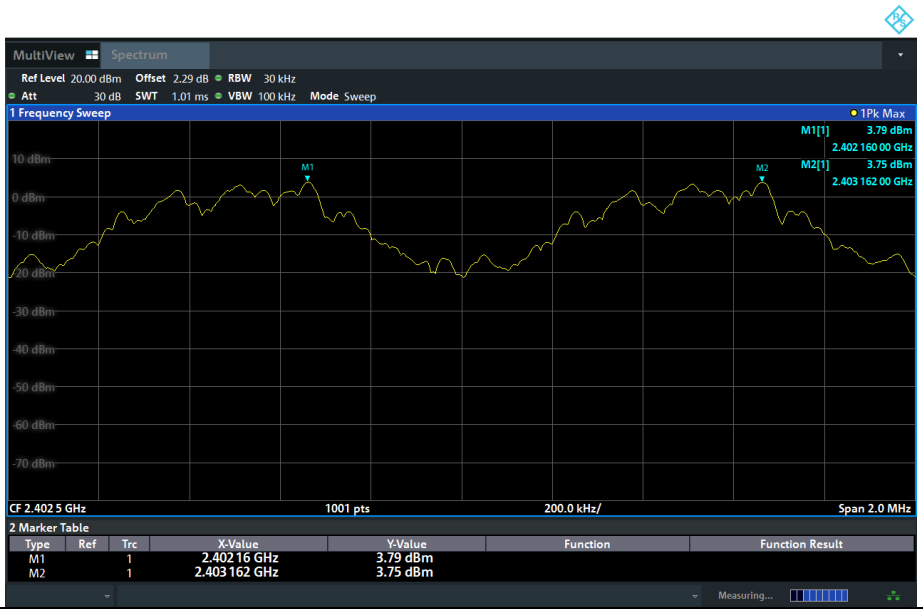
8800 Bluetooth chip:

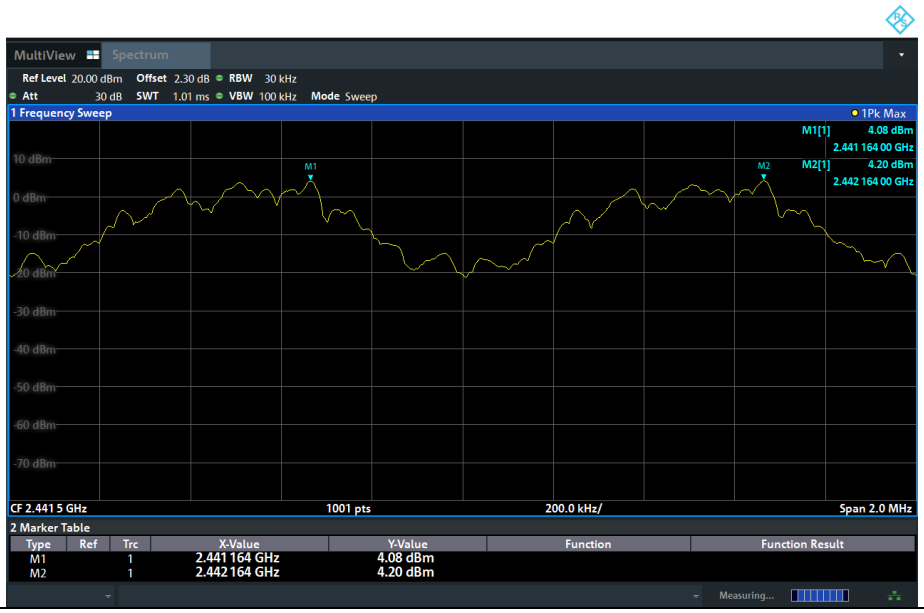
Mode	Channel	Frequency (MHz)	Test Result (MHz)	Limit (MHz)		Result
GFSK	Low	2402	1.002	0.656	2/3 of 20dB BW	Pass
	Middle	2441	1	0.651	2/3 of 20dB BW	Pass
	High	2480	1	0.653	2/3 of 20dB BW	Pass
π/4-DQPSK	Low	2402	1.002	0.874	2/3 of 20dB BW	Pass
	Middle	2441	1	0.874	2/3 of 20dB BW	Pass
	High	2480	1.002	0.872	2/3 of 20dB BW	Pass
8DPSK	Low	2402	0.998	0.880	2/3 of 20dB BW	Pass
	Middle	2441	1	0.878	2/3 of 20dB BW	Pass
	High	2480	1.002	0.883	2/3 of 20dB BW	Pass

