

Appendix Report

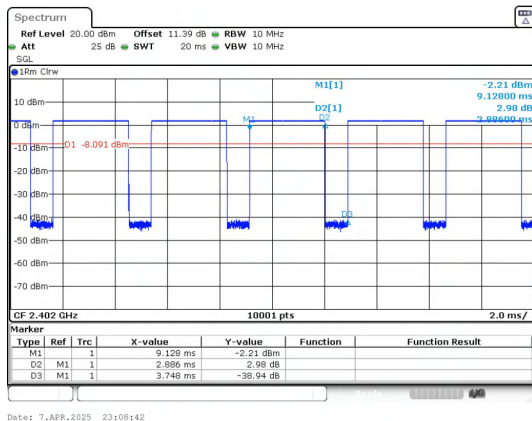
Project No.:	CISR250401014
Test Engineer:	James Wang
Supervised by:	Rory Huang

1) Duty Cycle

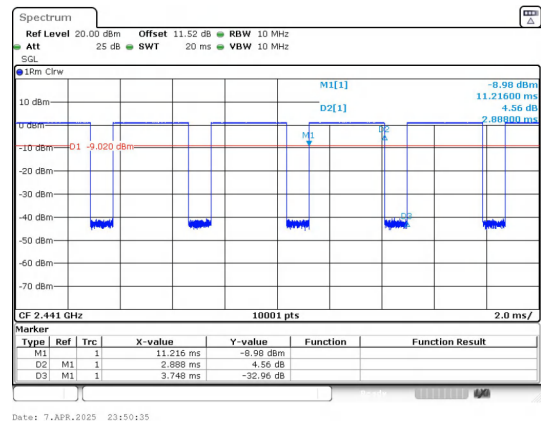
Test Result

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	2.888	3.748	77.05	0.7705	1.1323	0.3463
		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	2.890	3.748	77.11	0.7711	1.1289	0.3460
		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	2.892	3.748	77.16	0.7716	1.1261	0.3458
		78	2.892	3.748	77.16	0.7716	1.1261	0.3458

Test Graphs



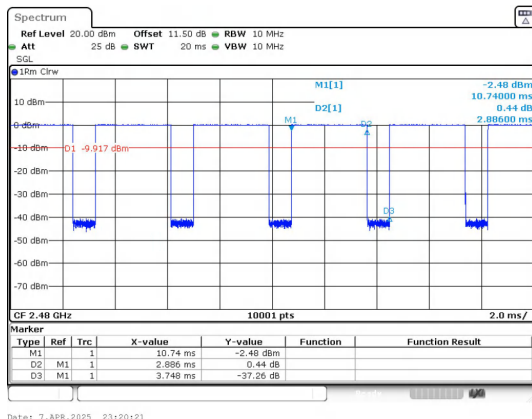
Date: 7.APR.2025 23:08:42



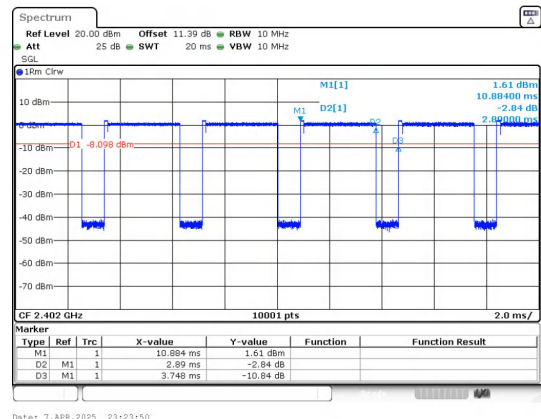
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GFSK(DH5)_Channel 0

GFSK(DH5)_Channel 39



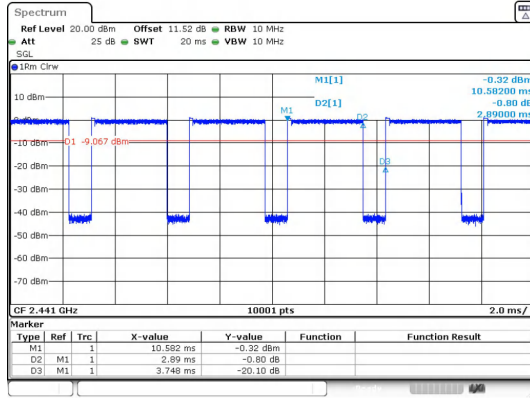
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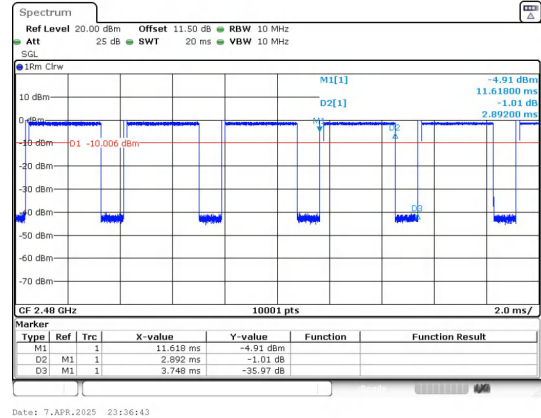
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GFSK(DH5)_Channel 78

