FCC Radio Test Report

FCC ID: 2ANM4SL-9068

Original Grant

Report No.	:	TB-FCC156105
Applicant	:	SHAOXING SUNSHINE ELECTRONIC CO.,LTD
Equipment Under Test (EUT)		
EUT Name	:	Bluetooth speaker desk lamp
Model No.	:	SL-9068
Series Model No.	:	N/A
Brand Name	:	N/A
Receipt Date	:	2017-06-18
Test Date	:	2017-06-19 to 2017-06-28
Issue Date	:	2017-06-26
Standards	:	FCC Part 15: 2016, Subpart C(15.247)
Test Method	:	ANSI C63.10: 2013
Conclusions	:	**PASS**
		In the configuration tested, the EUT complied with the standards specified above, The EUT technically complies with the FCC requirements
Test/Witness Engineer	:	IVAN SU
Approved& Authorized	:	

SHENZHEN TOBY TECHNOLOGY CO., LTD. TOBY

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.

1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, China
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1. General Information about EUT

1.1 Client Information

Applicant	:	SHAOXING SUNSHINE ELECTRONIC CO.,LTD
Address	:	Lihai Industrial Developing Zone, Shangyu, Zhejiang, China
Manufacturer	:	SHAOXING SUNSHINE ELECTRONIC CO.,LTD
Address	:	Lihai Industrial Developing Zone, Shangyu, Zhejiang, China

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	Bluetooth speaker desk lamp	
Models No.	:	SL-9068	
Product Description	:	Operation Frequency:	Bluetooth V4.0: 2402~2480 MHz
		Number of Channel:	Bluetooth: 79 Channels See Note 2
		Max Peak Output Power:	Bluetooth: 2.063dBm(GFSK)
		Antenna Gain:	1.2dBi PCB Antenna
		Modulation Type:	GFSK (1 Mbps) π/4-DQPSK (2 Mbps) 8-DPSK (3 Mbps)
Power Supply	:	DC Voltage supplied by AC/DC Adapter	
Power Rating	:	Adapter Mode(SL120300) Input:100-240V 50/60Hz 0.8A Output:12V/3A	
Connecting I/O Port(S)	:	Please refer to the User's Manual	

Note:

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

(2) Channel List:

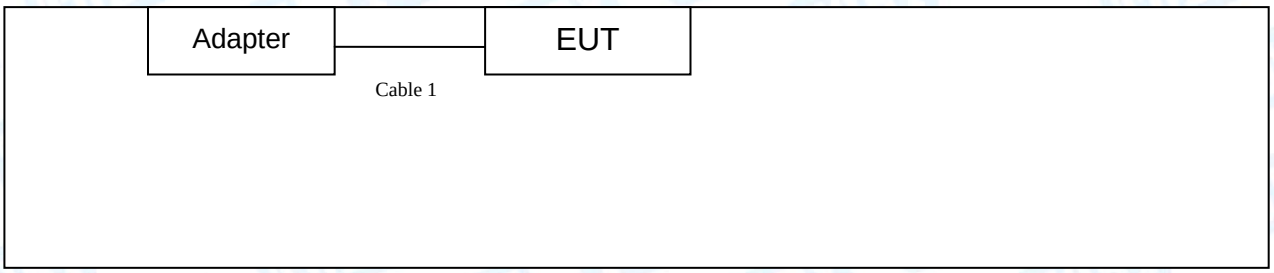
Bluetooth Channel List					
Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
00	**2402**	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462

07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	**39**	**2441**	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	**78**	**2480**
25	2427	52	2454		
26	2428	53	2455		

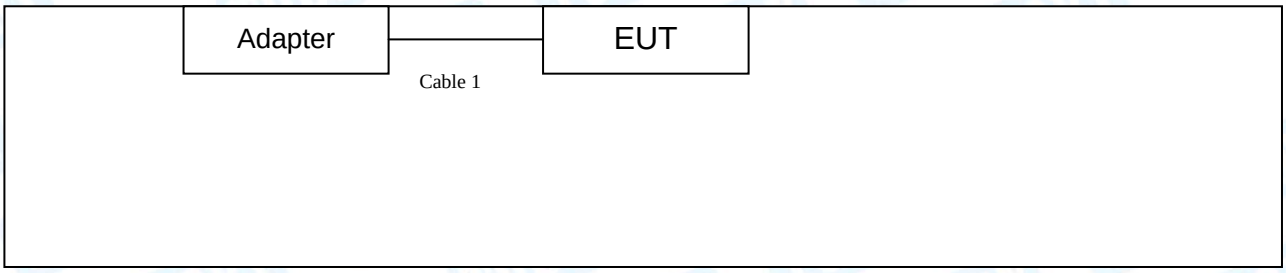
(3) The Antenna information about the equipment is provided by the applicant.

1.3 Block Diagram Showing the Configuration of System Tested

Normal Working + TX Mode



TX Mode



1.4 Description of Support Units

Equipment Information				
Name	**Model**	**FCC ID/VOC**	**Manufacturer**	**Used "√"**
Cable Information				
Number	**Shielded Type**	**Ferrite Core**	**Length**	**Note**
Cable 1	NO	NO	1.5M	

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	Charging + TX Mode

For Radiated Test	
Final Test Mode	**Description**
Mode 1	TX GFSK Mode
Mode 2	TX Mode(GFSK) Channel 00/39/78
Mode 3	TX Mode(π/4-DQPSK) Channel 00/39/78
Mode 4	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 modes above.
According to ANSI C63.10 standards, the measurements are performed at the highest, middle, lowest available channels, and the worst case data rate as follows:
TX Mode: GFSK (1 Mbps)
TX Mode: π/4-DQPSK (2 Mbps)
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	**FR301X_config_tool_2017.0703.11.exe**		
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 ± U，where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2，providing a level of confidence of approximately 95 %.

Test Item	**Parameters**	**Expanded Uncertainty (U_{Lab})**
Conducted Emission	Level Accuracy: 9kHz~150kHz 150kHz to 30MHz	±3.42 dB ±3.42 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	±4.60 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	±4.40 dB
Radiated Emission	Level Accuracy: Above 1000MHz	±4.20 dB

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.

2. Test Summary

FCC Part 15 Subpart C(15.247)/ RSS 247 Issue 2				
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(d)	RSS 247 5.5	Band Edge	PASS	N/A
15.247(c)& 15.209	RSS 247 5.5	Radiated Spurious Emission	PASS	N/A
15.247(a)	RSS 247 5.1 (1)	99% Occupied Bandwidth & 20dB Bandwidth	PASS	99%OBW GFSK: 824.7474kHz π/4-DQPSK: 1145.6kHz 8-DPSK: 1129.9KHz
Note: N/A is an abbreviation for Not Applicable.				

3. Test Equipment

AC Main Conducted Emission					
Description	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date**	**Cal. Due Date**
EMI Test Receiver	ROHDE& SCHWARZ	ESCI	100321	Jul. 21, 2016	Jul. 20, 2017
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Jul. 21, 2016	Jul. 20, 2017
L.I.S.N	Rohde & Schwarz	ENV216	101131	Jul. 21, 2016	Jul. 20, 2017
L.I.S.N	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jul. 21, 2016	Jul. 20, 2017
Radiation Spurious Emission					
Description	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date**	**Cal. Due Date**
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 21, 2016	Jul. 20, 2017
EMI Test Receiver	Rohde & Schwarz	ESPI	10SL-90680/007	Jul. 21, 2016	Jul. 20, 2017
Bilog Antenna	ETS-LINDGREN	3142E	SL-906817537	Mar.25, 2017	Mar. 24, 2018
Horn Antenna	ETS-LINDGREN	3117	SL-906843207	Mar.25, 2017	Mar. 24, 2018
Pre-amplifier	Sonoma	310N	185903	Mar.24, 2017	Mar. 23, 2018
Pre-amplifier	HP	8449B	3008A00849	Mar.24, 2017	Mar. 23, 2018
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar.24, 2017	Mar. 23, 2018
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Antenna Conducted Emission					
Description	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date**	**Cal. Due Date**
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 21, 2016	Jul. 20, 2017
Spectrum Analyzer	Rohde & Schwarz	ESPI	100321	Jul. 21, 2016	Jul. 20, 2017

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

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

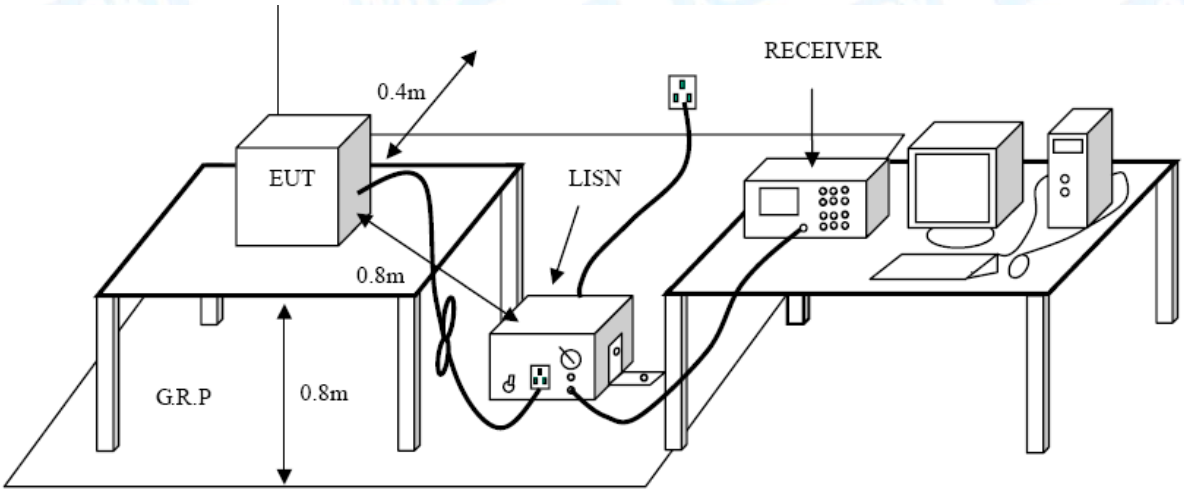
Notes:

(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.

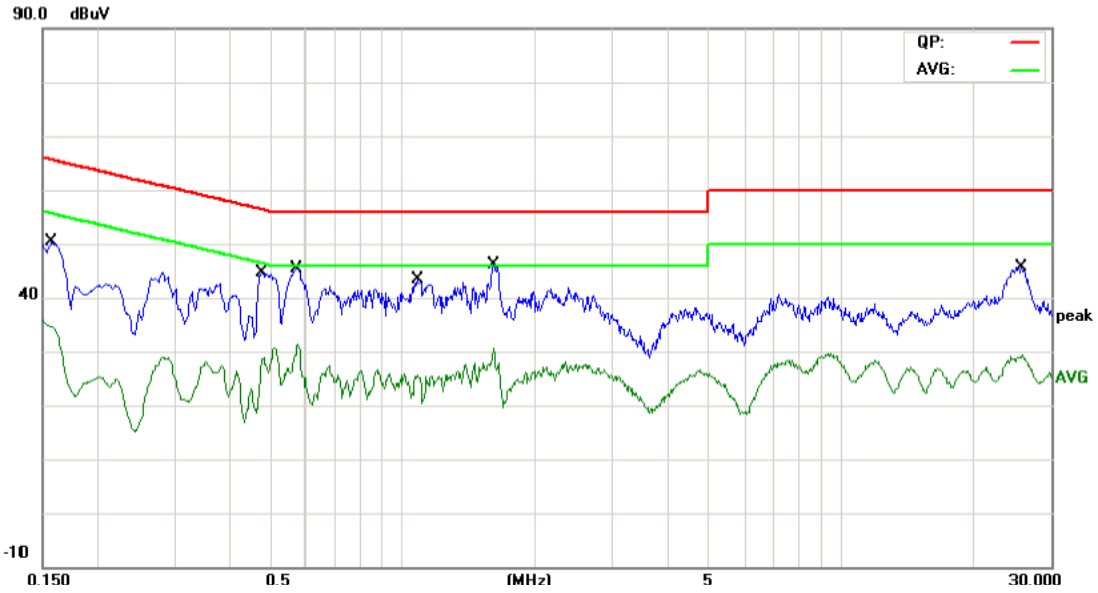
4.4 EUT Operating Mode

Please refer to the description of test mode.

4.5 Test Data

Test data please refer the following pages.

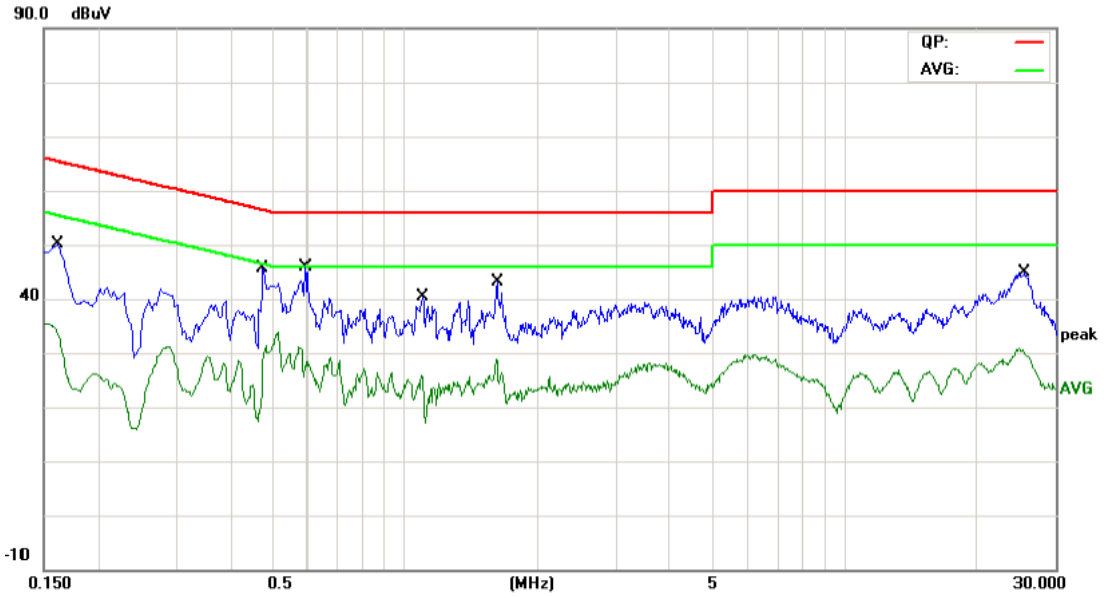
EUT:	Bluetooth speaker desk lamp	**Model Name :**	SL-9068
Temperature:	25℃	**Relative Humidity:**	55%
Test Voltage:	AC 120V/60 Hz		
Terminal:	Line		
Test Mode:	USB Charging Mode		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1580	37.11	9.64	46.75	65.56	-18.81	QP
2		0.1580	24.25	9.64	33.89	55.56	-21.67	AVG
3		0.4780	32.36	9.58	41.94	56.37	-14.43	QP
4		0.4780	18.90	9.58	28.48	46.37	-17.89	AVG
5	*	0.5740	33.33	9.58	42.91	56.00	-13.09	QP
6		0.5740	20.24	9.58	29.82	46.00	-16.18	AVG
7		1.0820	29.80	9.59	39.39	56.00	-16.61	QP
8		1.0820	14.66	9.59	24.25	46.00	-21.75	AVG
9		1.6060	32.01	9.60	41.61	56.00	-14.39	QP
10		1.6060	19.99	9.60	29.59	46.00	-16.41	AVG
11		25.6500	29.01	10.72	39.73	60.00	-20.27	QP
12		25.6500	17.07	10.72	27.79	50.00	-22.21	AVG

Emission Level= Read Level+ Correct Factor

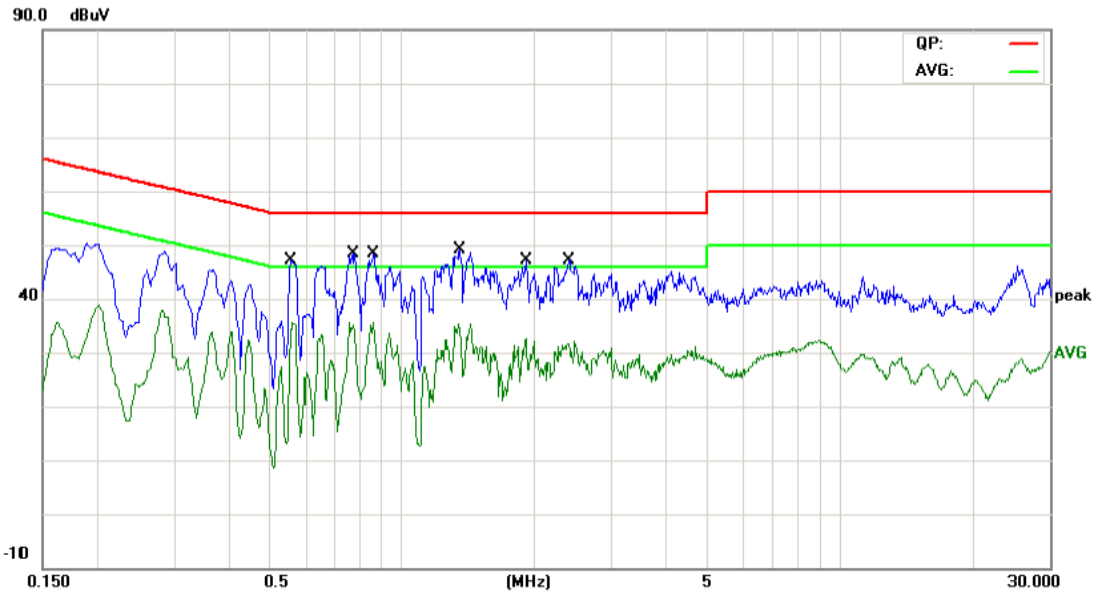
EUT:	Bluetooth speaker desk lamp	**Model Name :**	SL-9068
Temperature:	25℃	**Relative Humidity:**	55%
Test Voltage:	AC 120V/60 Hz		
Terminal:	Neutral		
Test Mode:	USB Charging Mode		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1620	36.84	9.64	46.48	65.36	-18.88	QP
2		0.1620	22.85	9.64	32.49	55.36	-22.87	AVG
3		0.4740	32.44	9.58	42.02	56.44	-14.42	QP
4		0.4740	18.33	9.58	27.91	46.44	-18.53	AVG
5	*	0.5940	32.51	9.58	42.09	56.00	-13.91	QP
6		0.5940	19.06	9.58	28.64	46.00	-17.36	AVG
7		1.0940	27.60	9.59	37.19	56.00	-18.81	QP
8		1.0940	15.49	9.59	25.08	46.00	-20.92	AVG
9		1.6140	29.74	9.60	39.34	56.00	-16.66	QP
10		1.6140	18.63	9.60	28.23	46.00	-17.77	AVG
11		25.4820	28.55	10.72	39.27	60.00	-20.73	QP
12		25.4820	18.19	10.72	28.91	50.00	-21.09	AVG

Emission Level= Read Level+ Correct Factor

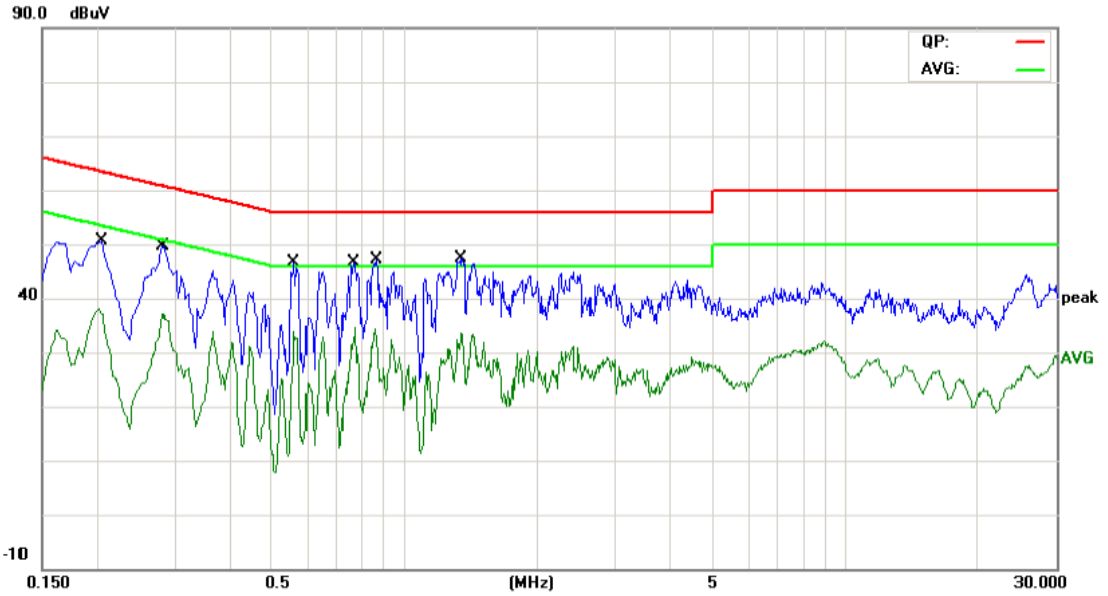
EUT:	Bluetooth speaker desk lamp	**Model Name :**	SL-9068
Temperature:	25℃	**Relative Humidity:**	55%
Test Voltage:	AC 240V/60 Hz		
Terminal:	Line		
Test Mode:	USB Charging Mode		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.5580	35.30	9.58	44.88	56.00	-11.12	QP
2		0.5580	22.73	9.58	32.31	46.00	-13.69	AVG
3		0.7740	35.26	9.59	44.85	56.00	-11.15	QP
4		0.7740	25.39	9.59	34.98	46.00	-11.02	AVG
5		0.8580	35.26	9.59	44.85	56.00	-11.15	QP
6		0.8580	25.33	9.59	34.92	46.00	-11.08	AVG
7	*	1.3460	35.92	9.60	45.52	56.00	-10.48	QP
8		1.3460	24.81	9.60	34.41	46.00	-11.59	AVG
9		1.9180	33.00	9.61	42.61	56.00	-13.39	QP
10		1.9180	21.68	9.61	31.29	46.00	-14.71	AVG
11		2.4060	33.11	9.63	42.74	56.00	-13.26	QP
12		2.4060	20.89	9.63	30.52	46.00	-15.48	AVG

Emission Level= Read Level+ Correct Factor

EUT:	Bluetooth speaker desk lamp	**Model Name :**	SL-9068
Temperature:	25℃	**Relative Humidity:**	55%
Test Voltage:	AC 240V/60 Hz		
Terminal:	Neutral		
Test Mode:	USB Charging Mode		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.2060	36.11	9.65	45.76	63.36	-17.60	QP
2		0.2060	26.75	9.65	36.40	53.36	-16.96	AVG
3		0.2819	35.64	9.58	45.22	60.76	-15.54	QP
4		0.2819	26.73	9.58	36.31	50.76	-14.45	AVG
5	*	0.5620	34.40	9.58	43.98	56.00	-12.02	QP
6		0.5620	24.16	9.58	33.74	46.00	-12.26	AVG
7		0.7660	32.95	9.59	42.54	56.00	-13.46	QP
8		0.7660	23.78	9.59	33.37	46.00	-12.63	AVG
9		0.8620	32.87	9.59	42.46	56.00	-13.54	QP
10		0.8620	22.65	9.59	32.24	46.00	-13.76	AVG
11		1.3420	34.15	9.60	43.75	56.00	-12.25	QP
12		1.3420	23.68	9.60	33.28	46.00	-12.72	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)

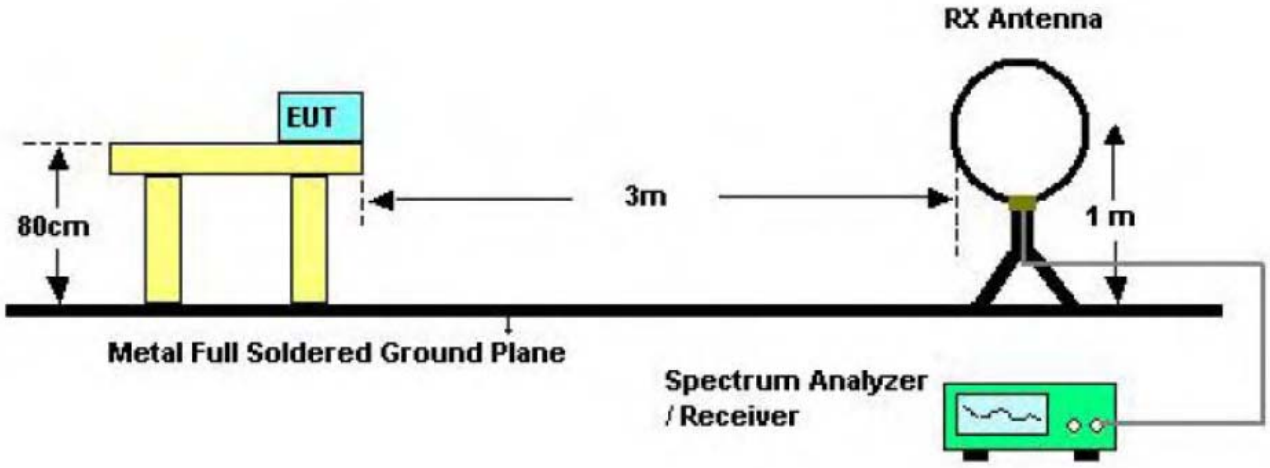
Frequency (MHz)	Class B (dBuV/m)(at 3m)	
	Peak	Average
Above 1000	74	54

Note:

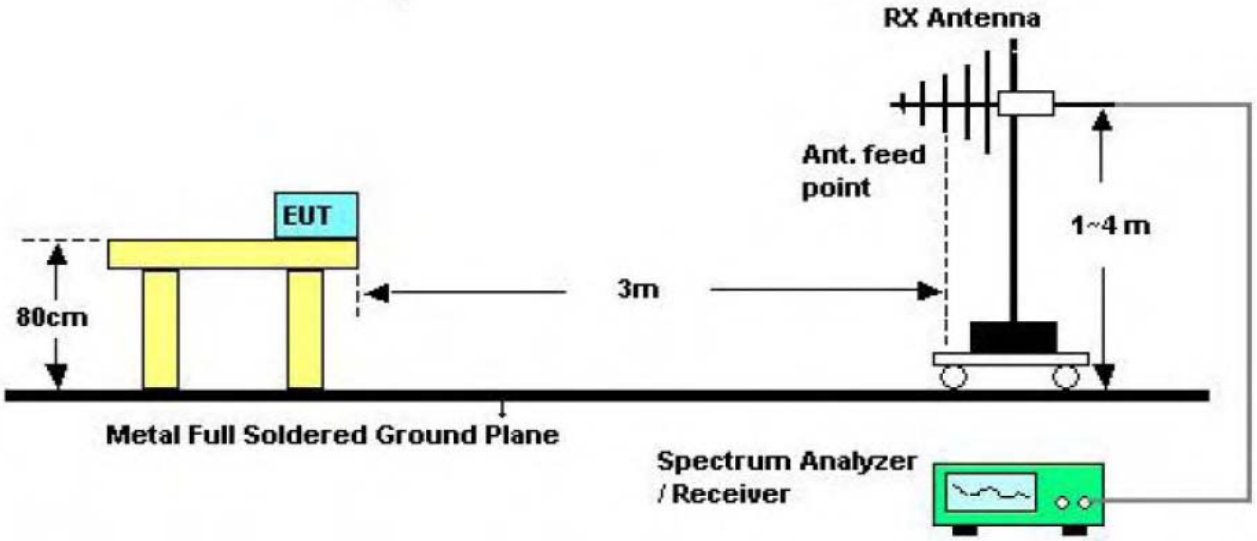
(1) The tighter limit applies at the band edges.

