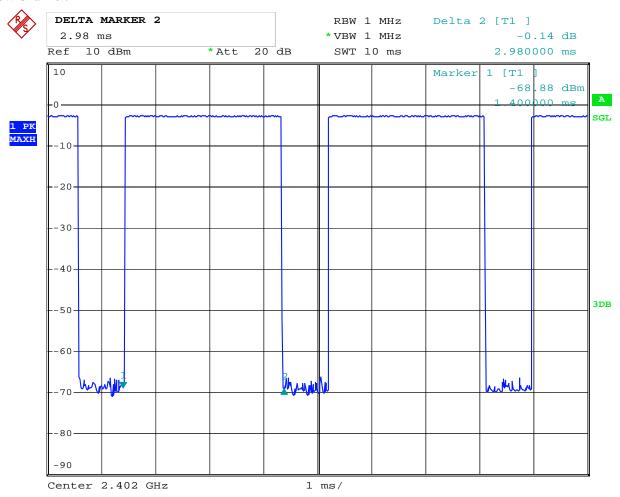
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Test Plots:

Low Channel:



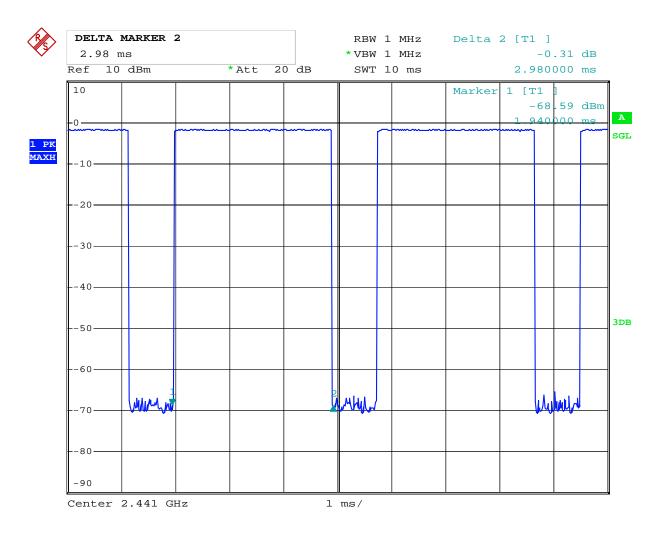
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Middle Channel:



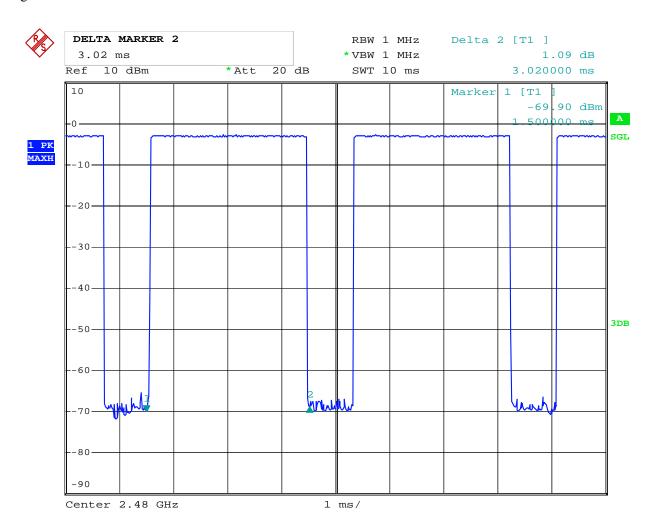
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High Channel



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Test Result

Type of Modulation: $\pi/4QPSK$

EUT		Active Speaker With Bluetooth Model			1	Occa5620	
Mode		Ke	ep Transmitting		Input Vol	tage	AC120V
Temperatu	re		24 deg. C,		Humidity		56% RH
Channel		Reading	Hoping Rate	A	Actual		Limit
Low		2.98	266.667 hop/s	(0.318		0.4s
Middle		2.96	266.667 hop/s	0.316			0.4s
High		3.00	266.667 hop/s	(0.320		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

