

Appendix A

Report No.:	CISRR240918158
FCC ID:	2BEBF-PRO4
Product Name:	Wireless Earphone
Model No.:	Pro 4
Test Engineer:	Lucas Huang
Supervised by:	Rory Huang

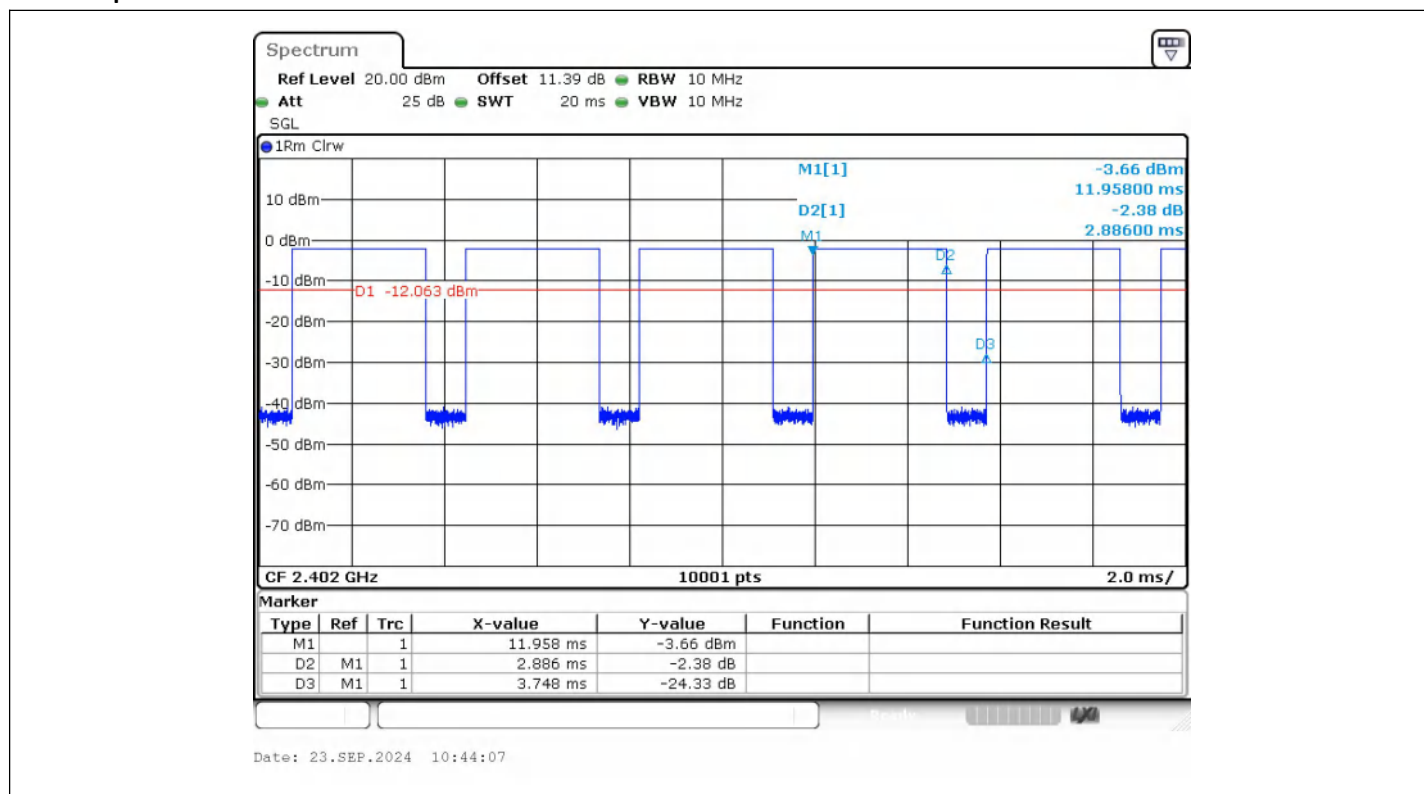
1) Duty Cycle

Right:

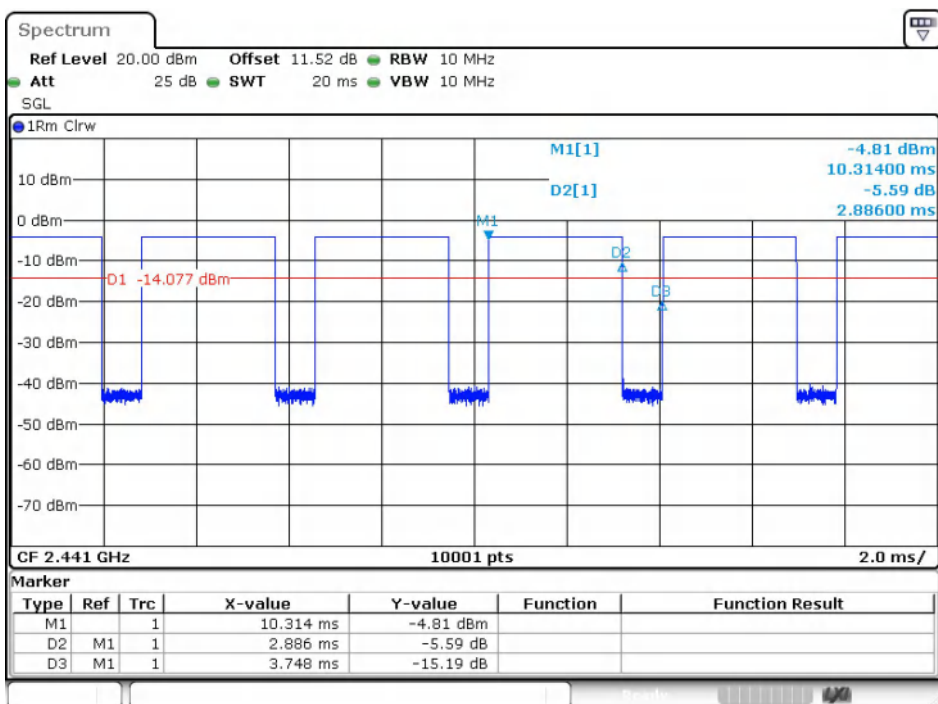
Test Result

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	0.35
		39	2.886	3.748	77.00	0.7700	1.1351	0.35
		78	2.886	3.748	77.00	0.7700	1.1351	0.35
$\pi/4$ DQPSK	2-DH5	0	2.890	3.748	77.11	0.7711	1.1289	0.35
		39	2.890	3.748	77.11	0.7711	1.1289	0.35
		78	2.890	3.748	77.11	0.7711	1.1289	0.35
8DPSK	3-DH5	0	2.892	3.748	77.16	0.7716	1.1261	0.35
		39	2.892	3.748	77.16	0.7716	1.1261	0.35
		78	2.892	3.748	77.16	0.7716	1.1261	0.35

Test Graphs

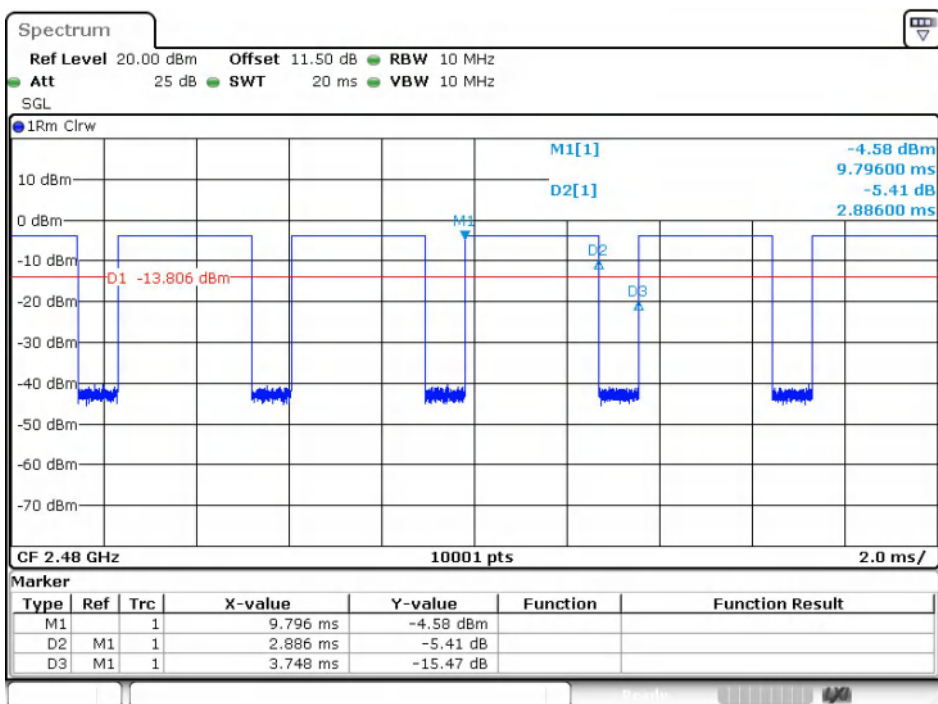


GFSK(DH5)_Channel 0



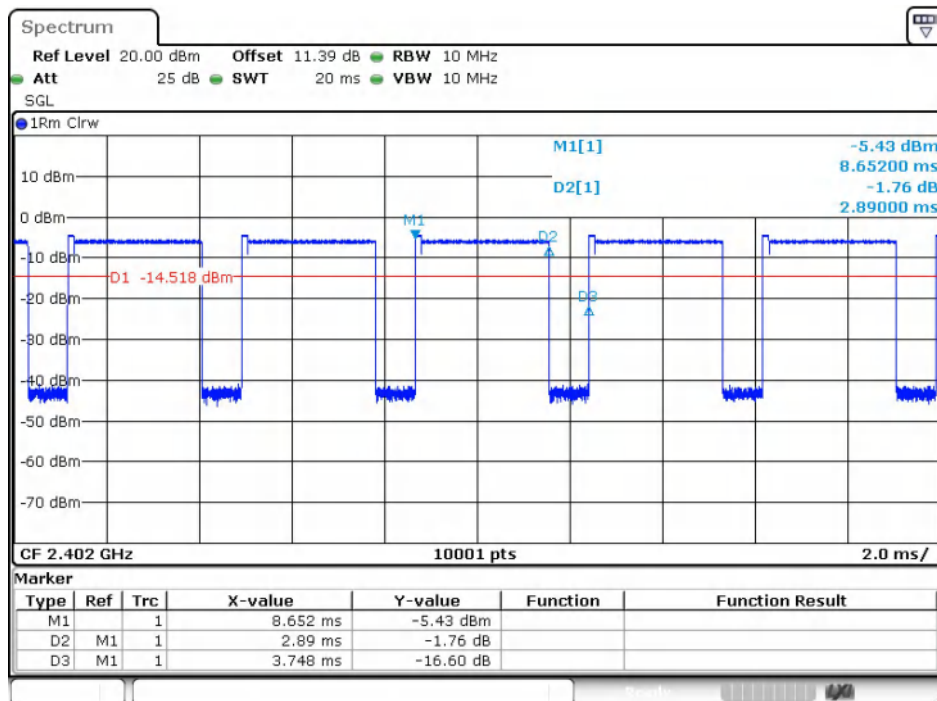
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GFSK(DH5)_Channel 39



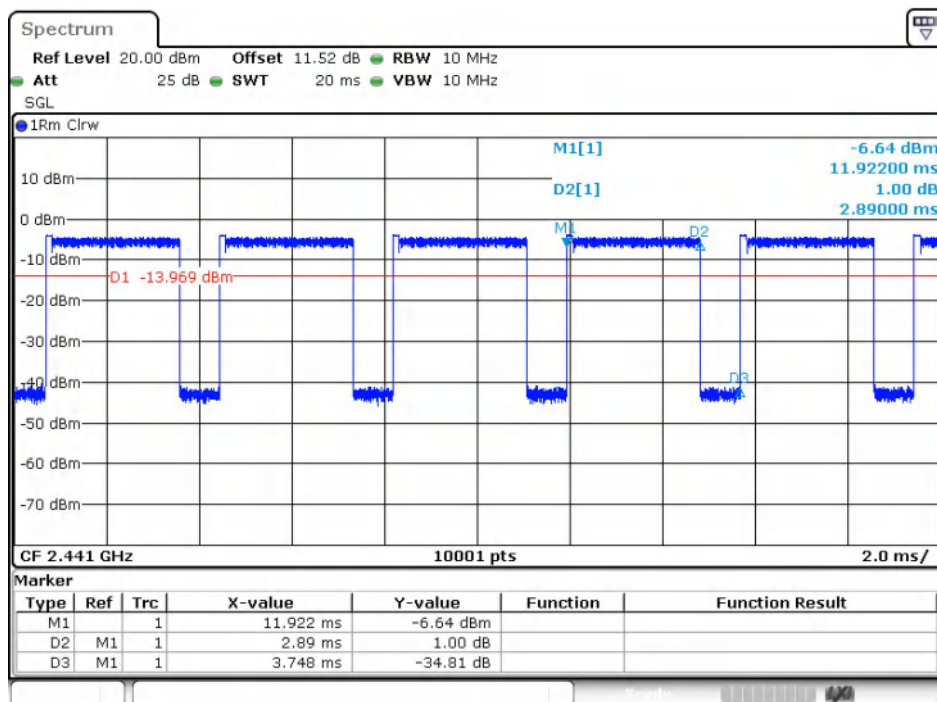
Date: 23.SEP.2024 10:58:23

GFSK(DH5)_Channel 78



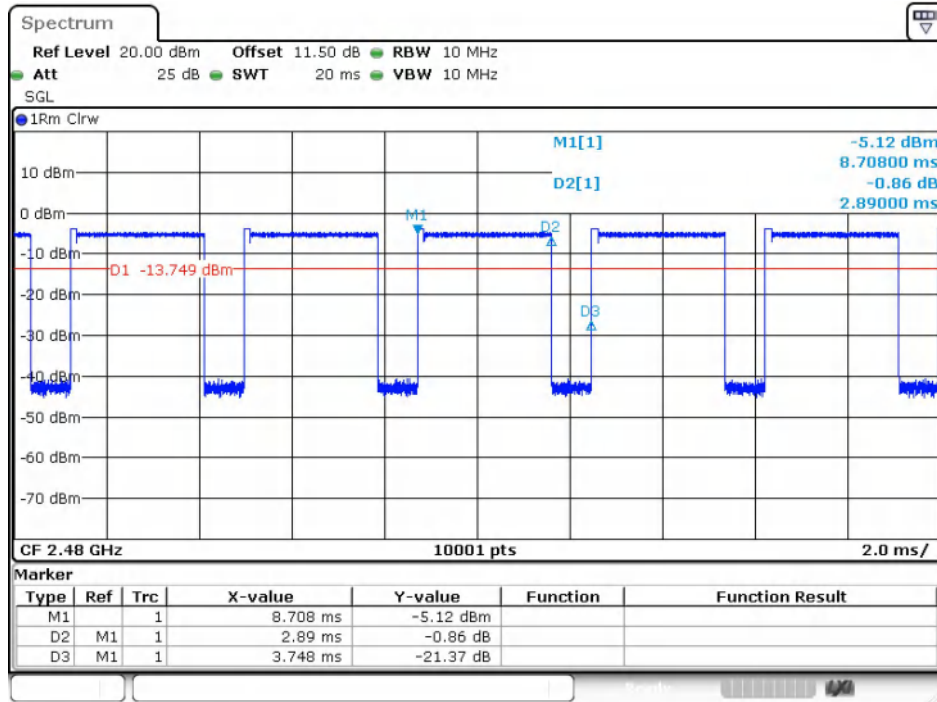
Date: 23.SEP.2024 11:00:56

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

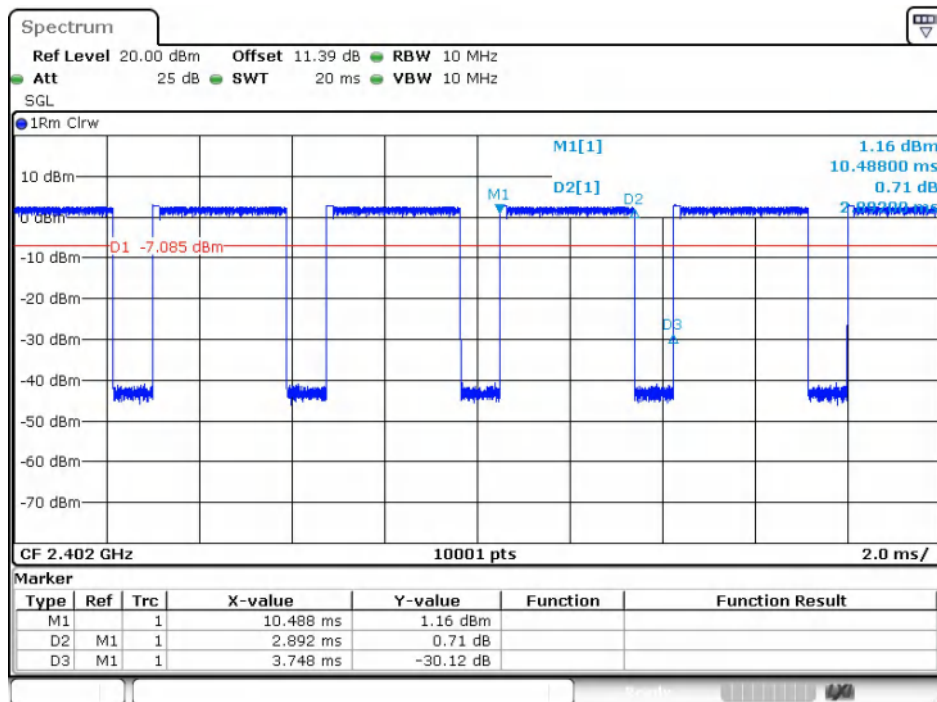


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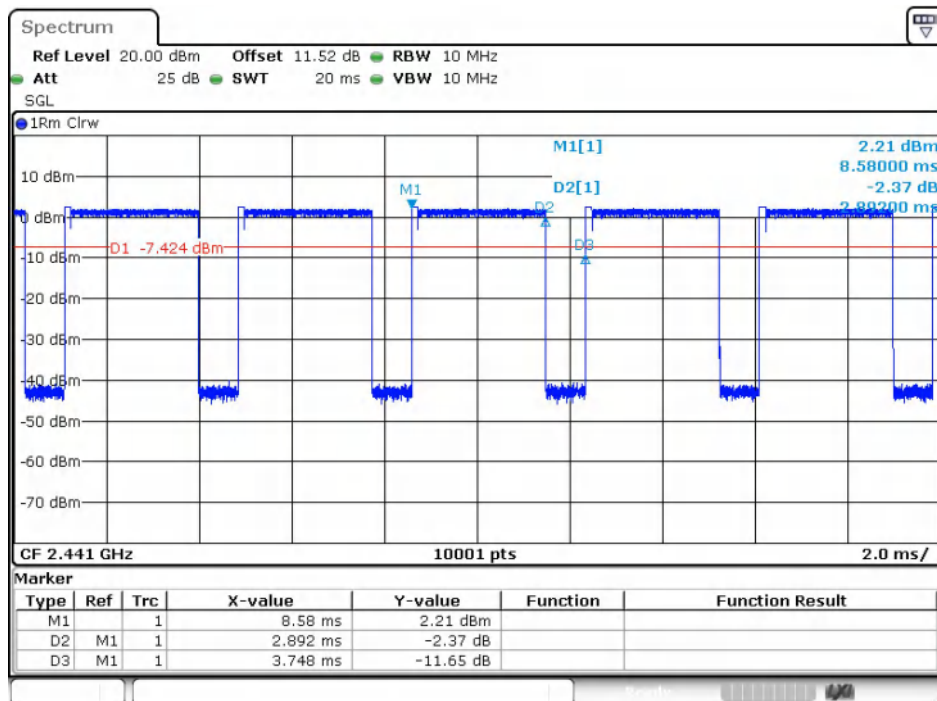
$\pi/4$ DQPSK(2-DH5)_Channel 39



