

Appendix A

Report No.:	CISRR240522131
FCC ID:	2BGGM-230
Product Name:	HMY Bluetooth headset
Model No.:	230
Test Engineer:	Lucas Huang
Supervised by:	Rory Huang

Conducted Peak Output Power

Test Result

Left

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	1.838	1.527	30	PASS
		39	1.350	1.364		PASS
		78	1.365	1.369		PASS
$\pi/4$ DQPSK	2-DH5	0	1.797	1.512	20.97	PASS
		39	1.265	1.338		PASS
		78	1.211	1.321		PASS
8DPSK	3-DH5	0	1.364	1.369		PASS
		39	0.814	1.206		PASS
		78	0.702	1.175		PASS

Right

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	2.038	1.599	30	PASS
		39	1.601	1.446		PASS
		78	1.751	1.497		PASS
$\pi/4$ DQPSK	2-DH5	0	1.532	1.423	20.97	PASS
		39	1.378	1.373		PASS
		78	1.558	1.432		PASS
8DPSK	3-DH5	0	1.042	1.271		PASS
		39	0.456	1.111		PASS
		78	0.386	1.093		PASS

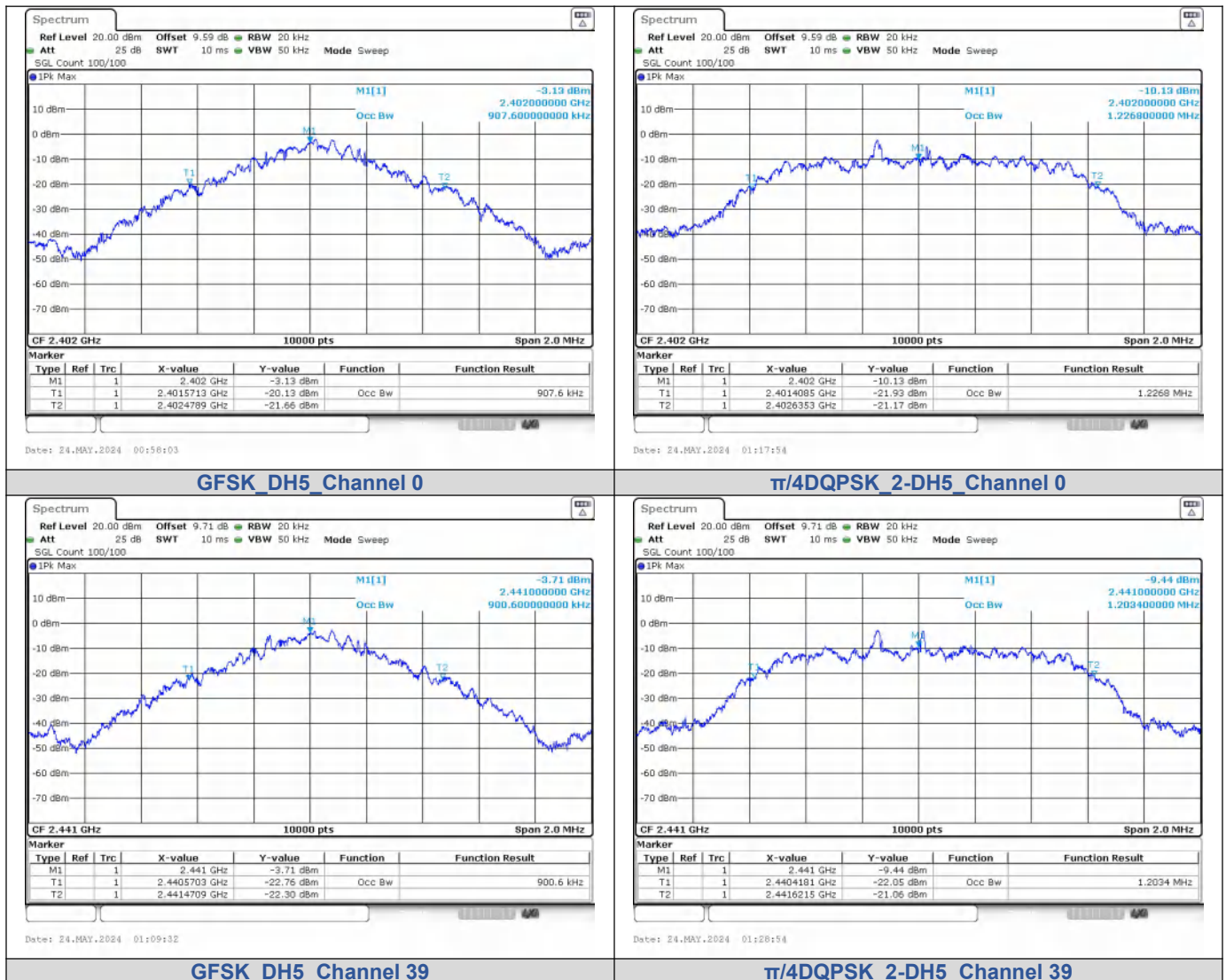
99% Bandwidth

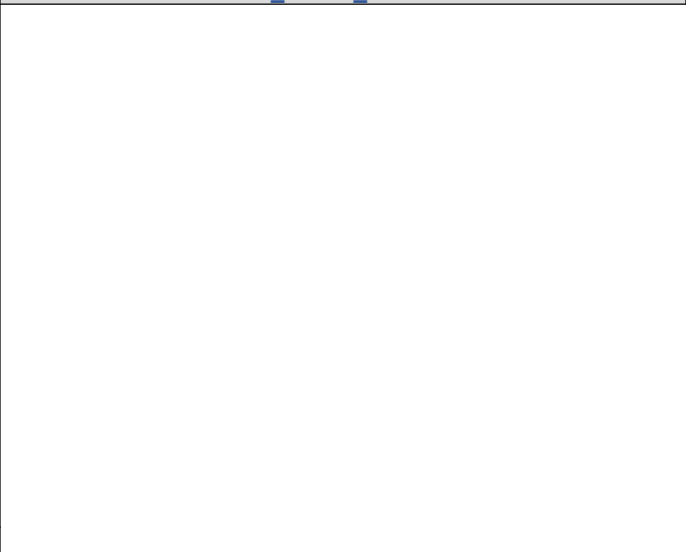
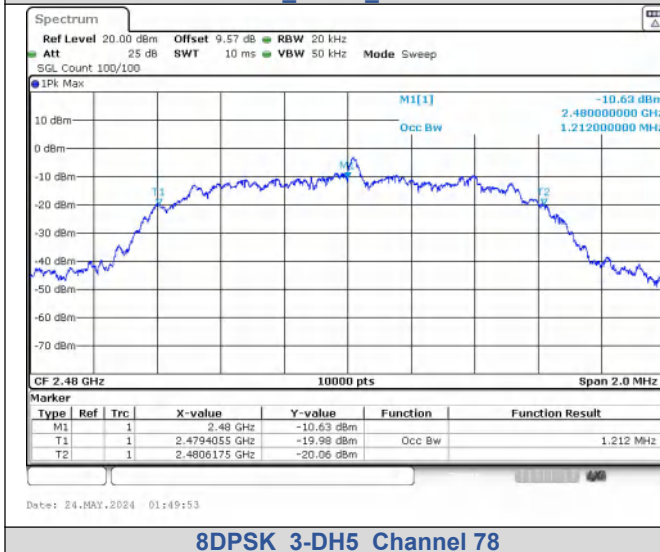
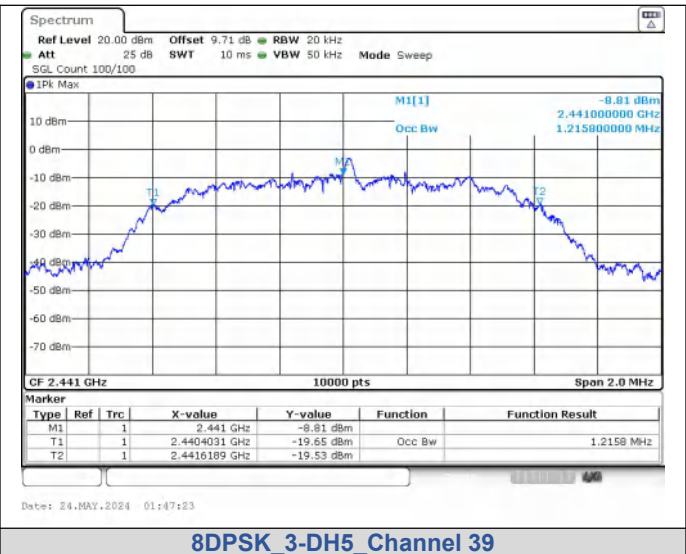
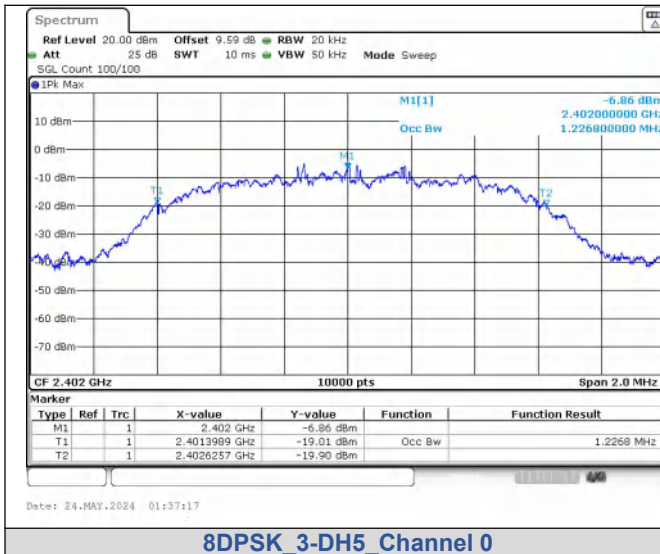
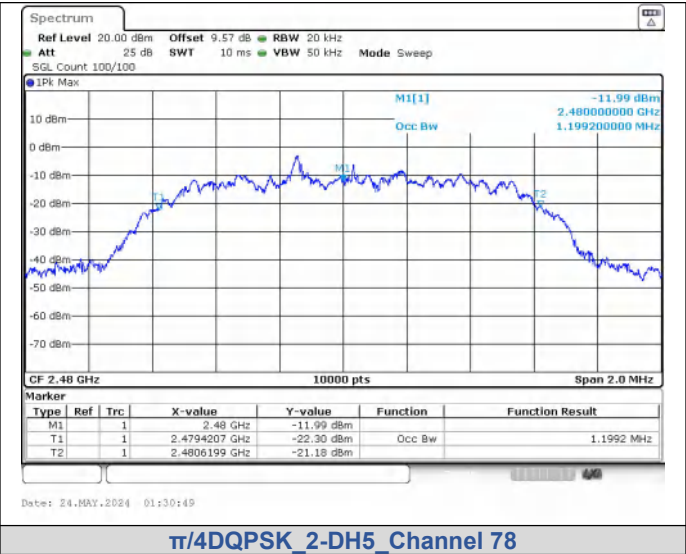
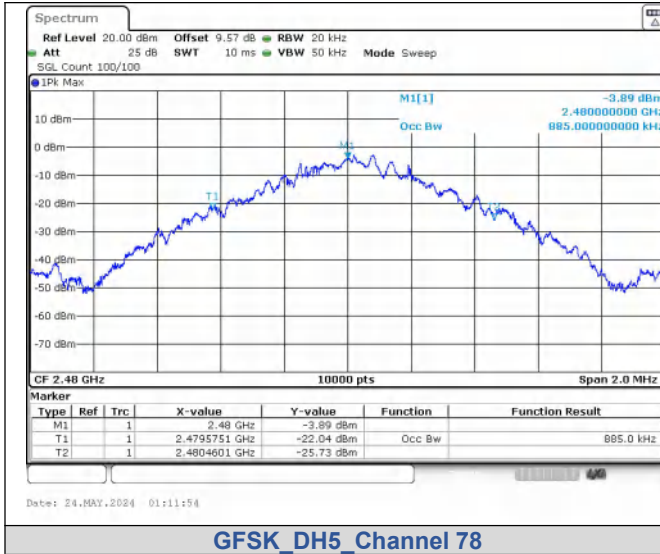
Test Result

Left

Modulation	Channel	99% BW (MHz)
GFSK	0	0.90760
	39	0.90060
	78	0.88500
π /4DQPSK	0	1.2226
	39	1.2034
	78	1.1992
8DPSK	0	1.2226
	39	1.2158
	78	1.2120

Test Graphs



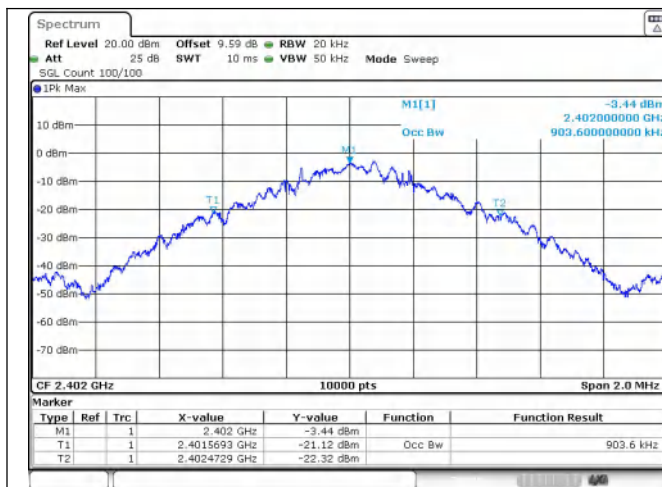


Right

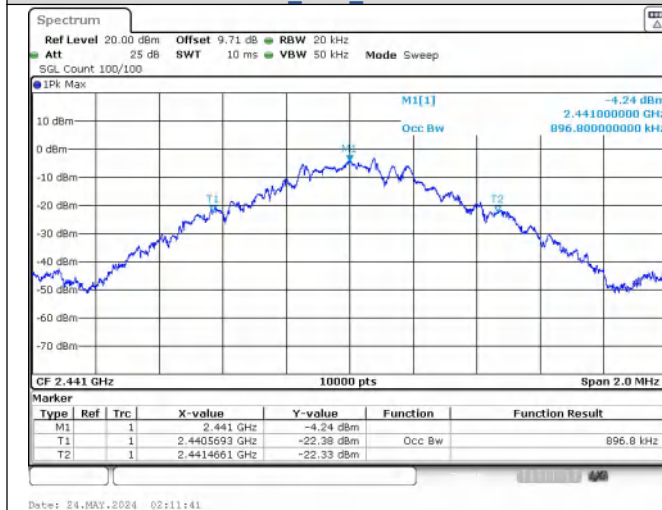
Test Result

Modulation	Channel	99% BW (MHz)
GFSK	0	0.90360
	39	0.89680
	78	0.89140
$\pi/4$ DQPSK	0	1.2386
	39	1.2102
	78	1.1984
8DPSK	0	1.2206
	39	1.2126
	78	1.2164

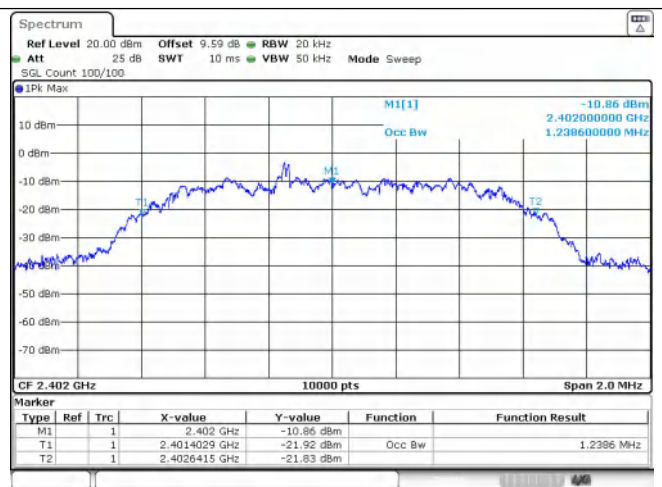
Test Graphs



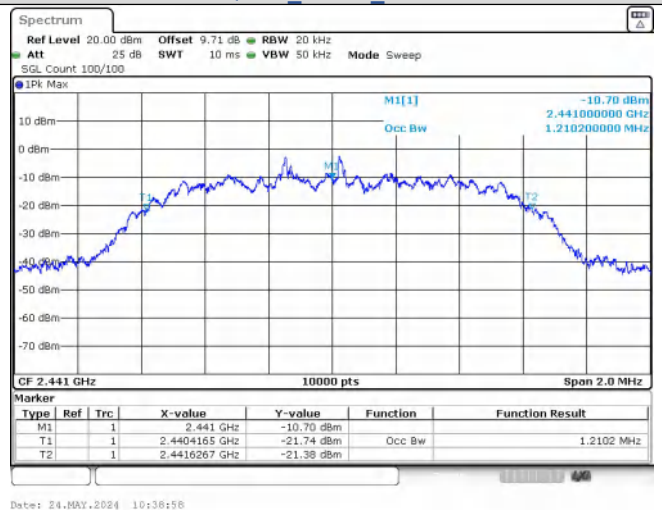
GFSK_DH5_Channel 0



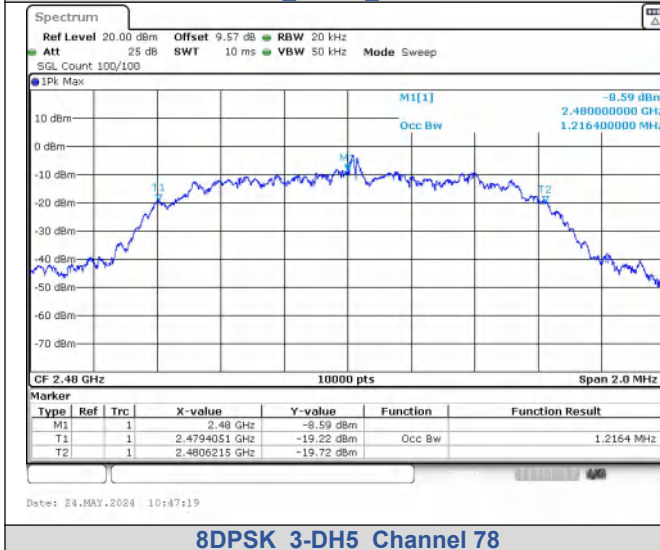
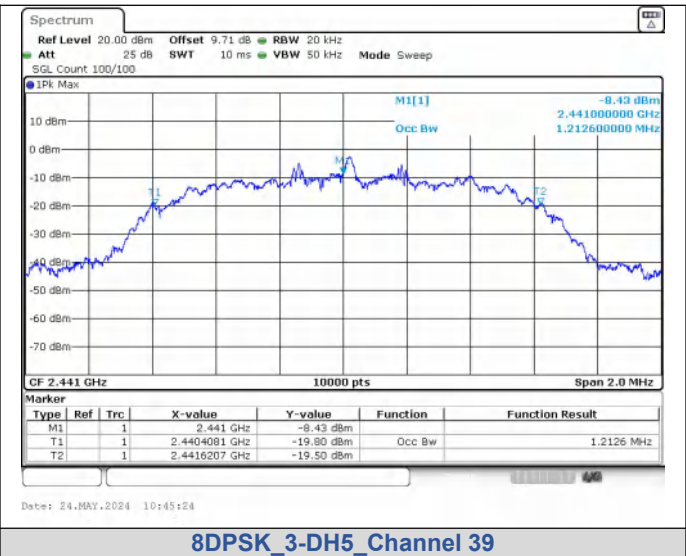
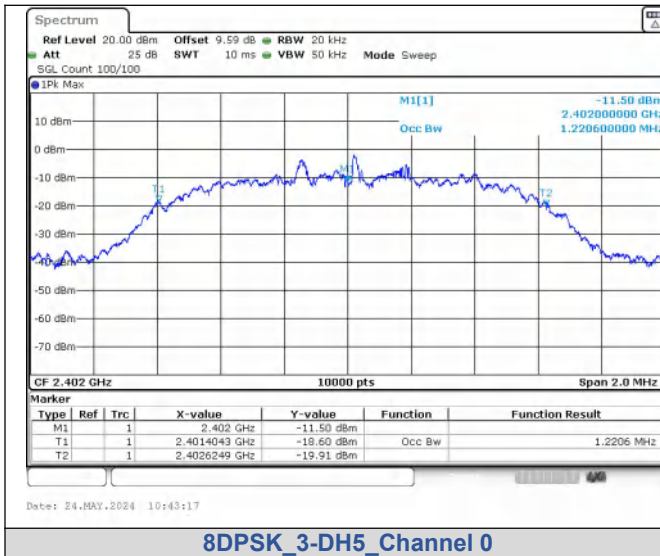
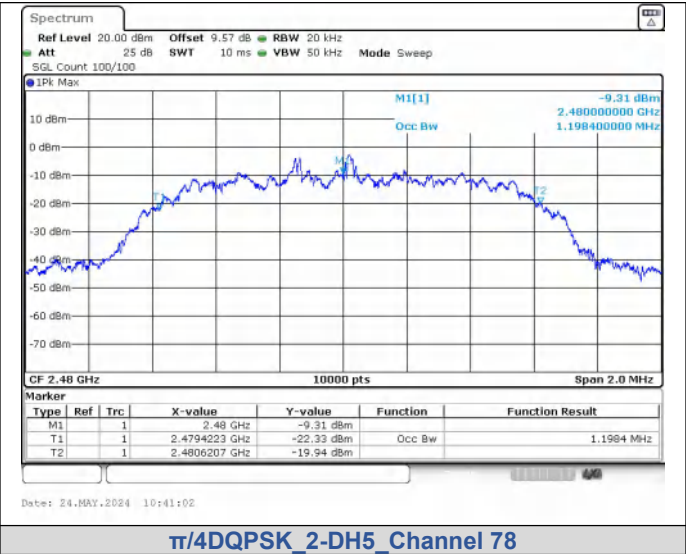
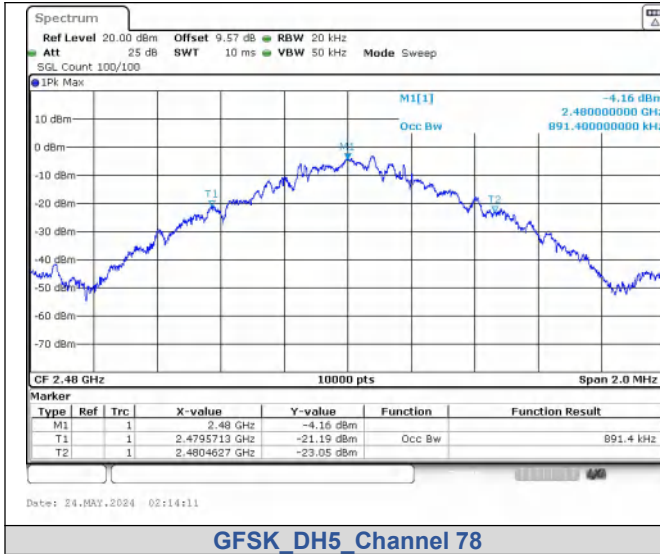
GFSK_DH5_Channel 39



