

Shenzhen Toby Technology Co., Ltd.

Report No.: TB-FCC146995 Page: 1 of 93

FCC Radio Test Report FCC ID: 2AFSGMA-2241

Original Grant

Report No. : TB-FCC146995

Applicant: Dongguan Jin wen hua digital technology Co., LTD.

Equipment Under Test (EUT)

EUT Name : Bluetooth speaker

Model No. : MA-2241

Series Model No. : A6

Brand Name : N/A

Receipt Date : 2016-03-04

Test Date : 2016-03-04 to 2016-03-10

Issue Date : 2016-03-11

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

Tel: +86 75526509301 Fax: +86 75526509195



Contents

COV	NTENTS	2
1.	GENERAL INFORMATION ABOUT EUT	4
	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	6
	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	
	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	
6.	RESTRICTED BANDS REQUIREMENT	38
	6.1 Test Standard and Limit	38
	6.2 Test Setup	38
	6.3 Test Procedure	38
	6.4 EUT Operating Condition	39
	6.4 Test Data	
7.	NUMBER OF HOPPING CHANNEL	52
	7.1 Test Standard and Limit	52
	7.2 Test Setup	
	7.3 Test Procedure	52
	7.4 EUT Operating Condition	
	7.5 Test Data	
8.	AVERAGE TIME OF OCCUPANCY	54
	8.1 Test Standard and Limit	54
	8.2 Test Setup	
	8.3 Test Procedure	54



Report No.: TB-FCC146995
Page: 3 of 93

54 73 73
73 73
73
73
73
73
74
86
86
86
86
86
87
93
93
93



Page: 4 of 93

1. General Information about EUT

1.1 Client Information

Applicant: Dongguan Jin wen hua digital technology Co., LTD.

Address : Floor 4, Building E, No. 655-90, Qiming Road, Yinzhou Investment &

Innovation Center, Ningbo, China

Manufacturer : Dongguan Jin wen hua digital technology Co., LTD.

Address : Floor 4, Building E, No. 655-90, Qiming Road, Yinzhou Investment &

Innovation Center, Ningbo, China

1.2 General Description of EUT (Equipment Under Test)

EUT Name		Bluetooth speaker	Bluetooth speaker			
Models No.		MA-2241, A6				
Model Difference	:	All these models are identical in the same PCB, layout and electrical circuit, the only difference is model name for commercial.				
003	1	Operation Frequency: Bluetooth 2.1+EDR: 2402~2480MHz				
		Number of Channel:	Bluetooth:79 Channels see Note 3			
Product Description		Max Peak Output Power: Bluetooth: 0.753 dBm(GFSK)				
Description	Š	Antenna Gain:	2 dBi PCB Antenna			
		Modulation Type:	GFSK 1Mbps(1 Mbps) π /4-DQPSK(2 Mbps) 8-DPSK(3 Mbps)			
Power Supply		DC Voltage supplied from Host System by USB cable.				
		DC power by Li-ion Battery.				
Power Rating	3	DC 5.0V by USB cable. DC 3.7V by 500mAh Li-ion Battery.				
Connecting I/O Port(S)	Ċ	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			



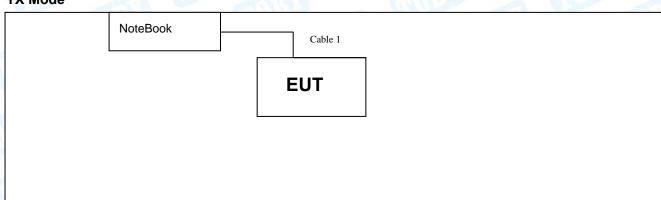
Page: 5 of 93

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		100
26	2428	53	2455	MARIE	

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

1.3 Block Diagram Showing the Configuration of System Tested

TX Mode





Page: 6 of 93

1.4 Description of Support Units

Equipment Information							
Name Model FCC ID/DOC Manufacturer Used "√"							
NoteBook T60P		Thinkpad					
	Cable Information						
Number Shielded Type Ferrite Core Length Note							
Cable 1	NO	NO	0.3m	Accessorise			

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(17 /4-DQPSK) Channel 00/39/78			
Mode 4	TX Mode(8-DPSK) Channel 00/39/78			
Mode 5	Hopping Mode(GFSK)			
Mode 6	Hopping Mode(π /4-DQPSK)			
Mode 7	Hopping Mode(8-DPSK)			

Note:

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

According to ANSI C63.10 standards, the measurements are performed at the highest, middle, lowest available channels, and the worst case data rate as follows:



Page: 7 of 93

TX Mode: GFSK (1 Mbps)
TX Mode: π /4-DQPSK (2 Mbps)
TX Mode: 8-DPSK (3Mbps)

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

1.6 Description of Test Software Setting

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

Test Software Version	A	ppo Tech RF Control Kit	V4.0
Frequency	2402 MHz	2441MHz	2480 MHz
GFSK	DEF	DEF	DEF
π /4-DQPSK	DEF	DEF	DEF
8-DPSK	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
	150kHz to 30MHz	±3.42 dB
Dedicted Emission	Level Accuracy:	. 4 CO dD
Radiated Emission	9kHz to 30 MHz	±4.60 dB
Dedicted Engineers	Level Accuracy:	. 4.40 dB
Radiated Emission	30MHz to 1000 MHz	±4.40 dB
Dedicted Engineers	Level Accuracy:	. 4.20 dB
Radiated Emission	Above 1000MHz	±4.20 dB



Page: 8 of 93

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.



Page: 9 of 93

2. Test Summary

FCC Part 15 Subpart C(15.247)/ RSS 247 Issue 1						
Standard Section		T(11	1 1			
FCC	IC	Test Item	Judgment	Remark		
15.203	٠.	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:981.6931kHz π/4-DQPSK: 1070.90kHz 8-DPSK: 1143.00KHz		

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



Page: 10 of 93

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



Page: 11 of 93

4. Conducted Emission Test

4.1 Test Standard and Limit

4.1.1Test Standard FCC Part 15.207

4.1.2 Test Limit

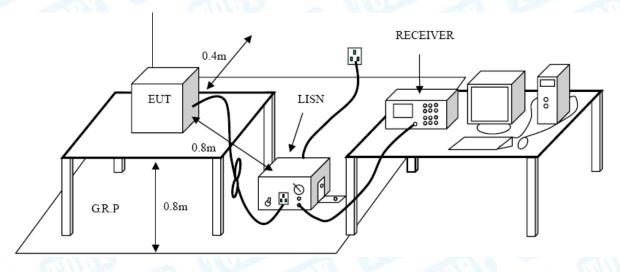
Conducted Emission Test Limit

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.



Page: 12 of 93

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

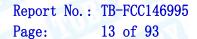
The bandwidth of EMI test receiver is set at 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

4.4 EUT Operating Mode

Please refer to the description of test mode.

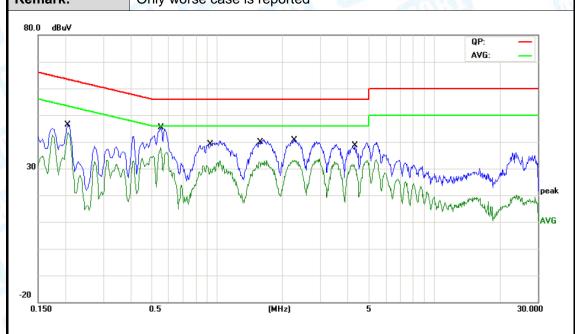
4.5 Test Data

Test data please refer the following pages.

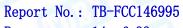




Bluetooth speaker EUT: MA-2241 **Model Name:** Temperature: 25 ℃ **Relative Humidity:** 55% AC 120V/60 Hz **Test Voltage:** Terminal: Line **Test Mode:** USB Charging with TX GFSK Mode 2402 MHz Remark: Only worse case is reported



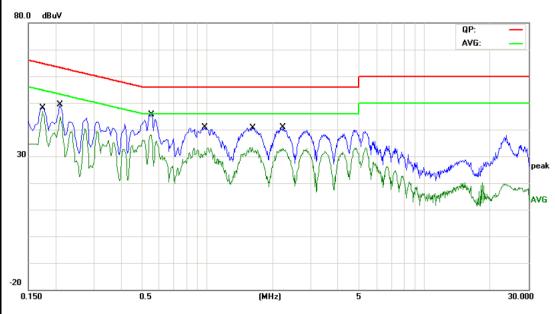
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∨	dB	dBuV	dBu∀	dB	Detector
1		0.2060	31.08	10.12	41.20	63.36	-22.16	QP
2		0.2060	29.96	10.12	40.08	53.36	-13.28	AVG
3		0.5540	35.45	10.02	45.47	56.00	-10.53	QP
4	*	0.5540	28.16	10.02	38.18	46.00	-7.82	AVG
5		0.9340	27.01	10.13	37.14	56.00	-18.86	QP
6		0.9340	19.62	10.13	29.75	46.00	-16.25	AVG
7		1.5780	26.10	10.10	36.20	56.00	-19.80	QP
8		1.5780	21.97	10.10	32.07	46.00	-13.93	AVG
9		2.2659	27.40	10.06	37.46	56.00	-18.54	QP
10		2.2659	22.64	10.06	32.70	46.00	-13.30	AVG
11		4.3259	24.05	10.06	34.11	56.00	-21.89	QP
12		4.3259	19.12	10.06	29.18	46.00	-16.82	AVG



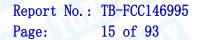


Page: 14 of 93

EUT:	Bluetooth speaker	Model Name :	MA-2241
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz	V COL	13
Terminal:	Neutral		
Test Mode:	USB Charging with TX GFS	K Mode 2402 MHz	CHITT:
Remark:	Only worse case is reported		

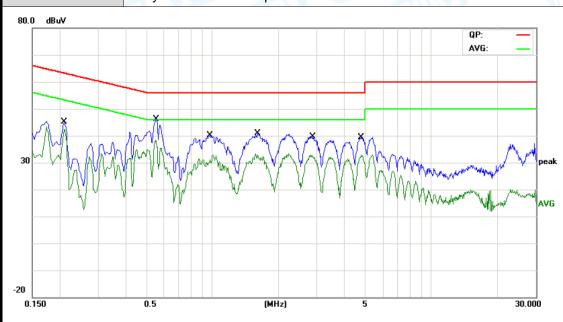


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB	dBu∀	dBu∀	dB	Detector
1		0.1740	37.44	9.97	47.41	64.76	-17.35	QP
2	*	0.1740	36.78	9.97	46.75	54.76	-8.01	AVG
3		0.2100	37.62	10.02	47.64	63.20	-15.56	QP
4		0.2100	34.46	10.02	44.48	53.20	-8.72	AVG
5		0.5540	35.00	10.05	45.05	56.00	-10.95	QP
6		0.5540	27.57	10.05	37.62	46.00	-8.38	AVG
7		0.9780	29.25	10.06	39.31	56.00	-16.69	QP
8		0.9780	21.57	10.06	31.63	46.00	-14.37	AVG
9		1.6220	28.88	10.06	38.94	56.00	-17.06	QP
10		1.6220	22.14	10.06	32.20	46.00	-13.80	AVG
11		2.2260	27.66	10.05	37.71	56.00	-18.29	QP
12		2.2260	22.83	10.05	32.88	46.00	-13.12	AVG

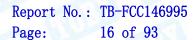




Bluetooth speaker EUT: MA-2241 **Model Name:** Temperature: 25 ℃ **Relative Humidity:** 55% AC 240V/60 Hz **Test Voltage:** Terminal: Line **Test Mode:** USB Charging with TX GFSK Mode 2402 MHz Remark: Only worse case is reported

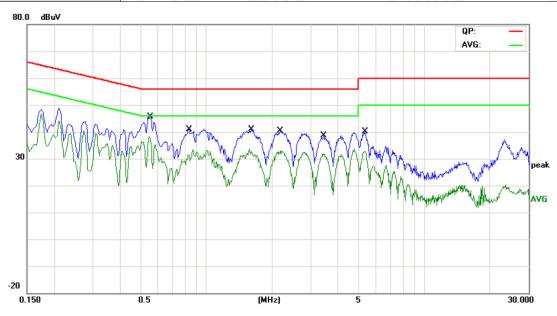


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB	dBu∀	dBu∀	dB	Detector
1		0.2100	34.02	10.12	44.14	63.20	-19.06	QP
2		0.2100	32.39	10.12	42.51	53.20	-10.69	AVG
3		0.5540	35.77	10.02	45.79	56.00	-10.21	QP
4	*	0.5540	28.20	10.02	38.22	46.00	-7.78	AVG
5		0.9740	28.97	10.15	39.12	56.00	-16.88	QP
6		0.9740	21.00	10.15	31.15	46.00	-14.85	AVG
7		1.6060	27.80	10.10	37.90	56.00	-18.10	QP
8		1.6060	22.42	10.10	32.52	46.00	-13.48	AVG
9		2.8740	26.83	10.06	36.89	56.00	-19.11	QP
10		2.8740	22.45	10.06	32.51	46.00	-13.49	AVG
11		4.7860	26.62	10.06	36.68	56.00	-19.32	QP
12		4.7860	22.86	10.06	32.92	46.00	-13.08	AVG





Bluetooth speaker EUT: MA-2241 **Model Name:** Temperature: 25 ℃ **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



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB	dBu∀	dBu∨	dB	Detector
1		0.5540	35.01	10.05	45.06	56.00	-10.94	QP
2	*	0.5540	27.44	10.05	37.49	46.00	-8.51	AVG
3		0.8340	29.99	10.09	40.08	56.00	-15.92	QP
4		0.8340	21.08	10.09	31.17	46.00	-14.83	AVG
5		1.6060	27.99	10.06	38.05	56.00	-17.95	QP
6		1.6060	22.51	10.06	32.57	46.00	-13.43	AVG
7		2.1740	27.42	10.05	37.47	56.00	-18.53	QP
8		2.1740	21.69	10.05	31.74	46.00	-14.26	AVG
9		3.4500	24.11	10.01	34.12	56.00	-21.88	QP
10		3.4500	21.07	10.01	31.08	46.00	-14.92	AVG
11		5.3340	27.02	9.98	37.00	60.00	-23.00	QP
12		5.3340	22.76	9.98	32.74	50.00	-17.26	AVG



Page: 17 of 93

5. Radiated Emission Test

5.1 Test Standard and Limit

5.1.1 Test Standard FCC Part 15.209

5.1.2 Test Limit

Radiated Emission Limit (9 kHz~1000MHz)

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

Radiated Emission Limit (Above 1000MHz)