Test plots

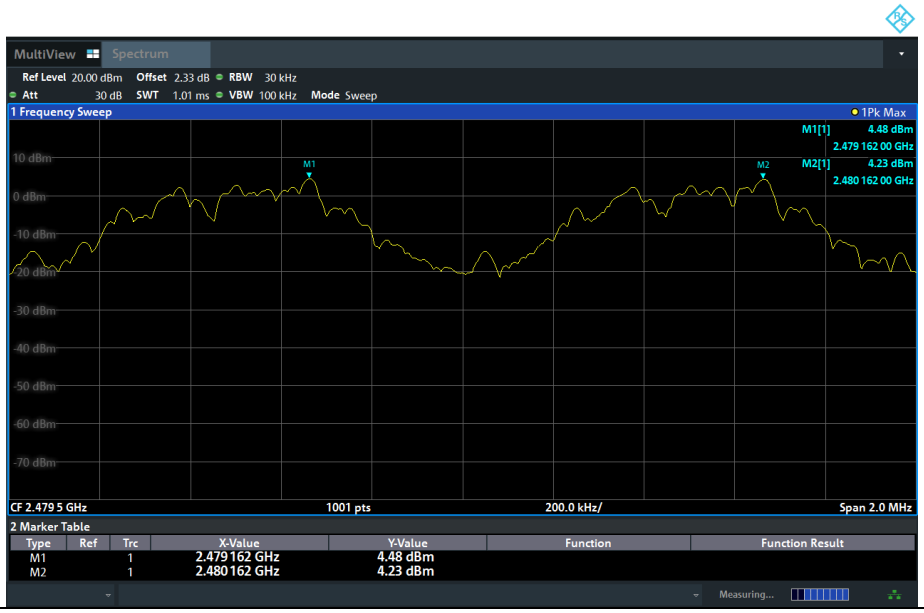
GFSK mode-CH00



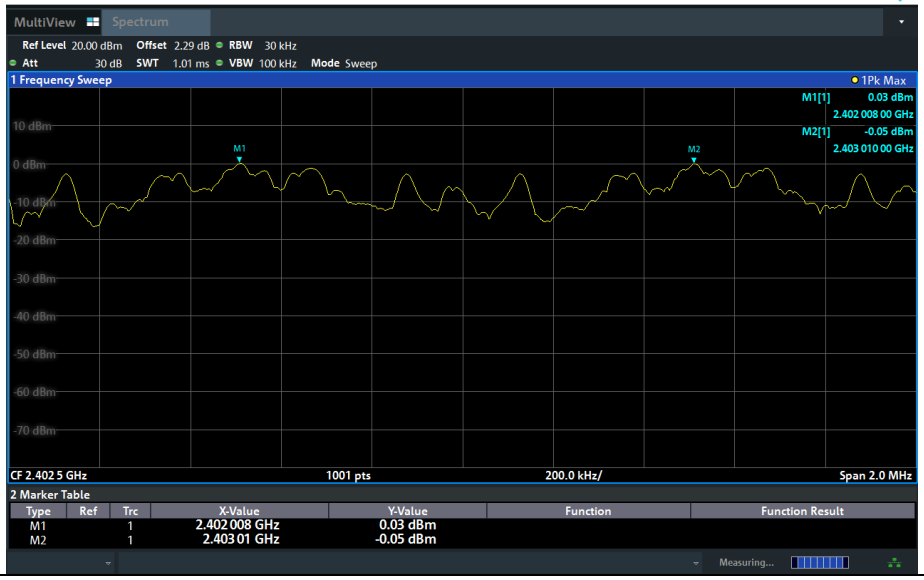
GFSK mode-CH39



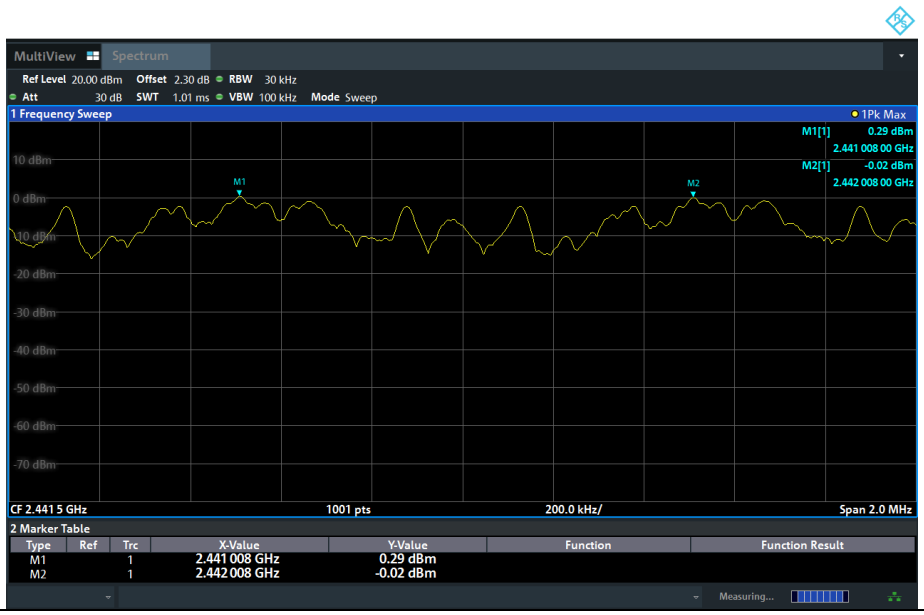
GFSK mode-CH78



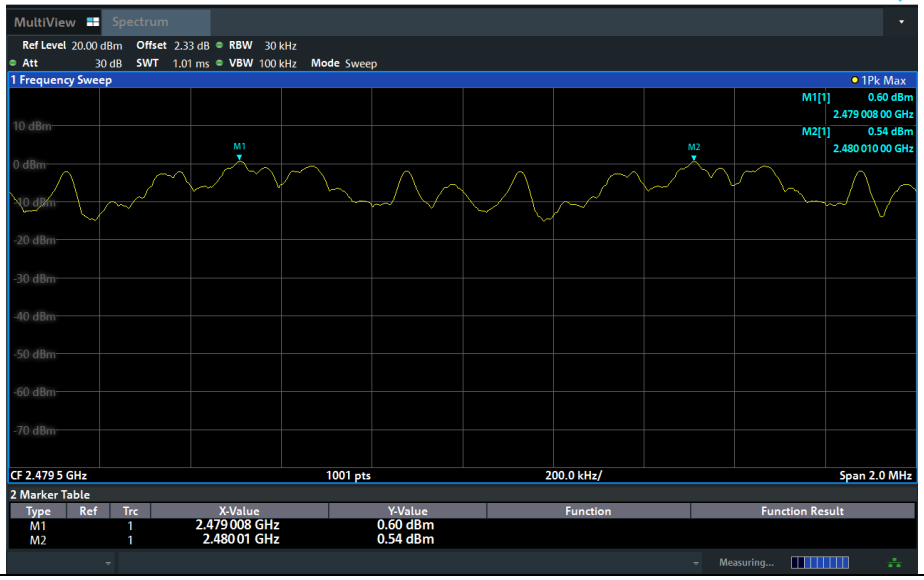
π/4-DQPSK mode-CH00



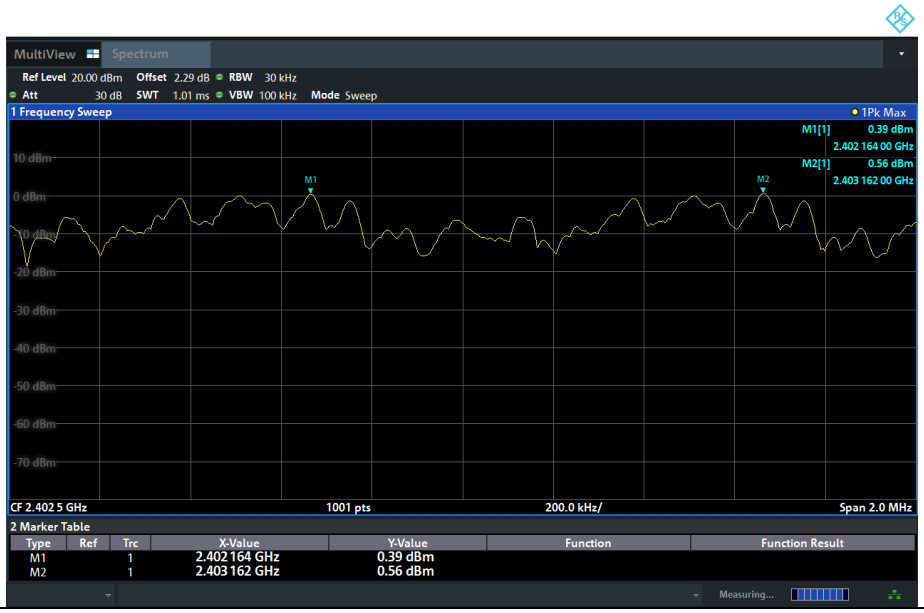
π/4-DQPSK mode-CH39



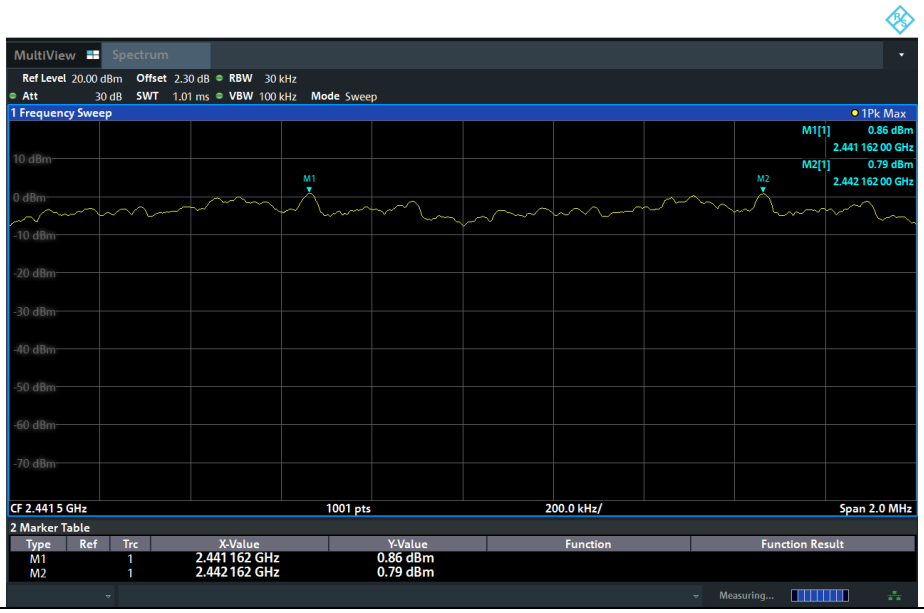
π/4-DQPSK mode-CH78



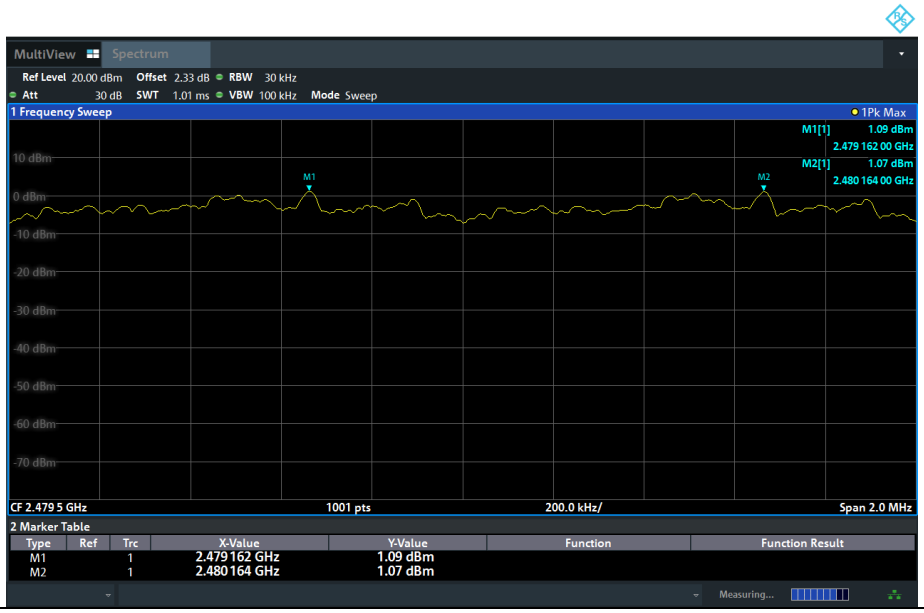
8DPSK mode-CH00



8DPSK mode-CH39



8DPSK mode-CH78



5.7 Hopping Channel Number

5.7.1 Limit

Frequency hopping systems in the 2400-2483.5MHz band shall use at least 15 channels.

5.7.2 Test Procedure

The testing follows IEEE / ANSI C63.10-2020 clause 7.8.3

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously.

The EUT must have its hopping function enabled.

Use the following spectrum analyzer settings:

Span = the frequency band of operation

RBW : To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.

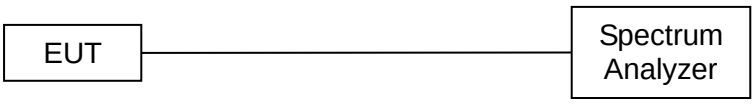
VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

5.7.3 Test Setup



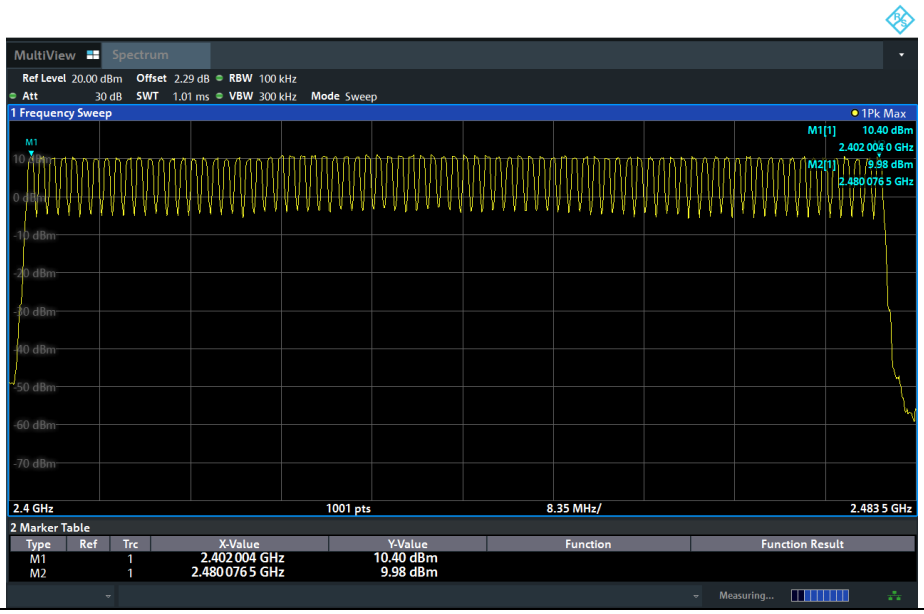
5.7.4 Test Results

8733 Bluetooth chip:

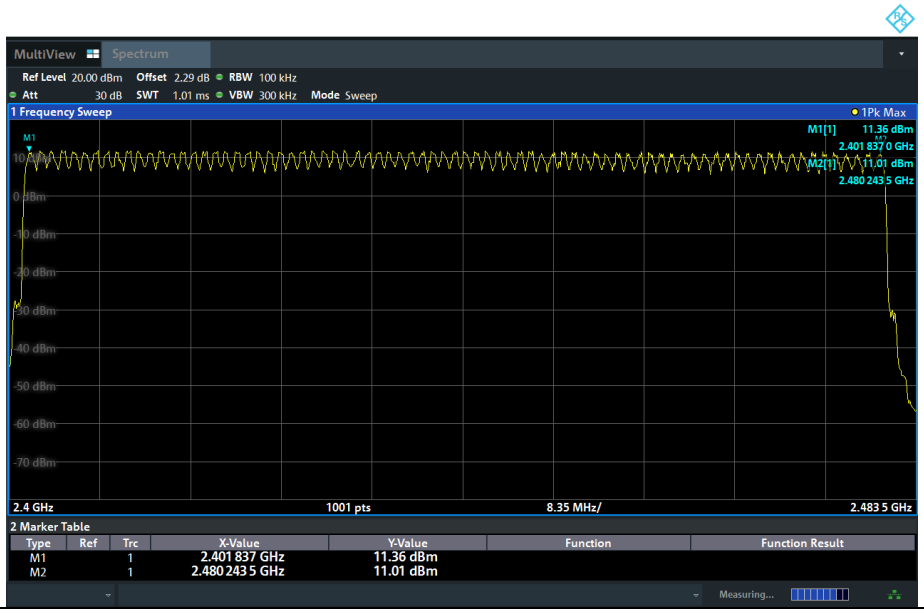
Mode	Quantity of Hopping Channel	Limit	Results
GFSK, π/4-DQPSK, 8DPSK	79	>15	Pass

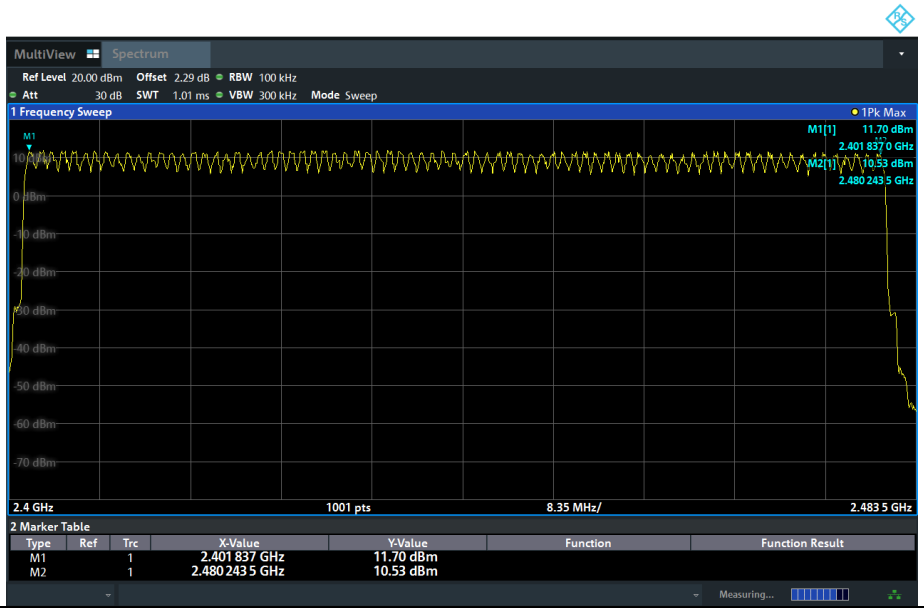
Test plots

GFSK mode



π/4-DQPSK mode



8DPSK mode


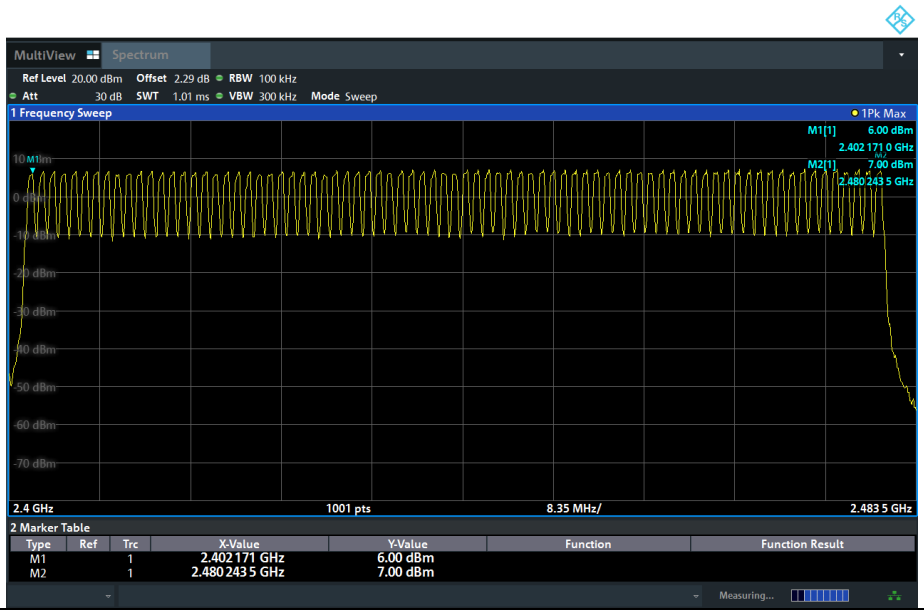
MultiView
Spectrum
Ref Level 20.00 dBm Offset 2.29 dB RBW 100 kHz
Att 30 dB SWT 1.01 ms VBW 300 kHz Mode Sweep
1 Frequency Sweep
1Pk Max
M1[1] 11.70 dBm
2.401 837 0 GHz
M2[1] 10.53 dBm
2.480 243 5 GHz
M1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
2.4 GHz
1001 pts
8.35 MHz/
2.483 5 GHz
2 Marker Table
Type Ref Trc X-Value Y-Value Function Function Result
M1 1 2.401 837 GHz 11.70 dBm
M2 1 2.480 243 5 GHz 10.53 dBm
Measuring...

