Appendix Report

Report No.:	CISR250401008
Test Engineer:	James Wang
Supervised by:	Rory Huang

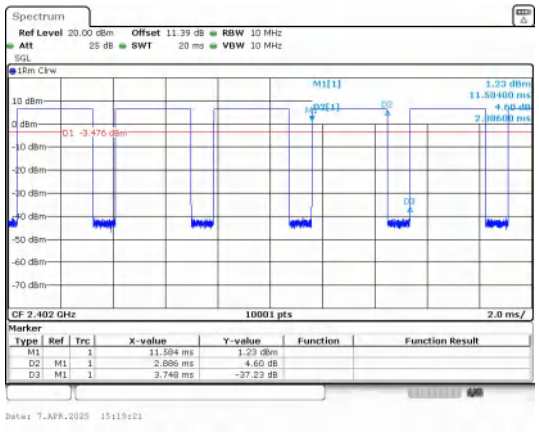
1) Duty Cycle

Test Result

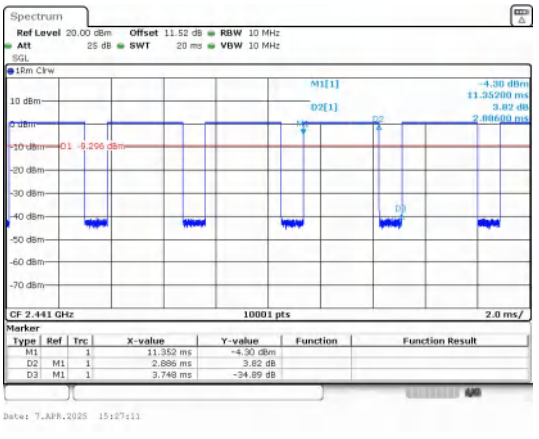
Left：

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	0.3465
		39	2.886	3.748	77.00	0.7700	1.1351	0.3465
		78	2.886	3.748	77.00	0.7700	1.1351	0.3465
π/4DQPSK	2-DH5	0	2.890	3.748	77.11	0.7711	1.1289	0.3460
		39	2.892	3.748	77.16	0.7716	1.1261	0.3458
		78	2.892	3.748	77.16	0.7716	1.1261	0.3458
8DPSK	3-DH5	0	2.894	3.748	77.21	0.7721	1.1233	0.3455
		39	2.894	3.748	77.21	0.7721	1.1233	0.3455
		78	2.892	3.748	77.16	0.7716	1.1261	0.3458

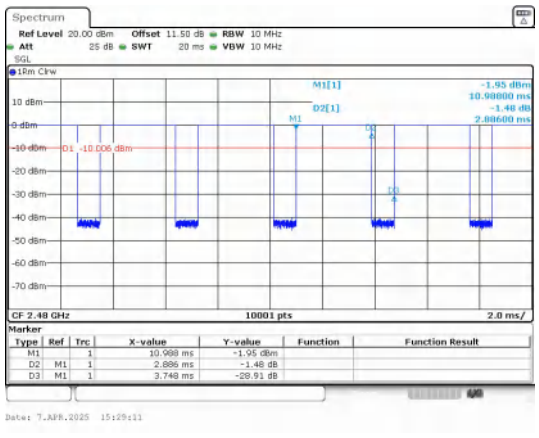
Test Graphs



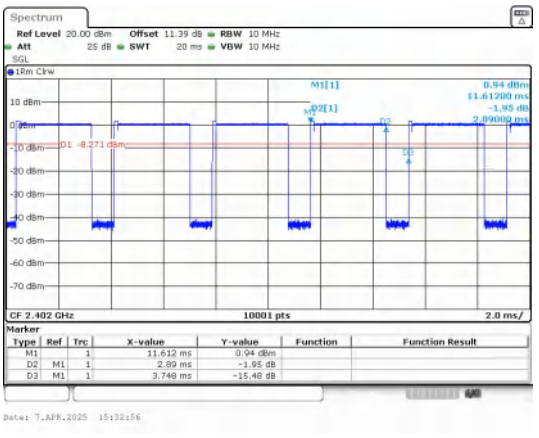
GFSK(DH5)_Channel 0



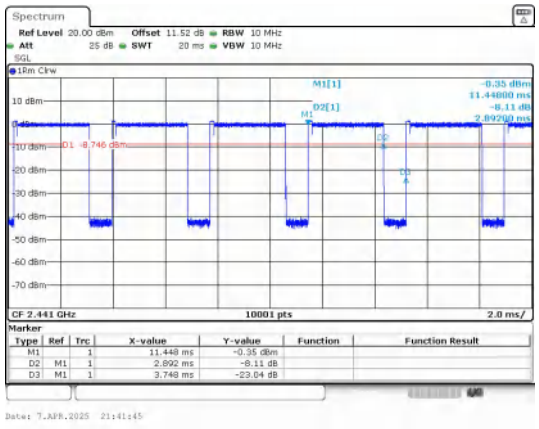
GFSK(DH5)_Channel 39



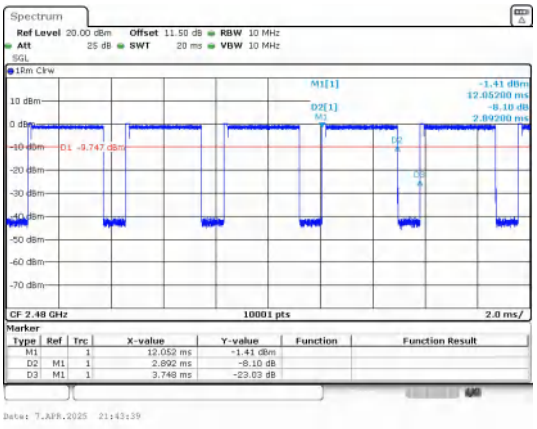
GFSK(DH5)_Channel 78



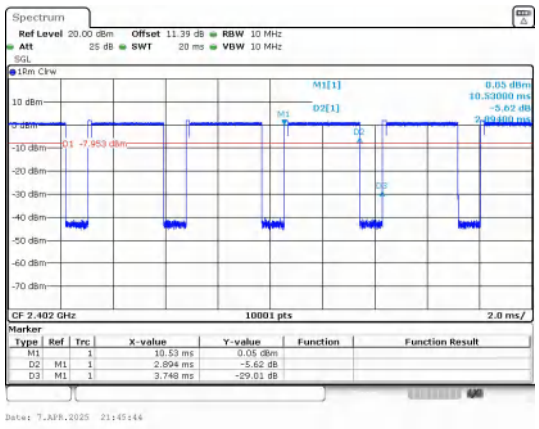
π/4DQPSK(2-DH5)_Channel 0



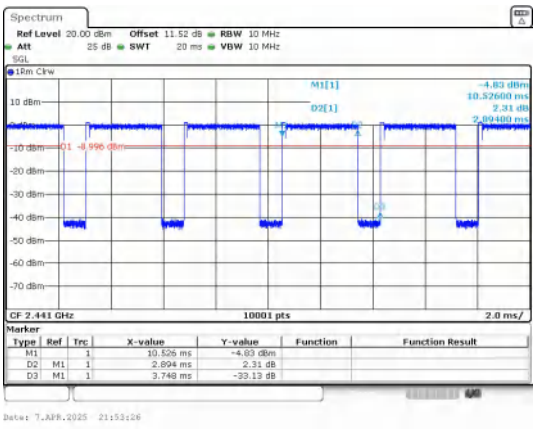
π/4DQPSK(2-DH5)_Channel 39



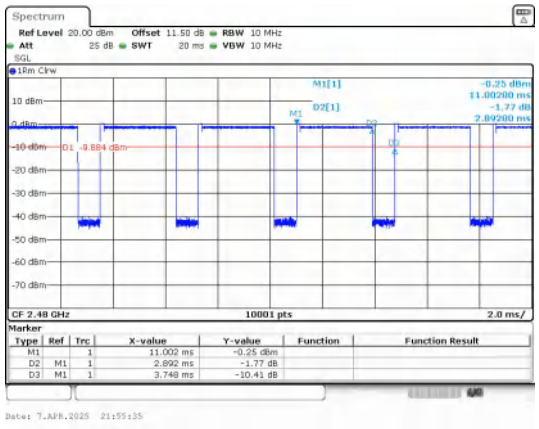
π/4DQPSK(2-DH5)_Channel 78



8DPSK(3-DH5)_Channel 0



8DPSK(3-DH5)_Channel 39



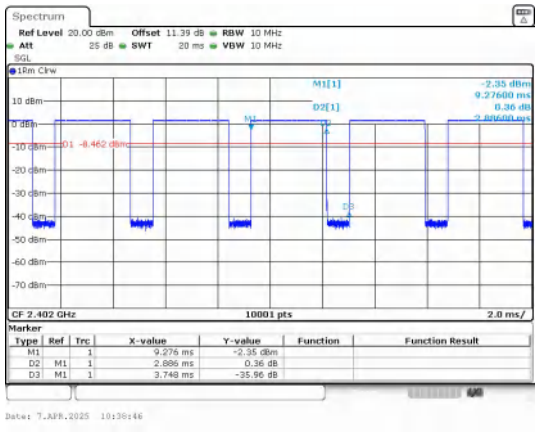
8DPSK(3-DH5)_Channel 78

Right：

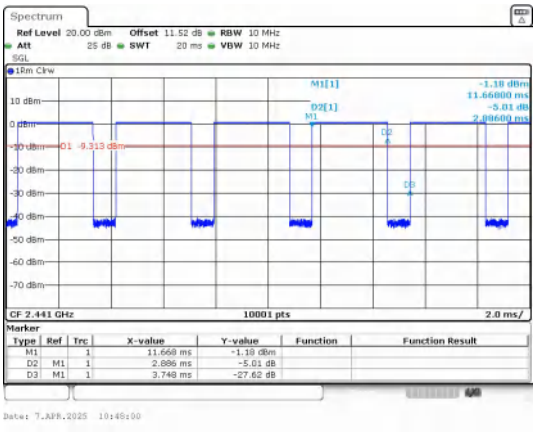
Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.886	3.748	77.00	0.7700	1.1351	0.3465
		39	2.886	3.748	77.00	0.7700	1.1351	0.3465
		78	2.886	3.748	77.00	0.7700	1.1351	0.3465
π/4DQPSK	2-DH5	0	2.890	3.748	77.11	0.7711	1.1289	0.3460
		39	2.890	3.748	77.11	0.7711	1.1289	0.3460

		78	2.890	3.748	77.11	0.7711	1.1289	0.3460
8DPSK	3-DH5	0	2.892	3.748	77.16	0.7716	1.1261	0.3458
		39	2.892	3.748	77.16	0.7716	1.1261	0.3458
		78	2.894	3.748	77.21	0.7721	1.1233	0.3455

