

# Shenzhen Toby Technology Co., Ltd.

Report No.: TB-FCC141393

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# FCC Radio Test Report FCC ID: 2ACUS-IT200

# **Original Grant**

Report No. : TB-FCC141393

**Applicant**: Shenzhen ShengHeDa Electronic Technology Co., Ltd

**Equipment Under Test (EUT)** 

**EUT Name**: Bluetooth Speaker

Model No. : IT200 Series Model : N/A

No.

Brand Name : N/A

**Receipt Date** : 2014-07-28

**Test Date** : 2014-07-28 to 2014-08-05

**Issue Date** : 2014-08-06

**Standards**: FCC Part 15, Subpart C(15.247)

Test Method : ANSI C63.4:2003

Conclusions : PASS

In the configuration tested, the EUT complied with the standards specified above,

The EUT technically complies with the FCC requirements

Test/Witness Engineer :

Approved& Authorized

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

TB-RF-074-1.0



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# 1. General Information about EUT

#### 1.1 Client Information

**Applicant**: Shenzhen ShengHeDa Electronic Technology Co., Ltd

**Address**: 2nd Floor, Bada Industrial, Heping, Fuyong, Baoan District,

Shenzhen, Guangdong, China

Manufacturer : Heritek Electronic Manufactory Co., Limited

**Address**: 2nd Floor, 11th Building, Huafeng Industrial Zone, Xiaweiyuan,

Gushu Village, Xixiang Town, Bao'an District, Shenzhen City, China

#### 1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	Bluetooth Speaker			
Models No.	:	IT200			
Model	:	N/A			
Difference					
		Operation Frequency:			
		Bluetooth:2402~2480MHz			
Product		Number of Channel:	Bluetooth:79 Channels see note (2)		
Description	:	Max Peak Output Power:	GFSK:-2.043 dBm (Conducted Power)		
		Antenna Gain:	0 dBi PCB Antenna		
		Modulation Type:	GFSK 1Mbps(1 Mbps)		
			π /4-DQPSK(2 Mbps)		
			8-DPSK(3 Mbps)		
Power Supply	:	DC Voltage supplied from	Host System by USB cable		
		DC power by Li-ion Battery	/		
Power Rating	:	DC 5.0V by USB cable.			
		DC 3.7V Li-ion Battery.			
Connecting I/O	:	Please refer to the User's Manual			
Port(S)					
Note:					

#### Note:

- (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- (2) This Test Report is FCC Part 15.247 for Bluetooth, and test procedure in accordance with Public Notice: DA 00-705.
- (3) Channel List:

Channel	Frequency	Channel	Frequency	Channel	Frequency
	(MHz)		(MHz)		(MHz)



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00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

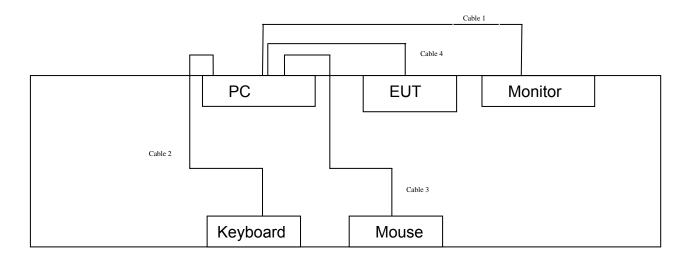
<sup>(4)</sup> The Antenna information about the equipment is provided by the applicant.



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#### 1.3 Block Diagram Showing the Configuration of System Tested

#### TX Mode



# 1.4 Description of Support Units

Equipment Information							
Name	Model	FCC ID/DOC	Manufacturer	Used "√"			
LCD Monitor	E170Sc	DOC	DELL	√			
PC	OPTIPLEX380	DOC	DELL	√			
Keyboard	Keyboard L100 DOC DELL		DELL	√			
Mouse	M-UARDEL7	DOC	DELL	√			
Cable Information							
Number	Number Shielded Type Ferrite Core Length Note						
Cable 1	YES	YES(2)	1.8M				
Cable 2	YES	NO	1.5M				
Cable 3	YES	NO	1.5M				
Cable 4	NO	NO	0.2M	Accessories			

# 1.5 Description of Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned follow was evaluated respectively.



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For Conducted Test			
Final Test Mode Description			
Mode 1	USB Charging with TX GFSK Mode		

For Radiated Test			
Final Test Mode	Description		
Mode 1	USB Charging with TX GFSK Mode		
Mode 2	TX Mode(GFSK) Channel 00/39/78		
Mode 3	TX Mode( IT /4-DQPSK) Channel 00/39/78		
Mode 4	TX Mode(8-DPSK) Channel 00/39/78		
Mode 5	Hopping Mode(GFSK)		
Mode 6	Hopping Mode( π /4-DQPSK)		
Mode 7	Hopping Mode(8-DPSK)		

#### Note:

(1) For all test, we have verified the construction and function in typical operation. And all the test modes were carried out with the EUT in transmitting operation in maximum power with all kinds of data rate. We have pretested all the test mode above.

According to ANSI C63.4 standards, the measurements are performed at the highest, middle, lowest available channels, and the worst case data rate as follows:

TX Mode: GFSK (1 Mbps)
TX Mode: 8-DPSK (3 Mbps)

(2) The EUT is considered a portable unit; it was pre-tested on the positioned of each 3 axis, X-plane, Y-plane and Z-plane. The worst case was found positioned on X-plane as the normal use. Therefore only the test data of this X-plane was used for radiated emission measurement test.

## 1.6 Description of Test Software Setting

During testing channel& Power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of Bluetooth mode.

Test Software Version	Test Program: RF Control Kit V1.0. exe			
Frequency	2402 MHz	2441MHz	2480 MHz	
GFSK	DEF	DEF	DEF	
π /4-DQPSK	DEF	DEF	DEF	
8-DPSK	DEF	DEF	DEF	



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## 1.7 Test Facility

The testing was performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at:

1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, Guangdong, China.

At the time of testing, the following bodies accredited the Laboratory:

#### **CNAS (L5813)**

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

#### FCC List No.: (811562)

The Laboratory is listed in the United States of American Federal Communications Commission (FCC), and the registration number is 811562.

#### IC Registration No.: (11950A-1)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A-1.



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# 2. Test Summary

FCC Part 15 Subpart C(15.247)				
Standard Section	Test Item	Judgment	Remark	
15.203	Antenna Requirement	PASS	N/A	
15.207	Conducted Emission	PASS	N/A	
15.205	Restricted Bands	PASS	N/A	
15.247(a)(1)	Hopping Channel Separation	PASS	N/A	
15.247(a)(1)	Dwell Time	PASS	N/A	
15.247(b)(1)	Peak Output Power	PASS	N/A	
15.247(b)(1)	Number of Hopping Frequency	PASS	N/A	
15.247(c)	Radiated Spurious Emission	PASS	N/A	
15.247(c)	Antenna Conducted Spurious Emission	PASS	N/A	
15.247(a) 20dB Bandwidth PASS N/A		N/A		
Note: N/A is an abbreviation for Not Applicable.				



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# 3. Conducted Emission Test

#### 3.1 Test Standard and Limit

3.1.1Test Standard FCC Part 15.207

#### 3.1.2 Test Limit

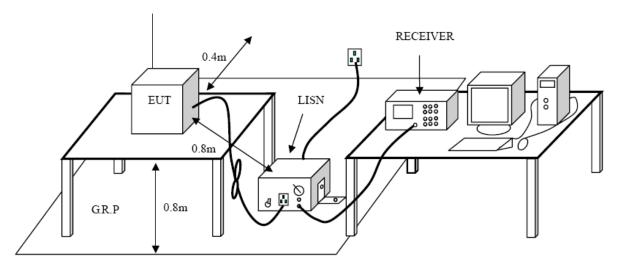
#### **Conducted Emission Test Limit**

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

#### Notes:

- (1) \*Decreasing linearly with logarithm of the frequency.
- (2) The lower limit shall apply at the transition frequencies.
- (3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

# 3.2 Test Setup



#### 3.3 Test Procedure

The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/50uH of coupling impedance for the measuring instrument.

Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.



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I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

LISN at least 80 cm from nearest part of EUT chassis

The bandwidth of EMI test receiver is set at 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

# 3.4 Test Equipment Used

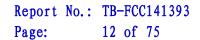
Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test	ROHDE&		400004	2013-08-10	2014-08-09
Receiver	SCHWARZ	ESCI	100321	2013-06-10	2014-00-09
50ΩCoaxial	Anritsu	MP59B	X10321	2013-08-10	2014-08-09
Switch	Aillisu	MESSE	X10321	2013-00-10	2014-00-09
L.I.S.N	Rohde & Schwarz	ENV216	101131	2013-08-10	2014-08-09
L.I.S.N	SCHWARZBECK	NNBL 8226-2	8226-2/164	2013-08-10	2014-08-09

# 3.5 EUT Operating Mode

Please refer to the description of test mode.

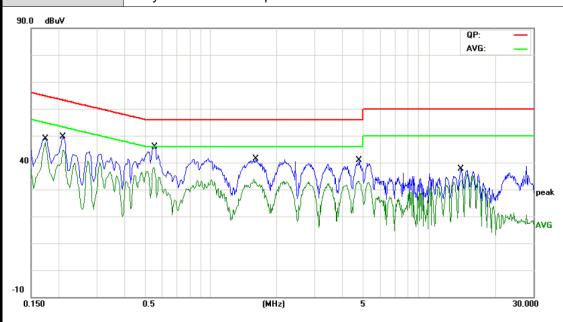
#### 3.6 Test Data

Please see the next page.

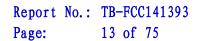




EUT: Bluetooth Speaker **Model Name:** IT200 25 ℃ Temperature: Relative Humidity: 55% AC 120V/60 Hz **Test Voltage:** Terminal: Line **Test Mode:** USB Charging with TX GFSK Mode 2402 MHz Remark: Only worse case is reported



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1740	48.06	0.00	48.06	64.76	-16.70	QP	
2	*	0.1740	47.59	0.00	47.59	54.76	-7.17	AVG	
3		0.2100	48.20	0.00	48.20	63.20	-15.00	QP	
4		0.2100	44.89	0.00	44.89	53.20	-8.31	AVG	
5		0.5540	45.22	0.00	45.22	56.00	-10.78	QP	
6		0.5540	37.34	0.00	37.34	46.00	-8.66	AVG	
7		1.6100	39.57	0.00	39.57	56.00	-16.43	QP	
8		1.6100	32.58	0.00	32.58	46.00	-13.42	AVG	-
9		4.7980	36.03	0.00	36.03	56.00	-19.97	QP	
10		4.7980	32.41	0.00	32.41	46.00	-13.59	AVG	
11		13.9460	33.98	0.00	33.98	60.00	-26.02	QP	
12		13.9460	33.24	0.00	33.24	50.00	-16.76	AVG	





EUT: Bluetooth Speaker Model Name: IT200

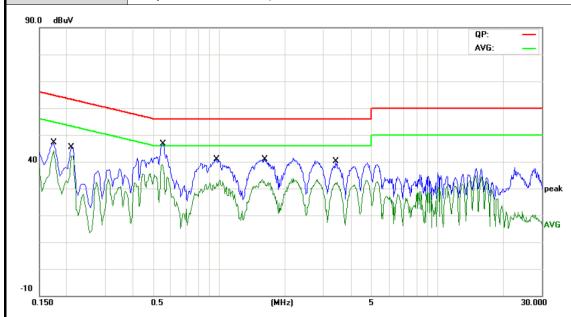
Temperature: 25 ℃ Relative Humidity: 55%

