

Shenzhen Toby Technology Co., Ltd.

Report No.: TB-FCC151769

Page: 1 of 77

FCC Radio Test Report FCC ID: 2ALM4-PUSHEEN

Original Grant

Report No. : TB-FCC151769

Applicant : Culturefly LLC

Equipment Under Test (EUT)

EUT Name : Bluetooth Loudspeaker

Model No. : Pusheen

Series Model No. : N/A

Brand Name : N/A

Receipt Date : 2017-03-02

Test Date : 2017-03-03 to 2017-03-24

Issue Date : 2017-03-25

Standards : FCC Part 15: 2016, 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 :

the report.

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

TB-RF-074-1.0

Tel: +86 75526509301 Fax: +86 75526509195



Page: 2 of 77

Contents

COI	NIENIS	
1.	GENERAL INFORMATION ABOUT EUT	
	1.1 Client Information	
	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	
	1.5 Description of Test Mode	
	1.6 Description of Test Software Setting	
	1.7 Measurement Uncertainty	
	1.8 Test Facility	
2.	TEST SUMMARY	
3.	TEST EQUIPMENT	10
4.	CONDUCTED EMISSION TEST	11
	4.1 Test Standard and Limit	11
	4.2 Test Setup	11
	4.3 Test Procedure	11
	4.4 EUT Operating Mode	12
	4.5 Test Data	12
5.	RADIATED EMISSION TEST	17
	5.1 Test Standard and Limit	17
	5.2 Test Setup	18
	5.3 Test Procedure	19
	5.4 EUT Operating Condition	19
	5.5 Test Data	19
6.	RESTRICTED BANDS REQUIREMENT	34
	6.1 Test Standard and Limit	34
	6.2 Test Setup	34
	6.3 Test Procedure	34
	6.4 EUT Operating Condition	35
	6.5 Test Data	35
7.	NUMBER OF HOPPING CHANNEL	48
	7.1 Test Standard and Limit	48
	7.2 Test Setup	
	7.3 Test Procedure	
	7.4 EUT Operating Condition	48
	7.5 Test Data	48
8.	AVERAGE TIME OF OCCUPANCY	
	8.1 Test Standard and Limit	
	8.2 Test Setup	



Report No.: TB-FCC151769
Page: 3 of 77

Page:

1	8.3 Test Procedure	50
	8.4 EUT Operating Condition	50
	8.5 Test Data	
9.	CHANNEL SEPARATION AND BANDWIDTH TEST	63
	9.1 Test Standard and Limit	63
	9.2 Test Setup	63
	9.3 Test Procedure	63
	9.4 EUT Operating Condition	63
	9.5 Test Data	64
10.	PEAK OUTPUT POWER TEST	72
	10.1 Test Standard and Limit	72
	10.2 Test Setup	72
	10.3 Test Procedure	
	10.4 EUT Operating Condition	72
	10.5 Test Data	73
11.	ANTENNA REQUIREMENT	77
	11.1 Standard Requirement	77
	11.2 Antenna Connected Construction	



Page: 4 of 77

1. General Information about EUT

1.1 Client Information

Applicant : Culturefly LLC

Address : 20 west 33rd street, 9th Floor, New York NY 10001

Manufacturer: Shenzhen WFB creative design co.,Ltd.

Address : 215# Fumin Road, Longxi, Longgang District, Shenzhen, China

1.2 General Description of EUT (Equipment Under Test)

EUT Name	2	Bluetooth Loudspeaker				
Models No.		Pusheen	Pusheen			
Model Difference		N/A				
	:	Operation Frequency:	Bluetooth V2.1+EDR: 2402~2480 MHz			
		Number of Channel:	Bluetooth: 79 Channels see Note 2			
Product		Max Peak Output Power: Bluetooth: -1.202dBm(π /4-DQPSK)				
Description		Antenna Gain: -0.68 dBi PCB Antenna				
		Modulation Type:	GFSK 1Mbps(1 Mbps) π /4-DQPSK(2 Mbps)			
Power Supply		DC power by USB cable.				
		DC power by Li-ion battery.				
Power Rating		DC 5.0V by USB cable.				
		DC 3.7V by 1200mAh Li-ion battery.				
Connecting I/O Port(S)		Please refer to the User's Manual				

Note:

(1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

(2) 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			
05	2407	32	2434	59	2461			
06	2408	33	2435	60	2462			



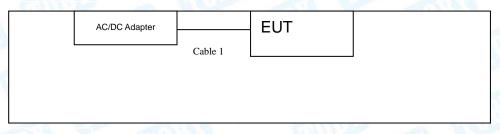
Page: 5 of 77

		E THE STATE OF THE			
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	100	177
26	2428	53	2455	MADE	

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

1.3 Block Diagram Showing the Configuration of System Tested

Charging with TX Mode



TX Mode





Page: 6 of 77

1.4 Description of Support Units

Equipment Information									
Name Model FCC ID/VOC Manufacturer Used "√"									
AC/DC Adapter TEKA012 VOC TEKA √									
AC/DC Adapter: Input:100~240V, 50/60Hz, 0.2A. Output: 5V, 1A									
	Cable Information								
Number Shielded Type Ferrite Core Length Note									
Cable 1	YES	YES	0.8M	mn 133					

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 Mode			

For Radiated Test					
Final Test Mode Description					
Mode 1	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 modes 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: 7 of 77

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	FCCAssist_1.5.exe		
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})
Conducted Emission	Level Accuracy: 9kHz~150kHz 150kHz to 30MHz	±3.42 dB ±3.42 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	±4.60 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	±4.40 dB
Radiated Emission	Level Accuracy: Above 1000MHz	±4.20 dB



Page: 8 of 77

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.



9 of 77 Page:

2. Test Summary

	FCC Part 15 Subpart C(15.247)/ RSS 247 Issue 1					
Standard Se	ction	T4 16	landarra and	D		
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(d)	RSS 247 5.5	Band Edge	PASS	N/A		
15.247(c)& 15.209	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:832.4069kHz π/4-DQPSK: 1167.80kHz		

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



Analyzer

Report No.: TB-FCC151769

Page: 10 of 77

3. Test Equipment

					Cal. Due
Description	Manufacturer	Model No.	Serial No.	Cal. Date	Date
EMI Test	ROHDE&	ESCI	100321	Jul. 22, 2016	Jul. 21, 2017
Receiver	SCHWARZ		.0002		
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Jul. 22, 2016	Jul. 21, 2017
L.I.S.N	Rohde & Schwarz	ENV216	101131	Jul. 22, 2016	Jul. 21, 2017
L.I.S.N	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jul. 22, 2016	Jul. 21, 2017
Radiation	Spurious Emiss	ion			Cal. Due
Description	Manufacturer	Model No.	Serial No.	Cal. Date	Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 22, 2016	Jul. 21, 2017
EMI Test Receiver	Rohde & Schwarz	ESPI	10Pusheen0/007	Jul. 22, 2016	Jul. 21, 2017
Bilog Antenna	ETS-LINDGREN	3142E	Pusheen17537	Mar. 18, 2017	Mar. 17, 2018
Horn Antenna	ETS-LINDGREN	3117	Pusheen43207	Mar. 17, 2017	Mar. 16, 2018
Loop Antenna	Laplace instrument	RF300	0701	Mar. 25, 2017	Mar. 24, 2018
Pre-amplifier	Sonoma	310N	185903	Mar. 18, 2017	Mar. 17, 2018
Pre-amplifier	HP	8449B	3008A00849	Mar. 26, 2016	Mar. 25, 2017
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 26, 2016	Mar. 25, 2017
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Antenna C	Conducted Emis	sion			
Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 22, 2016	Jul. 21, 2017
Spectrum Analyzer	Rohde & Schwarz	ESPI	100321	Jul. 22, 2016	Jul. 21, 2017



Page: 11 of 77

4. Conducted Emission Test

4.1 Test Standard and Limit

4.1.1Test Standard FCC Part 15.207

4.1.2 Test Limit

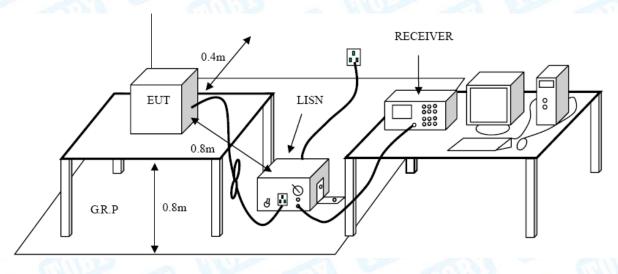
Conducted Emission Test Limit

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

Notes:

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

4.2 Test Setup



4.3 Test Procedure

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

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



Page: 12 of 77

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.

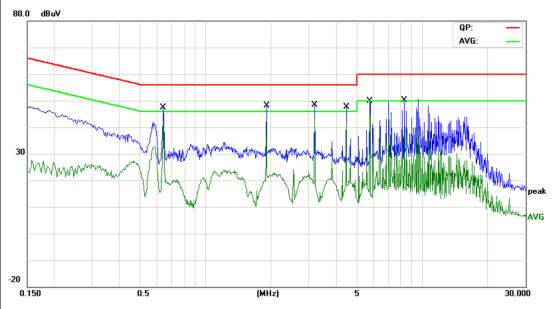
4.5 Test Data

Test data please refer the following pages.



Page: 13 of 77

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz	OV.	33
Terminal:	Line		
Test Mode:	USB Charging Mode		LITTLE TO
Remark:	Only worse case is reported		
80 0 dBuV			



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB	dBu∀	dBuV	dB	Detector
1		0.6380	35.47	10.09	45.56	56.00	-10.44	QP
2		0.6380	32.10	10.09	42.19	46.00	-3.81	AVG
3		1.9140	35.32	10.06	45.38	56.00	-10.62	QP
4		1.9140	32.03	10.06	42.09	46.00	-3.91	AVG
5		3.1900	34.58	10.02	44.60	56.00	-11.40	QP
6		3.1900	30.61	10.02	40.63	46.00	-5.37	AVG
7		4.4620	37.22	9.98	47.20	56.00	-8.80	QP
8	*	4.4620	32.64	9.98	42.62	46.00	-3.38	AVG
9		5.7380	37.49	10.00	47.49	60.00	-12.51	QP
10		5.7380	31.78	10.00	41.78	50.00	-8.22	AVG
11		8.2900	37.02	10.10	47.12	60.00	-12.88	QP
12		8.2900	28.58	10.10	38.68	50.00	-11.32	AVG



Page: 14 of 77

EUT:	Bluetooth Louds	peaker	Model Name	:	Pushee	en
Temperature:	25℃	- 61	Relative Hum	idity:	55%	
Test Voltage:	AC 120V/60 Hz	NB -	CAUT.			MARIN
Terminal:	Neutral			670	1180	
Test Mode:	USB Charging M	1ode		M		
Remark:	Only worse case	is reported	WHITE A		a 1	Mira.
30 -20 0.150		(MHz)	* * * * * * * * * * * * * * * * * * *		QP: AVG:	AVG
No. Mk. F	Reading req. Level	Correct Factor	Measure- ment	Limit	Over	
M	lHz dBu√	dB	dBuV	dBu∀	dB	Detector
1 0.6	380 36.42	10.02	46.44	56.00	-9.56	QP
2 0.6	380 30.97	10.02	40.99	16.00	-5.01	AVG
3 1.9	140 36.56	10.07	46.63	56.00	-9.37	QP
4 * 1.9	140 31.04	10.07	41.11	16.00	-4.89	AVG
5 3.1	900 36.77	10.06	46.83	56.00	-9.17	QP
6 3.1	900 31.00	10.06	41.06	16.00	-4.94	AVG
7 4.4	660 36.73	10.06	46.79	56.00	-9.21	QP
8 4.4	660 29.93	10.06	39.99	16.00	-6.01	AVG
9 5.7	420 36.73	10.06	46.79	60.00	-13.21	QP
10 5.7	420 29.85	10.06	39.91	50.00	-10.09	AVG
11 16.1	380 26.67	10.06	36.73	30.00	-23.27	QP
12 16.1	380 10.83	10.06	20.89	50.00	-29.11	AVG
Emission Level=	Read Level+ Cor	rect Factor				



