

# Test Report

FCC ID: 2APAO-BC01

Date of issue: Mar. 21, 2018

Report Number:	MTi180312E026
Sample Description:	Bluetooth Car Charger
Model(s):	BC01
Applicant:	Shenzhen Zhengyuhong Electronic Technology Co.,Ltd.
Address:	A Zone,4th Floor,Chuangxin Industrial Park 1600063,Guanlan Laocun Community,Longhua District,Shenzhen,Guangdong 518110 China
Date of Test:	Jan. 22, 2018 – Mar. 21, 2018

**Shenzhen Microtest Co., Ltd.**  
<http://www.mtitest.com>

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## TEST REPORT

Applicant's name: Shenzhen Zhengyuhong Electronic Technology Co.,Ltd.

Address: A Zone,4th Floor,Chuangxin Industrial Park 1600063,Guanlan Laocun Community,Longhua District,Shenzhen,Guangdong 518110 China

Manufacture's Name: Shenzhen Zhengyuhong Electronic Technology Co.,Ltd.

Address: A Zone,4th Floor,Chuangxin Industrial Park 1600063,Guanlan Laocun Community,Longhua District,Shenzhen,Guangdong 518110 China

Product name: Bluetooth Car Charger

Trademark: ZYH

Model name: BC01

Standards: FCC Part 15.247

Test Procedure: ANSI C63.10-2013  
DA 00-705

*This device described above has been tested by Shenzhen Microtest Co., Ltd. and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.*

Tested by:



Demi Mu

Mar. 21, 2018

Reviewed by:



Blue Zheng

Mar. 21, 2018

Approved by:



Smith Chen

Mar. 21, 2018

## 1 General Information

### 1.1 Description of EUT

Product name	Bluetooth Car Charger
Model name	BC01
Serial Model	N/A
Operation Frequency	TX 2402-2480MHz RX 2402-2480MHz
Number Of Channel	79 CH
Modulation Type:	GFSK, $\pi/4$ -DQPSK, 8DPSK
Bit Rate of Transmitter	1 Mbps, 2 Mbps, 3 Mbps
Max. Output Power	0.123 dBm
Antenna Type	Ceramic antenna
Antenna Gain	2dBi
Supply Voltage	DC 3.7V by battery

### 1.2 Operation 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	--	--

### 1.3 Test channel list

Channel	Channel	Frequency (MHz)
Low	00	2402
Middle	39	2441
High	79	2480

### 1.4 Ancillary equipment list

Equipment	Model	S/N	Manufacturer	Certificate type
/	/	/	/	/

### 1.5 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
/	/	/	/	/	/

**Note:**

(1)The support equipment was authorized by Declaration of Confirmation.

(2)For detachable type I/O cable should be specified the length in cm in 『Length』 column.

## 2 Summary of Test Results

Test procedures according to the technical standards:

No.	Standard Section	Test Item	Result	Remark
1	15.203/15.247(c)	Antenna requirement	Pass	
2	15.247(b)(1)	Peak output power	Pass	
3	15.207	Conducted emission	N/A	
4	15.247(d)	Band edge	Pass	
5	15.205/15.209	Spurious emission	Pass	
6	15.247(a)(1)	20dB occupied bandwidth	Pass	
7	15.247(a)(1)	Carrier Frequencies Separation	Pass	
8	15.247(a)(1)	Hopping channel number	Pass	
9	15.247(a)(1)	Dwell time	Pass	

Note: Not Applicable.

### 3 Test Facilities and Accreditations

#### 3.1 Test laboratory

Test Laboratory	Shenzhen Microtest Co., Ltd.
Location	No.102A & 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong, China
FCC Registration No.:	448573

#### 3.2 Environmental conditions

Temperature:	20°C~30°C
Humidity	30%~70%
Atmospheric pressure	98kPa~101kPa

#### 3.3 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 %

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power, conducted	$\pm 0.16\text{dB}$
3	Spurious emissions, conducted	$\pm 0.21\text{dB}$
4	All emissions, radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^\circ\text{C}$
7	Humidity	$\pm 2\%$

#### 3.4 Test software

Software Name	Manufacturer	Model	Version
RF Test System	Farad	LZ-RF	Lz_Rf 3A3

## 4 Equipment List

Equipment No.	Equipment Name	Manufacturer	Model	Serial No.	Calibration date	Due date
MTI-E001	Spectrum Analyzer	Agilent	E4407B	MY41441082	2017/09/18	2018/09/17
MTI-E002	CMU 200 universal radio communication tester	Rohde&schwarz	CMU 200	114587	2017/09/18	2018/09/17
MTI-E004	EMI Test Receiver	Rohde&schwarz	ESPI	1000314	2017/09/18	2018/09/17
MTI-E006	Broadband antenna	schwarabeck	VULB9163	872	2017/09/18	2018/09/17
MTI-E007	Horn antenna	schwarabeck	BBHA9120D	1201	2017/09/18	2018/09/17
MTI-E014	amplifier	America	8447D	3113A06150	2017/09/18	2018/09/17
MTI-E015	Conduction Immunity Signal Generator	Schloder	CDG6000	126A1343/2015	2017/09/18	2018/09/17
MTI-E016	Coupled decoupling network	Schloder	CDA M2/M3	A2210332/2015	2017/09/18	2018/09/17
MTI-E032	Comprehensive test instrument	Rohde&schwarz	CMW500	124192	2017/04/13	2018/09/12
MTI-E034	amplifier	Agilent	8449B	3008A02400	2017/08/22	2018/08/21
MTI-E040	Spectrum analyzer	Agilent	N9020A	MY49100060	2017/03/04	2018/09/04
MTI-E041	Signal generator	Agilent	N5182A	MY49060455	2017/02/22	2018/09/22
MTI-E042	Analog signal generator	Agilent	E4421B	GB40051240	2017/02/22	2018/09/22
MTI-E043	Power probe	Dare Instruments	RPR3006W	16I00054SN016	2017/02/28	2018/09/28
MTI-E047	10dB attenuator	Mini-Circuits	UNAT-10+	15542	2017/05/23	2018/09/23
MTI-E049	spectrum analyzer	Rohde&schwarz	FSP-38	100019	2017/09/18	2018/09/17
MTI-E050	PSG Signal generator	Agilent	E8257D	MY46520873	2017/04/24	2018/09/23
MTI-E051	Active Loop Antenna 9kHz - 30MHz	Schwarzbeek	FMZB 1519 B	00044	2017//2/26	2018/09/25
MTI-E052	18-40GHz amplifier	Chengdu step Micro Technology	ZLNA-18-40G-21	1608001	2017/09/18	2018/09/17
MTI-E053	15-40G Antenna	Schwarzbeek	BBHA9170	BBHA9170582	2017/09/18	2018/09/17

Note: the calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

## 5 Test Result

### 5.1 Antenna requirement

#### 5.1.1 Standard requirement

15.203 requirement: For intentional device, according to 15.203: 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

#### 5.1.2 EUT Antenna

The EUT antenna is Ceramic antenna. It comply with the standard requirement. In case of replacement of broken antenna the same antenna type must be used.

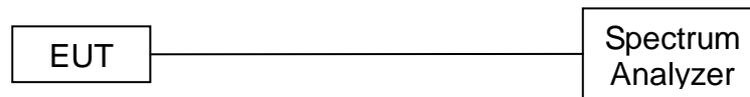


## 5.2 Peak output power

### 5.2.1 Limit

FCC Part15 Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
15.247(b)(3)	Peak output power	Hopping Channels>75 Power<1W(30dBm)	2400-2483.5

### 5.2.2 Test setup



### 5.2.3 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=3MHz, Detector=Peak (If 20dB BW ≤1 MHz)  
 RBW=3MHz, VBW=10MHz, Detector=Peak (If 20dB BW > 1 MHz)
- (3) The EUT was set to continuously transmitting in the max power during the test.

### 5.2.4 Test results

Test data

EUT :	Bluetooth Car Charger	Model Name :	BC01
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V by battery

GFSK

Test Channel	Frequency (MHz)	Maximum Peak Output Power(dBm)	Limit (dBm)
CH00	2402	-0.907	30
CH39	2441	-0.974	30
CH78	2480	-2.455	30

$\pi/4$ -DQPSK

Test Channel	Frequency (MHz)	Maximum Peak Output Power(dBm)	Limit (dBm)
CH00	2402	-0.809	21
CH39	2441	-0.574	21
CH78	2480	-0.581	21

8DPSK

Test Channel	Frequency (MHz)	Maximum Peak Output Power(dBm)	Limit (dBm)
CH00	2402	0.123	30
CH39	2441	0.056	30
CH78	2480	-2.389	30

### 5.3 Conducted emission

#### 5.3.1 Limits

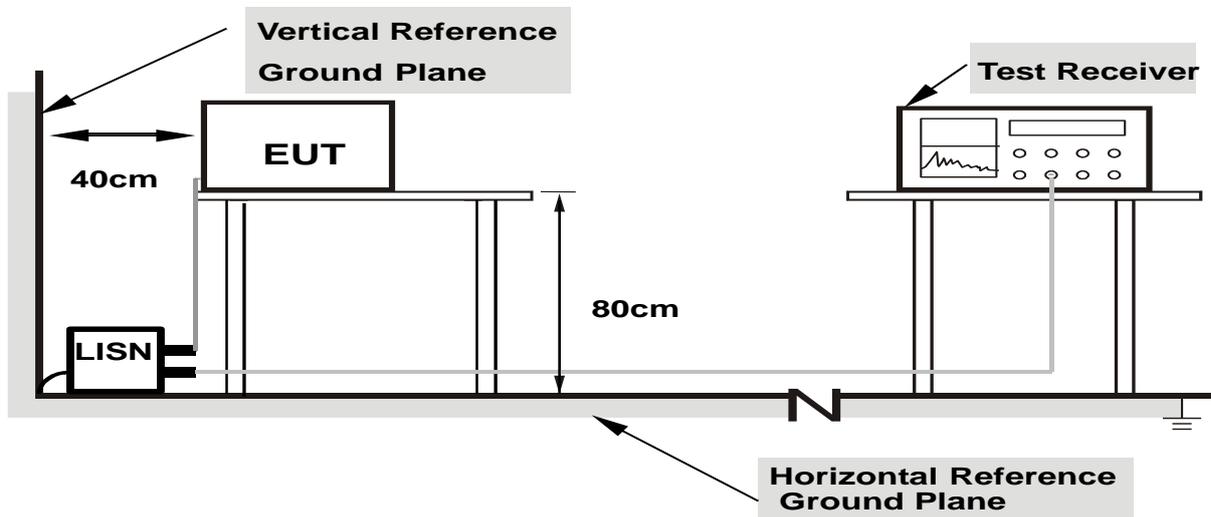
FREQUENCY (MHz)	Class B (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note

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

(2)The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

#### 5.3.2 Test setup



**Note: 1.Support units were connected to second LISN.**

**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

### 5.3.3 Test procedure

#### a. EUT Operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

#### b. The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

- c. 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.
- d. 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.
- e. 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.
- f. LISN at least 80 cm from nearest part of EUT chassis.

For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 5.3.4 Test results

Test data

EUT :	Bluetooth Car Charger	Model Name. :	BC01
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	N/A	Test Mode :	N/A

## 5.4 Radiated spurious emission

### 5.4.1 Limits

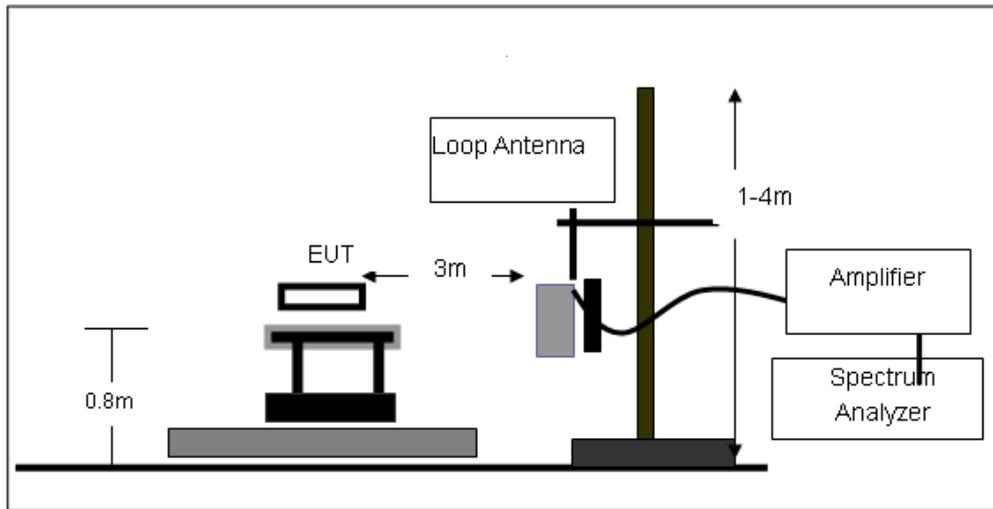
Frequency (MHz)	Field Strength (micovolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

