

# FCC Radio Test Report

## FCC ID: 2AFNM-JT2693

### Original Grant

**Report No.** : TB-FCC145235  
**Applicant** : Shenzhen Jinruitai Electronics Co.,Ltd  
**Equipment Under Test (EUT)**  
**EUT Name** : Waterproof Bluetooth Speaker  
**Model No.** : JT2693  
**Series Model No.** : N/A  
**Brand Name** : N/A  
**Receipt Date** : 2015-08-24  
**Test Date** : 2015-08-24 to 2015-09-07  
**Issue Date** : 2015-09-09  
**Standards** : FCC Part 15: 2014, Subpart C(15.247)  
**Test Method** : ANSI C63.10:2013  
**Conclusions** : **PASS**

In the configuration tested, the EUT complied with the standards specified above,  
The EUT technically complies with the FCC requirements

**Test/Witness Engineer** :

WANG SU

**Approved& Authorized** :

Longhai



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.



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# 1. General Information about EUT

## 1.1 Client Information

**Applicant** : Shenzhen Jinruitai Electronics Co.,Ltd  
**Address** : 4F, Building A, Taixinglong Industrial Town, Zhongwu Xixiang, Baoan District, Shenzhen City, Guangdong Province, China  
**Manufacturer** : Shenzhen Jinruitai Electronics Co.,Ltd  
**Address** : 4F, Building A, Taixinglong Industrial Town, Zhongwu Xixiang, Baoan District, Shenzhen City, Guangdong Province, China

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

EUT Name	:	Waterproof Bluetooth Speaker	
Models No.	:	JT2693	
Model Difference	:	N/A	
Product Description	:	Operation Frequency: Bluetooth:2402~2480MHz	
		Number of Channel:	Bluetooth:79 Channels see note (2)
	:	Max Peak Output Power:	8-DPSK:-0.126dBm (Conducted Power)
		Antenna Gain:	0 dBi PCB Antenna
		Modulation Type:	GFSK 1Mbps(1 Mbps) $\pi$ /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	:	DC 5.0V by USB cable. DC 3.7V 400mAh Li-ion Battery.	
Connecting I/O Port(S)	:	Please refer to the User's Manual	

### Note:

- (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- (2) This Test Report is FCC Part 15.247 for Bluetooth, and test procedure in accordance with Public Notice: DA 00-705.
- (3) Channel List:

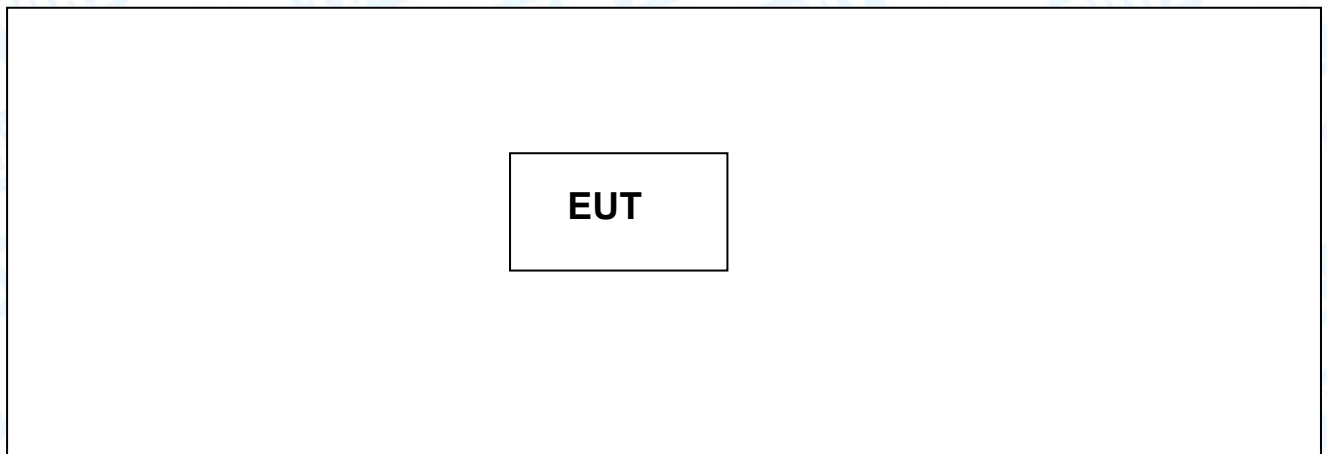
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458

03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	<b>39</b>	<b>2441</b>	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	<b>78</b>	<b>2480</b>
25	2427	52	2454		
26	2428	53	2455		

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

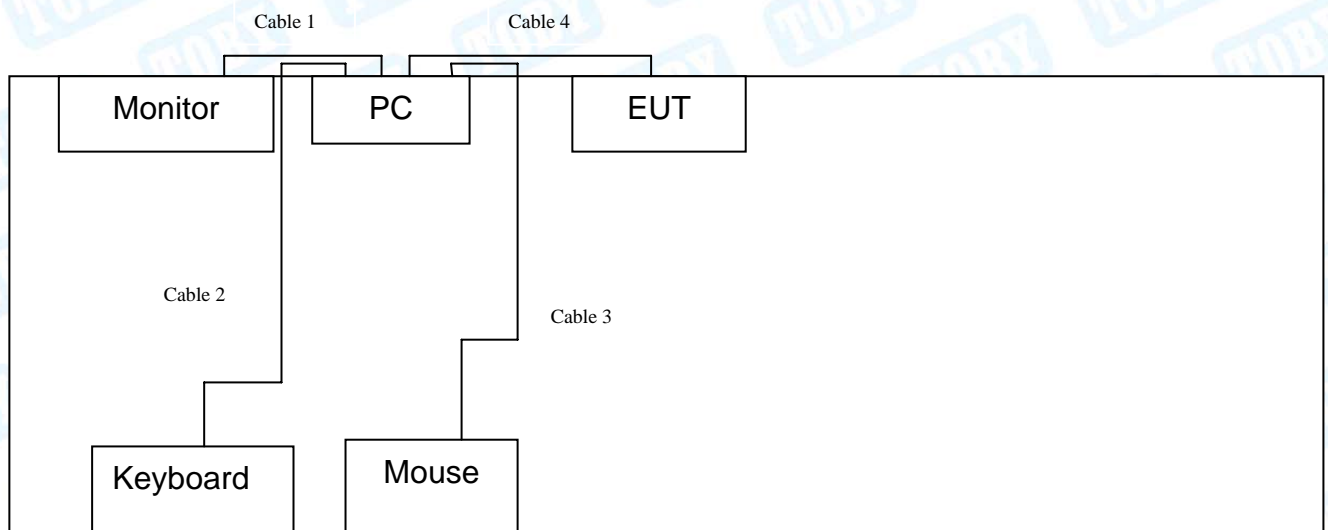
### 1.3 Block Diagram Showing the Configuration of System Tested

**TX Mode**





## USB Charging with TX Mode



## 1.4 Description of Support Units

Equipment Information				
Name	Model	FCC ID/DOC	Manufacturer	Used “√”
LCD Monitor	E170Sc	DOC	DELL	√
PC	OPTIPLEX380	DOC	DELL	√
Keyboard	L100	DOC	DELL	√
Mouse	M-UARDEL7	DOC	DELL	√
Cable Information				
Number	Shielded Type	Ferrite Core	Length	Note
Cable 1	YES	YES	1.5M	
Cable 2	YES	YES	1.5M	
Cable 2	YES	NO	1.5M	
Cable 3	NO	YES	0.8M	

## 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( $\pi/4$ -DQPSK) Channel 00/39/78
Mode 4	TX Mode(8-DPSK) Channel 00/39/78
Mode 5	Hopping Mode(GFSK)
Mode 6	Hopping Mode( $\pi/4$ -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:  
TX Mode: GFSK (1 Mbps)  
TX Mode:  $\pi/4$ -DQPSK (2 Mbps)  
TX Mode: 8-DPSK (3 Mbps)
- (2) The EUT is considered a portable unit; it was pre-tested on the positioned of each 3 axis, X-plane, Y-plane and Z-plane. The worst case was found positioned on X-plane as the normal use. Therefore only the test data of this X-plane was used for radiated emission measurement test.

## 1.6 Description of Test Software Setting

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

Test Software Version	N/A		
Frequency	2402 MHz	2441MHz	2480 MHz
GFSK	DEF	DEF	DEF
$\pi/4$ -DQPSK	DEF	DEF	DEF
8-DPSK	DEF	DEF	DEF



## 1.7 Measurement Uncertainty

The reported uncertainty of measurement  $y \pm U$ , where expanded 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	$\pm 3.42$ dB $\pm 3.42$ dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	$\pm 4.60$ dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	$\pm 4.40$ dB
Radiated Emission	Level Accuracy: Above 1000MHz	$\pm 4.20$ dB

## 1.8 Test Facility

The testing report were performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at 1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

### **CNAS (L5813)**

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

### **FCC List No.: (811562)**

The Laboratory is listed in the United States of American Federal Communications Commission (FCC), and the registration number is 811562.

### **IC Registration No.: (11950A-1)**

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A-1.

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



## 2. Test Summary

FCC Part 15 Subpart C(15.247)/ RSS 247 Issue 1				
Standard Section		Test Item	Judgment	Remark
FCC	IC			
15.203		Antenna Requirement	PASS	N/A
15.207	RSS-GEN 7.2.2	Conducted Emission	PASS	N/A
15.205	RSS-Gen 7.2.3	Restricted Bands	PASS	N/A
15.247(a)(1)	RSS 247 5.1 (2)	Hopping Channel Separation	PASS	N/A
15.247(a)(1)	RSS 247 5.1 (4)	Dwell Time	PASS	N/A
15.247(b)(1)	RSS 247 5.4 (2)	Peak Output Power	PASS	N/A
15.247(b)(1)	RSS 247 5.1 (4)	Number of Hopping Frequency	PASS	N/A
15.247(c)	RSS 247 5.5	Radiated Spurious Emission	PASS	N/A
15.247(a)	RSS 247 5.1 (1)	99% Occupied Bandwidth & 20dB Bandwidth	PASS	99%OBW GFSK:832.1399kHz $\pi$ /4-DQPSK: 1147.10kHz 8-DPSK: 1127.20kHz
<b>Note:</b> N/A is an abbreviation for Not Applicable.				



### 3. Test Equipment

Conducted Emission Test					
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
Radiation Emission Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
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



## 4. Conducted Emission Test

### 4.1 Test Standard and Limit

4.1.1 Test Standard  
FCC Part 15.207

4.1.2 Test Limit

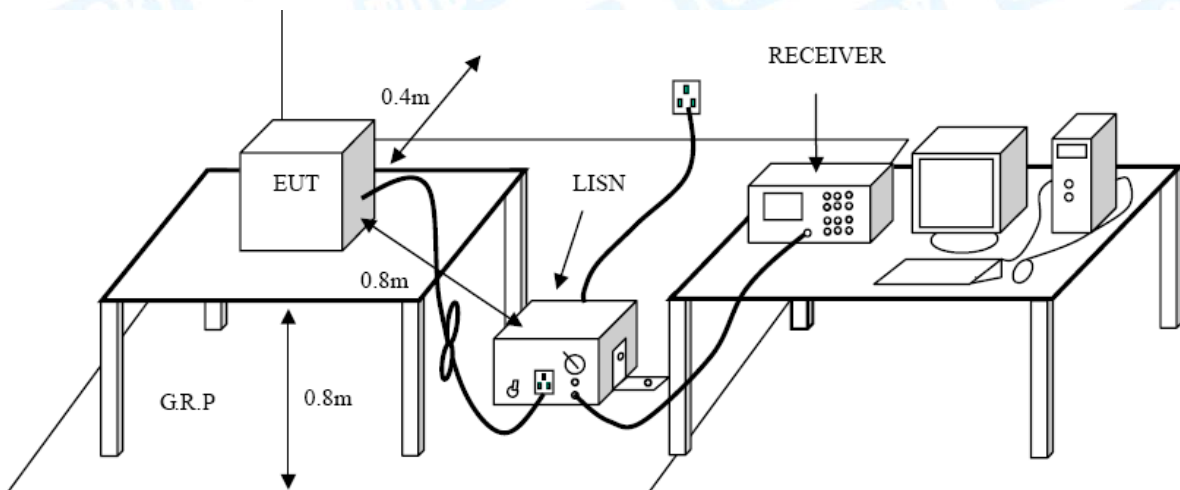
**Conducted Emission Test Limit**

Frequency	Maximum RF Line Voltage (dB $\mu$ V)	
	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.



I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

LISN at least 80 cm from nearest part of EUT chassis

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

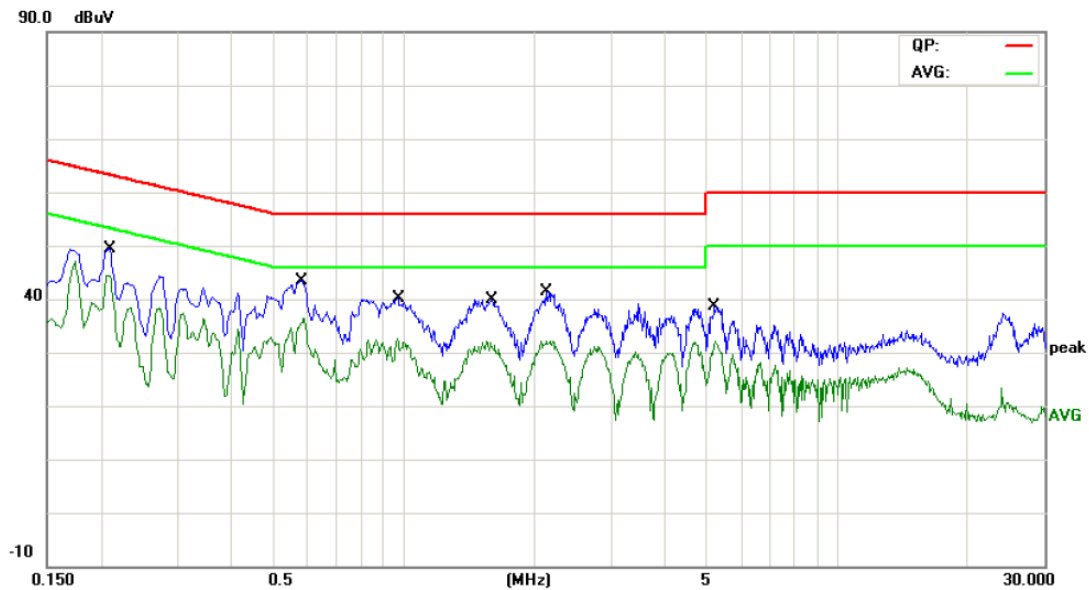
#### 4.4 EUT Operating Mode

Please refer to the description of test mode.

#### 4.5 Test Data

Please see the next page.

<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	AC 120V/60 Hz		
<b>Terminal:</b>	Line		
<b>Test Mode:</b>	USB Charging with TX GFSK Mode 2402 MHz		
<b>Remark:</b>	Only worse case is reported		

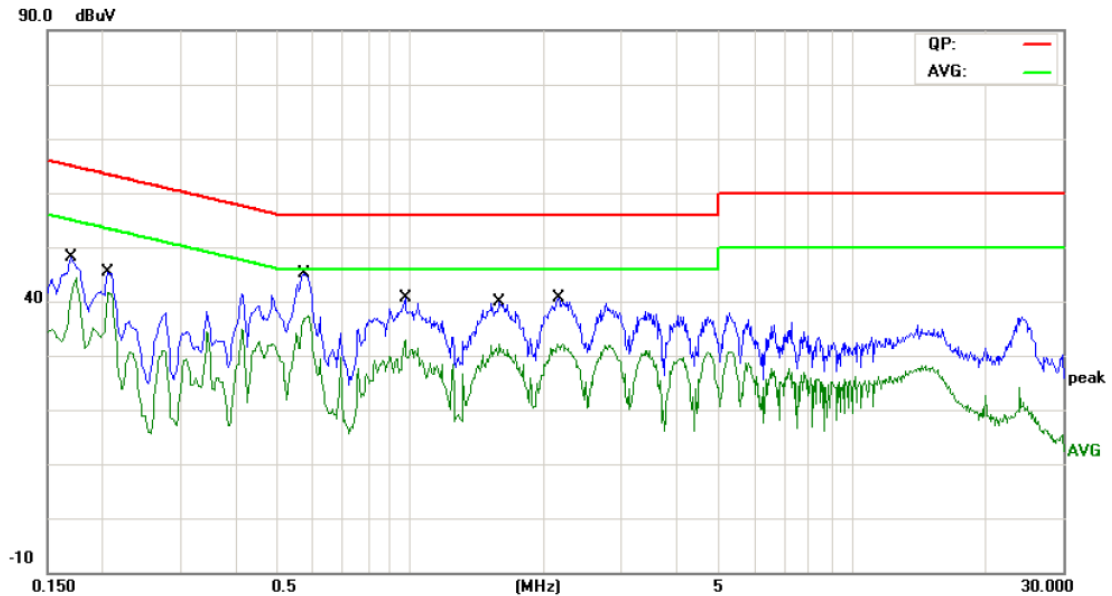


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.2100	37.18	10.02	47.20	63.20	-16.00	QP
2	*	0.2100	33.77	10.02	43.79	53.20	-9.41	AVG
3		0.5820	32.12	10.06	42.18	56.00	-13.82	QP
4		0.5820	25.49	10.06	35.55	46.00	-10.45	AVG
5		0.9700	28.23	10.07	38.30	56.00	-17.70	QP
6		0.9700	21.95	10.07	32.02	46.00	-13.98	AVG
7		1.5940	26.12	10.06	36.18	56.00	-19.82	QP
8		1.5940	20.90	10.06	30.96	46.00	-15.04	AVG
9		2.1220	25.45	10.06	35.51	56.00	-20.49	QP
10		2.1220	21.15	10.06	31.21	46.00	-14.79	AVG
11		5.2100	23.88	9.97	33.85	60.00	-26.15	QP
12		5.2100	21.25	9.97	31.22	50.00	-18.78	AVG

Emission Level= Read Level+ Correct Factor



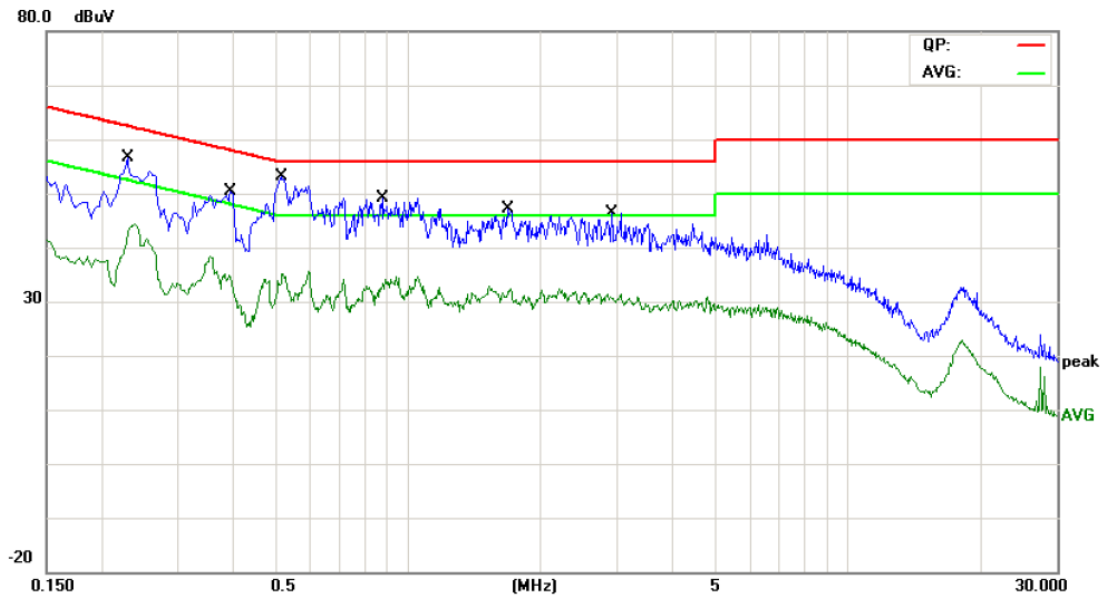
<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	AC 120V/60 Hz		
<b>Terminal:</b>	Neutral		
<b>Test Mode:</b>	USB Charging with TX GFSK Mode 2402 MHz		
<b>Remark:</b>	Only worse case is reported		



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	0.1700	36.05	9.96	46.01	64.96	-18.95	QP
2	0.1700	32.52	9.96	42.48	54.96	-12.48	AVG
3	0.2060	33.78	10.02	43.80	63.36	-19.56	QP
4	0.2060	31.48	10.02	41.50	53.36	-11.86	AVG
5	0.5740	34.07	10.06	44.13	56.00	-11.87	QP
6 *	0.5740	26.59	10.06	36.65	46.00	-9.35	AVG
7	0.9700	28.42	10.07	38.49	56.00	-17.51	QP
8	0.9700	22.57	10.07	32.64	46.00	-13.36	AVG
9	1.5900	26.67	10.06	36.73	56.00	-19.27	QP
10	1.5900	21.44	10.06	31.50	46.00	-14.50	AVG
11	2.1660	25.98	10.05	36.03	56.00	-19.97	QP
12	2.1660	21.42	10.05	31.47	46.00	-14.53	AVG

Emission Level= Read Level+ Correct Factor

<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	AC 240V/60 Hz		
<b>Terminal:</b>	Line		
<b>Test Mode:</b>	USB Charging with TX GFSK Mode 2402 MHz		
<b>Remark:</b>	Only worse case is reported		

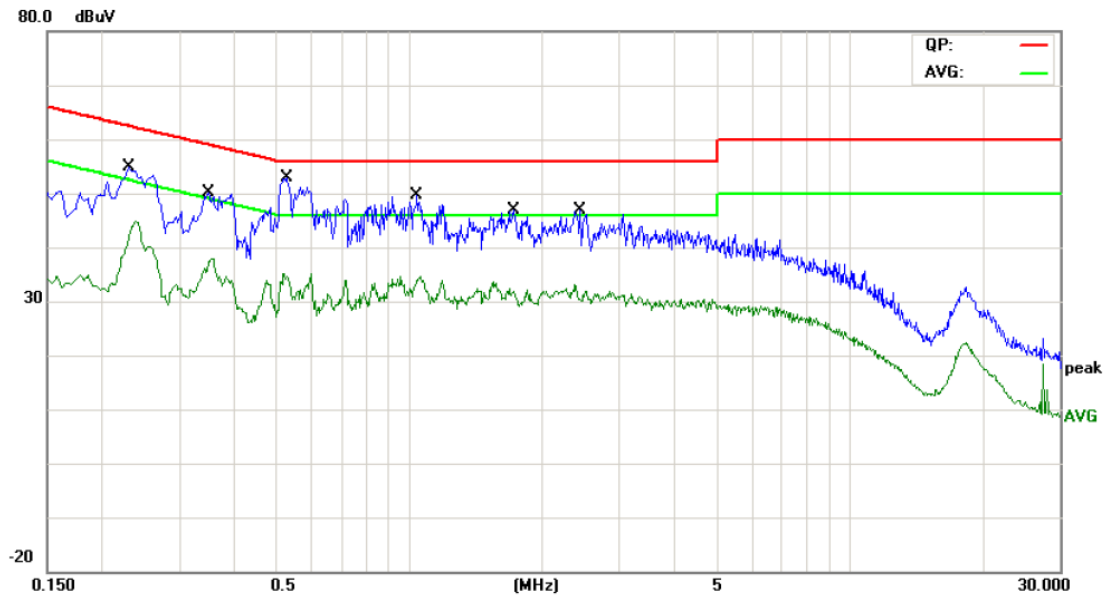


No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	0.2300	41.00	10.02	51.02	62.45	-11.43	QP
2	0.2300	32.19	10.02	42.21	52.45	-10.24	AVG
3	0.3940	36.90	10.02	46.92	57.98	-11.06	QP
4	0.3940	23.72	10.02	33.74	47.98	-14.24	AVG
5 *	0.5140	39.25	10.03	49.28	56.00	-6.72	QP
6	0.5140	24.18	10.03	34.21	46.00	-11.79	AVG
7	0.8740	30.43	10.09	40.52	56.00	-15.48	QP
8	0.8740	20.72	10.09	30.81	46.00	-15.19	AVG
9	1.6860	29.84	10.06	39.90	56.00	-16.10	QP
10	1.6860	21.43	10.06	31.49	46.00	-14.51	AVG
11	2.9060	27.34	10.03	37.37	56.00	-18.63	QP
12	2.9060	20.24	10.03	30.27	46.00	-15.73	AVG

Emission Level= Read Level+ Correct Factor



<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	AC 240V/60 Hz		
<b>Terminal:</b>	Neutral		
<b>Test Mode:</b>	USB Charging with TX GFSK Mode 2402 MHz		
<b>Remark:</b>	Only worse case is reported		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.2300	40.64	10.11	50.75	62.45	-11.70	QP
2		0.2300	32.04	10.11	42.15	52.45	-10.30	AVG
3		0.3500	35.38	10.07	45.45	58.96	-13.51	QP
4		0.3500	27.22	10.07	37.29	48.96	-11.67	AVG
5	*	0.5260	39.57	10.02	49.59	56.00	-6.41	QP
6		0.5260	25.06	10.02	35.08	46.00	-10.92	AVG
7		1.0380	33.56	10.16	43.72	56.00	-12.28	QP
8		1.0380	22.93	10.16	33.09	46.00	-12.91	AVG
9		1.7220	31.53	10.09	41.62	56.00	-14.38	QP
10		1.7220	21.73	10.09	31.82	46.00	-14.18	AVG
11		2.4460	27.16	10.06	37.22	56.00	-18.78	QP
12		2.4460	19.54	10.06	29.60	46.00	-16.40	AVG

Emission Level= Read Level+ Correct Factor

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

**Note:**

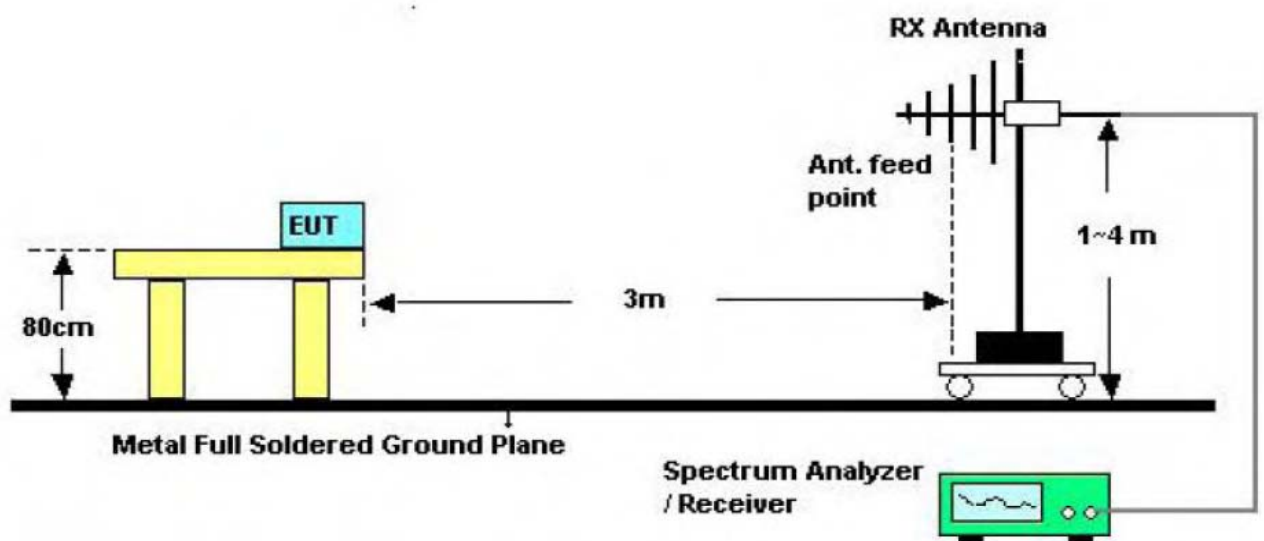
- (1) The tighter limit applies at the band edges.
- (2) Emission Level (dBuV/m)=20log Emission Level (uV/m)



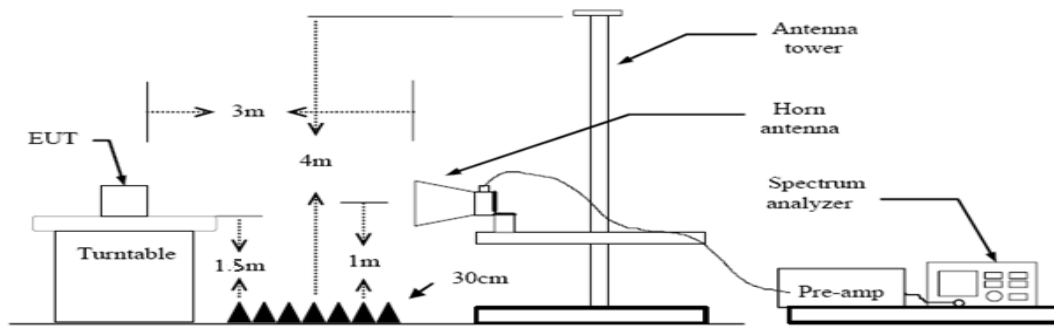
## 5.2 Test Setup



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.

