

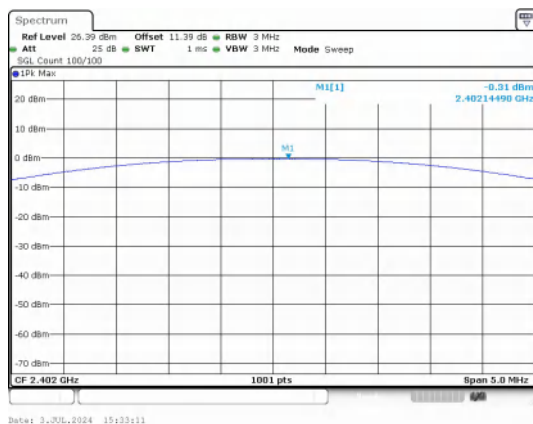
Appendix A

Report No.:	CISRR24070101101
FCC ID:	2BHID-M60
Product Name:	M60 Spaceship Bluetooth Sound System
Model No.:	M60
Test Engineer:	Lucas Huang
Supervised by:	Rory Huang

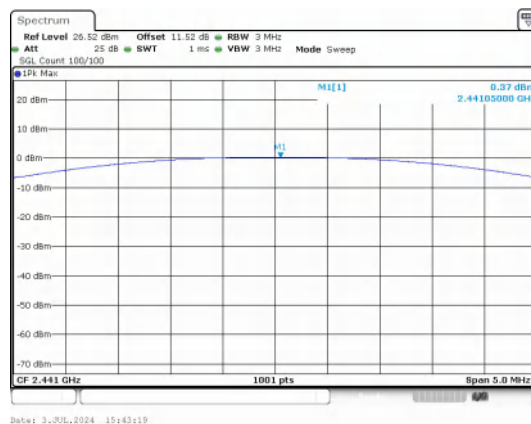
1) Conducted Peak Output Power

Test Result

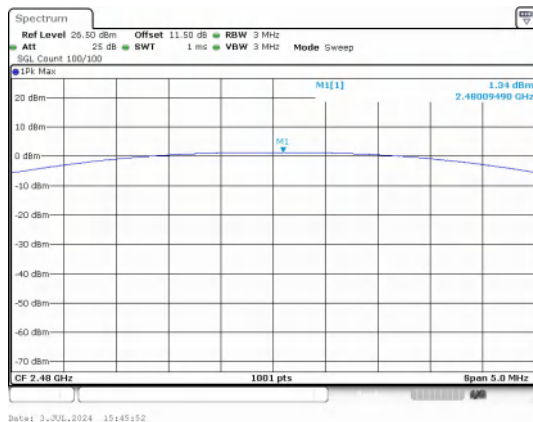
Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	-0.31	0.93	30	PASS
		39	0.37	1.09		PASS
		78	1.34	1.36		PASS
$\pi/4$ DQPSK	2-DH5	0	0.58	1.14	20.97	PASS
		39	1.22	1.32		PASS
		78	2.11	1.63		PASS
8DPSK	3-DH5	0	0.93	1.24		PASS
		39	1.58	1.44		PASS
		78	2.56	1.80		PASS



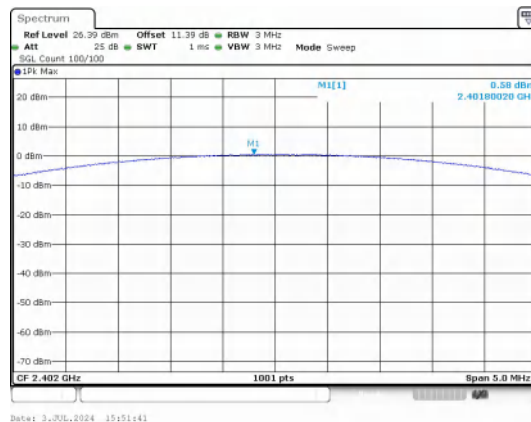
Peak Output Power
GFSK_Channel 0



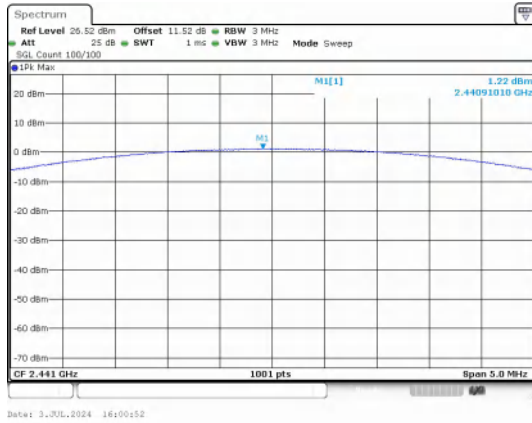
Peak Output Power
GFSK_Channel 39



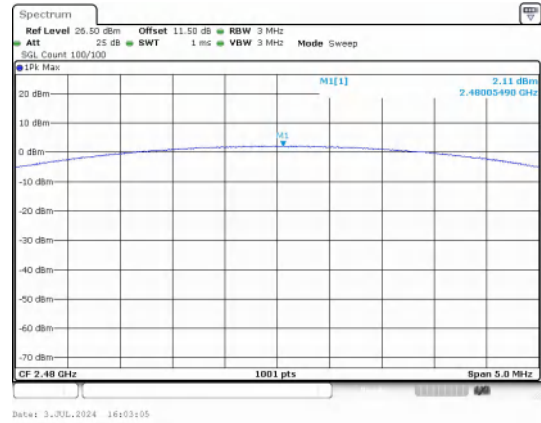
Peak Output Power
GFSK_Channel 78



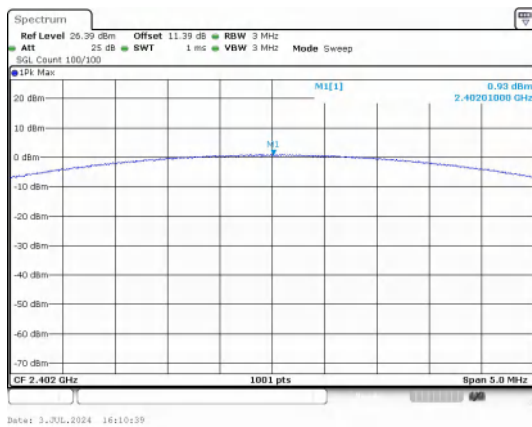
Peak Output Power
 $\pi/4$ DQPSK_Channel 0



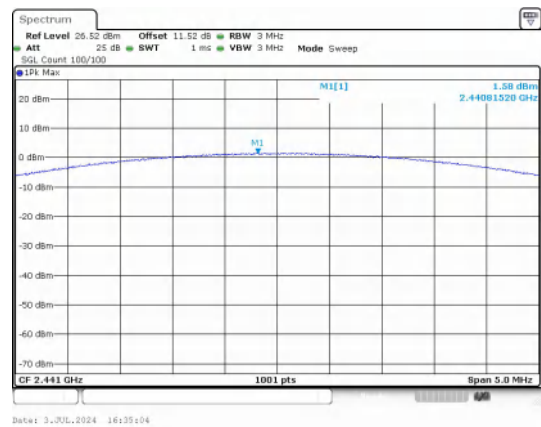
Peak Output Power
 $\pi/4$ DQPSK_Channel 39



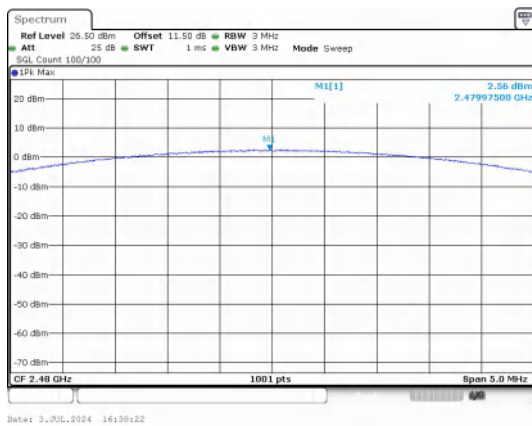
Peak Output Power
 $\pi/4$ DQPSK_Channel 78



Peak Output Power
8DPSK_Channel 0



Peak Output Power
8DPSK_Channel 39



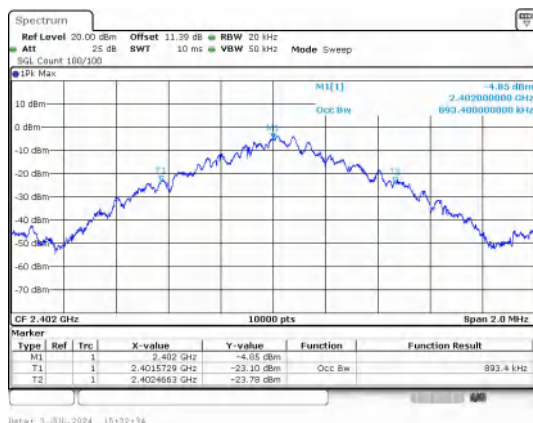
Peak Output Power
8DPSK_Channel 78

2) 99% Bandwidth

Test Result

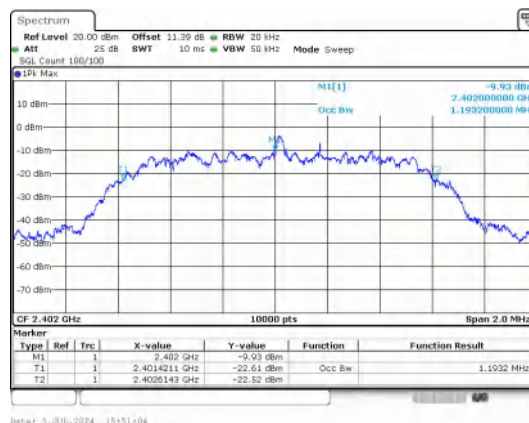
Modulation	Channel	Center Frequency (MHz)	99% BW (MHz)
GFSK	0	2402	0.8934
	39	2441	0.9016
	78	2480	0.9062
$\pi/4$ DQPSK	0	2402	1.1932
	39	2441	1.2120
	78	2480	1.1990
8DPSK	0	2402	1.2108
	39	2441	1.2092
	78	2480	1.2126