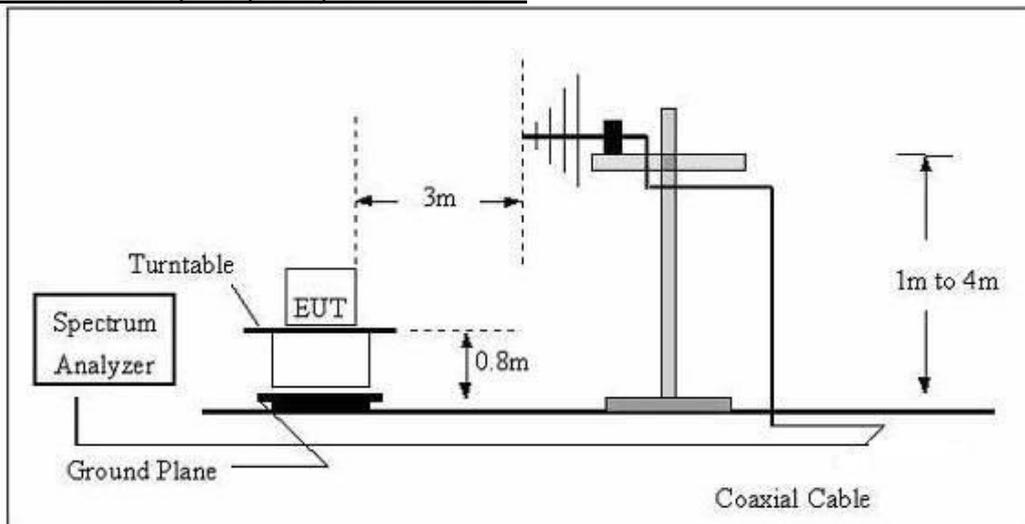
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

5.4.2 Test setup

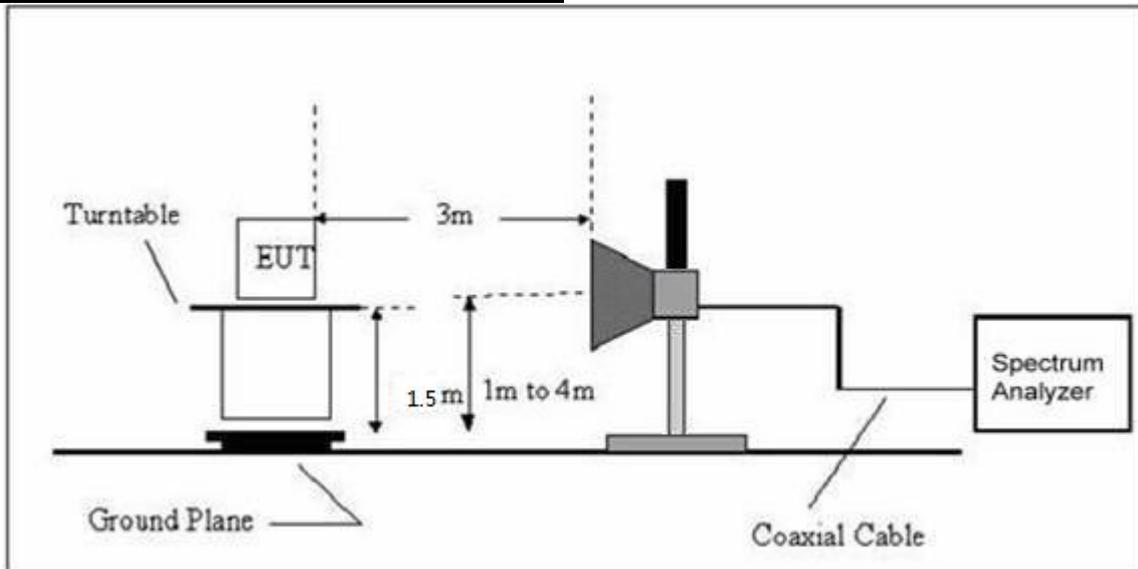
Radiated emission test-up frequency below 30MHz



Radiated emission test-up frequency 30MHz~1GHz



Radiated emission test-up frequency above 1GHz



#### 5.4.3 Test procedure

- a. The EUT is placed on a turntable, which is 0.8m above ground plane for test frequency range below 1GHz, and 1.5m above ground plane for test frequency range above 1GHz.
- b. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- c. Use the following spectrum analyzer settings:
- d. Span = wide enough to fully capture the emission being measured, RBW = 1 MHz for  $f \geq 1\text{GHz}$ , 100 kHz for  $f < 1\text{GHz}$ , VBW  $\geq$  RBW, Sweep = auto, Detector function = peak, Trace = max hold
- e. Follow the guidelines in ANSI C63.4-2014 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- f. The peak level, once corrected, must comply with the limit specified in Section 15.209. Set the RBW = 1MHz, VBW = 10Hz, Detector = PK for AV value, while maintaining all of the other instrument settings.

Note: Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

5.4.4 Test results

5.4.4.1 Radiation emission

Below 30MHz

EUT:	Bluetooth Car Charger	Model Name:	BC01
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage:	DC 3.7V by battery
Test Mode:	TX	Polarization :	--

Freq. (MHz)	Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	State P/F
--	--	--	--	Pass
--	--	--	--	Pass

Note:

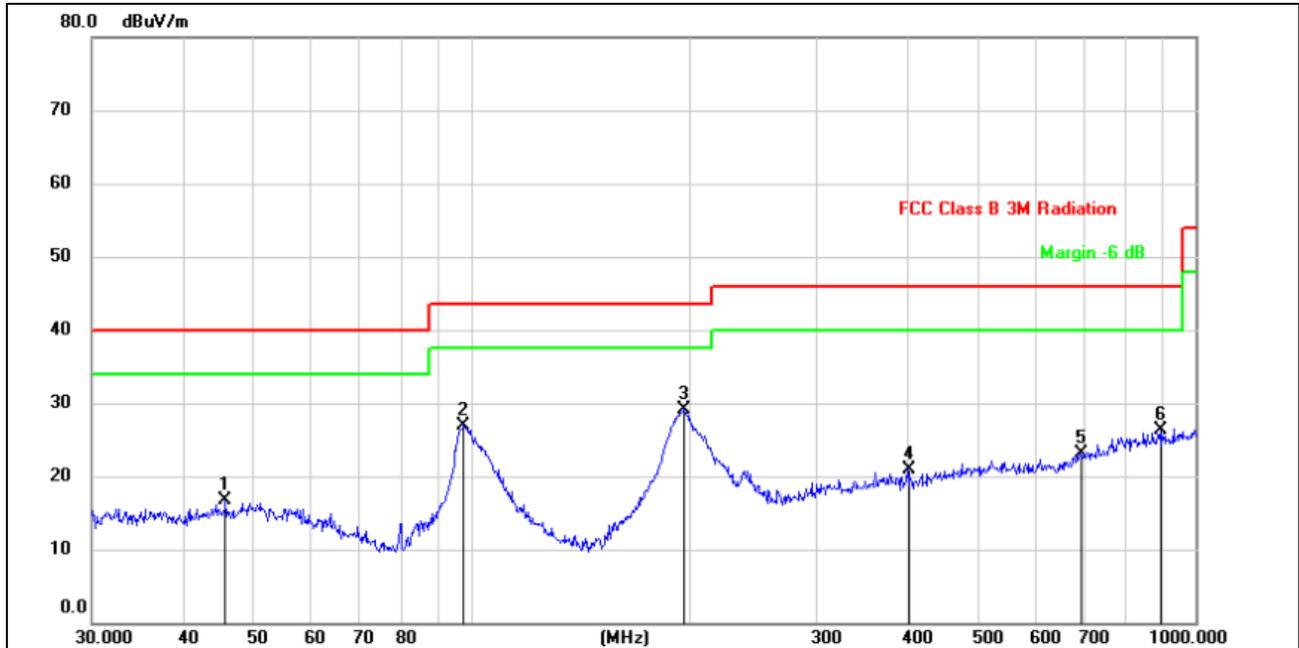
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =  $40 \log(\text{specific distance}/\text{test distance})$ (dB);

Limit line = specific limits(dBuV) + distance extrapolation factor.

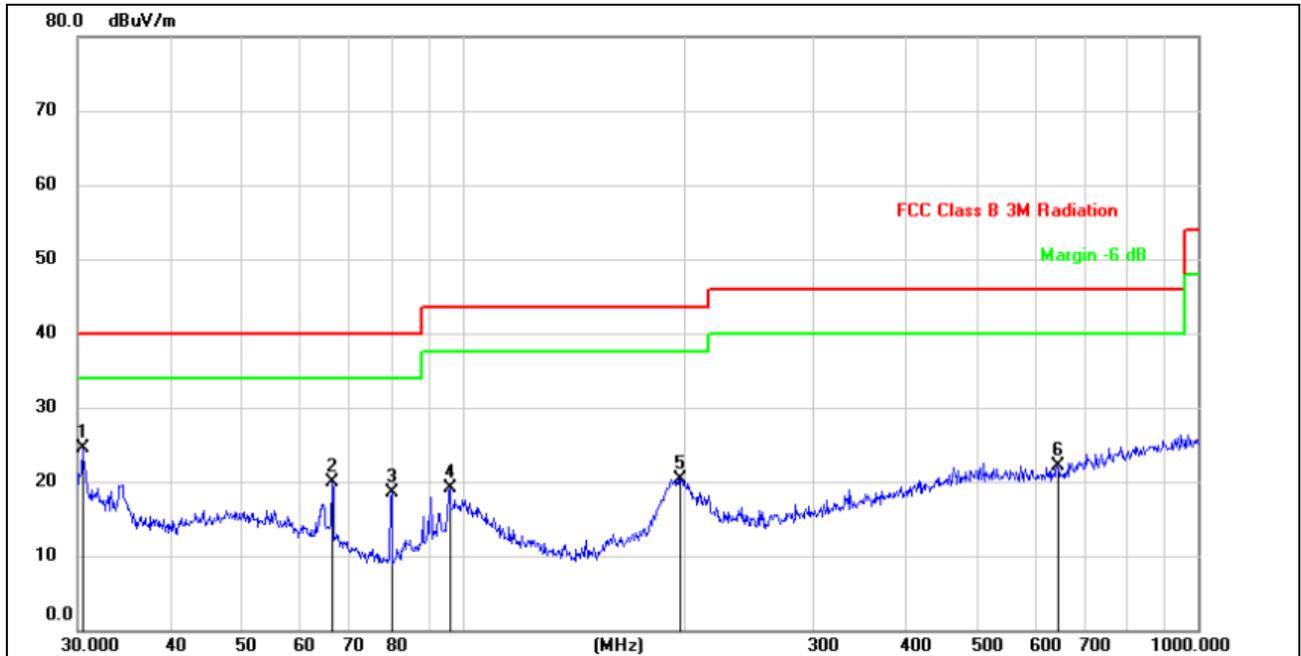
Between 30MHz – 1GHz

EUT :	Bluetooth Car Charger	Model Name :	BC01
Temperature :	20 °C	Relative Humidity :	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.7V by battery
Test Mode :	TX	Phase :	H



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	45.8553	26.39	-9.69	16.70	40.00	-23.30	QP
2	97.7983	38.80	-11.80	27.00	43.50	-16.50	QP
3	197.2001	41.36	-12.16	29.20	43.50	-14.30	QP
4	400.4319	27.54	-6.54	21.00	46.00	-25.00	QP
5	691.9867	27.50	-4.30	23.20	46.00	-22.80	QP
6	893.8567	27.67	-1.37	26.30	46.00	-19.70	QP

EUT :	Bluetooth Car Charger	Model Name :	BC01
Temperature :	20 °C	Relative Humidity :	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.7V by battery
Test Mode :	TX	Phase :	V



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	30.4238	36.00	-11.50	24.50	40.00	-15.50	QP
2	66.4989	32.70	-12.80	19.90	40.00	-20.10	QP
3	80.0806	33.00	-14.50	18.50	40.00	-21.50	QP
4	96.0986	31.18	-12.08	19.10	43.50	-24.40	QP
5	197.8928	30.82	-10.52	20.30	43.50	-23.20	QP
6	642.8613	27.06	-4.86	22.20	46.00	-23.80	QP

1G-25GHz

**GFSK**

Normal Voltage

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (2402 MHz)							
Vertical	4804.09	46.67	-5.04	41.63	74	-32.37	Peak
Vertical	4804.47	46.22	-5.54	40.68	74	-33.32	Peak
Vertical	7206.66	47.74	-4.51	43.23	74	-30.77	Peak
Vertical	7206.29	47.22	-4.26	42.96	74	-31.04	Peak
Vertical	9608.12	48.74	0.37	49.11	74	-24.89	Peak
Vertical	9608.64	48.57	0.26	48.83	74	-25.17	Peak
Horizontal	4804.82	47.95	-3.67	44.28	74	-29.72	Peak
Horizontal	4804.99	46.45	-3.95	42.50	74	-31.5	Peak
Horizontal	7206.19	47.75	-1.87	45.88	74	-28.12	Peak
Horizontal	7206.87	47.57	-1.15	46.42	74	-27.58	Peak
Horizontal	9608.02	48.15	2.38	50.53	74	-23.47	Peak
Horizontal	9608.62	48.07	2.49	50.56	74	-23.44	Peak
Mid Channel (2441 MHz)							
Vertical	4882.23	48.93	-4.24	44.69	74	-29.31	Peak
Vertical	4882.24	49.55	-4.31	45.24	74	-28.76	Peak
Vertical	7323.73	48.7	-3.68	45.02	74	-28.98	Peak
Vertical	7323.66	47.63	-3.52	44.11	74	-29.89	Peak
Vertical	9764.23	46.04	0.37	46.41	74	-27.59	Peak
Vertical	9764.84	47.04	0.28	47.32	74	-26.68	Peak
Horizontal	2482.32	45.26	-3.86	41.4	74	-32.6	Peak
Horizontal	2482.92	48.83	-3.85	44.98	74	-29.02	Peak
Horizontal	7323.02	48.67	-2.18	46.49	74	-27.51	Peak
Horizontal	7323.78	47.61	-2.93	44.68	74	-29.32	Peak
Horizontal	9764.39	48.62	1.47	50.09	74	-23.91	Peak
Horizontal	9764.77	47.64	1.45	49.09	74	-24.91	Peak
High Channel (2480 MHz)							
Vertical	4960.31	45.77	-3.12	42.65	74	-31.35	Peak
Vertical	4960.32	45.67	-3.18	42.49	74	-31.51	Peak
Vertical	7440.88	46.46	-1.32	45.14	74	-28.86	Peak
Vertical	7440.82	46.61	-1.46	45.15	74	-28.85	Peak
Vertical	9920.78	47.15	0.22	47.37	74	-26.63	Peak
Vertical	9920.7	47.32	0.28	47.6	74	-26.4	Peak
Horizontal	4960.95	45.91	-2.68	43.23	74	-30.77	Peak
Horizontal	4960.57	45.24	-2.09	43.15	74	-30.85	Peak
Horizontal	7440.75	46.12	0.82	46.94	74	-27.06	Peak
Horizontal	7440.55	46.77	0.74	47.51	74	-26.49	Peak
Horizontal	9920.49	47.14	2.15	49.29	74	-24.71	Peak
Horizontal	9920.85	47.31	2.32	49.63	74	-24.37	Peak

Note1 : Absolute Level = Reading Level+ Factor, Margin= Absolute Level- Limit, Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Note2 :The peak value is less than the AV value, AV value is not required Factor added by measurement software automatically.

