

Appendix Report

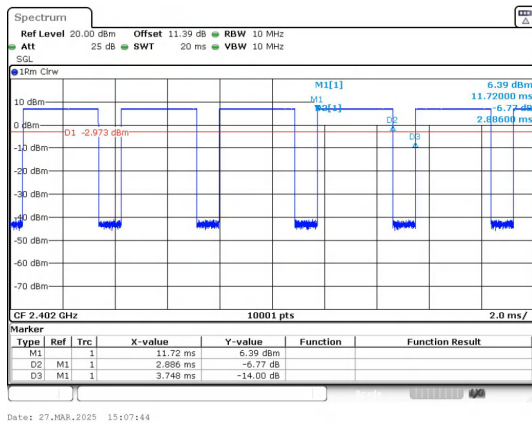
Project No.:	CISR250322191
Test Engineer:	James Wang
Supervised by:	Rory Huang

1) Duty Cycle

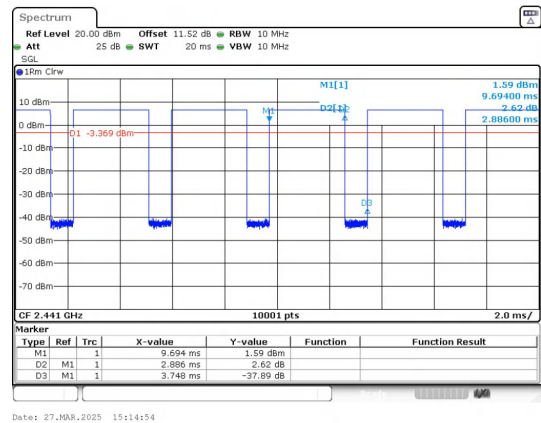
Test Result

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	2.892	3.748	77.16	0.7716	1.1261	0.3458
		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	2.892	3.748	77.16	0.7716	1.1261	0.3458

