

Shenzhen Toby Technology Co., Ltd.

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FCC Radio Test Report FCC ID: 2AHQJPBX-2100

Original Grant

Report No. TB-FCC147116

SHENZHEN RAYLAM TECHNOLOGY CO., LTD **Applicant**

Equipment Under Test (EUT)

EUT Name Multimedia Speaker with Blue-Tooth

PBX-2100 Model No.

RLBT-29, PBX-2105, PBX-2106, RLBT-33 Series Model No.

Brand Name N/A

Receipt Date 2016-03-10

Test Date 2016-03-11 to 2016-03-17

Issue Date 2016-03-18

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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1. General Information about EUT

1.1 Client Information

Applicant: SHENZHEN RAYLAM TECHNOLOGY CO., LTD

Address : BLDG A,SHANG FANG INDUSTRIAL PARK, XINQIAO XINFA, SHA

JING TOWN, BAO'AN DISTRICT, SHENZHEN, CHINA

Manufacturer : SHENZHEN RAYLAM TECHNOLOGY CO., LTD

Address : BLDG A,SHANG FANG INDUSTRIAL PARK, XINQIAO XINFA, SHA

JING TOWN, BAO'AN DISTRICT, SHENZHEN, CHINA

1.2 General Description of EUT (Equipment Under Test)

EUT Name	(Multimedia Speaker with B	Blue-Tooth	
Models No.	:	PBX-2100, RLBT-29, PBX-2105, PBX-2106, RLBT-33		
Model Difference	:	All these models are identical in the same PCB, layout and electrical circuit, the only difference is model name for commercial.		
100	9	Operation Frequency: Bluetooth 2.1+EDR: 2402~2480MHz		
		Number of Channel:	Bluetooth:79 Channels see Note 3	
Product Description	1	Max Peak Output Power:	Bluetooth: 4.445 dBm(π /4-DQPSK)	
Besonption	45	Antenna Gain:	0dBi PCB Antenna	
		Modulation Type:	GFSK 1Mbps(1 Mbps) π /4-DQPSK(2 Mbps)	
Power Supply	1	DC Voltage supplied from DC power by Li-ion Battery		
Power Rating		Switching Adapter: Input: AC 100~240V, 50/60 Output: DC 9.0V, 1.5A DC 7.4V by 2200mAh Li-io		
Connecting I/O Port(S)	:	Please refer to the User's I	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

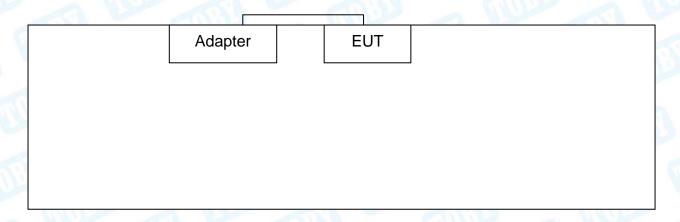


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			70.7		
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
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	MUL	A W
26	2428	53	2455	EII	(19)

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

1.3 Block Diagram Showing the Configuration of System Tested USB Charging with TX Mode





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1.4 Description of Support Units

The EUT has been test as an independent uint.

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	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.



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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 _{Lab})
	Level Accuracy:	
Conducted Emission	9kHz~150kHz	±3.42 dB
100	150kHz to 30MHz	±3.42 dB
Radiated Emission	Level Accuracy:	±4.60 dB
Radiated Effilssion	9kHz to 30 MHz	±4.60 dB
Radiated Emission	Level Accuracy:	.4.40 dB
Radiated Effilssion	30MHz to 1000 MHz	±4.40 dB
Radiated Emission	Level Accuracy:	±4,20 dB
Naulateu Elilission	Above 1000MHz	±4.20 ub



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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.



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2. Test Summary

FCC Part 15 Subpart C(15.247)/ RSS 247 Issue 1					
Standard S	ection				
FCC	IC	Test Item	Judgment	Remark	
15.203		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:828.7615kHz π/4-DQPSK: 1181.30kHz	



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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	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. 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

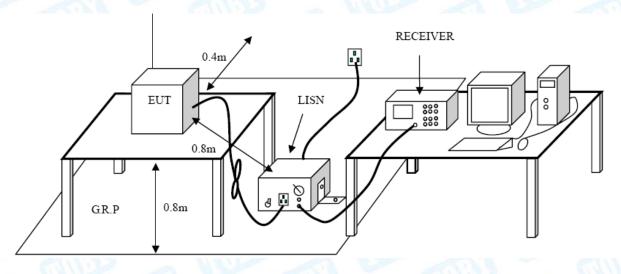
Conducted Emission Test Limit

Eroguenov	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

Test data please refer the following pages.



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EUT:	1 10 1	media Speaker -Tooth	with	Model Nam	e :	PBX-	2100
Temperature:	25 °C	C	F	Relative Hu	midity:	55%	
Test Voltage:	AC 1	20V/60 Hz	CIII)		N. P. H.	VI-	
Terminal:	Line			ATT.	3	_ 6	Miles
Test Mode:	USB	Charging with	TX GFSK	Mode 2402	MHz	80 A	
Remark:	Only	worse case is	reported		OID.		
90.0 dBuV							
-10 0.150	0.5		(MHz)	* * * * * * * * * * * * * * * * * * *		QP: AVG:	peak AVG
No. Mk.	Freq.		Correct Factor	Measure- ment	Limit	O∨er	
	MHz	dBu∨	dB	dBuV	dBu∨	dB	Detector
1	0.4420		10.02	52.62	57.02	-4.40	QP
2 *	0.4420		10.02	43.74	47.02	-3.28	AVG
3	1.3300		10.06	48.92	56.00	-7.08	QP
4	1.3300	29.04	10.06	39.10	46.00	-6.90	AVG
5							OD.
	2.2060	41.01	10.05	51.06	56.00	-4.94	QP
6	2.2060		10.05 10.05	51.06 40.42	56.00 46.00	-4.94 -5.58	AVG
		30.37					
6	2.2060	30.37 39.43	10.05	40.42	46.00	-5.58	AVG
6 7	2.2060 3.0860	30.37 39.43	10.05 10.02	40.42 49.45	46.00 56.00	-5.58 -6.55	AVG QP
6 7 8	2.2060 3.0860 3.0860	30.37 39.43 28.86	10.05 10.02 10.02	40.42 49.45 38.88	46.00 56.00 46.00	-5.58 -6.55 -7.12	AVG QP AVG

12

7.5099

Emission Level= Read Level+ Correct Factor

30.15

10.08

40.23

50.00 -9.77

AVG



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EUT:	Multin Blue-	nedia Speak Tooth	er with	Model Na	ame :	РВХ	-2100
Temperature	: 25 °C	CALL S		Relative	Humidity:	: 55%	
Test Voltage:	AC 12	20V/60 Hz	GIII		dille		
Terminal:	Neutra	al		THE REAL PROPERTY.	3	5	Miles
Test Mode:	USB	Charging wit	th TX GFSK	Mode 2402	MHz	1 6	
Remark:	Only	worse case	is reported		CHIE		
90.0 dBuV							
						QP: AVG:	_
40	www.	Martin Calling			*		peal AVG
-10 0.150	0.5		(MHz)	5			30.000
0.150		Reading Level	Correct	Measure-	Limit	O∨er	30.000
	Freq.	Reading Level			Limit	Over	30.000 Detector
0.150	Freq.	Level	Correct Factor	Measure- ment	dBu∀		

No. Mi	k. Freq.	Reading Le∨el	Correct Factor	Measure- ment	Limit	Over	
	MHz	dBu∀	dB	dBu∨	dBu∨	dB	Detector
1	0.4420	40.44	10.04	50.48	57.02	-6.54	QP
2	0.4420	29.87	10.04	39.91	47.02	-7.11	AVG
3	1.3300	37.54	10.13	47.67	56.00	-8.33	QP
4	1.3300	25.92	10.13	36.05	46.00	-9.95	AVG
5 *	2.2099	40.97	10.06	51.03	56.00	-4.97	QP
6	2.2099	25.74	10.06	35.80	46.00	-10.20	AVG
7	3.1018	40.12	10.06	50.18	56.00	-5.82	QP
8	3.1018	24.52	10.06	34.58	46.00	-11.42	AVG
9	3.9940	38.54	10.06	48.60	56.00	-7.40	QP
10	3.9940	29.29	10.06	39.35	46.00	-6.65	AVG
11	6.6459	42.90	10.06	52.96	60.00	-7.04	QP
12	6.6459	19.71	10.06	29.77	50.00	-20.23	AVG

Emission Level= Read Level+ Correct Factor

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EUT:	Multimedia Speal Blue-Tooth	ker with	Model Na	ıme :	PBX	-2100
Temperature:	25 ℃		Relative	Humidity	y : 55%	
Test Voltage:	AC 240V/60 Hz			MA		
Terminal:	Line	6		3	_ 6	Miles
Test Mode:	USB Charging wi	th TX GFSK	Mode 2402	MHz	ED 18	
Remark:	Only worse case	is reported		CHILL		
90.0 dBuV						
		×	. ×		QP: AVG:	
-10 0.150	0.5	(MHz)	5			AVG 30.000
No. Mk. Fr	Reading eq. Level	Correct Factor	Measure- ment	Limit	O∨er	
M	Hz dBu∨	dB	dBu∀	dBu∨	dB	Detector
1 0.44	460 41.14	10.02	51.16	56.95	-5.79	QP
2 0.44	460 32.50	10.02	42.52	46.95	-4.43	AVG
3 1.32	260 41.81	10.06	51.87	56.00	-4.13	QP
4 * 1.32	260 33.53	10.06	43.59	46.00	-2.41	AVG
5 2.20	099 40.66	10.05	50.71	56.00	-5.29	QP
6 2.20	099 31.29	10.05	41.34	46.00	-4.66	AVG
7 3.97	780 41.20	9.99	51.19	56.00	-4.81	QP

Emission Level= Read Level+ Correct Factor

31.84

42.51

34.44

39.04

31.81

9.99

10.00

10.00

10.21

10.21

41.83

52.51

44.44

49.25

42.02

46.00

60.00

50.00

50.00

-4.17

-7.49

-5.56

-7.98

60.00 -10.75

AVG

AVG

QP

AVG

QP

3.9780

5.7458

5.7458

17.6818

17.6818

9

10

11

12



Multimedia Speaker with PBX-2100 EUT: **Model Name:** Blue-Tooth 25 ℃ Temperature: **Relative Humidity:** 55% AC 240V/60 Hz **Test Voltage:** Terminal: Neutral **Test Mode:** USB Charging with TX GFSK Mode 2402 MHz Remark: Only worse case is reported dBuV 90.0 QP: AVG: 0.150 0.5 (MHz) 30.000

