

FCC ID: UZZRFWSP313

# FCC PART 15C TEST REPORT FOR CERTIFICATION On Behalf of

Beautiful Enterprise Co., Ltd

Bluetooth Indoor/Outdoor Speaker

Model Number: RF-WSP313

FCC ID: UZZRFWSP313

Prepared for: Beautiful Enterprise Co., Ltd

26th Floor, Beautiful Group Tower, 77 Connaught Road

Central, Hong Kong

Prepared By: Audix Technology (Shenzhen) Co., Ltd.

No. 6, Ke Feng Rd., 52 Block, Shenzhen Science & Industrial Park, Nantou, Shenzhen, Guangdong, China

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Report Number : ACS-F13213
Date of Test : Jul.21~23, 2013
Date of Report : Aug.14, 2013



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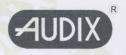
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#### TEST REPORT CERTIFICATION

Applicant

Beautiful Enterprise Co., Ltd

Manufacturer

Beautiful Enterprise Co., Ltd

**EUT Description** 

Bluetooth Indoor/Outdoor Speaker

FCC ID

UZZRFWSP313

(A) MODEL NO.

: RF-WSP313

(B) SERIAL NO.

: N/A

(C)POWER SUPPLY : DC 18V

(D)TEST VOLTAGE : DC 18V From Adapter Input AC 120V/60Hz

Tested for comply with:

FCC Rules and Regulations Part 15 Subpart C: 2012

Test procedure used: ANSI C63.10:2009

The device described above is tested by AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. to confirm comply with all the FCC Part 15 Subpart C requirements. The test results are contained in this test report and AUDIX TECHNOLOGY (SHENZHEN) CO., LTD, is assumed full responsibility for the accuracy and completeness of these tests. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC and IC requirements. This report contains data that are not covered by the NVLAP accreditation.

This Report is made under FCC Part 2.1075. No modifications were required during testing to bring this product into compliance.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Jul.21~23, 2013 Date of Test: Report of date: Aug.14, 2013 Prepared by: Reviewed by: 信拳科技(深圳)有限公司 Lu / Assistant Manager Julia Zhu / Assistant AUD Audix Technology (Shenzhen) Co., Ltd. EMC部門報告專用章 Stamp only for EMC Dept. Report Signature: Dowld Tin Bilk Approved & Authorized Signer: David Jin / Manager



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## 1. SUMMARY OF STANDARDS AND RESULTS

## 1.1.Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION					
<b>Description of Test Item</b>	Standard	Results			
Power Line Conducted Emission Test	FCC Part 15: 15.207	DACC			
Power Line Conducted Emission Test	ANSI C63.10 :2009	PASS			
	FCC Part 15: 15.209				
Radiated Emission Test	FCC Part 15: 15.247(d)	PASS			
	ANSI C63.10 :2009				
Conducted Spurious Emissions	FCC Part 15: 15.247(a)(1)	PASS			
Conducted Spurious Emissions	ANSI C63.10 :2009	1 ASS			
Comion Engavon ov Compandion Toot	FCC Part 15: 15.247(a)(1)	PASS			
Carrier Frequency Separation Test	ANSI C63.10 :2009	PASS			
20 ID D	FCC Part 15: 15.215	DACC			
20dB Bandwidth Test	ANSI C63.10 :2009	PASS			
N 1 OCH : E T	FCC Part 15: 15.247(a)(1)(iii)	DACC			
Number Of Hopping Frequency Test	ANSI C63.10 :2009	PASS			
D11 Ti T4	FCC Part 15: 15.247(a)(1)(iii)	PASS			
Dwell Time Test	ANSI C63.10 :2009	PASS			
M : P 10 4 P T	FCC Part 15: 15.247(b)(1)\	DACC			
Maximum Peak Output Power Test	ANSI C63.10 :2009	PASS			
Dend Eder Consuling a T	FCC Part 15: 15.247(d)	DACC			
Band Edge Compliance Test	ANSI C63.10 :2009	PASS			
N/A is an abbreviation for Not Applicab	le.				

N/A is an abbreviation for Not Applicable.



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#### 2. GENERAL INFORMATION

2.1.Description of Device (EUT)

Product Name : Bluetooth Indoor/Outdoor Speaker

Model Number : RF-WSP313

FCC ID : UZZRFWSP313

Radio : Buletooth3.0+EDR

Operation frequency: 2402MHz-2480MHz

Antenna : Integrated PCB Antenna, -1.72dBi PK gain

Modulation : GFSK,  $\pi/4$  DQPSK, 8-DPSK

Note: $\pi/4$ DQPSK modulation is same type modulation with 8-DPSK, and according exploratory test, 8-DPSK will have worse

emissions, so the final test were only performed with GFSK and

8-DPSK modulation.

Applicant : Beautiful Enterprise Co., Ltd

26th Floor, Beautiful Group Tower, 77 Connaught Road Central,

Hong Kong

Manufacturer : Beautiful Enterprise Co., Ltd

26th Floor, Beautiful Group Tower, 77 Connaught Road Central,

Hong Kong

Factory : Shenzhen Synchron Electronics Co., Ltd

No. 9 Mei Li Road, Xia Men Lin, Fu Tian Area, Shenzhen,

Guangdong, China

Manufacture: SHENZHEN JING QUAN HUA ELECTRONICS

CO., LTD

Power Adapter #1 : CO., LTD M/N: NSA45EU-180250

Cable: Unshielded, Detachable, 1.6m

Manufacture: Ten Pao Industrial Co Ltd

Power Adapter #2 : M/N: S048CU1800250

Cable: Unshielded, Detachable, 1.8m

Audio Cable : Unshielded, Detachable, 1.8m

Date of Test : Jul.21~23, 2013

Date of Receipt : Jul.20, 2013

Sample Type : Prototype production

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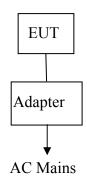
#### 2.2. Test information

The test software "bluesuite.exe" was used to control EUT work in Continuous TX mode, and select test channel.

Tested mode, channel, and data rate information						
Mode	data rate (Mbps)	Channel	Frequency (MHz)			
Tx Mode	1	Low:CH 0	2402			
GFSK	1	Middle: CH39	2441			
modulation	1	High: CH78	2480			
Tx Mode	3	Low:CH 0	2402			
8-DPSK	3	Middle: CH39	2441			
modulation	3	High: CH78	2480			

Note:  $\pi/4DQPSK$  modulation is same type modulation with 8-DPSK, and according exploratory test, 8-DPSK will have worse emissions, so the final test were only performed with GFSK and 8-DPSK modulation.

## 2.3.Block Diagram of Test Setup



(EUT: Bluetooth Indoor/Outdoor Speaker)



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## 2.4. Test Facility

Site Description

Audix Technology (Shenzhen) Co., Ltd.

No. 6, Ke Feng Rd., 52 Block, Shenzhen Name of Firm

& Industrial Park, Nantou, Science

Shenzhen, Guangdong, China

Certificated by FCC, USA 3m Anechoic Chamber Registration Number: 90454

Valid Date: Feb.22, 2015

Certificated by FCC, USA 3m & 10m Anechoic Chamber

Registration Number: 794232 Valid Date: Oct.31, 2015

Certificated by Industry Canada EMC Lab.

Registration Number: IC 5183A-1

Valid Date: Jun.13, 2014

Certificated by DAkkS, Germany Registration No: D-PL-12151-01-01

Valid Date: Feb.01, 2014

Accredited by NVLAP, USA NVLAP Code: 200372-0 Valid Date: Mar.31, 2014

## 2.5. Measurement Uncertainty (95% confidence levels, k=2)

Test Item	Uncertainty
Uncertainty for Conduction emission test	3.48dB(9KHz to 150KHz)
in No. 1 Conduction	3.1dB (150KHz to 30MHz)
	3.22 dB (30~200MHz, Polarize: H)
Uncertainty for Radiation Emission test	3.23 dB (30~200MHz, Polarize: V)
in 3m chamber	3.49 dB (200M~1GHz, Polarize: H)
	3.39 dB (200M~1GHz, Polarize: V)
Uncertainty for Radiation Emission test in	5.04 dB (1-6GHz Distance: 3m)
3m chamber (1GHz-18GHz)	5.06 dB (6-18GHz Distance: 3m)
Uncertainty for Radiated Spurious	3.57 dB
Emission test in RF chamber	3.57 db
Uncertainty for Conduction Spurious	2.00 dB
emission test	2.00 <b>u</b> D
Uncertainty for Output power test	0.73 dB
Uncertainty for Bandwidth test	83 kHz
Uncertainty for DC power test	0.038 %
Uncertainty for test site temperature and	0.6℃
humidity	3%

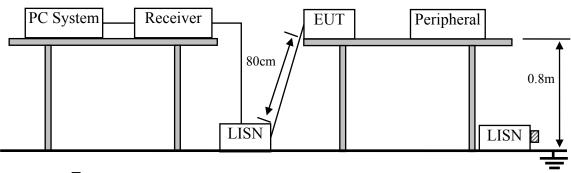


#### 3. POWER LINE CONDUCTED EMISSION MEASUREMENT

#### 3.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESHS10	838693/001	Oct.31, 12	1 Year
2.	L.I.S.N.#1	Rohde & Schwarz	ESH2-Z5	834066/011	Oct.31, 12	1 Year
3.	L.I.S.N.#3	Kyoritsu	KNW-242C	8-1920-1	May.08, 13	1 Year
4.	Terminator	Hubersuhner	$50\Omega$	No. 1	May.08, 13	1 Year
5.	Terminator	Hubersuhner	$50\Omega$	No. 2	May.08, 13	1 Year
6.	RF Cable	Fujikura	3D-2W	No.1	May.08, 13	1Year
7.	Coaxial Switch	Anritsu	MP59B	M50564	May.08, 13	1 Year
8.	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100341	May.08, 13	1 Year

## 3.2.Block Diagram of Test Setup



 $\square$  :50 $\Omega$  Terminator

#### 3.3. Power Line Conducted Emission Test Limits

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

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

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

#### 3.4. Configuration of EUT on Test

The following equipment are installed on Power Line Conducted Emission Test to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

#### 3.4.1. Bluetooth Indoor/Outdoor Speaker (EUT)

Model Number : RF-WSP313

Serial Number : N/A



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#### 3.5. Operating Condition of EUT

- 3.5.1. Setup the EUT and simulator as shown as Section 3.2.
- 3.5.2. Turn on the power of all equipment.
- 3.5.3. Let the EUT work in test mode (TX Mode) and measure it.

#### 3.6. Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#). this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4-2009 on conducted Emission test.

The bandwidth of test receiver (R&S TEST RECEIVER ESHS10) is set at 9 kHz.

The frequency range from 150kHz to 30MHz is checked. The test result are reported on Section 3.7.

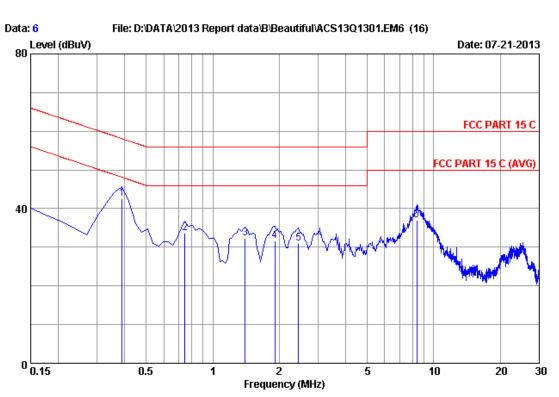
#### 3.7. Conducted Emission at Mains Terminals Test Results

**PASS.** (All emissions not reported below are too low against the prescribed limits.)

Audix Technology (Shenzhen) Co., Ltd. Report No. ACS-F13213

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Site no :1#conduction Data No :6

Dis./Ant. :\*\* 2012 ESH2-Z5 LINE

Limit :FCC PART 15 C

Env./Ins. :21.7\*C/45% Engineer :Leo-Li

EUT :Bluetooth Indoor/Outdoor Speaker

Power Rating :DC 18V From Adapter Input AC 120V/60Hz

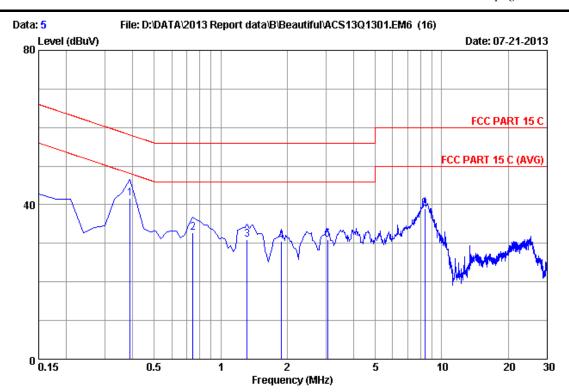
Test Mode :Tx Mode :M/N:RF-WSP313

		LISN	Cable		Emissior	ı		
No	Freq	Factor	Loss	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dB)	
1	0.38880	0.19	0.02	42.41	42.62	58.09	15.47	QP
2	0.74700	0.20	0.03	33.51	33.74	56.00	22.26	QP
3	1.404	0.22	0.03	31.96	32.21	56.00	23.79	QP
4	1.911	0.24	0.04	31.26	31.54	56.00	24.46	QP
5	2.448	0.25	0.04	30.67	30.96	56.00	25.04	QP
6	8.389	0.41	0.09	36.40	36.90	60.00	23.10	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss+Reading.