**8DPSK**

Normal Voltage

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (2402 MHz)							
Vertical	4804.54	46.63	-5.04	41.59	74	-32.41	Peak
Vertical	4804.58	45.07	-5.54	39.53	74	-34.47	Peak
Vertical	7323.65	46.9	-4.51	42.39	74	-31.61	Peak
Vertical	7323.61	45.91	-4.26	41.65	74	-32.35	Peak
Vertical	9764.27	46.72	0.37	47.09	74	-26.91	Peak
Vertical	9764.83	48.64	0.26	48.9	74	-25.1	Peak
Horizontal	2482.31	46.35	-3.67	42.68	74	-31.32	Peak
Horizontal	2482.85	49.54	-3.95	45.59	74	-28.41	Peak
Horizontal	7323.37	47.11	-1.87	45.24	74	-28.76	Peak
Horizontal	7323.28	49.14	-1.15	47.99	74	-26.01	Peak
Horizontal	9620.49	47.36	2.38	49.74	74	-24.26	Peak
Horizontal	9620.85	49.42	2.49	51.91	74	-22.09	Peak
Mid Channel (2441 MHz)							
Vertical	4882.16	45.33	-4.24	41.09	74	-32.91	Peak
Vertical	4882.36	46.98	-4.31	42.67	74	-31.33	Peak
Vertical	7323.25	46.72	-3.68	43.04	74	-30.96	Peak
Vertical	7323.64	46.55	-3.52	43.03	74	-30.97	Peak
Vertical	9764.62	47.89	0.37	48.26	74	-25.74	Peak
Vertical	9764.36	46.2	0.28	46.48	74	-27.52	Peak
Horizontal	2482.37	45.28	-3.86	41.42	74	-32.58	Peak
Horizontal	2482.72	45.99	-3.85	42.14	74	-31.86	Peak
Horizontal	7323.62	47.1	-2.18	44.92	74	-29.08	Peak
Horizontal	7323.27	48.97	-2.93	46.04	74	-27.96	Peak
Horizontal	9720.49	47.12	1.47	48.59	74	-25.41	Peak
Horizontal	9720.85	49.97	1.45	51.42	74	-22.58	Peak
High Channel (2480 MHz)							
Vertical	4960.31	47.81	-3.12	44.69	74	-29.31	Peak
Vertical	4960.32	45.39	-3.18	42.21	74	-31.79	Peak
Vertical	7440.88	45.1	-1.32	43.78	74	-30.22	Peak
Vertical	7440.82	45.62	-1.46	44.16	74	-29.84	Peak
Vertical	9920.78	48.29	0.22	48.51	74	-25.49	Peak
Vertical	9920.32	48.79	0.28	49.07	74	-24.93	Peak
Horizontal	4960.41	47.76	-2.68	45.08	74	-28.92	Peak
Horizontal	4960.25	46.48	-2.09	44.39	74	-29.61	Peak
Horizontal	7440.71	48.21	0.82	49.03	74	-24.97	Peak
Horizontal	7440.34	45.49	0.74	46.23	74	-27.77	Peak
Horizontal	9920.25	49.21	2.45	51.66	74	-22.34	Peak
Horizontal	9920.84	48.49	2.52	51.01	74	-22.99	Peak

Note1 : Absolute Level = Reading Level+ Factor, Margin= Absolute Level- Limit, Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Note2 :The peak value is less than the AV value, AV value is not required Factor added by measurement software automatically.

5.4.4.2 Band edge - radiated

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type	Comment
<b>GFSK</b>							
2390	62.36	-10.38	51.98	74.00	-22.02	peak	Vertical
2390	54.94	-9.46	45.48	74.00	-28.52	peak	Horizontal
2400	62.46	-10.31	52.15	74.00	-21.85	peak	Vertical
2400	61.73	-9.43	52.30	74.00	-21.70	peak	Horizontal
2483.5	57.69	-9.73	47.96	74.00	-26.04	peak	Vertical
2483.5	54.14	-8.66	45.48	74.00	-28.52	peak	Horizontal
<b>π/4-DQPSK</b>							
2390	54.95	-10.38	44.51	74.00	-29.49	peak	Vertical
2390	53.39	-9.46	43.84	74.00	-30.16	peak	Horizontal
2400	61.43	-10.31	51.12	74.00	-22.88	peak	Vertical
2400	62.60	-9.43	53.17	74.00	-20.83	peak	Horizontal
2483.5	58.48	-9.73	48.75	74.00	-25.25	peak	Vertical
2483.5	57.78	-8.66	49.12	74.00	-24.88	peak	Horizontal
<b>8DPSK</b>							
2390	62.63	-10.38	52.25	74.00	-21.75	peak	Vertical
2390	54.49	-9.46	45.03	74.00	-28.97	peak	Horizontal
2400	60.01	-10.31	49.70	74.00	-24.30	peak	Vertical
2400	58.95	-9.43	49.52	74.00	-24.48	peak	Horizontal
2483.5	58.23	-9.73	48.50	74.00	-25.50	peak	Vertical
2483.5	58.37	-8.66	49.71	74.00	-24.29	peak	Horizontal

Note1 : Absolute Level = Reading Level+ Factor, Margin= Absolute Level- Limit, Factor = Antenna Factor + Cable Loss – Pre-amplifier.

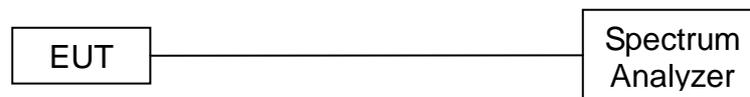
Note2 :The peak value is less than the AV value, AV value is not required Factor added by measurement software automatically.

## 5.5 20dB occupied channel bandwidth

### 5.5.1 Limit

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
15.247a(1)	20dB bandwidth	/	2400-2483.5

### 5.5.2 Test setup



### 5.5.3 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:  
Bandwidth: RBW=30 kHz, VBW=100 kHz, detector= Peak

### 5.5.4 Test results

Test data

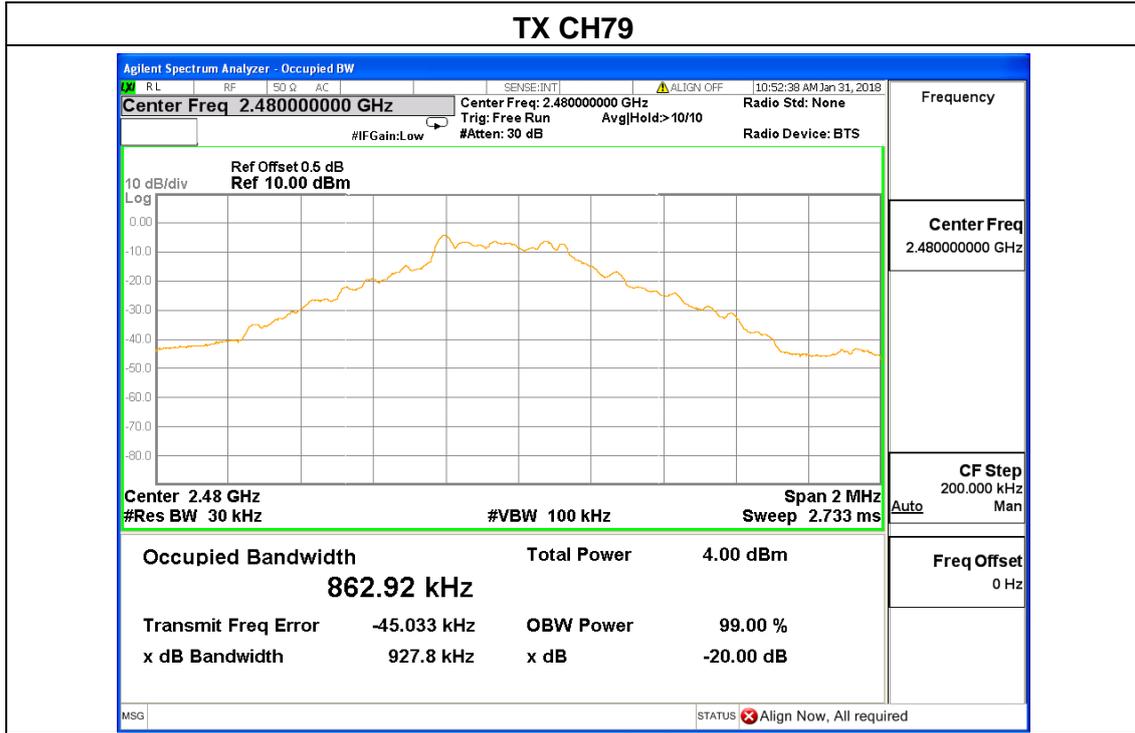
EUT :	Bluetooth Car Charger	Model Name :	BC01
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V by battery

Mode	Frequency (MHz)	20dB Bandwidth (MHz)	Limit (kHz)	Result
GFSK	2402	0.861	/	Pass
	2441	0.862	/	Pass
	2480	0.863	/	Pass
π /4-DQPSK	2402	1.1549	/	Pass
	2441	1.1553	/	Pass
	2480	1.1595	/	Pass
8DPSK	2402	1.1553	/	Pass
	2441	1.1549	/	Pass
	2480	1.1565	/	Pass