Test Voltage: AC 120V/60 Hz

Terminal: Neutral

Test Mode: USB Charging with TX GFSK Mode 2402 MHz

Remark: Only worse case is reported



	MHz	dBuV						
	0.4740		dB	dBuV	dBuV	dB	Detector	Comment
1	0.1740	34.59	10.12	44.71	64.76	-20.05	QP	
2	0.1740	33.99	10.12	44.11	54.76	-10.65	AVG	
3	0.2100	34.11	10.12	44.23	63.20	-18.97	QP	
4	0.2100	32.19	10.12	42.31	53.20	-10.89	AVG	
5	0.5540	36.17	10.02	46.19	56.00	-9.81	QP	
6 *	0.5540	28.29	10.02	38.31	46.00	-7.69	AVG	
7	0.9700	29.24	10.15	39.39	56.00	-16.61	QP	
8	0.9700	21.08	10.15	31.23	46.00	-14.77	AVG	
9	1.6220	28.78	10.10	38.88	56.00	-17.12	QP	
10	1.6220	21.97	10.10	32.07	46.00	-13.93	AVG	
11	3.4180	26.06	10.06	36.12	56.00	-19.88	QP	
12	3.4180	22.32	10.06	32.38	46.00	-13.62	AVG	



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# 4. Radiated Emission Test

## 4.1 Test Standard and Limit

4.1.1 Test Standard FCC Part 15.209

4.1.2 Test Limit

#### Radiated Emission Limit (9 kHz~1000MHz)

h	adiated Ellission Ellint (5 kilz	1000111112)
Frequency (MHz	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

## Radiated Emission Limit (Above 1000MHz)

Frequency	Class B (dBuV	/m)(at 3m)
(MHz)	Peak	Average
Above 1000	74	54

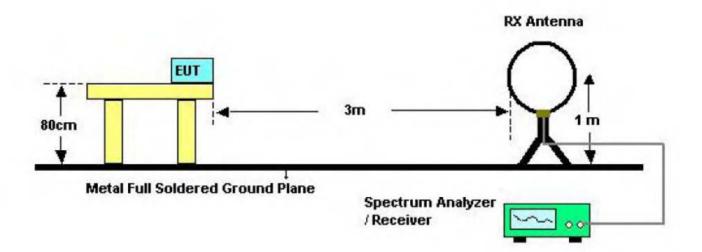
#### Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission Level (dBuV/m)=20log Emission Level (uV/m)

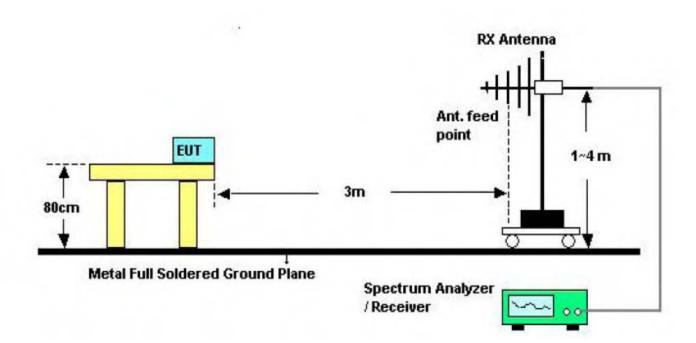


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# 4.2 Test Setup



Bellow 30MHz Test Setup



Bellow 1000MHz Test Setup



Turntable

EUT

0.8 m lm to 4m

Coaxial Cable

Above 1GHz Test Setup

#### 4.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above the ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (3) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (4) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (5) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (6) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (7) For the actual test configuration, please see the test setup photo.

# 4.4 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power in TX mode.



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# 4.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015
Spectrum Analyzer	Rohde & Schwarz	FSP30	DE25181	Aug. 10, 2013	Aug.09, 2014
EMI Test Receiver	Rohde & Schwarz	ESCI	101165	Aug. 10, 2013	Aug.09, 2014
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 07, 2014	Mar.06, 2015
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 07, 2014	Mar.06, 2015
Pre-amplifier	HP	11909A	185903	Mar. 07, 2014	Mar.06, 2015
Pre-amplifier	HP	8447B	3008A00849	Mar. 07, 2014	Mar.06, 2015
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 07, 2014	Mar.06, 2015
Signal Generator	Rohde & Schwarz	SML03	IKW682-054	Feb. 11, 2014	Feb.10, 2015
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A

#### 4.6 Test Data

Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

Test data please refer the following pages.

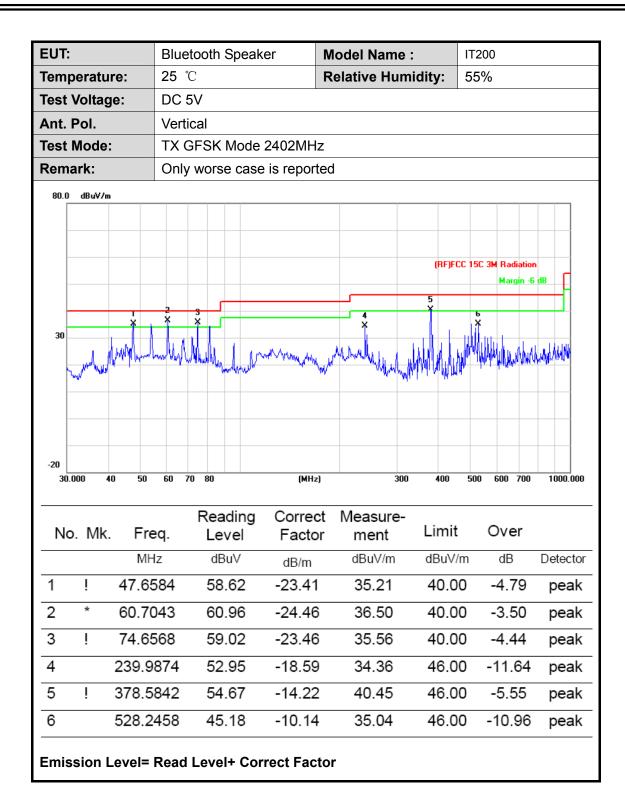


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5 °C OC 5V Horizontal TX GFSK Mode 2402MH Only worse case is repo	ted	55%
lorizontal X GFSK Mode 2402MF	ted	
X GFSK Mode 2402MF	ted	
	ted	
Only worse case is repo		
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	3 4 5 6 X	FCC 15C 3M Radiation  Margin - 6 dB
U 70 00 (MF	2) 300 400	300 600 700 1000.000
•	1	t Over
dBuV dB/m	dBuV/m dBuV	//m dB Detector
75 56.89 -23.2	2 33.67 40.0	00 -6.33 peak
67 43.32 -21.8	6 21.46 43.5	50 -22.04 peak
09 54.59 -20.7	9 33.80 43.5	50 -9.70 peak
40 51.31 -19.7	0 31.61 46.0	00 -14.39 peak
41 44.69 -14.1	4 30.55 46.0	00 -15.45 peak
57 45.98 -12.7	8 33.20 46.0	00 -12.80 peak
	Reading Correlation   Correlat	Reading Correct Measure- Level Factor ment Limited MBuV MB/m MBuV/m MBuV MB/m MBuV/m M



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EUT:	Bluetooth Speaker	Model Name :	IT200				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 3.7V	DC 3.7V					
Ant. Pol.	Horizontal	Horizontal					
Test Mode:	TX GFSK Mode 2402MH	z					
Remark:	No report for the emissio prescribed limit.	n which more than 10 c	dB below the				

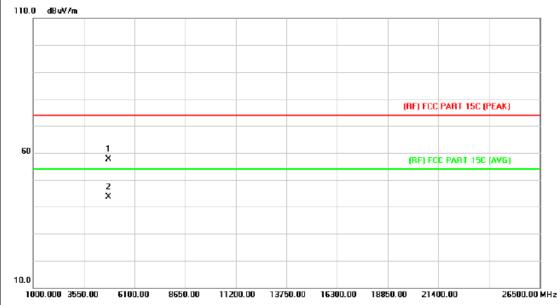


	۷o.	Mk.	Freq.		Correct Factor	Measure- ment	Limit	Ov er	
			MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αÐ	Detector
1		*	4804.112	29.28	13.44	42.72	54.00	-11.28	AVG
2			4804.291	43.68	13.44	57.12	74.00	-16.88	peak



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EUT:	Bluetooth Speaker	Model Name :	IT200				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 3.7V						
Ant. Pol.	Vertical	Vertical					
Test Mode:	TX GFSK Mode 2402MH	z					
Remark:	No report for the emissio prescribed limit.	n which more than 10 c	dB below the				

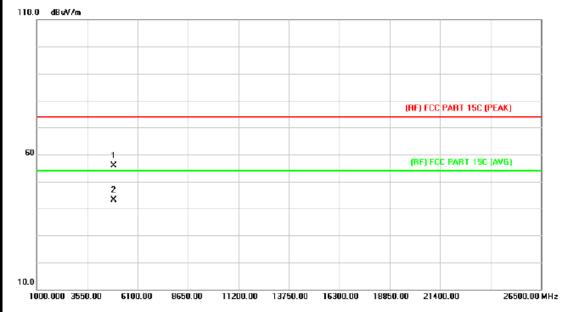


No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Ov er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αB	Detector
1		4803.450	44.12	13.44	57.56	74.00	-16.44	peak
2	*	4804.020	30.21	13.44	43.65	54.00	-10.35	AVG



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EUT:	Bluetooth Speaker	Model Name :	IT200				
Temperature:	25 ℃	55%					
Test Voltage:	DC 3.7V	DC 3.7V					
Ant. Pol.	Horizontal	Horizontal					
Test Mode:	TX GFSK Mode 2441MH	TX GFSK Mode 2441MHz					
Remark:	No report for the emissio prescribed limit.	No report for the emission which more than 10 dB below the prescribed limit.					



No	. Mk.	Freq.	Reading Level		Measure- ment	Limit	Ov er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αB	Detector
1		4881.940	41.96	13.90	55.86	74.00	-18.14	peak
2	*	4881.940	29.14	13.90	43.04	54.00	-10.96	AVG



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EUT:	Bluetooth Speaker	Model Name :	IT200			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V					
Ant. Pol.	Vertical					
Test Mode:	TX GFSK Mode 2441MH	z				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.					
procenous min.						

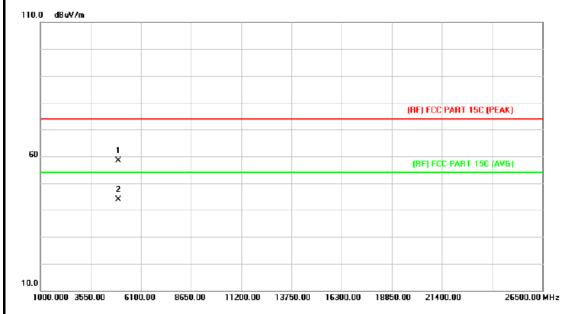


N	o. M	lk. Freq.	Reading Level		Measure- ment	Limit	Ov er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αB	Detector
1	*	4881.990	29.78	13.90	43.68	54.00	-10.32	AVG
2		4882.170	43.46	13.90	57.36	74.00	-16.64	peak



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EUT:	Bluetooth Speaker	Model Name :	IT200			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V					
Ant. Pol.	Horizontal					
Test Mode:	TX GFSK Mode 2480MH	z				
Remark:	No report for the emission which more than 10 dB below the					
	prescribed limit.					

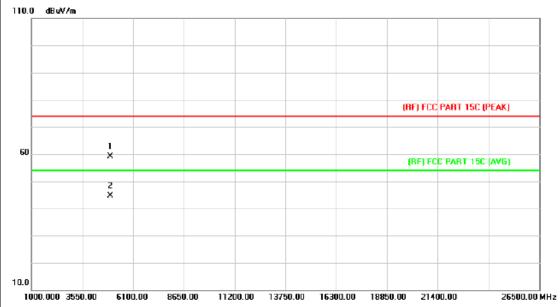


No.	. Mk.	Freq.		Correct Factor	Measure- ment	Limit	Ov er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αÐ	Detector
1		4959.580	44.00	14.36	58.36	74.00	-15.64	peak
2	*	4959.820	29.50	14.36	43.86	54.00	-10.14	AVG



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EUT:	Bluetooth Speaker	Model Name :	IT200			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V					
Ant. Pol.	Vertical					
Test Mode:	TX GFSK Mode 2480MH	z				
Remark:	Remark: No report for the emission which more than 10 dB below the prescribed limit.					
110.0 M.W.						

