

Appendix A

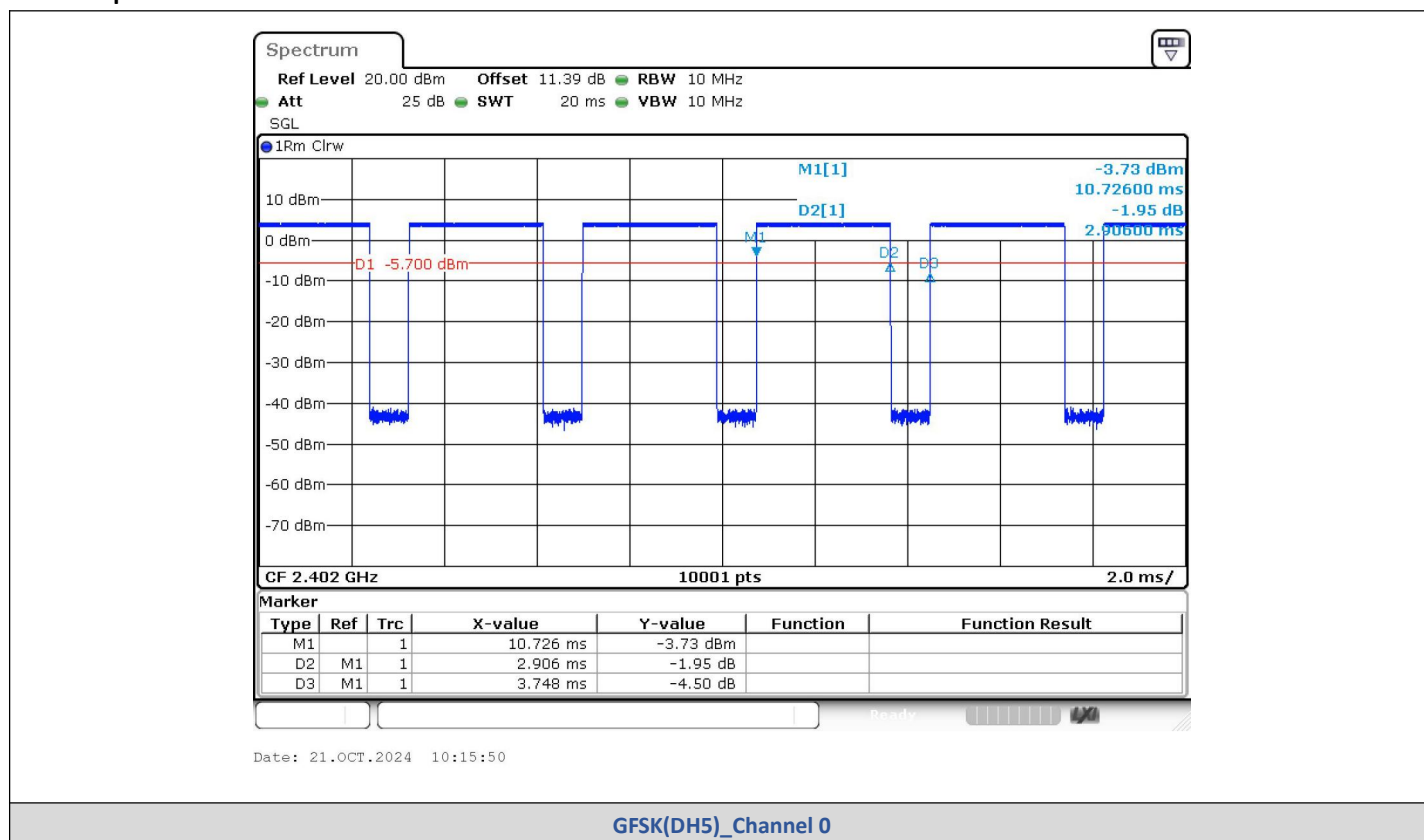
Report No.:	CISRR241015065
FCC ID:	2BLOE-TYD-CCYHY-001
Product Name:	Outbound Astronaut Star Projection Lamp
Model No.:	TYD-CCYHY-001
Test Engineer:	Lucas Huang
Supervised by:	Rory Huang

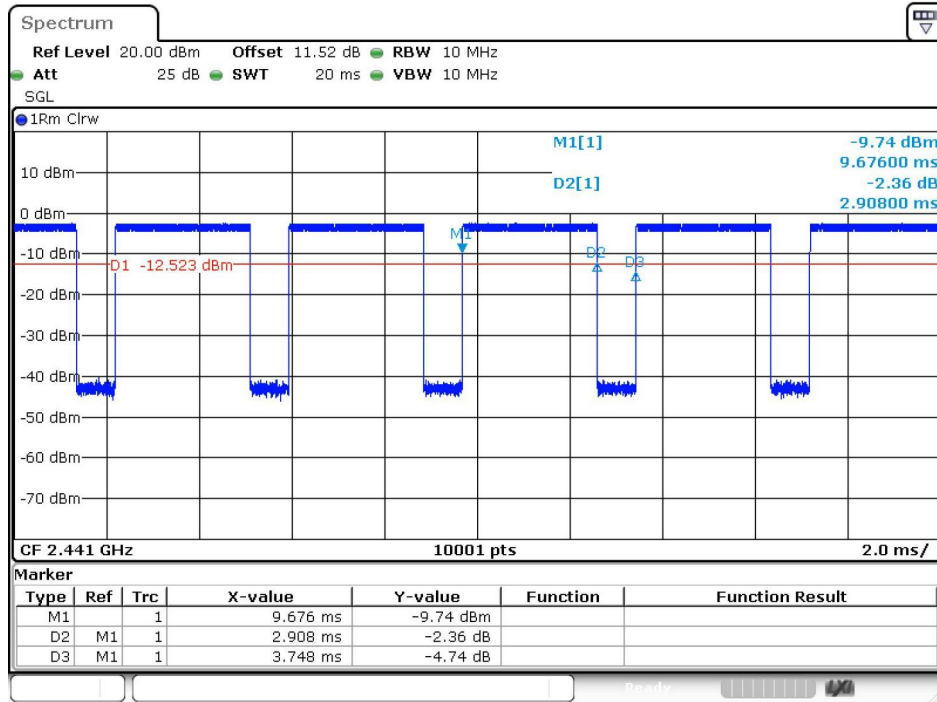
1) Duty Cycle

Test Result

Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.906	3.748	77.53	0.7753	1.1053	0.34
		39	2.908	3.748	77.59	0.7759	1.1019	0.34
		78	2.908	3.748	77.59	0.7759	1.1019	0.34
$\pi/4$ DQPSK	2-DH5	0	2.914	3.748	77.75	0.7775	1.093	0.34
		39	2.914	3.748	77.75	0.7775	1.093	0.34
		78	2.914	3.748	77.75	0.7775	1.093	0.34
8DPSK	3-DH5	0	2.916	3.748	77.80	0.7780	1.0902	0.34
		39	2.916	3.748	77.80	0.7780	1.0902	0.34
		78	2.916	3.748	77.80	0.7780	1.0902	0.34

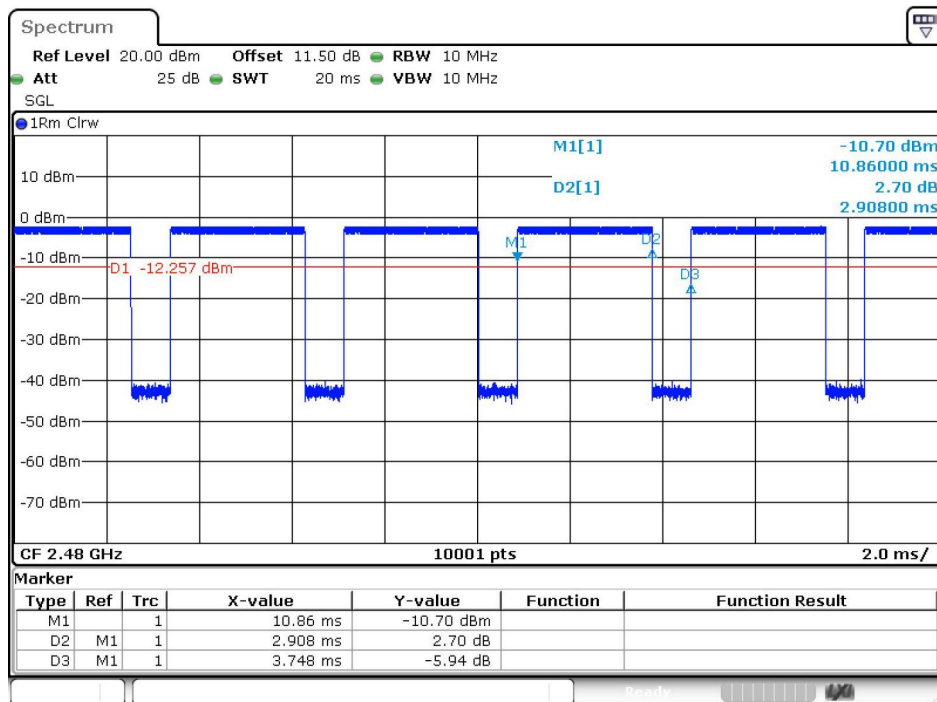
Test Graphs





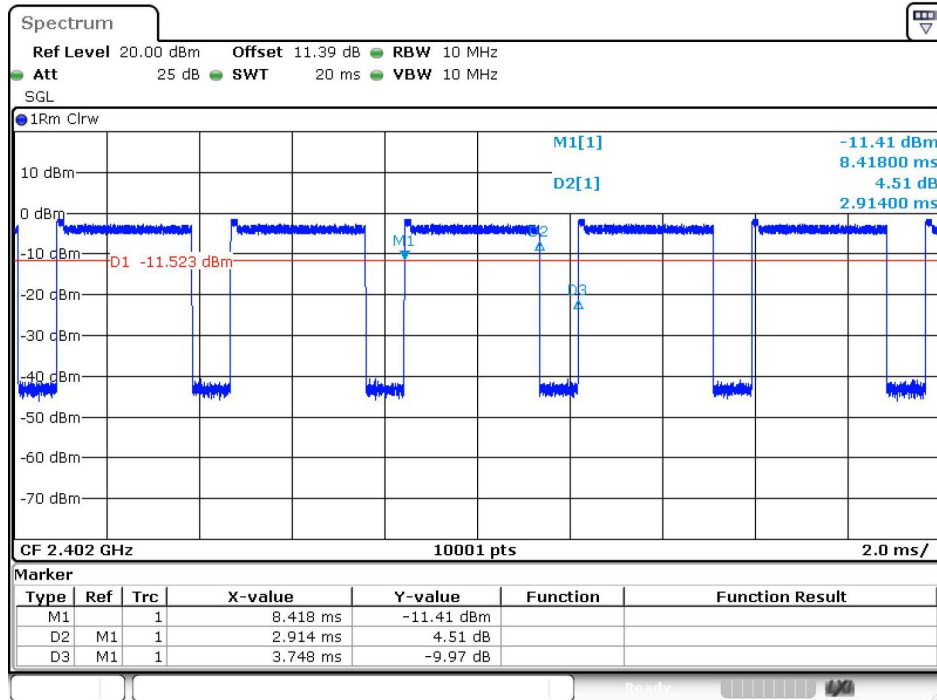
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GFSK(DH5)_Channel 39



