Appendix A

Report No.:	CISRR240626195
FCC ID:	2BHBB-QCWS-B7
Product Name:	Zombiescat Coconut Ball series B7 Open Wearable stereo
Model No.:	QCWS-B7
Test Engineer:	Lucas Huang
Supervised by:	Rory Huang

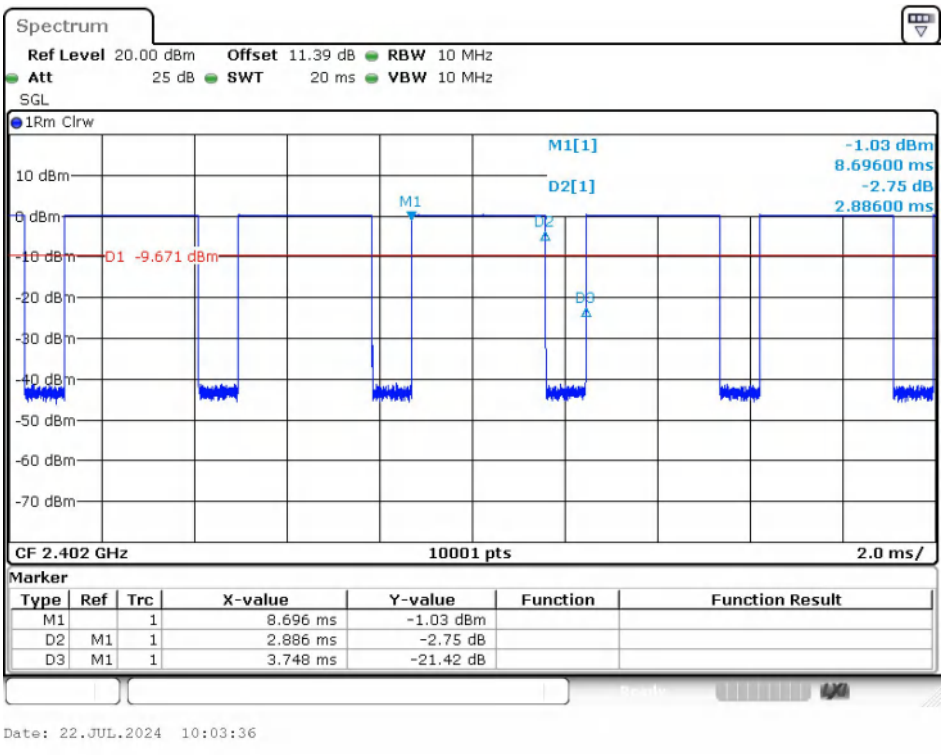
1) Duty Cycle

Left

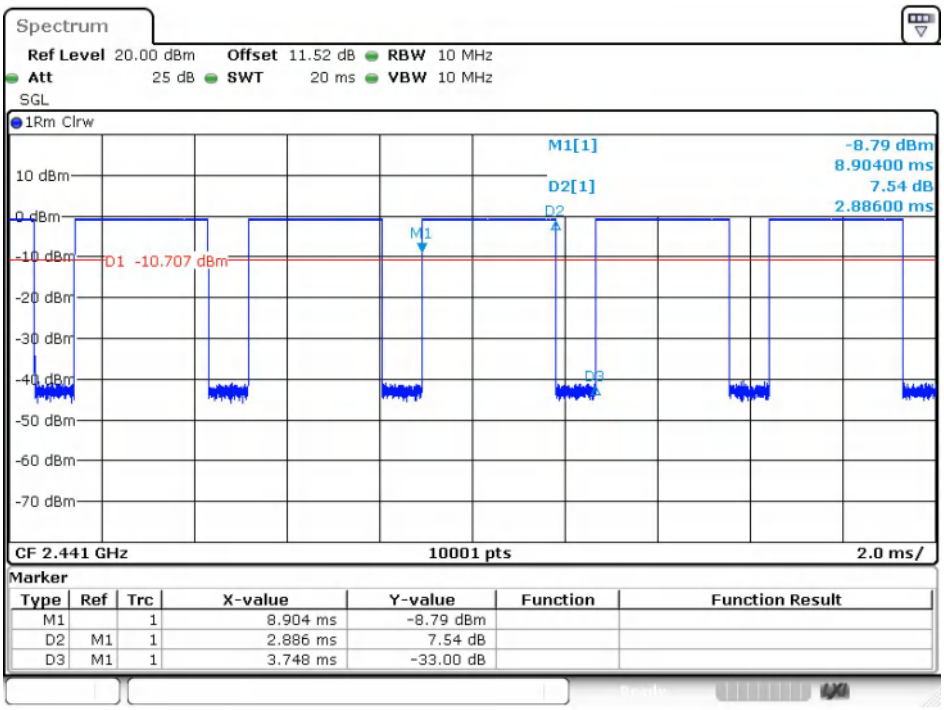
Test Result

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	2.890	3.748	77.11	0.7711	1.1289	0.35
8DPSK	3-DH5	0	2.894	3.748	77.21	0.7721	1.1233	0.35
		39	2.892	3.748	77.16	0.7716	1.1261	0.35
		78	2.894	3.748	77.21	0.7721	1.1233	0.35