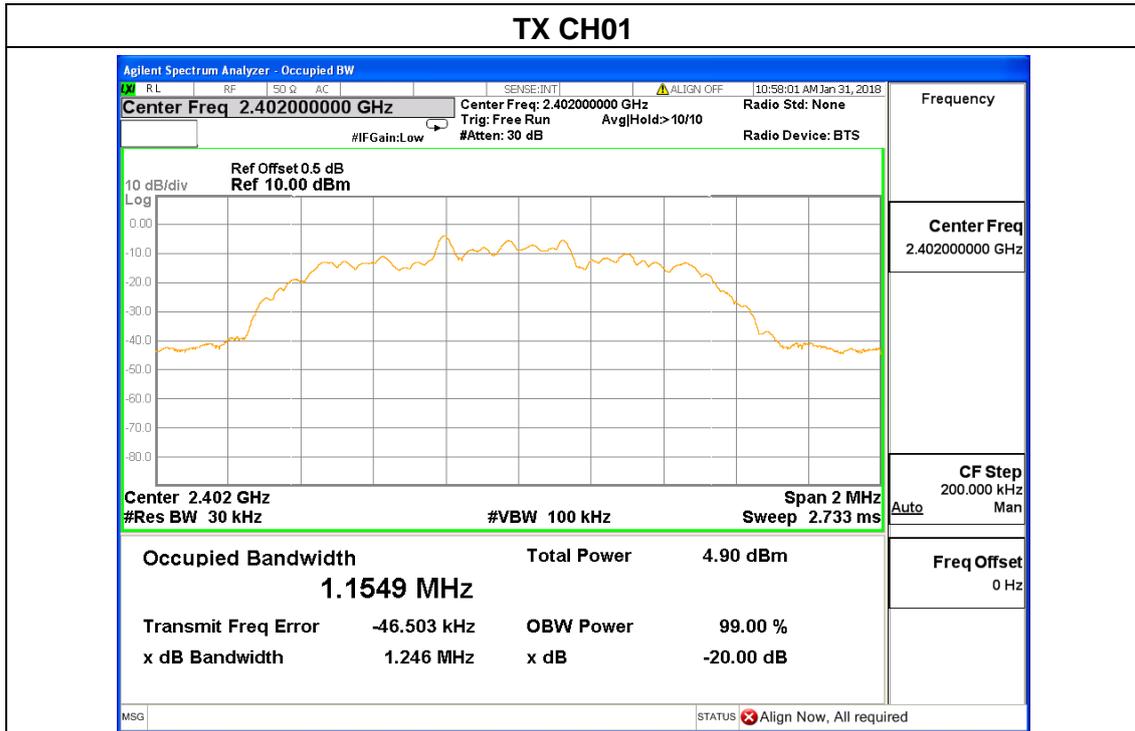
Test plots

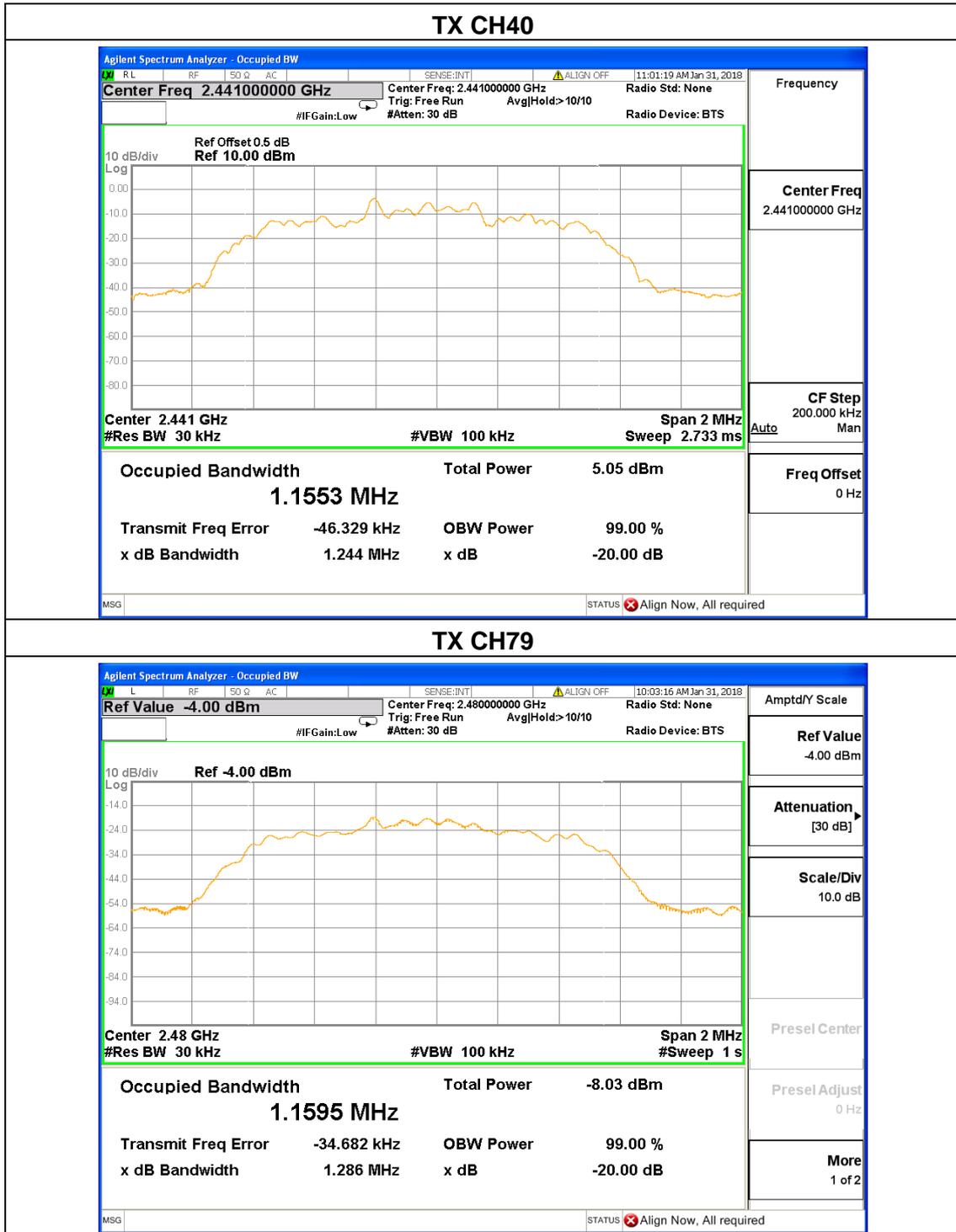
GFSK mode



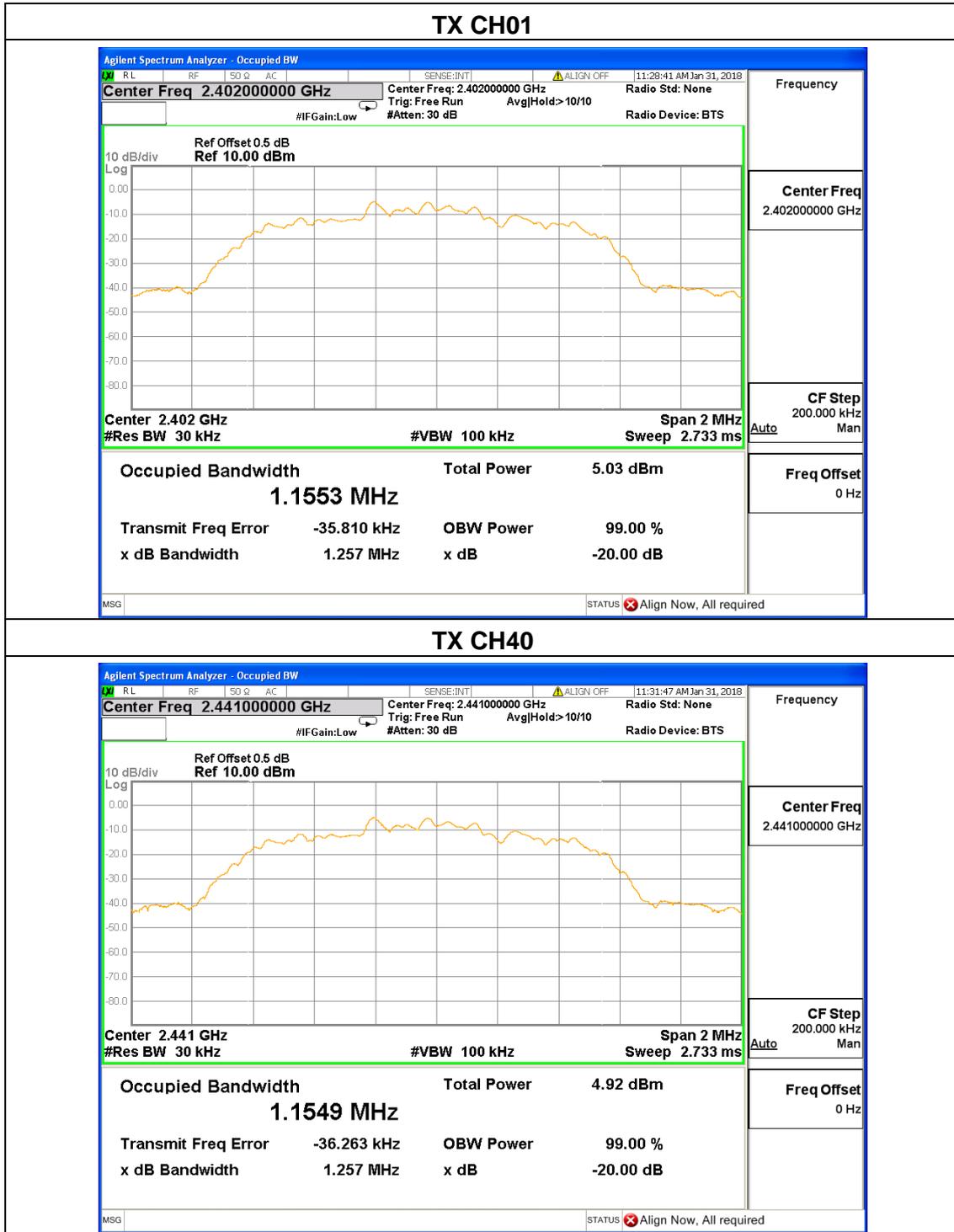


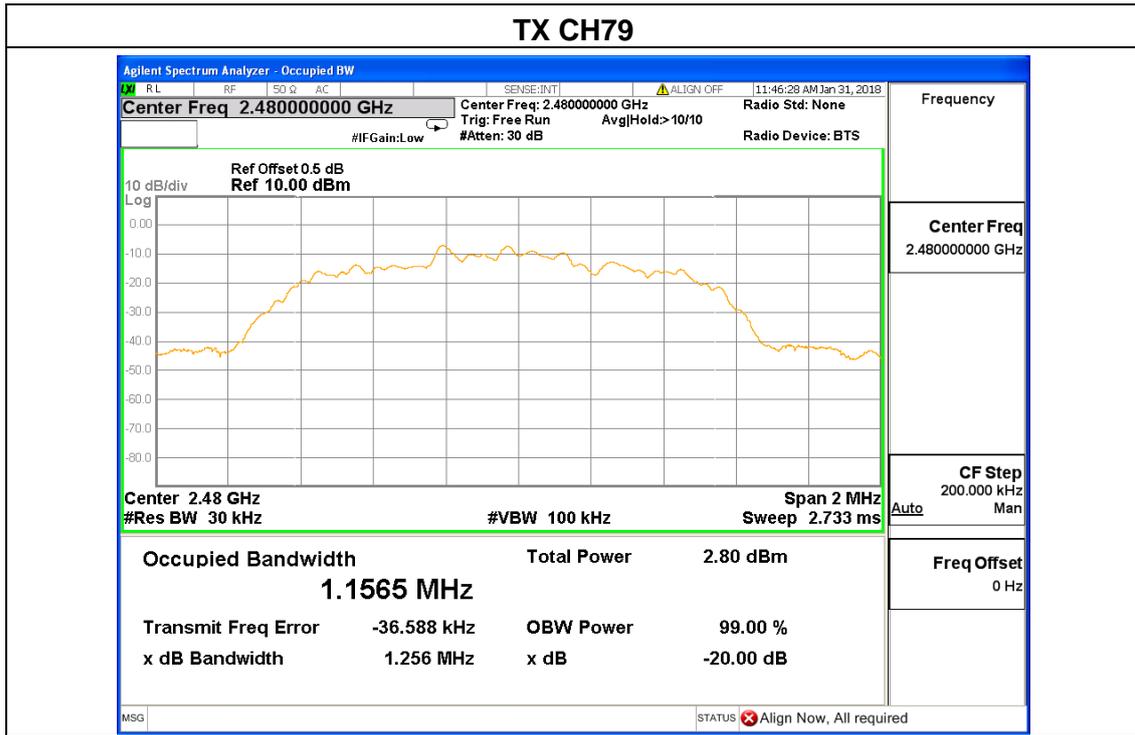
**$\pi/4$ -DQPSK**





**8DPSK mode**



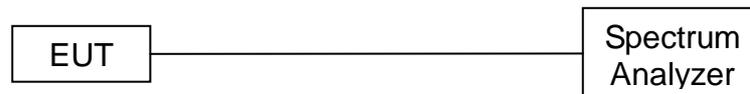


## 5.6 Carrier frequency separation

### 5.6.1 Limit

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
15.247(a)(1)	Channel Separation	>25KHz or >two-thirds of the 20 dB bandwidth (Which is greater)	2400-2483.5

### 5.6.2 Test setup



### 5.6.3 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=30 kHz, VBW=100 kHz, detector= Peak, Sweep Time =auto.
- (3) The EUT was set to the Hopping Mode for Channel Separation Test and continuously transmitting for the Test.