2.If the average limit is met when useing a quasi-peak detector. the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

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Site no :1#conduction Data No :5

Dis./Ant. :\*\* 2012 ESH2-Z5 NEUTRAL

Limit :FCC PART 15 C

Env./Ins. :21.7\*C/45% Engineer :Leo-Li

EUT :Bluetooth Indoor/Outdoor Speaker

Power Rating :DC 18V From Adapter Input AC 120V/60Hz

Test Mode :Tx Mode :M/N:RF-WSP313

No 	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.38880	0.22	0.02	41.43	41.67	58.09	16.42	QP
2	0.74700	0.24	0.03	32.49	32.76	56.00	23.24	QP
3	1.314	0.26	0.03	30.67	30.96	56.00	25.04	QP
4	1.881	0.28	0.04	30.28	30.60	56.00	25.40	QP
5	3.045	0.31	0.05	30.55	30.91	56.00	25.09	QP
6	8.389	0.42	0.09	38.42	38.93	60.00	21.07	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss+Reading.

2.If the average limit is met when useing a quasi-peak detector. the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.



## 4. RADIATED EMISSION MEASUREMENT

#### 4.1.Test Equipment

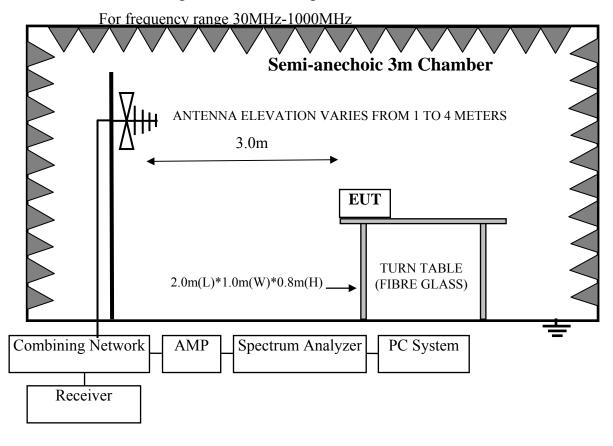
Frequency rang: 30~1000MHz

		<u> </u>				
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	3#Chamber	AUDIX	N/A	N/A	Nov.24,12	1 Year
2	EMI Spectrum	Agilent	E4407B	MY41440292	May.08, 13	1 Year
3	Test Receiver	Rohde & Schwarz	ESVS10	834468/011	May.08, 13	1 Year
4	Amplifier	HP	8447D	2648A04738	May.08, 13	1 Year
5	Bilog Antenna	Schaffner	CBL6111C	2598	Mar.14,13	1 Year
6	RF Cable	MIYAZAKI	CFD400-NL	3# Chamber No.3	May.08, 13	1 Year
7	Coaxial Switch	Anritsu	MP59B	M74389	May.08, 13	1 Year

Frequency rang: above 1000MHz

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Oct.31, 12	1 Year
2	Horn Antenna	EMCO	3115	9607-4877	Aug.28, 13	1 Year
3	Amplifier	Agilent	8449B	3008A00863	May.08, 13	1 Year
4	RF Cable	Hubersuhner	SUCOFLEX106	77980/6	May.08, 13	1 Year
5	RF Cable	Hubersuhner	SUCOFLEX106	77977/6	May.08, 13	1 Year
6	Horn Antenna	EMCO	3116	00060089	Aug.28, 12	1 Year

## 4.2.Block Diagram of Test Setup



page

Receiver

Semi-anechoic 3m Chamber

ANTENNA ELEVATION VARIES FROM 1 TO 4 METERS

3m

2.0m(L)\*1.0m(W)\*0.8m(H)

ABSORBER

TURN TABLE
(FIBRE GLASS)

Combining Network

AMP

Spectrum Analyzer

PC System

#### 4.3. Radiated Emission Limit Standard: FCC 15.209

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

Remark : (1) Emission level dB $\mu$ V = 20 log Emission level  $\mu$ V/m

- (2) The smaller limit shall apply at the cross point between two frequency bands.
- (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.
- (4) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

#### 4.4.EUT Configuration on Test

The following equipment are installed on Radiated Emission Test to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.



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#### 4.4.1. Bluetooth Indoor/Outdoor Speaker (EUT)

Model Number : RF-WSP313

Serial Number : N/A

#### 4.5. Operating Condition of EUT

- 4.5.1. Setup the EUT and simulator as shown as Section 3.2.
- 4.5.2. Turned on the power of all equipment.
- 4.5.3. Let EUT work in Tx mode.

#### 4.6. Test Procedure

The EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on Test. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.10-2009 on radiated emission Test.

This test was performed with EUT in X, Y, Z position, and the worse case was found when EUT in X position as the test photo indicated.

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

The bandwidth of the Spectrum's RBW is set at 1MHz and VBW is set at 3MHz for peak emissions measurement above 1GHz

This device is pulse Modulated, a duty cycle factor was used to calculated average level based measured peak level.

The frequency range from 30MHz to 10th harmonic (25GHz) are checked. and no any emissions were found from 18GHz to 25 GHz, So the radiated emissions from 18GHz to 25GHz were not record.

#### 4.7. Radiated Emission Test Results

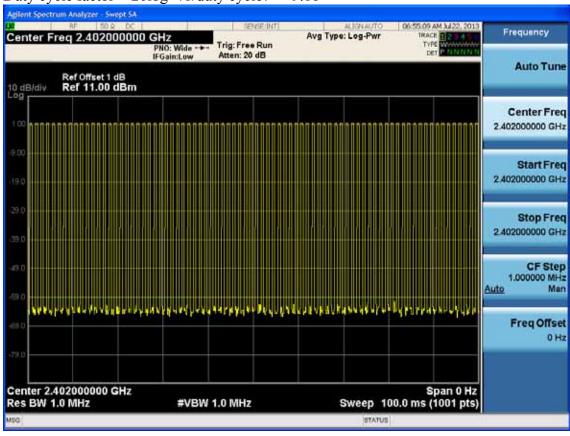
#### PASS.

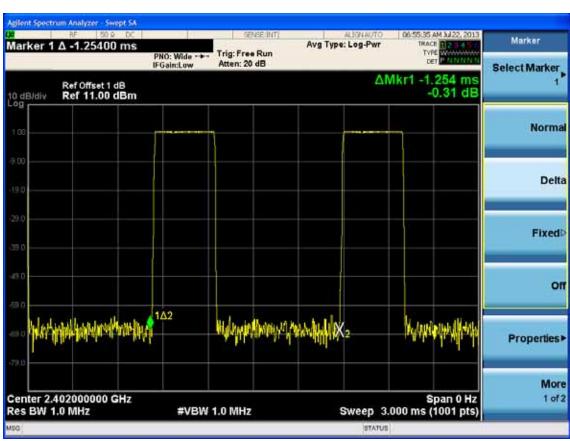
All the emissions from 30MHz to 25GHz were comply with the 15.209 Limit.

Note: The duty cycle factor for calculate average level is 9.16dB, and average limit is 20dB below peak limit, so if peak measured level comply with peak limit, the average level was deemed to comply with average limit.

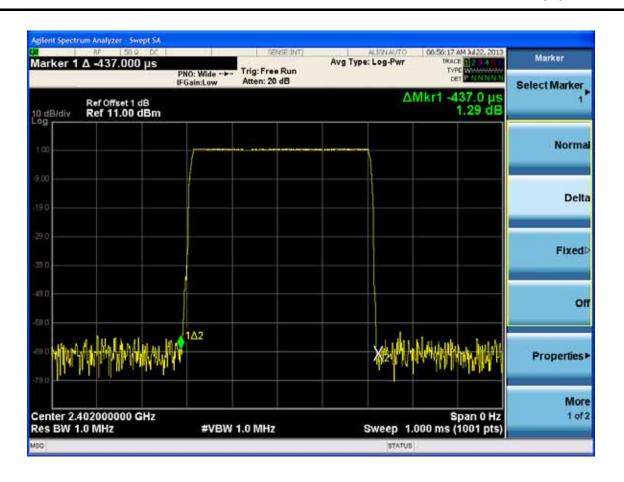


Duty cycle: 0.437 ms / 1.254 ms \* 100% = 34.8%Duty cycle factor =  $20 \log (1/\text{duty cycle}) = 9.16$ 





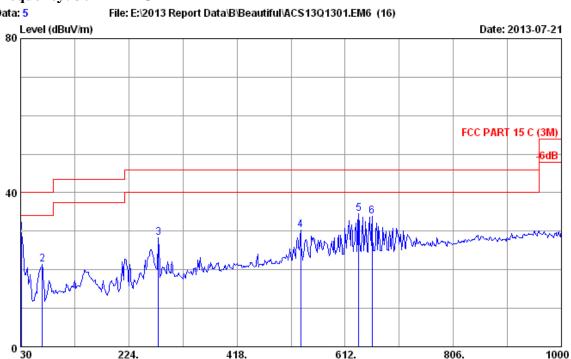
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Frequency (MHz)

Site no. : 3m Chamber Data no. : 5

Dis. / Ant. : 3m 2013 CBL6111C 2598 Ant. pol. : HORIZONTAL

Limit : FCC PART 15 C (3M)

Env. / Ins. : 24\*C/65% Engineer : Leo-Li

EUT : Bluetooth Indoor/Outdoor Speaker Power rating : DC 18V From Adapter Input AC 120V/60Hz

Test Mode : Tx Mode

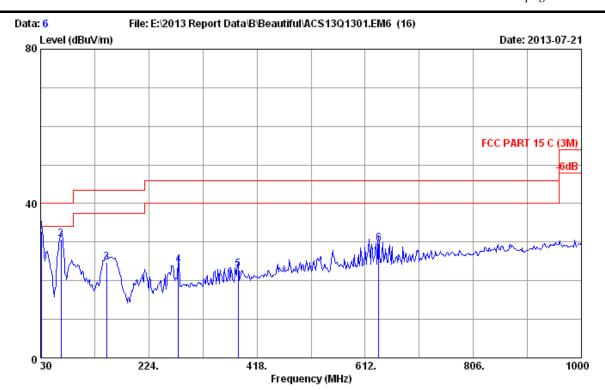
M/N:RF-WSP313 NSA45EU-180250

_	No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	_	Emission Level (dBuV/m)		_	Remark
	1	31.940	18.93	0.86	9.79	29.58	40.00	10.42	QP
	2	68.800	6.56	1.27	13.54	21.37	40.00	18.63	QP
	3	277.350	13.15	2.08	13.03	28.26	46.00	17.74	QP
	4	532.460	18.65	2.84	8.75	30.24	46.00	15.76	QP
	5	636.250	20.30	3.14	11.17	34.61	46.00	11.39	QP
	6	660.500	20.30	3.21	10.26	33.77	46.00	12.23	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.

2. The emission levels that are 20dB below the official limit are not reported.

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Site no. : 3m Chamber Data no. : 6

Dis. / Ant. : 3m 2013 CBL6111C 2598 Ant. pol. : VERTICAL

Limit : FCC PART 15 C (3M)

Env. / Ins. : 24\*C/65% Engineer : Leo-Li

EUT : Bluetooth Indoor/Outdoor Speaker

Power rating: DC 18V From Adapter Input AC 120V/60Hz

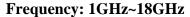
Test Mode : Tx Mode

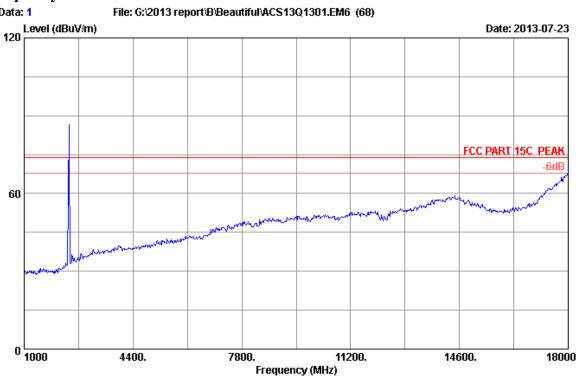
M/N:RF-WSP313

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	31.940	18.93	0.86	12.97	32.76	40.00	7.24	QP
2	66.860	6.34	1.26	23.05	30.65	40.00	9.35	QP
3	148.340	11.88	1.59	11.25	24.72	43.50	18.78	QP
4	277.350	13.15	2.08	8.78	24.01	46.00	21.99	QP
5	384.050	15.78	2.41	4.84	23.03	46.00	22.97	QP
6	636.250	20.30	3.14	6.15	29.59	46.00	16.41	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.

page





Site no. : 10M Data no. : 1

Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

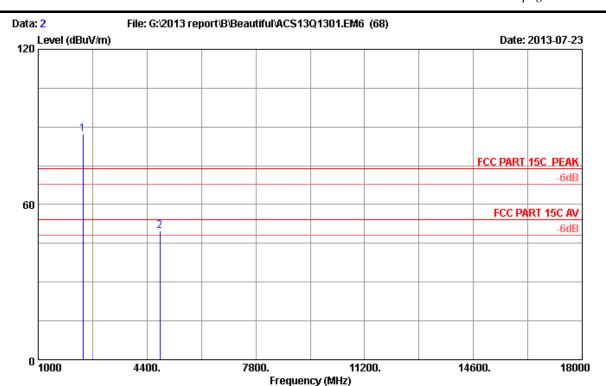
Env. / Ins. : 24\*C/56% Engineer : Leo-Li

