

Appendix Report

Report No.:	CISRR250325217
Test Engineer:	Lucas Huang
Supervised by:	Rory Huang

1) Duty Cycle

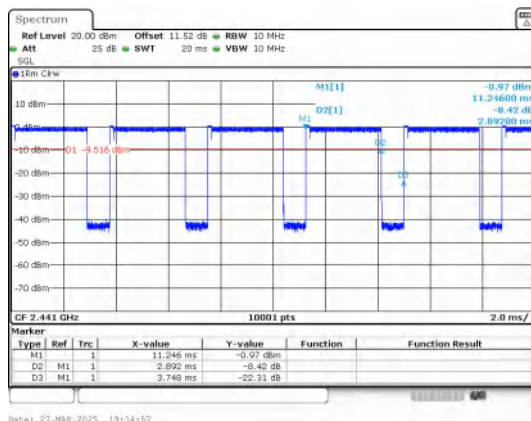
Test Result

Left:

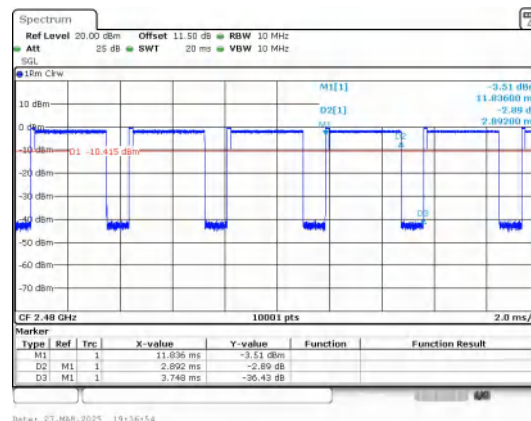
Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.884	3.748	76.95	0.7695	1.1379	0.3467
		39	2.886	3.748	77.00	0.7700	1.1351	0.3465
		78	2.886	3.748	77.00	0.7700	1.1351	0.3465
$\pi/4$ DQPSK	2-DH5	0	2.892	3.748	77.16	0.7716	1.1261	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	2.892	3.748	77.16	0.7716	1.1261	0.3458
		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

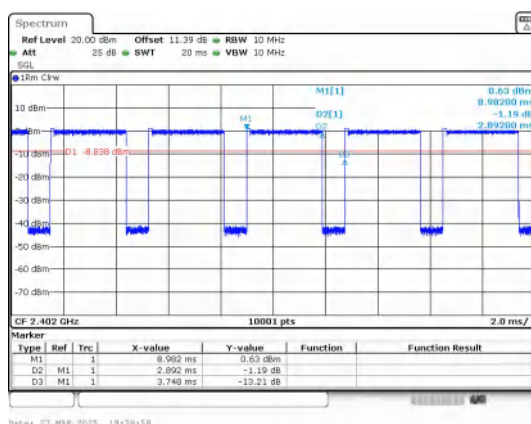




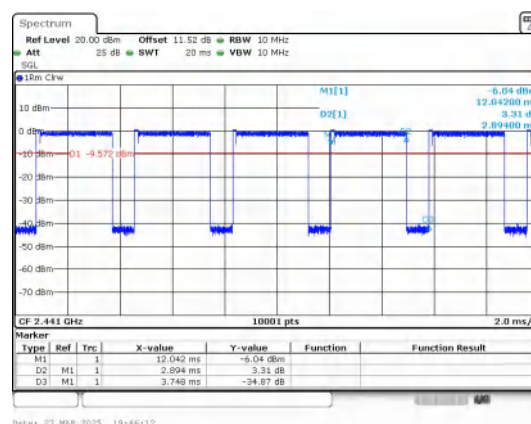
$\pi/4$ DQPSK(2-DH5)_Channel 39



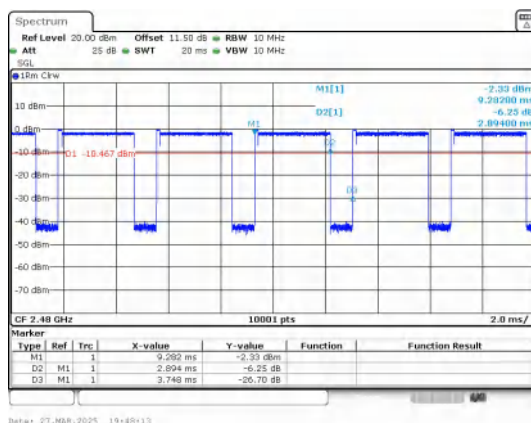
$\pi/4$ DQPSK(2-DH5)_Channel 78



8DPSK(3-DH5)_Channel 0



8DPSK(3-DH5)_Channel 39

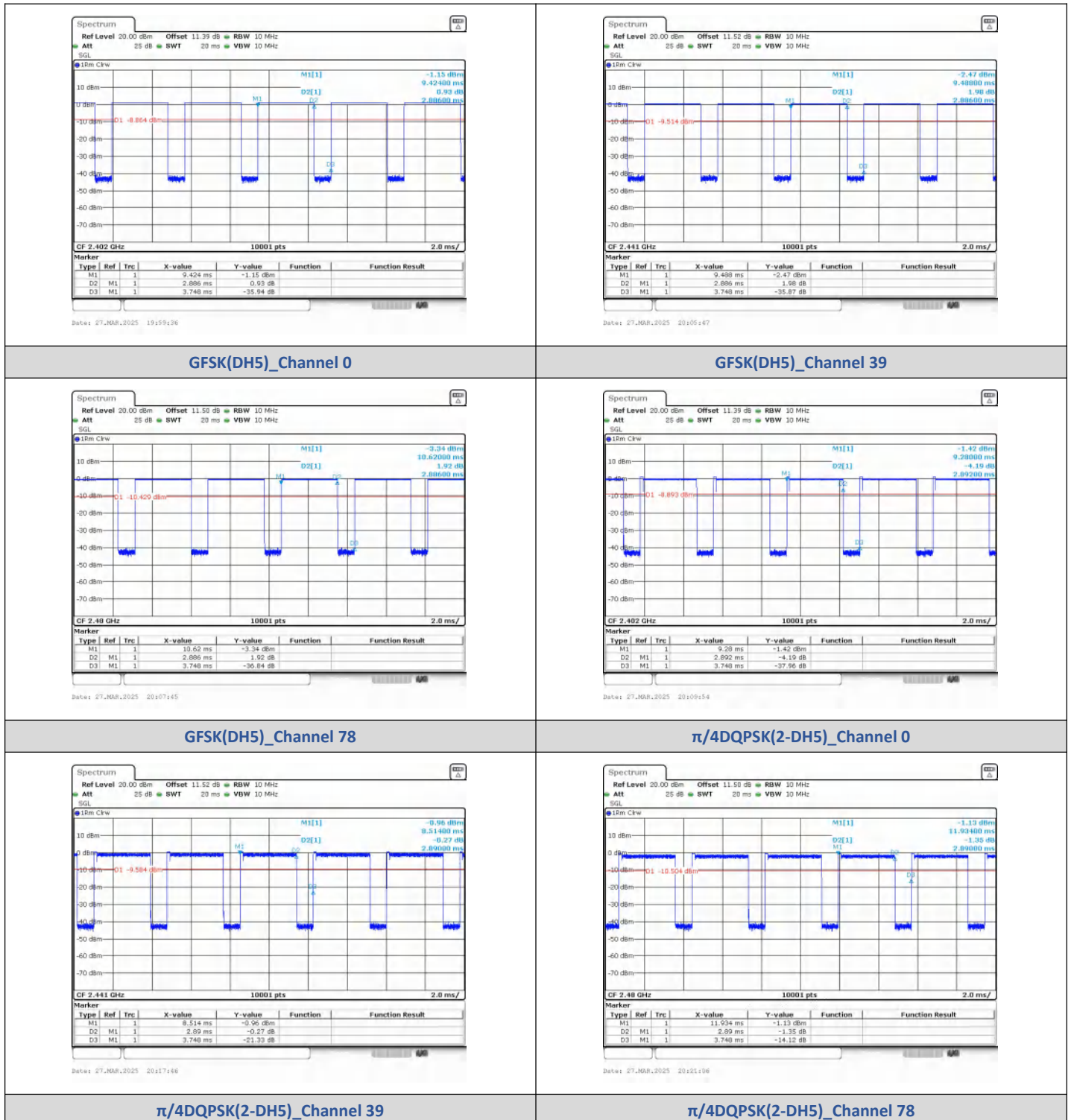


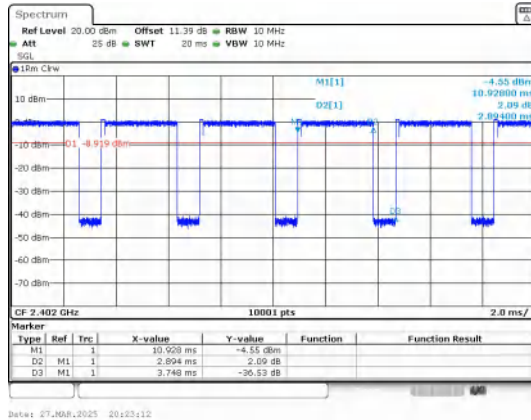
Right:

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	2.890	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	2.894	3.748	77.21	0.7721	1.1233	0.3455

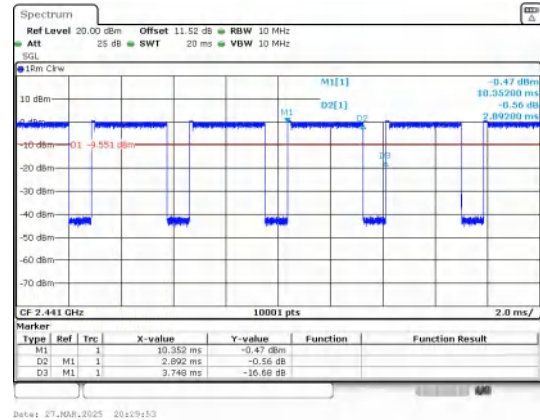
		39	2.892	3.748	77.16	0.7716	1.1261	0.3458
		78	2.894	3.748	77.21	0.7721	1.1233	0.3455