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

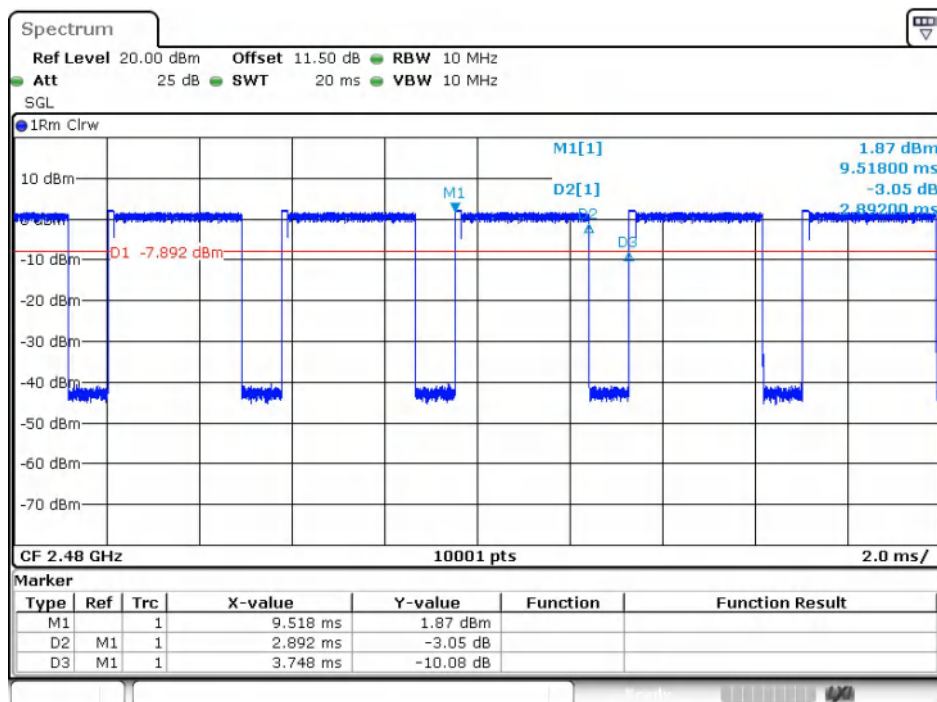


Left:8DPSK(3-DH5)_Channel 0



Date: 23.SEP.2024 21:00:17

8DPSK(3-DH5)_Channel 39



Date: 23.SEP.2024 21:02:26

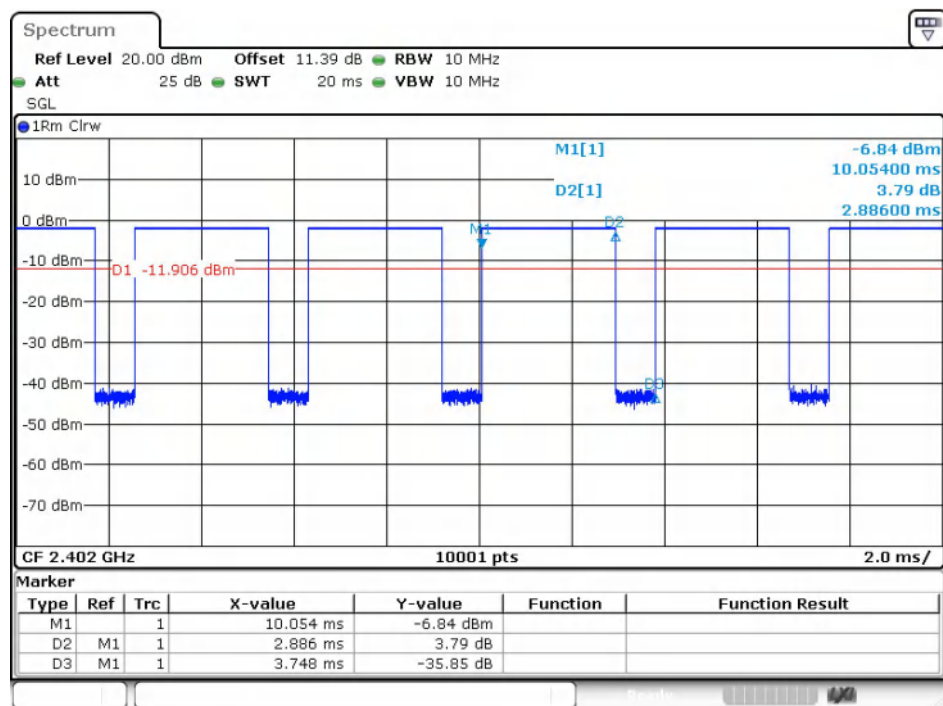
8DPSK(3-DH5)_Channel 78

Left:

Test Result

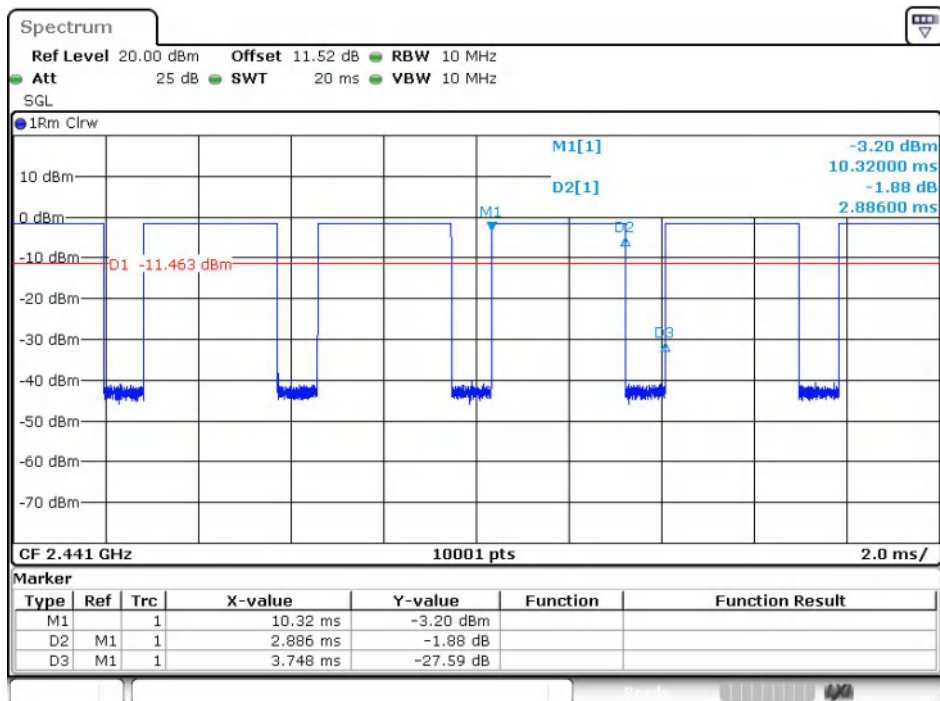
Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.886	3.748	77.00	0.7700	1.1351	0.35
		39	2.886	3.748	77.00	0.7700	1.1351	0.35
		78	2.886	3.748	77.00	0.7700	1.1351	0.35
$\pi/4$ DQPSK	2-DH5	0	2.892	3.748	77.16	0.7716	1.1261	0.35
		39	2.890	3.748	77.11	0.7711	1.1289	0.35
		78	2.890	3.748	77.11	0.7711	1.1289	0.35
8DPSK	3-DH5	0	2.894	3.748	77.21	0.7721	1.1233	0.35
		39	2.892	3.748	77.16	0.7716	1.1261	0.35
		78	2.894	3.748	77.21	0.7721	1.1233	0.35

Test Graphs



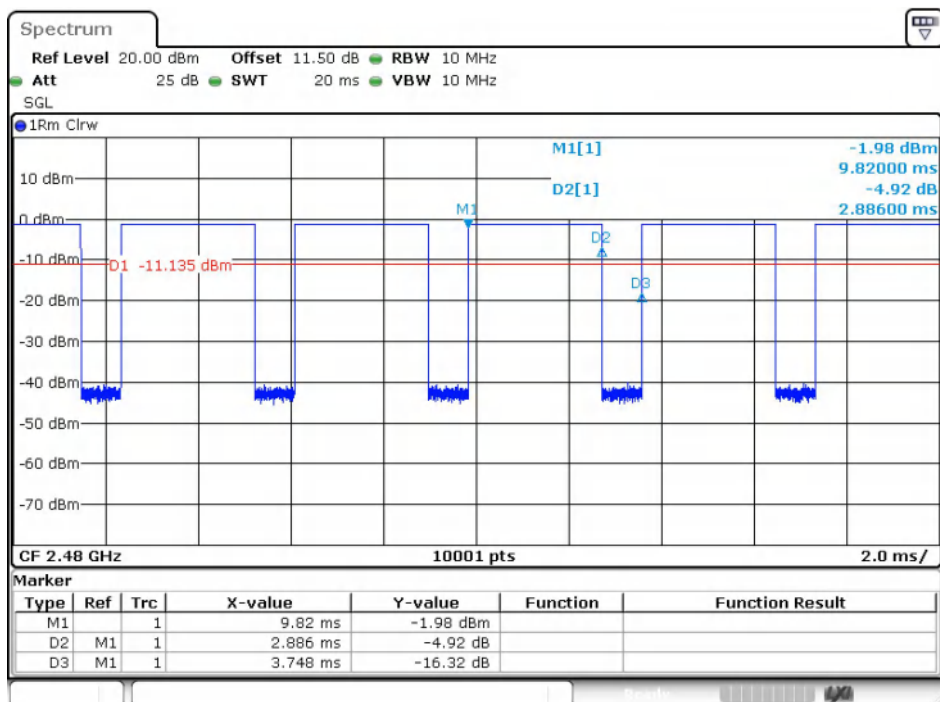
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GFSK(DH5)_Channel 0



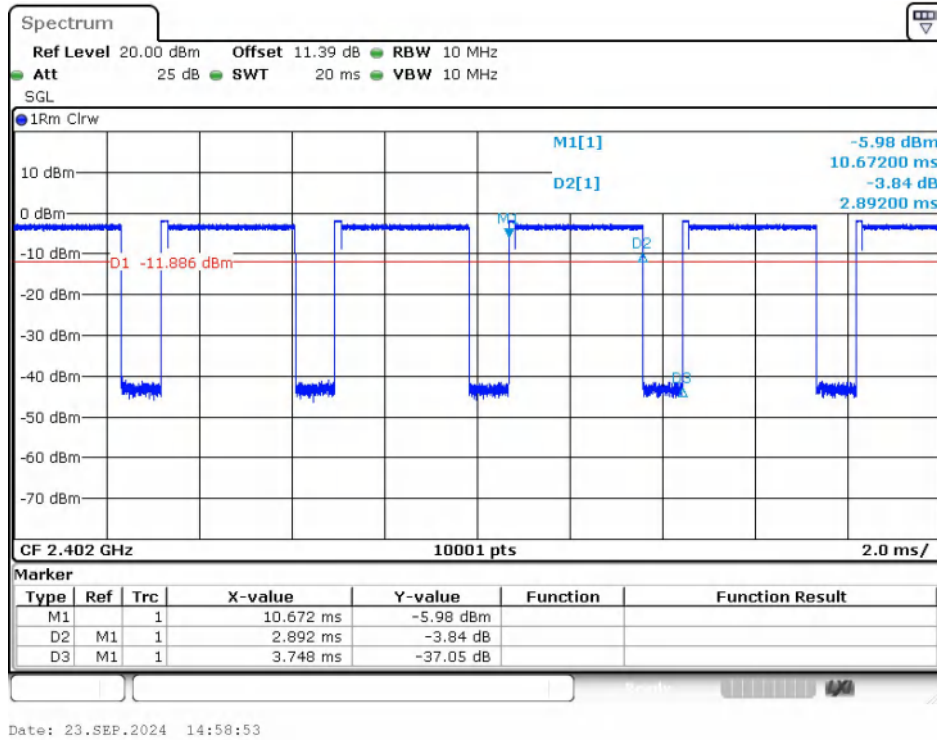
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GFSK(DH5)_Channel 39

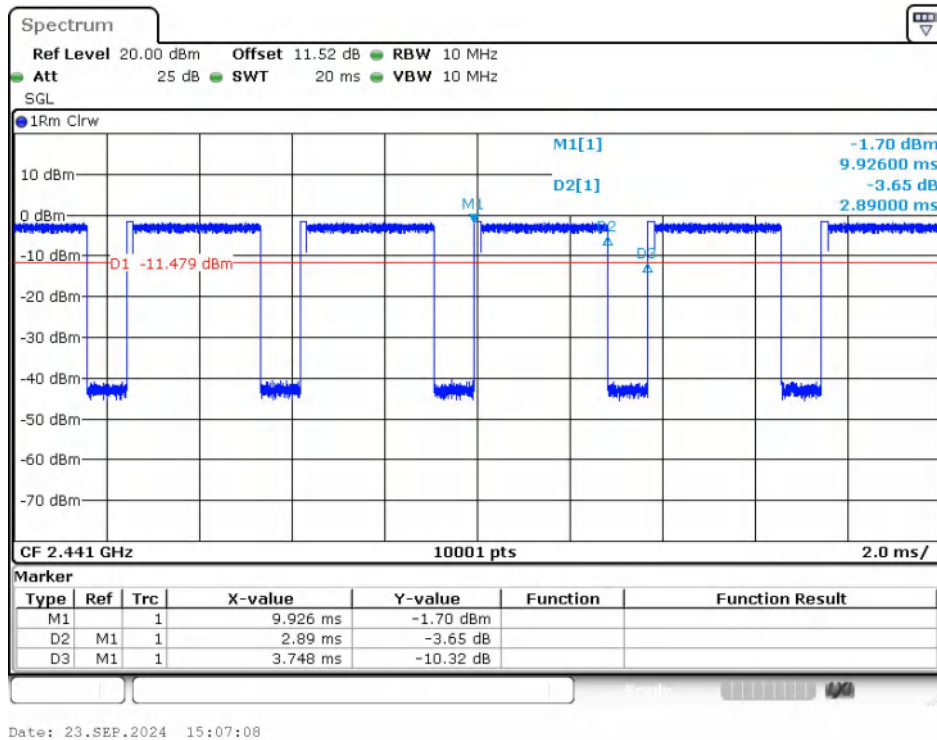


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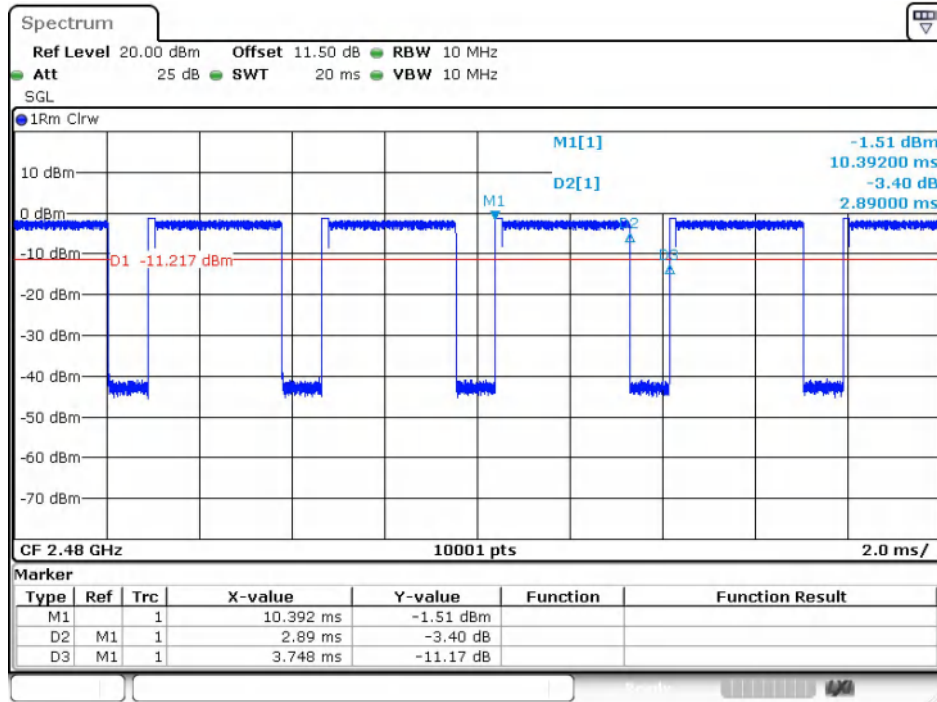
GFSK(DH5)_Channel 78



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

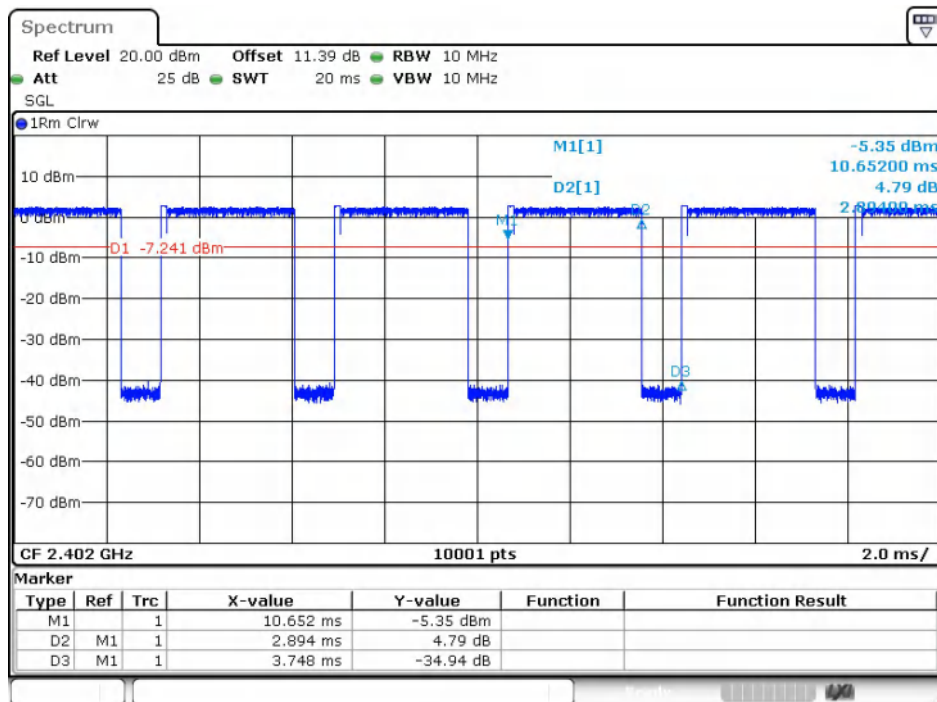


$\pi/4$ QPSK(2-DH5)_Channel 39



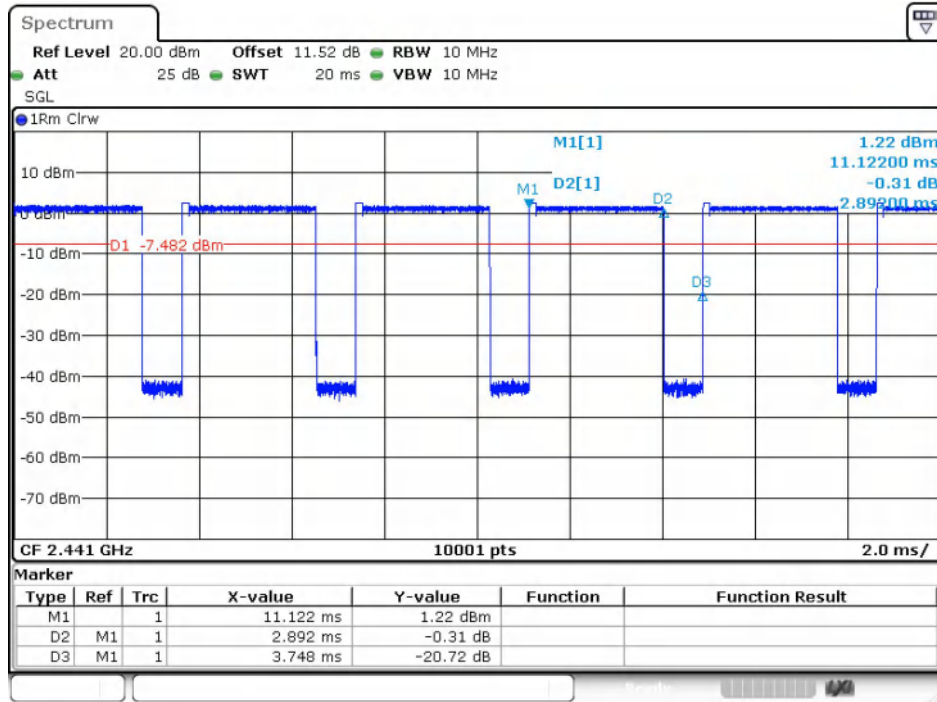
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$\pi/4$ DQPSK(2-DH5)_Channel 78