Page: 15 of 77

EUT:	Bluetooth Lo	oudspeaker	Model Name :	Pushee	en
Temperature:	25 ℃		Relative Humidity:	55%	LINE
Test Voltage:	AC 240V/60	Hz		7733	
Terminal:	Line	- GAU			
Test Mode:	USB Chargi	ng Mode		- 1	Miles
Remark:	Only worse	case is reported		2.0	6
30 dBuV -20 0.150	0.5	(MHz)	* * * * * * * * * * * * * * * * * * *	QP: AVG:	peak AVG
No. Mk.	Rea Freq. Le	ding Correct vel Factor	1.1.11	Over	
	MHz dB	uV dB	dBuV dBuV	dB	Detector
1 0.	6380 35.	42 10.09	45.51 56.00	-10.49	QP
2 * 0.	6380 32.	62 10.09	42.71 46.00	-3.29	AVG
3 1.	9140 34.	83 10.06	44.89 56.00	-11.11	QP
4 1.	9140 31.	90 10.06	41.96 46.00	-4.04	AVG
5 3.	1860 35.	10 10.02	45.12 56.00	-10.88	QP
6 3.	1860 24.	57 10.02	34.59 46.00	-11.41	AVG
7 4.	4620 9.	65 9.98	19.63 56.00	-36.37	QP
8 4.	4620 1.	17 9.98	11.15 46.00	-34.85	AVG
9 5.	7380 21.	55 10.00	31.55 60.00	-28.45	QP
10 5.	7380 10.	74 10.00	20.74 50.00	-29.26	AVG
11 8.	2860 15.	39 10.10	25.49 60.00	-34.51	QP
		81 10.10		-31.09	AVG
Emission Level	= Read Level	+ Correct Facto	or		



Report No.: TB-FCC151769
Page: 16 of 77

EUT:	Bluetooth Louds	peaker	Model Name :	Pushe	en
Temperature:	25℃	2 61	Relative Humidit	y: 55%	100
Test Voltage:	AC 240V/60 Hz	13			MAIL
Terminal:	Neutral	40			
Test Mode:	USB Charging M	lode			
Remark:	Only worse case	is reported		1 N	
30 dBuV	Want of the state	deraportal belaporto		QP: AVG:	peak
0.150	0.5	(MHz)	5		30.000
No. Mk. F	Reading req. Level	Correct Factor	Measure- ment Lim	nit Over	
N	∕lHz dBuV	dB	dBu∀ dBu	ıV dB	Detector
1 0.6	35.78	10.02	45.80 56.	00 -10.20	QP
2 * 0.6	380 29.02	10.02	39.04 46.	00 -6.96	AVG
3 1.9	100 30.97	10.07	41.04 56.	00 -14.96	QP
4 1.9	21.31	10.07	31.38 46.	00 -14.62	AVG
5 3.1	900 34.56	10.06	44.62 56.	00 -11.38	QP
6 3.1	900 24.73	10.06	34.79 46.	00 -11.21	AVG
7 4.4	699 34.73	10.06	44.79 56.	00 -11.21	QP
8 4.4	699 25.24	10.06	35.30 46.	00 -10.70	AVG
	380 30.02	10.06		00 -19.92	QP
	380 19.62	10.06		00 -20.32	AVG
11 13.3	35.52	10.09	45.61 60.	00 -14.39	QP
12 13.3	940 20.66	10.09	30.75 50.	00 -19.25	AVG
Emission Level=	Read Level+ Cor	rect Factor			



Page: 17 of 77

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	Distance of 3m (dBuV/m)			
(MHz)	Peak	Average		
Above 1000	74	54		

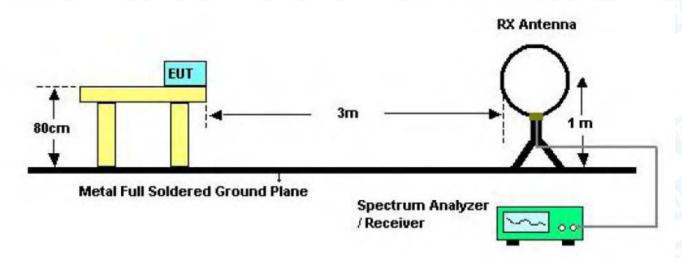
Note:

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

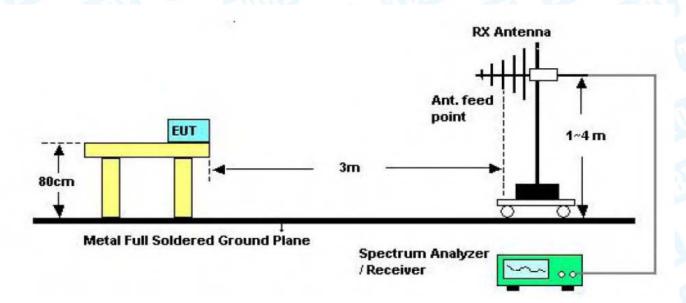


Page: 18 of 77

5.2 Test Setup



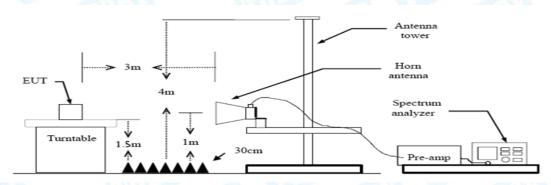
Below 30MHz Test Setup



Below 1000MHz Test Setup



Page: 19 of 77



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=10 Hz with Peak Detector for Average Values.

Test data please refer the following pages.



Page: 20 of 77

9KHz~30MHz

From 9KHz to 30MHz: Conclusion: PASS

Emission Level= Read Level+ Correct Factor

Note: The amplitude of spurious emissions which are attenuated by more than 20dB

below the permissible value has no need to be reported.

30MHz~1GHz

	T:			Bli	ueto	oth I	Loudsp	eaker	Model N	lame :		Pushee	en	
en	nper	ature) :	25	$^{\circ}$ C				Relative	Humidity	:	55%	%	
es	t Vo	Itage	:	DO	3.7	7V				OID			a 1	
۱nt	. Po	l.		Н	rizc	ntal	2	A BULL	ATT I	Contract of the Contract of th		CIN'	13	
es	t Mc	de:		TX	GF	SKI	Mode 2	2402MHz	CHILL	-				
Rer	nark	(:		Or	ıly v	vorse	e case	is reported					181	
80.	O dB	uV/m												
										(RF)FCC	15C 3	M Radiation		
				+	+							Margin -6	dB	
				_	+							4	6	
30					_	$+$ \square				1 X	2 X	3 X	5X X	
								ı				اساليا		
	WULVY	***							when hopen the	Jan White with	Marie Marie	Month		
	יוי	1	Wyw	HAMANA.		ميامييرين	handragen serieban.	Mary market harder	WAR ON THE					
					er lyvak _y t	<i>μ</i>								
-20														
30	0.000	40	50	60	70	80		(MHz)	300	400	500	600 700	1000.00	
						Dag	ading	Correct						
							_		Measure-			_		
1	No.	Mk.	Fı	req.			vel	Factor	Measure- ment	Limit		Over		
1	No.	Mk.		r eq. IHz		Le	_			Limit dBuV/n		Over dB	Detecto	
1	No.			Hz		Le dE	vel	Factor	ment		n			
	No.		M	Hz 580	3	dE 42	vel BuV	Factor dB/m	ment dBuV/m	dBuV/n	n)	dB		
1	No.		M 420.	Hz 580 372	3	42 39	evel BuV	dB/m -12.43	ment dBuV/m 30.48	dBuV/n	n) -	dB -15.52	peal peal	
1 2	No.		M 420. 541.	580 372 150	3 5 5	de 42 39 37	evel BuV 2.91 0.76	dB/m -12.43 -9.53	ment dBuV/m 30.48 30.23	dBuV/n 46.00 46.00	n) -	dB -15.52 -15.77	peal peal peal	
1 2 3	No.		M 420. 541. 661.	580 372 150 345	3 5 5 3	42 39 37 41	evel BuV 2.91 0.76	Factor dB/m -12.43 -9.53 -7.32	ment dBuV/m 30.48 30.23 30.55	46.00 46.00 46.00	n) .	dB -15.52 -15.77 -15.45	peal peal peal	
1 2 3 4		,	M 420. 541. 661. 782.	150 372 150 345 087	3 5 5 3	42 39 37 41	2.91 0.76 7.87	Factor dB/m -12.43 -9.53 -7.32 -5.49	ment dBuV/m 30.48 30.23 30.55 35.56	46.00 46.00 46.00 46.00) ·	dB -15.52 -15.77 -15.45 -10.44	peal peal peal peal	

TB-RF-074-1.0



Page: 21 of 77

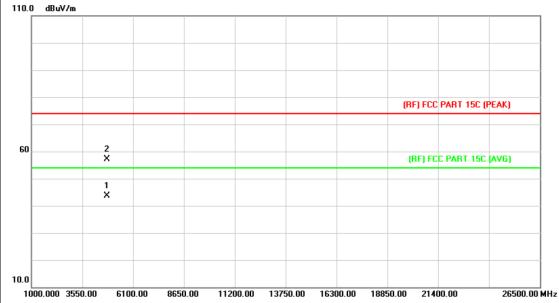
			Bluet	tooth	Lou	ıdspea	ker	Mod	del Na	ame :		Pus	heer	1
Гетре	ratur	e:	25 ℃			10		Rela	tive H	lumidi	ty:	55%	ó	AA
est V	oltag	e:	DC 3	3.7V				WI I						
Ant. P	ol.		Verti	cal			MAIN			1	للولا		4	
Test M	ode:		TX G	FSK	Mo	de 240	2MHz		113	3		. 1		المالية
Remar	k:		Only	wors	se ca	ase is i	reported	W						
80.0 dl	BuV/m													
30	oppin militaring	hall his maken	"Marry	H. seekel fee	J. J		1 X Kayroli-Aga-khalagaliya	2 X	yak kalanda	(RF)FC	3 ×	3M Radi Marg	5 X	6 ×
20 30.000	40	50	60	70 80			(MHz)		300	400	500	600	700	1000.000
	NAI.			R	ead	ing	Correct	Meas	ure-					
No.	IVIK.	F	req.	İ	Leve	el	Factor	me		Limit		Ove	er	
No.	IVIK.		req. MHz				Factor dB/m		nt	Limit dBuV		Ove		Detecto
No.	IVIK.	N			Leve	V		mei	nt //m		/m			Detecto peak
	IVIK.	143.	ИHz	;	dBu\	v 99	dB/m	mei dBu\	nt //m 48	dBuV	/m 50	dB	02	
1	IVIK.	143 239	MHz .8295 .9874	; <i>i</i>	dBu\ 46.9	v 99 70	dB/m -21.51	dBu\ 25.4	nt //m 48 52	dBuV	/m 50 00	dB -18.	02 48	peak peak
1 2	IVIK.	143 239 541	.8295 .9874 .3725	; , , , , , , , , , , , , , , , , , , ,	dBu ¹ 46.9 42.7 36.5	v 99 70	dB/m -21.51 -18.18 -9.53	25.4 24.5 27.0	nt //m 48 52 05	43.5 46.0 46.0	/m 50 00	dB -18. -21.	02 48 95	peak peak
1 2 3 4	IVIK.	143. 239. 541. 661.	.8295 .9874 .3725	;	dBu ¹ 46.9 42.7 36.5 34.8	70 58	dB/m -21.51 -18.18 -9.53 -7.32	25.4 24.5 27.5 27.5	nt //m 48 52 05 57	43.5 46.0 46.0 46.0	/m 50 00 00	dB -18. -21. -18.	02 48 95 43	peak peak peak
1 2 3	tvik.	143 239 541 661 782	.8295 .9874 .3725	5 4 5 5 5 5 5 5	dBu ¹ 46.9 42.7 36.5	70 58 39	dB/m -21.51 -18.18 -9.53	25.4 24.5 27.0	nt //m 48 52 05 57 65	43.5 46.0 46.0	/m 50 00 00 00	dB -18. -21.	02 48 95 43 35	peak peak