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

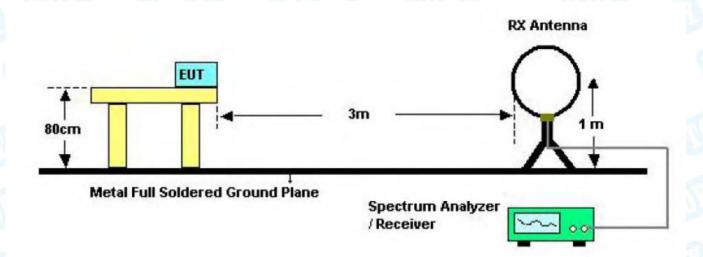
Note:

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

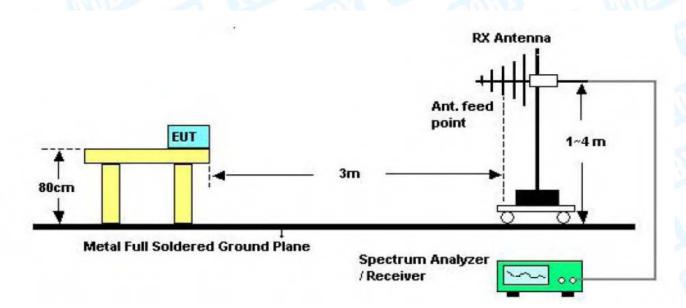


Page: 18 of 93

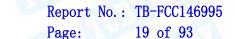
5.2 Test Setup



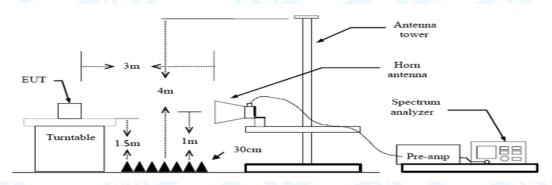
Bellow 30MHz Test Setup



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

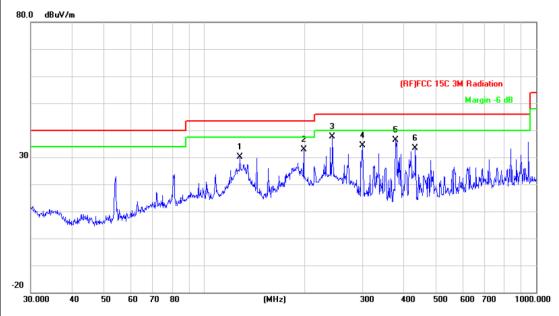
Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=1 kHz with Peak Detector for Average Values.

Test data please refer the following pages.



Page: 20 of 93

Bluetooth speaker	Model Name :	MA-2241
25 ℃	Relative Humidity:	55%
DC 5V	W Comment	133
Horizontal		
TX GFSK Mode 2402MHz	CI 132	LINE TO
Only worse case is reported		
	25 ℃ DC 5V Horizontal TX GFSK Mode 2402MHz	25 °C Relative Humidity: DC 5V Horizontal



No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		128.1130	52.30	-22.24	30.06	43.50	-13.44	peak
2		199.2855	53.19	-20.43	32.76	43.50	-10.74	peak
3	*	243.3772	56.01	-18.43	37.58	46.00	-8.42	peak
4		299.3158	51.50	-17.10	34.40	46.00	-11.60	peak
5		377.2591	50.58	-14.31	36.27	46.00	-9.73	peak
6		432.5457	46.27	-12.78	33.49	46.00	-12.51	peak

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



Report No.: TB-FCC146995
Page: 21 of 93

	Bluetooth spe	Jakoi	Model Name :	MA-2241
Temperature:	25 ℃	THE PARTY OF	Relative Humidity	: 55%
Test Voltage:	DC 5V			
Ant. Pol.	Vertical			
Test Mode:	TX GFSK M	Mode 2402MHz		THE PROPERTY OF
Remark:	Only worse	case is reported		33
80.0 dBuV/m			(RF)F0	CC 15C 3M Radiation Margin - 6 dB
30 3	Lilla	wat had we make he had a second		physical physical section is
30 S	Lilla	(MHz)	300 400	500 600 700 1000.00
20 30.000 40 50	60 70 80 Rearreq. Le	(MHz) ading Corrected Facto	t Measure- · ment Limit	500 600 700 1000.00
20 30.000 40 50 No. Mk. F	60 70 80 Rea req. Le	ading Correctevel Facto	t Measure- ment Limit dBuV/m dBuV/	500 600 700 1000.00 Over
20 30.000 40 50 No. Mk. F	Reareq. Legal 14 de 18 8 1 7 5 6	ading Correctivel Facto BuV dB/m 3.11 -24.45	t Measure- ment Limit dBuV/m dBuV/ 31.66 40.0	500 600 700 1000.00 Over m dB Detecto 00 -8.34 peak
20 30.000 40 50 No. Mk. F 1 * 53.2 2 62.3	Reareq. Les 1Hz dE 8817 568 54	ading Correct Facto BuV dB/m 6.11 -24.45	t Measure- ment Limit dBuV/m dBuV/ 31.66 40.0	500 600 700 1000.00 COver OM dB Detector OO -8.34 peak
20 30.000 40 50 No. Mk. F 1 * 53.2 2 62.3	Reareq. Le 1Hz dE 8817 56	ading Correctivel Facto BuV dB/m 3.11 -24.45	t Measure- ment Limit dBuV/m dBuV/ 31.66 40.0	500 600 700 1000.00 COver OM dB Detector OO -8.34 peak
20 30.000 40 50 No. Mk. F 1 * 53.3 2 62.3 3 71.3	Reareq. Le 8817 568708 548319 51	ading Correct Facto BuV dB/m 6.11 -24.45	t Measure- ment Limit dBuV/m dBuV/ 31.66 40.0	500 600 700 1000.00 COver CM dB Detector 00 -8.34 peak 00 -9.85 peak 00 -12.04 peak
No. Mk. F 1 * 53.8 2 62.8 4 243.8	Real Real Real Real Real Real Real Real	(MHz) ading Correct Evel Facto BuV dB/m 6.11 -24.45 1.41 -24.26	t Measure- ment Limit dBuV/m dBuV/ 31.66 40.0 30.15 40.0 27.96 40.0	500 600 700 1000.00 COver CM dB Detector 00 -8.34 peak 00 -9.85 peak 00 -12.04 peak 00 -15.77 peak



Page: 22 of 93

25 °C DC 5V Horizontal TX ≖/4-DQPSK	M 1 2422	Relative Hu	midity:	55%		
Horizontal	M 1 0 100		TO THE	133		
	M. I. 0460					
TX π/4-DQPSK						
TX π/4-DQPSK Mode 2402MHz Only worse case is reported						
Only worse case	is reported	C.	ALC:			
		_	(RF)FCC 15		dB	
L salver de la		*	6 *	,,,16,, 24, 16, 24, 16 Nov. 16	White.	
0 70 80	(MHz)	300	400 500	0 600 700	1000.00	
Reading q. Level	Correct Factor	Measure- ment	Limit	Over		
z dBuV	dB/m	dBuV/m	dBuV/m	dB	Detecto	
16 50.73	-23.21	27.52	40.00	-12.48	peak	
576 54.16	-22.14	32.02	43.50	-11.48	peak	
294 56.28	-21.67	34.61	43.50	-8.89	peak	
376 54.51	-20.20	34.31	43.50	-9.19	peak	
572 50.86	-17.07	33.79	46.00	-12.21	peak	
141 45.72	-14.14	31.58	46.00	-14.42	peak	
	Reading Level dBuV 16 50.73 54.16 294 56.28 376 54.51	Reading Correct Factor dBuV dB/m 16 50.73 -23.21 576 54.16 -22.14 294 56.28 -21.67 376 54.51 -20.20	Reading Correct Measure- q. Level Factor ment dBuV dB/m dBuV/m 16 50.73 -23.21 27.52 676 54.16 -22.14 32.02 294 56.28 -21.67 34.61 376 54.51 -20.20 34.31	Reading Correct Measure— Level Factor ment Limit dBuV dB/m dBuV/m dBuV/m 16 50.73 -23.21 27.52 40.00 576 54.16 -22.14 32.02 43.50 294 56.28 -21.67 34.61 43.50 376 54.51 -20.20 34.31 43.50	Reading Correct Measure- Level Factor ment Limit Over dBuV dB/m dBuV/m dBuV/m dB 56.28 -21.67 34.61 43.50 -8.89 676 54.51 -20.20 34.31 43.50 -9.19	



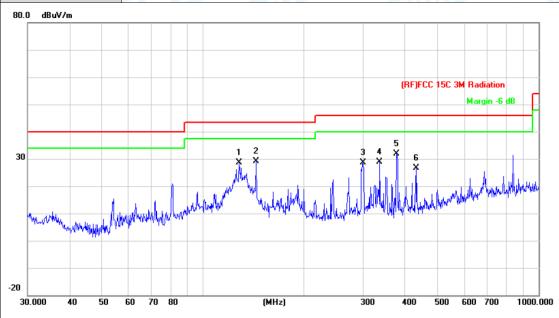
Report No.: TB-FCC146995
Page: 23 of 93

	Bluetooth speaker	N N	Model Name	•	MA-2241		
Temperature:	25 ℃	F	Relative Hum	idity:	55%	AMA.	
Test Voltage:	DC 5V			1	THE S		
Ant. Pol.	Vertical	THUS		I W		1	
Test Mode:	TX π/4-DQPSK	PSK Mode 2402MHz					
Remark:	Only worse case	is reported	The same	AT.			
80.0 dBuV/m							
30 ×	2 3 X X X	calous A maghi house make a	5 *	(RF)FCC	15C 3M Radiation Margin -6		
20	CO. 70. 90	(441-)	200	400	E00 C00 700	1000 00	
	60 70 80	(MHz)	300	400 !	500 600 700	1000.00	
20	Reading	(MHz) Correct Factor	Measure- ment	400 !	500 600 700 Over	1000.00	
20 30.000 40 50	Reading eq. Level	Correct	Measure-		Over	1000.00	
20 30.000 40 50 No. Mk. Fre	Reading eq. Level	Correct Factor	Measure- ment	Limit	Over	Detecto	
20 30.000 40 50 No. Mk. Fre	Reading Level dBuV 711 54.47	Correct Factor	Measure- ment dBuV/m	Limit dBuV/m	Over dB -9.98	Detecto peak	
No. Mk. Fre	Reading Level Hz dBuV 711 54.47 916 52.97	Correct Factor dB/m -24.45	Measure- ment dBuV/m 30.02	Limit dBuV/m	O∨er dB -9.98	Detecto peak peak	
No. Mk. Fre	Reading Level Hz dBuV 711 54.47 916 52.97 442 50.09	Correct Factor dB/m -24.45 -24.25	Measurement dBuV/m 30.02 28.72	Limit dBuV/m 40.00 40.00	Over dB -9.98 -11.28 -13.16	Detecto peak peak peak	
No. Mk. Fre	Reading Level Hz dBuV 711 54.47 916 52.97 442 50.09 3295 46.35	Correct Factor dB/m -24.45 -24.25 -23.25	Measure- ment dBuV/m 30.02 28.72 26.84	Limit dBu∀/m 40.00 40.00 40.00	Over dB -9.98 -11.28 -13.16 -18.82	Detecto peak peak peak peak	
No. Mk. Free MH 1 * 54.03 2 63.09 3 80.64 4 143.8	Reading Level dBu V 711	Correct Factor dB/m -24.45 -24.25 -23.25 -21.67	Measurement dBuV/m 30.02 28.72 26.84 24.68	Limit dBu∀/m 40.00 40.00 40.00 43.50	Over -9.98 -11.28 -13.16 -18.82 -12.21		



Page: 24 of 93

EUT:	Bluetooth speaker	Model Name :	MA-2241				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 5V						
Ant. Pol.	Horizontal						
Test Mode:	TX 8-DPSK Mode 2402MHz						
Remark:	Only worse case is reported	TO TO					



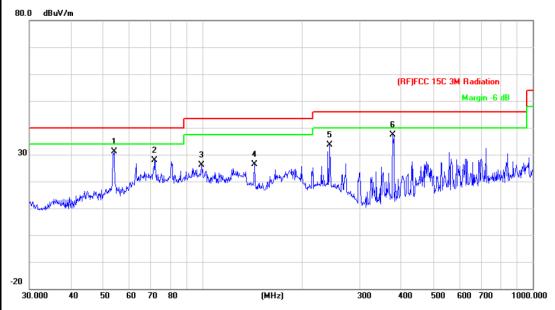
No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		128.1130	50.84	-22.24	28.60	43.50	-14.90	peak
2		143.8295	50.77	-21.67	29.10	43.50	-14.40	peak
3		299.3158	45.75	-17.10	28.65	46.00	-17.35	peak
4		336.0352	44.33	-15.46	28.87	46.00	-17.13	peak
5	*	377.2591	46.27	-14.31	31.96	46.00	-14.04	peak
6		432.5457	39.42	-12.78	26.64	46.00	-19.36	peak
		•						

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



Page: 25 of 93

EUT:	Bluetooth speaker	Model Name :	MA-2241				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 5V	DC 5V					
Ant. Pol.	Vertical						
Test Mode:	TX 8-DPSK Mode 2402MHz						
Remark:	Only worse case is reported						



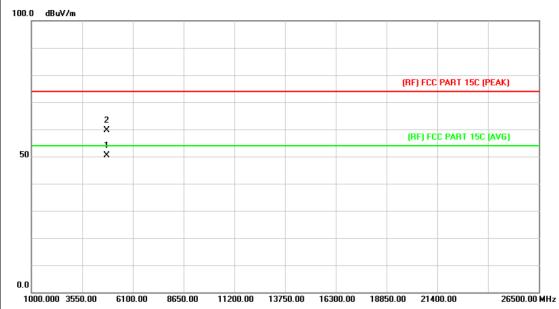
No	. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		54.0711	55.47	-24.45	31.02	40.00	-8.98	peak
2		71.8320	51.38	-23.56	27.82	40.00	-12.18	peak
3		99.5281	47.97	-21.86	26.11	43.50	-17.39	peak
4		143.8295	48.17	-21.67	26.50	43.50	-17.00	peak
5		243.3772	52.04	-18.43	33.61	46.00	-12.39	peak
6	*	377.2591	51.58	-14.31	37.27	46.00	-8.73	peak

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



Page: 26 of 93

EUT:	Bluetooth speaker	Model Name :	MA-2241				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 5V	DC 5V					
Ant. Pol.	Horizontal	The same of the					
Test Mode:	TX GFSK Mode 2402MHz		THE PARTY OF THE P				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						

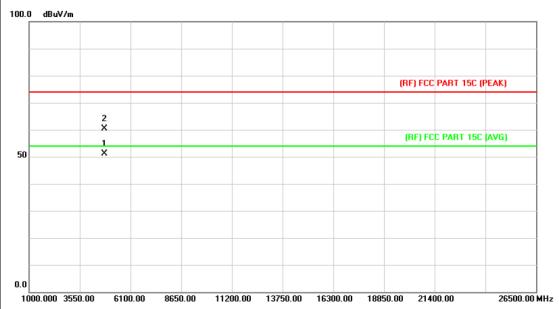


N	o. Mk	. Freq.	_	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4804.050	36.90	13.44	50.34	54.00	-3.66	AVG
2		4804.115	46.27	13.44	59.71	74.00	-14.29	peak



Page: 27 of 93

EUT:	Bluetooth speaker	Model Name :	MA-2241				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 5V	DC 5V					
Ant. Pol.	Vertical	Vertical					
Test Mode:	TX GFSK Mode 2402MHz		- Ture				
Remark:	No report for the emission which more than 10 dB below the						
prescribed limit.							

