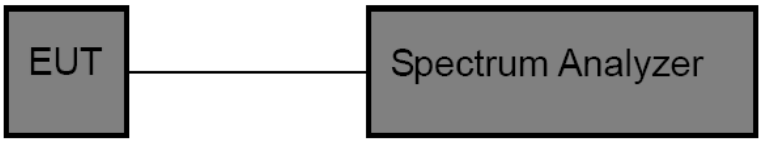
3.5. 20dB Bandwidth

Limit

N/A

Test Configuration



Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. OCB and 20dB Spectrum Setting:
   (1) Set RBW = 1% ~ 5% occupied bandwidth.
   (2) Set the video bandwidth (VBW) ≥ 3 RBW.
   (3) Detector = Peak.
   (4) Trace mode = Max hold.
   (5) Sweep = Auto couple.

Note: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

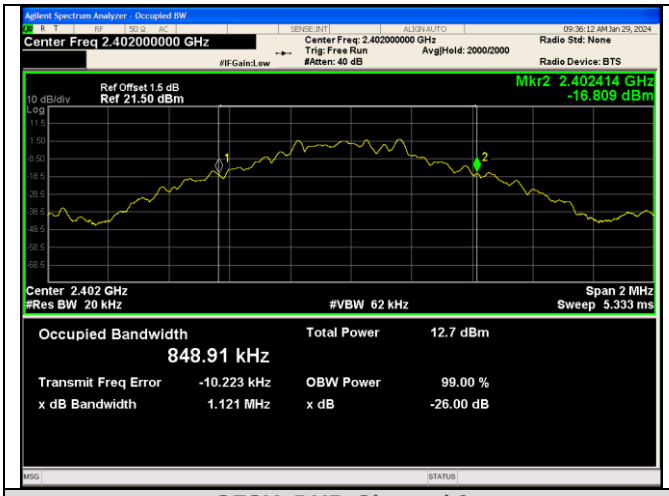
Test Mode

Please refer to the clause 2.4.

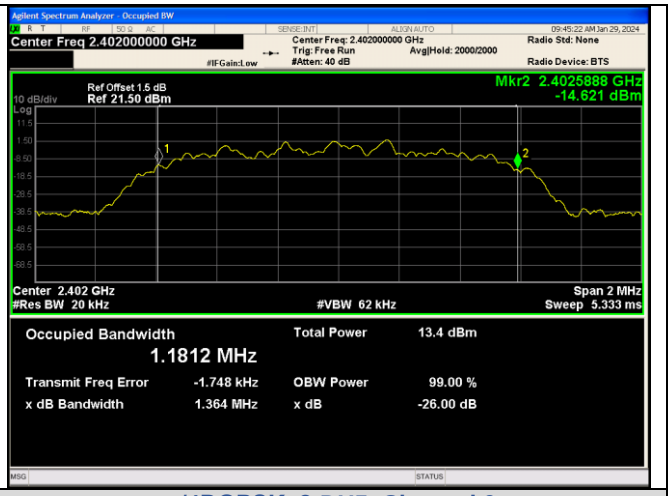
Test Result

Test Mode	Frequency (MHz)	99% Bandwidth (MHz)	20 dB Bandwidth (MHz)	20dB Bandwidth *2/3 (MHz)
DH5	2402	0.84891	0.9422	0.628
	2441	0.84912	0.9430	0.629
	2480	0.84848	0.9418	0.628
2DH5	2402	1.1812	1.280	0.853
	2441	1.1809	1.285	0.857
	2480	1.1815	1.279	0.853
3DH5	2402	1.1741	1.298	0.865
	2441	1.1734	1.299	0.866
	2480	1.1730	1.297	0.865

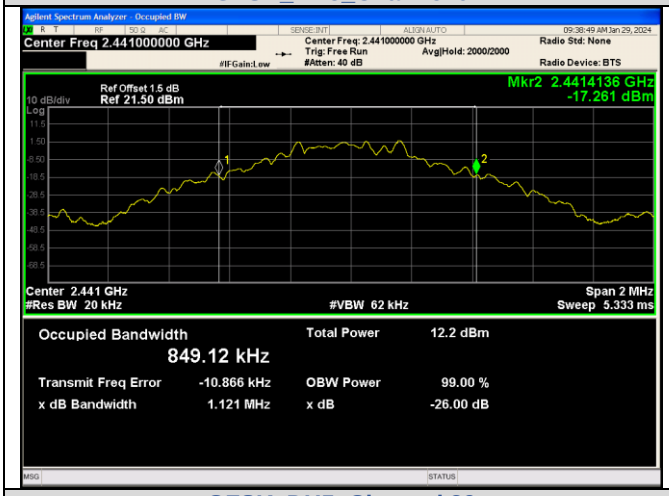
99% Bandwidth:



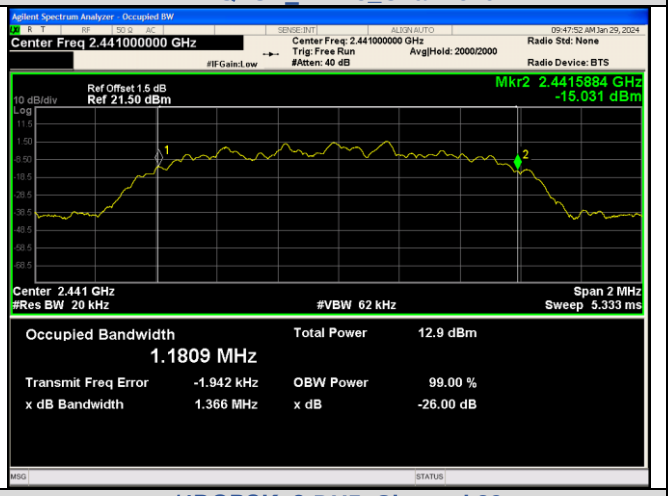
GFSK_DH5_Channel 0



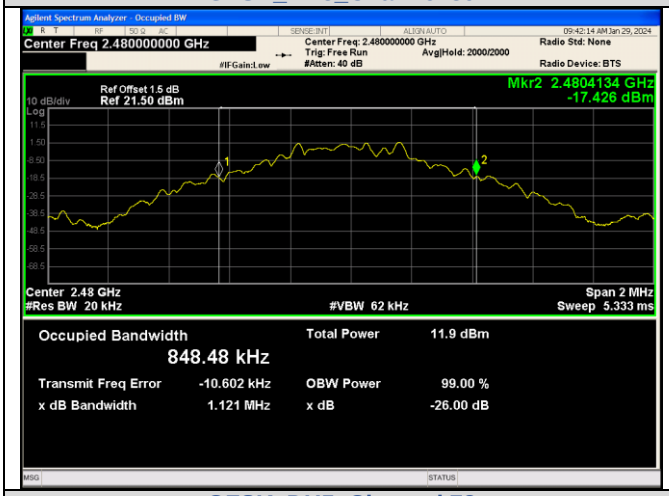
π/4DQPSK_2-DH5_Channel 0



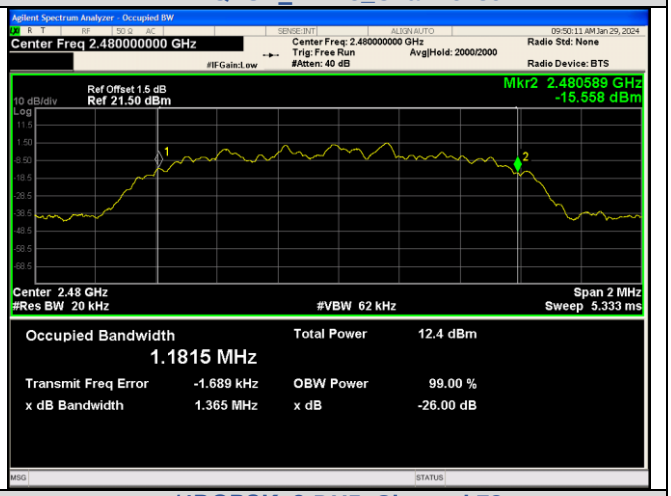
GFSK_DH5_Channel 39



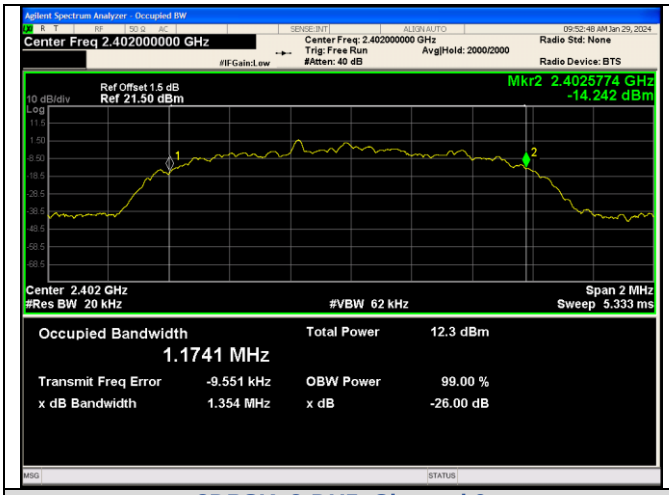
π/4DQPSK_2-DH5_Channel 39



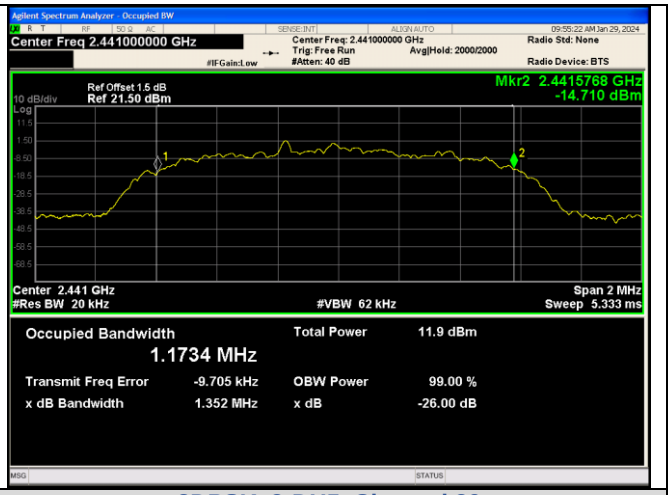
GFSK_DH5_Channel 78



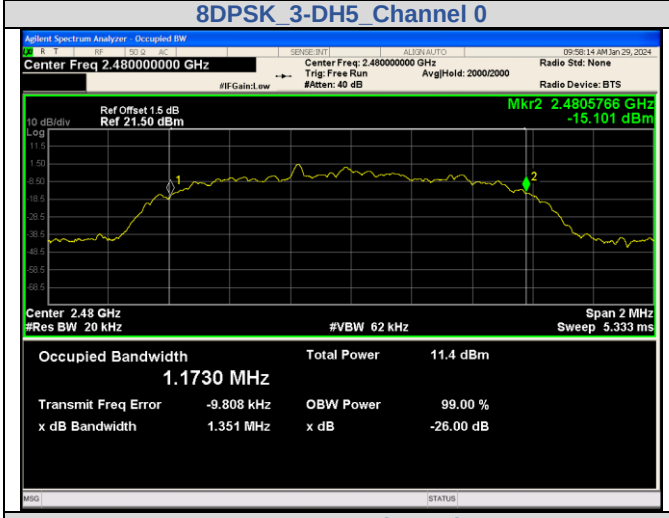
π/4DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0

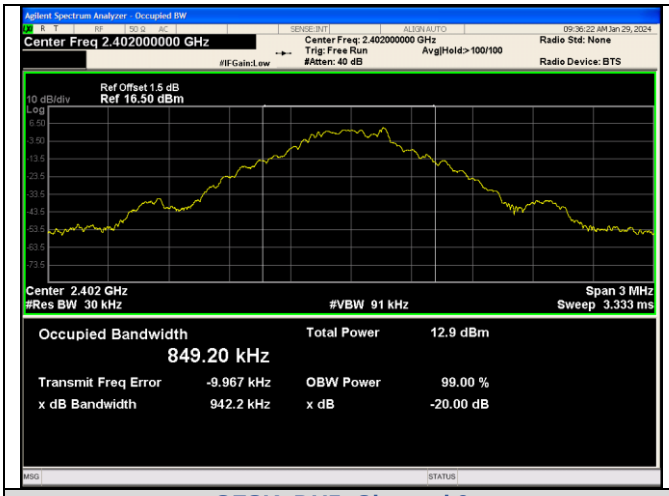


8DPSK_3-DH5_Channel 39

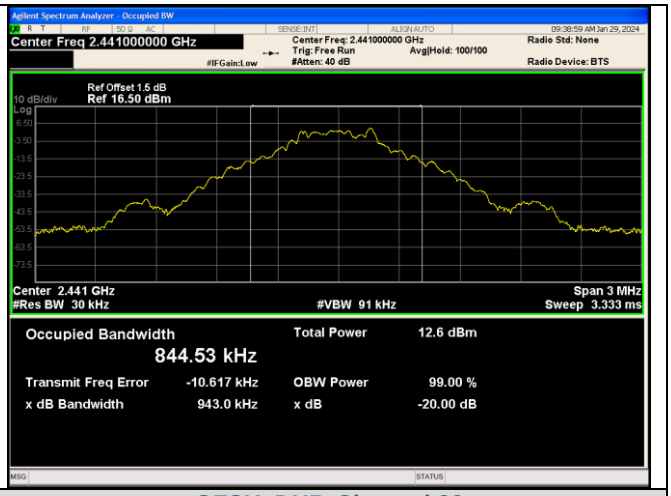


8DPSK_3-DH5_Channel 78

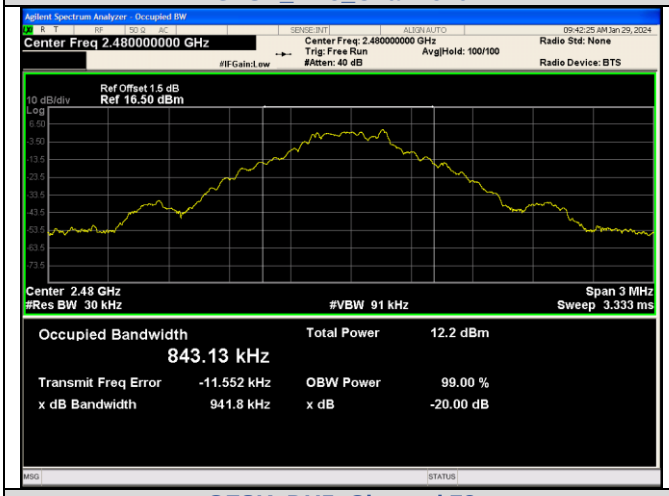
20dB Bandwidth:



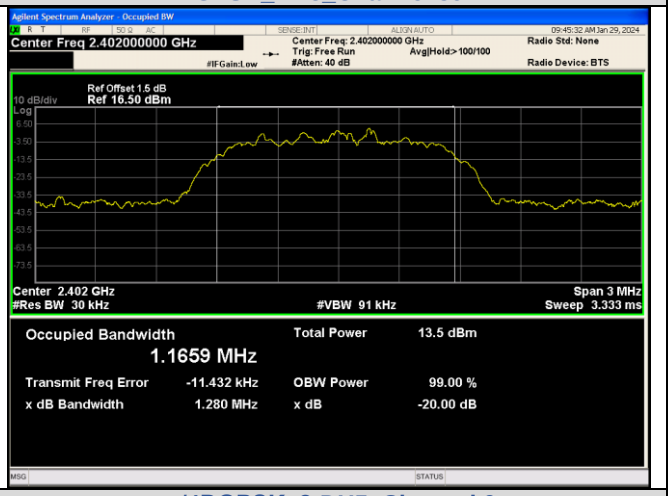
GFSK_DH5_Channel 0



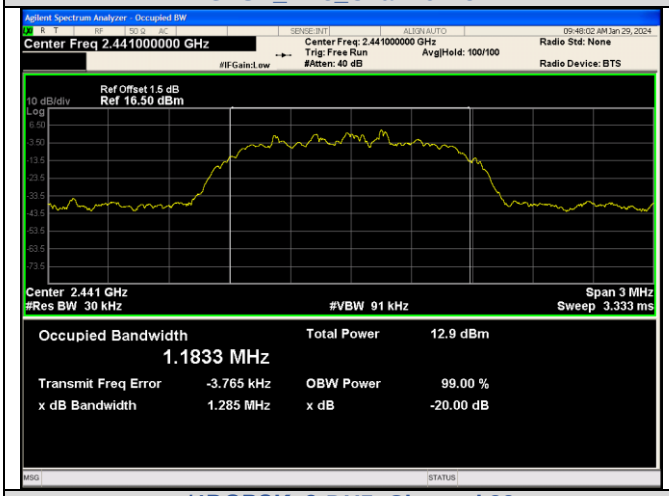
GFSK_DH5_Channel 39



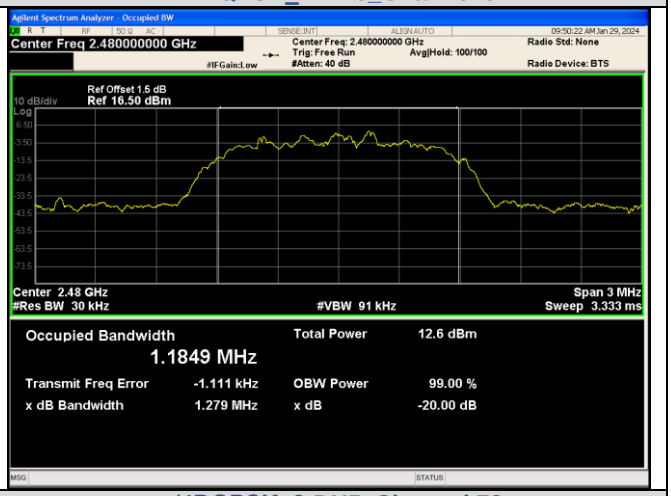
GFSK_DH5_Channel 78



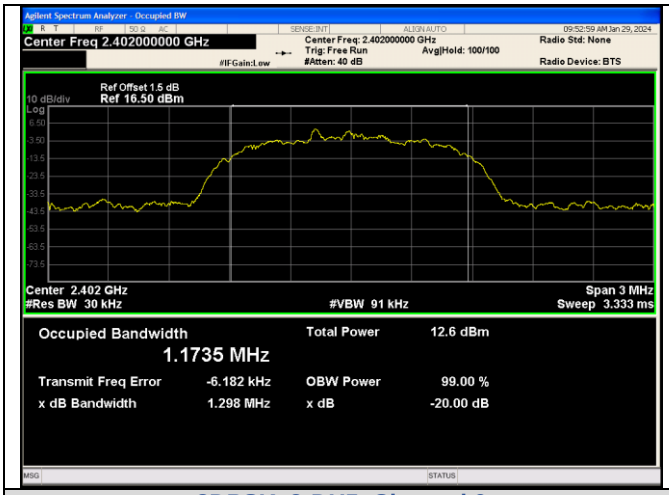
π/4DQPSK_2-DH5_Channel 0



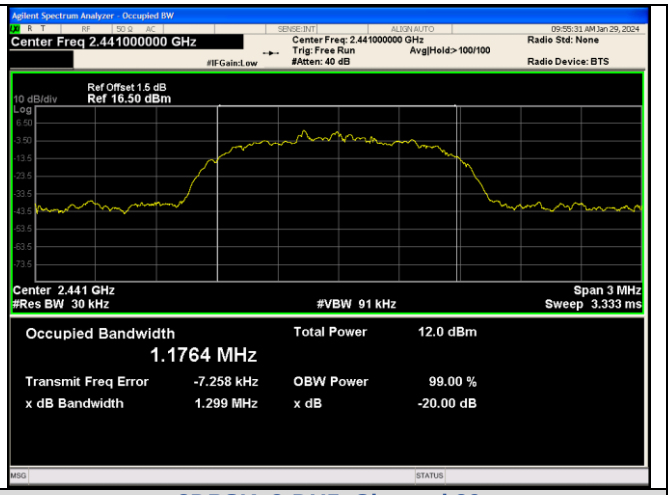
π/4DQPSK_2-DH5_Channel 39



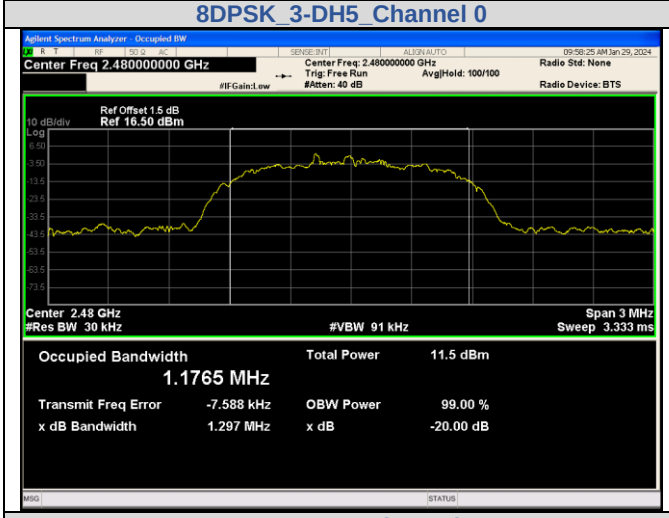
π/4DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



8DPSK_3-DH5_Channel 78

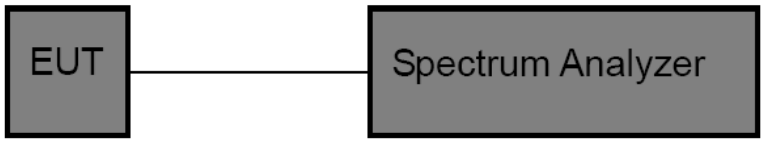
3.6. Channel Separation

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1) / RSS-247 5.1 b

Test Item	Limit	Frequency Range (MHz)
Channel Separation	>25kHz or >two-thirds of the 20 dB bandwidth Which is greater	2400~2483.5

Test Configuration



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:
   (1) Set RBW = 100 kHz.
   (2) Set the video bandwidth (VBW) ≥ 3 RBW.
   (3) Detector = Peak.
   (4) Trace mode = Max hold.
   (5) Sweep = Auto couple.

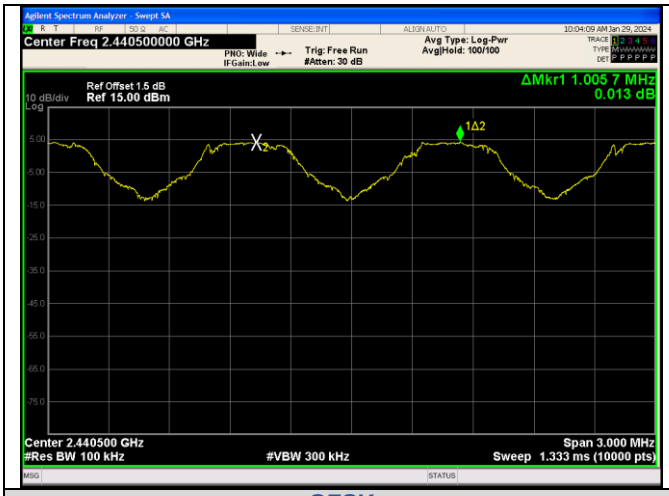
Test Mode

Please refer to the clause 2.4.

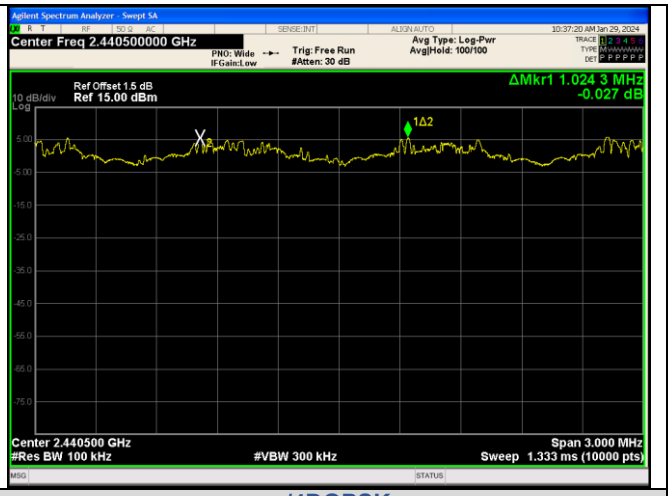
Test Result

Test Mode	Frequency (MHz)	Result (MHz)	Limit (MHz)	Verdict
DH5	Hop	1.0057	≥0.629	PASS
2DH5	Hop	1.0243	≥0.857	PASS
3DH5	Hop	0.9868	≥0.866	PASS

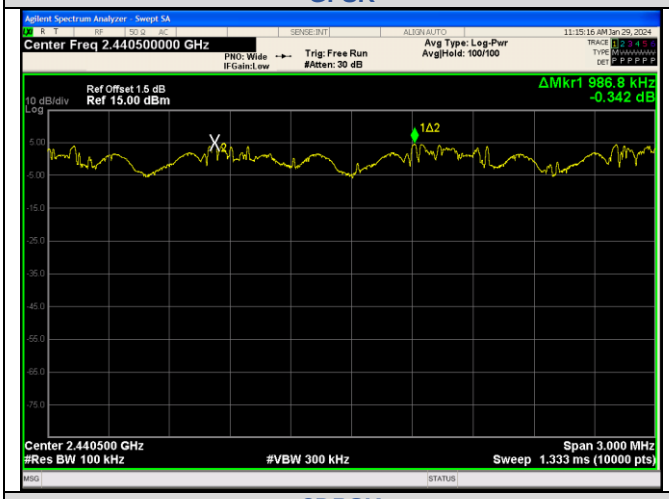
Test Graphs:



GFSK



π/4DQPSK



8DPSK

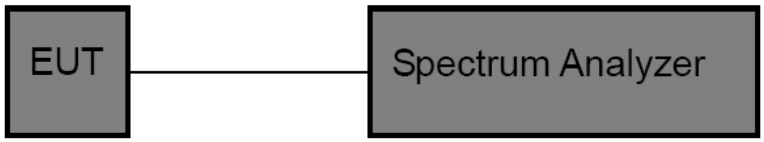
3.7. Number of Hopping Channel

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(iii) / RSS-247 5.1 d

Section	Test Item	Limit
15.247 (a)(iii) RSS-247 5.1 d	Number of Hopping Channel	⩾15

Test Configuration



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:
   (1) Peak Detector: RBW=100 kHz, VBW⩾RBW, Sweep time= Auto.