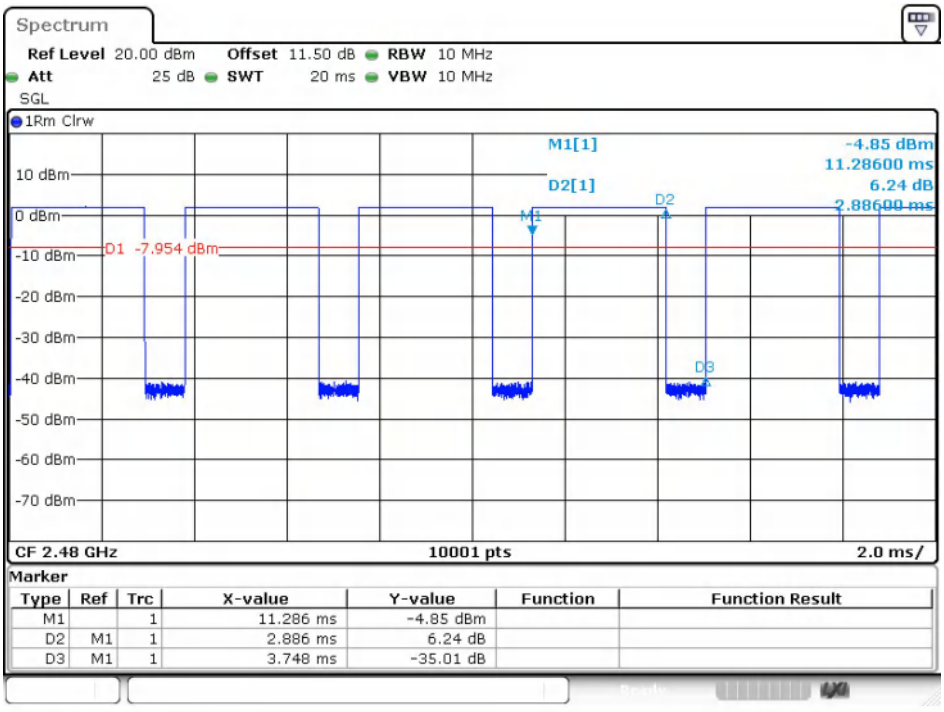
Test Graphs



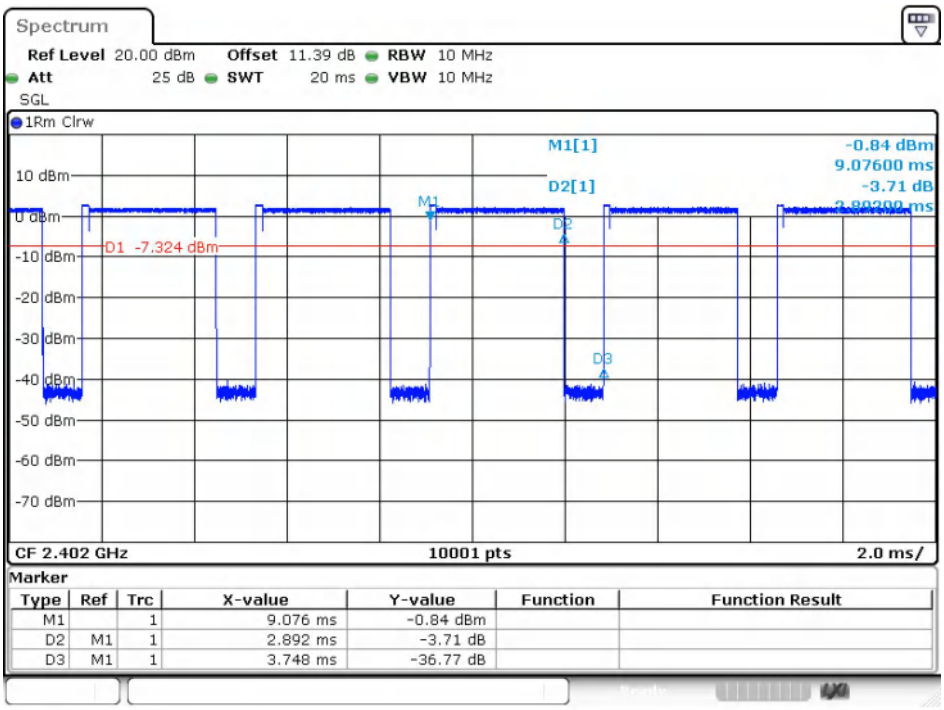
GFSK(DH5)_Channel 0



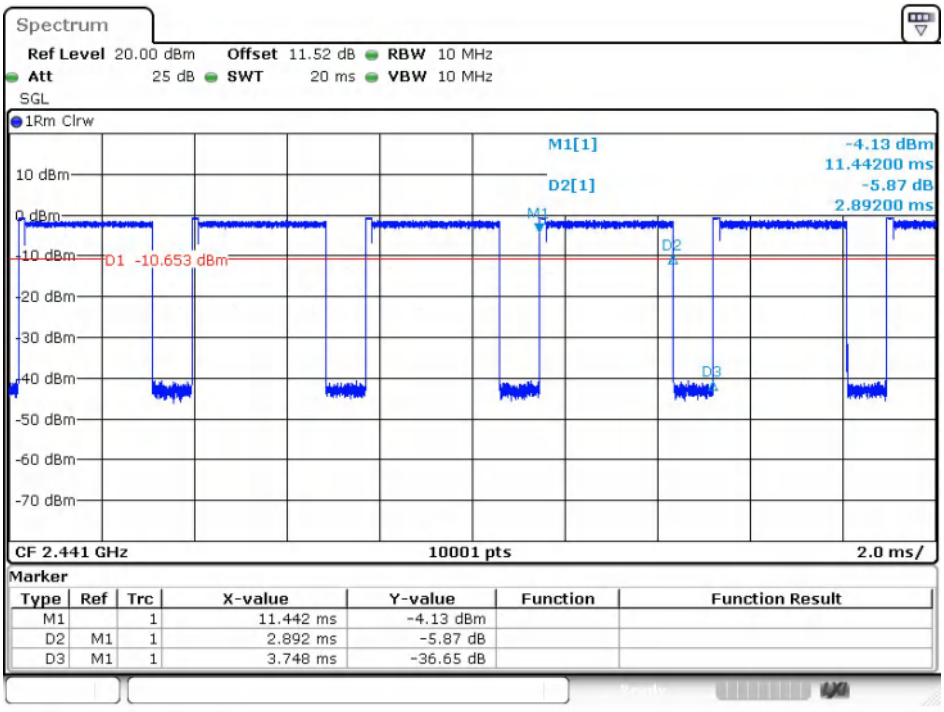
GFSK(DH5)_Channel 39



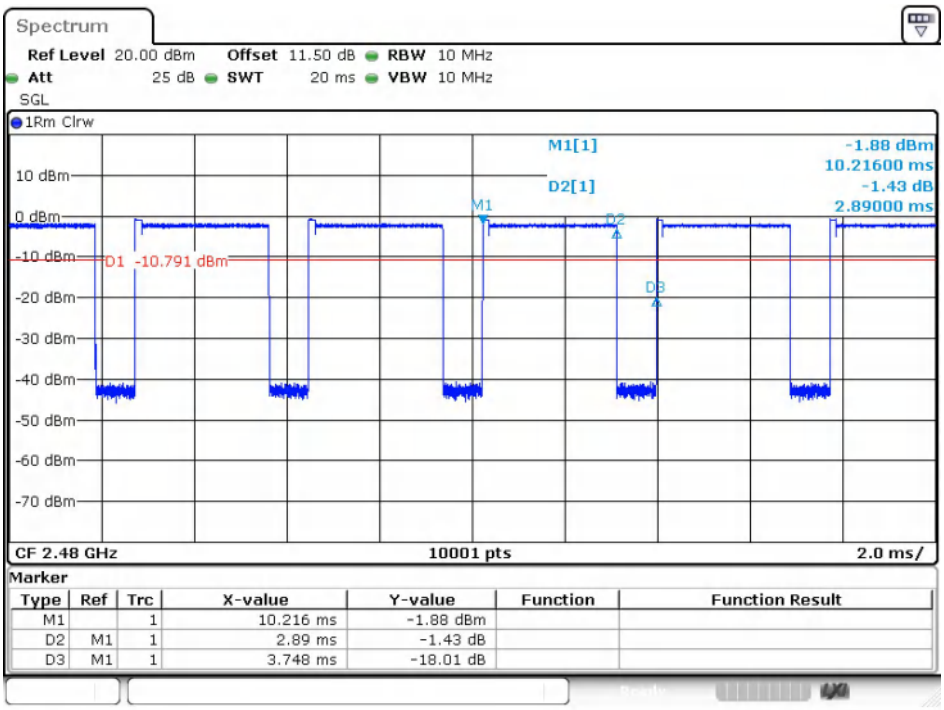
GFSK(DH5)_Channel 78



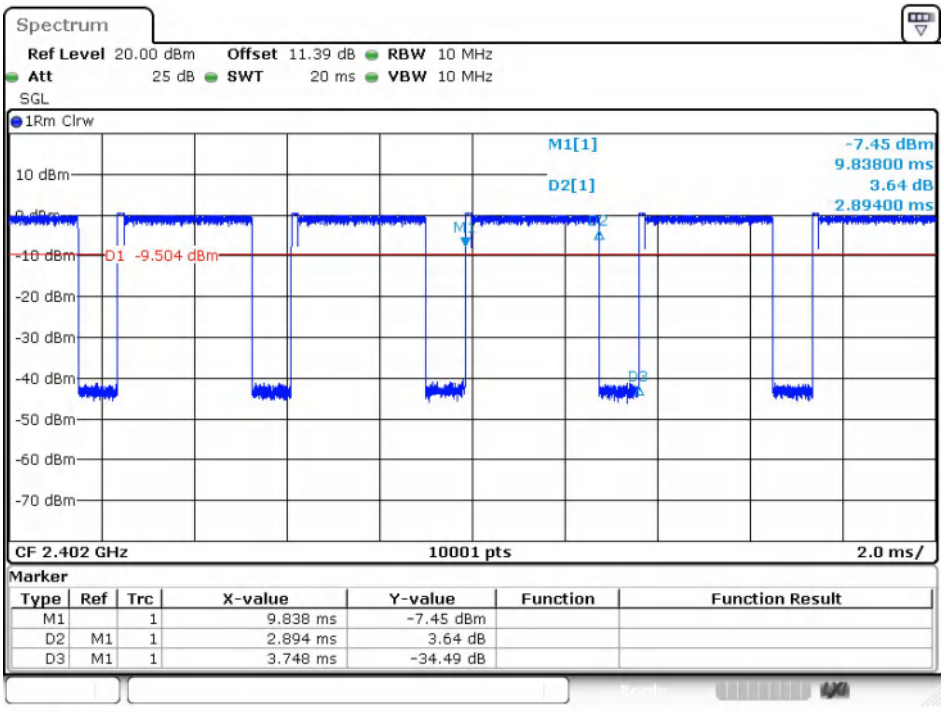
π/4DQPSK(2-DH5)_Channel 0



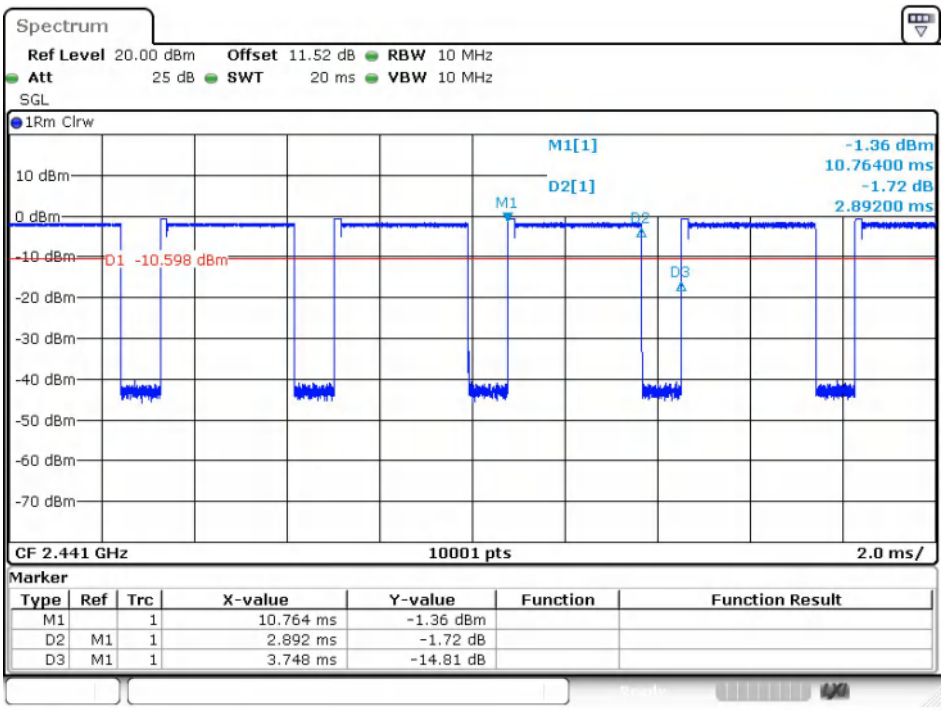
π/4DQPSK(2-DH5)_Channel 39



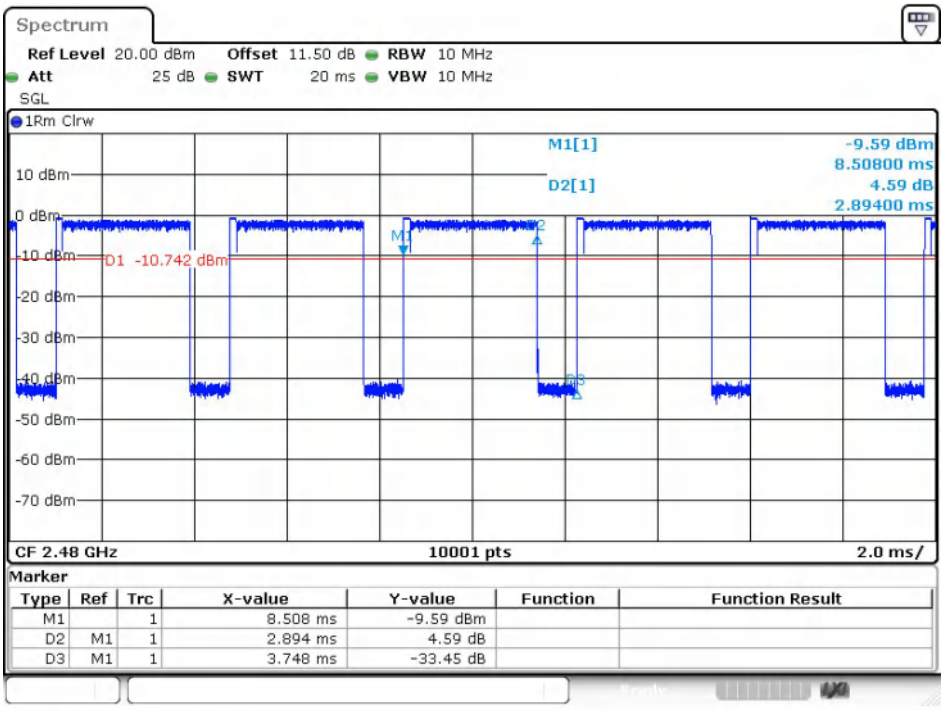
π/4DQPSK(2-DH5)_Channel 78



8DPSK(3-DH5)_Channel 0



8DPSK(3-DH5)_Channel 39



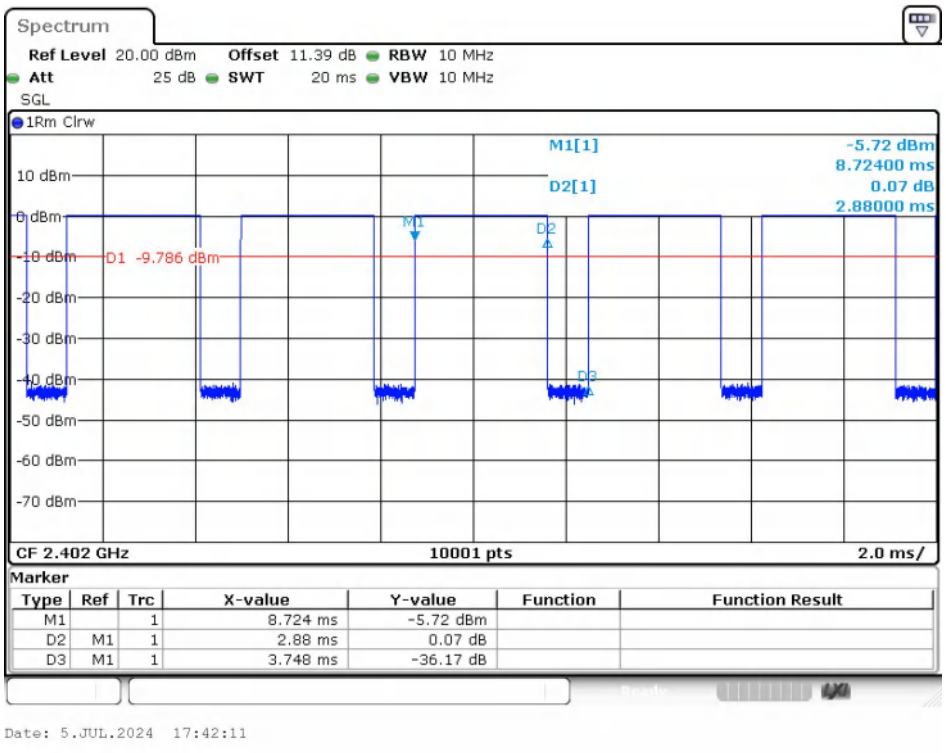
8DPSK(3-DH5)_Channel 78

Right

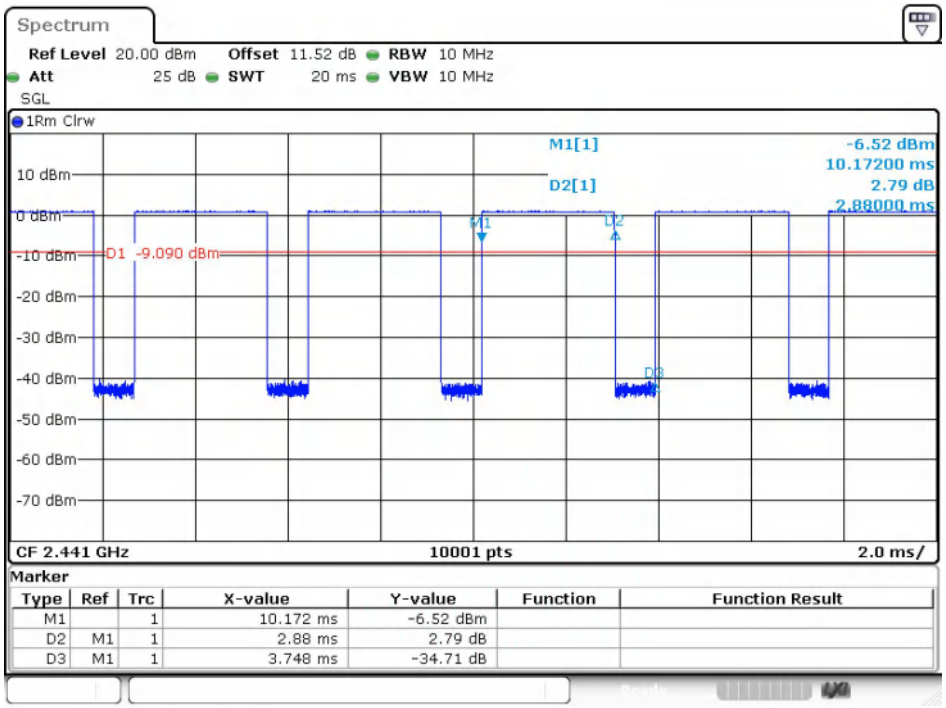
Test Result

Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.880	3.748	76.84	0.7684	1.1441	0.35
		39	2.880	3.748	76.84	0.7684	1.1441	0.35
		78	2.878	3.748	76.79	0.7679	1.147	0.35
π/4DQPSK	2-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	2.884	3.748	76.95	0.7695	1.1379	0.35
8DPSK	3-DH5	0	2.886	3.748	77.00	0.7700	1.1351	0.35
		39	2.888	3.748	77.05	0.7705	1.1323	0.35
		78	2.888	3.748	77.05	0.7705	1.1323	0.35

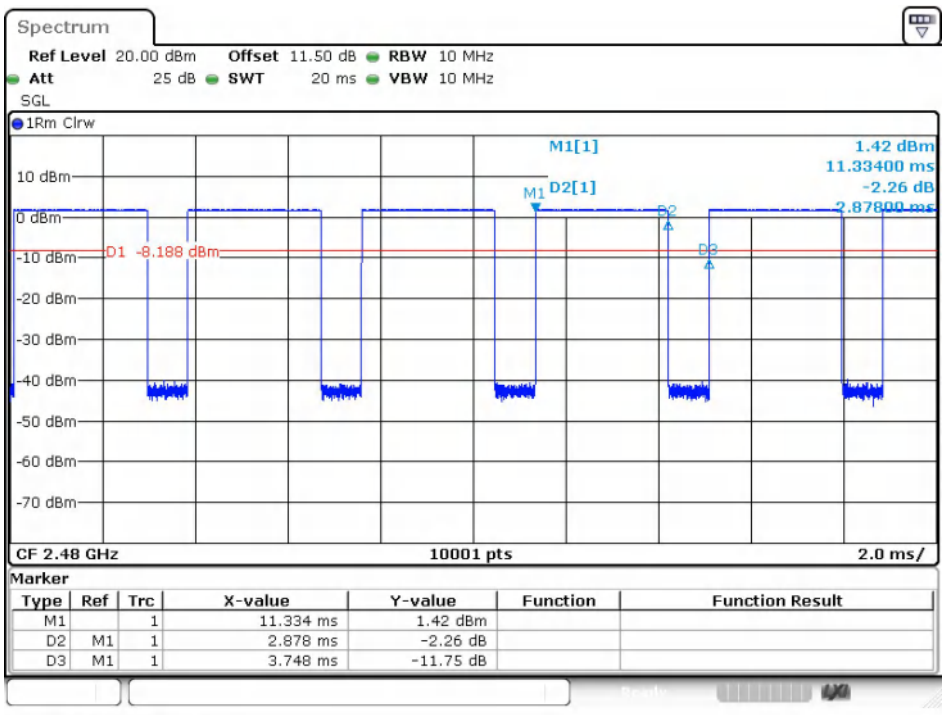
Test Graphs



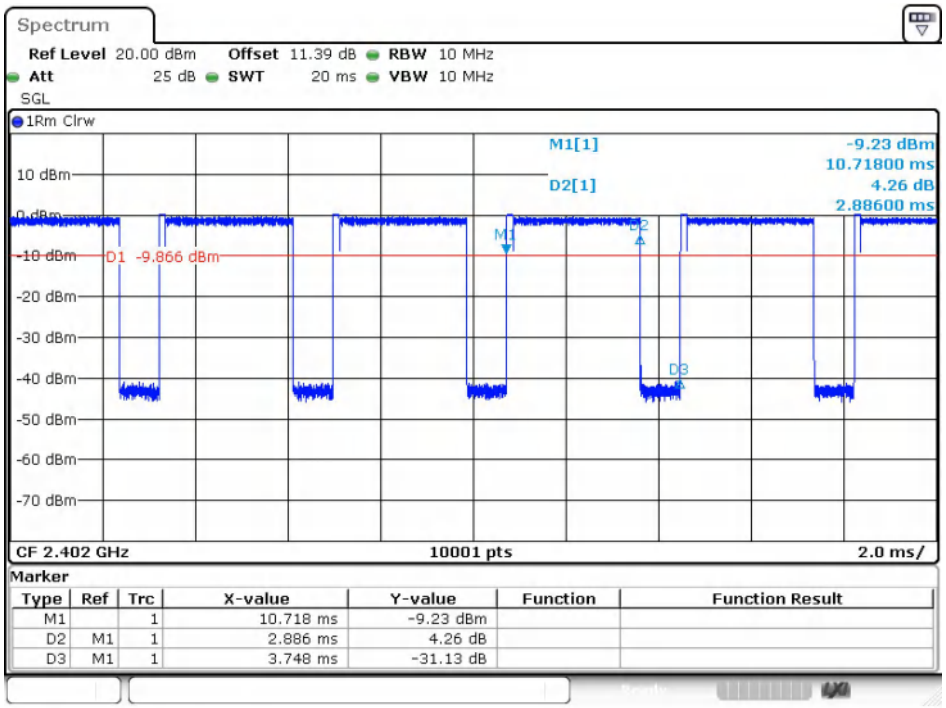
GFSK(DH5)_Channel 0



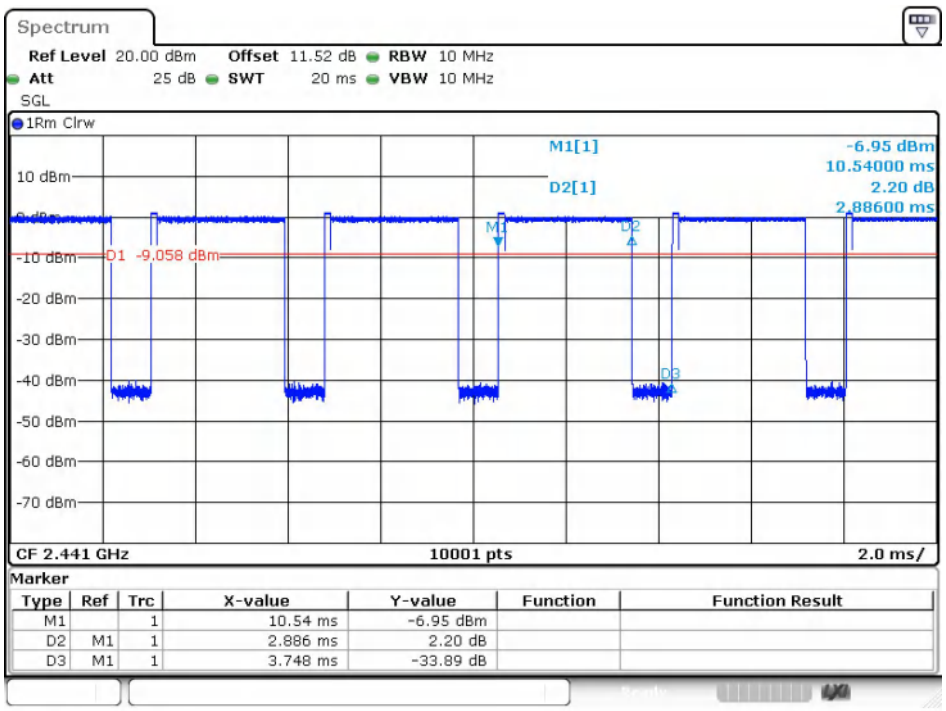
GFSK(DH5)_Channel 39



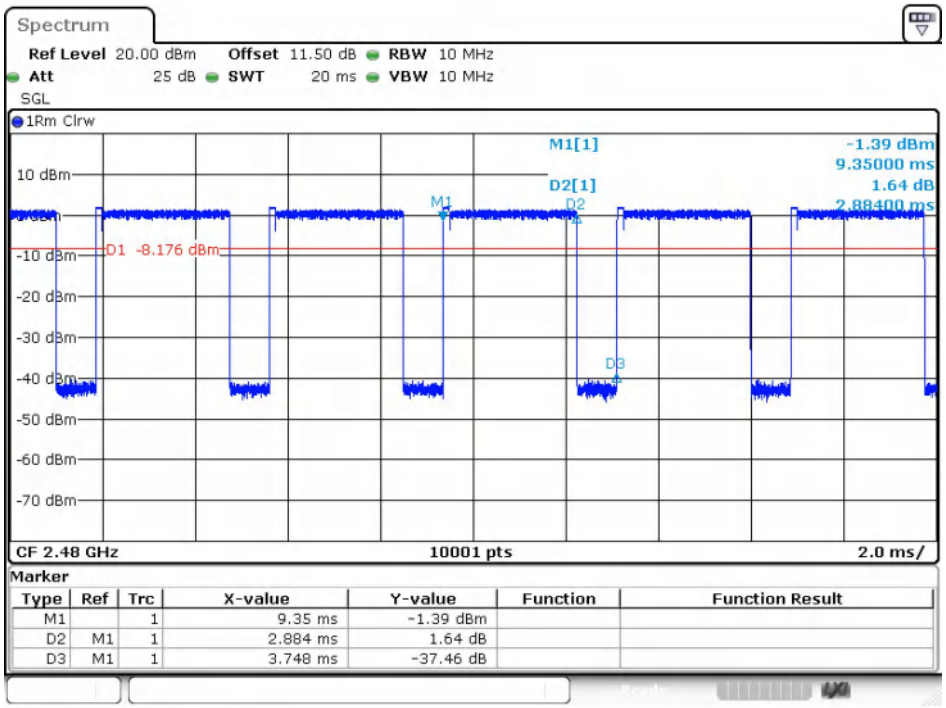
GFSK(DH5)_Channel 78



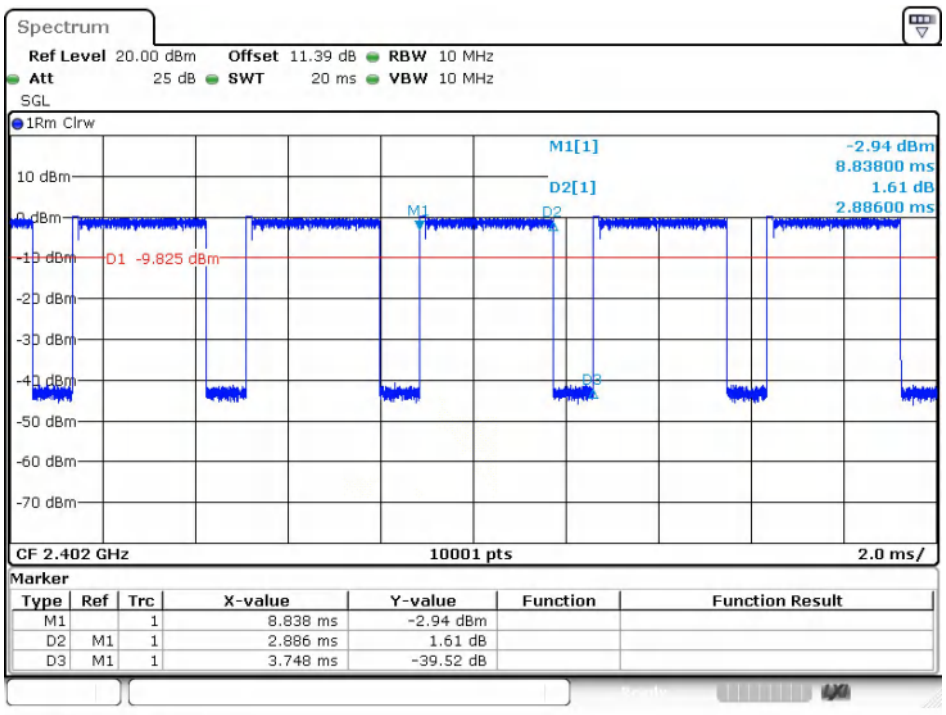
π/4DQPSK(2-DH5)_Channel 0



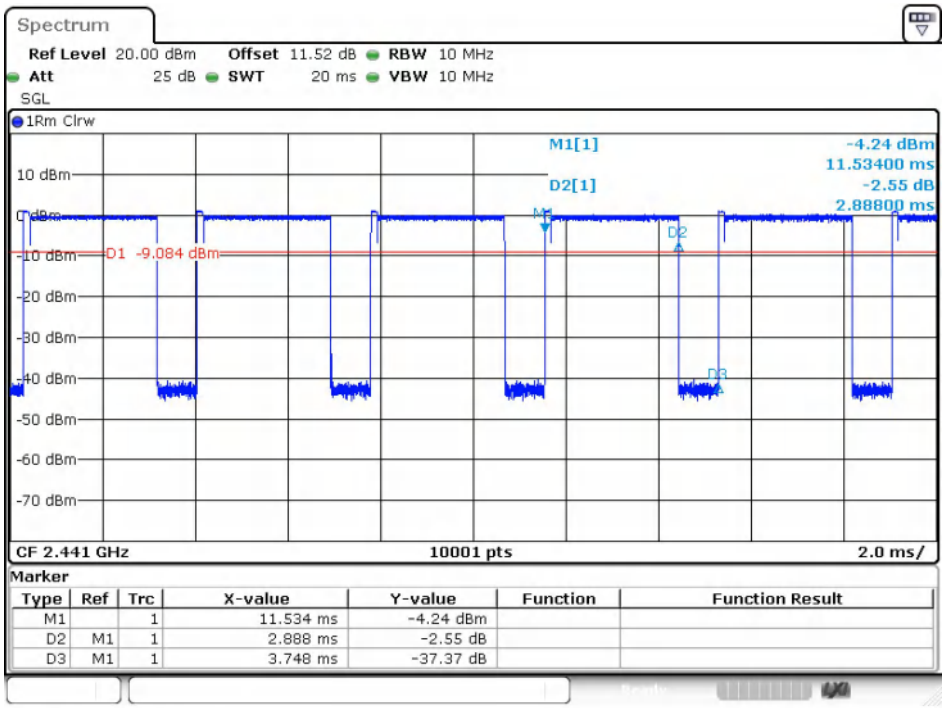
π/4DQPSK(2-DH5)_Channel 39



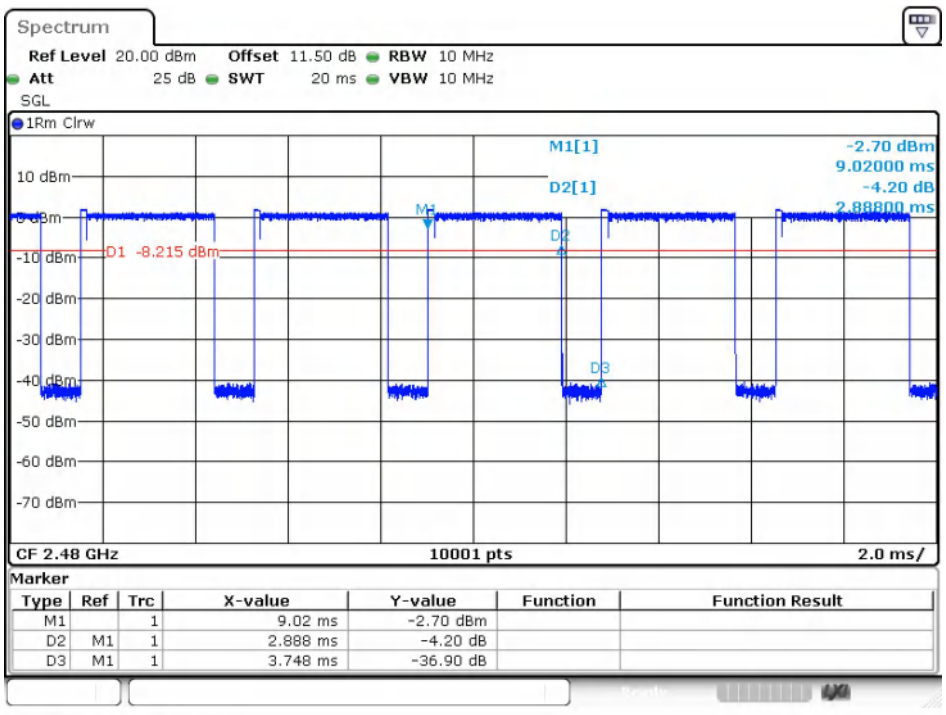
π/4DQPSK(2-DH5)_Channel 78



8DPSK(3-DH5)_Channel 0



8DPSK(3-DH5)_Channel 39



8DPSK(3-DH5)_Channel 78

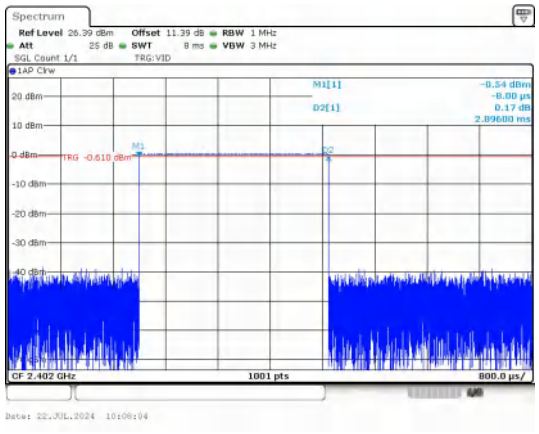
2) Dwell Time

Left

Test Result

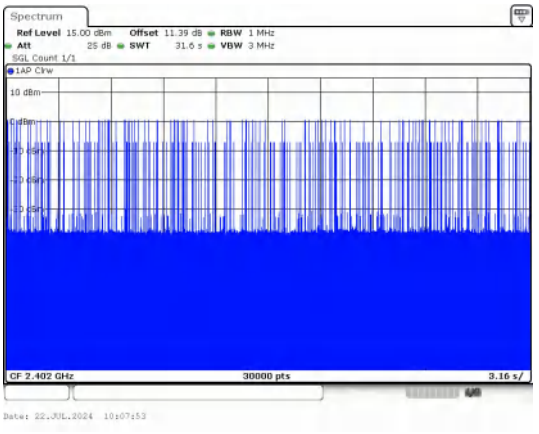
Modulation	Packet	Mode	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	Hopping	2.896	107	309.87	< 400	PASS
π/4DQPSK	2-DH5		2.896	96	278.02		PASS
8DPSK	3-DH5		2.896	106	306.98		PASS