Test Graphs

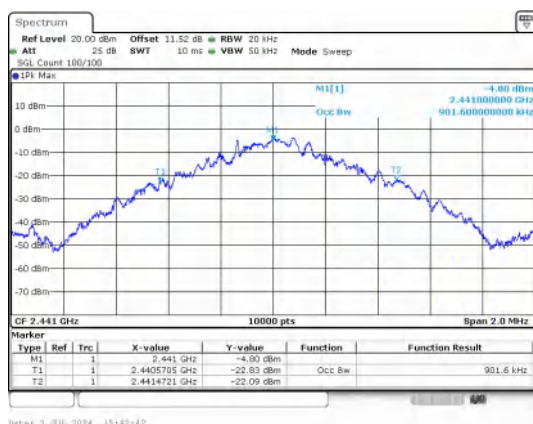


Date: 3-JUL-2024 15:22:34

GFSK_DH5_Channel 0

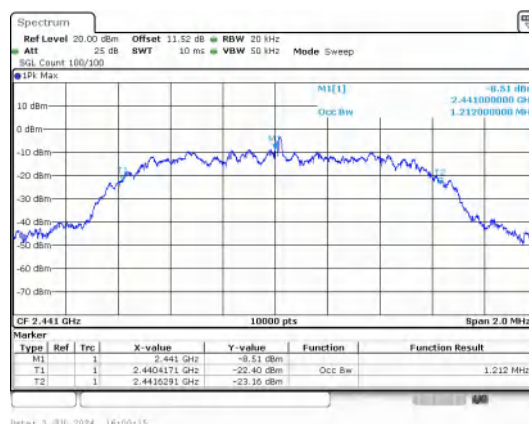


Date: 3-JUL-2024 15:51:04

 $\pi/4$ DQPSK_2-DH5_Channel 0


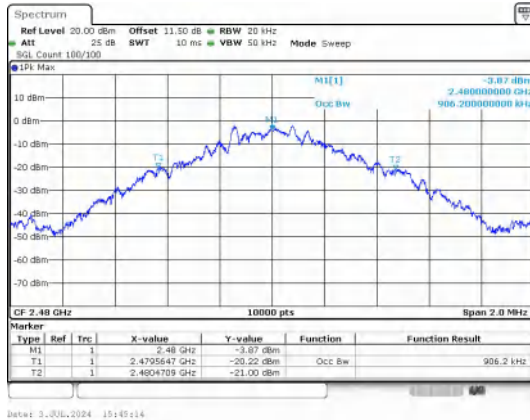
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GFSK_DH5_Channel 39

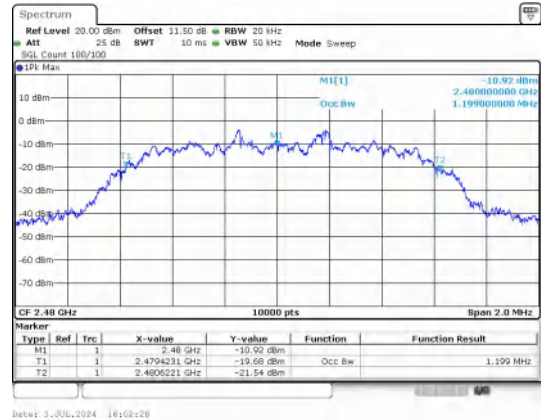


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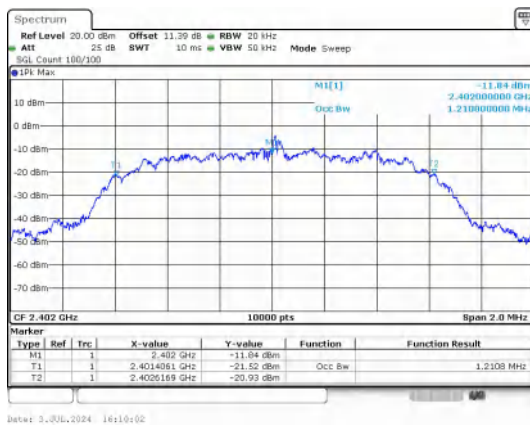
 $\pi/4$ DQPSK_2-DH5_Channel 39



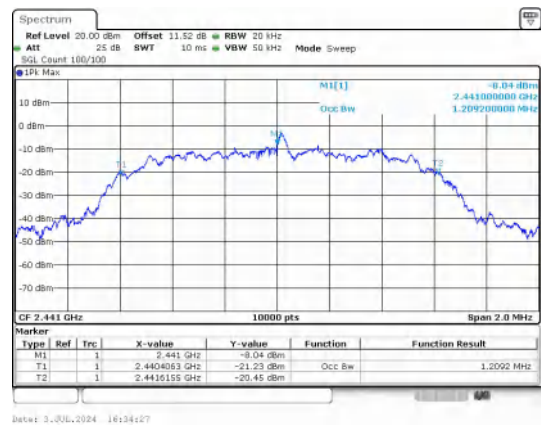
GFSK_DH5_Channel 78



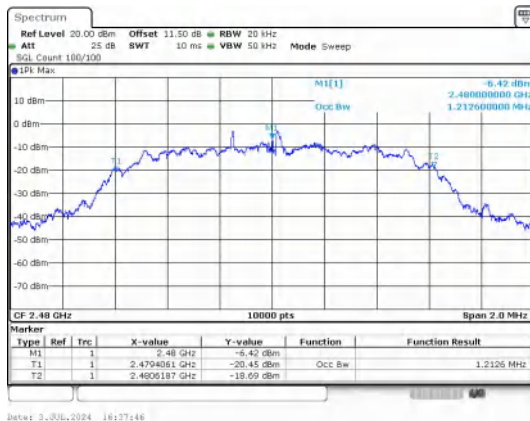
$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



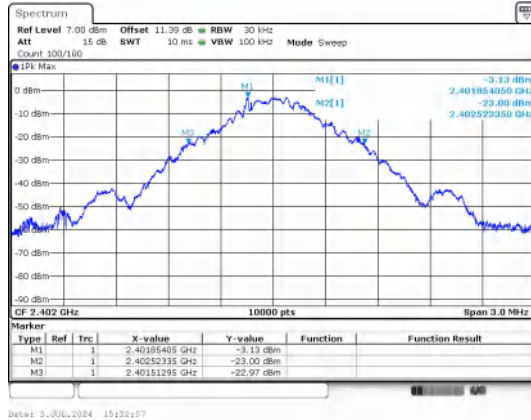
8DPSK_3-DH5_Channel 78

3) 20dB Bandwidth

Test Result

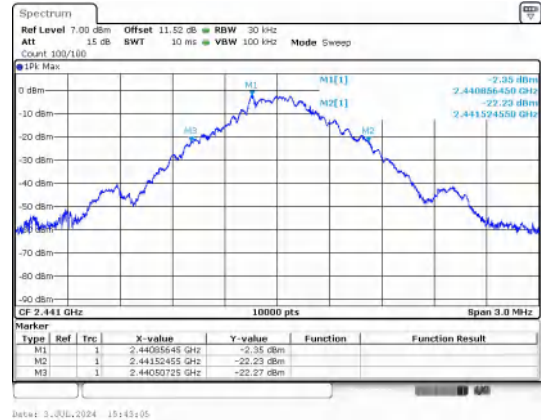
Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.010
	39	2441 MHz	1.010
	78	2480 MHz	1.020
$\pi/4$ DQPSK	0	2402 MHz	1.300
	39	2441 MHz	1.320
	78	2480 MHz	1.320
8DPSK	0	2402 MHz	1.290
	39	2441 MHz	1.300
	78	2480 MHz	1.290

Test Graphs



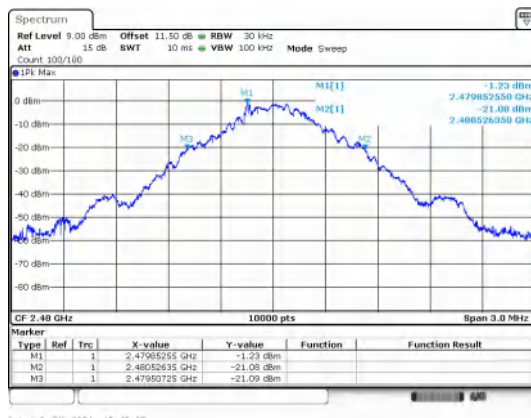
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GFSK_DH5_Channel 0



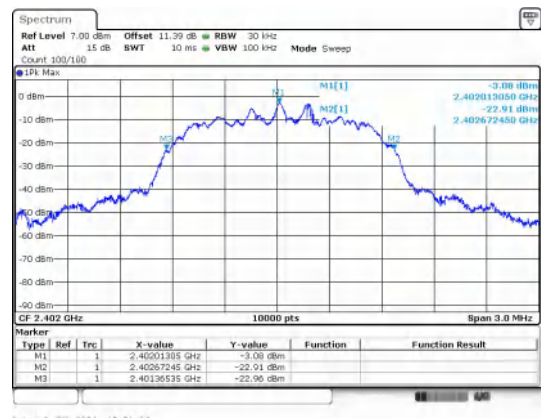
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GFSK_DH5_Channel 39



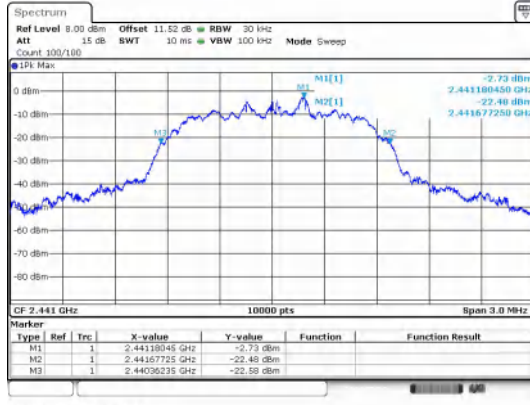
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GFSK_DH5_Channel 78

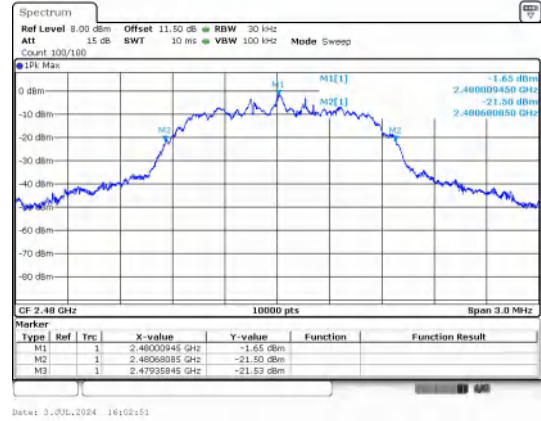


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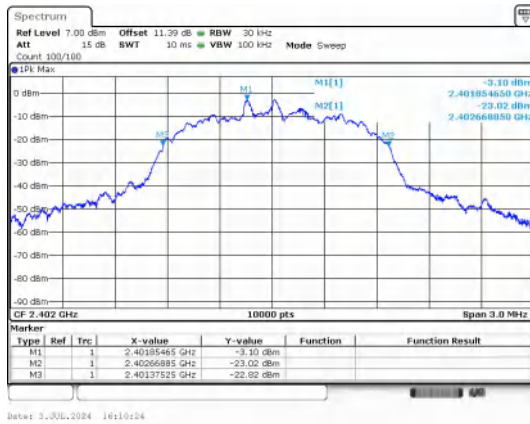
$\pi/4$ DQPSK_2-DH5_Channel 0



