

Appendix Report

Report No.:	CISRR25011513204
Test Engineer:	Mark Fu
Supervised by:	Rory Huang

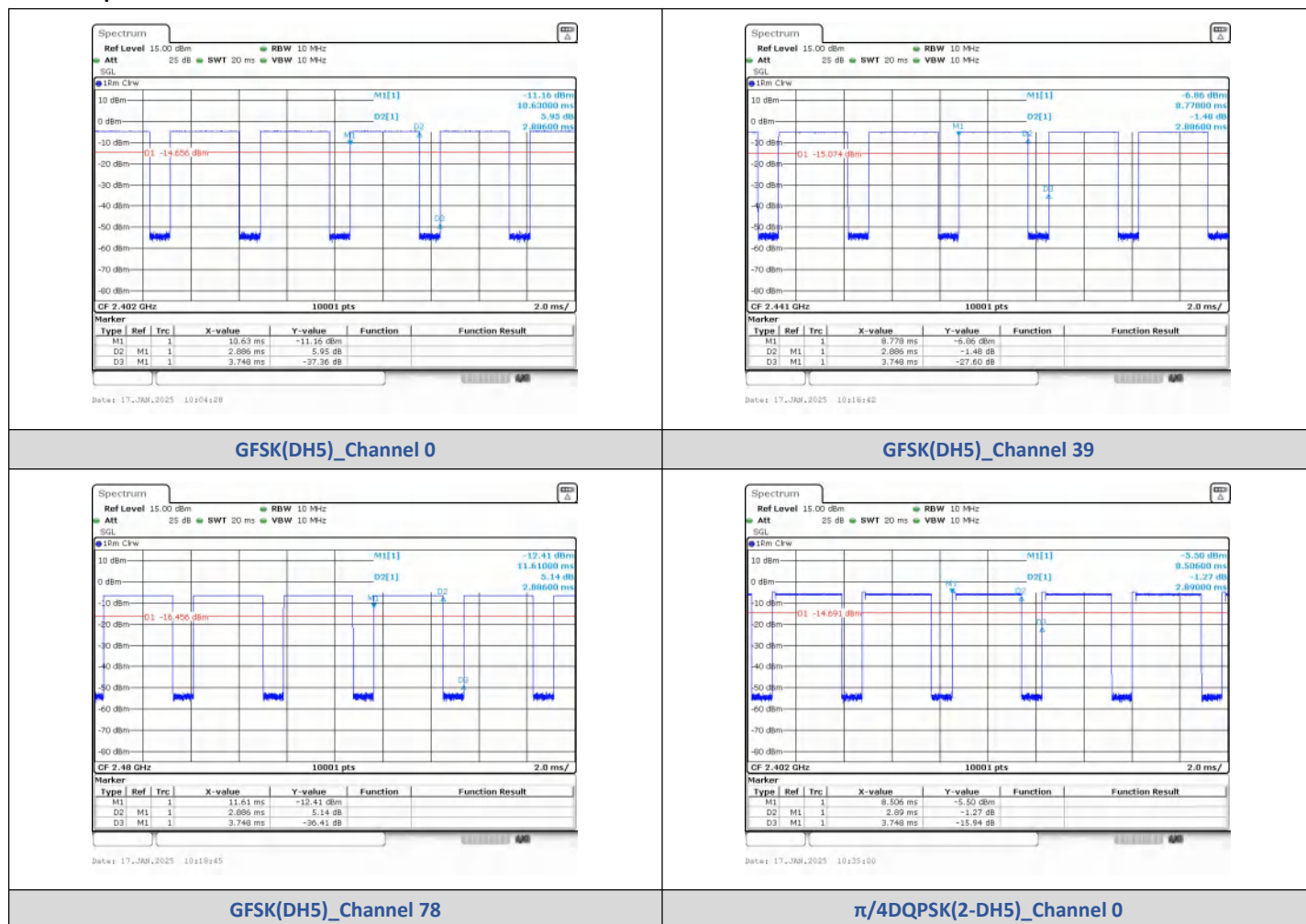
1) Duty Cycle

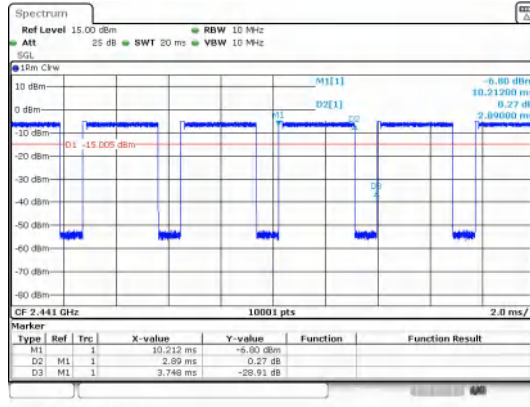
LEFT:

Test Result

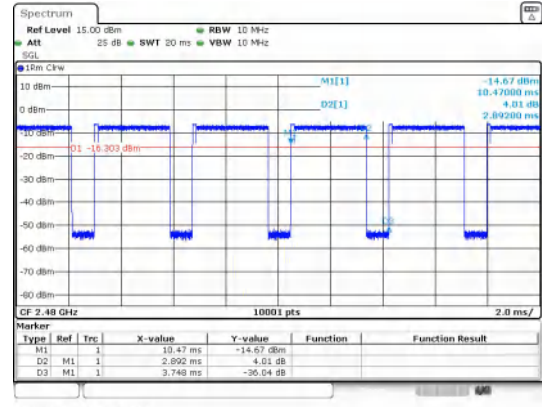
Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.886	3.748	77.00	0.7700	1.1351	0.3465
		39	2.886	3.748	77.00	0.7700	1.1351	0.3465
		78	2.886	3.748	77.00	0.7700	1.1351	0.3465
$\pi/4$ DQPSK	2-DH5	0	2.890	3.748	77.11	0.7711	1.1289	0.3460
		39	2.890	3.748	77.11	0.7711	1.1289	0.3460
		78	2.892	3.748	77.16	0.7716	1.1261	0.3458
8DPSK	3-DH5	0	2.894	3.748	77.21	0.7721	1.1233	0.3455
		39	2.892	3.748	77.16	0.7716	1.1261	0.3458
		78	2.892	3.748	77.16	0.7716	1.1261	0.3458

Test Graphs

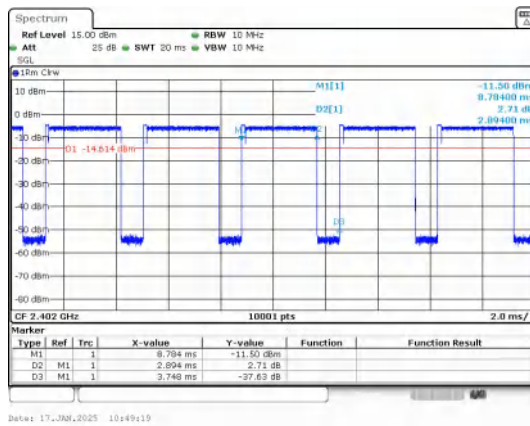




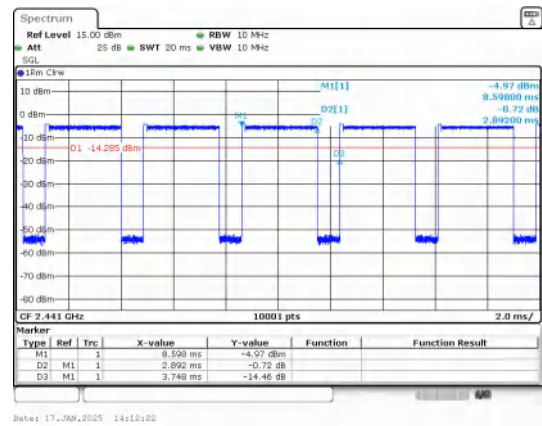
$\pi/4$ DQPSK(2-DH5)_Channel 39



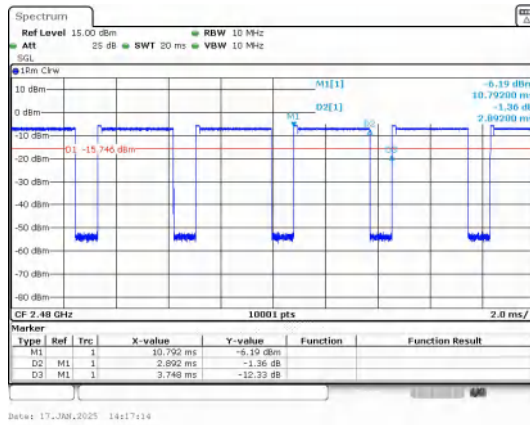
$\pi/4$ DQPSK(2-DH5)_Channel 78



8DPSK(3-DH5)_Channel 0



8DPSK(3-DH5)_Channel 39



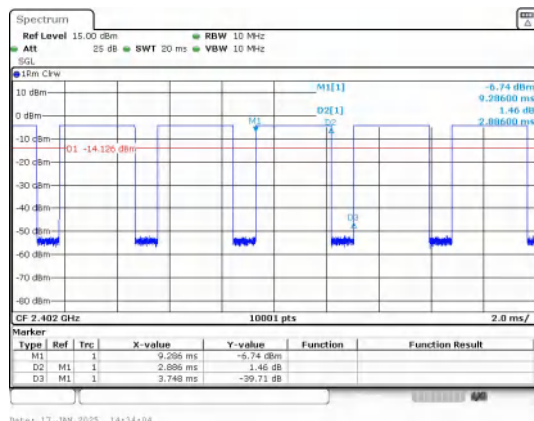
8DPSK(3-DH5)_Channel 78

RIGHT:

Test Result

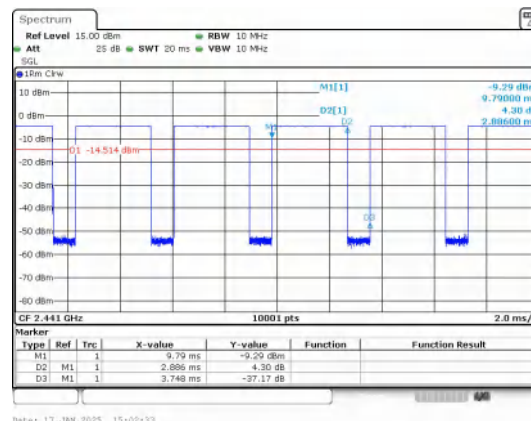
Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.886	3.748	77.00	0.7700	1.1351	0.3465
		39	2.886	3.748	77.00	0.7700	1.1351	0.3465
		78	2.886	3.748	77.00	0.7700	1.1351	0.3465
$\pi/4$ DQPSK	2-DH5	0	2.890	3.748	77.11	0.7711	1.1289	0.3460
		39	2.890	3.748	77.11	0.7711	1.1289	0.3460
		78	2.890	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	2.894	3.748	77.21	0.7721	1.1233	0.3455
		78	2.892	3.748	77.16	0.7716	1.1261	0.3458

Test Graphs



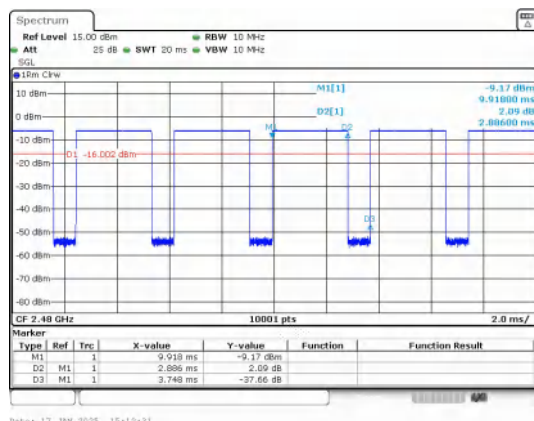
Date: 17-JAN-2025 14:24:04

GFSK(DH5)_Channel 0



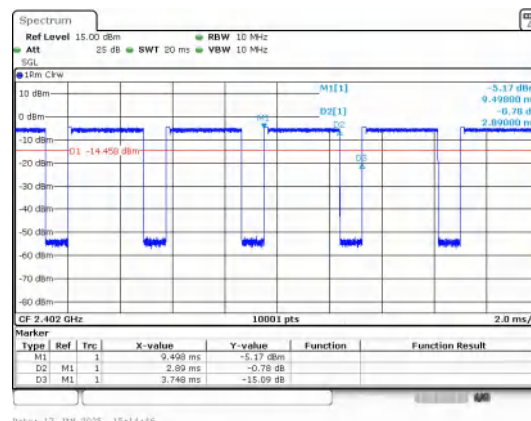
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GFSK(DH5)_Channel 39



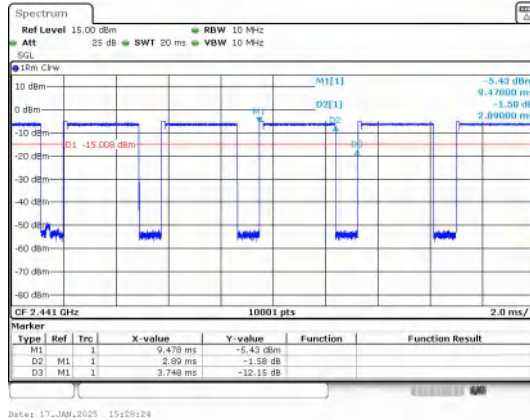
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GFSK(DH5)_Channel 78

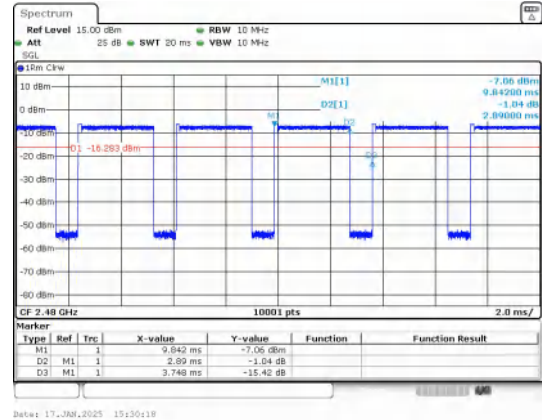


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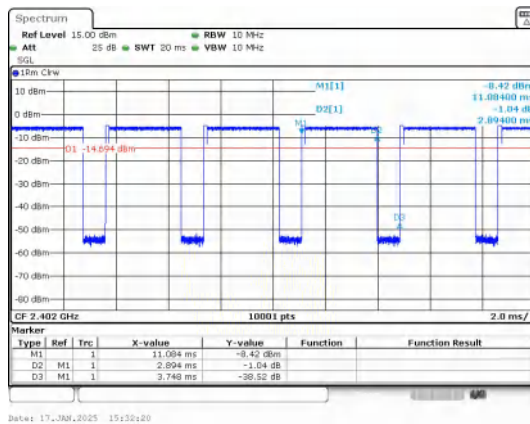
 $\pi/4$ DQPSK(2-DH5)_Channel 0



