

Appendix A

Report No.:	CISRR240531208
FCC ID:	2BGWS-DJ20
Product Name:	Sound Card
Model No.:	Dj20
Test Engineer:	Lucas Huang
Supervised by:	Rory Huang

Conducted Peak Output Power

Test Result

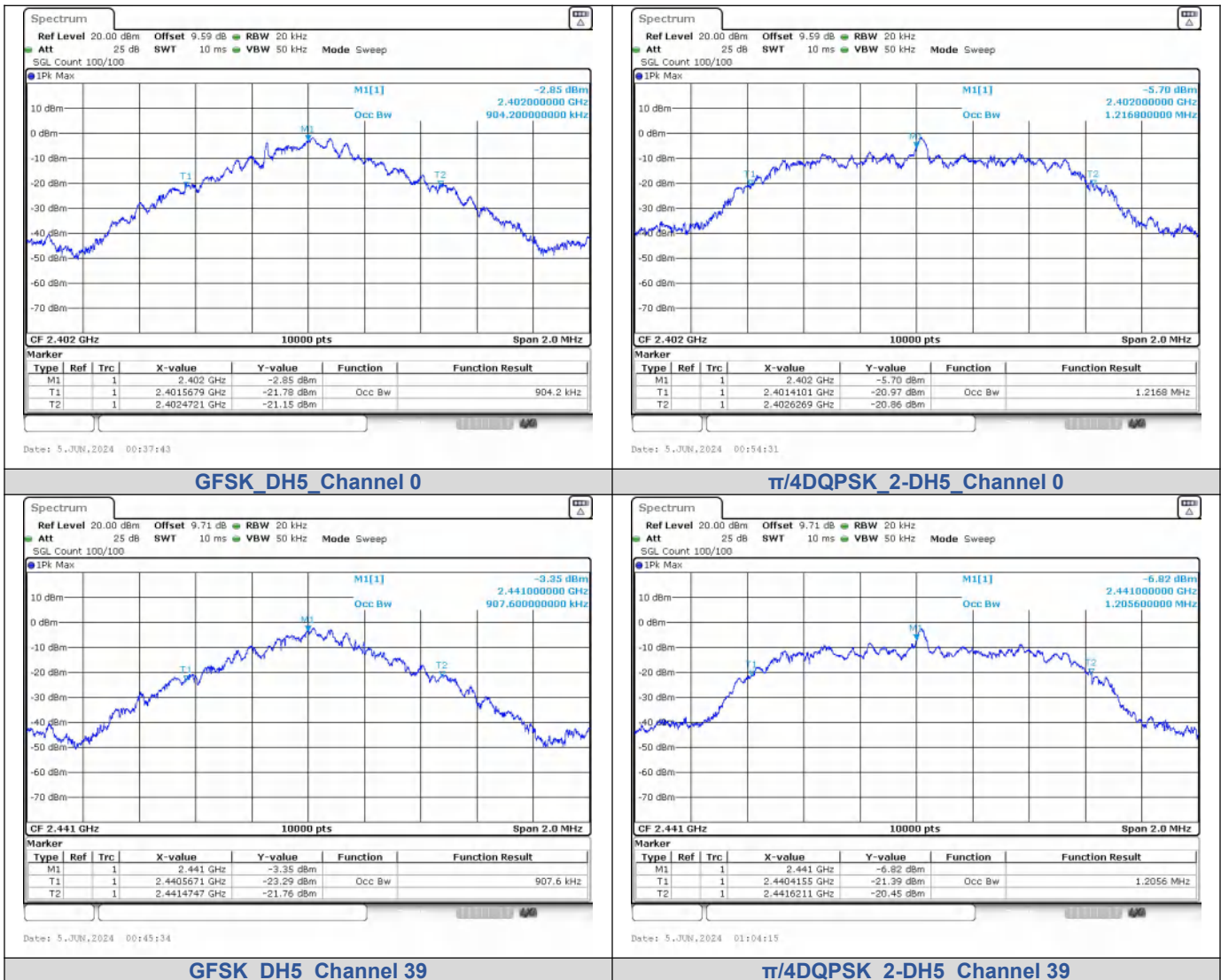
Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	2.324	1.708	30	PASS
		39	1.821	1.521		PASS
		78	1.864	1.536		PASS
$\pi/4$ DQPSK	2-DH5	0	2.201	1.660	20.97	PASS
		39	1.669	1.469		PASS
		78	1.685	1.474		PASS
8DPSK	3-DH5	0	1.719	1.486		PASS
		39	1.212	1.322		PASS
		78	1.155	1.305		PASS

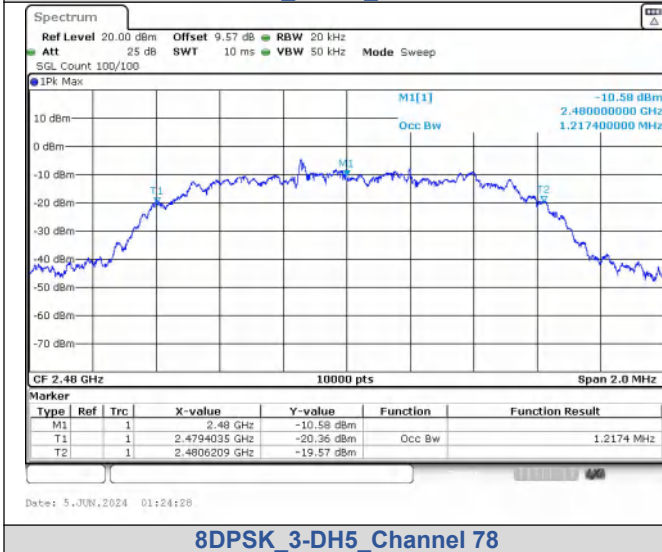
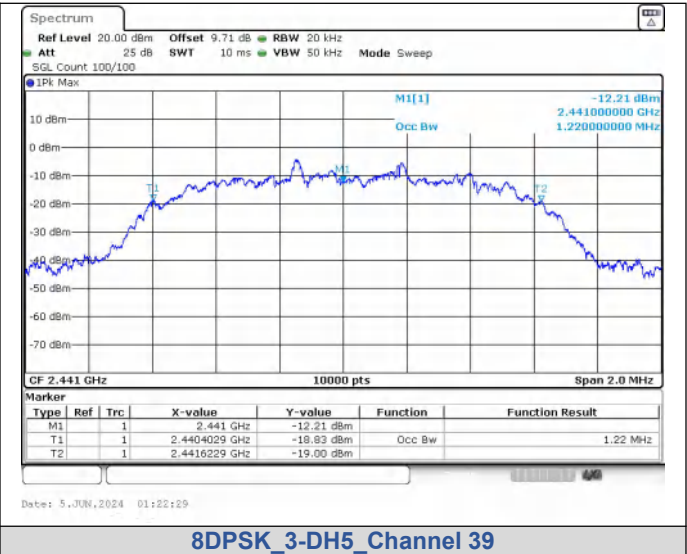
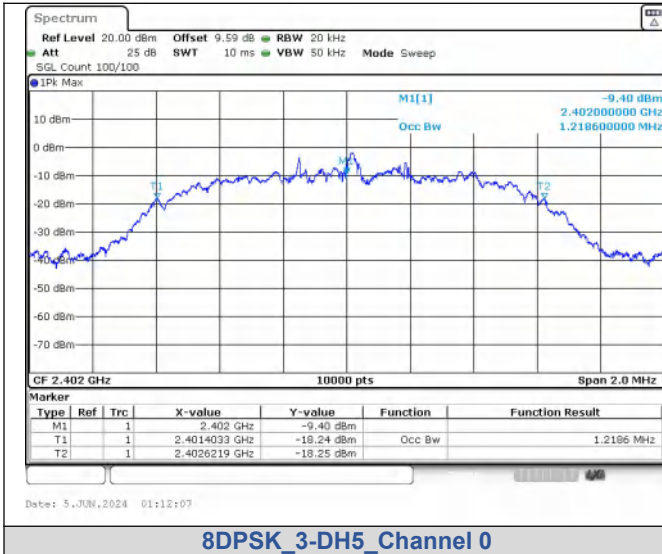
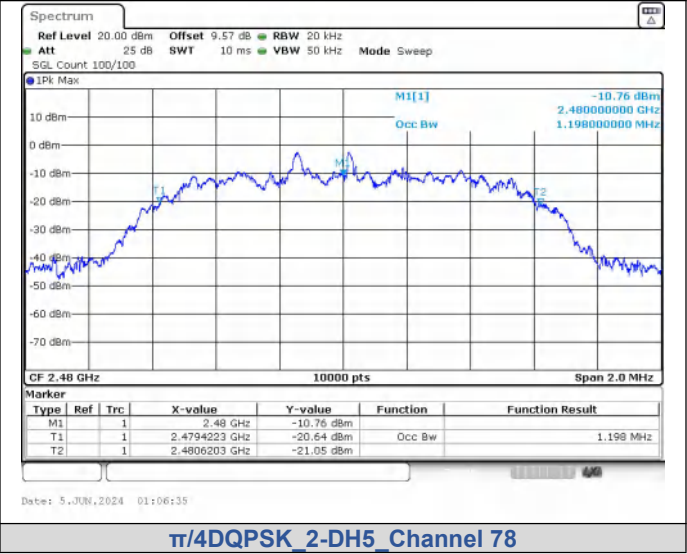
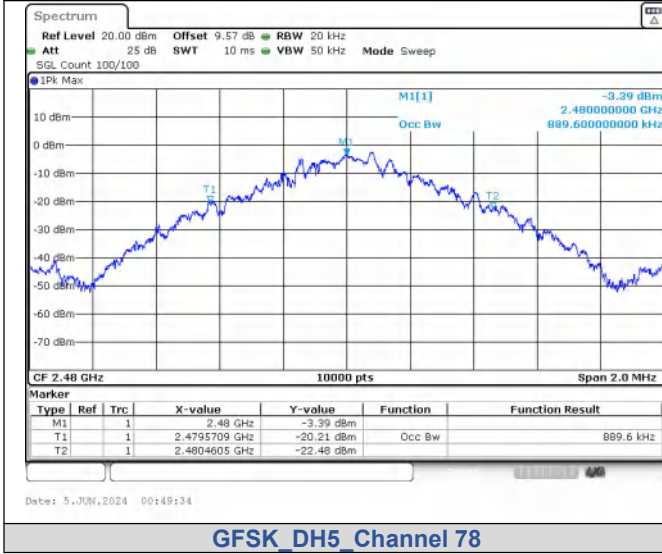
99% Bandwidth

Test Result

Modulation	Channel	99% BW (MHz)
GFSK	0	0.90420
	39	0.90760
	78	0.88960
$\pi/4$ DQPSK	0	1.2168
	39	1.2056
	78	1.1980
8DPSK	0	1.2186
	39	1.2200
	78	1.2174