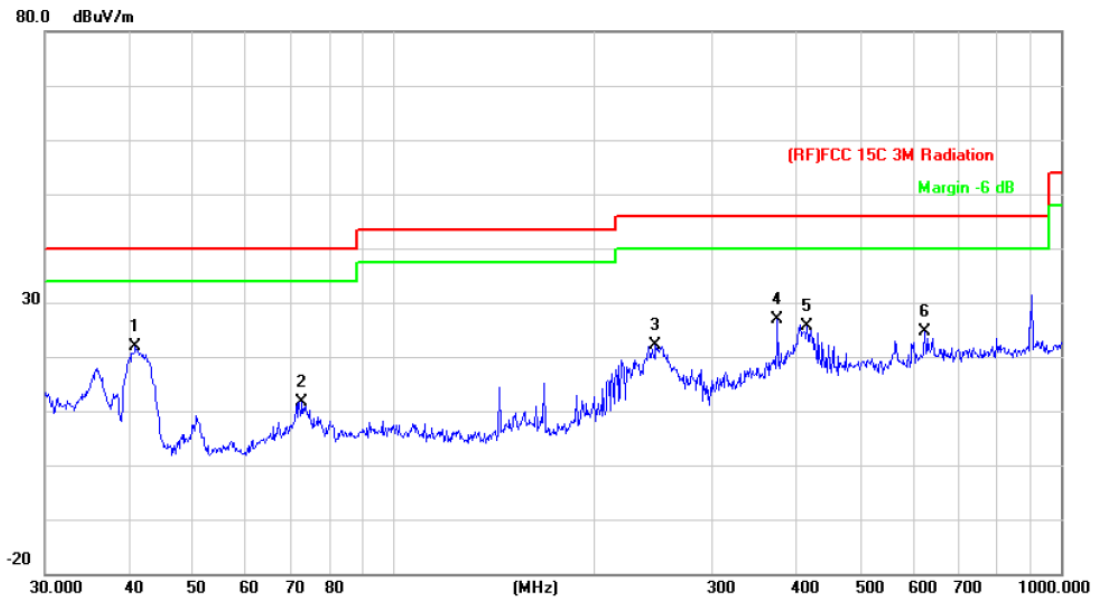
### 5.5 Test Data

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 Kz with Peak Detector for Average Values.

Test data please refer the following pages.



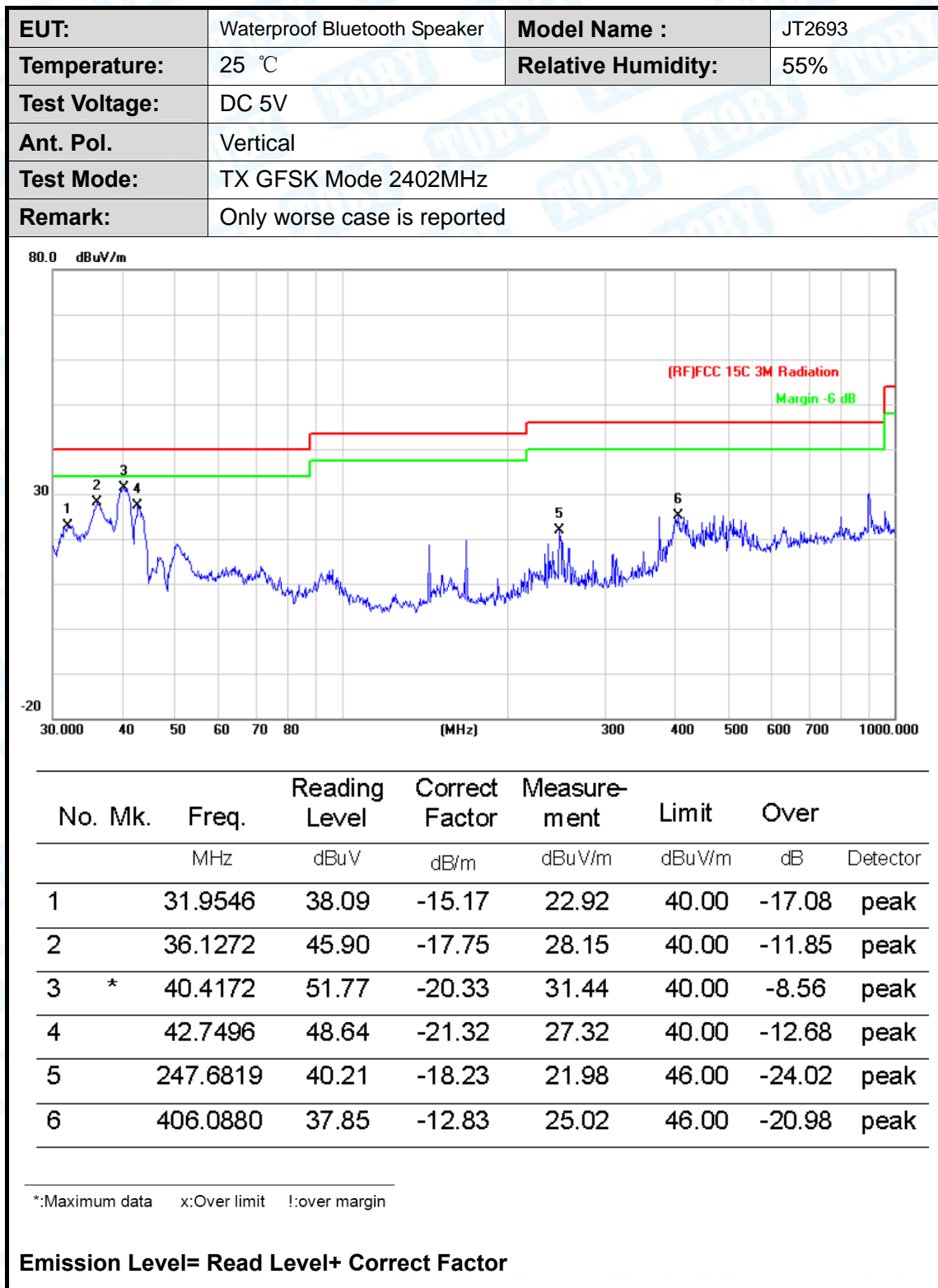
<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Horizontal		
<b>Test Mode:</b>	TX GFSK Mode 2402MHz		
<b>Remark:</b>	Only worse case is reported		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	40.9881	42.37	-20.58	21.79	40.00	-18.21	peak
2		72.8466	35.25	-23.52	11.73	40.00	-28.27	peak
3		246.8149	40.33	-18.27	22.06	46.00	-23.94	peak
4		375.9385	41.30	-14.40	26.90	46.00	-19.10	peak
5		416.1791	38.57	-12.88	25.69	46.00	-20.31	peak
6		625.0780	33.19	-8.51	24.68	46.00	-21.32	peak

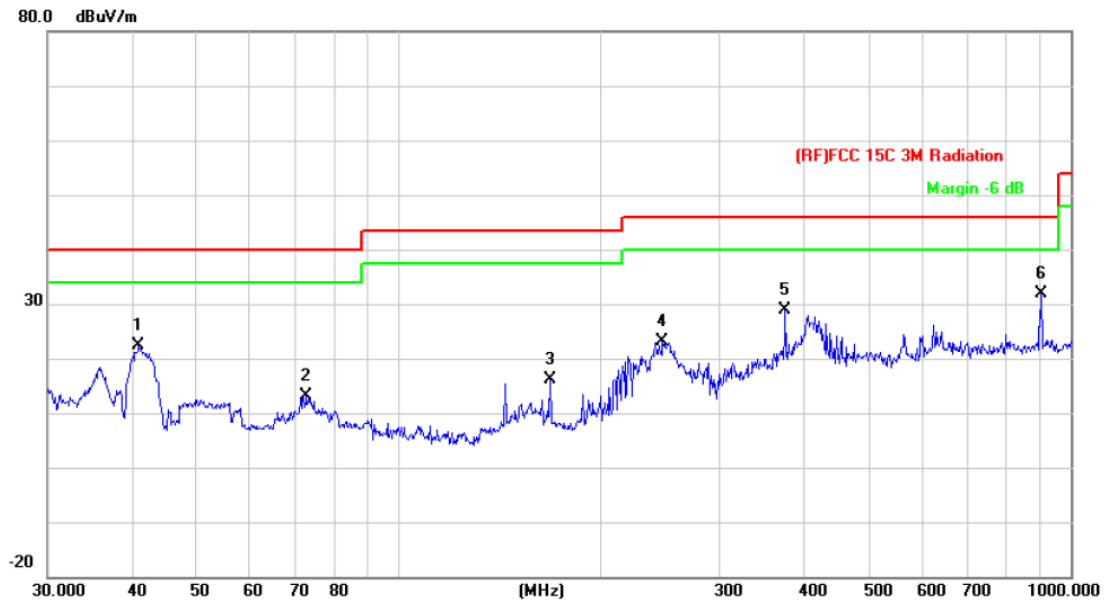
\*:Maximum data    x:Over limit    !:over margin

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





<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Horizontal		
<b>Test Mode:</b>	TX GFSK Mode 2441MHz		
<b>Remark:</b>	Only worse case is reported		

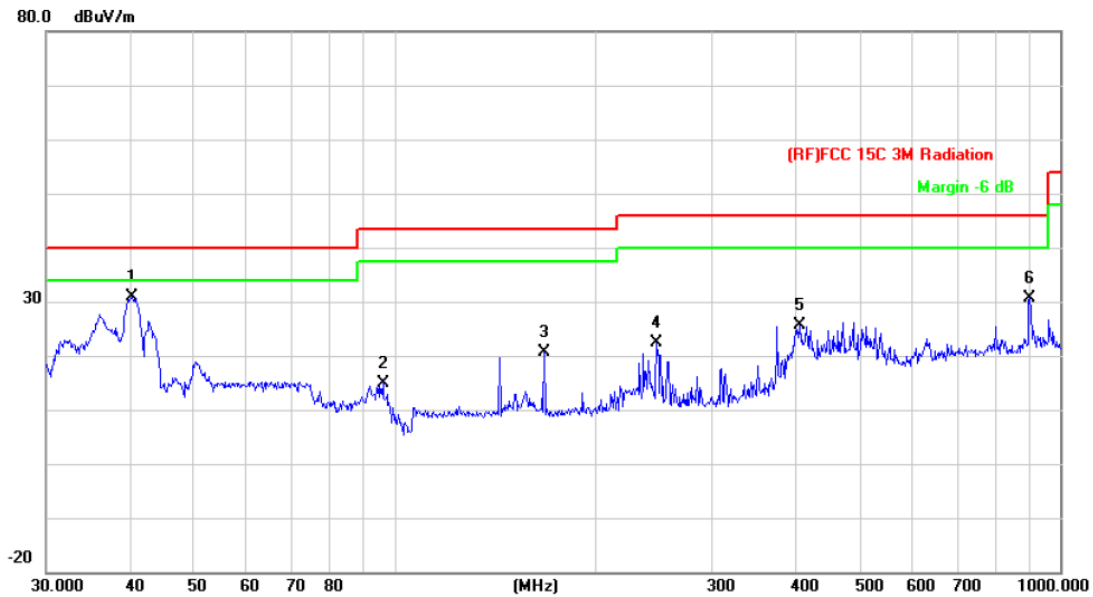


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		40.9881	42.87	-20.58	22.29	40.00	-17.71	peak
2		72.8465	36.75	-23.52	13.23	40.00	-26.77	peak
3		167.8240	37.22	-21.04	16.18	43.50	-27.32	peak
4		246.8146	41.33	-18.27	23.06	46.00	-22.94	peak
5		375.9384	43.30	-14.40	28.90	46.00	-17.10	peak
6	*	903.3093	36.97	-5.02	31.95	46.00	-14.05	peak

\*:Maximum data    x:Over limit    !:over margin

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

<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Vertical		
<b>Test Mode:</b>	TX GFSK Mode 2441MHz		
<b>Remark:</b>	Only worse case is reported		

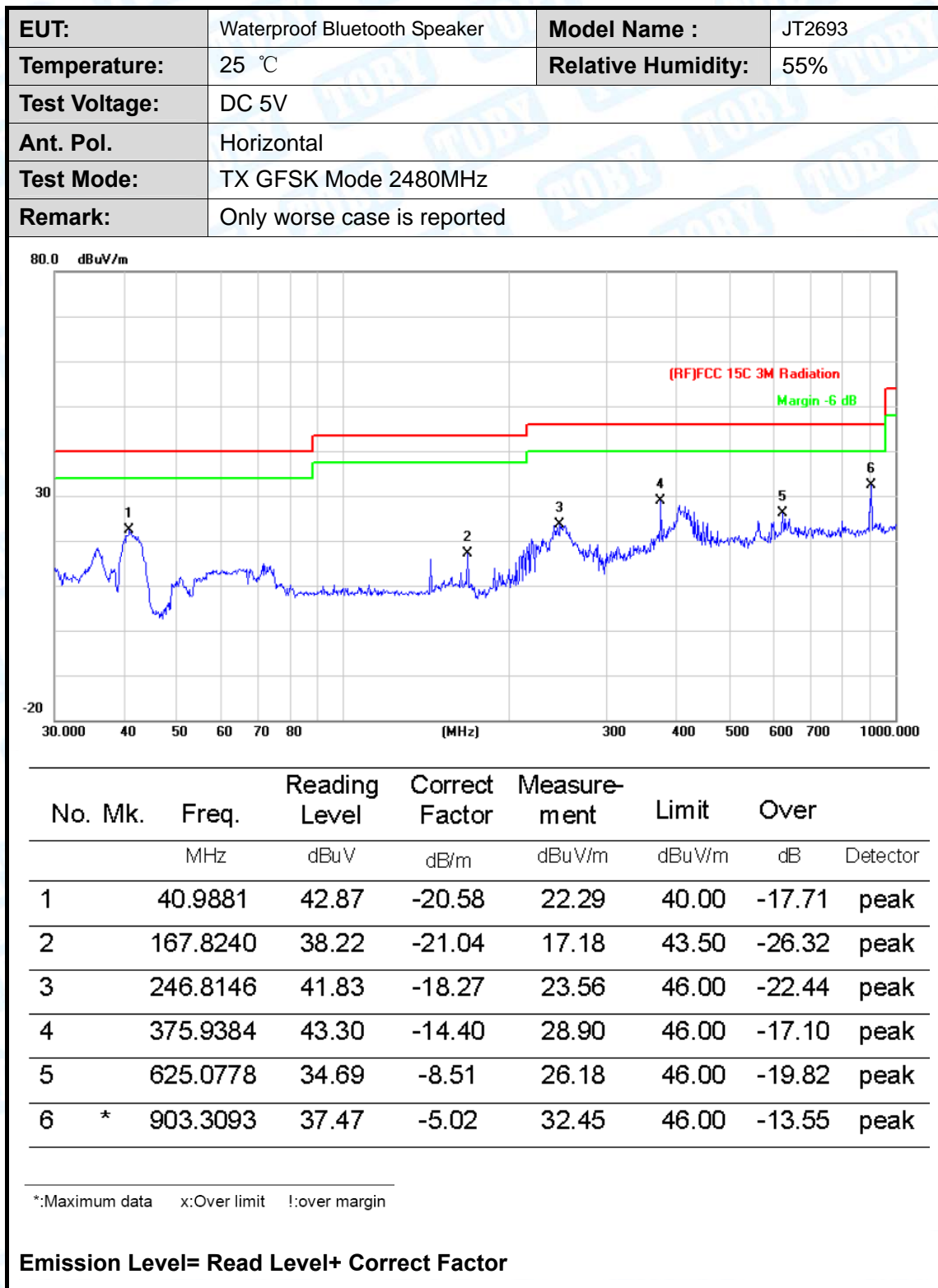


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	40.4172	51.27	-20.33	30.94	40.00	-9.06	peak
2		96.0986	37.16	-22.16	15.00	43.50	-28.50	peak
3		167.8241	41.71	-21.04	20.67	43.50	-22.83	peak
4		247.6819	40.71	-18.23	22.48	46.00	-23.52	peak
5		406.0880	38.35	-12.83	25.52	46.00	-20.48	peak
6		900.1472	35.58	-5.06	30.52	46.00	-15.48	peak

\*:Maximum data    x:Over limit    !:over margin

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





<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Vertical		
<b>Test Mode:</b>	TX GFSK Mode 2480MHz		
<b>Remark:</b>	Only worse case is reported		

80.0 dBuV/m

(RF)FCC 15C 3M Radiation

Margin -6 dB

30

-20

30.000 40 50 60 70 80 (MHz) 300 400 500 600 700 1000.000

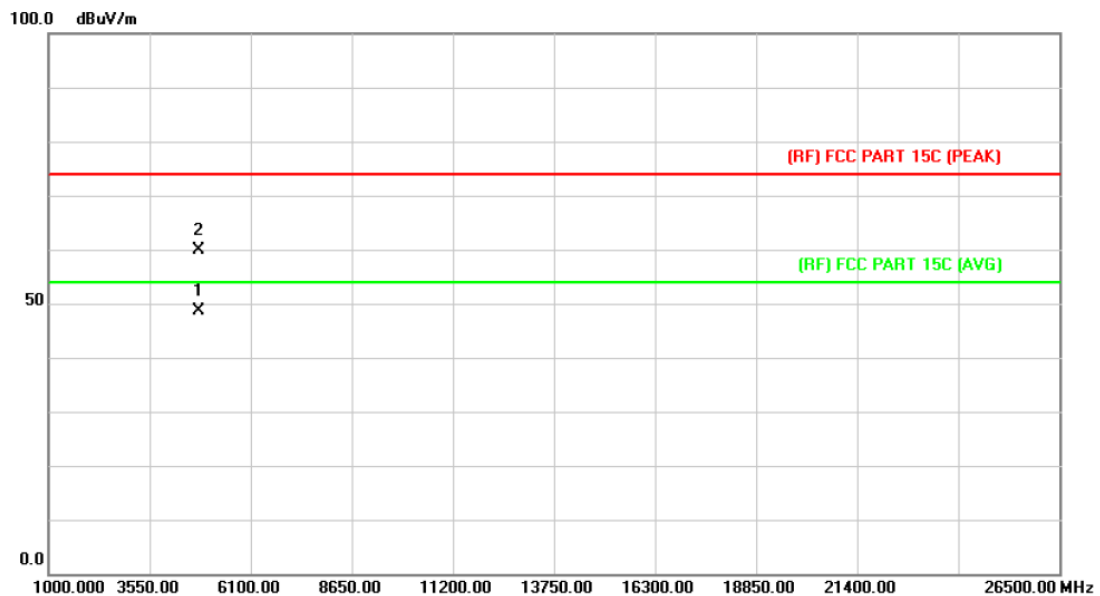
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	40.4172	52.27	-20.33	31.94	40.00	-8.06	peak
2		96.0986	35.16	-22.16	13.00	43.50	-30.50	peak
3		143.8293	40.77	-21.67	19.10	43.50	-24.40	peak
4		167.8241	41.21	-21.04	20.17	43.50	-23.33	peak
5		247.6819	41.71	-18.23	23.48	46.00	-22.52	peak
6		472.1759	38.73	-11.70	27.03	46.00	-18.97	peak

\*:Maximum data    x:Over limit    !:over margin

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



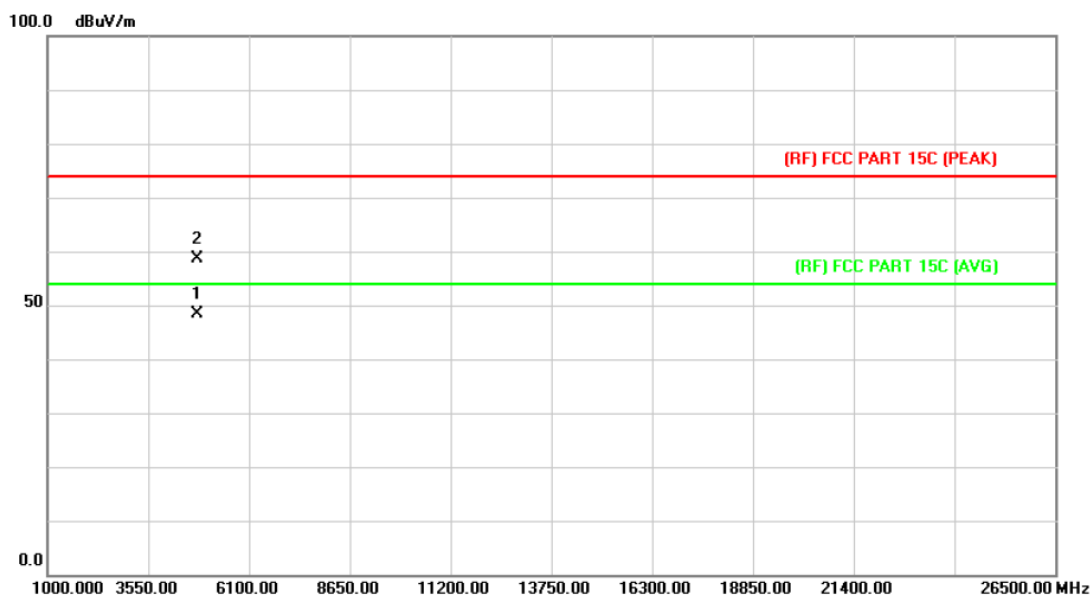
<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Horizontal		
<b>Test Mode:</b>	TX GFSK Mode 2402MHz		
<b>Remark:</b>	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4804.014	35.20	13.44	48.64	54.00	-5.36	AVG
2		4804.087	46.40	13.44	59.84	74.00	-14.16	peak

Emission Level= Read Level+ Correct Factor

<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Vertical		
<b>Test Mode:</b>	TX GFSK Mode 2402MHz		
<b>Remark:</b>	No report for the emission which more than 10 dB below the prescribed limit.		

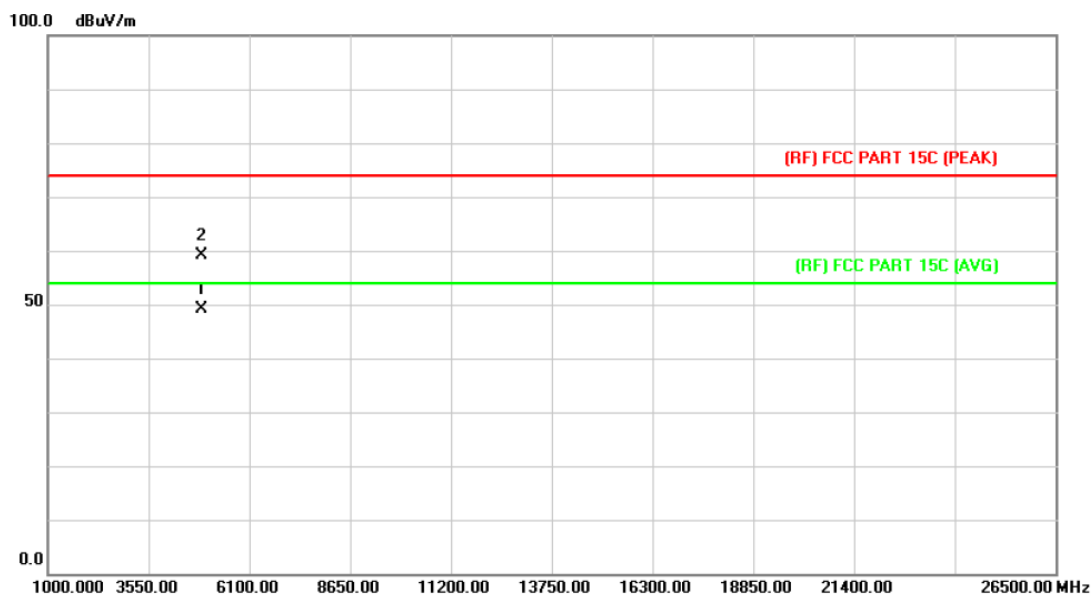


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4803.964	34.97	13.44	48.41	54.00	-5.59	AVG
2		4804.131	45.20	13.44	58.64	74.00	-15.36	peak

Emission Level= Read Level+ Correct Factor



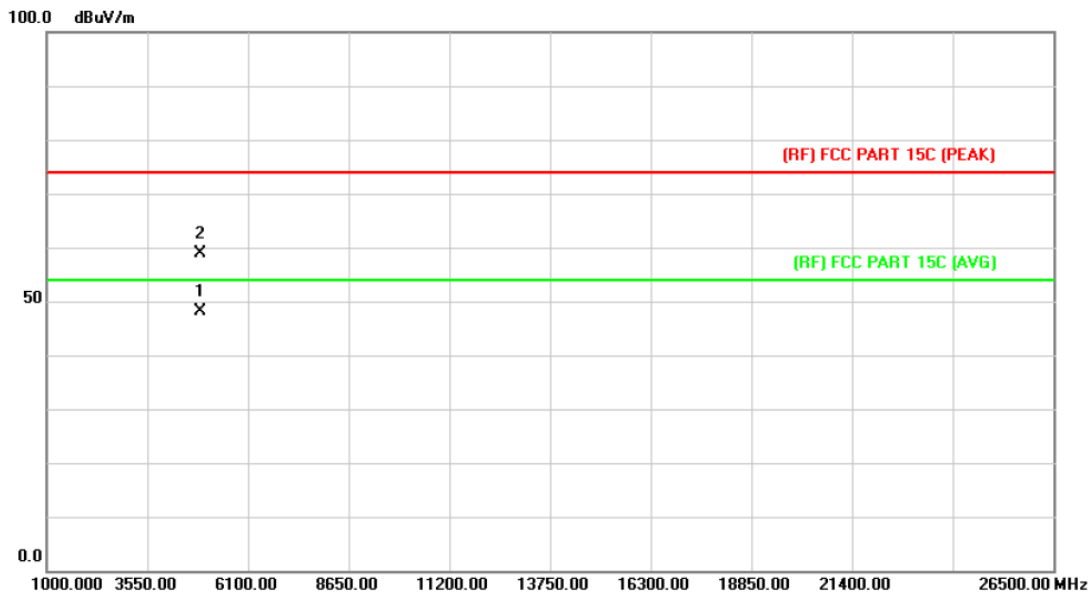
<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Horizontal		
<b>Test Mode:</b>	TX GFSK Mode 2441MHz		
<b>Remark:</b>	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4882.471	35.14	13.90	49.04	54.00	-4.96	AVG
2		4882.617	45.31	13.90	59.21	74.00	-14.79	peak

Emission Level= Read Level+ Correct Factor

<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Vertical		
<b>Test Mode:</b>	TX GFSK Mode 2441MHz		
<b>Remark:</b>	No report for the emission which more than 10 dB below the prescribed limit.		