Page: 22 of 77

Above 1GHz(Only worse case is reported)

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen				
Temperature:	25℃	Relative Humidity:	55%				
Test Voltage:	DC 3.7V						
Ant. Pol.	Horizontal						
Test Mode:	TX GFSK Mode 2402MHz		- DILLE				
Remark:	No report for the emission wh prescribed limit.	ich more than 10 dB bo	elow the				

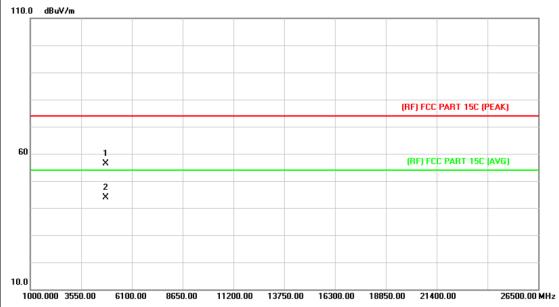


N	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4802.650	30.16	13.43	43.59	54.00	-10.41	AVG
2		4803.088	43.69	13.44	57.13	74.00	-16.87	peak



Page: 23 of 77

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen				
Temperature:	25℃	Relative Humidity:	55%				
Test Voltage:	DC 3.7V	OC 3.7V					
Ant. Pol.	Vertical	Vertical					
Test Mode:	TX GFSK Mode 2402MH:	z	Chine and a second				
Remark:	No report for the emission prescribed limit.	n which more than 10 dB	3 below the				

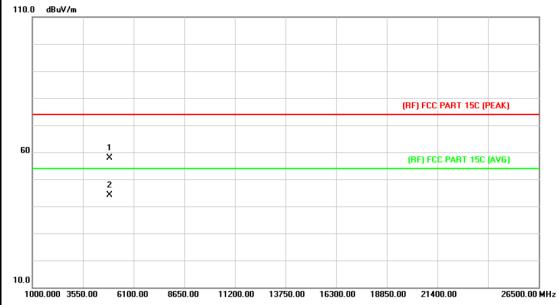


No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.559	42.89	13.44	56.33	74.00	-17.67	peak
2	*	4804.243	30.34	13.44	43.78	54.00	-10.22	AVG



Page: 24 of 77

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen		
Temperature:	25℃	Relative Humidity:	55%		
Test Voltage:	DC 3.7V				
Ant. Pol.	Horizontal				
Test Mode:	TX GFSK Mode 2441MHz	(1) 32 m	THE PARTY OF THE P		
Remark:	No report for the emission prescribed limit.	which more than 10 dE	3 below the		

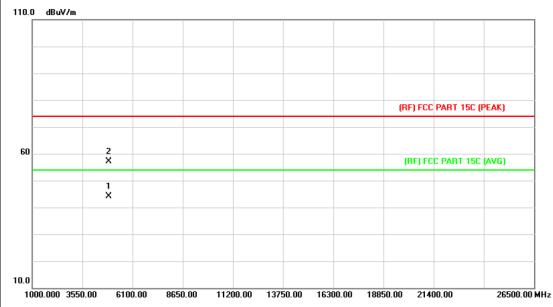


No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4882.108	43.90	13.90	57.80	74.00	-16.20	peak
2	*	4882.546	30.22	13.90	44.12	54.00	-9.88	AVG



Page: 25 of 77

Bluetooth Loudspeaker	Model Name :	Pusheen				
25℃	Relative Humidity:	55%				
DC 3.7V	DC 3.7V					
Vertical						
TX GFSK Mode 2441MHz		LILL STREET				
No report for the emission who prescribed limit.	No report for the emission which more than 10 dB below the prescribed limit.					
	25℃ DC 3.7V Vertical TX GFSK Mode 2441MHz No report for the emission wh	25°C Relative Humidity: DC 3.7V Vertical TX GFSK Mode 2441MHz No report for the emission which more than 10 dB be				

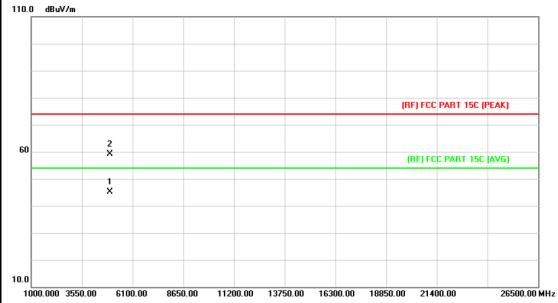


١	No.	Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
			MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		*	4881.064	30.24	13.90	44.14	54.00	-9.86	AVG
2			4883.083	43.17	13.91	57.08	74.00	-16.92	peak



Page: 26 of 77

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen				
Temperature:	25℃	Relative Humidity:	55%				
Test Voltage:	DC 3.7V	DC 3.7V					
Ant. Pol.	Horizontal						
Test Mode:	TX GFSK Mode 2480MHz		LINE TO SERVICE				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						

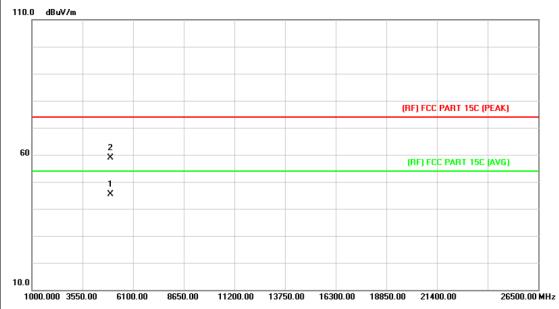


No	o. Mk	c. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4959.193			45.15	54.00	-8.85	AVG
2		4960.339	44.81	14.36	59.17	74.00	-14.83	peak



Page: 27 of 77

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen			
Temperature:	25℃	Relative Humidity:	55%			
Test Voltage:	ge: DC 3.7V					
Ant. Pol.	Vertical	Vertical				
Test Mode:	TX GFSK Mode 2480MHz	CU137	LINE TO SERVICE			
Remark:						

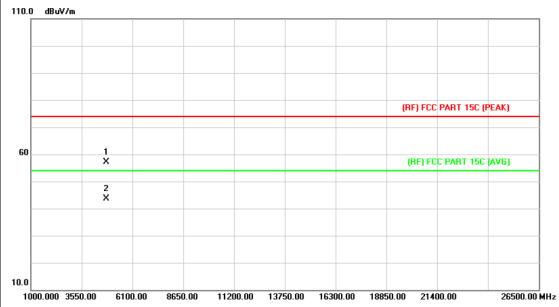


No	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4960.756	30.94	14.36	45.30	54.00	-8.70	AVG
2		4961.191	44.39	14.38	58.77	74.00	-15.23	peak



Page: 28 of 77

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen				
Temperature:	25℃	Relative Humidity:	55%				
Test Voltage:	DC 3.7V	OC 3.7V					
Ant. Pol.	Horizontal	Horizontal					
Test Mode:	TX π /4-DQPSK Mode 2402	MHz	LINE TO				
Remark: No report for the emission which more than 10 dB below the prescribed limit.							

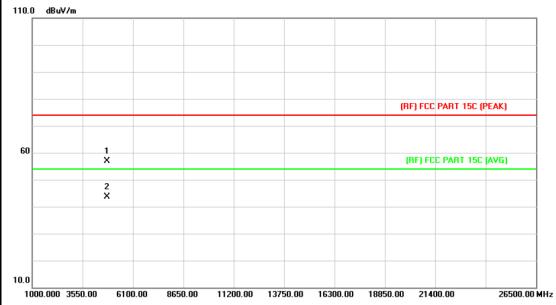


No	. Mk	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4804.177	43.80	13.44	57.24	74.00	-16.76	peak
2	*	4804.837	30.21	13.44	43.65	54.00	-10.35	AVG



Page: 29 of 77

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen			
Temperature:	25℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V					
Ant. Pol.	Vertical					
Test Mode:	TX π /4-DQPSK Mode 240	2MHz	O. C. C.			
Remark:	No report for the emission which more than 10 dB below the prescribed limit.					

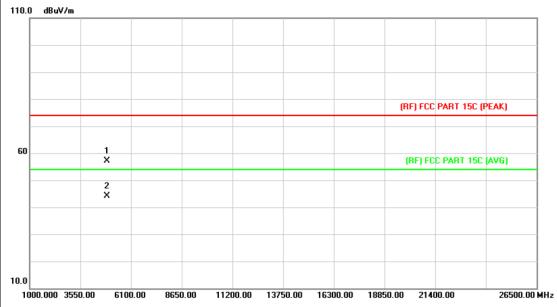


No.	Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.115	43.34	13.44	56.78	74.00	-17.22	peak
2	*	4804.147	30.14	13.44	43.58	54.00	-10.42	AVG



Page: 30 of 77

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

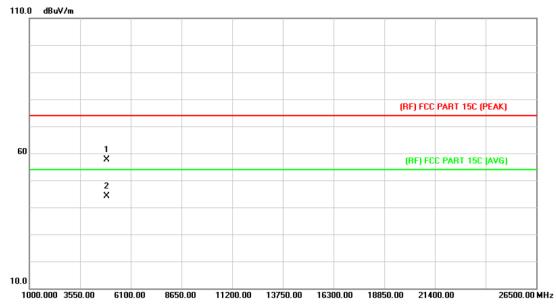


N	o. Mk	. Freq.			Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4881.319	43.29	13.90	57.19	74.00	-16.81	peak
2	*	4882.891	30.22	13.90	44.12	54.00	-9.88	AVG



Page: 31 of 77

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen				
Temperature:	25°C Relative Humidity:		55%				
Test Voltage:	DC 3.7V						
Ant. Pol.	Vertical						
Test Mode:	TX π /4-DQPSK Mode 2441	MHz	LINE TO				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						

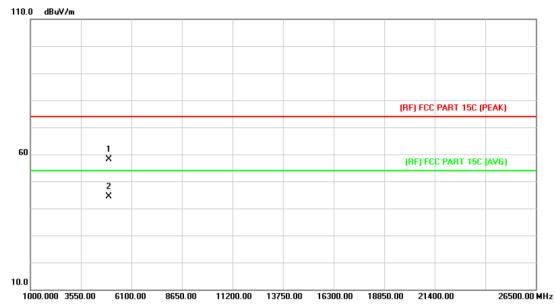


No	o. Mk.	Freq.	_	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4881.805	43.71	13.90	57.61	74.00	-16.39	peak
2	*	4882.756	30.13	13.90	44.03	54.00	-9.97	AVG



Page: 32 of 77

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen				
Temperature:	25℃	Relative Humidity:	55%				
Test Voltage:	DC 3.7V	DC 3.7V					
Ant. Pol.	Horizontal						
Test Mode:	TX π /4-DQPSK Mode 2480M	Hz	LITTLE OF				
Remark: No report for the emission which more than 10 dB below the prescribed limit.							