Test Graphs



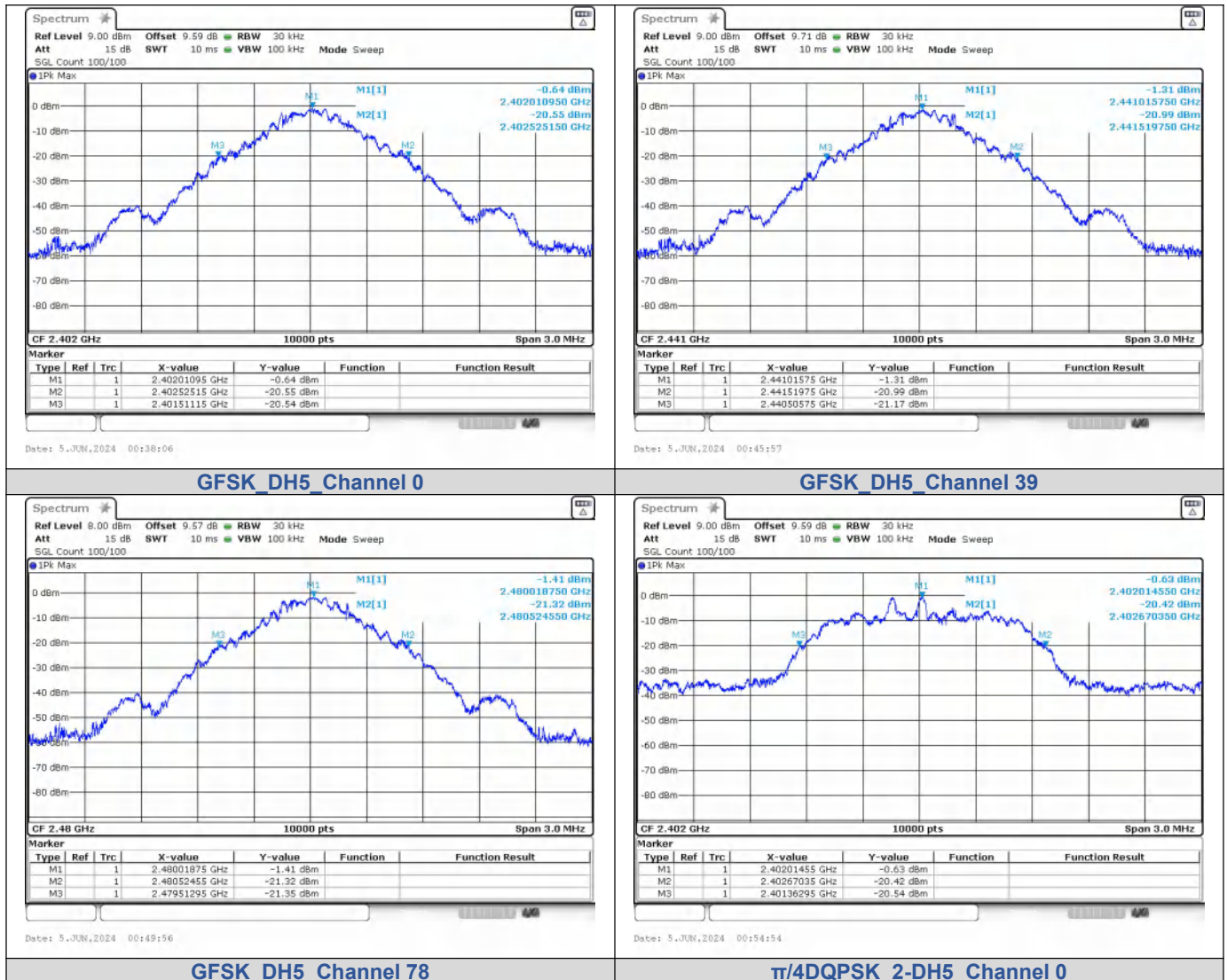


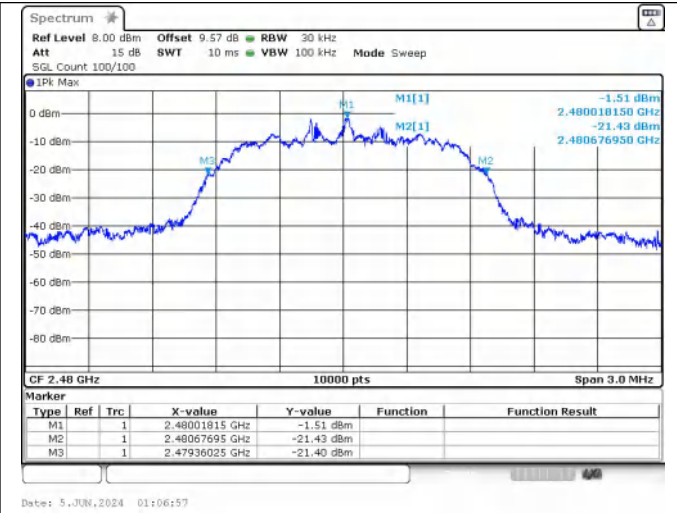
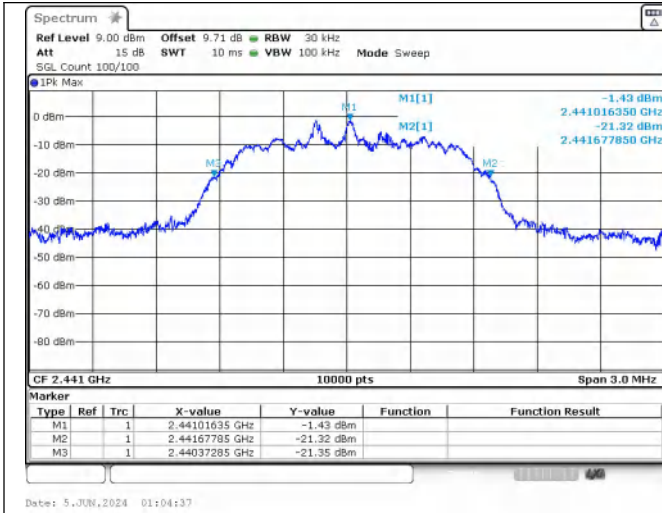
20dB Bandwidth

Test Result

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

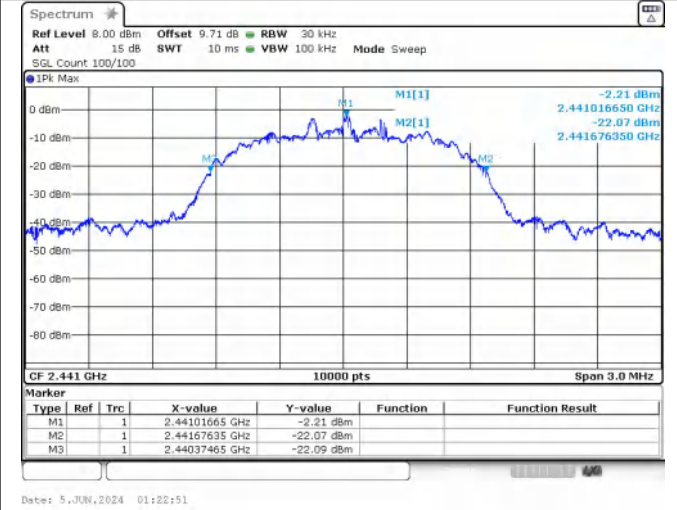
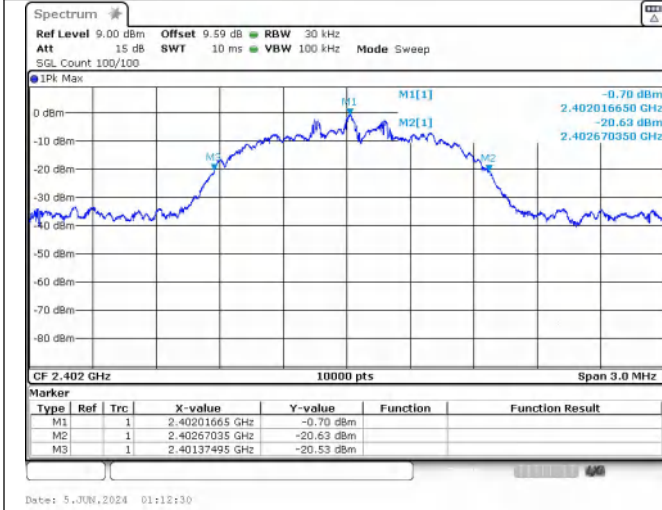
Test Graphs





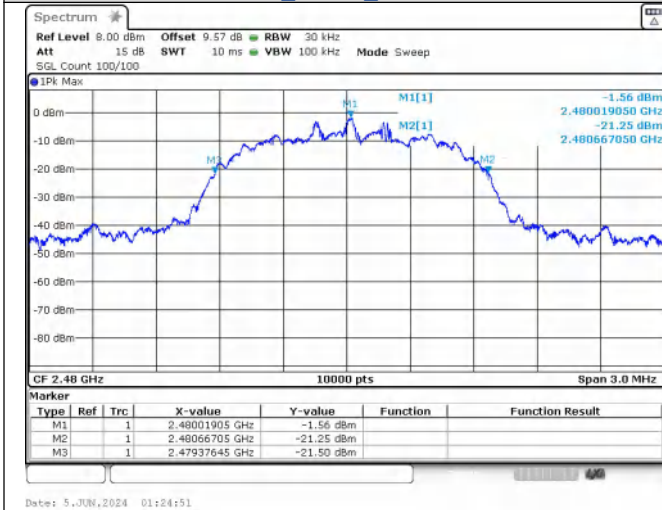
π /4DQPSK_2-DH5_Channel 39

π /4DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0

8DPSK_3-DH5_Channel 39



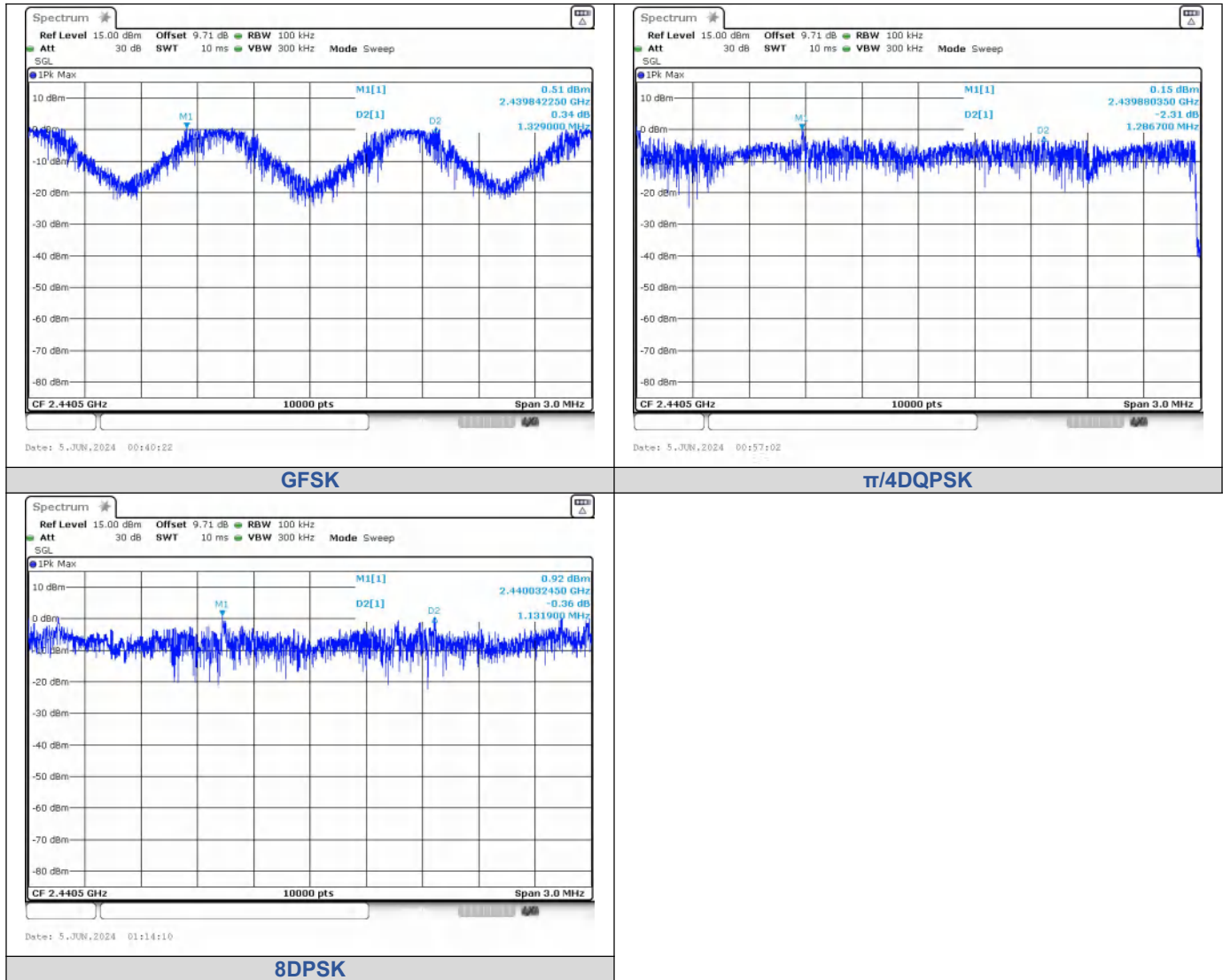
8DPSK_3-DH5_Channel 78

Carrier Frequencies Separation

Test Result

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2439.8423	2441.1712	1.3290	1.020	PASS
$\pi/4$ DQPSK	2-DH5	2439.8803	2441.1671	1.2867	0.873	PASS
8DPSK	3-DH5	2440.0325	2441.1644	1.1319	0.867	PASS

