

Appendix Report

Report No.:	CISRR25010602004
Test Engineer:	Lucas Huang
Supervised by:	Rory Huang

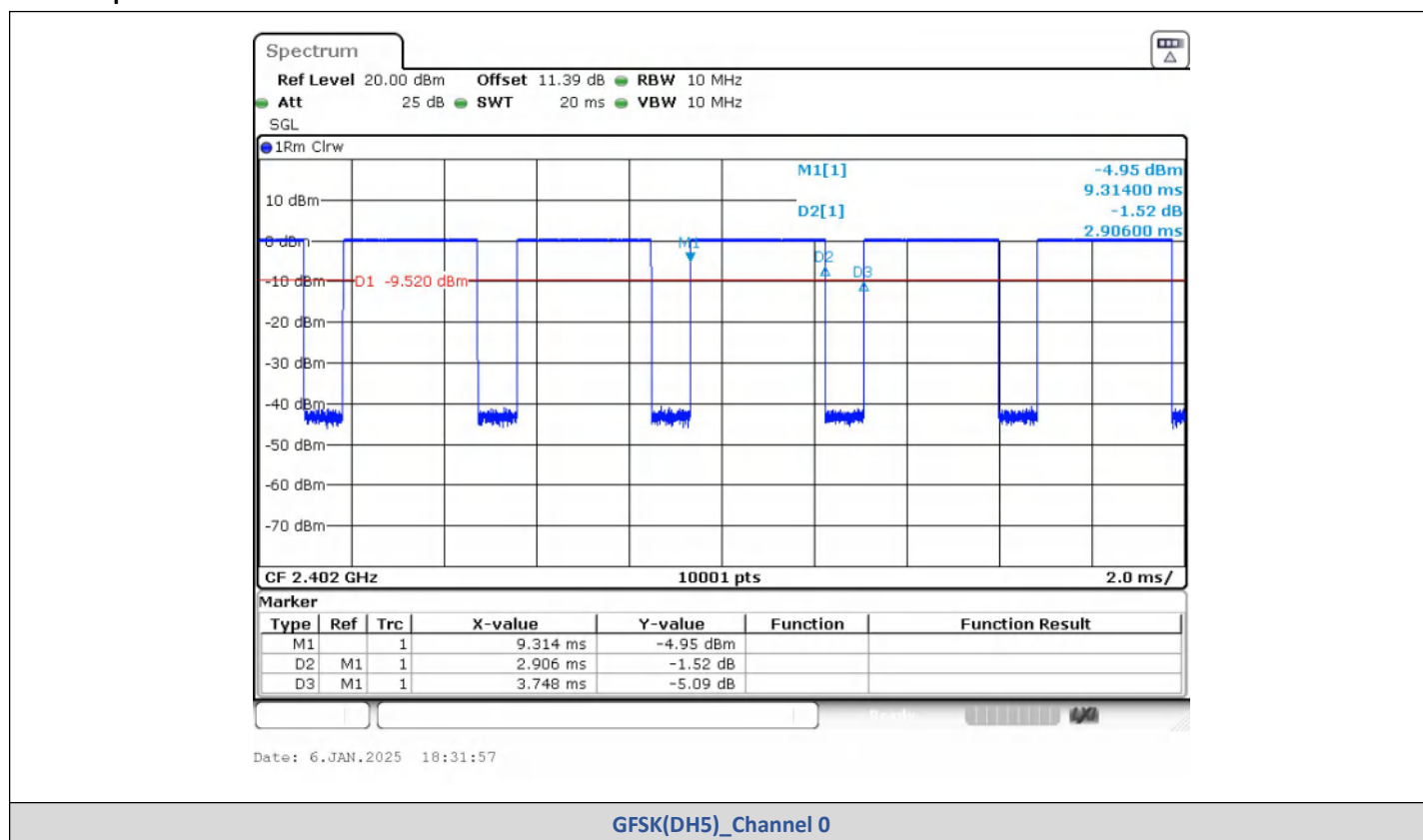
1) Duty Cycle

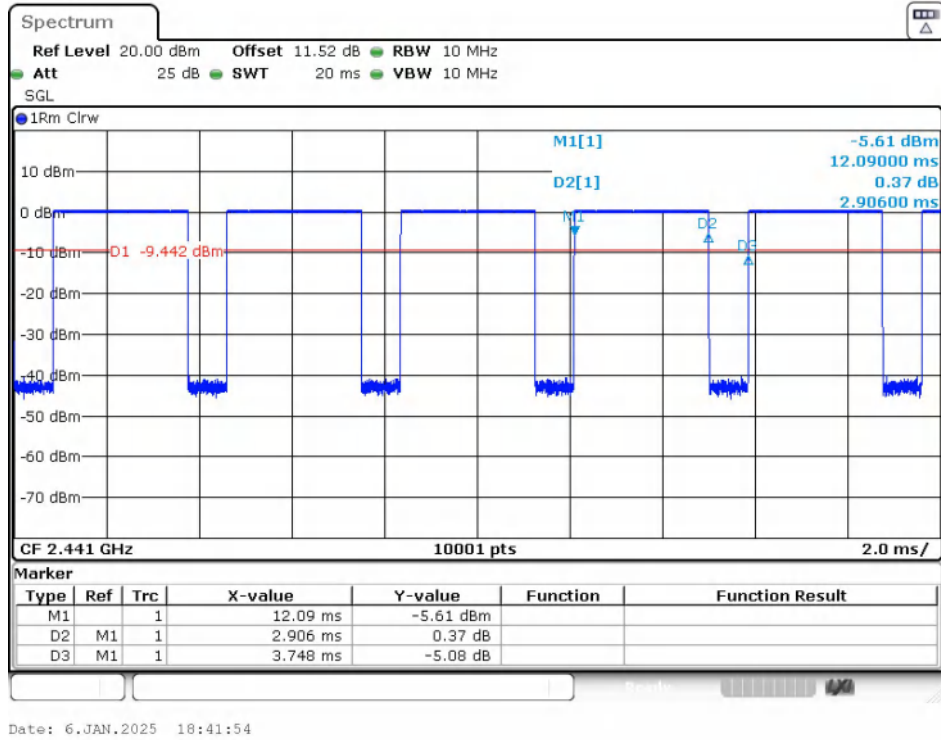
Test Result

Left:

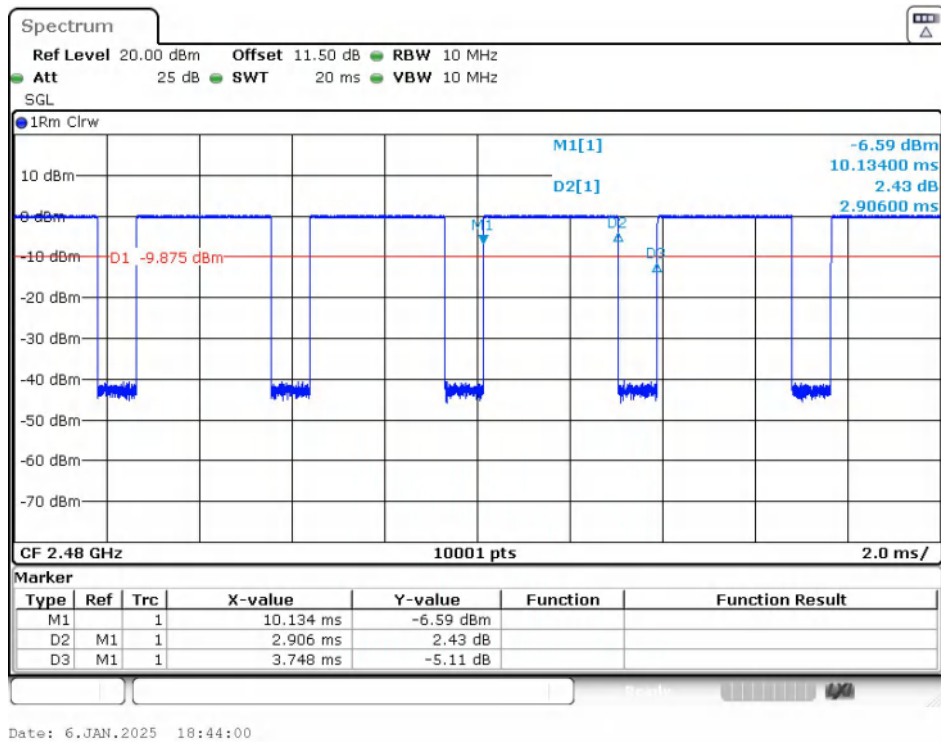
Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.906	3.748	77.53	0.7753	1.1053	0.3441
		39	2.906	3.748	77.53	0.7753	1.1053	0.3441
		78	2.906	3.748	77.53	0.7753	1.1053	0.3441
$\pi/4$ DQPSK	2-DH5	0	2.912	3.748	77.69	0.7769	1.0963	0.3434
		39	2.912	3.748	77.69	0.7769	1.0963	0.3434
		78	2.910	3.748	77.64	0.7764	1.0991	0.3436
8DPSK	3-DH5	0	2.914	3.748	77.75	0.7775	1.093	0.3432
		39	2.916	3.748	77.80	0.7780	1.0902	0.3429
		78	2.914	3.748	77.75	0.7775	1.093	0.3432