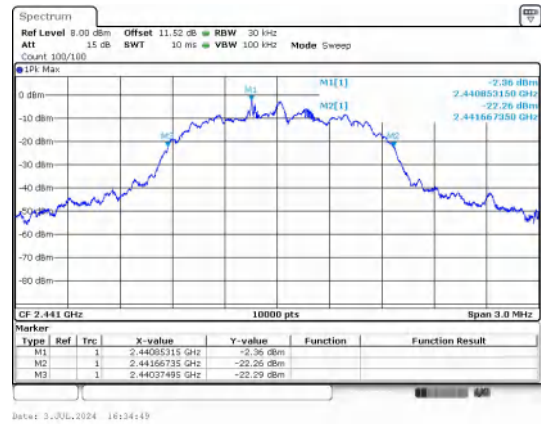
$\pi/4$ DQPSK_2-DH5_Channel 39



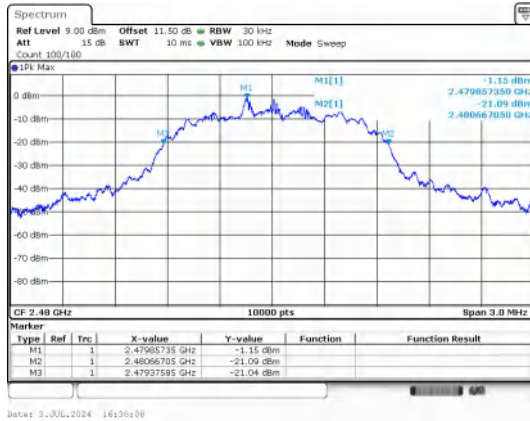
$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



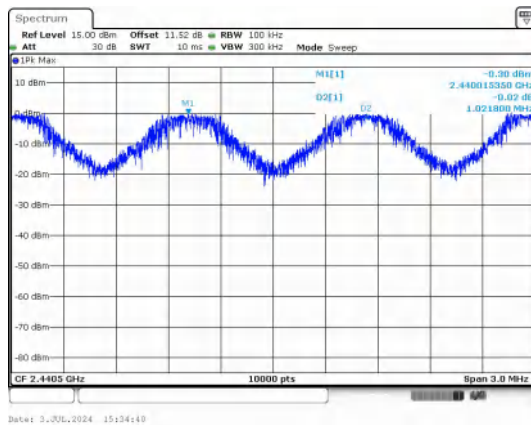
8DPSK_3-DH5_Channel 78

4) Carrier Frequencies Separation

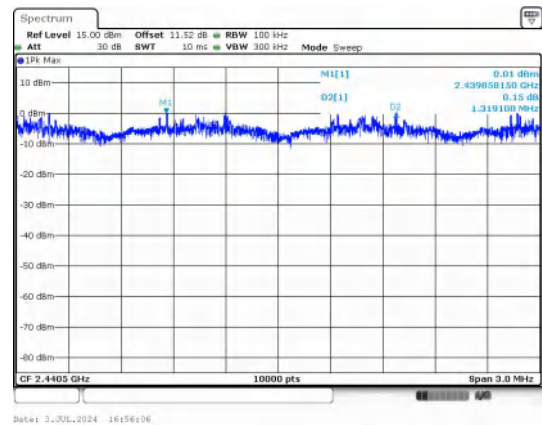
Test Result

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2440.0154	2441.0372	1.0218	1.020	PASS
$\pi/4$ DQPSK	2-DH5	2439.8582	2441.1773	1.3191	0.867	PASS
8DPSK	3-DH5	2439.8555	2441.1847	1.3293	0.860	PASS

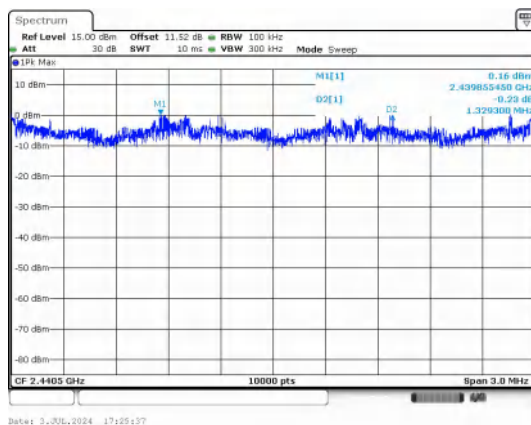
Test Graphs



GFSK



$\pi/4$ DQPSK



8DPSK

5) Conducted Out Of Band Emission

Test Result

Non-Hopping

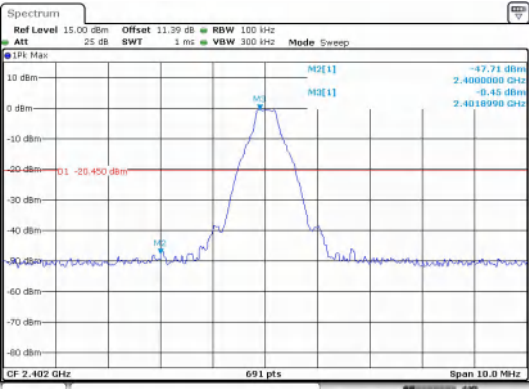
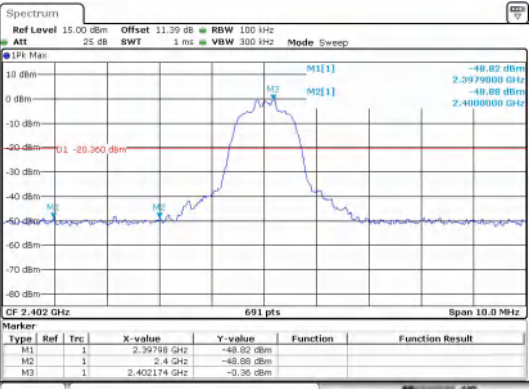
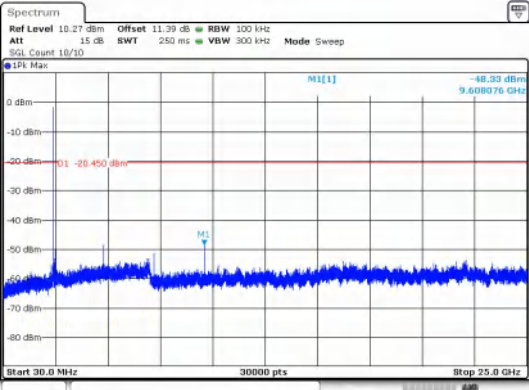
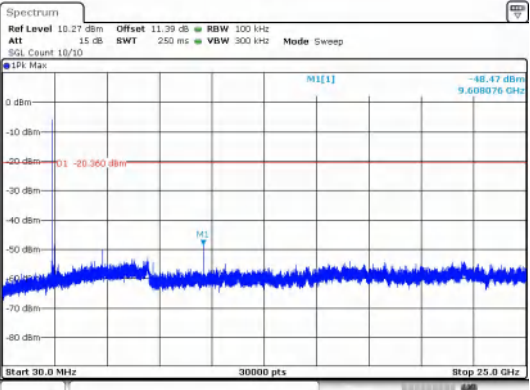
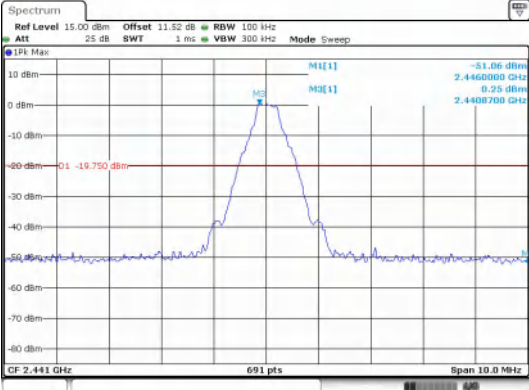
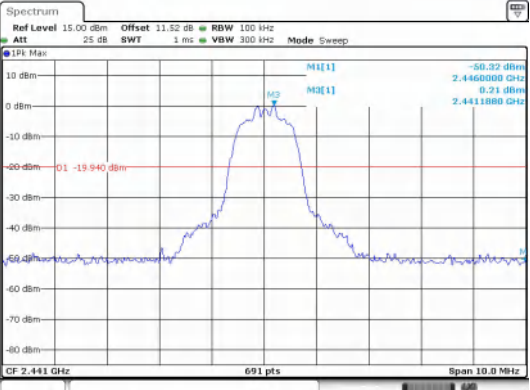
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-47.714	-20.45	-27.264	PASS
			9608.08	-48.334	-20.45	-27.884	PASS
		39	4882.09	-45.917	-19.75	-26.167	PASS
		78	2483.50	-50.108	-18.75	-31.358	PASS
			4960.33	-44.842	-18.75	-26.092	PASS
$\pi/4$ DQPSK	2-DH5	0	2397.98	-48.824	-20.36	-28.464	PASS
			2400.00	-48.883	-20.36	-28.523	PASS
			9608.10	-48.475	-20.36	-28.115	PASS
		39	9763.72	-47.563	-19.94	-27.623	PASS
		78	2483.50	-50.869	-18.91	-31.959	PASS
			4959.49	-48.572	-18.91	-29.662	PASS
8DPSK	3-DH5	0	2398.71	-48.471	-20.48	-27.991	PASS
			2400.00	-50.152	-20.48	-29.672	PASS
			9608.10	-47.765	-20.48	-27.285	PASS
		39	9763.72	-47.641	-19.77	-27.871	PASS
		78	2483.50	-50.935	-18.86	-32.075	PASS
			4959.49	-47.849	-18.86	-28.989	PASS

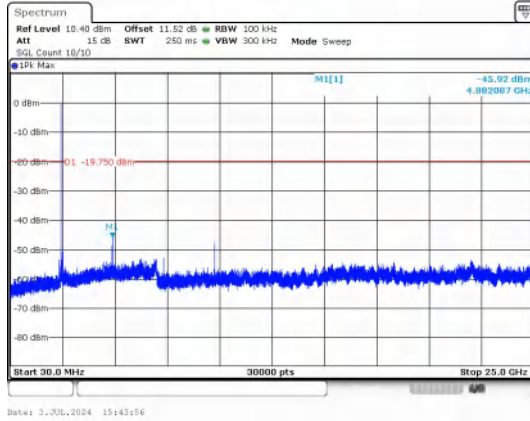
Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2395.01	-47.379	-20.48	-26.899	PASS
			2400.00	-48.654	-20.48	-28.174	PASS
			2483.50	-48.798	-18.74	-30.058	PASS
			2397.99	-47.705	-20.42	-27.285	PASS
			2400.00	-49.455	-20.42	-29.035	PASS
			2483.50	-48.884	-19.12	-29.764	PASS
$\pi/4$ DQPSK	2-DH5		2400.00	-48.000	-20.6	-27.400	PASS
			2483.50	-48.589	-18.78	-29.809	PASS
			2396.37	-47.259	-20.52	-26.739	PASS
			2400.00	-49.034	-20.52	-28.514	PASS
			2483.50	-48.038	-20.81	-27.228	PASS
8DPSK	3-DH5		2398.06	-47.414	-20.36	-27.054	PASS
			2400.00	-47.889	-20.36	-27.529	PASS
			2483.50	-48.343	-18.95	-29.393	PASS
			2397.35	-47.367	-20.44	-26.927	PASS

