

Appendix Report

Report No.:	CISRR25022815305
Test Engineer:	Lucas Huang
Supervised by:	Rory Huang

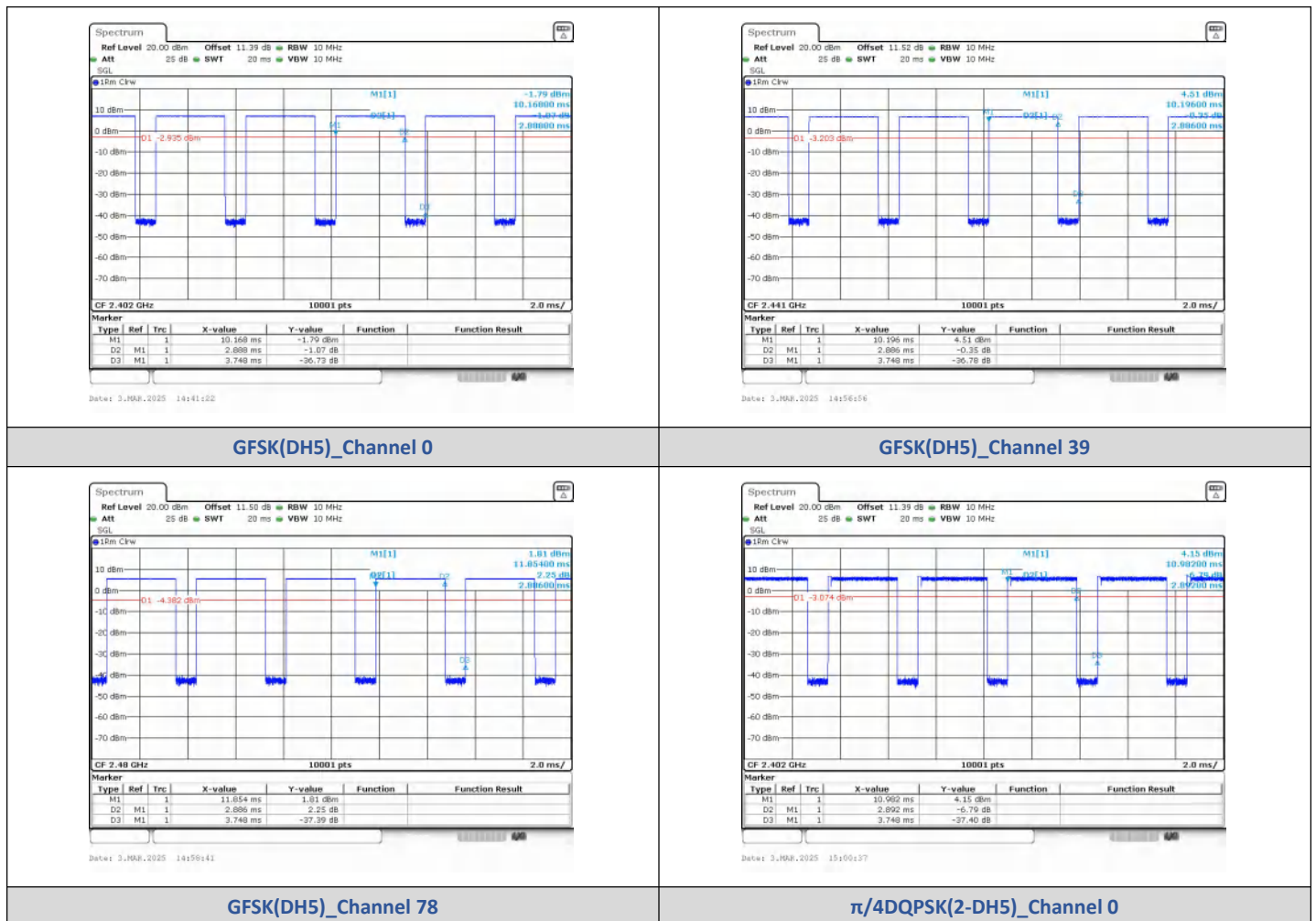
1) Duty Cycle

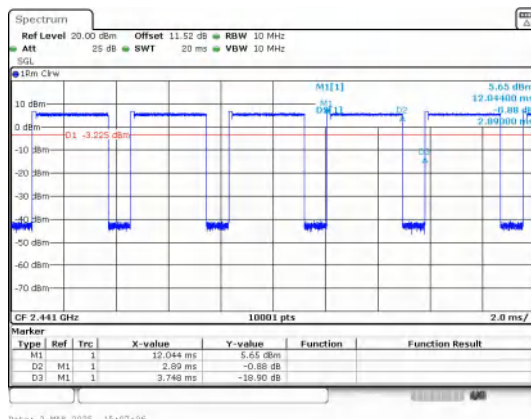
Test Result

Left:

Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.888	3.748	77.05	0.7705	1.1323	0.3463
		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	2.892	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

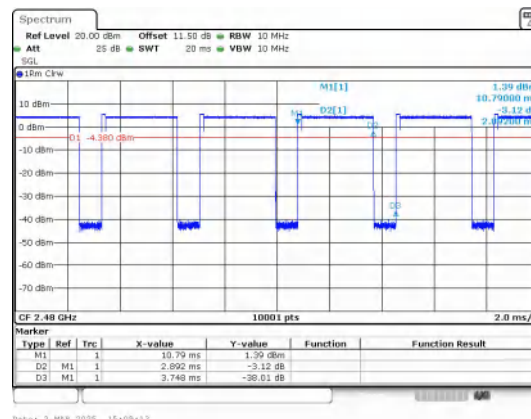
Test Graphs





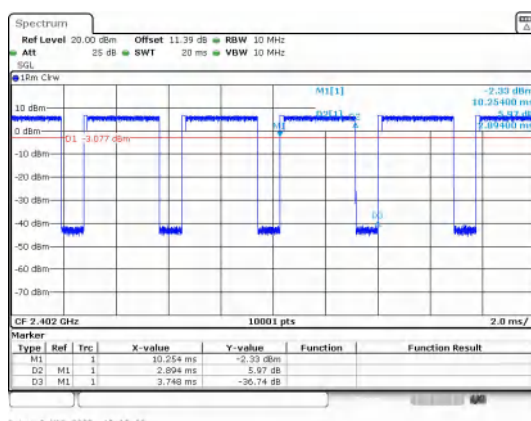
Date: 3.HAR.2025 15:07:06

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



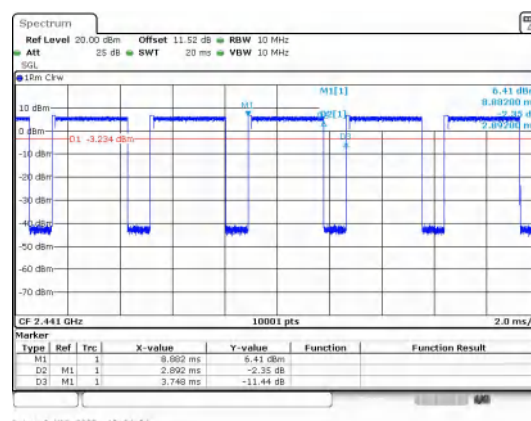
Date: 3.HAR.2025 15:09:13

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



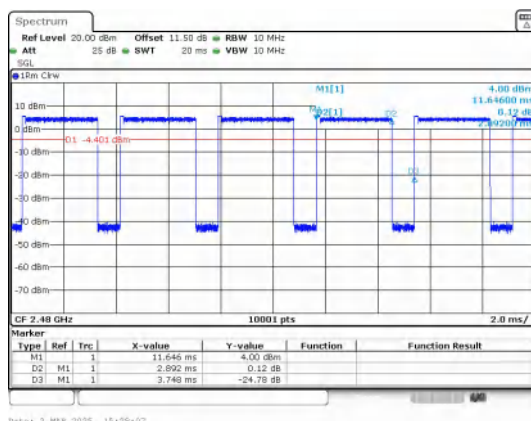
Date: 3.HAR.2025 15:12:33

8DPSK(3-DH5)_Channel 0



Date: 3.HAR.2025 15:24:54

8DPSK(3-DH5)_Channel 39



Date: 3.HAR.2025 15:28:07

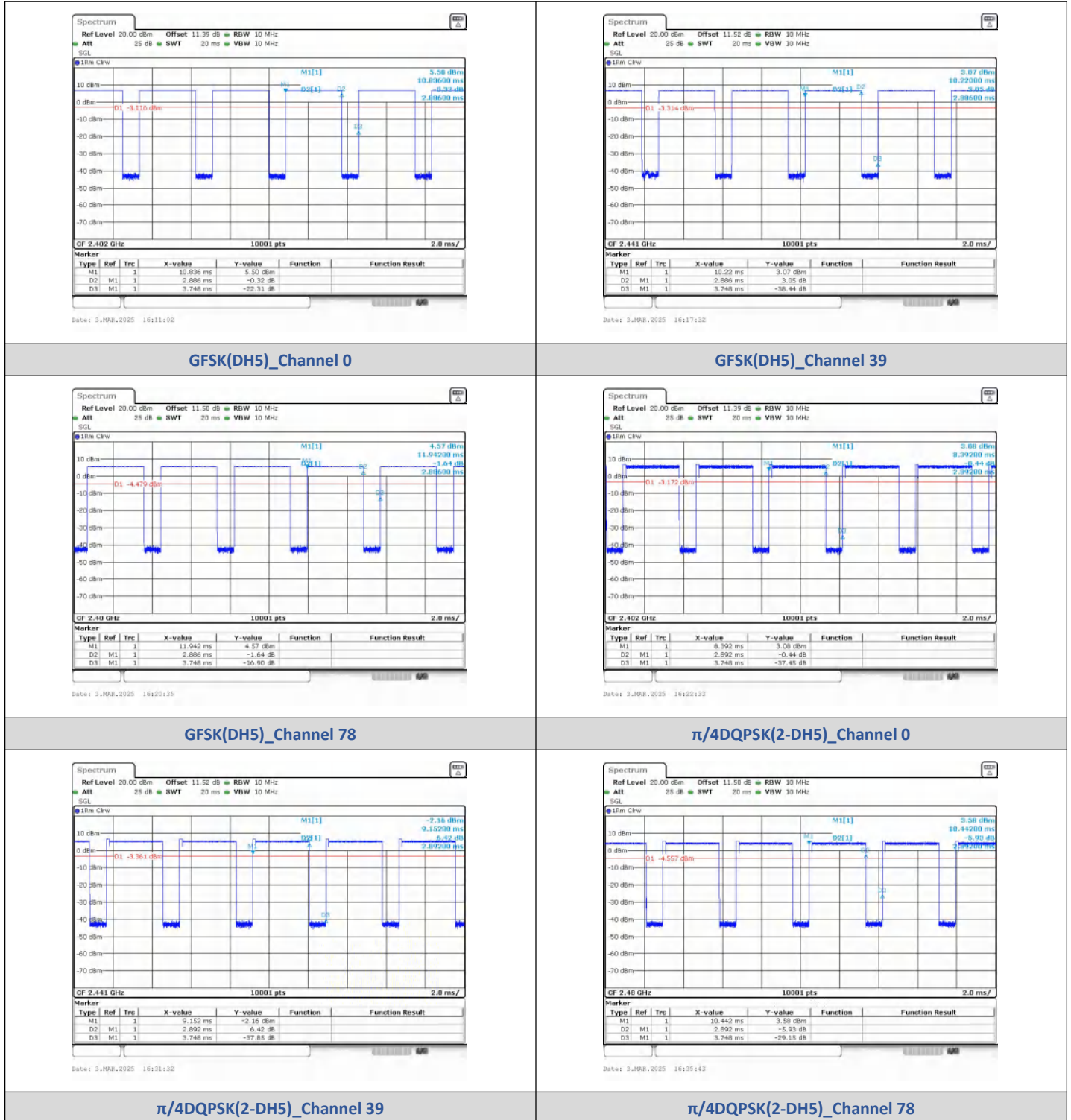
8DPSK(3-DH5)_Channel 78

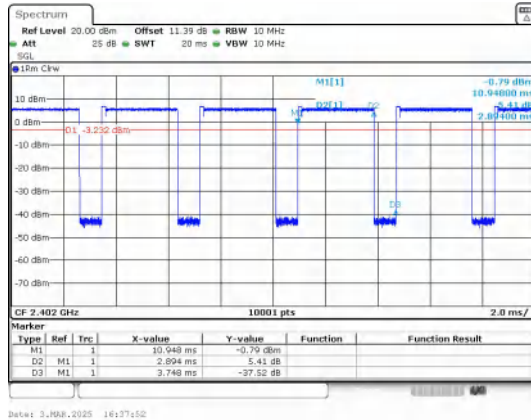
Right:

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	2.892	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

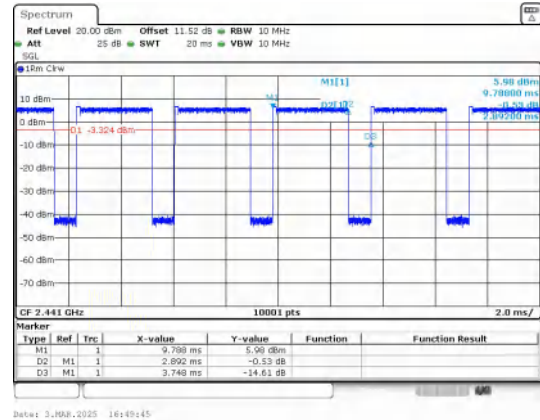
8DPSK	3-DH5	0	2.894	3.748	77.21	0.7721	1.1233	0.3455
		39	2.892	3.748	77.16	0.7716	1.1261	0.3458
		78	2.894	3.748	77.21	0.7721	1.1233	0.3455