Test Graphs



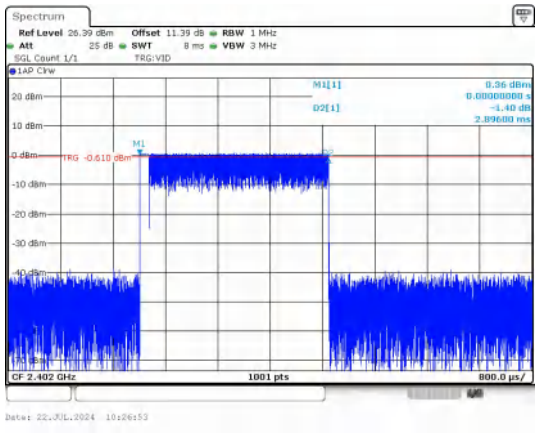
Pulse Width

GFSK_DH5



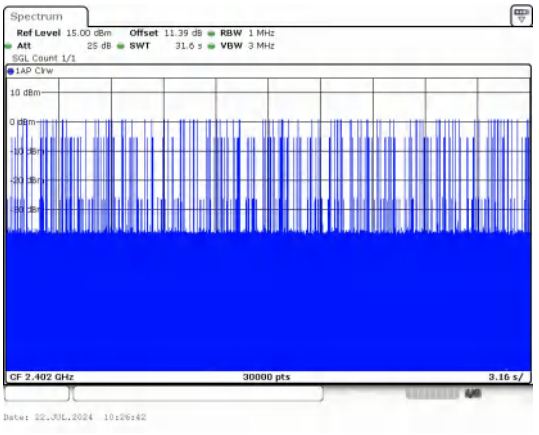
Number of Pulses in 31.6 seconds

GFSK_DH5



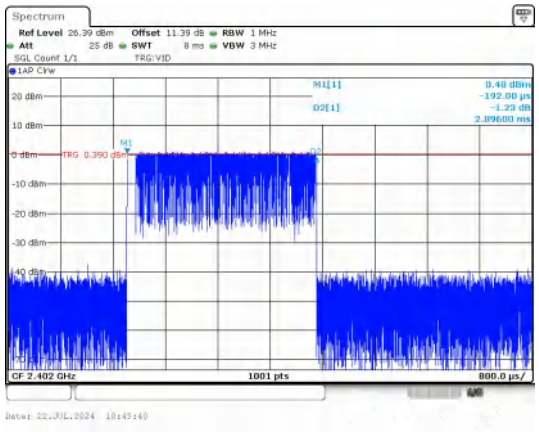
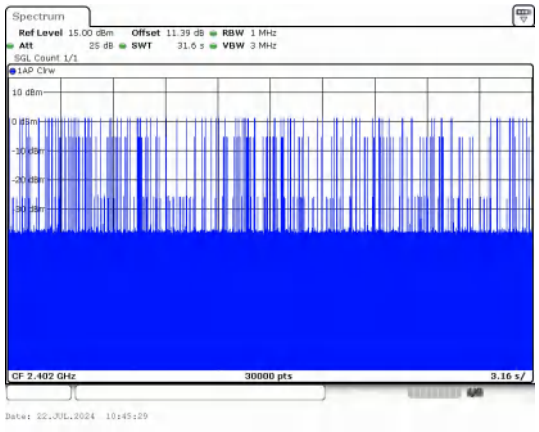
Pulse Width

π/4DQPSK_2-DH5



Number of Pulses in 31.6 seconds

π/4DQPSK_2-DH5

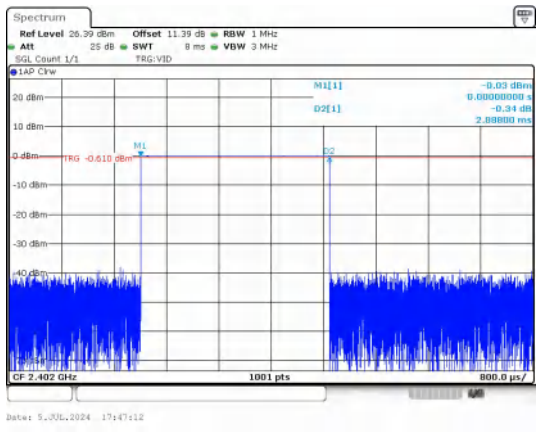
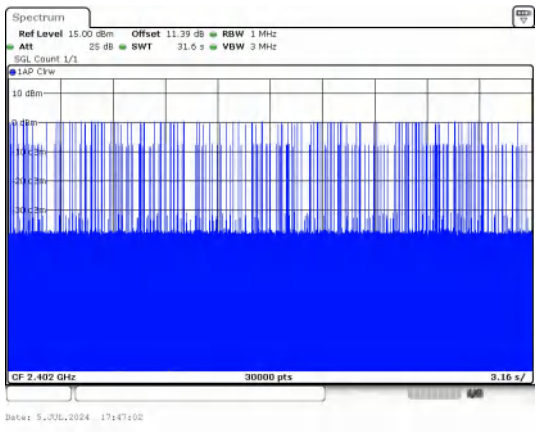
	
Pulse Width 8DPSK_3-DH5	Number of Pulses in 31.6 seconds 8DPSK_3-DH5

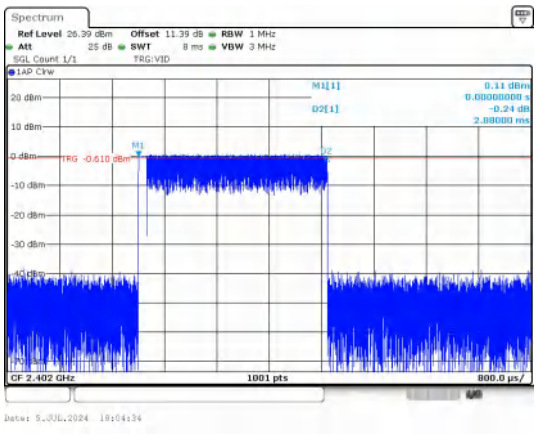
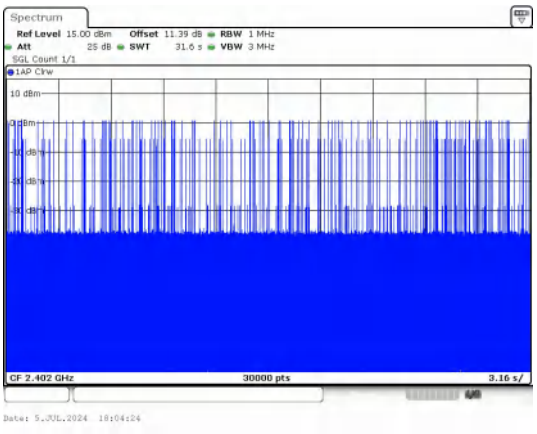
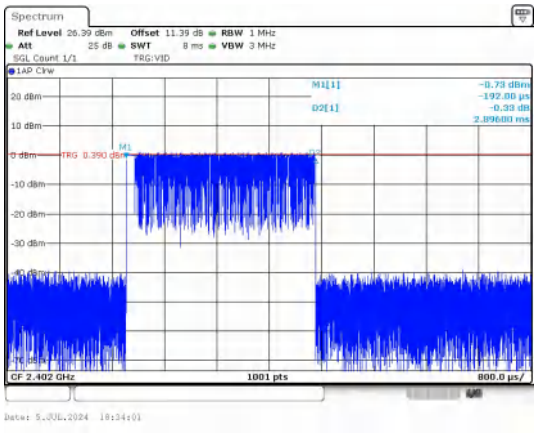
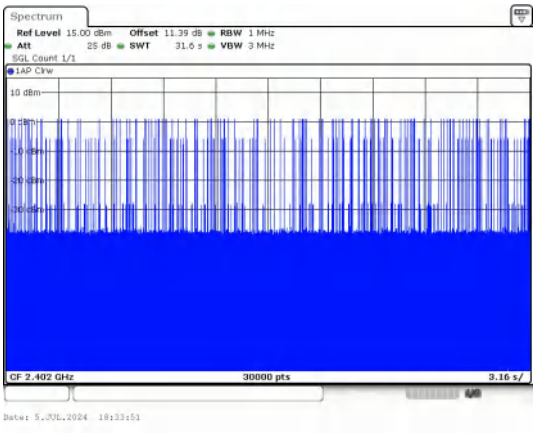
Right

Test Result

Modulation	Packet	Mode	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	Hopping	2.888	121	349.45	< 400	PASS
π/4DQPSK	2-DH5		2.880	113	325.44		PASS
8DPSK	3-DH5		2.896	119	344.62		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**

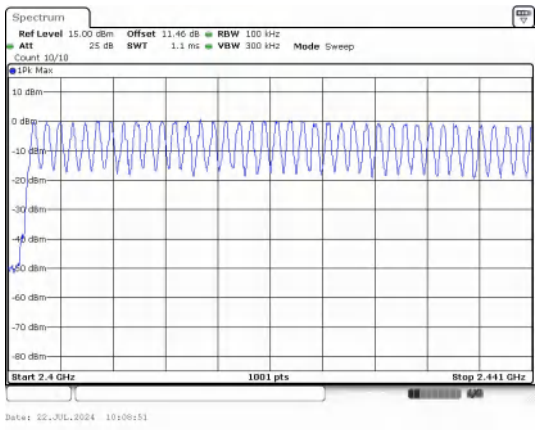
3) Number Of Hopping Channel

Left

Test Result

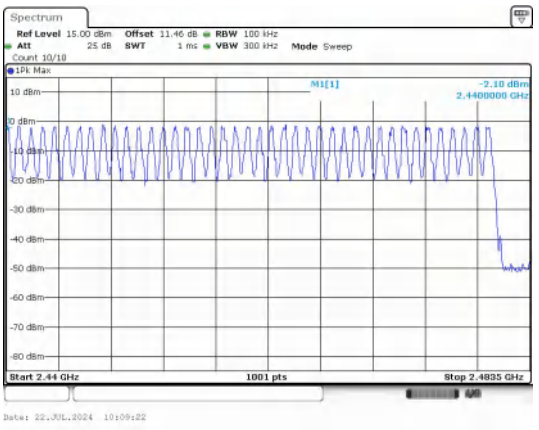
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
π/4DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

Test Graphs



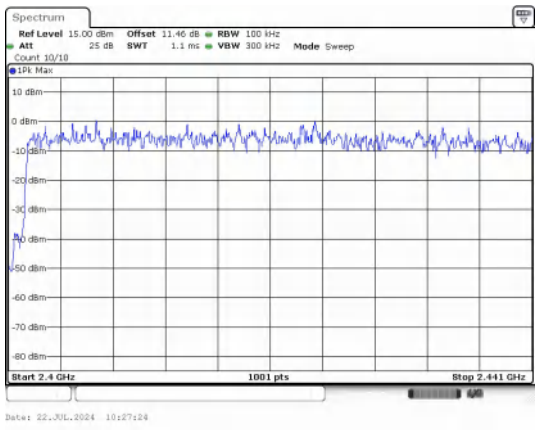
Low End Spectrum Channel Hopping Plot

GFSK



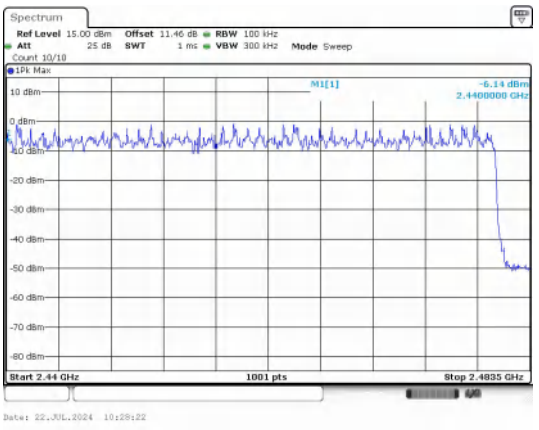
High End Spectrum Channel Hopping Plot

GFSK



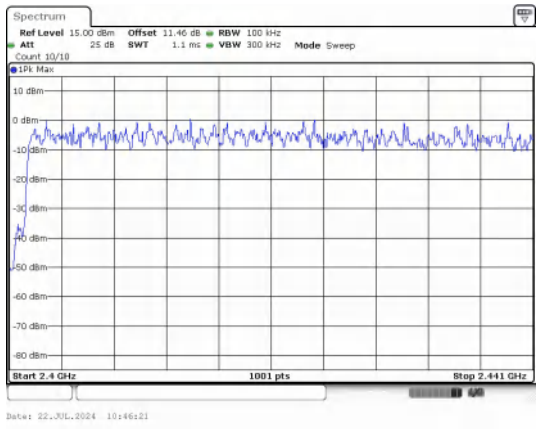
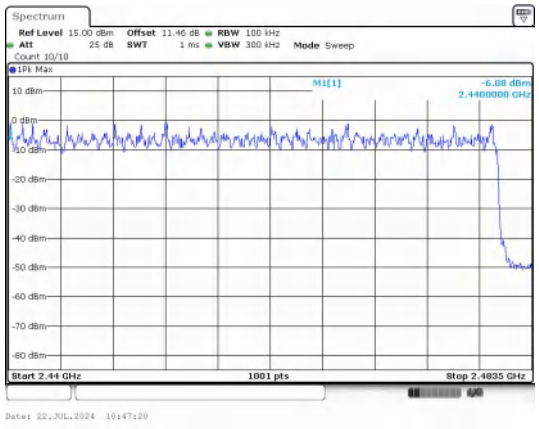
Low End Spectrum Channel Hopping Plot

π/4DQPSK



High End Spectrum Channel Hopping Plot

π/4DQPSK

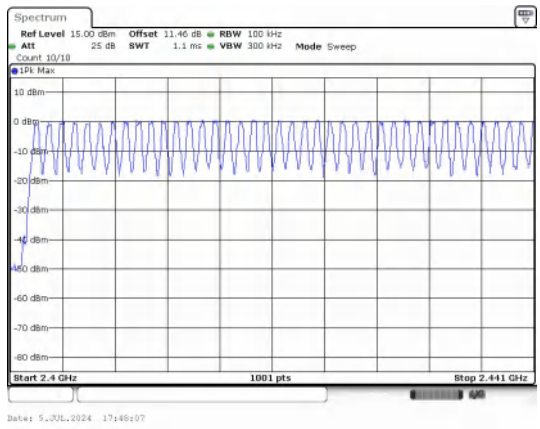
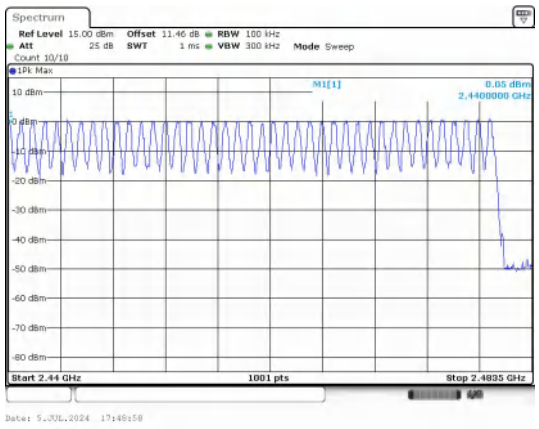
	
Low End Spectrum Channel Hopping Plot 8DPSK	High End Spectrum Channel Hopping Plot 8DPSK

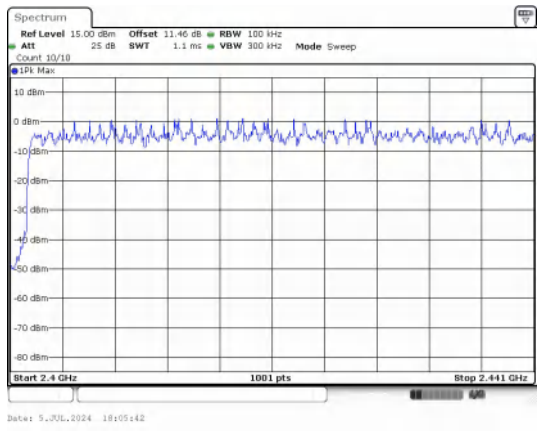
Right

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

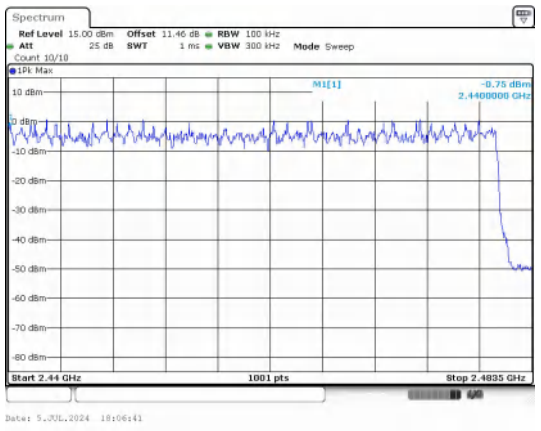
Test Graphs

	
Low End Spectrum Channel Hopping Plot GFSK	High End Spectrum Channel Hopping Plot GFSK



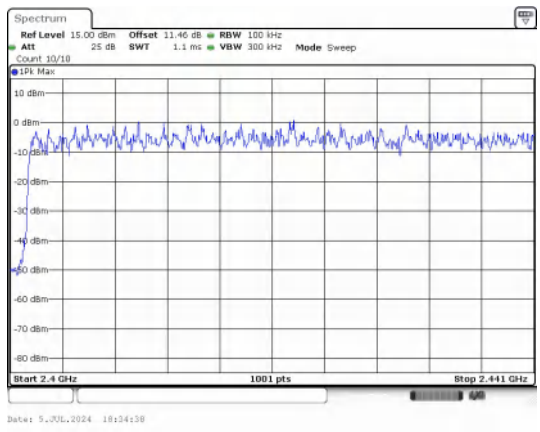
Low End Spectrum Channel Hopping Plot

π/4DQPSK



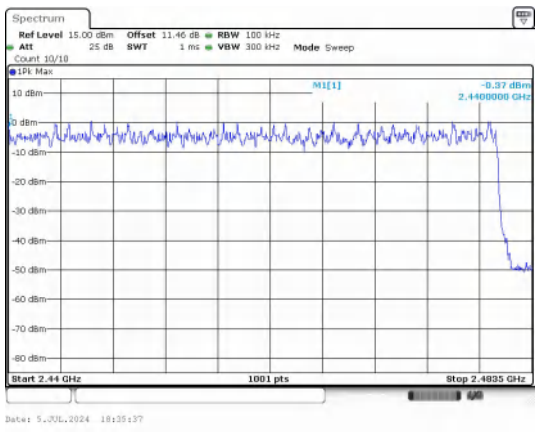
High End Spectrum Channel Hopping Plot

π/4DQPSK



Low End Spectrum Channel Hopping Plot

8DPSK



High End Spectrum Channel Hopping Plot

8DPSK

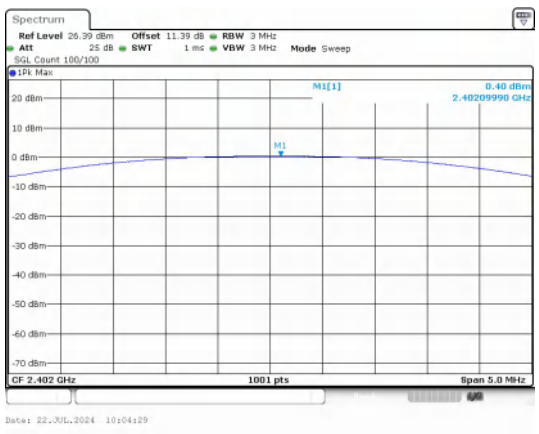
4) Conducted Peak Output Power

Left

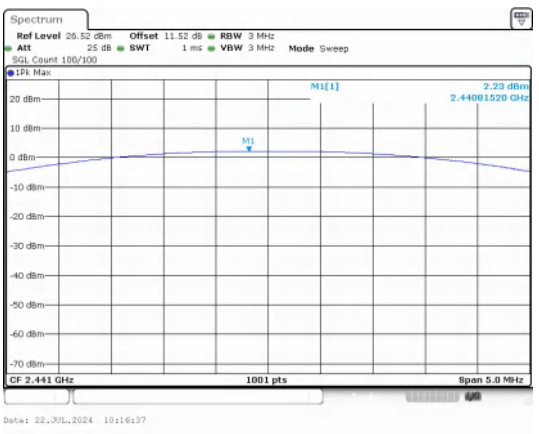
Test Result

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	0.40	1.095	≤30	PASS
		39	2.23	1.670		PASS
		78	2.10	1.622		PASS
π/4DQPSK	2-DH5	0	1.14	1.299	≤20.97	PASS
		39	0.20	1.048		PASS
		78	0.10	1.024		PASS
8DPSK	3-DH5	0	1.50	1.411		PASS
		39	0.61	1.150		PASS
		78	0.48	1.116		PASS