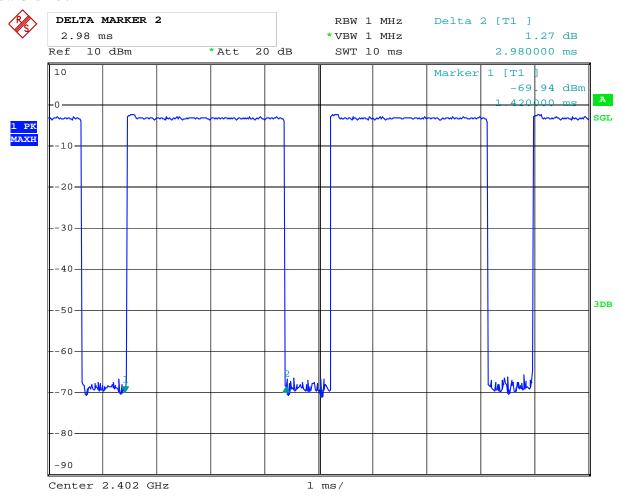
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Test Plots:

Low Channel:



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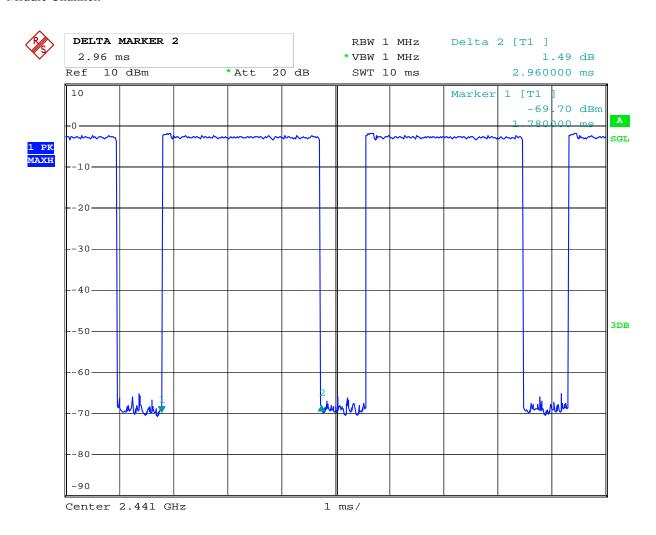
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Middle Channel:



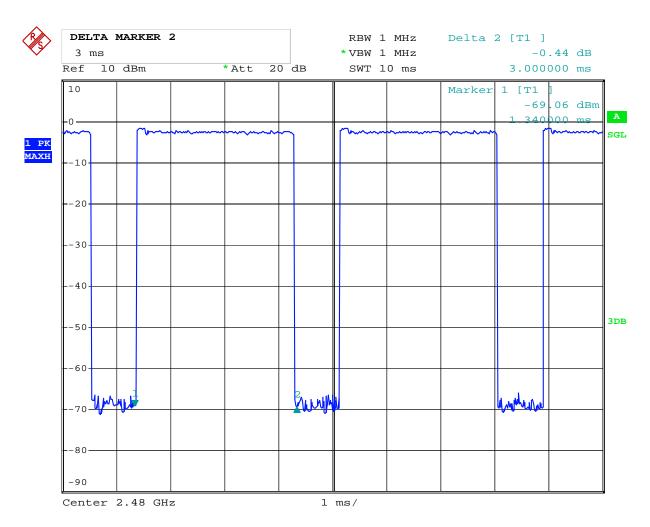
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High Channel



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Type of Modulation: 8DPSK

EUT		Active Sp	eaker With Bluetooth		Mode	1	Occa5620
Mode		Ke	ep Transmitting		Input Vol	tage	AC120V
Temperatu	re		24 deg. C,		Humidity		56% RH
Channel		Reading	Hoping Rate	A	Actual		Limit
Low		3.02	266.667 hop/s	(0.322		0.4s
Middle		2.98	266.667 hop/s	(0.318		0.4s
High		2.98	266.667 hop/s	().318		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

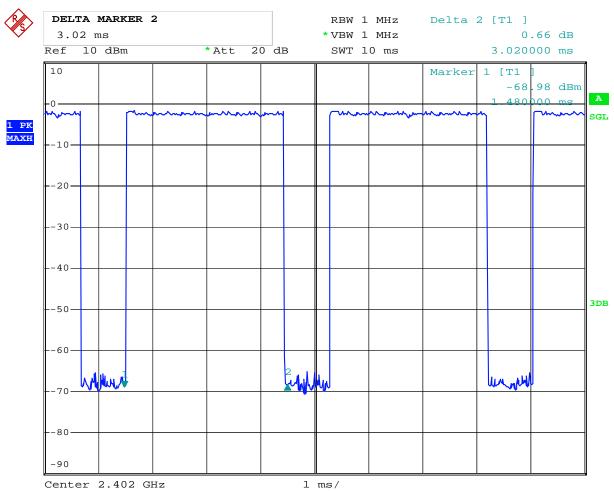
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Test Plots:

Low Channel:



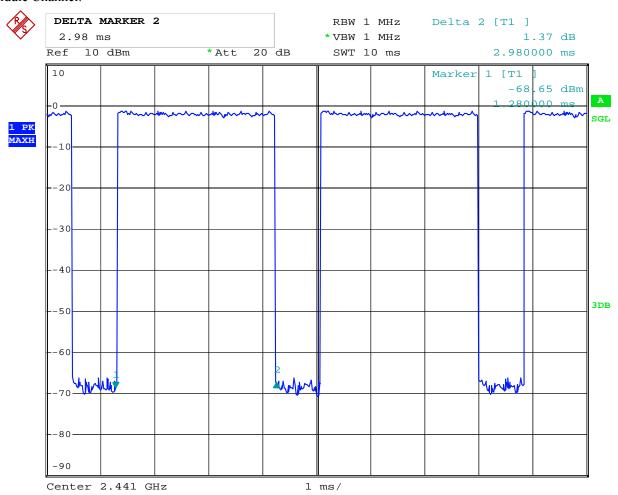
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Middle Channel:



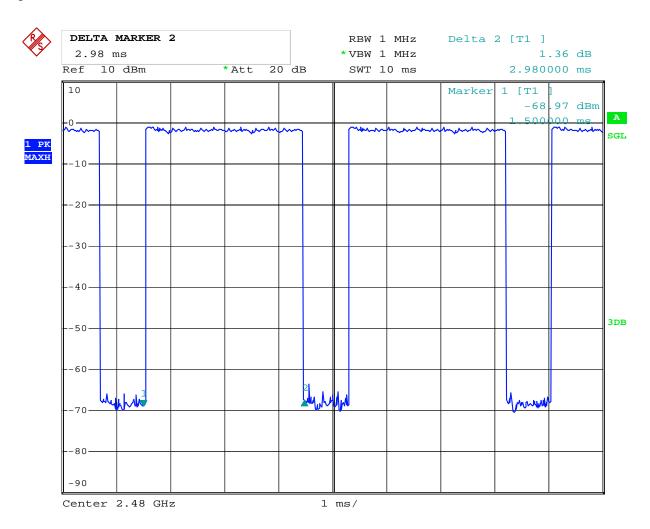
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High Channel



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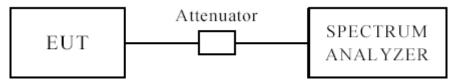
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12 Out of Band Measurement

12.1 Test Setup



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

12.2 Limits of Out of Band Emissions Measurement

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

12.3 Test Procedure

For signals in the restricted bands above and below the 2.4-2.483GHz allocated band a measurement was made of radiated emission test. Peak values with RBW=VBW=1MHz and PK detector.

For bandage test, the spectrum set as follows: RBW=100, VBW=300 kHz. A conducted measurement used

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

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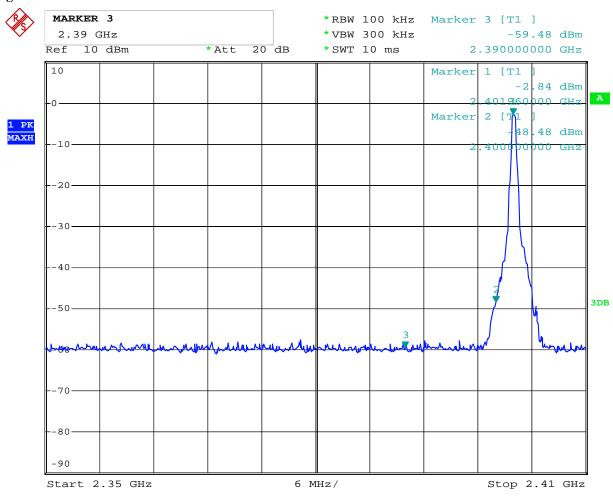


