

Appendix

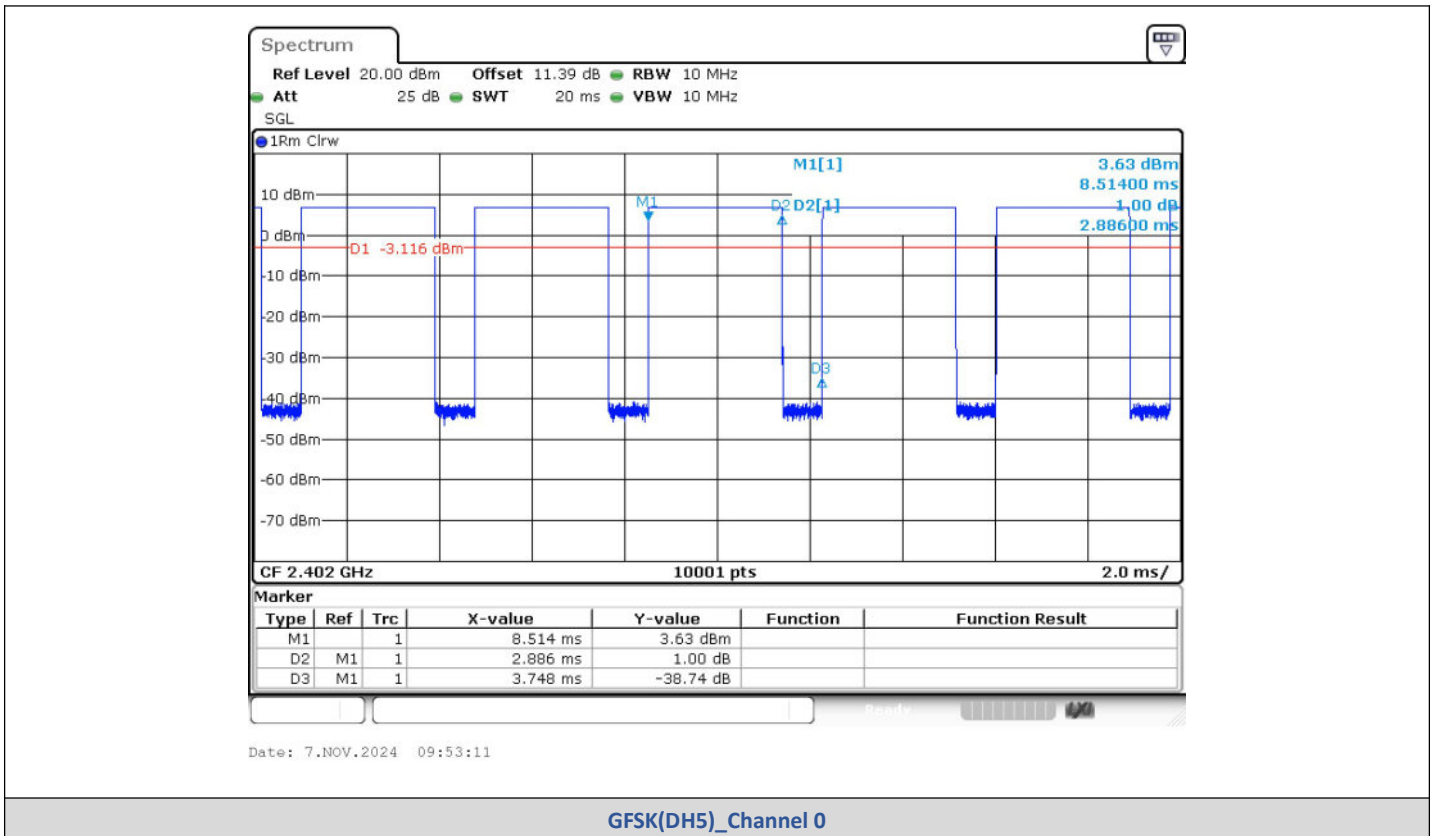
Report No.:	CISRR241105029
FCC ID:	2BL5P-TG-415
Product Name:	Bluetooth Speaker
Model No.:	TG-415
Test Engineer:	Lucas Huang
Supervised by:	Rory Huang