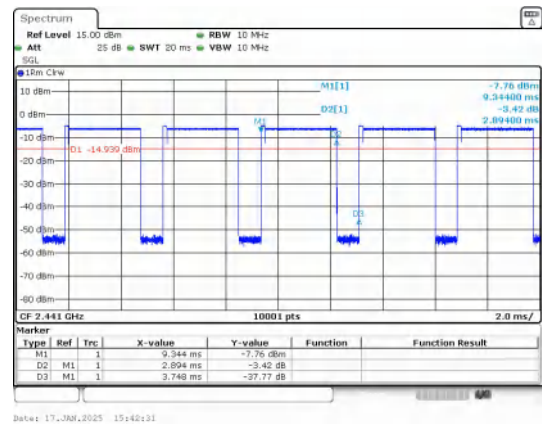
$\pi/4$ DQPSK(2-DH5)_Channel 39



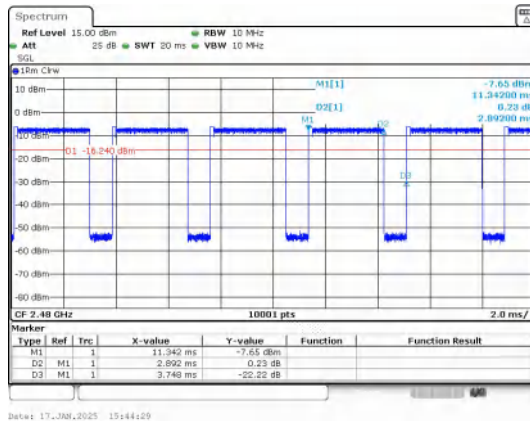
$\pi/4$ DQPSK(2-DH5)_Channel 78



8DPSK(3-DH5)_Channel 0



8DPSK(3-DH5)_Channel 39



8DPSK(3-DH5)_Channel 78

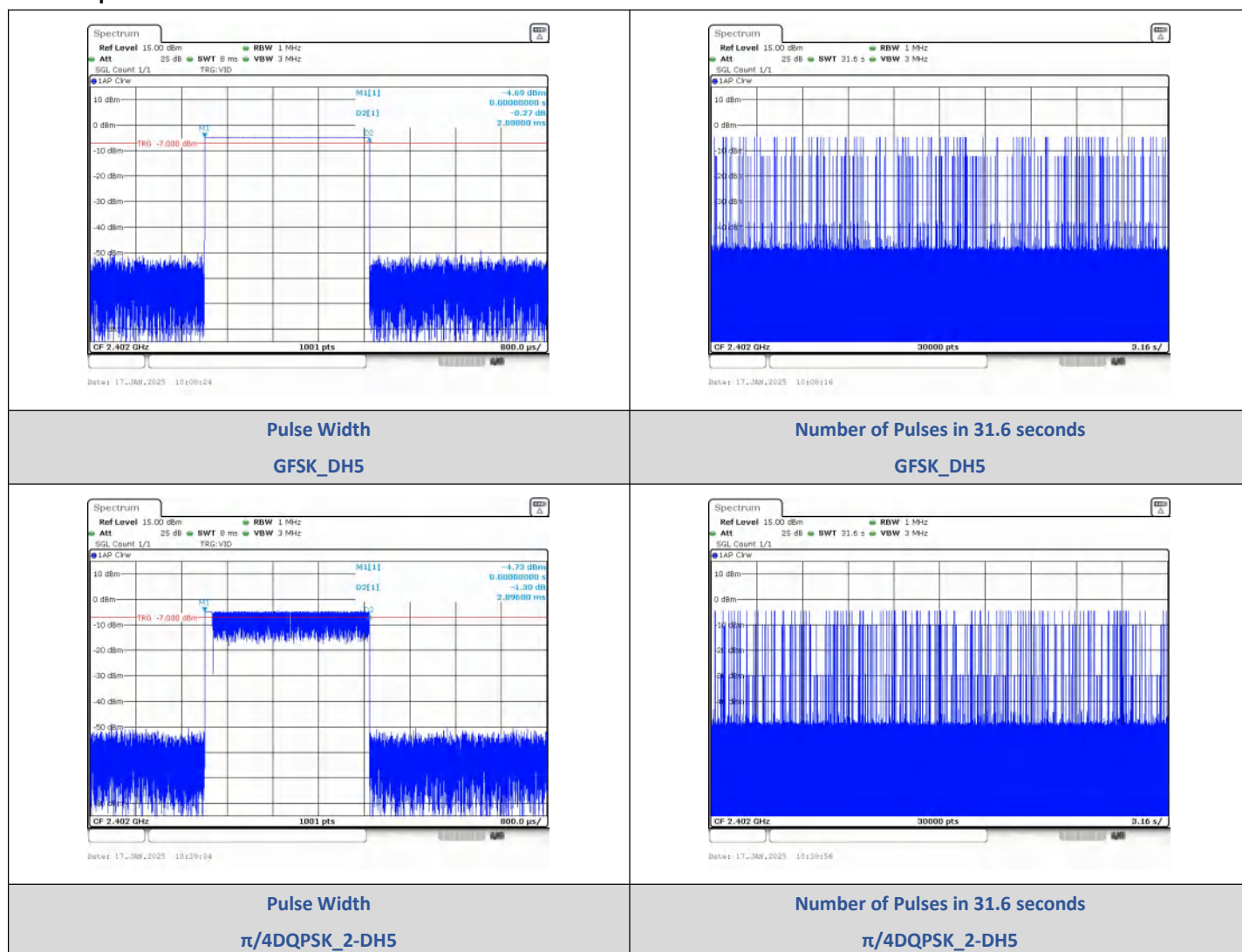
2) Dwell Time

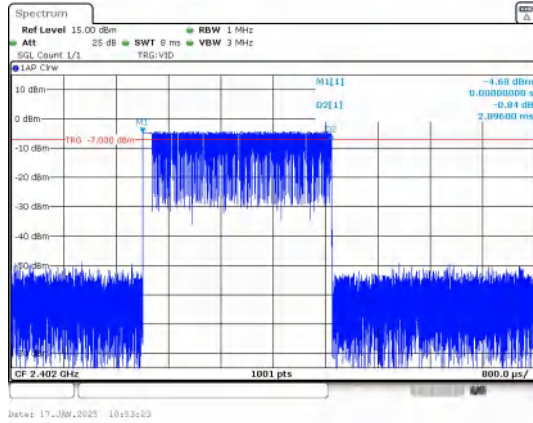
LEFT:

Test Result

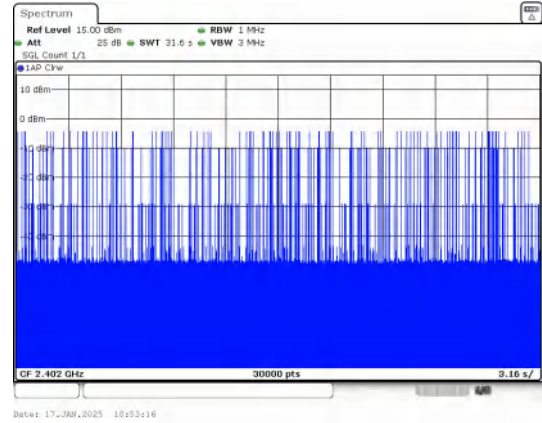
Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.888	100	288.8	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.896	108	312.77		PASS
8DPSK	3-DH5		2.896	94	272.22		PASS

Test Graphs





Pulse Width
8DPSK_3-DH5



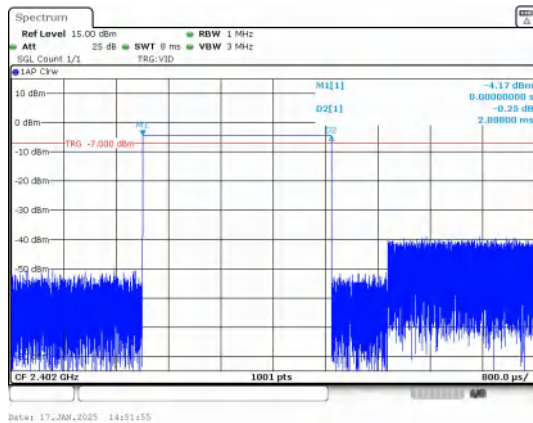
Number of Pulses in 31.6 seconds
8DPSK_3-DH5

RIGHT:

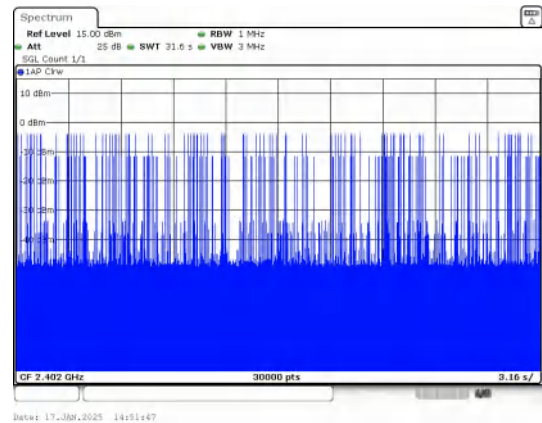
Test Result

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	98	283.02	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.896	107	309.87		PASS
8DPSK	3-DH5		2.896	105	304.08		PASS

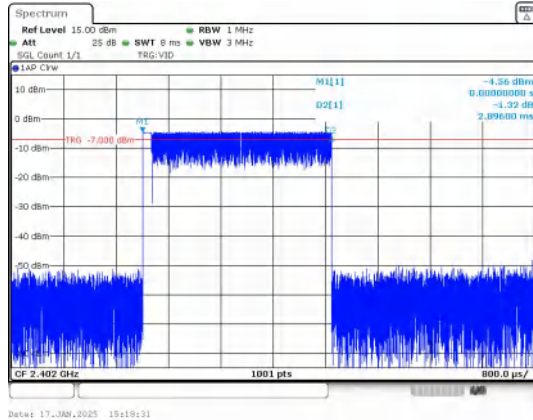
Test Graphs



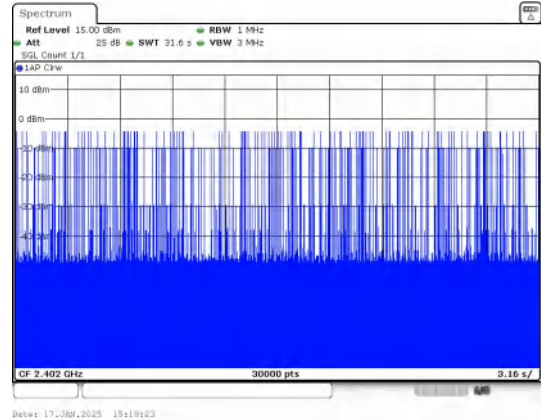
Pulse Width
GFSK_DH5



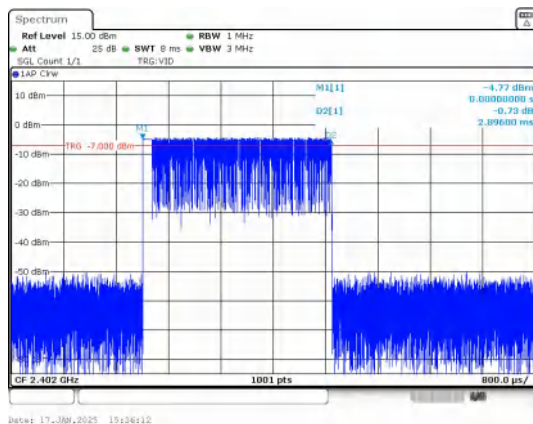
Number of Pulses in 31.6 seconds
GFSK_DH5



