Appendix A

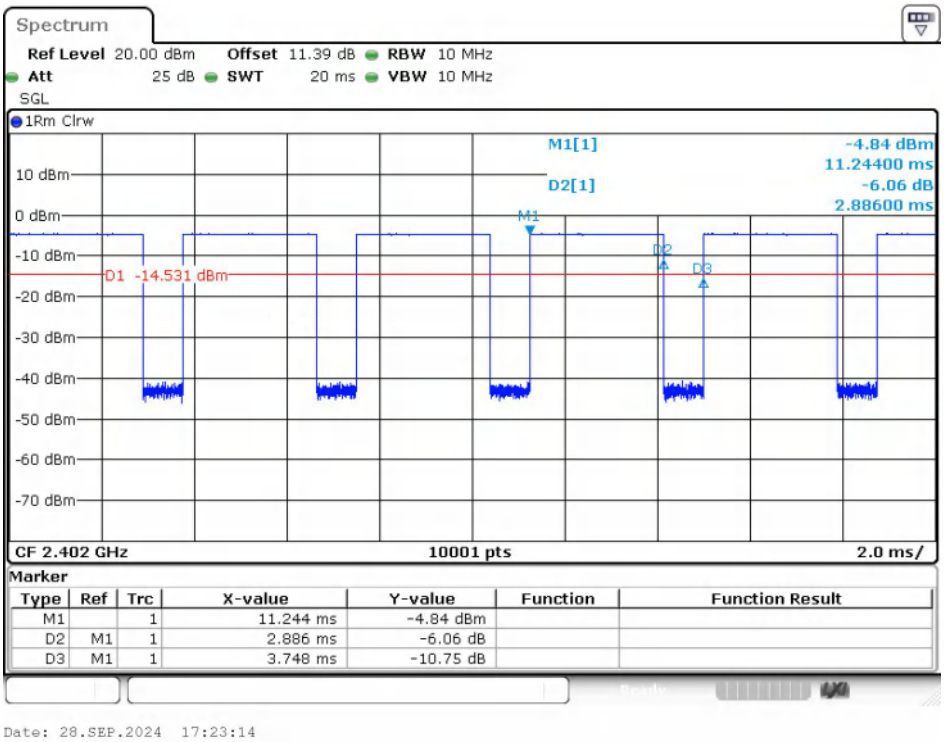
Report No.:	CISRR24091917701
FCC ID:	2BK9F-V200
Product Name:	Intelligent Microprojector
Model No.:	V200
Test Engineer:	Lucas Huang
Supervised by:	Rory Huang

1) Duty Cycle

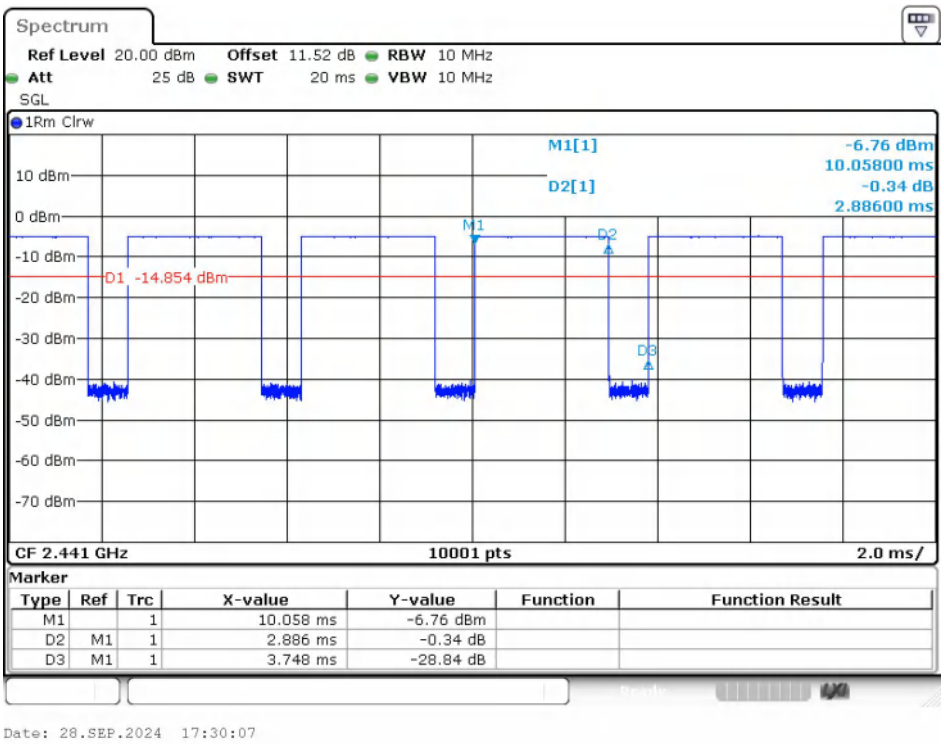
Test Result

Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.886	3.748	77.00	0.7700	1.1351	0.35
		39	2.886	3.748	77.00	0.7700	1.1351	0.35
		78	2.886	3.748	77.00	0.7700	1.1351	0.35
π/4DQPSK	2-DH5	0	2.892	3.748	77.16	0.7716	1.1261	0.35
		39	2.892	3.748	77.16	0.7716	1.1261	0.35
		78	2.892	3.748	77.16	0.7716	1.1261	0.35
8DPSK	3-DH5	0	2.892	3.748	77.16	0.7716	1.1261	0.35
		39	2.892	3.748	77.16	0.7716	1.1261	0.35
		78	2.892	3.748	77.16	0.7716	1.1261	0.35