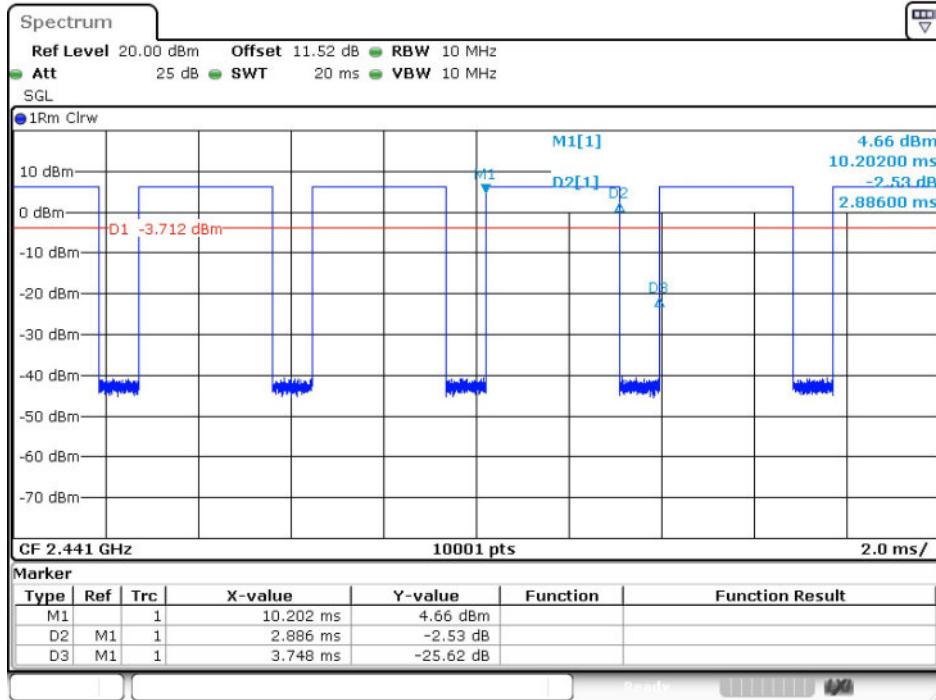
1) Duty Cycle

Test Result

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

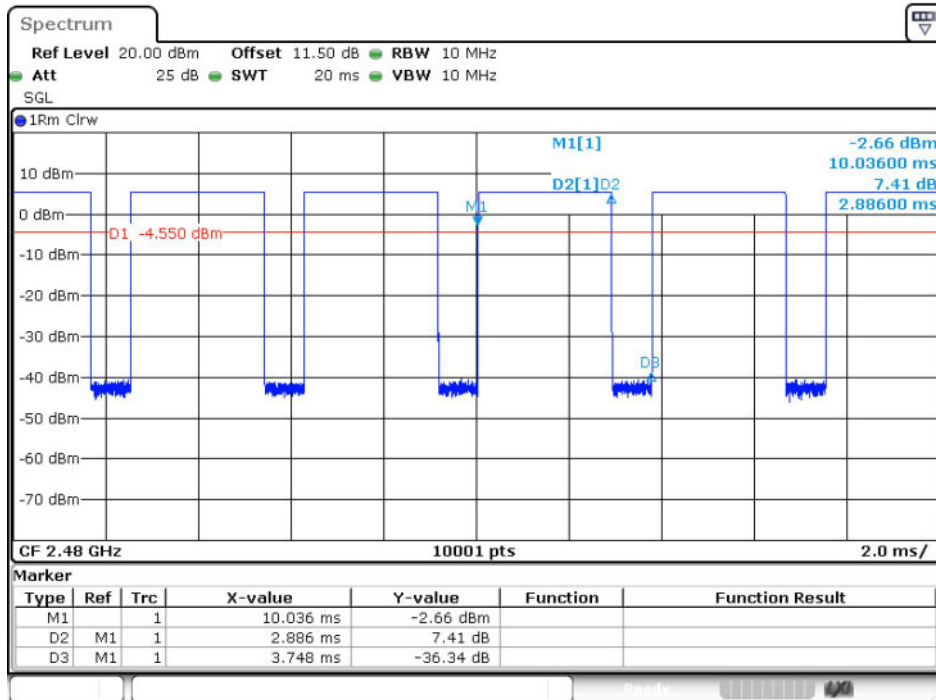
Test Graphs





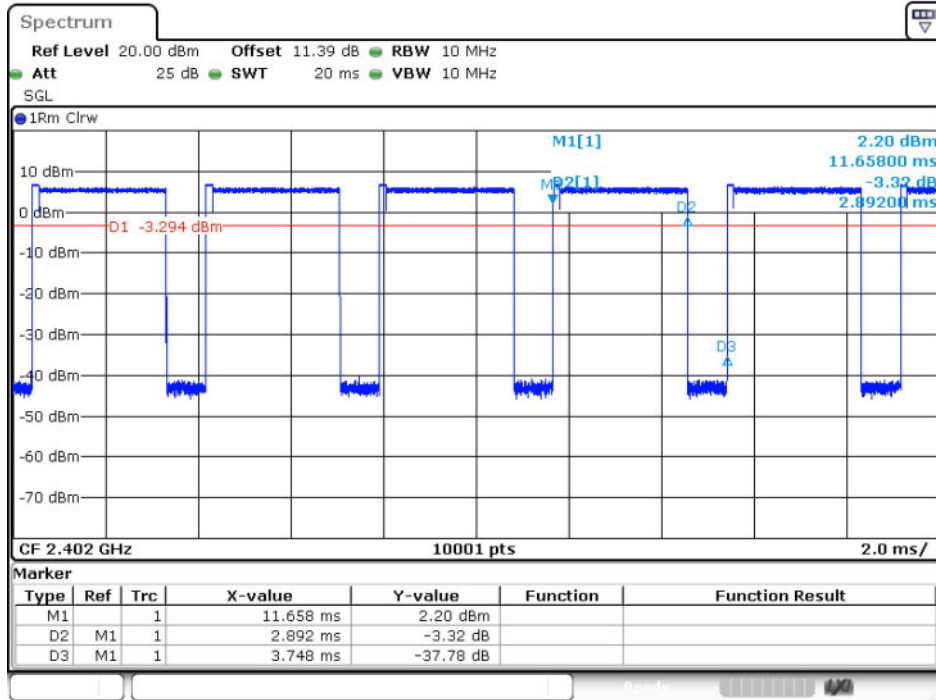
Date: 7.NOV.2024 10:01:40

