

Appendix

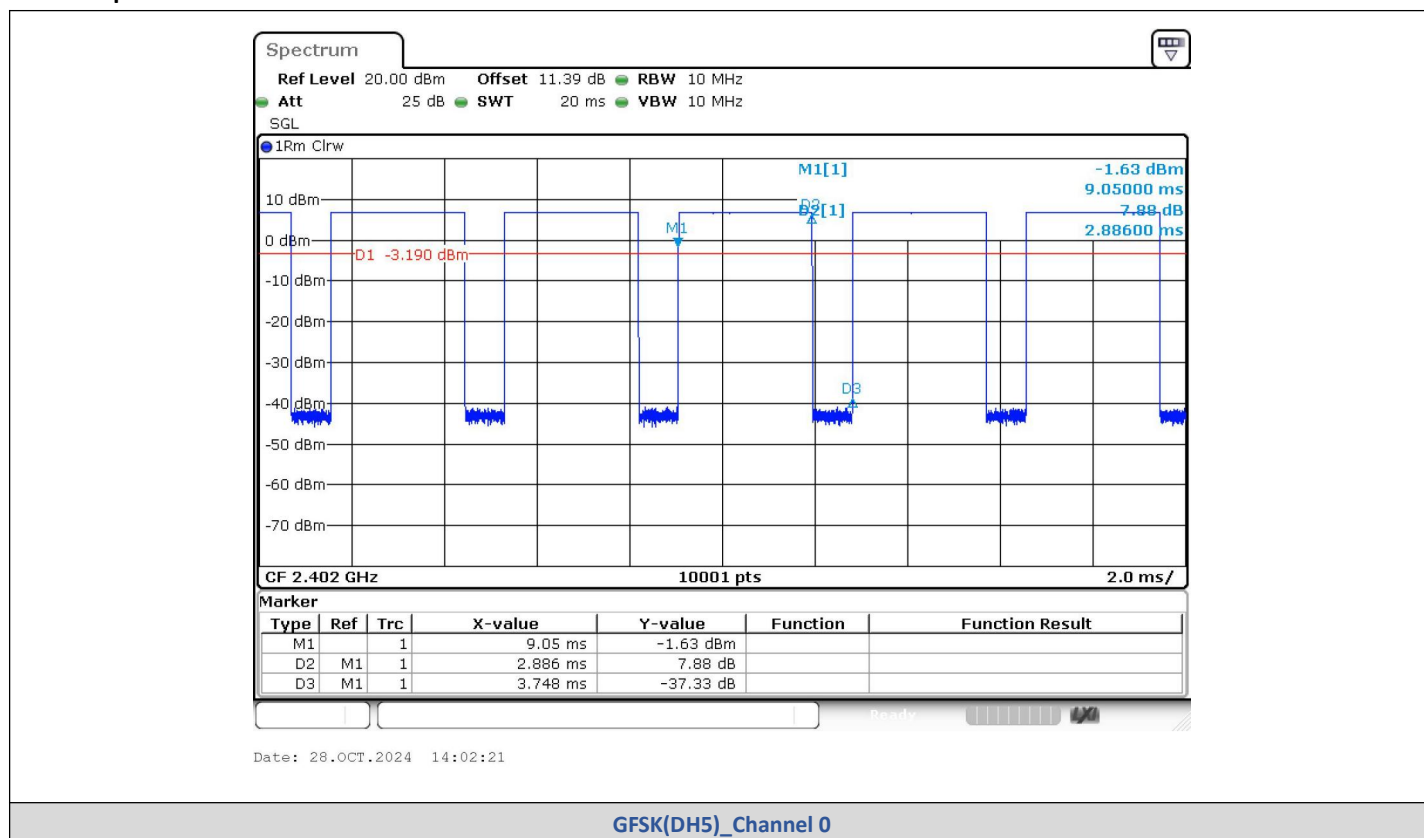
Report No.:	CISRR241024142
FCC ID:	2A4M8-BT-S5
Product Name:	Helmet Bluetooth Headset
Model No.:	BT-S5
Test Engineer:	Lucas Huang
Supervised by:	Rory Huang