EUT : Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

Test Mode : GFSK 2402MHz Tx RF-WSP313

page



Data no. : 2

Site no. : 10M Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

: Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

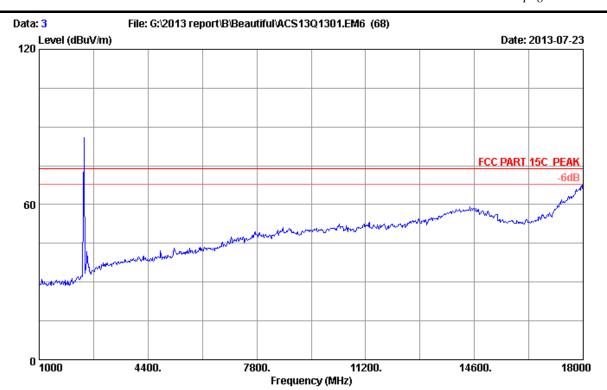
Test Mode : GFSK 2402MHz Tx RF-WSP313

		Ant.	Cable	AMP		Emission			
No.	Freq. (MHz)	Factor (dB/m)		factor (dB)	Reading (dBuV)	Level (dBuV/m)		_	Remark
1	2402.000	26.77	6.02	35.92	90.49	87.36	74.00	-13.36	Peak
2	4804.000	32.47	8.67	35.72	44.48	49.90	74.00	24.10	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

2. The emission levels that are 20dB below the official limit are not reported.

page



Data no. : 3

Site no. : 10M Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL

Limit : FCC PART 15C PEAK

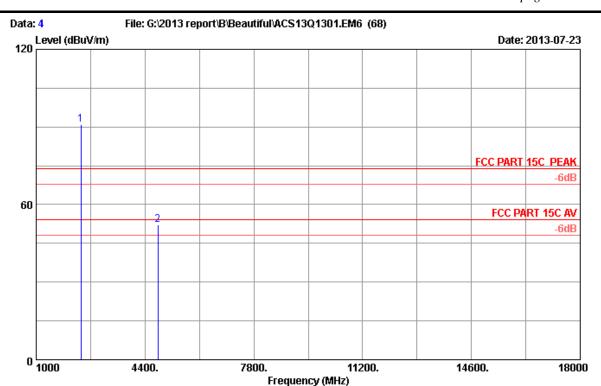
Env. / Ins. : 24\*C/56% Engineer : Leo-Li

: Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

Test Mode : GFSK 2402MHz Tx RF-WSP313

page



Data no. : 4

Site no. : 10M Dis. / Ant. : 3m Limit 2012 3115 (4580) Ant. pol. : VERTICAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

: Bluetooth Indoor/Outdoor Speaker

Power Rating: DC 18V From Adapter Input AC 120V/60Hz

Test Mode : GFSK 2402MHz Tx

RF-WSP313

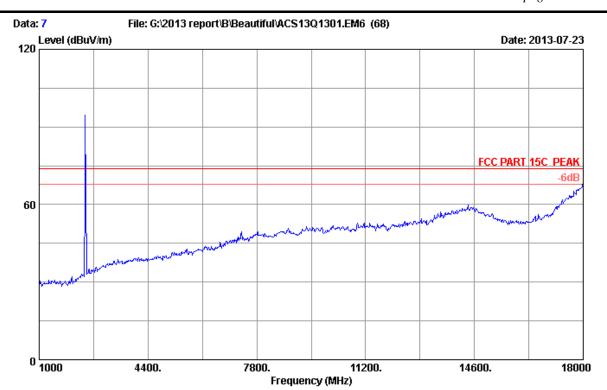
		Ant.	Cable	AMP		Emission		
No.	Freq. (MHz)	Factor (dB/m)		factor (dB)	Reading (dBuV)	Level (dBuV/m)	_	Remark
_	2402.000 4804.000			35.92 35.72	94.05 46.75	90.92 52.17	 -16.92 21.83	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

2. The emission levels that are 20dB below the official limit are not reported.

page

4-12



Data no. : 7

Site no. : 10M Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

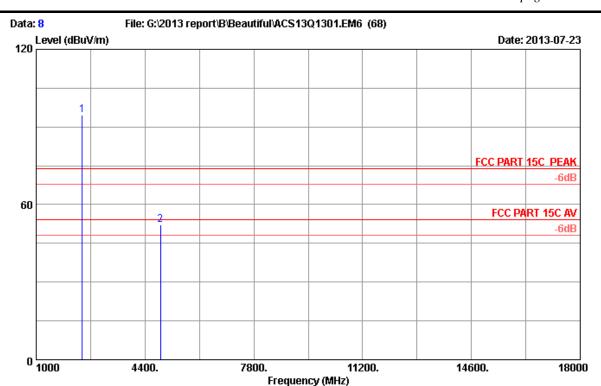
: Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

Test Mode : GFSK 2441MHz Tx

RF-WSP313

4-13 page



Data no. : 8

Site no. : 10M Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

: Bluetooth Indoor/Outdoor Speaker

Power Rating: DC 18V From Adapter Input AC 120V/60Hz

Test Mode : GFSK 2441MHz Tx

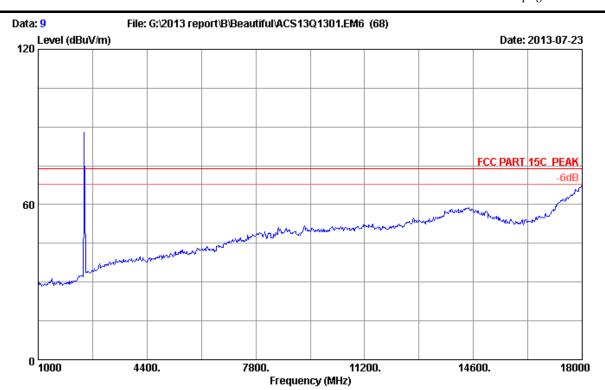
RF-WSP313

		Ant.	Cable	AMP		Emission		
No.	Freq. (MHz)	Factor (dB/m)		factor (dB)	Reading (dBuV)	Level (dBuV/m)	_	Remark
_	2441.000 4882.000	27.02 32.64	6.09 8.74	35.92 35.69	97.48 46.52	94.67 52.21	 -20.67 21.79	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

2. The emission levels that are 20dB below the official limit are not reported.

page



Site no. : 10M Dis. / Ant. : 3m Data no. : 9

2012 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

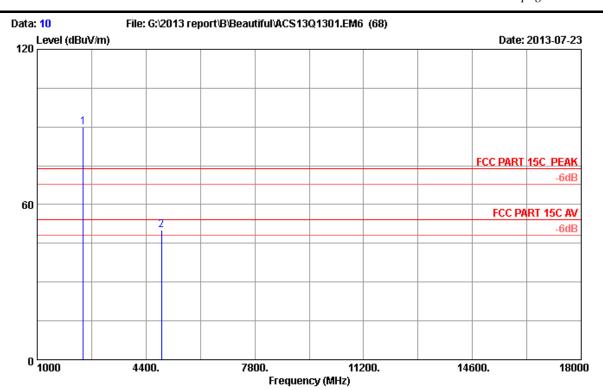
Env. / Ins. : 24\*C/56% Engineer : Leo-Li

: Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

Test Mode : GFSK 2441MHz Tx RF-WSP313

page



Data no. : 10

Site no. : 10M Dis. / Ant. : 3m Limit 2012 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

: Bluetooth Indoor/Outdoor Speaker

Power Rating: DC 18V From Adapter Input AC 120V/60Hz

Test Mode : GFSK 2441MHz Tx

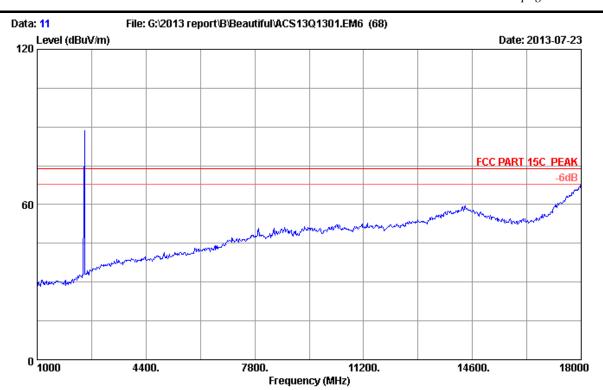
RF-WSP313

		Ant.	Cable	AMP		Emission		
No.	Freq. (MHz)	Factor (dB/m)		factor (dB)	Reading (dBuV)	Level (dBuV/m)	_	Remark
_	2441.000 4882.000	27.02 32.64		35.92 35.69	92.61 44.44	89.80 50.13	 -15.80 23.87	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

2. The emission levels that are 20dB below the official limit are not reported.

page



Site no. : 10M Dis. / Ant. : 3m Limit Data no. : 11

2012 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

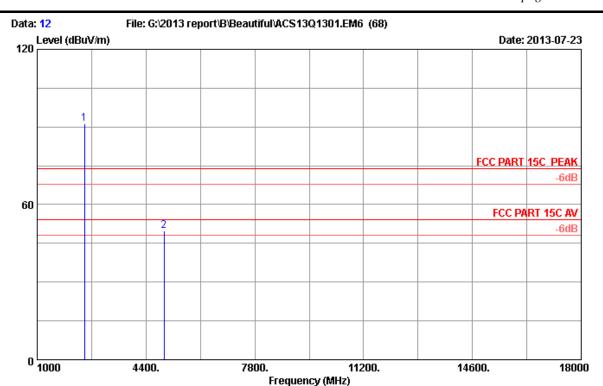
: Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

Test Mode : GFSK 2480MHz Tx

RF-WSP313

4-17 page



Site no. : 10M Dis. / Ant. : 3m Data no. : 12

2012 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

: Bluetooth Indoor/Outdoor Speaker

Power Rating: DC 18V From Adapter Input AC 120V/60Hz

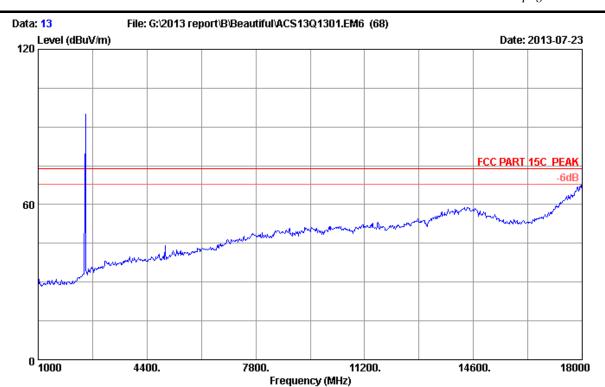
Test Mode : GFSK 2480MHz Tx RF-WSP313

		Ant.	Cable	AMP		Emission			
No.	Freq. (MHz)	Factor (dB/m)		factor (dB)	Reading (dBuV)	Level (dBuV/m)		_	Remark
_	2480.000 4960.000	27.27 32.81		35.92 35.66	93.76 43.82	91.26 49.78	74.00 74.00		

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

2. The emission levels that are 20dB below the official limit are not reported.

page



Site no. : 10M Dis. / Ant. : 3m Data no. : 13

2012 3115 (4580) Ant. pol. : VERTICAL

Limit : FCC PART 15C PEAK

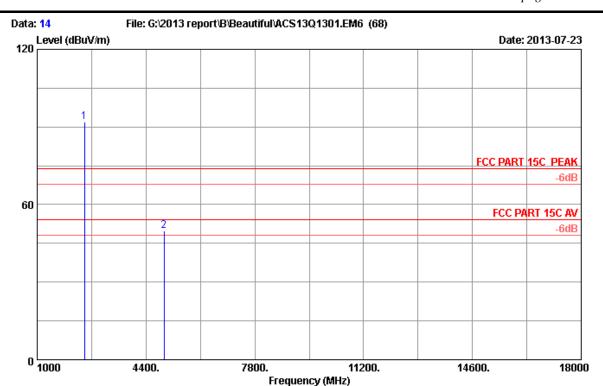
Env. / Ins. : 24\*C/56% Engineer : Leo-Li

: Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

Test Mode : GFSK 2480MHz Tx RF-WSP313

page 4-1



Site no. : 10M Data no. : 14

Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

EUT : Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

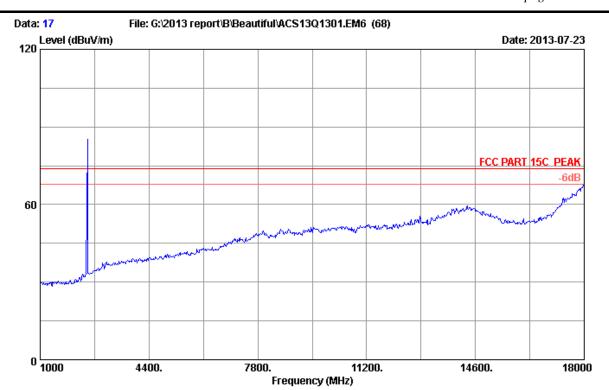
Test Mode : GFSK 2480MHz Tx RF-WSP313

		Ant.	Cable	AMP		Emission		
No.	Freq. (MHz)	Factor (dB/m)		factor (dB)	Reading (dBuV)	Level (dBuV/m)	_	Remark
_	2480.000 4960.000	27.27 32.81	6.15 8.81	35.92 35.66	94.51 43.99	92.01 49.95	 -18.01 24.05	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading  $-\mathrm{Amp}$  Factor