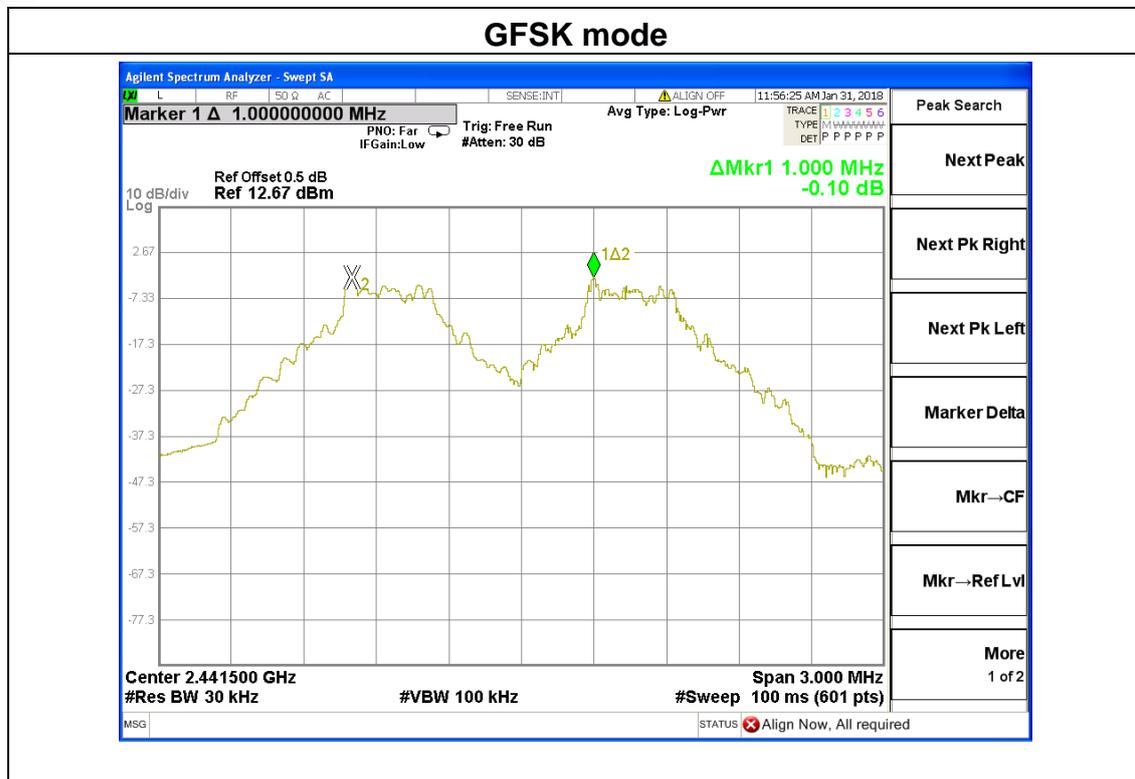
### 5.6.4 Test results

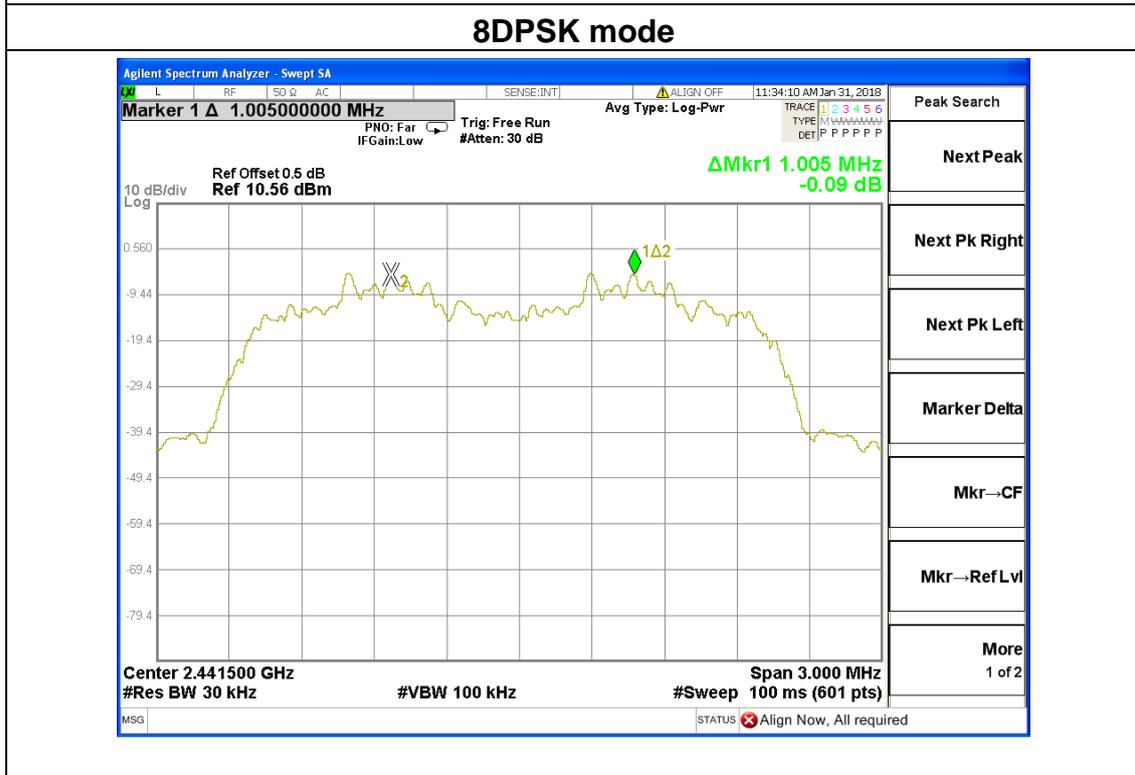
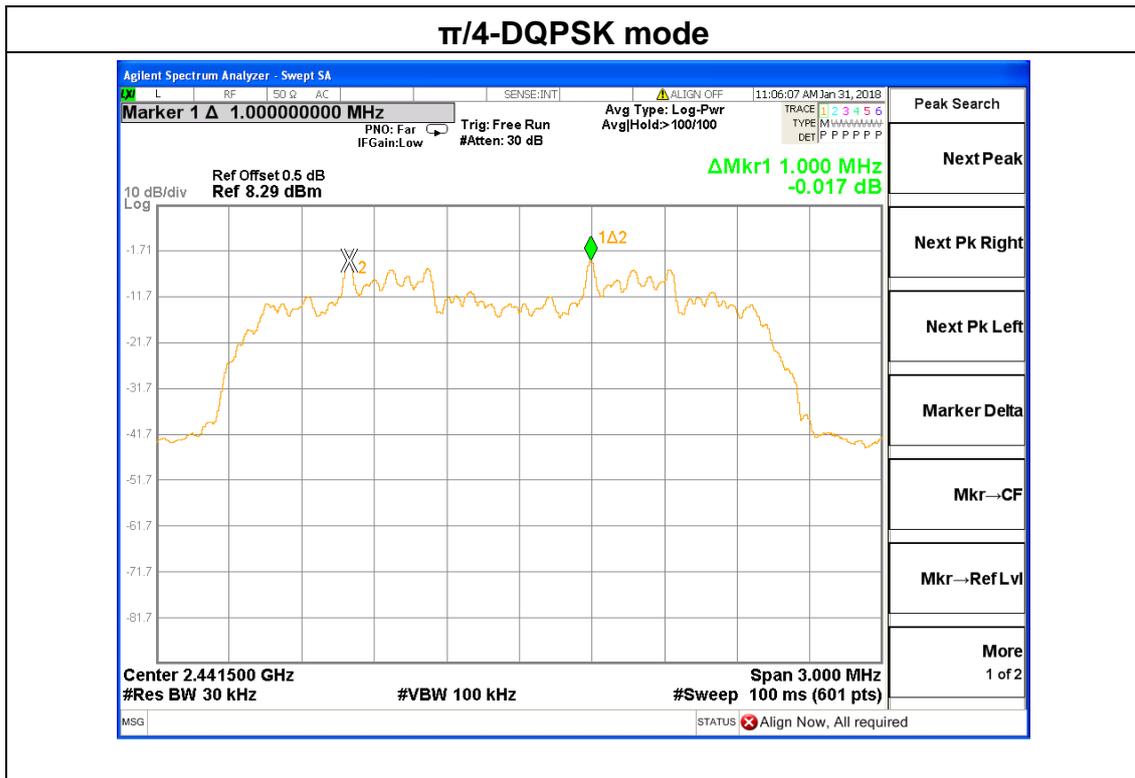
Test data

EUT :	Bluetooth audio transmitter	Model Name :	KCDBT181
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V by battery
Test Mode :	GFSK Mode /CH00, CH39, CH78		

Mode	Channel	Frequency (MHz)	Test Result (KHz)	Limit (kHz)	Result
GFSK	Middle	2441	1000	668	Pass
$\pi/4$ -DQPSK	Middle	2441	1000	668	Pass
8DPSK	Middle	2441	1005	668	Pass

Test plots

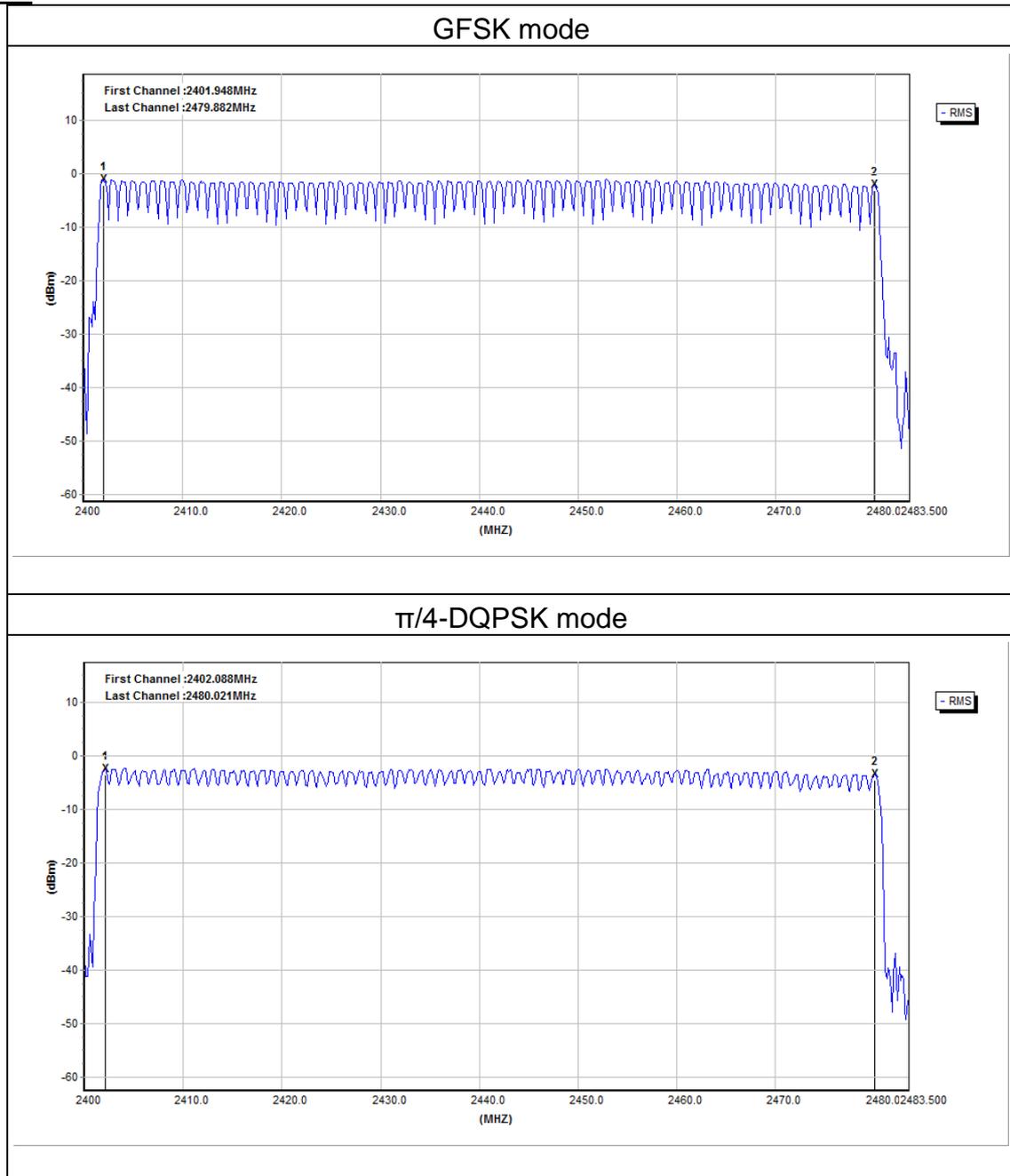


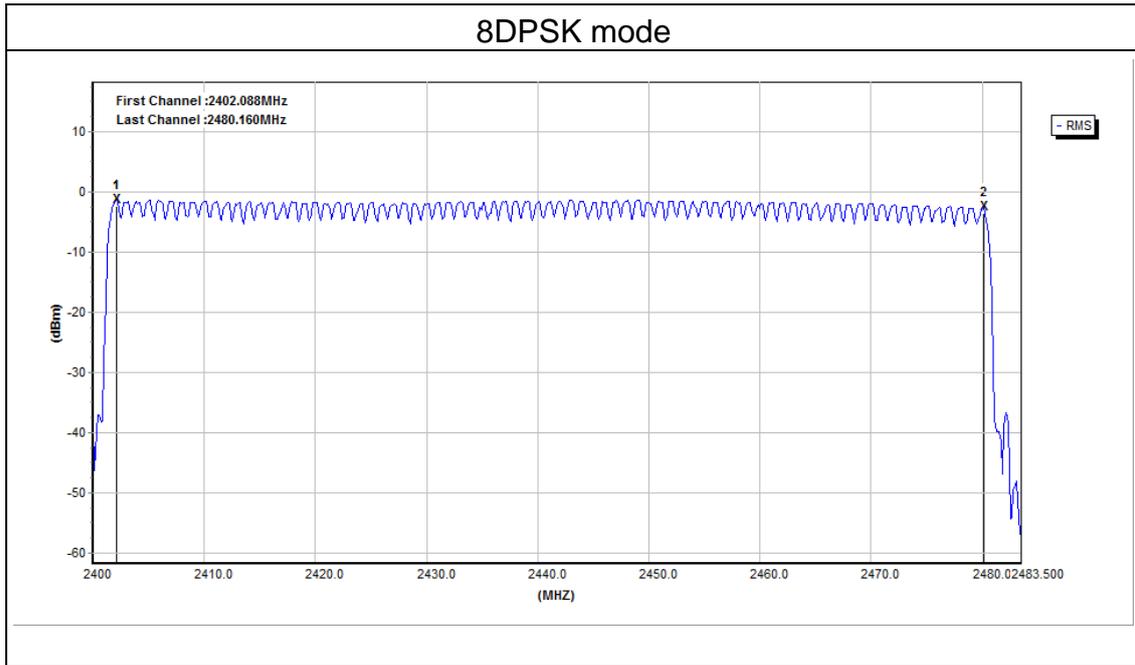


**HOPPING CHANNEL**

Mode	Quantity of Hopping Channel	Limit	Results
GFSK, $\pi/4$ -DQPSK, 8DPSK	79	>15	Pass