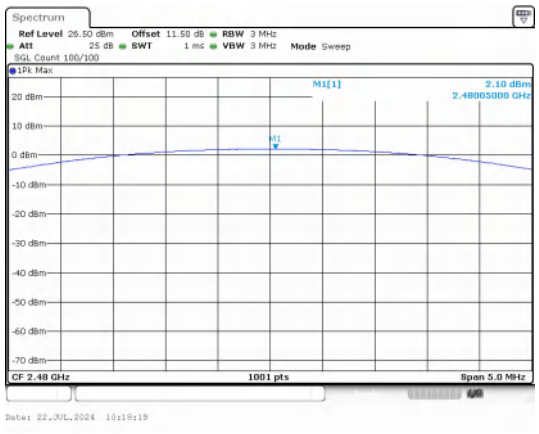
Test Graphs



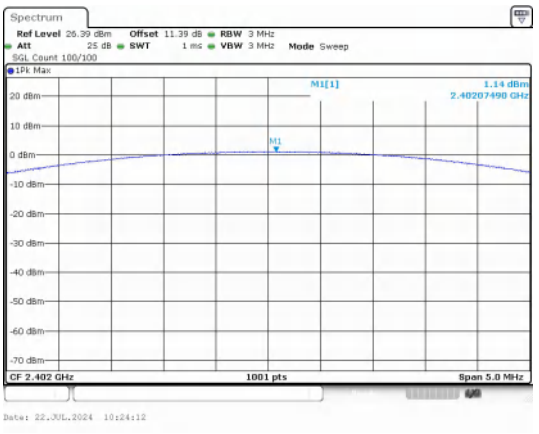
Peak Output Power
GFSK_Channel 0



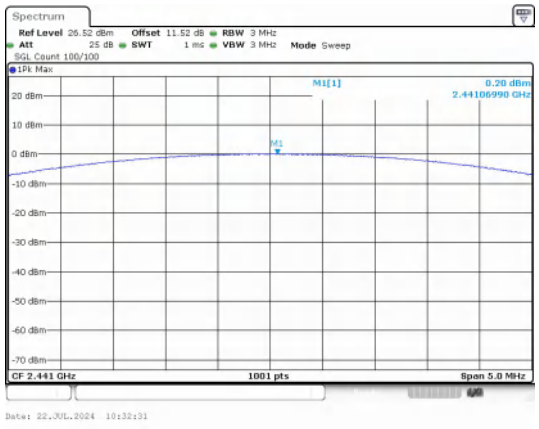
Peak Output Power
GFSK_Channel 39



Peak Output Power
GFSK_Channel 78

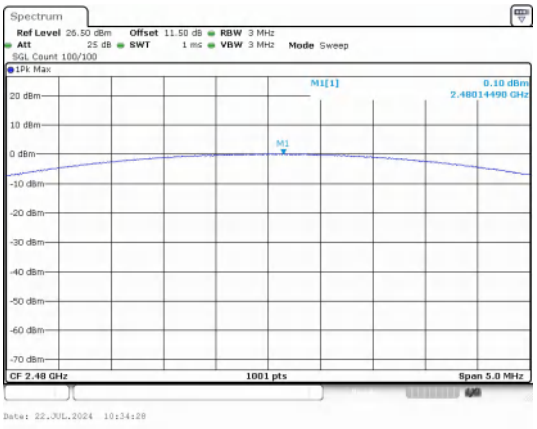


Peak Output Power
π/4DQPSK_Channel 0



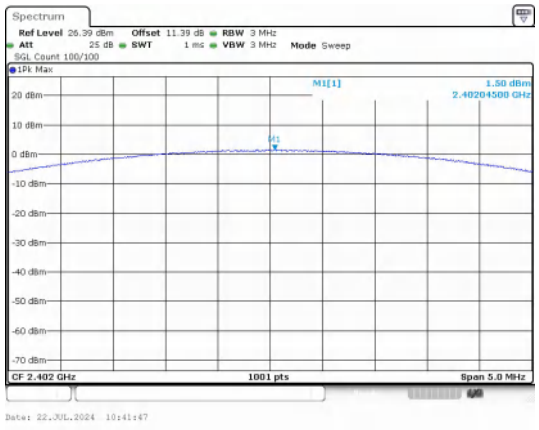
Peak Output Power

π/4DQPSK_Channel 39



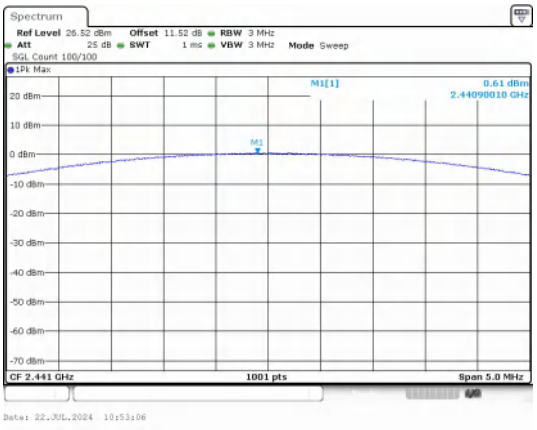
Peak Output Power

π/4DQPSK_Channel 78



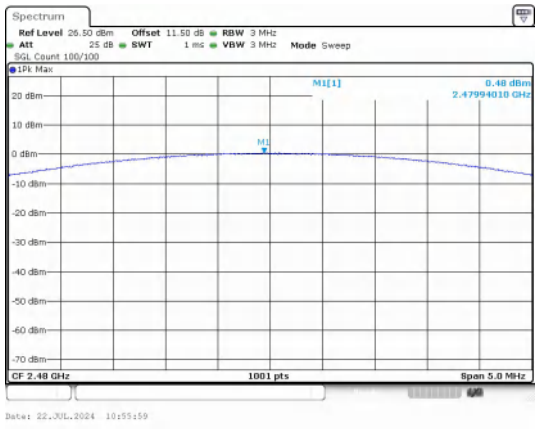
Peak Output Power

8DPSK_Channel 0



Peak Output Power

8DPSK_Channel 39



Peak Output Power

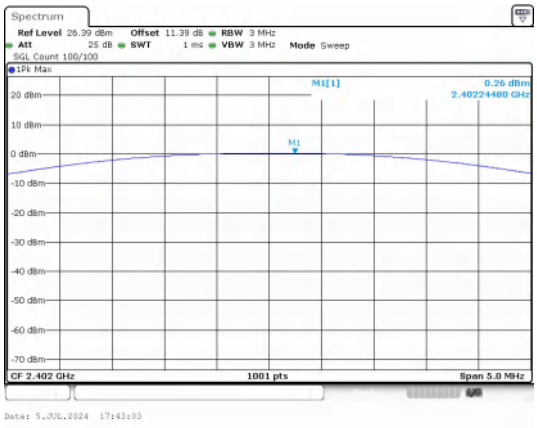
8DPSK_Channel 78

Right

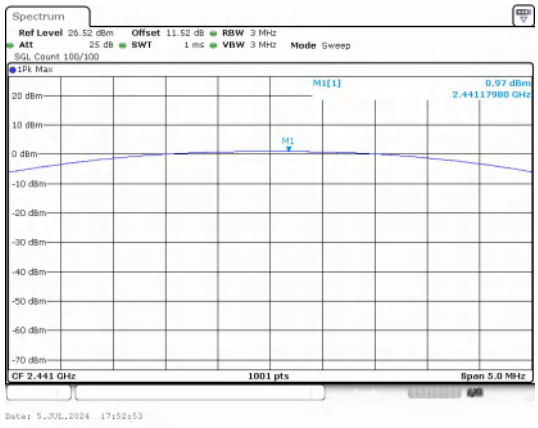
Test Result

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	0.26	1.06	≤30	PASS
		39	0.97	1.25		PASS
		78	1.84	1.53		PASS
π/4DQPSK	2-DH5	0	1.09	1.29	≤20.97	PASS
		39	1.84	1.53		PASS
		78	2.69	1.86		PASS
8DPSK	3-DH5	0	1.54	1.42		PASS
		39	2.18	1.65		PASS
		78	3.05	2.02		PASS

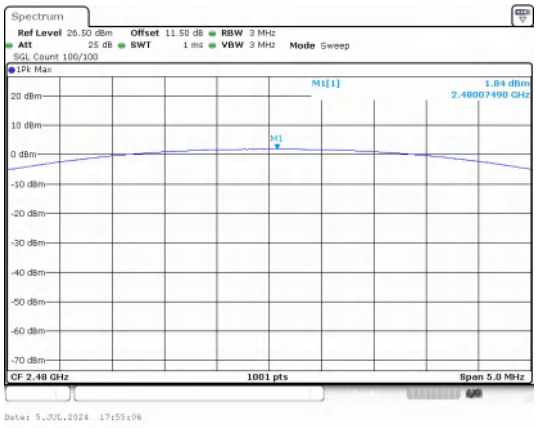
Test Graphs



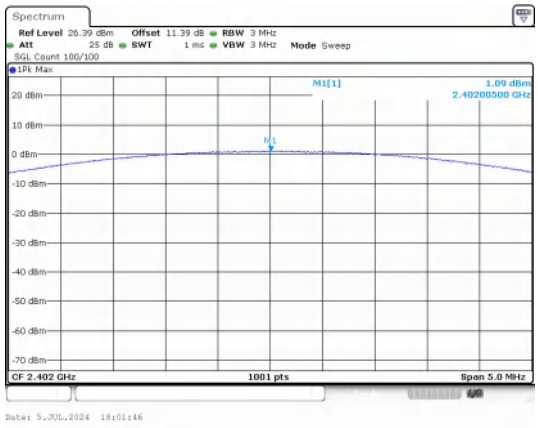
Peak Output Power
GFSK_Channel 0



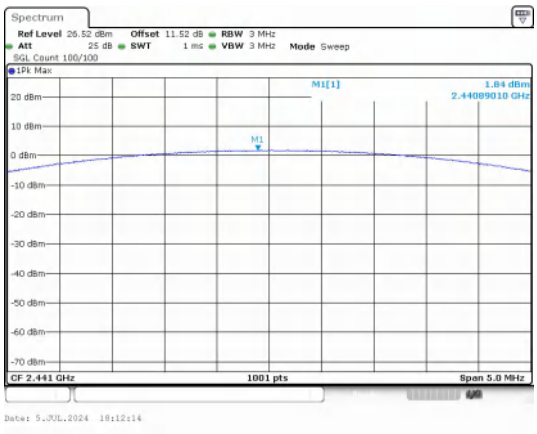
Peak Output Power
GFSK_Channel 39



Peak Output Power
GFSK_Channel 78

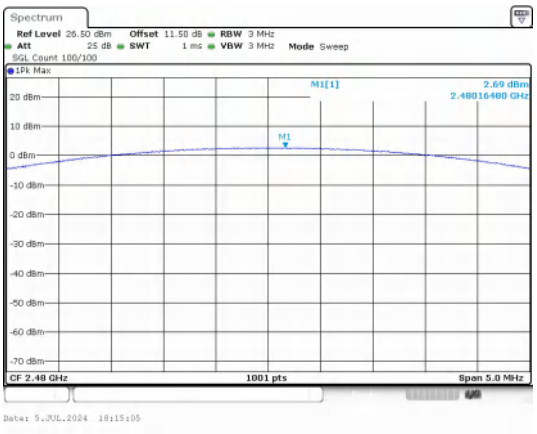


Peak Output Power
π/4DQPSK_Channel 0



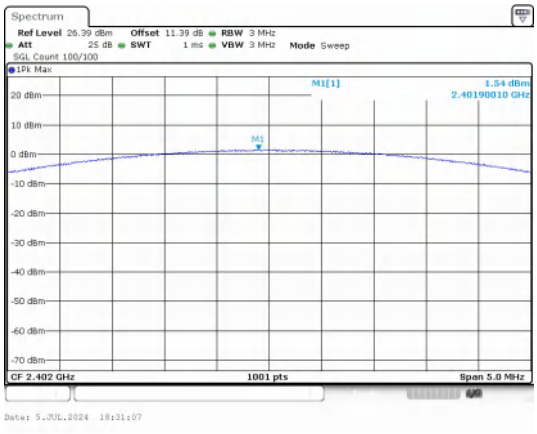
Peak Output Power

π/4DQPSK_Channel 39



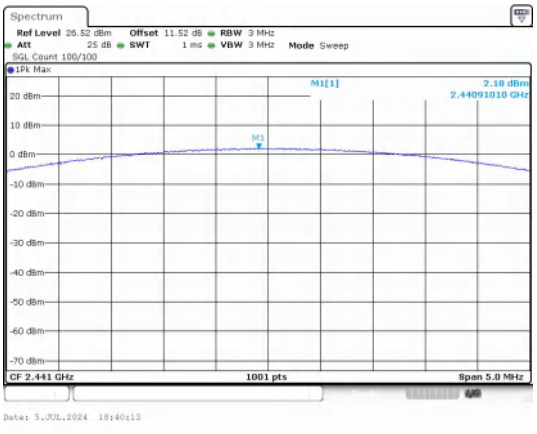
Peak Output Power

π/4DQPSK_Channel 78



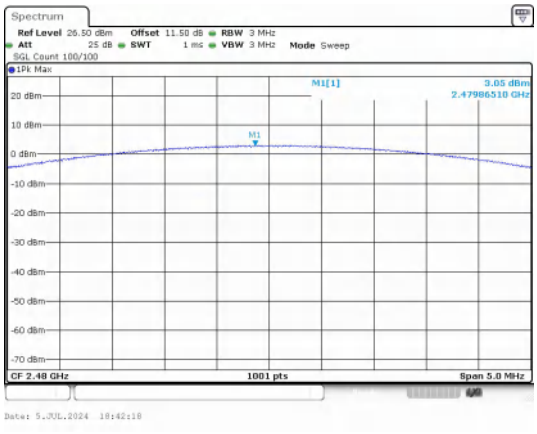
Peak Output Power

8DPSK_Channel 0



Peak Output Power

8DPSK_Channel 39



Peak Output Power

8DPSK_Channel 78

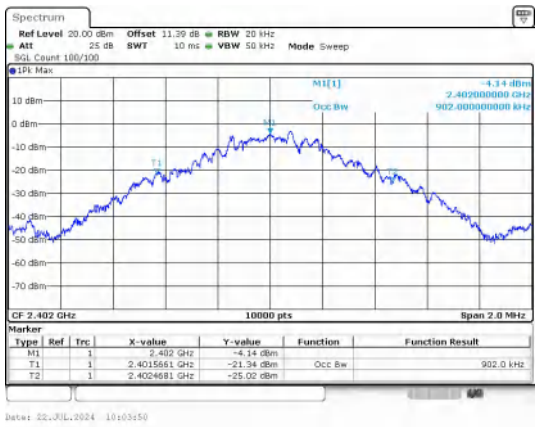
5) 99% Bandwidth

Left

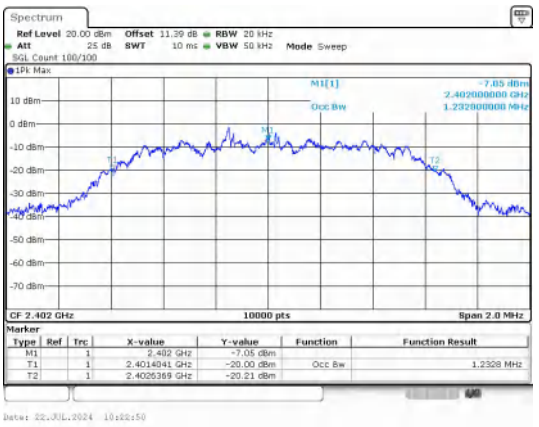
Test Result

Modulation	Channel	Center Frequency (MHz)	99% BW (MHz)
GFSK	0	2402	0.90200
	39	2441	0.90080
	78	2480	0.89080
π/4DQPSK	0	2402	1.2328
	39	2441	1.1936
	78	2480	1.1994
8DPSK	0	2402	1.2086
	39	2441	1.2126
	78	2480	1.2106

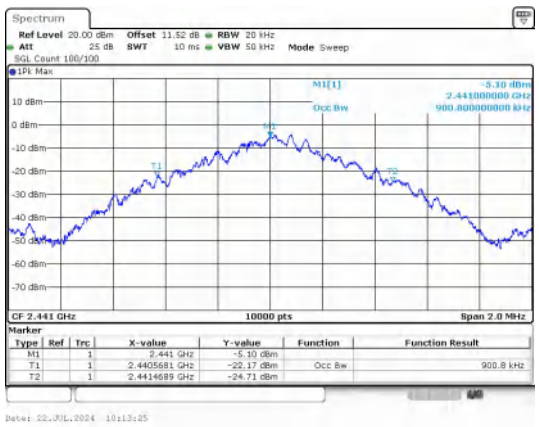
Test Graphs



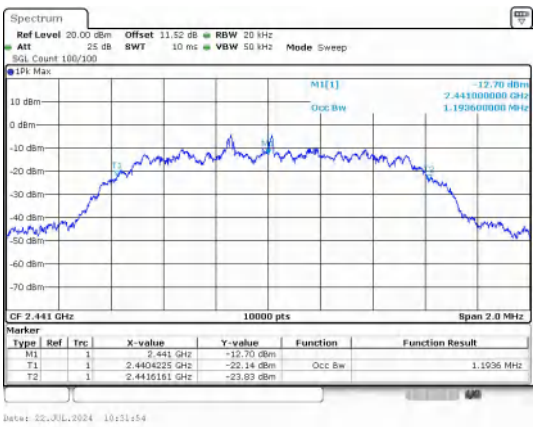
GFSK_DH5_Channel 0



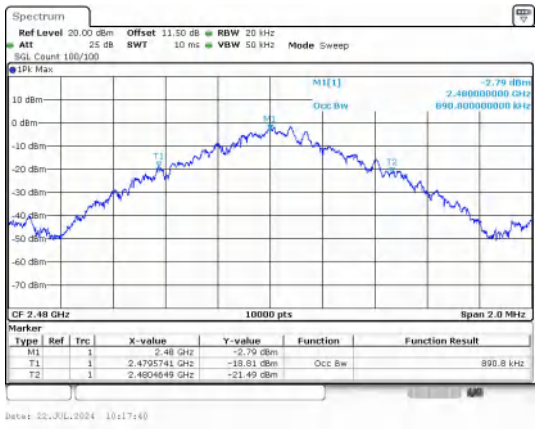
π/4DQPSK_2-DH5_Channel 0



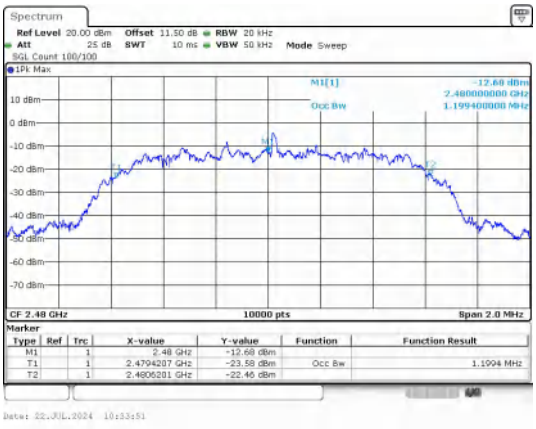
GFSK_DH5_Channel 39



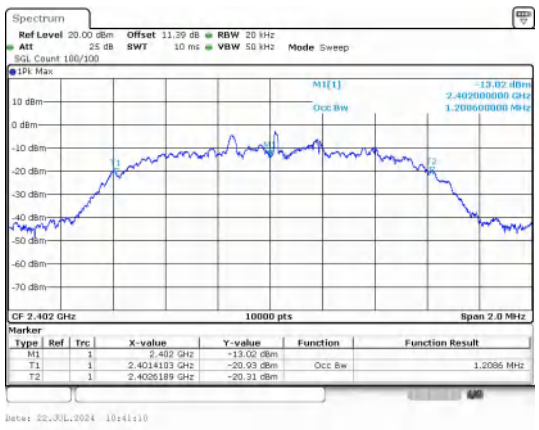
π/4DQPSK_2-DH5_Channel 39



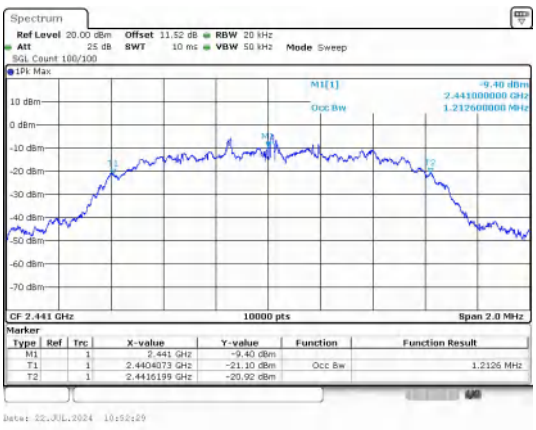
GFSK_DH5_Channel 78



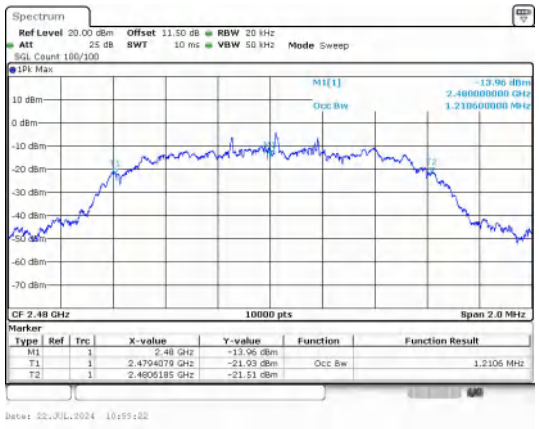
π/4DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