Type of Modulation: GFSK

12.4 Out of Band Test Result

Product:	Active S	Active Speaker With Bluetooth		Low Channel
Mode	Kee	ping Transmitting	Input Voltage	AC120V
Temperature		24 deg. C		56% RH
Test Result:		Pass	Detector	PK
The Max. FS in	PK (dBμV/m)	36.3		74(dBµV/m)
Restrict Band	AV(dBμV/m)		Limit	54(dBµV/m)
2390MHz				

Test Figure:



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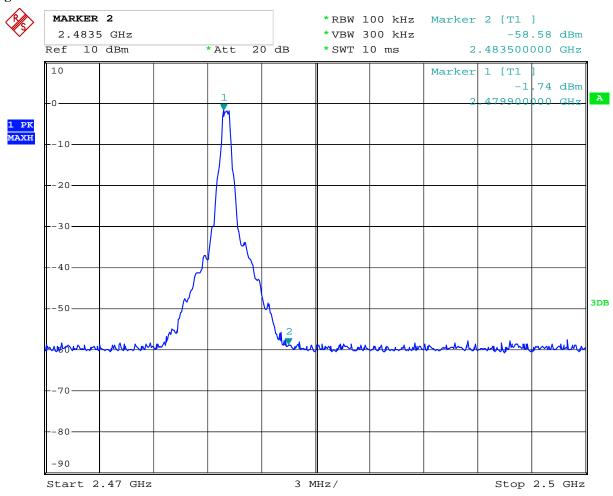


Type of Modulation: GFSK

12.4 Out of Band Test Result

Product:	Acti	ve Speaker With Bluetooth	Test Mode:	High Channel
Mode	Kee	ping Transmitting	Input Voltage	AC120V
Temperature		24 deg. C,	Humidity	56% RH
Test Result:		Pass	Detector	PK
The Max. FS in	PK (dBμV/m)	37.3		$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	$54(dB\mu V/m)$
2483.5MHz				

Test Figure:



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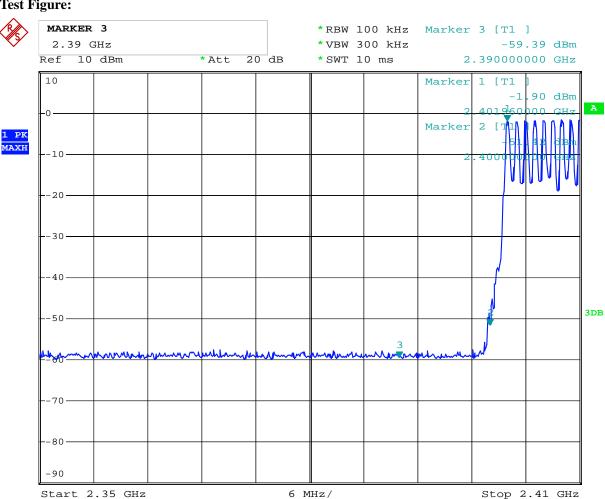


Type of Modulation: GFSK

Out of Band Test Result

Product:	Active S ₁	peaker With Bluetooth	Test Mode:	Hopping mode
Mode		Hopping On	Input Voltage	AC120V
Temperature		24 deg. C,	Humidity	56% RH
Test Result:		Pass	Detector	PK
The Max. FS in	PK (dBμV/m)	37.0		$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)	(dBμV/m)		$54(dB\mu V/m)$
2390MHz				

Test Figure:



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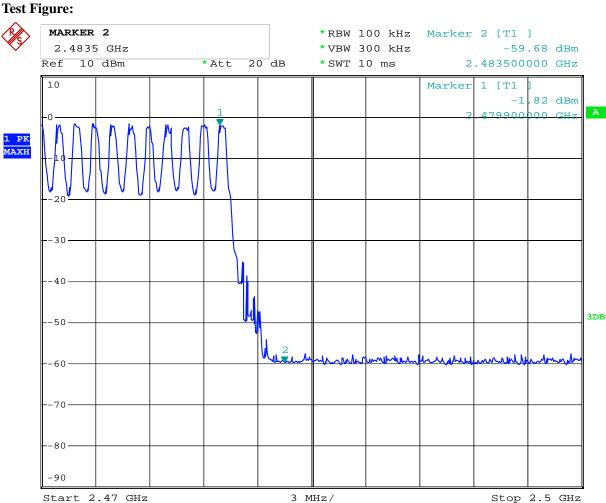
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Type of Modulation: GFSK