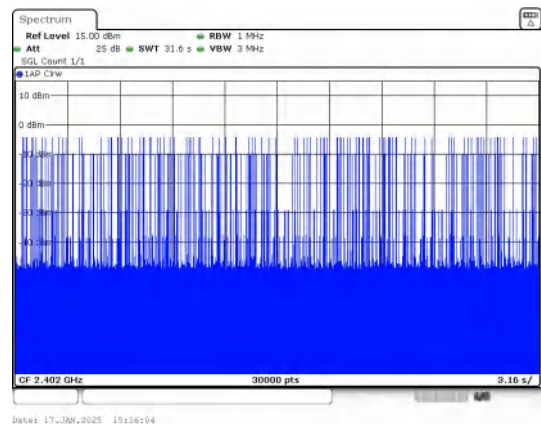
Pulse Width
 $\pi/4$ DQPSK_2-DH5



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

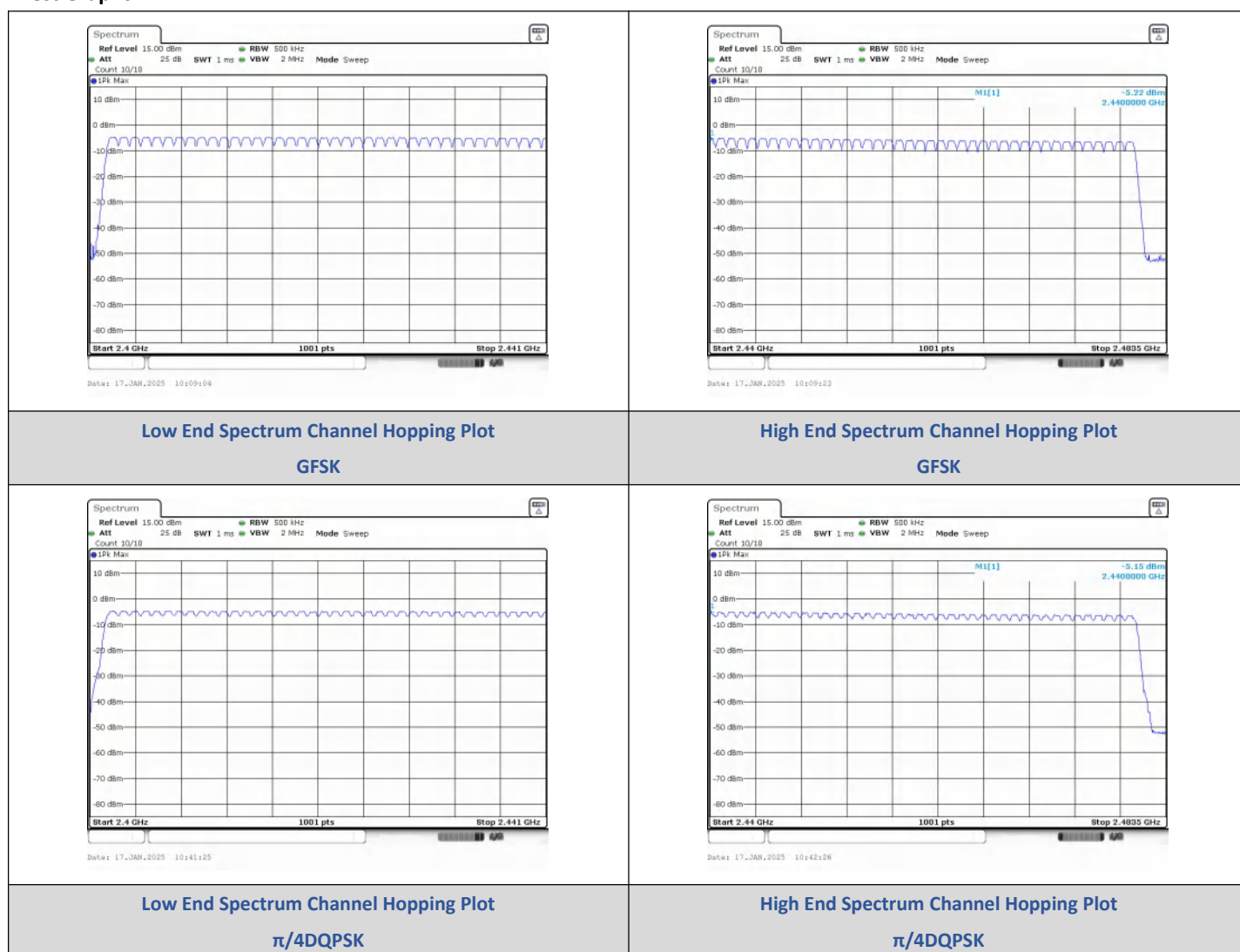
3) Number Of Hopping Channel

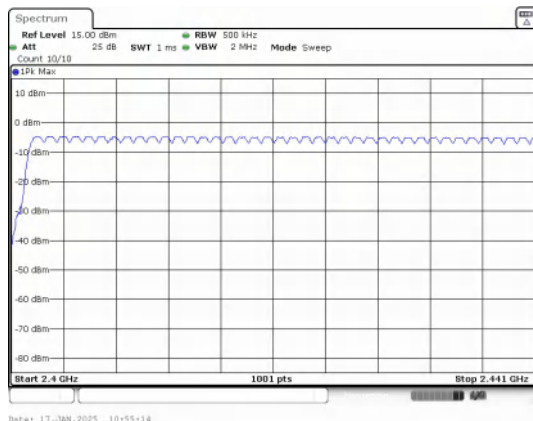
LEFT:

Test Result

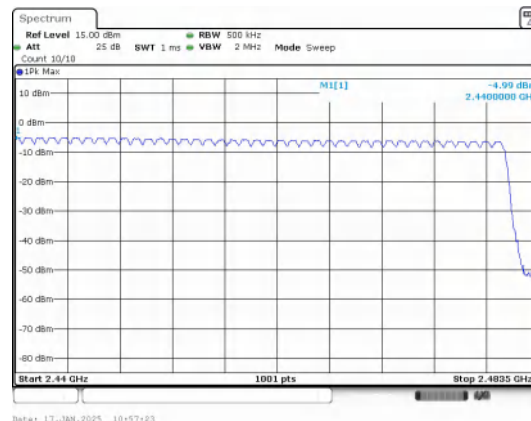
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
$\pi/4$ DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

Test Graphs





Low End Spectrum Channel Hopping Plot
8DPSK



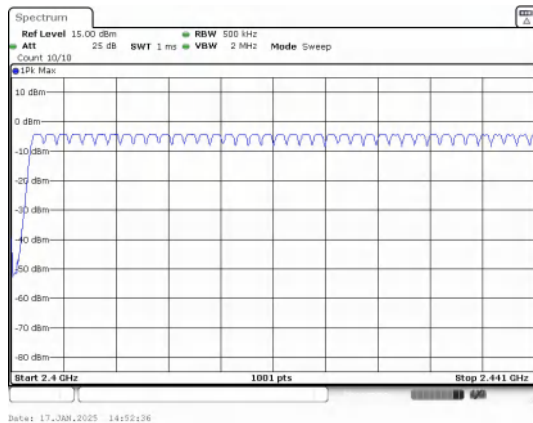
High End Spectrum Channel Hopping Plot
8DPSK

RIGHT:

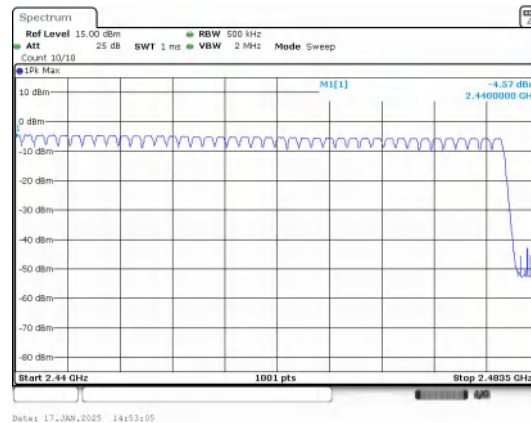
Test Result

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

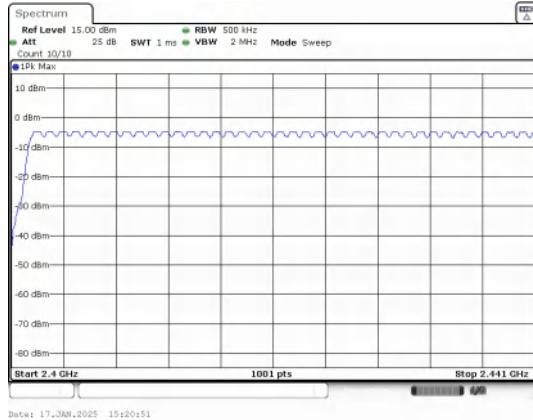
Test Graphs



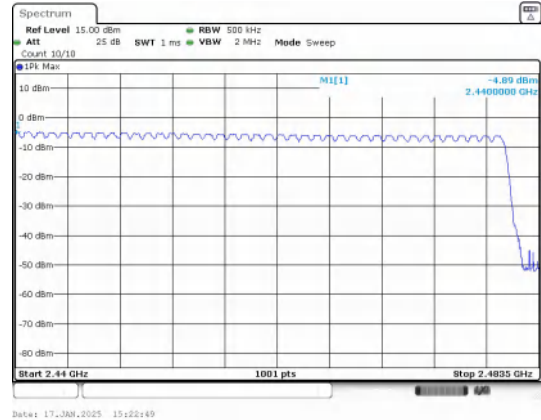
Low End Spectrum Channel Hopping Plot
GFSK



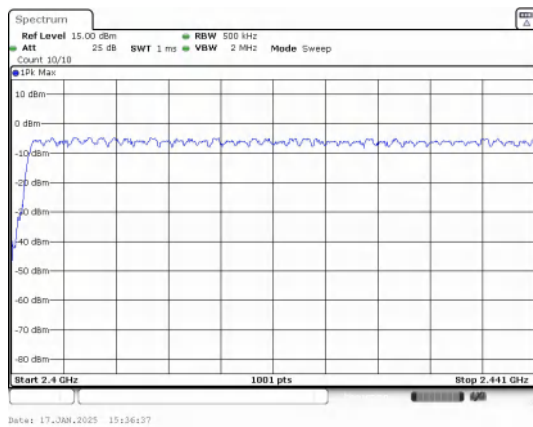
High End Spectrum Channel Hopping Plot
GFSK



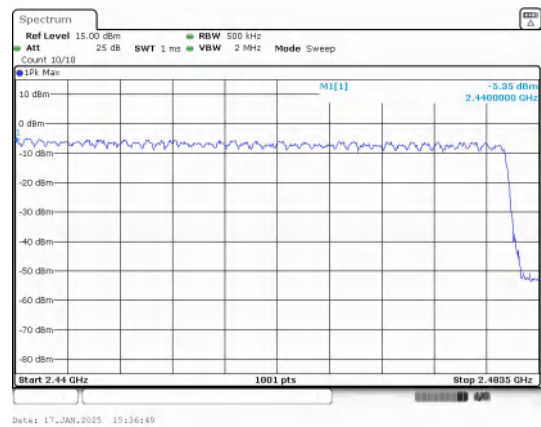
Low End Spectrum Channel Hopping Plot
 $\pi/4$ DQPSK



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 Output Power

LEFT:

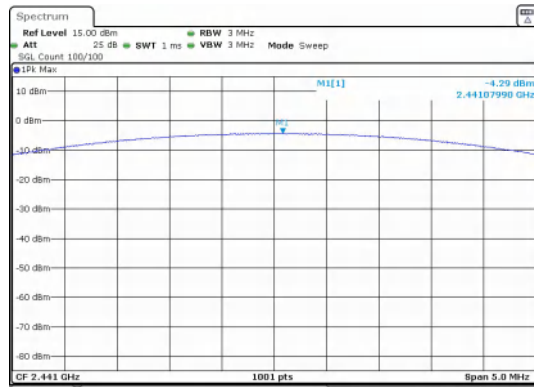
Test Result

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	-4.59	0.35	≤30	PASS
		39	-5.05	0.31		PASS
		78	-6.42	0.23		PASS
$\pi/4$ DQPSK	2-DH5	0	-4.12	0.39	≤20.97	PASS
		39	-4.29	0.37		PASS
		78	-5.61	0.27		PASS
8DPSK	3-DH5	0	-3.83	0.41		PASS
		39	-3.54	0.44		PASS
		78	-4.81	0.33		PASS