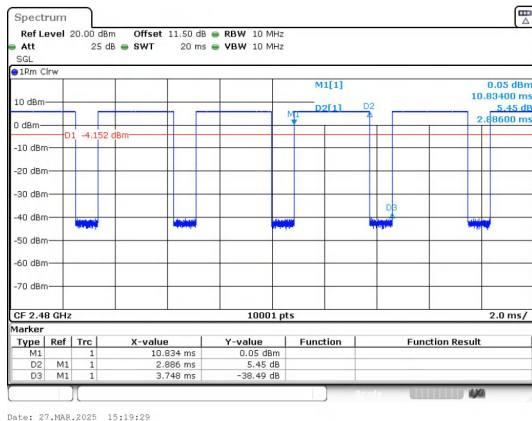
Test Graphs



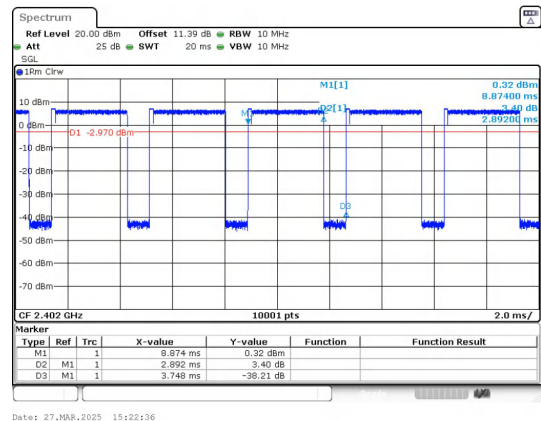
GFSK(DH5)_Channel 0

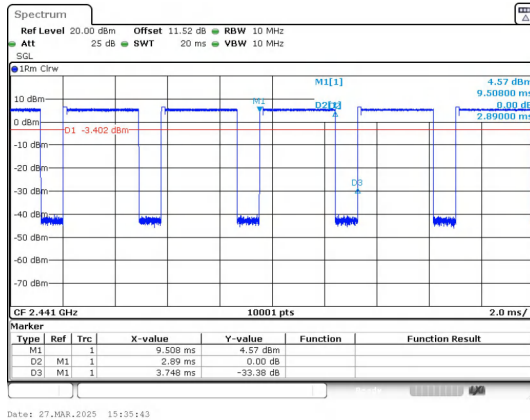


GFSK(DH5)_Channel 39

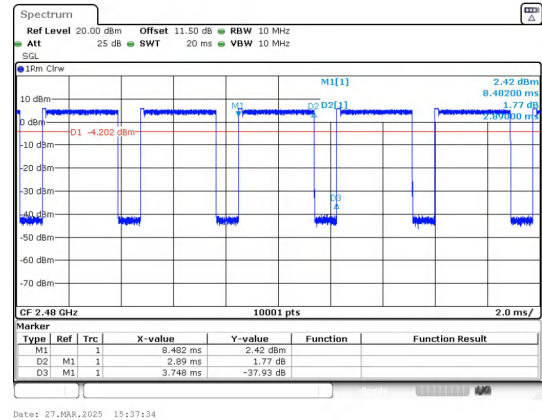


GFSK(DH5)_Channel 78

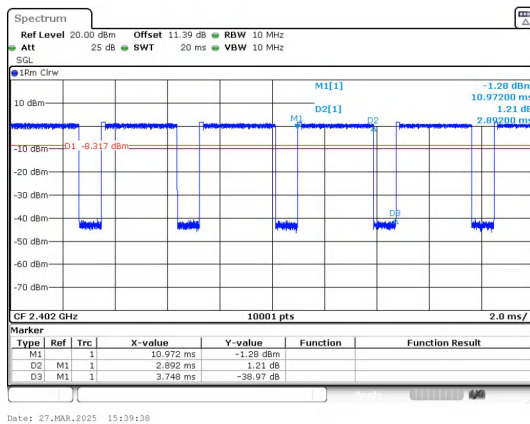

 $\pi/4$ DQPSK(2-DH5)_Channel 0



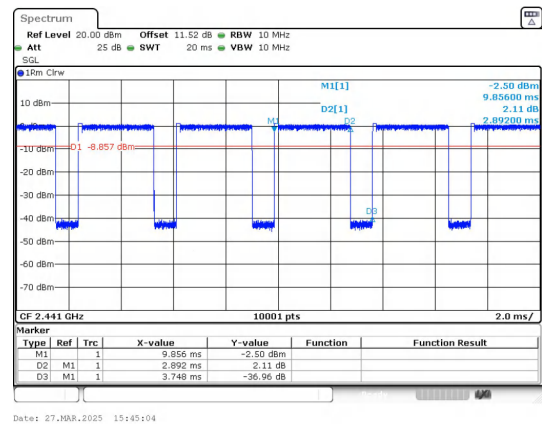
$\pi/4$ DQPSK(2-DH5)_Channel 39



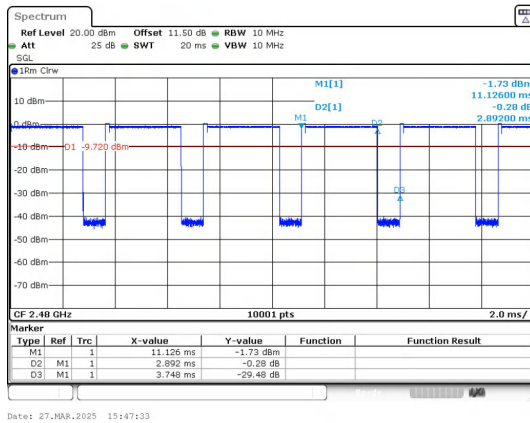
$\pi/4$ DQPSK(2-DH5)_Channel 78



8DPSK(3-DH5)_Channel 39



8DPSK(3-DH5)_Channel 78



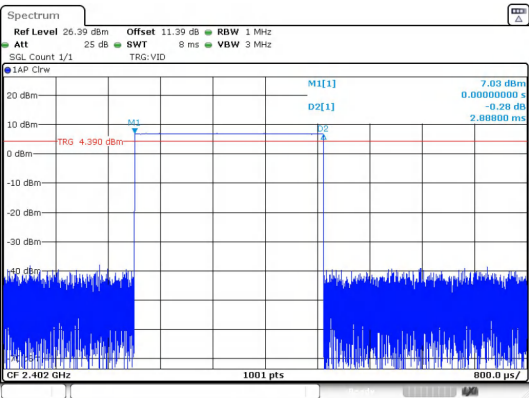
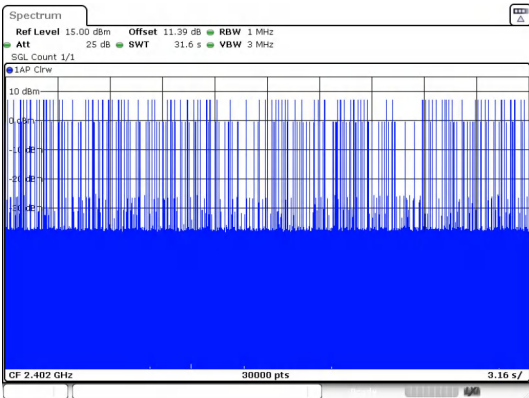
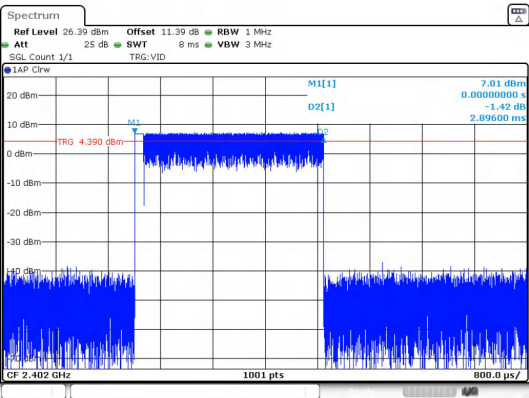
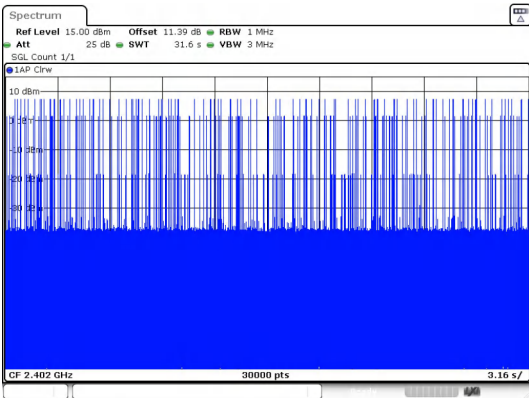
8DPSK(3-DH5)_Channel 78

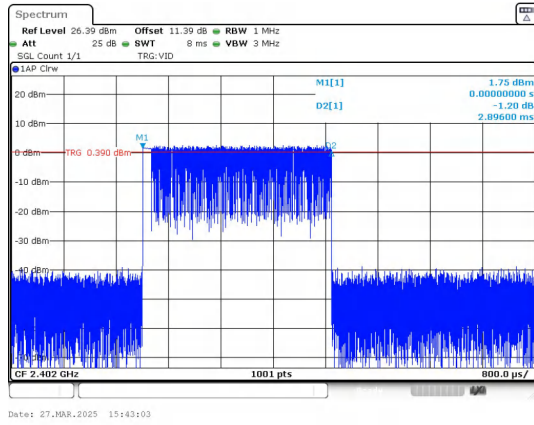
2) Dwell Time

Test Result

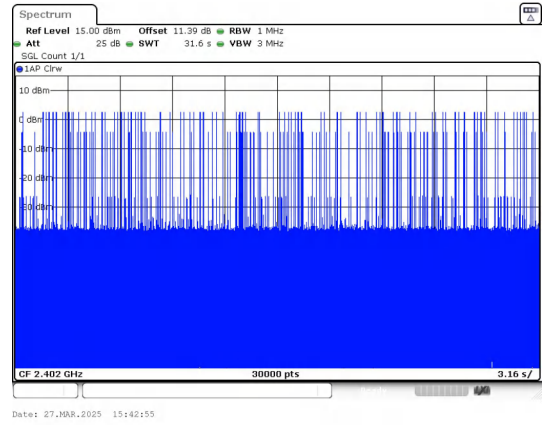
Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.888	108	311.9	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.896	103	298.29		PASS
8DPSK	3-DH5		2.896	107	309.87		PASS

Test Graphs

 Date: 27.MAR.2025 15:11:08	 Date: 27.MAR.2025 15:11:00
Pulse Width GFSK_DH5	Number of Pulses in 31.6 seconds GFSK_DH5
 Date: 27.MAR.2025 15:27:47	 Date: 27.MAR.2025 15:27:39
Pulse Width $\pi/4$DQPSK_2-DH5	Number of Pulses in 31.6 seconds $\pi/4$DQPSK_2-DH5