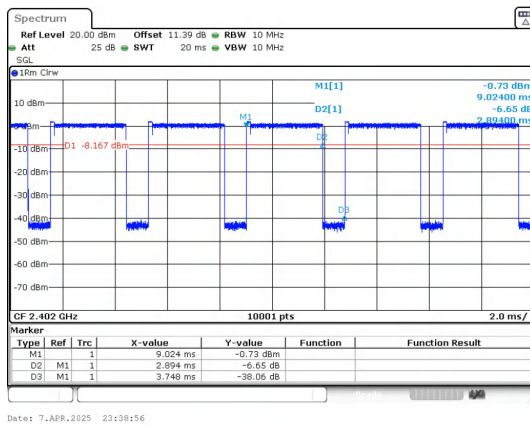
 $\pi/4$ DQPSK(2-DH5)_Channel 0



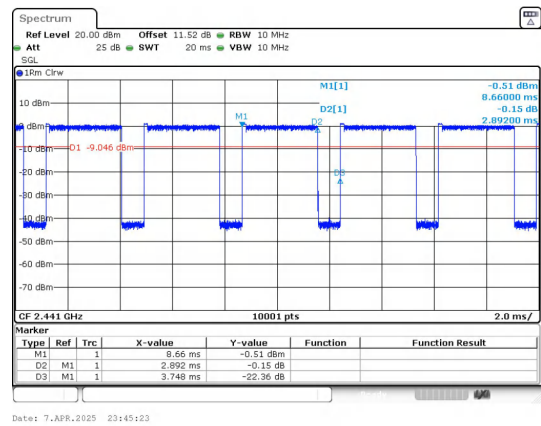
$\pi/4$ DQPSK(2-DH5)_Channel 39



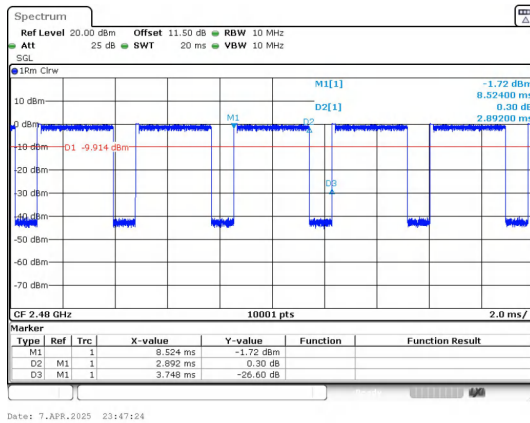
$\pi/4$ DQPSK(2-DH5)_Channel 78



8DPSK(3-DH5)_Channel 0



8DPSK(3-DH5)_Channel 39



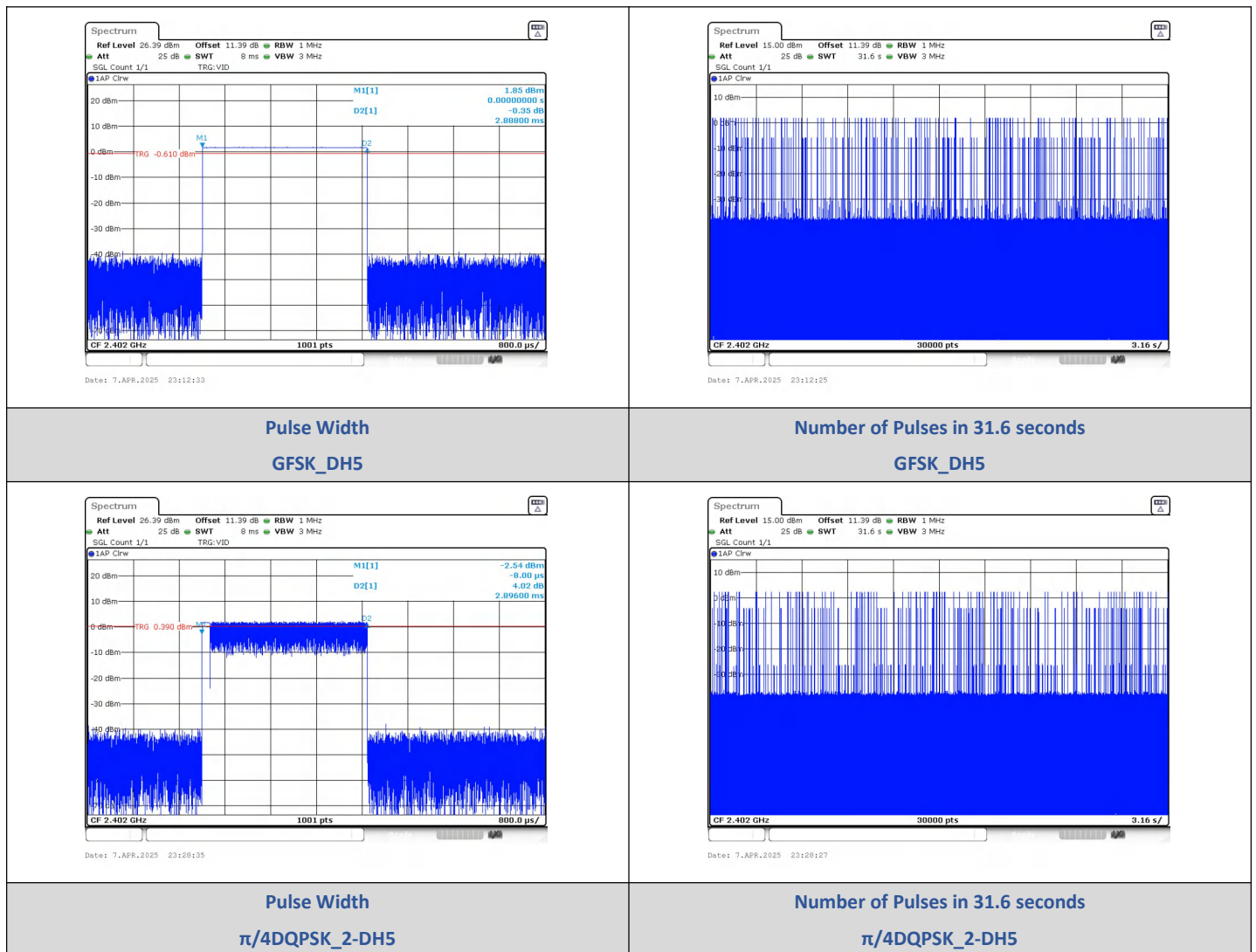
8DPSK(3-DH5)_Channel 78

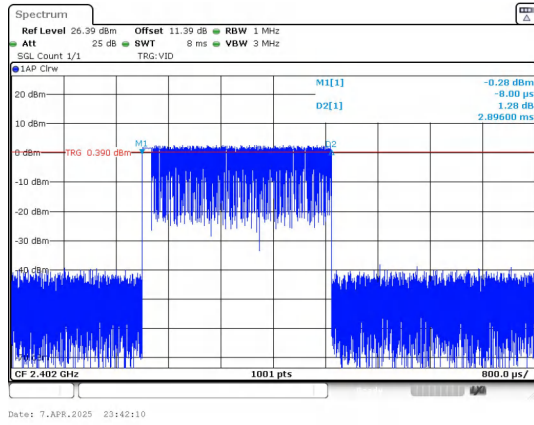
2) Dwell Time

Test Result

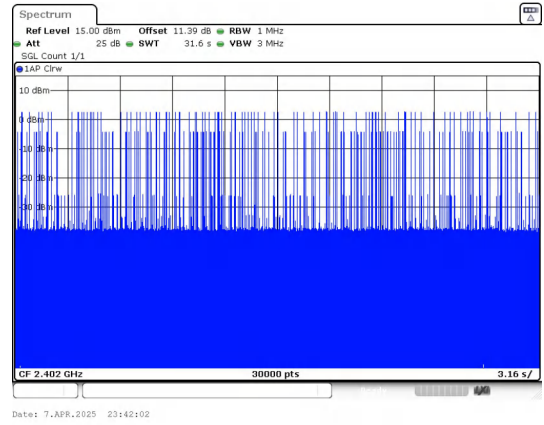
Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.888	117	337.9	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.896	107	309.87		PASS
8DPSK	3-DH5		2.896	99	286.7		PASS