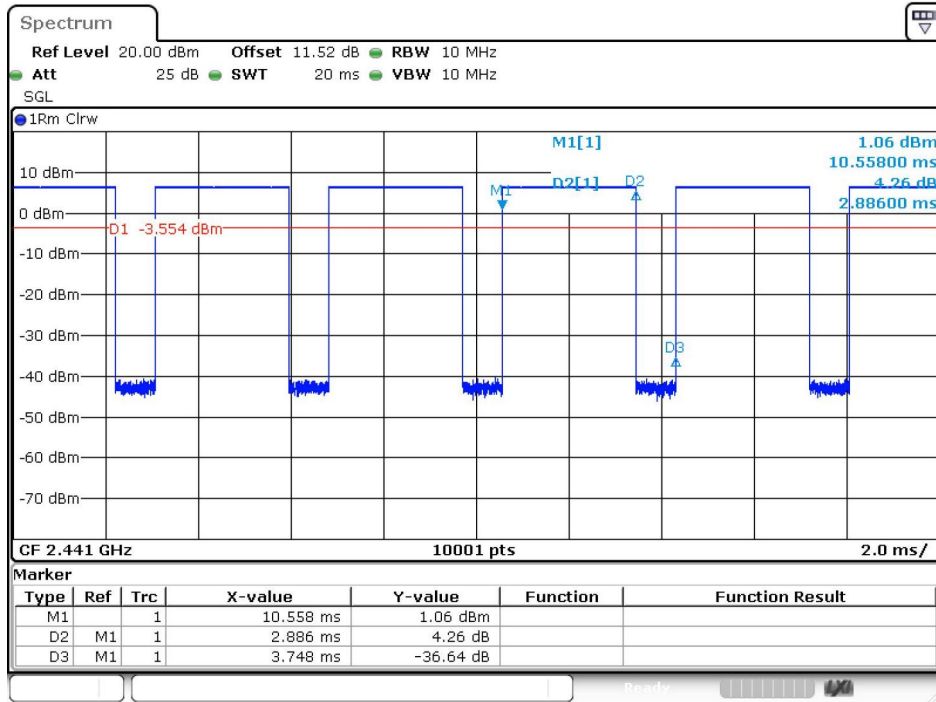
1) Duty Cycle

Test Result

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

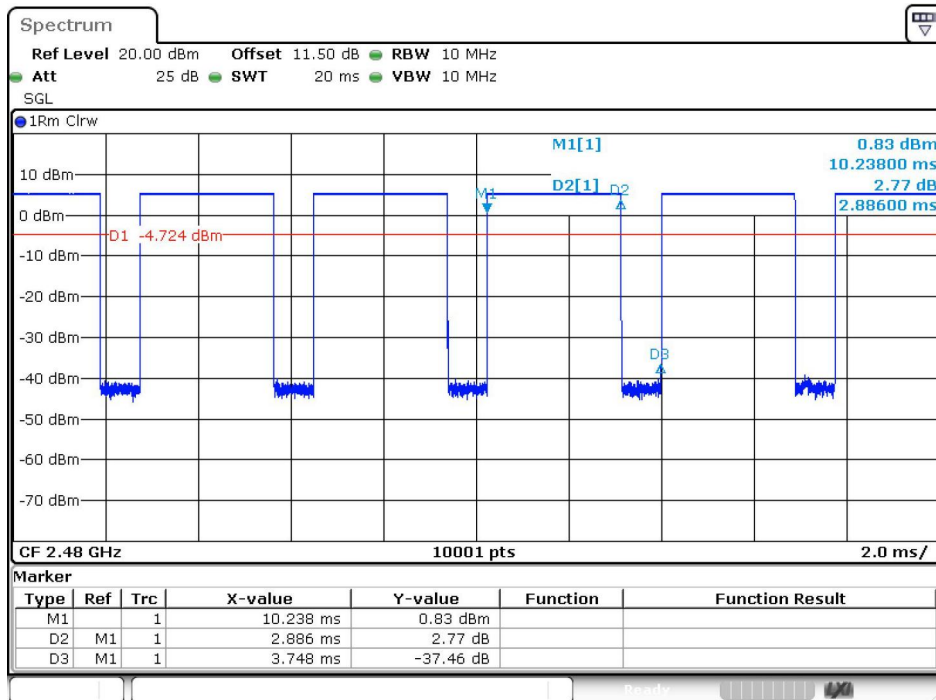
Test Graphs





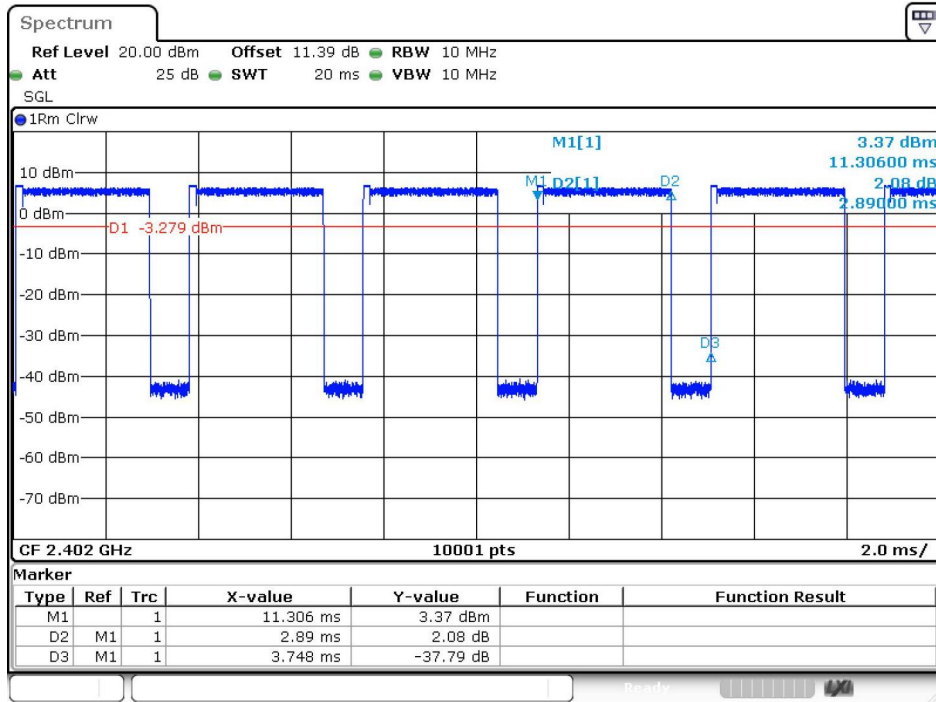
Date: 28.OCT.2024 14:27:50

GFSK(DH5)_Channel 39



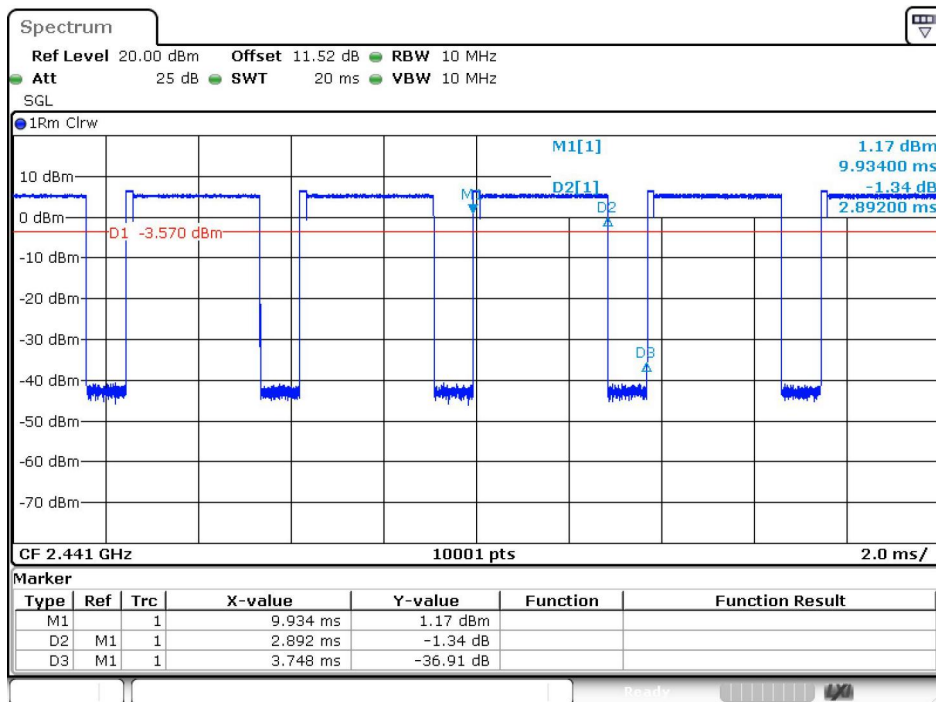
Date: 28.OCT.2024 14:30:13

GFSK(DH5)_Channel 78



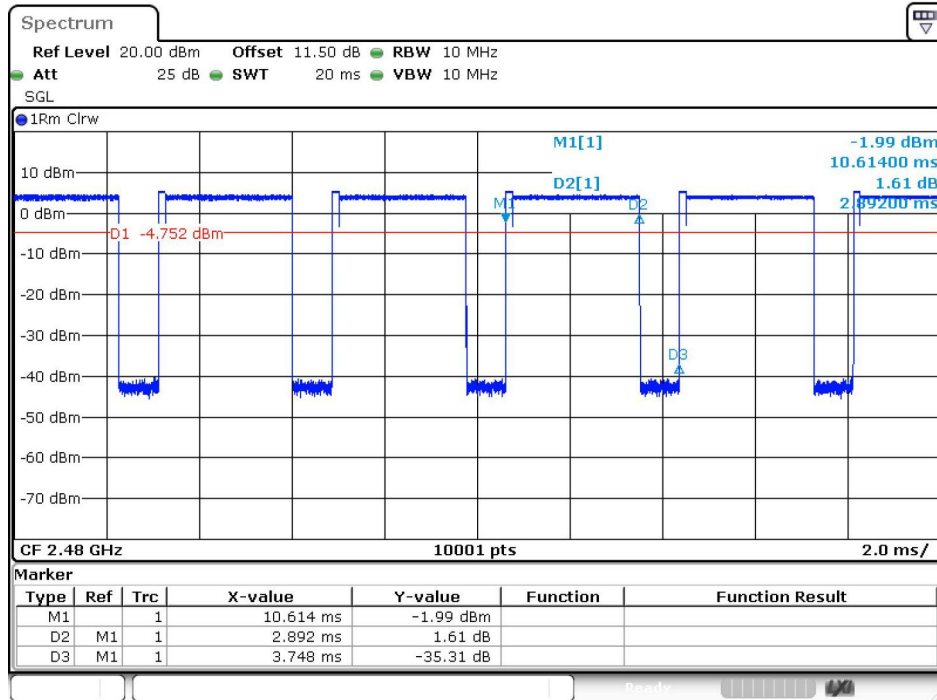
Date: 28.OCT.2024 14:33:17

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



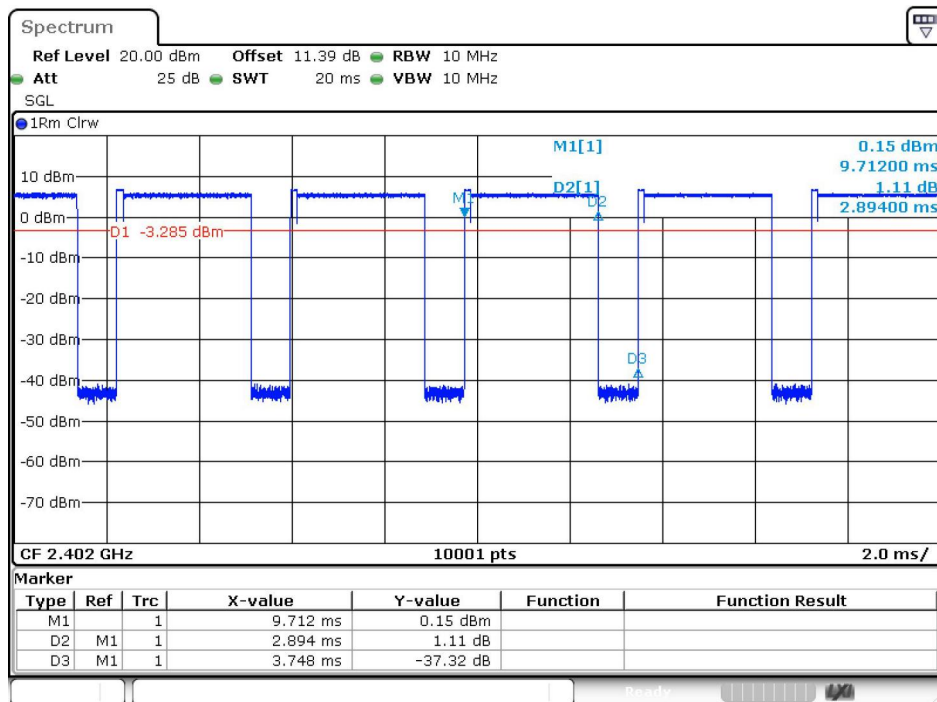
Date: 28.OCT.2024 14:38:20

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



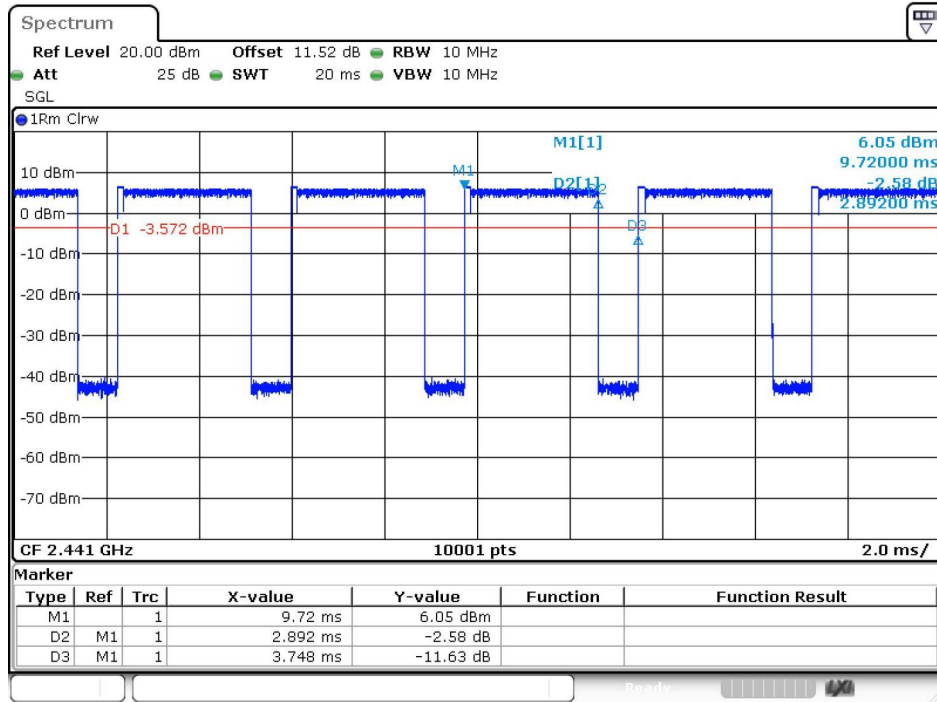
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$\pi/4$ DQPSK(2-DH5)_Channel 78