Test Graphs



Conducted Out Of Band Emission

Test Result

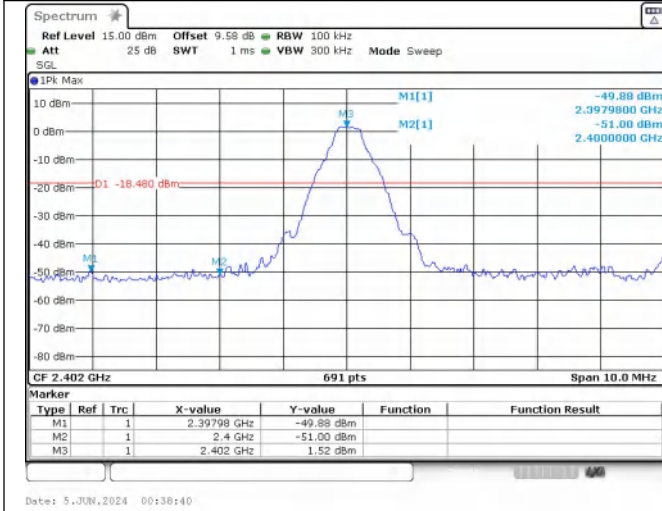
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	
GFSK	DH5	0	2400.00	-51.004	-18.48	-32.524	PASS	
			2397.98	-49.879	-18.48	-31.399	PASS	
			7206.80	-40.690	-18.48	-22.210	PASS	
		39	9764.55	-42.387	-19.05	-23.337	PASS	
			78	2483.50	-51.721	-18.95	-32.771	PASS
				9920.20	-40.890	-18.95	-21.940	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-45.624	-18.48	-27.144	PASS	
			7205.96	-44.046	-18.48	-25.566	PASS	
		39	9763.72	-41.778	-19.14	-22.638	PASS	
			78	2483.50	-52.535	-19.13	-33.405	PASS
		9920.20		40.760	-19.13	-21.630	PASS	
			8DPSK	3-DH5	0	2400.00	-49.636	-18.66
7205.96	-44.915	-18.66				-26.255	PASS	
39	9763.72	-42.092			-19.2	-22.892	PASS	
	78	2483.50			-51.133	-19.25	-31.883	PASS
9920.20		-40.464			-19.25	-21.214	PASS	

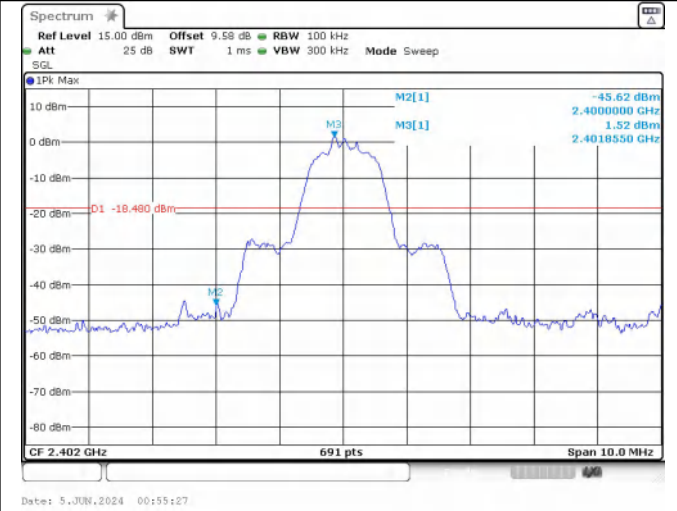
Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2395.75	-50.841	-18.41	-32.431	PASS
			2400.00	-51.471	-18.41	-33.061	PASS
			2483.50	-51.395	-19.08	-32.315	PASS
			2395.22	-50.462	-18.2	-32.262	PASS
			2400.00	-50.939	-18.2	-32.739	PASS
			2483.50	-51.154	-18.97	-32.184	PASS
$\pi/4$ DQPSK	2-DH5		2398.71	-49.584	-18.34	-31.244	PASS
			2400.00	-51.204	-18.34	-32.864	PASS
			2483.50	-51.255	-21.68	-29.575	PASS
			2395.77	-48.972	-18.74	-30.232	PASS
			2400.00	-50.291	-18.74	-31.551	PASS
			2483.50	-52.266	-20.4	-31.866	PASS
8DPSK	3-DH5	2395.28	-49.316	-18.65	-30.666	PASS	
		2400.00	-49.800	-18.65	-31.150	PASS	
		2483.50	-50.750	-19.15	-31.600	PASS	
		2400.00	-49.087	-18.48	-30.607	PASS	
		2483.50	-51.038	-19.7	-31.338	PASS	

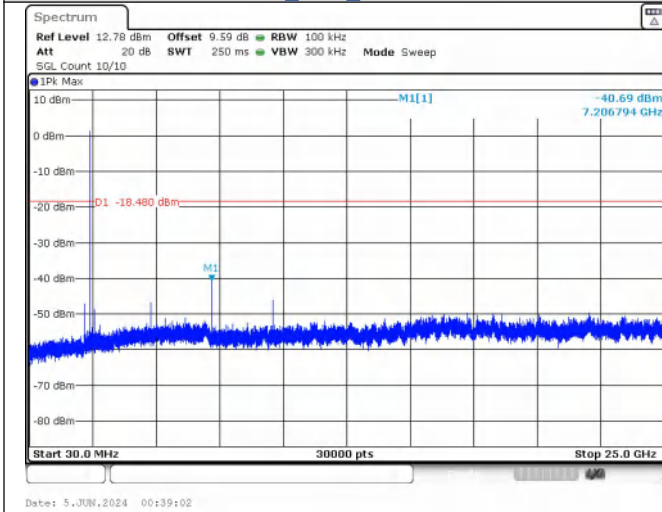
Test Graphs



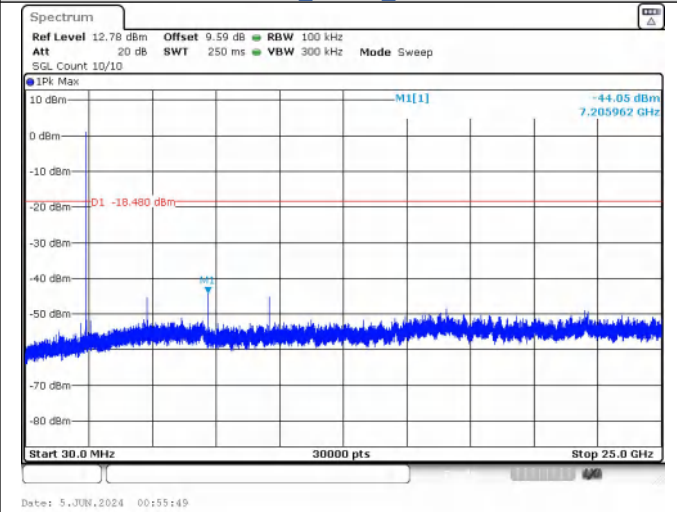
**Out Of Band Emission
GFSK_DH5_Channel 0**



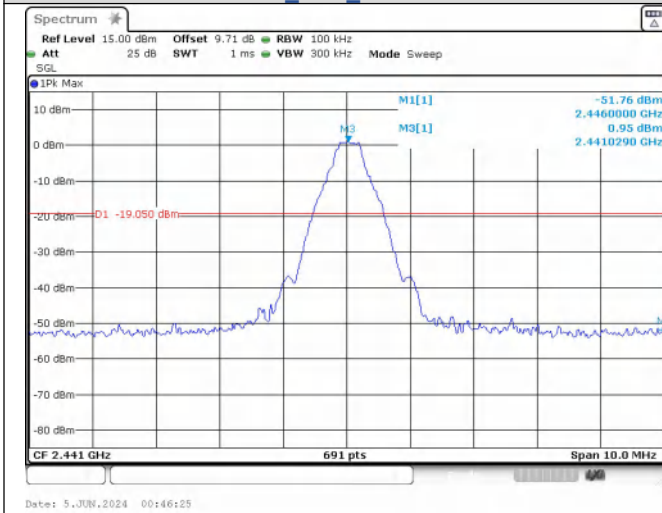
**Out Of Band Emission
 $\pi/4$ QPSK_2-DH5_Channel 0**



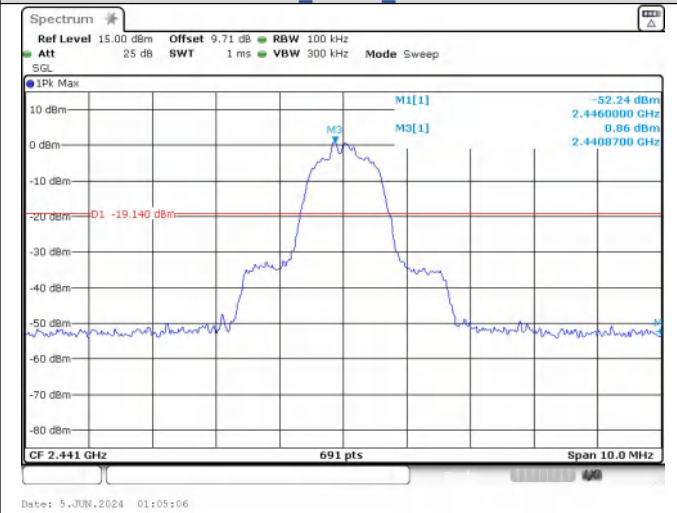
**Spurious Emission
GFSK_DH5_Channel 0**