Pulse Width
8DPSK_3-DH5



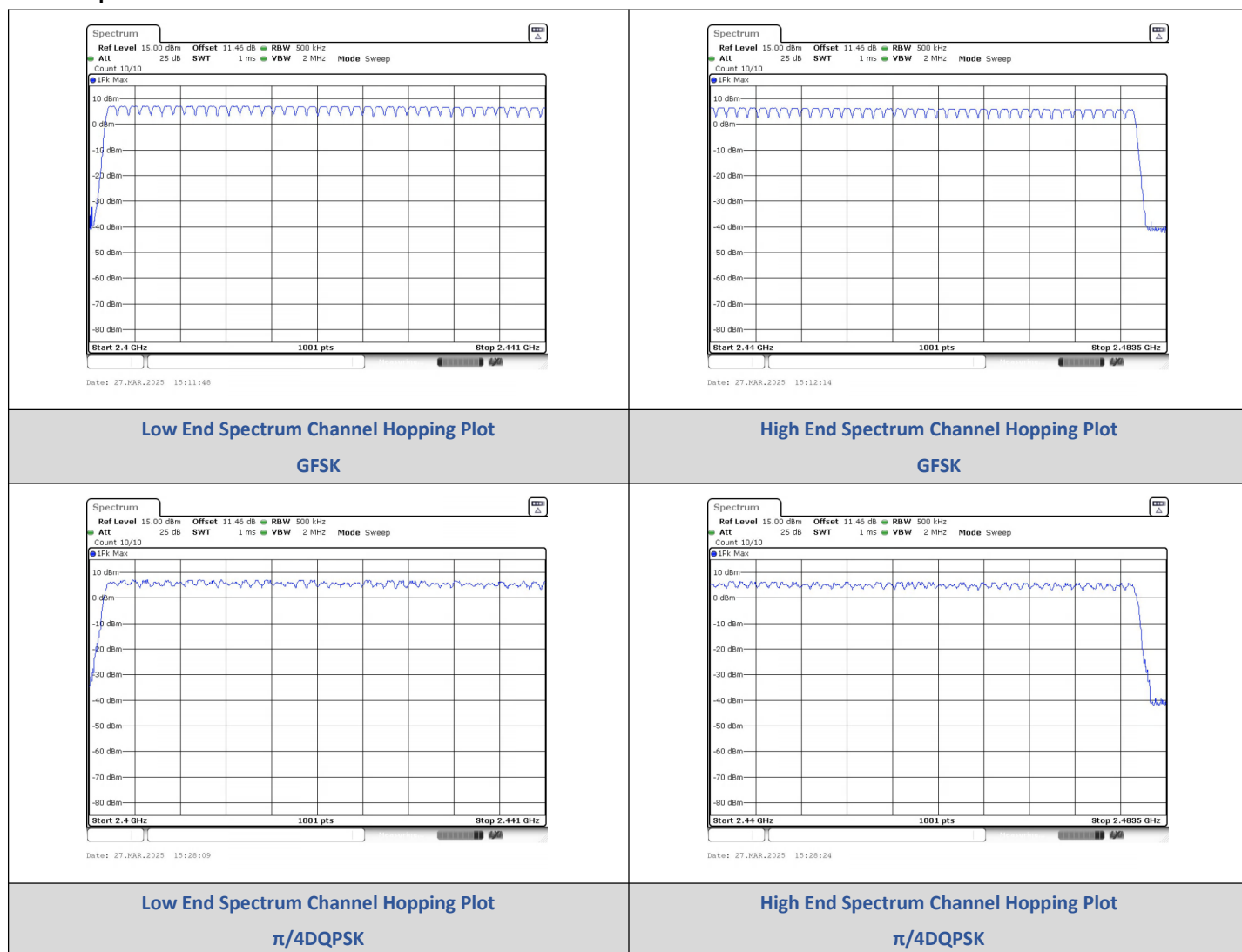
Number of Pulses in 31.6 seconds
8DPSK_3-DH5

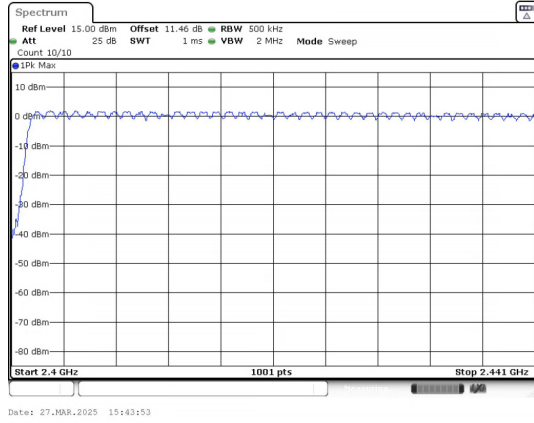
3) Number Of Hopping Channel

Test Result

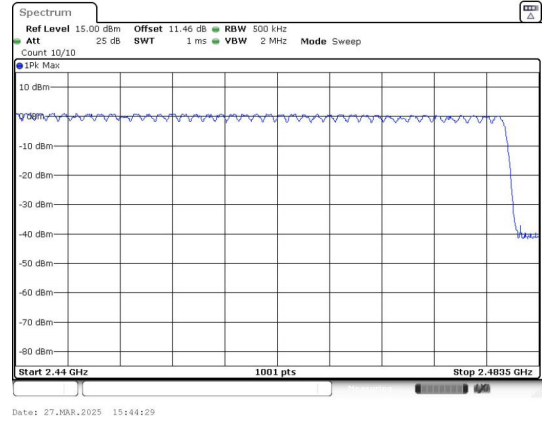
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
$\pi/4$ DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

Test Graphs





Low End Spectrum Channel Hopping Plot
8DPSK



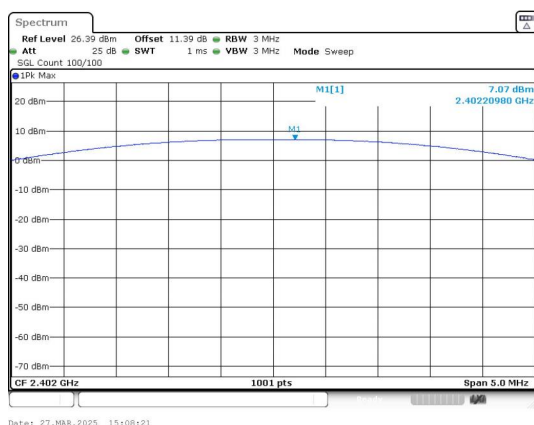
High End Spectrum Channel Hopping Plot
8DPSK

4) Conducted Output Power

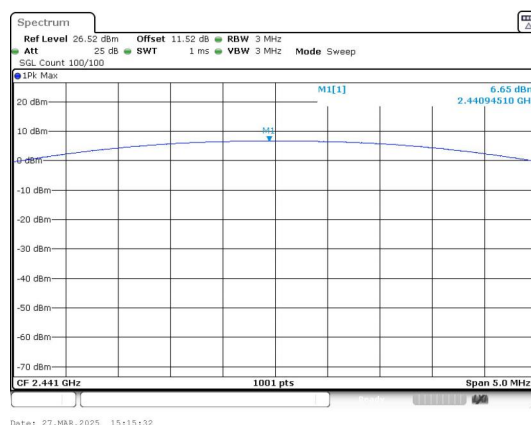
Test Result

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	7.07	5.09	≤30	PASS
		39	6.65	4.62		PASS
		78	5.88	3.87		PASS
$\pi/4$ DQPSK	2-DH5	0	7.68	5.86	≤20.97	PASS
		39	7.28	5.35		PASS
		78	6.47	4.44		PASS
8DPSK	3-DH5	0	2.99	1.99		PASS
		39	2.43	1.75		PASS
		78	1.49	1.41		PASS