**Test plots**





## 5.7 Dwell time

### 5.7.1 Limit

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
15.247(a)(a)	Dwell time	0.4 sec	2400-2483.5

### 5.7.2 Test setup



### 5.7.3 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=1MHz, VBW=1MHz, Span=0Hz, Detector=Peak
- (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 span.
- (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.
- (9) The EUT was set to the Hopping Mode for Dwell Time Test

### 5.7.4 Test results

Test data

EUT :	Bluetooth audio transmitter	Model Name :	KCDBT181
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V by battery
Test Mode :	GFSK, $\pi/4$ -DQPSK, 8DPSK / CH00, CH39, CH78		

Mode	Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (ms)	Limit(s)	Conclusion
GFSK	DH1	2441	0.39	124.80	<0.4	Pass
	DH3	2441	1.65	264.00	<0.4	Pass
	DH5	2441	2.90	309.33	<0.4	Pass
$\pi/4$ DQPSK	2DH1	2441	0.39	124.80	<0.4	Pass
	2DH3	2441	1.64	262.40	<0.4	Pass
	2DH5	2441	2.90	309.33	<0.4	Pass
8DPSK	3DH1	2441	0.39	124.80	<0.4	Pass
	3DH3	2441	1.64	262.40	<0.4	Pass
	3DH5	2441	2.90	309.33	<0.4	Pass

Note1: A period time = 0.4 (s) \* 79 = 31.6(s)

Note2:

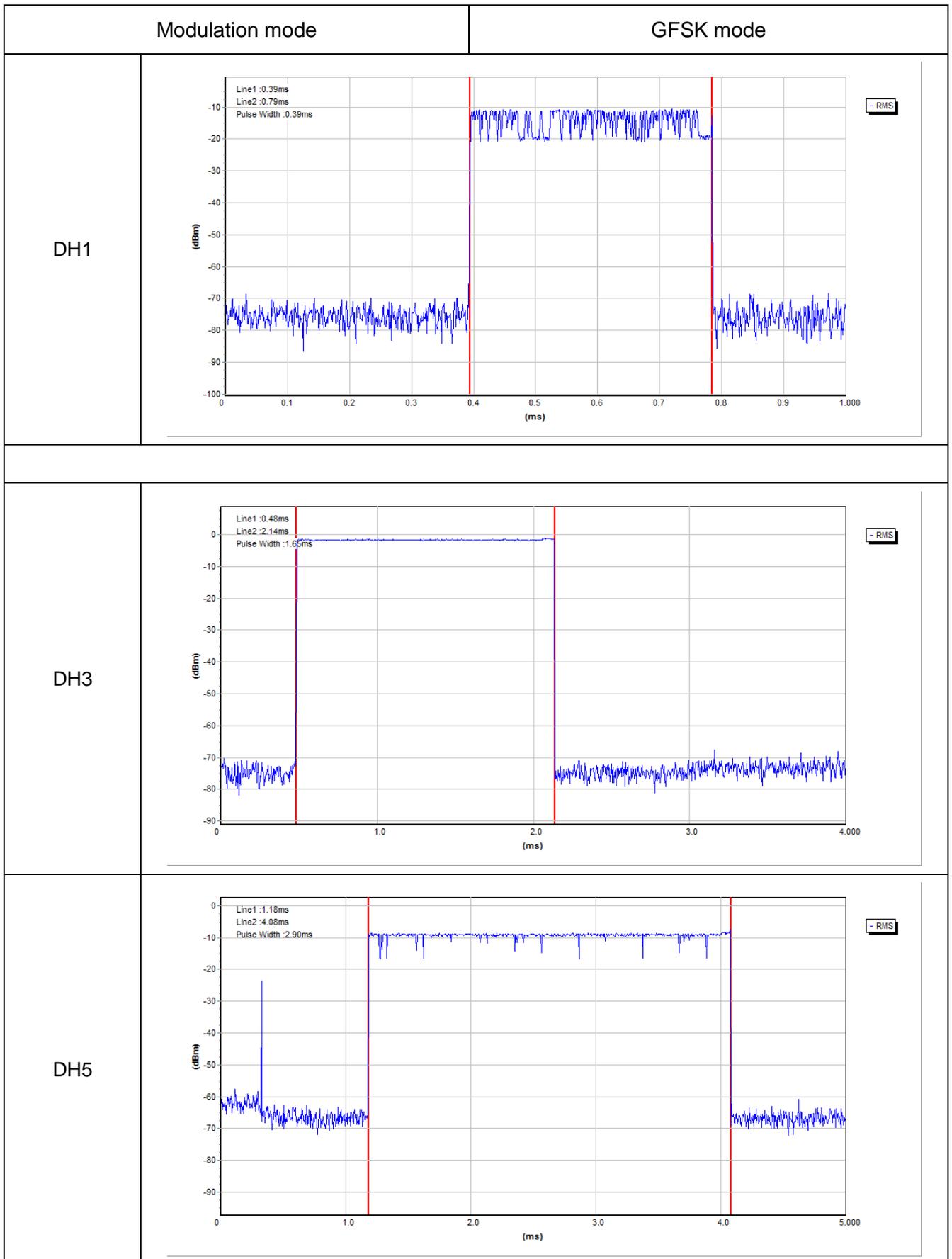
DH1 time slot = Pulse Duration \* (1600/(2\*79)) \* A period time

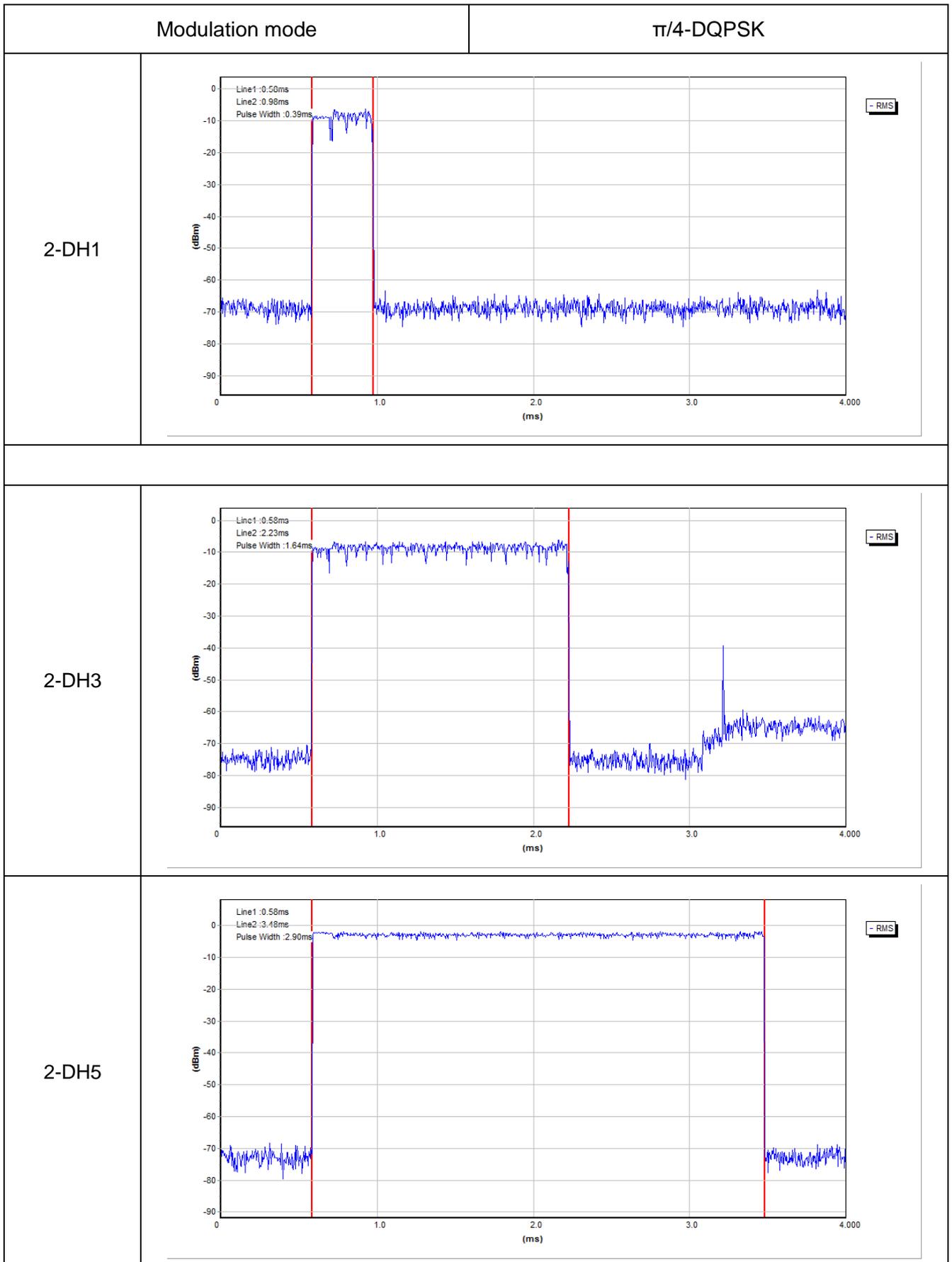
DH3 time slot = Pulse Duration \* (1600/(4\*79)) \* A period time

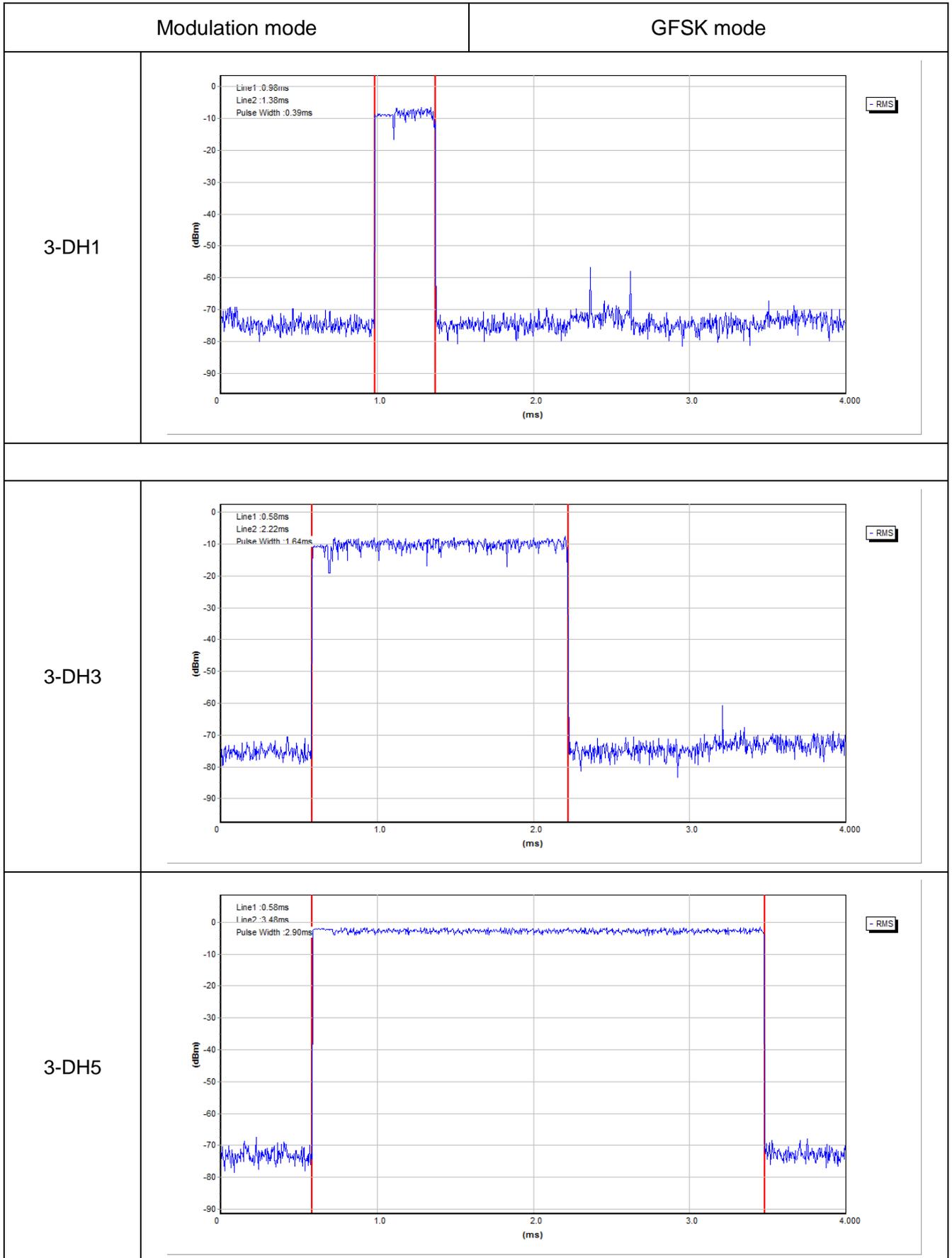
DH5 time slot = Pulse Duration \* (1600/(6\*79)) \* A period time

Note3: For GFSK,  $\pi/4$ -DQPSK and 8DPSK: The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

Test plots





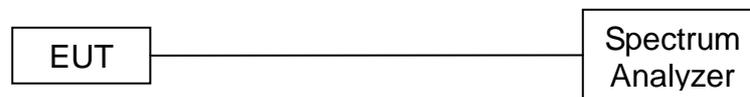


## 5.8 Conducted spurious emission and bandedge

### 5.8.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### 5.8.2 Test setup



### 5.8.3 Test procedure

- a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- e) Repeat above procedures until all measured frequencies were complete.