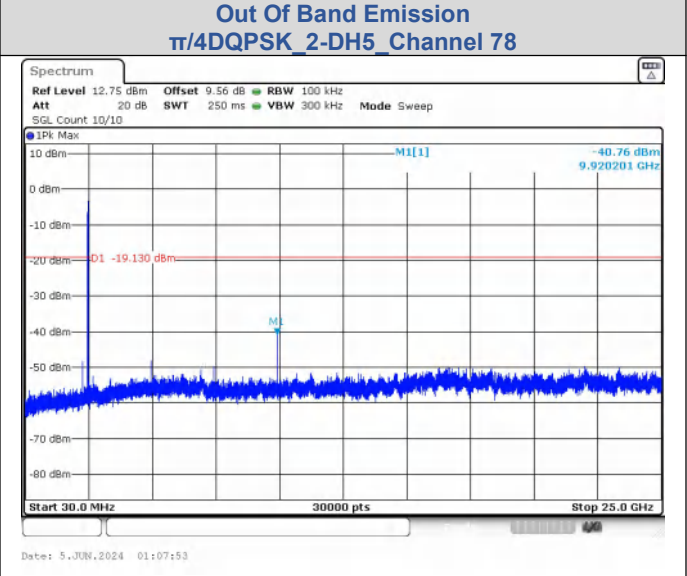
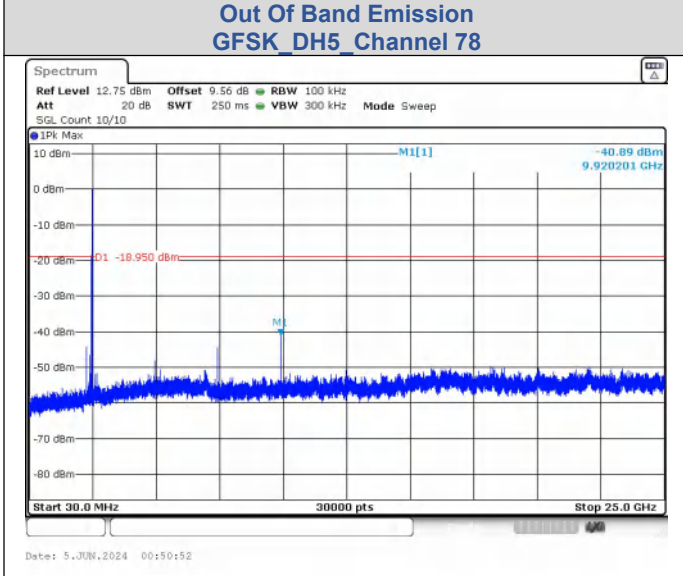
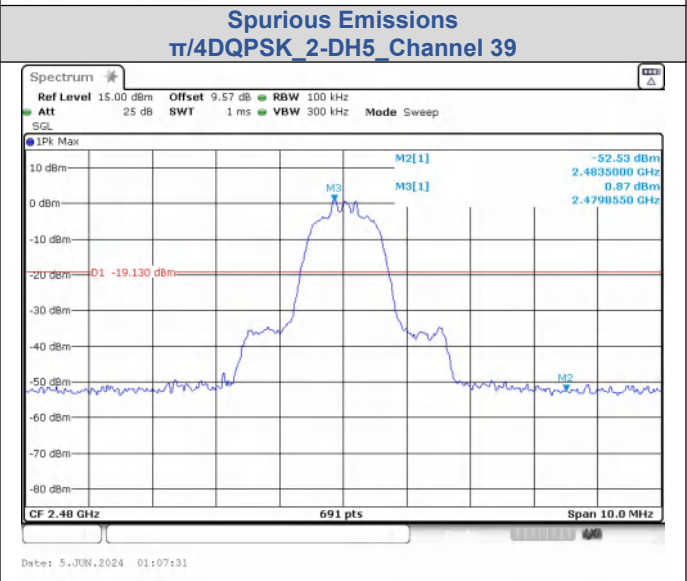
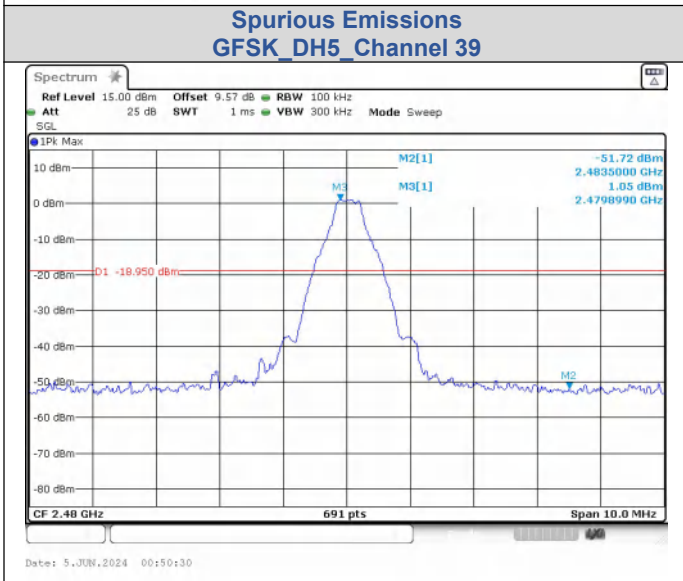
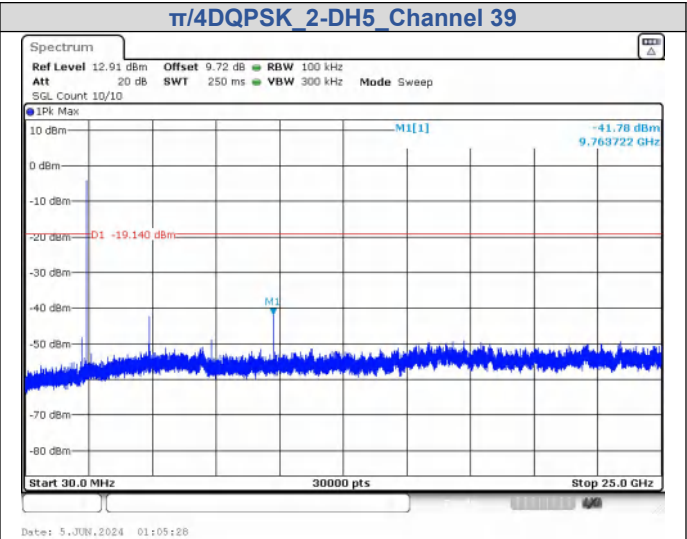
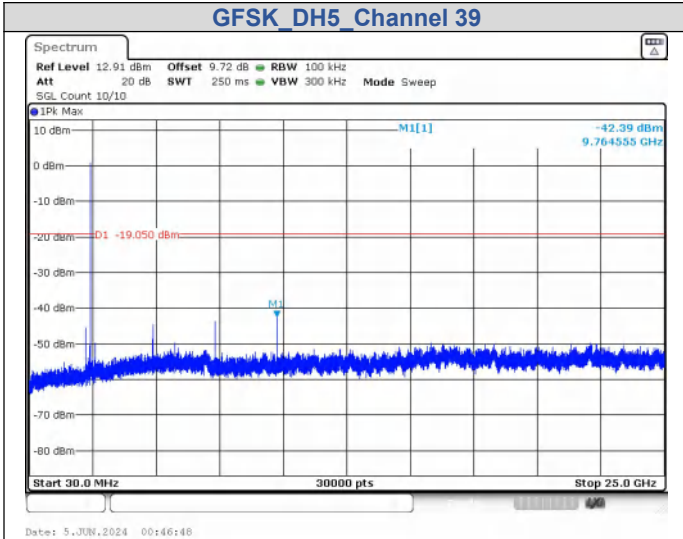
**Spurious Emission
 $\pi/4$ QPSK_2-DH5_Channel 0**



Out Of Band Emission

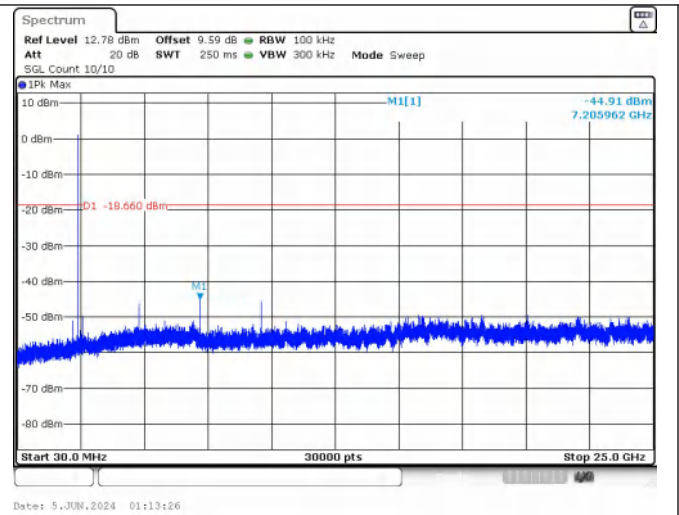
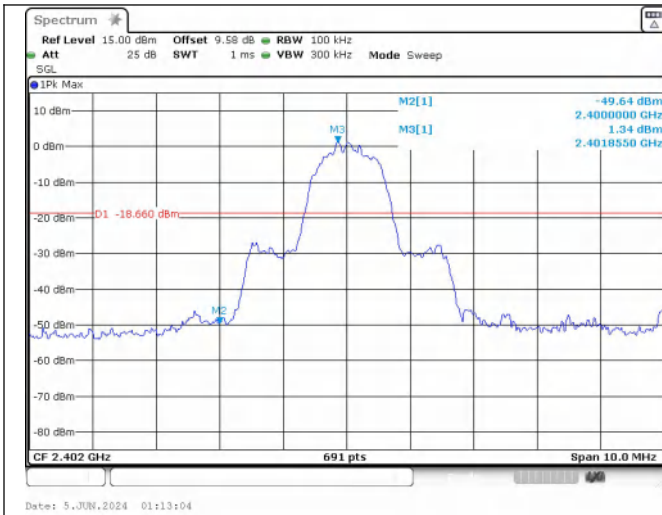


Out Of Band Emission



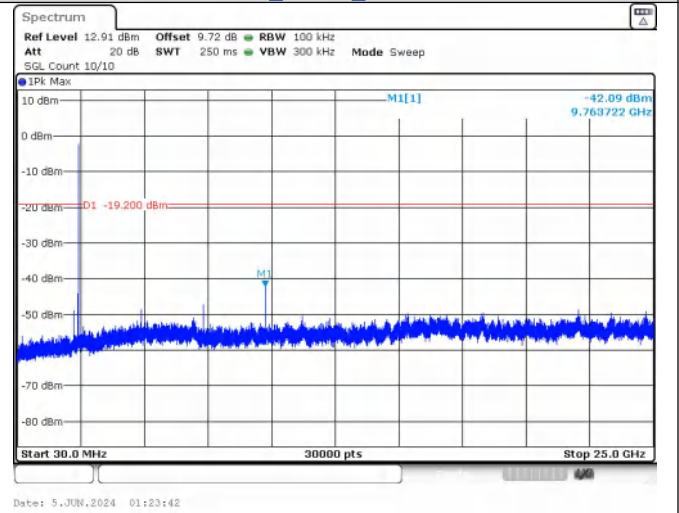
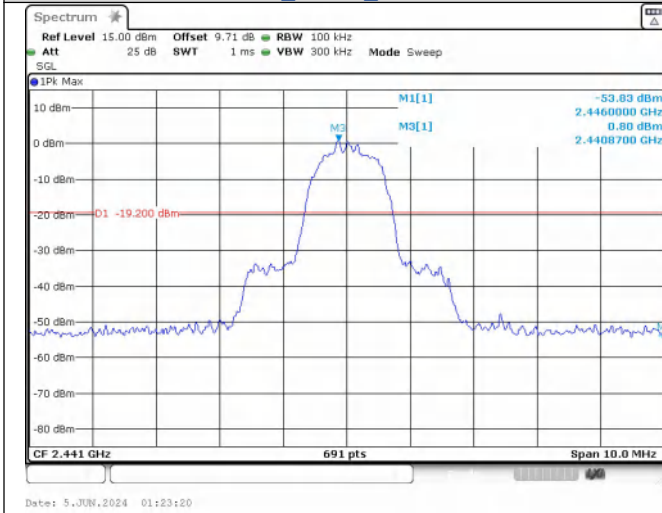
Spurious Emission
GFSK_DH5_Channel 78