Test Graphs

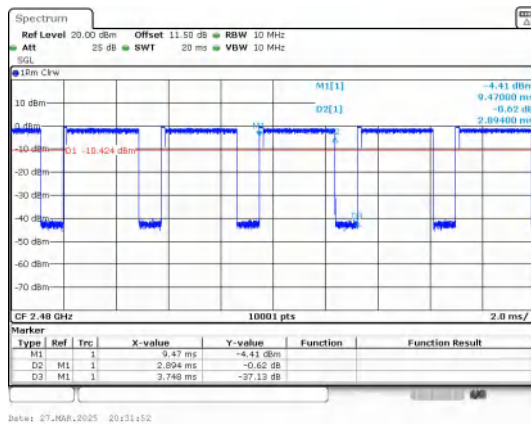




8DPSK(3-DH5)_Channel 0



8DPSK(3-DH5)_Channel 39



8DPSK(3-DH5)_Channel 78

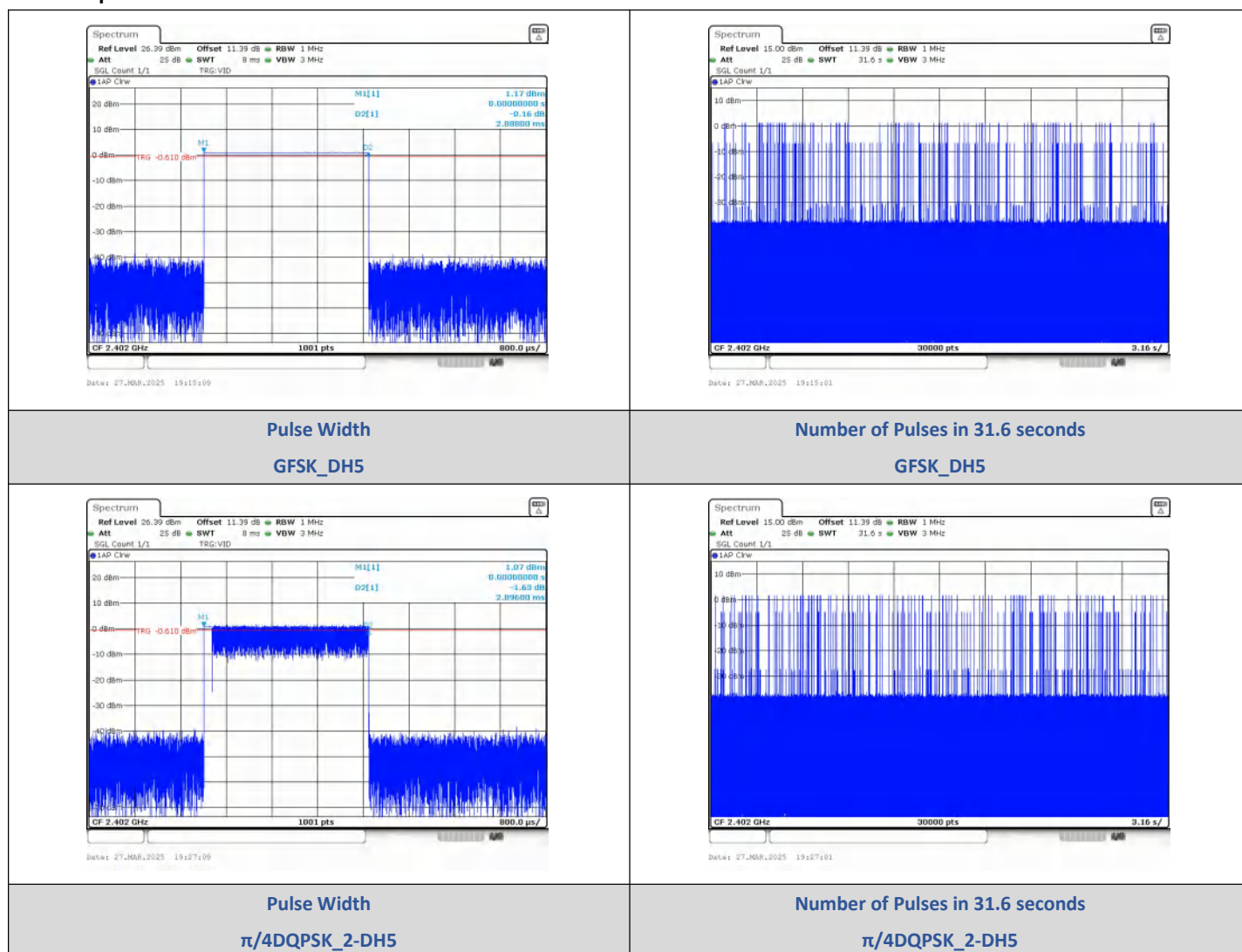
2) Dwell Time

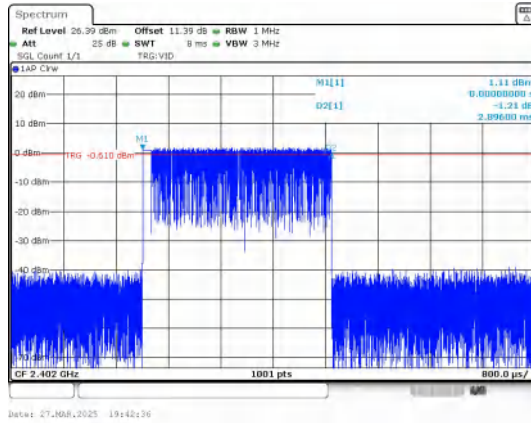
Test Result

Left:

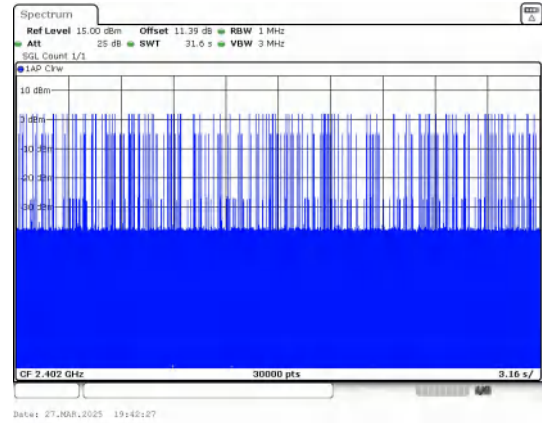
Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.888	93	268.58	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.896	103	298.29		PASS
8DPSK	3-DH5		2.896	112	324.35		PASS

Test Graphs





Pulse Width
8DPSK_3-DH5

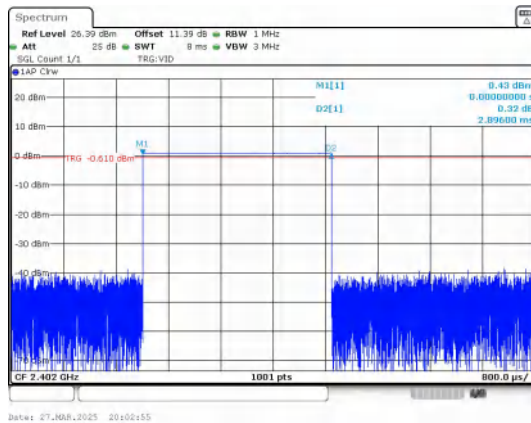


Number of Pulses in 31.6 seconds
8DPSK_3-DH5

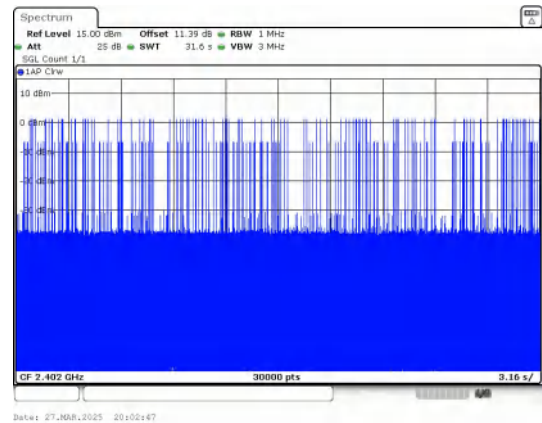
Right:

Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.896	106	306.98	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.792	109	304.33		PASS
8DPSK	3-DH5		2.896	113	327.25		PASS

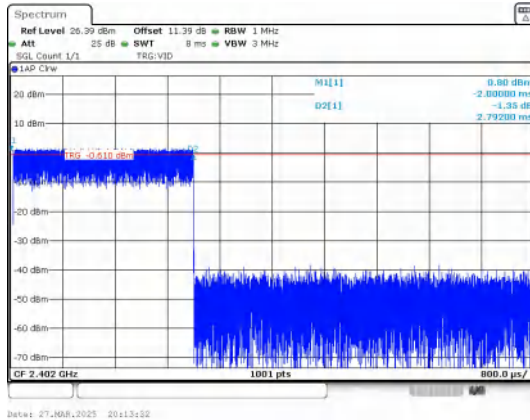
Test Graphs



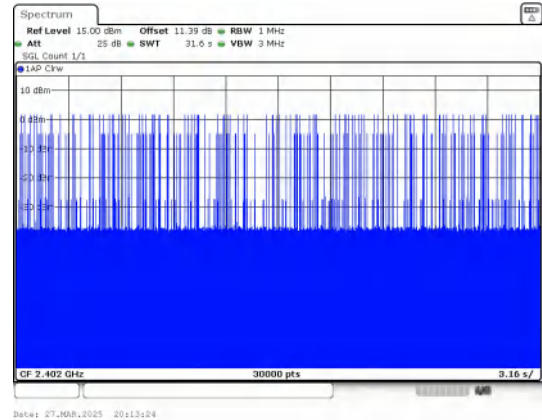
Pulse Width
GFSK_DH5



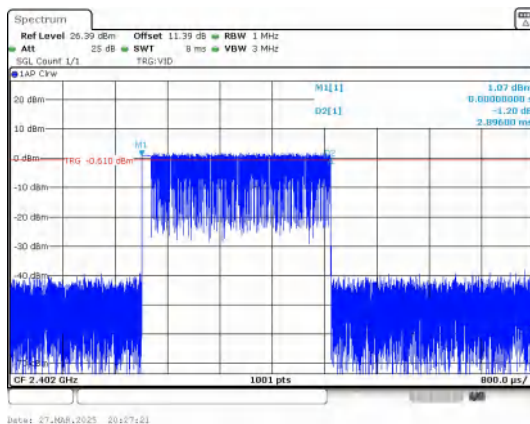
Number of Pulses in 31.6 seconds
GFSK_DH5



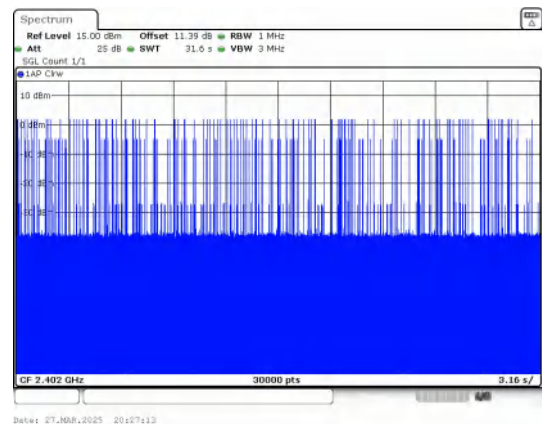
Pulse Width
 $\pi/4$ DQPSK_2-DH5



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

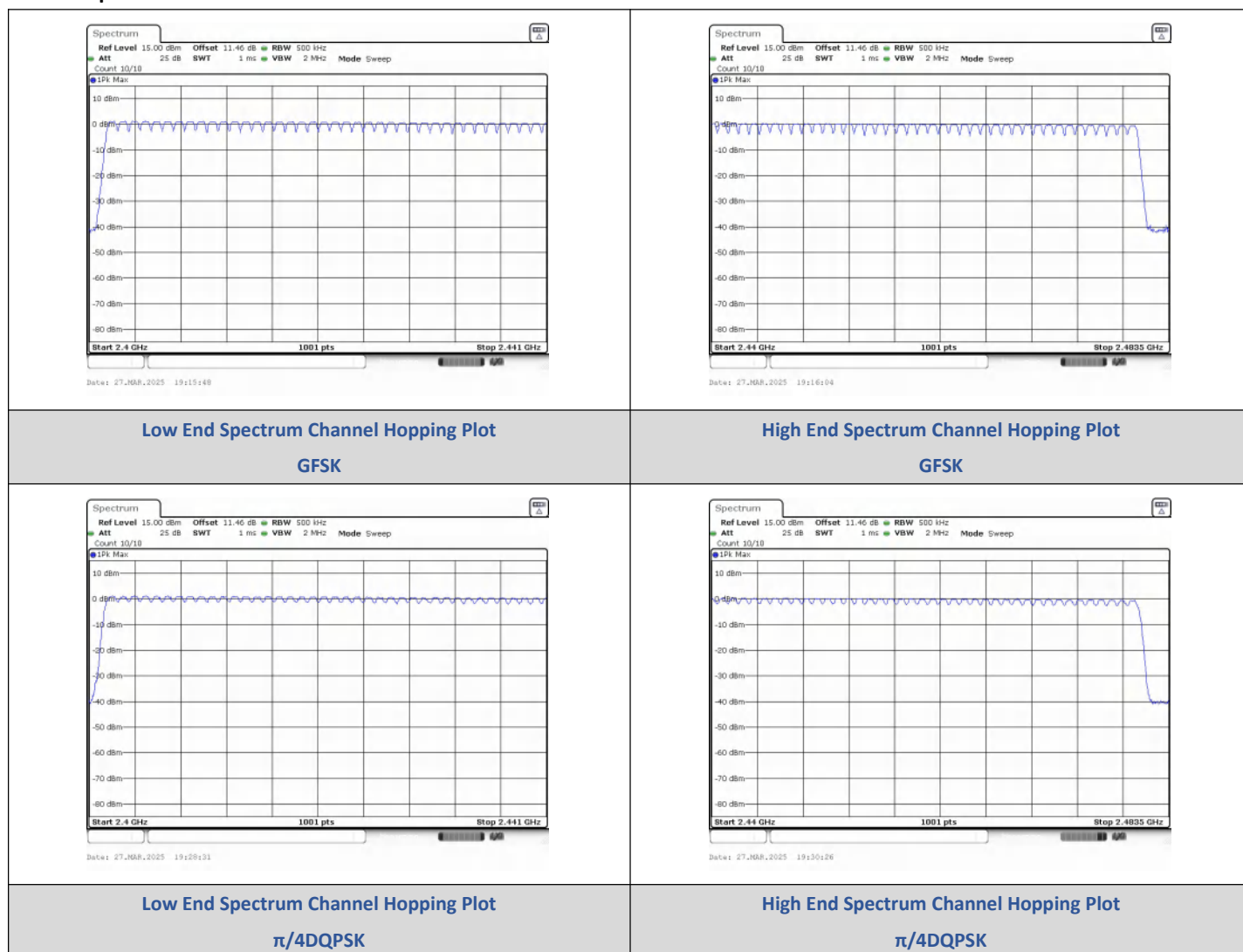
3) Number Of Hopping Channel

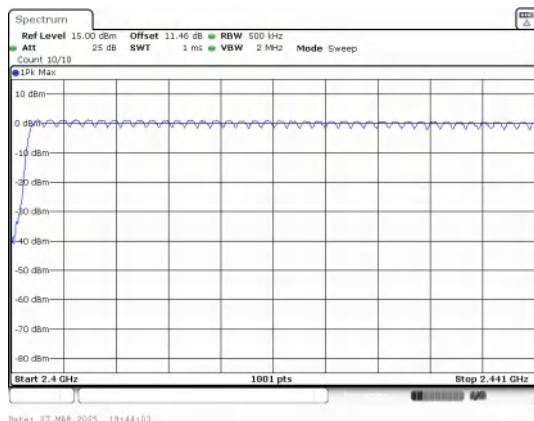
Test Result

Left:

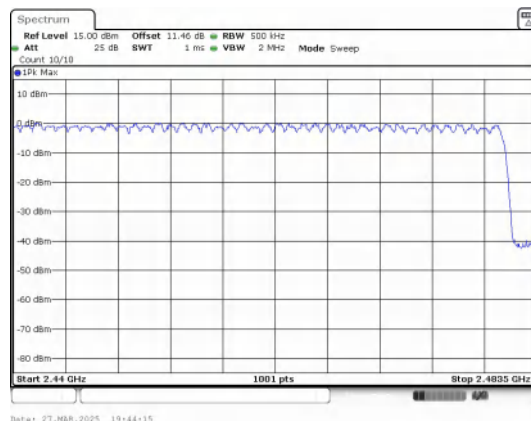
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
$\pi/4$ DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

Test Graphs





Low End Spectrum Channel Hopping Plot
8DPSK



High End Spectrum Channel Hopping Plot
8DPSK

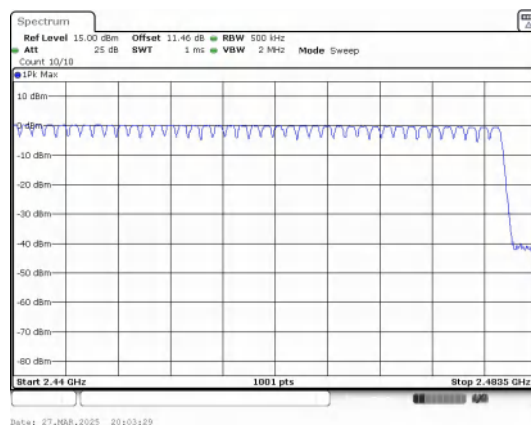
Right:

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

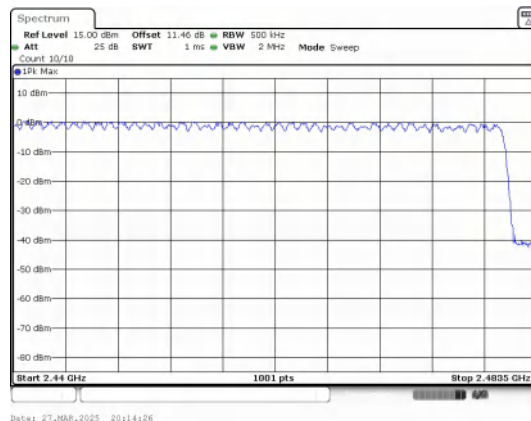
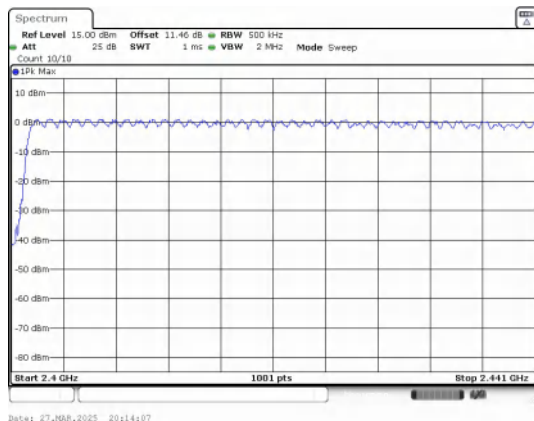
Test Graphs

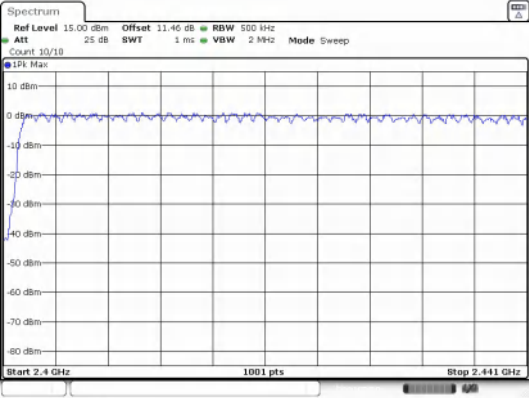
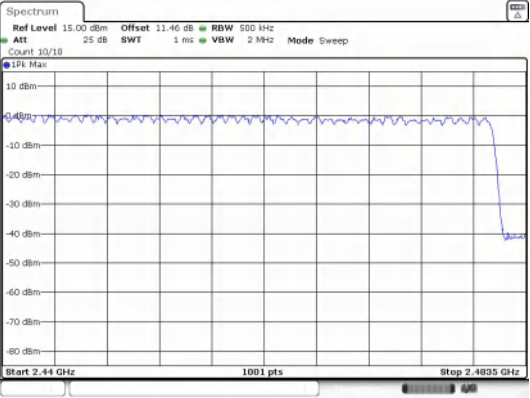


Low End Spectrum Channel Hopping Plot
GFSK



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: 27-Nov-2025 20:27:43	 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 2.44 GHz 1001 pts Stop 2.4835 GHz Date: 27-Nov-2025 20:28:03
Low End Spectrum Channel Hopping Plot 8DPSK	High End Spectrum Channel Hopping Plot 8DPSK

4) Conducted Peak Output Power

Test Result

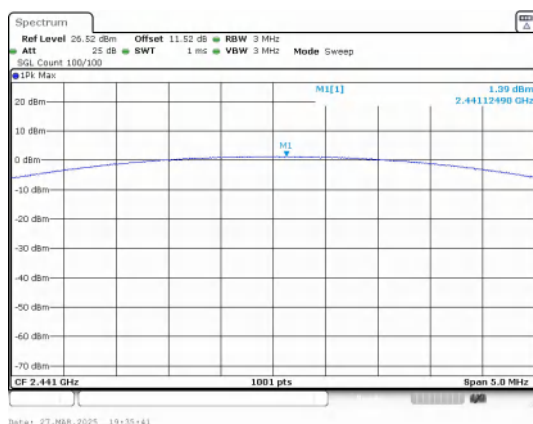
Left:

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	1.20	1.32	≤30	PASS
		39	0.52	1.13		PASS
		78	-0.40	0.91		PASS
$\pi/4$ DQPSK	2-DH5	0	1.99	1.58	≤20.97	PASS
		39	1.39	1.38		PASS
		78	0.49	1.12		PASS
8DPSK	3-DH5	0	2.40	1.74		PASS
		39	1.71	1.48		PASS
		78	0.82	1.21		PASS

Test Graphs

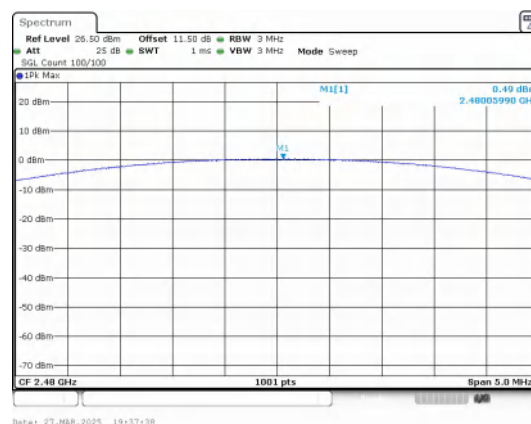


GFSK_Channel 78



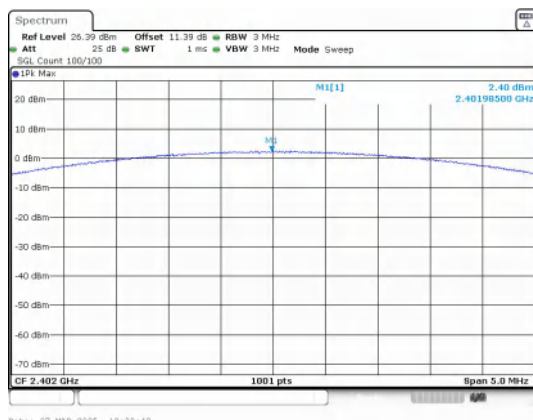
Date: 27, Nov, 2025 19:35:41

π /4DQPSK_Channel 0



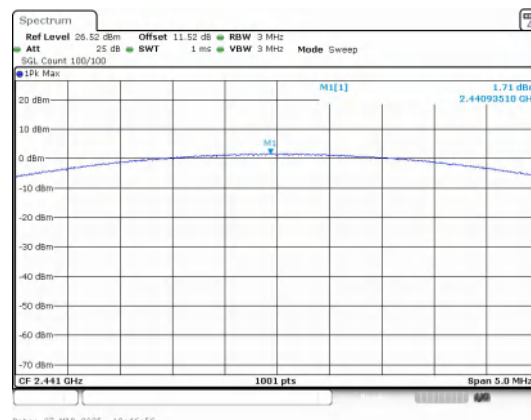
Date: 27, Nov, 2025 19:37:38

Peak Output Power
 π /4DQPSK_Channel 39



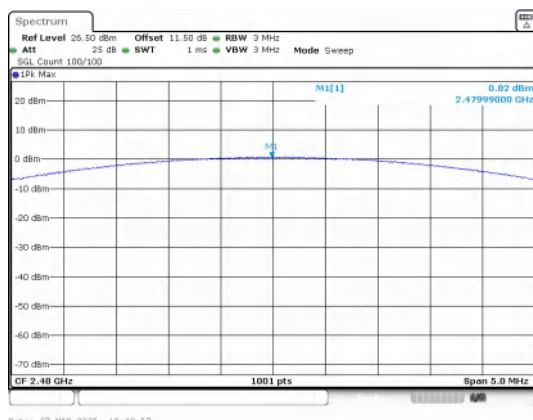
Date: 27, Nov, 2025 19:39:42

Peak Output Power
 π /4DQPSK_Channel 78



Date: 27, Nov, 2025 19:46:56

Peak Output Power
8DPSK_Channel 0



Date: 27, Nov, 2025 19:48:57

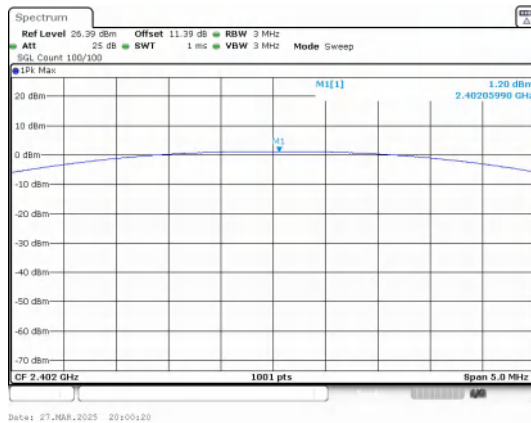
Peak Output Power
8DPSK_Channel 78

Right:

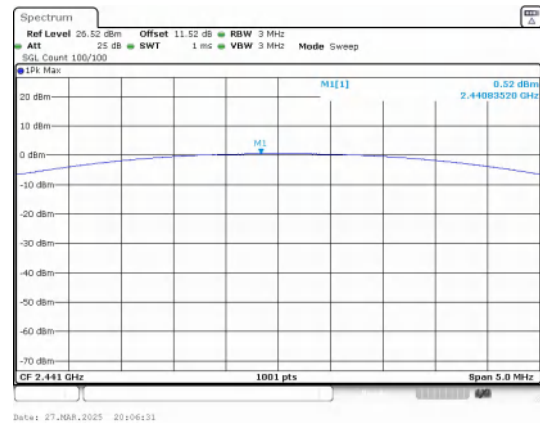
Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	C		≤30	PASS

$\pi/4$ DQPSK	2-DH5	39	0.52	1.13	≤ 20.97	PASS
		78	-0.37	0.92		PASS
		0	2.00	1.58		PASS
		39	1.34	1.36		PASS
		78	0.41	1.10		PASS
		0	2.31	1.70		PASS
8DPSK	3-DH5	39	1.73	1.49		PASS
		78	0.87	1.22		PASS