		Ponding	Corroot	Measure-			
No. Mk.	Freq.	Reading Level	Correct Factor	ment	Limit	O∨er	
	MHz	dBu∀	dB	dBu∨	dBu∀	dB	Detector
1	0.4420	42.46	10.04	52.50	57.02	-4.52	QP
2	0.4420	33.81	10.04	43.85	47.02	-3.17	AVG
3	1.3260	40.06	10.13	50.19	56.00	-5.81	QP
4	1.3260	31.16	10.13	41.29	46.00	-4.71	AVG
5	2.2100	38.65	10.06	48.71	56.00	-7.29	QP
6	2.2100	31.06	10.06	41.12	46.00	-4.88	AVG
7	3.0980	40.57	10.06	50.63	56.00	-5.37	QP
8	3.0980	31.87	10.06	41.93	46.00	-4.07	AVG
9 *	4.8699	45.13	10.06	55.19	56.00	-0.81	QP
10	4.8699	32.31	10.06	42.37	46.00	-3.63	AVG
11	6.6379	43.74	10.06	53.80	60.00	-6.20	QP
12	6.6379	34.60	10.06	44.66	50.00	-5.34	AVG
							-



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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

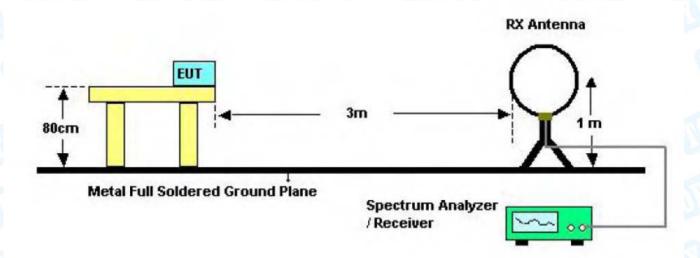
Note:

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

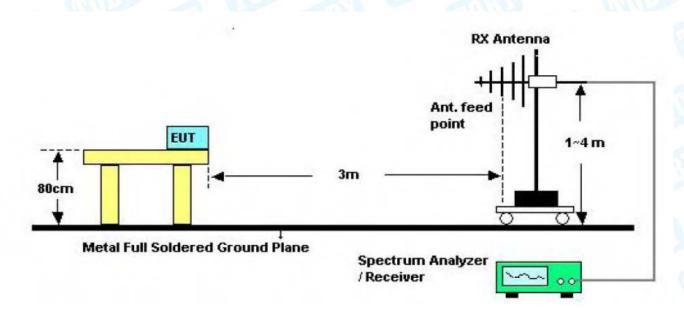


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5.2 Test Setup



Bellow 30MHz Test Setup



Bellow 1000MHz Test Setup



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.



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EUT:	Multimed	dia Speake	er with Blue-Tooth	Model N	Name :	PBX-2	2100
Temperature:	25 ℃		1919	Relative	Humidity:	: 55%	1111
Test Voltage:	AC 120)V/60Hz		1	TOT!	10	
Ant. Pol.	Horizor	ntal			Barre		M
Test Mode:	TX GF	SK Mode	2402MHz			- CIII	Jake .
Remark:	Only w	orse case	e is reported	630	ATTE !		
80.0 dBuV/m		1	2 3		(RF)FCC 15C 3	3M Radiation Margin -6 d	В
20	To Varry with the	Will State of the	(h. 1		MA HARANA ANA	Mapphot Mall May	haybra-rida
May have been been been been been been been be	60 70 8	10	(MHz)	300	400 500	600 700	1000.000
20 30.000 40 50		Reading		300 Measure- ment		600 700 Over	1000.000
20 30.000 40 50	F eq.	Reading	Correct N	/leasure-			
20 30.000 40 50 No. Mk. Fr	F eq. ⊣z	Reading Level	Correct N Factor	/leasure- ment	Limit dBuV/m	Over	Detecto
20 30.000 40 50 No. Mk. Fr	eq. ⊣z 2667	Reading Level	Correct N Factor	/leasure- ment dBuV/m	Limit dBuV/m 43.50	Over	Detecto peak
20 30.000 40 50 No. Mk. From Min 1 108.2	eq. ⊣z 2667 3135	Reading Level dBuV 49.86	Correct N Factor dB/m -21.86	fleasure- ment dBuV/m	Limit dBuV/m 43.50	O∨er dB -15.50	Detecto peak peak peak
No. Mk. From Mt 1 108.2 2 173.8	eq. 2667 3135 2376	Reading Level dBuV 49.86 54.31	Correct N Factor dB/m -21.86 -20.95	Measure- ment dBuV/m 28.00 33.36	Limit dBuV/m 43.50 43.50	Over dB -15.50 -10.14	Detecto peak peak
No. Mk. From Mt 1 108.2 2 173.8 3 * 204.2	eq. 2667 3135 2376	Reading Level dBuV 49.86 54.31 55.28	Correct N Factor dB/m -21.86 -20.95 -20.20	Measure- ment dBuV/m 28.00 33.36 35.08	Limit dBuV/m 43.50 43.50 43.50 46.00	Over dB -15.50 -10.14 -8.42	Detecto peak peak peak



EUT: **Model Name:** PBX-2100 Multimedia Speaker with Blue-Tooth Temperature: 25 ℃ **Relative Humidity:** 55% **Test Voltage:** AC 120V/60Hz Ant. Pol. Vertical **Test Mode:** TX GFSK Mode 2402MHz Remark: Only worse case is reported



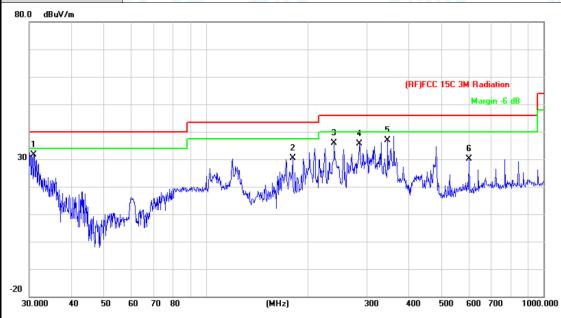
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		52.2079	55.20	-24.43	30.77	40.00	-9.23	peak
2		81.4969	50.45	-23.20	27.25	40.00	-12.75	peak
3		120.2766	52.52	-22.50	30.02	43.50	-13.48	peak
4	*	204.2376	55.47	-20.20	35.27	43.50	-8.23	peak
5		383.9318	44.73	-13.87	30.86	46.00	-15.14	peak
6		576.6443	42.43	-10.09	32.34	46.00	-13.66	peak

^{*:}Maximum data x:Over limit !:over margin



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EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz	The same	
Ant. Pol.	Horizontal		
Test Mode:	TX π/4-DQPSK Mode 2402MH	Z	DITT.
Remark:	Only worse case is reported		
80.0 dBuV/m			



١	lo. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	30.9618	46.14	-14.55	31.59	40.00	-8.41	peak
2		180.6486	50.86	-20.59	30.27	43.50	-13.23	peak
3		239.9874	54.44	-18.59	35.85	46.00	-10.15	peak
4		284.9766	53.02	-17.38	35.64	46.00	-10.36	peak
5		345.5951	51.70	-14.88	36.82	46.00	-9.18	peak
6		601.4265	39.43	-9.41	30.02	46.00	-15.98	peak

^{*:}Maximum data x:Over limit !:over margin



Report No.: TB-FCC147116
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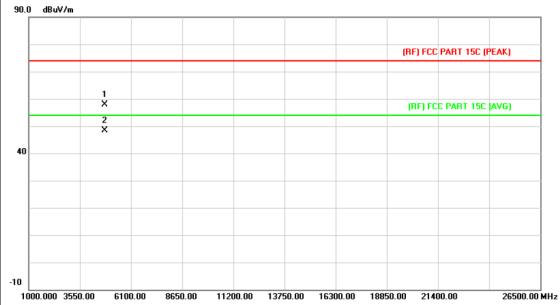
Page:

	Multimedia Sp	eaker with Blue-Tooth	Model N	lame :	PBX-21	100
Temperature:	25 ℃	mill .	Relative	Humidity:	55%	
Test Voltage:	AC 120V/60	Hz	1 6300		10	
Ant. Pol.	Vertical			Hilling		1
Test Mode:	TX π/4-DQ	PSK Mode 2402MI	Hz		CALL	
Remark:	Only worse	case is reported				
80.0 dBuV/m						
				(RF)FCC 15C 3h	M Radiation Margin -6 dB	
30 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3	4 5			1	
	hyper has	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		A MINIMA MANAMA		gu fradh
				7 []		
20 30.000 40 50	60 70 80	(MHz)	300	400 500	600 700	1000.00
	60 70 80 Read		300 leasure-			1000.00
	Read	ing Correct M			600 700 Over	1000.00
30.000 40 50	Read eq. Lev	ing Correct M el Factor	leasure-		O∨er	
30.000 40 50 No. Mk. Fre	Read eq. Lev	ing Correct M el Factor V dB/m	leasure- ment	Limit (Over	1000.00
No. Mk. Fre	Read eq. Leve lz dBu 000 46.2	ing Correct Mel Factor dB/m 28 -13.96	leasure- ment dBuV/m	Limit (Over dB □ -7.68)etecto
No. Mk. Fre	Read eq. Leve lz dBu 000 46.2	ing Correct Mel Factor dB/m 28 -13.96 39 -17.83	leasure- ment dBuV/m 32.32	Limit 0 dBuV/m 40.00 -	Over dB □ -7.68	etecto peal peal
No. Mk. Fre	Read Level Level 12 dBu	ing Correct Mel Factor V dB/m 28 -13.96 59 -17.83	leasure- ment dBuV/m 32.32 31.86	Limit 0 dBuV/m 40.00 - 40.00 -	Over dB □ -7.68 -8.14	etecto peal
No. Mk. Free MH 1 30.00 2 36.25 3 79.52	Read Level 12 dBu 2000 46.2 dBu 208 55.7 56.4	ing Correct Mel Factor V dB/m 28 -13.96 59 -17.83 77 -23.30 42 -22.50	leasure- ment dBuV/m 32.32 31.86 32.47	Limit 0 dBuV/m 40.00 - 40.00 - 40.00 -	Over dB	etecto peal peal peal



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EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60Hz					
Ant. Pol.	Horizontal					
Test Mode:	TX GFSK Mode 2402MHz	10:30	D. M. T.			
Remark:	Remark: No report for the emission which more than 10 dB below the prescribed limit.					

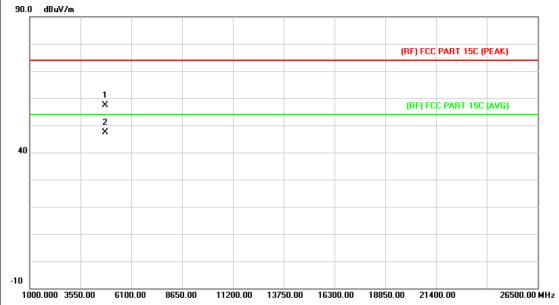


No	. Mk.	Freq.	Reading Level		Measure- ment	Limit	O∨er	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.114	44.38	13.44	57.82	74.00	-16.18	peak
2	*	4803.468	34.87	13.44	48.31	54.00	-5.69	AVG



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EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100					
Temperature:	25 ℃	Relative Humidity:	55%					
Test Voltage:	AC 120V/60Hz	AC 120V/60Hz						
Ant. Pol.	Vertical							
Test Mode:	TX GFSK Mode 2402MHz		DIO.					
Remark: No report for the emission which more than 10 dB below the prescribed limit.								