The emission levels that are 20dB below the official limit are not reported.

page



Site no. : 10M Dis. / Ant. : 3m Limit Data no. : 17

2012 3115 (4580) Ant. pol. : VERTICAL Limit : FCC PART 15C PEAK

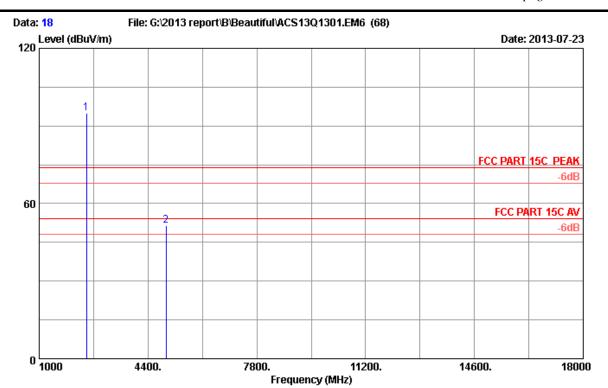
Env. / Ins. : 24\*C/56% Engineer : Leo-Li : Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

Test Mode : 8DPSK 2480MHz Tx

RF-WSP313

page



Site no. : 10M Dis. / Ant. : 3m Data no. : 18

2012 3115 (4580) Ant. pol. : VERTICAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

: Bluetooth Indoor/Outdoor Speaker

Power Rating: DC 18V From Adapter Input AC 120V/60Hz

Test Mode : 8DPSK 2480MHz Tx

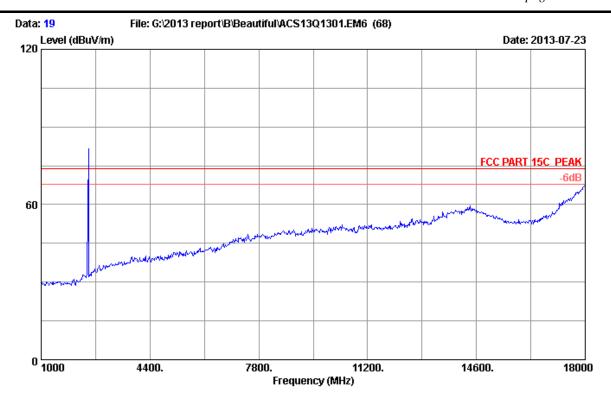
RF-WSP313

		Ant.	Cable	AMP		Emission		
No.	Freq. (MHz)	Factor (dB/m)		factor (dB)	Reading (dBuV)	Level (dBuV/m)	_	Remark
_	2480.000 4960.000	27.27 32.81	6.15 8.81	35.92 35.66	97.35 45.49	94.85 51.45	 -20.85 22.55	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

2. The emission levels that are 20dB below the official limit are not reported.

page



Site no. : 10M Dis. / Ant. : 3m Limit Data no. : 19

2012 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

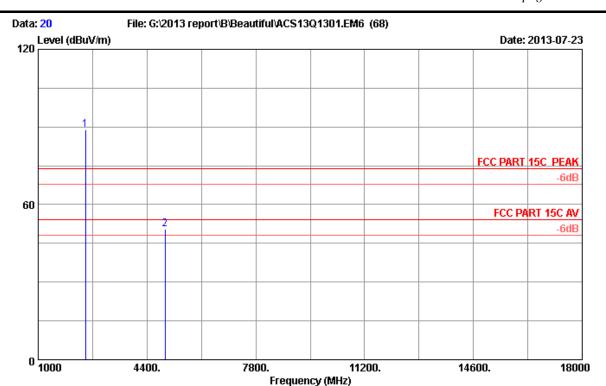
: Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

Test Mode : 8DPSK 2480MHz Tx

RF-WSP313

page



Data no. : 20

Site no. : 10M Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

: Bluetooth Indoor/Outdoor Speaker

Power Rating: DC 18V From Adapter Input AC 120V/60Hz

Test Mode : 8DPSK 2480MHz Tx

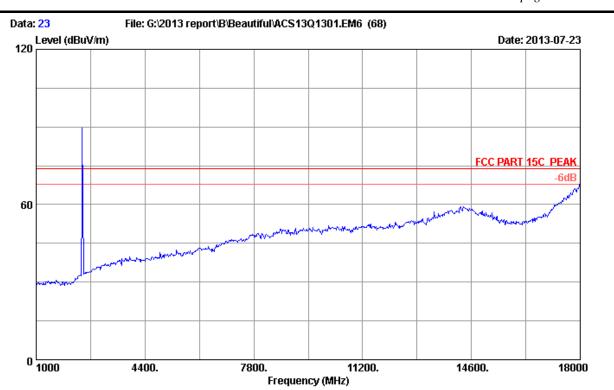
RF-WSP313

		Ant.	Cable	AMP		Emission		
No.	Freq. (MHz)	Factor (dB/m)		factor (dB)	Reading (dBuV)	Level (dBuV/m)	_	Remark
_	2480.000 4960.000		6.15 8.81		91.34 44.41	88.84 50.37	 -14.84 23.63	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

2. The emission levels that are 20dB below the official limit are not reported.

page



Site no. : 10M Data no. : 23
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

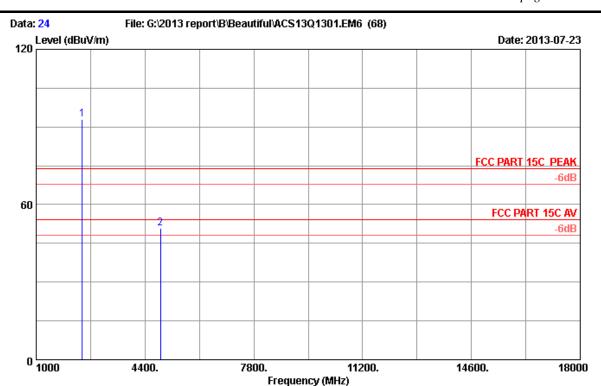
EUT : Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

Test Mode : 8DPSK 2441MHz Tx

RF-WSP313

page



Site no. : 10M Data no. : 24

Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

EUT : Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

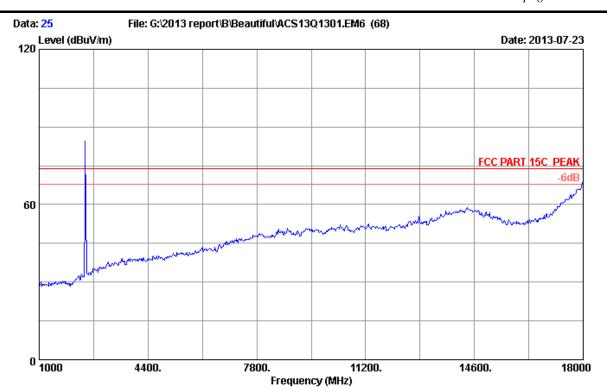
Test Mode : 8DPSK 2441MHz Tx

RF-WSP313

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits	_	Remark
_	2441.000 4882.000	27.02 32.64		35.92 35.69	95.67 45.11	92.86 50.80	74.00 74.00	-18.86 23.20	Peak Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading  $-\mathrm{Amp}$  Factor

2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 10M Dis. / Ant. : 3m Data no. : 25

2012 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

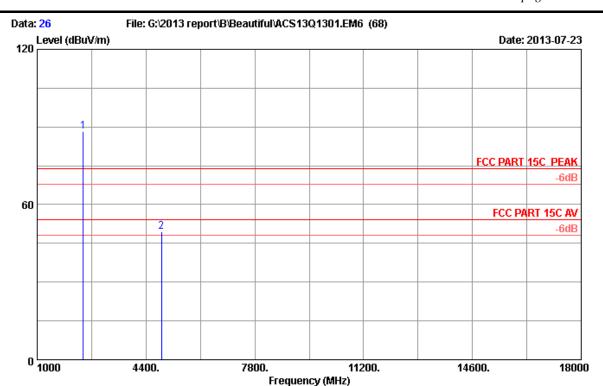
: Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

Test Mode : 8DPSK 2441MHz Tx

RF-WSP313

page



Data no. : 26

Site no. : 10M Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

: Bluetooth Indoor/Outdoor Speaker

Power Rating: DC 18V From Adapter Input AC 120V/60Hz

Test Mode : 8DPSK 2441MHz Tx

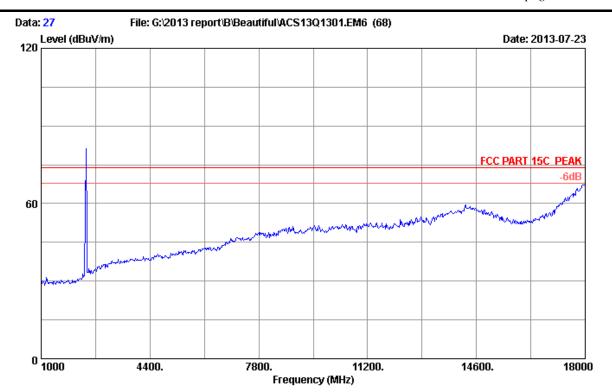
RF-WSP313

		Ant.	Cable	AMP		Emission		
No.	Freq. (MHz)	Factor (dB/m)		factor (dB)	Reading (dBuV)	Level (dBuV/m)	_	Remark
_	2441.000 4882.000	27.02 32.64		35.92 35.69	91.11 43.86	88.30 49.55	 -14.30 24.45	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

2. The emission levels that are 20dB below the official limit are not reported.

1-28



Site no. : 10M Data no. : 27
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

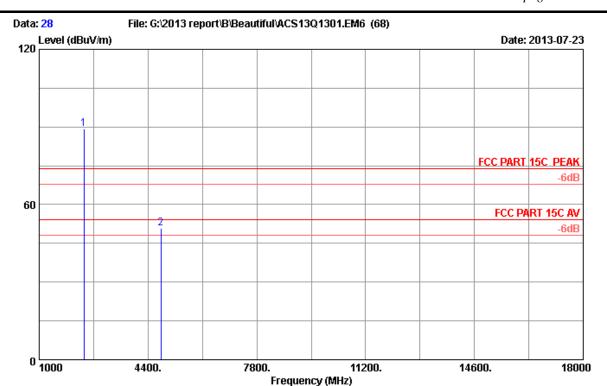
EUT : Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

Test Mode : 8DPSK 2402MHz Tx

RF-WSP313

page



Site no. : 10M Data no. : 28

Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

EUT : Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

Test Mode : 8DPSK 2402MHz Tx

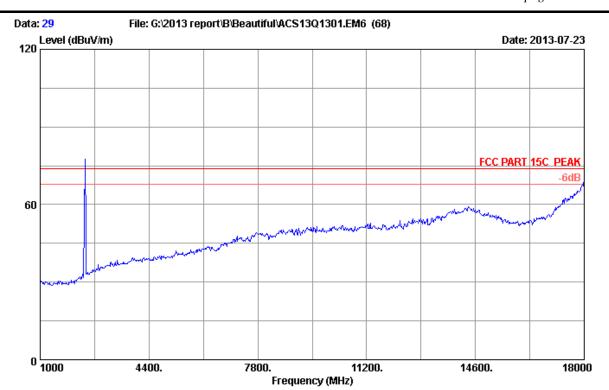
RF-WSP313

		Ant.	Cable	AMP		Emission		
No.	Freq. (MHz)	Factor (dB/m)		factor (dB)	Reading (dBuV)	Level (dBuV/m)	_	Remark
_	2402.000 4804.000		6.02 8.67	35.92 35.72	92.35 45.31	89.22 50.73	 -15.22 23.27	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading  $-\mathrm{Amp}$  Factor

The emission levels that are 20dB below the official limit are not reported.

page



Site no. : 10M Dis. / Ant. : 3m Data no. : 29

2012 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

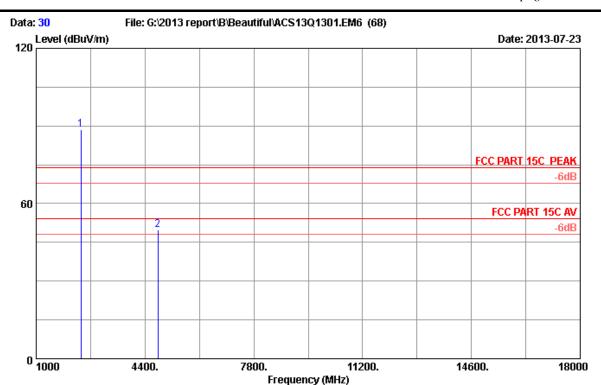
: Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

Test Mode : 8DPSK 2402MHz Tx

RF-WSP313

4-31 page



Data no. : 30

Site no. : 10M Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

: Bluetooth Indoor/Outdoor Speaker

Power Rating: DC 18V From Adapter Input AC 120V/60Hz

Test Mode : 8DPSK 2402MHz Tx

RF-WSP313

		Ant.	Cable	AMP		Emission		
No.	Freq. (MHz)	Factor (dB/m)		factor (dB)	Reading (dBuV)	Level (dBuV/m)	_	Remark
_	2402.000 4804.000	26.77 32.47	6.02 8.67	35.92 35.72	91.64 44.22	88.51 49.64	 -14.51 24.36	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

2. The emission levels that are 20dB below the official limit are not reported.



## 5. CONDUCTED SPURIOUS EMISSIONS

## 5.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9030A	MY51380221	Oct.31, 12	1Year
2.	Attenuator	Agilent	8491B	MY39262165	May.08,13	1 Year
3.	RF Cable	Hubersuhner	SUCOFLEX102	28618/2	May.08,13	1Year

### 5.2.Limit

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

### 5.3.Test Procedure

The transmitter output was connected to a spectrum analyzer, The resolution bandwidth is set to 100 kHz, The video bandwidth is set to 300 kHz and measure all the emissions detected.