Test Graphs

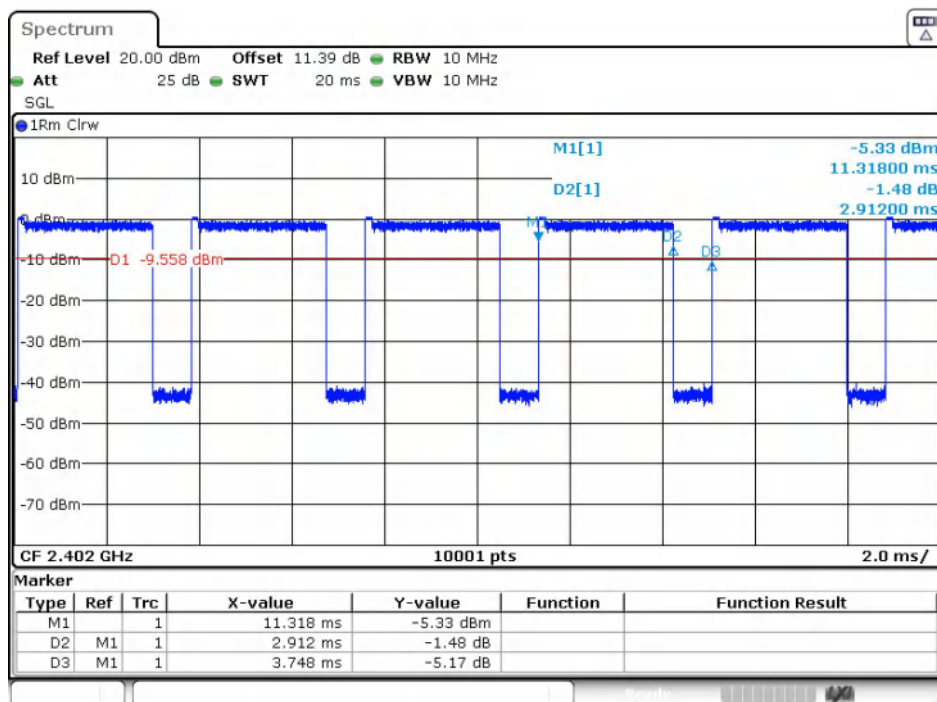




GFSK(DH5)_Channel 39

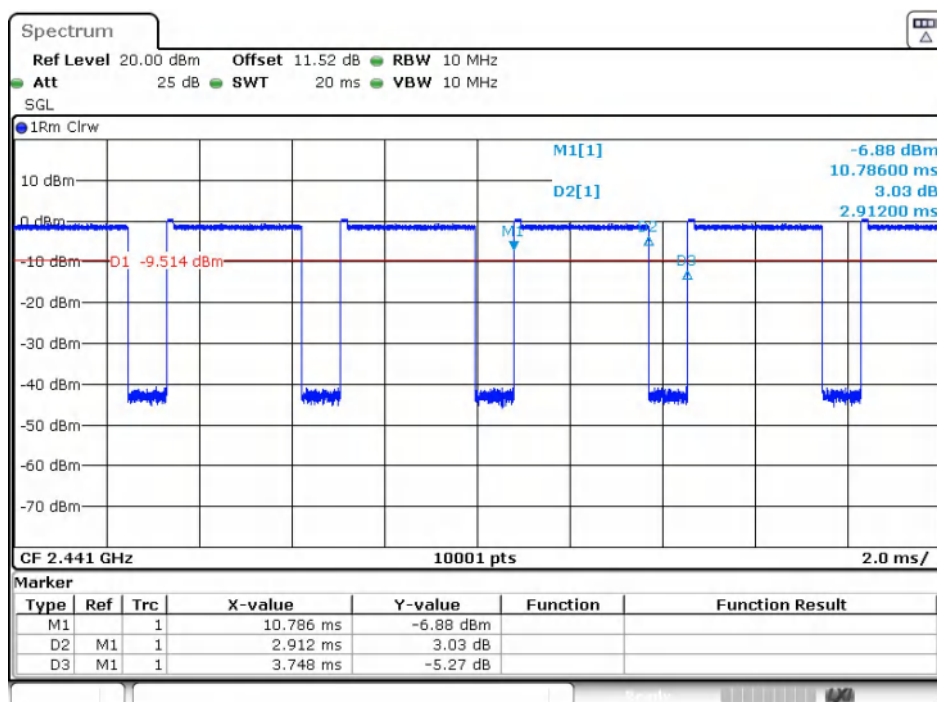


GFSK(DH5)_Channel 78



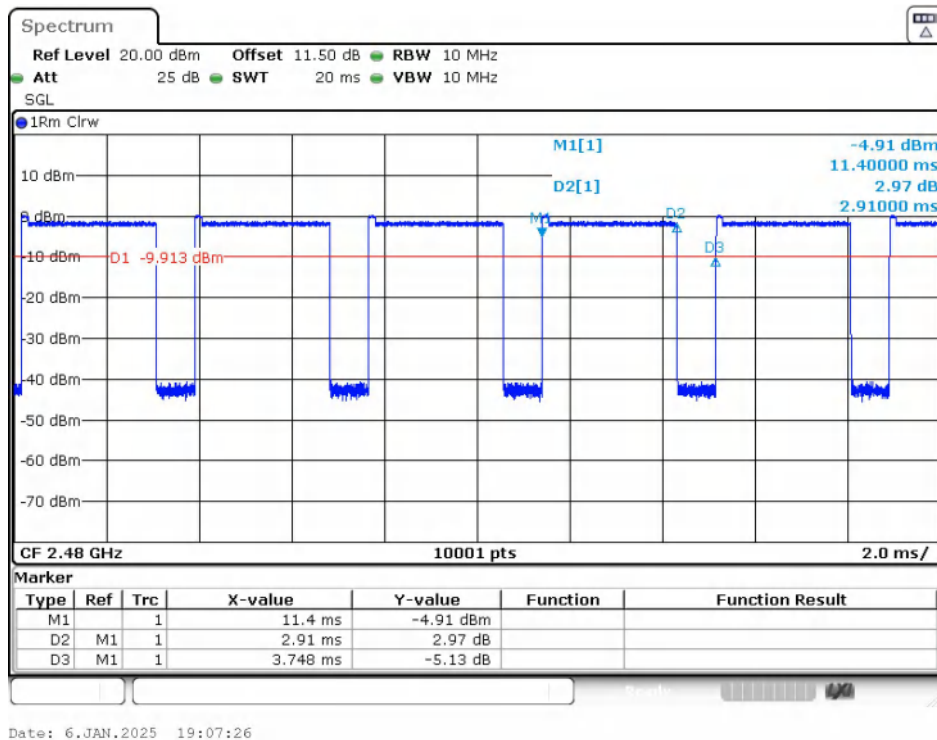
Date: 6, JAN. 2025 18:51:50

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

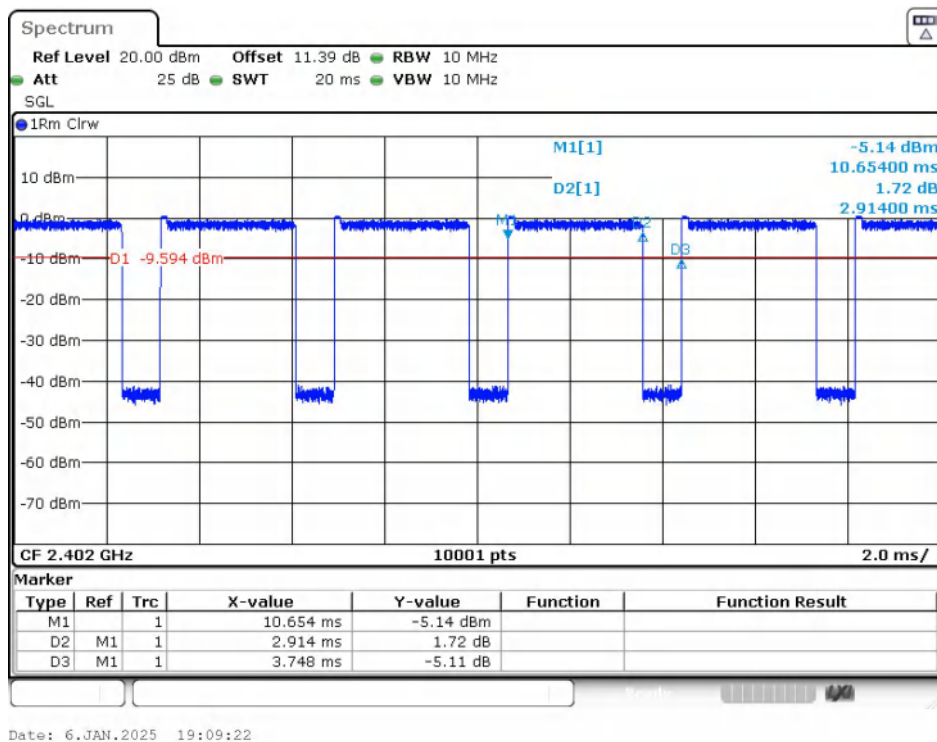


Date: 6, JAN. 2025 19:04:45

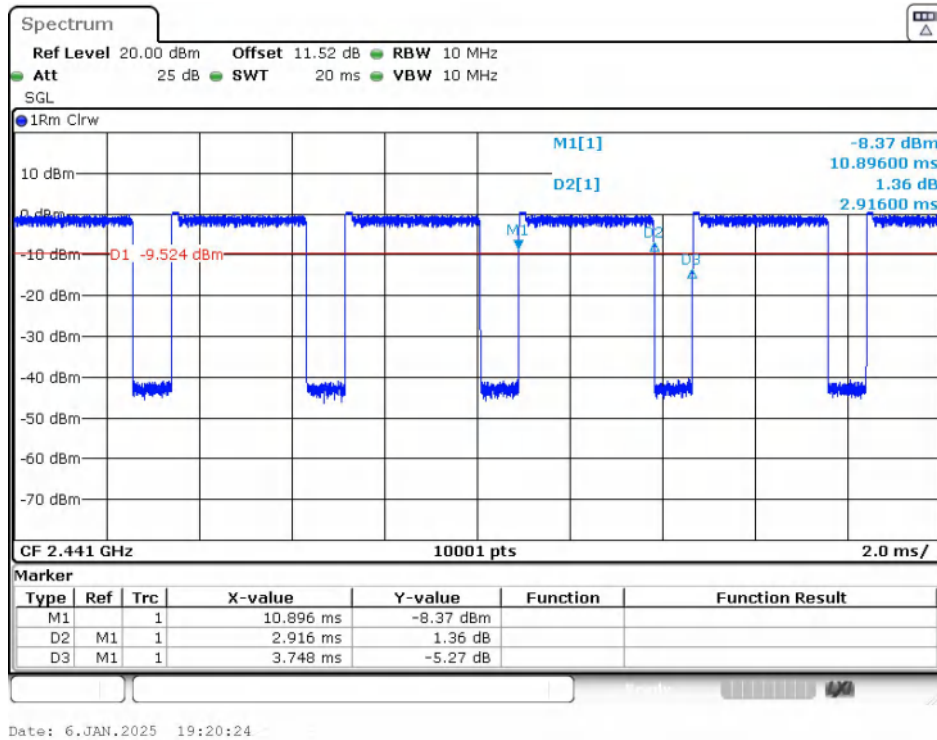
$\pi/4$ DQPSK(2-DH5)_Channel 39



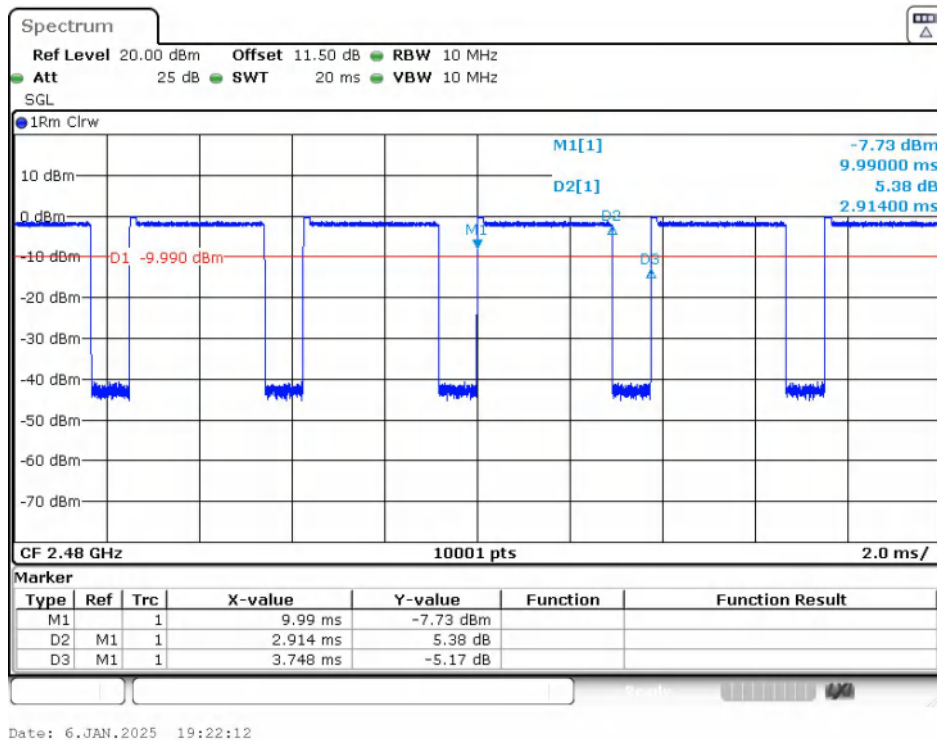
$\pi/4$ DQPSK(2-DH5)_Channel 78



8DPSK(3-DH5)_Channel 0



8DPSK(3-DH5)_Channel 39



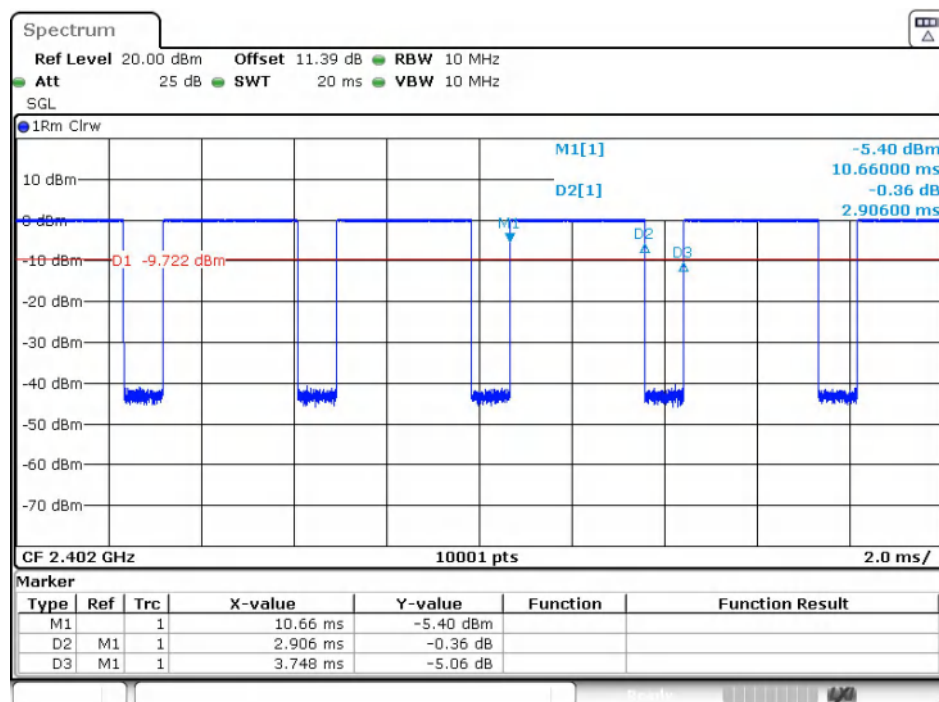
8DPSK(3-DH5)_Channel 78

Right:

Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.906	3.748	77.53	0.7753	1.1053	0.3441
		39	2.906	3.748	77.53	0.7753	1.1053	0.3441

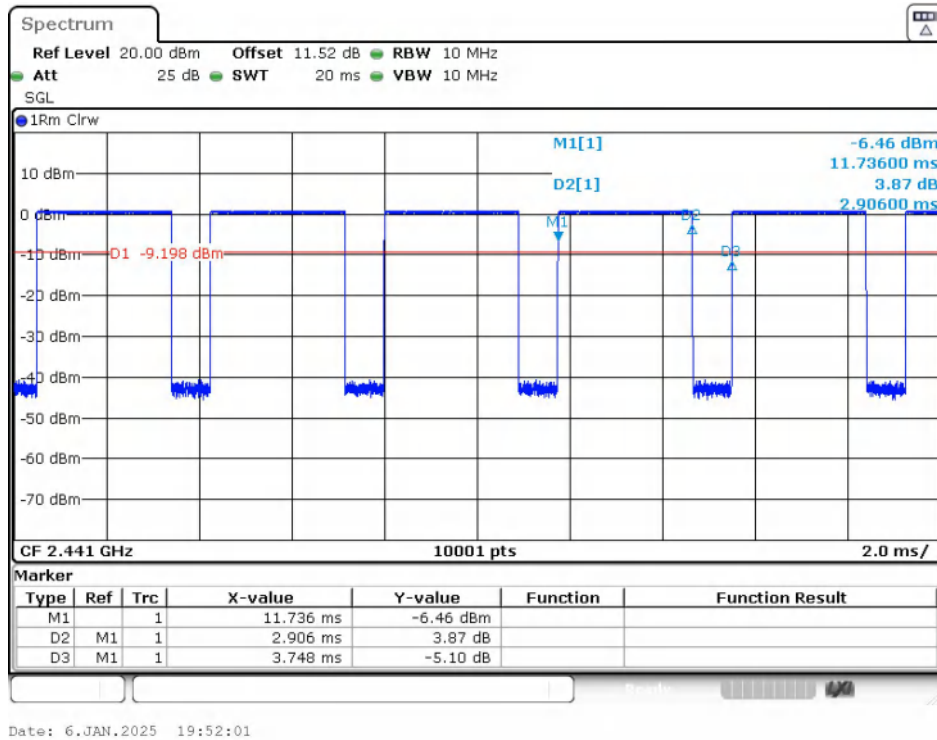
		78	2.906	3.748	77.53	0.7753	1.1053	0.3441
$\pi/4$ DQPSK	2-DH5	0	2.912	3.748	77.69	0.7769	1.0963	0.3434
		39	2.912	3.748	77.69	0.7769	1.0963	0.3434
		78	2.912	3.748	77.69	0.7769	1.0963	0.3434
8DPSK	3-DH5	0	2.916	3.748	77.80	0.7780	1.0902	0.3429
		39	2.914	3.748	77.75	0.7775	1.093	0.3432
		78	2.914	3.748	77.75	0.7775	1.093	0.3432