$\pi/4$ DQPSK_2-DH5_Channel 0



$\pi/4$ DQPSK_2-DH5_Channel 39



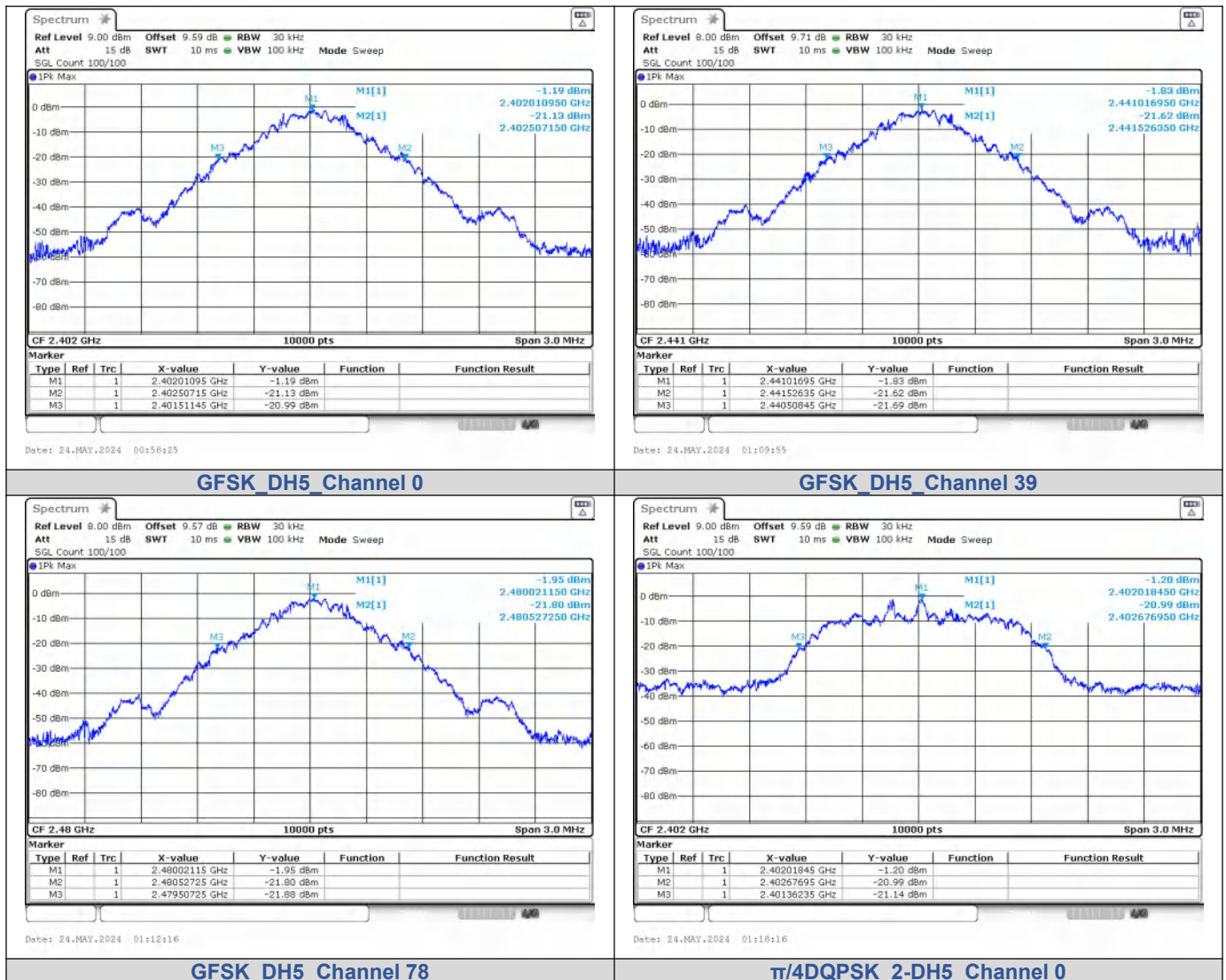
20dB Bandwidth

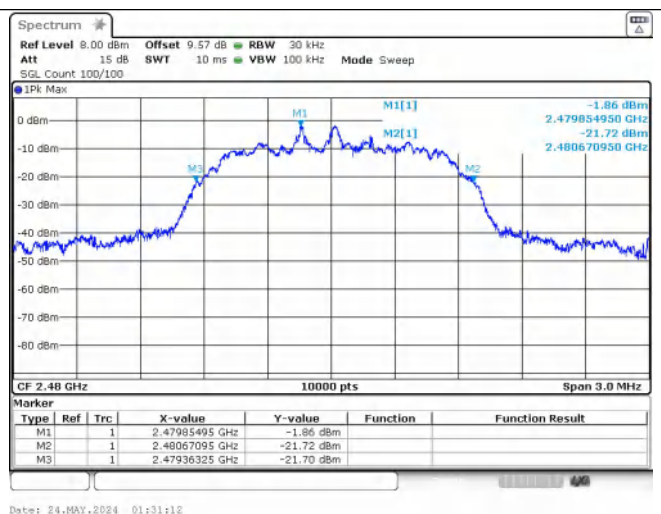
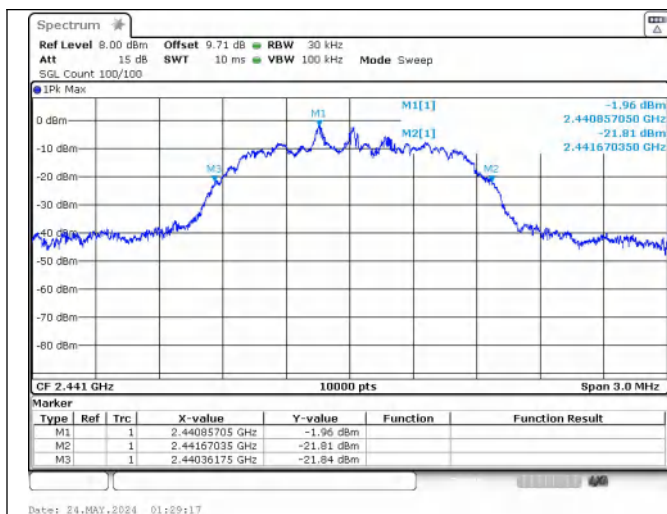
Test Result

Left

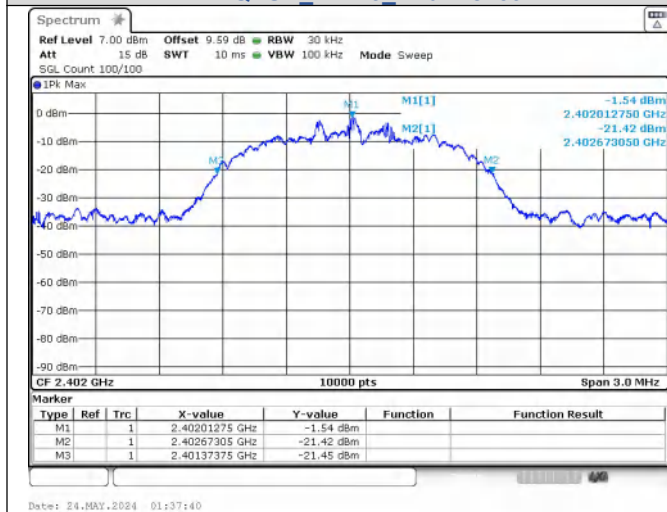
Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.000
	39	2441 MHz	1.020
	78	2480 MHz	1.020
$\pi/4$ DQPSK	0	2402 MHz	1.320
	39	2441 MHz	1.310
	78	2480 MHz	1.310
8DPSK	0	2402 MHz	1.300
	39	2441 MHz	1.290
	78	2480 MHz	1.290

Test Graphs

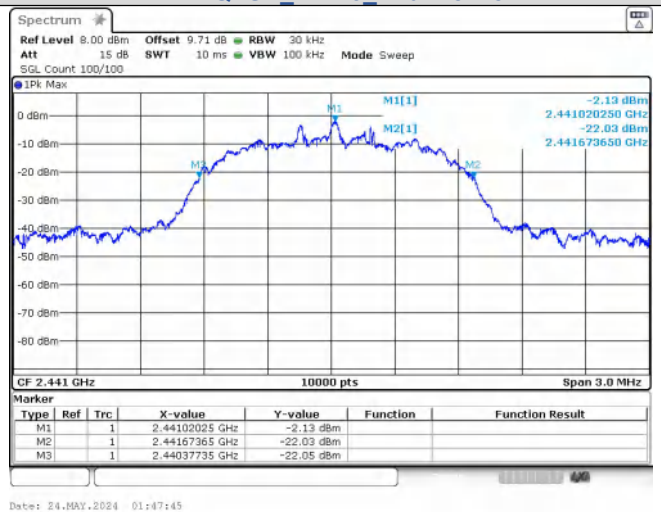




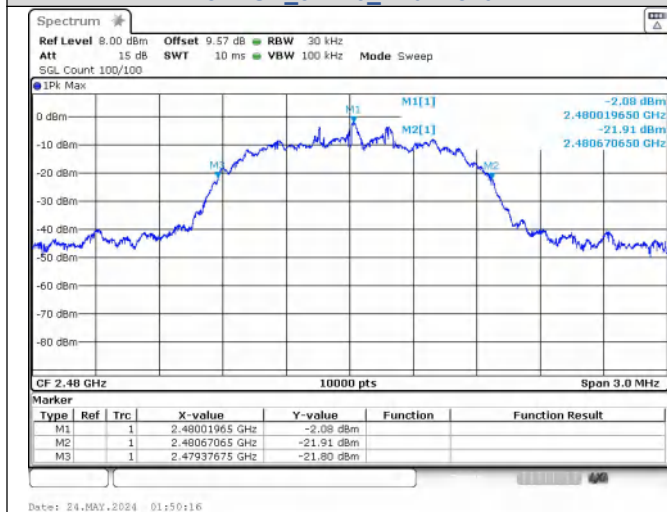
$\pi/4$ DQPSK_2-DH5_Channel 39



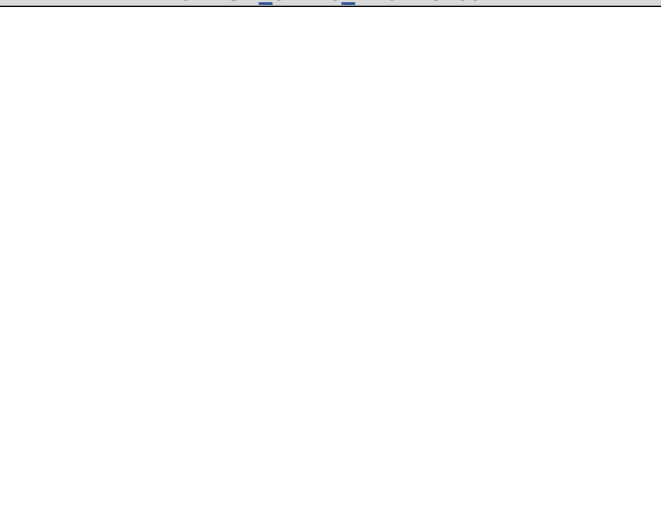
$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



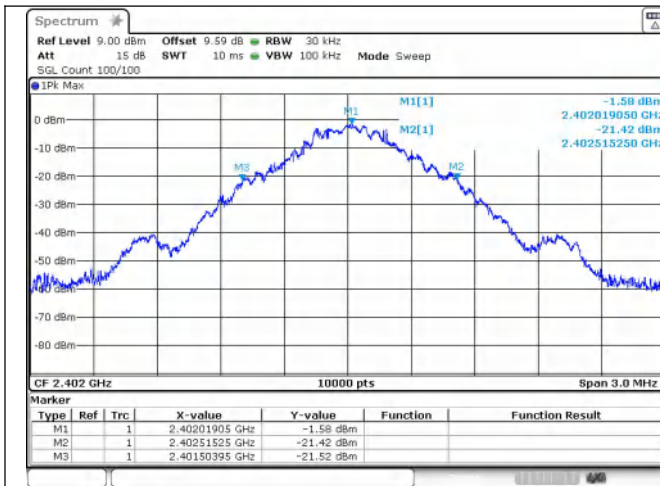
8DPSK_3-DH5_Channel 78

Right

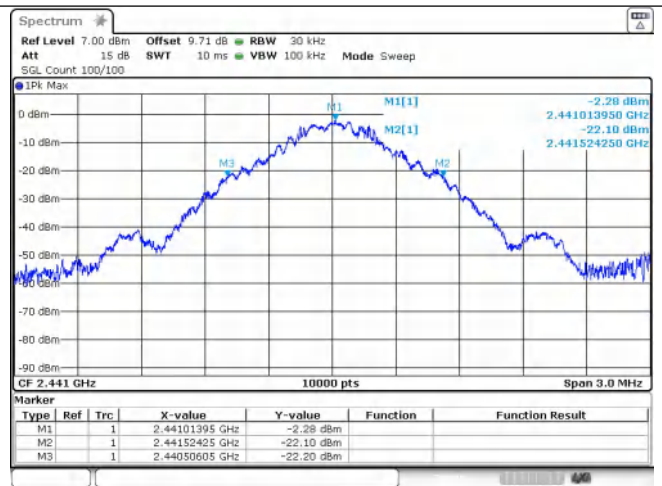
Test Result

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	1.320
	39	2441 MHz	1.300
	78	2480 MHz	1.310
8DPSK	0	2402 MHz	1.290
	39	2441 MHz	1.300
	78	2480 MHz	1.290

Test Graphs



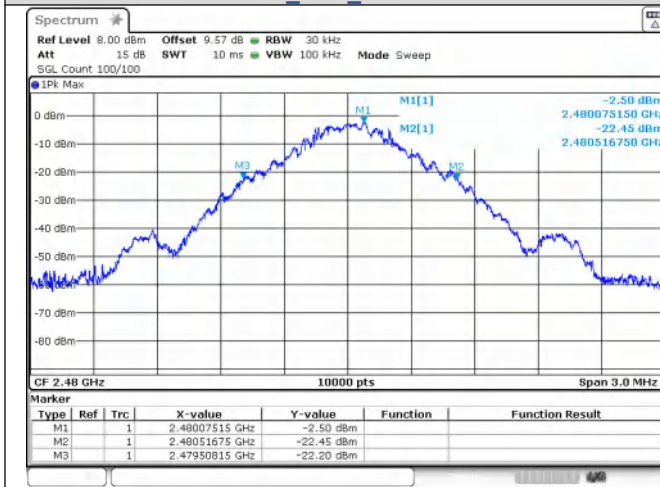
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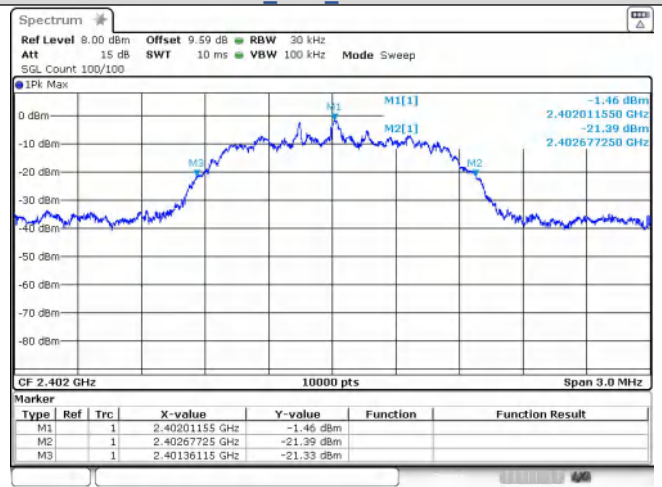
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GFSK_DH5_Channel 0

GFSK_DH5_Channel 39



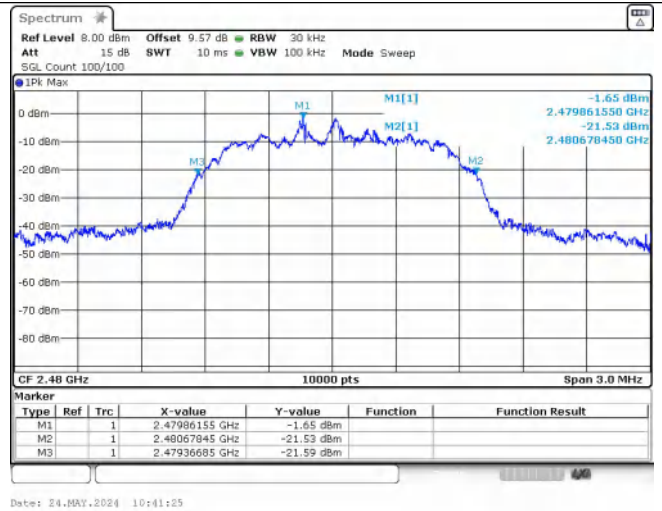
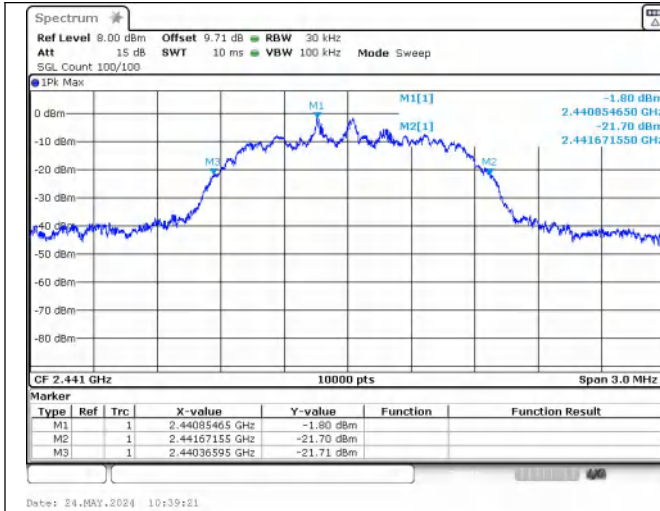
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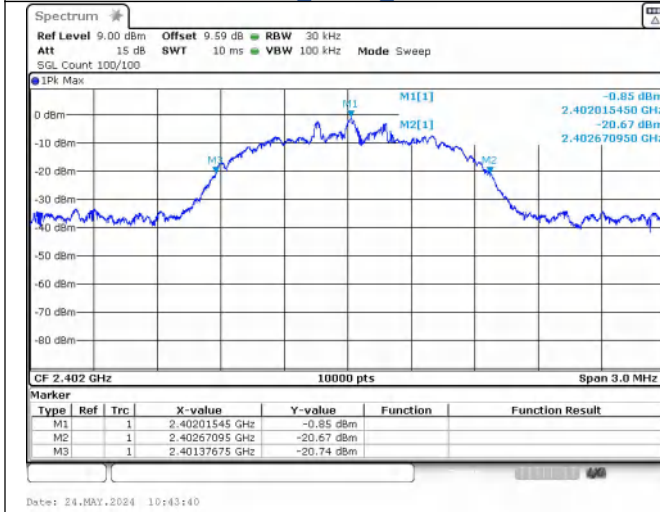
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GFSK_DH5_Channel 78

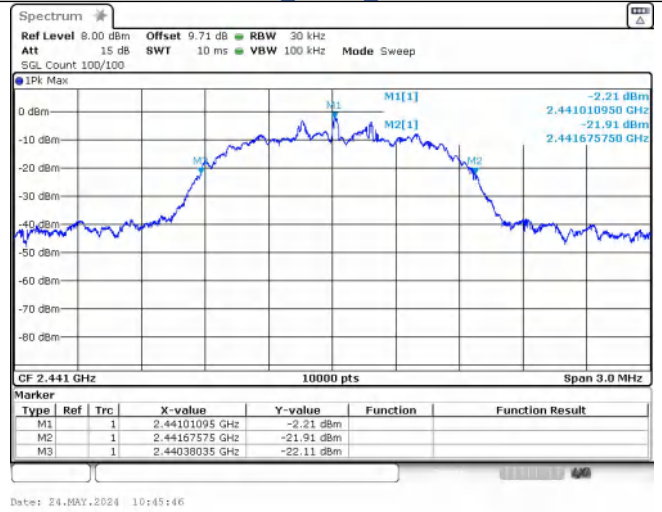
 $\pi/4$ DQPSK_2-DH5_Channel 0



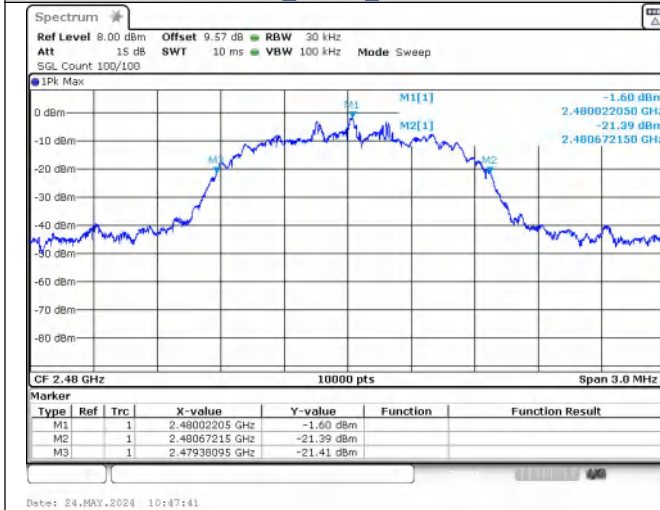
$\pi/4$ DQPSK_2-DH5_Channel 39



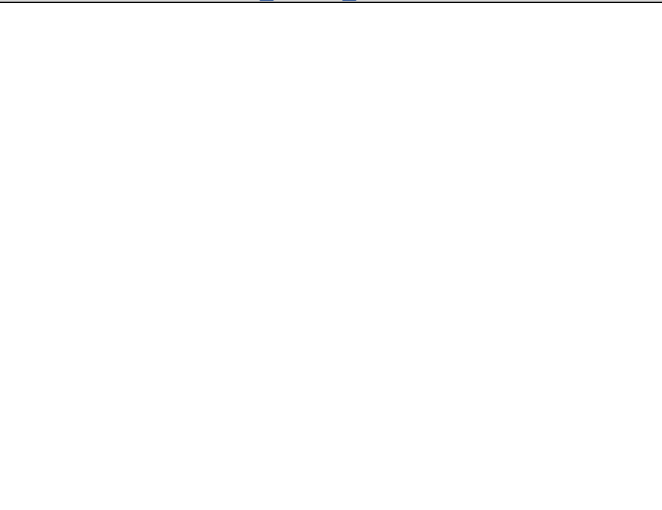
$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



8DPSK_3-DH5_Channel 78

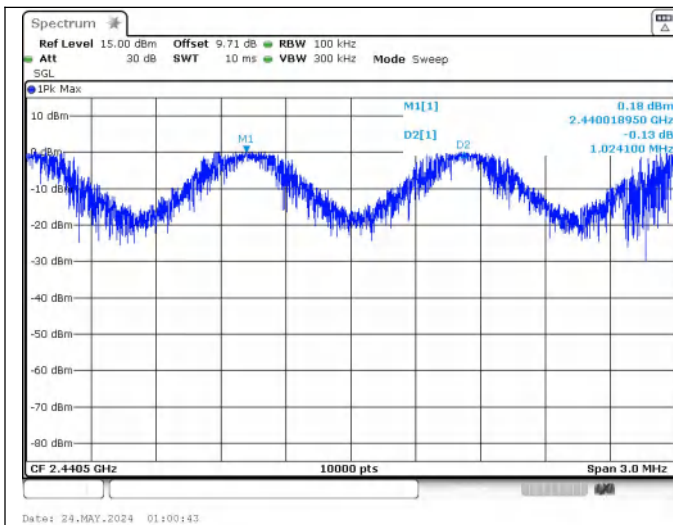
Carrier Frequencies Separation

Test Result

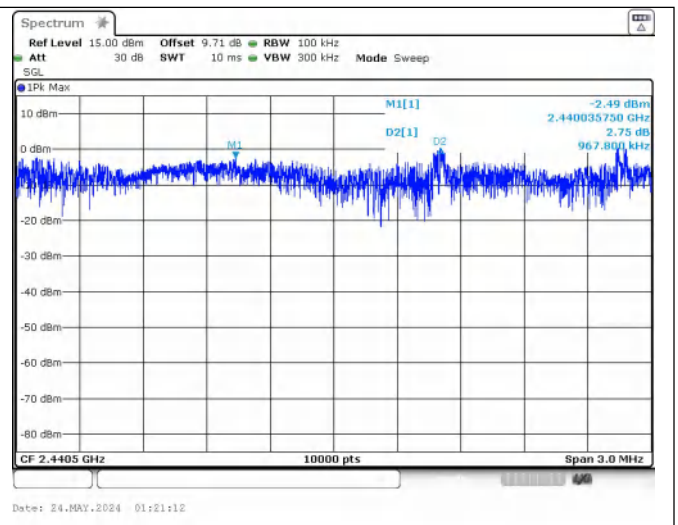
Left

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2440.019	2441.023	1.0241	1.020	PASS
$\pi/4$ DQPSK	2-DH5	2440.0358	2441.0035	0.9678	0.88	PASS
8DPSK	3-DH5	2440.1597	2441.0437	0.8841	0.867	PASS

