

Appendix Report

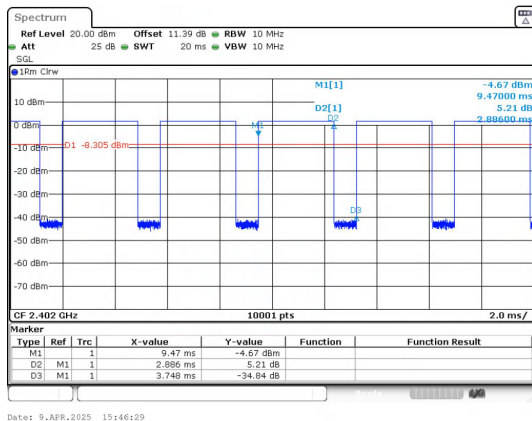
Project No.:	CISR250408080
Test Engineer:	James Wang
Supervised by:	Rory Huang

1) Duty Cycle

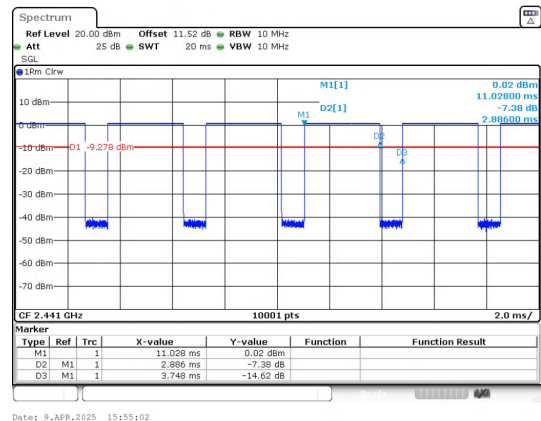
Test Result

Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.886	3.748	77.00	0.7700	1.1351	0.3465
		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
$\pi/4$ DQPSK	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

