

# Shenzhen Toby Technology Co., Ltd.

Report No.: TB-FCC145105

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## **FCC Radio Test Report** FCC ID: 2AFNM-JT2681

## **Original Grant**

Report No. TB-FCC145105

**Applicant** Shenzhen Jinruitai Electronics Co., Ltd

**Equipment Under Test (EUT)** 

**EUT Name** Waterproof Bluetooth Speaker

JT2681 Model No.

Series Model No. N/A

**Brand Name** N/A

**Receipt Date** 2015-08-13

**Test Date** 2015-08-13 to 2015-08-19

**Issue Date** 2015-08-20

**Standards** FCC Part 15: 2014, Subpart C(15.247)

**Test Method** ANSI C63.10:2013

**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

Tel: +86 75526509301



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## 1. General Information about EUT

#### 1.1 Client Information

**Applicant**: Shenzhen Jinruitai Electronics Co.,Ltd

Address : 4F, Building A, Taixinglong Industrial Town, Zhongwu Xixiang, Baoan

District, Shenzhen City, GuangDong Province, China

Manufacturer : Shenzhen Jinruitai Electronics Co.,Ltd

Address : 4F, Building A, Taixinglong Industrial Town, Zhongwu Xixiang, Baoan

District, Shenzhen City, GuangDong Province, China

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

EUT Name	:	Waterproof Bluetooth Spea	aker		
Models No.	<b>)</b> :	JT2681	JT2681		
Model Difference	6	N/A			
60033		Operation Frequency: Bluetooth:2402~2480MHz			
	W	Number of Channel:	Bluetooth:79 Channels see note (2)		
Product Description		Max Peak Output Power:	GFSK:2.111dBm (Conducted Power)		
Bocomption	5	Antenna Gain:	-0.68 dBi PCB Antenna		
		Modulation Type:	GFSK 1Mbps(1 Mbps)		
		William In	π /4-DQPSK(2 Mbps)		
			8-DPSK(3 Mbps)		
Power Supply		DC Voltage supplied from Host System by USB cable.			
	ė	DC power by Li-ion Battery			
Power Rating		DC 5.0V by USB cable.			
		DC 3.7V Li-ion Battery.			
Connecting I/O Port(S)		Please refer to the User's Manual			

#### 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 (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458



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	ALL DE	6.111.12	- W.K.		
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		100

(4) The Antenna information about the equipment is provided by the applicant.

## 1.3 Block Diagram Showing the Configuration of System Tested

EUT	



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## 1.4 Description of Support Units

Equipment Information							
Name Model FCC ID/DOC Manufacturer Used "√"							
133							
	Cable Information						
Number	Number Shielded Type Ferrite Core Length Note						

## 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.

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( π /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 C63.10 standards, the measurements are performed at the highest,



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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	N/A		
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 Measurement Uncertainty

The reported uncertainty of measurement  $y \pm U$ , where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

Test Item	Parameters	Expanded Uncertainty (U <sub>Lab</sub> )
	Level Accuracy:	3 13
Conducted Emission	9kHz~150kHz	±3.42 dB
	150kHz to 30MHz	±3.42 dB
Dadiated Emission	Level Accuracy:	. 4 CO dD
Radiated Emission	9kHz to 30 MHz	±4.60 dB
Dadiated Emission	Level Accuracy:	. 4 40 dD
Radiated Emission	30MHz to 1000 MHz	±4.40 dB
Dedicted Emission	Level Accuracy:	. 4 20 dD
Radiated Emission	Above 1000MHz	±4.20 dB

## 1.8 Test Facility

The testing report were 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.

May 22, 2014 certificated by TUV Rheinland(China) Co., Ltd. with TUV certificate No.: UA 50282953 0001 and report No.: 17026822 002. The certificate is valid until the next scheduled audit or up to 18 months, at the discretion of TUV Rhineland.



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# 2. Test Summary

	FCC Part 15 Subpart C(15.247)/ RSS 247 Issue 1						
Standard Section		T ( 1)	1 1				
FCC	IC	Test Item	Judgment	Remark			
15.203	٠ ا	Antenna Requirement	PASS	N/A			
15.207	RSS-GEN 7.2.2	Conducted Emission	PASS	N/A			
15.205	RSS-Gen 7.2.3	Restricted Bands	PASS	N/A			
15.247(a)(1)	RSS 247 5.1 (2)	Hopping Channel Separation	PASS	N/A			
15.247(a)(1)	RSS 247 5.1 (4)	Dwell Time	PASS	N/A			
15.247(b)(1)	RSS 247 5.4 (2)	Peak Output Power	PASS	N/A			
15.247(b)(1)	RSS 247 5.1 (4)	Number of Hopping Frequency	PASS	N/A			
15.247(c)	RSS 247 5.5	Radiated Spurious Emission	PASS	N/A			
15.247(a)	RSS 247 5.1 (1)	99% Occupied Bandwidth & 20dB Bandwidth	PASS	99%OBW GFSK:1004.80kHz π/4-DQPSK: 1079.00kHz 8-DPSK: 1128.80kHz			

**Note:** N/A is an abbreviation for Not Applicable.



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# 3. Test Equipment

Conducte	d Emission Te	est			
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Aug. 07, 2015	Aug. 06, 2016
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Aug. 07, 2015	Aug. 06, 2016
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Aug. 07, 2015	Aug. 06, 2016
LISN	Rohde & Schwarz	ENV216	101131	Aug. 07, 2015	Aug. 06, 2016
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	
Spectrum Analyzer	Agilent	E4407B	MY45106456	Sep. 01, 2014	Aug. 31, 2015
EMI Test Receiver	Rohde & Schwarz	ESCI	100010/007	Aug. 07, 2015	Aug. 06, 2016
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 28, 2015	Mar. 27, 2016
Bilog Antenna	ETS-LINDGREN	3142E	00117542	Mar. 28, 2015	Mar. 27, 2016
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 28, 2015	Mar. 27, 2016
Horn Antenna	ETS-LINDGREN	3117	00143209	Mar. 28, 2015	Mar. 27, 2016
Pre-amplifier	Sonoma	310N	185903	Mar. 28, 2015	Mar. 27, 2016
Pre-amplifier	HP	8447B	3008A00849	Mar. 28, 2015	Mar. 27, 2016
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 28, 2015	Mar. 27, 2016
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A



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## 4. Conducted Emission Test

#### 4.1 Test Standard and Limit

4.1.1Test Standard FCC Part 15.207

#### 4.1.2 Test Limit

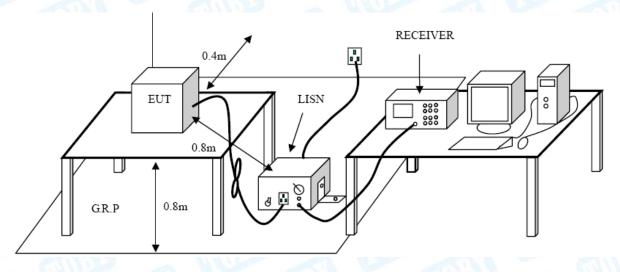
### **Conducted Emission Test Limit**

Eroguopov	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.

## 4.2 Test Setup



#### 4.3 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.

## 4.4 EUT Operating Mode

Please refer to the description of test mode.

#### 4.5 Test Data

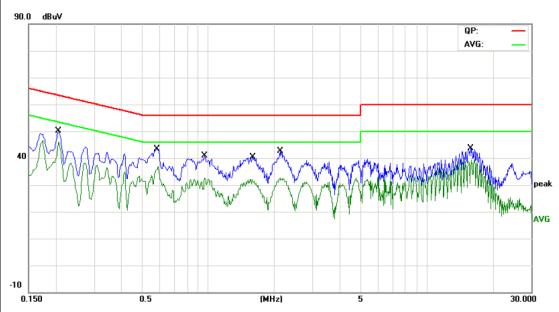
Please see the next page.



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EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		33
Terminal:	Line		100
Test Mode:	USB Charging with TX GFS	K Mode 2402 MHz	CHO.
Remark:	Only worse case is reported		

TOBY



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB	dBuV	dBu∀	dB	Detector
1		0.2060	38.59	10.02	48.61	63.36	-14.75	QP
2	*	0.2060	35.75	10.02	45.77	53.36	-7.59	AVG
3		0.5820	32.40	10.06	42.46	56.00	-13.54	QP
4		0.5820	26.00	10.06	36.06	46.00	-9.94	AVG
5		0.9620	28.64	10.07	38.71	56.00	-17.29	QP
6		0.9620	22.31	10.07	32.38	46.00	-13.62	AVG
7		1.5940	26.01	10.06	36.07	56.00	-19.93	QP
8		1.5940	21.07	10.06	31.13	46.00	-14.87	AVG
9		2.1300	27.09	10.06	37.15	56.00	-18.85	QP
10		2.1300	21.92	10.06	31.98	46.00	-14.02	AVG
11		15.8620	29.59	10.24	39.83	60.00	-20.17	QP
12		15.8620	26.89	10.24	37.13	50.00	-12.87	AVG



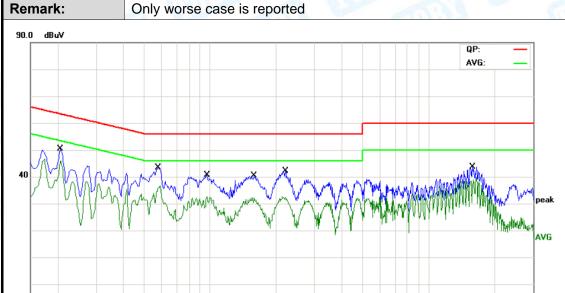
EUT: Waterproof Bluetooth Speaker Model Name: JT2681

Temperature: 25 °C Relative Humidity: 55%

Test Voltage: AC 120V/60 Hz

Terminal: Neutral

Test Mode: USB Charging with TX GFSK Mode 2402 MHz



(MHz)

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB	dBu∀	dBu∨	dB	Detector
1		0.2060	38.57	10.12	48.69	63.36	-14.67	QP
2	*	0.2060	35.67	10.12	45.79	53.36	-7.57	AVG
3		0.5780	32.63	10.02	42.65	56.00	-13.35	QP
4		0.5780	25.75	10.02	35.77	46.00	-10.23	AVG
5		0.9660	28.22	10.14	38.36	56.00	-17.64	QP
6		0.9660	22.48	10.14	32.62	46.00	-13.38	AVG
7		1.5859	27.35	10.10	37.45	56.00	-18.55	QP
8		1.5859	22.27	10.10	32.37	46.00	-13.63	AVG
9		2.2020	26.56	10.06	36.62	56.00	-19.38	QP
10		2.2020	21.92	10.06	31.98	46.00	-14.02	AVG
11		15.8620	29.60	10.06	39.66	60.00	-20.34	QP
12		15.8620	26.88	10.06	36.94	50.00	-13.06	AVG

**Emission Level= Read Level+ Correct Factor** 

0.5

0.150

30.000



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## 5. Radiated Emission Test

## 5.1 Test Standard and Limit

5.1.1 Test Standard FCC Part 15.209

5.1.2 Test Limit

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

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

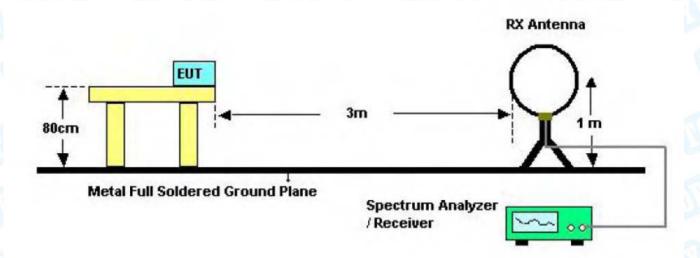
### Note:

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

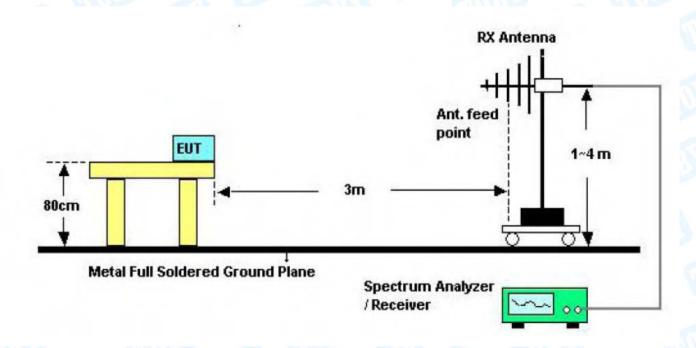


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## 5.2 Test Setup



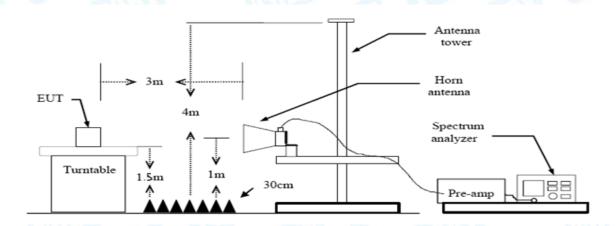
Bellow 30MHz Test Setup



Bellow 1000MHz Test Setup



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Above 1GHz 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) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (4) 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.
- (5) 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.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) 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.
- (8) 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 in TX mode.

#### 5.5 Test Data

Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3



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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.