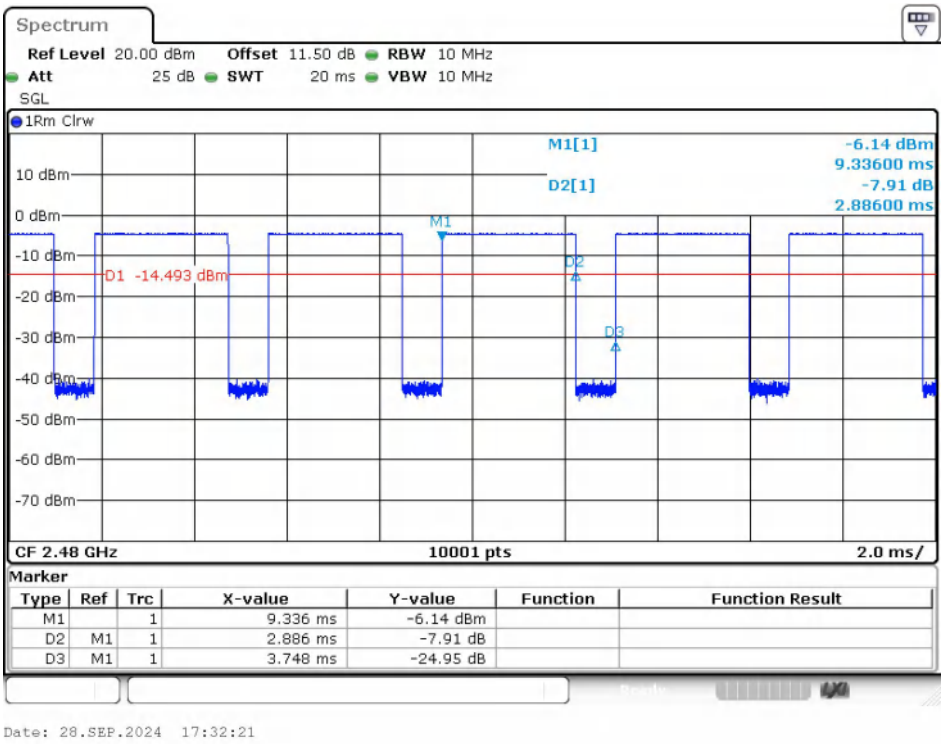
Test Graphs



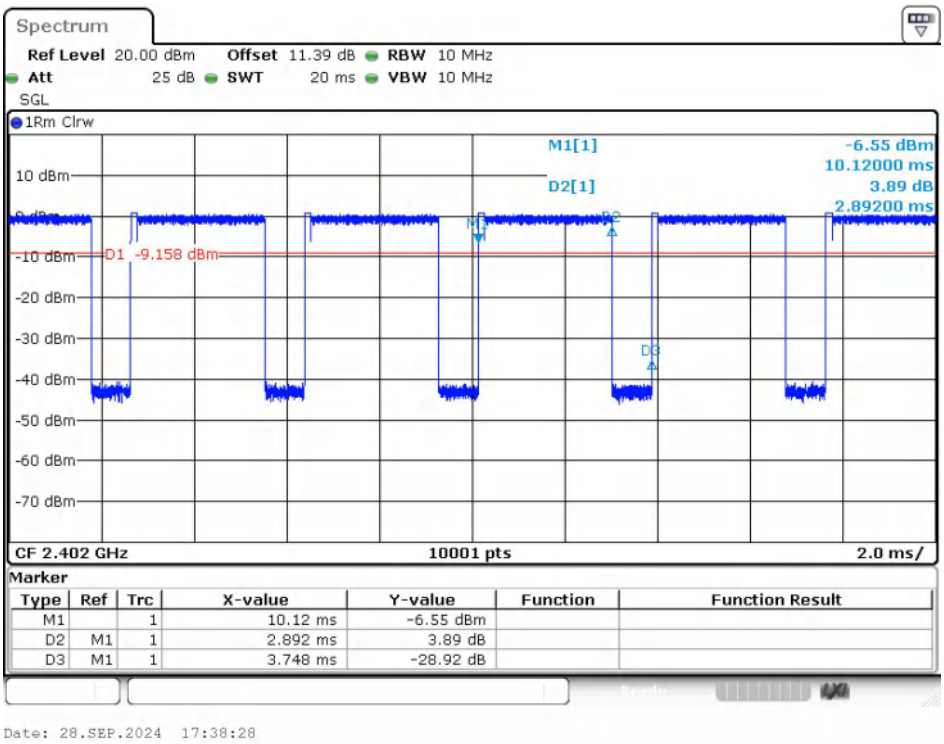
GFSK(DH5)_Channel 0



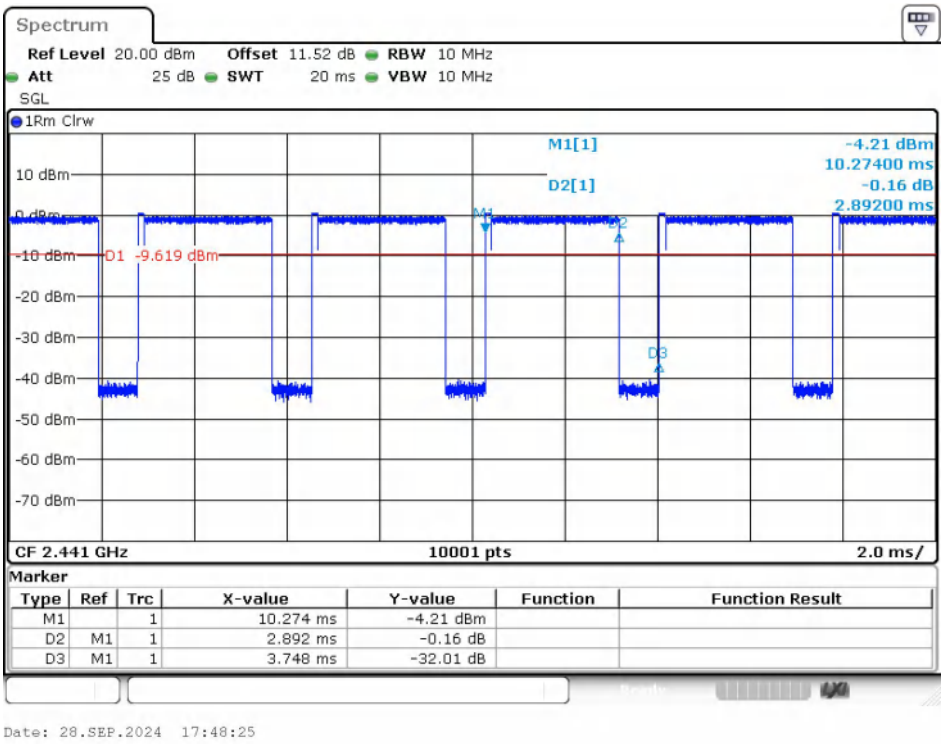
GFSK(DH5)_Channel 39



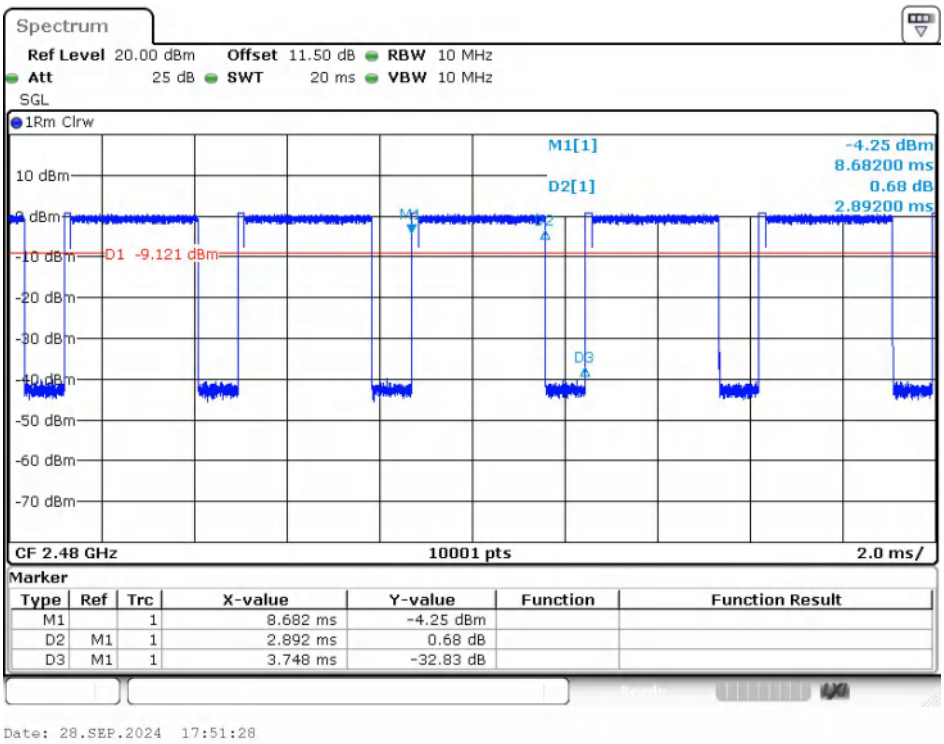
GFSK(DH5)_Channel 78



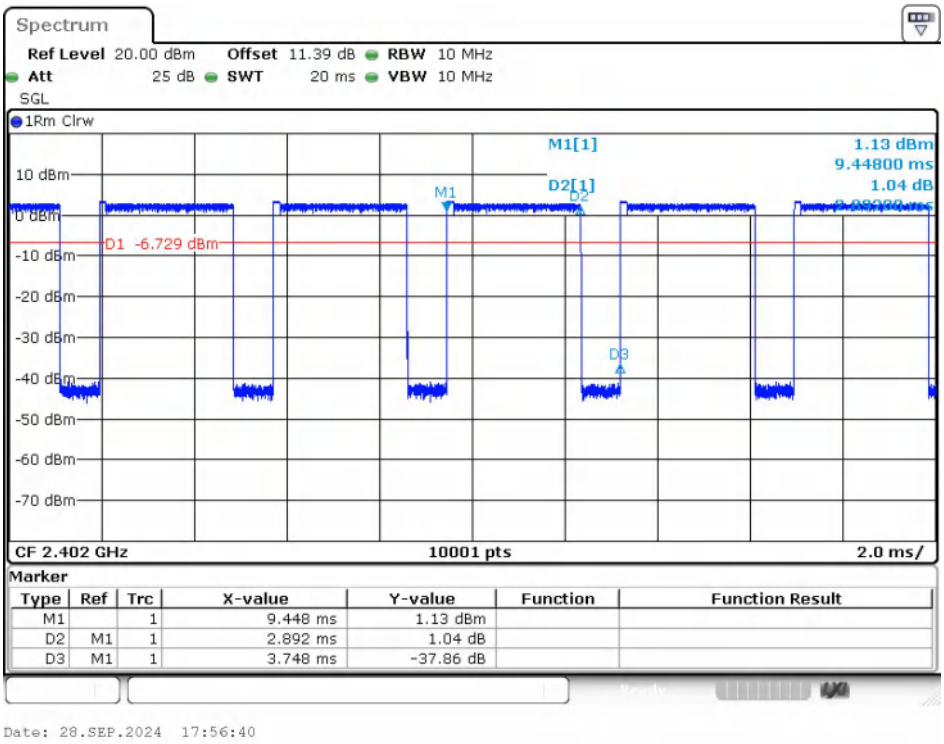
π/4DQPSK(2-DH5)_Channel 0



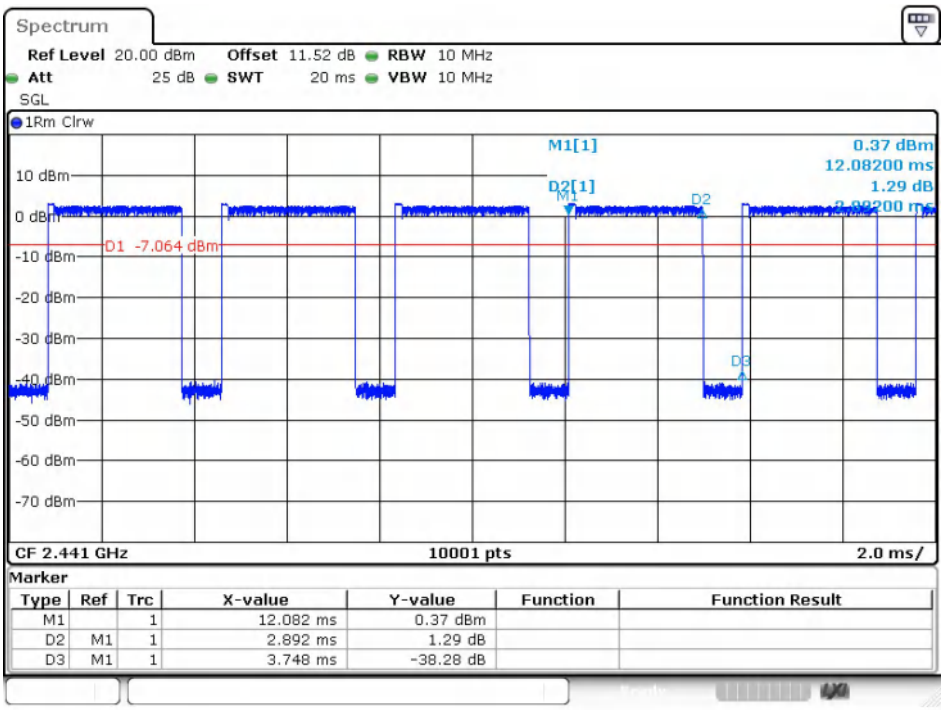
π/4DQPSK(2-DH5)_Channel 39



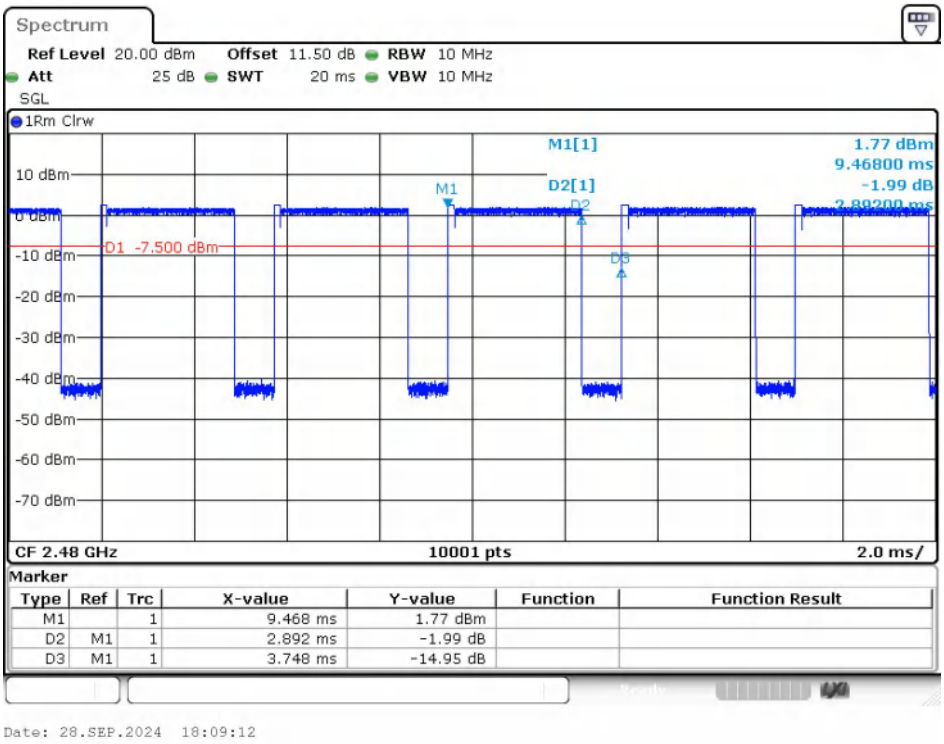
π/4DQPSK(2-DH5)_Channel 78



8DPSK(3-DH5)_Channel 0



8DPSK(3-DH5)_Channel 39



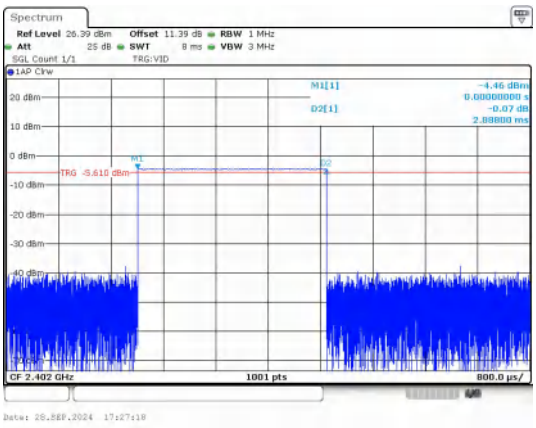
8DPSK(3-DH5)_Channel 78

2) Dwell Time

Test Result

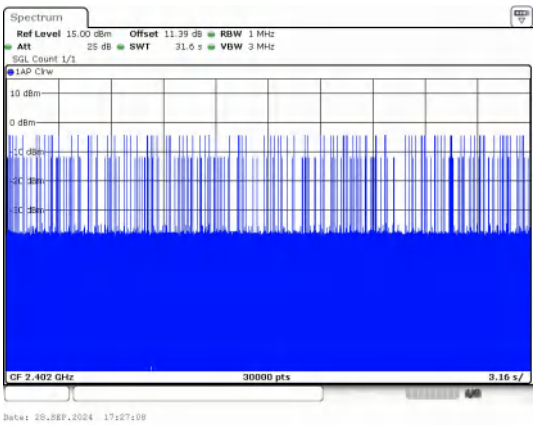
Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.888	104	300.35	< 400	PASS