### 5.8.4 Test results

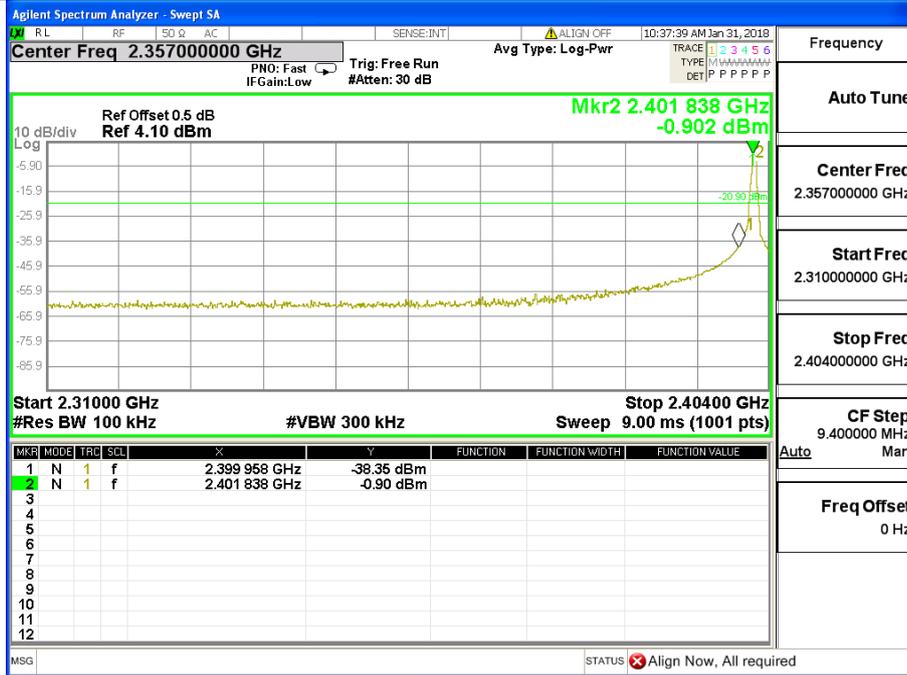
Test data

EUT :	Bluetooth audio transmitter	Model Name :	BC01
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V by battery

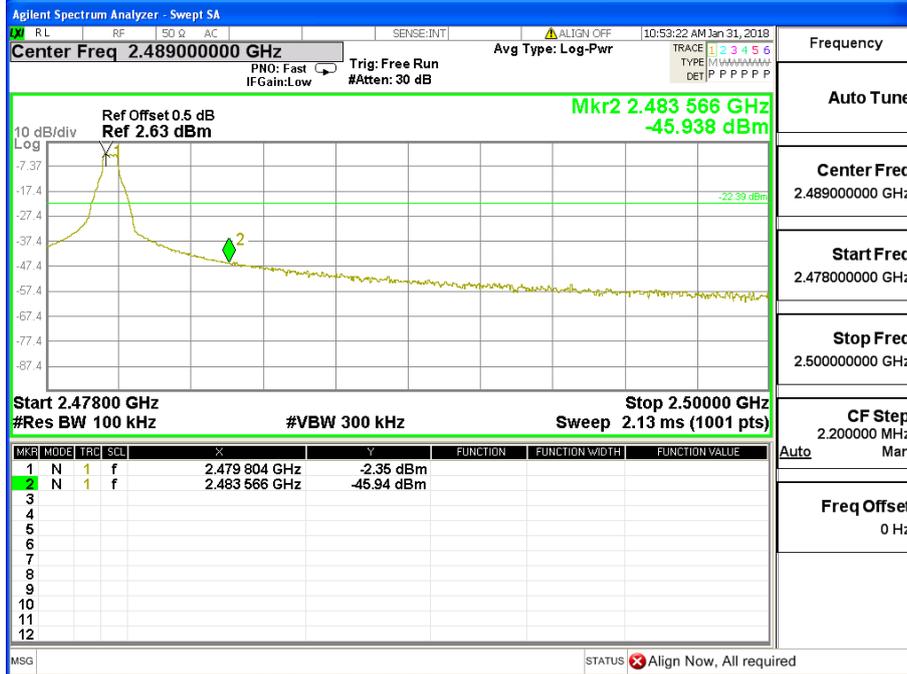
Frequency Band	Delta Peak to band emission (dBc)	> Limit (dBc)	Result
GFSK mode			
Left-band	40.47	20	Pass
Right-band	43.59	20	Pass
$\pi/4$ -DQPSK mode			
Left-band	39.37	20	Pass
Right-band	48.46	20	Pass
8DPSK mode			
Left-band	37.45	20	Pass
Right-band	47.84	20	Pass