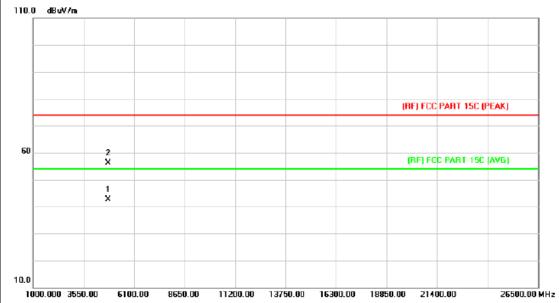


N	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Ov er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αÐ	Detector
1		4959.800	44.86	14.36	59.22	74.00	-14.78	peak
2	*	4959.910	30.20	14.36	44.56	54.00	-9.44	AVG



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EUT:	Bluetooth Speaker	Model Name :	IT200			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V					
Ant. Pol.	Horizontal	Horizontal				
Test Mode:	TX 8-DPSK Mode 2402M	1Hz				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.					

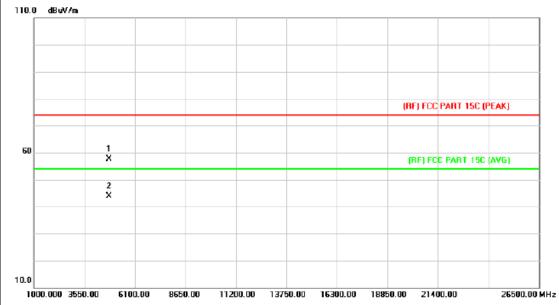


	No.	Mk.	Freq.	Reading Level		Measure- ment	Limit	Ov er	
			MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αÐ	Detector
1		*	4803.940	29.12	13.44	42.56	54.00	-11.44	AVG
2			4804.200	42.79	13.44	56.23	74.00	-17.77	peak



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EUT:	Bluetooth Speaker	Model Name :	IT200			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V					
Ant. Pol.	Vertical					
Test Mode:	TX 8-DPSK Mode 2402M	1Hz				
Remark:	Remark: No report for the emission which more than 10 dB below the prescribed limit.					

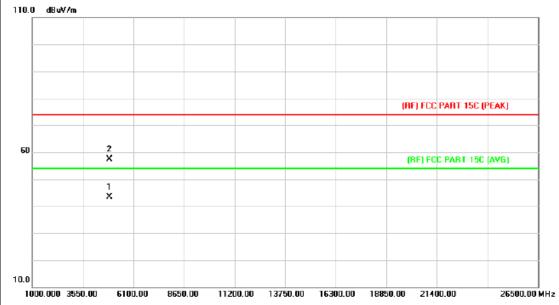


N	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Ov er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αB	Detector
1		4804.010	44.24	13.44	57.68	74.00	-16.32	peak
2	*	4804.120	30.45	13.44	43.89	54.00	-10.11	AVG



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EUT:	Bluetooth Speaker	Model Name :	IT200			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V					
Ant. Pol.	Horizontal					
Test Mode:	TX 8-DPSK Mode 2441M	1Hz				
Remark:	rk: No report for the emission which more than 10 dB below the prescribed limit.					

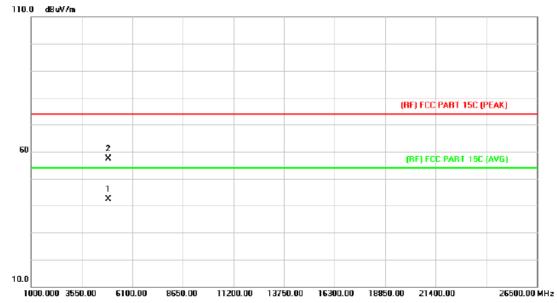


No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Ov er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αB	Detector
1	*	4881.963	29.36	13.90	43.26	54.00	-10.74	AVG
2		4881.985	43.46	13.90	57.36	74.00	-16.64	peak



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EUT:	Bluetooth Speaker	Model Name :	IT200
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX 8-DPSK Mode 2441M	1Hz	
Remark:	No report for the emission prescribed limit.	n which more than 10 c	dB below the
			·

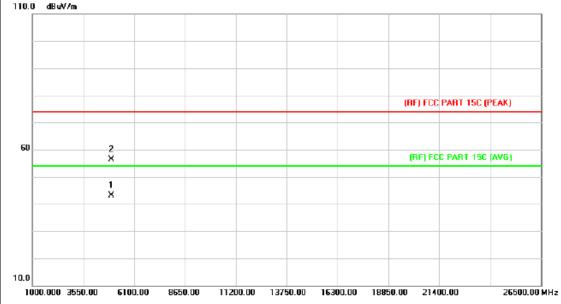


N	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Ov er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αB	Detector
1	*	4881.967	28.46	13.90	42.36	54.00	-11.64	AVG
2		4881.987	43.41	13.90	57.31	74.00	-16.69	peak



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EUT:	Bluetooth Speaker	Model Name :	IT200
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX 8-DPSK Mode 2480N	1Hz	
Remark:	No report for the emissio prescribed limit.	n which more than 10 c	dB below the
110.0 40.00			



	No.	Mk.	Freq.	Reading Level		Measure- ment	Limit	Ov er	
			MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αÐ	Detector
1	l	*	4959.854	28.76	14.36	43.12	54.00	-10.88	AVG
2	2		4959.932	42.00	14.36	56.36	74.00	-17.64	peak



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EUT:	Bluetooth Speaker	Model Name :	IT200				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 3.7V						
Ant. Pol.	Vertical						
Test Mode:	TX 8-DPSK Mode 2480M	1Hz					
Remark:	•	No report for the emission which more than 10 dB below the					
	prescribed limit.						



N	۷o.	Mk.	Freq.		Correct Factor	Measure- ment	Limit	Ov er	
			MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αÐ	Detector
1		*	4959.963	28.76	14.36	43.12	54.00	-10.88	AVG
2			4959.971	43.33	14.36	57.69	74.00	-16.31	peak



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# 5. Restricted Bands Requirement

#### 5.1 Test Standard and Limit

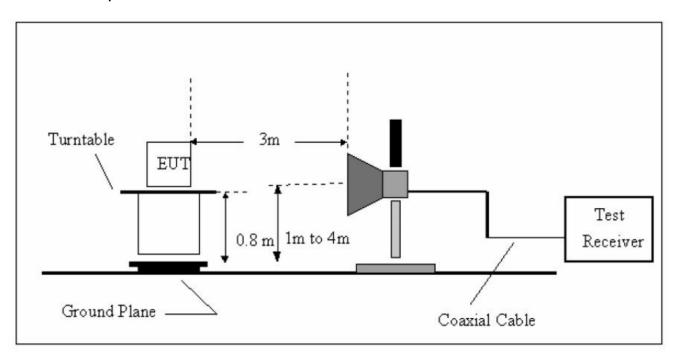
5.1.1 Test Standard FCC Part 15.209 FCC Part 15.205

5.1.2 Test Limit

Class B (dBuV/m)(at 3m)				
Peak	Average			
74	54			
74	54			
	Peak 74			

Note: All restriction bands have been tested, only the worst case is reported.

#### 5.2 Test Setup



#### 5.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (3) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked



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and then Quasi Peak detector mode re-measured.

(4) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.

- (5) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (6) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (7) For the actual test configuration, please see the test setup photo.

# 5.4 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

#### 5.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015
Spectrum Analyzer	Rohde & Schwarz	FSP30	DE25181	Aug. 10, 2013	Aug.09, 2014
EMI Test Receiver	Rohde & Schwarz	ESCI	101165	Aug. 10, 2013	Aug.09, 2014
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 07, 2014	Mar.06, 2015
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 07, 2014	Mar.06, 2015
Pre-amplifier	HP	11909A	185903	Mar. 07, 2014	Mar.06, 2015
Pre-amplifier	HP	8447B	3008A00849	Mar. 07, 2014	Mar.06, 2015
Cable	HUBER+SUHNE R	100	SUCOFLEX	Mar. 07, 2014	Mar.06, 2015
Signal Generator	Rohde & Schwarz	SML03	IKW682-054	Feb. 11, 2014	Feb.10, 2015
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A

#### 5.6 Test Data

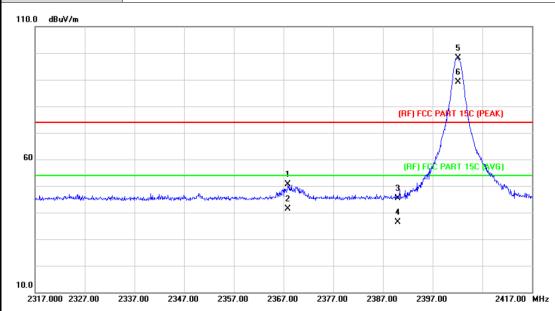
All restriction bands have been tested, only the worst case is reported.



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# (1) Radiation Test

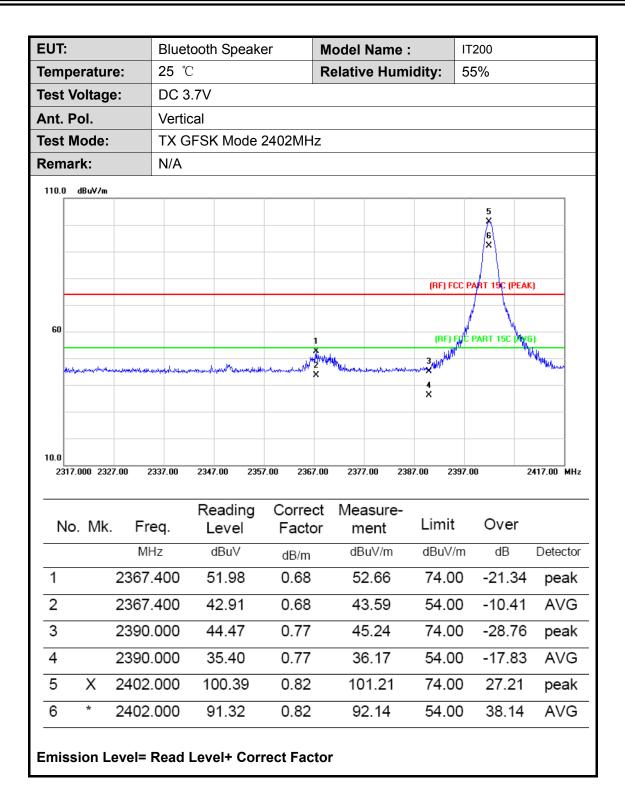
EUT:	Bluetooth Speaker	Model Name :	IT200			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V					
Ant. Pol.	Horizontal					
Test Mode:	TX GFSK Mode 2402MH	TX GFSK Mode 2402MHz				
Remark:	N/A					



No.	Mk.	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2367.900	49.87	0.68	50.55	74.00	-23.45	peak
2		2367.900	40.80	0.68	41.48	54.00	-12.52	AVG
3		2390.000	44.71	0.77	45.48	74.00	-28.52	peak
4		2390.000	35.64	0.77	36.41	54.00	-17.59	AVG
5	Χ	2402.100	97.42	0.82	98.24	74.00	24.24	peak
6	*	2402.100	88.35	0.82	89.17	54.00	35.17	AVG