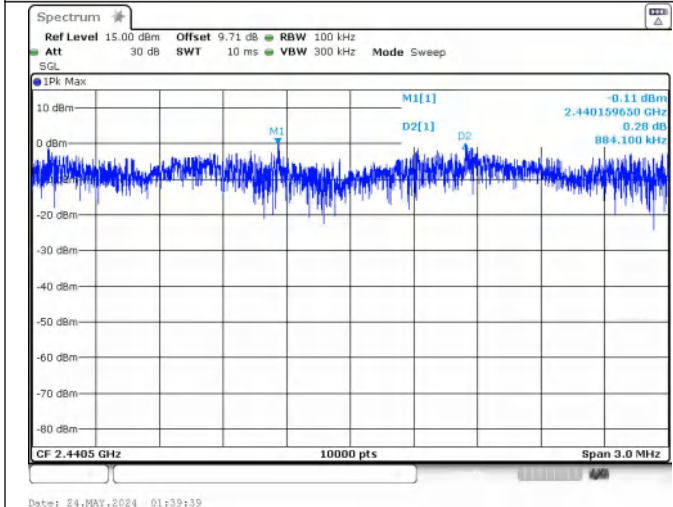
Test Graphs



GFSK



$\pi/4$ DQPSK



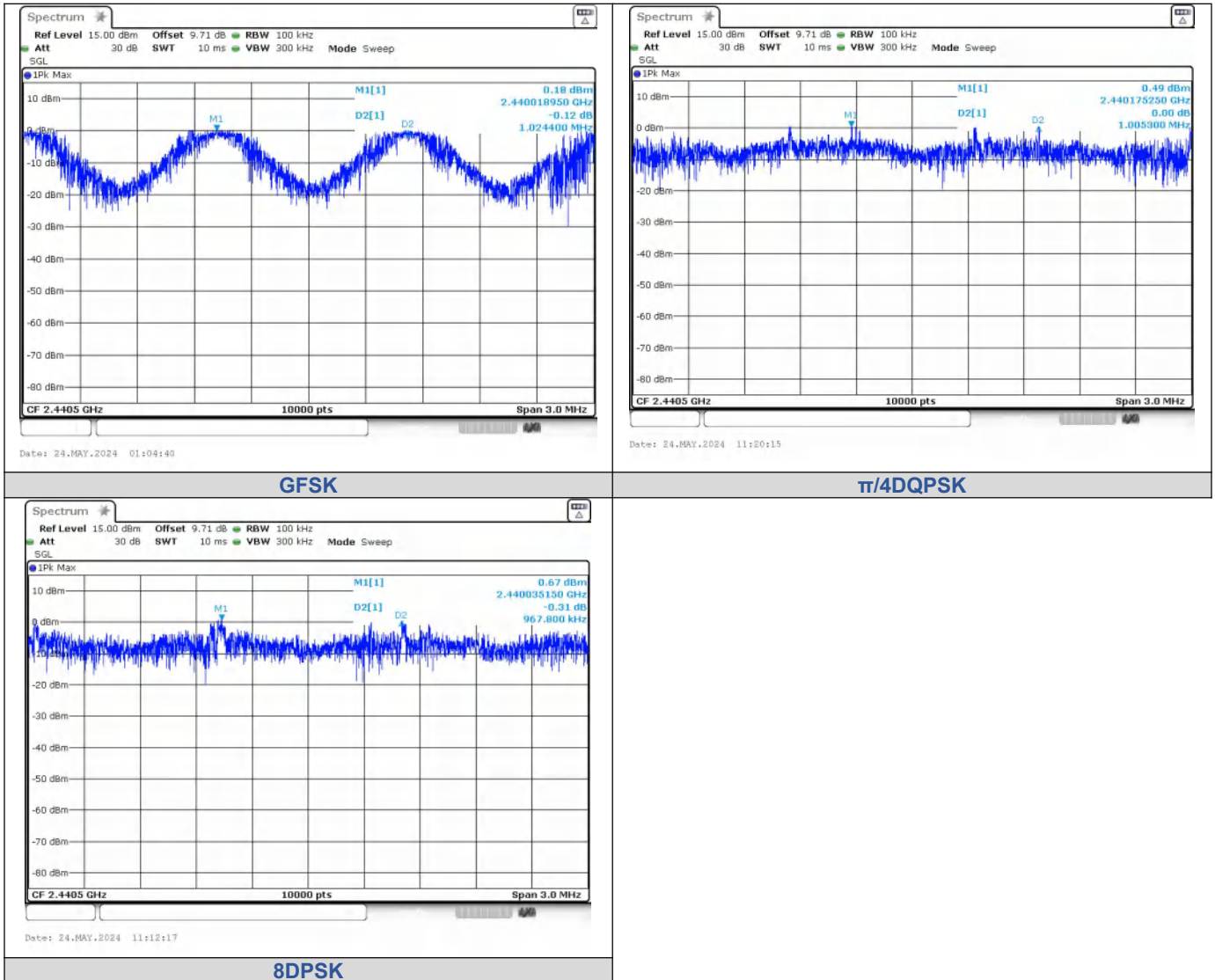
8DPSK

Right

Test Result

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2440.0406	2441.0141	1.0244	1.020	PASS
$\pi/4$ DQPSK	2-DH5	2440.1752	2441.1806	1.0053	0.88	PASS
8DPSK	3-DH5	2440.0352	2441.003	0.9678	0.86	PASS

Test Graphs



Conducted Out Of Band Emission

Test Result

Left

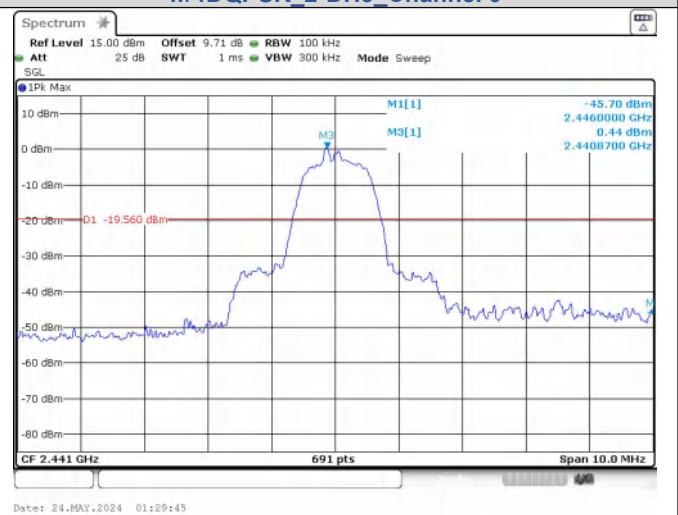
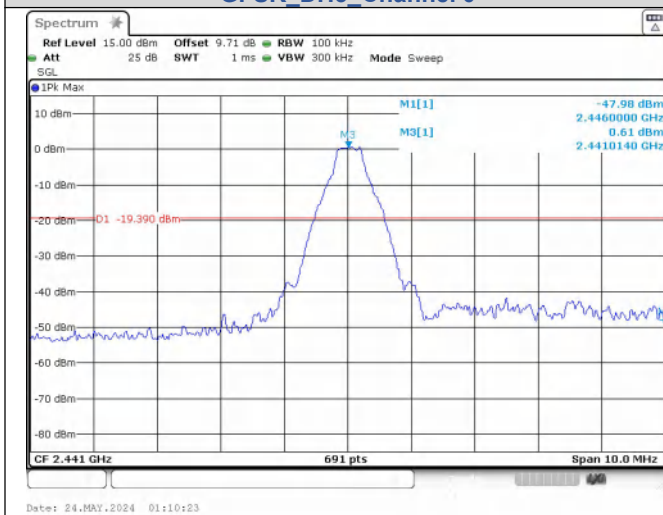
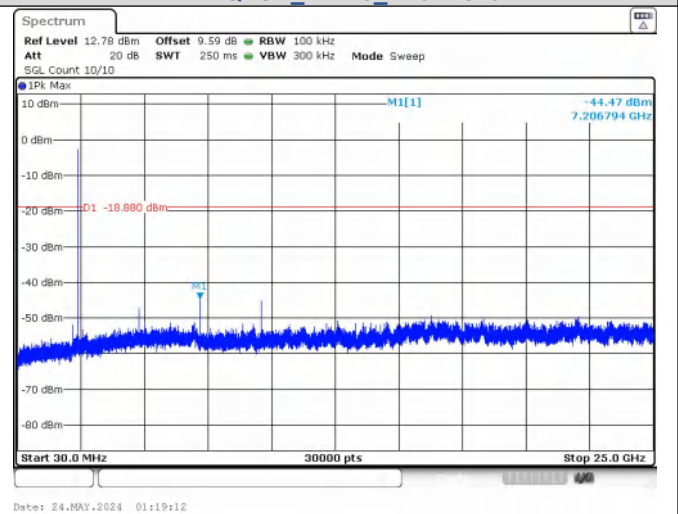
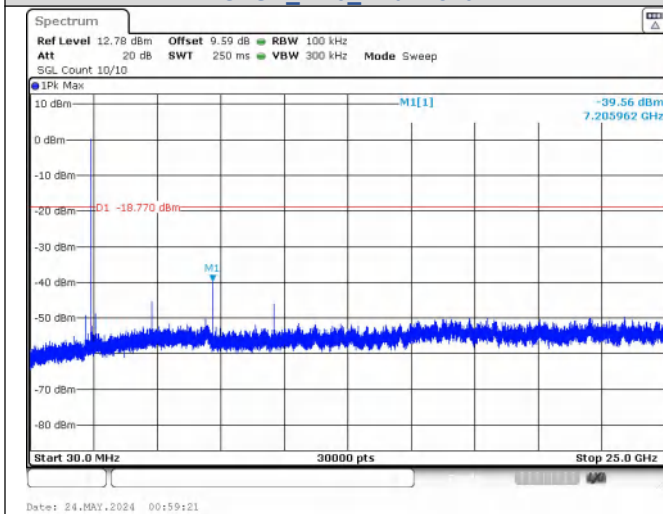
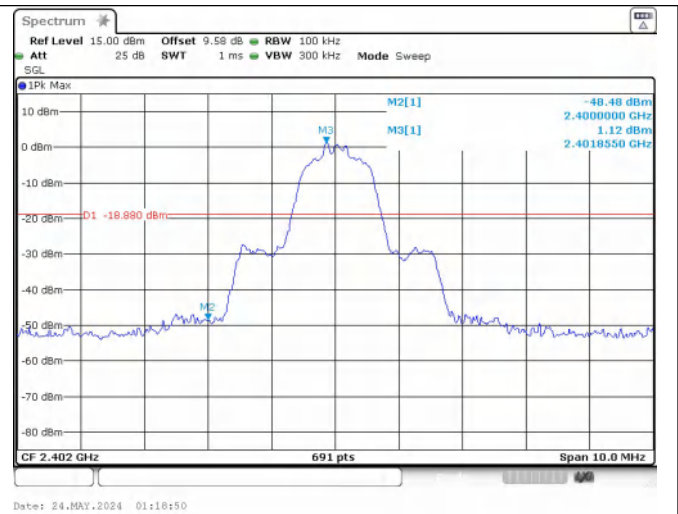
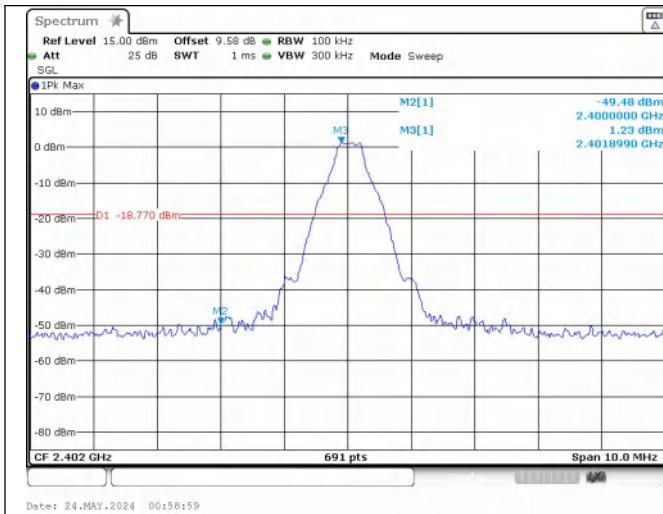
Non-Hopping

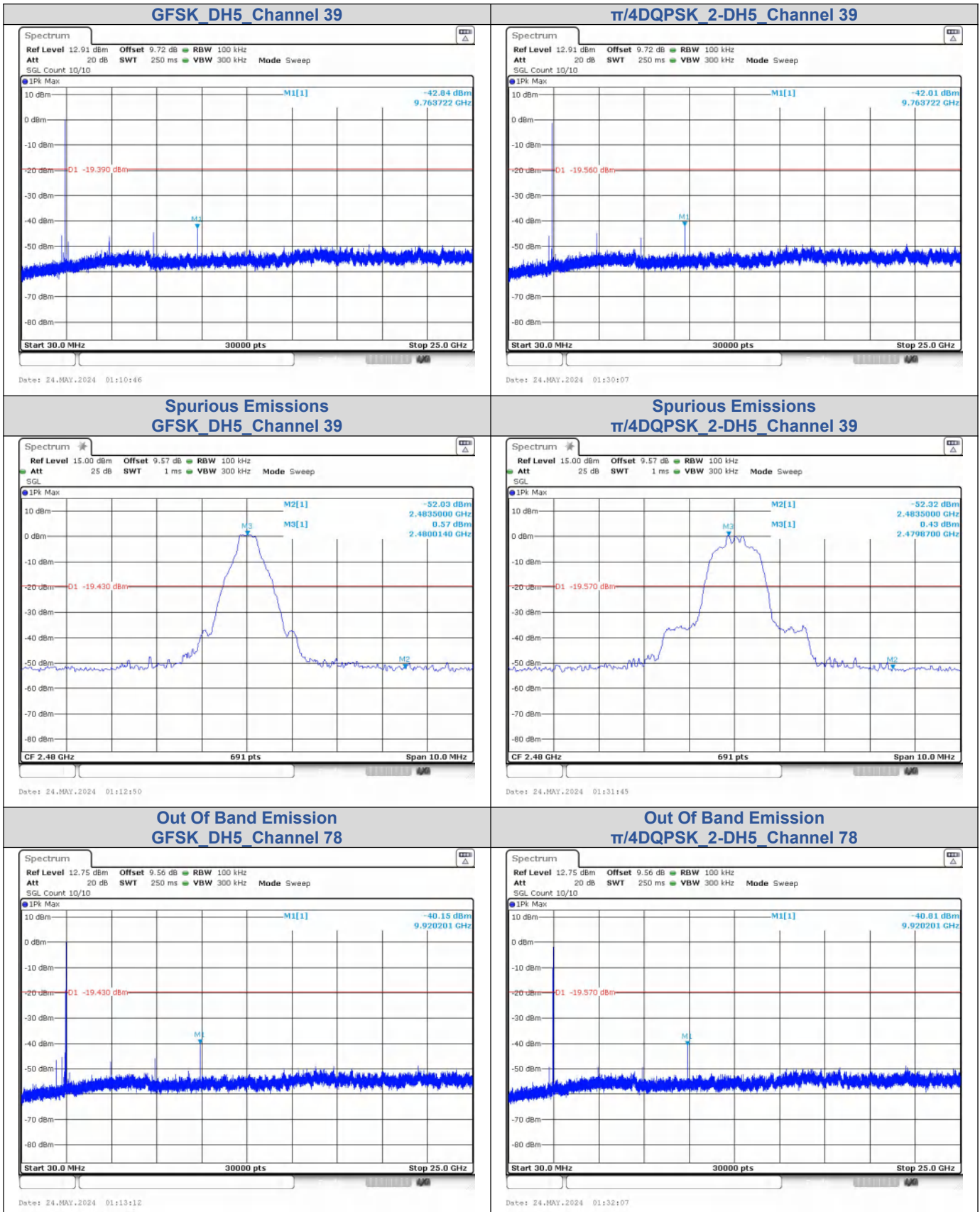
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-49.478	-18.77	-30.708	PASS
			7205.96	-39.560	-18.77	-20.790	PASS
		39	9763.72	-42.836	-19.39	-23.446	PASS
		78	2483.50	-52.027	-19.43	-32.597	PASS
			9920.20	-40.148	-19.43	-20.718	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-48.479	-18.88	-29.599	PASS
			7206.79	-44.467	-18.88	-25.587	PASS
		39	9763.72	-42.013	-19.56	-22.453	PASS
		78	2483.50	-52.320	-19.57	-32.750	PASS
			9920.20	-40.815	-19.57	-21.245	PASS
8DPSK	3-DH5	0	2400.00	-47.301	-18.92	-28.381	PASS
			5828.45	-41.682	-18.92	-22.762	PASS
		39	9763.72	-40.818	-20.0	-20.818	PASS
		78	2483.50	-52.317	-19.75	-32.567	PASS
			9920.20	-40.585	-19.75	-20.835	PASS

Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2395.25	-50.423	-18.86	-31.563	PASS
			2400.00	-52.788	-18.86	-33.928	PASS
			2483.50	-51.195	-19.32	-31.875	PASS
			2397.90	-50.106	-18.6	-31.506	PASS
			2400.00	-51.681	-18.6	-33.081	PASS
π/4DQPSK	2-DH5		2483.50	-51.870	-19.72	-32.150	PASS
			2400.00	-49.796	-18.81	-30.986	PASS
			2483.50	-51.393	-19.64	-31.753	PASS
			2400.00	-49.495	-18.89	-30.605	PASS
			2483.50	-51.218	-19.8	-31.418	PASS
8DPSK	3-DH5		2400.00	-49.445	-19.48	-29.965	PASS
			2483.50	-51.831	-20.05	-31.781	PASS
			2395.41	-49.843	-19.02	-30.823	PASS
			2400.00	-50.409	-19.02	-31.389	PASS
			2483.50	-52.011	-19.85	-32.161	PASS

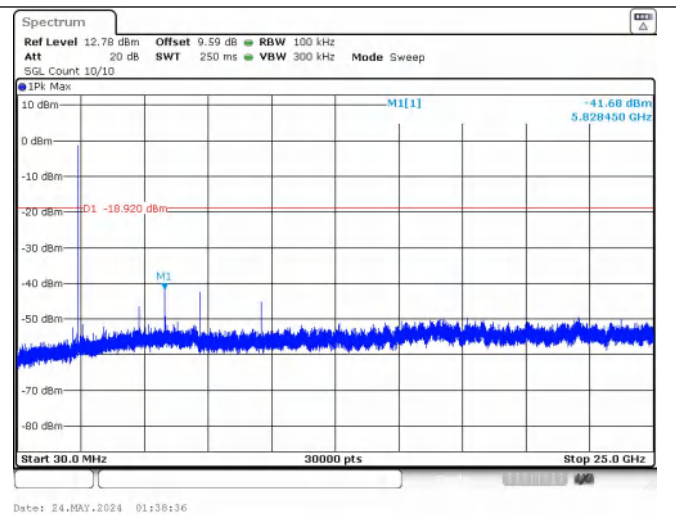
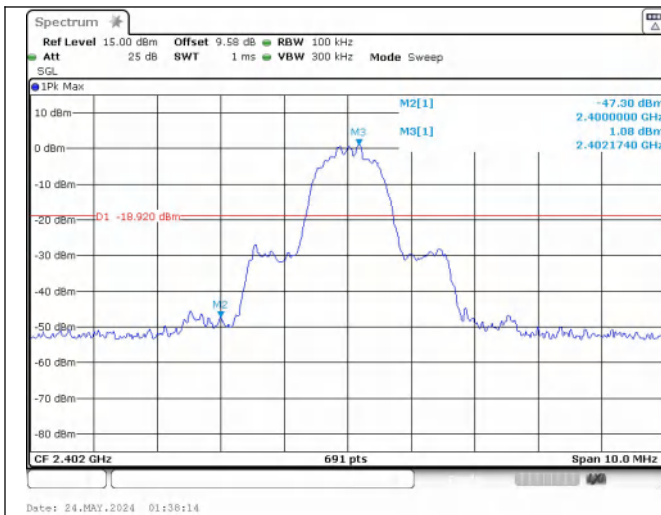
Test Graphs





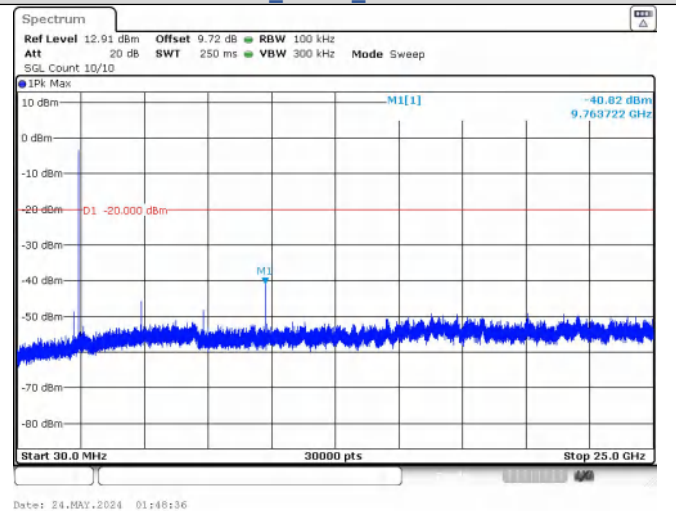
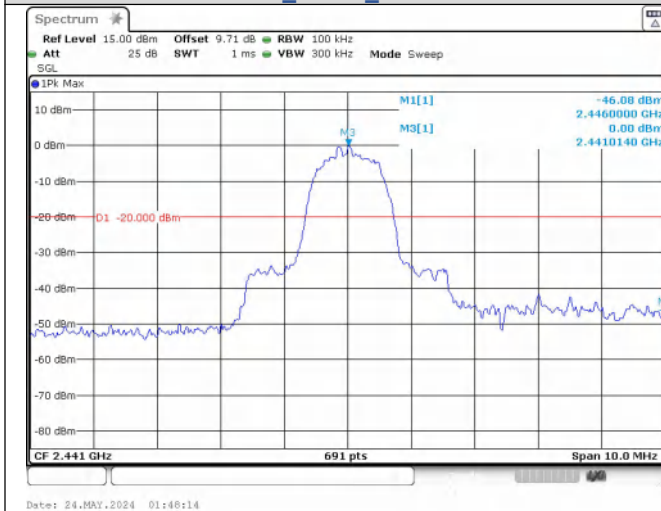
Spurious Emission
GFSK_DH5_Channel 78

