

# Shenzhen Toby Technology Co., Ltd.

Report No.: TB-FCC147601

Page: 1 of 80

# **FCC Radio Test Report** FCC ID: 2AH9K-TT810BT

# **Original Grant**

Report No. TB-FCC147601

**Applicant** Shenzhen Tianzhihong Electronic Co.,Ltd

**Equipment Under Test (EUT)** 

**EUT Name** Portable Bluetooth Speaker

TT810BT Model No.

TT740BT, TT610BT, TT630BT Series Model No.

**Brand Name** N/A

**Receipt Date** 2016-04-12

**Test Date** 2016-04-13 to 2016-05-03

**Issue Date** 2016-05-04

**Standards** FCC Part 15: 2015, 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

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# Contents

COI	NTENTS	2
1.	GENERAL INFORMATION ABOUT EUT	4
	1.1 Client Information	4
	1.2 General Description of EUT (Equipment Under Test)	
	1.3 Block Diagram Showing the Configuration of System Tested	
	1.4 Description of Support Units	6
	1.5 Description of Test Mode	7
	1.6 Description of Test Software Setting	8
	1.7 Measurement Uncertainty	8
	1.8 Test Facility	
2.	TEST SUMMARY	10
3.	TEST EQUIPMENT	11
4.	CONDUCTED EMISSION TEST	12
	4.1 Test Standard and Limit	12
	4.2 Test Setup	
	4.3 Test Procedure	
	4.4 EUT Operating Mode	
	4.5 Test Data	
5.	RADIATED EMISSION TEST	18
	5.1 Test Standard and Limit	
	5.2 Test Setup	
	5.3 Test Procedure	
	5.4 EUT Operating Condition	
6.	RESTRICTED BANDS REQUIREMENT	37
	6.1 Test Standard and Limit	
	6.2 Test Setup	
	6.3 Test Procedure	
	6.4 EUT Operating Condition	38
	6.4 Test Data	38
7.	NUMBER OF HOPPING CHANNEL	51
	7.1 Test Standard and Limit	
	7.2 Test Setup	
	7.3 Test Procedure	
	7.4 EUT Operating Condition	51
	7.5 Test Data	51
8.	AVERAGE TIME OF OCCUPANCY	53
	8.1 Test Standard and Limit	
	8.2 Test Setup	
	8.3 Test Procedure	



Report No.: TB-FCC147601
Page: 3 of 80

	8.4 EUT Operating Condition	53
	8.5 Test Data	
9.	CHANNEL SEPARATION AND BANDWIDTH TEST	66
	9.1 Test Standard and Limit	66
	9.2 Test Setup	66
	9.3 Test Procedure	66
	9.4 EUT Operating Condition	
	9.5 Test Data	
10.	PEAK OUTPUT POWER TEST	75
	10.1 Test Standard and Limit	75
	10.2 Test Setup	75
	10.3 Test Procedure	75
	10.4 EUT Operating Condition	75
	10.5 Test Data	
11.	ANTENNA REQUIREMENT	80
	11.1 Standard Requirement	80
	11.2 Antenna Connected Construction	80



Page: 4 of 80

# 1. General Information about EUT

### 1.1 Client Information

**Applicant**: Shenzhen Tianzhihong Electronic Co.,Ltd

Address : 3-4/F, Bldg 1 Huafeng Logistics Industrial Park, 11th Dayang Road,

Fuyong Street, Baoan, Shenzhen, Guangdong, China

Manufacturer : Shenzhen Tianzhihong Electronic Co.,Ltd

Address : 3-4/F, Bldg 1 Huafeng Logistics Industrial Park, 11th Dayang Road,

Fuyong Street, Baoan, Shenzhen, Guangdong, China

# 1.2 General Description of EUT (Equipment Under Test)

<b>EUT Name</b>	0	Portable Bluetooth Speake	Portable Bluetooth Speaker			
Models No.		TT810BT, TT740BT, TT610	TT810BT, TT740BT, TT610BT, TT630BT			
Model Difference		All these models are identical in the same PCB, layout and electrical circuit, the only difference is color.				
TOD I		Operation Frequency: Bluetooth 2.1+EDR: 2402~	-2480MHz			
		Number of Channel:	Bluetooth:79 Channels see Note 3			
Product Description	:	Max Peak Output Power: Bluetooth: 4.041 dBm( π /4-DQPSK)				
Description	15	Antenna Gain: 2dBi PCB Antenna				
	1	Modulation Type:	GFSK 1Mbps(1 Mbps) π /4-DQPSK(2 Mbps)			
Power Supply		DC Voltage supplied from Host System by USB cable.				
		DC power by Li-ion Battery	1.07			
Power Rating	:	DC 5V by USB Cable from PC system. DC 3.7V by 1800mAh Li-ion Battery.				
	4					
Connecting I/O Port(S)	975	Please refer to the User's N	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) Channel List:

	Bluetooth 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			
03	2405	30	2432	57	2459			
04	2406	31	2433	58	2460			



Page: 5 of 80

		611111			
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

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

# 1.3 Block Diagram Showing the Configuration of System Tested

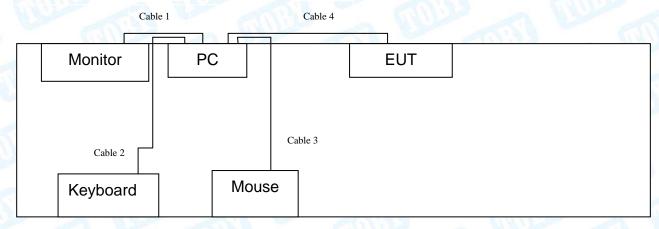
### TX Mode

EUT



Page: 6 of 80

# **USB Charging with TX Mode**



# 1.4 Description of Support Units

Equipment Information						
Name	Model	FCC ID/DOC	Manufacturer	Used "√"		
LCD Monitor	E170Sc	DOC	DELL	J		
PC	OPTIPLEX380	DOC	DELL	1		
Keyboard	L100	DOC	DELL	1		
Mouse	M-UARDEL7	DOC	DELL	<b>√</b>		
		Cable Informa	tion			
Number	Shielded Type	Ferrite Core	Length	Note		
Cable 1	YES	YES	1.5M			
Cable 2	NO	NO	1.0M			
Cable 3	YES	NO	1.5M	COURT IN		
Cable 4	YES	YES	0.5M	Accessorise		



Page: 7 of 80

## 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	S. Comments				
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	Hopping Mode(GFSK)				
Mode 5	Hopping Mode( π /4-DQPSK)				

#### 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, middle, lowest available channels, and the worst case data rate as follows:

TX Mode: GFSK (1 Mbps)
TX Mode: π /4-DQPSK (2 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.



Page: 8 of 80

# 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	FCC Assist 1.5			
Frequency	2402 MHz	2441MHz	2480 MHz	
GFSK	DEF	DEF	DEF	
π /4-DQPSK	DEF	DEF	DEF	

# 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:	
Conducted Emission	9kHz~150kHz	±3.42 dB
	150kHz to 30MHz	±3.42 dB
Radiated Emission	Level Accuracy:	±4.60 dB
Radiated Emission	9kHz to 30 MHz	±4.60 dB
Padiated Emission	Level Accuracy:	.4.40 dB
Radiated Emission	30MHz to 1000 MHz	±4.40 dB
Radiated Emission	Level Accuracy:	±4,20 dB
Radiated Emilssion	Above 1000MHz	±4.20 UB



Page: 9 of 80

## 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.



Report No.: TB-FCC147601 10 of 80 Page:

2. Test Summary

FCC Part 15 Subpart C(15.247)/ RSS 247 Issue 1					
Standard S	ection	Total No. or	1 1		
FCC	IC	Test Item	Judgment	Remark	
15.203	, C	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:822.1480kHz π/4-DQPSK: 1190.60kHz	



Page: 11 of 80

# 3. Test Equipment

Conducted Emission Test							
Equipment Manufacturer Model No. Serial No. Last Cal.							
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. 08, 2015	Aug. 07, 2016		
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Date		
Radiation	Emission Tes	τ			Cal. Due		
Spectrum Analyzer	Agilent	E4407B	MY45106456	Aug. 29, 2015	Aug. 28, 2016		
EMI Test Receiver	Rohde & Schwarz	ESCI	100010/007	Aug. 07, 2015	Aug. 06, 2016		
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 26, 2015	Mar. 25, 2017		
Bilog Antenna	ETS-LINDGREN	3142E	00117542	Mar. 26, 2015	Mar. 25, 2017		
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 26, 2015	Mar. 25, 2017		
Horn Antenna	ETS-LINDGREN	3117	00143209	Mar. 26, 2015	Mar. 25, 2017		
Pre-amplifier	Sonoma	310N	185903	Mar. 26, 2015	Mar. 25, 2017		
Pre-amplifier	HP	8447B	3008A00849	Mar. 26, 2015	Mar. 25, 2017		
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 26, 2015	Mar. 25, 2017		
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A		



Report No.: TB-FCC147601 Page: 12 of 80

# 4. Conducted Emission Test

### 4.1 Test Standard and Limit

4.1.1Test Standard FCC Part 15.207

#### 4.1.2 Test Limit

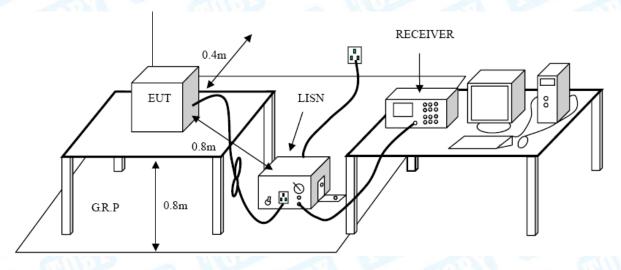
### **Conducted Emission Test Limit**

Evaguanov	Maximum RF Line	e 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.



Report No.: TB-FCC147601 Page: 13 of 80

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

Test data please refer the following pages.