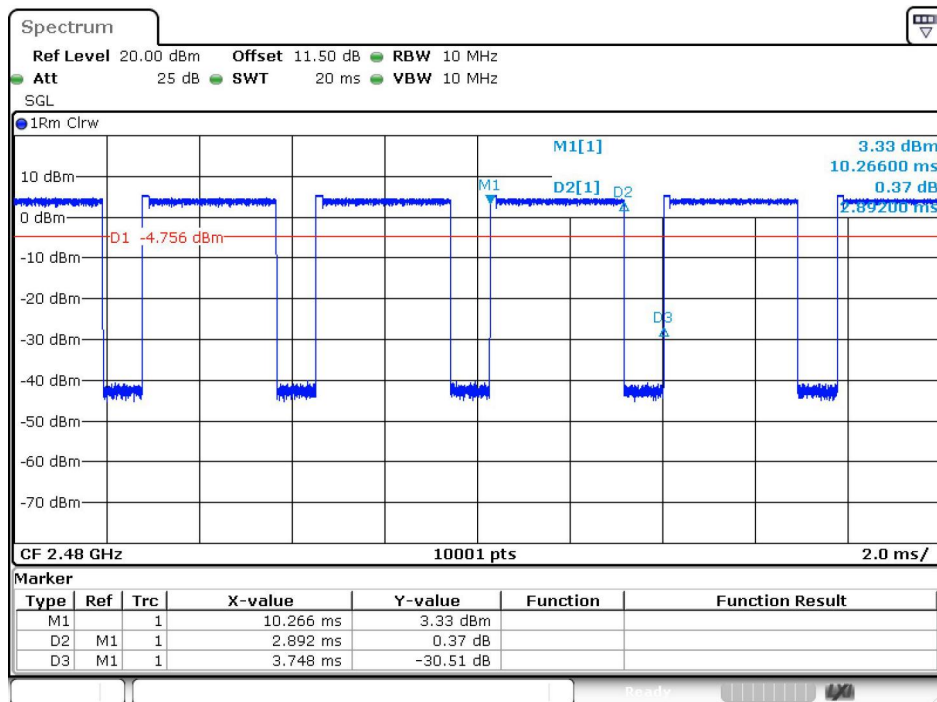
Date: 28.OCT.2024 14:43:40

8DPSK(3-DH5)_Channel 0



Date: 28.OCT.2024 14:49:24

8DPSK(3-DH5)_Channel 39



Date: 28.OCT.2024 14:51:13

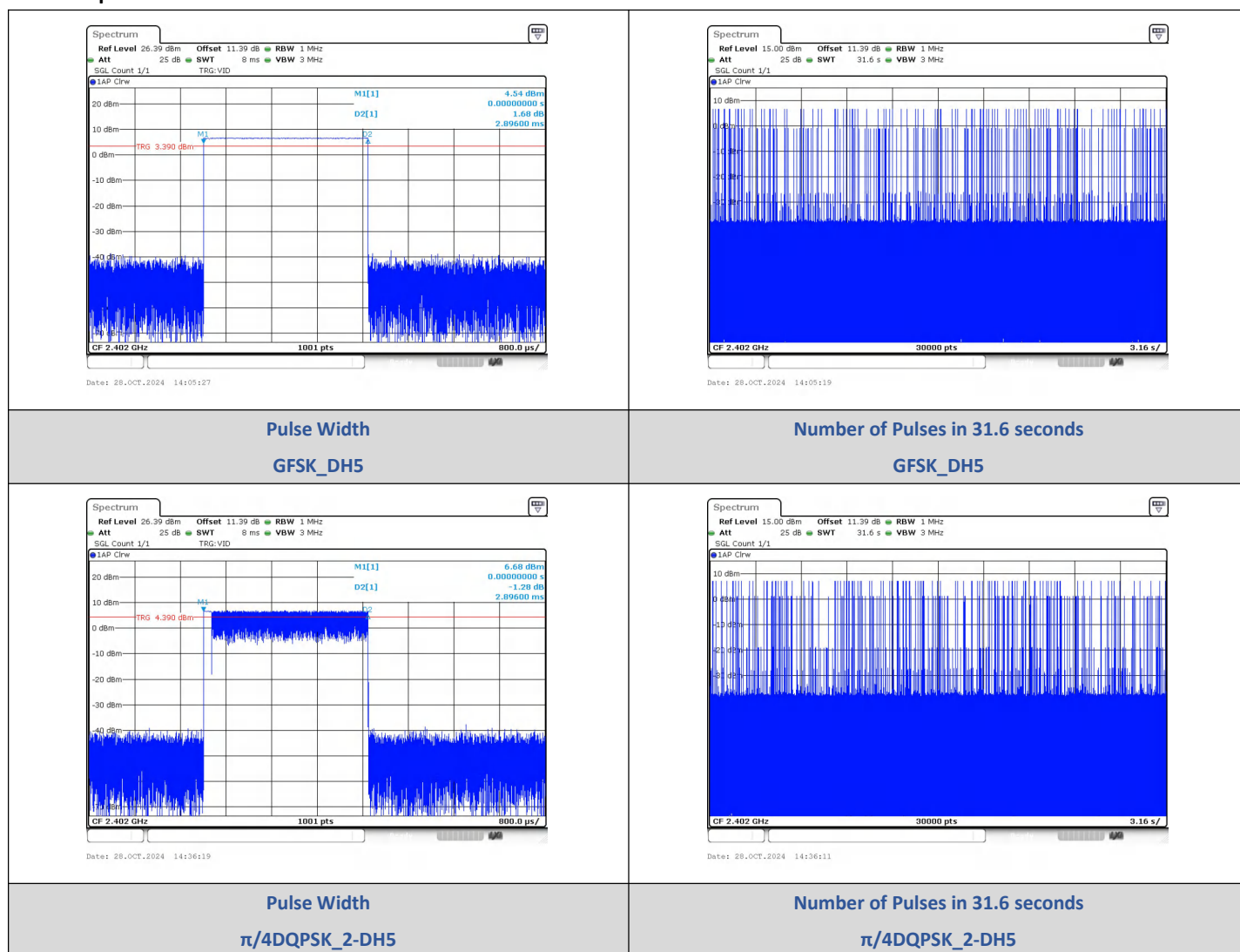
8DPSK(3-DH5)_Channel 78

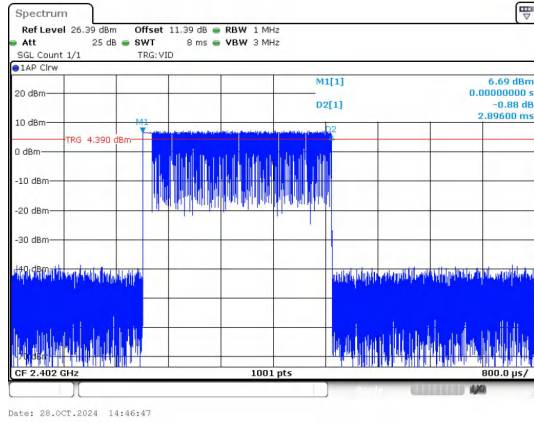
2) Dwell Time

Test Result

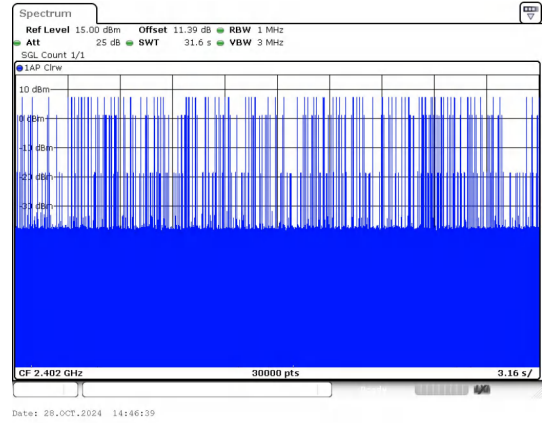
Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.896	106	306.98	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.896	114	330.14		PASS
8DPSK	3-DH5		2.896	101	292.5		PASS

Test Graphs





Pulse Width
8DPSK_3-DH5



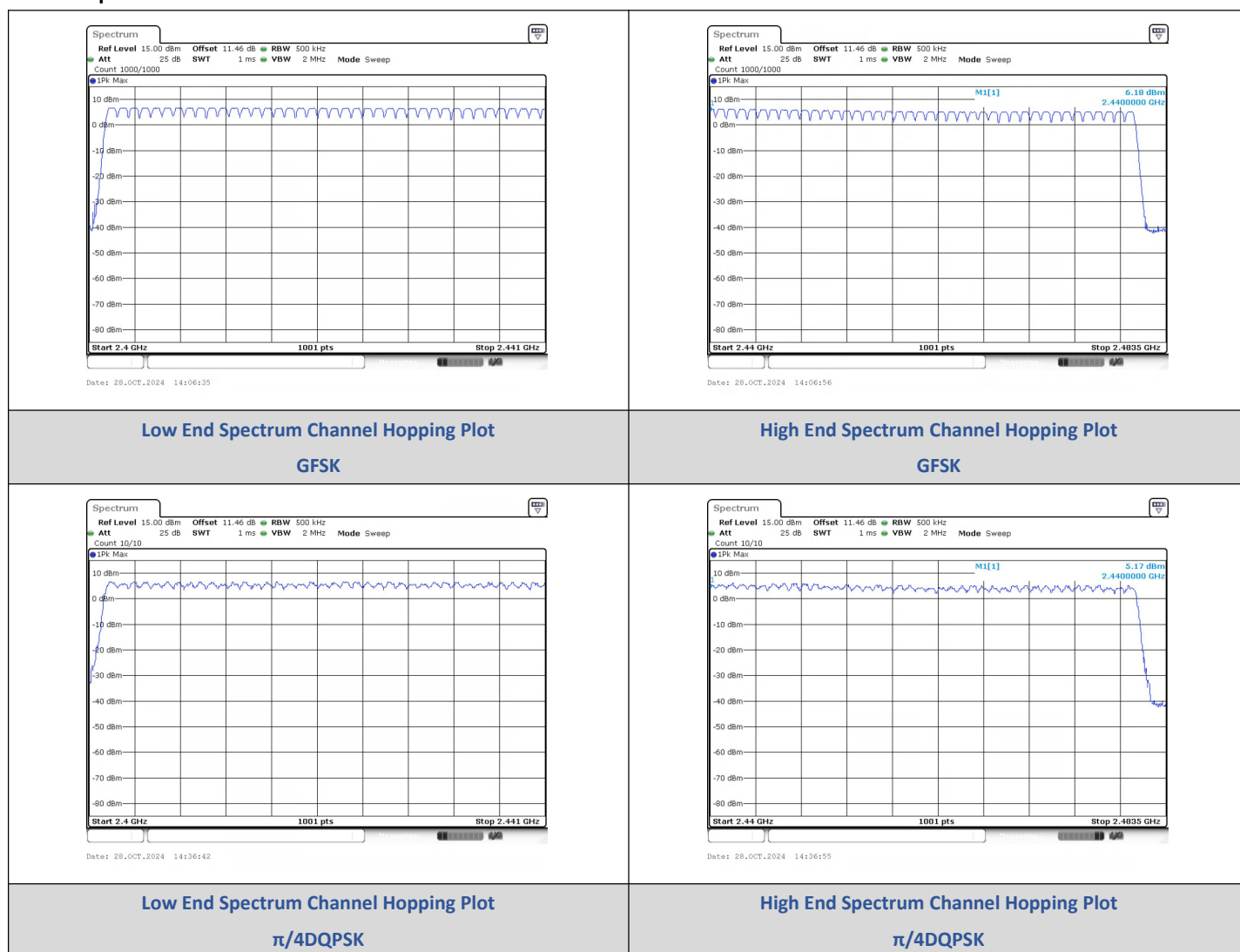
Number of Pulses in 31.6 seconds
8DPSK_3-DH5

