

Appendix Report

Report No.:	CISRR25011411301
Test Engineer:	Lucas Huang
Supervised by:	Rory Huang

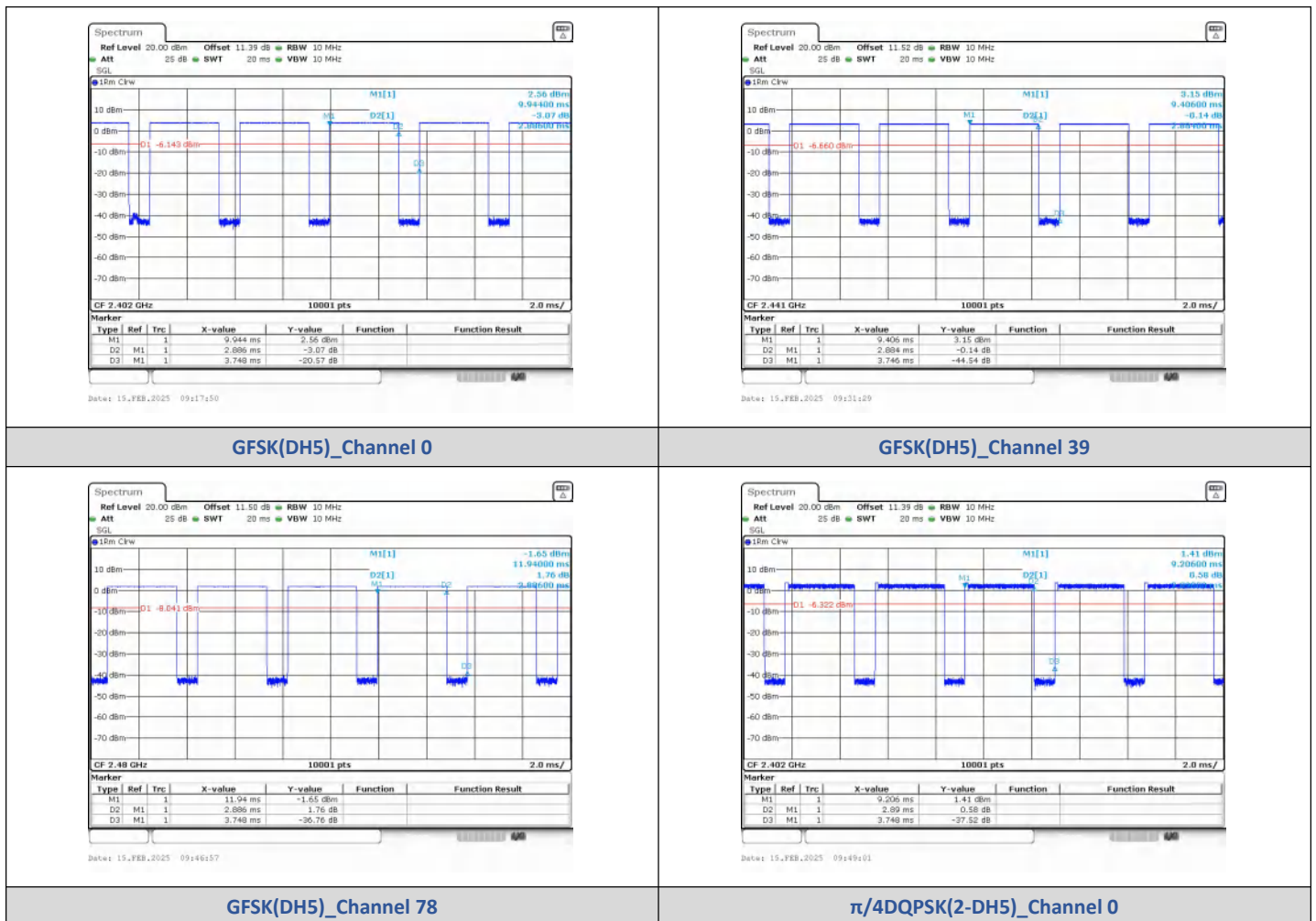
1) Duty Cycle

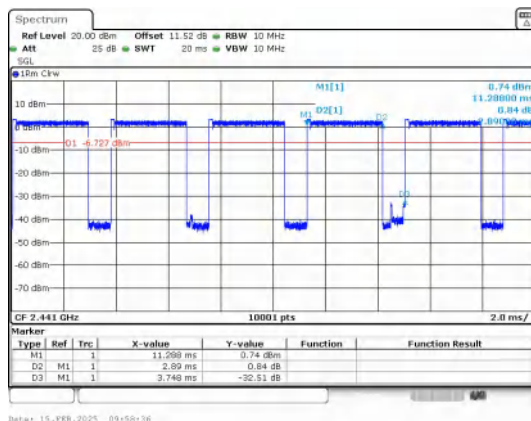
Test Result

Left:

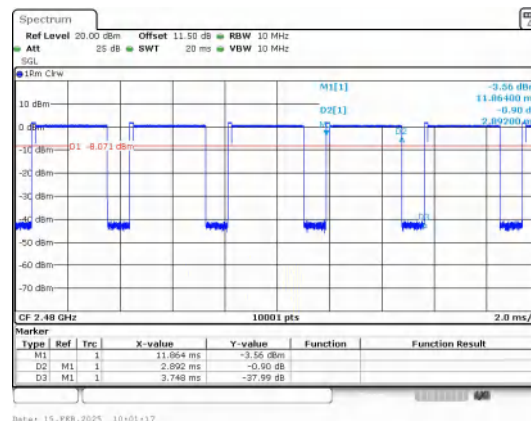
Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.886	3.748	77.00	0.7700	1.1351	0.3465
		39	2.884	3.746	76.99	0.7699	1.1357	0.3467
		78	2.886	3.748	77.00	0.7700	1.1351	0.3465
$\pi/4$ DQPSK	2-DH5	0	2.890	3.748	77.11	0.7711	1.1289	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	2.892	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

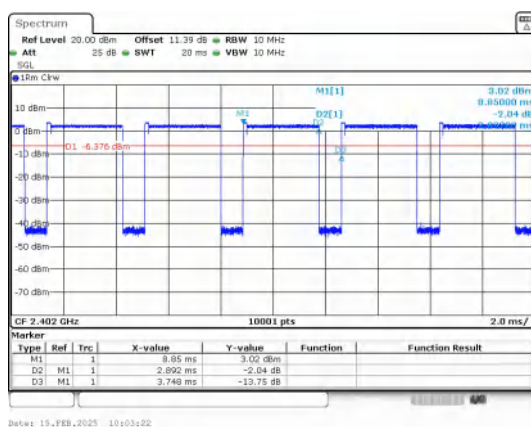




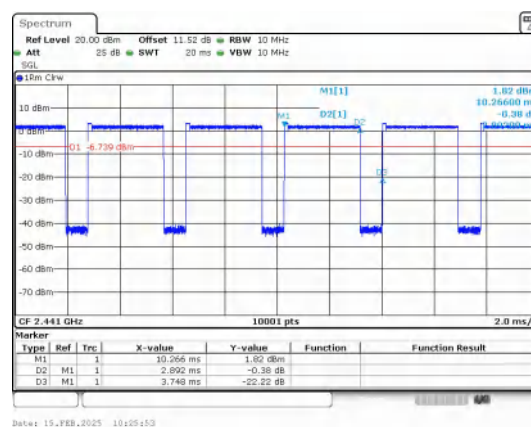
$\pi/4$ DQPSK(2-DH5)_Channel 39



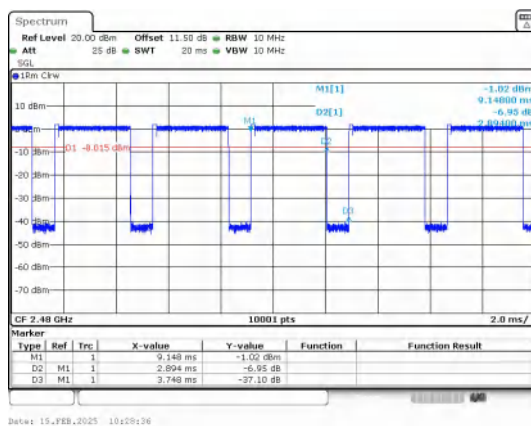
$\pi/4$ DQPSK(2-DH5)_Channel 78



8DPSK(3-DH5)_Channel 0



8DPSK(3-DH5)_Channel 39



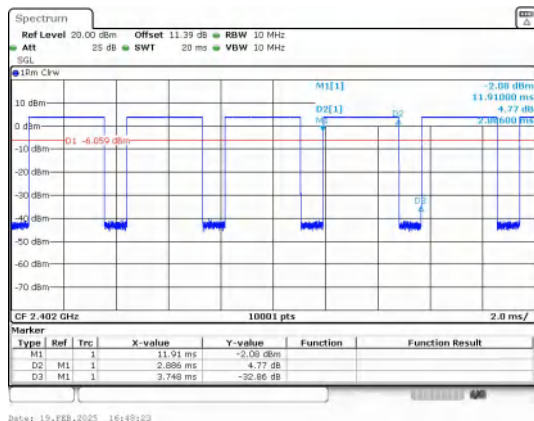
8DPSK(3-DH5)_Channel 78

Right:

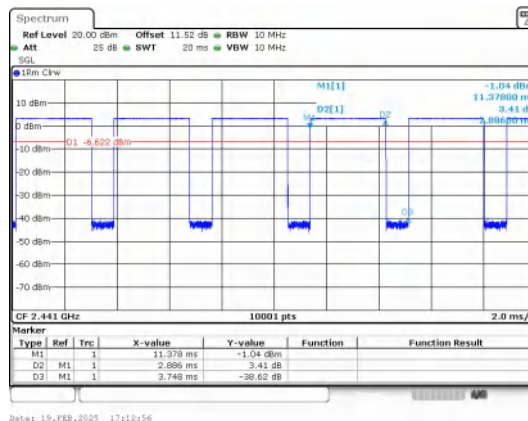
Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.886	3.748	77.00	0.7700	1.1351	0.3465
		39	2.886	3.748	77.00	0.7700	1.1351	0.3465
		78	2.886	3.748	77.00	0.7700	1.1351	0.3465
$\pi/4$ DQPSK	2-DH5	0	2.890	3.748	77.11	0.7711	1.1289	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	2.894	3.748	77.21	0.7721	1.1233	0.3455
		78	2.894	3.748	77.21	0.7721	1.1233	0.3455

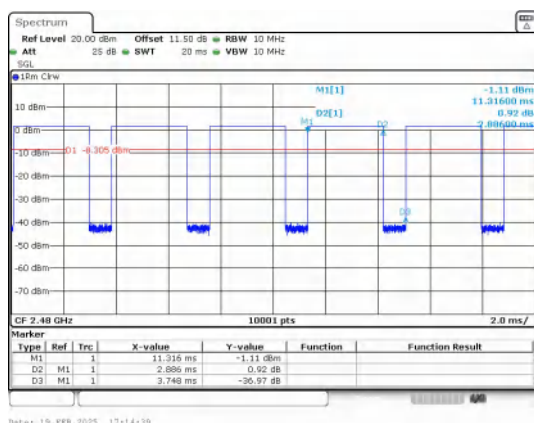
Test Graphs



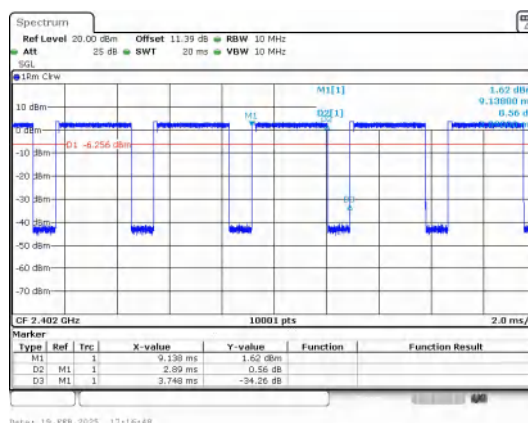
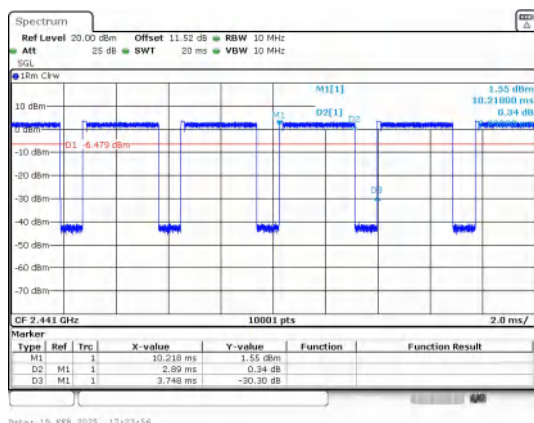
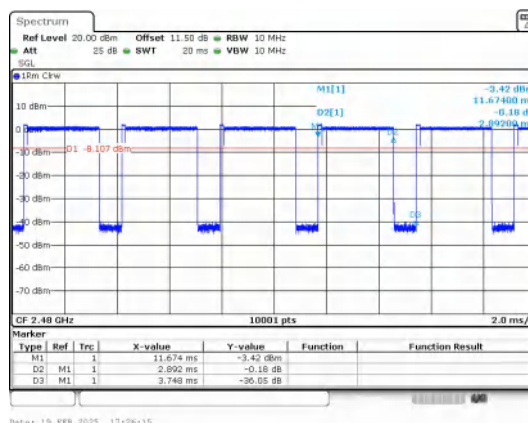
GFSK(DH5)_Channel 0