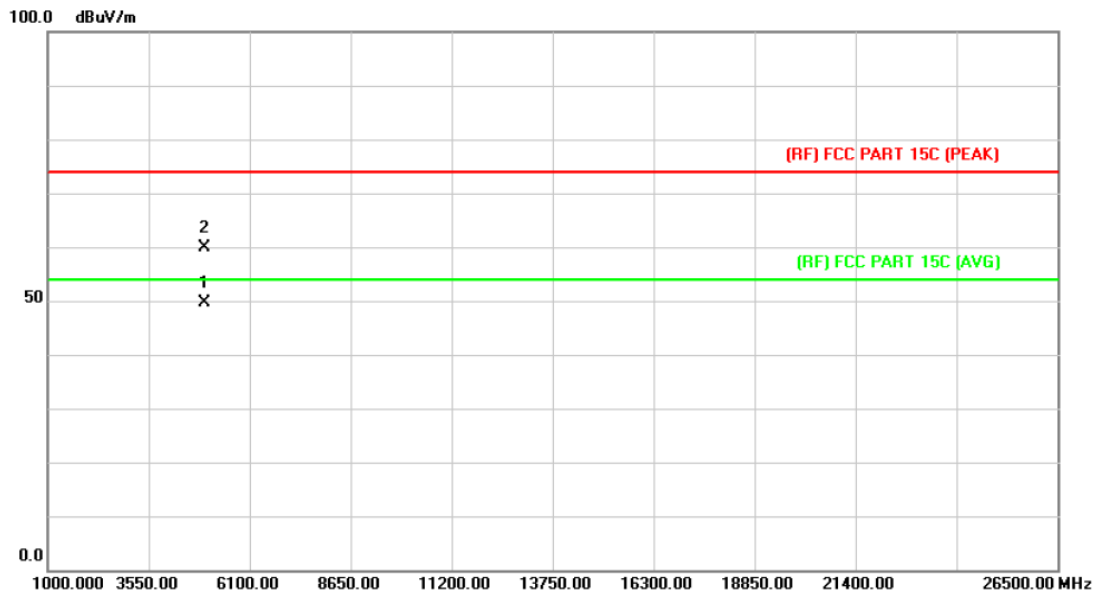


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4882.014	34.27	13.90	48.17	54.00	-5.83	AVG
2		4882.047	45.05	13.90	58.95	74.00	-15.05	peak

Emission Level= Read Level+ Correct Factor



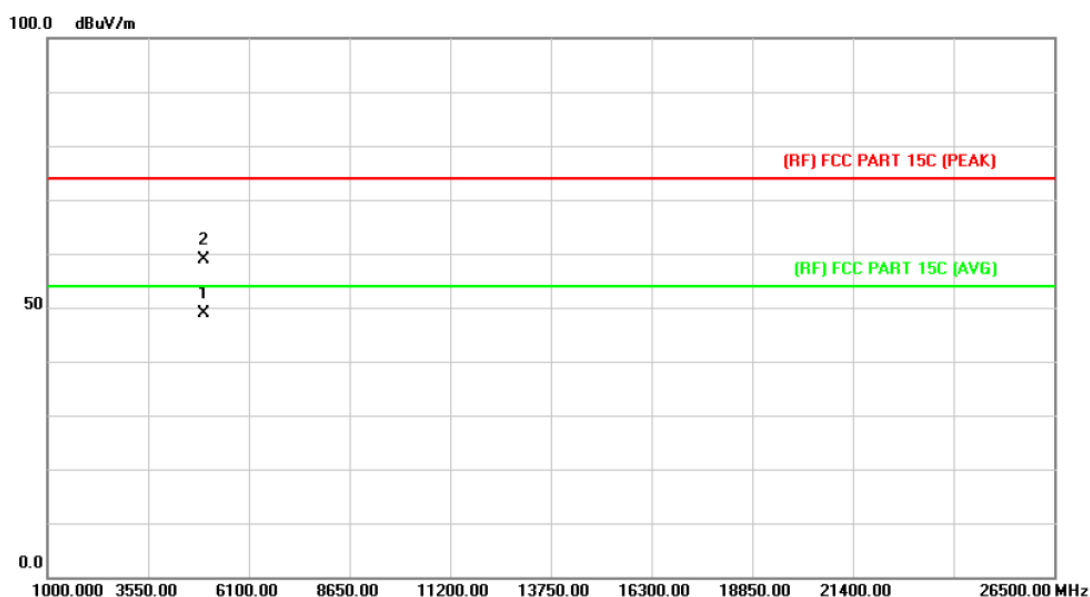
<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Horizontal		
<b>Test Mode:</b>	TX GFSK Mode 2480MHz		
<b>Remark:</b>	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4960.476	35.16	14.36	49.52	54.00	-4.48	AVG
2		4960.614	45.48	14.36	59.84	74.00	-14.16	peak

Emission Level= Read Level+ Correct Factor

<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Vertical		
<b>Test Mode:</b>	TX GFSK Mode 2480MHz		
<b>Remark:</b>	No report for the emission which more than 10 dB below the prescribed limit.		

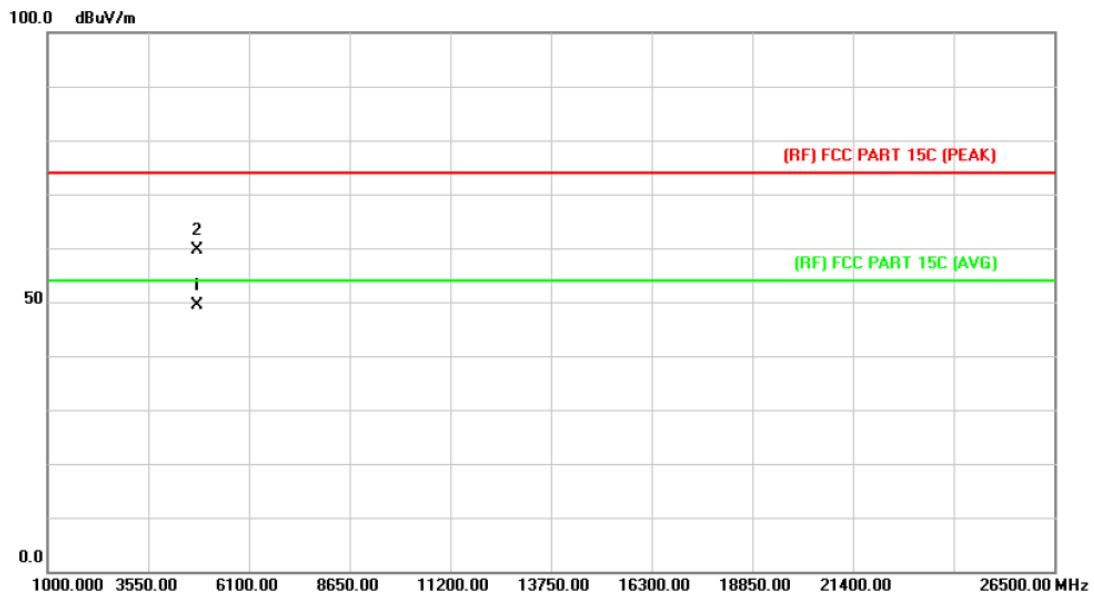


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4959.661	34.51	14.36	48.87	54.00	-5.13	AVG
2		4960.449	44.55	14.36	58.91	74.00	-15.09	peak

Emission Level= Read Level+ Correct Factor



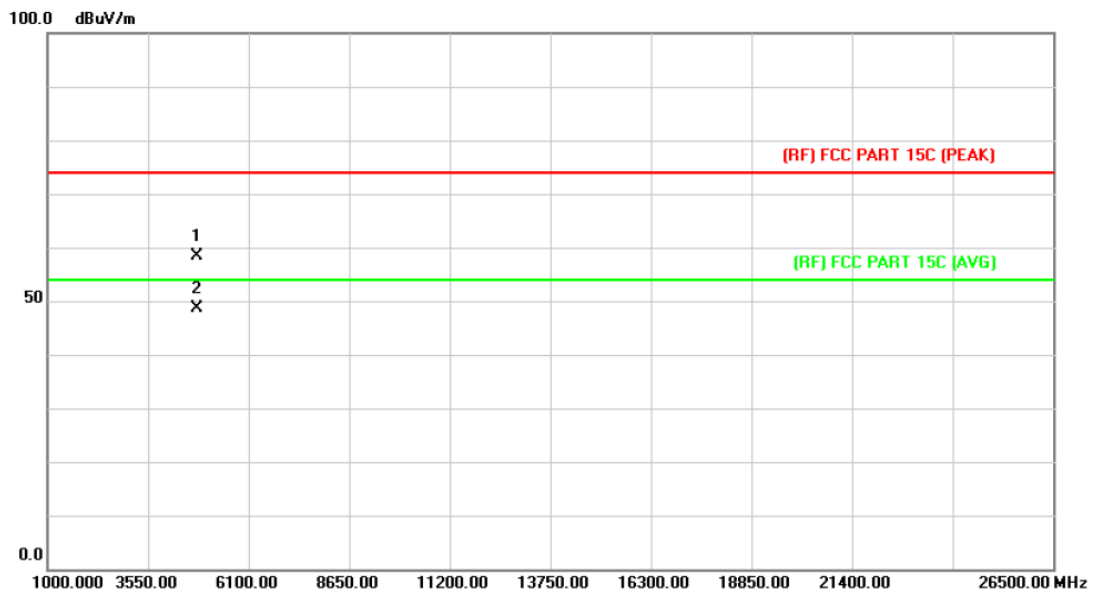
<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Horizontal		
<b>Test Mode:</b>	TX 8-DPSK Mode 2402MHz		
<b>Remark:</b>	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4804.647	35.84	13.44	49.28	54.00	-4.72	AVG
2		4804.947	46.29	13.44	59.73	74.00	-14.27	peak

Emission Level= Read Level+ Correct Factor

<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Vertical		
<b>Test Mode:</b>	TX 8-DPSK Mode 2402MHz		
<b>Remark:</b>	No report for the emission which more than 10 dB below the prescribed limit.		

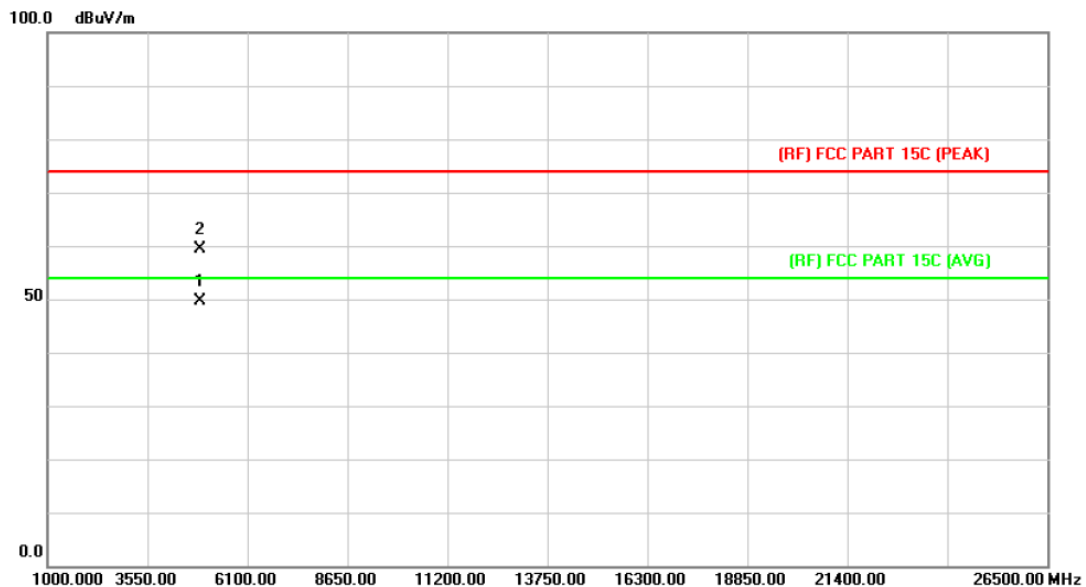


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		4803.349	44.95	13.44	58.39	74.00	-15.61	peak
2	*	4804.447	35.13	13.44	48.57	54.00	-5.43	AVG

Emission Level= Read Level+ Correct Factor



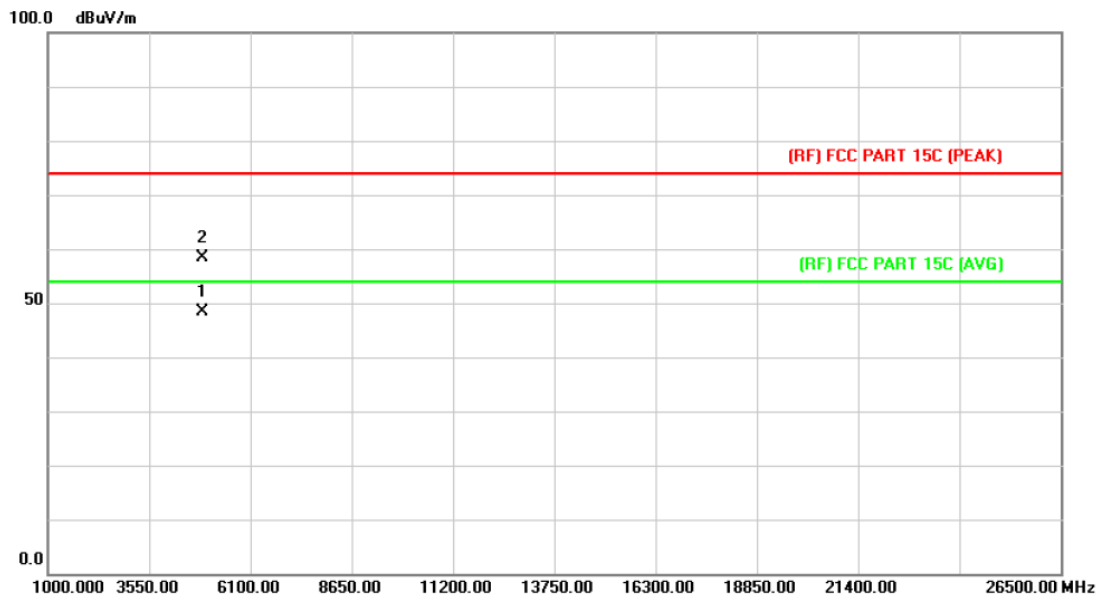
<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Horizontal		
<b>Test Mode:</b>	TX 8-DPSK Mode 2441MHz		
<b>Remark:</b>	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4881.317	35.77	13.90	49.67	54.00	-4.33	AVG
2		4882.366	45.53	13.90	59.43	74.00	-14.57	peak

Emission Level= Read Level+ Correct Factor

<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Vertical		
<b>Test Mode:</b>	TX 8-DPSK Mode 2441MHz		
<b>Remark:</b>	No report for the emission which more than 10 dB below the prescribed limit.		

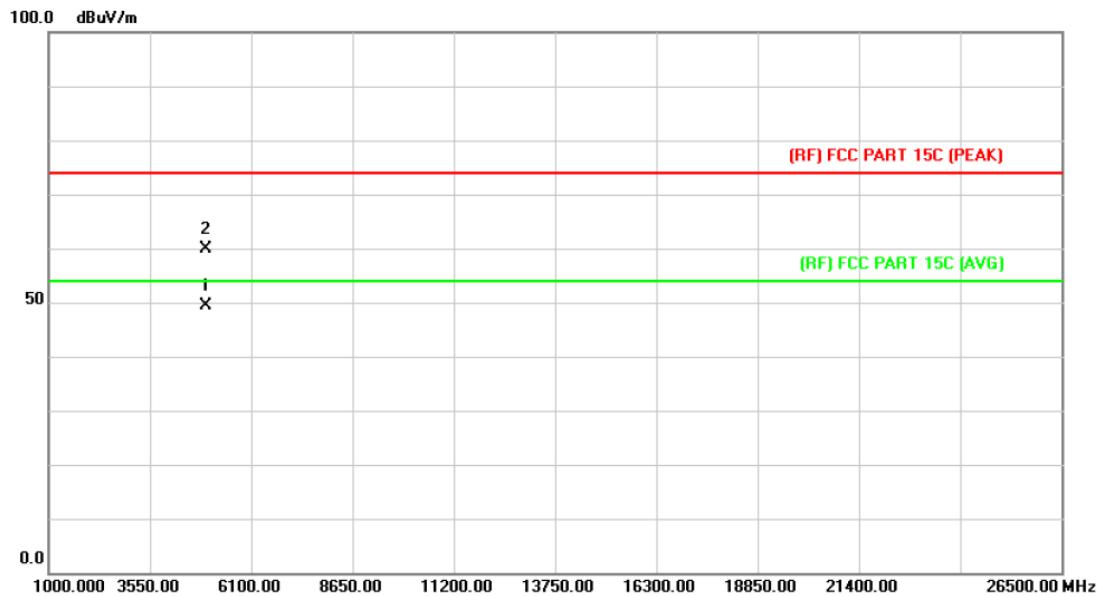


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	4882.314	34.59	13.90	48.49	54.00	-5.51	AVG
2		4882.471	44.47	13.90	58.37	74.00	-15.63	peak

Emission Level= Read Level+ Correct Factor



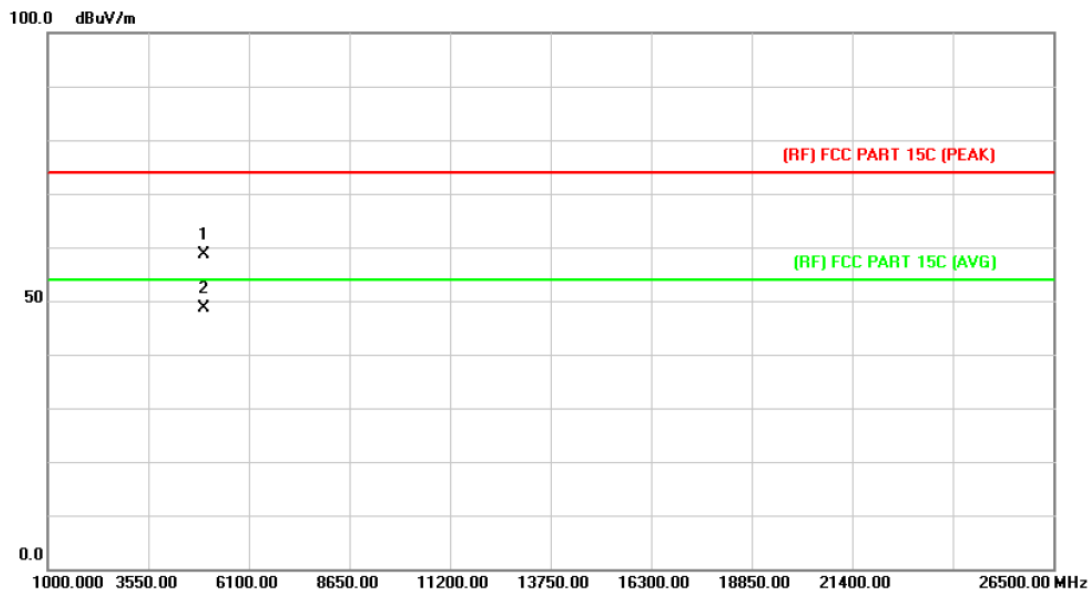
<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Horizontal		
<b>Test Mode:</b>	TX 8-DPSK Mode 2480MHz		
<b>Remark:</b>	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4960.114	34.97	14.36	49.33	54.00	-4.67	AVG
2		4960.334	45.44	14.36	59.80	74.00	-14.20	peak

Emission Level= Read Level+ Correct Factor

<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Vertical		
<b>Test Mode:</b>	TX 8-DPSK Mode 2480MHz		
<b>Remark:</b>	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4959.317	44.38	14.36	58.74	74.00	-15.26	peak
2	*	4959.547	34.20	14.36	48.56	54.00	-5.44	AVG

Emission Level= Read Level+ Correct Factor



## 6. Restricted Bands Requirement

### 6.1 Test Standard and Limit

#### 6.1.1 Test Standard

FCC Part 15.209

FCC Part 15.205

#### 6.1.2 Test Limit

Restricted Frequency Band (MHz)	Class B (dBUV/m)(at 3m)	
	Peak	Average
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.

- (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

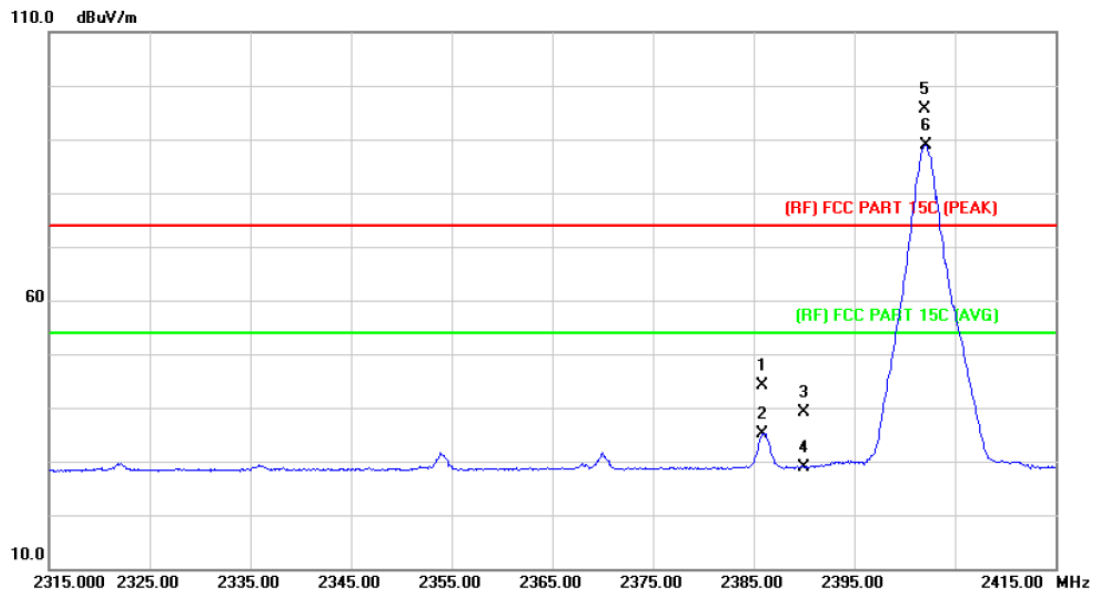
Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=1 KHz with Peak Detector for Average Values.

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



## (1) Radiation Test

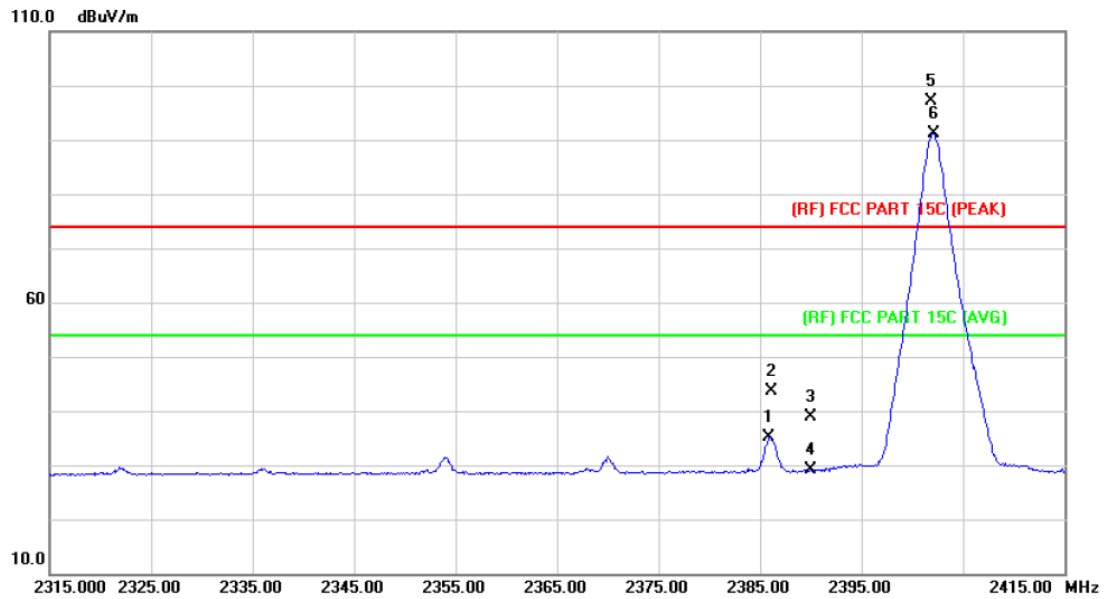
EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2693
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	N/A		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2385.800	43.47	0.76	44.23	74.00	-29.77	peak
2		2385.900	34.49	0.76	35.25	54.00	-18.75	AVG
3		2390.000	38.28	0.77	39.05	74.00	-34.95	peak
4		2390.000	28.01	0.77	28.78	54.00	-25.22	AVG
5	X	2402.000	94.86	0.82	95.68	Fundamental Frequency		peak
6	*	2402.100	88.08	0.82	88.90	Fundamental Frequency		AVG

Emission Level= Read Level+ Correct Factor

<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Vertical		
<b>Test Mode:</b>	TX GFSK Mode 2402MHz		
<b>Remark:</b>	N/A		

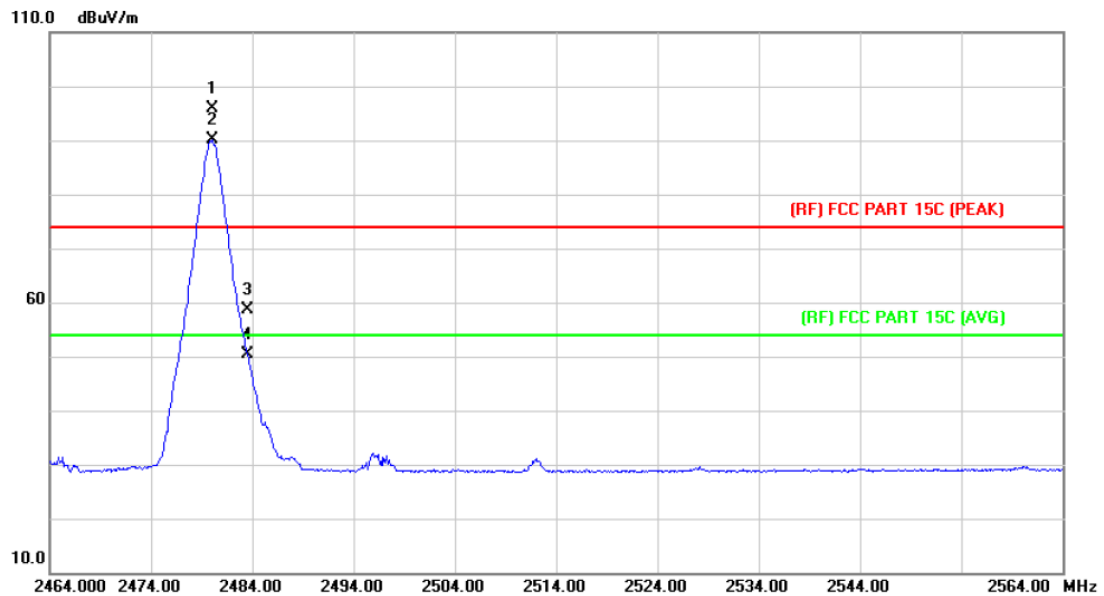


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		2385.900	34.44	0.76	35.20	54.00	-18.80	AVG
2		2386.200	42.97	0.76	43.73	74.00	-30.27	peak
3		2390.000	38.04	0.77	38.81	74.00	-35.19	peak
4		2390.000	28.33	0.77	29.10	54.00	-24.90	AVG
5	X	2401.800	96.34	0.82	97.16	Fundamental Frequency		peak
6	*	2402.100	90.37	0.82	91.19	Fundamental Frequency		AVG

Emission Level= Read Level+ Correct Factor



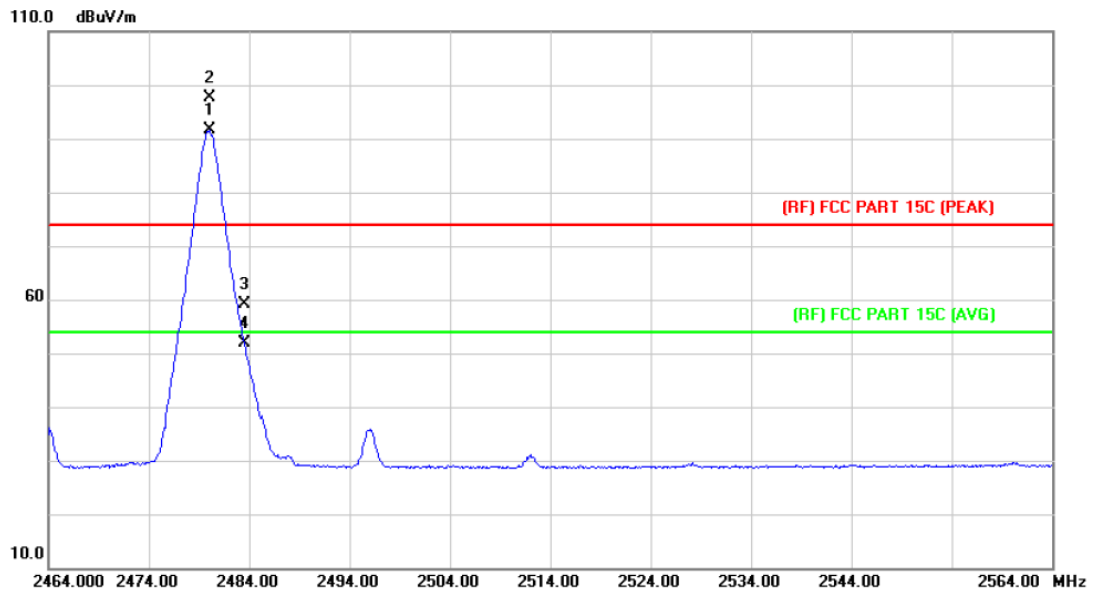
<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Horizontal		
<b>Test Mode:</b>	TX GFSK Mode 2480 MHz		
<b>Remark:</b>	N/A		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	X	2480.000	94.74	1.15	95.89	Fundamental Frequency		peak
2	*	2480.000	88.99	1.15	90.14	Fundamental Frequency		AVG
3		2483.500	57.50	1.17	58.67	74.00	-15.33	peak
4		2483.500	49.26	1.17	50.43	54.00	-3.57	AVG

Emission Level= Read Level+ Correct Factor

<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Vertical		
<b>Test Mode:</b>	TX GFSK Mode 2480 MHz		
<b>Remark:</b>	N/A		