GFSK(DH5)_Channel 39



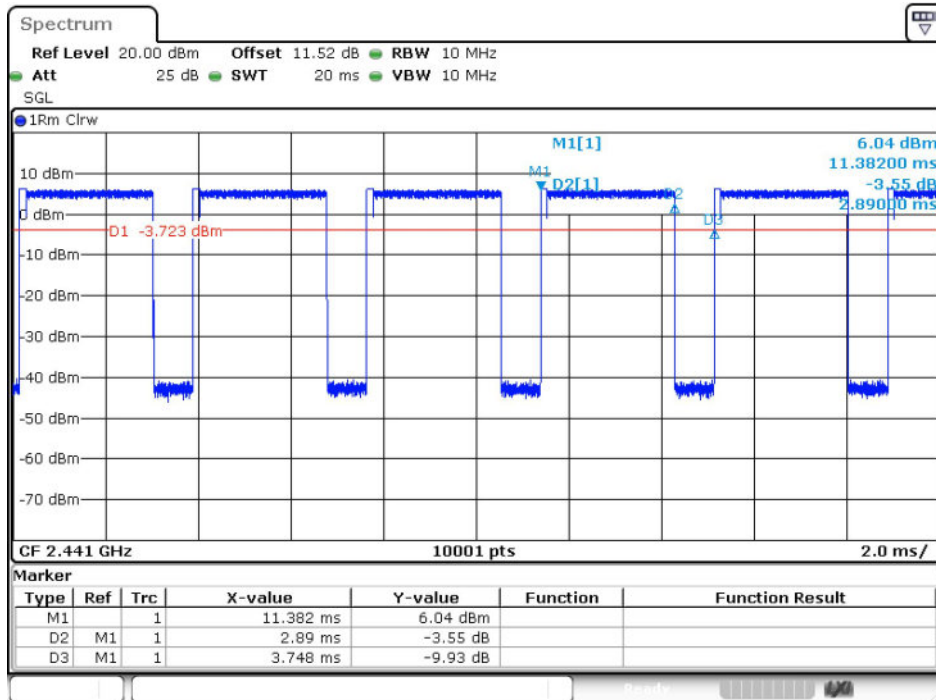
Date: 7.NOV.2024 10:09:58

GFSK(DH5)_Channel 78



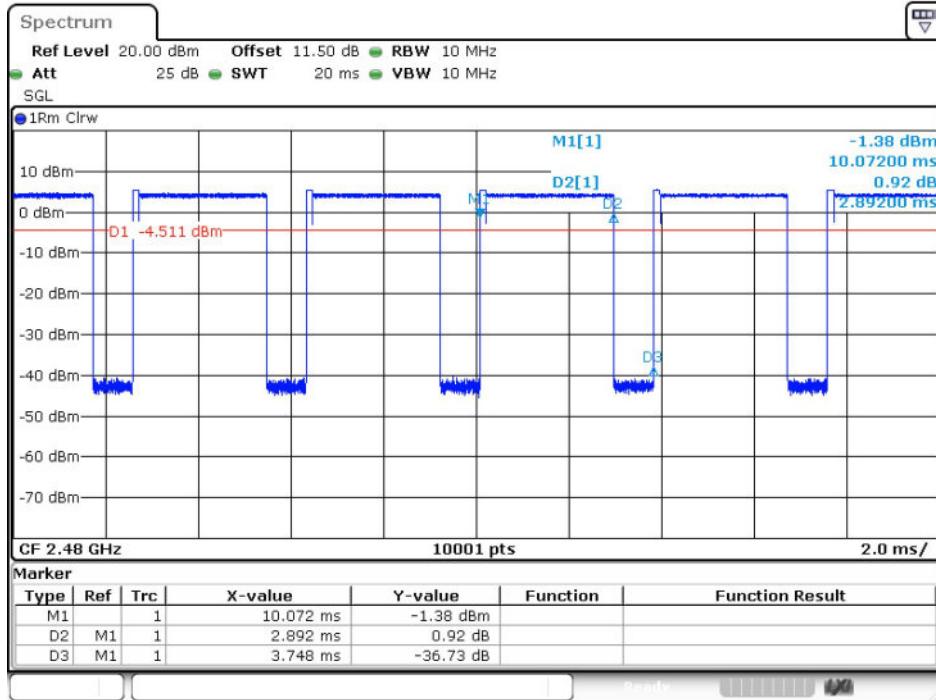
Date: 7.NOV.2024 10:12:15

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



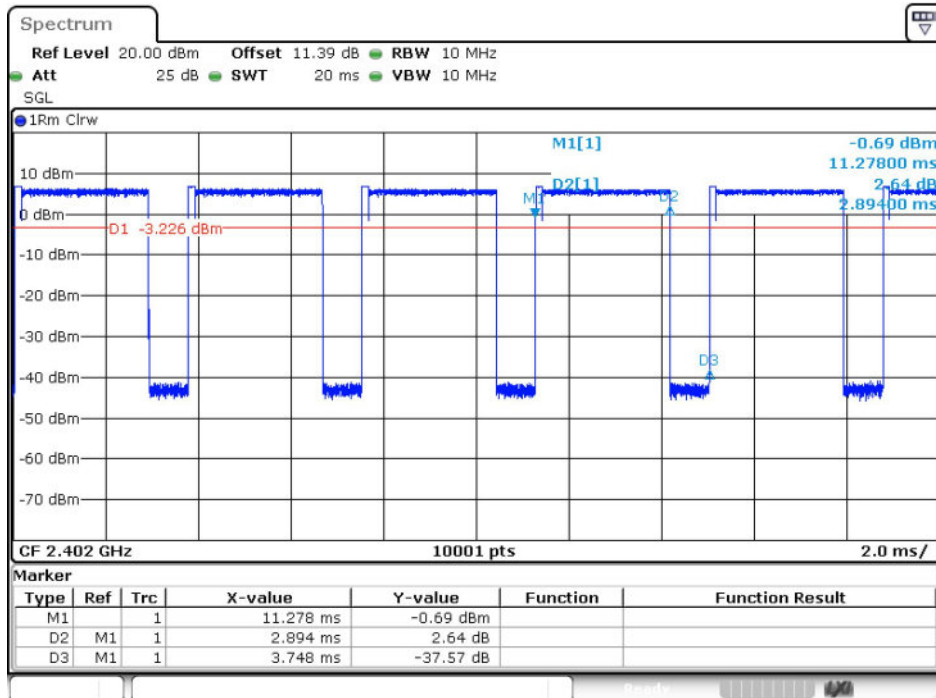