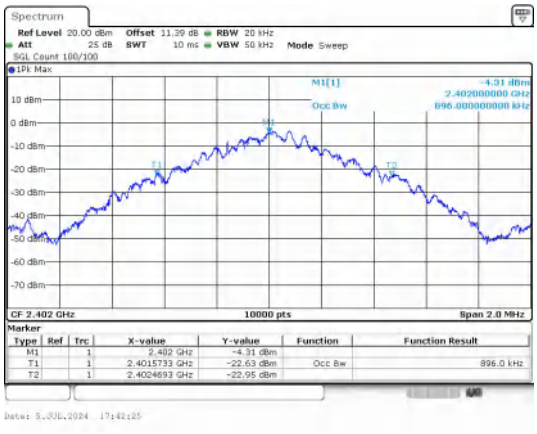
8DPSK_3-DH5_Channel 78

Right

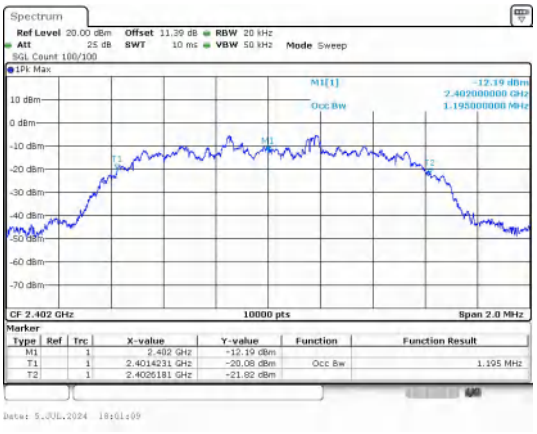
Test Result

Modulation	Channel	Center Frequency (MHz)	99% BW (MHz)
GFSK	0	2402	0.89600
	39	2441	0.90160
	78	2480	0.91660
π/4DQPSK	0	2402	1.1950
	39	2441	1.1928
	78	2480	1.2036
8DPSK	0	2402	1.2012
	39	2441	1.2120
	78	2480	1.2116

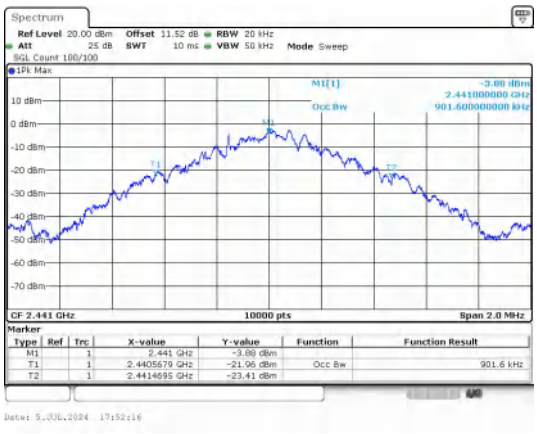
Test Graphs



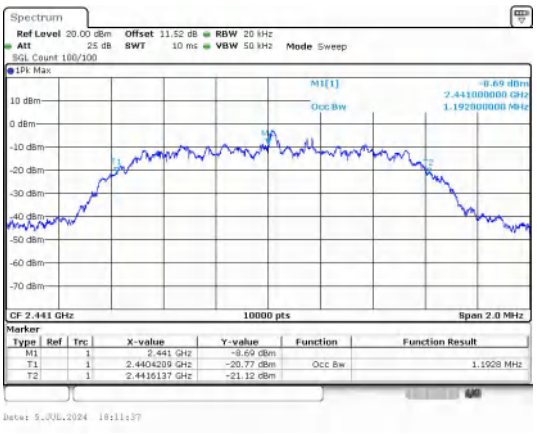
GFSK_DH5_Channel 0



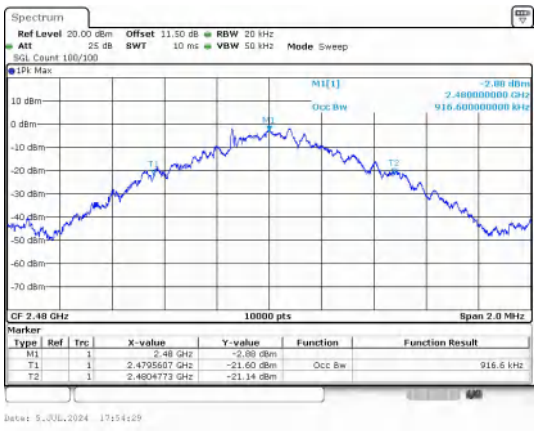
π/4DQPSK_2-DH5_Channel 0



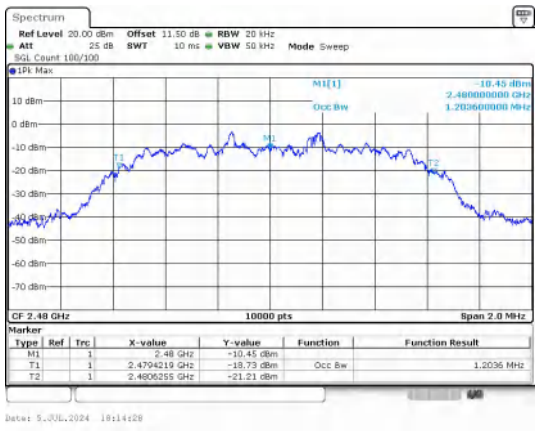
GFSK_DH5_Channel 39



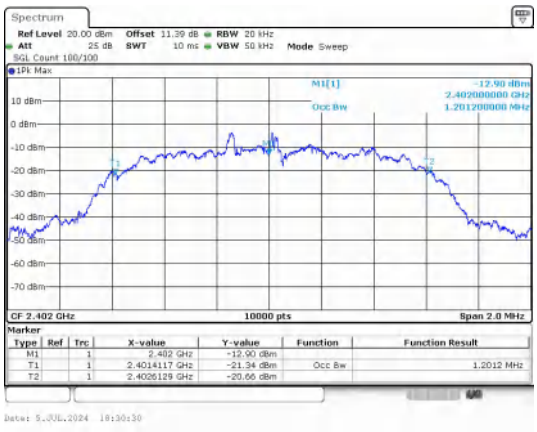
π/4DQPSK_2-DH5_Channel 39



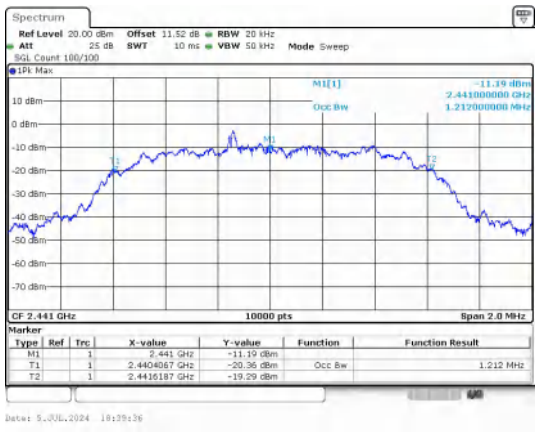
GFSK_DH5_Channel 78



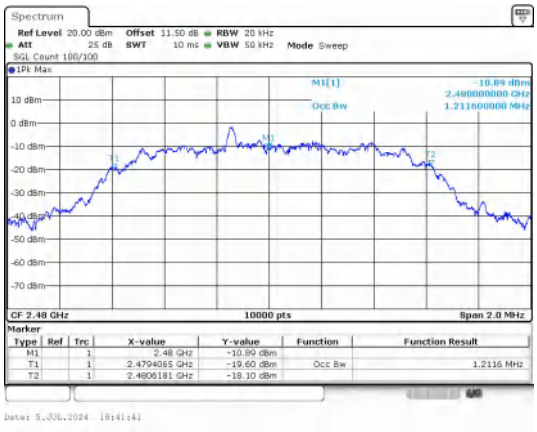
π/4DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



8DPSK_3-DH5_Channel 78

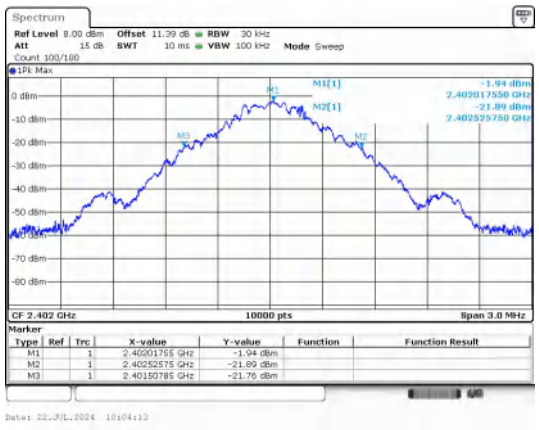
6) 20dB Bandwidth

Left

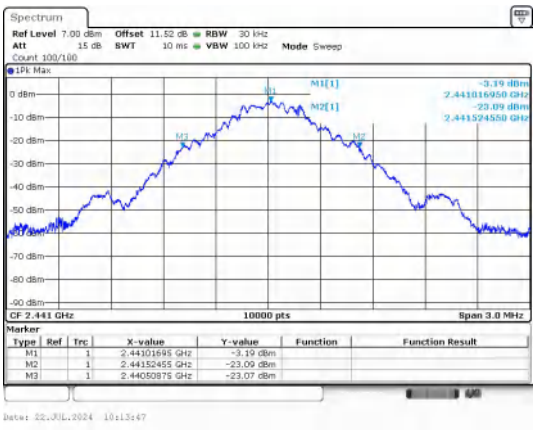
Test Result

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.020
	39	2441 MHz	1.010
	78	2480 MHz	1.020
π/4DQPSK	0	2402 MHz	1.320
	39	2441 MHz	1.320
	78	2480 MHz	1.300
8DPSK	0	2402 MHz	1.290
	39	2441 MHz	1.300
	78	2480 MHz	1.290

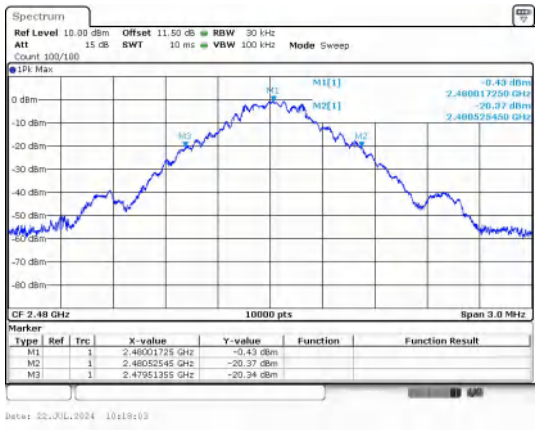
Test Graphs



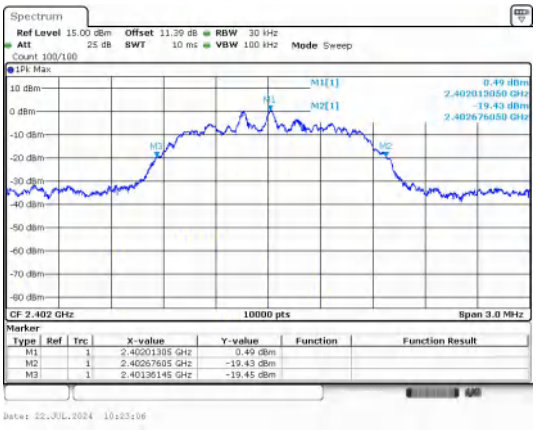
GFSK_DH5_Channel 0



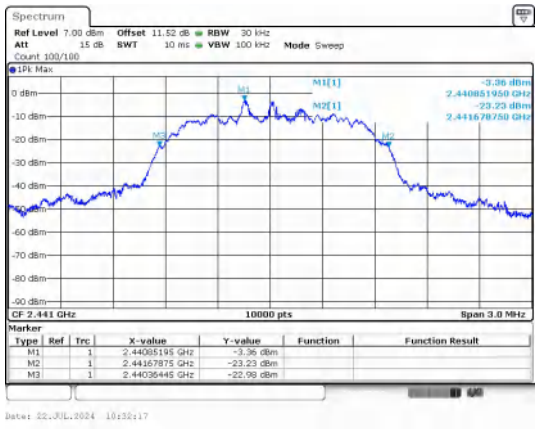
GFSK_DH5_Channel 39



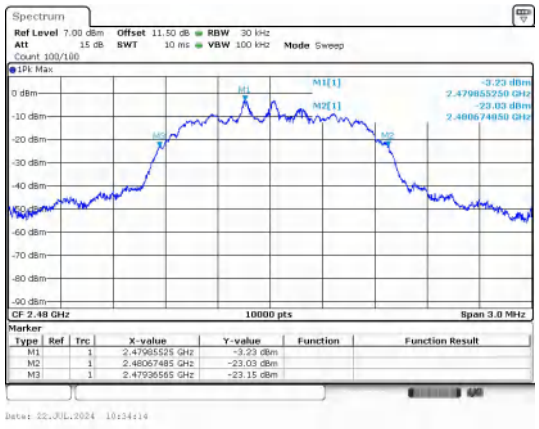
GFSK_DH5_Channel 78



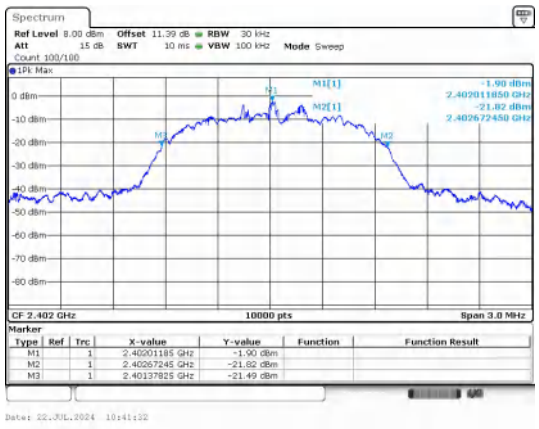
π/4DQPSK_2-DH5_Channel 0



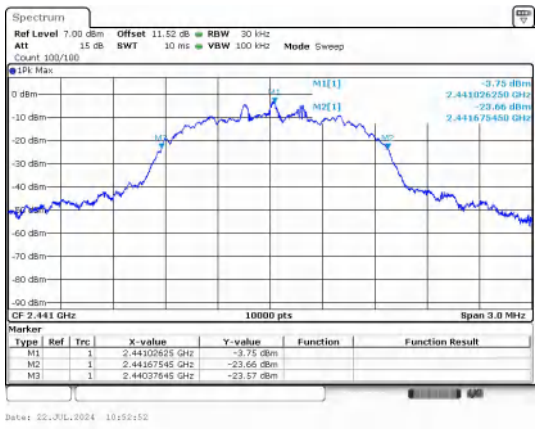
π/4DQPSK_2-DH5_Channel 39



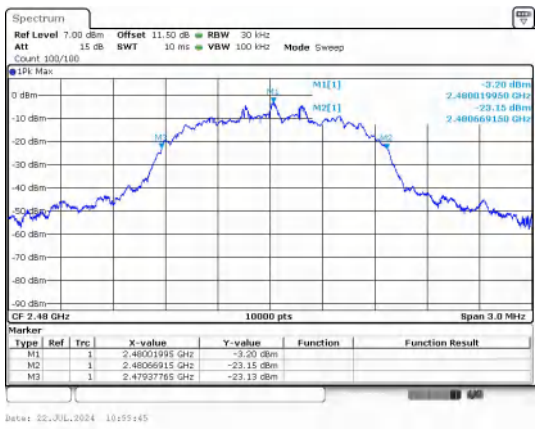
π/4DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



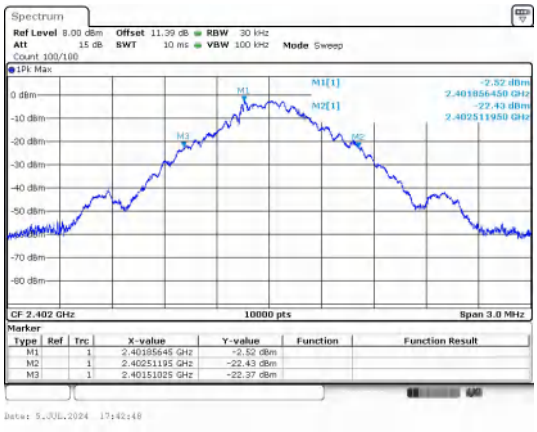
8DPSK_3-DH5_Channel 78

Right

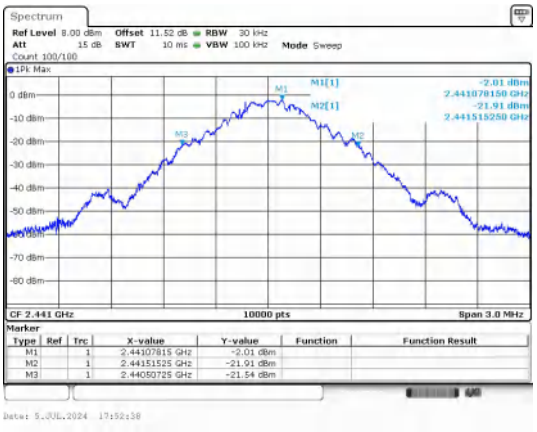
Test Result

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.000
	39	2441 MHz	1.010
	78	2480 MHz	1.020
π/4DQPSK	0	2402 MHz	1.320
	39	2441 MHz	1.320
	78	2480 MHz	1.320
8DPSK	0	2402 MHz	1.290
	39	2441 MHz	1.290
	78	2480 MHz	1.290

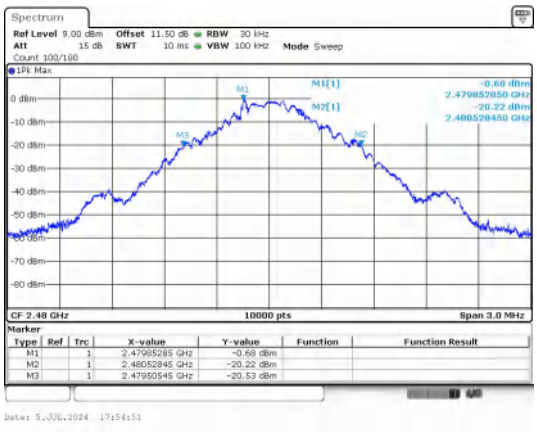
Test Graphs



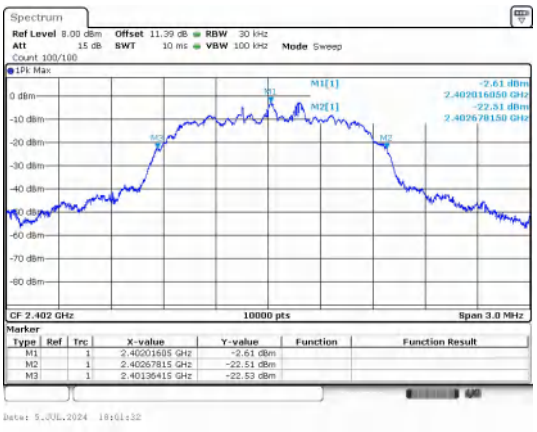
GFSK_DH5_Channel 0



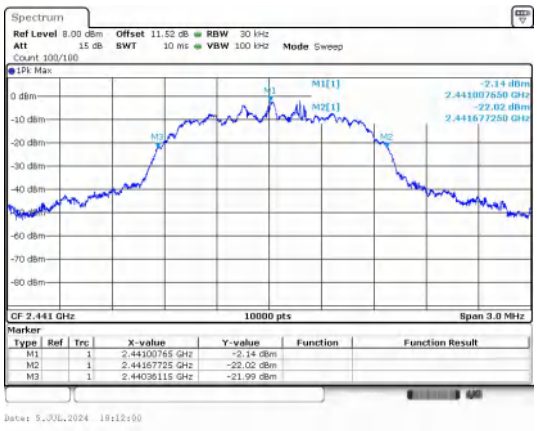
GFSK_DH5_Channel 39



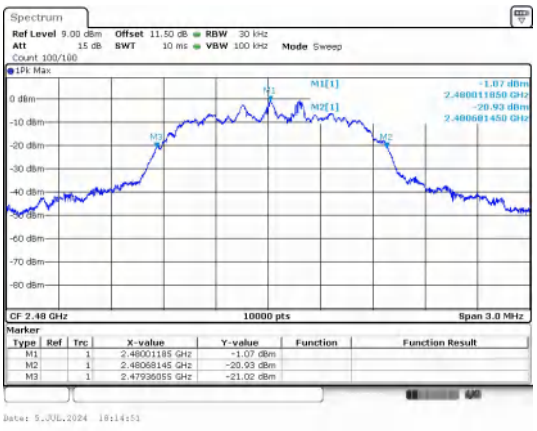
GFSK_DH5_Channel 78



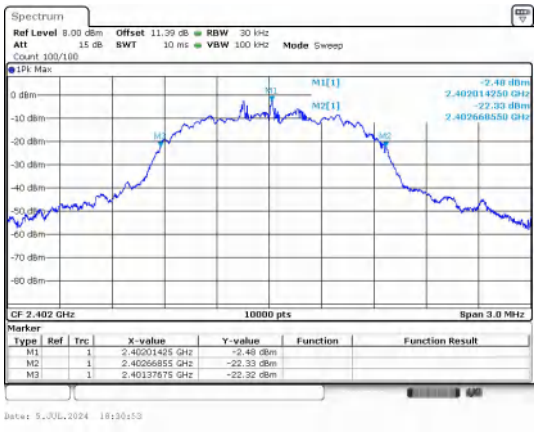
π/4DQPSK_2-DH5_Channel 0



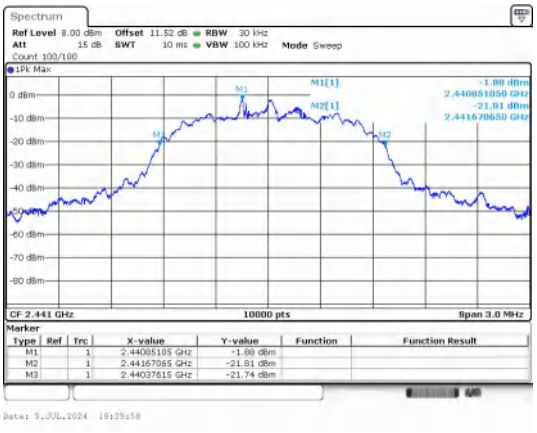
π/4DQPSK_2-DH5_Channel 39



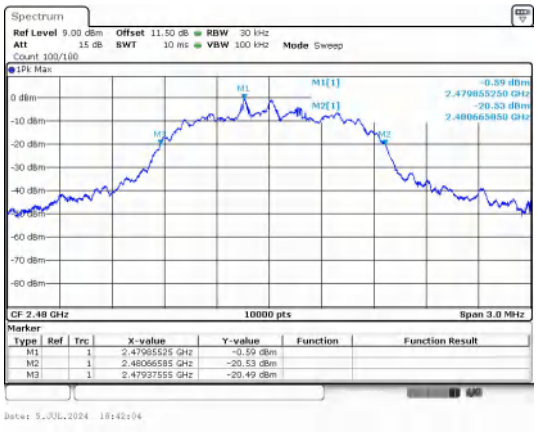
π/4DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