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



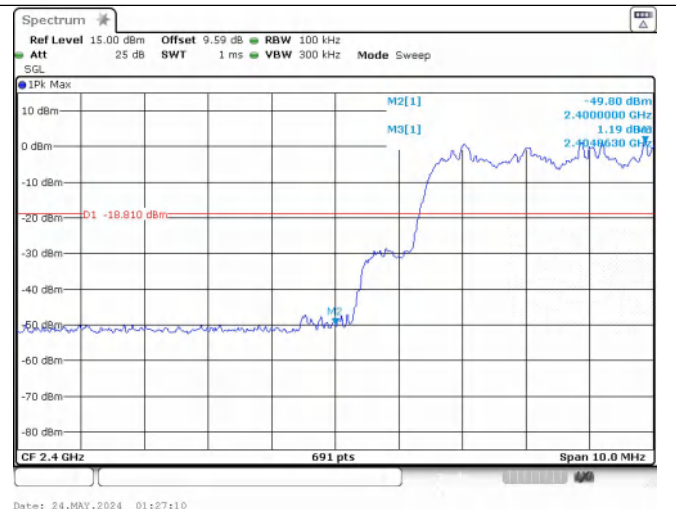
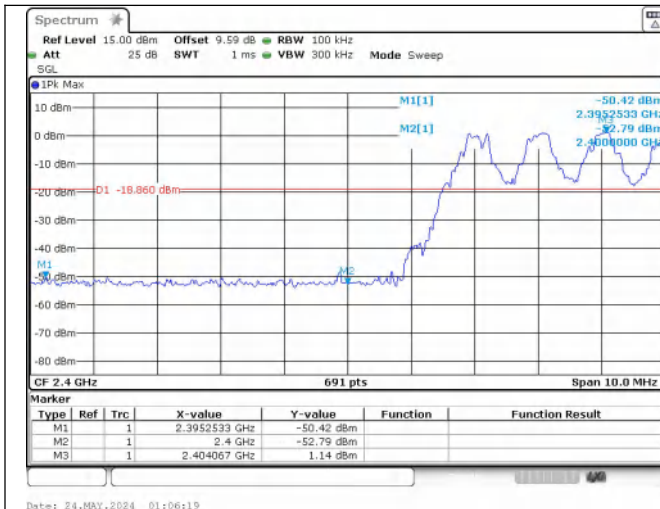
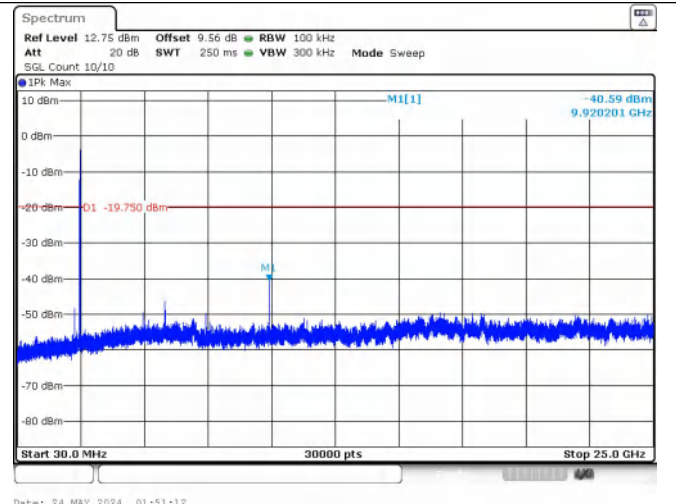
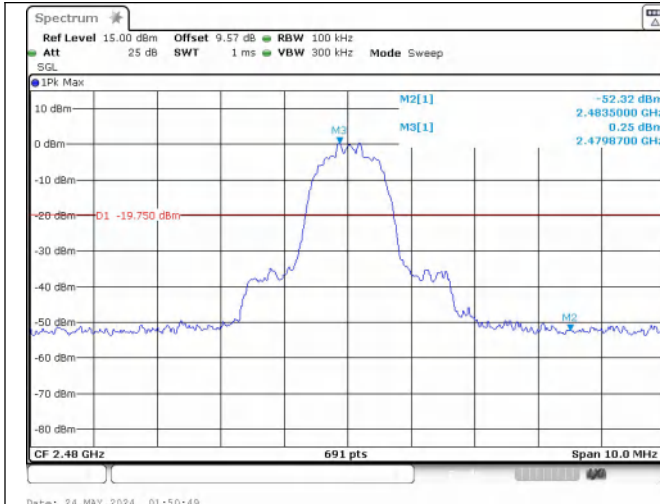
Out Of Band Emission
8DPSK_3-DH5_Channel 0

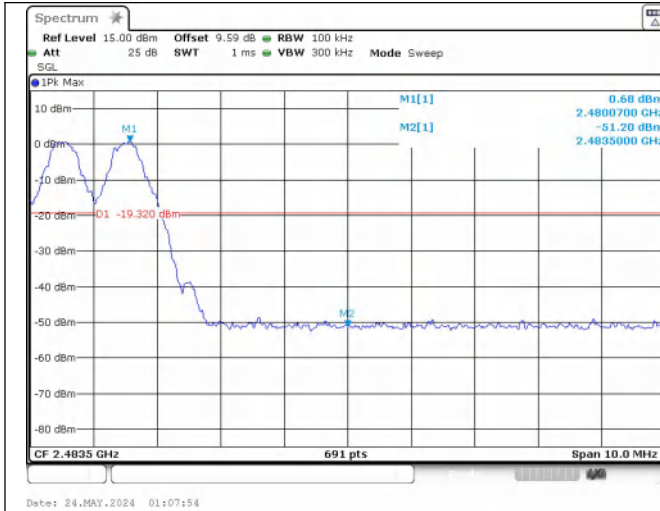
Spurious Emission
8DPSK_3-DH5_Channel 0



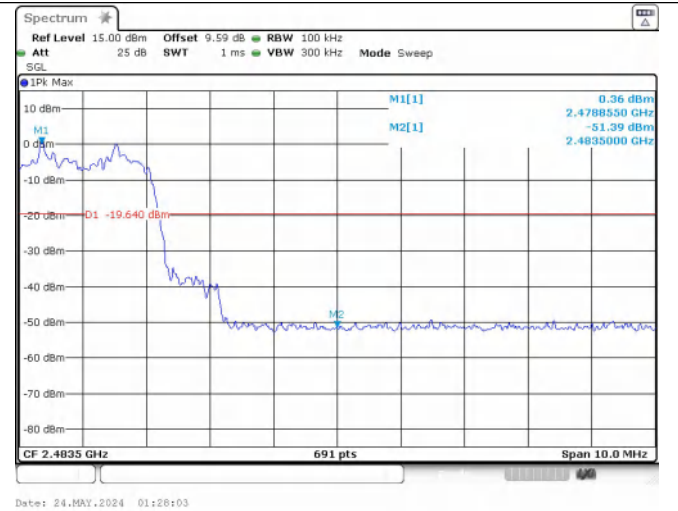
Out Of Band Emission
8DPSK_3-DH5_Channel 39

Spurious Emissions
8DPSK_3-DH5_Channel 39

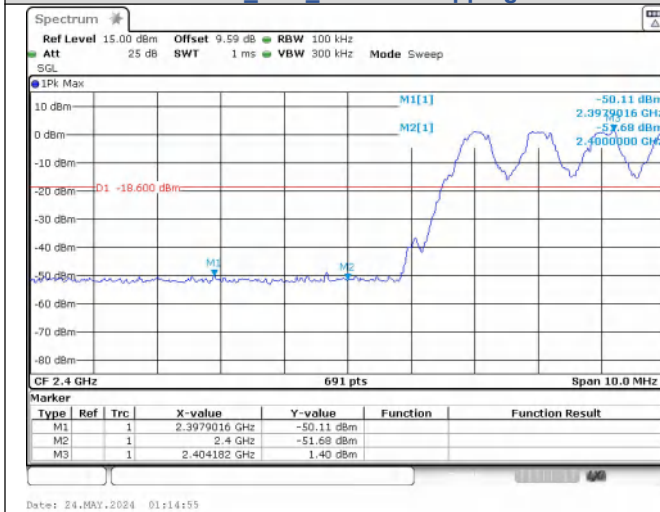




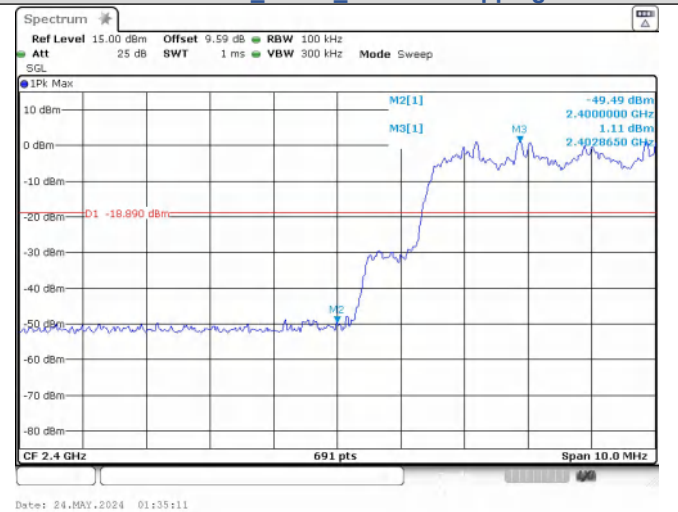
**Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping**



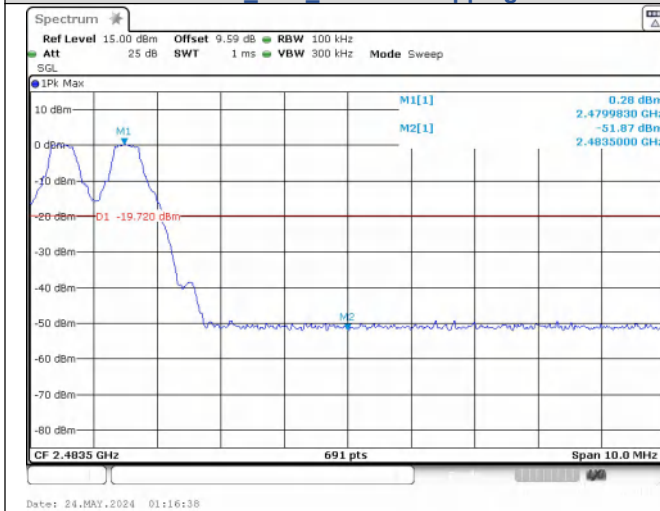
**Out Of Band Emission(Right)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping**



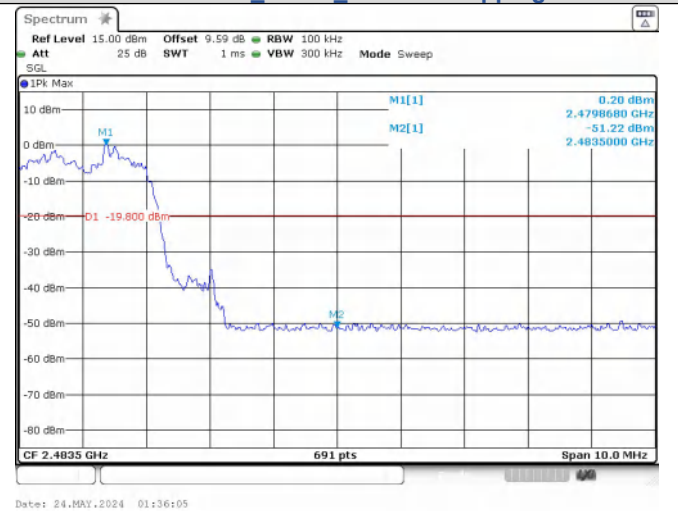
**Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping**



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



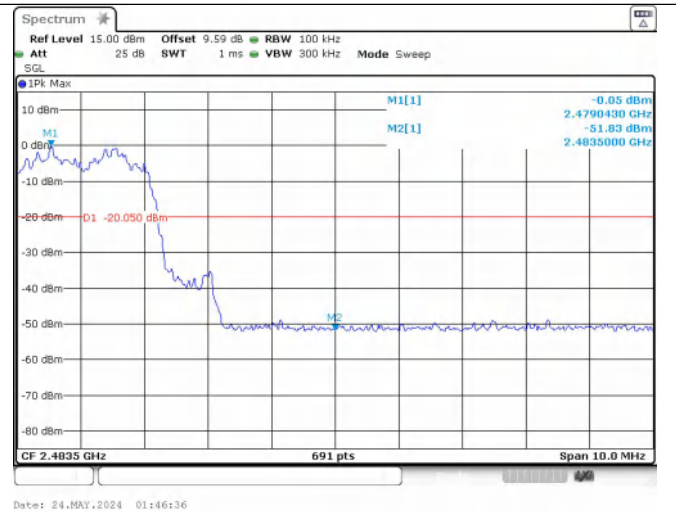
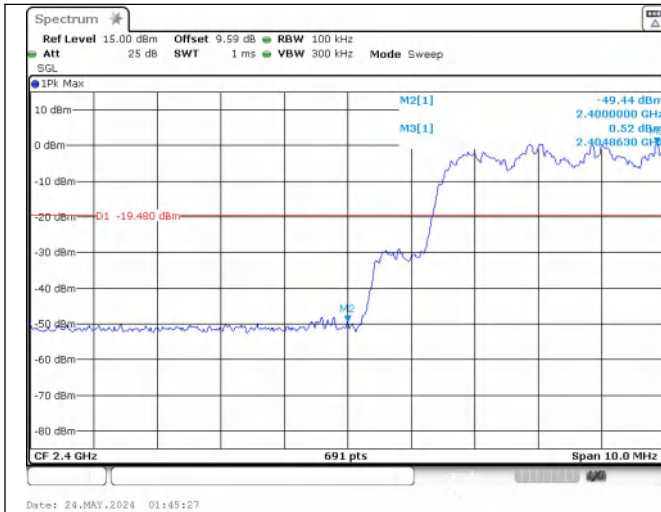
**Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping**



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

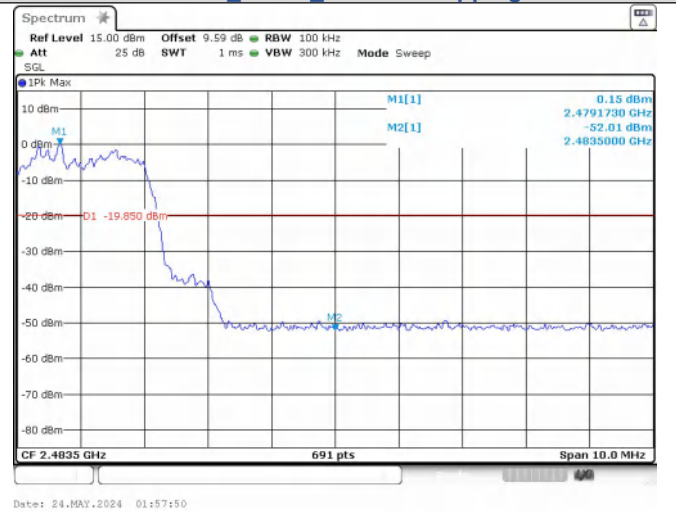
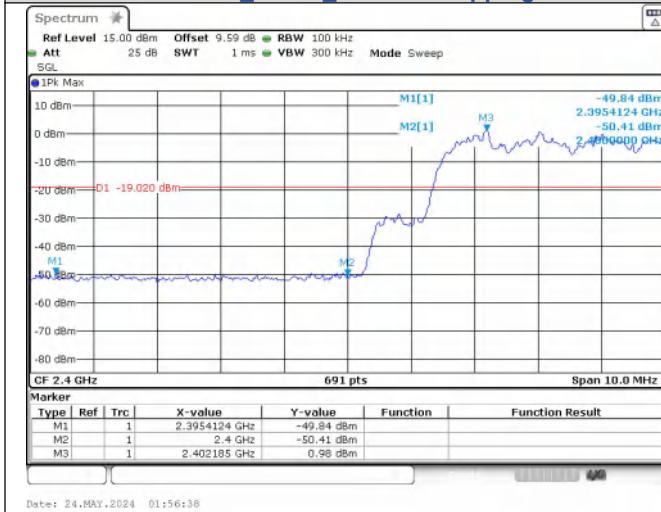
GFSK_DH5_Channel Hopping

$\pi/4$ 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**



**Out Of Band Emission(Left)
8DPSK_3-DH5_Channel Hopping**

**Out Of Band Emission(Right)
8DPSK_3-DH5_Channel Hopping**

Right

Test Result

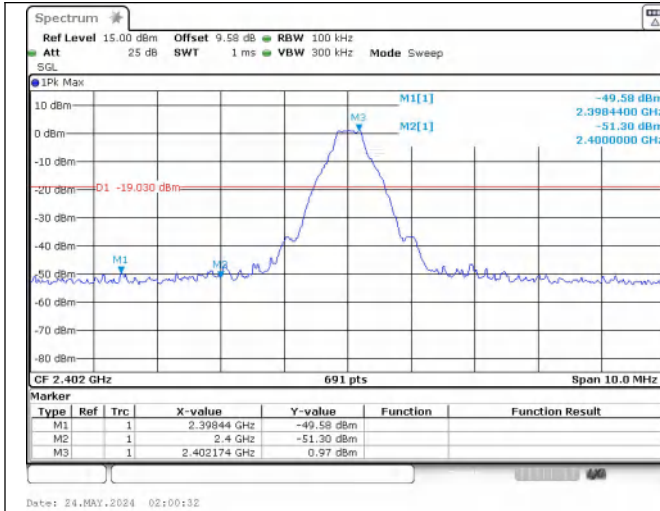
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-51.304	-19.03	-32.274	PASS
			2398.44	-49.580	-19.03	-30.550	PASS
			7206.00	-42.693	-19.03	-23.663	PASS
		39	9763.72	-42.055	-19.79	-22.265	PASS
		78	2483.50	-52.883	-19.72	-33.163	PASS
			9920.20	-40.790	-19.72	-21.070	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-48.640	-19.2	-29.440	PASS
			7205.96	-43.950	-19.2	-24.750	PASS
		39	9763.72	-41.486	-19.42	-22.066	PASS
		78	2483.50	-52.211	-19.22	-32.991	PASS
			9920.20	-40.356	-19.22	-21.136	PASS
8DPSK	3-DH5	0	2400.00	-47.523	-18.88	-28.643	PASS
			7205.96	-40.758	-18.88	-21.878	PASS
		39	9764.55	-41.096	-19.43	-21.666	PASS
		78	2483.50	-53.032	-19.26	-33.772	PASS
			9920.20	-40.358	-19.26	-21.098	PASS

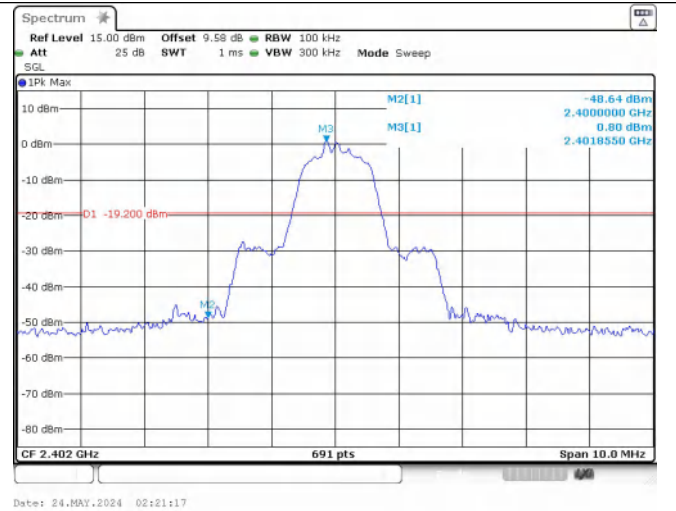
Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2398.67	-49.658	-19.03	-30.628	PASS
			2400.00	-51.898	-19.03	-32.868	PASS
			2483.50	-51.164	-19.77	-31.394	PASS
			2400.00	-49.928	-18.85	-31.078	PASS
			2483.50	-51.221	-20.41	-30.811	PASS
π/4DQPSK	2-DH5		2397.71	-49.394	-19.49	-29.904	PASS
			2400.00	-50.560	-19.49	-31.070	PASS
			2483.50	-52.176	-19.68	-32.496	PASS
			2396.14	-48.444	-18.51	-29.934	PASS
			2400.00	-49.874	-18.51	-31.364	PASS
8DPSK	3-DH5		2483.50	-52.038	-20.27	-31.768	PASS
			2396.71	-49.437	-18.52	-30.917	PASS
			2400.00	-51.920	-18.52	-33.400	PASS
			2483.50	-52.243	-20.88	-31.363	PASS
			2396.56	-49.582	-19.54	-30.042	PASS
			2400.00	-52.061	-19.54	-32.521	PASS
			2483.50	-51.290	-22.34	-28.950	PASS

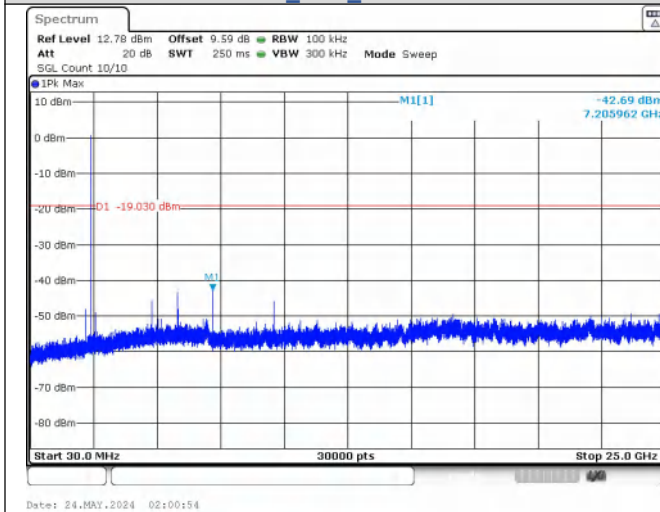
Test Graphs



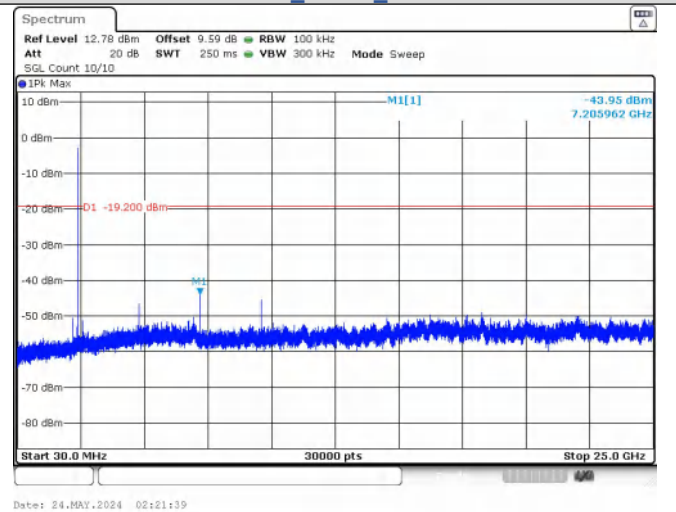
**Out Of Band Emission
GFSK_DH5_Channel 0**



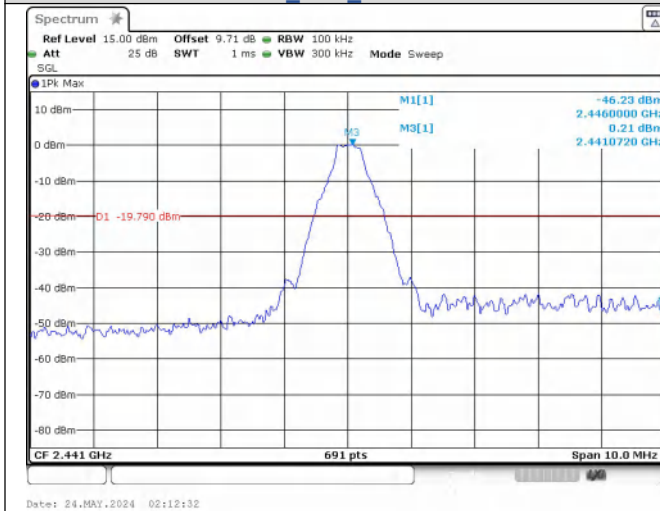
**Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 0**