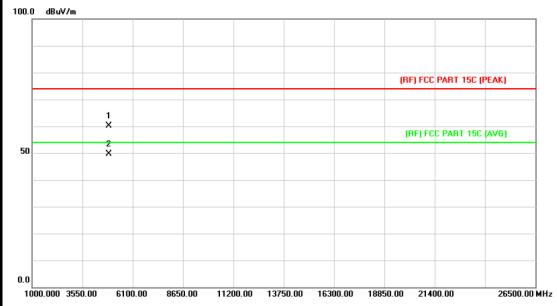


N	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4804.050	37.63	13.44	51.07	54.00	-2.93	AVG
2		4804.105	46.89	13.44	60.33	74.00	-13.67	peak



Page: 28 of 93

EUT:	Bluetooth speaker	Model Name :	MA-2241				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 5V	DC 5V					
Ant. Pol.	Horizontal	N COLUMN					
Test Mode:	TX GFSK Mode 2441M	Hz	LINE TO SERVICE				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						

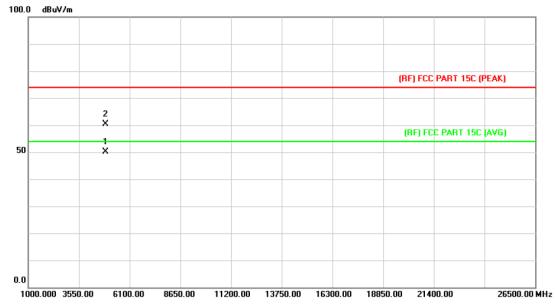


No	. Mk.	Freq.	_	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4881.475	46.26	13.90	60.16	74.00	-13.84	peak
2	*	4881.647	35.67	13.90	49.57	54.00	-4.43	AVG



Page: 29 of 93

EUT:	Bluetooth speaker	Model Name :	MA-2241		
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	DC 5V	TV C	1133		
Ant. Pol.	Vertical				
Test Mode:	TX GFSK Mode 2441MHz		THE PARTY OF THE P		
Remark:	No report for the emission prescribed limit.	which more than 10 dE	B below the		

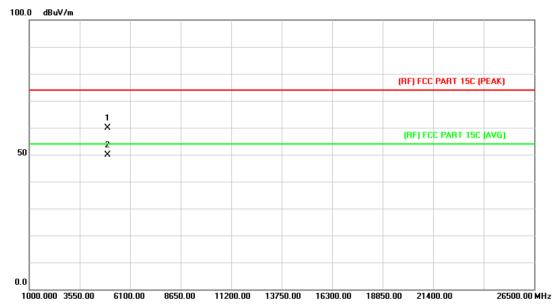


No	o. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4882.351	36.31	13.90	50.21	54.00	-3.79	AVG
2		4882.368	46.49	13.90	60.39	74.00	-13.61	peak



Page: 30 of 93

EUT:	Bluetooth speaker	Model Name :	MA-2241				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 5V		773				
Ant. Pol.	Horizontal						
Test Mode:	TX GFSK Mode 2480MHz		- Chillian				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						

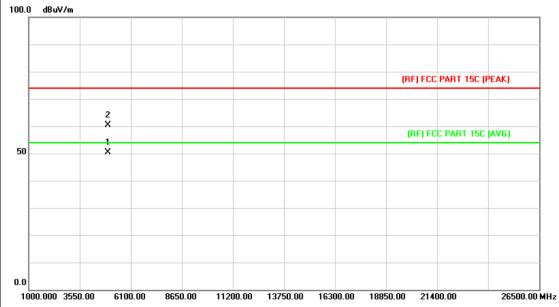


No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4960.147	45.57	14.36	59.93	74.00	-14.07	peak
2	*	4960.368	35.48	14.36	49.84	54.00	-4.16	AVG



Page: 31 of 93

EUT:	Bluetooth speaker	Model Name :	MA-2241					
Temperature:	25 ℃	Relative Humidity:	55%					
Test Voltage:	DC 5V		(3)					
Ant. Pol.	Vertical							
Test Mode:	TX GFSK Mode 2480MHz	(M) 32	LINE TO					
Remark:	No report for the emission which more than 10 dB below the prescribed limit.							
100 0 ID VI								



No	o. Mk	. Freq.	_	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4960.551	36.01	14.36	50.37	54.00	-3.63	AVG
2		4960.627	46.05	14.36	60.41	74.00	-13.59	peak



Page: 32 of 93

EUT:	Bluetooth speaker	Model Name :	MA-2241				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 5V						
Ant. Pol.	Horizontal						
Test Mode:	TX 8-DPSK Mode 2402Mi	-lz	- Chillian				
Remark:	Remark: No report for the emission which more than 10 dB below the prescribed limit.						

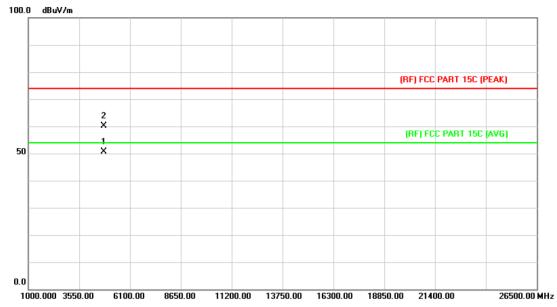


N	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	O∨er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4804.030	36.43	13.44	49.87	54.00	-4.13	AVG
2		4804.387	46.29	13.44	59.73	74.00	-14.27	peak



Page: 33 of 93

EUT:	Bluetooth speaker	Model Name :	MA-2241			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 5V		773			
Ant. Pol.	Vertical					
Test Mode:	TX 8-DPSK Mode 2402MI	Hz	- Chillian			
Remark: No report for the emission which more than 10 dB below the prescribed limit.						

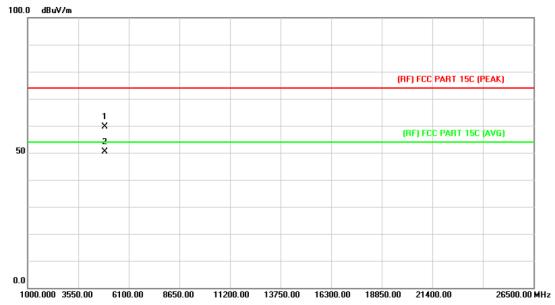


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4804.012	37.27	13.44	50.71	54.00	-3.29	AVG
2		4804.366	46.65	13.44	60.09	74.00	-13.91	peak



Page: 34 of 93

EUT:	Bluetooth speaker	Model Name :	MA-2241			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 5V					
Ant. Pol.	Horizontal					
Test Mode:	TX 8-DPSK Mode 2441MI	Hz	THE PARTY OF			
Remark: No report for the emission which more than 10 dB below the prescribed limit.						

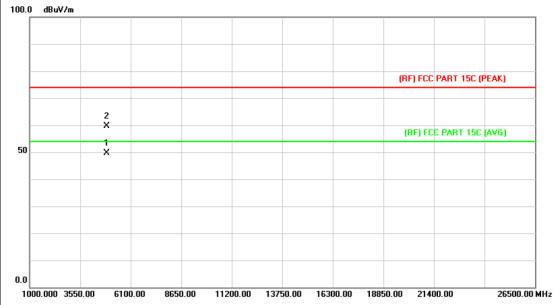


No	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4881.853	45.64	13.90	59.54	74.00	-14.46	peak
2	*	4881.949	36.42	13.90	50.32	54.00	-3.68	AVG



Page: 35 of 93

EUT:	Bluetooth speaker	Model Name :	MA-2241				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 5V	W. Comment	(39)				
Ant. Pol.	Vertical						
Test Mode:	TX 8-DPSK Mode 2441MH	z	THE PARTY				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						

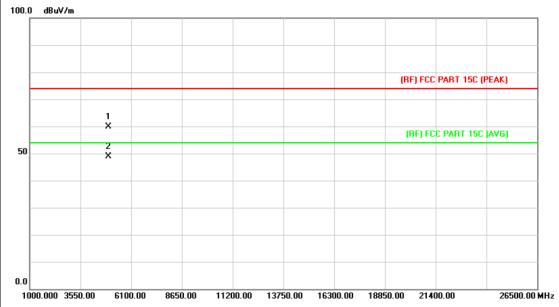


No. Mk.		. Freq.	_		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4882.072	35.75	13.90	49.65	54.00	-4.35	AVG
2		4882.243	45.79	13.90	59.69	74.00	-14.31	peak



Page: 36 of 93

EUT:	Bluetooth speaker	Model Name :	MA-2241			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 5V					
Ant. Pol.	Horizontal					
Test Mode:	TX 8-DPSK Mode 2480	TX 8-DPSK Mode 2480MHz				
Remark: No report for the emission which more than 10 dB below the prescribed limit.						
400 0 70 111						

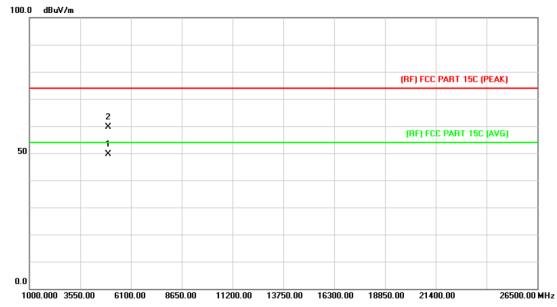


No	o. Mk.	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4960.000	45.51	14.36	59.87	74.00	-14.13	peak
2	*	4960.009	34.45	14.36	48.81	54.00	-5.19	AVG



Page: 37 of 93

EUT:	Bluetooth speaker	Model Name :	MA-2241					
Temperature:	25 ℃	Relative Humidity:	55%					
Test Voltage:	DC 5V	DC 5V						
Ant. Pol.	Vertical	Vertical						
Test Mode:	TX 8-DPSK Mode 2480MH		LINE TO SERVICE					
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	*	4960.111	35.39	14.36	49.75	54.00	-4.25	AVG
2		4960.291	45.32	14.36	59.68	74.00	-14.32	peak



Page: 38 of 93

6. Restricted Bands Requirement

6.1 Test Standard and Limit

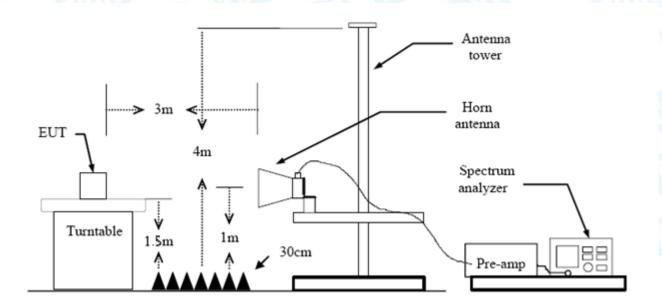
6.1.1 Test Standard FCC Part 15.209 FCC Part 15.205

6.1.2 Test Limit

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

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.



Report No.: TB-FCC146995 Page: 39 of 93

(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.

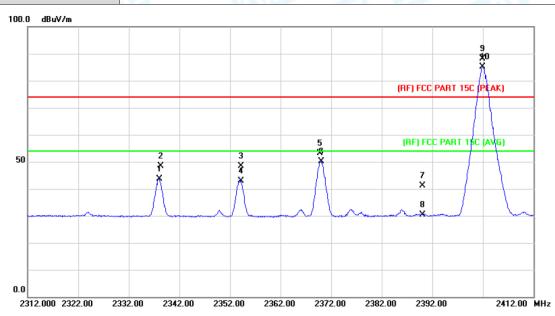
All restriction bands have been tested, only the worst case is reported.





(1) Radiation Test

EUT:	Bluetooth speaker	Model Name :	MA-2241				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 5V	DC 5V					
Ant. Pol.	Horizontal		THE PARTY OF THE P				
Test Mode:	TX GFSK Mode 2402MHz	The same of the sa					
Remark:	N/A		1				



No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2338.000	42.96	0.55	43.51	54.00	-10.49	AVG
2		2338.300	47.71	0.56	48.27	74.00	-25.73	peak
3		2354.200	47.66	0.62	48.28	74.00	-25.72	peak
4		2354.200	42.16	0.62	42.78	54.00	-11.22	AVG
5		2369.800	52.55	0.68	53.23	74.00	-20.77	peak
6		2370.000	49.49	0.69	50.18	54.00	-3.82	AVG
7		2390.000	40.27	0.77	41.04	74.00	-32.96	peak
8		2390.000	29.59	0.77	30.36	54.00	-23.64	AVG
9	Х	2401.900	87.36	0.82	88.18	Fundamental	Frequency	peak
10	*	2401.900	84.33	0.82	85.15	Fundamental	Frequency	AVG



Page: 41 of 93

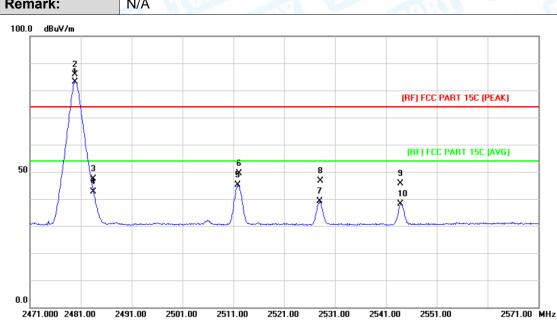


UT		Bluetooth s	peaker	Model Nan	ne:	MA-2241			
em	perature:	25 ℃		Relative H	Relative Humidity:		55%		
est	Voltage:	DC 5V	N. C.		-	M. T.			
nt.	Pol.	Vertical	_ DI	مر المانا	3 W				
est	Mode:	Mode: TX GFSK Mode 2402MHz							
Remark:		N/A	The same of the sa	3					
100.0	dBuV/m								
					(RF) FCC	PART 15C (PEAK)			
				6	(RF) FC	C PART 15C (AVG)			
50		2 ¥ *	3 %	X	7 X 8 X		\n		
0.0						.00 2412.00			