EUT:	Portable Blueto	oth Speaker	Model Na	me :	ТТ	810BT
Temperature:	25 ℃	211	Relative F	lumidity:	55	%
Test Voltage:	AC 120V/60 Hz				1919	
Terminal:	Line			1 1/1/2		
Test Mode:	USB Charging	with TX GFSK	Mode 2402	2 MHz	a 1	Millian
Remark:	Only worse cas	e is reported	1			6
0.0 dBuV	0.5	(MHz)	5		QP: AVG:	peak AVG
No. Mk. F	Reading req. Level	Correct Factor	Measure- ment	Limit	Over	
N	∕lHz dBuV	dB	dBuV	dBuV	dB	Detector
1 0.1	740 37.78	9.97	47.75	64.76 -	17.01	QP
2 0.1	740 37.30	9.97	47.27	54.76	-7.49	AVG
3 0.5	540 34.60	10.05	44.65	56.00 -	11.35	QP
4 0.5	540 26.88	10.05	36.93	46.00	-9.07	AVG
5 1.1	500 32.21	10.06	42.27	56.00 -	13.73	QP
6 1.1	500 28.03	10.06	38.09	46.00	-7.91	AVG
7 3.5	30.71	10.01	40.72	56.00 -	15.28	QP
8 3.5	180 26.94	10.01	36.95	46.00	-9.05	AVG
9 8.9	580 37.05	10.13	47.18	60.00 -	12.82	QP
10 8.9	580 34.44	10.13	44.57	50.00	-5.43	AVG
11 14.0	780 39.07	10.24	49.31	60.00 -	10.69	QP
12 * 14.0	780 37.90	10.24	48.14	50.00	-1.86	AVG
Emission Level=	Read Level+ Co	rrect Factor				





EUT:	Porta	able Bluetoot	th Speaker	Model Na	ame :	TT8	10BT
Temper	rature: 25 °	C	11	Relative	Humidity:	55%	ó
Test Vo	Itage: AC 1	120V/60 Hz			-	1919	
Termina	al: Neut	tral	W. C.		I Have		
Test Mo	ode: USB	Charging wi	th TX GFSK	Mode 2402	MHz	. E	Mira
Remark	c: Only	worse case	is reported	Comment			6
120.0 dB	u∀						
						QP: AVG:	
60							
×	×	×		×			
M	1 20 1 100 10	\. ~~~~	Mary Johnson			TALL STATE	alme a
$V \lor V$	~ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	My www.				· '\\\	peak
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	YW W	v W W	7 7 1 1			AVG
0.0	,						
0.150	0.5		(MHz)	5			30.000
		Reading	Correct	Measure-			
No.	Mk. Freq.	Level	Factor	ment	Limit	Over	
	MHz	dBu∀	dB	dBu∀	dBu∀	dB	Detector
1	0.1740	34.29	10.12	44.41	64.76 -2	20.35	QP
2	0.1740	33.65	10.12	43.77	54.76 -	10.99	AVG
3	0.5540	35.55	10.02	45.57	56.00 -	10.43	QP
4	0.5540	27.78	10.02	37.80	46.00 -	8.20	AVG
5	1.1500	33.83	10.14	43.97	56.00 -	12.03	QP
6	1.1500	29.68	10.14	39.82	46.00 -	6.18	AVG
7	3.5180	31.87	10.06	41.93	56.00 -	14.07	QP
•	3.5180	27.65	10.06	37.71	46.00 -	-8.29	AVG
8	3.3100			46.12	60.00 -		QP
8		35.96	10.16				
8	10.0460	35.96 33.39	10.16				A\/G
8 9 10	10.0460 10.0460	33.39	10.16	43.55	50.00 -	6.45	
8 9 10 11	10.0460				50.00 -	6.45	AVG QP AVG





EUT: Portable Bluetooth Speaker **Model Name: TT810BT** 25 °C Temperature: **Relative Humidity:** 55% Test Voltage: AC 240V/60 Hz Terminal: Line **Test Mode:** USB Charging with TX GFSK Mode 2402 MHz Remark: Only worse case is reported 120.0 dBuV QP: AVG: 60 0.0 0.150 0.5 (MHz) 30.000 Reading Correct Measure-Over No. Mk. Freq. Limit Level Factor ment MHz dBuV dB dBuV dBuV dΒ Detector 0.2140 37.04 10.02 47.06 -15.981 63.04 QΡ -9.22 2 0.2140 33.80 10.02 43.82 53.04 AVG 3 0.5540 34.45 10.05 44.50 56.00 -11.50 QΡ 0.5540 26.69 36.74 46.00 -9.26AVG 4 10.05 5 0.9700 29.63 10.07 39.70 56.00 -16.30 QΡ 0.9700 31.03 46.00 -14.97 AVG 6 20.96 10.07 7 2.1980 27.59 37.64 56.00 -18.36 QΡ 10.05 2.1980 22.36 10.05 32.41 46.00 -13.59 AVG 8 9 4.7380 25.91 9.97 35.88 56.00 -20.12 QΡ 10 4.7380 22.63 9.97 32.60 46.00 -13.40 AVG 15.8100 22.13 32.37 60.00 -27.63 QΡ 11 10.24 12 15.8100 11.46 10.24 21.70 50.00 -28.30 AVG **Emission Level= Read Level+ Correct Factor** 





EUT: Portable Bluetooth Speaker **Model Name: TT810BT** 25 °C Temperature: **Relative Humidity:** 55% Test Voltage: AC 240V/60 Hz Terminal: Neutral Test Mode: USB Charging with TX GFSK Mode 2402 MHz Remark: Only worse case is reported 120.0 dBuV QP: AVG: 60 0.0 0.150 0.5 (MHz) 30.000 Reading Correct Measure-Limit Over No. Mk. Freq. Level Factor ment dBuV dΒ dBuV dBuV dΒ MHz Detector 44.45 56.00 -11.55 1 0.5540 34.40 10.05 QΡ 2 0.5540 26.71 10.05 36.76 46.00 -9.24 AVG 3 1.1539 22.19 10.06 32.25 56.00 -23.75 QP 4 1.1539 16.93 10.06 26.99 46.00 -19.01 **AVG** 5 3.1980 19.11 29.13 56.00 -26.87 QΡ 10.02 3.1980 14.82 10.02 24.84 46.00 -21.16 AVG 6 QΡ 7 7.1019 19.08 10.06 29.14 60.00 -30.86 7.1019 50.00 -25.06 AVG 8 14.88 10.06 24.94 8.9579 11.25 10.13 21.38 60.00 -38.62 QΡ 9 50.00 -33.05 AVG 10 8.9579 6.82 10.13 16.95 11 13.1819 5.62 10.22 15.84 60.00 -44.16 QΡ 12 13.1819 -0.38 10.22 9.84 50.00 -40.16 AVG **Emission Level= Read Level+ Correct Factor** 



Report No.: TB-FCC147601 Page: 18 of 80

# 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

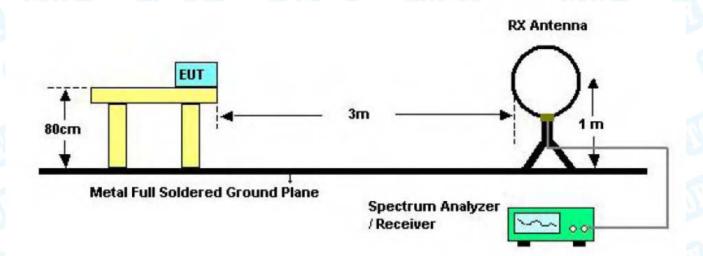
### Note:

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

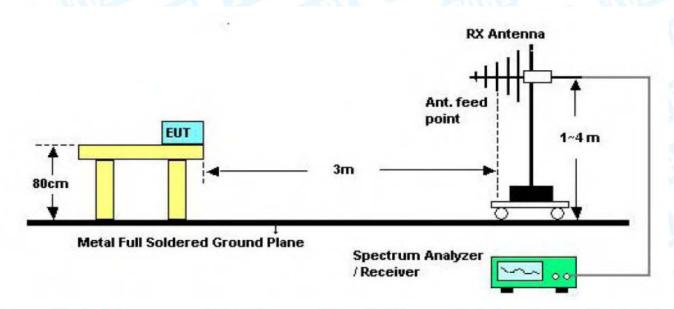


Page: 19 of 80

# 5.2 Test Setup

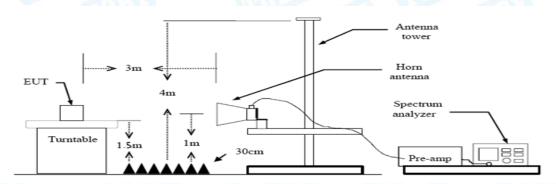


Bellow 30MHz Test Setup



**Bellow 1000MHz Test Setup** 





**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 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=1 kHz with Peak Detector for Average Values.

Test data please refer the following pages.



Report No.: TB-FCC147601
Page: 21 of 80

25 ℃	11	Polotiv		
	& C30	Relativ	55%	
DC 5V		1 630		13
Horizontal	Will Fre		Alle	
TX GFSK Mode 2	402MHz			MILL
Only worse case i	s reported	Comment		
Mary Market Mark	3 4 5	6 X	(RF)FCC 15C 3h	Margin -6 dB
Reading Level	(MHz)  Correct N Factor	300 leasure- ment		600 700 1000.00 Over
dBuV	dB/m	dBuV/m	dBuV/m	dB Detecto
35 52.07	-16.84	35.23	40.00	-4.77 peak
14 55.97	-21.83	34.14	43.50	-9.36 peak
74 59.97	-22.14	37.83	43.50	-5.67 peak
14 58.76	-21.34	37.42	43.50	-6.08 peak
50 58.70	-20.81	37.89	43.50	-5.61 peak
74 52.72	-18.59	34.13	46.00 -	11.87 peak
	Reading Level dBuv 55.97 14 55.97 14 58.76 50 58.70	Reading Correct National Horizontal Control of the National Nation	Reading Correct Measure-Factor ment  dBuV dB/m dBuV/m  35 52.07 -16.84 35.23  14 55.97 -21.83 34.14  74 59.97 -22.14 37.83  14 58.76 -21.34 37.42  50 58.70 -20.81 37.89	Reading Correct Measure- Level Factor ment Limit G  dBuV dB/m dBuV/m dBuV/m 35 52.07 -16.84 35.23 40.00 14 55.97 -21.83 34.14 43.50 17 59.97 -22.14 37.83 43.50 18 58.76 -21.34 37.42 43.50



Portable Bluetooth Speaker Model Name: TT810BT EUT: Temperature: 25 ℃ **Relative Humidity:** 55% Test Voltage: DC 5V Ant. Pol. Vertical **Test Mode:** TX GFSK Mode 2402MHz Remark: Only worse case is reported

											(RF)FCC		Radia Margin		4B [
40	hand of the same o	Λ.	and the same	استار مستواره	and the same	2 X	Hotel	**************************************	warehandanda.	6 X	بالرويسوريدا	phrehi	and a special state of	البروسأه	may make the
0		10 !	50 E	50 T	70 1	30		(MHz)		300	400		500 70		1000

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	34.3962	52.22	-16.69	35.53	40.00	-4.47	peak
2	į	86.2001	57.49	-22.92	34.57	40.00	-5.43	peak
3	į	102.0014	60.11	-21.83	38.28	43.50	-5.22	peak
4		128.1127	59.49	-22.24	37.25	43.50	-6.25	peak
5		191.7450	55.73	-20.81	34.92	43.50	-8.58	peak
6		360.4476	47.81	-14.55	33.26	46.00	-12.74	peak

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



Page: 23 of 80

EUT:			Port	table E	Bluetoo	th Speaker	Mo	del Nam	e :	TT8	10BT
Гетр	eratur	e:	25	$^{\circ}$		111	Rel	ative Hu	ımidity	<b>y</b> : 55%	ó
Test V	/oltage	e:	DC	5V			W N		1	M. J.	
Ant. F	Pol.		Hor	izontal					Rin		
Test N	/lode:		TX	π <b>/4-</b> [	QPSK	Mode 240	2MHz			10	M. Free
Rema	rk:		Only	y wors	e case	is reported	( D				
90.0	dBuV/m										
40 	1 X D 40	50		70 80	2 XX+4,144,144,144,144,144,144,144,144,144,1	3 4	55 *	(R	6 ×	Margin -6	dB
No	. Mk.	Fre	-u		ading vel	Correct Factor	Measur	1.0	nit	Over	
- 110.	. IVIIC.	MH			BuV		dBuV/n		uV/m	dB	Detecto
1	!	34.63			.57	dB/m -16.84	34.73		0.00	-5.27	
											peak
2		102.0			5.47	-21.83	34.64		3.50	-8.86	peak
3	*	139.8	505		.98	-21.99	38.99	9 43	3.50	-4.51	peak
4	ļ	191.7	450	58	3.70	-20.81	37.89	9 43	3.50	-5.61	peak
		239.9	074	52	.72	-18.59	34.13	3 46	6.00	-11.87	peak
5		200.0	8/4	02	1 2						