(2) Emission Level (dBuV/m)=20log Emission Level (uV/m)

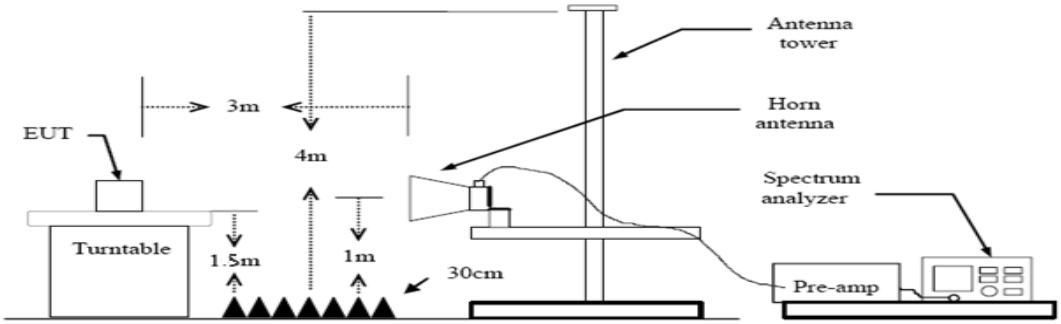
5.2 Test Setup



Below 30MHz Test Setup



Below 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=10 Hz with Peak Detector for Average Values.

Test data please refer the following pages.

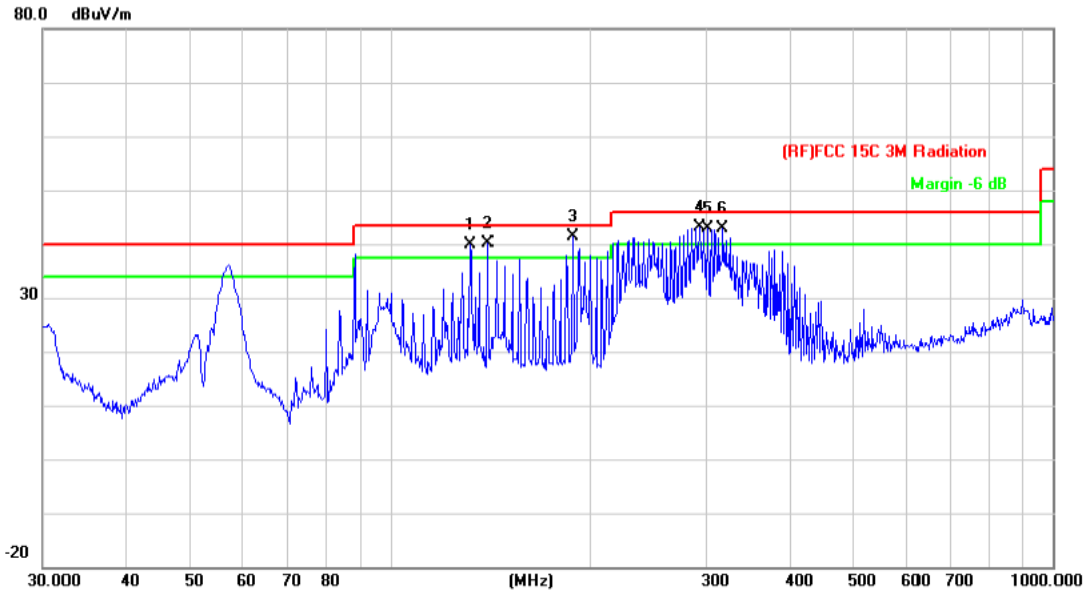
9KHz~30MHz

From 9KHz to 30MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

30MHz~1GHz

EUT:	Bluetooth speaker desk lamp	**Model Name :**	SL-9068
Temperature:	25℃	**Relative Humidity:**	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	Only worse case is reported		

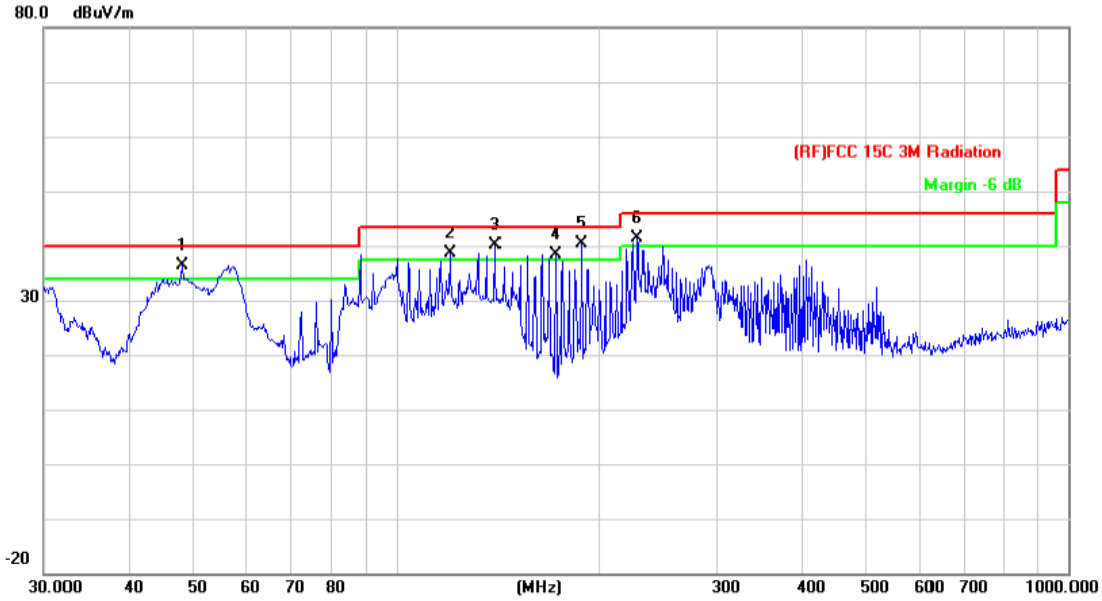


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	!	132.2204	60.89	-21.07	39.82	43.50	-3.68	QP
2	!	140.3420	61.04	-20.98	40.06	43.50	-3.44	QP
3	*	189.0741	61.46	-19.97	41.49	43.50	-2.01	QP
4	!	293.0842	59.79	-16.62	43.17	46.00	-2.83	QP
5	!	301.4223	59.28	-16.39	42.89	46.00	-3.11	QP
6	!	317.7010	58.58	-15.72	42.86	46.00	-3.14	QP

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

Emission Level= Read Level+ Correct Factor

EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	Only worse case is reported		



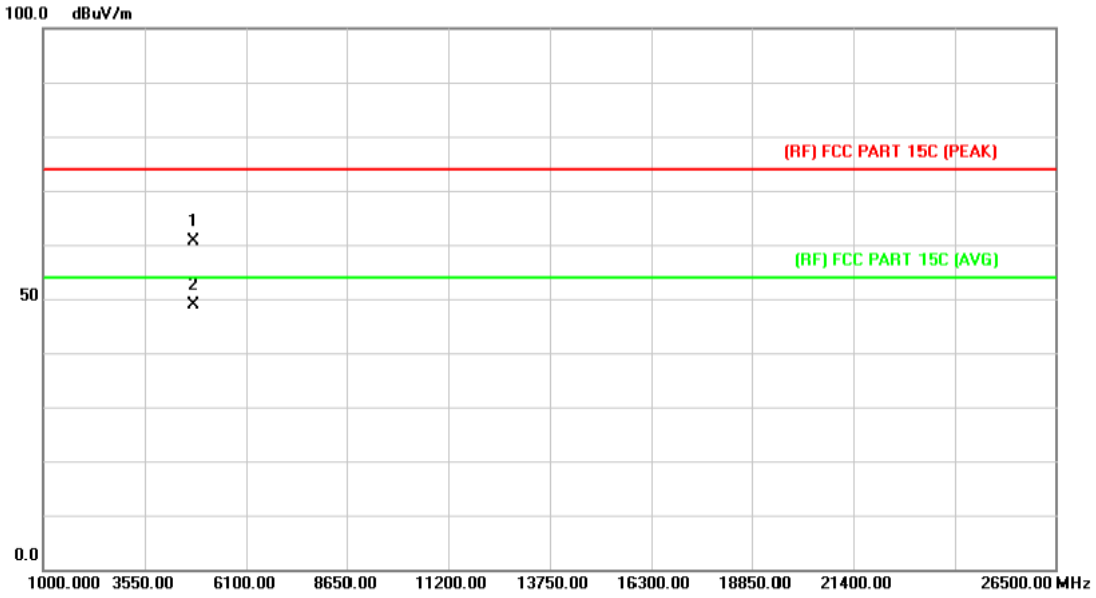
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	!	48.1625	59.64	-23.29	36.35	40.00	-3.65	QP
2	!	120.2766	59.77	-21.20	38.57	43.50	-4.93	QP
3	!	140.3420	61.18	-20.98	40.20	43.50	-3.30	QP
4	!	172.5988	58.84	-20.35	38.49	43.50	-5.01	QP
5	*	189.0740	60.36	-19.97	40.39	43.50	-3.11	QP
6	!	228.4901	59.92	-18.56	41.36	46.00	-4.64	QP

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

Emission Level= Read Level+ Correct Factor

Above 1GHz(Only worse case is reported)

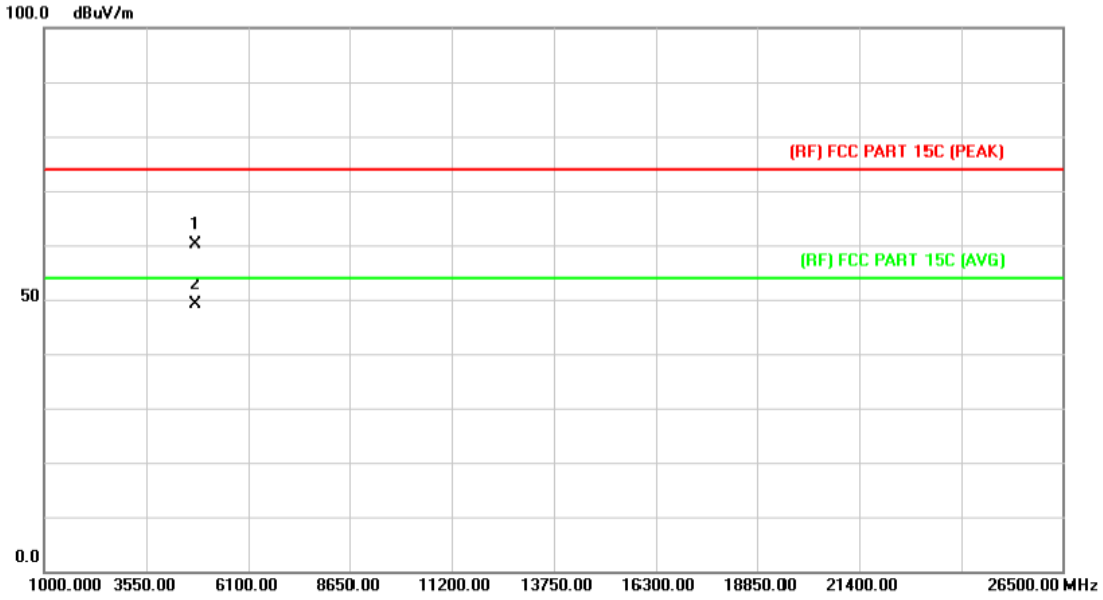
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.530	47.07	13.44	60.51	74.00	-13.49	peak
2	*	4804.056	35.34	13.44	48.78	54.00	-5.22	AVG

Emission Level= Read Level+ Correct Factor

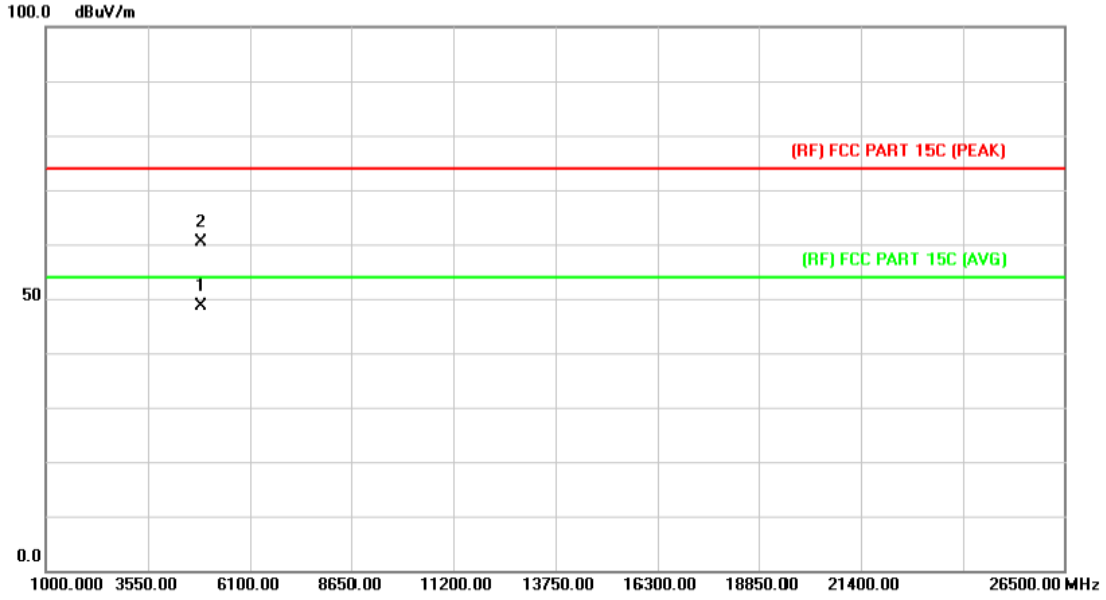
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.779	46.69	13.44	60.13	74.00	-13.87	peak
2	*	4803.961	35.74	13.44	49.18	54.00	-4.82	AVG

Emission Level= Read Level+ Correct Factor

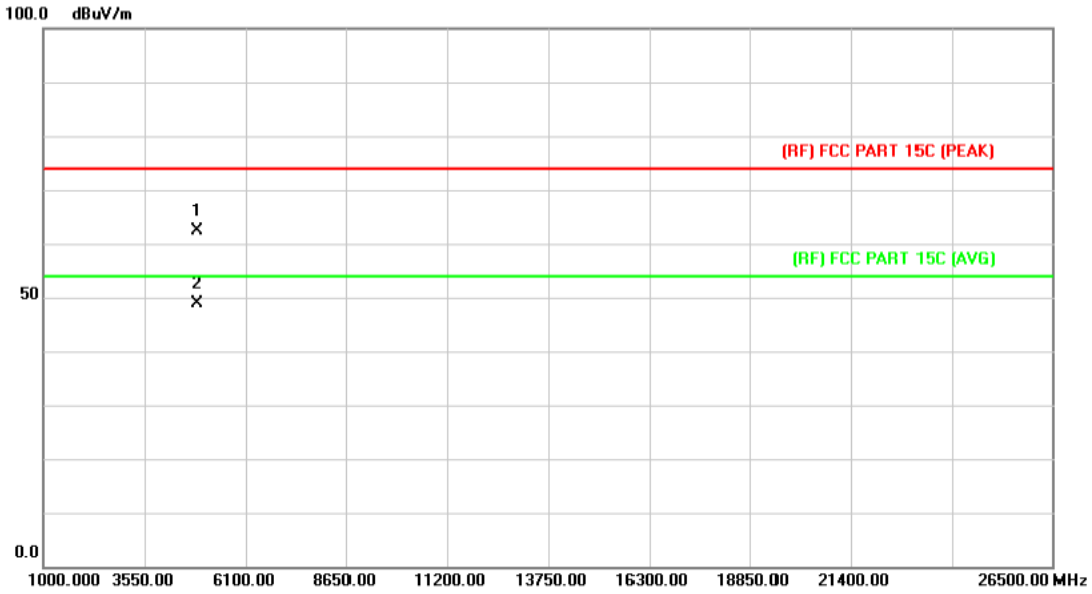
EUT:	Bluetooth speaker desk lamp	**Model Name :**	SL-9068
Temperature:	25℃	**Relative Humidity:**	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2441MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4882.140	34.77	13.90	48.67	54.00	-5.33	AVG
2		4882.458	46.56	13.90	60.46	74.00	-13.54	peak

Emission Level= Read Level+ Correct Factor

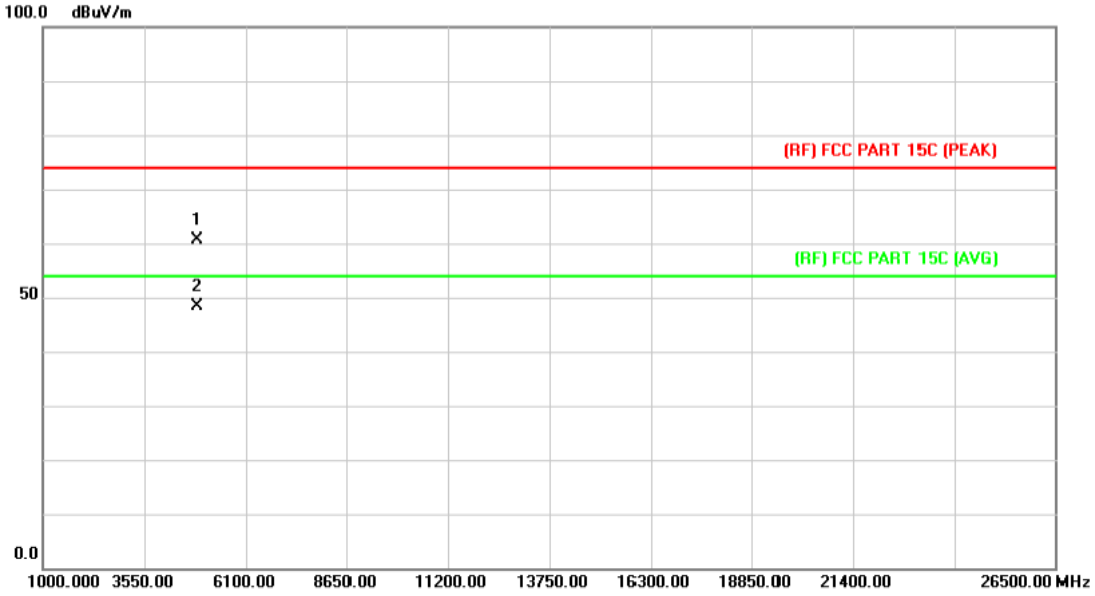
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2441MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4881.979	48.43	13.90	62.33	74.00	-11.67	peak
2	*	4881.979	34.95	13.90	48.85	54.00	-5.15	AVG

Emission Level= Read Level+ Correct Factor

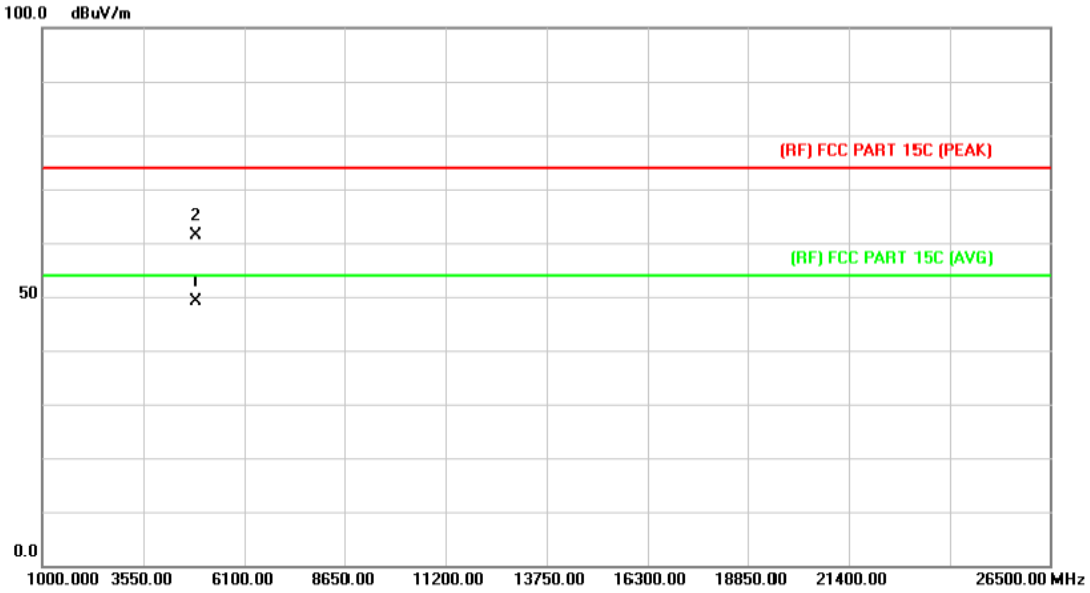
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2480MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4895.908	46.60	13.99	60.59	74.00	-13.41	peak
2	*	4896.132	34.33	13.99	48.32	54.00	-5.68	AVG

Emission Level= Read Level+ Correct Factor

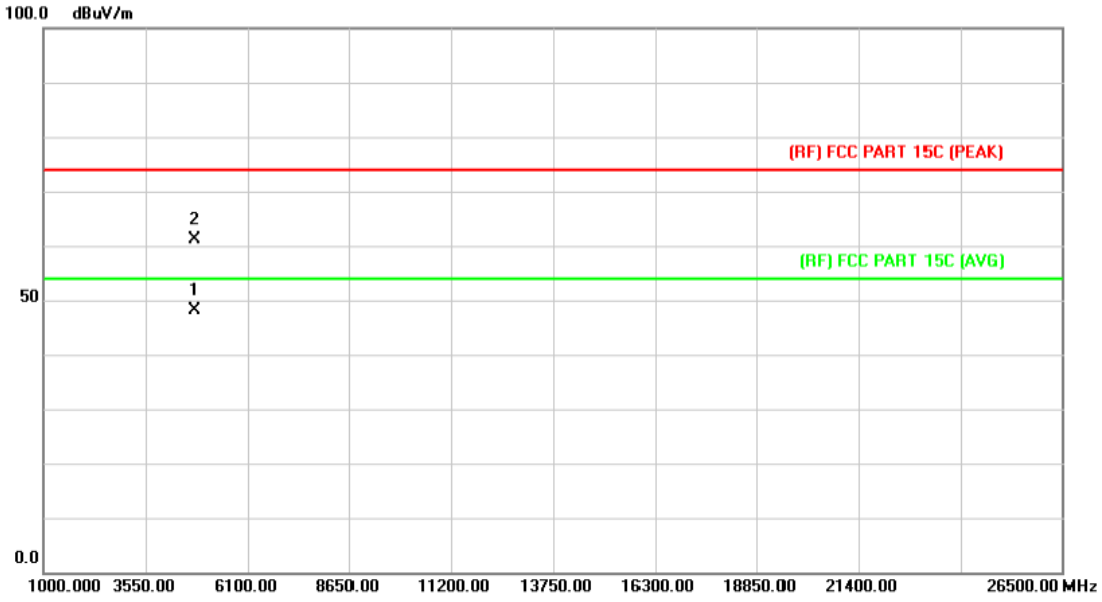
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2480MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4896.035	35.17	13.99	49.16	54.00	-4.84	AVG
2		4896.167	47.27	13.99	61.26	74.00	-12.74	peak

Emission Level= Read Level+ Correct Factor

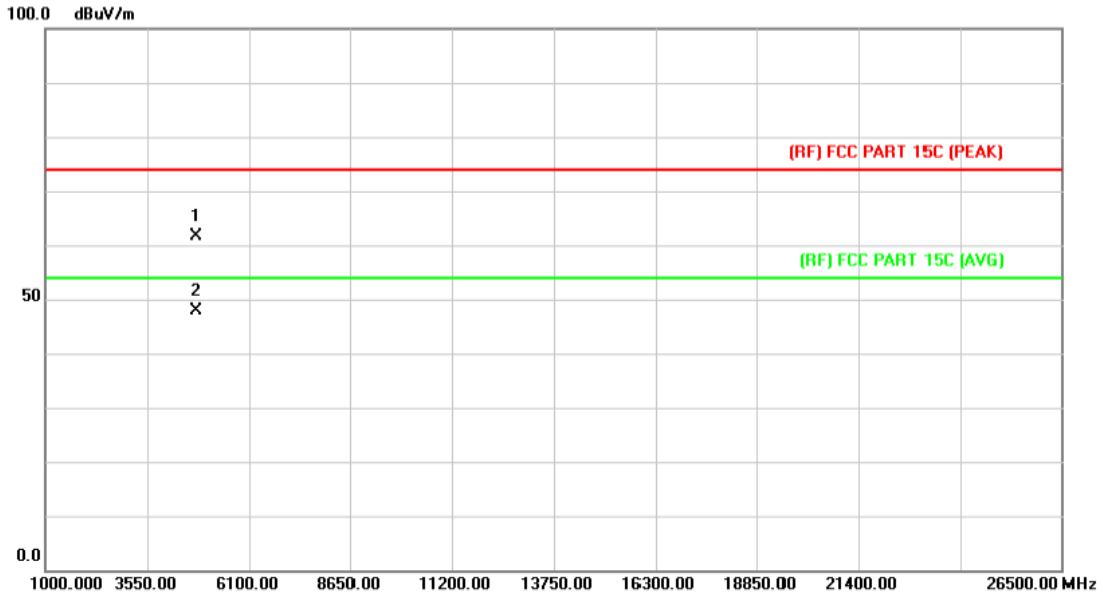
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX π/4-DQPSK Mode 2402MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4803.822	34.78	13.44	48.22	54.00	-5.78	AVG
2		4804.084	47.81	13.44	61.25	74.00	-12.75	peak

Emission Level= Read Level+ Correct Factor

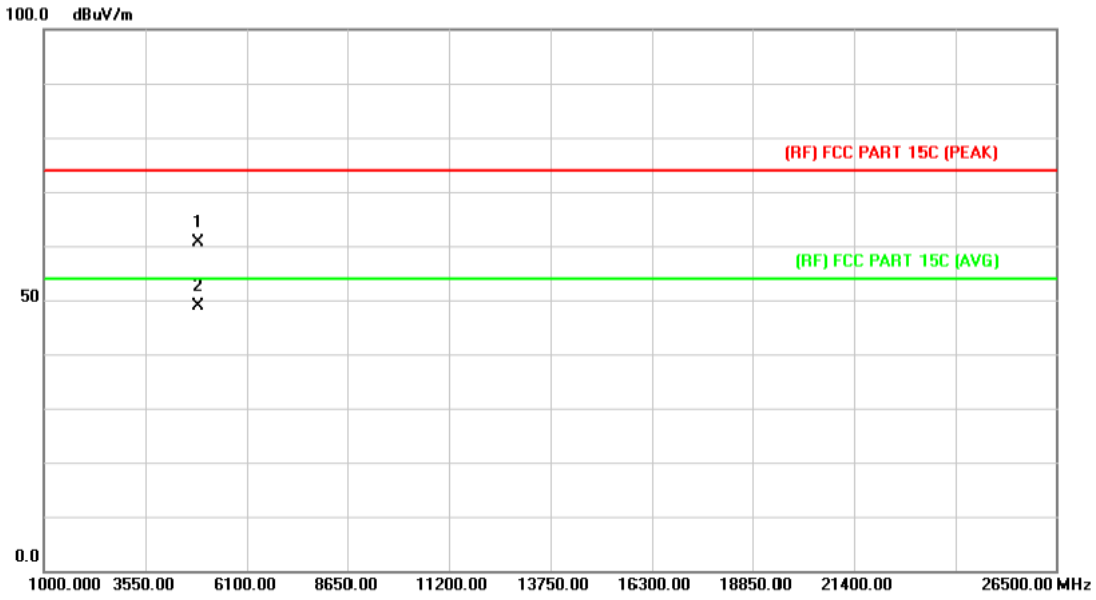
EUT:	Bluetooth speaker desk lamp	**Model Name :**	SL-9068
Temperature:	25℃	**Relative Humidity:**	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX π/4-DQPSK Mode 2402MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.763	48.09	13.44	61.53	74.00	-12.47	peak
2	*	4804.201	34.42	13.44	47.86	54.00	-6.14	AVG