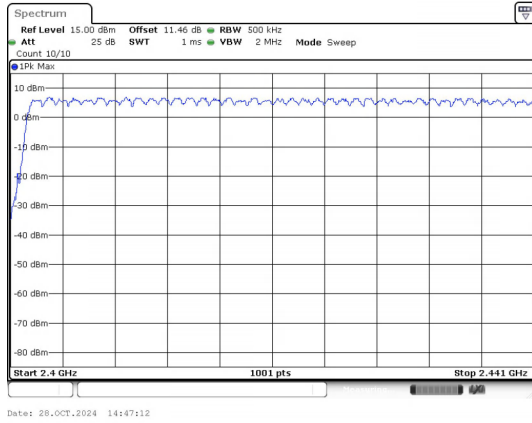
3) Number Of Hopping Channel

Test Result

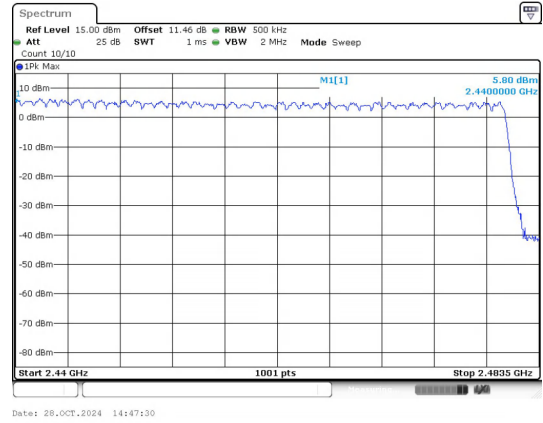
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
$\pi/4$ DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

Test Graphs





Low End Spectrum Channel Hopping Plot
8DPSK



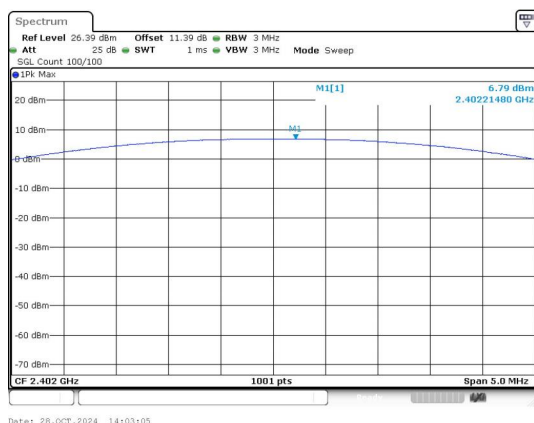
High End Spectrum Channel Hopping Plot
8DPSK

4) Conducted Peak Output Power

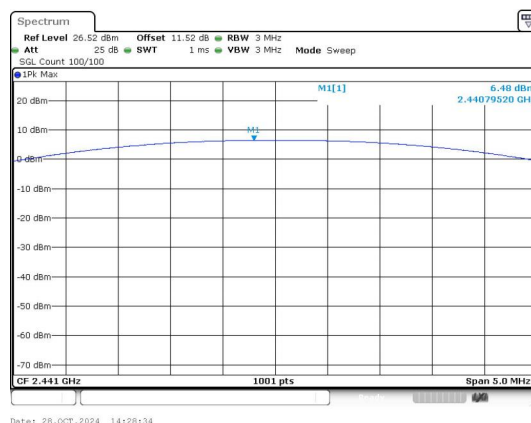
Test Result

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	6.79	4.78	≤30	PASS
		39	6.48	4.45		PASS
		78	5.36	3.44		PASS
$\pi/4$ DQPSK	2-DH5	0	7.37	5.46	≤20.97	PASS
		39	7.02	5.04		PASS
		78	5.98	3.96		PASS
8DPSK	3-DH5	0	7.60	5.75		PASS
		39	7.19	5.24		PASS
		78	6.19	4.16		PASS

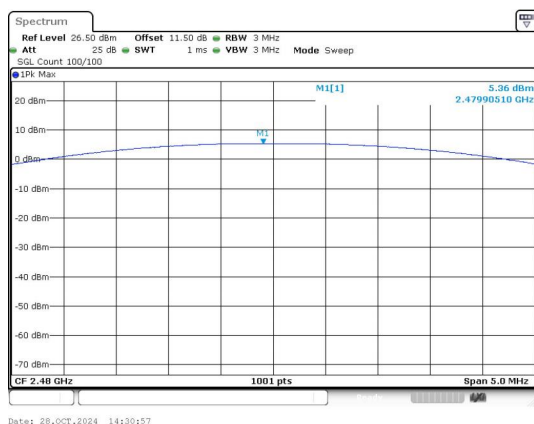
Test Graphs



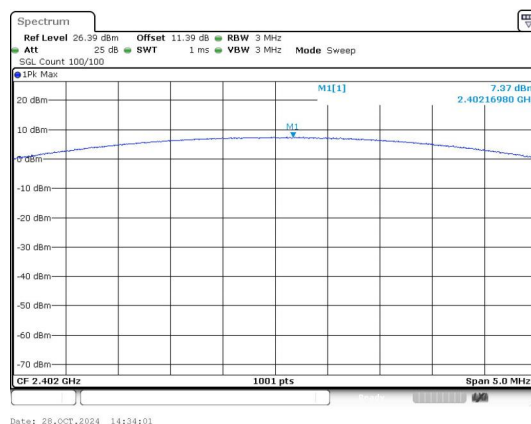
Peak Output Power
GFSK_Channel 0



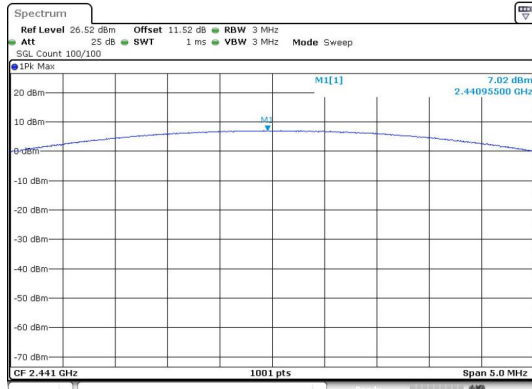
Peak Output Power
GFSK_Channel 39



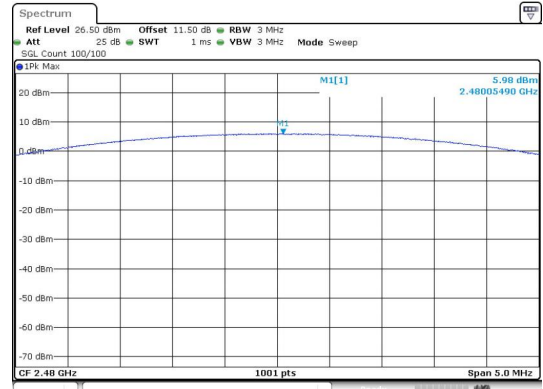
Peak Output Power
GFSK_Channel 78



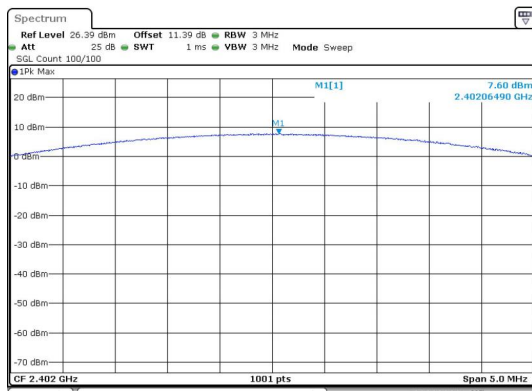
Peak Output Power
 $\pi/4$ DQPSK_Channel 0



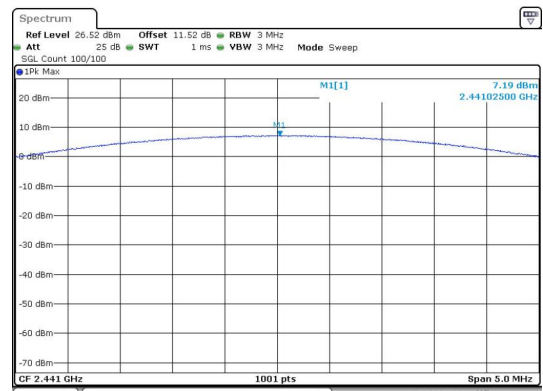
Peak Output Power
 $\pi/4$ DQPSK_Channel 39