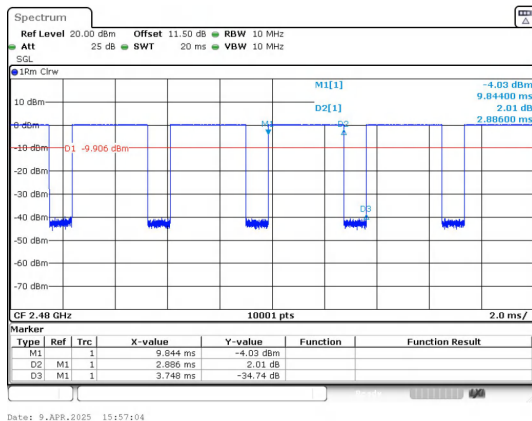
Test Graphs



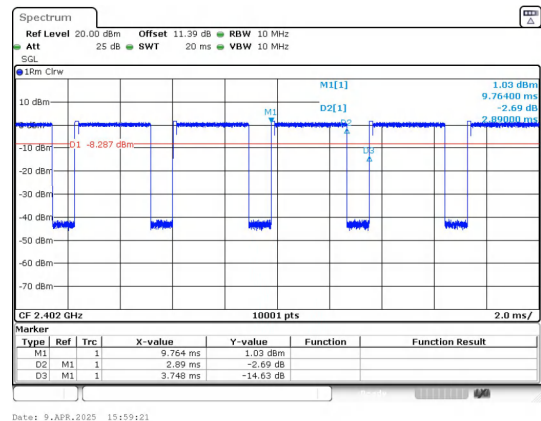
GFSK(DH5)_Channel 0

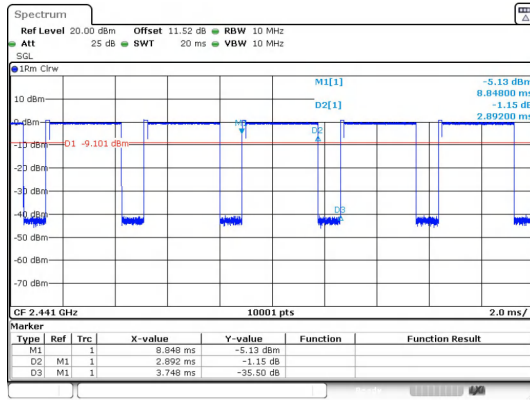


GFSK(DH5)_Channel 39

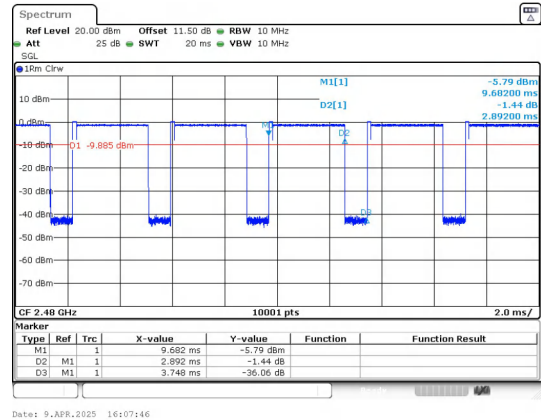


GFSK(DH5)_Channel 78

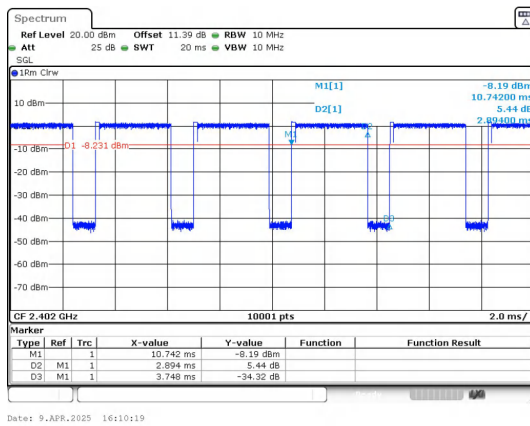

 $\pi/4$ DQPSK(2-DH5)_Channel 0



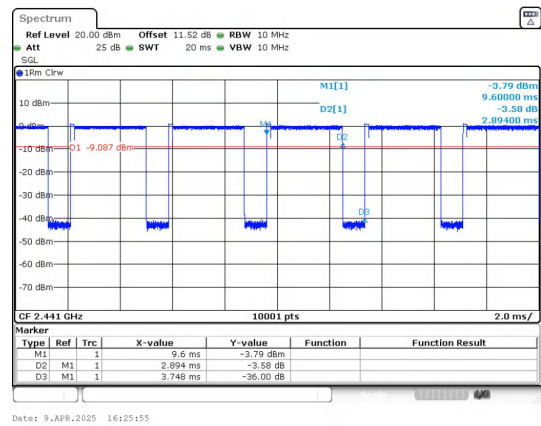
$\pi/4$ DQPSK(2-DH5)_Channel 39



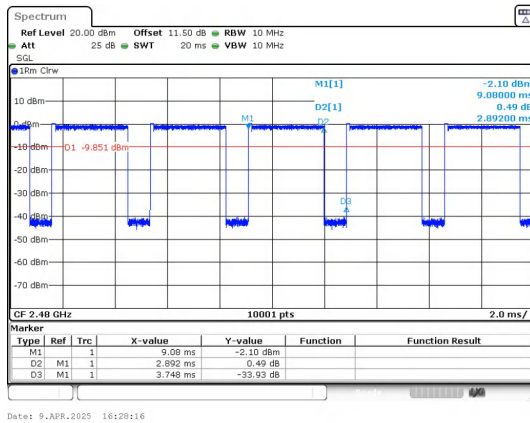
$\pi/4$ DQPSK(2-DH5)_Channel 78



8DPSK(3-DH5)_Channel 0



8DPSK(3-DH5)_Channel 39



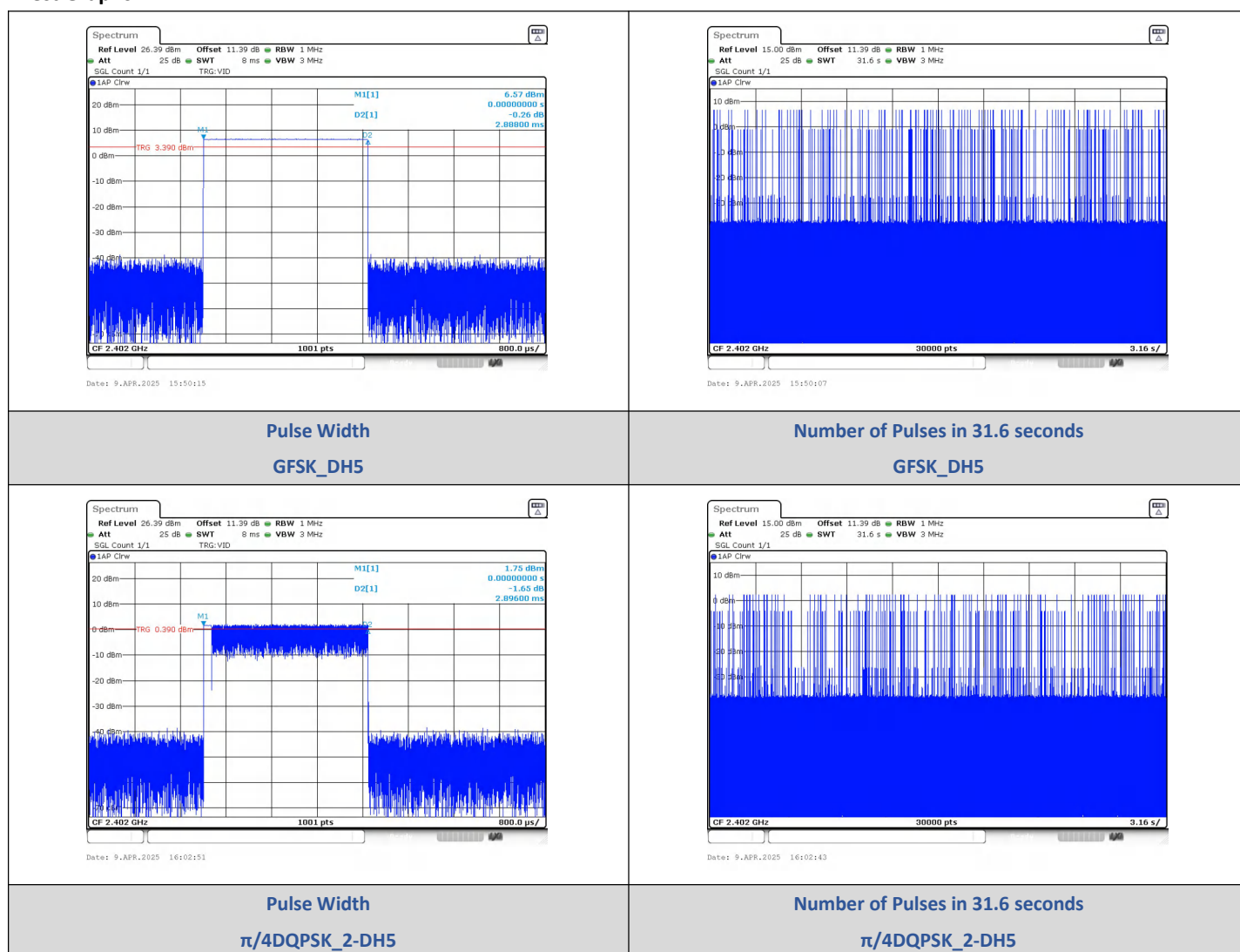
8DPSK(3-DH5)_Channel 78

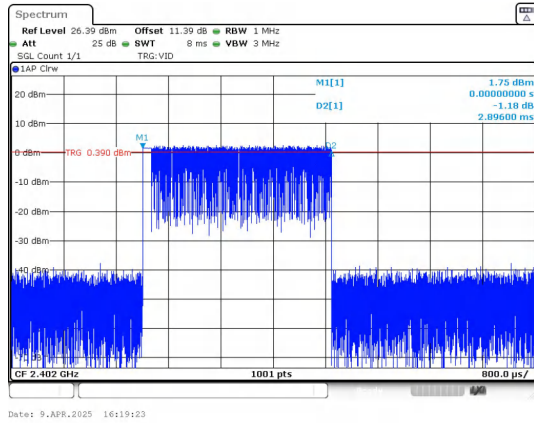
2) Dwell Time

Test Result

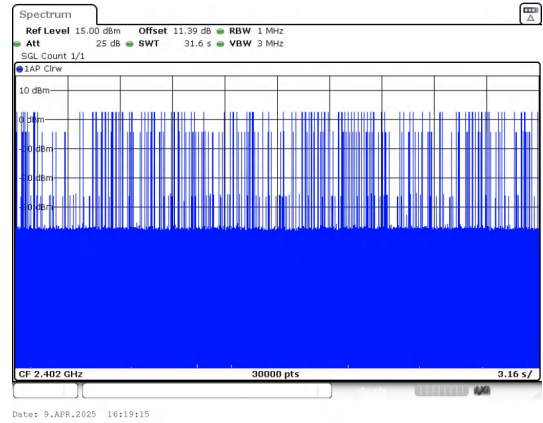
Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.888	103	297.46	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.896	104	301.18		PASS
8DPSK	3-DH5		2.896	126	364.9		PASS