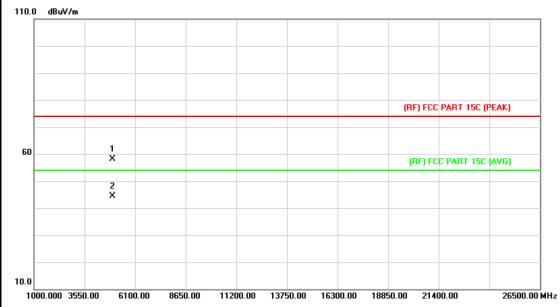


No	. Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4958.944	43.83	14.35	58.18	74.00	-15.82	peak
2	*	4960.825	30.09	14.36	44.45	54.00	-9.55	AVG



Page: 33 of 77

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen					
Temperature:	25℃	Relative Humidity:	55%					
Test Voltage:	DC 3.7V	DC 3.7V						
Ant. Pol.	Vertical							
Test Mode:	TX π /4-DQPSK Mode 2480M	lHz	- DIVI					
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		4960.669	43.79	14.36	58.15	74.00	-15.85	peak
2	*	4960.708	30.06	14.36	44.42	54.00	-9.58	AVG



Page: 34 of 77

6. Restricted Bands Requirement

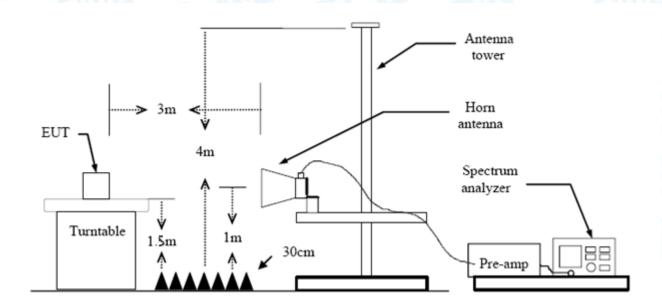
6.1 Test Standard and Limit

6.1.1 Test Standard FCC Part 15.209 FCC Part 15.205

6.1.2 Test Limit

Restricted Frequency	Distance of	3m (dBuV/m)
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-FCC151769 Page: 35 of 77

(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 AVG 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.

6.5 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=10 Hz with Peak Detector for Average Values.

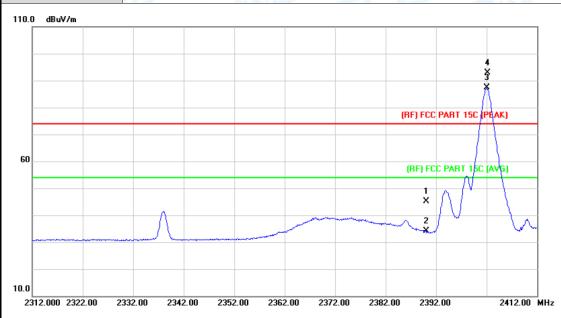
All restriction bands have been tested, only the worst case is reported.



Page: 36 of 77

(1) Radiation Test

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	Only worse case is reported		

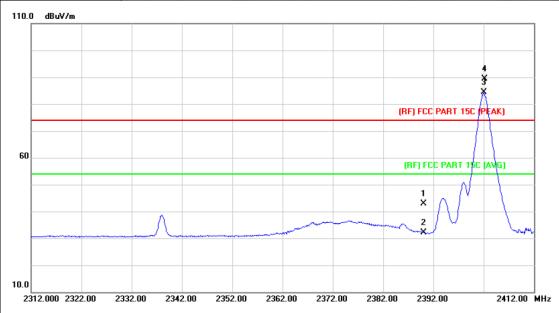


No	. Mk	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	44.27	0.77	45.04	74.00	-28.96	peak
2		2390.000	33.44	0.77	34.21	54.00	-19.79	AVG
3	*	2402.000	86.56	0.82	87.38	Fundamental Frequency		AVG
4	Χ	2402.200	91.99	0.82	92.81	Fundamental Frequency		peak



Page: 37 of 77

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen			
Temperature:	25℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V	DC 3.7V				
Ant. Pol.	Vertical		S. C. C.			
Test Mode:	TX GFSK Mode 2402MHz	TX GFSK Mode 2402MHz				
Remark:	Only worse case is reported					

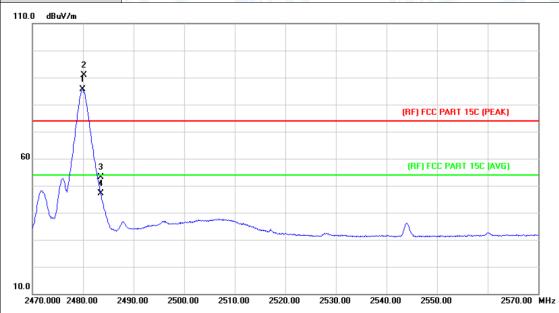


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	42.18	0.77	42.95	74.00	-31.05	peak
2		2390.000	31.36	0.77	32.13	54.00	-21.87	AVG
3	*	2402.000	83.44	0.82	84.26	Fundamental	Frequency	AVG
4	X	2402.200	88.64	0.82	89.46	Fundamental	Frequency	peak



Page: 38 of 77

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen				
Temperature:	25℃	Relative Humidity:	55%				
Test Voltage:	DC 3.7V	DC 3.7V					
Ant. Pol.	Horizontal						
Test Mode:	TX GFSK Mode 2480 MHz	TX GFSK Mode 2480 MHz					
Remark:	Only worse case is reported						

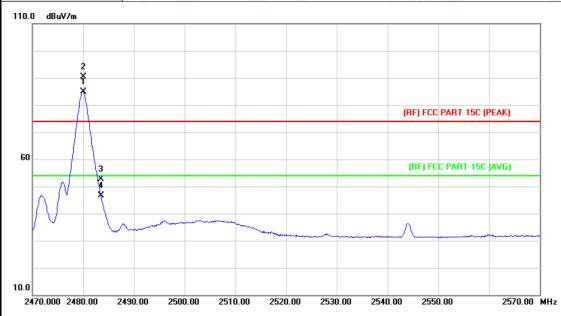


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	2479.900	84.43	1.15	85.58	Fundamenta	I Frequency	AVG
2	X	2480.200	89.69	1.15	90.84	Fundamenta	I Frequency	peak
3		2483.500	52.06	1.17	53.23	74.00	-20.77	peak
4		2483.500	45.96	1.17	47.13	54.00	-6.87	AVG



Page: 39 of 77

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2480 MHz		CHILL STREET
Remark:	Only worse case is reported	The same of the sa	

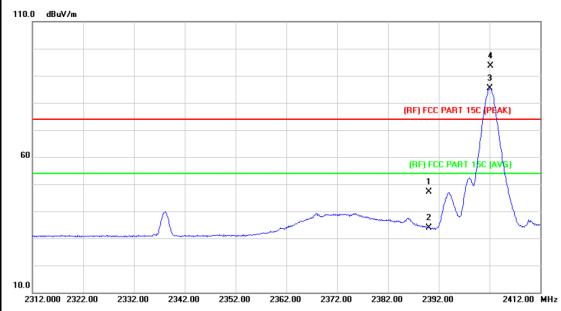


No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	2480.000	83.84	1.15	84.99	Fundamenta	I Frequency	AVG
2	Χ	2480.100	89.15	1.15	90.30	Fundamenta	I Frequency	peak
3		2483.500	51.38	1.17	52.55	74.00	-21.45	peak
4		2483.500	45.34	1.17	46.51	54.00	-7.49	AVG



Page: 40 of 77

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen				
Temperature:	25℃	Relative Humidity:	55%				
Test Voltage:	DC 3.7V	DC 3.7V					
Ant. Pol.	Horizontal						
Test Mode:	TX π /4-DQPSK Mode 2402	MHz	2 100				
Remark: Only worse case is reported							
110.0 dBuV/m							

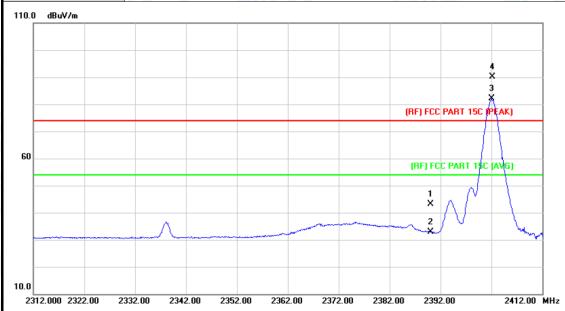


No	Mk.	Erog	Reading	Correct		Limit	Over	
NO.	IVIK.	. Freq.	Level	Factor	ment	Little	OVCI	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	46.43	0.77	47.20	74.00	-26.80	peak
2		2390.000	33.16	0.77	33.93	54.00	-20.07	AVG
3	*	2402.100	84.61	0.82	85.43	Fundamental	Frequency	AVG
4	X	2402.200	92.70	0.82	93.52	Fundamental	Frequency	peak



Page: 41 of 77

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen			
Temperature:	25℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V	m K				
Ant. Pol.	Vertical					
Test Mode:	TX π /4-DQPSK Mode 2402N	1Hz	A MILLER			
Remark: Only worse case is reported						
110.0 dBuV/m						

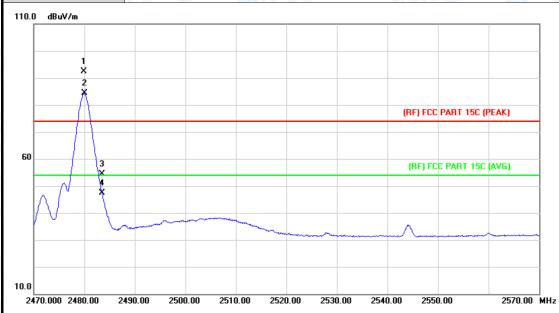


No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	42.25	0.77	43.02	74.00	-30.98	peak
2		2390.000	32.07	0.77	32.84	54.00	-21.16	AVG
3	*	2402.000	81.20	0.82	82.02	Fundamenta	I Frequency	AVG
4	Χ	2402.200	89.22	0.82	90.04	Fundamenta	I Frequency	peak



Page: 42 of 77

EUT:	Bluetooth Loudspeaker Model Nam		Pusheen			
Temperature:	25℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V	DC 3.7V				
Ant. Pol.	Horizontal					
Test Mode:	TX π /4-DQPSK Mode 2480)MHz	A HILL			
Remark: Only worse case is reported						
110.0 dBuV/m						

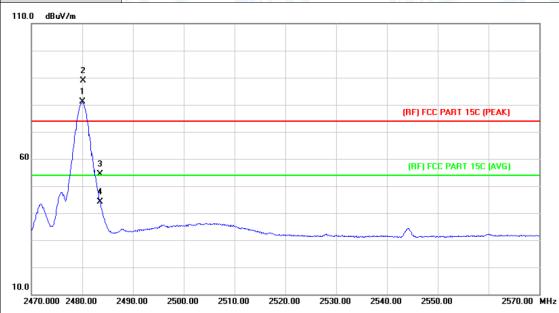


No	o. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Χ	2479.900	91.25	1.15	92.40	Fundamenta	I Frequency	peak
2	*	2480.000	83.19	1.15	84.34	Fundamenta	I Frequency	AVG
3		2483.500	53.16	1.17	54.33	74.00	-19.67	peak
4		2483.500	46.33	1.17	47.50	54.00	-6.50	AVG