Emission Level= Read Level+ Correct Factor

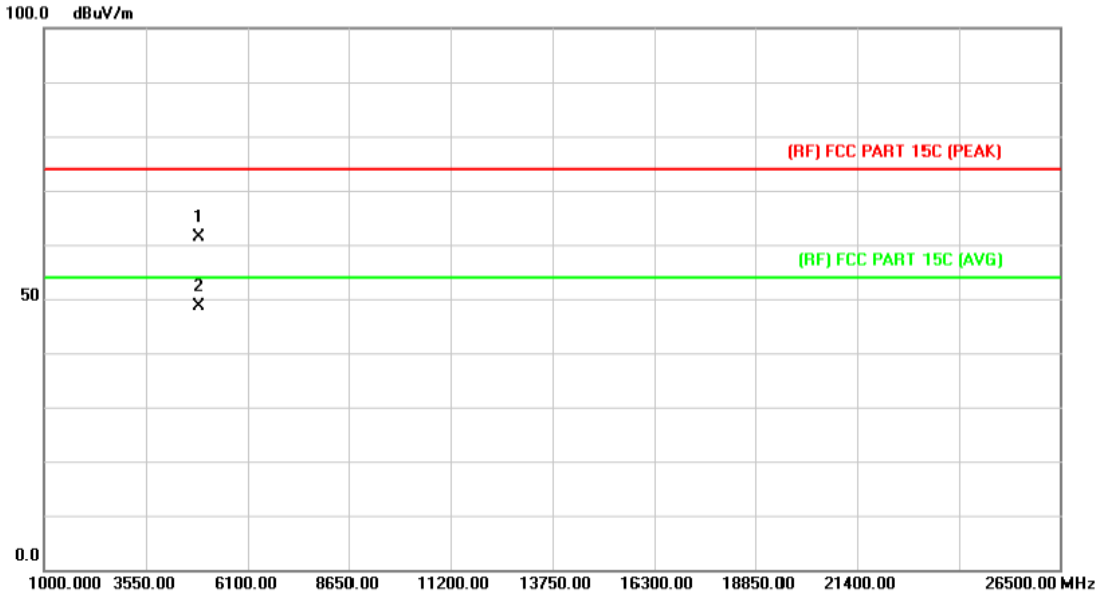
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX π/4-DQPSK Mode 2441MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4881.726	46.64	13.90	60.54	74.00	-13.46	peak
2	*	4882.205	34.87	13.90	48.77	54.00	-5.23	AVG

Emission Level= Read Level+ Correct Factor

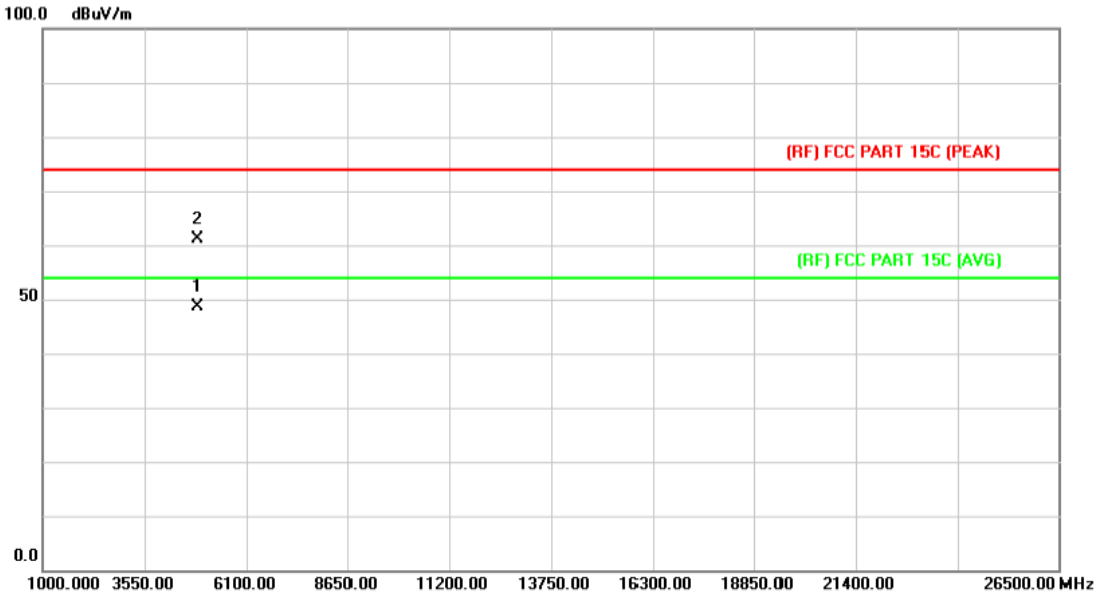
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX π/4-DQPSK Mode 2441MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4881.887	47.44	13.90	61.34	74.00	-12.66	peak
2	*	4882.243	34.72	13.90	48.62	54.00	-5.38	AVG

Emission Level= Read Level+ Correct Factor

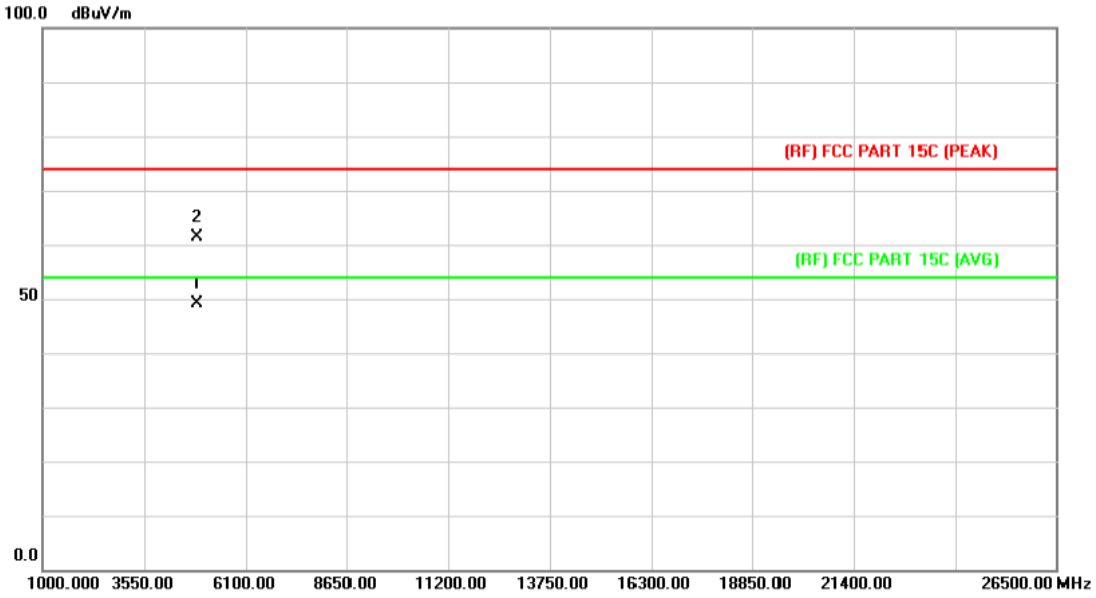
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX π/4-DQPSK Mode 2480MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4895.600	34.68	13.99	48.67	54.00	-5.33	AVG
2		4896.325	47.09	13.99	61.08	74.00	-12.92	peak

Emission Level= Read Level+ Correct Factor

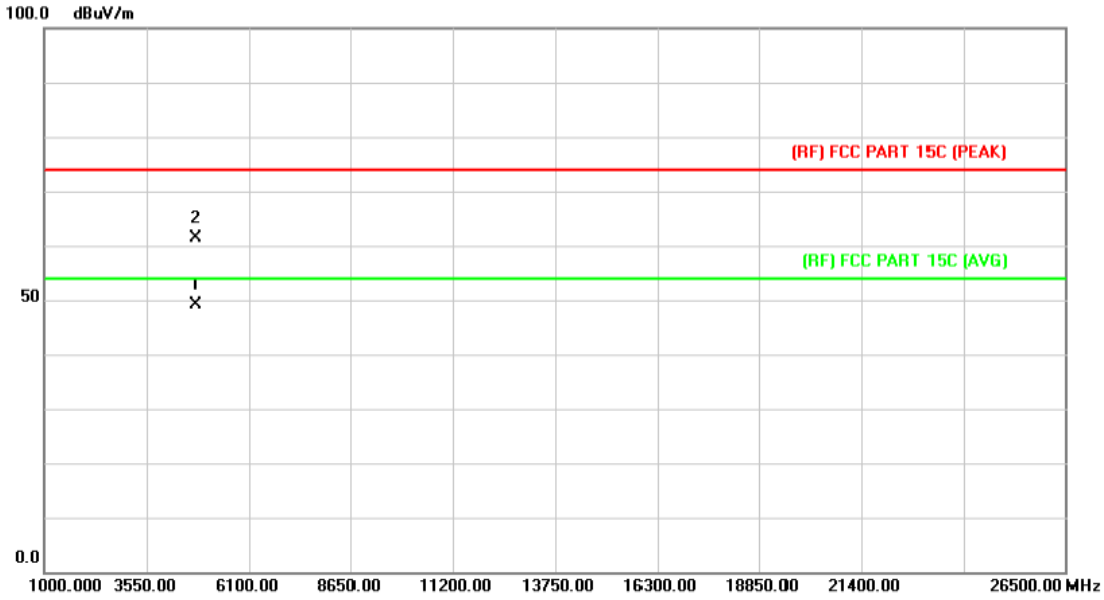
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX π/4-DQPSK Mode 2480MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4895.767	35.12	13.99	49.11	54.00	-4.89	AVG
2		4896.186	47.35	13.99	61.34	74.00	-12.66	peak

Emission Level= Read Level+ Correct Factor

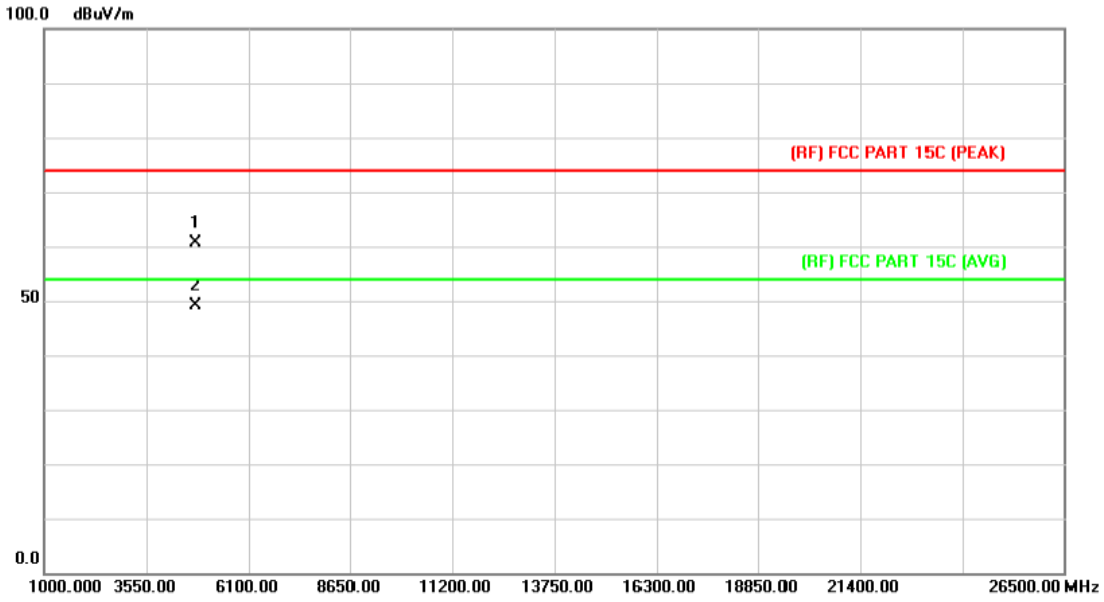
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX 8-DPSK Mode 2402MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4804.076	35.70	13.44	49.14	54.00	-4.86	AVG
2		4804.451	47.92	13.44	61.36	74.00	-12.64	peak

Emission Level= Read Level+ Correct Factor

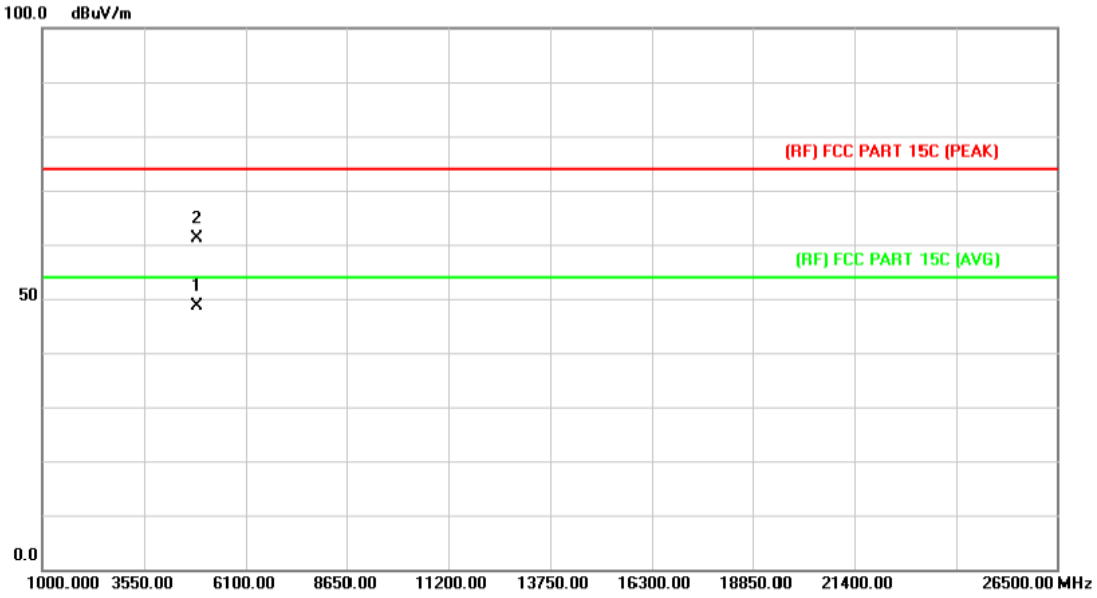
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX 8-DPSK Mode 2402MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.781	47.12	13.44	60.56	74.00	-13.44	peak
2	*	4803.976	35.79	13.44	49.23	54.00	-4.77	AVG

Emission Level= Read Level+ Correct Factor

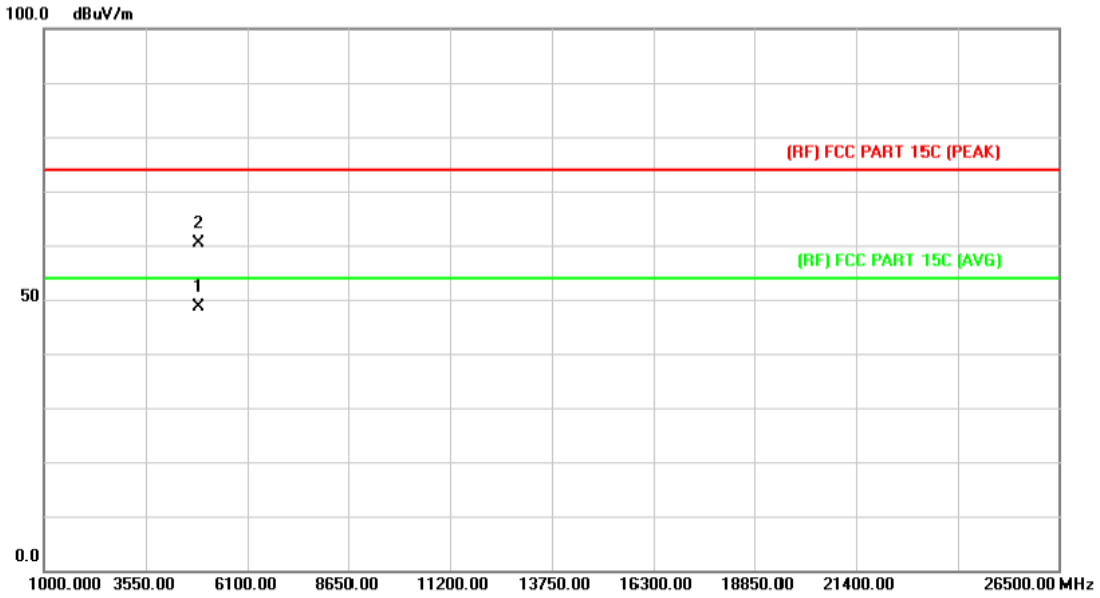
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX 8-DPSK Mode 2441MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4881.826	34.72	13.90	48.62	54.00	-5.38	AVG
2		4882.173	47.30	13.90	61.20	74.00	-12.80	peak

Emission Level= Read Level+ Correct Factor

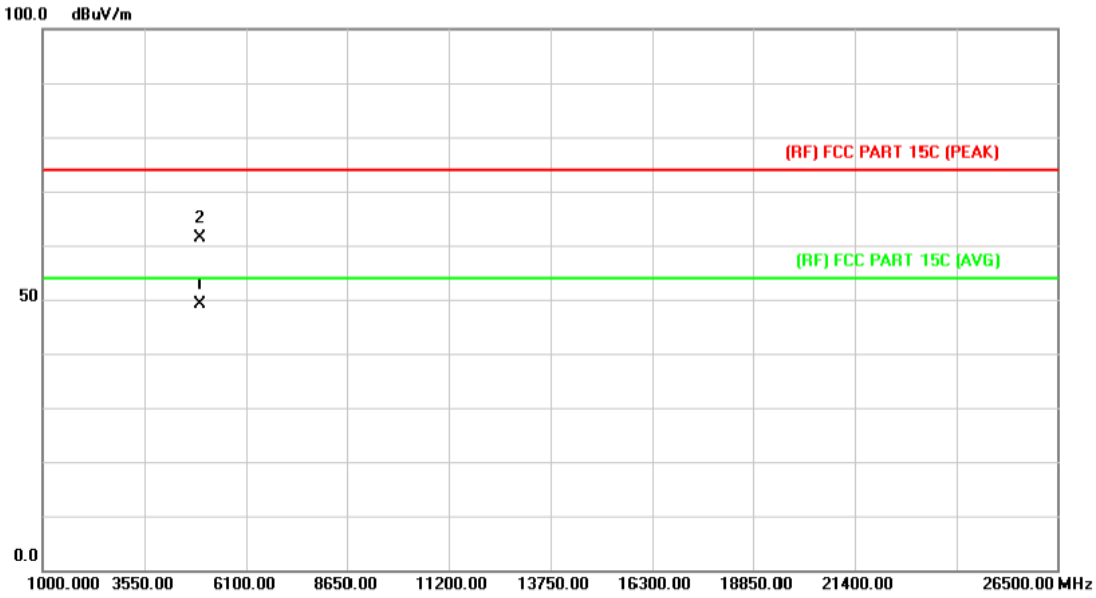
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX 8-DPSK Mode 2441MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4881.752	34.76	13.90	48.66	54.00	-5.34	AVG
2		4882.359	46.51	13.90	60.41	74.00	-13.59	peak

Emission Level= Read Level+ Correct Factor

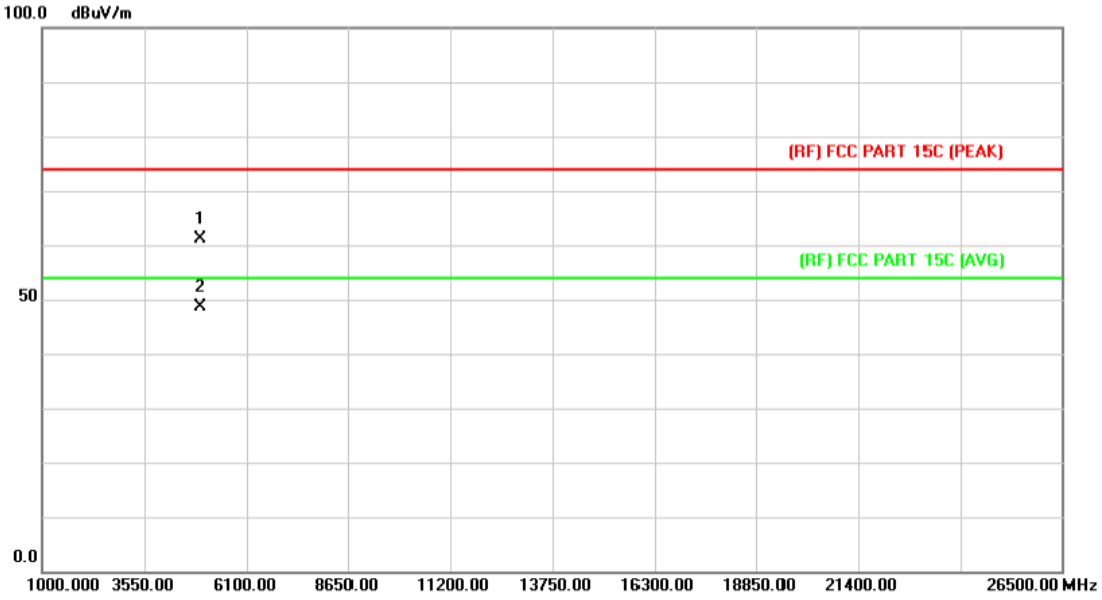
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX 8-DPSK Mode 2480MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4959.781	34.80	14.36	49.16	54.00	-4.84	AVG
2		4960.454	46.94	14.36	61.30	74.00	-12.70	peak

Emission Level= Read Level+ Correct Factor

EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX 8-DPSK Mode 2480MHz		
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	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4959.627	46.71	14.36	61.07	74.00	-12.93	peak
2	*	4960.235	34.19	14.36	48.55	54.00	-5.45	AVG

Emission Level= Read Level+ Correct Factor

6. Restricted Bands Requirement

6.1 Test Standard and Limit

6.1.1 Test Standard

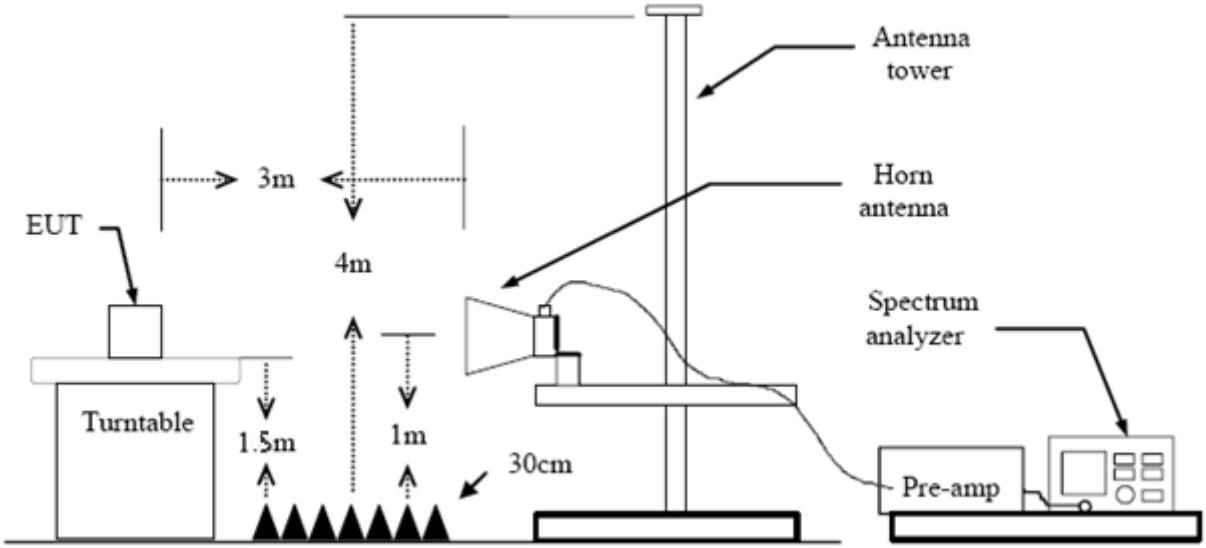
FCC Part 15.209

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 AVG Detector for Average Values.
(8) For the actual test configuration, please see the test setup photo.