Test Graphs





Pulse Width
8DPSK_3-DH5



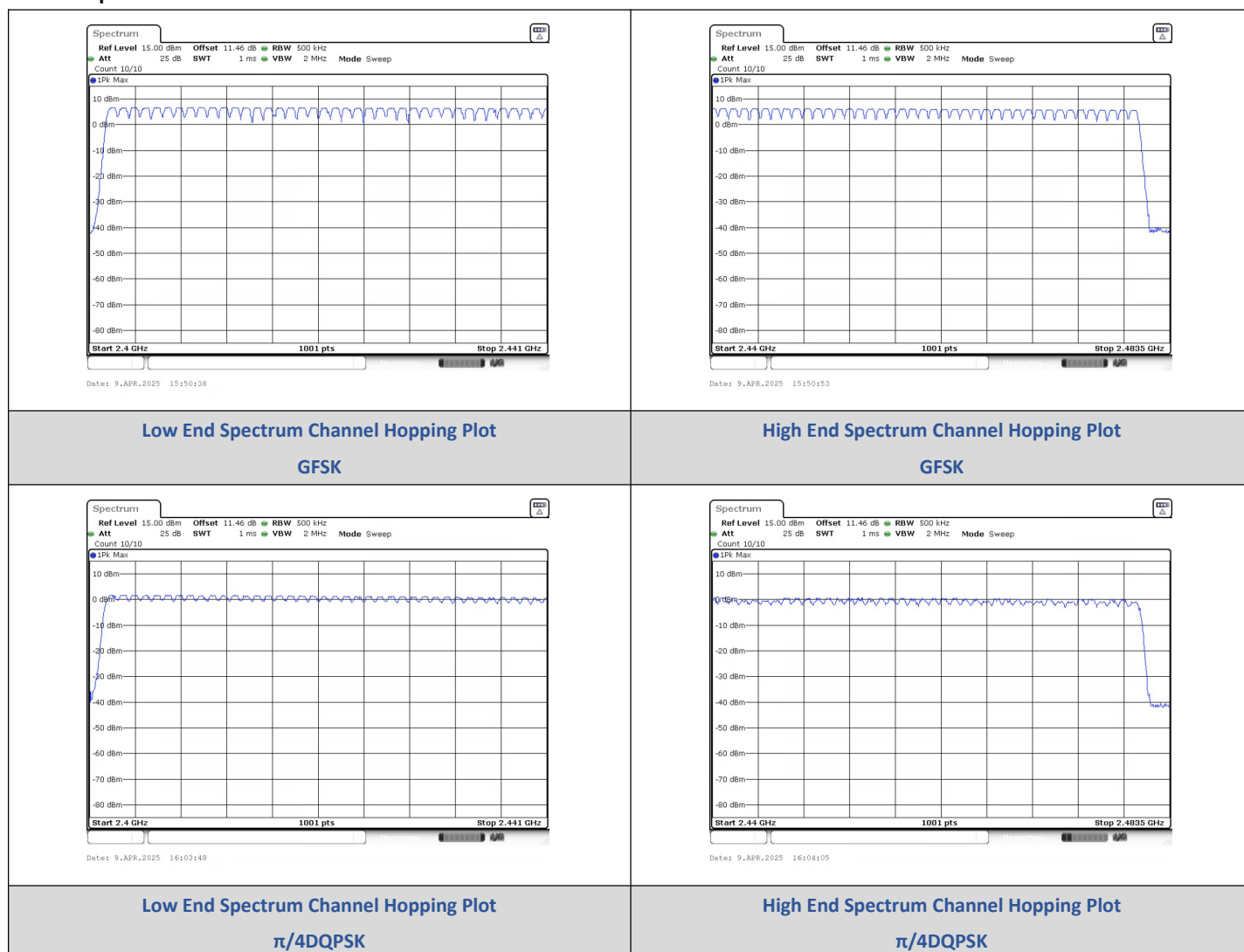
Number of Pulses in 31.6 seconds
8DPSK_3-DH5

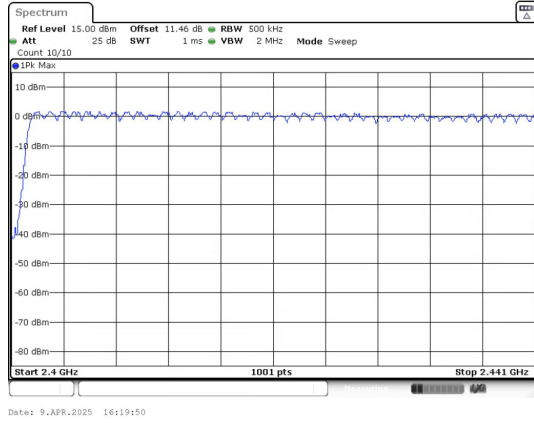
3) Number Of Hopping Channel

Test Result

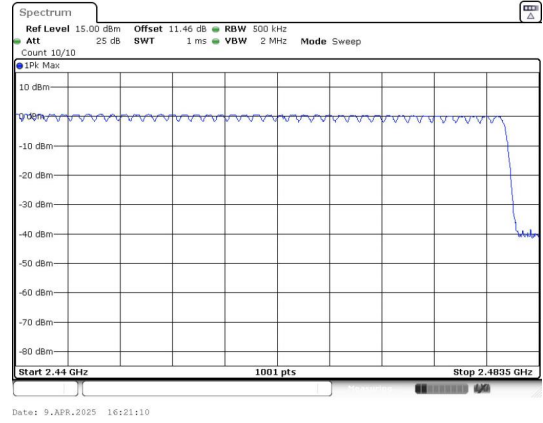
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
$\pi/4$ DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

Test Graphs





Low End Spectrum Channel Hopping Plot
8DPSK



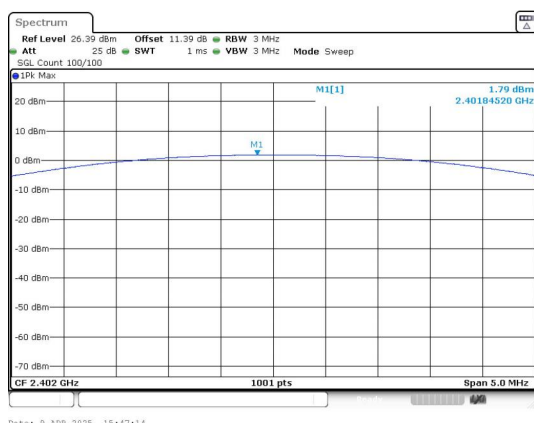
High End Spectrum Channel Hopping Plot
8DPSK

4) Conducted Output Power

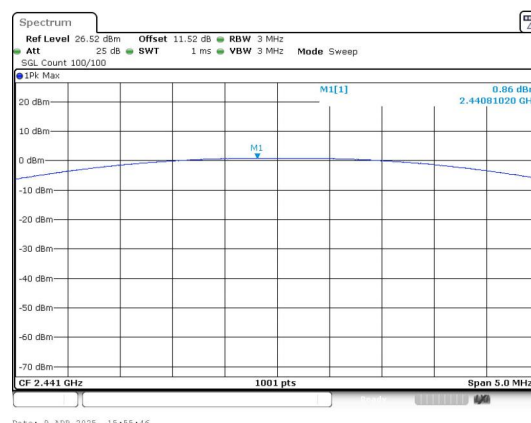
Test Result

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	1.79	1.51	≤30	PASS
		39	0.86	1.22		PASS
		78	0.17	1.04		PASS
$\pi/4$ DQPSK	2-DH5	0	2.65	1.84	≤20.97	PASS
		39	1.81	1.52		PASS
		78	1.11	1.29		PASS
8DPSK	3-DH5	0	2.99	1.99		PASS
		39	2.15	1.64		PASS
		78	1.40	1.38		PASS