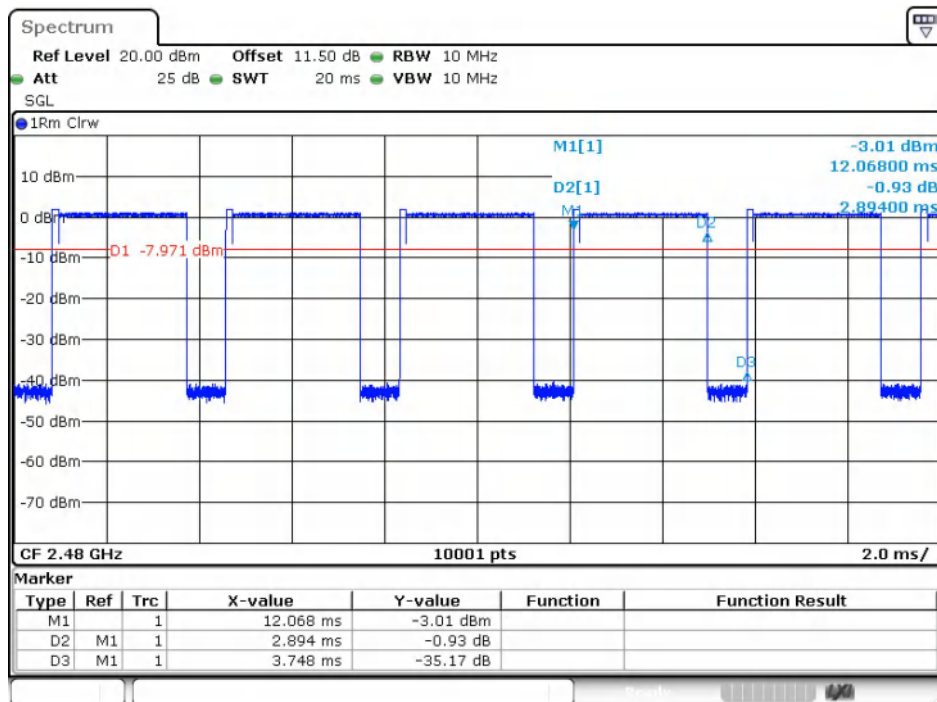
Date: 23.SEP.2024 20:11:37

8DPSK(3-DH5)_Channel 0



Date: 23.SEP.2024 20:13:10

8DPSK(3-DH5)_Channel 39



Date: 23.SEP.2024 20:10:21

8DPSK(3-DH5)_Channel 78

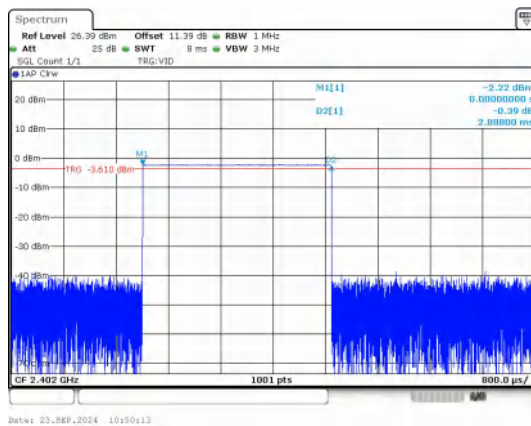
2) Dwell Time

Right:

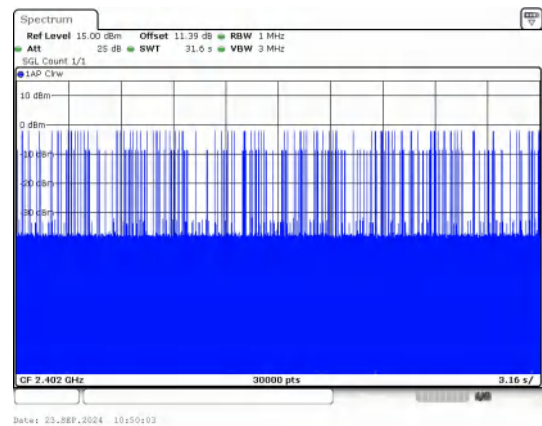
Test Result

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	100	288.8	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.888	116	335.01		PASS
8DPSK	3-DH5		2.896	99	286.7		PASS

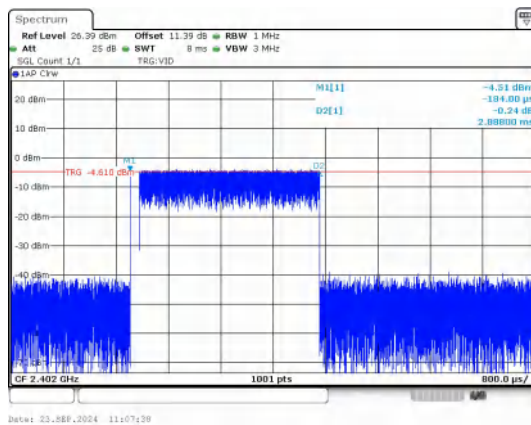
Test Graphs



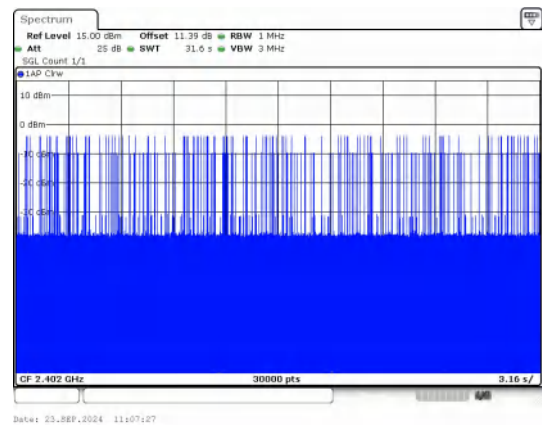
Pulse Width
GFSK_DH5



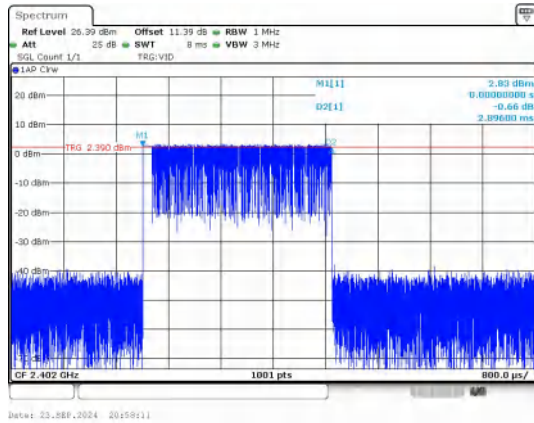
Number of Pulses in 31.6 seconds
GFSK_DH5



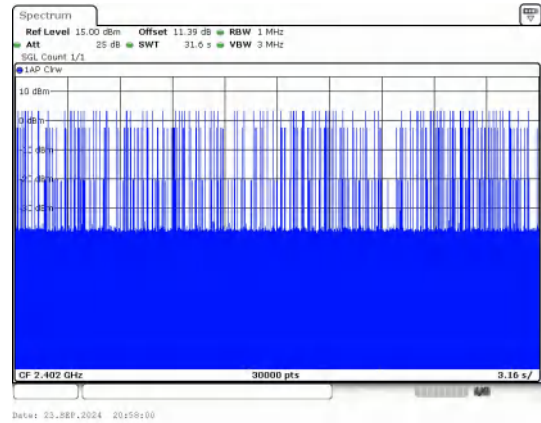
Pulse Width
 $\pi/4$ DQPSK_2-DH5



Number of Pulses in 31.6 seconds
 $\pi/4$ DQPSK_2-DH5



Pulse Width
8DPSK_3-DH5



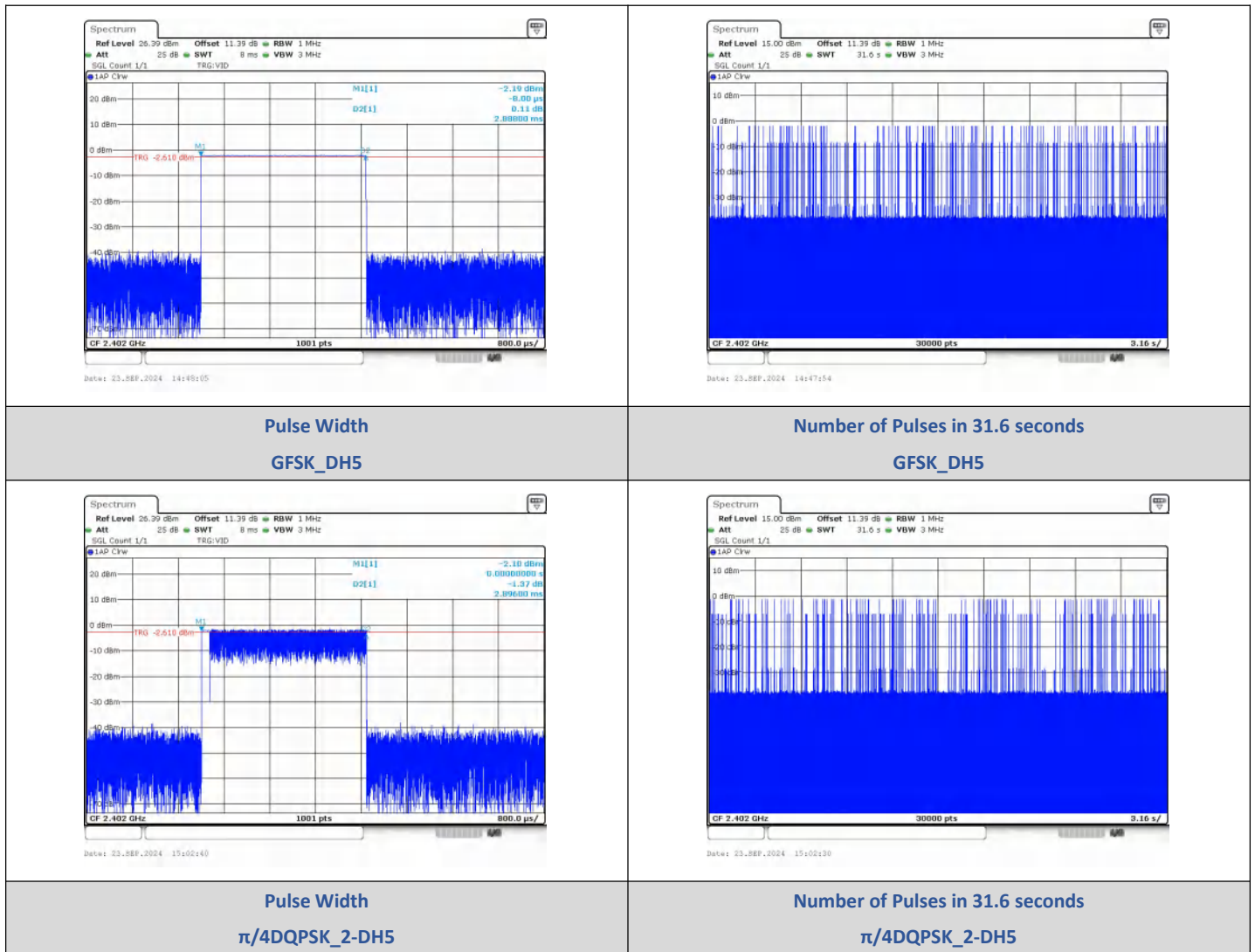
Number of Pulses in 31.6 seconds
8DPSK_3-DH5

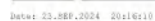
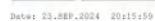
Left:

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	106	306.13	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.896	108	312.77		PASS
8DPSK	3-DH5		2.896	113	327.25		PASS

Test Graphs



Pulse Width
8DPSK_3-DH5

Number of Pulses in 31.6 seconds

8DPSK_3-DH5

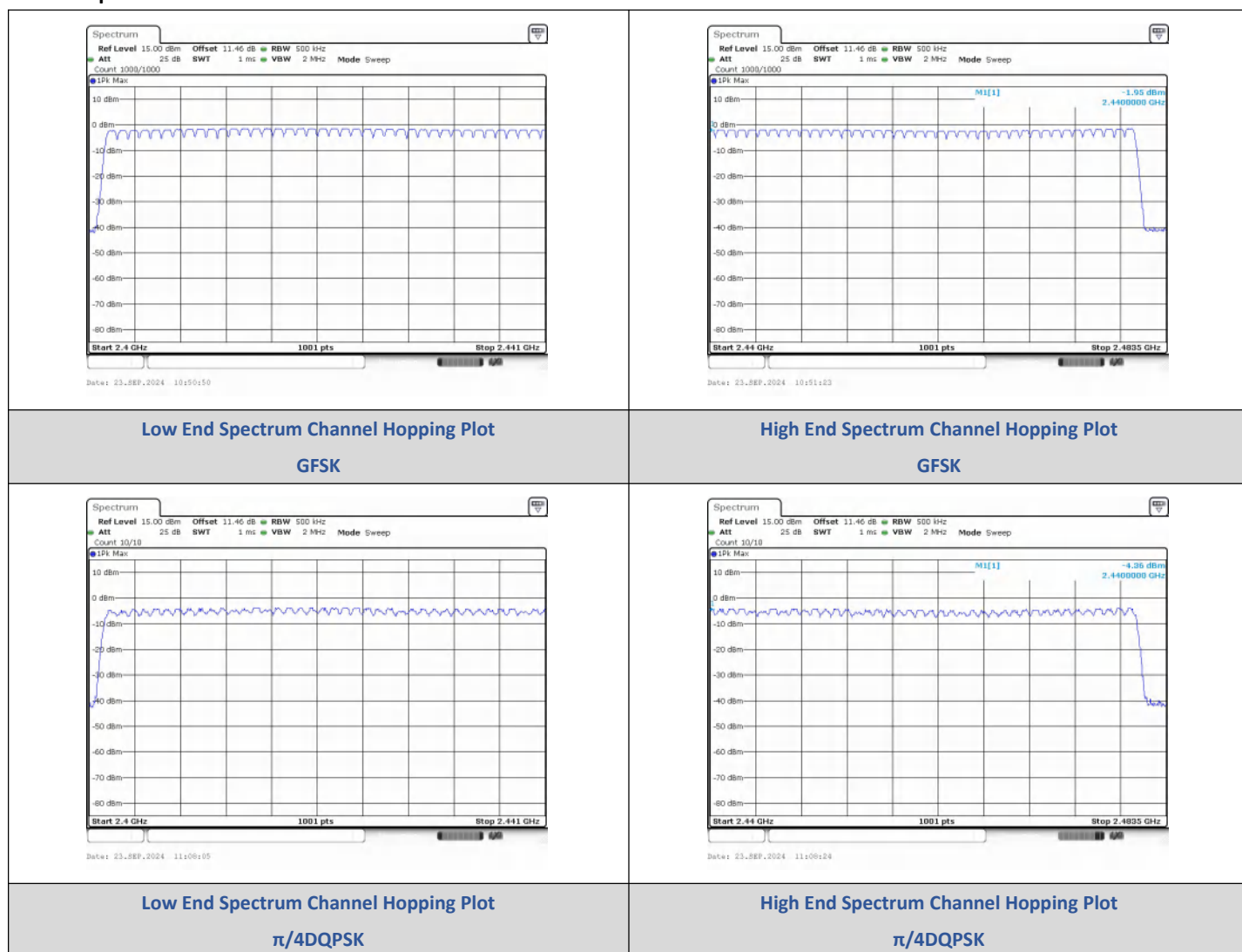
3) Number Of Hopping Channel

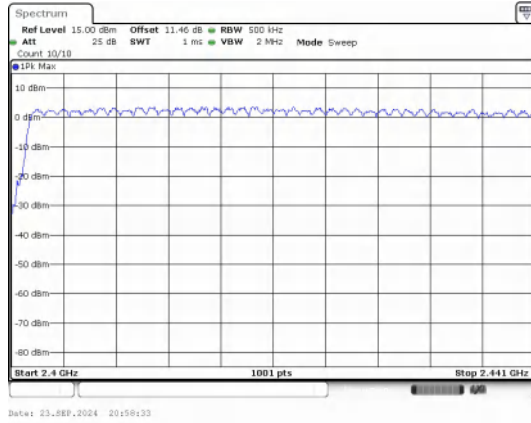
Right:

Test Result

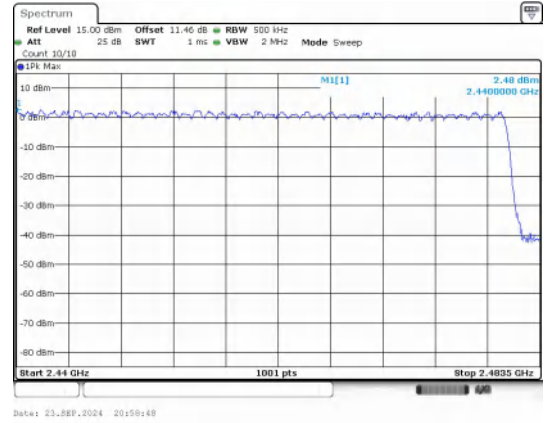
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
$\pi/4$ DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