Out of Band Test Result

Product:	Active S ₁	peaker With Bluetooth	Test Mode:	Hopping mode
Mode	Hopping On		Input Voltage	AC120V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
The Max. FS in	PK (dBμV/m) 37.3			$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	54(dBμV/m)
2483.5MHz				



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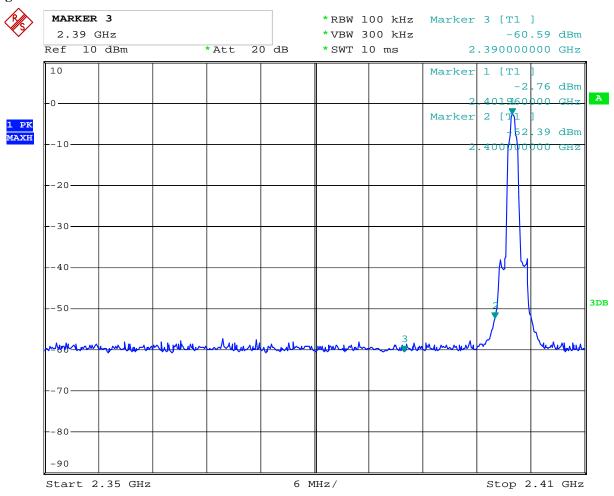


Type of Modulation: JI/4QPSK

12.4 Out of Band Test Result

Product:	Active S ₁	peaker With Bluetooth	Test Mode:	Low Channel
Mode	Keeping Transmitting		Input Voltage	AC120V
Temperature	24 deg. C		Humidity	56% RH
Test Result:	Pass		Detector	PK
The Max. FS in	PK (dBμV/m) 36.1			$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	54(dBμV/m)
2390MHz				

Test Figure:



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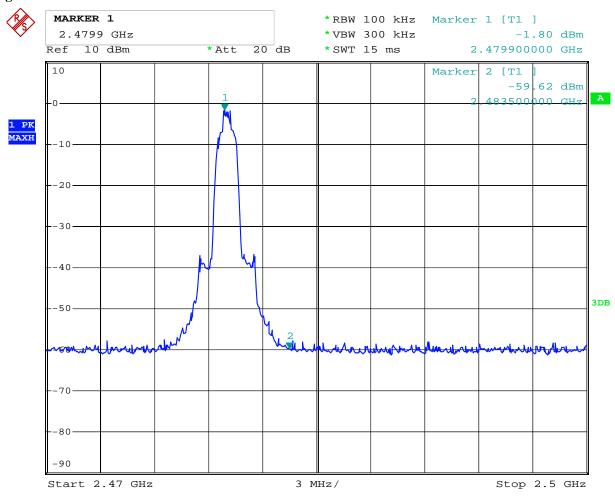


Type of Modulation: JI/4QPSK

12.4 Out of Band Test Result

Product:	Acti	ve Speaker With Bluetooth	Test Mode:	High Channel
Mode	Kee	ping Transmitting	Input Voltage	AC120V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
The Max. FS in	PK (dBμV/m) 37.4			$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	$54(dB\mu V/m)$
2483.5MHz				

Test Figure:



Date: 16.JUL.2013 15:53:58

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Type of Modulation: Л/4QPSK

Out of Band Test Result

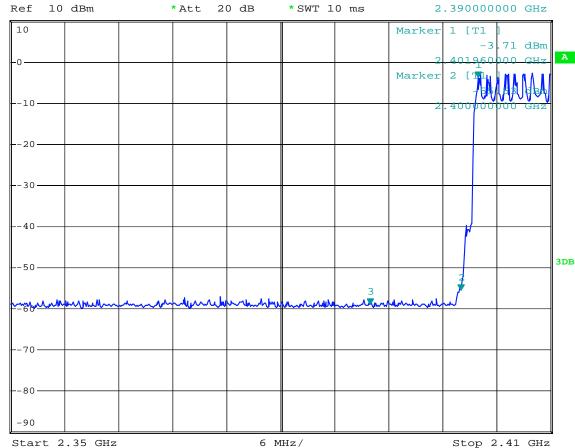
Product:	Active S	peaker With Bluetooth	Test Mode:	Hopping mode
Mode		Hopping On	Input Voltage	AC120V
Temperature		24 deg. C,	Humidity	56% RH
Test Result:	Pass		Detector	PK
The Max. FS in	PK (dBμV/m) 36.2			74(dBμV/m)
Restrict Band	AV(dBμV/m)		Limit	54(dBμV/m)
2390MHz				