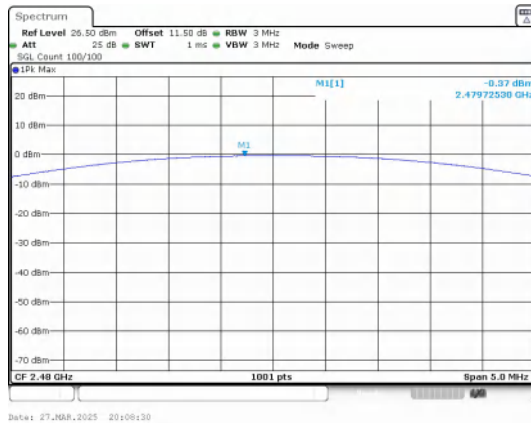
Test Graphs



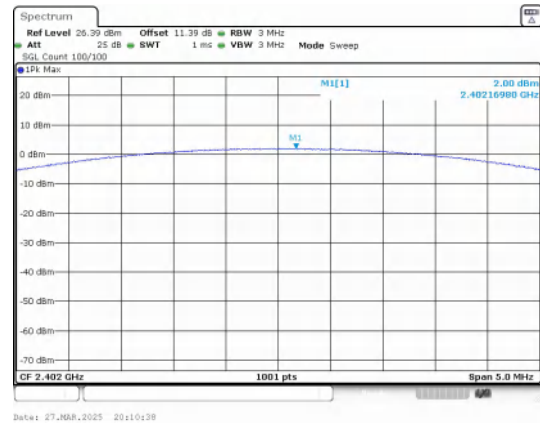
Peak Output Power
GFSK_Channel 0



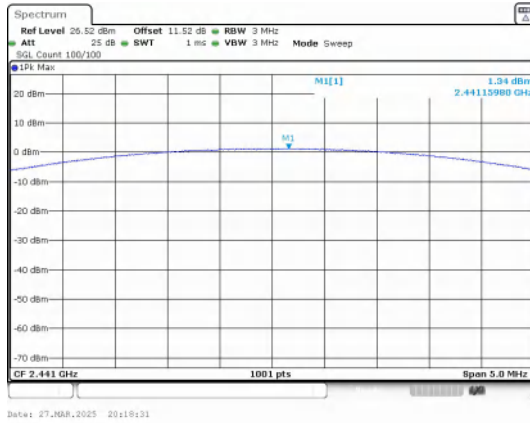
Peak Output Power
GFSK_Channel 39



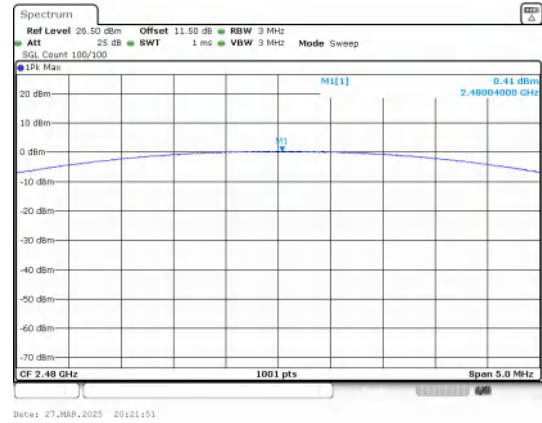
Peak Output Power
GFSK_Channel 78



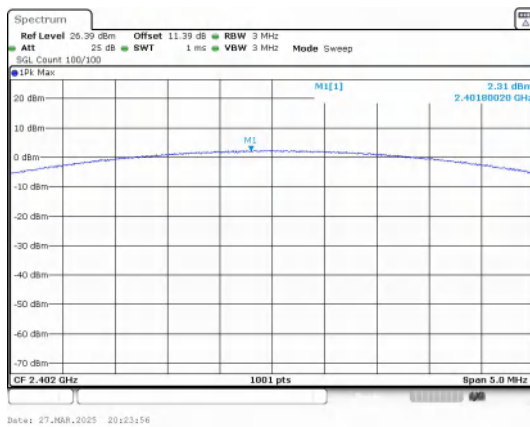
Peak Output Power
 $\pi/4$ DQPSK_Channel 0



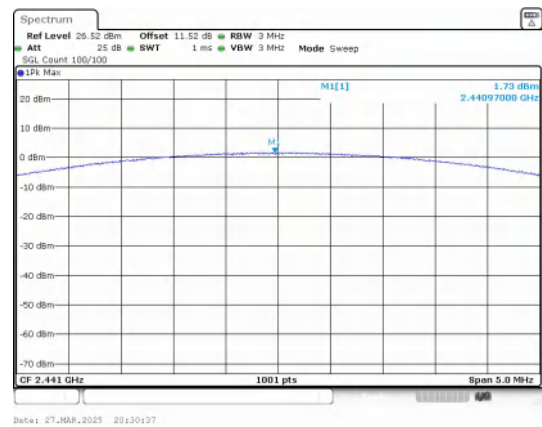
Peak Output Power
 $\pi/4$ DQPSK_Channel 39



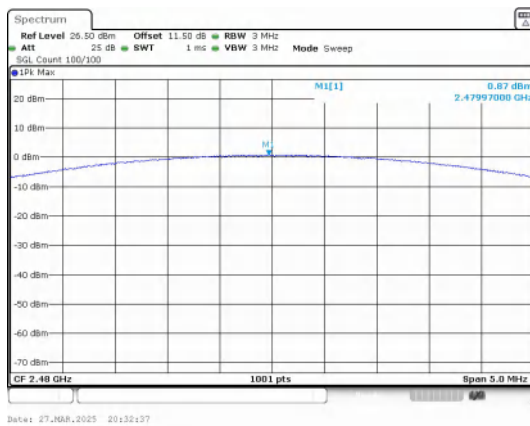
Peak Output Power
 $\pi/4$ DQPSK_Channel 78



Peak Output Power
8DPSK_Channel 0



Peak Output Power
8DPSK_Channel 39



Peak Output Power
8DPSK_Channel 78

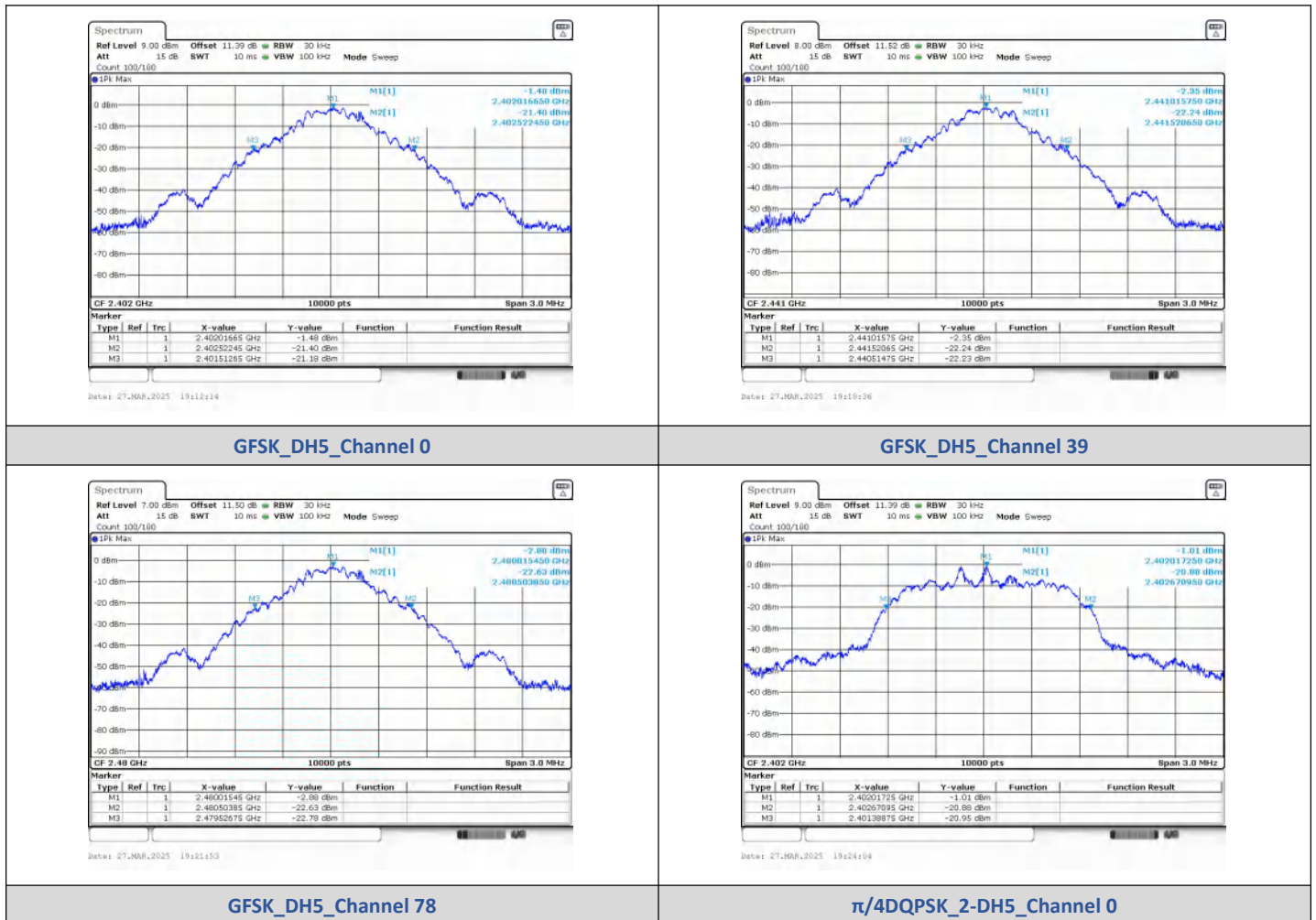
5) 20dB Bandwidth

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	0.9700
$\pi/4$ QPSK	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

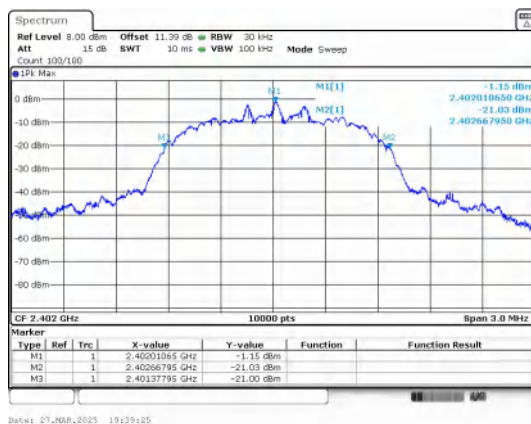




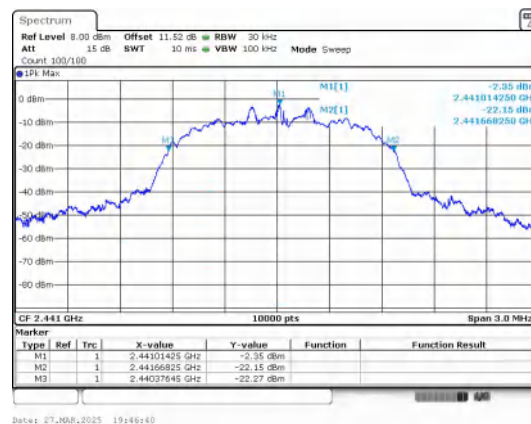
$\pi/4$ DQPSK_2-DH5_Channel 39



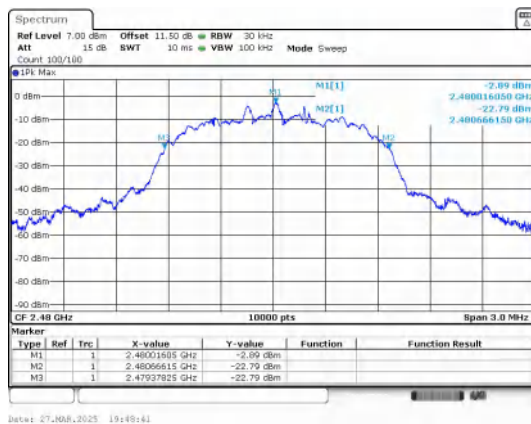
$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