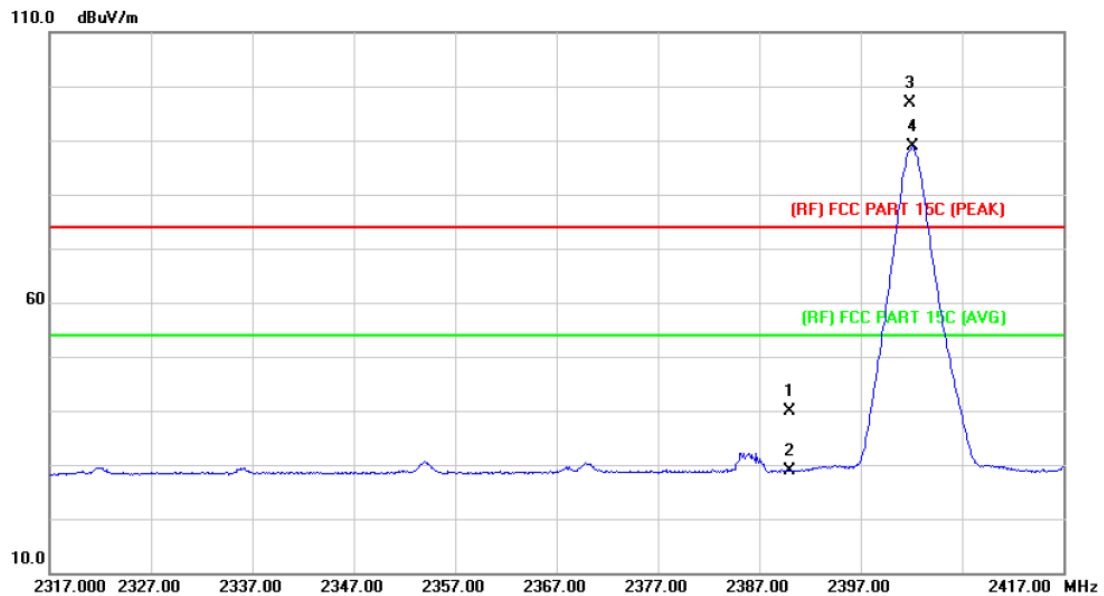


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	2480.000	90.49	1.15	91.64	Fundamental Frequency		AVG
2	X	2480.100	96.37	1.15	97.52	Fundamental Frequency		peak
3		2483.500	57.88	1.17	59.05	74.00	-14.95	peak
4		2483.500	50.76	1.17	51.93	54.00	-2.07	AVG

Emission Level= Read Level+ Correct Factor



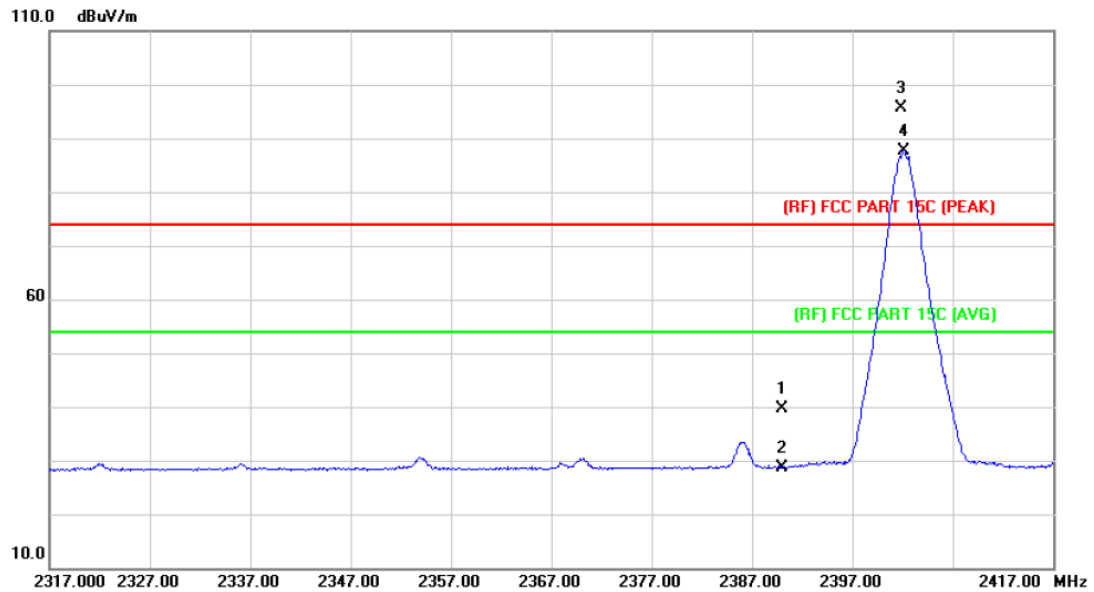
<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Horizontal		
<b>Test Mode:</b>	TX 8-DPSK Mode 2402MHz		
<b>Remark:</b>	N/A		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		2390.000	39.18	0.77	39.95	74.00	-34.05 peak
2		2390.000	28.21	0.77	28.98	54.00	-25.02 AVG
3	X	2401.800	96.17	0.82	96.99	Fundamental Frequency	peak
4	*	2402.100	88.01	0.82	88.83	Fundamental Frequency	AVG

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

<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Vertical		
<b>Test Mode:</b>	TX 8-DPSK Mode 2402MHz		
<b>Remark:</b>	N/A		

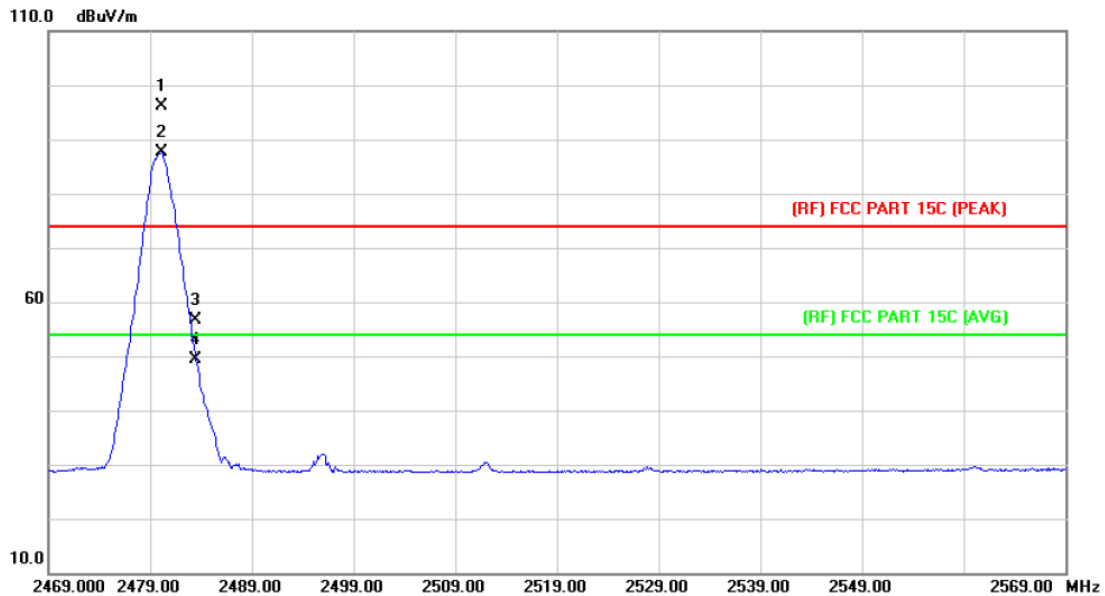


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		2390.000	38.78	0.77	39.55	74.00	-34.45	peak
2		2390.000	27.98	0.77	28.75	54.00	-25.25	AVG
3	X	2401.900	94.92	0.82	95.74	Fundamental Frequency		peak
4	*	2402.100	86.93	0.82	87.75	Fundamental Frequency		AVG

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



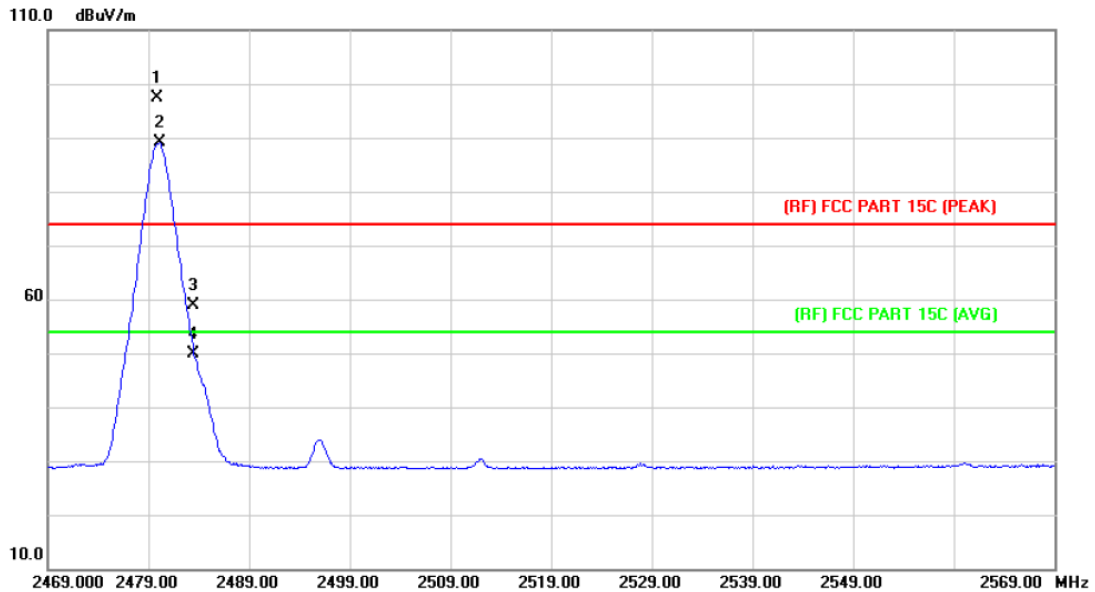
<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Horizontal		
<b>Test Mode:</b>	TX 8-DPSK Mode 2480MHz		
<b>Remark:</b>	N/A		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	X	2480.100	94.97	1.15	96.12	Fundamental Frequency		peak
2	*	2480.100	86.38	1.15	87.53	Fundamental Frequency		AVG
3		2483.500	55.57	1.17	56.74	74.00	-17.26	peak
4		2483.500	48.26	1.17	49.43	54.00	-4.57	AVG

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

<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 5V		
<b>Ant. Pol.</b>	Vertical		
<b>Test Mode:</b>	TX 8-DPSK Mode 2480MHz		
<b>Remark:</b>	N/A		



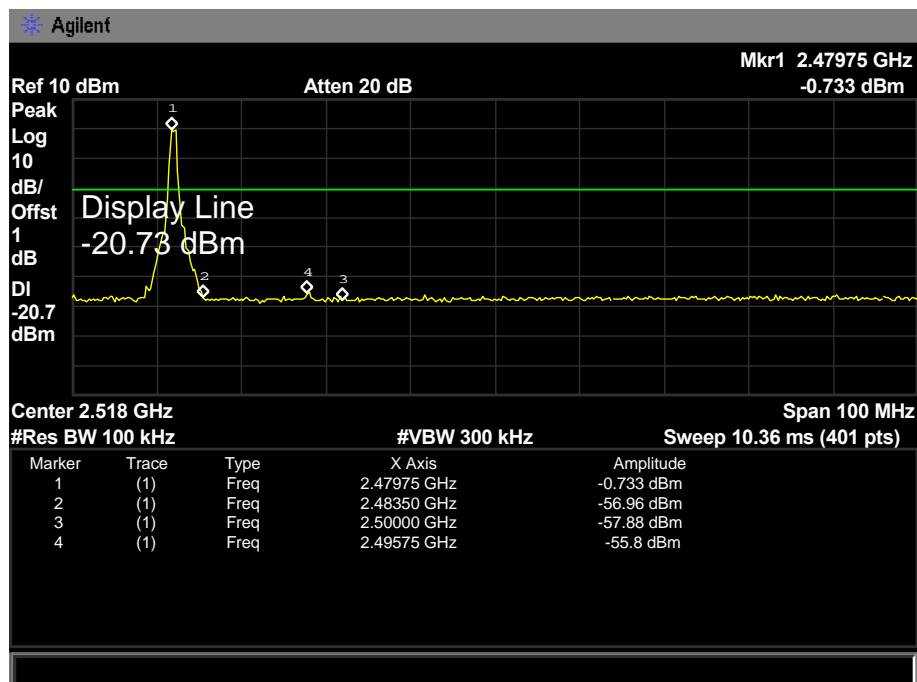
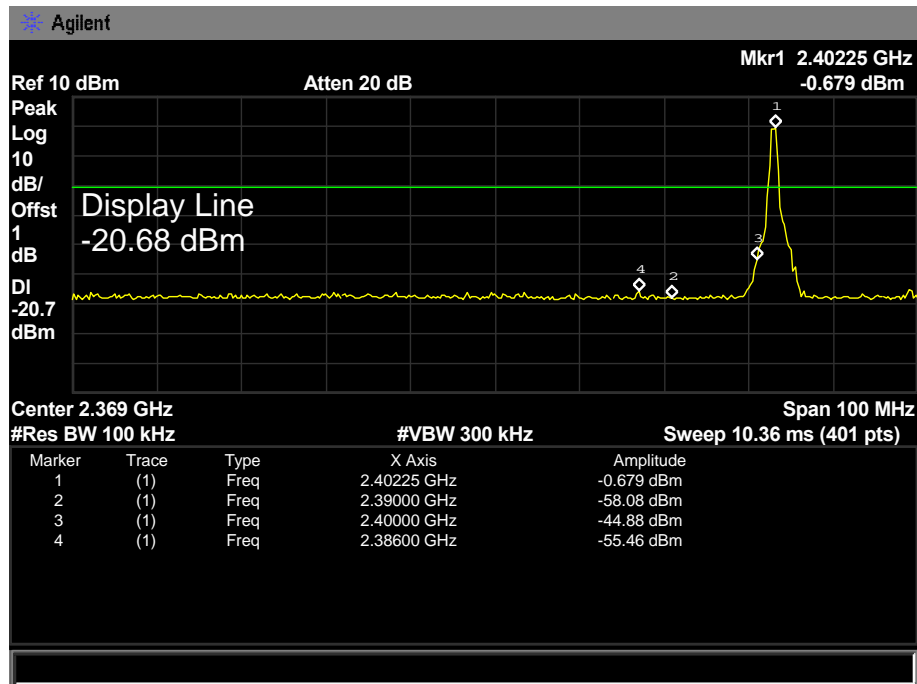
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	X	2479.900	96.29	1.15	97.44	Fundamental Frequency		peak
2	*	2480.100	87.88	1.15	89.03	Fundamental Frequency		AVG
3		2483.500	57.76	1.17	58.93	74.00	-15.07	peak
4		2483.500	48.76	1.17	49.93	54.00	-4.07	AVG

Emission Level= Read Level+ Correct Factor

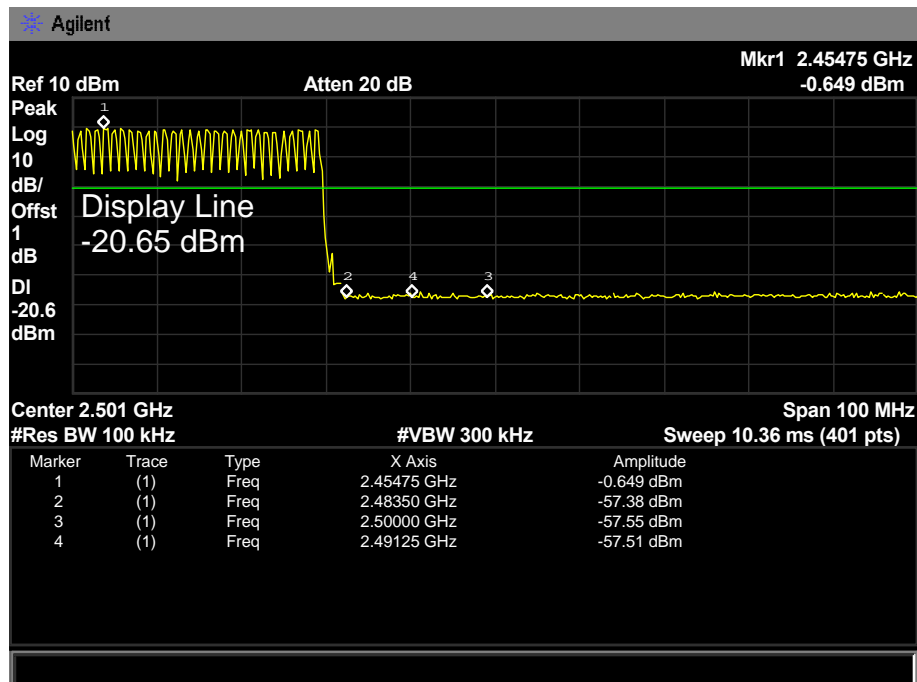
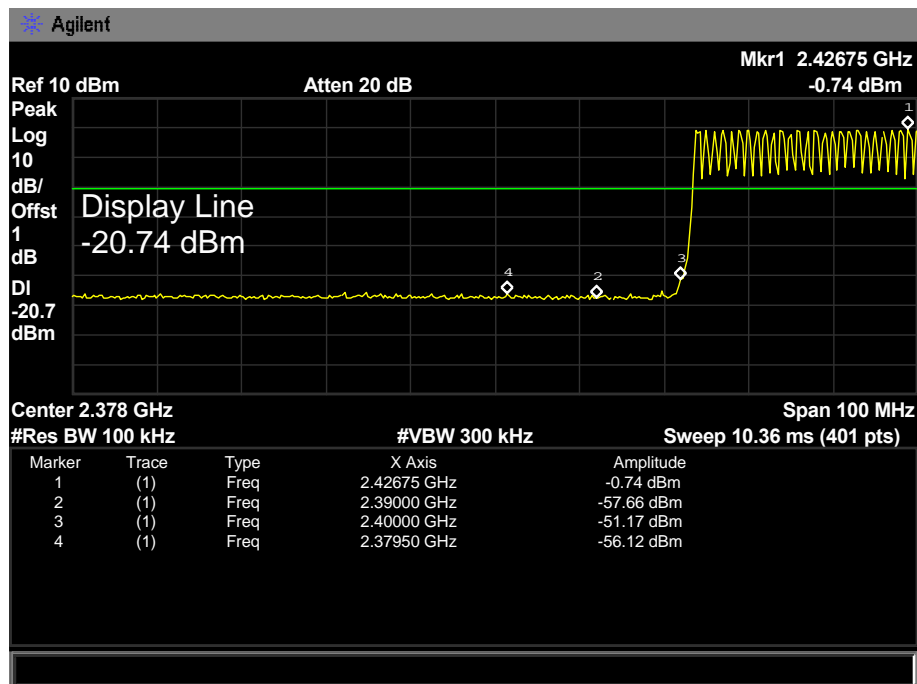


## (2) Conducted Test

EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2693
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	TX GFSK Mode 2402MHz / 2480 MHz		
Remark:	N/A		

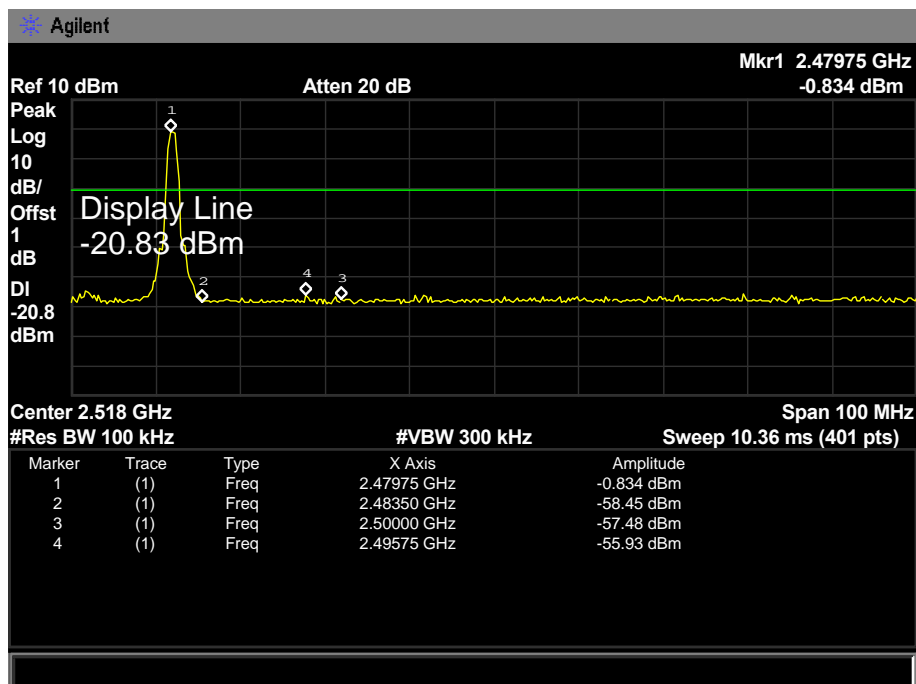
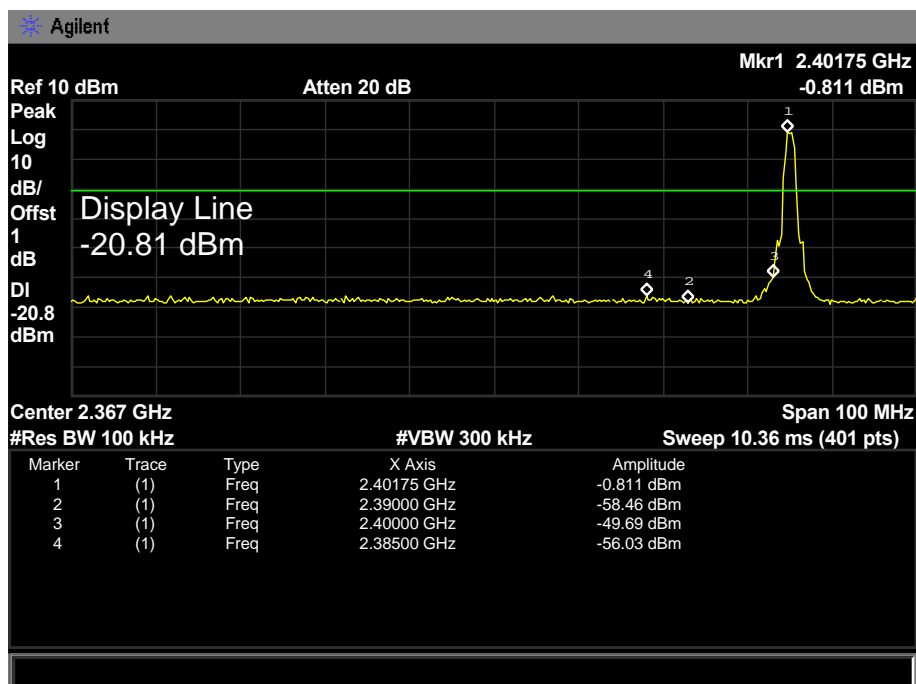


EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2693
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	GFSK Hopping Mode		
Remark:	N/A		

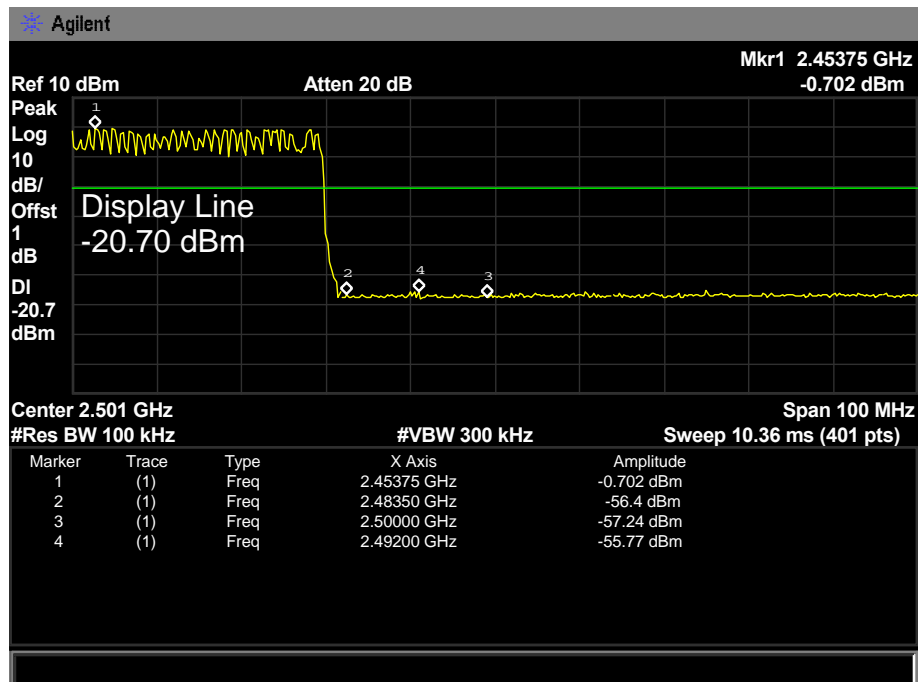
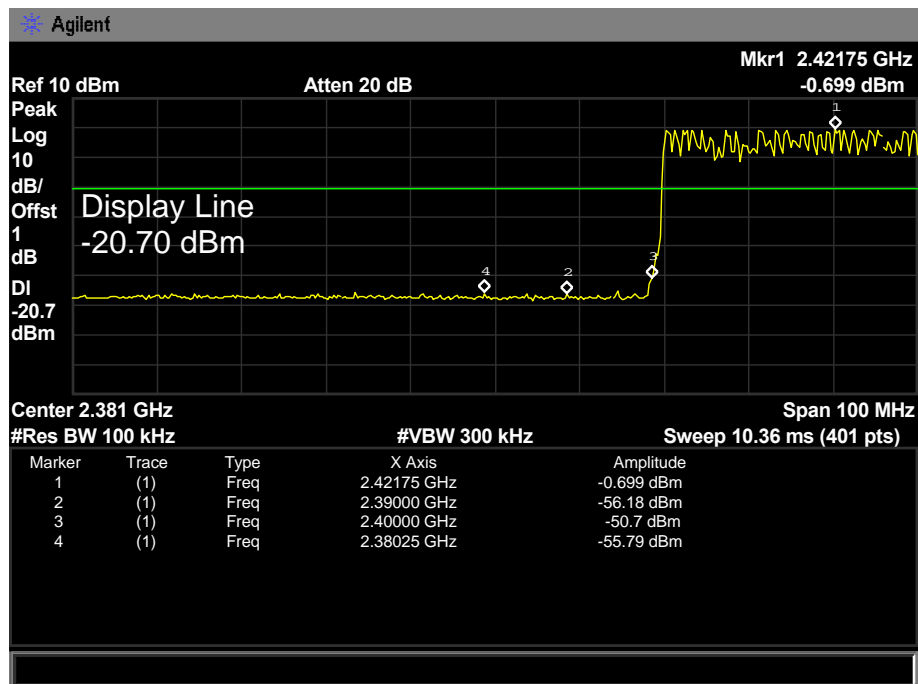




EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2693
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	TX 8-DPSK Mode 2402MHz / 2480 MHz		
Remark:	N/A		



EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2693
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	8-DPSK Hopping Mode		
Remark:	N/A		





## 7. Number of Hopping Channel

### 7.1 Test Standard and Limit

#### 6.1.1 Test Standard

FCC Part 15.247 (a)(1)

#### 6.1.2 Test Limit

Section	Test Item	Limit
15.247	Number of Hopping Channel	>15

### 7.2 Test Setup



### 7.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting: RBW=100 KHz, VBW=100 KHz, Sweep time= Auto.

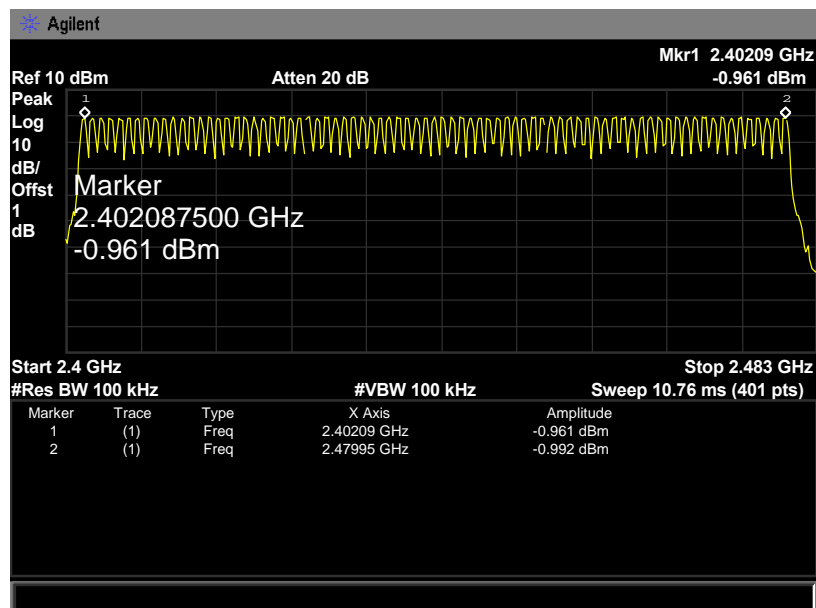
### 7.4 EUT Operating Condition

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

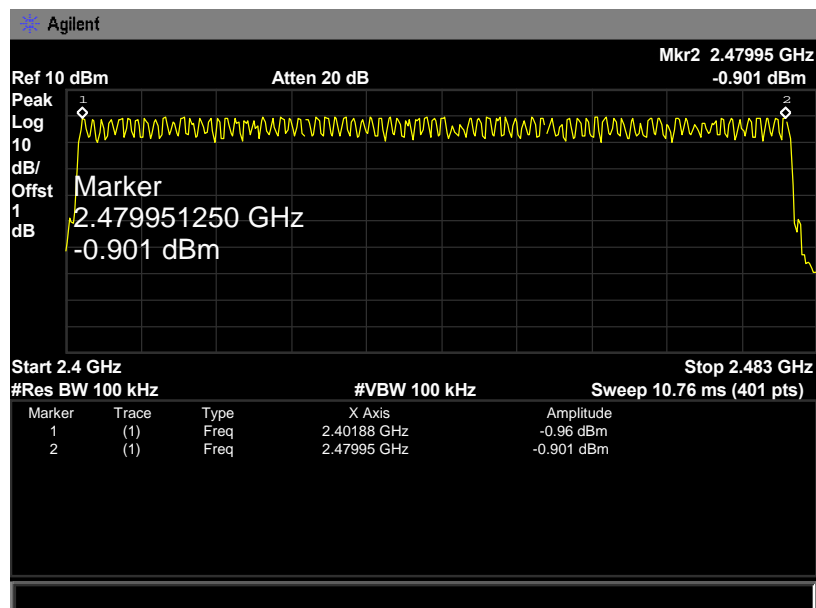
### 7.5 Test Data

EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2693
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	Hopping Mode (GFSK/ 8-DPSK)		
Frequency Range	Quantity of Hopping Channel	Limit	
2402MHz~2480MHz	79	>15	
	79		

## GFSK Mode



## 8-DPSK Mode





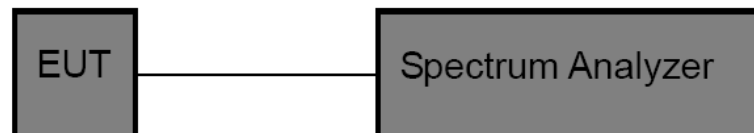
## 8. Average Time of Occupancy

### 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 Annex 8(A8.1d)	Average Time of 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.