Test Graphs

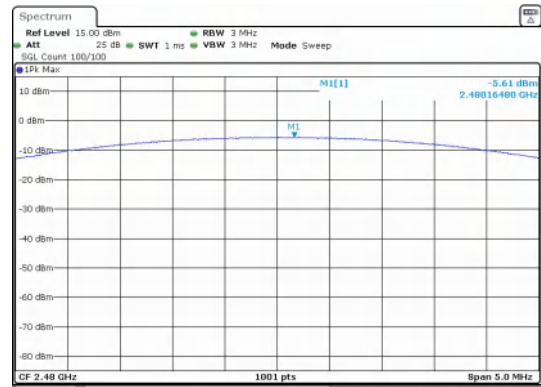


GFSK_Channel 78



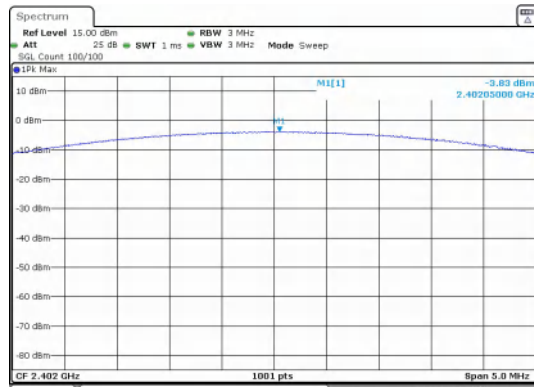
Date: 17, JAN, 2025 10:45:18

π /4DQPSK_Channel 0



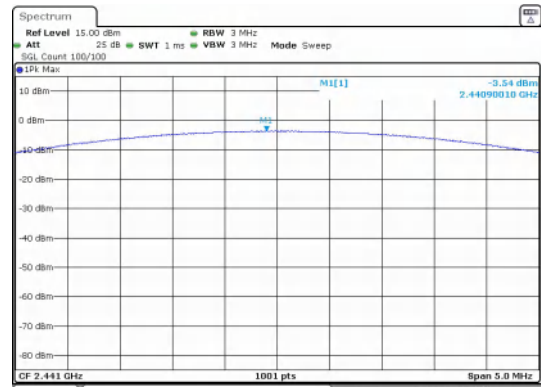
Date: 17, JAN, 2025 10:47:12

Peak Output Power
 π /4DQPSK_Channel 39



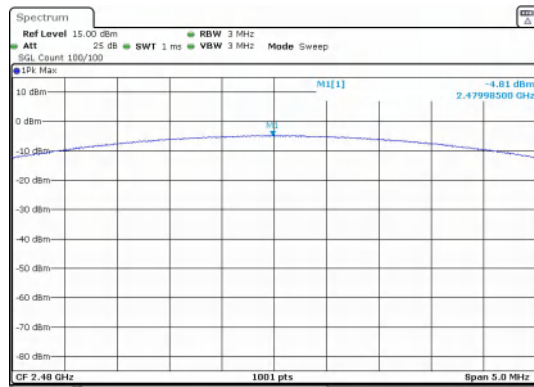
Date: 17, JAN, 2025 10:50:02

Peak Output Power
 π /4DQPSK_Channel 78



Date: 17, JAN, 2025 14:13:06

Peak Output Power
8DPSK_Channel 0



Date: 17, JAN, 2025 14:17:58

Peak Output Power
8DPSK_Channel 39

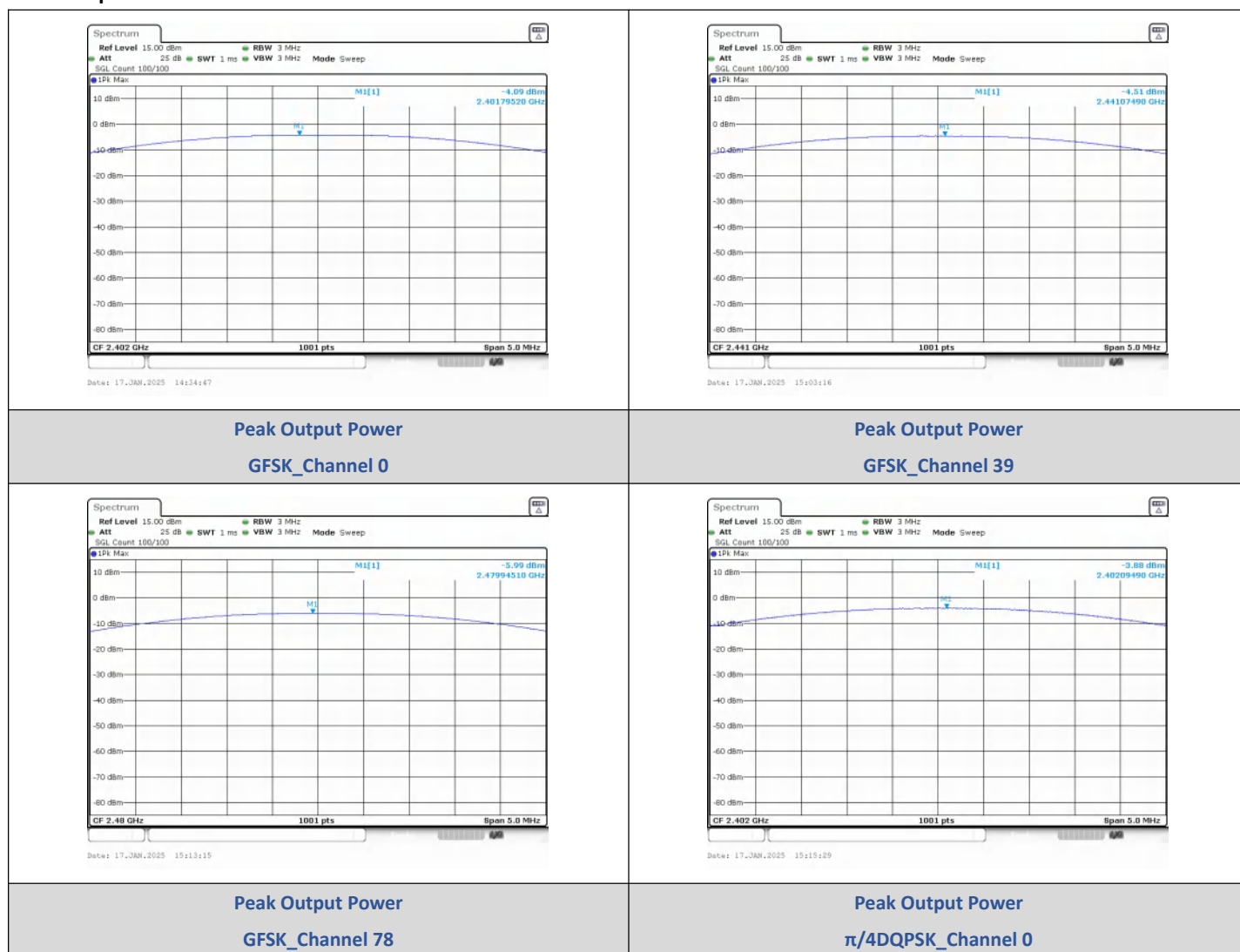
Peak Output Power
8DPSK_Channel 78

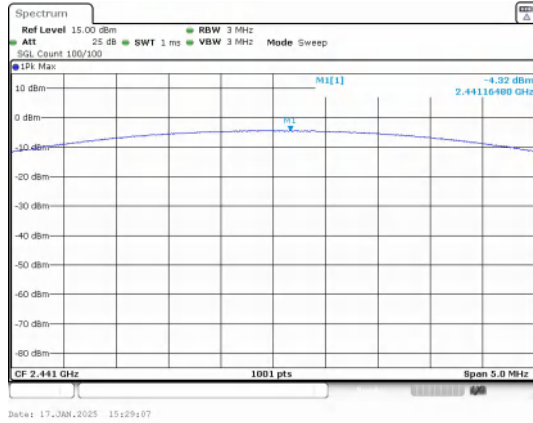
RIGHT:

Test Result

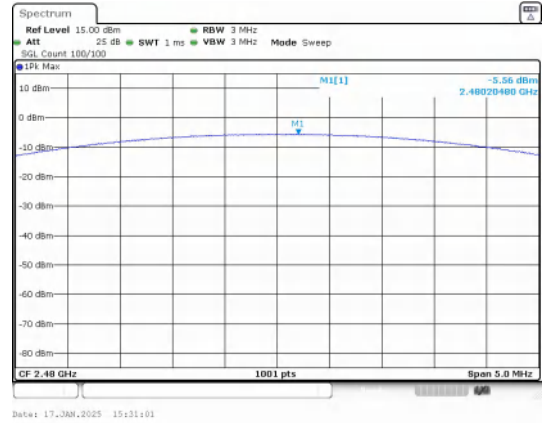
Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	-4.09	0.39	≤30	PASS
		39	-4.51	0.35		PASS
		78	-5.99	0.25		PASS
$\pi/4$ DQPSK	2-DH5	0	-3.88	0.41	≤20.97	PASS
		39	-4.32	0.37		PASS
		78	-5.56	0.28		PASS
8DPSK	3-DH5	0	-3.90	0.41		PASS
		39	-4.07	0.39		PASS
		78	-5.31	0.29		PASS

Test Graphs

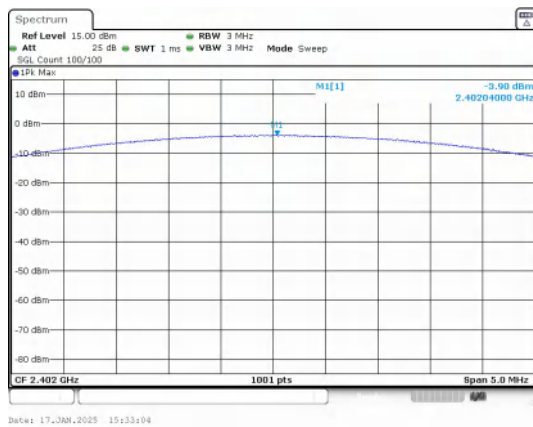




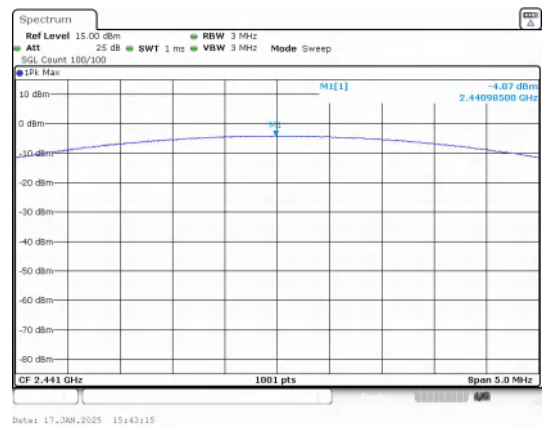
Peak Output Power
 $\pi/4$ DQPSK_Channel 39



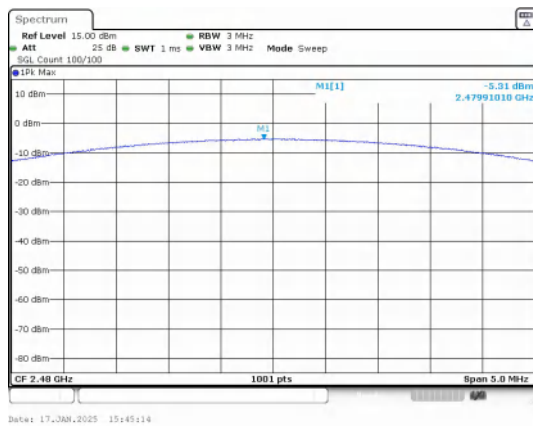
Peak Output Power
 $\pi/4$ DQPSK_Channel 78



Peak Output Power
8DPSK_Channel 0



Peak Output Power
8DPSK_Channel 39



Peak Output Power
8DPSK_Channel 78

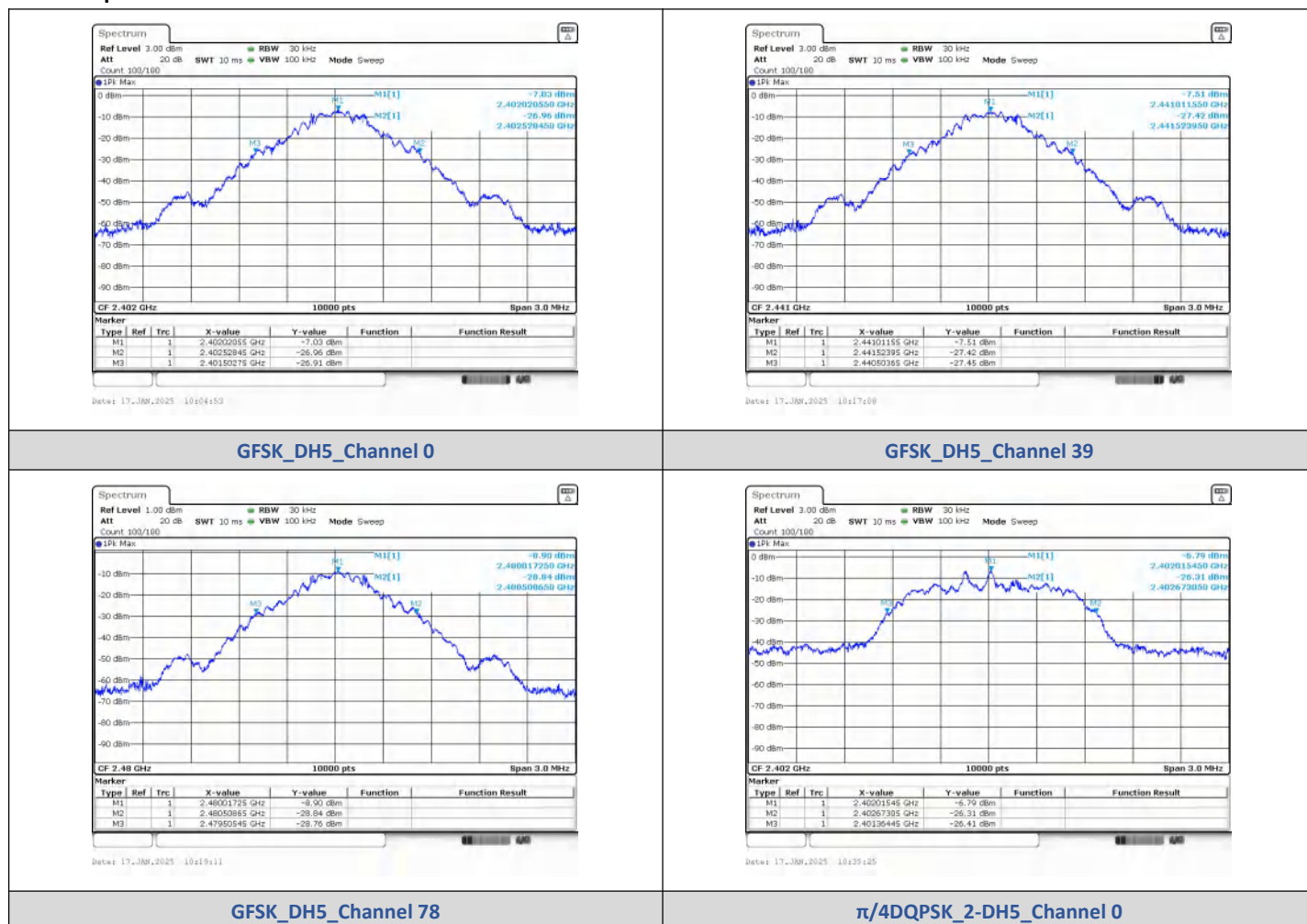
5) 20dB Bandwidth

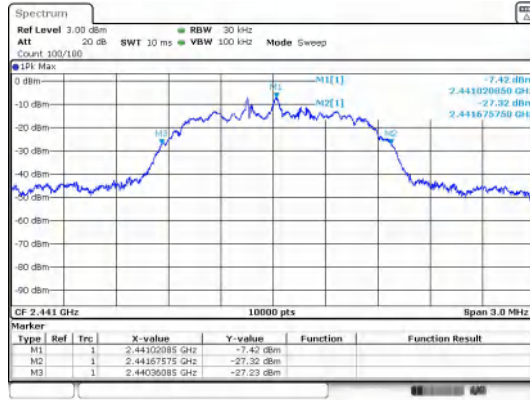
LEFT:

Test Result

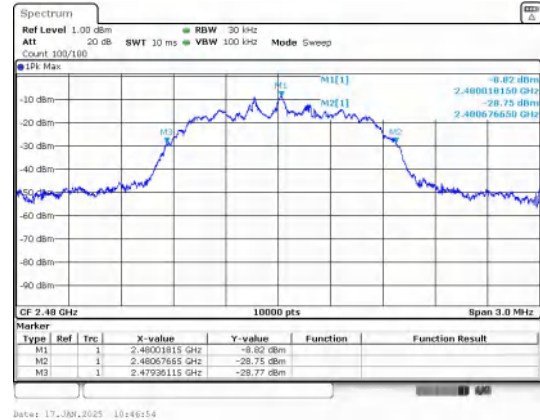
Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.030
	39	2441 MHz	1.020
	78	2480 MHz	1.000
$\pi/4$ QPSK	0	2402 MHz	1.310
	39	2441 MHz	1.320
	78	2480 MHz	1.320
8DPSK	0	2402 MHz	1.280
	39	2441 MHz	1.300
	78	2480 MHz	1.290

Test Graphs

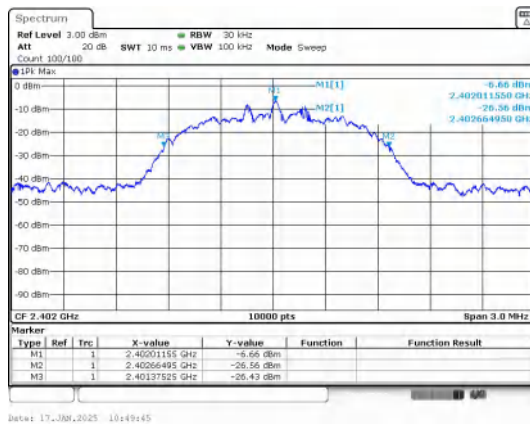




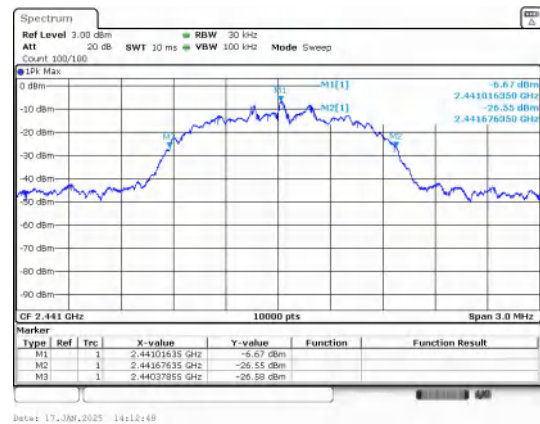
$\pi/4$ DQPSK_2-DH5_Channel 39



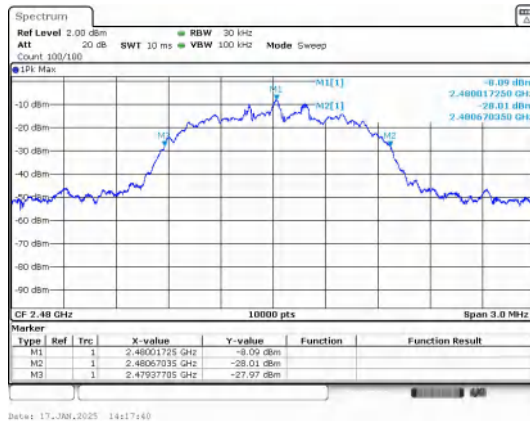
$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