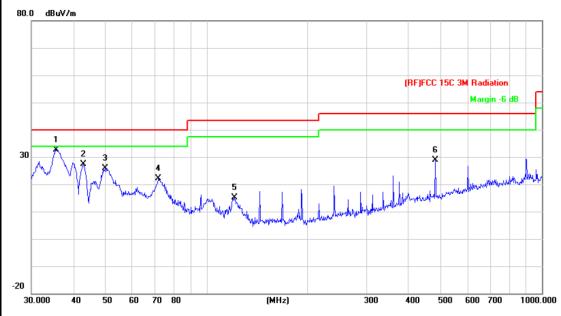
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EU.	Т:			Wate	erpr	oof	Blueto	ooth	n Speake	er	N	lode	l Na	me	:		JT	268	1	1
Ten	nperat	ture:		25	$^{\circ}$ C		45				R	elat	ive l	lum	idity	y:	55	5%		
Tes	t Volta	age:		DC	5V	N		k		6		16								
Ant	. Pol.			Hor	izoı	ntal			01		Jaco .		a						<b>6</b>	30
Tes	t Mod	e:		TX	GF	SK	Mod	e 2	402M⊢	lz	C					á.	1		1))	
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			_		F		ading	<b>j</b>	Corre		Mea		<del>-</del>				_			
1	No. M	lk.	Fre	q.		Le	vel		Fact	or	m	ent		Lim	ıt		)ve	er ——		
			MHz			dE	3u∨ —		dB/m		dB	uV/m		dBu	V/m		dB		Det	ecto
1		35	5.37	50		37	'.99		-17.2	9	20	0.70		40	.00	-	19.	30	р	eak
2		73	3.61	70		38	3.52		-23.4	9	15	5.03		40	.00	-:	24.	97	р	eak
3		14	3.82	295		42	2.84		-21.6	7	2′	1.17		43	.50	-:	22.	33	р	eak
4		19	1.74	150		42	2.02		-20.8	1	2	1.21		43	.50	-:	22.	29	p	eak
5			9.98				6.67		-18.5			7.08			.00			92		eak
$\frac{6}{6}$			7.99				2.87		-17.3			5.55			.00			45		
	*																			eak
7		36	0.44	₽/ b		48	3.90		-14.5	<b>o</b>	34	1.35		46	.00		11.	65	p	eak
*:M	laximum	data	x:Ove	er limi	it	!:ove	er marg	jin												
		Love	\I- D			)VO	I+ C	\rr	ect Fac	tor										



Page: 20 of 92

EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 5V		339
Ant. Pol.	Vertical		1
Test Mode:	TX GFSK Mode 2402MHz		CHILL
Remark:	Only worse case is reported		
00.0 40.4/1-			



No	. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	35.4993	50.09	-17.37	32.72	40.00	-7.28	peak
2		42.8998	48.65	-21.39	27.26	40.00	-12.74	peak
3		49.7068	50.13	-24.27	25.86	40.00	-14.14	peak
4		71.5806	45.67	-23.56	22.11	40.00	-17.89	peak
5		121.1231	37.66	-22.47	15.19	43.50	-28.31	peak
6		480.5276	40.39	-11.62	28.77	46.00	-17.23	peak

<sup>\*:</sup>Maximum data x:Over limit !:over margin



Page: 21 of 92

UT:	Water	proof Bluetoo	th Speaker	Model Na	me:	JT2681	18
emperature:	25 ℃		13	Relative H	lumidity:	55%	HIN
est Voltage:	DC 5	V				189	
Ant. Pol.	Horiz	ontal	(2) (1) (1)		I MAG		5
est Mode:	TX G	FSK Mode	2441MHz			CH	1
Remark:	Only	worse case	is reported	62	-		
80.0 dBuV/m							
					(RF)FCC 15C	3M Radiation	
						Margin -6 o	IB H
					6		
30				5	×		
1 2			4 ×	<u> </u>		1 M. Sharkaladorean	لمهماري
	, 3	<u> </u>	المال	and an annual state of	Mall Markey March	NOTE OF THE PERSON OF THE PERS	
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	77	<u> </u>					
20 20 30.000 40 5	0 60 70	80	(MHz)	300	400 500	600 700	1000.00
30.000 40 3	00 70	00	(MIIZ)	300	400 300	000 700	1000.00
	_	Reading	Correct	Measure-	1::	O	
No. Mk.	Freq.	Level	Factor	ment	Limit	Over	
	MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB [	Detecto
1 35	.3750	36.99	-17.29	19.70	40.00	-20.30	peak
1 33	.3730						
	.8997	38.82	-21.39	17.43	40.00	-22.57	peak
2 42			-21.39 -23.49	17.43 13.03		-22.57 -26.97	
2 42 3 73	.8997	38.82			40.00		peak peak peak
2 42 3 73 4 143	.8997 .6170	38.82 36.52	-23.49	13.03	40.00 43.50	-26.97	peak
2 42 3 73 4 143 5 239	8997 6170 3.8293	38.82 36.52 42.84	-23.49 -21.67	13.03 21.17	40.00 43.50 46.00	-26.97 -22.33	peak peak



Page: 22 of 92

	vvaterp	proof Bluetoot	h Speaker	Model Nar	ne :	JT2681	
emperature:	25 ℃		18	Relative H	lumidity:	55%	MAR
est Voltage:	DC 5\	/				333	
nt. Pol.	Vertic	al	CHIT!		1130		5
est Mode:	TX GI	FSK Mode 2	2441MHz		3	E BH	
Remark:	Only	worse case	is reported	100			4
80.0 dBuV/m							
					(RF)FCC 15	C 3M Radiation Margin -6	
						- Indigit o	H
1					_		
30 X 2	3				×		
* V)/~/	\ X		4 .	5 *	1	who we have the same of the sa	policy policy by
' V	Jana Mary	many haper hand happy		- James Mary Mary Mary	All Maryand day	, , , , , , , , , , , , , , , , , , , ,	
			The fill are all a will	Add Market Water Comments			
			aduatement true.				
			adial kahaan trua, lin				
20			atrickment true. In				
20 30.000 40 5	50 60 70	80	(MHz)	300	400 50	0 600 700	1000.00
	50 60 70				400 50	0 600 700	1000.00
	50 60 70 Freq.	Reading Level	(MHz)  Correct Factor	300 Measure- ment	400 50 Limit	0 600 700 Over	1000.00
30.000 40 5		Reading	Correct	Measure-			1000.00
30.000 40 5 No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment dBuV/m	<b>Limit</b> dBuV/m	<b>Over</b>	Detecto
No. Mk.  1 * 35 2 42	Freq. MHz 5.4992	Reading Level dBuV 49.09	Correct Factor dB/m -17.37	Measure- ment dBuV/m 31.72	Limit dBuV/m 40.00	Over	Detecto peak peak
No. Mk.  1 * 35 2 42 3 71	Freq. MHz 5.4992 2.6000	Reading Level dBuV 49.09 47.74	Correct Factor dB/m -17.37 -21.26	Measurement dBuV/m 31.72 26.48	Limit dBu∀/m 40.00 40.00	Over  dB  -8.28  -13.52	Detecto peak peak peak
No. Mk.  1 * 35 2 42 3 71 4 14	Freq. MHz 5.4992 2.6000	Reading Level dBuV 49.09 47.74 44.67	Correct Factor dB/m -17.37 -21.26 -23.56	Measure- ment dBuV/m 31.72 26.48 21.11	Limit dBu∀/m 40.00 40.00 40.00	Over  dB  -8.28  -13.52  -18.89	Detecto peak peak peak peak
No. Mk.  1 * 35 2 42 3 71 4 14 5 23	Freq. MHz 5.4992 2.6000 1.5806 3.8293	Reading Level dBuV 49.09 47.74 44.67 38.02	Correct Factor dB/m -17.37 -21.26 -23.56 -21.67	Measurement  dBuV/m  31.72  26.48  21.11  16.35	Limit dBuV/m 40.00 40.00 40.00 43.50	Over  dB  -8.28  -13.52  -18.89  -27.15	Detecto <b>peak</b>



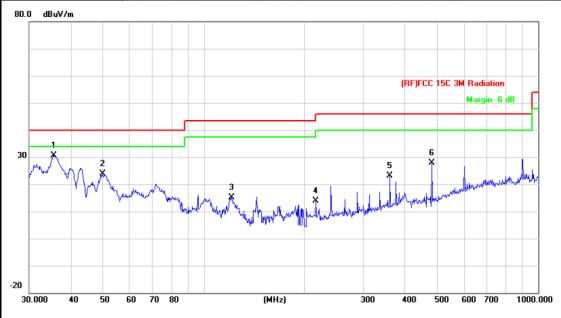
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	Waterproof Bluetoo	oth Speaker	Model Na	ame :	JT2681
Temperature:	25 ℃		Relative Humidity:		
Test Voltage:	DC 5V		1 0		13
Ant. Pol.	Horizontal	all o		Marie	
Test Mode:	TX GFSK Mode	2480MHz		)	Million
Remark:	Only worse case	e is reported	120		
30 1 2 2 20 30.000 40 50	60 70 80	4 X (MHz)	5 × 300	(RF)FCC 15C 3	BM Radiation Margin -6 dB
No. Mk. Fr	Reading eq. Level	Correct Factor	Measure- ment	Limit	Over
MH	Hz dBuV	dB/m	dBuV/m	dBuV/m	dB Detecti
1 35.7	490 39.09	-17.53	21.56	40.00	-18.44 peal
2 42.8	997 39.82	-21.39	18.43	40.00	-21.57 peal
3 73.6	170 37.52	-23.49	14.03	40.00	-25.97 peal
4 143.8	3291 42.84	-21.67	21.17	43.50	-22.33 peal
5 287.9		-17.32	24.55		-21.45 peal
6 * 360.4		-14.55	31.85		-14.15 peal



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EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 5V		13
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2480MHz		CIUCA
Remark:	Only worse case is reported		



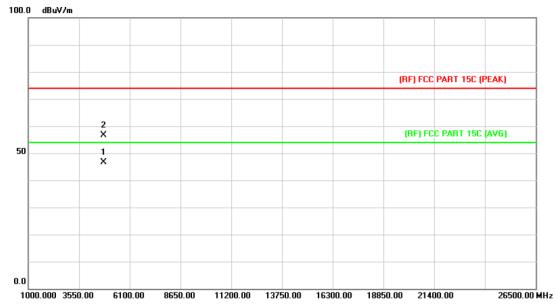
Ν	o. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	35.4992	48.09	-17.37	30.72	40.00	-9.28	peak
2		49.7068	48.13	-24.27	23.86	40.00	-16.14	peak
3		121.1230	37.66	-22.47	15.19	43.50	-28.31	peak
4		216.0240	33.48	-19.70	13.78	46.00	-32.22	peak
5		360.4476	37.70	-14.55	23.15	46.00	-22.85	peak
6		480.5276	39.39	-11.62	27.77	46.00	-18.23	peak

<sup>\*:</sup>Maximum data x:Over limit !:over margin



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EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681				
Temperature:	<b>25</b> ℃	Relative Humidity:	55%				
Test Voltage:	DC 5V		339				
Ant. Pol.	Horizontal						
Test Mode:	TX GFSK Mode 2402MHz		CHILITIES				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						

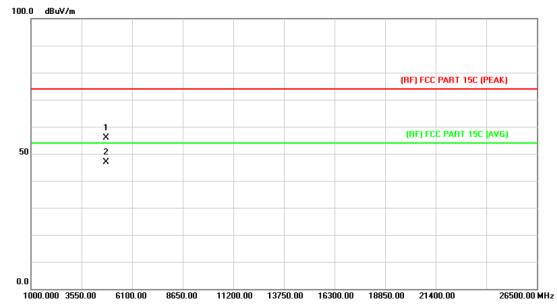


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4804.118	33.10	13.44	46.54	54.00	-7.46	AVG
2		4804.128	43.24	13.44	56.68	74.00	-17.32	peak



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EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 5V		19
Ant. Pol.	Vertical		1000
Test Mode:	TX GFSK Mode 2402MHz		CHILL
Remark:	No report for the emission wh prescribed limit.	ich more than 10 dB beld	ow the

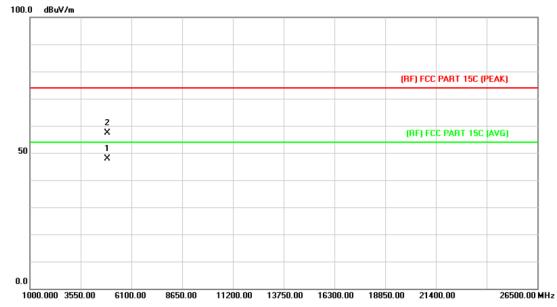


No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	O∨er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.884	42.54	13.44	55.98	74.00	-18.02	peak
2	*	4803.916	33.46	13.44	46.90	54.00	-7.10	AVG



Page: 27 of 92

EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681
Temperature:	<b>25</b> ℃	Relative Humidity:	55%
Test Voltage:	DC 5V		:19
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2441MHz		CHILD
Remark:	No report for the emission who prescribed limit.	nich more than 10 dB bo	elow the

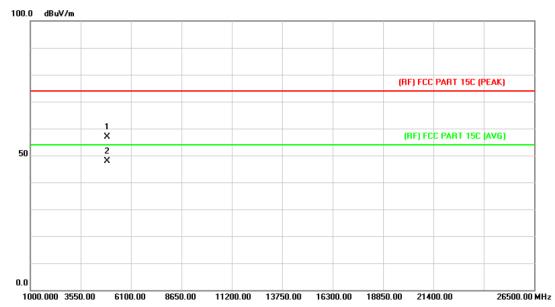


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4882.107	34.04	13.90	47.94	54.00	-6.06	AVG
2		4882.138	43.46	13.90	57.36	74.00	-16.64	peak



Page: 28 of 92

EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 5V		(3.5)				
Ant. Pol.	Vertical		1				
Test Mode:	TX GFSK Mode 2441MHz	COURSE OF	CHILL				
Remark:		No report for the emission which more than 10 dB below the					
	prescribed limit.						

