

Appendix Report

Report No.:	CISR250401007
Test Engineer:	Lucas Huang
Supervised by:	Rory Huang

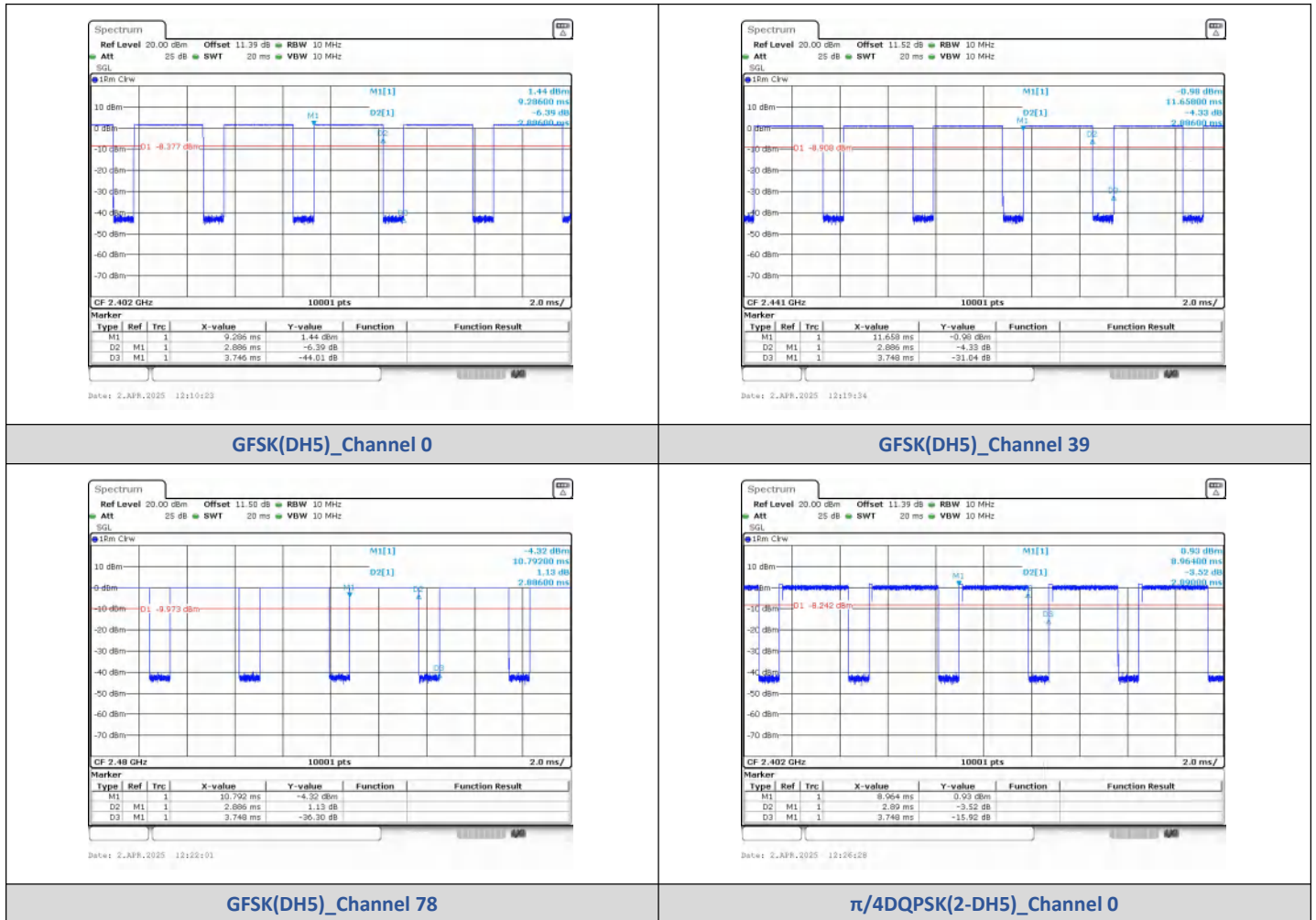
1) Duty Cycle

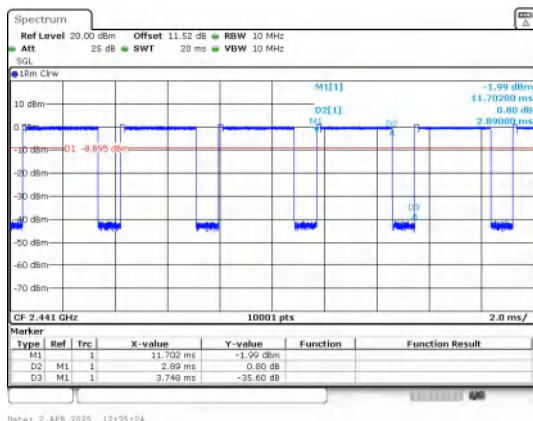
Test Result

Left:

Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.886	3.746	77.04	0.7704	1.1328	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	2.892	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

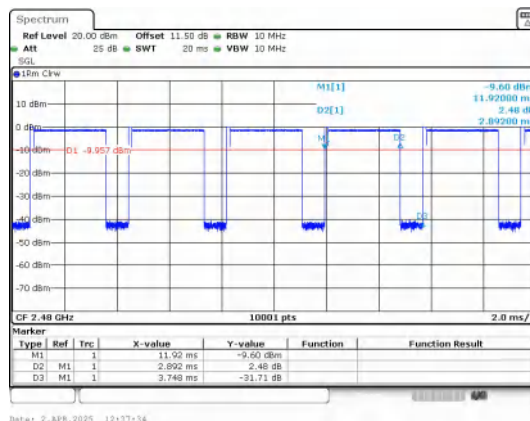
Test Graphs





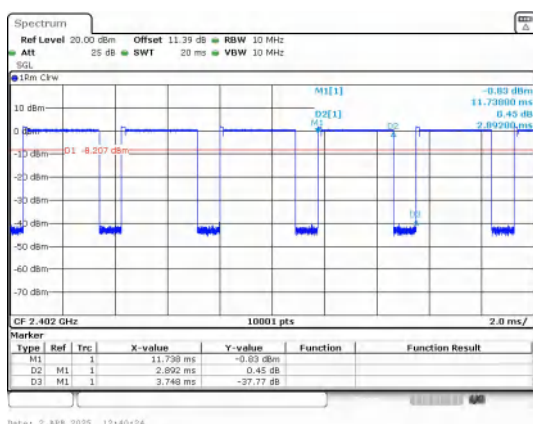
Date: 2.APR.2025 12:35:24

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



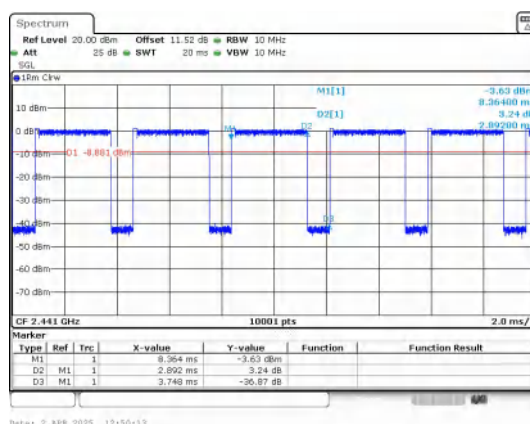
Date: 2.APR.2025 12:37:34

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



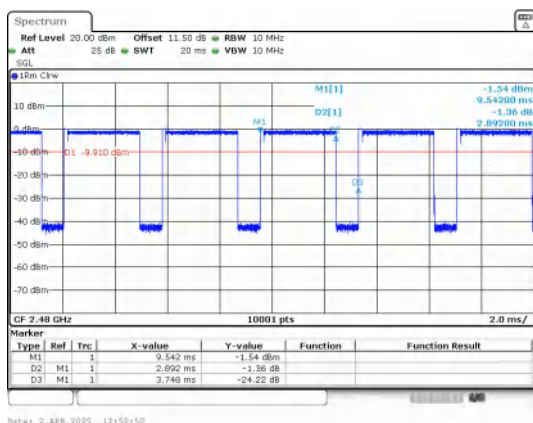
Date: 2.APR.2025 12:40:24

8DPSK(3-DH5)_Channel 0



Date: 2.APR.2025 12:50:13

8DPSK(3-DH5)_Channel 39



Date: 2.APR.2025 12:52:52

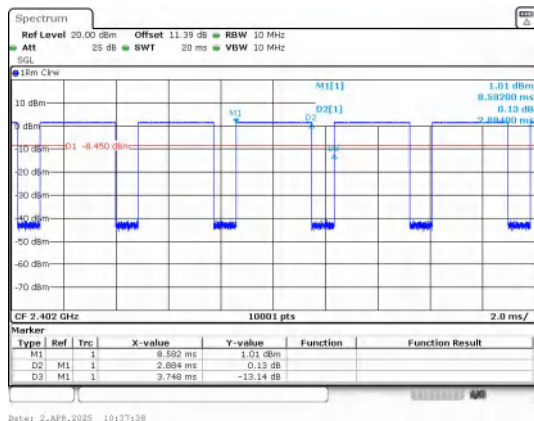
8DPSK(3-DH5)_Channel 78

Right:

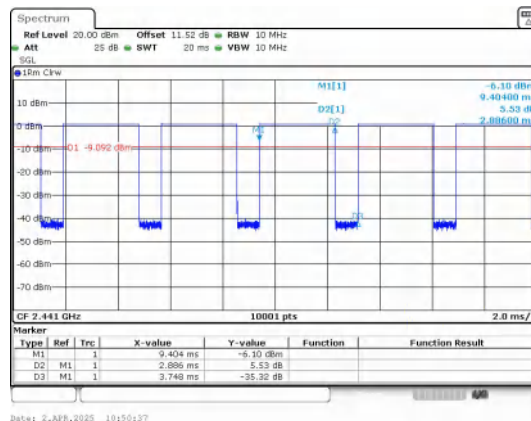
Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.884	3.748	76.95	0.7695	1.1379	0.3467
		39	2.886	3.748	77.00	0.7700	1.1351	0.3465
		78	2.886	3.748	77.00	0.7700	1.1351	0.3465
$\pi/4$ DQPSK	2-DH5	0	2.890	3.748	77.11	0.7711	1.1289	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	2.892	3.748	77.16	0.7716	1.1261	0.3458
		39	2.892	3.748	77.16	0.7716	1.1261	0.3458
		78	2.894	3.748	77.21	0.7721	1.1233	0.3455

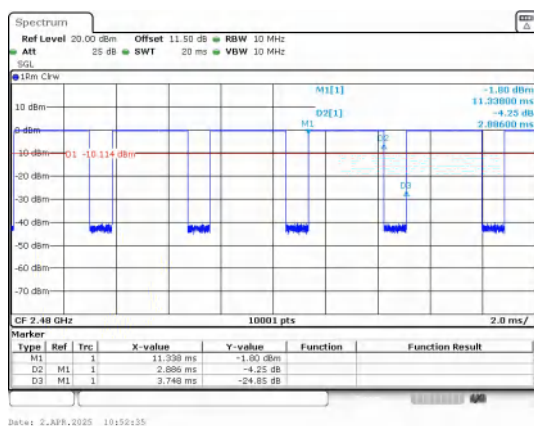
Test Graphs



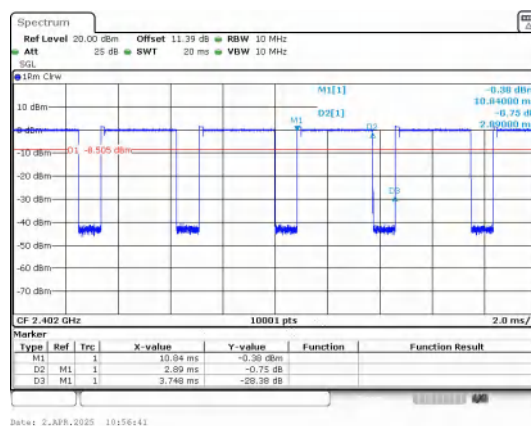
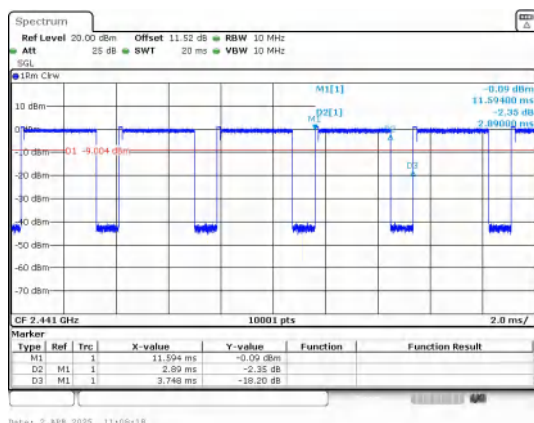
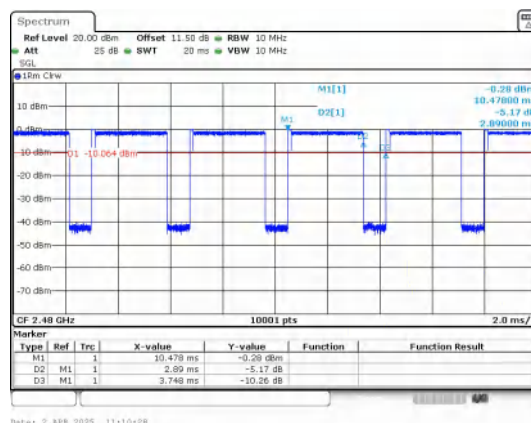
GFSK(DH5)_Channel 0

