

Appendix A

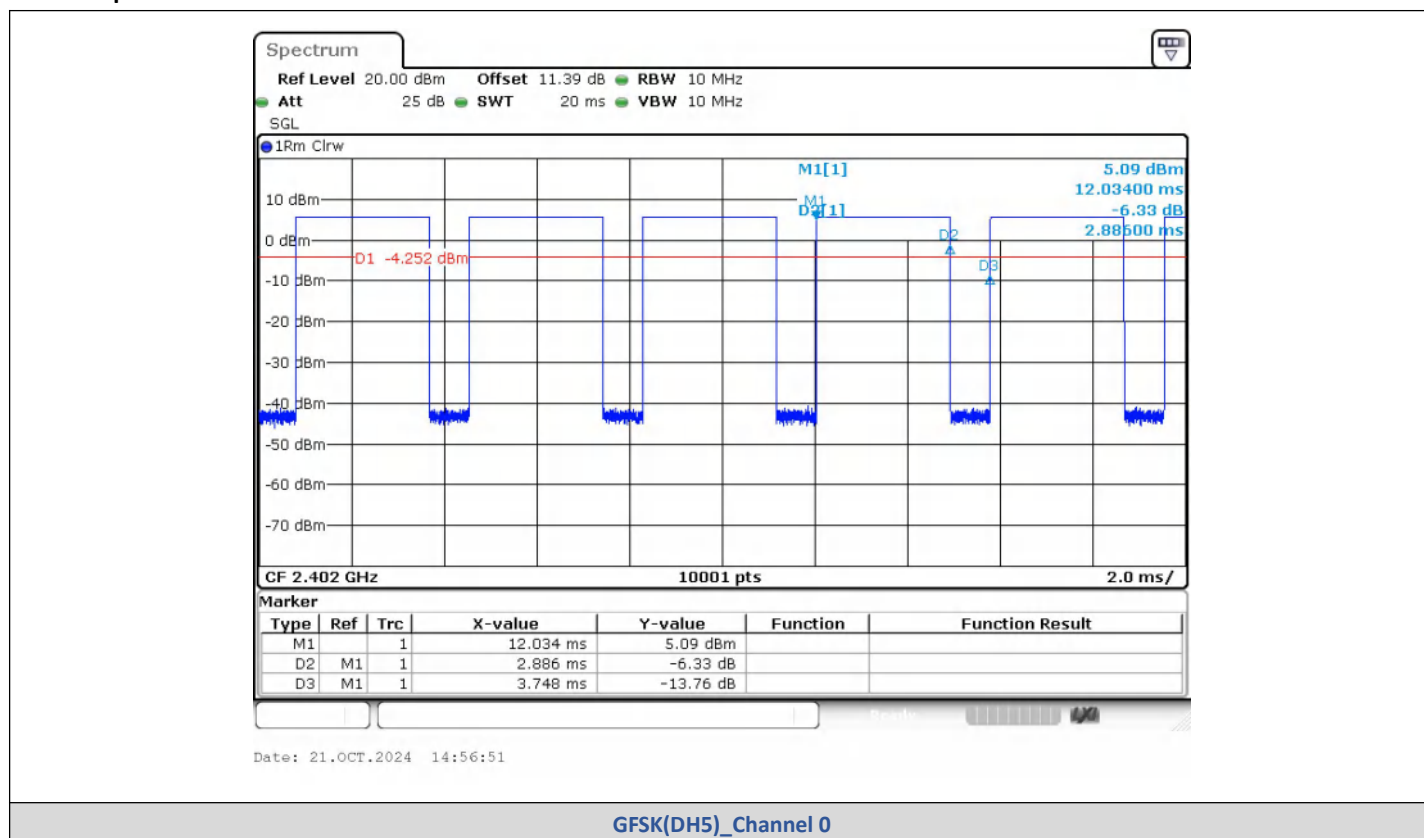
Report No.:	CISRR241009023
FCC ID:	2BLNJ-HA09
Product Name:	Bluetooth speaker
Model No.:	HA09
Test Engineer:	Mark Fu
Supervised by:	Rory Huang

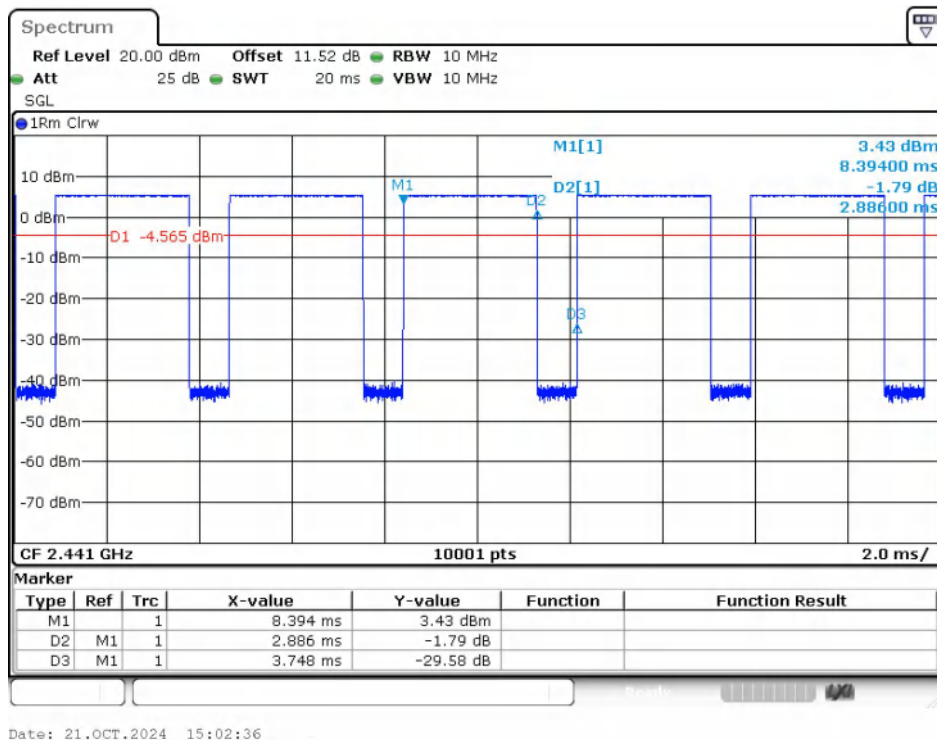
1) Duty Cycle

Test Result

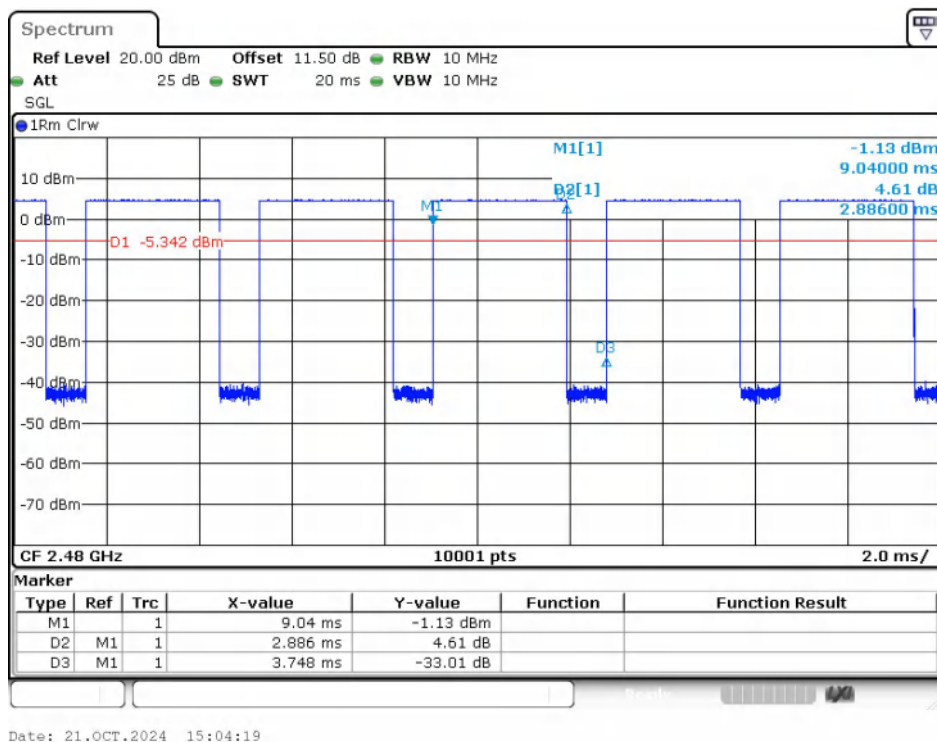
Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.886	3.748	77.00	0.7700	1.1351	0.35
		39	2.886	3.748	77.00	0.7700	1.1351	0.35
		78	2.886	3.748	77.00	0.7700	1.1351	0.35
$\pi/4$ DQPSK	2-DH5	0	2.892	3.748	77.16	0.7716	1.1261	0.35
		39	2.892	3.748	77.16	0.7716	1.1261	0.35
		78	2.892	3.748	77.16	0.7716	1.1261	0.35
8DPSK	3-DH5	0	2.892	3.748	77.16	0.7716	1.1261	0.35
		39	2.892	3.748	77.16	0.7716	1.1261	0.35
		78	2.892	3.748	77.16	0.7716	1.1261	0.35