π/4DQPSK	2-DH5		2.896	90	260.64		PASS
8DPSK	3-DH5		2.904	100	290.4		PASS

Test Graphs



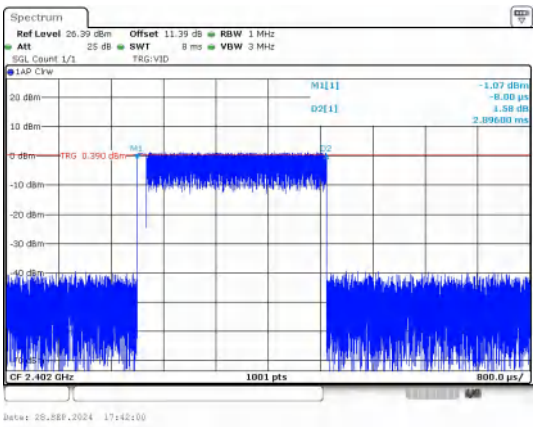
Pulse Width

GFSK_DH5



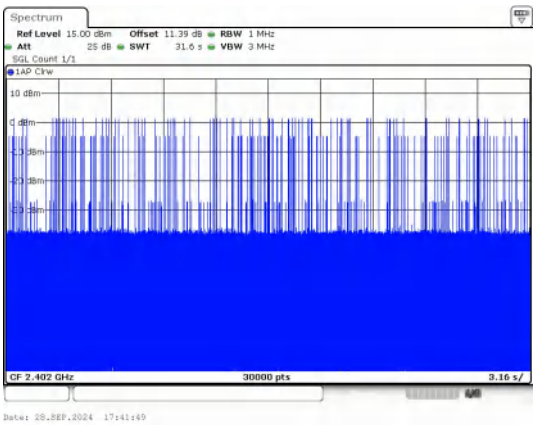
Number of Pulses in 31.6 seconds

GFSK_DH5



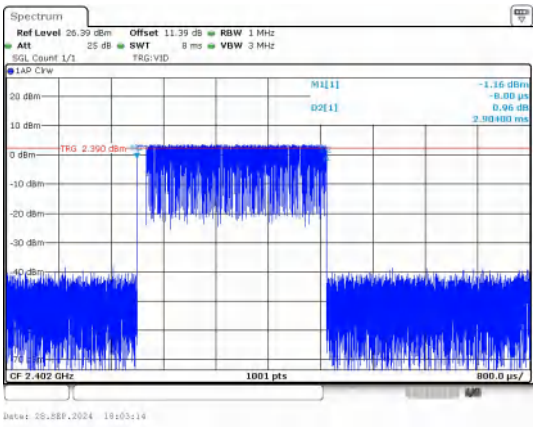
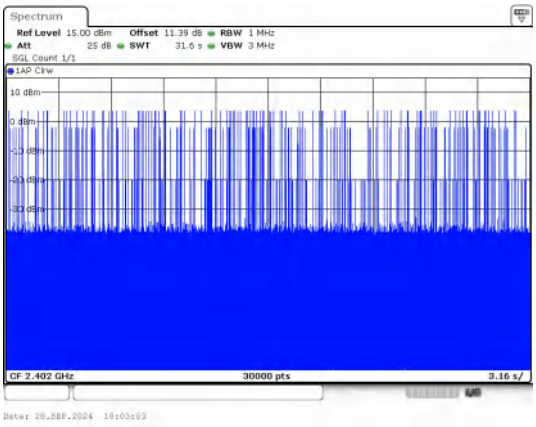
Pulse Width

π/4DQPSK_2-DH5



Number of Pulses in 31.6 seconds

π/4DQPSK_2-DH5

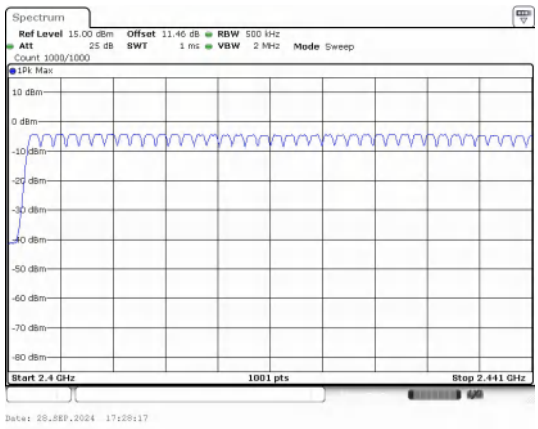
	
Pulse Width **8DPSK_3-DH5**	**Number of Pulses in 31.6 seconds** **8DPSK_3-DH5**

3) Number Of Hopping Channel

Test Result

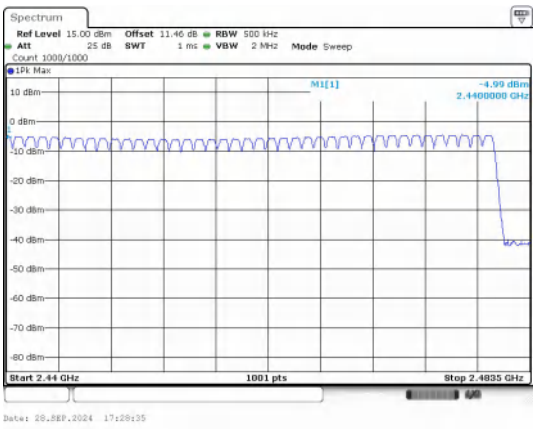
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
π/4DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