8800 Bluetooth chip:

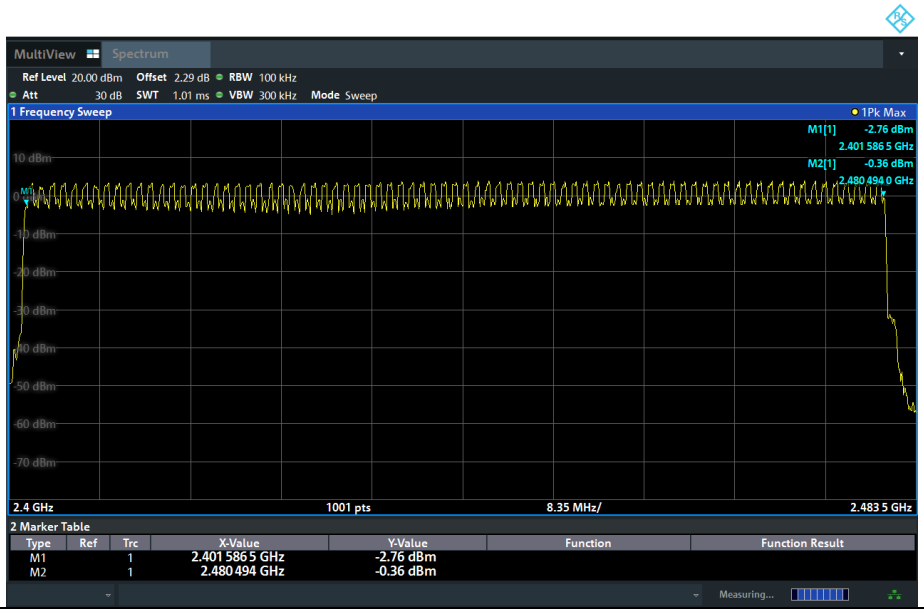
Mode	Quantity of Hopping Channel	Limit	Results
GFSK, π/4-DQPSK, 8DPSK	79	>15	Pass

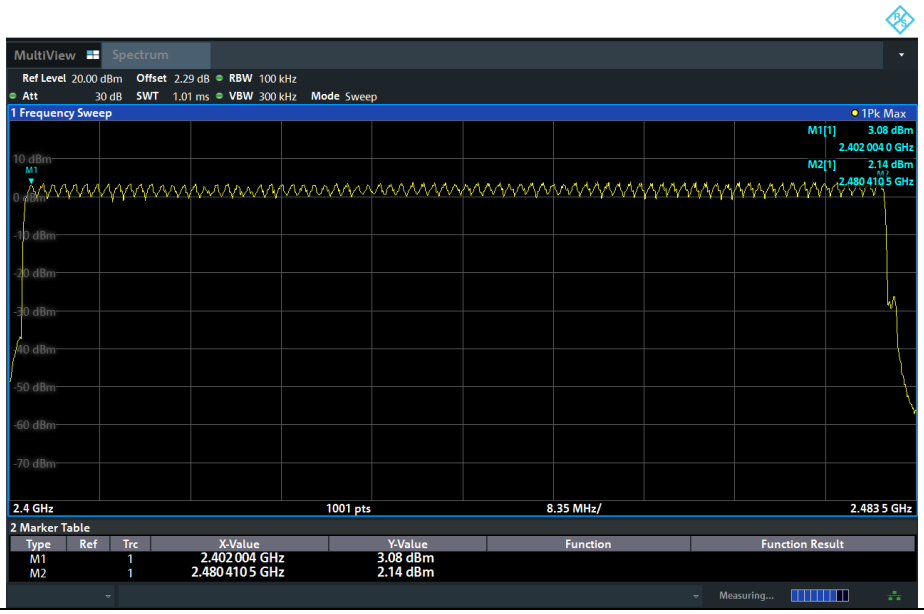
Test plots

GFSK mode



π/4-DQPSK mode



8DPSK mode


MultiView
Spectrum
Ref Level 20.00 dBm Offset 2.29 dB RBW 100 kHz
Att 30 dB SWT 1.01 ms VBW 300 kHz Mode Sweep
1 Frequency Sweep
1Pk Max
M1[1] 3.08 dBm
2.402 004 0 GHz
M2[1] 2.14 dBm
2.480 410 5 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
2.4 GHz
1001 pts
8.35 MHz/
2.483 5 GHz
2 Marker Table
Type Ref Trc X-Value Y-Value Function Function Result
M1 1 2.402 004 GHz 3.08 dBm
M2 1 2.480 410 5 GHz 2.14 dBm
Measuring...

5.8 Dwell Time

5.8.1 Limit

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
15.247(a)(1)	Dwell time	0.4 sec	2400-2483.5

5.8.2 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, 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.

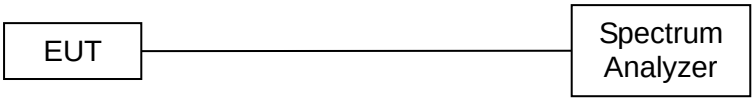
(6) Measure the maximum time duration of one single pulse.

(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.

5.8.3 Test Setup



5.8.4 Test Results

EUT:	CarPlay/Android Auto AI BOX	Model Name:	CP04
Pressure:	1012 hPa	Test Voltage:	DC 5V from adapter AC 120V/60Hz
Test Mode:	GFSK, π/4-DQPSK, 8DPSK /CH39		

8733 Bluetooth chip:

Mode	Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (ms)	Limit(s)	Conclusion
GFSK	DH1	2441	0.383	121.411	<0.4	Pass
	DH3	2441	1.639	270.435	<0.4	Pass
	DH5	2441	2.887	294.474	<0.4	Pass
π/4 DQPSK	2DH1	2441	0.391	124.338	<0.4	Pass
	2DH3	2441	1.644	243.312	<0.4	Pass
	2DH5	2441	2.891	297.773	<0.4	Pass
8DPSK	3DH1	2441	0.392	124.656	<0.4	Pass
	3DH3	2441	1.643	272.738	<0.4	Pass
	3DH5	2441	2.894	298.082	<0.4	Pass

Note:
1.A period time = 0.4 (s) * 79 = 31.6(s)

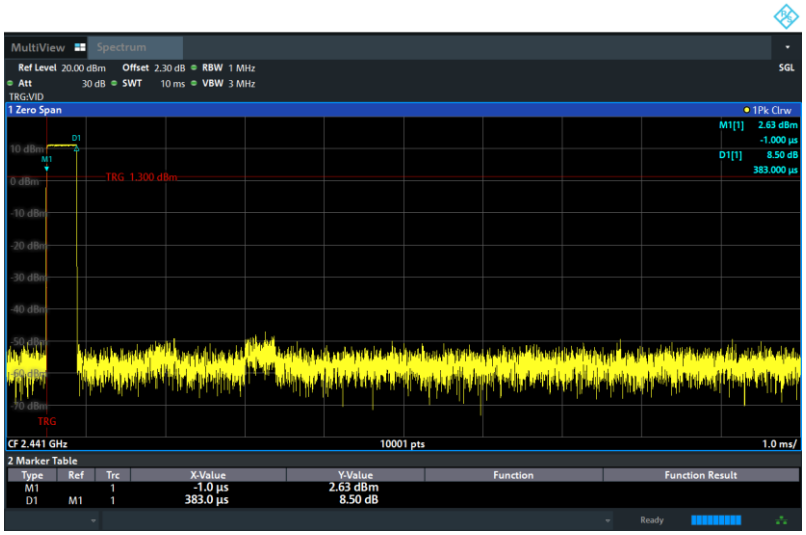
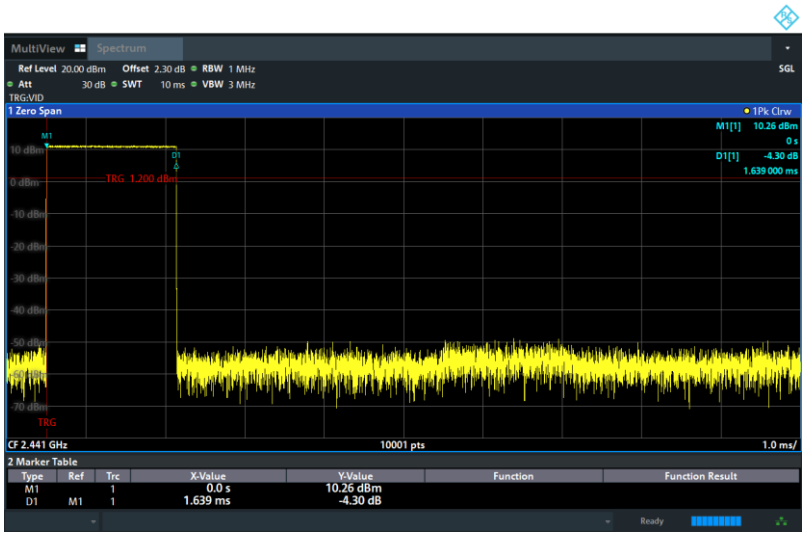
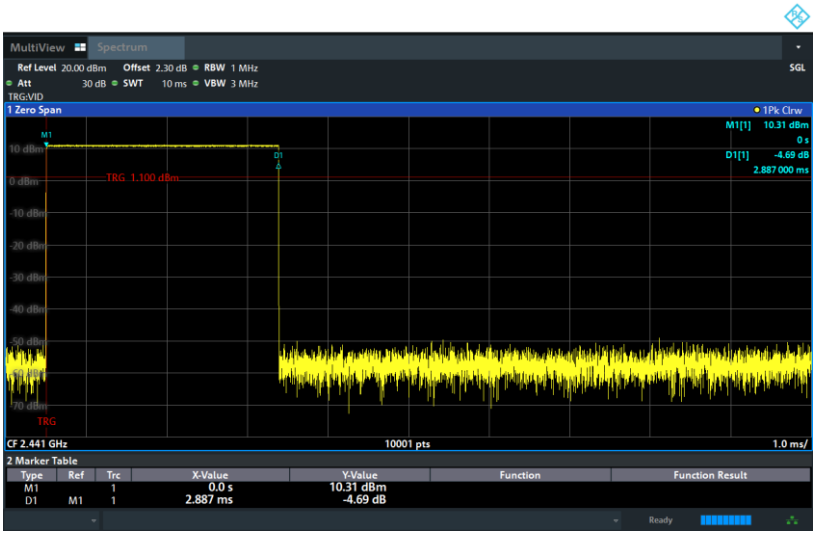
2.DH1 time slot = Pulse Duration * (1600/(2*79)) * A period time