Test Graphs

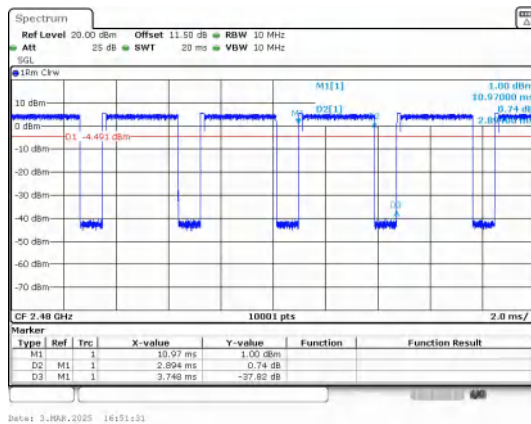




8DPSK(3-DH5)_Channel 0



8DPSK(3-DH5)_Channel 39



8DPSK(3-DH5)_Channel 78

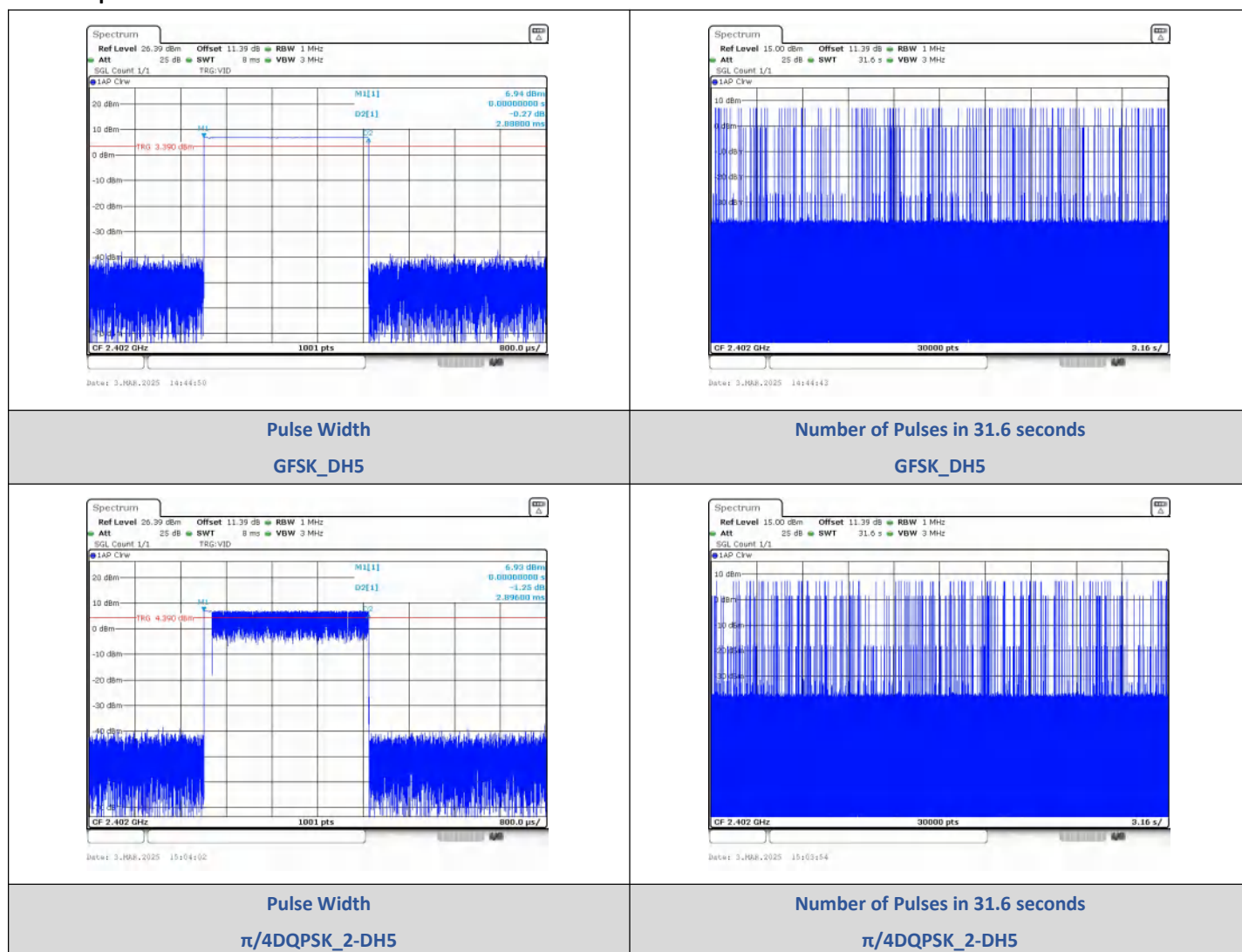
2) Dwell Time

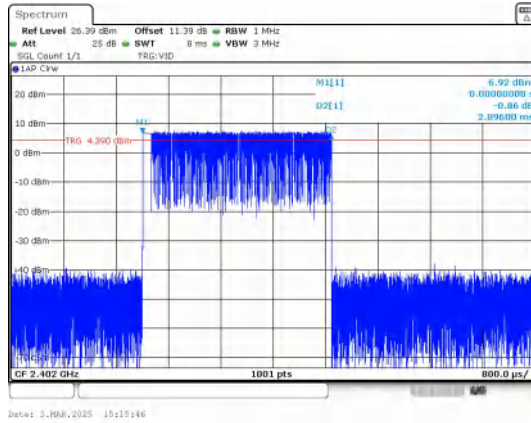
Test Result

Left:

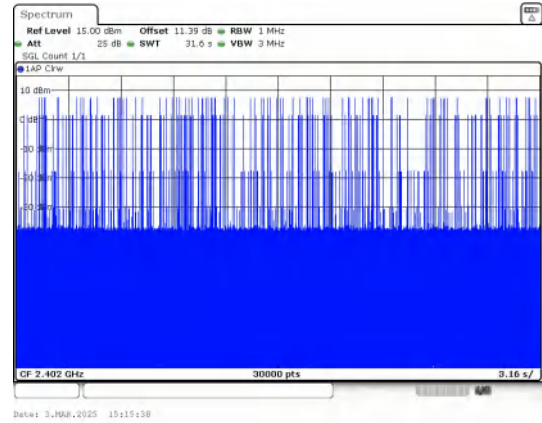
Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.888	119	343.67	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.896	107	309.87		PASS
8DPSK	3-DH5		2.896	92	266.43		PASS

Test Graphs





Pulse Width
8DPSK_3-DH5

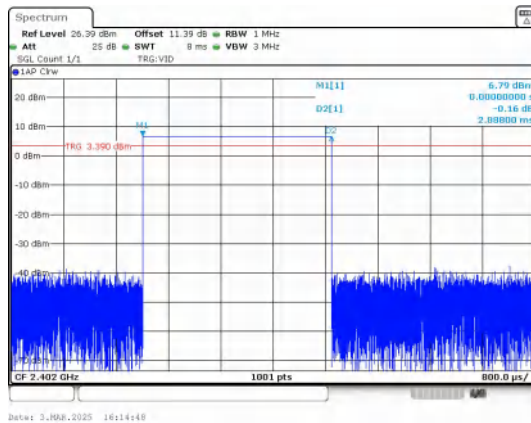


Number of Pulses in 31.6 seconds
8DPSK_3-DH5

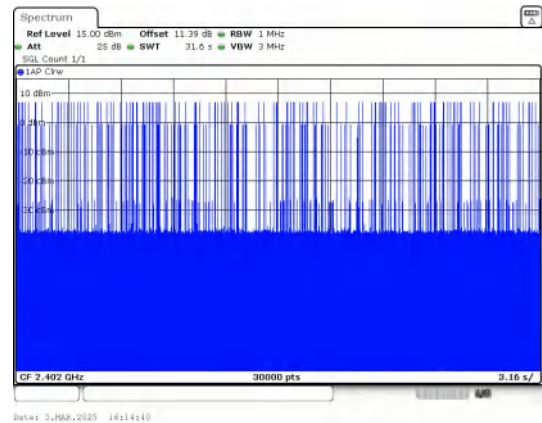
Right:

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	125	361.0	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.888	99	285.91		PASS
8DPSK	3-DH5		2.896	103	298.29		PASS

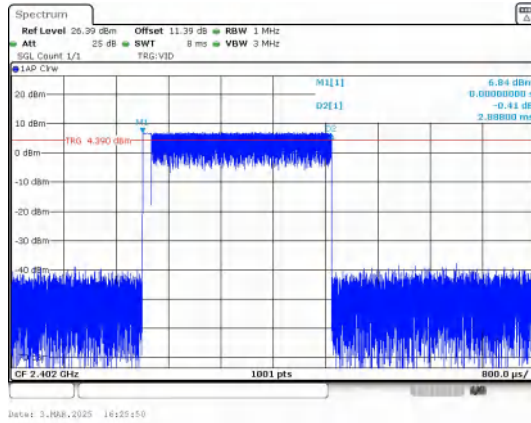
Test Graphs



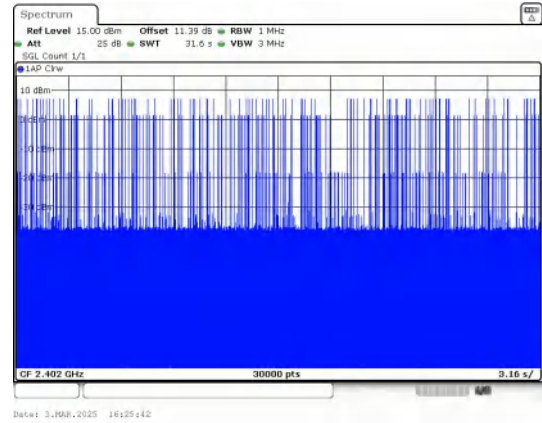
Pulse Width
GFSK_DH5



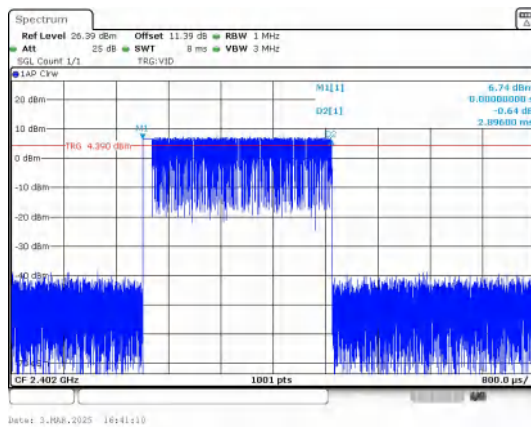
Number of Pulses in 31.6 seconds
GFSK_DH5