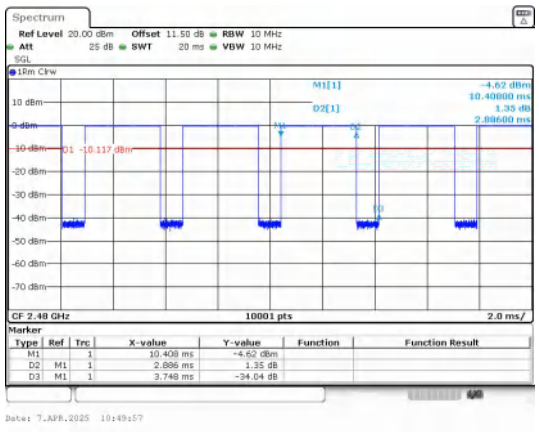
Test Graphs



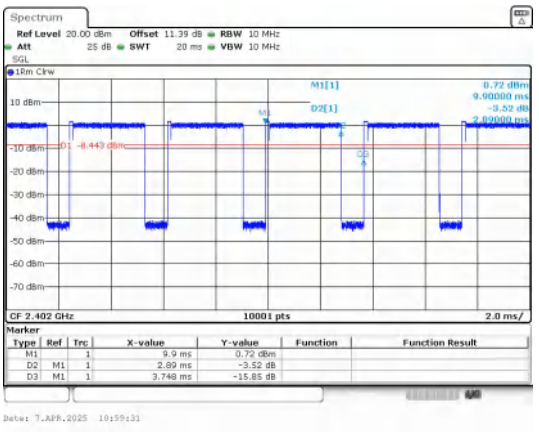
GFSK(DH5)_Channel 0



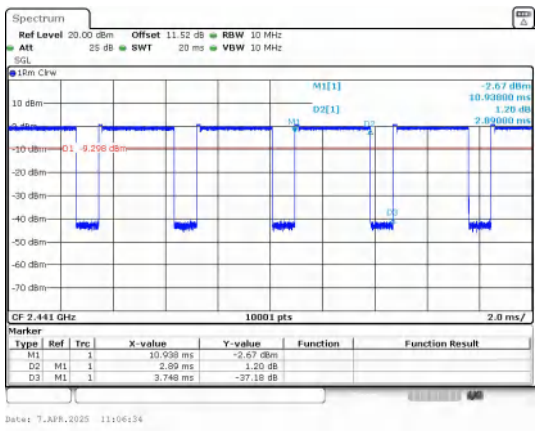
GFSK(DH5)_Channel 39



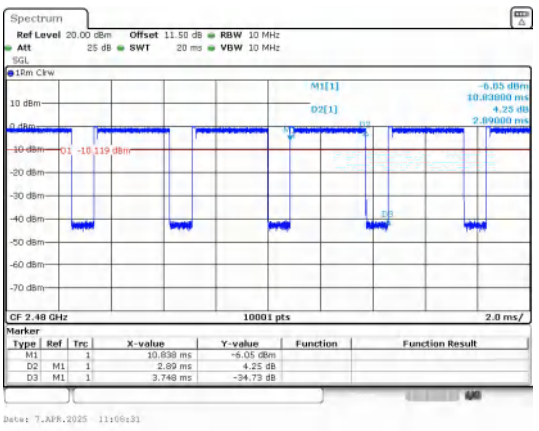
GFSK(DH5)_Channel 78



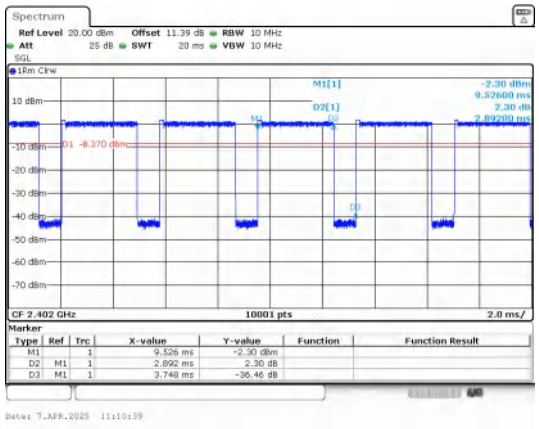
π/4DQPSK(2-DH5)_Channel 0



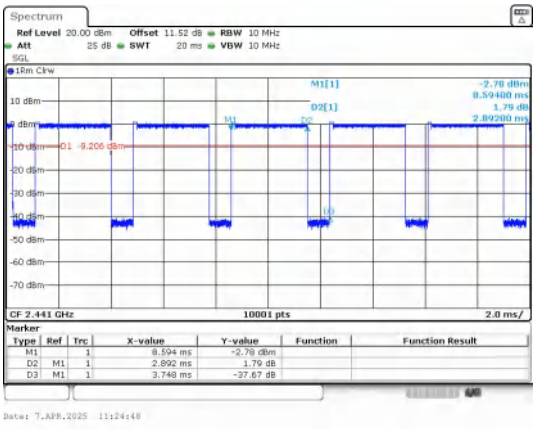
π/4DQPSK(2-DH5)_Channel 39



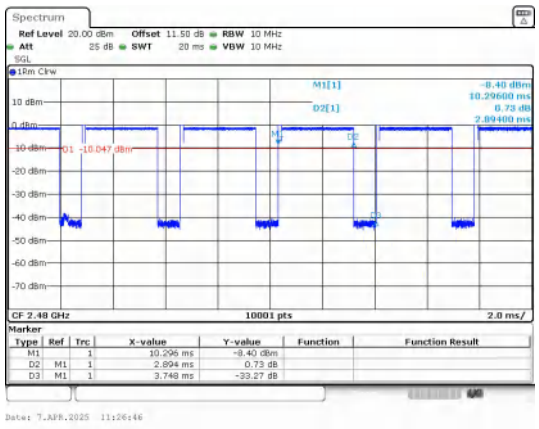
π/4DQPSK(2-DH5)_Channel 78



8DPSK(3-DH5)_Channel 0



8DPSK(3-DH5)_Channel 39



8DPSK(3-DH5)_Channel 78

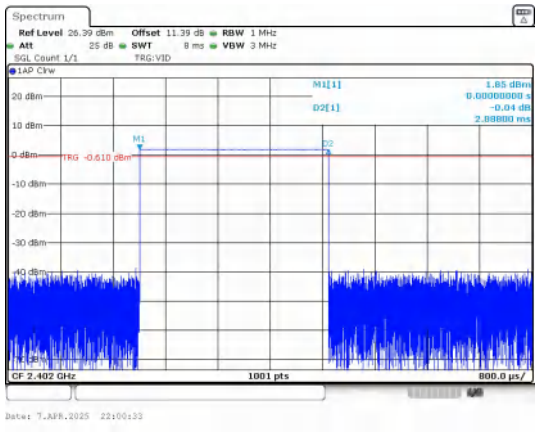
2) Dwell Time

Test Result

Left：

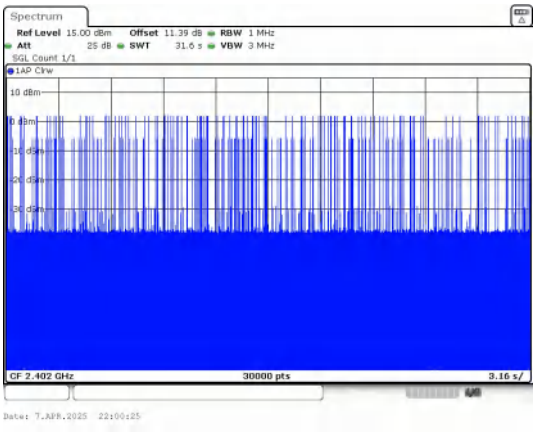
Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.888	119	343.67	< 400	PASS
π/4DQPSK	2-DH5		2.896	114	330.14		PASS
8DPSK	3-DH5		2.896	111	321.46		PASS

Test Graphs



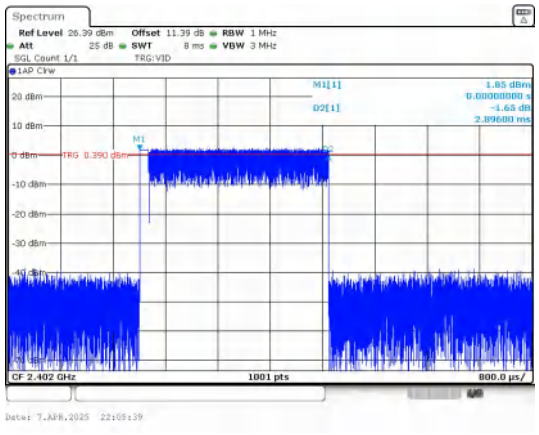
Pulse Width

GFSK_DH5



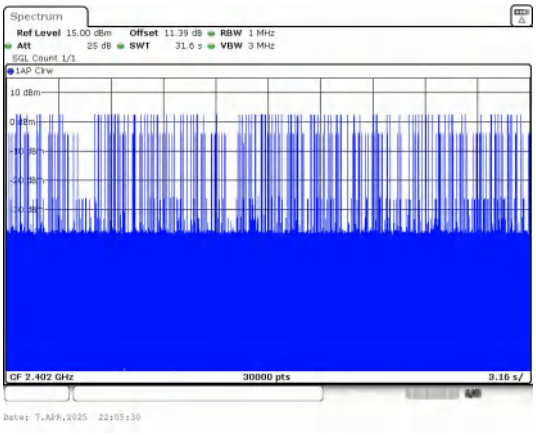
Number of Pulses in 31.6 seconds

GFSK_DH5



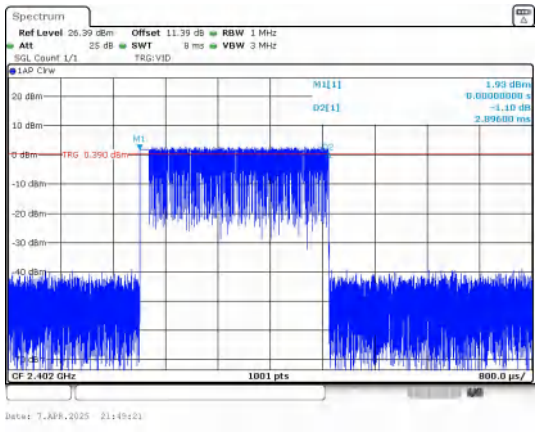
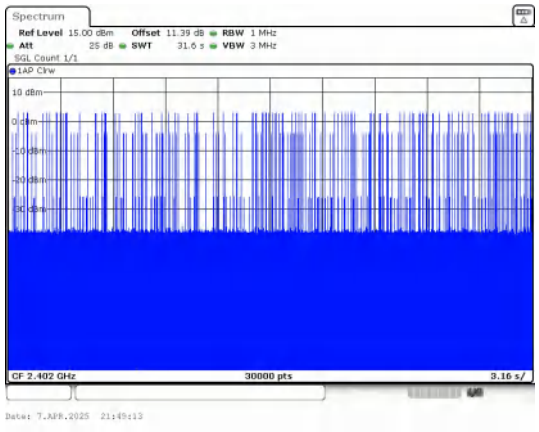
Pulse Width

π/4DQPSK_2-DH5



Number of Pulses in 31.6 seconds

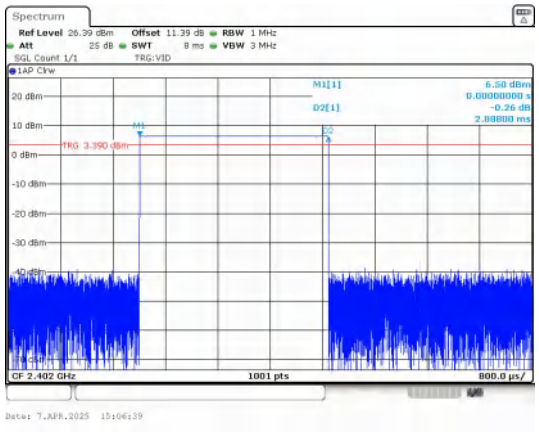
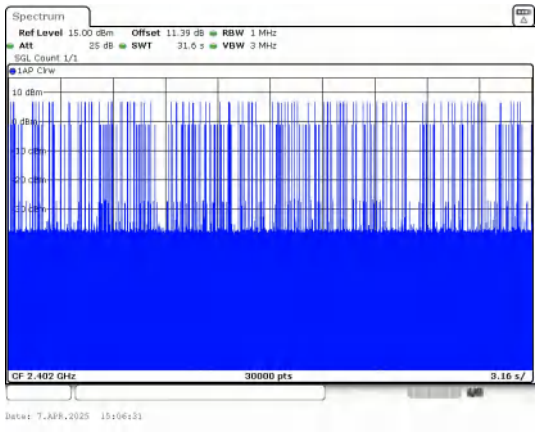
π/4DQPSK_2-DH5

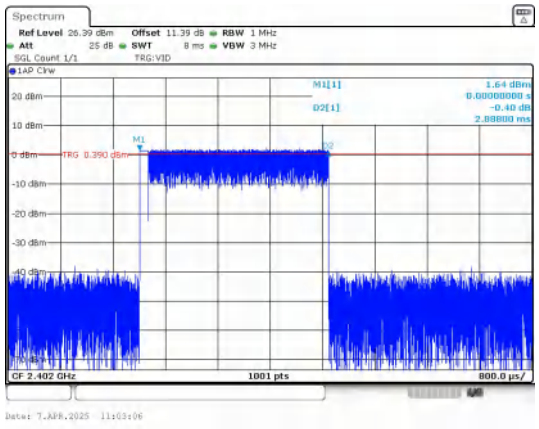
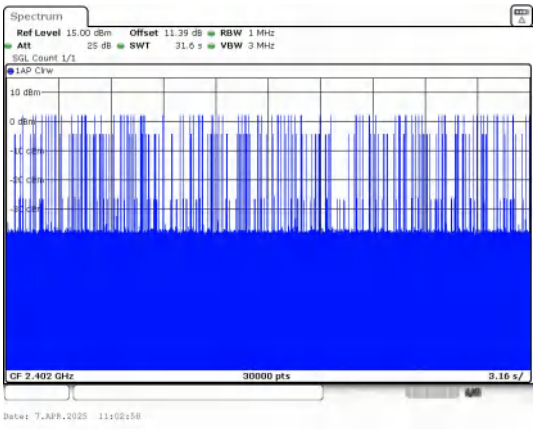
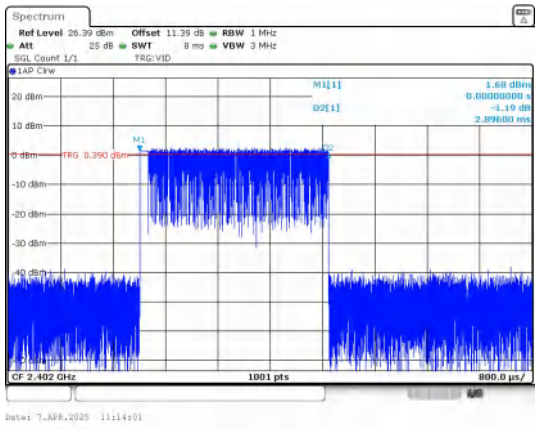
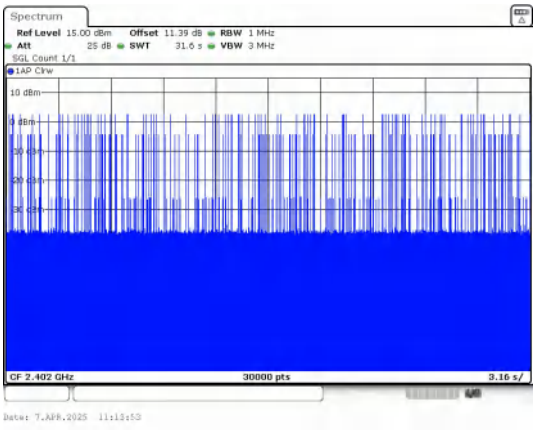
	
Pulse Width 8DPSK_3-DH5	Number of Pulses in 31.6 seconds 8DPSK_3-DH5

Right：

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	101	291.69	< 400	PASS
π/4DQPSK	2-DH5		2.888	102	294.58		PASS
8DPSK	3-DH5		2.896	100	289.6		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**

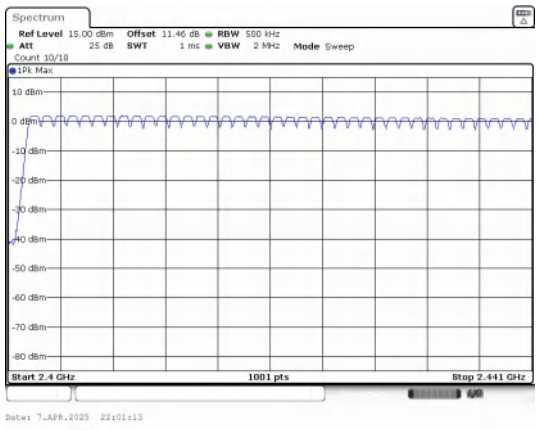
3) Number Of Hopping Channel

Test Result

Left：

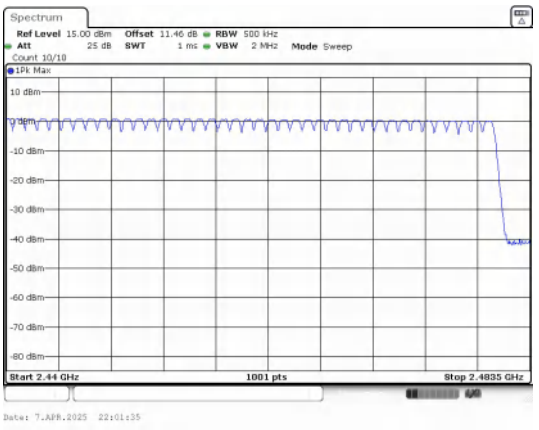
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
π/4DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