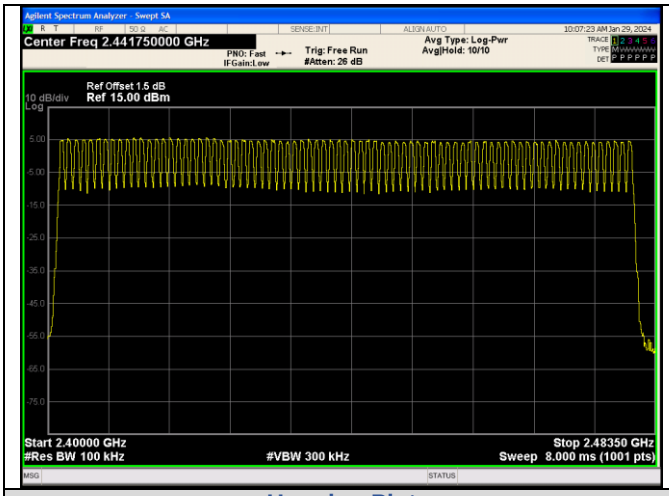
Test Mode

Please refer to the clause 2.4.

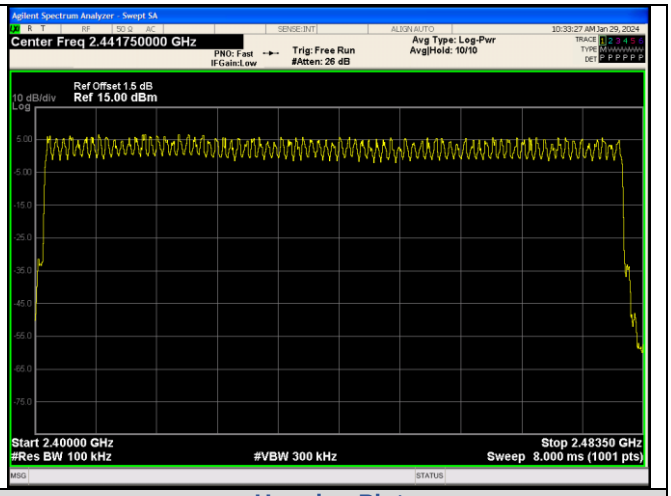
Test Result

Test Mode	Frequency (MHz)	Result [Num]	Limit [Num]	Verdict
DH5	Hop	79	≥15	PASS
2DH5	Hop	79	≥15	PASS
3DH5	Hop	79	≥15	PASS

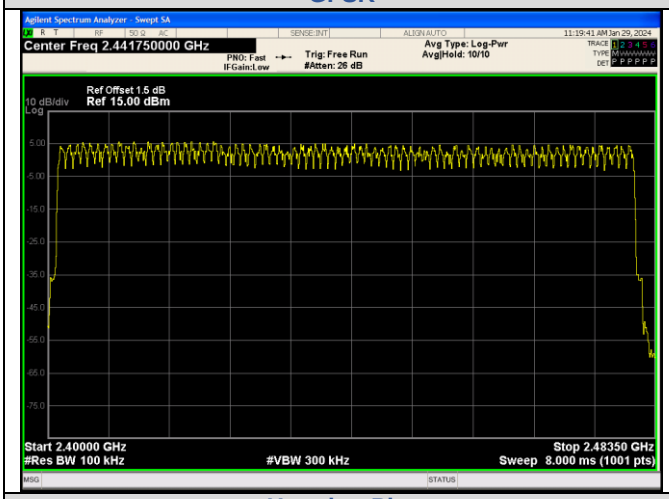
Test Graphs:



Hopping Plot
GFSK



Hopping Plot
π/4DQPSK



Hopping Plot
8DPSK

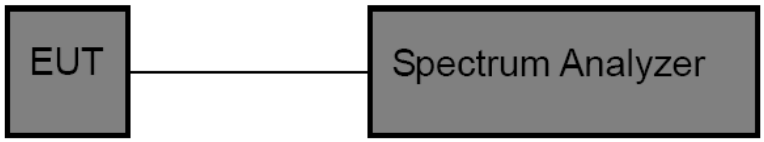
3.8. Dwell Time

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(iii) / RSS-247 5.1 d

Section	Test Item	Limit
15.247 (a)(iii) RSS-247 5.1 d	Average Time of Occupancy	0.4 sec

Test Configuration



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:
   (1) Spectrum Setting: RBW=1MHz, VBW≥RBW.
   (2) Use video trigger with the trigger level set to enable triggering only on full pulses.
   (3) Sweep Time is more than once pulse time.
   (4) Set the center frequency on any frequency would be measure and set the frequency span to zero.
   (5) Measure the maximum time duration of one single pulse.
   (6) Set the EUT for packet transmitting.

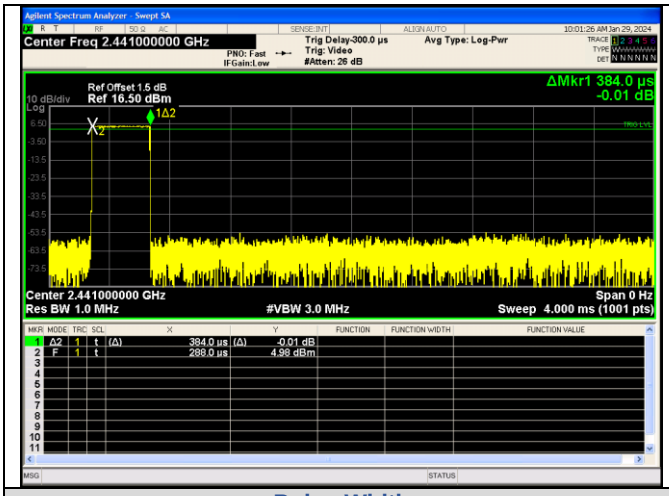
Test Mode

Please refer to the clause 2.4.

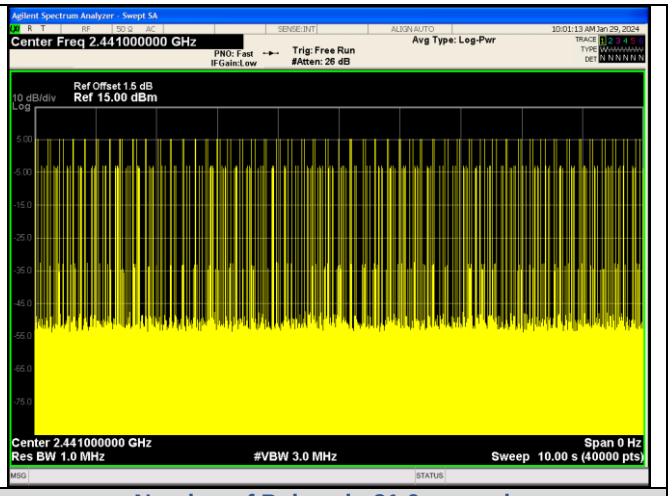
Test Result

Modulation	Packet	Freq(MHz)	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH1	Hop	0.384	101	38.78	< 400	PASS
	DH3	Hop	1.640	55	90.20		PASS
	DH5	Hop	2.888	35	101.08		PASS
π/4DQPSK	2-DH1	Hop	0.392	100	39.20		PASS
	2-DH3	Hop	1.640	54	88.56		PASS
	2-DH5	Hop	2.888	35	101.08		PASS
8DPSK	3-DH1	Hop	0.392	100	39.20		PASS
	3-DH3	Hop	1.640	52	85.28		PASS
	3-DH5	Hop	2.896	29	83.98		PASS

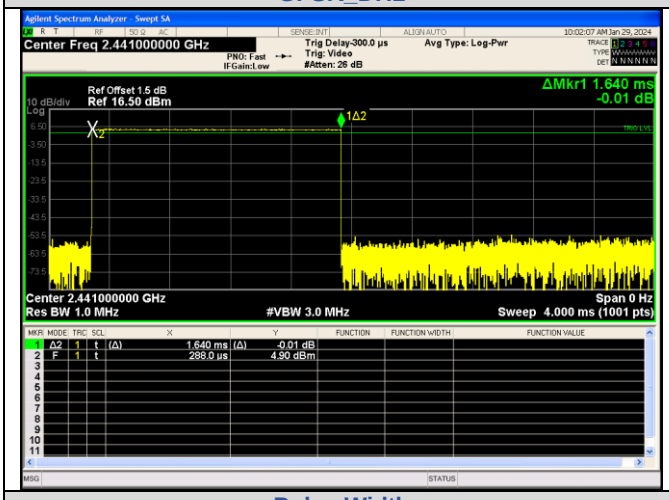
Test plot as follows:



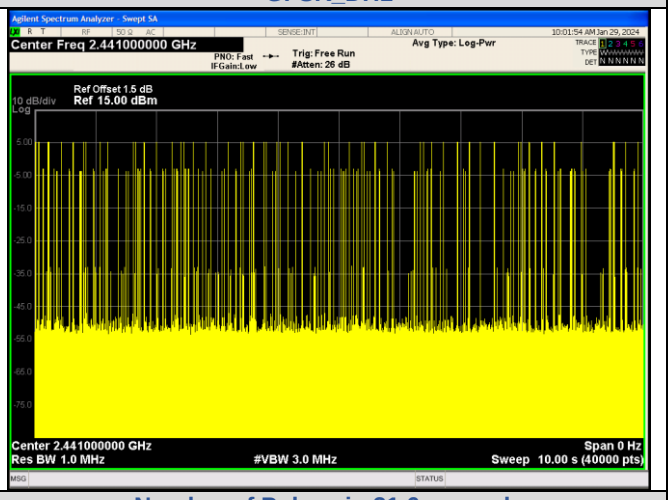
Pulse Width
GFSK_DH1



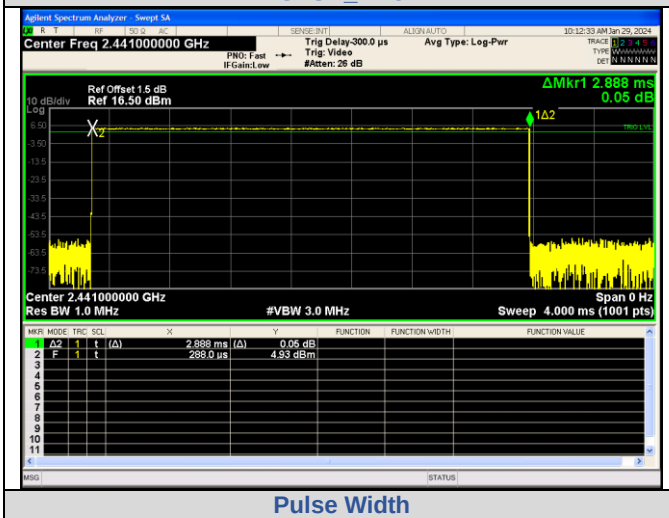
Number of Pulses in 31.6 seconds
GFSK_DH1



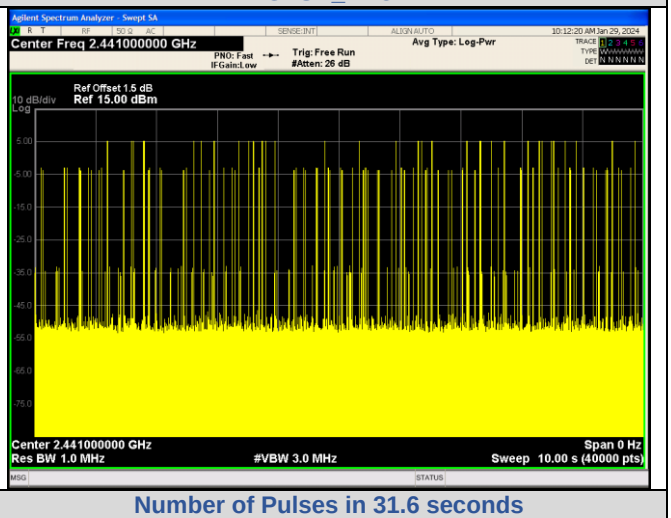
Pulse Width
GFSK_DH3



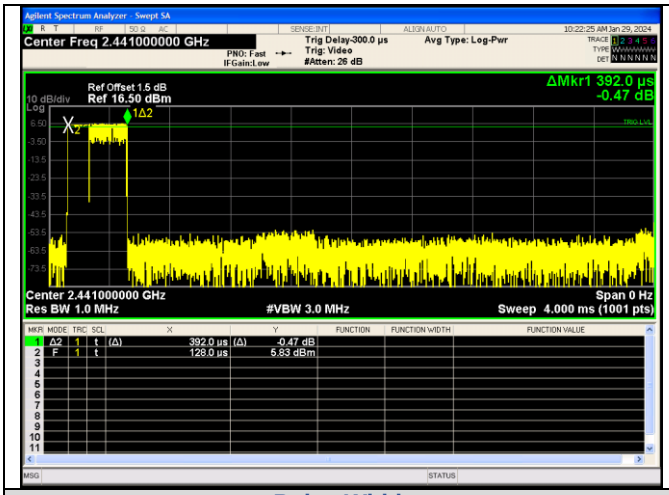
Number of Pulses in 31.6 seconds
GFSK_DH3



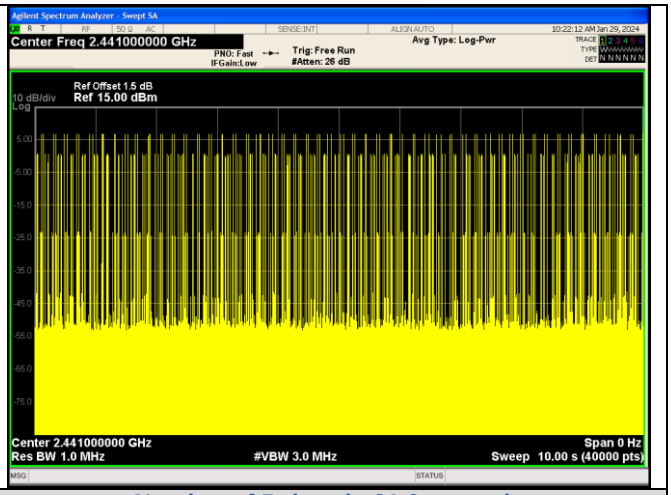
Pulse Width
GFSK_DH5



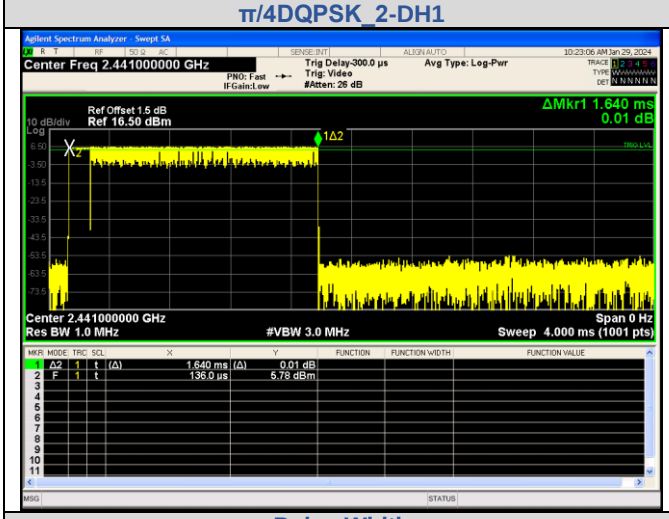
Number of Pulses in 31.6 seconds
GFSK_DH5



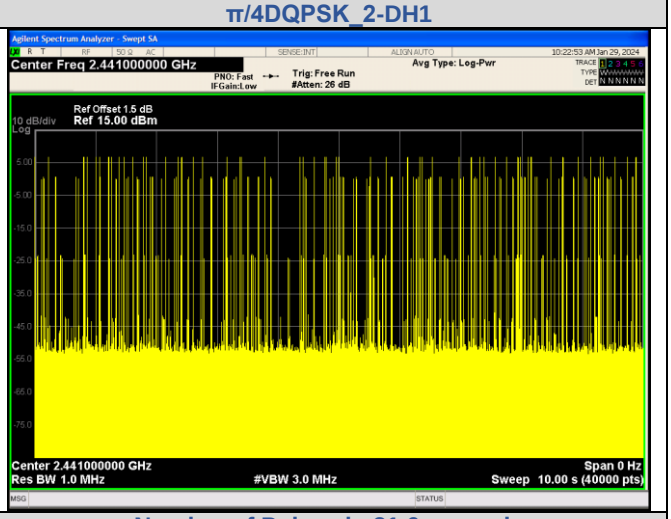
Pulse Width
π/4DQPSK_2-DH1



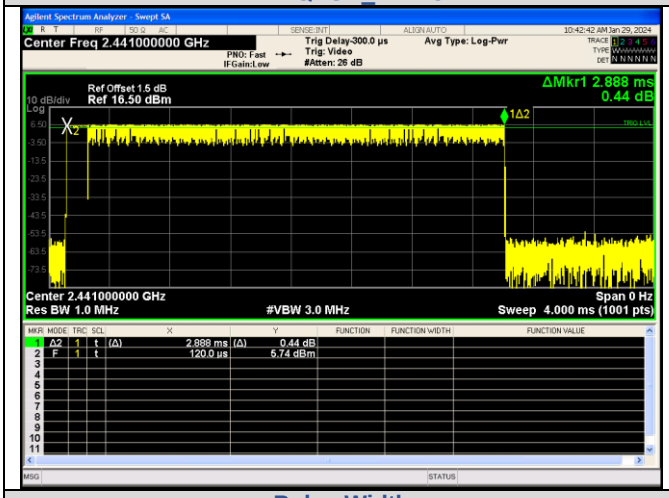
Number of Pulses in 31.6 seconds
π/4DQPSK_2-DH1