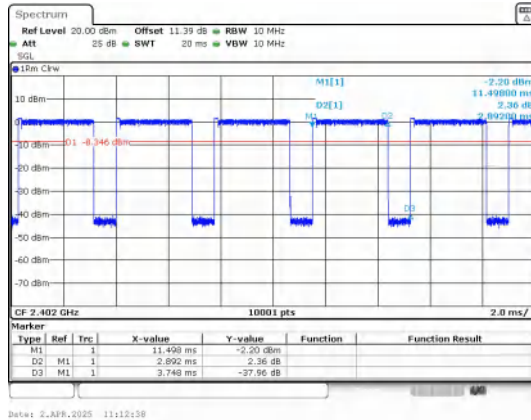


GFSK(DH5)_Channel 39

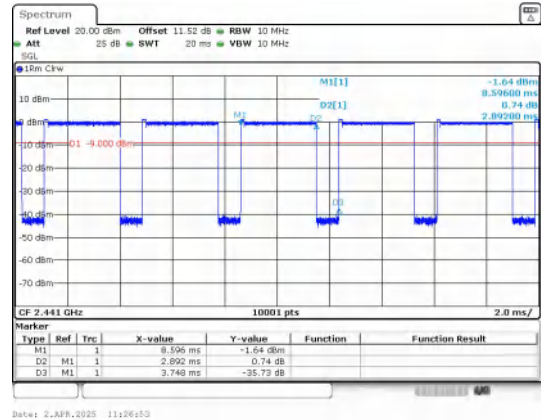


GFSK(DH5)_Channel 78

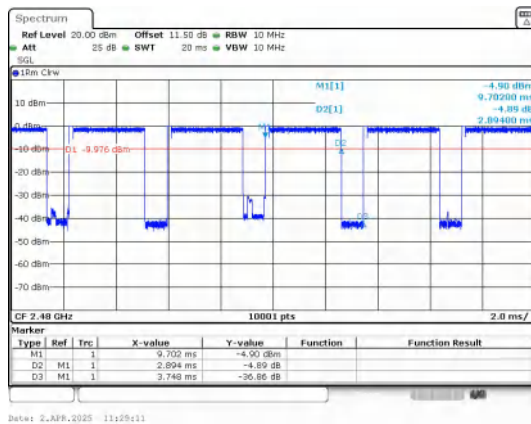

 $\pi/4$ DQPSK(2-DH5)_Channel 0

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

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



8DPSK(3-DH5)_Channel 0



8DPSK(3-DH5)_Channel 39



8DPSK(3-DH5)_Channel 78

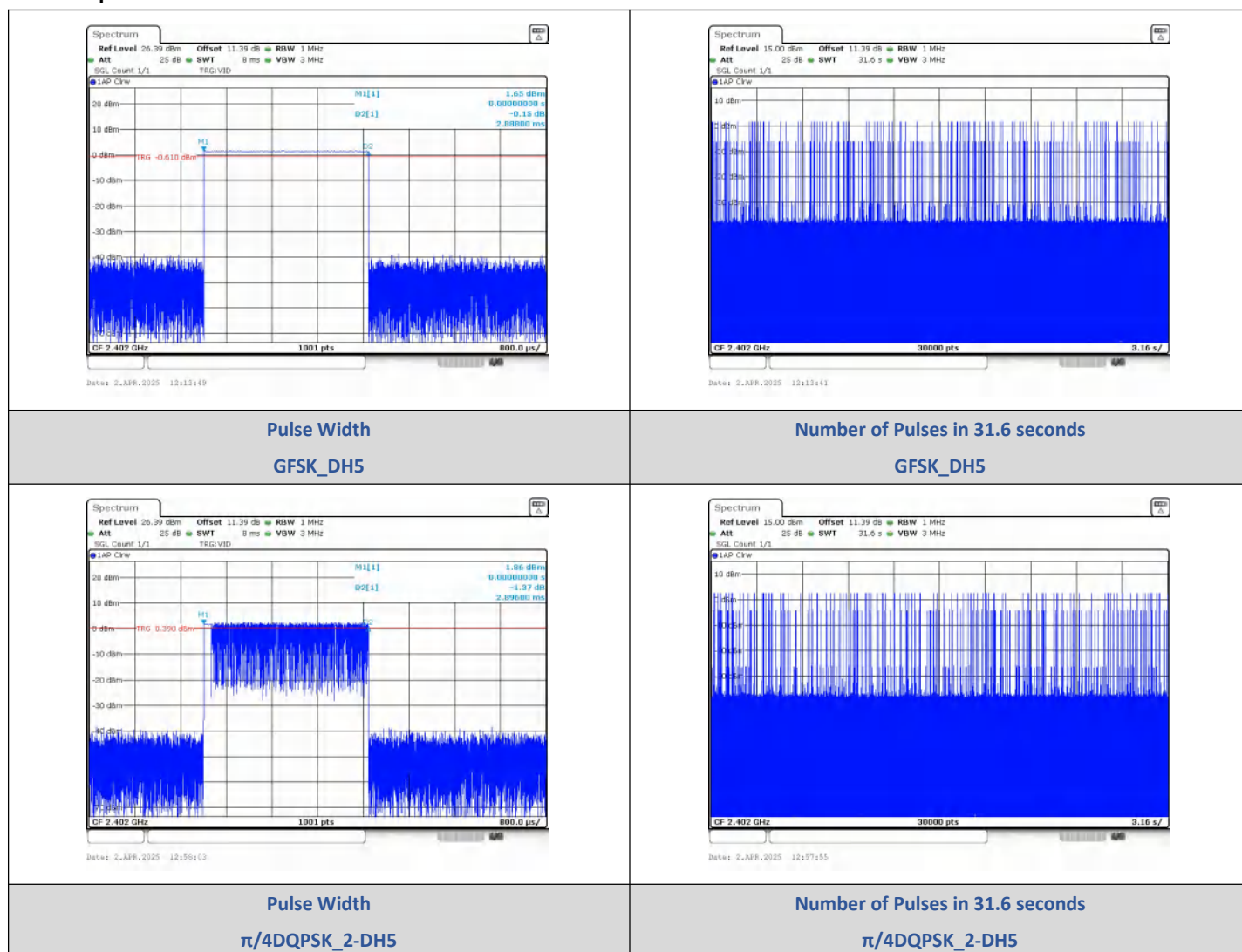
2) Dwell Time

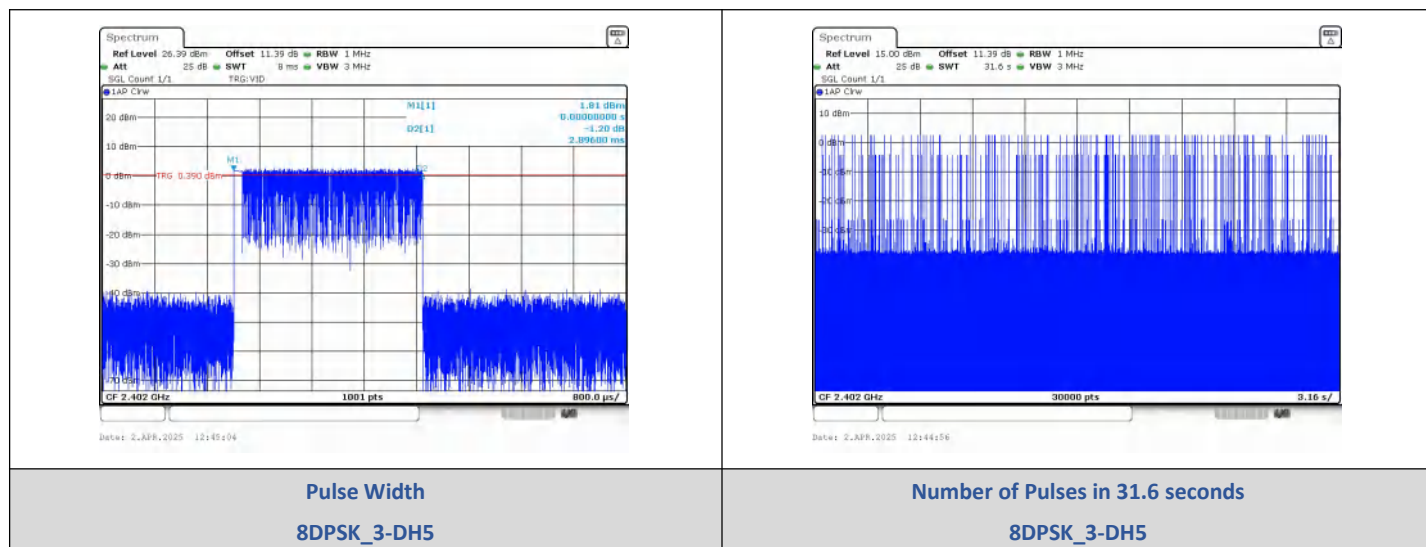
Test Result

Left:

Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.888	100	288.8	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.896	110	318.56		PASS
8DPSK	3-DH5		2.896	106	306.98		PASS

Test Graphs

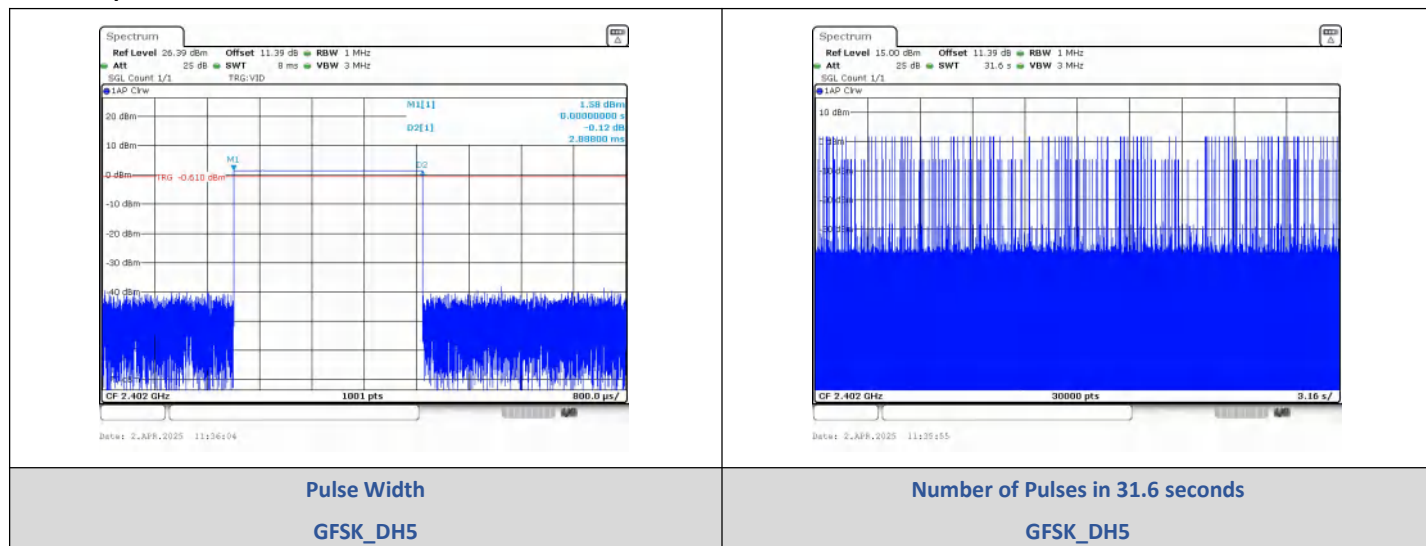


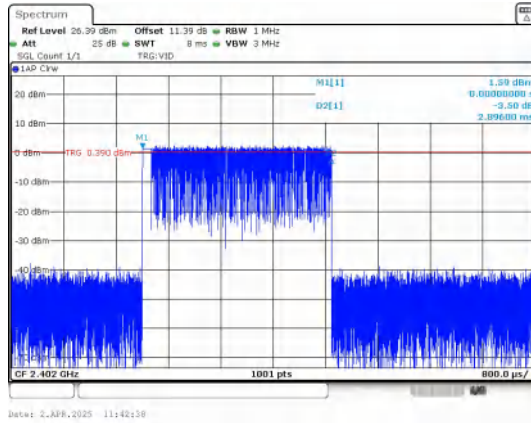


Right:

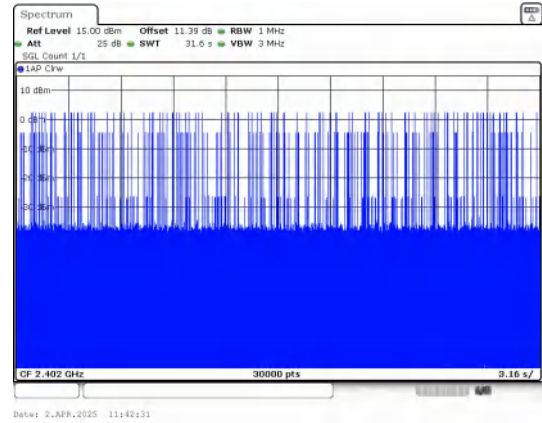
Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.888	106	306.13	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.896	108	312.77		PASS
8DPSK	3-DH5		2.896	104	301.18		PASS