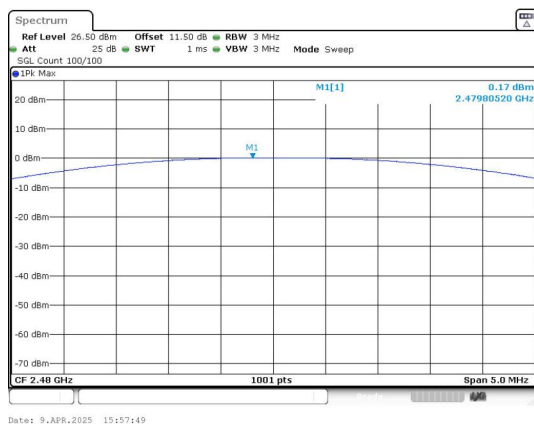
Test Graphs



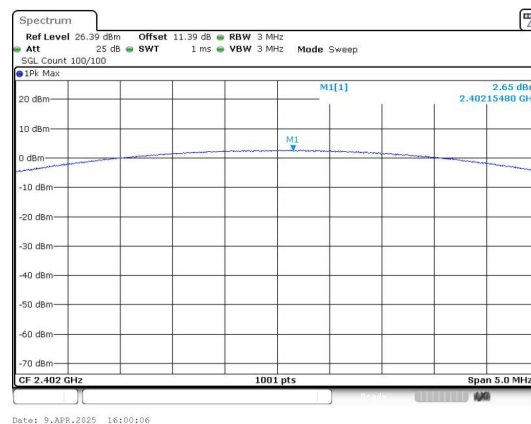
Peak Output Power
GFSK_Channel 0



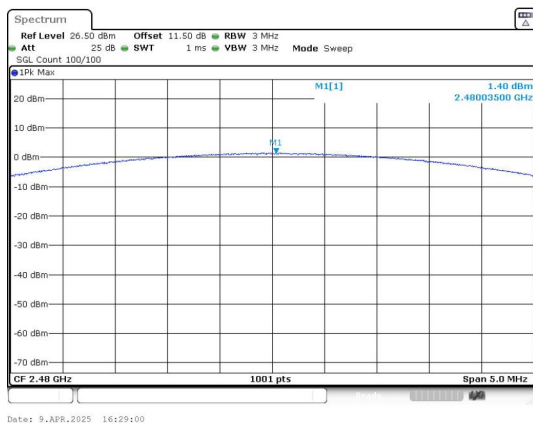
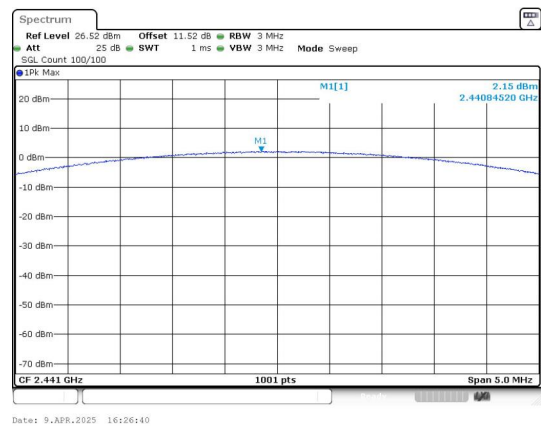
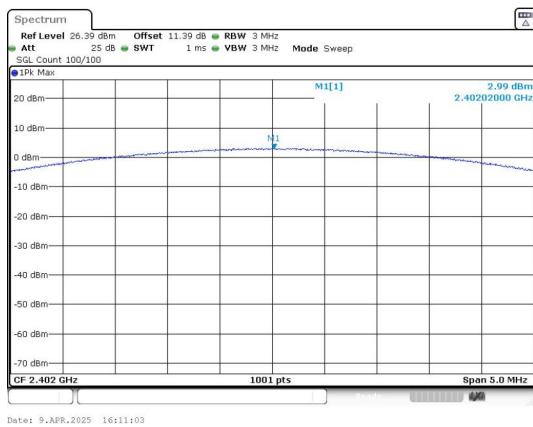
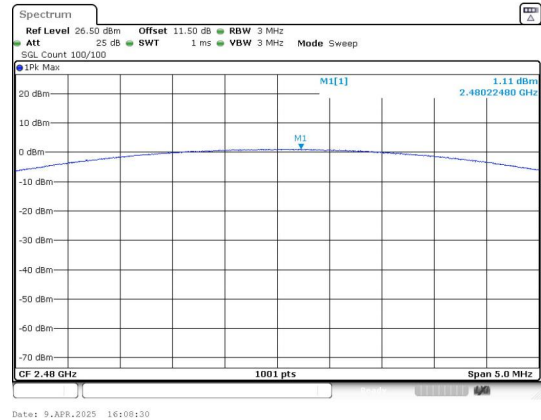
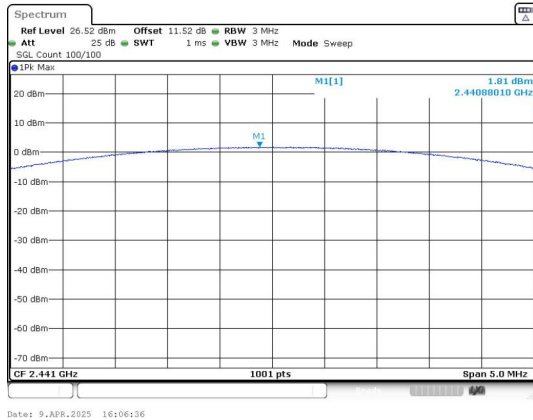
Peak Output Power
GFSK_Channel 39



Peak Output Power
GFSK_Channel 78



Peak Output Power
 $\pi/4$ DQPSK_Channel 0

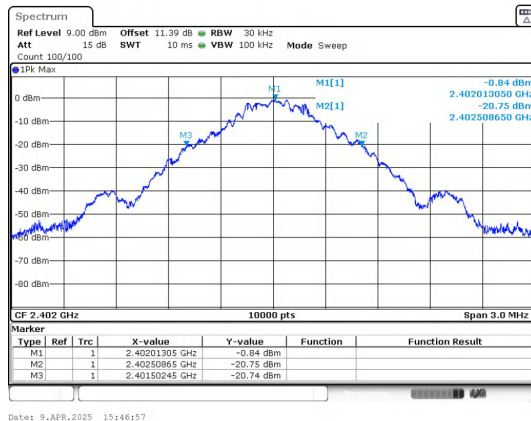


5) 20dB Bandwidth

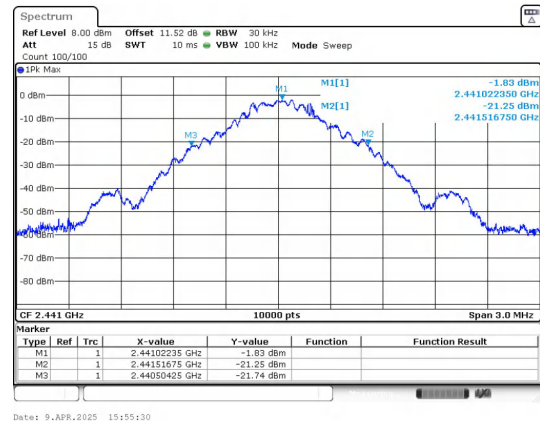
Test Result

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.02
	39	2441 MHz	1.02
	78	2480 MHz	1.02
$\pi/4$ DQPSK	0	2402 MHz	1.280
	39	2441 MHz	1.300
	78	2480 MHz	1.300
8DPSK	0	2402 MHz	1.290
	39	2441 MHz	1.310
	78	2480 MHz	1.290