8DPSK_3-DH5_Channel 78

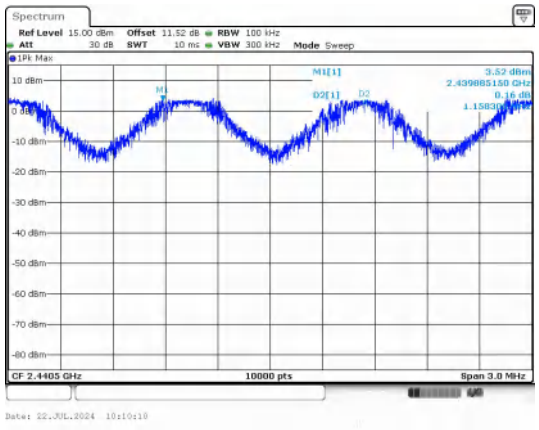
7) Carrier Frequencies Separation

Left

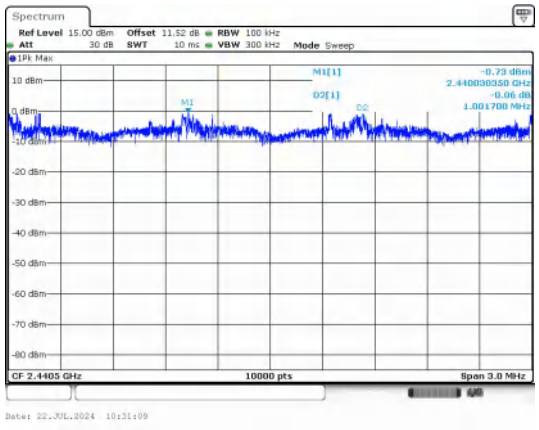
Test Result

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2439.8852	2441.0435	1.1583	0.902	PASS
π/4DQPSK	2-DH5	2440.0303	2441.032	1.0017	0.88	PASS
8DPSK	3-DH5	2440.0327	2441.017	0.9843	0.86	PASS

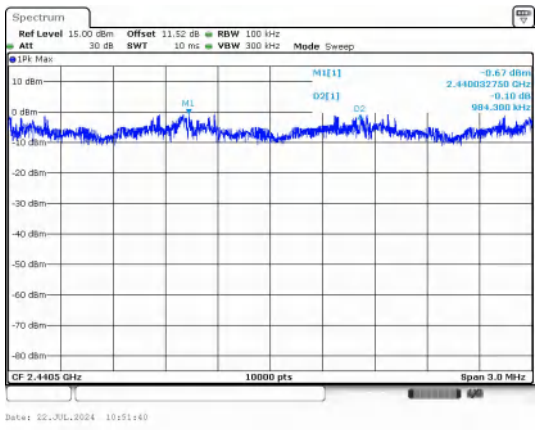
Test Graphs



GFSK



π/4DQPSK



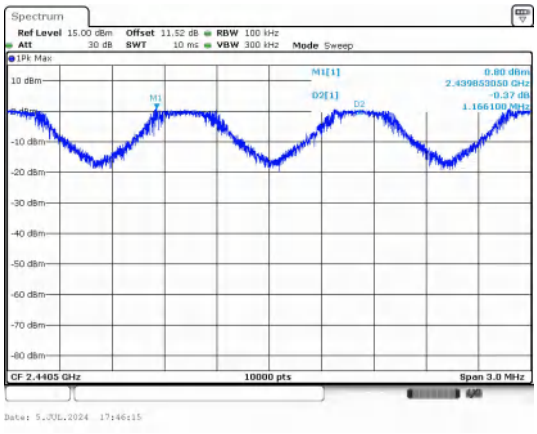
8DPSK

Right

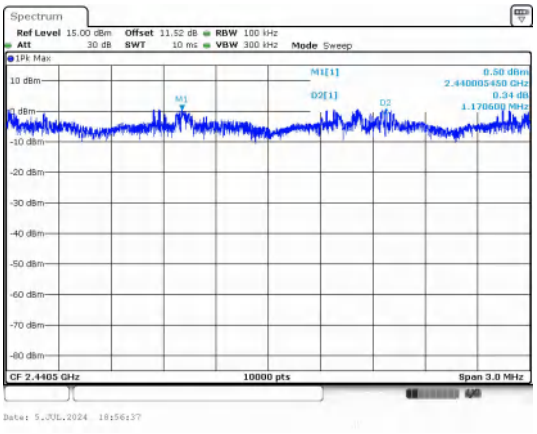
Test Result

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2439.8531	2441.0192	1.1661	1.020	PASS
π/4DQPSK	2-DH5	2440.0055	2441.1761	1.1706	0.88	PASS
8DPSK	3-DH5	2439.8537	2441.173	1.3194	0.86	PASS

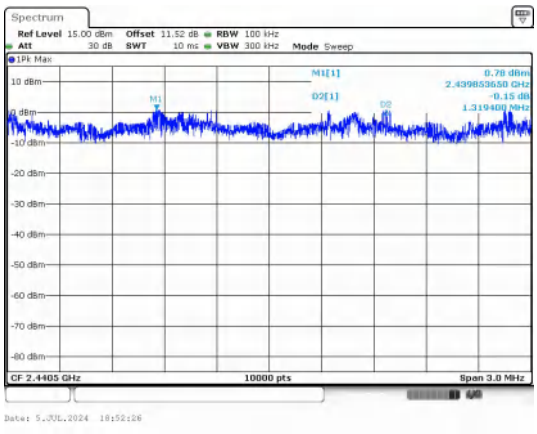
Test Graphs



GFSK



π/4DQPSK



8DPSK

8) Conducted Out Of Band Emission

Left

Test Result

Non-Hopping

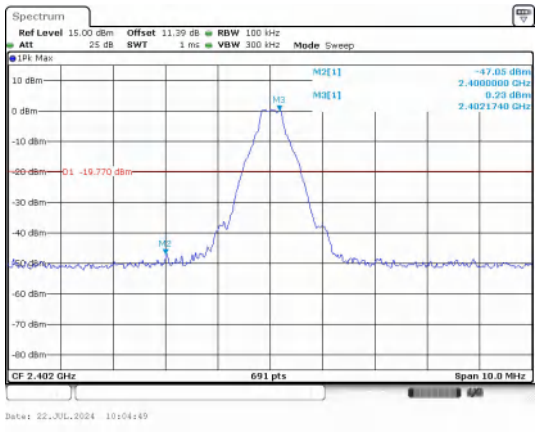
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-47.045	-19.77	-27.275	PASS
			7205.96	-45.559	-19.77	-25.789	PASS
		39	9763.72	-41.691	-20.79	-20.901	PASS
		78	2483.50	-51.160	-18.09	-33.070	PASS
			9920.20	-39.033	-18.09	-20.943	PASS
π/4DQPSK	2-DH5	0	2397.25	-49.314	-19.69	-29.624	PASS
			2400.00	-50.003	-19.69	-30.313	PASS
			9608.10	-45.533	-19.69	-25.843	PASS
		39	9763.72	-41.803	-20.78	-21.023	PASS
		78	2483.50	-51.625	-20.93	-30.695	PASS
			9920.20	-40.275	-20.93	-19.345	PASS
8DPSK	3-DH5	0	2398.28	-47.638	-19.68	-27.958	PASS
			2400.00	-49.123	-19.68	-29.443	PASS
			9608.10	-45.458	-19.68	-25.778	PASS
		39	9763.72	-41.503	-20.75	-20.753	PASS
		78	2483.50	-50.502	-20.88	-29.622	PASS
			9920.20	-40.202	-20.88	-19.322	PASS

Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2395.25	-48.664	-19.83	-28.834	PASS
			2400.00	-51.163	-19.83	-31.333	PASS
			2483.50	-49.678	-21.1	-28.578	PASS
			2397.95	-48.016	-17.25	-30.766	PASS
			2400.00	-48.699	-17.25	-31.449	PASS
			2483.50	-49.383	-18.19	-31.193	PASS
π/4DQPSK	2-DH5		2395.64	-48.490	-19.77	-28.720	PASS
			2400.00	-49.599	-19.77	-29.829	PASS
			2483.50	-48.324	-21.32	-27.004	PASS
			2397.79	-48.424	-19.9	-28.524	PASS
			2400.00	-49.301	-19.9	-29.401	PASS
			2483.50	-48.572	-21.15	-27.422	PASS
8DPSK	3-DH5		2397.00	-47.446	-19.57	-27.876	PASS

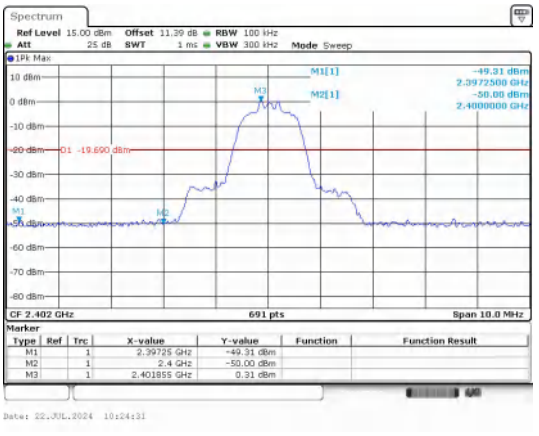
			2400.00	-49.451	-19.57	-29.881	PASS
			2483.50	-49.557	-22.34	-27.217	PASS
			2397.58	-48.619	-20.39	-28.229	PASS
			2400.00	-50.040	-20.39	-29.650	PASS
			2483.50	-49.634	-21.01	-28.624	PASS

Test Graphs



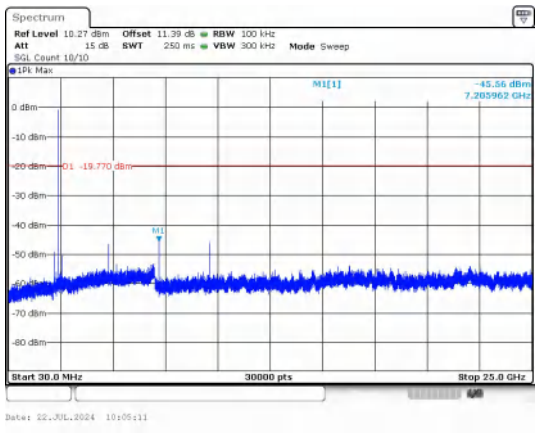
Out Of Band Emission

GFSK_DH5_Channel 0



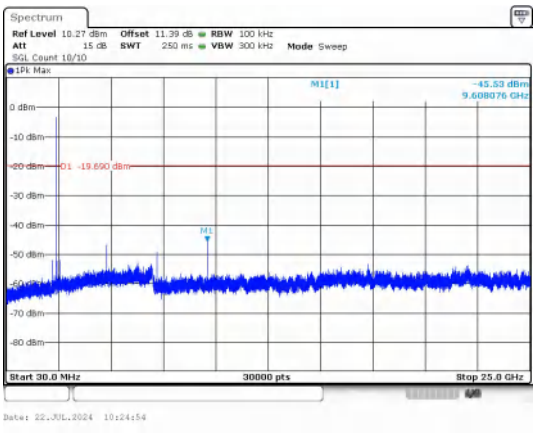
Out Of Band Emission

π/4DQPSK_2-DH5_Channel 0



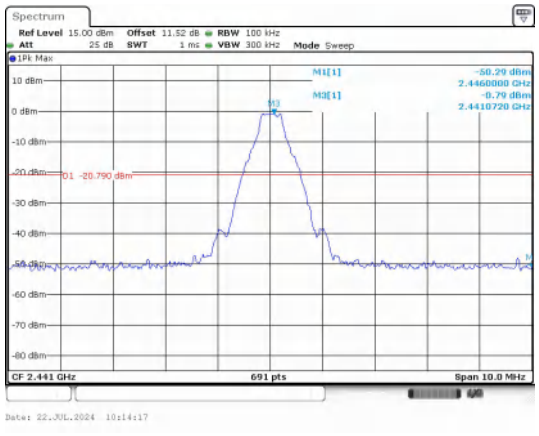
30.0 MHz - 25000.0 MHz

GFSK_DH5_Channel 0

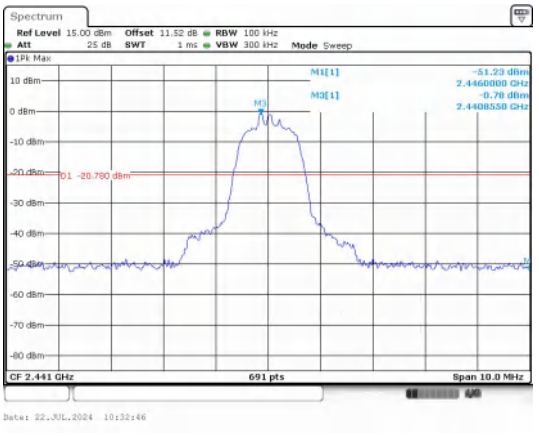


30.0 MHz - 25000.0 MHz

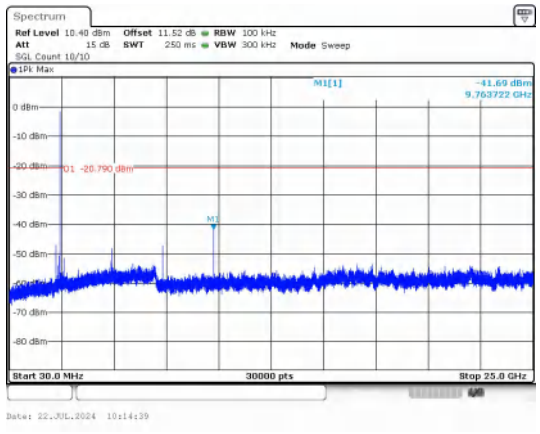
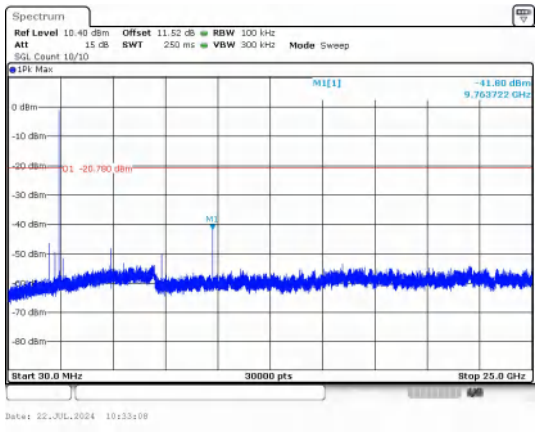
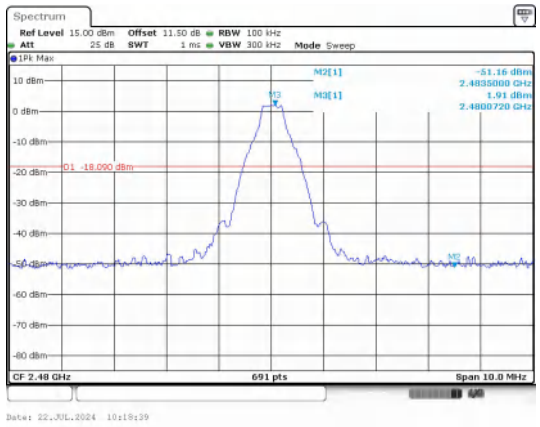
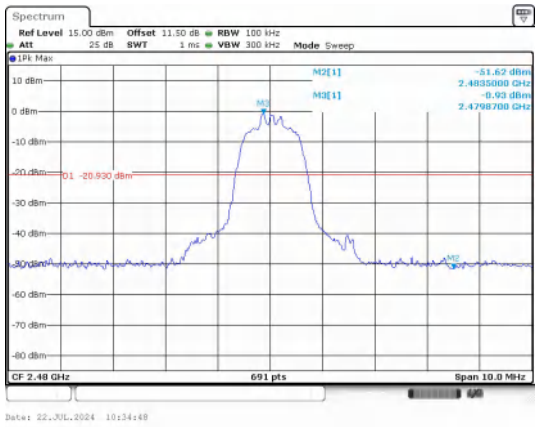
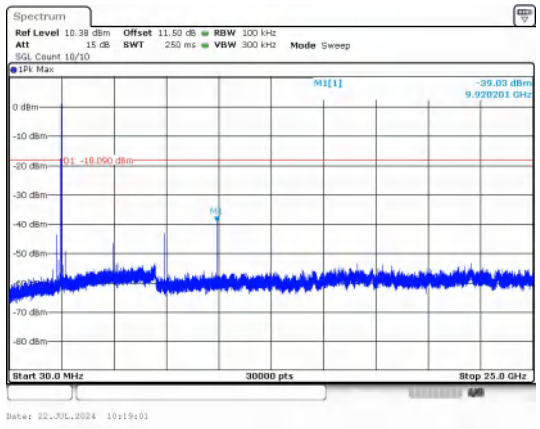
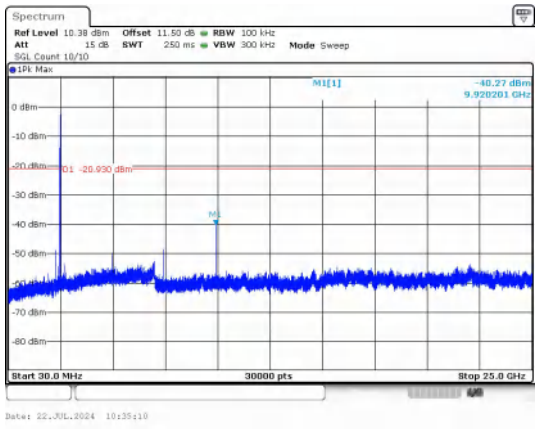
π/4DQPSK_2-DH5_Channel 0