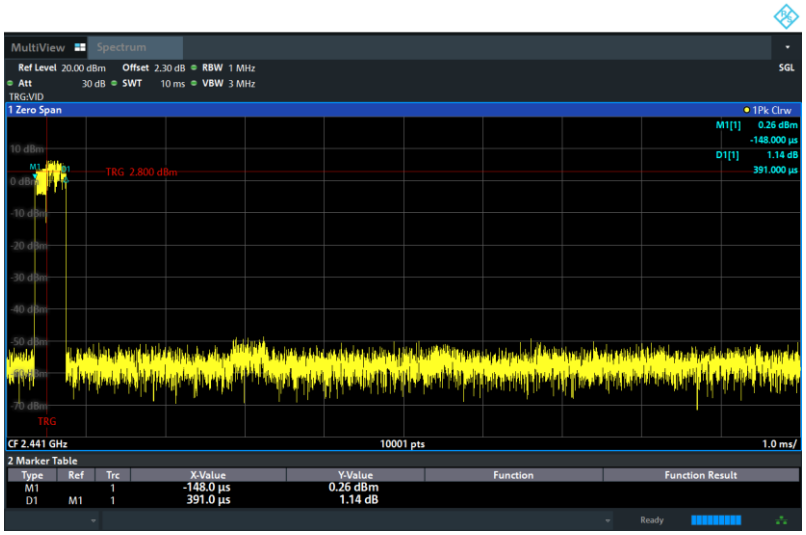
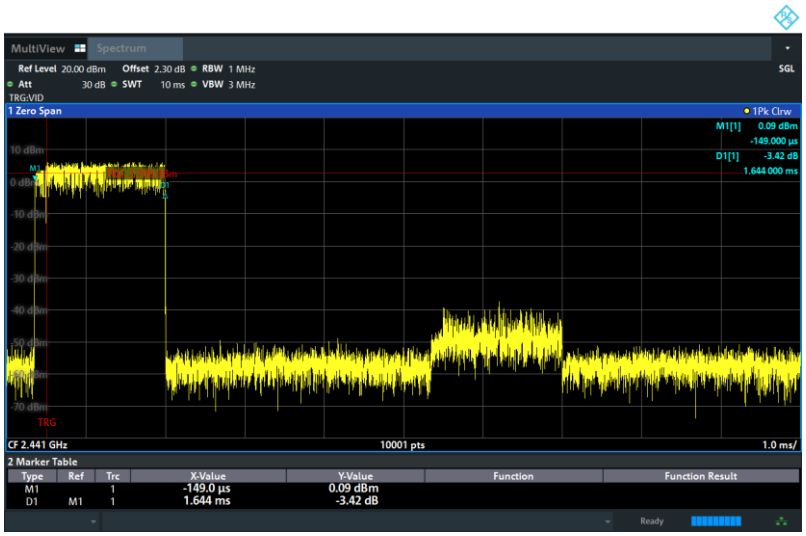
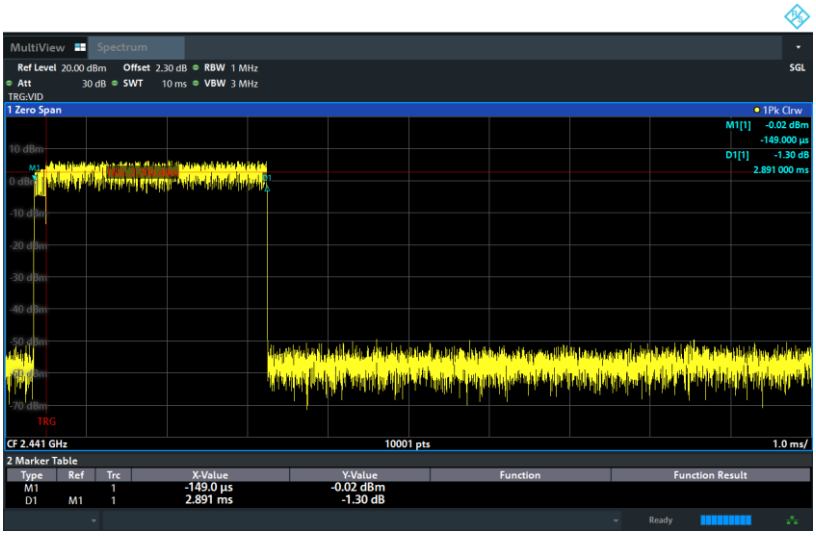
DH3 time slot = Pulse Duration * (1600/(4*79)) * A period time

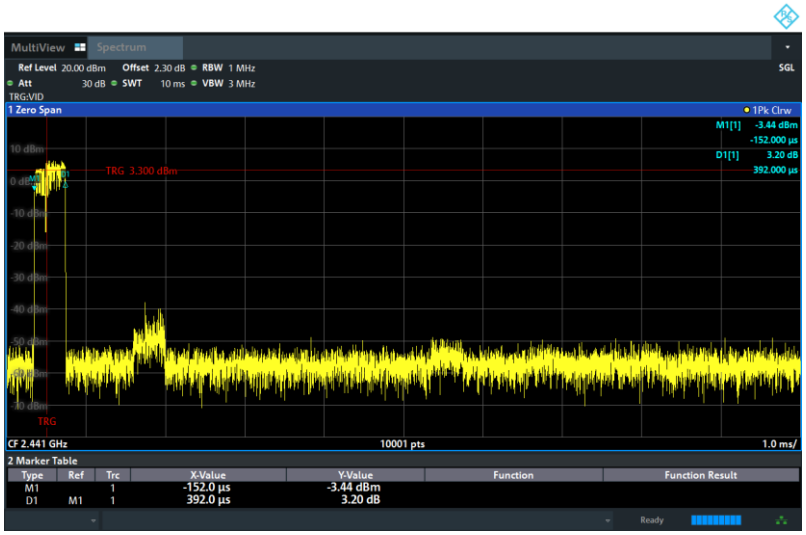
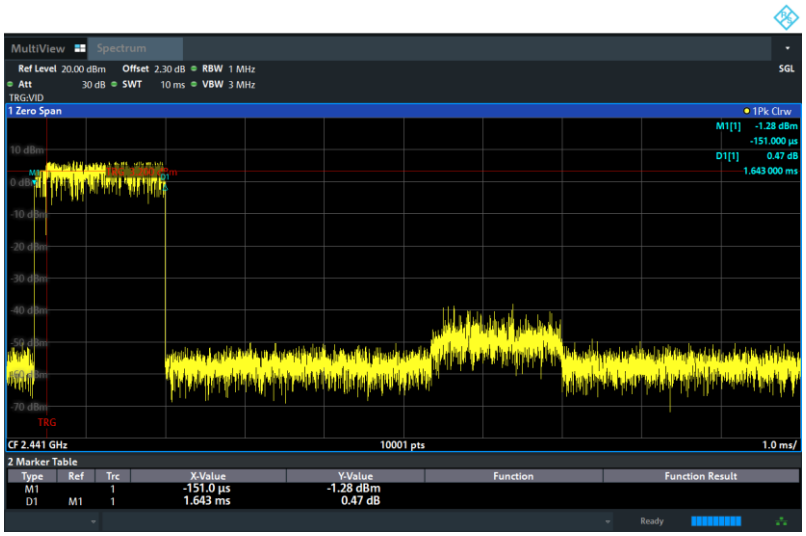
DH5 time slot = Pulse Duration * (1600/(6*79)) * A period time

3. For GFSK, π/4-DQPSK and 8DPSK: The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

Test plots

Modulation mode	GFSK mode
DH1	
DH3	
DH5	

Modulation mode	π/4-DQPSK mode
2-DH1	
2-DH3	
2-DH5	

Modulation mode	8DPSK mode
3-DH1	
3-DH3	
3-DH5	

8800 Bluetooth chip:

Mode	Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (ms)	Limit(s)	Conclusion
GFSK	DH1	2441	0.368	117.392	<0.4	Pass
	DH3	2441	1.624	258.216	<0.4	Pass
	DH5	2441	2.872	327.408	<0.4	Pass
π/4 DQPSK	2DH1	2441	0.377	120.263	<0.4	Pass
	2DH3	2441	1.63	249.39	<0.4	Pass
	2DH5	2441	2.875	376.625	<0.4	Pass
8DPSK	3DH1	2441	0.377	119.509	<0.4	Pass
	3DH3	2441	1.628	253.968	<0.4	Pass
	3DH5	2441	2.88	288	<0.4	Pass

Note:
1.A period time = 0.4 (s) * 79 = 31.6(s)

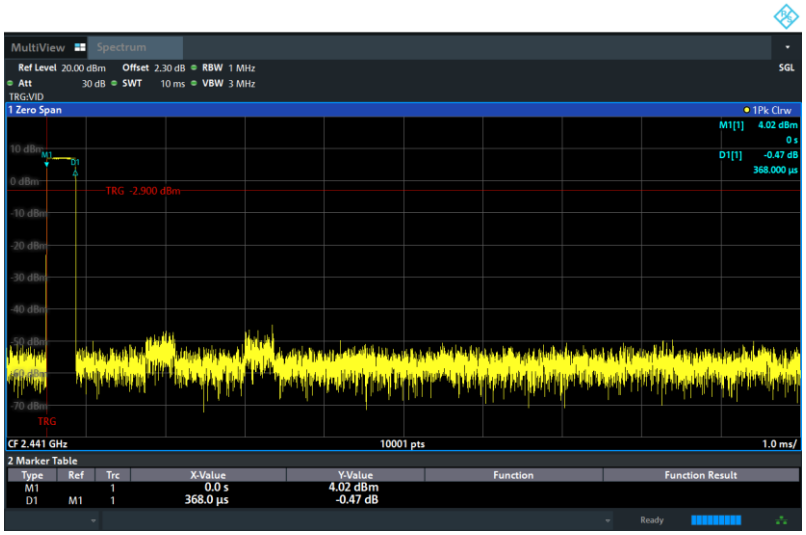
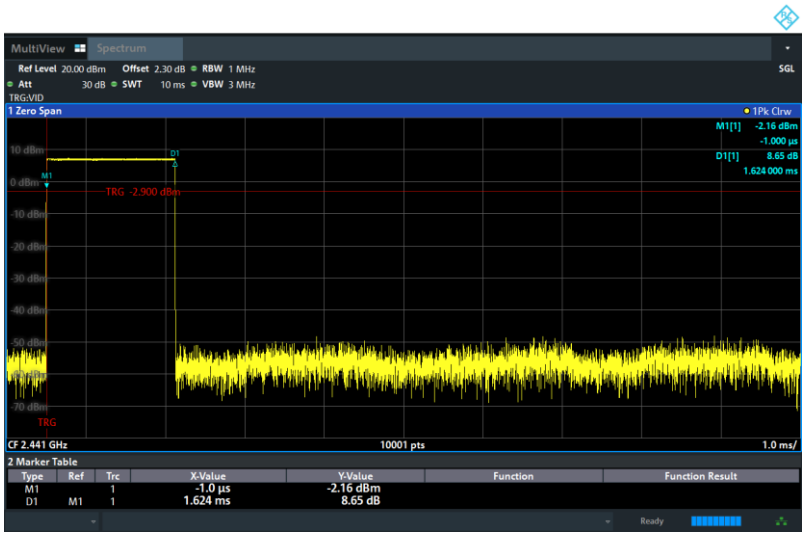
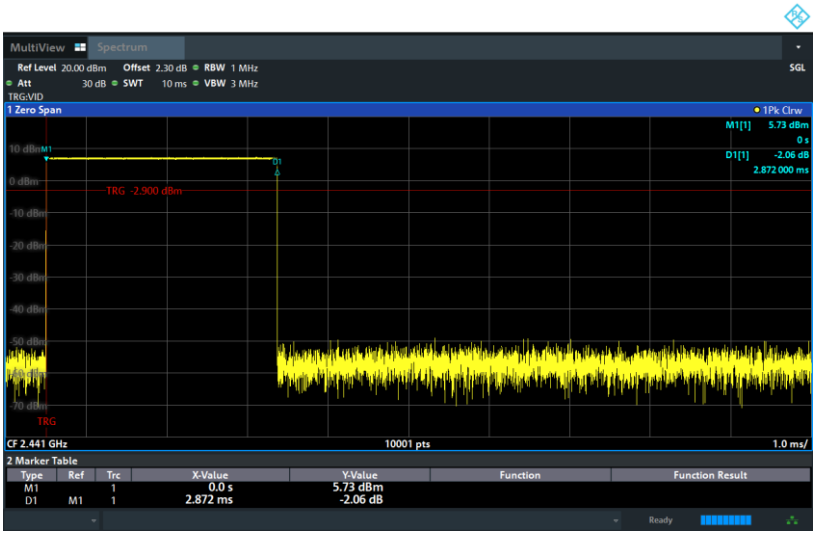
2.DH1 time slot = Pulse Duration * (1600/(2*79)) * A period time