Test Graphs

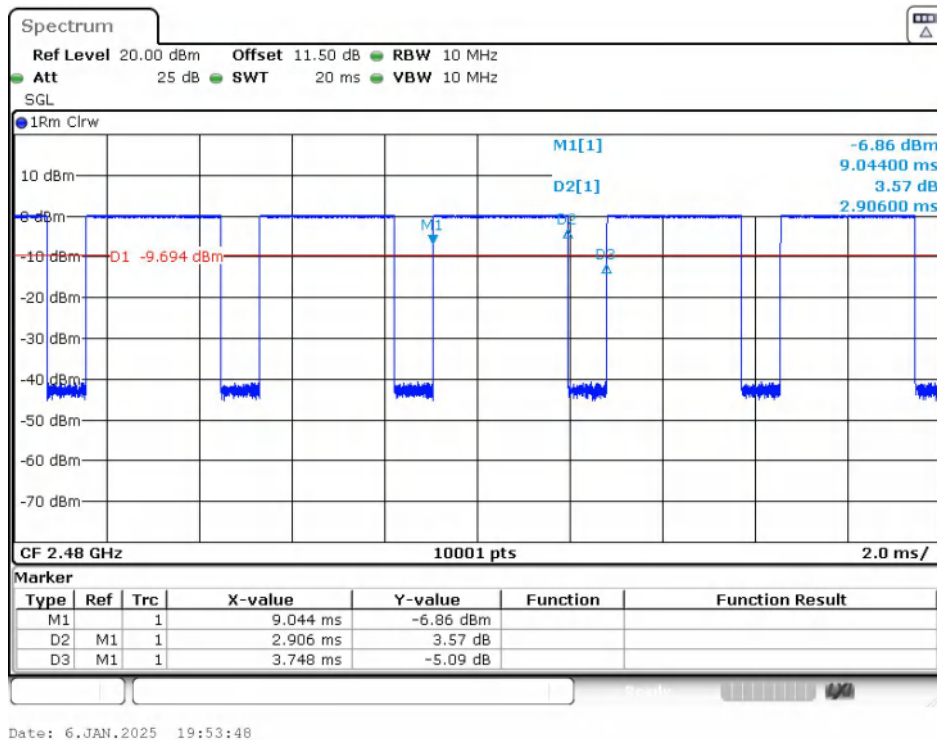


Date: 6, JAN. 2025 19:32:10

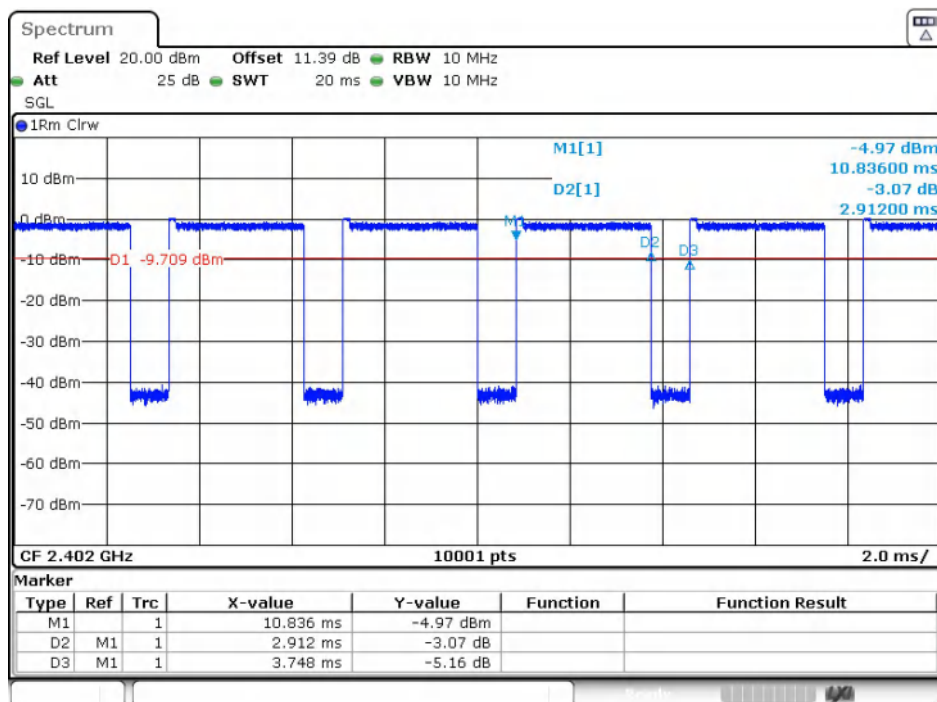
GFSK(DH5)_Channel 0



GFSK(DH5)_Channel 39

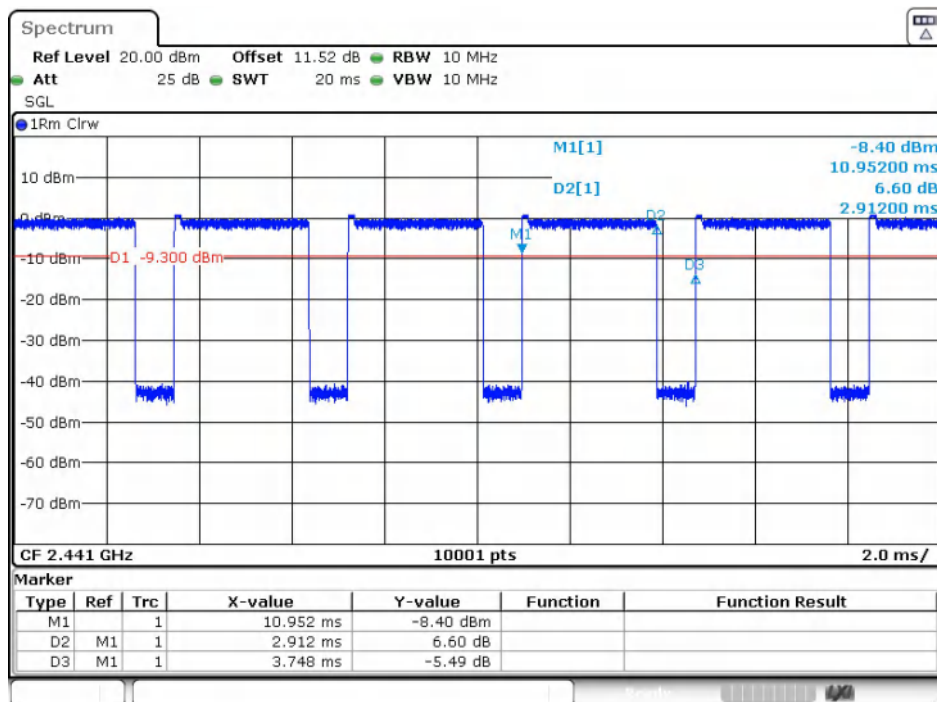


GFSK(DH5)_Channel 78



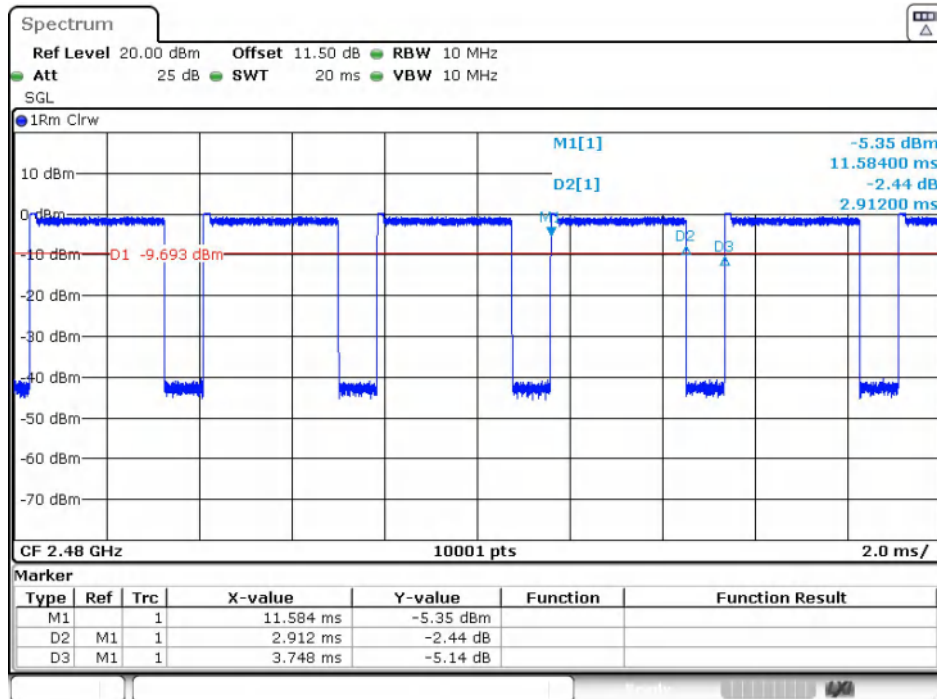
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$\pi/4$ DQPSK(2-DH5)_Channel 0



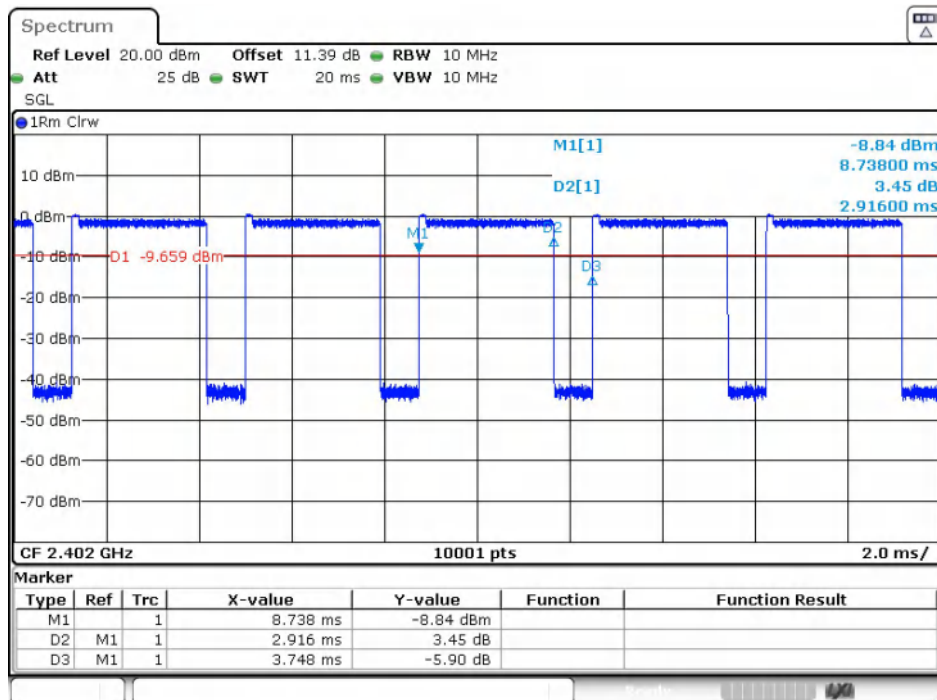
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$\pi/4$ DQPSK(2-DH5)_Channel 39



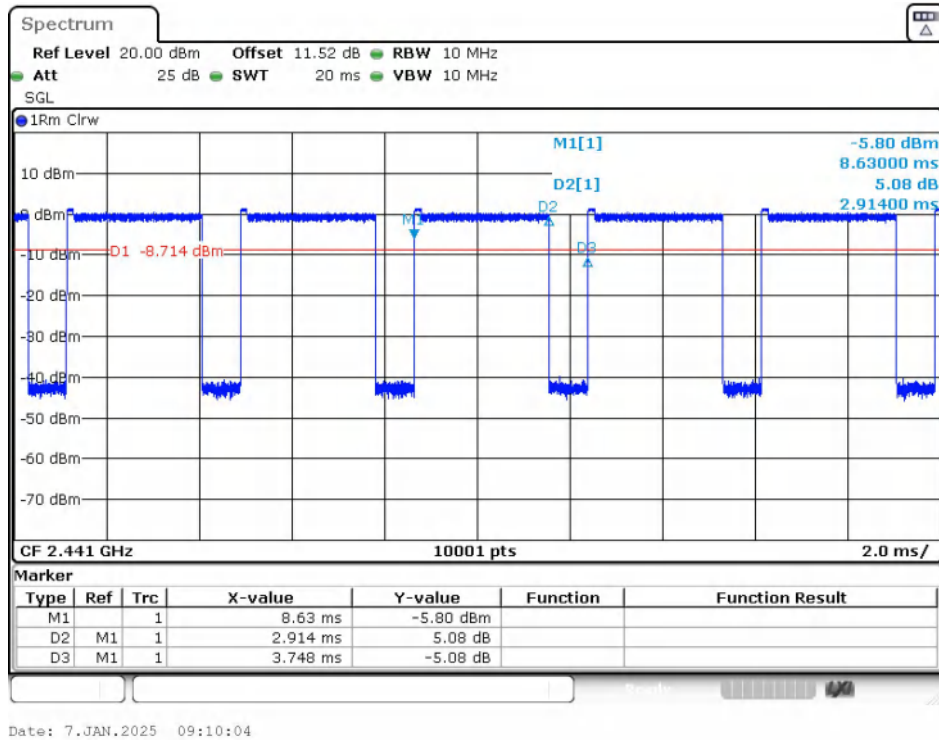
Date: 6, JAN. 2025 20:01:20

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

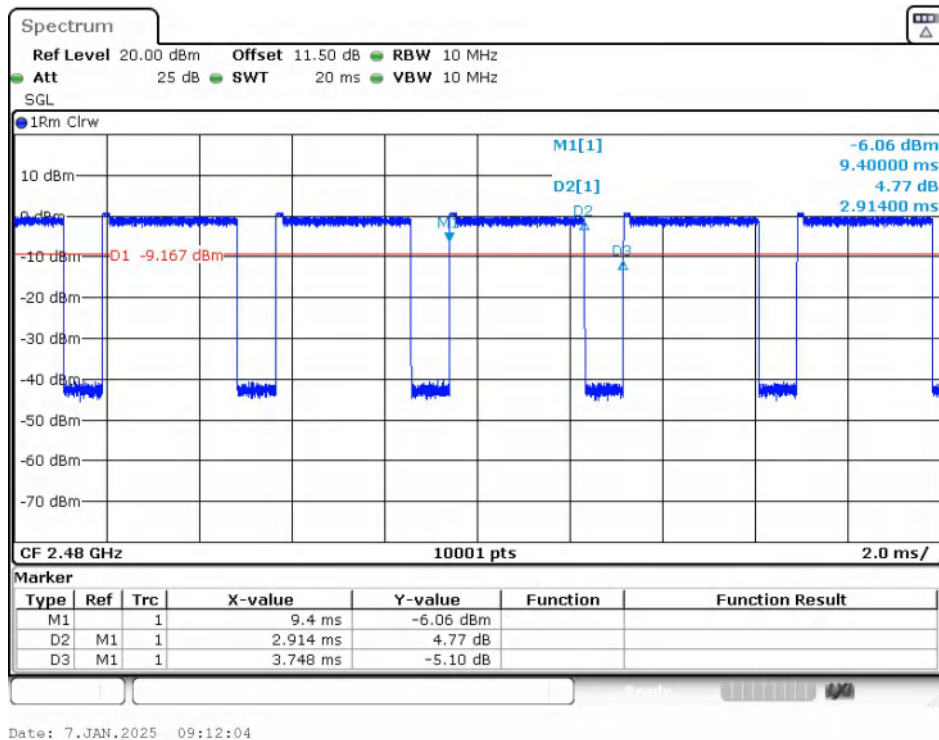


Date: 6, JAN. 2025 19:35:58

8DPSK(3-DH5)_Channel 0



8DPSK(3-DH5)_Channel 39



8DPSK(3-DH5)_Channel 78

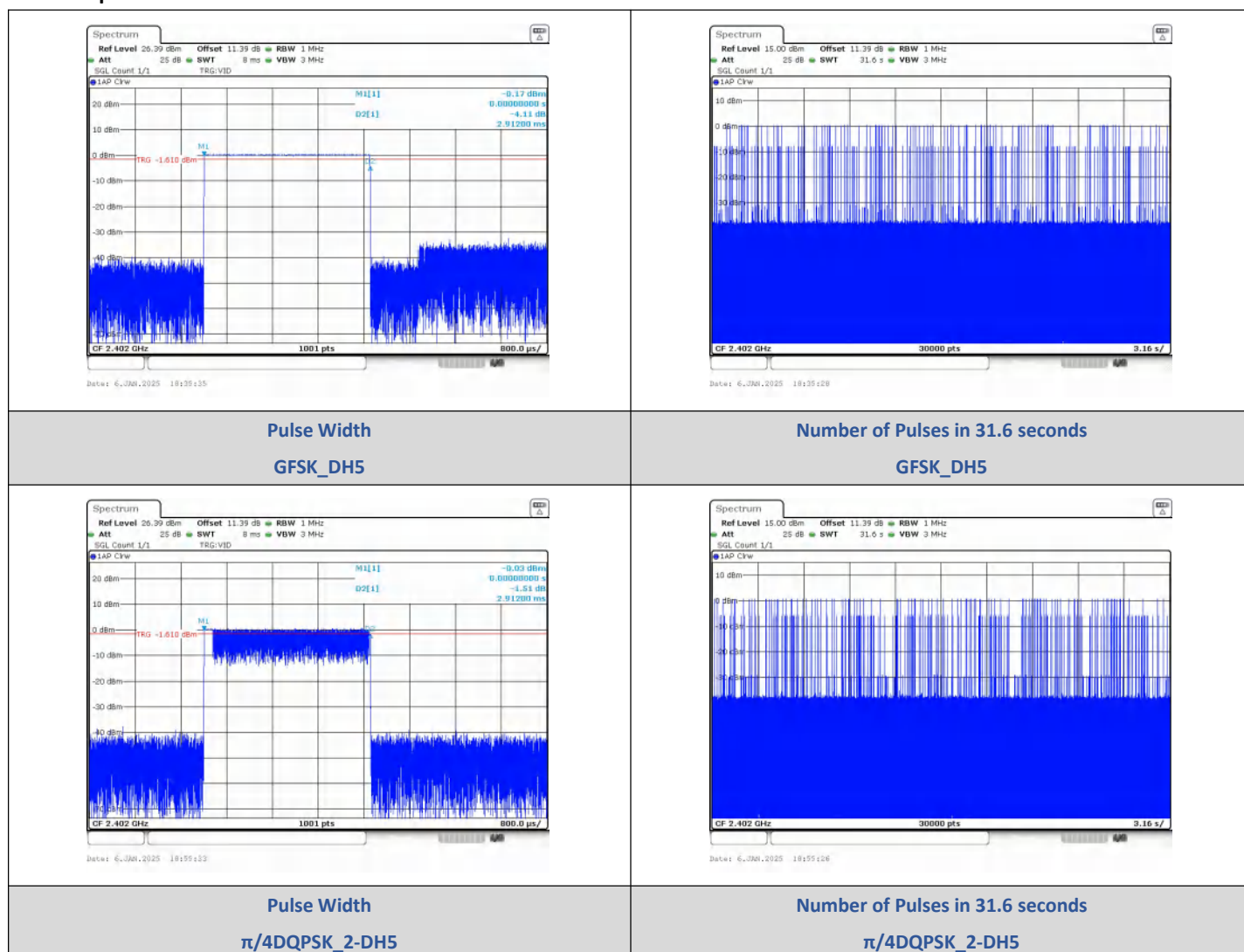
2) Dwell Time

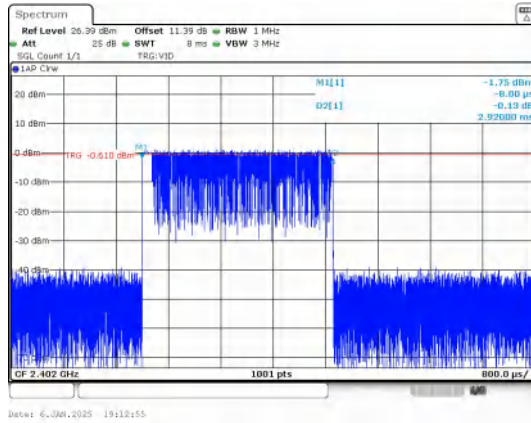
Test Result

Left:

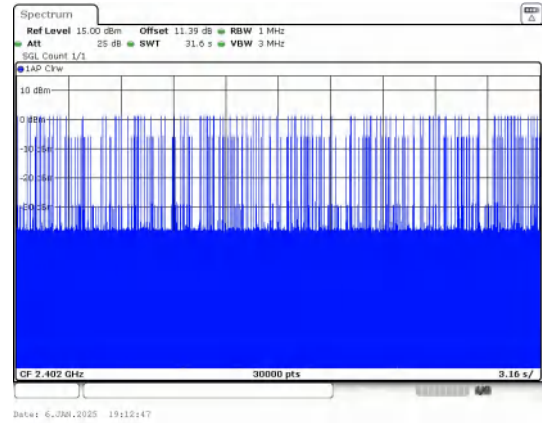
Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.912	96	279.55	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.912	105	305.76		PASS
8DPSK	3-DH5		2.920	108	315.36		PASS

Test Graphs





Pulse Width
8DPSK_3-DH5

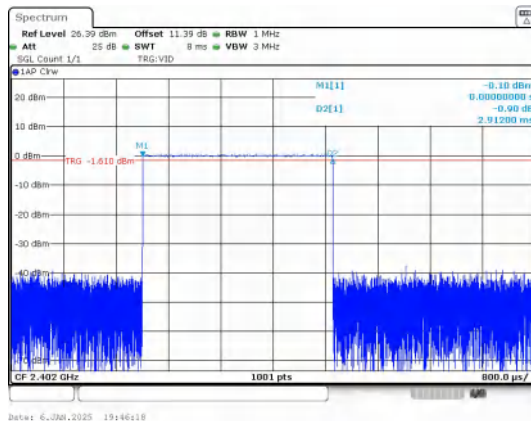


Number of Pulses in 31.6 seconds
8DPSK_3-DH5

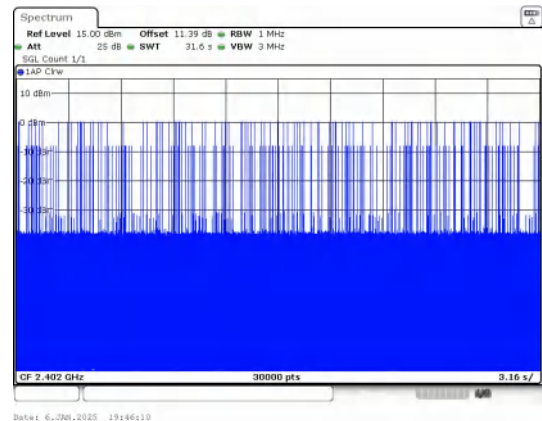
Right:

Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.912	101	294.11	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.912	109	317.41		PASS
8DPSK	3-DH5		2.920	101	294.92		PASS

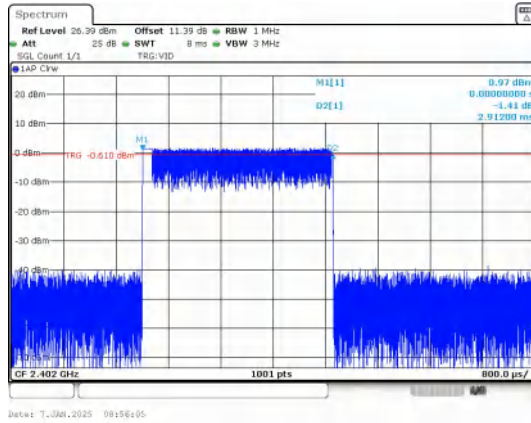
Test Graphs



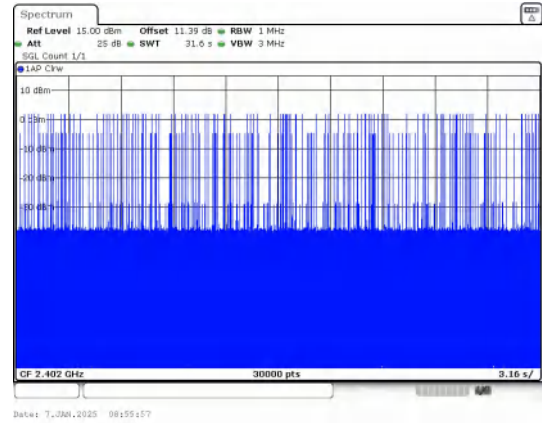
Pulse Width
GFSK_DH5



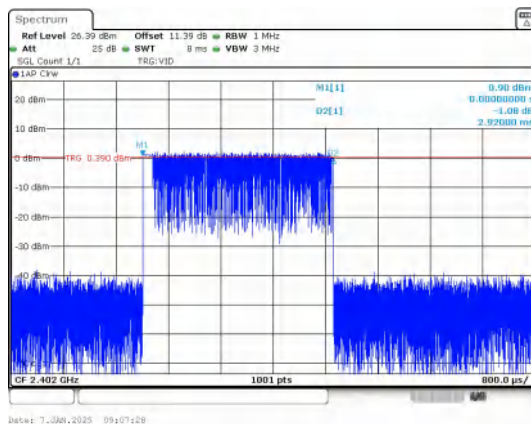
Number of Pulses in 31.6 seconds
GFSK_DH5



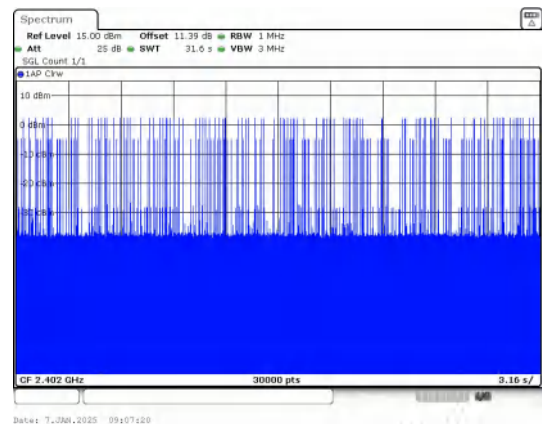
Pulse Width
 $\pi/4$ DQPSK_2-DH5



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

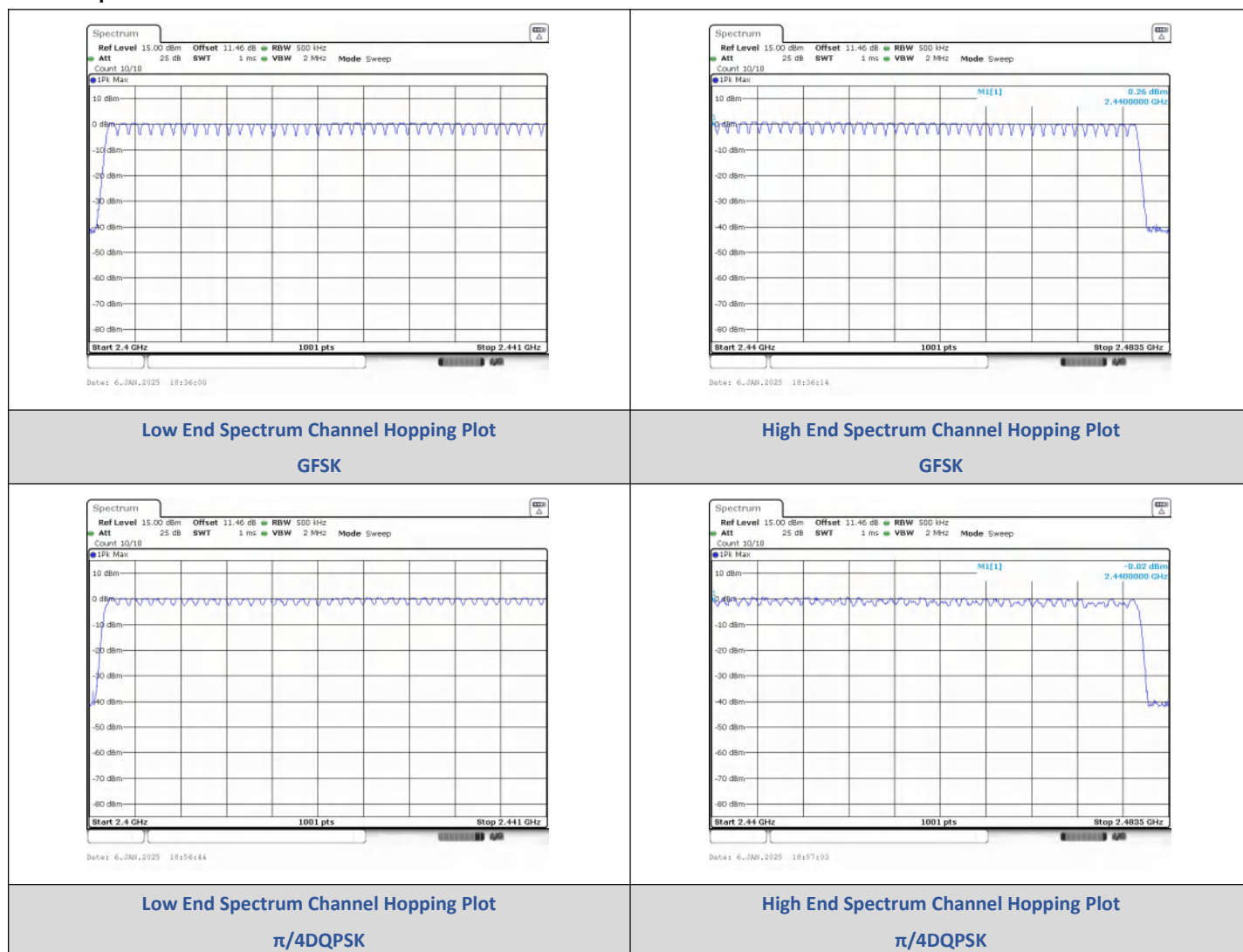
3) Number Of Hopping Channel

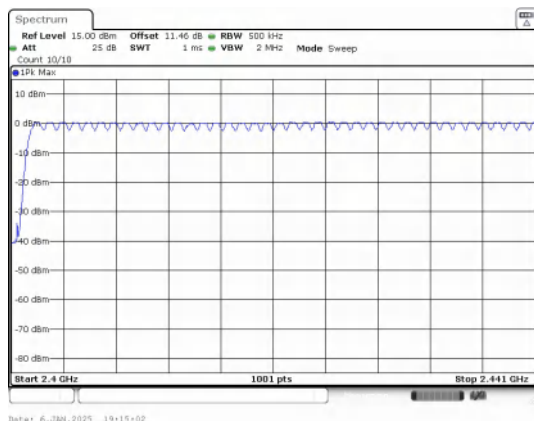
Test Result

Left:

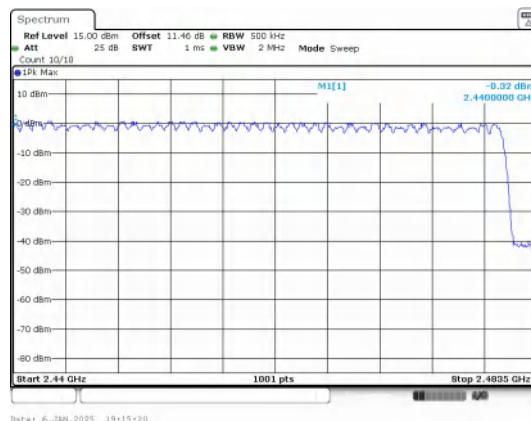
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
$\pi/4$ DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

Test Graphs





Low End Spectrum Channel Hopping Plot
8DPSK

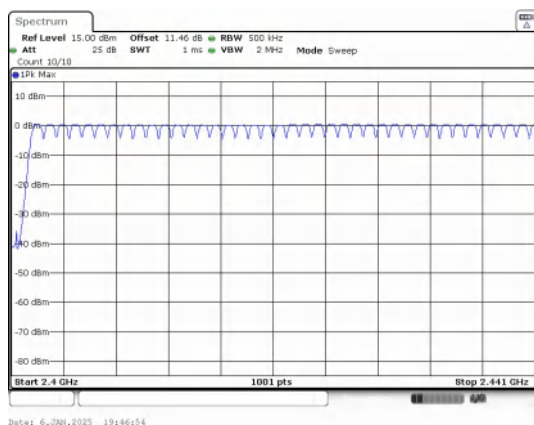


High End Spectrum Channel Hopping Plot
8DPSK

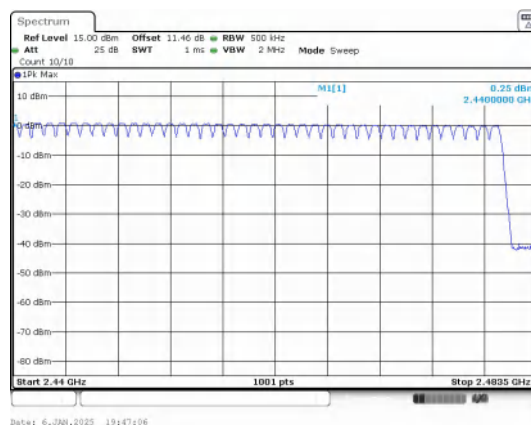
Right:

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

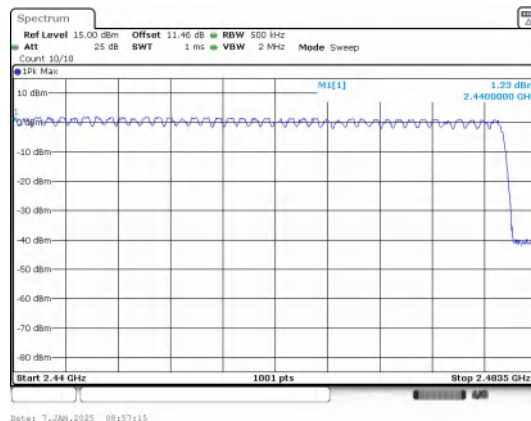
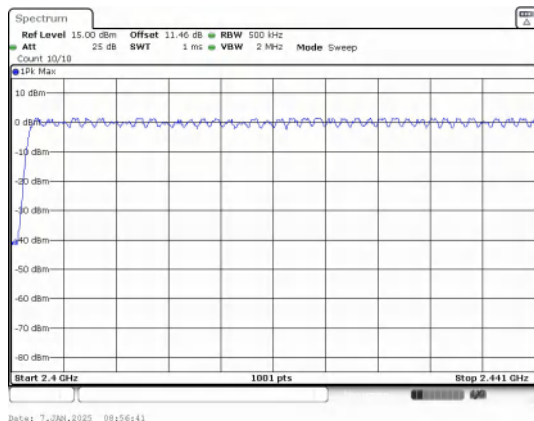
Test Graphs



Low End Spectrum Channel Hopping Plot
GFSK

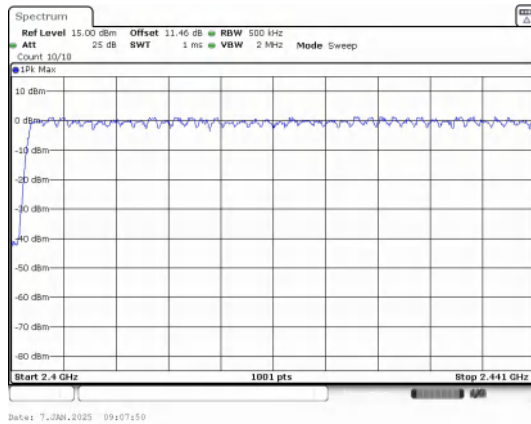


High End Spectrum Channel Hopping Plot
GFSK



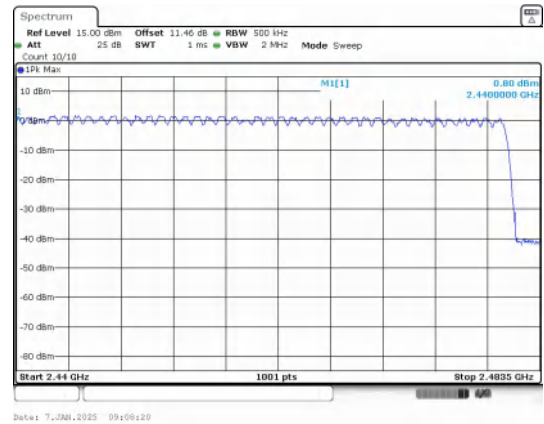
Low End Spectrum Channel Hopping Plot

$\pi/4$ DQPSK



High End Spectrum Channel Hopping Plot

$\pi/4$ DQPSK



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	0.50	1.12	≤30	PASS
		39	0.60	1.15		PASS
		78	0.18	1.04		PASS
$\pi/4$ DQPSK	2-DH5	0	1.25	1.33	≤20.97	PASS
		39	1.26	1.34		PASS
		78	0.83	1.21		PASS
8DPSK	3-DH5	0	1.70	1.48		PASS
		39	1.82	1.52		PASS
		78	1.31	1.35		PASS