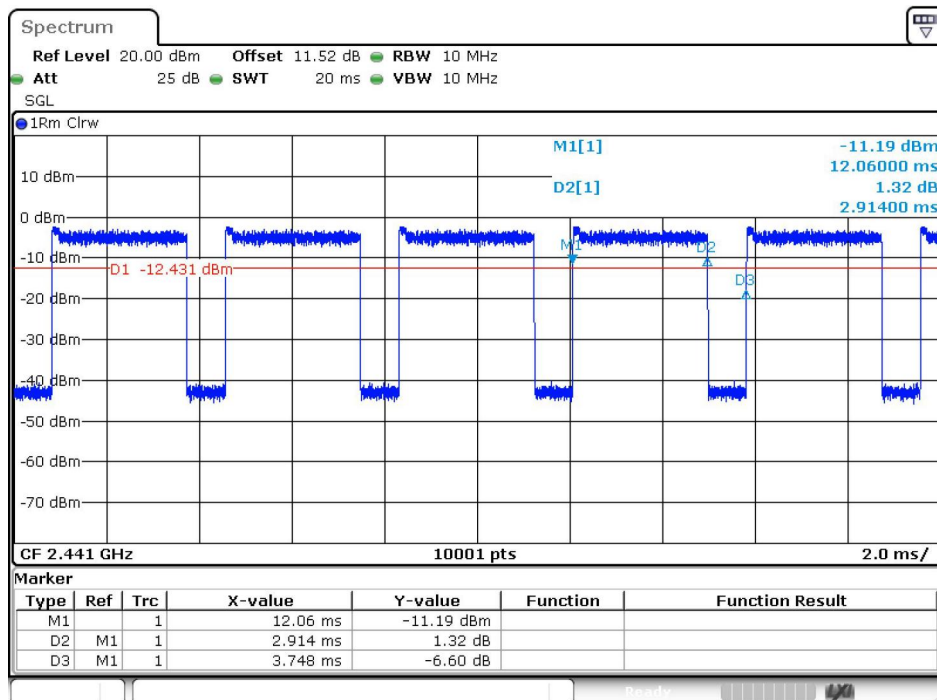
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GFSK(DH5)_Channel 78