Test Graphs





Low End Spectrum Channel Hopping Plot
8DPSK



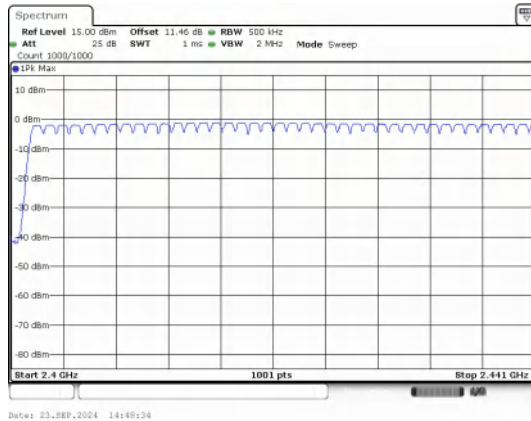
High End Spectrum Channel Hopping Plot
8DPSK

Left:

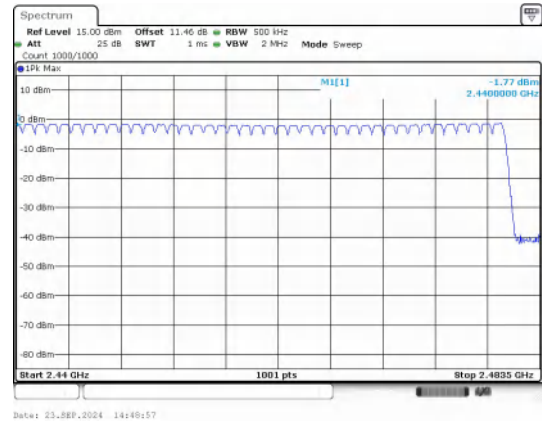
Test Result

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

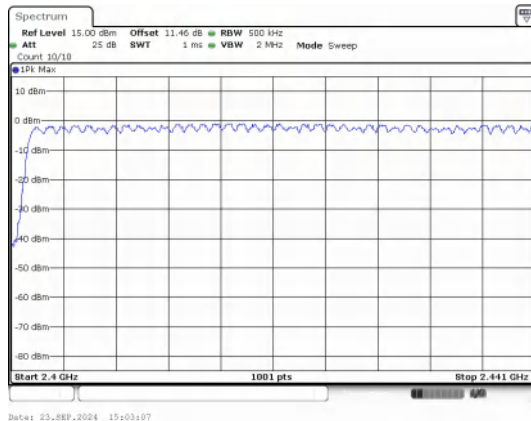
Test Graphs



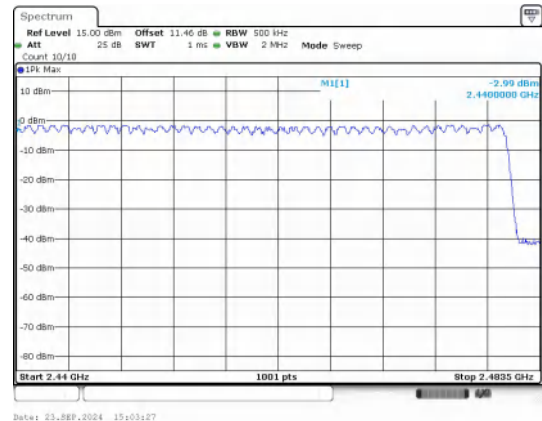
Low End Spectrum Channel Hopping Plot
GFSK



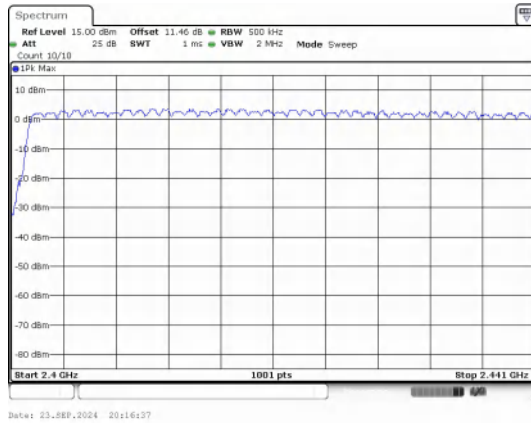
High End Spectrum Channel Hopping Plot
GFSK



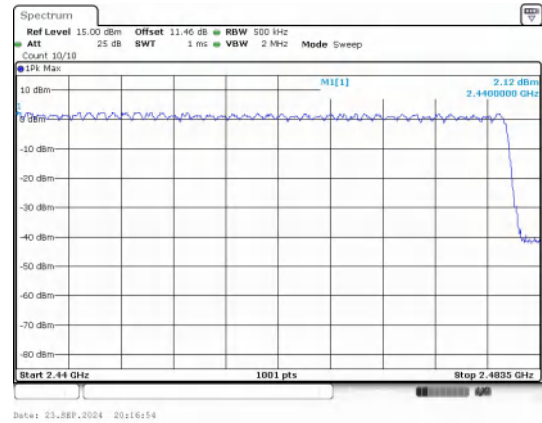
Low End Spectrum Channel Hopping Plot
 $\pi/4$ DQPSK



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



Low End Spectrum Channel Hopping Plot
8DPSK



High End Spectrum Channel Hopping Plot
8DPSK

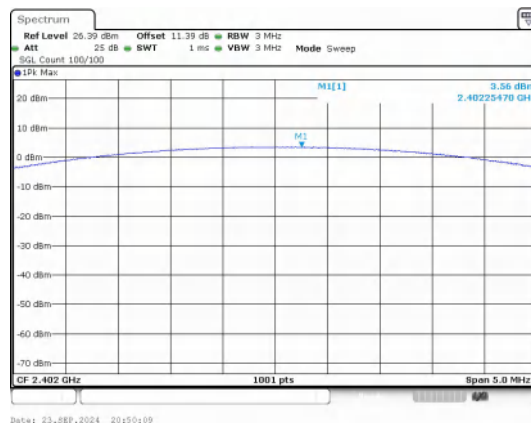
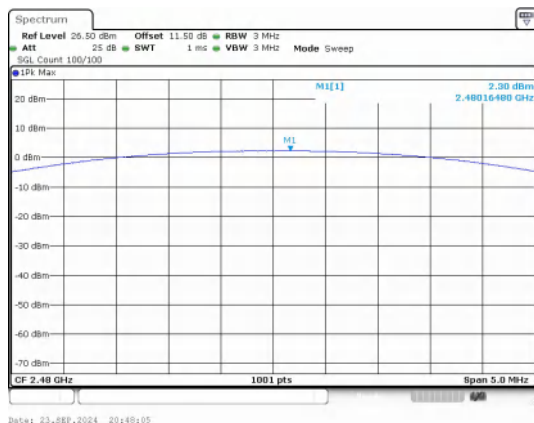
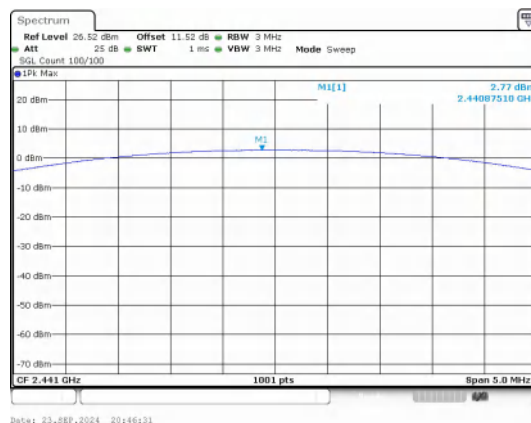
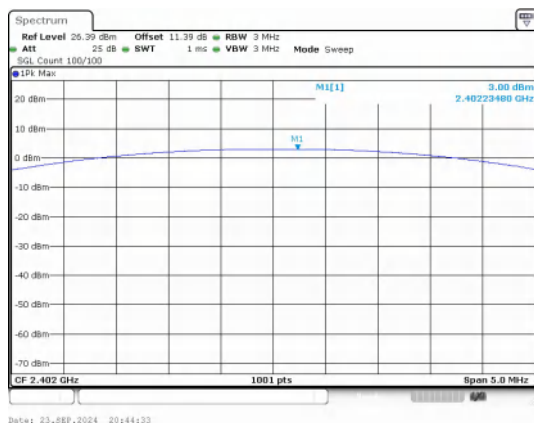
4) Conducted Peak Output Power

Right:

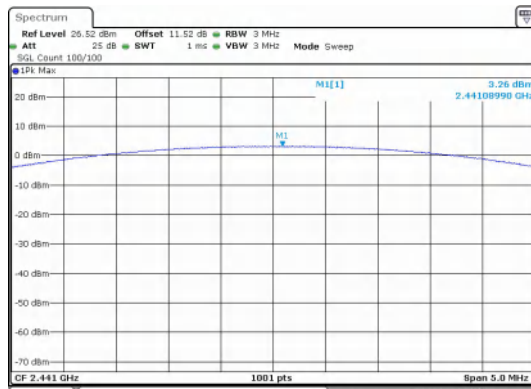
Test Result

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	3.00	2.00	≤30	PASS
		39	2.77	1.89		PASS
		78	2.30	1.70		PASS
$\pi/4$ DQPSK	2-DH5	0	3.56	2.27	≤20.97	PASS
		39	3.26	2.12		PASS
		78	2.93	1.96		PASS
8DPSK	3-DH5	0	3.65	2.32		PASS
		39	3.48	2.23		PASS
		78	3.06	2.02		PASS

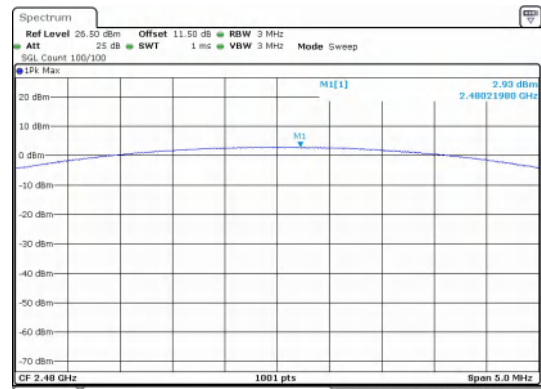
Test Graphs



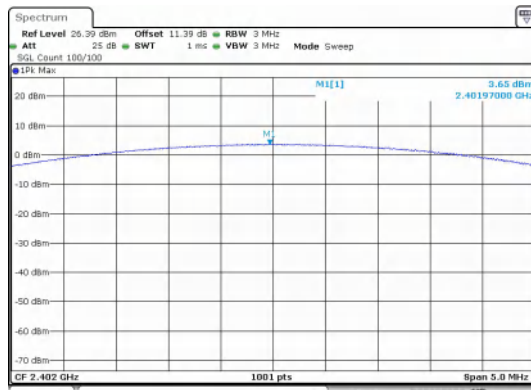
GFSK_Channel 78



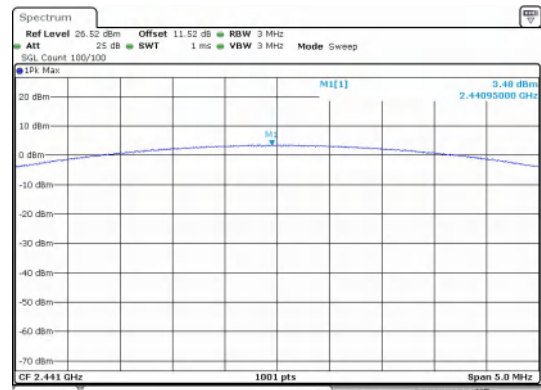
$\pi/4$ DQPSK_Channel 0



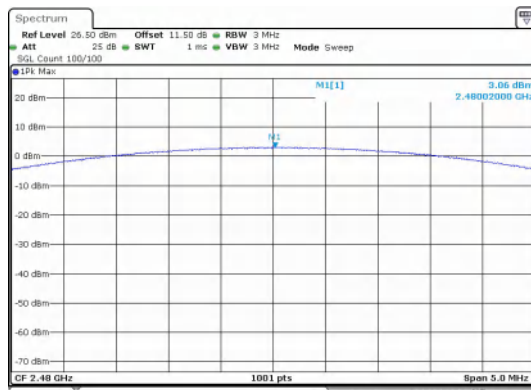
Peak Output Power
 $\pi/4$ DQPSK_Channel 39



Peak Output Power
 $\pi/4$ DQPSK_Channel 78



Peak Output Power
8DPSK_Channel 0



Peak Output Power
8DPSK_Channel 39

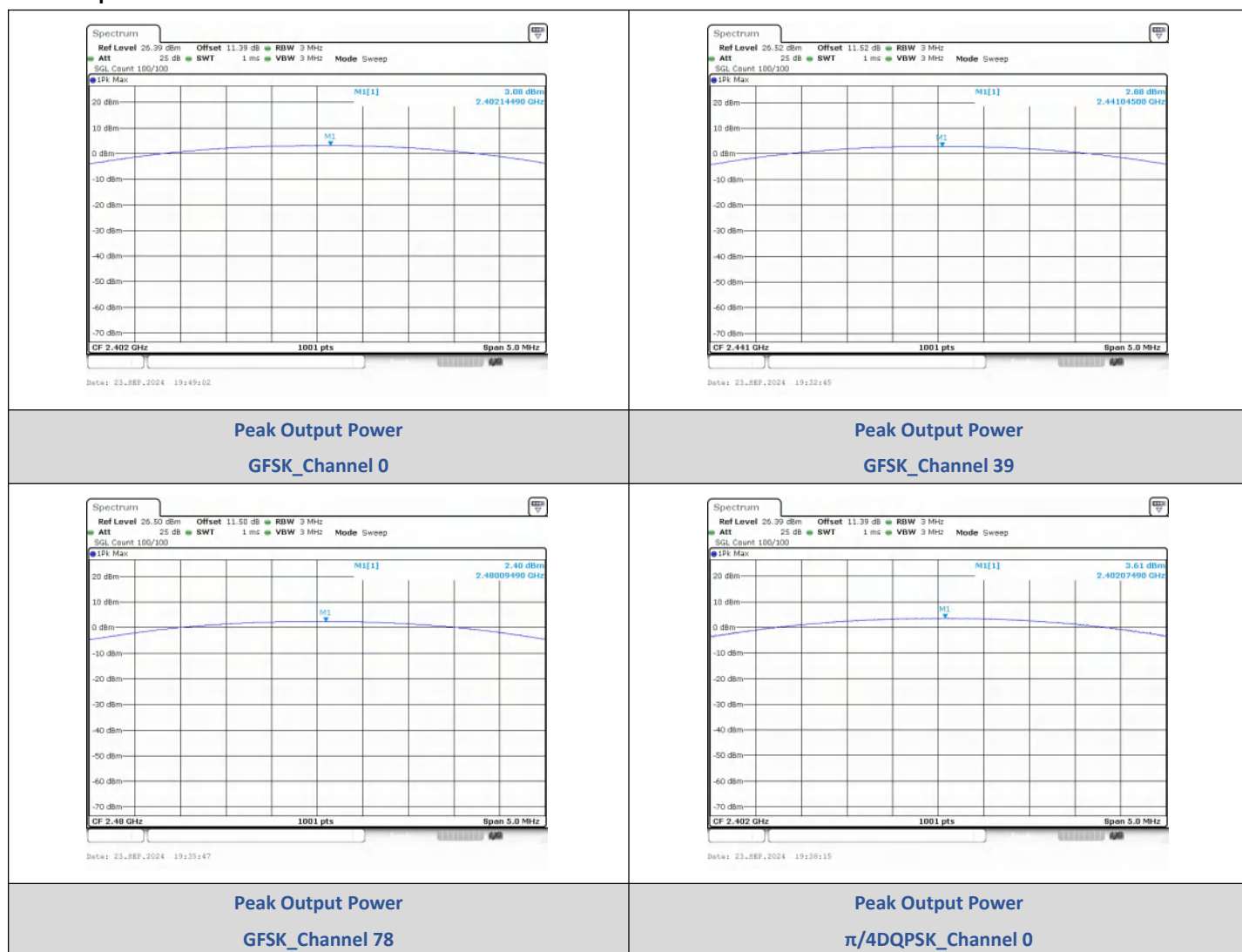
Peak Output Power
8DPSK_Channel 78

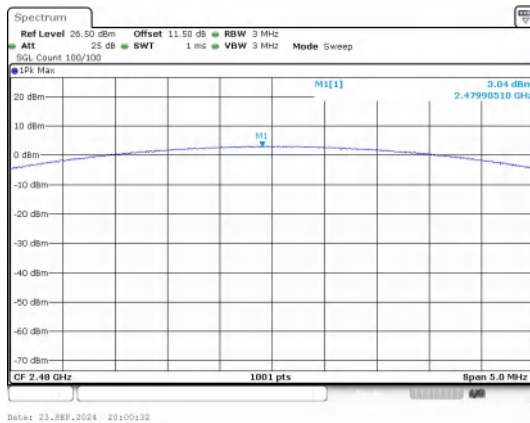
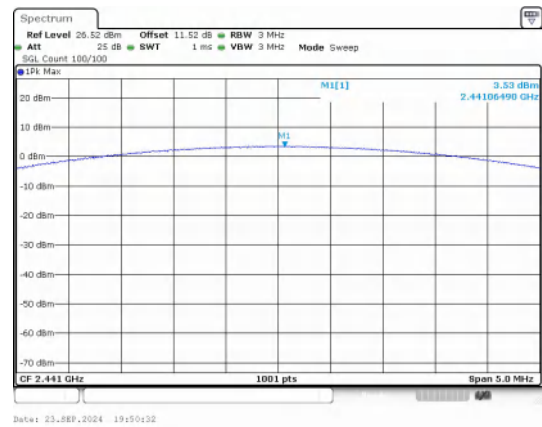
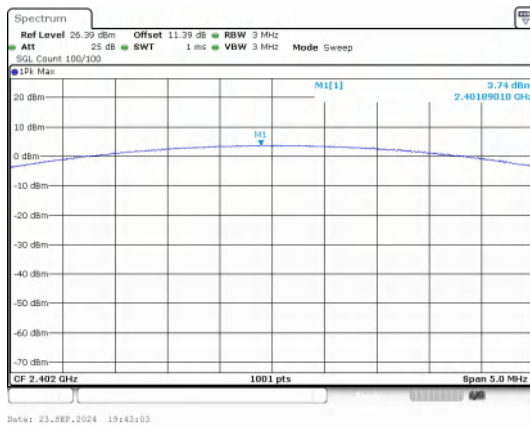
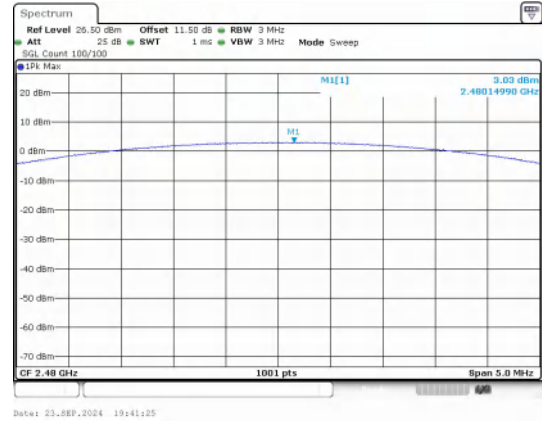
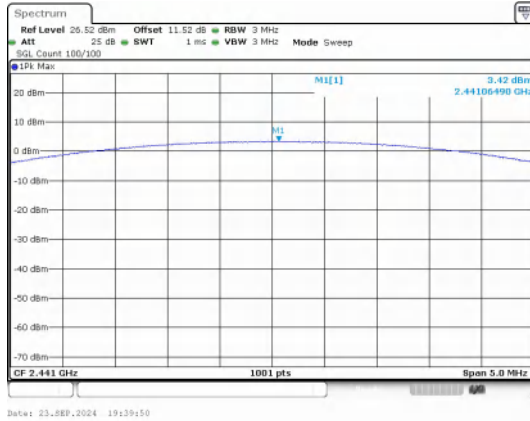
Left:

Test Result

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	3.08	2.03	≤30	PASS
		39	2.89	1.94		PASS
		78	2.40	1.74		PASS
$\pi/4$ DQPSK	2-DH5	0	3.61	2.30	≤20.97	PASS
		39	3.42	2.20		PASS
		78	3.03	2.01		PASS
8DPSK	3-DH5	0	3.74	2.36		PASS
		39	3.53	2.26		PASS
		78	3.04	2.02		PASS

Test Graphs





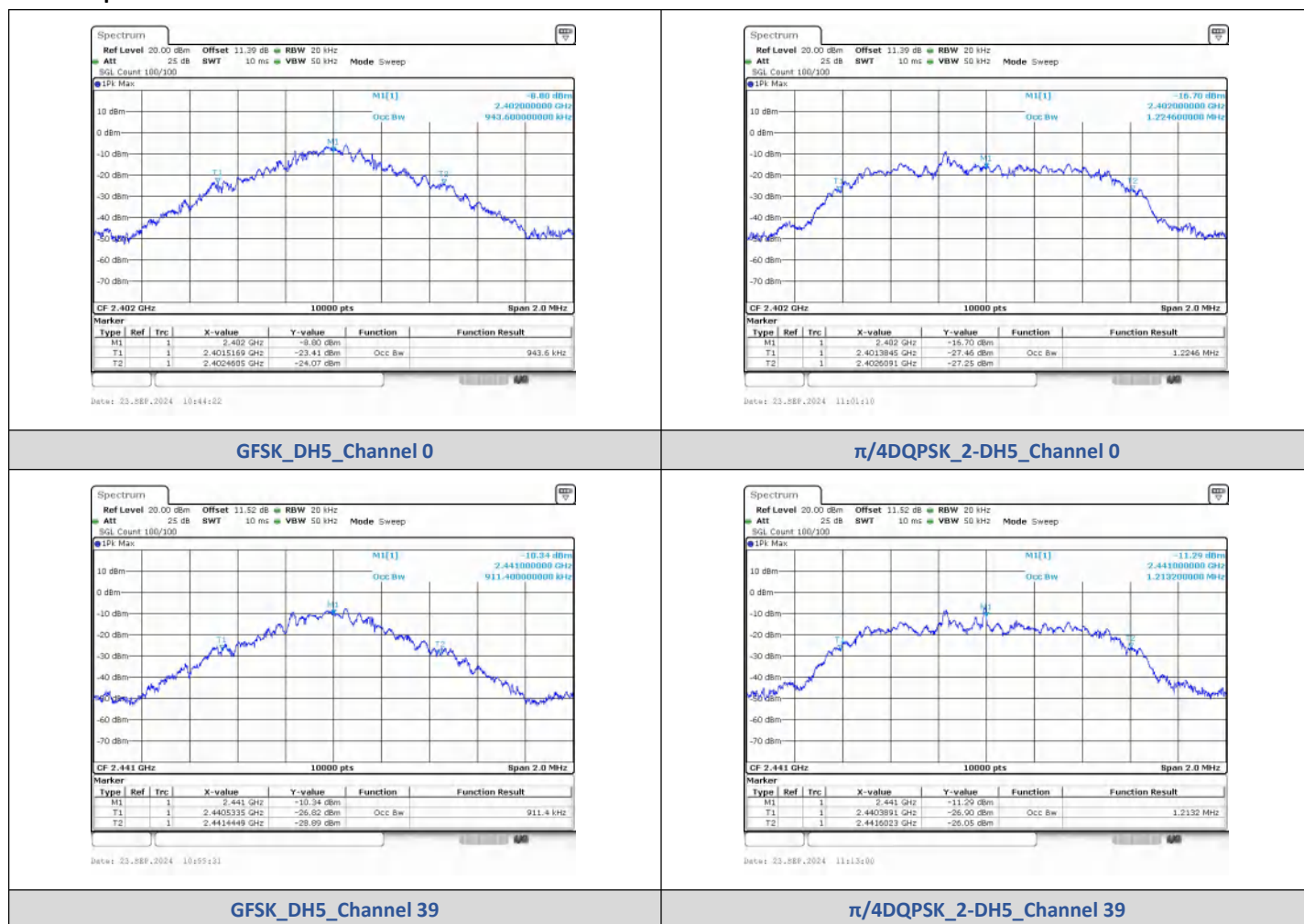
5) 99% Bandwidth

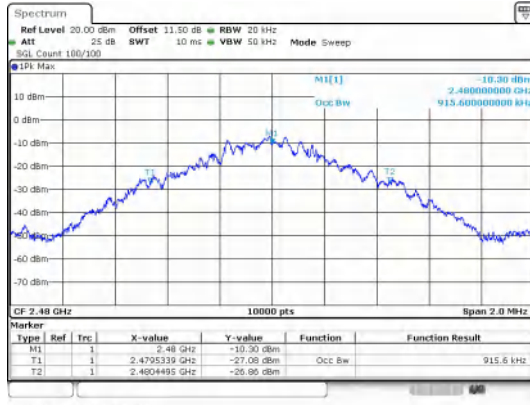
Right:

Test Result

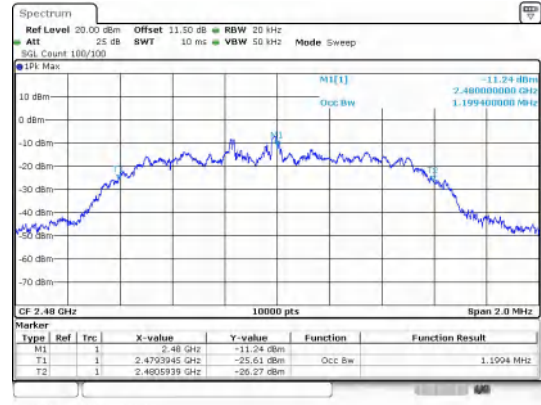
Modulation	Channel	Center Frequency (MHz)	99% BW (MHz)
GFSK	0	2402	0.94360
	39	2441	0.91140
	78	2480	0.91560
$\pi/4$ DQPSK	0	2402	1.2246
	39	2441	1.2132
	78	2480	1.1994
8DPSK	0	2402	1.2208
	39	2441	1.2156
	78	2480	1.2094

Test Graphs

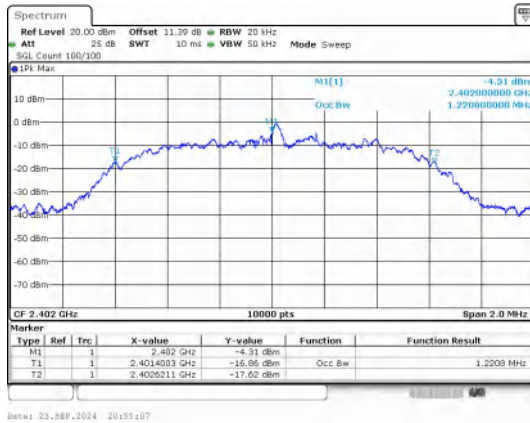




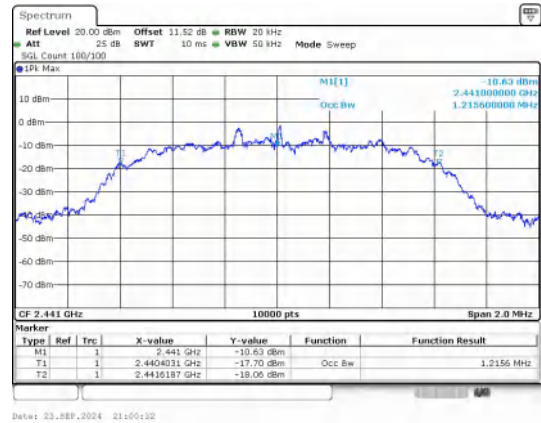
GFSK_DH5_Channel 78



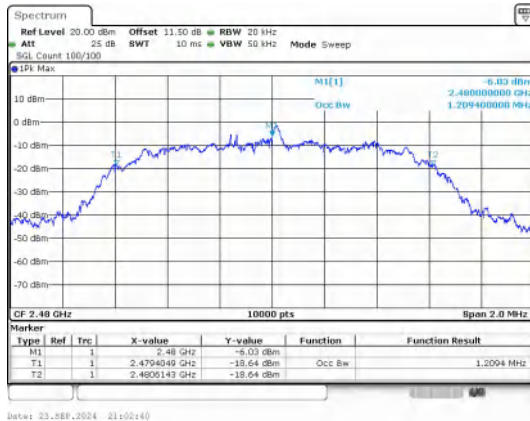
$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



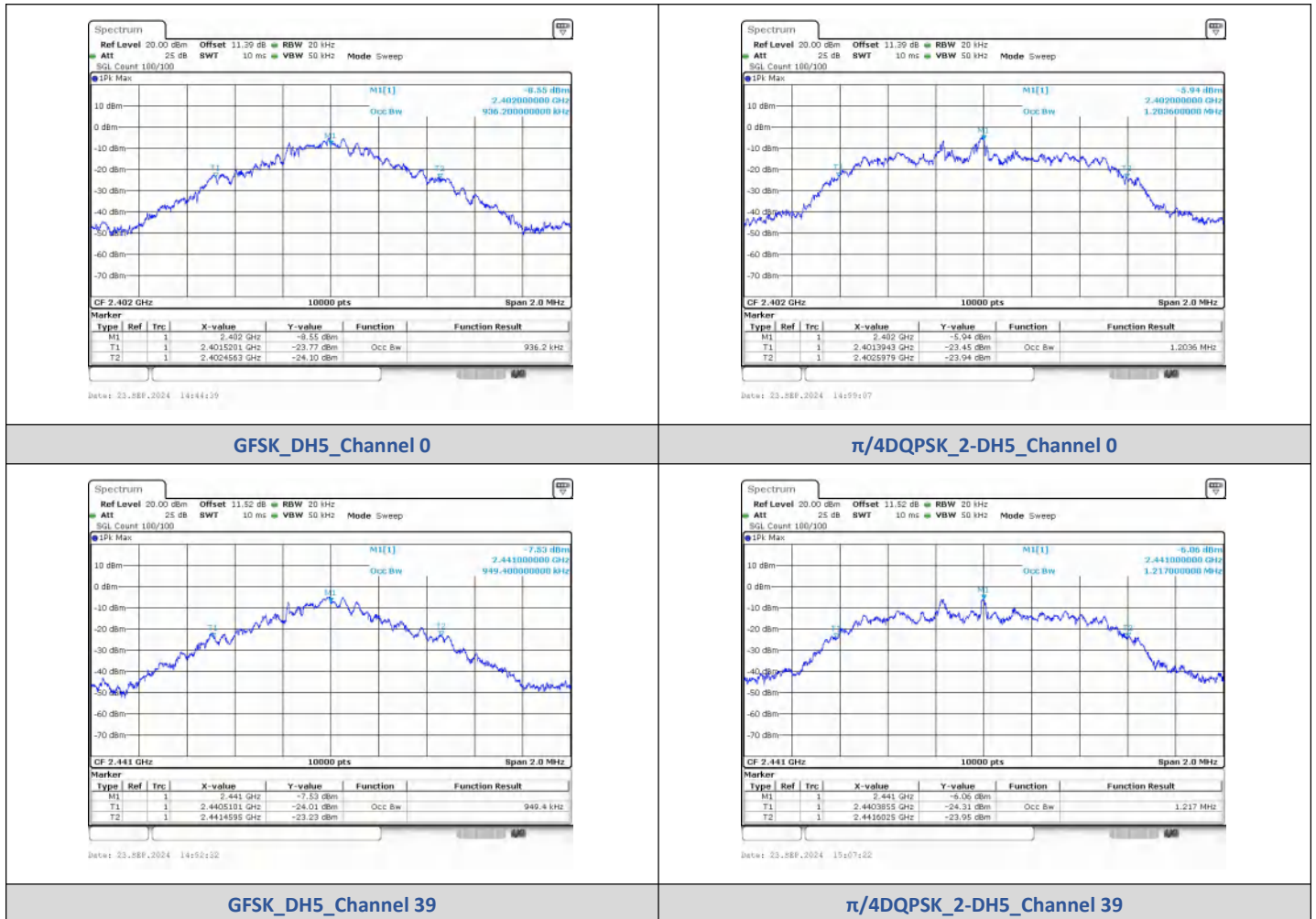
8DPSK_3-DH5_Channel 78

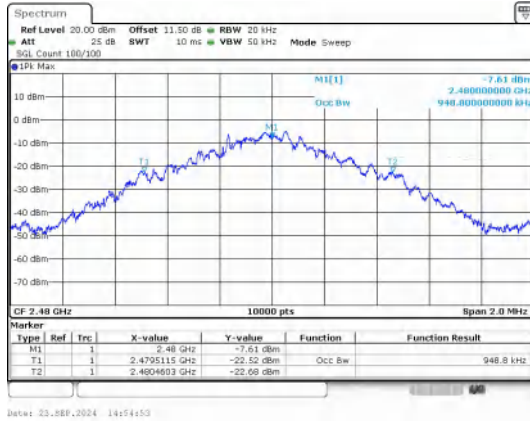
Left:

Test Result

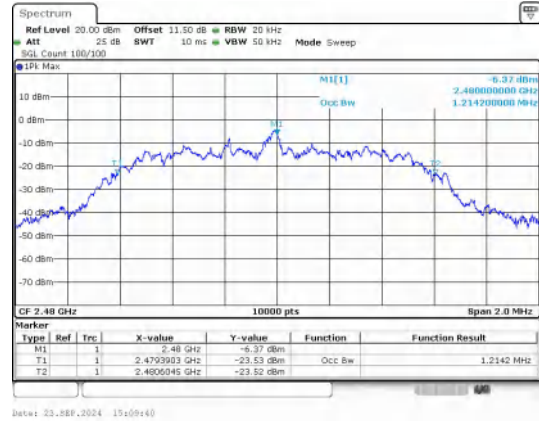
Modulation	Channel	Center Frequency (MHz)	99% BW (MHz)
GFSK	0	2402	0.93620
	39	2441	0.94940
	78	2480	0.94880
$\pi/4$ DQPSK	0	2402	1.2036
	39	2441	1.2170
	78	2480	1.2142
8DPSK	0	2402	1.2192
	39	2441	1.2160
	78	2480	1.2160

Test Graphs

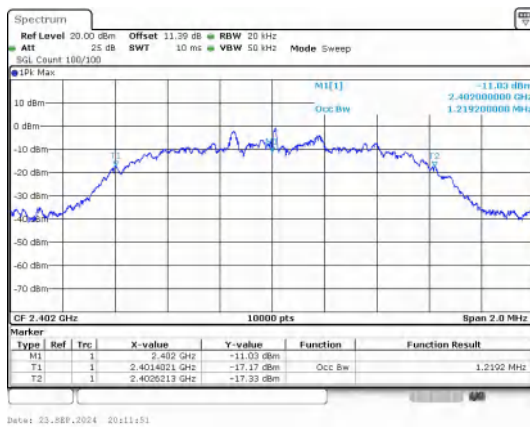




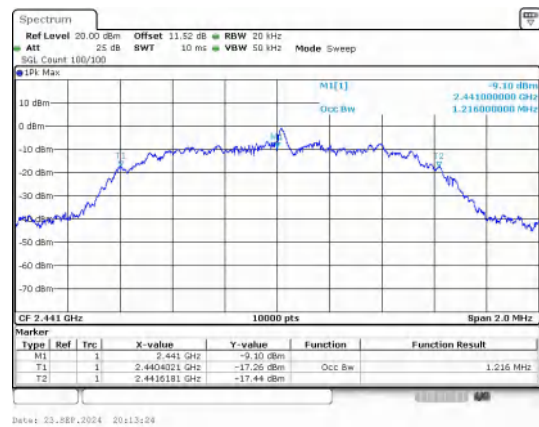
GFSK_DH5_Channel 78



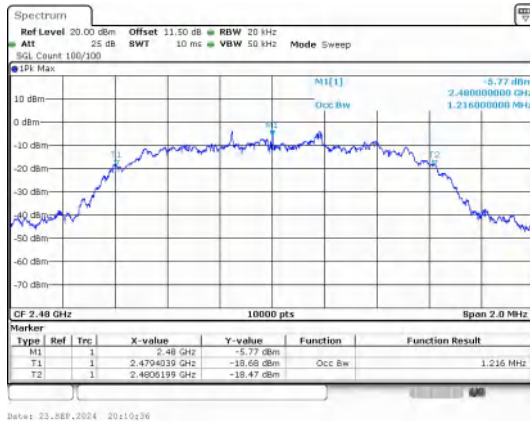
$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



8DPSK_3-DH5_Channel 78

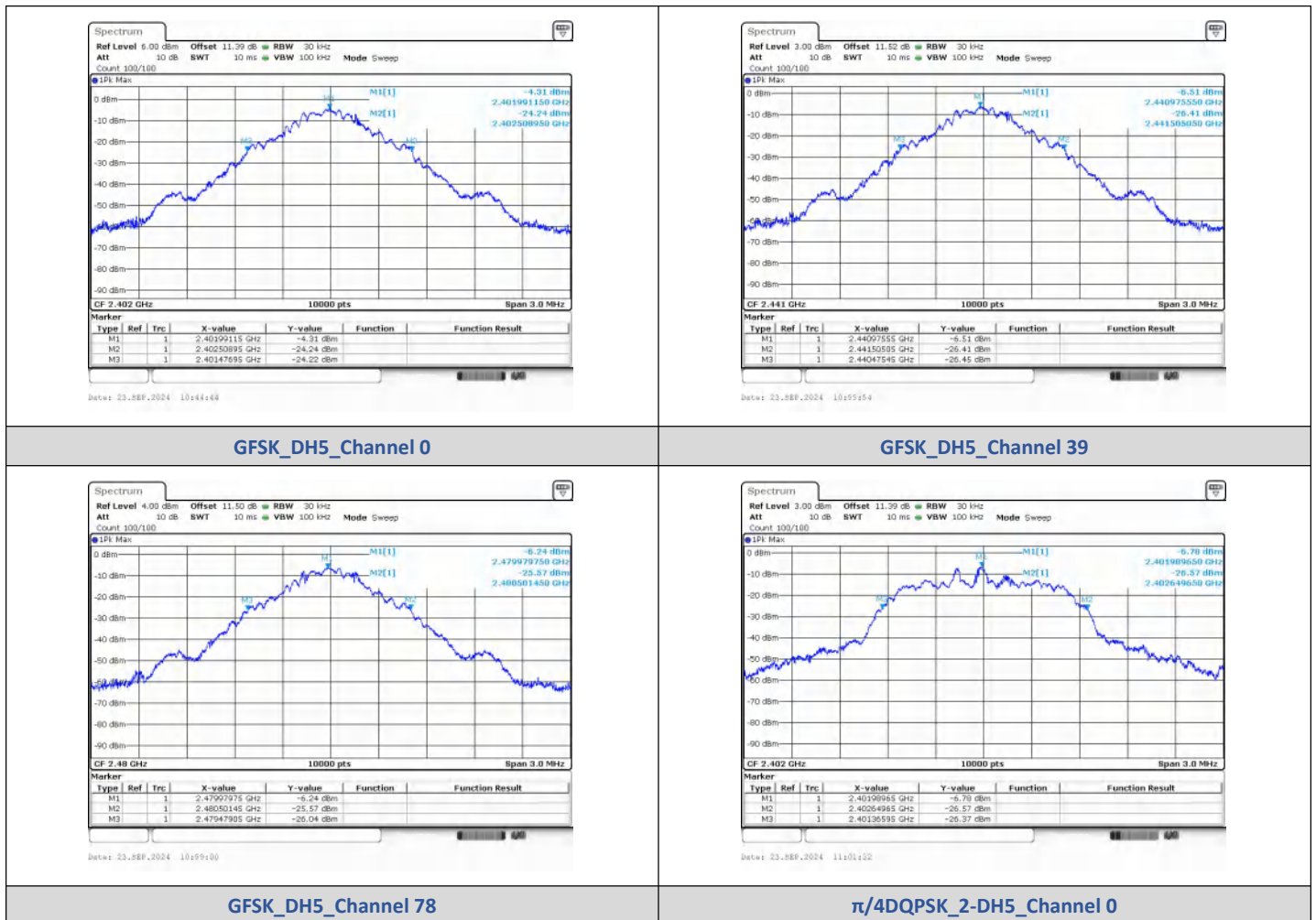
6) 20dB Bandwidth

Right:

Test Result

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

Test Graphs

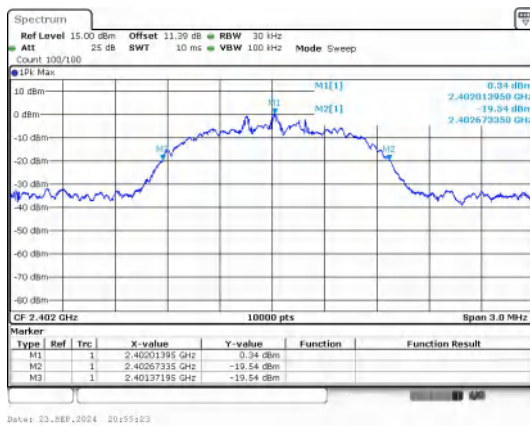




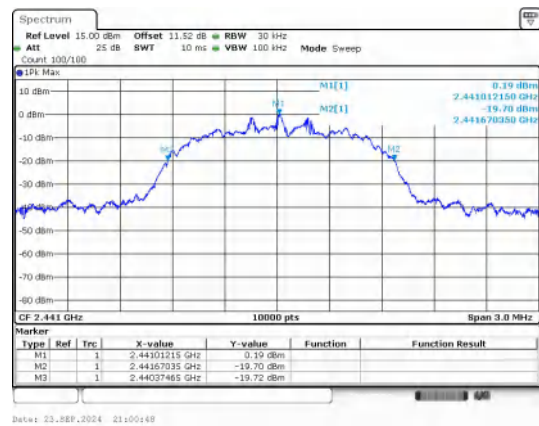
$\pi/4$ DQPSK_2-DH5_Channel 39



$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



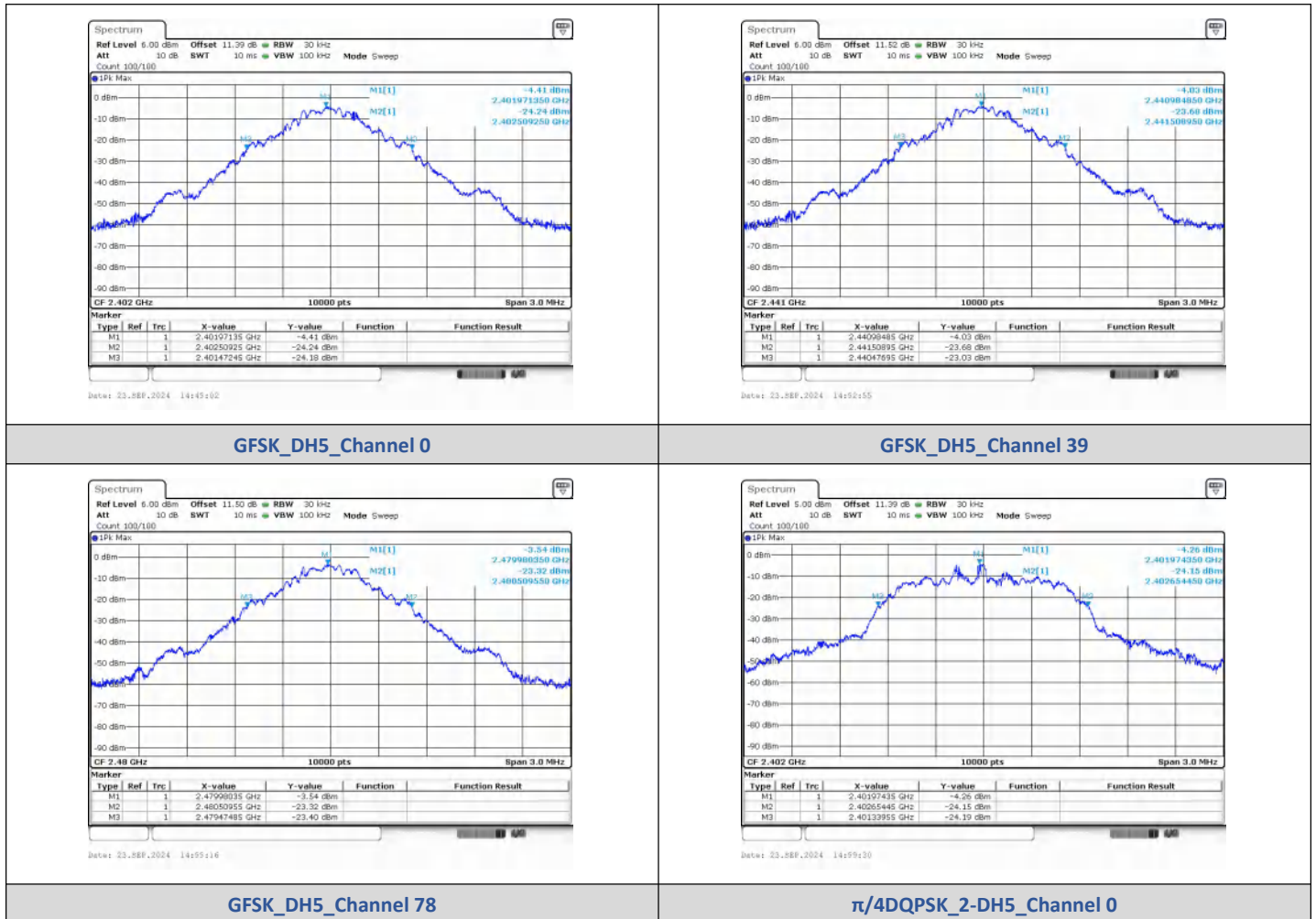
8DPSK_3-DH5_Channel 78

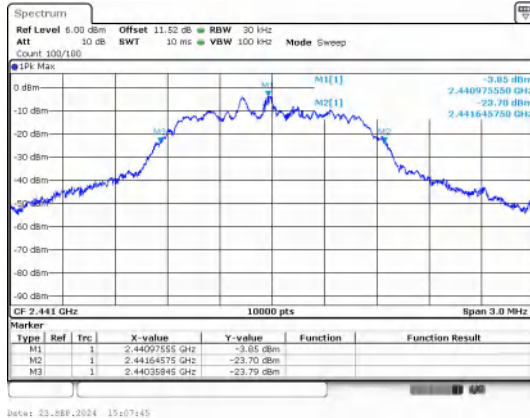
Left:

Test Result

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.040
	39	2441 MHz	1.030
	78	2480 MHz	1.040
$\pi/4$ DQPSK	0	2402 MHz	1.310
	39	2441 MHz	1.290
	78	2480 MHz	1.310
8DPSK	0	2402 MHz	1.300
	39	2441 MHz	1.300
	78	2480 MHz	1.300

Test Graphs

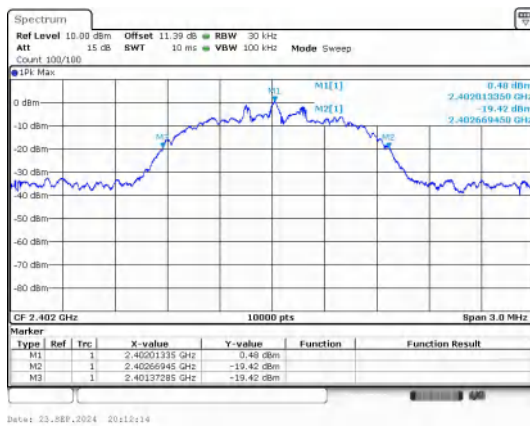




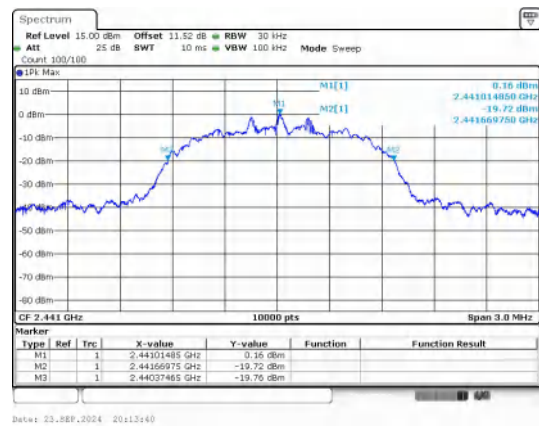
$\pi/4$ DQPSK_2-DH5_Channel 39



$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



8DPSK_3-DH5_Channel 78

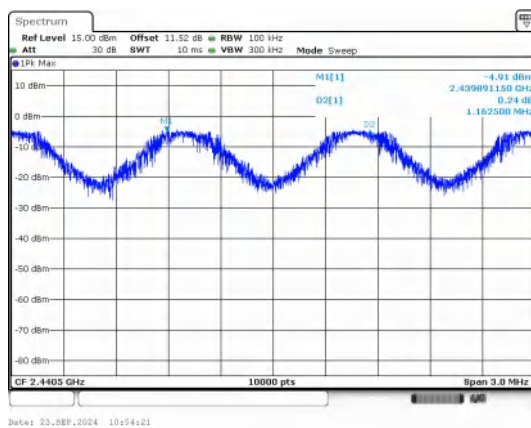
7) Carrier Frequencies Separation

Right:

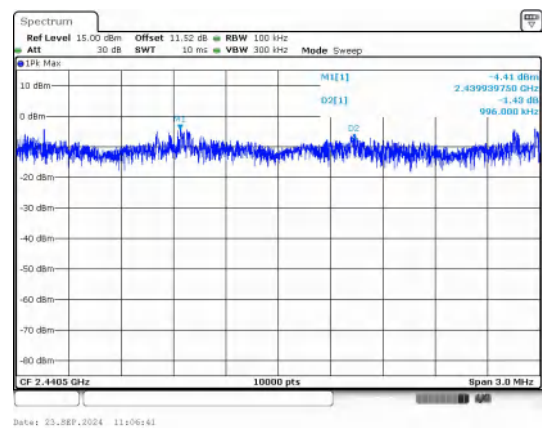
Test Result

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2439.8911	2441.0536	1.1625	1.030	PASS
$\pi/4$ QPSK	2-DH5	2439.9398	2440.9358	0.9960	0.853	PASS
8DPSK	3-DH5	2440.0406	2441.1881	1.1475	0.867	PASS

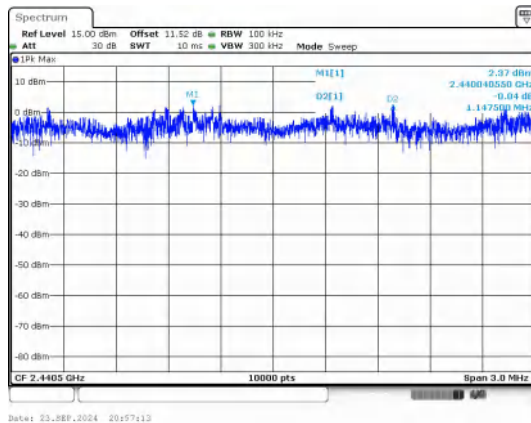
Test Graphs



GFSK



$\pi/4$ QPSK



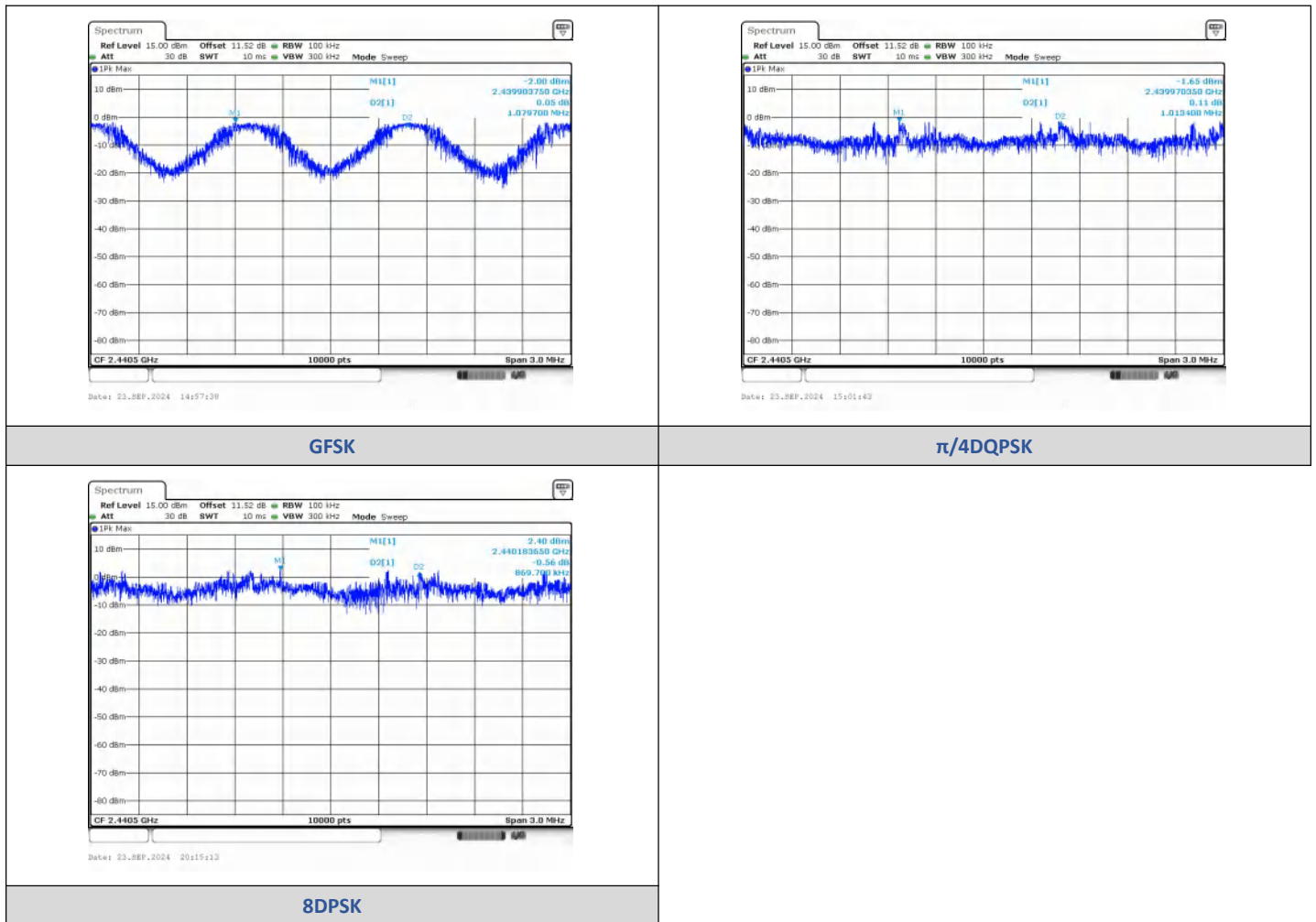
8DPSK

Left:

Test Result

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2439.9037	2440.9835	1.0797	1.040	PASS
$\pi/4$ DQPSK	2-DH5	2439.9704	2440.9837	1.0134	0.873	PASS
8DPSK	3-DH5	2440.1836	2441.0534	0.8697	0.867	PASS

Test Graphs



8) Conducted Out Of Band Emission

Right:

Test Result

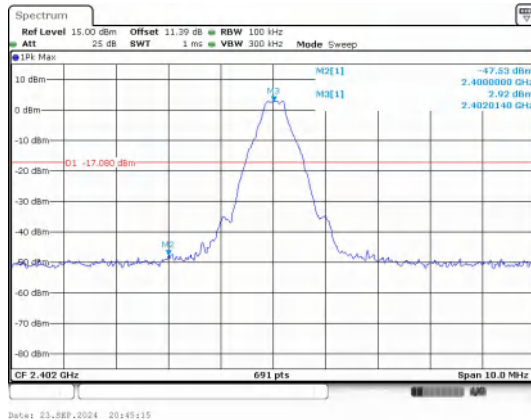
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-47.530	-17.08	-30.450	PASS
			7206.79	-39.109	-17.08	-22.029	PASS
		39	9763.72	-40.140	-17.38	-22.760	PASS
		78	2483.50	-50.535	-17.85	-32.685	PASS
			9920.20	-38.816	-17.85	-20.966	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-46.112	-17.27	-28.842	PASS
			9608.08	-43.889	-17.27	-26.619	PASS
		39	9763.72	-40.409	-17.57	-22.839	PASS
		78	2483.50	-49.089	-17.92	-31.169	PASS
			9920.20	-38.655	-17.92	-20.735	PASS
8DPSK	3-DH5	0	2400.00	-47.406	-17.15	-30.256	PASS
			7206.79	-43.526	-17.15	-26.376	PASS
		39	9763.72	-40.118	-17.49	-22.628	PASS
		78	2483.50	-49.912	-17.94	-31.972	PASS
			9920.20	-38.661	-17.94	-20.721	PASS

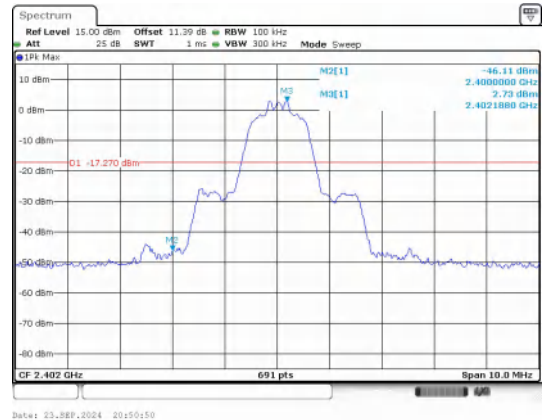
Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2398.68	-48.143	-22.1	-26.043	PASS
			2400.00	-49.431	-22.1	-27.331	PASS
			2483.50	-49.897	-21.78	-28.117	PASS
$\pi/4$ DQPSK	2-DH5		2395.67	-48.050	-24.93	-23.120	PASS
			2400.00	-49.524	-24.93	-24.594	PASS
			2483.50	-48.548	-26.59	-21.958	PASS
8DPSK	3-DH5		2397.22	-48.102	-17.8	-30.302	PASS
			2400.00	-50.901	-17.8	-33.101	PASS
			2483.50	-49.241	-21.23	-28.011	PASS