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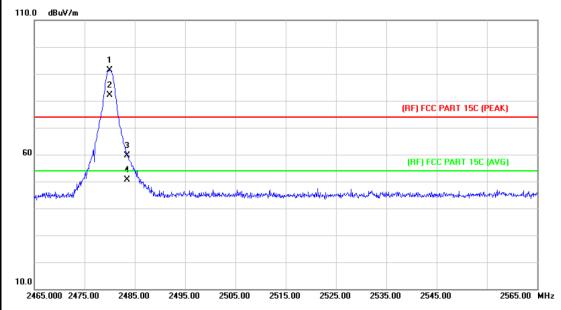
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EUT:	Bluetooth Spea	ıker <b>N</b>	Model Name :	IT	200				
Temperature:	25 ℃	<b>Relative Humidity:</b> 55%							
Test Voltage:	DC 3.7V								
Ant. Pol.	Horizontal								
Test Mode:	TX GFSK Mode	X GFSK Mode 2480 MHz							
Remark: N/A									
110.0 dBuV/m									
60	3 X 4 X X X X X X X X X X X X X X X X X	Andrew Address	spethings regular production from the Massick for	(RF) FCC	PART 15C (PEA)	G)			
10.0	2485.00 2495.00 2	2505.00 2515.00	0 2525.00 2535.	00 2545.		2565.00 MHz			
No. Mk. Fr	Reading req. Level Hz dBuV		Measure-	Limit dBuV/m	Over	Detector			
1 X 2480	.100 92.59	1.15	93.74	74.00	19.74	peak			
2 * 2480	.100 85.52	1.15	86.67	54.00	32.67	AVG			
3 2483	.500 60.88	1.17	62.05	74.00	-11.95	peak			
4 2483		1.17	52.98	54.00	-1.02	AVG			



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EUT:	Bluetooth Speaker	Model Name :	IT200
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2480 MI	Hz	
Remark:	N/A		
110.0 dBuV/m			



No	o. Mk	c. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Χ	2480.000	90.17	1.15	91.32	74.00	17.32	peak
2	*	2480.000	81.10	1.15	82.25	54.00	28.25	AVG
3		2483.500	58.47	1.17	59.64	74.00	-14.36	peak
4		2483.500	49.40	1.17	50.57	54.00	-3.43	AVG



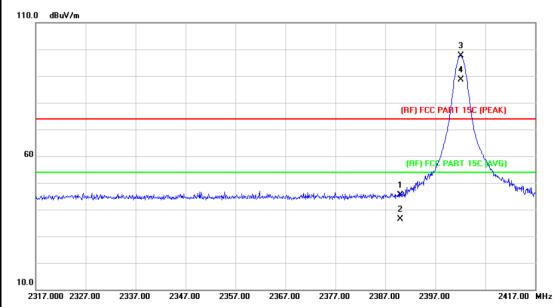
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EUT	:		Blue	tooth	Speak	er	Mod	el Nar	ne :		IT200			
Tem	peratur	e:	25 °C Relative Humidity: 55%											
Test	Voltage	e:	DC 3.7V											
Ant.	Pol.		Hori	Horizontal										
Test	Mode:		TX 8	B-DPS	K Mod	e 2402N	1Hz							
Rem	nark:		N/A											
110.0	0 dBuV/m													
										(RF) FCC	3 X 4 X PART 1	SC (PEAK	()	
60										(RF) F	É PART	15C <b>W</b> V6	i)	
	Harrida, tradition of the	openia-enteriorie	and the second	and the second s	nghapisnaghrighdinghia	an and an and	whiteher	gransk andrivansk	hawaraykayay	1 2 ×		4,,	Hythophylkan	
10.0 23	317.000 232		337.00	2347.	00 235	57.00 236	7.00 2	2377.00	2387	7.00 239	7.00	2	2417.00	MHz
N	lo. Mk.	Fre	eq.		ading	Corre Facto		easui ment		Limit	0	ver		
		MH	•		BuV	dB/m		dBuV/r		dBuV/n	n (	dB	Dete	ctor
1		2390.	000	45	5.25	0.77		46.02	2	74.00	) -2	7.98	pea	ak
2		2390.			3.18	0.77		36.95		54.00		7.05	AV	
3	Х	2401.			3.26	0.82		99.08		74.00		5.08	pea	
	*													
4		2401.	900	88	9.19	0.82		90.0	I	54.00	3	6.01	ΑV	G



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EUT:	Bluetooth Speaker	Model Name :	IT200				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 3.7V						
Ant. Pol.	Vertical						
Test Mode:	TX 8-DPSK Mode 2402N	1Hz					
Remark:	N/A	N/A					



No	o. Mk	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	44.57	0.77	45.34	74.00	-28.66	peak
2		2390.000	35.50	0.77	36.27	54.00	-17.73	AVG
3	Х	2402.100	96.92	0.82	97.74	74.00	23.74	peak
4	*	2402.100	87.85	0.82	88.67	54.00	34.67	AVG



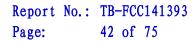
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EUI	Γ:		Blue	tooth Sp	eaker		Мс	del	Name	<b>)</b> :	I	T200			
Tem	peratur	e:	25 °	<b>25</b> ℃				lativ	e Hur	midit	y:	55%			
Tes	t Voltag	e:	DC 3	DC 3.7V											
Ant	. Pol.		Hori	zontal											
Tes	t Mode:		TX 8	B-DPSK	Mode	2480M	lHz								
Ren	nark:		N/A												
110.0	0 dBuV/m														
60		1 × /2 ×	S S S S S S S S S S S S S S S S S S S	Market Ma	hogh-athroproving.	Paragraph with	numarin	topororad	son Andrews	Angent House		C PART 15C			
10.0															
	465.000 247 No. Mk.		eq.	Read Leve	_	Corre	ct		asure ent		imit.	5.00 Ove		565.00	miliz
		M	Hz	dBu'	V	dB/m		dB	uV/m	C	lBuV/n	n dB	3	Detec	ctor
1	Χ	2479	.700	95.9	96	1.15		9	7.11		74.00	23.	11	pea	ak
2	*	2479	.700	86.8	39	1.15		88	8.04	į	54.00	34.	04	ΑV	G
3		2483	.500	60.4	15	1.17		6	1.62	-	74.00	-12.	.38	pea	ak
4		2483	.500	51.3	88	1.17		52	2.55	ļ	54.00	-1.4	45	ΑV	G



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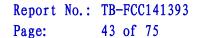
		Blu	etooth S	Speak	er	Mo	odel N	ame		IT20	00	
ratur	e:	25	25 ℃			Re	elative	Hum	idity:	55%	6	
oltag	e:	DC	DC 3.7V									
ol.		Ver	Vertical									
ode:		TX	8-DPS	< Mod	e 2480	OMHz						
k:		N/A										
dBuV/m												
(M) THINK	1 X	\$ X X X X X X X X X X X X X X X X X X X	"Pallotal Allabora	th bloom, and	the state of the s	holp, sage, n, holes,	do to the state of	more	(RI	F) FCC PA	ART 15C (AV	/G)
000 24	75.00	2485.00	2495.0	)0 25	05.00	2515.00	2525.0	00 2	535.00	2545.00		2565.00 MI
Mk.	Fr	eq.		_					Limi	t	Over	
	M	Hz	dB	uV	dB/	m	dBu\	//m	dBu∖	//m	dB	Detecto
Χ	2479	.700	101	.28	1.1	5	102	.43	74.0	00	28.43	peak
*	2479	.700	92.	21	1.1	5	93.	36	54.0	00	39.36	AVG
	2483	3.500	60.	47	1.1	7	61.	64	74.0	00	-12.36	peak
						17		57	54.0		-1.43	AVG
	oltagol. ode: k: dBuV/m	ode: k:  dBuV/m  1  2  000 2475.00  Mk. Fr  M  X 2479  * 2479	rature: 25 pltage: DC pl. Veri code: TX k: N/A dBuV/m  Mk. Freq. MHz X 2479.700 * 2479.700	rature: 25 °C  pltage: DC 3.7V  pl. Vertical  TX 8-DPSk  k: N/A  dBuv/m  1  2  Rea  Mk. Freq. Lev  MHz dB  X 2479.700 92.	### Predict of the pr	DC 3.7V  DI. Vertical  Ode: TX 8-DPSK Mode 2480  k: N/A	rature: 25 °C	Relative   25 °C   Relative   DC 3.7V   DI.   Vertical   Ode:   TX 8-DPSK Mode 2480MHz   Relative   TX 8-DPSK Mode 2480MHz   TX 8-DPSK Mode 2480	Relative Hum  oltage: DC 3.7V  ol. Vertical  TX 8-DPSK Mode 2480MHz  k: N/A  dBuV/m  Reading Correct Measure-  Mk. Freq. Level Factor ment  MHz dBuV dB/m  X 2479.700 101.28 1.15 102.43  * 2479.700 92.21 1.15 93.36	Relative Humidity:   DC 3.7V   DI.   Vertical   TX 8-DPSK Mode 2480MHz   N/A     Relative Humidity:   DC 3.7V   DI.   Vertical   DC 3.7V   DI.   Vertical   DC 3.7V   DC 3.7V	Relative Humidity:	Parture: 25 °C Relative Humidity: 55%    DC 3.7V