No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2337.900	42.23	0.55	42.78	54.00	-11.22	AVG
2		2338.100	47.42	0.56	47.98	74.00	-26.02	peak
3		2353.800	46.60	0.62	47.22	74.00	-26.78	peak
4		2354.000	41.22	0.62	41.84	54.00	-12.16	AVG
5		2370.000	47.72	0.69	48.41	54.00	-5.59	AVG
6		2370.100	51.44	0.69	52.13	74.00	-21.87	peak
7		2390.000	40.35	0.77	41.12	74.00	-32.88	peak
8		2390.000	29.84	0.77	30.61	54.00	-23.39	AVG
9	*	2402.000	82.98	0.82	83.80	Fundamental	Frequency	AVG
10	Х	2402.100	85.69	0.82	86.51	Fundamental	Frequency	peak



EUT: Bluetooth speaker **Model Name:** MA-2241 Temperature: 25 ℃ **Relative Humidity:** 55% Test Voltage: DC 5V Ant. Pol. Horizontal **Test Mode:** TX GFSK Mode 2480 MHz Remark: N/A

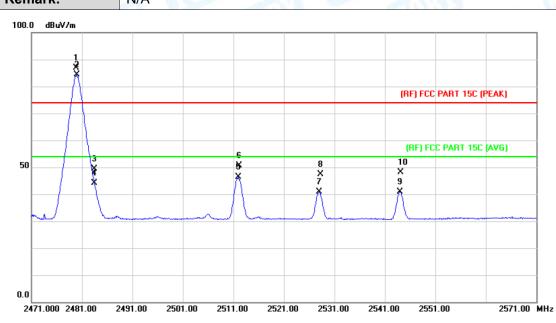


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	2479.800	81.94	1.15	83.09	Fundamental	Frequency	AVG
2	Х	2479.900	84.72	1.15	85.87	Fundamental	Frequency	peak
3		2483.500	46.11	1.17	47.28	74.00	-26.72	peak
4		2483.500	41.45	1.17	42.62	54.00	-11.38	AVG
5		2511.800	43.71	1.31	45.02	54.00	-8.98	AVG
6		2512.100	48.02	1.32	49.34	74.00	-24.66	peak
7		2528.000	37.85	1.40	39.25	54.00	-14.75	AVG
8		2528.100	45.31	1.40	46.71	74.00	-27.29	peak
9		2543.900	44.22	1.49	45.71	74.00	-28.29	peak
10		2543.900	36.70	1.49	38.19	54.00	-15.81	AVG



Page: 43 of 93

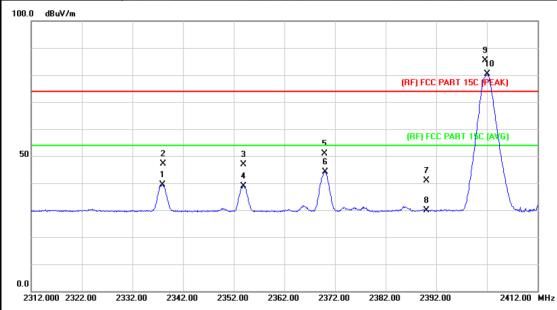
EUT:	Bluetooth speaker	Model Name :	MA-2241					
Temperature:	25 ℃	Relative Humidity:	55%					
Test Voltage:	DC 5V	DC 5V						
Ant. Pol.	Vertical							
Test Mode:	TX GFSK Mode 2480 MHz	(M) 32	A CHURCH					
Remark:	N/A	100						



No	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Χ	2479.900	85.78	1.15	86.93	Fundamental F	requency	peak
2	*	2480.000	83.11	1.15	84.26	Fundamental F	requency	AVG
3		2483.500	48.17	1.17	49.34	74.00	-24.66	peak
4		2483.500	42.84	1.17	44.01	54.00	-9.99	AVG
5		2512.000	45.00	1.31	46.31	54.00	-7.69	AVG
6		2512.100	49.27	1.32	50.59	74.00	-23.41	peak
7		2528.000	39.43	1.40	40.83	54.00	-13.17	AVG
8		2528.300	45.97	1.40	47.37	74.00	-26.63	peak
9		2544.000	39.49	1.49	40.98	54.00	-13.02	AVG
10		2544.100	46.57	1.49	48.06	74.00	-25.94	peak



EUT:	Bluetooth speaker	Model Name :	MA-2241						
Temperature:	25 ℃	Relative Humidity:	55%						
Test Voltage:	DC 5V	TV TO	133						
Ant. Pol.	Horizontal	Horizontal							
Test Mode:	TX 8-DPSK Mode 2402MF	łz	LINE TO SERVICE						
Remark:	N/A								
100.0 dBuV/m									



No.	Mk.	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2337.900	38.78	0.55	39.33	54.00	-14.67	AVG
2		2338.100	46.51	0.56	47.07	74.00	-26.93	peak
3		2353.900	46.20	0.62	46.82	74.00	-27.18	peak
4		2353.900	38.26	0.62	38.88	54.00	-15.12	AVG
5		2369.900	50.25	0.68	50.93	74.00	-23.07	peak
6		2370.000	43.48	0.69	44.17	54.00	-9.83	AVG
7		2390.000	40.07	0.77	40.84	74.00	-33.16	peak
8		2390.000	29.07	0.77	29.84	54.00	-24.16	AVG
9	Х	2401.700	84.66	0.82	85.48	Fundamenta	I Frequency	peak
10	*	2402.000	79.52	0.82	80.34	Fundamenta	I Frequency	AVG



EUT: Bluetooth speaker Model Name: MA-2241

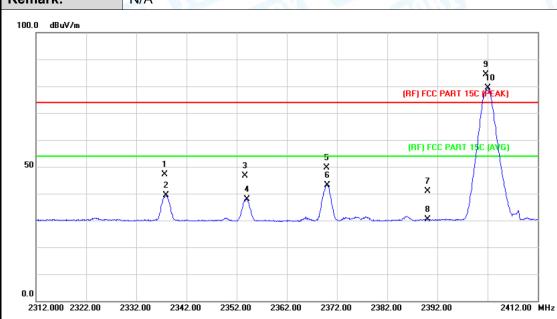
Temperature: 25 °C Relative Humidity: 55%

Test Voltage: DC 5V

Ant. Pol. Vertical

Test Mode: TX 8-DPSK Mode 2402MHz

Remark: N/A



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2337.700	46.50	0.55	47.05	74.00	-26.95	peak
2		2337.900	38.83	0.55	39.38	54.00	-14.62	AVG
3		2353.700	45.90	0.62	46.52	74.00	-27.48	peak
4		2354.000	37.17	0.62	37.79	54.00	-16.21	AVG
5		2369.900	49.00	0.68	49.68	74.00	-24.32	peak
6		2370.100	42.53	0.69	43.22	54.00	-10.78	AVG
7		2390.000	40.20	0.77	40.97	74.00	-33.03	peak
8		2390.000	29.60	0.77	30.37	54.00	-23.63	AVG
9	Х	2401.700	83.57	0.82	84.39	Fundamental	Frequency	peak
10	*	2402.000	78.55	0.82	79.37	Fundamental	Frequency	AVG



EUT: Bluetooth speaker Model Name: MA-2241

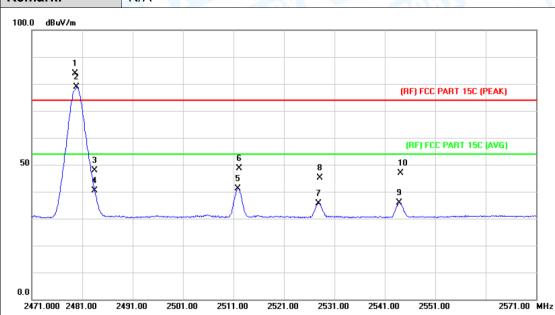
Temperature: 25 °C Relative Humidity: 55%

Test Voltage: DC 5V

Ant. Pol. Horizontal

Test Mode: TX 8-DPSK Mode 2480MHz

Remark: N/A

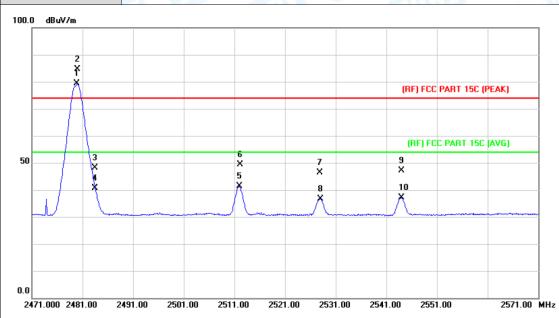


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Х	2479.600	82.73	1.15	83.88	Fundamental	Frequency	peak
2	*	2479.900	77.69	1.15	78.84	Fundamental	Frequency	AVG
3		2483.500	46.74	1.17	47.91	74.00	-26.09	peak
4		2483.500	39.10	1.17	40.27	54.00	-13.73	AVG
5		2511.800	39.81	1.31	41.12	54.00	-12.88	AVG
6		2512.200	47.30	1.32	48.62	74.00	-25.38	peak
7		2527.800	34.34	1.40	35.74	54.00	-18.26	AVG
8		2528.100	43.82	1.40	45.22	74.00	-28.78	peak
9		2543.900	34.49	1.49	35.98	54.00	-18.02	AVG
10		2544.100	45.46	1.49	46.95	74.00	-27.05	peak

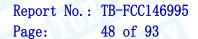


Page: 47 of 93

EUT:	Bluetooth speaker	Model Name :	MA-2241		
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	DC 5V				
Ant. Pol.	Vertical				
Test Mode:	TX 8-DPSK Mode 2480MHz				
Remark:	N/A		33		



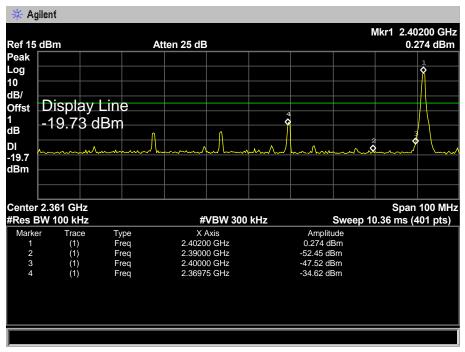
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	2479.900	78.19	1.15	79.34	Fundamenta	l Frequency	AVG
2	Х	2480.000	83.56	1.15	84.71	Fundamenta	I Frequency	peak
3		2483.500	46.86	1.17	48.03	74.00	-25.97	peak
4		2483.500	39.35	1.17	40.52	54.00	-13.48	AVG
5		2512.000	40.01	1.31	41.32	54.00	-12.68	AVG
6		2512.100	48.02	1.32	49.34	74.00	-24.66	peak
7		2527.800	44.94	1.40	46.34	74.00	-27.66	peak
8		2528.000	35.30	1.40	36.70	54.00	-17.30	AVG
9		2544.000	45.58	1.49	47.07	74.00	-26.93	peak
10		2544.000	35.68	1.49	37.17	54.00	-16.83	AVG

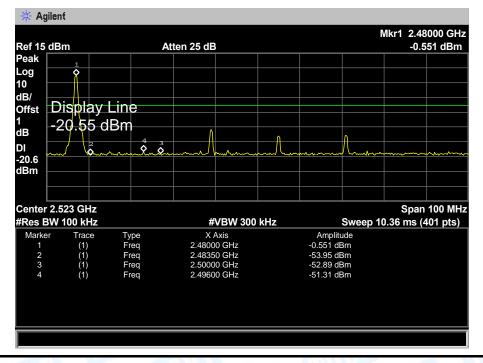




(2) Conducted Test

EUT:	Bluetooth speaker	Model Name :	MA-2241		
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	DC 5V				
Test Mode:	TX GFSK Mode 2402MHz / 2480 MHz				
Remark:	N/A	The same of the sa			

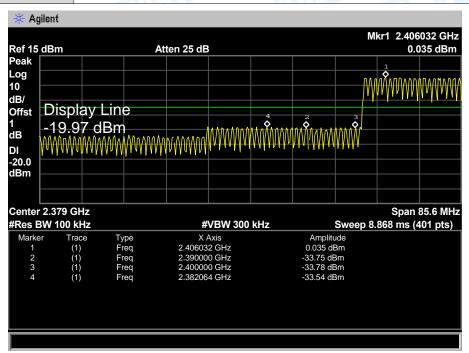


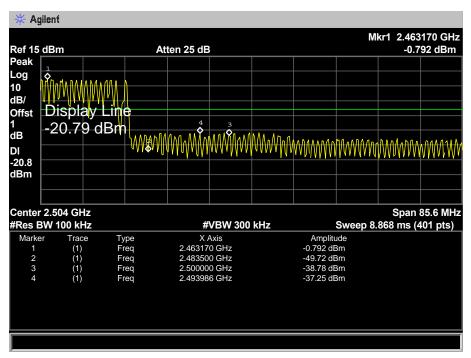




Page: 49 of 93

EUT:	Bluetooth speaker	Model Name :	MA-2241		
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	DC 5V		133		
Test Mode:	GFSK Hopping Mode				
Remark:	N/A		TIVE		

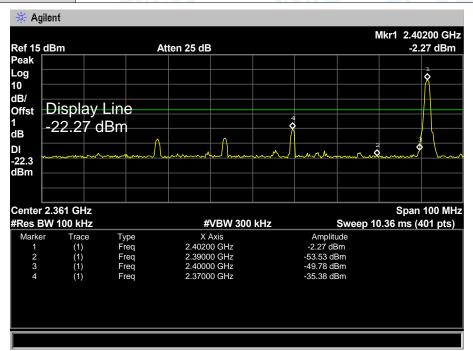


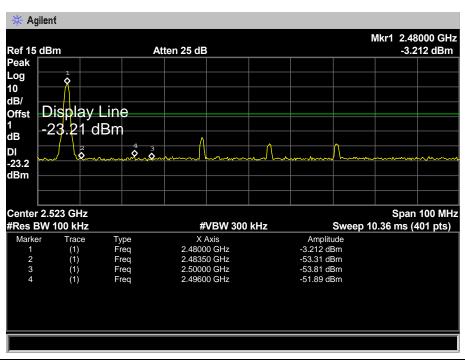




50 of 93 Page:

EUT:	Bluetooth speaker	Model Name :	MA-2241		
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	DC 5V				
Test Mode:	TX 8-DPSK Mode 2402MHz / 2480 MHz				
Remark:	N/A		THE PARTY OF THE P		







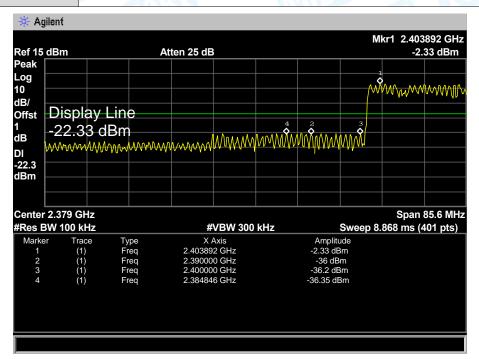
EUT: Bluetooth speaker Model Name: MA-2241