Test Graphs

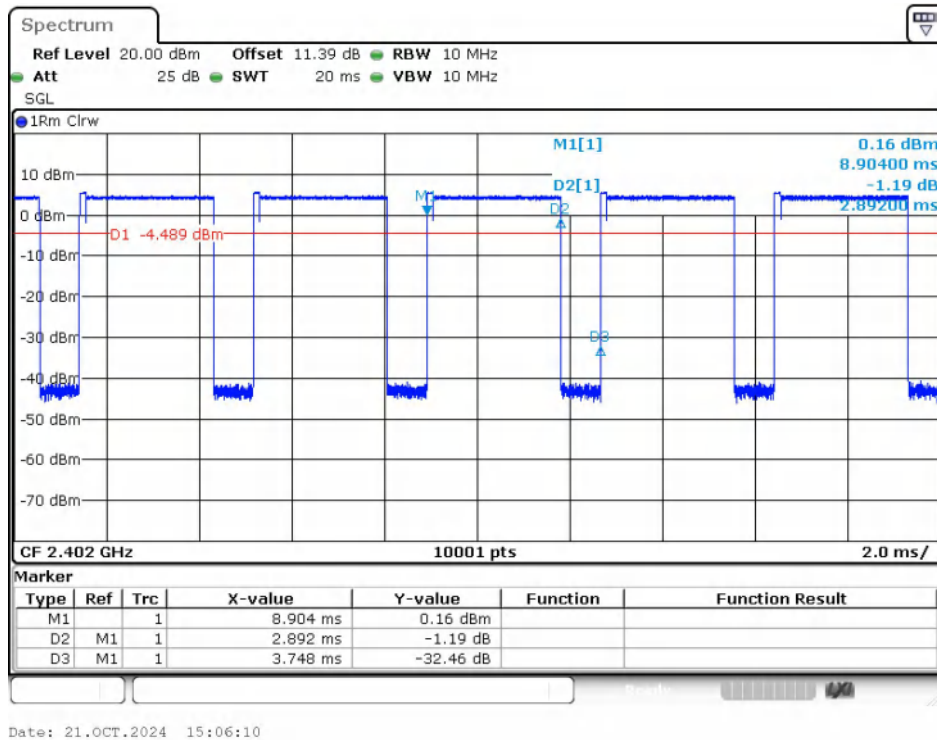




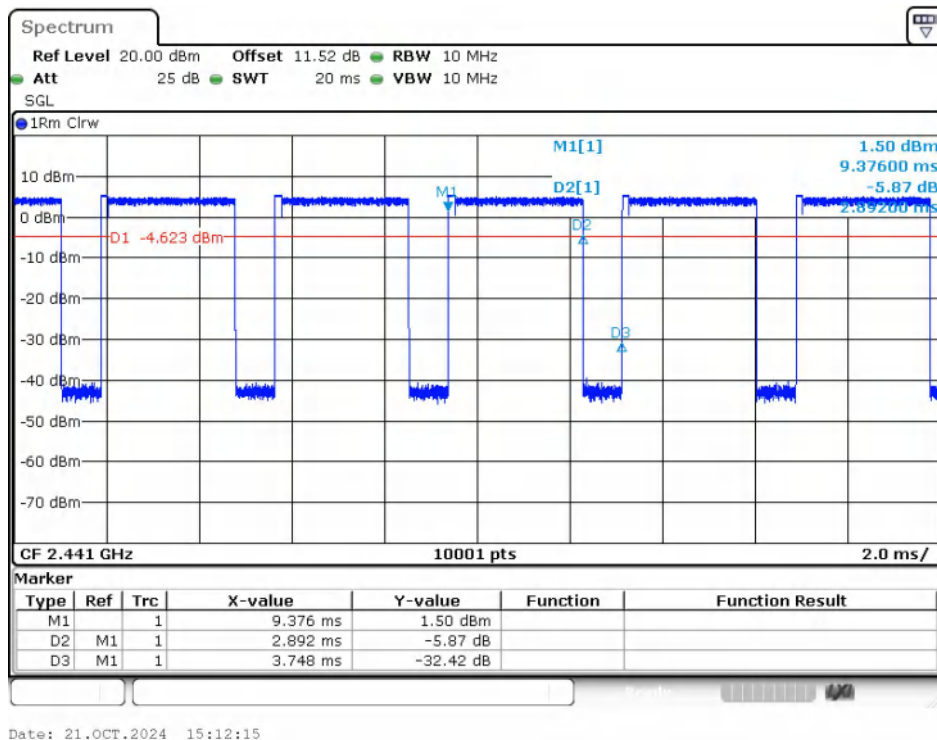
GFSK(DH5)_Channel 39



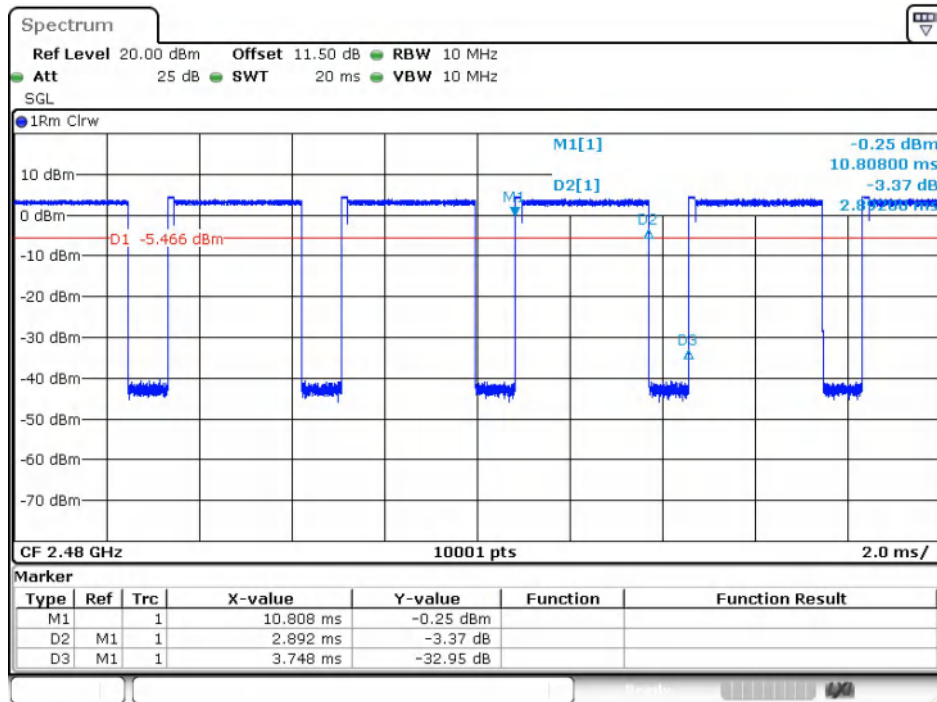
GFSK(DH5)_Channel 78



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

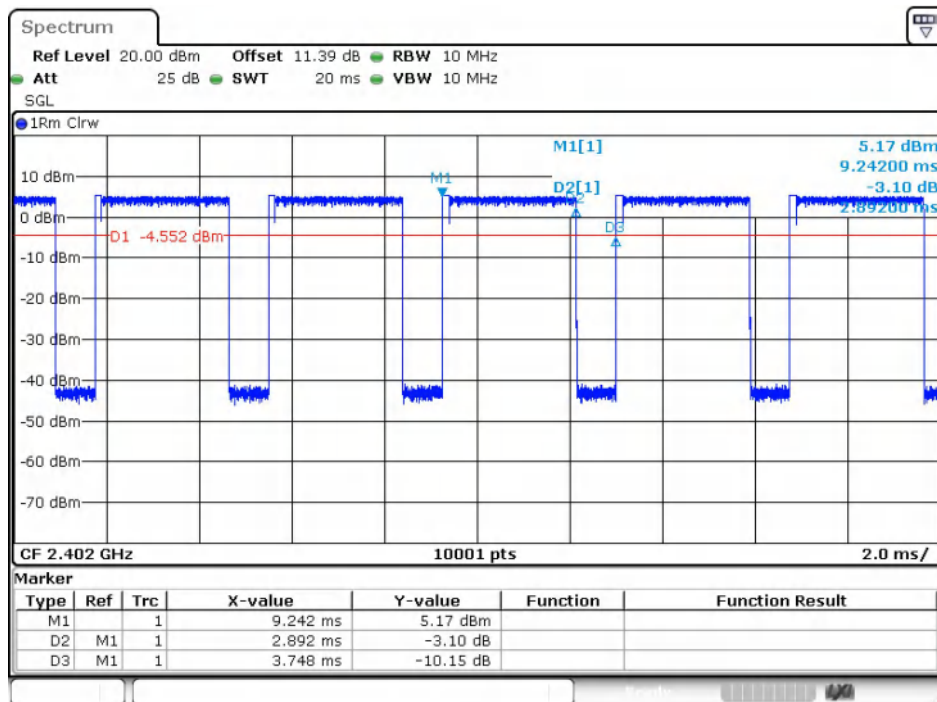


$\pi/4$ QPSK(2-DH5)_Channel 39



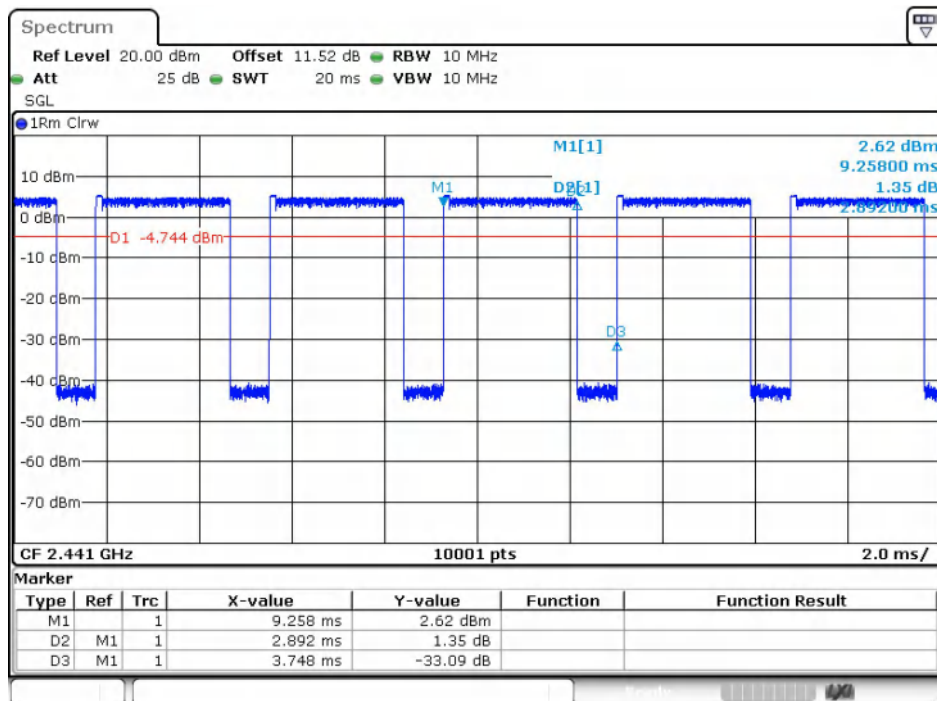
Date: 21.OCT.2024 15:14:13

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



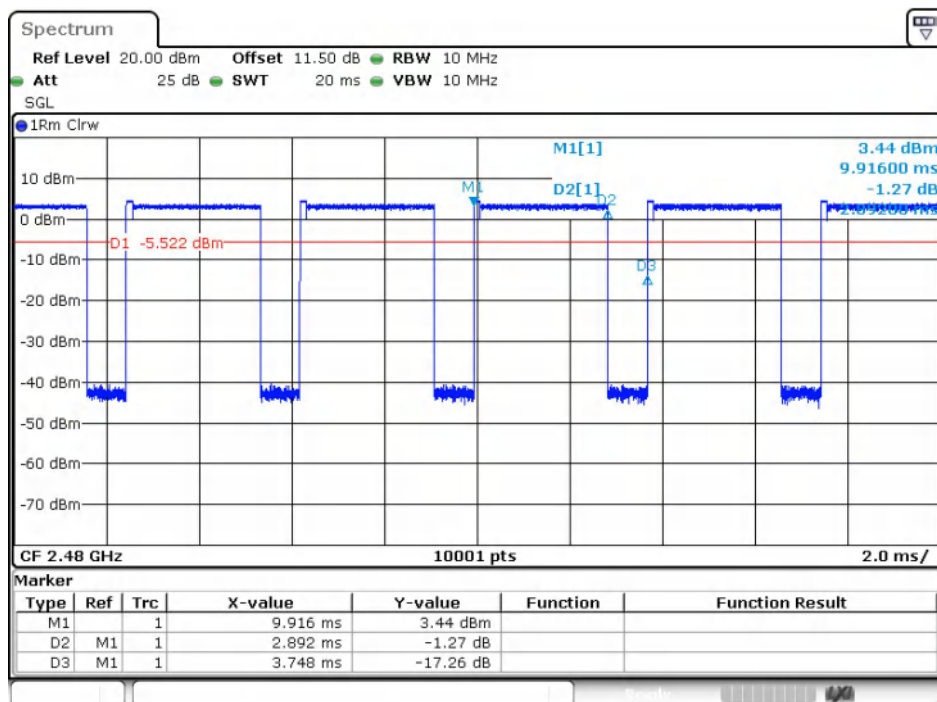
Date: 21.OCT.2024 15:16:02

8DPSK(3-DH5)_Channel 0



Date: 21.OCT.2024 15:21:52

8DPSK(3-DH5)_Channel 39



Date: 21.OCT.2024 15:23:53

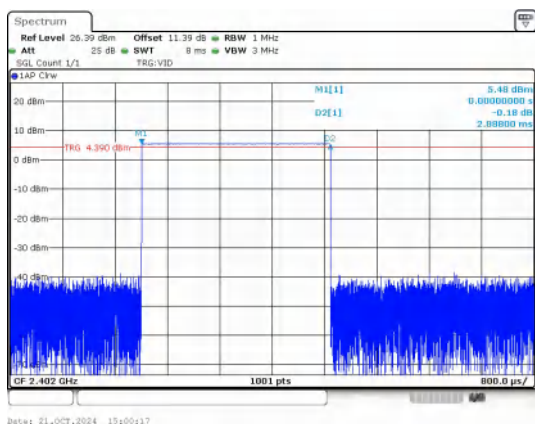
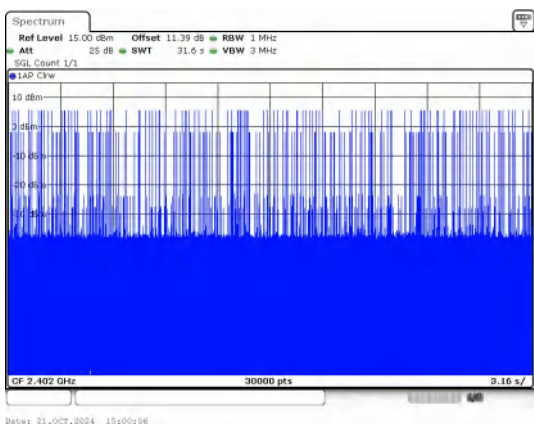
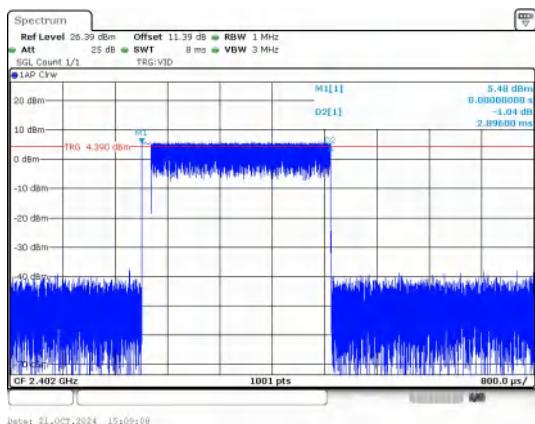
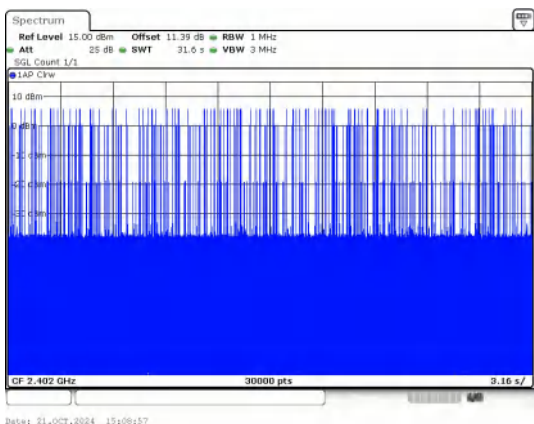
8DPSK(3-DH5)_Channel 78

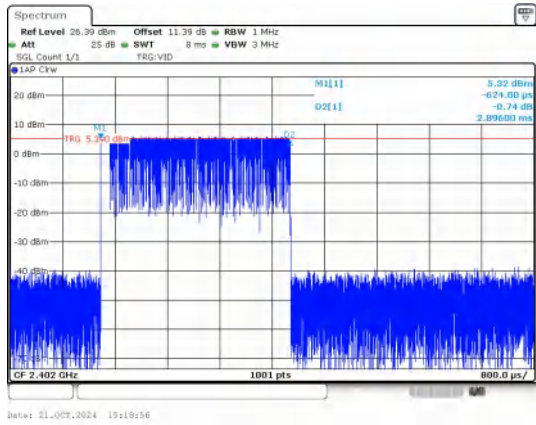
2) Dwell Time

Test Result

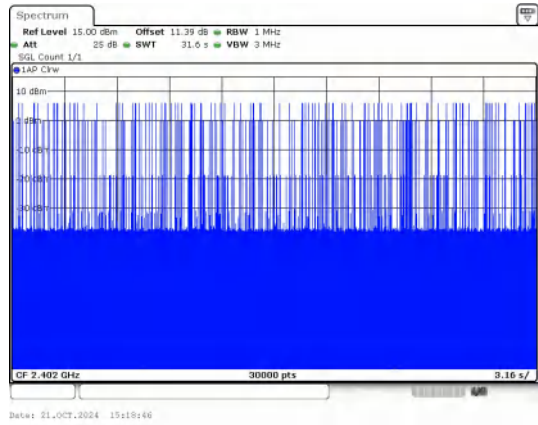
Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.888	109	314.79	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.896	112	324.35		PASS