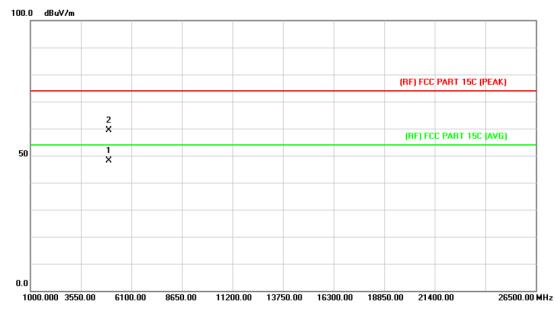


No	. Mk	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4882.258	42.97	13.90	56.87	74.00	-17.13	peak
2	*	4882.460	33.97	13.90	47.87	54.00	-6.13	AVG



Page: 29 of 92

EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 5V		3.9
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2480MHz		CHILL
Remark:	No report for the emission who prescribed limit.	nich more than 10 dB be	low the

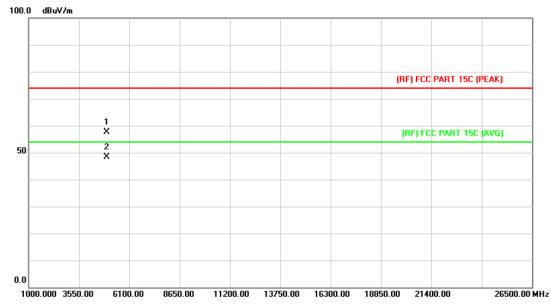


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4959.873	33.86	14.36	48.22	54.00	-5.78	AVG
2		4960.366	44.98	14.36	59.34	74.00	-14.66	peak



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EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 5V		33				
Ant. Pol.	Vertical	Vertical					
Test Mode:	TX GFSK Mode 2480MHz		CHILL				
Remark: No report for the emission which more than 10 dB below the prescribed limit.							
400.0 10.111							

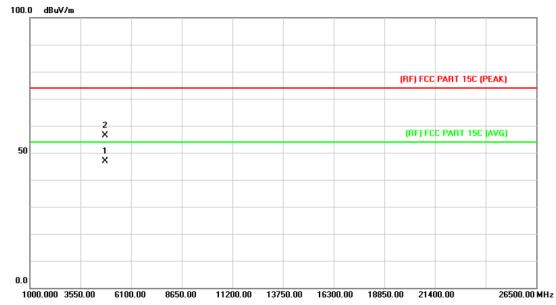


No.	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4960.114	43.33	14.36	57.69	74.00	-16.31	peak
2	*	4960.300	34.01	14.36	48.37	54.00	-5.63	AVG



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EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 5V		19			
Ant. Pol.	Horizontal					
Test Mode:	TX 8-DPSK Mode 2402MHz		CHILL			
Remark:	No report for the emission who prescribed limit.	nich more than 10 dB bel	ow the			

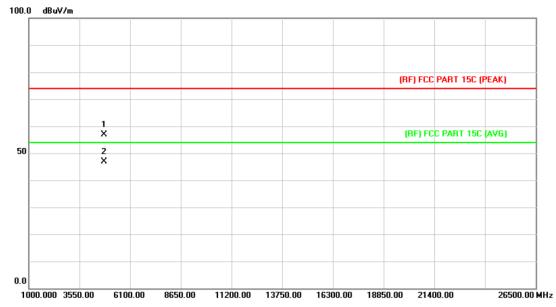


No	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4803.954	33.49	13.44	46.93	54.00	-7.07	AVG
2		4804.148	42.94	13.44	56.38	74.00	-17.62	peak



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EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 5V		13				
Ant. Pol.	Vertical		1				
Test Mode:	TX 8-DPSK Mode 2402MHz		CHOCK				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						

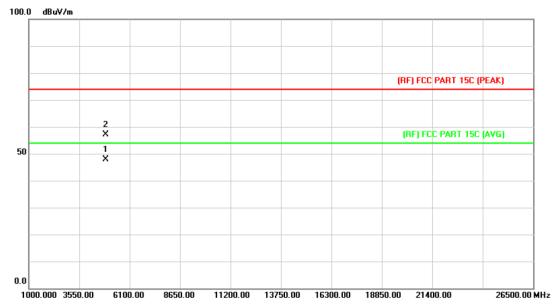


No	. Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.802	43.43	13.44	56.87	74.00	-17.13	peak
2	*	4804.094	33.49	13.44	46.93	54.00	-7.07	AVG



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EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681				
Temperature:	25 ℃	25 °C Relative Humidity:					
Test Voltage:	DC 5V		(4)				
Ant. Pol.	Horizontal						
Test Mode:	TX 8-DPSK Mode 2441MH	Z	CIU.				
Remark:	No report for the emission which more than 10 dB below the						
	prescribed limit.						

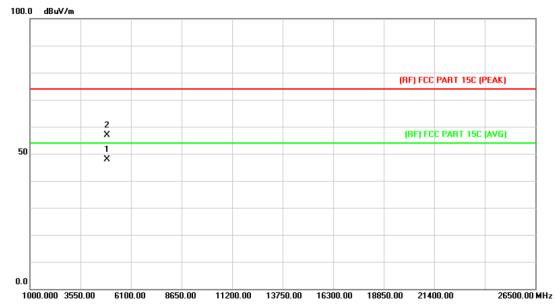


No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4881.601	33.96	13.90	47.86	54.00	-6.14	AVG
2		4881.805	43.31	13.90	57.21	74.00	-16.79	peak



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EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 5V		18.5				
Ant. Pol.	Vertical						
Test Mode:	TX 8-DPSK Mode 2441MHz		CHILL				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						

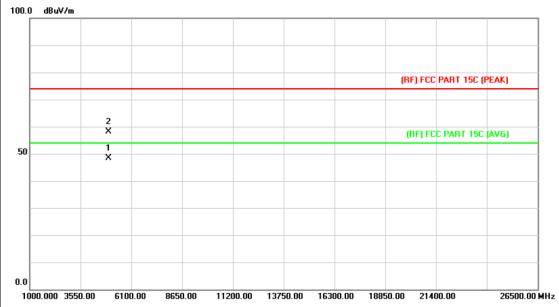


No	o. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4881.700	33.94	13.90	47.84	54.00	-6.16	AVG
2		4882.143	43.03	13.90	56.93	74.00	-17.07	peak



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EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681					
Temperature:	<b>25</b> ℃	Relative Humidity:	55%					
Test Voltage:	DC 5V	DC 5V						
Ant. Pol.	Horizontal	Horizontal						
Test Mode:	TX 8-DPSK Mode 2480MH		CHILL					
Remark:	rk: No report for the emission which more than 10 dB below the prescribed limit.							
	·							

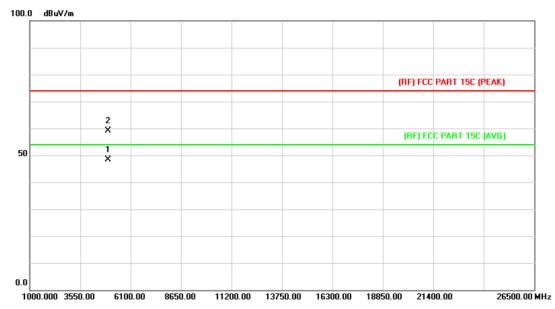


No	o. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4959.688	33.93	14.36	48.29	54.00	-5.71	AVG
2		4959.990	43.86	14.36	58.22	74.00	-15.78	peak



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EUT:	Waterproof Bluetooth Speaker Model Name :		JT2681			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 5V					
Ant. Pol.	Vertical					
Test Mode:	TX 8-DPSK Mode 2480MHz					
Remark:	No report for the emission which more than 10 dB below the prescribed limit.					



No	o. Mk	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4959.799	34.10	14.36	48.46	54.00	-5.54	AVG
2		4959.942	44.85	14.36	59.21	74.00	-14.79	peak



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# 6. Restricted Bands Requirement

#### 6.1 Test Standard and Limit

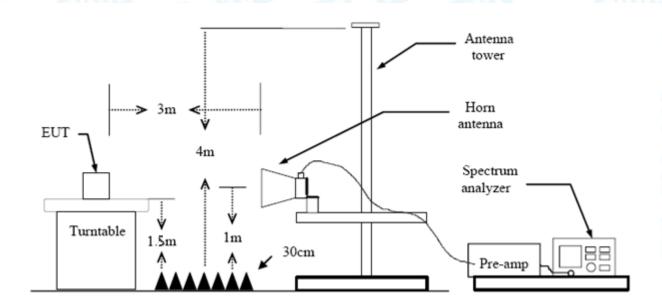
6.1.1 Test Standard FCC Part 15.209 FCC Part 15.205

6.1.2 Test Limit

Restricted Frequency	Class B (dBuV/m)(at 3m)				
Band (MHz)	Peak	Average			
2310 ~2390	74	54			
2483.5 ~2500	74	54			

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

## 6.2 Test Setup



#### 6.3 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) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.



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(3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.

- (4) 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.
- (5) 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.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) 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.
- (8) For the actual test configuration, please see the test setup photo.

## 6.4 EUT Operating Condition

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

### 6.4 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=1 KHz with Peak Detector for Average Values.

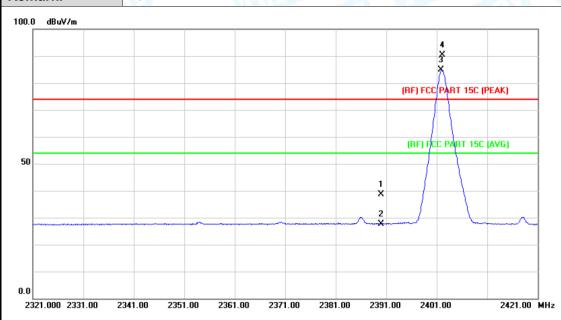
All restriction bands have been tested, only the worst case is reported.



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# (1) Radiation Test

l	EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681					
	Temperature:	25 ℃	Relative Humidity:	55%					
	Test Voltage:	DC 5V	DC 5V						
Ì	Ant. Pol.	Horizontal		CHILD S					
	Test Mode:	TX GFSK Mode 2402MHz							
	Remark:	N/A	THE PERSON NAMED IN						

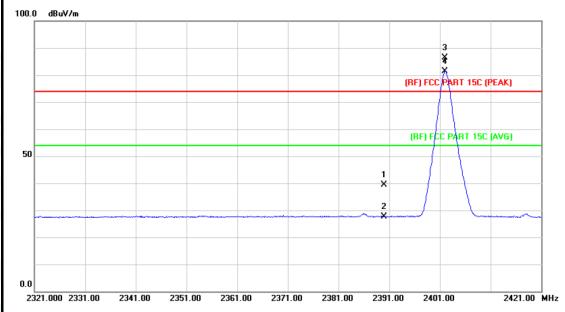


No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	37.83	0.77	38.60	74.00	-35.40	peak
2		2390.000	26.95	0.77	27.72	54.00	-26.28	AVG
3	*	2401.900	84.17	0.82	84.99	Fundamental Frequency		AVG
4	Χ	2402.200	89.48	0.82	90.30	Fundamenta	Frequency	peak



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Waterproof Bluetooth Speaker	Model Name :	JT2681				
25 ℃	Relative Humidity:	55%				
Test Voltage: DC 5V						
Vertical	The same of the					
TX GFSK Mode 2402MHz		CHILLIA				
N/A						
100.0 dBuV/m						
	25 °C DC 5V Vertical TX GFSK Mode 2402MHz	25 °C Relative Humidity:  DC 5V  Vertical  TX GFSK Mode 2402MHz				

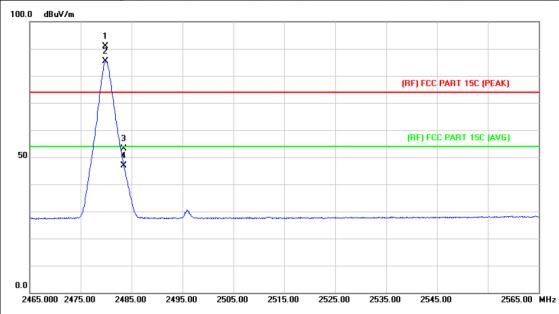


No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	38.58	0.77	39.35	74.00	-34.65	peak
2		2390.000	26.92	0.77	27.69	54.00	-26.31	AVG
3	Χ	2402.000	85.57	0.82	86.39	Fundamental Frequency		peak
4	*	2402.000	80.56	0.82	81.38	Fundamental	Frequency	AVG



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EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681					
Temperature:	25 ℃	Relative Humidity:	55%					
Test Voltage:	DC 5V	DC 5V						
Ant. Pol.	Horizontal							
Test Mode:	TX GFSK Mode 2480 MHz	TX GFSK Mode 2480 MHz						
Remark:	N/A		1					