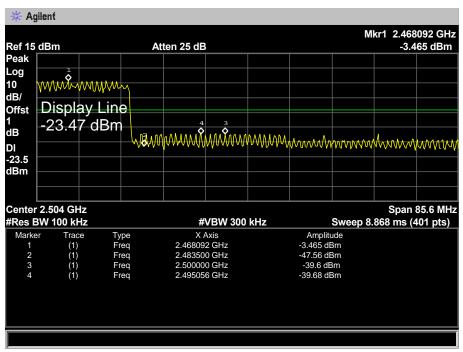
Temperature: 25 °C Relative Humidity: 55%

Test Voltage: DC 5V

Test Mode: 8-DPSK Hopping Mode

Remark: N/A







Page: 52 of 93

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

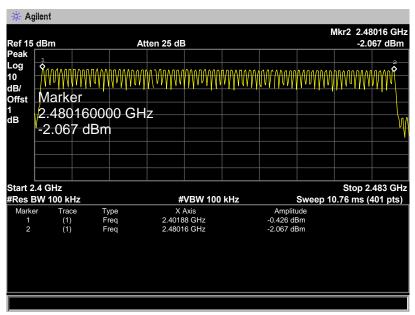


TOBY

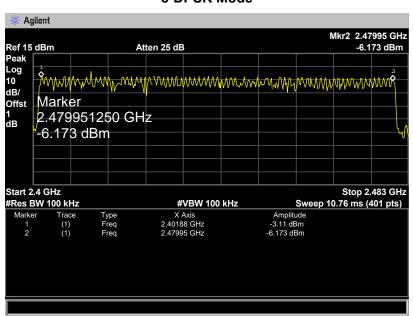
EUT:	Bluetooth speaker		Model Name :	MA-2241		
Temperature:	25 ℃	313	Relative Humidity:	55%		
Test Voltage:	DC 5V	DC 5V				
Test Mode:	Mode: Hopping Mode (GFSK/8-DPSK)					
	Quantity of Hopping					

Frequency Range	Quantity of Hopping Channel	Limit
24021111- 24801111-	79	>1 E
2402MHz~2480MHz	79	>15

GFSK Mode



8-DPSK Mode





Page: 54 of 93

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	0.4.222
Annex 8(A8.1d)	Occupancy	0.4 sec

8.2 Test Setup



8.3 Test Procedure

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

8.4 EUT Operating Condition

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

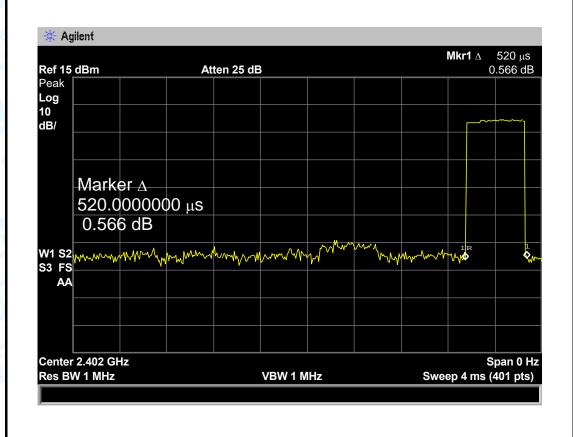


Page: 55 of 93

8.5 Test Data

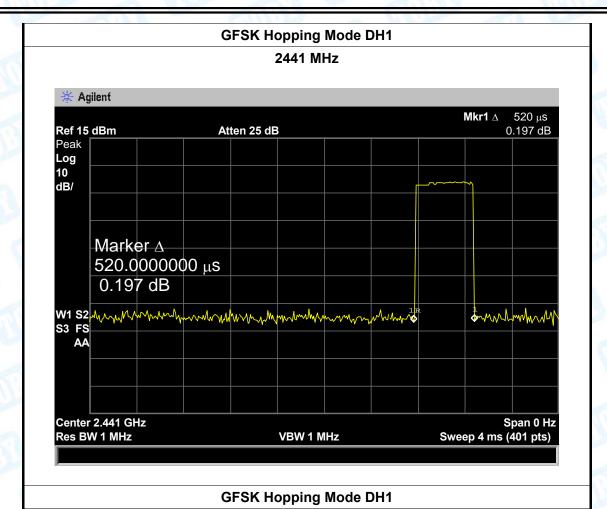
EUT:	Bluetooth s	peaker	Model Name :		MA-2241	
Temperature:	25 ℃	The same of	Relative Humidity:		55%	
Test Voltage:	DC 5V	NIII.		1 60		
Test Mode:	Hopping I	Mode (GFSK DH	1)	3	3 110	
Channel	Pulse Time	Total of Dwell	Period Time	Limit	Result	
(MHz)	(ms)	(ms)	(s)	(ms)	Result	
2402	0.520	166.40				
2441	0.520	166.40	31.60	400	PASS	
2480	0.520	166.40				
GFSK Hopping Mode DH1						

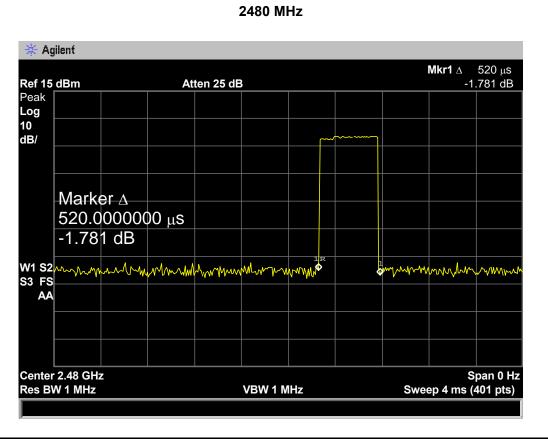
GFSK Hopping Mode DH1





Page: 56 of 93



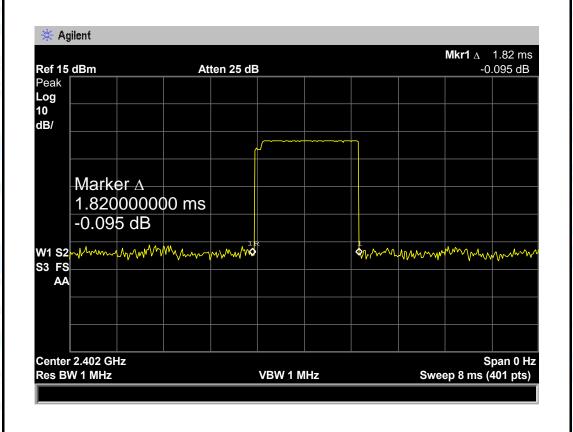




Page: 57 of 93

EUT: Bluetooth s			peaker	Model Name :		MA-2241
Temperature: 25 °C				Relative Hum	55%	
Test Voltage: DC 5V			N. S. C.	AVI No	-0	(33)
Test Mode:		Hopping	Mode (GFSK DH	3)	MA	
Channel	Pu	Ise Time	Total of Dwell	Period Time	Limit	Result
(MHz)		(ms)	(ms)	(s)	(ms)	Result
2402		1.820	291.20			
2441		1.820	291.20	31.60	400	PASS
2480		1.820	291.20			
	•		GFSK Hopping	Mode DH3		

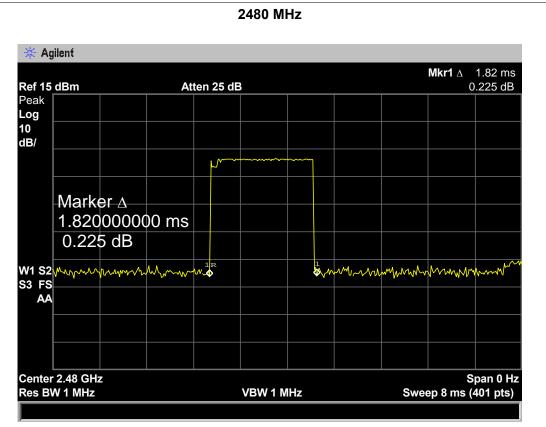
GFSK Hopping Mode DH3





58 of 93 Page:



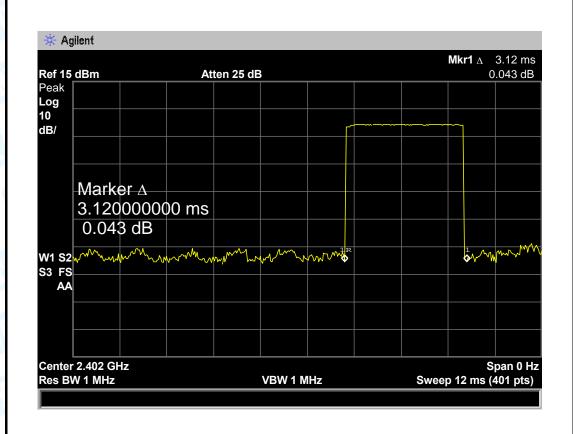


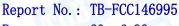


Page: 59 of 93

EUT: Bluetoot			peaker	Model Name :		MA-2241
Temperature		25 ℃		Relative Humidity:		55%
Test Voltage:		DC 5V	N. S. C.	AVI NO	-0	(33)
Test Mode:		Hopping I	Mode (GFSK DH	5)	MI	
Channel	Pulse Time		Total of Dwell	Period Time	Limit	Result
(MHz)		(ms)	(ms)	(s)	(ms)	Result
2402		3.120	332.80	31.60	400	
2441		3.120	332.80			PASS
2480		3.120	332.80			
	•		CECK Hanning	Mode DUE		

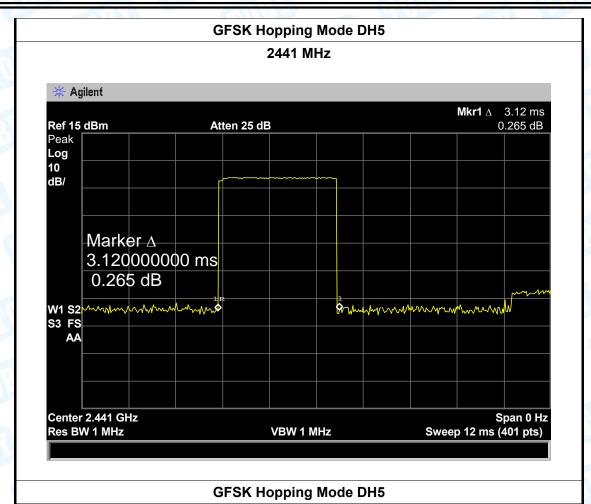
GFSK Hopping Mode DH5

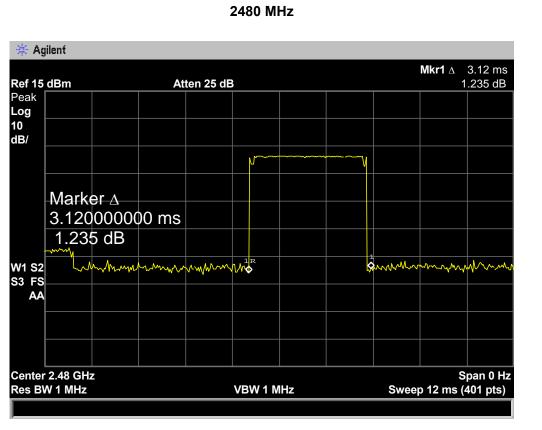






Page: 60 of 93



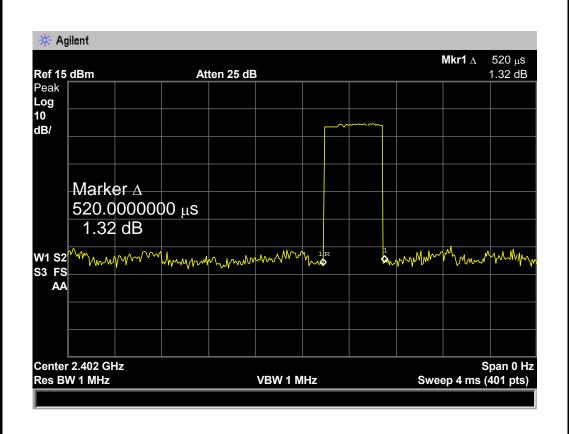




Page: 61 of 93

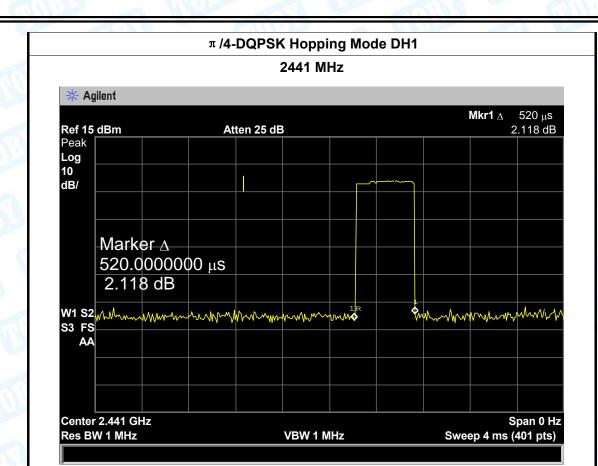
EUT:		Bluetooth s	peaker	Model Name :		MA-2241
Temperature		25 ℃		Relative Humidity:		55%
Test Voltage:	Test Voltage: DC 5V				-0	(3)
Test Mode:		Hopping I	Mode (π/4-DQP	SK DH1)	MA	
Channel	el Pulse Time		Total of Dwell	Period Time	Limit	Result
(MHz)		(ms)	(ms)	(s)	(ms)	Result
2402		0.520	166.40			
2441		0.520	166.40	31.60	400	PASS
2480		0.520	166.40			

π /4-DQPSK Hopping Mode DH1

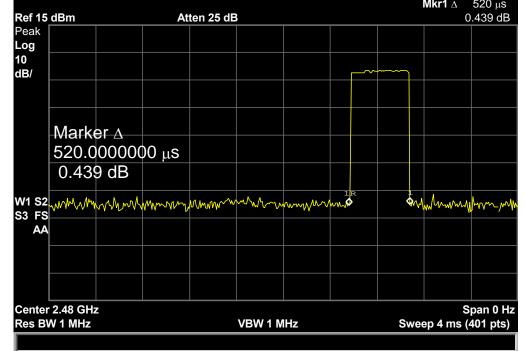




62 of 93 Page:



π /4-DQPSK Hopping Mode DH1 2480 MHz * Agilent Mkr1 Δ 520 μs Ref 15 dBm Atten 25 dB