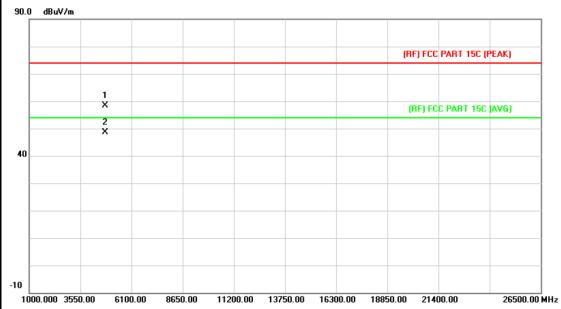
Page: 24 of 80

C 5 °C C 5V ertical X π/4-DQPSK Mode 2 nly worse case is repor		55%
ertical X π/4-DQPSK Mode 2		
X π/4-DQPSK Mode 2		
nly worse case is repor	ted	
	(RF)FCC 15C 3	Margin -6 dB
70 80 (MHz	300 400 500	600 700 1000.000
•	1.1.14	Over
dBuV dB/m	dBuV/m dBuV/m	dB Detecto
2 51.22 -16.6	9 34.53 40.00	-5.47 peak
14 61.11 -21.8	3 39.28 43.50	-4.22 peak
26 60.99 -22.2	4 38.75 43.50	-4.75 peak
		-5.21 peak
		-8.58 peak
		-11.24 peak
	Reading Corre Level Factor  dBuV dB/m  2 51.22 -16.60  14 61.11 -21.80  26 60.99 -22.20  34 59.21 -20.90  50 55.73 -20.80	Reading Correct Measure- Level Factor ment Limit dBuV dB/m dBuV/m dBuV/m 2 51.22 -16.69 34.53 40.00 14 61.11 -21.83 39.28 43.50 26 60.99 -22.24 38.75 43.50 26 60.99 -22.24 38.75 43.50 36 59.21 -20.92 38.29 43.50 37 49.31 -14.55 34.76 46.00



Page: 25 of 80

EUT:	Portable Bluetooth Speaker	Model Name :	TT810BT						
Temperature:	<b>25</b> ℃	25 ℃ Relative Humidity: 55%							
Test Voltage:	DC 3.7V	C 3.7V							
Ant. Pol.	Horizontal	Horizontal							
Test Mode:	TX GFSK Mode 2402MHz	TX GFSK Mode 2402MHz							
Remark:	No report for the emission which prescribed limit.	ch more than 10 dB belo	w the						
00.0 40.44									

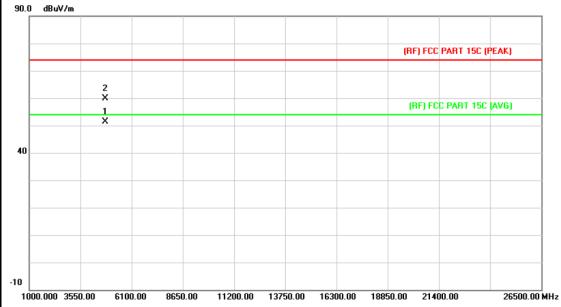


N	o. Mk	. Freq.	_	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.460	44.96	13.44	58.40	74.00	-15.60	peak
2	*	4803.838	35.27	13.44	48.71	54.00	-5.29	AVG



Page: 26 of 80

EUT:	Portable Bluetooth Speaker	ooth Speaker Model Name :			
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	DC 3.7V				
Ant. Pol.	Vertical	THE RESERVE			
Test Mode:	TX GFSK Mode 2402MHz		CHI.		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.				
90.0 dP-3//m					

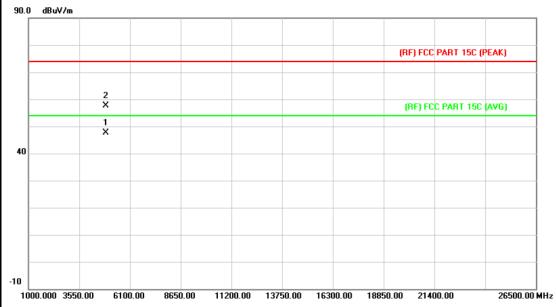


No	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4804.003	37.90	13.44	51.34	54.00	-2.66	AVG
2		4804.183	46.40	13.44	59.84	74.00	-14.16	peak



Page: 27 of 80

EUT:	Portable Bluetooth Speaker	Model Name :	TT810BT				
Temperature:	<b>25</b> ℃	Relative Humidity: 5					
Test Voltage:	DC 3.7V	DC 3.7V					
Ant. Pol.	Horizontal	TO VILLE					
Test Mode:	TX GFSK Mode 2441MHz		DIO.				
Remark:	ark: No report for the emission which more than 10 dB below the prescribed limit.						
00.0 10.111							

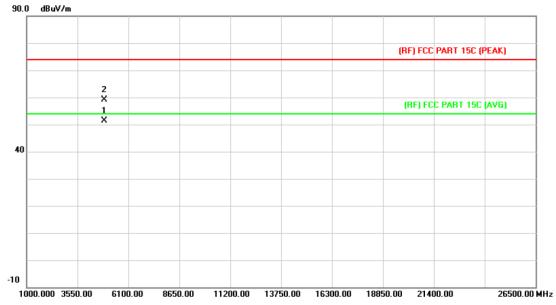


N	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4882.201	33.64	13.90	47.54	54.00	-6.46	AVG
2		4883.377	43.67	13.92	57.59	74.00	-16.41	peak



Page: 28 of 80

EUT:	Portable Bluetooth Speaker	Model Name :	TT810BT		
Temperature:	<b>25</b> ℃	Relative Humidity:			
Test Voltage:	DC 3.7V				
Ant. Pol.	Vertical				
Test Mode:	TX GFSK Mode 2441MHz		DATE:		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.				

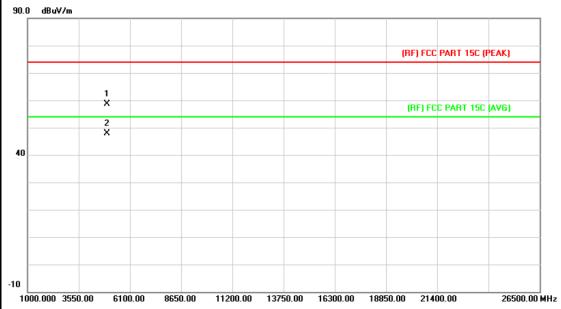


N	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4881.808	37.56	13.90	51.46	54.00	-2.54	AVG
2		4883.413	45.12	13.92	59.04	74.00	-14.96	peak



Page: 29 of 80

EUT:	Portable Bluetooth Speaker	Model Name :	TT810BT				
Temperature:	<b>25</b> ℃	Relative Humidity: 55%					
Test Voltage:	DC 3.7V	DC 3.7V					
Ant. Pol.	Horizontal	THE RESERVE					
Test Mode:	TX GFSK Mode 2480MHz	20137	C. C.				
Remark:	No report for the emission which	No report for the emission which more than 10 dB below the					
	prescribed limit.	prescribed limit.					
00.0 40.377-							

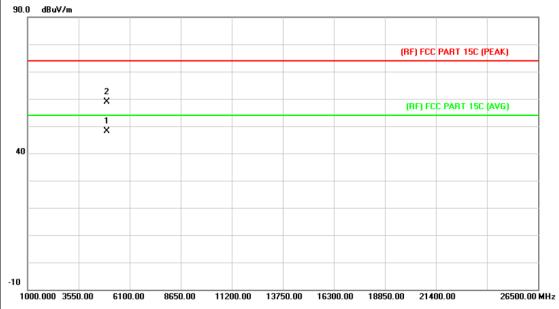


No	. Mk	Freq.	_		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4960.786	44.24	14.36	58.60	74.00	-15.40	peak
2	*	4961.167	33.62	14.38	48.00	54.00	-6.00	AVG



Page: 30 of 80

EUT:	Portable Bluetooth Speaker	oth Speaker Model Name :			
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	DC 3.7V				
Ant. Pol.	Vertical	THE RESERVE			
Test Mode:	TX GFSK Mode 2480MHz		CHI.		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.				
90.0 dP.3(/m					

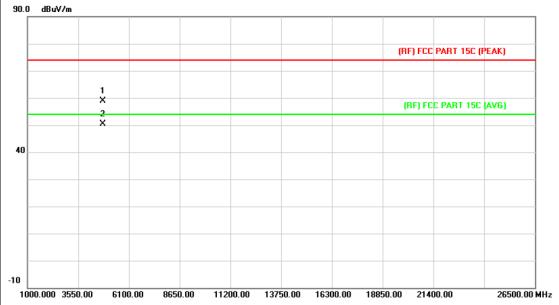


N	o. Mł	c. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4959.778	33.74	14.36	48.10	54.00	-5.90	AVG
2		4960.016	44.50	14.36	58.86	74.00	-15.14	peak



Page: 31 of 80

EUT:	Portable Bluetooth Speaker	ole Bluetooth Speaker Model Name : T				
Temperature:	25 ℃	Relative Humidity: 55%				
Test Voltage:	DC 3.7V	TO B				
Ant. Pol.	Horizontal	Horizontal				
Test Mode:	TX π /4-DQPSK Mode 2402MHz		DITT.			
Remark:	No report for the emission which more than 10 dB below the prescribed limit.					
20.0 10.111		·				

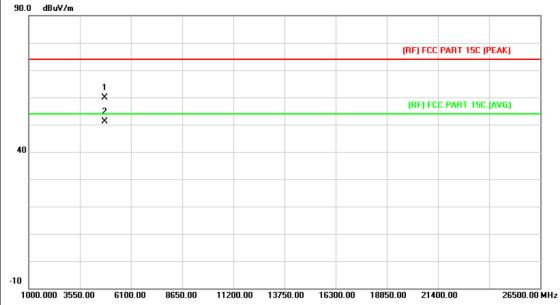


No	o. Mk	. Freq.			Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.715	45.45	13.44	58.89	74.00	-15.11	peak
2	*	4803.943	36.88	13.44	50.32	54.00	-3.68	AVG



Page: 32 of 80

EUT:	Portable Bluetooth Speaker	uetooth Speaker Model Name :					
Temperature:	25 ℃	Relative Humidity:					
Test Voltage:	DC 3.7V	DC 3.7V					
Ant. Pol.	Vertical						
Test Mode:	TX π /4-DQPSK Mode 2402MHz	10:30	LIII.				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						
00.0 40-3/4-							

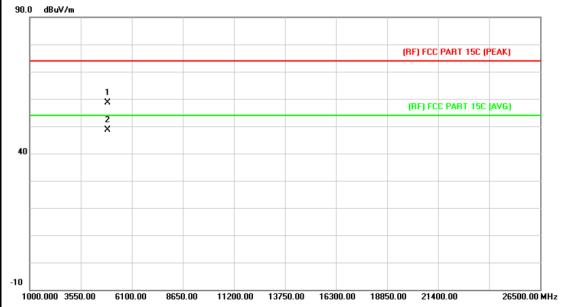


No	. Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.666	46.40	13.44	59.84	74.00	-14.16	peak
2	*	4803.886	37.81	13.44	51.25	54.00	-2.75	AVG



Page: 33 of 80

EUT:	Portable Bluetooth Speaker	Model Name :	TT810BT				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 3.7V	DC 3.7V					
Ant. Pol.	Horizontal	Horizontal					
Test Mode:	TX π /4-DQPSK Mode 2441MHz	10.33	DITTE				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						
00.0 10.41							

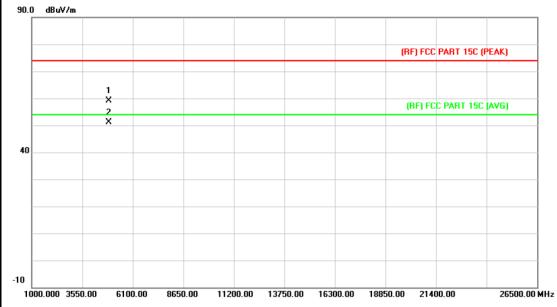


No	. Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4881.849	44.71	13.90	58.61	74.00	-15.39	peak
2	*	4881.849	34.72	13.90	48.62	54.00	-5.38	AVG



Page: 34 of 80

EUT:	Portable Bluetooth Speaker	Model Name :	TT810BT		
Temperature:	<b>25</b> ℃	55%			
Test Voltage:	DC 3.7V				
Ant. Pol.	Vertical				
Test Mode:	TX π /4-DQPSK Mode 2441MHz				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.				