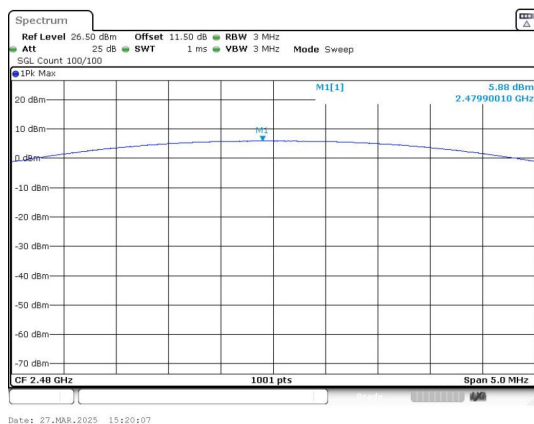
Test Graphs



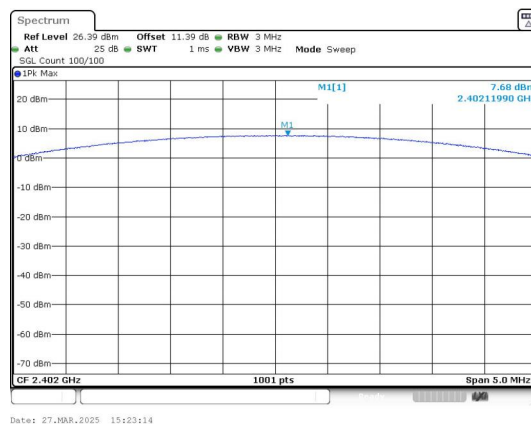
Peak Output Power
GFSK_Channel 0



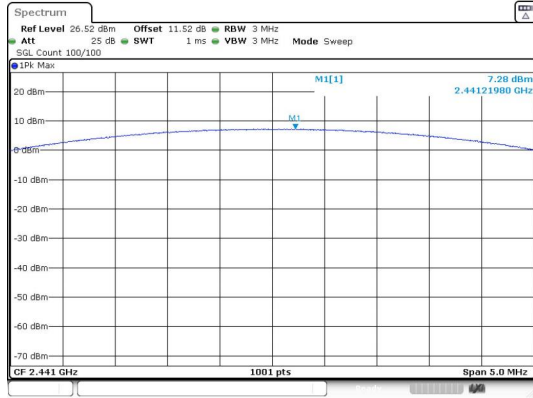
Peak Output Power
GFSK_Channel 39



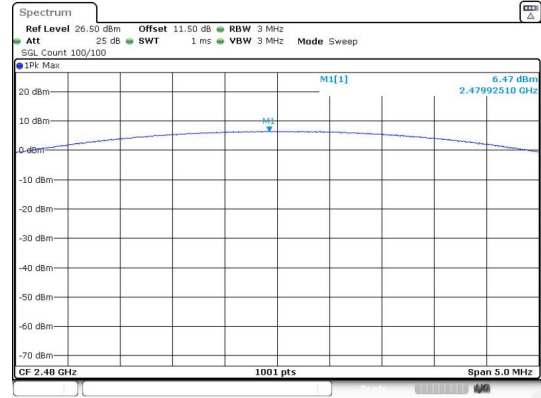
Peak Output Power
GFSK_Channel 78



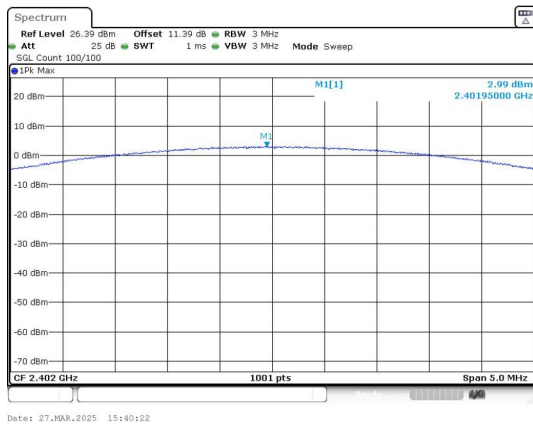
Peak Output Power
 $\pi/4$ DQPSK_Channel 0



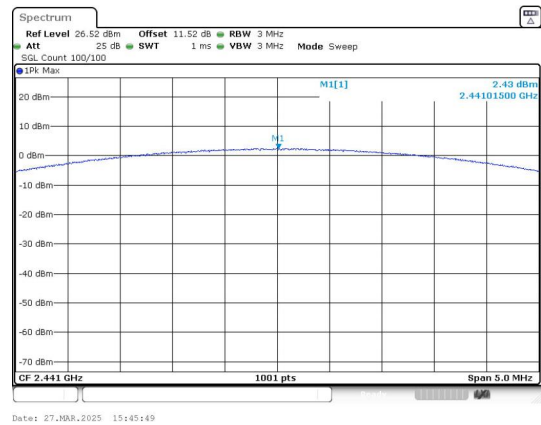
Peak Output Power
 $\pi/4$ DQPSK_Channel 39



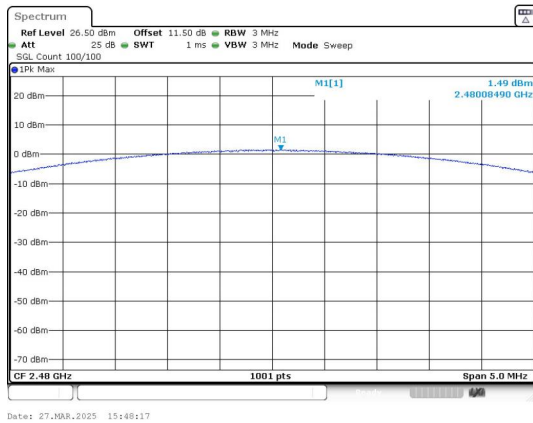
Peak Output Power
 $\pi/4$ DQPSK_Channel 78



Peak Output Power
8DPSK_Channel 0



Peak Output Power
8DPSK_Channel 39



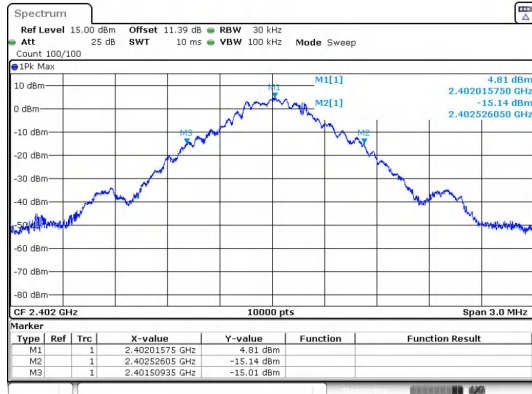
Peak Output Power
8DPSK_Channel 78

5) 20dB Bandwidth

Test Result

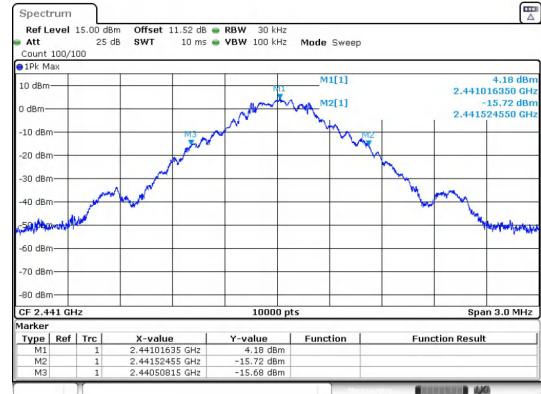
Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.02
	39	2441 MHz	1.02
	78	2480 MHz	1.02
$\pi/4$ DQPSK	0	2402 MHz	1.300
	39	2441 MHz	1.320
	78	2480 MHz	1.310
8DPSK	0	2402 MHz	1.290
	39	2441 MHz	1.290
	78	2480 MHz	1.290

Test Graphs



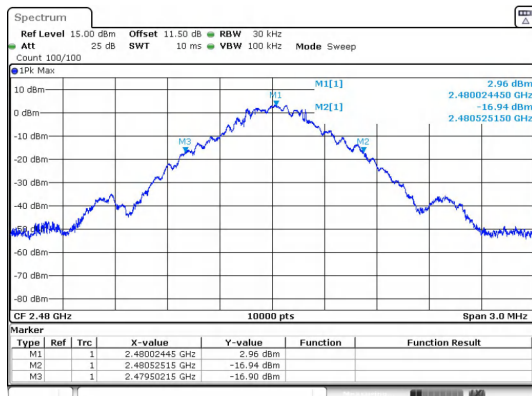
Date: 27.MAR.2025 15:10:05

GFSK_DH5_Channel 0



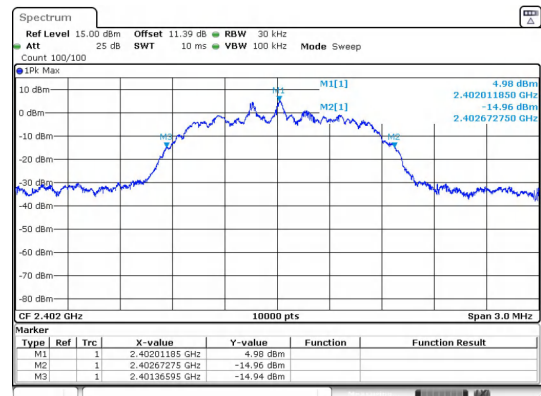
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GFSK_DH5_Channel 39