Test Graphs



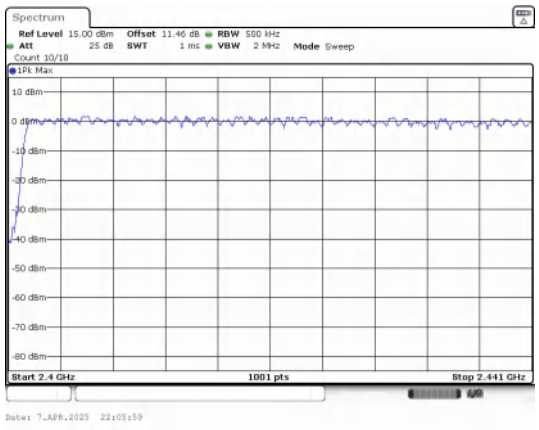
Low End Spectrum Channel Hopping Plot

GFSK



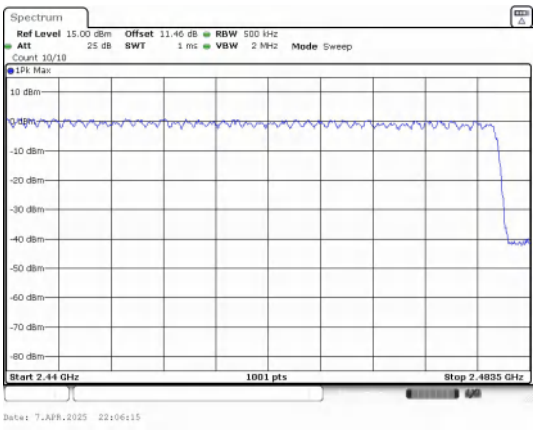
High End Spectrum Channel Hopping Plot

GFSK



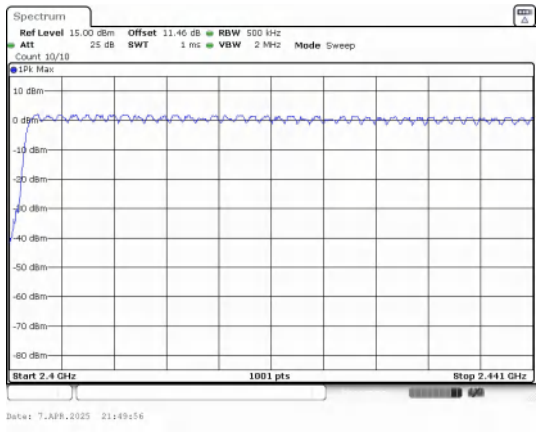
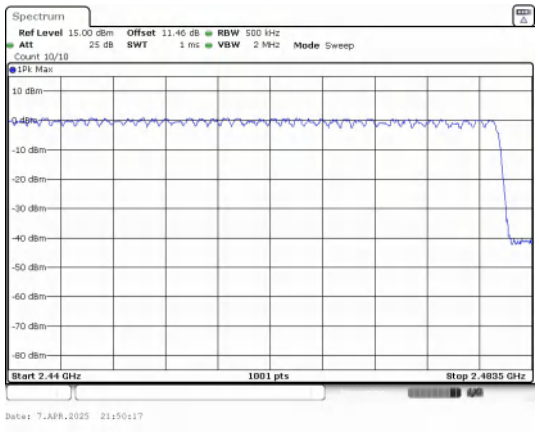
Low End Spectrum Channel Hopping Plot

π/4DQPSK



High End Spectrum Channel Hopping Plot

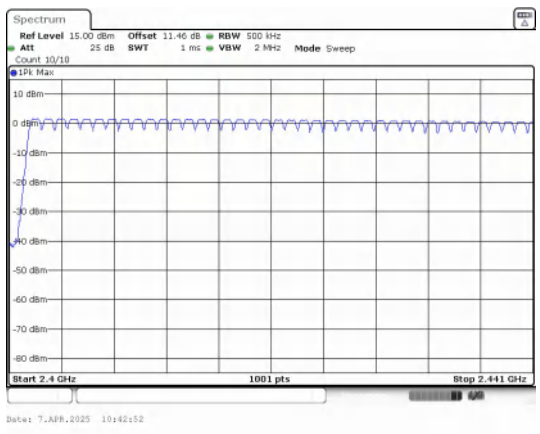
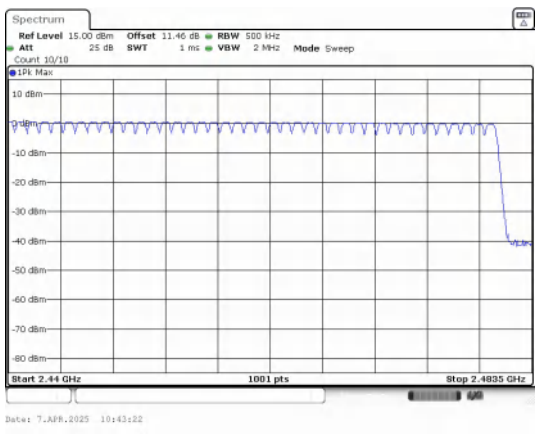
π/4DQPSK

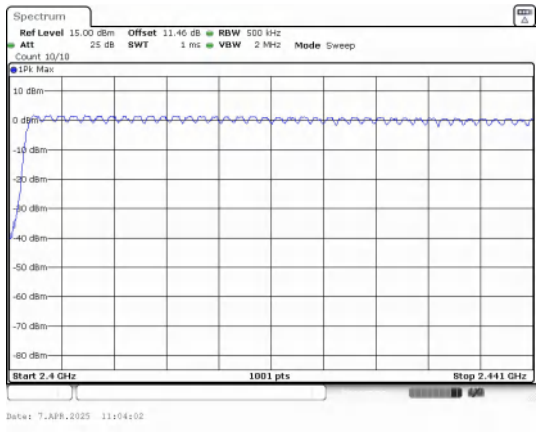
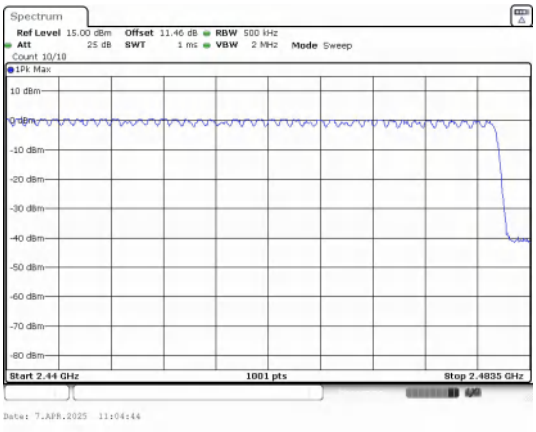
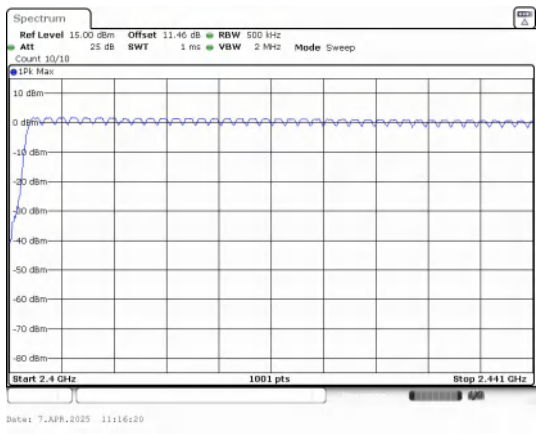
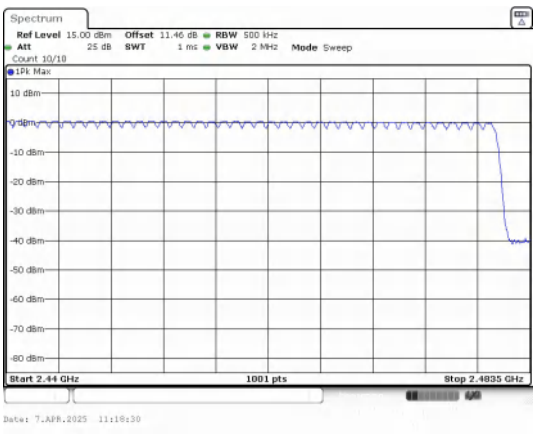
	
Low End Spectrum Channel Hopping Plot 8DPSK	High End Spectrum Channel Hopping Plot 8DPSK

Right：

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**

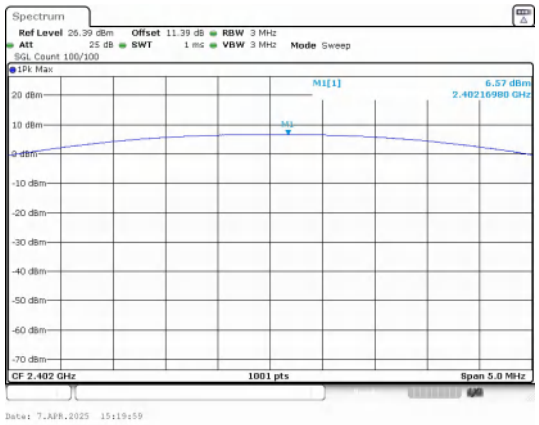
4) Conducted Peak Output Power

Test Result

Left：

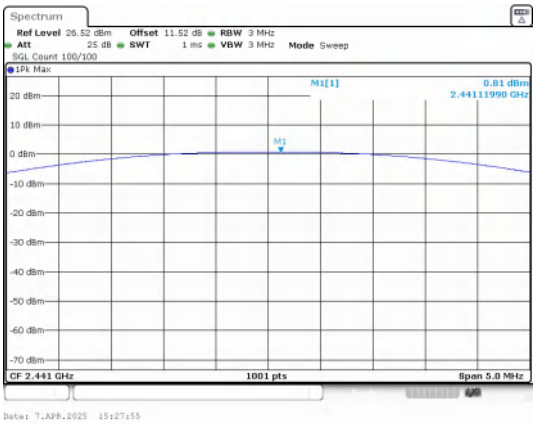
Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	6.57	4.54	≤30	PASS
		39	0.81	1.21		PASS
		78	0.13	1.03		PASS
π/4DQPSK	2-DH5	0	2.59	1.82	≤20.97	PASS
		39	2.17	1.65		PASS
		78	1.21	1.32		PASS
8DPSK	3-DH5	0	3.35	2.16		PASS
		39	2.34	1.71		PASS
		78	1.46	1.40		PASS

Test Graphs



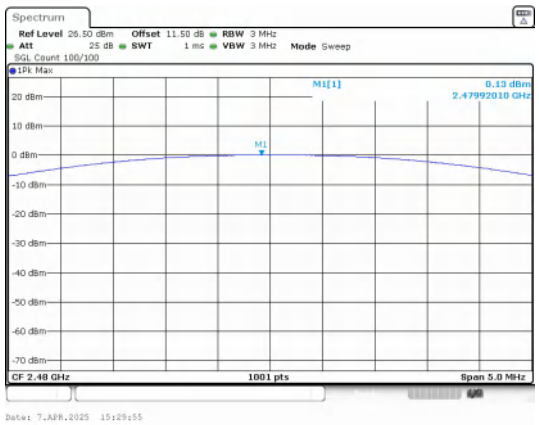
Peak Output Power

GFSK_Channel 0

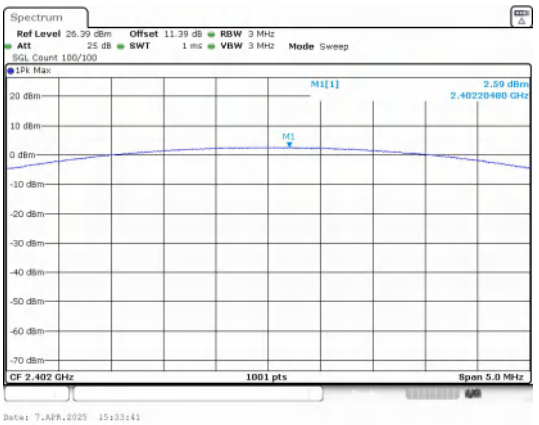


Peak Output Power

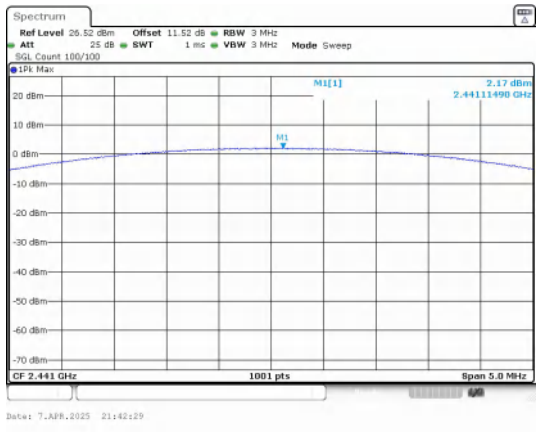
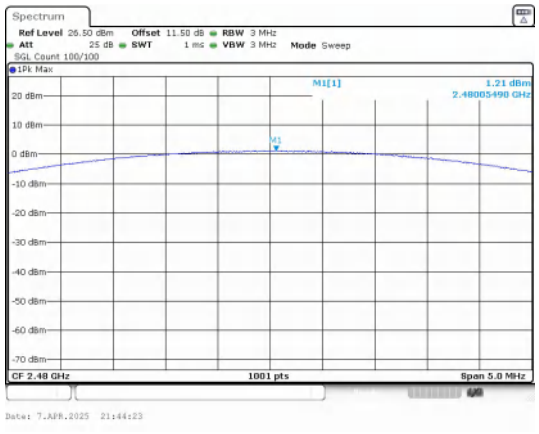
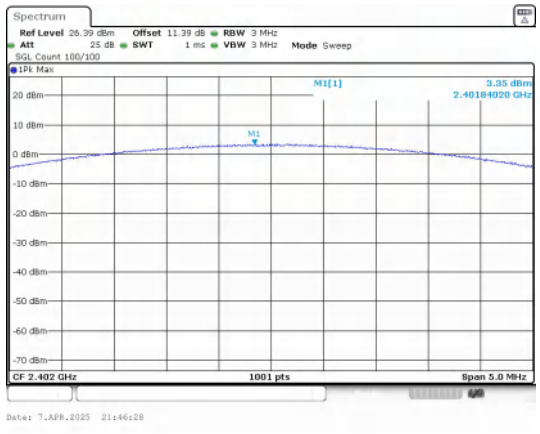
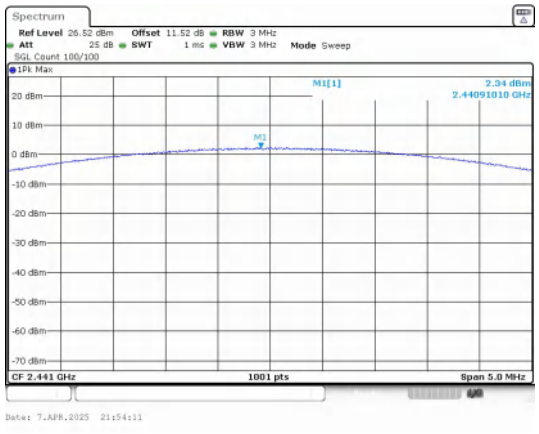
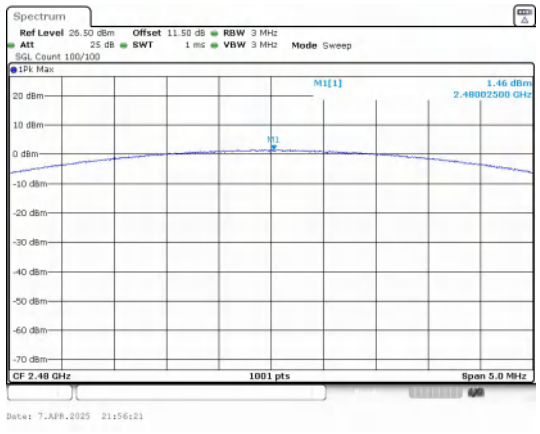
GFSK_Channel 39