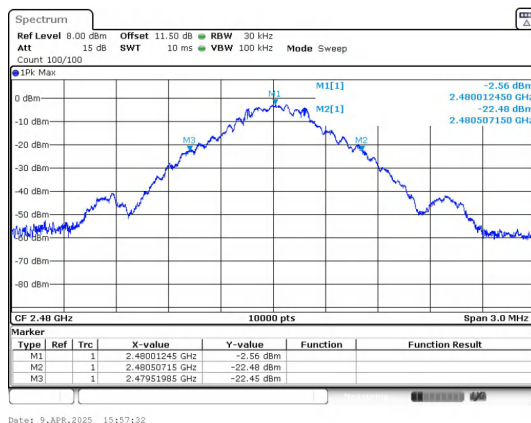
Test Graphs



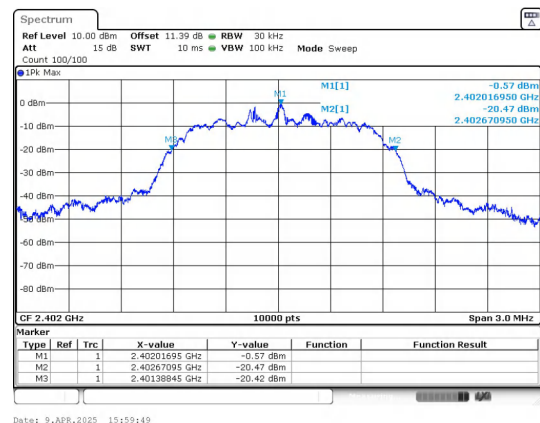
GFSK_DH5_Channel 0

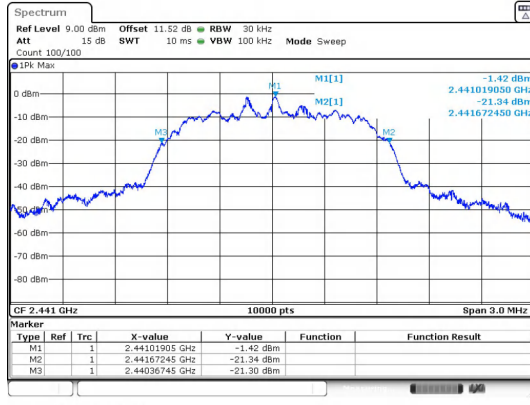


GFSK_DH5_Channel 39

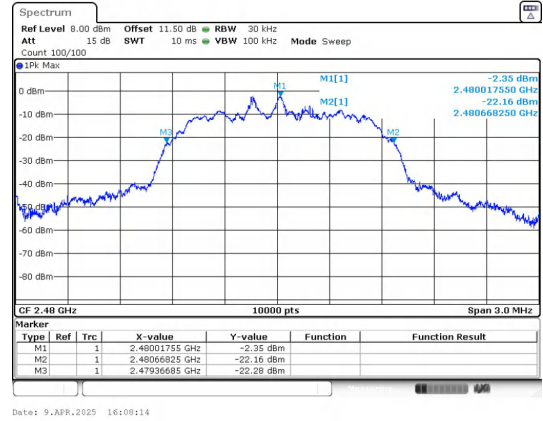


GFSK_DH5_Channel 78

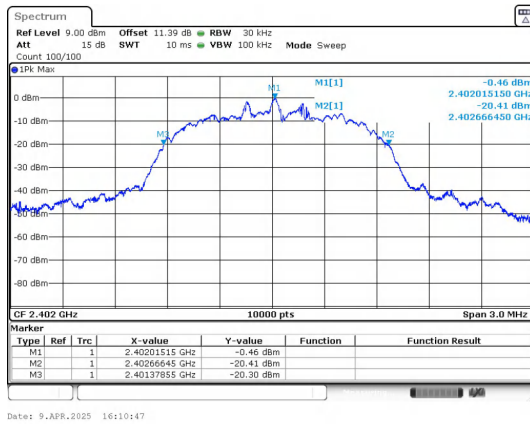

 $\pi/4$ DQPSK_2-DH5_Channel 0



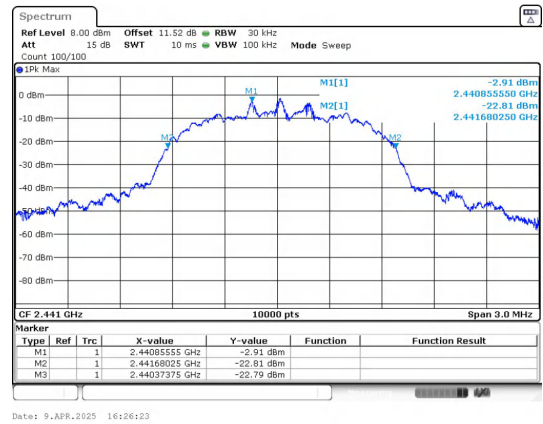
$\pi/4$ DQPSK_2-DH5_Channel 39



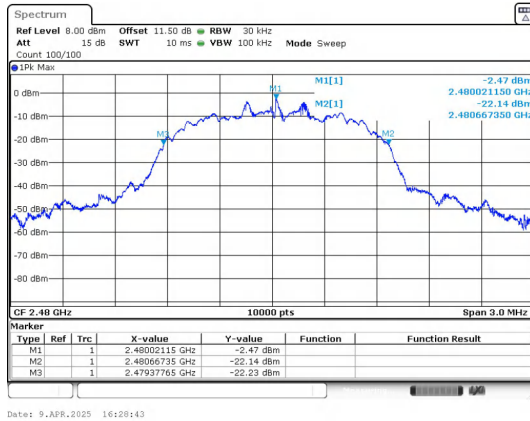
$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