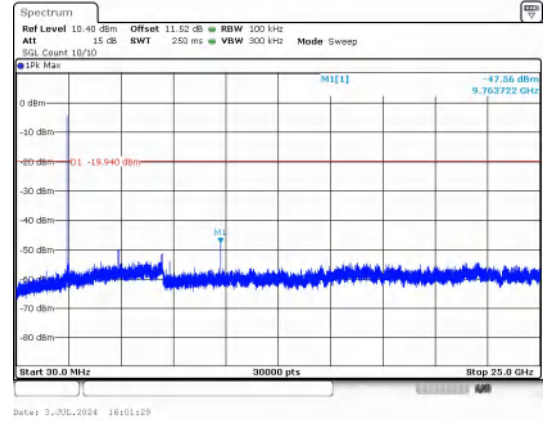
			2400.00	-48.685	-20.44	-28.245	PASS
			2483.50	-48.846	-19.01	-29.835	PASS

Test Graphs

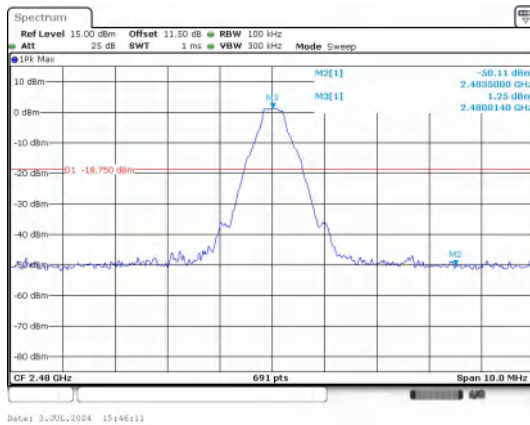
 Ref Level 15.00 dBm Offset 11.39 dB RBW 100 kHz Att 25 dB SWT 1 ms VBW 300 kHz Mode Sweep CF 2.402 GHz 691 pts Span 10.0 MHz Date: 3-JUL-2024 15:33:31	 Ref Level 15.00 dBm Offset 11.39 dB RBW 100 kHz Att 25 dB SWT 1 ms VBW 300 kHz Mode Sweep CF 2.402 GHz 691 pts Span 10.0 MHz Date: 3-JUL-2024 15:52:00
Out Of Band Emission GFSK_DH5_Channel 0	Out Of Band Emission $\pi/4$DQPSK_2-DH5_Channel 0
 Ref Level 10.27 dBm Offset 11.39 dB RBW 100 kHz Att 15 dB SWT 250 ms VBW 300 kHz Mode Sweep Start 30.0 MHz 30000 pts Stop 25.0 GHz Date: 3-JUL-2024 15:33:50	 Ref Level 10.27 dBm Offset 11.39 dB RBW 100 kHz Att 15 dB SWT 250 ms VBW 300 kHz Mode Sweep Start 30.0 MHz 30000 pts Stop 25.0 GHz Date: 3-JUL-2024 15:52:20
30.0 MHz - 25000.0 MHz GFSK_DH5_Channel 0	30.0 MHz - 25000.0 MHz $\pi/4$DQPSK_2-DH5_Channel 0
 Ref Level 15.00 dBm Offset 11.52 dB RBW 100 kHz Att 25 dB SWT 1 ms VBW 300 kHz Mode Sweep CF 2.441 GHz 691 pts Span 10.0 MHz Date: 3-JUL-2024 15:43:34	 Ref Level 15.00 dBm Offset 11.52 dB RBW 100 kHz Att 25 dB SWT 1 ms VBW 300 kHz Mode Sweep CF 2.441 GHz 691 pts Span 10.0 MHz Date: 3-JUL-2024 16:01:07
Out Of Band Emission GFSK_DH5_Channel 39	Out Of Band Emission $\pi/4$DQPSK_2-DH5_Channel 39



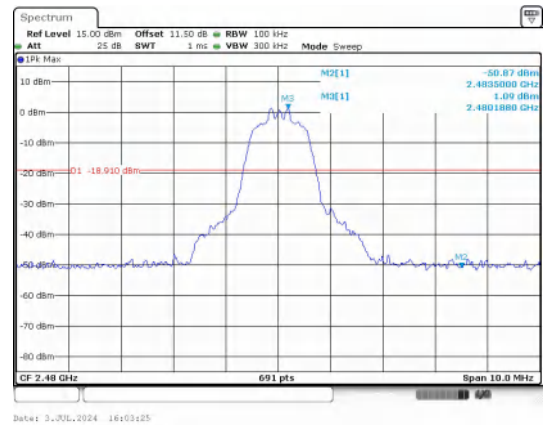
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



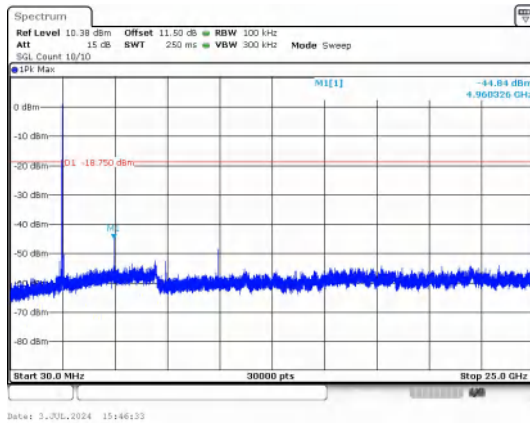
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39



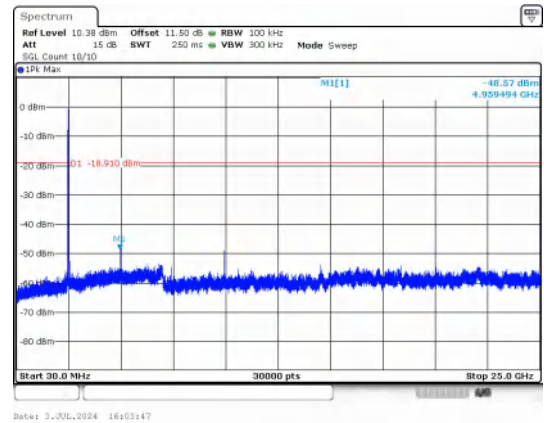
Out Of Band Emission
GFSK_DH5_Channel 78



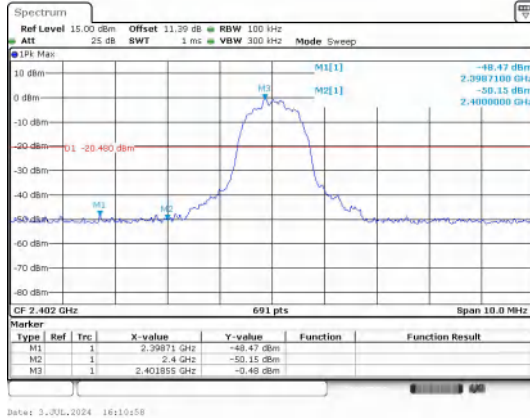
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



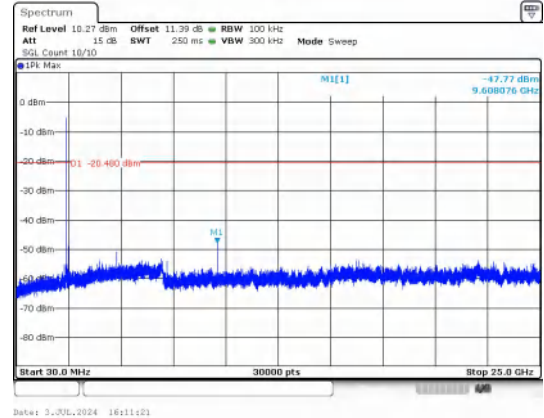
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



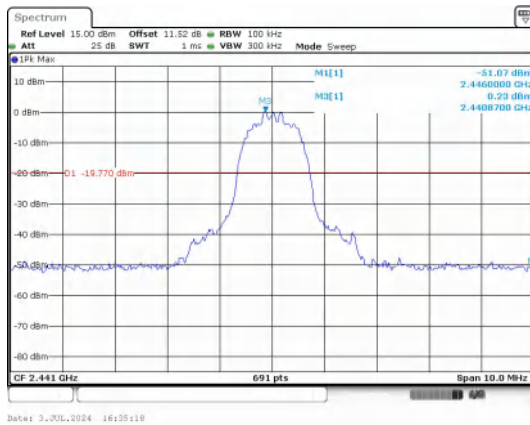
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 $\pi/4$ DQPSK_2-DH5_Channel 78



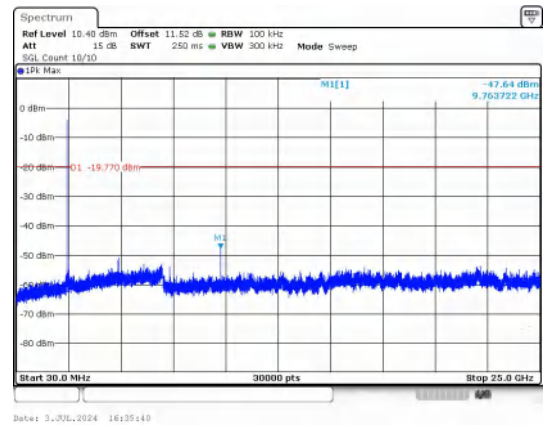
Out Of Band Emission
8DPSK_3-DH5_Channel 0



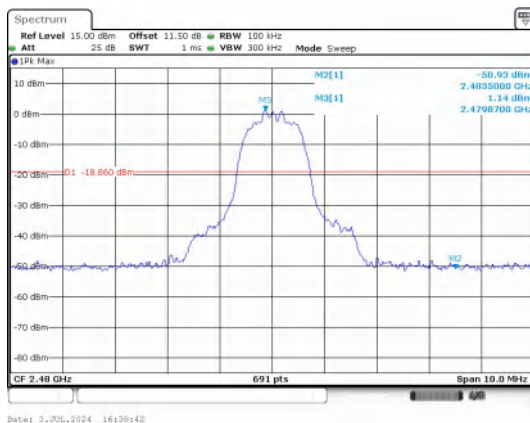
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



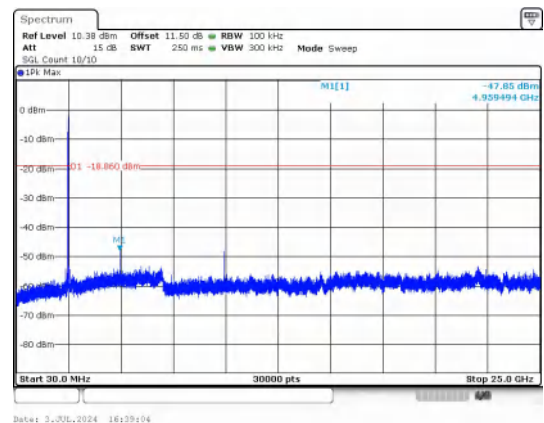
Out Of Band Emission
8DPSK_3-DH5_Channel 39