Page: 43 of 77

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen			
Temperature:	25℃	25℃ Relative Humidity:				
Test Voltage:	DC 3.7V	DC 3.7V				
Ant. Pol.	Vertical	Vertical				
Test Mode:	TX π /4-DQPSK Mode 2480MHz					
Remark:	Only worse case is reported					
110.0 dP.4//m						

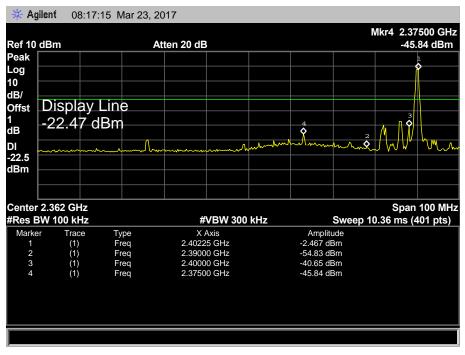


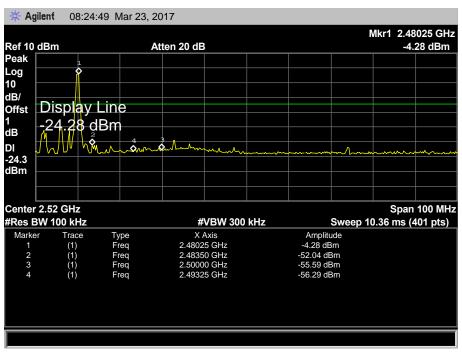
N	o. l	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
			MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	r	2480.000	79.91	1.15	81.06	Fundamenta	l Frequency	AVG
2)	X	2480.200	87.80	1.15	88.95	Fundamenta	l Frequency	peak
3			2483.500	53.29	1.17	54.46	74.00	-19.54	peak
4			2483.500	42.90	1.17	44.07	54.00	-9.93	AVG



(2) Conducted Test

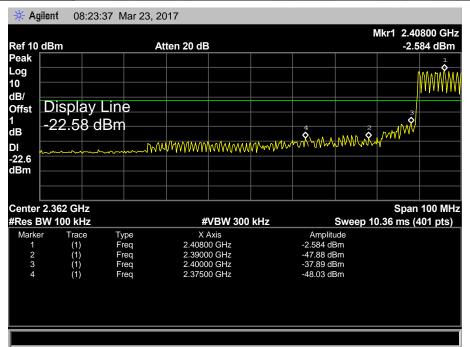
EUT:	Bluetooth Loudspeaker	Pusheen			
Temperature:	25℃ Relative Humidity: 55%				
Test Voltage:	DC 3.7V				
Test Mode:	TX GFSK Mode 2402MHz/2480 MHz				
Remark:	Only worse case is reported				

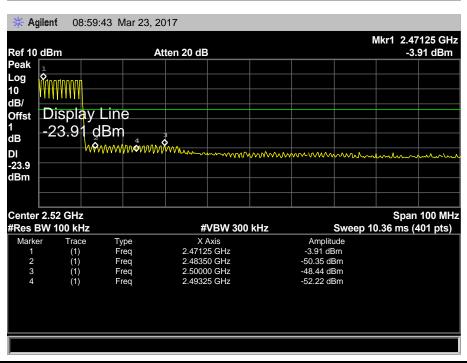






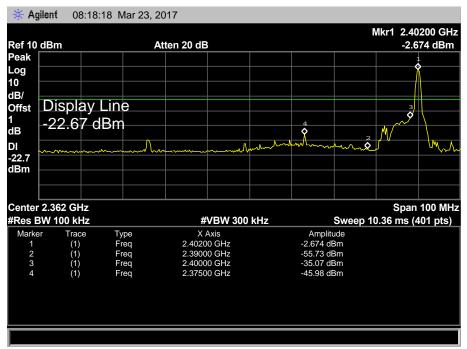
EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen		
Temperature:	25℃	Relative Humidity:	55%		
Test Voltage:	DC 3.7V		13.3		
Test Mode:	GFSK Hopping Mode				
Remark:	Only worse case is reported		LINE .		

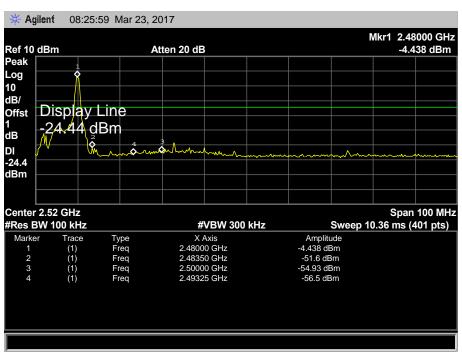






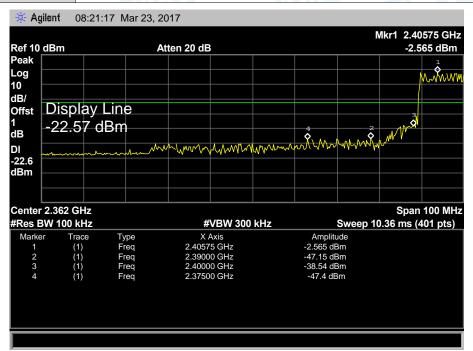
EUT:	Bluetooth Loudspeaker	oudspeaker Model Name :			
Temperature:	25℃ Relative Humidity: 55%				
Test Voltage:	DC 3.7V				
Test Mode:	TX π /4-DQPSK Mode 2402MHz/2480 MHz				
Remark:	Only worse case is reported				

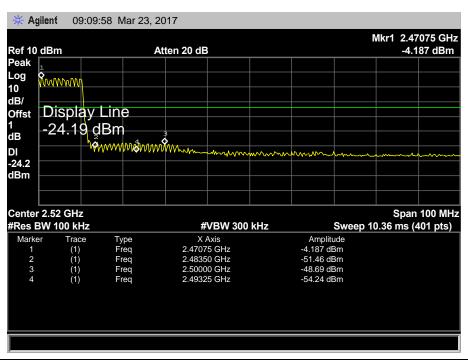






EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen		
Temperature:	25℃	Relative Humidity:	55%		
Test Voltage:	DC 3.7V				
Test Mode:	л /4-DQPSK Hopping Mode				
Remark:	Only worse case is reported	(1) July 1	CHILL STORY		







Page: 48 of 77

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



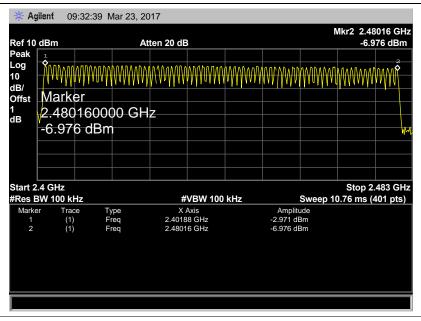
49 of 77 Page:

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen		
Temperature:	25℃	Relative Humidity:	55%		
Test Voltage:	DC 3.7V				
Test Mode:	Hopping Mode				

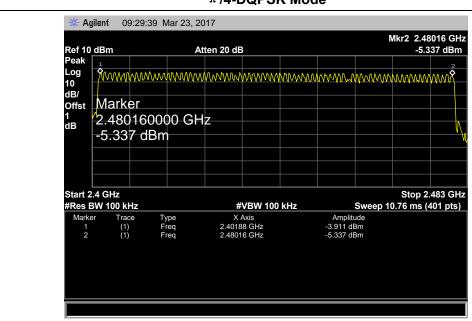
Test Mode:	Hopping Mode

Frequency Range	Quantity of Hopping Channel	
2402111- 2400111-	79	>15
2402MHz~2480MHz	79	>15

GFSK Mode



π /4-DQPSK Mode





Page: 50 of 77

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 average time of occupancy on any channel within the Period can be calculated with formulas:

 $\{Total \ of \ Dwell\} = \{Pulse \ Time\} * (1600 / X) / \{Number \ of \ Hopping \ Frequency\} * \{Period\} = 0.4s * \{Number \ of \ Hopping \ Frequency\}$

Note: X=2 or 4 or 6 (1DH1=2, 1DH3=4, 1DH5=6. 2DH1=2, 2DH3=4, 2DH5=6. 3DH1=2,3DH3=4, 3DH5=6)

The lowest, middle and highest channels are selected to perform testing to record the dwell time of each occupation measured in this channel, which is called Pulse Time here.

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



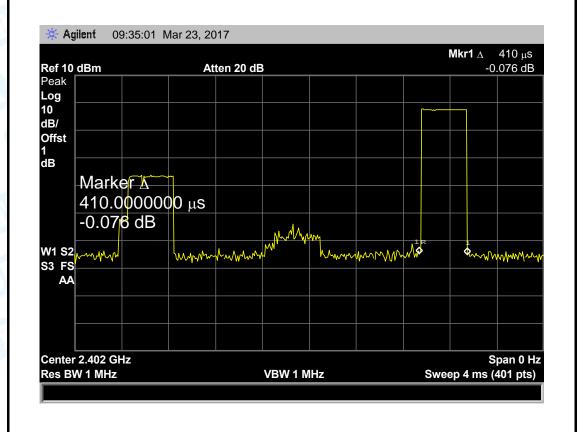
Page: 51 of 77

8.5 Test Data

EUT:	Bluetooth Loudspeaker Model Name :		e :	Pusheen	
Temperature:	25℃		Relative Humidity:		55%
Test Voltage:	DC 3.7V	DC 3.7V			
Test Mode:	Hopping Mod	Hopping Mode (GFSK 1DH1)			A HILL
Channel	Pulse Time	Total of Dwell	Period Time	Limit	
(MHz)	(ms)	(ms)	(s)	(ms)	Result
2402	0.410	131.20			
2441	0.410	131.20	31.60	400	PASS
2480	0.410	131.20			
Note: Divisit tim	a Dulas Tissa	(ma) (1600 2	. 70)04 0		

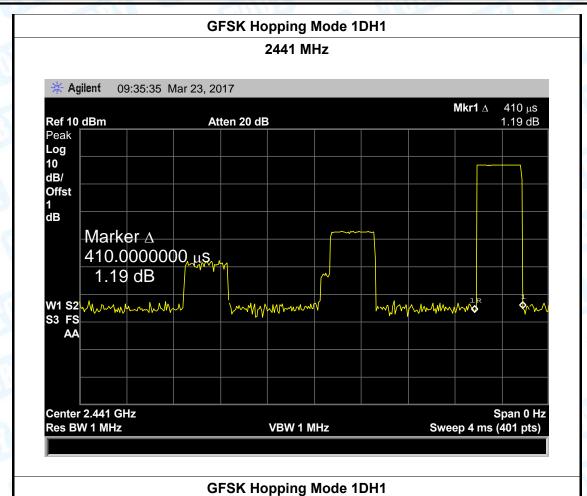
Note: Dwell time=Pulse Time (ms) \times (1600 \div 2 \div 79) \times 31.6