Test Graphs





Pulse Width
8DPSK_3-DH5



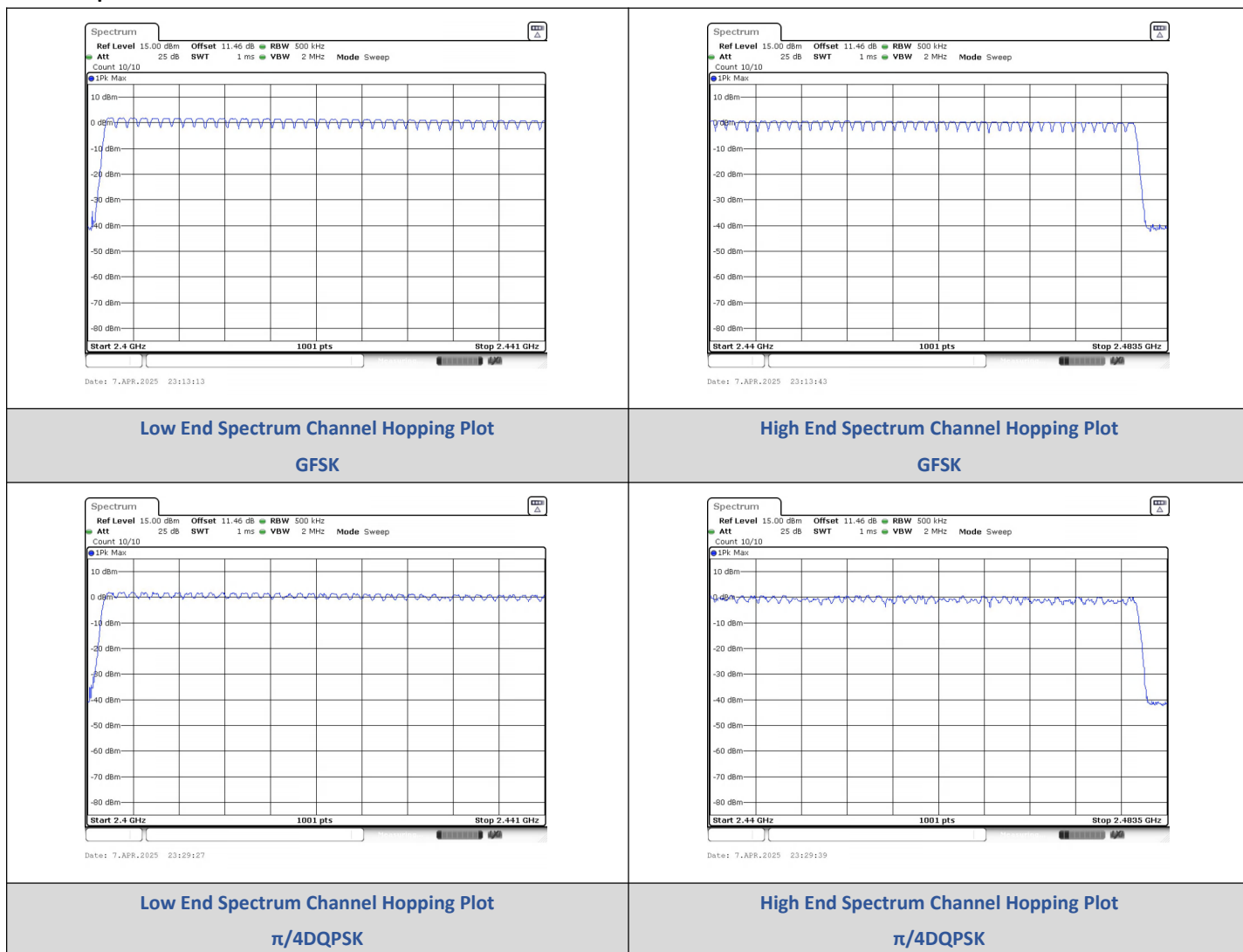
Number of Pulses in 31.6 seconds
8DPSK_3-DH5

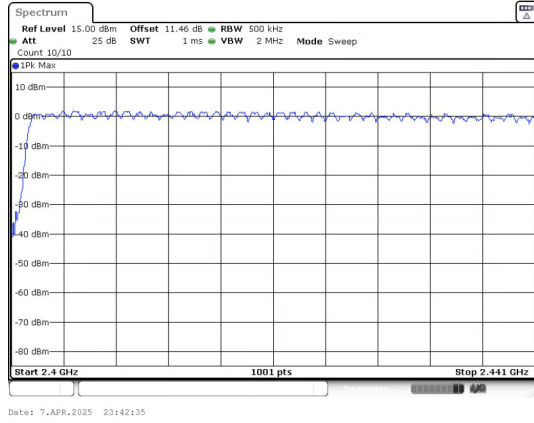
3) Number Of Hopping Channel

Test Result

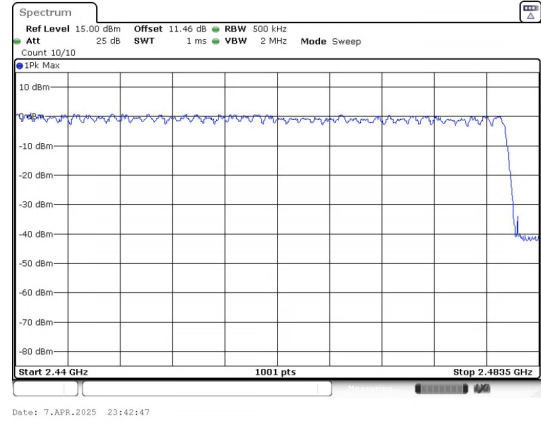
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
$\pi/4$ DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

Test Graphs





Low End Spectrum Channel Hopping Plot
8DPSK



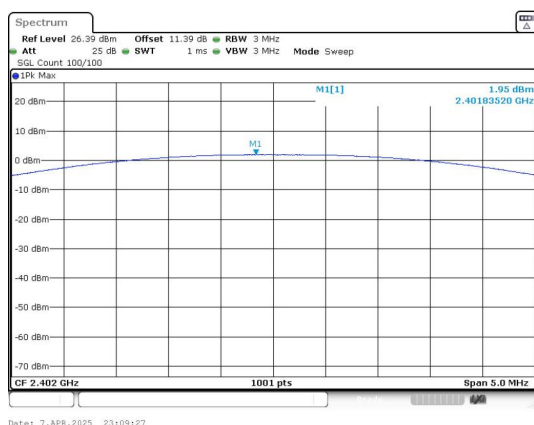
High End Spectrum Channel Hopping Plot
8DPSK

4) Conducted Output Power

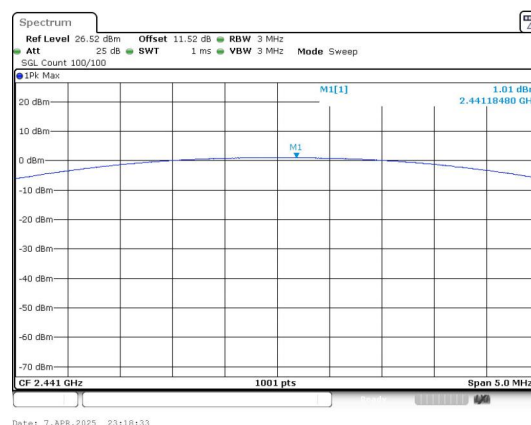
Test Result

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	1.95	1.57	≤30	PASS
		39	1.01	1.26		PASS
		78	0.14	1.03		PASS
$\pi/4$ DQPSK	2-DH5	0	2.79	1.90	≤20.97	PASS
		39	1.83	1.52		PASS
		78	0.91	1.23		PASS
8DPSK	3-DH5	0	3.06	2.02		PASS
		39	2.22	1.67		PASS
		78	1.32	1.36		PASS