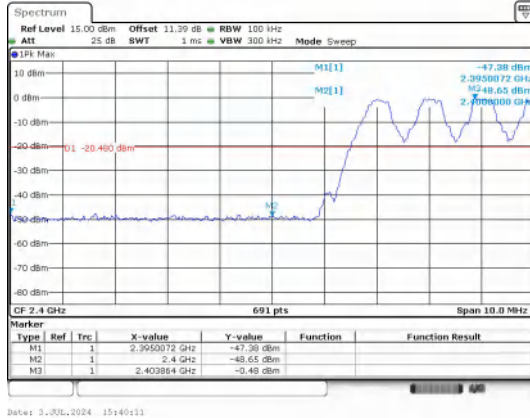
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



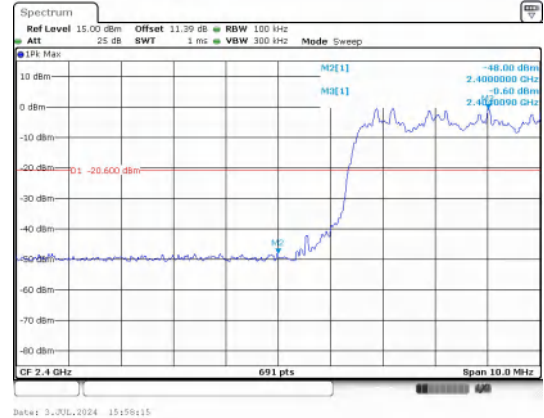
Out Of Band Emission
8DPSK_3-DH5_Channel 78



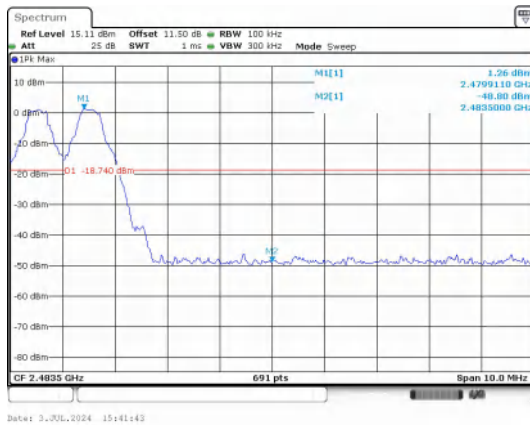
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



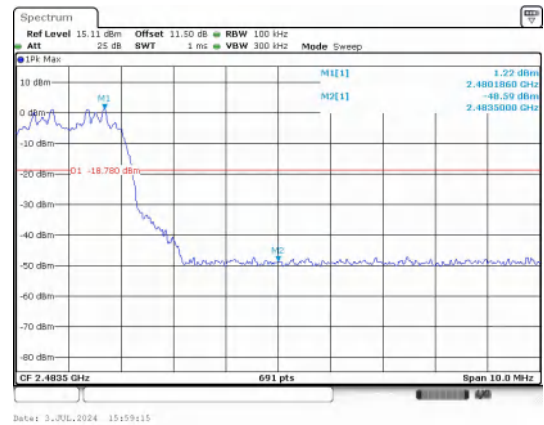
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



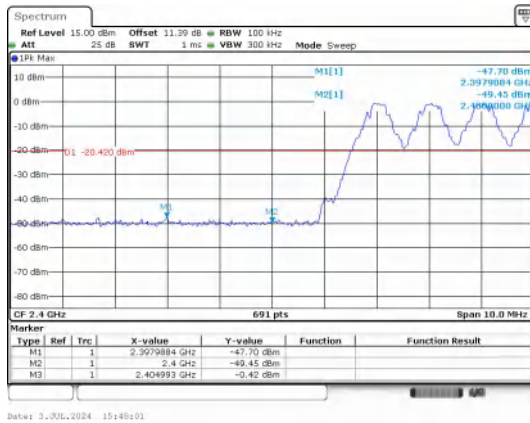
Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



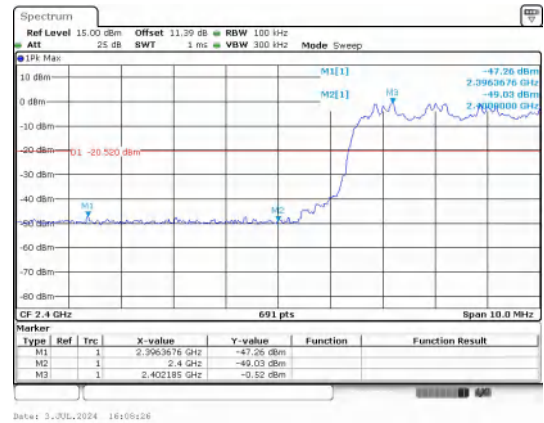
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



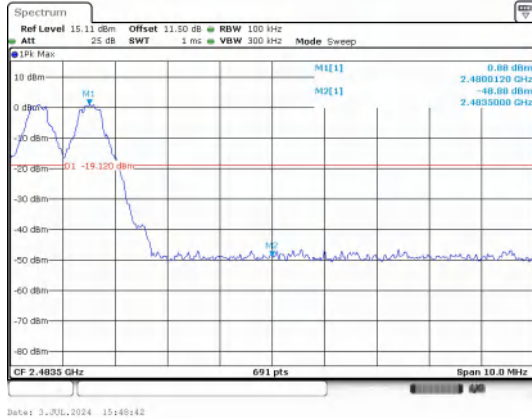
Out Of Band Emission(Right)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



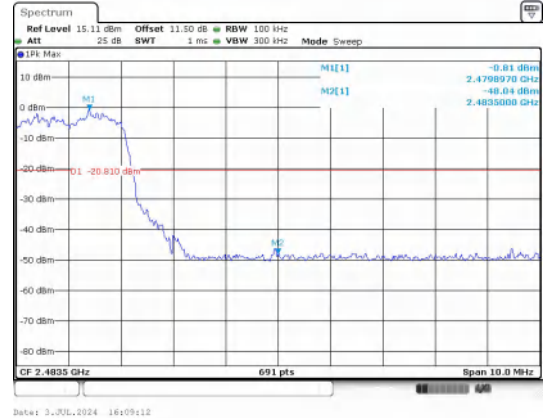
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



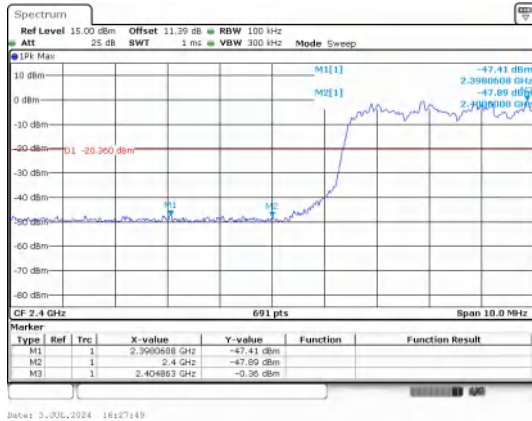
Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



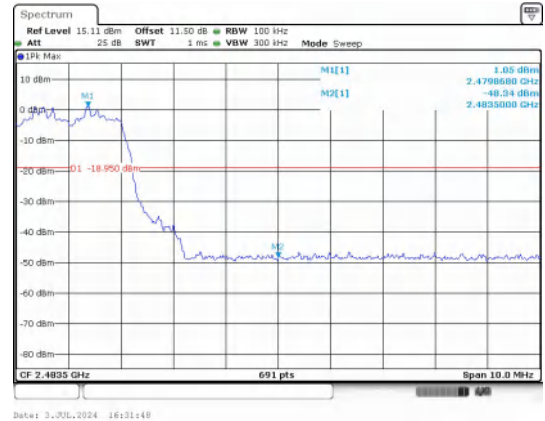
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



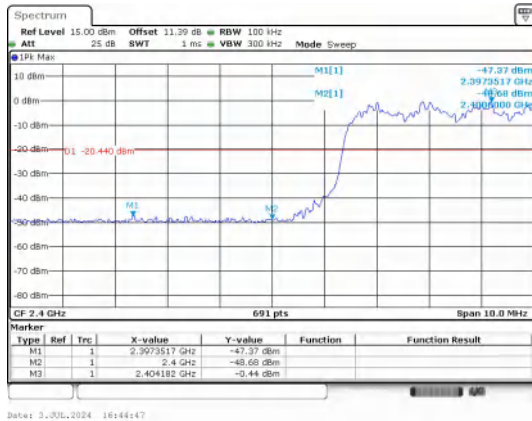
Out Of Band Emission(Right)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



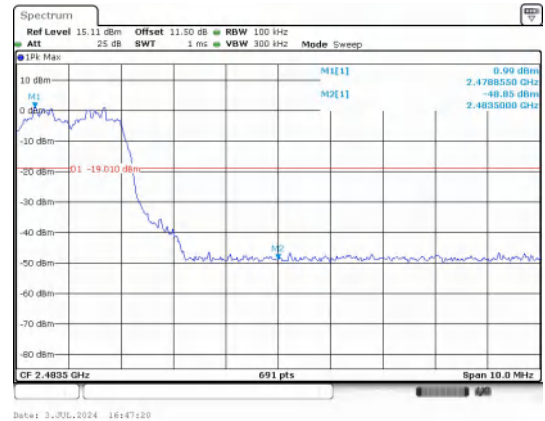
Out Of Band Emission(Left)
8DPSK_3-DH5_Channel Hopping