Peak Output Power



Peak Output Power

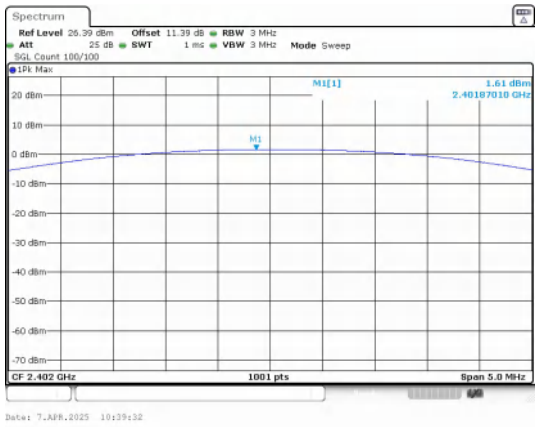
GFSK_Channel 78	π/4DQPSK_Channel 0
	
Peak Output Power	**Peak Output Power**
π/4DQPSK_Channel 39	**π/4DQPSK_Channel 78**
	
Peak Output Power	**Peak Output Power**
8DPSK_Channel 0	**8DPSK_Channel 39**
	
Peak Output Power	
8DPSK_Channel 78	

Right：

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result

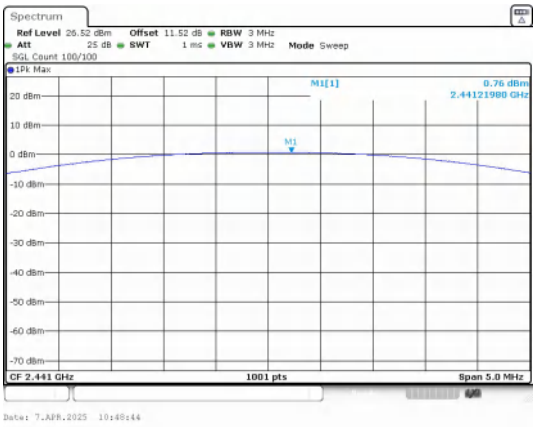
GFSK	DH5	0	1.61	1.45	≤30	PASS
		39	0.76	1.19		PASS
		78	-0.04	0.99		PASS
π/4DQPSK	2-DH5	0	2.45	1.76	≤20.97	PASS
		39	1.65	1.46		PASS
		78	0.84	1.21		PASS
8DPSK	3-DH5	0	2.87	1.94		PASS
		39	2.04	1.60		PASS
		78	1.20	1.32		PASS

Test Graphs



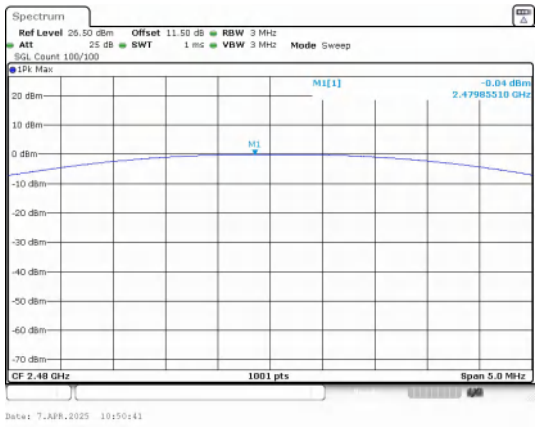
Peak Output Power

GFSK_Channel 0



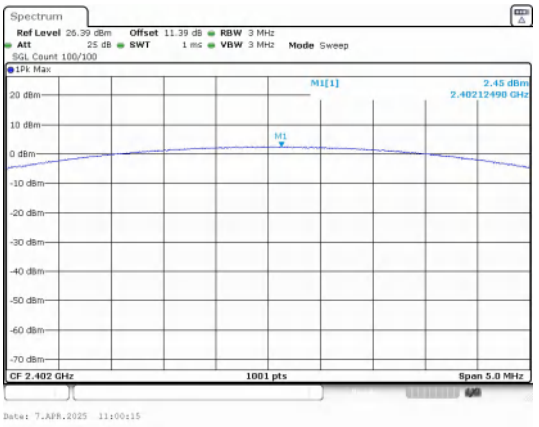
Peak Output Power

GFSK_Channel 39



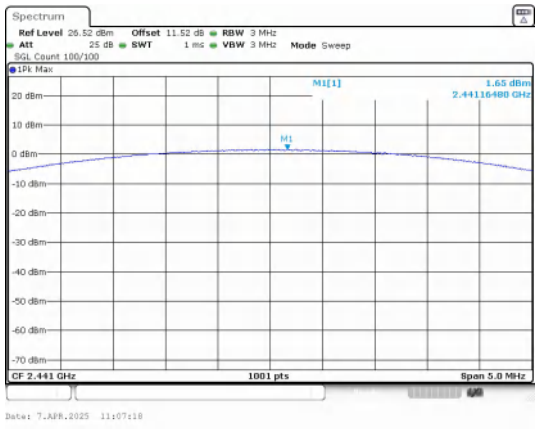
Peak Output Power

GFSK_Channel 78



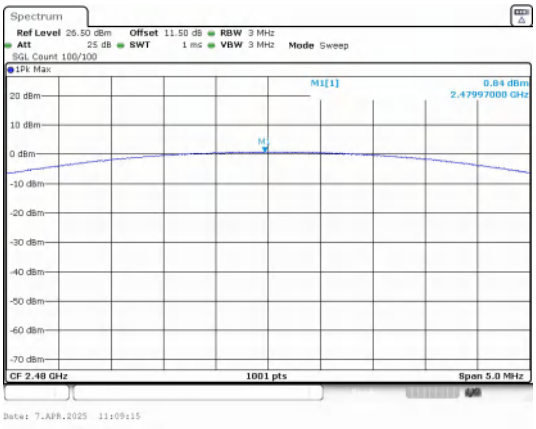
Peak Output Power

π/4DQPSK_Channel 0



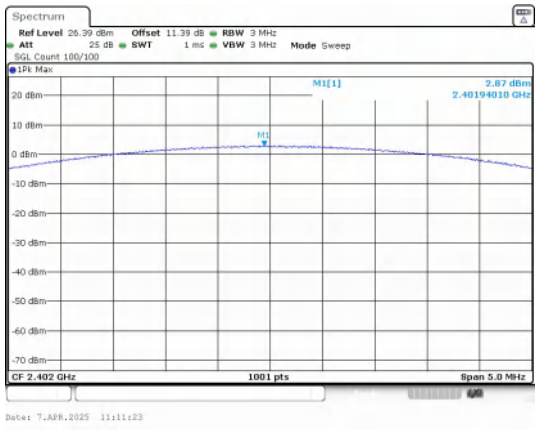
Peak Output Power

π/4DQPSK_Channel 39



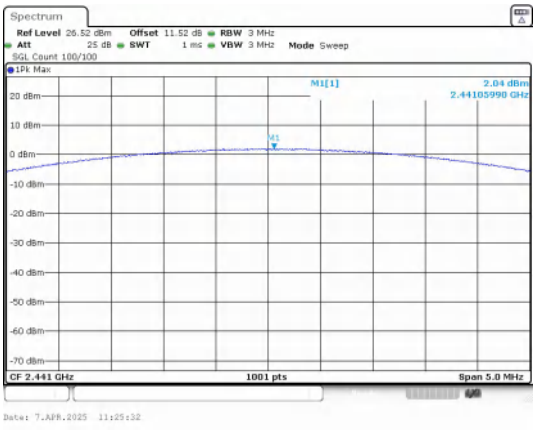
Peak Output Power

π/4DQPSK_Channel 78



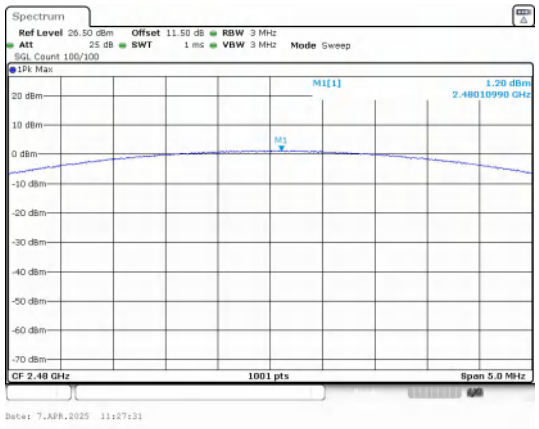
Peak Output Power

8DPSK_Channel 0



Peak Output Power

8DPSK_Channel 39



Peak Output Power

8DPSK_Channel 78

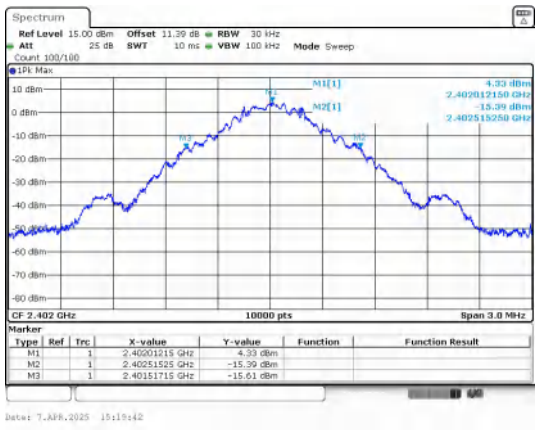
5) 20dB Bandwidth

Test Result

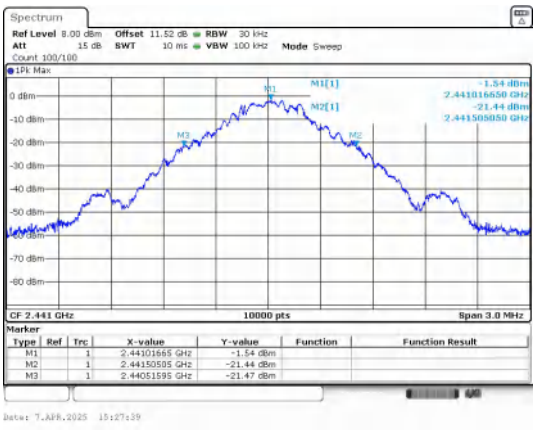
Left：

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.0
	39	2441 MHz	1.0
	78	2480 MHz	1.0
π/4DQPSK	0	2402 MHz	1.280
	39	2441 MHz	1.280
	78	2480 MHz	1.300
8DPSK	0	2402 MHz	1.290
	39	2441 MHz	1.290
	78	2480 MHz	1.290

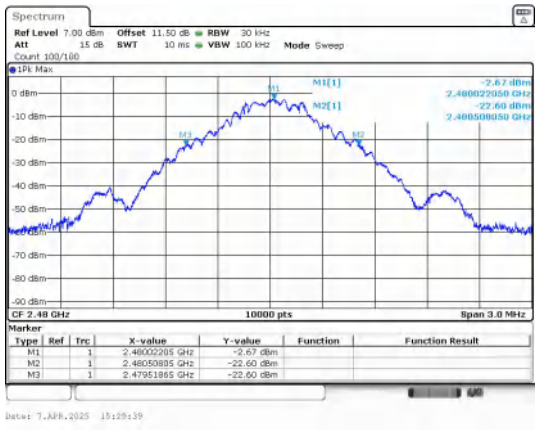
Test Graphs



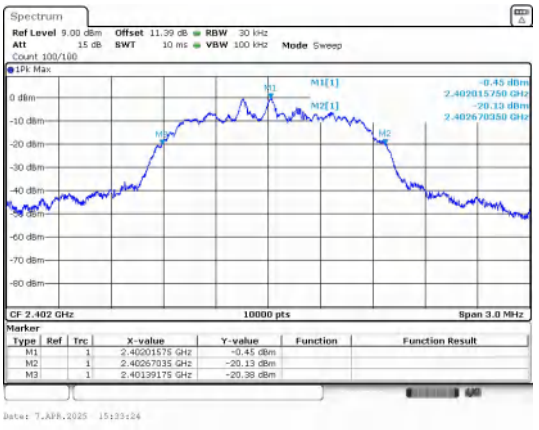
GFSK_DH5_Channel 0



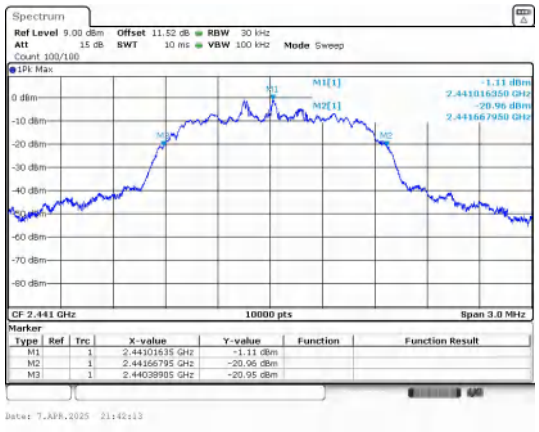
GFSK_DH5_Channel 39



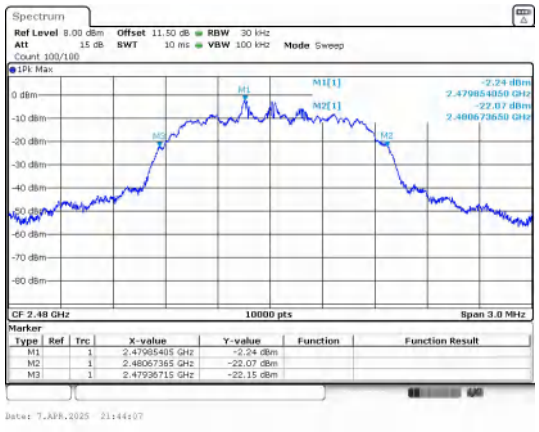
GFSK_DH5_Channel 78



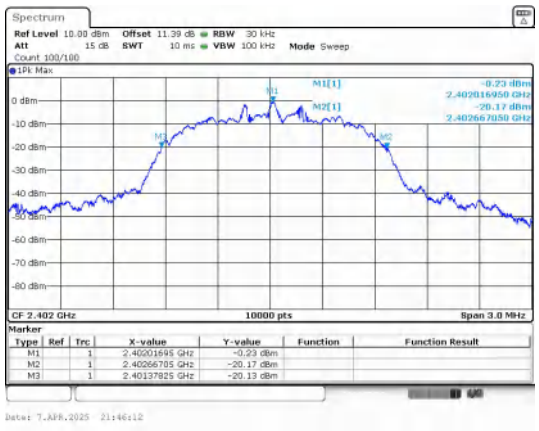
π/4DQPSK_2-DH5_Channel 0



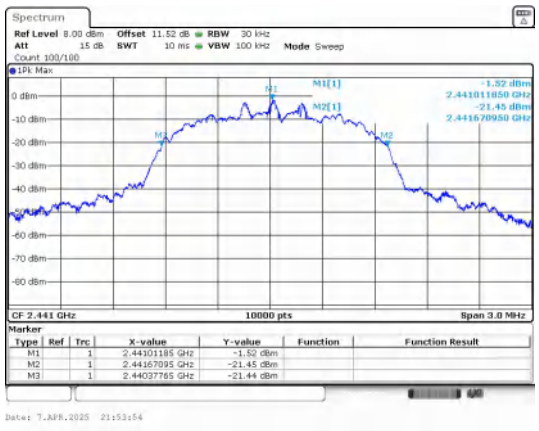
π/4DQPSK_2-DH5_Channel 39



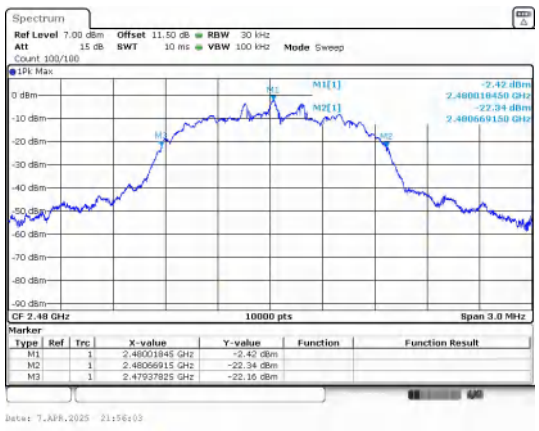
π/4DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