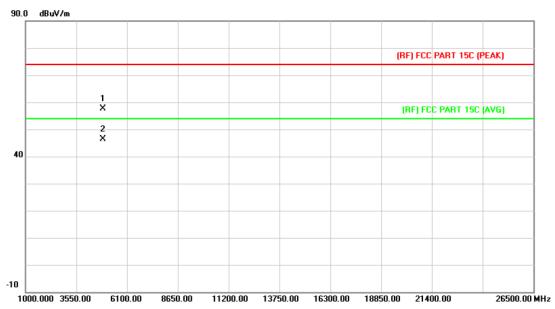


No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	O∨er	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.145	44.05	13.44	57.49	74.00	-16.51	peak
2	*	4803.438	33.87	13.44	47.31	54.00	-6.69	AVG



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Multimedia Speaker with Blue-Tooth Model Name : PBX						
25 °C Relative Humidity: 55%						
AC 120V/60Hz						
Horizontal	THE RESERVE TO SERVE					
TX GFSK Mode 2441MHz	Mills I	CHILL				
Remark: No report for the emission which more than 10 dB below the prescribed limit.						
	25 °C AC 120V/60Hz Horizontal TX GFSK Mode 2441MHz No report for the emission which	25 °C Relative Humidity: AC 120V/60Hz Horizontal TX GFSK Mode 2441MHz No report for the emission which more than 10 dB below				

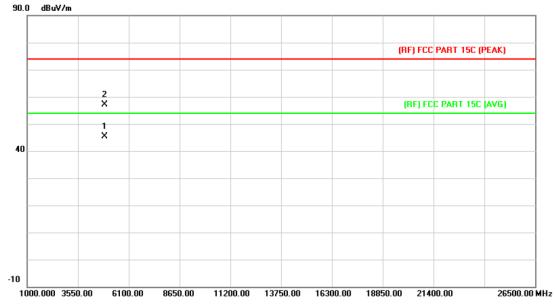


No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4881.169	43.71	13.90	57.61	74.00	-16.39	peak
2	*	4881.354	32.39	13.90	46.29	54.00	-7.71	AVG



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EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100				
Temperature:	25 ℃	25 ℃ Relative Humidity: 55					
Test Voltage:	AC 120V/60Hz						
Ant. Pol.	Vertical	Vertical					
Test Mode:	TX GFSK Mode 2441MHz		DITT. F				
Remark: No report for the emission which more than 10 dB below the prescribed limit.							

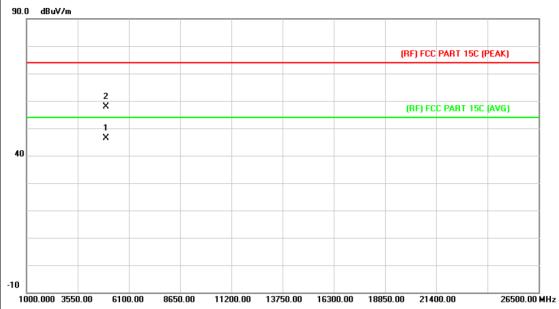


No	o. Mk	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4881.364	31.46	13.90	45.36	54.00	-8.64	AVG
2		4881.985	43.29	13.90	57.19	74.00	-16.81	peak



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EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100				
Temperature:	25 ℃ Relative Humidity:		55%				
Test Voltage:	AC 120V/60Hz	AC 120V/60Hz					
Ant. Pol.	Horizontal	Horizontal					
Test Mode:	TX GFSK Mode 2480MHz		C. M. C.				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						

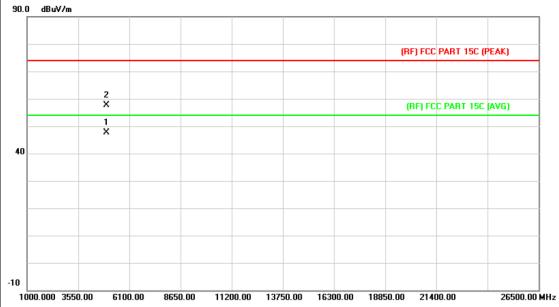


	No.	Mk.	Freq.	_	Correct Factor	Measure- ment	Limit	O∨er	
			MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		*	4959.241	32.07	14.36	46.43	54.00	-7.57	AVG
2	1		4959.334	43.62	14.36	57.98	74.00	-16.02	peak



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EUT:		Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100				
Temper	ature:	25 ℃	Relative Humidity:	55%				
Test Vo	tage:	AC 120V/60Hz						
Ant. Po	l.	Vertical						
Test Mo	de:	TX GFSK Mode 2480MHz		D. M. C.				
Remark	:	No report for the emission which more than 10 dB below the prescribed limit.						
00.0 ID								

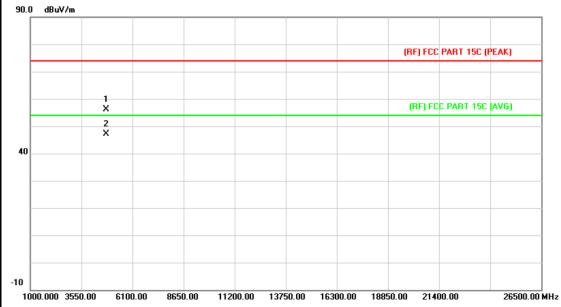


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4960.322	33.28	14.36	47.64	54.00	-6.36	AVG
2		4960.353	43.30	14.36	57.66	74.00	-16.34	peak



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EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100				
Temperature:	25 ℃	25 ℃ Relative Humidity: 55%					
Test Voltage:	AC 120V/60Hz	AC 120V/60Hz					
Ant. Pol.	Horizontal						
Test Mode:	TX π /4-DQPSK Mode 2402MHz		CHI.				
Remark:	No report for the emission which	No report for the emission which more than 10 dB below the					
	prescribed limit.						

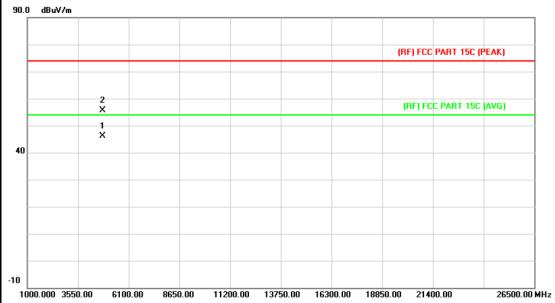


No	. Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.391	42.66	13.44	56.10	74.00	-17.90	peak
2	*	4804.317	33.80	13.44	47.24	54.00	-6.76	AVG



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EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100					
Temperature:	25 ℃	5 ℃ Relative Humidity: 55%						
Test Voltage:	AC 120V/60Hz	AC 120V/60Hz						
Ant. Pol.	Vertical	TO VIEW						
Test Mode:	TX π /4-DQPSK Mode 2402MHz	11133	DIO.					
Remark:	No report for the emission which more than 10 dB below the prescribed limit.							

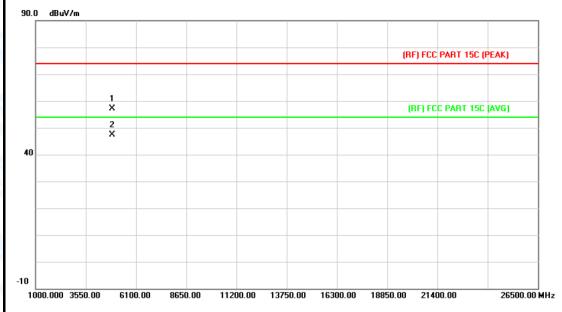


No	o. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4803.428	32.80	13.44	46.24	54.00	-7.76	AVG
2		4804.631	42.23	13.44	55.67	74.00	-18.33	peak



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EUT:	Multimedia Speaker with Blue-Tooth Model Name : PBX-2					
Temperature:	25 ℃	25 ℃ Relative Humidity: 55%				
Test Voltage:	AC 120V/60Hz					
Ant. Pol.	Horizontal					
Test Mode:	TX π /4-DQPSK Mode 2441MHz		D.M.			
Remark:	No report for the emission which more than 10 dB below the prescribed limit.					

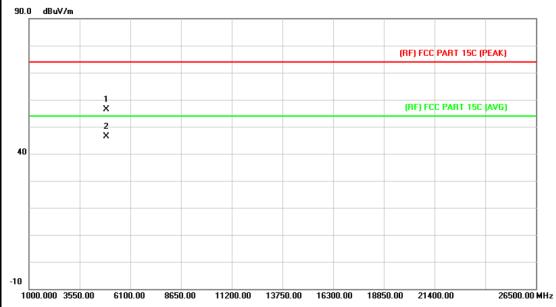


No	. Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4881.339	43.31	13.90	57.21	74.00	-16.79	peak
2	*	4882.409	33.55	13.90	47.45	54.00	-6.55	AVG



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EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100					
Temperature:	25 °C Relative Humidity: 55%							
Test Voltage:	AC 120V/60Hz	AC 120V/60Hz						
Ant. Pol.	Vertical	The state of the s						
Test Mode:	TX π /4-DQPSK Mode 2441MHz		D. M. C.					
Remark:	No report for the emission which prescribed limit.	more than 10 dB below	w the					

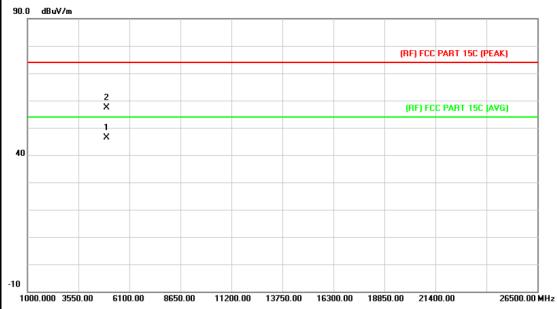


No	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4881.313	42.59	13.90	56.49	74.00	-17.51	peak
2	*	4882.347	32.37	13.90	46.27	54.00	-7.73	AVG



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EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100				
Temperature:	25 ℃	25 °C Relative Humidity: 55%					
Test Voltage:	AC 120V/60Hz						
Ant. Pol.	Horizontal						
Test Mode:	TX π /4-DQPSK Mode 2480MHz	111:33	DITT. S				
Remark:	No report for the emission which prescribed limit.	No report for the emission which more than 10 dB below the prescribed limit.					
Remark:		more than 10 dB below	w the				

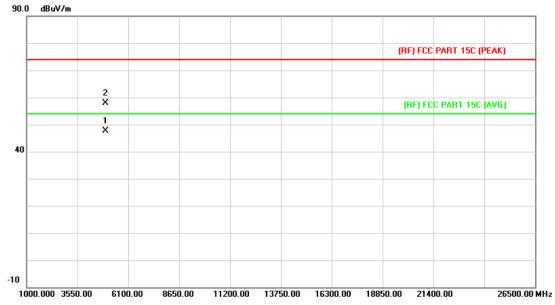


No	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4959.167	31.92	14.36	46.28	54.00	-7.72	AVG
2		4959.632	43.13	14.36	57.49	74.00	-16.51	peak