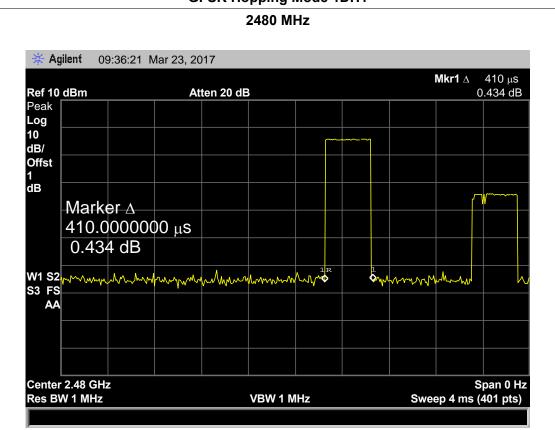
GFSK Hopping Mode 1DH1





Page: 52 of 77





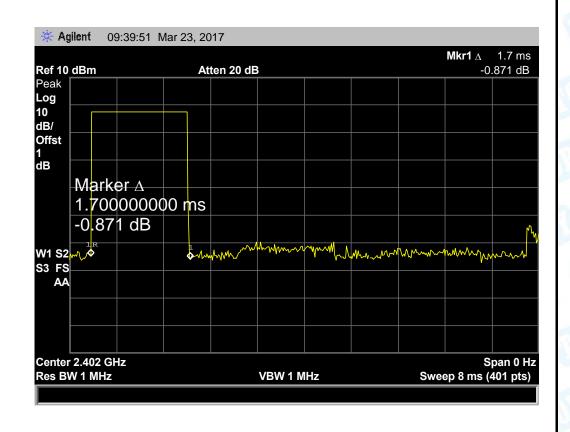


Page: 53 of 77

EUT:	Bluetooth L	Bluetooth Loudspeaker		Model Name :	
Temperature	: 25 ℃		Relative Humidity: 55%		
Test Voltage:	DC 3.7V	N. S. C.		-0	10
Test Mode:	Hopping M	ode (GFSK 1DH3)	Alle	
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			

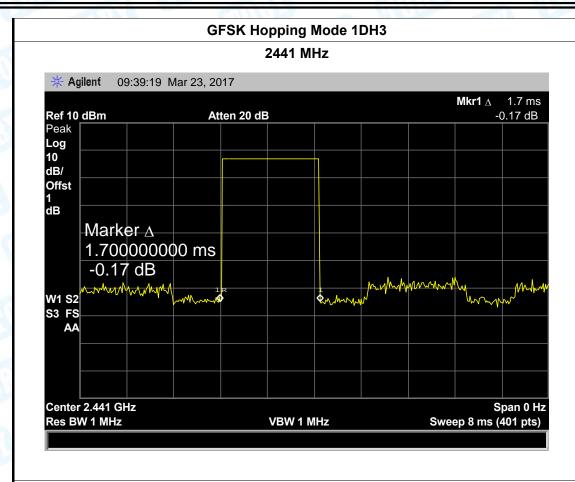
Note: Dwell time=Pulse Time (ms) \times (1600 \div 4 \div 79) \times 31.6

GFSK Hopping Mode 1DH3

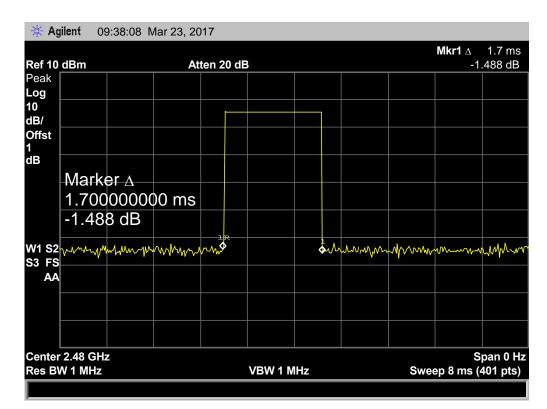




Page: 54 of 77



GFSK Hopping Mode 1DH3



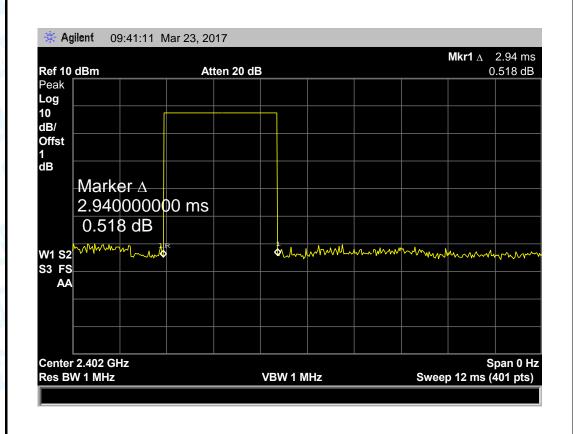


Page: 55 of 77

EUT:	Bluetooth L	oudspeaker	Model Name :		Pusheen
Temperature:	25℃	25℃ Relative Humidity			55%
Test Voltage:	DC 3.7V	DC 3.7V			30
Test Mode:	Hopping M	Hopping Mode (GFSK 1DH5)			
Channel	Pulse Time	Total of Dwell	Period Time	Limit	Result
(MHz)	(ms)	(ms)	(s)	(ms)	Result
2402	2.940	313.60			
2441	2.970	316.80	31.60	400	PASS
2480	2.970	316.80			

Note: Dwell time=Pulse Time (ms) \times (1600 \div 6 \div 79) \times 31.6

GFSK Hopping Mode 1DH5



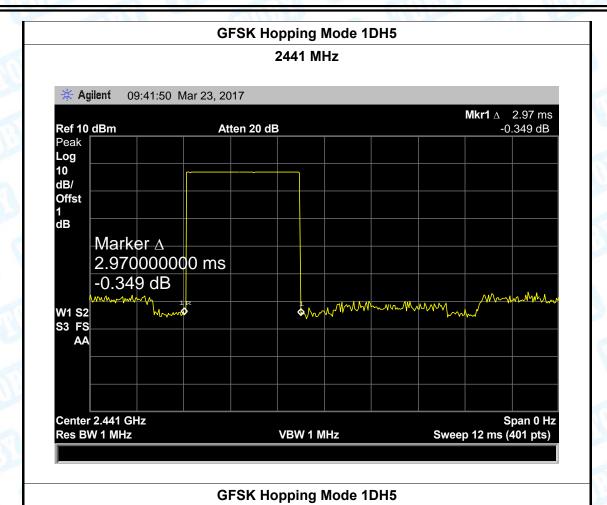


Center 2.48 GHz

Res BW 1 MHz

Report No.: TB-FCC151769

Page: 56 of 77



2480 MHz * Agilent 09:42:24 Mar 23, 2017 **Mkr1** Δ 2.97 ms Ref 10 dBm Atten 20 dB 0.483 dB Peak Log 10 dB/ Offst 1 dB Marker A 2.970000000 ms 0.483 dB W1 S2 S3 FS АА

VBW 1 MHz

Span 0 Hz

Sweep 12 ms (401 pts)

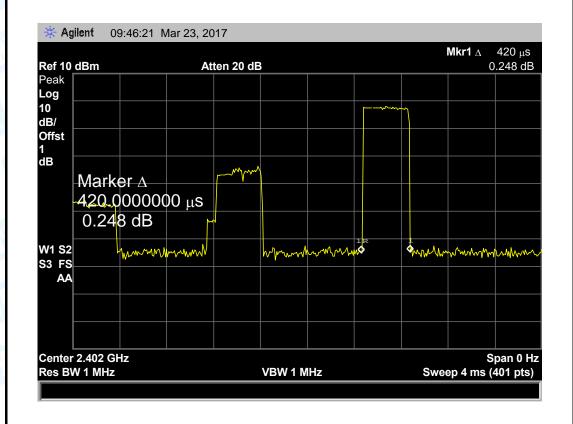


Page: 57 of 77

EUT:	Bluetooth L	Bluetooth Loudspeaker		Model Name :	
Temperature	: 25 ℃	1033	Relative Hum	idity:	55%
Test Voltage:	DC 3.7V	The same of	V C	-	18
Test Mode:	Hopping M	ode (π/4-DQPSK	2DH1)	Hilli	
Channel	Pulse Time	Total of Dwell	Period Time	Limit	Result
(MHz)	(ms)	(ms)	(s)	(ms)	Result
2402	0.420	134.40			
2441	0.410	131.20	31.60	400	PASS
2480	0.410	131.20			

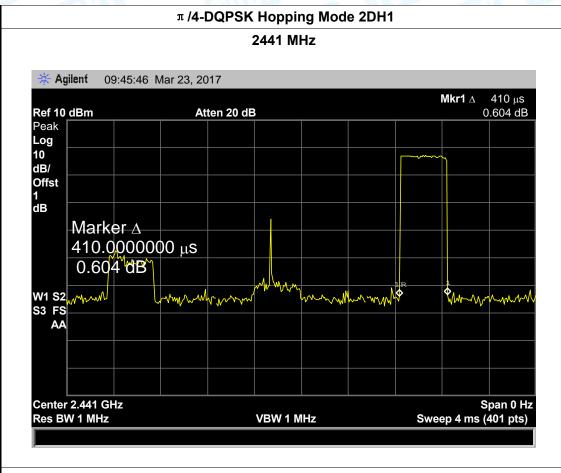
Note: Dwell time=Pulse Time (ms) \times (1600 \div 2 \div 79) \times 31.6

π /4-DQPSK Hopping Mode 2DH1



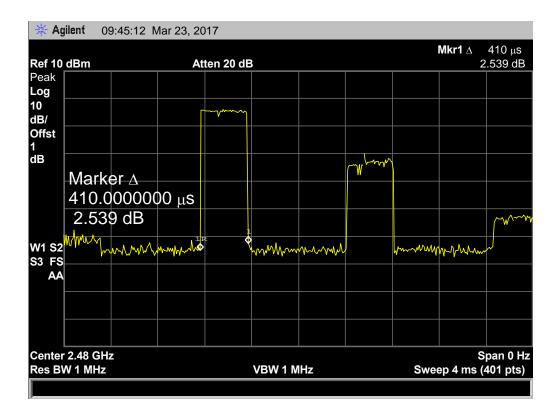


Page: 58 of 77



 π /4-DQPSK Hopping Mode 2DH1







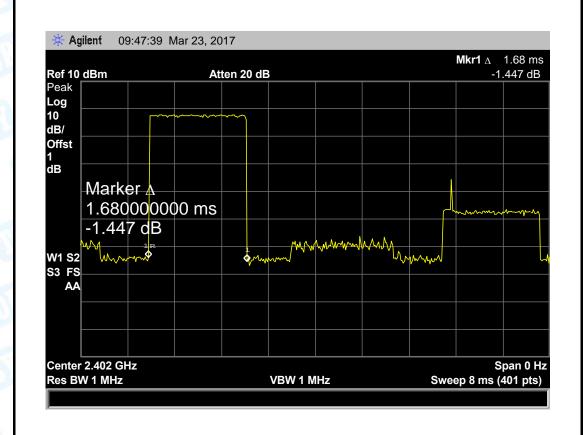
Page: 59 of 77

į	EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen
1	Temperature:	25℃	Relative Humidity:	55%
	Test Voltage:	DC 3.7V		
	Test Mode:	Hopping Mode (π /4-DQPSK 2DH3)		

100000.01		(, , = 5,			
Channel	Pulse Time	Total of Dwell	Period Time	Limit	Popult
(MHz)	(ms)	(ms)	(s)	(ms)	Result
2402	1.680	268.80			
2441	1.700	272.00	31.60	400	PASS
2480	1.680	268.80			