6.4 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

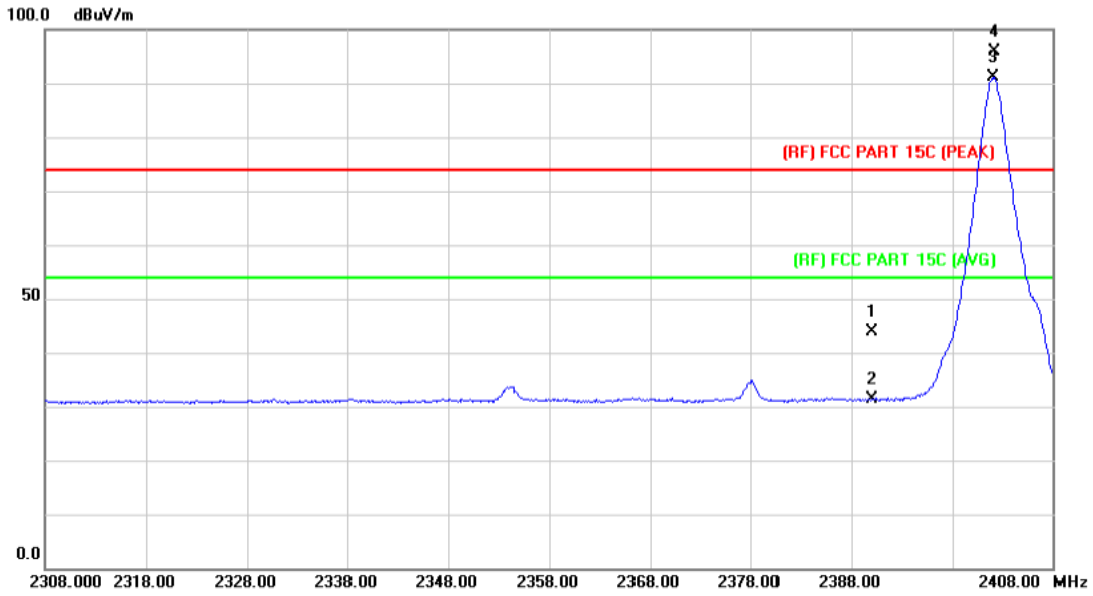
6.5 Test Data

Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

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

(1) Radiation Test

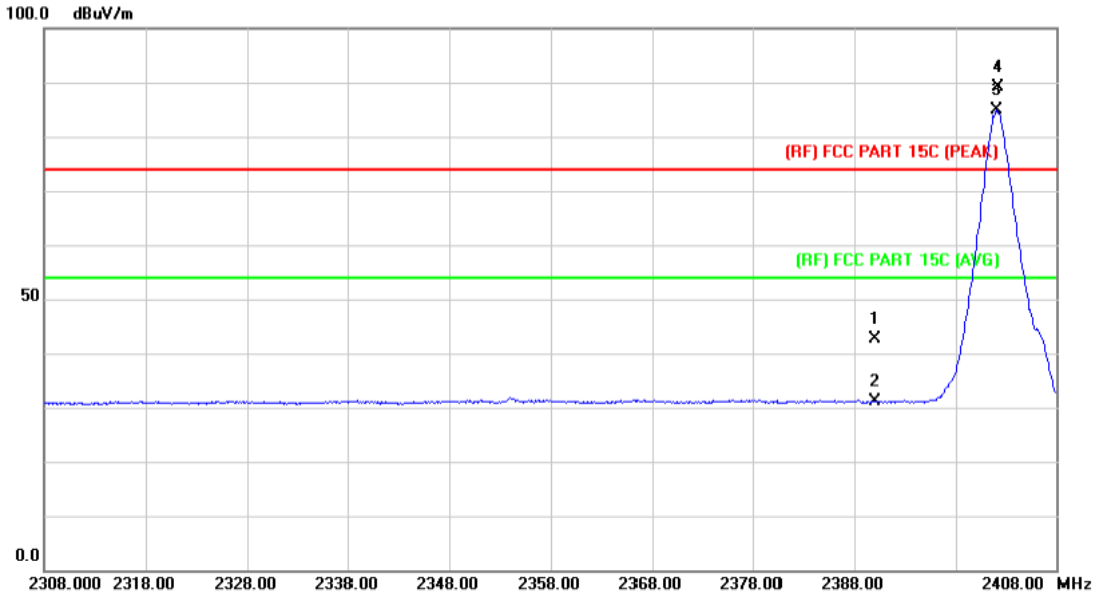
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	43.01	0.77	43.78	74.00	-30.22	peak
2		2390.000	30.66	0.77	31.43	54.00	-22.57	AVG
3	*	2402.000	90.37	0.82	91.19	Fundamental Frequency		AVG
4	X	2402.200	94.97	0.82	95.79	Fundamental Frequency		peak

Emission Level= Read Level+ Correct Factor

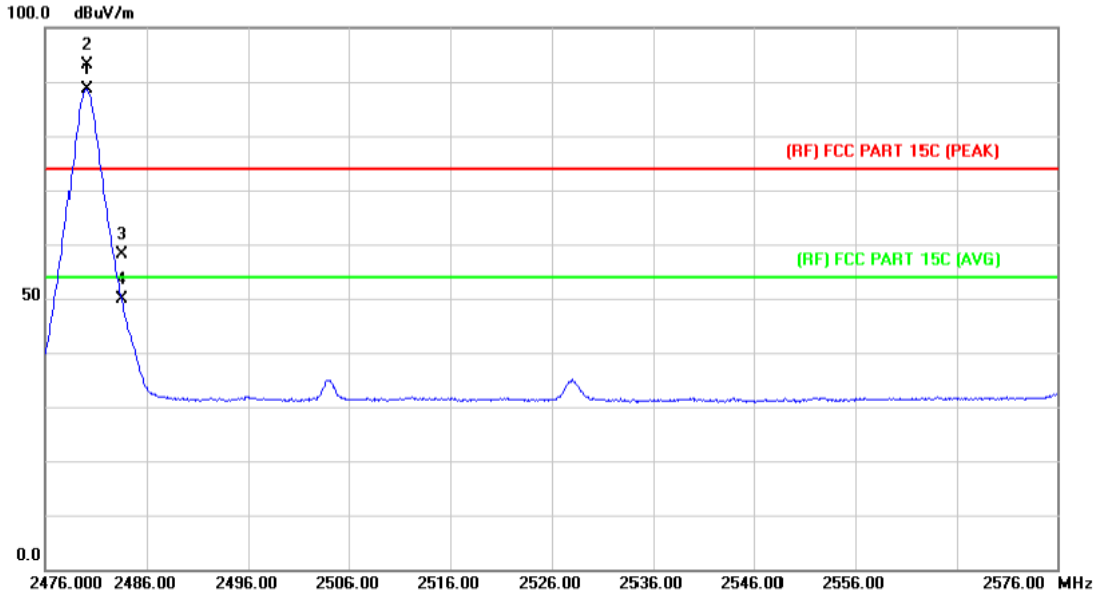
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	41.76	0.77	42.53	74.00	-31.47	peak
2		2390.000	30.32	0.77	31.09	54.00	-22.91	AVG
3	*	2402.000	84.07	0.82	84.89	Fundamental Frequency		AVG
4	X	2402.200	88.26	0.82	89.08	Fundamental Frequency		peak

Emission Level= Read Level+ Correct Factor

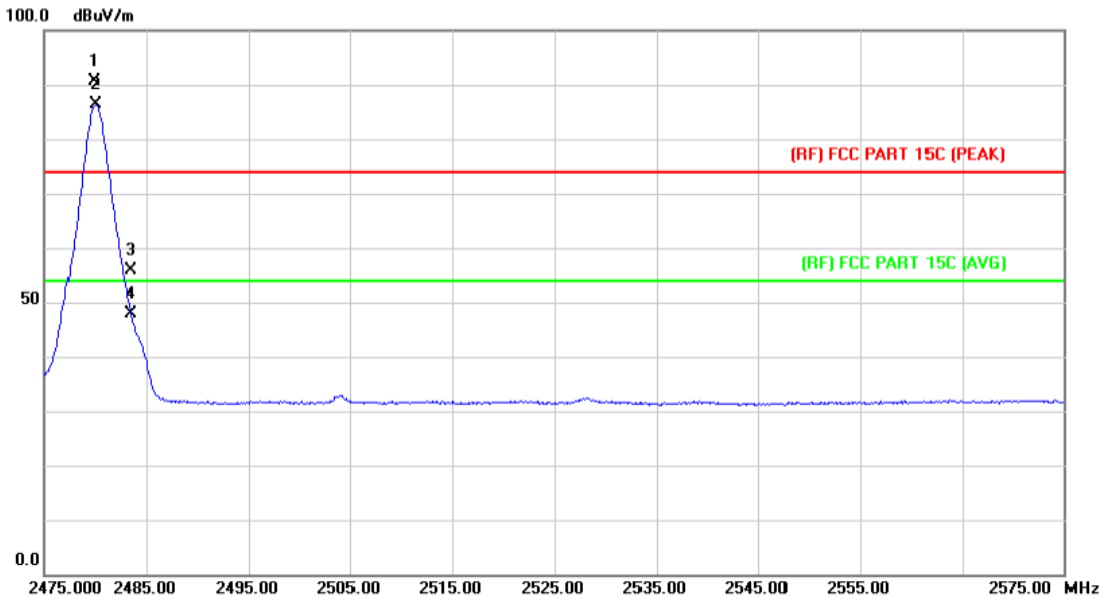
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2480 MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	2480.000	87.57	1.15	88.72	Fundamental Frequency		AVG
2	X	2480.100	91.88	1.15	93.03	Fundamental Frequency		peak
3		2483.500	56.87	1.17	58.04	74.00	-15.96	peak
4		2483.500	48.60	1.17	49.77	54.00	-4.23	AVG

Emission Level= Read Level+ Correct Factor

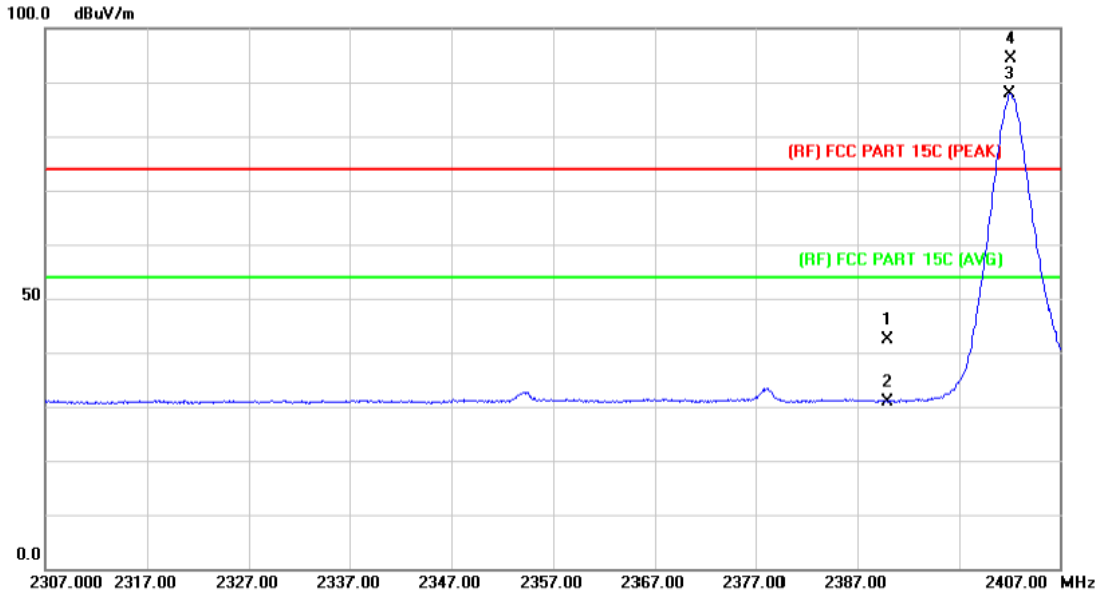
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2480 MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	X	2479.800	89.43	1.15	90.58	Fundamental Frequency		peak
2	*	2480.000	85.26	1.15	86.41	Fundamental Frequency		AVG
3		2483.500	54.64	1.17	55.81	74.00	-18.19	peak
4		2483.500	46.68	1.17	47.85	54.00	-6.15	AVG

Emission Level= Read Level+ Correct Factor

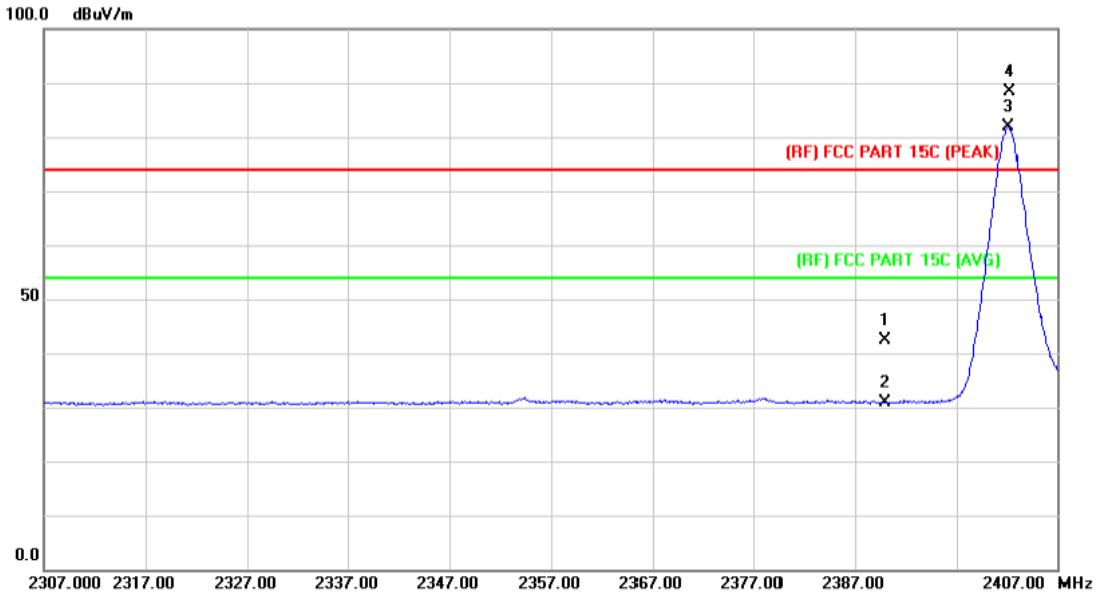
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX π/4-DQPSK Mode 2402MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	41.68	0.77	42.45	74.00	-31.55	peak
2		2390.000	30.18	0.77	30.95	54.00	-23.05	AVG
3	*	2402.000	87.10	0.82	87.92	Fundamental Frequency		AVG
4	X	2402.200	93.61	0.82	94.43	Fundamental Frequency		peak

Emission Level= Read Level+ Correct Factor

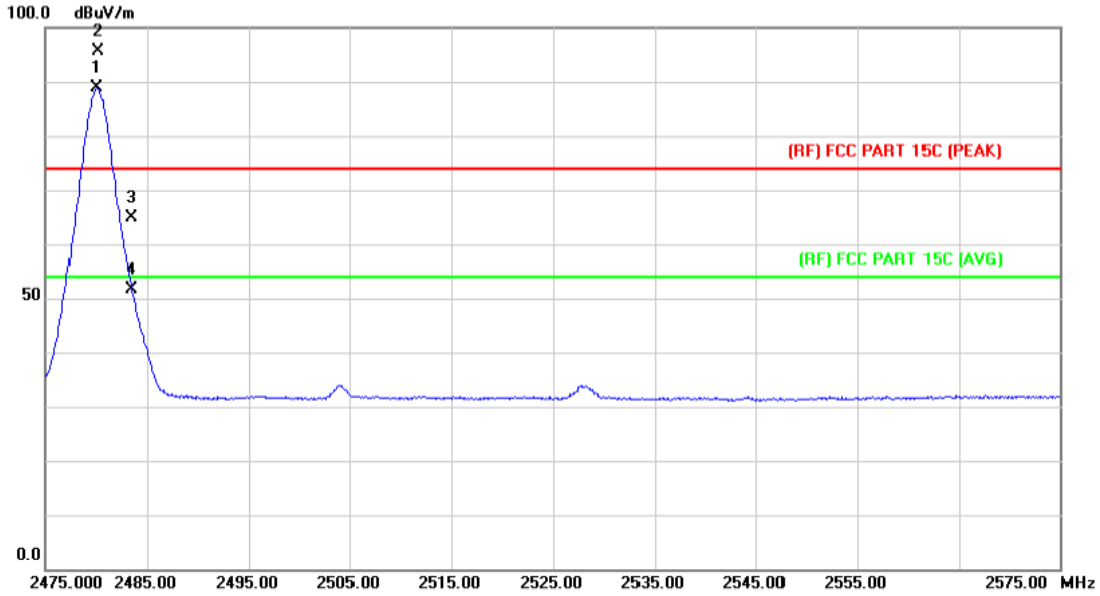
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX π/4-DQPSK Mode 2402MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	41.58	0.77	42.35	74.00	-31.65	peak
2		2390.000	30.12	0.77	30.89	54.00	-23.11	AVG
3	*	2402.200	81.08	0.82	81.90	Fundamental Frequency		AVG
4	X	2402.300	87.56	0.82	88.38	Fundamental Frequency		peak

Emission Level= Read Level+ Correct Factor

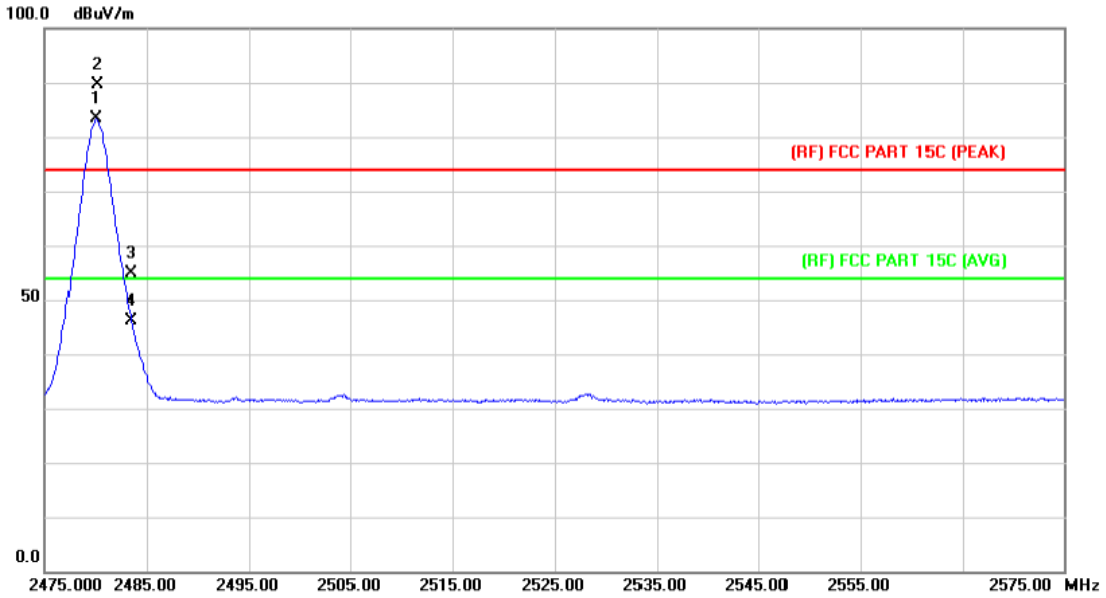
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX π/4-DQPSK Mode 2480MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	2480.000	87.66	1.15	88.81	Fundamental Frequency		AVG
2	X	2480.100	94.42	1.15	95.57	Fundamental Frequency		peak
3		2483.500	63.76	1.17	64.93	74.00	-9.07	peak
4		2483.500	50.55	1.17	51.72	54.00	-2.28	AVG

Emission Level= Read Level+ Correct Factor

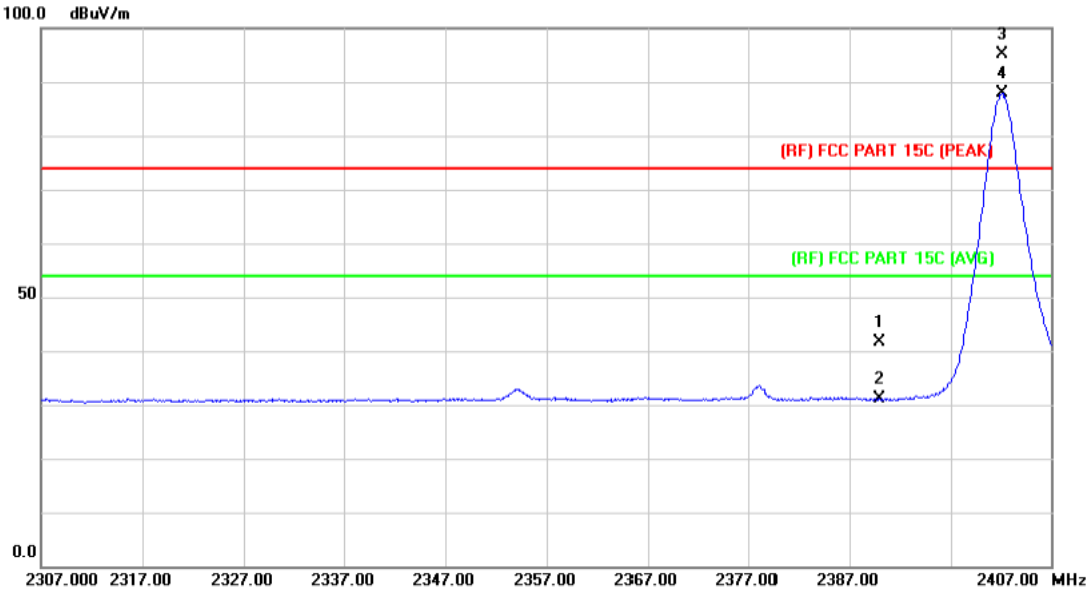
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX π/4-DQPSK Mode 2480MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	2480.000	82.32	1.15	83.47	Fundamental Frequency		AVG
2	X	2480.200	88.53	1.15	89.68	Fundamental Frequency		peak
3		2483.500	53.80	1.17	54.97	74.00	-19.03	peak
4		2483.500	44.92	1.17	46.09	54.00	-7.91	AVG

Emission Level= Read Level+ Correct Factor

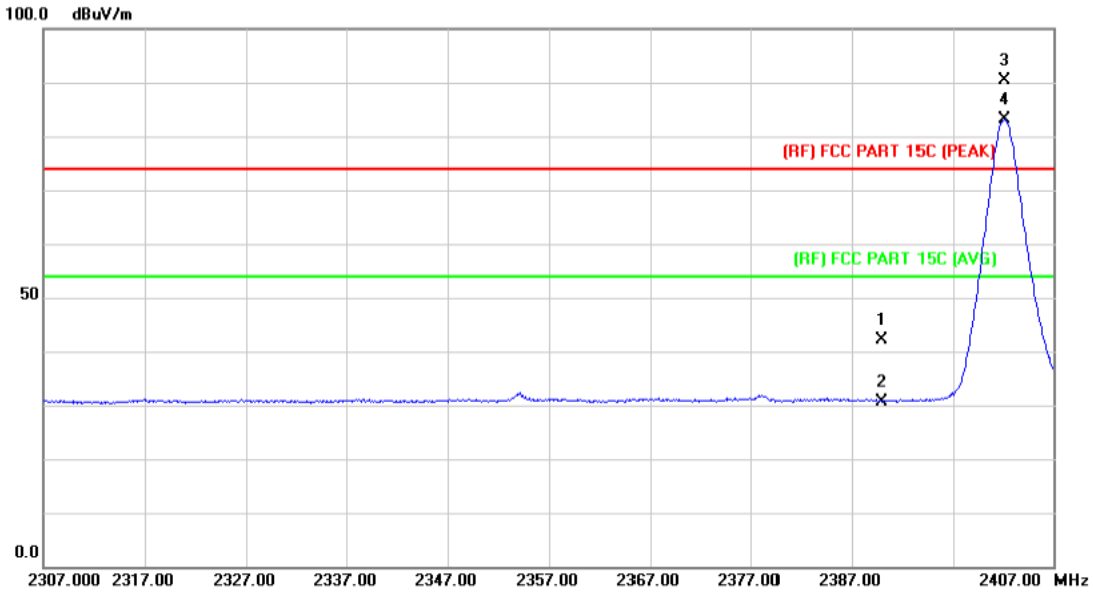
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX 8-DPSK Mode 2402MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	40.78	0.77	41.55	74.00	-32.45	peak
2		2390.000	30.35	0.77	31.12	54.00	-22.88	AVG
3	X	2402.100	94.25	0.82	95.07	Fundamental Frequency		peak
4	*	2402.100	87.07	0.82	87.89	Fundamental Frequency		AVG

Emission Level= Read Level+ Correct Factor

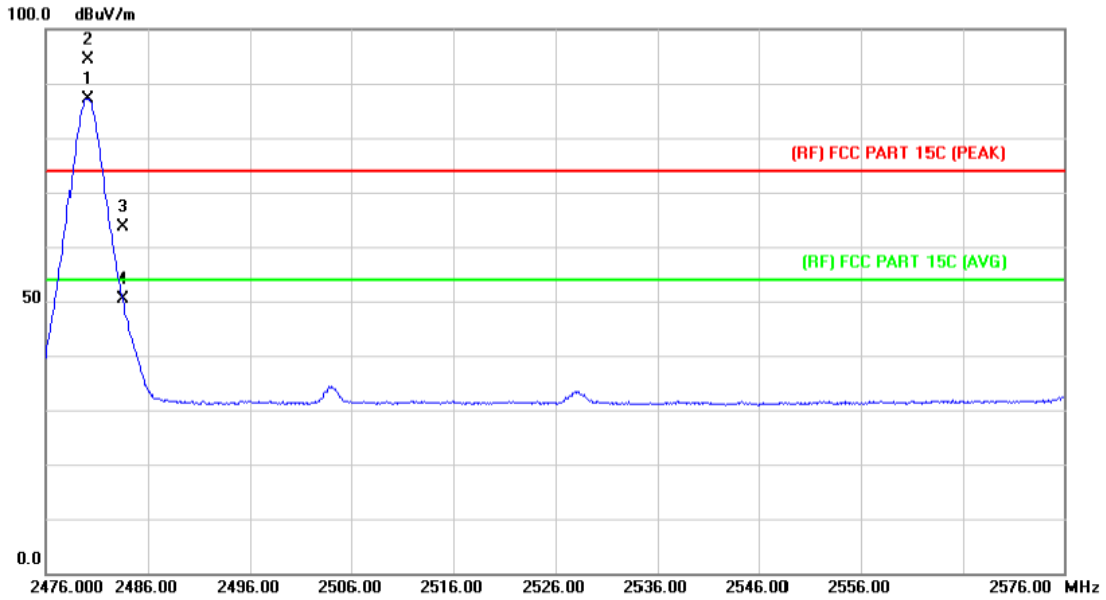
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX 8-DPSK Mode 2402MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	41.39	0.77	42.16	74.00	-31.84	peak
2		2390.000	29.91	0.77	30.68	54.00	-23.32	AVG
3	X	2402.100	89.44	0.82	90.26	Fundamental Frequency		peak
4	*	2402.200	82.38	0.82	83.20	Fundamental Frequency		AVG

Emission Level= Read Level+ Correct Factor

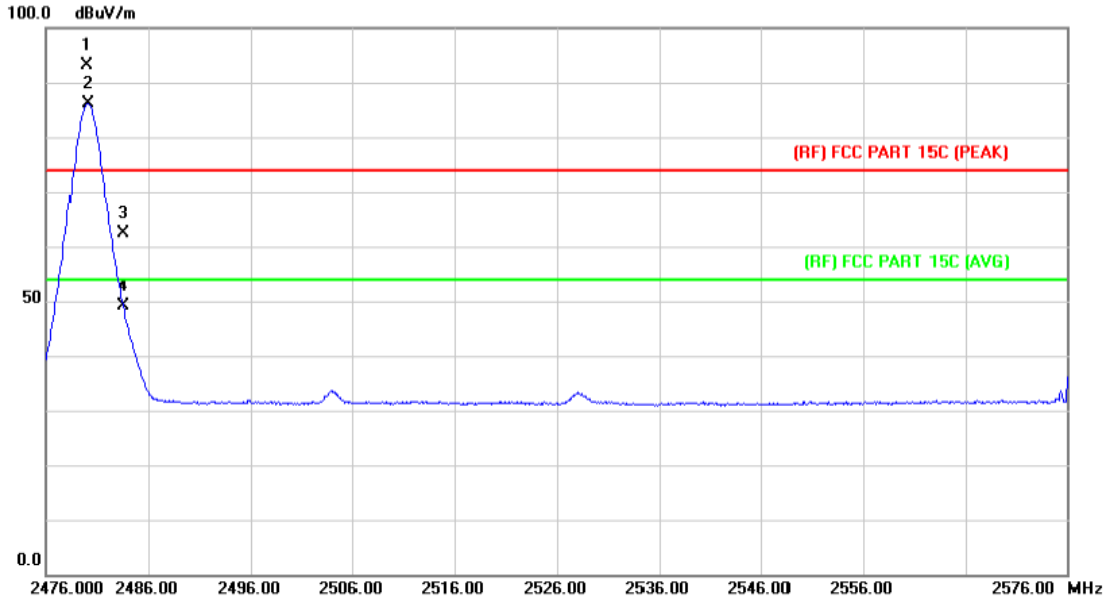
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX 8-DPSK Mode 2480MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	2480.000	86.07	1.15	87.22	Fundamental Frequency		AVG
2	X	2480.100	93.18	1.15	94.33	Fundamental Frequency		peak
3		2483.500	62.52	1.17	63.69	74.00	-10.31	peak
4		2483.500	49.25	1.17	50.42	54.00	-3.58	AVG

Emission Level= Read Level+ Correct Factor

EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX 8-DPSK Mode 2480MHz		
Remark:	Only worse case is reported		