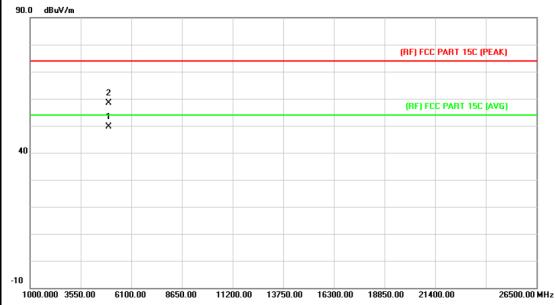


No	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4881.903	45.22	13.90	59.12	74.00	-14.88	peak
2	*	4882.207	37.16	13.90	51.06	54.00	-2.94	AVG



Page: 35 of 80

EUT:	Portable Bluetooth Speaker	Model Name :	TT810BT			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V					
Ant. Pol.	Horizontal					
Test Mode:	TX π /4-DQPSK Mode 2480MHz	10:30	LIII.			
Remark:	No report for the emission which more than 10 dB below the prescribed limit.					

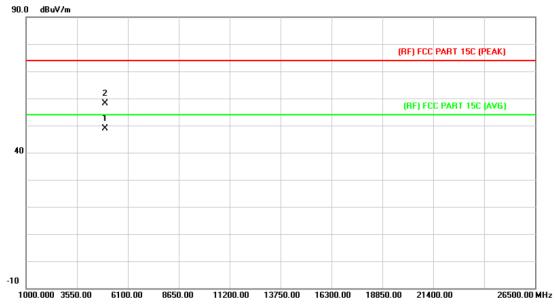


No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4959.573	35.32	14.36	49.68	54.00	-4.32	AVG
2		4959.593	43.98	14.36	58.34	74.00	-15.66	peak



Page: 36 of 80

EUT:	Portable Bluetooth Speaker	Model Name :	TT810BT			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V	DC 3.7V				
Ant. Pol.	Vertical	Vertical				
Test Mode:	TX π /4-DQPSK Mode 2480MHz		D.M.			
Remark:	No report for the emission which more than 10 dB below the prescribed limit.					



N	o. M	lk. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4959.678	34.52	14.36	48.88	54.00	-5.12	AVG
2		4959.942	43.85	14.36	58.21	74.00	-15.79	peak



37 of 80 Page:

# 6. Restricted Bands Requirement

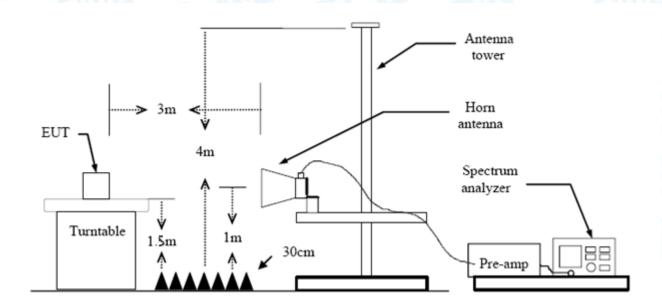
### 6.1 Test Standard and Limit

6.1.1 Test Standard FCC Part 15.209 FCC Part 15.205

6.1.2 Test Limit

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

# 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.



Report No.: TB-FCC147601 Page: 38 of 80

(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.

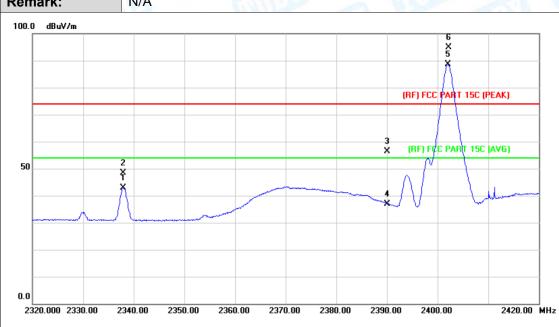
All restriction bands have been tested, only the worst case is reported.



Page: 39 of 80

# (1) Radiation Test

EUT:	Portable Bluetooth Speaker	Model Name :	TT810BT
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		CIULIA DE
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	N/A	A III	1



No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2337.900	47.91	0.55	48.46	74.00	-25.54	peak
2		2337.900	42.32	0.55	42.87	54.00	-11.13	AVG
3		2390.000	55.50	0.77	56.27	74.00	-17.73	peak
4		2390.000	36.14	0.77	36.91	54.00	-17.09	AVG
5	*	2402.100	87.87	0.82	88.69	Fundamental	Frequency	AVG
6	X	2402.200	94.02	0.82	94.84	Fundamental	Frequency	peak



Page: 40 of 80

EUT:	Portak	Portable Bluetooth Spea		Mode	el Name :	TT	810BT
Temperature:	25 ℃		13	Relat	ive Humidity	<b>/</b> : 55°	%
Test Voltage:	DC 3.	7V		VI P		19	
Ant. Pol.	Vertica	Vertical					
Test Mode:	Mode: TX GFSK Mode 2402MHz						صفال
Remark: N/A						. (	
50	1 X 2				(RF) FCC PART 1	5C (PEAK)	
2316.900 2326.90	2336.90	2346.90 2356 Reading	2366.90 Correct	2376.90 238 Measure-	6.90 2396.90		6.90 MHz
No. Mk. F	req.	Level	Factor	ment	Limit (	Over	
	MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detecto
1 233	7.800	45.59	0.55	46.14	74.00 -	-27.86	peak
2 233	8.100	37.13	0.56	37.69	54.00 -	16.31	AVG
3 239	0.000	49.17	0.77	49.94	74.00 -	-24.06	peak
4 239	0.000	33.20	0.77	33.97	54.00 -	-20.03	AVG

0.82

90.15

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

89.33

2402.200

Χ

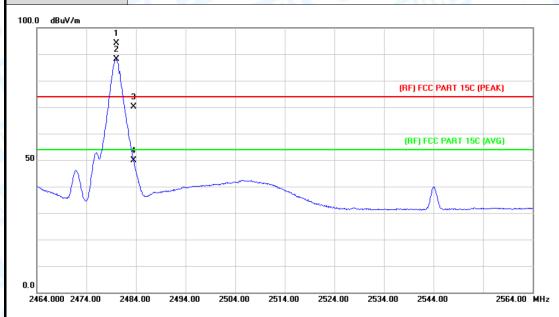
peak

**Fundamental Frequency** 



Page: 41 of 80

EUT:	Portable Bluetooth Speaker	Model Name :	TT810BT
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2480 MHz		CHILL
Remark:	N/A		

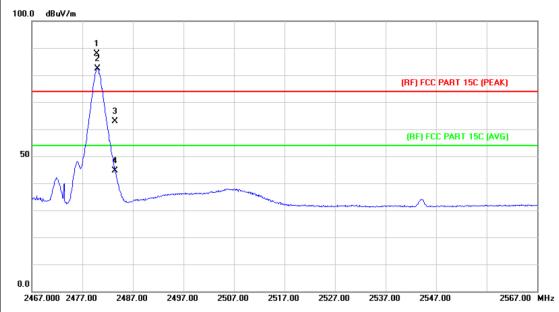


1	No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
			MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		X	2480.000	93.08	1.15	94.23	Fundamental	Frequency	peak
2		*	2480.000	86.96	1.15	88.11	Fundamental	Frequency	AVG
3			2483.500	69.01	1.17	70.18	74.00	-3.82	peak
4			2483.500	48.64	1.17	49.81	54.00	-4.19	AVG



Page: 42 of 80

EUT:	Portable Bluetooth Speaker	Model Name :	TT810BT
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2480 MHz	W.37	THURSDAY
Remark:	N/A		6

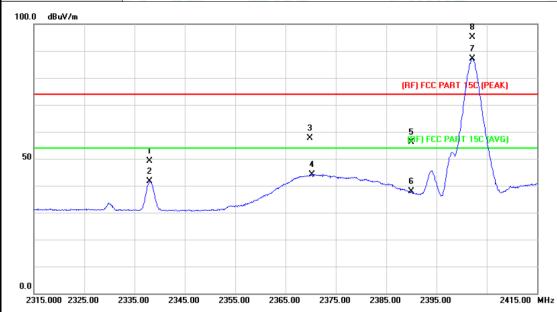


-	No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
			MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		X	2479.800	86.83	1.15	87.98	Fundamental F	requency	peak
2		*	2480.000	81.32	1.15	82.47	Fundamental F	requency	AVG
3			2483.500	61.73	1.17	62.90	74.00	-11.10	peak
4			2483.500	43.52	1.17	44.69	54.00	-9.31	AVG



Page: 43 of 80

EUT:	Portable Bluetooth Speaker	Model Name :	TT810BT
Temperature:	<b>25</b> ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX π /4-DQPSK Mode 2402MHz	11.37	
Remark:	N/A		

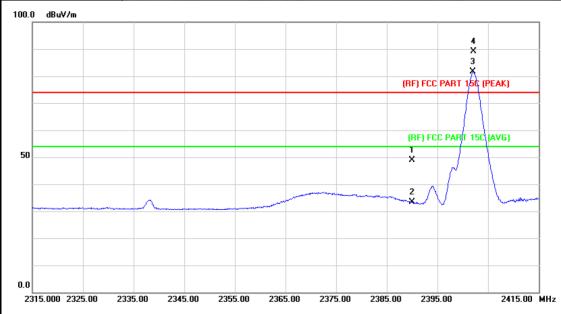


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2338.000	48.62	0.55	49.17	74.00	-24.83	peak
2		2338.000	40.99	0.55	41.54	54.00	-12.46	AVG
3		2369.800	56.85	0.68	57.53	74.00	-16.47	peak
4		2370.300	43.48	0.69	44.17	54.00	-9.83	AVG
5		2390.000	55.33	0.77	56.10	74.00	-17.90	peak
6		2390.000	37.03	0.77	37.80	54.00	-16.20	AVG
7	*	2402.100	86.42	0.82	87.24	Fundamental	Frequency	AVG
8	Χ	2402.200	94.28	0.82	95.10	Fundamental	Frequency	peak