## 8.5 Test Data

EUT:		Waterproof Bluetooth Speaker		Model Name :		JT2693	
Temperature:		25 °C		Relative Humidity:		55%	
Test Voltage:		DC 3.7V					
Test Mode:		Hopping Mode (GFSK DH1)					
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result		
2402	0.430	137.60	31.60	400	PASS		
2441	0.430	137.60					
2480	0.440	140.80					

GFSK Hopping Mode DH1

2402 MHz

Agilent

Ref 10 dBm

Peak

Log

10

dB/

Offst

1

dB

Marker Δ

430.000000 μs

-0.27 dB

W1 S2

S3 FS

AA

Center 2.402 GHz

Res BW 1 MHz

#VBW 1 MHz

Span 0 Hz

Sweep 4 ms (401 pts)

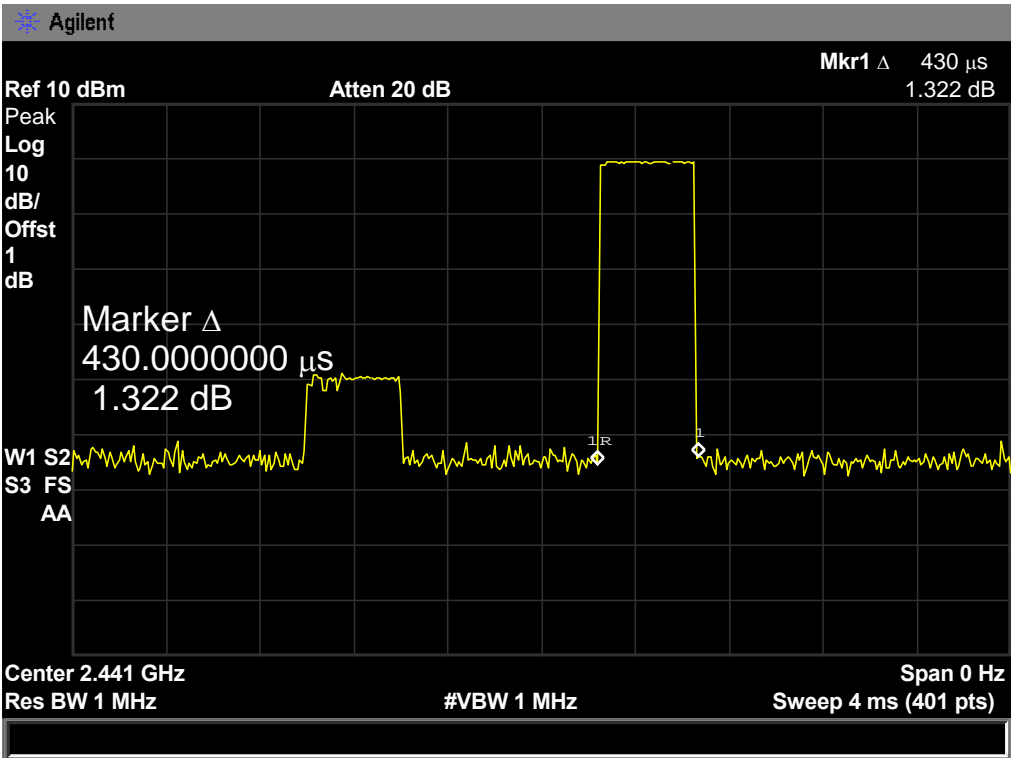
Mkr1 Δ

430 μs

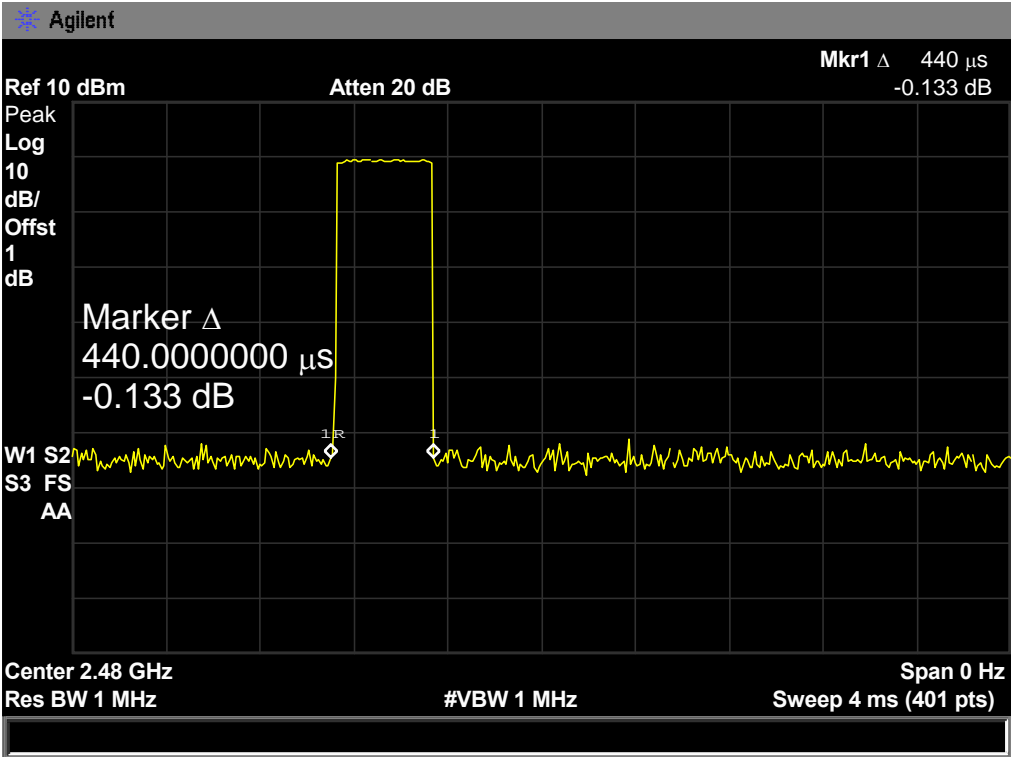
-0.27 dB



**GFSK Hopping Mode DH1**  
**2441 MHz**



**GFSK Hopping Mode DH1**  
**2480 MHz**



EUT:	Waterproof Bluetooth Speaker		Model Name :	JT2693	
Temperature:	25 °C		Relative Humidity:	55%	
Test Voltage:	DC 3.7V				
Test Mode:	Hopping Mode (GFSK DH3)				
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402	1.700	272.00	31.60	400	PASS
2441	1.700	272.00			
2480	1.700	272.00			

GFSK Hopping Mode DH3

2402 MHz

Agilent

Ref 10 dBm

Peak

Log

10

dB/

Offst

1

dB

Marker Δ

1.700000000 ms

-1.95 dB

1R

W1 S2

S3 FS

AA

Center 2.402 GHz

Res BW 1 MHz

#VBW 1 MHz

Mkr1 Δ

1.7 ms

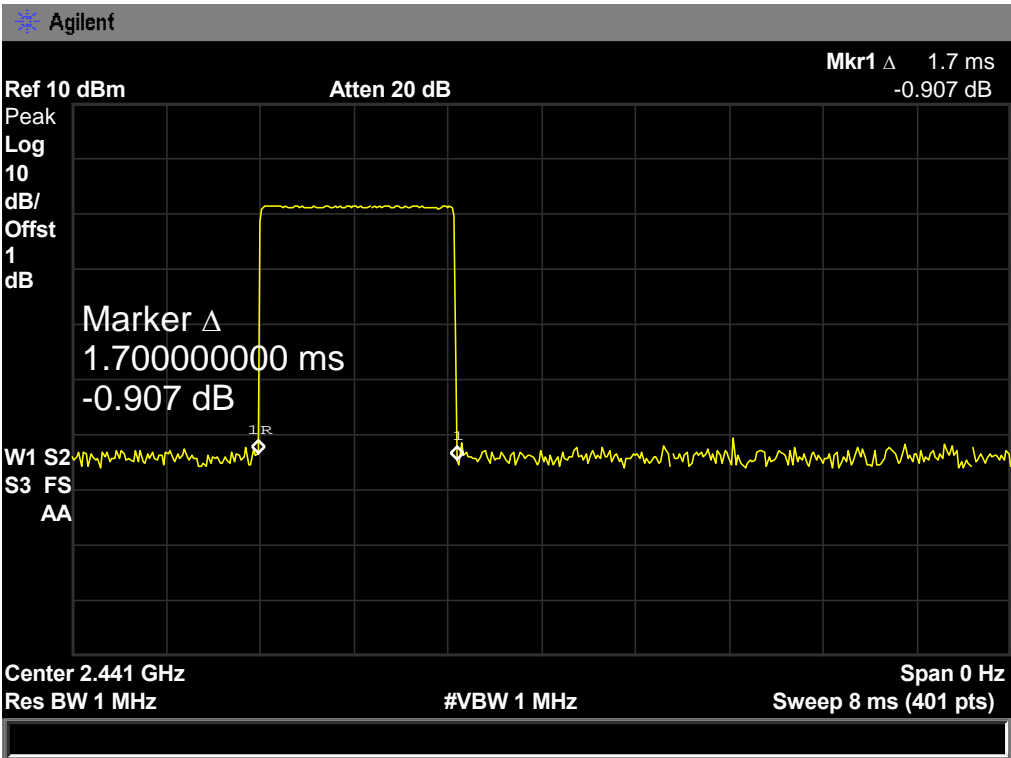
-1.95 dB

Span 0 Hz

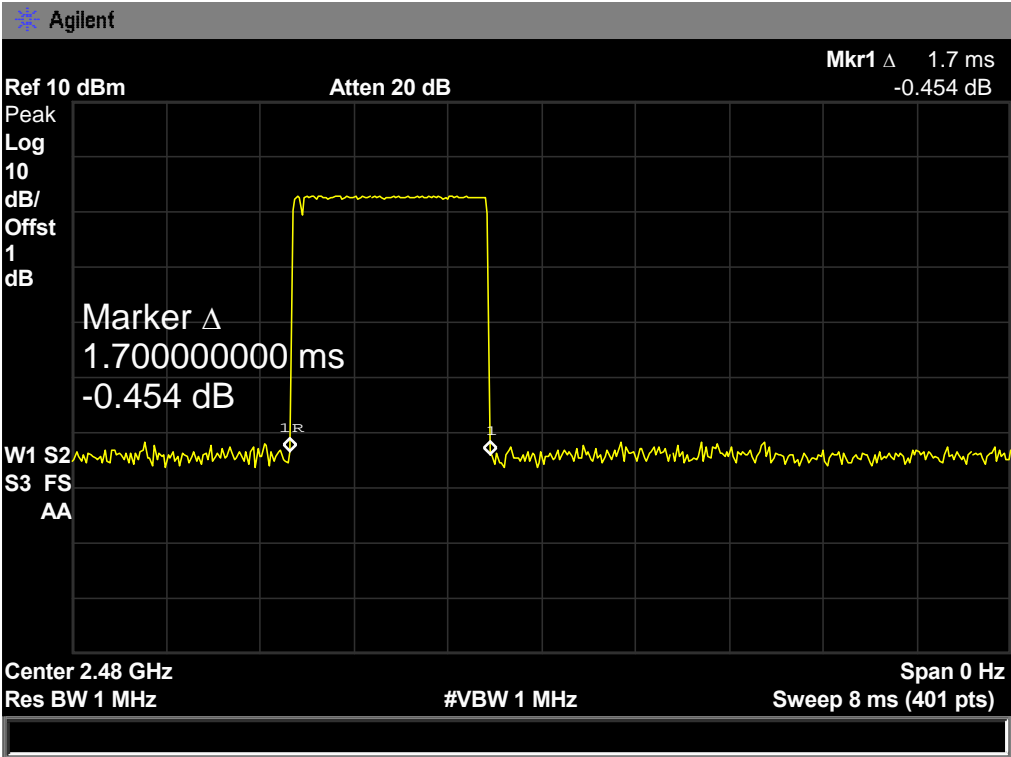
Sweep 8 ms (401 pts)



GFSK Hopping Mode DH3  
 2441 MHz



GFSK Hopping Mode DH3  
 2480 MHz



EUT:	Waterproof Bluetooth Speaker		Model Name :	JT2693	
Temperature:	25 °C		Relative Humidity:	55%	
Test Voltage:	DC 3.7V				
Test Mode:	Hopping Mode (GFSK DH5)				
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402	3.000	320.00	31.60	400	PASS
2441	3.000	320.00			
2480	3.000	320.00			

GFSK Hopping Mode DH5

2402 MHz

Agilent

Ref 10 dBm

Atten 20 dB

Mkr1 Δ 3 ms  
0.783 dB

Peak

Log

10

dB/

Offst

1

dB

Marker Δ

3.000000000 ms

0.783 dB

W1 S2

S3 FS

AA

Center 2.402 GHz

Res BW 1 MHz

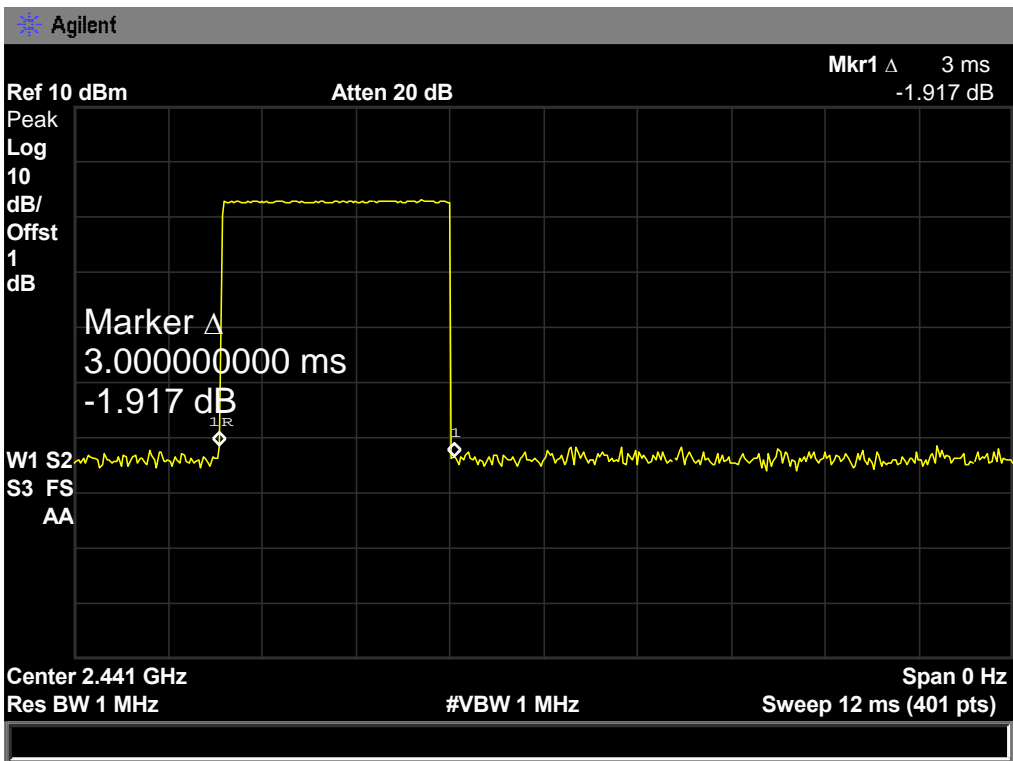
#VBW 1 MHz

Span 0 Hz

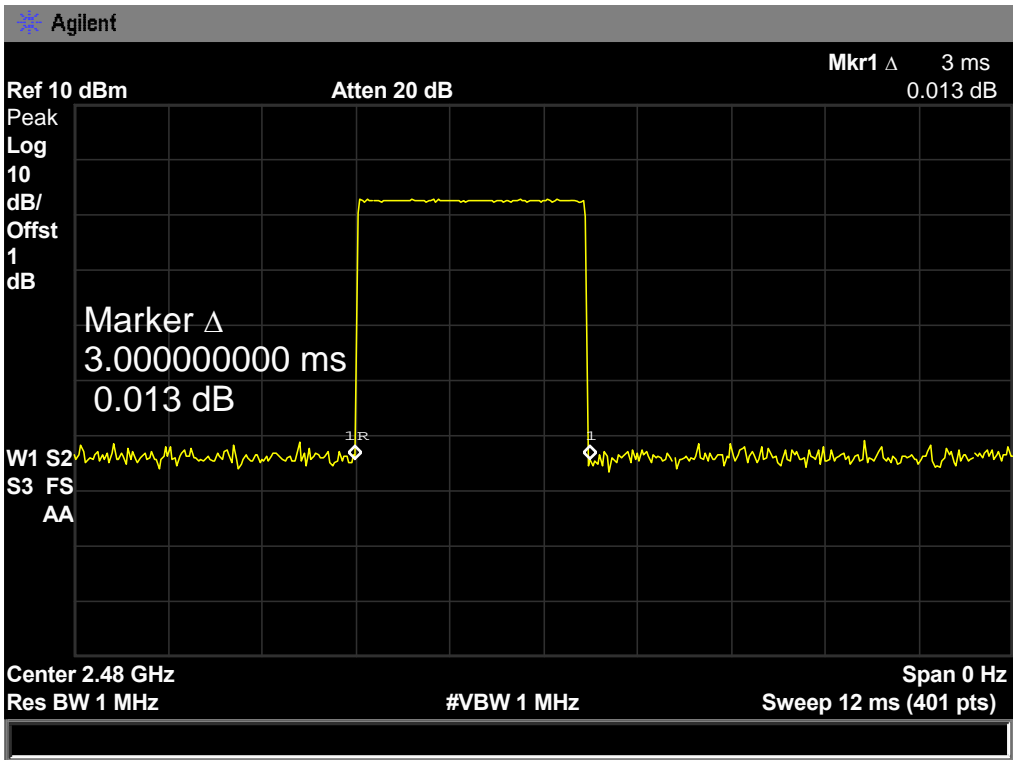
Sweep 12 ms (401 pts)



GFSK Hopping Mode DH5  
 2441 MHz



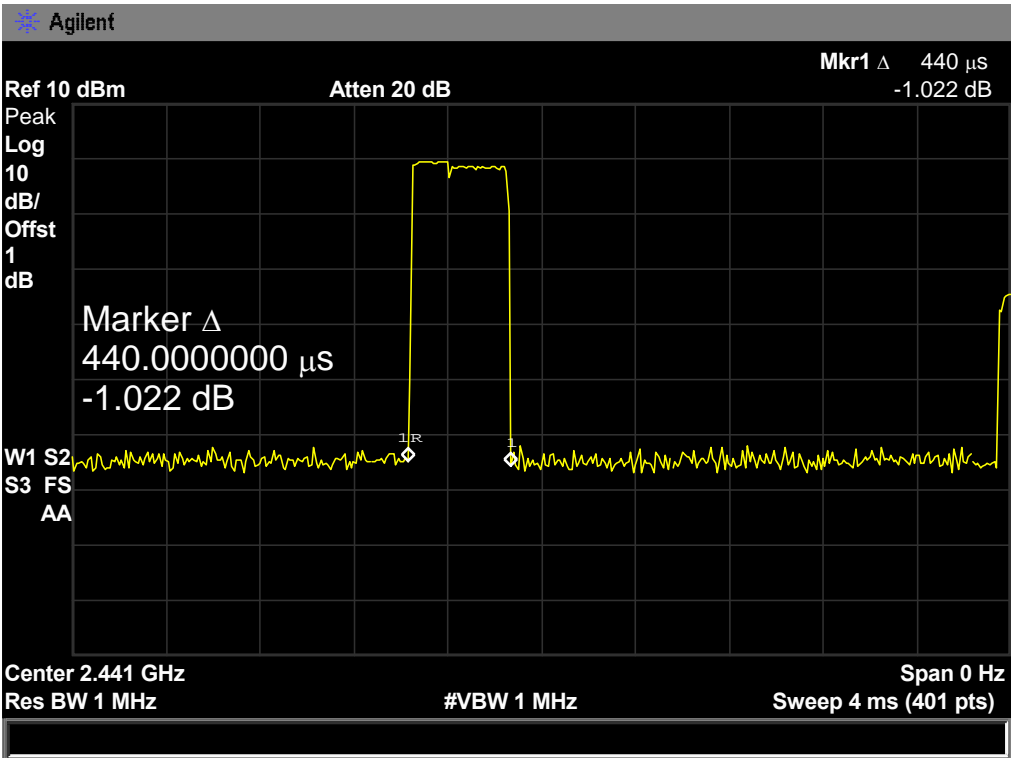
GFSK Hopping Mode DH5  
 2480 MHz



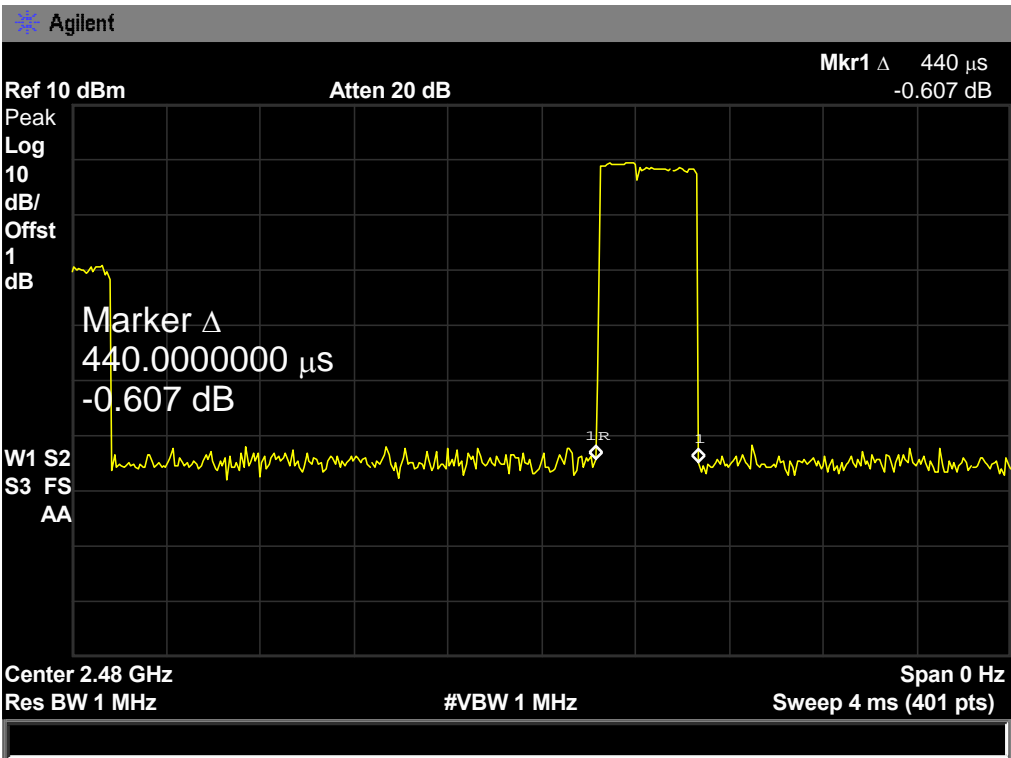




$\pi$  /4-DQPSK Hopping Mode DH1  
 2441 MHz



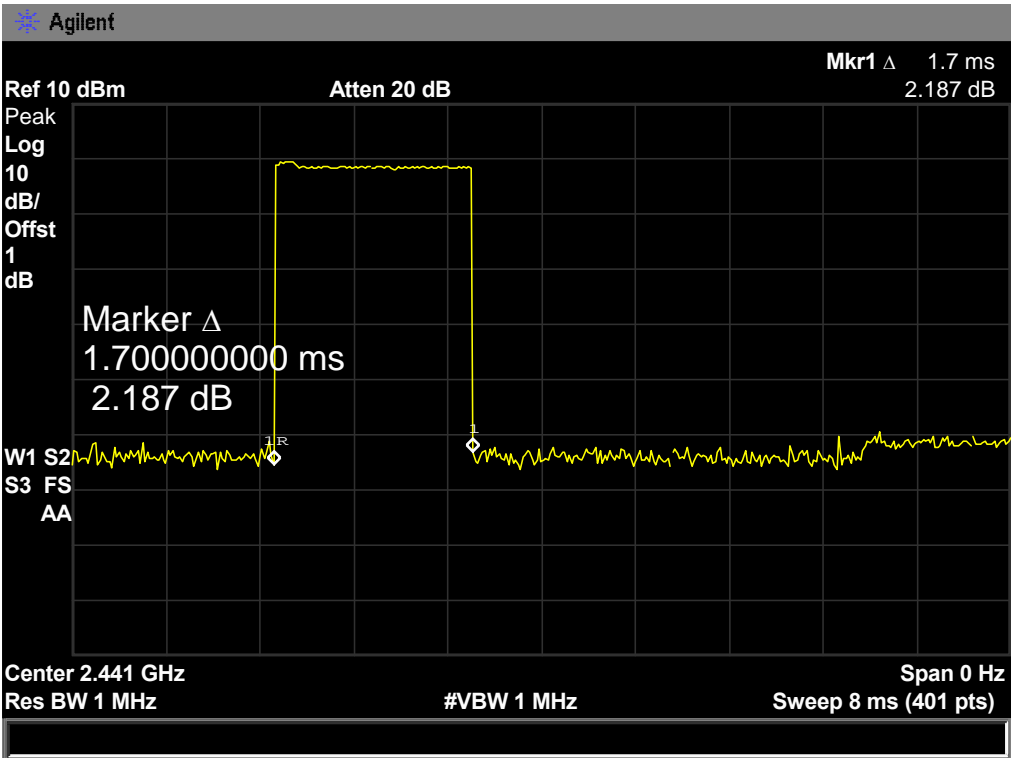
$\pi$  /4-DQPSK Hopping Mode DH1  
 2480 MHz