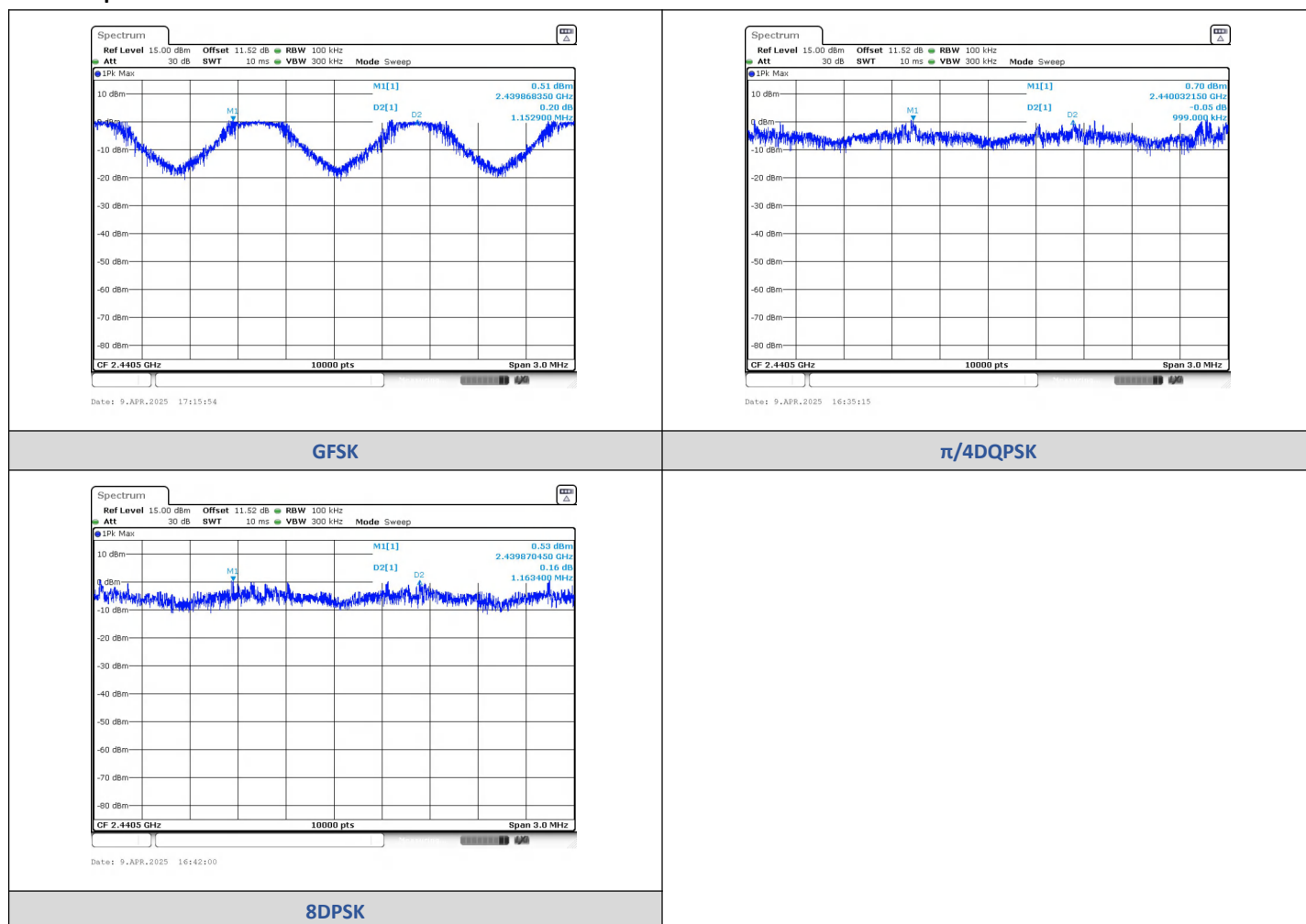
8DPSK_3-DH5_Channel 78

6) Carrier Frequencies Separation

Test Result

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2439.8684	2441.0212	1.1529	1.02	PASS
$\pi/4$ QPSK	2-DH5	2440.0322	2441.0311	0.9990	0.867	PASS
8DPSK	3-DH5	2439.8704	2441.0338	1.1634	0.873	PASS

Test Graphs



7) Conducted Out Of Band Emission

Test Result

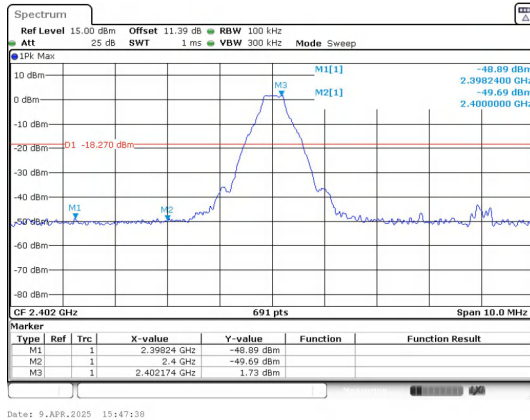
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2398.24	-48.889	-18.27	-30.619	PASS
			2400.00	-49.690	-18.27	-31.420	PASS
			9608.10	-44.607	-18.27	-26.337	PASS
		39	9763.72	-43.053	-19.31	-23.743	PASS
		78	2483.50	-50.070	-19.98	-30.090	PASS
			9920.20	-39.839	-19.98	-19.859	PASS
$\pi/4$ DQPSK	2-DH5	0	2398.56	-48.327	-18.34	-29.987	PASS
			2400.00	-48.410	-18.34	-30.070	PASS
			9608.10	-44.063	-18.34	-25.723	PASS
		39	9763.72	-42.128	-19.52	-22.608	PASS
		78	2483.50	-50.530	-20.21	-30.320	PASS
			9920.20	-39.591	-20.21	-19.381	PASS
8DPSK	3-DH5	0	2398.71	-48.251	-18.55	-29.701	PASS
			2400.00	-48.770	-18.55	-30.220	PASS
			9608.10	-44.146	-18.55	-25.596	PASS
		39	1770.83	-38.555	-19.42	-19.135	PASS
		78	2483.50	-50.310	-19.96	-30.350	PASS
			9920.20	-39.451	-19.96	-19.491	PASS

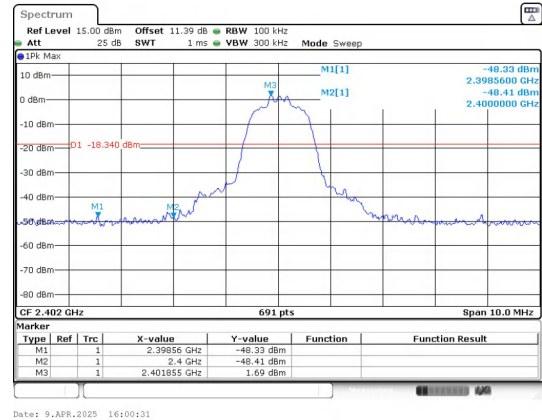
Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2396.21	-46.785	-13.63	-33.155	PASS
			2400.00	-49.780	-13.63	-36.150	PASS
			2483.50	-48.620	-14.44	-34.180	PASS
$\pi/4$ DQPSK	2-DH5		2396.38	-47.651	-18.7	-28.951	PASS
			2400.00	-50.570	-18.7	-31.870	PASS
			2483.50	-49.070	-22.18	-26.890	PASS
8DPSK	3-DH5		2395.69	-47.860	-19.18	-28.680	PASS
			2400.00	-50.170	-19.18	-30.990	PASS
			2483.50	-48.160	-20.16	-28.000	PASS

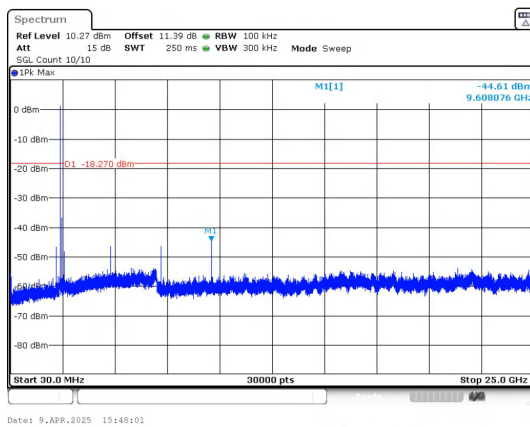
Test Graphs



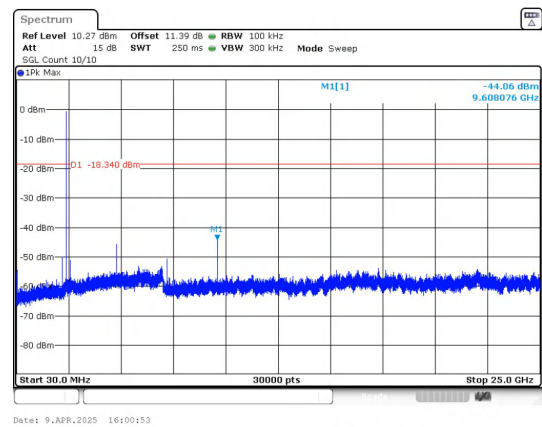
Out Of Band Emission
GFSK_DH5_Channel 0



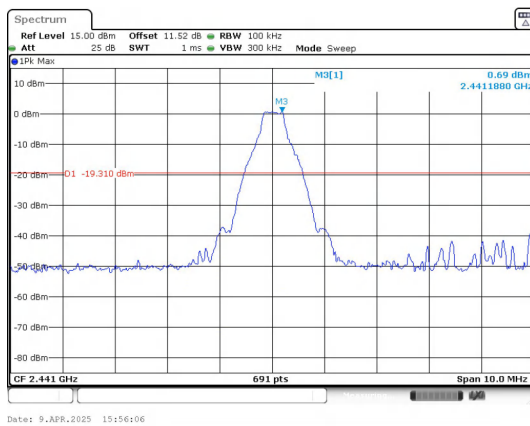
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 0