Test Graphs

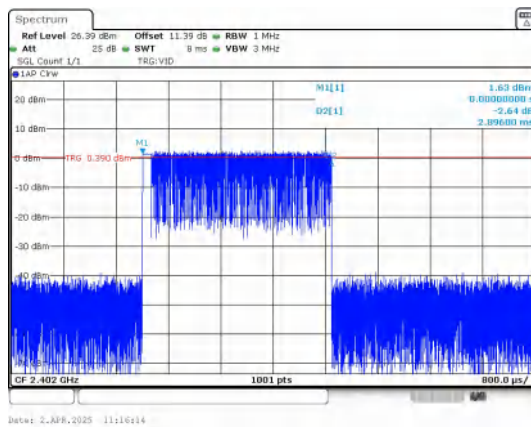




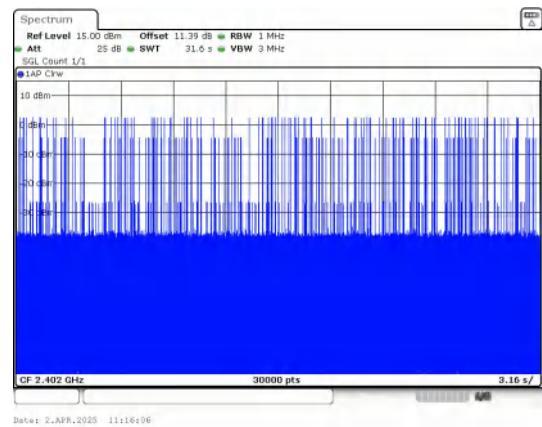
Pulse Width
 $\pi/4$ DQPSK_2-DH5



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

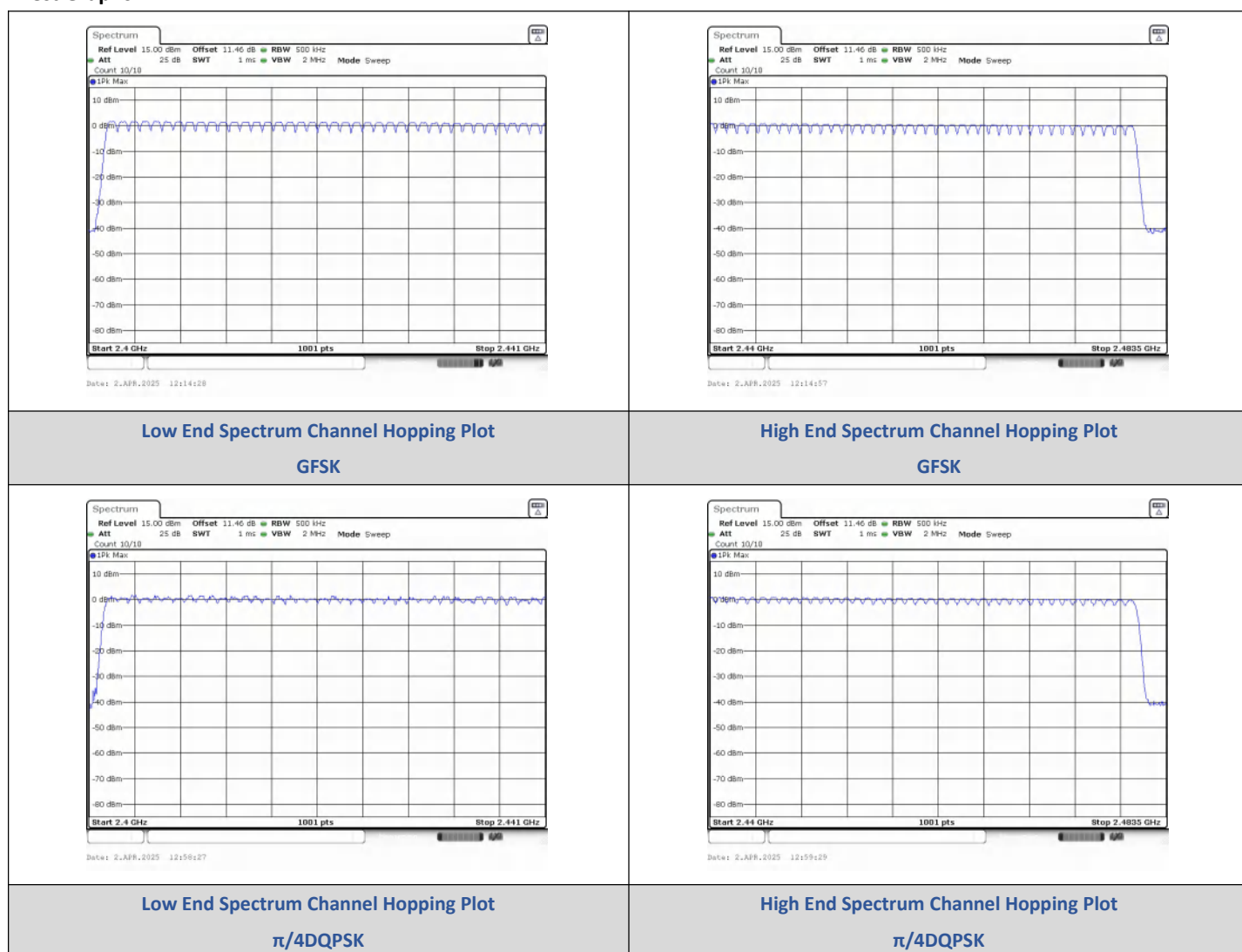
3) Number Of Hopping Channel

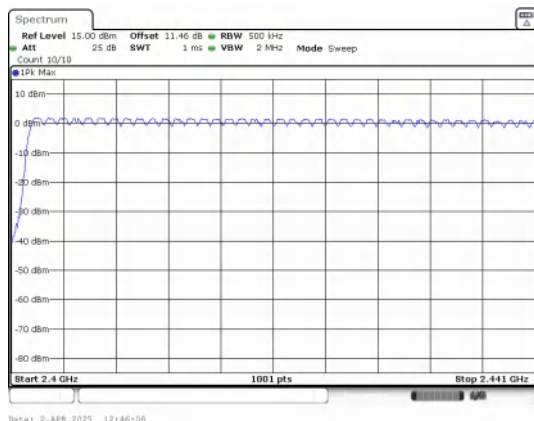
Test Result

Left:

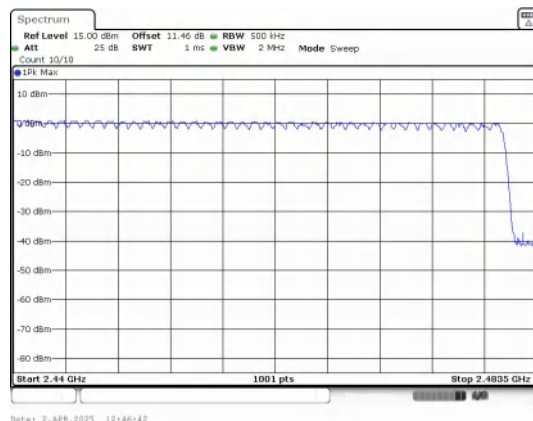
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
$\pi/4$ DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

Test Graphs





Low End Spectrum Channel Hopping Plot
8DPSK

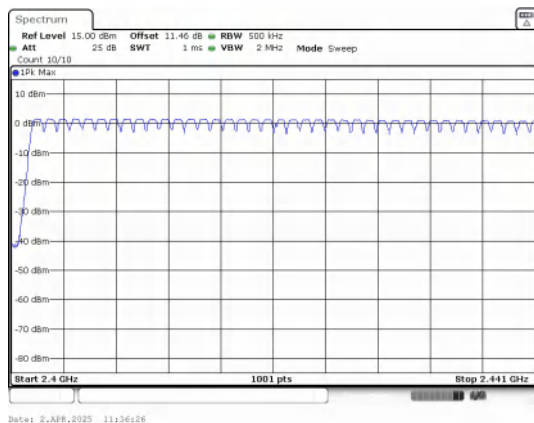


High End Spectrum Channel Hopping Plot
8DPSK

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

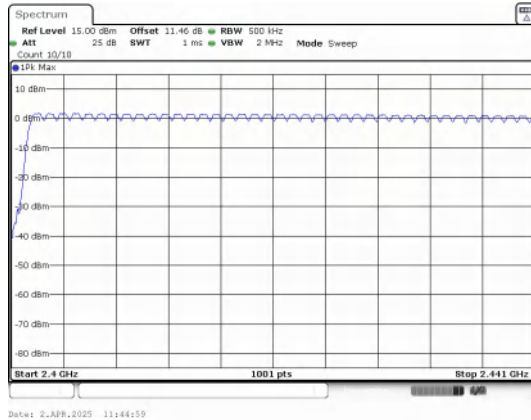
Test Graphs



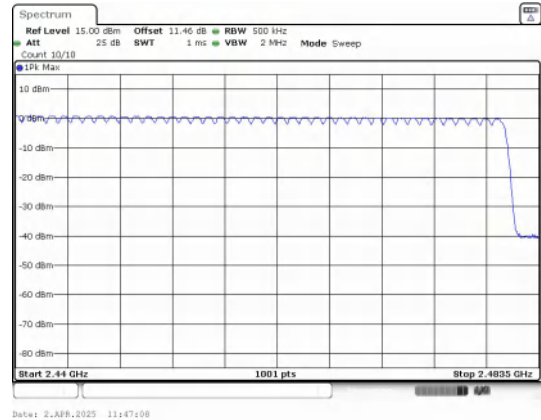
Low End Spectrum Channel Hopping Plot
GFSK



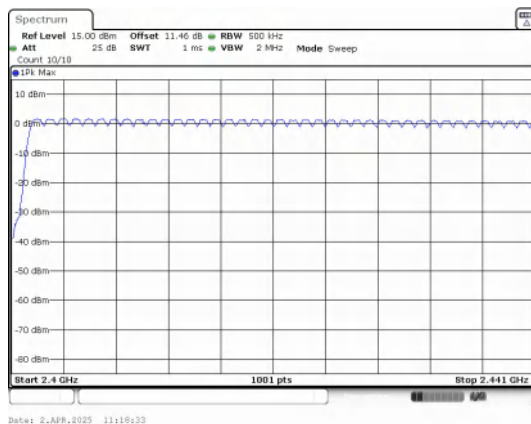
High End Spectrum Channel Hopping Plot
GFSK



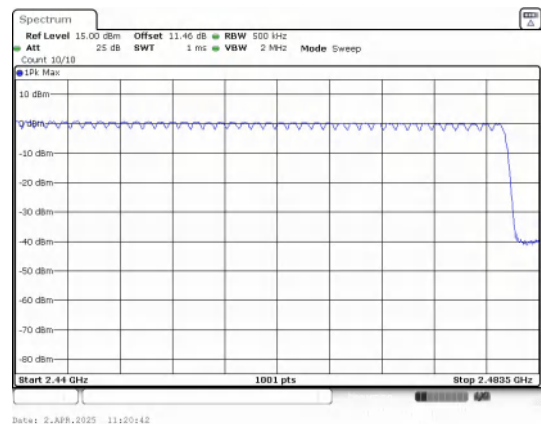
Low End Spectrum Channel Hopping Plot
 $\pi/4$ DQPSK



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	1.71	1.48	≤30	PASS
		39	1.13	1.30		PASS
		78	0.09	1.02		PASS
$\pi/4$ DQPSK	2-DH5	0	2.64	1.84	≤20.97	PASS
		39	2.02	1.59		PASS
		78	0.98	1.25		PASS
8DPSK	3-DH5	0	3.04	2.01		PASS
		39	2.39	1.73		PASS
		78	1.34	1.36		PASS

Test Graphs



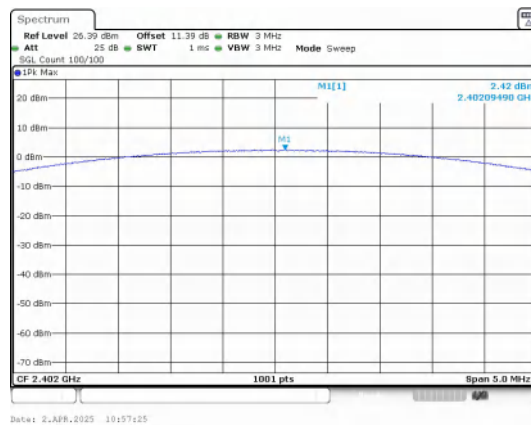
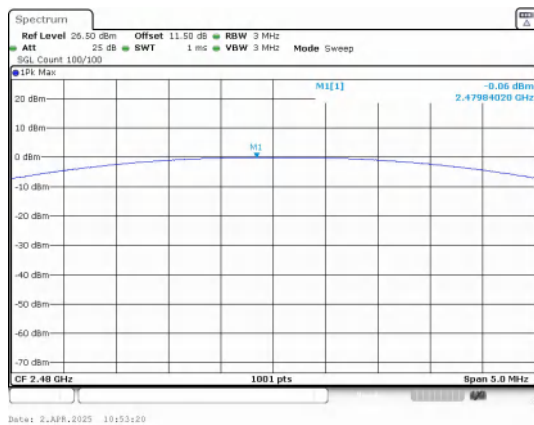
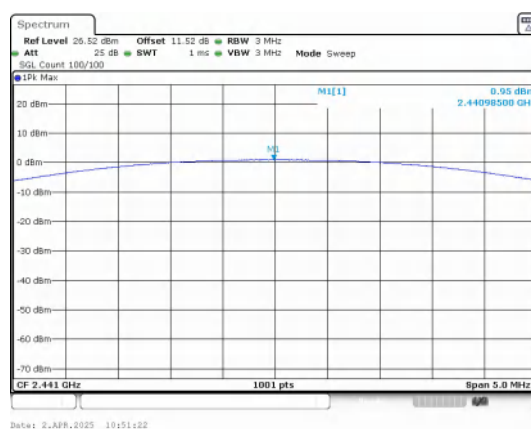
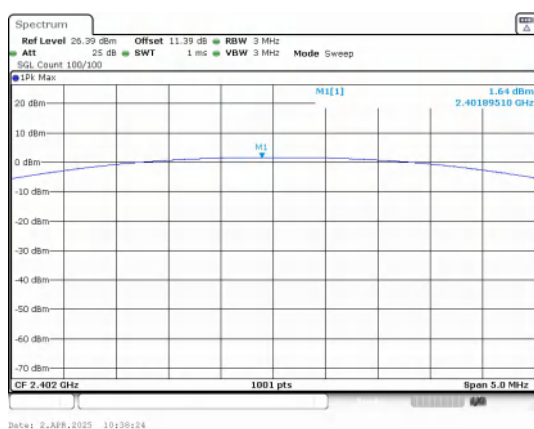