Test Graphs



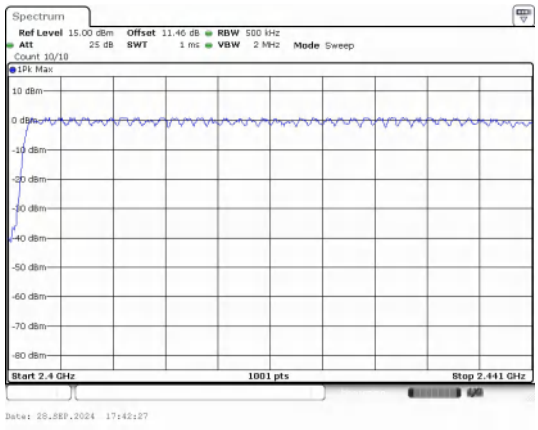
Low End Spectrum Channel Hopping Plot

GFSK



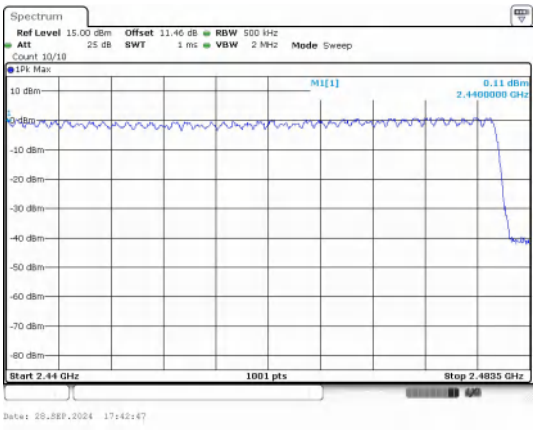
High End Spectrum Channel Hopping Plot

GFSK



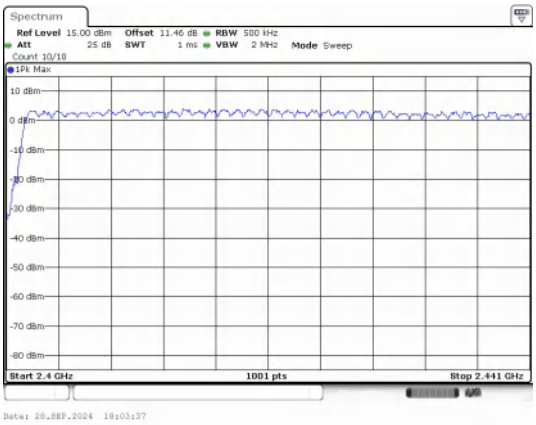
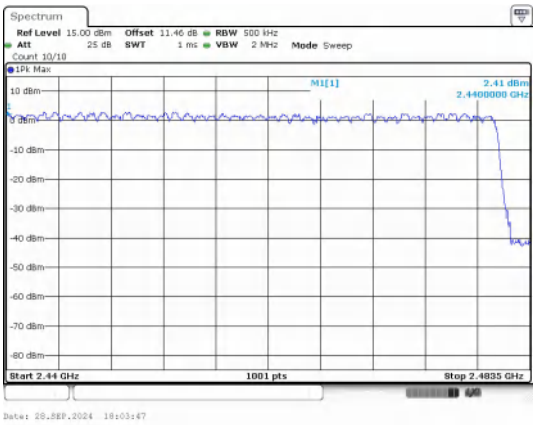
Low End Spectrum Channel Hopping Plot

π/4DQPSK



High End Spectrum Channel Hopping Plot

π/4DQPSK

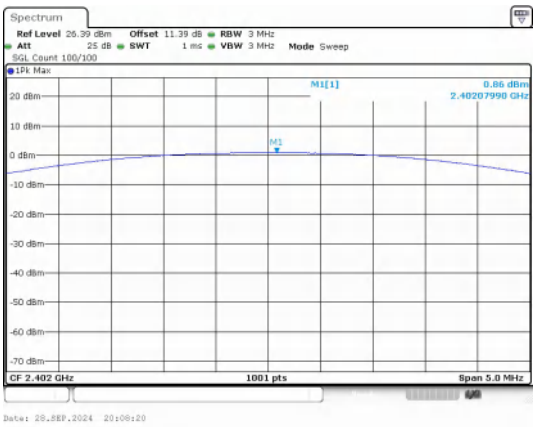
	
Low End Spectrum Channel Hopping Plot **8DPSK**	**High End Spectrum Channel Hopping Plot** **8DPSK**

4) Conducted Peak Output Power

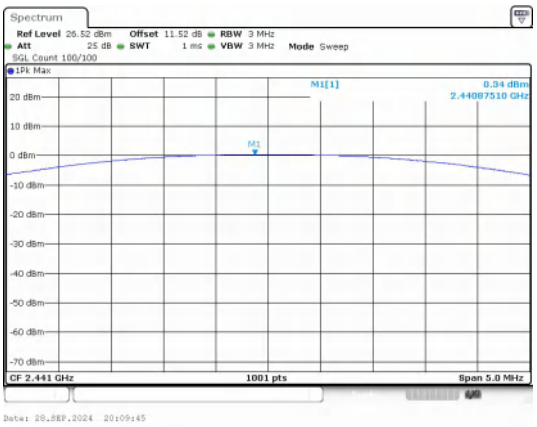
Test Result

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	0.86	1.22	≤30	PASS
		39	0.34	1.08		PASS
		78	0.94	1.24		PASS
π/4DQPSK	2-DH5	0	1.30	1.35	≤20.97	PASS
		39	1.18	1.31		PASS
		78	1.84	1.53		PASS
8DPSK	3-DH5	0	1.59	1.44		PASS
		39	1.12	1.29		PASS
		78	2.13	1.63		PASS