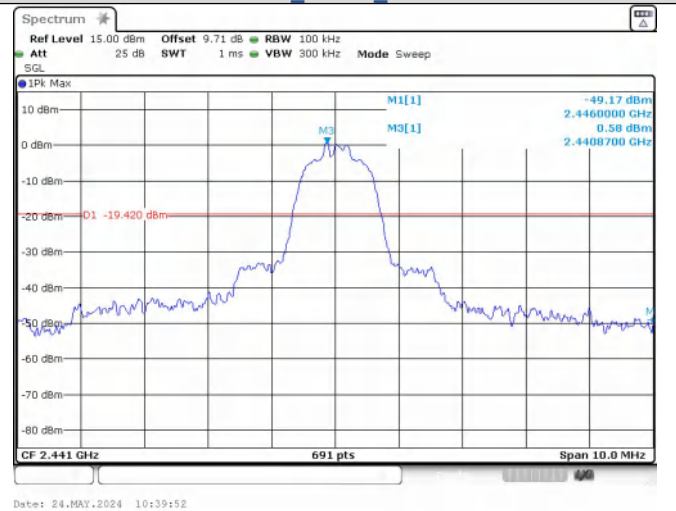
**Spurious Emission
GFSK_DH5_Channel 0**



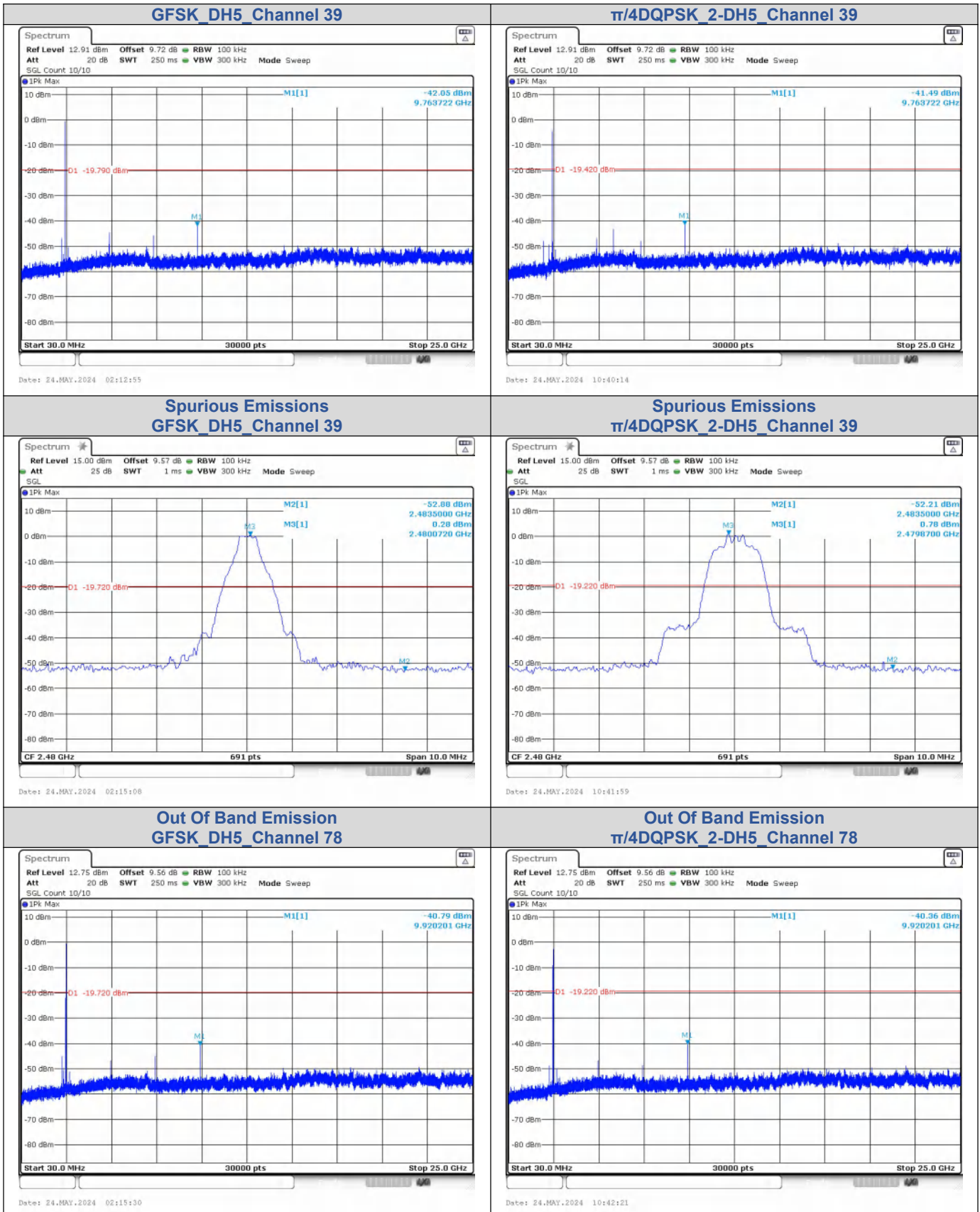
**Spurious Emission
 $\pi/4$ DQPSK_2-DH5_Channel 0**



Out Of Band Emission

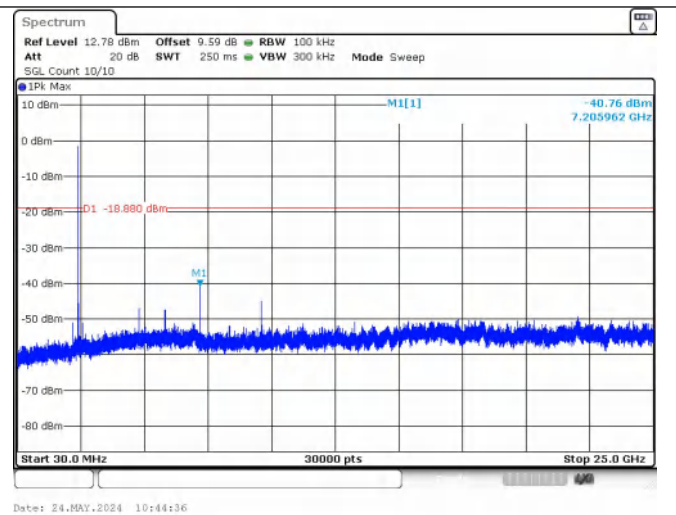
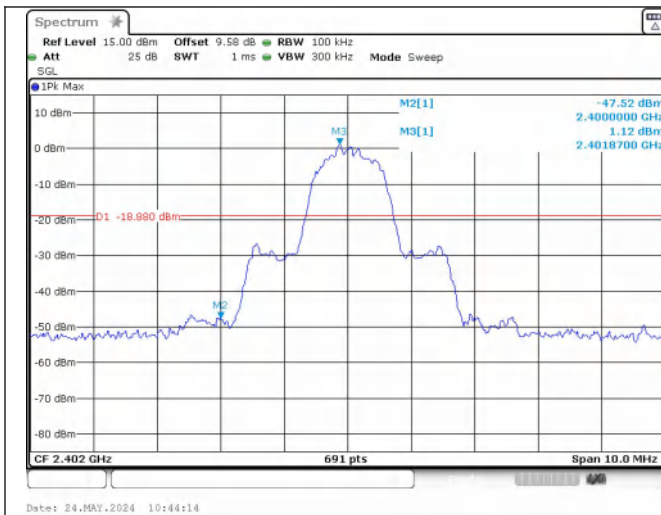


Out Of Band Emission



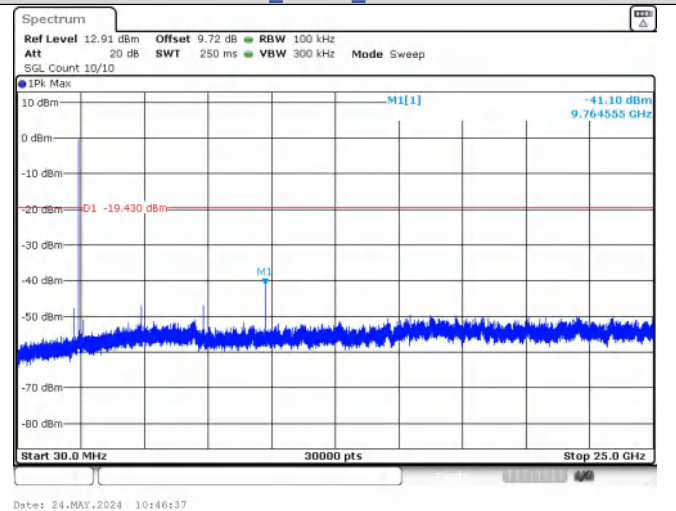
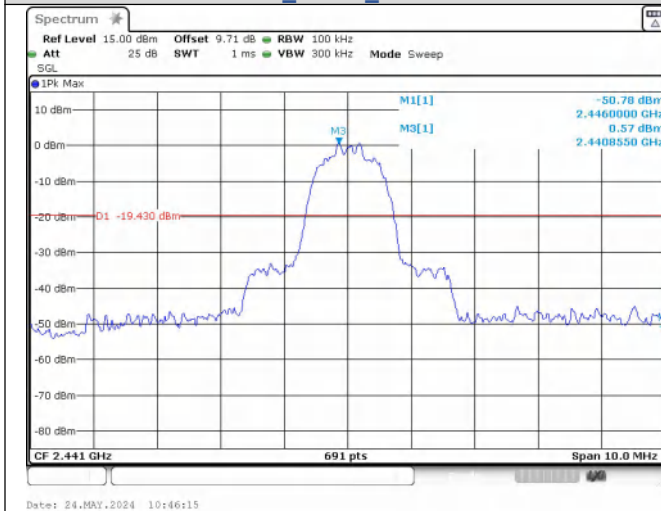
Spurious Emission GFSK_DH5_Channel 78

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



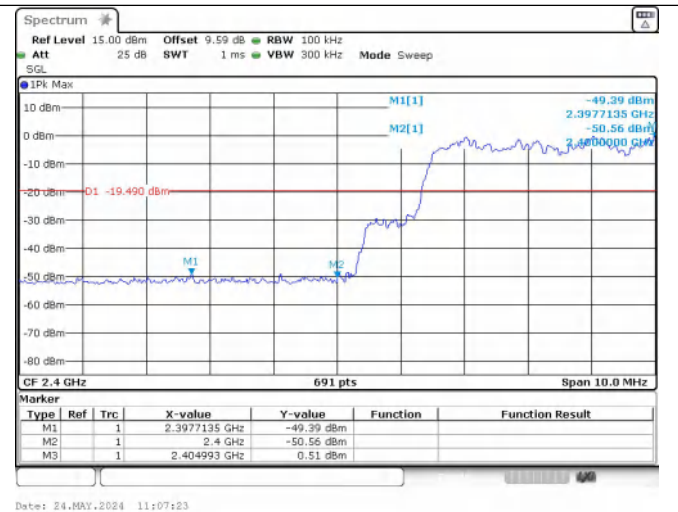
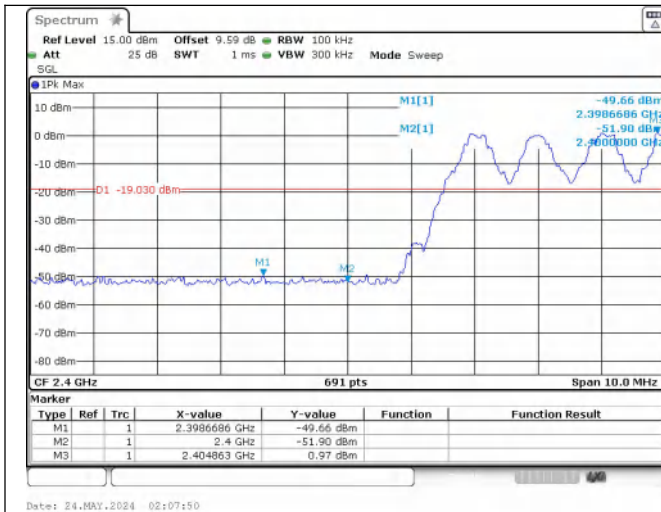
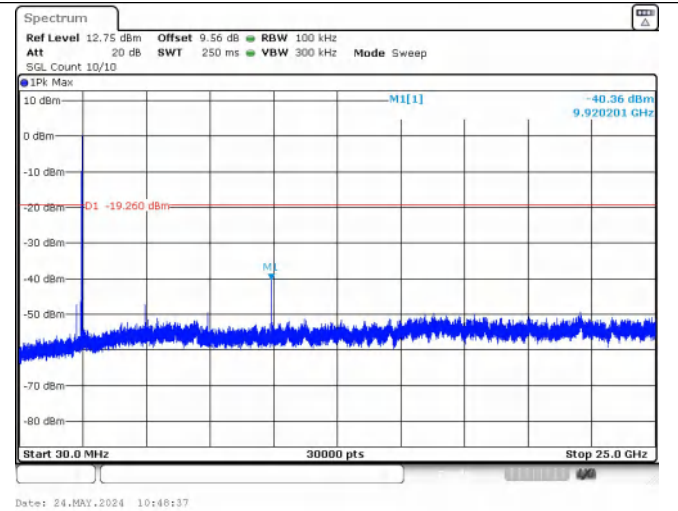
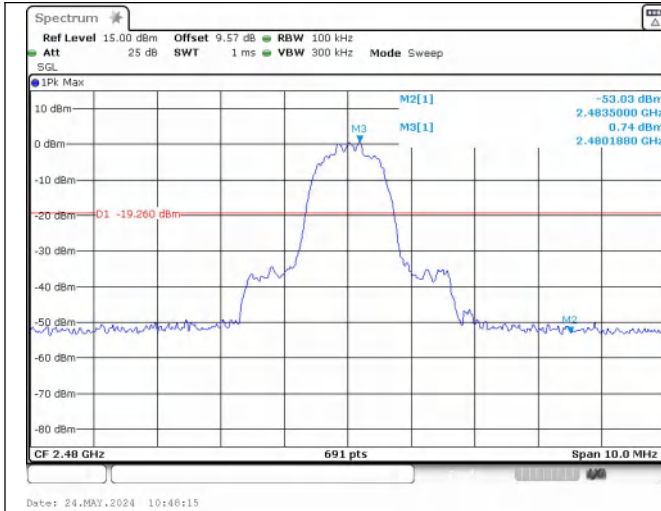
Out Of Band Emission 8DPSK_3-DH5_Channel 0

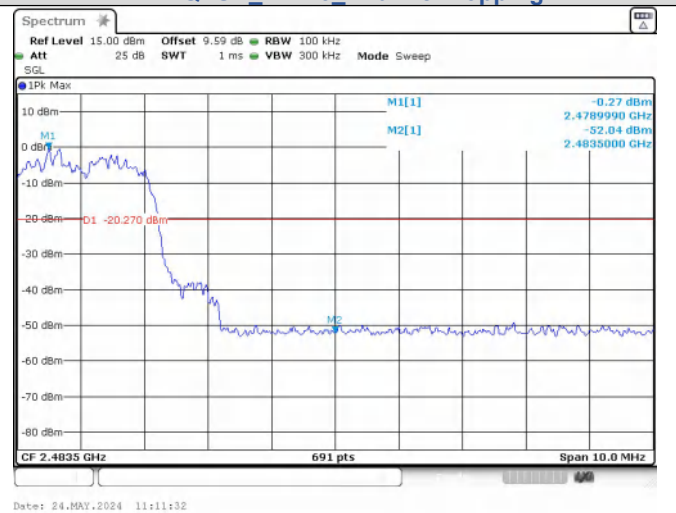
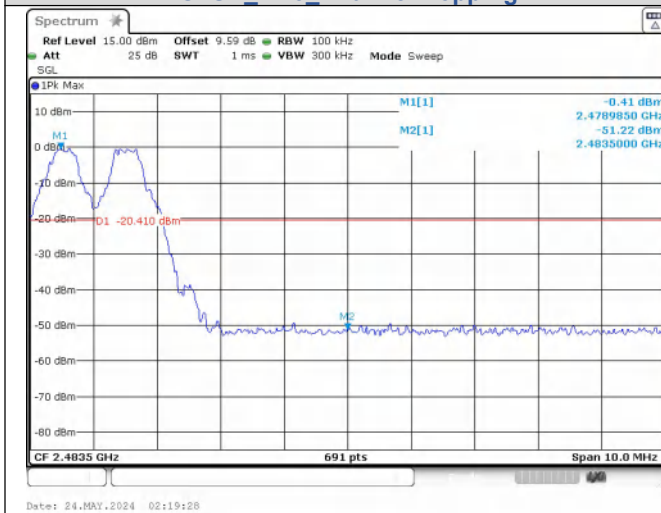
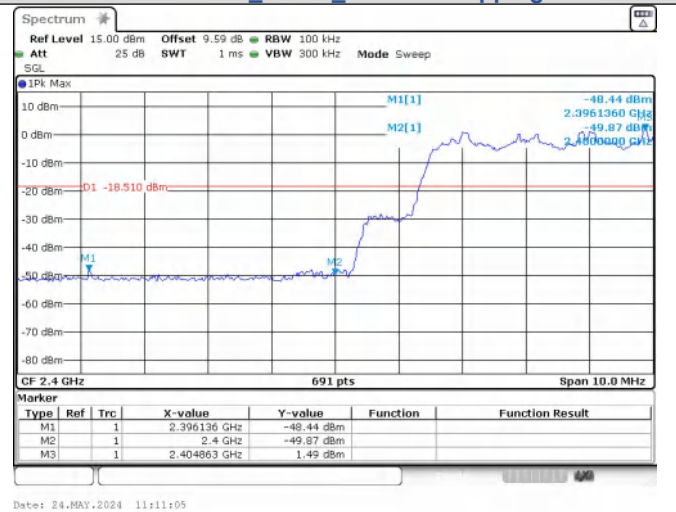
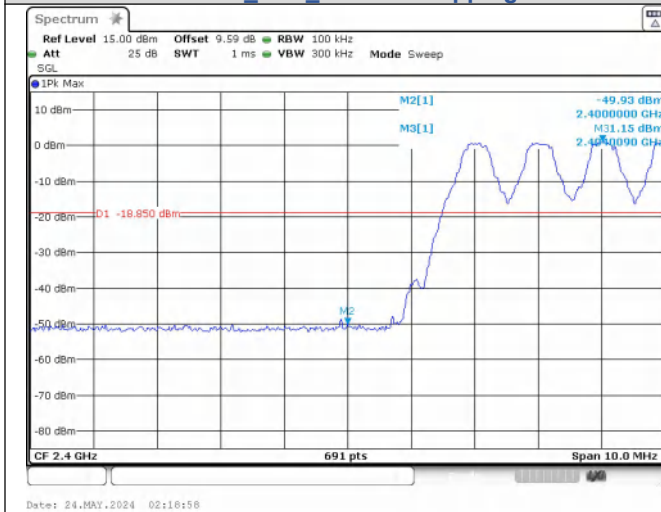
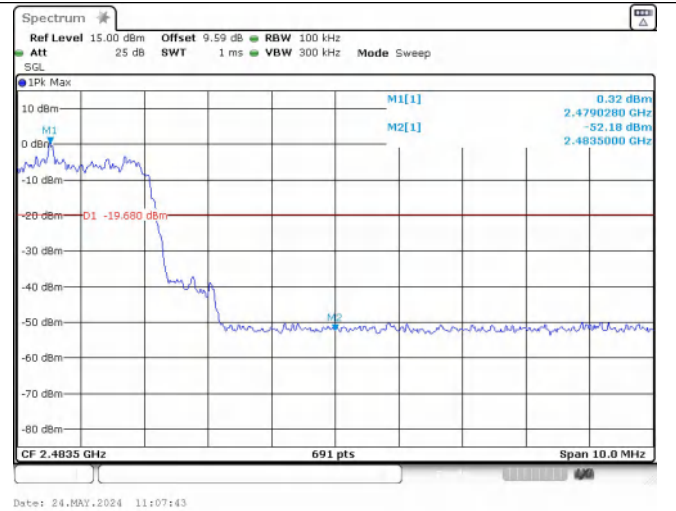
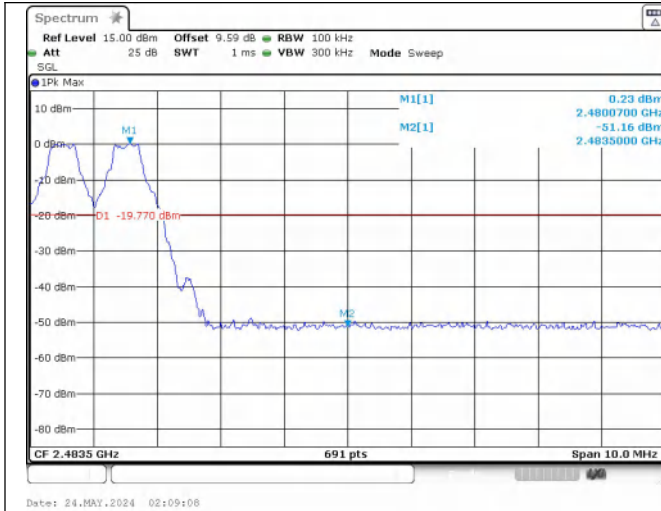
Spurious Emission 8DPSK_3-DH5_Channel 0



Out Of Band Emission 8DPSK_3-DH5_Channel 39

Spurious Emissions 8DPSK_3-DH5_Channel 39



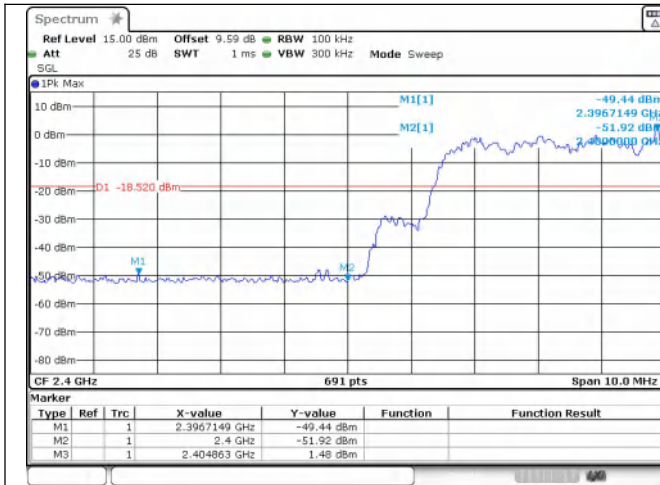


Out Of Band Emission(Right)

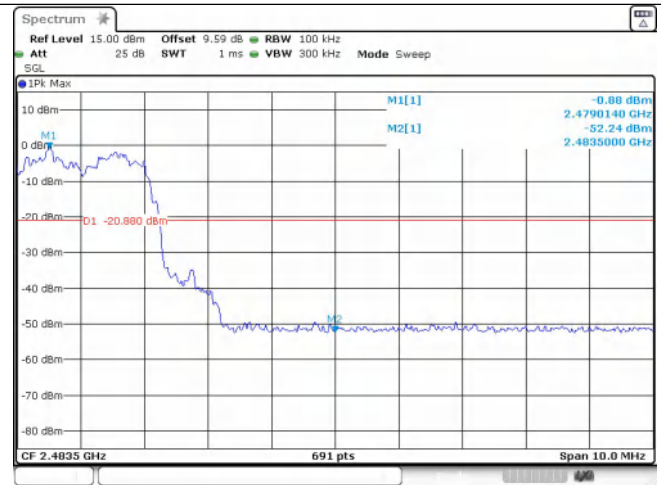
Out Of Band Emission(Right)