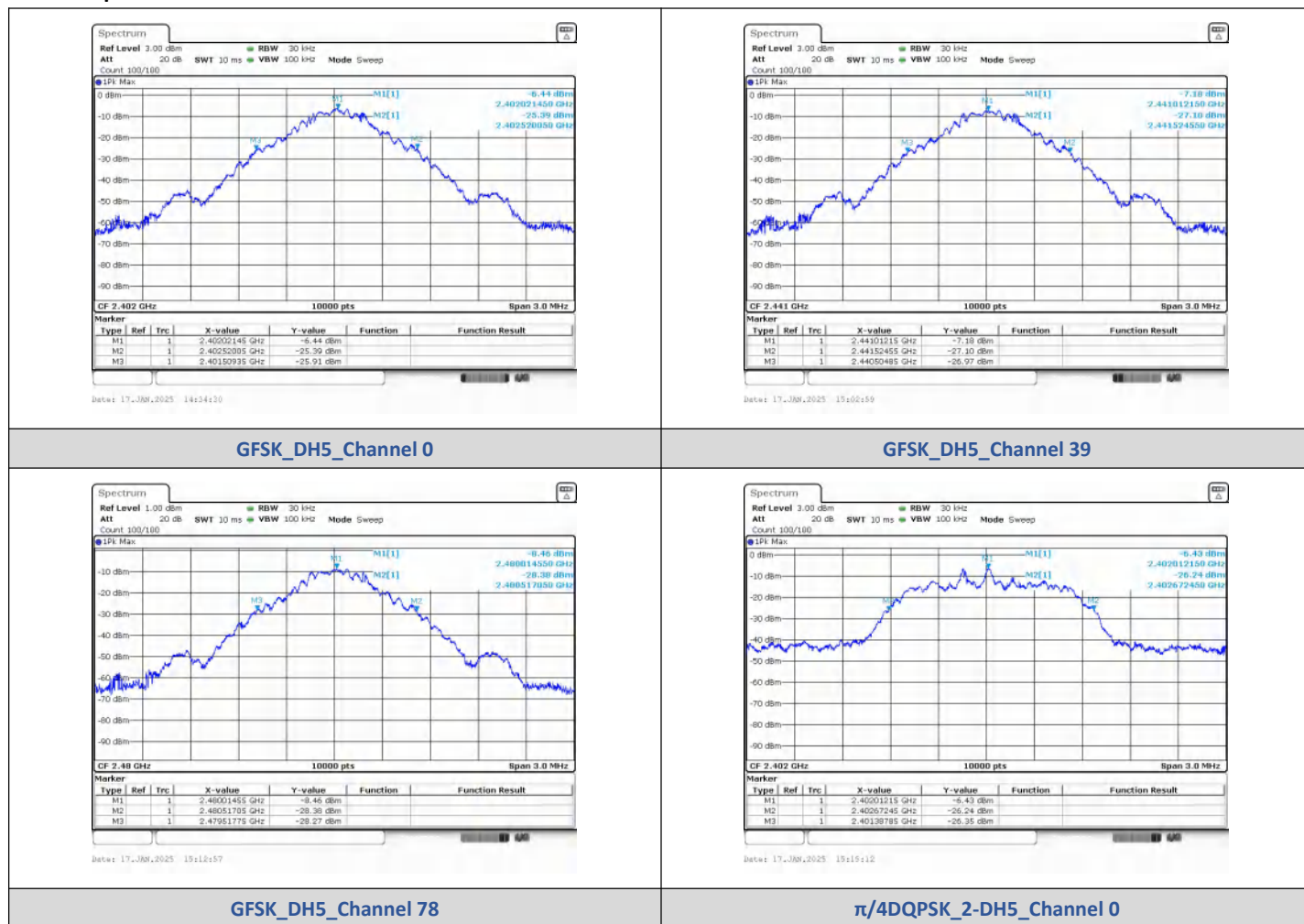
8DPSK_3-DH5_Channel 78

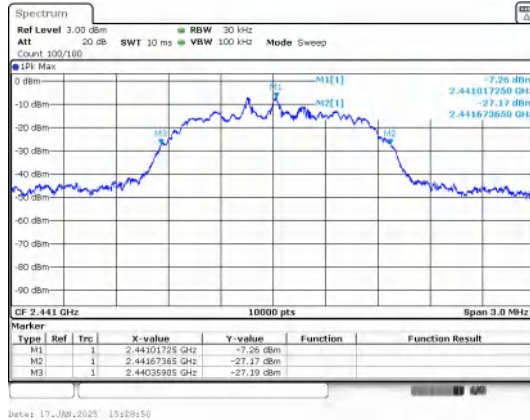
RIGHT:

Test Result

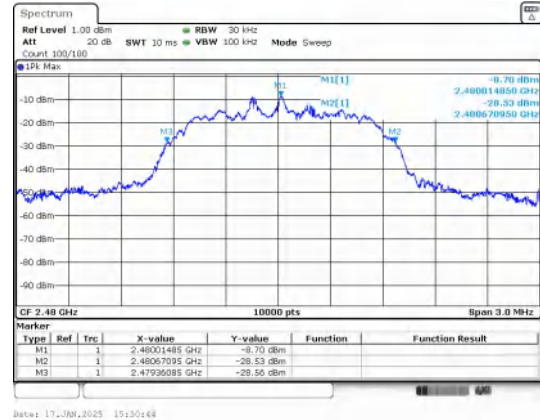
Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.010
	39	2441 MHz	1.020
	78	2480 MHz	1.000
$\pi/4$ DQPSK	0	2402 MHz	1.280
	39	2441 MHz	1.310
	78	2480 MHz	1.310
8DPSK	0	2402 MHz	1.290
	39	2441 MHz	1.290
	78	2480 MHz	1.290

Test Graphs

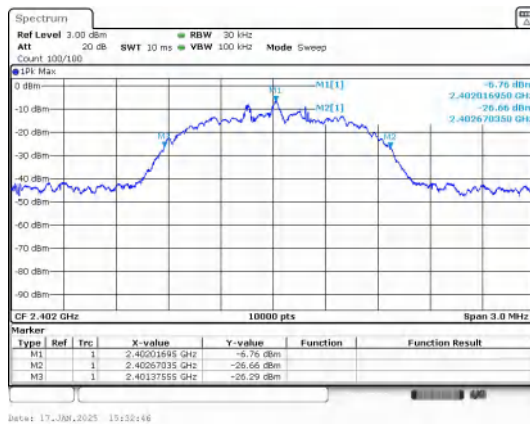




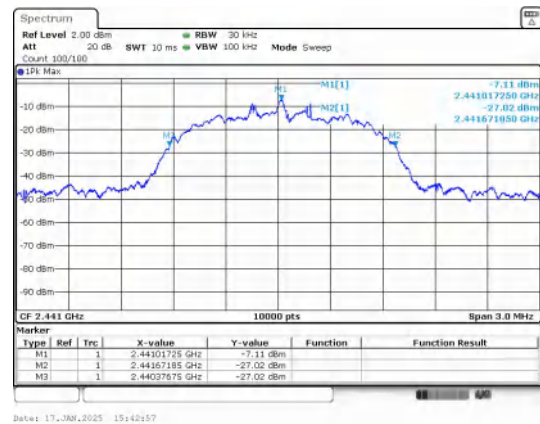
$\pi/4$ DQPSK_2-DH5_Channel 39



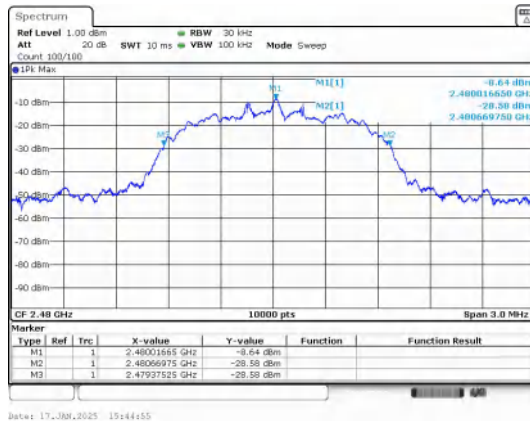
$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



8DPSK_3-DH5_Channel 78

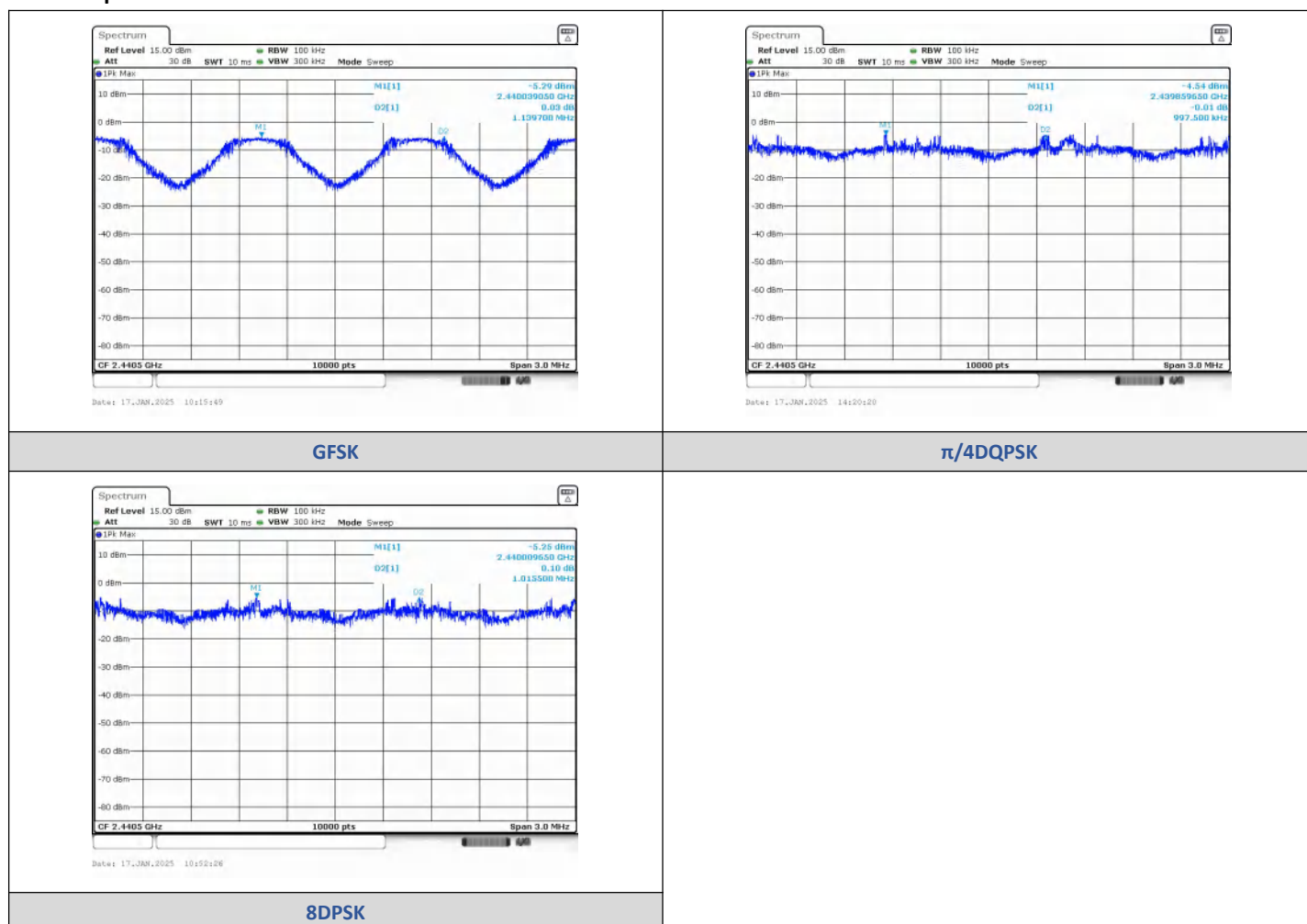
6) Carrier Frequencies Separation

LEFT:

Test Result

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2440.039	2441.1788	1.1397	1.03	PASS
$\pi/4$ DQPSK	2-DH5	2439.8596	2440.8571	0.9975	0.88	PASS
8DPSK	3-DH5	2440.0096	2441.0251	1.0155	0.853	PASS