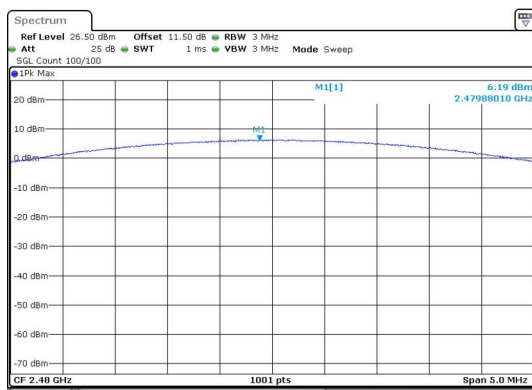
Peak Output Power
 $\pi/4$ DQPSK_Channel 78



Peak Output Power
8DPSK_Channel 0



Peak Output Power
8DPSK_Channel 39



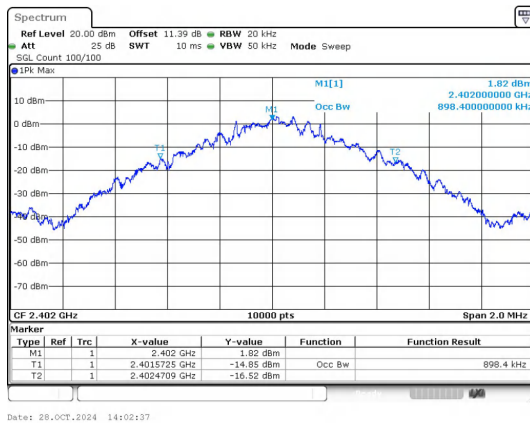
Peak Output Power
8DPSK_Channel 78

5) 99% Bandwidth

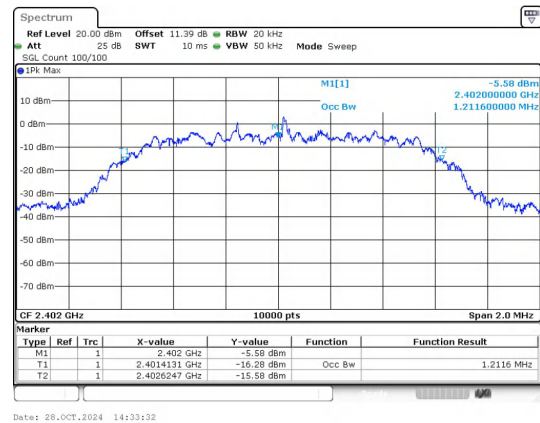
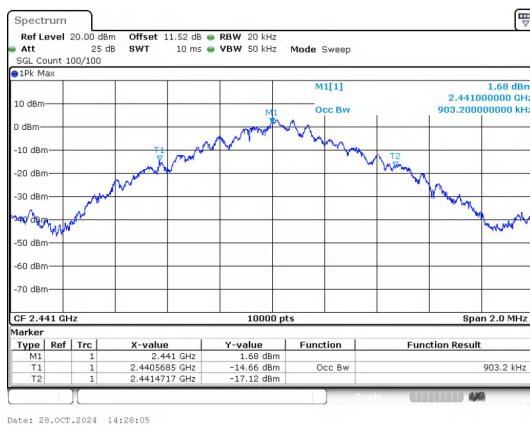
Test Result

Modulation	Channel	Center Frequency (MHz)	99% BW (MHz)
GFSK	0	2402	0.89840
	39	2441	0.90320
	78	2480	0.89820
$\pi/4$ DQPSK	0	2402	1.2116
	39	2441	1.2224
	78	2480	1.1972
8DPSK	0	2402	1.2116
	39	2441	1.2236
	78	2480	1.2110

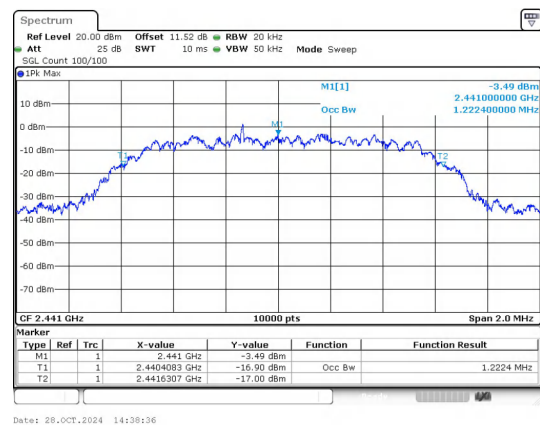
Test Graphs

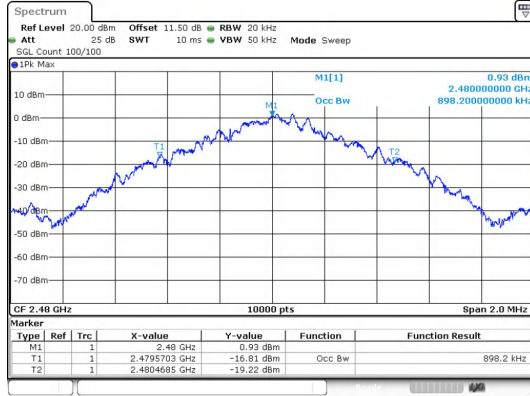


GFSK_DH5_Channel 0

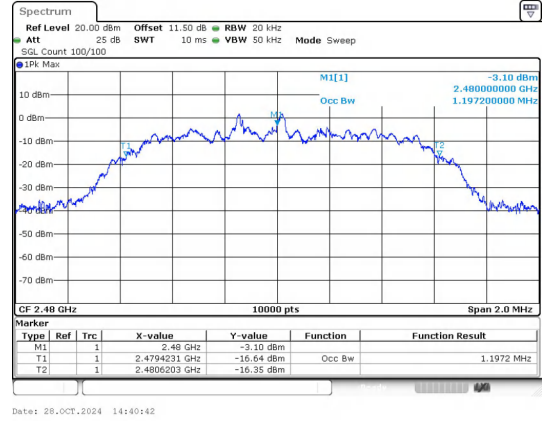

 $\pi/4$ DQPSK_2-DH5_Channel 0


GFSK_DH5_Channel 39

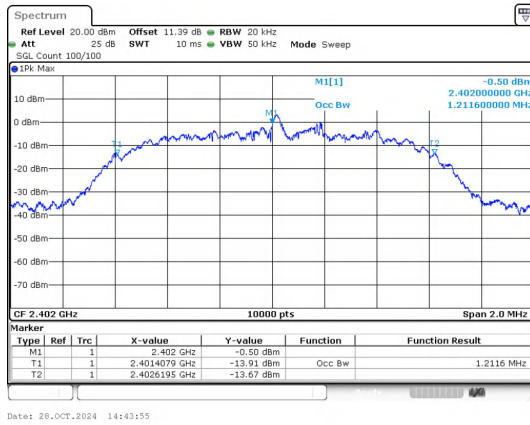

 $\pi/4$ DQPSK_2-DH5_Channel 39



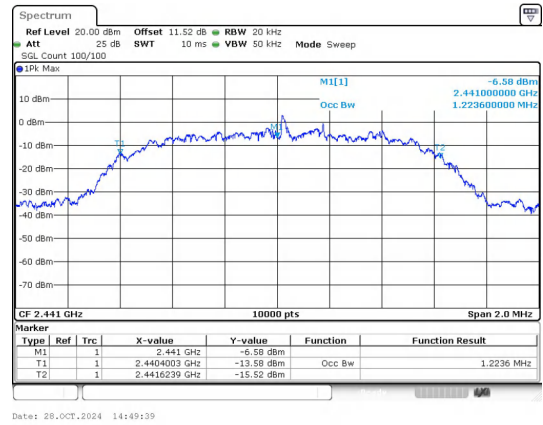
GFSK_DH5_Channel 78



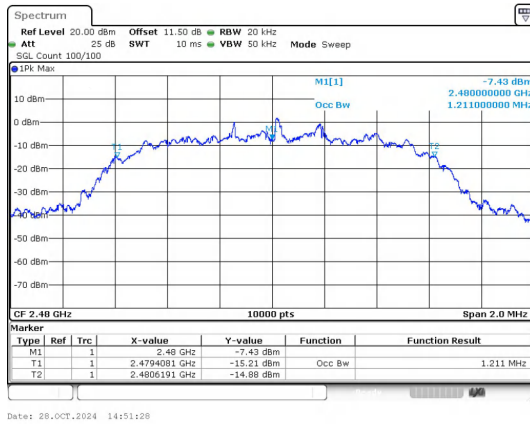
$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



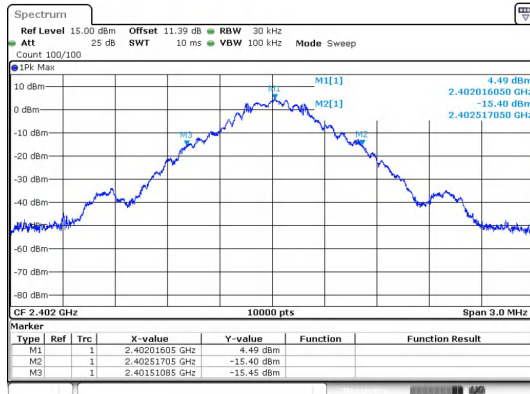
8DPSK_3-DH5_Channel 78

6) 20dB Bandwidth

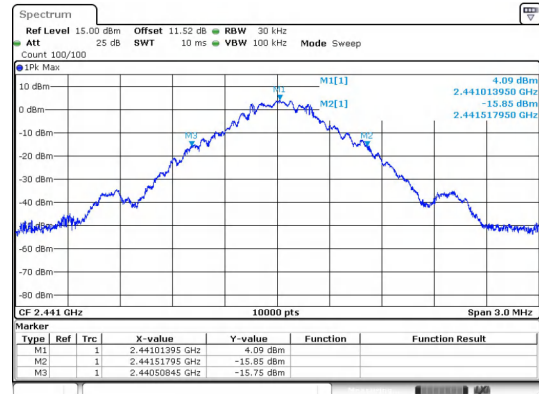
Test Result

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.010
	39	2441 MHz	1.010
	78	2480 MHz	1.020
$\pi/4$ DQPSK	0	2402 MHz	1.320
	39	2441 MHz	1.310
	78	2480 MHz	1.310
8DPSK	0	2402 MHz	1.310
	39	2441 MHz	1.300
	78	2480 MHz	1.290