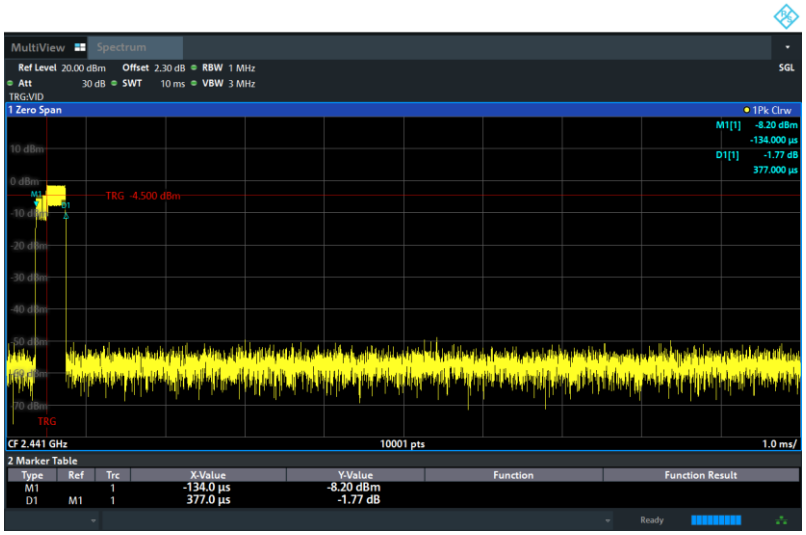
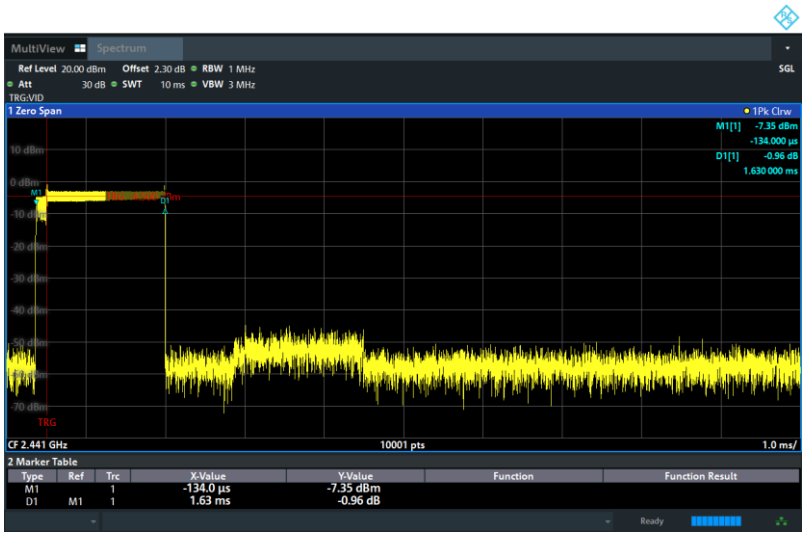
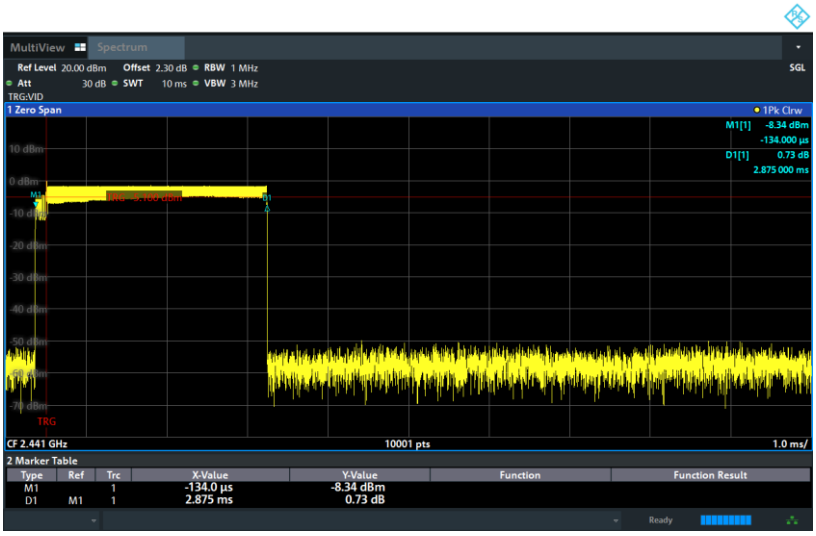
DH3 time slot = Pulse Duration * (1600/(4*79)) * A period time

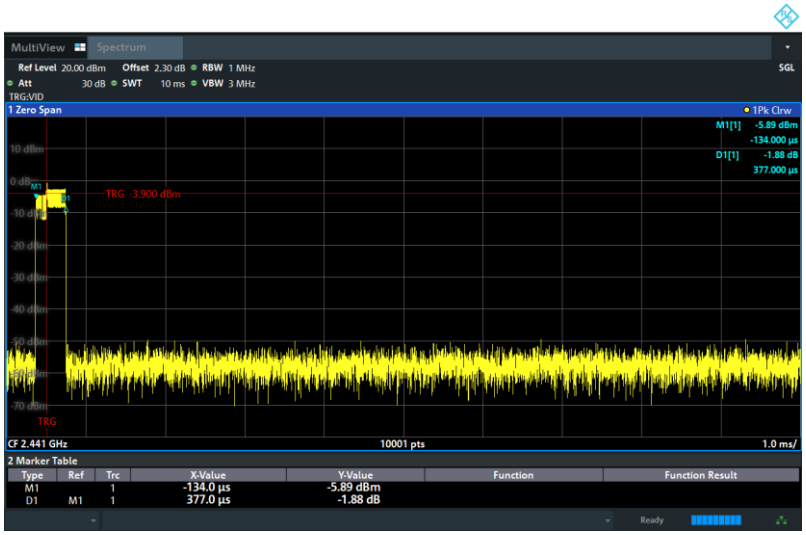
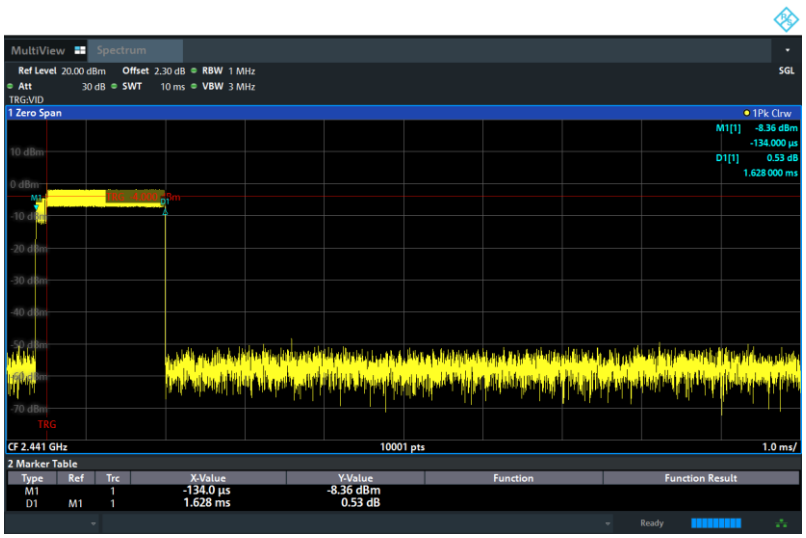
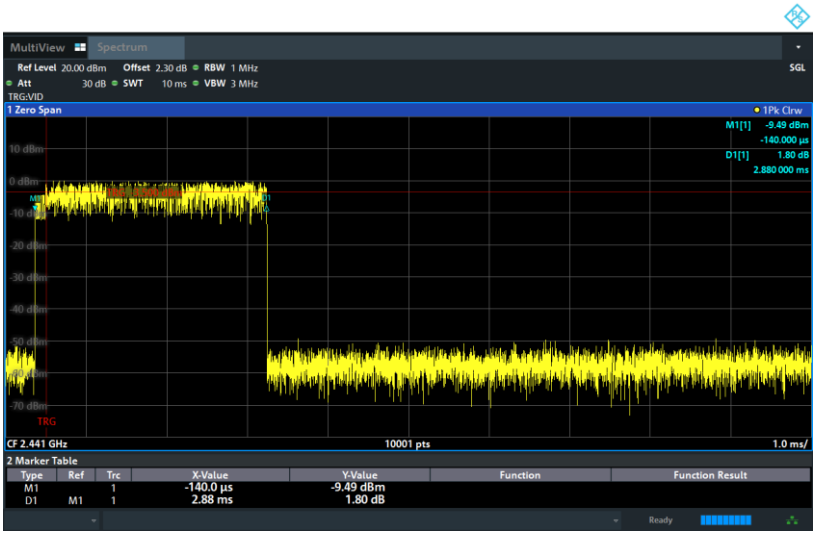
DH5 time slot = Pulse Duration * (1600/(6*79)) * A period time

3. For GFSK, π/4-DQPSK and 8DPSK: The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

Test plots

Modulation mode	GFSK mode
DH1	
DH3	
DH5	

Modulation mode	π/4-DQPSK mode
2-DH1	
2-DH3	
2-DH5	

Modulation mode	8DPSK mode
3-DH1	
3-DH3	
3-DH5	

5.9 Conducted Band Edge

5.9.1 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)).

5.9.2 Test Procedure

a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

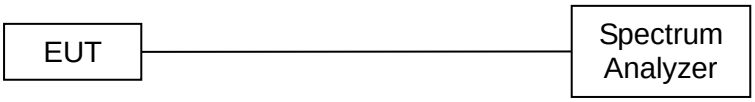
b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.

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.

5.9.3 Test Setup

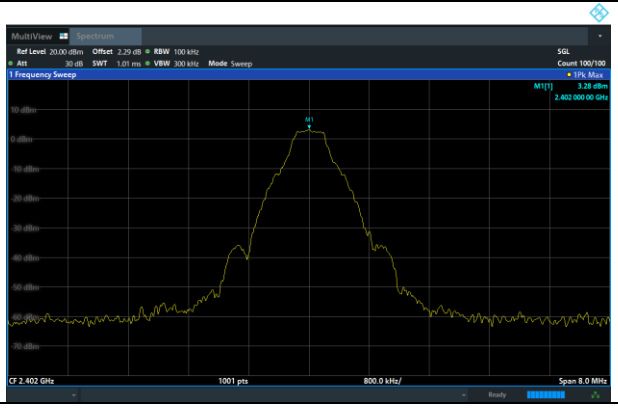


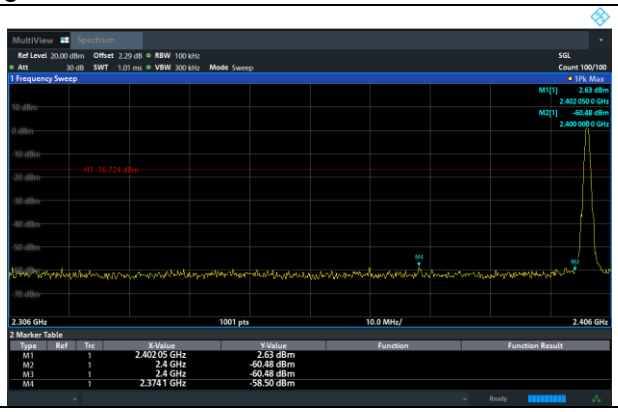
5.9.4 Test Results

EUT:	CarPlay/Android Auto AI BOX	Model Name:	CP04
Pressure:	1012 hPa	Test Voltage:	DC 5V from adapter AC 120V/60Hz