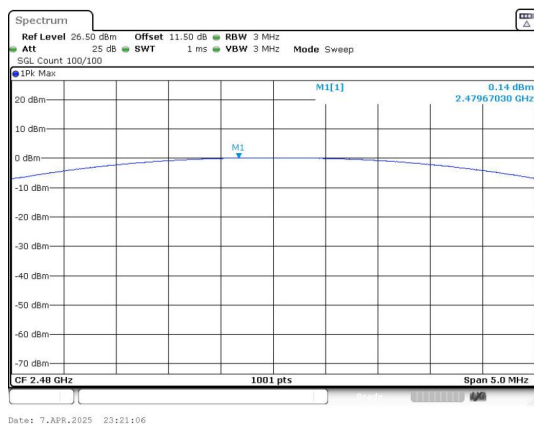
Test Graphs



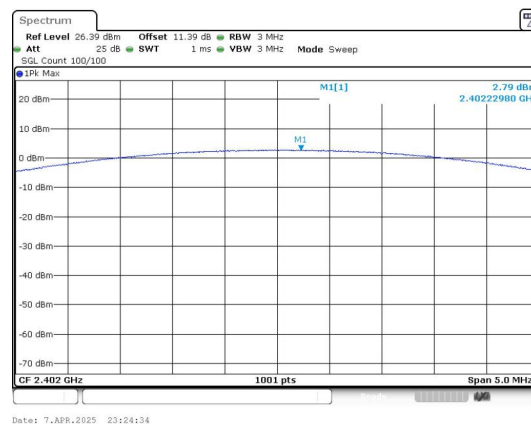
Peak Output Power
GFSK_Channel 0



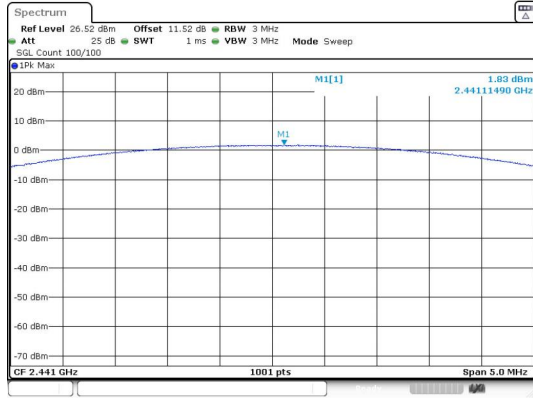
Peak Output Power
GFSK_Channel 39



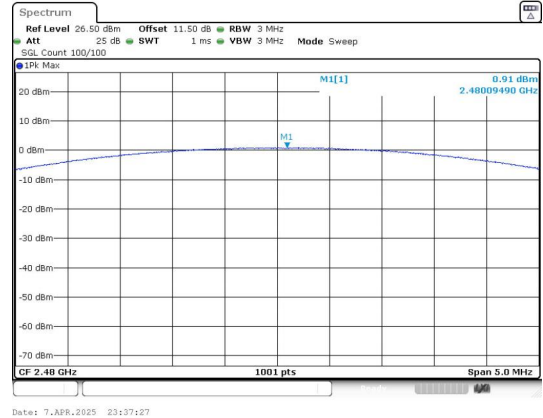
Peak Output Power
GFSK_Channel 78



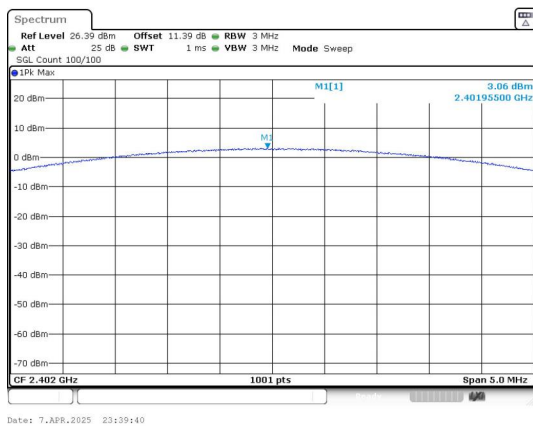
Peak Output Power
 $\pi/4$ DQPSK_Channel 0



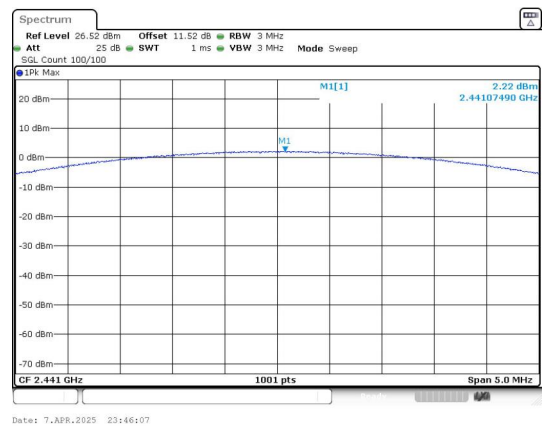
Peak Output Power
 $\pi/4$ DQPSK_Channel 39



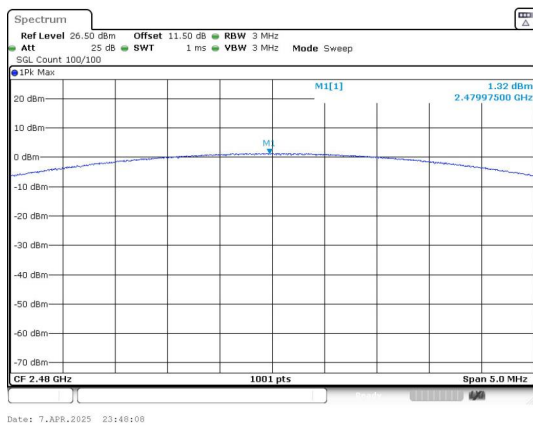
Peak Output Power
 $\pi/4$ DQPSK_Channel 78



Peak Output Power
8DPSK_Channel 0



Peak Output Power
8DPSK_Channel 39



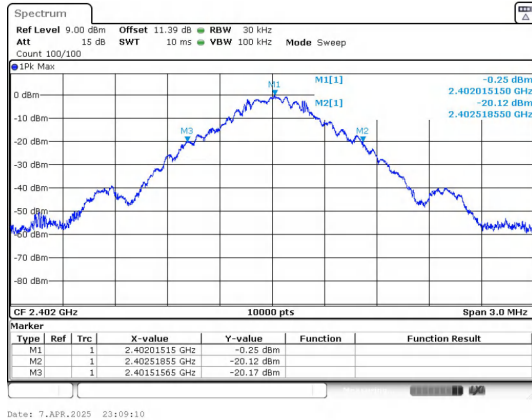
Peak Output Power
8DPSK_Channel 78

5) 20dB Bandwidth

Test Result

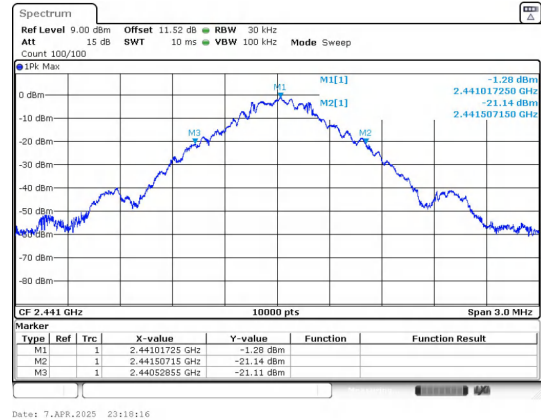
Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.0
	39	2441 MHz	1.0
	78	2480 MHz	1.0
$\pi/4$ DQPSK	0	2402 MHz	1.290
	39	2441 MHz	1.280
	78	2480 MHz	1.300
8DPSK	0	2402 MHz	1.290
	39	2441 MHz	1.290
	78	2480 MHz	1.290

Test Graphs



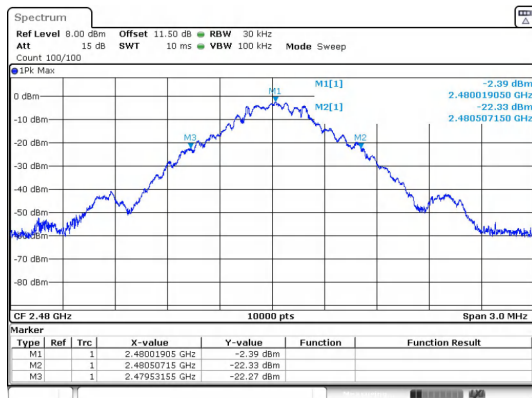
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GFSK_DH5_Channel 0