8DPSK	3-DH5		2.896	110	318.56		PASS

Test Graphs

 Ref Level 26.39 dBm Offset 11.39 dB RBW 1 MHz Att 25 dB SWT 8 ms VBW 3 MHz SQL Count 1/1 TRG:VID 1AP Ckrw M1[1] 5.48 dBm D2[1] 0.00000000 s -0.18 dB 2.88800 ms TRG 4.390 dBm CF 2.402 GHz 1001 pts 800.0 μs Date: 21_OCT_2024 15:00:17	 Ref Level 15.00 dBm Offset 11.39 dB RBW 1 MHz Att 25 dB SWT 31.6 s VBW 3 MHz SQL Count 1/1 1AP Ckrw CF 2.402 GHz 30000 pts 3.16 s Date: 21_OCT_2024 15:00:06
Pulse Width GFSK_DH5	Number of Pulses in 31.6 seconds GFSK_DH5
 Ref Level 26.39 dBm Offset 11.39 dB RBW 1 MHz Att 25 dB SWT 8 ms VBW 3 MHz SQL Count 1/1 TRG:VID 1AP Ckrw M1[1] 5.48 dBm D2[1] 0.00000000 s -1.04 dB 2.89600 ms TRG 4.390 dBm CF 2.402 GHz 1001 pts 800.0 μs Date: 21_OCT_2024 15:00:08	 Ref Level 15.00 dBm Offset 11.39 dB RBW 1 MHz Att 25 dB SWT 31.6 s VBW 3 MHz SQL Count 1/1 1AP Ckrw CF 2.402 GHz 30000 pts 3.16 s Date: 21_OCT_2024 15:00:57
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