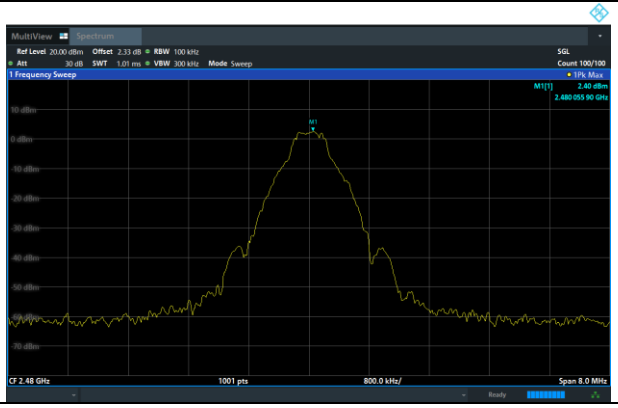
8733 Bluetooth chip:
Test plots

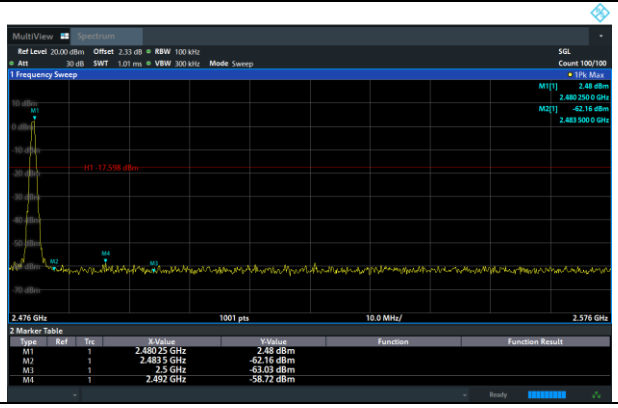
GFSK: Band Edge, Left Side



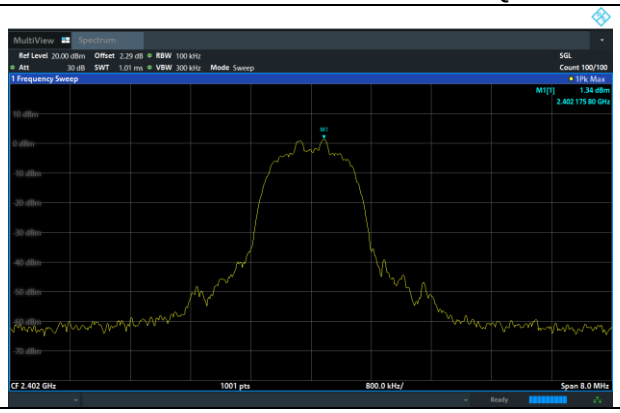


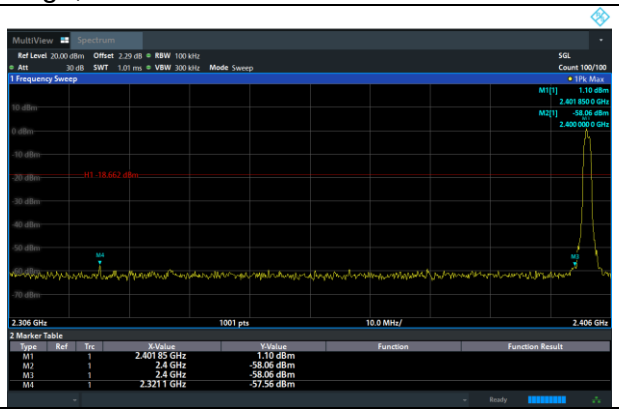
GFSK: Band Edge, Right Side



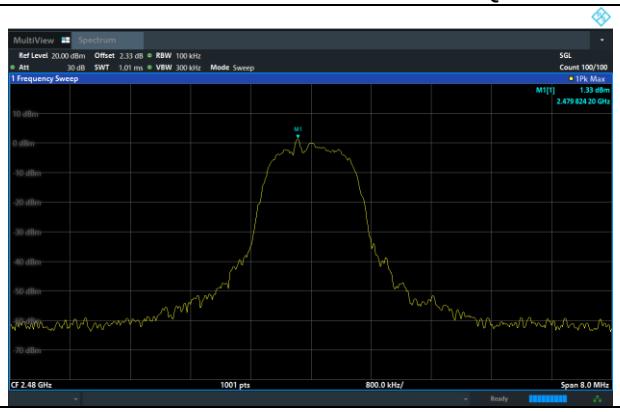


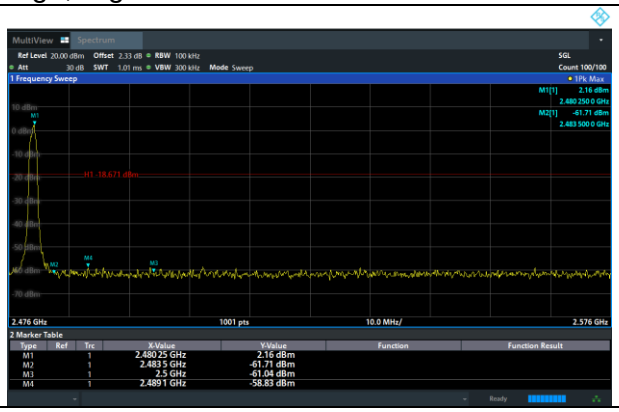
π/4-DQPSK: Band Edge, Left Side

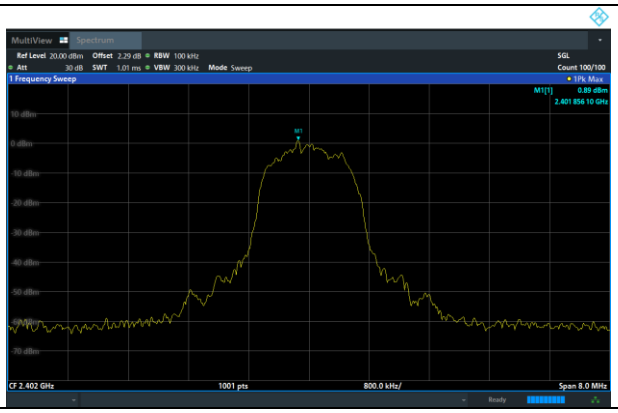
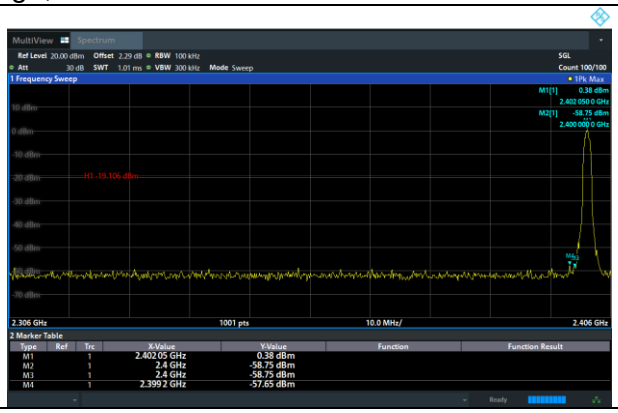
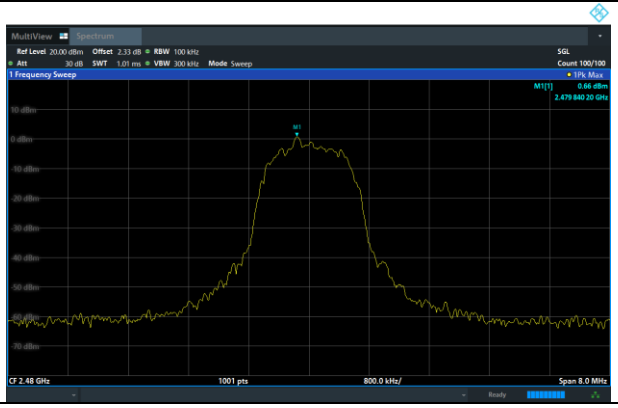
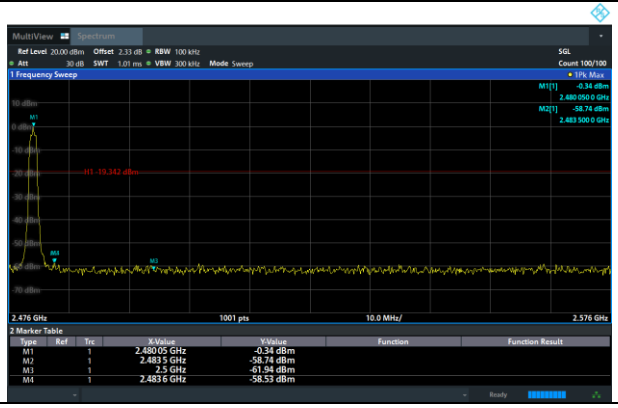