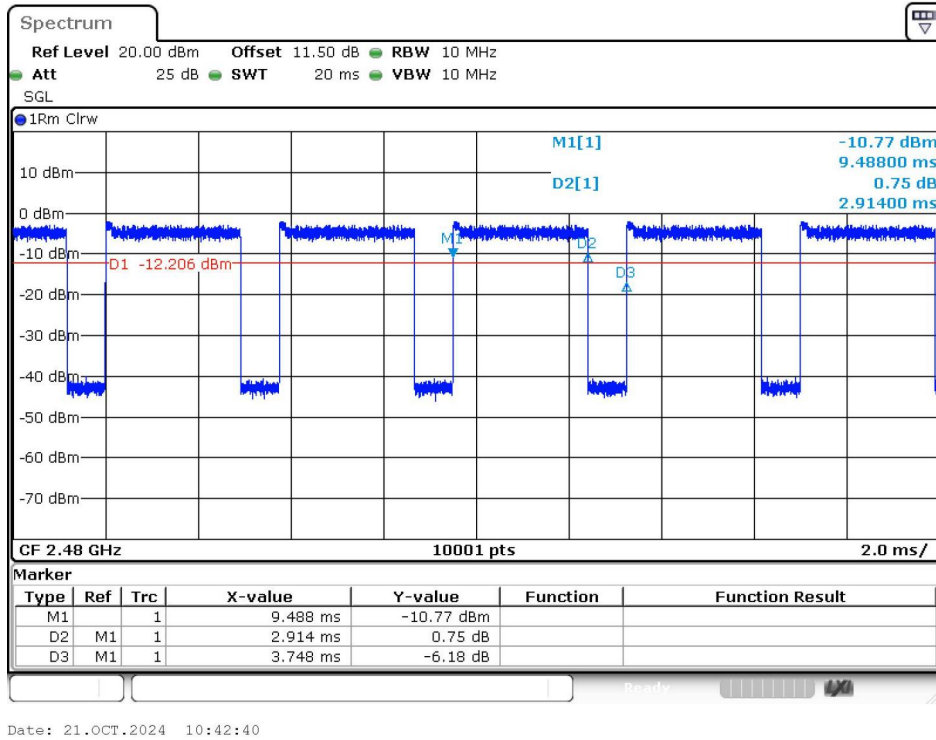
Date: 21.OCT.2024 10:29:28

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

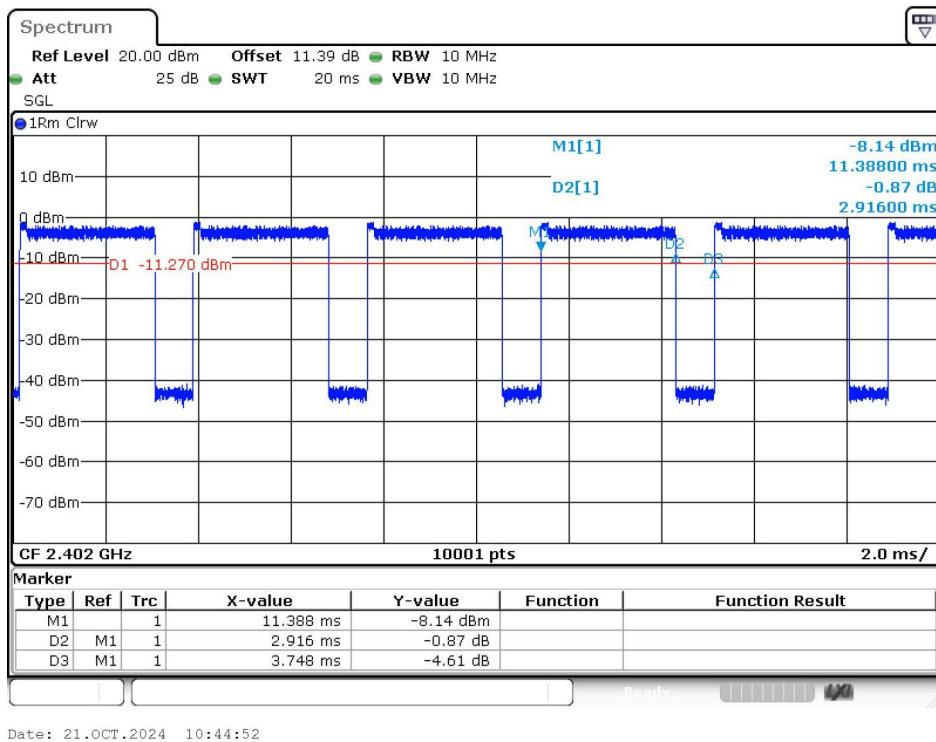


Date: 21.OCT.2024 10:40:38

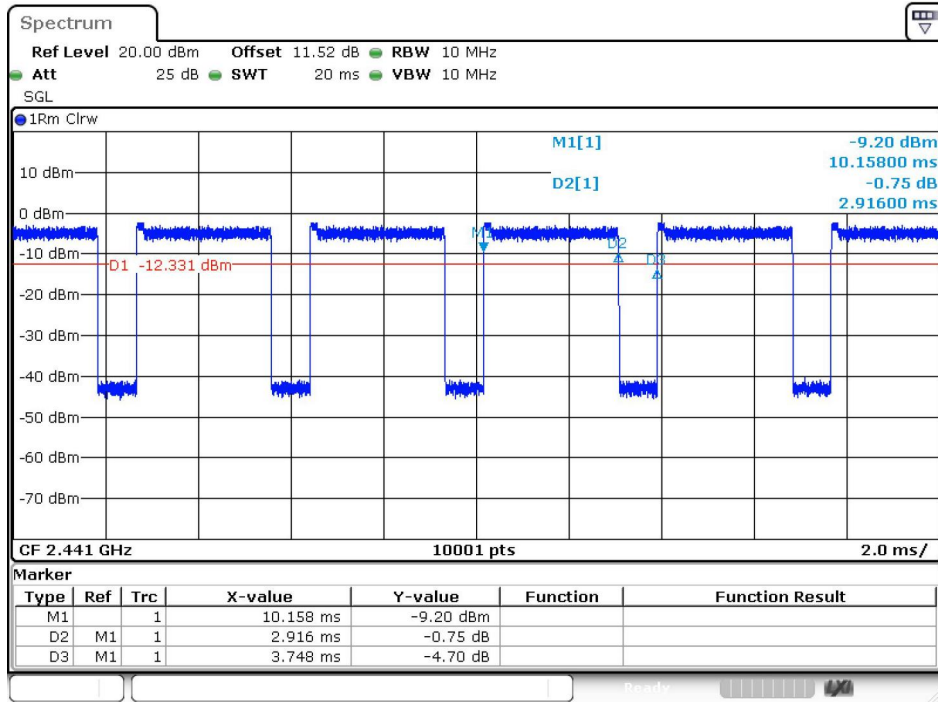
$\pi/4$ QPSK(2-DH5)_Channel 39



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

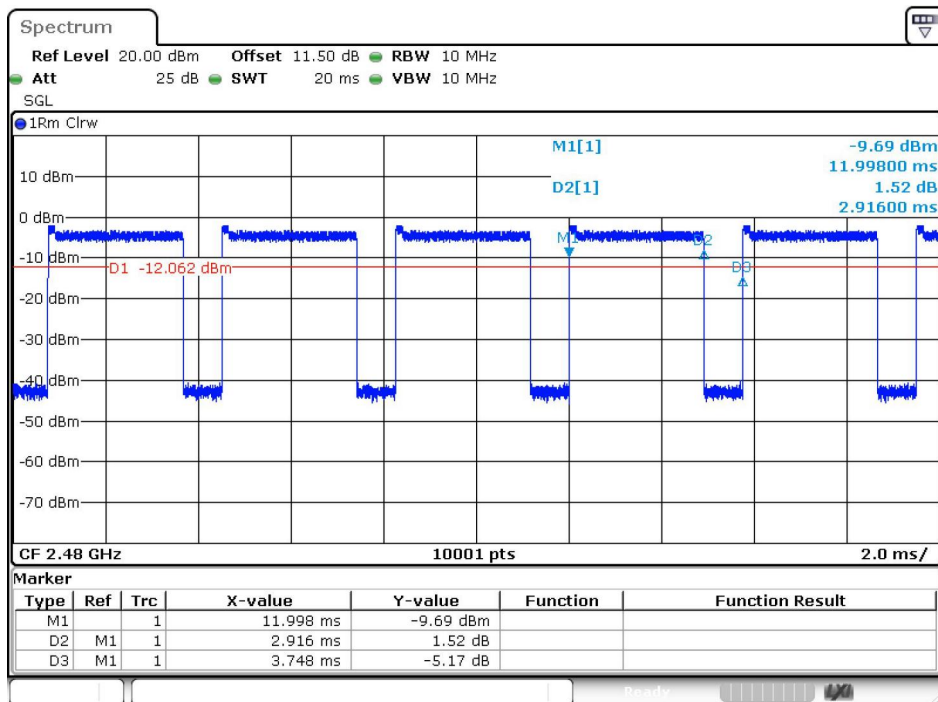


8DPSK(3-DH5)_Channel 0



Date: 21.OCT.2024 10:52:06

8DPSK(3-DH5)_Channel 39



Date: 21.OCT.2024 10:55:26

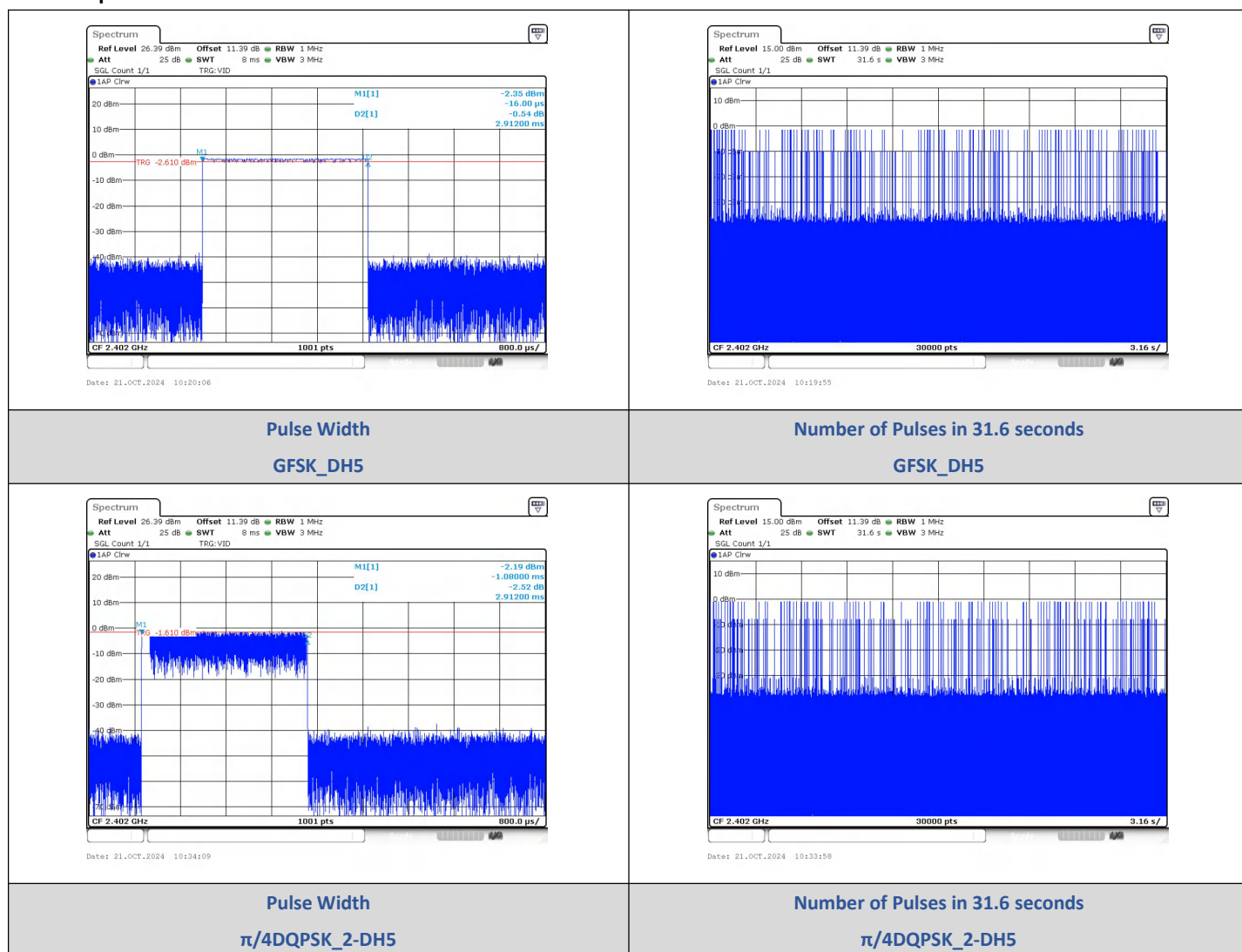
8DPSK(3-DH5)_Channel 78

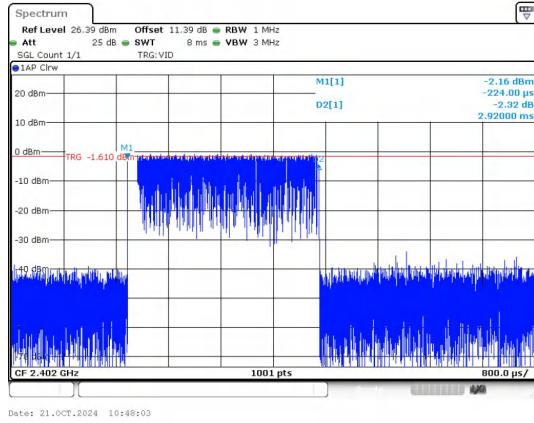
2) Dwell Time

Test Result

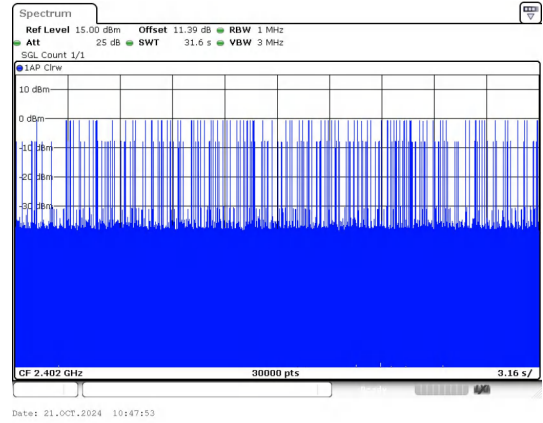
Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.912	114	331.97	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.912	113	329.06		PASS
8DPSK	3-DH5		2.920	102	297.84		PASS