Date: 7.NOV.2024 10:18:30

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



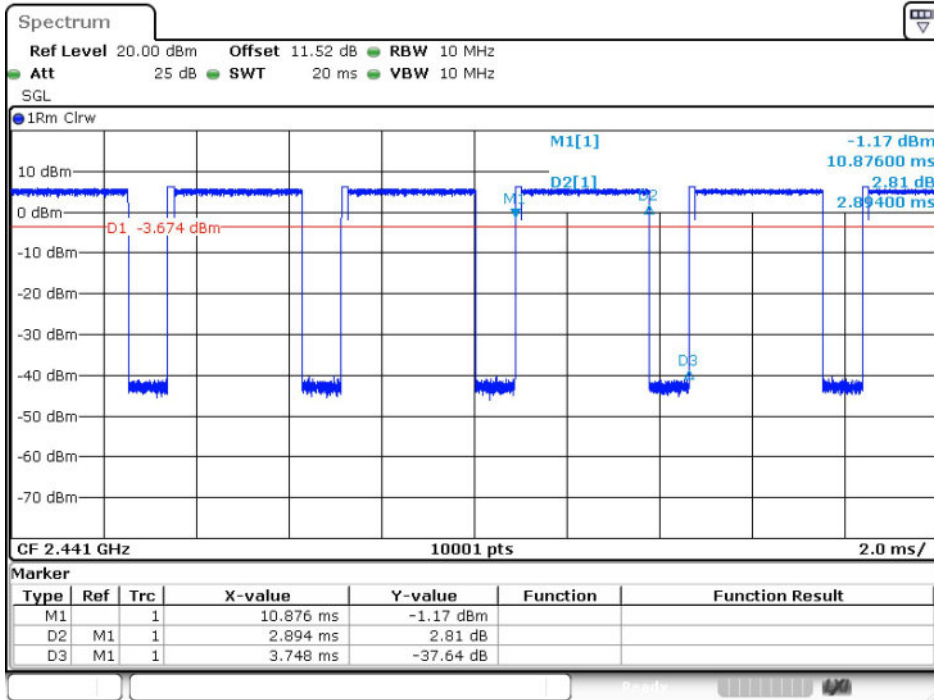
Date: 7.NOV.2024 10:20:30

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



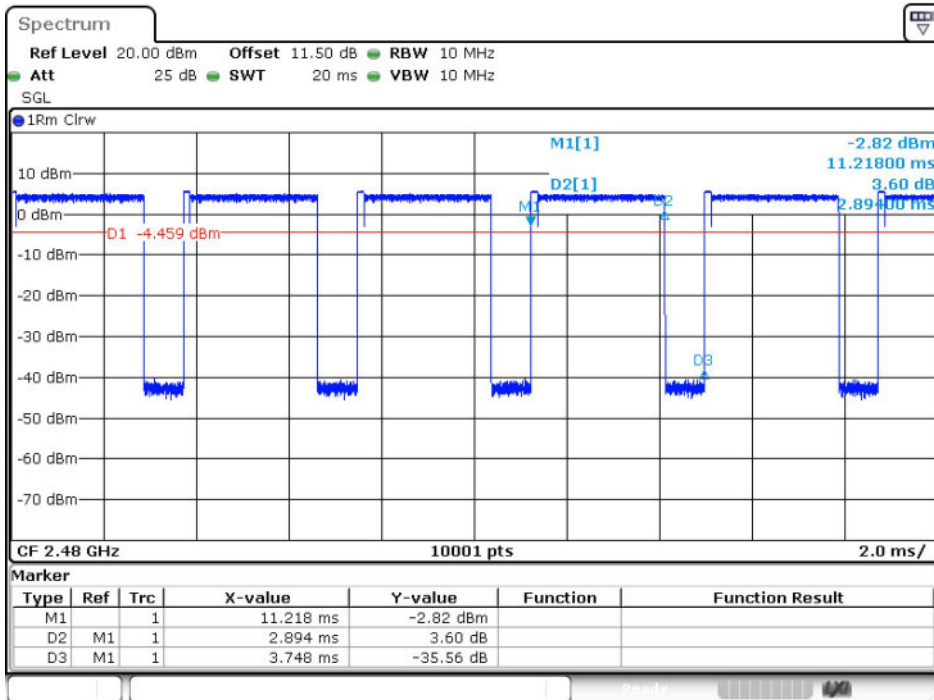