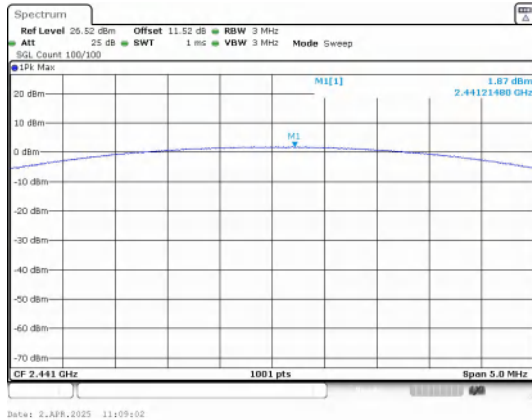
Right:

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
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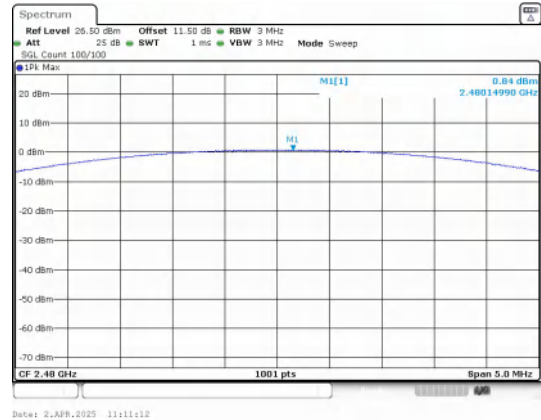
GFSK	DH5	0	1.64	1.46	≤30	PASS
		39	0.95	1.24		PASS
		78	-0.06	0.99		PASS
$\pi/4$ DQPSK	2-DH5	0	2.42	1.75	≤20.97	PASS
		39	1.87	1.54		PASS
		78	0.84	1.21		PASS
8DPSK	3-DH5	0	2.90	1.95		PASS
		39	2.28	1.69		PASS
		78	1.28	1.34		PASS

Test Graphs

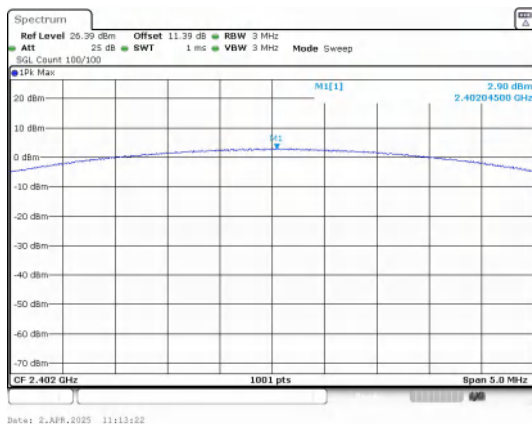




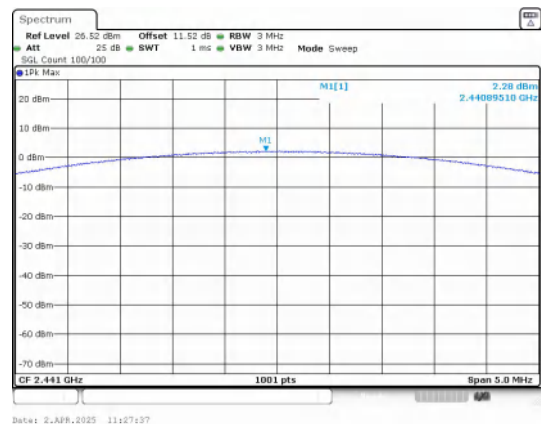
Peak Output Power
 $\pi/4$ DQPSK_Channel 39



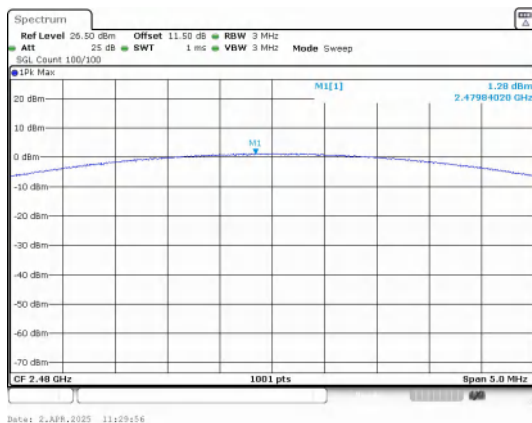
Peak Output Power
 $\pi/4$ DQPSK_Channel 78



Peak Output Power
8DPSK_Channel 0



Peak Output Power
8DPSK_Channel 39



Peak Output Power
8DPSK_Channel 78

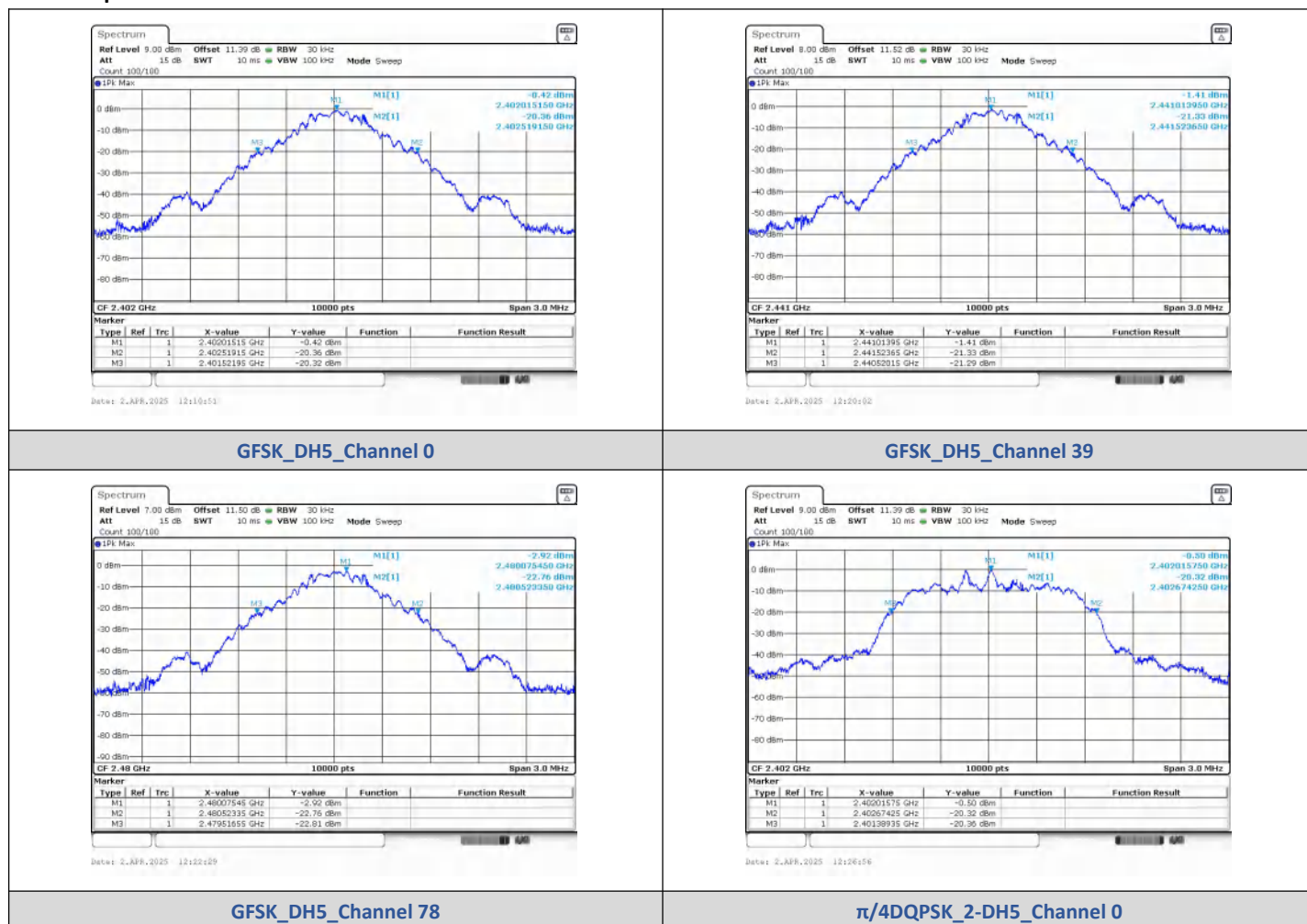
5) 20dB Bandwidth

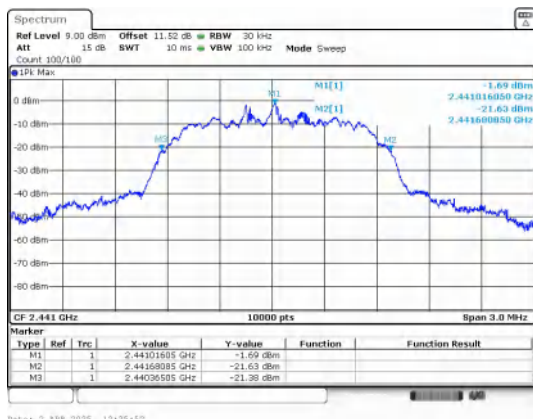
Test Result

Left:

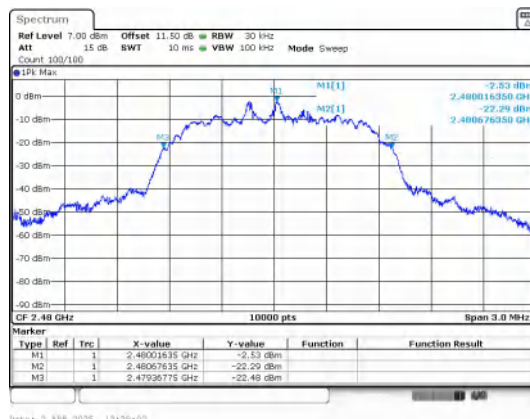
Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.0
	39	2441 MHz	1.0
	78	2480 MHz	1.0
$\pi/4$ DQPSK	0	2402 MHz	1.280
	39	2441 MHz	1.310
	78	2480 MHz	1.310
8DPSK	0	2402 MHz	1.290
	39	2441 MHz	1.290
	78	2480 MHz	1.290