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EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100					
Temperature:	25 ℃	5 ℃ Relative Humidity: 55%						
Test Voltage:	AC 120V/60Hz	AC 120V/60Hz						
Ant. Pol.	Vertical							
Test Mode:	TX π /4-DQPSK Mode 2480MHz		D. M. C.					
Remark:	No report for the emission which prescribed limit.	more than 10 dB below	w the					
00.0 10.41								



No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4959.449	33.23	14.36	47.59	54.00	-6.41	AVG
2		4960.358	43.45	14.36	57.81	74.00	-16.19	peak



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6. Restricted Bands Requirement

6.1 Test Standard and Limit

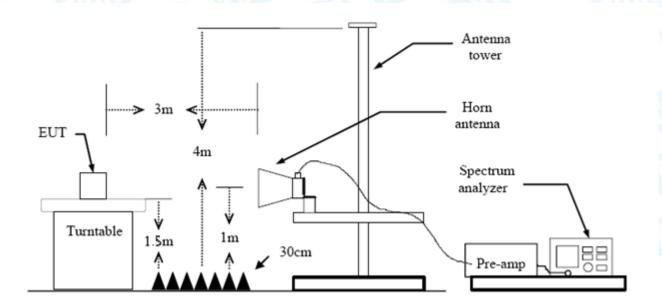
6.1.1 Test Standard FCC Part 15.209 FCC Part 15.205

6.1.2 Test Limit

Restricted Frequency Band (MHz)	Class B (dBuV/m)(at 3m)	
	Peak	Average
310 ~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.

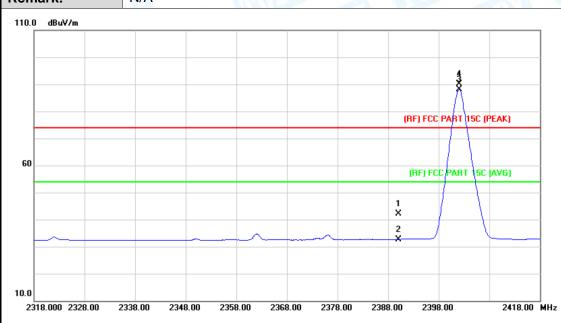
All restriction bands have been tested, only the worst case is reported.



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(1) Radiation Test

	EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100			
	Temperature:	25 ℃	Relative Humidity:	55%			
	Test Voltage:	AC 120V/60Hz					
	Ant. Pol.						
	Test Mode:	TX GFSK Mode 2402MHz					
Remark: N/A							

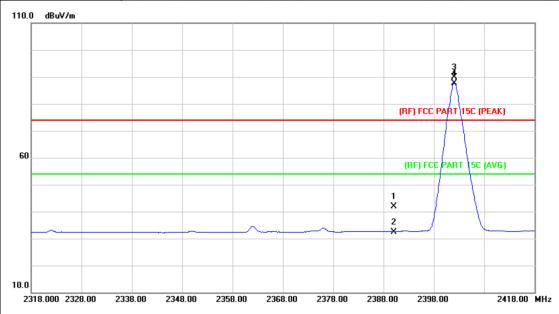


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	41.28	0.77	42.05	74.00	-31.95	peak
2		2390.000	31.82	0.77	32.59	54.00	-21.41	AVG
3	*	2402.000	87.19	0.82	88.01	Fundamental	Frequency	AVG
4	Х	2402.100	89.37	0.82	90.19	Fundamental	Frequency	peak



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	EUT:	EUT: Multimedia Speaker with Blue-Tooth		PBX-2100			
١	Temperature:	25 ℃	Relative Humidity:	55%			
	Test Voltage:	AC 120V/60Hz					
	Ant. Pol.	Vertical					
	Test Mode: TX GFSK Mode 2402MHz						
Remark: N/A							

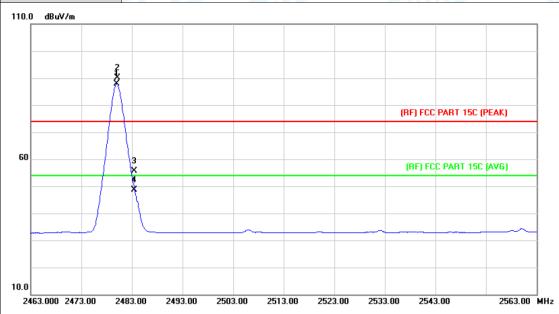


No.	Mk.	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	41.02	0.77	41.79	74.00	-32.21	peak
2		2390.000	31.64	0.77	32.41	54.00	-21.59	AVG
3	Х	2402.000	89.12	0.82	89.94	Fundamenta	I Frequency	peak
4	*	2402.100	86.86	0.82	87.68	Fundamenta	I Frequency	AVG



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EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100				
Temperature:	25 ℃	25 °C Relative Humidity: 55%					
Test Voltage:	AC 120V/60Hz	AC 120V/60Hz					
Ant. Pol.	Horizontal	THE RESERVE TO SERVE					
Test Mode: TX GFSK Mode 2480 MHz							
Remark:	N/A						

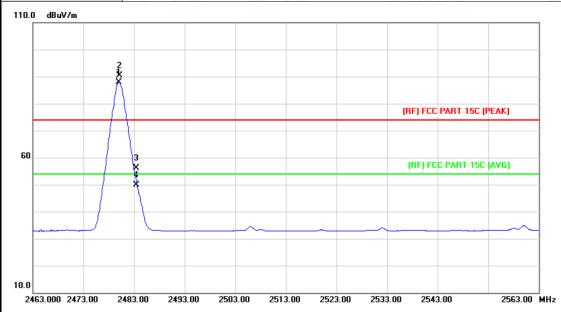


N	lo. N	/lk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
			MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*		2480.000	86.74	1.15	87.89	Fundamental	Frequency	AVG
2	Х		2480.100	88.95	1.15	90.10	Fundamental	Frequency	peak
3			2483.500	54.42	1.17	55.59	74.00	-18.41	peak
4			2483.500	47.44	1.17	48.61	54.00	-5.39	AVG



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EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	AC 120V/60Hz	AC 120V/60Hz					
Ant. Pol.	Vertical						
Test Mode:	TX GFSK Mode 2480 MHz						
Remark: N/A							

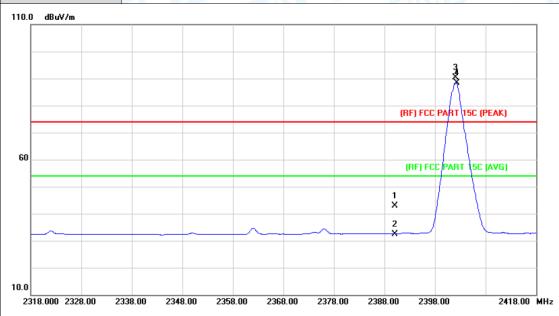


No.	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	2480.000	86.83	1.15	87.98	Fundamental I	Frequency	AVG
2	Х	2480.200	89.20	1.15	90.35	Fundamental I	Frequency	peak
3		2483.500	55.02	1.17	56.19	74.00	-17.81	peak
4		2483.500	48.81	1.17	49.98	54.00	-4.02	AVG



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i	EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100				
ì	Temperature:	25 ℃	Relative Humidity:	55%				
	Test Voltage:	AC 120V/60Hz						
	Ant. Pol.	Horizontal						
	Test Mode:	11.37	MILLER					
Remark: N/A								

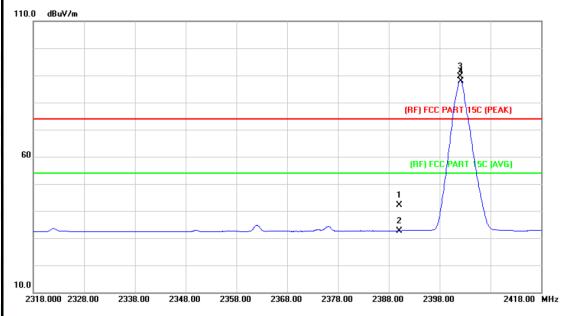


No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	41.99	0.77	42.76	74.00	-31.24	peak
2		2390.000	31.72	0.77	32.49	54.00	-21.51	AVG
3	Х	2402.100	89.49	0.82	90.31	Fundamenta	I Frequency	peak
4	*	2402.300	87.54	0.82	88.36	Fundament	al Frequency	AVG



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EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60Hz					
Ant. Pol.	Vertical					
Test Mode:	TX π /4-DQPSK Mode 2402MHz					
Remark:	N/A		6			
110.0 dBuV/m						

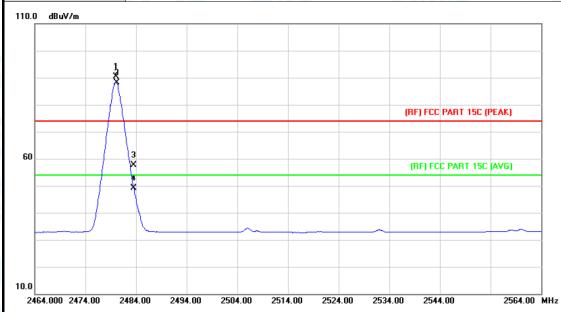


No	. Mk.	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	41.44	0.77	42.21	74.00	-31.79	peak
2		2390.000	31.82	0.77	32.59	54.00	-21.41	AVG
3	Χ	2402.000	88.87	0.82	89.69	Fundamental	Frequency	peak
4	*	2402.200	87.06	0.82	87.88	Fundamental	Frequency	AVG



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EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100		
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	AC 120V/60Hz				
Ant. Pol.	Horizontal				
Test Mode:	TX π /4-DQPSK Mode 2480MHz				
Remark:	N/A		6		

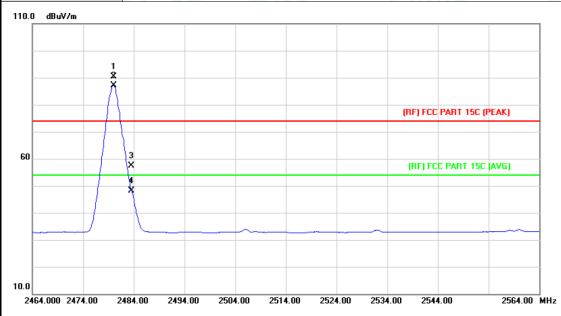


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Χ	2480.000	89.31	1.15	90.46	Fundamental	Frequency	peak
2	*	2480.200	86.92	1.15	88.07	Fundamental	Frequency	AVG
3		2483.500	56.41	1.17	57.58	74.00	-16.42	peak
4		2483.500	48.02	1.17	49.19	54.00	-4.81	AVG