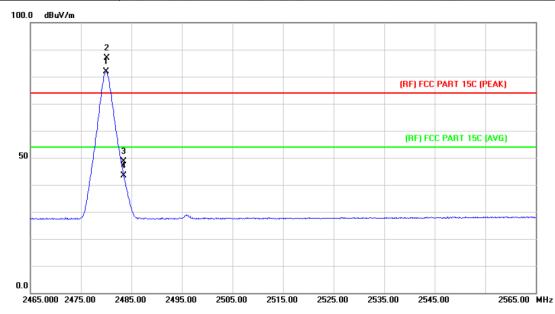


No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Х	2479.900	89.63	1.15	90.78	Fundamenta	Frequency	peak
2	*	2479.900	84.17	1.15	85.32	Fundamental	Frequency	AVG
3		2483.500	52.08	1.17	53.25	74.00	-20.75	peak
4		2483.500	45.64	1.17	46.81	54.00	-7.19	AVG



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EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 5V						
Ant. Pol.	Vertical						
Test Mode:	TX GFSK Mode 2480 MHz	TX GFSK Mode 2480 MHz					
Remark:	N/A						

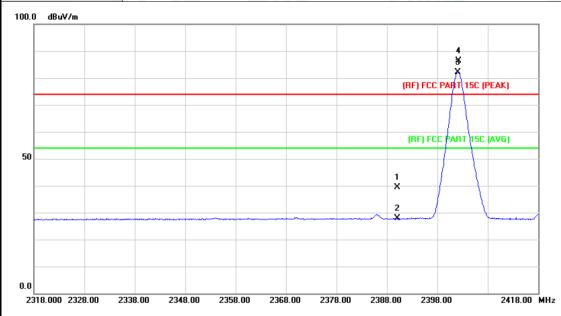


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	2480.000	80.64	1.15	81.79	Fundamental Frequency		AVG
2	Х	2480.200	85.75	1.15	86.90	Fundamental	Frequency	peak
3		2483.500	47.54	1.17	48.71	74.00	-25.29	peak
4		2483.500	42.15	1.17	43.32	54.00	-10.68	AVG



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EUT:	Waterproof Bluetooth Speaker	JT2681						
Temperature:	25 °C Relative Humidity: 55%							
Test Voltage:	DC 5V	DC 5V						
Ant. Pol.	Horizontal							
Test Mode:	TX 8-DPSK Mode 2402MHz							
Remark:	N/A							

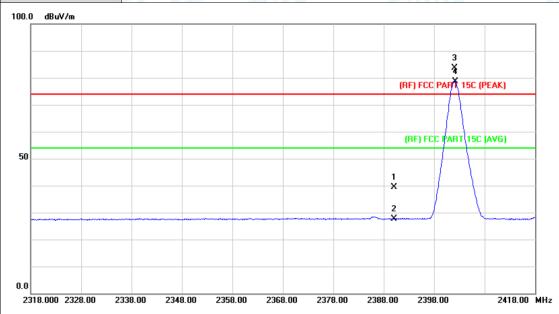


No.	Mk.	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	38.59	0.77	39.36	74.00	-34.64	peak
2		2390.000	27.04	0.77	27.81	54.00	-26.19	AVG
3	*	2402.100	81.29	0.82	82.11	Fundamental Frequency		AVG
4	Х	2402.200	85.55	0.82	86.37	Fundamental	Frequency	peak



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EUT:	Waterproof Bluetooth Speaker	JT2681					
Temperature:	25 ℃ Relative Humidity: 55%						
Test Voltage:	DC 5V						
Ant. Pol.	Vertical						
Test Mode:	TX 8-DPSK Mode 2402MHz	TX 8-DPSK Mode 2402MHz					
Remark:	N/A						

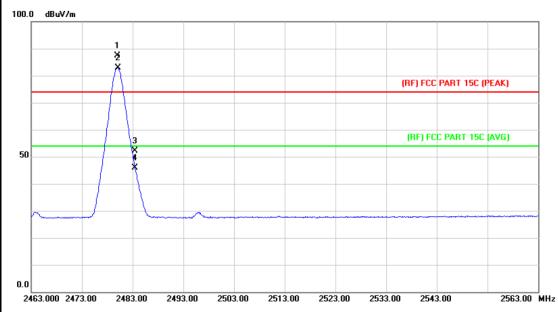


No	. Mk.	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	38.52	0.77	39.29	74.00	-34.71	peak
2		2390.000	26.85	0.77	27.62	54.00	-26.38	AVG
3	Χ	2402.000	82.86	0.82	83.68	Fundamenta	l Frequency	peak
4	*	2402.200	77.76	0.82	78.58	Fundamenta	I Frequency	AVG



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EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681	
Temperature:	25 ℃	Relative Humidity:	55%	
Test Voltage:	DC 5V			
Ant. Pol.	Horizontal			
Test Mode:	TX 8-DPSK Mode 2480MHz			
Remark:	N/A			

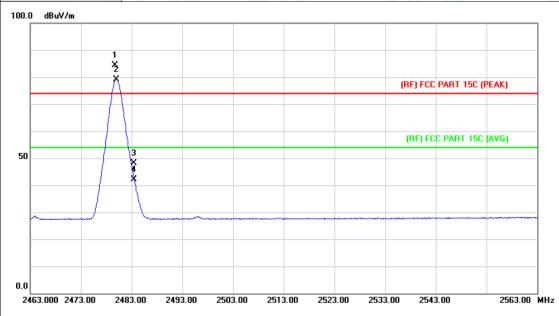


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Χ	2480.000	86.17	1.15	87.32	Fundamental	Frequency	peak
2	*	2480.100	81.72	1.15	82.87	Fundamental	Frequency	AVG
3		2483.500	51.04	1.17	52.21	74.00	-21.79	peak
4		2483.500	44.71	1.17	45.88	54.00	-8.12	AVG



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EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681		
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	DC 5V				
Ant. Pol.	Vertical				
Test Mode:	TX 8-DPSK Mode 2480MHz				
Remark:	N/A				



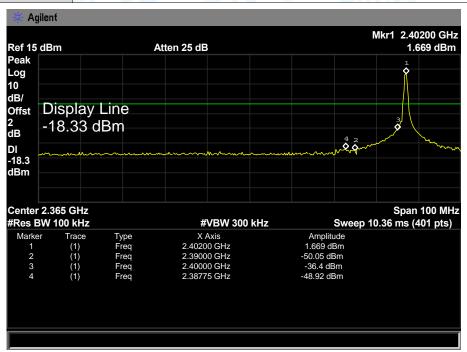
N	lo. M	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Х	2479.700	83.21	1.15	84.36	Fundamental	Frequency	peak
2	*	2480.000	78.08	1.15	79.23	Fundamental	Frequency	AVG
3		2483.500	46.94	1.17	48.11	74.00	-25.89	peak
4		2483.500	40.96	1.17	42.13	54.00	-11.87	AVG

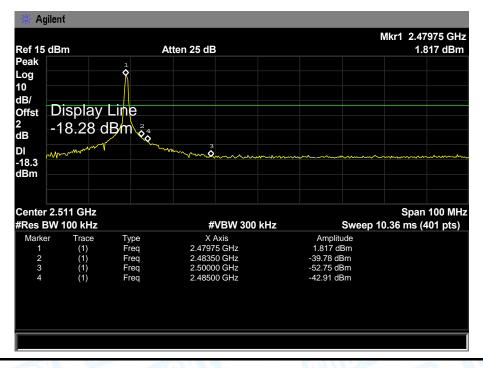




(2) Conducted Test

EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681		
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	DC 3.7V				
Test Mode: TX GFSK Mode 2402MHz / 2480 MHz		80 MHz	CHILLIA		
Remark:	N/A				







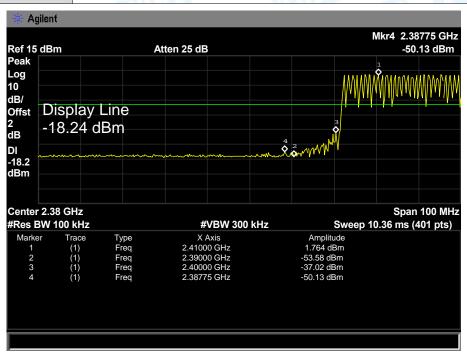
EUT: Waterproof Bluetooth Speaker Model Name: JT2681

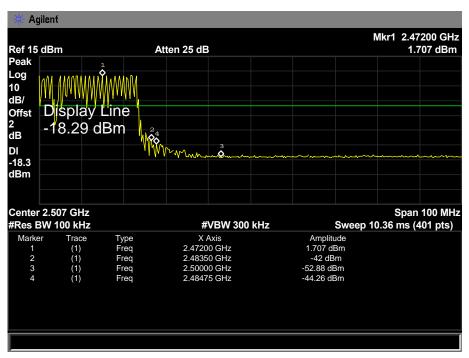
Temperature: 25 ℃ Relative Humidity: 55%

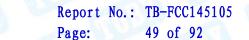
Test Voltage: DC 3.7V

Test Mode: GFSK Hopping Mode

Remark: N/A









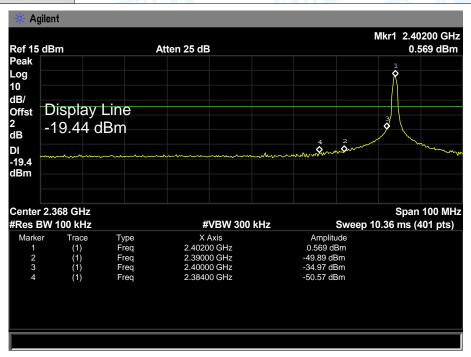
EUT: Waterproof Bluetooth Speaker Model Name: JT2681

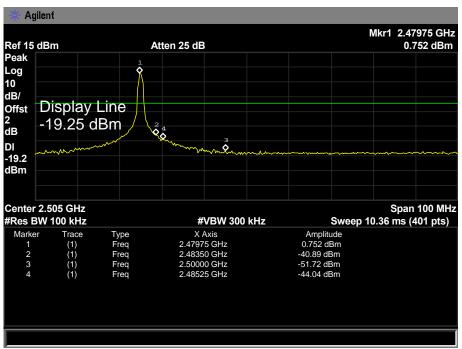
Temperature: 25 ℃ Relative Humidity: 55%

Test Voltage: DC 3.7V

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

Remark: N/A







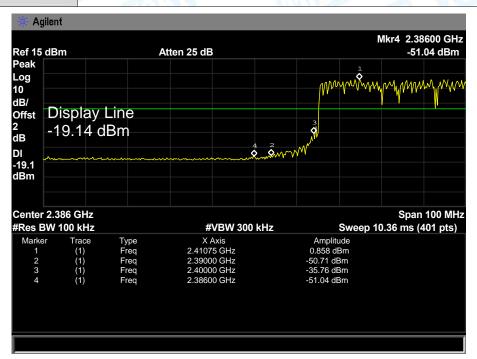
EUT: Waterproof Bluetooth Speaker Model Name: JT2681

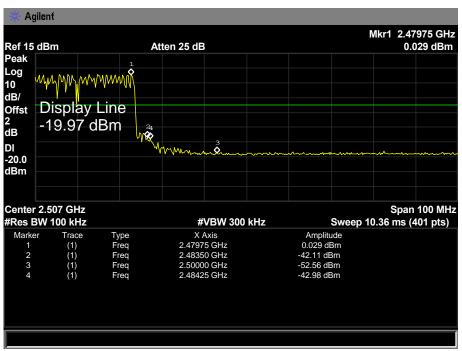
Temperature: 25 ℃ Relative Humidity: 55%

Test Voltage: DC 3.7V

Test Mode: 8-DPSK Hopping Mode

Remark: N/A







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# 7. Number of Hopping Channel

## 7.1 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

## 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=100 KHz, VBW=100 KHz, Sweep time= Auto.

## 7.4 EUT Operating Condition

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

## 7.5 Test Data

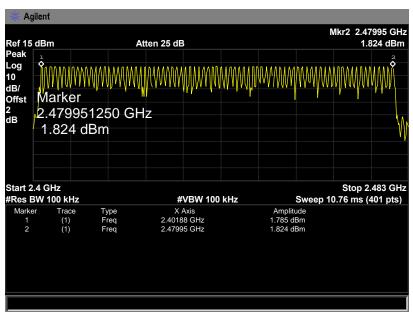


EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage: DC 3.7V		7	:33			

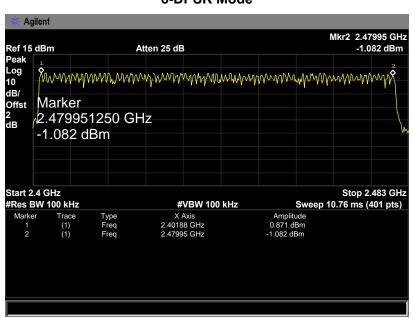
Test Mode:	Hopping Mode (GFSK/ 8-DPSK)
------------	-----------------------------

Frequency Range	Quantity of Hopping Channel	Limit
2402MU- 2400MU-	79	<b>\4</b> E
2402MHz~2480MHz	79	>15

#### **GFSK Mode**



#### 8-DPSK Mode





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# 8. Average Time of Occupancy