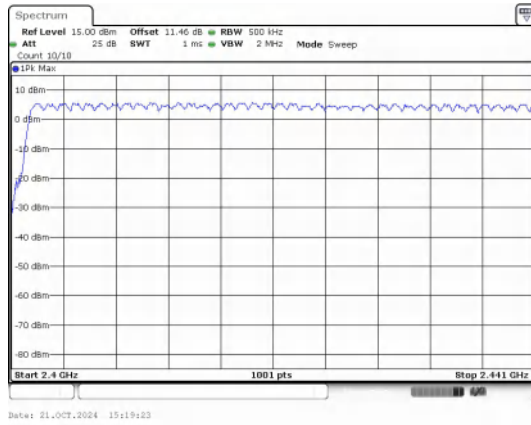
3) Number Of Hopping Channel

Test Result

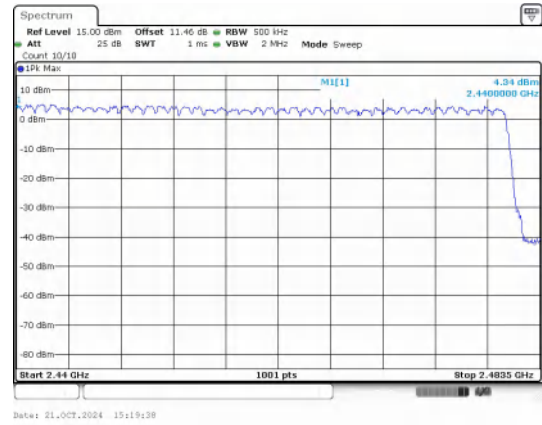
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
$\pi/4$ DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

Test Graphs





Low End Spectrum Channel Hopping Plot
8DPSK



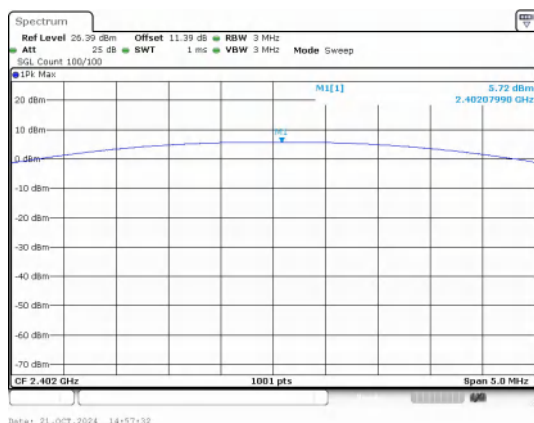
High End Spectrum Channel Hopping Plot
8DPSK

4) Conducted Peak Output Power

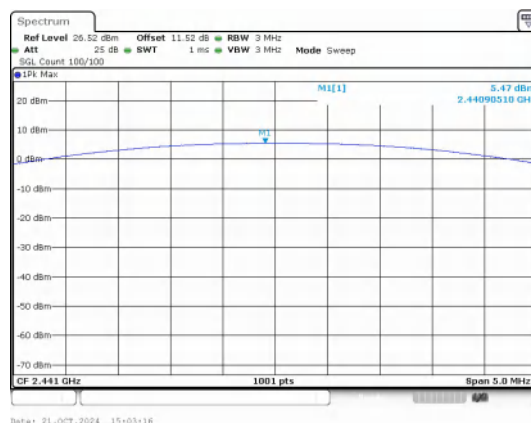
Test Result

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	5.72	3.73	≤30	PASS
		39	5.47	3.52		PASS
		78	4.69	2.95		PASS
$\pi/4$ DQPSK	2-DH5	0	6.14	4.11	≤20.97	PASS
		39	6.04	4.02		PASS
		78	5.28	3.37		PASS
8DPSK	3-DH5	0	6.23	4.20		PASS
		39	6.20	4.17		PASS
		78	5.44	3.50		PASS

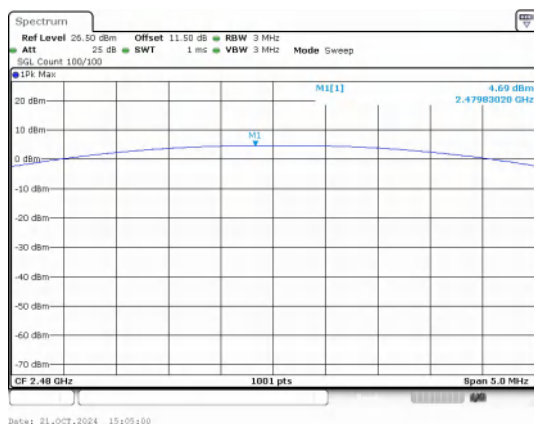
Test Graphs



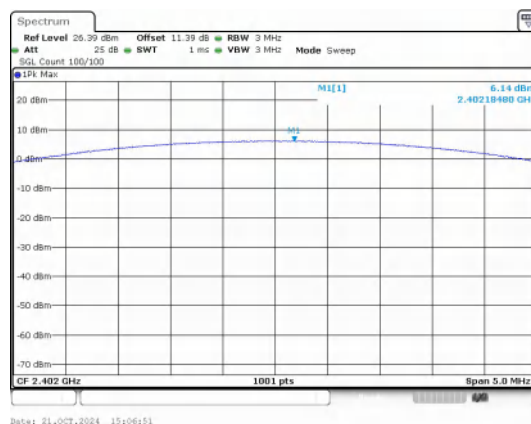
Peak Output Power
GFSK_Channel 0



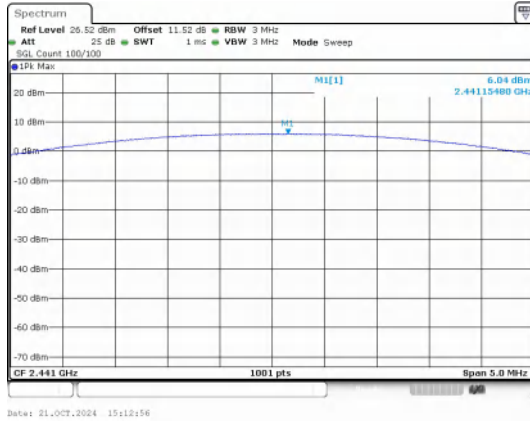
Peak Output Power
GFSK_Channel 39



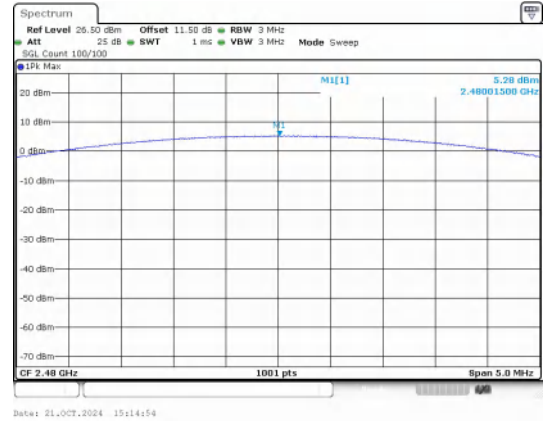
Peak Output Power
GFSK_Channel 78



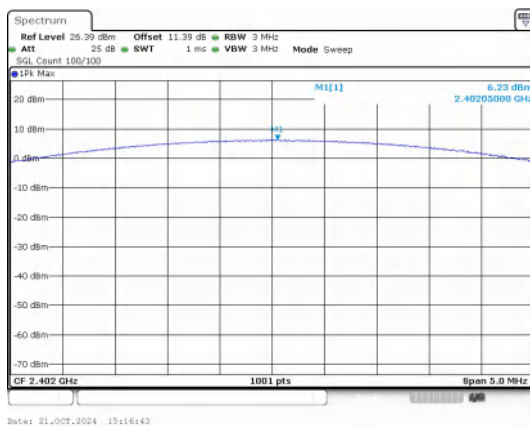
Peak Output Power
 $\pi/4$ DQPSK_Channel 0



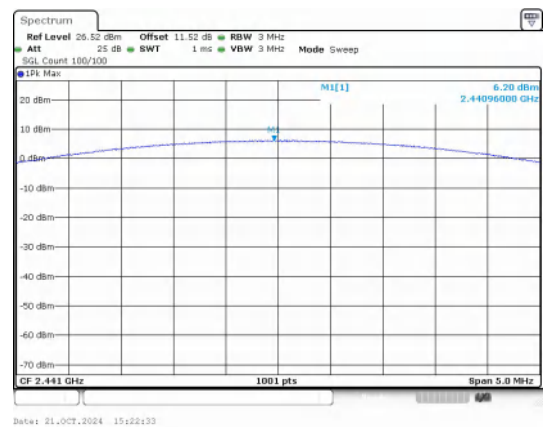
Peak Output Power
 $\pi/4$ DQPSK_Channel 39