Test Graphs





Pulse Width
8DPSK_3-DH5



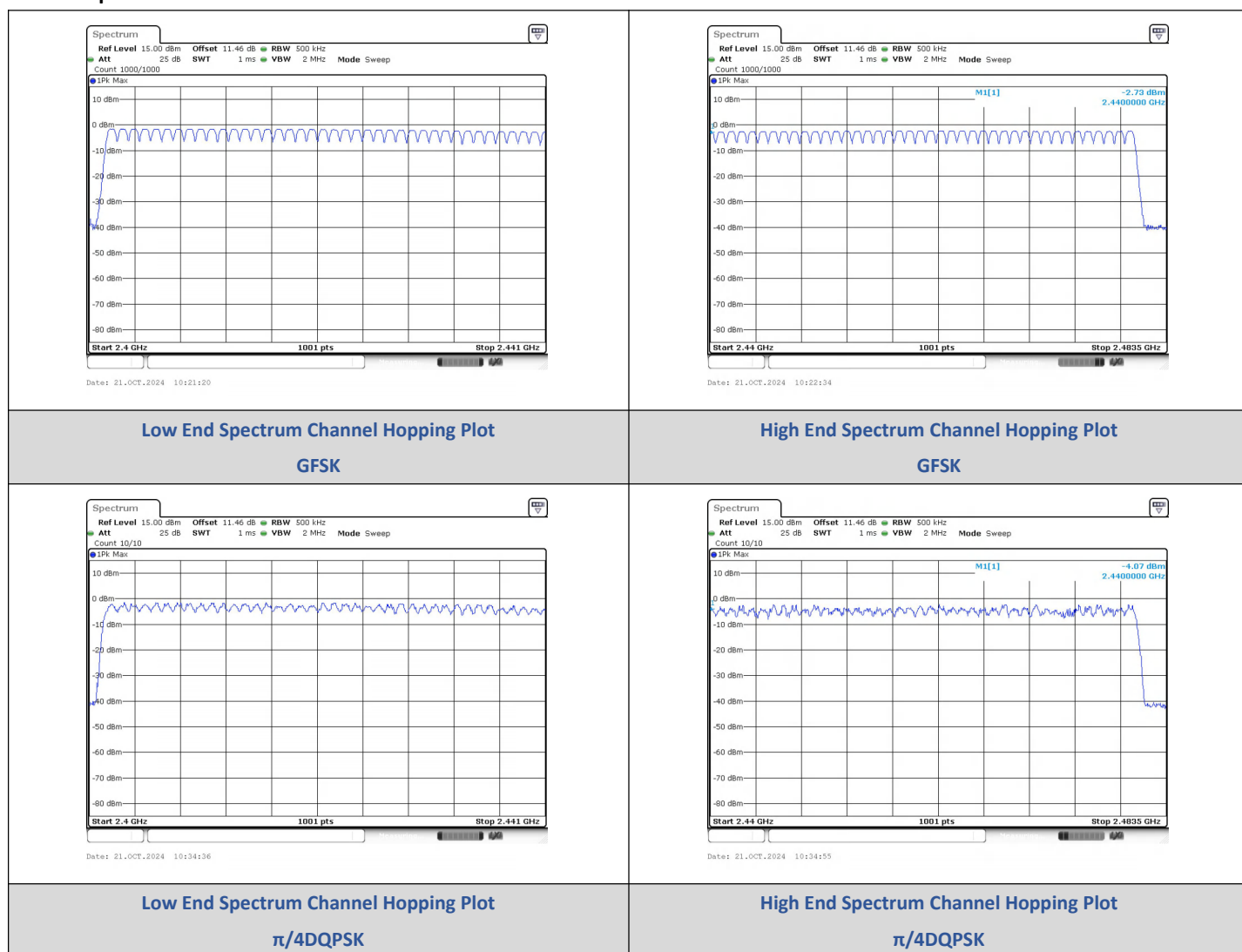
Number of Pulses in 31.6 seconds
8DPSK_3-DH5

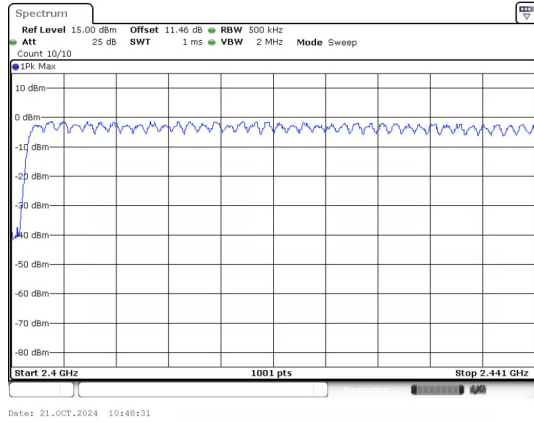
3) Number Of Hopping Channel

Test Result

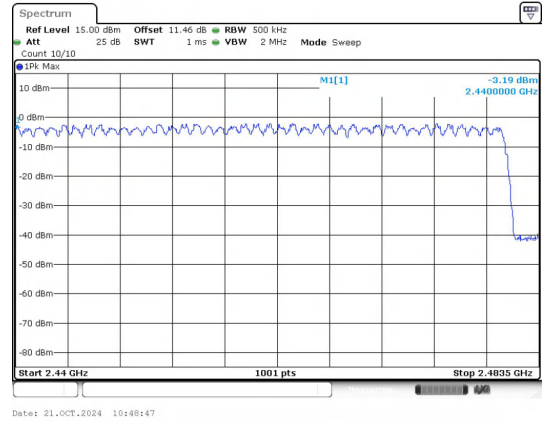
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
$\pi/4$ DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

Test Graphs





Low End Spectrum Channel Hopping Plot
8DPSK



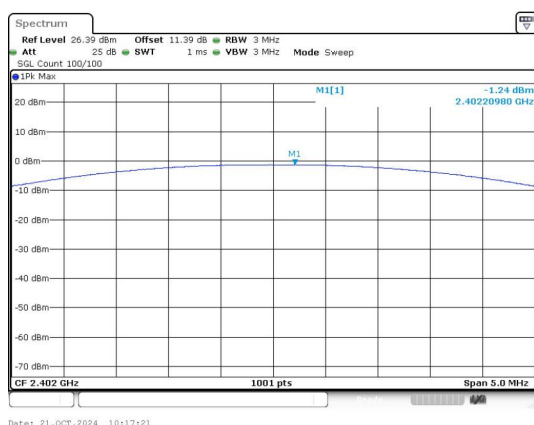
High End Spectrum Channel Hopping Plot
8DPSK

4) Conducted Peak Output Power

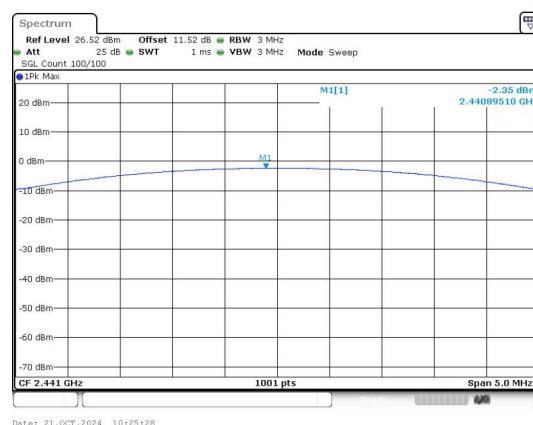
Test Result

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	-1.24	0.75	≤30	PASS
		39	-2.35	0.58		PASS
		78	-2.09	0.62		PASS
$\pi/4$ DQPSK	2-DH5	0	-0.54	0.88	≤20.97	PASS
		39	-1.59	0.69		PASS
		78	-1.22	0.76		PASS
8DPSK	3-DH5	0	-0.22	0.95		PASS
		39	-1.28	0.75		PASS
		78	-0.98	0.80		PASS

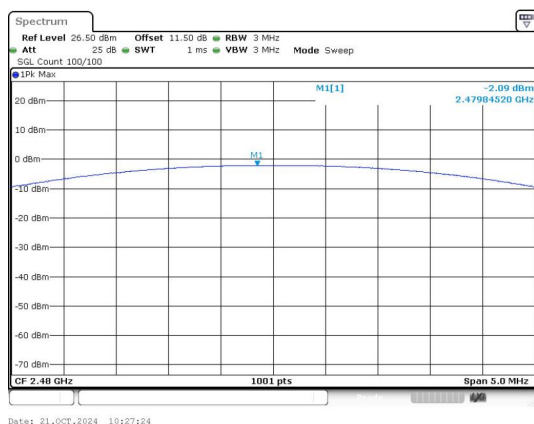
Test Graphs



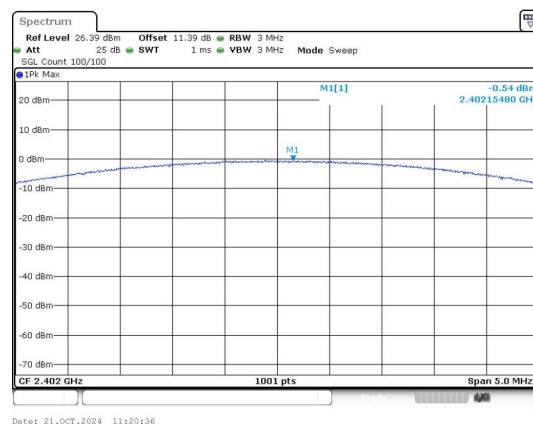
Peak Output Power
GFSK_Channel 0



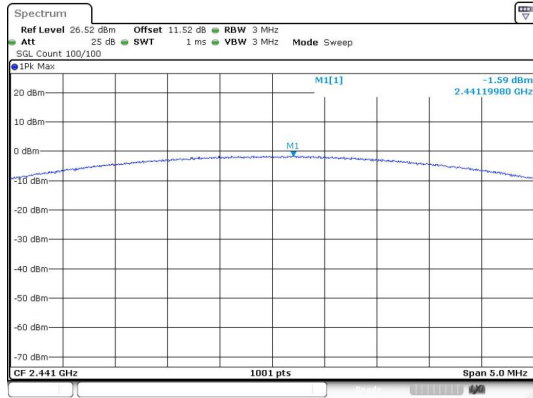
Peak Output Power
GFSK_Channel 39



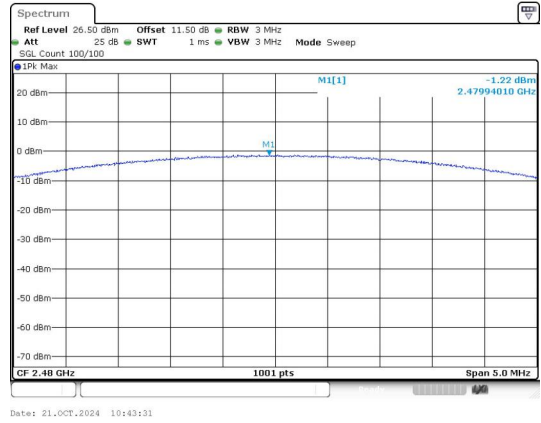
Peak Output Power
GFSK_Channel 78



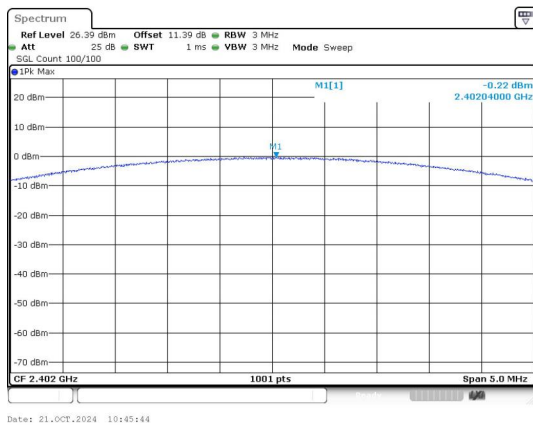
Peak Output Power
 $\pi/4$ DQPSK_Channel 0