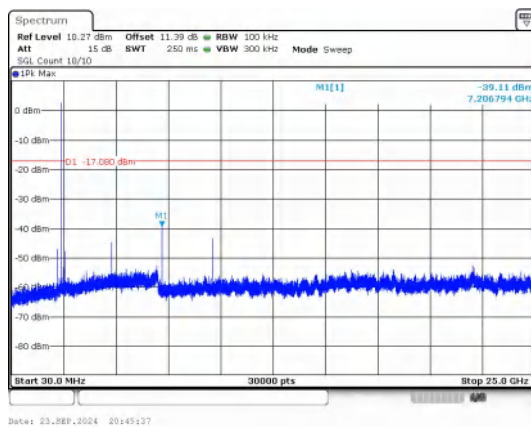
Test Graphs



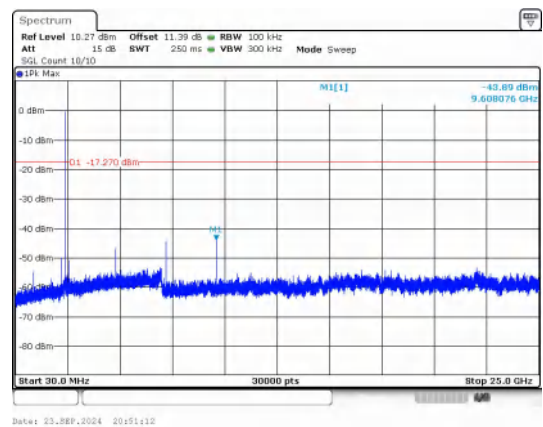
Out Of Band Emission
GFSK_DH5_Channel 0



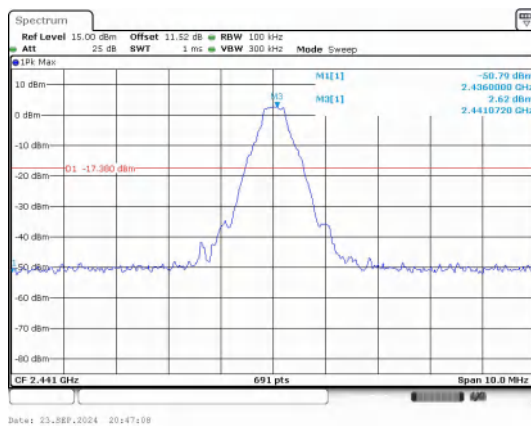
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 0



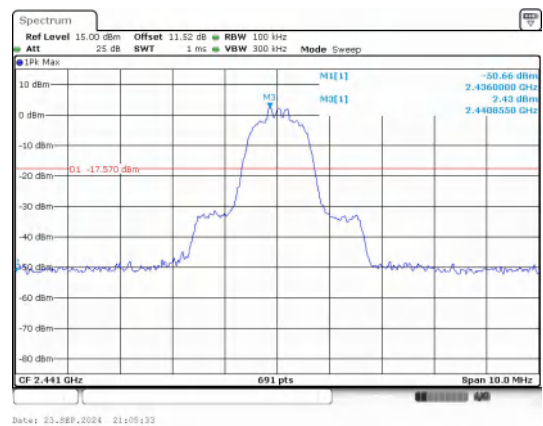
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



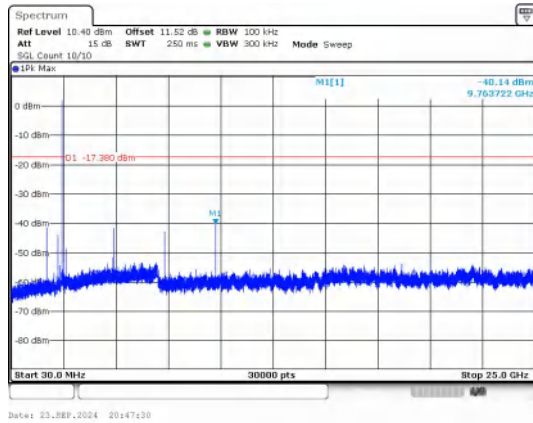
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 0



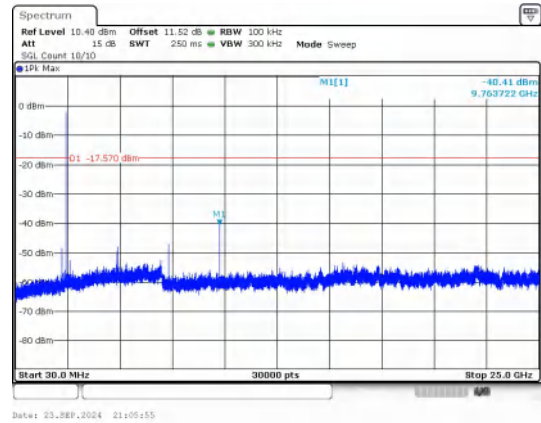
Out Of Band Emission
GFSK_DH5_Channel 39



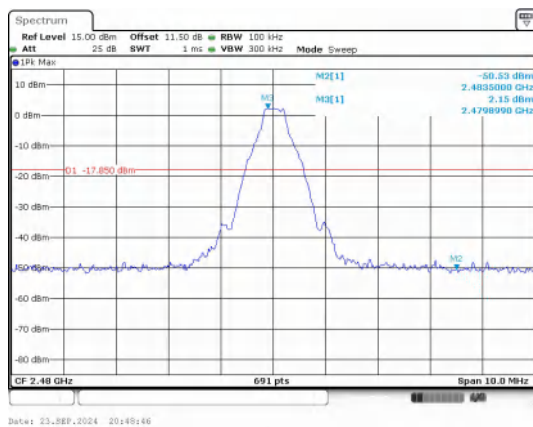
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39



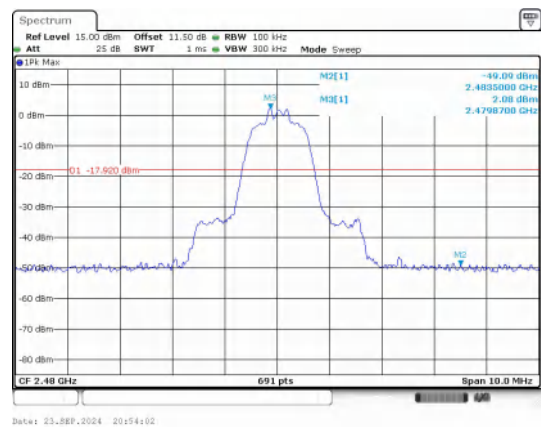
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



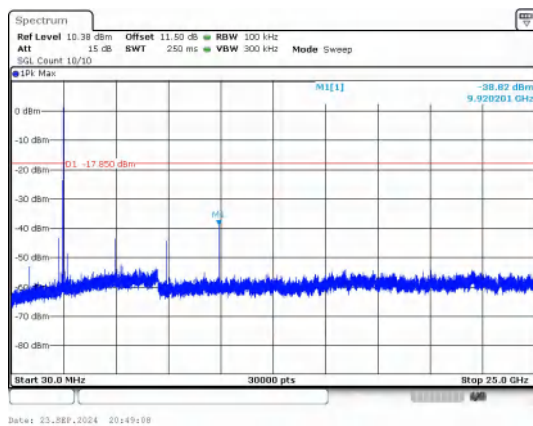
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39



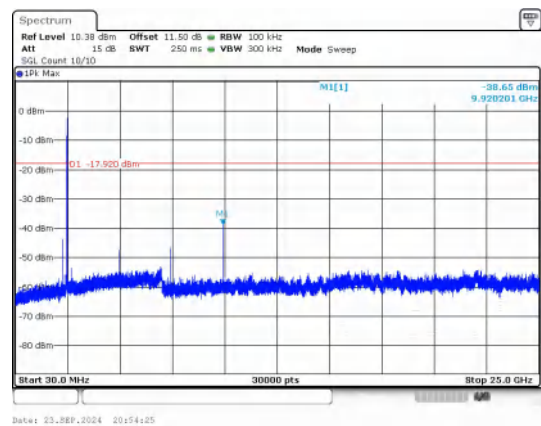
Out Of Band Emission
GFSK_DH5_Channel 78



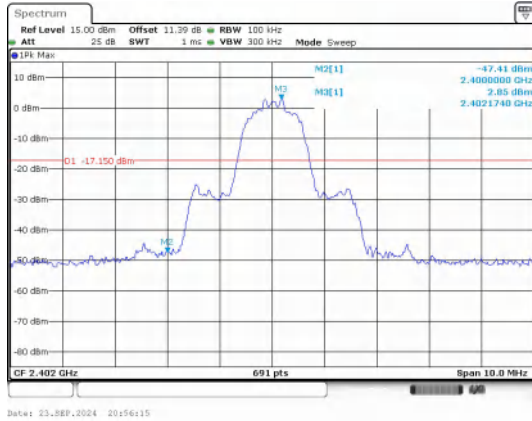
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



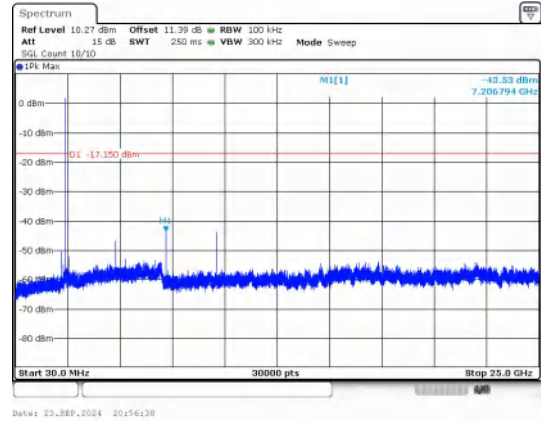
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



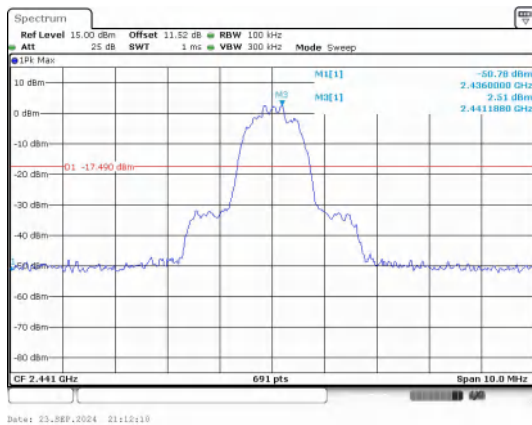
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 78



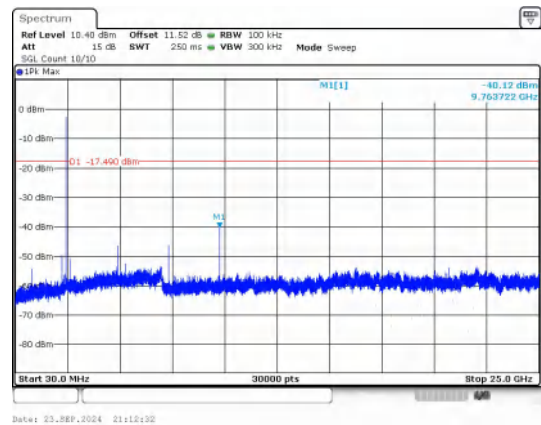
Out Of Band Emission
8DPSK_3-DH5_Channel 0



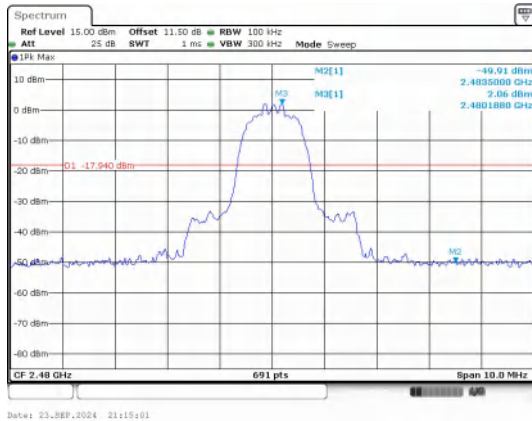
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



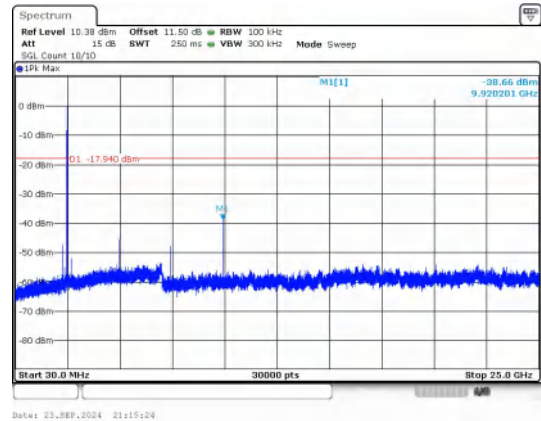
Out Of Band Emission
8DPSK_3-DH5_Channel 39



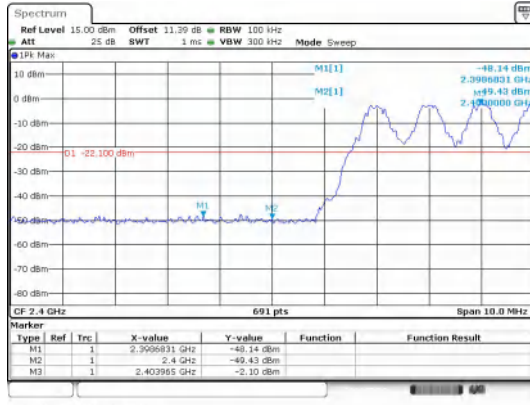
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



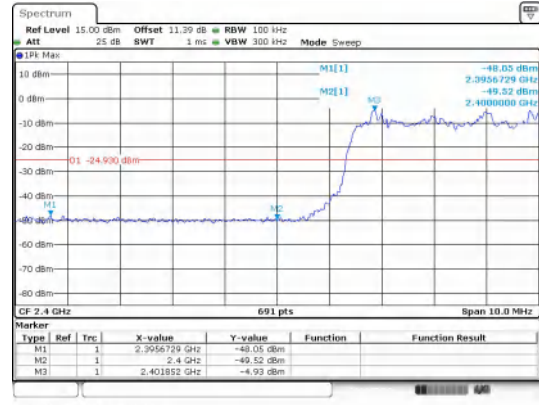
Out Of Band Emission
8DPSK_3-DH5_Channel 78



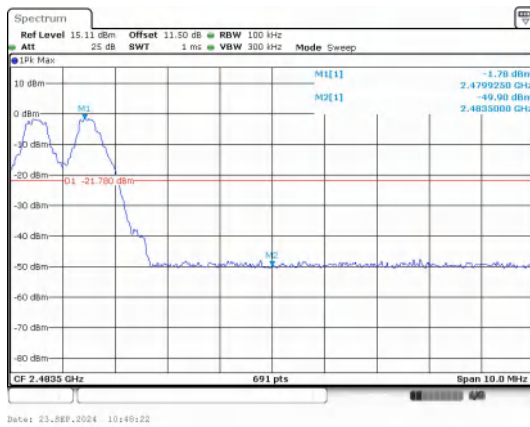
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



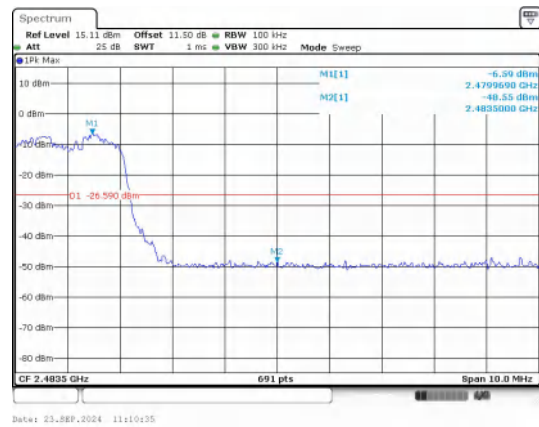
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



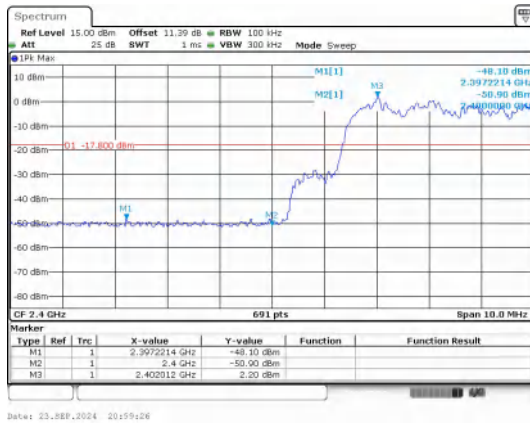
Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



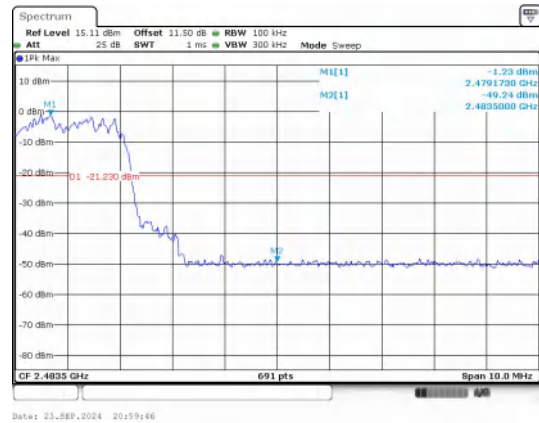
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



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

Left:

Test Result

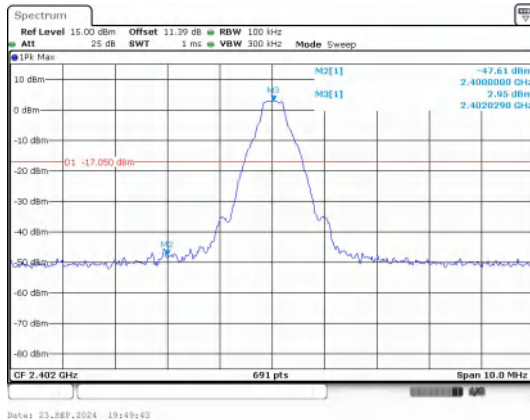
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-47.610	-17.05	-30.560	PASS
			7205.96	-40.249	-17.05	-23.199	PASS
		39	9763.72	-40.756	-17.29	-23.466	PASS
		78	2483.50	-51.057	-17.81	-33.247	PASS
			9920.20	-38.754	-17.81	-20.944	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-45.698	-17.09	-28.608	PASS
			7205.96	-41.690	-17.09	-24.600	PASS
		39	9763.72	-40.309	-17.37	-22.939	PASS
		78	2483.50	-50.965	-17.84	-33.125	PASS
			9920.20	-39.090	-17.84	-21.250	PASS
8DPSK	3-DH5	0	2400.00	-46.360	-17.15	-29.210	PASS
			4803.85	-43.019	-17.15	-25.869	PASS
		39	9763.72	-40.214	-17.78	-22.434	PASS
		78	2483.50	-48.981	-17.89	-31.091	PASS
			9920.20	-38.870	-17.89	-20.980	PASS