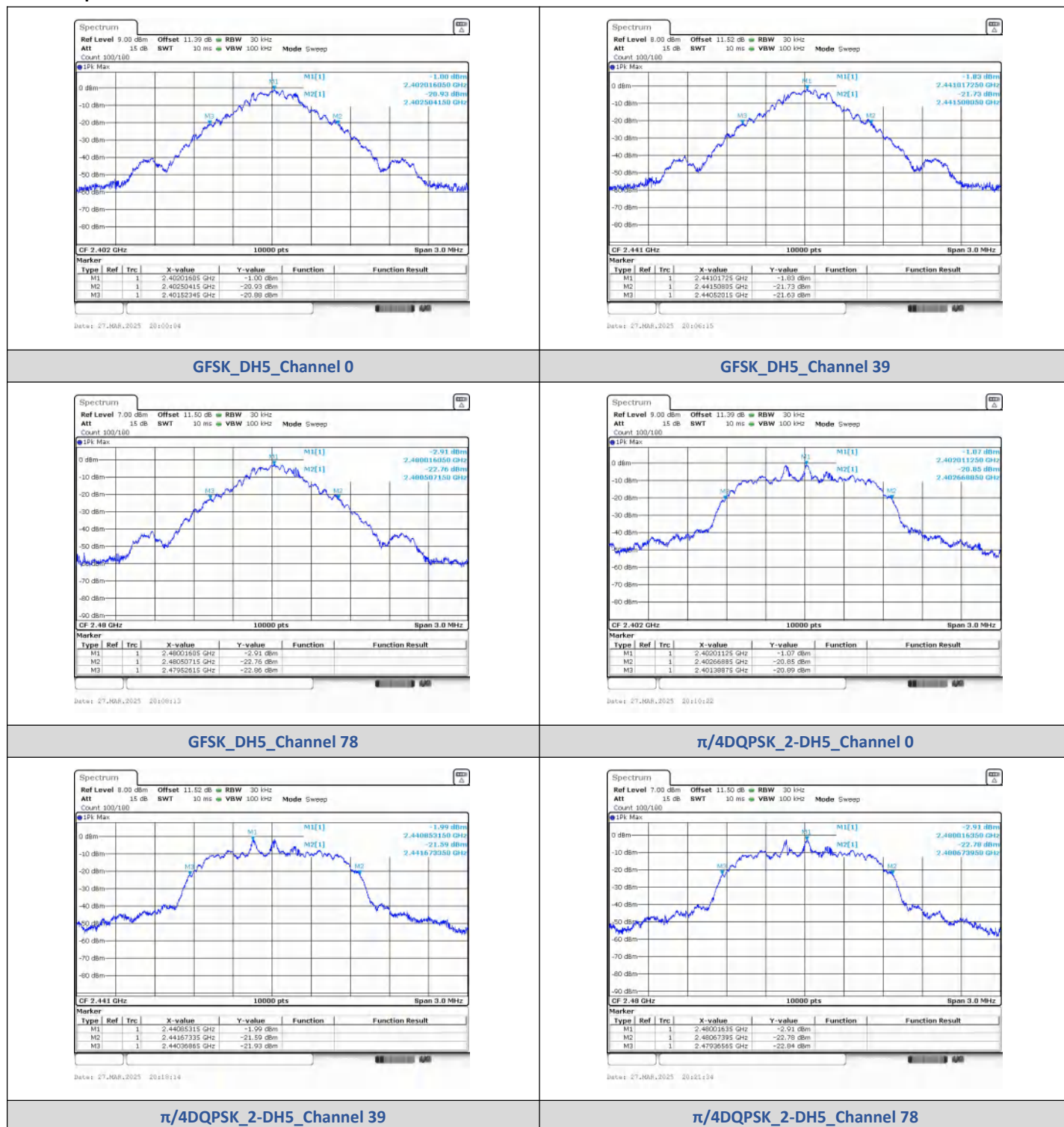
8DPSK_3-DH5_Channel 78

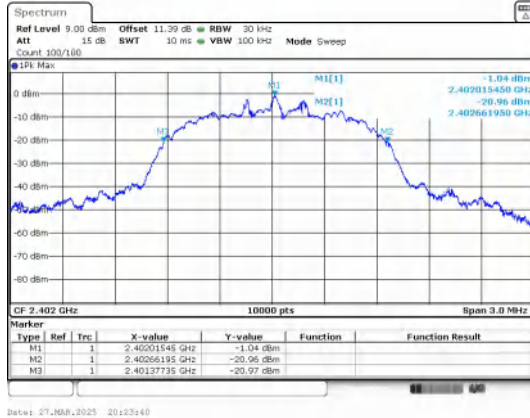
Right:

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	0.9800
	39	2441 MHz	0.9900
	78	2480 MHz	0.9800
$\pi/4$ DQPSK	0	2402 MHz	1.280
	39	2441 MHz	1.300
	78	2480 MHz	1.300

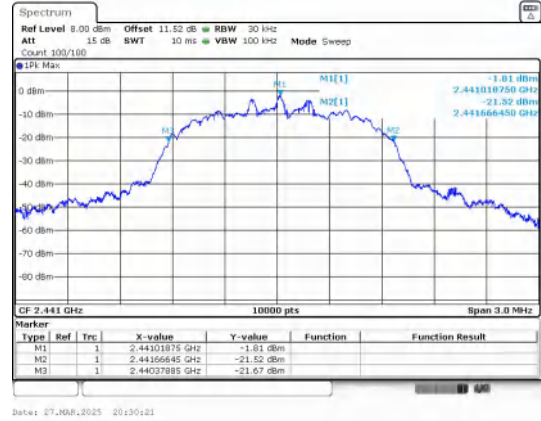
8DPSK	0	2402 MHz	1.280
	39	2441 MHz	1.290
	78	2480 MHz	1.290

Test Graphs

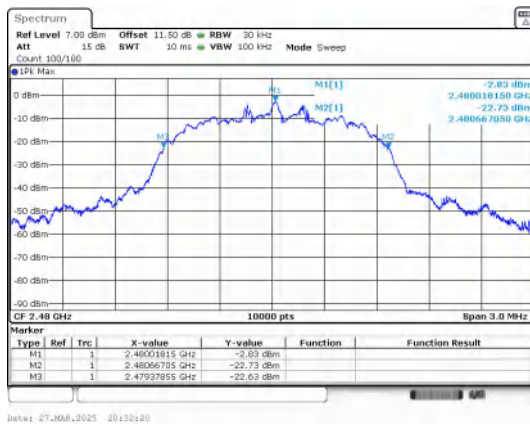




8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



8DPSK_3-DH5_Channel 78

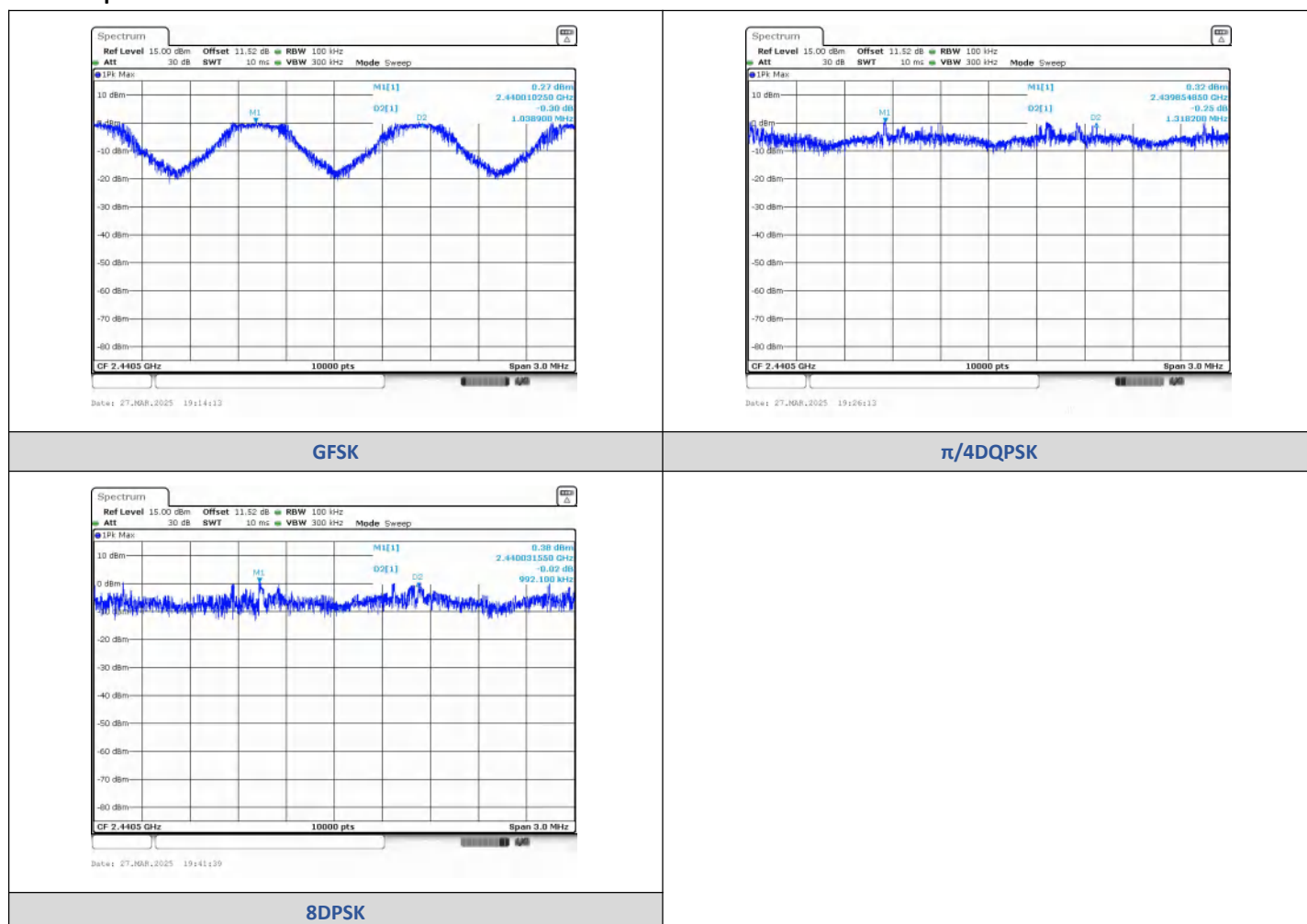
6) Carrier Frequencies Separation

Test Result

Left:

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2440.0102	2441.0491	1.0389	1.01	PASS
$\pi/4$ DQPSK	2-DH5	2439.8549	2441.173	1.3182	0.853	PASS
8DPSK	3-DH5	2440.0316	2441.0237	0.9921	0.86	PASS

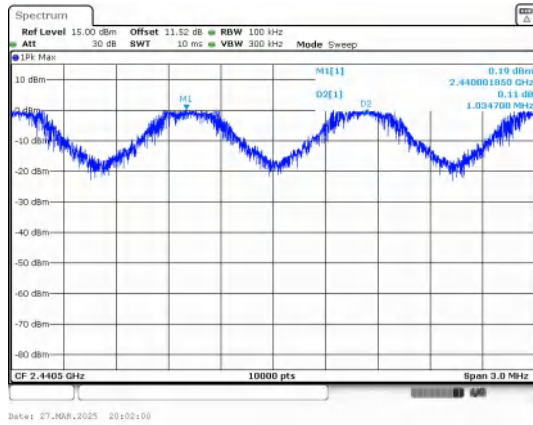
Test Graphs



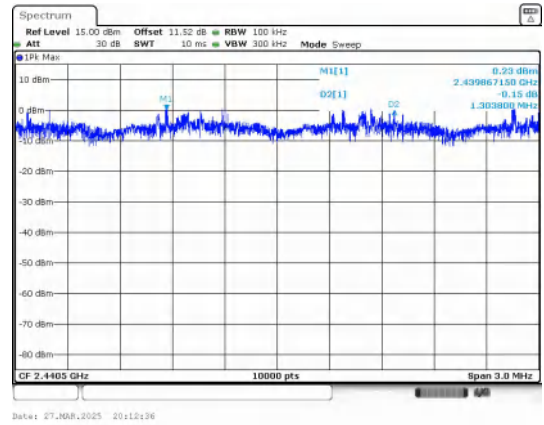
Right:

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2440.0019	2441.0365	1.0347	0.98	PASS
$\pi/4$ DQPSK	2-DH5	2439.8672	2441.171	1.3038	0.853	PASS
8DPSK	3-DH5	2439.8441	2441.1869	1.3428	0.853	PASS

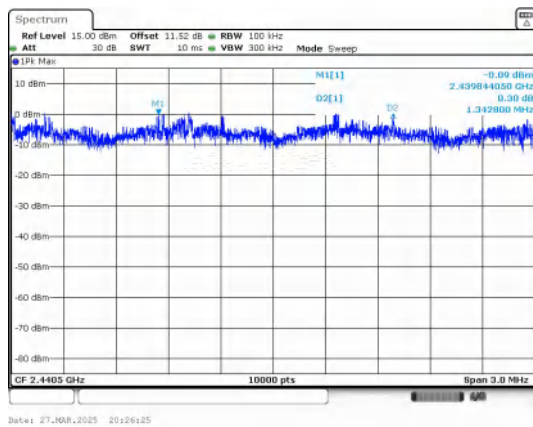
Test Graphs



GFSK



$\pi/4$ DQPSK



8DPSK

7) Conducted Out Of Band Emission

Test Result

Left:

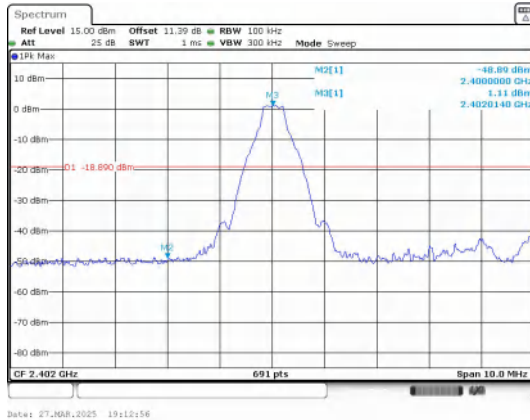
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	824.46	-37.957	-18.89	-19.067	PASS
			2400.00	-48.890	-18.89	-30.000	PASS
		39	9763.72	-43.334	-19.61	-23.724	PASS
		78	2483.50	-50.630	-20.54	-30.090	PASS
			9920.20	-39.794	-20.54	-19.254	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-48.310	-19.01	-29.300	PASS
			9608.08	-44.408	-19.01	-25.398	PASS
		39	5746.05	-39.981	-19.61	-20.371	PASS
		78	2483.50	-49.810	-20.48	-29.330	PASS
			9920.20	-39.634	-20.48	-19.154	PASS
8DPSK	3-DH5	0	2398.06	-48.715	-18.92	-29.795	PASS
			2400.00	-50.010	-18.92	-31.090	PASS
			9608.10	-45.019	-18.92	-26.099	PASS
		39	9763.72	-43.056	-19.87	-23.186	PASS
		78	2483.50	-49.950	-20.61	-29.340	PASS
			9920.20	-39.636	-20.61	-19.026	PASS