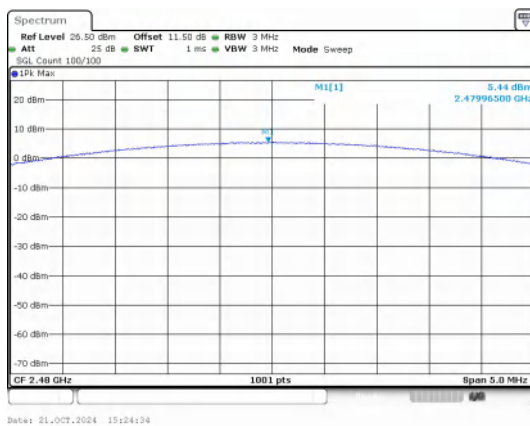
Peak Output Power
 $\pi/4$ DQPSK_Channel 78



Peak Output Power
8DPSK_Channel 0



Peak Output Power
8DPSK_Channel 39



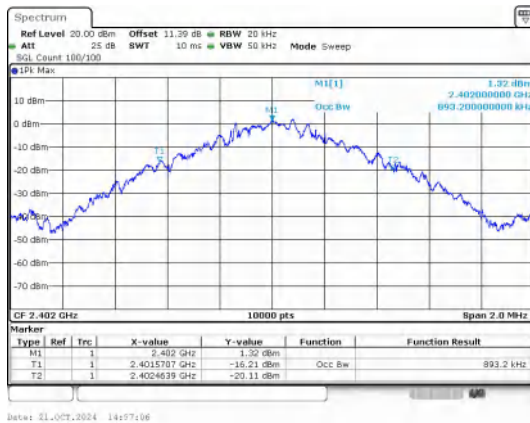
Peak Output Power
8DPSK_Channel 78

5) 99% Bandwidth

Test Result

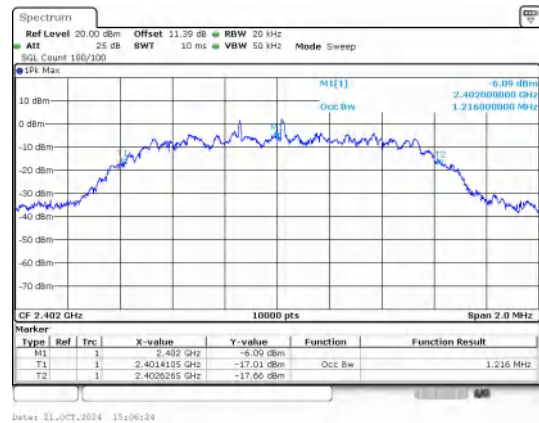
Modulation	Channel	Center Frequency (MHz)	99% BW (MHz)
GFSK	0	2402	0.89320
	39	2441	0.89020
	78	2480	0.88680
$\pi/4$ DQPSK	0	2402	1.2160
	39	2441	1.1992
	78	2480	1.2124
8DPSK	0	2402	1.2200
	39	2441	1.2154
	78	2480	1.2124

Test Graphs



Date: 21-OCT-2024 14:57:06

GFSK_DH5_Channel 0

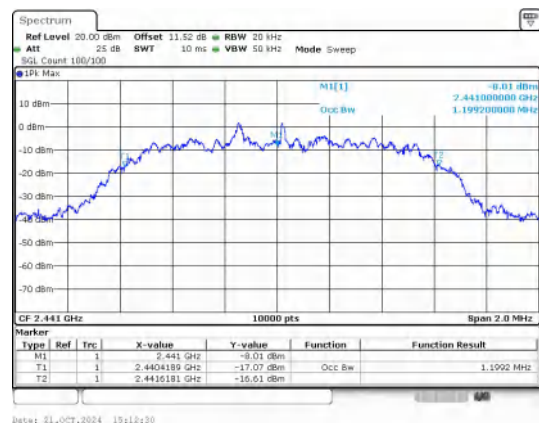


Date: 21-OCT-2024 15:06:24

 $\pi/4$ DQPSK_2-DH5_Channel 0

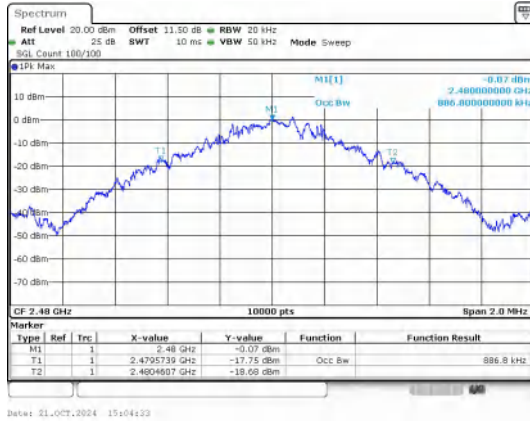

Date: 21-OCT-2024 15:02:50

GFSK_DH5_Channel 39

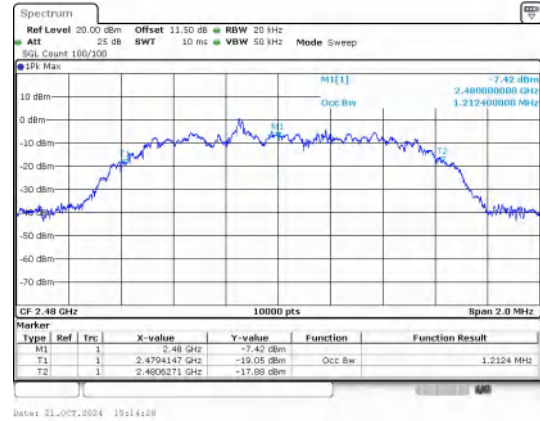


Date: 21-OCT-2024 15:12:30

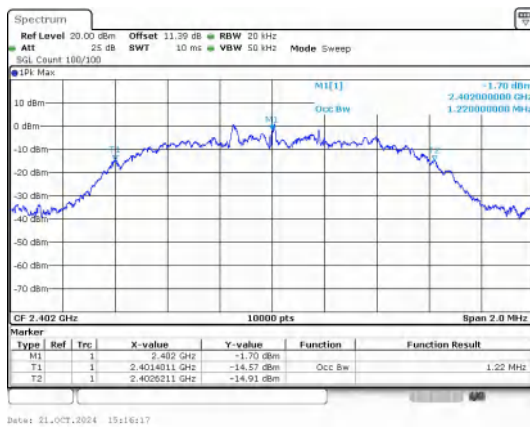
 $\pi/4$ DQPSK_2-DH5_Channel 39



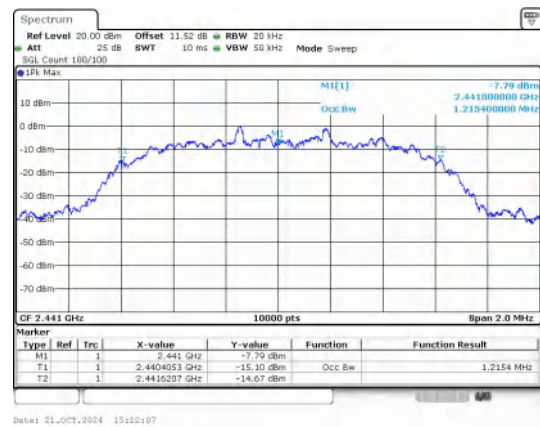
GFSK_DH5_Channel 78



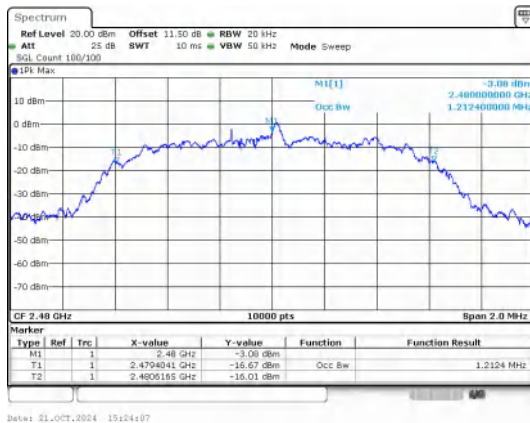
$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



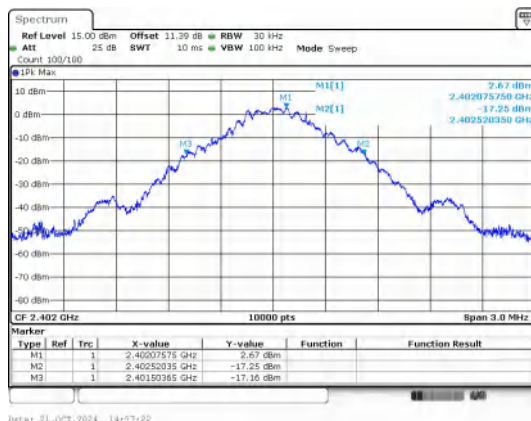
8DPSK_3-DH5_Channel 78

6) 20dB Bandwidth

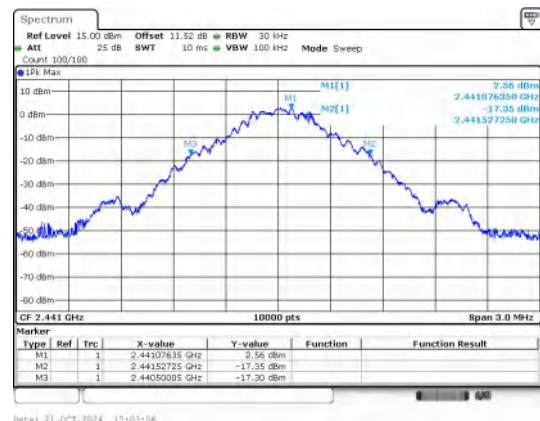
Test Result

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.020
	39	2441 MHz	1.030
	78	2480 MHz	1.030
$\pi/4$ DQPSK	0	2402 MHz	1.310
	39	2441 MHz	1.320
	78	2480 MHz	1.320
8DPSK	0	2402 MHz	1.300
	39	2441 MHz	1.310
	78	2480 MHz	1.300