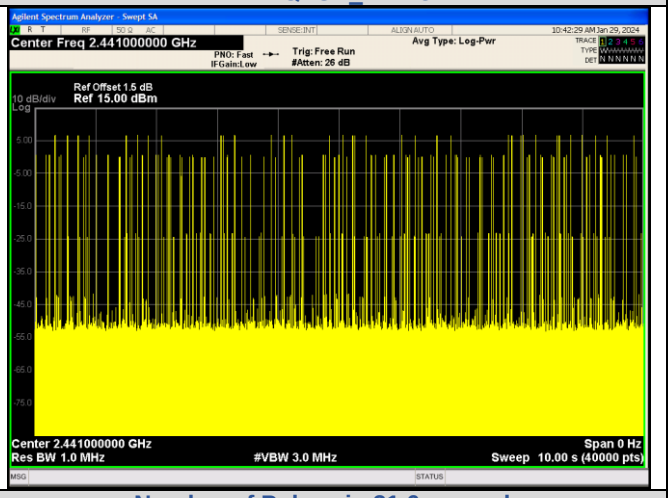
Pulse Width
π/4DQPSK_2-DH3



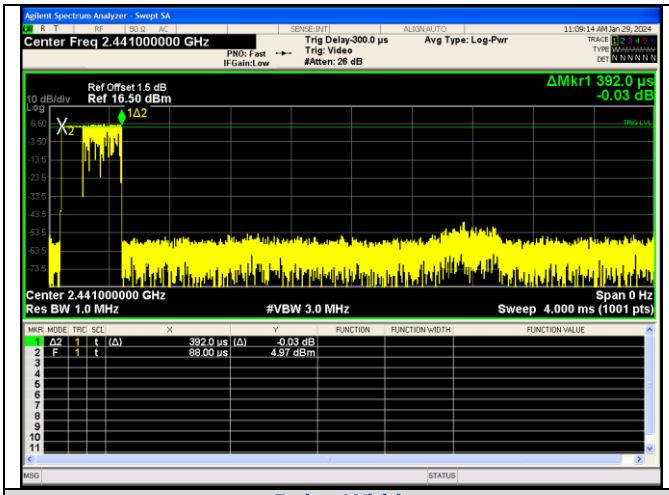
Number of Pulses in 31.6 seconds
π/4DQPSK_2-DH3



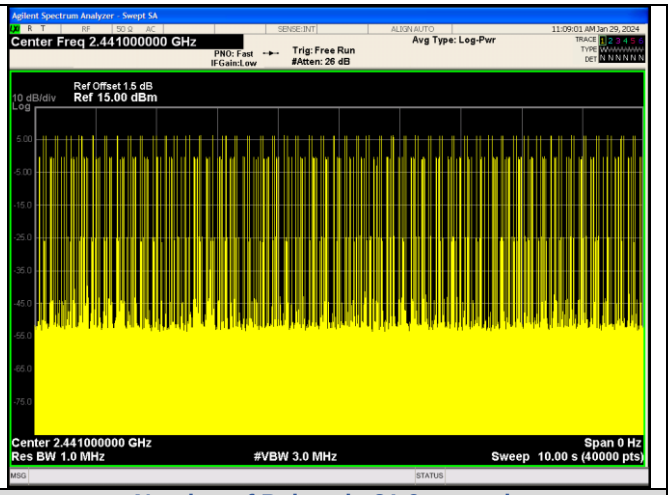
Pulse Width
π/4DQPSK_2-DH5



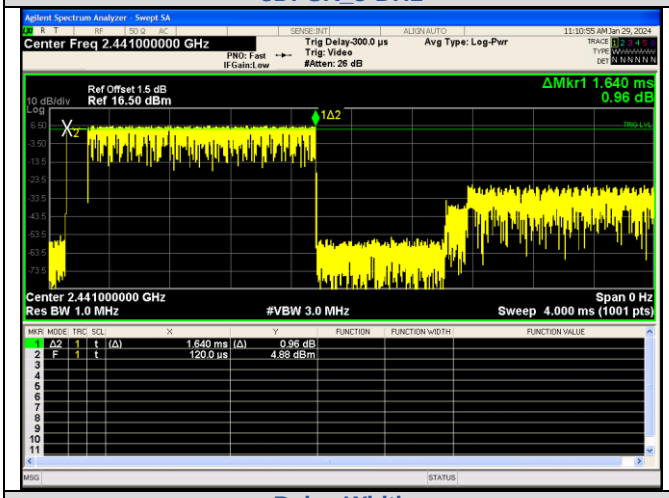
Number of Pulses in 31.6 seconds
π/4DQPSK_2-DH5



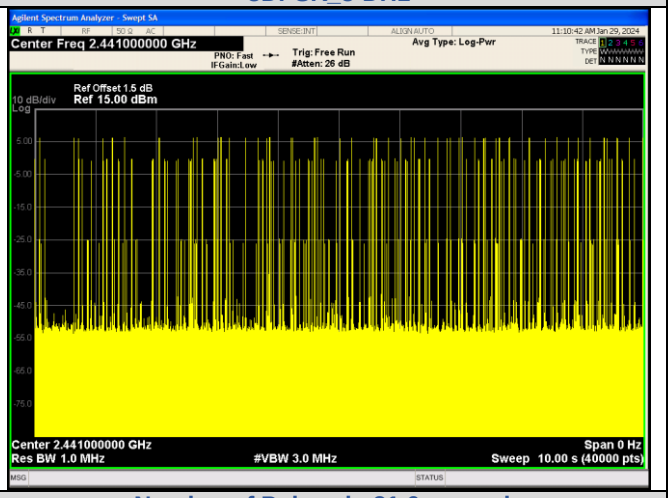
Pulse Width
8DPSK_3-DH1



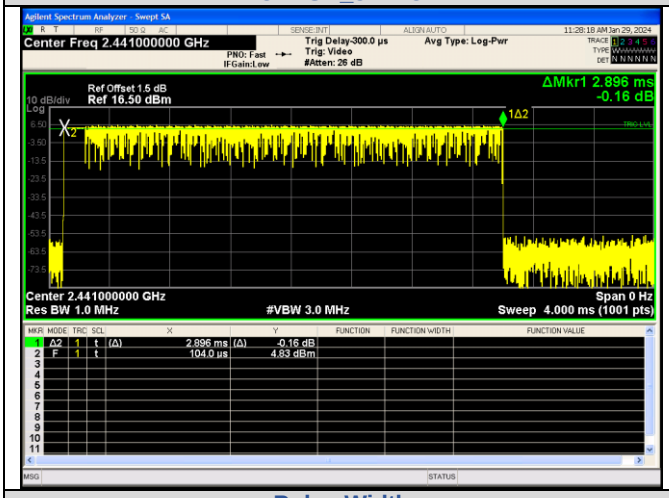
Number of Pulses in 31.6 seconds
8DPSK_3-DH1



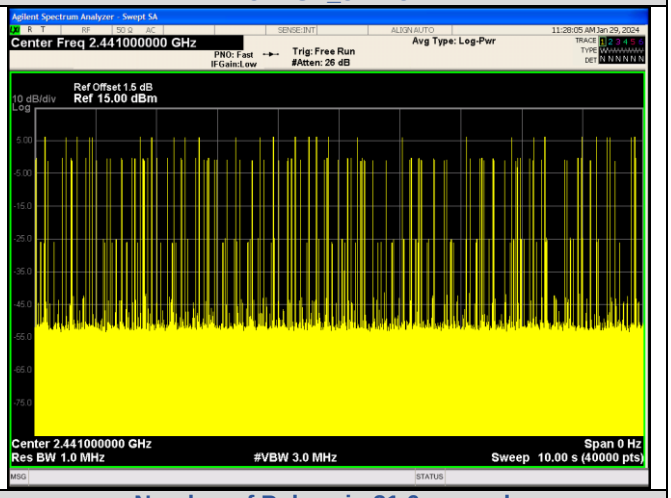
Pulse Width
8DPSK_3-DH3



Number of Pulses in 31.6 seconds
8DPSK_3-DH3



Pulse Width
8DPSK_3-DH5



Number of Pulses in 31.6 seconds
8DPSK_3-DH5

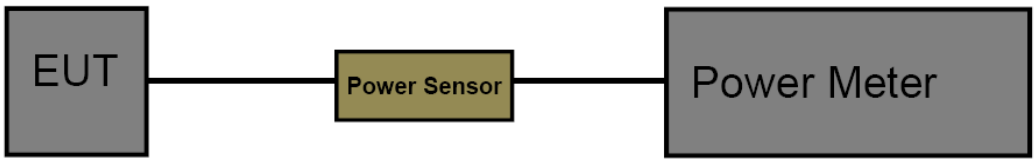
3.9. Peak Output Power

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(1) / RSS-247 5.4 b

Section	Test Item	Limit	Frequency Range (MHz)
FCC CFR 47 Part15.247 (b)(1)	Maximum Conducted Output Power	Hopping Channels≥75, Power <1W(30dBm); Others <125mW(21dBm)	2400~2483.5
ISED RSS-247 5.4 b	EIRP	4 Watt or 36dBm	2400~2483.5

Test Configuration



Test Procedure

1. The maximum conducted output power may be measured using a broadband Peak RF power meter.
2. Peak power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor.
3. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.
   Record the measurement data.