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EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100	
Temperature:	25 ℃	Relative Humidity:	55%	
Test Voltage:	AC 120V/60Hz			
Ant. Pol.	Vertical			
Test Mode:	TX π /4-DQPSK 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	89.22	1.15	90.37	Fundamental	Frequency	peak
2	*	2480.100	86.08	1.15	87.23	Fundamental	Frequency	AVG
3		2483.500	56.19	1.17	57.36	74.00	-16.64	peak
4		2483.500	47.07	1.17	48.24	54.00	-5.76	AVG

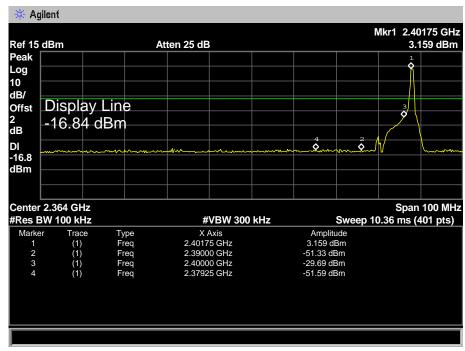


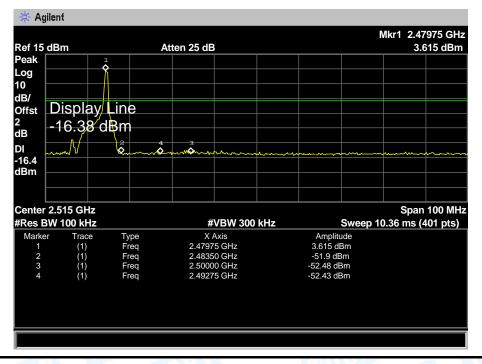
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(2) Conducted Test

TOBY

EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100	
Temperature:	25 ℃	Relative Humidity:	55%	
Test Voltage:	AC 120V/60Hz			
Test Mode:	TX GFSK Mode 2402MHz / 2480 MHz			
Remark:	N/A			







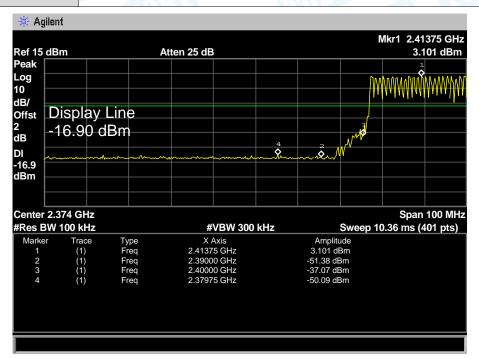
EUT: Multimedia Speaker with Blue-Tooth Model Name: PBX-2100

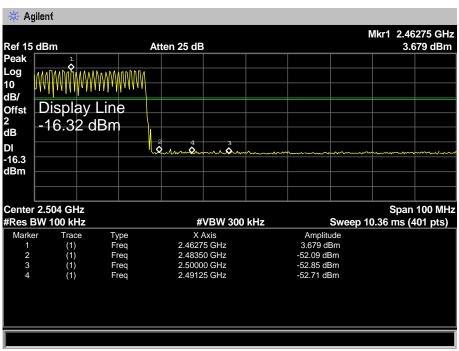
Temperature: 25 °C Relative Humidity: 55%

Test Voltage: AC 120V/60Hz

Test Mode: GFSK Hopping Mode

Remark: N/A

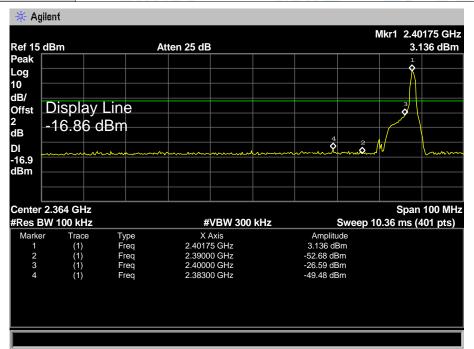


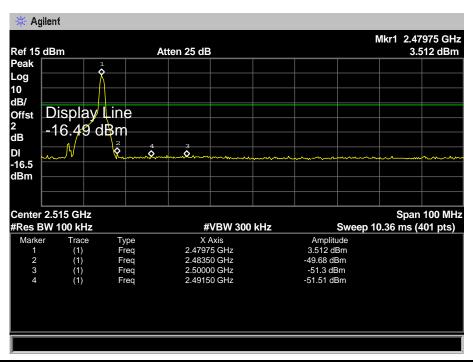




TOBY Page:

EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100		
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	AC 120V/60Hz				
Test Mode:	TX π /4-DQPSK Mode 2402MHz / 2480 MHz				
Remark:	N/A				

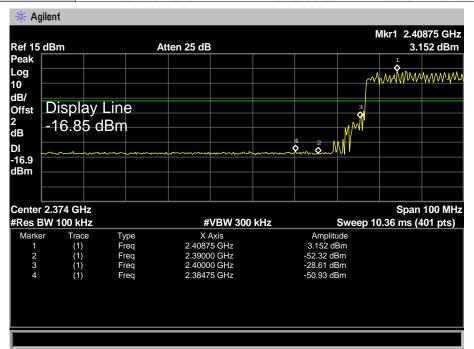


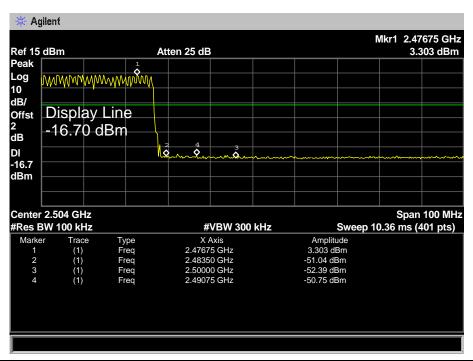




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EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Test Mode:	л /4-DQPSK Hopping Mode		
Remark:	N/A		CALL TO SERVICE







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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





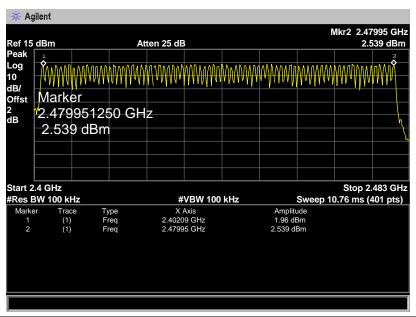
Multimedia Speaker with EUT: PBX-2100 **Model Name:** Blue-Tooth 25 ℃ Temperature: 55% **Relative Humidity:** AC 120V/60Hz

Test Voltage:

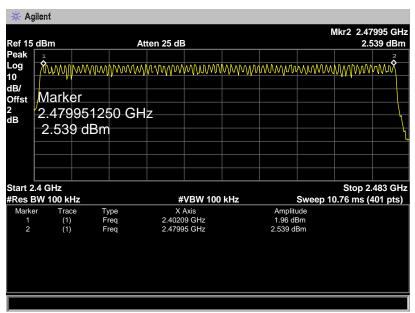
Test Mode: Hopping Mode (GFSK/ π /4-DQPSK)

Frequency Range	Quantity of Hopping Channel	Limit
2402MHz~2480MHz	79	>15
2402101112~2400101112	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	0.4.000	
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.

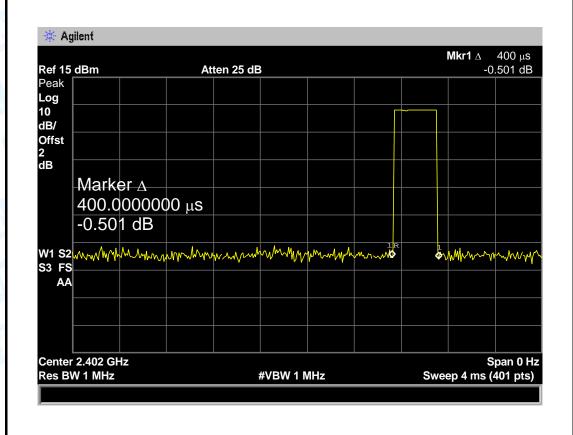


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8.5 Test Data

EUT:	Multimedia Speaker with Blue-Tooth Model Name:		PBX-2100			
Temperature	ature: 25 °C		The Contraction of the Contracti	Relative Hum	idity:	55%
Test Voltage:		AC 120V/	60Hz			
Test Mode:		Hopping N	Mode (GFSK DH	1)		13
Channel	Pu	Ise Time	Total of Dwell	Period Time	Limit	Result
(MHz)		(ms)	(ms)	(s)	(ms)	Result
2402		0.400	128.00			
2441		0.400	128.00	31.60	400	PASS
2480		0.400	128.00			
CCCV Hamming Made DU4						

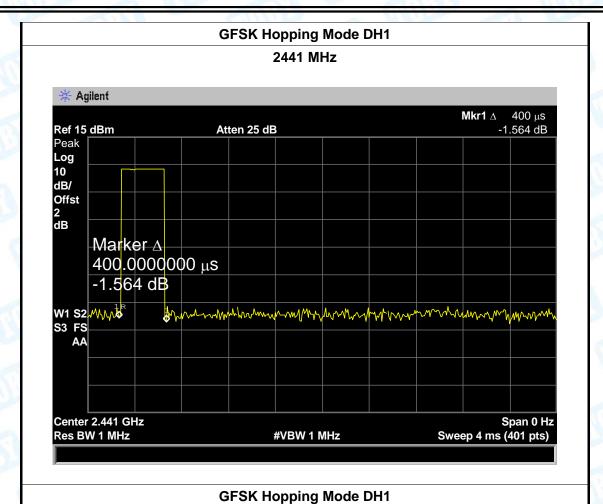
GFSK Hopping Mode DH1

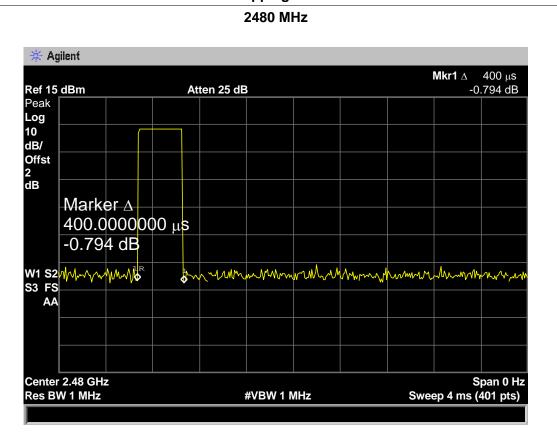






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2441

2480

1.680

1.680

Report No.: TB-FCC147116

PASS

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EUT:		Multimedia Speaker with Blue-Tooth		Model Name :		PBX-2100	
Temperature:		25 ℃	Relative Humidity:		55%		
Test Voltage:		AC 120V/	60Hz	ور الزان	I WIN		
Test Mode:		Hopping N	Mode (GFSK DH	3)	3	CHILD STORY	
Channel	Pu	Ise Time	Total of Dwell	Period Time	Limit	Result	
(MHz)		(ms)	(ms)	(s)	(ms)	Nesult	
2402		1.680	268.80				