Test Graphs



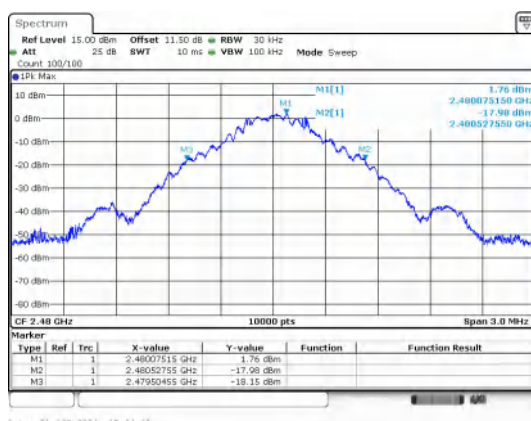
Date: 21.OCT.2024 14:57:22



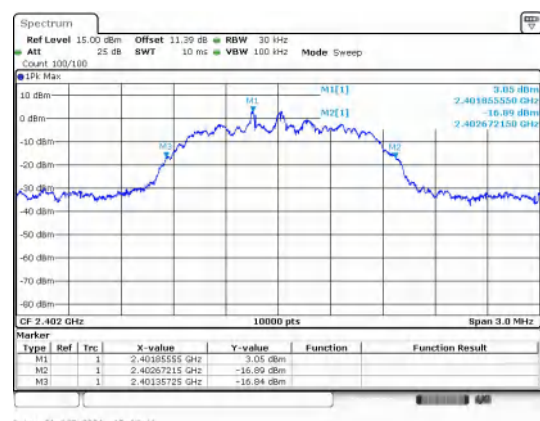
Date: 21.OCT.2024 15:03:06

GFSK_DH5_Channel 0

GFSK_DH5_Channel 39



Date: 21.OCT.2024 15:04:49



Date: 21.OCT.2024 15:06:41

GFSK_DH5_Channel 78

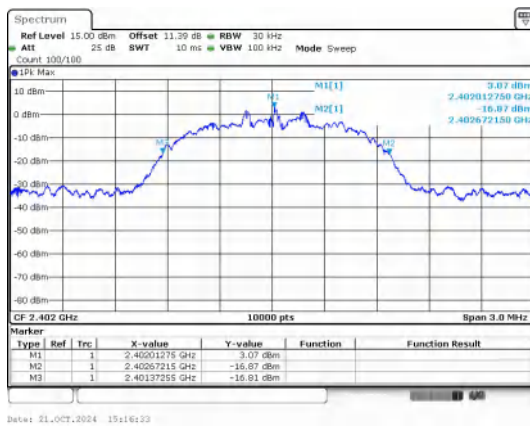
 $\pi/4$ DQPSK_2-DH5_Channel 0



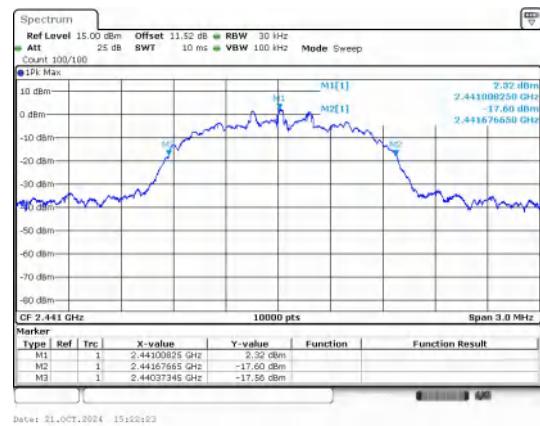
$\pi/4$ DQPSK_2-DH5_Channel 39



$\pi/4$ DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



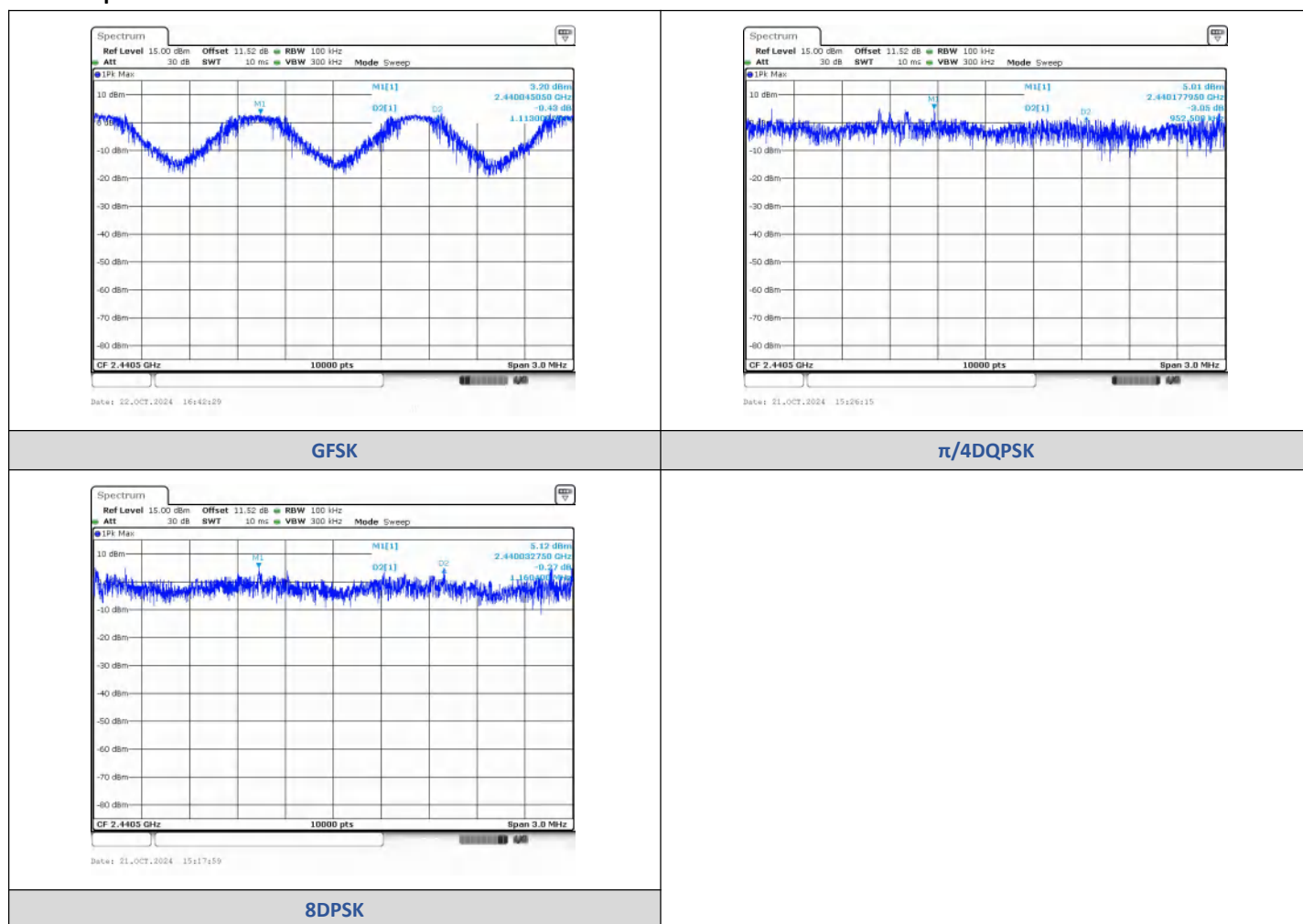
8DPSK_3-DH5_Channel 78

7) Carrier Frequencies Separation

Test Result

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2440.0451	2441.1581	1.1130	1.030	PASS
$\pi/4$ DQPSK	2-DH5	2440.1779	2441.1305	0.9525	0.873	PASS
8DPSK	3-DH5	2440.0327	2441.1932	1.1604	0.867	PASS

Test Graphs



8) Conducted Out Of Band Emission

Test Result

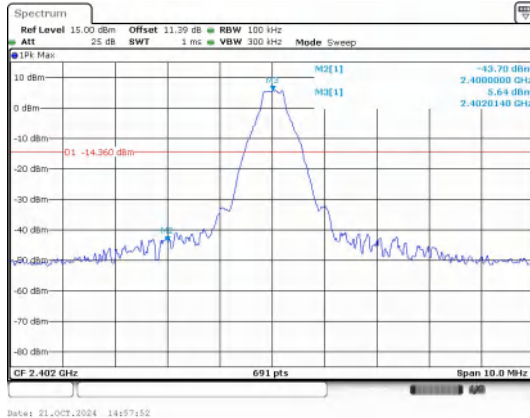
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-43.701	-14.36	-29.341	PASS
			7206.79	-38.631	-14.36	-24.271	PASS
		39	9763.72	-39.736	-14.67	-25.066	PASS
		78	2483.50	-49.383	-15.52	-33.863	PASS
			9920.20	-39.514	-15.52	-23.994	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-46.606	-14.52	-32.086	PASS
			7205.96	-43.176	-14.52	-28.656	PASS
		39	9763.72	-39.959	-14.76	-25.199	PASS
		78	2483.50	-49.353	-15.66	-33.693	PASS
			9920.20	-39.904	-15.66	-24.244	PASS
8DPSK	3-DH5	0	2400.00	-45.880	-14.69	-31.191	PASS
			7205.96	-37.295	-14.69	-22.605	PASS
		39	9763.72	-39.498	-14.85	-24.648	PASS
		78	2483.50	-51.013	-15.62	-35.393	PASS
			9920.20	-39.666	-15.62	-24.046	PASS