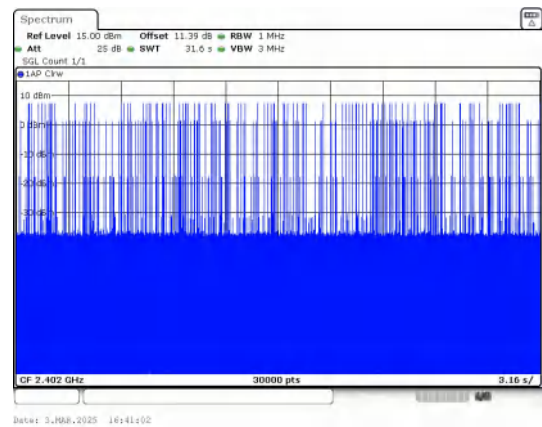
Pulse Width
 $\pi/4$ DQPSK_2-DH5



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

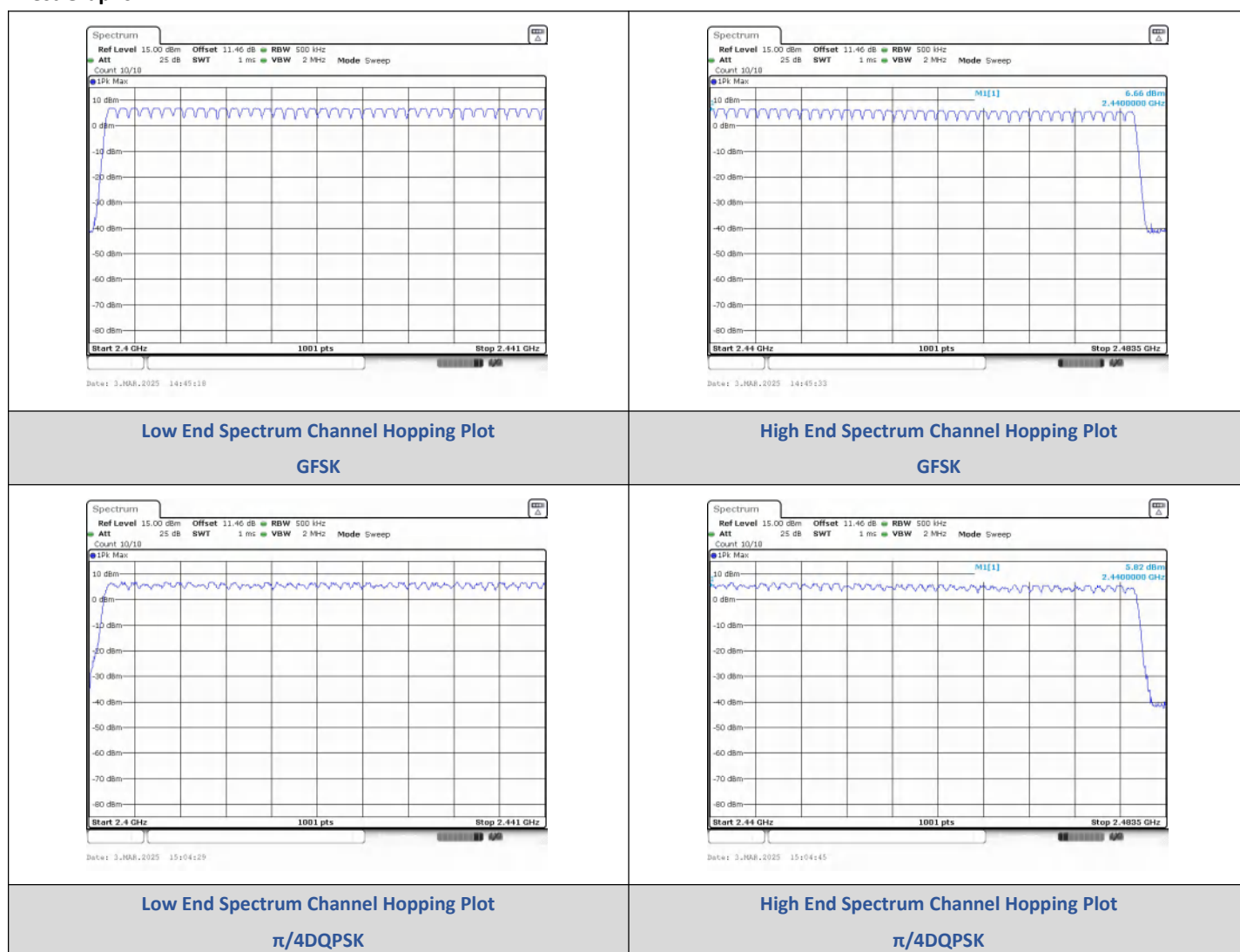
3) Number Of Hopping Channel

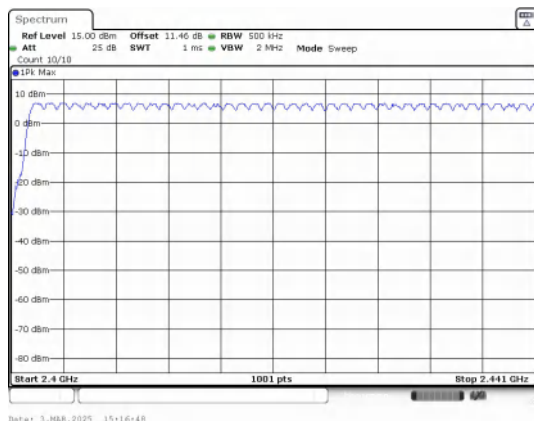
Test Result

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

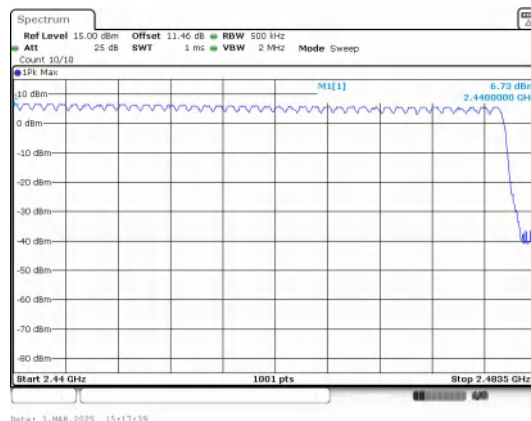
Test Graphs





Low End Spectrum Channel Hopping Plot

8DPSK



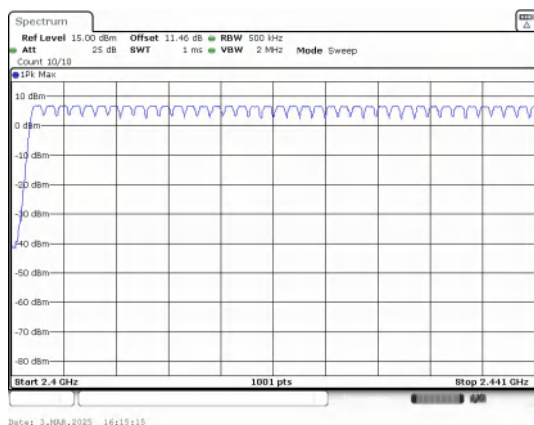
High End Spectrum Channel Hopping Plot

8DPSK

Right:

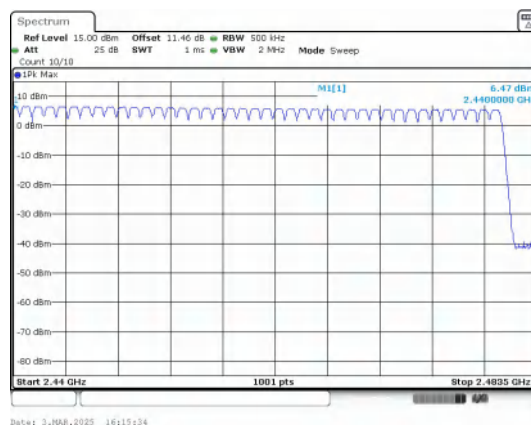
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
$\pi/4$ DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

Test Graphs



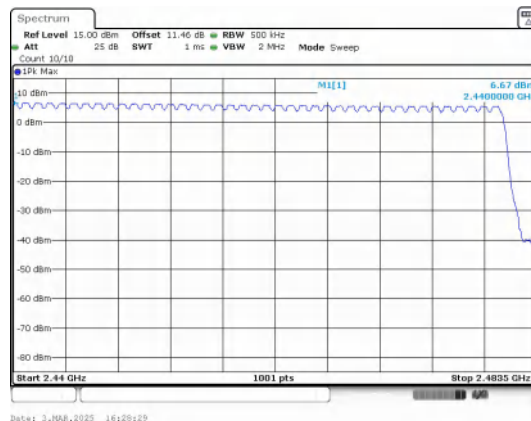
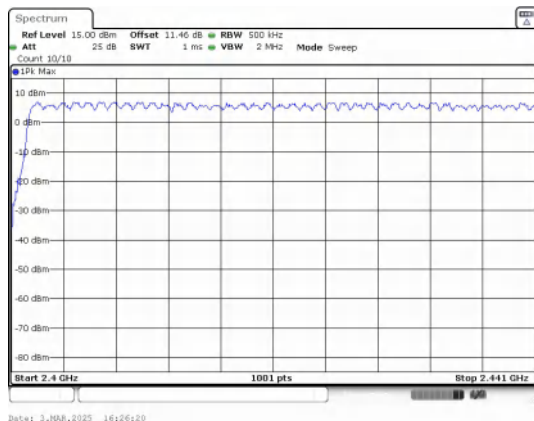
Low End Spectrum Channel Hopping Plot

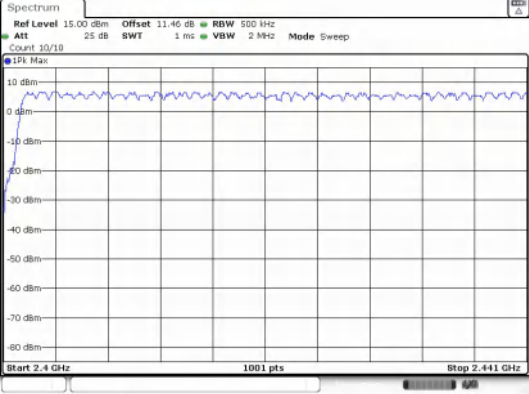
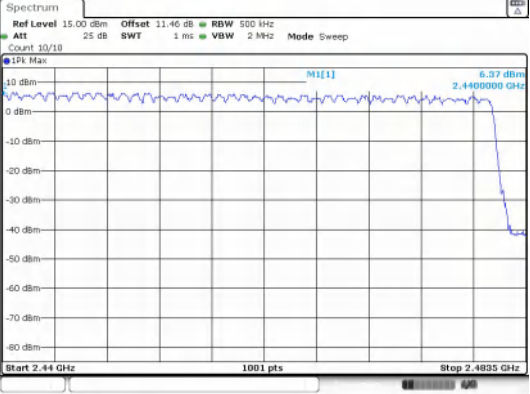
GFSK



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
 Spectrum Ref Level 15.00 dBm Offset 11.46 dB RBW 500 Hz Att 25 dB SWT 1 ms VBW 2 MHz Mode Sweep Count 10/10 1Pk Max Start 2.4 GHz 1001 pts Stop 2.441 GHz Date: 3.MAR.2025 16:41:26	 Spectrum Ref Level 15.00 dBm Offset 11.46 dB RBW 500 Hz Att 25 dB SWT 1 ms VBW 2 MHz Mode Sweep Count 10/10 1Pk Max M1[1] 6.37 dBm 2.4408008 GHz Start 2.4 GHz 1001 pts Stop 2.4835 GHz Date: 3.MAR.2025 16:41:53
Low End Spectrum Channel Hopping Plot 8DPSK	High End Spectrum Channel Hopping Plot 8DPSK

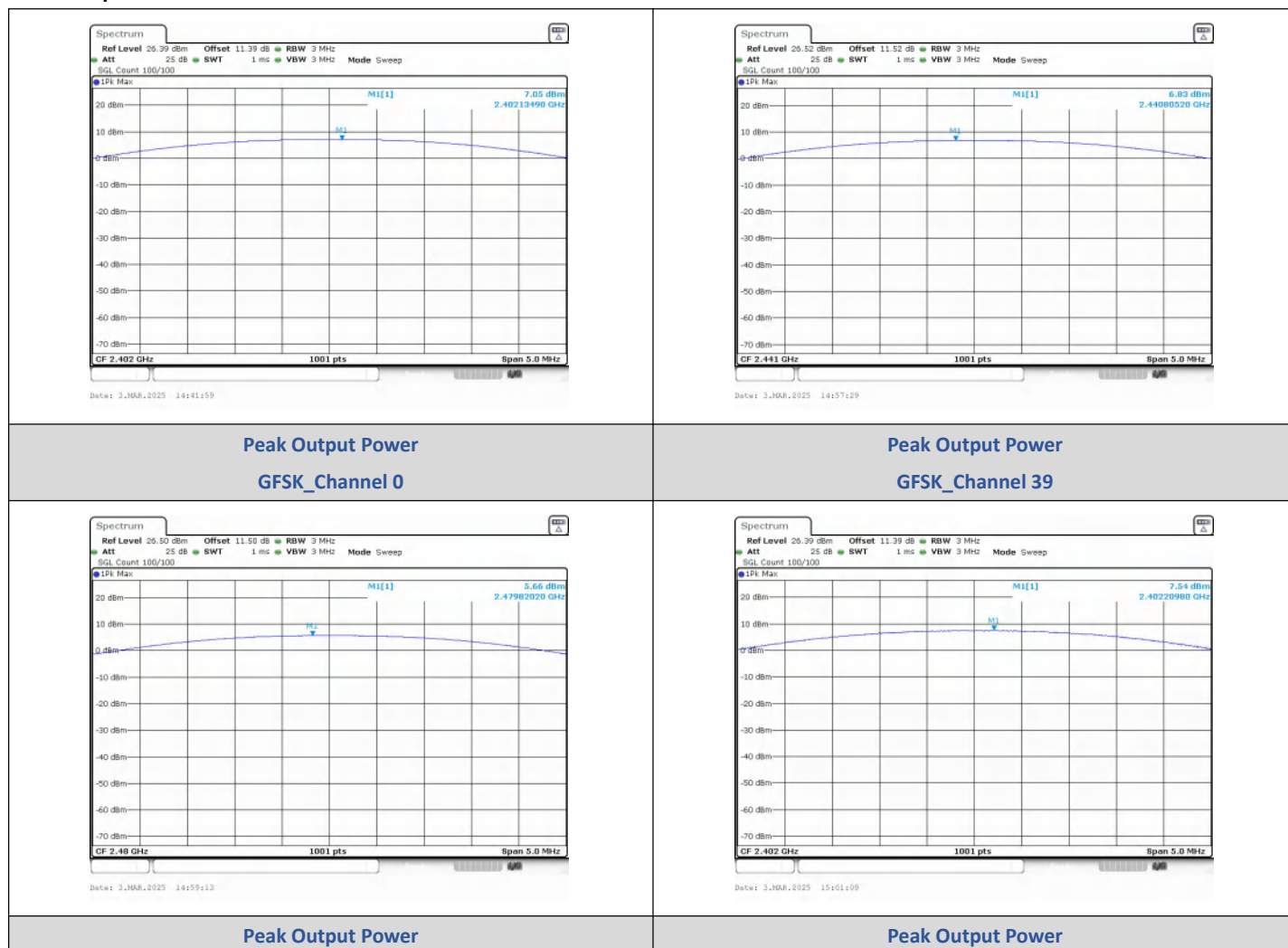
4) Conducted Peak Output Power

Test Result

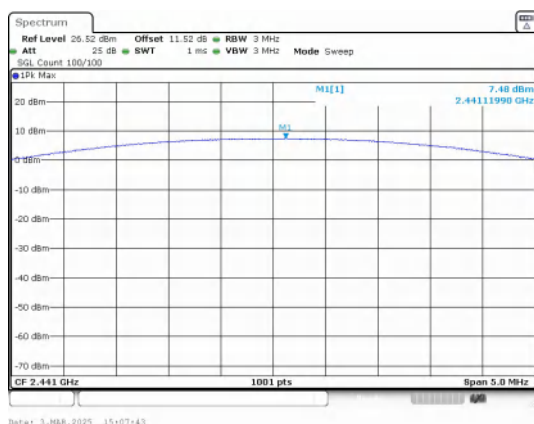
Left:

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	7.05	5.07	≤30	PASS
		39	6.83	4.82		PASS
		78	5.66	3.68		PASS
$\pi/4$ DQPSK	2-DH5	0	7.54	5.68	≤20.97	PASS
		39	7.48	5.60		PASS
		78	6.32	4.29		PASS
8DPSK	3-DH5	0	7.73	5.93		PASS
		39	7.65	5.82		PASS
		78	6.53	4.50		PASS

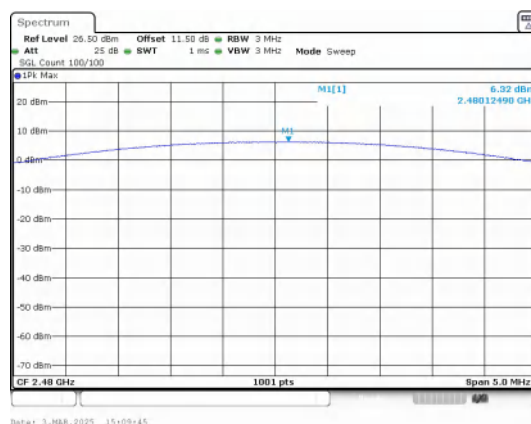
Test Graphs



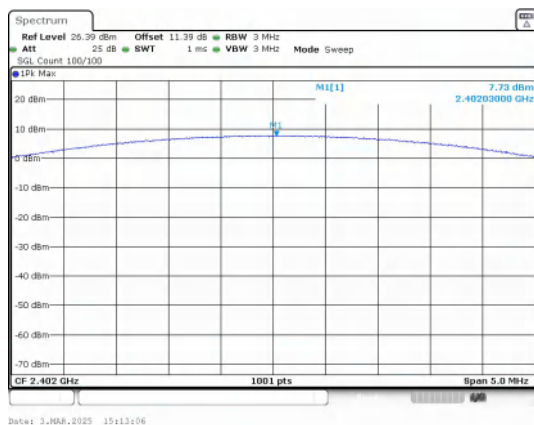
GFSK_Channel 78



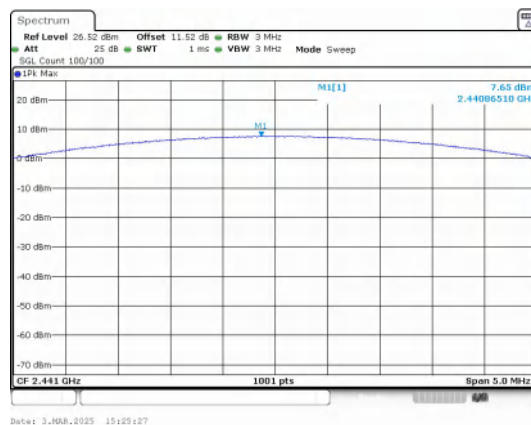
$\pi/4$ DQPSK_Channel 0



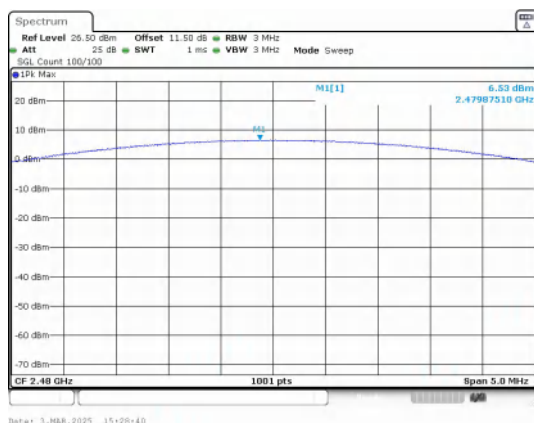
Peak Output Power
 $\pi/4$ DQPSK_Channel 39



Peak Output Power
 $\pi/4$ DQPSK_Channel 78



Peak Output Power
8DPSK_Channel 0



Peak Output Power
8DPSK_Channel 39

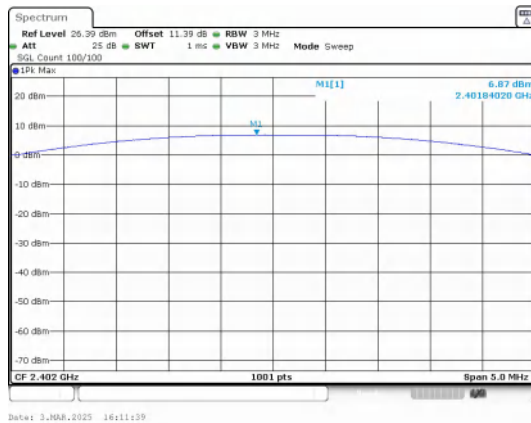
Peak Output Power
8DPSK_Channel 78

Right:

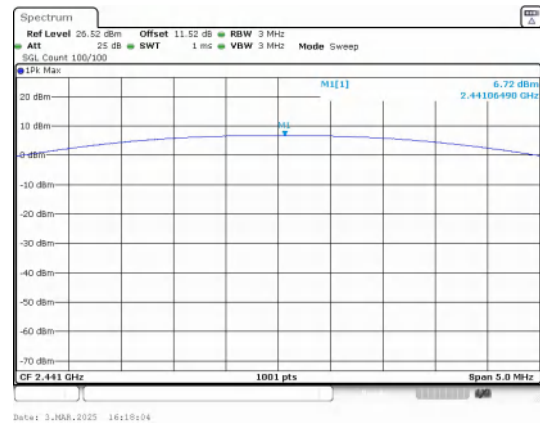
Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	6.87	4.86	≤ 30	PASS

		39	6.72	4.70		PASS
		78	5.60	3.63		PASS
		0	7.46	5.57		PASS
$\pi/4$ DQPSK	2-DH5	39	7.32	5.40	≤ 20.97	PASS
		78	6.17	4.14		PASS
		0	7.58	5.73		PASS
8DPSK	3-DH5	39	7.57	5.71		PASS
		78	6.44	4.41		PASS
						PASS

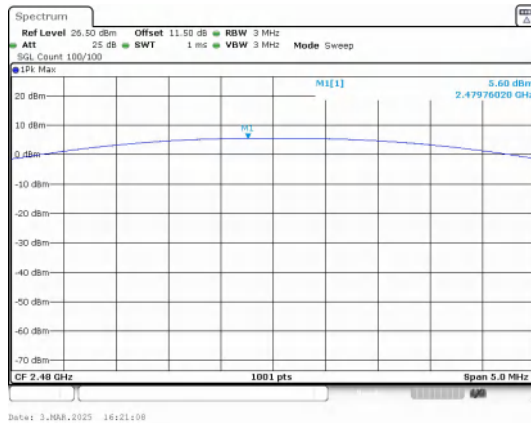
Test Graphs



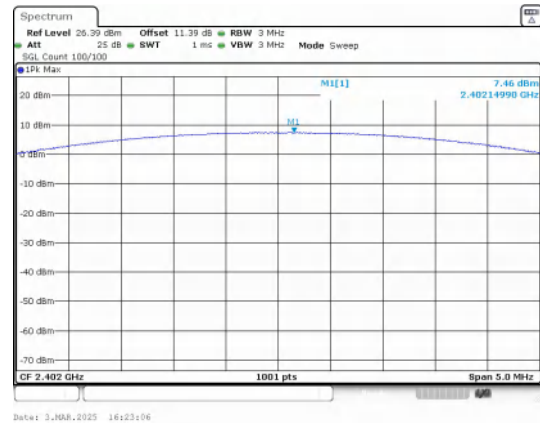
Peak Output Power
GFSK_Channel 0



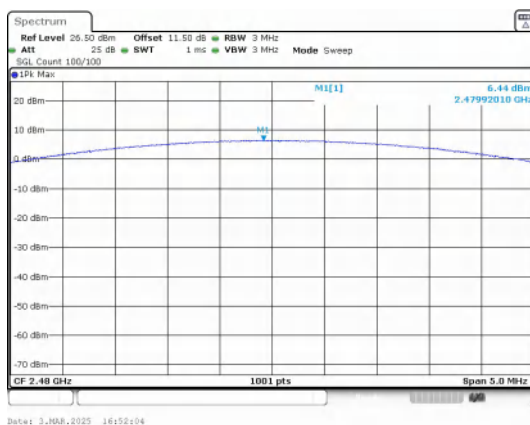
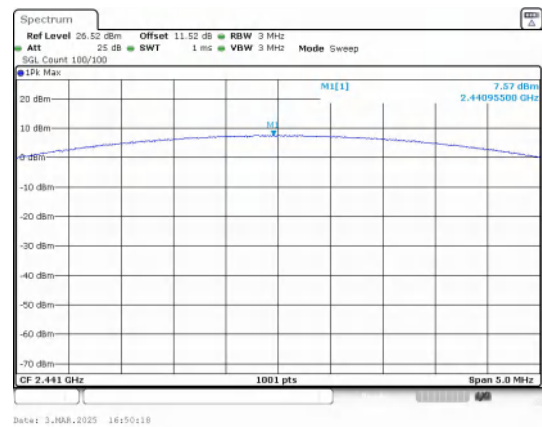
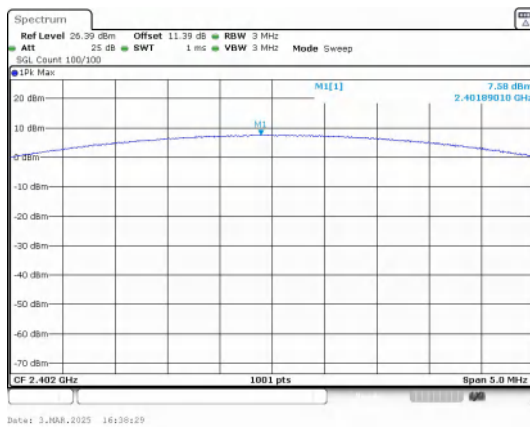
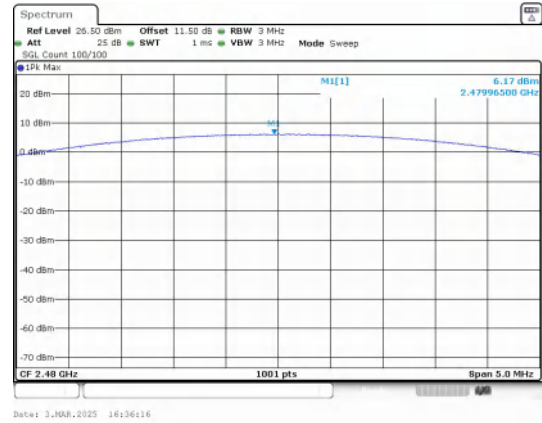
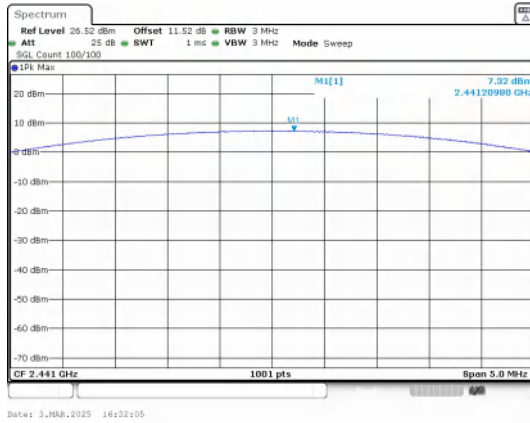
Peak Output Power
GFSK_Channel 39