Page: 44 of 80

EUT:	Portable Bluetooth Speaker	Model Name :	TT810BT
Temperature:	<b>25</b> ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX π /4-DQPSK Mode 2402MF	łz	CHILL
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	48.07	0.77	48.84	74.00	-25.16	peak
2		2390.000	32.62	0.77	33.39	54.00	-20.61	AVG
3	*	2402.000	80.80	0.82	81.62	Fundamental	Frequency	AVG
4	Χ	2402.200	88.22	0.82	89.04	Fundamental	Frequency	peak



4

Report No.: TB-FCC147601

45 of 80 Page:

EUT:			Portable Bluetooth Speaker Model Name :		•	TT810	ВТ						
Temp	eratur	e:	25 ℃ Re			Rela	Relative Humidity: 5			55%			
Test \	Voltage	<b>)</b> :	DC 3	3.7V			6	A			1.33		
Ant. F	Pol.		Horiz	zontal						a W			1
Test I	Mode:		ТΧ π	/4-DQP	SK N	Node 24	80M	Hz		23	- V	MIL	
Rema	ark:		N/A	All			a	V	1		F. W.		. 65
100.0	dBuV/m												
50	✓	2 × 1	×						- Agenty of the garmany		PART 15C (PI		
0.0 2464	.000 2474	.00 2	484.00	2494.00	2504	.00 251	4.00	2524	.00 25	34.00 2544	1.00	2564.00	MHz
No	o. Mk.	Fre	eq.	Read Leve		Corre			asure- ent	Limit	Over	, ,	
		M	Hz	dBu\	/	dB/m		dB	uV/m	dBuV/m	n dB	Dete	ector
1	*	2480	.000	85.5	3	1.15		86	6.68	Fundamen	tal Frequen	cy A'	VG
2	X	2480.	.100	93.3	3	1.15		94	1.48	Fundamen	tal Frequen	<sub>cy</sub> pe	eak
3		2483.	.500	68.5	7	1.17		69	9.74	74.00	-4.20	6 pe	eak

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

49.10

1.17

50.27

2483.500

AVG

-3.73

54.00



Page: 46 of 80

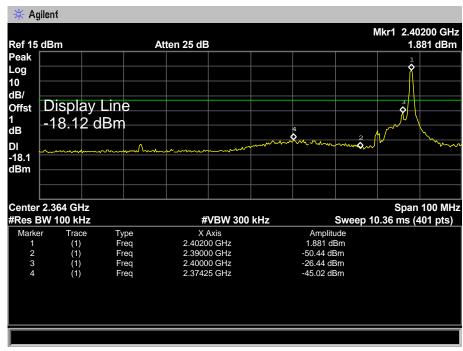
EU	Γ:		Porta	able Bluetoc	th Speaker	Mod	el Name :		810BT
Ten	peratu	re:	25 °C		33	Rela	tive Humidity	<b>y</b> : 55	%
Tes	t Voltag	je:	DC 3	3.7V				19	
Ant	. Pol.		Verti	cal	CHIT!		3 Killing		177
Tes	t Mode:		ТХπ	/4-DQPSK	Mode 2480N	lHz		M	11.00
Ren	nark:		N/A	Alle		Charles and the same of the sa		1	6
100.	D dBuV/m								
50		1 X 2 X X X X X X X X X X X X X X X X X					(RF) FCC PART		
	167.000 247	77.00 2	487.00		07.00 2517.00		537.00 2547.00		567.00 MHz
Ν	lo. Mk	. Fre	eq.	Reading Level	Correct Factor	Measure- ment		Over	
		MH	łz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	X	2479.	800	87.00	1.15	88.15	Fundamental Fr	equency	peak
2	*	2480.	000	79.82	1.15	80.97	Fundamental Fr	equency	AVG
_									
3		2483.	500	55.92	1.17	57.09	74.00	-16.91	peak

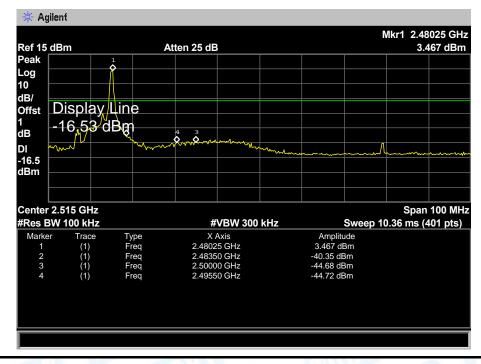




(2) Conducted Test

EUT:	Portable Bluetooth Speaker	Model Name :	TT810BT			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V					
Test Mode:	TX GFSK Mode 2402MHz / 2480 MHz					
Remark:	N/A					







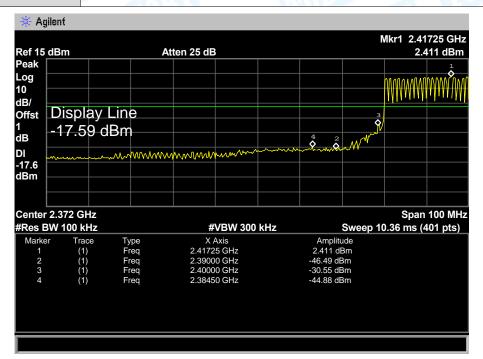
EUT: Portable Bluetooth Speaker Model Name: TT810BT

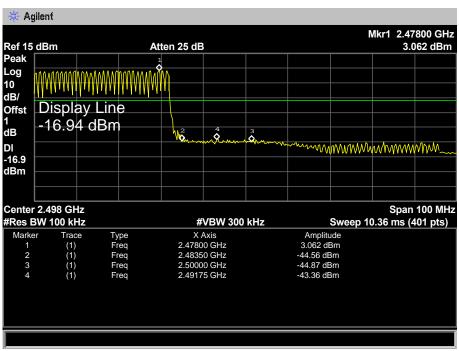
Temperature: 25 ℃ Relative Humidity: 55%

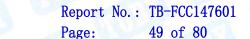
Test Voltage: DC 3.7V

Test Mode: GFSK Hopping Mode

Remark: N/A

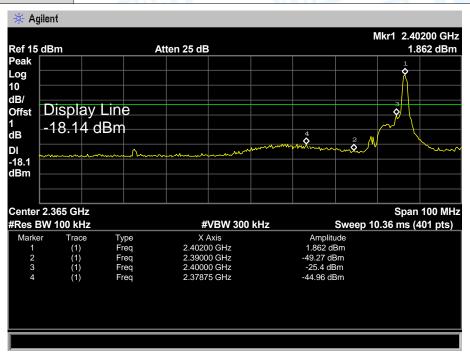


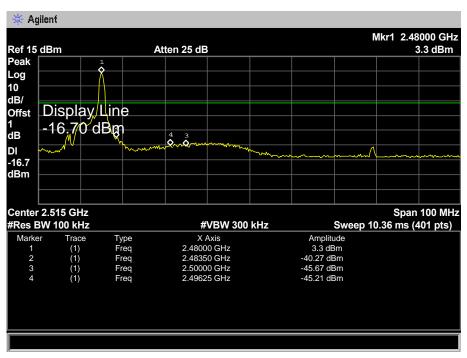






EUT:Portable Bluetooth SpeakerModel Name:TT810BTTemperature:25 °CRelative Humidity:55%Test Voltage:DC 3.7VTest Mode:TX π /4-DQPSK Mode 2402MHz / 2480 MHzRemark:N/A







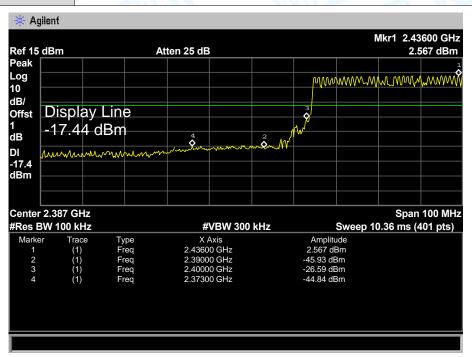
 EUT:
 Portable Bluetooth Speaker
 Model Name:
 TT810BT

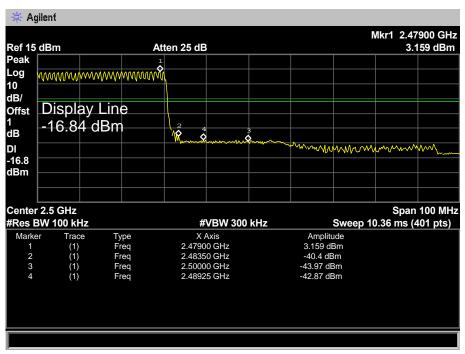
 Temperature:
 25 °C
 Relative Humidity:
 55%

 Test Voltage:
 DC 3.7V

 Test Mode:
 π /4-DQPSK Hopping Mode

 Remark:
 N/A







Page: 51 of 80

# 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.

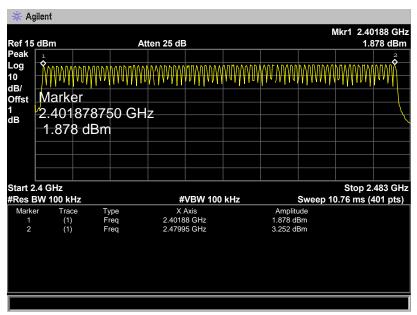
# 7.5 Test Data



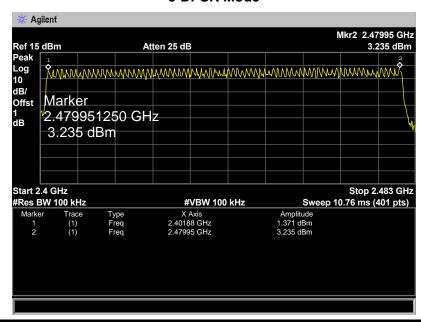
EUT:	Portable Bluetooth Speaker	Model Name :	TT810BT					
Temperature:	<b>25</b> ℃	Relative Humidity:	55%					
Test Voltage:	DC 3.7V	DC 3.7V						
Test Mode:	Hopping Mode (GFSK/ π /4-DQPSK)							

Frequency Range	Quantity of Hopping Channel	Limit	
240211117 240011117	79	<b>\1</b> E	
2402MHz~2480MHz	79	>15	

#### **GFSK Mode**



#### 8-DPSK Mode





Page: 53 of 80

# 8. Average Time of Occupancy

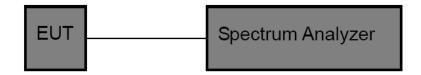
### 8.1 Test Standard and Limit

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	0.4.000
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.