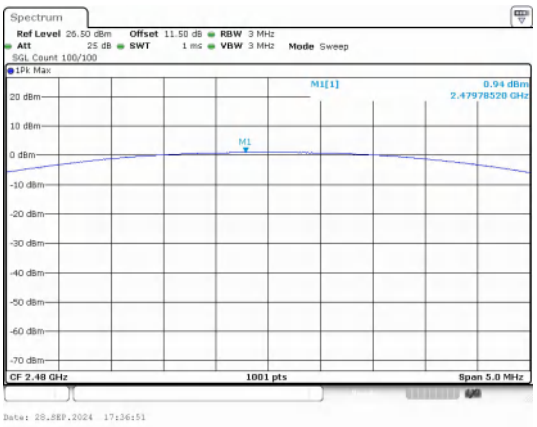
Test Graphs



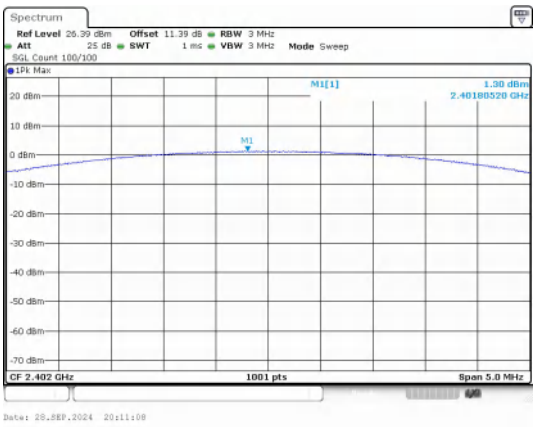
Peak Output Power
GFSK_Channel 0



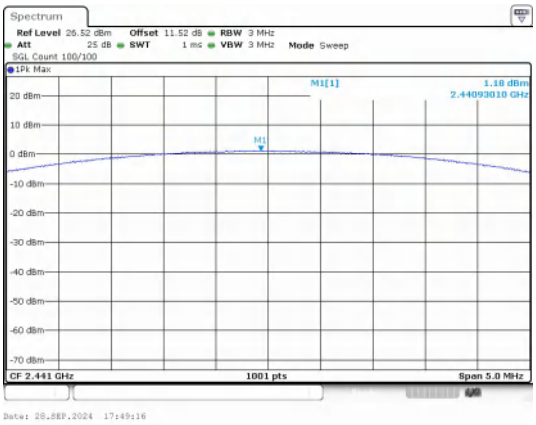
Peak Output Power
GFSK_Channel 39



Peak Output Power
GFSK_Channel 78

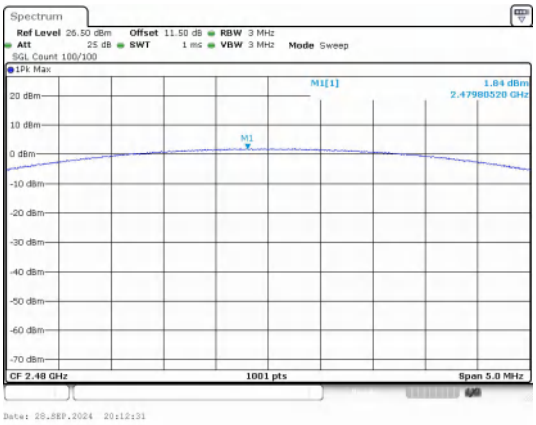


Peak Output Power
π/4DQPSK_Channel 0



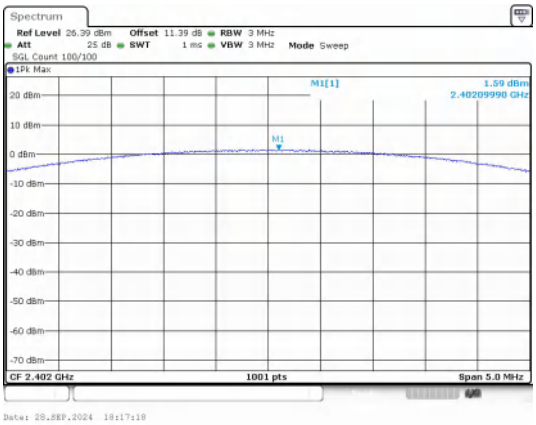
Peak Output Power

π/4DQPSK_Channel 39



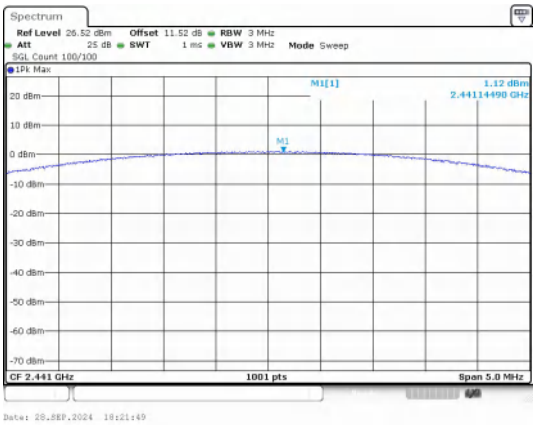
Peak Output Power

π/4DQPSK_Channel 78



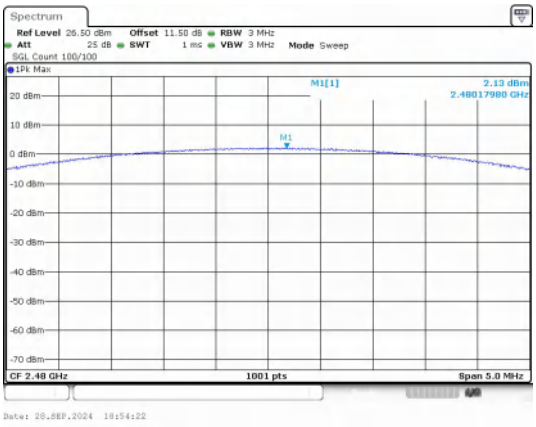
Peak Output Power

8DPSK_Channel 0



Peak Output Power

8DPSK_Channel 39



Peak Output Power

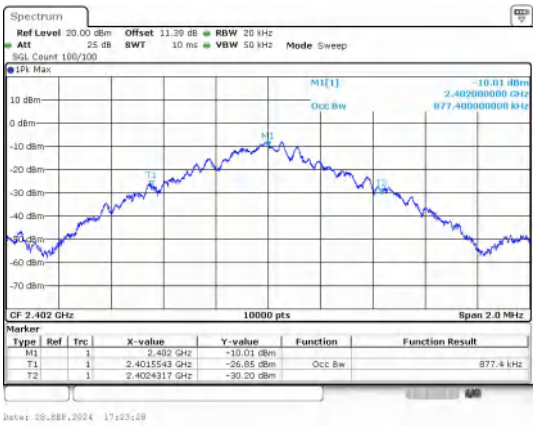
8DPSK_Channel 78

5) 99% Bandwidth

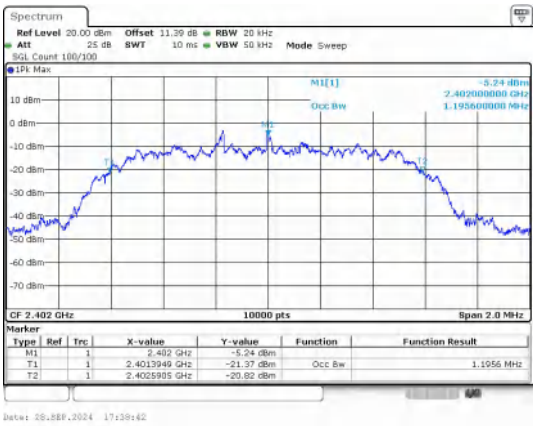
Test Result

Modulation	Channel	Center Frequency (MHz)	99% BW (MHz)
GFSK	0	2402	0.87740
	39	2441	0.88200
	78	2480	0.88940
π/4DQPSK	0	2402	1.1956
	39	2441	1.2150
	78	2480	1.2182
8DPSK	0	2402	1.1702
	39	2441	1.1800
	78	2480	1.1828

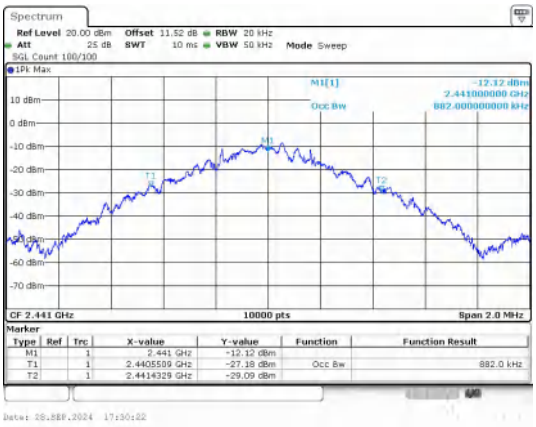
Test Graphs



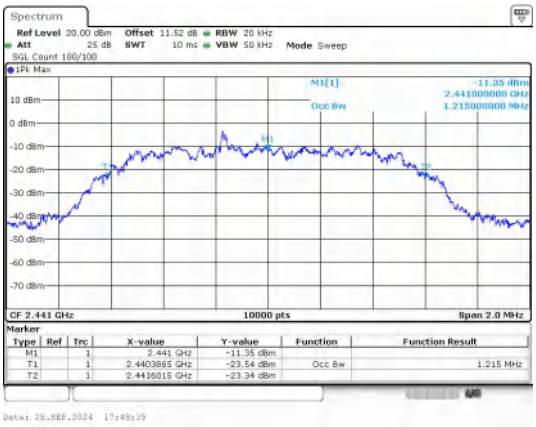
GFSK_DH5_Channel 0



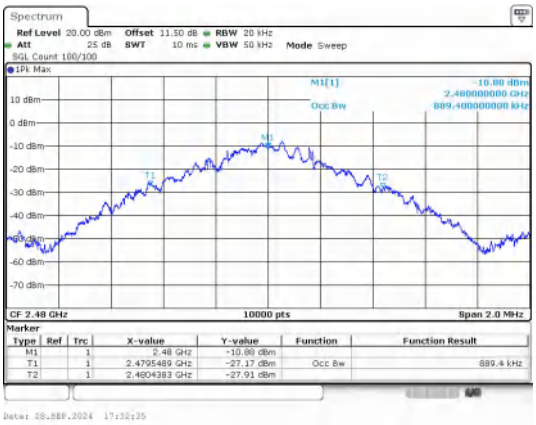
π/4DQPSK_2-DH5_Channel 0



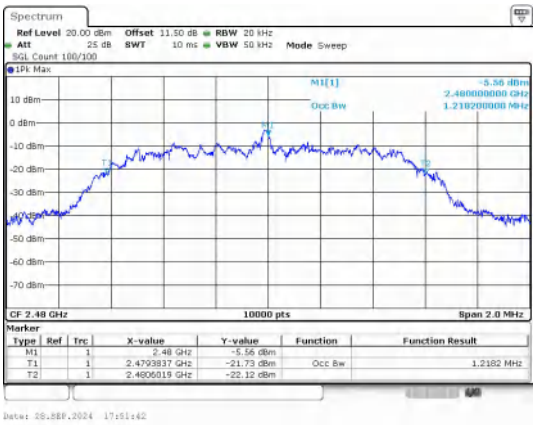
GFSK_DH5_Channel 39



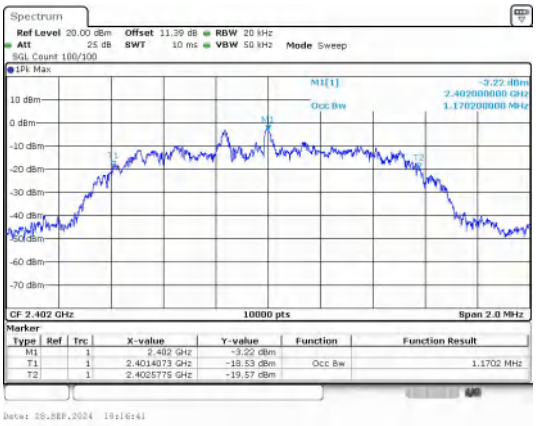
π/4DQPSK_2-DH5_Channel 39



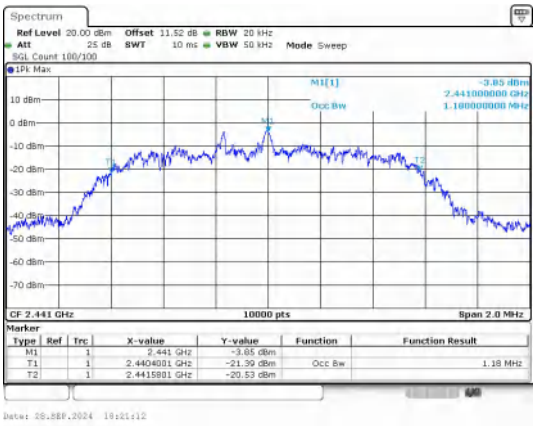
GFSK_DH5_Channel 78



π/4DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39

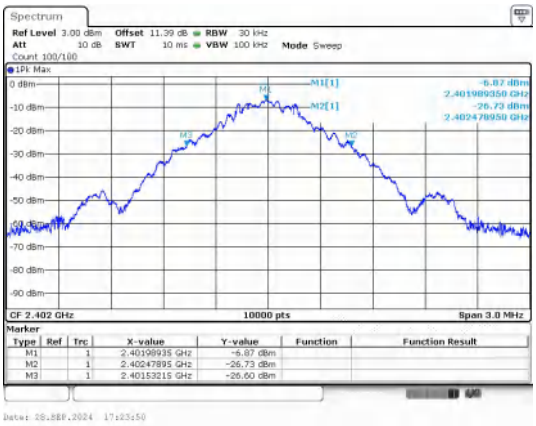
8DPSK_3-DH5_Channel 78

6) 20dB Bandwidth

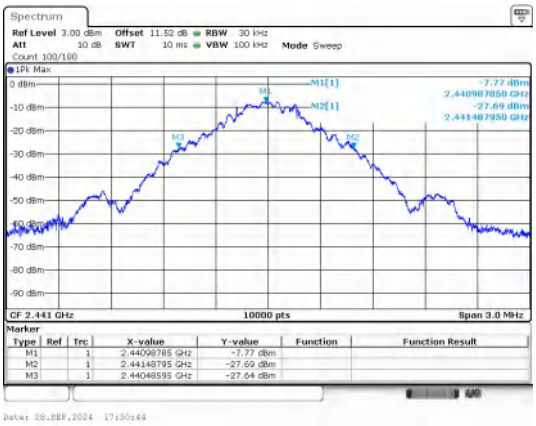
Test Result

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	0.9500
	39	2441 MHz	1.000
	78	2480 MHz	1.010
π/4DQPSK	0	2402 MHz	1.280
	39	2441 MHz	1.320
	78	2480 MHz	1.320
8DPSK	0	2402 MHz	1.270
	39	2441 MHz	1.310
	78	2480 MHz	1.290