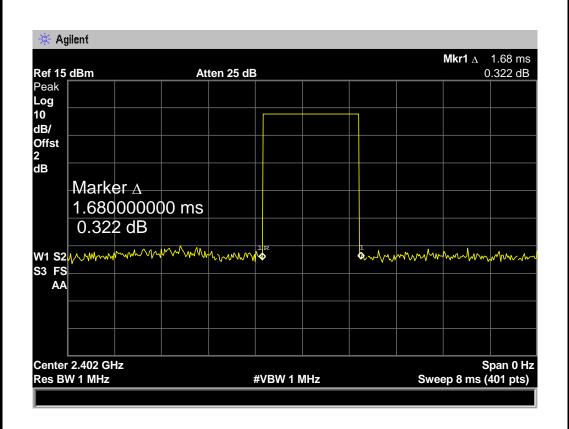
GFSK Hopping Mode DH3

268.80

268.80

31.60

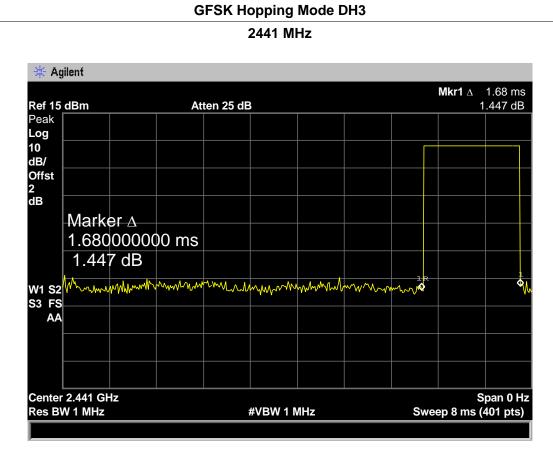
400

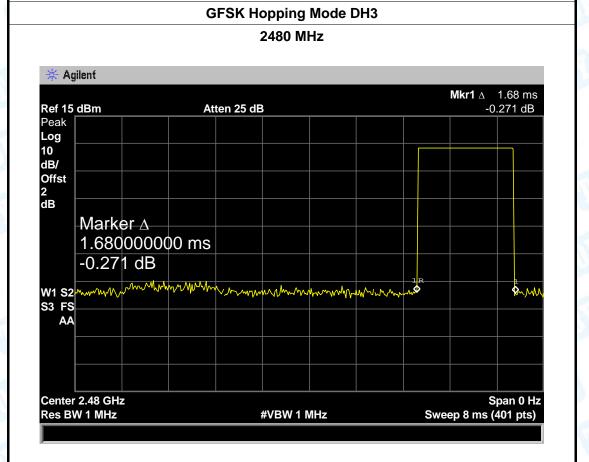






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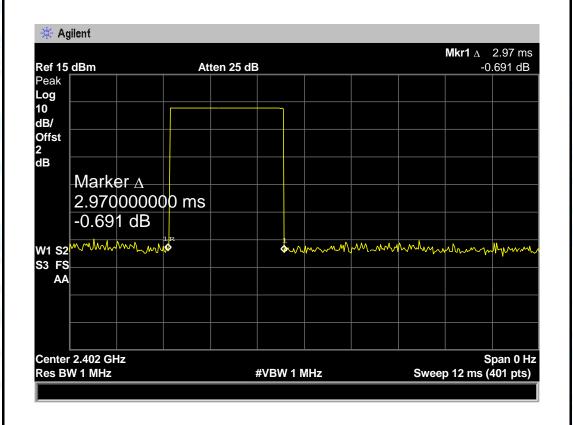


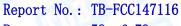
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EUT:		Multimedi Blue-Toot	a Speaker with h	Model Name	:	PBX-2100
Temperature:	•	25 ℃	CALL TO SERVICE STATE OF THE PARTY OF THE PA	Relative Hum	idity:	55%
Test Voltage:		AC 120V/60Hz				
Test Mode:		Hopping I	Mode (GFSK DH	5)	3	
Channel (MHz)	Pu	Ise Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result

Channel (MHz)	Pulse 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			

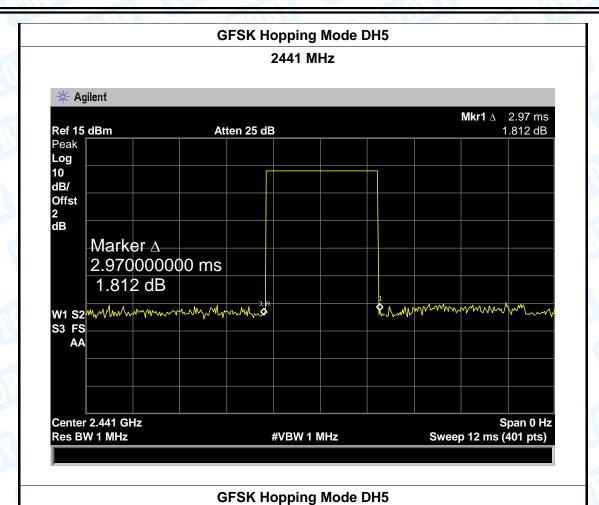
GFSK Hopping Mode DH5

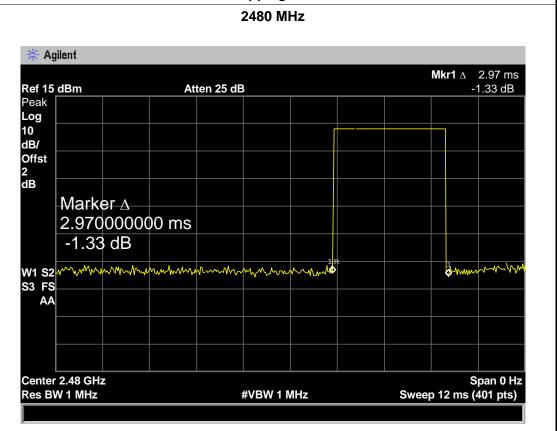






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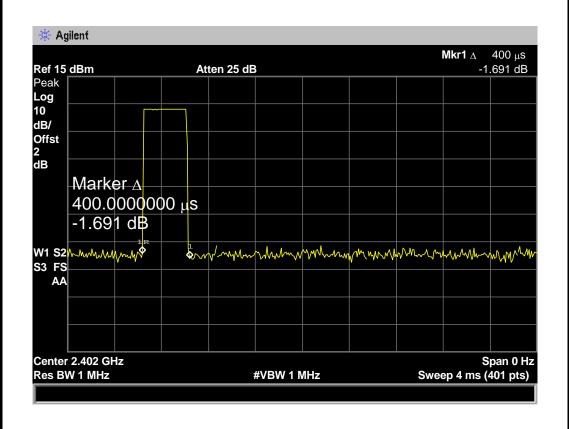


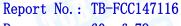
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Channel (MHz)	Pu	Ise Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
Test Mode:		Hopping N	Mode (π/4-DQPS	SK DH1)		
Test Voltage:		AC 120V/60Hz				
Temperature:		25 ℃	ALC: NO	Relative Hum	idity:	55%
EUT:		Multimedi Blue-Toot	a Speaker with h	Model Name :		PBX-2100

Channel	Pulse Time	Total of Dwell	Period Time	Limit	Result
(MHz)	(ms)	(ms)	(s)	(ms)	
2402	0.400	128.00			
2441	0.400	128.00	31.60	400	PASS
2480	0.400	128.00			

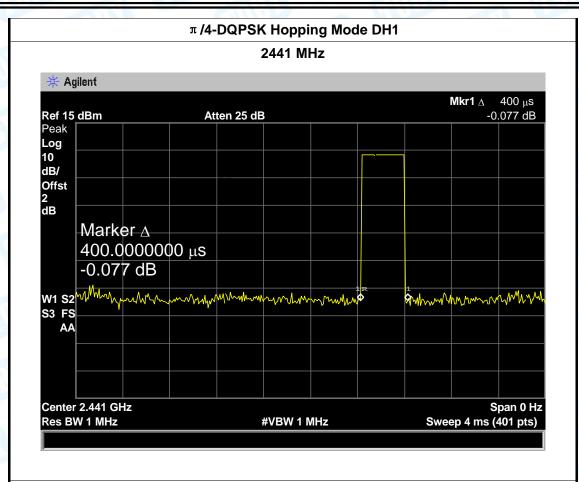
π/4-DQPSK Hopping Mode DH1



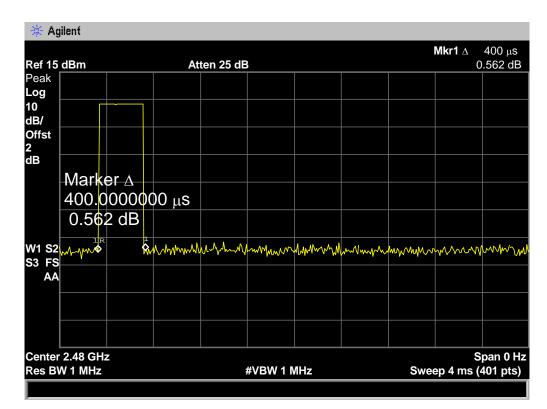




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π/4-DQPSK Hopping Mode DH1





2441

2480

1.680

1.680

Report No.: TB-FCC147116

PASS

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EUT:		Multimedia Speaker with Blue-Tooth		Model Name :		PBX-2100
Temperature:		25 ℃	A LUIS	Relative Hum	idity:	55%
Test Voltage:		AC 120V/	60Hz	ور الزان	M.	
Test Mode:		Hopping I	Mode (π/4-DQP	SK DH3)	3	CHILD STORY
Channel	Pu	lse Time	Total of Dwell	Period Time	Limit	Result
(MHz)		(ms)	(ms)	(s)	(ms)	Nesuit
2402		1.680	268.80			