Test Graphs

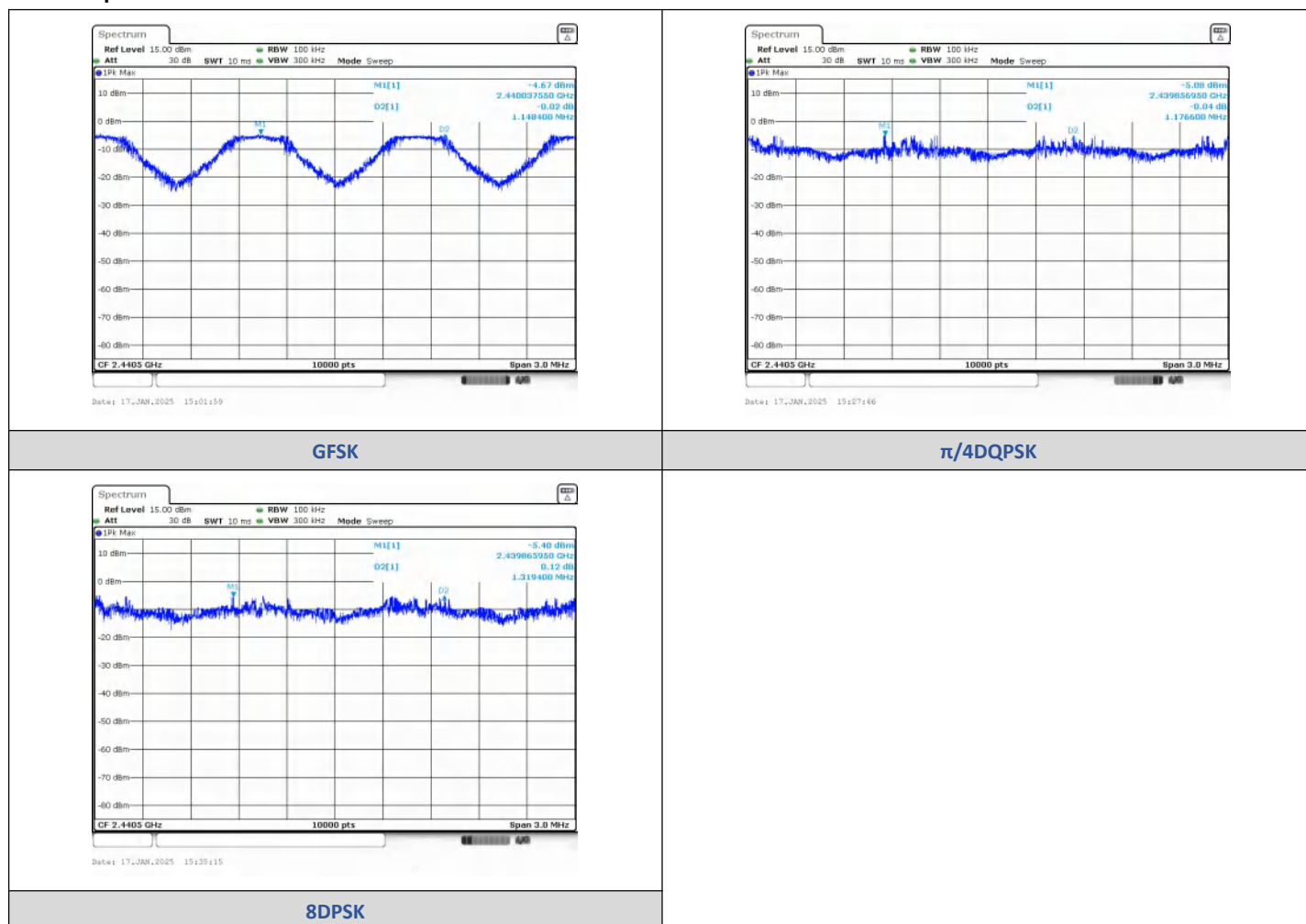


RIGHT:

Test Result

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2440.0376	2441.186	1.1484	1.01	PASS
$\pi/4$ DQPSK	2-DH5	2439.8569	2441.0336	1.1766	0.853	PASS
8DPSK	3-DH5	2439.8659	2441.1854	1.3194	0.86	PASS

Test Graphs



7) Conducted Out Of Band Emission

LEFT:

Test Result

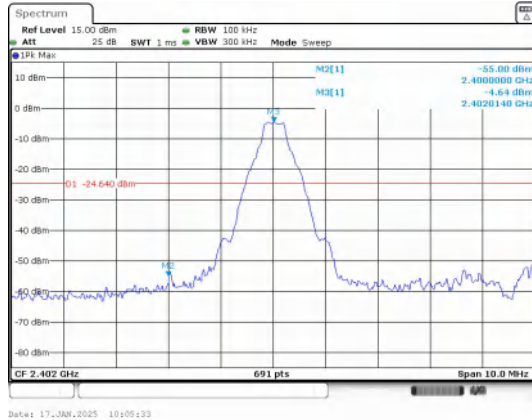
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-55.000	-24.64	-30.360	PASS
			6894.67	-44.525	-24.64	-19.885	PASS
		39	6903.82	-44.375	-25.23	-19.145	PASS
		78	2483.50	-61.250	-26.55	-34.700	PASS
			9920.20	-45.256	-26.55	-18.706	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-54.130	-24.74	-29.390	PASS
			6957.93	-44.649	-24.74	-19.909	PASS
		39	22056.5	-44.654	-25.07	-19.584	PASS
		78	2483.50	-61.290	-26.44	-34.850	PASS
			6904.66	-44.492	-26.44	-18.052	PASS
8DPSK	3-DH5	0	2400.00	-56.330	-25.08	-31.250	PASS
			6911.32	-44.595	-25.08	-19.515	PASS
		39	6916.31	-44.633	-24.43	-20.203	PASS
		78	2483.50	-59.480	-25.92	-33.560	PASS
			6928.79	-44.101	-25.92	-18.181	PASS

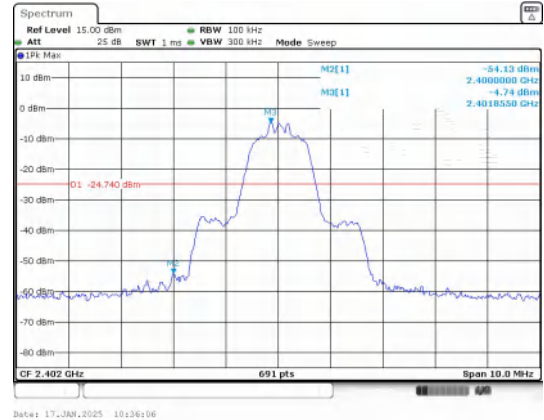
Hopping

Hopping							
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2397.12	-58.828	-24.71	-34.118	PASS
			2400.00	-60.180	-24.71	-35.470	PASS
			2483.50	-60.310	-26.55	-33.760	PASS
$\pi/4$ DQPSK	2-DH5		2400.00	-58.010	-25.12	-32.890	PASS
			2483.50	-61.470	-29.01	-32.460	PASS
8DPSK	3-DH5		2397.84	-58.786	-25.65	-33.136	PASS
			2400.00	-59.640	-25.65	-33.990	PASS
			2483.50	-60.520	-25.83	-34.690	PASS

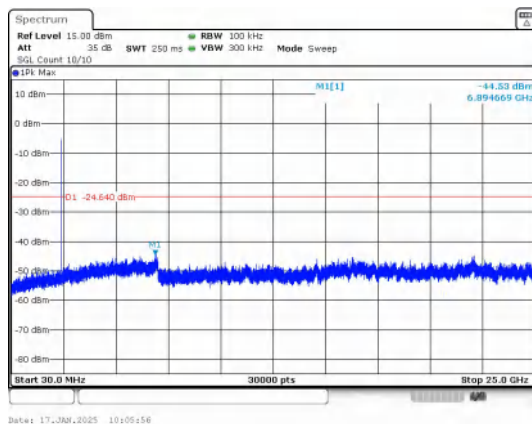
Test Graphs



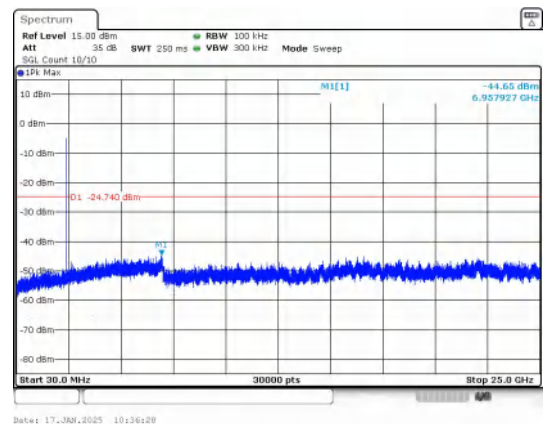
Out Of Band Emission
GFSK_DH5_Channel 0



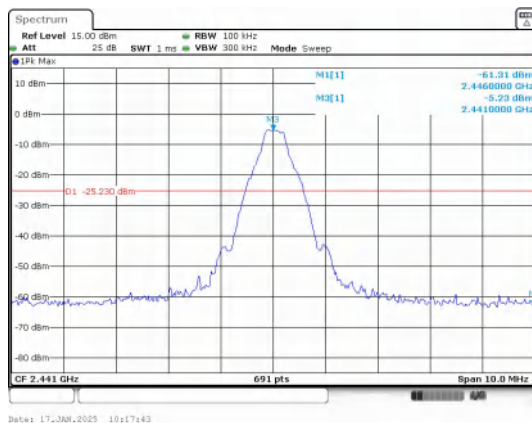
Out Of Band Emission
 $\pi/4$ QPSK_2-DH5_Channel 0



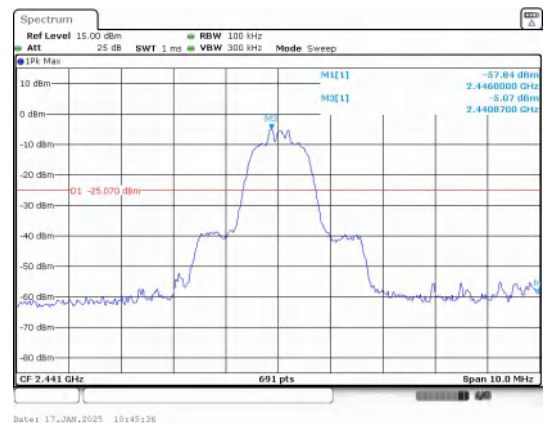
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



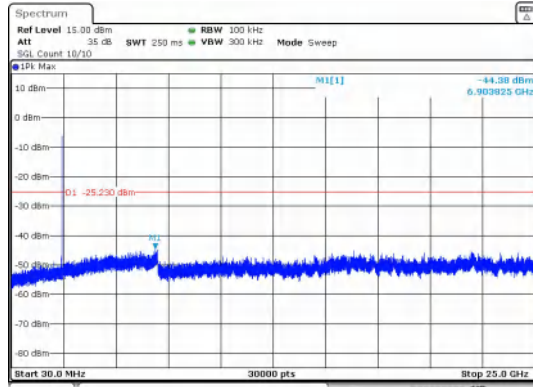
30.0 MHz - 25000.0 MHz
 $\pi/4$ QPSK_2-DH5_Channel 0



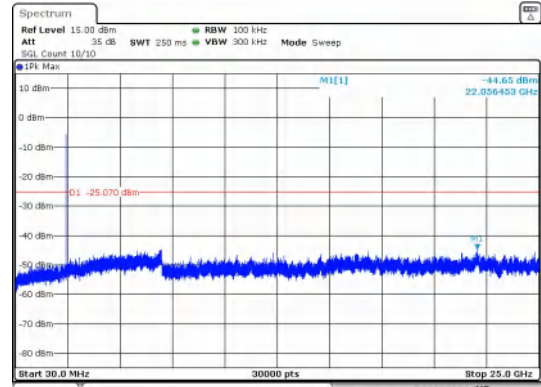
Out Of Band Emission
GFSK_DH5_Channel 39



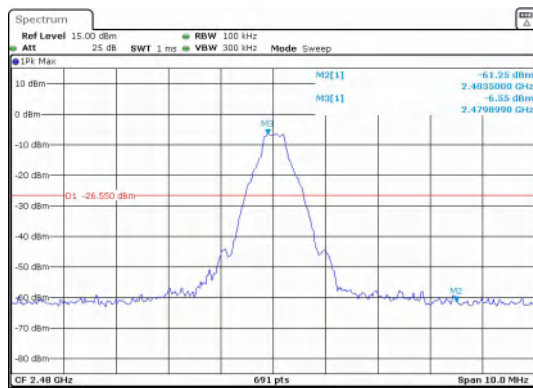
Out Of Band Emission
 $\pi/4$ QPSK_2-DH5_Channel 39



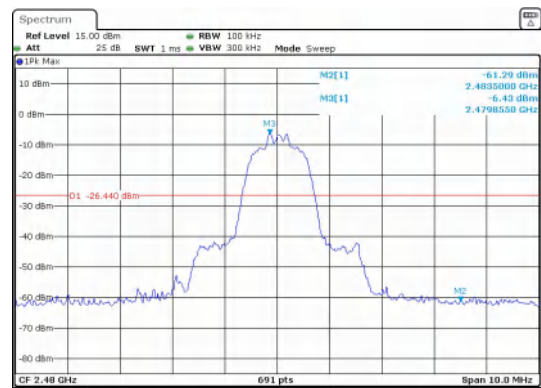
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



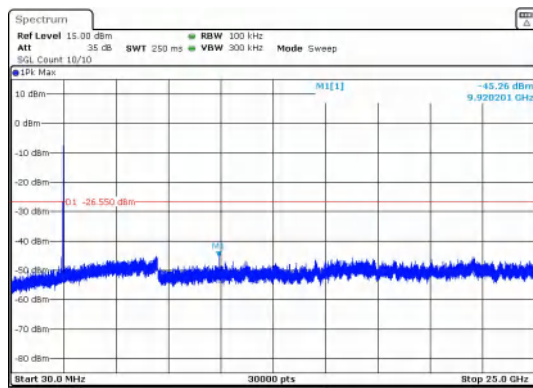
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39



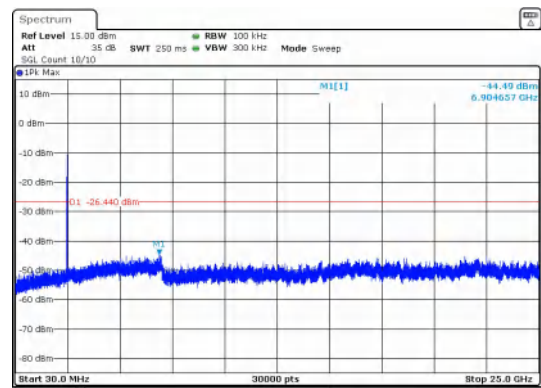
Out Of Band Emission
GFSK_DH5_Channel 78



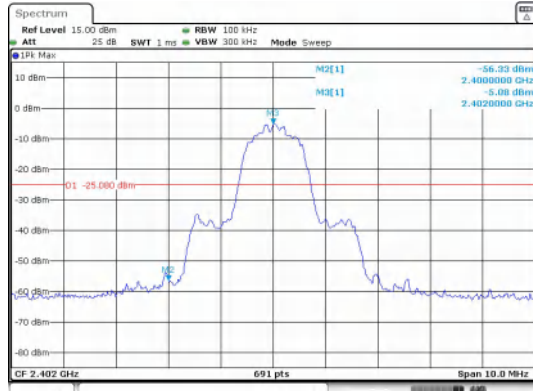
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