Spurious Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



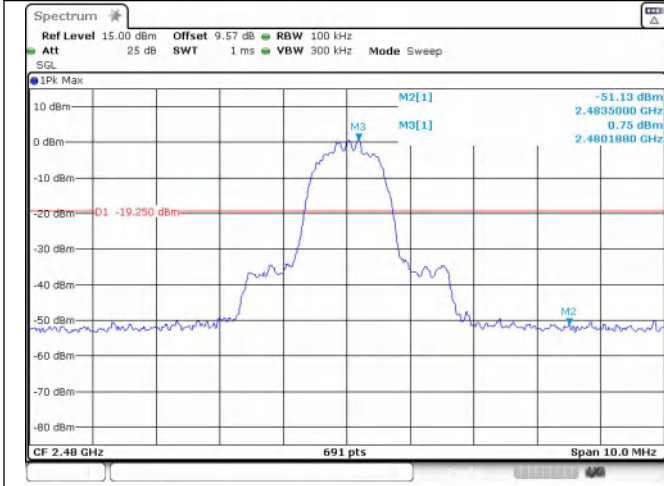
Out Of Band Emission
8DPSK_3-DH5_Channel 0

Spurious Emission
8DPSK_3-DH5_Channel 0

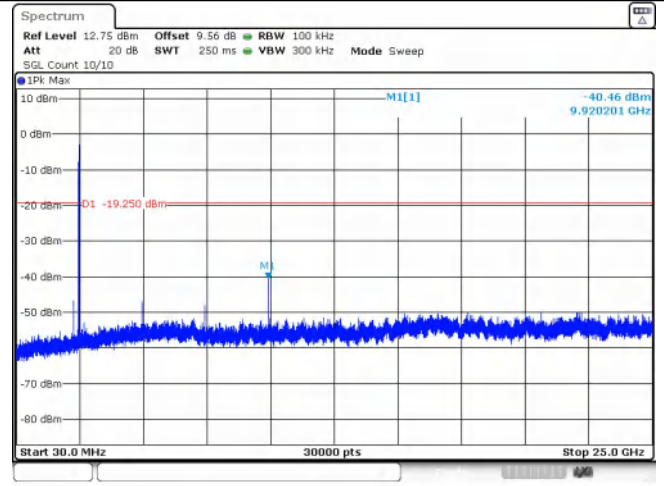


Out Of Band Emission
8DPSK_3-DH5_Channel 39

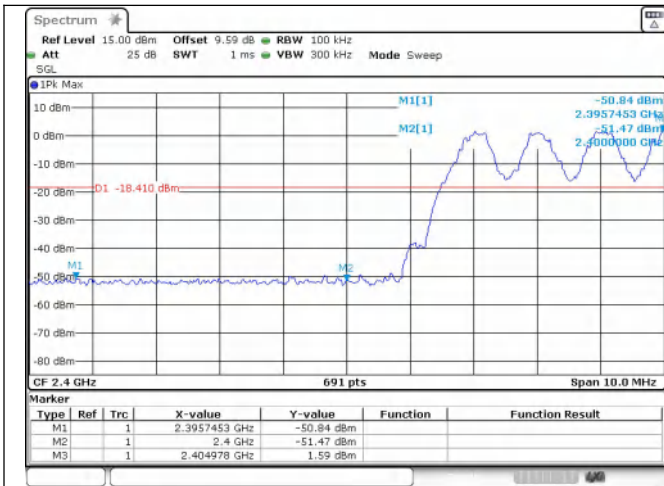
Spurious Emissions
8DPSK_3-DH5_Channel 39



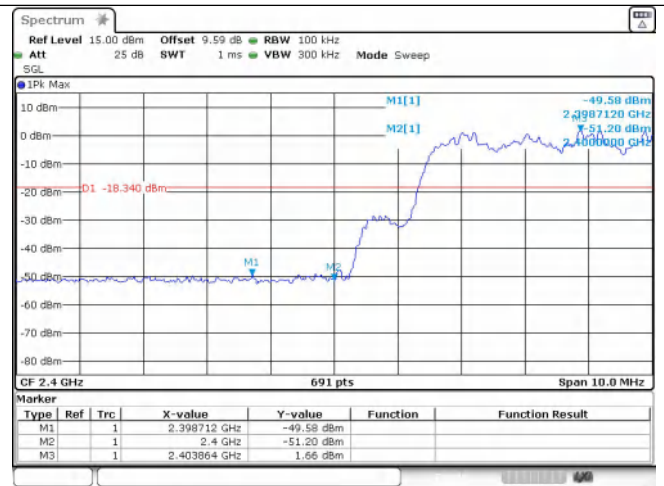
**Out Of Band Emission
8DPSK_3-DH5_Channel 78**



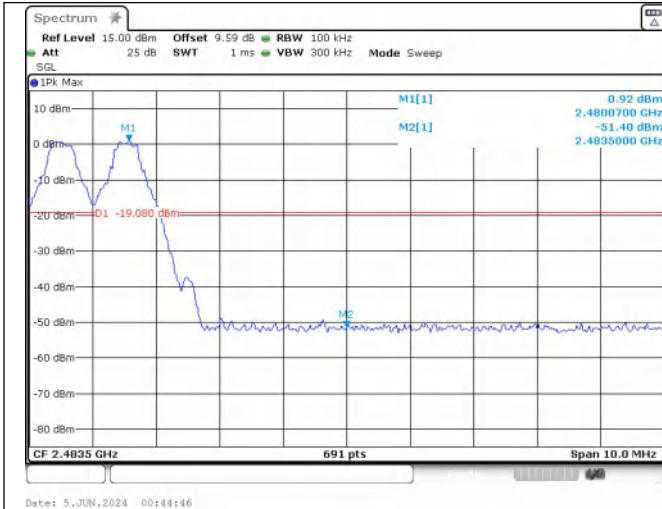
**Spurious Emission
8DPSK_3-DH5_Channel 78**



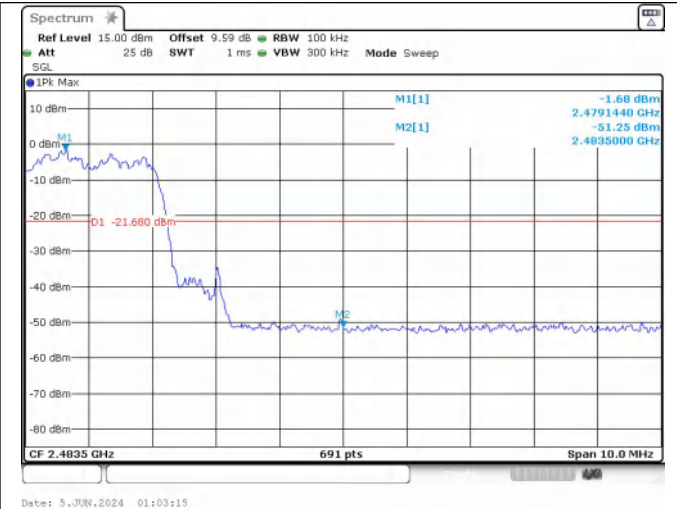
**Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping**



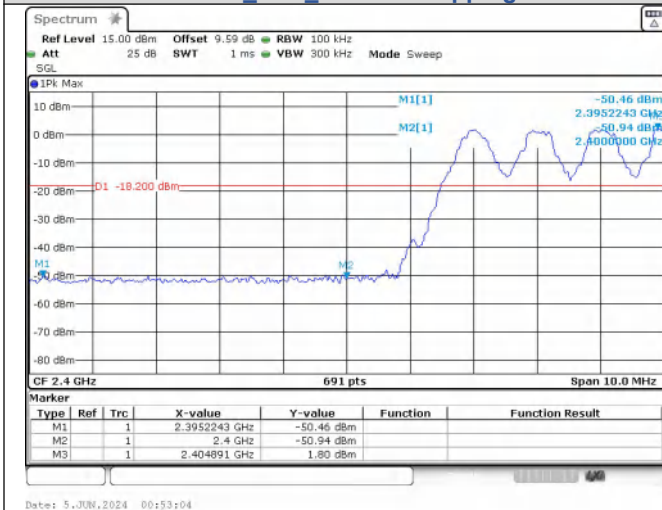
**Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping**



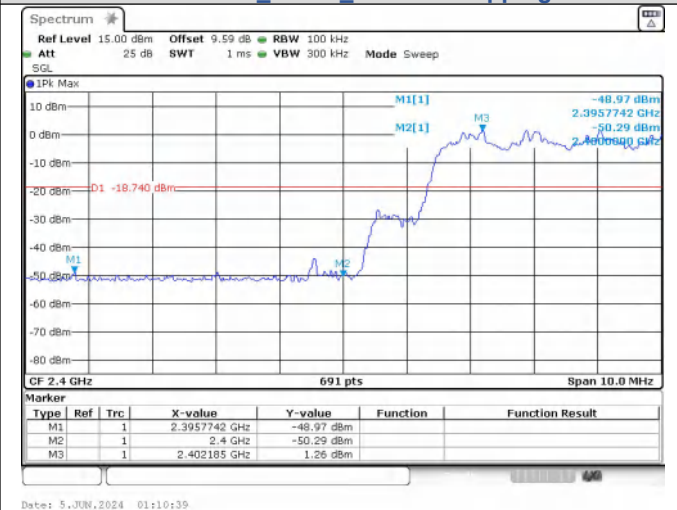
**Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping**



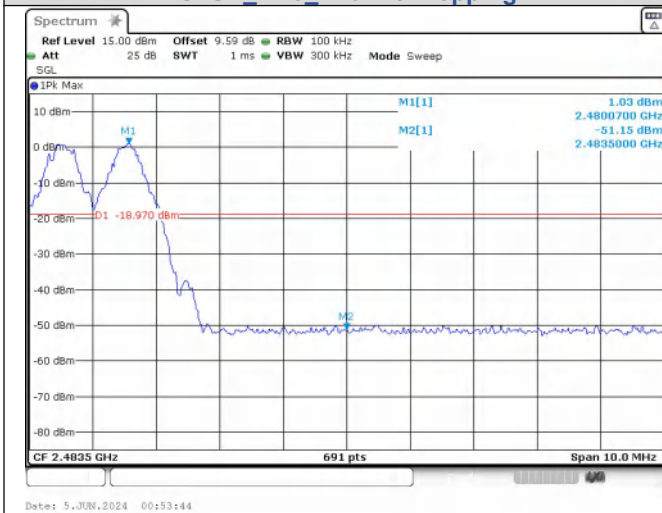
**Out Of Band Emission(Right)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping**



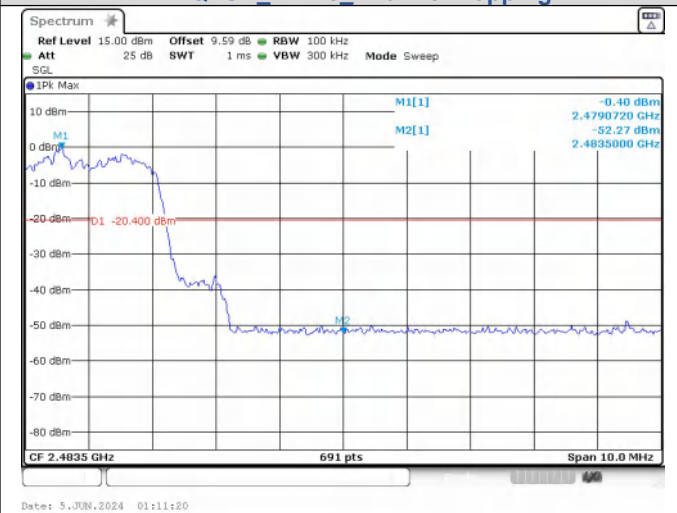
**Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping**



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



Out Of Band Emission(Right)