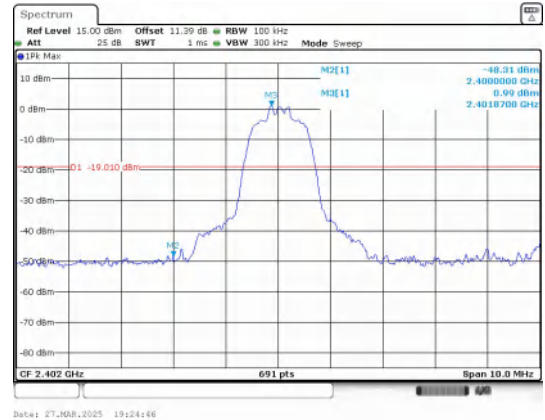
Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2396.30	-47.944	-19.34	-28.604	PASS
			2400.00	-50.420	-19.34	-31.080	PASS
			2483.50	-47.290	-20.53	-26.760	PASS
$\pi/4$ DQPSK	2-DH5		2395.37	-47.893	-19.0	-28.893	PASS
			2400.00	-49.770	-19.0	-30.770	PASS
			2483.50	-49.560	-20.85	-28.710	PASS
8DPSK	3-DH5		2396.21	-48.502	-19.13	-29.372	PASS
			2400.00	-49.750	-19.13	-30.620	PASS
			2483.50	-49.580	-20.59	-28.990	PASS

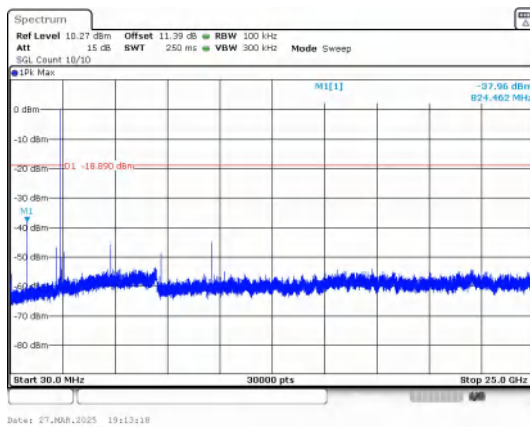
Test Graphs



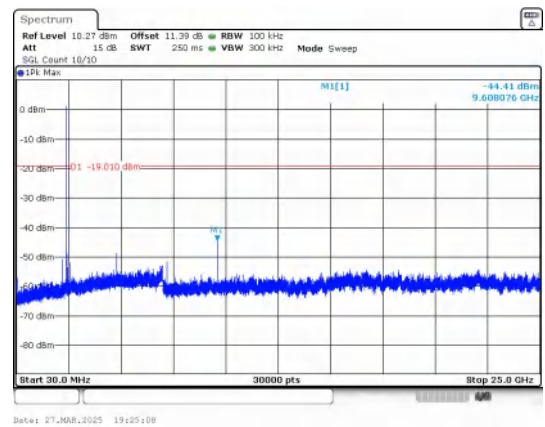
Out Of Band Emission
GFSK_DH5_Channel 0



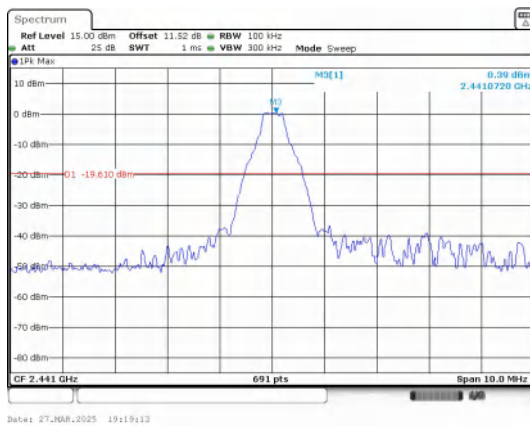
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 0



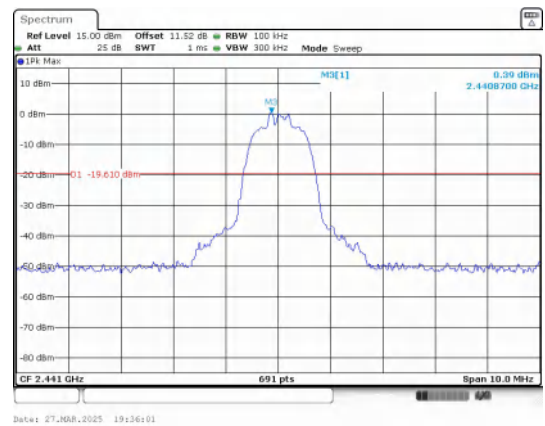
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



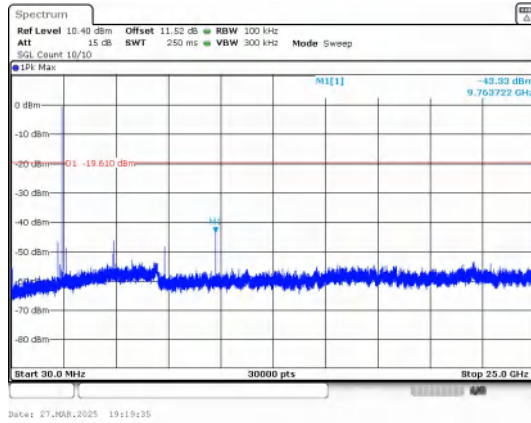
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 0



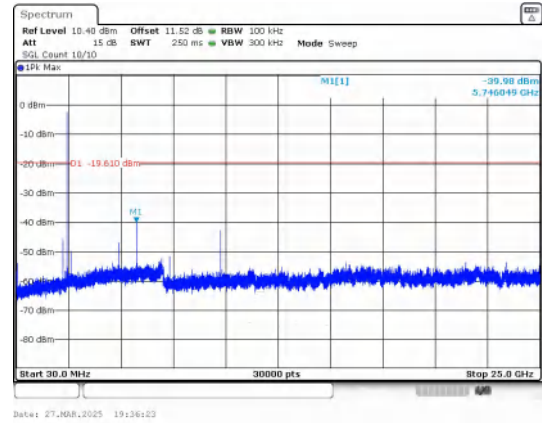
Out Of Band Emission
GFSK_DH5_Channel 39



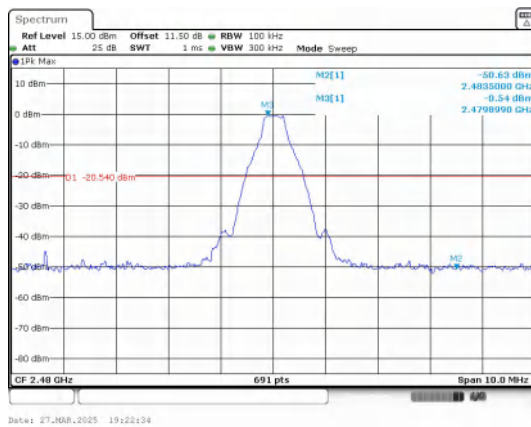
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39



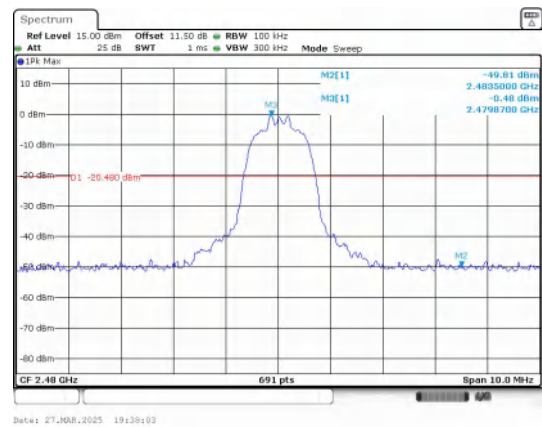
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



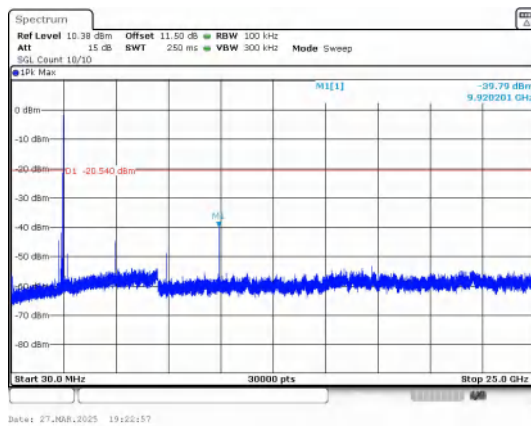
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39



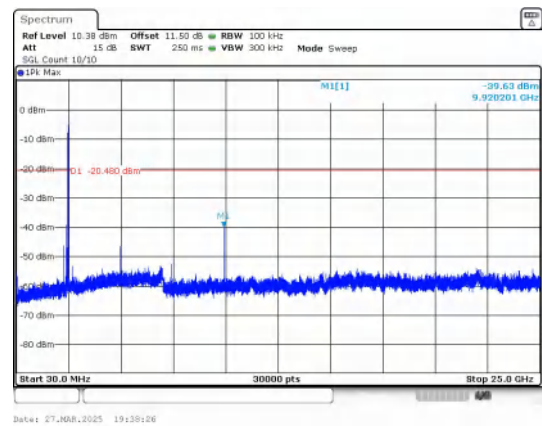
Out Of Band Emission
GFSK_DH5_Channel 78



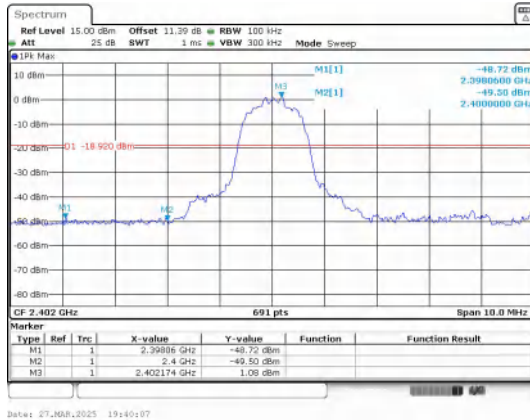
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78