(2) Conducted Test

## Agilent 15:45:40 Jul 27, 2014  ## Agilent 15:46:40 Jul 27, 2014  ## Agi			Blueto	oth Sp	eaker		Model	Name:		IT200	)
St Mode: TX GFSK Mode 2402MHz / 2480 MHz  N/A  Agilent 15:45:04 Jul 27, 2014  Ref 10 dBm #Atten 25 dB 45.7 dBm Peak Log ID	eratur	e:	<b>25</b> ℃				Relativ	ve Humidit	y:	55%	)
## Agilent 15:45:04 Jul 27, 2014    Mkr4 2:35425 GHz	Voltage	):	DC 3.7	7V							
## Agilent 15:45:04 Jul 27, 2014    Mkr4 2:35425 GHz	Mode:		TX GF	SK M	ode 240	2MHz	z / 2480	) MHz			
Ref 10 dBm	ark:		N/A								
Ref 10 dBm	∦ A	gilent 1	5:45:04	Jul 27, 2	014						
Peak   Log   10	Ref 10	dBm		#/	Atten 25 dE	3			N		
Display Line	Peak									1	
Display Line -22.60 dBm  Center 2.369 GHz #Res BW 100 kHz #Res BW 100 kHz  I (1) Freq 2.49000 GHz 2.596 dBm  3 (1) Freq 2.49000 GHz -57.99 dBm 3 (1) Freq 2.39000 GHz -57.99 dBm 4 (1) Freq 2.35425 GHz -45.7 dBm   #Agllent 15:46:40 Jul 27, 2014   #Agllent 2.48025 GHz  Display Line -23.49 dBm  DI -23.54 dBm  DI -23.55 dBm  Center 2.515 GHz  #Atten 25 dB  Span 100 MHz  #Atten 25 dB  Span 100 MHz  Sweep 10.36 ms (401 pts)  Mkr1 2.48025 GHz -45.7 dBm  Span 100 MHz  #Atten 25 dB  Span 100 MHz  Sweep 10.36 ms (401 pts)  Agglent 15:46:40 Jul 27, 2014	10										
-22.60 dBm  Center 2.369 GHz #Res BW 100 kHz #Res BW 100 kHz  Marker Trace Type X Axis Amplitude 1 (1) Freq 2.49000 GHz -2.596 dBm 2 (1) Freq 2.39000 GHz -57.99 dBm 3 (1) Freq 2.49000 GHz -57.99 dBm 4 (1) Freq 2.35425 GHz -45.7 dBm   Mkr1 2.48025 GHz  Agilent 15:46:40 Jul 27, 2014  Ref 10 dBm #Atten 25 dB -3.489 dBm  Peak Log 10 dBm	dB/	Displ	ay Lin	ne							
DI -22.6 dBm  Center 2.369 GHz		-22.6	0 dBn	n	4 <b>\$</b>						
Center 2.369 GHz #Res BW 100 kHz  #Res BW 100 kHz  Marker Trace Type X Axis Amplitude 2 40200 GHz 2 (1) Freq 2.39900 GHz 3 (1) Freq 2.40000 GHz 4 (1) Freq 2.355425 GHz Agilent  Agilent 15:46:40 Jul 27, 2014  Mkr1 2.48025 GHz  Agilent  Agilent  Display Line -23.49 dBm  Di 23.5  Center 2.515 GHz  Ref BW 100 kHz  Freq X Axis Amplitude Am			·					2		\$ \_	
#Res BW 100 kHz  #VBW 300 kHz											
#Res BW 100 kHz  #VBW 300 kHz											
Marker Trace Type X Axis Amplitude 1 (1) Freq 2.40200 GHz -2.596 dBm 2 (1) Freq 2.39000 GHz -57.99 dBm 3 (1) Freq 2.40000 GHz -57 dBm 4 (1) Freq 2.35425 GHz -45.7 dBm  Mkr1 2.48025 GHz  Ref 10 dBm #Atten 25 dB -3.489 dBm  Peak Log 10 dB/ Display Line -23.49 dBm  DI -23.5 dBm  Center 2.515 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 10.36 ms (401 pts)  Marker Trace Type X Axis Amplitude 1 (1) Freq 2.48025 GHz -3.489 dBm						VRW 2	nn kHz	Swe	en 10		
2 (1) Freq 2.39000 GHz -57.99 dBm -57 dBm 4 (1) Freq 2.40000 GHz -57 dBm -45.7 dBm  **Agilent 15:46:40 Jul 27, 2014  **Ref 10 dBm #Atten 25 dB -3.489 dBm	Mark	er Trad	ce T		X	Axis	OC KIIZ	Amplitude	ъср IV	ou IIIs	(401 pts)
Agilent 15:46:40 Jul 27, 2014  Mkr1 2.48025 GHz  Ref 10 dBm	2	(1)	) F	req	2.3900	00 GHz		-57.99 dBm			
Mkr1 2.48025 GHz  Ref 10 dBm	3										
Peak Log 10 dB/ Display Line -23.49 dBm  Di -23.5 dBm  Center 2.515 GHz	4	(1)	F								
Log 10 dB/ Display Line -23.49 dBm  DI -23.5 dBm  Center 2.515 GHz #Res BW 100 kHz  Marker Trace Type X Axis Amplitude 1 (1) Free 2.48025 GHz 3-3.489 dBm	₩ A	gilent 1	F	Jul 27, 2	2.3542	25 GHz			M		
Display Line -23.49 dBm  Di -23.5 dBm  Center 2.515 GHz  #Res BW 100 kHz  #Res BW 100 kHz  #VBW 300 kHz  Sweep 10.36 ms (401 pts)  Marker Trace Type X Axis Amplitude 1 (1) Freg 2.48025 GHz -3.489 dBm	* A	gilent 1	5:46:40	Jul 27, 2	2.3542	25 GHz			M		
-23.49 dBm  DI -23.5 dBm  Center 2.515 GHz  #Res BW 100 kHz  #Res BW 100 kHz  Marker Trace Type	Ref 10 Peak	gilent 1	5:46:40	Jul 27, 2	2.3542	25 GHz			W		
DI -23.5 dBm  Center 2.515 GHz  #Res BW 100 kHz  Marker Trace Type X Axis Amplitude 1 (1) Freo 2.48025 GHz -3.489 dBm	Ref 10 Peak Log	gilent 1:	5:46:40	Jul 27, 2	2.3542	25 GHz			W		
-23.5 dBm  Center 2.515 GHz  #Res BW 100 kHz  Marker Trace Type X Axis Amplitude 1 (1) Freo 2.48025 GHz -3.489 dBm	Ref 10 Peak Log	gilent 1:	5:46:40	Jul 27, 2 #/	2.3542	25 GHz			V		
Center 2.515 GHz  #Res BW 100 kHz  #VBW 300 kHz  Span 100 MHz  #VBW 300 kHz  Sweep 10.36 ms (401 pts)  Marker Trace Type X Axis Amplitude 1 (1) Freq 2.48025 GHz -3.489 dBm	Ref 10 Peak Log 10 dB/	gilent 1:	5:46:40 ay Lin 9 dBn	Jul 27, 20 ##	014 Atten 25 dE	25 GHz		-45.7 dBm	M		
#Res BW 100 kHz	Ref 10 Peak Log 10 dB/	gilent 1:	5:46:40 ay Lin 9 dBn	Jul 27, 20 ##	014 Atten 25 dE	25 GHz		-45.7 dBm	W		
#Res BW 100 kHz	Ref 10 Peak Log 10 dB/	gilent 1:	5:46:40 ay Lin 9 dBn	Jul 27, 20 ##	014 Atten 25 dE	25 GHz		-45.7 dBm	N		
1 (1) Freq 2.48025 GHz -3.489 dBm	Ref 10 Peak Log 10 dB/	gilent 1s	5:46:40 ay Lin 9 dBn	Jul 27, 20 ##	014 Atten 25 dE	25 GHz		-45.7 dBm	N	-3	3.489 dBm
2 (1) Freq 2.48350 GHz -57.76 dBm 3 (1) Freq 2.50000 GHz -57.04 dBm 4 (1) Freq 2.49025 GHz -57.13 dBm	Ref 10 Peak Log 10 dB/	gilent 1:  dBm  Displ  -23.4  r 2.515 Gi	ay Lin 9 dBn	Jul 27, 2	2.3542 014 Atten 25 dE	3 3 2VBW 3	00 kHz	-45.7 dBm		-3	3.489 dBm
4 (1) Freq 2.49025 GHz -57.13 dBm	Ref 10 Peak Log 10 dB/	1 dBm Displ -23.4  r 2.515 GBW 100 kler Trace	ay Lin 9 dBn	Jul 27, 20 #/ ne	2.3542 014 Atten 25 dE	3 3 Axis 25 GHz	00 kHz	-45.7 dBm  Swe Amplitude -3.489 dBm		-3	3.489 dBm
	Ref 10 Peak Log 10 dB/ DI -23.5 dBm Cente #Res I Mark	1 dBm Displ -23.4  r 2.515 GBW 100 kler Trace	ay Lin 9 dBn	Jul 27, 2	2.3542 014 Atten 25 dE ** ** ** ** ** ** ** ** ** ** ** ** **	3 Axis 25 GHz 0 GHz 10 GHz	00 kHz	Swe Amplitude -3.489 dBm -57.76 dBm		-3	3.489 dBm
	Ref 10 Peak Log 10 dB/ DI -23.5 dBm Cente #Res I Mark	1 dBm Displ -23.4  r 2.515 GBW 100 kler Trace	ay Lin 9 dBn	Jul 27, 2	2.3542 014 Atten 25 dE ** ** ** ** ** ** ** ** ** ** ** ** **	3 Axis 25 GHz 0 GHz 10 GHz	00 kHz	Swe Amplitude -3.489 dBm -57.76 dBm		-3	3.489 dBm
	Ref 10 Peak Log 10 dB/ DI -23.5 dBm Cente #Res I Mark	1 dBm Displ -23.4  r 2.515 GBW 100 kler Trace	ay Lin 9 dBn	Jul 27, 2	2.3542 014 Atten 25 dE ** ** ** ** ** ** ** ** ** ** ** ** **	3 Axis 25 GHz 0 GHz 10 GHz	00 kHz	Swe Amplitude -3.489 dBm -57.76 dBm		-3	3.489 dBm





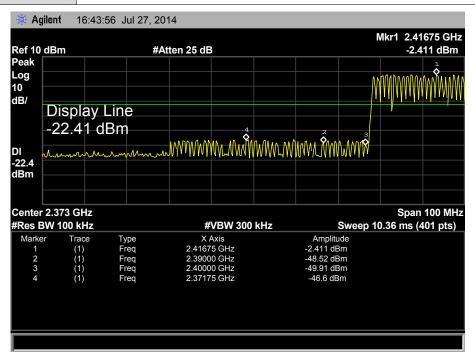
EUT: Bluetooth Speaker Model Name: IT200

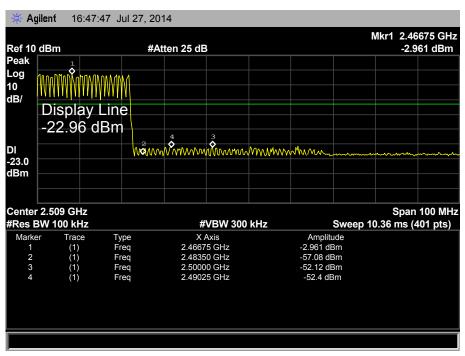
Temperature: 25 ℃ Relative Humidity: 55%

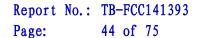
Test Voltage: DC 3.7V

Test Mode: GFSK Hopping Mode

Remark: N/A









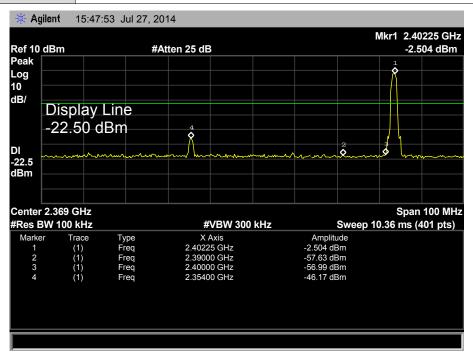
EUT: Bluetooth Speaker Model Name: IT200

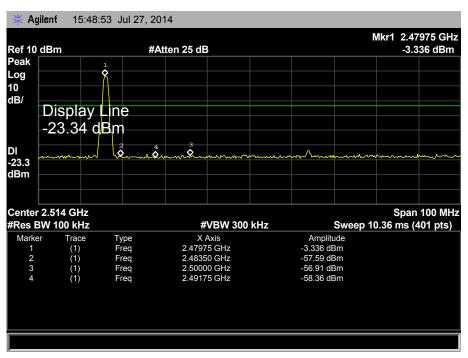
Temperature: 25 °C Relative Humidity: 55%

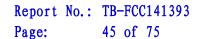
Test Voltage: DC 3.7V

Test Mode: TX 8-DPSK Mode 2402MHz / 2480 MHz

Remark: N/A









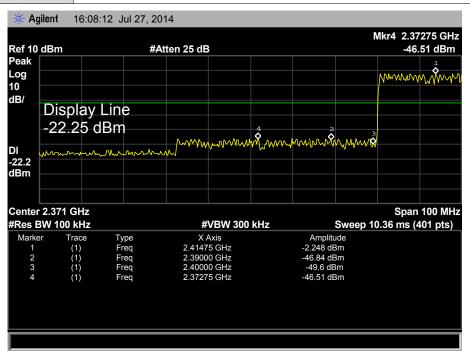
EUT: Bluetooth Speaker Model Name: IT200

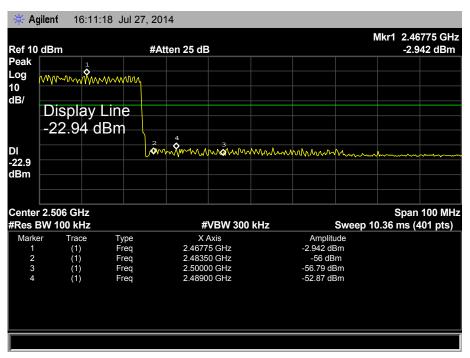
Temperature: 25 °C Relative Humidity: 55%

Test Voltage: DC 3.7V

Test Mode: 8-DPSK Hopping Mode

Remark: N/A







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# 6. Number of Hopping Channel

# 6.1 Test Standard and Limit

6.1.1 Test Standard FCC Part 15.247 (a)(1)

6.1.2 Test Limit

Section	Test Item	Limit
15.247	Number of Hopping Channel	>15

# 6.2 Test Setup



#### 6.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting: RBW=100 KHz, VBW=100 KHz, Sweep time= Auto.

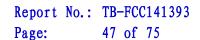
# 6.4 EUT Operating Condition

The EUT was set to the Hopping Mode by the Customer.