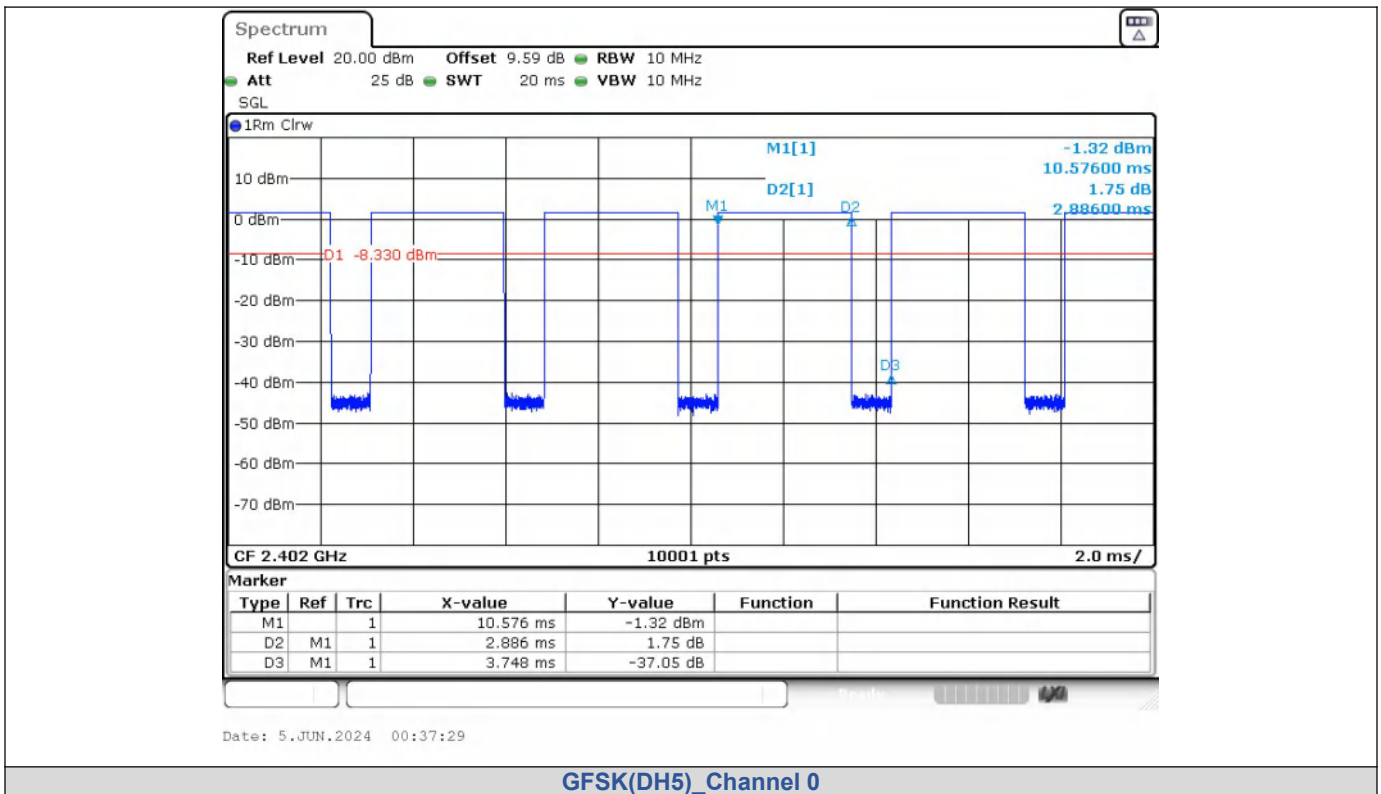
Out Of Band Emission(Right)

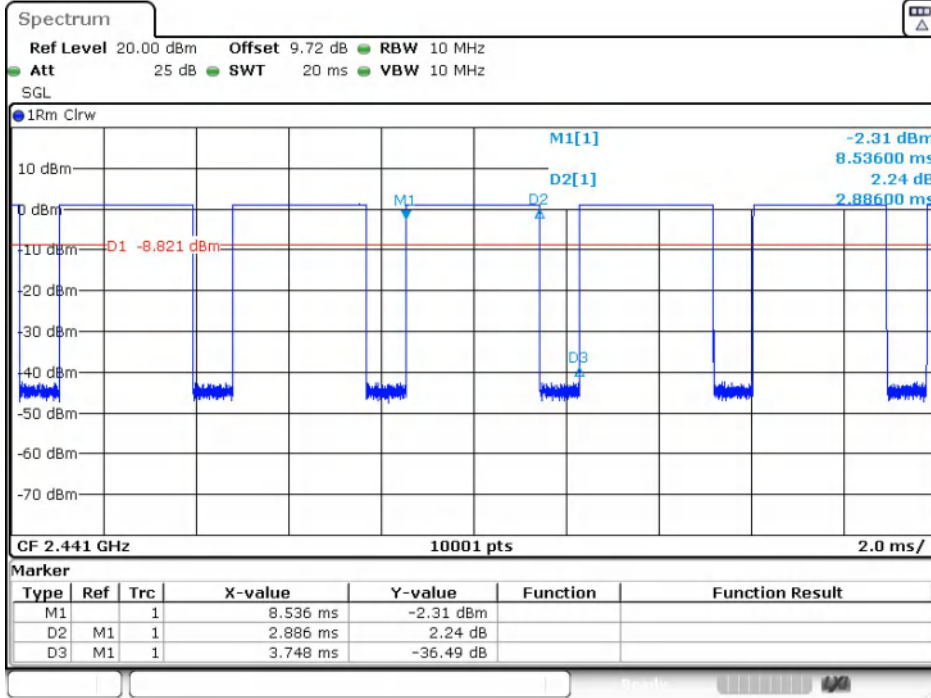
Duty Cycle

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	0.35
		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	2.892	3.748	77.16	0.7716	1.1261	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	2.892	3.746	77.20	0.7720	1.1238	0.35

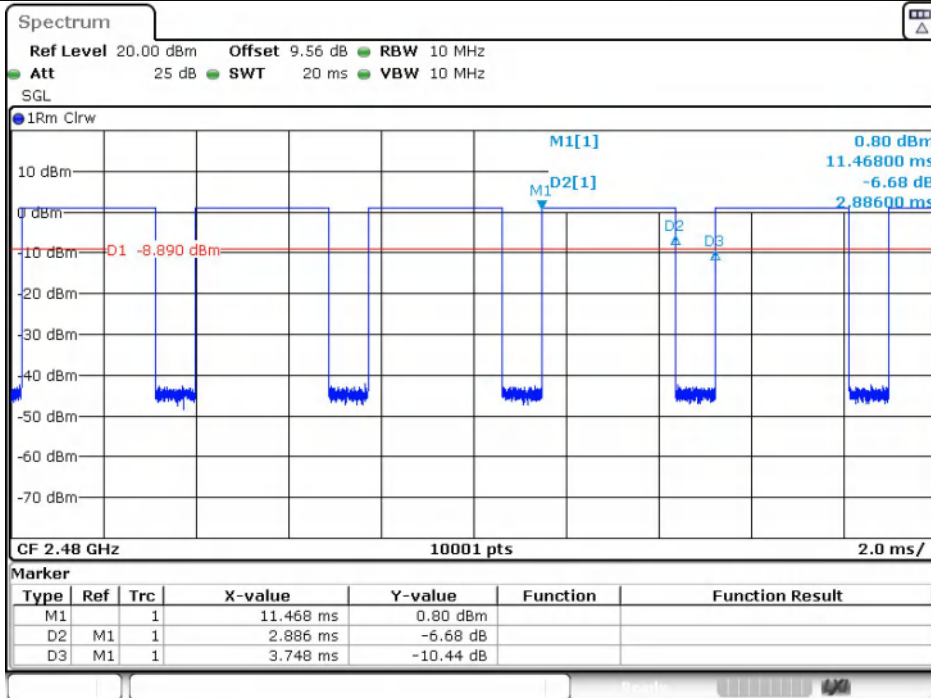
Test Graphs





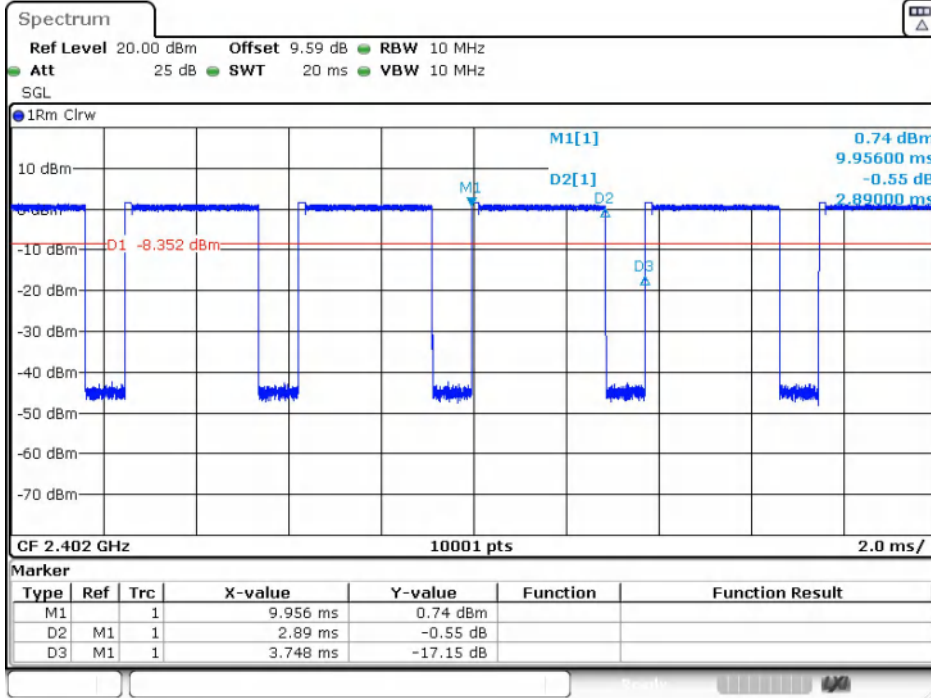
Date: 5.JUN.2024 00:45:20

GFSK(DH5)_Channel 39



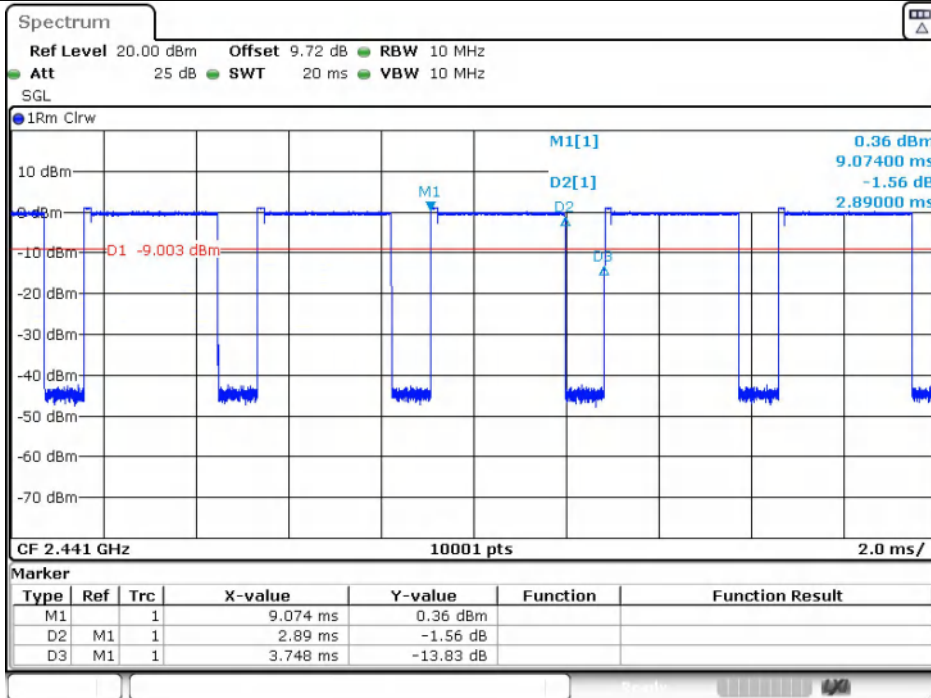
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GFSK(DH5)_Channel 78