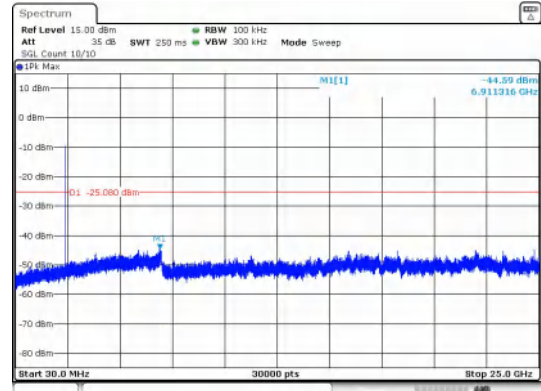
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



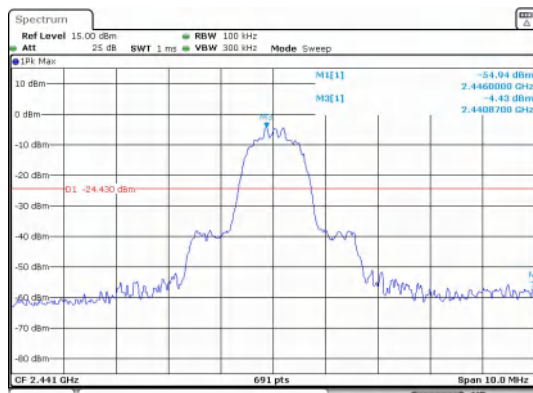
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 78



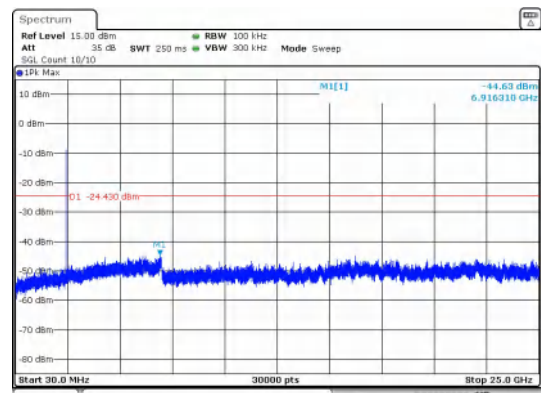
Out Of Band Emission
8DPSK_3-DH5_Channel 0



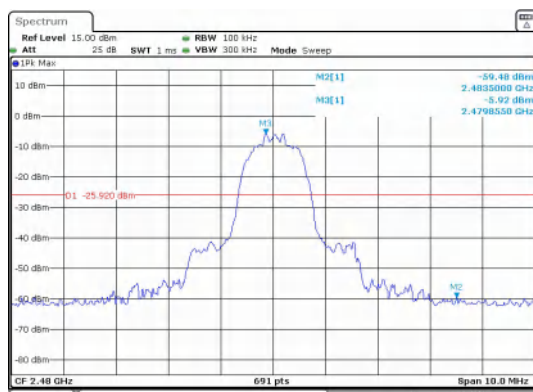
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



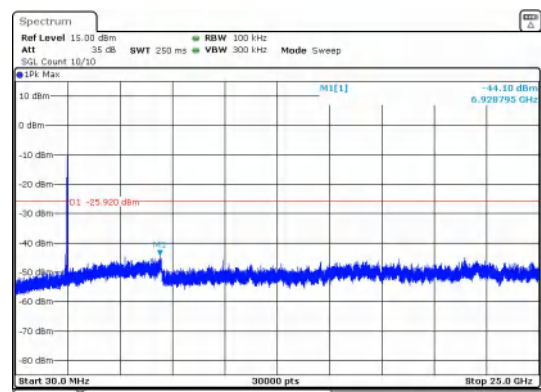
Out Of Band Emission
8DPSK_3-DH5_Channel 39



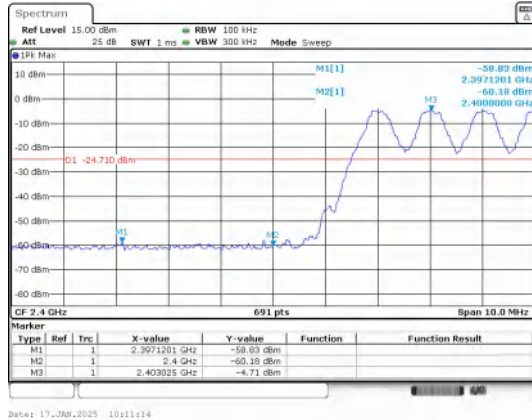
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



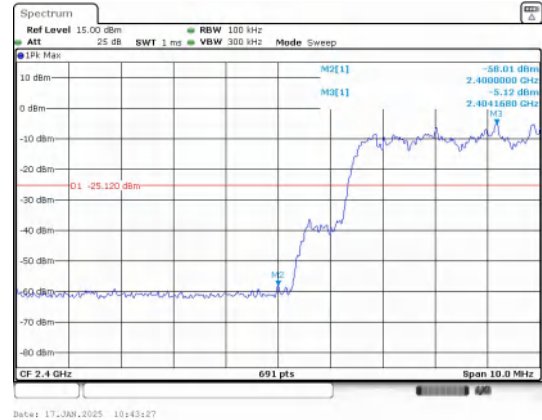
Out Of Band Emission
8DPSK_3-DH5_Channel 78



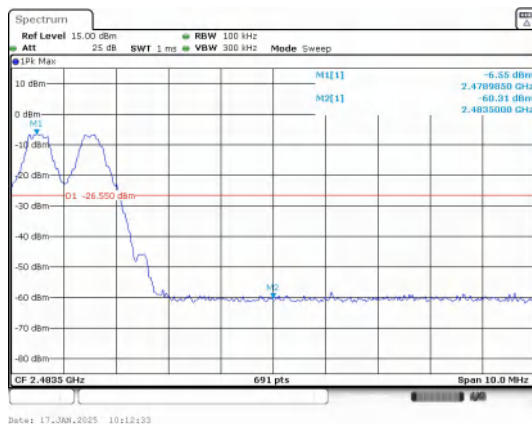
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



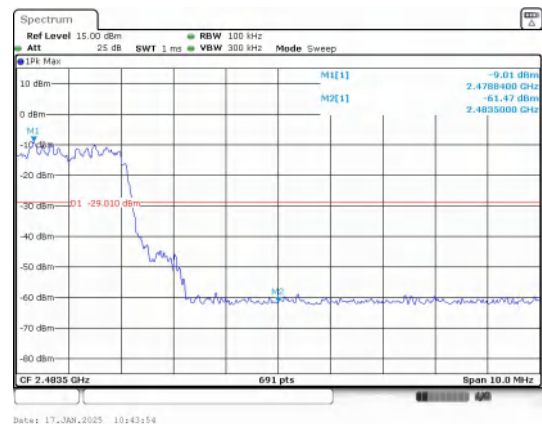
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



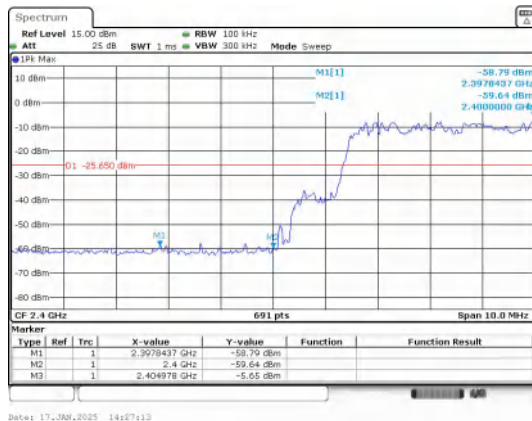
Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



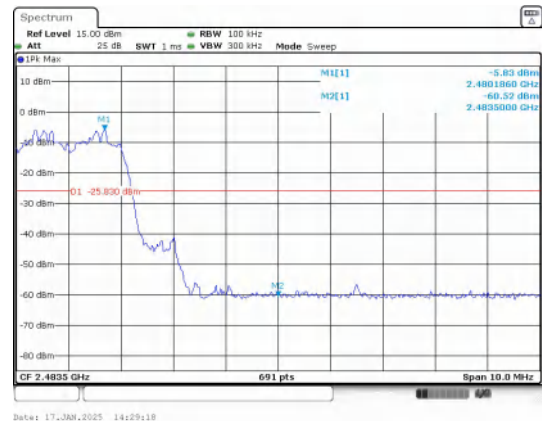
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



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:

Test Result

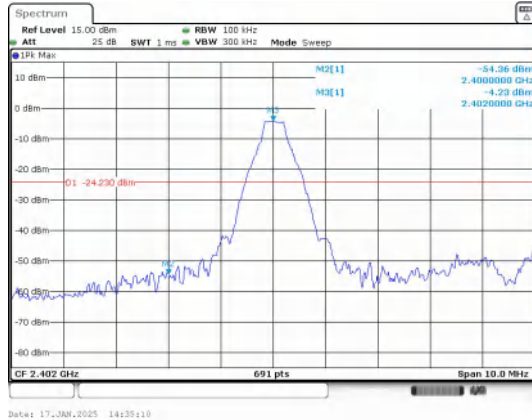
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-54.360	-24.23	-30.130	PASS
			6970.41	-43.516	-24.23	-19.286	PASS
		39	6891.34	-44.670	-24.62	-20.050	PASS
		78	2483.50	-60.270	-26.05	-34.220	PASS
			22092.2	-44.633	-26.05	-18.583	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-52.840	-24.59	-28.250	PASS
			6893.00	-44.747	-24.59	-20.157	PASS
		39	6919.64	-44.695	-25.07	-19.625	PASS
		78	2483.50	-61.160	-26.37	-34.790	PASS
			6863.04	-44.614	-26.37	-18.244	PASS
8DPSK	3-DH5	0	2400.00	-55.650	-24.96	-30.690	PASS
			22063.1	-44.645	-24.96	-19.685	PASS
		39	6967.91	-44.631	-25.32	-19.311	PASS
		78	2483.50	-60.880	-26.41	-34.470	PASS
			22188.8	-45.116	-26.41	-18.706	PASS

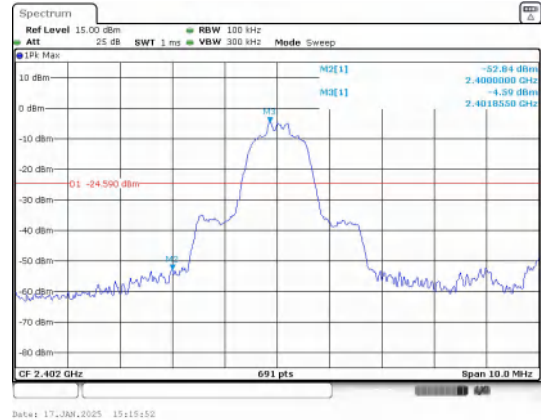
Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2398.49	-58.607	-24.5	-34.107	PASS
			2400.00	-59.930	-24.5	-35.430	PASS
			2483.50	-60.850	-25.83	-35.020	PASS
$\pi/4$ DQPSK	2-DH5		2400.00	-58.900	-27.34	-31.560	PASS
			2483.50	-60.870	-26.3	-34.570	PASS
8DPSK	3-DH5		2400.00	-57.280	-24.96	-32.320	PASS
			2483.50	-60.590	-26.44	-34.150	PASS

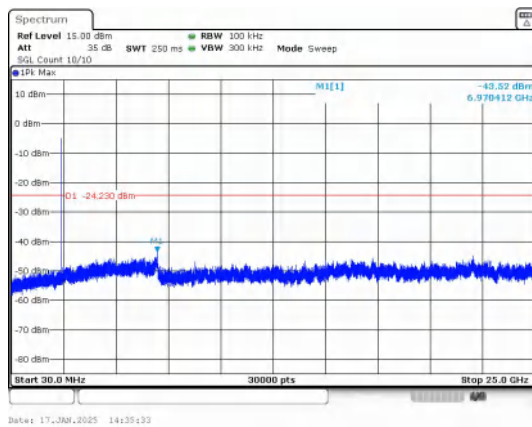
Test Graphs



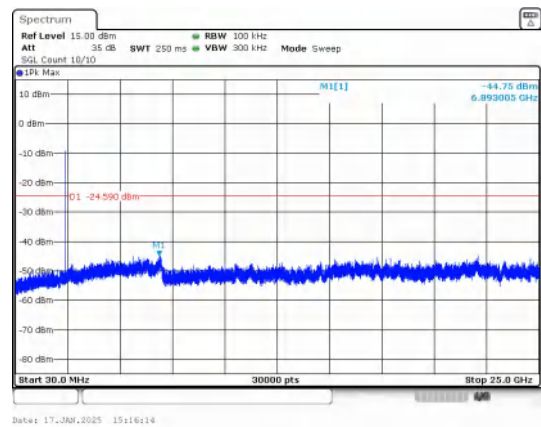
Out Of Band Emission
GFSK_DH5_Channel 0



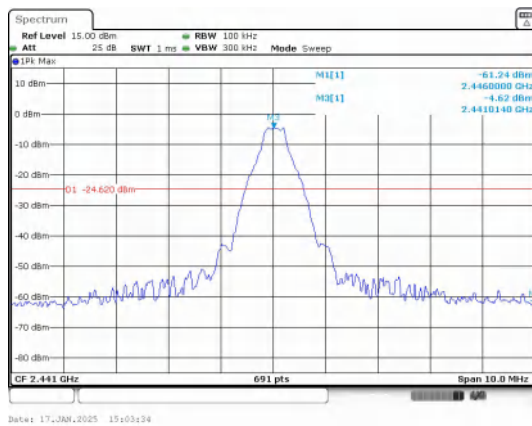
Out Of Band Emission
 $\pi/4$ QPSK_2-DH5_Channel 0



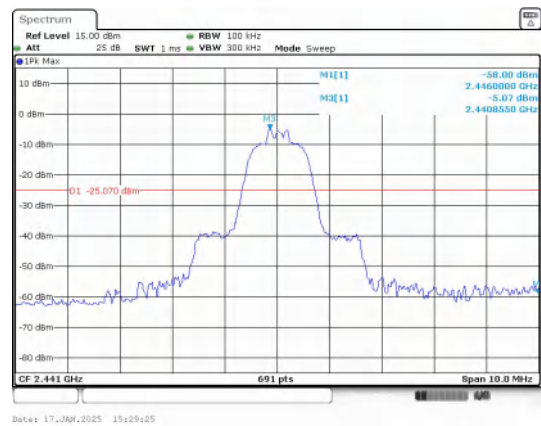
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