Test Graphs



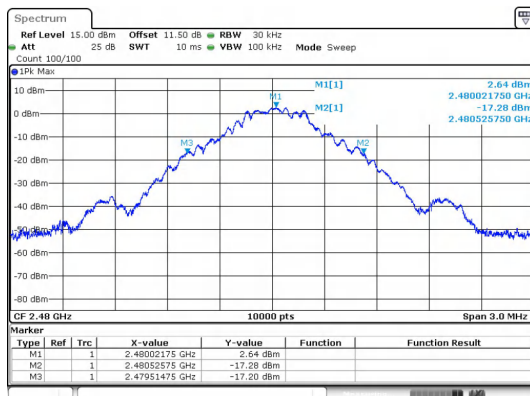
Date: 28.OCT.2024 14:10:154



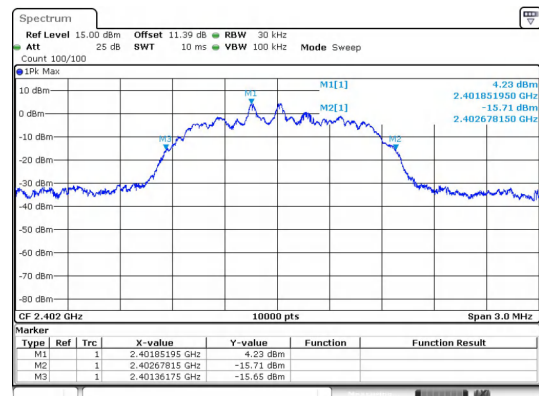
Date: 28.OCT.2024 14:12:22

GFSK_DH5_Channel 0

GFSK_DH5_Channel 39



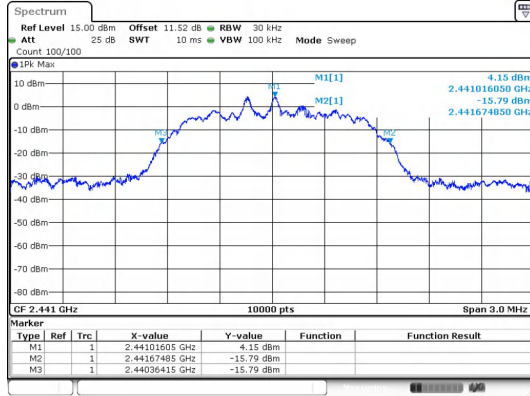
Date: 28.OCT.2024 14:13:145



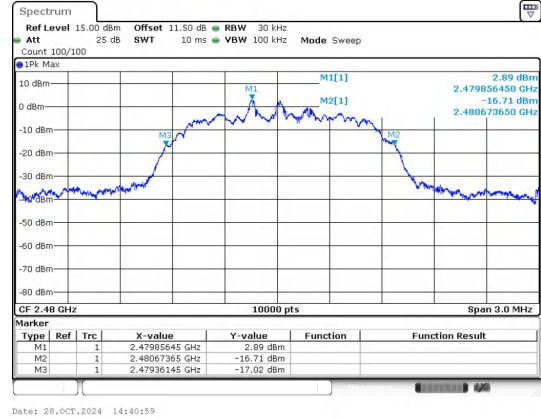
Date: 28.OCT.2024 14:13:149

GFSK_DH5_Channel 78

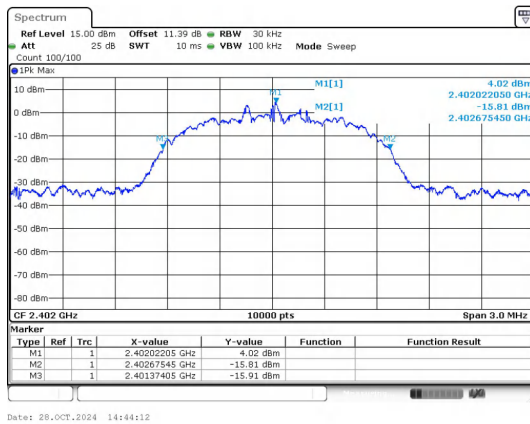
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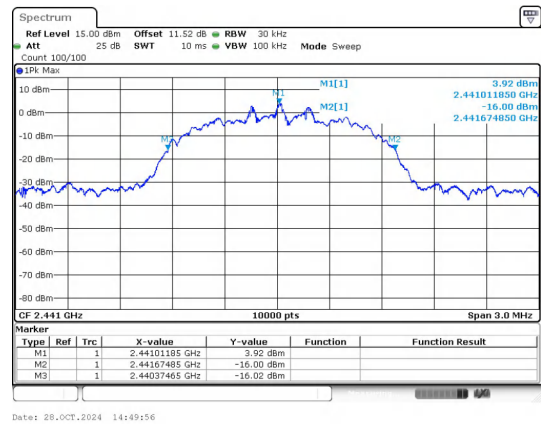
$\pi/4$ DQPSK_2-DH5_Channel 39



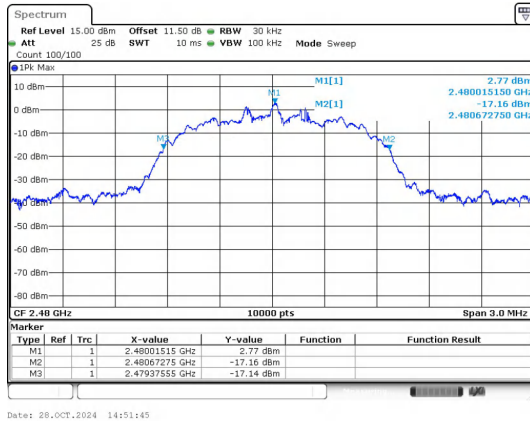
$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



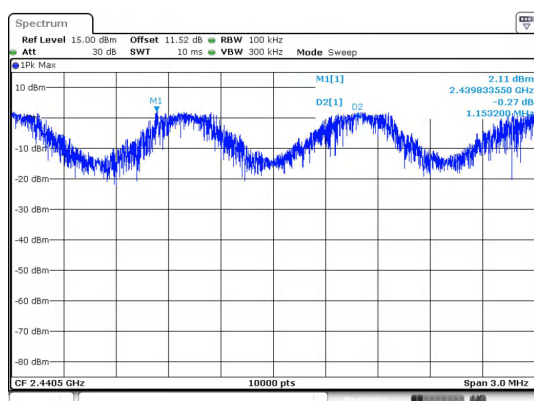
8DPSK_3-DH5_Channel 78

7) Carrier Frequencies Separation

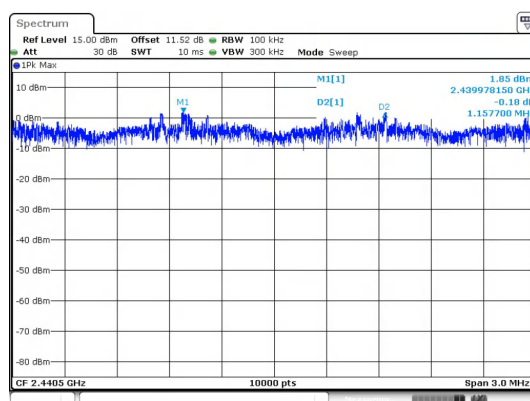
Test Result

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2439.8335	2440.9868	1.1532	1.020	PASS
$\pi/4$ QPSK	2-DH5	2439.9781	2441.1359	1.1577	0.887	PASS
8DPSK	3-DH5	2439.8522	2440.9832	1.1310	0.86	PASS

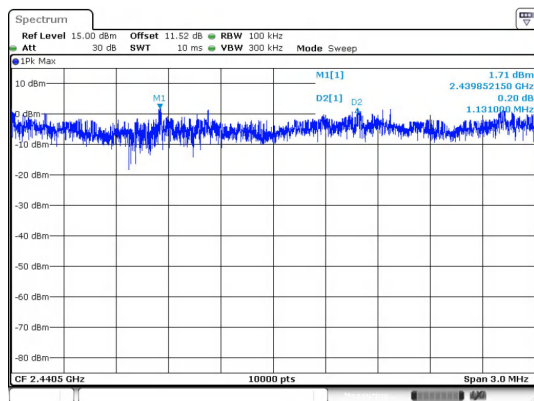
Test Graphs



GFSK



$\pi/4$ QPSK



8DPSK

8) Conducted Out Of Band Emission

Test Result

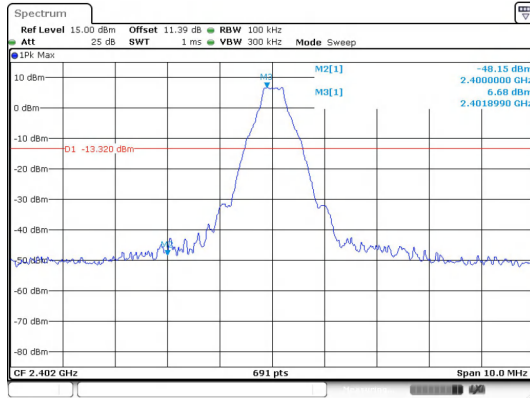
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-48.153	-13.32	-34.833	PASS
			7205.96	-42.543	-13.32	-29.223	PASS
		39	3418.85	-38.020	-13.66	-24.360	PASS
		78	2483.50	-48.976	-14.73	-34.246	PASS
			9920.20	-39.249	-14.73	-24.519	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-43.345	-13.34	-30.005	PASS
			9608.08	-44.527	-13.34	-31.187	PASS
		39	9763.72	-40.255	-13.58	-26.675	PASS
		78	2483.50	-49.700	-14.77	-34.930	PASS
			9920.20	-39.401	-14.77	-24.631	PASS
8DPSK	3-DH5	0	2400.00	-44.639	-13.48	-31.159	PASS
			4803.85	-41.952	-13.48	-28.472	PASS
		39	9763.72	-40.102	-13.95	-26.152	PASS
		78	2483.50	-50.154	-14.8	-35.354	PASS
			9920.20	-39.455	-14.8	-24.655	PASS