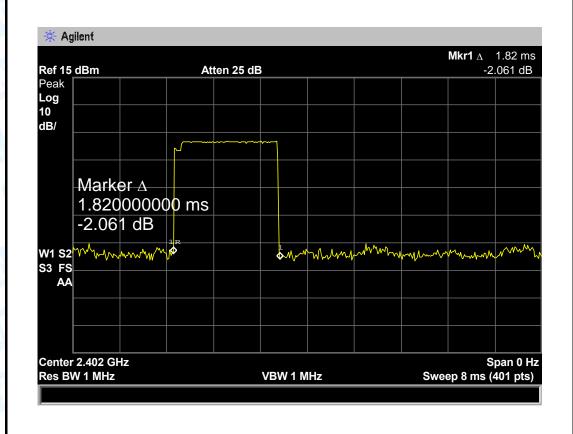




Page: 63 of 93

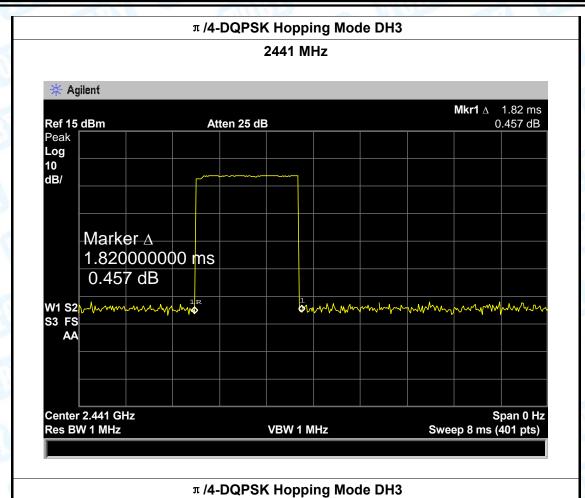
EUT:		Bluetooth s	peaker	Model Name :		MA-2241
Temperature:	ıre: 25 ℃			Relative Humidity:		55%
Test Voltage:	Test Voltage: DC 5V				(33)	
Test Mode:		Hopping I	Mode (π/4-DQP	SK DH3)	MI	
Channel	Pulse Time		Total of Dwell	Period Time	Limit	Result
(MHz)		(ms)	(ms)	(s)	(ms)	Result
2402		1.820	291.20	31.60	400	
2441		1.820	291.20			PASS
2480		1.820	291.20			
						· ·

π /4-DQPSK Hopping Mode DH3

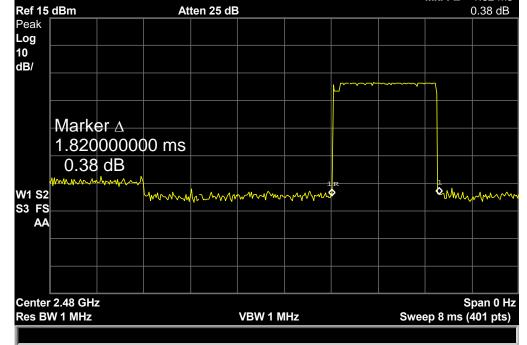




64 of 93 Page:



2480 MHz * Agilent Mkr1 A 1.82 ms Ref 15 dBm Atten 25 dB

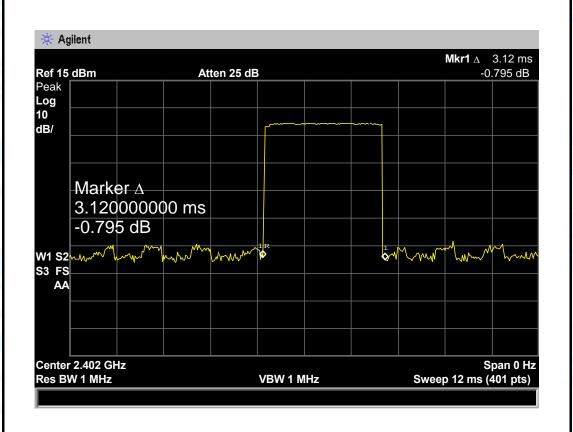




Page: 65 of 93

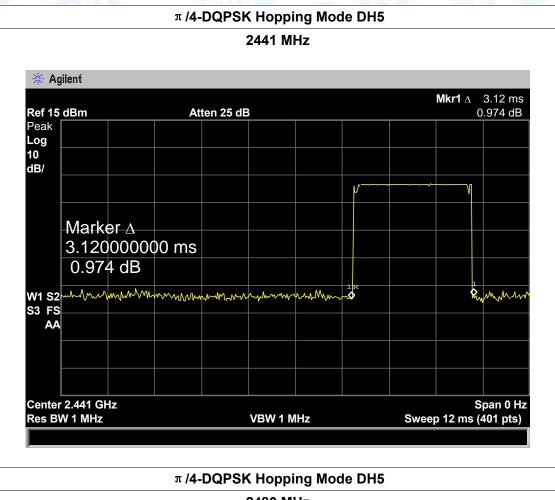
EUT: Bluetooth s		peaker	Model Name :		MA-2241	
Temperature: 25 °C				Relative Hum	idity:	55%
Test Voltage:		DC 5V	N. S. C.			130
Test Mode:		Hopping I	Mode (π/4-DQP	SK DH5)	Mill	
Channel	Pu	Ise Time	Total of Dwell	Period Time	Limit	Result
(MHz)		(ms)	(ms)	(s)	(ms)	Result
2402	3	.120	332.80			
2441	3	.120	332.80	31.60	400	PASS
2480	3	.120	332.80			

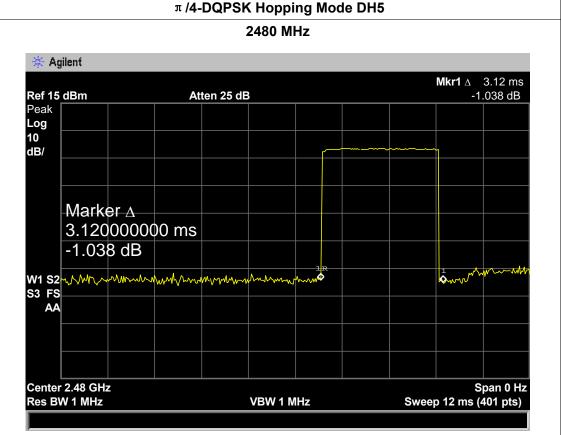
π /4-DQPSK Hopping Mode DH5





Page: 66 of 93







2480

0.520

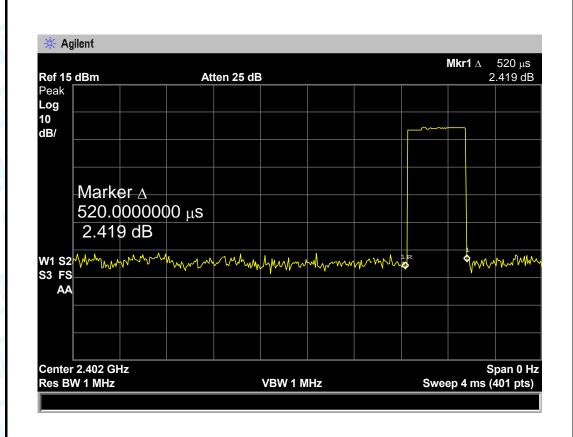
Report No.: TB-FCC146995

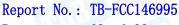
Page: 67 of 93

EUT:	Bluetooth speaker			Model Name	•	MA-2241
Temperature	Temperature: 25 °C			Relative Hum	55%	
Test Voltage:	Test Voltage: DC 5V				A MARIE	
Test Mode:		Hopping I	Mode (8-DPSK D	H1)	600	[:33
Channel	Channel Pulse Tin		Total of Dwell	Period Time	Limit	Result
(MHz)		(ms)	(ms)	(s)	(ms)	Result
2402		0.520	166.40			
2441		0.520	166.40	31.60	400	PASS

8-DPSK Hopping Mode DH1

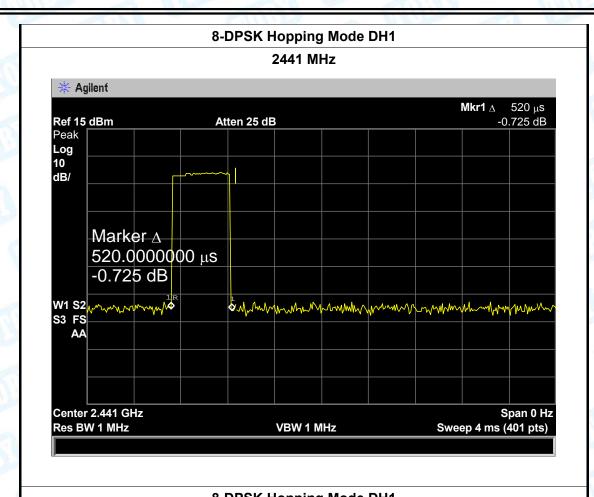
166.40







Page: 68 of 93



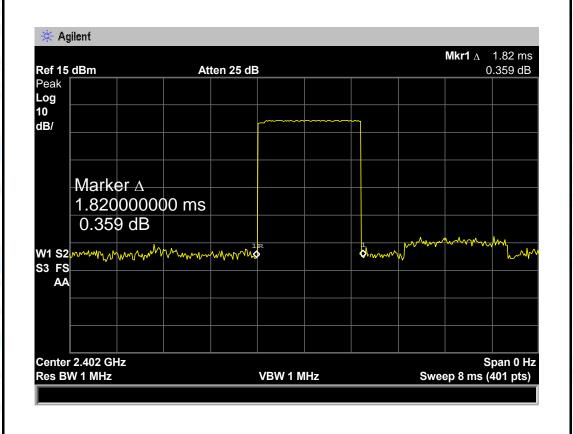
8-DPSK Hopping Mode DH1 2480 MHz * Agilent Mkr1 Δ 520 μs Ref 15 dBm Atten 25 dB 0.235 dB Peak Log 10 dB/ Marker ∆ 520.0000000 μs 0.235 dB W1 S2 MANA S3 FS ~~~~~~ AΑ Center 2.48 GHz Span 0 Hz Res BW 1 MHz VBW 1 MHz Sweep 4 ms (401 pts)



Page: 69 of 93

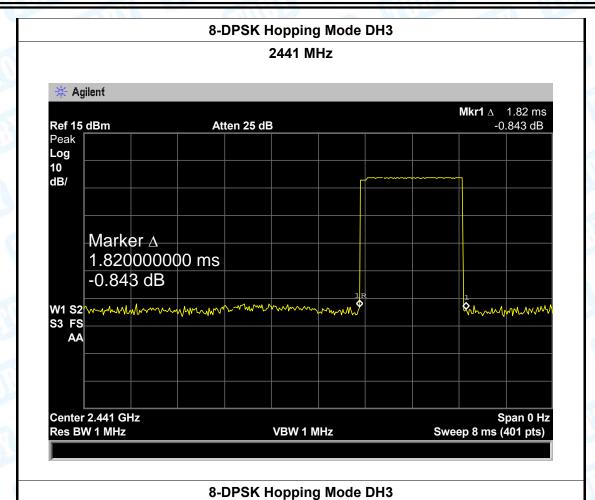
EUT: Bluetooth s			peaker	Model Name :		MA-2241
Temperature: 25 ℃				Relative Hum	55%	
Test Voltage: DC 5V				-0	(33)	
Test Mode:		Hopping I	Mode (8-DPSK D	H3)	MI	
Channel	Pu	lse Time	Total of Dwell	Period Time	Limit	Result
(MHz)		(ms)	(ms)	(s)	(ms)	Resuit
2402		1.820	291.20		400	
2441		1.820	291.20	31.60		PASS
2480		1.820	291.20			
	•		8-DPSK Hoppin	na Mode DH3		

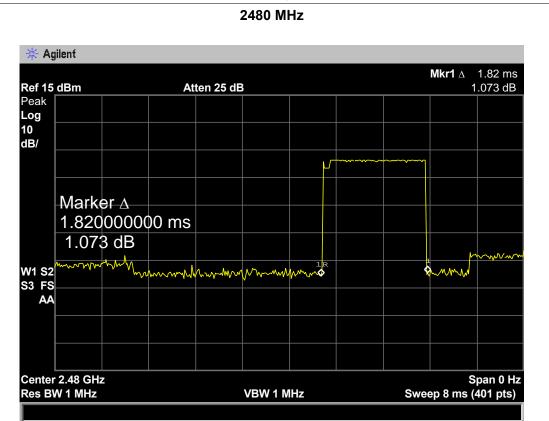
8-DPSK Hopping Mode DH3





70 of 93 Page:



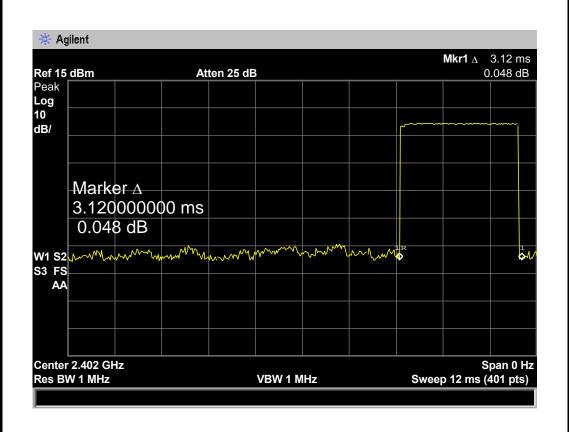




Page: 71 of 93

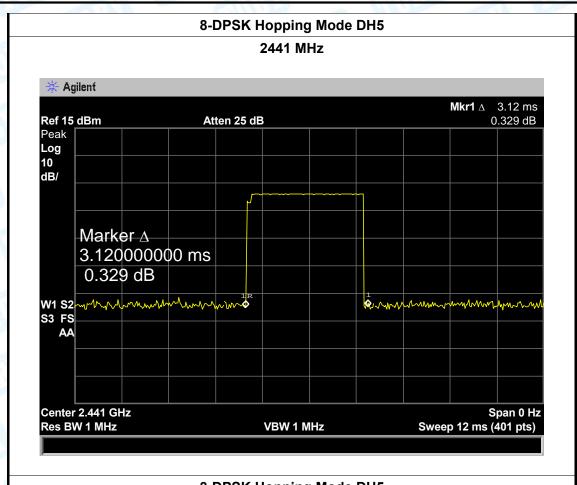
EUT: Blue		Bluetooth speaker		Model Name :		MA-2241	
Temperature: 25 °C				Relative Hum	idity:	55%	
Test Voltage:		DC 5V	N. S. C.	OV P	-30	133	
Test Mode:		Hopping I	Mode (8-DPSK D	H5)	MA		
Channel	Pulse Time		Total of Dwell	Period Time	Limit	Popult	
(MHz)		(ms)	(ms)	(s)	(ms)	Result	
2402	3	.120	332.80				
2441	3	.120	332.80	31.60	400	PASS	
2480	3.120		332.80				
O DDOK Harris Made DUE							

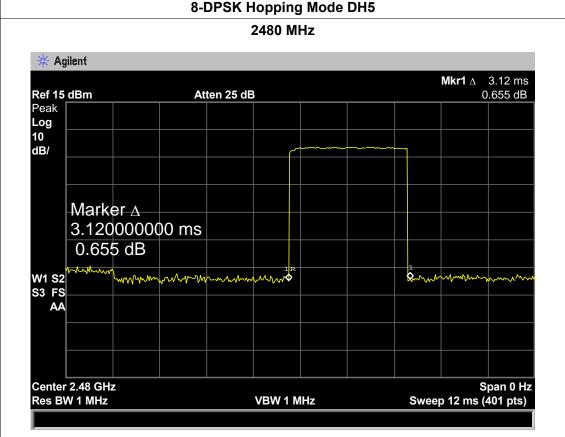
8-DPSK Hopping Mode DH5





72 of 93 Page:







Page: 73 of 93

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.