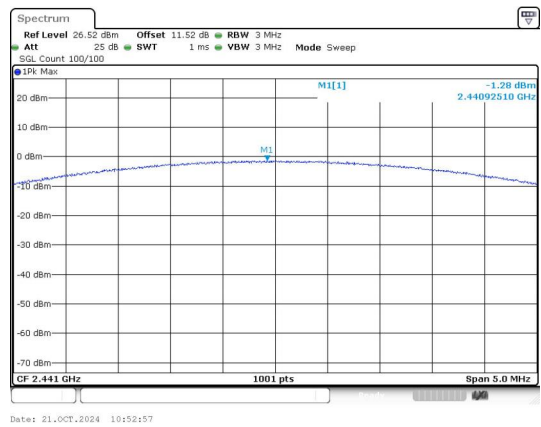
Peak Output Power
 $\pi/4$ QPSK_Channel 39



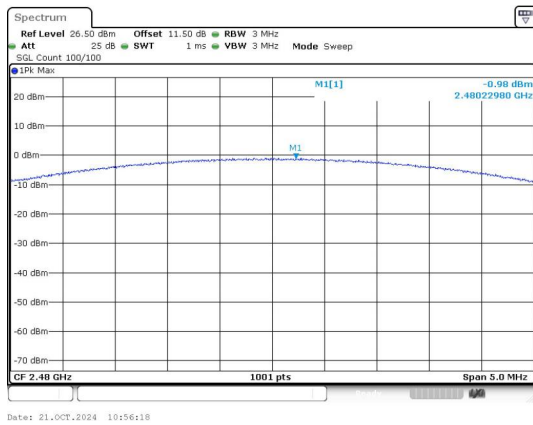
Peak Output Power
 $\pi/4$ QPSK_Channel 78



Peak Output Power
8DPSK_Channel 0



Peak Output Power
8DPSK_Channel 39



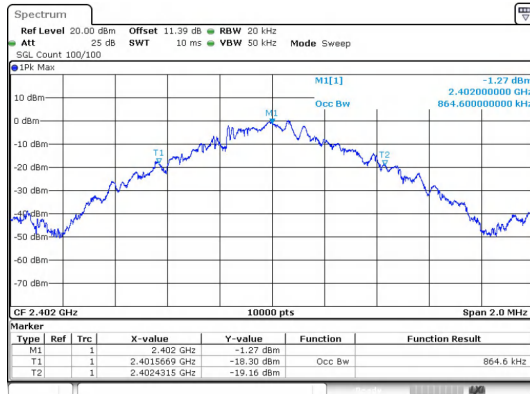
Peak Output Power
8DPSK_Channel 78

5) 99% Bandwidth

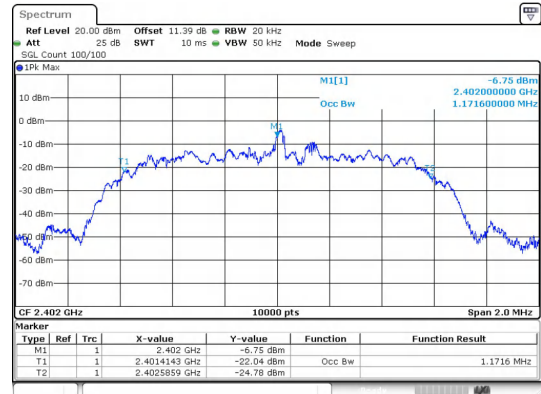
Test Result

Modulation	Channel	Center Frequency (MHz)	99% BW (MHz)
GFSK	0	2402	0.86460
	39	2441	0.86160
	78	2480	0.86140
$\pi/4$ DQPSK	0	2402	1.1716
	39	2441	1.1802
	78	2480	1.1726
8DPSK	0	2402	1.1934
	39	2441	1.1950
	78	2480	1.1896

Test Graphs

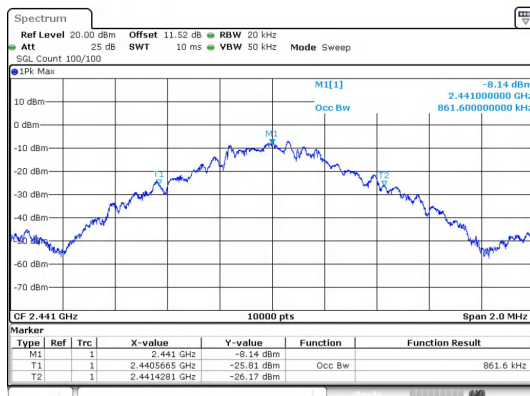


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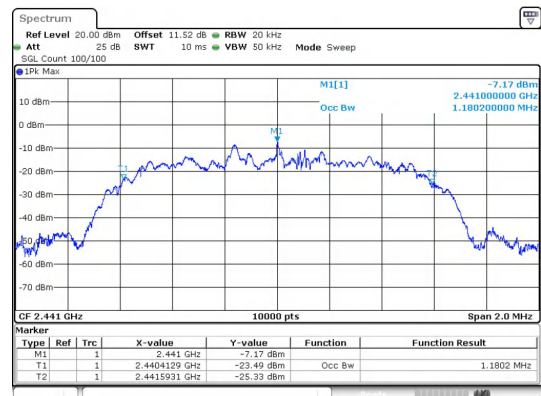


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GFSK_DH5_Channel 0

 $\pi/4$ DQPSK_2-DH5_Channel 0


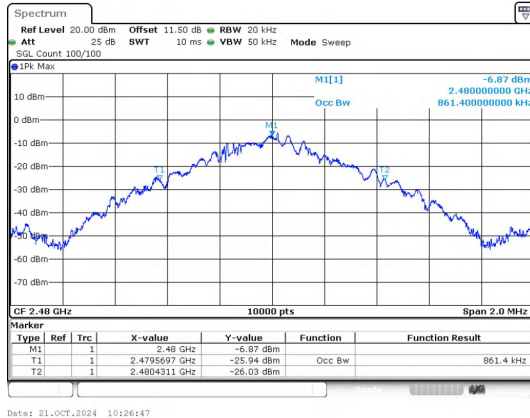
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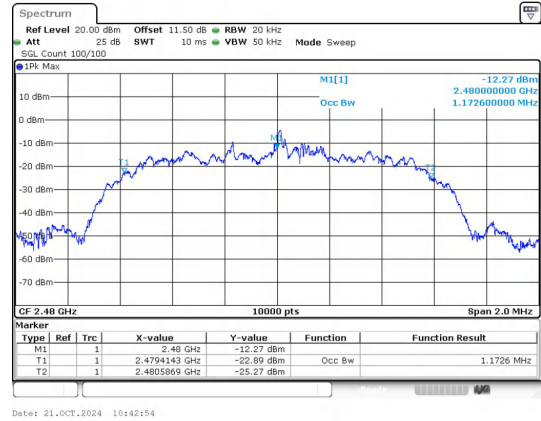
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GFSK_DH5_Channel 39

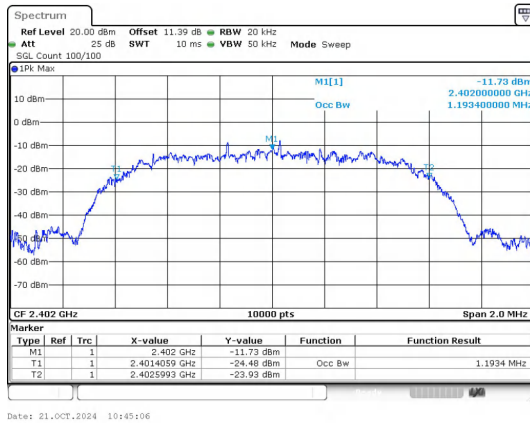
 $\pi/4$ DQPSK_2-DH5_Channel 39



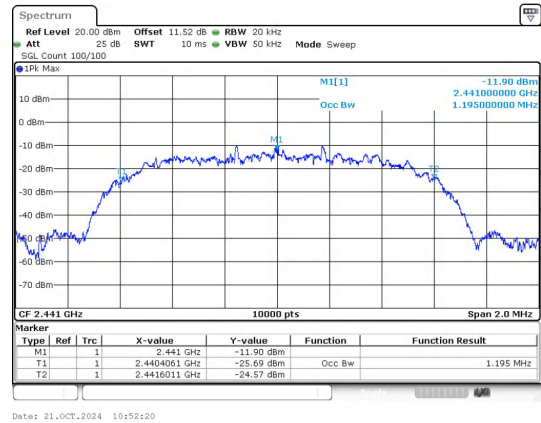
GFSK_DH5_Channel 78



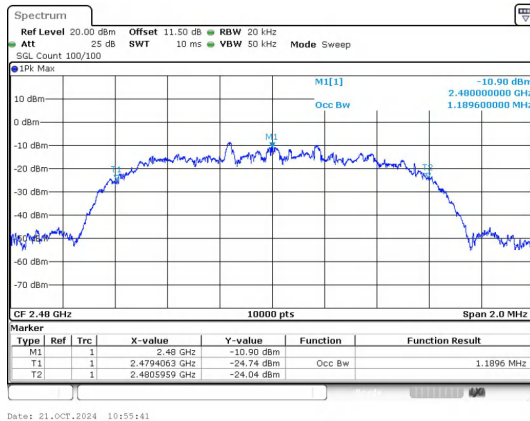
$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