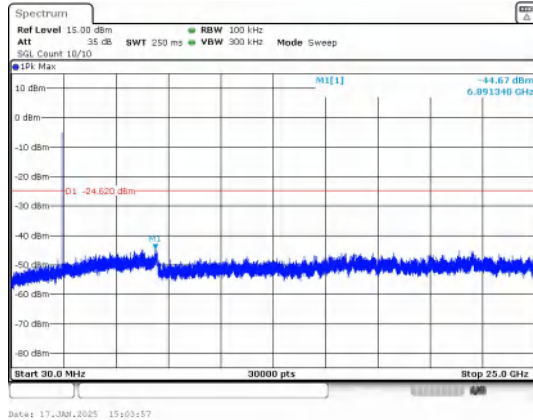
30.0 MHz - 25000.0 MHz
 $\pi/4$ QPSK_2-DH5_Channel 0



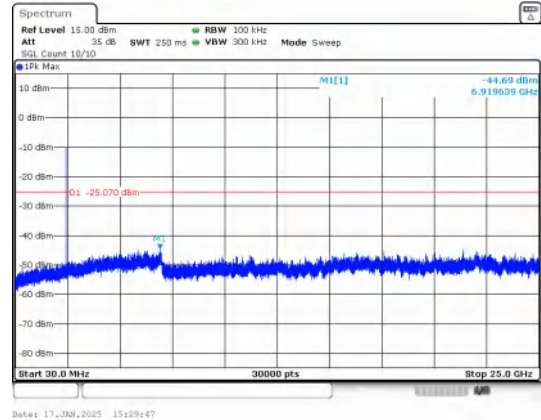
Out Of Band Emission
GFSK_DH5_Channel 39



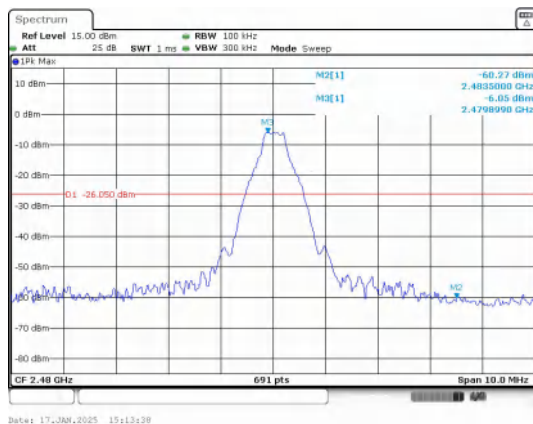
Out Of Band Emission
 $\pi/4$ QPSK_2-DH5_Channel 39



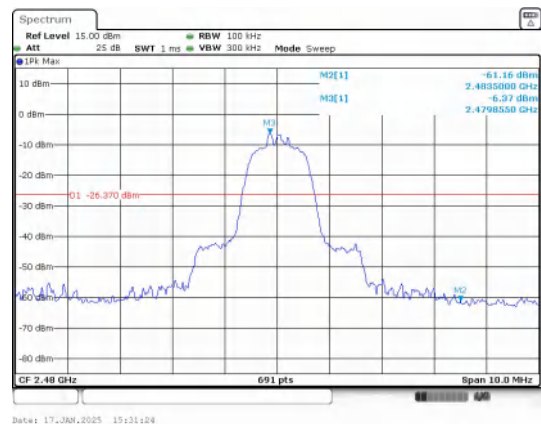
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



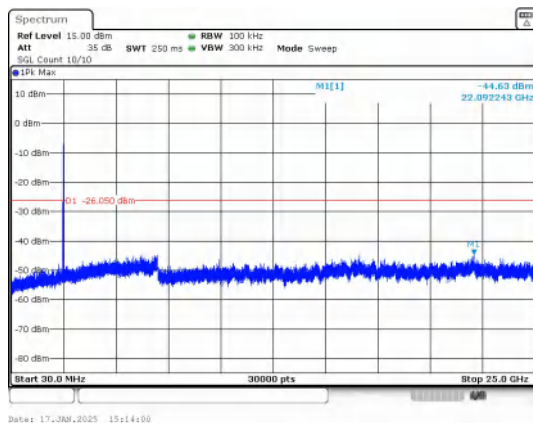
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39



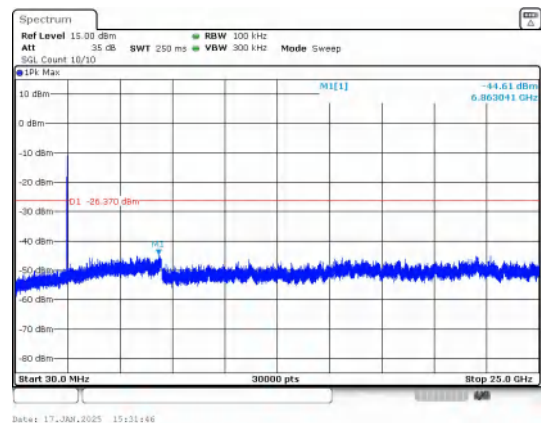
Out Of Band Emission
GFSK_DH5_Channel 78



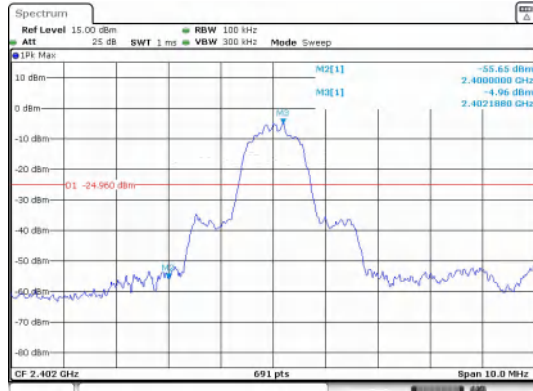
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



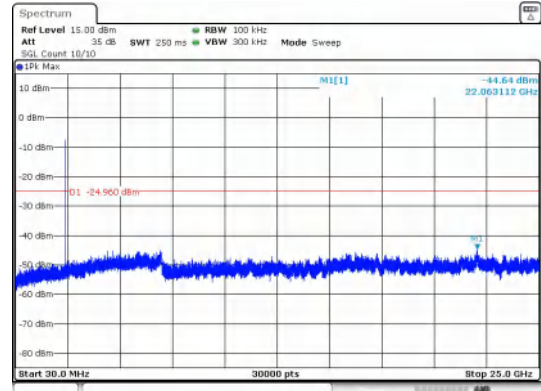
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



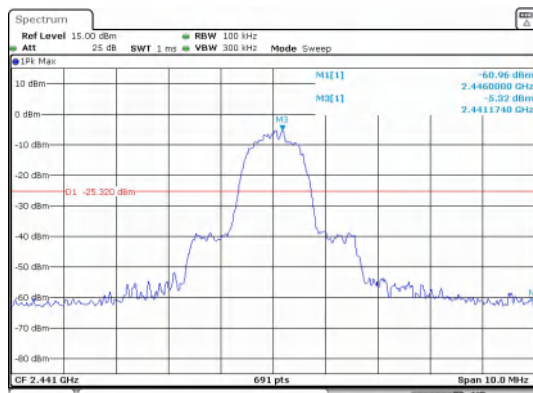
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 78



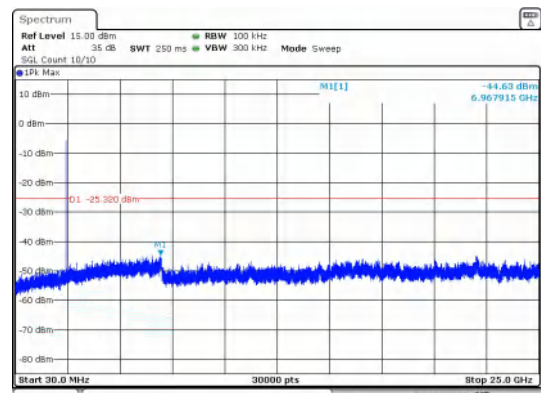
Out Of Band Emission
8DPSK_3-DH5_Channel 0



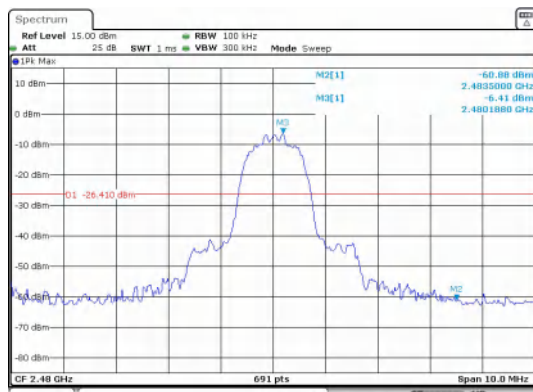
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



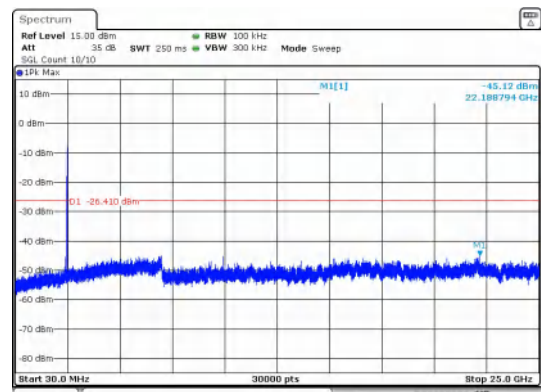
Out Of Band Emission
8DPSK_3-DH5_Channel 39



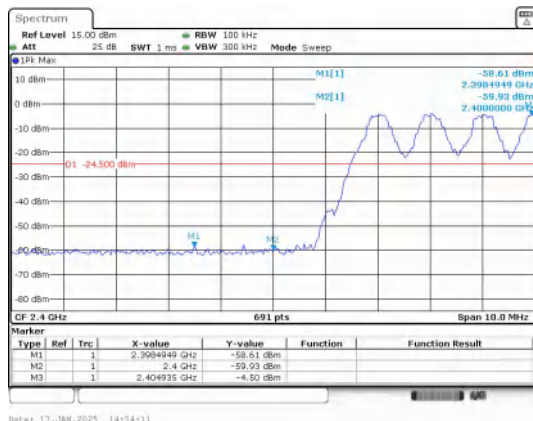
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



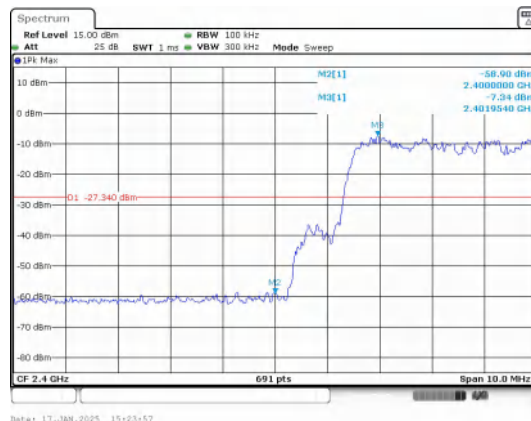
Out Of Band Emission
8DPSK_3-DH5_Channel 78



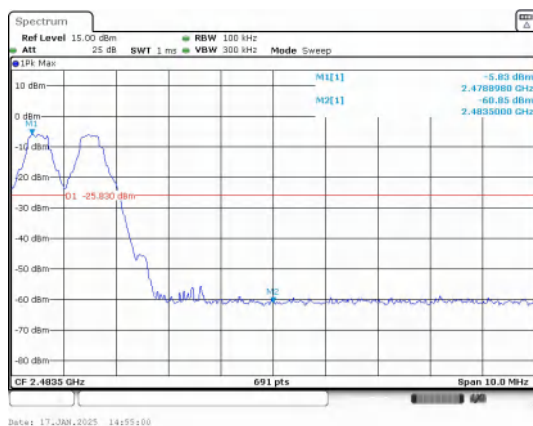
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



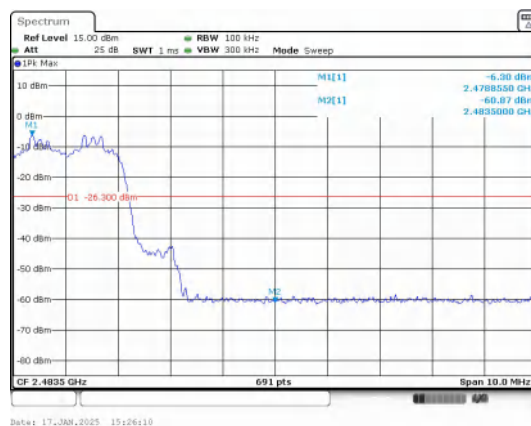
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



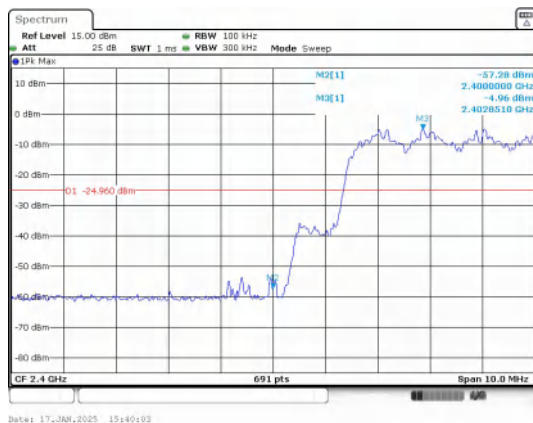
Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



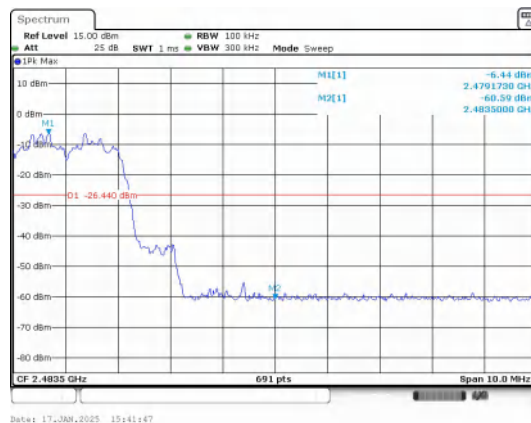
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



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-----