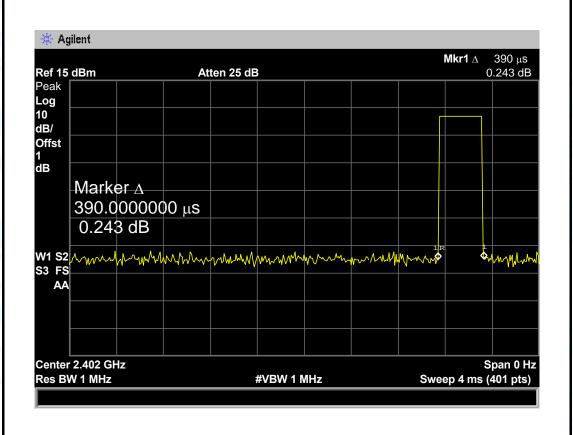


Page: 54 of 80

# 8.5 Test Data

EUT:	UT: Portable Bluetooth Speaker Model Name :		TT810BT		
Temperature	<b>25</b> ℃		Relative Hum	55%	
Test Voltage:	Test Voltage: DC 3.7V			100	
Test Mode:	Hopping M	ode (GFSK DH1)	CHILL ST		1 Hills
Channel	Pulse Time	Total of Dwell	Period Time	Limit	Result
(MHz)	(ms)	(ms)	(s)	(ms)	Result
2402	0.390	124.80		400	
2441	0.390	124.80	31.60		PASS
2480	0.390	124.80			

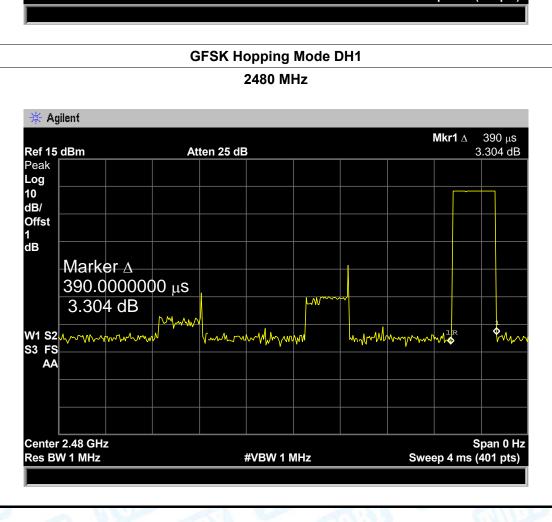
# **GFSK Hopping Mode DH1**







**GFSK Hopping Mode DH1** 2441 MHz Agilent Mkr1  $\Delta$ 390 μs -0.828 dB Ref 15 dBm Atten 25 dB Peak Log 10 dB/ Offst 1 dB Marker ∆ 390.000000 μs -0.828 dB andy My My My My W1 S2 MM Murymyn S3 FS AA Center 2.441 GHz Span 0 Hz Res BW 1 MHz #VBW 1 MHz Sweep 4 ms (401 pts) **GFSK Hopping Mode DH1** 2480 MHz \* Agilent Mkr1 A 390 μs Ref 15 dBm Atten 25 dB 3.304 dB Peak Log

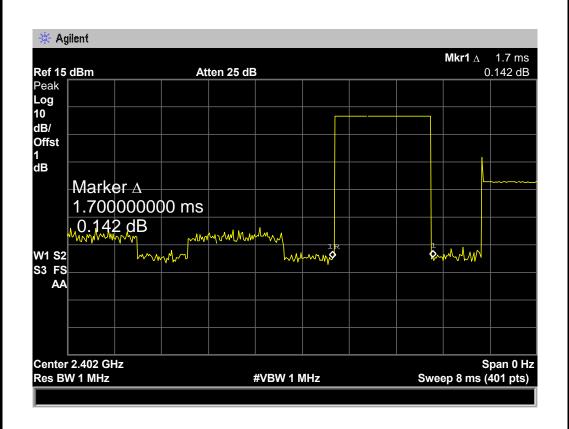




Page: 56 of 80

EUT:	Portable Bl	uetooth Speaker	Model Name	TT810BT		
Temperature:	mperature: 25 ℃ Relative Humidity:		Relative Humid		55%	
Test Voltage:	est Voltage: DC 3.7V			33		
Test Mode:	Hopping M	ode (GFSK DH3)	1	Hill.		
Channel	Pulse Time	Total of Dwell	Period Time	Limit	Result	
(MHz)	(ms)	(ms)	(s)	(ms)	Result	
2402	1.700	272.00		400		
2441	1.700	272.00	31.60		PASS	
2480	1.700	272.00				
		CECK Hanning	Mada DU2		•	

# **GFSK Hopping Mode DH3**







**GFSK Hopping Mode DH3** 2441 MHz 🔆 Agilent Mkr1  $\Delta$  1.7 ms 0.516 dB Ref 15 dBm Atten 25 dB Peak Log 10 dB/ Offst 1 dB Marker ∆ 1.700000000 ms 0.516 dB hyraman ammy hommuno W1 S2 S3 FS AA Span 0 Hz Center 2.441 GHz Res BW 1 MHz #VBW 1 MHz Sweep 8 ms (401 pts) **GFSK Hopping Mode DH3** 2480 MHz

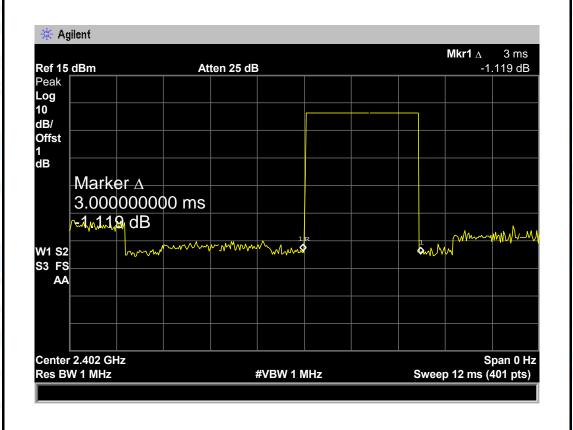
\* Agilent **Mkr1**  $\triangle$  1.7 ms Ref 15 dBm Atten 25 dB -2.601 dB Peak Log 10 dB/ Offst 1 dB Marker A 1.700000000 ms -2.601 dB W1 S2 S3 FS &mornow work MMM/MM mm AΑ Center 2.48 GHz Span 0 Hz Res BW 1 MHz #VBW 1 MHz Sweep 8 ms (401 pts)

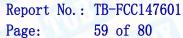


Page: 58 of 80

EUT:	Portable Bl	Portable Bluetooth Speaker		Model Name :				
Temperature	Temperature: 25 ℃		Relative Humidity:		55%			
Test Voltage:	DC 3.7V	The same of	VI V	-	13.9			
Test Mode:	Hopping M	ode (GFSK DH5)		H.D.				
Channel	Pulse Time	Total of Dwell	Period Time	Limit	Result			
(MHz)	(ms)	(ms)	(s)	(ms)	Result			
2402	3.000	320.00		400				
2441	3.000	320.00	31.60		PASS			
2480	3.000	320.00						
	GESK Hopping Mode DH5							

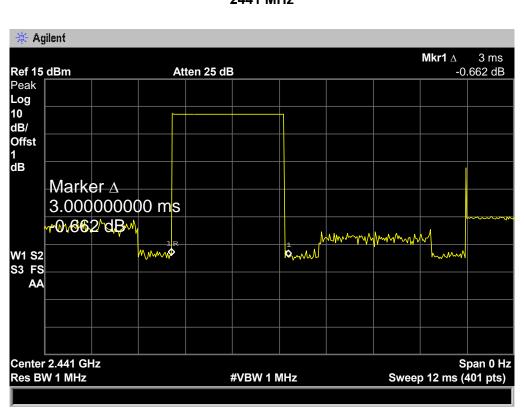
### **GFSK Hopping Mode DH5**



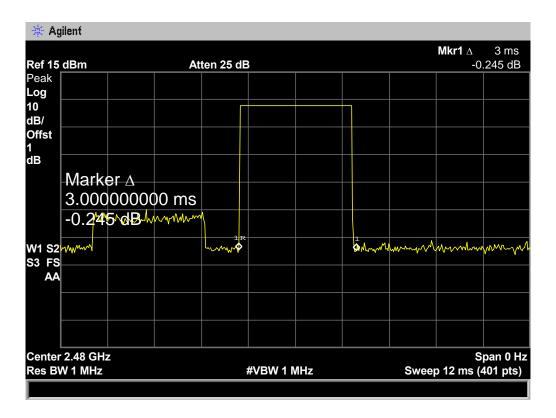




GFSK Hopping Mode DH5
2441 MHz



# GFSK Hopping Mode DH5

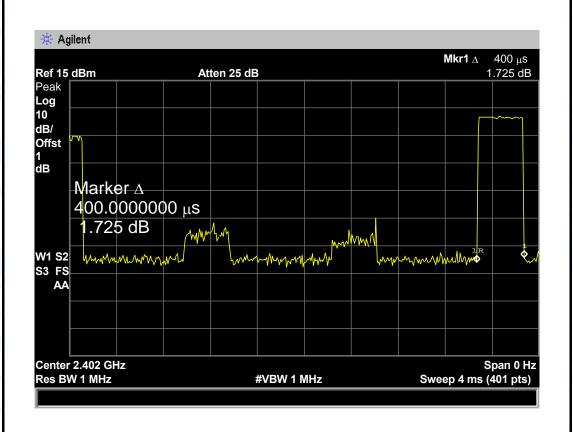


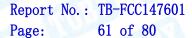


Page: 60 of 80

EUT:	Portable Bl	luetooth Speaker	Model Name	TT810BT				
Temperature:	nperature: 25 °C Relative Humidity:			55%				
Test Voltage:	Test Voltage: DC 3.7V			18.9				
Test Mode: Hopping Mode (π/4-DQPSK DH1)			All In					
Channel	Pulse Time	Total of Dwell	Period Time	Limit	Decuit			
(MHz)	(ms)	(ms)	(s)	(ms)	Result			
2402	0.400	128.00		400				
2441	0.400	128.00	31.60		PASS			
2480	0.400	128.00	7					
	T /A DORSK Hanning Made DH1							

# π /4-DQPSK Hopping Mode DH1

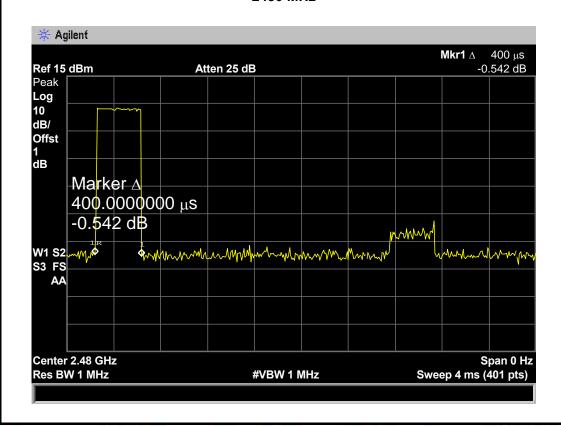






π/4-DQPSK Hopping Mode DH1 2441 MHz \* Agilent Mkr1  $\Delta$  400  $\mu$ s -0.774 dB Ref 15 dBm Atten 25 dB Peak Log 10 dB/ Offst 1 dB LW Marker ∆ 400.000000 μs -0.774 dB Mundhalman MMyymmhms W1 S2 4 1 S3 FS AA Span 0 Hz Center 2.441 GHz Res BW 1 MHz Sweep 4 ms (401 pts) #VBW 1 MHz

# π/4-DQPSK Hopping Mode DH1

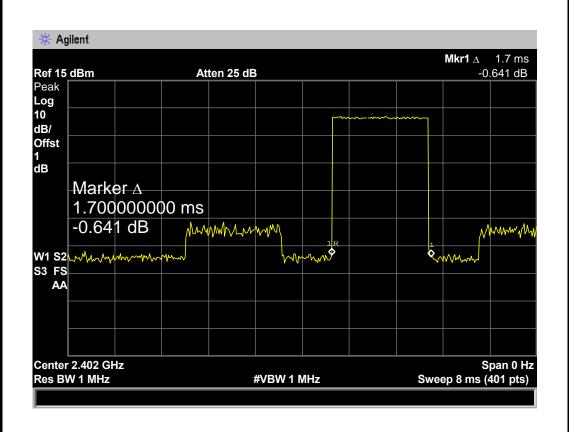


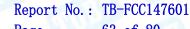


Page: 62 of 80

EUT:	Portable Bl	uetooth Speaker	Model Name :		TT810BT	
Temperature:	: <b>25</b> ℃	25 ℃ Relative Humidity:			55%	
Test Voltage:	ge: DC 3.7V			13.9		
Test Mode: Hopping Mode (π/4-DQPSK DH3)						
Channel	Pulse Time	Total of Dwell	Period Time	Limit	Result	
(MHz)	(ms)	(ms)	(s)	(ms)	Result	
2402	1.700	272.00				
2441	1.700	272.00	31.60	400	PASS	
2480	1.700	272.00				
	_	// DODOK Harras	Mada DUO		1	