GFSK_DH5_Channel Hopping

$\pi/4$ DQPSK_2-DH5_Channel Hopping



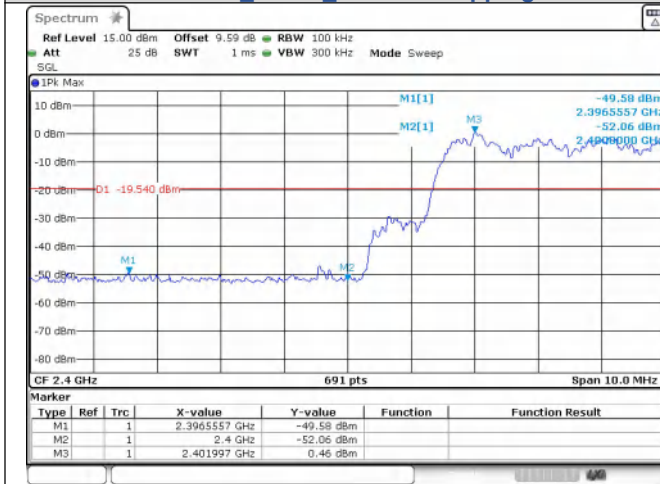
Date: 24.MAY.2024 11:15:33



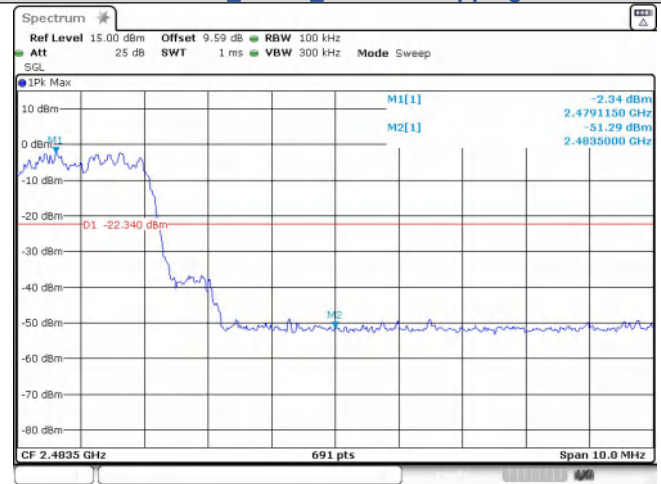
Date: 24.MAY.2024 11:16:17

Out Of Band Emission(Left) 8DPSK_3-DH5_Channel Hopping

Out Of Band Emission(Right) 8DPSK_3-DH5_Channel Hopping



Date: 24.MAY.2024 11:17:46



Date: 24.MAY.2024 11:18:16

Out Of Band Emission(Left) 8DPSK_3-DH5_Channel Hopping

Out Of Band Emission(Right) 8DPSK_3-DH5_Channel Hopping

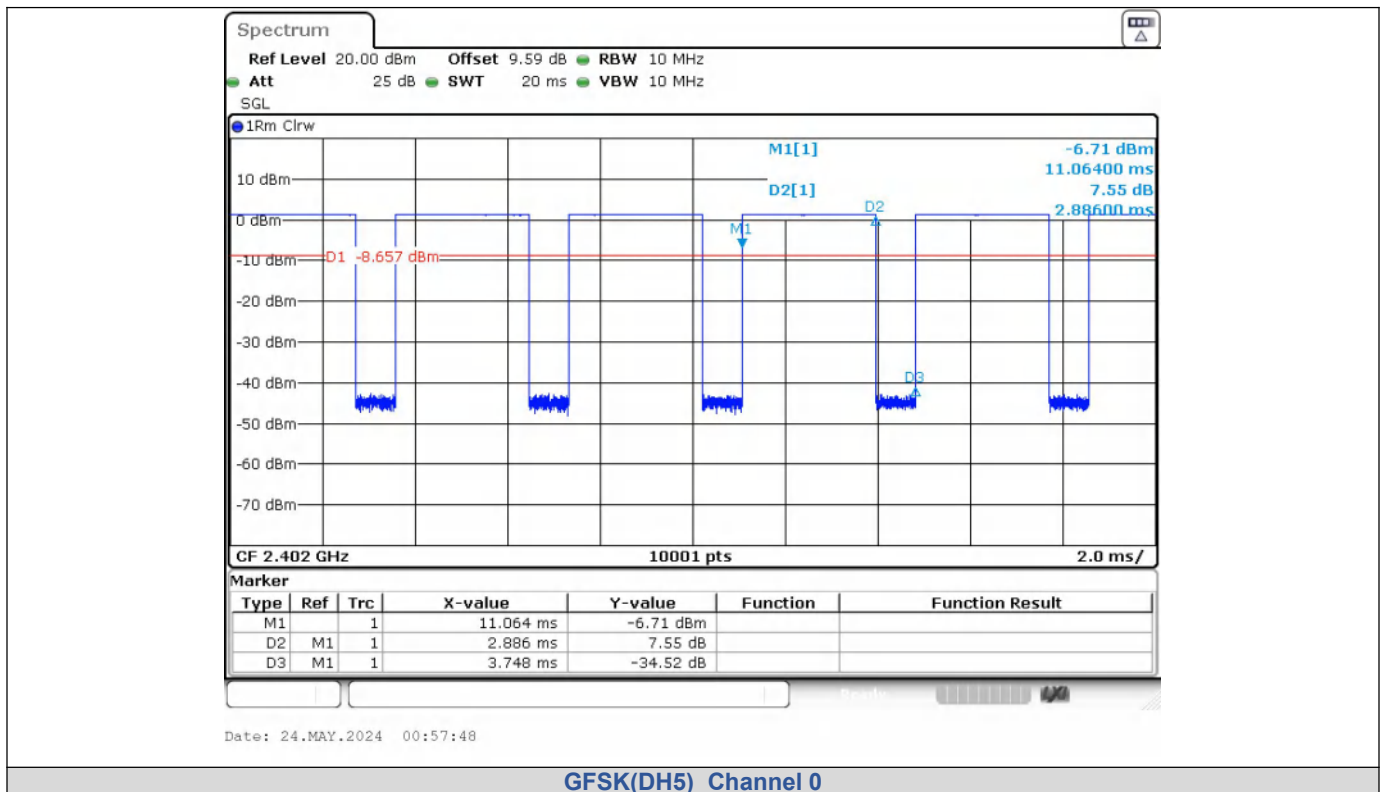
Duty Cycle

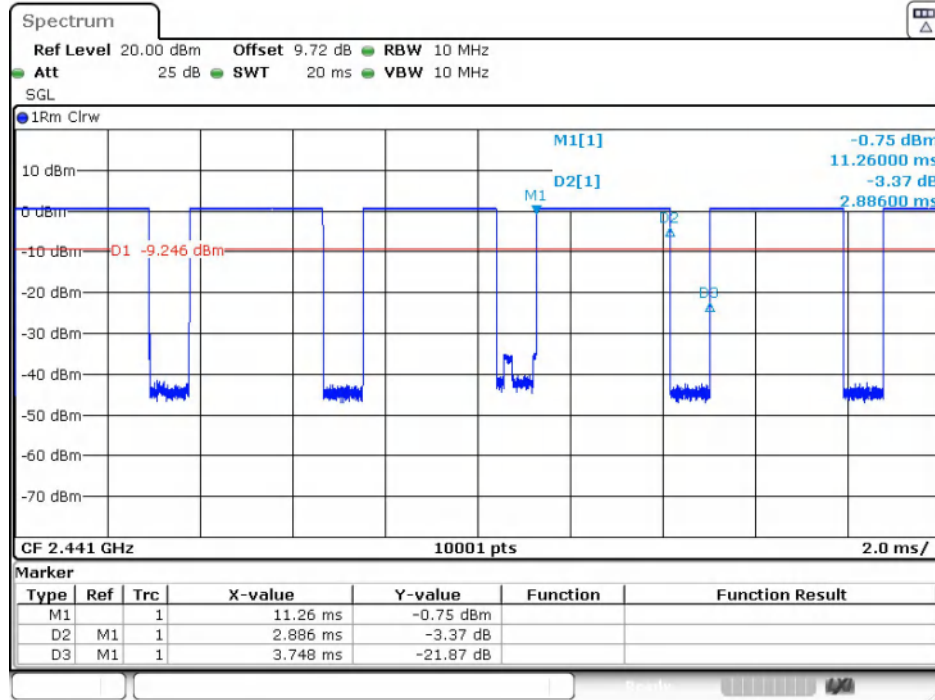
Left

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	2.890	3.748	77.11	0.7711	1.1289	0.35
		39	2.892	3.748	77.16	0.7716	1.1261	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	2.894	3.748	77.21	0.7721	1.1233	0.35
		78	2.894	3.748	77.21	0.7721	1.1233	0.35