Test Figure:



*RBW 100 kHz Marker 3 [T1] *VBW 300 kHz -58.99 dBm *SWT 10 ms 2.390000000 GHz Marker





Date:

16.JUL.2013 15:47:03

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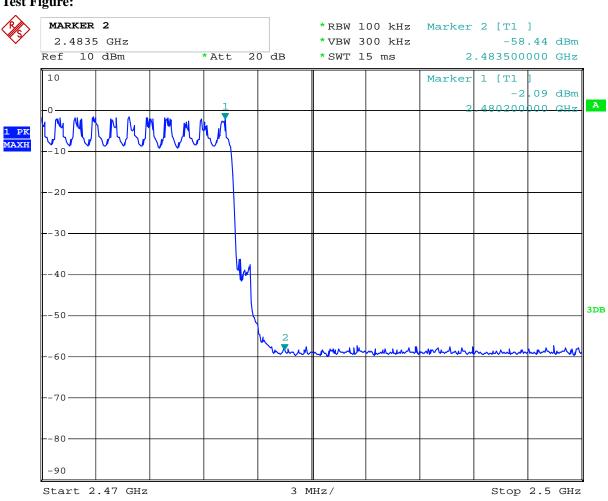


Type of Modulation: $\pi/4$ QPSK

12.4 Out of Band Test Result

Product:	Active S ₁	peaker With Bluetooth	Test Mode:	Hopping mode
Mode	Hopping On		Input Voltage	AC120V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
The Max. FS in	PK (dBμV/m) 37.8			74(dBμV/m)
Restrict Band	AV(dBμV/m)		Limit	54(dBμV/m)
2483.5MHz				

Test Figure:



Date: 16.JUL.2013 15:53:09

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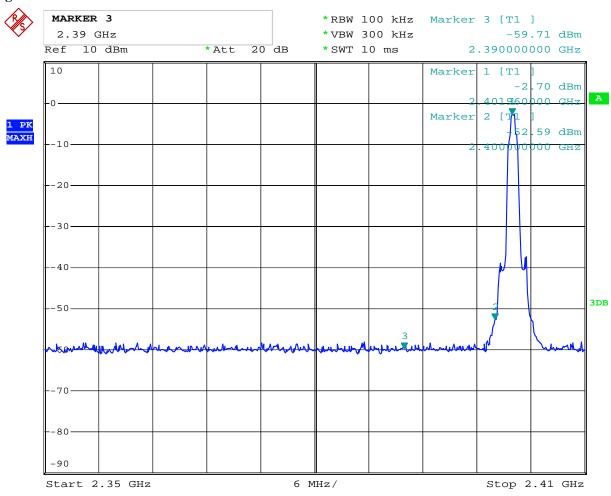


Type of Modulation: 8DPSK

12.4 Out of Band Test Result

Product:	Active S	peaker With Bluetooth	Test Mode:	Low Channel
Mode	Kee	ping Transmitting	Input Voltage	AC120V
Temperature	24 deg. C		Humidity	56% RH
Test Result:	Pass		Detector	PK
The Max. FS in	PK (dBμV/m) 35.7			$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	54(dBμV/m)
2390MHz				

Test Figure:



Date: 17.JUL.2013 10:37:31

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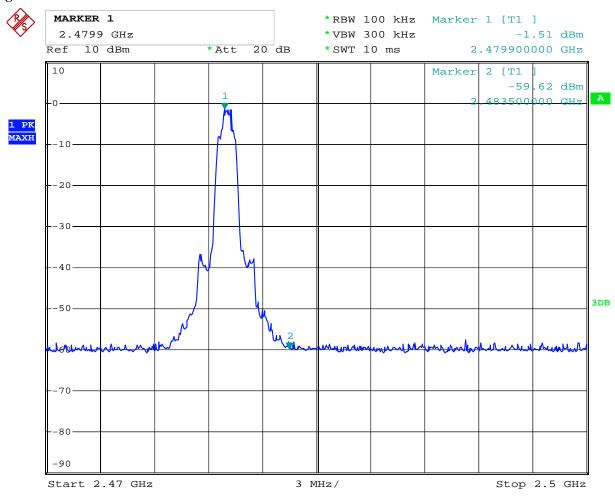