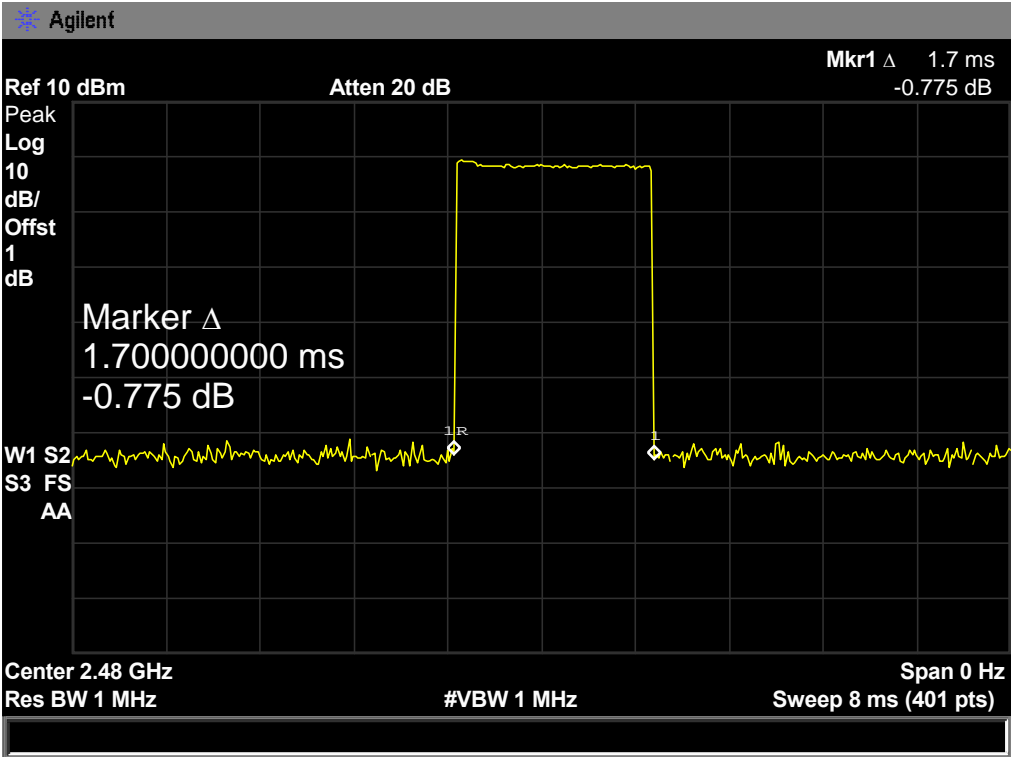




$\pi$  /4-DQPSK Hopping Mode DH3  
 2441 MHz



$\pi$  /4-DQPSK Hopping Mode DH3  
 2480 MHz

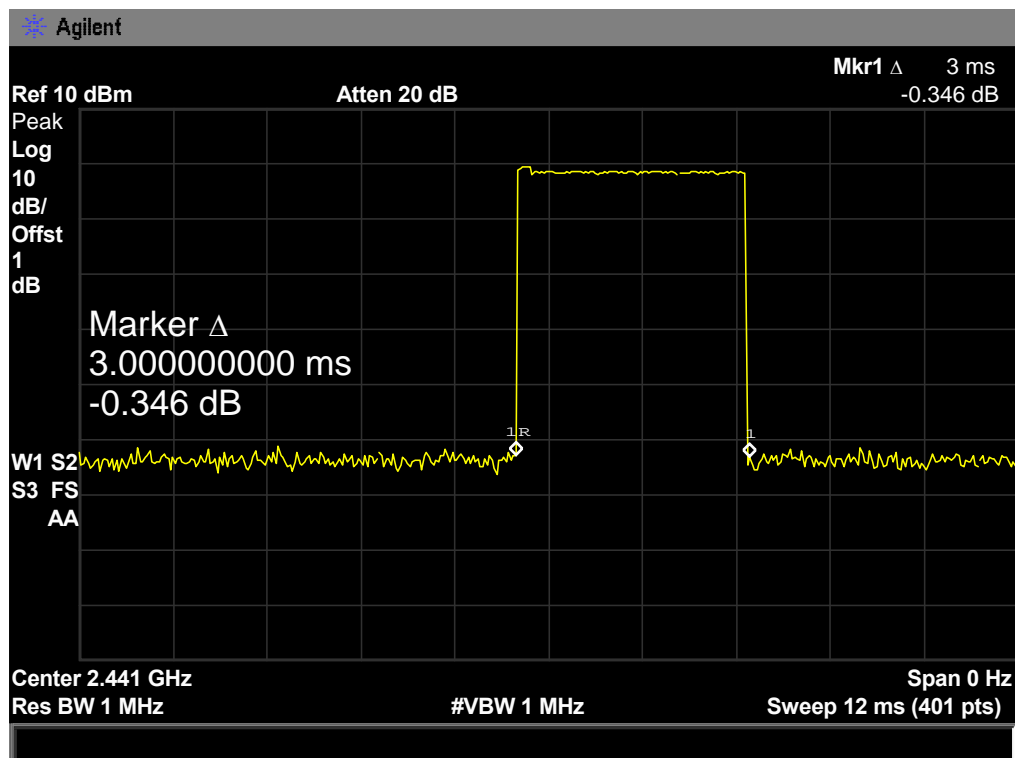






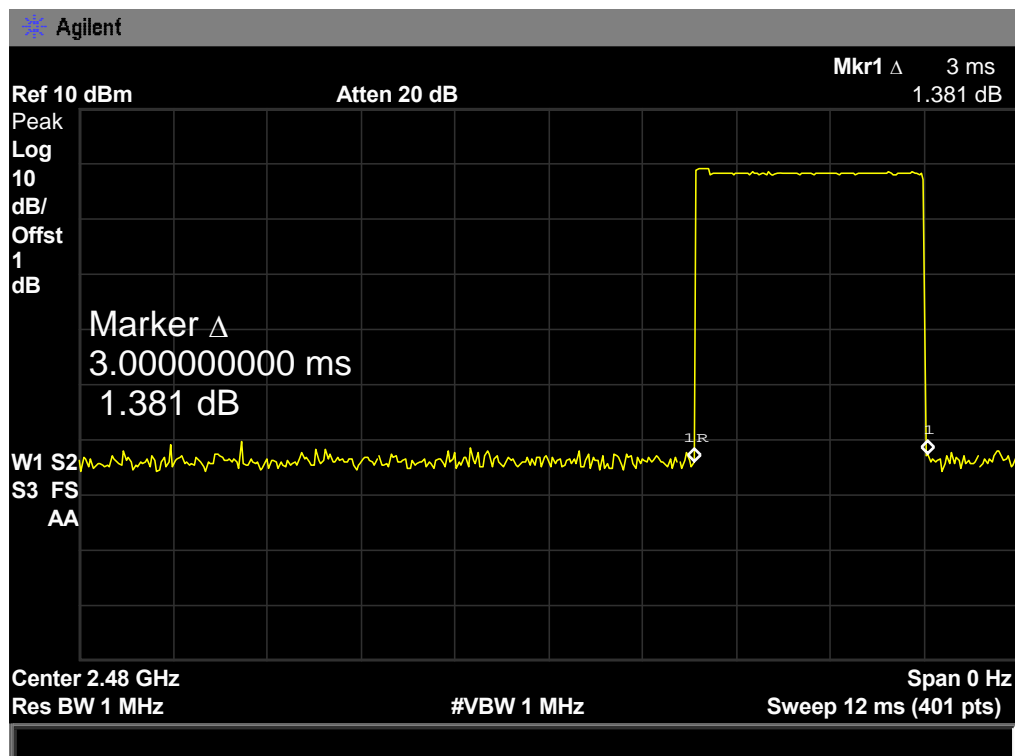
$\pi$  /4-DQPSK Hopping Mode DH5

2441 MHz



$\pi$  /4-DQPSK Hopping Mode DH5

2480 MHz



EUT:	Waterproof Bluetooth Speaker		Model Name :	JT2693	
Temperature:	25 °C		Relative Humidity:	55%	
Test Voltage:	DC 3.7V				
Test Mode:	Hopping Mode (8-DPSK DH1)				
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402	0.440	140.80	31.60	400	PASS
2441	0.430	137.60			
2480	0.430	137.60			
8-DPSK Hopping Mode DH1					
2402 MHz					

Agilent

Ref 10 dBm

Atten 20 dB

Mkr1 Δ 440 μs  
1.752 dB

Peak Log 10 dB/ Offst 1 dB

Marker Δ 440.000000 μs  
1.752 dB

W1 S2  
S3 FS  
AA

Center 2.402 GHz

Res BW 1 MHz

#VBW 1 MHz

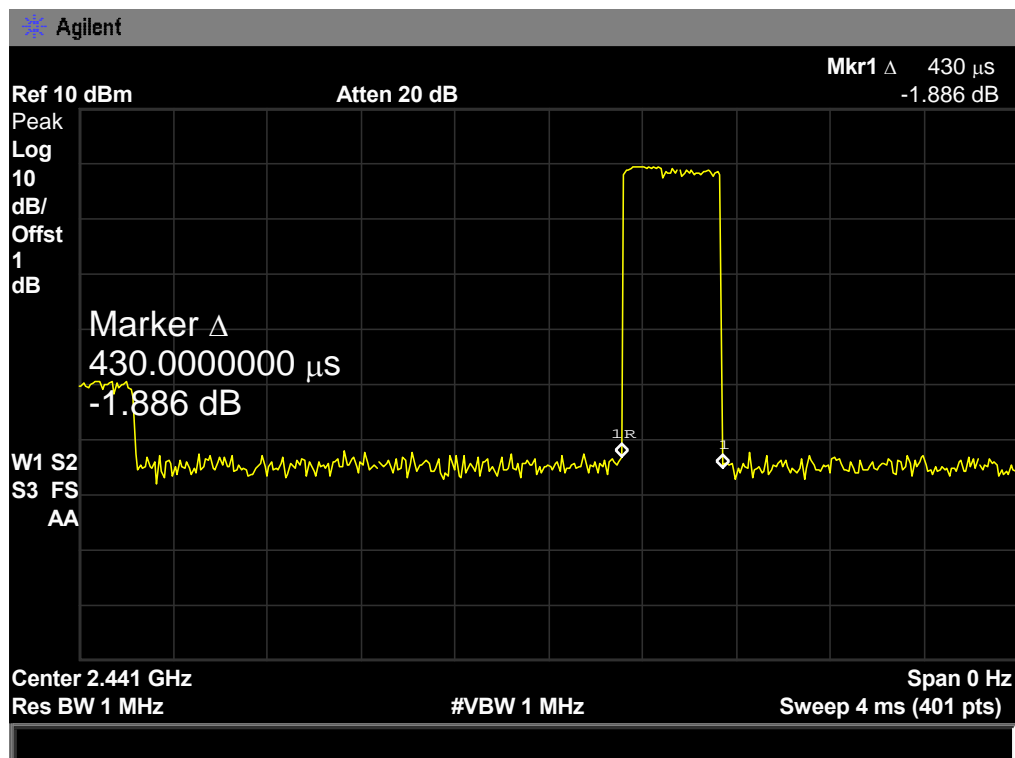
Span 0 Hz

Sweep 4 ms (401 pts)



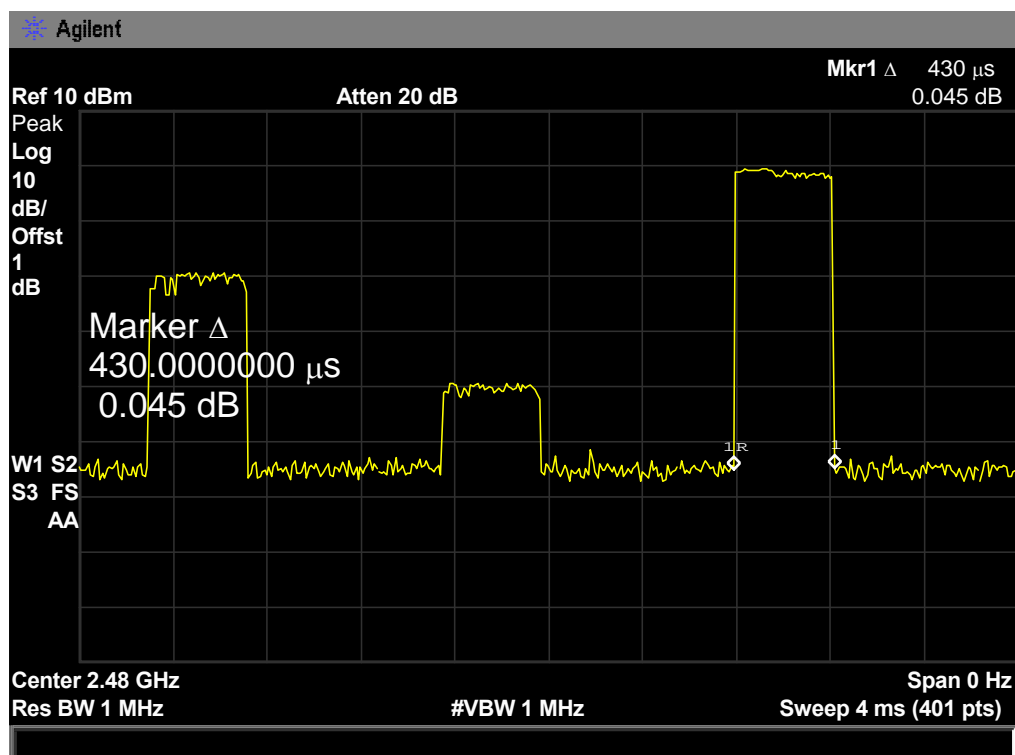
**8-DPSK Hopping Mode DH1**

**2441 MHz**



**8-DPSK Hopping Mode DH1**

**2480 MHz**



EUT:		Waterproof Bluetooth Speaker		Model Name :		JT2693	
Temperature:		25 °C		Relative Humidity:		55%	
Test Voltage:		DC 3.7V					
Test Mode:		Hopping Mode (8-DPSK DH3)					
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)		Period Time (s)	Limit (ms)	Result	
2402	1.720	275.20		31.60	400	PASS	
2441	1.700	272.00					
2480	1.700	272.00					
8-DPSK Hopping Mode DH3							
2402 MHz							

Agilent

Ref 10 dBm

Atten 20 dB

Mkr1 Δ 1.72 ms  
1.181 dB

Peak

Log

10

dB/

Offst

1

dB

Marker Δ

1.720000000 ms

1.181 dB

W1 S2

S3 FS

AA

Center 2.402 GHz

Res BW 1 MHz

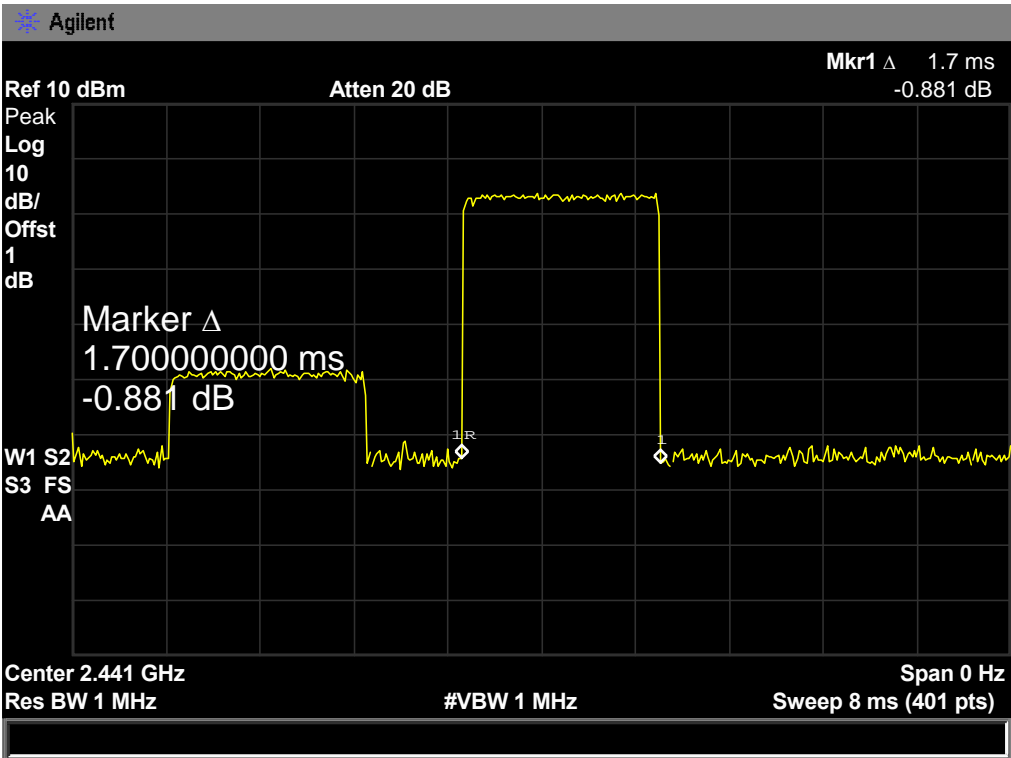
#VBW 1 MHz

Span 0 Hz

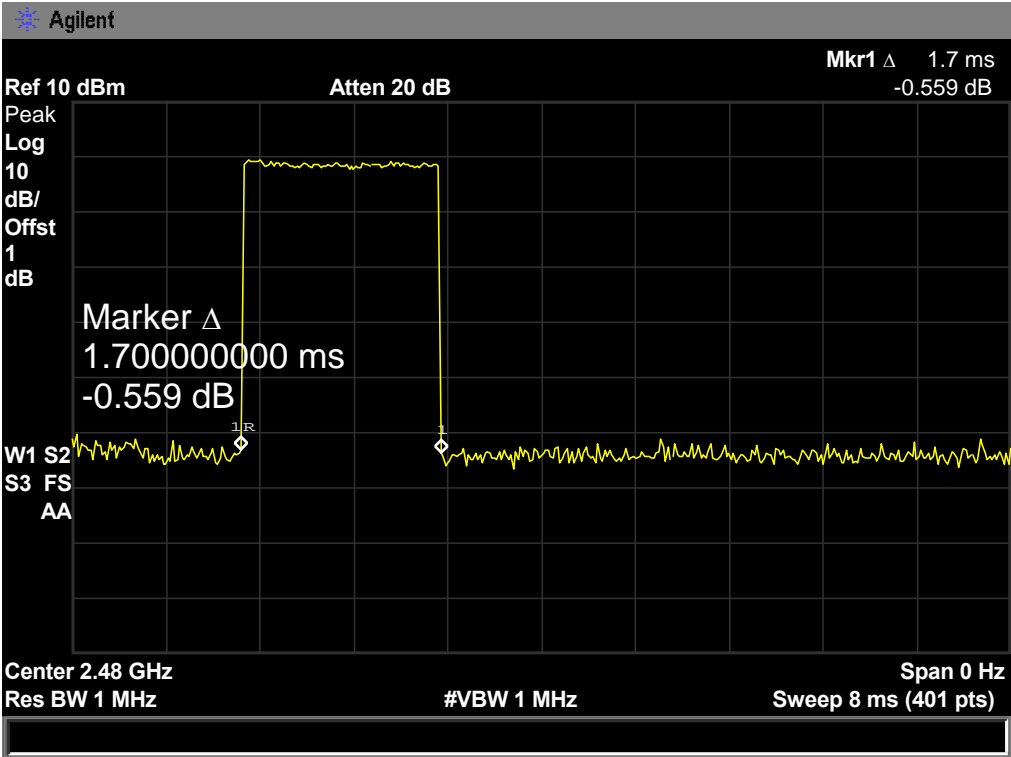
Sweep 8 ms (401 pts)



8-DPSK Hopping Mode DH3  
 2441 MHz



8-DPSK Hopping Mode DH3  
 2480 MHz



EUT:	Waterproof Bluetooth Speaker		Model Name :	JT2693	
Temperature:	25 °C		Relative Humidity:	55%	
Test Voltage:	DC 3.7V				
Test Mode:	Hopping Mode (8-DPSK DH5)				
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402	2.970	316.80	31.60	400	PASS
2441	3.000	320.00			
2480	3.000	320.00			
8-DPSK Hopping Mode DH5					
2402 MHz					

Agilent

Ref 10 dBmAtten 20 dB

Mkr1 Δ 2.97 ms-0.972 dB

PeakLog10 dB/Offst1 dB

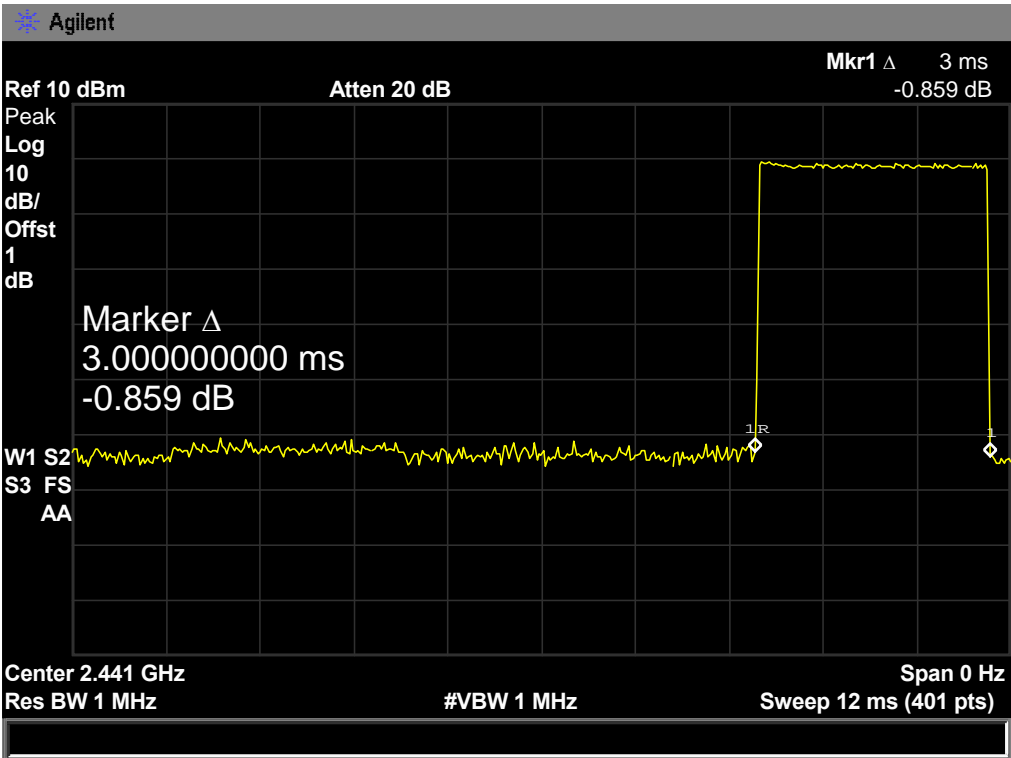
Marker Δ2.970000000 ms-0.972 dB

W1 S2S3 FSAA

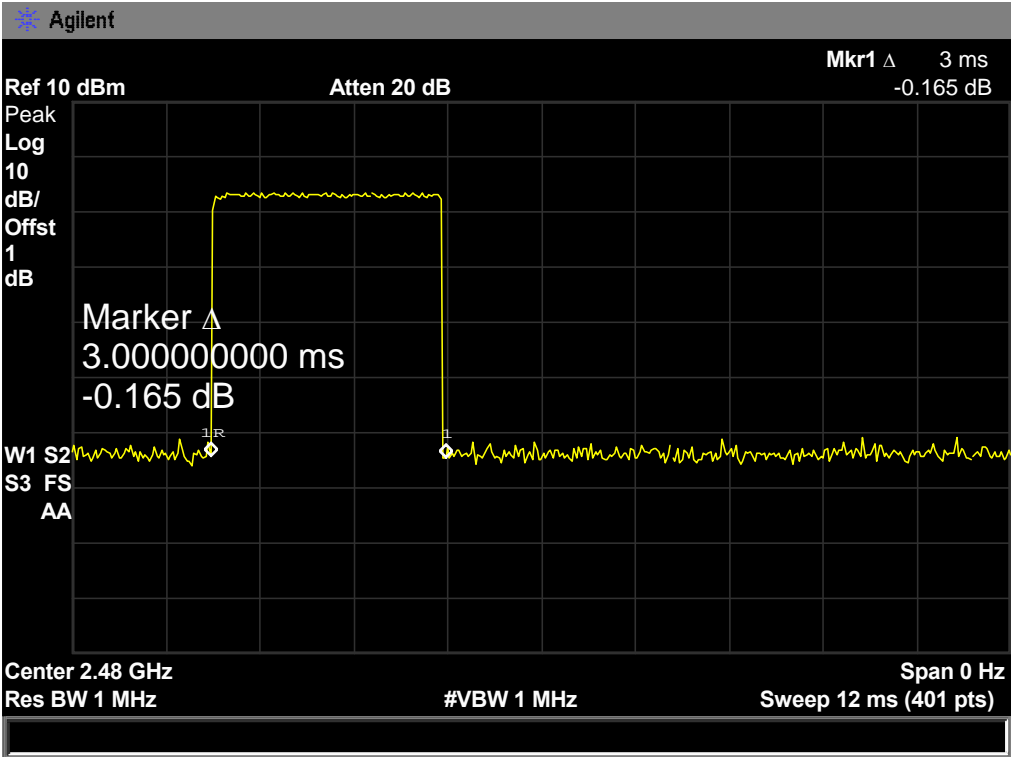
Center 2.402 GHzRes BW 1 MHz#VBW 1 MHzSpan 0 HzSweep 12 ms (401 pts)



8-DPSK Hopping Mode DH5  
 2441 MHz



8-DPSK Hopping Mode DH5  
 2480 MHz



## 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	$\leq 1$ MHz (20dB bandwidth)	2400~2483.5
Channel Separation	$>25$ KHz 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.



## 9.5 Test Data

<b>EUT:</b>	Waterproof Bluetooth Speaker	<b>Model Name :</b>	JT2693
<b>Temperature:</b>	25 °C	<b>Relative Humidity:</b>	55%
<b>Test Voltage:</b>	DC 3.7V		
<b>Test Mode:</b>	TX Mode (GFSK)		
Channel frequency (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	831.6322	855.291	
2441	832.1399	849.655	
2480	831.1242	856.634	

GFSK TX Mode			
2402 MHz			

Agilent

Ref 10 dBm Atten 20 dB

#Peak Log 10 dB/ Offst 1 dB

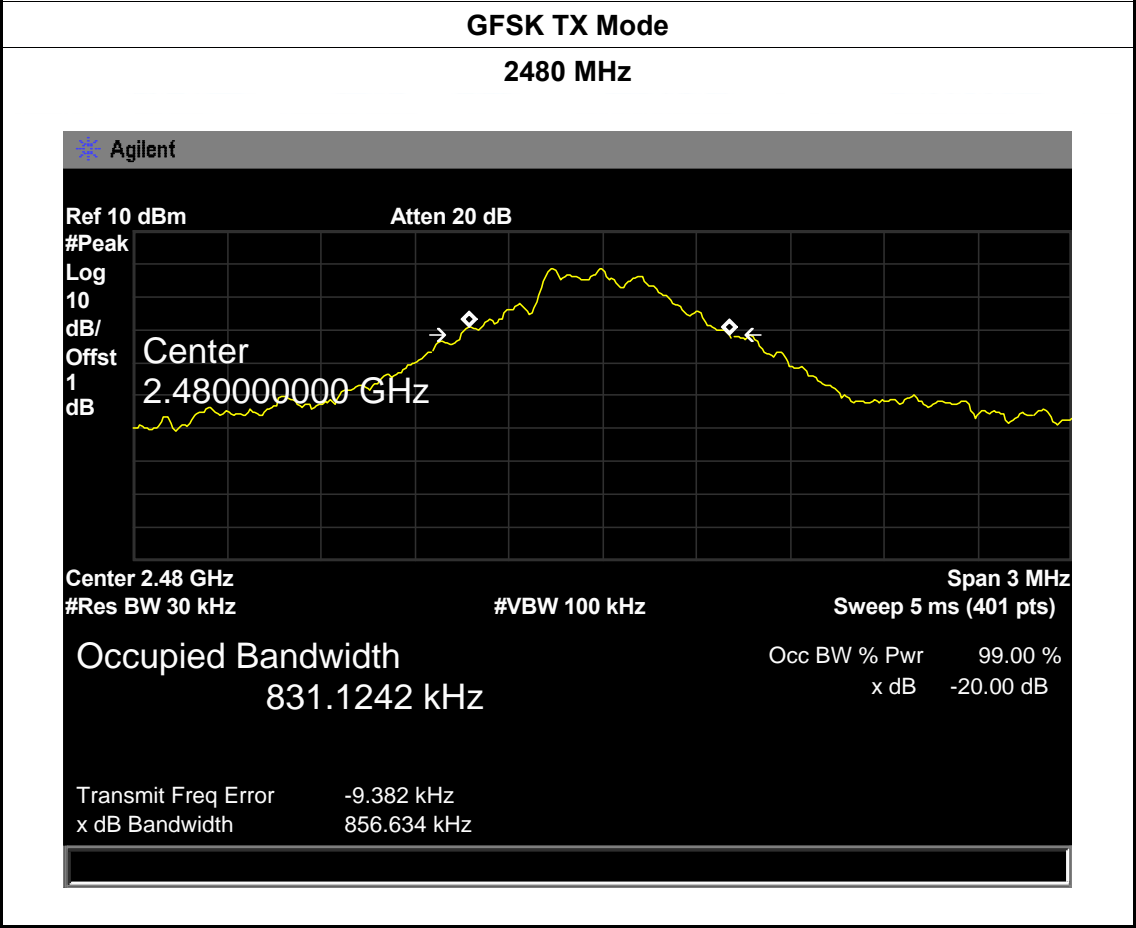
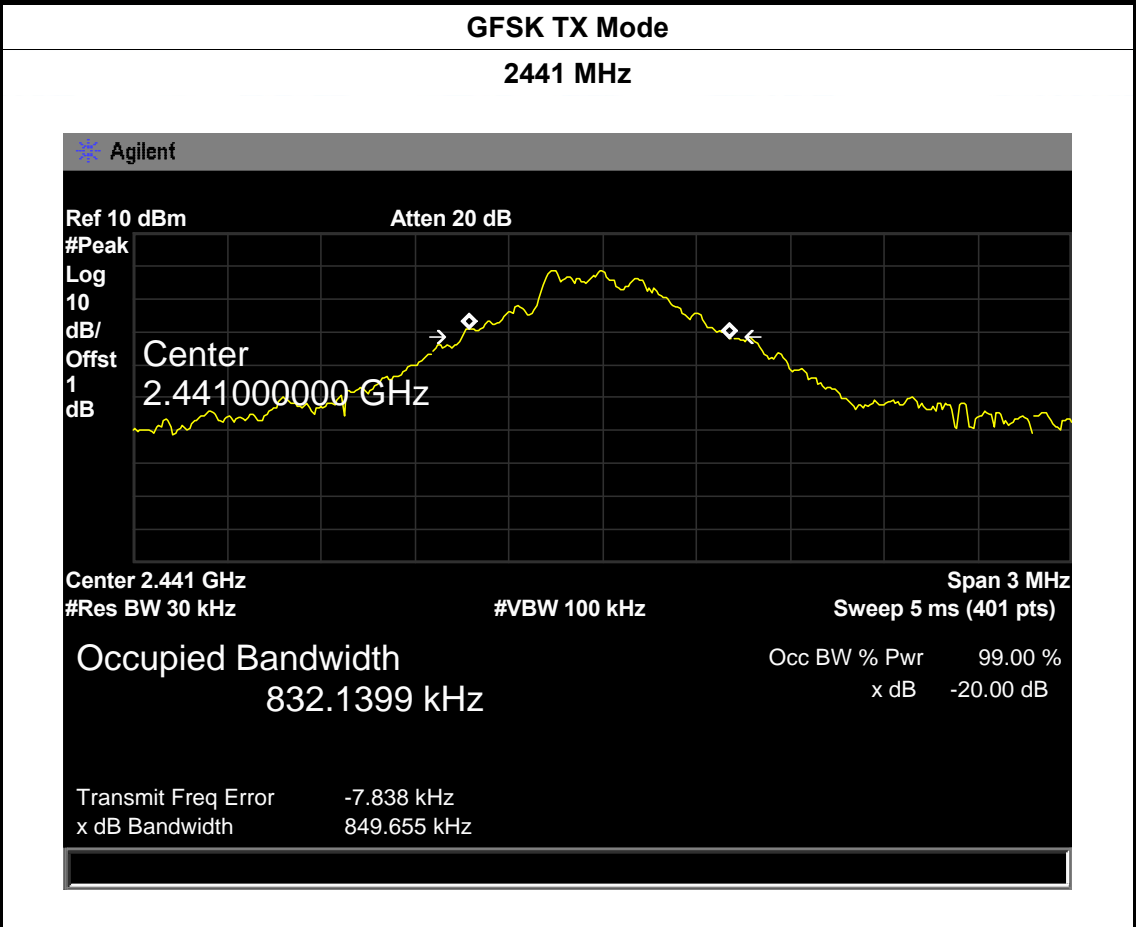
Center 2.402000000 GHz