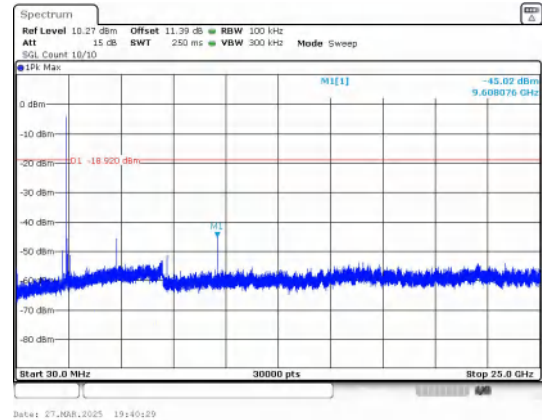


30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 78



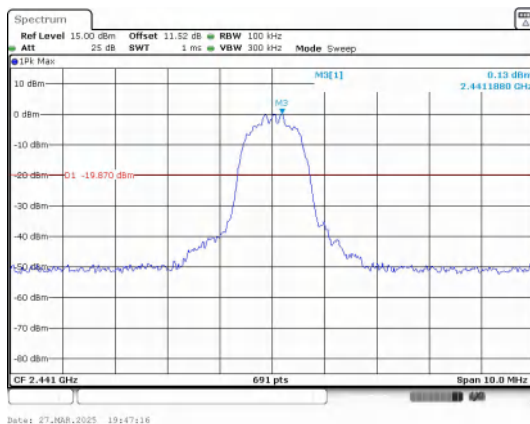
Date: 27/10/2025 19:40:07

Out Of Band Emission
8DPSK_3-DH5_Channel 0



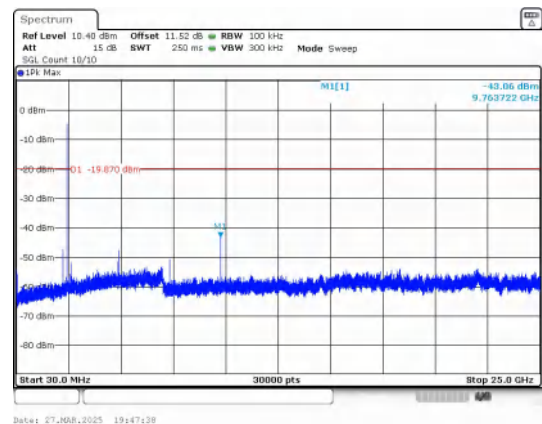
Date: 27/10/2025 19:40:29

30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



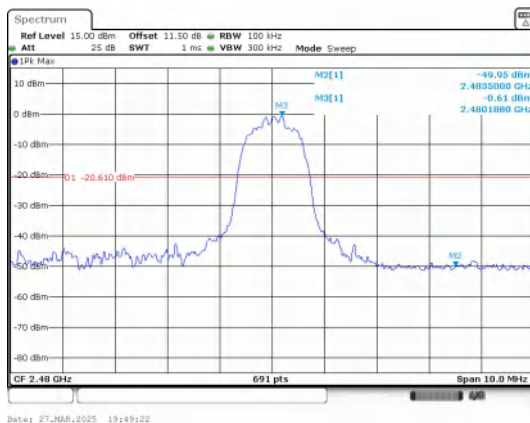
Date: 27/10/2025 19:47:16

Out Of Band Emission
8DPSK_3-DH5_Channel 39



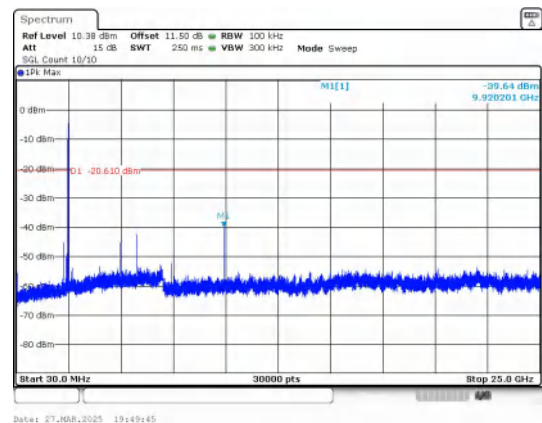
Date: 27/10/2025 19:47:38

30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



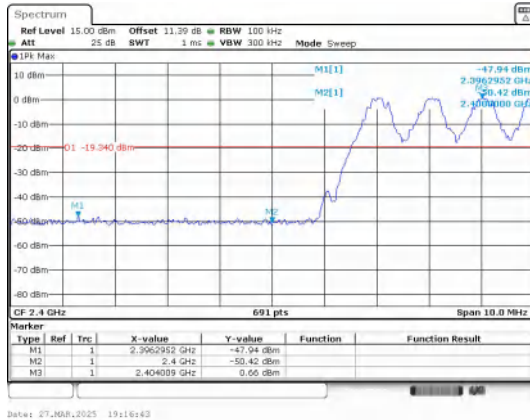
Date: 27/10/2025 19:49:22

Out Of Band Emission
8DPSK_3-DH5_Channel 78

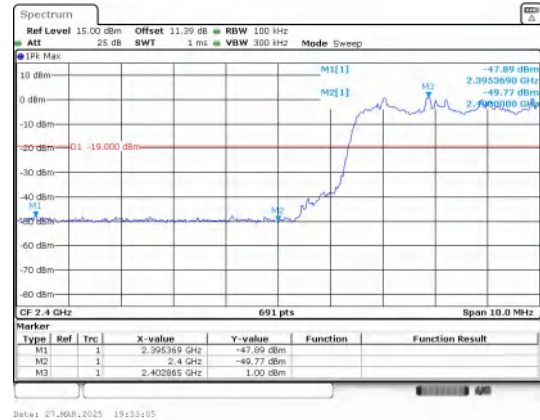


Date: 27/10/2025 19:49:45

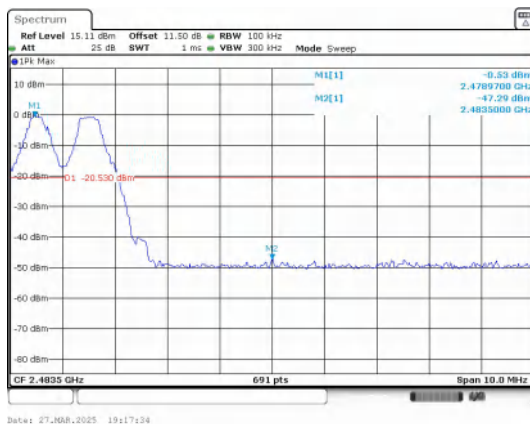
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



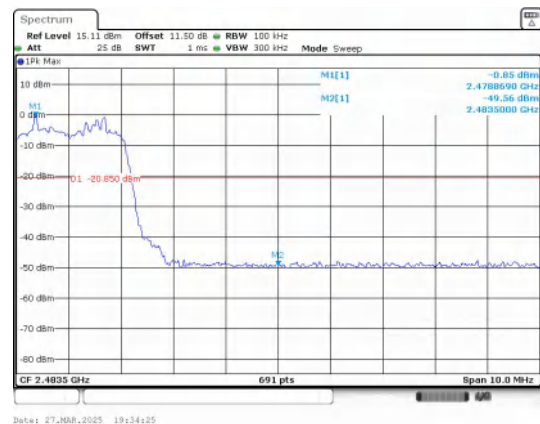
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



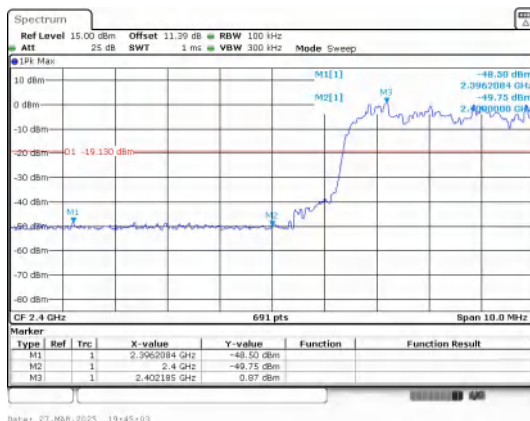
Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



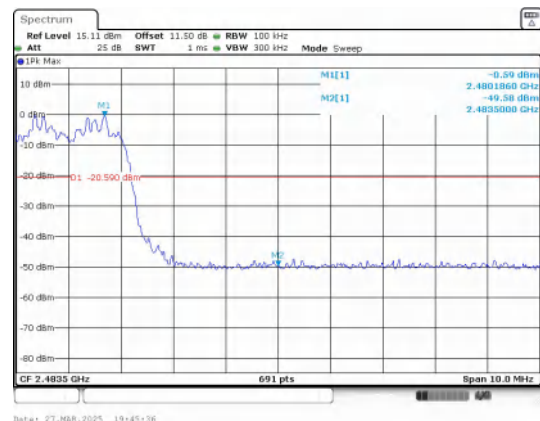
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



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

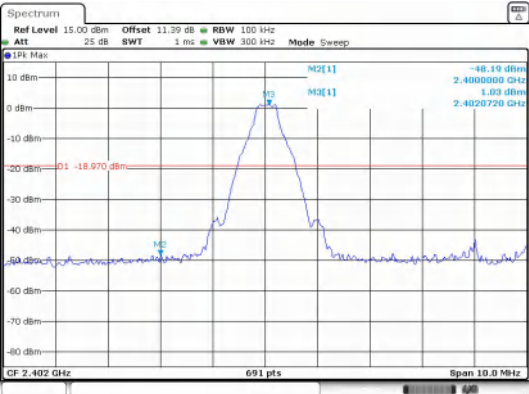
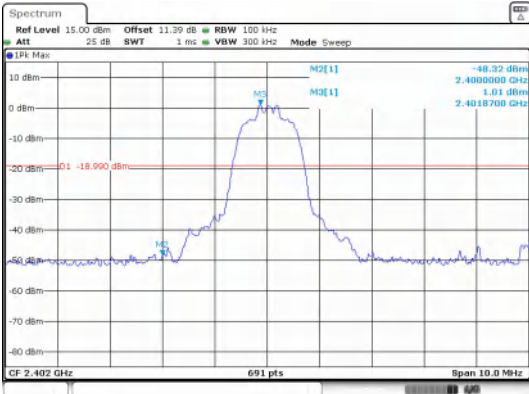
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
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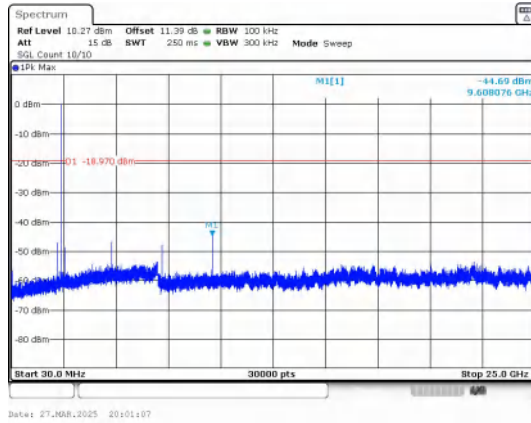
GFSK	DH5	0	2400.00	-48.190	-18.97	-29.220	PASS
			9608.08	-44.689	-18.97	-25.719	PASS
		39	9763.72	-43.846	-19.61	-24.236	PASS
		78	2483.50	-50.980	-20.58	-30.400	PASS
			5750.21	-39.892	-20.58	-19.312	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-48.320	-18.99	-29.330	PASS
			9608.08	-45.485	-18.99	-26.495	PASS
		39	9763.72	-43.325	-20.01	-23.315	PASS
		78	2483.50	-50.040	-20.58	-29.460	PASS
			9920.20	-39.054	-20.58	-18.474	PASS
8DPSK	3-DH5	0	2400.00	-49.020	-19.1	-29.920	PASS
			9608.08	-44.551	-19.1	-25.451	PASS
		39	9763.72	-43.638	-19.64	-23.998	PASS
		78	2483.50	-50.860	-20.56	-30.300	PASS
			9920.20	-39.647	-20.56	-19.087	PASS

Hopping

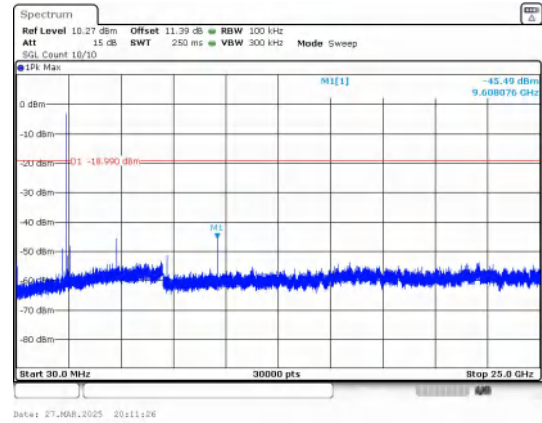
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2397.42	-48.973	-19.1	-29.873	PASS
			2400.00	-50.010	-19.1	-30.910	PASS
			2483.50	-50.040	-20.78	-29.260	PASS
$\pi/4$ DQPSK	2-DH5		2397.90	-48.719	-20.85	-27.869	PASS
			2400.00	-50.340	-20.85	-29.490	PASS
			2483.50	-49.640	-20.56	-29.080	PASS
8DPSK	3-DH5		2396.54	-48.774	-21.3	-27.474	PASS
			2400.00	-50.210	-21.3	-28.910	PASS
			2483.50	-50.130	-22.43	-27.700	PASS

Test Graphs

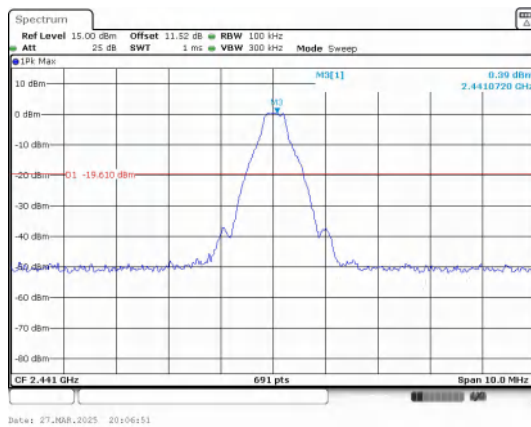
 Out Of Band Emission GFSK_DH5_Channel 0	 Out Of Band Emission $\pi/4$DQPSK_2-DH5_Channel 0
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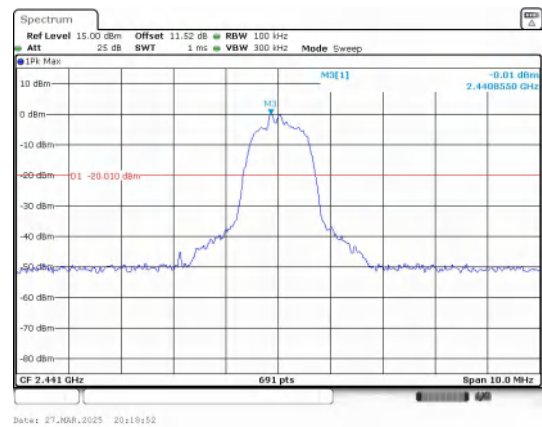
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



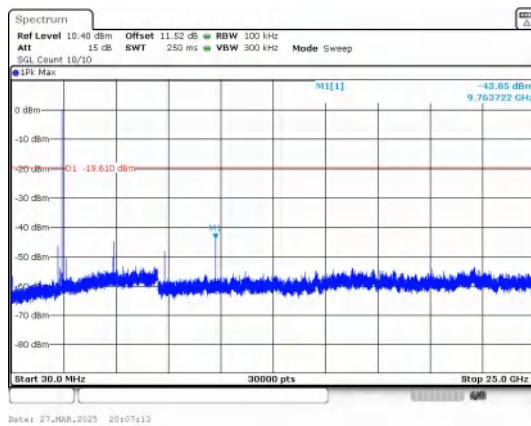
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 0