Test Graphs



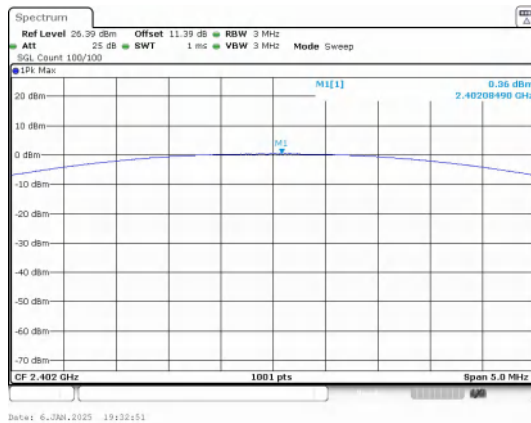


Right:

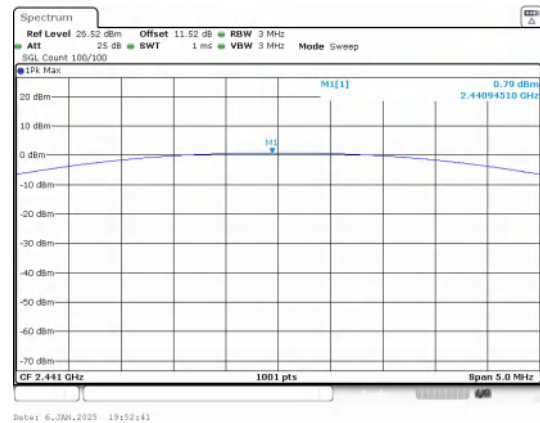
Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	0.36	1.09	≤30	PASS

		39	0.79	1.20		PASS
		78	0.33	1.08		PASS
		0	1.16	1.31		PASS
$\pi/4$ DQPSK	2-DH5	39	1.54	1.43	≤ 20.97	PASS
		78	1.06	1.28		PASS
		0	1.72	1.49		PASS
8DPSK	3-DH5	39	2.62	1.83		PASS
		78	2.14	1.64		PASS
						PASS

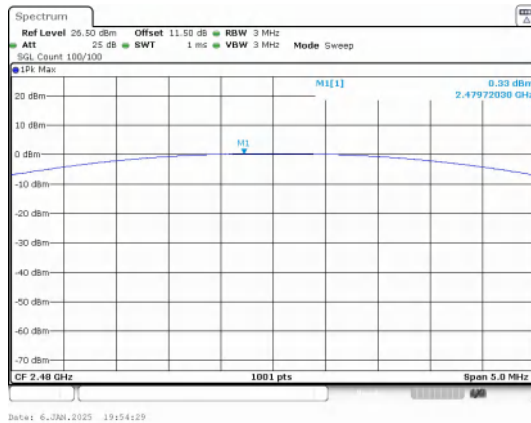
Test Graphs



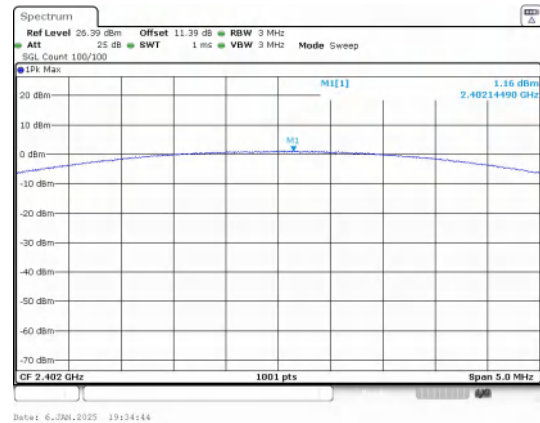
Peak Output Power
GFSK_Channel 0



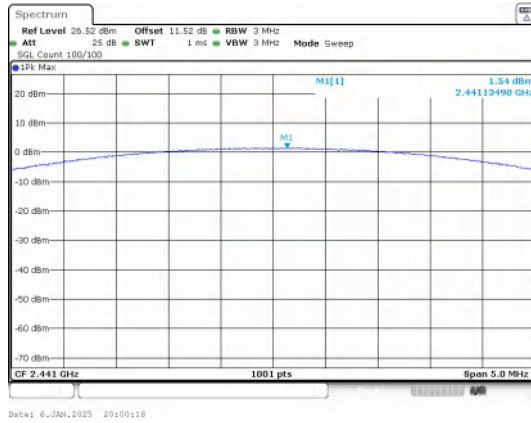
Peak Output Power
GFSK_Channel 39



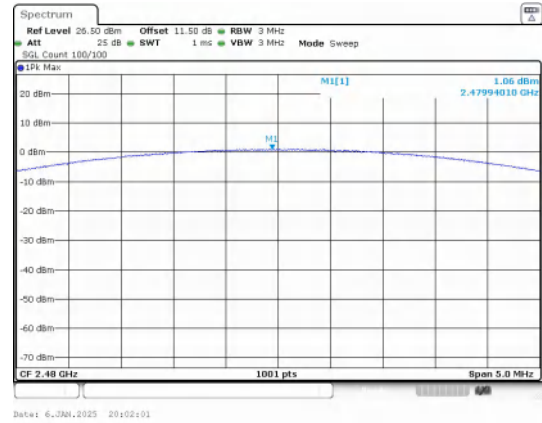
Peak Output Power
GFSK_Channel 78



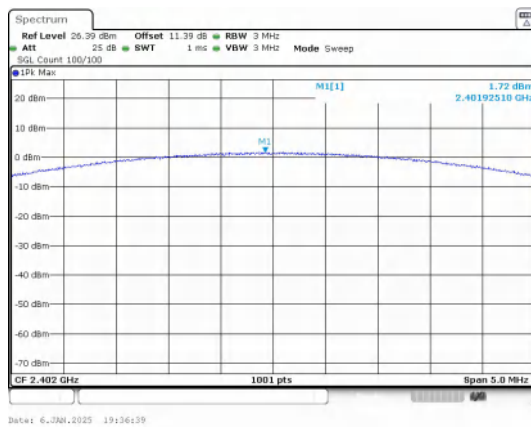
Peak Output Power
 $\pi/4$ DQPSK_Channel 0



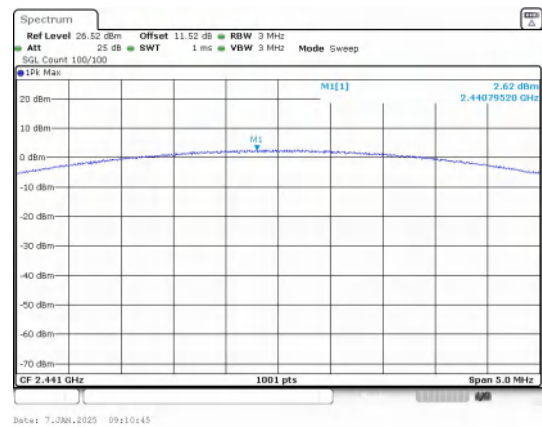
Peak Output Power
 $\pi/4$ DQPSK_Channel 39



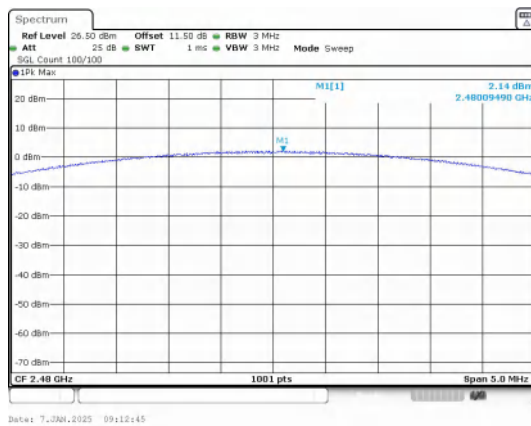
Peak Output Power
 $\pi/4$ DQPSK_Channel 78



Peak Output Power
8DPSK_Channel 0



Peak Output Power
8DPSK_Channel 39



Peak Output Power
8DPSK_Channel 78

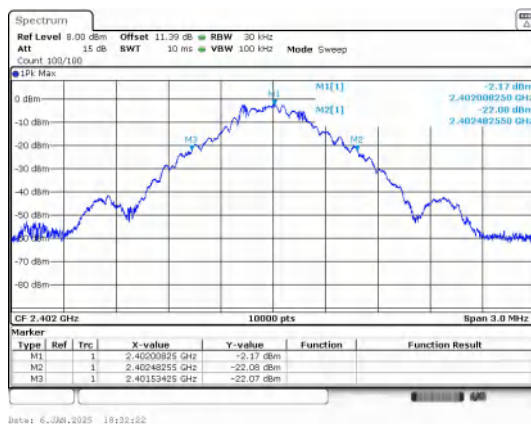
5) 20dB Bandwidth

Test Result

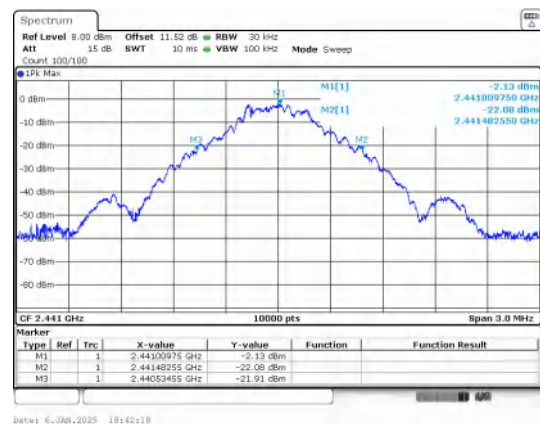
Left:

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	0.9500
	39	2441 MHz	0.9500
	78	2480 MHz	0.9500
$\pi/4$ DQPSK	0	2402 MHz	1.270
	39	2441 MHz	1.270
	78	2480 MHz	1.280
8DPSK	0	2402 MHz	1.270
	39	2441 MHz	1.280
	78	2480 MHz	1.270

Test Graphs



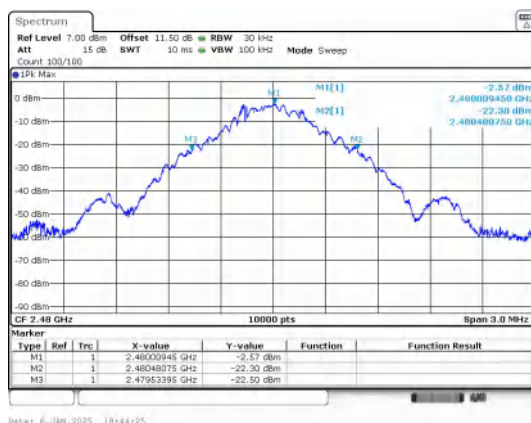
Date: 6-Jun-2025 18:32:02



Date: 6-Jun-2025 18:42:18

GFSK_DH5_Channel 0

GFSK_DH5_Channel 39



Date: 6-Jun-2025 18:44:05



Date: 6-Jun-2025 18:52:15

GFSK_DH5_Channel 78

$\pi/4$ DQPSK_2-DH5_Channel 0



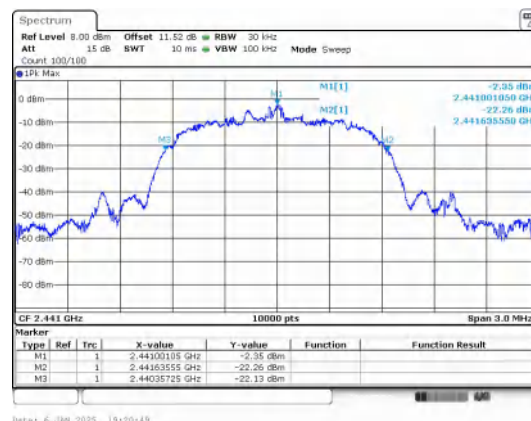
$\pi/4$ DQPSK_2-DH5_Channel 39



$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



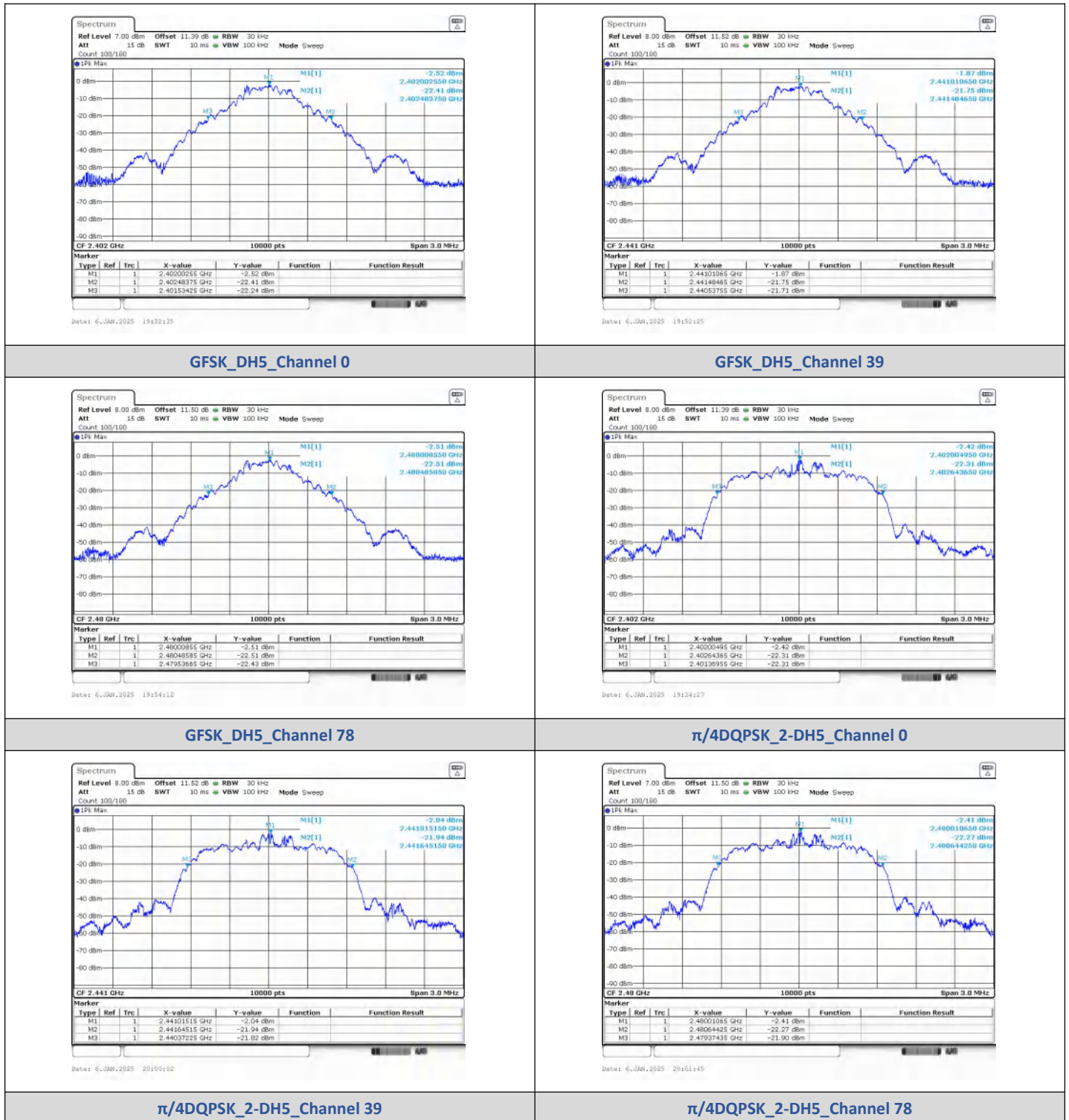
8DPSK_3-DH5_Channel 78

Right:

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	0.9500
	39	2441 MHz	0.9400
	78	2480 MHz	0.9500
$\pi/4$ DQPSK	0	2402 MHz	1.270
	39	2441 MHz	1.280
	78	2480 MHz	1.270

8DPSK	0	2402 MHz	1.270
	39	2441 MHz	1.280
	78	2480 MHz	1.280

Test Graphs





8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



8DPSK_3-DH5_Channel 78

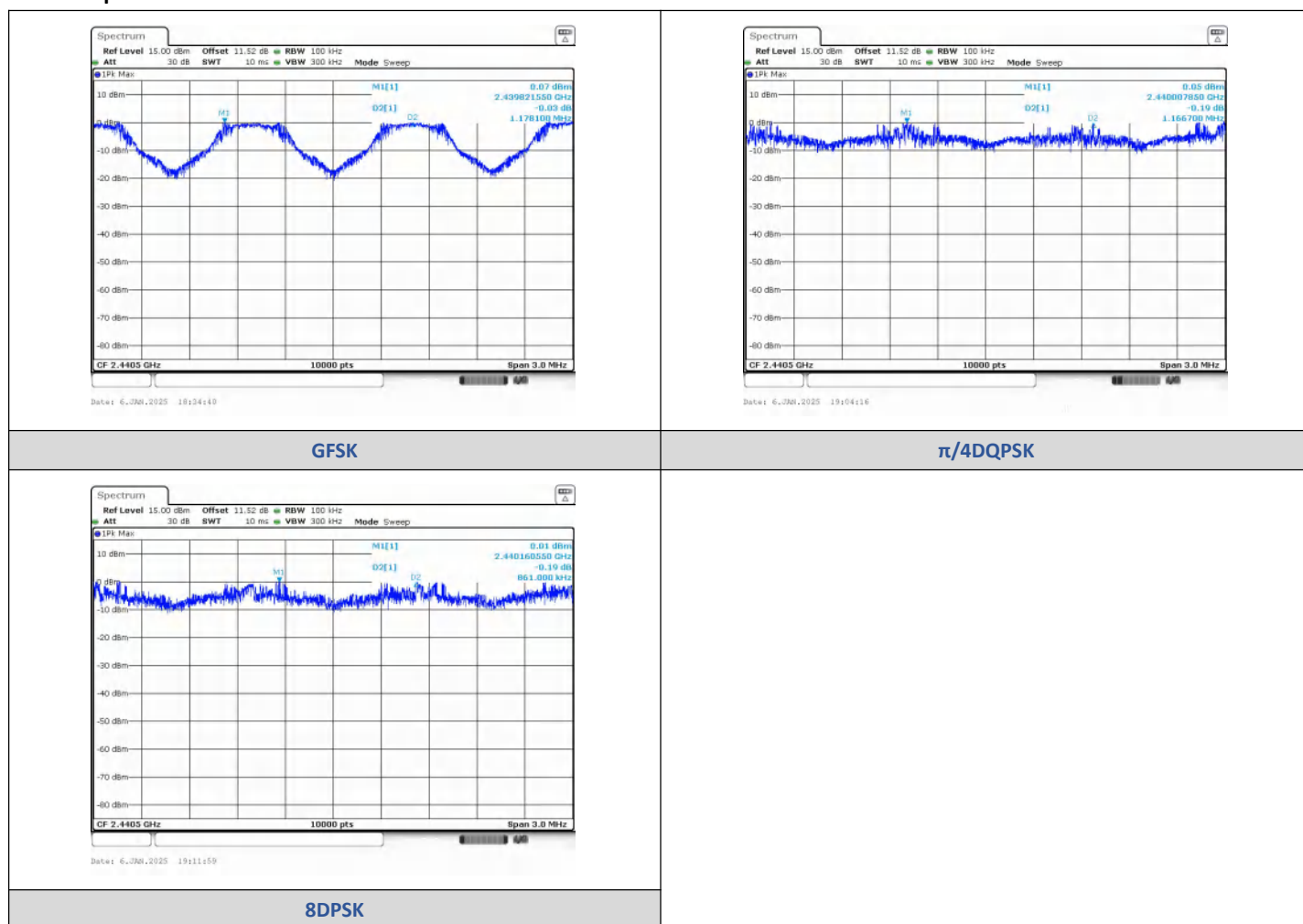
6) Carrier Frequencies Separation

Test Result

Left:

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2439.8216	2440.9997	1.1781	0.95	PASS
$\pi/4$ DQPSK	2-DH5	2440.0078	2441.1746	1.1667	0.847	PASS
8DPSK	3-DH5	2440.1606	2441.0215	0.8610	0.847	PASS

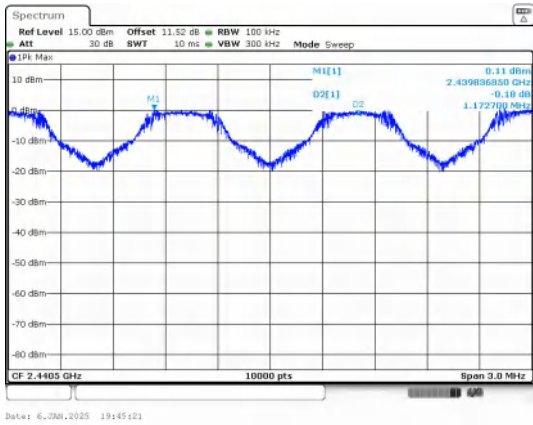
Test Graphs



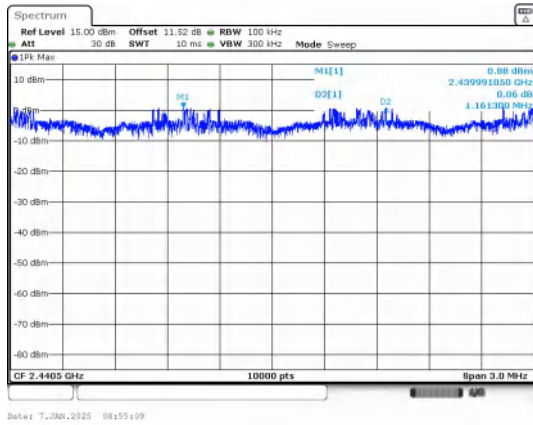
Right:

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2439.8369	2441.0096	1.1727	0.95	PASS
$\pi/4$ DQPSK	2-DH5	2439.9911	2441.1523	1.1613	0.853	PASS
8DPSK	3-DH5	2439.9956	2441.0017	1.0062	0.847	PASS

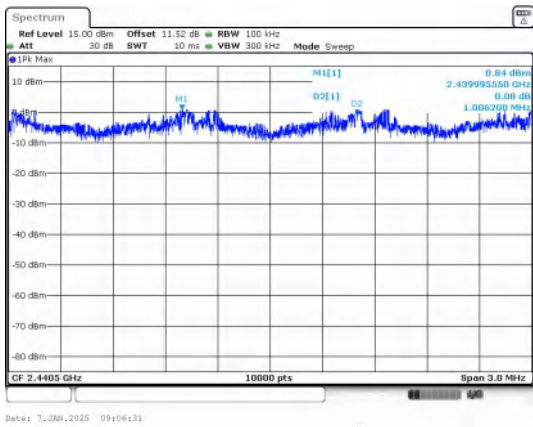
Test Graphs



GFSK



$\pi/4$ DQPSK



8DPSK

7) Conducted Out Of Band Emission

Test Result

Left:

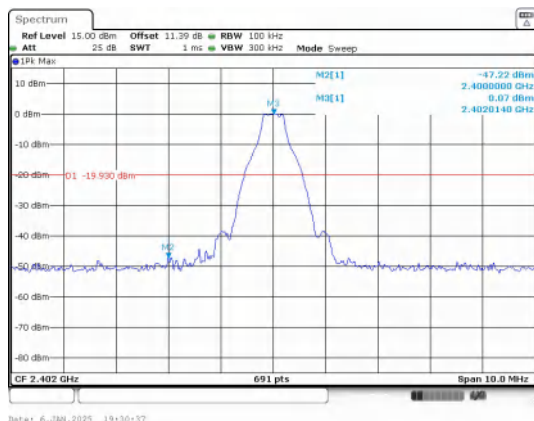
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-47.220	-19.93	-27.290	PASS
			9608.08	-52.483	-19.93	-32.553	PASS
		39	6324.52	-53.692	-19.72	-33.972	PASS
		78	2483.50	-50.170	-20.13	-30.040	PASS
			6977.07	-52.739	-20.13	-32.609	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-49.540	-20.04	-29.500	PASS
			6895.50	-53.224	-20.04	-33.184	PASS
		39	6933.79	-53.711	-20.57	-33.141	PASS
		78	2483.50	-51.010	-20.49	-30.520	PASS
			6913.81	-52.868	-20.49	-32.378	PASS
8DPSK	3-DH5	0	2400.00	-47.260	-19.96	-27.300	PASS
			9608.08	-52.411	-19.96	-32.451	PASS
		39	6624.99	-53.582	-19.82	-33.762	PASS
		78	2483.50	-51.000	-20.42	-30.580	PASS
			22064.8	-53.088	-20.42	-32.668	PASS

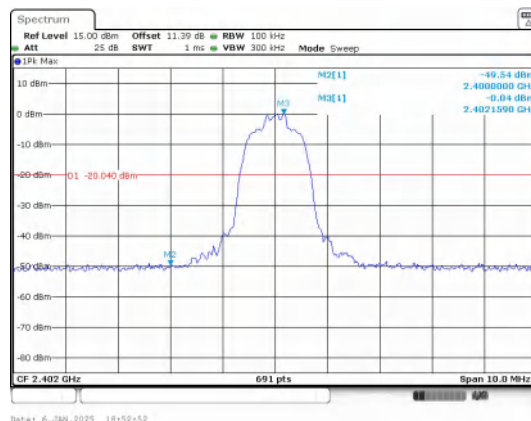
Hopping

Hopping							
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2397.09	-47.591	-19.93	-27.661	PASS
			2400.00	-49.420	-19.93	-29.490	PASS
			2483.50	-49.690	-20.21	-29.480	PASS
$\pi/4$ DQPSK	2-DH5		2397.11	-47.763	-19.86	-27.903	PASS
			2400.00	-49.580	-19.86	-29.720	PASS
			2483.50	-49.620	-20.61	-29.010	PASS
8DPSK	3-DH5		2396.28	-46.512	-20.02	-26.492	PASS
			2400.00	-49.880	-20.02	-29.860	PASS
			2483.50	-48.760	-20.23	-28.530	PASS

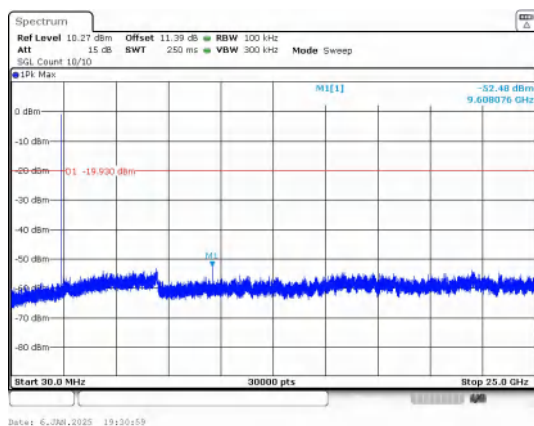
Test Graphs



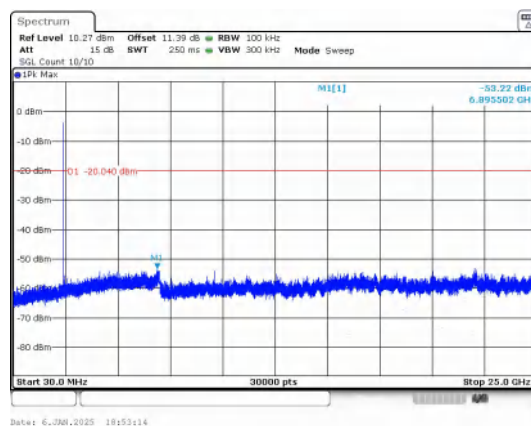
Out Of Band Emission
GFSK_DH5_Channel 0



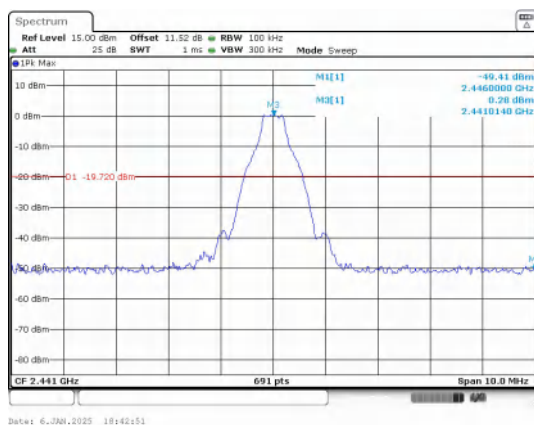
Out Of Band Emission
 $\pi/4$ QPSK_2-DH5_Channel 0



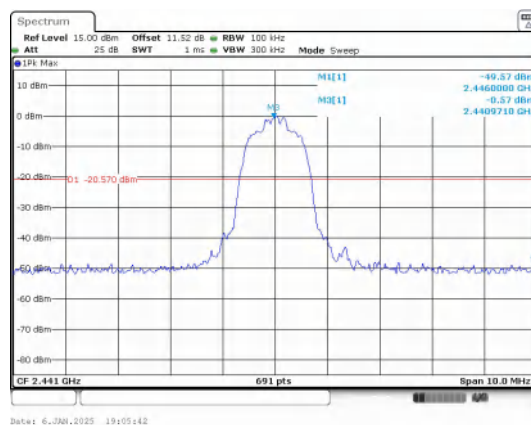
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



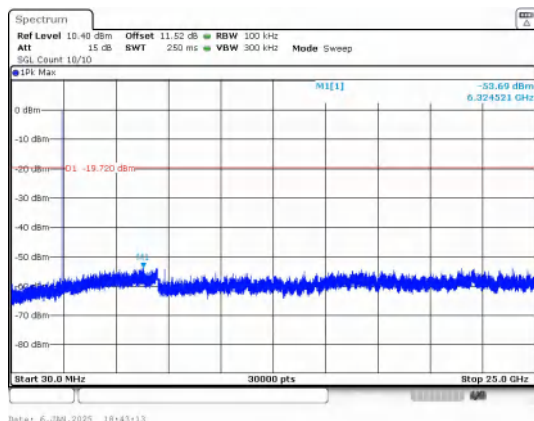
30.0 MHz - 25000.0 MHz
 $\pi/4$ QPSK_2-DH5_Channel 0



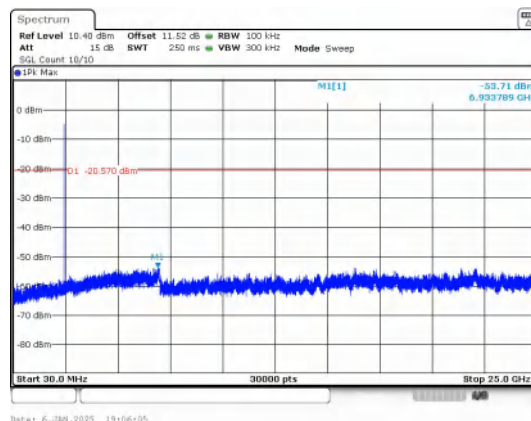
Out Of Band Emission
GFSK_DH5_Channel 39



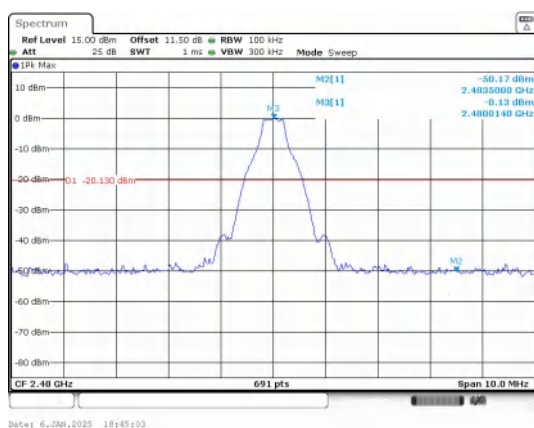
Out Of Band Emission
 $\pi/4$ QPSK_2-DH5_Channel 39