Date: 7.NOV.2024 10:22:55

8DPSK(3-DH5)_Channel 0



Date: 7.NOV.2024 10:29:33

8DPSK(3-DH5)_Channel 39



Date: 7.NOV.2024 10:31:33

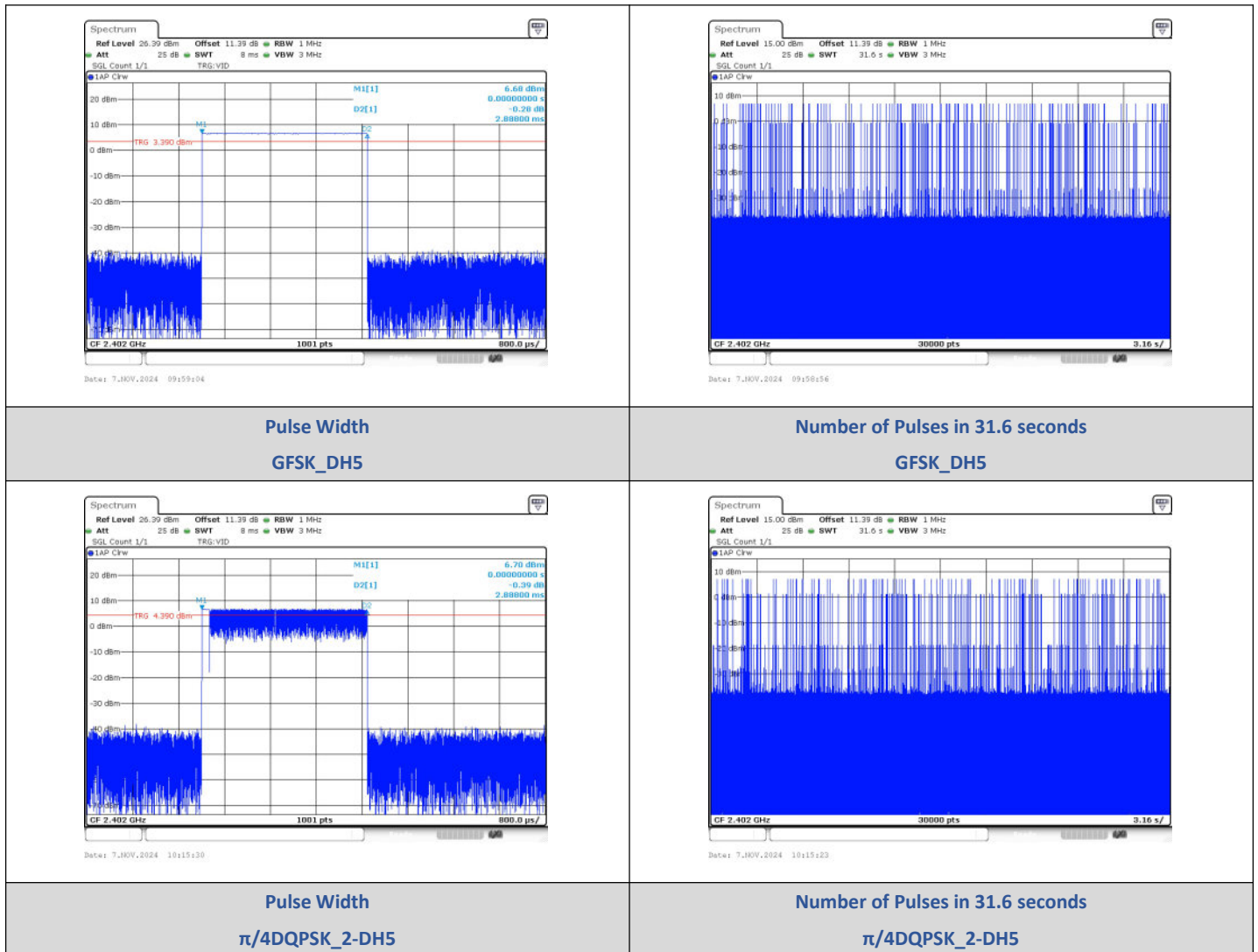
8DPSK(3-DH5)_Channel 78

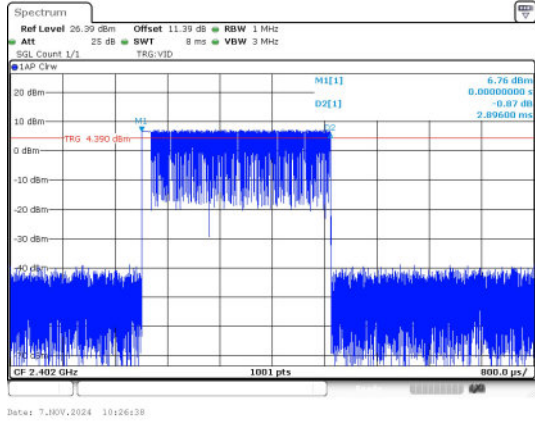
2) Dwell Time

Test Result

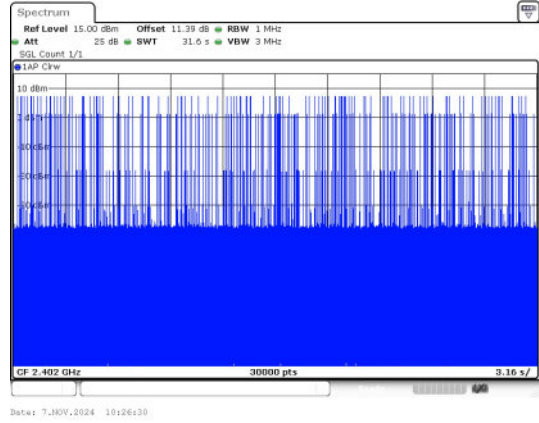
Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CHO (2402MHz)	2.888	122	352.34	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.888	102	294.58		PASS
8DPSK	3-DH5		2.896	111	321.46		PASS