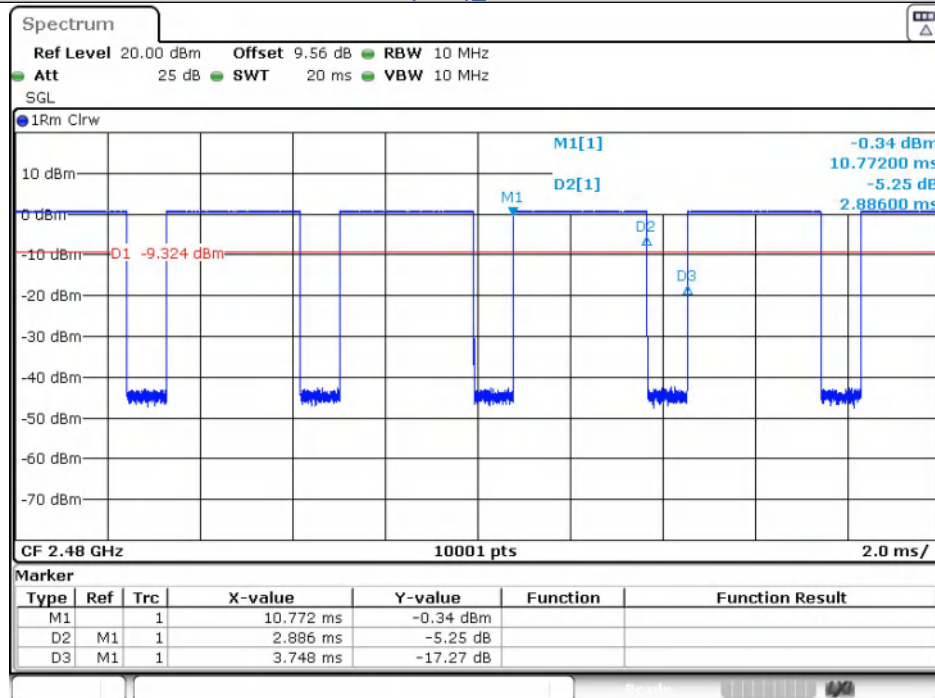
Test Graphs





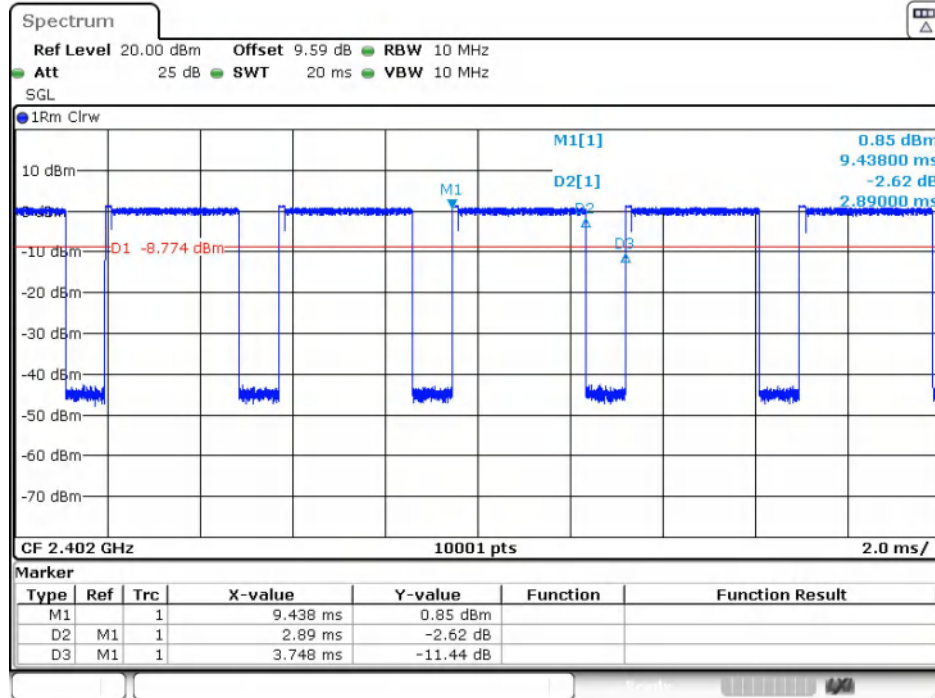
Date: 24.MAY.2024 01:09:18

GFSK(DH5)_Channel 39



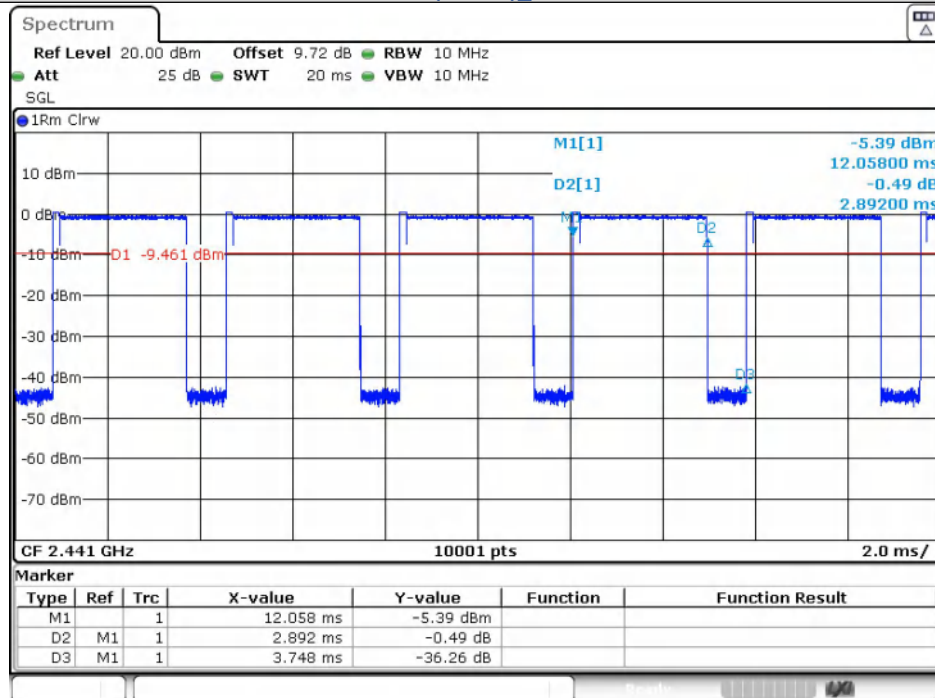
Date: 24.MAY.2024 01:11:39

GFSK(DH5)_Channel 78



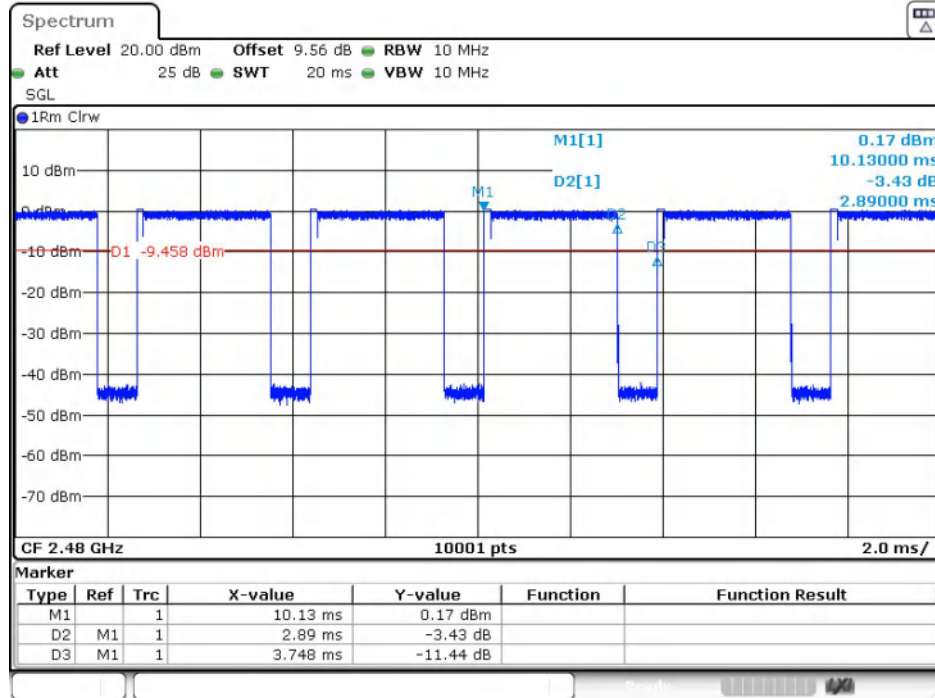
Date: 24.MAY.2024 01:17:39

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



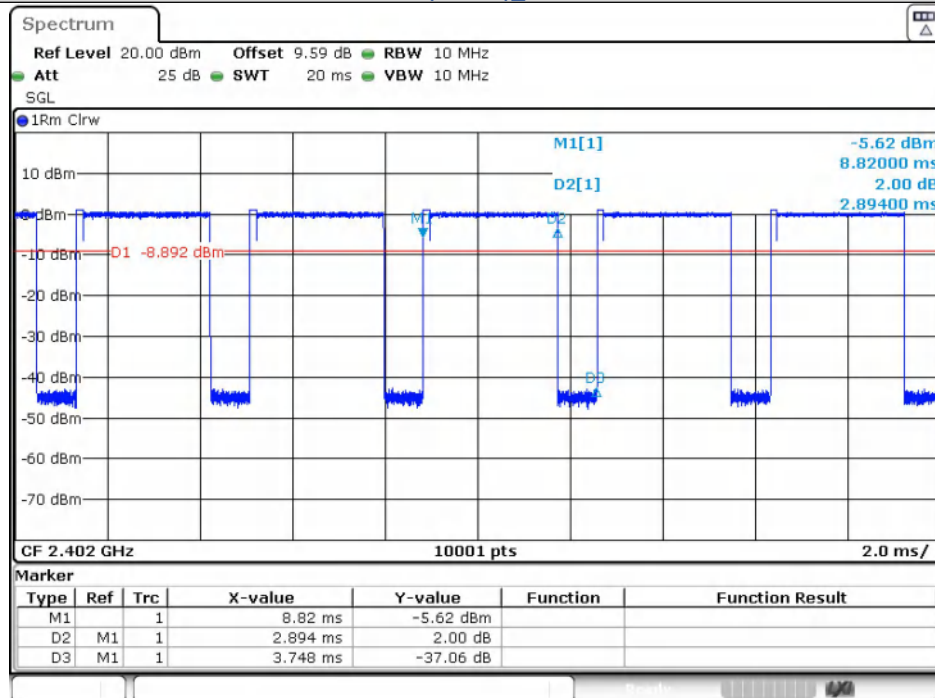
Date: 24.MAY.2024 01:28:40

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



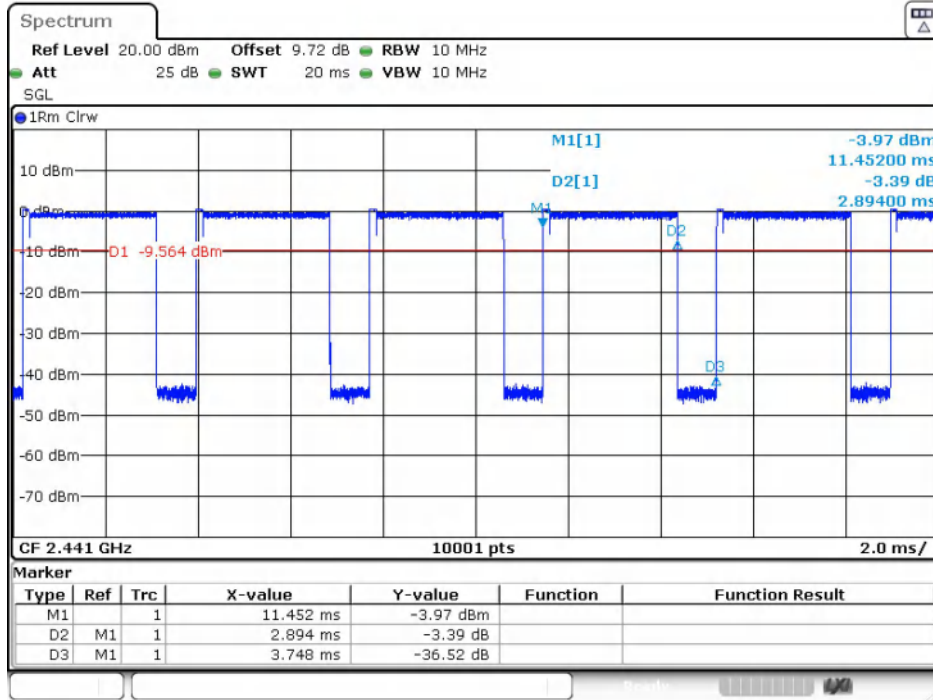
Date: 24.MAY.2024 01:30:35

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



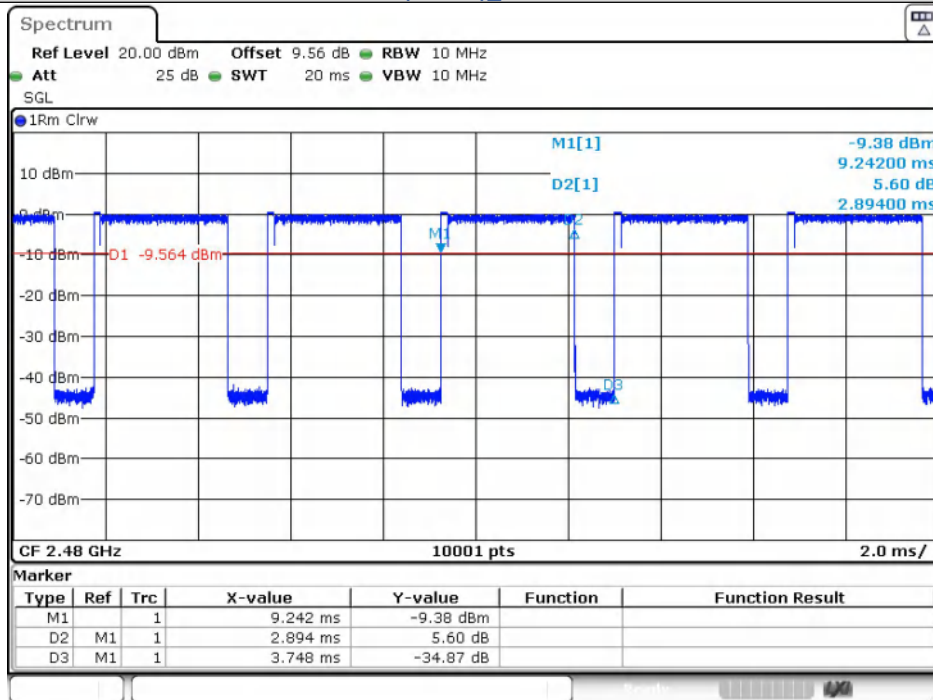
Date: 24.MAY.2024 01:37:03

8DPSK(3-DH5)_Channel 0



Date: 24.MAY.2024 01:47:09

8DPSK(3-DH5)_Channel 39



Date: 24.MAY.2024 01:49:39

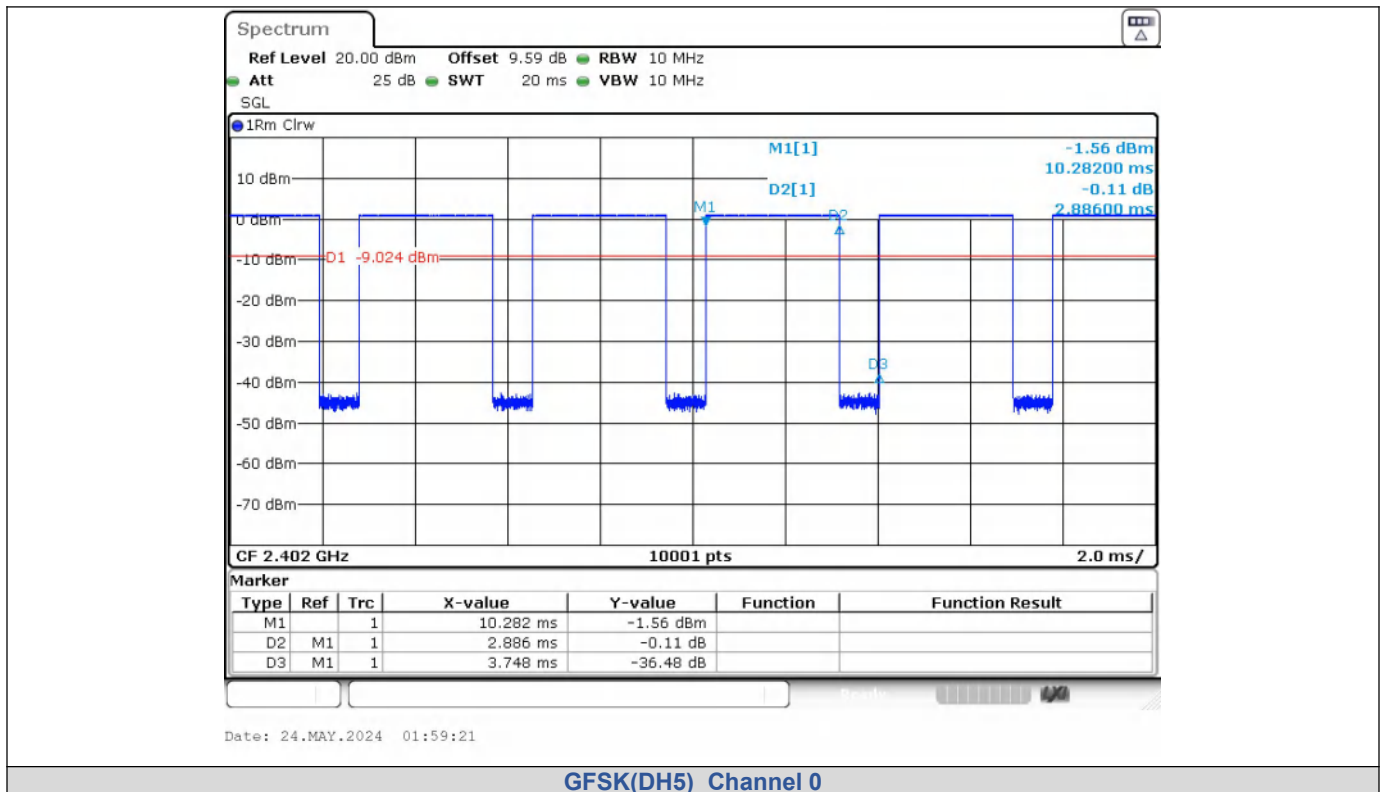
8DPSK(3-DH5)_Channel 78

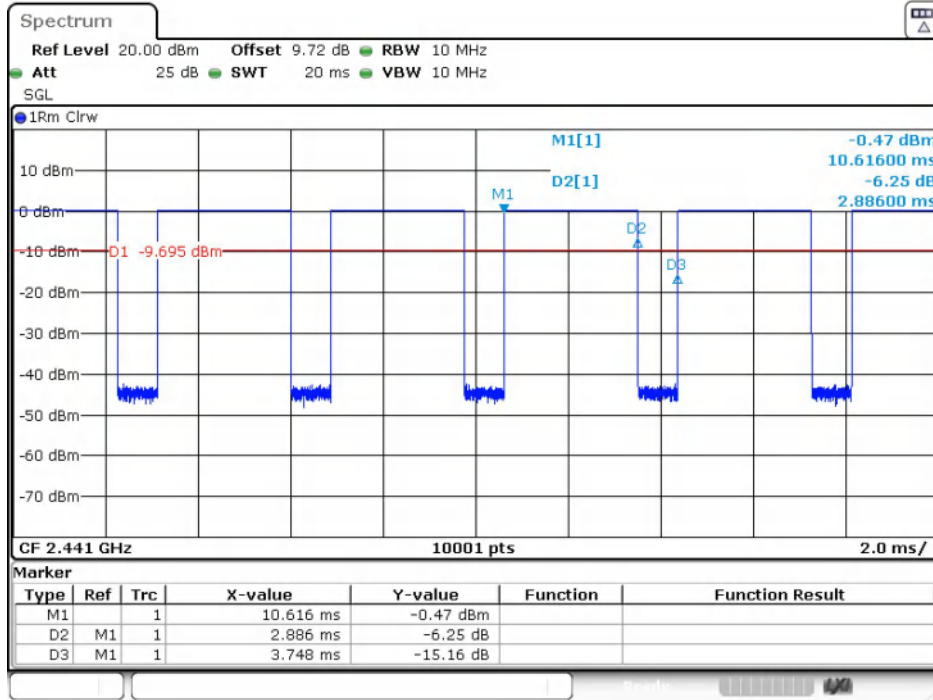
Right

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	2.884	3.748	76.95	0.7695	1.1379	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	2.894	3.748	77.21	0.7721	1.1233	0.35
		78	2.894	3.748	77.21	0.7721	1.1233	0.35