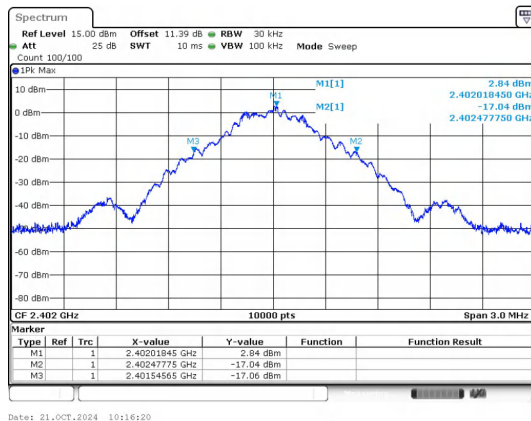
8DPSK_3-DH5_Channel 78

6) 20dB Bandwidth

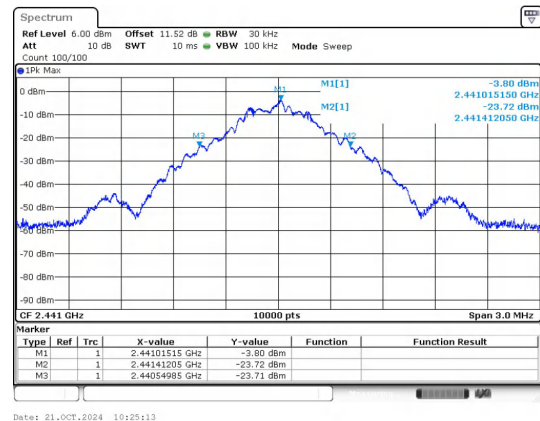
Test Result

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	0.9300
	39	2441 MHz	0.8600
	78	2480 MHz	0.8600
π /4DQPSK	0	2402 MHz	1.200
	39	2441 MHz	1.210
	78	2480 MHz	1.200
8DPSK	0	2402 MHz	1.240
	39	2441 MHz	1.240
	78	2480 MHz	1.220

Test Graphs



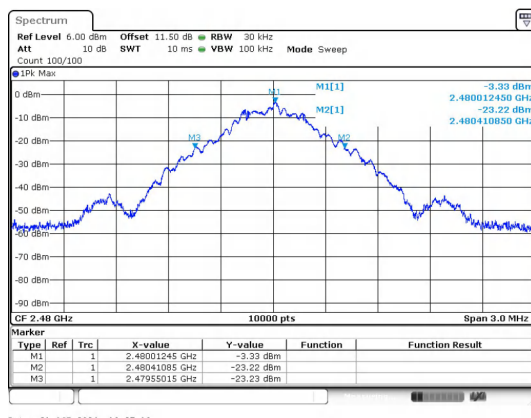
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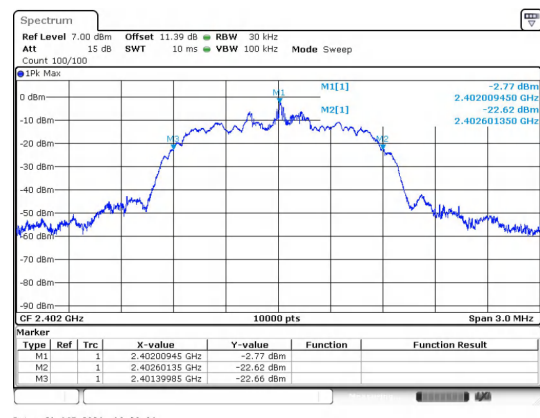
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GFSK_DH5_Channel 0

GFSK_DH5_Channel 39



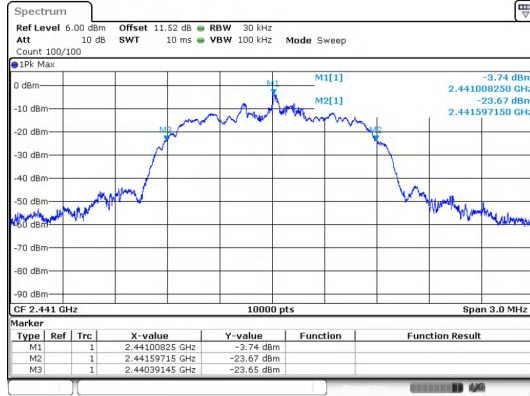
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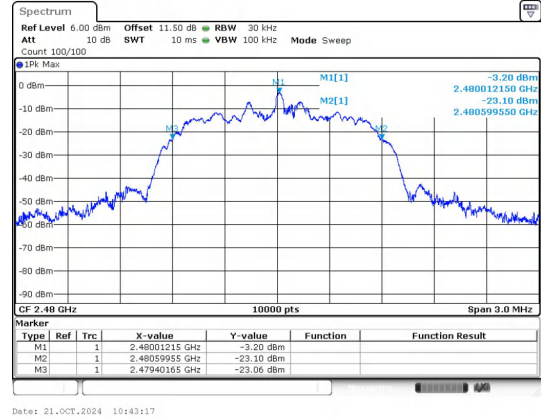
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GFSK_DH5_Channel 78

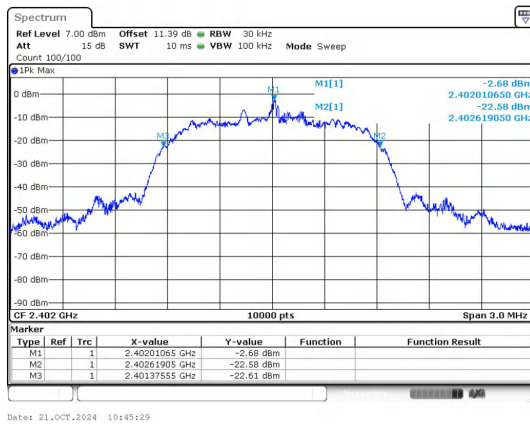
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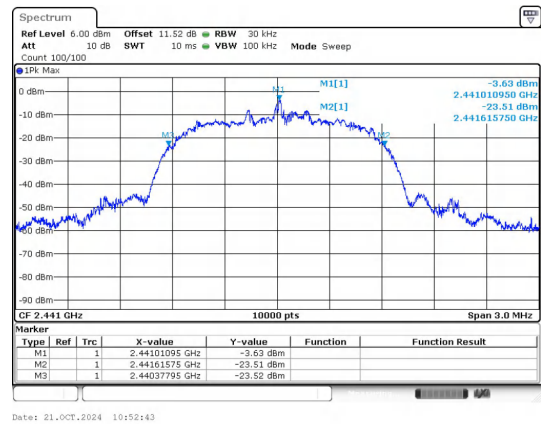
$\pi/4$ DQPSK_2-DH5_Channel 39



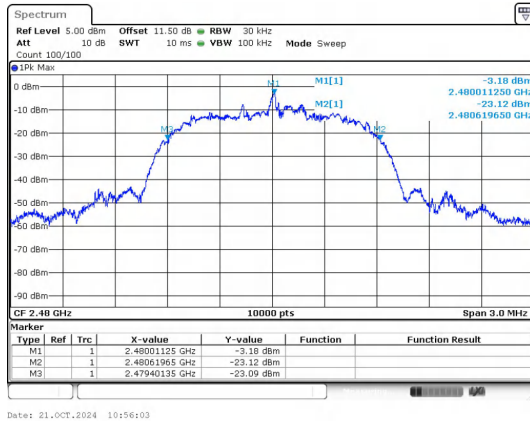
$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



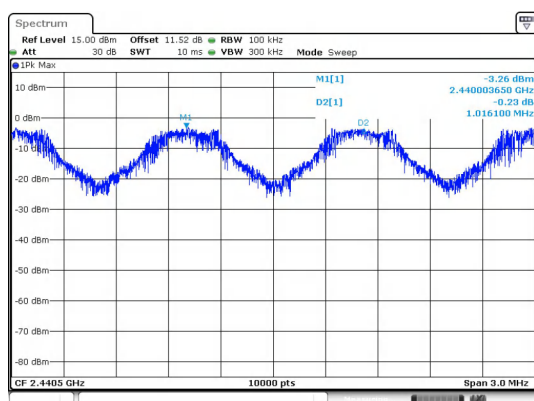
8DPSK_3-DH5_Channel 78

7) Carrier Frequencies Separation

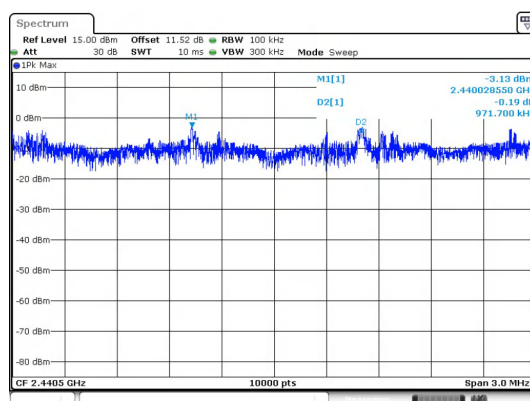
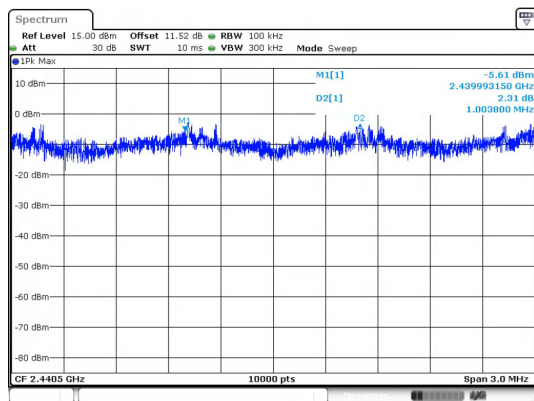
Test Result

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2440.0037	2441.0197	1.0161	0.9300	PASS
$\pi/4$ DQPSK	2-DH5	2440.0285	2441.0003	0.9717	0.8	PASS
8DPSK	3-DH5	2439.9931	2440.997	1.0038	0.827	PASS