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



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



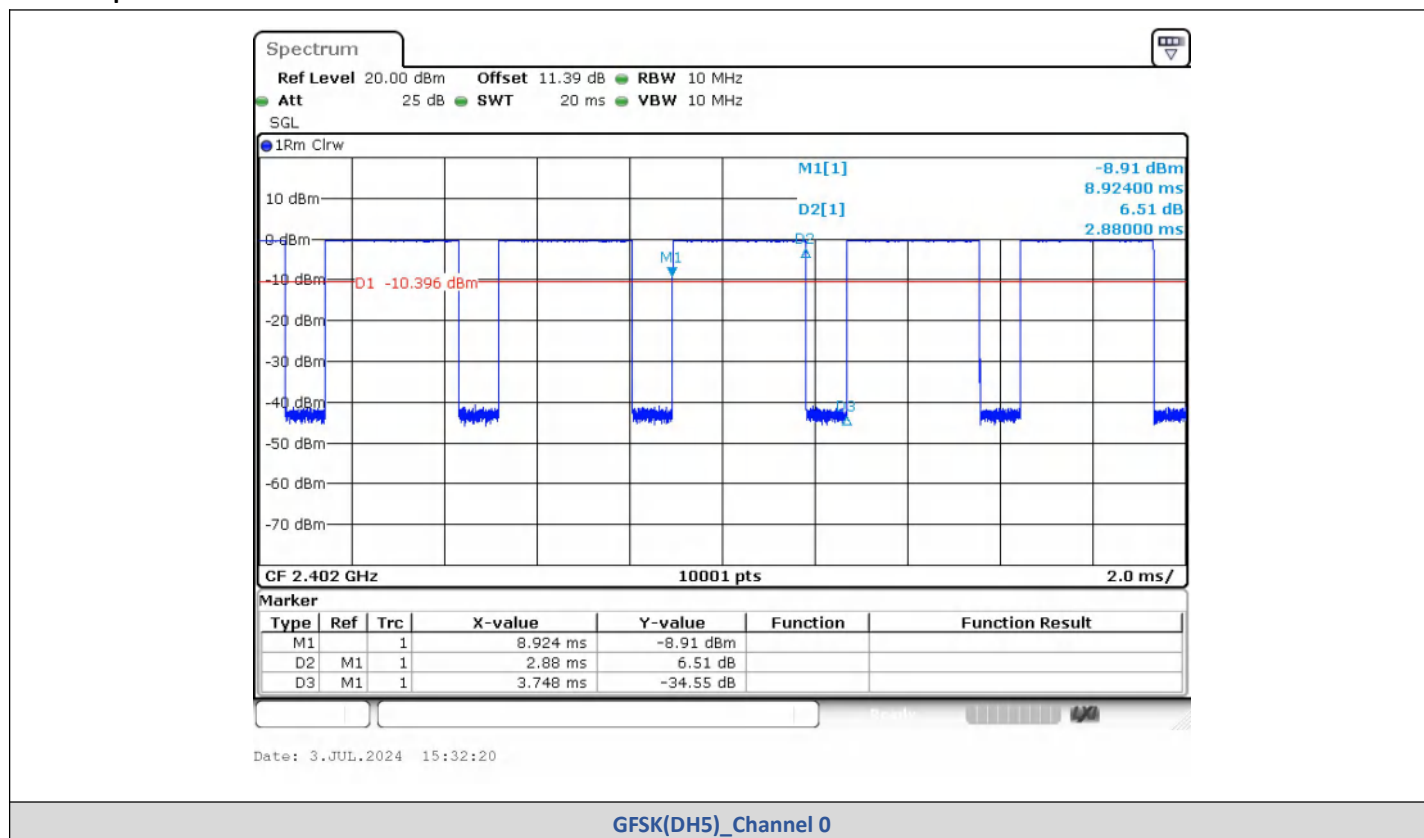
Out Of Band Emission(Right)
8DPSK_3-DH5_Channel Hopping

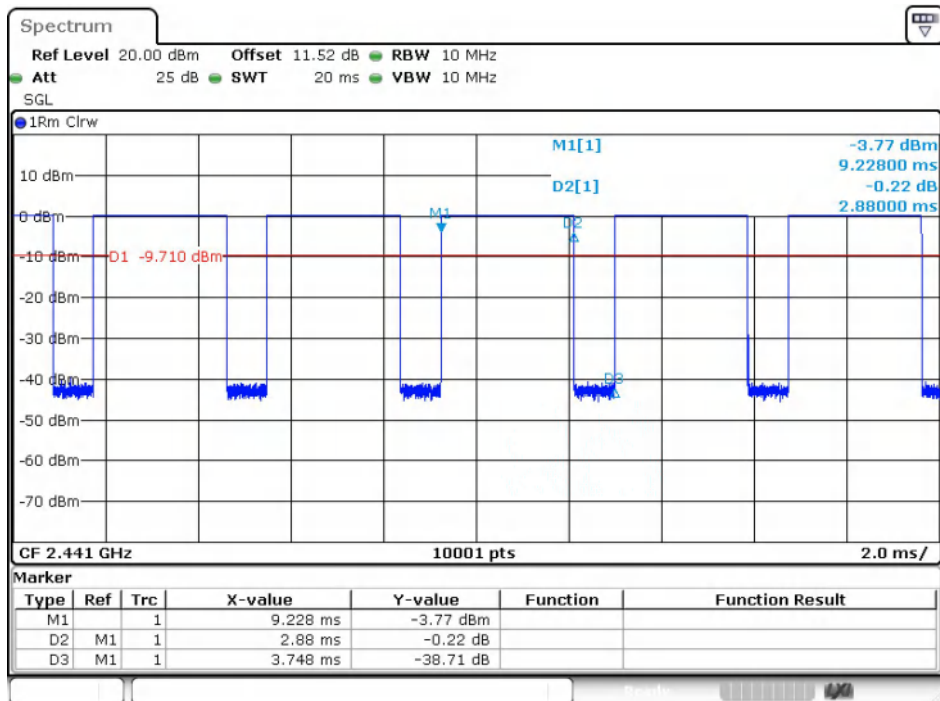
6) Duty Cycle

Test Result

Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.880	3.748	76.84	0.7684	1.1441	0.35
		39	2.880	3.748	76.84	0.7684	1.1441	0.35
		78	2.878	3.748	76.79	0.7679	1.147	0.35
$\pi/4$ DQPSK	2-DH5	0	2.884	3.748	76.95	0.7695	1.1379	0.35
		39	2.884	3.748	76.95	0.7695	1.1379	0.35
		78	2.886	3.748	77.00	0.7700	1.1351	0.35
8DPSK	3-DH5	0	2.886	3.748	77.00	0.7700	1.1351	0.35
		39	2.888	3.748	77.05	0.7705	1.1323	0.35
		78	2.888	3.748	77.05	0.7705	1.1323	0.35