Note: Dwell time=Pulse Time (ms) \times (1600 \div 4 \div 79) \times 31.6

π /4-DQPSK Hopping Mode 2DH3



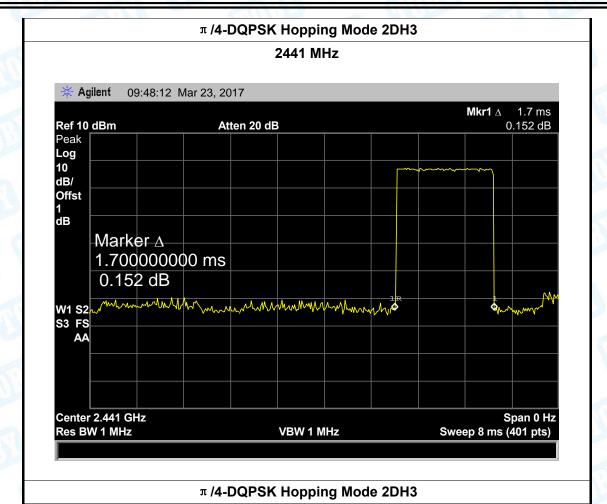


Center 2.48 GHz

Res BW 1 MHz

Report No.: TB-FCC151769

Page: 60 of 77



2480 MHz * Agilent 09:49:40 Mar 23, 2017 **Mkr1** Δ 1.68 ms Ref 10 dBm Atten 20 dB -1.133 dB Peak Log 10 dB/ Offst 1 dB Marker ∆ 1.680000000 ms -1.133 dB mmm mmm mmulana makana W1 S2 S3 FS АА

VBW 1 MHz

Span 0 Hz

Sweep 8 ms (401 pts)

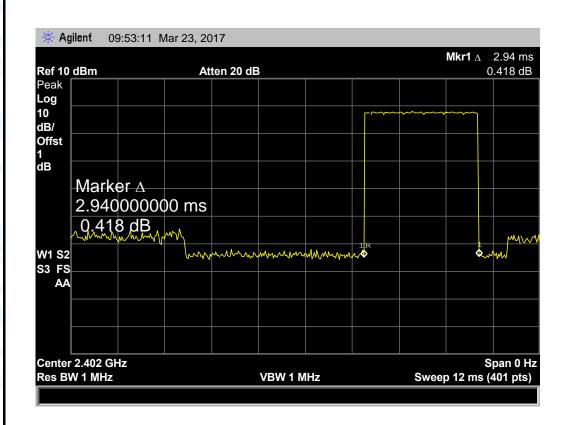


Page: 61 of 77

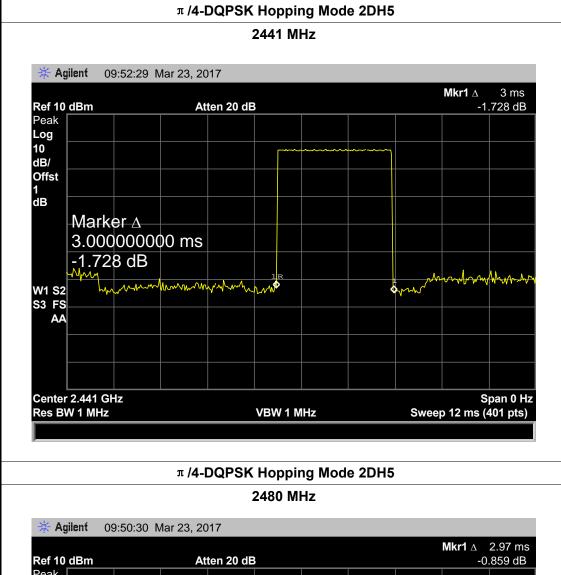
EUT:	Bluetooth L	Bluetooth Loudspeaker		Model Name :	
Temperature:	25 ℃	25℃ Relative Humidity: 5			55%
Test Voltage:	DC 3.7V	N. S. C.	V No.	-	18.0
Test Mode:	Hopping M	ode (π/4-DQPSK	2DH5)	Hilli	
Channel	Pulse Time	Total of Dwell	Period Time	Limit	Result
(MHz)	(ms)	(ms)	(s)	(ms)	Resuit
2402	2.940	313.60			
2441	3.000	320.00	31.60	400	PASS
2480	2.970	316.80			

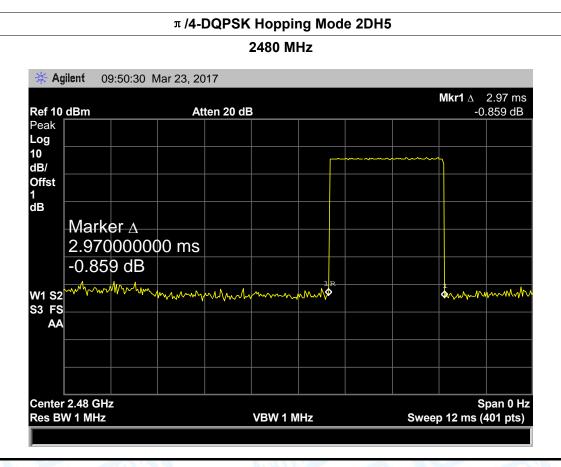
Note: Dwell time=Pulse Time (ms) \times (1600 \div 6 \div 79) \times 31.6

π /4-DQPSK Hopping Mode 2DH5











Page: 63 of 77

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.

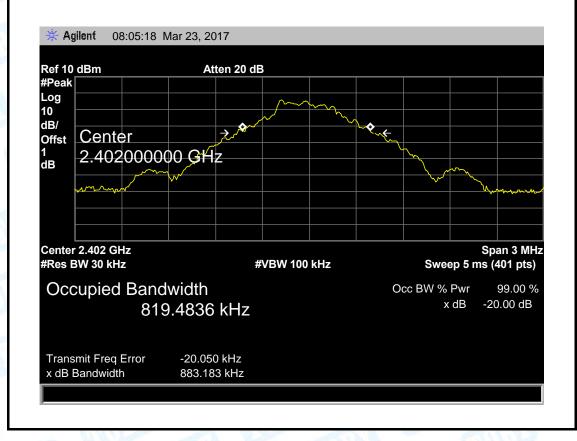


Page: 64 of 77

9.5 Test Data

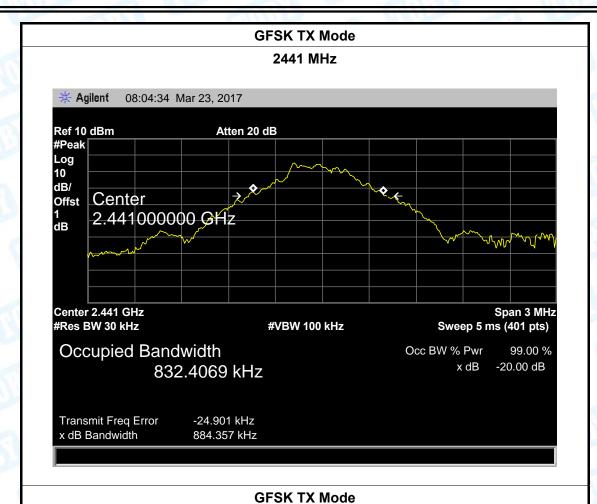
EUT:	Blue	etooth Loudspeaker	Model Name :	Pusheen
Temperature:	25°C		Relative Humidity:	55%
Test Voltage:	DC	3.7V		
Test Mode:	TX	Mode (GFSK)	CHILD ST	A HILL
Channel frequer	ncy	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402		819.4836	883.183	
2441		832.4069	884.357	
2480		831.7446	889.086	

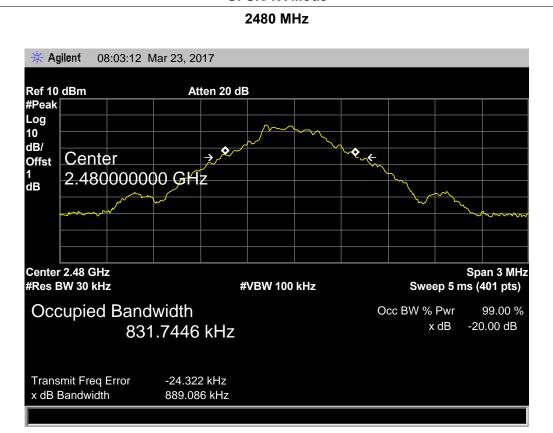
GFSK TX Mode





Report No.: TB-FCC151769 Page: 65 of 77





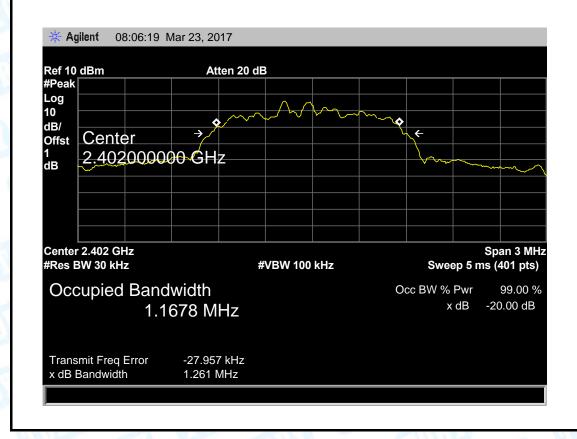


Page: 66 of 77

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		130
Test Mode:	TX Mode (π/4-DQPSK)		
			20dB

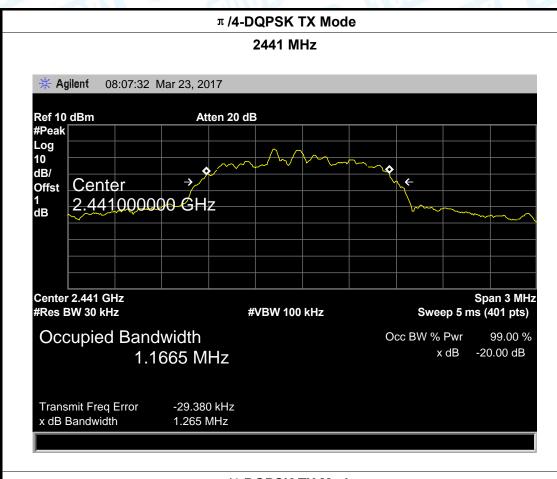
Channel frequency (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	1167.80	1261.00	840.67
2441	1166.50	1265.00	843.33
2480	1165.70	1259.00	839.33

π/4-DQPSK TX Mode

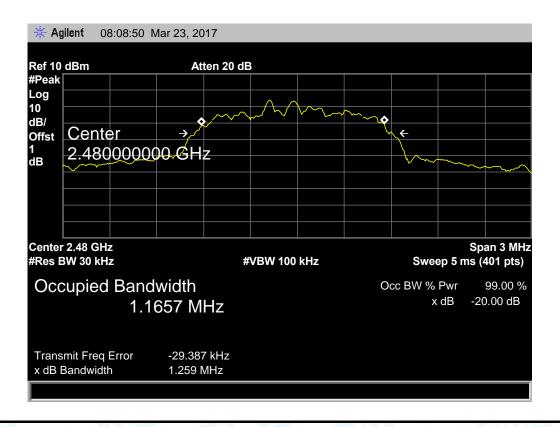




Page: 67 of 77



π /4-DQPSK TX Mode





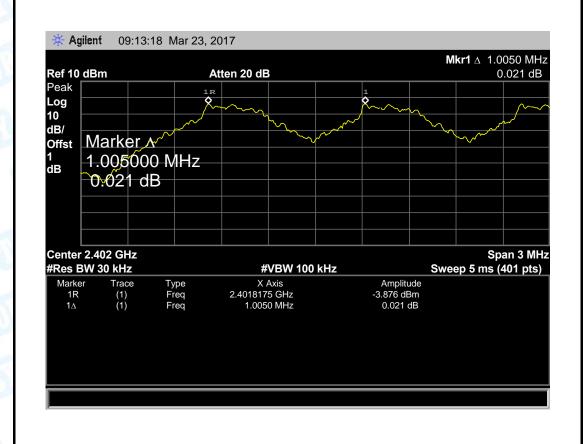
Page: 68 of 77

EUT:	Bluetooth Loudspeaker	Model Name :	Pusheen
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
	11 M . L (OFOIO)		