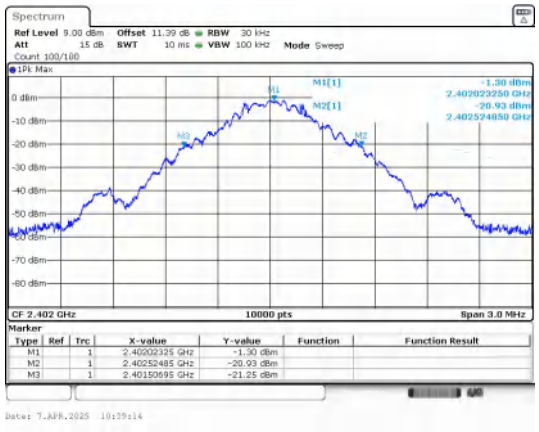
8DPSK_3-DH5_Channel 78

Right：

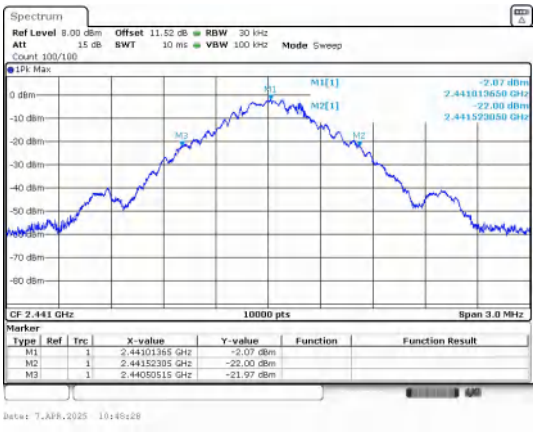
Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.01
	39	2441 MHz	1.01
	78	2480 MHz	1.01
π/4DQPSK	0	2402 MHz	1.280
	39	2441 MHz	1.300
	78	2480 MHz	1.300

8DPSK	0	2402 MHz	1.290
	39	2441 MHz	1.290
	78	2480 MHz	1.290

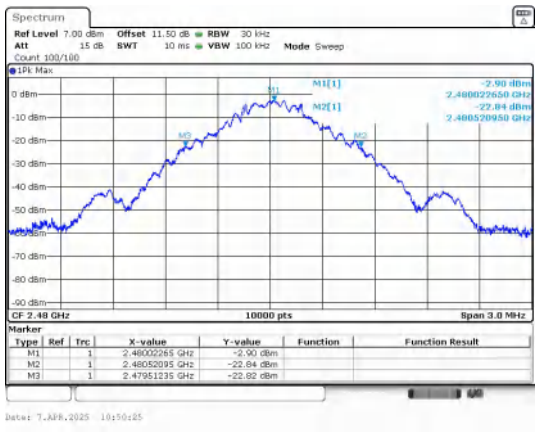
Test Graphs



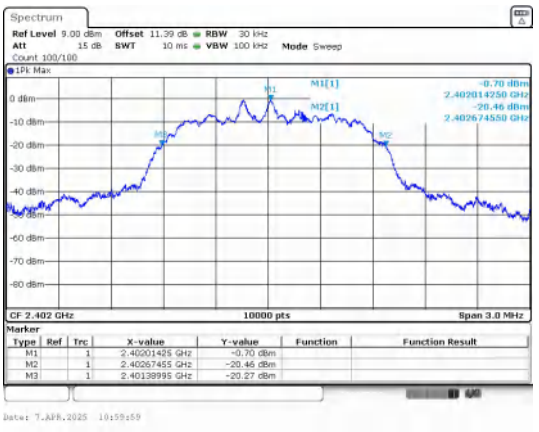
GFSK_DH5_Channel 0



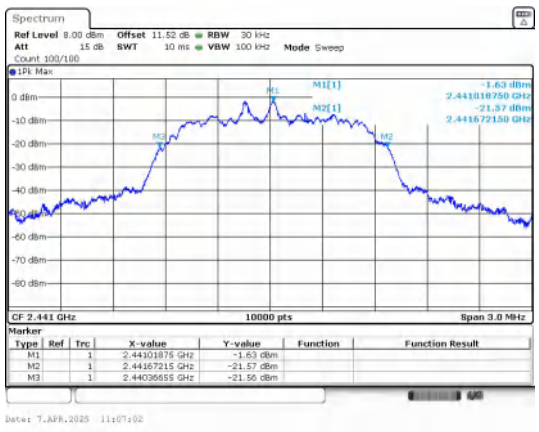
GFSK_DH5_Channel 39



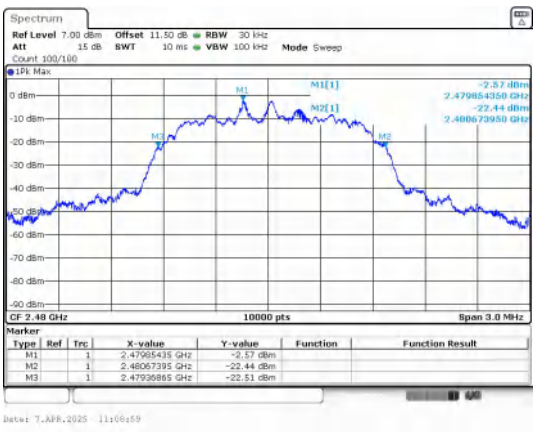
GFSK_DH5_Channel 78



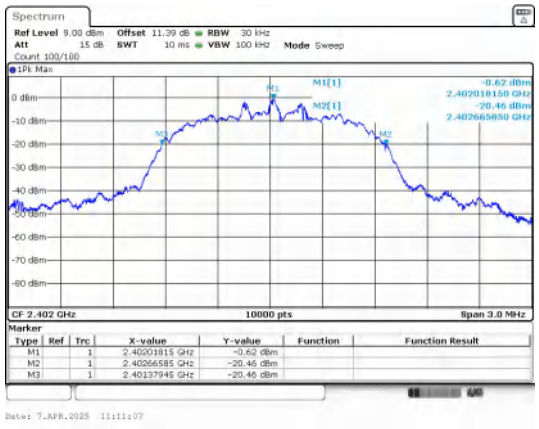
π/4DQPSK_2-DH5_Channel 0



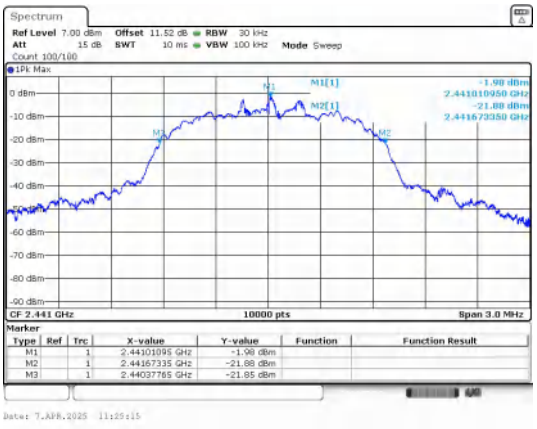
π/4DQPSK_2-DH5_Channel 39



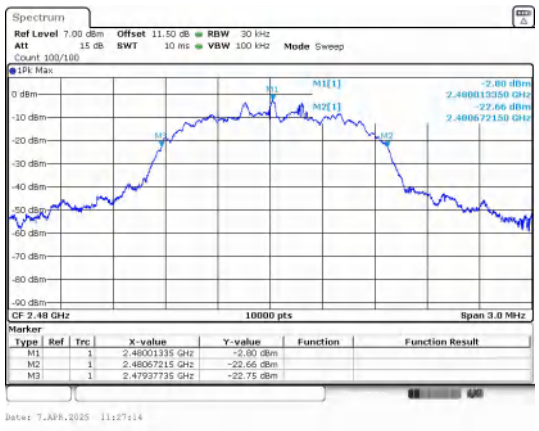
π/4DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



8DPSK_3-DH5_Channel 78

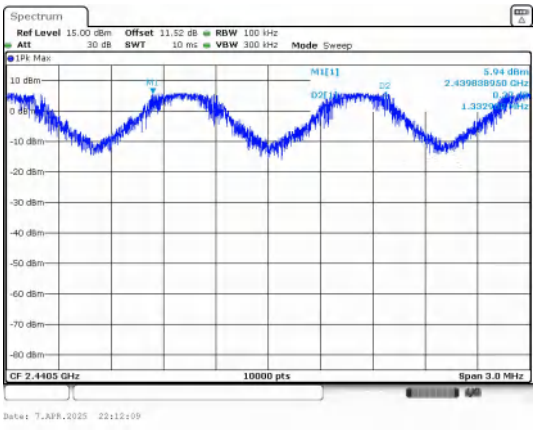
6) Carrier Frequencies Separation

Test Result

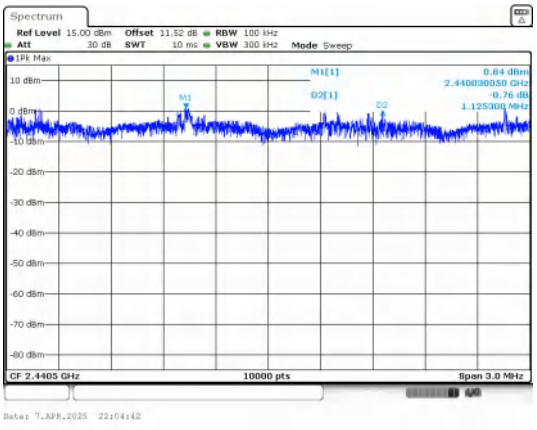
Left:

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2439.8389	2441.1719	1.3329	1.0	PASS
π/4DQPSK	2-DH5	2440.03	2441.1553	1.1253	0.867	PASS
8DPSK	3-DH5	2439.9877	2441.1917	1.2039	0.86	PASS

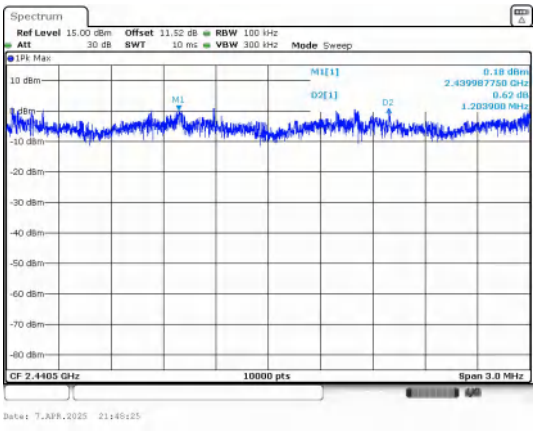
Test Graphs



GFSK



π/4DQPSK

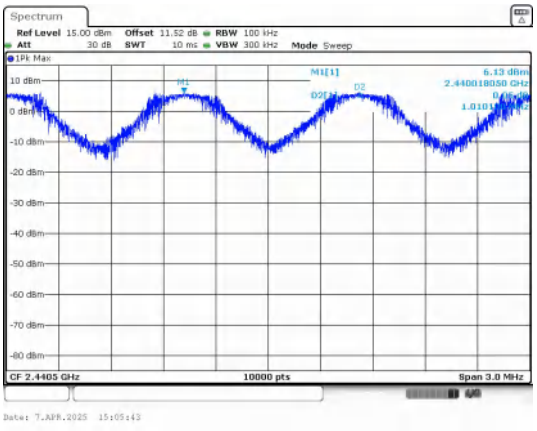


8DPSK

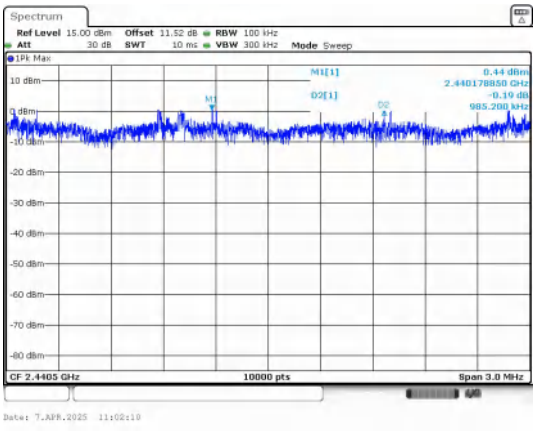
Right:

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2440.0181	2441.0282	1.0101	1.01	PASS
π/4DQPSK	2-DH5	2440.1788	2441.164	0.9852	0.853	PASS
8DPSK	3-DH5	2440.0267	2441.1802	1.1535	0.86	PASS