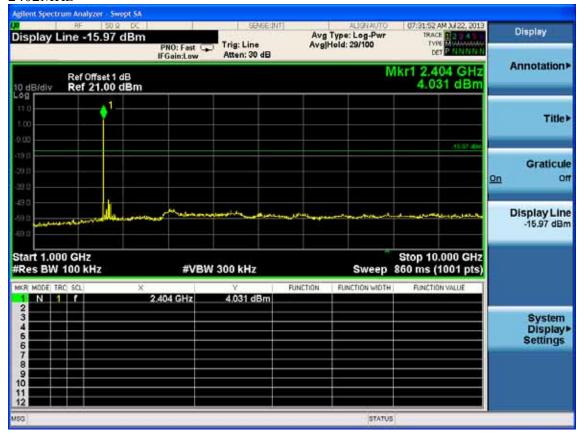
### 5.4. Test result

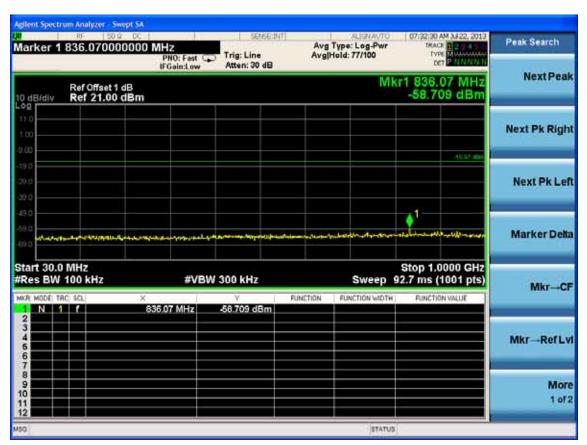
**PASS** (The testing data was attached in the next pages.)