Test Graphs

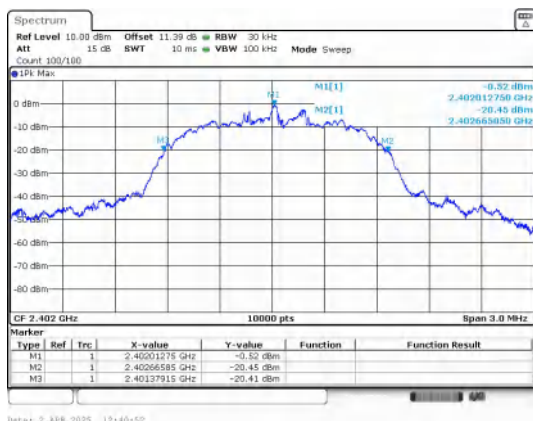




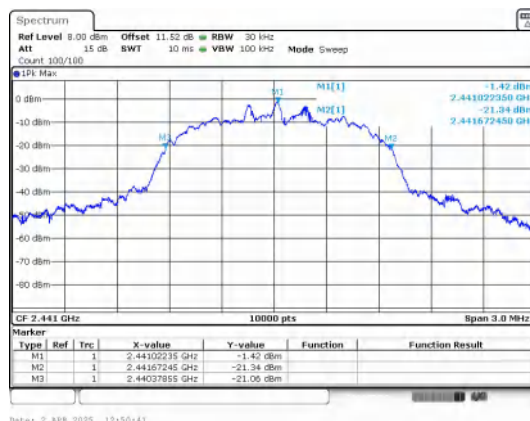
$\pi/4$ DQPSK_2-DH5_Channel 39



$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



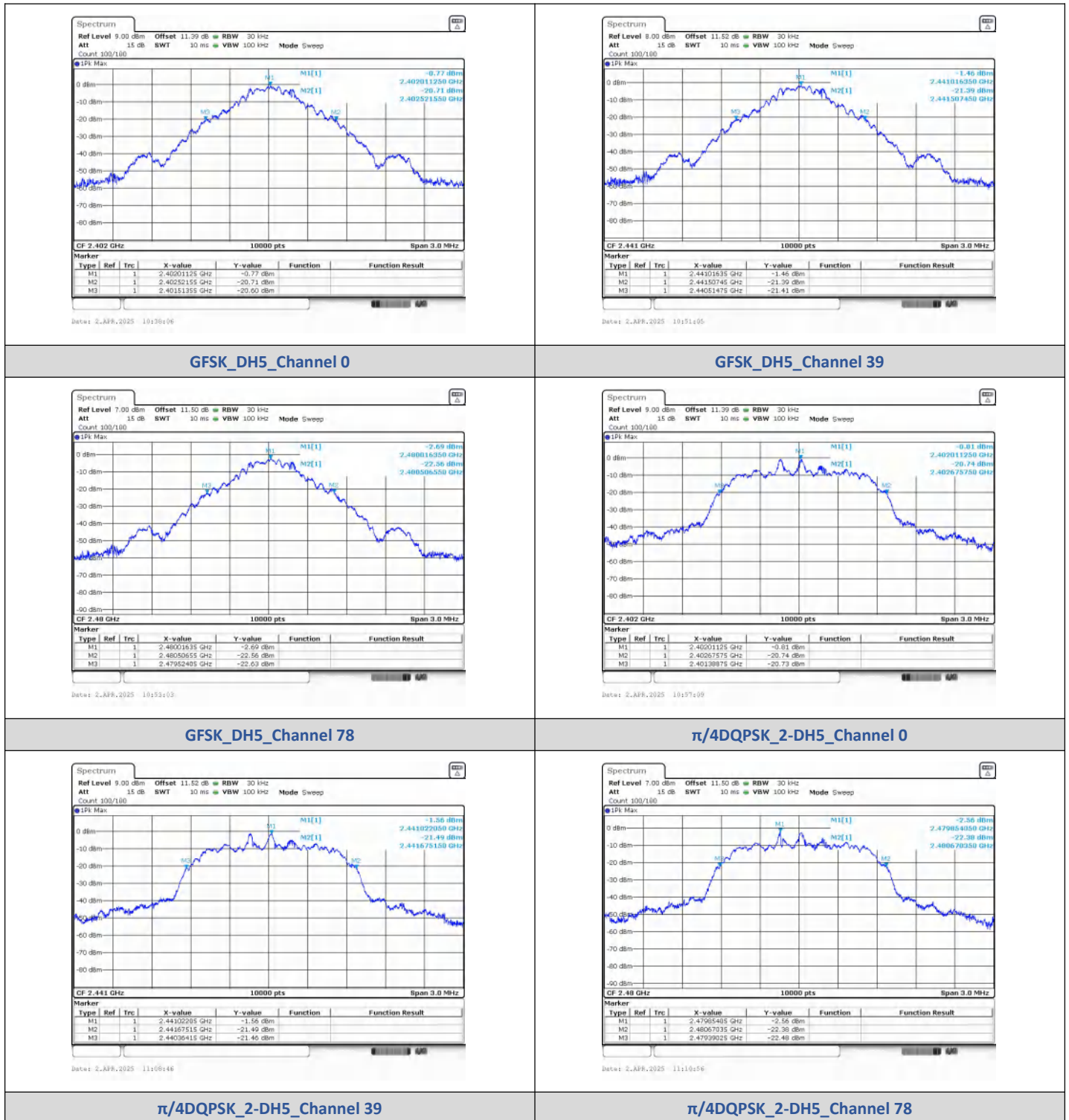
8DPSK_3-DH5_Channel 78

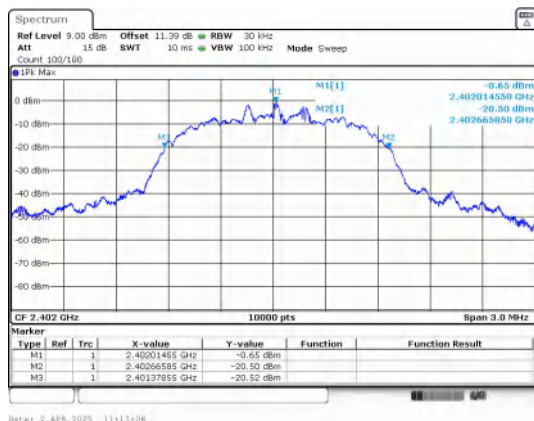
Right:

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.01
	39	2441 MHz	1.01
	78	2480 MHz	1.01
$\pi/4$ DQPSK	0	2402 MHz	1.290
	39	2441 MHz	1.320
	78	2480 MHz	1.280

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

Test Graphs

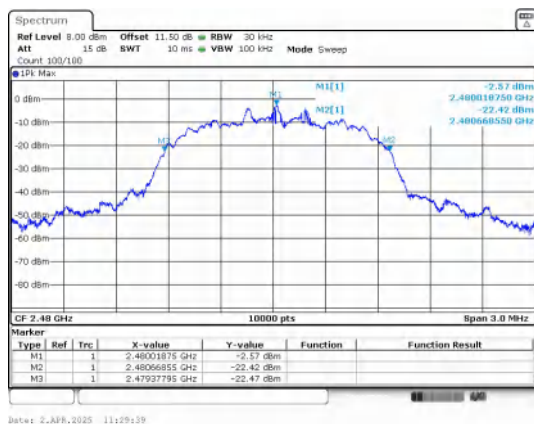




8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



8DPSK_3-DH5_Channel 78

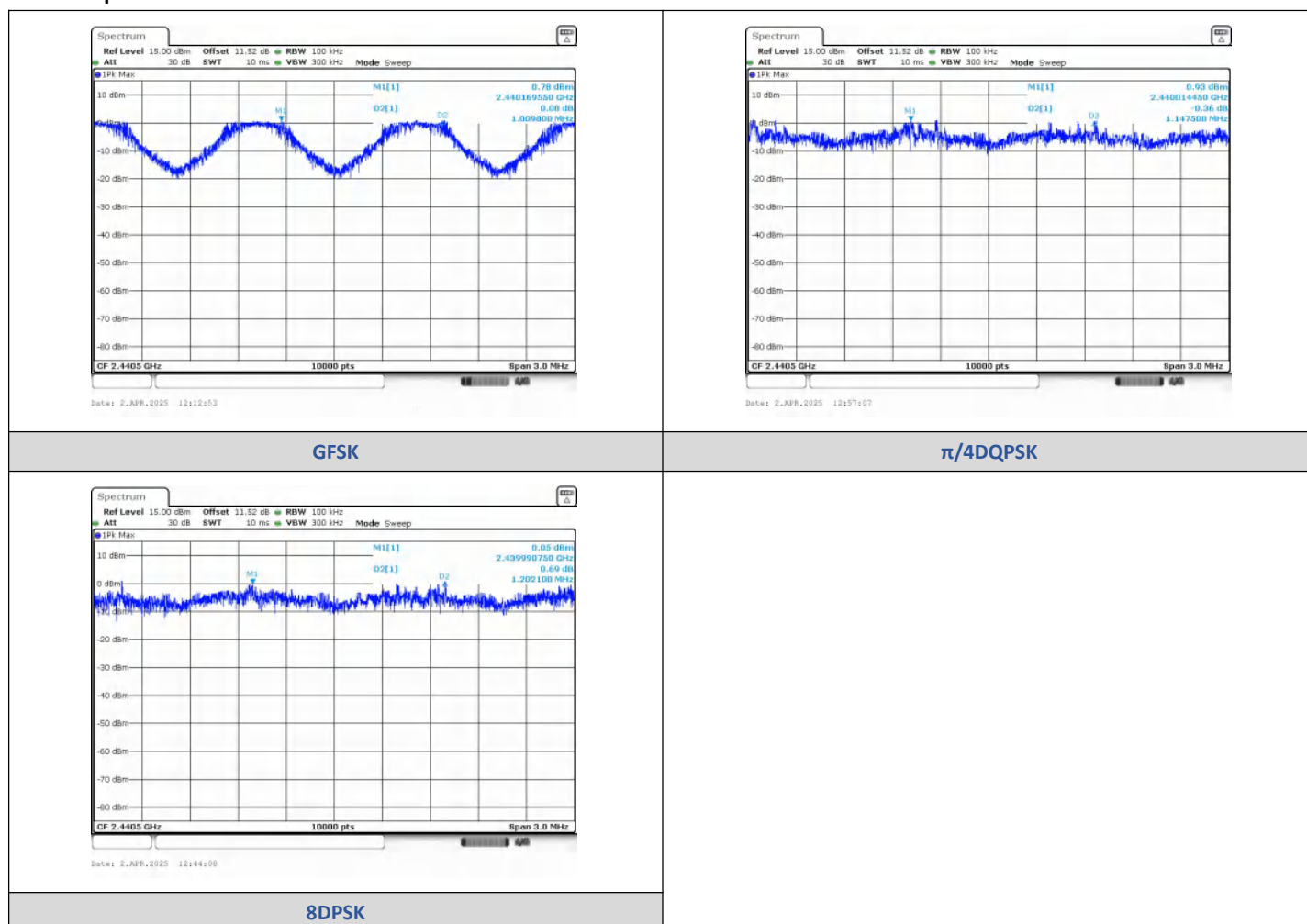
6) Carrier Frequencies Separation

Test Result

Left:

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2440.1696	2441.1793	1.0098	1.0	PASS
$\pi/4$ DQPSK	2-DH5	2440.0145	2441.162	1.1475	0.873	PASS
8DPSK	3-DH5	2439.9907	2441.1928	1.2021	0.86	PASS

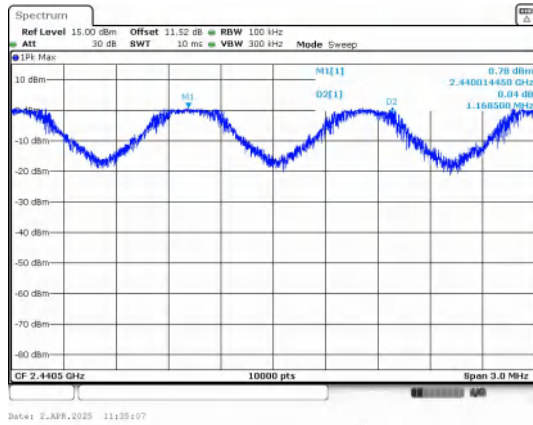
Test Graphs



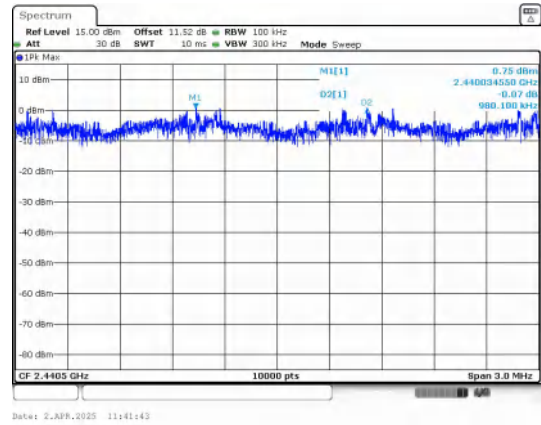
Right:

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2440.0145	2441.1829	1.1685	1.01	PASS
$\pi/4$ DQPSK	2-DH5	2440.0345	2441.0147	0.9801	0.88	PASS
8DPSK	3-DH5	2440.01	2441.0251	1.0152	0.86	PASS

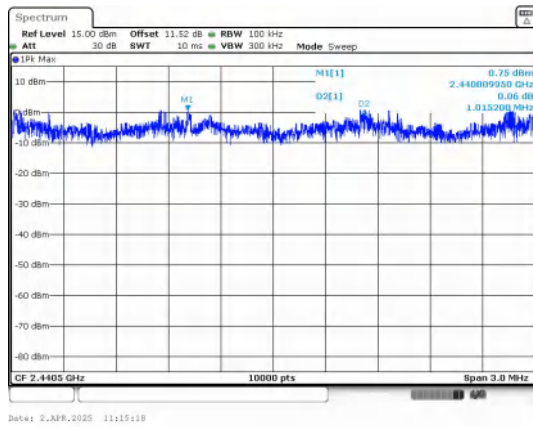
Test Graphs



GFSK



$\pi/4$ DQPSK



8DPSK

7) Conducted Out Of Band Emission

Test Result

Left:

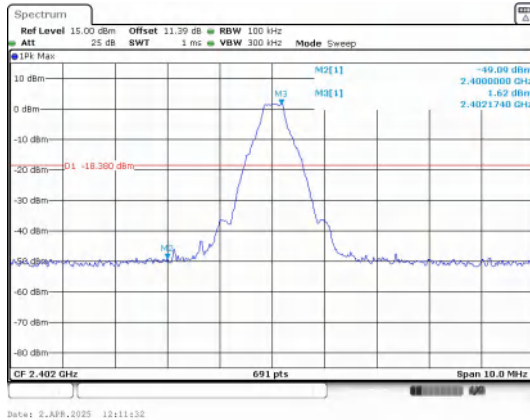
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-49.090	-18.38	-30.710	PASS
			5743.55	-40.930	-18.38	-22.550	PASS
		39	9763.72	-43.464	-19.06	-24.404	PASS
		78	2483.50	-51.060	-20.08	-30.980	PASS
			9920.20	-39.786	-20.08	-19.706	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-48.760	-18.32	-30.440	PASS
			9608.08	-44.427	-18.32	-26.107	PASS
		39	9763.72	-43.488	-19.11	-24.378	PASS
		78	2483.50	-51.050	-20.02	-31.030	PASS
			9920.20	-39.705	-20.02	-19.685	PASS
8DPSK	3-DH5	0	2400.00	-46.000	-18.28	-27.720	PASS
			9608.08	-44.292	-18.28	-26.012	PASS
		39	9763.72	-42.537	-19.02	-23.517	PASS
		78	2483.50	-49.780	-20.28	-29.500	PASS
			9920.20	-39.390	-20.28	-19.110	PASS