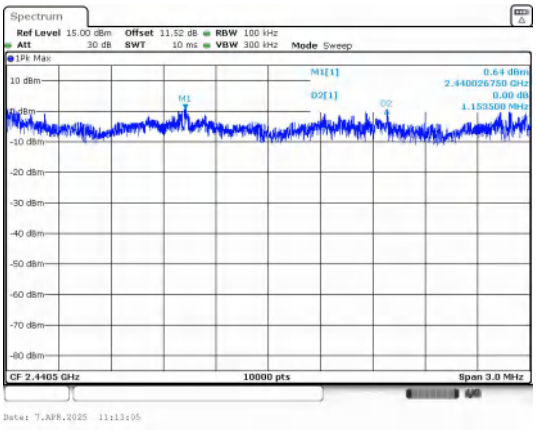
Test Graphs



GFSK



π/4DQPSK



8DPSK

7) Conducted Out Of Band Emission

Test Result

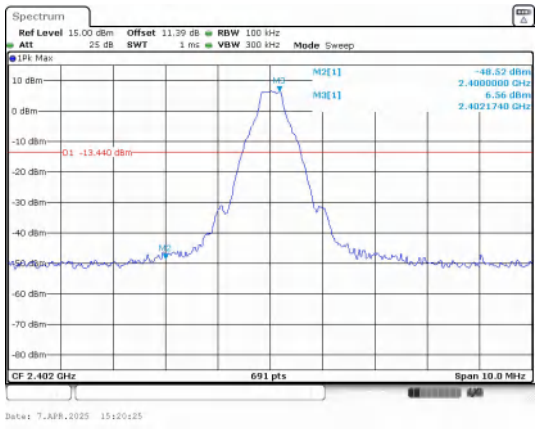
Left：

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-48.520	-13.44	-35.080	PASS
			7205.96	-36.605	-13.44	-23.165	PASS
		39	9763.72	-42.094	-19.24	-22.854	PASS
		78	2483.50	-49.270	-20.06	-29.210	PASS
			9920.20	-39.543	-20.06	-19.483	PASS
π/4DQPSK	2-DH5	0	2398.69	-49.020	-18.28	-30.740	PASS
			2400.00	-50.400	-18.28	-32.120	PASS
			9608.10	-44.309	-18.28	-26.029	PASS
		39	9764.55	-42.084	-18.91	-23.174	PASS
		78	2483.50	-50.390	-19.8	-30.590	PASS
			9920.20	-39.313	-19.8	-19.513	PASS
8DPSK	3-DH5	0	2400.00	-45.860	-18.08	-27.780	PASS
			9608.08	-43.825	-18.08	-25.745	PASS
		39	9763.72	-42.355	-19.15	-23.205	PASS
		78	2483.50	-49.730	-20.03	-29.700	PASS
			9920.20	-38.786	-20.03	-18.756	PASS

Hopping

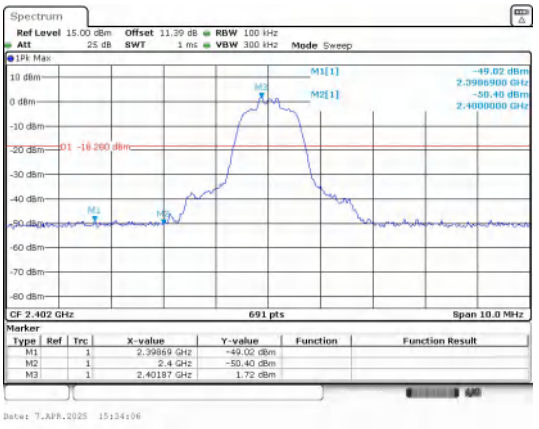
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2398.29	-47.905	-18.06	-29.845	PASS
			2400.00	-49.950	-18.06	-31.890	PASS
			2483.50	-49.950	-20.07	-29.880	PASS
π/4DQPSK	2-DH5		2397.84	-48.555	-18.53	-30.025	PASS
			2400.00	-50.380	-18.53	-31.850	PASS
			2483.50	-49.750	-24.19	-25.560	PASS
8DPSK	3-DH5		2398.38	-48.061	-18.16	-29.901	PASS
			2400.00	-49.620	-18.16	-31.460	PASS
			2483.50	-49.290	-21.66	-27.630	PASS

Test Graphs



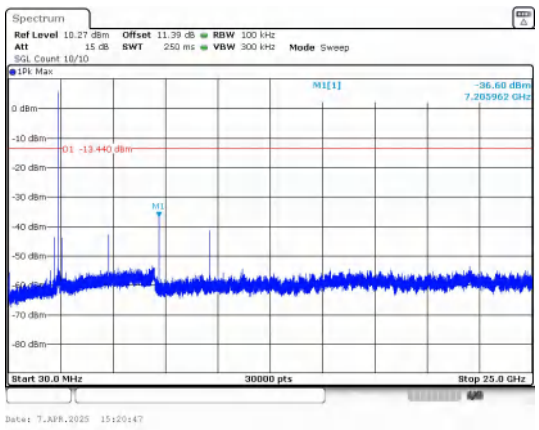
Out Of Band Emission

GFSK_DH5_Channel 0



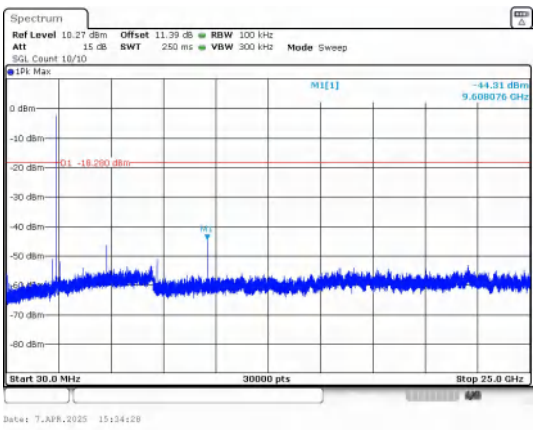
Out Of Band Emission

π/4DQPSK_2-DH5_Channel 0



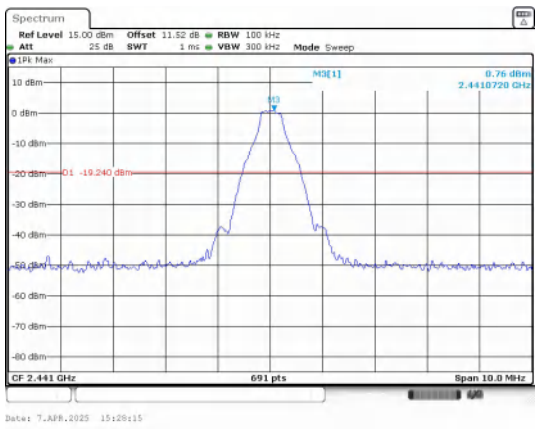
30.0 MHz - 25000.0 MHz

GFSK_DH5_Channel 0



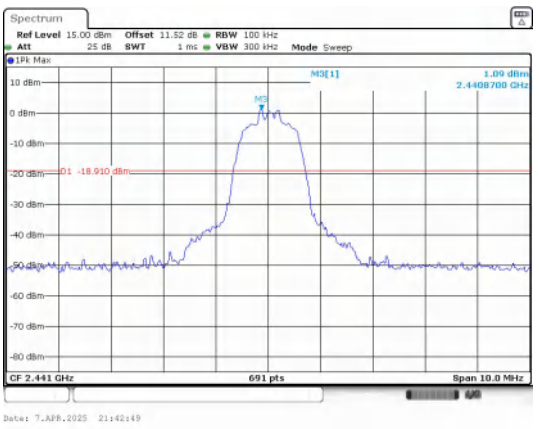
30.0 MHz - 25000.0 MHz

π/4DQPSK_2-DH5_Channel 0



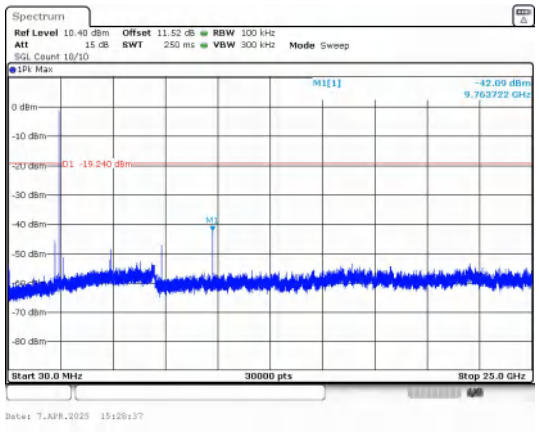
Out Of Band Emission

GFSK_DH5_Channel 39



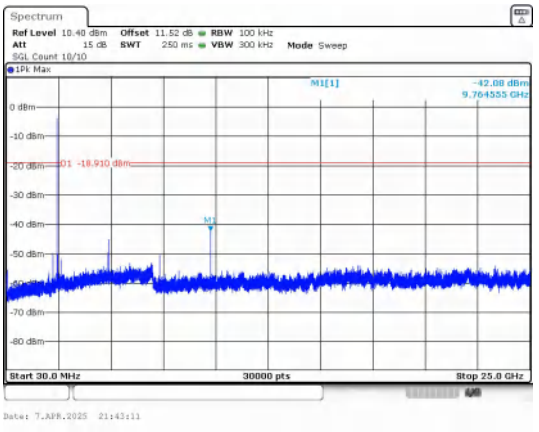
Out Of Band Emission

π/4DQPSK_2-DH5_Channel 39



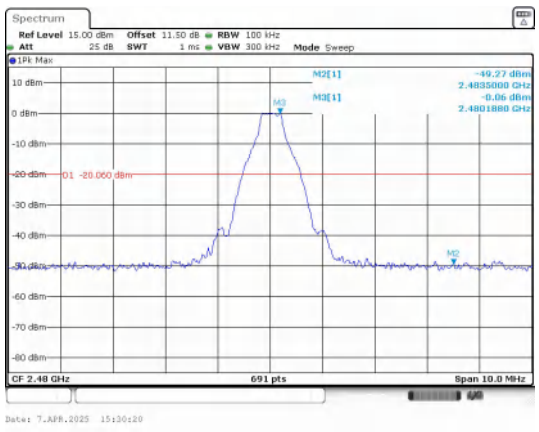
30.0 MHz - 25000.0 MHz

GFSK_DH5_Channel 39



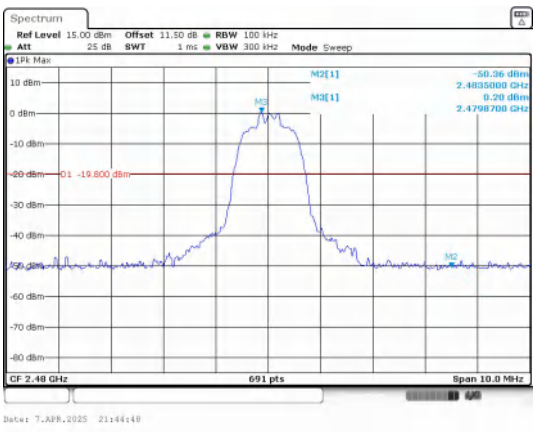
30.0 MHz - 25000.0 MHz

π/4DQPSK_2-DH5_Channel 39



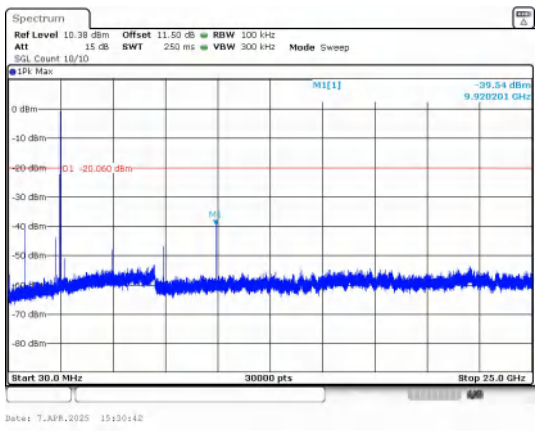
Out Of Band Emission

GFSK_DH5_Channel 78



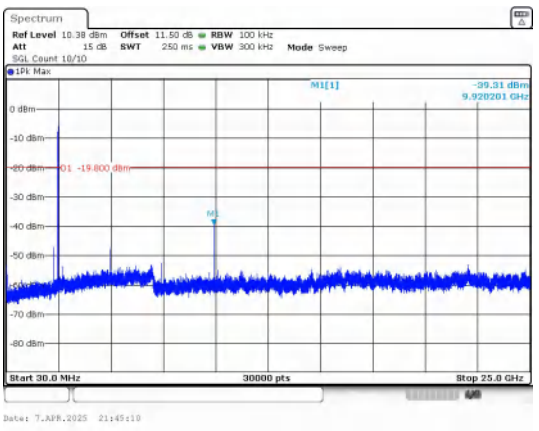
Out Of Band Emission

π/4DQPSK_2-DH5_Channel 78



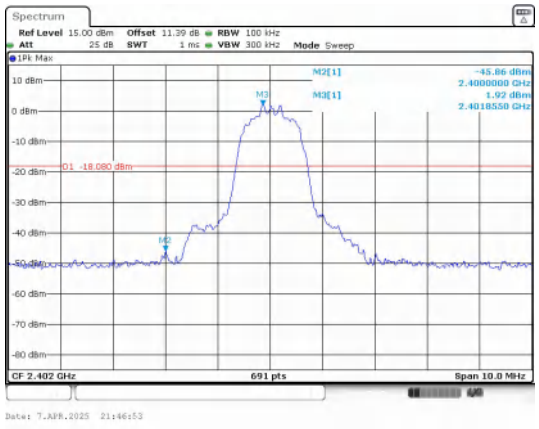
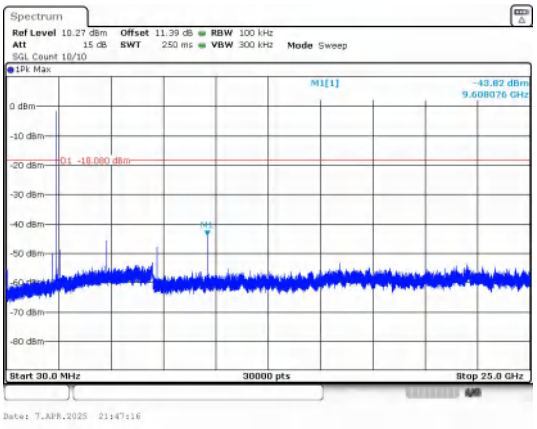
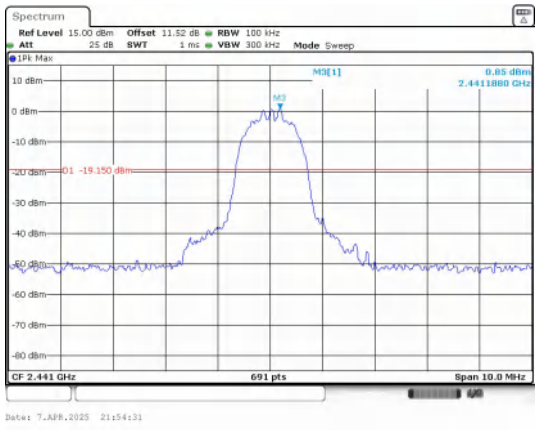
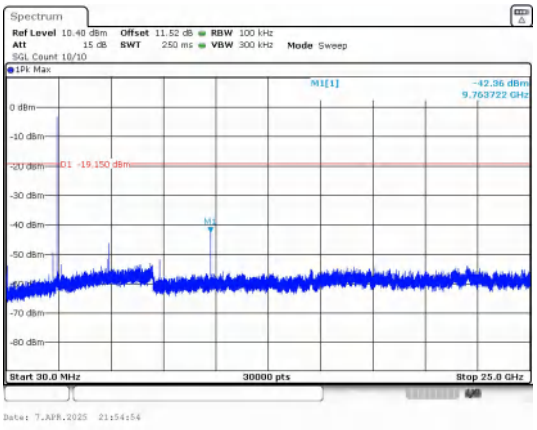
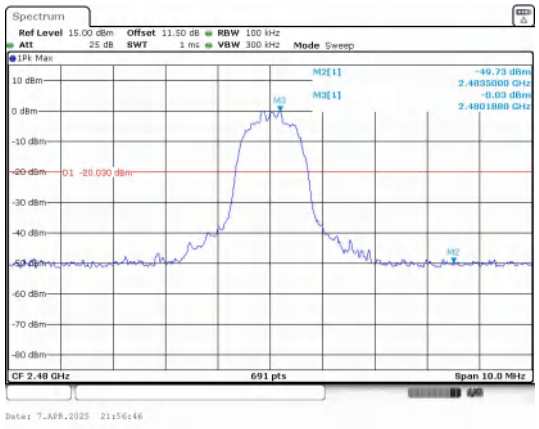
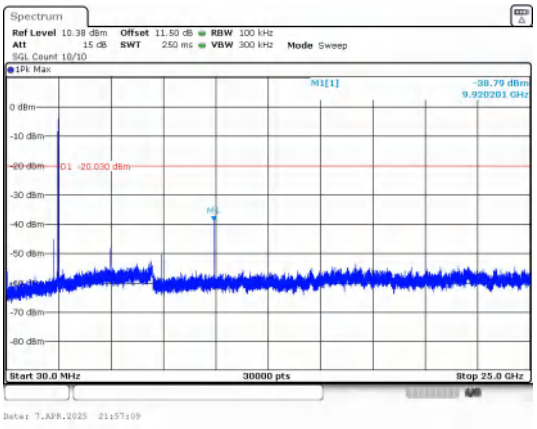
30.0 MHz - 25000.0 MHz