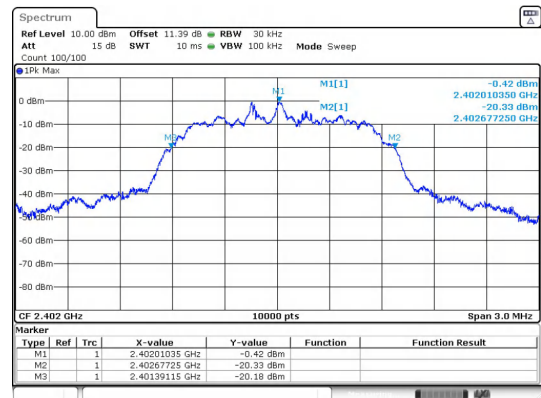
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GFSK_DH5_Channel 39



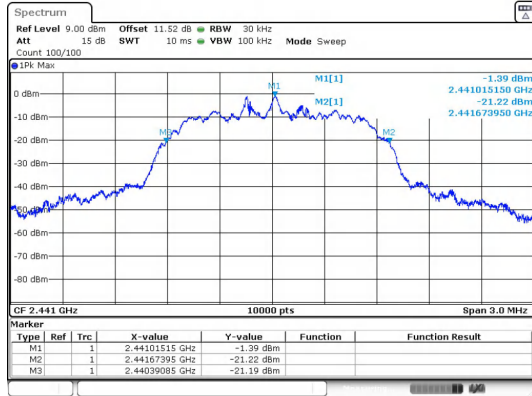
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GFSK_DH5_Channel 78

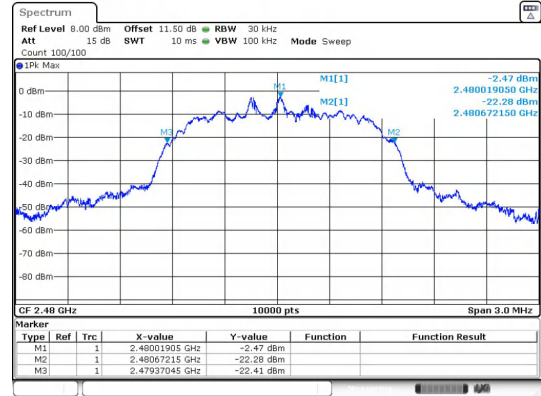


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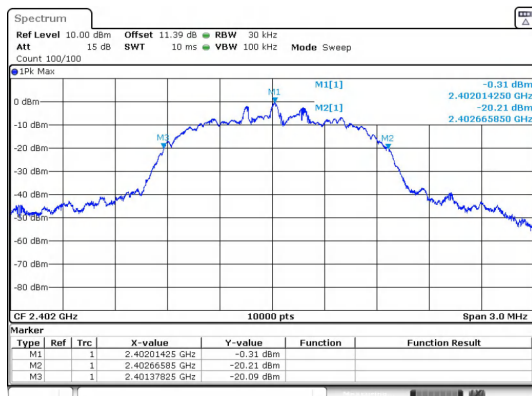
 $\pi/4$ DQPSK_2-DH5_Channel 0



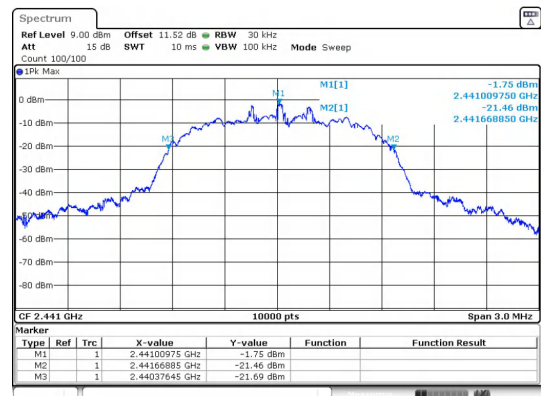
$\pi/4$ DQPSK_2-DH5_Channel 39



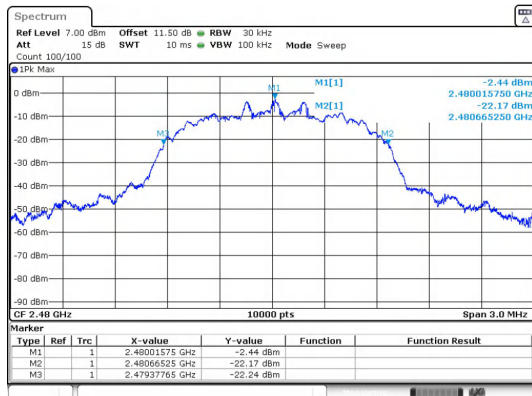
$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