### 8.1 Test Standard and Limit

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

8.1.2 Test Limit

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

## 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: 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.

## 8.4 EUT Operating Condition

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

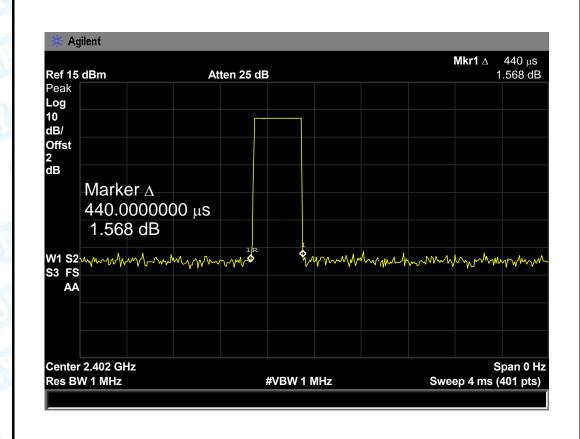


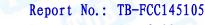
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## 8.5 Test Data

EUT:		Waterproof Bluetooth Speaker		Model Name :		JT2681
Temperature:		25 ℃		Relative Humidity:		55%
Test Voltage:		DC 3.7V	A RIVE		600	
Test Mode:		Hopping I	Mode (GFSK DH1)			N. W.
Channel	Pu	Ilse Time   Total of Dwell   Period Time   Lin		Limit	Result	
(MHz)		(ms)	(ms)	(s)	(ms)	Result
2402		0.440	140.80			
2441		0.440	140.80	31.60	400	PASS
2480		0.440	140.80			
CESK Honning Mode DH1						

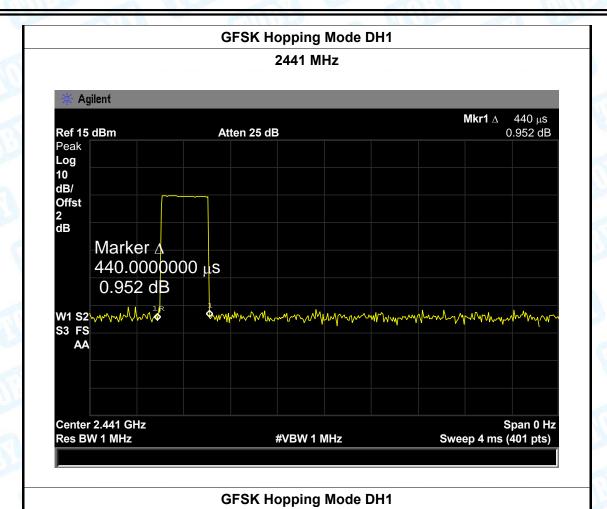
### **GFSK Hopping Mode DH1**

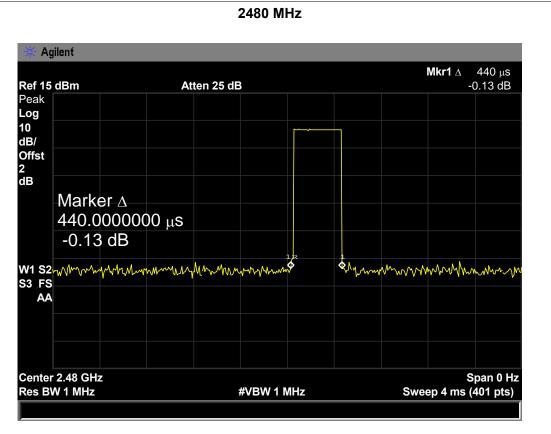






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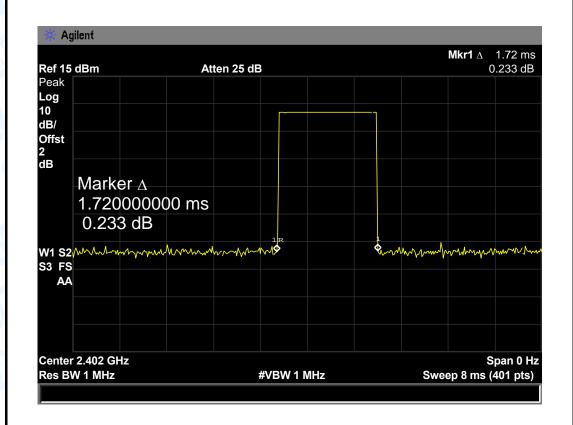




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EUT: Waterproo		Waterproof	Bluetooth Speaker	Bluetooth Speaker Model Name :		JT2681
Temperature		25 ℃		Relative Humidity:		55%
Test Voltage:		DC 3.7V	The same of the sa	100		3
Test Mode:		Hopping I	Mode (GFSK DH3)	-0	Alle	1377
Channel (MHz)	Pu	lse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402		1.720	275.20			
2441		1.700	272.00	31.60	400	PASS
2480		1.700	272.00			

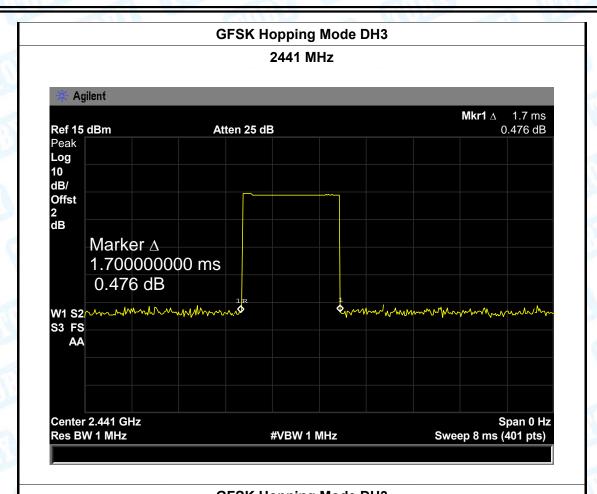
## **GFSK Hopping Mode DH3**

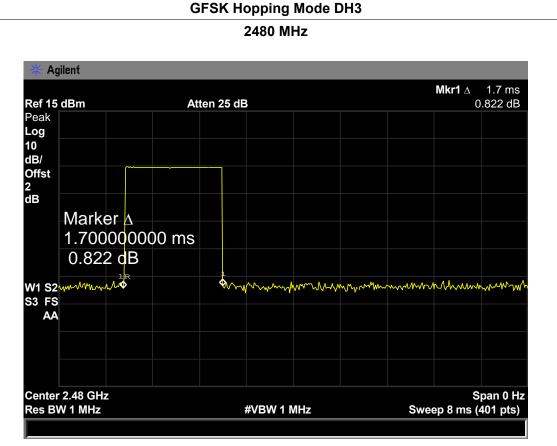






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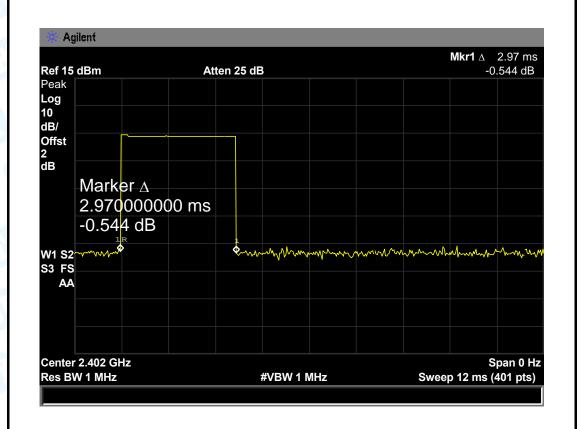


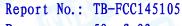


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EUT: Waterpro		Waterproof	Bluetooth Speaker	Model Name :		JT2681
Temperature	Temperature: 25 °C Relative Hui		Humidity:	55%		
Test Voltage: D		DC 3.7V	THE PARTY OF THE P	1		3
Test Mode: Hopping		Hopping I	Mode (GFSK DH5)		Alle	155
Channel (MHz)	Pu	lse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402		2.970	316.80			
2441		2.970	316.80	31.60	400	PASS
2480		2.970	316.80			

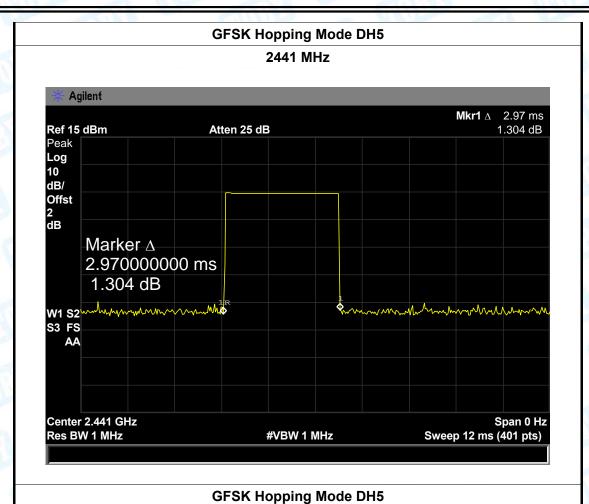
### **GFSK Hopping Mode DH5**

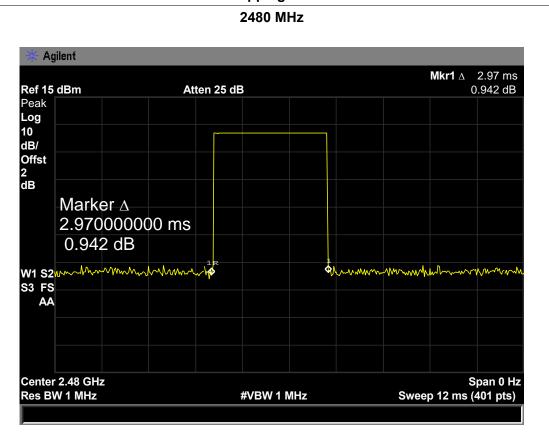






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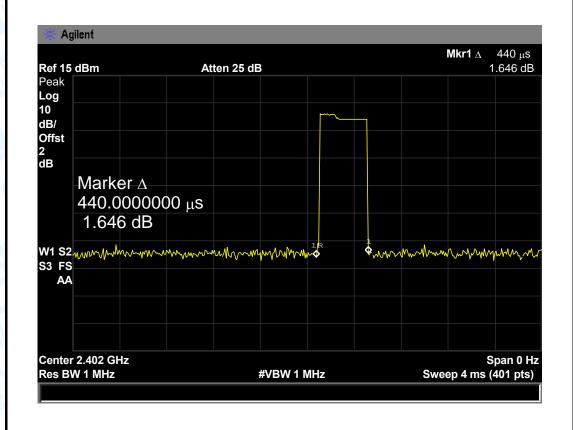




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EUT: Waterproof Bluetooth Speake		Model Name :		JT2681
25 ℃		Relative Humidity: 55%		55%
DC 3.7V				
Hopping N	Mode (π/4-DQPSK	DH1)	130	ATTEN A
Pulse Time	Total of Dwell	Period Time	Limit	Result
(ms)	(ms)	(s)	(ms)	Result
0.440	140.80			
0.440	140.80	31.60	400	PASS
0.440	140.80			
	25 °C DC 3.7V Hopping N Pulse Time (ms) 0.440 0.440	25 °C  DC 3.7V  Hopping Mode ( π /4-DQPSK I  Pulse Time (ms) (ms)  0.440 140.80  0.440 140.80	25 °C   Relative Hum     DC 3.7V     Hopping Mode ( π/4-DQPSK DH1)     Pulse Time   Total of Dwell   Period Time     (ms)   (s)     0.440   140.80   31.60	25 °C   Relative Humidity:     DC 3.7V     Hopping Mode ( π/4-DQPSK DH1)     Pulse Time