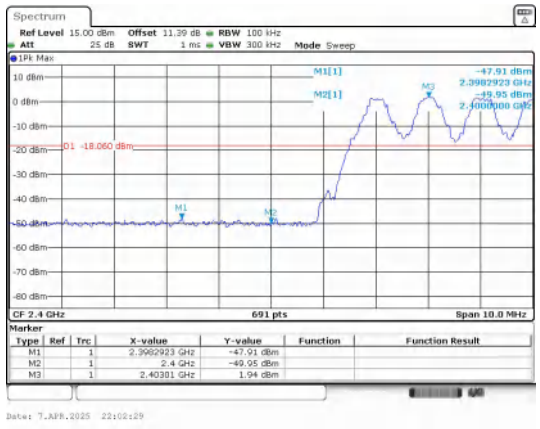
GFSK_DH5_Channel 78



30.0 MHz - 25000.0 MHz

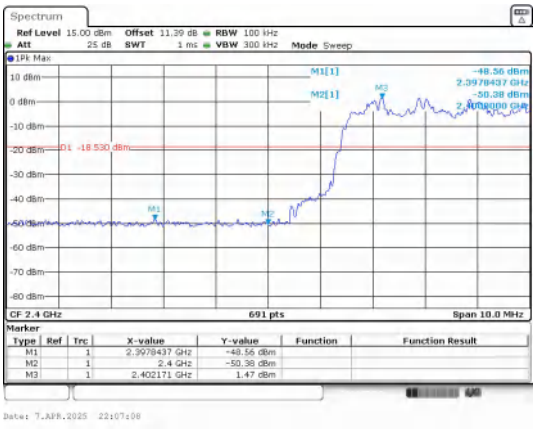
π/4DQPSK_2-DH5_Channel 78

	
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**



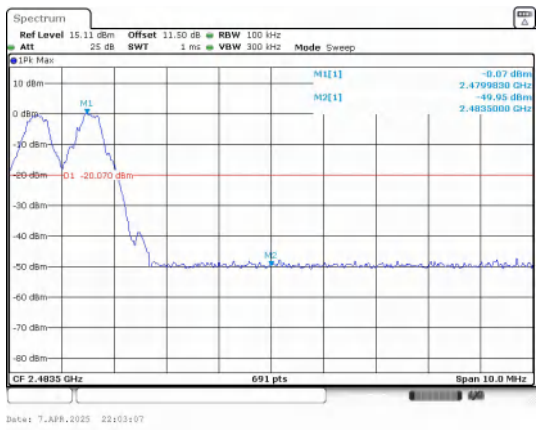
Out Of Band Emission(Left)

GFSK_DH5_Channel Hopping



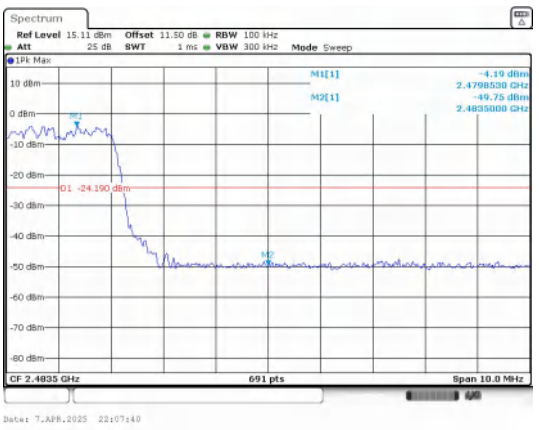
Out Of Band Emission(Left)

π/4DQPSK_2-DH5_Channel Hopping



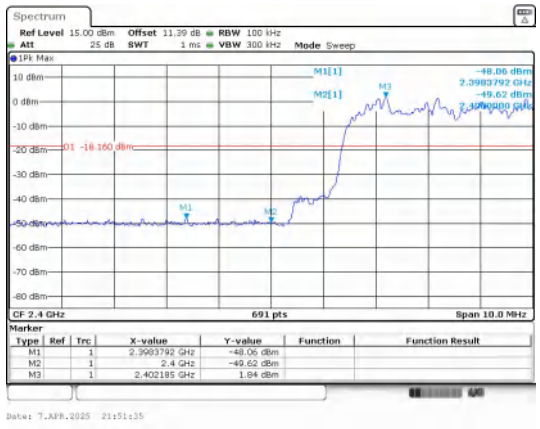
Out Of Band Emission(Right)

GFSK_DH5_Channel Hopping



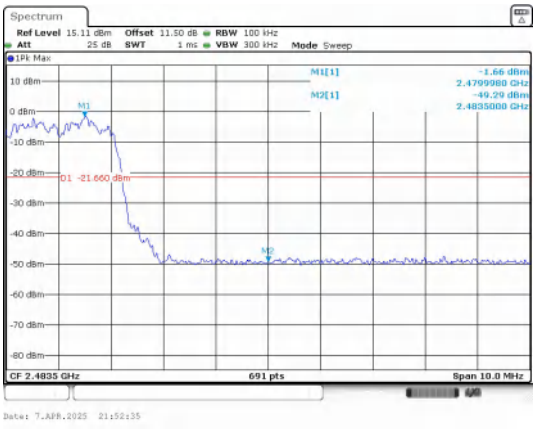
Out Of Band Emission(Right)

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

Right:

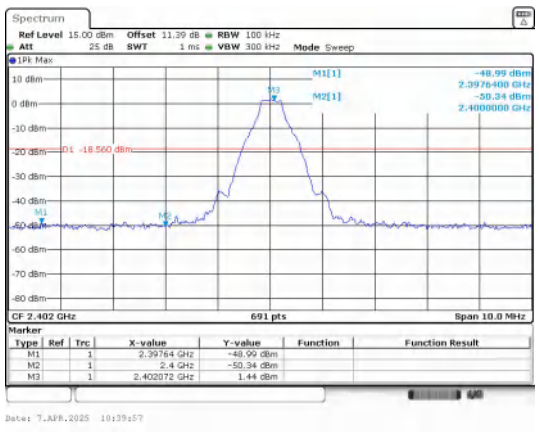
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result

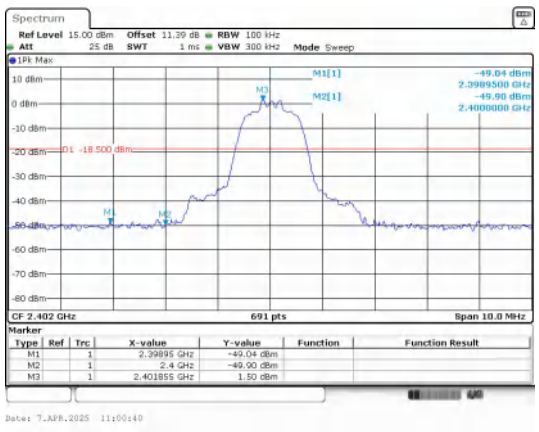
GFSK	DH5	0	2397.64	-48.995	-18.56	-30.435	PASS
			2400.00	-50.340	-18.56	-31.780	PASS
			9608.10	-44.389	-18.56	-25.829	PASS
		39	9763.72	-42.293	-19.37	-22.923	PASS
		78	2483.50	-50.710	-20.29	-30.420	PASS
			9920.20	-39.948	-20.29	-19.658	PASS
π/4DQPSK	2-DH5	0	2398.95	-49.039	-18.5	-30.539	PASS
			2400.00	-49.900	-18.5	-31.400	PASS
			9608.10	-44.157	-18.5	-25.657	PASS
		39	9763.72	-42.468	-19.41	-23.058	PASS
		78	2483.50	-49.820	-20.21	-29.610	PASS
			9920.20	-39.776	-20.21	-19.566	PASS
8DPSK	3-DH5	0	2400.00	-47.820	-18.41	-29.410	PASS
			9608.08	-44.173	-18.41	-25.763	PASS
		39	9763.72	-42.091	-19.32	-22.771	PASS
		78	2483.50	-49.870	-20.56	-29.310	PASS
			9920.20	-39.102	-20.56	-18.542	PASS

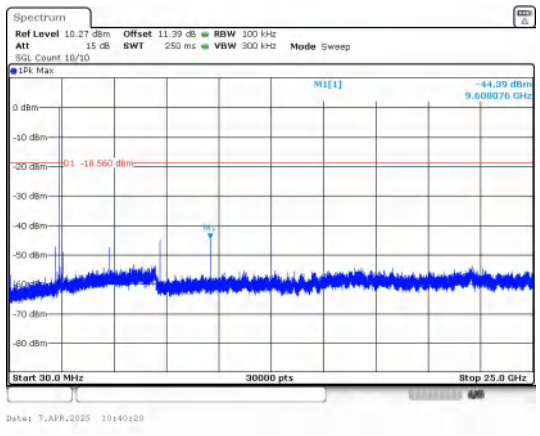
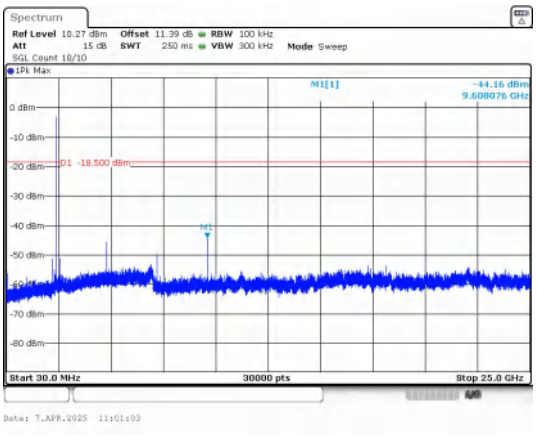
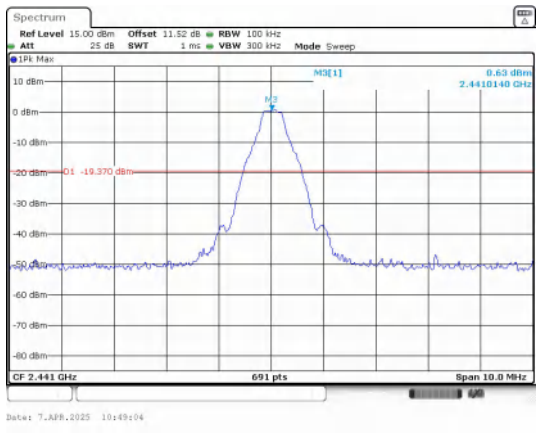
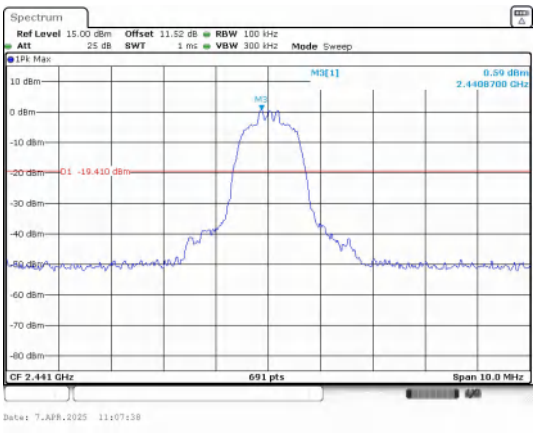
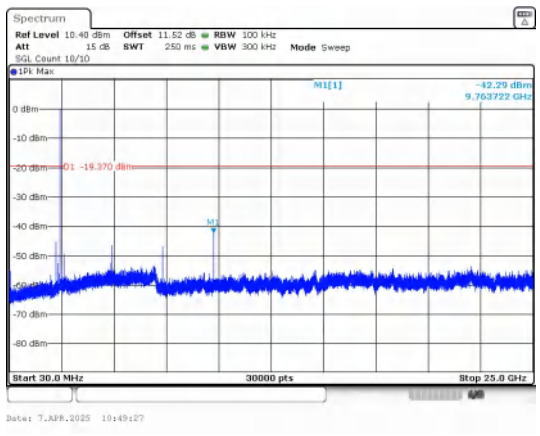
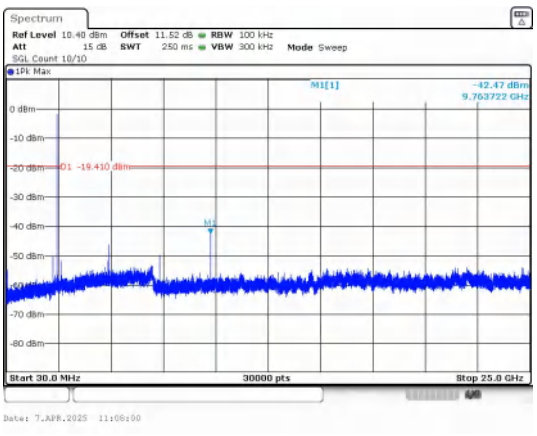
Hopping