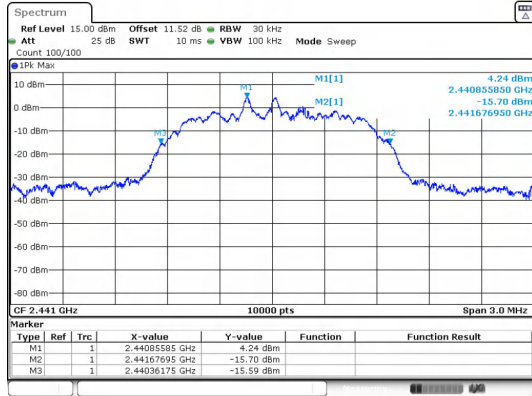
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GFSK_DH5_Channel 78

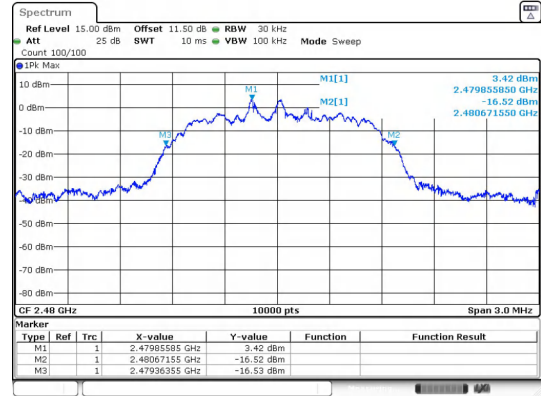


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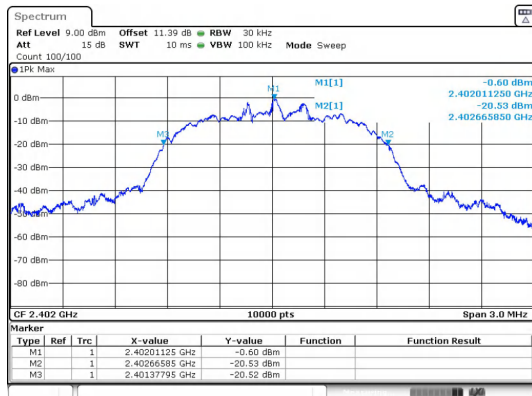
 $\pi/4$ DQPSK_2-DH5_Channel 0



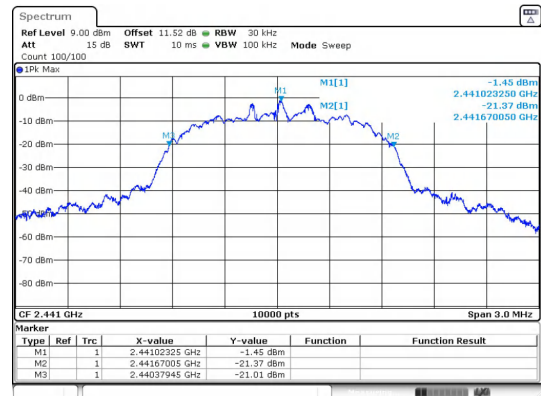
$\pi/4$ DQPSK_2-DH5_Channel 39



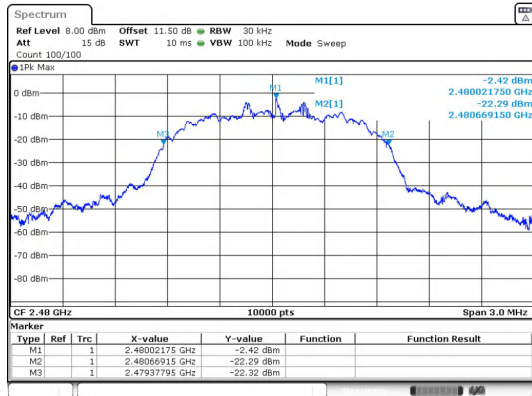
$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