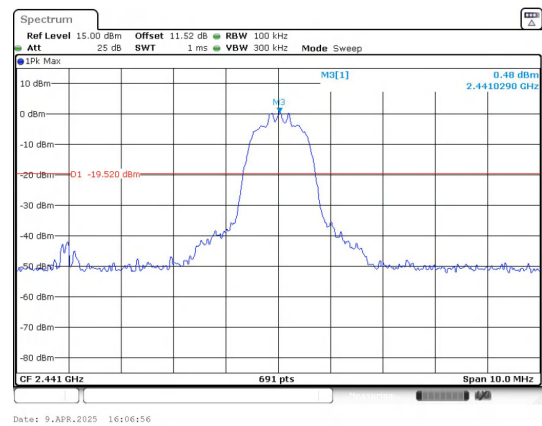
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



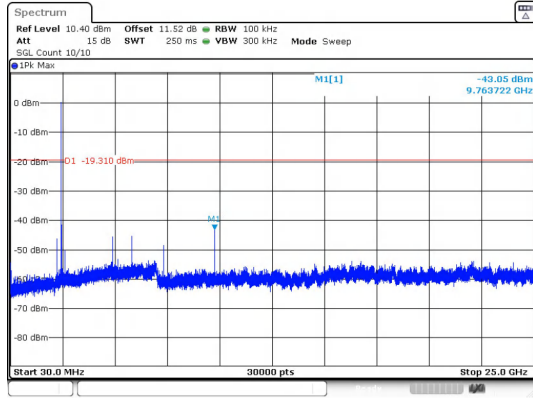
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 0



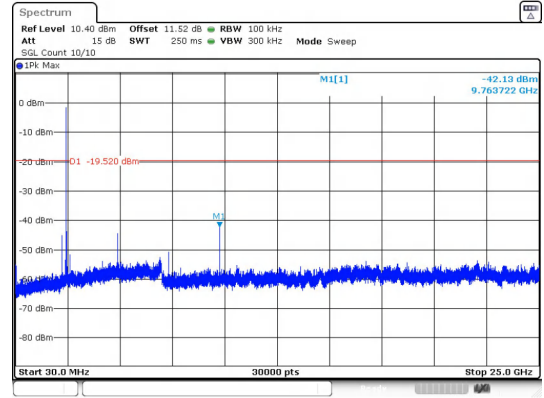
Out Of Band Emission
GFSK_DH5_Channel 39



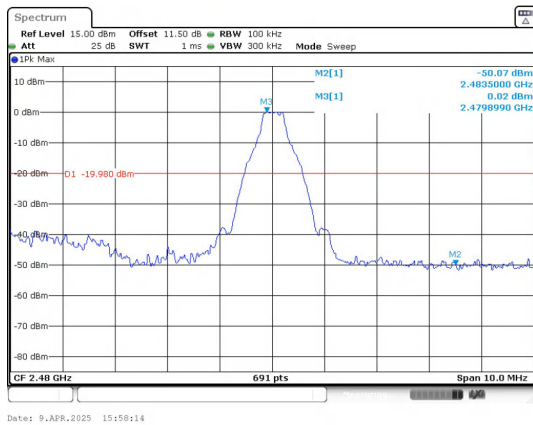
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39



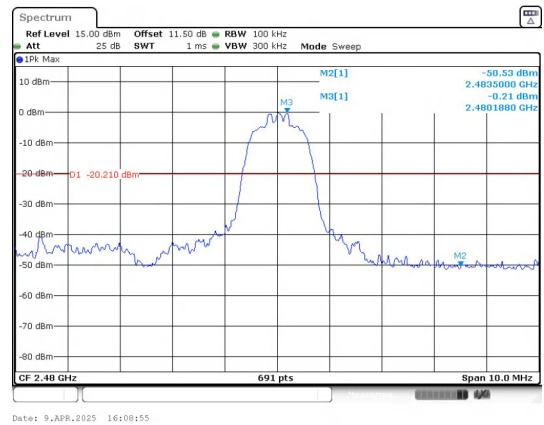
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



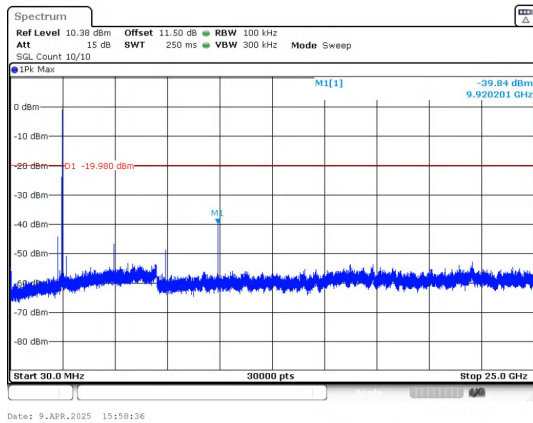
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39



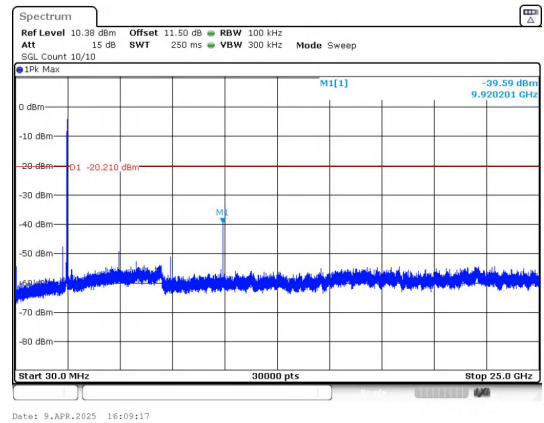
Out Of Band Emission
GFSK_DH5_Channel 78



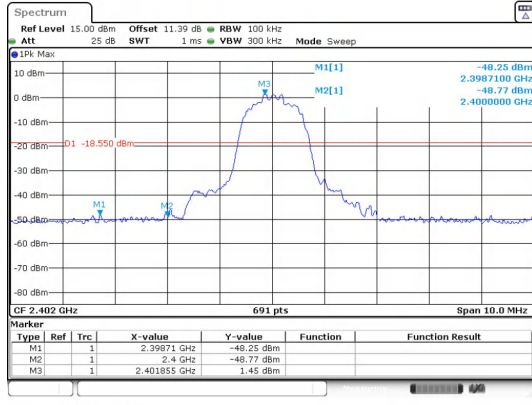
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



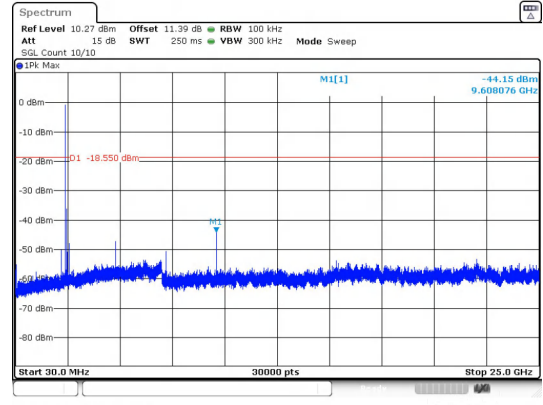
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 78