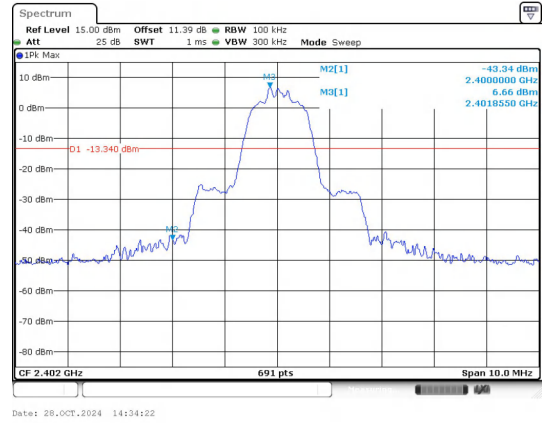
Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2395.48	-48.448	-13.53	-34.918	PASS
			2400.00	-50.262	-13.53	-36.732	PASS
			2483.50	-48.599	-14.74	-33.859	PASS
$\pi/4$ DQPSK	2-DH5		2397.35	-48.312	-13.79	-34.522	PASS
			2400.00	-51.060	-13.79	-37.270	PASS
			2483.50	-50.285	-17.88	-32.405	PASS
8DPSK	3-DH5		2395.82	-47.596	-13.39	-34.206	PASS
			2400.00	-50.275	-13.39	-36.885	PASS
			2483.50	-49.834	-15.34	-34.494	PASS

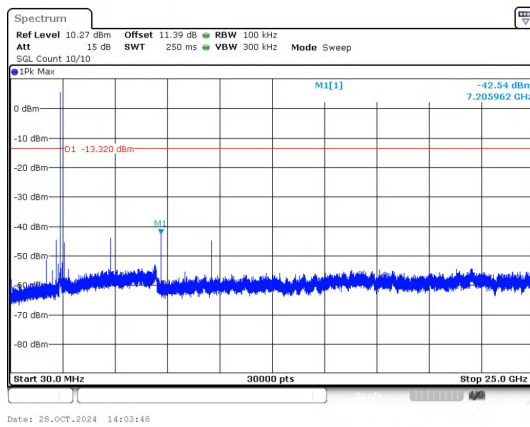
Test Graphs



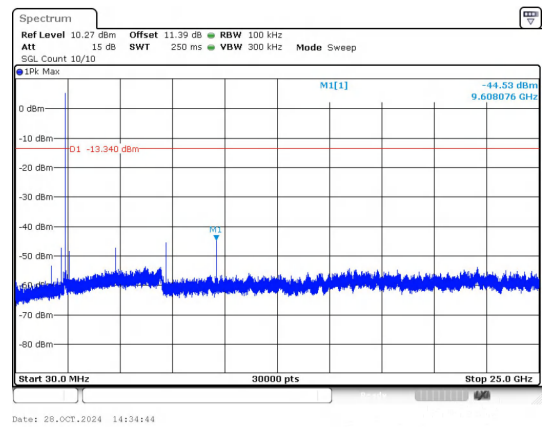
Out Of Band Emission
GFSK_DH5_Channel 0



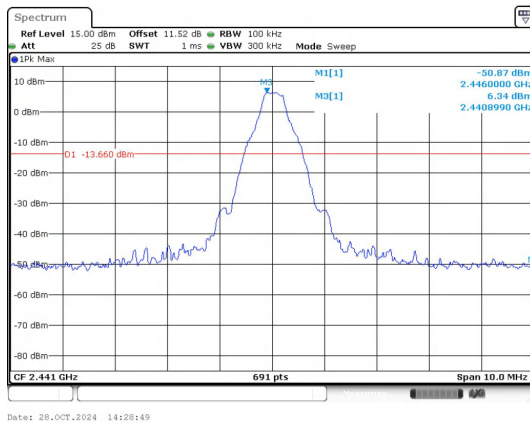
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 0



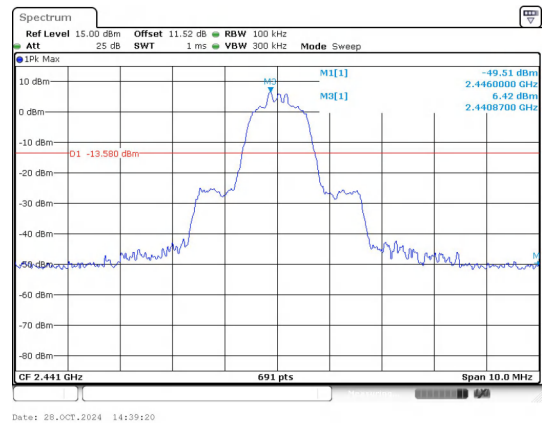
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



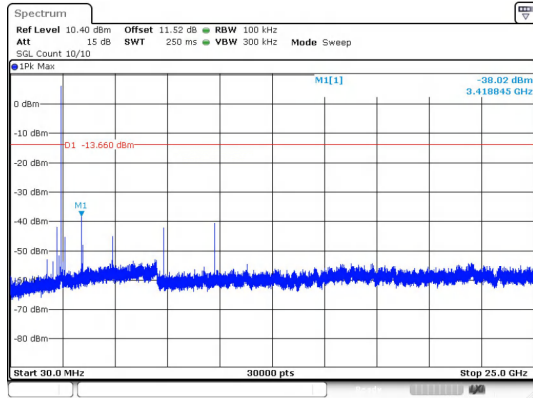
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 0



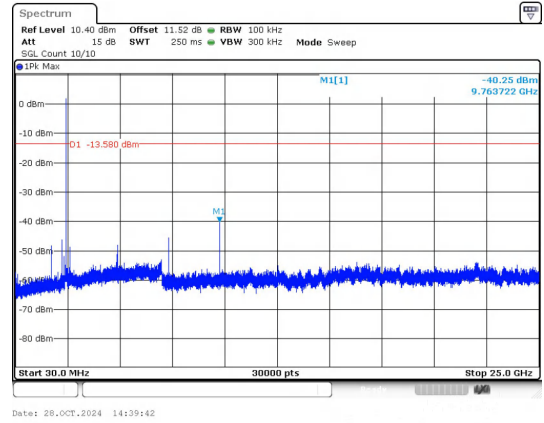
Out Of Band Emission
GFSK_DH5_Channel 39



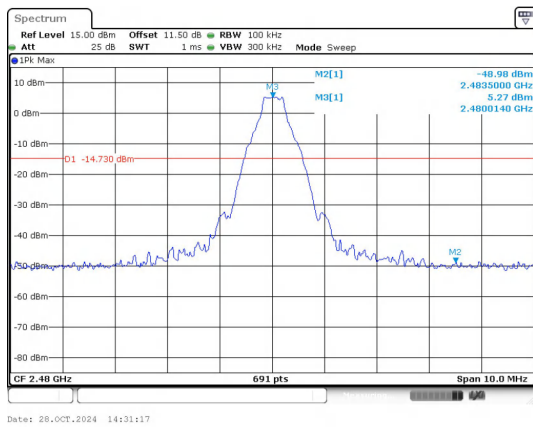
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39



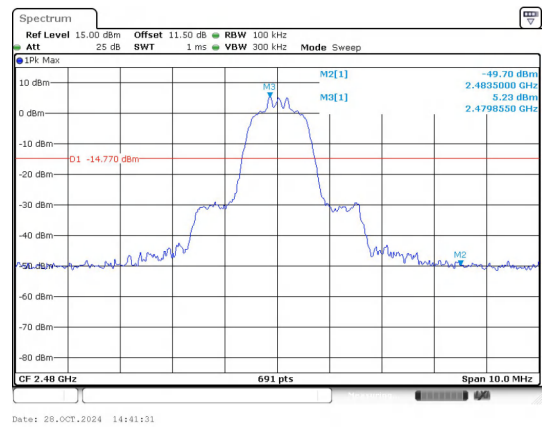
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



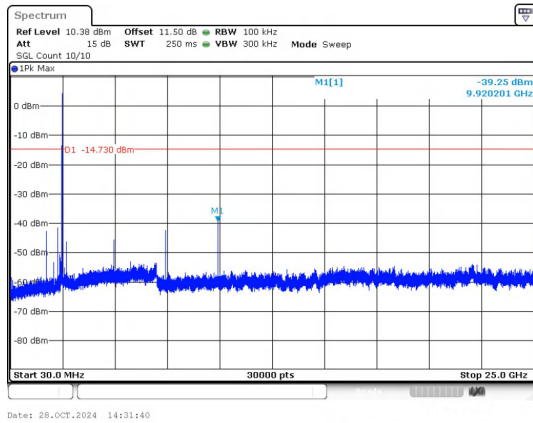
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39



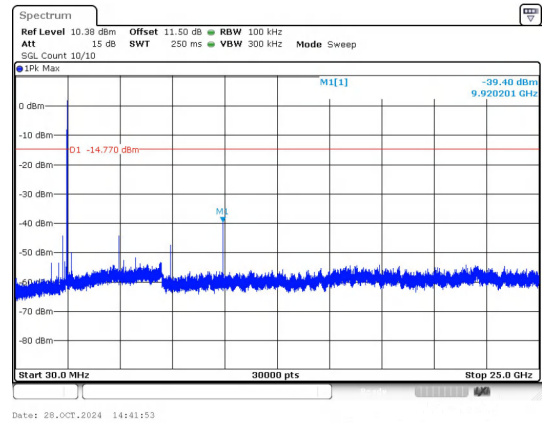
Out Of Band Emission
GFSK_DH5_Channel 78