Peak Output Power
GFSK_Channel 78



Peak Output Power
 $\pi/4$ DQPSK_Channel 0



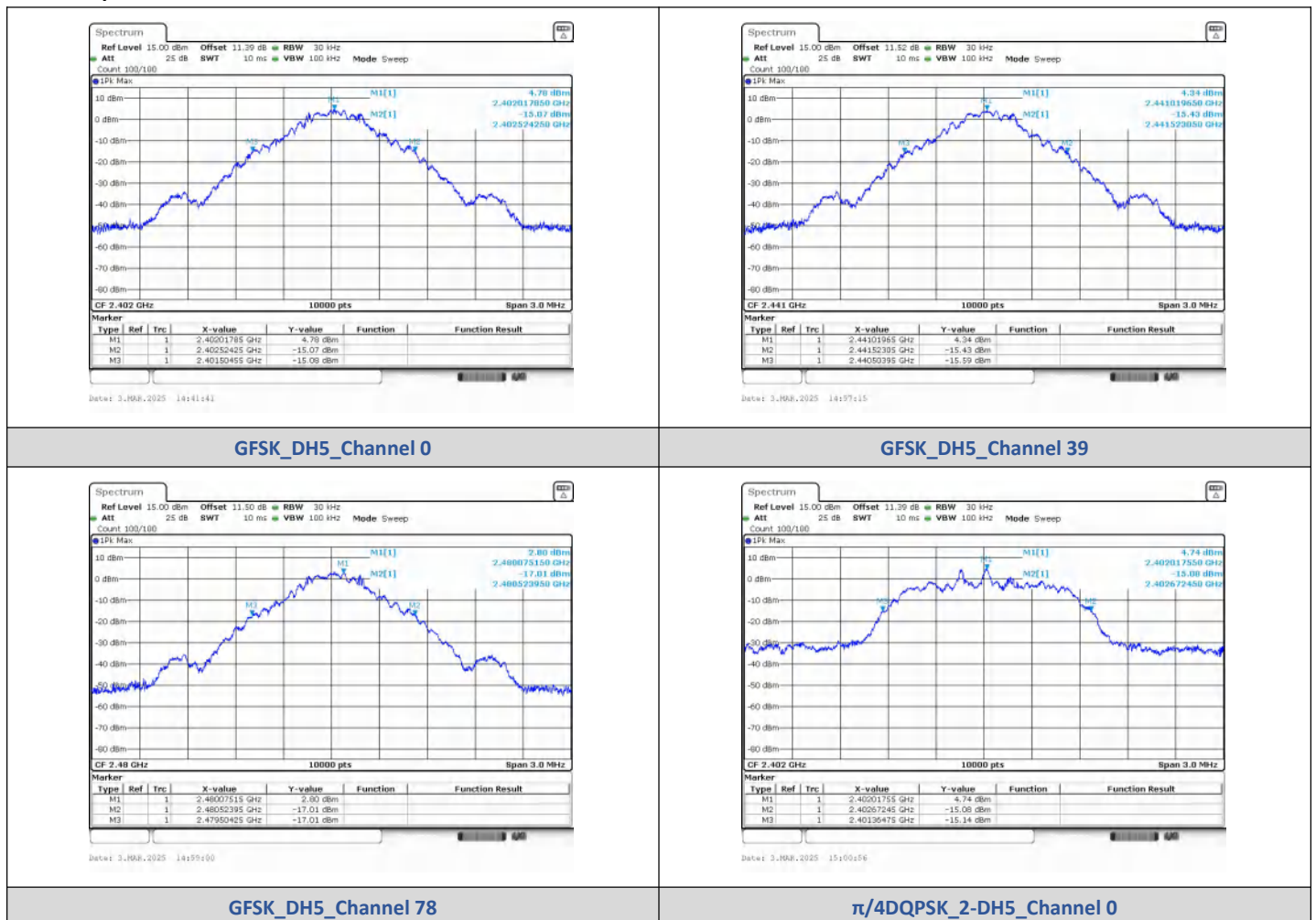
5) 20dB Bandwidth

Test Result

Left:

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.020
	39	2441 MHz	1.020
	78	2480 MHz	1.020
$\pi/4$ DQPSK	0	2402 MHz	1.310
	39	2441 MHz	1.310
	78	2480 MHz	1.300
8DPSK	0	2402 MHz	1.290
	39	2441 MHz	1.290
	78	2480 MHz	1.300

Test Graphs





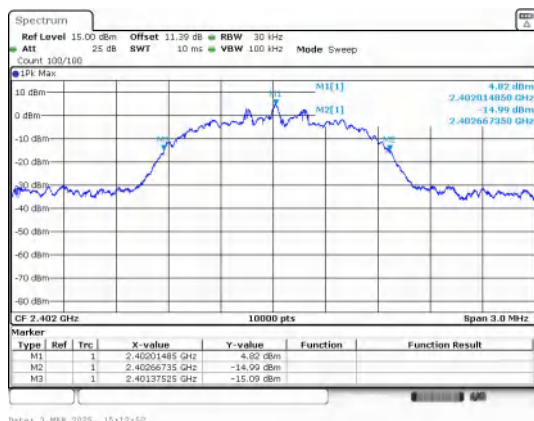
Date: 3.09.2025 15:07:25

$\pi/4$ DQPSK_2-DH5_Channel 39



Date: 3.09.2025 15:09:32

$\pi/4$ DQPSK_2-DH5_Channel 78



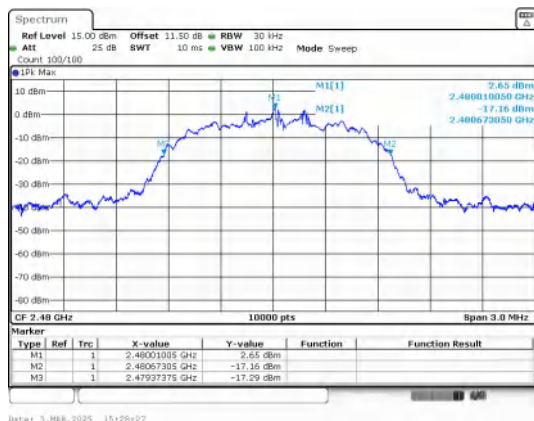
Date: 3.09.2025 15:12:52

8DPSK_3-DH5_Channel 0



Date: 3.09.2025 15:12:14

8DPSK_3-DH5_Channel 39



Date: 3.09.2025 15:12:27

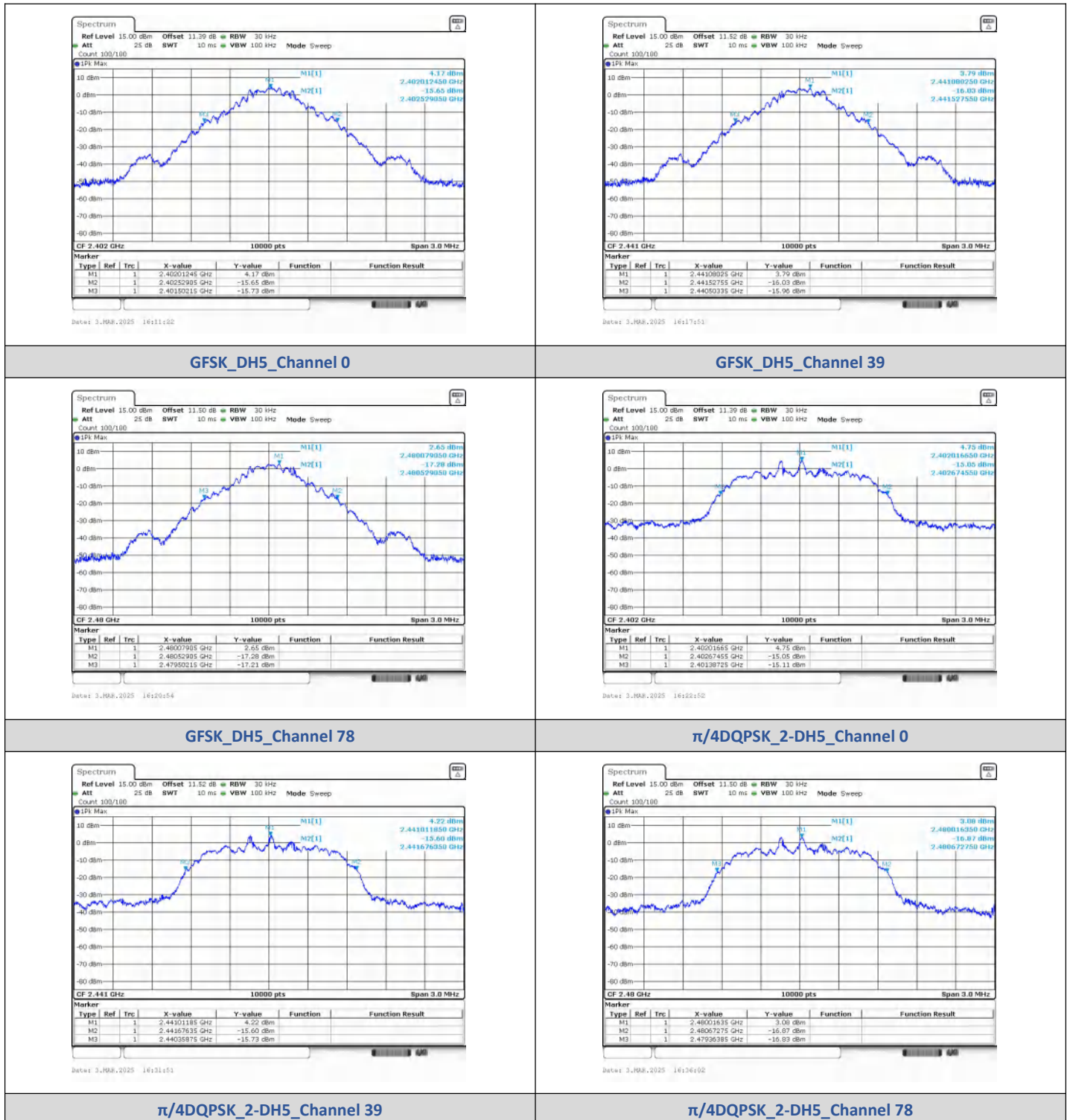
8DPSK_3-DH5_Channel 78

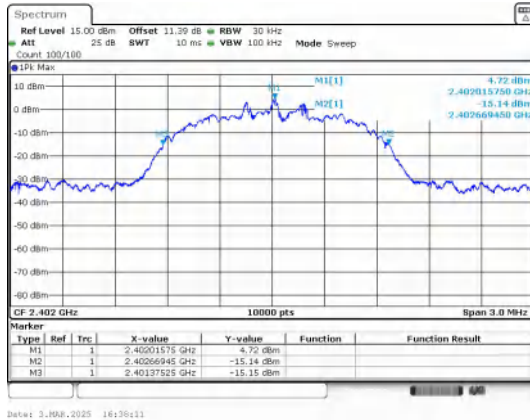
Right:

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.030
	39	2441 MHz	1.030
	78	2480 MHz	1.030
$\pi/4$ DQPSK	0	2402 MHz	1.280
	39	2441 MHz	1.320
	78	2480 MHz	1.310

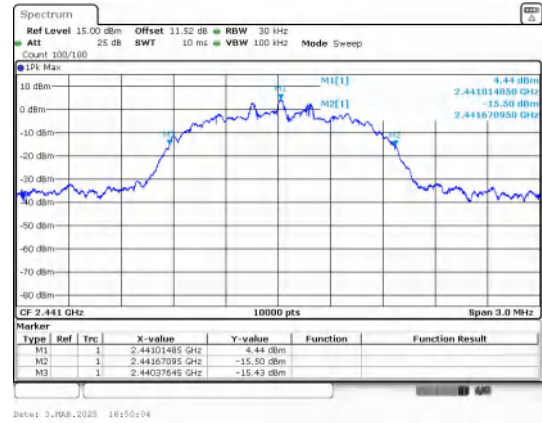
8DPSK	0	2402 MHz	1.290
	39	2441 MHz	1.290
	78	2480 MHz	1.290

Test Graphs

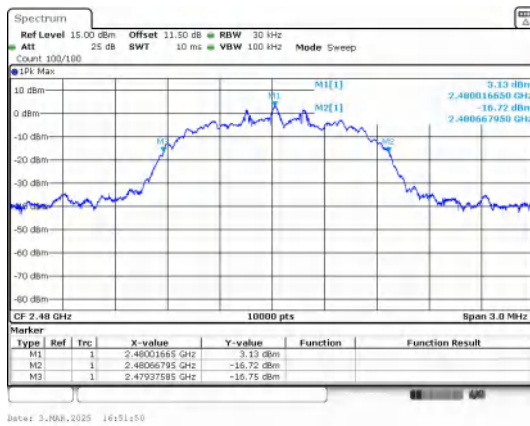




8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



8DPSK_3-DH5_Channel 78

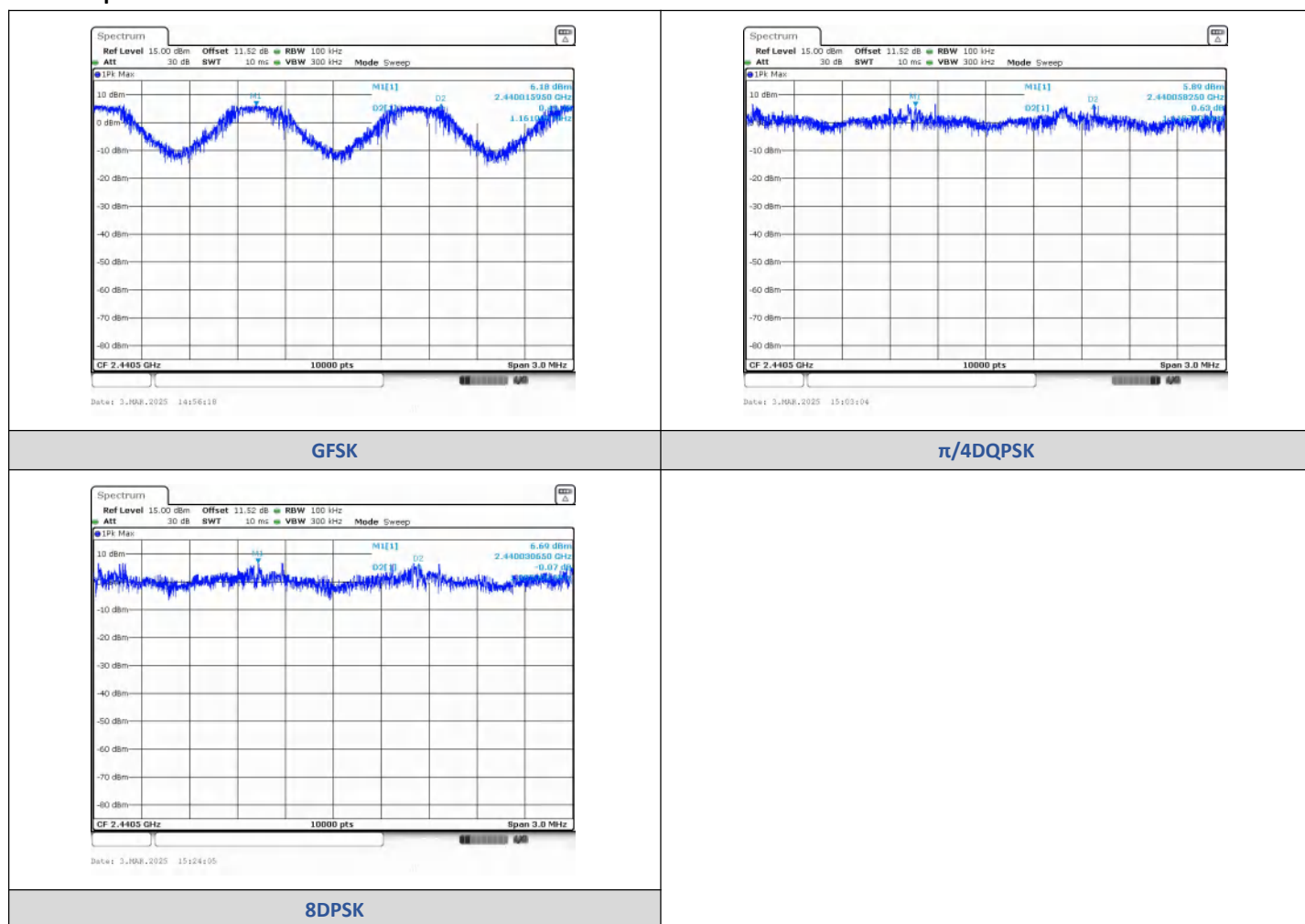
6) Carrier Frequencies Separation

Test Result

Left:

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2440.0159	2441.177	1.1610	1.02	PASS
$\pi/4$ DQPSK	2-DH5	2440.0583	2441.177	1.1187	0.873	PASS
8DPSK	3-DH5	2440.0307	2441.0356	1.0050	0.86	PASS

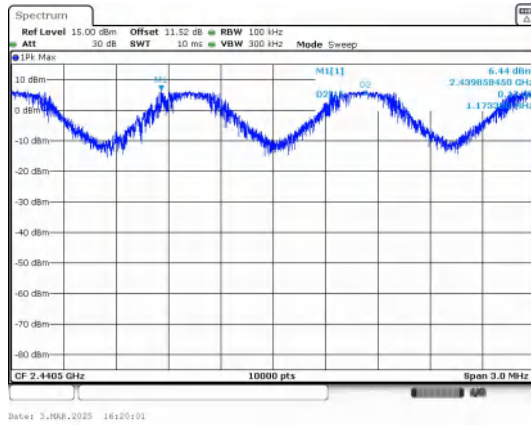
Test Graphs



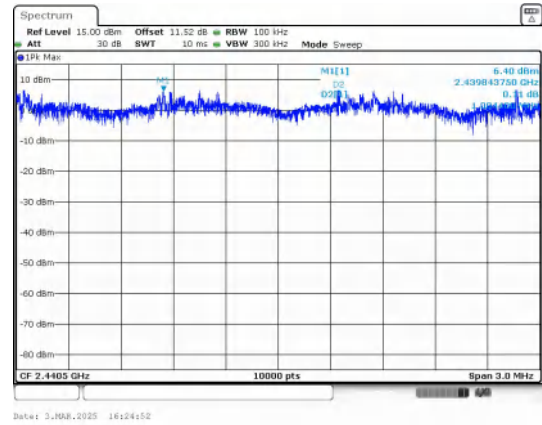
Right:

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2439.8585	2441.0318	1.1733	1.03	PASS
$\pi/4$ DQPSK	2-DH5	2439.8438	2440.8481	1.0044	0.853	PASS
8DPSK	3-DH5	2440.0262	2441.0329	1.0068	0.86	PASS

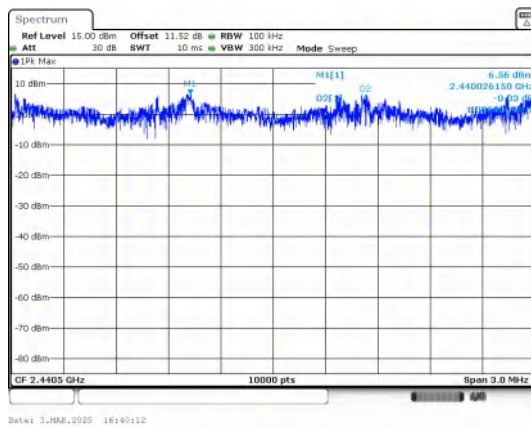
Test Graphs



GFSK



$\pi/4$ DQPSK



8DPSK

7) Conducted Out Of Band Emission

Test Result

Left:

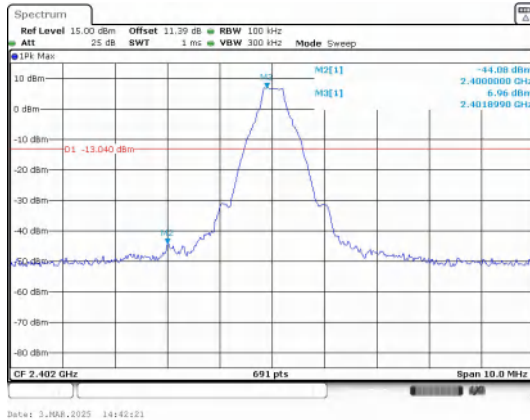
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-44.080	-13.04	-31.040	PASS
			7206.79	-40.106	-13.04	-27.066	PASS
		39	9763.72	-40.577	-13.27	-27.307	PASS
		78	2483.50	-50.540	-14.47	-36.070	PASS
			9920.20	-37.222	-14.47	-22.752	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-45.070	-13.14	-31.930	PASS
			4803.85	-40.047	-13.14	-26.907	PASS
		39	4882.09	-37.894	-13.34	-24.554	PASS
		78	2483.50	-50.130	-14.48	-35.650	PASS
			9920.20	-37.143	-14.48	-22.663	PASS
8DPSK	3-DH5	0	2400.00	-44.580	-13.13	-31.450	PASS
			9608.08	-41.718	-13.13	-28.588	PASS
		39	9763.72	-40.021	-13.44	-26.581	PASS
		78	2483.50	-50.820	-14.5	-36.320	PASS
			9920.20	-37.337	-14.5	-22.837	PASS

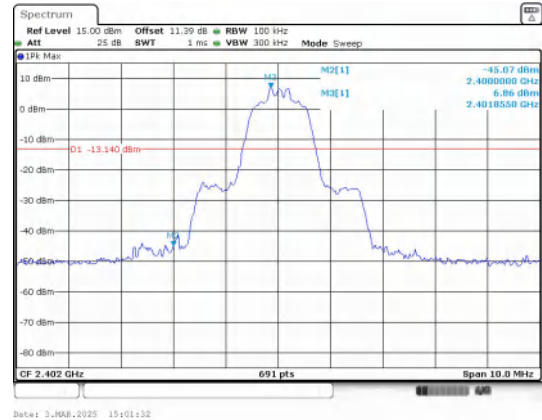
Hopping

Hopping							
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2395.40	-48.381	-13.39	-34.991	PASS
			2400.00	-49.060	-13.39	-35.670	PASS
			2483.50	-50.100	-14.49	-35.610	PASS
$\pi/4$ DQPSK	2-DH5		2400.00	-45.270	-13.12	-32.150	PASS
			2483.50	-49.820	-14.97	-34.850	PASS
8DPSK	3-DH5		2400.00	-46.870	-13.77	-33.100	PASS
			2483.50	-48.090	-14.63	-33.460	PASS

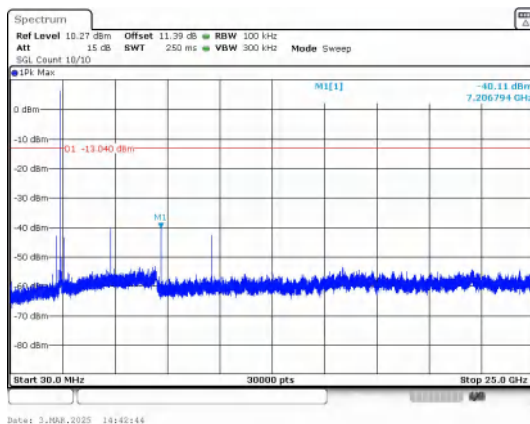
Test Graphs



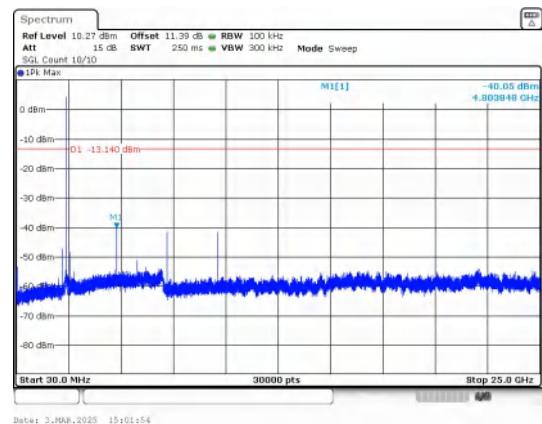
Out Of Band Emission
GFSK_DH5_Channel 0



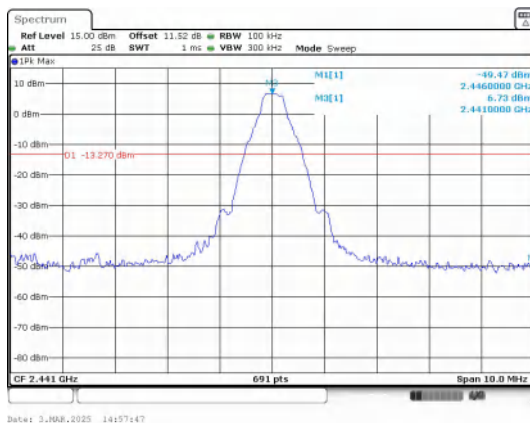
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 0



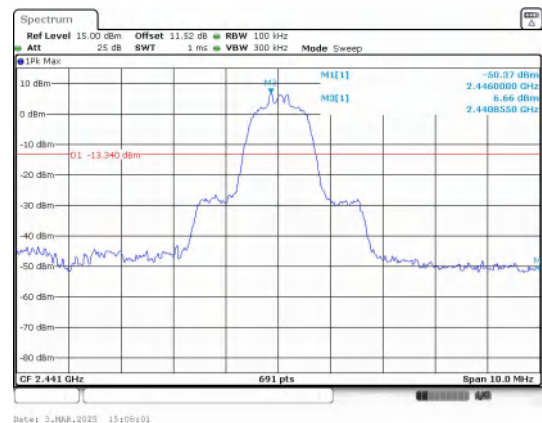
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



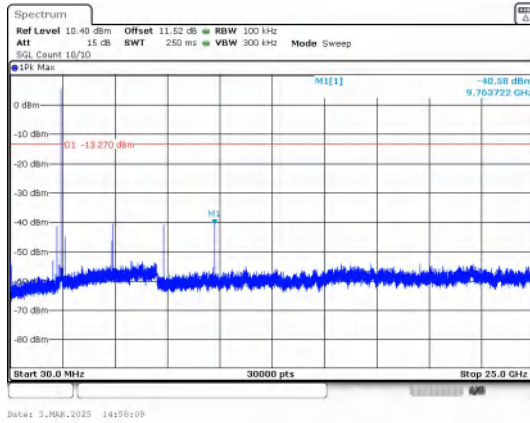
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 0



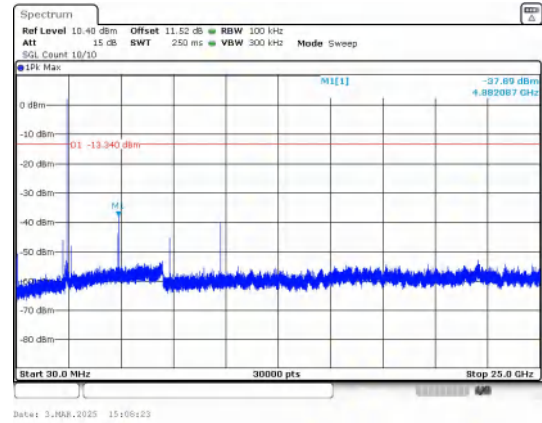
Out Of Band Emission
GFSK_DH5_Channel 39



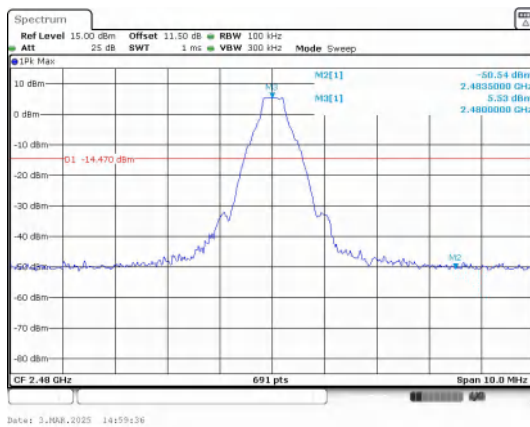
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39