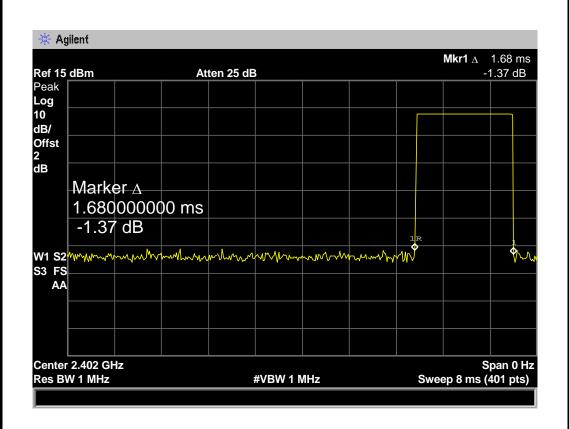
π /4-DQPSK Hopping Mode DH3

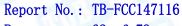
268.80

268.80

31.60

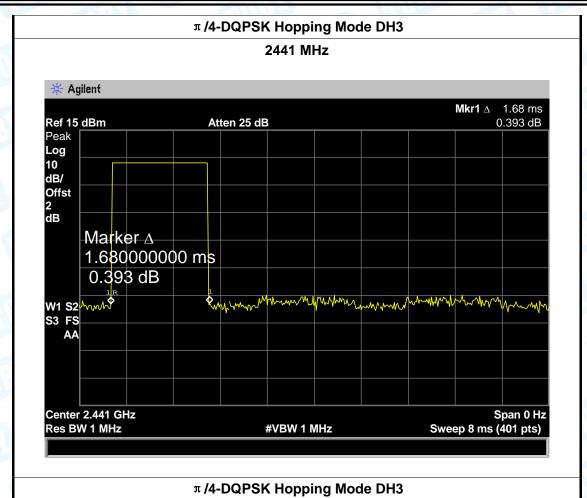
400

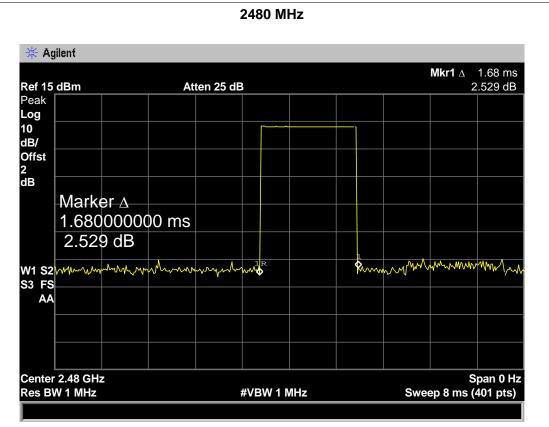






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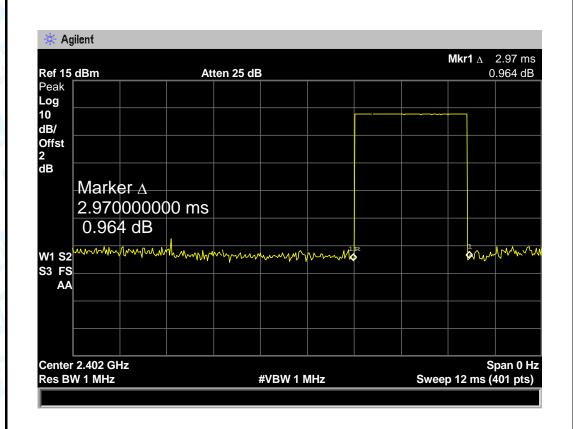


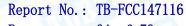
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	CUT.		Multimedi	a Speaker with	Model Name :		PBX-2100	
ĺ	EUT:		Blue-Tooth		woder name :		PBA-2100	
	Temperature:		25 ℃	25 °C Relative Humidity:		55%		
	Test Voltage:		AC 120V/	60Hz	سر الزار	I WIN		
	Test Mode:	Test Mode: Hopping Mode (π /4-DQF			SK DH5)	3	CHILD STORY	
	Channel	Pu	Ise Time	Total of Dwell	Period Time	Limit	Result	
	(MHz)		(ms)	(ms)	(s)	(ms)	Result	
					· ·			

Channel (MHz)	Pulse 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			

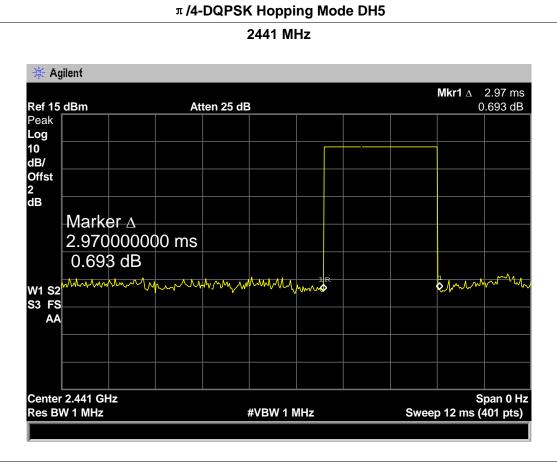
π /4-DQPSK Hopping Mode DH5

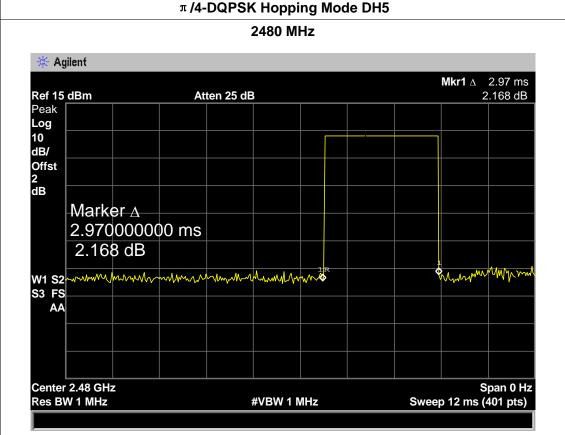






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9. Channel Separation and Bandwidth Test

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.

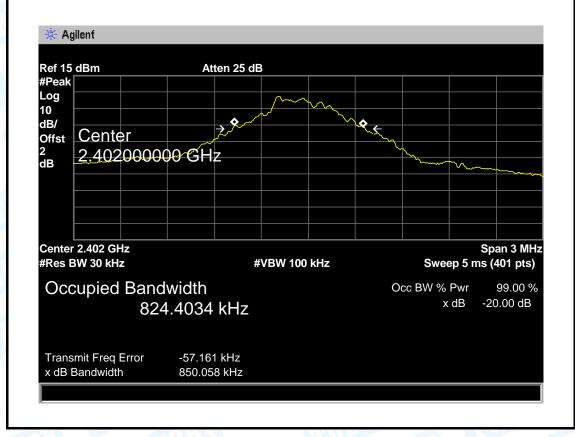


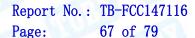
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9.5 Test Data

EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz	CONTRACT OF THE PARTY OF THE PA	a little
Test Mode:	TX Mode (GFSK)		
Channel frequence (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	824.4034	850.058	
2441	828.7615	855.262	
2480	825.9540	858.417	

GFSK TX Mode

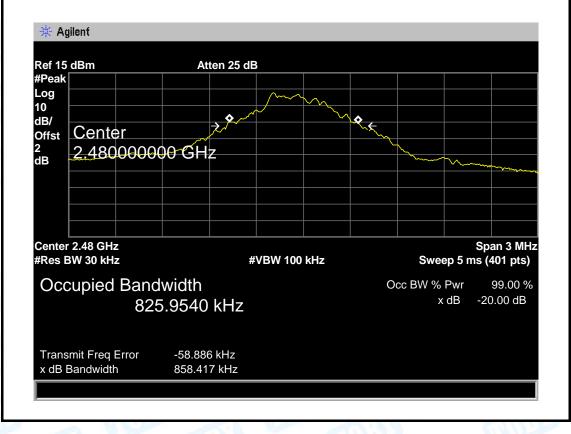






GFSK TX Mode 2441 MHz * Agilent Ref 15 dBm Atten 25 dB #Peak Log 10 dB/ Center Offst 2,441000000 GHz 2 dB Center 2.441 GHz Span 3 MHz #Res BW 30 kHz **#VBW 100 kHz** Sweep 5 ms (401 pts) Occupied Bandwidth 99.00 % Occ BW % Pwr x dB -20.00 dB 828.7615 kHz Transmit Freq Error -58.566 kHz x dB Bandwidth 855.262 kHz

GFSK TX Mode





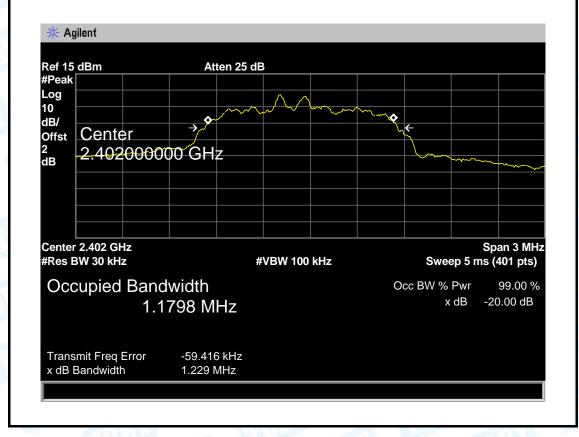
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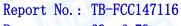
EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Took Mode.	TV Made (= /4 DODCK)		

Test Mode: TX Mode (π /4-DQPSK)

Channel frequency (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	1179.80	1229.00	819.33
2441	1181.30	1233.00	822.00
2480	1180.40	1234.00	822.67

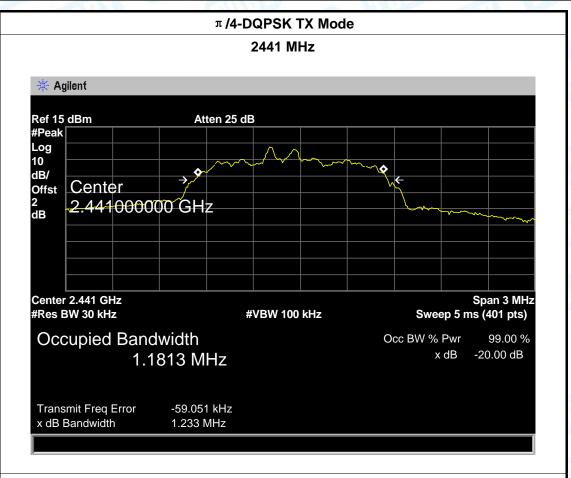
π/4-DQPSK TX Mode



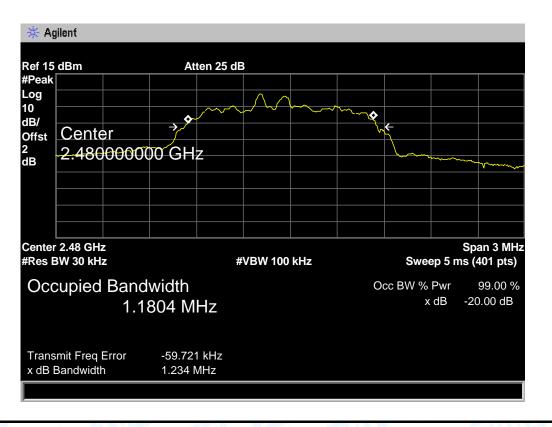




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π/4-DQPSK TX Mode





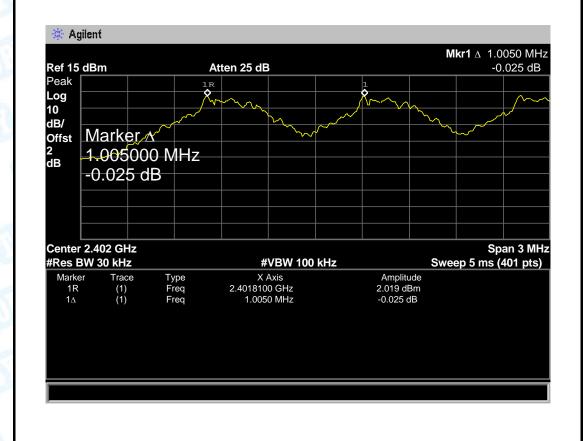
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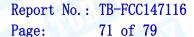
١	EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100
	Temperature:	25 ℃	Relative Humidity:	55%
	Test Voltage:	DC 3.7V		