# 6.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015

## 6.6 Test Data



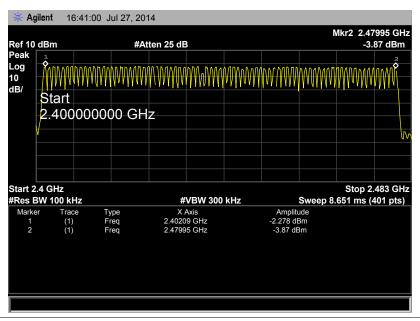


EUT:Bluetooth SpeakerModel Name :IT200Temperature:25 °CRelative Humidity:55%Test Voltage:DC 3.7V

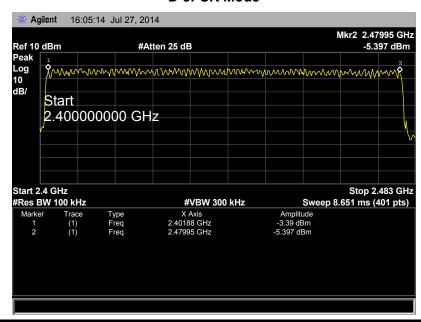
**Test Mode:** Hopping Mode (GFSK/ 8-DPSK)

Frequency Range	Quantity of Hopping Channel	Limit
24020447~24900447	79	>15
2402MHz~2480MHz	79	>15

#### **GFSK Mode**



#### **D-8PSK Mode**





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# 7. Average Time of Occupancy

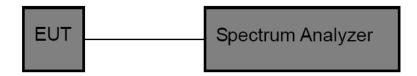
#### 7.1 Test Standard and Limit

5.1.1 Test Standard FCC Part 15.247 (a)(1)

5.1.2 Test Limit

Section	Test Item	Limit
15.247(a)(1)/ RSS-210	Average Time of	0.4.000
Annex 8(A8.1d)	Occupancy	0.4 sec

## 7.2 Test Setup



#### 7.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting: RBW=1MHz, VBW=1MHz.
- (3) Use video trigger with the trigger level set to enable triggering only on full pulses.
- (4) Sweep Time is more than once pulse time.
- (5) Set the center frequency on any frequency would be measure and set the frequency span to zero.
- (6) Measure the maximum time duration of one single pulse.
- (7) Set the EUT for packet transmitting.
- (8) Measure the maximum time duration of one single pulse.

# 7.4 EUT Operating Condition

The EUT was set to the Hopping Mode by the Customer.

# 7.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015

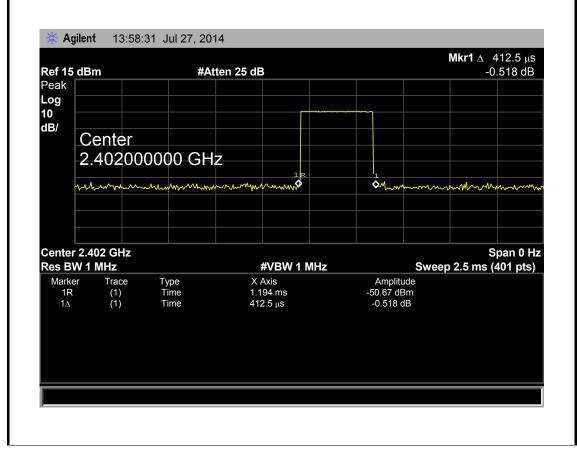


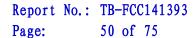
7.6 Test Data

EUT:		Bluetooth	Speaker	Model Name	:	IT200	
Temperature:		25 ℃		Relative Hum	idity:	55%	
Test Voltage:	e: DC 3.7V						
Test Mode:		Hopping N	Mode (GFSK D	H1)			
Channel	Pu	lse Time	Total of	Period Time	Lir	nit	Result
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result

Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402	0.413	132.16			
2441	0.413	132.16	31.60 400	PASS	
2480	0.413	132.16			

#### **GFSK Hopping Mode DH1**







**GFSK Hopping Mode DH1** 2441 MHz Agilent 13:59:45 Jul 27, 2014 Mkr1  $\Delta$  412.5  $\mu$ s -2.674 dB Ref 15 dBm #Atten 25 dB Peak Log 10 dB/ Center 2.441000000 GHz Center 2.441 GHz Span 0 Hz Res BW 1 MHz #VBW 1 MHz Sweep 2.5 ms (401 pts) Amplitude -48.49 dBm -2.674 dB Marker X Axis Trace Туре 1.119 ms 412.5 μs (1) (1) Time Time 1R 1Δ **GFSK Hopping Mode DH1** 

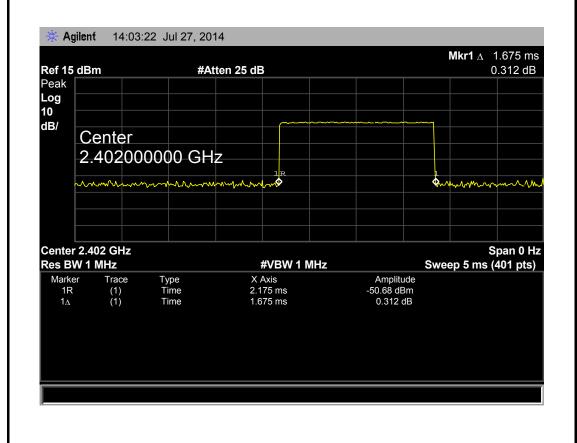
#### 2480 MHz Agilent 14:02:10 Jul 27, 2014 **Mkr1** Δ 412.5 μs 1.608 dB Ref 15 dBm #Atten 25 dB Peak Log 10 dB/ Center 2.480000000 GHz Rum Center 2.48 GHz Span 0 Hz Res BW 1 MHz #VBW 1 MHz Sweep 2.5 ms (401 pts) Amplitude -50.91 dBm Marker Trace Туре X Axis (1) (1) $387.5~\mu s$ $412.5~\mu s$ Time 1.608 dB Time

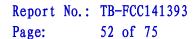


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EUT:		Bluetooth	Bluetooth Speaker Model Name : IT200				
Temperature:		25 ℃ Relative Humidity: 55%					
Test Voltage:		DC 3.7V					
Test Mode:		Hopping I	Mode (GFSK D	H3)			
Channel	Pu	lse Time	Total of	Period Time	Lir	nit	Result
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result
2402		1.675	268.00				
2441		1.675	268.00	31.60	40	00	PASS
2480	80 1.675 268.00						
	GFSK Hopping Mode DH3						

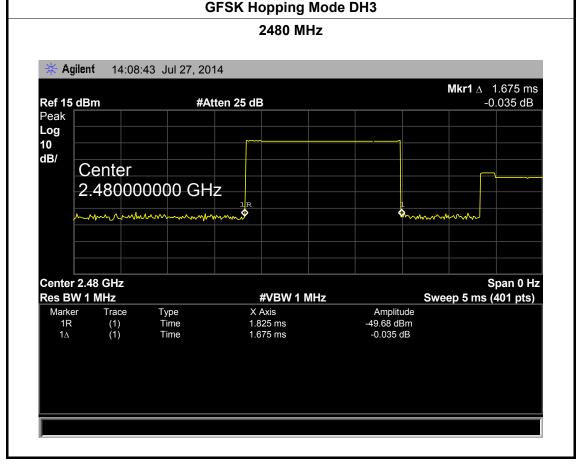
#### ok Hopping wode







**GFSK Hopping Mode DH3** 2441 MHz Agilent 14:04:22 Jul 27, 2014 Mkr1 A 1.675 ms 2.902 dB Ref 15 dBm #Atten 25 dB Peak Log 10 dB/ Center 2.441000000 GHz Center 2.441 GHz Span 0 Hz Res BW 1 MHz #VBW 1 MHz Sweep 5 ms (401 pts) Amplitude -51.91 dBm 2.902 dB Marker X Axis Trace Туре 2.013 ms 1.675 ms (1) (1) Time Time 1R 1Δ

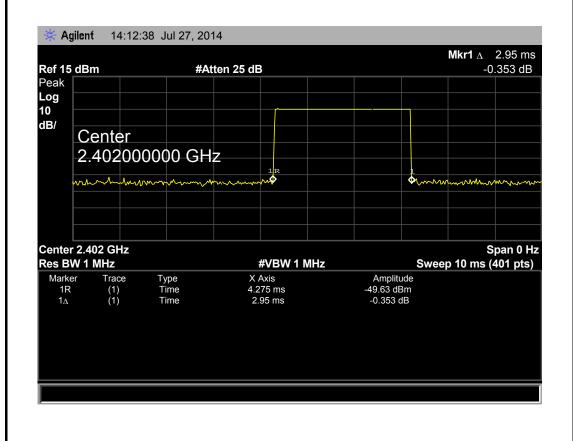


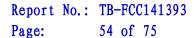


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EUT:		Bluetooth Speaker Model Name :				IT200	
Temperature		25 ℃ Relative Humidity: 55%					
Test Voltage:		DC 3.7V					
Test Mode:		Hopping Mode (GFSK DH5)					
Channel	Pu	Ise Time	Total of	Period Time	Lir	nit	Result
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result
2402		2.950	314.67				
2441		2.950	314.67	31.60	40	00	PASS
2480		2.950	314.67				
			GESK Honnii	na Mode DH5			

#### **GFSK Hopping Mode DH5**







GFSK Hopping Mode DH5

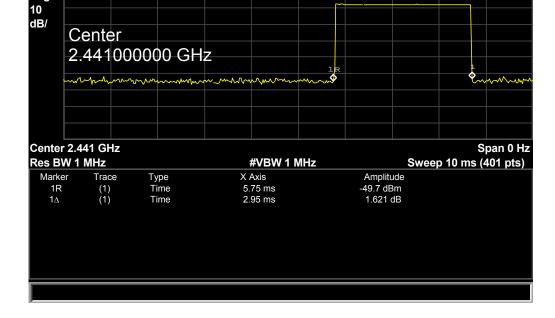
2441 MHz

Agilent 14:14:05 Jul 27, 2014

Mkr1 △ 2.95 ms

1.621 dB

Peak
Log



**GFSK Hopping Mode DH5** 

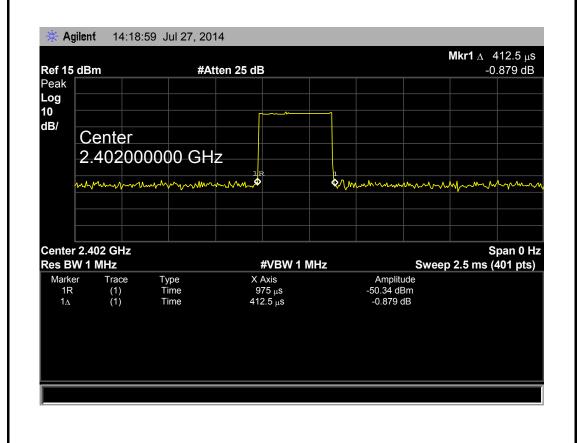
#### 2480 MHz Agilent 14:17:50 Jul 27, 2014 **Mkr1** $\triangle$ 2.95 ms Ref 15 dBm #Atten 25 dB 0.372 dB Peak Log 10 dB/ Center 2.480000000 GHz Center 2.48 GHz Span 0 Hz Res BW 1 MHz #VBW 1 MHz Sweep 10 ms (401 pts) Amplitude -50.03 dBm Marker Trace Туре X Axis (1) (1) 2.2 ms Time 2.95 ms 0.372 dB Time

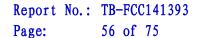


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EUT:		Bluetooth Speaker Model Name : IT200					
Temperature		25 °C Relative Humidity: 55%					
Test Voltage:		DC 3.7V					
Test Mode:		Hopping I	Mode (8-DPSK	DH1)			
Channel	Pu	lse Time	Total of	Period Time	Lir	nit	Result
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result
2402		0.413	132.16				
2441		0.413	132.16	31.60	40	00	PASS
2480		0.413	132.16				
8 DPSK Happing Mode DH1							