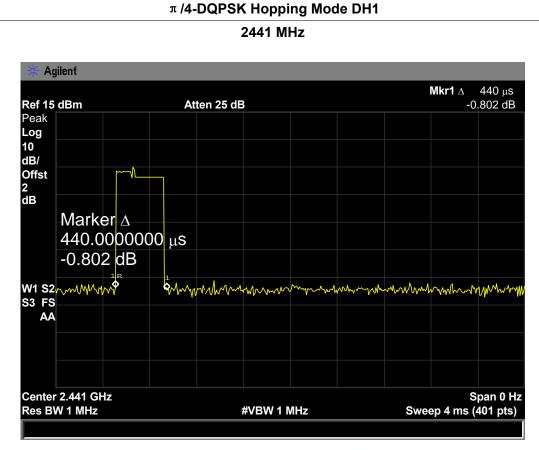
# $\pi$ /4-DQPSK Hopping Mode DH1



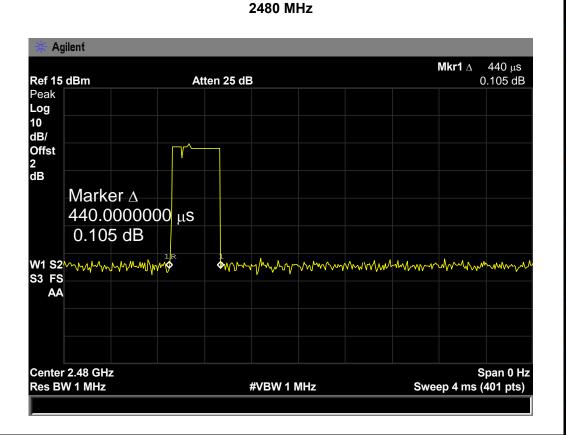




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π /4-DQPSK Hopping Mode DH1

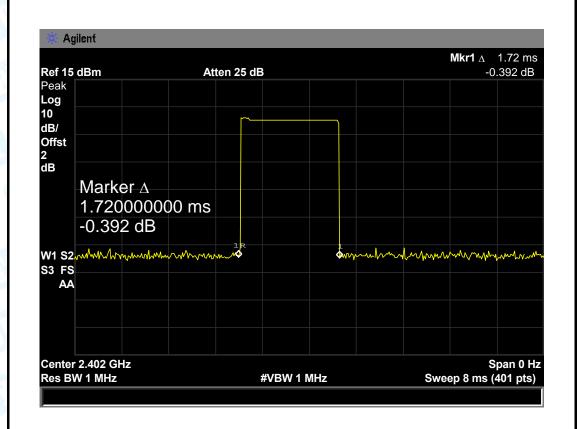




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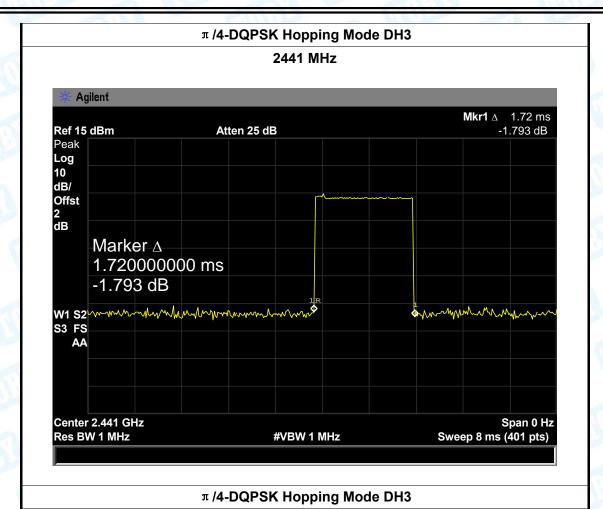
Waterproof	Bluetooth Speaker	Model Name	•	JT2681
25 °C	Bidetooti opeaker	Relative Humidity: 55%		
DC 3.7V	Mr.			
Hopping N	Mode (π/4-DQPSK	DH3)	All Comments	A COLO
Pulse Time	Total of Dwell	Period Time	Limit	Dogult
(ms)	(ms)	(s)	(ms)	Result
1.720	275.20			
1.720	275.20	31.60	400	PASS
1.720	275.20			
	25 °C DC 3.7V Hopping N Pulse Time (ms) 1.720 1.720	DC 3.7V Hopping Mode ( π /4-DQPSK  Pulse Time (ms) (ms)  1.720 275.20  1.720 275.20	25 °C Relative Hum  DC 3.7V Hopping Mode ( π /4-DQPSK DH3)  Pulse Time (ms) (ms) (s)  1.720 275.20  1.720 275.20 31.60	25 °C Relative Humidity:  DC 3.7V  Hopping Mode ( π /4-DQPSK DH3)  Pulse Time (ms) (ms) (s) (ms)  1.720 275.20  1.720 275.20 31.60 400

### π /4-DQPSK Hopping Mode DH3





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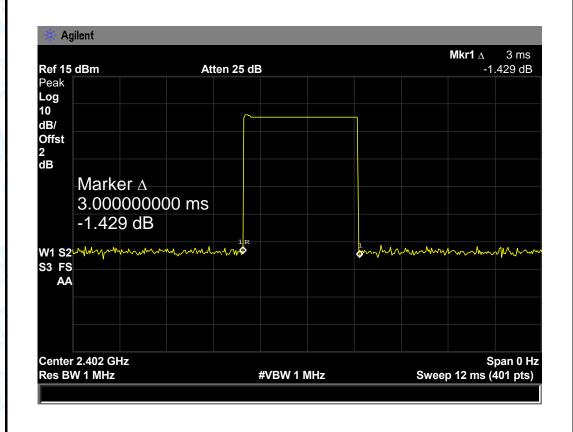
2480 MHz Agilent **Mkr1**  $\Delta$  1.72 ms Ref 15 dBm Atten 25 dB 0.789 dB Peak Log 10 dB/ Offst 2 dB Marker ∆ 1.720000000 ms 0.789 dB W1 S2 my hame when how how S3 FS AΑ Center 2.48 GHz Span 0 Hz Res BW 1 MHz #VBW 1 MHz Sweep 8 ms (401 pts)



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	Didelootii Speakei	uetooth Speaker Model Name :		JT2681
25 ℃		Relative Humidity: 55		55%
DC 3.7V	H. H. L.	1	9	
Hopping N	/lode (π/4-DQPSK I	DH5)	100	1
Pulse Time	Total of Dwell	Period Time	Limit	Dogult
(ms)	(ms)	(s)	(ms)	Result
3.000	320.00			
3.000	320.00	31.60	400	PASS
3.000	320.00			
	DC 3.7V Hopping N Pulse Time (ms) 3.000 3.000	DC 3.7V Hopping Mode ( π /4-DQPSK I  Pulse Time (ms) (ms) 3.000 320.00 3.000 320.00	DC 3.7V Hopping Mode ( π /4-DQPSK DH5)  Pulse Time (ms) (ms) (s)  3.000 320.00 31.60	DC 3.7V   Hopping Mode ( π /4-DQPSK DH5)

### π /4-DQPSK Hopping Mode DH5







 $\pi$  /4-DQPSK Hopping Mode DH5 2441 MHz Agilent Mkr1  $\Delta$ 3 ms Ref 15 dBm Atten 25 dB -0.828 dB Peak Log 10 dB/ Offst 2 dB Marker A 3.0000000000 ms -0.828 dB W1 S2~~~~~~ S3 FS AA Center 2.441 GHz Span 0 Hz Res BW 1 MHz #VBW 1 MHz Sweep 12 ms (401 pts)  $\pi$  /4-DQPSK Hopping Mode DH5 2480 MHz Agilent Mkr1  $\Delta$ 3 ms Ref 15 dBm Atten 25 dB 0.823 dB Peak Log 10 dB/ Offst 2 dB Marker A 3.000000000 ms 0.823 dB

#VBW 1 MHz

S3 FS AA

Center 2.48 GHz

Res BW 1 MHz

Span 0 Hz

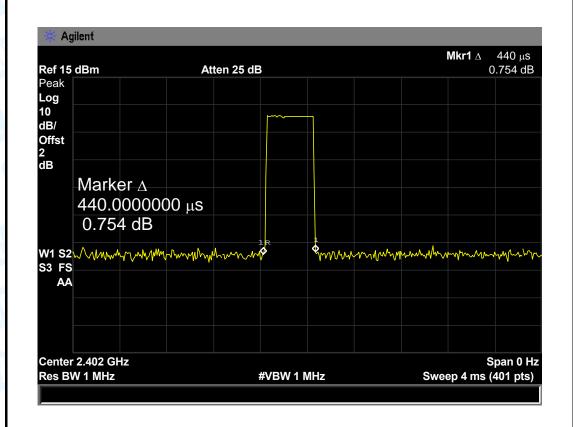
Sweep 12 ms (401 pts)

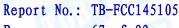


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EUT: Wa		Waterproof	Bluetooth Speaker	Model Name :		JT2681
Temperature: 2		25 ℃	Relative Humidity:		55%	
Test Voltage:		DC 3.7V		1		3
Test Mode:		Hopping I	Mode (8-DPSK DH1)		Alle	1377
Channel (MHz)	Pu	lse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402		0.440	140.80			
2441		0.440	140.80	31.60	400	PASS
2480		0.440	140.80			

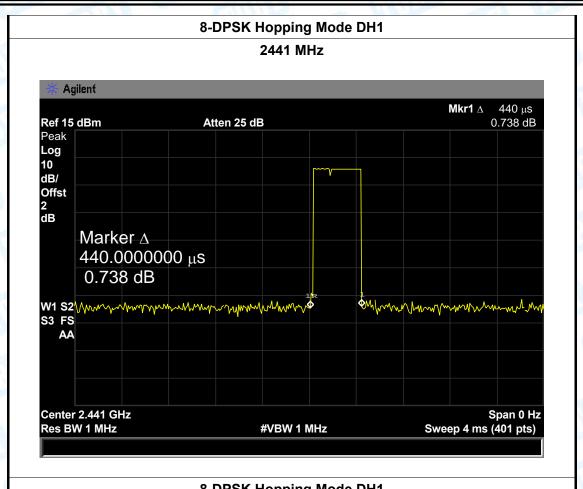
## 8-DPSK Hopping Mode DH1



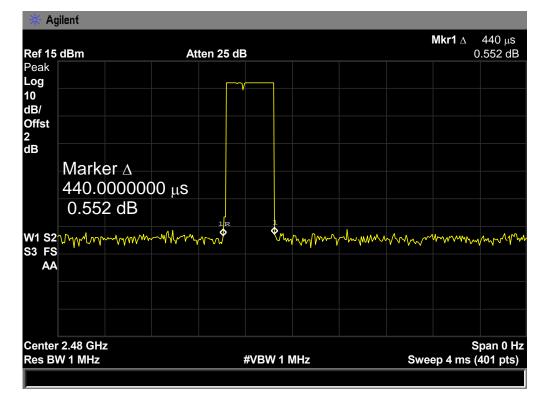




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# 8-DPSK Hopping Mode DH1 2480 MHz

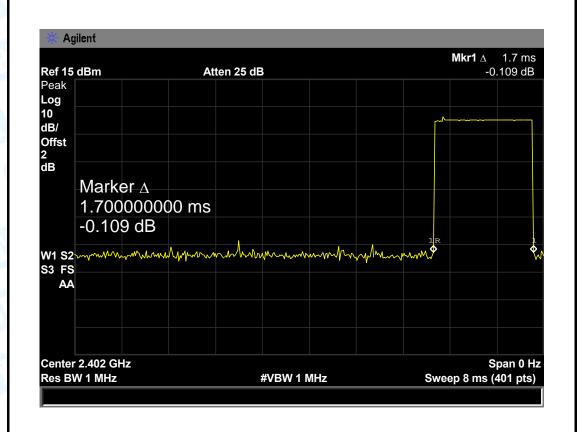




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EUT:	EUT: Waterproof		Bluetooth Speaker	Model Name :		JT2681
Temperature		25 ℃		Relative Humidity:		55%
Test Voltage:		DC 3.7V	W. C.	1	A COLOR	3
Test Mode:		Hopping N	Mode (8-DPSK DH3)	-0	Alto	1
Channel (MHz)	Pu	lse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402		1.700	272.00			
2441		1.700	272.00	31.60	400	PASS
2480		1.700	272.00			

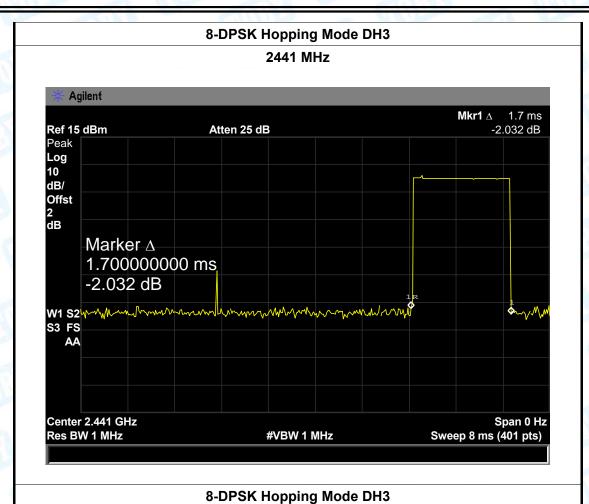
### 8-DPSK Hopping Mode DH3

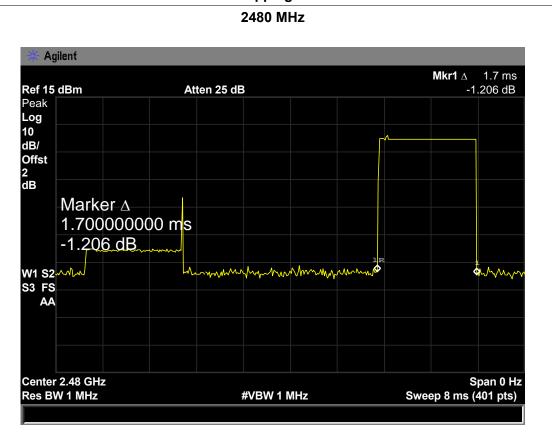






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2441

2480

2.910

2.910

Report No.: TB-FCC145105

**PASS** 

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EUT:		Waterproof	Bluetooth Speaker	Model Name :		JT2681
Temperature		25 ℃		Relative Humidity:		55%
Test Voltage:		DC 3.7V	130	1		3
Test Mode:		Hopping I	Mode (8-DPSK DH5)		Alle	1
Channel (MHz)	Pu	lse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402		3.000	320.00			