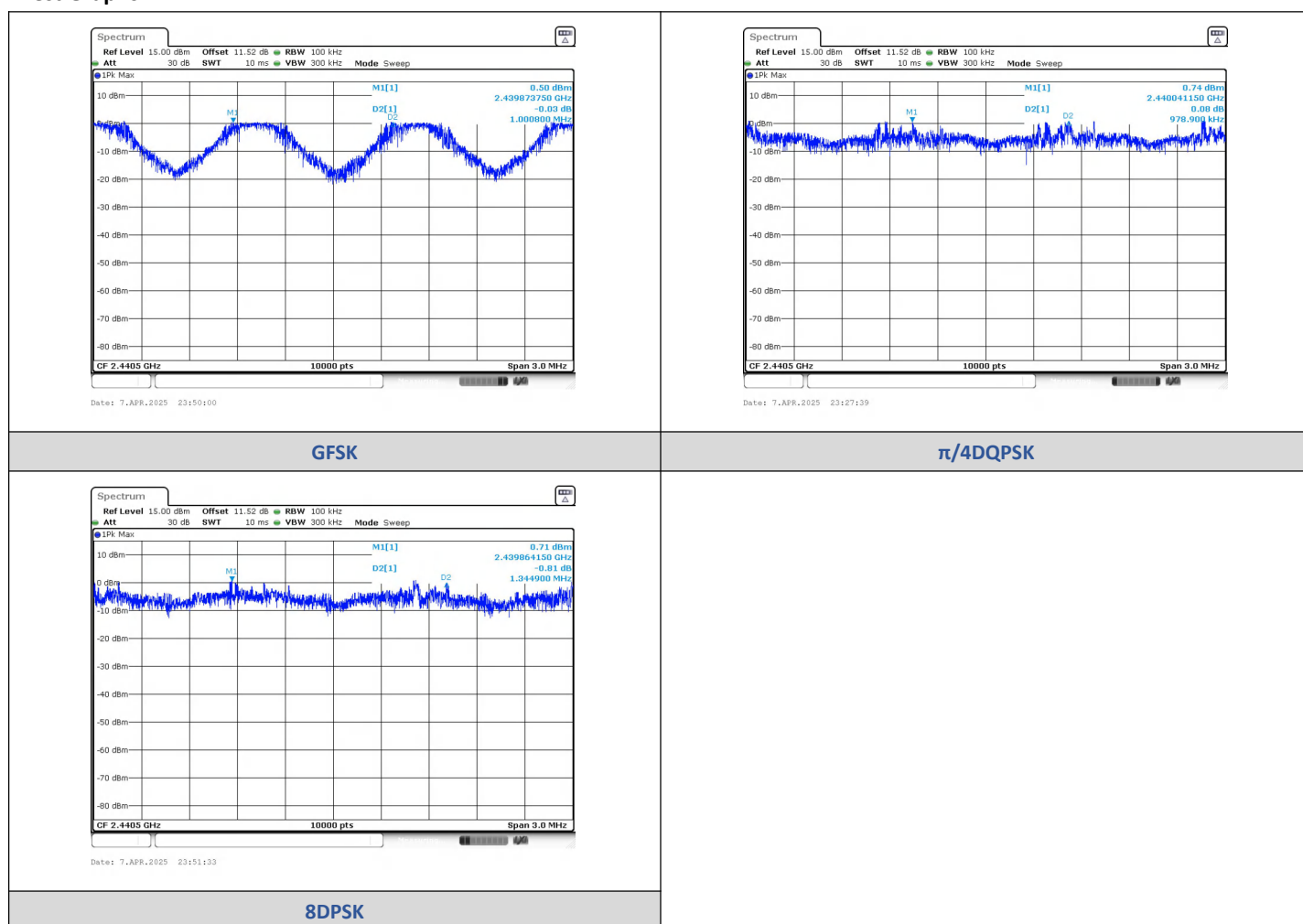
8DPSK_3-DH5_Channel 78

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	2439.8738	2440.8745	1.0008	1.0	PASS
$\pi/4$ DQPSK	2-DH5	2440.0412	2441.0201	0.9789	0.86	PASS
8DPSK	3-DH5	2439.8641	2441.209	1.3449	0.86	PASS

Test Graphs



7) Conducted Out Of Band Emission

Test Result

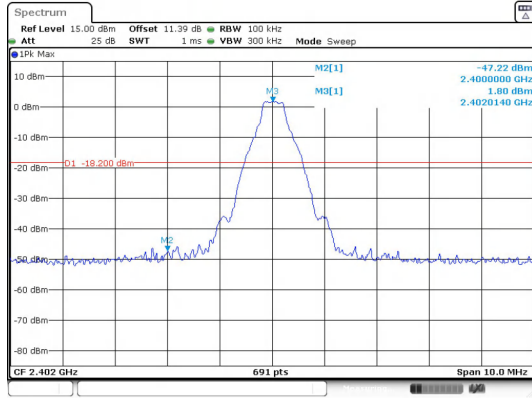
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-47.220	-18.2	-29.020	PASS
			7205.96	-43.829	-18.2	-25.629	PASS
		39	9763.72	-42.477	-19.06	-23.417	PASS
		78	2483.50	-50.320	-20.02	-30.300	PASS
			9920.20	-39.230	-20.02	-19.210	PASS
$\pi/4$ DQPSK	2-DH5	0	2397.64	-49.037	-18.25	-30.787	PASS
			2400.00	-50.310	-18.25	-32.060	PASS
			9608.10	-44.129	-18.25	-25.879	PASS
		39	9763.72	-42.272	-19.31	-22.962	PASS
		78	2483.50	-50.370	-20.07	-30.300	PASS
			9920.20	-39.291	-20.07	-19.221	PASS
8DPSK	3-DH5	0	2400.00	-46.960	-18.21	-28.750	PASS
			9608.08	-44.040	-18.21	-25.830	PASS
		39	9764.55	-42.181	-19.13	-23.051	PASS
		78	2483.50	-50.930	-20.16	-30.770	PASS
			9920.20	-39.504	-20.16	-19.344	PASS

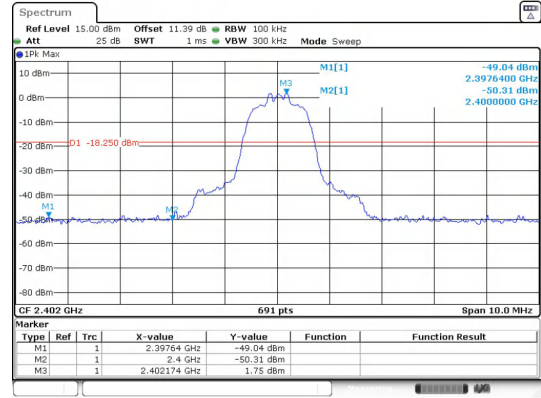
Hopping

Hopping							
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2396.80	-48.205	-18.44	-29.765	PASS
			2400.00	-50.380	-18.44	-31.940	PASS
			2483.50	-50.410	-20.22	-30.190	PASS
$\pi/4$ DQPSK	2-DH5		2397.22	-48.263	-18.37	-29.893	PASS
			2400.00	-50.660	-18.37	-32.290	PASS
			2483.50	-49.740	-21.27	-28.470	PASS
8DPSK	3-DH5		2396.73	-47.801	-18.93	-28.871	PASS
			2400.00	-49.480	-18.93	-30.550	PASS
			2483.50	-49.540	-22.17	-27.370	PASS

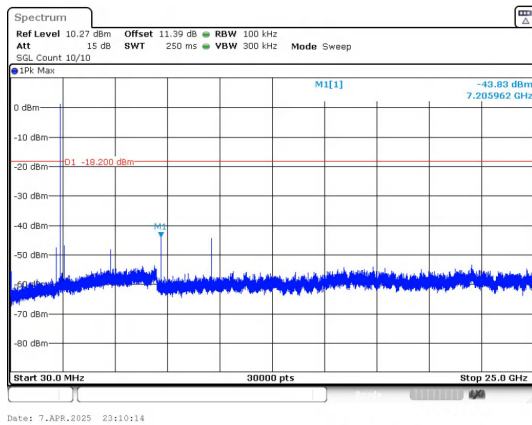
Test Graphs



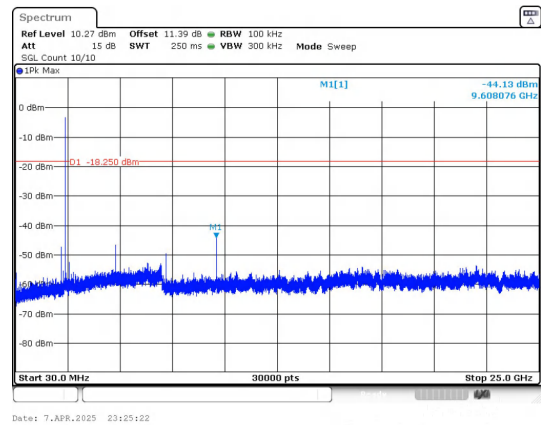
Out Of Band Emission
GFSK_DH5_Channel 0



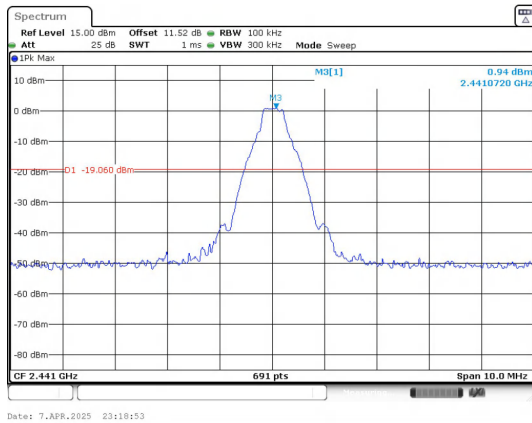
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 0