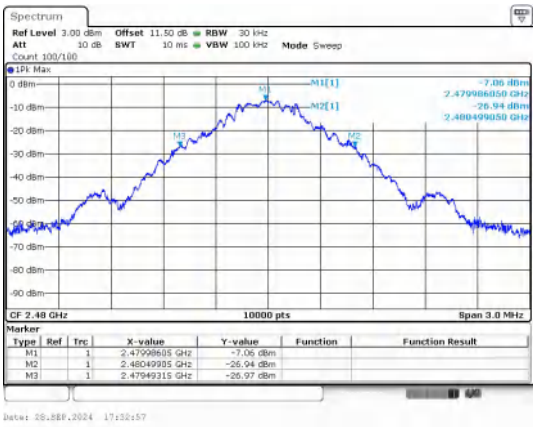
Test Graphs



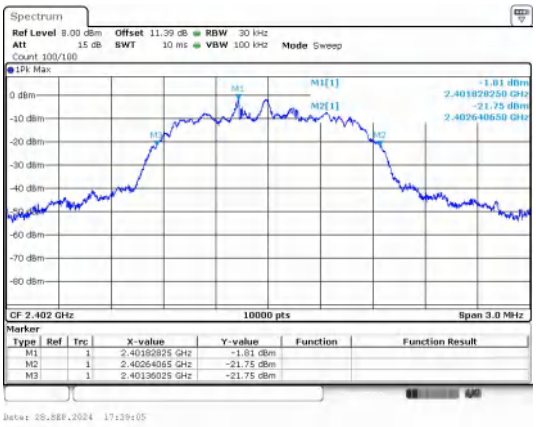
GFSK_DH5_Channel 0



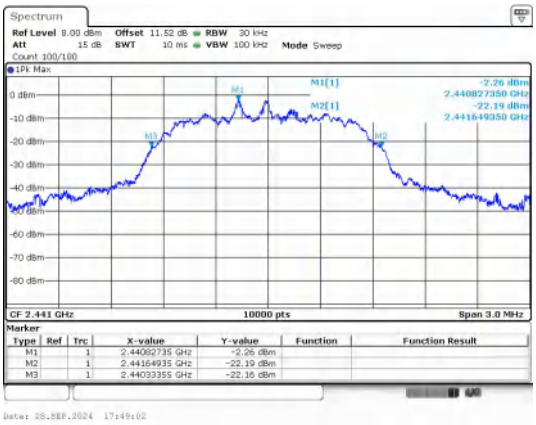
GFSK_DH5_Channel 39



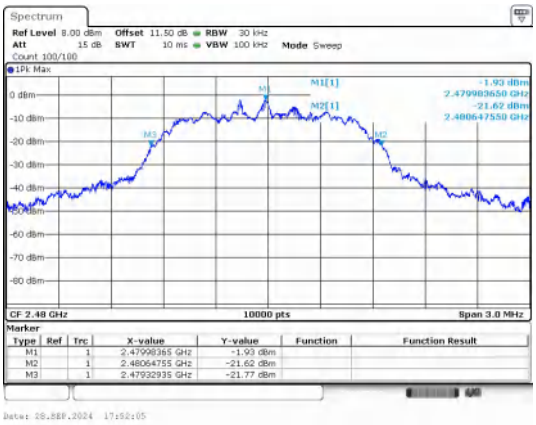
GFSK_DH5_Channel 78



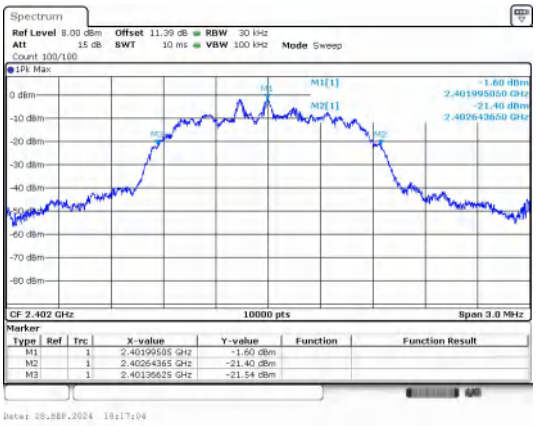
π/4DQPSK_2-DH5_Channel 0



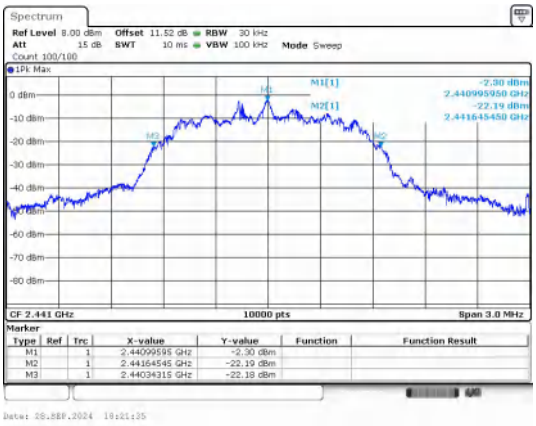
π/4DQPSK_2-DH5_Channel 39



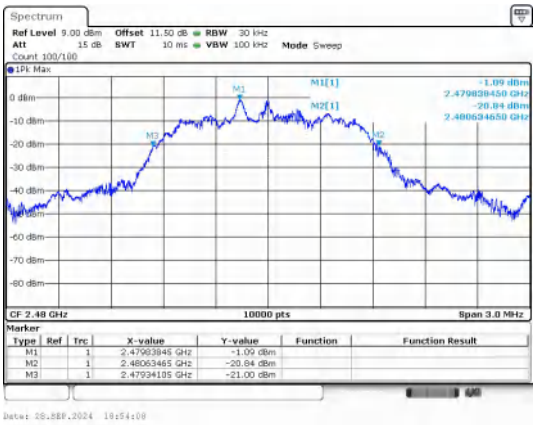
π/4DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



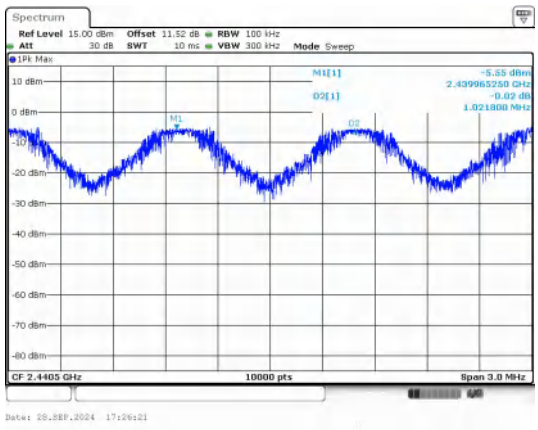
8DPSK_3-DH5_Channel 78

7) Carrier Frequencies Separation

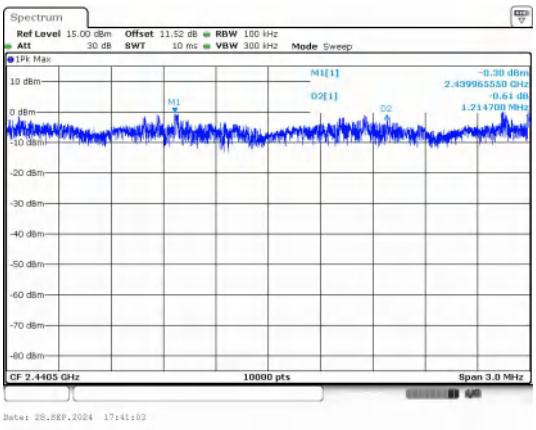
Test Result

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2439.9653	2440.9871	1.0218	1.010	PASS
π/4DQPSK	2-DH5	2439.9655	2441.1802	1.2147	0.853	PASS
8DPSK	3-DH5	2440.1912	2441.0858	0.8946	0.873	PASS

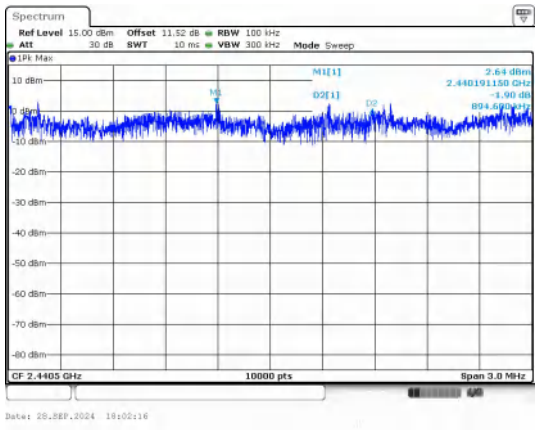
Test Graphs



GFSK



π/4DQPSK



8DPSK

8) Conducted Out Of Band Emission

Test Result

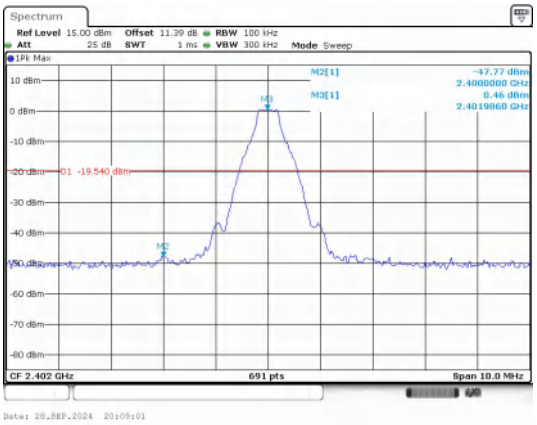
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-47.769	-19.54	-28.229	PASS
			9608.08	-44.763	-19.54	-25.223	PASS
		39	9763.72	-43.408	-19.82	-23.588	PASS
		78	2483.50	-50.205	-19.15	-31.055	PASS
			9920.20	-43.388	-19.15	-24.238	PASS
π/4DQPSK	2-DH5	0	2400.00	-48.069	-19.6	-28.469	PASS
			9608.08	-44.574	-19.6	-24.974	PASS
		39	9763.72	-42.722	-19.73	-22.992	PASS
		78	2483.50	-50.021	-19.14	-30.881	PASS
			9920.20	-42.920	-19.14	-23.780	PASS
8DPSK	3-DH5	0	2400.00	-47.897	-19.37	-28.527	PASS
			9608.08	-45.226	-19.37	-25.856	PASS
		39	9763.72	-44.019	-19.77	-24.249	PASS
		78	2483.50	-49.817	-18.82	-30.997	PASS
			9920.20	-43.825	-18.82	-25.005	PASS