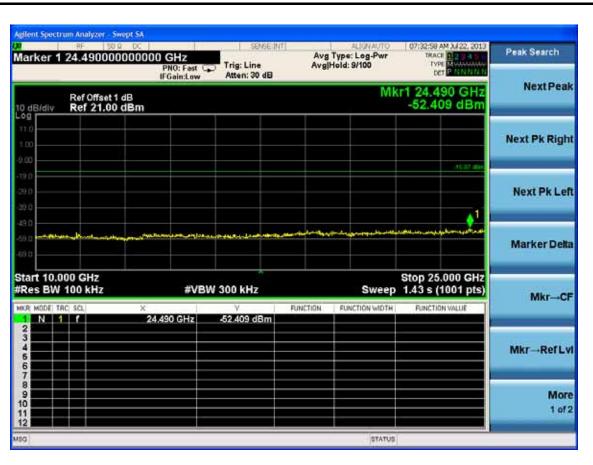
5-1

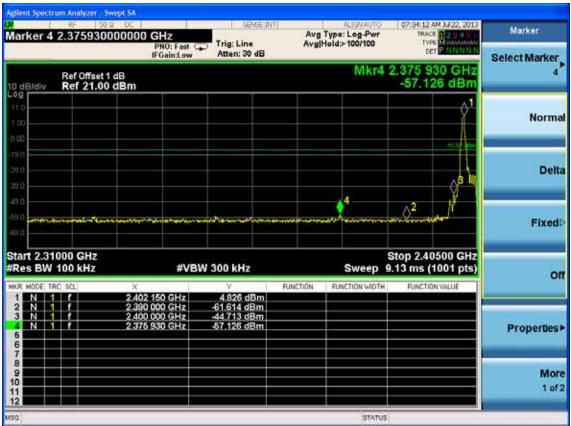
# Hopping Off GFSK



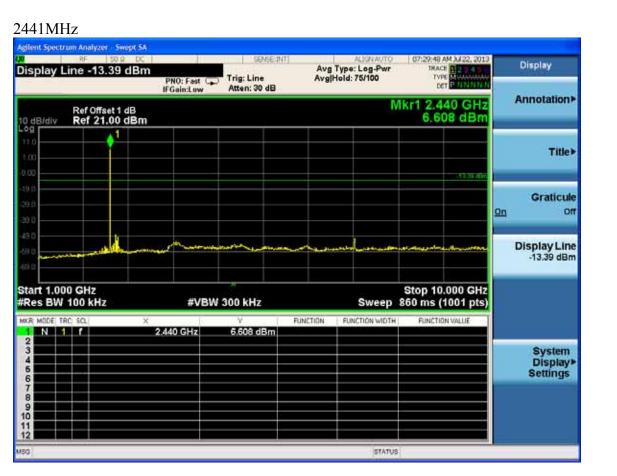


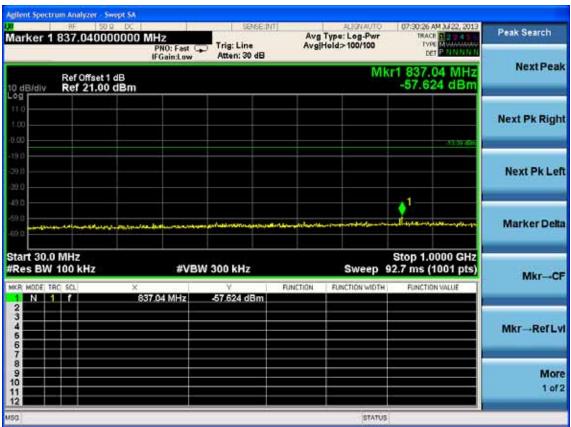




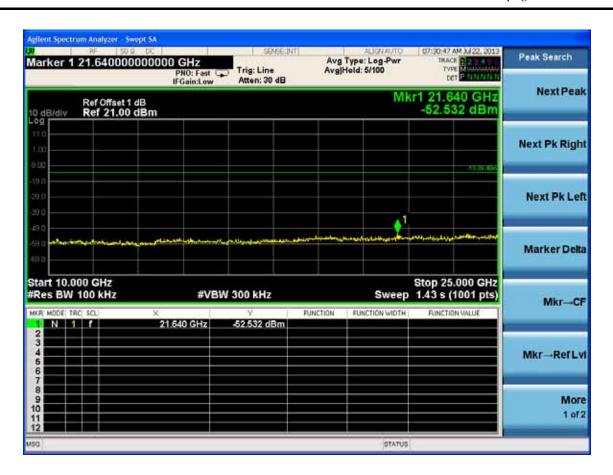




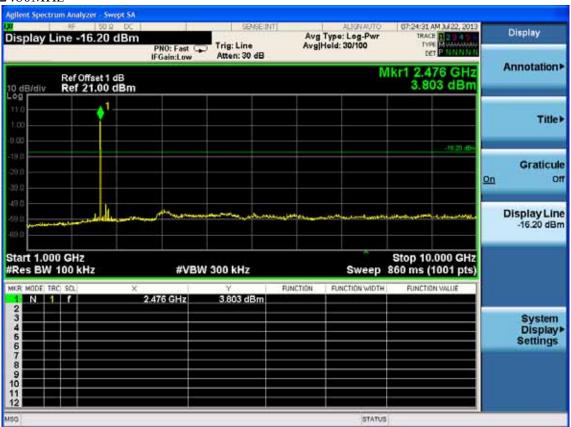




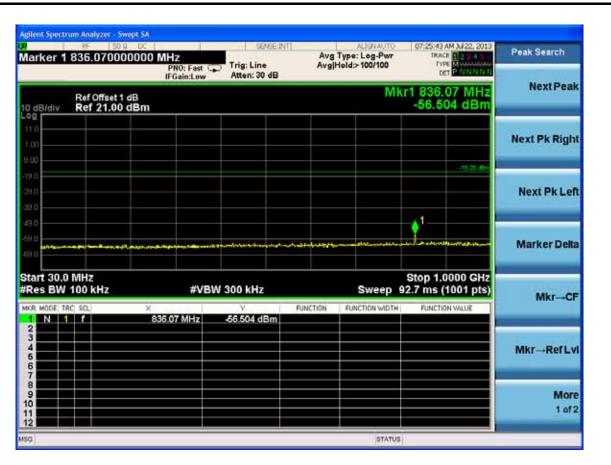
5-4

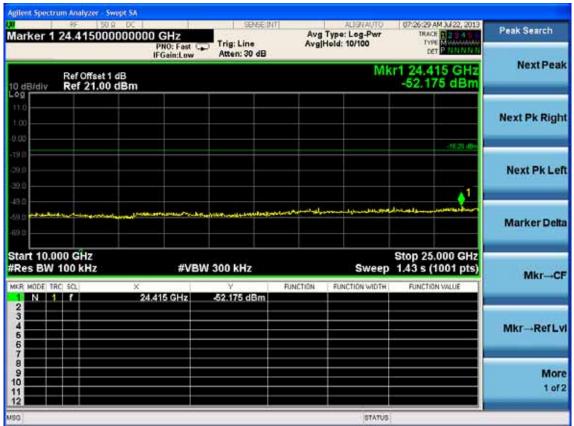


#### 2480MHz



5-.5



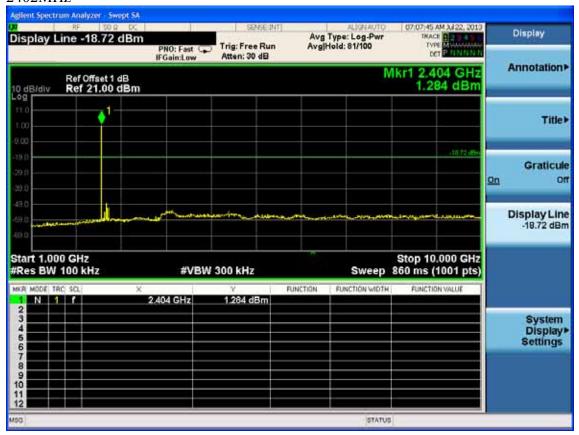




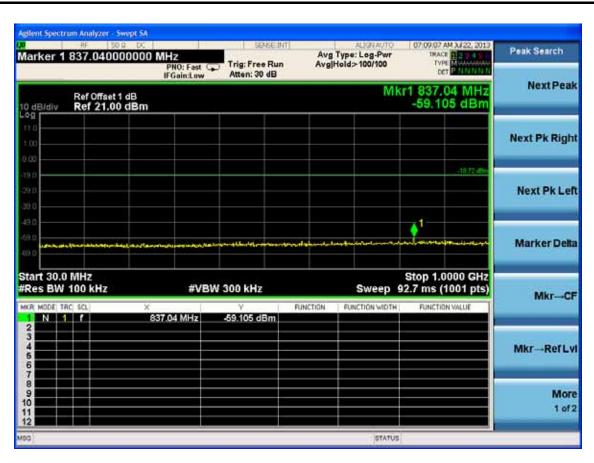


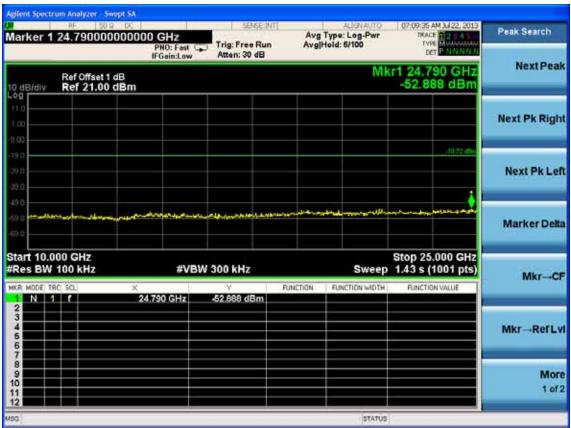
#### 8-DPSK

#### 2402MHz

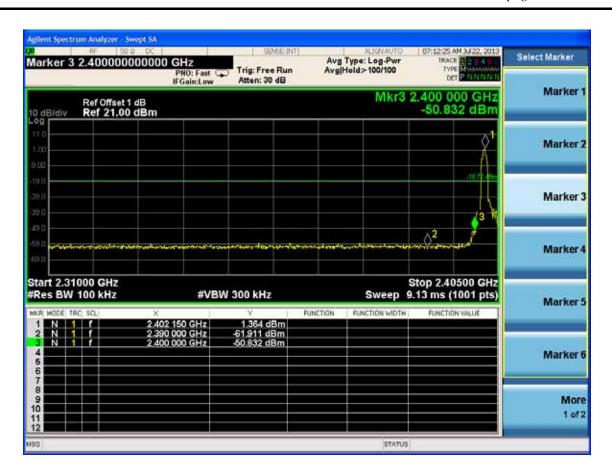


5-7

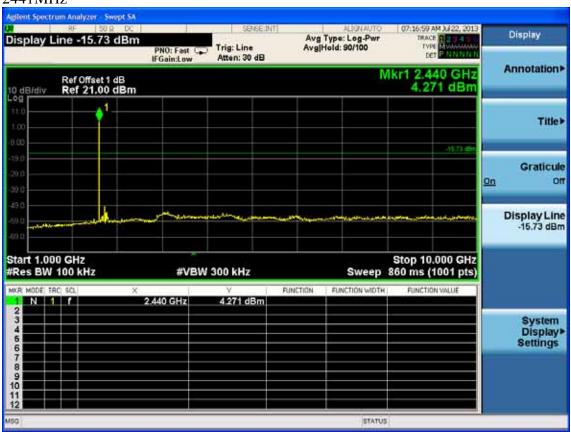




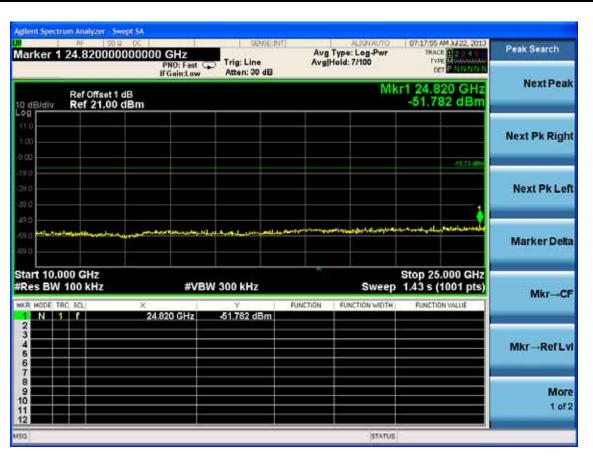


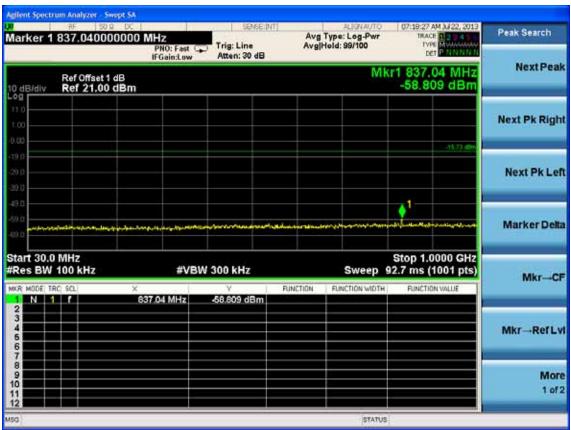


#### 2441MHz

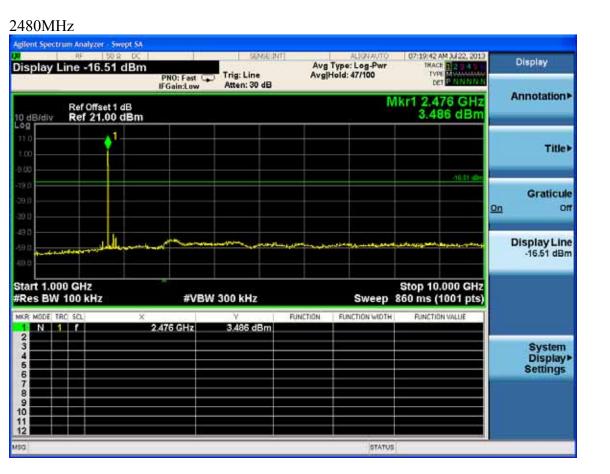


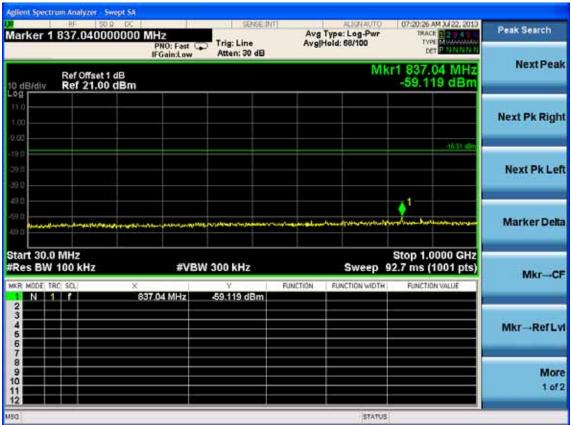
5-9





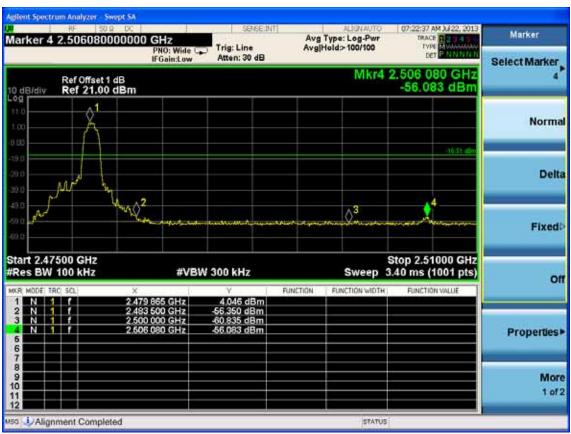












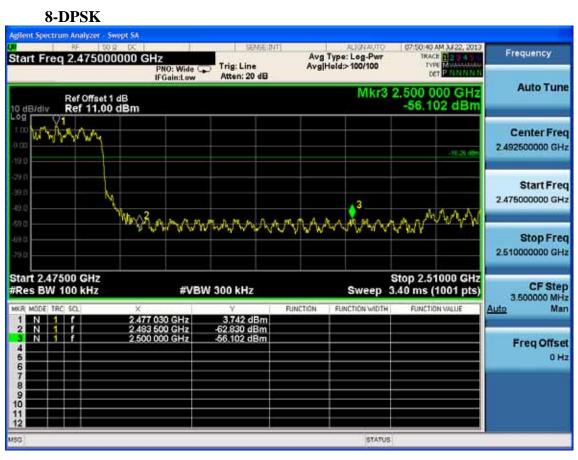


# Hopping on GFSK













# 6. CARRIER FREQUENCY SEPARATION TEST

# 6.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A	MY51380221	Oct.31, 12	1Year

### 6.2.Limit

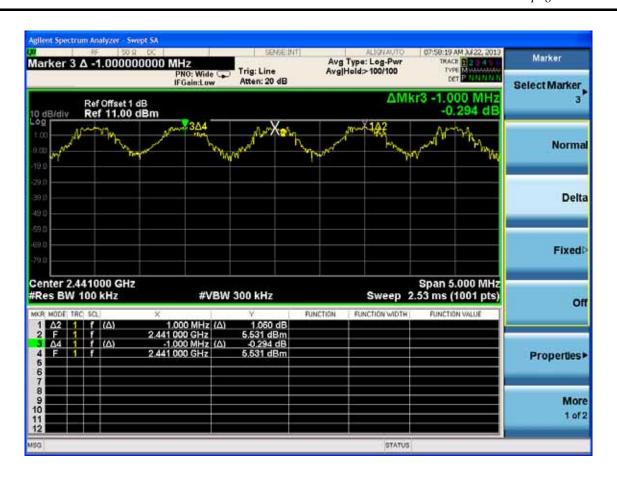
Frequency hopping systems shall have hopping channel carrier frequency separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are 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.

### 6.3. Test Results.

EUT: Bluetooth Indoor/Outdoor Speaker					
M/N: RF-WSP313					
Test date: 2013-07-22	Pressure: 101.5±1.0 kpa	Humidity: 52.2±3.0%			
Tested by: Leo-Li	Test site: RF Site	Temperature: 22.5±0.6°C			

Test Mode	Channel separation	Conclusion
8-DPSK	1.0MHz	PASS
GFSK	1.0MHz	PASS

6-2





# 7. 20 DB BANDWIDTH TEST

# 7.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9030A	MY51380221	Oct.31, 12	1Year

### 7.2.Limit

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

### 7.3.Test Results

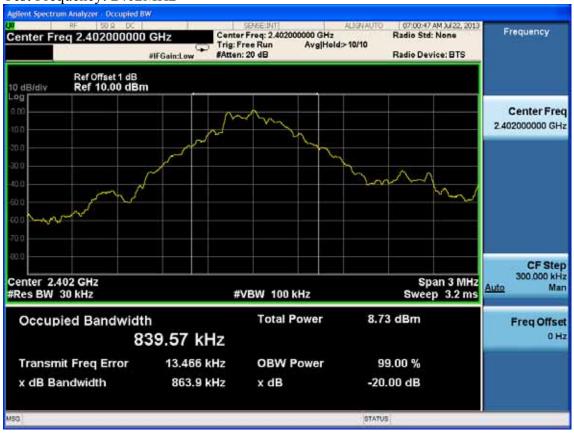
EUT: Bluetooth Indoor/Outdoor Speaker					
M/N: RF-WSP313					
Test date: 2013-07-22	Pressure: 101.5±1.0 kpa	Humidity: 52.2±3.0%			
Tested by: Leo-Li	Test site: RF Site	Temperature: 22.5±0.6℃			

Test Mode	CH (MHz)	20dB bandwidth (KHz)	Limit (KHz)
	2402	863.9	N/A
GFSK	2441	870.2	N/A
	2480	877.1	N/A
	2402	1208	N/A
8-DPSK	2441	1211	N/A
	2480	1212	N/A
Conclusion: PA	ASS	·	

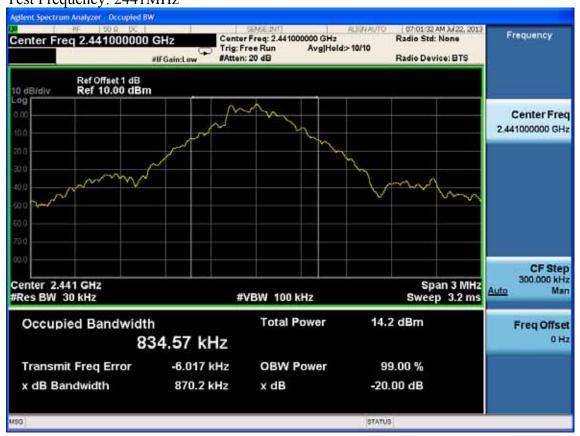


#### **GFSK**

Test Frequency: 2402MHz



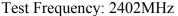
Test Frequency: 2441MHz





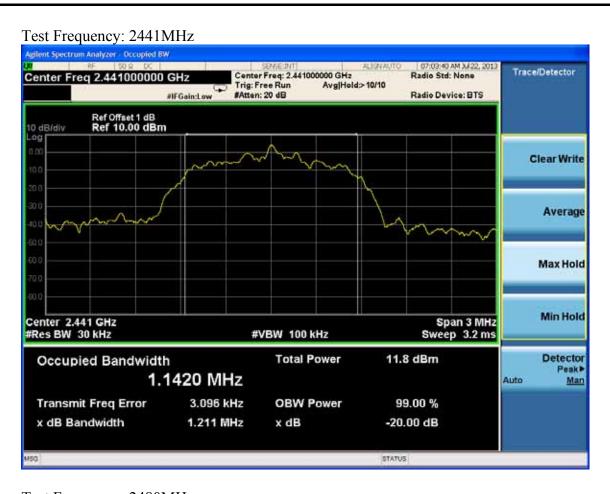


#### 8-DPSK

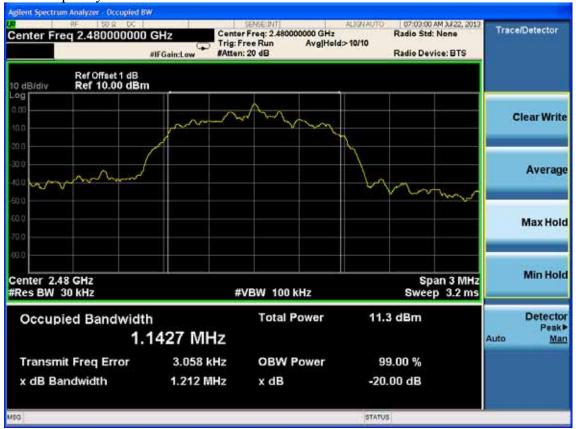














# 8. NUMBER OF HOPPING FREQUENCY TEST

# 8.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A	MY51380221	Oct.31, 12	1Year

# 8.2.Limit

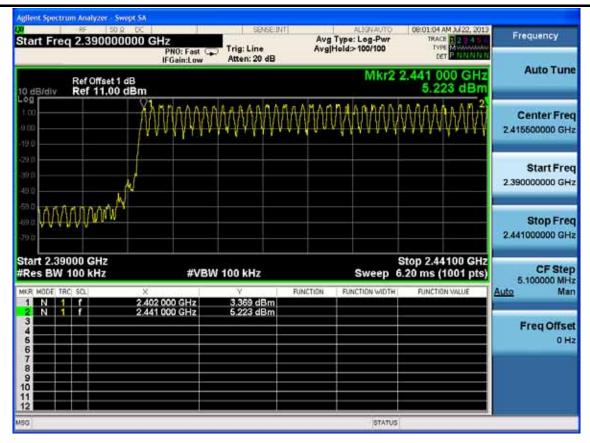
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

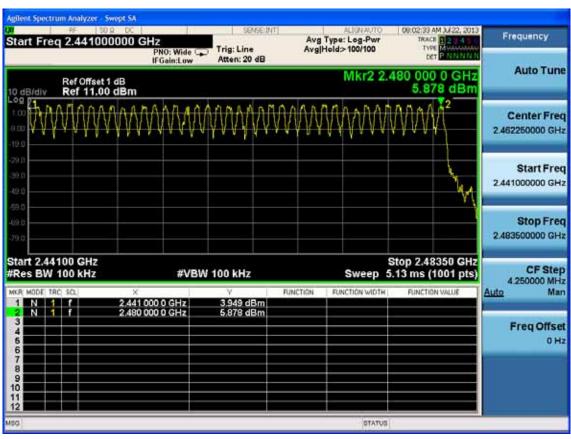
# 8.3. Test Results

EUT: Bluetooth Indoor/Outdoor Speaker				
M/N: RF-WSP313				
Test date: 2013-07-22	Pressure: 101.5±1.0 kpa	Humidity: 52.2±3.0%		
Tested by: Leo-Li	Test site: RF Site	Temperature: 22.5±0.6°C		

Test Mode	Number of channel	Limit	Conclusion
8-DPSK	79	>=15	PASS
GFSK	79	>=15	PASS

8-2







# 9. DWELL TIME

# 9.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A	MY51380221	Oct.31, 12	1Year

# 9.2.Limit

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.