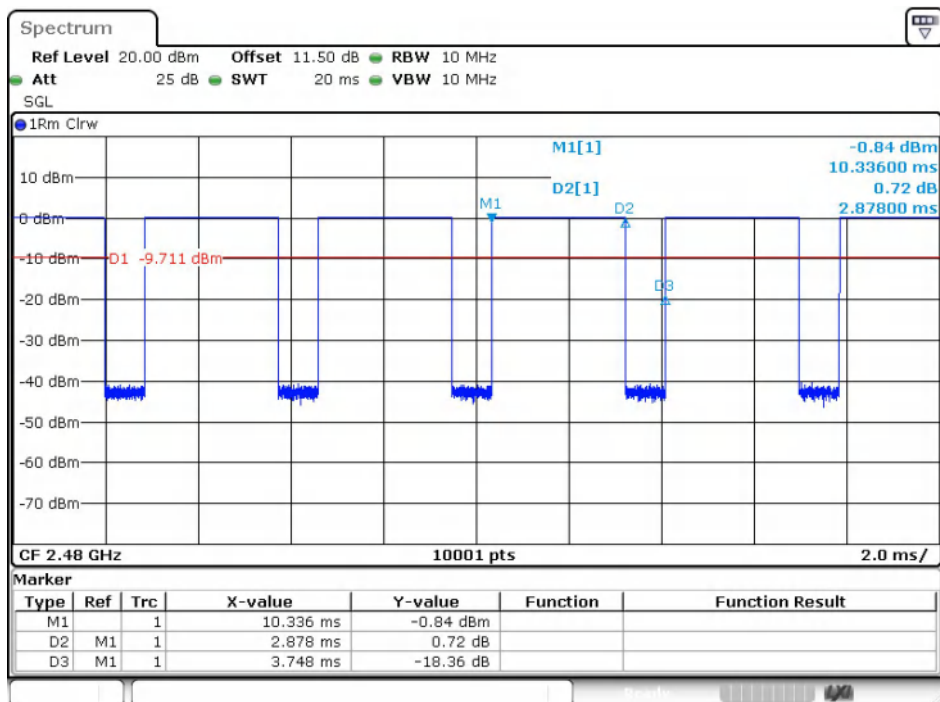
Test Graphs





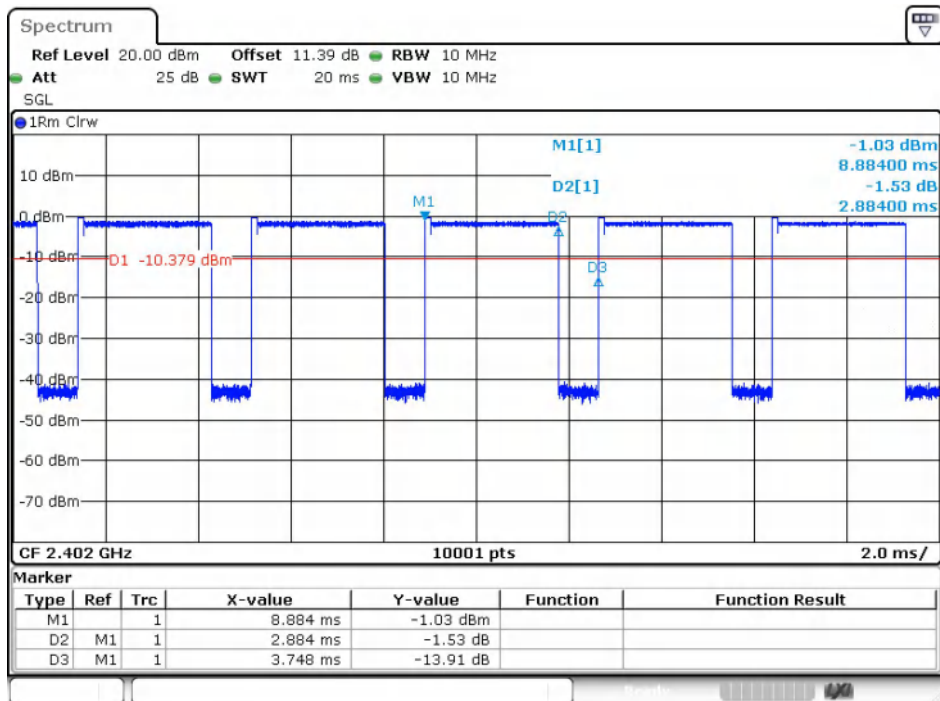
Date: 3.JUL.2024 15:42:28

GFSK(DH5)_Channel 39



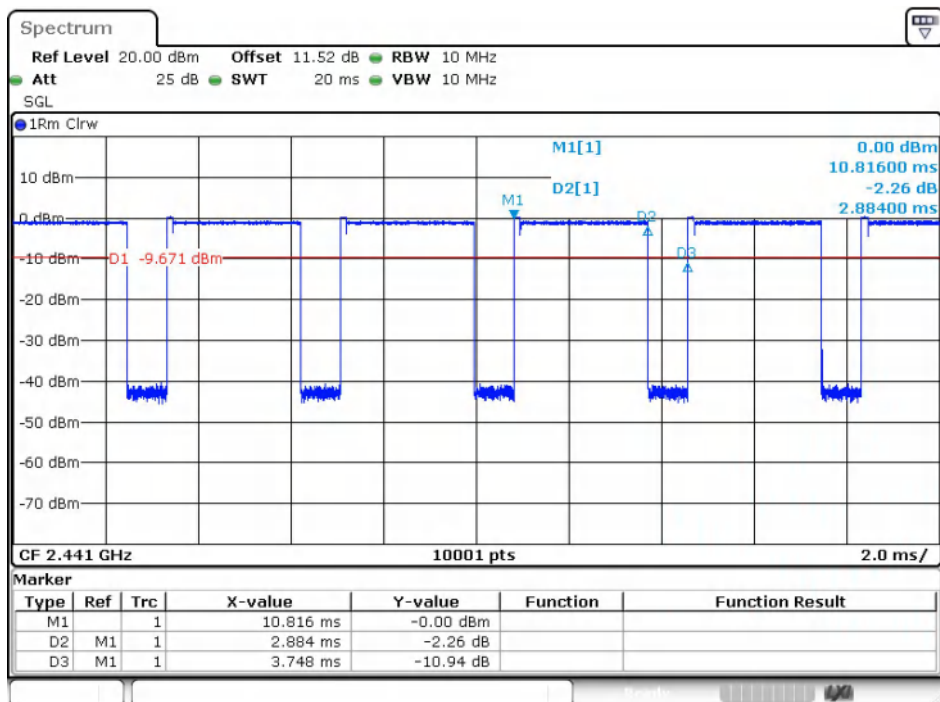
Date: 3.JUL.2024 15:45:00

GFSK(DH5)_Channel 78



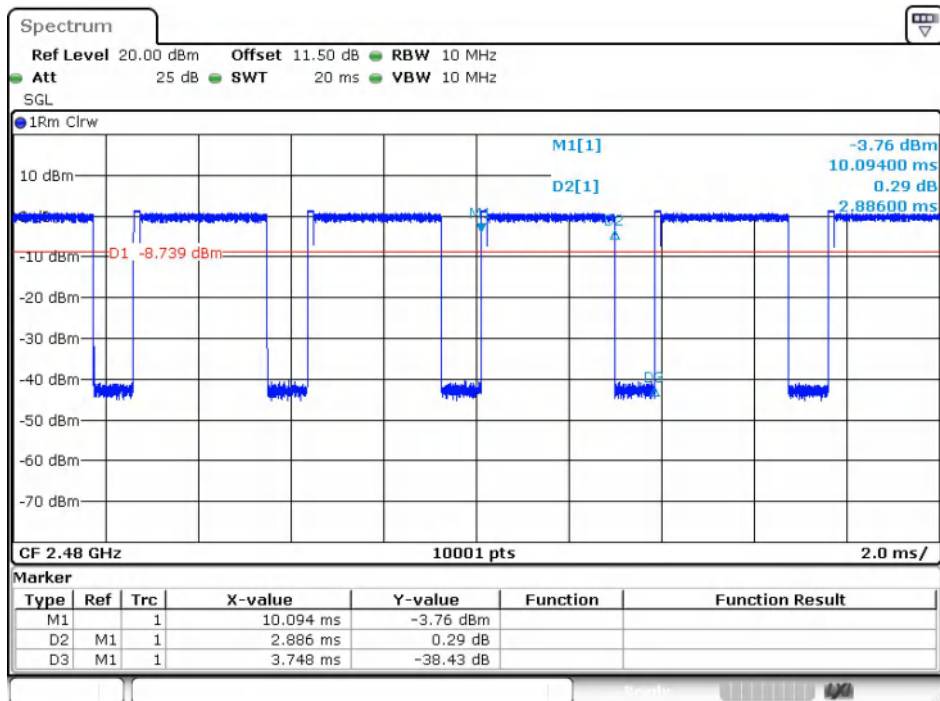
Date: 3.JUL.2024 15:50:49

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



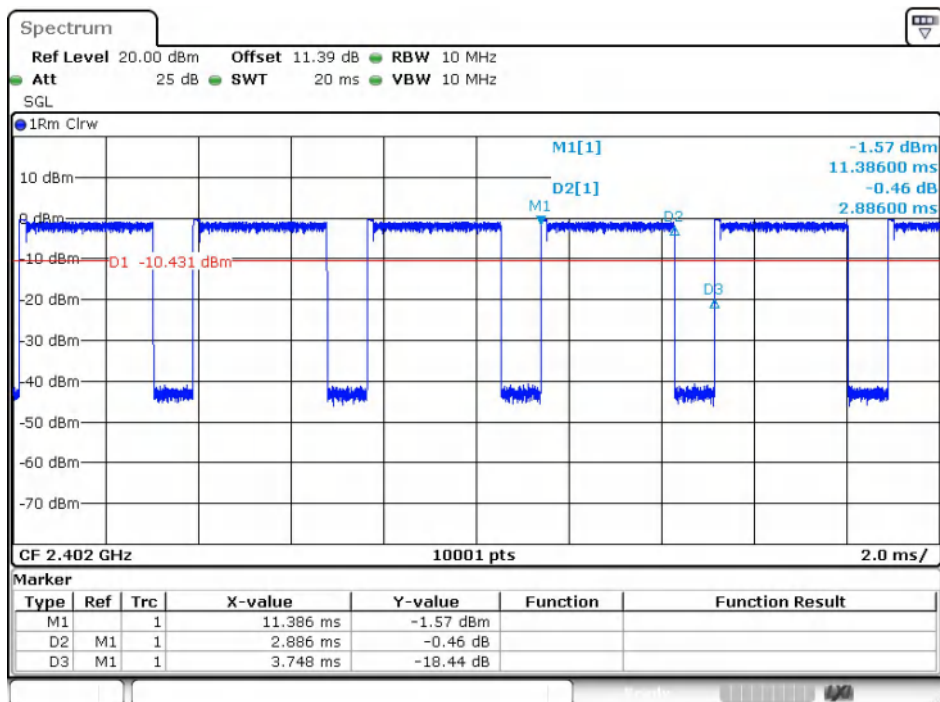
Date: 3.JUL.2024 16:00:01

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



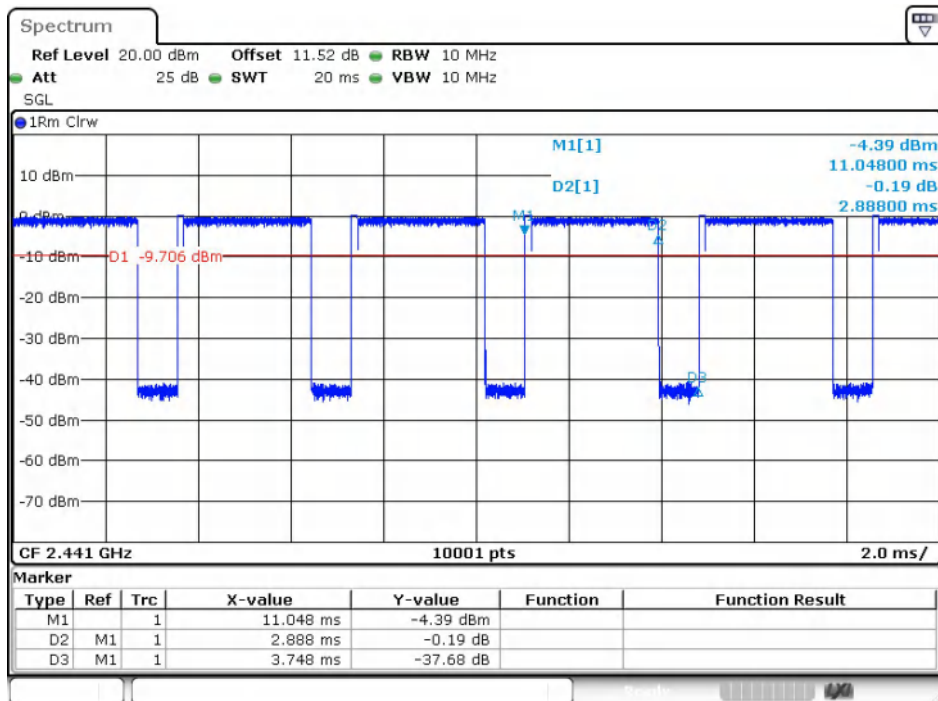
Date: 3.JUL.2024 16:02:14

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



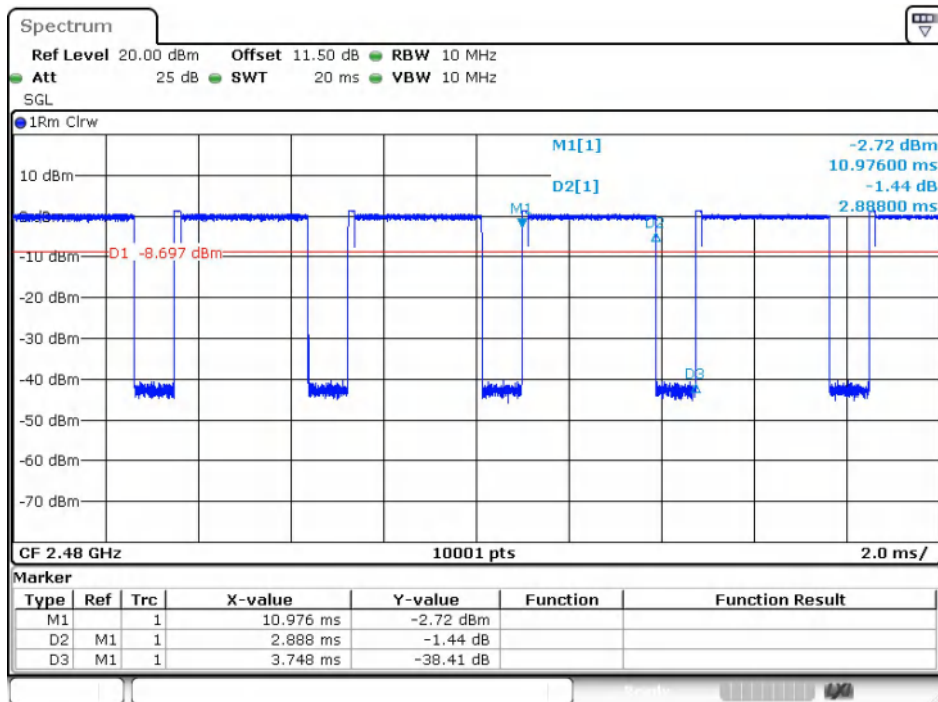
Date: 3.JUL.2024 16:09:47

8DPSK(3-DH5)_Channel 0



Date: 3.JUL.2024 16:34:13

8DPSK(3-DH5)_Channel 39



Date: 3.JUL.2024 16:37:31

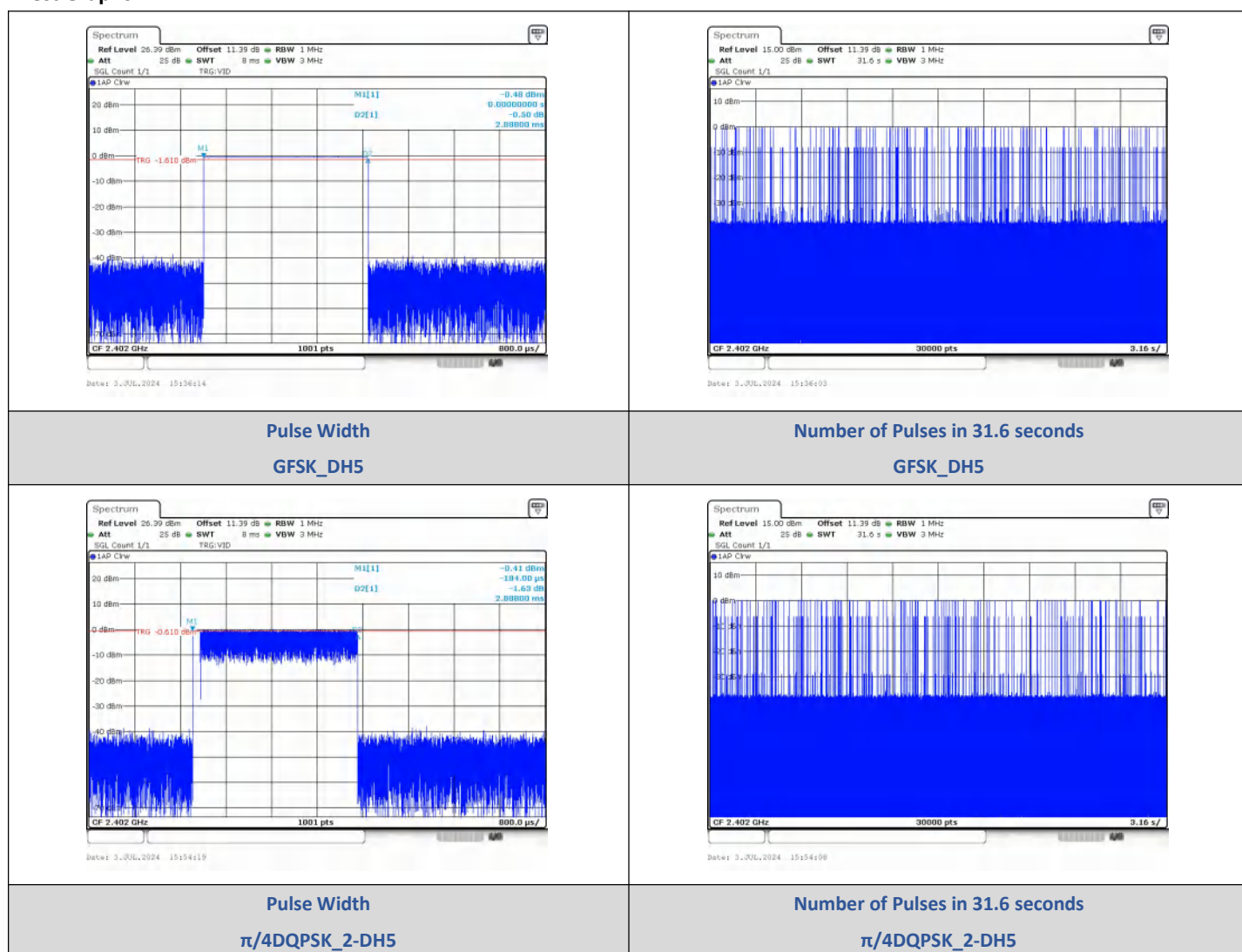