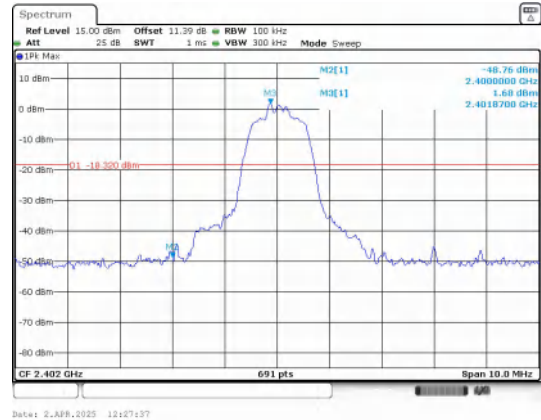
Hopping

Hopping							
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2396.24	-46.682	-18.4	-28.282	PASS
			2400.00	-49.330	-18.4	-30.930	PASS
			2483.50	-49.780	-20.27	-29.510	PASS
$\pi/4$ DQPSK	2-DH5		2398.34	-48.670	-20.36	-28.310	PASS
			2400.00	-50.000	-20.36	-29.640	PASS
			2483.50	-49.260	-22.62	-26.640	PASS
8DPSK	3-DH5		2396.99	-48.616	-18.43	-30.186	PASS
			2400.00	-50.100	-18.43	-31.670	PASS
			2483.50	-49.590	-20.04	-29.550	PASS

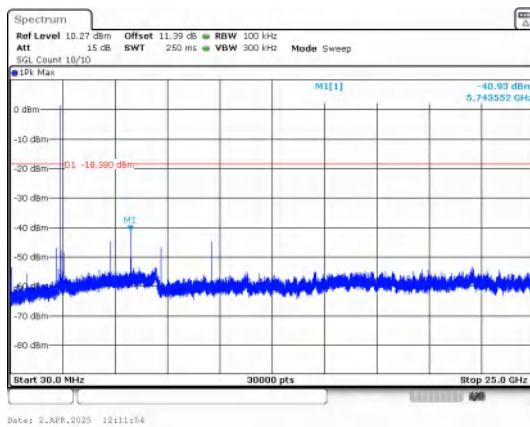
Test Graphs



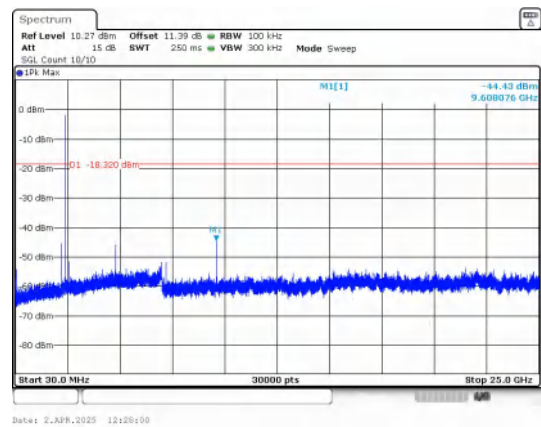
Out Of Band Emission
GFSK_DH5_Channel 0



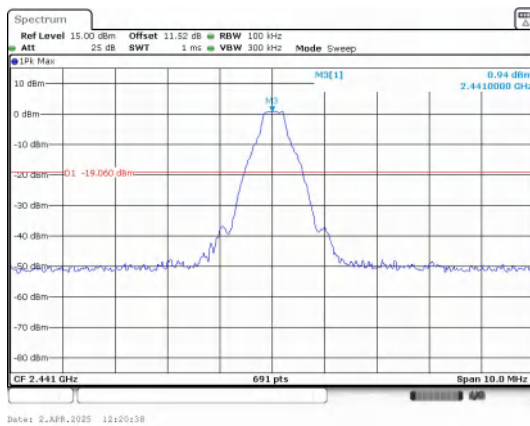
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 0



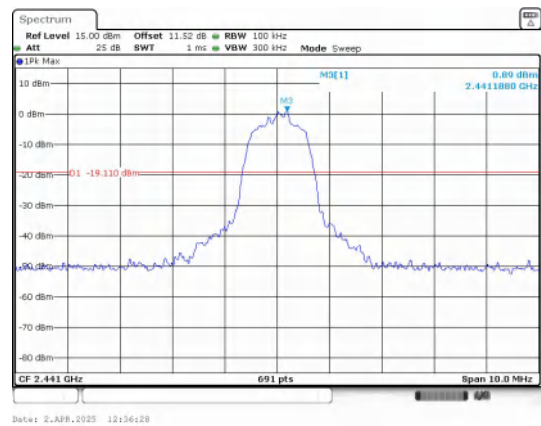
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



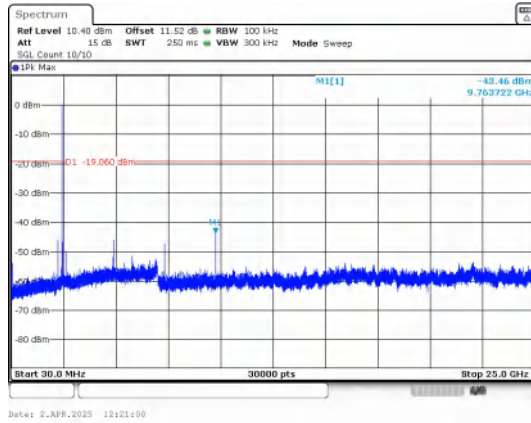
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 0



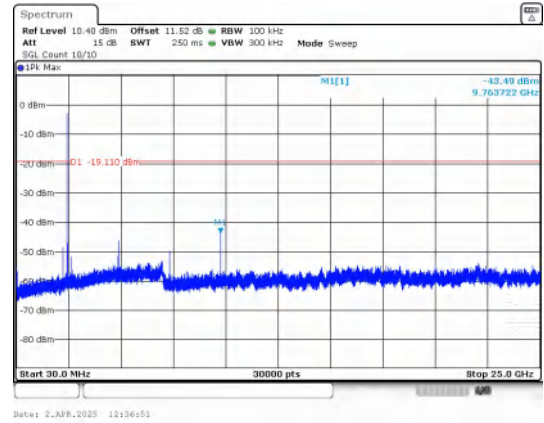
Out Of Band Emission
GFSK_DH5_Channel 39



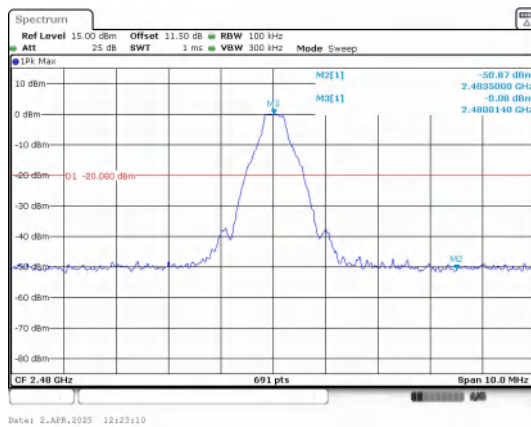
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39



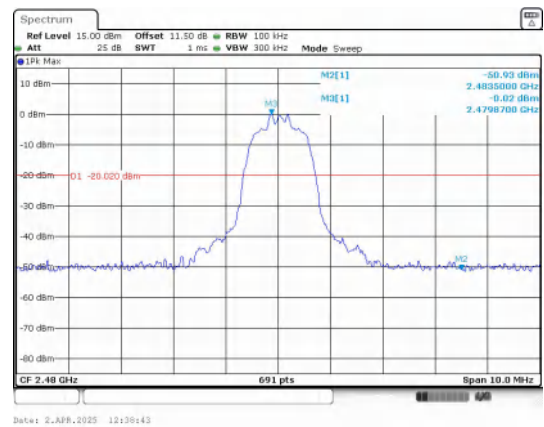
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



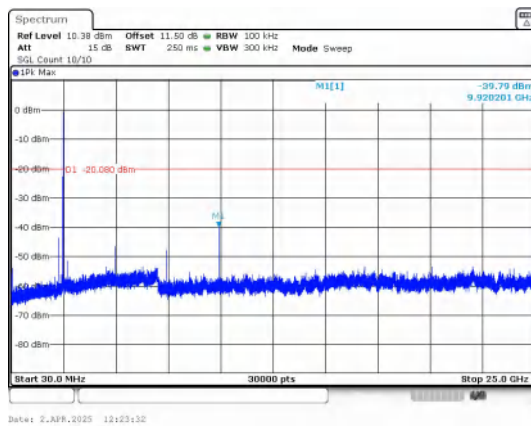
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39



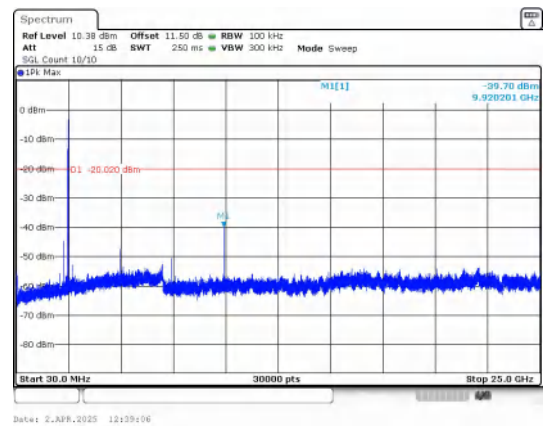
Out Of Band Emission
GFSK_DH5_Channel 78



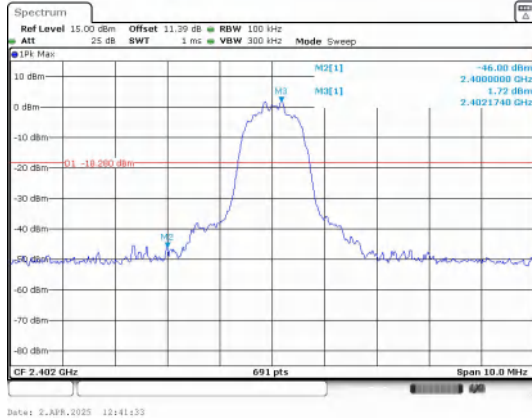
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



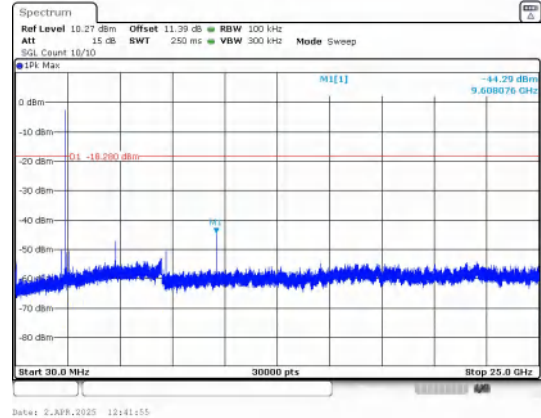
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



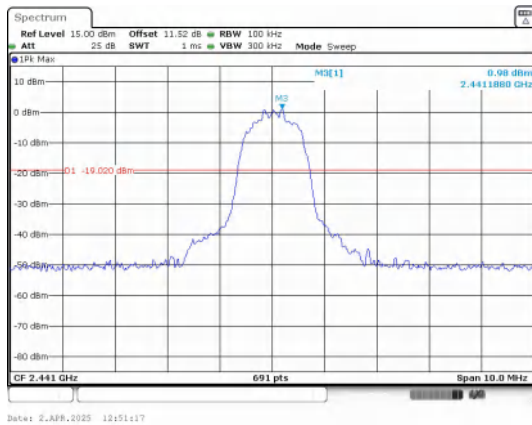
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 78



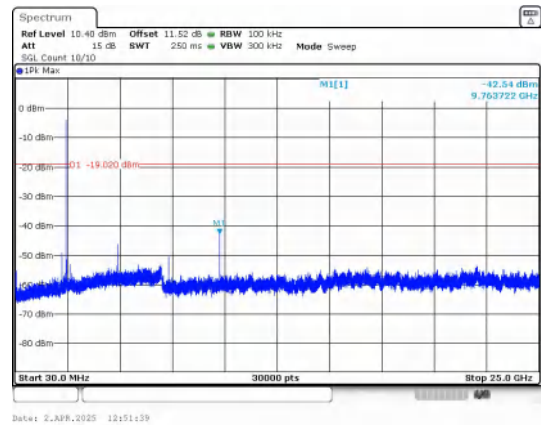
Out Of Band Emission
8DPSK_3-DH5_Channel 0



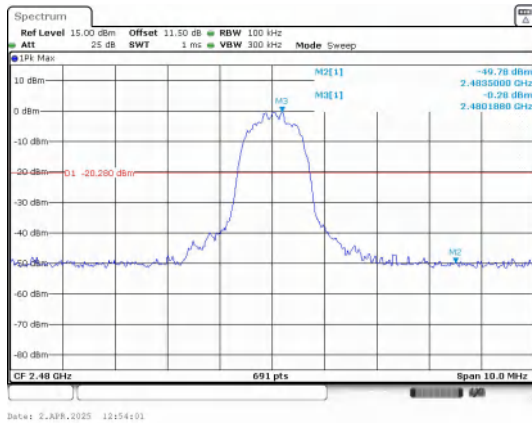
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