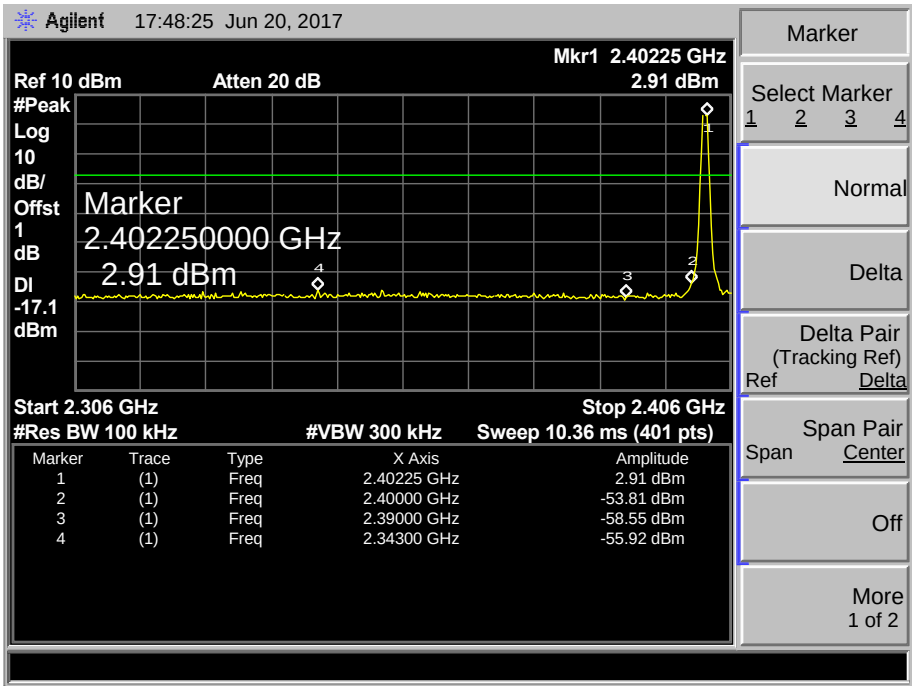


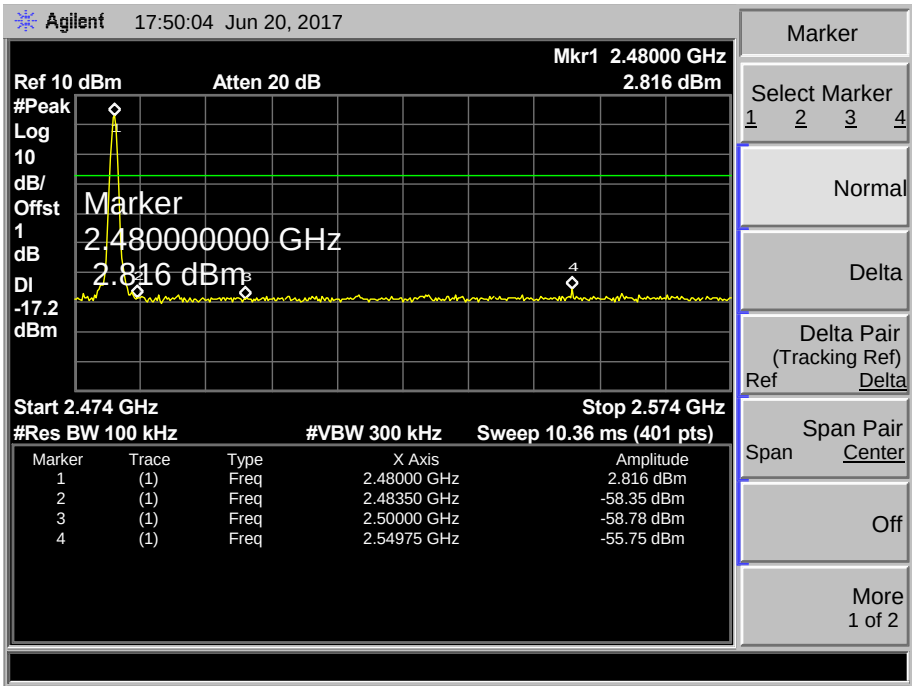
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	X	2479.900	91.97	1.15	93.12	Fundamental Frequency		peak
2	*	2480.000	85.06	1.15	86.21	Fundamental Frequency		AVG
3		2483.500	61.12	1.17	62.29	74.00	-11.71	peak
4		2483.500	48.08	1.17	49.25	54.00	-4.75	AVG

Emission Level= Read Level+ Correct Factor

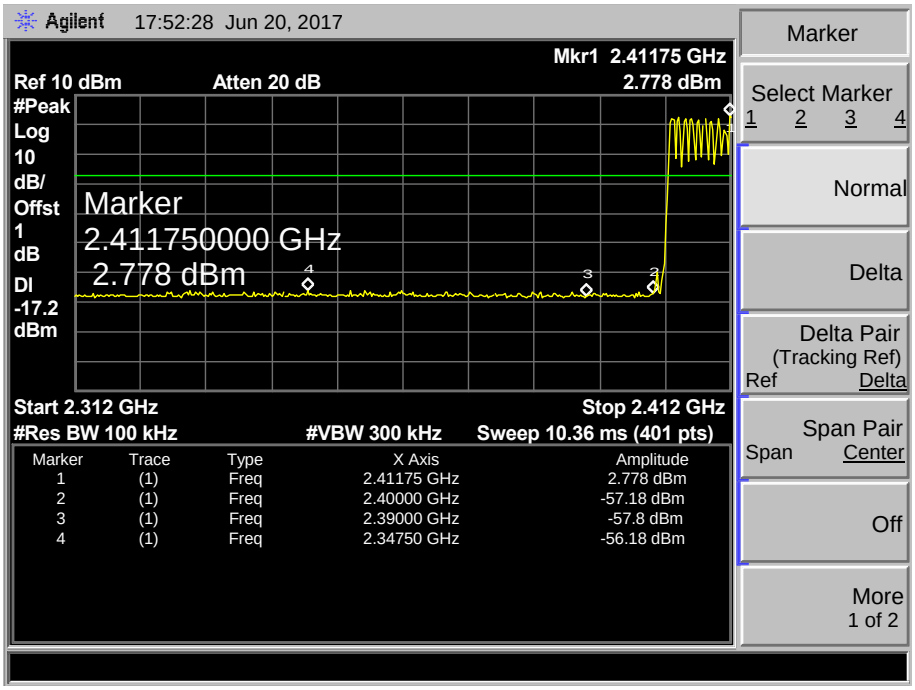
(2) Conducted Test

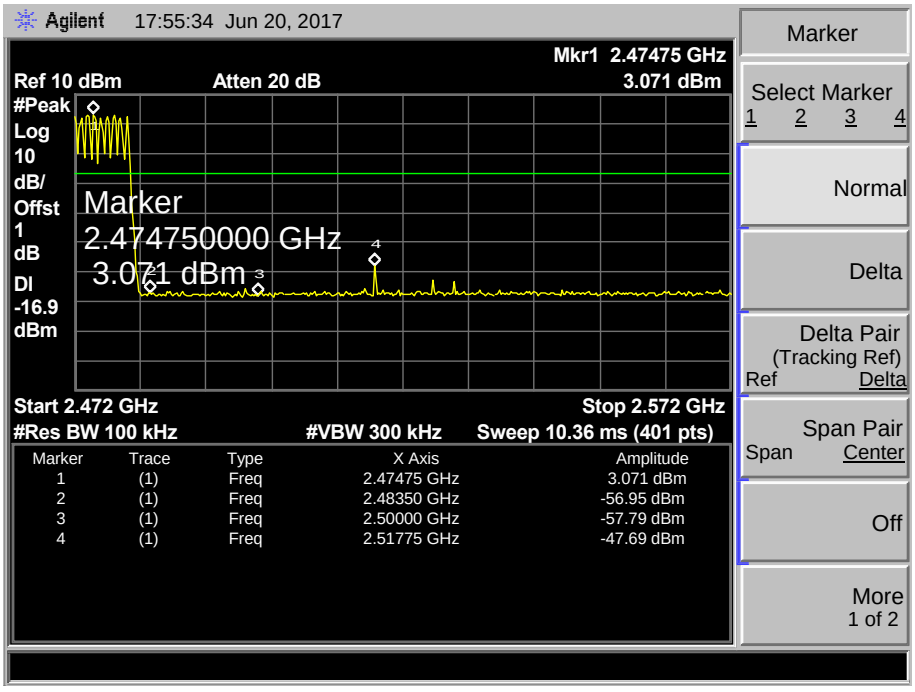
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	TX GFSK Mode 2402MHz/2480 MHz		
Remark:	Only worse case is reported		



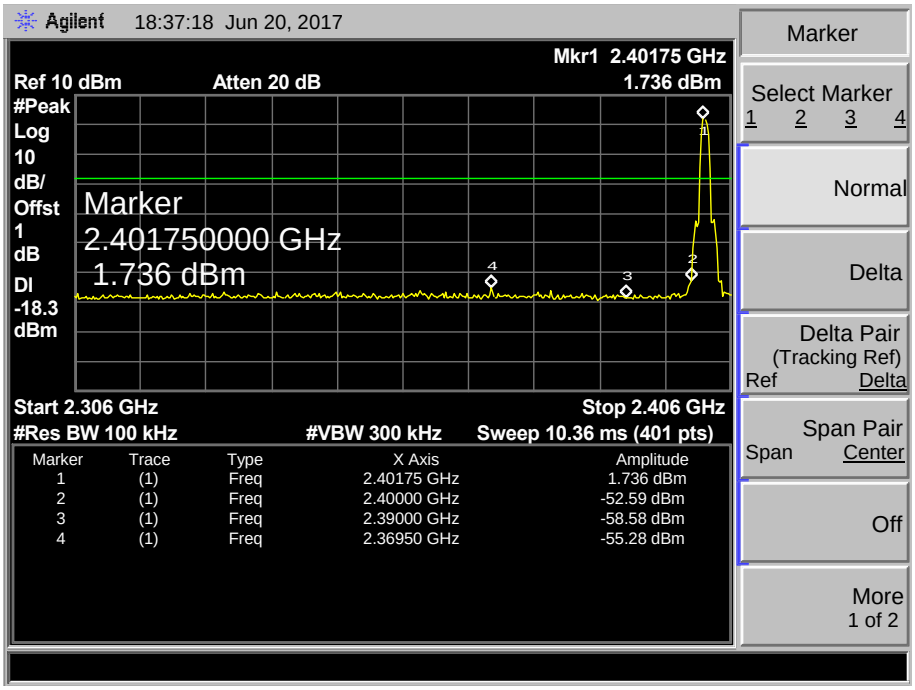


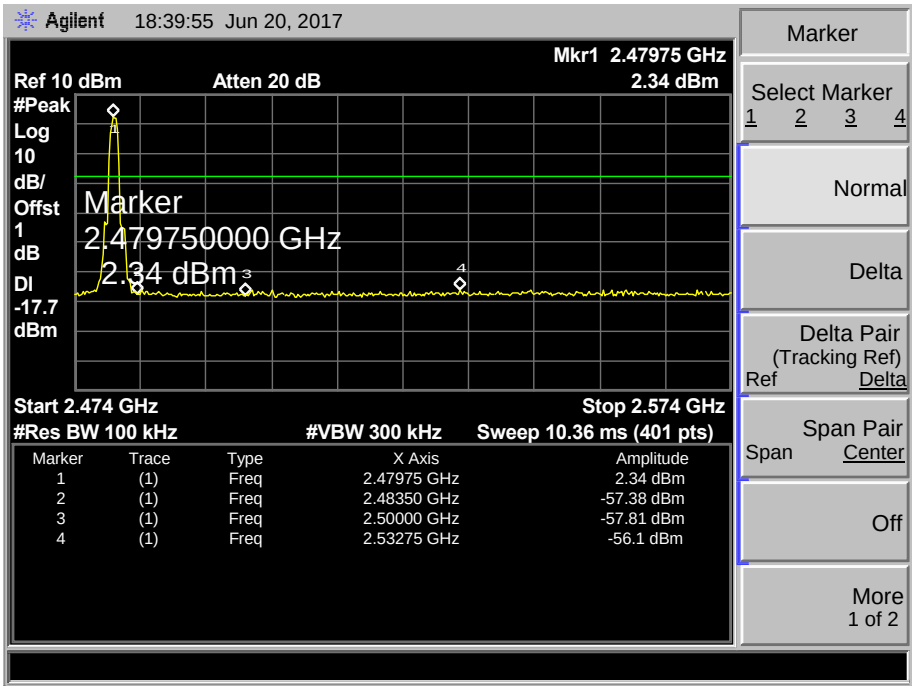
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	GFSK Hopping Mode		
Remark:	Only worse case is reported		



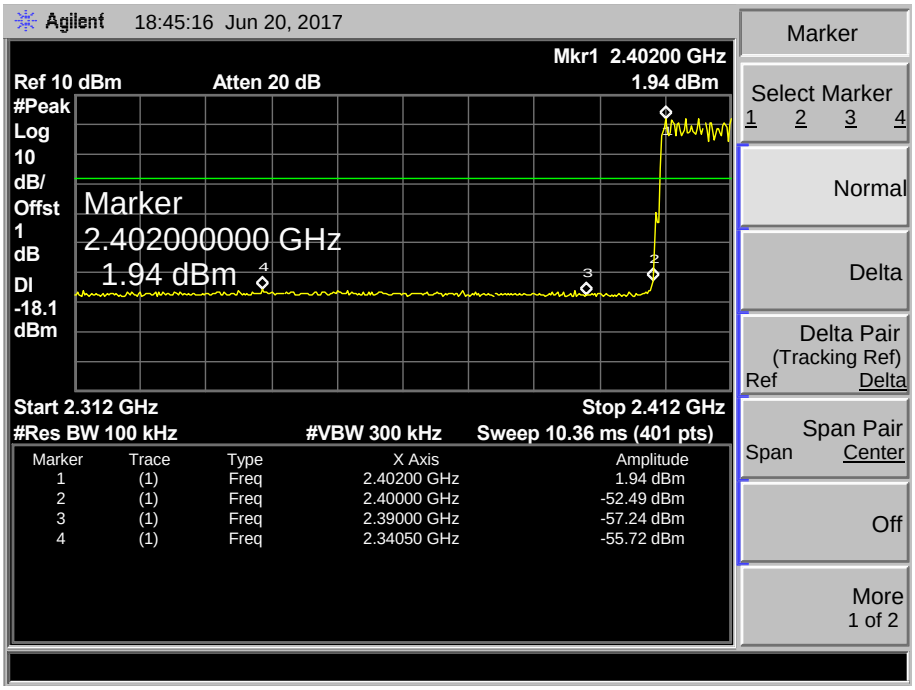


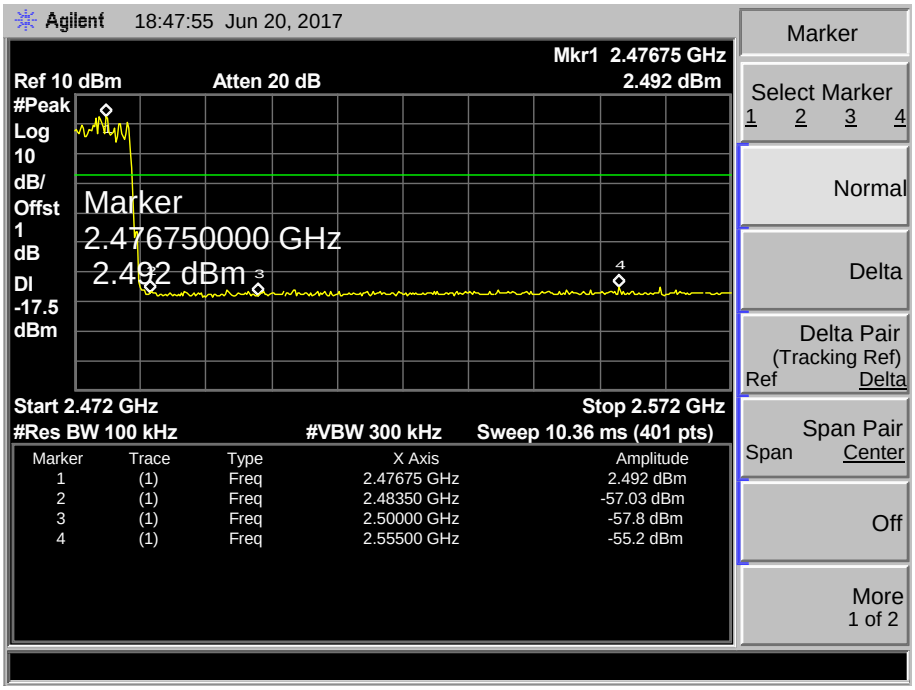
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	TX π /4-DQPSK Mode 2402MHz/2480 MHz		
Remark:	Only worse case is reported		



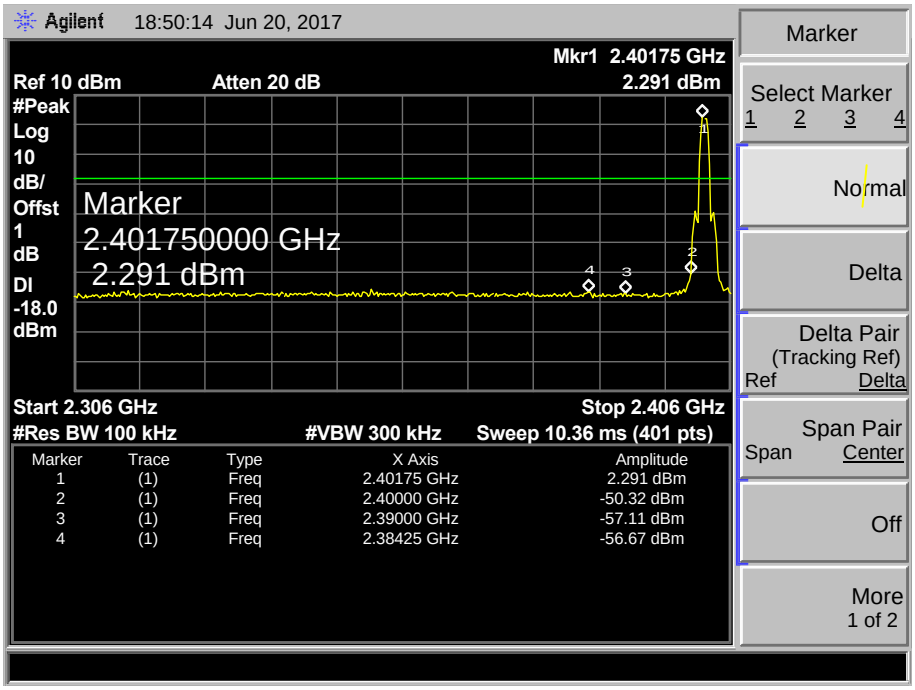


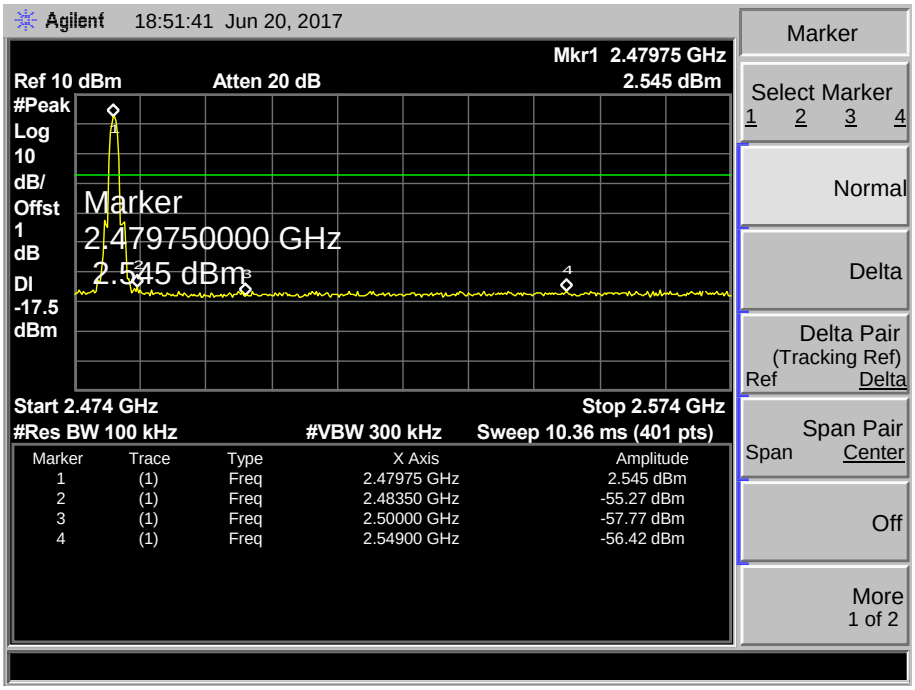
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	π/4-DQPSK Hopping Mode		
Remark:	Only worse case is reported		



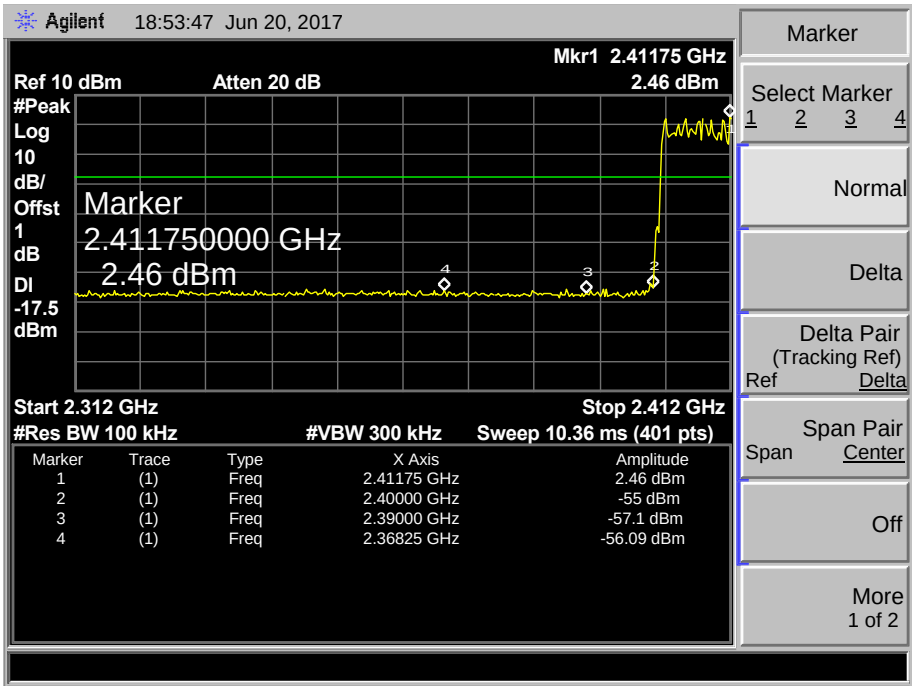


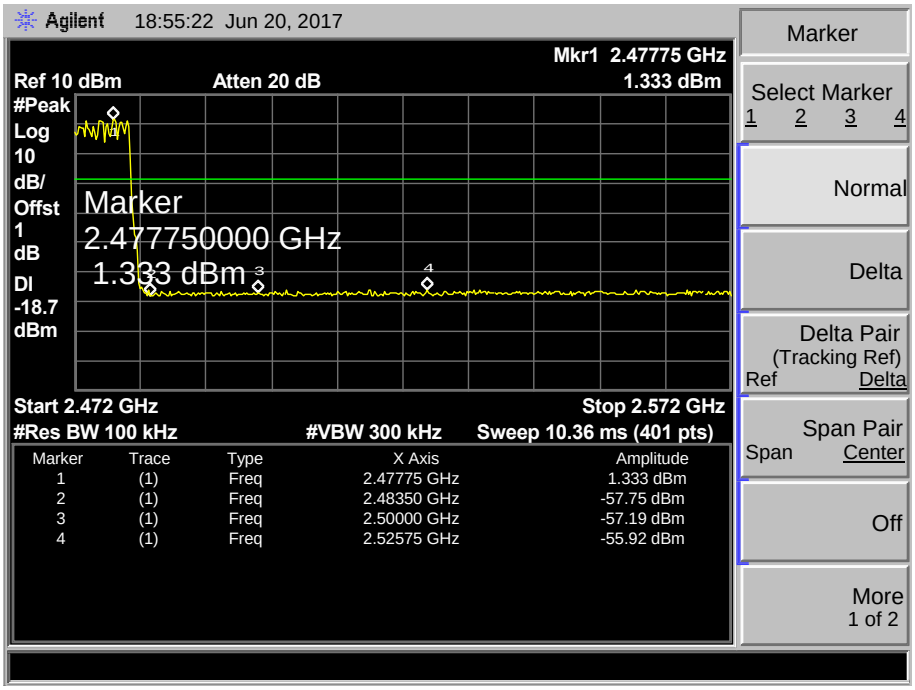
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	TX 8-DPSK Mode 2402MHz/2480 MHz		
Remark:	Only worse case is reported		





EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	8-DPSK Hopping Mode		
Remark:	Only worse case is reported		





7. Number of Hopping Channel

7.1 Test Standard and Limit

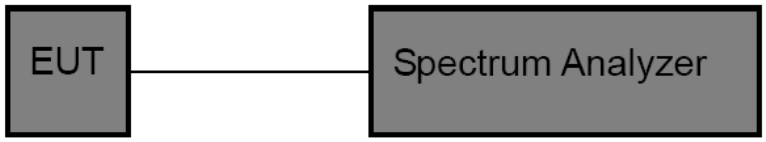
6.1.1 Test Standard

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

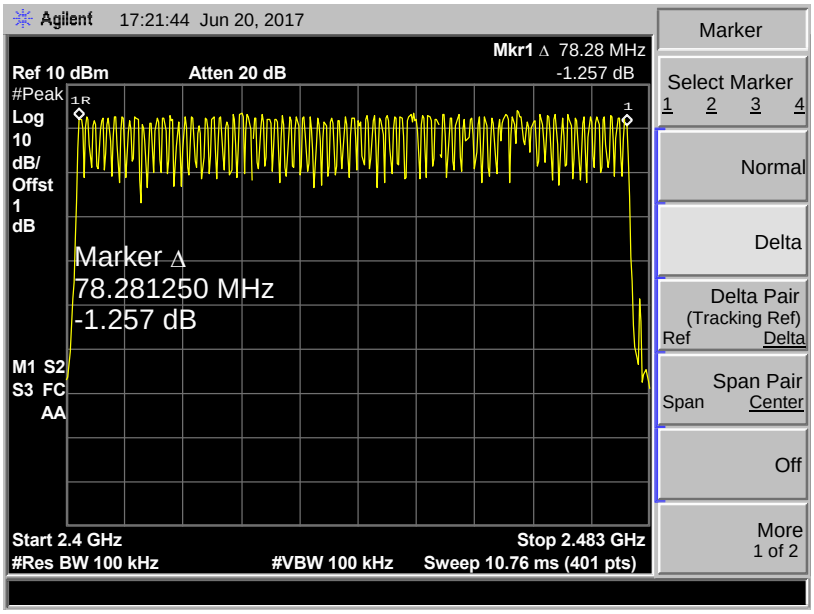
The EUT was set to the Hopping Mode by the Customer.