8DPSK(3-DH5)_Channel 78

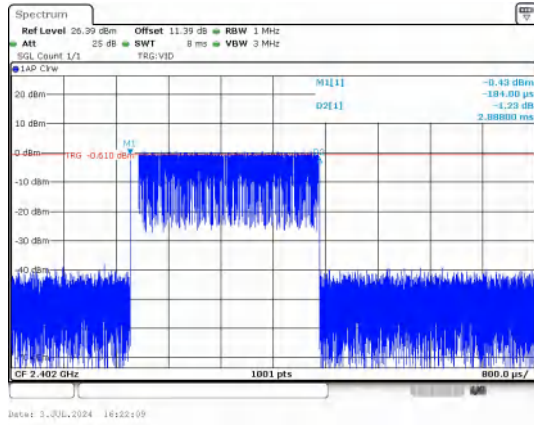
7) Dwell Time

Test Result

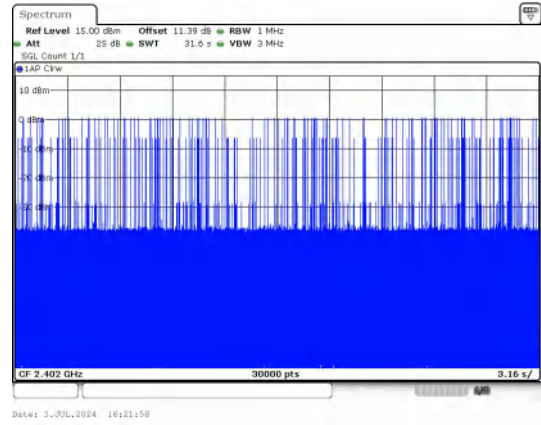
Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.888	118	340.78	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.888	117	337.9		PASS
8DPSK	3-DH5		2.888	108	311.9		PASS

Test Graphs





Pulse Width
8DPSK_3-DH5



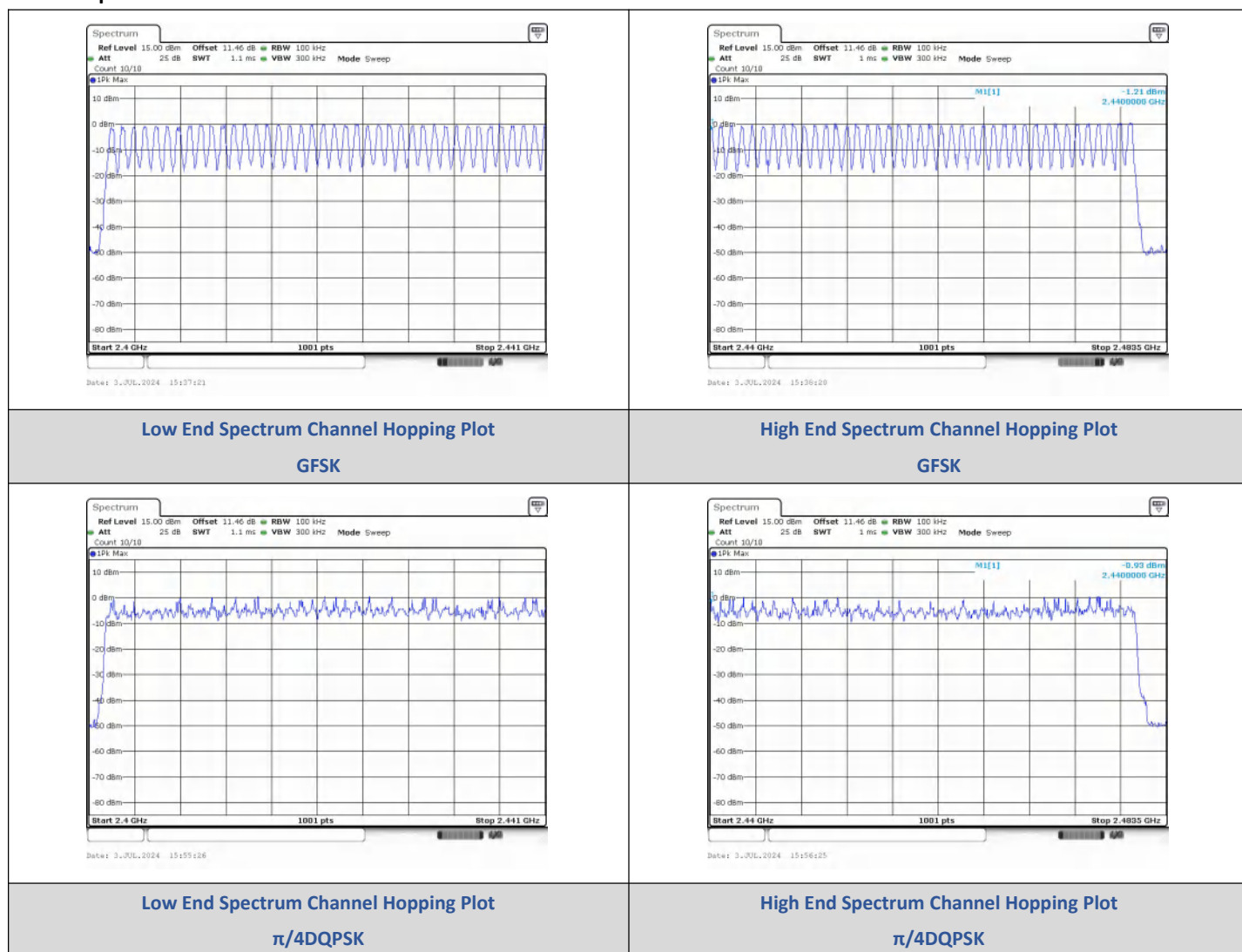
Number of Pulses in 31.6 seconds
8DPSK_3-DH5

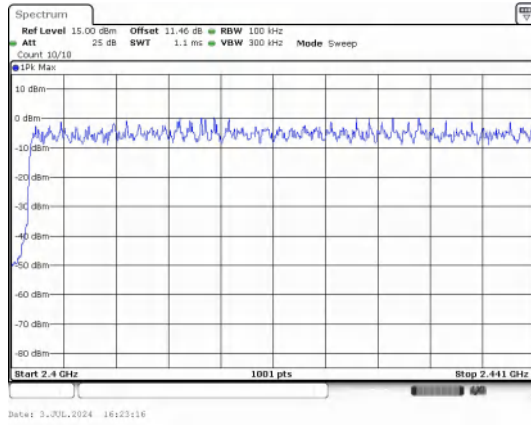
8) Number Of Hopping Channel

Test Result

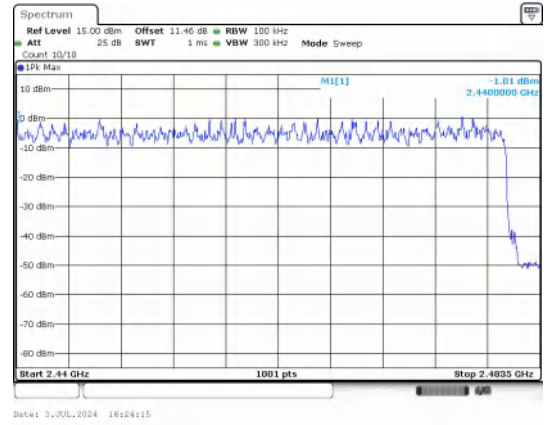
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
$\pi/4$ DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

Test Graphs





Low End Spectrum Channel Hopping Plot
8DPSK



High End Spectrum Channel Hopping Plot
8DPSK