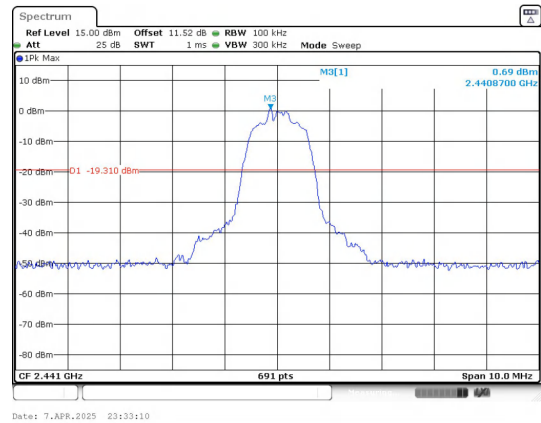
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



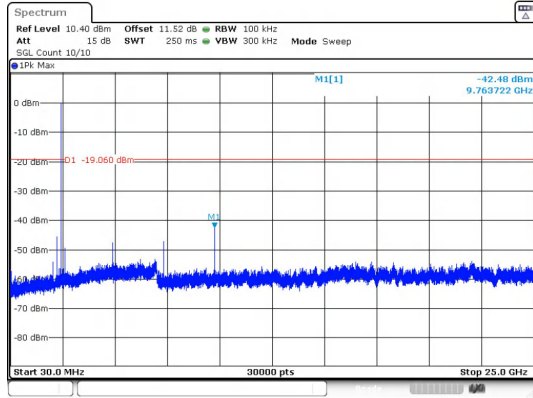
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 0



Out Of Band Emission
GFSK_DH5_Channel 39

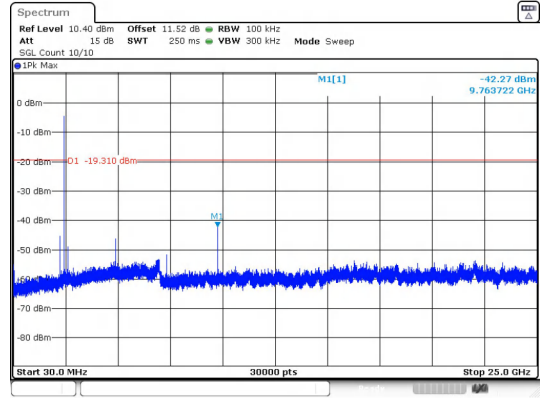


Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39



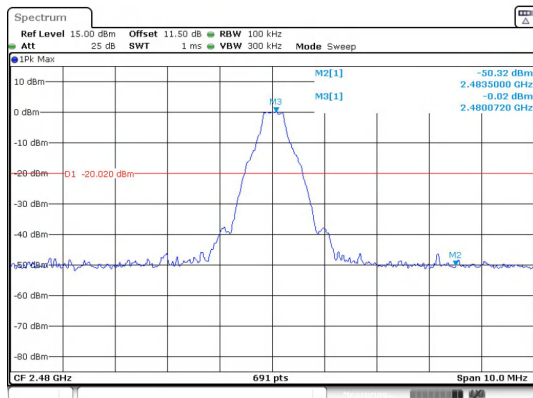
Date: 7.APR.2025 23:19:15

30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



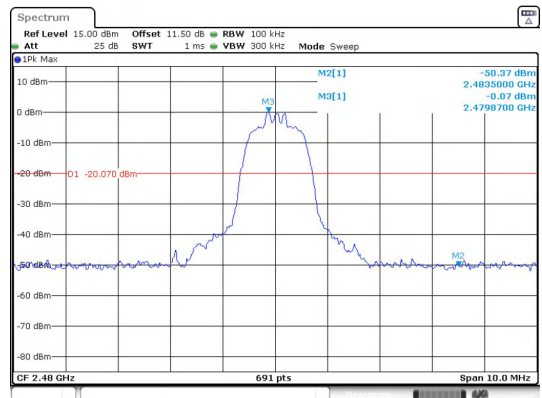
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30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39



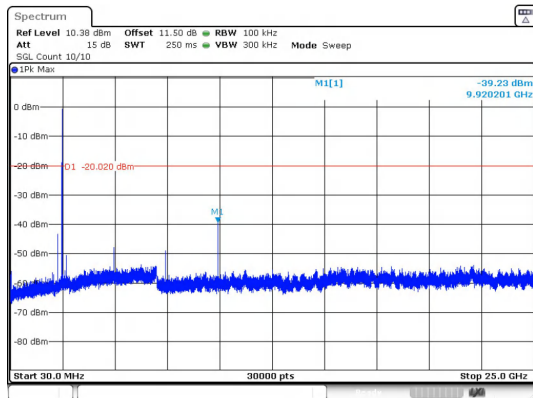
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Out Of Band Emission
GFSK_DH5_Channel 78



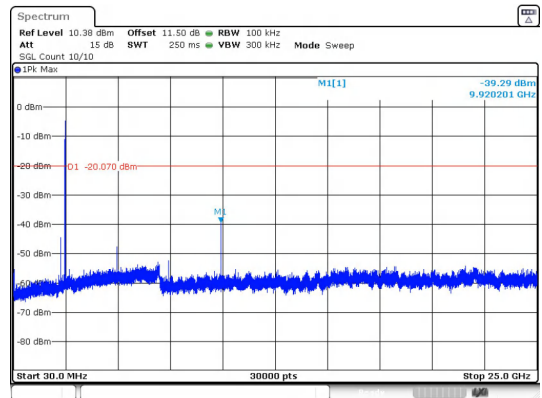
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Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



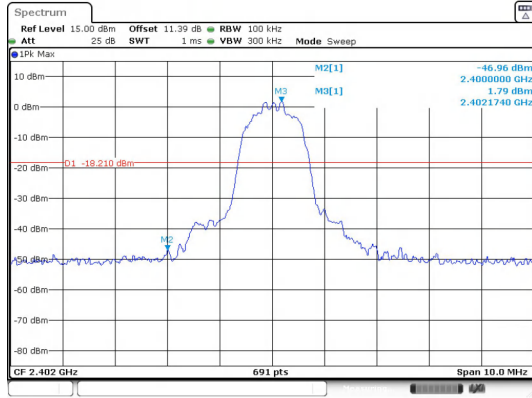
Date: 7.APR.2025 23:21:53

30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



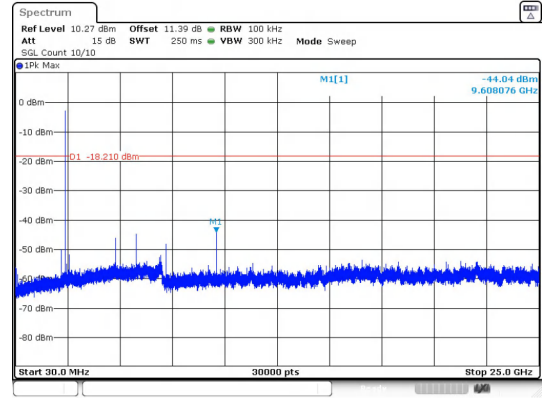
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30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 78



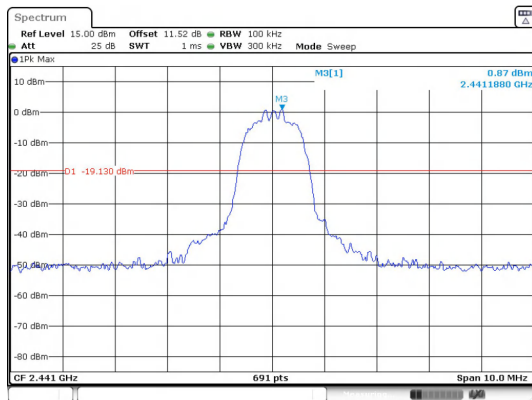
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Out Of Band Emission
8DPSK_3-DH5_Channel 0