7.5 Test Data

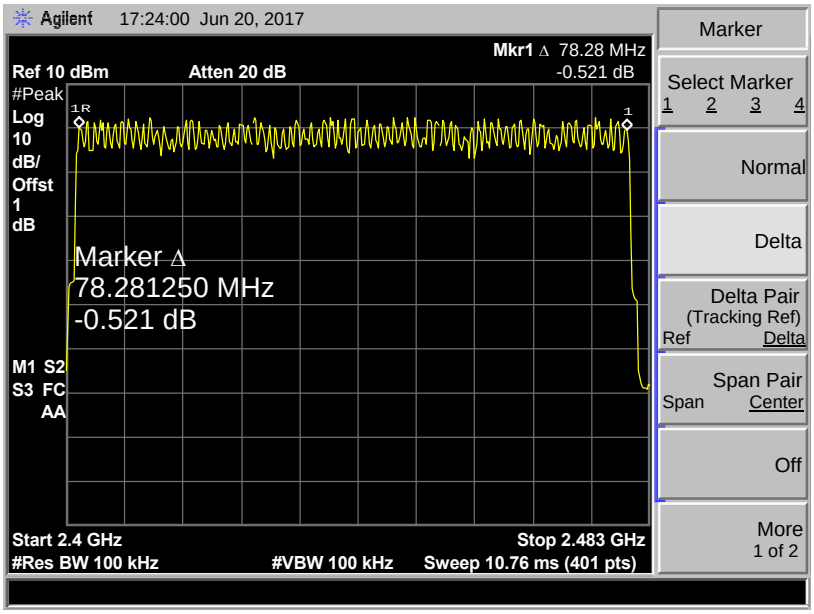
EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	Hopping Mode		

Frequency Range	Test Mode	Quantity of Hopping Channel	Limit
2402MHz~2480MHz	GFSK	79	>15
	π /4-DQPSK	79	
	8-DPSK	79	

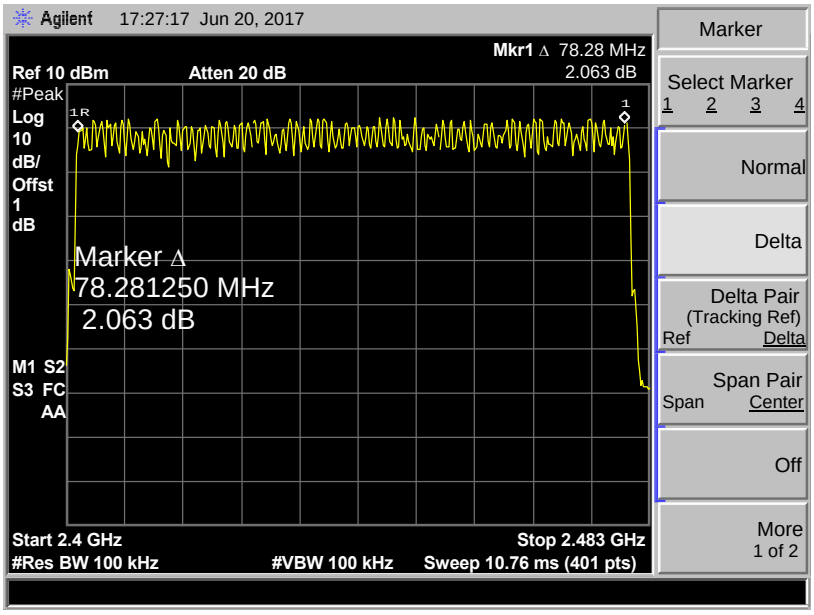
GFSK Mode



π /4-DQPSK Mode



8-DPSK Mode


Agilent 17:27:17 Jun 20, 2017
Mkr1 Δ 78.28 MHz
2.063 dB
Ref 10 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
1
dB
Marker Δ
78.281250 MHz
2.063 dB
M1 S2
S3 FC
AA
Start 2.4 GHz
#Res BW 100 kHz
#VBW 100 kHz
Stop 2.483 GHz
Sweep 10.76 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

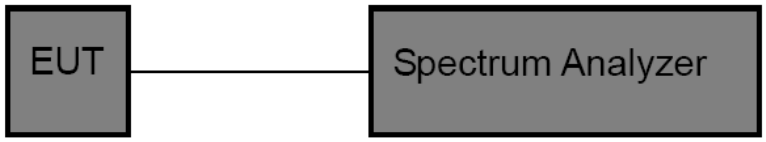
8. Average Time of Occupancy

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 247 Issue 2	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 average time of occupancy on any channel within the Period can be calculated with formulas:
{Total of Dwell} = {Pulse Time} * (1600 / X) / {Number of Hopping Frequency} * {Period}
{Period} = 0.4s * {Number of Hopping Frequency}
Note: X=2 or 4 or 6 (1DH1=2, 1DH3=4, 1DH5=6. 2DH1=2, 2DH3=4, 2DH5=6. 3DH1=2, 3DH3=4, 3DH5=6)
The lowest, middle and highest channels are selected to perform testing to record the dwell time of each occupation measured in this channel, which is called Pulse Time here.

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

8.5 Test Data

EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	Hopping Mode (GFSK)		

Test Mode	Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
1DH1	2441	0.40	128.00	31.60	**400**	**PASS**
1DH3	2441	1.65	264.00	31.60	**400**	**PASS**
1DH5	2441	2.91	310.40	31.60	**400**	**PASS**

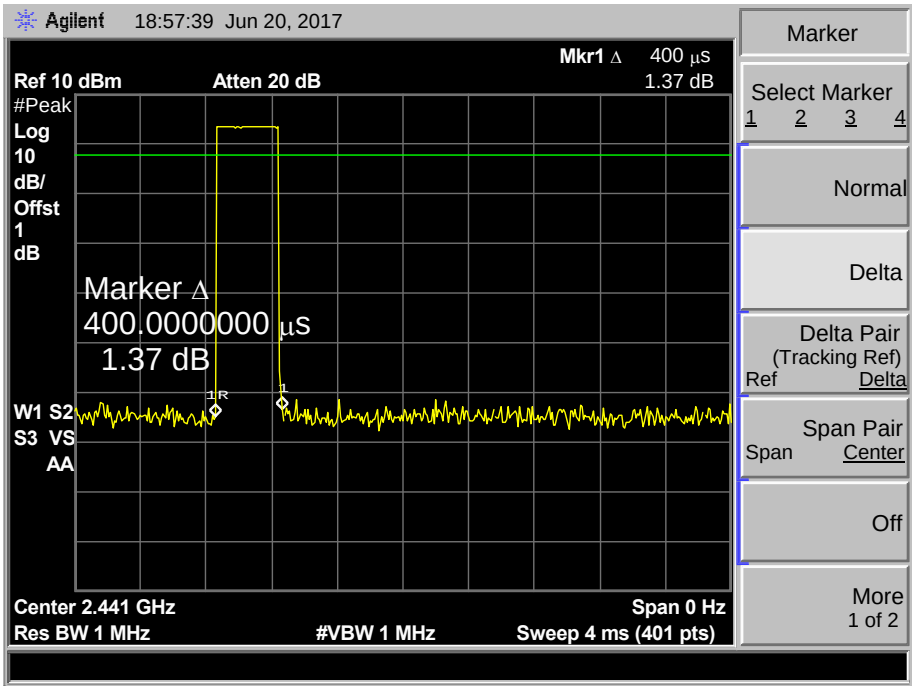
1DH1 Total of Dwell= Pulse Time(1600/2)*31.6/79*

1DH3 Total of Dwell= Pulse Time(1600/4)*31.6/79*

1DH5 Total of Dwell= Pulse Time(1600/6)*31.6/79*

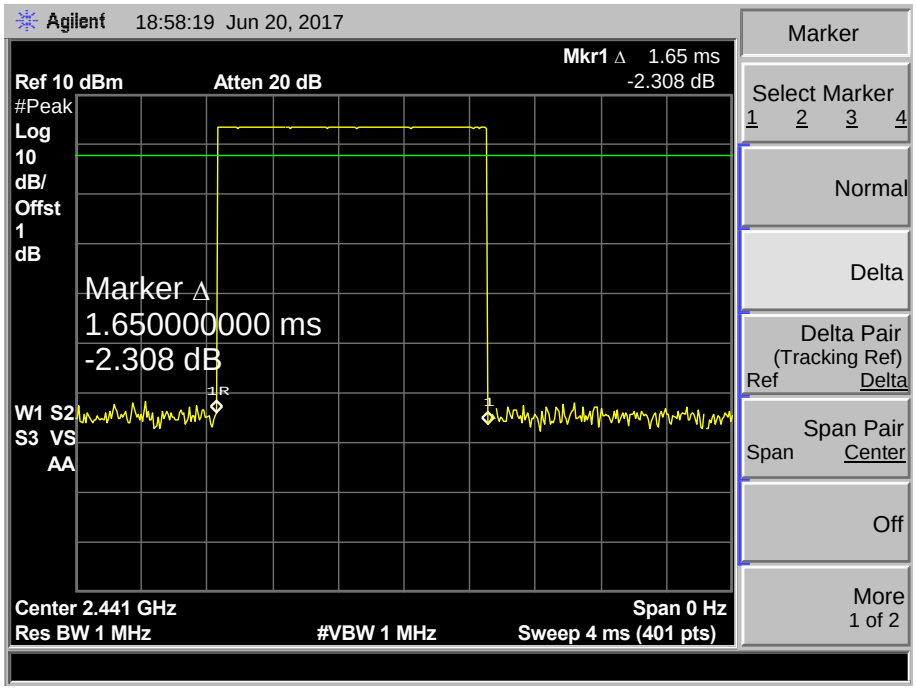
GFSK Hopping Mode 1DH1

2441 MHz



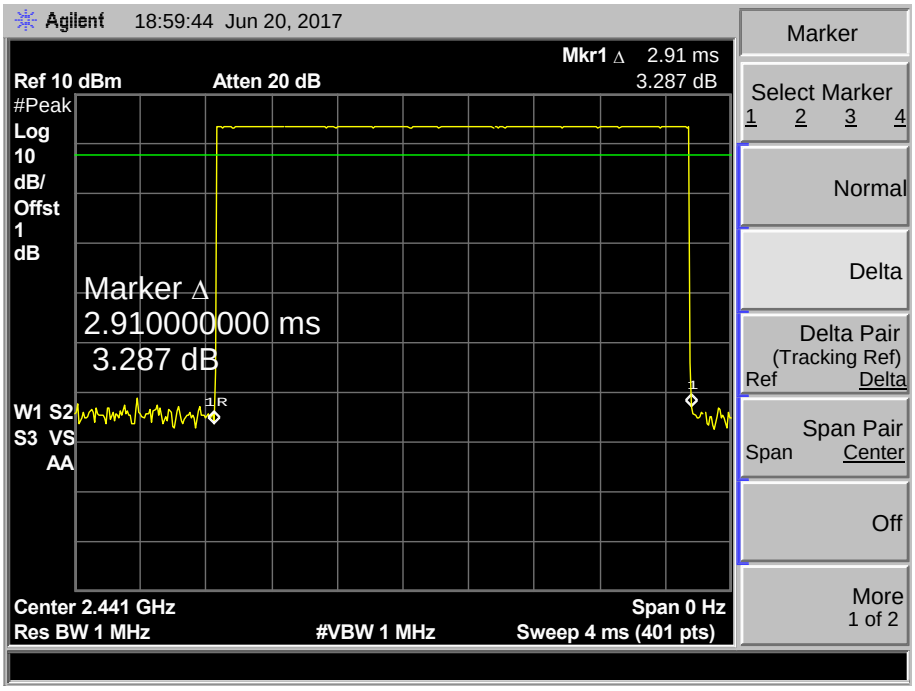
GFSK Hopping Mode 1DH3

2441 MHz



GFSK Hopping Mode 1DH5

2441 MHz



EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	Hopping Mode (π /4-DQPSK)		

Test Mode	Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2DH1	2441	0.41	131.20	31.60	**400**	**PASS**
2DH3	2441	1.66	265.60	31.60	**400**	**PASS**
2DH5	2441	2.92	311.47	31.60	**400**	**PASS**

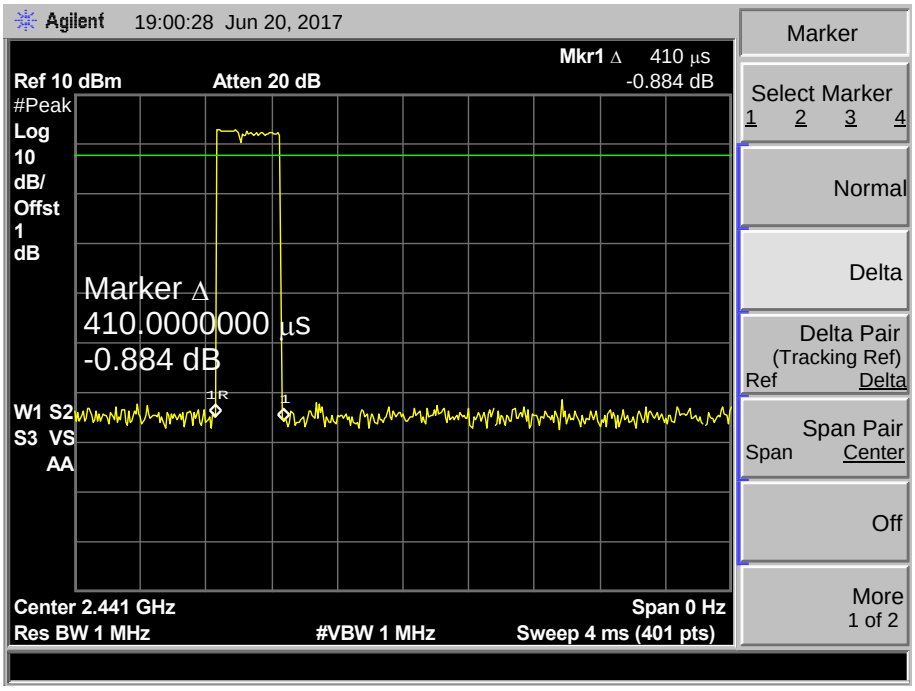
2DH1 Total of Dwell= Pulse Time(1600/2)*31.6/79*

2DH3 Total of Dwell= Pulse Time(1600/4)*31.6/79*

2DH5 Total of Dwell= Pulse Time(1600/6)*31.6/79*

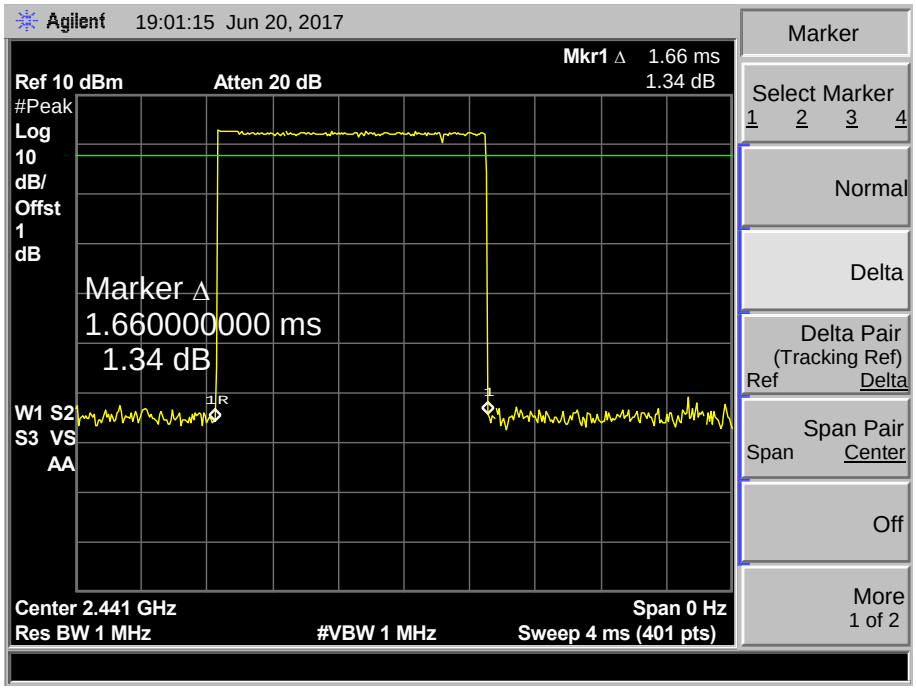
π /4-DQPSK **Hopping Mode 2DH1**

2441 MHz



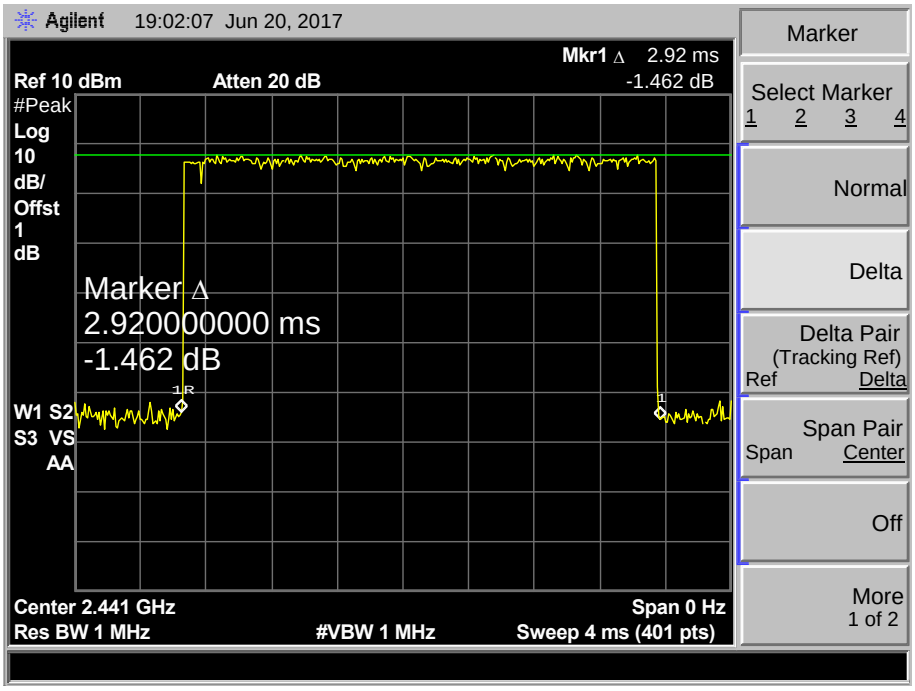
π /4-DQPSK Hopping Mode 2DH3

2441 MHz



π /4-DQPSK Hopping Mode 2DH5

2441 MHz



EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	Hopping Mode (8-DQPSK)		

Test Mode	Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
3DH1	2441	0.44	140.80	31.60	**400**	**PASS**
3DH3	2441	1.68	268.80	31.60	**400**	**PASS**
3DH5	2441	2.91	310.40	31.60	**400**	**PASS**

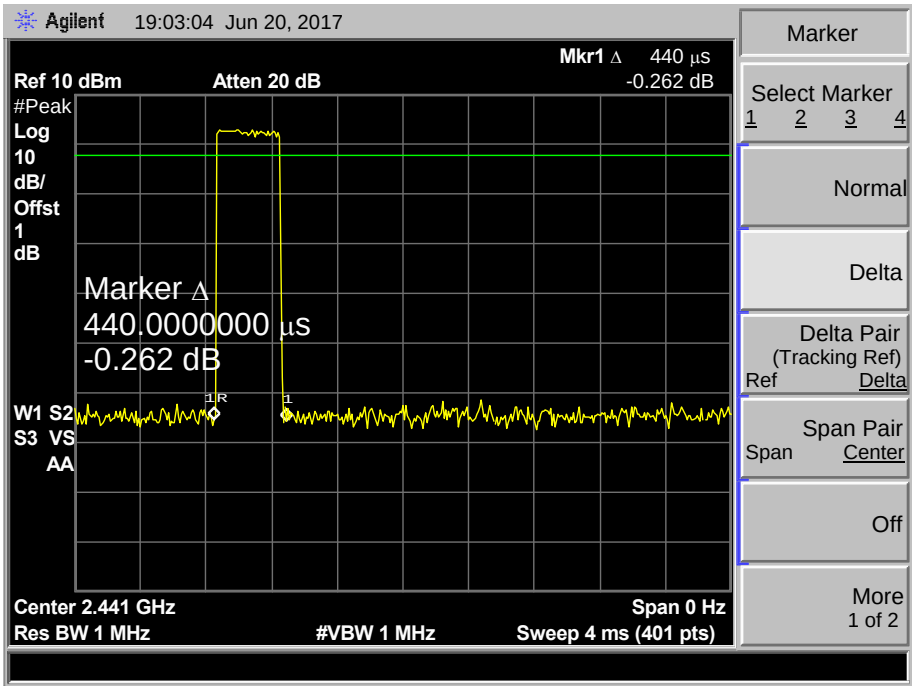
3DH1 Total of Dwell= Pulse Time(1600/2)*31.6/79*

3DH3 Total of Dwell= Pulse Time(1600/4)*31.6/79*

3DH5 Total of Dwell= Pulse Time(1600/6)*31.6/79*

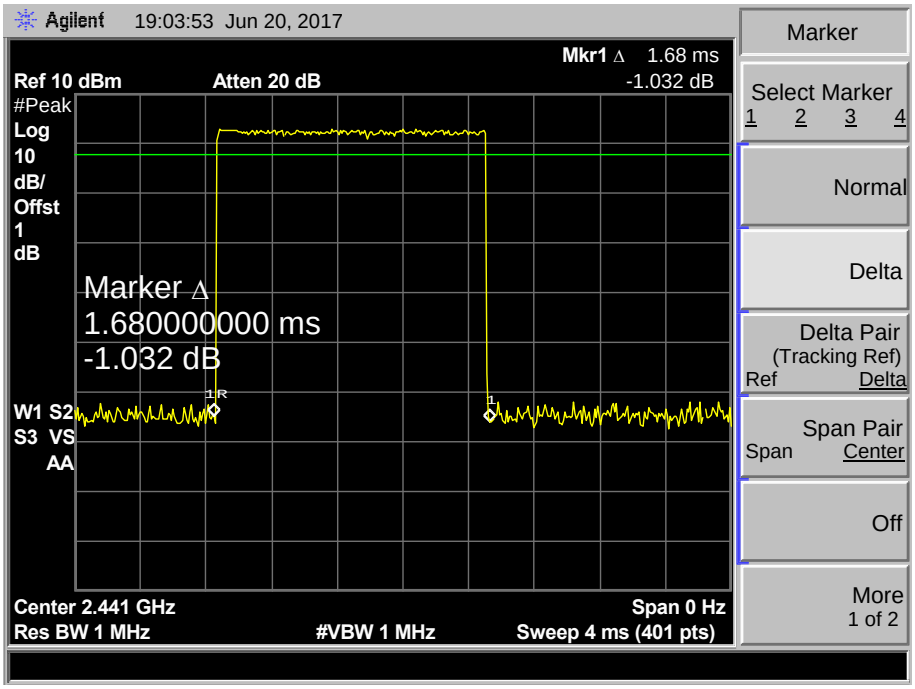
8-DQPSK Hopping Mode 3DH1

2441 MHz



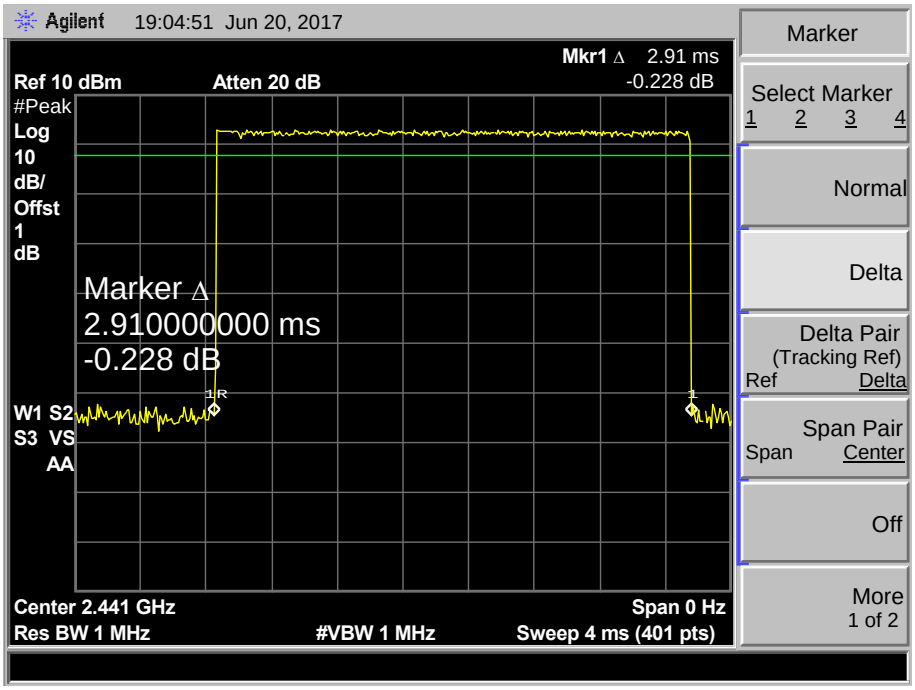
8-DQPSK Hopping Mode 3DH3

2441 MHz



8-DQPSK Hopping Mode 3DH5

2441 MHz



9. Channel Separation and Bandwidth Test

9.1 Test Standard and Limit

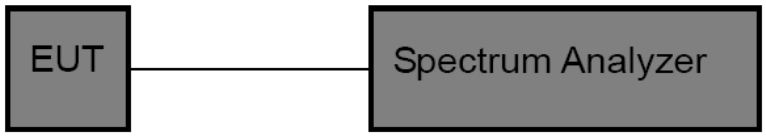
9.1.1 Test Standard

FCC Part 15.247

9.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)
Bandwidth	<=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=100 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.