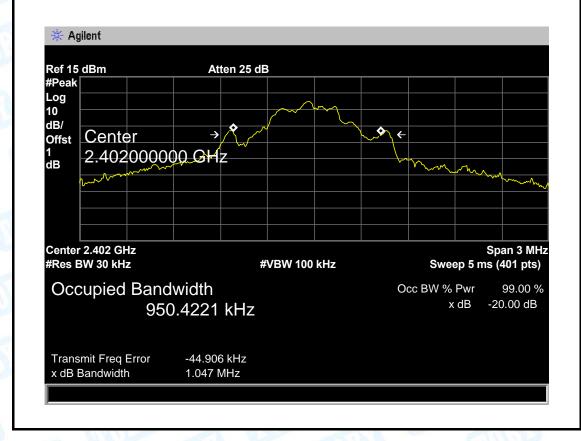


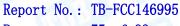
Page: 74 of 93

9.5 Test Data

EUT:	Bluetooth speaker	Model Name :	MA-2241
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 5V		
Test Mode:	TX Mode (GFSK)	CHILL STORY	2 110
Channel frequenc (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	950.4221	1047.00	698.00
2441	981.6931	1046.00	697.33
2480	978.6928	1040.00	693.33

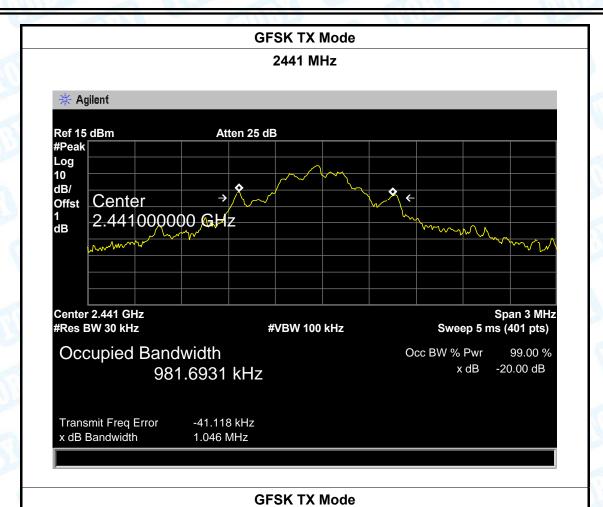
GFSK TX Mode

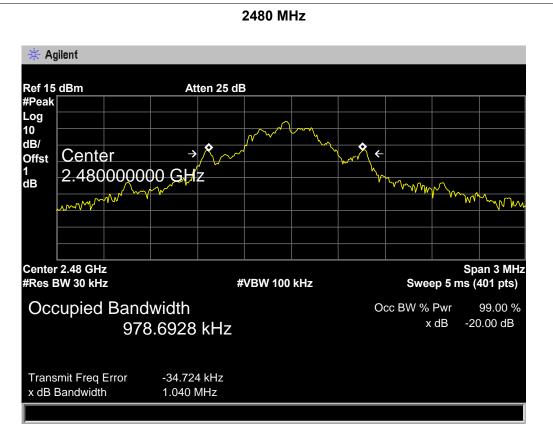






Page: 75 of 93





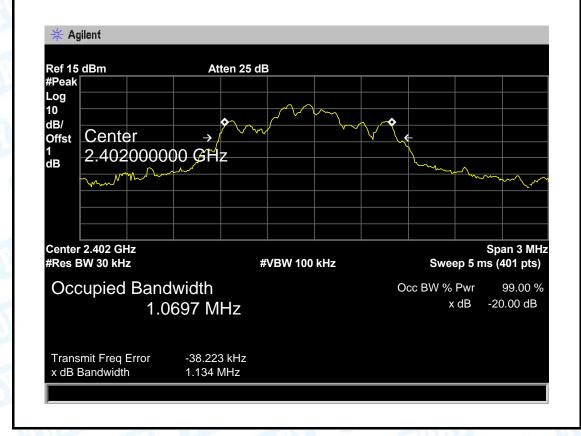


Page: 76 of 93

Channel frequend	cy 99% OBW (kHz)	20dB Bandwidth	20dB Bandwidth *2/3
Test Mode:	TX Mode (π/4-DQPSK)		
Test Voltage:	DC 5V		
Temperature:	25 ℃	Relative Humidity:	55%
EUT:	Bluetooth speaker	Model Name :	MA-2241

Channel frequency (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	1069.70	1134.00	756.00
2441	1070.90	1136.00	757.33
2480	1059.00	1118.00	745.33

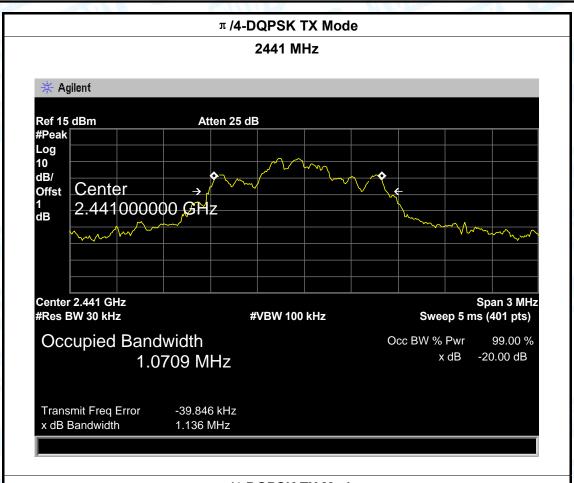
π/4-DQPSK TX Mode



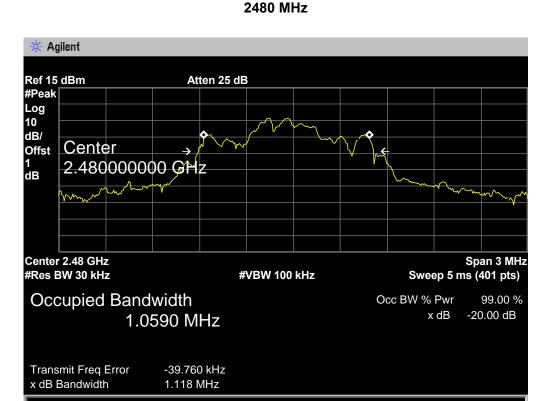




Page: 77 of 93



π /4-DQPSK TX Mode



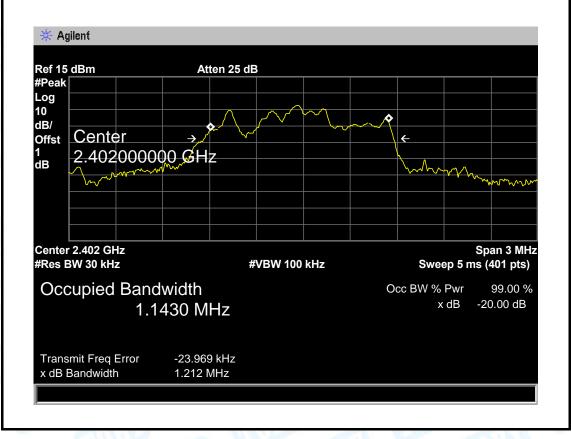


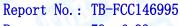
Page: 78 of 93

EUT:	Bluetooth speaker	Model Name :	MA-2241
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 5V		
Test Mode:	TX Mode (8-DPSK)		

		The state of the s	
Channel frequency (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	1143.00	1212.00	808.00
2441	1043.10	1210.00	806.67
2480	1141.60	1213.00	808.67

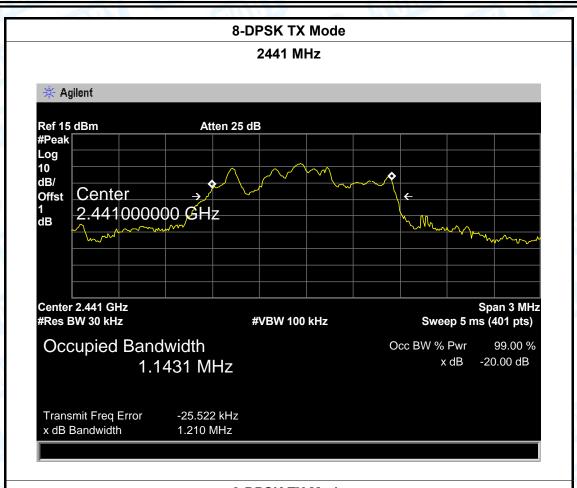
8-DPSK TX Mode



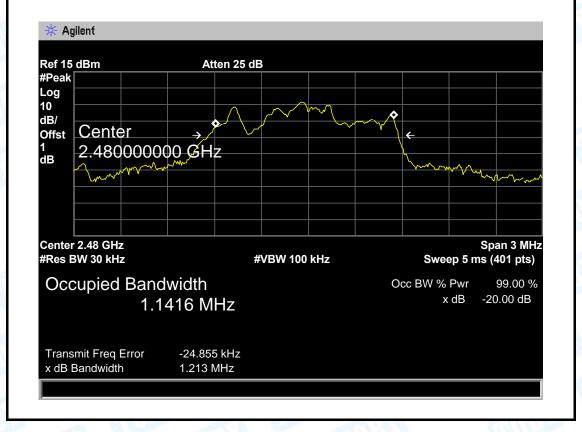




Page: 79 of 93



8-DPSK TX Mode 2480 MHz





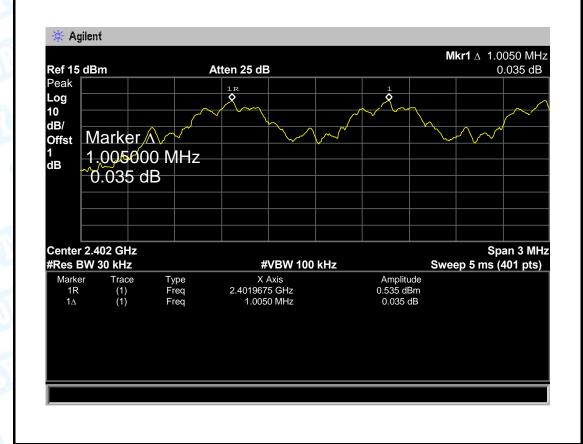
Page: 80 of 93

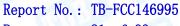
EUT:	Bluetooth speaker	Model Name :	MA-2241
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		

Test Mode: Hopping Mode (GFSK)

Channel frequency	Separation Read Value	Separation Limit	
(MHz)	(kHz)	(kHz)	
2402	1005.00	698.00	
2441	1005.00	697.33	
2480	1005.00	693.33	

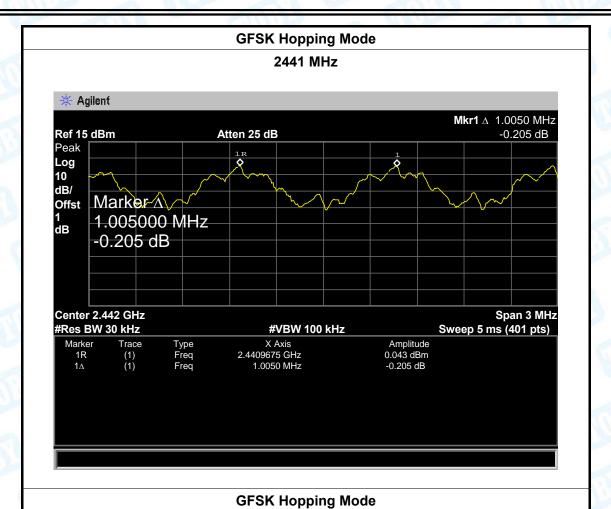
GFSK Hopping Mode

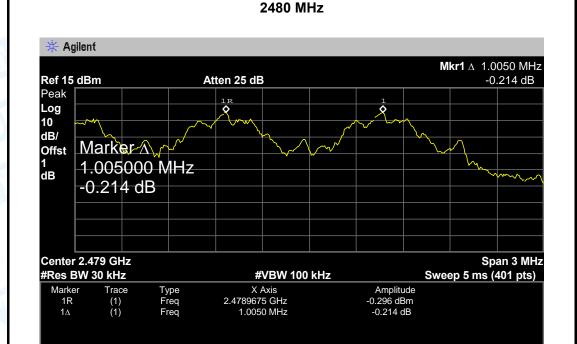






Page: 81 of 93







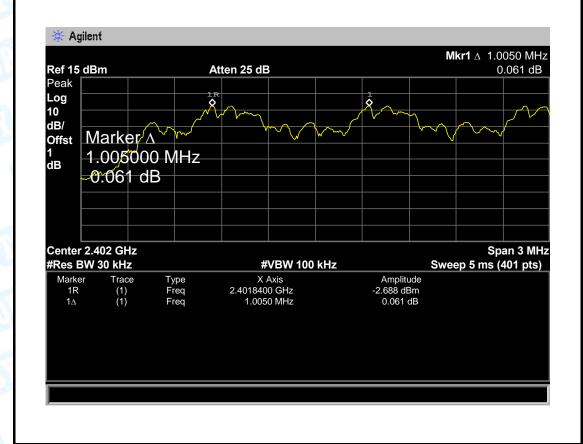
Page: 82 of 93

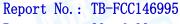
EUT:	Bluetooth speaker	Model Name :	MA-2241
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V	THE WAY	

Test Mode: Hopping Mode (π/4-DQPSK)

Channel frequency	Separation Read Value	Separation Limit	
(MHz)	(kHz)	(kHz)	
2402	1005.00	756.00	
2441	1005.00	757.33	
2480	1005.00	745.33	