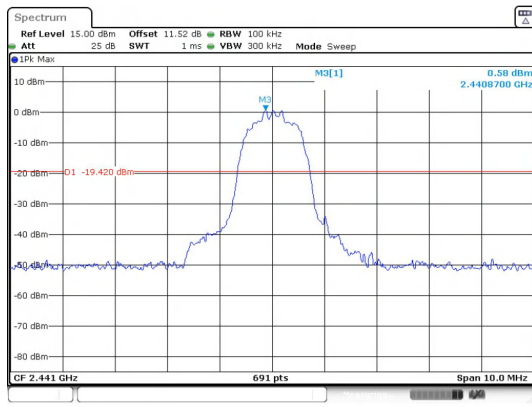
Date: 9.APR.2025 16:11:29



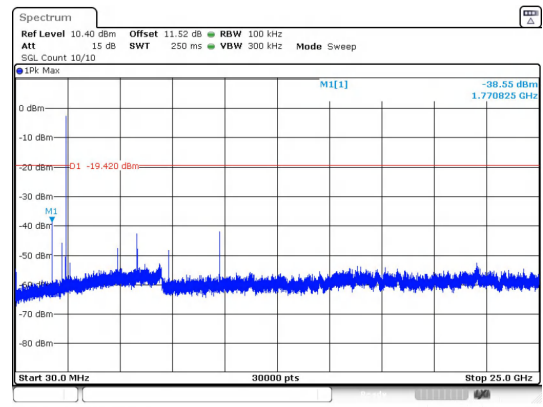
Date: 9.APR.2025 16:11:51

Out Of Band Emission
8DPSK_3-DH5_Channel 0

30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



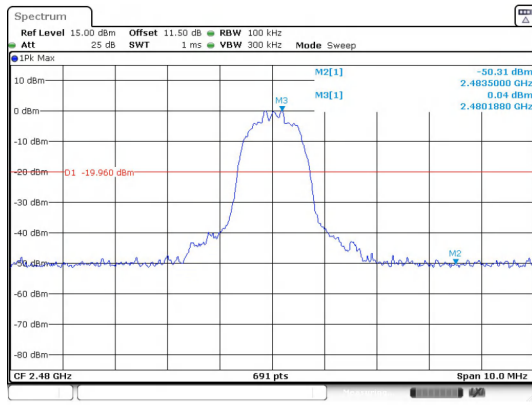
Date: 9.APR.2025 16:27:00



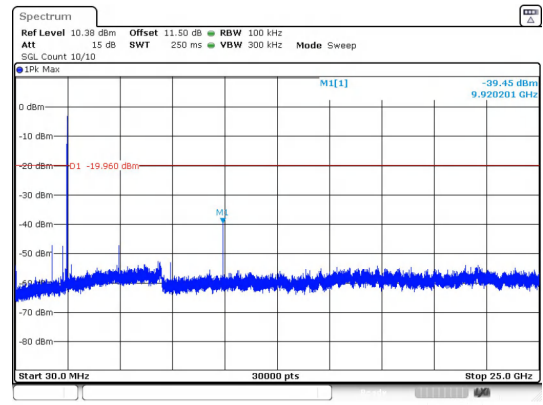
Date: 9.APR.2025 16:27:22

Out Of Band Emission
8DPSK_3-DH5_Channel 39

30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



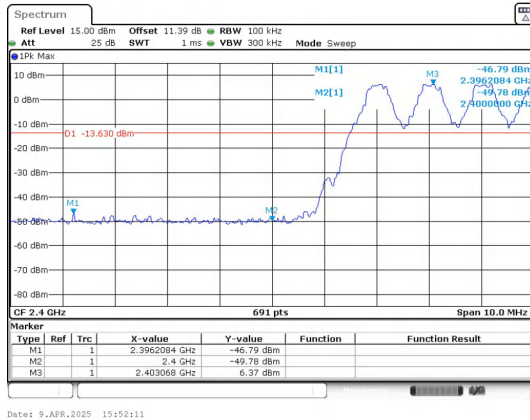
Date: 9.APR.2025 16:29:25



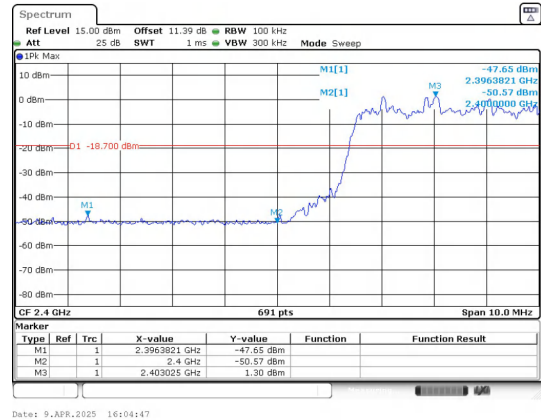
Date: 9.APR.2025 16:29:47

Out Of Band Emission
8DPSK_3-DH5_Channel 78

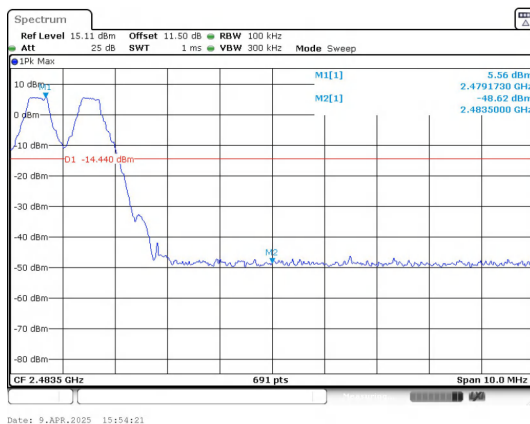
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



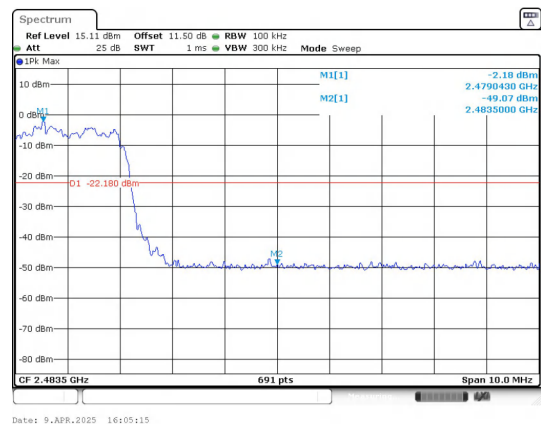
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



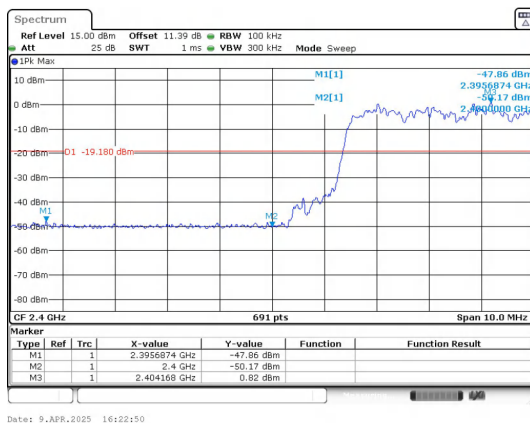
Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



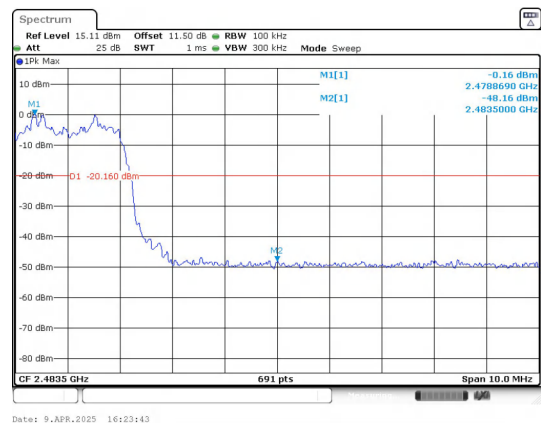
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



Out Of Band Emission(Right)
 $\pi/4$ DQPSK_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-----