## 9.3.Test Results

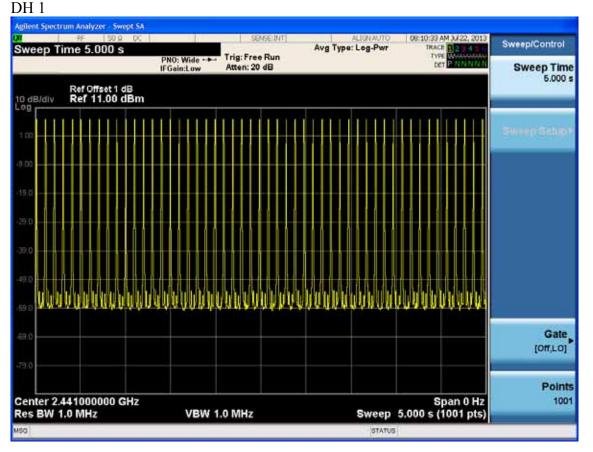
EUT: Bluetooth Indoor/Outdoor Speaker				
M/N: RF-WSP313				
Test date: 2013-07-22	Pressure: 101.5±1.0 kpa	Humidity: 52.2±3.0%		
Tested by: Leo-Li	Test site: RF Site	Temperature: 22.5±0.6°C		

Mode		dwell time	Limit	Conclusion
GFSK	DH1	51hops/5s*0.4*79chanels*0.436ms =140.53ms	<400ms	PASS
	DH3	25hops/5s*0.4*79chanels*1.698ms =268.28ms	<400ms	PASS
	DH5	17hops/5s*0.4*79chanels*2.975ms=319.63ms	<400ms	PASS
8-DPSK	DH1	50hops/5s*0.4*79chanels*0.449ms =141.89ms	<400ms	PASS
	DH3	26hops/5s*0.4*79chanels*1.710ms =280.99ms	<400ms	PASS
	DH5	17hops/5s*0.4*79chanels*2.960ms =318.02ms	<400ms	PASS

Note: All the lower levels were signal from receiver's, and should not considered in here.



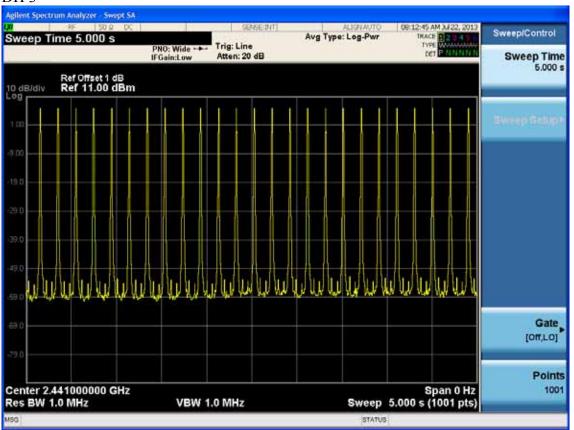
# GFSK

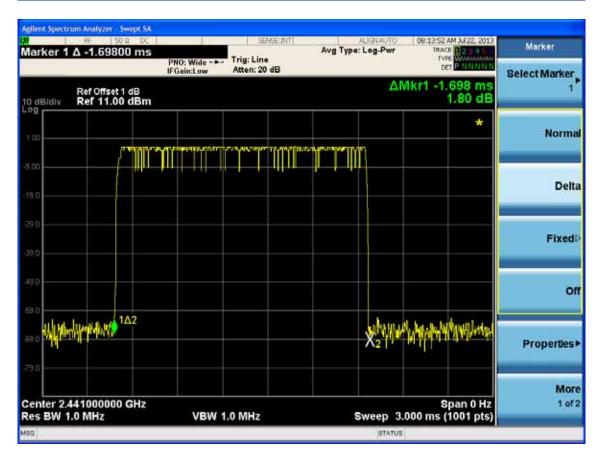




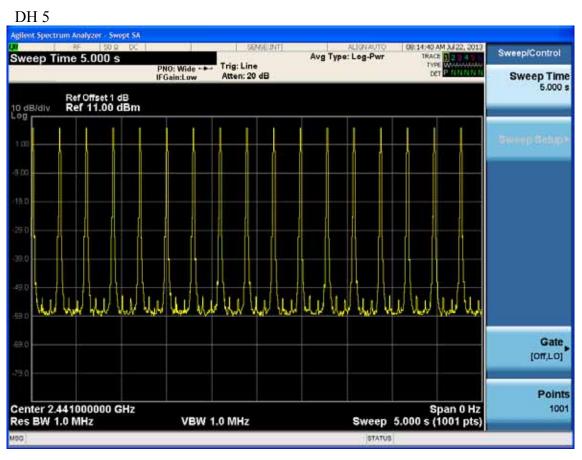


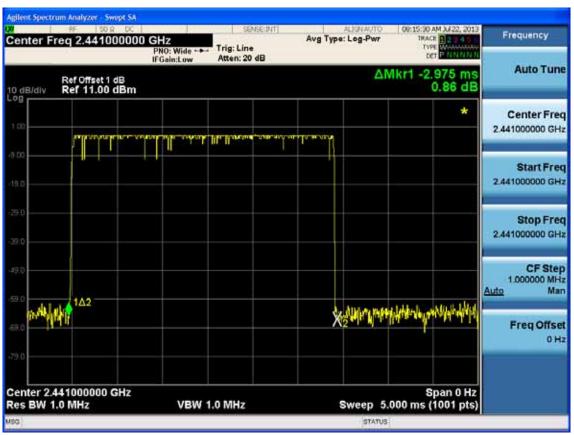








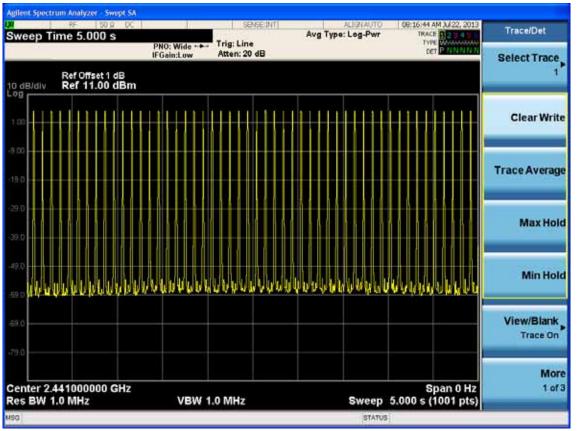


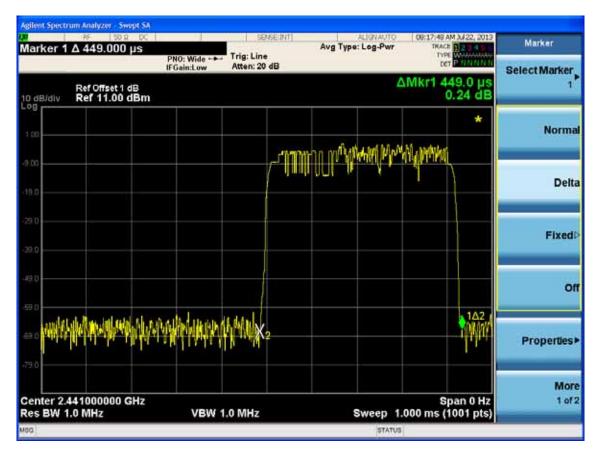




#### 8-DPSK

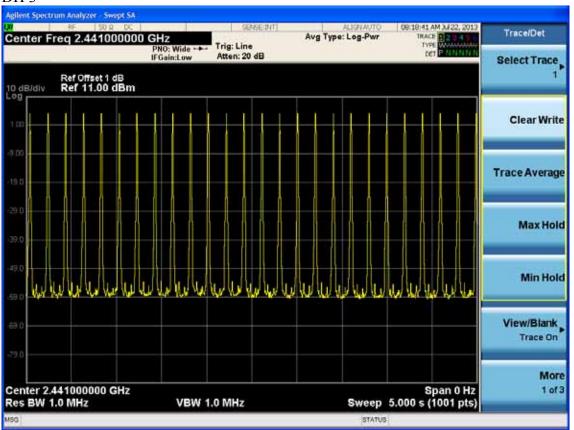
DH 1

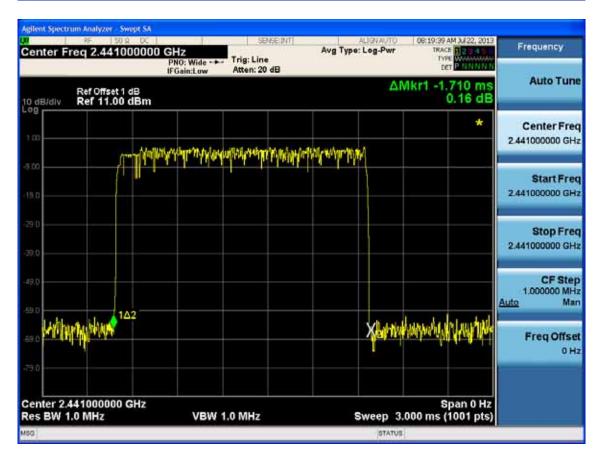




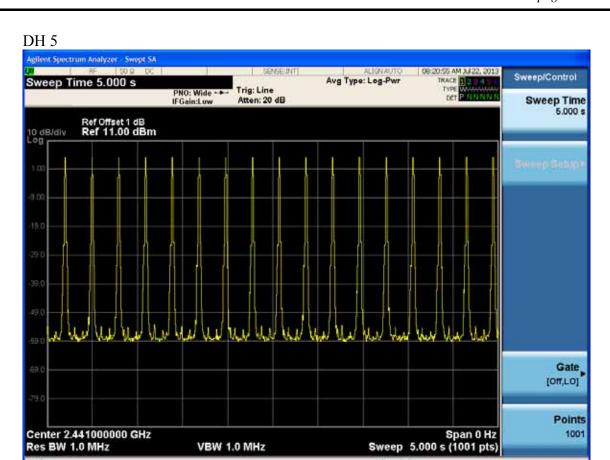


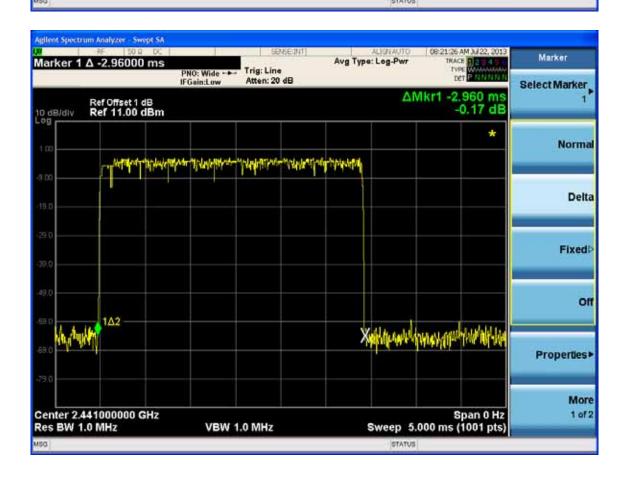
### DH 3













### 10.MAXIMUM PEAK OUTPUT POWER TEST

### 10.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9030A	MY51380221	Oct.31, 12	1Year
2.	Amp	HP	8449B	3008A08495	May.08, 13	1 Year
3.	Antenna	EMCO	3115	9607-4877	May.08, 13	1Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May.08, 13	1 Year
5.	Power Meter	Anritsu	ML2487A	6K00002472	May.08, 13	1Year
6.	Power Sensor	Anritsu	MA2491A	033005	May.08, 13	1Year

### 10.2.Limit

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

### 10.3. Test Procedure

- 1. Connected the EUT's antenna port to spectrum analyzer.
- 2. Set the RBW> Bandwidth of test Frequency and put the test Frequency, Set the Span large enough to capture the entire signal
- 3. Use a peak detector on max hold
- 4. Reading the value from the Spectrum analyzer

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.