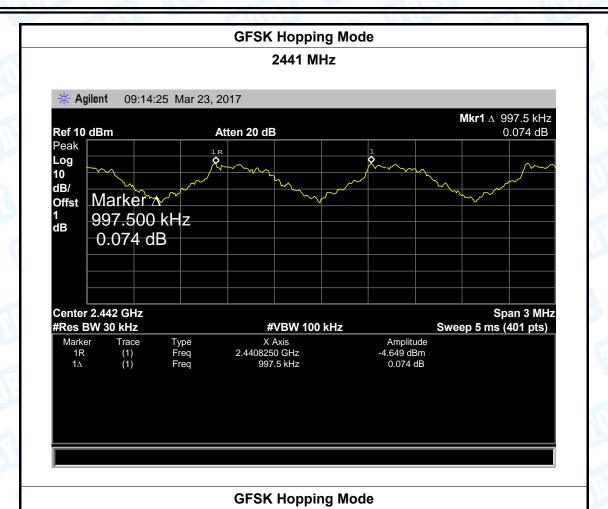
Test Mode: Hopping Mode (GFSK)

Channel frequency	Separation Read Value	Separation Limit		
(MHz)	(kHz)	(kHz)		
2402	1005.0	883.183		
2441	997.50	884.357		
2480	1005.0	889.086		

GFSK Hopping Mode











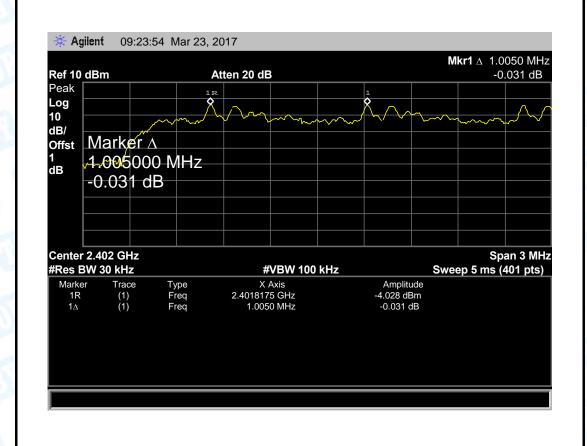
Page: 70 of 77

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

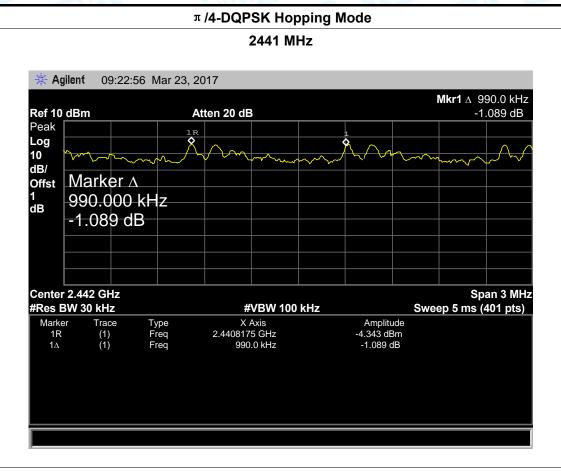
Test Mode: Hopping Mode (π /4-DQPSK)

Channel frequency	Separation Read Value	Separation Limit
(MHz)	(kHz)	(kHz)
2402	1005.0	840.67
2441	990.00	843.33
2480	997.50	839.33

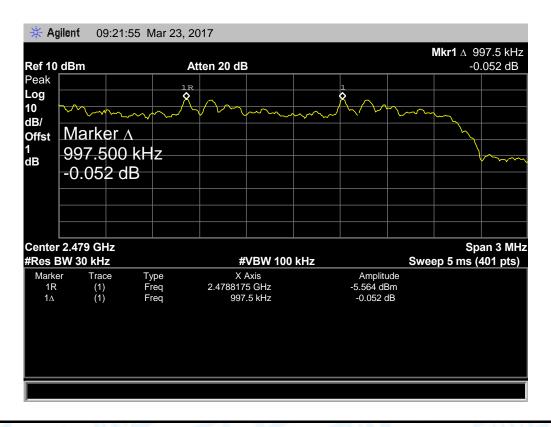
π /4-DQPSK Hopping Mode







π /4-DQPSK Hopping Mode





Page: 72 of 77

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.



-2.501 dBm

M1 S2 S3 FC AA

Center 2.402 GHz #Res BW 1 MHz Report No.: TB-FCC151769

Page: 73 of 77

10.5 Test Data

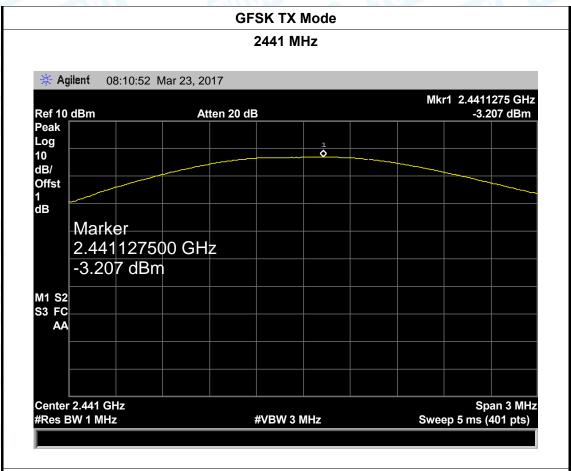
EUT:	Bluetooth L	Bluetooth Loudspeaker		ame :	Pusheen	
emperature:	25℃	THE PARTY	Relative H	umidity:	55%	
est Voltage:	DC 3.7V		COME !			
est Mode:	TX Mode (0	GFSK)	10	100	13	
Channel freque	ncy (MHz) Test Result		t (dBm)	n) Limit (dBm)		
2402	!	-2.50)1			
2441		-3.207			30	
2480		-4.45	57			
	·	GFSK TX	Mode			
		2402 N	ИHz			
		2402 N	ЛHz			
* Agilent 0)8:11:16 Mar 23, 2		ЛНz			
		2017	ИНZ	Mi	r1 2.4021275 GH	
* Agilent 0 Ref 10 dBm Peak			//Hz	М	r1 2.4021275 GHz -2.501 dBm	
Ref 10 dBm Peak Log		2017	//Hz	Мн		
Ref 10 dBm Peak Log 10 dB/		2017	1	Mk		
Ref 10 dBm Peak Log 10		2017	1	Mi		
Ref 10 dBm Peak Log 10 dB/ Offst 1 dB	A	2017	1	Mi		
Ref 10 dBm Peak Log 10 dB/ Offst 1 dB Mark	A	2017 Atten 20 dB	1	Mi		

#VBW 3 MHz

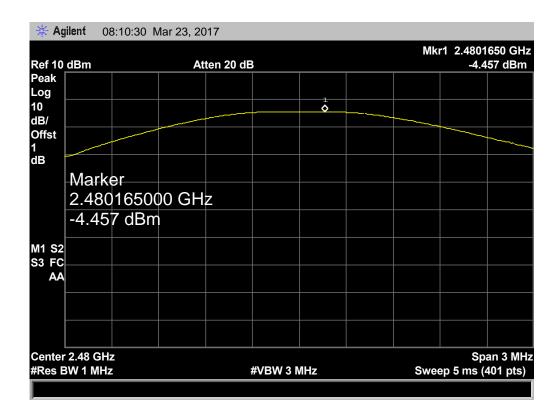
Span 3 MHz Sweep 5 ms (401 pts)



Page: 74 of 77



GFSK TX Mode

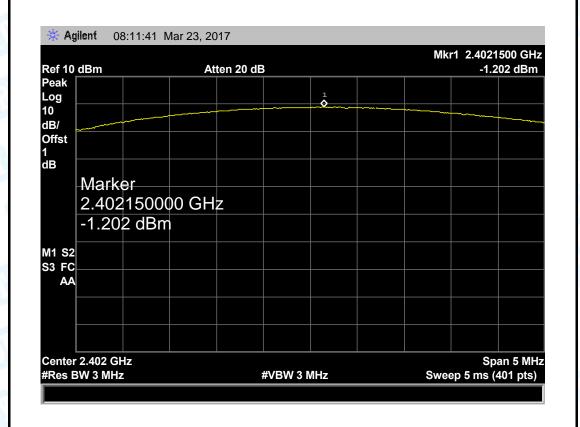




Page: 75 of 77

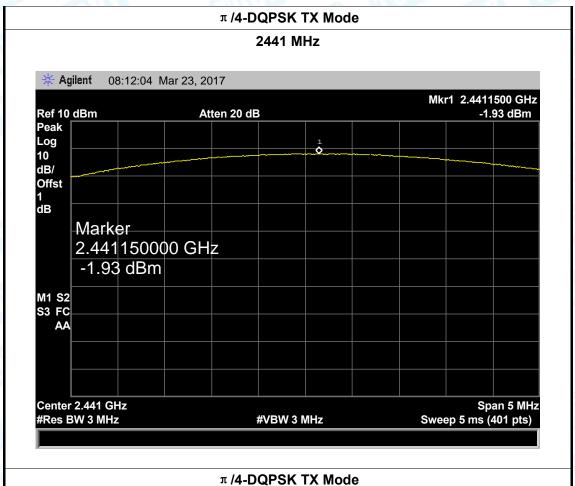
EUT:	Bluetooth	Loudspeaker	Model Name :	Pusheen	
Temperature:	25℃		Relative Humidity:	55%	
Test Voltage:	DC 3.7V	N. C.			
Test Mode:	TX Mode	(π /4-DQPSK)			
Channel frequency (MHz)		Test Result (dBm) Li		imit (dBm)	
2402		-1.202	2		
2441		-1.930)	21	
2480		-3.231			
	.,	π /Δ-DOPSK :	TY Mode		

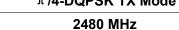
π /4-DQPSK TX Mode

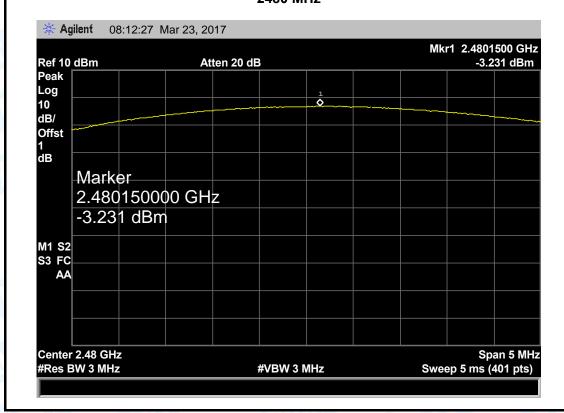




Page: 76 of 77









Page: 77 of 77

11. Antenna Requirement

11.1 Standard Requirement

11.1.1 Standard FCC Part 15.203

11.1.2 Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

11.2 Antenna Connected Construction

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

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

	Antenna Type
	▼ Permanent attached antenna
	□ Unique connector antenna
1	□ Professional installation antenna

----END OF REPORT----