Test plots

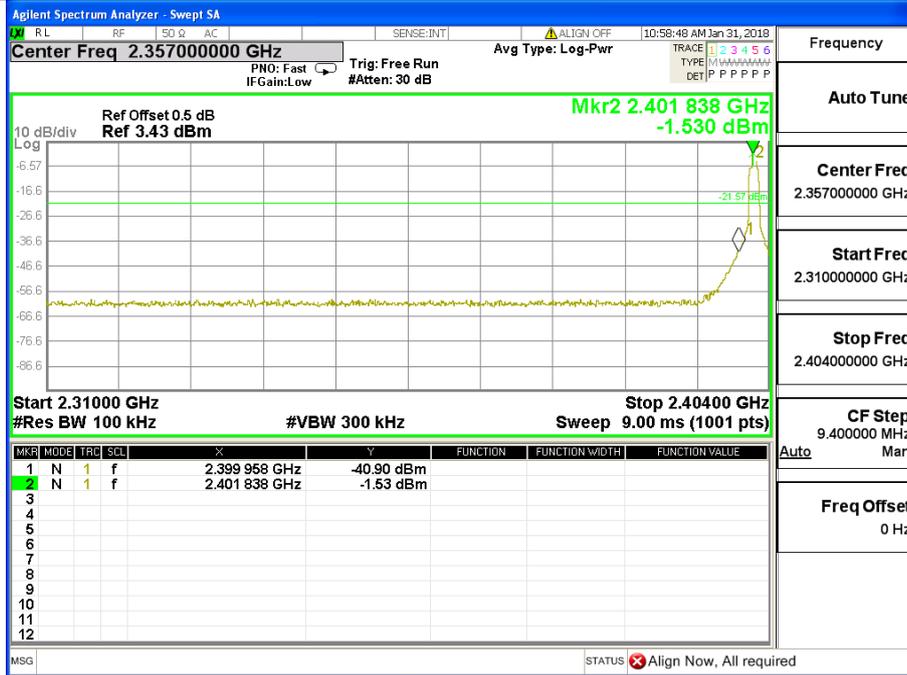
GFSK: Band Edge, Left Side



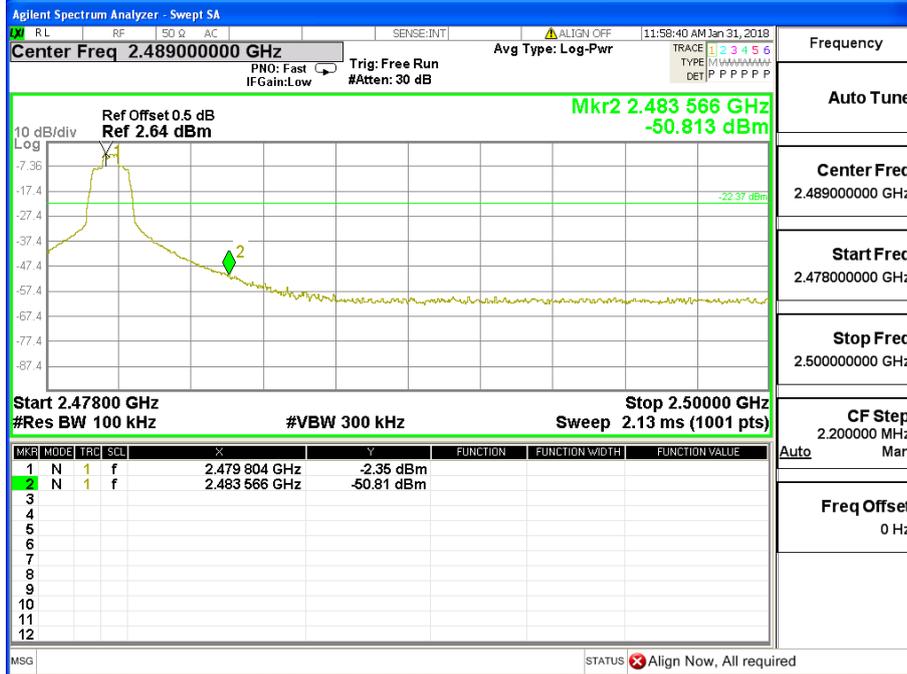
GFSK: Band Edge, Right Side



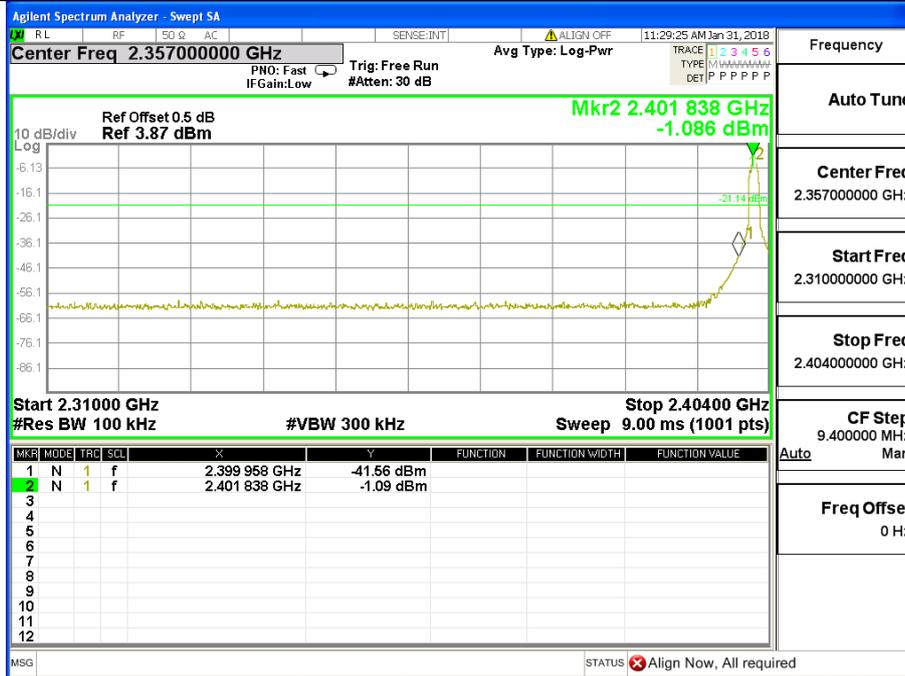
$\pi/4$ -DQPSK: Band Edge, Left Side



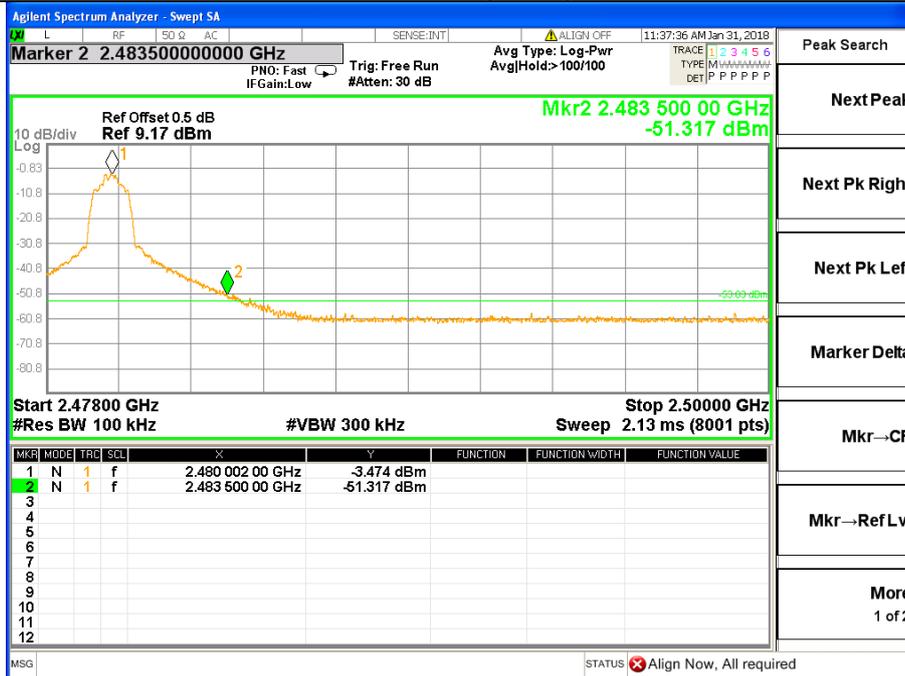
$\pi/4$ -DQPSK: Band Edge, Right Side



### 8DPSK: Band Edge, Left Side



### 8DPSK: Band Edge, Right Side



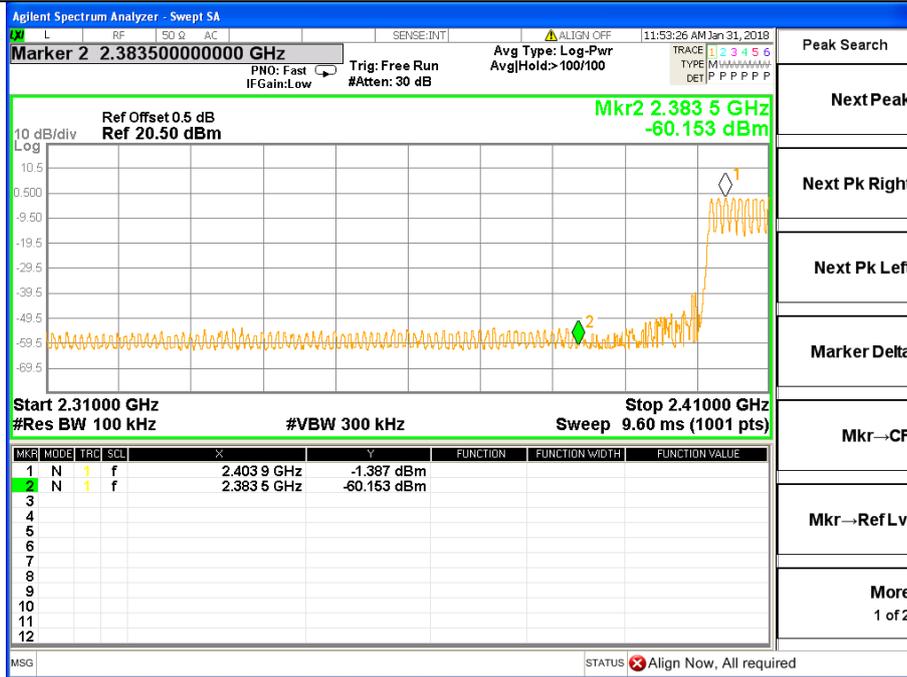
Hopping Mode

Frequency Band	Delta Peak to band emission (dBc)	> Limit (dBc)	Result
GFSK mode			
Left-band	58.766	20	Pass
Right-band	43.286	20	Pass
$\pi/4$ -DQPSK mode			
Left-band	49.582	20	Pass
Right-band	54.436	20	Pass
8DPSK mode			
Left-band	49.582	20	Pass
Right-band	43.286	20	Pass

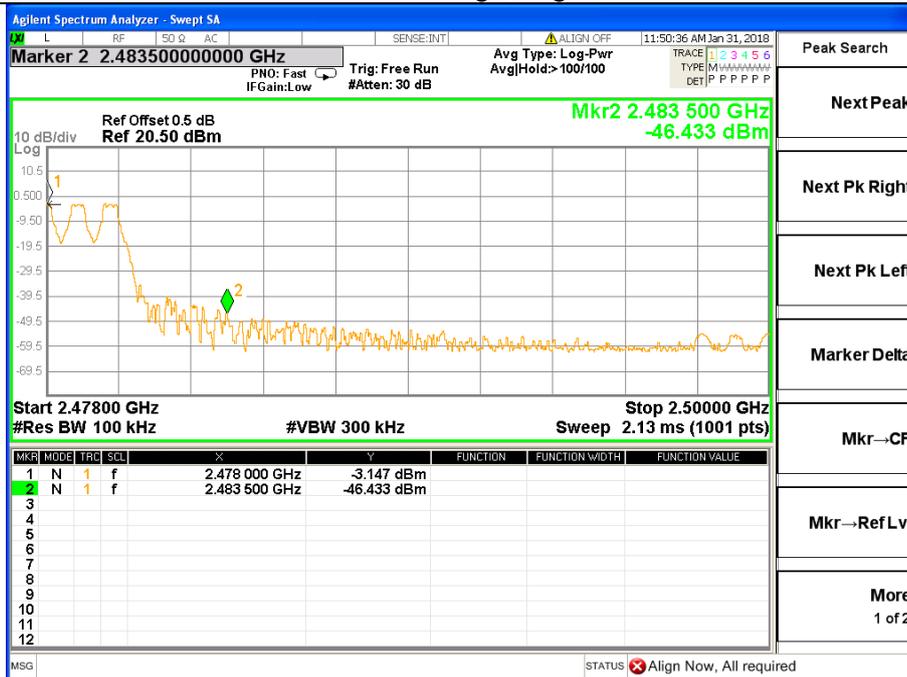
Note: ◇1-◇2

Test plots

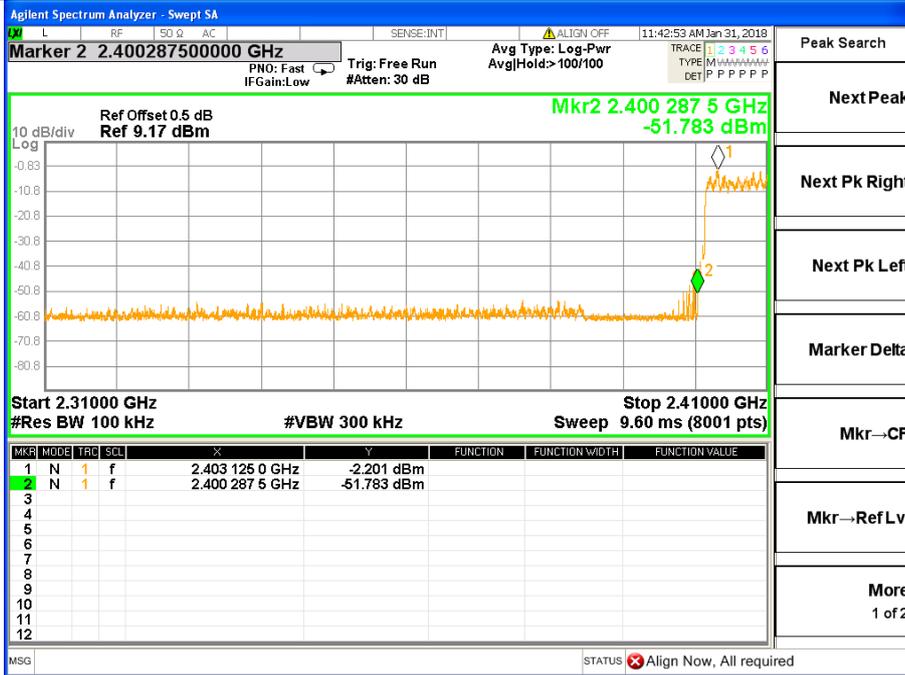
GFSK: Band Edge, Left Side



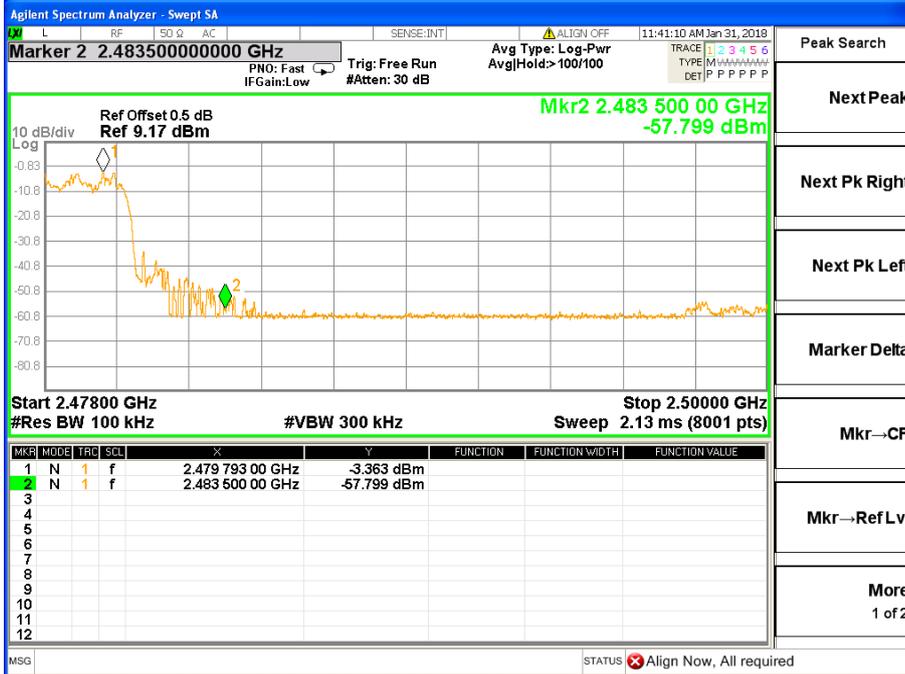
GFSK: Band Edge, Right Side



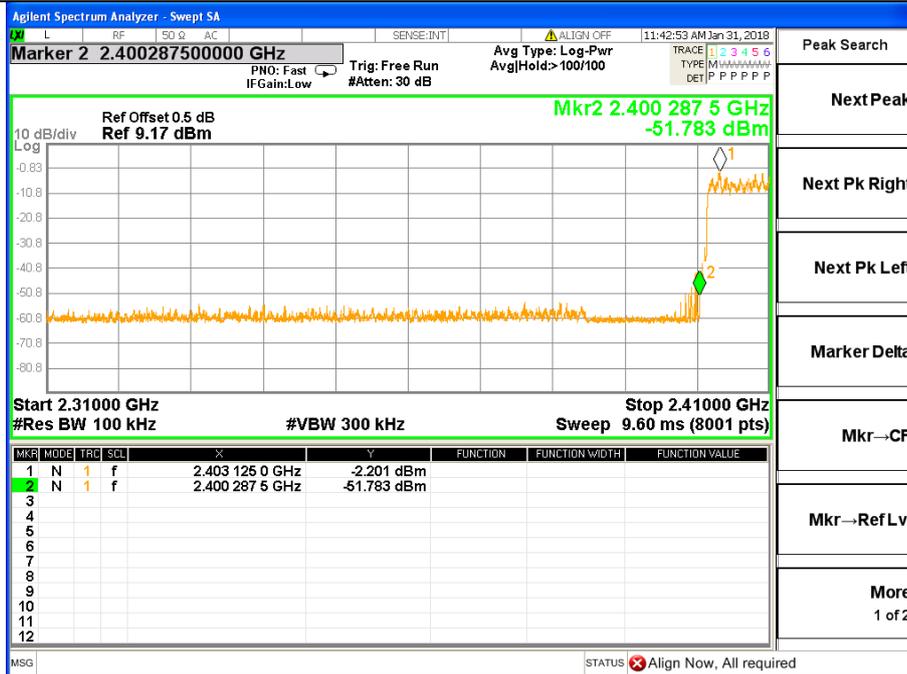
$\pi/4$ -DQPSK: Band Edge, Left Side



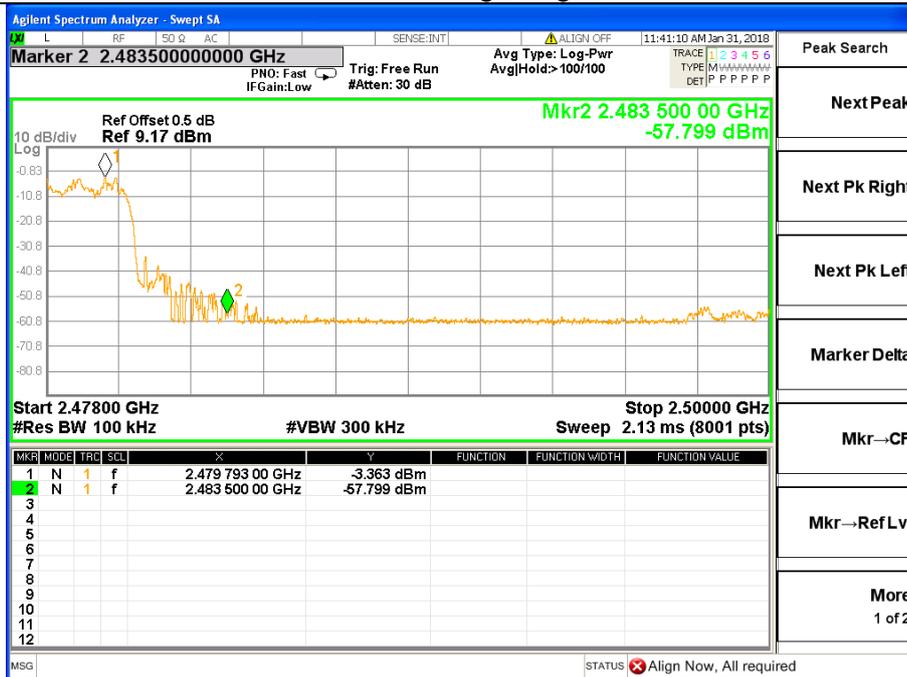
$\pi/4$ -DQPSK Band Edge, Right Side



### 8DPSK: Band Edge, Left Side



### 8DPSK Band Edge, Right Side



PHOTOGRAPHS OF THE TEST SETUP

**Radiated Spurious Emission Below 1G**



**Radiated Spurious Emission Above 1G**



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