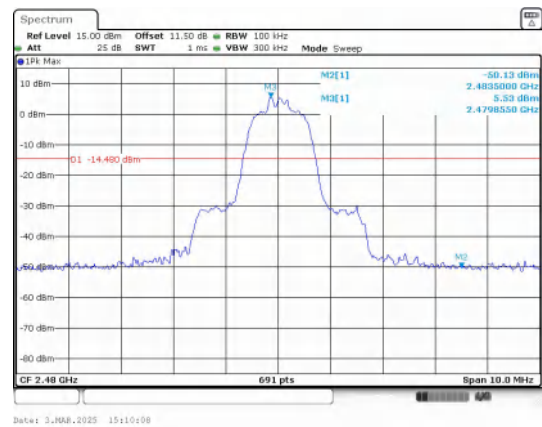
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



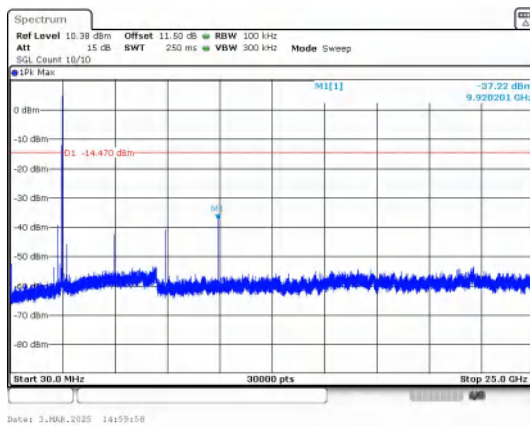
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39



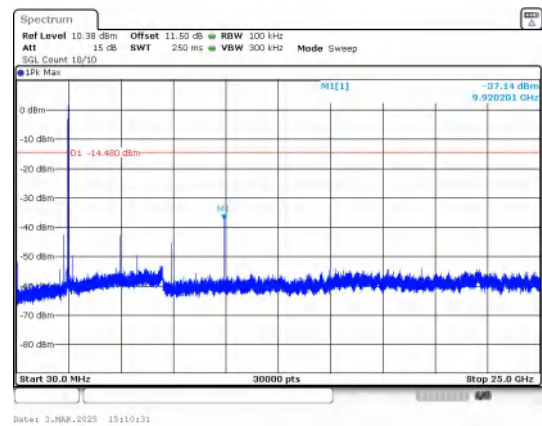
Out Of Band Emission
GFSK_DH5_Channel 78



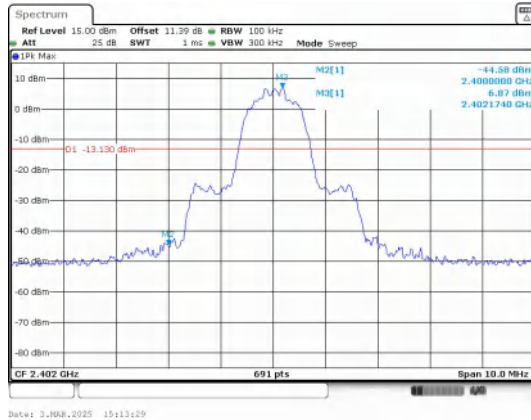
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



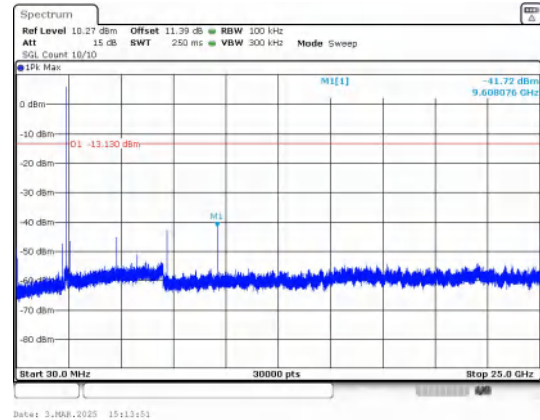
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



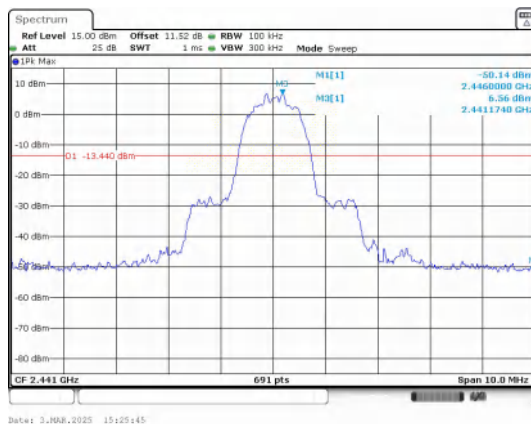
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 78



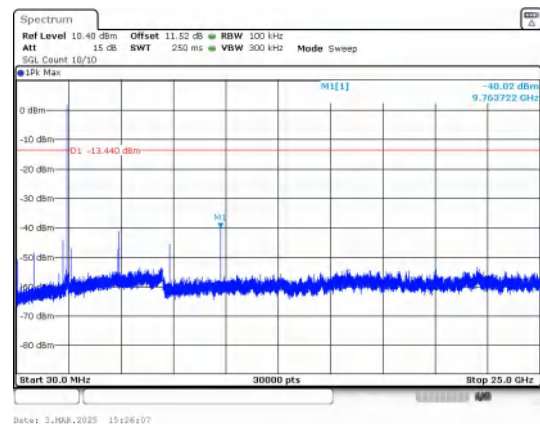
Out Of Band Emission
8DPSK_3-DH5_Channel 0



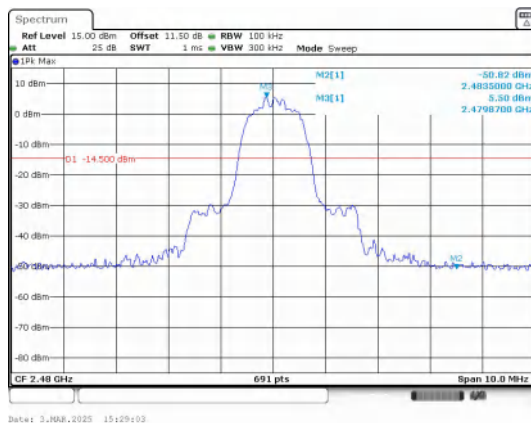
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



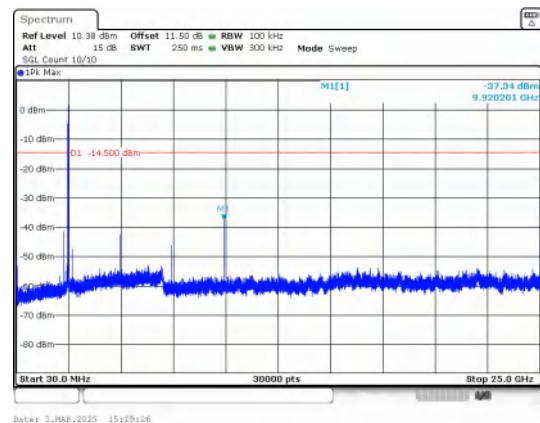
Out Of Band Emission
8DPSK_3-DH5_Channel 39



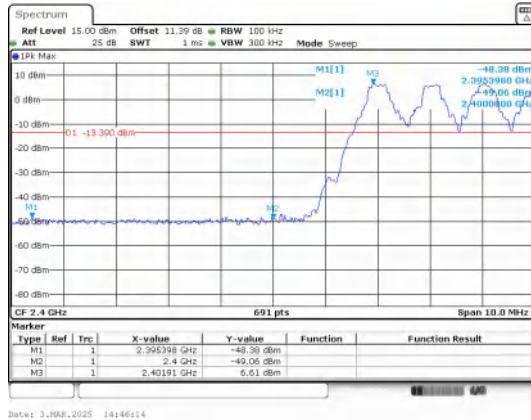
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



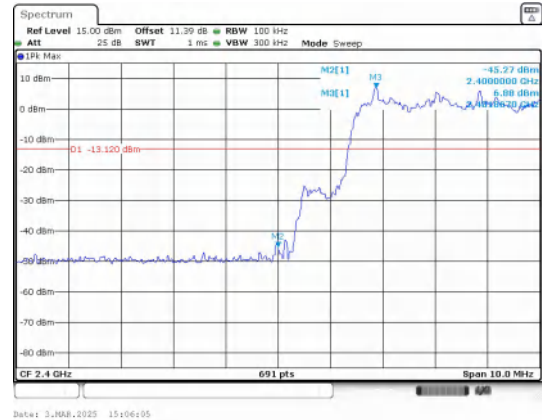
Out Of Band Emission
8DPSK_3-DH5_Channel 78



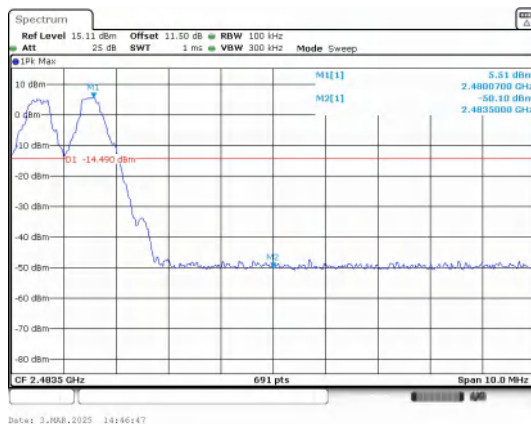
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



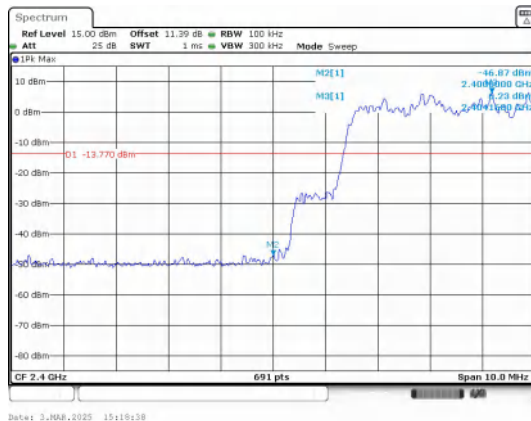
Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



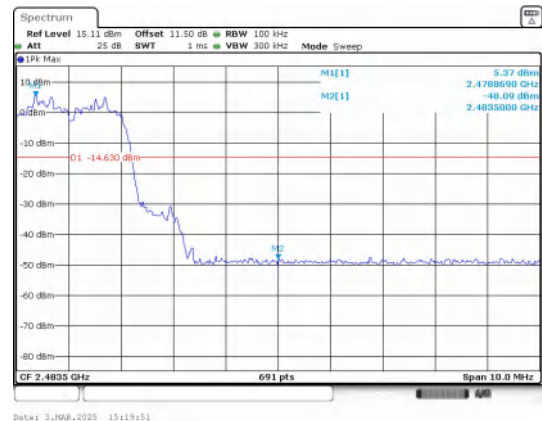
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



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

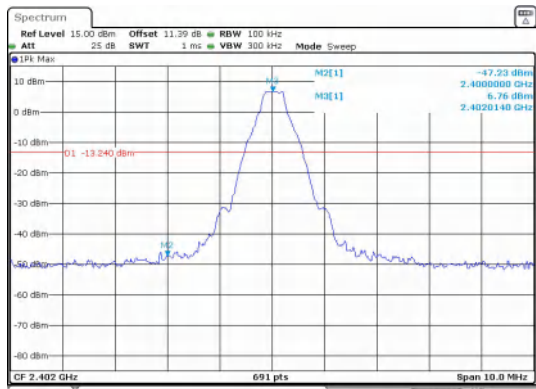
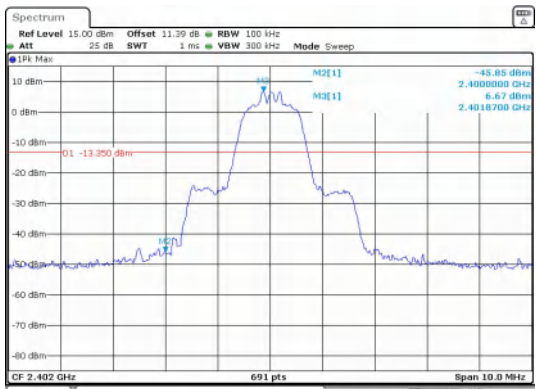
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
------------	--------	---------	------------------------------------	--------------------------------	----------------	--------------------	--------

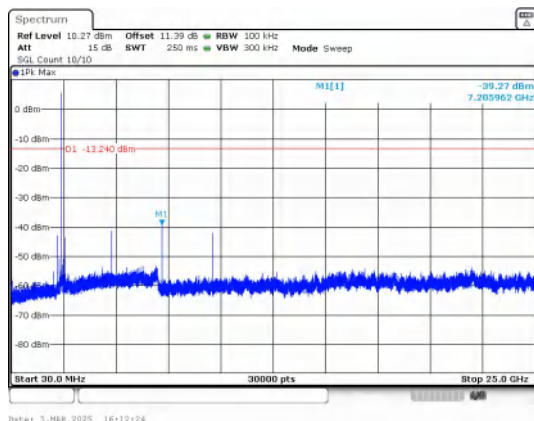
GFSK	DH5	0	2400.00	-47.230	-13.24	-33.990	PASS
			7205.96	-39.269	-13.24	-26.029	PASS
		39	9763.72	-41.068	-13.4	-27.668	PASS
		78	2483.50	-51.060	-14.57	-36.490	PASS
			9920.20	-37.414	-14.57	-22.844	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-45.850	-13.35	-32.500	PASS
			9608.08	-41.802	-13.35	-28.452	PASS
		39	9763.72	-40.268	-13.73	-26.538	PASS
		78	2483.50	-50.340	-14.64	-35.700	PASS
			9920.20	-37.410	-14.64	-22.770	PASS
8DPSK	3-DH5	0	2400.00	-43.440	-13.4	-30.040	PASS
			7205.96	-38.552	-13.4	-25.152	PASS
		39	9763.72	-40.721	-13.4	-27.321	PASS
		78	2483.50	-49.990	-14.89	-35.100	PASS
			9920.20	-37.153	-14.89	-22.263	PASS