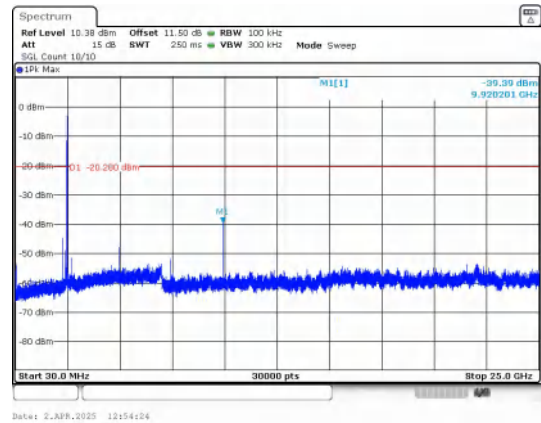
Out Of Band Emission
8DPSK_3-DH5_Channel 39



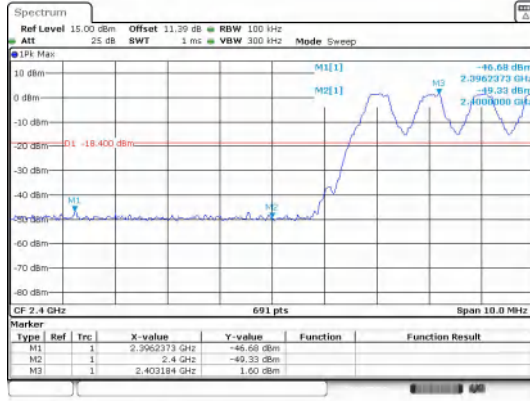
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



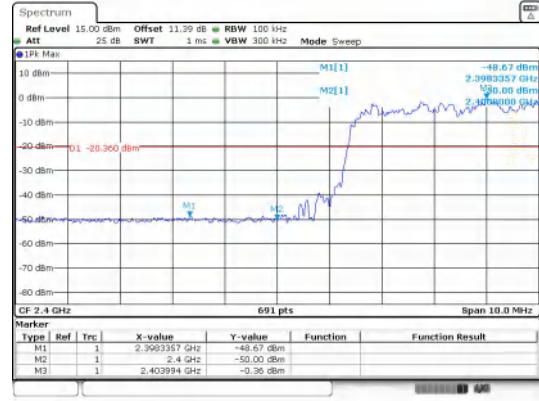
Out Of Band Emission
8DPSK_3-DH5_Channel 78



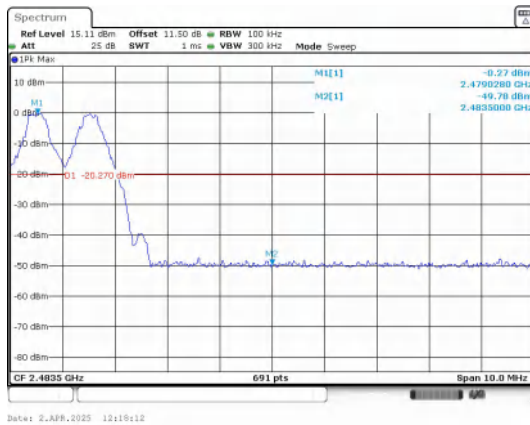
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



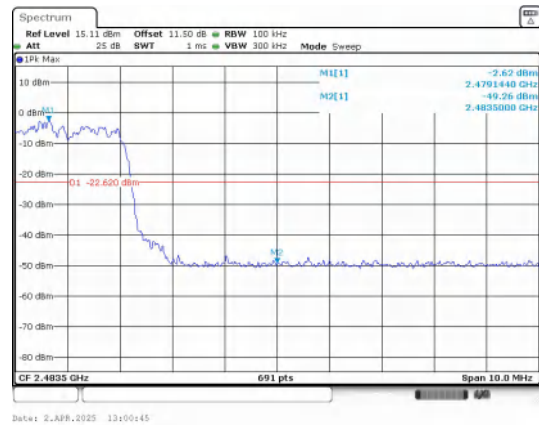
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



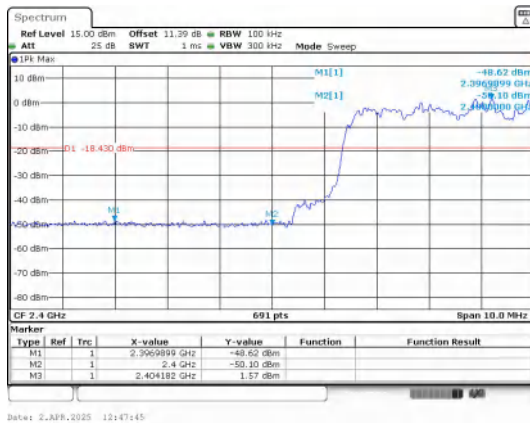
Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



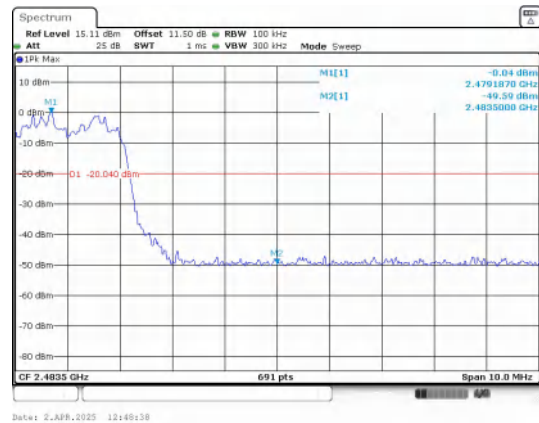
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



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

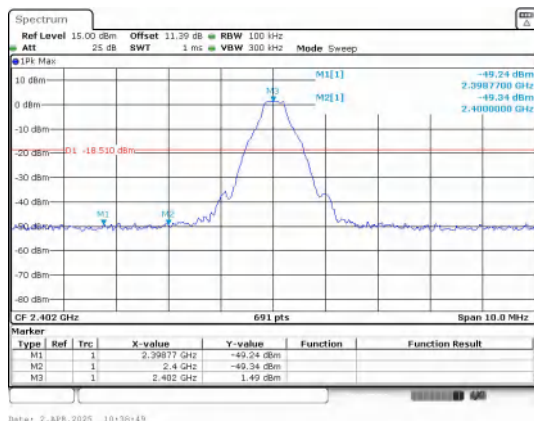
Modulation	Packet	Channel	OOB Emission Frequency	OOB Emission Level	Limit (dBm)	Over Limit (dB)	Result
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			(MHz)	(dBm)			
GFSK	DH5	0	2398.77	-49.243	-18.51	-30.733	PASS
			2400.00	-49.340	-18.51	-30.830	PASS
			9608.10	-45.207	-18.51	-26.697	PASS
		39	9763.72	-43.378	-19.34	-24.038	PASS
		78	2483.50	-51.120	-20.27	-30.850	PASS
			9920.20	-39.706	-20.27	-19.436	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-48.180	-18.61	-29.570	PASS
			9608.08	-44.737	-18.61	-26.127	PASS
		39	9763.72	-43.180	-19.13	-24.050	PASS
		78	2483.50	-50.140	-20.11	-30.030	PASS
			9920.20	-39.745	-20.11	-19.635	PASS
8DPSK	3-DH5	0	2398.95	-49.399	-18.82	-30.579	PASS
			2400.00	-49.520	-18.82	-30.700	PASS
			9608.10	-44.626	-18.82	-25.806	PASS
		39	9763.72	-42.864	-19.08	-23.784	PASS
		78	2483.50	-50.610	-20.1	-30.510	PASS
			9920.20	-39.707	-20.1	-19.607	PASS

Hopping

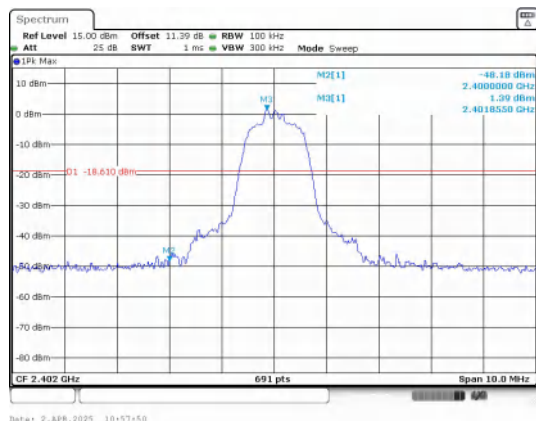
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2395.70	-48.651	-18.75	-29.901	PASS
			2400.00	-49.500	-18.75	-30.750	PASS
			2483.50	-50.660	-20.09	-30.570	PASS
$\pi/4$ DQPSK	2-DH5		2395.09	-48.082	-20.23	-27.852	PASS
			2400.00	-49.520	-20.23	-29.290	PASS
			2483.50	-48.520	-20.09	-28.430	PASS
8DPSK	3-DH5		2395.60	-47.757	-18.39	-29.367	PASS
			2400.00	-48.800	-18.39	-30.410	PASS
			2483.50	-50.420	-20.81	-29.610	PASS

Test Graphs



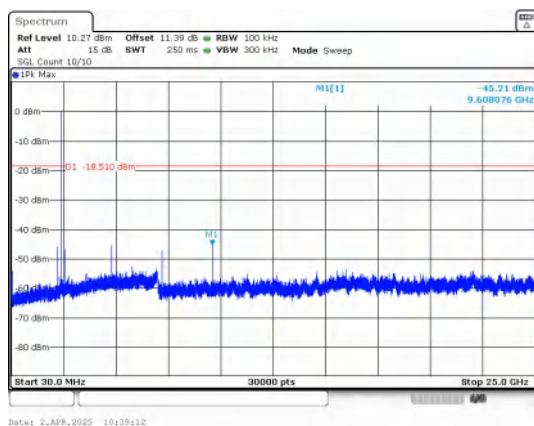
Date: 2.APR.2025 10:30:49

Out Of Band Emission
GFSK_DH5_Channel 0



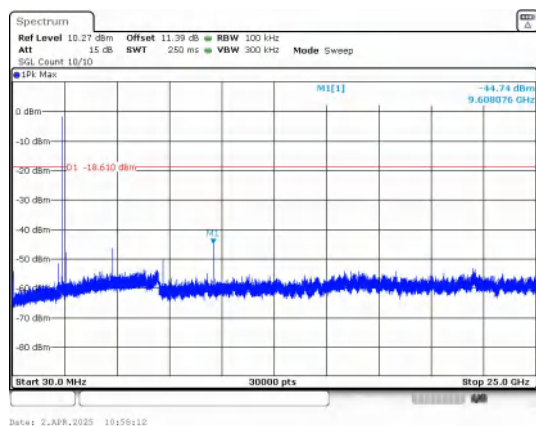
Date: 2.APR.2025 10:57:50

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



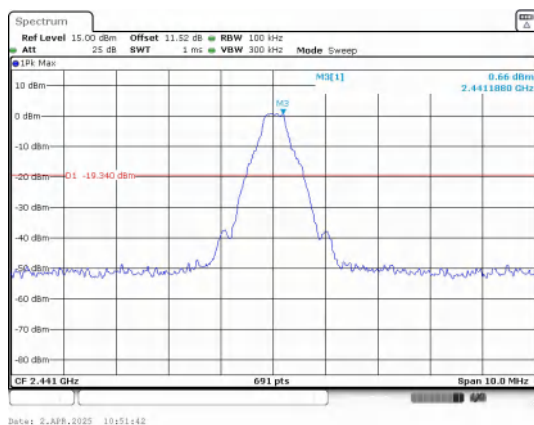
Date: 2.APR.2025 10:39:12

30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



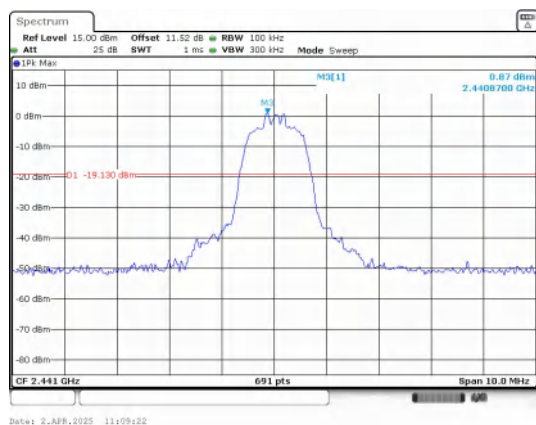
Date: 2.APR.2025 10:56:12

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



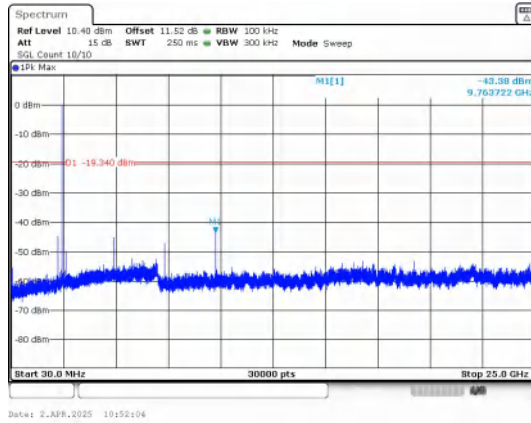
Date: 2.APR.2025 10:51:42

Out Of Band Emission
GFSK_DH5_Channel 39

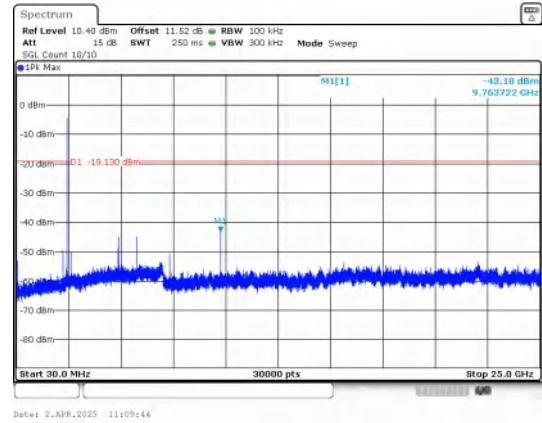


Date: 2.APR.2025 11:09:22

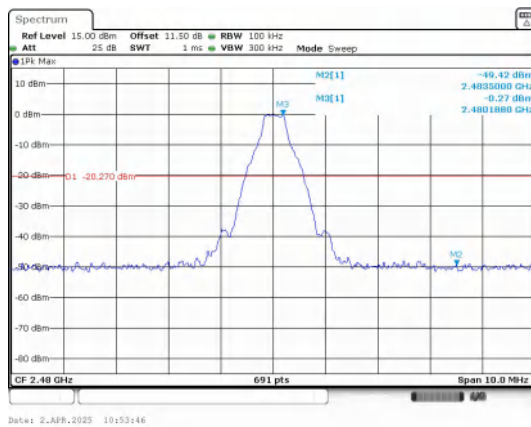
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39