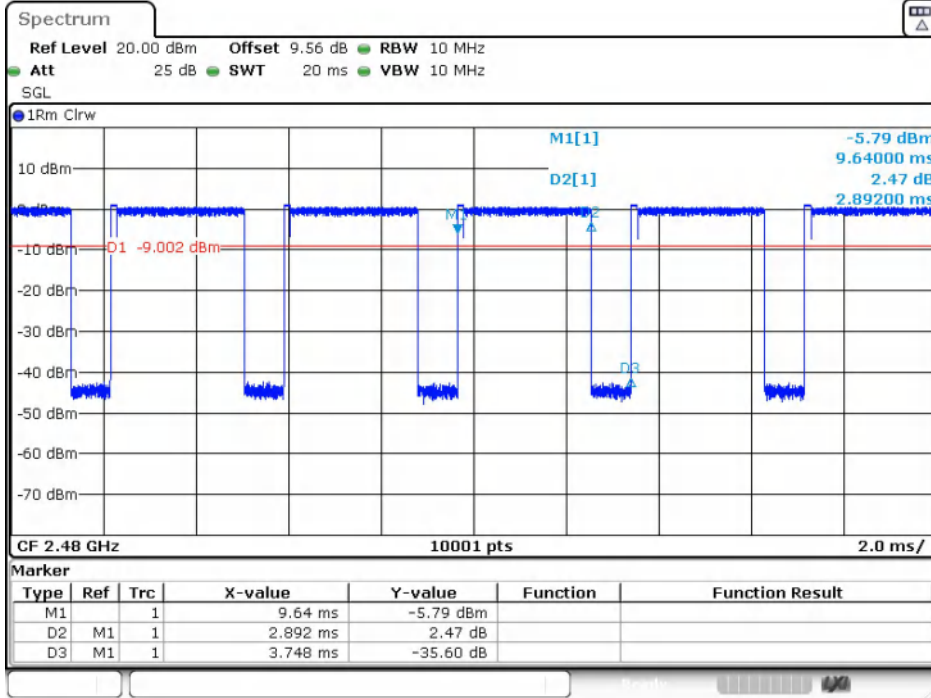
Date: 5.JUN.2024 00:54:17

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



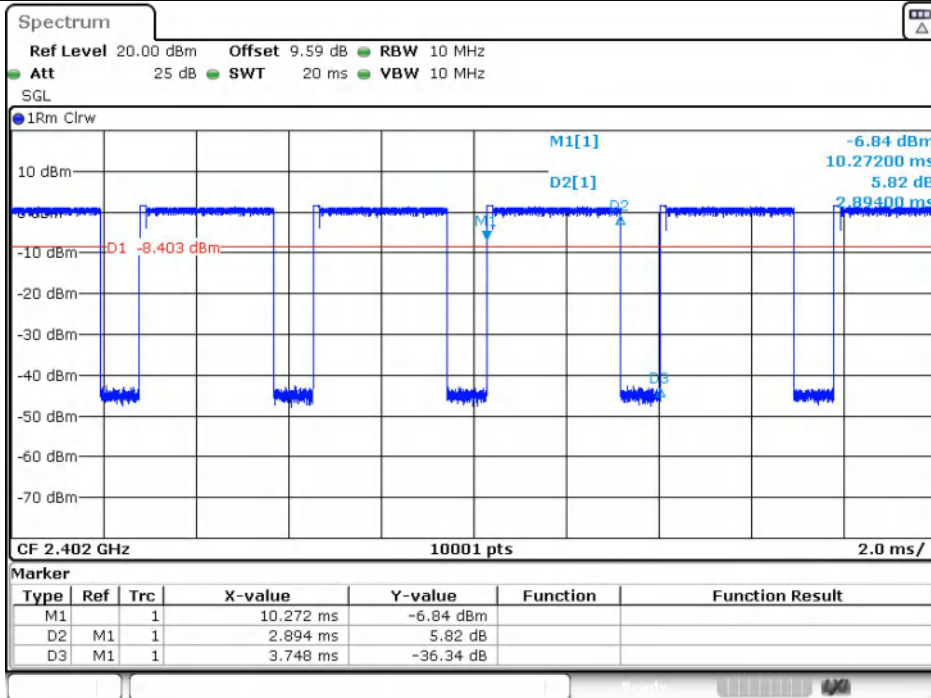
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$\pi/4$ DQPSK(2-DH5)_Channel 39



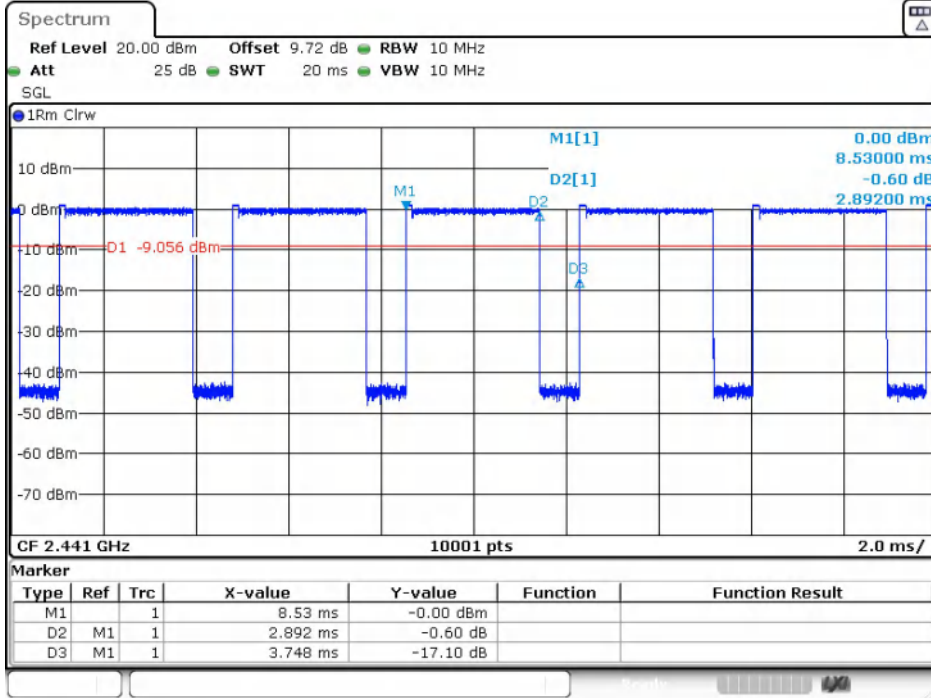
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$\pi/4$ DQPSK(2-DH5)_Channel 78



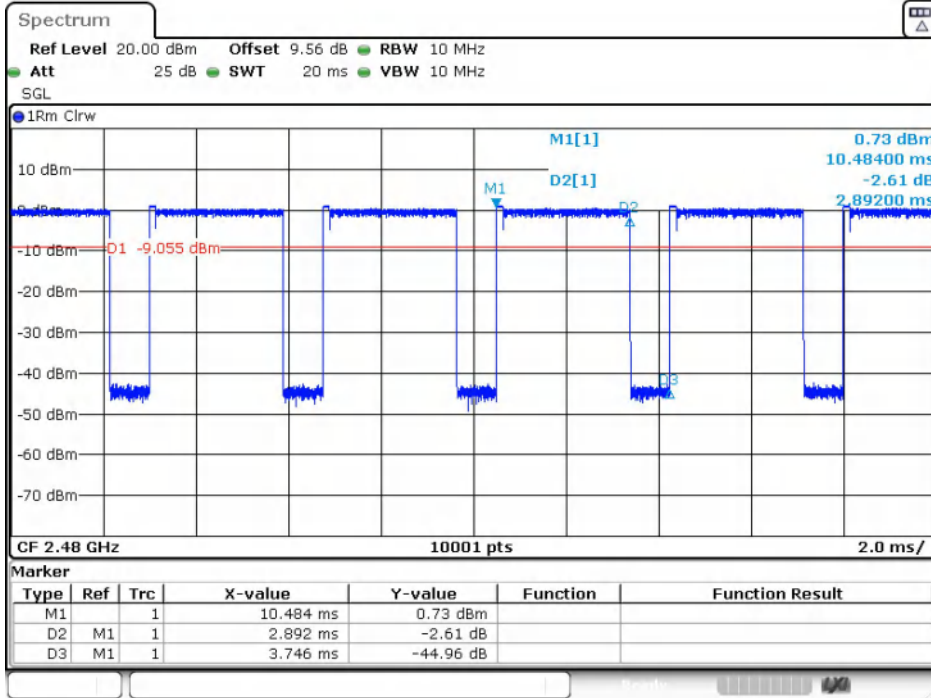
Date: 5.JUN.2024 01:11:53

8DPSK(3-DH5)_Channel 0



Date: 5.JUN.2024 01:22:14

8DPSK(3-DH5)_Channel 39



Date: 5.JUN.2024 01:24:14

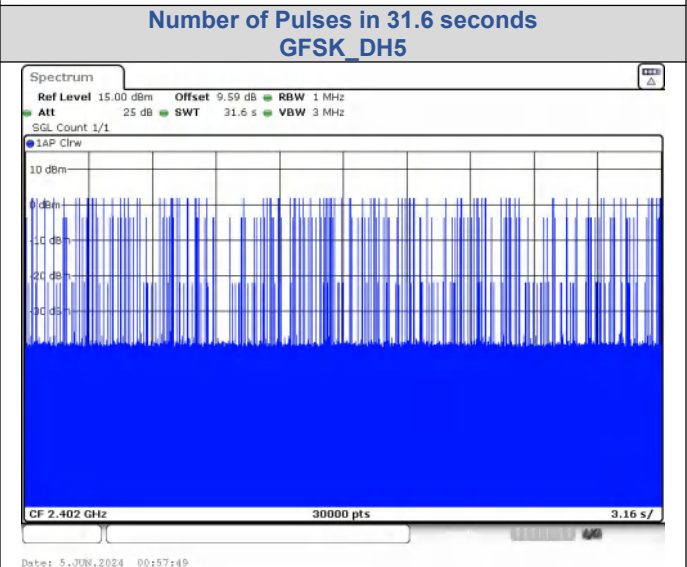
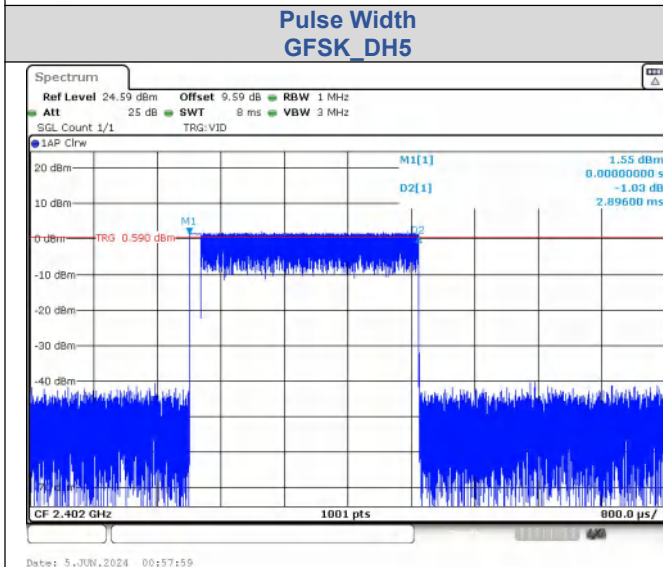
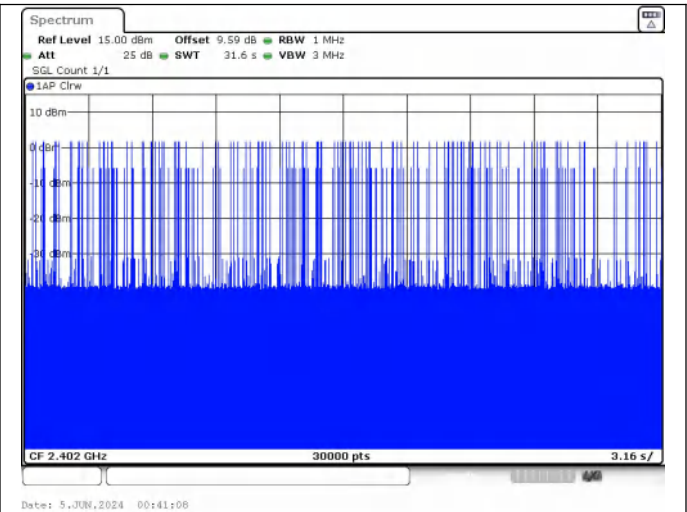
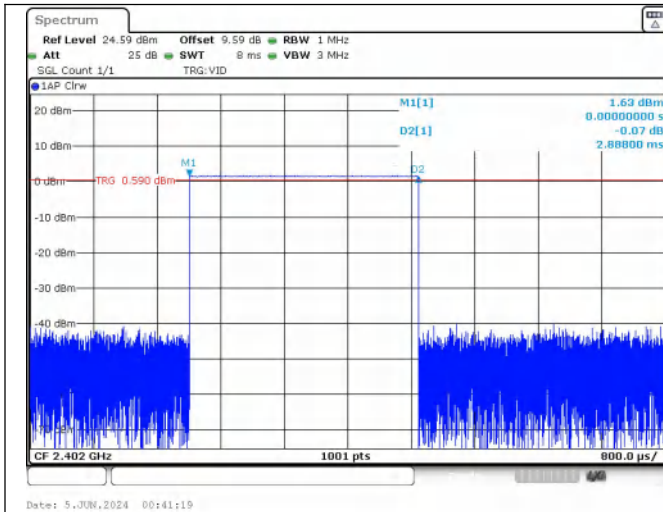
8DPSK(3-DH5)_Channel 78