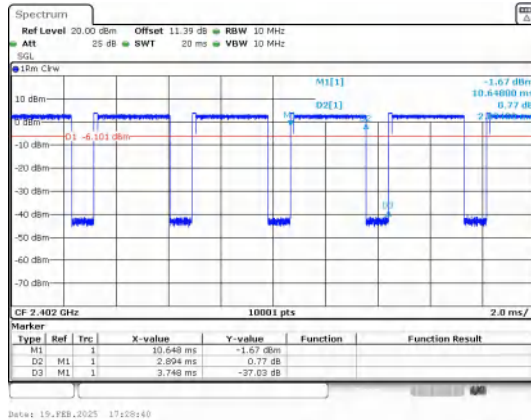


GFSK(DH5)_Channel 39

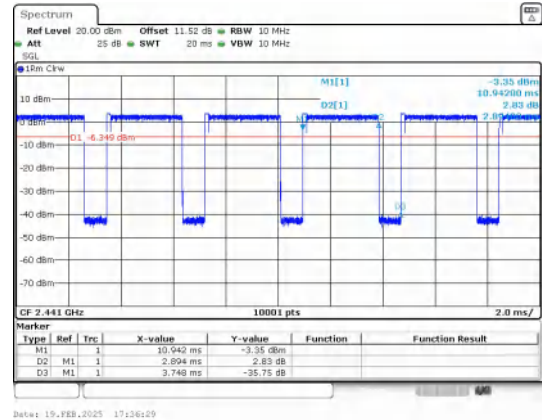


GFSK(DH5)_Channel 78

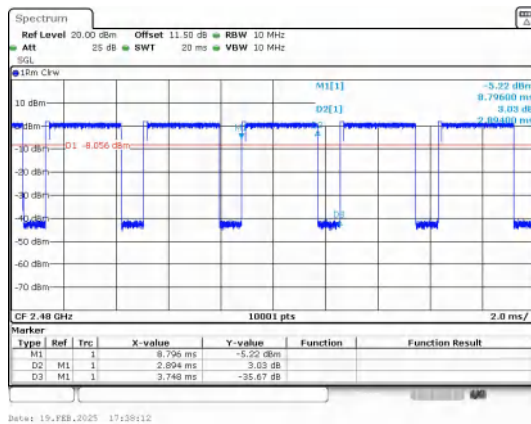

 $\pi/4$ DQPSK(2-DH5)_Channel 0

 $\pi/4$ 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

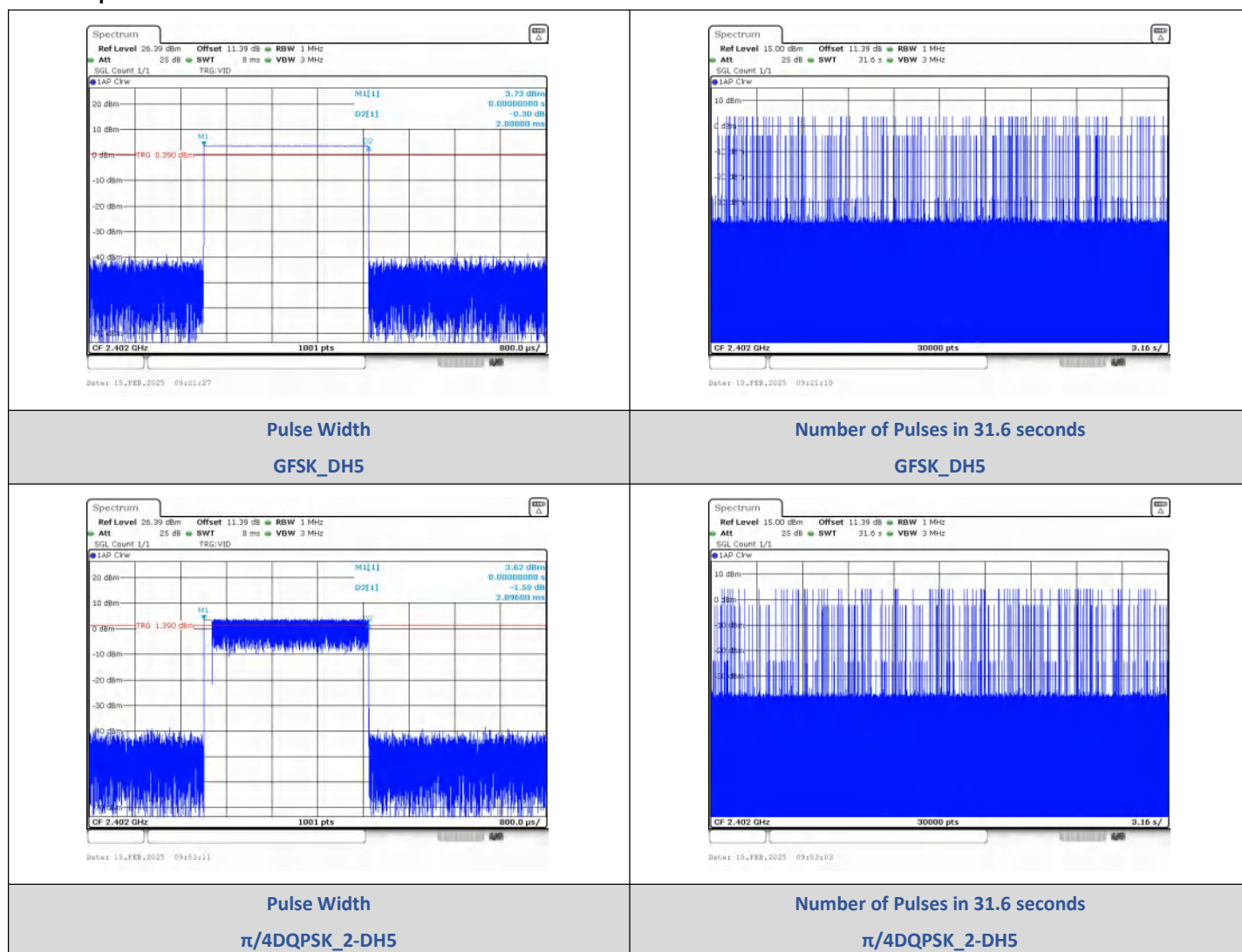
2) Dwell Time

Test Result

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	105	303.24	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.896	103	298.29		PASS
8DPSK	3-DH5		2.896	103	298.29		PASS

Test Graphs



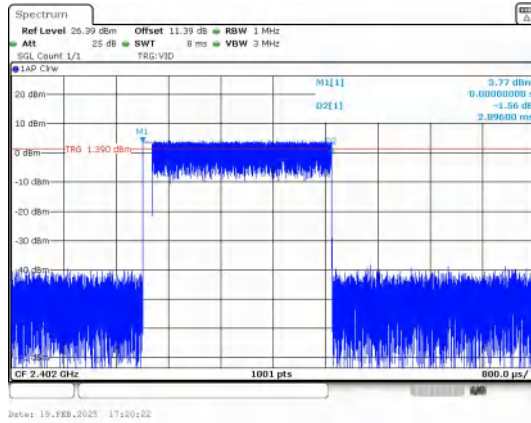


Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.888	97	280.14	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.896	100	289.6		PASS
8DPSK	3-DH5		2.896	107	309.87		PASS

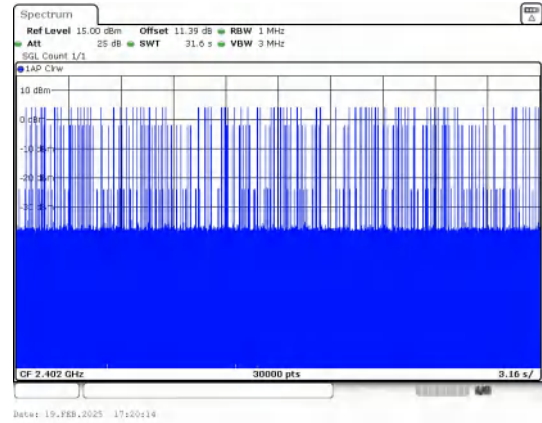
Pulse Width

GFSK_DH5

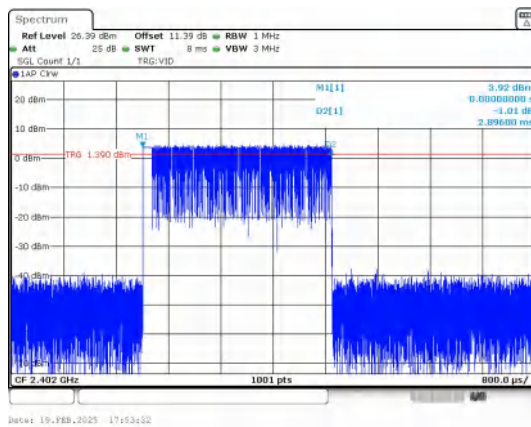




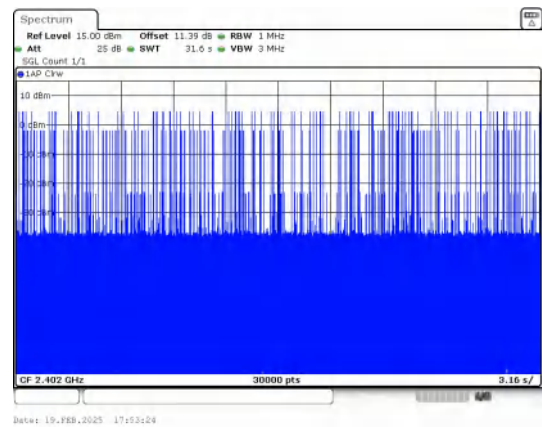
Pulse Width
 $\pi/4$ DQPSK_2-DH5



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

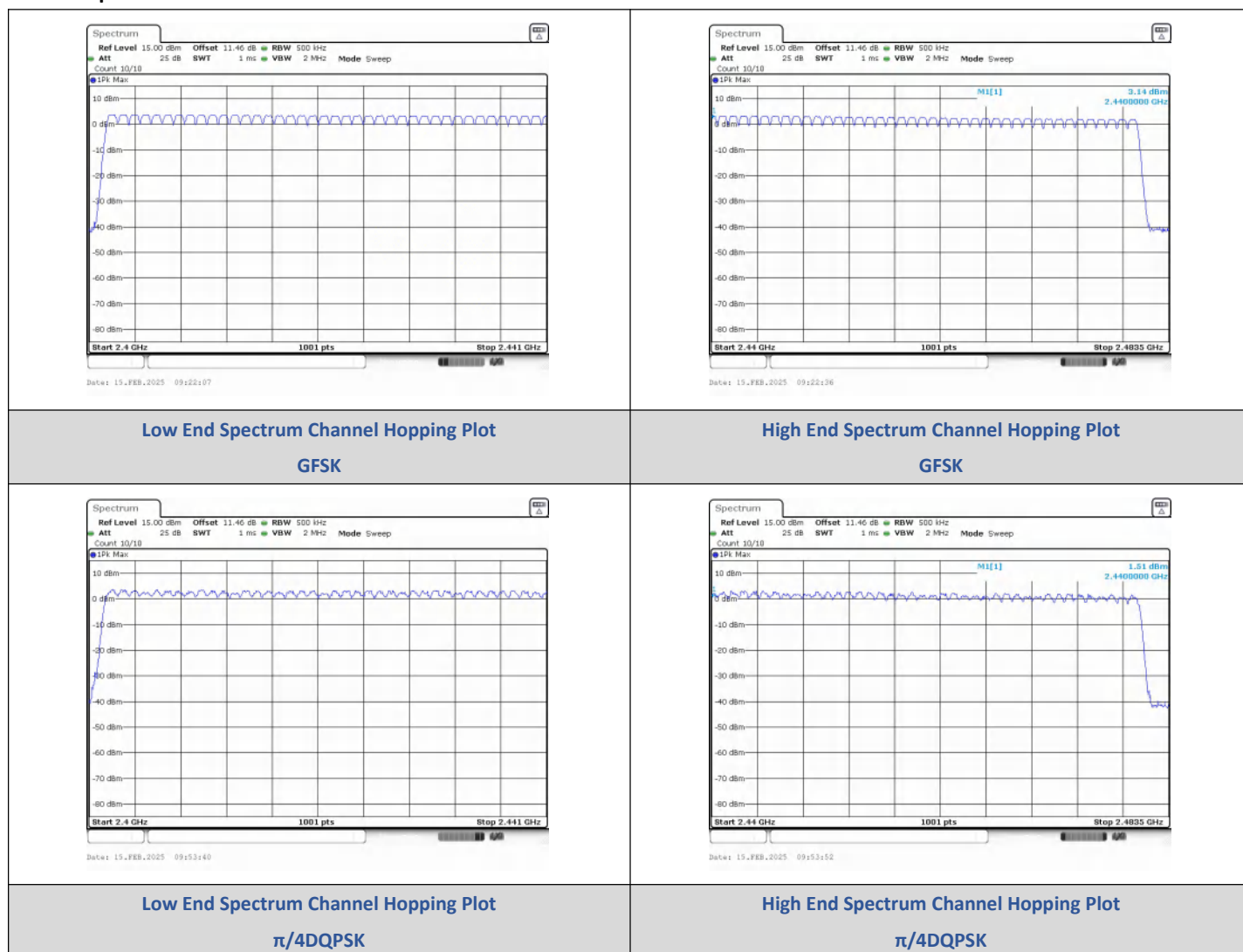
3) Number Of Hopping Channel

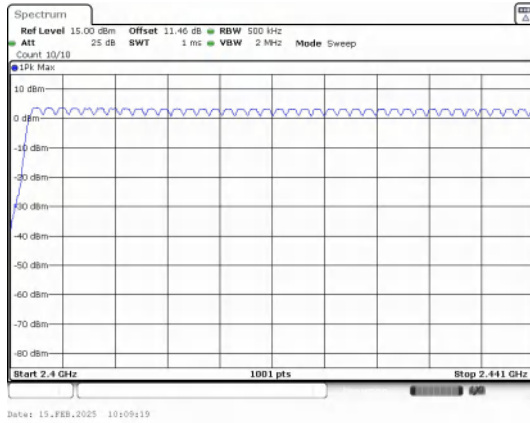
Test Result

Left:

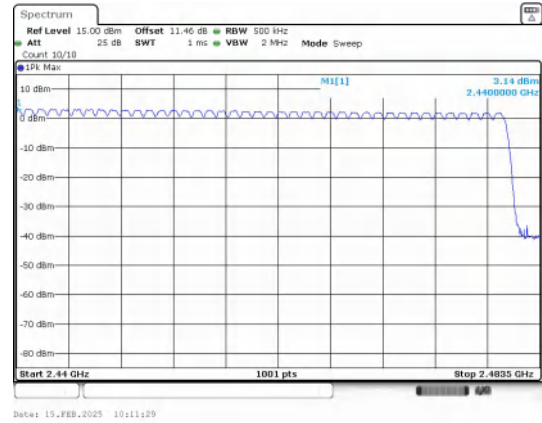
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
$\pi/4$ DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

Test Graphs





Low End Spectrum Channel Hopping Plot
8DPSK



High End Spectrum Channel Hopping Plot
8DPSK

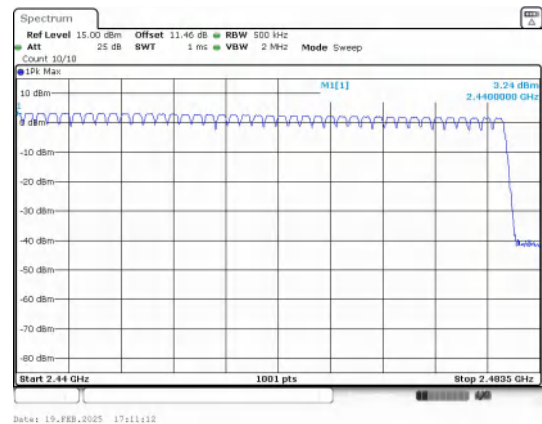
Right:

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

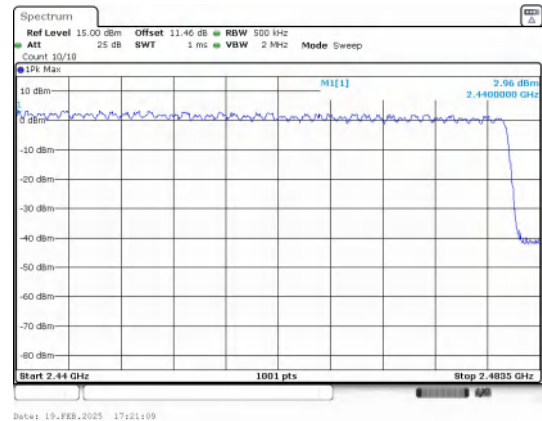
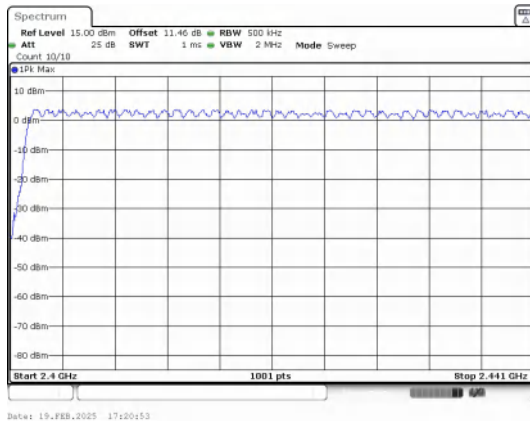
Test Graphs

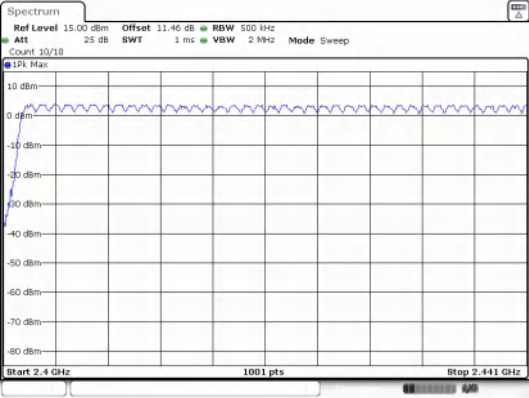
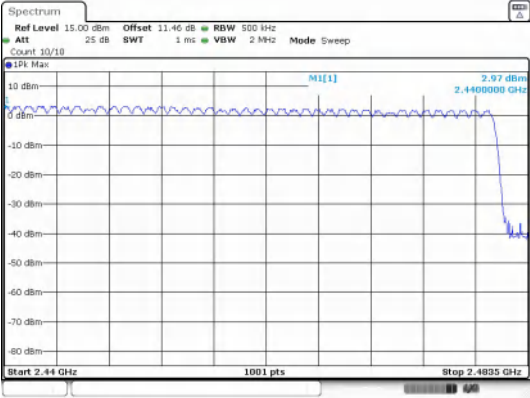


Low End Spectrum Channel Hopping Plot
GFSK



High End Spectrum Channel Hopping Plot
GFSK



Low End Spectrum Channel Hopping Plot $\pi/4$DQPSK 	High End Spectrum Channel Hopping Plot $\pi/4$DQPSK 
Low End Spectrum Channel Hopping Plot 8DPSK	High End Spectrum Channel Hopping Plot 8DPSK

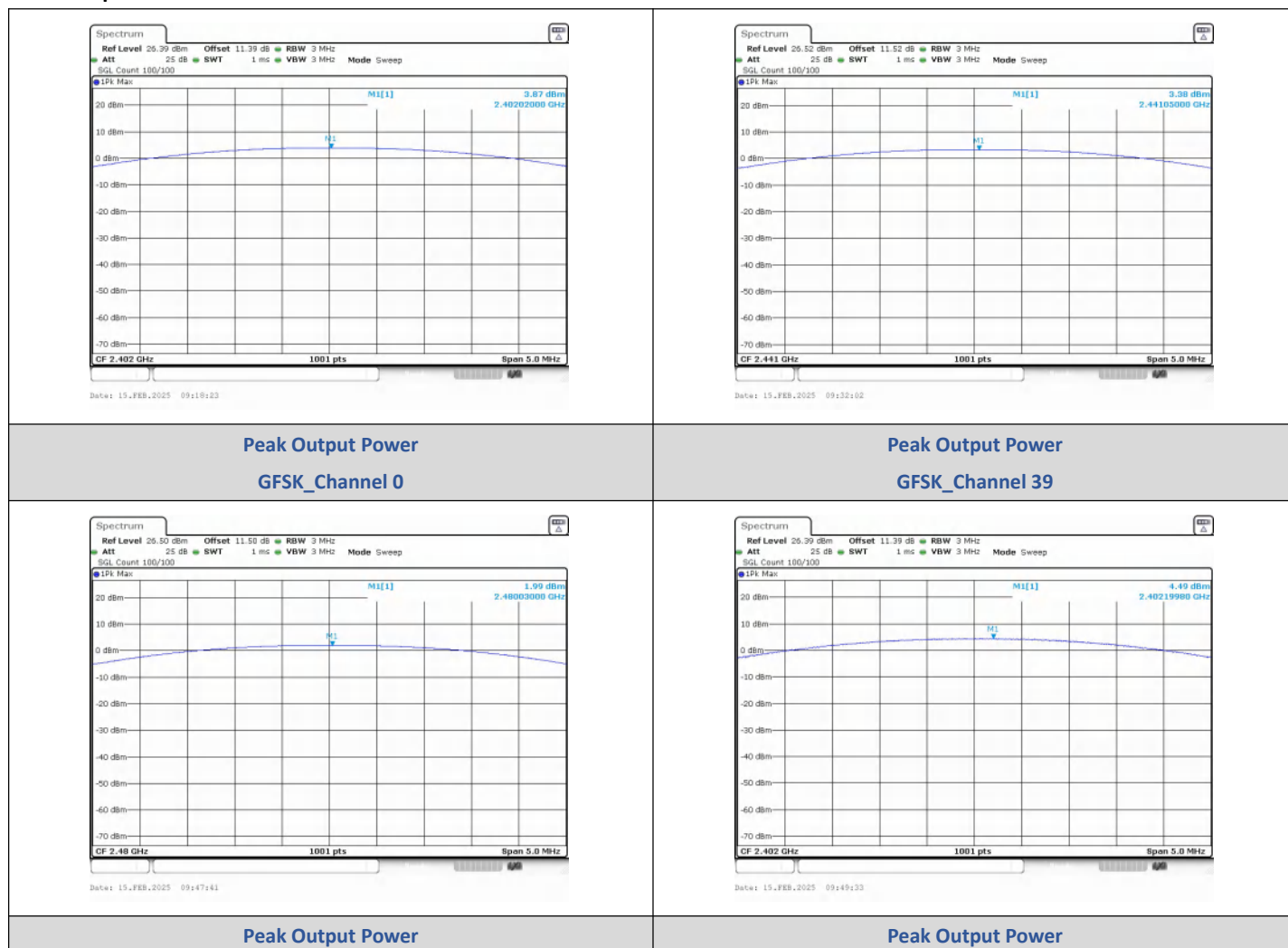
4) Conducted Peak Output Power

Test Result

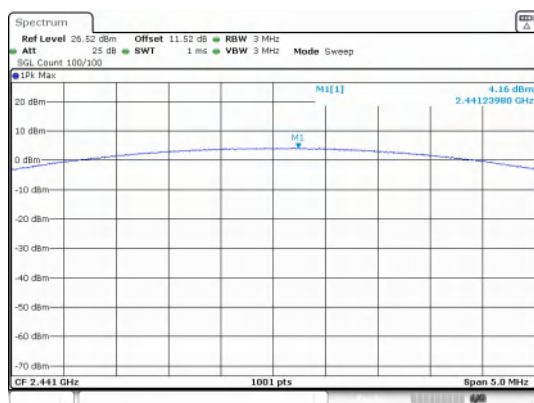
Left:

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	3.87	2.44	≤30	PASS
		39	3.38	2.18		PASS
		78	1.99	1.58		PASS
$\pi/4$ DQPSK	2-DH5	0	4.49	2.81	≤20.97	PASS
		39	4.16	2.61		PASS
		78	2.82	1.91		PASS
8DPSK	3-DH5	0	4.76	2.99		PASS
		39	4.47	2.80		PASS
		78	6.23	4.20		PASS

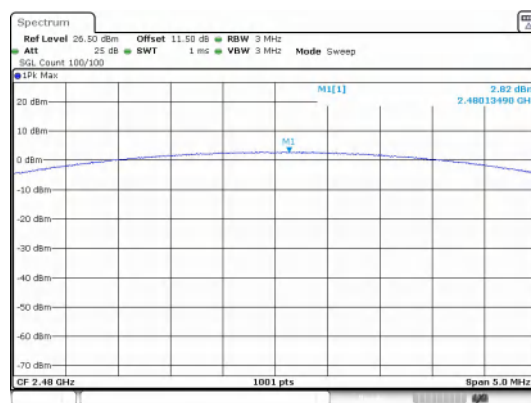
Test Graphs



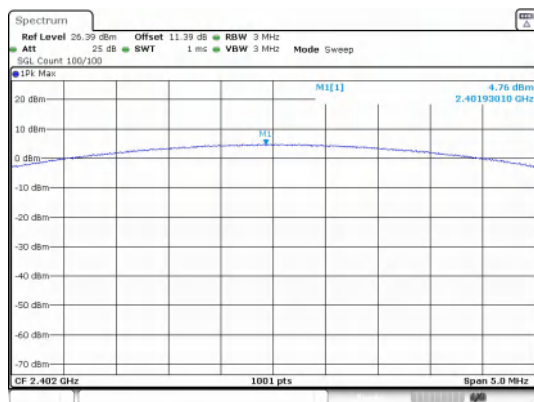
GFSK_Channel 78



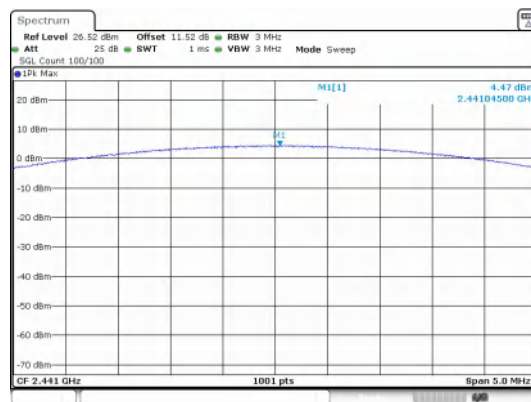
Date: 15.FEB.2025 09:59:13

 $\pi/4$ DQPSK_Channel 0


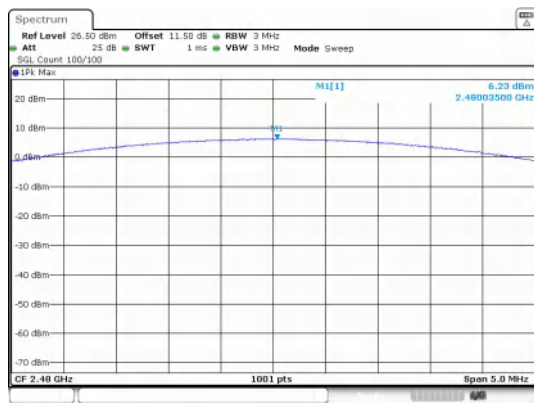
Date: 15.FEB.2025 10:02:01

Peak Output Power
 $\pi/4$ DQPSK_Channel 39


Date: 15.FEB.2025 10:03:55

Peak Output Power
 $\pi/4$ DQPSK_Channel 78


Date: 15.FEB.2025 10:06:29

Peak Output Power
8DPSK_Channel 0


Date: 15.FEB.2025 11:13:57

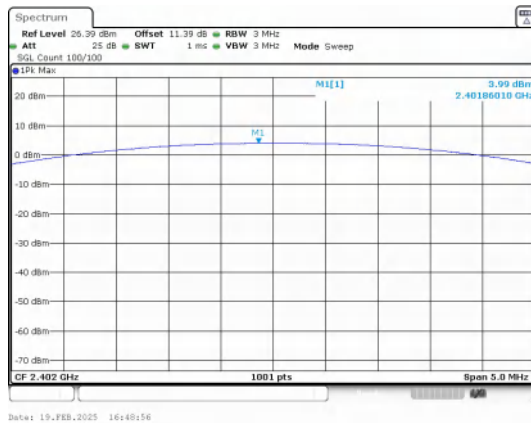
Peak Output Power
8DPSK_Channel 78

Right:

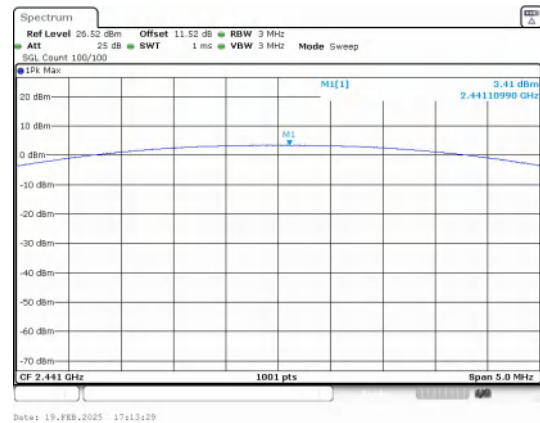
Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	3.99	2.51	≤30	PASS

		39	3.41	2.19		PASS
		78	1.77	1.50		PASS
		0	4.55	2.85		PASS
$\pi/4$ DQPSK	2-DH5	39	4.40	2.75	≤ 20.97	PASS
		78	2.78	1.90		PASS
		0	4.96	3.13		PASS
8DPSK	3-DH5	39	4.78	3.01		PASS
		78	3.18	2.08		PASS
						PASS

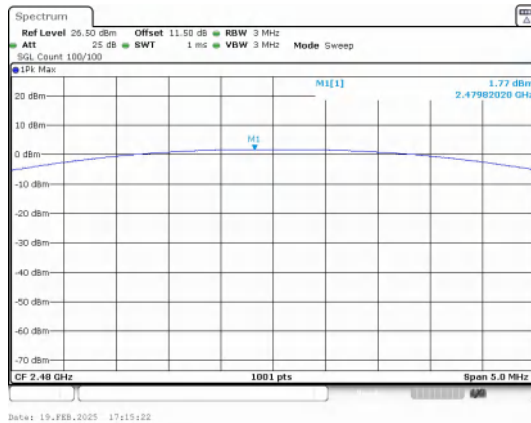
Test Graphs



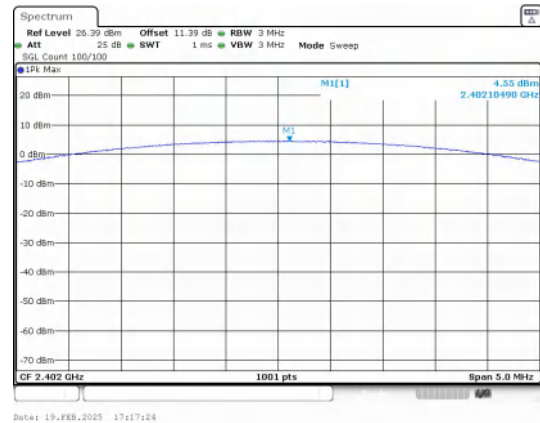
Peak Output Power
GFSK_Channel 0



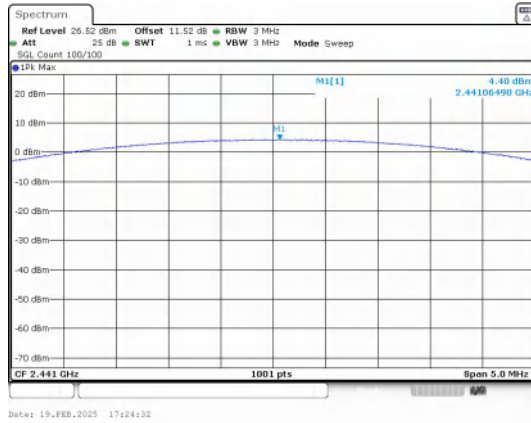
Peak Output Power
GFSK_Channel 39



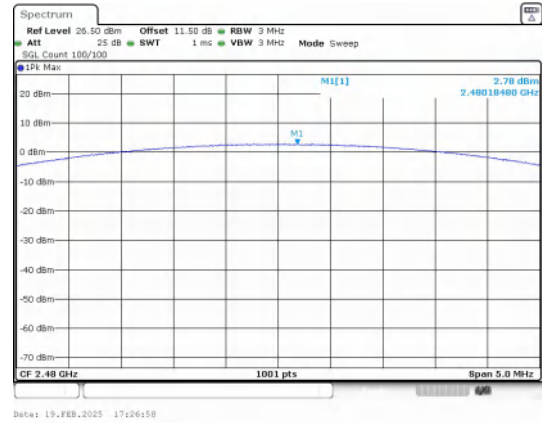
Peak Output Power
GFSK_Channel 78



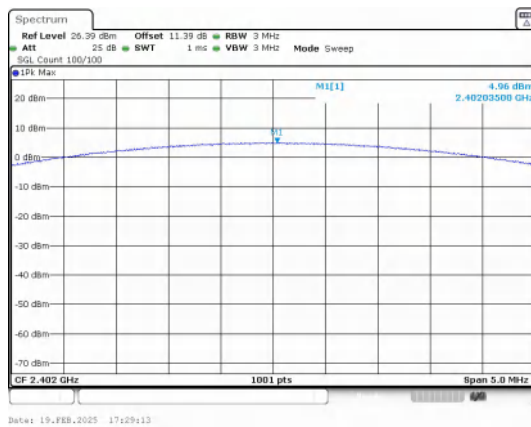
Peak Output Power
 $\pi/4$ DQPSK_Channel 0



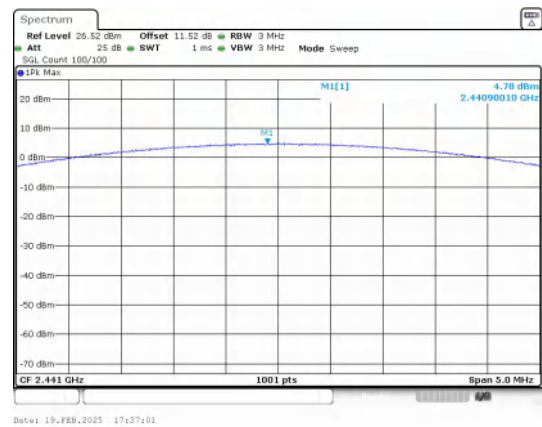
Peak Output Power
 $\pi/4$ DQPSK_Channel 39



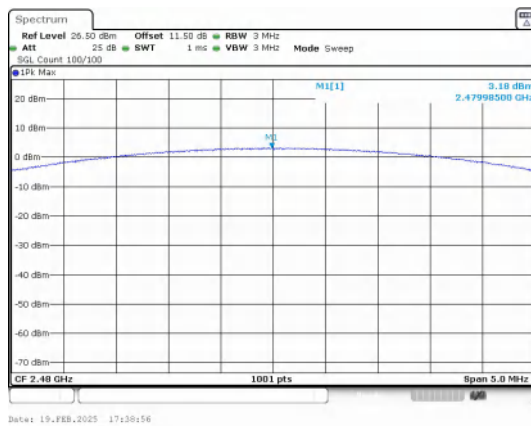
Peak Output Power
 $\pi/4$ DQPSK_Channel 78



Peak Output Power
8DPSK_Channel 0



Peak Output Power
8DPSK_Channel 39



Peak Output Power
8DPSK_Channel 78

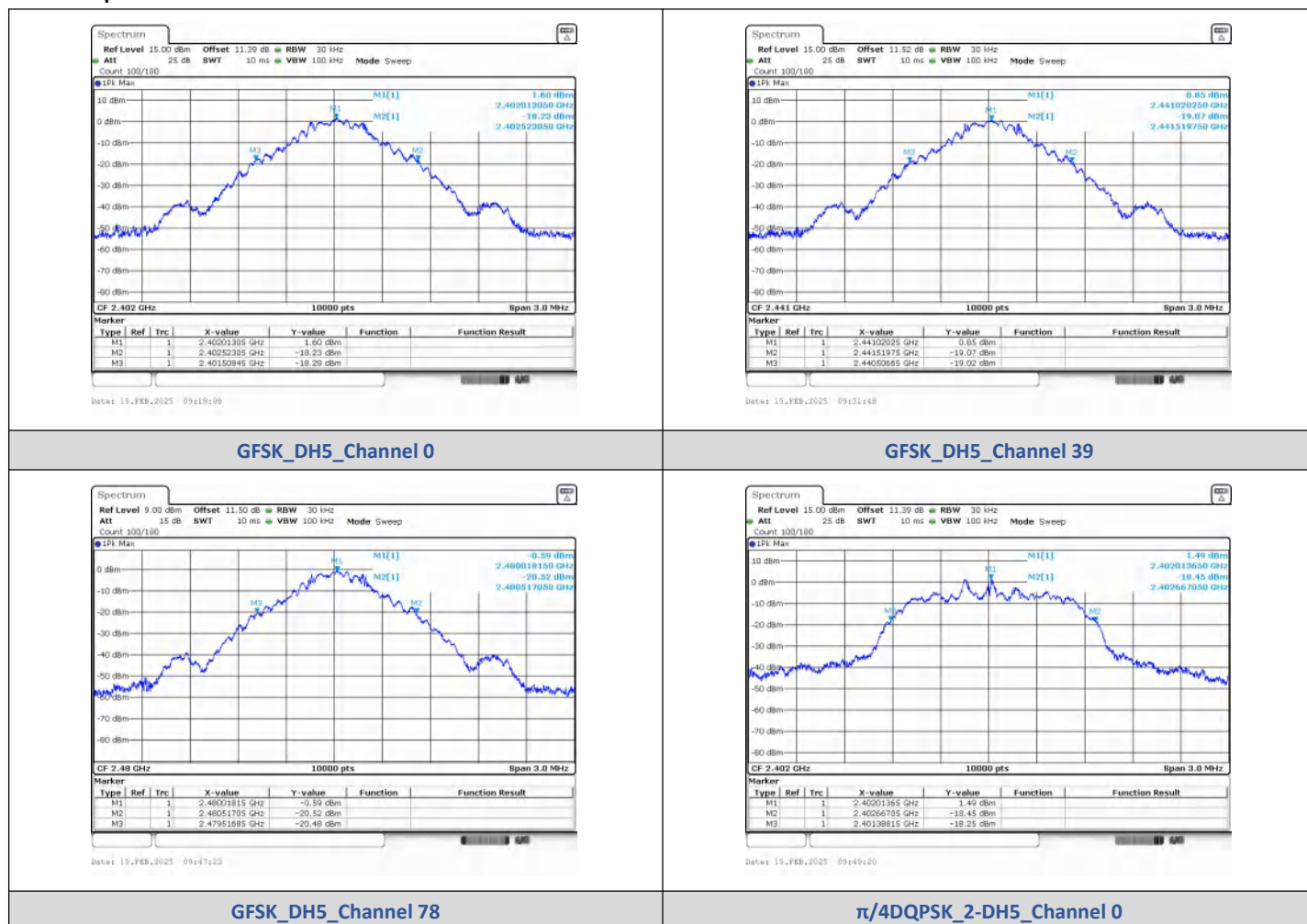
5) 20dB Bandwidth

Test Result

Left:

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.010
	39	2441 MHz	1.010
	78	2480 MHz	1.000
$\pi/4$ DQPSK	0	2402 MHz	1.280
	39	2441 MHz	1.300
	78	2480 MHz	1.310
8DPSK	0	2402 MHz	1.290
	39	2441 MHz	1.290
	78	2480 MHz	1.290

Test Graphs

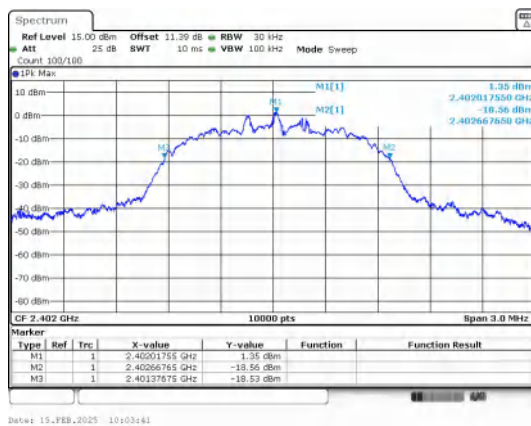




$\pi/4$ DQPSK_2-DH5_Channel 39



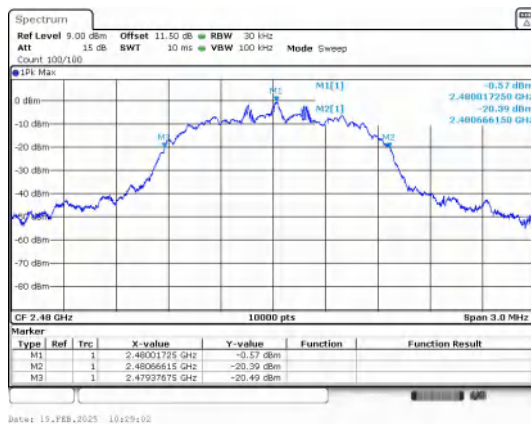
$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