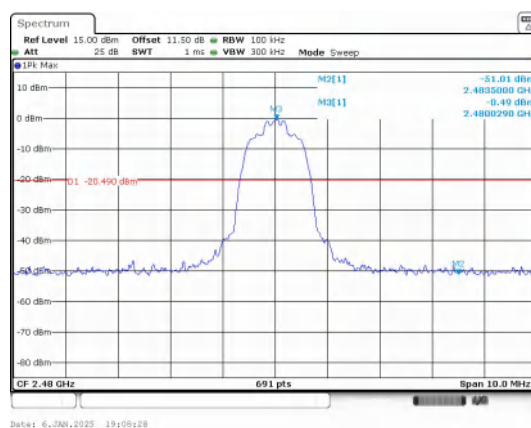
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



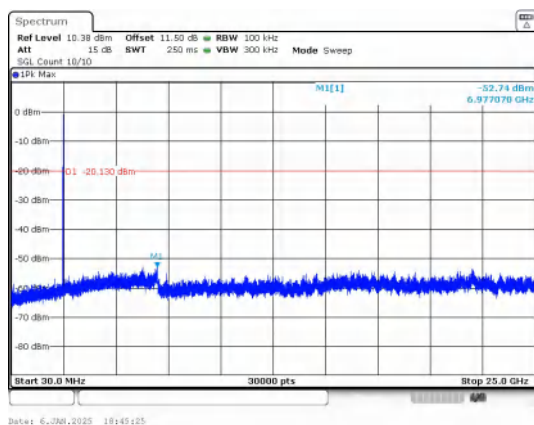
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 $\pi/4$ DQPSK_2-DH5_Channel 39



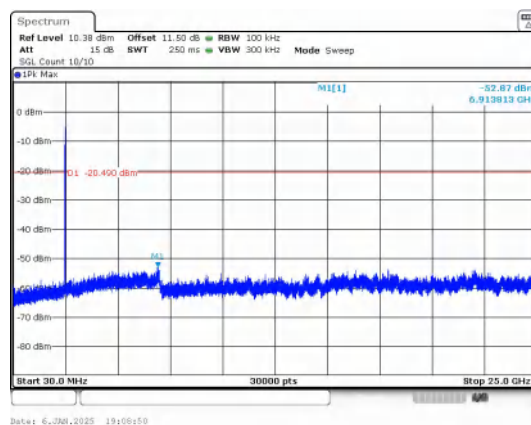
Out Of Band Emission
GFSK_DH5_Channel 78



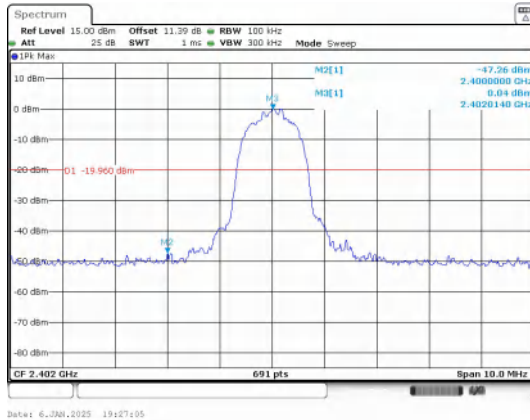
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



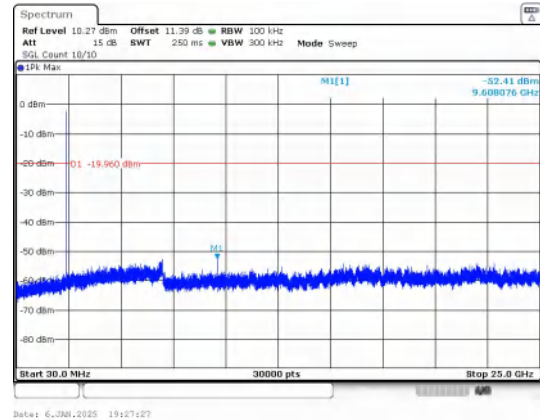
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



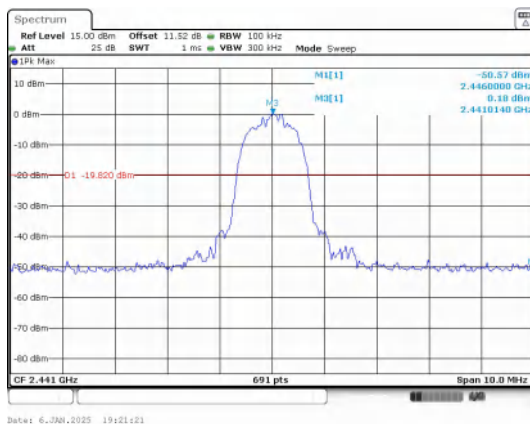
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 78



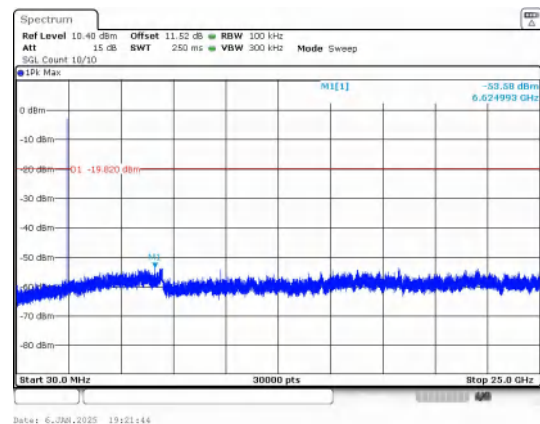
Out Of Band Emission
8DPSK_3-DH5_Channel 0



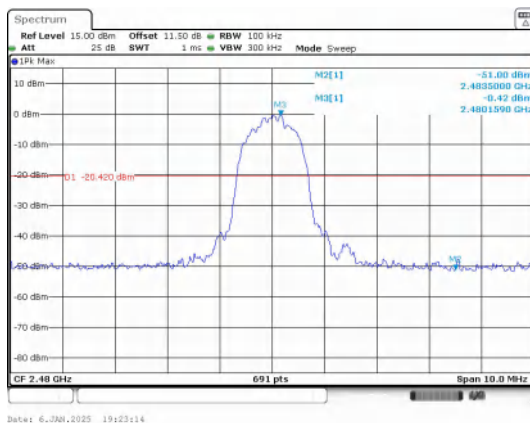
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



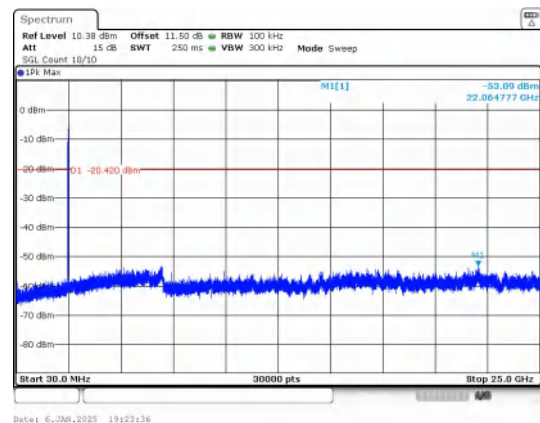
Out Of Band Emission
8DPSK_3-DH5_Channel 39



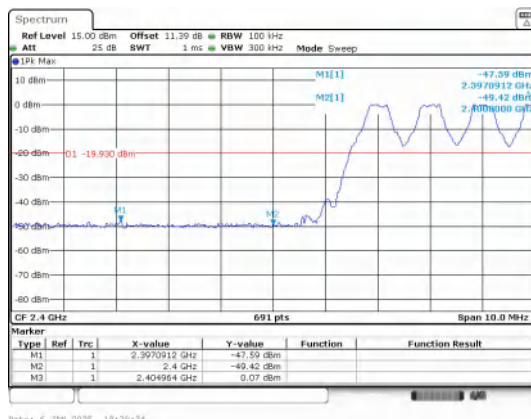
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



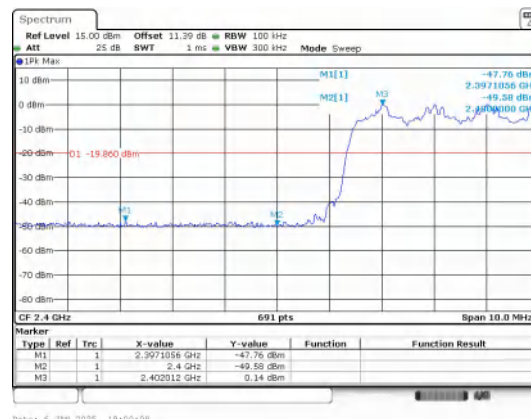
Out Of Band Emission
8DPSK_3-DH5_Channel 78



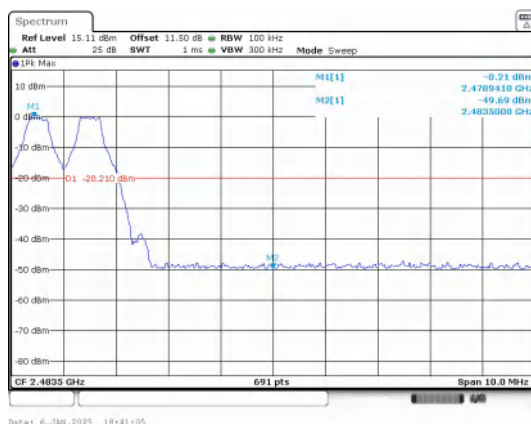
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



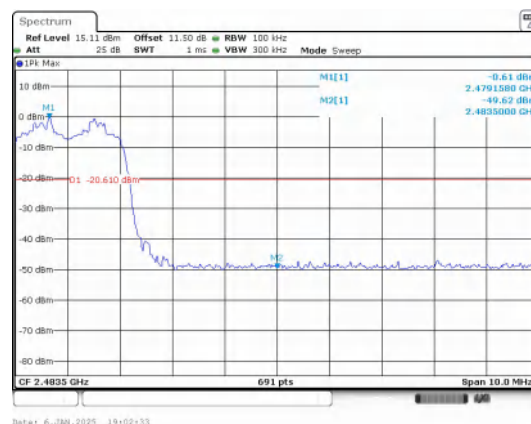
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



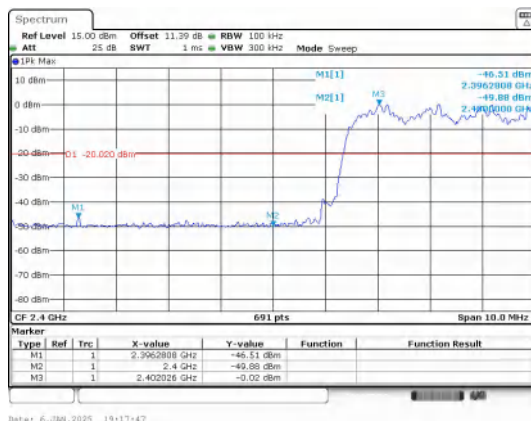
Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



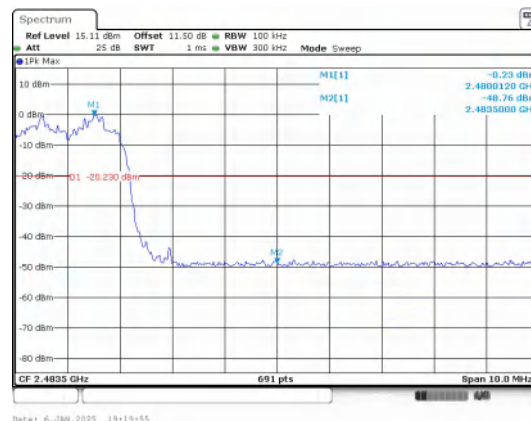
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



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

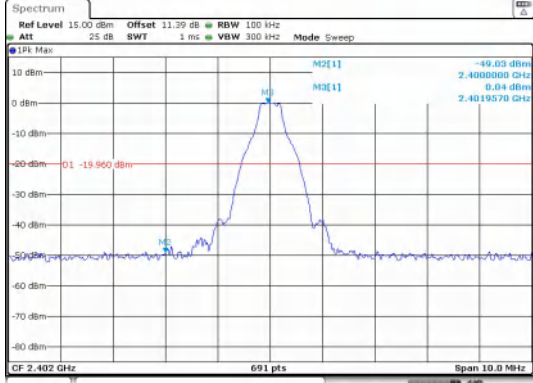
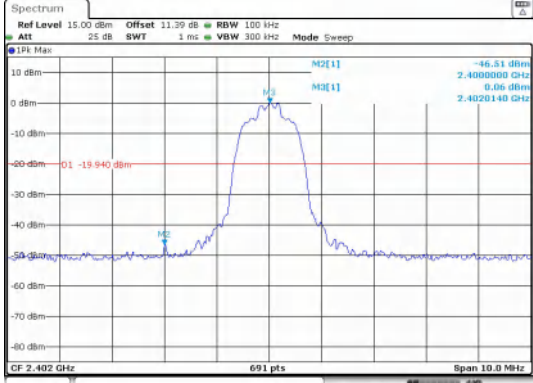
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
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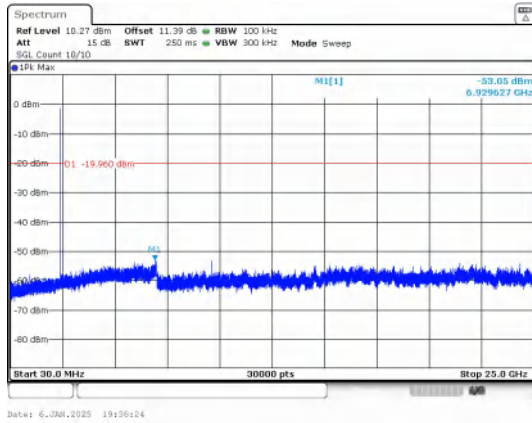
GFSK	DH5	0	2400.00	-49.030	-19.96	-29.070	PASS
			6929.63	-53.046	-19.96	-33.086	PASS
		39	6942.94	-51.810	-19.53	-32.280	PASS
		78	2483.50	-48.570	-19.95	-28.620	PASS
			6967.08	-52.409	-19.95	-32.459	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-46.510	-19.94	-26.570	PASS
			5892.54	-52.974	-19.94	-33.034	PASS
		39	4971.98	-53.024	-19.62	-33.404	PASS
		78	2483.50	-50.030	-19.93	-30.100	PASS
			22060.6	-52.594	-19.93	-32.664	PASS
8DPSK	3-DH5	0	2400.00	-48.650	-19.83	-28.820	PASS
			6947.11	-52.714	-19.83	-32.884	PASS
		39	6908.82	-52.955	-19.0	-33.955	PASS
		78	2483.50	-50.240	-19.47	-30.770	PASS
			15874.7	-52.997	-19.47	-33.527	PASS

Hopping

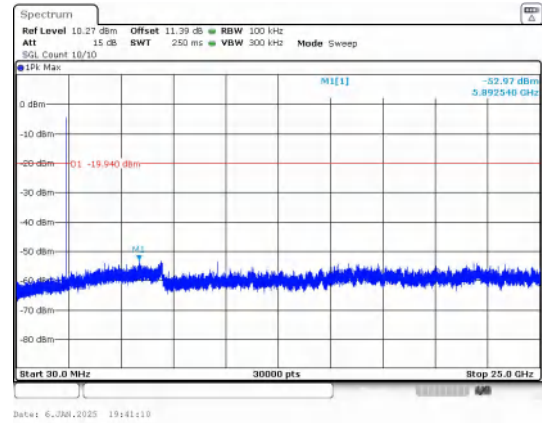
Hopping							
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2396.74	-47.924	-19.67	-28.254	PASS
			2400.00	-48.200	-19.67	-28.530	PASS
			2483.50	-49.250	-19.88	-29.370	PASS
$\pi/4$ DQPSK	2-DH5		2397.79	-47.003	-18.83	-28.173	PASS
			2400.00	-49.440	-18.83	-30.610	PASS
			2483.50	-49.060	-19.63	-29.430	PASS
8DPSK	3-DH5		2398.93	-48.839	-19.79	-29.049	PASS
			2400.00	-51.360	-19.79	-31.570	PASS
			2483.50	-49.210	-21.35	-27.860	PASS