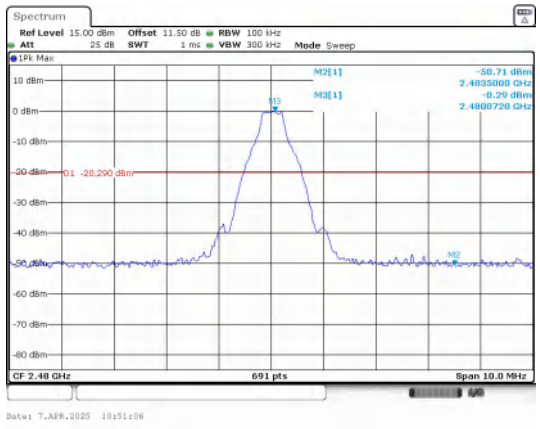
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2397.21	-48.136	-18.51	-29.626	PASS
			2400.00	-49.420	-18.51	-30.910	PASS
			2483.50	-49.740	-20.47	-29.270	PASS
π/4DQPSK	2-DH5		2398.76	-48.332	-19.18	-29.152	PASS
			2400.00	-50.910	-19.18	-31.730	PASS
			2483.50	-50.200	-23.38	-26.820	PASS
8DPSK	3-DH5		2396.45	-48.169	-19.01	-29.159	PASS
			2400.00	-50.030	-19.01	-31.020	PASS
			2483.50	-49.160	-20.17	-28.990	PASS

Test Graphs



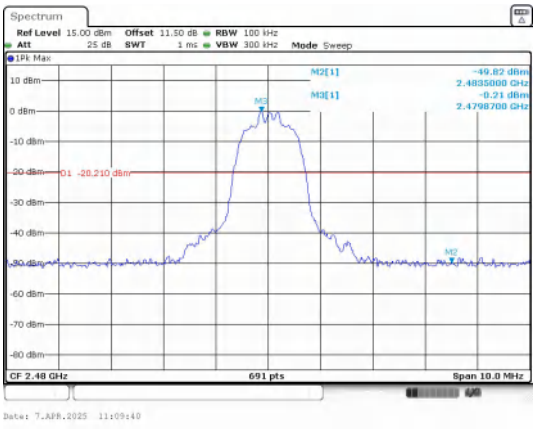


Out Of Band Emission GFSK_DH5_Channel 0	Out Of Band Emission π/4DQPSK_2-DH5_Channel 0
	
30.0 MHz - 25000.0 MHz GFSK_DH5_Channel 0	30.0 MHz - 25000.0 MHz π/4DQPSK_2-DH5_Channel 0
	
Out Of Band Emission GFSK_DH5_Channel 39	Out Of Band Emission π/4DQPSK_2-DH5_Channel 39
	
30.0 MHz - 25000.0 MHz GFSK_DH5_Channel 39	30.0 MHz - 25000.0 MHz π/4DQPSK_2-DH5_Channel 39



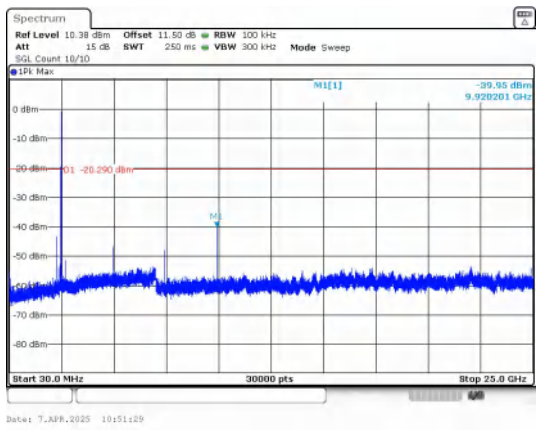
Out Of Band Emission

GFSK_DH5_Channel 78



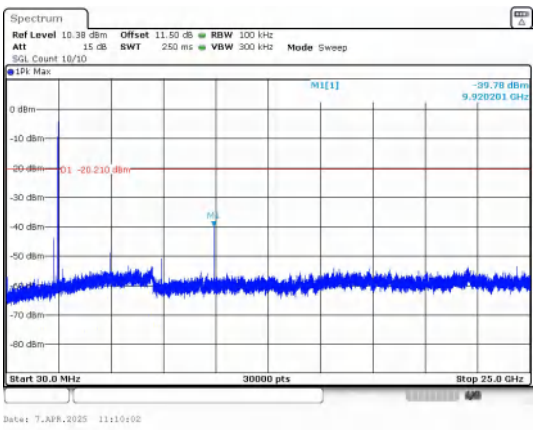
Out Of Band Emission

π/4DQPSK_2-DH5_Channel 78



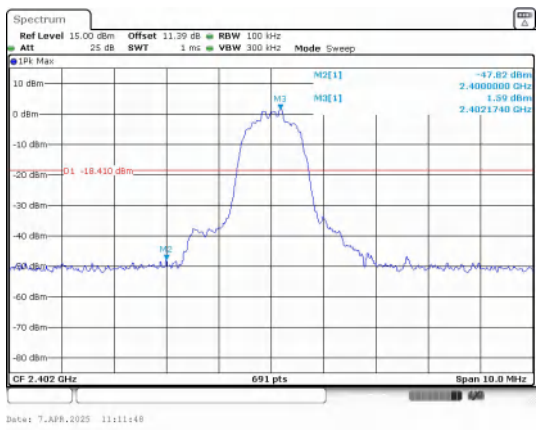
30.0 MHz - 25000.0 MHz

GFSK_DH5_Channel 78



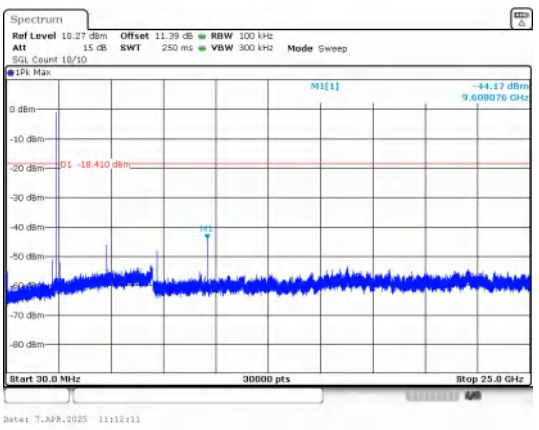
30.0 MHz - 25000.0 MHz

π/4DQPSK_2-DH5_Channel 78



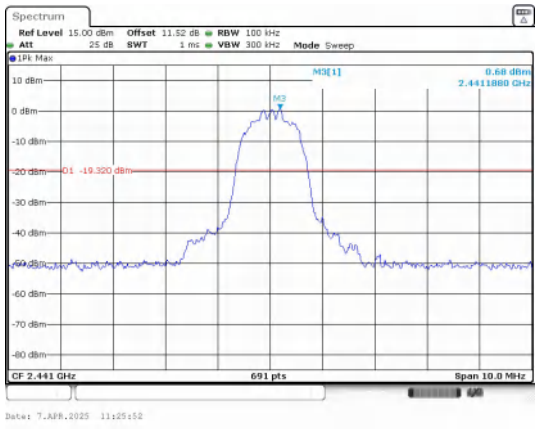
Out Of Band Emission

8DPSK_3-DH5_Channel 0



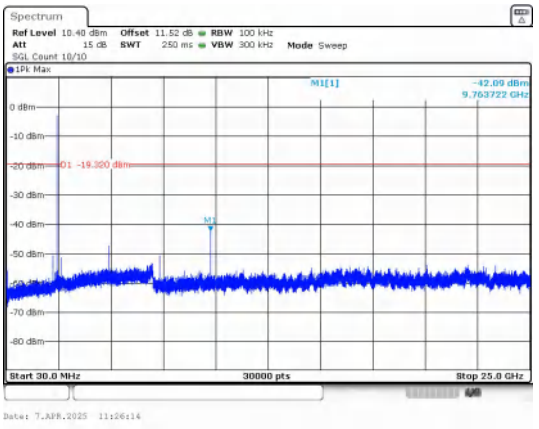
30.0 MHz - 25000.0 MHz

8DPSK_3-DH5_Channel 0



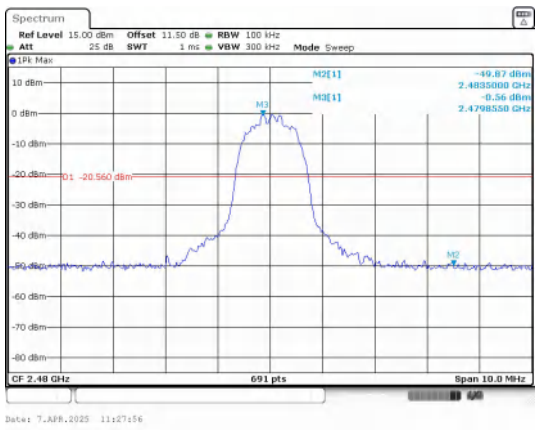
Out Of Band Emission

8DPSK_3-DH5_Channel 39



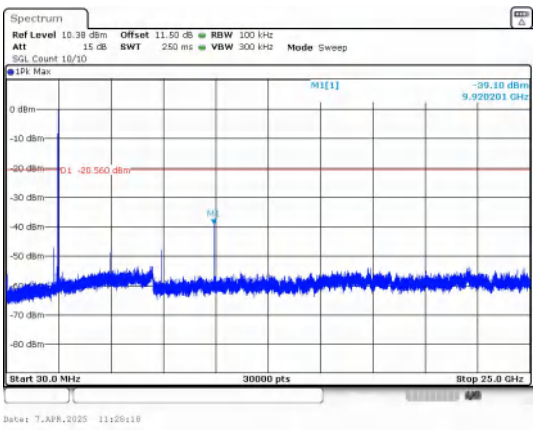
30.0 MHz - 25000.0 MHz

8DPSK_3-DH5_Channel 39



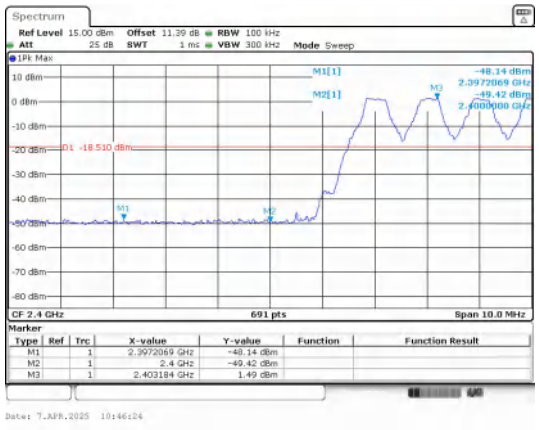
Out Of Band Emission

8DPSK_3-DH5_Channel 78



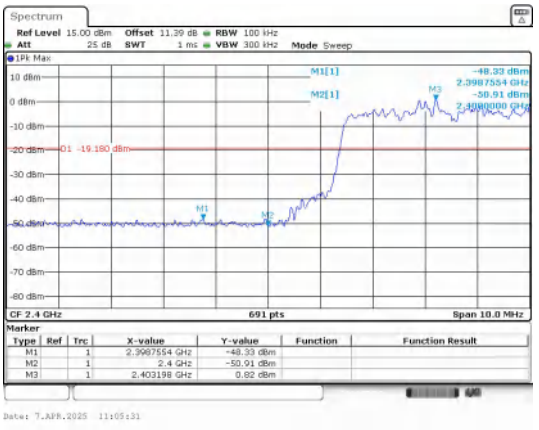
30.0 MHz - 25000.0 MHz

8DPSK_3-DH5_Channel 78



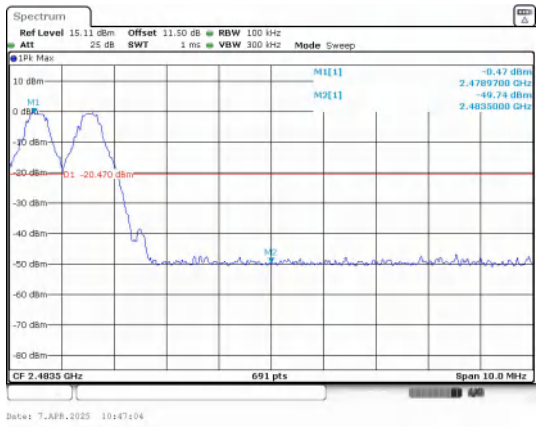
Out Of Band Emission(Left)

GFSK_DH5_Channel Hopping



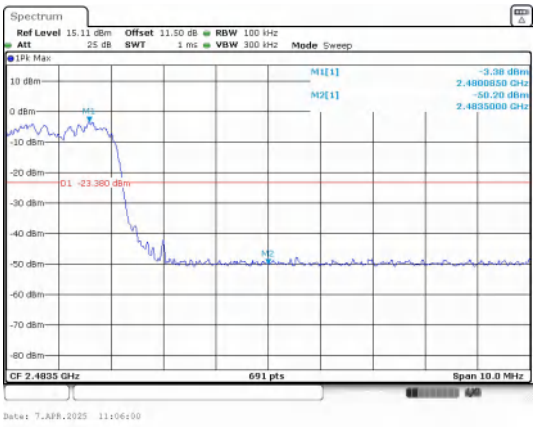
Out Of Band Emission(Left)

π/4DQPSK_2-DH5_Channel Hopping



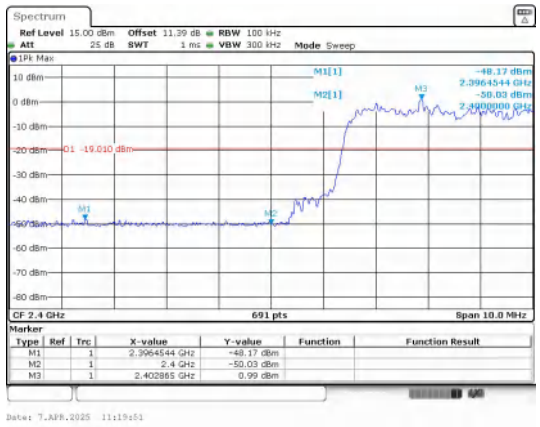
Out Of Band Emission(Right)

GFSK_DH5_Channel Hopping



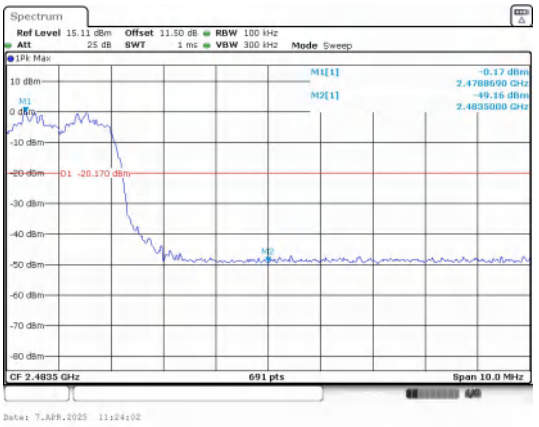
Out Of Band Emission(Right)

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

------End of the report-----