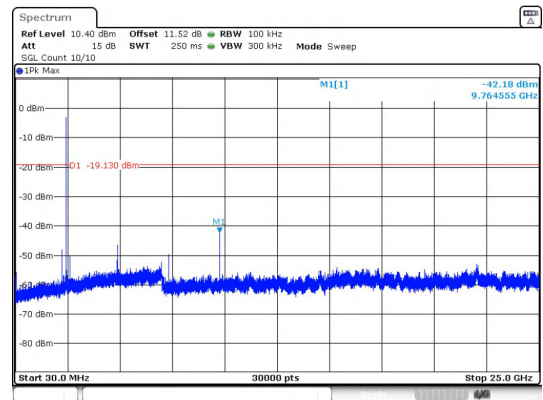
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30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



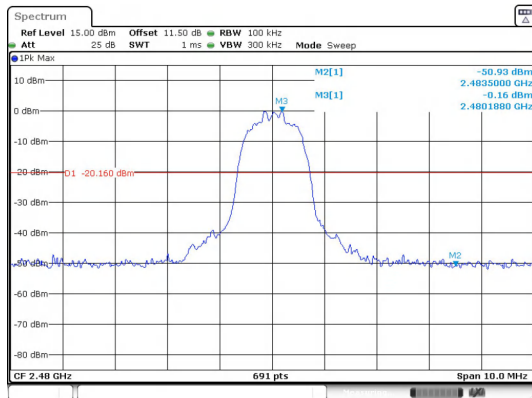
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Out Of Band Emission
8DPSK_3-DH5_Channel 39



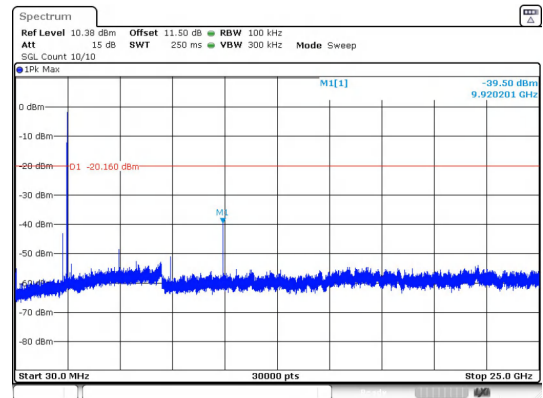
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30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



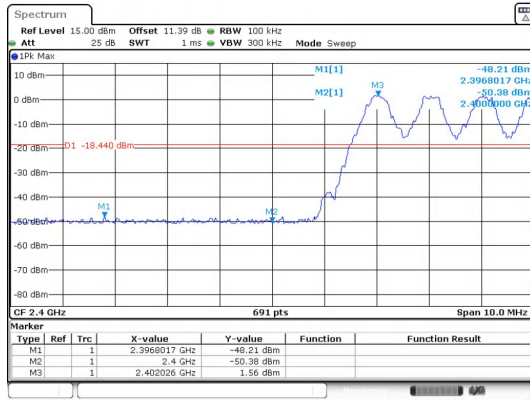
Date: 7.APR.2025 23:48:33

Out Of Band Emission
8DPSK_3-DH5_Channel 78

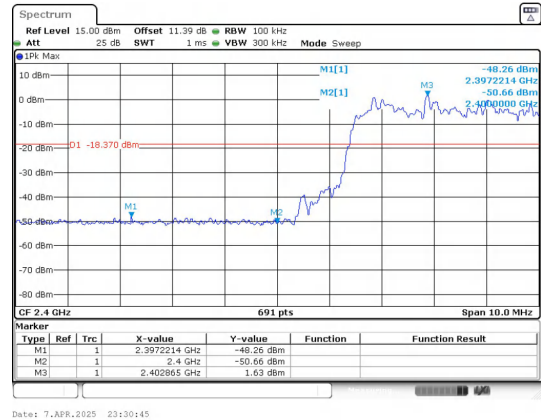


Date: 7.APR.2025 23:48:56

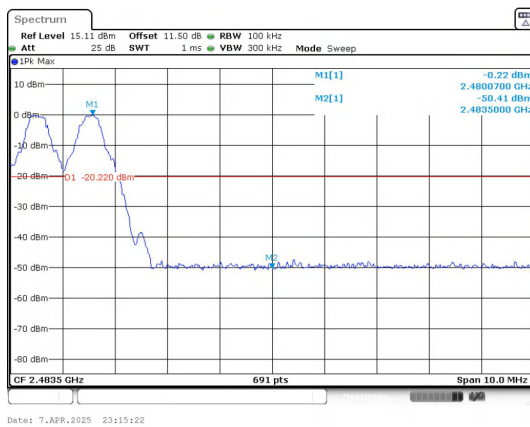
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



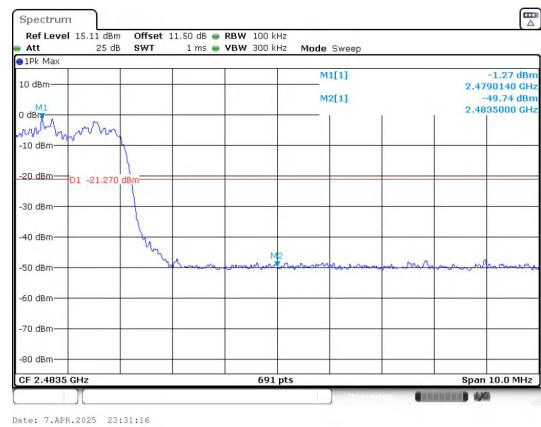
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



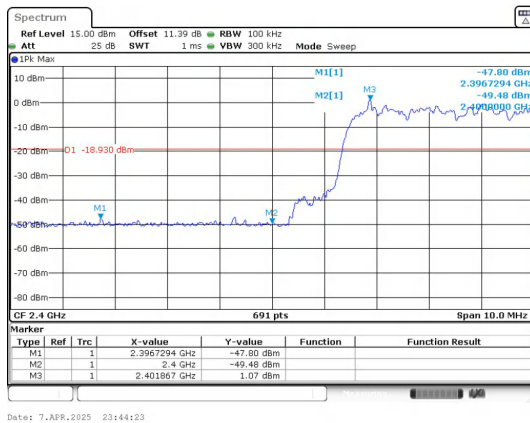
Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



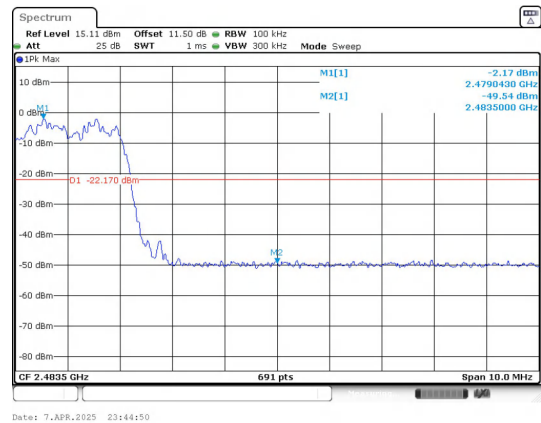
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



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-----