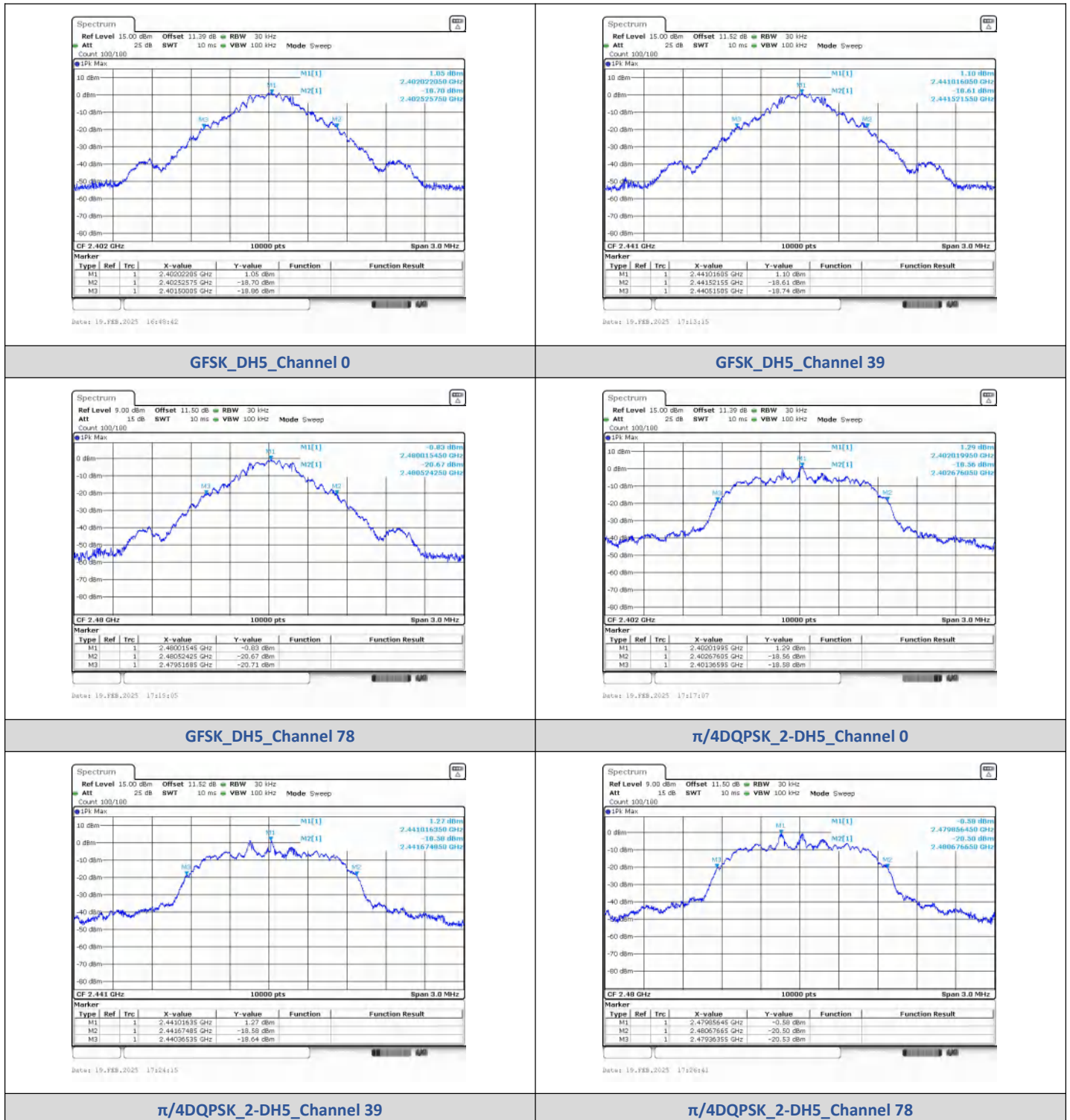
8DPSK_3-DH5_Channel 78

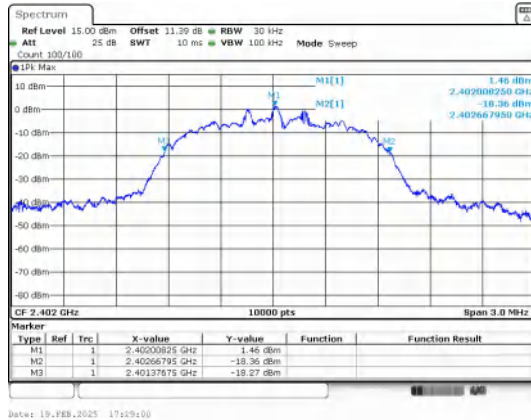
Right:

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.030
	39	2441 MHz	1.000
	78	2480 MHz	1.000
$\pi/4$ DQPSK	0	2402 MHz	1.310
	39	2441 MHz	1.300
	78	2480 MHz	1.320

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

Test Graphs





8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



8DPSK_3-DH5_Channel 78

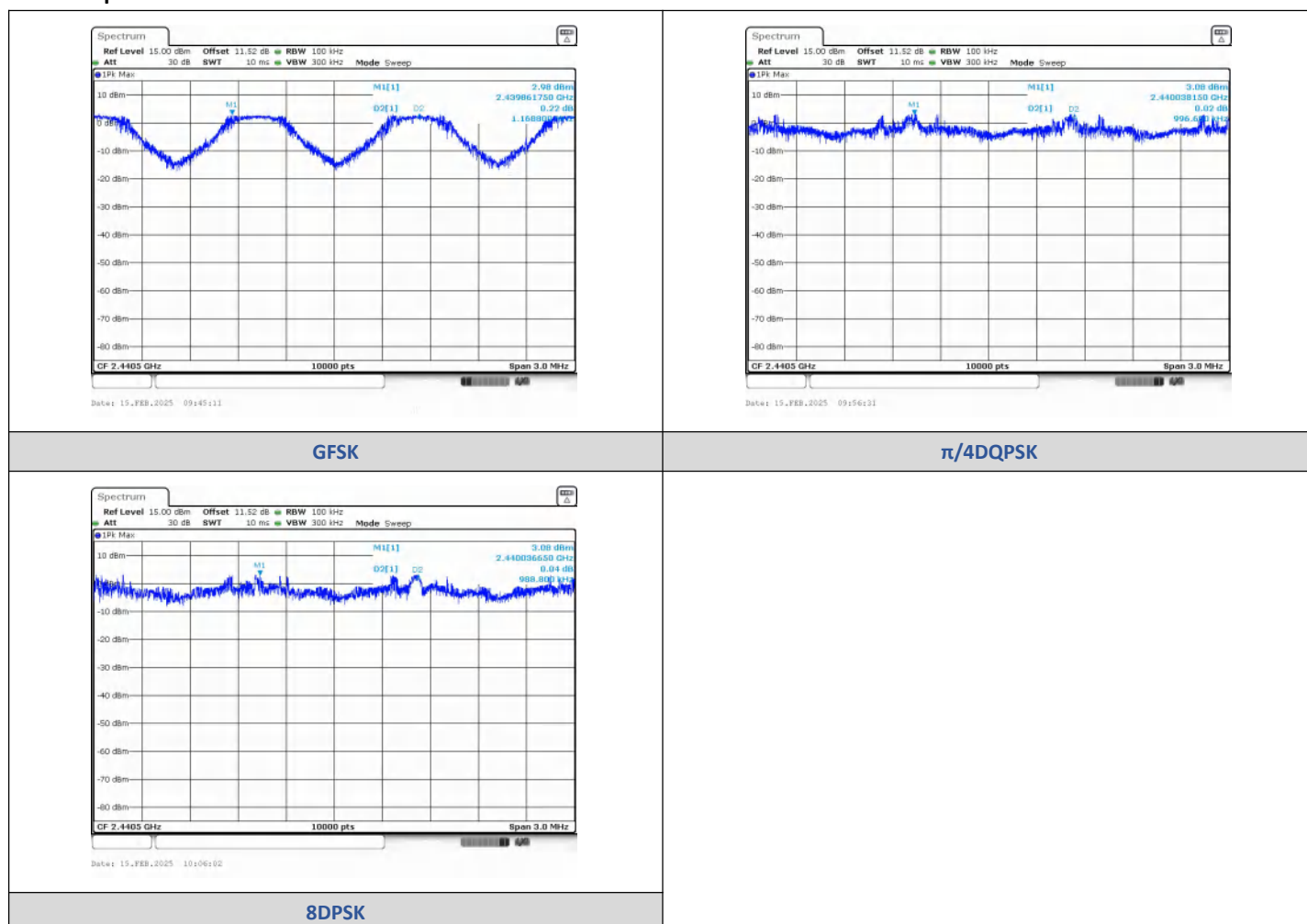
6) Carrier Frequencies Separation

Test Result

Left:

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2439.8618	2441.0305	1.1688	1.01	PASS
$\pi/4$ DQPSK	2-DH5	2440.0381	2441.0347	0.9966	0.853	PASS
8DPSK	3-DH5	2440.0367	2441.0255	0.9888	0.86	PASS

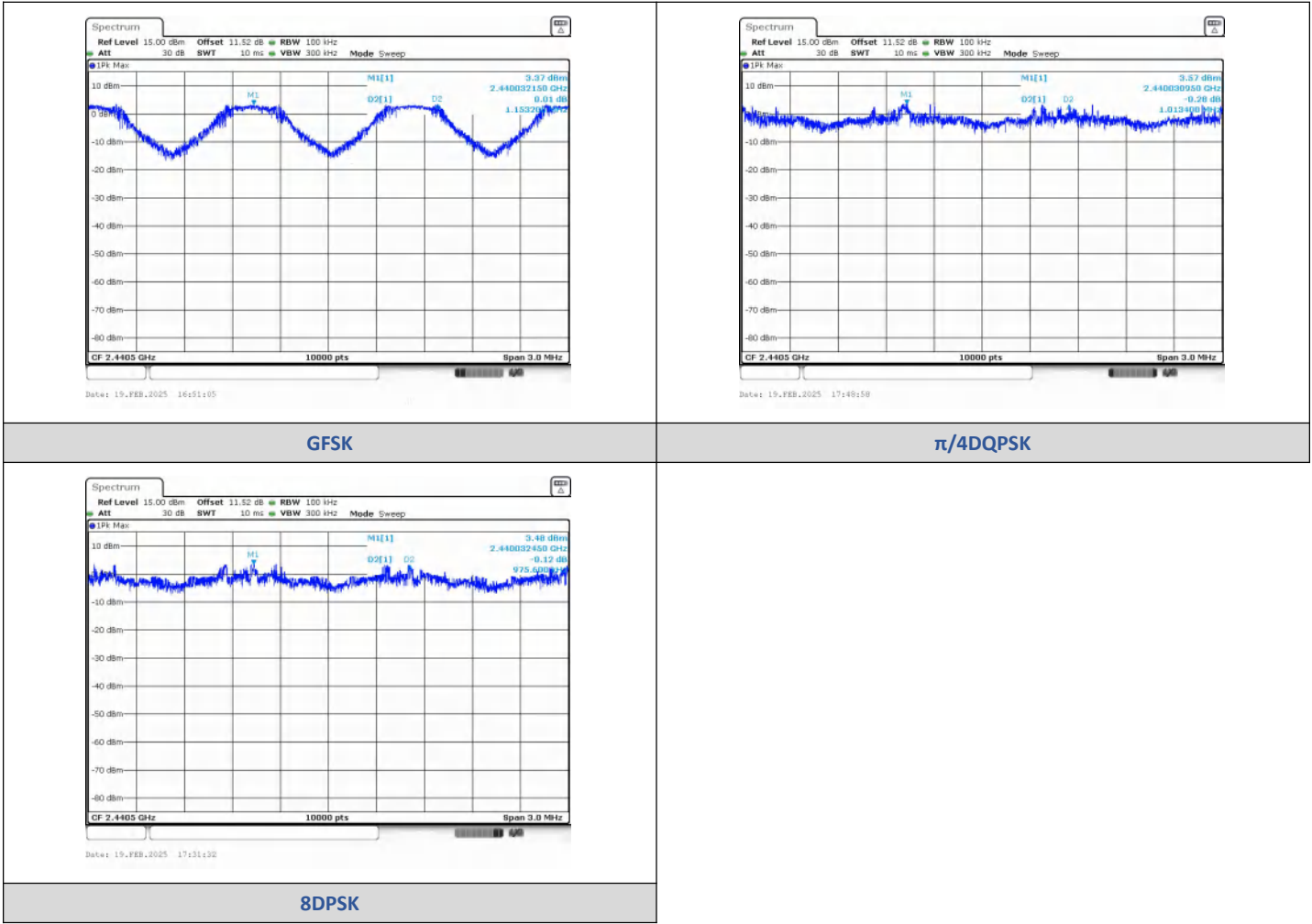
Test Graphs



Right:

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2440.0322	2441.1854	1.1532	1.03	PASS
$\pi/4$ DQPSK	2-DH5	2440.0309	2441.0444	1.0134	0.88	PASS
8DPSK	3-DH5	2440.0325	2441.008	0.9756	0.86	PASS

Test Graphs



7) Conducted Out Of Band Emission

Test Result

Left:

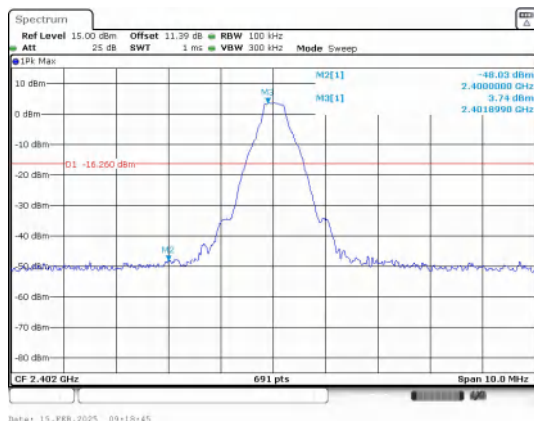
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	827.79	-42.050	-16.26	-25.790	PASS
			2400.00	-48.030	-16.26	-31.770	PASS
		39	9763.72	-42.577	-16.9	-25.677	PASS
		78	2483.50	-50.970	-18.2	-32.770	PASS
			9920.20	-39.561	-18.2	-21.361	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-47.380	-16.45	-30.930	PASS
			3404.70	-41.748	-16.45	-25.298	PASS
		39	9763.72	-42.217	-16.91	-25.307	PASS
		78	2483.50	-50.310	-18.21	-32.100	PASS
			9920.20	-38.967	-18.21	-20.757	PASS
8DPSK	3-DH5	0	1780.81	-39.433	-16.49	-22.943	PASS
			2400.00	-44.990	-16.49	-28.500	PASS
		39	9763.72	-41.837	-16.98	-24.857	PASS
		78	2483.50	-50.560	-15.12	-35.440	PASS
			9920.20	-37.455	-15.12	-22.335	PASS

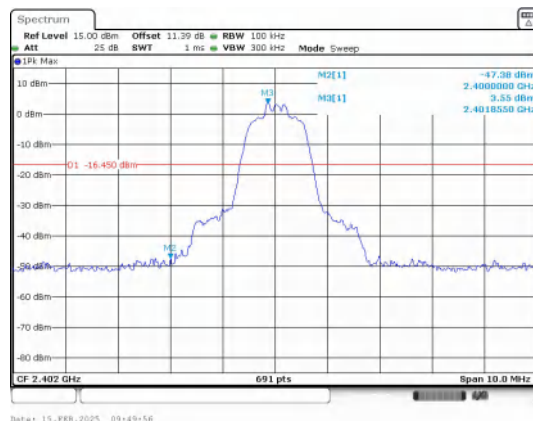
Hopping

Hopping							
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2397.06	-47.775	-16.4	-31.375	PASS
			2400.00	-49.860	-16.4	-33.460	PASS
			2483.50	-48.300	-18.28	-30.020	PASS
$\pi/4$ DQPSK	2-DH5		2397.77	-47.974	-16.97	-31.004	PASS
			2400.00	-49.970	-16.97	-33.000	PASS
			2483.50	-48.670	-19.05	-29.620	PASS
8DPSK	3-DH5		2400.00	-45.140	-16.49	-28.650	PASS
			2483.50	-49.520	-19.46	-30.060	PASS

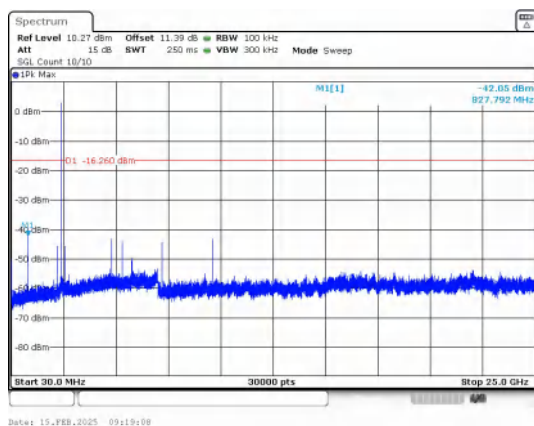
Test Graphs



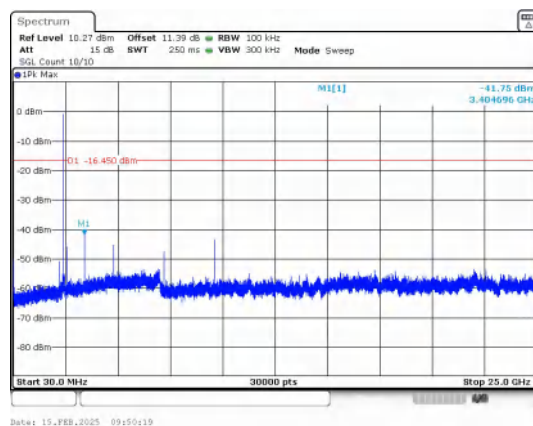
Out Of Band Emission
GFSK_DH5_Channel 0



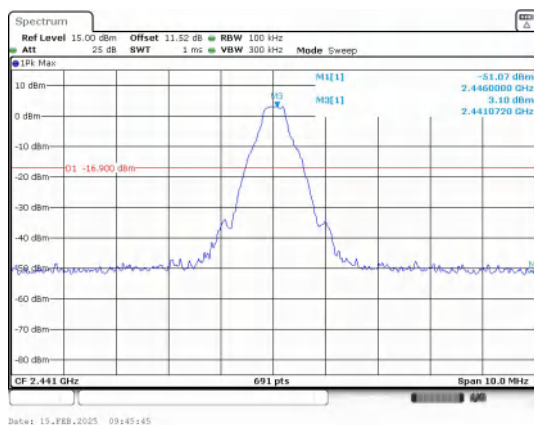
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 0



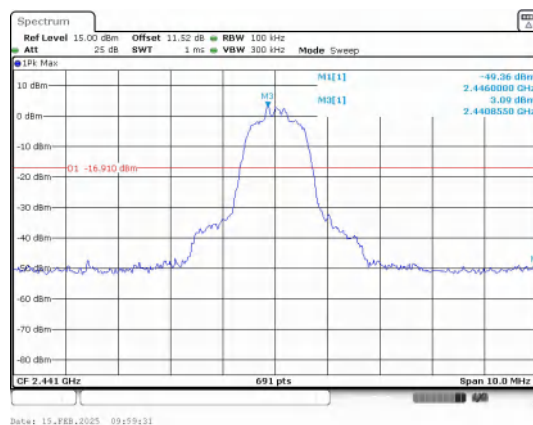
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



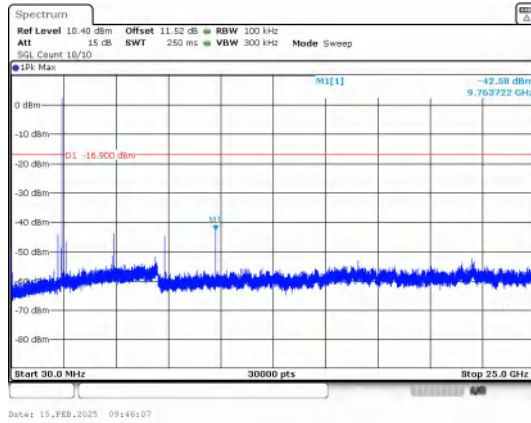
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 0



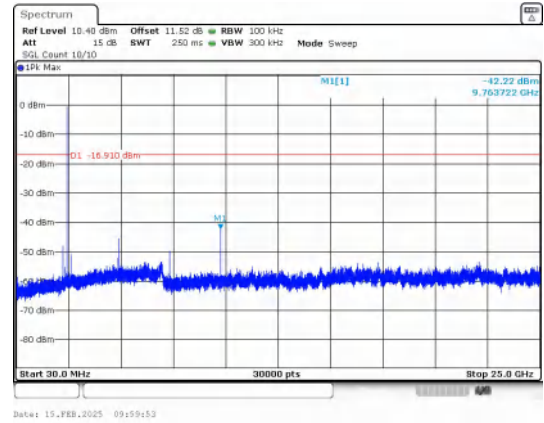
Out Of Band Emission
GFSK_DH5_Channel 39



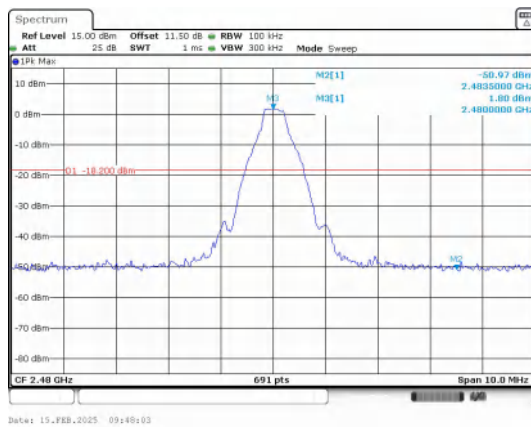
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39



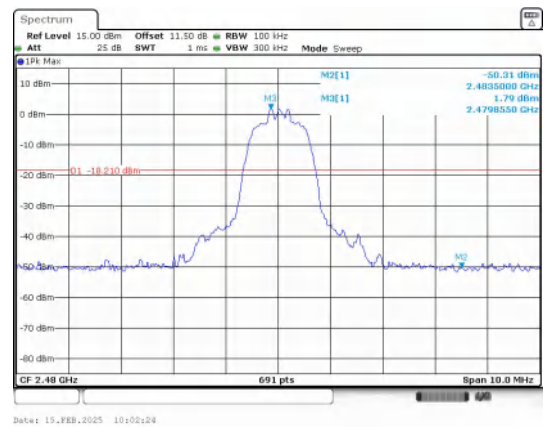
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



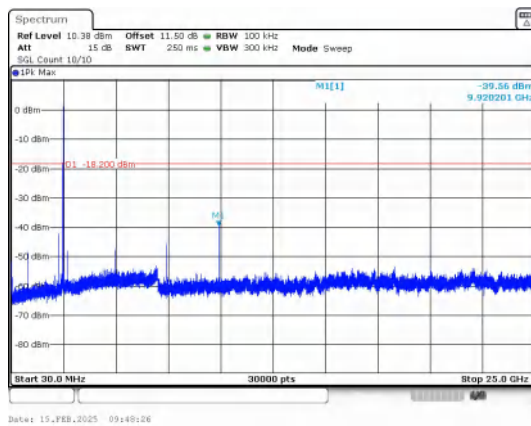
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39



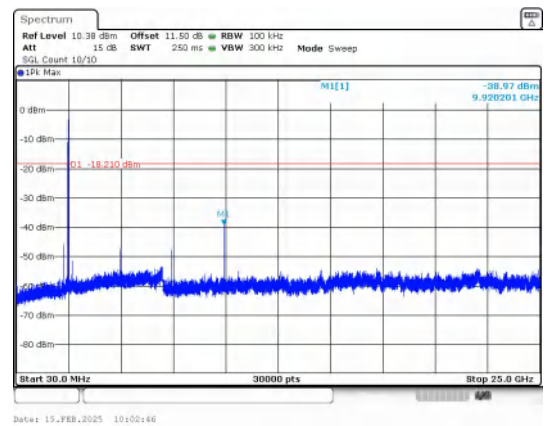
Out Of Band Emission
GFSK_DH5_Channel 78



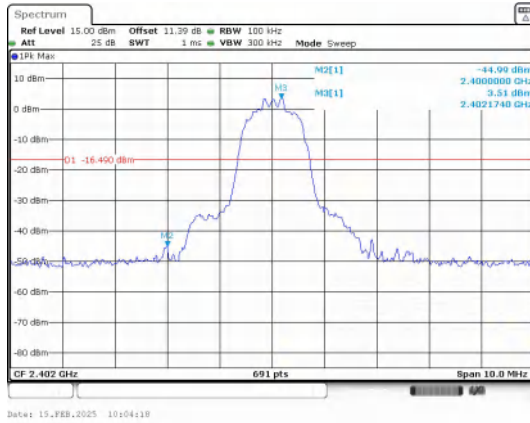
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



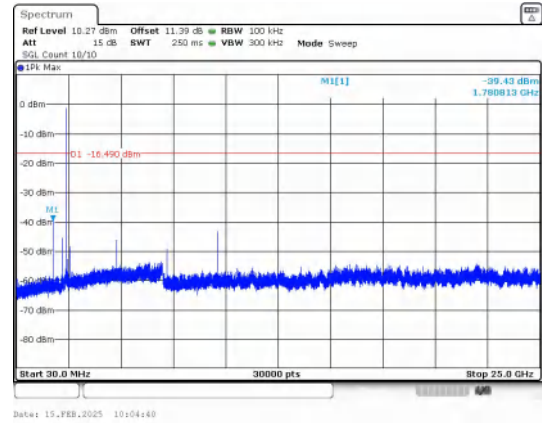
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



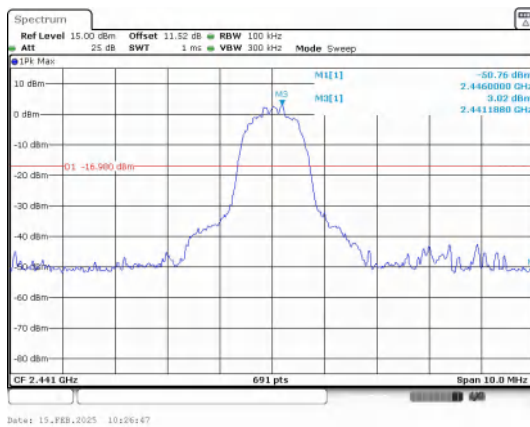
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 78