#### 8-DPSK Hopping Mode DH1

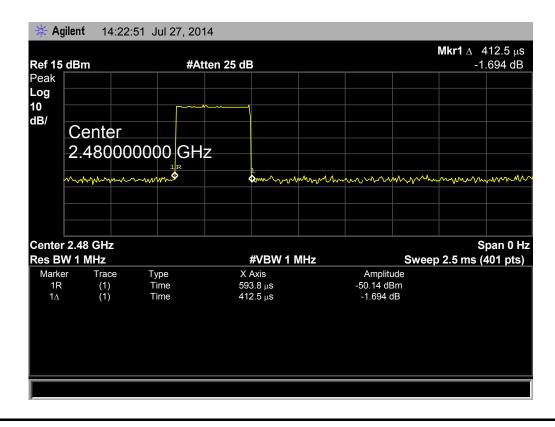






8-DPSK Hopping Mode DH1 2441 MHz 14:20:03 Jul 27, 2014 Agilent Mkr1  $\Delta$  412.5  $\mu$ s 3.324 dB Ref 15 dBm #Atten 25 dB Peak Log 10 dB/ Center 2.441000000 GHz Center 2.441 GHz Span 0 Hz Res BW 1 MHz #VBW 1 MHz Sweep 2.5 ms (401 pts) Amplitude Marker X Axis Trace Туре 881.2 μs 412.5 μs -51.29 dBm 3.324 dB (1) (1) Time Time 1R 1Δ

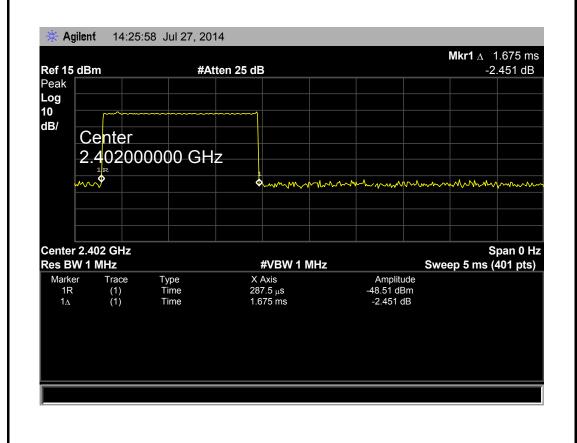
# 8-DPSK Hopping Mode DH1

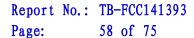




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EUT:		Bluetooth Speaker Model Name :			IT200		
Temperature		25 °C Relative Humidity: 55%					
Test Voltage:	e: DC 3.7V						
Test Mode:		Hopping Mode (8-DPSK DH3)					
Channel	Pu	Ise Time	Total of	Period Time	Lir	nit	Result
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result
2402		1.675	268.00				
2441		1.675	268.00	31.60	40	00	PASS
2480		1.675	268.00				
	•		8-DPSK Hopp	ing Mode DH3			







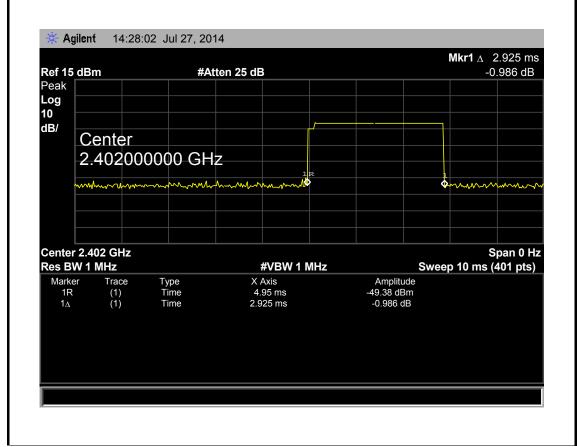
8-DPSK Hopping Mode DH3 2441 MHz Agilent 14:25:12 Jul 27, 2014 Mkr1 A 1.675 ms -1.026 dB Ref 15 dBm #Atten 25 dB Peak Log 10 dB/ Center 2.441000000 GHz ammun Center 2.441 GHz Span 0 Hz Res BW 1 MHz #VBW 1 MHz Sweep 5 ms (401 pts) Amplitude -49.97 dBm -1.026 dB X Axis Marker Trace Туре (1) (1) Time Time 850 μs 1.675 ms 1R 1Δ 8-DPSK Hopping Mode DH3 2480 MHz Agilent 14:24:07 Jul 27, 2014 **Mkr1**  $\Delta$  1.675 ms Ref 15 dBm #Atten 25 dB -0.047 dB Peak Log 10 dB/ Center 2.480000000 GHz

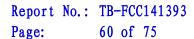


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EUT:		Bluetooth	Speaker	Model Name : IT200			
Temperature:		25 ℃		Relative Hum	idity:	55%	
Test Voltage:		DC 3.7V					
Test Mode:	Hopping Mode (8-DPSK DH5)						
Channel	Pu	Ise Time	Total of	Period Time	Lir	nit	Result
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result
2402		2.925	312.00				
2441		2.975	317.33	31.60	40	00	PASS
2480 2.975 317.33							
			8-DPSK Hopp	ing Mode DH5			

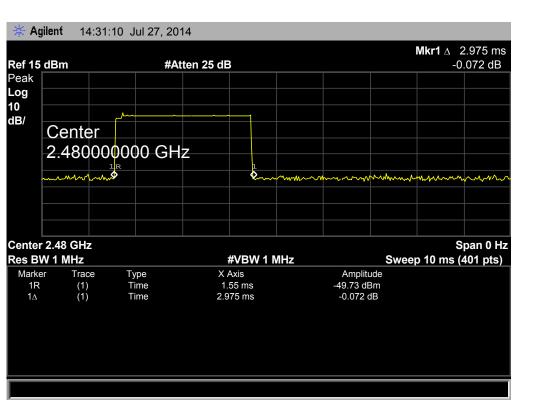
#### 11 0







8-DPSK Hopping Mode DH5 2441 MHz Agilent 14:32:19 Jul 27, 2014 Mkr1  $\triangle$  2.975 ms -1.265 dB Ref 15 dBm #Atten 25 dB Peak Log 10 dB/ Center 2.441000000 GHz Quan Center 2.441 GHz Span 0 Hz Res BW 1 MHz #VBW 1 MHz Sweep 10 ms (401 pts) Amplitude -48.1 dBm -1.265 dB X Axis Marker Trace Туре (1) (1) Time Time 3.325 ms 1R 1Δ 2.975 ms 8-DPSK Hopping Mode DH5 2480 MHz





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# 8. Channel Separation and Bandwidth Test

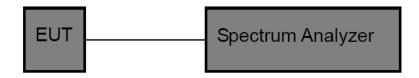
#### 8.1 Test Standard and Limit

8.1.1 Test Standard FCC Part 15.247

8.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)	
Bandwidth	<=1 MHz (20dB bandwidth)	2400~2483.5	
	>25KHz or >two-thirds of		
Channel Separation	the 20 dB bandwidth	2400~2483.5	
	Which is greater		

## 8.2 Test Setup



#### 8.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:

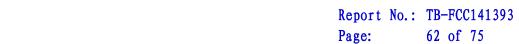
Channel Separation: RBW=30 kHz, VBW=100 kHz.

Bandwidth: RBW=30 kHz, VBW=100 kHz.

- (3) The bandwidth is measured at an amplitude level reduced 20dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst –case (i.e the widest) bandwidth.
- (4) Measure the channel separation the spectrum analyzer was set to Resolution Bandwidth:30 kHz, and Video Bandwidth:100 kHz. Sweep Time set auto.

# 8.4 EUT Operating Condition

The EUT was set to the Hopping Mode for Channel Separation Test and continuously transmitting for the Bandwidth Test.

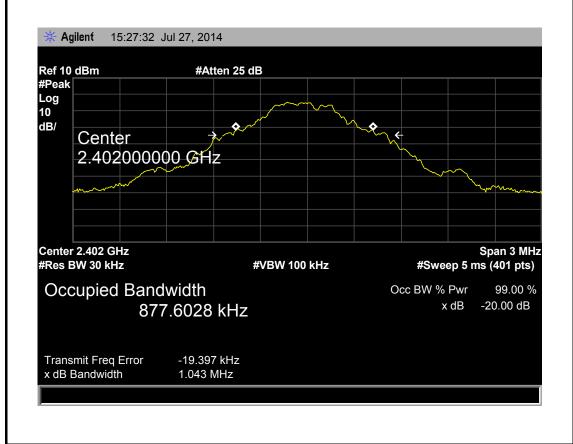


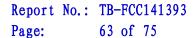
8.5 Test Equipment

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum	Agilopt		NAV/4E40C4EC	Mar. 20, 2014	Mar. 19, 2015
Analyzer	Agilent	E4407B	MY45106456	Mai. 20, 2014	Mai. 19, 2015

## 8.6 Test Data

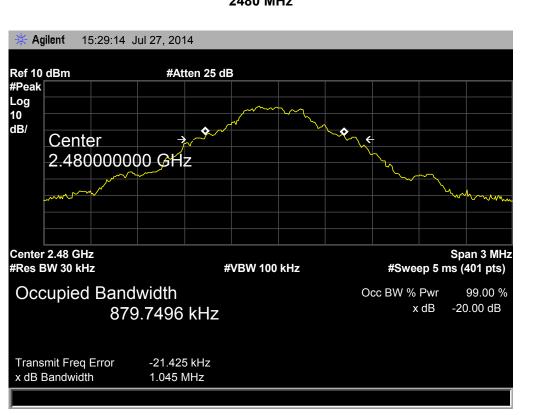
EUT:	Bluetooth Speaker	Model Name :	IT200			
Temperature:	<b>25</b> ℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V					
Test Mode:	TX Mode (GFSK)					
Channel frequence	cy 99% OBW (kHz)	20dB Bandwidth	20dB Bandwidth			
(MHz)		(kHz)	*2/3 (kHz)			
2402	877.6028	1043.00	695.33			
2441	882.3178	1043.00	695.33			
2480	879.7496	1045.00	696.67			
GFSK TX Mode						







**GFSK TX Mode** 2441 MHz 15:28:35 Jul 27, 2014 Agilent Ref 10 dBm #Atten 25 dB #Peak Log 10 dB/ **\$** Center 2.441000000 GHz Center 2.441 GHz Span 3 MHz #Res BW 30 kHz **#VBW 100 kHz** #Sweep 5 ms (401 pts) Occupied Bandwidth Occ BW % Pwr 99.00 % -20.00 dB 882.3178 kHz x dB Transmit Freq Error -20.593 kHz x dB Bandwidth 1.043 MHz **GFSK TX Mode** 2480 MHz

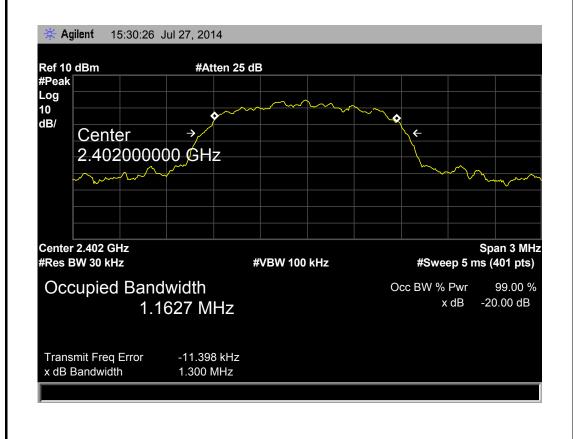


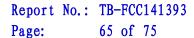


EUT:	Bluetooth Speaker	Model Name :	IT200
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	TX Mode (8-DPSK)		

TA Mode (6-DFSK)				
Channel frequence	y 99% OBW (kHz)	20dB Bandwidth	20dB Bandwidth	
(MHz)		(kHz)	*2/3 (kHz)	
2402	1162.70	1300.00	866.67	
2441	1159.00	1296.00	864.00	
2480	1161.30	1296.00	864.00	