Type of Modulation: 8DPSK

12.4 Out of Band Test Result

Product:	Acti	ve Speaker With Bluetooth	Test Mode:	High Channel
Mode	Kee	ping Transmitting	Input Voltage	AC120V
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.JUL.2013 11:08:45

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Stop 2.41 GHz

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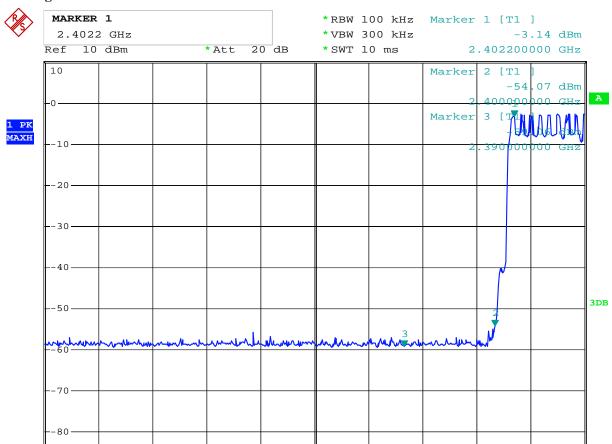


Type of Modulation: 8DPSK

12.4 Out of Band Test Result

Product:	Active S	peaker With Bluetooth	Test Mode:	Hopping mode
Mode		Hopping On	Input Voltage	AC120V
Temperature		24 deg. C,	Humidity	56% RH
Test Result:	Pass		Detector	PK
The Max. FS in	PK (dBμV/m) 36.6			74(dBμV/m)
Restrict Band	AV(dBμV/m)		Limit	54(dBμV/m)
2390MHz				

Test Figure:



Date: 17.JUL.2013 10:55:28

Start 2.35 GHz

6 MHz/

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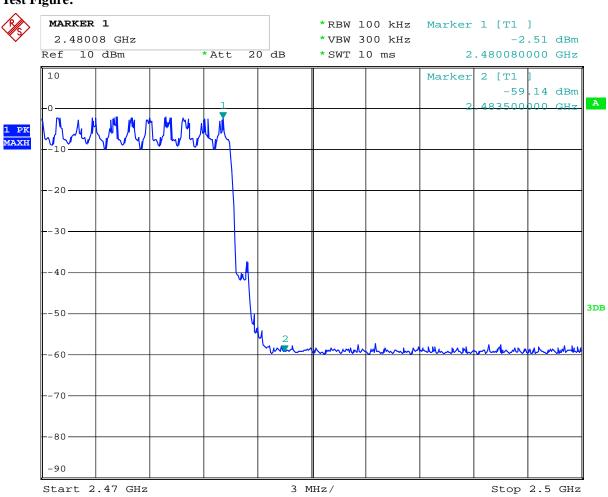


Type of Modulation: 8DPSK

12.4 Out of Band Test Result

Product:	Active S ₁	peaker With Bluetooth	Test Mode:	Hopping mode
Mode	Hopping On		Input Voltage	AC120V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
The Max. FS in	PK (dBμV/m) 37.3			$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	54(dBμV/m)
2483.5MHz				

Test Figure:



Date: 17.JUL.2013 11:00:01

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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 integral antenna. The maximum Gain of this antenna is 2dBi

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14.0 Maximum Permissible Exposure

Applicable Standard

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

(a) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E 2 , H 2 or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100000			5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E 2 , H 2 or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100000			1.0	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

MPE Calculation Method

 $E(V/m) = (30*P*G)^{0.5}/d$

Power Density: Pd $(W/m^2) = E^2/377$

 $\mathbf{E} = \text{Electric Field (V/m)}$

 \mathbf{P} = Peak RF output Power (W)

G = EUT Antenna numeric gain (numeric)

 \mathbf{d} = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = (30*P*G) / (377*d^2)$$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

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

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Type of Modulation: 8DPSK

Calculated Result and Limit

Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
1.585	-0.80	0.83	0.00026	1	Compiles

Note: 8DPSK was the worse case.