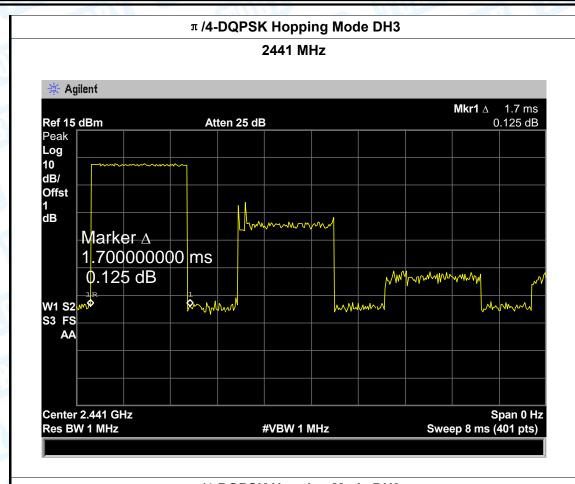
# π /4-DQPSK Hopping Mode DH3



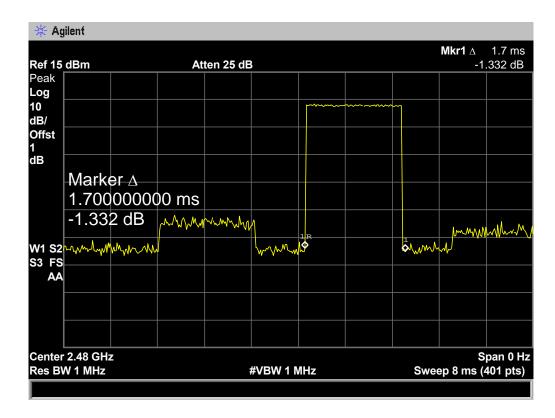




Page: 63 of 80



# π/4-DQPSK Hopping Mode DH3

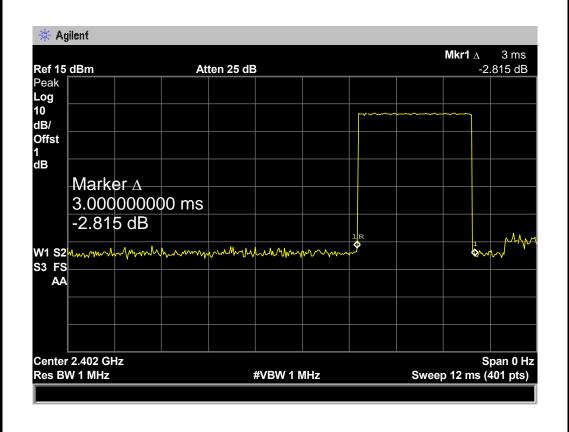




Page: 64 of 80

EUT:	Portable Bl	uetooth Speaker	Model Name :		TT810BT
Temperature	: <b>25</b> ℃	1033	Relative Humidity:		55%
Test Voltage:	DC 3.7V	N. S. C.	VI V	-	33
Test Mode:	Hopping M	ode (π/4-DQPSK	DH5)	H.D.	
Channel	Pulse Time	Total of Dwell	Period Time	Limit	Result
(MHz)	(ms)	(ms)	(s)	(ms)	Result
2402	3.000	320.00			
2441	3.000	320.00	31.60	400	PASS
2480	3.000	320.00			
π /4-DOPSK Honning Mode DH5					

# $\pi$ /4-DQPSK Hopping Mode DH5







190,4178hdB

W1 S2 S3 FS AA

Center 2.48 GHz Res BW 1 MHz

 $\pi$  /4-DQPSK Hopping Mode DH5 2441 MHz 🔆 Agilent Mkr1  $\Delta$ 3 ms -0.347 dB Ref 15 dBm Atten 25 dB Peak Log 10 dB/ Offst 1 dB Marker A 3.000000000 ms ~0**\B**4#7~dB\\~ \$nhy Myyy 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 0.478 dB Ref 15 dBm Atten 25 dB Peak Log 10 dB/ Offst 1 dB Marker ∆ 3.000000000 ms

R.M.

#VBW 1 MHz

myshing

Sweep 12 ms (401 pts)

Span 0 Hz



Report No.: TB-FCC147601 Page: 66 of 80

# 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.

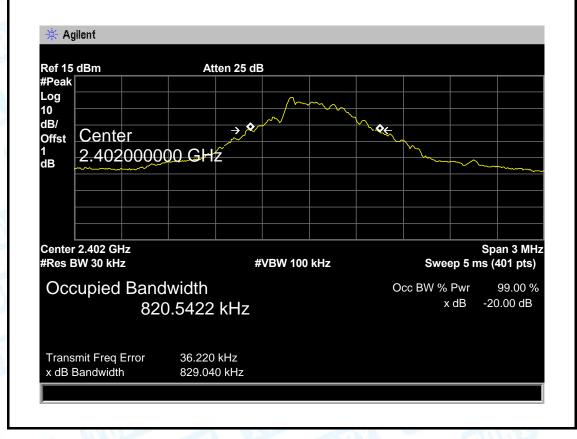


Page: 67 of 80

# 9.5 Test Data

EUT:	Portable Bluetooth Speaker	Model Name :	TT810BT
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	TX Mode (GFSK)		2 Million
Channel freque (MHz)	ncy 99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3
		· · ·	(kHz)
2402	820.5422	829.040	(kHz)
2402 2441	820.5422 822.1480	829.040 834.283	(kHz)

#### **GFSK TX Mode**







GFSK TX Mode

2441 MHz

Ref 15 dBm Atten 25 dB
#Peak
Log
10
dB/
Offst
1
dB

Center
2.441000000 GHz

Center 2.441 GHz #Res BW 30 kHz Occupied Bandwidth

#VBW 100 kHz

Span 3 MHz Sweep 5 ms (401 pts)

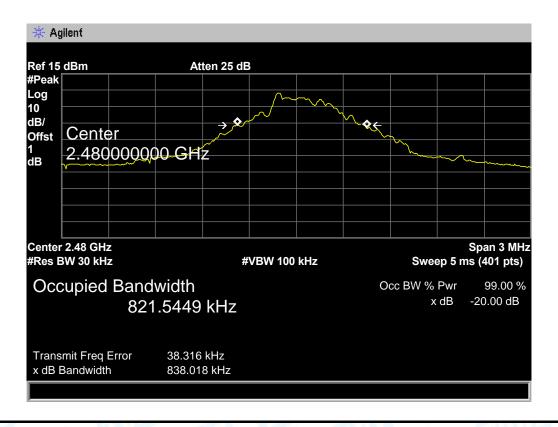
Occ BW % Pwr 99.00 % x dB -20.00 dB

Transmit Freq Error x dB Bandwidth

35.756 kHz 834.283 kHz

822.1480 kHz

### **GFSK TX Mode**

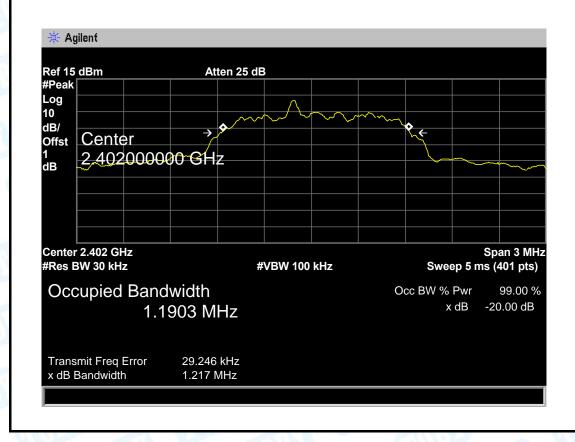




EUT:	Portable Bluetooth Speaker	Model Name :	TT810BT
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V	W Comment	130
Test Mode:	TX Mode (π/4-DQPSK)	A RIV	

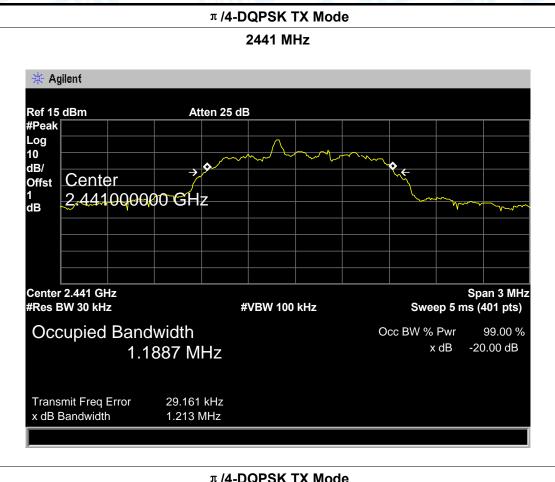
Channel frequency (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	1190.30	1217.00	811.33
2441	1188.70	1213.00	808.67
2480	1190.60	1218.00	812.00

#### π/4-DQPSK TX Mode

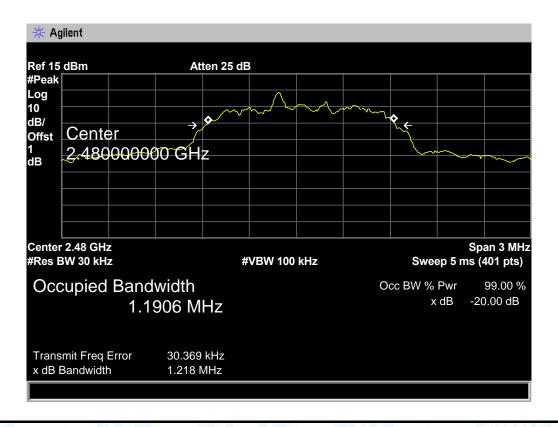








# π/4-DQPSK TX Mode





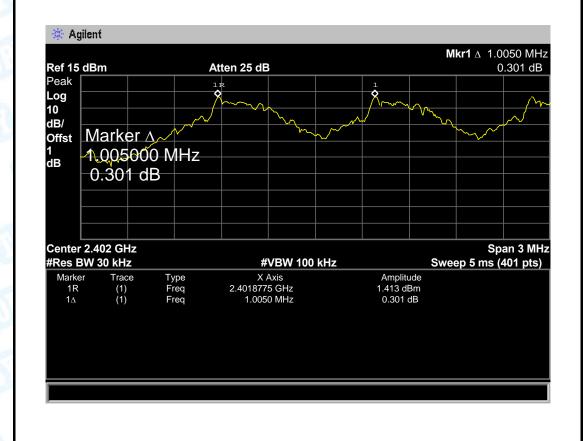
Page: 71 of 80

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

Test Mode: Hopping Mode (GFSK)