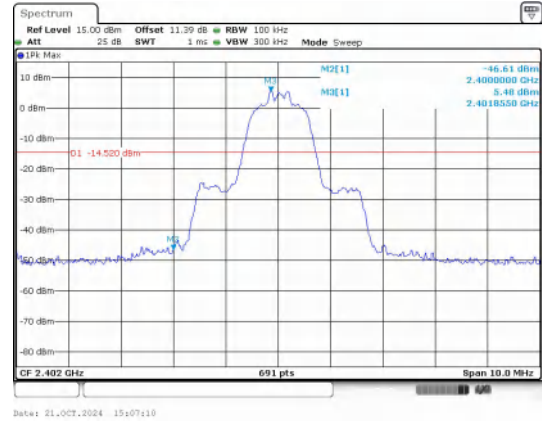
Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2398.96	-47.494	-14.84	-32.654	PASS
			2400.00	-50.213	-14.84	-35.373	PASS
			2483.50	-50.169	-15.59	-34.579	PASS
$\pi/4$ DQPSK	2-DH5		2400.00	-46.759	-14.66	-32.099	PASS
			2483.50	-49.463	-15.49	-33.973	PASS
8DPSK	3-DH5		2396.50	-48.335	-15.7	-32.635	PASS
			2400.00	-48.590	-15.7	-32.891	PASS
			2483.50	-49.389	-16.62	-32.769	PASS

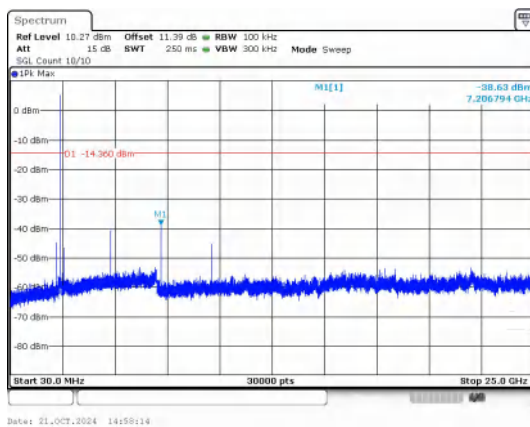
Test Graphs



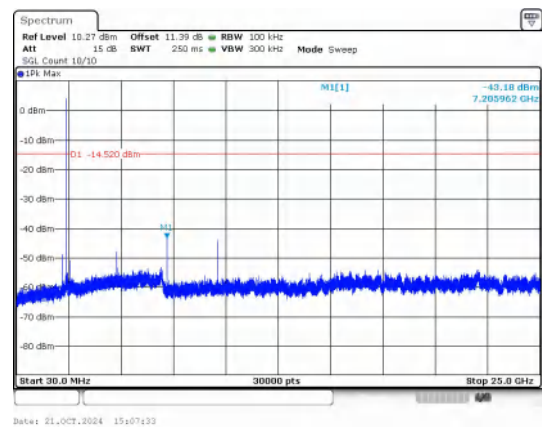
Out Of Band Emission
GFSK_DH5_Channel 0



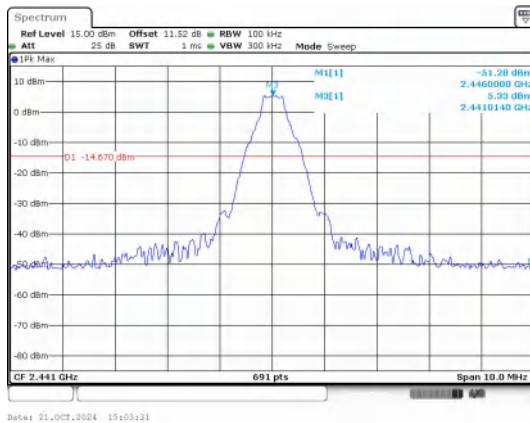
Out Of Band Emission
 $\pi/4$ QPSK_2-DH5_Channel 0



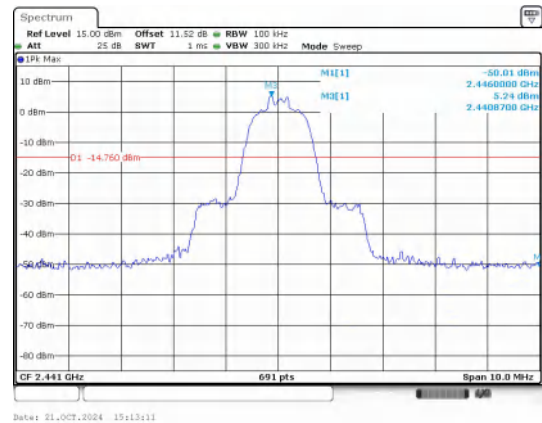
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



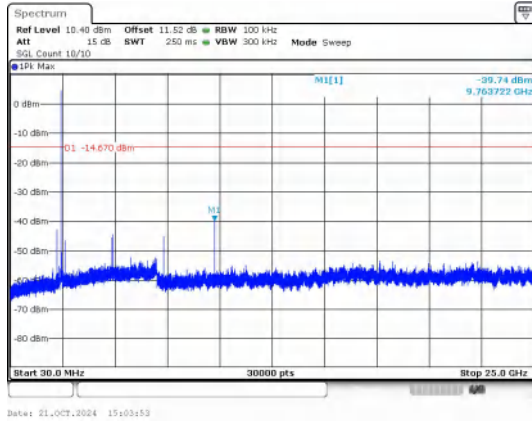
30.0 MHz - 25000.0 MHz
 $\pi/4$ QPSK_2-DH5_Channel 0



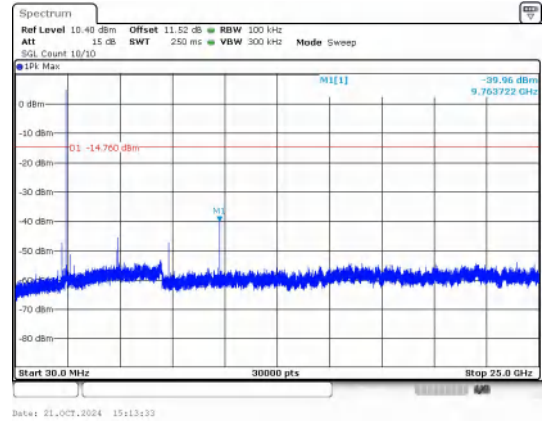
Out Of Band Emission
GFSK_DH5_Channel 39



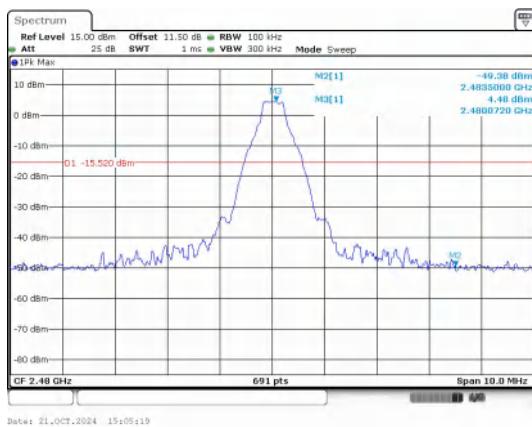
Out Of Band Emission
 $\pi/4$ QPSK_2-DH5_Channel 39



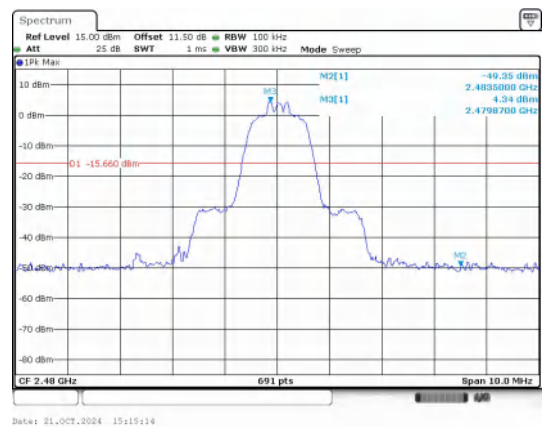
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



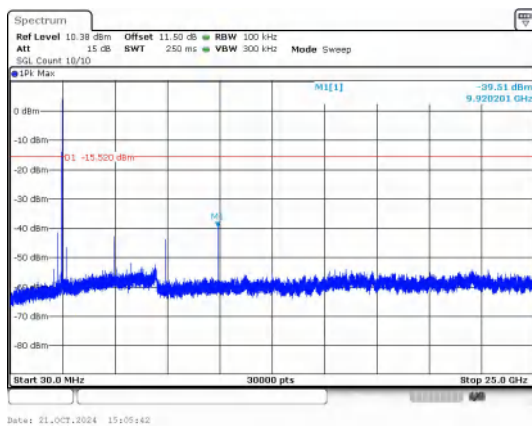
30.0 MHz - 25000.0 MHz
 $\pi/4$ QPSK_2-DH5_Channel 39



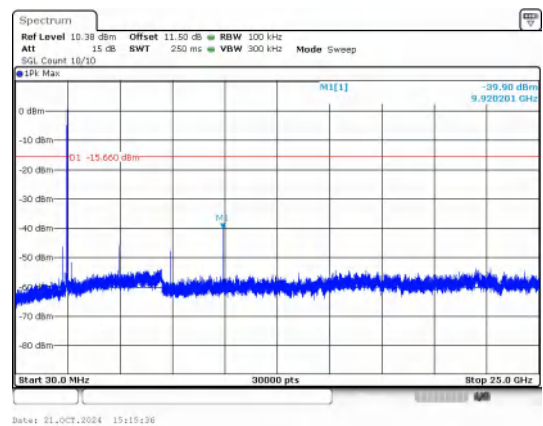
Out Of Band Emission
GFSK_DH5_Channel 78