page

10-2

## 10.4.Test Results

EUT: Bluetoo	oth Indoor/Outdoo	r Speake	r	
M/N: RF-WS	SP313			
Test date: 20	13-07-22	Pressur	e: 101.4±1.0kpa	Humidity: 52.3±1.0%
Tested by: Le	eo-Li	Test sit	e: RF site	Temperature: 24.3±1.0 ℃
Test Mode	CH (MHz)		Peak output Power (dBm)	Limit (dBm)
	2402	5.068		30
GFSK	2441		7.018	30
	2480		6.879	30
	2402		3.351	30
8-DPSK 2441			5.822	30
	2480		5.489	30
Conclusion: I	PASS			•



### **GFSK** 2402MHz



#### 2441MHz





#### 2480MHz



#### 8-DPSK

#### 2402MHz





#### 2441MHz



#### 2480MHz





### 11.BAND EDGE COMPLIANCE TEST

### 11.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4446A	US44300459	May.08, 13	1 Year
2.	Amp	HP	8449B	3008A08495	May.08, 13	1 Year
3.	Antenna	EMCO	3115	9607-4877	May.08, 13	1Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May.08, 13	1 Year

#### 11.2.Limit

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

#### 11.3.Test Produce

For upper band emissions that are up to two bandwidths(2MHz) away (2483.5MHz to 2485.5MHz) from the band-edge use below produce:

- 1. Choose a spectrum analyzer span that encompasses both the peak of the fundamental emission and the band-edge emission under investigation. Set the analyzer RBW to 100KHz and with a video bandwidth 300KHz. Record the peak levels of the fundamental emission and the relevant band-edge emission, Observe the stored trace and measure the amplitude delta between the peak of the fundamental and the peak of the band-edge emission. This is not a field strength measurement, it is only a relative measurement to determine the amount by which the emission drops at the band edge relative to the highest fundamental emission level.
- 2. Subtract the delta measured in step (1) from the maximum field strengths measured in clause 4. The resultant field strengths are then used to determine band-edge compliance as required by Section 15.205

For emissions above two bandwidths away from the band-edge use below produce:

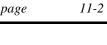
- 1. The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.
- 2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
- 3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
- 4. Set the spectrum analyzer in the following setting in order to capture the lower and upperband-edges of the emission:
  - (a) PEAK: RBW=1MHz; VBW=3MHz, PK detector, Sweep=AUTO
  - (b) This is pulse Modulation device a duty cycle factor was used to calculate average level based measured peak level.

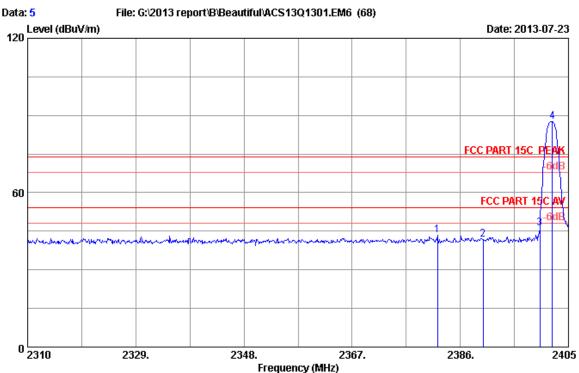
#### 11.4.Test Results

Pass (The testing data was attached in the next pages.)

Note: If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

page





Site no. : 10M Data no. : 5

Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

: Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

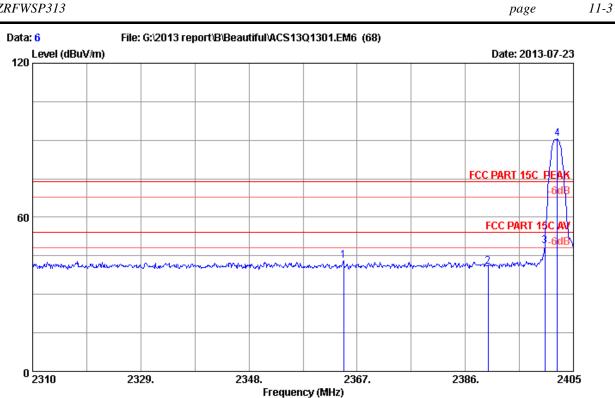
Test Mode : GFSK 2402MHz Tx

RF-WSP313

Remark
Peak
Peak
Peak
Peak
n ) -

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

page



: 10M Data no. : 6

Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL

: FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

: Bluetooth Indoor/Outdoor Speaker

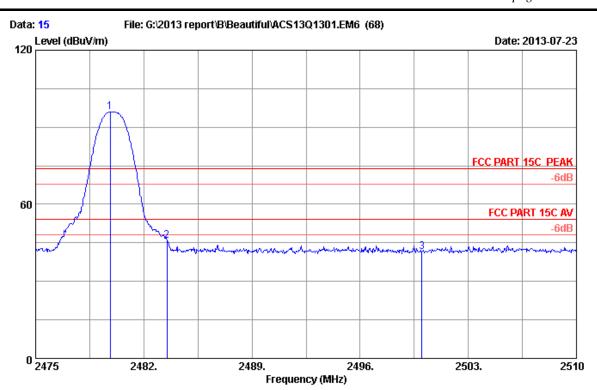
Power Rating : DC 18V From Adapter Input AC 120V/60Hz

Test Mode : GFSK 2402MHz Tx RF-WSP313

		Ant.	Cable	AMP		Emission			
No.	Freq.	Factor	Loss	factor	Reading	Level	Limits	_	Remark
	(MHz)	(dB/m) 	(dB) 	(dB)	(dBuV)	(авиv/m) 	(dBuV/m)	(dB) 	
1	2364.625	26.53	5.96	35.92	46.64	43.21	74.00	30.79	Peak
2	2390.000	26.70	6.00	35.92	44.16	40.94	74.00	33.06	Peak
3	2400.000	26.76	6.02	35.92	51.86	48.72	74.00	25.28	Peak
4	2402.150	26.77	6.02	35.92	93.62	90.49	74.00	-16.49	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

11-4



Site no. : 10M Data no. : 15
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

EUT : Bluetooth Indoor/Outdoor Speaker

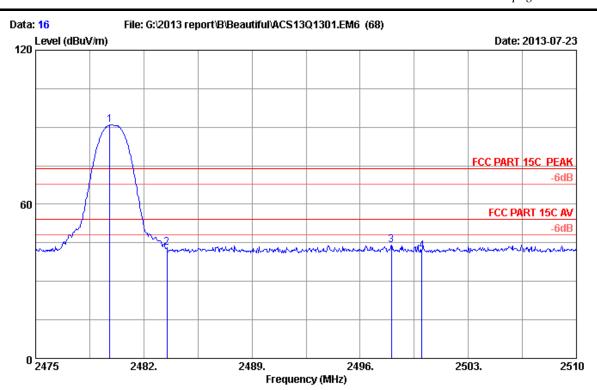
Power Rating : DC 18V From Adapter Input AC 120V/60Hz

Test Mode : GFSK 2480MHz Tx RF-WSP313

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits		Remark
2	2479.830 2483.500 2500.000	27.27 27.29 27.40	6.15 6.16 6.19	35.92 35.92 35.93	98.43 48.33 43.83	95.93 45.86 41.49	74.00 74.00 74.00	28.14	Peak Peak Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading - Amp Factor

11-5



Site no. : 10M Data no. : 16

Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

EUT : Bluetooth Indoor/Outdoor Speaker

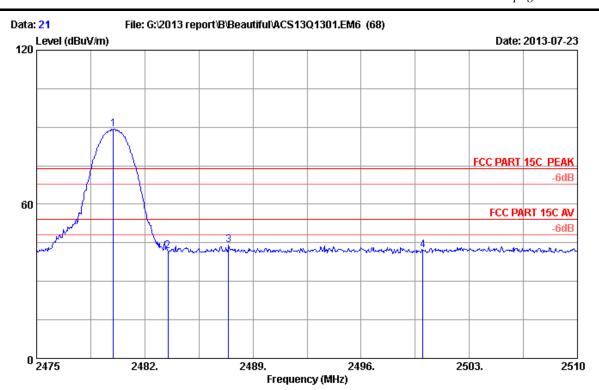
Power Rating : DC 18V From Adapter Input AC 120V/60Hz

Test Mode : GFSK 2480MHz Tx RF-WSP313

		Ant.	Cable	AMP		Emission			
No.	Freq.	Factor	Loss	factor	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2479.795	27.27	6.15	35.92	93.30	90.80	74.00	-16.80	Peak
2	2483.500	27.29	6.16	35.92	45.46	42.99	74.00	31.01	Peak
3	2498.030	27.39	6.18	35.92	46.42	44.07	74.00	29.93	Peak
4	2500.000	27.40	6.19	35.93	44.27	41.93	74.00	32.07	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

11-6



Site no. : 10M Data no. : 21

Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

EUT : Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

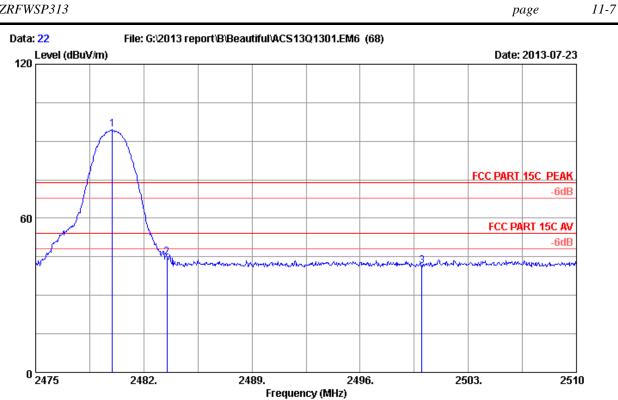
Test Mode : 8DPSK 2480MHz Tx

RF-WSP313

		Ant.	Cable	AMP		Emission			
No.	Freq. (MHz)	Factor (dB/m)	Loss (dB)	factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limits	Margin (dB)	Remark
				·			(abav, m,		
1	2479.970	27.27	6.15	35.92	91.76	89.26	74.00	-15.26	Peak
2	2483.500	27.29	6.16	35.92	44.31	41.84	74.00	32.16	Peak
3	2487.425	27.32	6.17	35.92	46.57	44.14	74.00	29.86	Peak
4	2500.000	27.40	6.19	35.93	44.56	42.22	74.00	31.78	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

page



: 10M Data no. : 22 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL

: FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

: Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

Test Mode : 8DPSK 2480MHz Tx

RF-WSP313

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits	Margin (dB)	Remark
2	2479.970	27.27	6.15	35.92	97.08	94.58	74.00	-20.58	Peak
	2483.500	27.29	6.16	35.92	47.28	44.81	74.00	29.19	Peak
	2500.000	27.40	6.19	35.93	43.71	41.37	74.00	32.63	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

0 2310

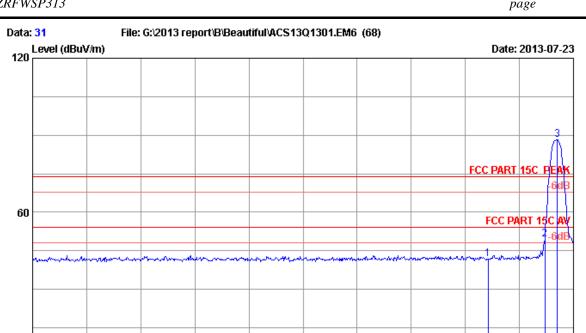
## AUDIX Technology (Shenzhen) Co., Ltd.

2386.

page

2405

11-8



2367.

: 10M Data no. : 31

Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL

Frequency (MHz)

: FCC PART 15C PEAK

2329.

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

2348.

: Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

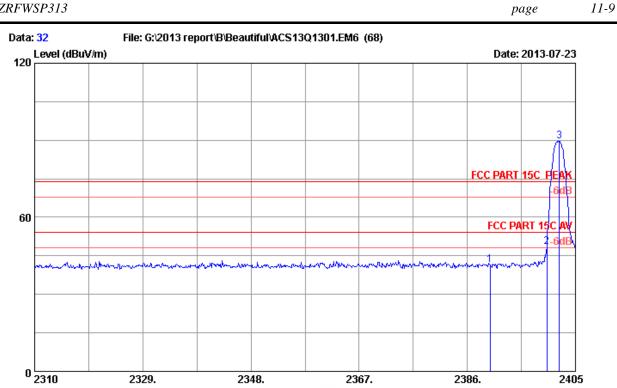
Test Mode : 8DPSK 2402MHz Tx

RF-WSP313

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits	Margin (dB)	Remark
2	2390.000	26.70	6.00	35.92	45.05	41.83	74.00	32.17	Peak
	2400.000	26.76	6.02	35.92	52.52	49.38	74.00	24.62	Peak
	2402.150	26.77	6.02	35.92	91.31	88.18	74.00	-14.18	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

page



Frequency (MHz)

: 10M Data no. : 32 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL

: FCC PART 15C PEAK

Env. / Ins. : 24\*C/56% Engineer : Leo-Li

: Bluetooth Indoor/Outdoor Speaker

Power Rating : DC 18V From Adapter Input AC 120V/60Hz

Test Mode : 8DPSK 2402MHz Tx

RF-WSP313

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits		Remark
2	2390.000 2400.000 2402.150	26.70 26.76 26.77	6.00 6.02 6.02	35.92 35.92 35.92	44.77 51.58 92.74	41.55 48.44 89.61	74.00 74.00 74.00	25.56	Peak Peak Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor



12-1

12.DEVIATION TO TEST SPECIFICATIONS [NONE]