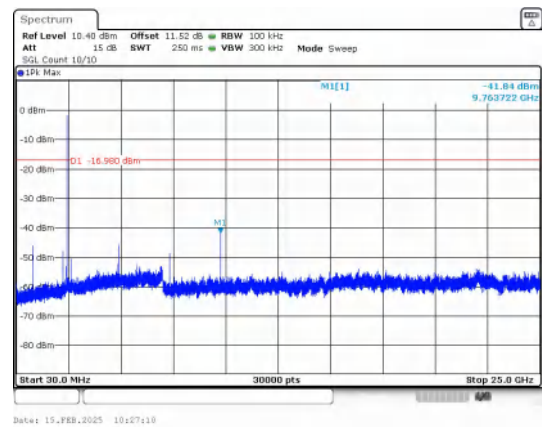
Out Of Band Emission
8DPSK_3-DH5_Channel 0



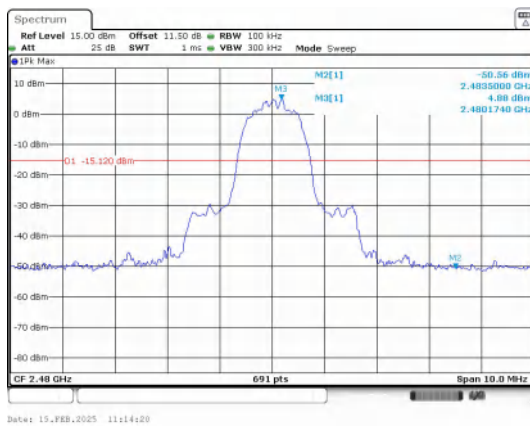
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



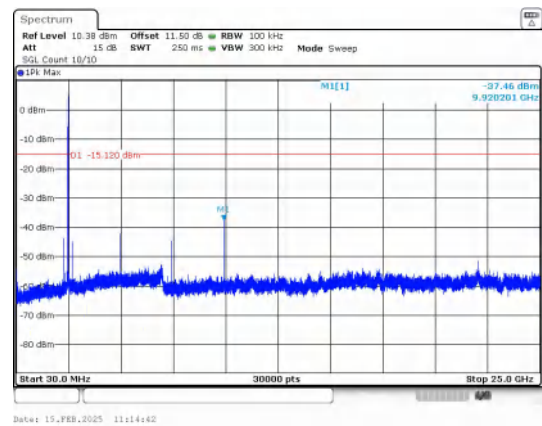
Out Of Band Emission
8DPSK_3-DH5_Channel 39



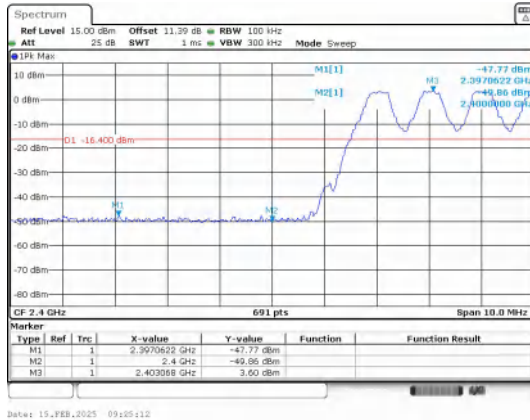
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



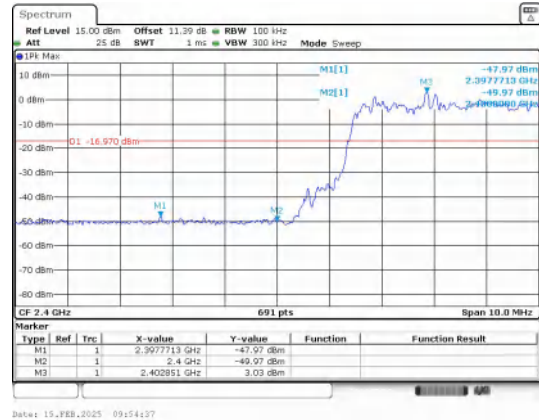
Out Of Band Emission
8DPSK_3-DH5_Channel 78



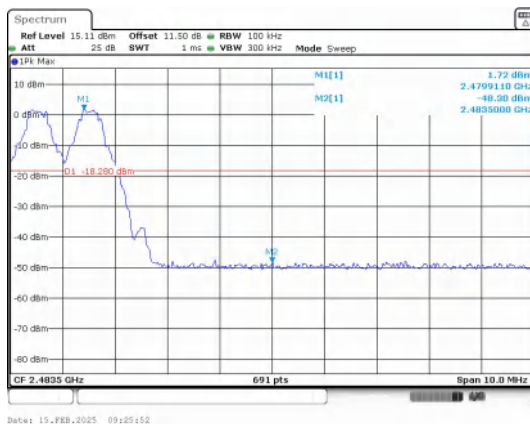
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



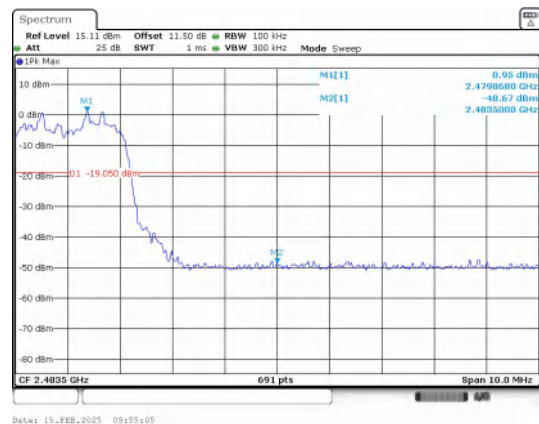
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



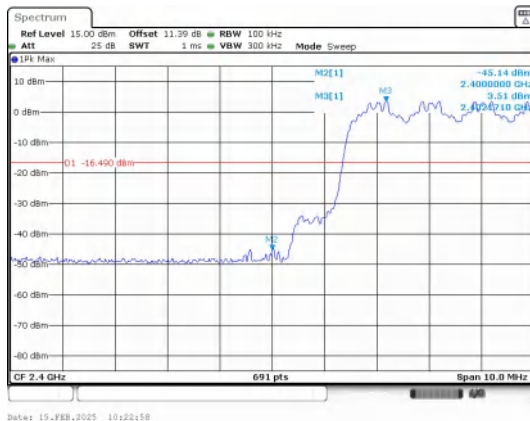
Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



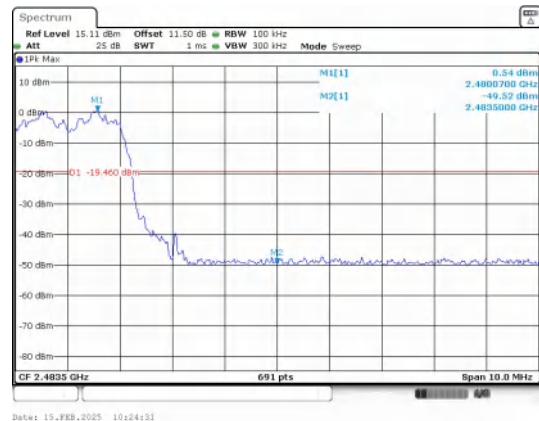
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



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

Right:
Non-Hopping

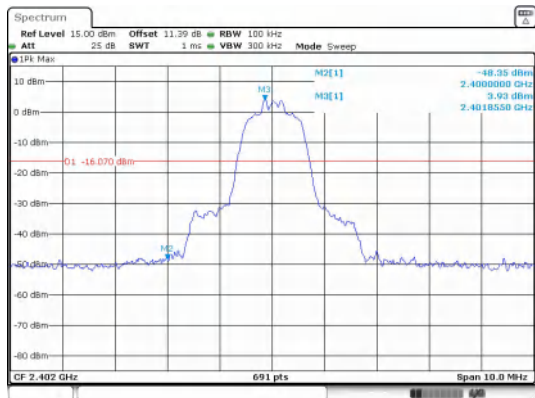
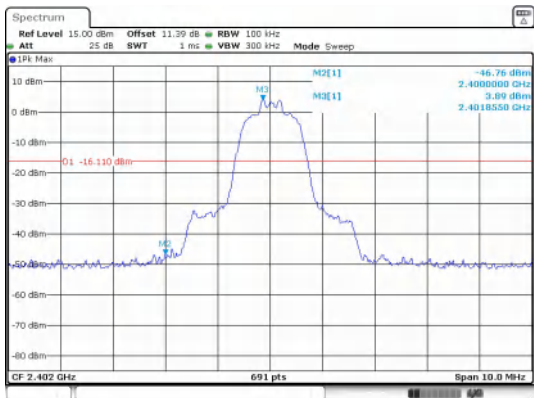
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
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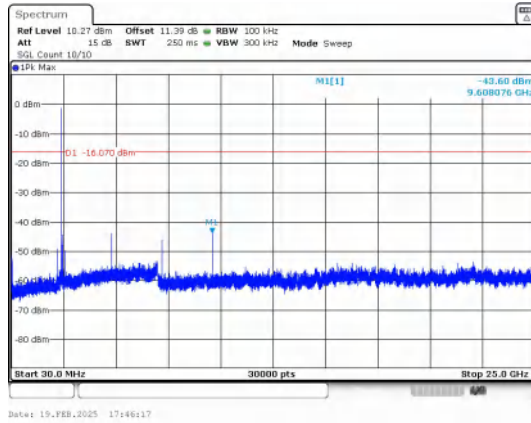
GFSK	DH5	0	2400.00	-48.350	-16.07	-32.280	PASS
			9608.08	-43.595	-16.07	-27.525	PASS
		39	9763.72	-41.316	-16.79	-24.526	PASS
		78	2483.50	-48.700	-18.29	-30.410	PASS
			9920.20	-39.158	-18.29	-20.868	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-46.760	-16.11	-30.650	PASS
			4803.85	-42.870	-16.11	-26.760	PASS
		39	9763.72	-41.127	-16.55	-24.577	PASS
		78	2483.50	-49.560	-18.2	-31.360	PASS
			9920.20	-38.698	-18.2	-20.498	PASS
8DPSK	3-DH5	0	2400.00	-46.830	-16.18	-30.650	PASS
			9608.08	-43.333	-16.18	-27.153	PASS
		39	9763.72	-41.299	-16.56	-24.739	PASS
		78	2483.50	-50.720	-18.18	-32.540	PASS
			9920.20	-39.060	-18.18	-20.880	PASS

Hopping

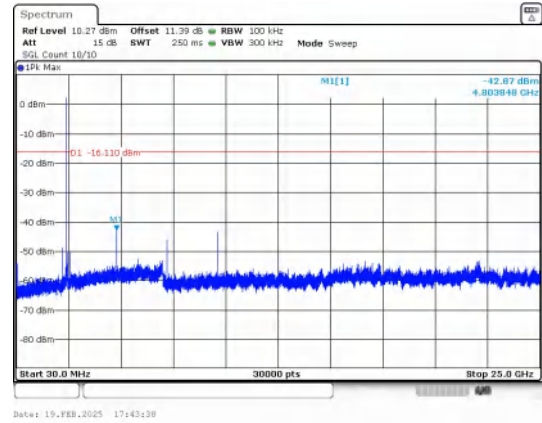
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2395.72	-47.758	-16.55	-31.208	PASS
			2400.00	-49.070	-16.55	-32.520	PASS
			2483.50	-49.790	-18.72	-31.070	PASS
$\pi/4$ DQPSK	2-DH5		2397.13	-48.642	-16.44	-32.202	PASS
			2400.00	-49.480	-16.44	-33.040	PASS
			2483.50	-49.100	-18.68	-30.420	PASS
8DPSK	3-DH5		2398.21	-48.345	-16.56	-31.785	PASS
			2400.00	-50.050	-16.56	-33.490	PASS
			2483.50	-49.780	-19.47	-30.310	PASS

Test Graphs

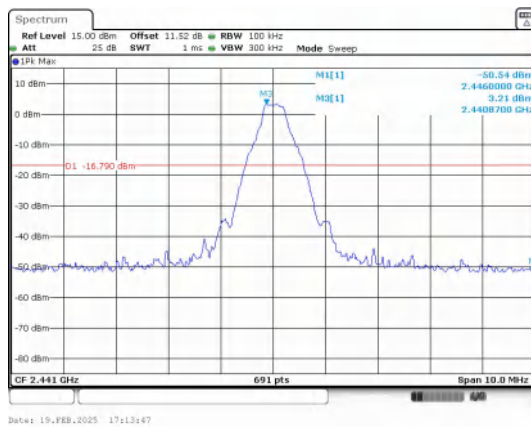
 Out Of Band Emission GFSK_DH5_Channel 0	 Out Of Band Emission $\pi/4$DQPSK_2-DH5_Channel 0
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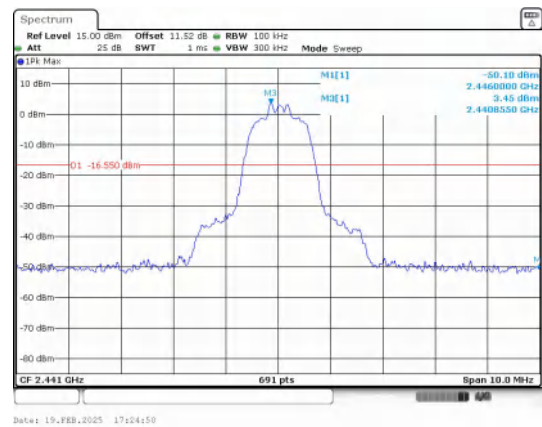
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



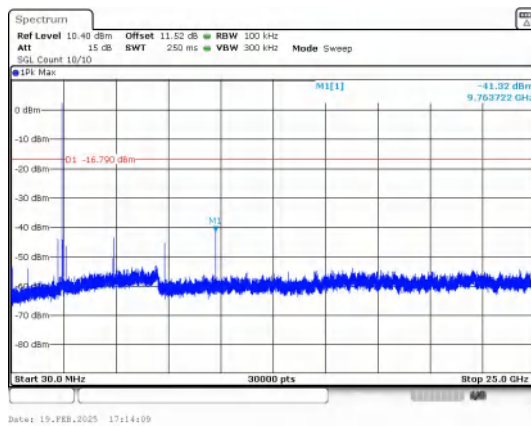
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 0