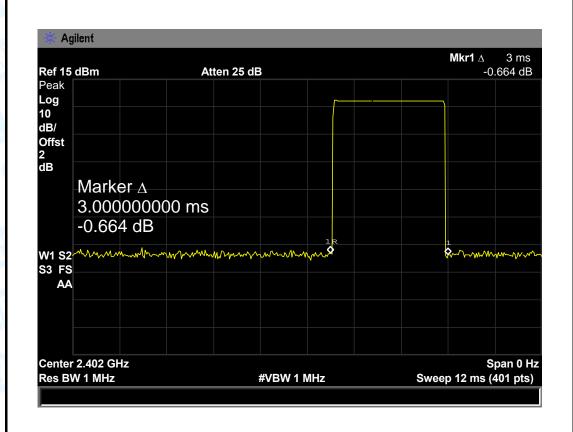
## 8-DPSK Hopping Mode DH5

31.60

400

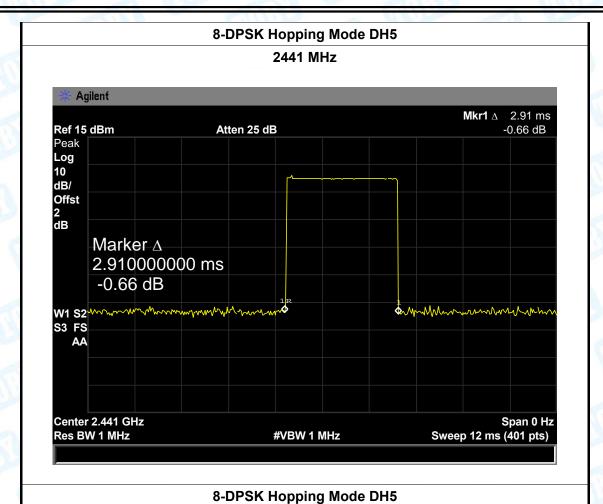
310.40

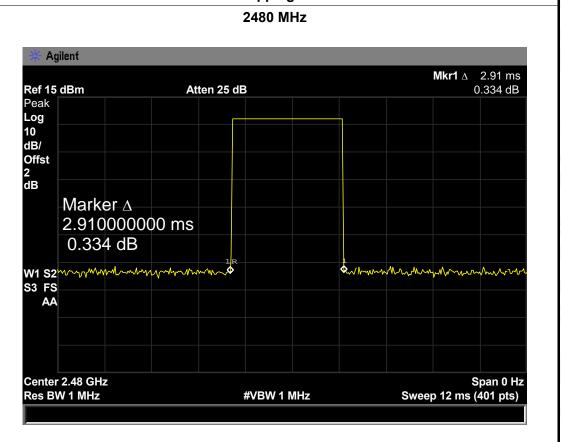
310.40





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# 9. Channel Separation and Bandwidth Test

#### 9.1 Test Standard and Limit

9.1.1 Test Standard FCC Part 15.247

9.1.2 Test Limit

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

## 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:

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.

# 9.4 EUT Operating Condition

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

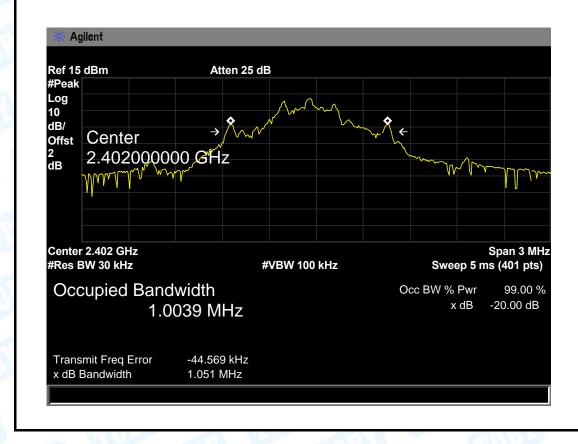


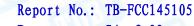
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# 9.5 Test Data

EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681	
Temperature:	25 ℃	Relative Humidity:	55%	
Test Voltage:	DC 3.7V			
Test Mode:	TX Mode (GFSK)	CALIFE S	A VIV	
Channel frequence (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)	
2402	1003.90	1051.00	700.67	
2441	1004.80	1052.00	701.33	
2480	1003.70	1055.00	703.33	
	CECK TV			

#### **GFSK TX Mode**







#Res BW 30 kHz

Transmit Freq Error

x dB Bandwidth

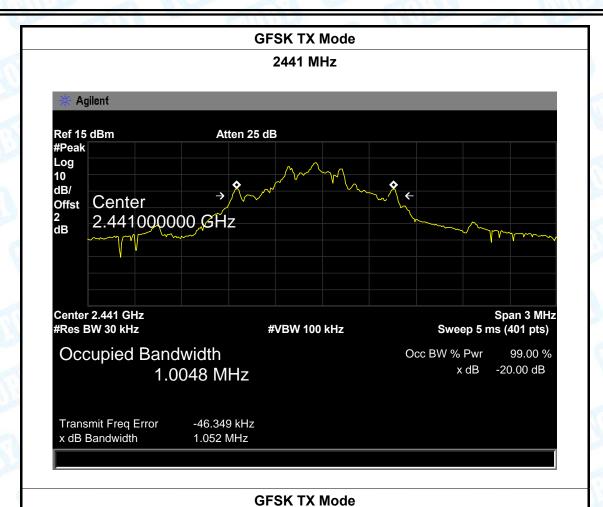
Occupied Bandwidth

1.0037 MHz

-46.553 kHz

1.055 MHz

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## 

**#VBW 100 kHz** 

2480 MHz

Sweep 5 ms (401 pts)

99.00 % -20.00 dB

Occ BW % Pwr

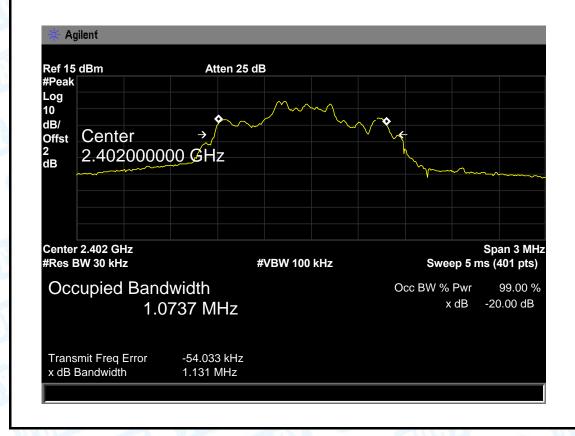


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EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681
Temperature:	<b>25</b> ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		1339
Test Mode:	TX Mode (π/4-DQPSK)		
			00.10

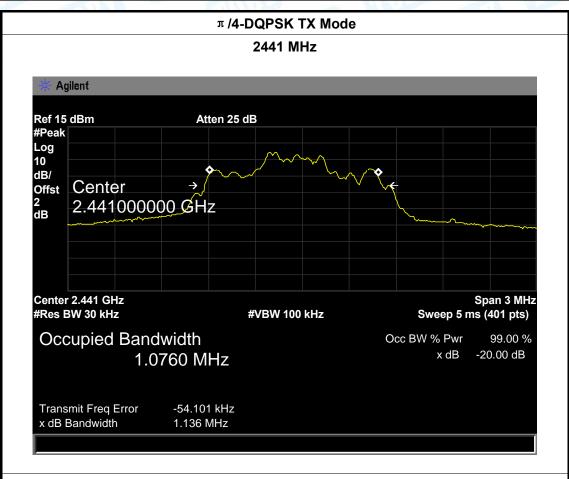
Channel frequency (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	1073.70	1131.00	754.00
2441	1076.00	1136.00	757.33
2480	1074.40	1132.00	754.67

### π/4-DQPSK TX Mode

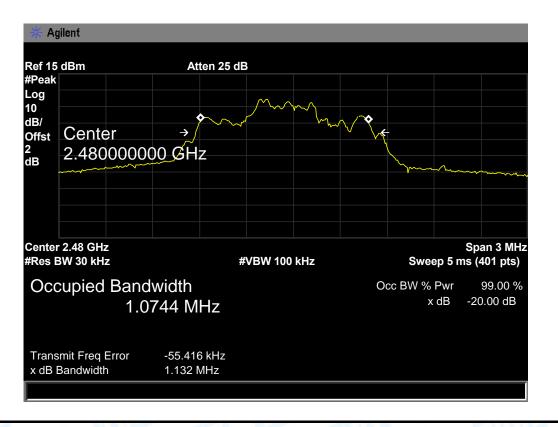




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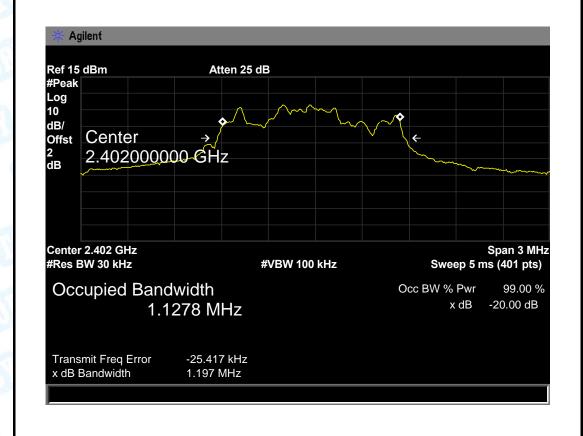
Report No.: TB-FCC145105 Page: 77 of 92

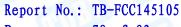
EUT:Waterproof Bluetooth SpeakerModel Name :JT2681Temperature:25 °CRelative Humidity:55%Test Voltage:DC 3.7V

Test Mode: TX Mode (8-DPSK)

rest mode.	( Wode (o Di Oit)		100
Channel frequency	99% OBW	20dB Bandwidth	20dB
(MHz)	(kHz)	(kHz)	Bandwidth *2/3
			(kHz)
2402	1127.80	1197.00	798.00
2441	1127.70	1200.00	800.00
2480	1128.80	1201.00	800.67

# 8-DPSK TX Mode 2402 MHz



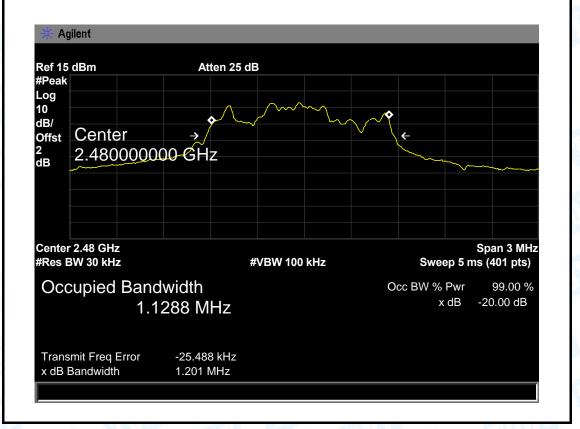




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## 8-DPSK TX Mode 2480 MHz





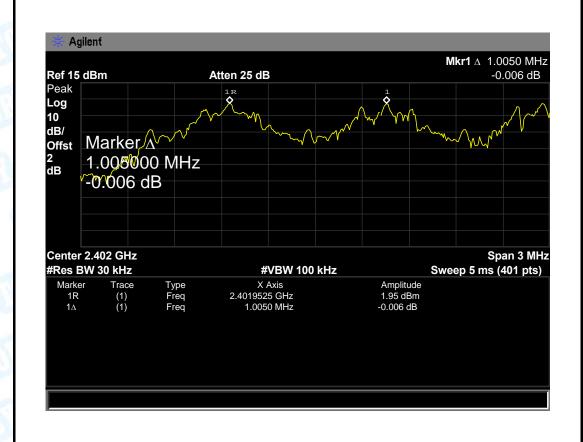
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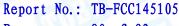
EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2681
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		UHILL

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

Channel frequency (MHz)	Separation Read Value	Separation Limit (kHz)
	(kHz)	
2402	1005.00	700.67
2441	1005.00	701.33
2480	1005.00	703.33

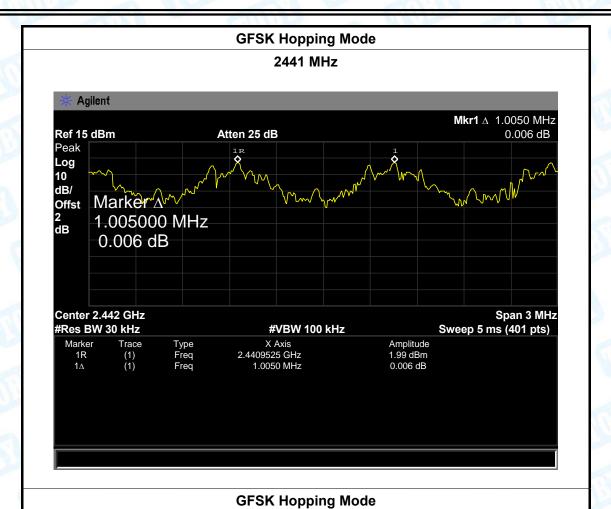
### **GFSK Hopping Mode**







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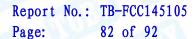




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EUT:	Waterproof Bluetooth Speaker		Model Name :		JT2681
Temperature:	25 ℃		Relativ	e Humidity:	55%
Test Voltage:	DC 3.7V	THE PARTY OF THE P	1630		3
Test Mode:	Hopping N	Mode (π/4-DQPSK)		1 Will	
Channel frequen	cy (MHz)	Separation Read V	alue	Separation	Limit (kHz)
		(kHz)			
2402		1005.00		754	4.00
2441	2441 1005.00		757.33		7.33
2480	2480 1005.00			754	4.67
π /4-DQPSK Hopping Mode					