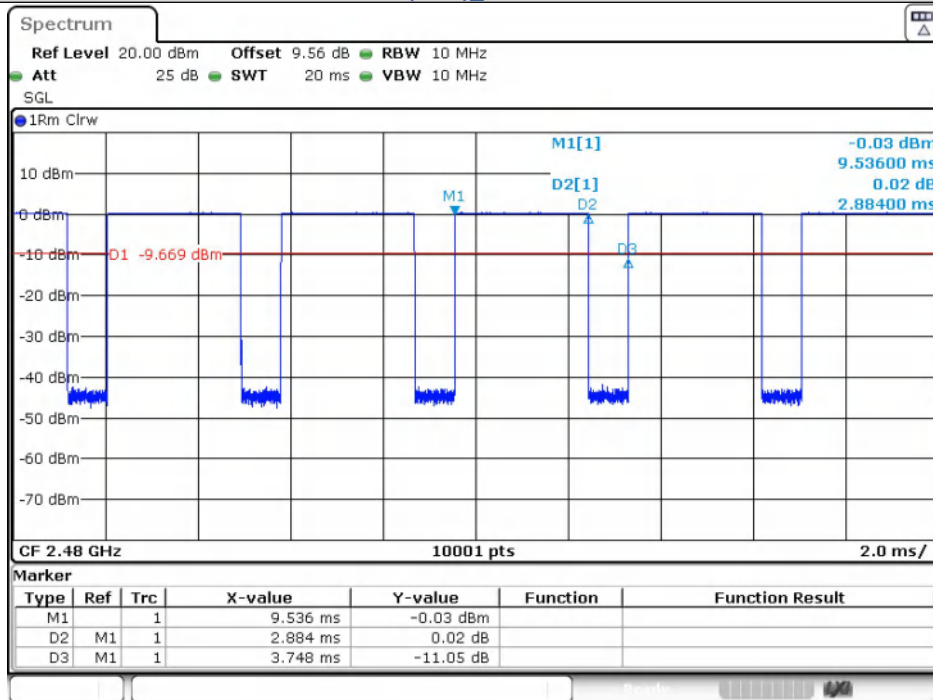
Test Graphs





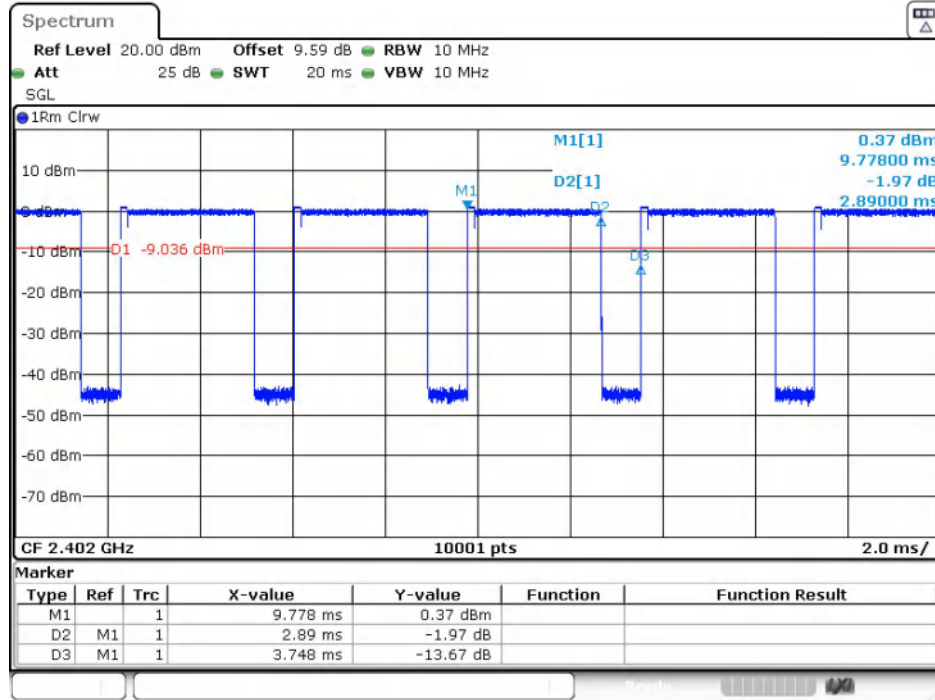
Date: 24.MAY.2024 02:11:27

GFSK(DH5)_Channel 39



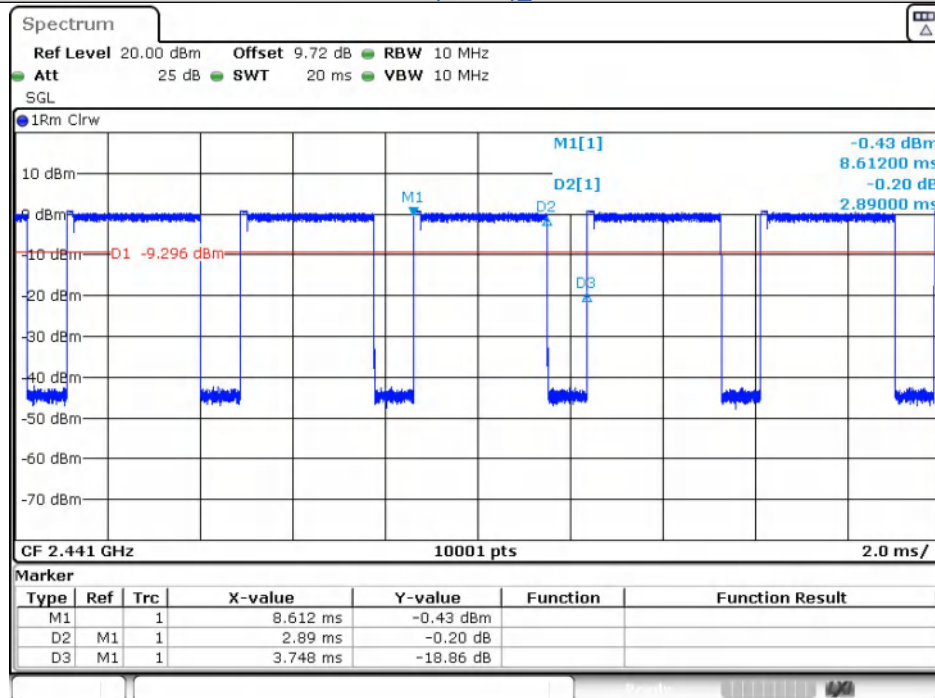
Date: 24.MAY.2024 02:13:57

GFSK(DH5)_Channel 78



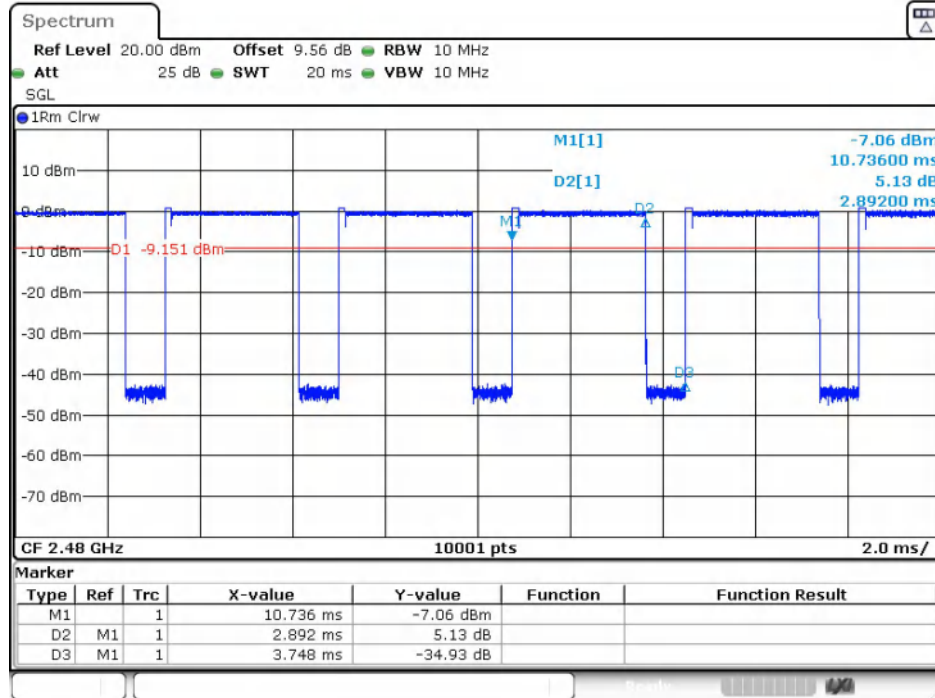
Date: 24.MAY.2024 02:20:06

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



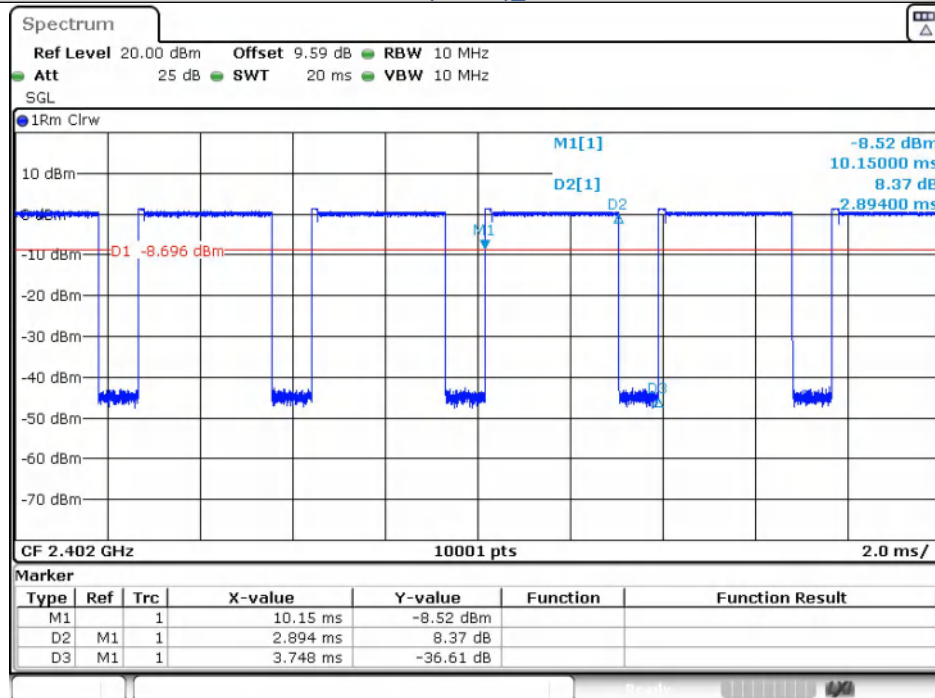
Date: 24.MAY.2024 10:38:44

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



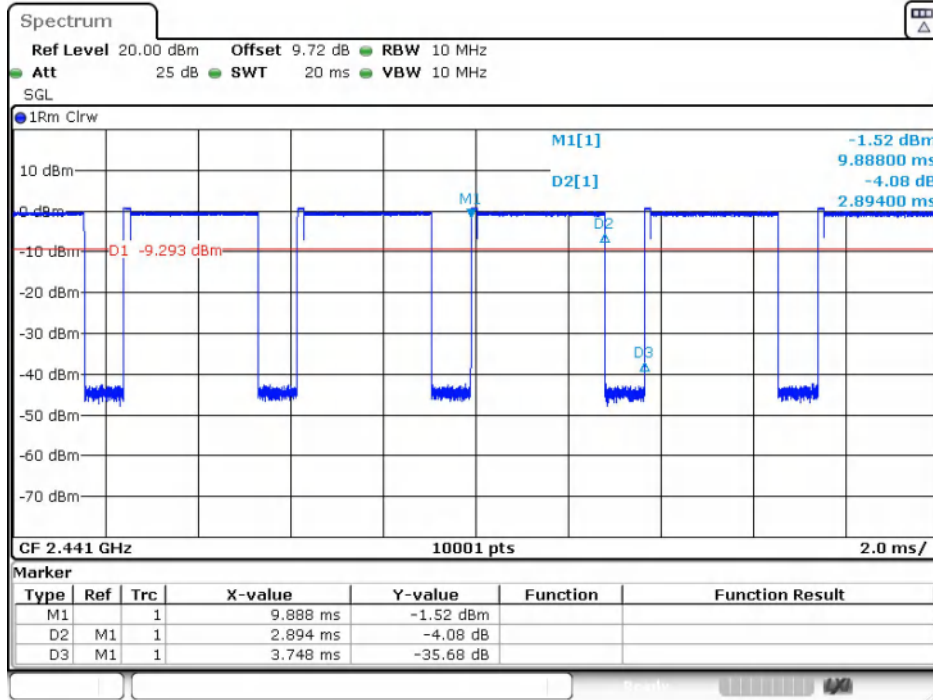
Date: 24.MAY.2024 10:40:48

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



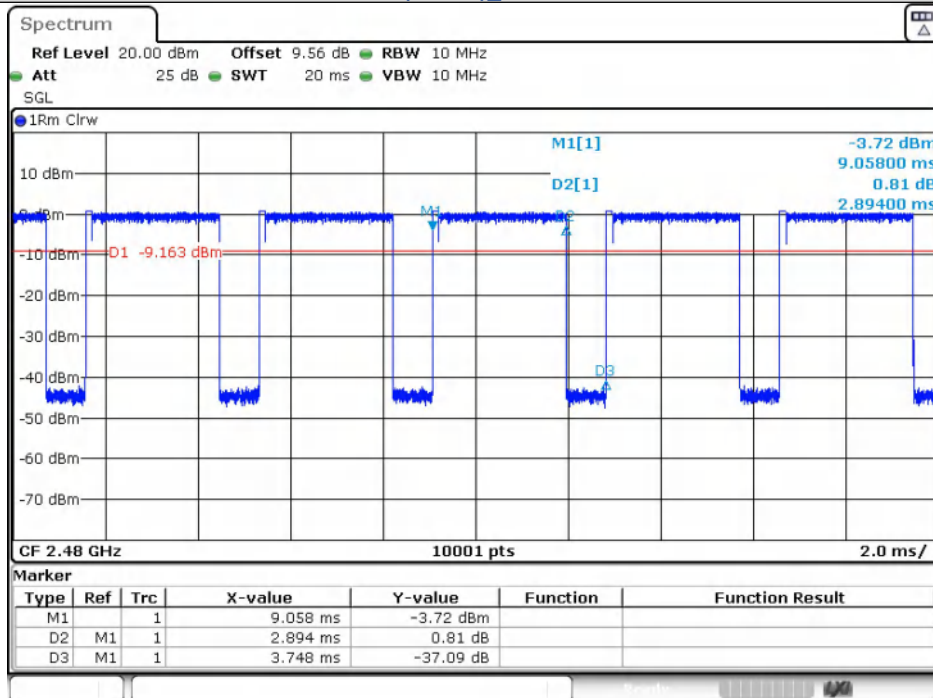
Date: 24.MAY.2024 10:43:03

8DPSK(3-DH5)_Channel 0



Date: 24.MAY.2024 10:45:10

8DPSK(3-DH5)_Channel 39



Date: 24.MAY.2024 10:47:04

8DPSK(3-DH5)_Channel 78

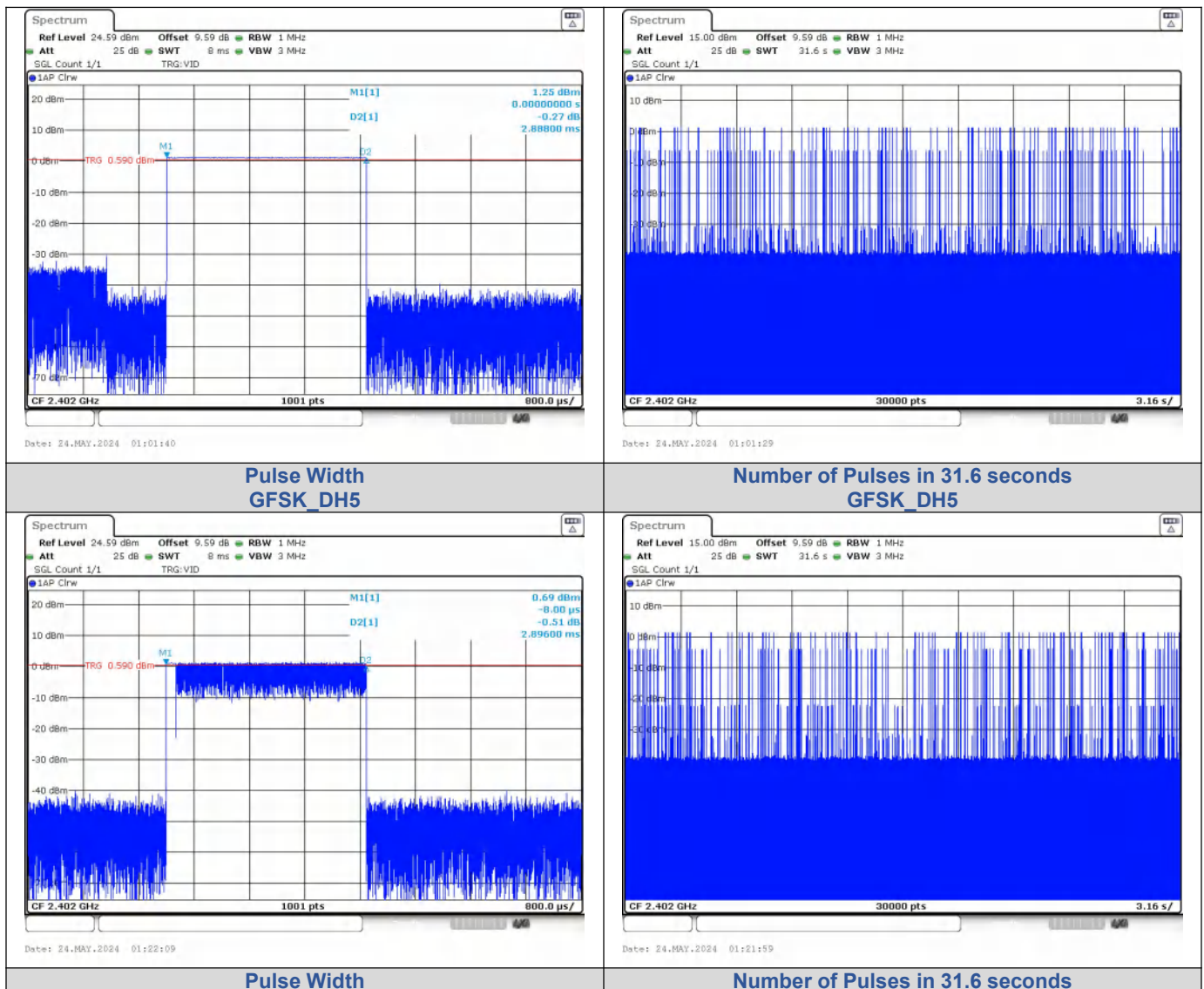
Dwell Time

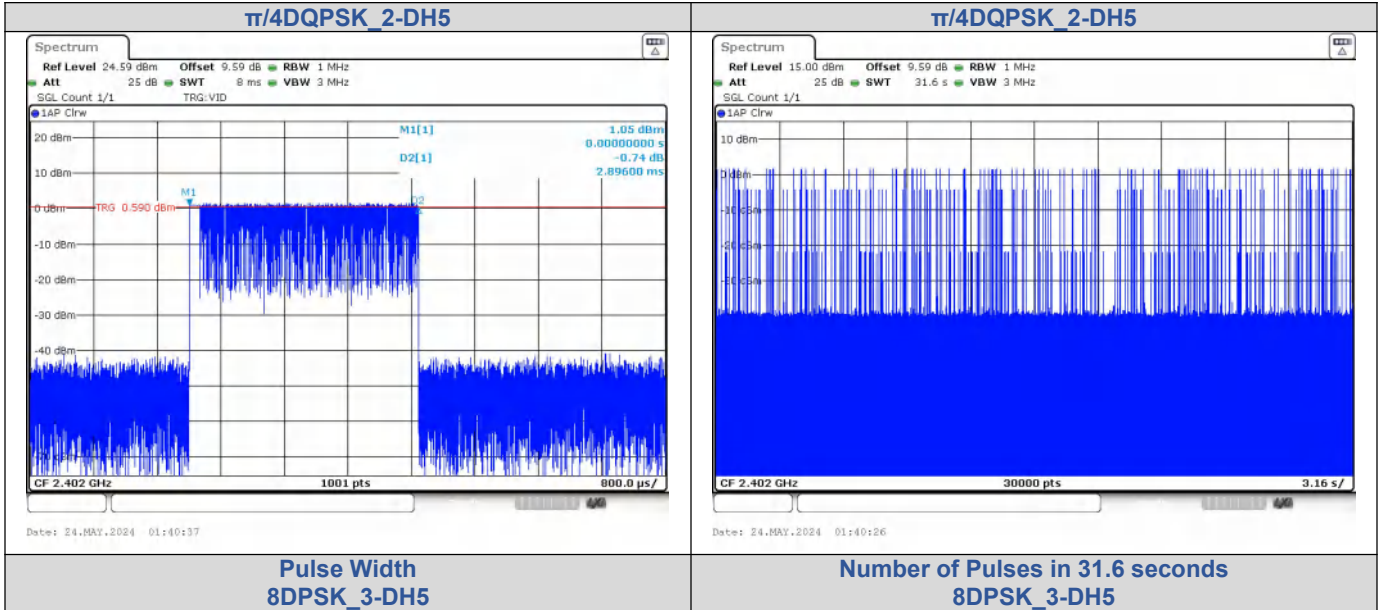
Left

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	99	285.91	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.896	108	312.77		PASS
8DPSK	3-DH5		2.896	109	315.66		PASS

Test Graphs



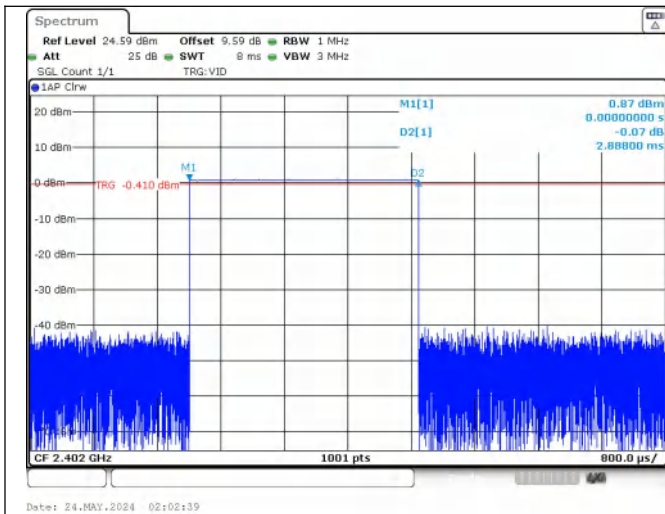


Right

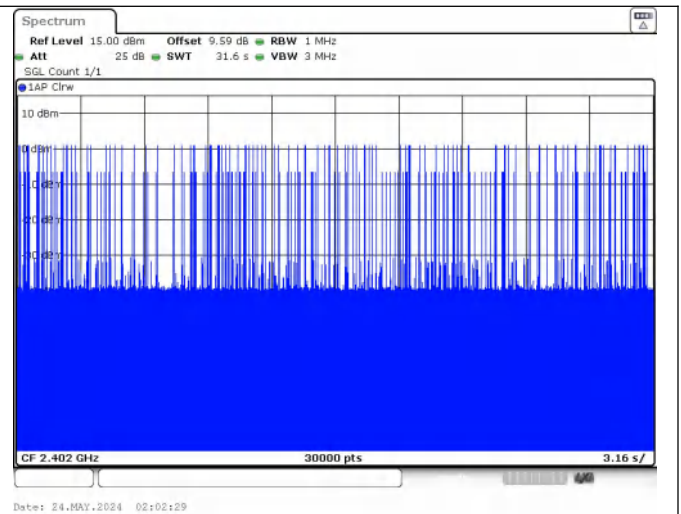
Test Result

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	109	314.79	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.896	117	338.83		PASS
8DPSK	3-DH5		2.896	114	330.14		PASS

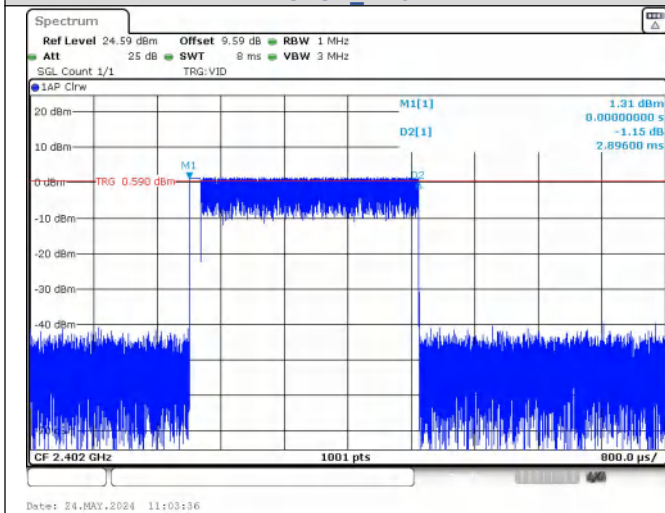
Test Graphs



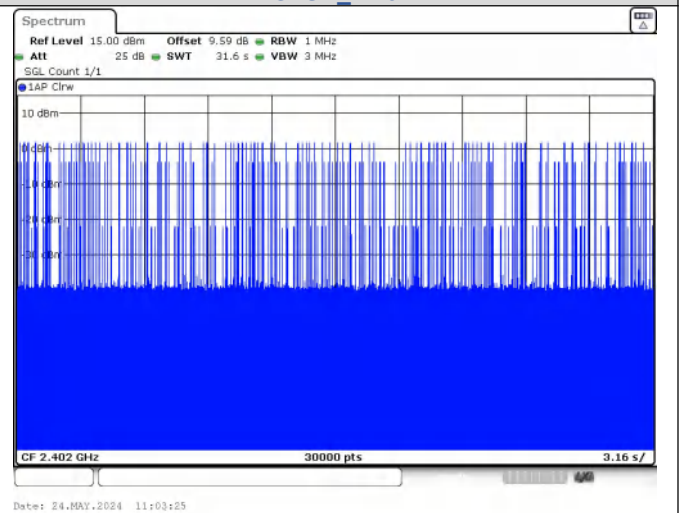
Pulse Width
GFSK_DH5



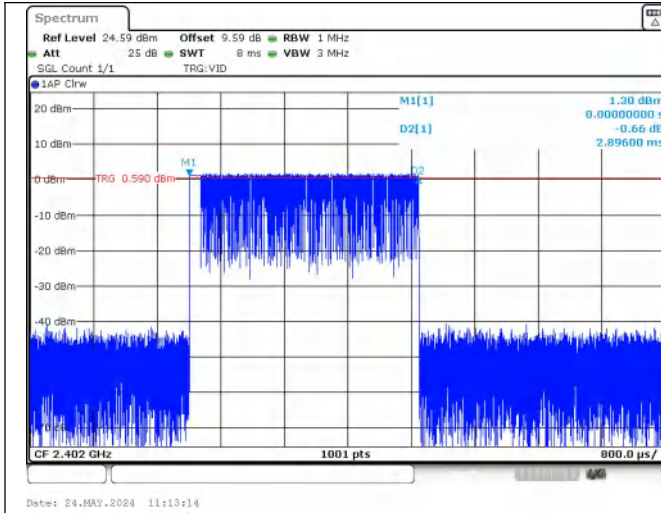
Number of Pulses in 31.6 seconds
GFSK_DH5



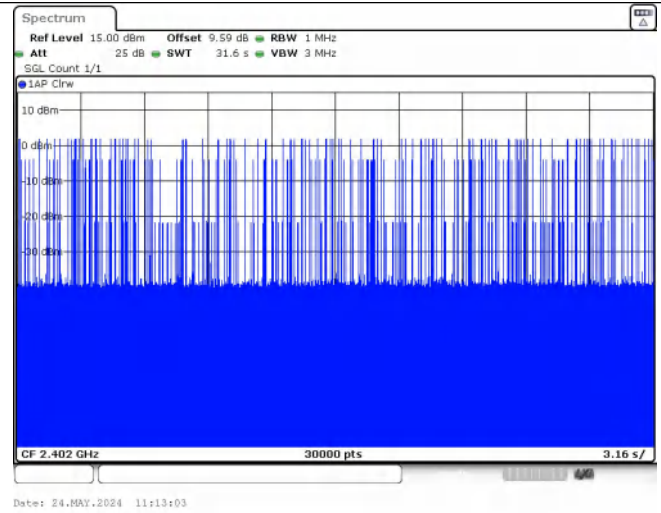
Pulse Width
 $\pi/4$ DQPSK_2-DH5



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

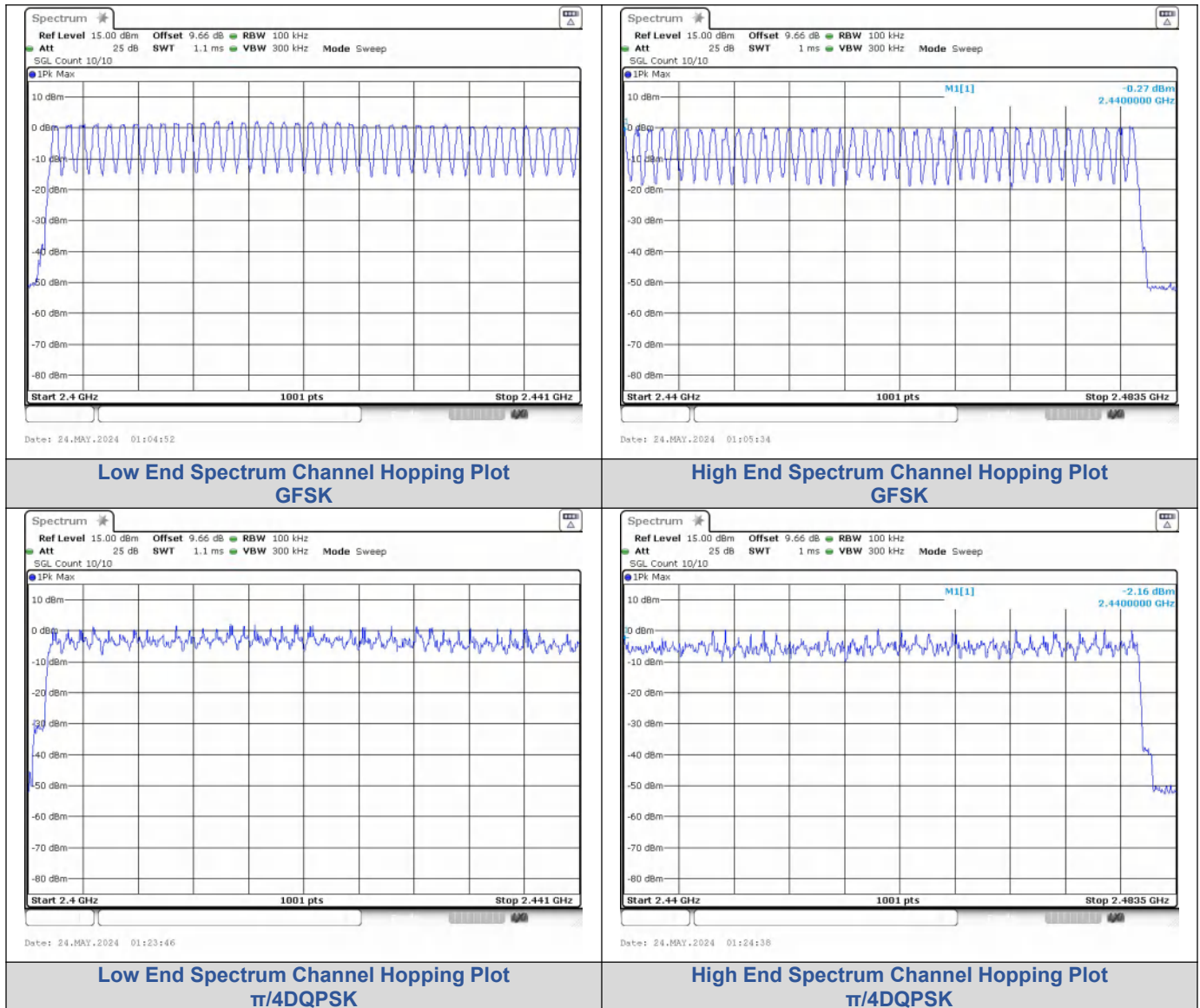
Number Of Hopping Channel

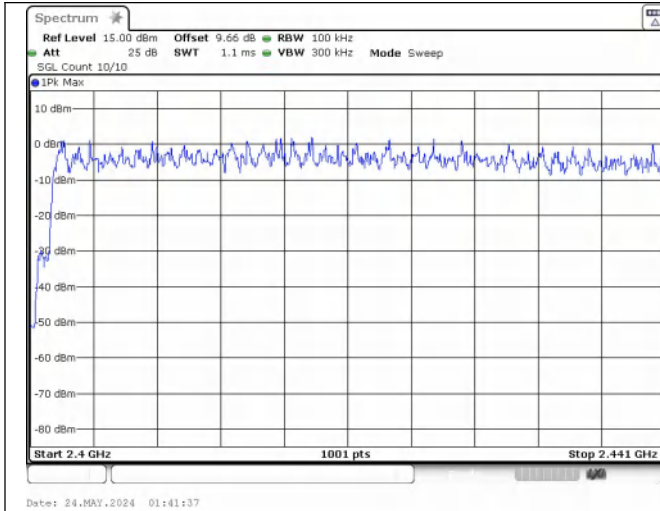
Left

Test Result

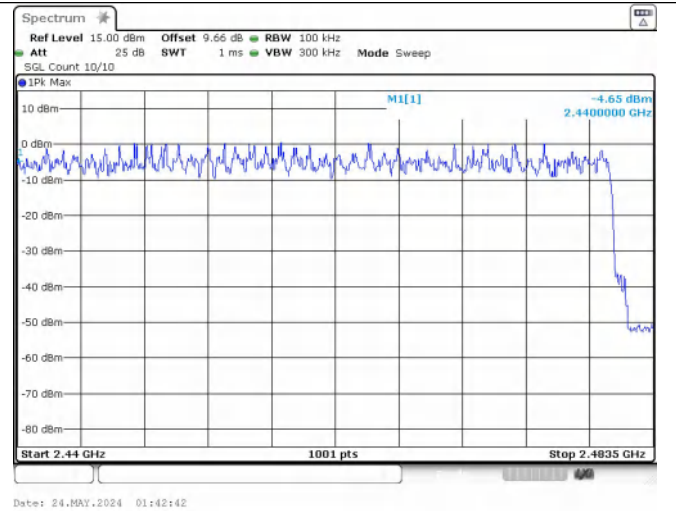
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
$\pi/4$ DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

Test Graphs





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

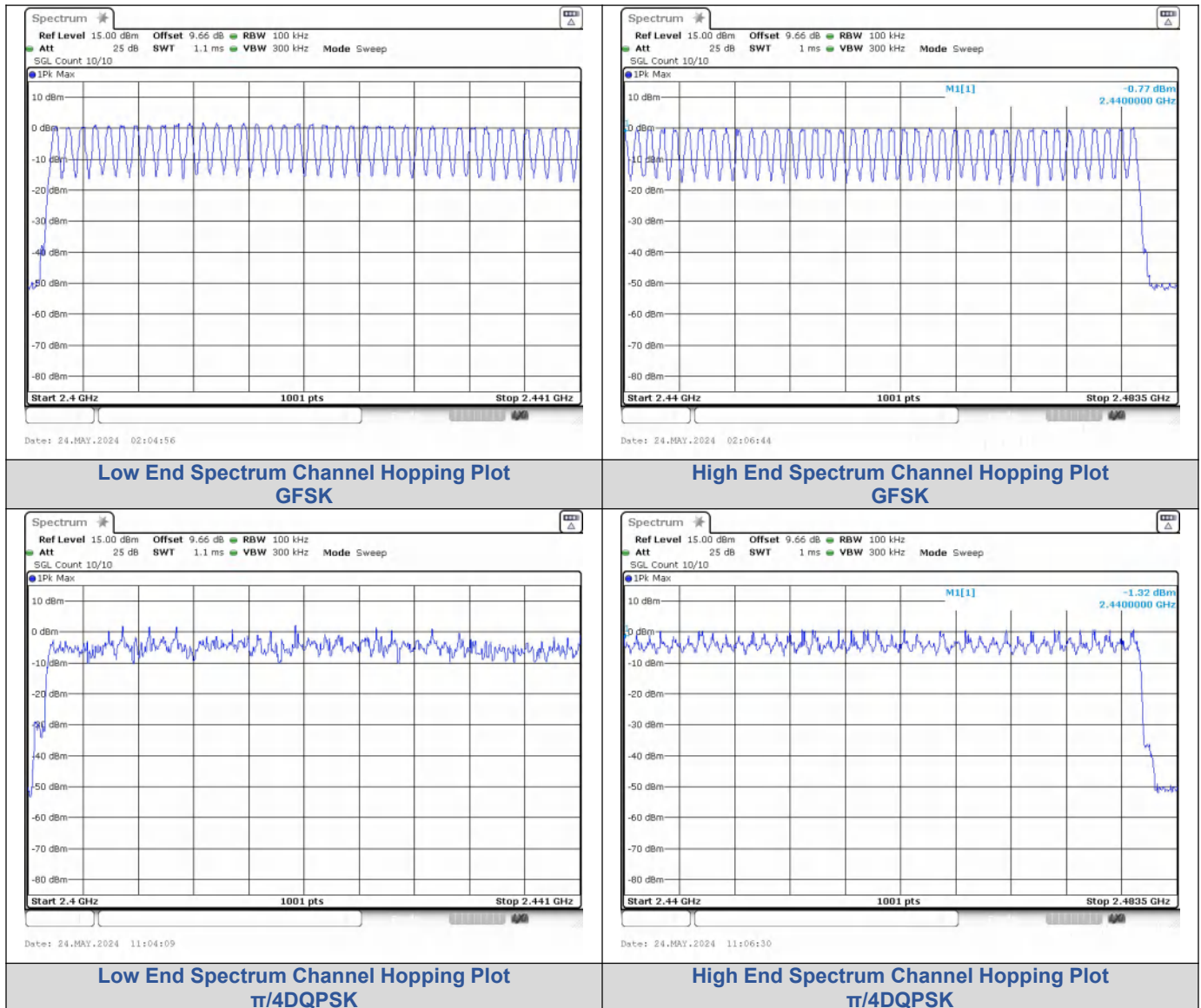


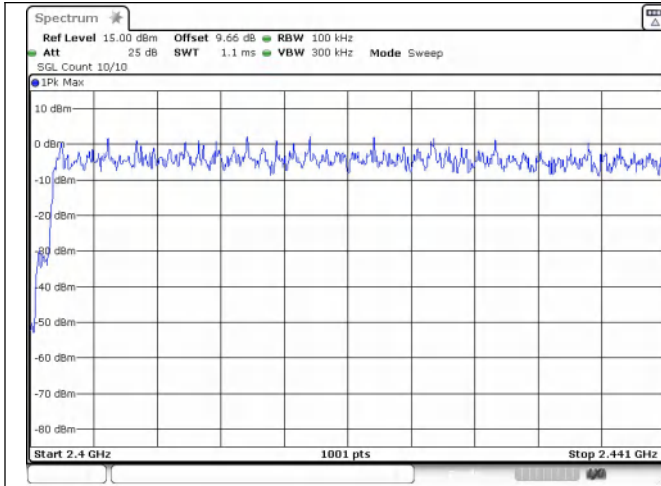
**High End Spectrum Channel Hopping Plot
8DPSK**

Right Test Result

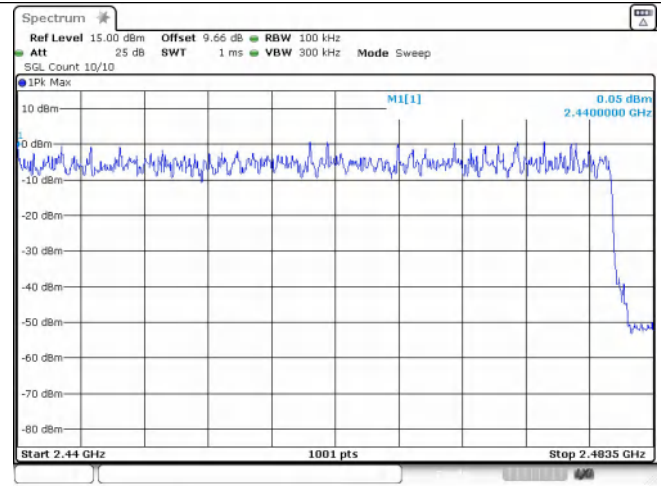
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
$\pi/4$ DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

Test Graphs





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



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