π/4-DQPSK: Band Edge, Right Side



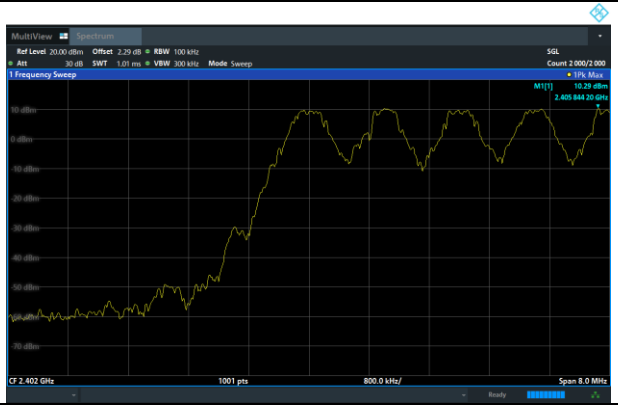


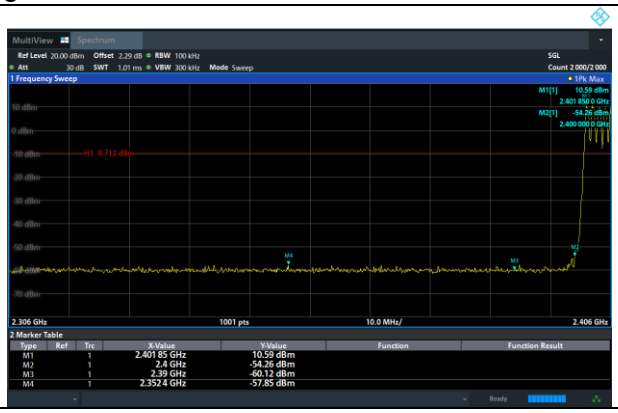
8DPSK: Band Edge, Left Side	
	
8DPSK: Band Edge, Right Side	
	

Hopping Mode

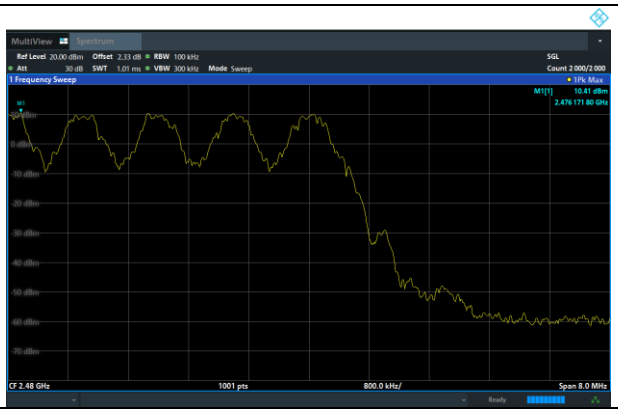
Test plots

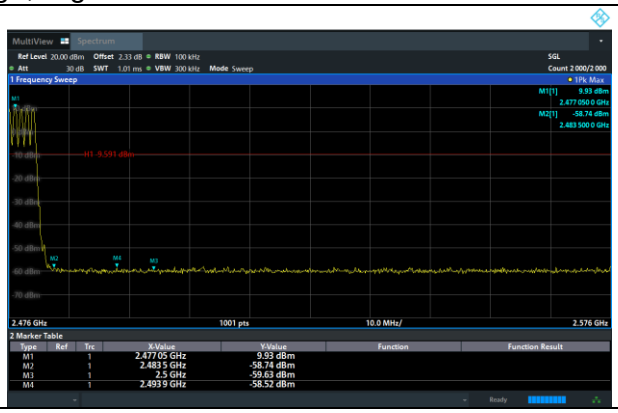
GFSK: Band Edge, Left Side



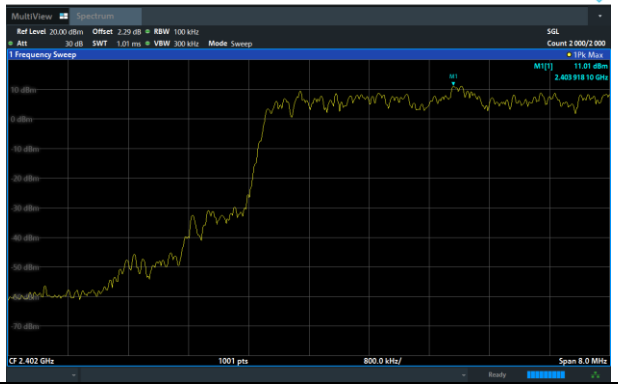


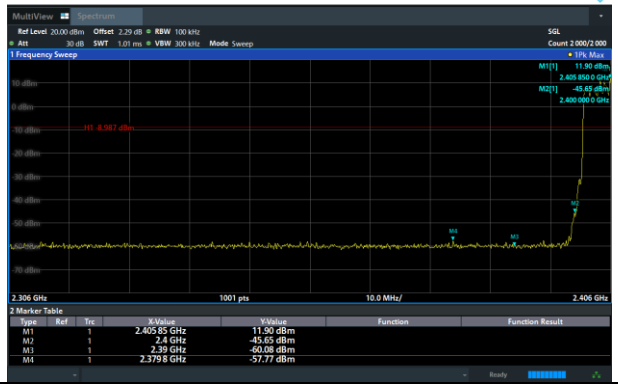
GFSK: Band Edge, Right Side



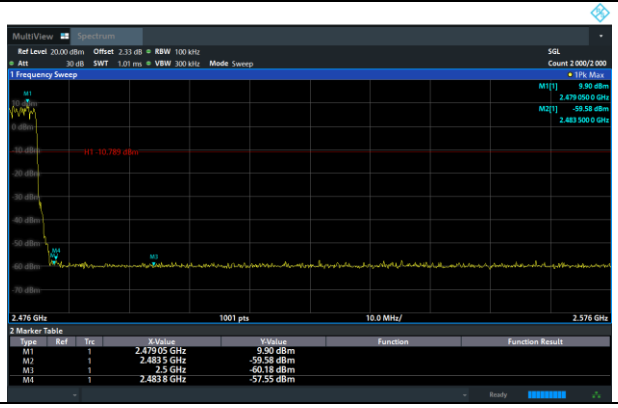


π/4-DQPSK: Band Edge, Left Side

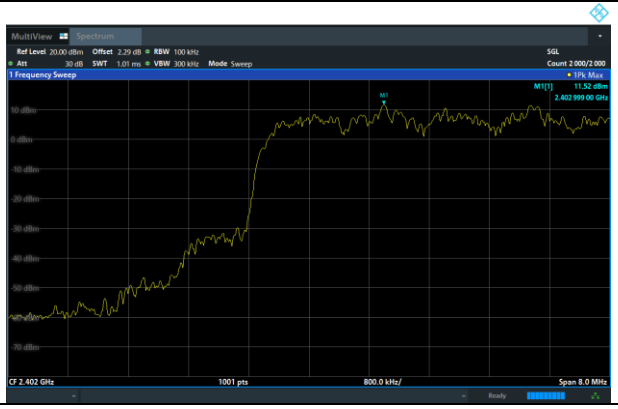


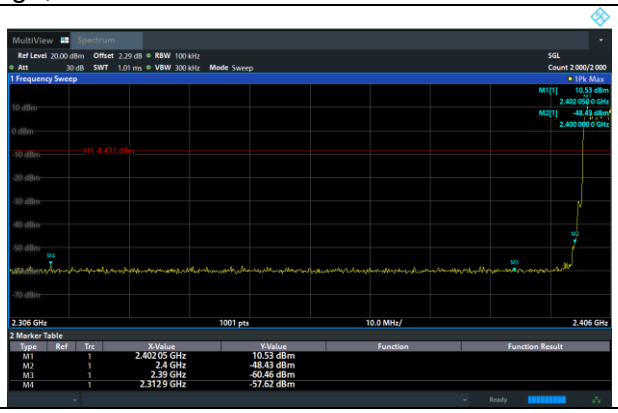


π/4-DQPSK: Band Edge, Right Side

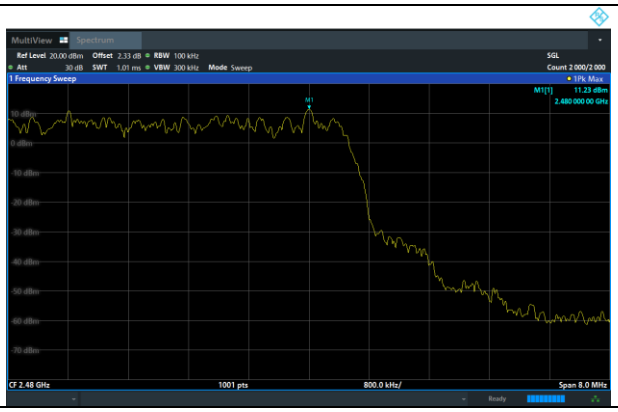


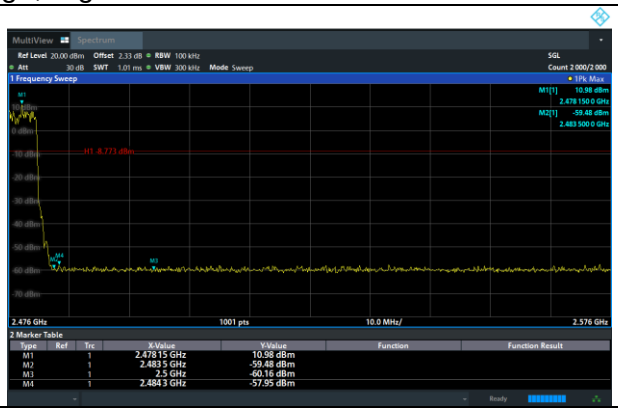
8DPSK: Band Edge, Left Side



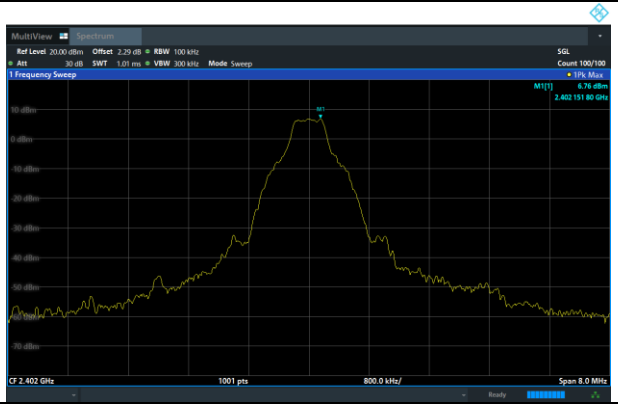
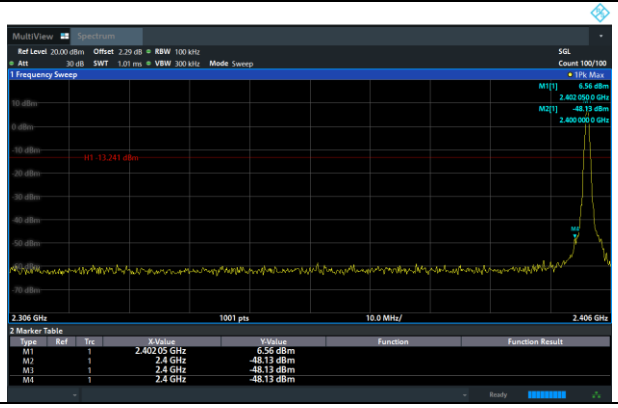
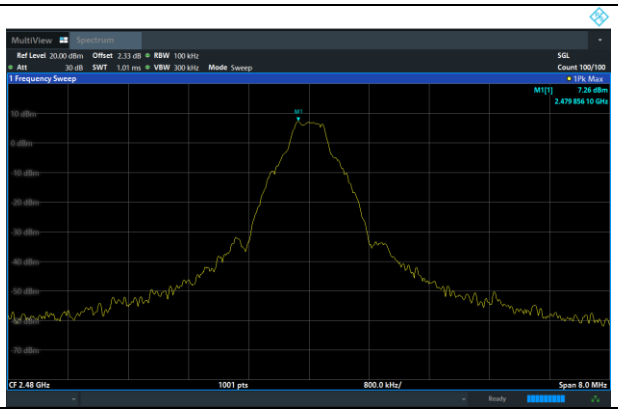
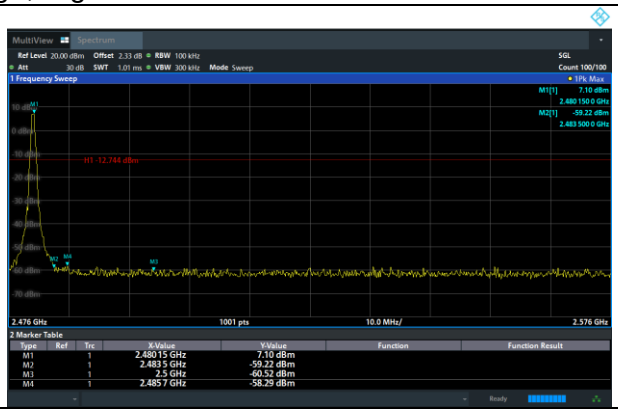