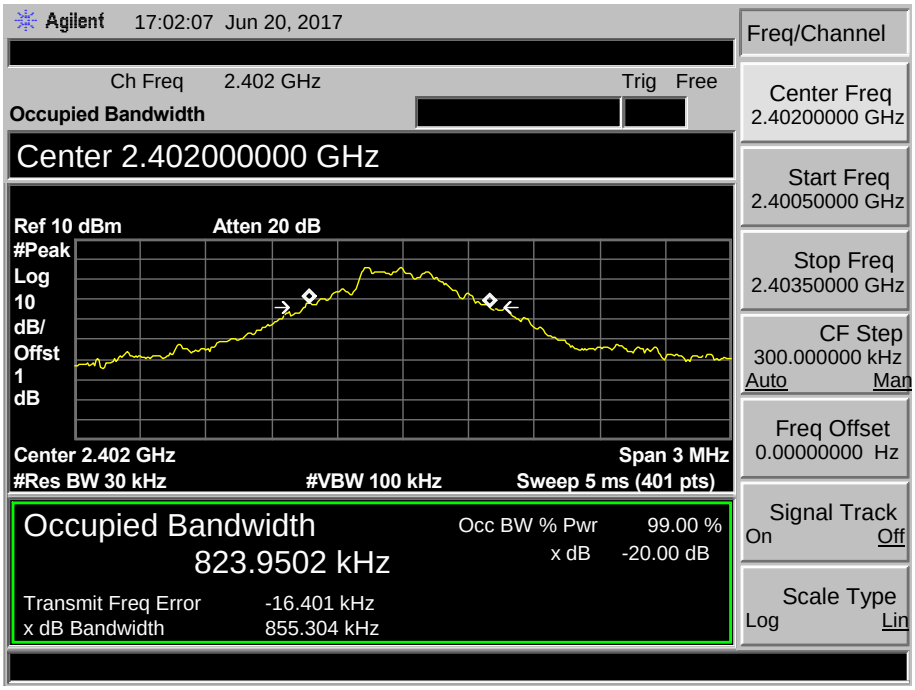
9.5 Test Data

EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	TX Mode (GFSK)		

Channel frequency (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	823.9502	855.304	
2441	818.6423	847.245	
2480	824.7474	855.540	

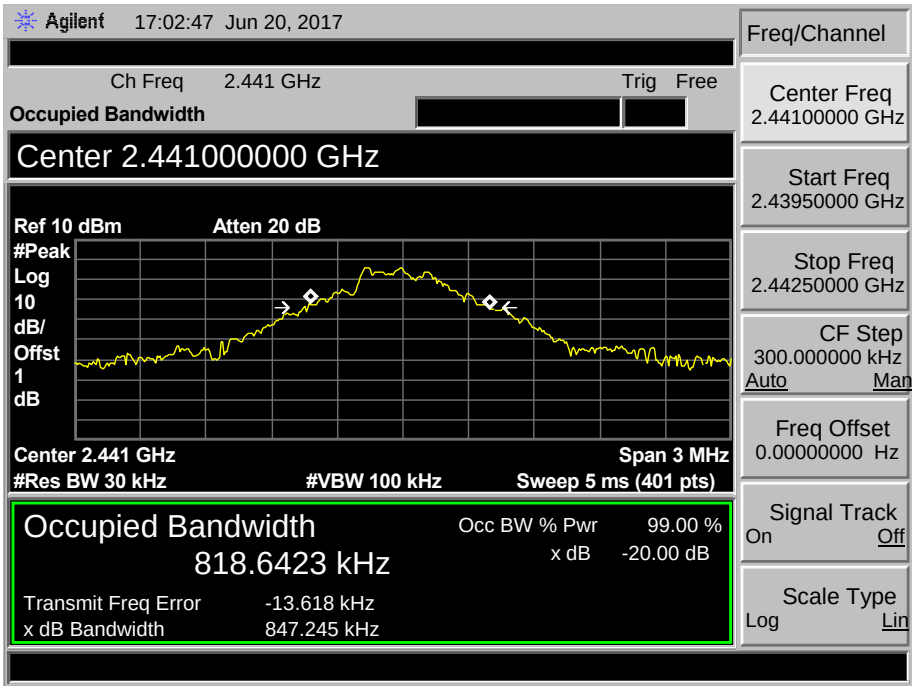
GFSK TX Mode

2402 MHz



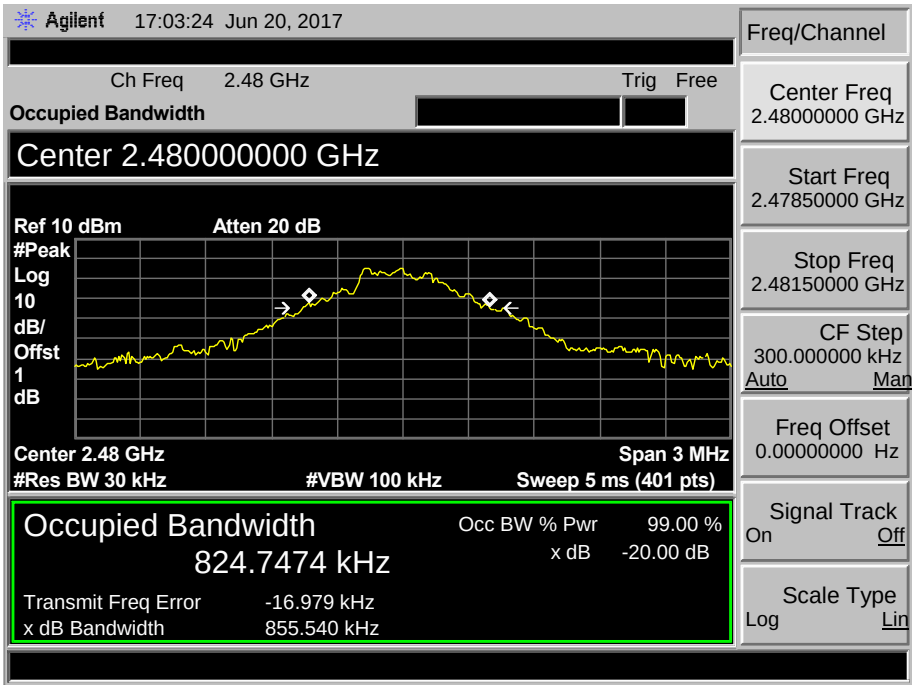
GFSK TX Mode

2441 MHz



GFSK TX Mode

2480 MHz

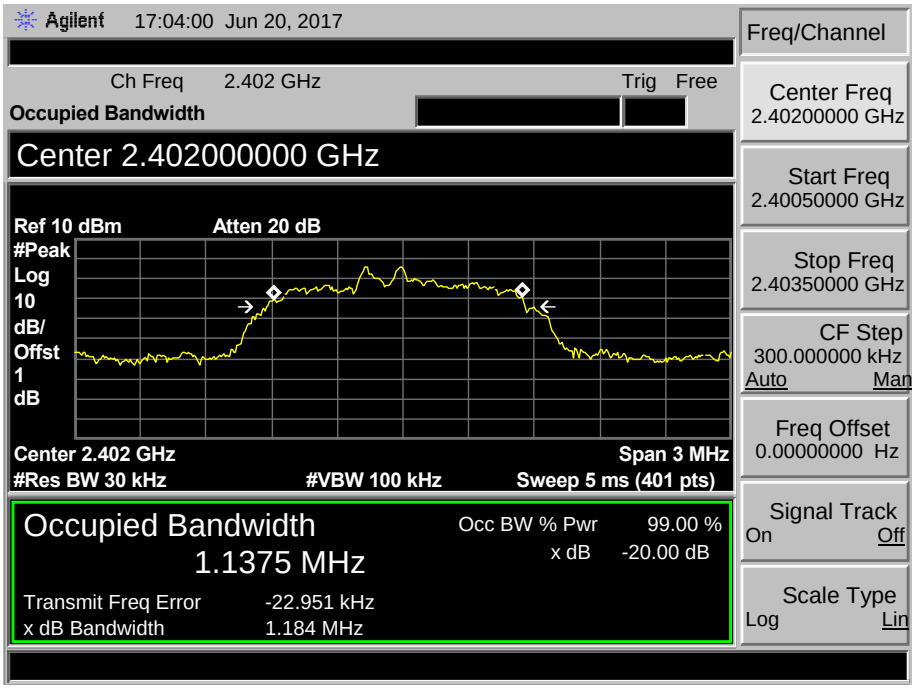


EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	TX Mode (π/4-DQPSK)		

Channel frequency (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	1137.5	1184	789.33
2441	1140.0	1214	809.33
2480	1145.6	1217	811.33

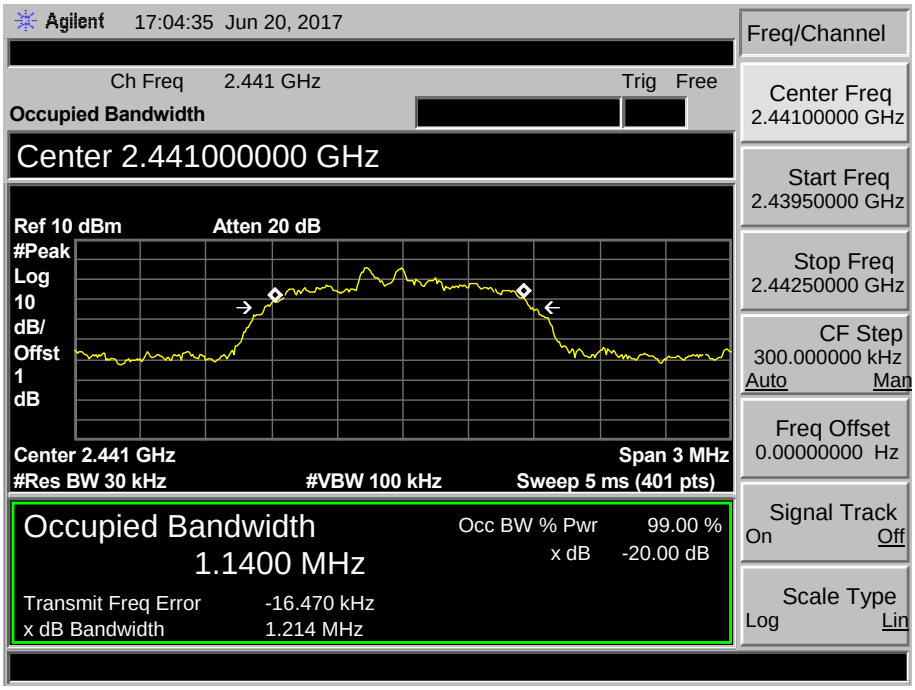
π/4-DQPSK TX Mode

2402 MHz



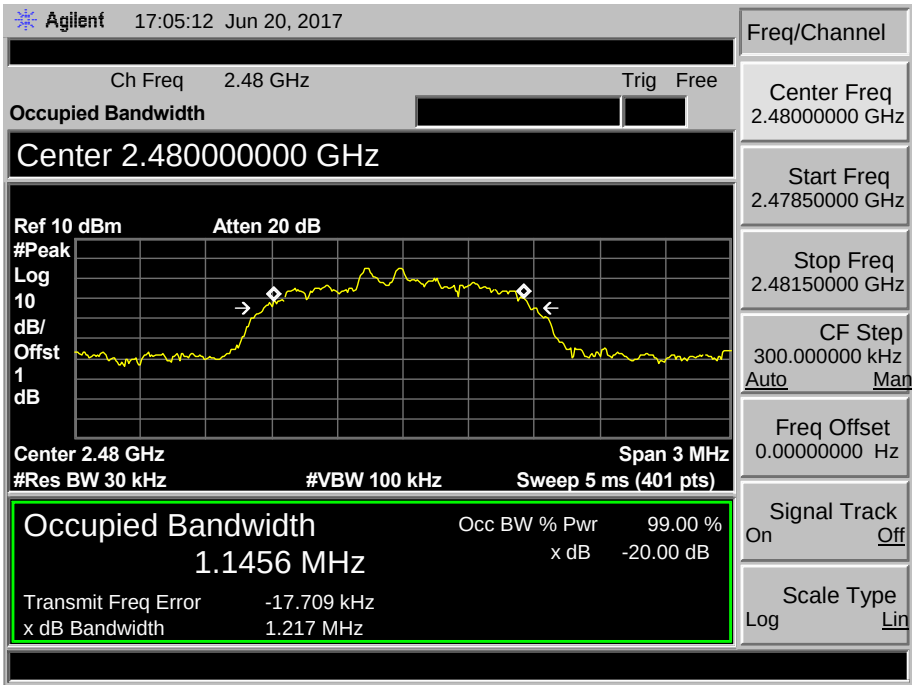
π /4-DQPSK TX Mode

2441 MHz



π /4-DQPSK TX Mode

2480 MHz

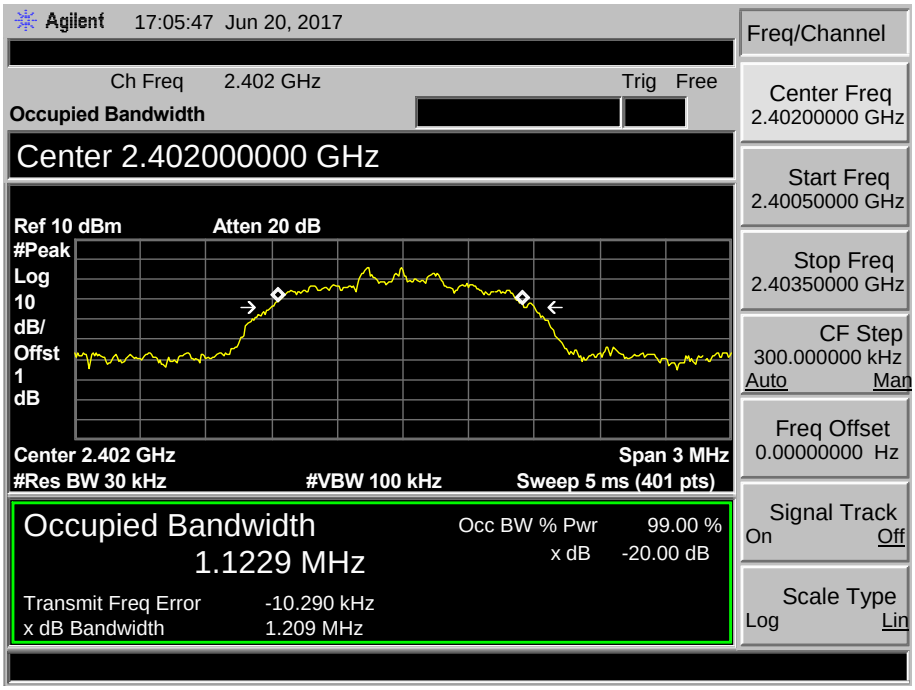


EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	TX Mode (8-DPSK)		

Channel frequency (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	1122.9	1209	806.00
2441	1129.9	1198	798.67
2480	1128.0	1214	809.33

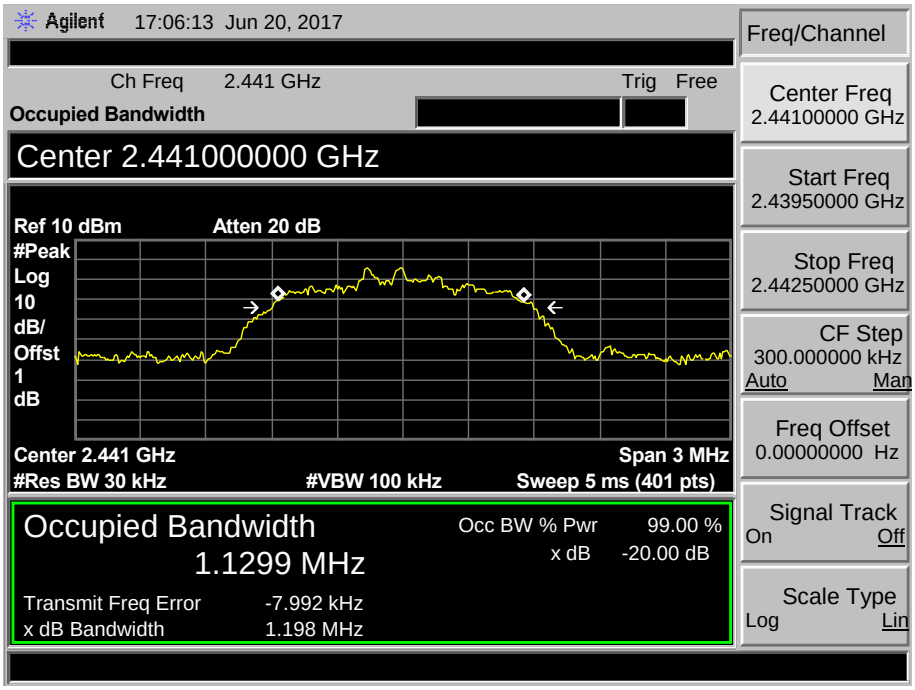
8-DPSK TX Mode

2402 MHz



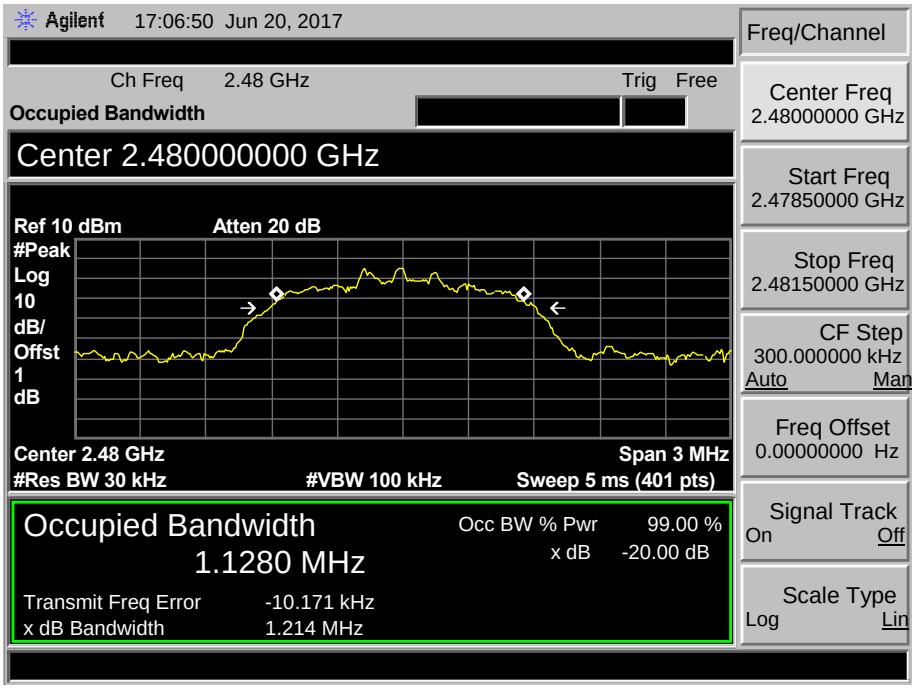
8-DPSK TX Mode

2441 MHz



8-DPSK TX Mode

2480 MHz

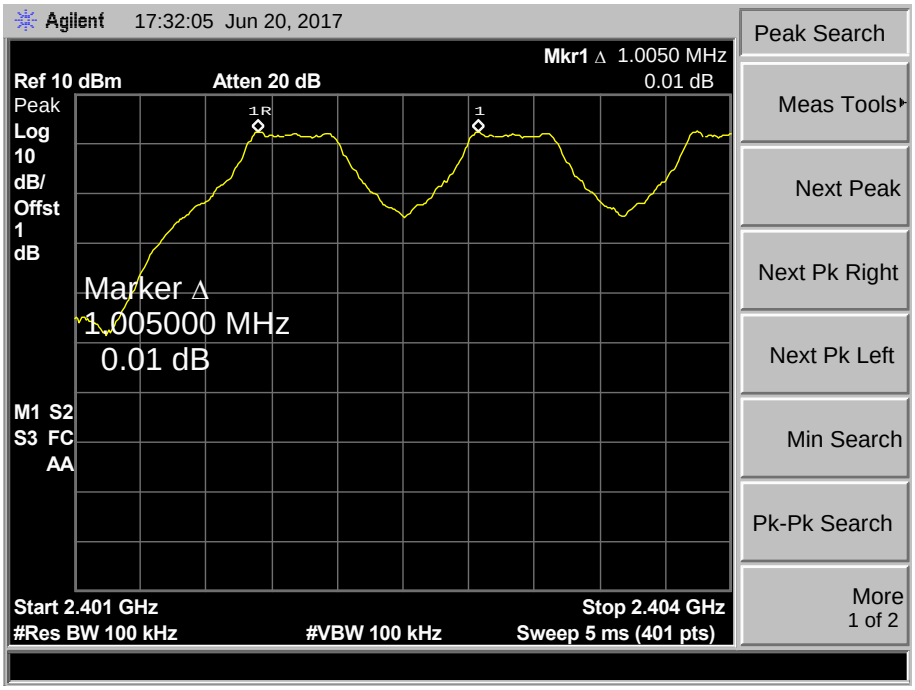


EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	Hopping Mode (GFSK)		

Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit (kHz)
2402	1005	855.304
2441	1005	847.245
2480	1005	855.540

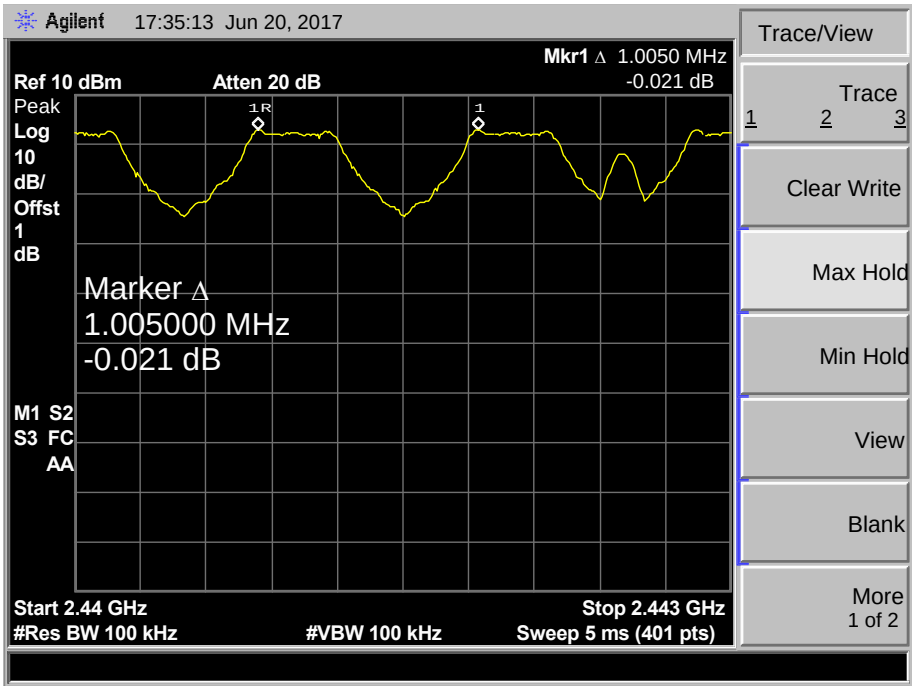
GFSK Hopping Mode

2402 MHz



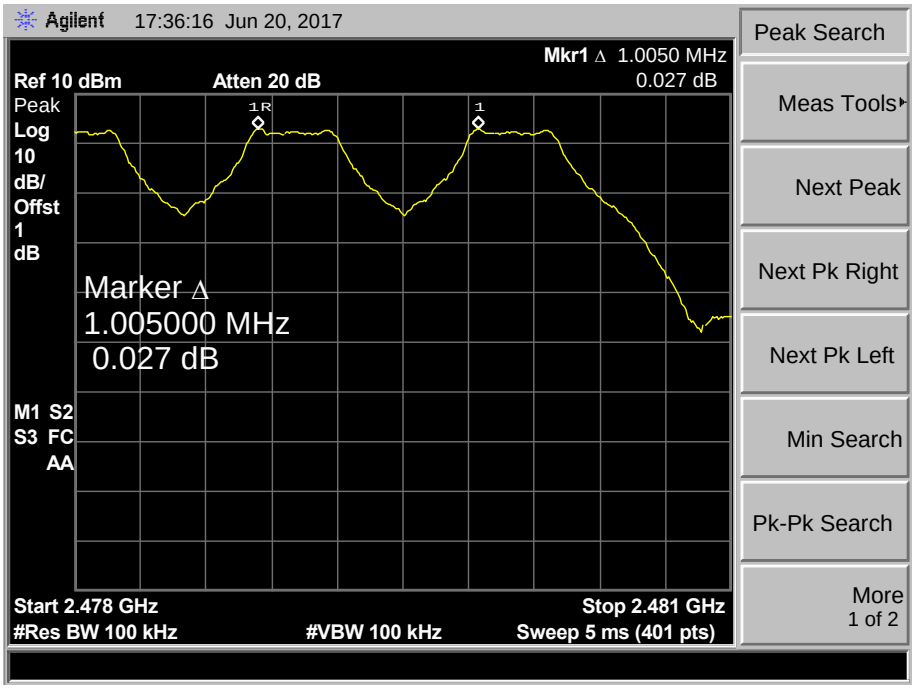
GFSK Hopping Mode

2441 MHz



GFSK Hopping Mode

2480 MHz

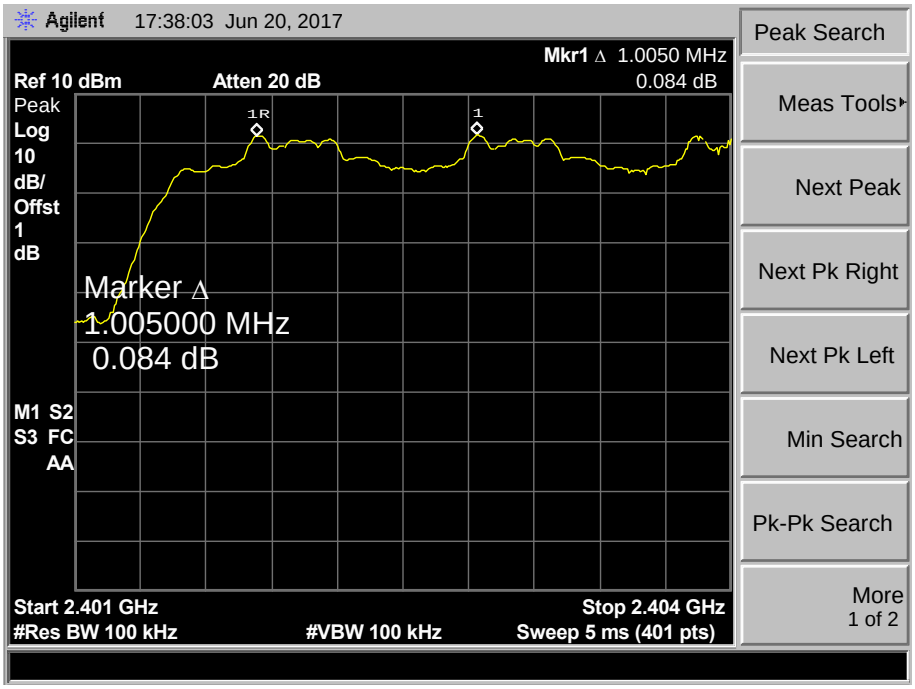


EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	Hopping Mode (π/4-DQPSK)		

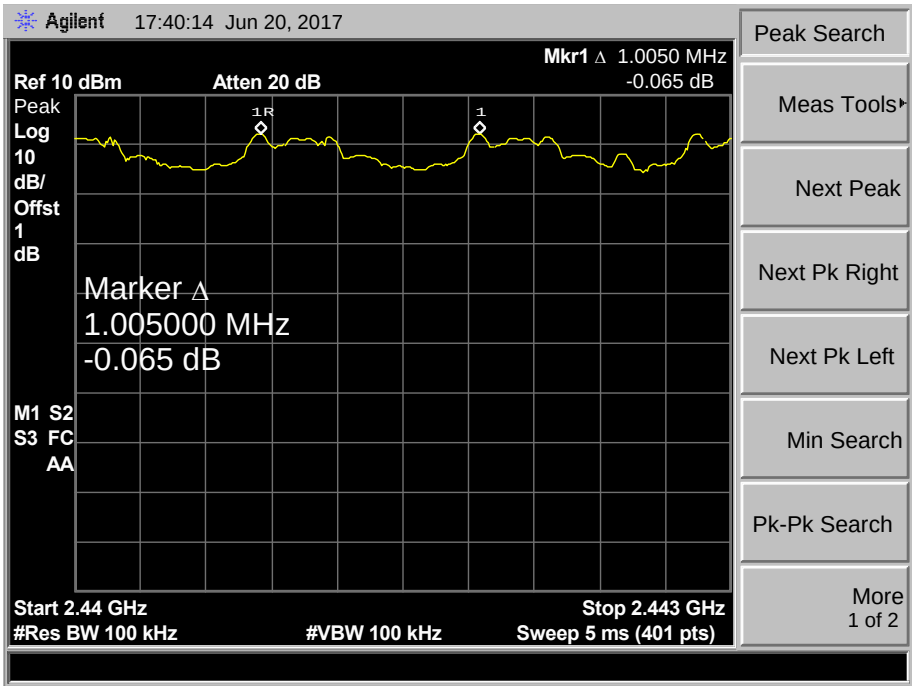
Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit (kHz)
2402	1005	789.33
2441	1005	809.33
2480	1005	811.33