Test Mode: Hopping Mode (GFSK)

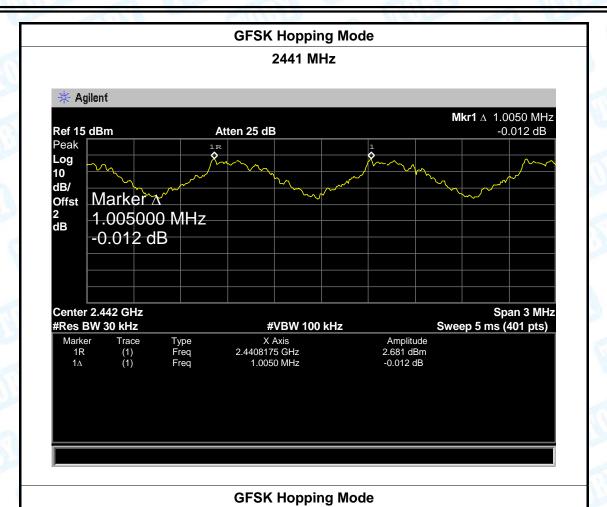
	Channel frequency	Separation Read Value	Separation Limit
	(MHz)	(kHz)	(kHz)
	2402	1005.00	850.058
	2441	1005.00	855.262
	2480	1005.00	858.417

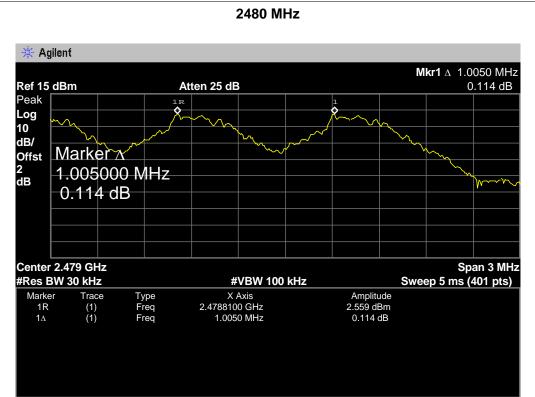
GFSK Hopping Mode













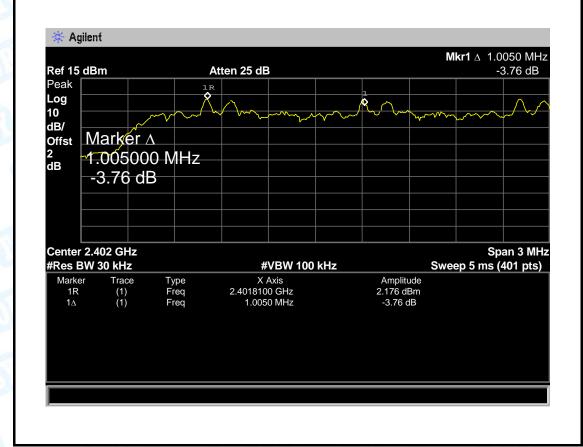
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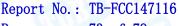
EUT:	Multimedia Speaker with Blue-Tooth	Model Name :	PBX-2100
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		

Test Mode: Hopping Mode (π /4-DQPSK)

Channel frequency	Separation Read Value	Separation Limit	
(MHz)	(kHz)	(kHz)	
2402	1005.00	819.33	
2441	1005.00	822.00	
2480	1005.00	822.67	

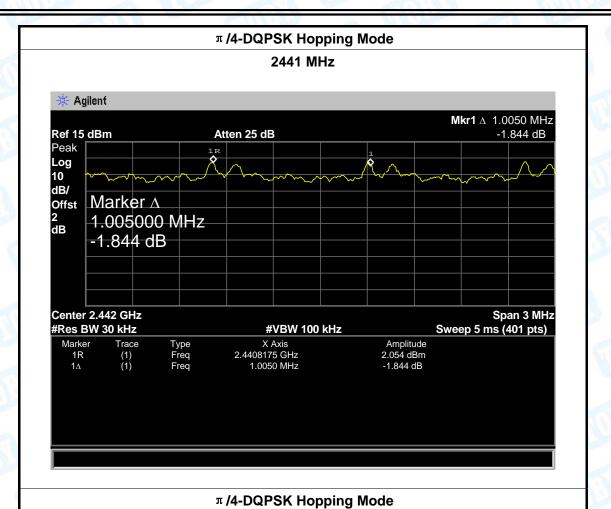
π/4-DQPSK Hopping Mode







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* Agilent **Mkr1** A 1.0050 MHz Ref 15 dBm Atten 25 dB -0.226 dB Peak Log 10 dB/ Marker ∧ Offst 1.005000 MHz dB -0.226 dB Center 2.479 GHz Span 3 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 5 ms (401 pts) Amplitude 2.711 dBm -0.226 dB X Axis 2.4788100 GHz 1.0050 MHz (1) (1)



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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) 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

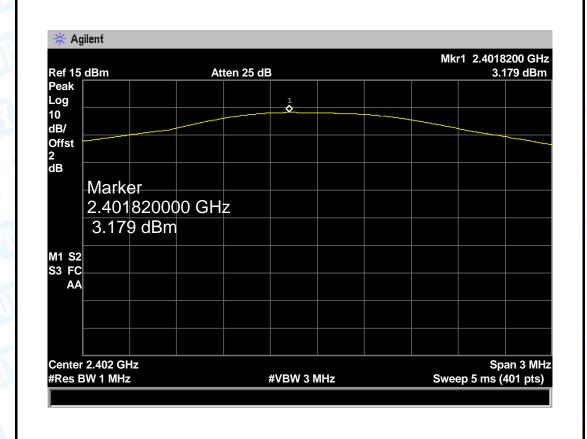
The EUT was set to continuously transmitting in the max power during the test.



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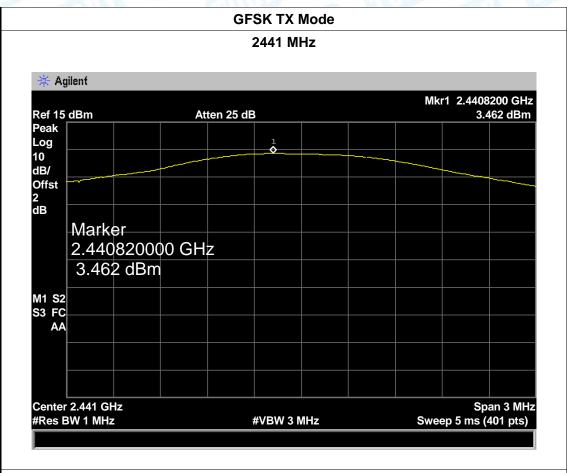
10.5 Test Data

EUT: Multimedia		Speaker with Blue-Tooth	Mode	el Name :	PBX-2100
Temperature:	rature: 25 °C		Rela	ive Humidity:	55%
Test Voltage:	oltage: AC 120V/60Hz				THU
Test Mode: TX Mode (GFSK)					
Channel frequency (MHz)		Test Result (dBm)	Limit (dBm)	
2402		3.179			
2441		3.462		30	
2480		3.553			
	GFSK TX Mode				
	0400 MII-				

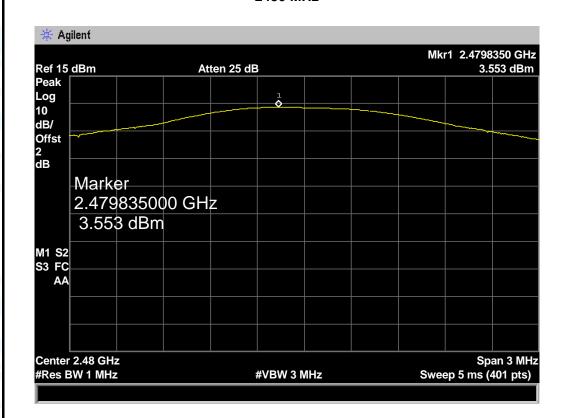




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GFSK TX Mode

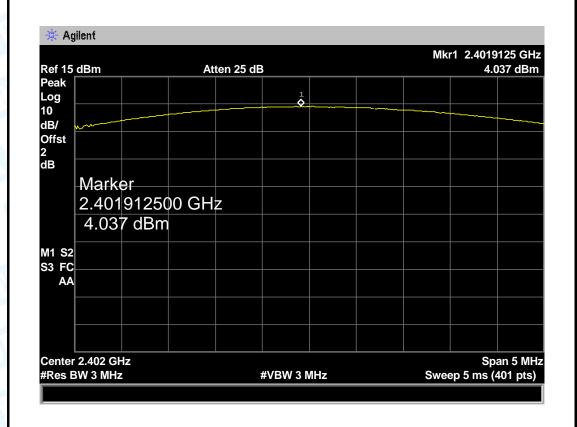


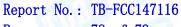


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EUT:	Multimedia Speaker with Blue-Tooth		Model Name :	PBX-2100
Temperature:	25 ℃		Relative Humidity:	55%
Test Voltage: AC 120V		60Hz	TO B	9
Test Mode: TX Mode		(π/4-DQPSK)		
Channel frequency (MHz)		Test Result (dBr	m) Limit (dBm)	
2402 2441 2480		4.037		
		4.310		21
		4.445	4.445	
T /A DODGE TV Mode				

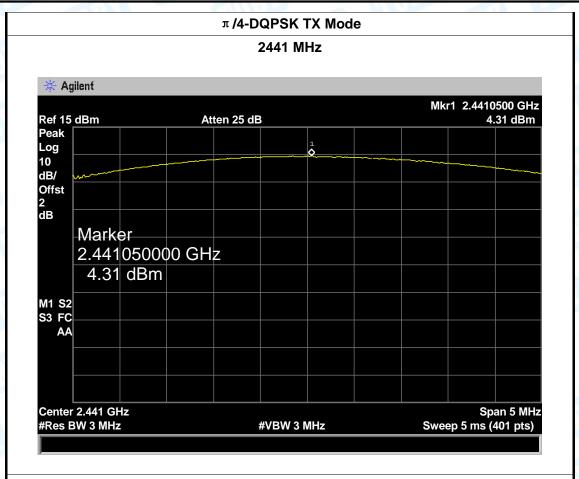
π/4-DQPSK TX Mode



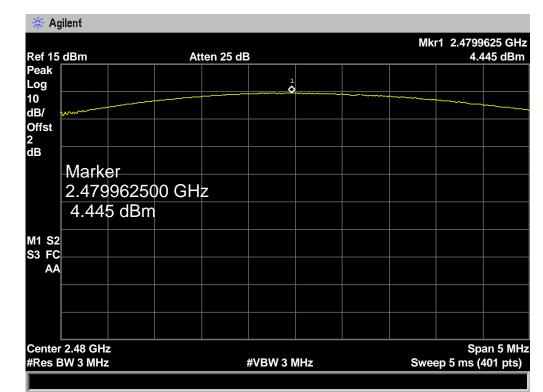




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π/4-DQPSK TX Mode





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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 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