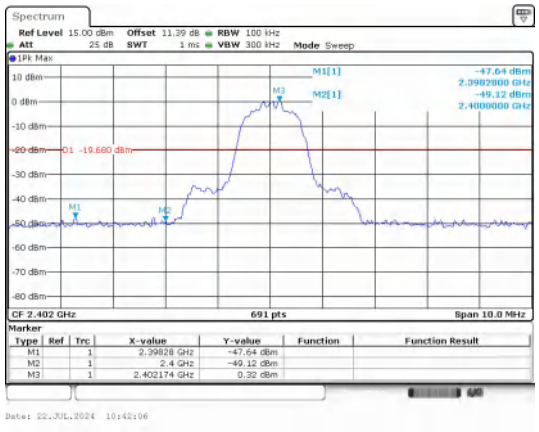


Out Of Band Emission



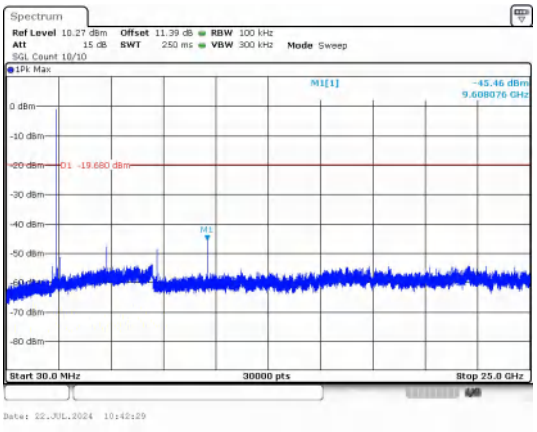
Out Of Band Emission

GFSK_DH5_Channel 39	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



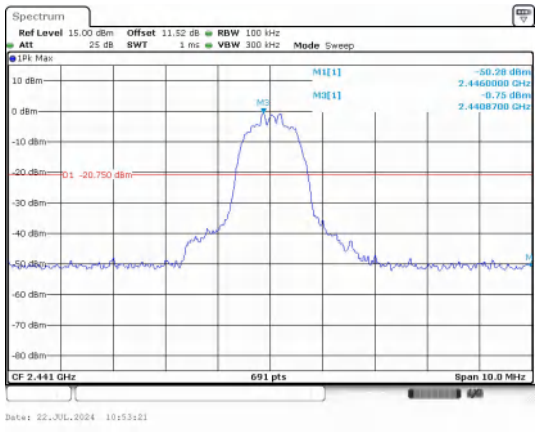
Out Of Band Emission

8DPSK_3-DH5_Channel 0



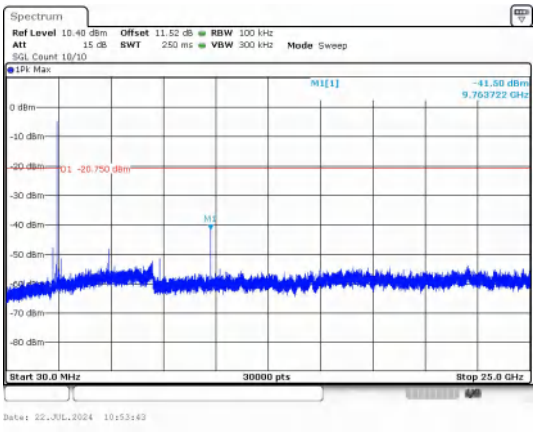
30.0 MHz - 25000.0 MHz

8DPSK_3-DH5_Channel 0



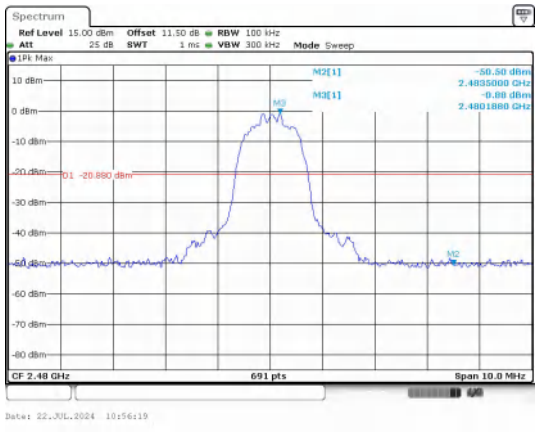
Out Of Band Emission

8DPSK_3-DH5_Channel 39



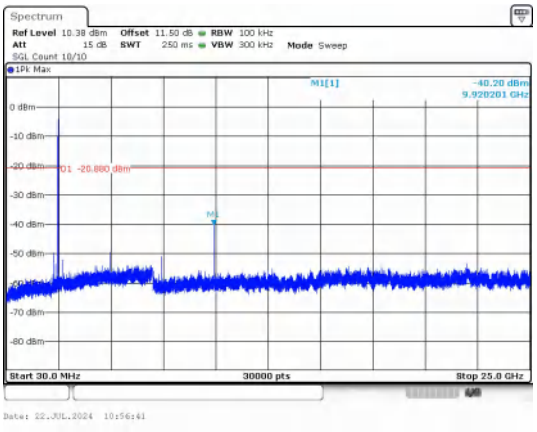
30.0 MHz - 25000.0 MHz

8DPSK_3-DH5_Channel 39



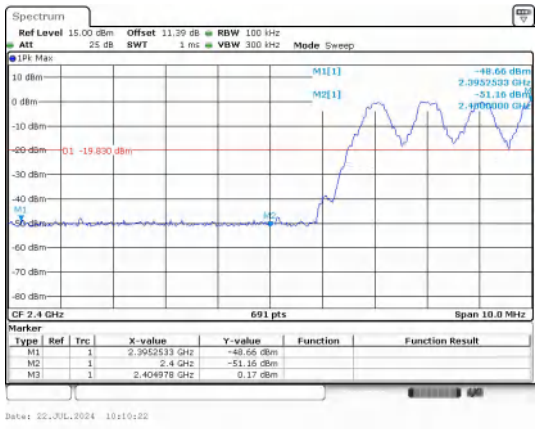
Out Of Band Emission

8DPSK_3-DH5_Channel 78



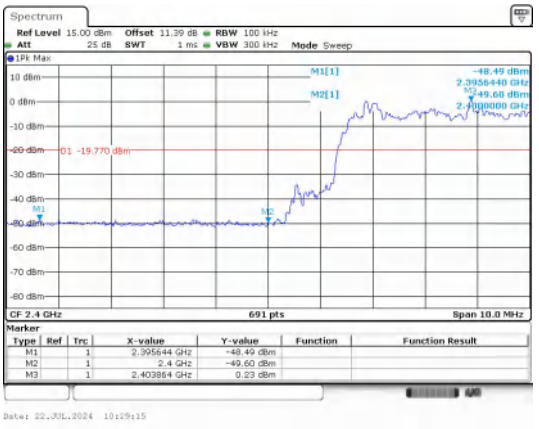
30.0 MHz - 25000.0 MHz

8DPSK_3-DH5_Channel 78



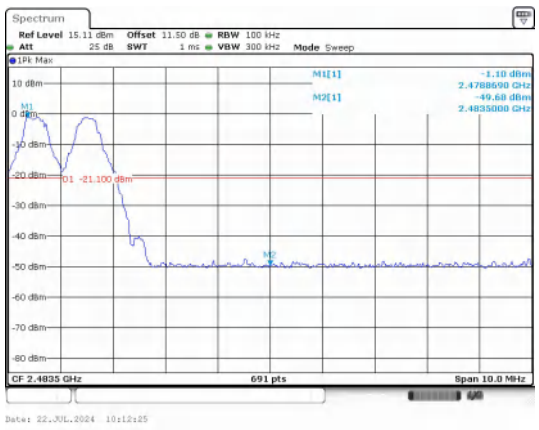
Out Of Band Emission(Left)

GFSK_DH5_Channel Hopping



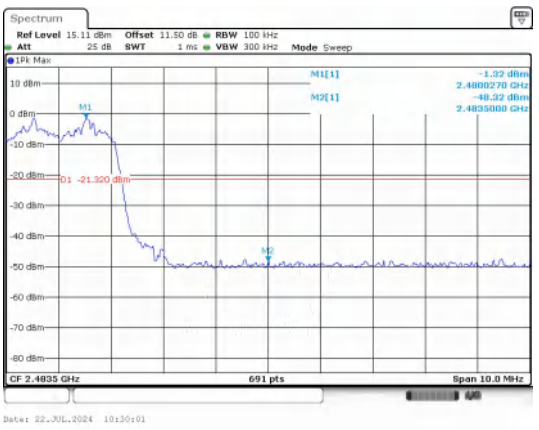
Out Of Band Emission(Left)

π/4DQPSK_2-DH5_Channel Hopping



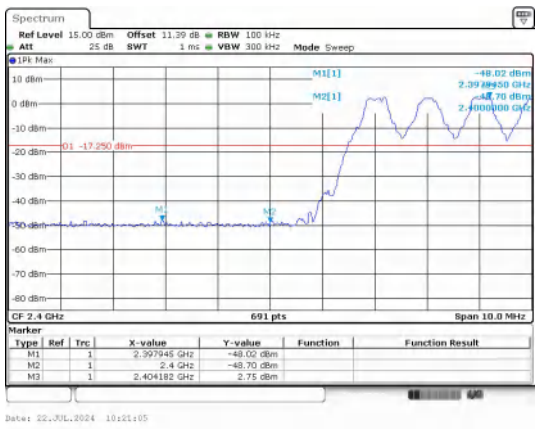
Out Of Band Emission(Right)

GFSK_DH5_Channel Hopping



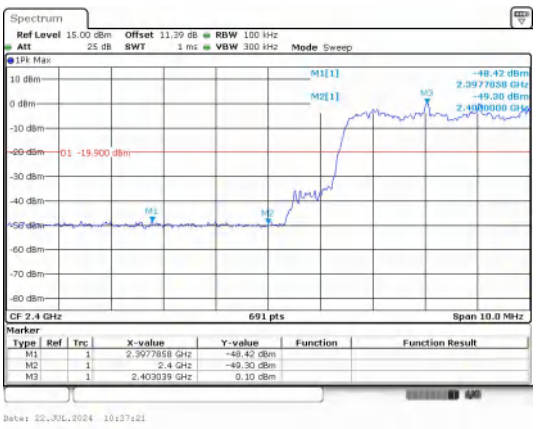
Out Of Band Emission(Right)

π/4DQPSK_2-DH5_Channel Hopping



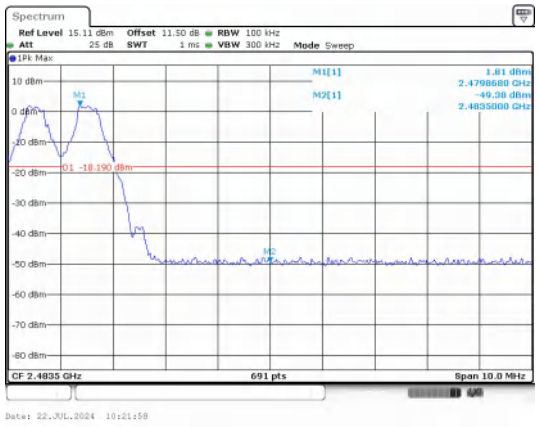
Out Of Band Emission(Left)

GFSK_DH5_Channel Hopping



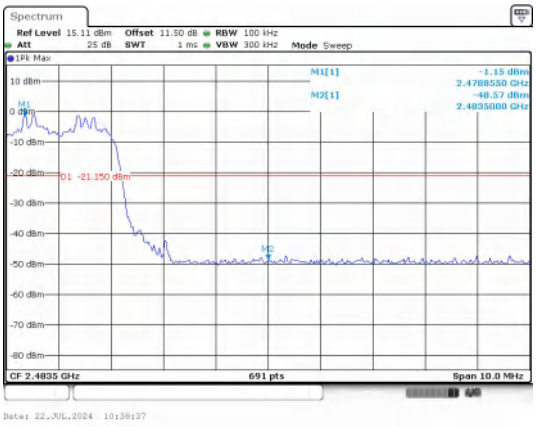
Out Of Band Emission(Left)

π/4DQPSK_2-DH5_Channel Hopping



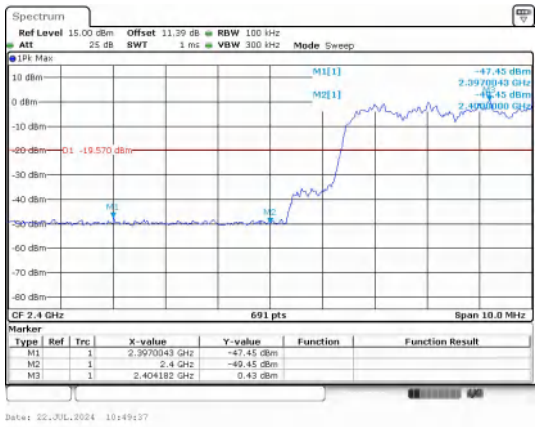
Out Of Band Emission(Right)

GFSK_DH5_Channel Hopping



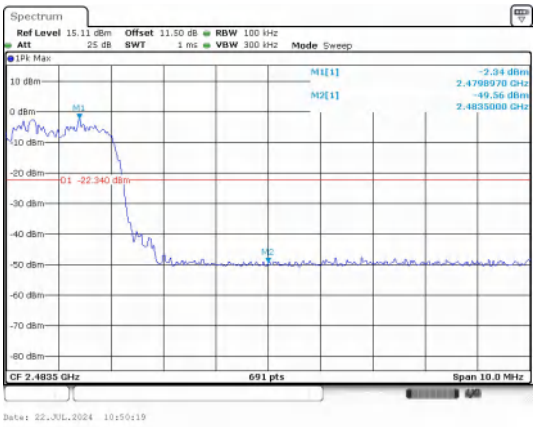
Out Of Band Emission(Right)

π/4DQPSK_2-DH5_Channel Hopping



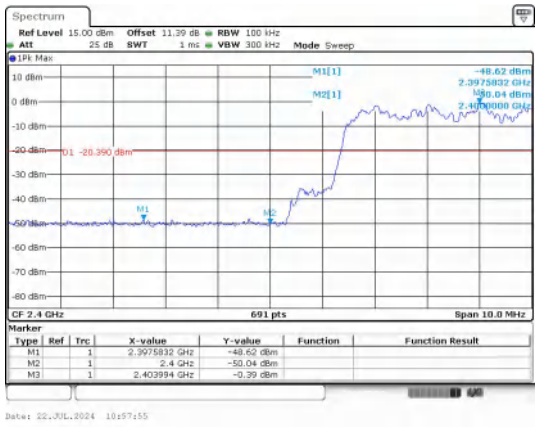
Out Of Band Emission(Left)

8DPSK_3-DH5_Channel Hopping



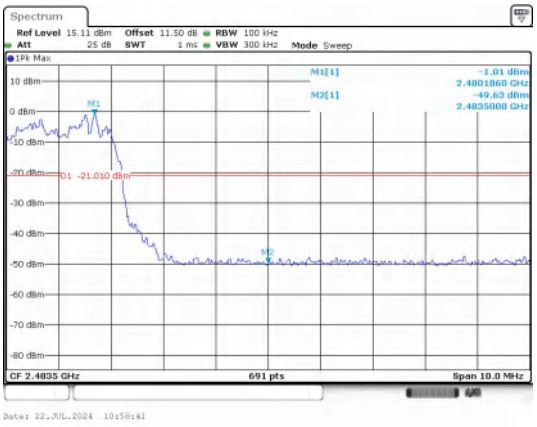
Out Of Band Emission(Right)

8DPSK_3-DH5_Channel Hopping



Out Of Band Emission(Left)

8DPSK_3-DH5_Channel Hopping



Out Of Band Emission(Right)

8DPSK_3-DH5_Channel Hopping

Right

Test Result

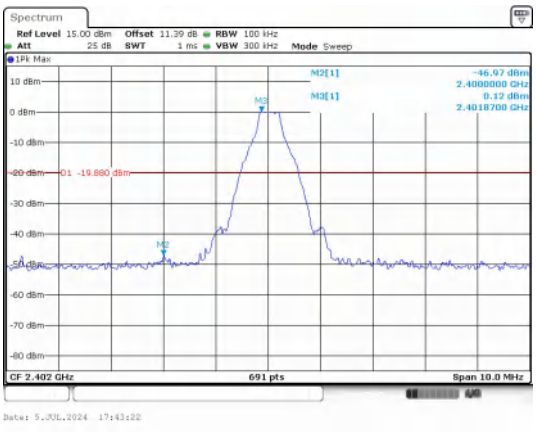
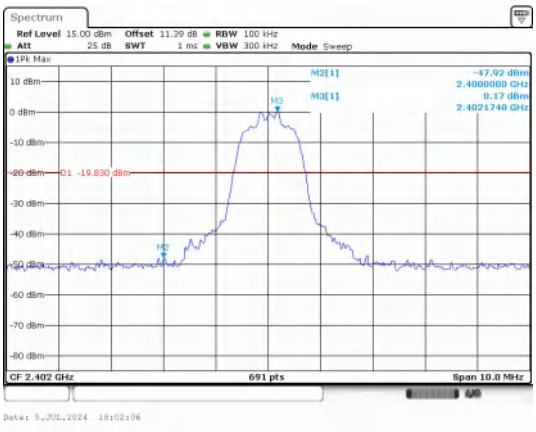
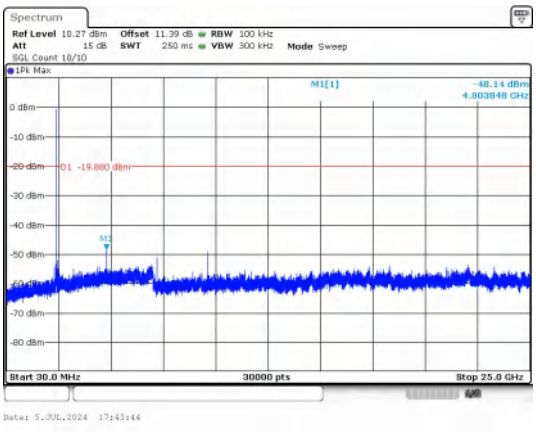
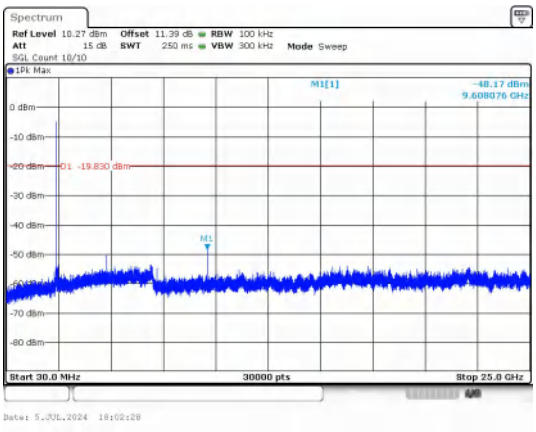
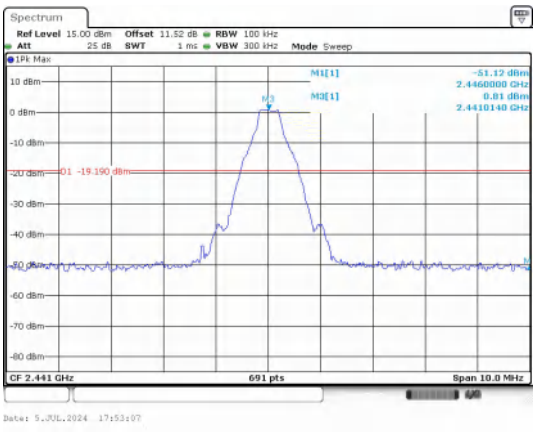
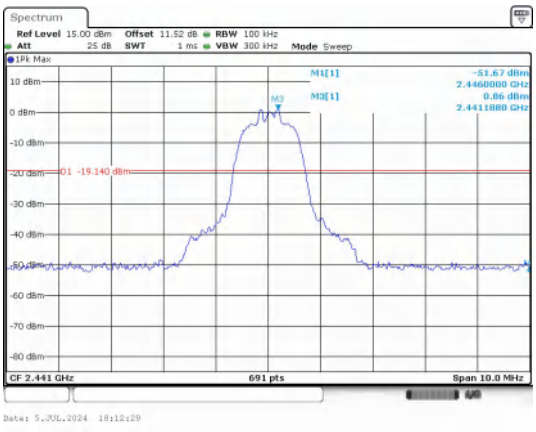
Non-Hopping

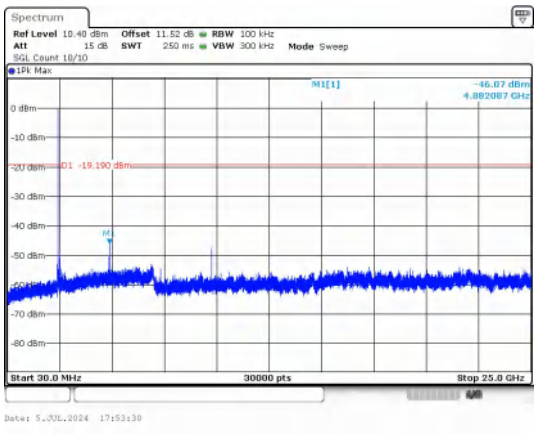
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-46.967	-19.88	-27.087	PASS
			4803.85	-48.144	-19.88	-28.264	PASS
		39	4882.09	-46.065	-19.19	-26.875	PASS
		78	2483.50	-50.280	-18.28	-32.000	PASS
			4960.33	-44.311	-18.28	-26.031	PASS
π/4DQPSK	2-DH5	0	2400.00	-47.921	-19.83	-28.091	PASS
			9608.08	-48.170	-19.83	-28.340	PASS
		39	9763.72	-47.673	-19.14	-28.533	PASS
		78	2483.50	-50.052	-18.39	-31.662	PASS
			4960.33	-47.132	-18.39	-28.742	PASS
8DPSK	3-DH5	0	2400.00	-49.076	-19.98	-29.096	PASS
			4803.85	-46.073	-19.98	-26.093	PASS
		39	9763.72	-47.735	-19.2	-28.535	PASS
		78	2483.50	-50.265	-18.37	-31.895	PASS
			4960.33	-47.105	-18.37	-28.735	PASS

Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2397.00	-48.463	-19.91	-28.553	PASS
			2400.00	-48.823	-19.91	-28.913	PASS
			2483.50	-48.686	-18.62	-30.066	PASS
			2396.70	-47.737	-19.85	-27.887	PASS
			2400.00	-48.411	-19.85	-28.561	PASS
			2483.50	-49.204	-18.53	-30.674	PASS
π/4DQPSK	2-DH5		2400.00	-47.707	-19.89	-27.817	PASS
			2483.50	-48.167	-19.31	-28.857	PASS
			2395.43	-47.591	-19.78	-27.811	PASS
			2400.00	-48.116	-19.78	-28.336	PASS
			2483.50	-49.084	-18.38	-30.704	PASS
8DPSK	3-DH5		2398.99	-48.001	-19.9	-28.101	PASS
			2400.00	-48.315	-19.9	-28.415	PASS
			2483.50	-49.252	-19.08	-30.172	PASS
			2397.18	-47.767	-19.87	-27.897	PASS
			2400.00	-49.221	-19.87	-29.351	PASS
			2483.50	-48.474	-18.81	-29.664	PASS

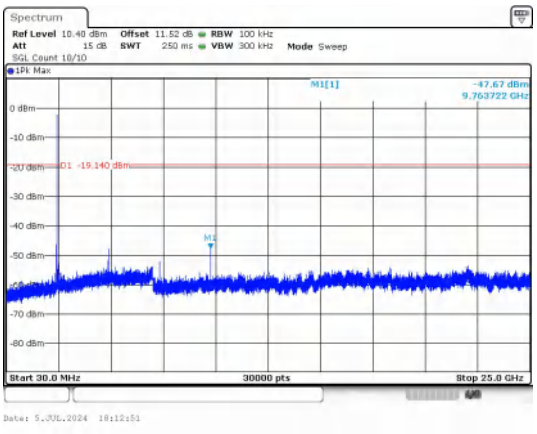
Test Graphs

	
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



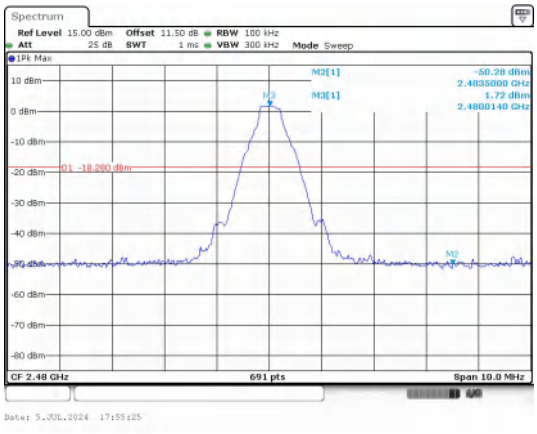
30.0 MHz - 25000.0 MHz

GFSK_DH5_Channel 39



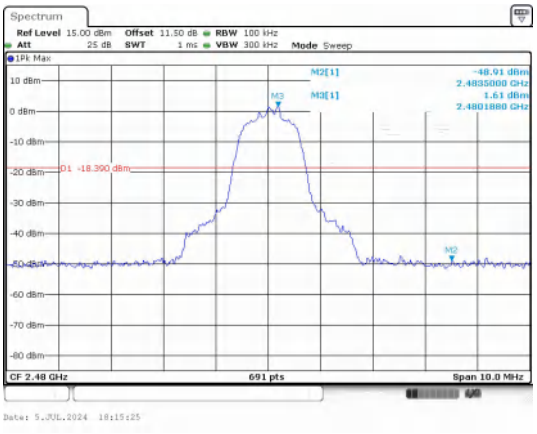
30.0 MHz - 25000.0 MHz

π/4DQPSK_2-DH5_Channel 39



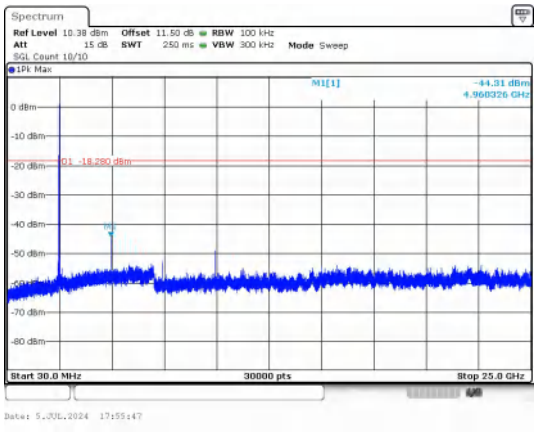
Out Of Band Emission

GFSK_DH5_Channel 78



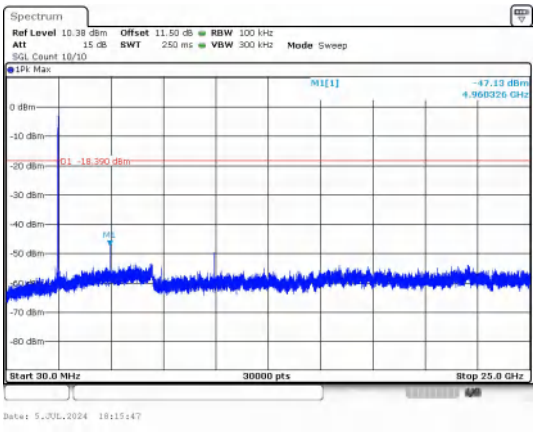
Out Of Band Emission

π/4DQPSK_2-DH5_Channel 78



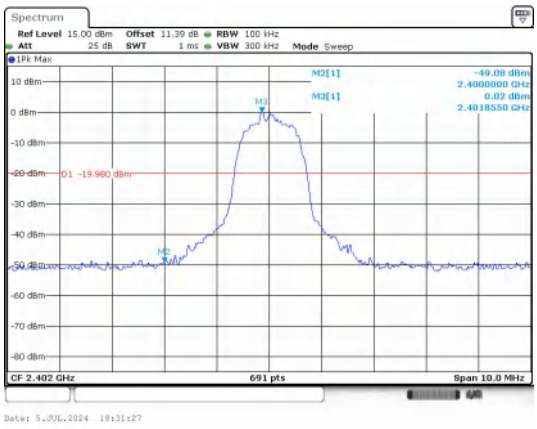
30.0 MHz - 25000.0 MHz

GFSK_DH5_Channel 78



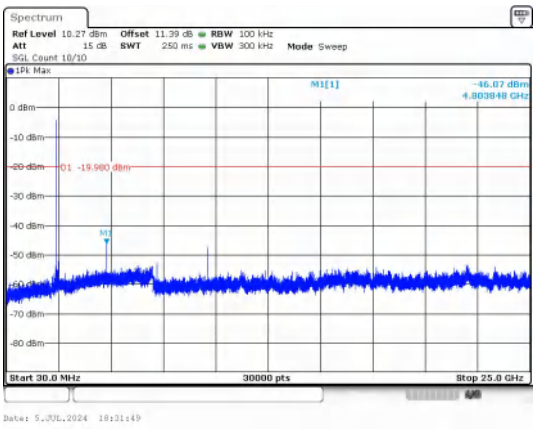
30.0 MHz - 25000.0 MHz

π/4DQPSK_2-DH5_Channel 78



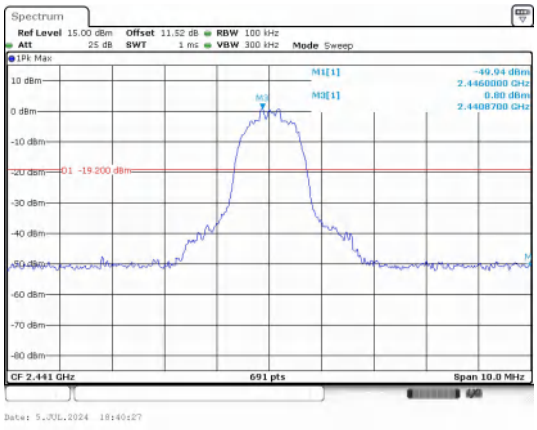
Out Of Band Emission

8DPSK_3-DH5_Channel 0



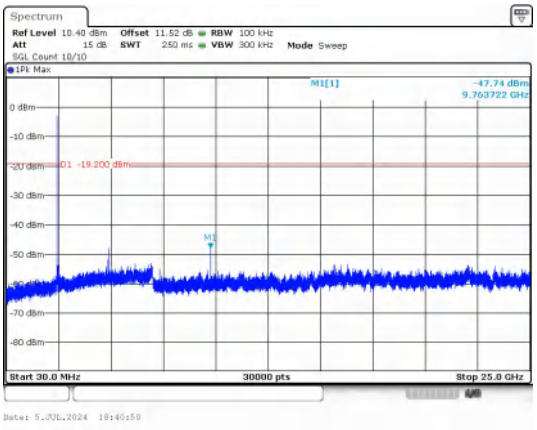
30.0 MHz - 25000.0 MHz

8DPSK_3-DH5_Channel 0



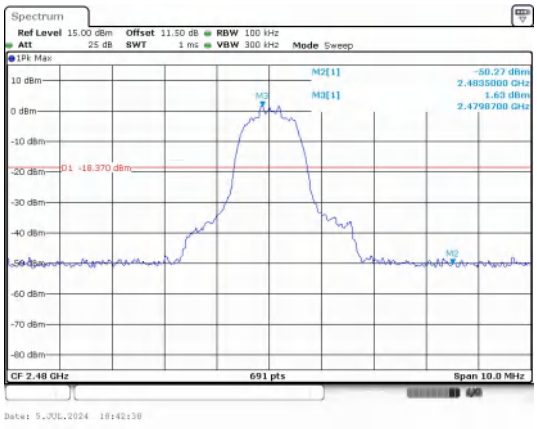
Out Of Band Emission

8DPSK_3-DH5_Channel 39



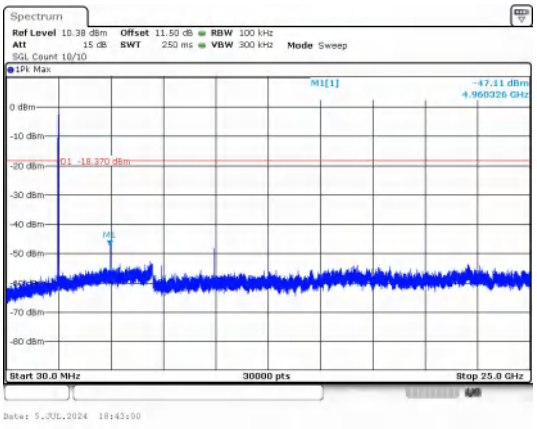
30.0 MHz - 25000.0 MHz

8DPSK_3-DH5_Channel 39



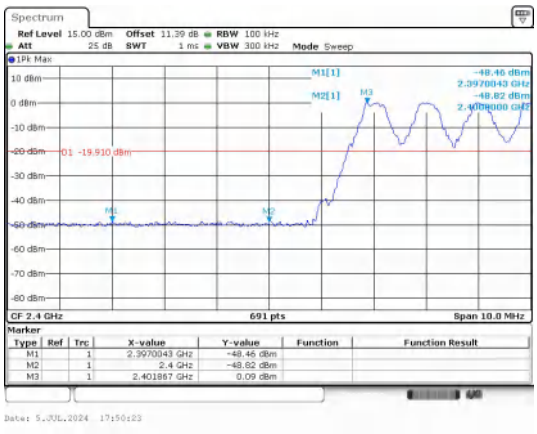
Out Of Band Emission

8DPSK_3-DH5_Channel 78



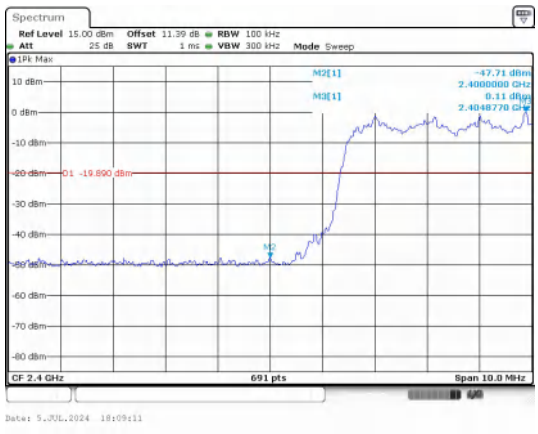
30.0 MHz - 25000.0 MHz

8DPSK_3-DH5_Channel 78



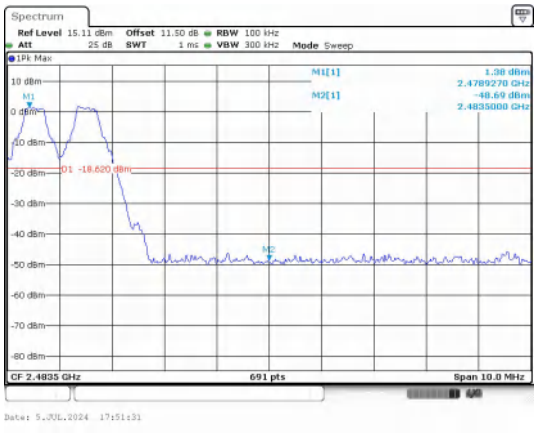
Out Of Band Emission(Left)

GFSK_DH5_Channel Hopping



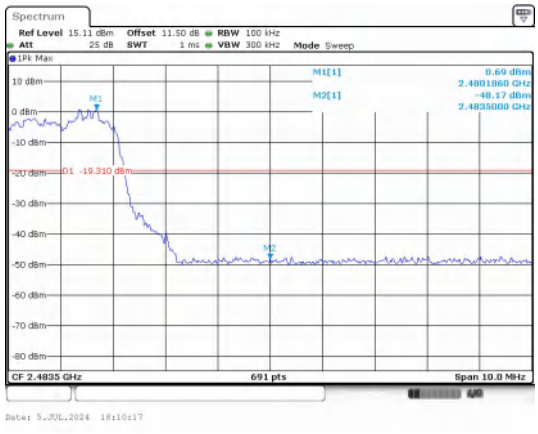
Out Of Band Emission(Left)

π/4DQPSK_2-DH5_Channel Hopping



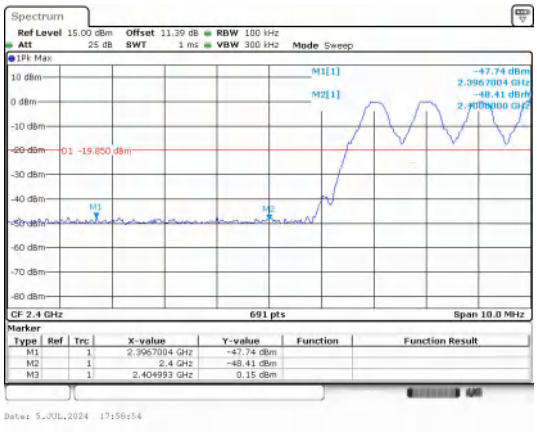
Out Of Band Emission(Right)

GFSK_DH5_Channel Hopping



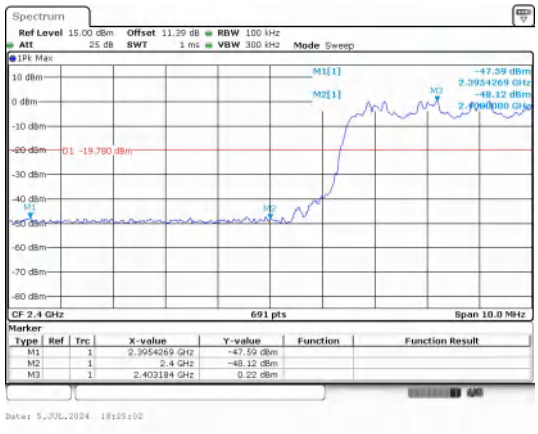
Out Of Band Emission(Right)

π/4DQPSK_2-DH5_Channel Hopping



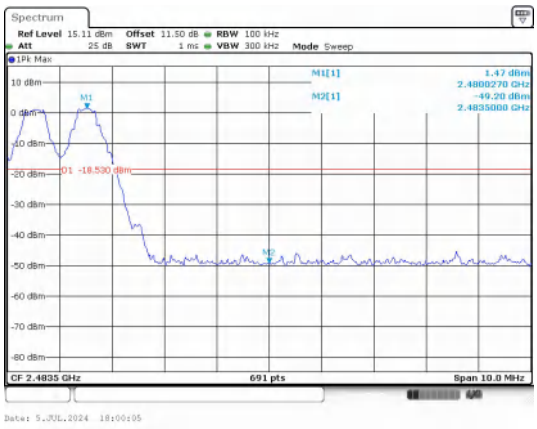
Out Of Band Emission(Left)

GFSK_DH5_Channel Hopping



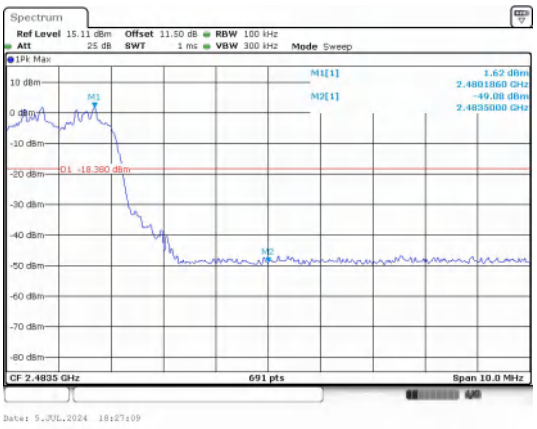
Out Of Band Emission(Left)

π/4DQPSK_2-DH5_Channel Hopping



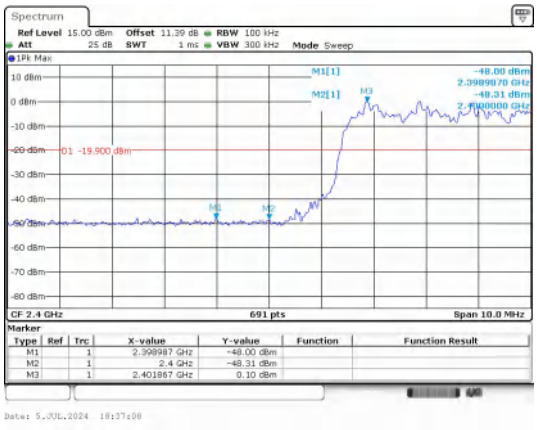
Out Of Band Emission(Right)

GFSK_DH5_Channel Hopping



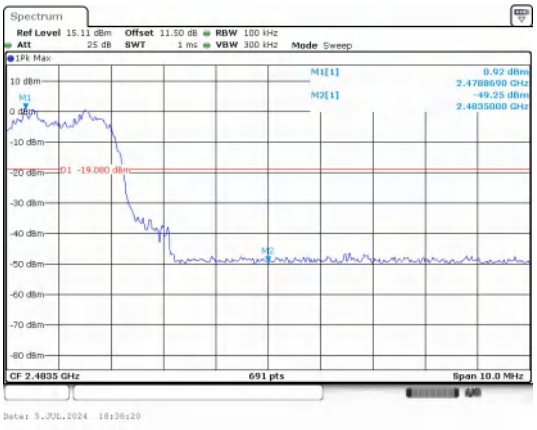
Out Of Band Emission(Right)

π/4DQPSK_2-DH5_Channel Hopping



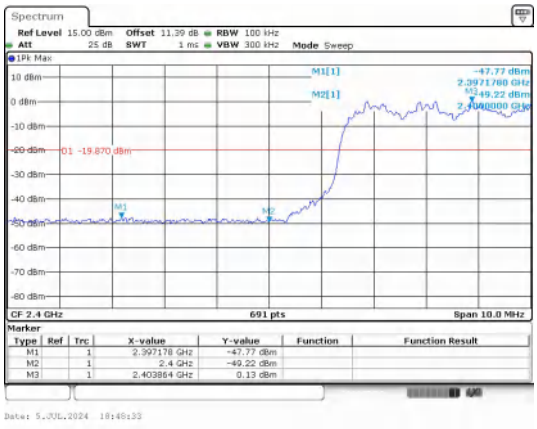
Out Of Band Emission(Left)

8DPSK_3-DH5_Channel Hopping



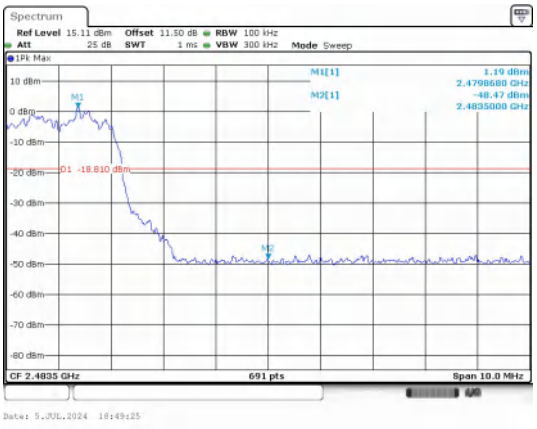
Out Of Band Emission(Right)

8DPSK_3-DH5_Channel Hopping



Out Of Band Emission(Left)

8DPSK_3-DH5_Channel Hopping



Out Of Band Emission(Right)

8DPSK_3-DH5_Channel Hopping