Test Graphs

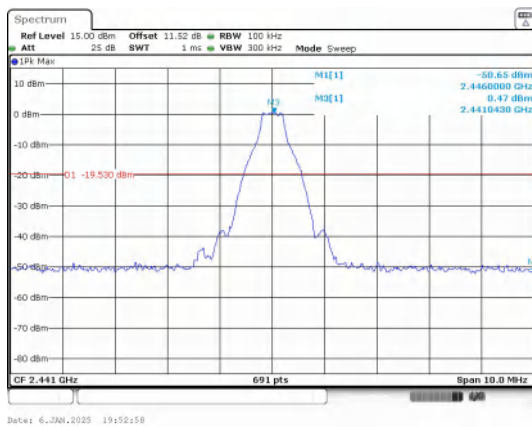
 Out Of Band Emission GFSK_DH5_Channel 0	 Out Of Band Emission $\pi/4$DQPSK_2-DH5_Channel 0
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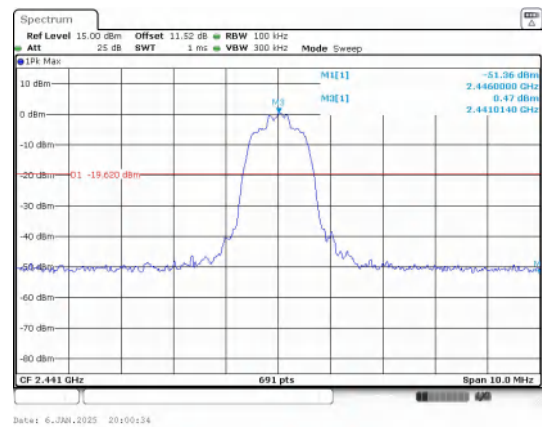
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



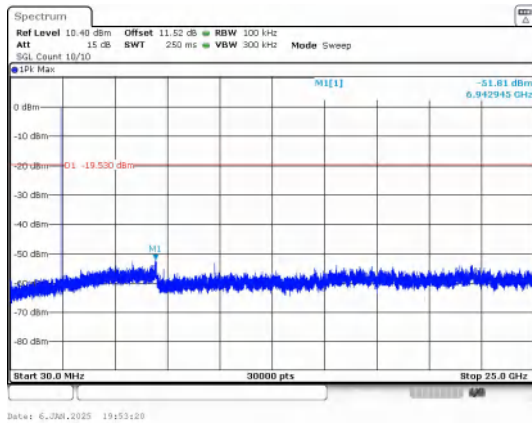
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 0



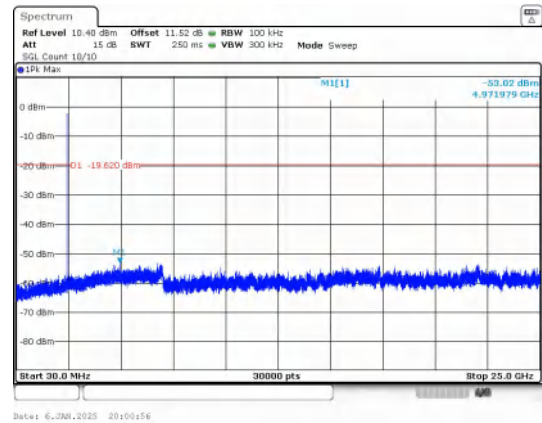
Out Of Band Emission
GFSK_DH5_Channel 39



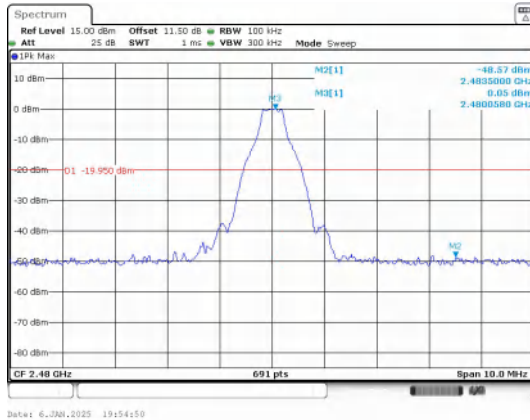
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39



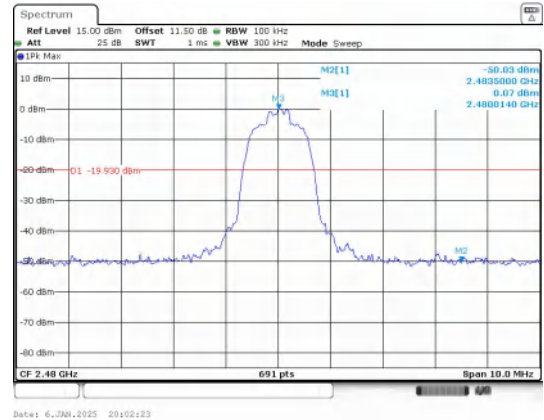
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



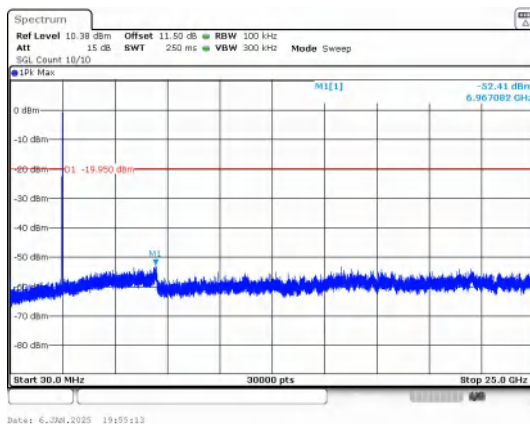
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39



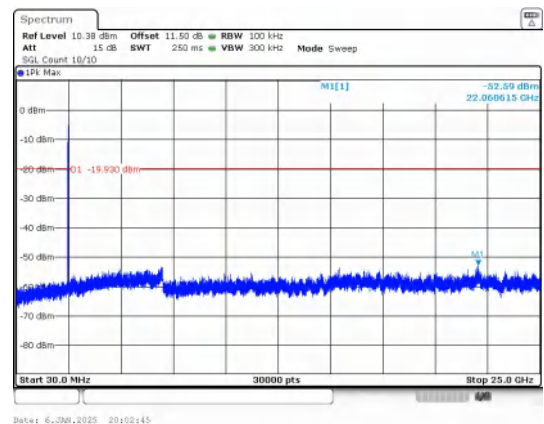
Out Of Band Emission
GFSK_DH5_Channel 78



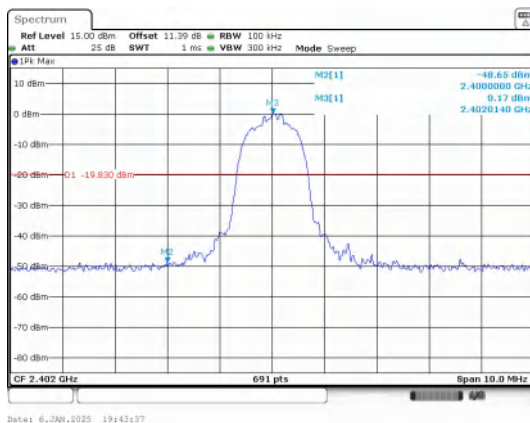
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



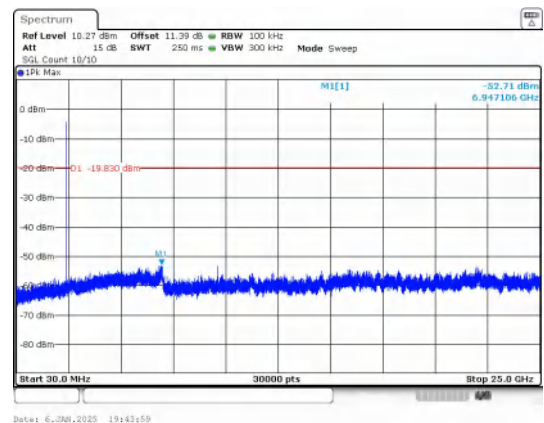
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



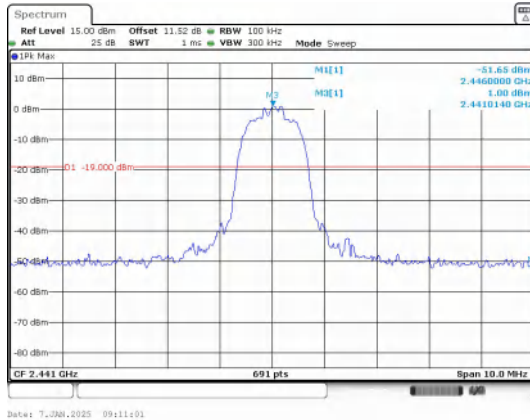
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 78



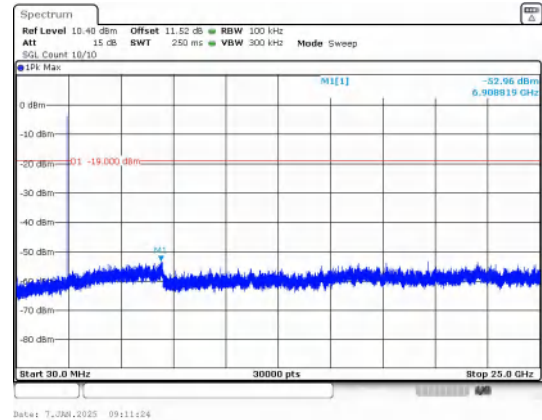
Out Of Band Emission
8DPSK_3-DH5_Channel 0



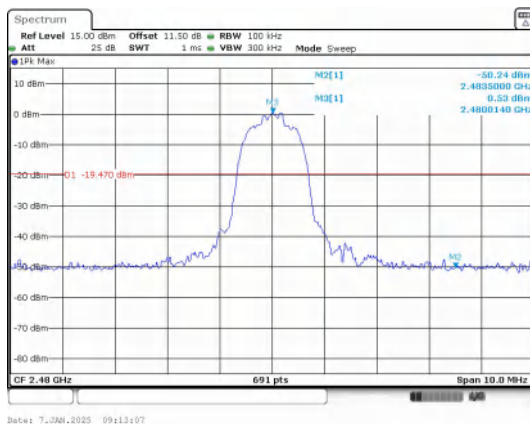
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



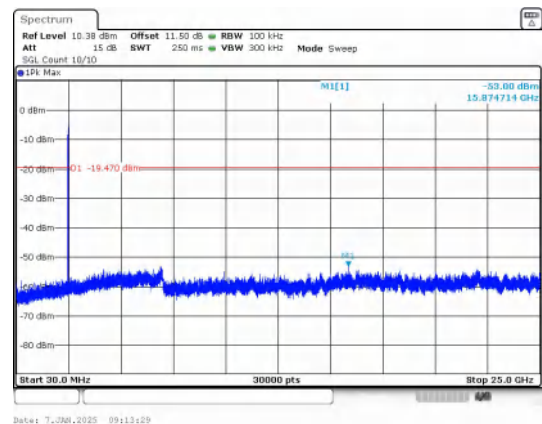
Out Of Band Emission
8DPSK_3-DH5_Channel 39



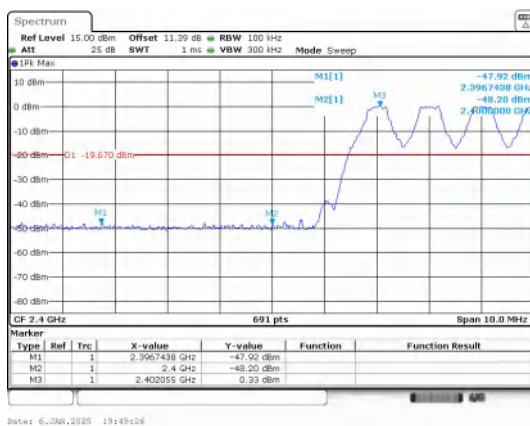
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



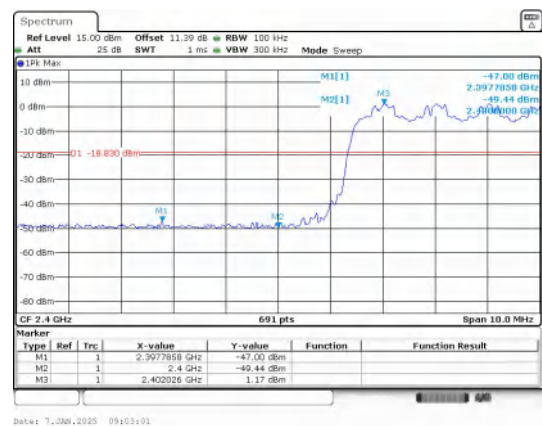
Out Of Band Emission
8DPSK_3-DH5_Channel 78



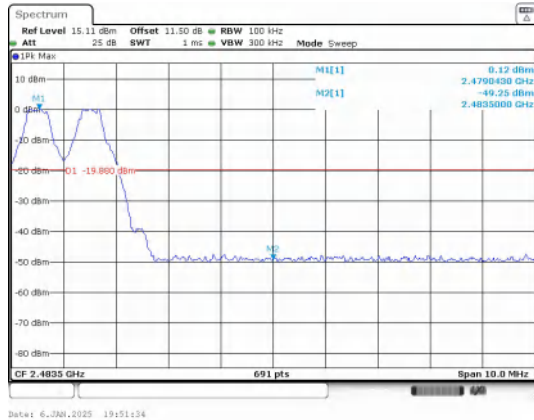
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



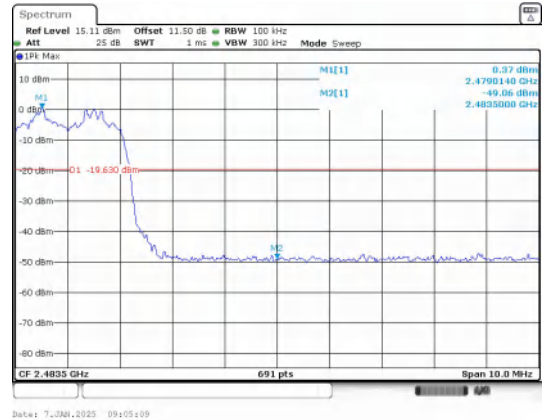
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



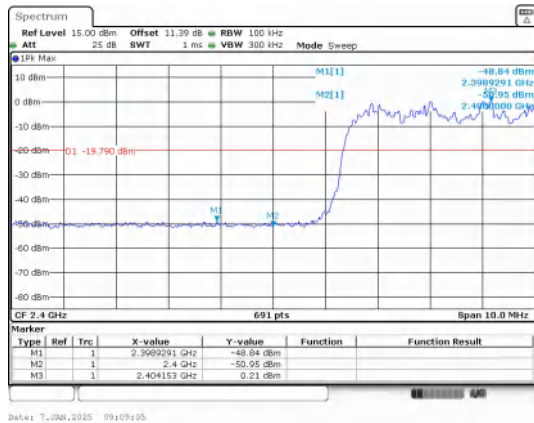
Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



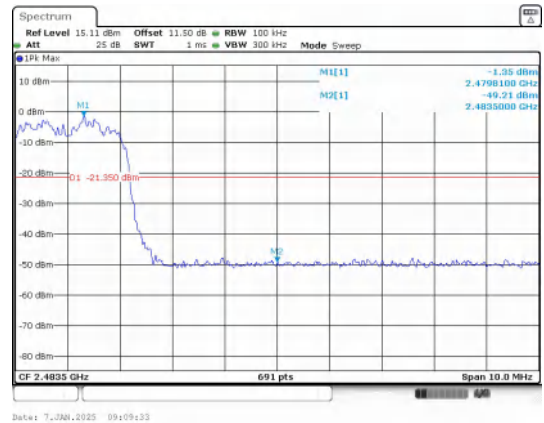
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



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-----