π/4-DQPSK Hopping Mode

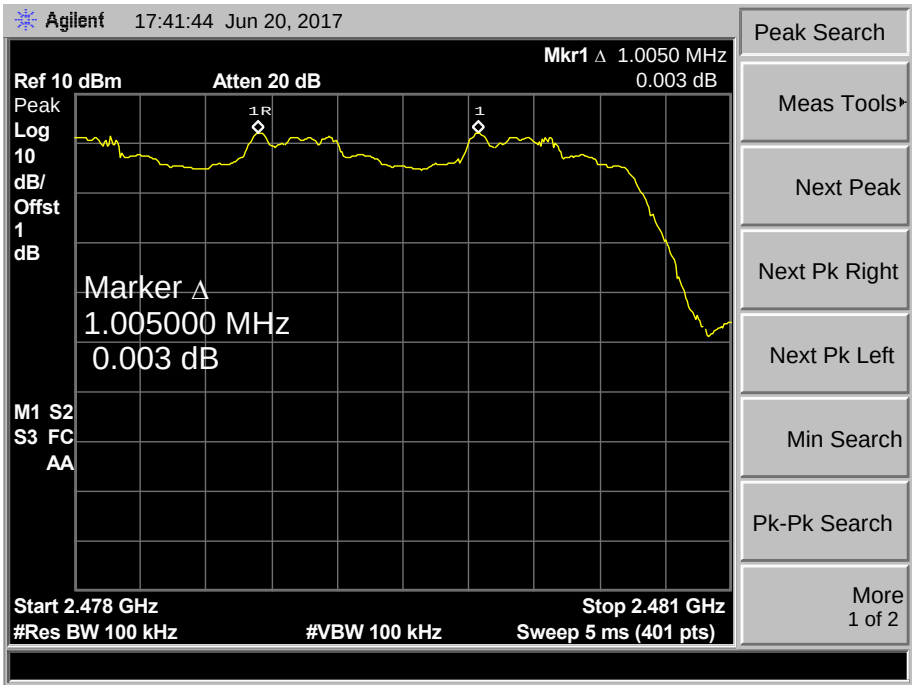
2402 MHz



π /4-DQPSK Hopping Mode
2441 MHz



π /4-DQPSK Hopping Mode
2480 MHz

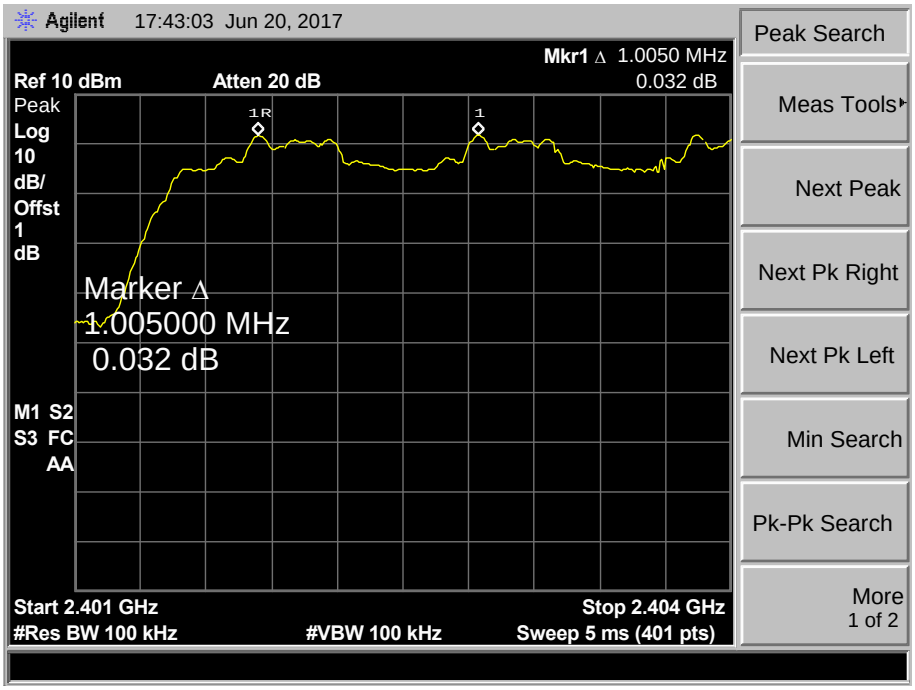


EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	Hopping Mode (8-DPSK)		

Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit (kHz)
2402	1005	806.00
2441	1005	798.67
2480	1005	809.33

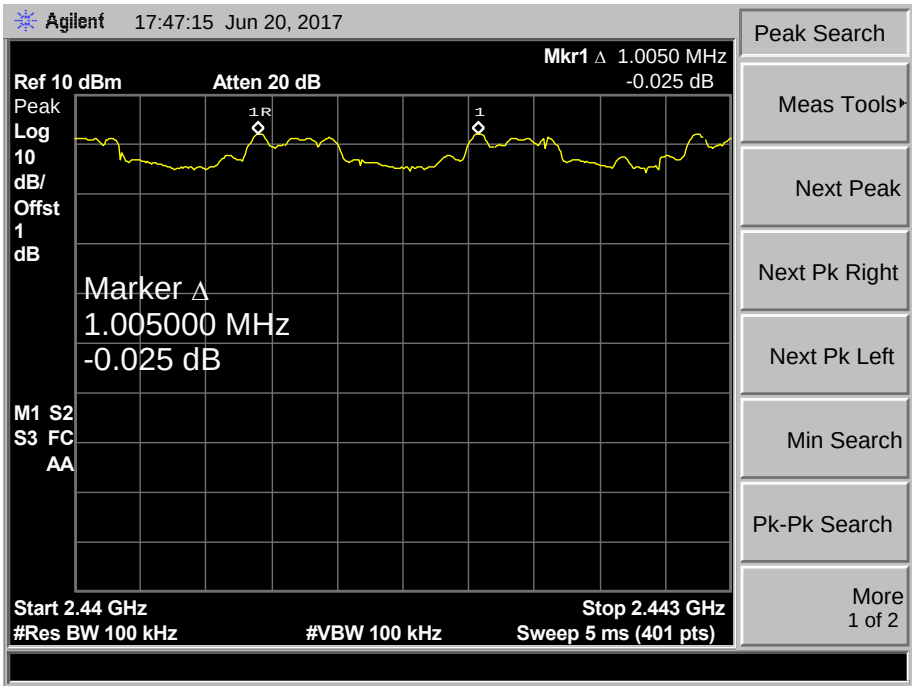
8-DPSK Hopping Mode

2402 MHz



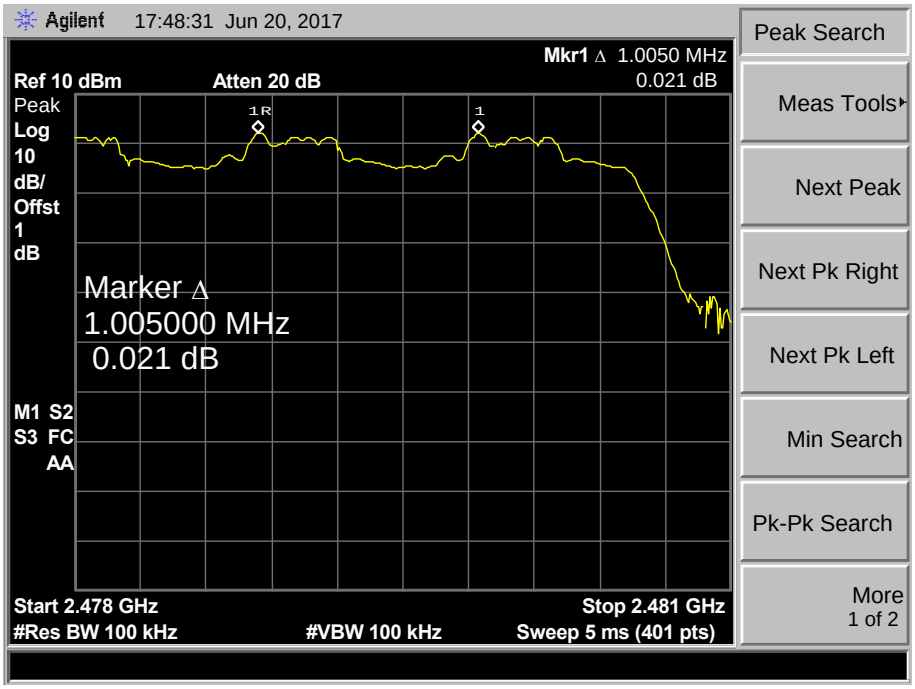
8-DPSK Hopping Mode

2441 MHz



8-DPSK Hopping Mode

2480 MHz



10. Peak Output Power Test

10.1 Test Standard and Limit

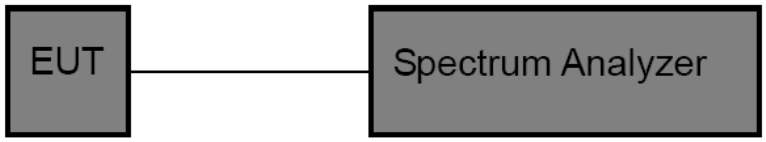
10.1.1 Test Standard

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.

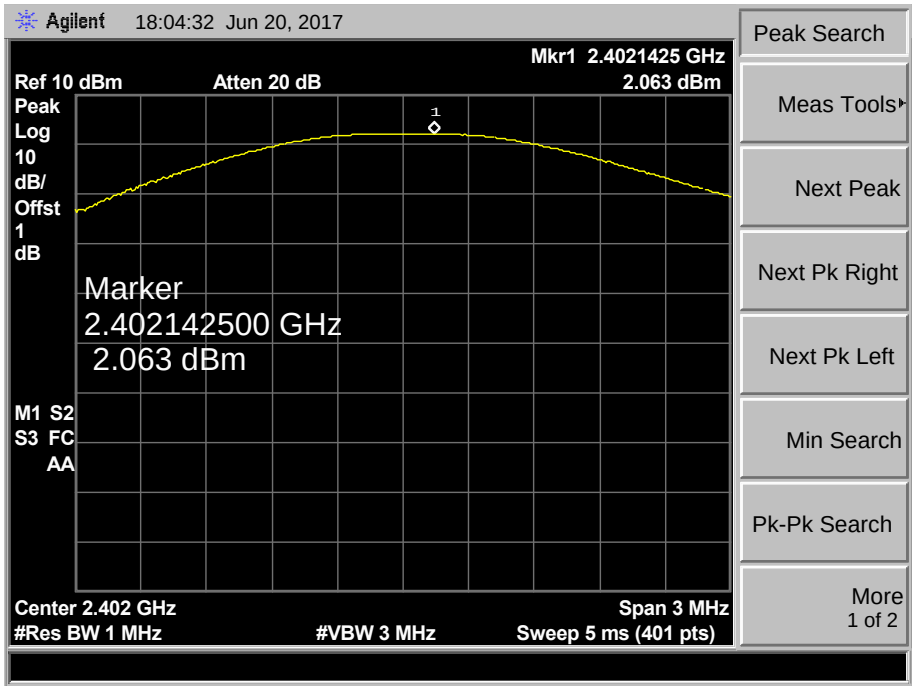
10.5 Test Data

EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	TX Mode (GFSK)		

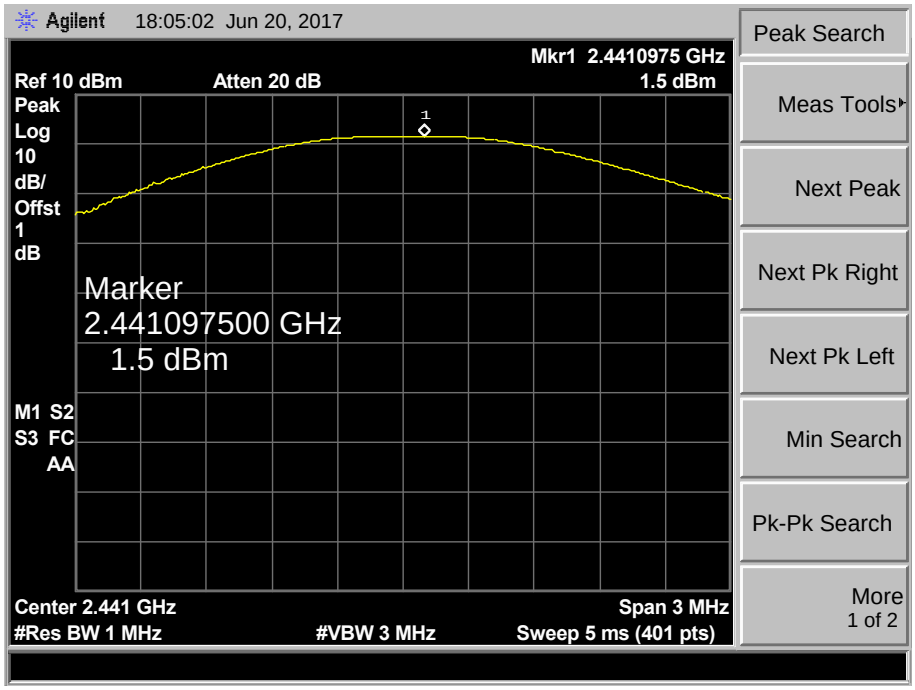
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)
2402	2.063	30
2441	1.500	
2480	0.846	

GFSK TX Mode

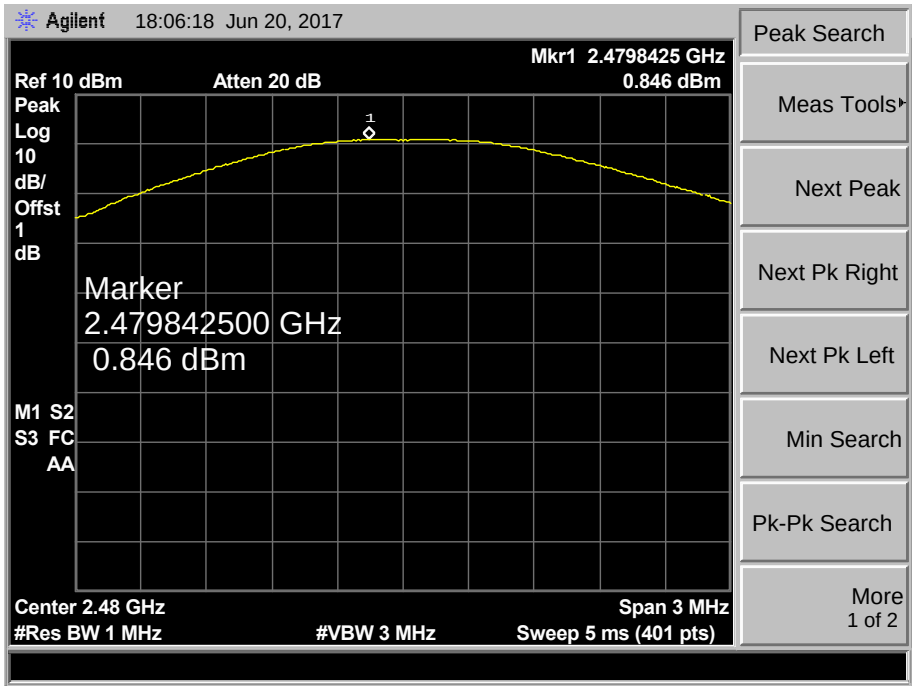
2402 MHz



GFSK TX Mode
2441 MHz



GFSK TX Mode
2480 MHz

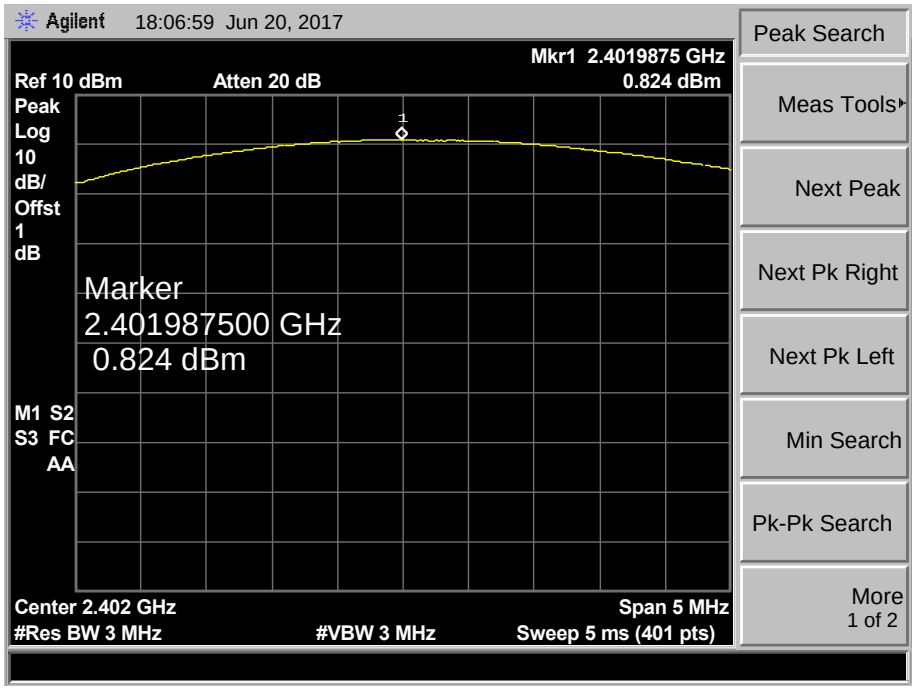


EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	TX Mode (π/4-DQPSK)		

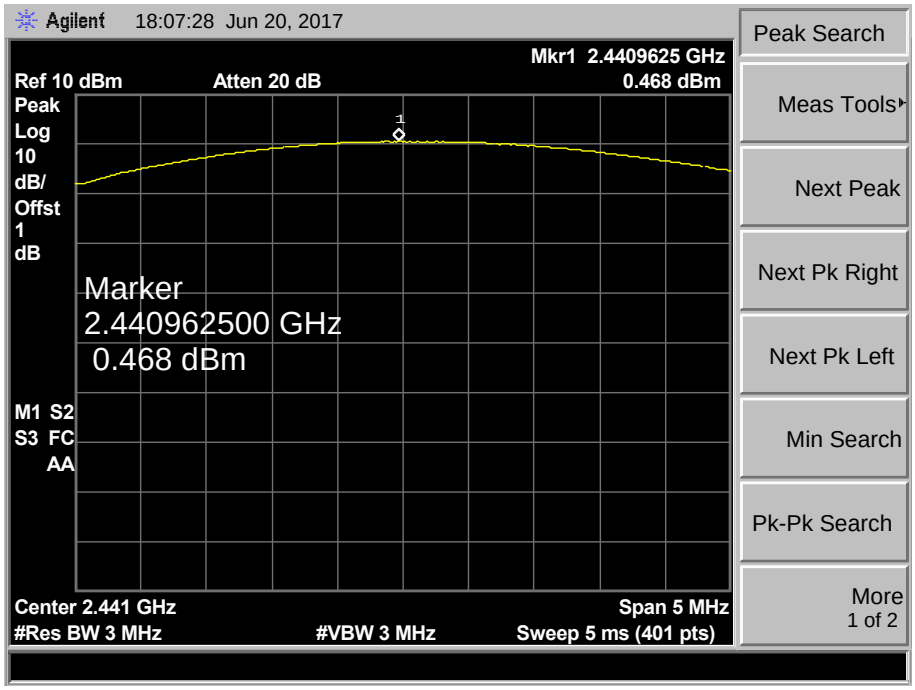
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)
2402	0.824	21
2441	0.468	
2480	-0.203	

π/4-DQPSK TX Mode

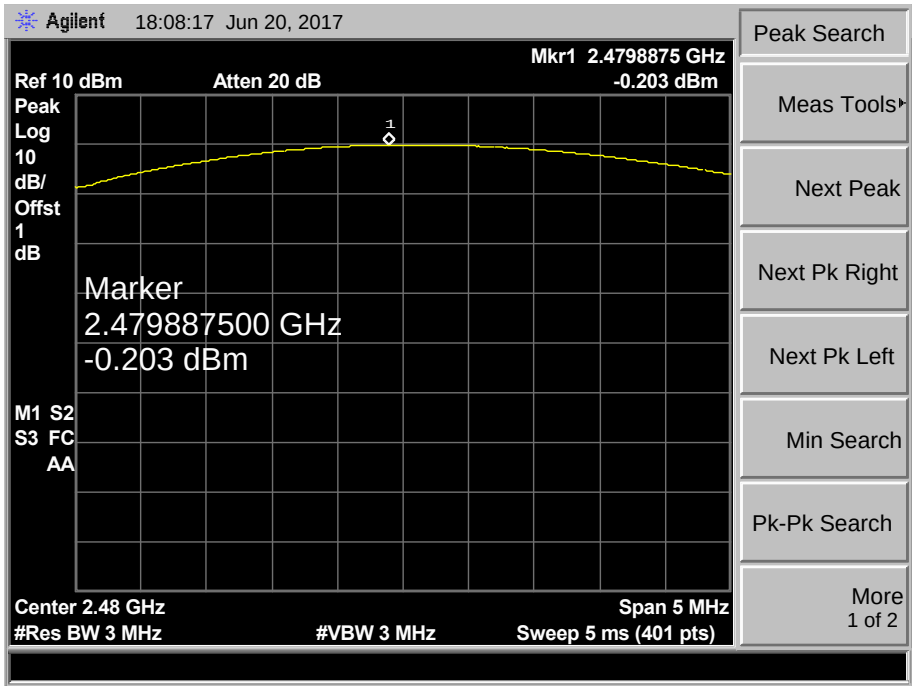
2402 MHz



π /4-DQPSK TX Mode
2441 MHz



π /4-DQPSK TX Mode
2480 MHz

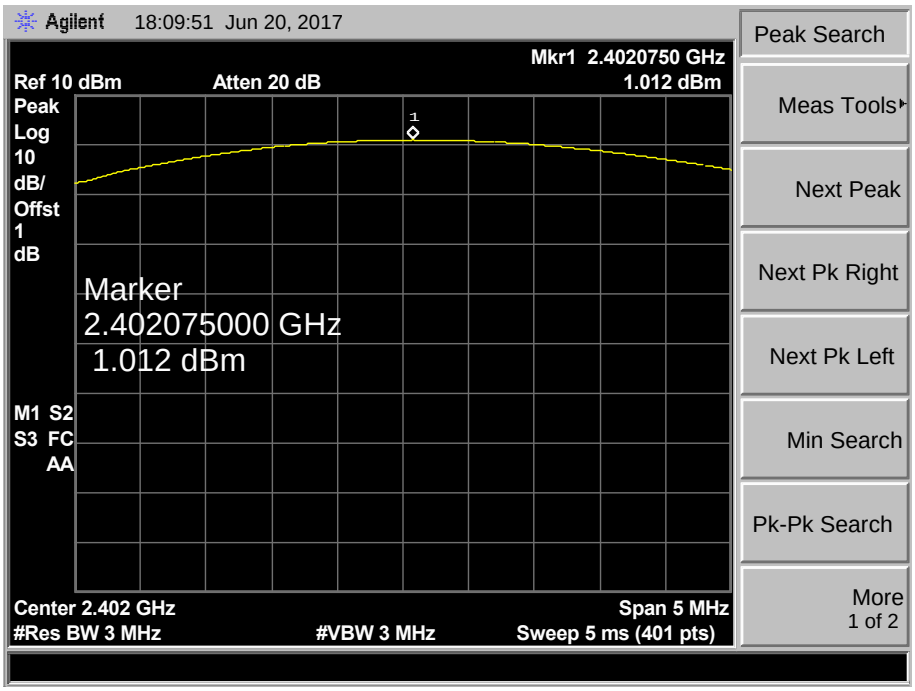


EUT:	Bluetooth speaker desk lamp	Model Name :	SL-9068
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	TX Mode (8-DPSK)		

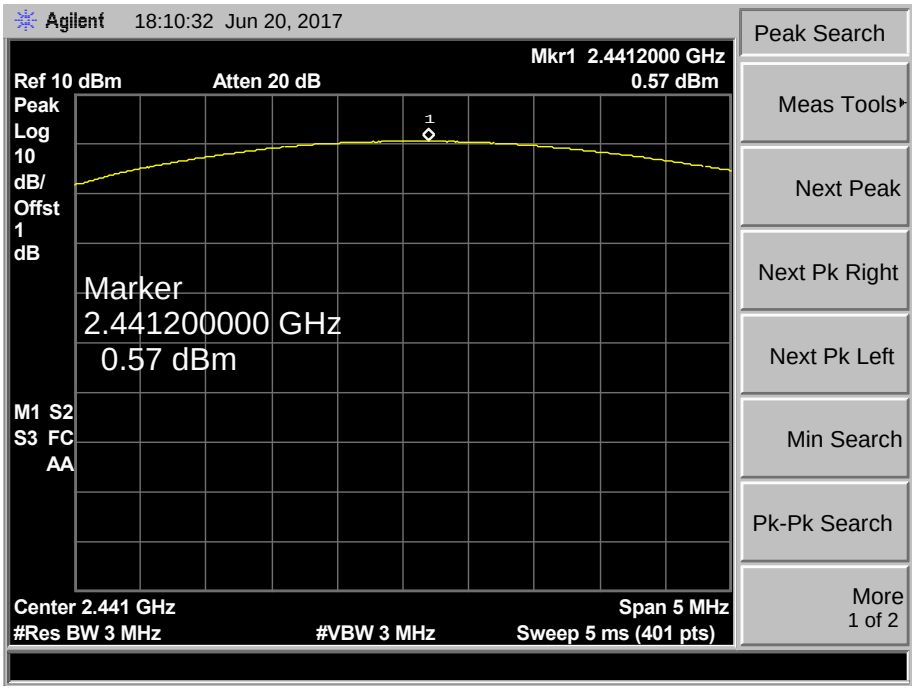
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)
2402	1.012	21
2441	0.250	
2480	-0.170	

8-DPSK TX Mode

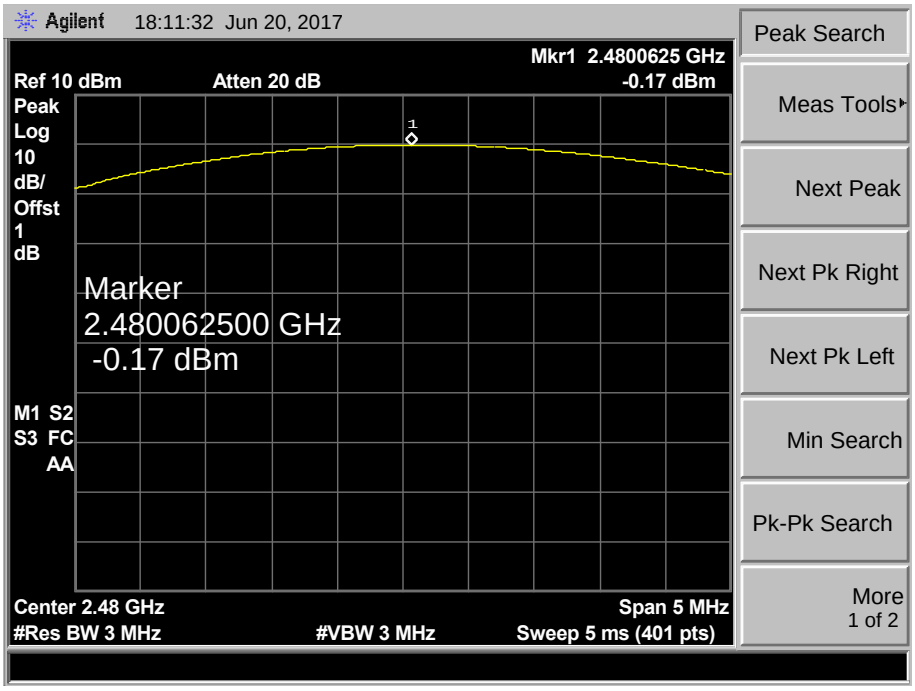
2402 MHz



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 1.2dBi, and the antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

11.3 Result

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

Antenna Type
☒Permanent attached antenna
☐Unique connector antenna
☐Professional installation antenna

-----END OF REPORT-----