Hopping

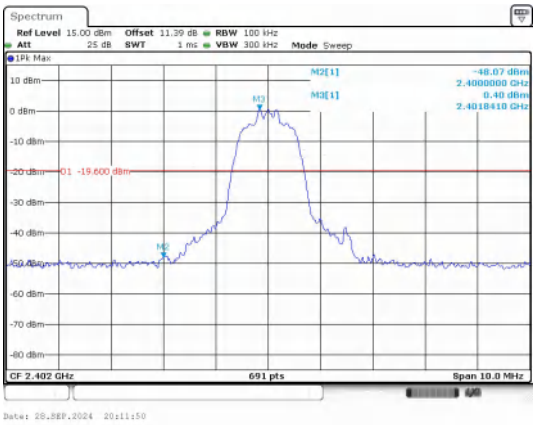
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2398.71	-48.820	-24.63	-24.190	PASS
			2400.00	-51.334	-24.63	-26.704	PASS
			2483.50	-49.251	-24.71	-24.541	PASS
π/4DQPSK	2-DH5		2398.94	-48.072	-19.24	-28.832	PASS
			2400.00	-49.475	-19.24	-30.235	PASS
			2483.50	-48.294	-19.27	-29.024	PASS
8DPSK	3-DH5		2395.79	-47.959	-18.89	-29.069	PASS
			2400.00	-50.118	-18.89	-31.228	PASS
			2483.50	-49.721	-20.59	-29.131	PASS