Test Graphs



GFSK


 $\pi/4$ DQPSK


8DPSK

8) Conducted Out Of Band Emission

Test Result

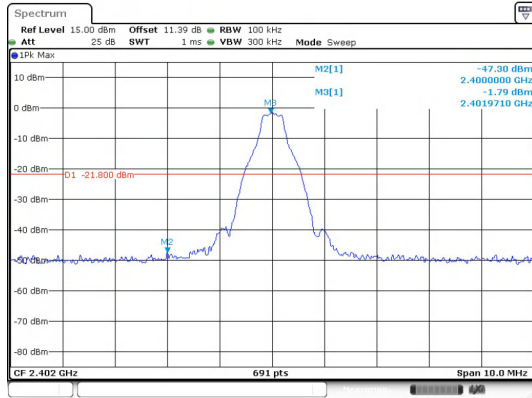
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-47.301	-21.8	-25.501	PASS
			4803.85	-45.517	-21.8	-23.717	PASS
		39	4882.09	-50.244	-23.11	-27.134	PASS
		78	2483.50	-49.045	-22.61	-26.435	PASS
			2558.21	-51.827	-22.61	-29.217	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-48.541	-22.16	-26.381	PASS
			9608.08	-48.731	-22.16	-26.571	PASS
		39	9763.72	-50.826	-22.94	-27.886	PASS
		78	2483.50	-50.115	-22.4	-27.715	PASS
			2558.21	-53.286	-22.4	-30.886	PASS
8DPSK	3-DH5	0	2400.00	-47.734	-21.64	-26.094	PASS
			9608.08	-49.290	-21.64	-27.650	PASS
		39	4882.09	-50.060	-22.83	-27.230	PASS
		78	2483.50	-49.046	-22.45	-26.596	PASS
			6937.95	-52.133	-22.45	-29.683	PASS

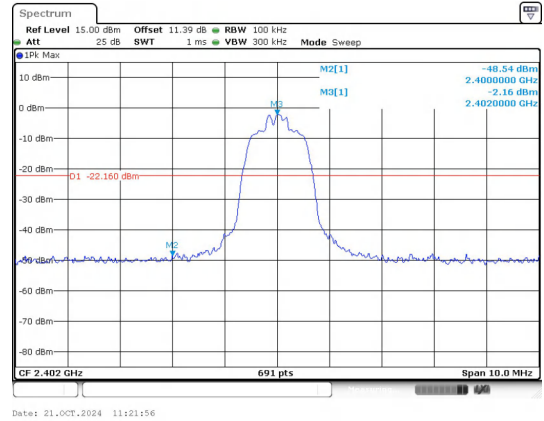
Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2395.12	-46.718	-22.24	-24.478	PASS
			2400.00	-48.893	-22.24	-26.653	PASS
			2483.50	-49.278	-22.76	-26.518	PASS
$\pi/4$ DQPSK	2-DH5		2396.05	-47.269	-21.72	-25.549	PASS
			2400.00	-47.761	-21.72	-26.041	PASS
			2483.50	-50.511	-24.73	-25.781	PASS
8DPSK	3-DH5		2397.37	-47.366	-21.64	-25.726	PASS
			2400.00	-48.205	-21.64	-26.565	PASS
			2483.50	-50.767	-25.45	-25.317	PASS

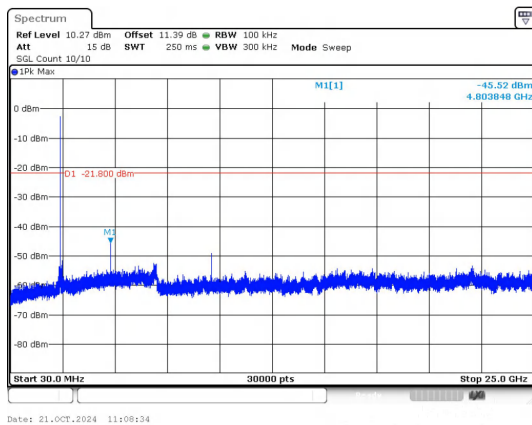
Test Graphs



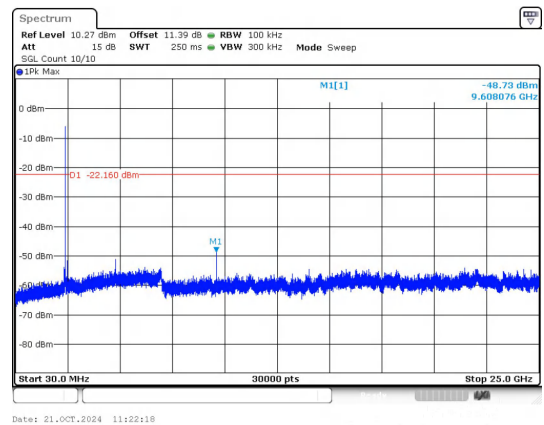
Out Of Band Emission
GFSK_DH5_Channel 0



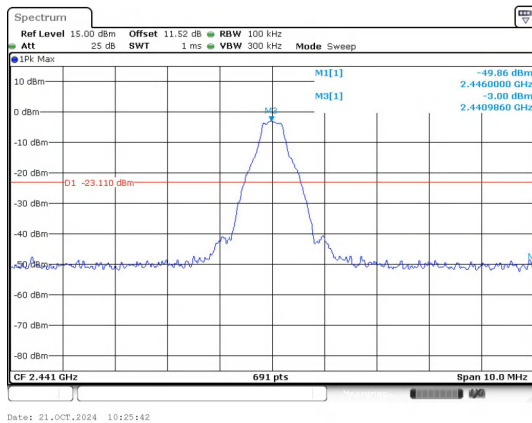
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 0



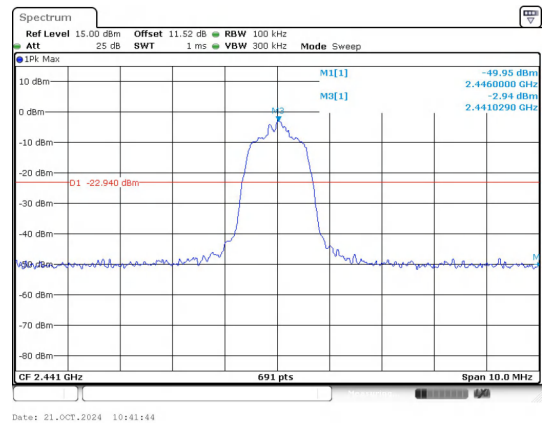
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



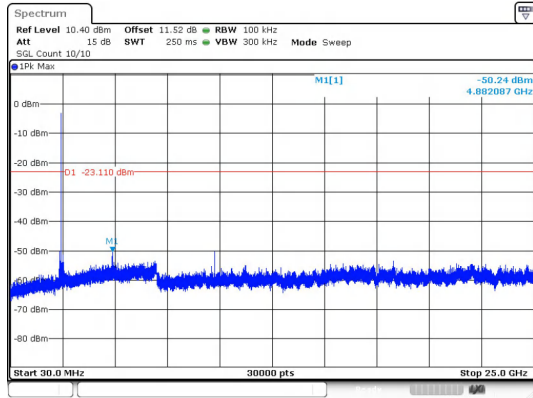
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 0



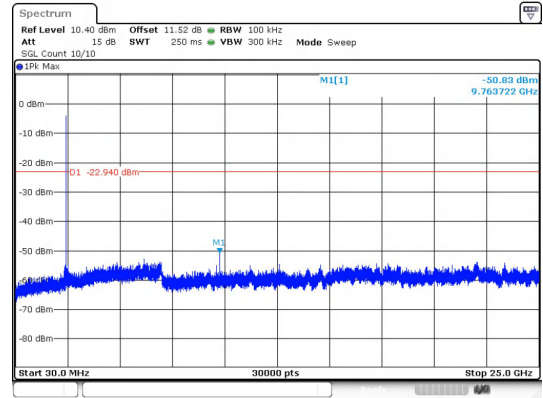
Out Of Band Emission
GFSK_DH5_Channel 39



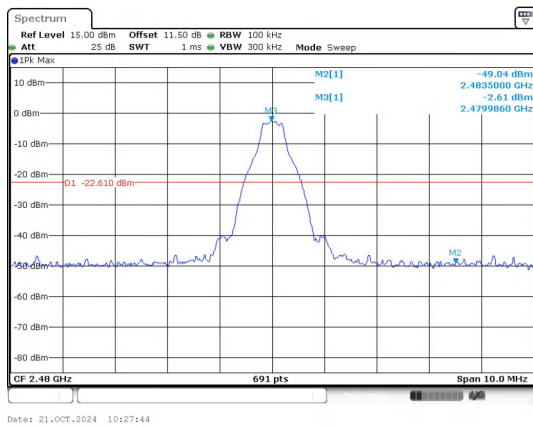
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39



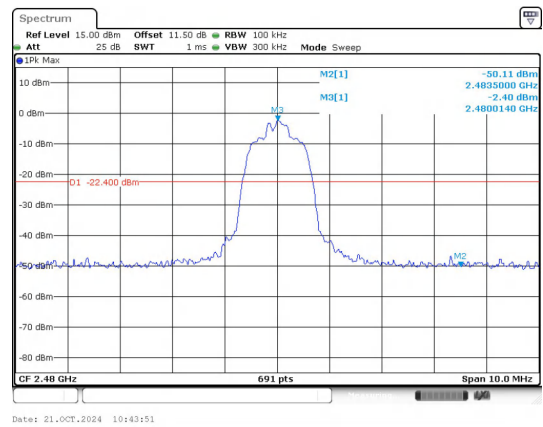
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



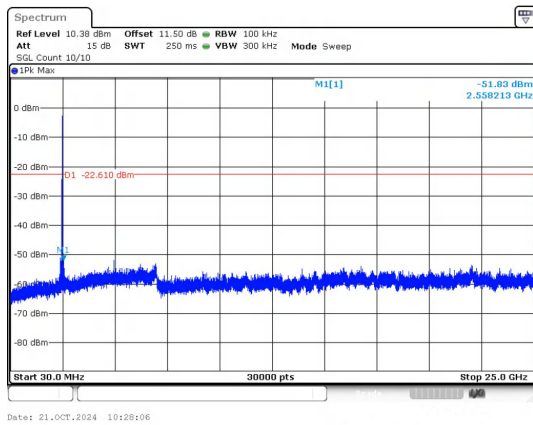
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39