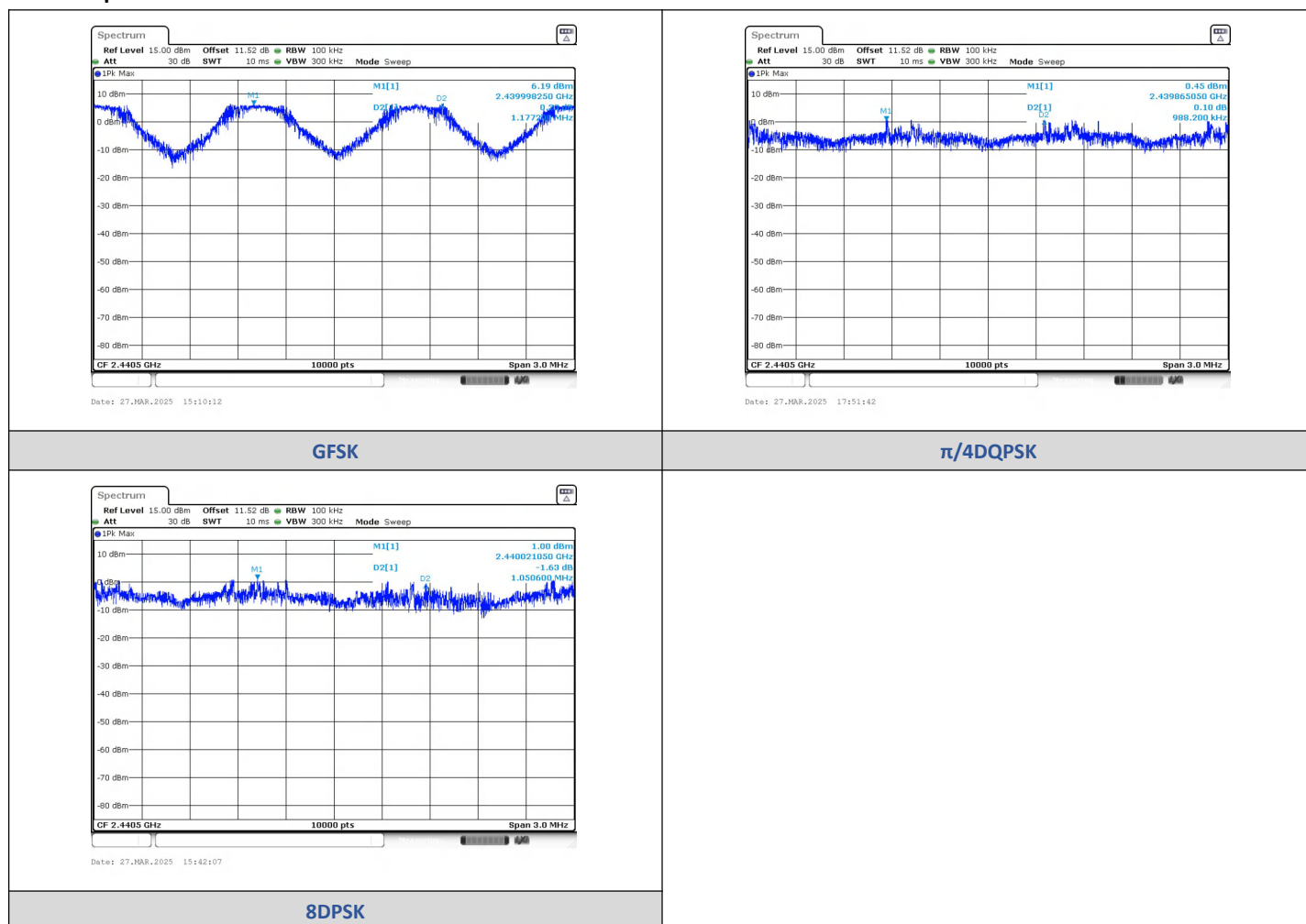
8DPSK_3-DH5_Channel 78

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	2439.9983	2441.1755	1.1772	1.02	PASS
$\pi/4$ DQPSK	2-DH5	2439.865	2440.8533	0.9882	0.88	PASS
8DPSK	3-DH5	2440.021	2441.0716	1.0506	0.86	PASS

Test Graphs



7) Conducted Out Of Band Emission

Test Result

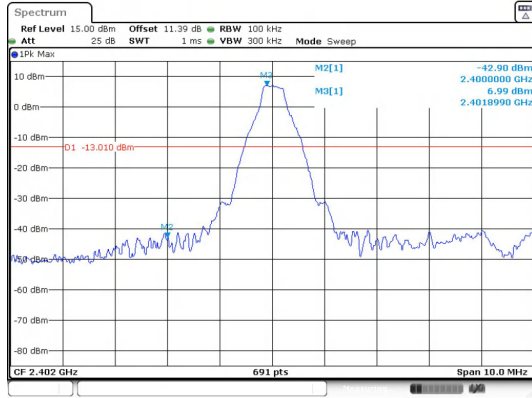
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-42.900	-13.01	-29.890	PASS
			7205.96	-39.768	-13.01	-26.758	PASS
		39	9763.72	-40.825	-13.57	-27.255	PASS
		78	2483.50	-49.940	-14.26	-35.680	PASS
			9920.20	-37.220	-14.26	-22.960	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-43.670	-13.01	-30.660	PASS
			5744.38	-38.033	-13.01	-25.023	PASS
		39	9763.72	-40.375	-13.79	-26.585	PASS
		78	2483.50	-49.770	-14.21	-35.560	PASS
			9920.20	-37.081	-14.21	-22.871	PASS
8DPSK	3-DH5	0	2397.96	-48.299	-18.57	-29.729	PASS
			2400.00	-49.220	-18.57	-30.650	PASS
			9608.10	-43.243	-18.57	-24.673	PASS
		39	9763.72	-42.599	-18.93	-23.669	PASS
		78	2483.50	-50.320	-19.89	-30.430	PASS
			9920.20	-39.617	-19.89	-19.727	PASS

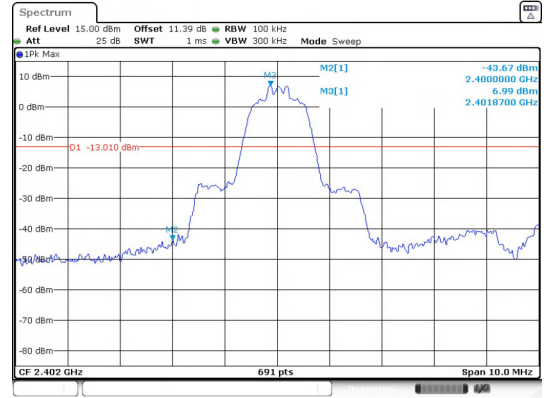
Hopping

Hopping							
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2398.32	-48.424	-13.0	-35.424	PASS
			2400.00	-50.210	-13.0	-37.210	PASS
			2483.50	-49.570	-14.33	-35.240	PASS
$\pi/4$ DQPSK	2-DH5		2400.00	-44.830	-13.01	-31.820	PASS
			2483.50	-48.840	-14.22	-34.620	PASS
8DPSK	3-DH5		2397.76	-48.290	-18.93	-29.360	PASS
			2400.00	-50.080	-18.93	-31.150	PASS
			2483.50	-50.250	-20.33	-29.920	PASS

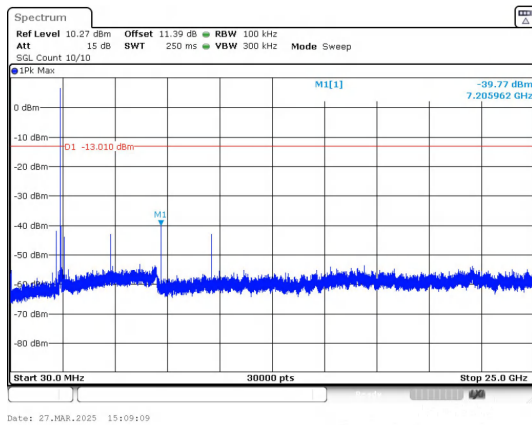
Test Graphs



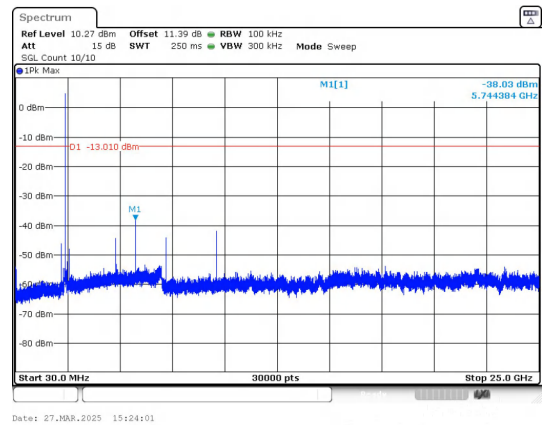
Out Of Band Emission
GFSK_DH5_Channel 0



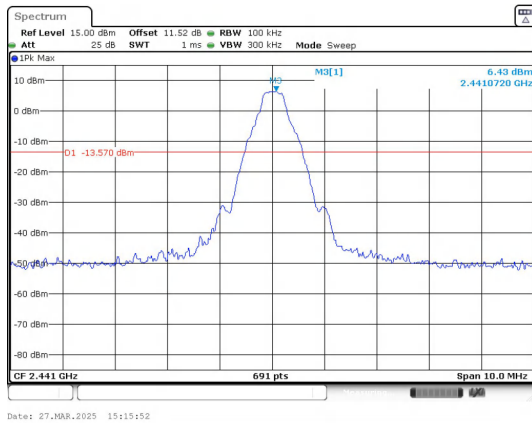
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 0