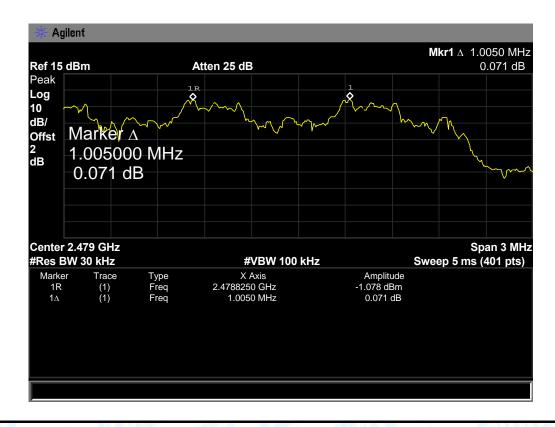






π /4-DQPSK Hopping Mode 2441 MHz Agilent Mkr1 A 1.0050 MHz Ref 15 dBm Atten 25 dB -0.111 dB Peak Log 10 dB/ Marker ∆ Offst 1.005000 MHz 2 dB -0.111 dB Center 2.442 GHz Span 3 MHz #Res BW 30 kHz **#VBW 100 kHz** Sweep 5 ms (401 pts) X Axis 2.4408325 GHz Type Freq Freq Amplitude Marker -0.949 dBm -0.111 dB (1) (1) 1.0050 MHz

 $\pi$  /4-DQPSK Hopping Mode

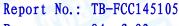




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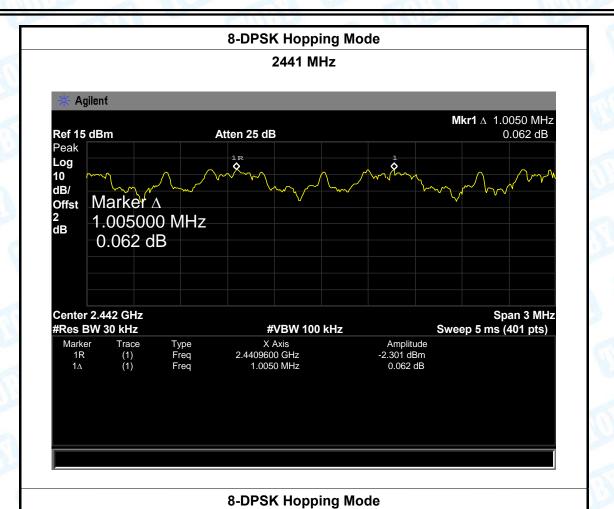
EUT:	Waterproof	Bluetooth Speaker	Model Name :		JT2681
Temperature:	25 ℃		Relativ	e Humidity:	55%
Test Voltage:	DC 3.7V		16.30		3
Test Mode:	Hopping N	Mode (8-DPSK)		I WILL	1
Channel frequen	cy (MHz)	Separation Read V	Read Value Separation Limit (kHz)		Limit (kHz)
		(kHz)			
2402		1005.00		798	3.00
2441	2441		.00 800.00		0.00
2480	2480 1005.00			800	0.67
8-DPSK Hopping Mode					

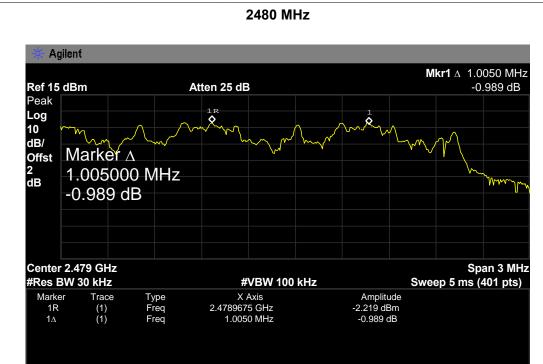






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# 10. Peak Output Power Test

### 10.1 Test Standard and Limit

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

10.1.2 Test Limit

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

# 10.2 Test Setup



### 10.3 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.

# 10.4 EUT Operating Condition

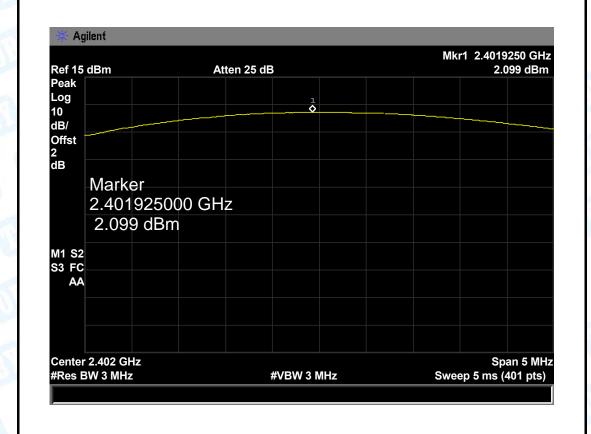
The EUT was set to continuously transmitting in the max power during the test.



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# 10.5 Test Data

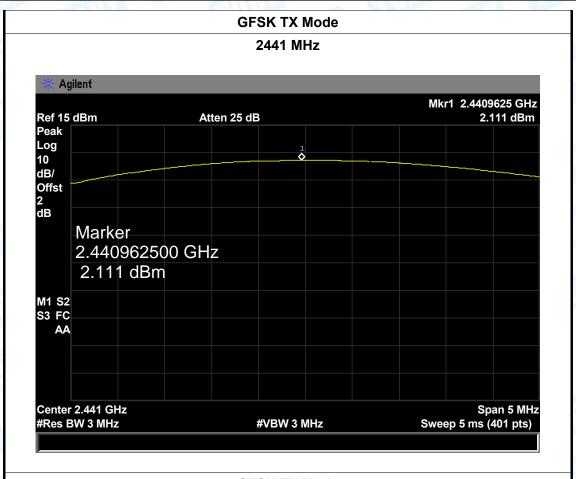
EUT:	Waterproof	Bluetooth Speaker	Model Name :	JT2681
Temperature:	25 ℃	AMILE .	Relative Humidity:	55%
Test Voltage:	DC 3.7V			AHO
Test Mode:	TX Mode	(GFSK)		
Channel frequen	cy (MHz)	Test Result (dBr	n) Limit	(dBm)
2402		2.099		
2441 2.111		2	21	
2480 2.035				
GFSK TX Mode				



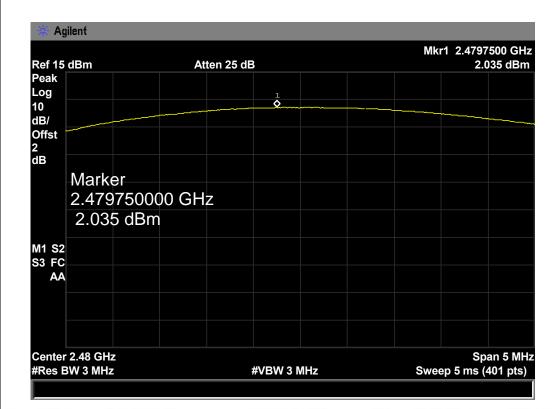




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# **GFSK TX Mode**

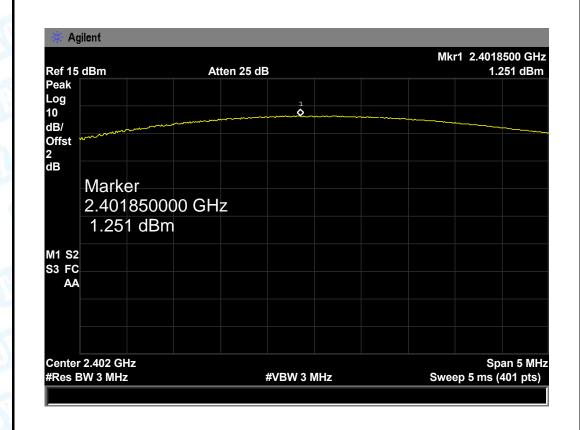




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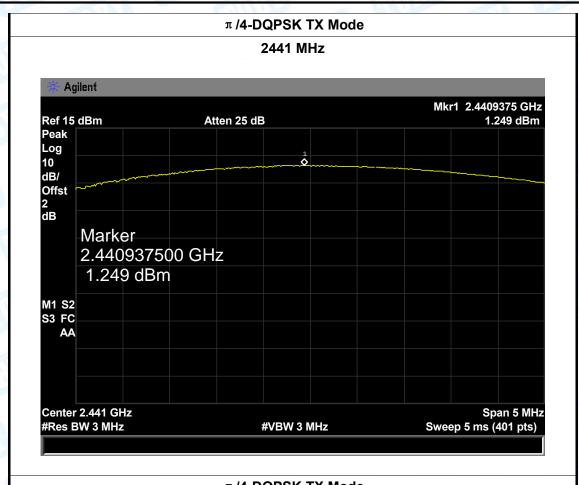
EUT:	Waterproof	Bluetooth Speaker	Model Name :	JT2681
Temperature:	25 ℃		Relative Humidity:	55%
Test Voltage:	DC 3.7V	130		133
Test Mode:	TX Mode	( π /4-DQPSK)		1111
Channel frequen	cy (MHz)	Test Result (	dBm) Li	mit (dBm)
2402		1.251		
2441		1.249		21
2480		1.207		
		π /Δ-DOPSK T	Y Mode	

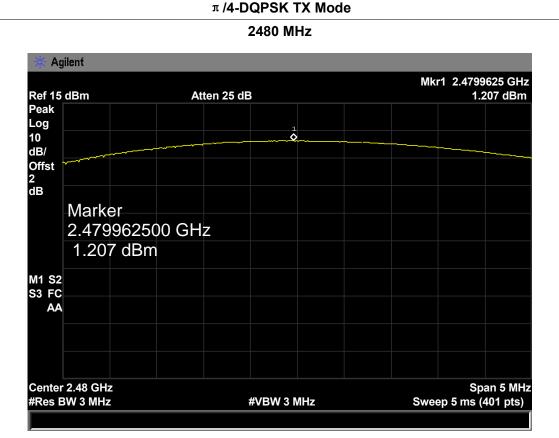
#### π /4-DQPSK TX Mode





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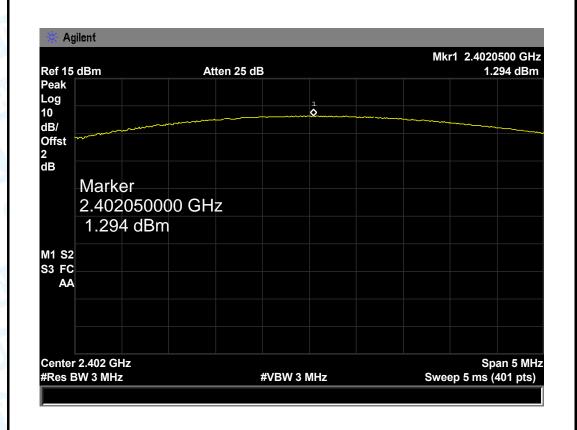




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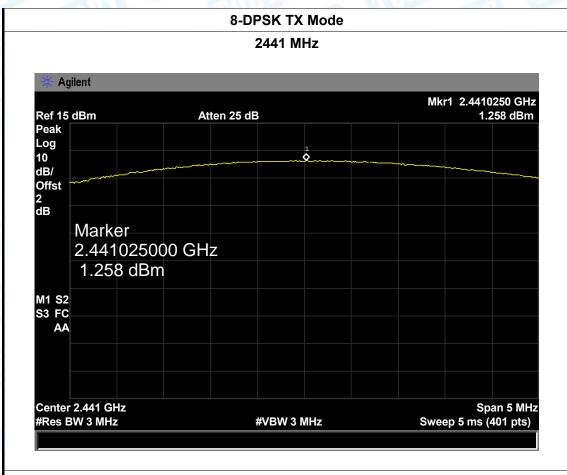
EUT:	Waterproof	Bluetooth Speaker	Model Name	<b>)</b> :	JT2681
Temperature:	25 ℃		Relative Hui	midity:	55%
Test Voltage:	DC 3.7V	130	1		39
Test Mode:	TX Mode	(8-DPSK)		Alle	
Channel frequen	Channel frequency (MHz) Test Result (c		dBm)	Lin	nit (dBm)
2402		1.294			
2441		1.258	58 21		21
2480		1.215			
		a ppok TV	M1 -		

## 8-DPSK TX Mode

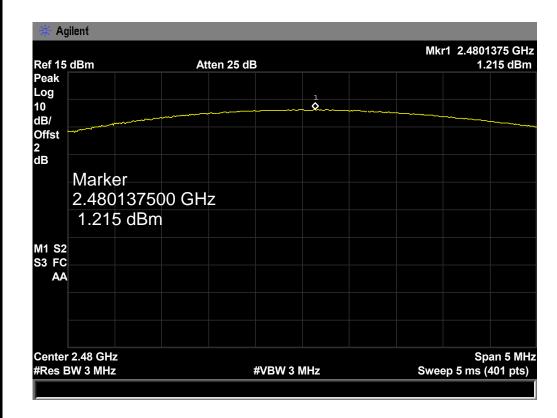




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#### 8-DPSK TX Mode





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# 11. Antenna Requirement

# 11.1 Standard Requirement

11.1.1 Standard FCC Part 15.203

### 11.1.2 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.

### 11.2 Antenna Connected Construction

The directional gains of the antenna used for transmitting is -0.68 dBi, and the antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

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

Antenna Type		
<b>▽</b> Perman	nent attached antenna	
□Unique	e connector antenna	TO THE
□ Profes	ssional installation anter	ina