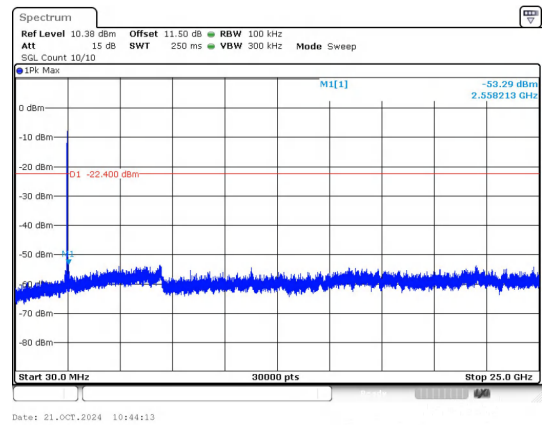
Out Of Band Emission
GFSK_DH5_Channel 78



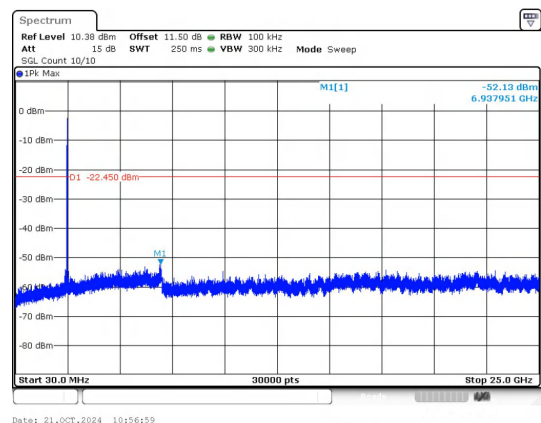
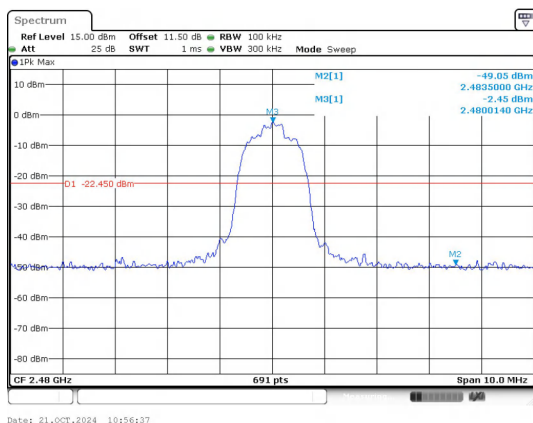
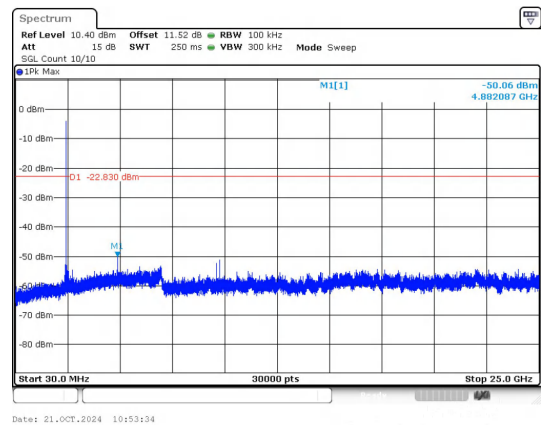
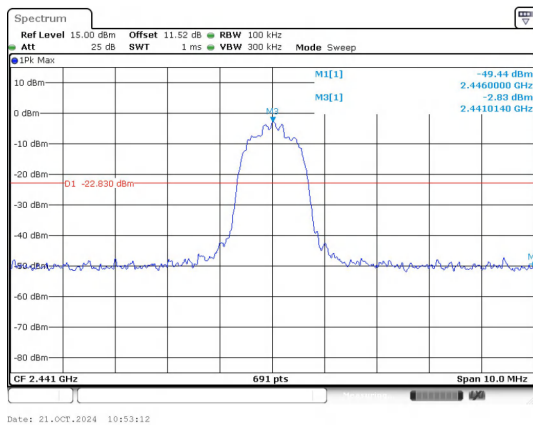
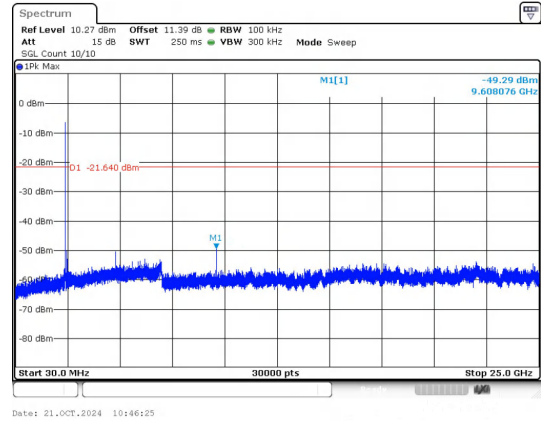
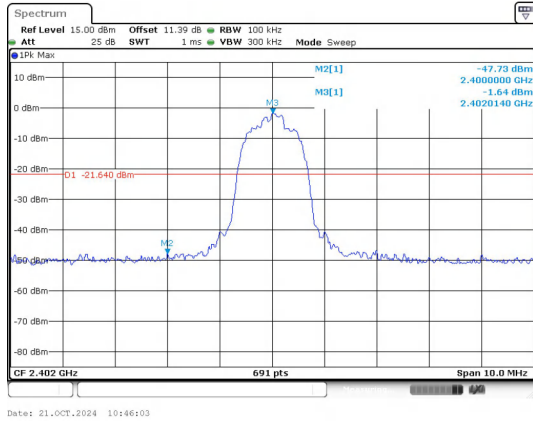
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78

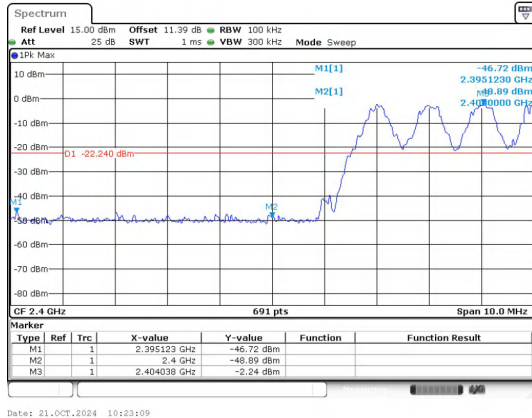


30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78

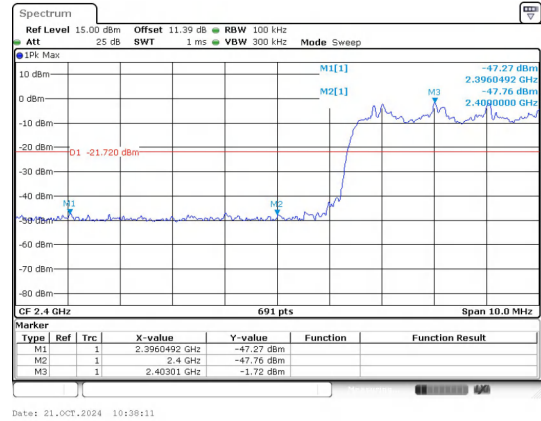


30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 78

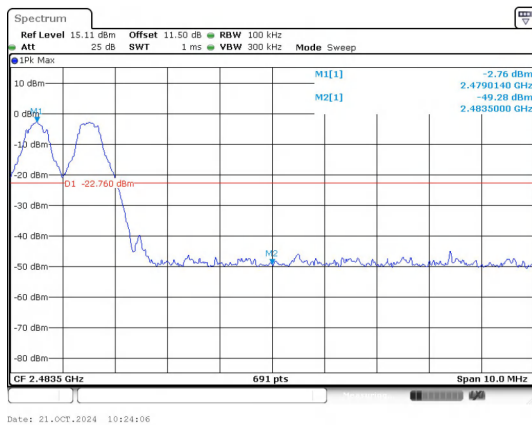




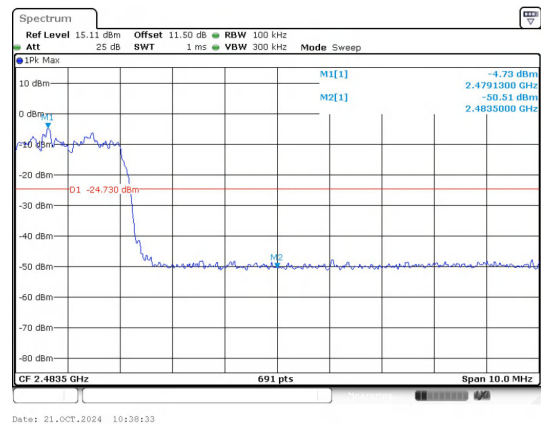
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



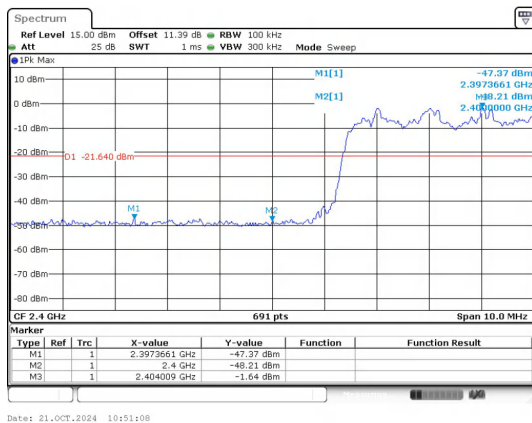
Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



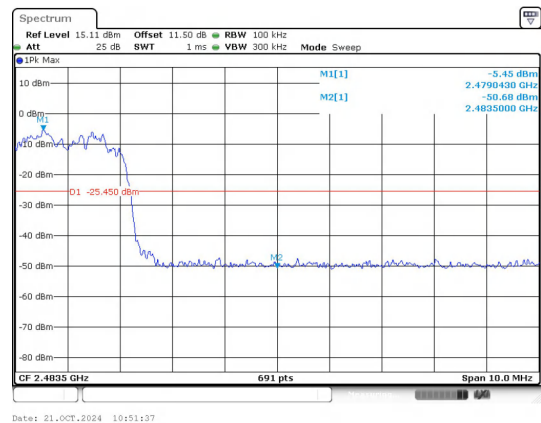
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



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