Center 2.402 GHz #Res BW 30 kHz #VBW 100 kHz Span 3 MHz Sweep 5 ms (401 pts)

Occupied Bandwidth 831.6322 kHz

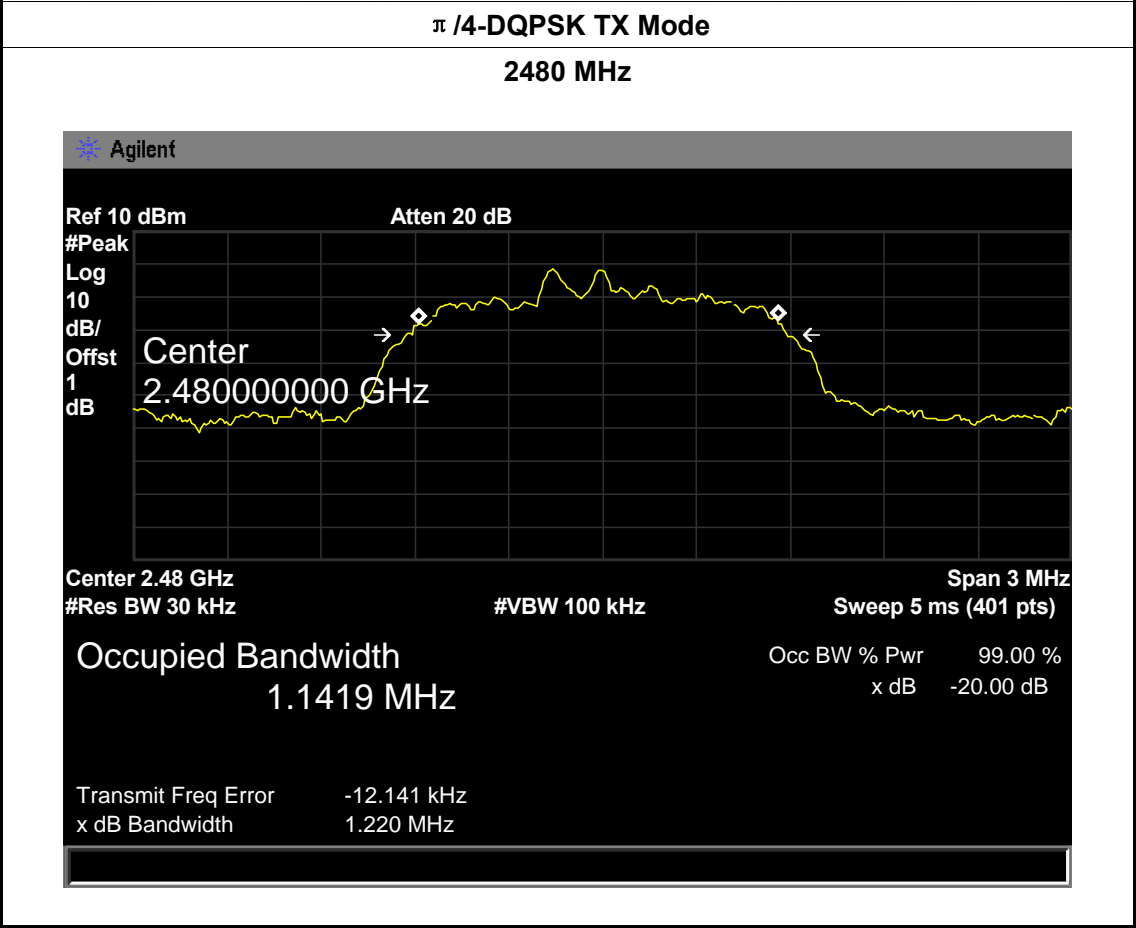
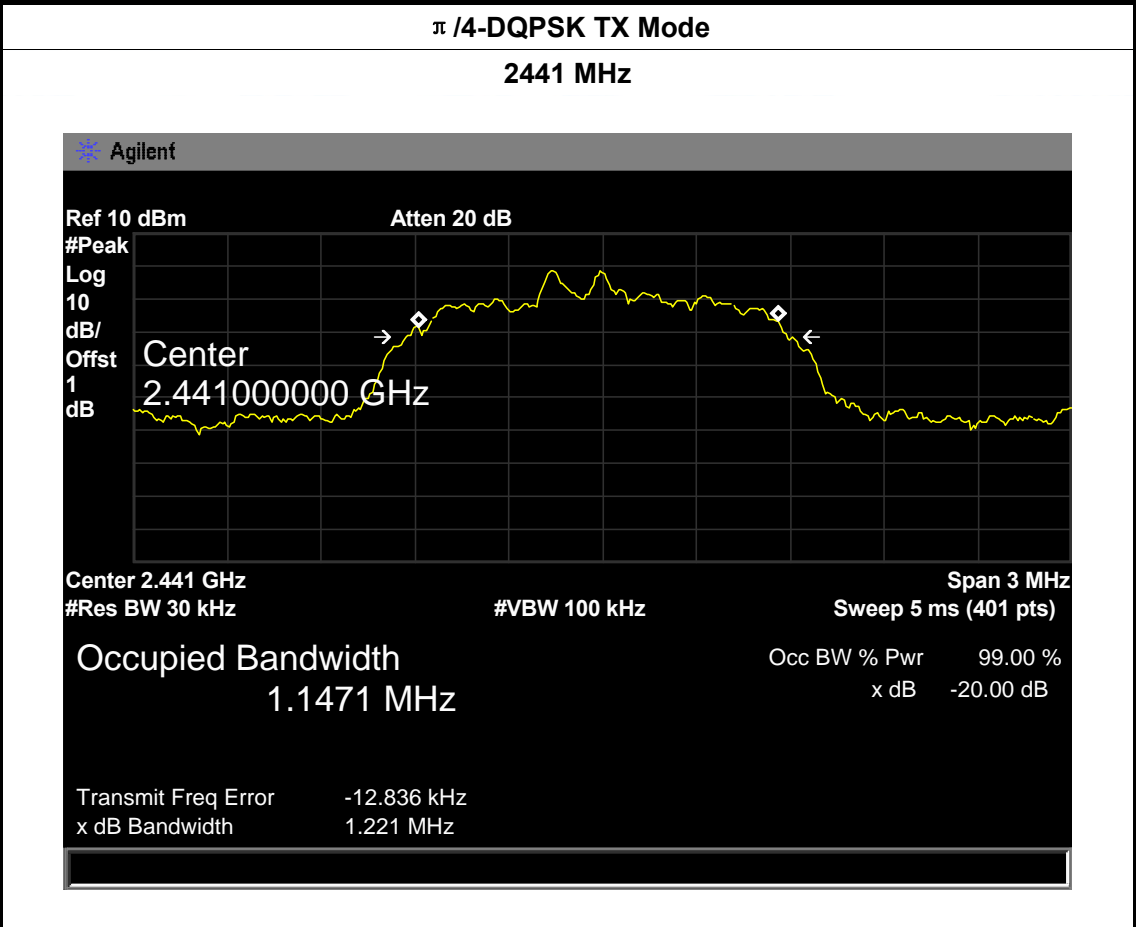
Occ BW % Pwr 99.00 % x dB -20.00 dB

Transmit Freq Error -9.007 kHz x dB Bandwidth 855.291 kHz





EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2693
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	TX Mode ( $\pi$ /4-DQPSK)		
Channel frequency (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	1146.90	1239.00	826.00
2441	1147.10	1221.00	814.00
2480	1141.90	1220.00	813.33
$\pi$ /4-DQPSK TX Mode			
2402 MHz			
<div> <div> <div>Agilent</div> <div> <div>Ref 10 dBm</div> <div>Atten 20 dB</div> <div> <div>#Peak</div> <div>Log</div> <div>10</div> <div>dB/</div> <div>Offst</div> <div>1</div> <div>dB</div> </div> </div> <div> <div>Center</div> <div>2.402000000 GHz</div> </div> </div> <div> <div>Center 2.402 GHz</div> <div>#Res BW 30 kHz</div> <div>#VBW 100 kHz</div> <div>Span 3 MHz</div> <div>Sweep 5 ms (401 pts)</div> <div>Occupied Bandwidth</div> <div>1.1469 MHz</div> <div>Occ BW % Pwr</div> <div>99.00 %</div> <div>x dB</div> <div>-20.00 dB</div> <div>Transmit Freq Error</div> <div>-10.998 kHz</div> <div>x dB Bandwidth</div> <div>1.239 MHz</div> </div> </div>			

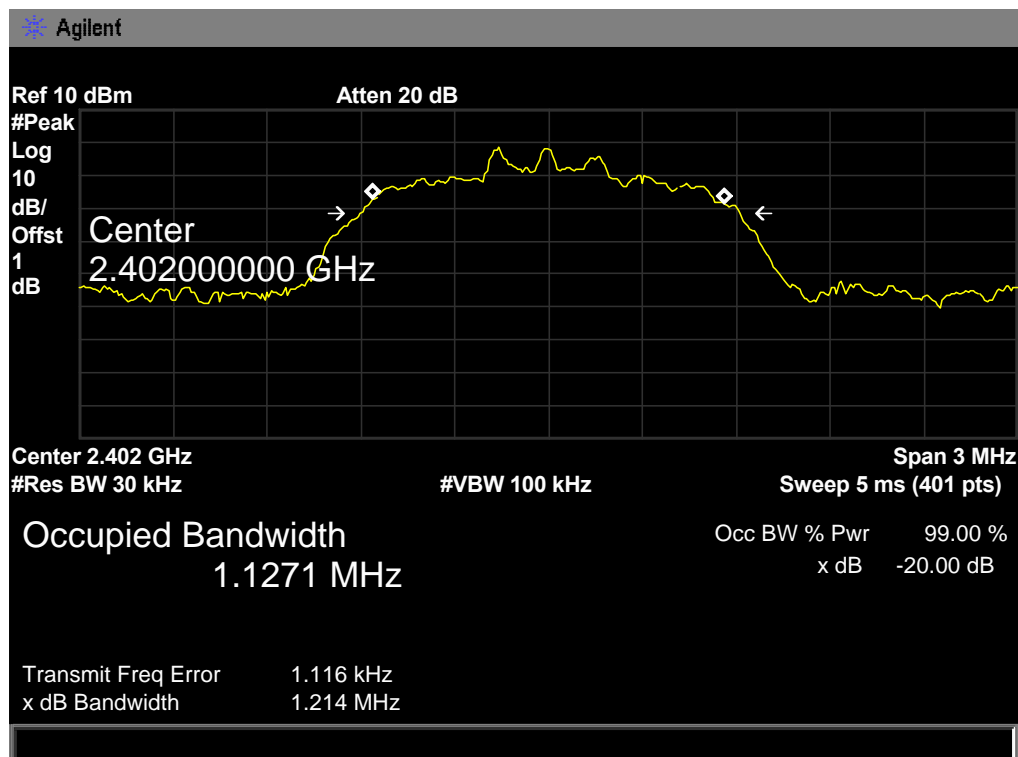




EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2693
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	TX Mode (8-DPSK)		
Channel frequency (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	1127.10	1214.00	809.33
2441	1127.20	1212.00	808.00
2480	1124.60	1212.00	808.00