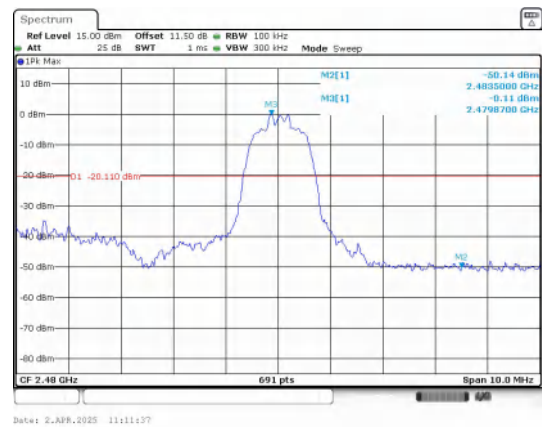
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



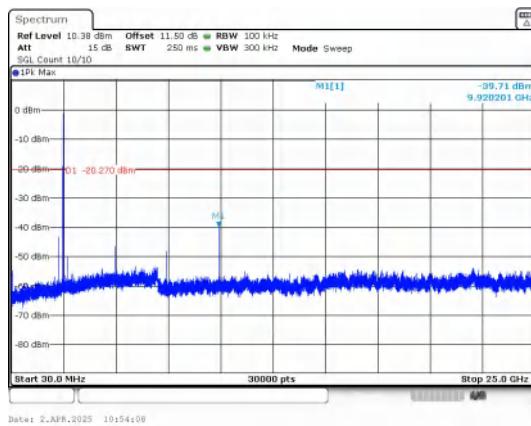
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39



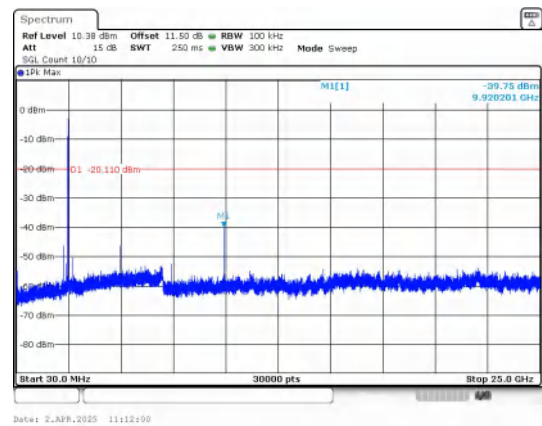
Out Of Band Emission
GFSK_DH5_Channel 78



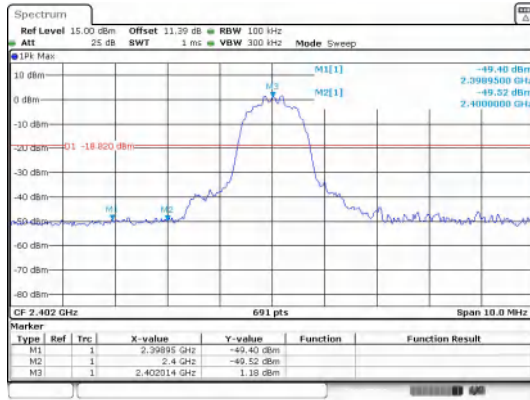
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78

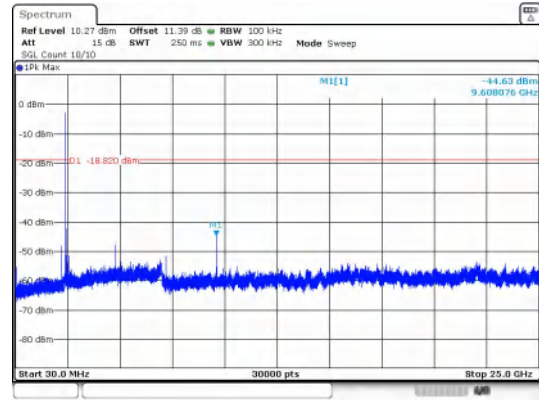


30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 78



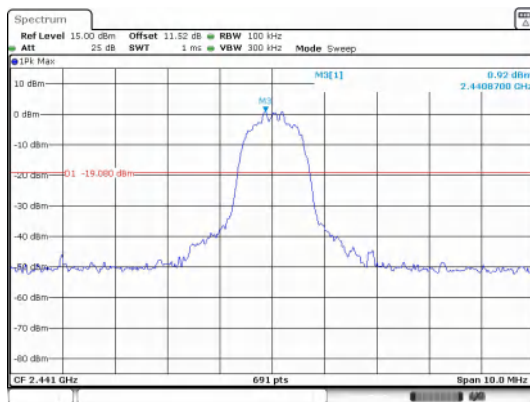
Date: 2.APR.2025 11:13:47

Out Of Band Emission
8DPSK_3-DH5_Channel 0



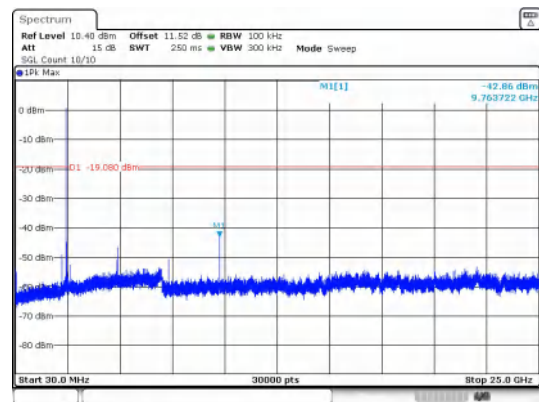
Date: 2.APR.2025 11:14:09

30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



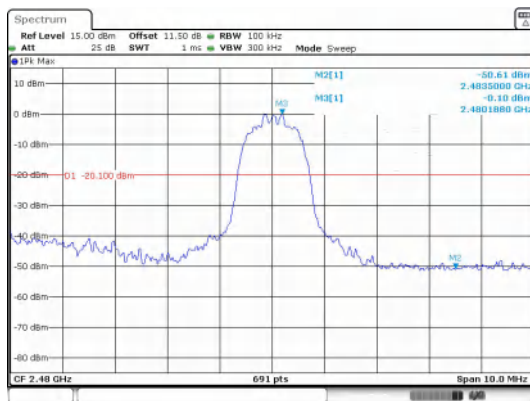
Date: 2.APR.2025 11:27:57

Out Of Band Emission
8DPSK_3-DH5_Channel 39



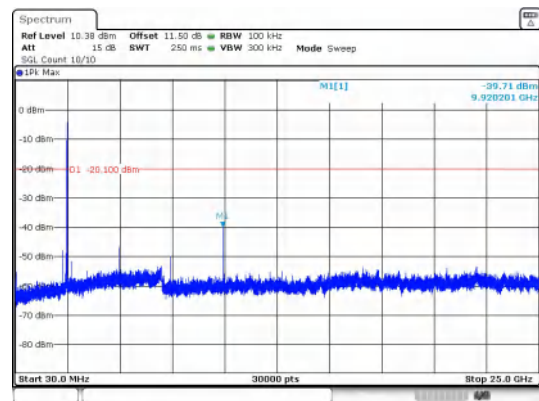
Date: 2.APR.2025 11:28:19

30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



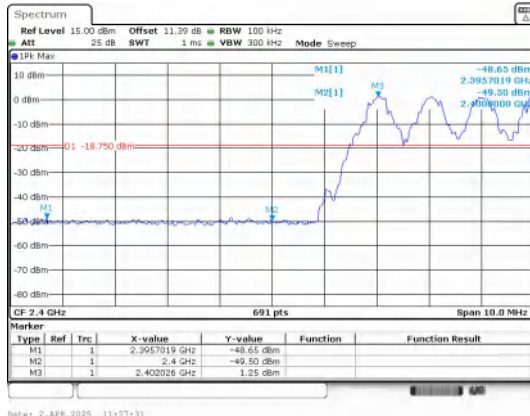
Date: 2.APR.2025 11:30:20

Out Of Band Emission
8DPSK_3-DH5_Channel 78

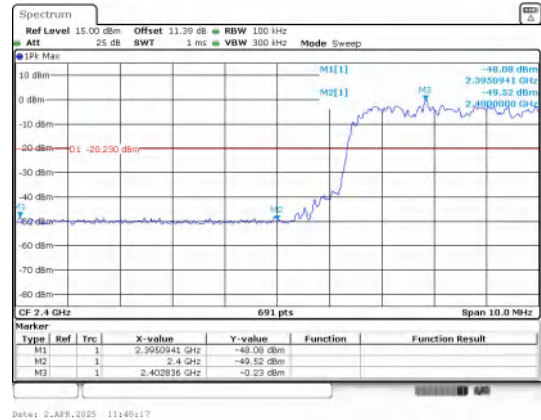


Date: 2.APR.2025 11:30:43

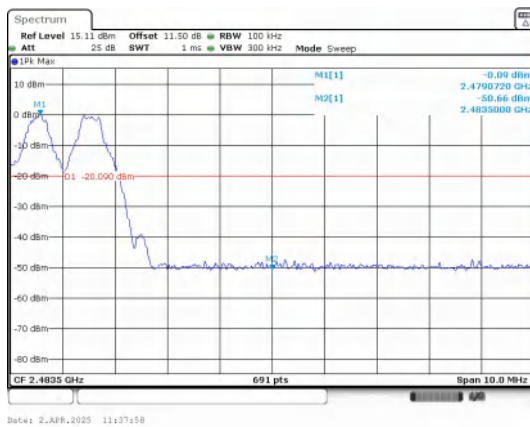
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



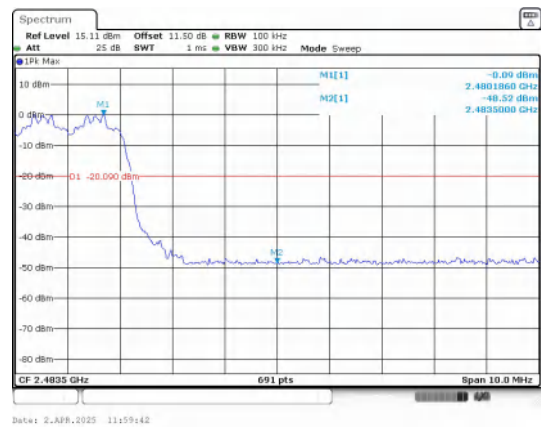
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



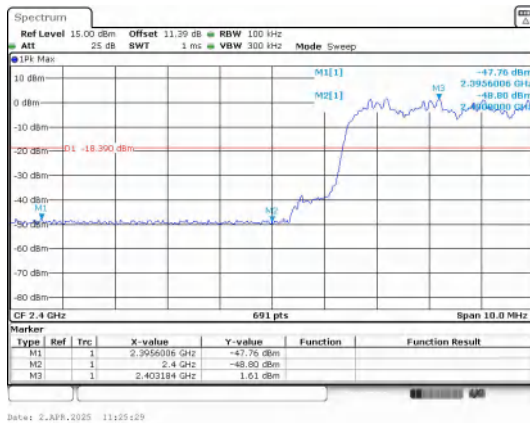
Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



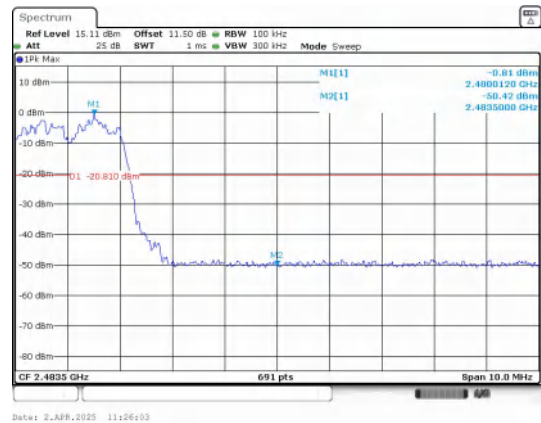
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



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-----