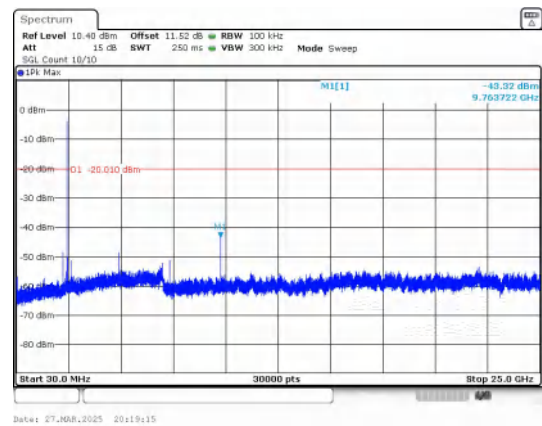
Out Of Band Emission
GFSK_DH5_Channel 39



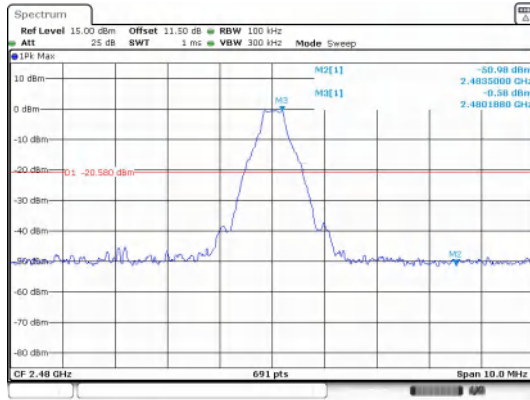
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39



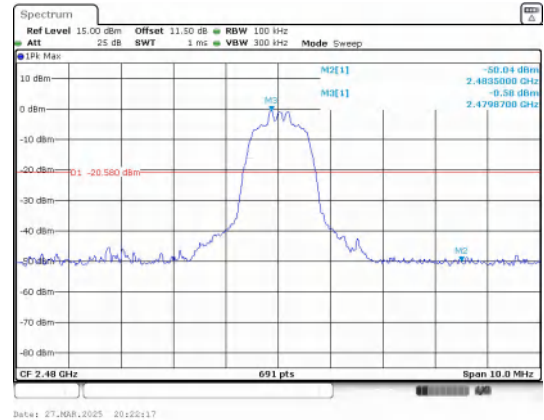
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



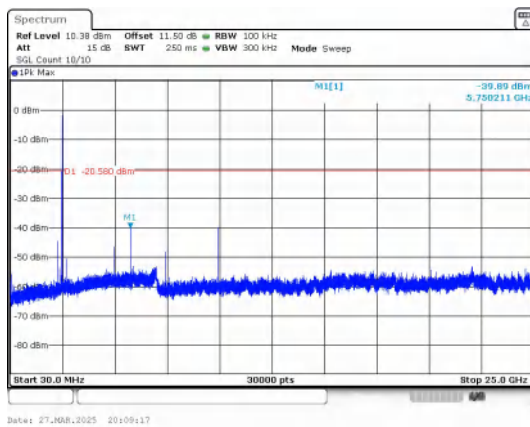
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39



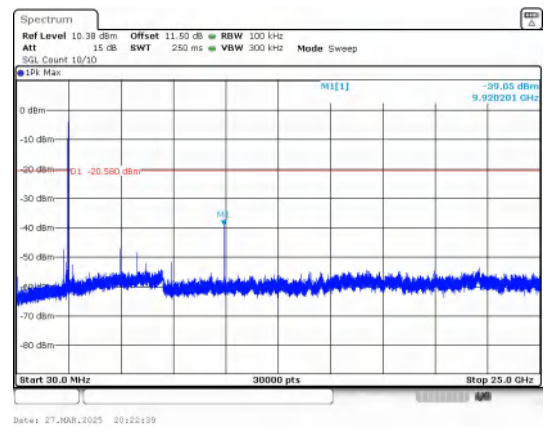
Out Of Band Emission
GFSK_DH5_Channel 78



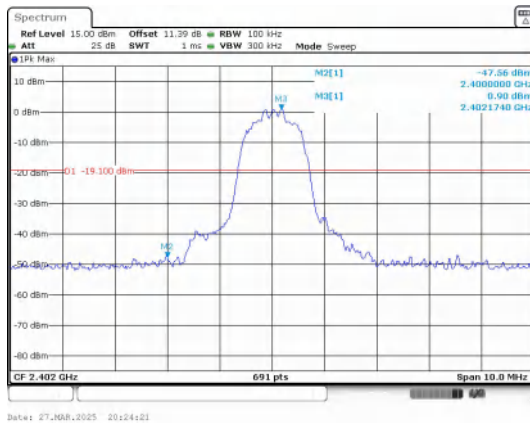
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



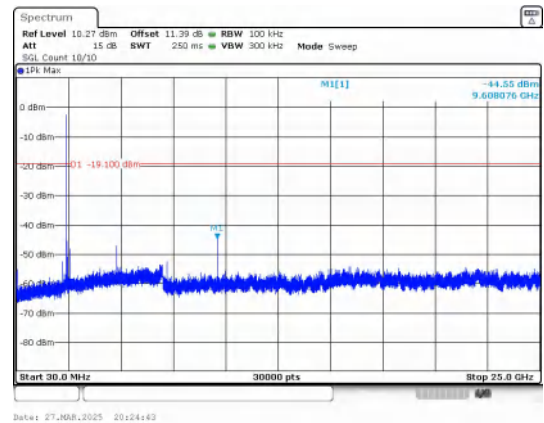
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



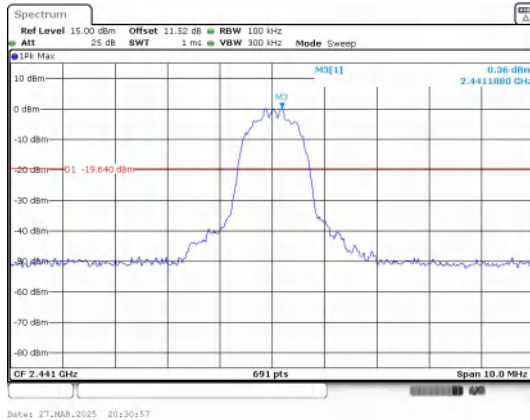
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 78



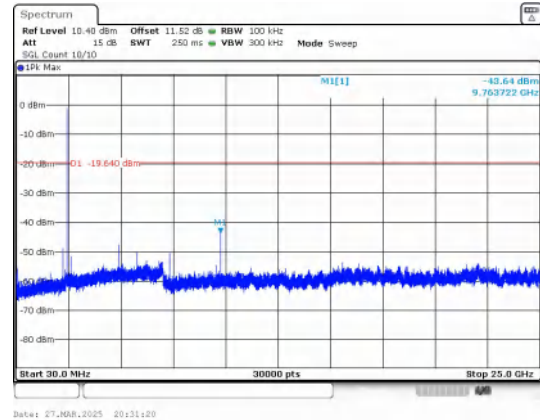
Out Of Band Emission
8DPSK_3-DH5_Channel 0



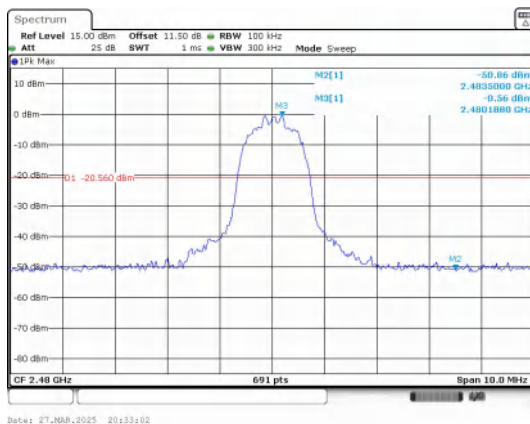
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



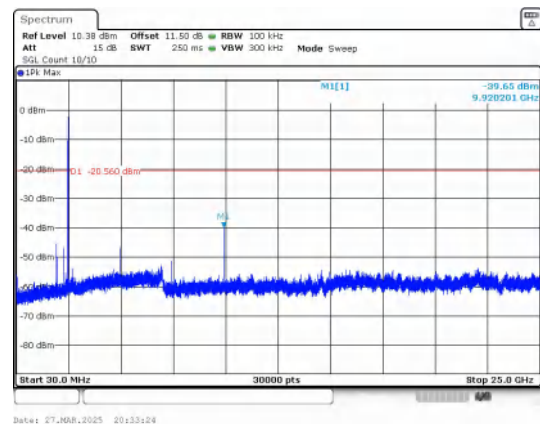
Out Of Band Emission
8DPSK_3-DH5_Channel 39



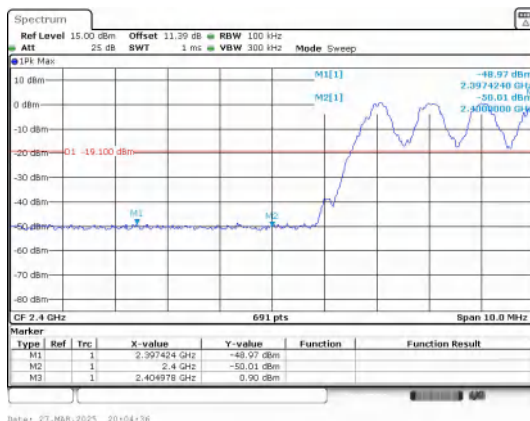
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



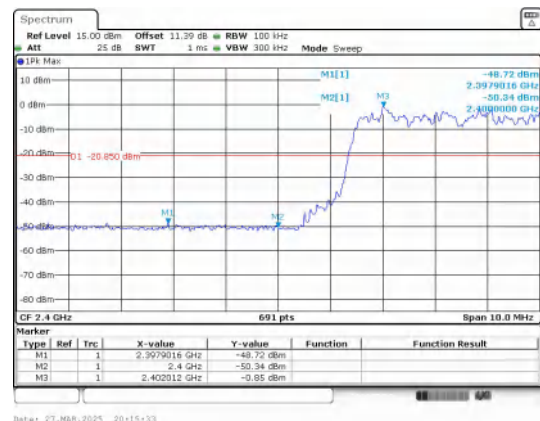
Out Of Band Emission
8DPSK_3-DH5_Channel 78



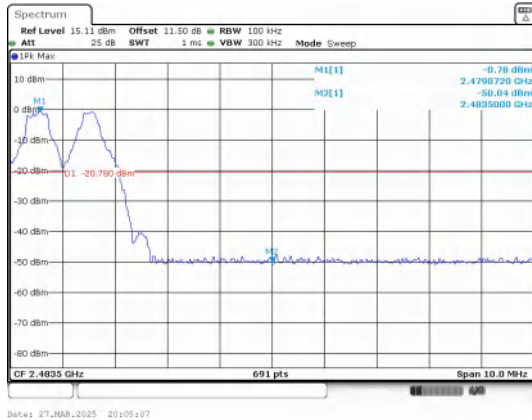
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



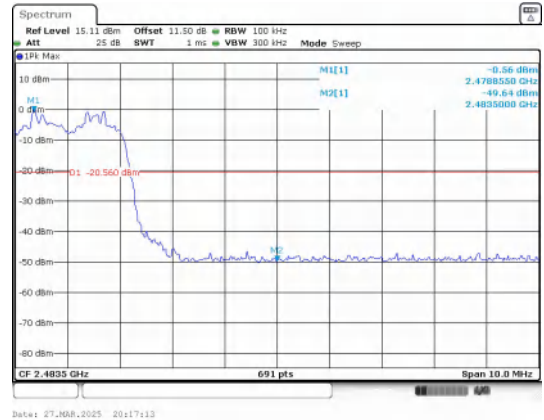
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



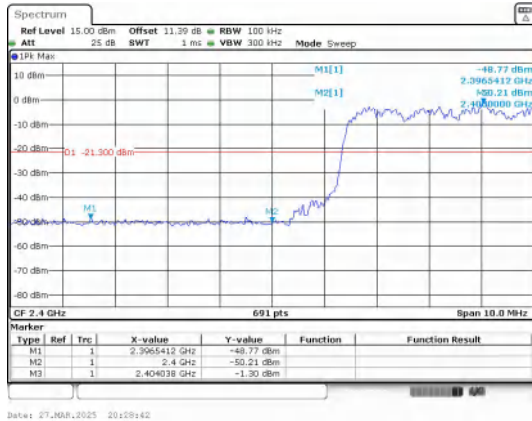
Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



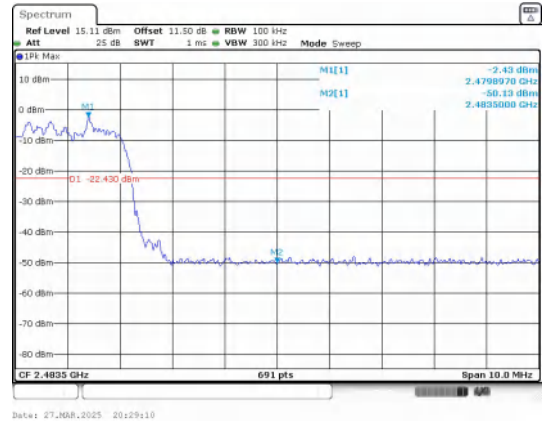
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



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-----