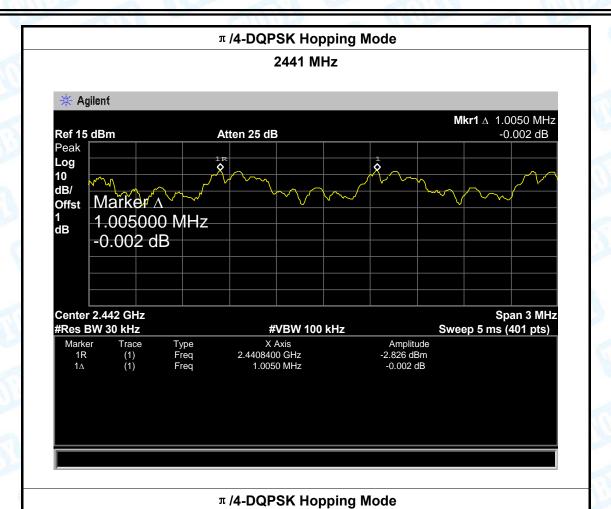
π /4-DQPSK Hopping Mode

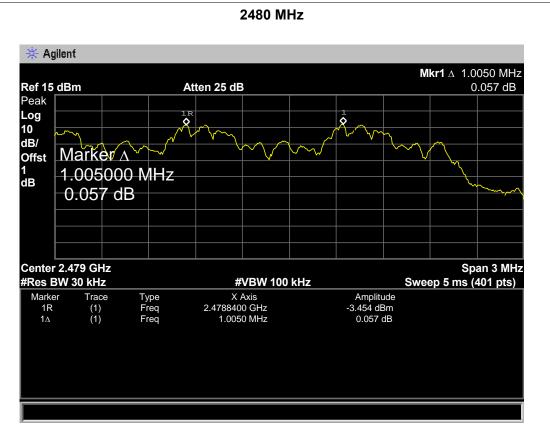






Page: 83 of 93







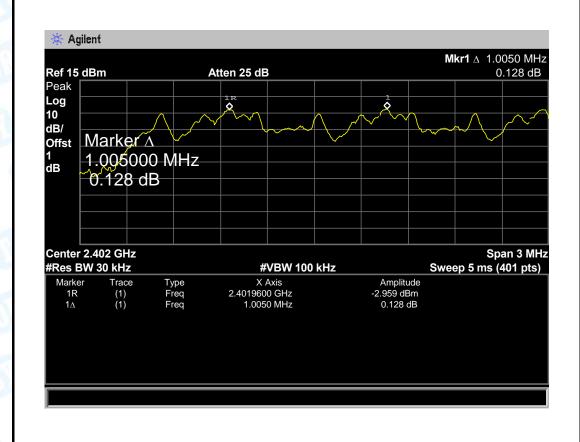
Page: 84 of 93

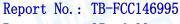
EUT:	Bluetooth speaker	Model Name :	MA-2241
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		

Test Mode: Hopping Mode (8-DPSK)

Channel frequency	Separation Read Value	Separation Limit	
(MHz)	(kHz)	(kHz)	
2402	1005.00	808.00	
2441	1005.00	806.67	
2480	1005.00	808.67	

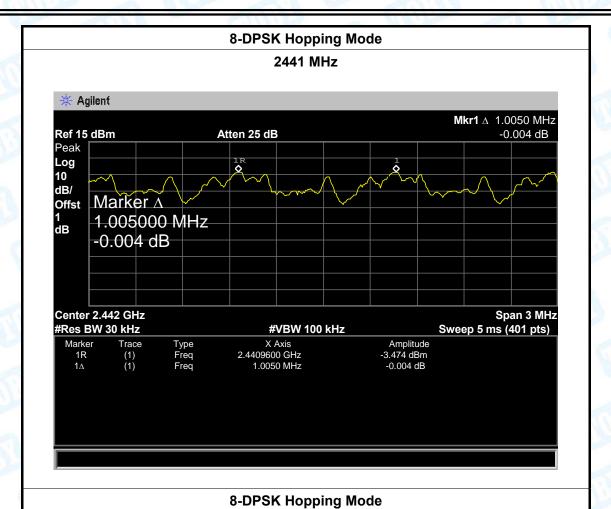
8-DPSK Hopping Mode

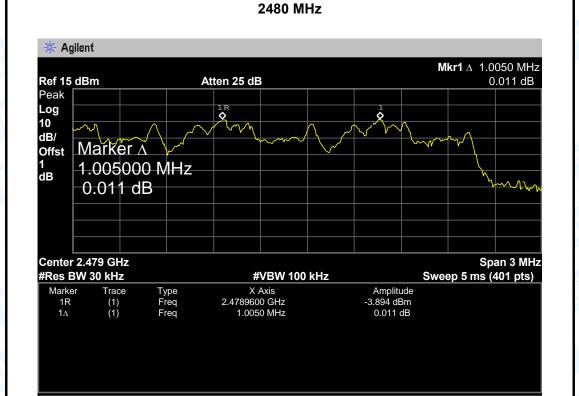






Page: 85 of 93







Page: 86 of 93

10. Peak Output Power Test

10.1 Test Standard and Limit

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

10.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)
Peak Output Power	Hopping Channels>75 Power<1W(30dBm)	2400~2483.5
01000	Other <125 mW(21dBm)	

10.2 Test Setup



10.3 Test Procedure

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

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

10.4 EUT Operating Condition

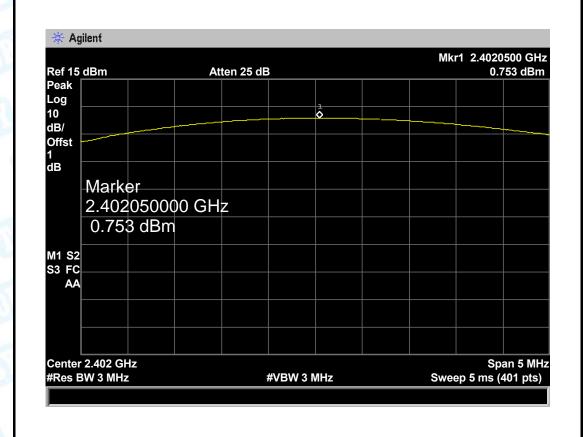
The EUT was set to continuously transmitting in the max power during the test.



Page: 87 of 93

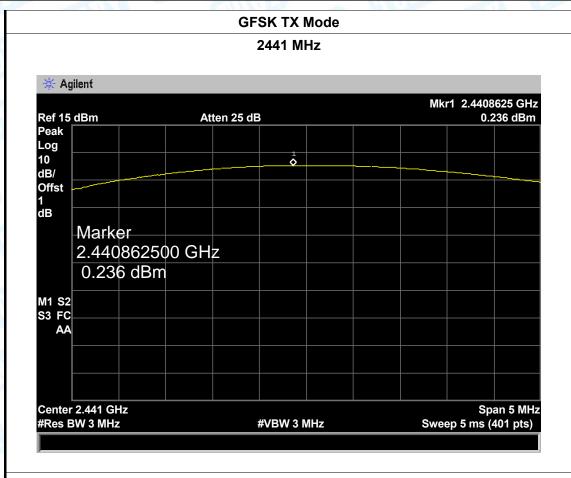
10.5 Test Data

EUT:	Bluetooth s	peaker	Model Name :	MA-2241	
Temperature:	25 ℃		Relative Humidity:	55%	
Test Voltage:	DC 5V		COLUMN TO SERVICE SERV	A MILLIAN	
Test Mode:	TX Mode (GFSK)				
Channel frequency (MHz) Test Result		(dBm) L	.imit (dBm)		
2402		0.753			
2441	11 0.236			21	
2480		-0.131			
GFSK TX Mode					

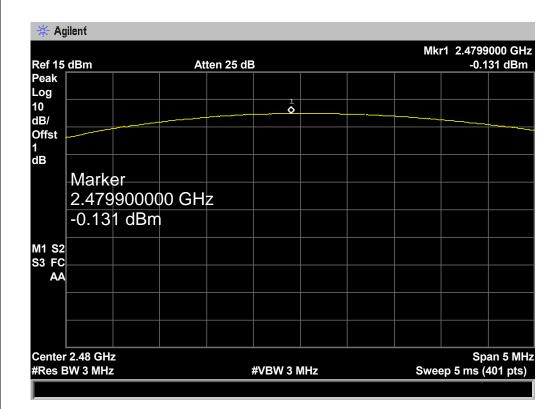




88 of 93 Page:





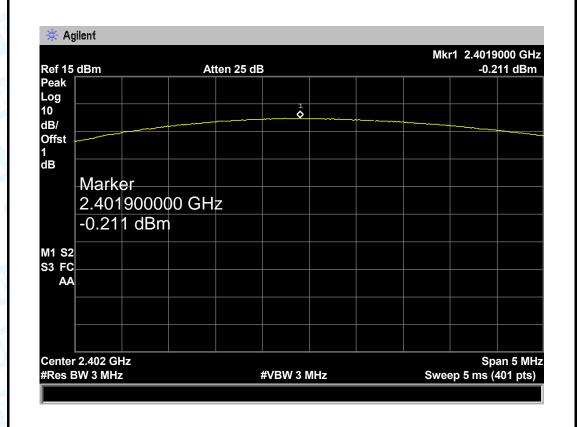




Page: 89 of 93

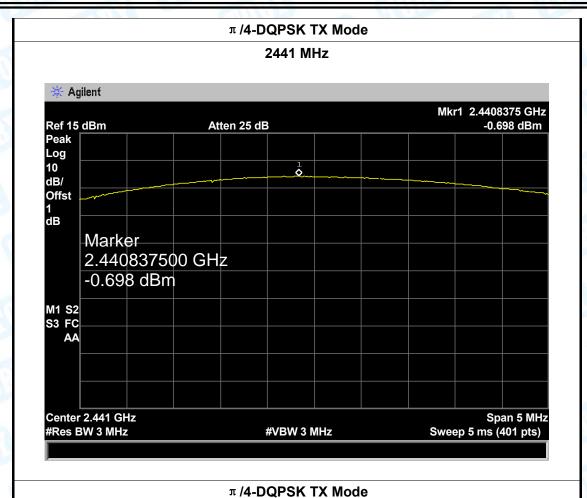
EUT:	Bluetooth s	peaker	Model Nam	e :	MA-2241
Temperature:	25 ℃		Relative Hu	midity:	55%
Test Voltage:	DC 5V				181
Test Mode:	TX Mode	(π/4-DQPSk	()	3 W	
Channel frequen	cy (MHz)	Test Re	esult (dBm)		Limit (dBm)
2402		-(0.211		
2441		-(0.698		21
2480		′	1.155		
T // DODSK TV Mode					

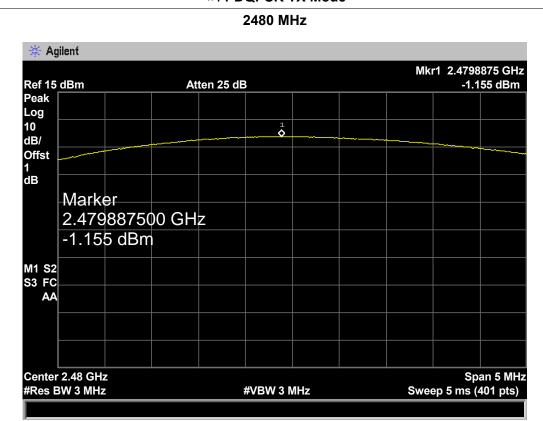
π /4-DQPSK TX Mode





90 of 93 Page:



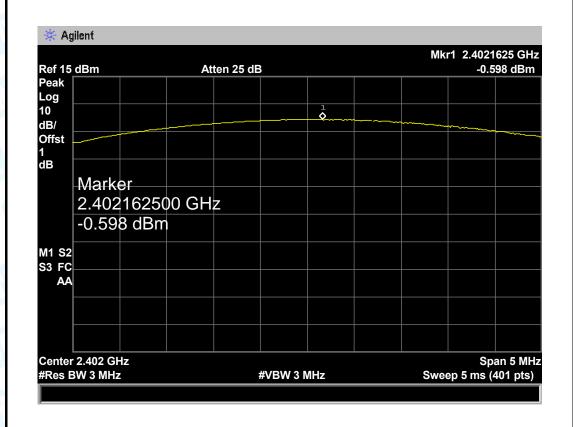




Page: 91 of 93

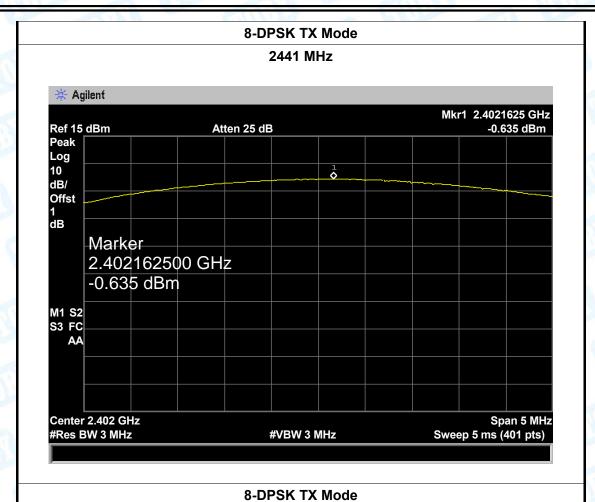
EUT:	Bluetooth s	peaker	Model Name :	MA-2241
Temperature:	25 ℃		Relative Humidity:	55%
Test Voltage:	DC 5V	N. S. C.	TV C	
Test Mode:	TX Mode	(8-DPSK)		
Channel frequency (MHz) Test Result (dBm)		lt (dBm)	Limit (dBm)	
2402		-0.5	98	
2441		-0.635		21
2480		-1.5	.543	
8-DPSK TY Mode				

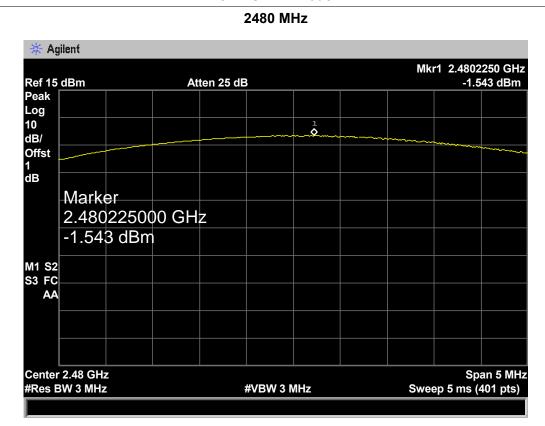
8-DPSK TX Mode





92 of 93 Page:







Page: 93 of 93

11. Antenna Requirement

11.1 Standard Requirement

11.1.1 Standard FCC Part 15.203

11.1.2 Requirement

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

11.2 Antenna Connected Construction

The directional gains of the antenna used for transmitting is 2 dBi, and the antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

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

Antenna Type			
▶ Permanent attached antenna	0.000		
□ Unique connector antenna	THE PERSON NAMED IN		
☐ Professional installation antenna			