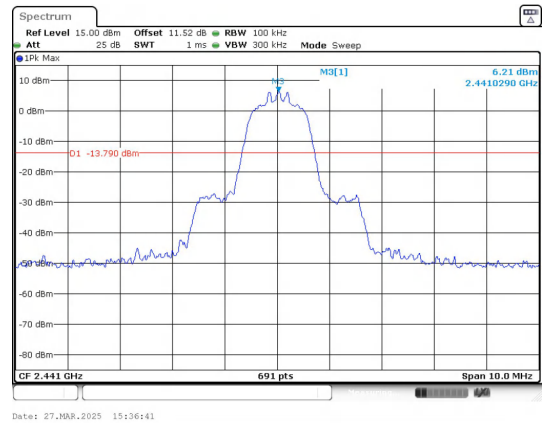
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



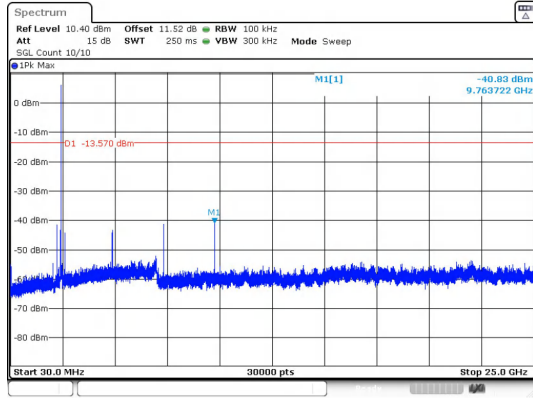
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 0



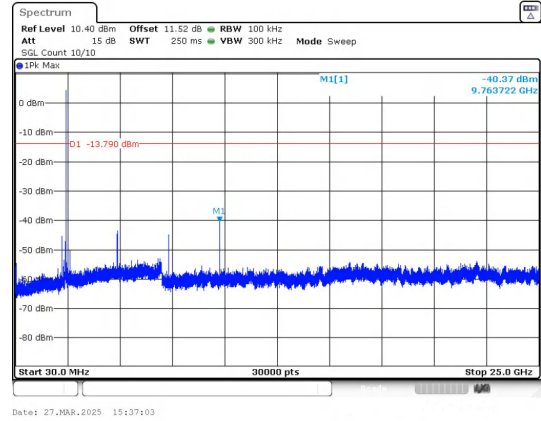
Out Of Band Emission
GFSK_DH5_Channel 39



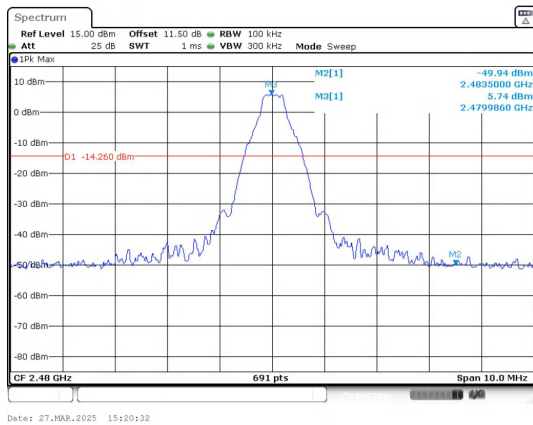
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39



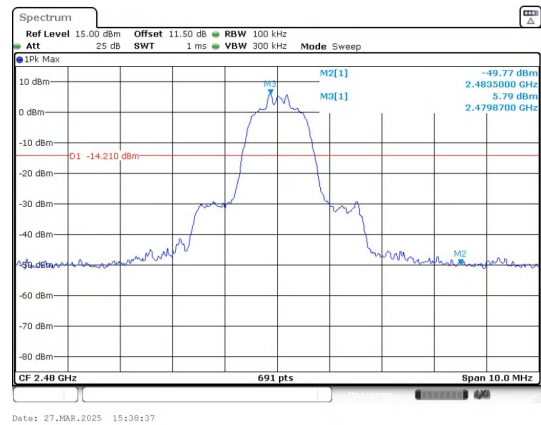
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



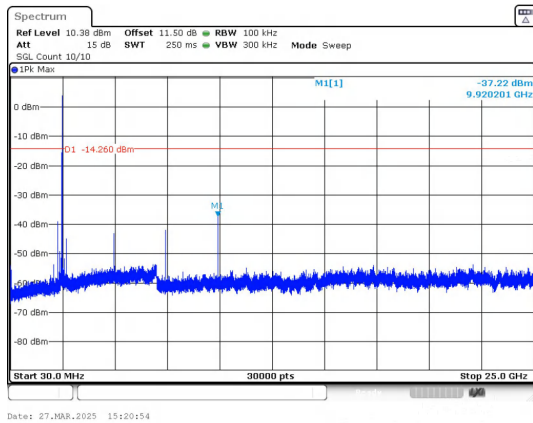
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39



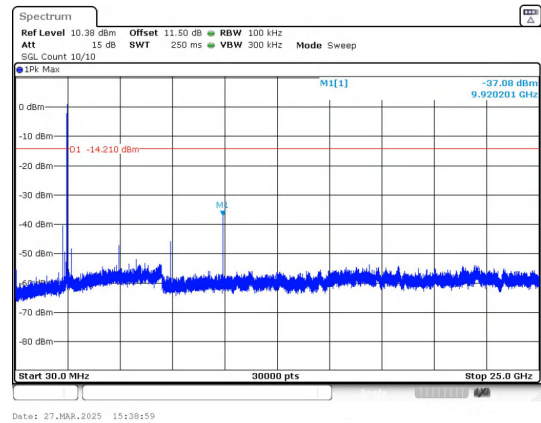
Out Of Band Emission
GFSK_DH5_Channel 78



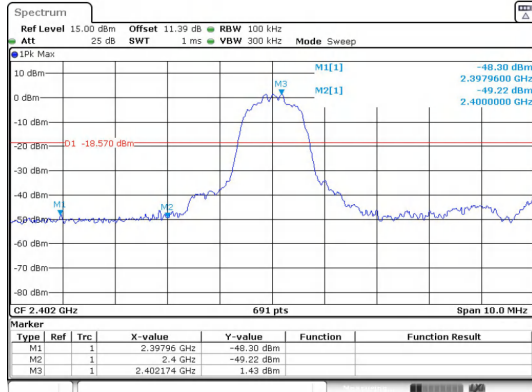
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



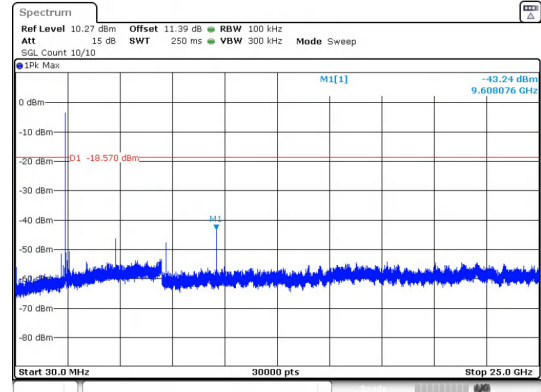
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