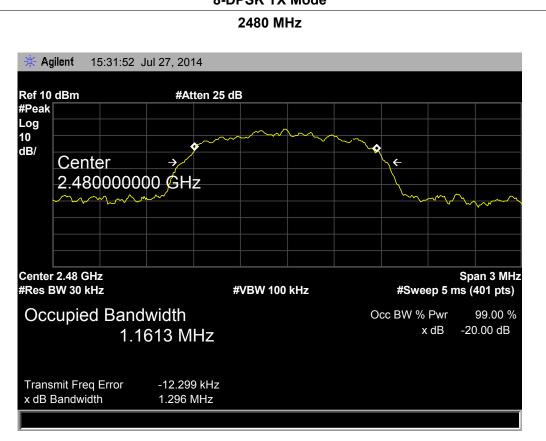
# 8-DPSK TX Mode 2402 MHz







8-DPSK TX Mode 2441 MHz 15:31:15 Jul 27, 2014 Agilent Ref 10 dBm #Atten 25 dB #Peak Log 10 dB/ Center 2.441000000 GHz Center 2.441 GHz Span 3 MHz #Res BW 30 kHz **#VBW 100 kHz** #Sweep 5 ms (401 pts) Occupied Bandwidth Occ BW % Pwr 99.00 % -20.00 dB 1.1590 MHz x dB Transmit Freq Error -12.463 kHz x dB Bandwidth 1.296 MHz 8-DPSK TX Mode





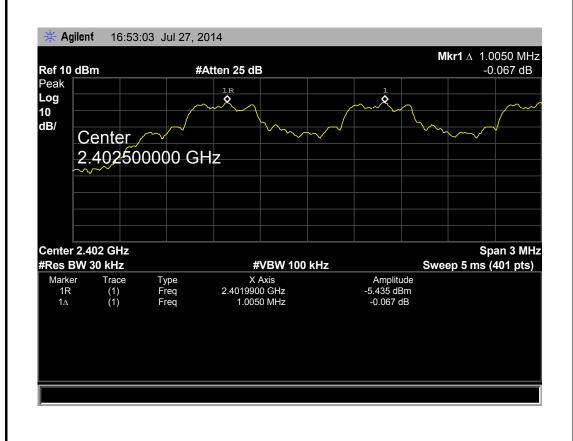
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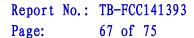
EUT:	Bluetooth Speaker	Model Name :	IT200
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		

**Test Mode:** Hopping Mode (GFSK)

Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit (kHz)
2402	1005.00	695.33
2441	1005.00	695.33
2480	1005.00	696.67

# **GFSK Hopping Mode**





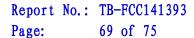




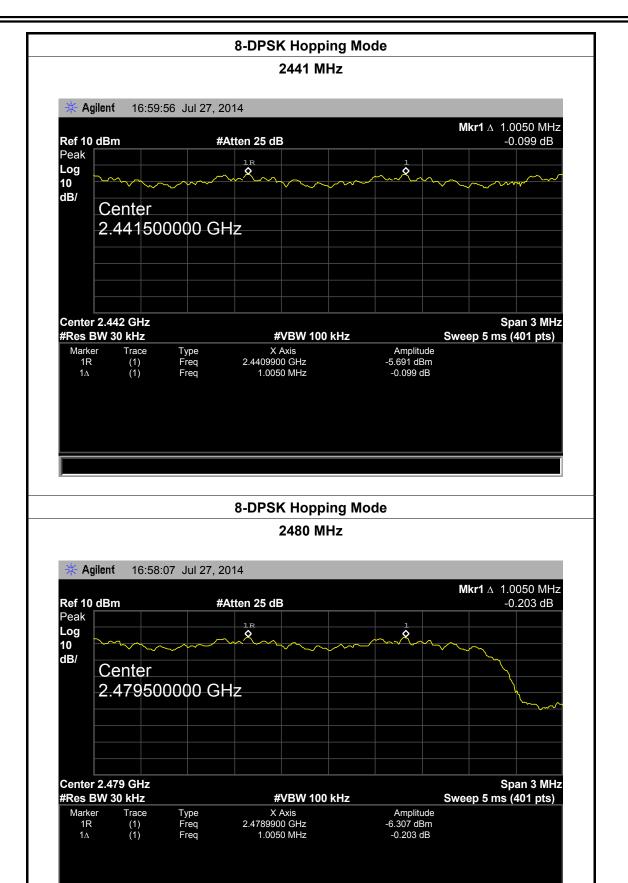


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EUT:	Bluetooth Speaker Model Name :			IT200	
Temperature:	25 ℃		Relative Humi	dity:	55%
Test Voltage:	DC 3.7V				
Test Mode:	Hopping Mode (8-DPSK)				
Channel frequen	ncy (MHz) Separation Read Value Separation Limit (		aration Limit (kHz)		
2402		100	5.00	866.67	
2441	2441 1005.0		5.00	864.00	
2480	2480 1009		5.00	864.00	
	<u>.</u>	8-DPSK Ho	pping Mode		
<b>※ Agilenf</b> 17:	01:51 Jul 27,	<b>2402</b> 2014	MHz		
A William II.					<b>Mkr1</b> ∆ 1.0050 MHz









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# 9. Peak Output Power Test

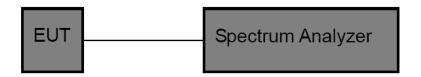
## 9.1 Test Standard and Limit

9.1.1 Test Standard FCC Part 15.247 (b) (1)

9.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)
Peak Output Power	Hopping Channels>75 Power<1W(30dBm)	2400~2483.5
	Other <125 mW(21dBm)	

# 9.2 Test Setup



# 9.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:

Peak Detector: RBW=1 MHz, VBW=3 MHz for bandwidth less than 1MHz. RBW=3 MHz, VBW=3 MHz for bandwidth more than 1MHz.

# 9.4 EUT Operating Condition

The EUT was set to continuously transmitting in the max power during the test.

# 9.5 Test Equipment

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015

#### 9.6 Test Data

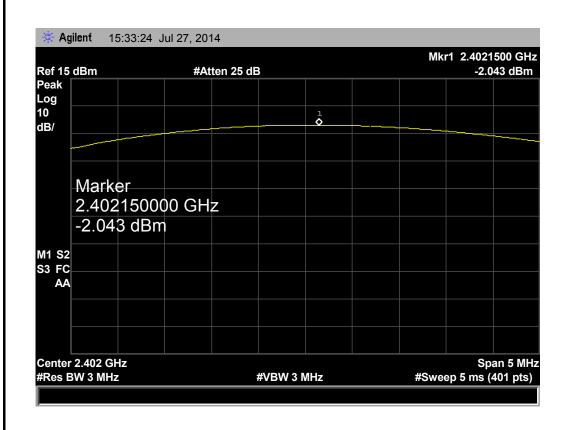


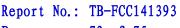
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EUT:	Bluetooth Speaker	Model Name :	IT200
Temperature:	<b>25</b> ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	TX Mode (GFSK)		
	(1011)		1: :(/IB )

Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)
2402	-2.043	
2441	-2.275	21
2480	-2.971	

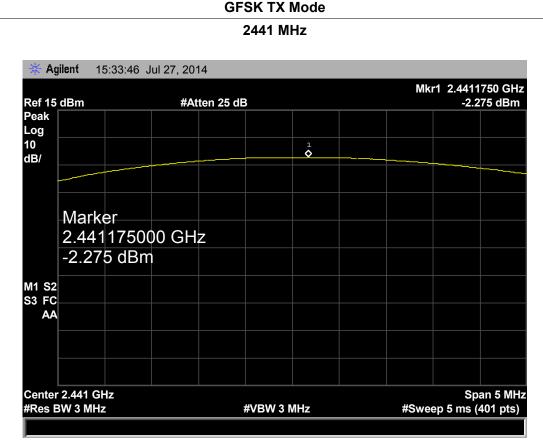
#### **GFSK TX Mode**



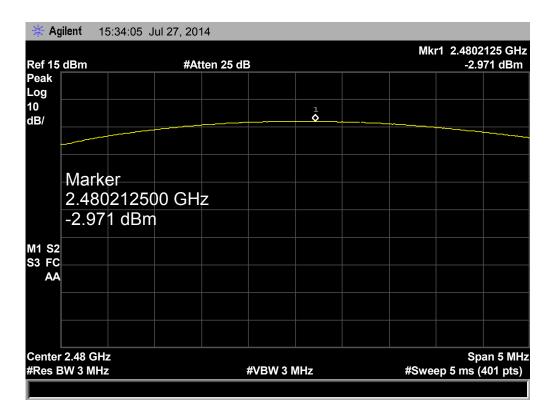




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# **GFSK TX Mode**



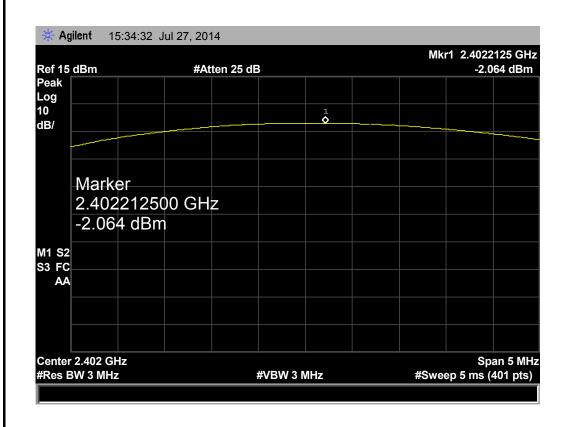


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EUT:	Bluetooth Speaker	Model Name :	IT200
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	TX Mode (8-DPSK)		

Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)
2402	-2.064	
2441	-2.275	21
2480	-3.049	

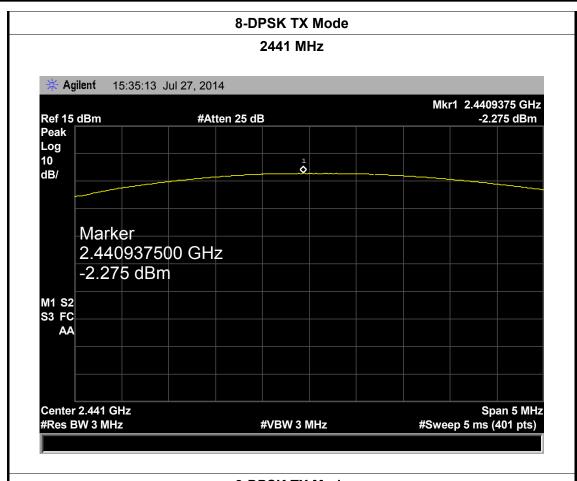
#### 8-DPSK TX Mode



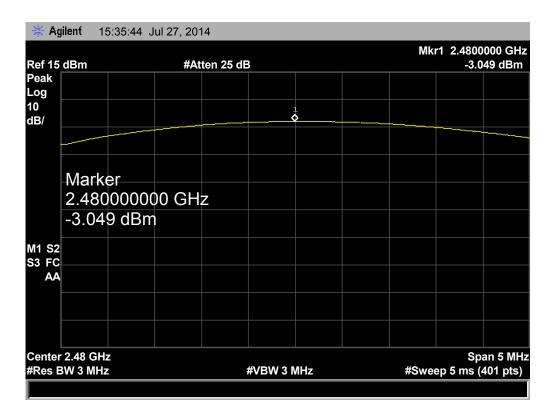




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# 8-DPSK TX Mode





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# 10. Antenna Requirement

# 10.1 Standard Requirement

10.1.1 Standard FCC Part 15.203

## 10.1.2 Requirement

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

### 10.2 Antenna Connected Construction

The directional gains of the antenna used for transmitting is 0 dBi, and the antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

## 10.2 Result

The EUT antenna is a PCB Antenna. It complies with the standard requirement.