Test Graphs





Pulse Width
8DPSK_3-DH5



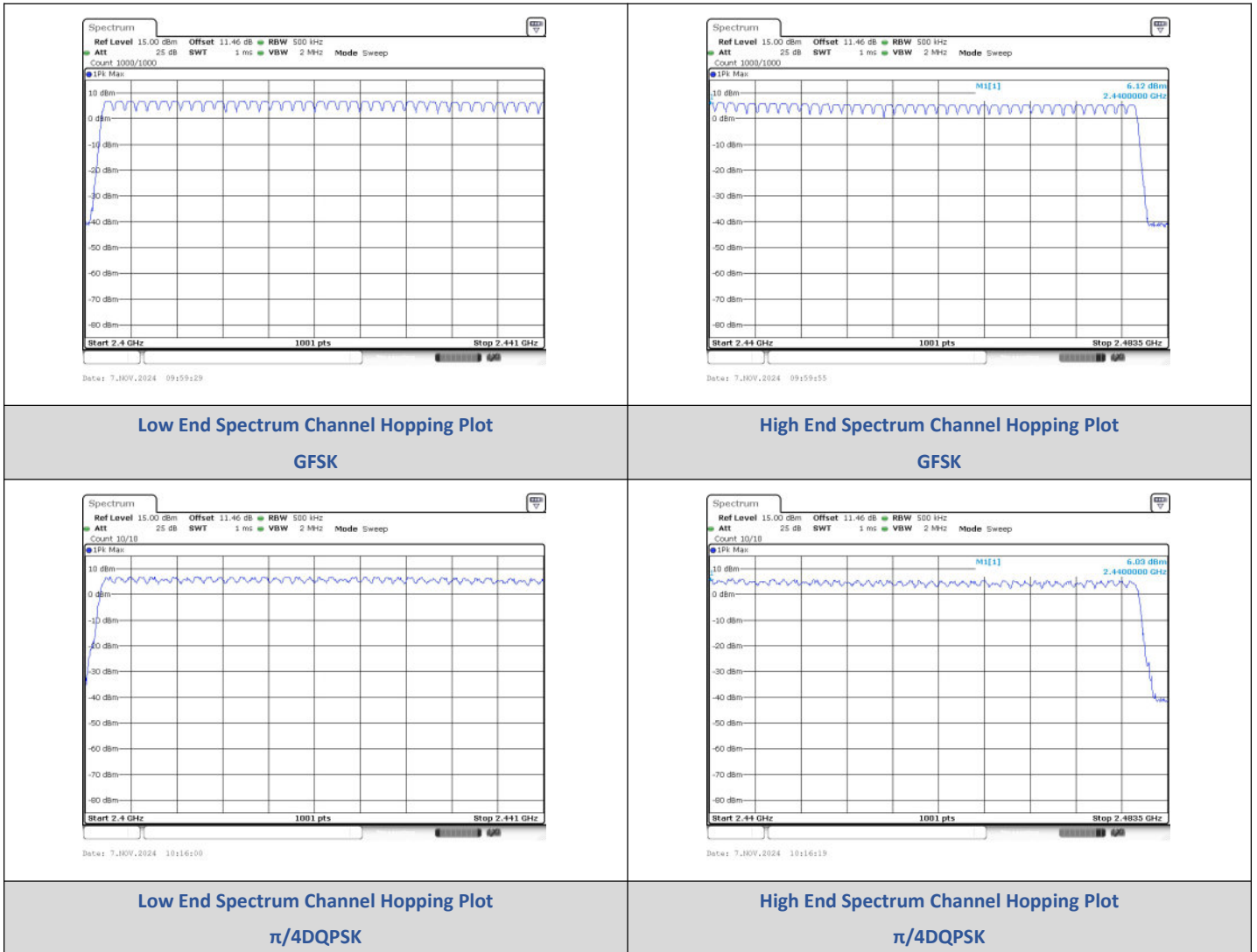
Number of Pulses in 31.6 seconds
8DPSK_3-DH5

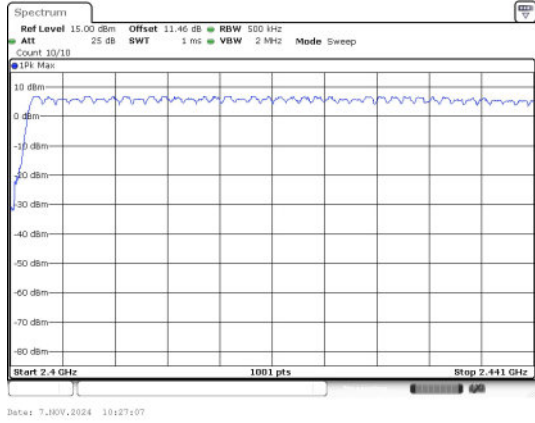
3) Number Of Hopping Channel

Test Result

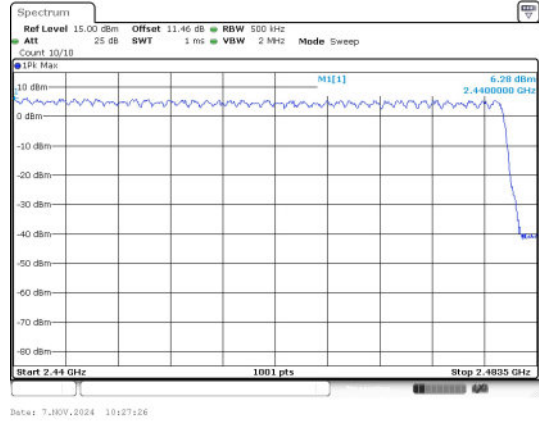
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
$\pi/4$ DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