8DPSK: Band Edge, Right Side

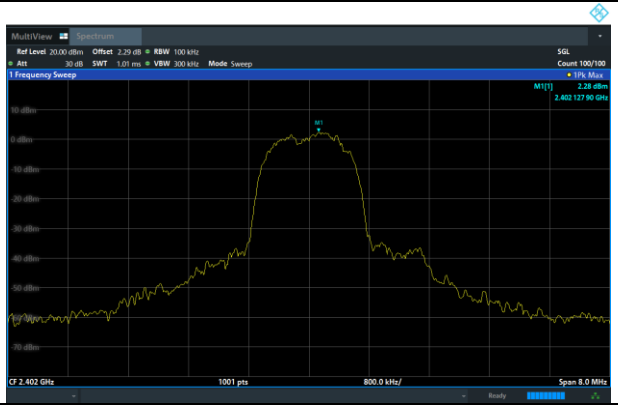


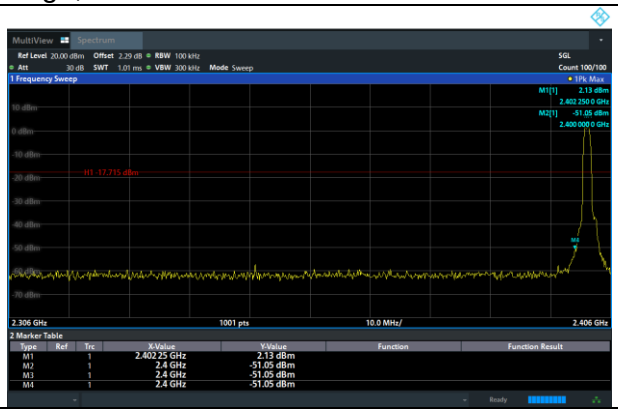


8800 Bluetooth chip:
Test plots

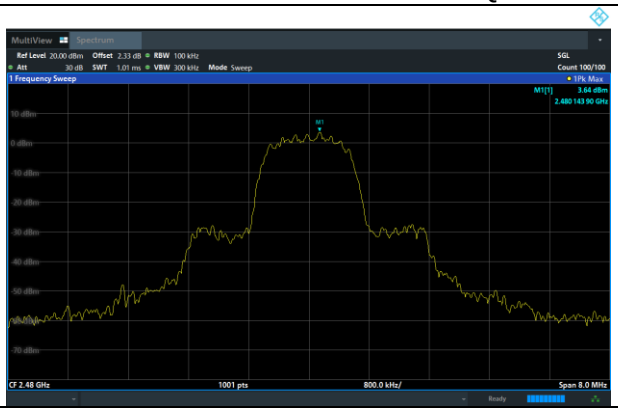
GFSK: Band Edge, Left Side	
	
GFSK: Band Edge, Right Side	
	

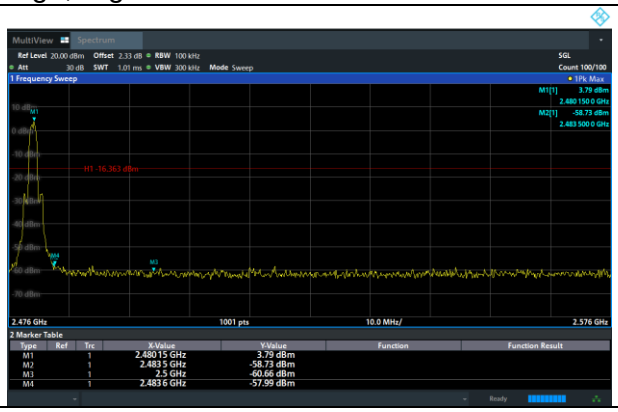
π/4-DQPSK: Band Edge, Left Side



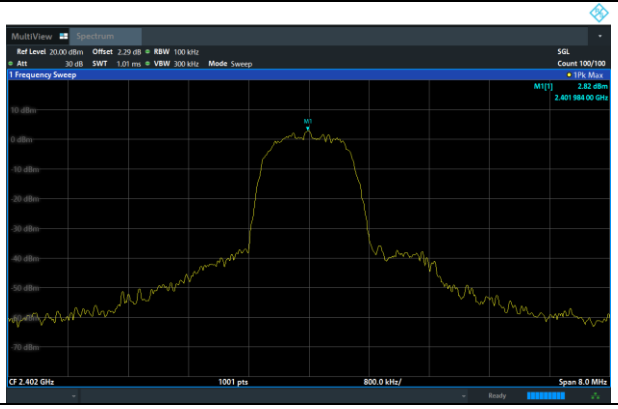


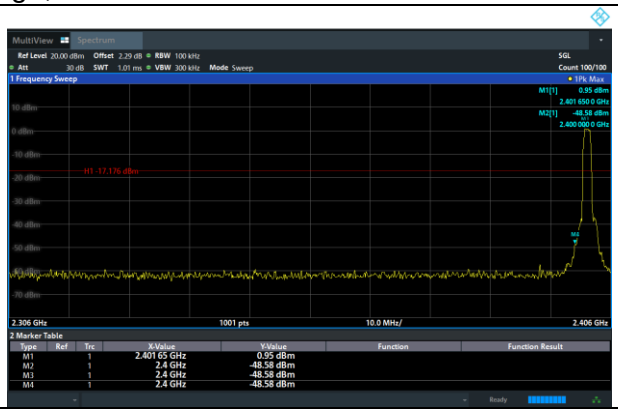
π/4-DQPSK: Band Edge, Right Side



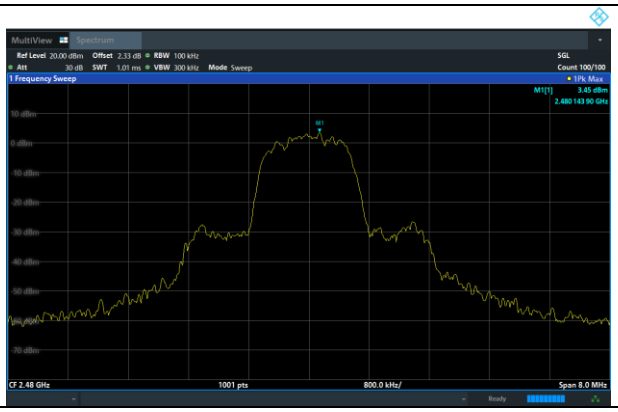


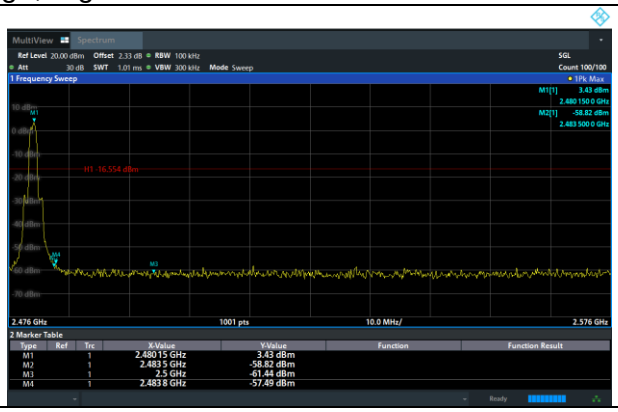
8DPSK: Band Edge, Left Side





8DPSK: Band Edge, Right Side

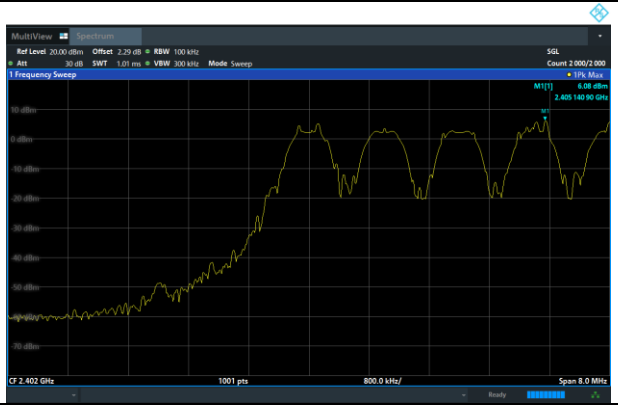


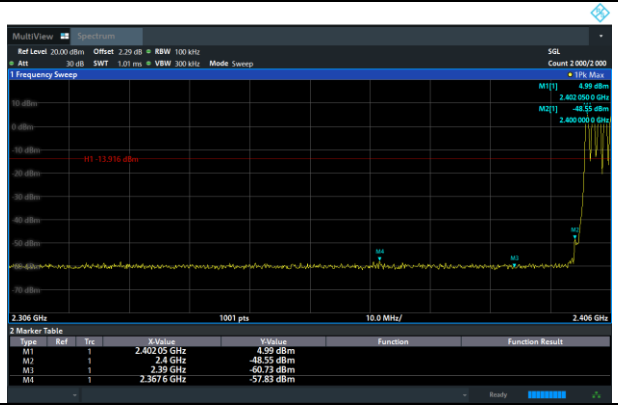


Hopping Mode

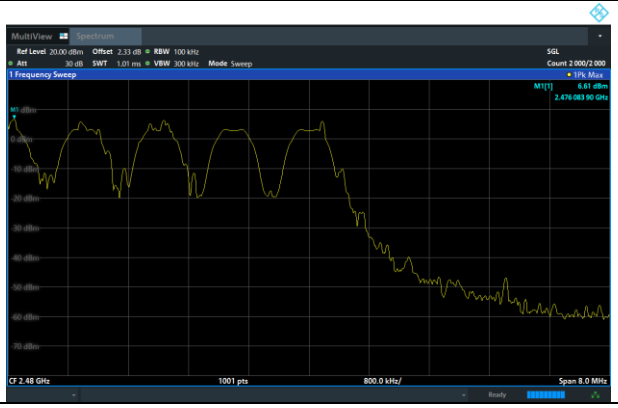
Test plots

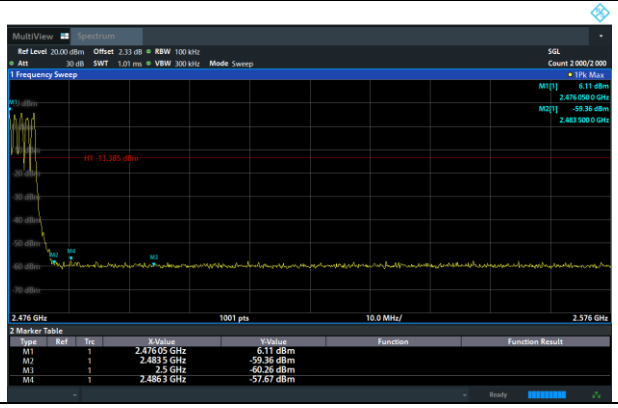
GFSK: Band Edge, Left Side



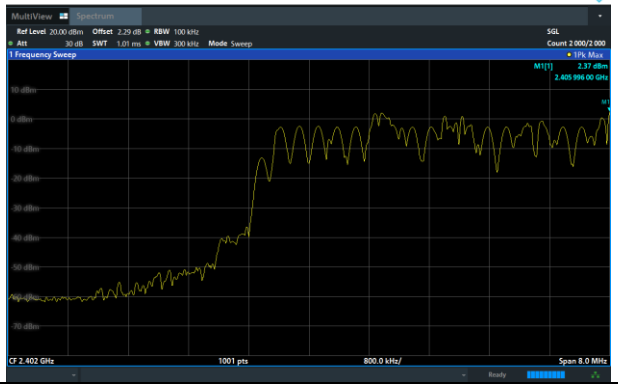


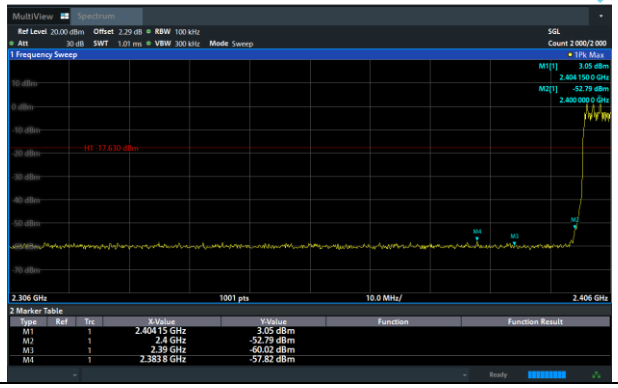
GFSK: Band Edge, Right Side



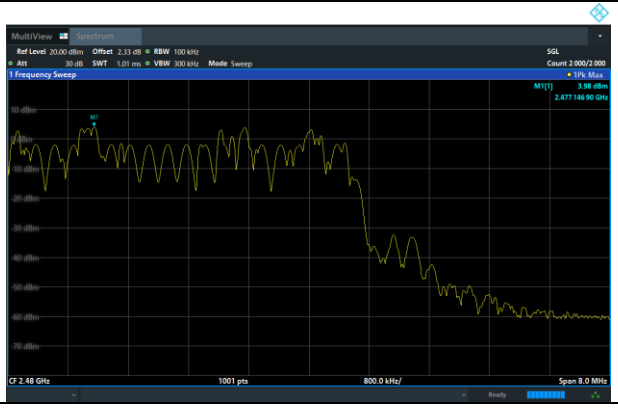


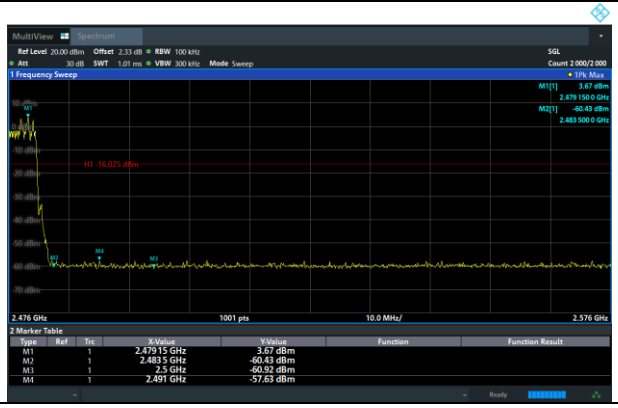
π/4-DQPSK: Band Edge, Left Side



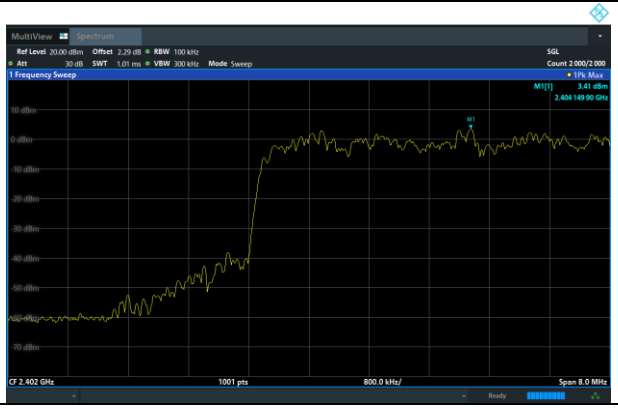


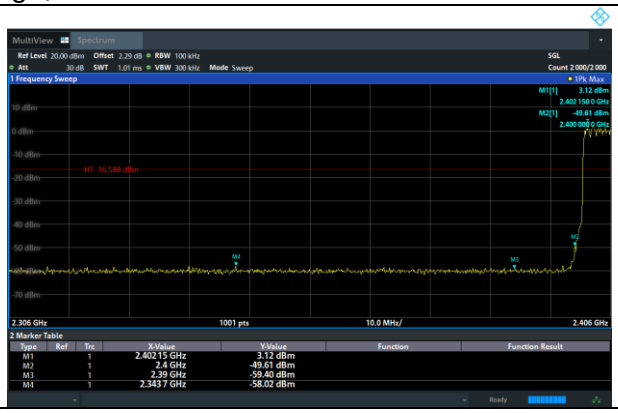
π/4-DQPSK: Band Edge, Right Side



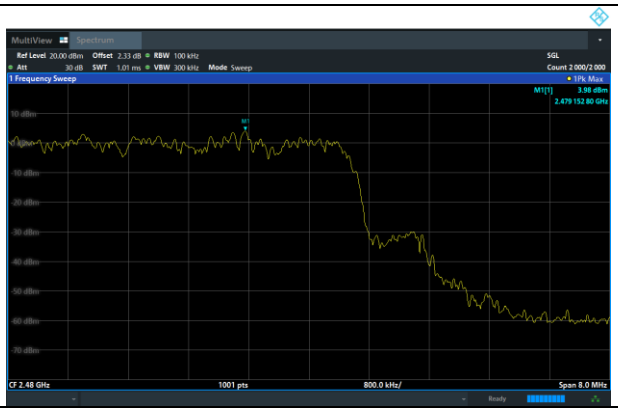


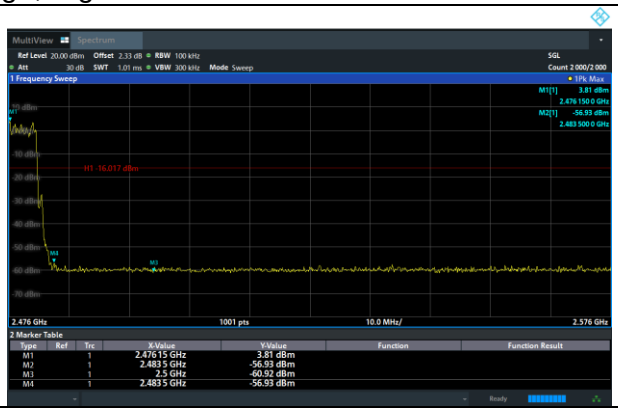
8DPSK: Band Edge, Left Side





8DPSK: Band Edge, Right Side





5.10 Spurious RF Conducted Emissions

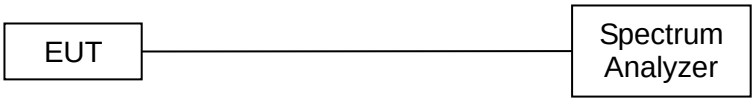
5.10.1 Limit

Below -20dB of the highest emission level in operating band.

5.10.2 Test Procedure

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2020 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBW= 300kHz to measure the peak field strength, and measure frequency range from 9kHz to 26.5GHz.

5.10.3 Test Setup



5.10.4 Test Results

Note:

1: The measurement frequency range is from 9kHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and band edge measurement data.