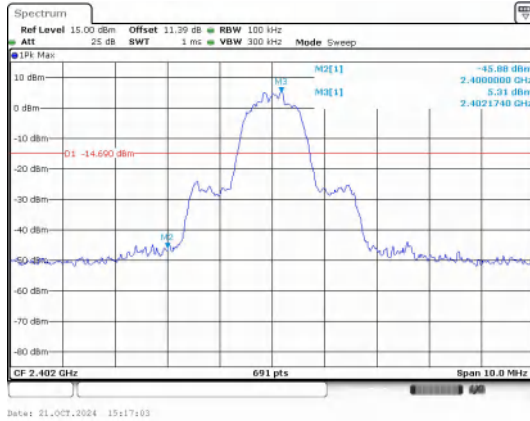
Out Of Band Emission
 $\pi/4$ QPSK_2-DH5_Channel 78



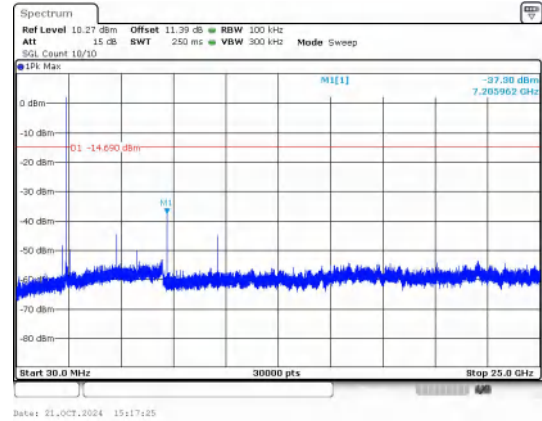
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



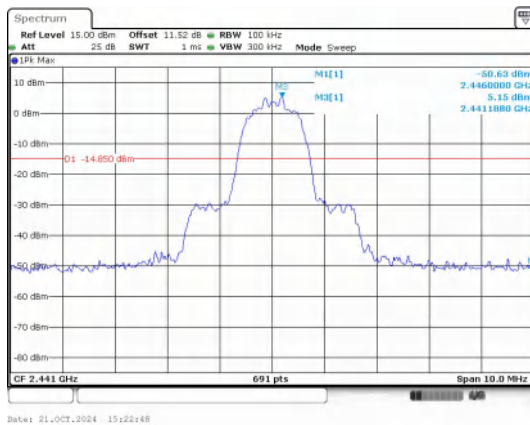
30.0 MHz - 25000.0 MHz
 $\pi/4$ QPSK_2-DH5_Channel 78



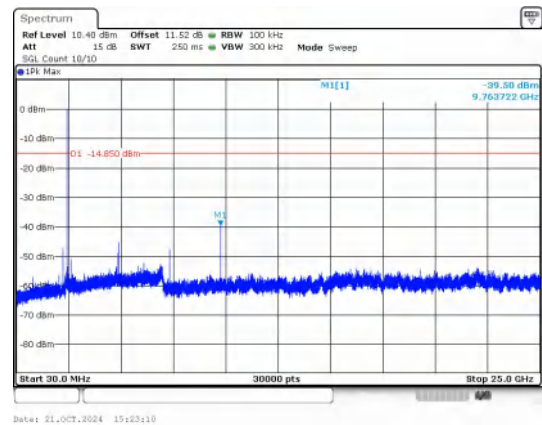
Out Of Band Emission
8DPSK_3-DH5_Channel 0



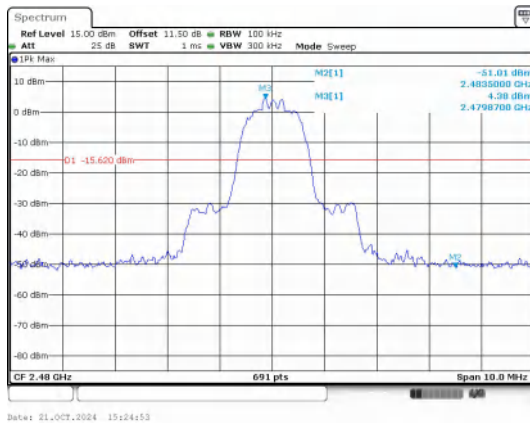
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



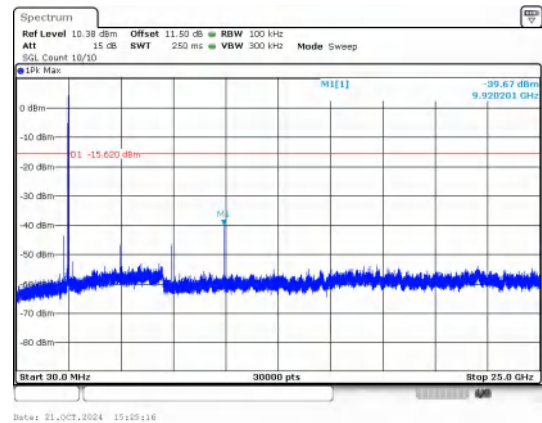
Out Of Band Emission
8DPSK_3-DH5_Channel 39



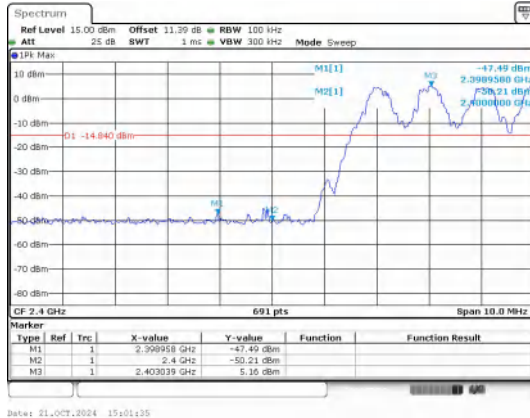
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



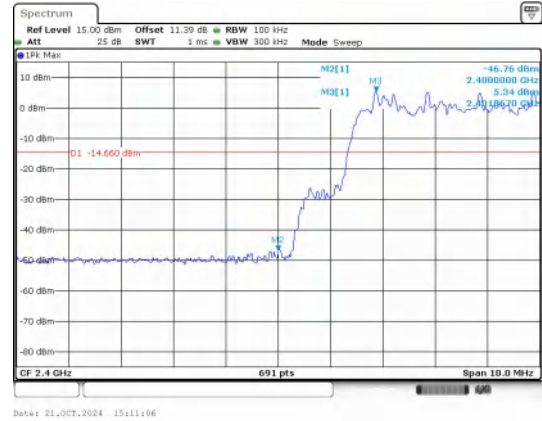
Out Of Band Emission
8DPSK_3-DH5_Channel 78



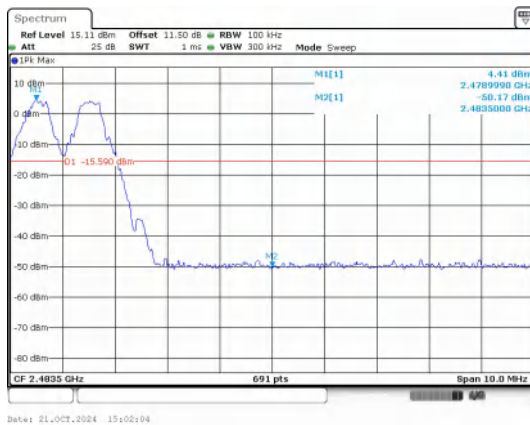
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



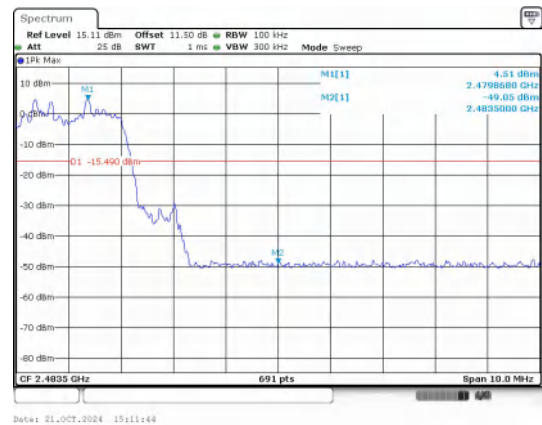
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



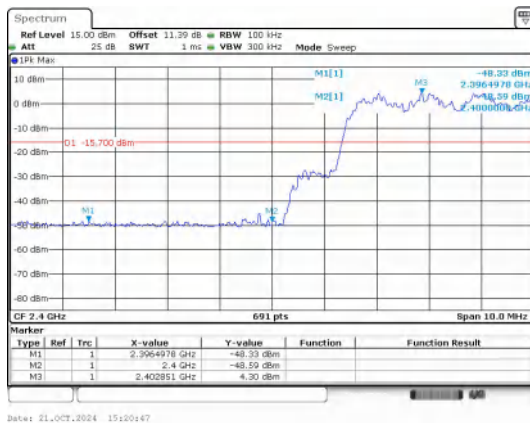
Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



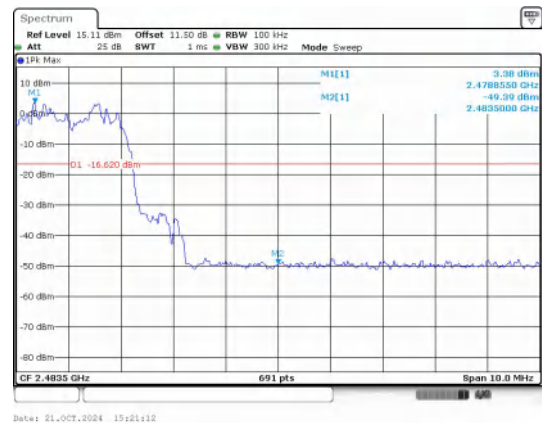
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



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