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15.0 FCC ID Label

FCC ID: 2AAN6OCCA5620

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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16.0 Photo of testing

Conducted Emission Test Setup:



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Radiated Emission Test Setup:





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7.3 Photo for the EUT





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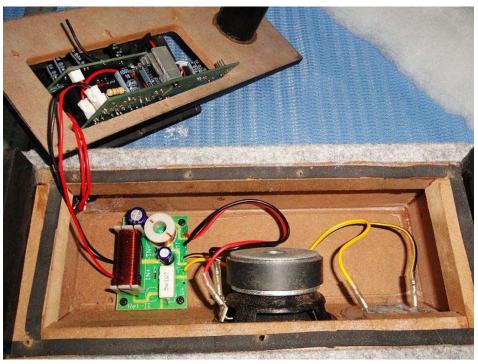
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Photo for the EUT



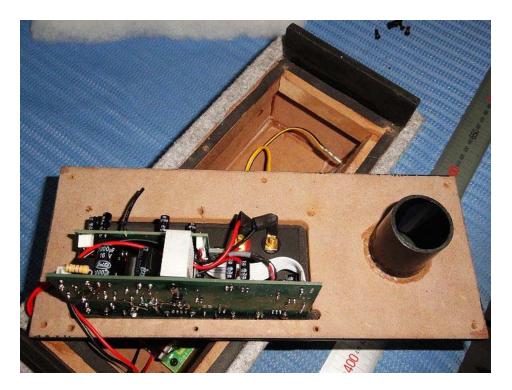


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Photo for the EUT





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Photo for the EUT

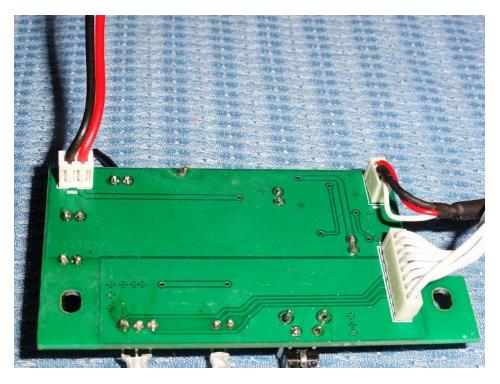






Photo for the EUT





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Photo for the EUT



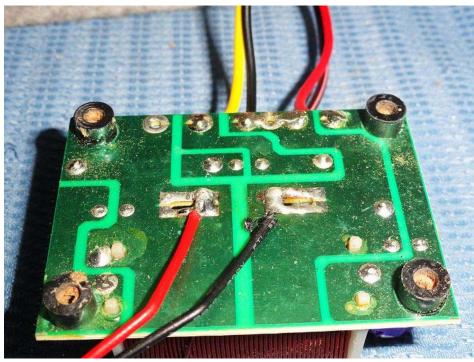




Photo for the EUT





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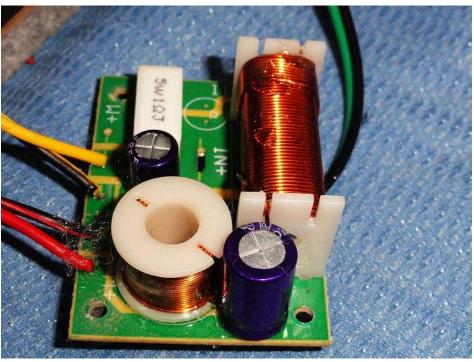
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Photo for the EUT





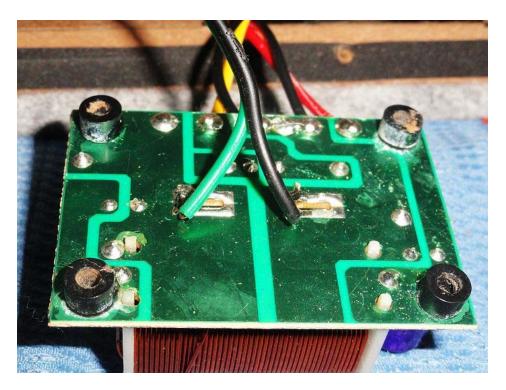
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End of the report