Test Mode

Please refer to the clause 2.4.

Test Result

Test Mode	Frequency(MHz)	Peak Output Power[dBm]	Limit[dBm]	Verdict
DH5	2402	5.566	≤30	PASS
	2441	5.209	≤30	PASS
	2480	5.071	≤30	PASS
2DH5	2402	7.592	≤30	PASS
	2441	7.228	≤30	PASS
	2480	7.028	≤30	PASS
3DH5	2402	7.196	≤30	PASS
	2441	6.828	≤30	PASS
	2480	6.570	≤30	PASS

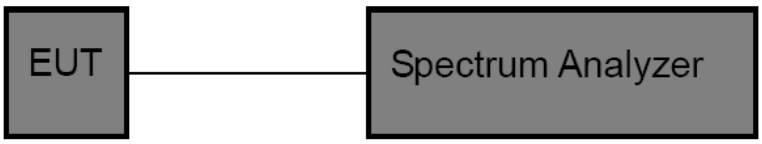
Test Mode	Frequency(MHz)	EIRP[dBm]	Limit[dBm]	Verdict
DH5	2402	7.566	≤30	PASS
	2441	7.209	≤30	PASS
	2480	7.071	≤30	PASS
2DH5	2402	9.592	≤30	PASS
	2441	9.228	≤30	PASS
	2480	9.028	≤30	PASS
3DH5	2402	9.196	≤30	PASS
	2441	8.828	≤30	PASS
	2480	8.570	≤30	PASS

3.10. Duty Cycle

Limit

None, for report purposes only.

Test Configuration



Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 DTS Meas Guidance v05r02.
3. Spectrum Setting:

Set analyzer center frequency to test channel center frequency.
Set the span to 0Hz.
Set the RBW to 10MHz.
Set the VBW to 10MHz.
Detector: Peak.
Sweep time: Auto.
Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

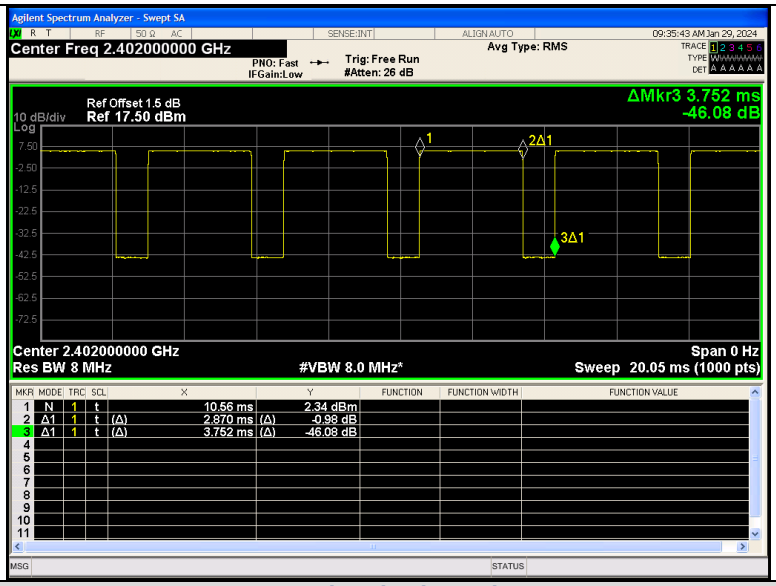
Test Mode

Please refer to the clause 2.4.

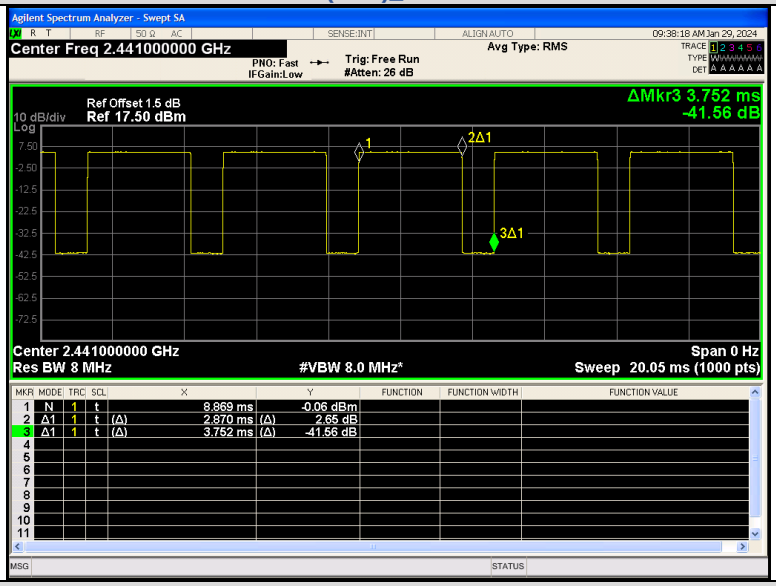
Test Result

Test Mode	Freq(MHz)	ON Time [ms]	Period [ms]	Duty Cycle [%]	1/T Minimum VBW (kHz)	Final Setting for VBW (kHz)
DH5	2402	2.870	3.752	76.47	0.35	1
	2441	2.870	3.752	76.47	0.35	1
	2480	2.849	3.752	75.94	0.35	1
2DH5	2402	2.890	3.773	76.60	0.35	1
	2441	2.890	3.773	76.60	0.35	1
	2480	2.870	3.773	76.06	0.35	1
3DH5	2402	2.870	3.773	76.06	0.35	1
	2441	2.890	3.773	76.60	0.35	1
	2480	2.890	3.773	76.60	0.35	1

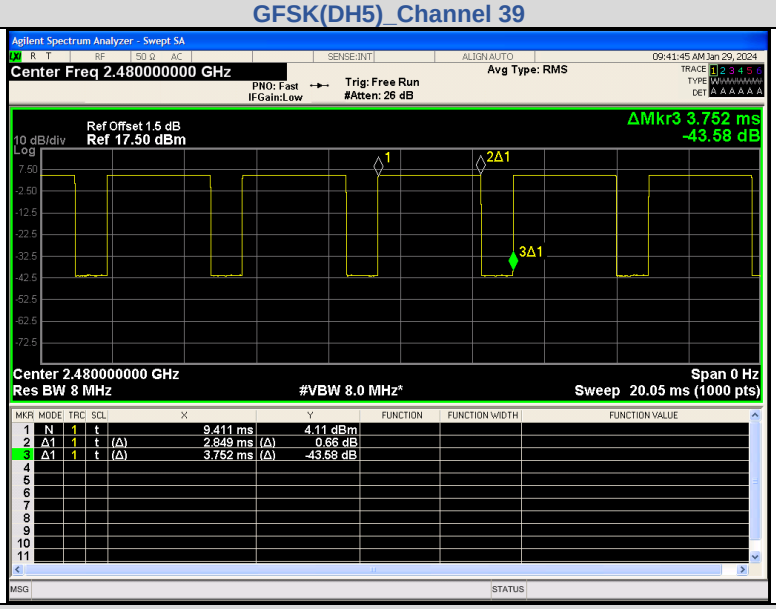
Test Graphs:



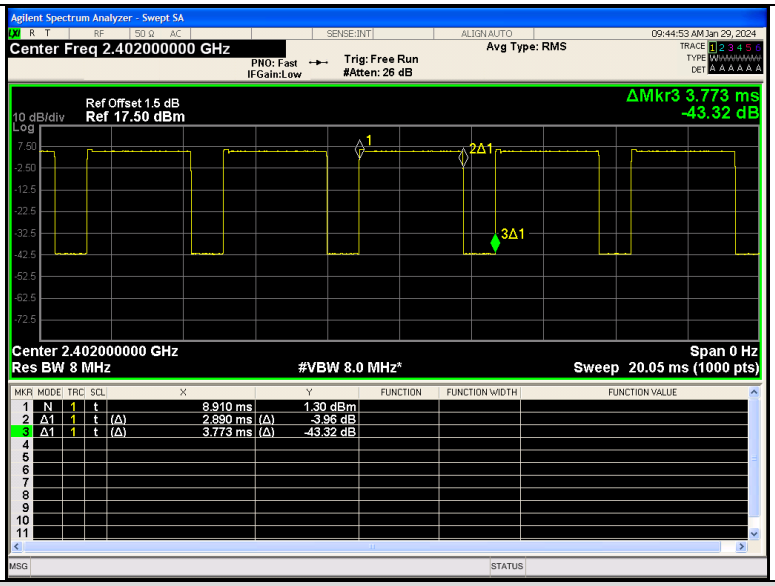
GFSK(DH5)_Channel 0



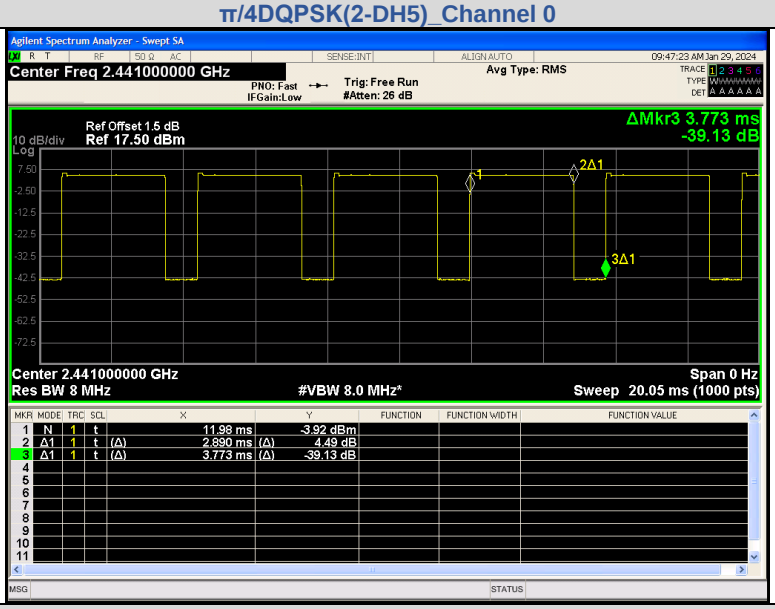
GFSK(DH5)_Channel 39



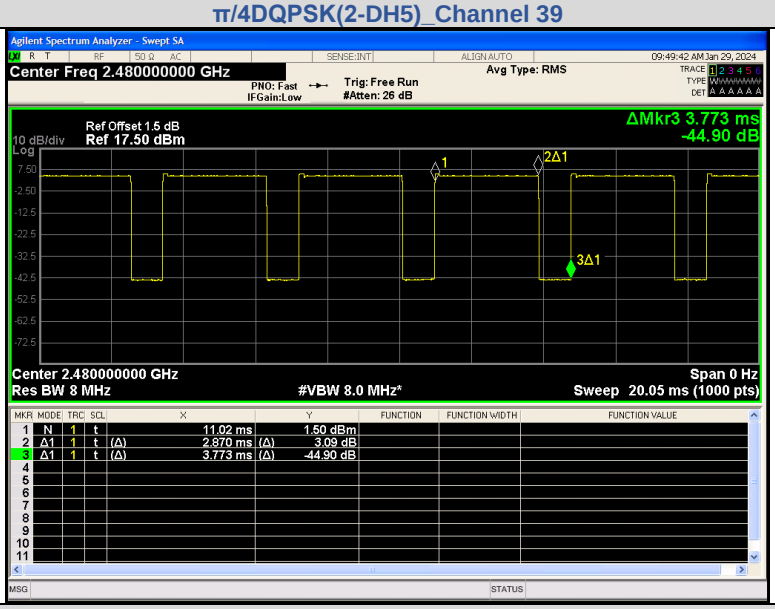
GFSK(DH5)_Channel 78



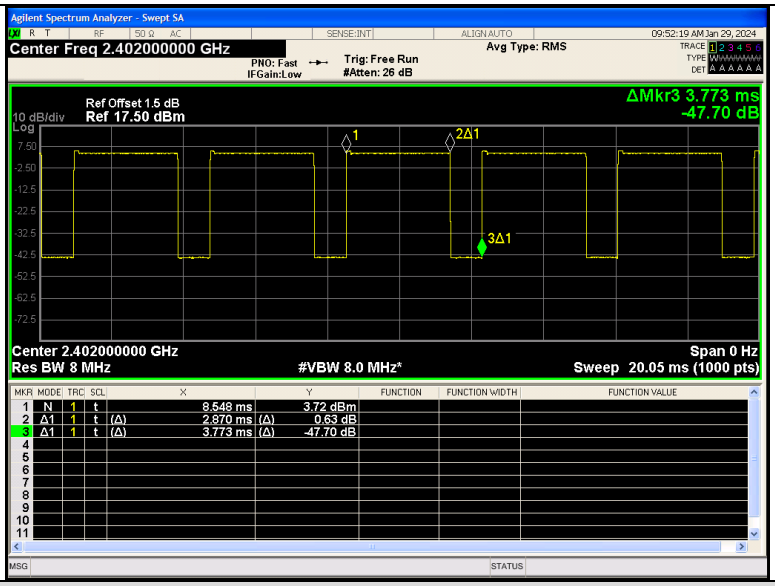
π/4DQPSK(2-DH5)_Channel 0



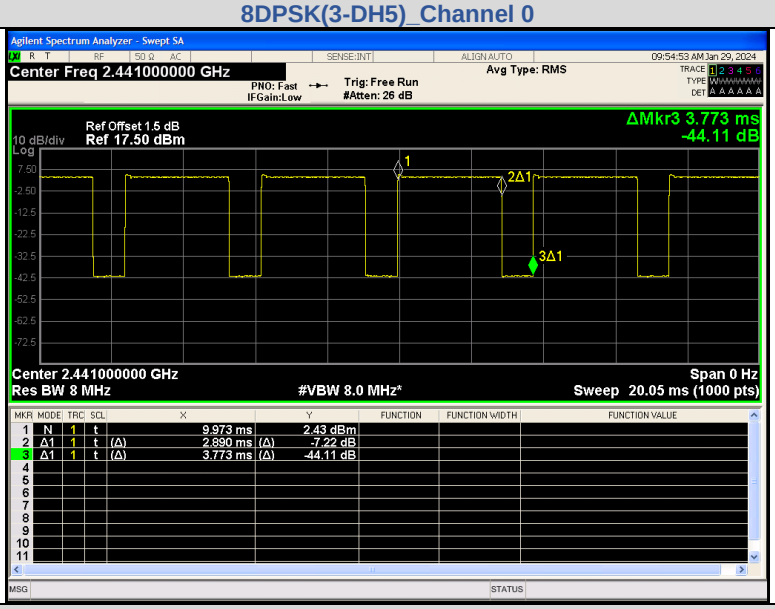
π/4DQPSK(2-DH5)_Channel 39



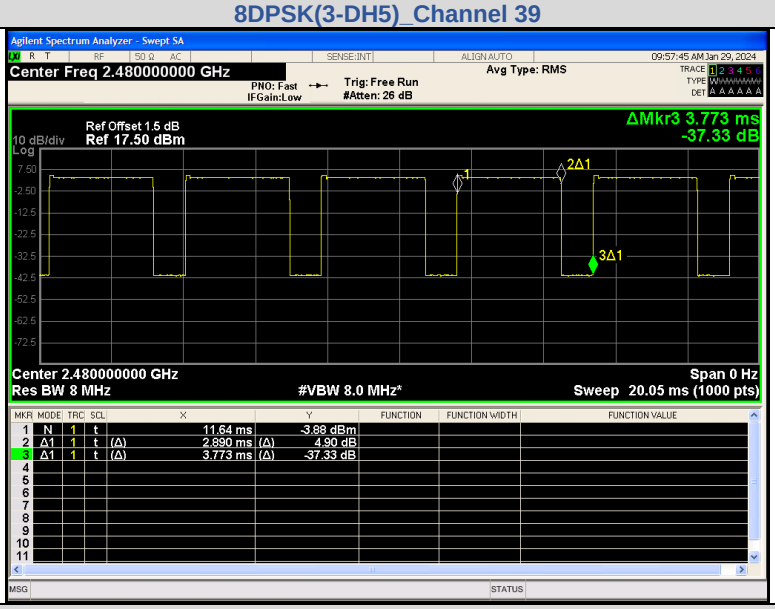
π/4DQPSK(2-DH5)_Channel 78



8DPSK(3-DH5)_Channel 0



8DPSK(3-DH5)_Channel 39



8DPSK(3-DH5)_Channel 78

3.11. Antenna Requirement

Requirement

FCC CFR Title 47 Part 15 Subpart C Section 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. The use of a permanently attached antenna or of antenna that uses a unique coupling to the intentional radiator, 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.
FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i)
(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

Test Result

The directional gain of the antenna is less than 6dBi, please refer to the EUT internal photographs antenna photo.

************************THE END*************************