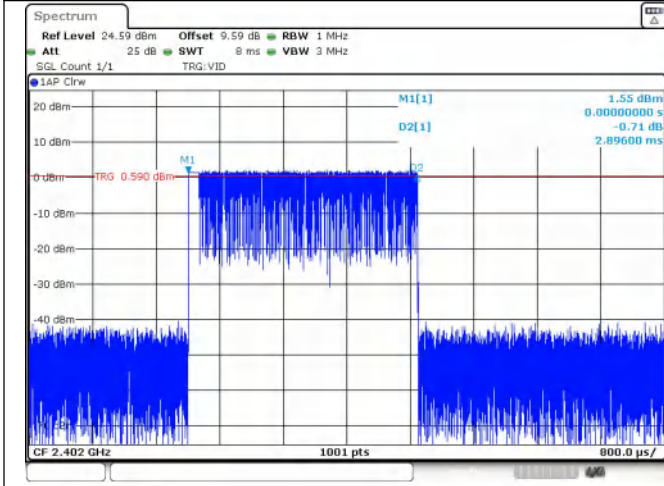
Dwell Time

Test Result

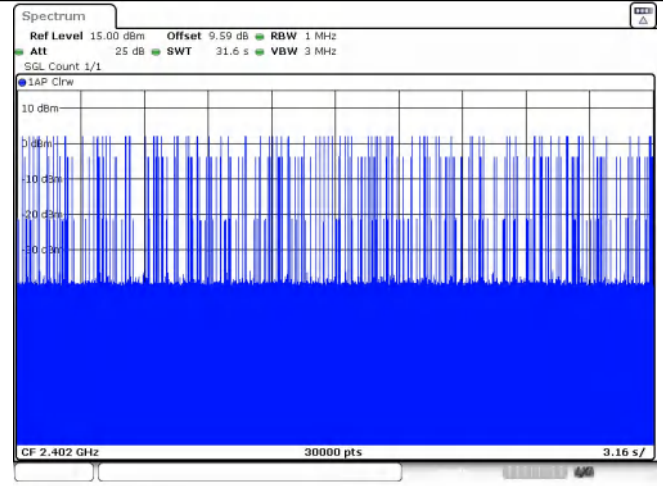
Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.888	122	352.34	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.896	102	295.39		PASS
8DPSK	3-DH5		2.896	96	278.02		PASS

Test Graphs





**Pulse Width
8DPSK_3-DH5**



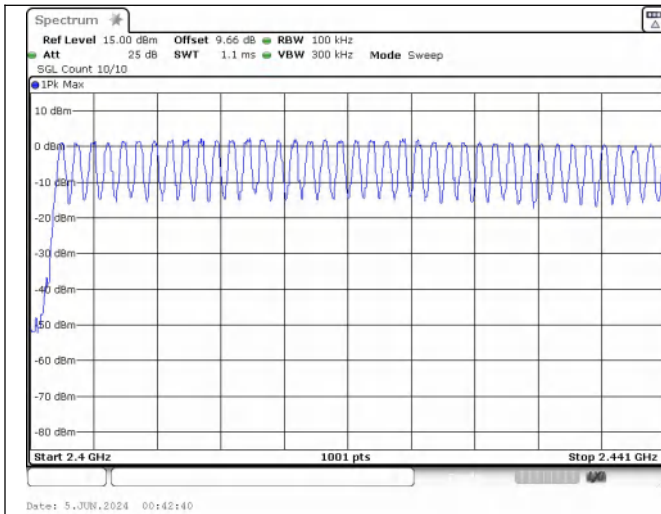
**Number of Pulses in 31.6 seconds
8DPSK_3-DH5**

Number Of Hopping Channel

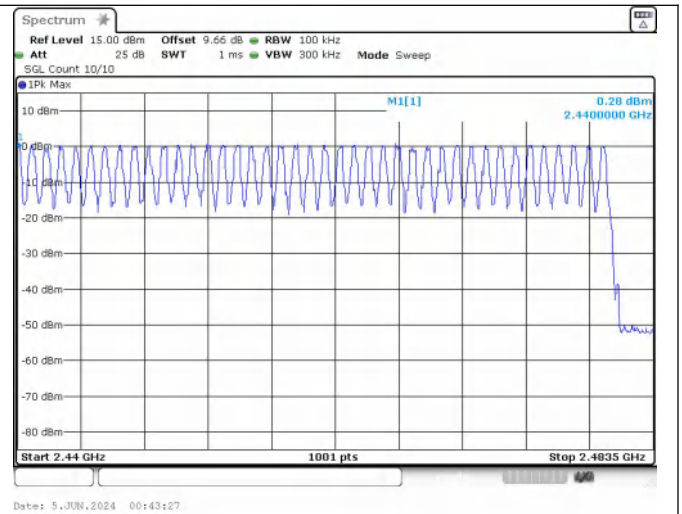
Test Result

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

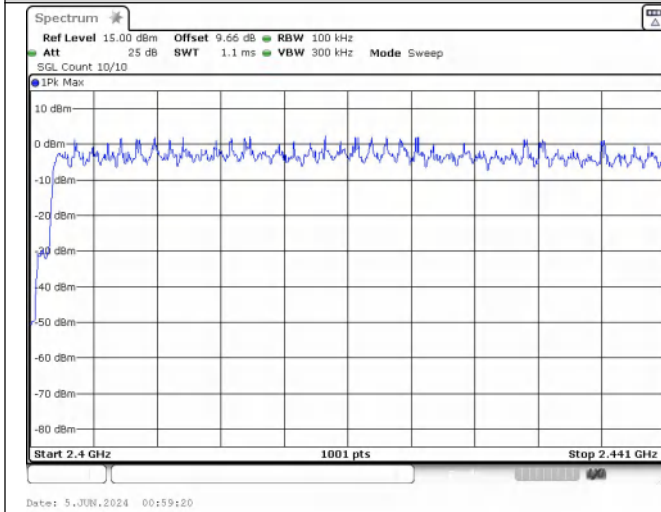
Test Graphs



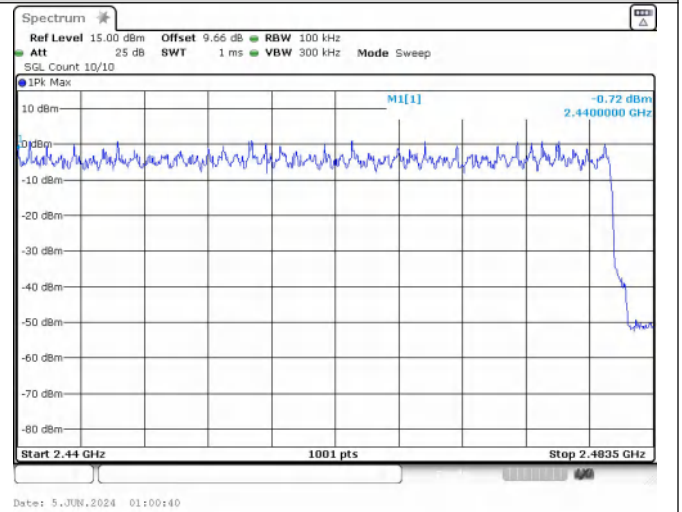
Low End Spectrum Channel Hopping Plot
GFSK



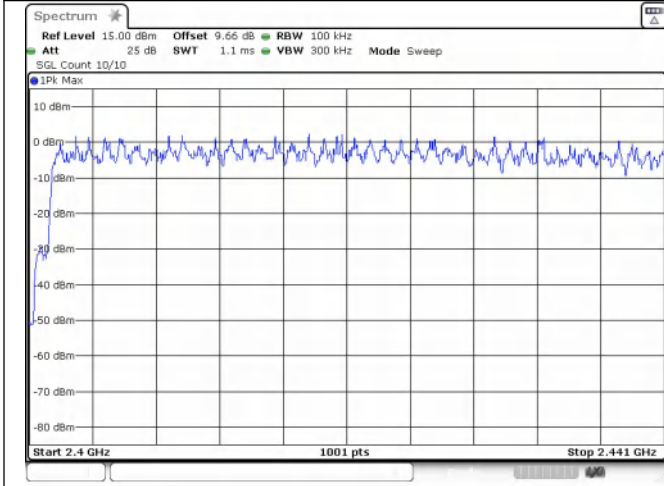
High End Spectrum Channel Hopping Plot
GFSK



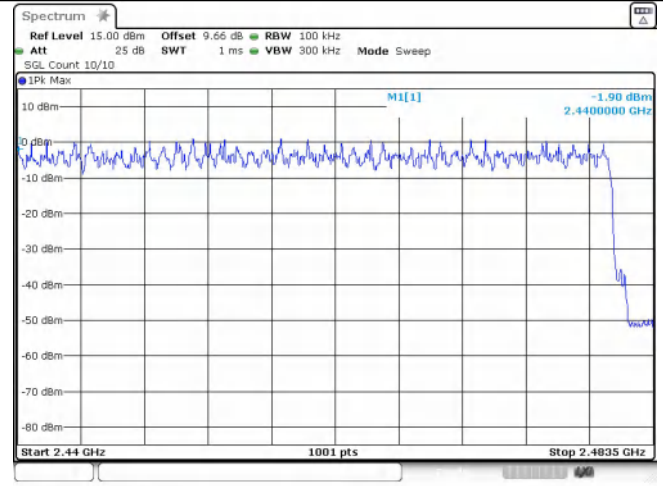
Low End Spectrum Channel Hopping Plot
 $\pi/4$ DQPSK



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



**Low End Spectrum Channel Hopping Plot
8DPSK**



**High End Spectrum Channel Hopping Plot
8DPSK**