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



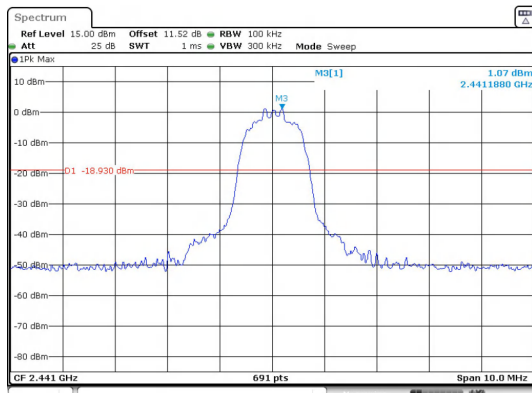
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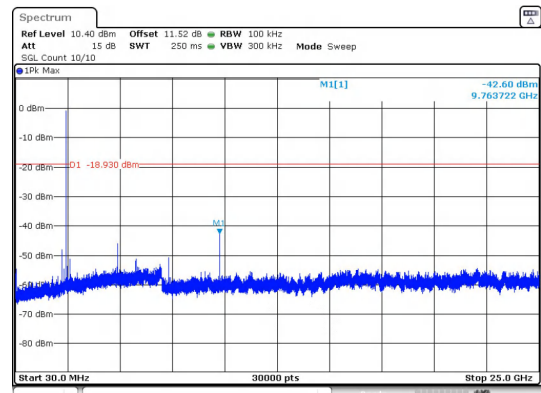
Date: 27.MAR.2025 15:41:10

Out Of Band Emission
8DPSK_3-DH5_Channel 0

30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



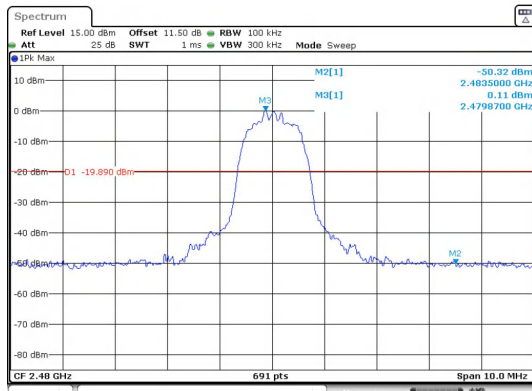
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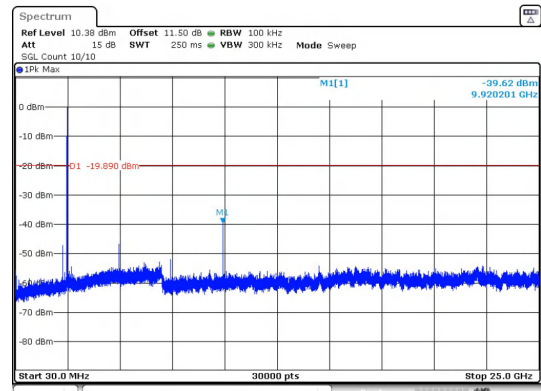
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Out Of Band Emission
8DPSK_3-DH5_Channel 39

30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



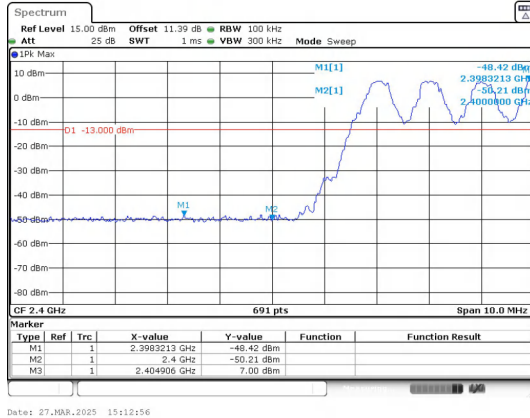
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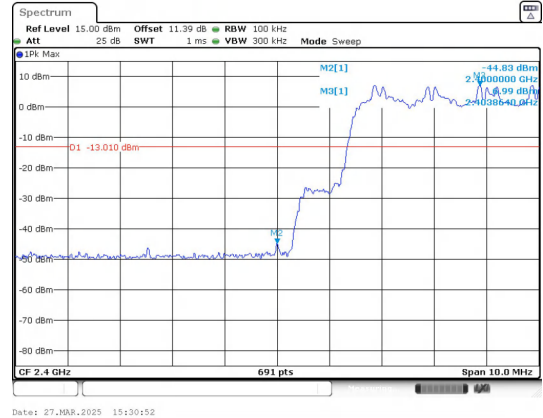
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Out Of Band Emission
8DPSK_3-DH5_Channel 78

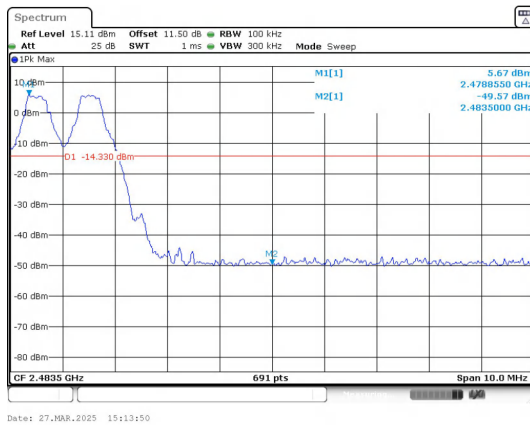
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



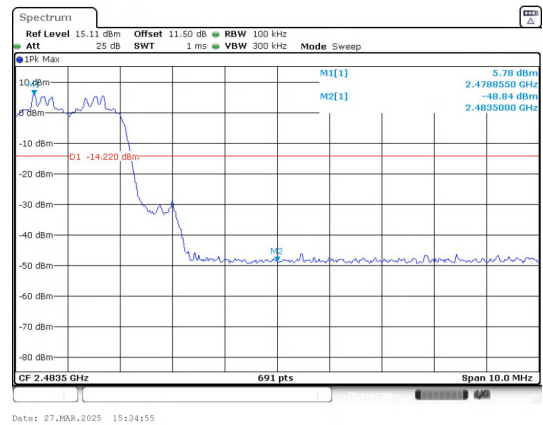
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



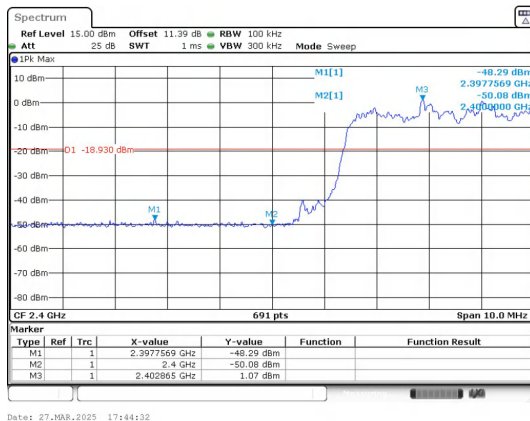
Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



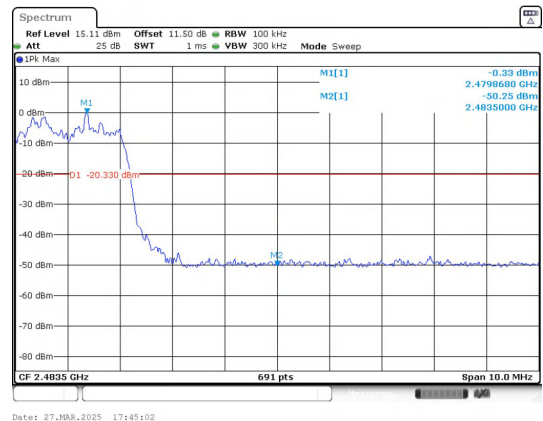
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



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-----