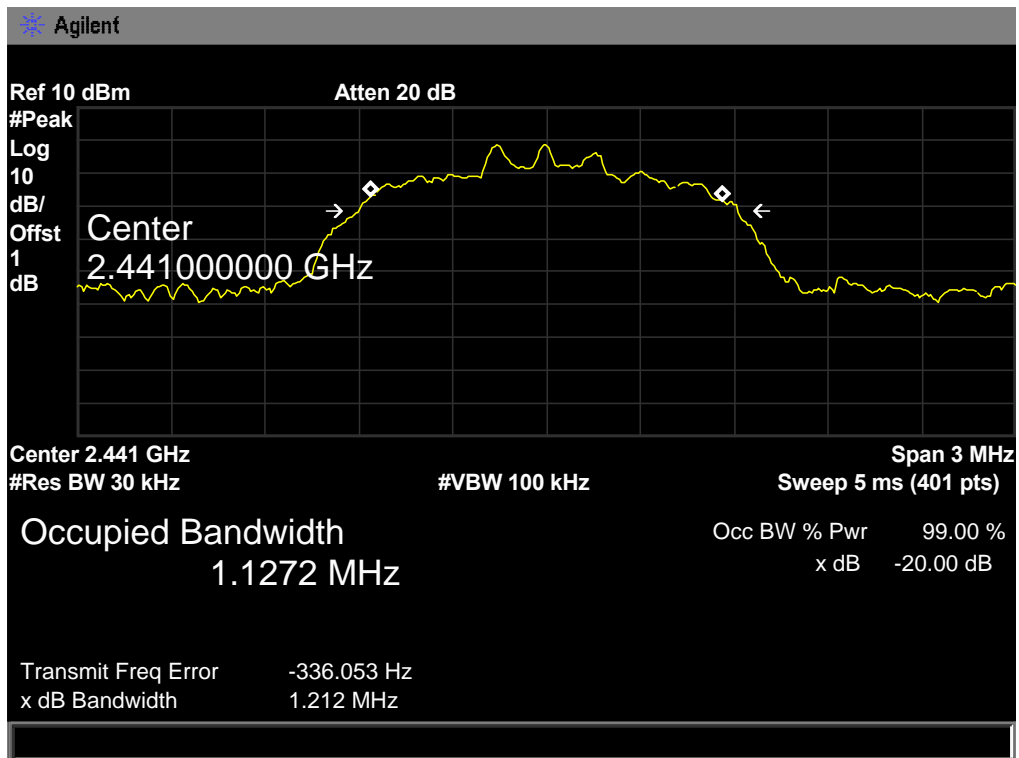
## 8-DPSK TX Mode

2402 MHz



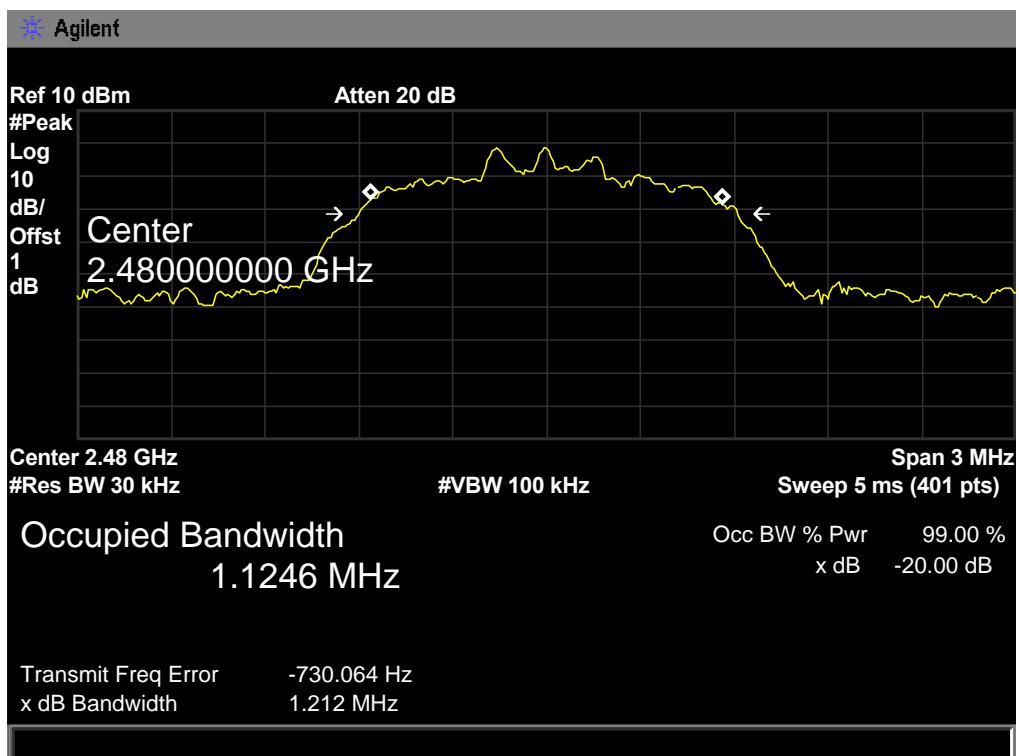
8-DPSK TX Mode

2441 MHz



8-DPSK TX Mode

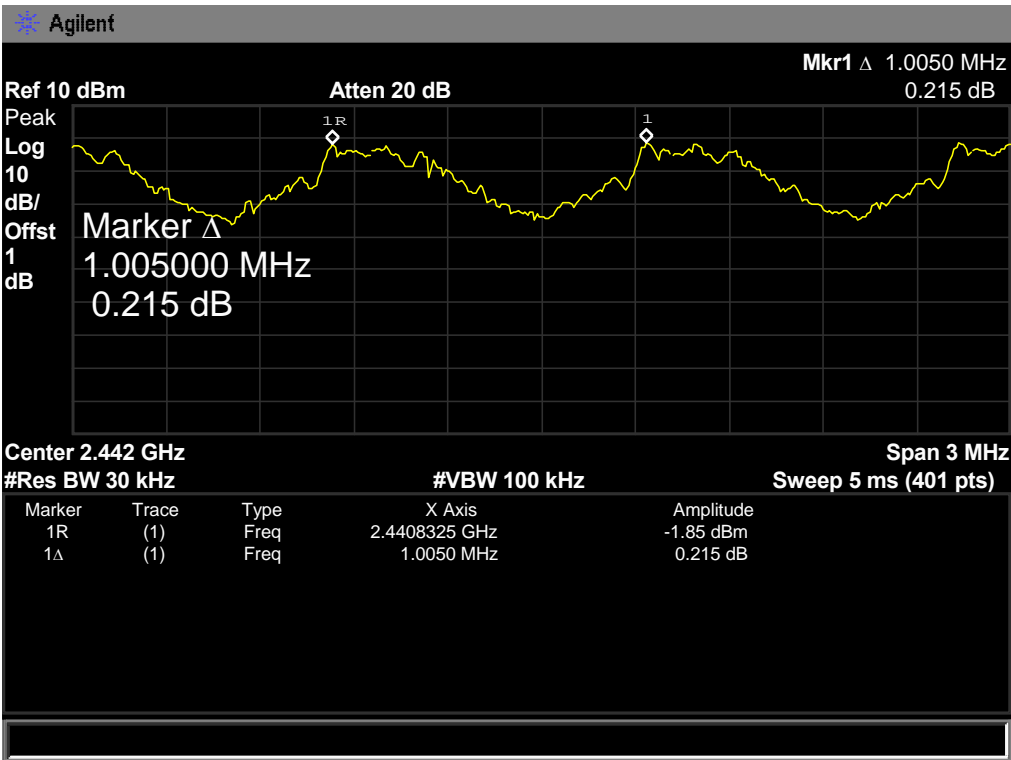
2480 MHz



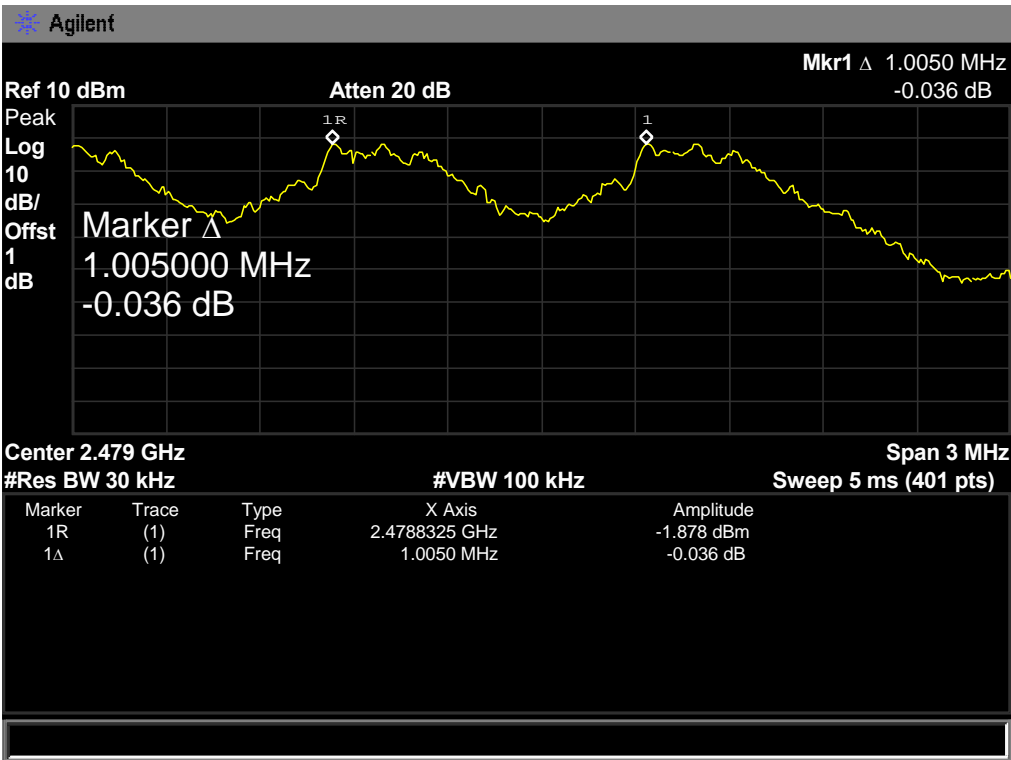




GFSK Hopping Mode  
 2441 MHz



GFSK Hopping Mode  
 2480 MHz

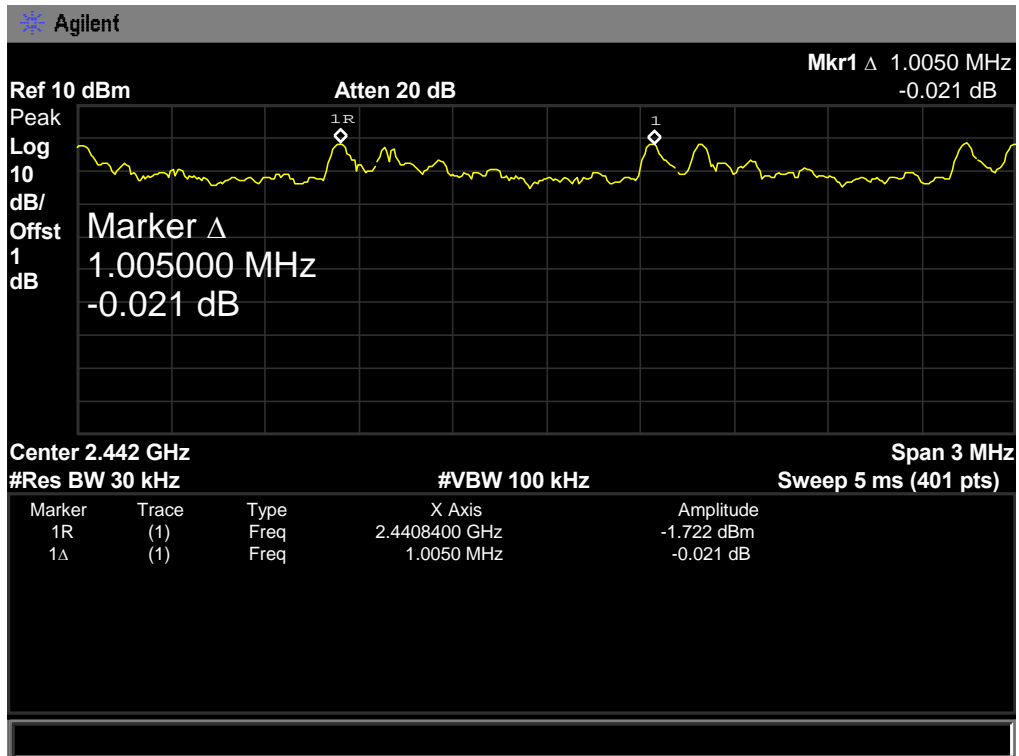






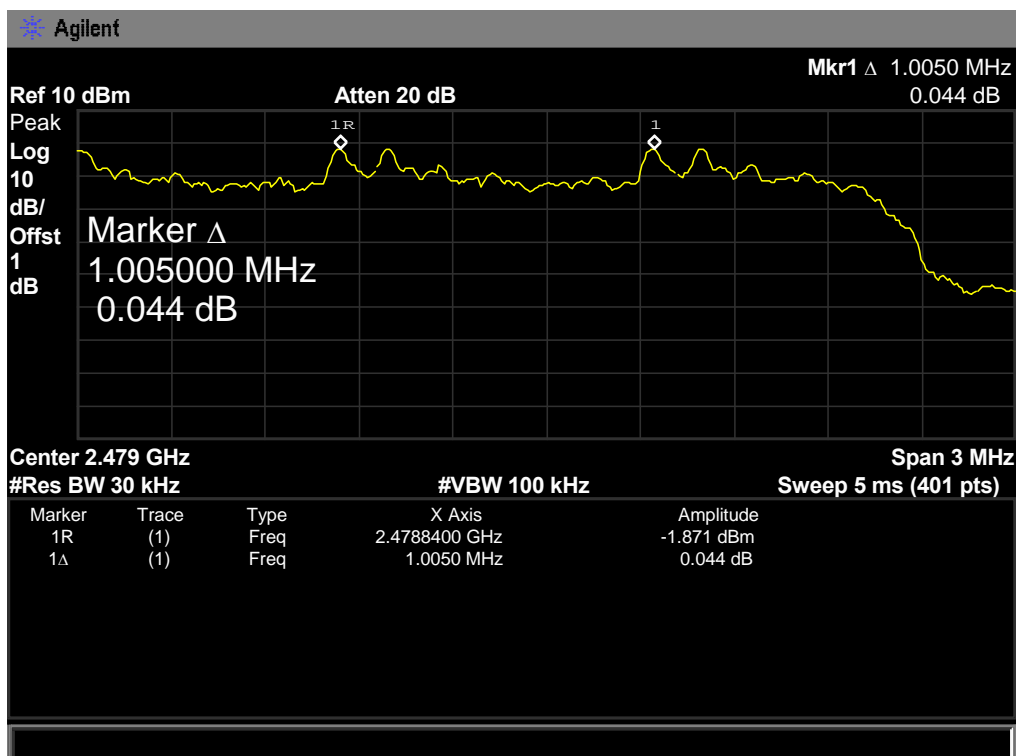
$\pi$ /4-DQPSK Hopping Mode

2441 MHz



$\pi$ /4-DQPSK Hopping Mode

2480 MHz

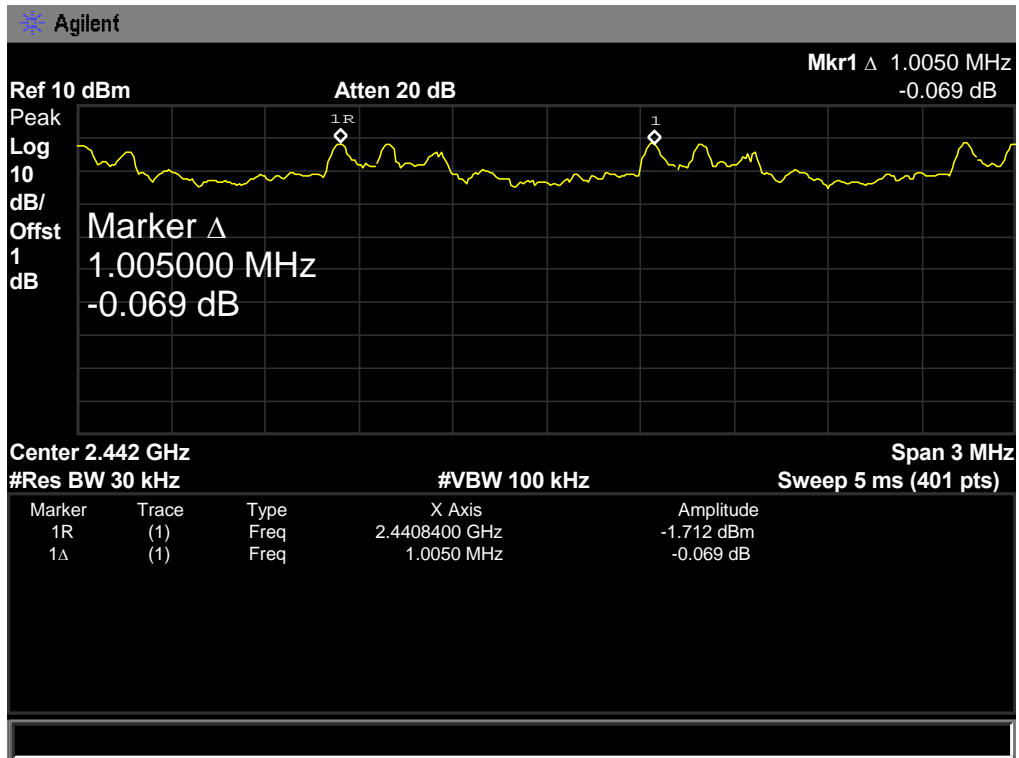






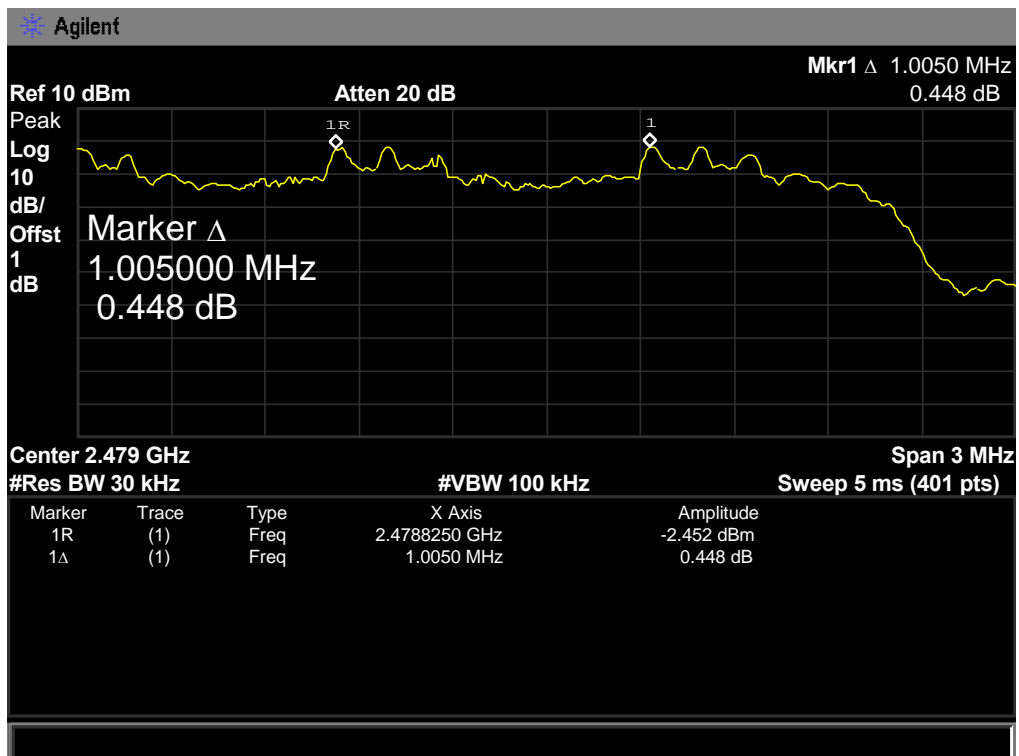
### 8-DPSK Hopping Mode

2441 MHz



### 8-DPSK Hopping Mode

2480 MHz





## 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.

## 10.5 Test Data

EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2693
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	TX Mode (GFSK)		
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)	
2402	-0.402	21	
2441	-0.281		
2480	-0.368		
GFSK TX Mode			
2402 MHz			

Agilent

Ref 10 dBm

Atten 20 dB

Mkr1 2.4021875 GHz  
-0.402 dBm

Peak Log 10 dB/ Offst 1 dB

Marker  
2.402187500 GHz  
-0.402 dBm

M1 S2  
S3 FC  
AA

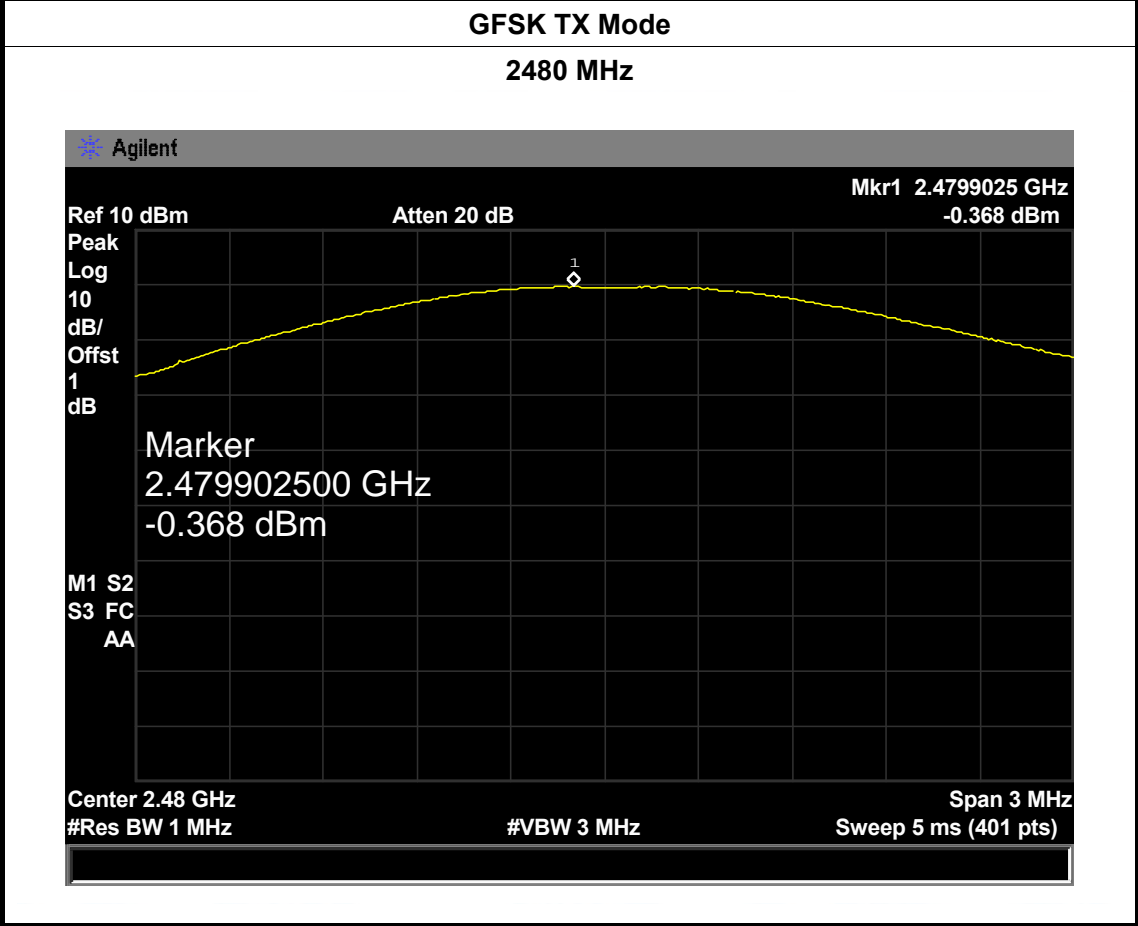
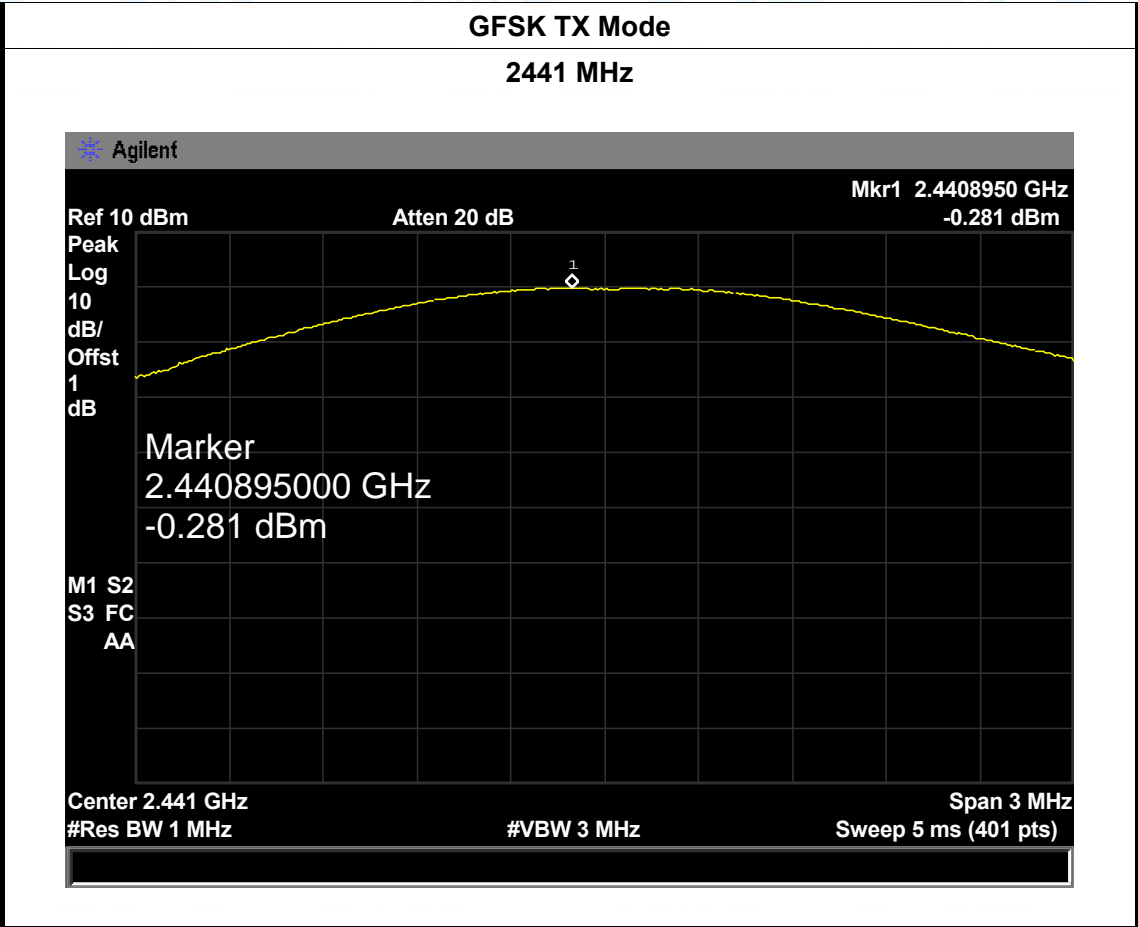
Center 2.402 GHz

#Res BW 1 MHz

#VBW 3 MHz

Span 3 MHz  
Sweep 5 ms (401 pts)





EUT:	Waterproof Bluetooth Speaker	Model Name :	JT2693
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	TX Mode ( $\pi$ /4-DQPSK)		
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)	
2402	-0.393	21	
2441	-0.231		
2480	-0.320		
$\pi$ /4-DQPSK TX Mode			
2402 MHz			

Agilent

Ref 10 dBm

Atten 20 dB

Mkr1 2.4020625 GHz  
-0.393 dBm

Peak

Log

10

dB/

Offst

1

dB

Marker

2.402062500 GHz

-0.393 dBm

M1 S2

S3 FC

AA

Center 2.402 GHz

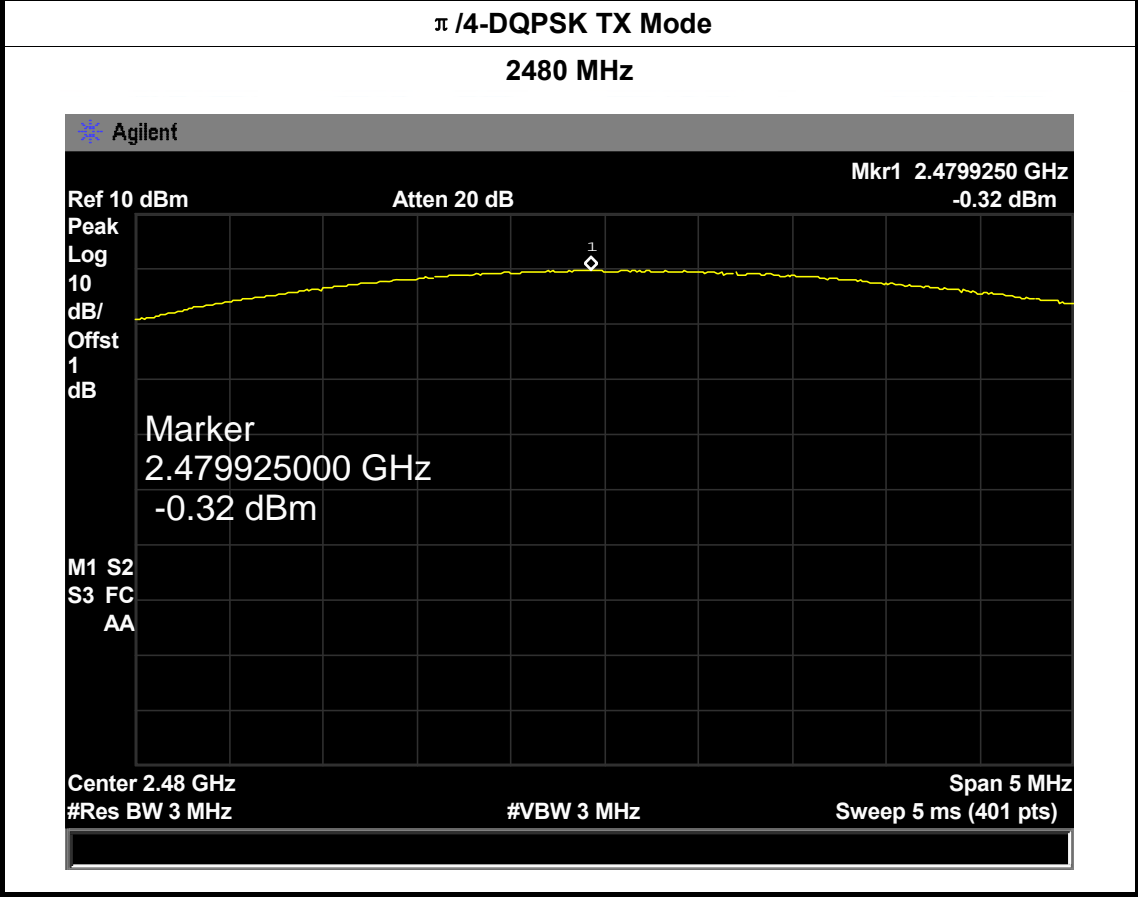
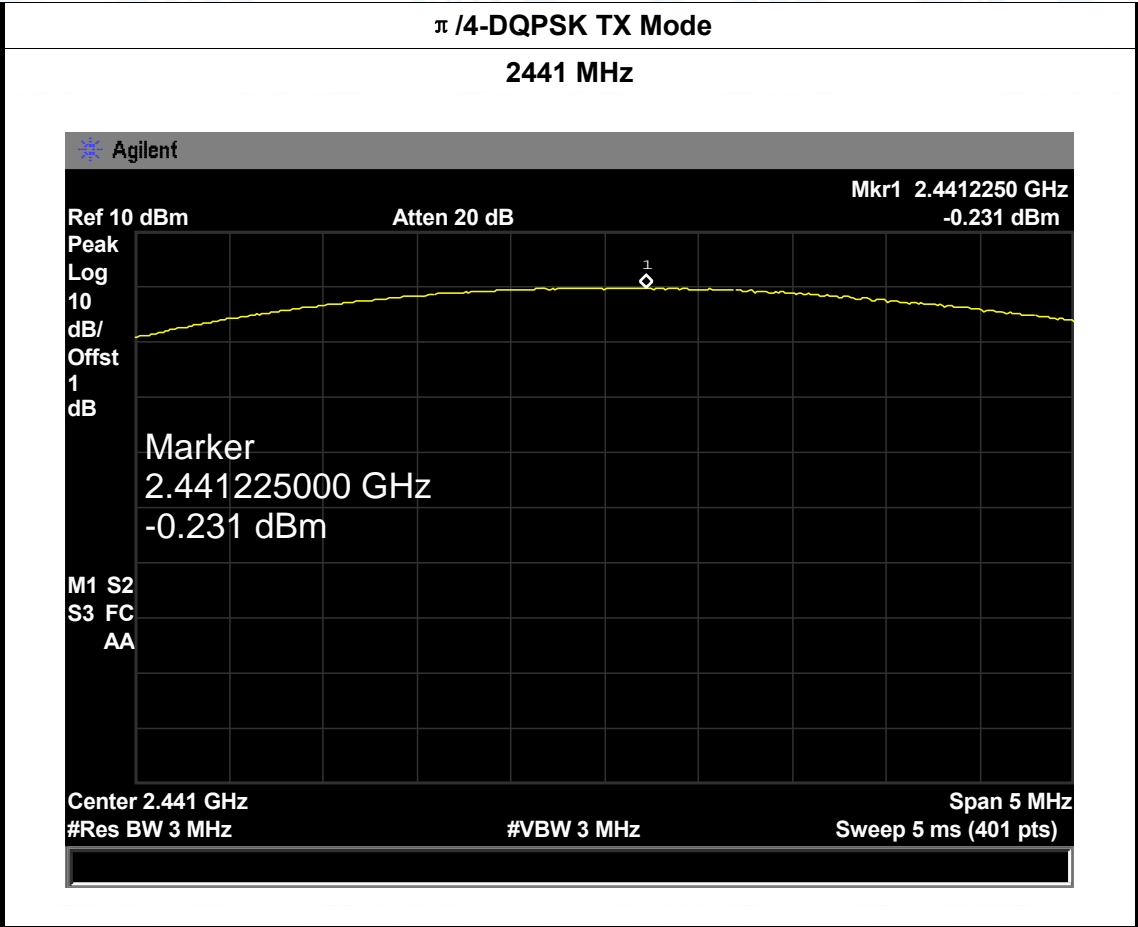
#Res BW 3 MHz

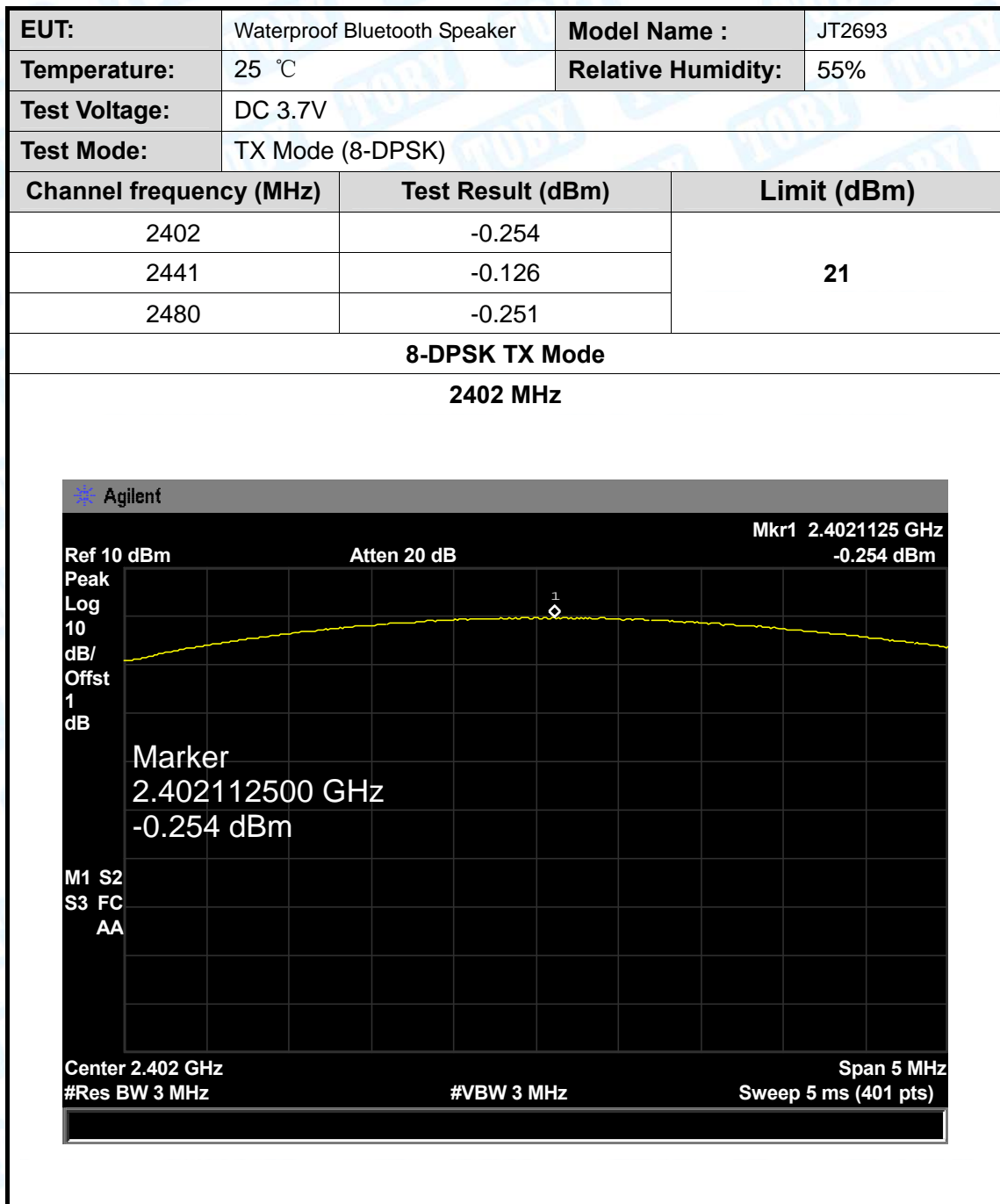
#VBW 3 MHz

Span 5 MHz

Sweep 5 ms (401 pts)

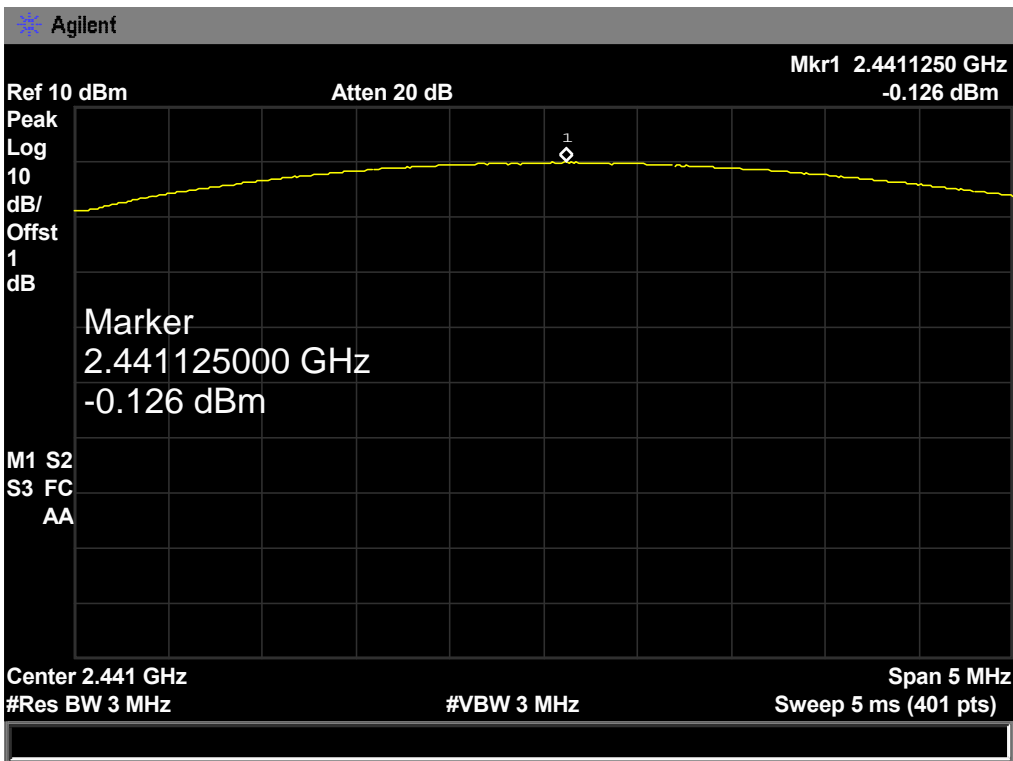




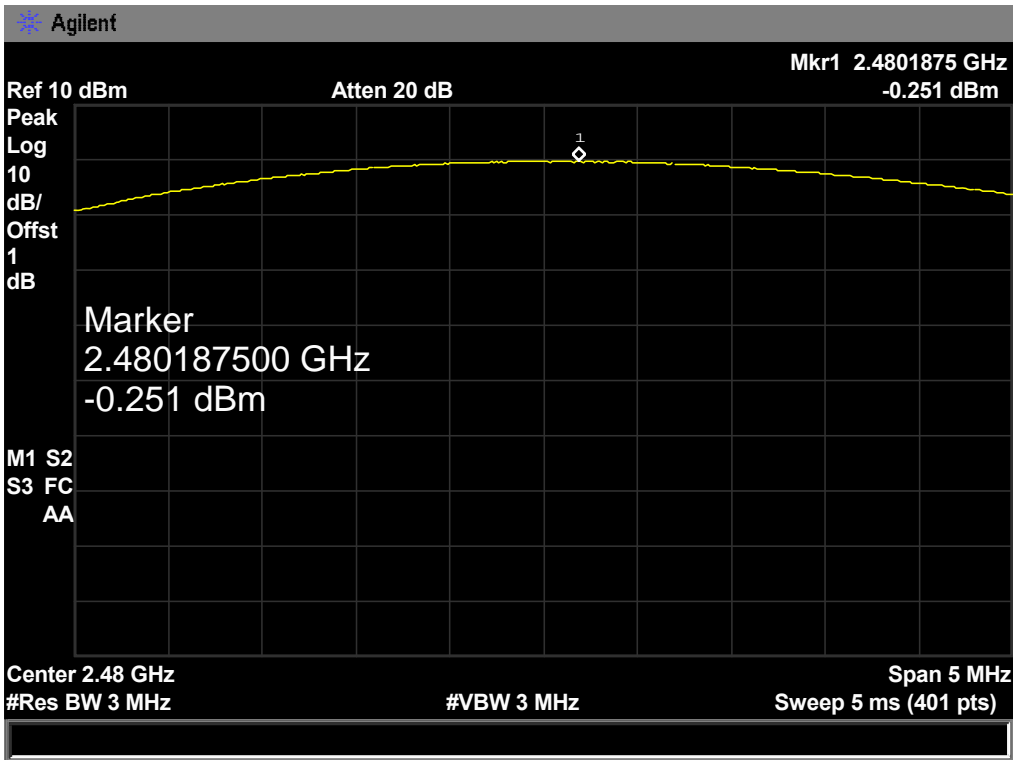




8-DPSK TX Mode  
2441 MHz



8-DPSK TX Mode  
2480 MHz



## 11. Antenna Requirement

### 11.1 Standard Requirement

#### 11.1.1 Standard

FCC Part 15.203

#### 11.1.2 Requirement

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

### 11.2 Antenna Connected Construction

The directional gains of the antenna used for transmitting is 0 dBi, and the antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

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

Antenna Type
<input checked="" type="checkbox"/> Permanent attached antenna
<input type="checkbox"/> Unique connector antenna
<input type="checkbox"/> Professional installation antenna