Test Graphs



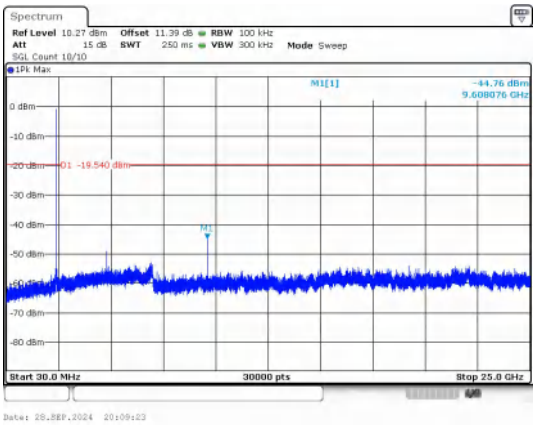
Out Of Band Emission

GFSK_DH5_Channel 0



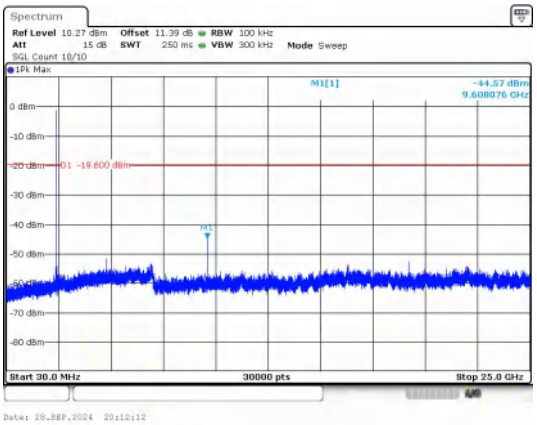
Out Of Band Emission

π/4DQPSK_2-DH5_Channel 0



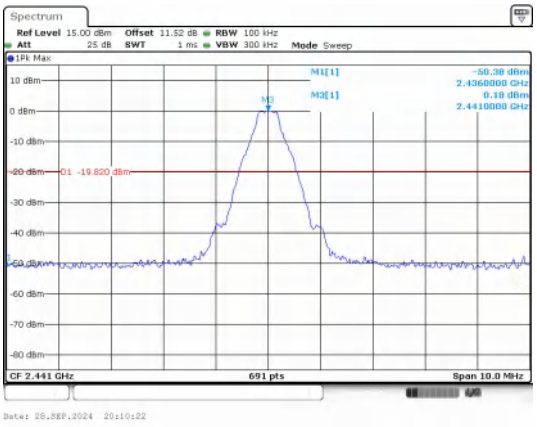
30.0 MHz - 25000.0 MHz

GFSK_DH5_Channel 0



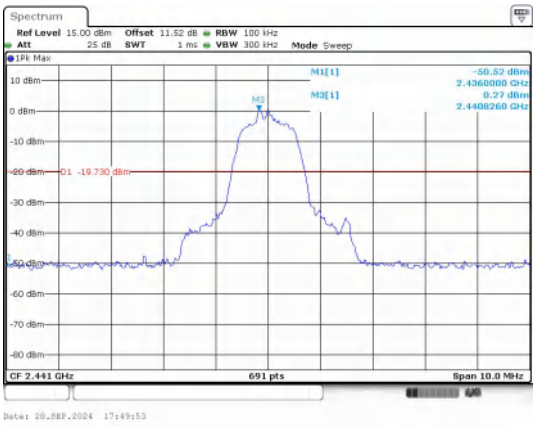
30.0 MHz - 25000.0 MHz

π/4DQPSK_2-DH5_Channel 0



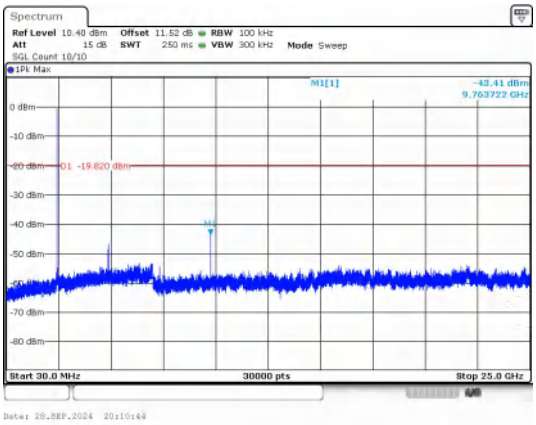
Out Of Band Emission

GFSK_DH5_Channel 39



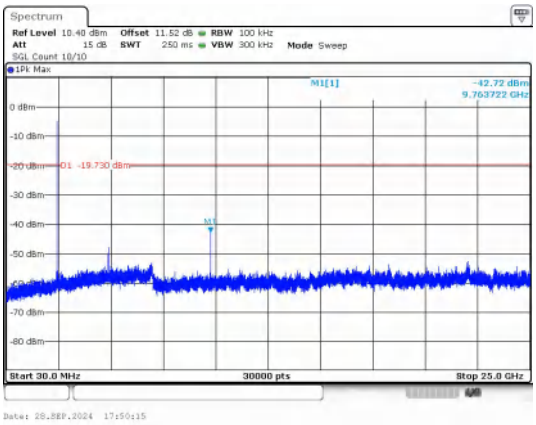
Out Of Band Emission

π/4DQPSK_2-DH5_Channel 39



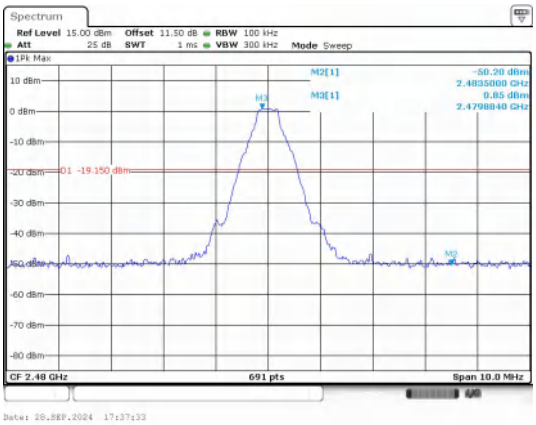
30.0 MHz - 25000.0 MHz

GFSK_DH5_Channel 39



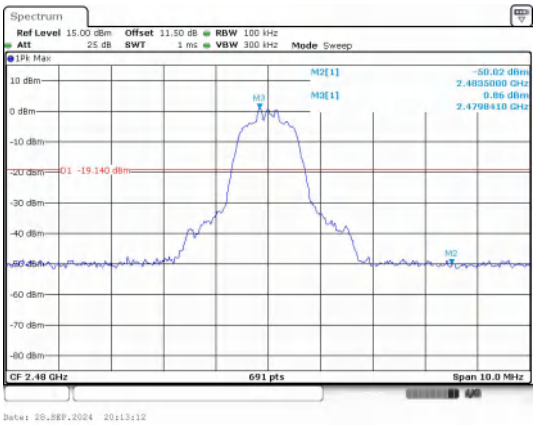
30.0 MHz - 25000.0 MHz

π/4DQPSK_2-DH5_Channel 39



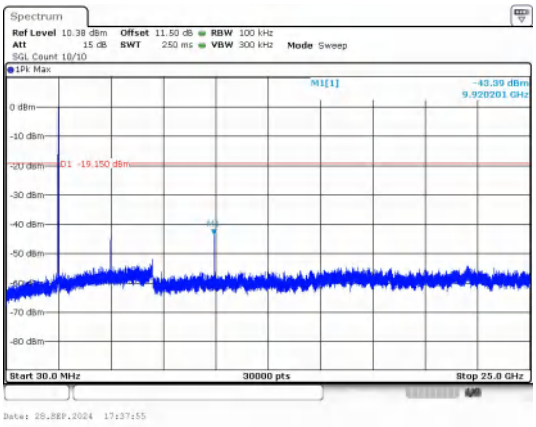
Out Of Band Emission

GFSK_DH5_Channel 78



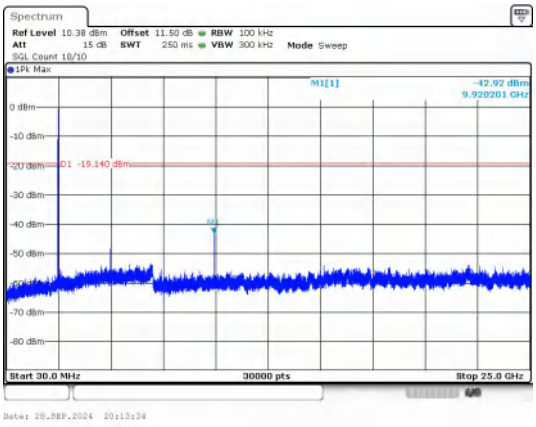
Out Of Band Emission

π/4DQPSK_2-DH5_Channel 78



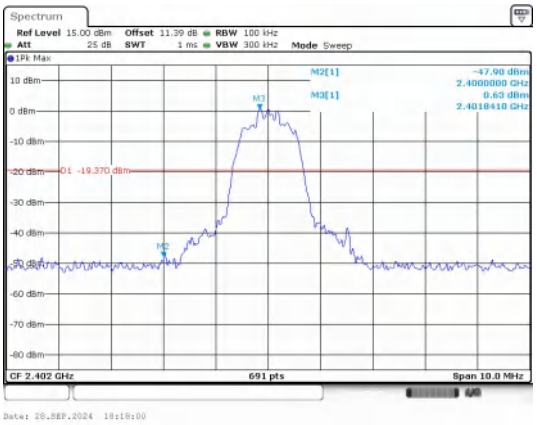
30.0 MHz - 25000.0 MHz

GFSK_DH5_Channel 78



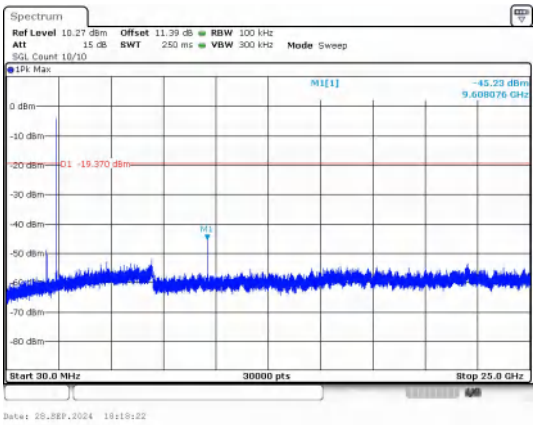
30.0 MHz - 25000.0 MHz

π/4DQPSK_2-DH5_Channel 78



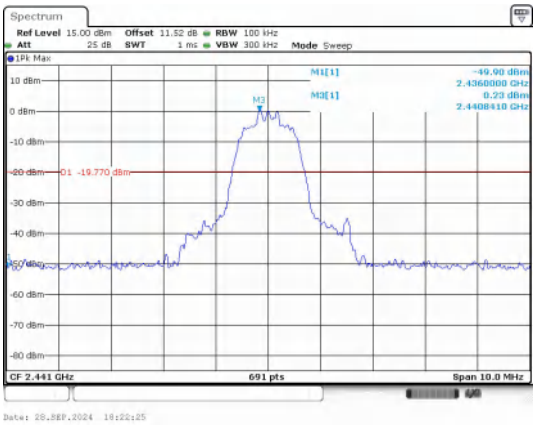
Out Of Band Emission

8DPSK_3-DH5_Channel 0



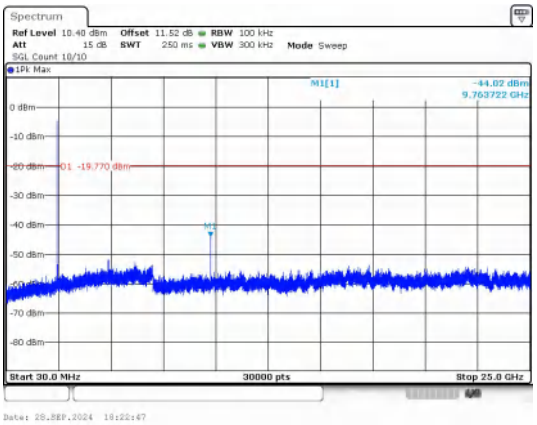
30.0 MHz - 25000.0 MHz

8DPSK_3-DH5_Channel 0



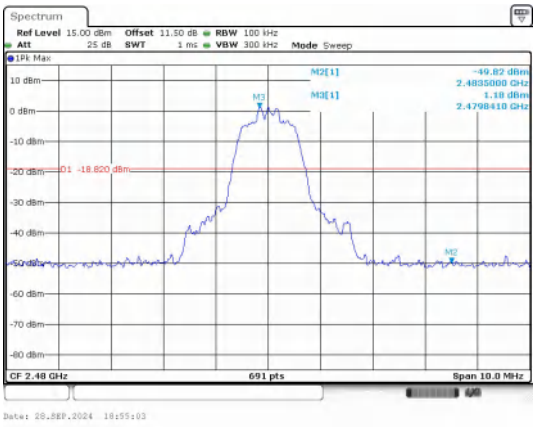
Out Of Band Emission

8DPSK_3-DH5_Channel 39



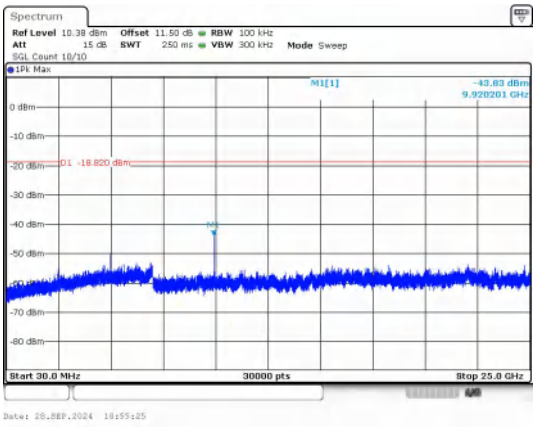
30.0 MHz - 25000.0 MHz

8DPSK_3-DH5_Channel 39



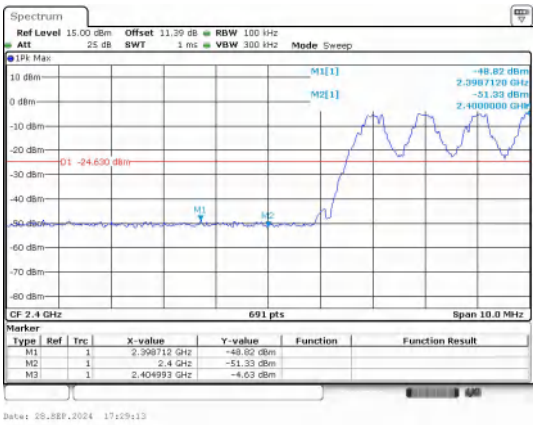
Out Of Band Emission

8DPSK_3-DH5_Channel 78



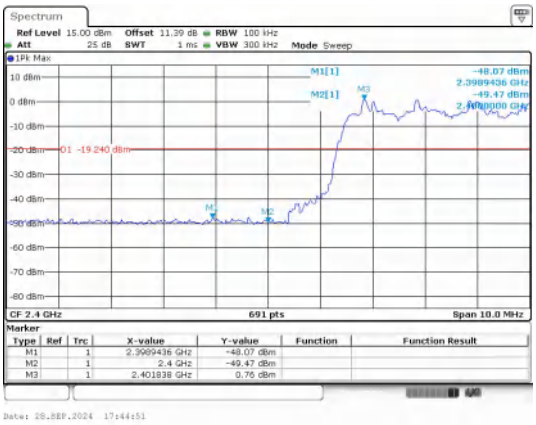
30.0 MHz - 25000.0 MHz

8DPSK_3-DH5_Channel 78



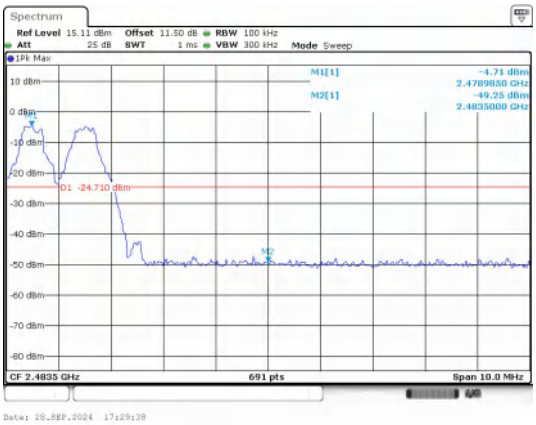
Out Of Band Emission(Left)

GFSK_DH5_Channel Hopping



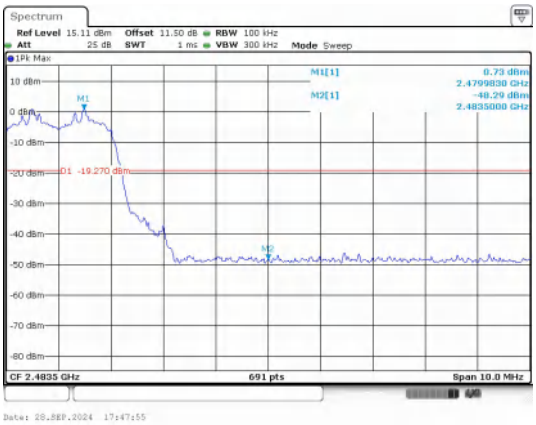
Out Of Band Emission(Left)

π/4DQPSK_2-DH5_Channel Hopping



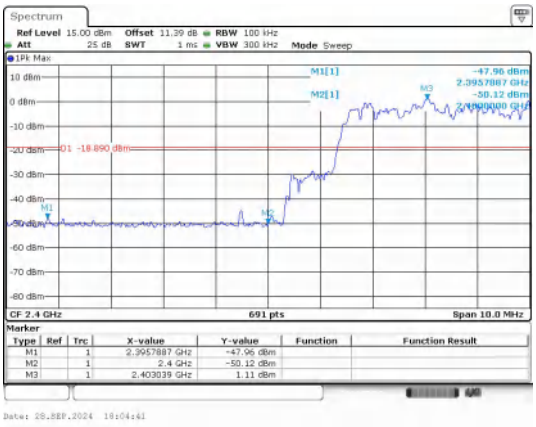
Out Of Band Emission(Right)

GFSK_DH5_Channel Hopping



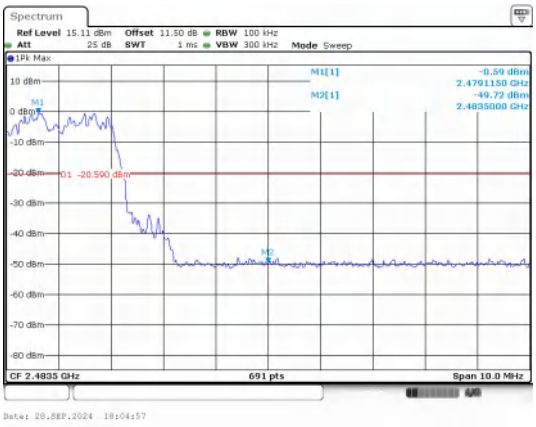
Out Of Band Emission(Right)

π/4DQPSK_2-DH5_Channel Hopping



Out Of Band Emission(Left)

8DPSK_3-DH5_Channel Hopping



Out Of Band Emission(Right)

8DPSK_3-DH5_Channel Hopping