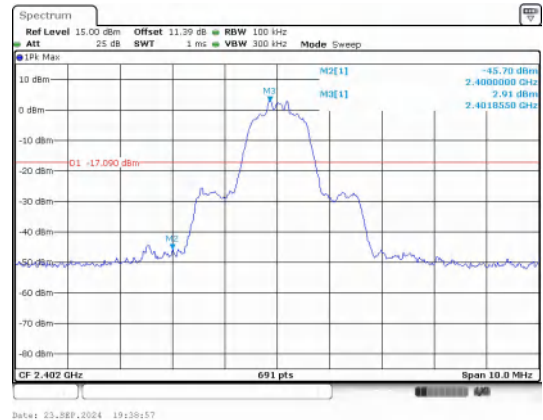
Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2396.85	-48.213	-22.01	-26.203	PASS
			2400.00	-50.487	-22.01	-28.477	PASS
			2483.50	-48.129	-21.15	-26.979	PASS
$\pi/4$ DQPSK	2-DH5		2396.87	-48.216	-21.94	-26.276	PASS
			2400.00	-49.256	-21.94	-27.316	PASS
			2483.50	-48.806	-21.54	-27.266	PASS
8DPSK	3-DH5		2398.21	-47.789	-17.81	-29.979	PASS
			2400.00	-48.539	-17.81	-30.729	PASS
			2483.50	-48.966	-18.7	-30.266	PASS

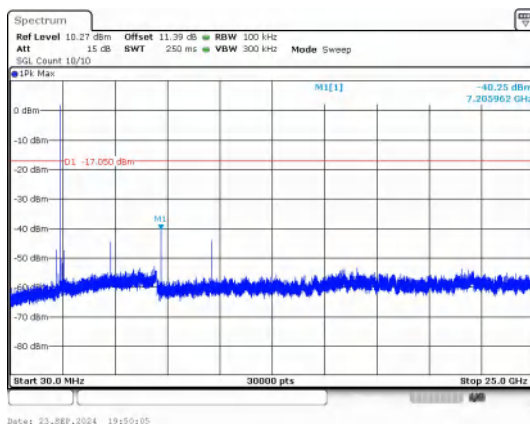
Test Graphs



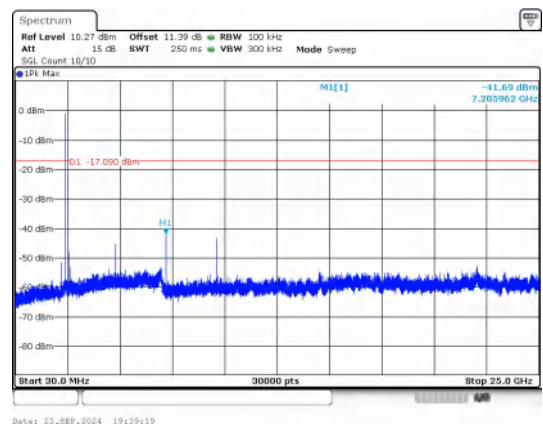
Out Of Band Emission
GFSK_DH5_Channel 0



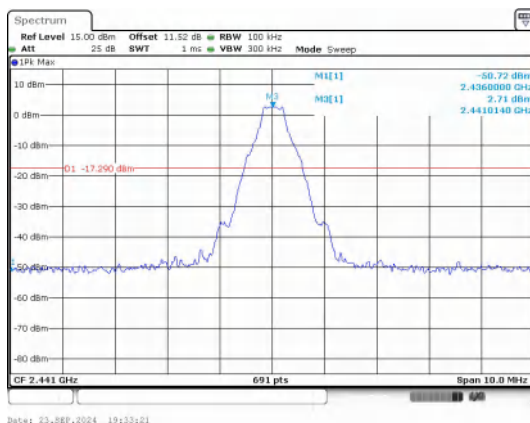
Out Of Band Emission
 $\pi/4$ QPSK_2-DH5_Channel 0



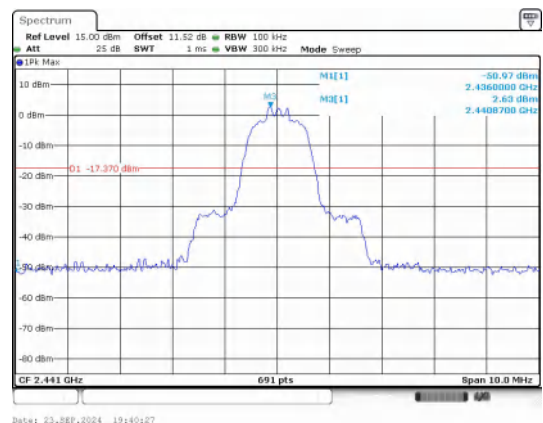
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



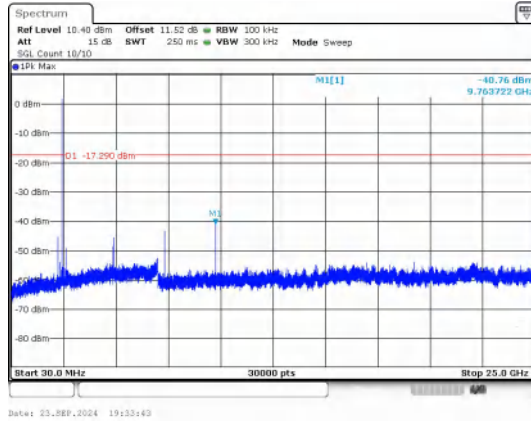
30.0 MHz - 25000.0 MHz
 $\pi/4$ QPSK_2-DH5_Channel 0



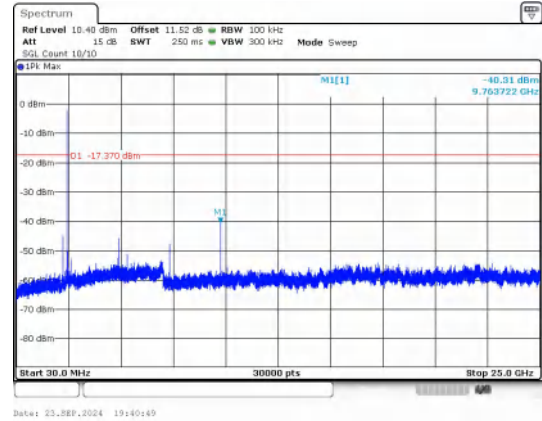
Out Of Band Emission
GFSK_DH5_Channel 39



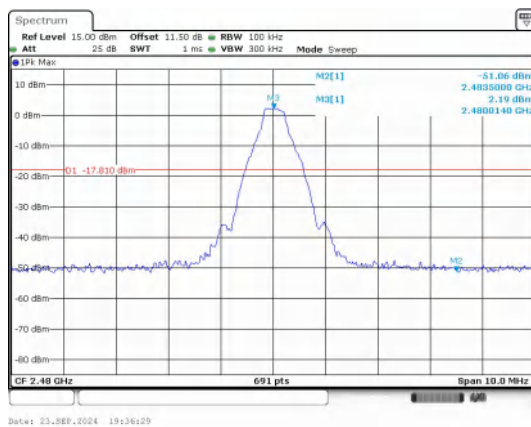
Out Of Band Emission
 $\pi/4$ QPSK_2-DH5_Channel 39



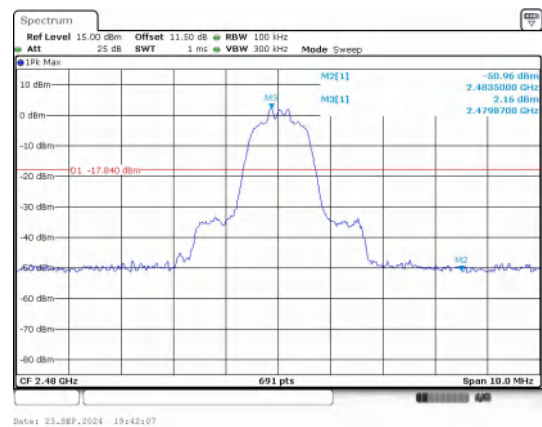
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



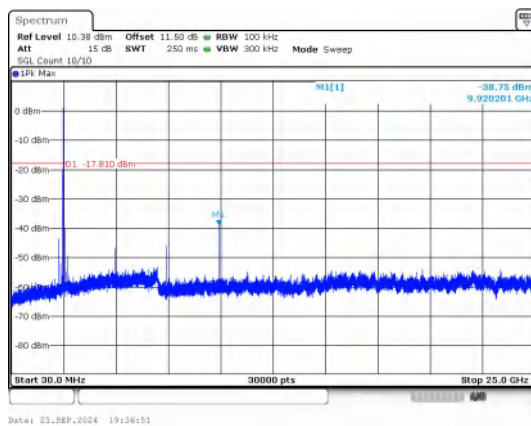
30.0 MHz - 25000.0 MHz
 $\pi/4$ QPSK_2-DH5_Channel 39



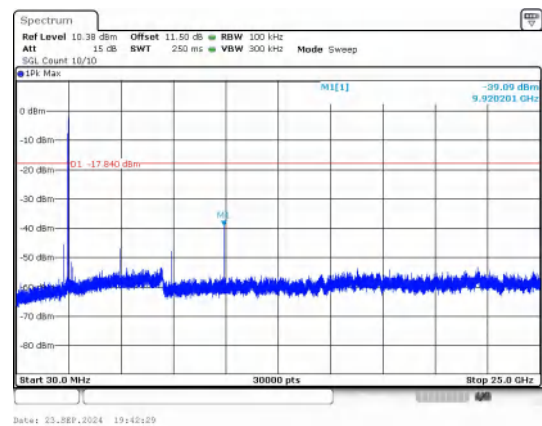
Out Of Band Emission
GFSK_DH5_Channel 78



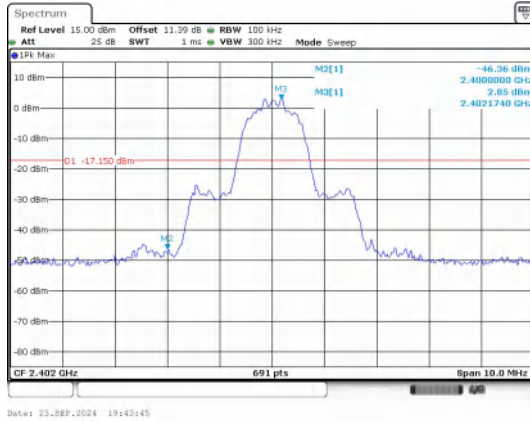
Out Of Band Emission
 $\pi/4$ QPSK_2-DH5_Channel 78



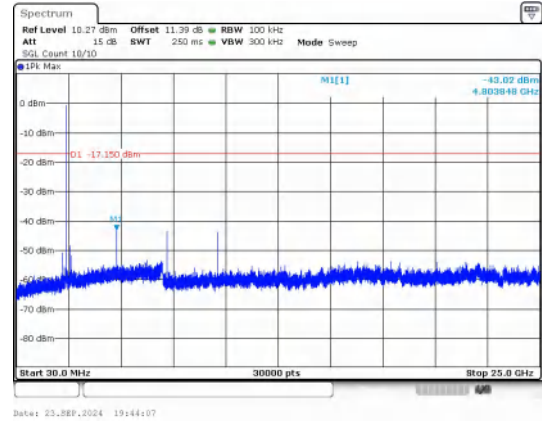
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



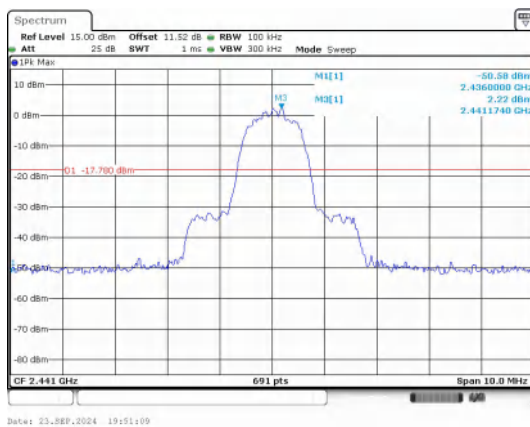
30.0 MHz - 25000.0 MHz
 $\pi/4$ QPSK_2-DH5_Channel 78



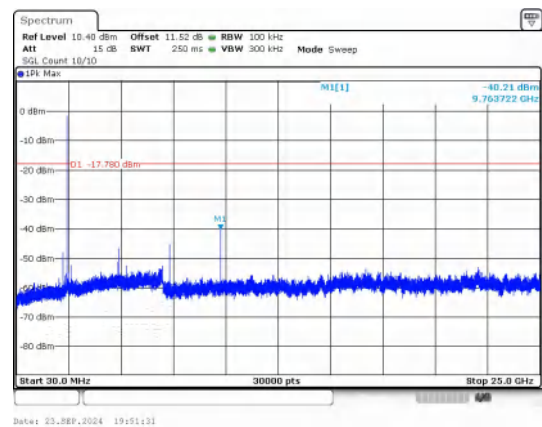
Out Of Band Emission
8DPSK_3-DH5_Channel 0



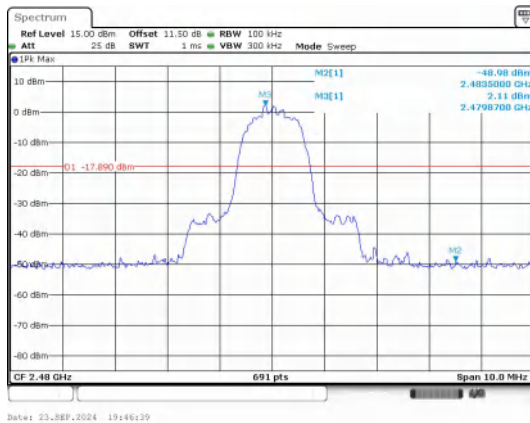
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



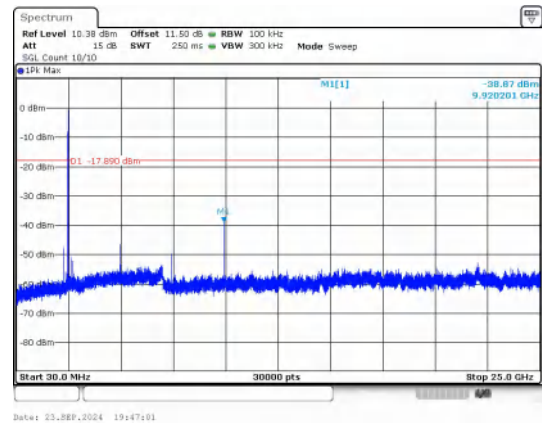
Out Of Band Emission
8DPSK_3-DH5_Channel 39



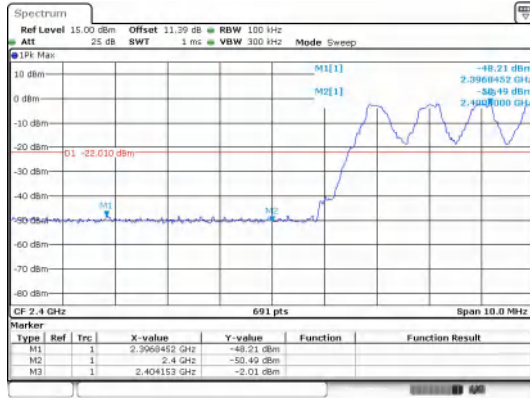
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



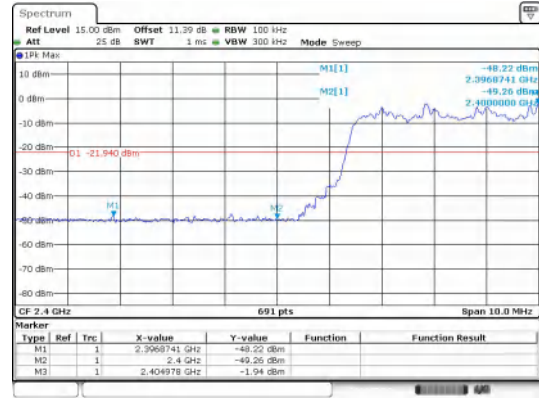
Out Of Band Emission
8DPSK_3-DH5_Channel 78



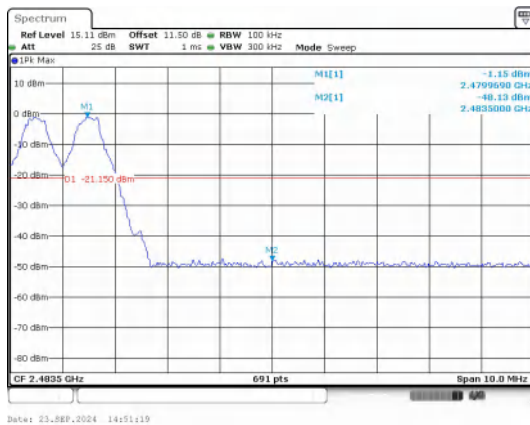
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



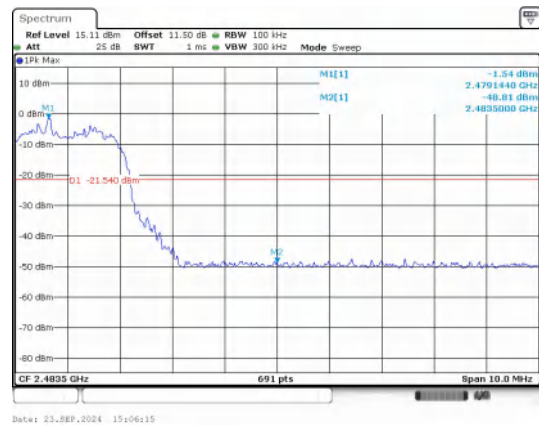
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



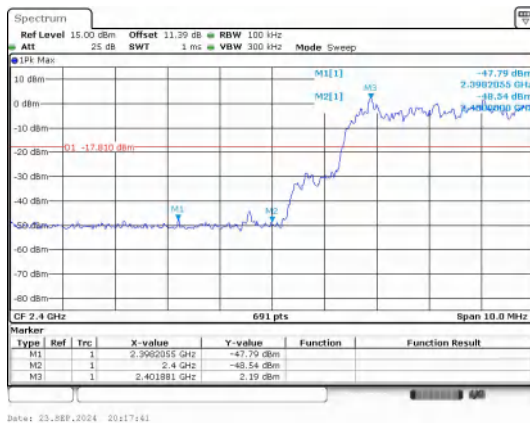
Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



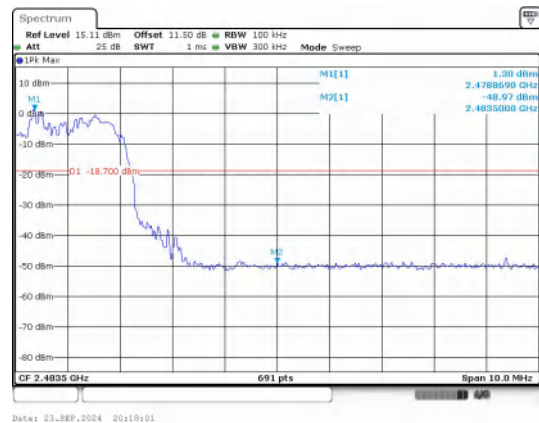
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



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