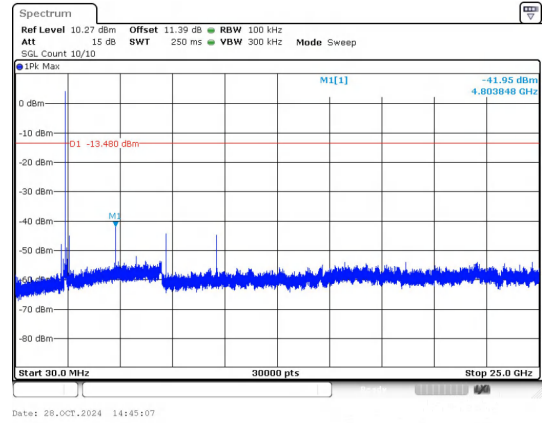
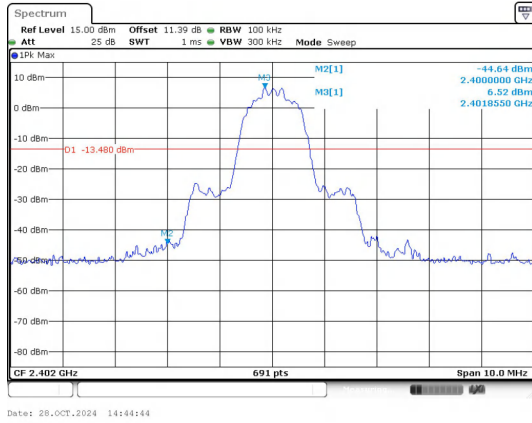
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78

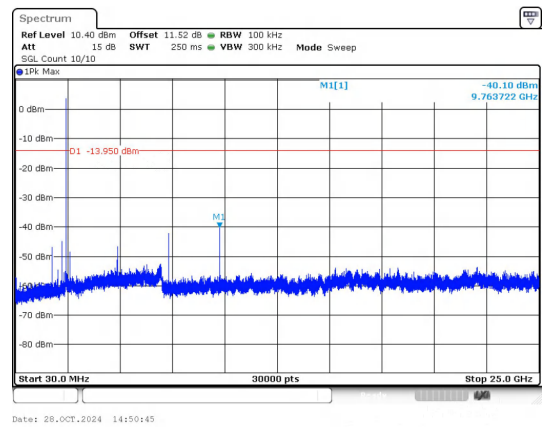
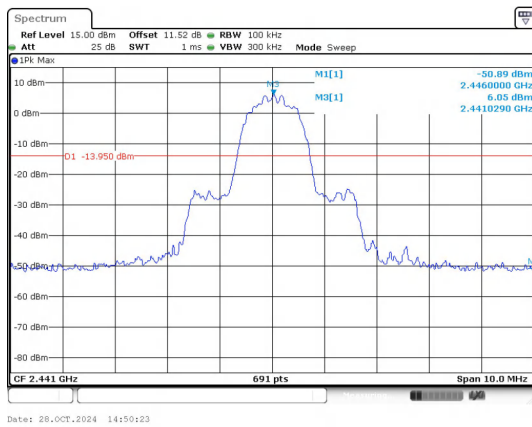


30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 78



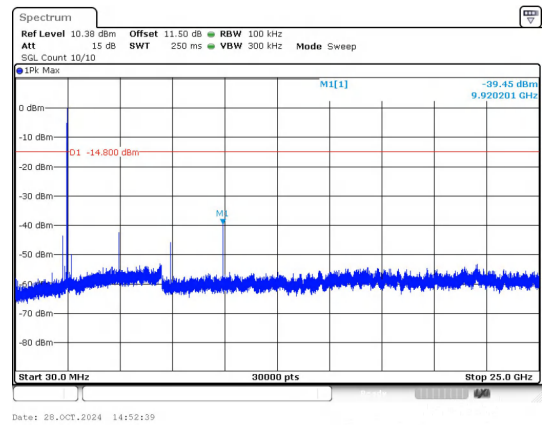
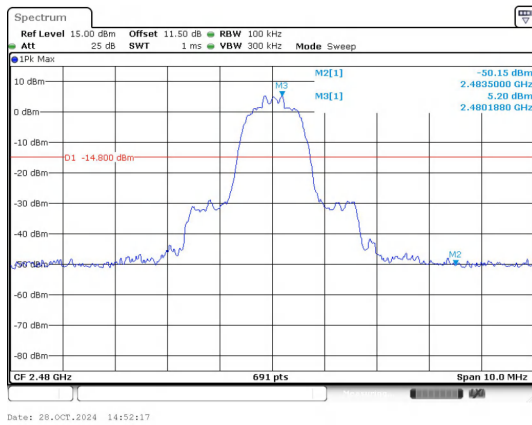
Out Of Band Emission
8DPSK_3-DH5_Channel 0

30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



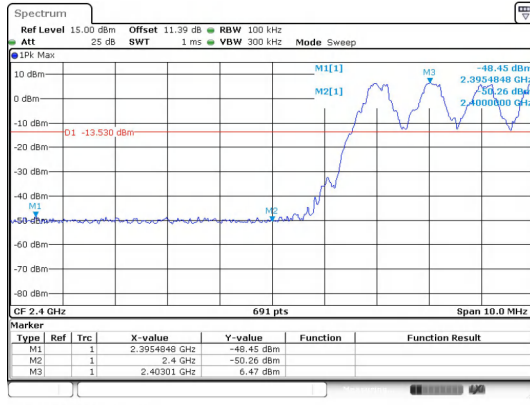
Out Of Band Emission
8DPSK_3-DH5_Channel 39

30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39

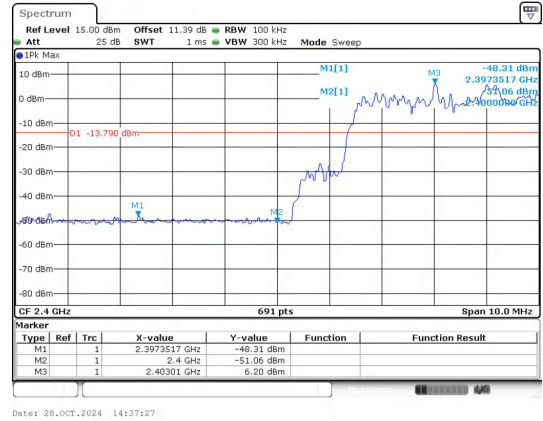


Out Of Band Emission
8DPSK_3-DH5_Channel 78

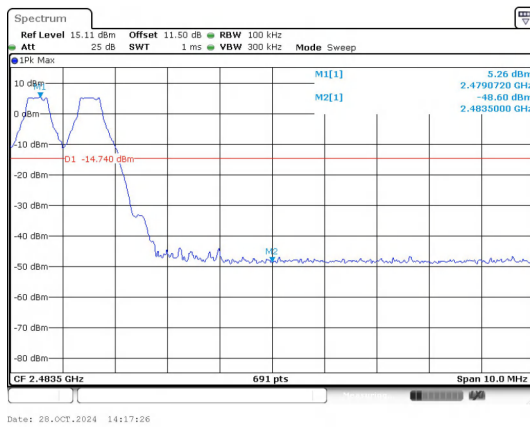
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



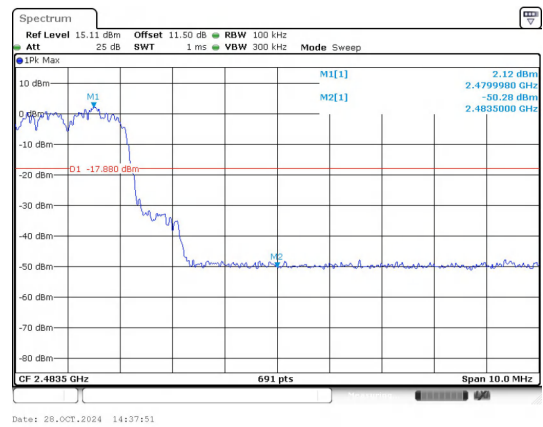
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



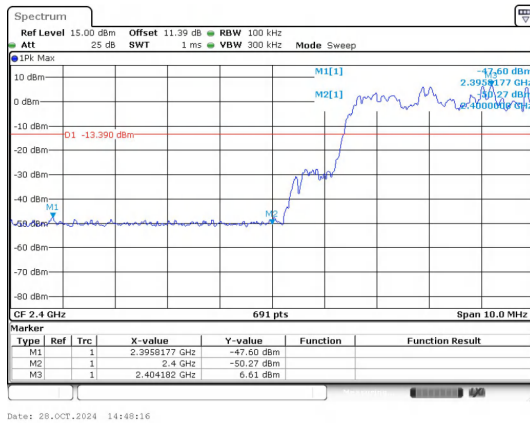
Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



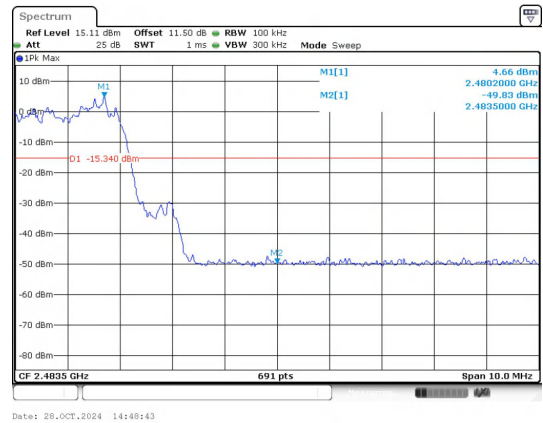
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



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