Hopping

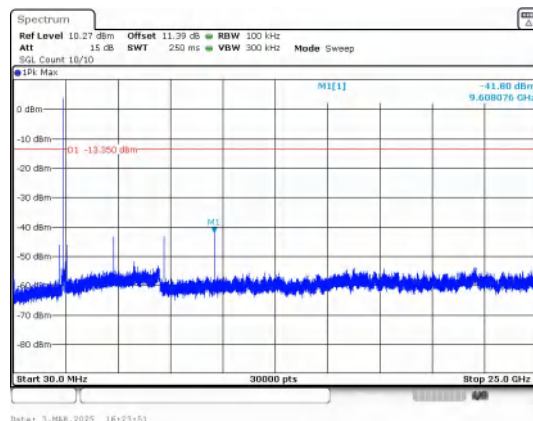
Hopping							
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2398.41	-48.348	-13.4	-34.948	PASS
			2400.00	-49.680	-13.4	-36.280	PASS
			2483.50	-49.160	-15.0	-34.160	PASS
$\pi/4$ DQPSK	2-DH5		2397.57	-48.267	-13.88	-34.387	PASS
			2400.00	-49.050	-13.88	-35.170	PASS
			2483.50	-48.530	-14.57	-33.960	PASS
8DPSK	3-DH5		2397.81	-48.043	-13.5	-34.543	PASS
			2400.00	-49.170	-13.5	-35.670	PASS
			2483.50	-49.310	-14.98	-34.330	PASS

Test Graphs

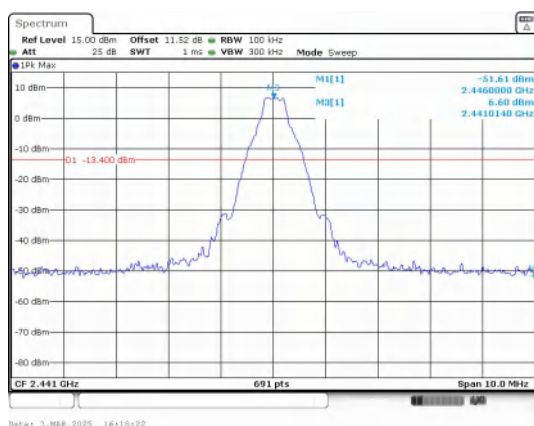
 Out Of Band Emission GFSK_DH5_Channel 0	 Out Of Band Emission $\pi/4$DQPSK_2-DH5_Channel 0
--	--



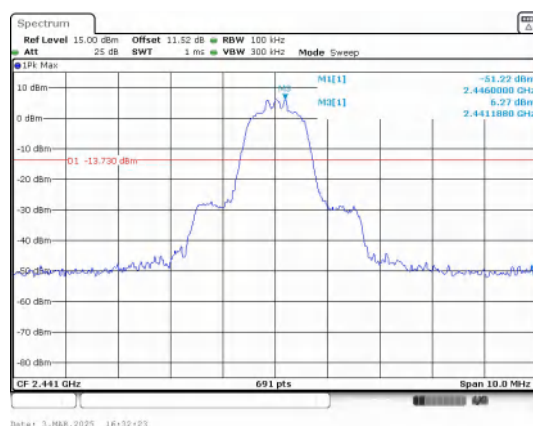
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



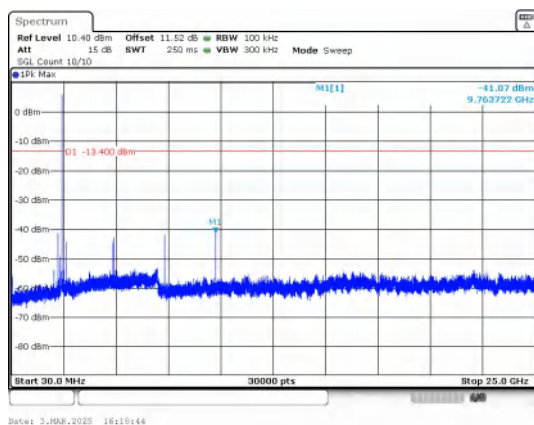
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 0



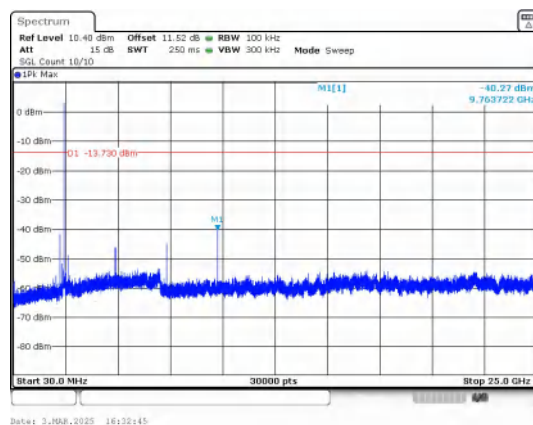
Out Of Band Emission
GFSK_DH5_Channel 39



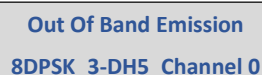
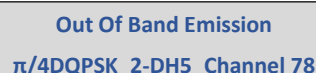
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39

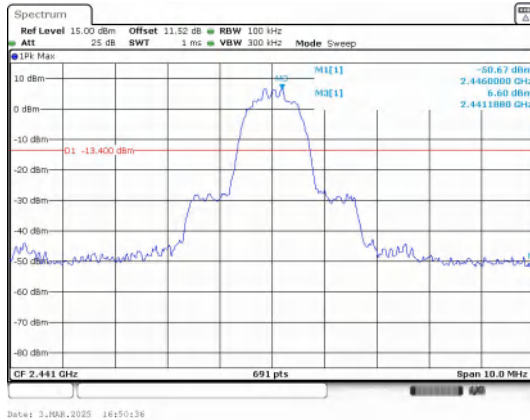


30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39

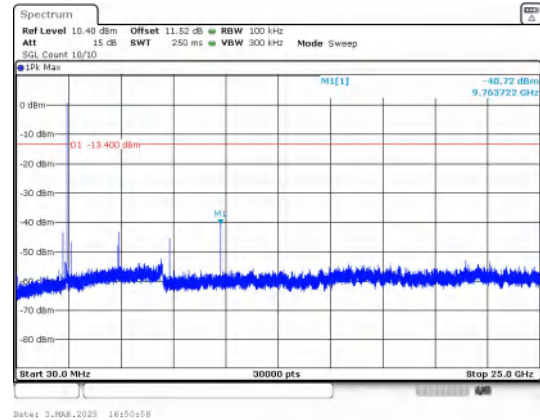


30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39

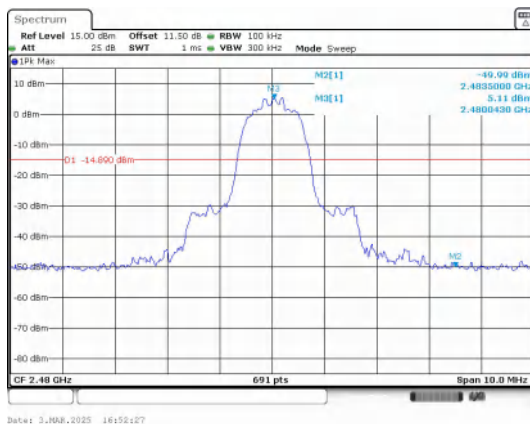




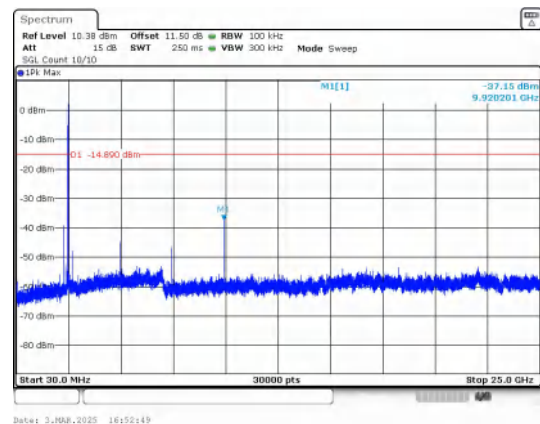
Out Of Band Emission
8DPSK_3-DH5_Channel 39



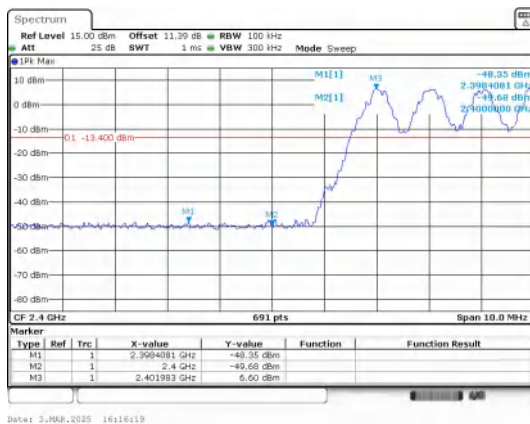
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



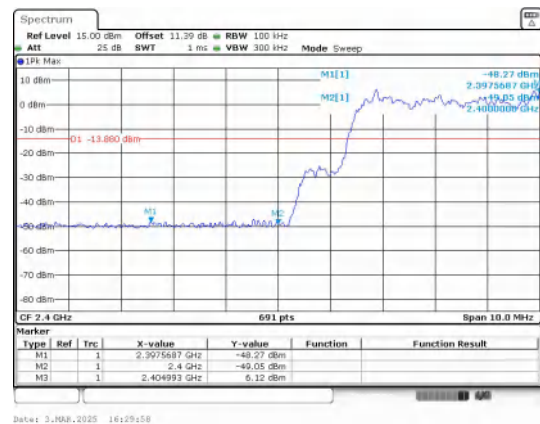
Out Of Band Emission
8DPSK_3-DH5_Channel 78



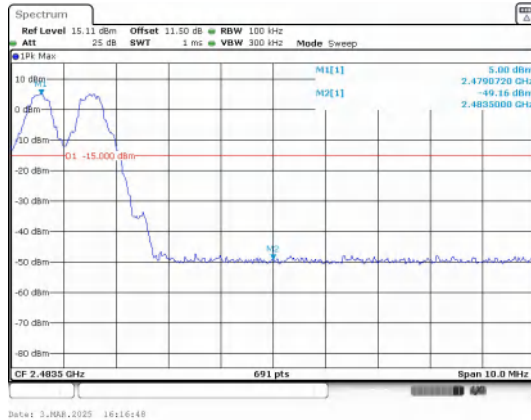
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



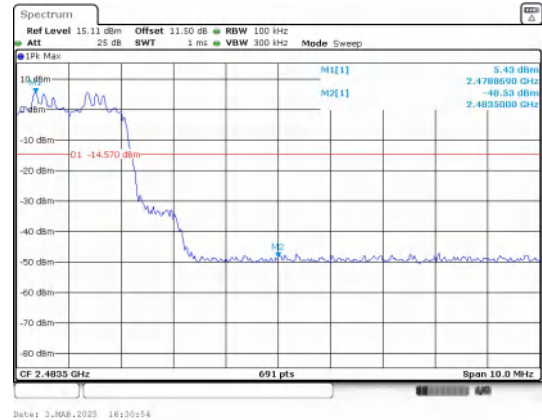
Out Of Band Emission (Left)
GFSK_DH5_Channel Hopping



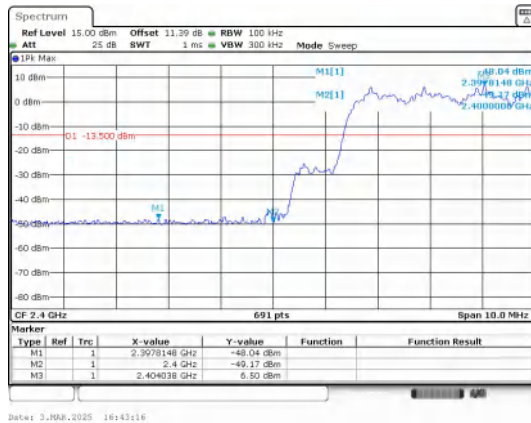
Out Of Band Emission (Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



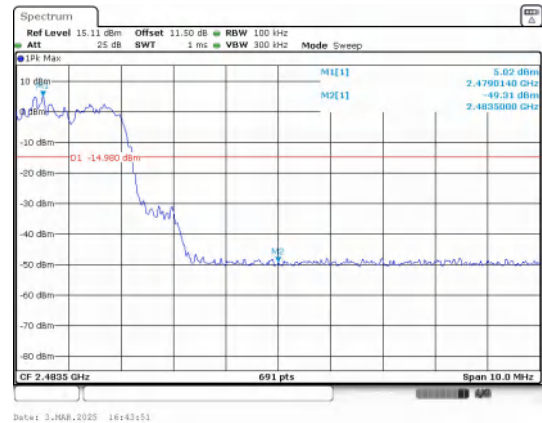
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



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

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