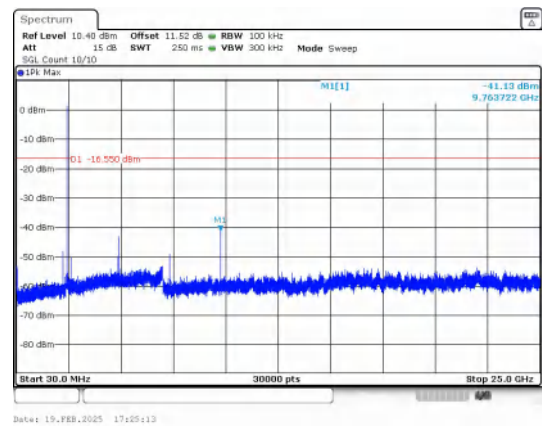
Out Of Band Emission
GFSK_DH5_Channel 39



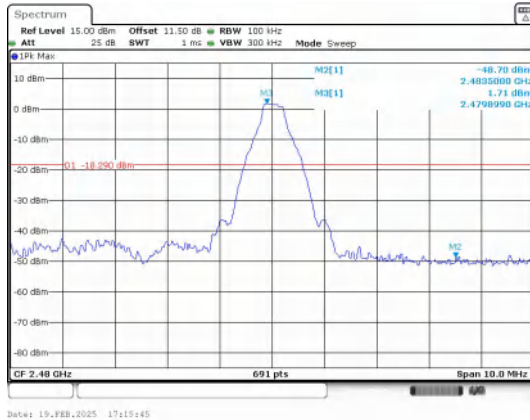
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39



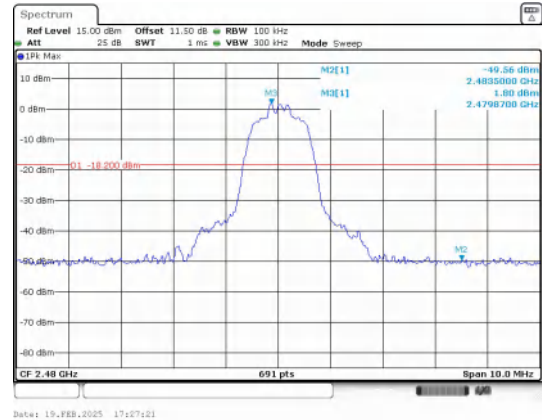
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



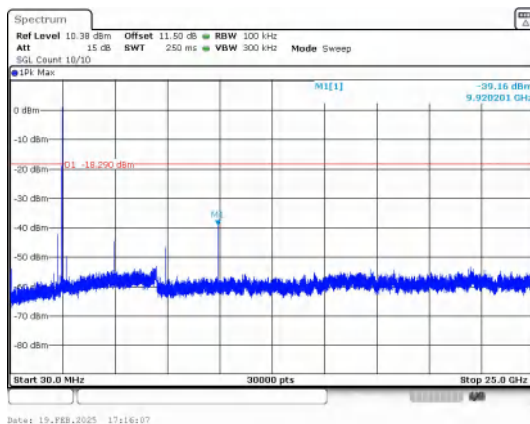
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39



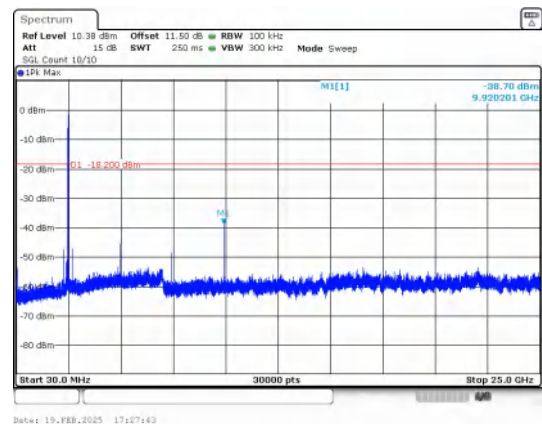
Out Of Band Emission
GFSK_DH5_Channel 78



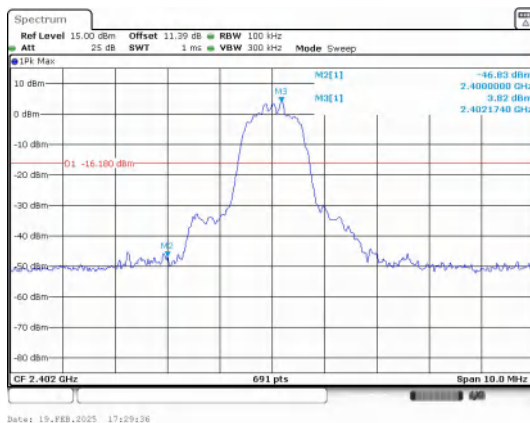
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



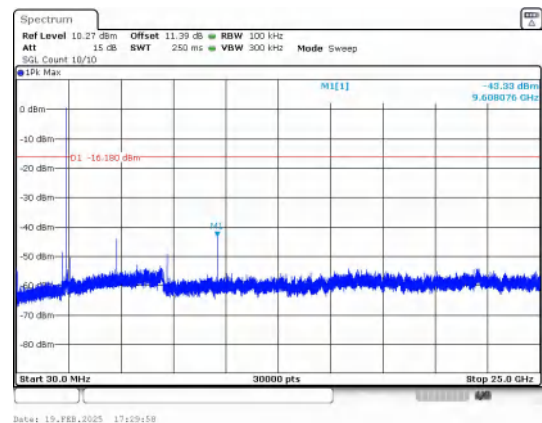
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



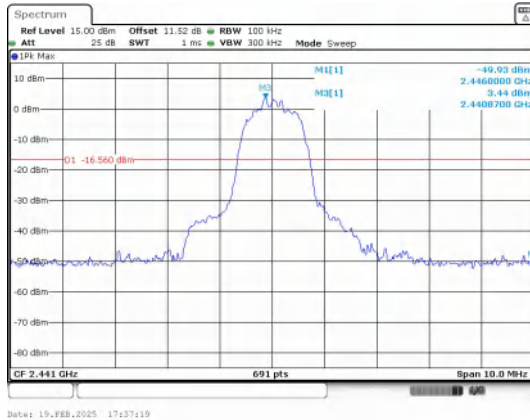
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 78



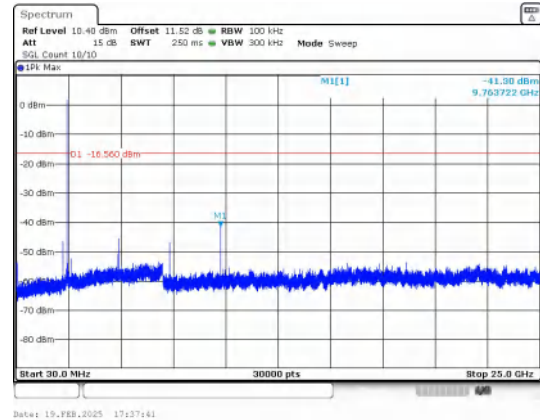
Out Of Band Emission
8DPSK_3-DH5_Channel 0



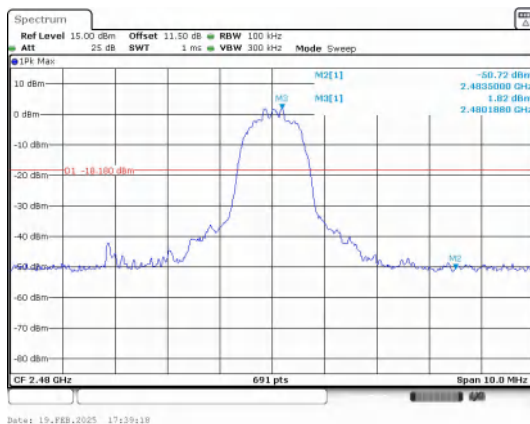
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



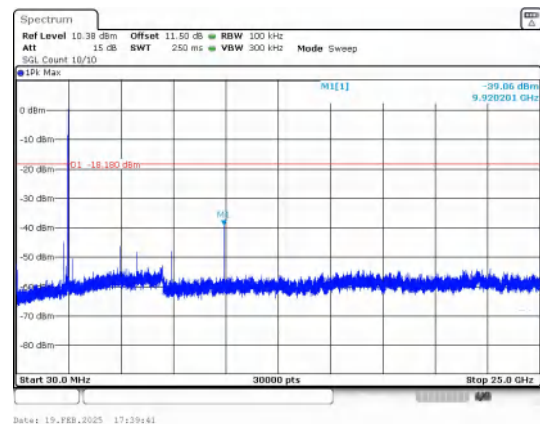
Out Of Band Emission
8DPSK_3-DH5_Channel 39



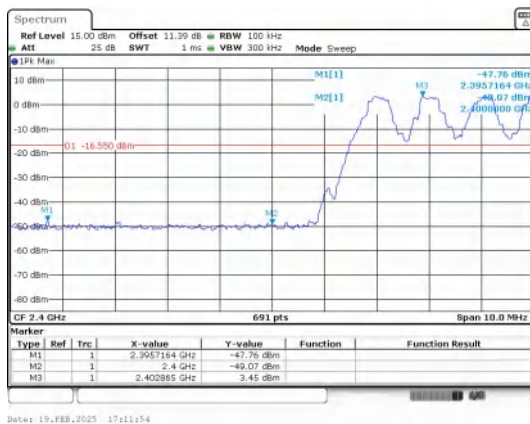
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



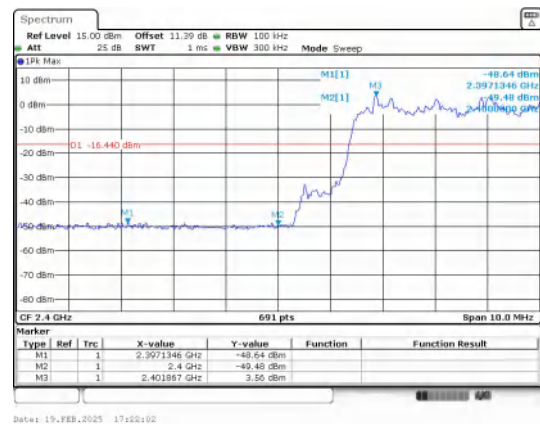
Out Of Band Emission
8DPSK_3-DH5_Channel 78



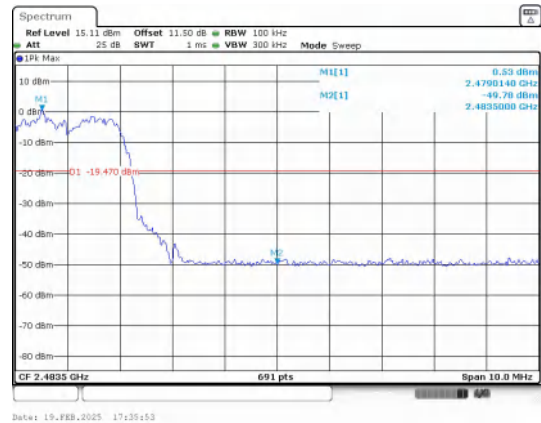
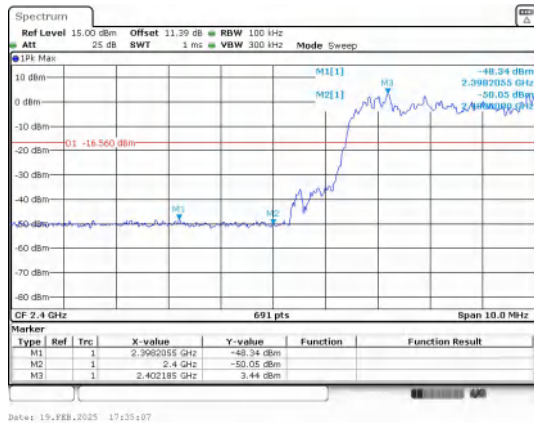
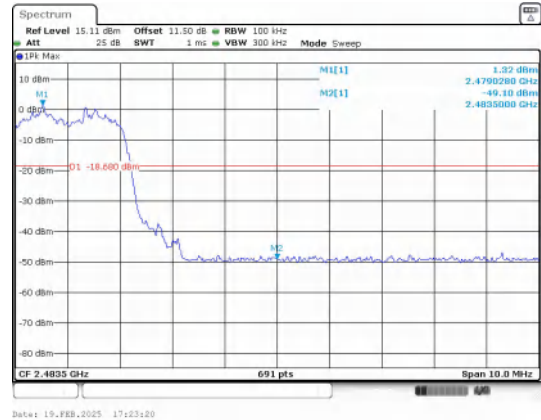
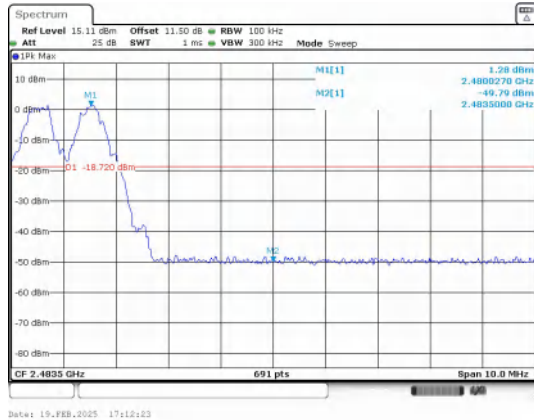
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



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



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