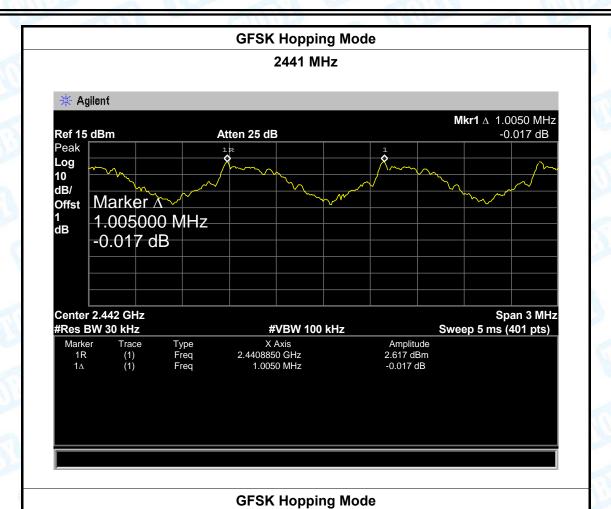
Channel frequency	Separation Read Value	Separation Limit
(MHz)	(kHz)	(kHz)
2402	1005.00	829.040
2441	1005.00	834.283
2480	1005.00	838.018

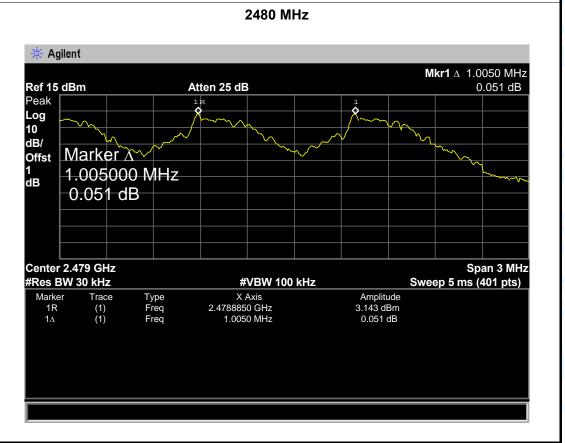
# **GFSK Hopping Mode**













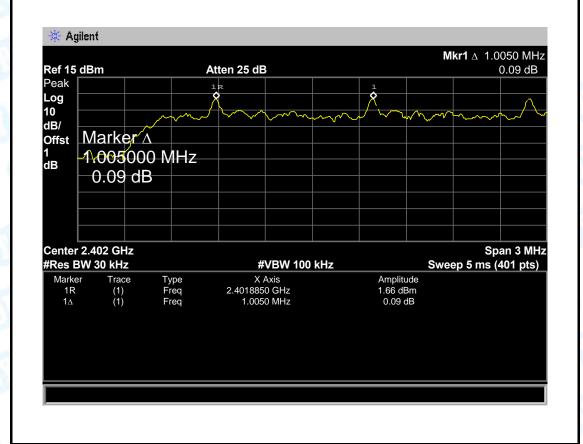
Page: 73 of 80

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

Test Mode: Hopping Mode ( π /4-DQPSK)

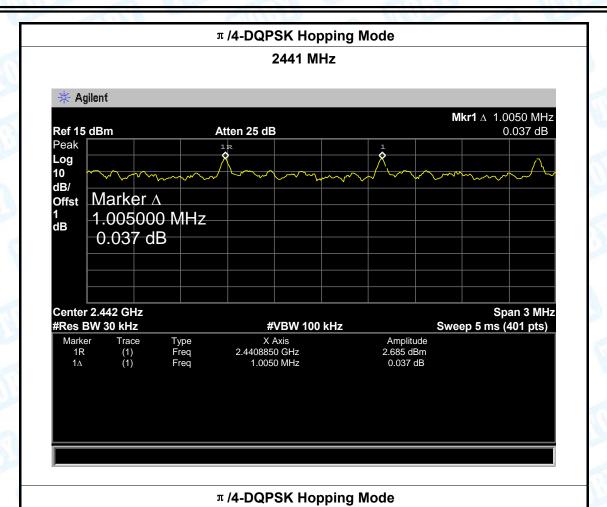
Channel frequency	Separation Read Value	Separation Limit
(MHz)	(kHz)	(kHz)
2402	1005.00	811.33
2441	1005.00	808.67
2480	1005.00	812.00

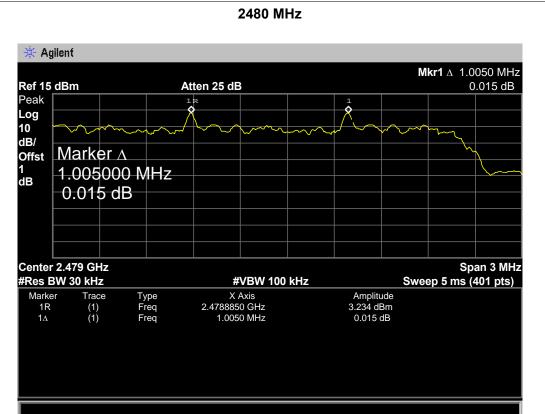
# π /4-DQPSK Hopping Mode













Report No.: TB-FCC147601 Page: 75 of 80

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) Other <125 mW(21dBm)	2400~2483.5

# 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

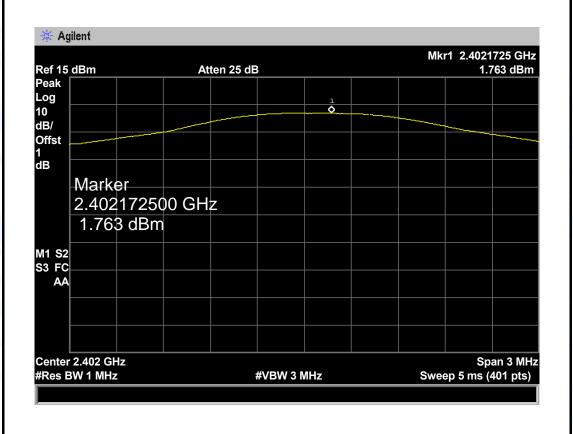
The EUT was set to continuously transmitting in the max power during the test.



Report No.: TB-FCC147601 Page: 76 of 80

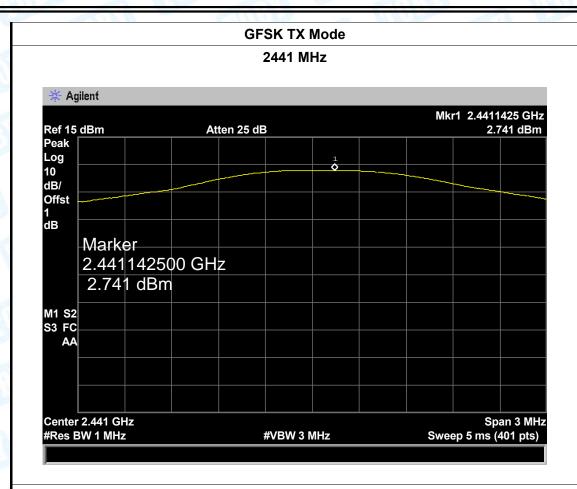
10.5 Test Data

EUT:	Portable Bluetooth Speaker		Model Name :		TT810BT
Temperature:	25 ℃	P.O.	Rela	tive Humidity:	55%
Test Voltage:	DC 3.7V		$W_{i}$		MATTER
Test Mode:	TX Mode	(GFSK)	No.		
Channel frequence	cy (MHz)	Test Result (dBm)		Limit (dBm)	
2402		1.763			
2441		2.741		30	
2480		3.246			
GFSK TX Mode					

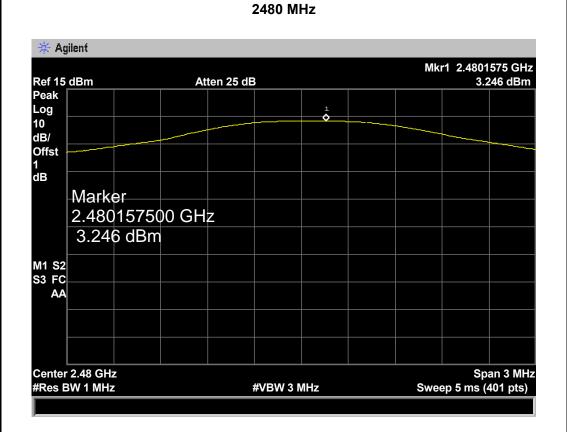










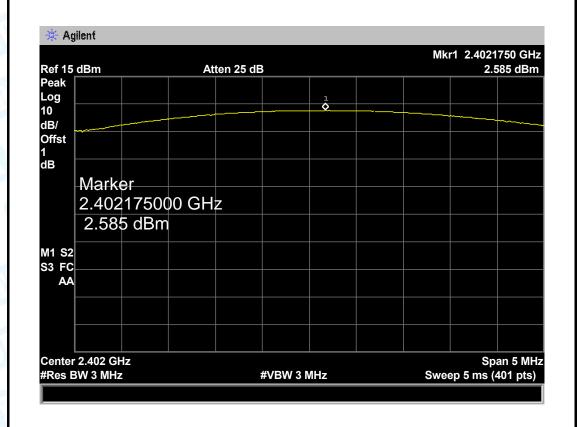


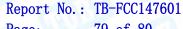


Page: 78 of 80

EUT:	Portable E	Portable Bluetooth Speaker		Name:	TT810BT	
Temperature:	<b>25</b> ℃		Relativ	ve Humidity:	55%	
Test Voltage:	DC 3.7V		18			
Test Mode:	TX Mode	( π /4-DQPSK)		J Killian	1	
Channel frequency (MHz)		Test Result (dBm) Limit		Limit (	(dBm)	
2402		2.585				
2441		3.530		21		
2480		4.041				
		# /4 DODSK TY I	Modo			

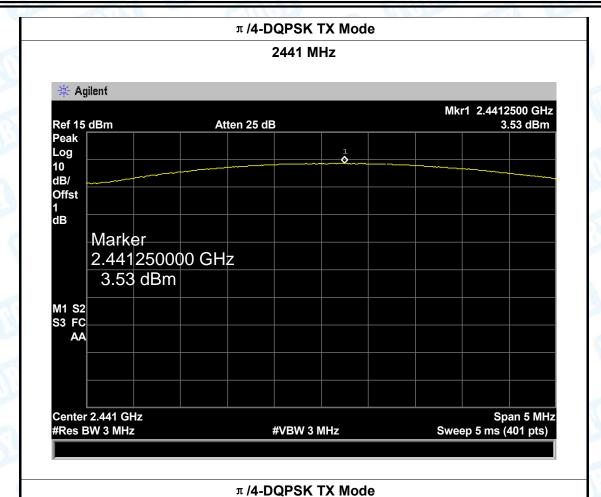
#### π/4-DQPSK TX Mode

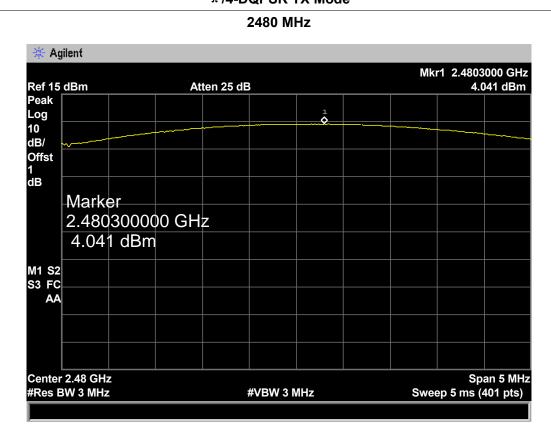






79 of 80 Page:







Page: 80 of 80

# 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 2 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
▼ Permanent attached antenna
□ Unique connector antenna
□ Professional installation antenna