Test Graphs





Low End Spectrum Channel Hopping Plot
 8DPSK



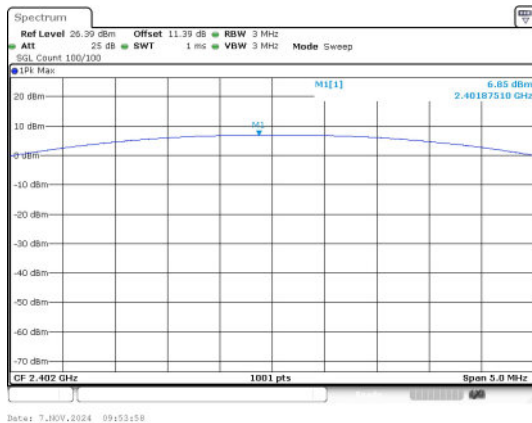
High End Spectrum Channel Hopping Plot
 8DPSK

4) Conducted Peak Output Power

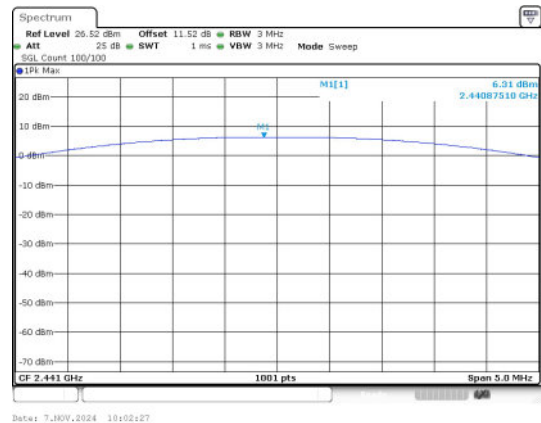
Test Result

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	6.85	4.84	≤30	PASS
		39	6.31	4.28		PASS
		78	5.48	3.53		PASS
π/4DQPSK	2-DH5	0	7.35	5.43	≤20.97	PASS
		39	6.88	4.88		PASS
		78	6.20	4.17		PASS
8DPSK	3-DH5	0	7.60	5.75	≤20.97	PASS
		39	7.12	5.15		PASS
		78	6.43	4.40		PASS

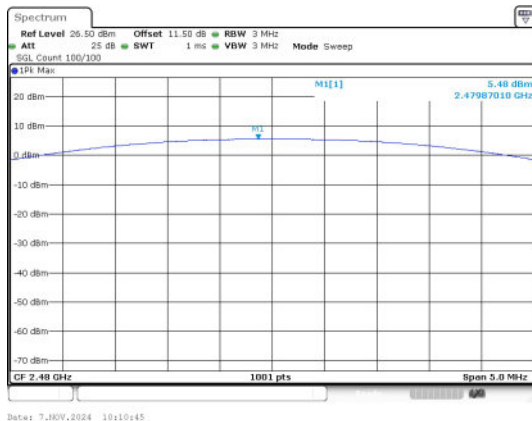
Test Graphs



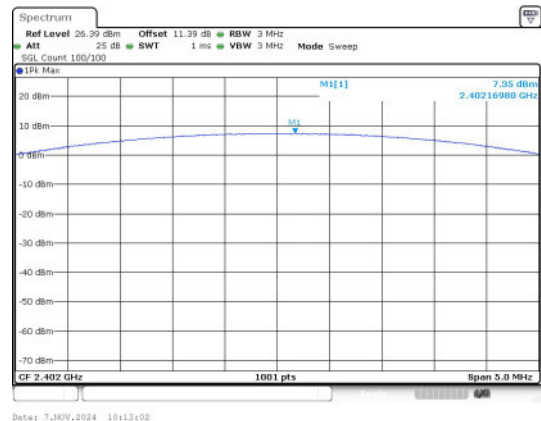
Peak Output Power
GFSK_Channel 0



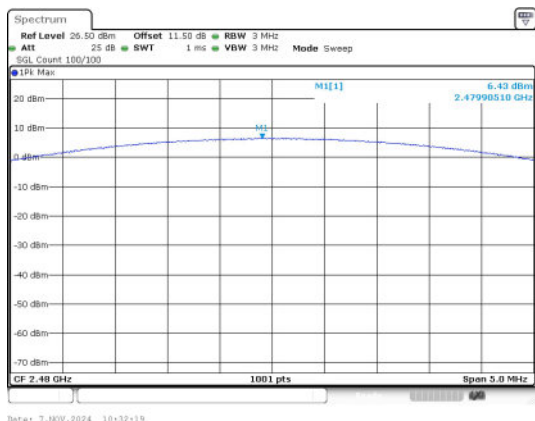
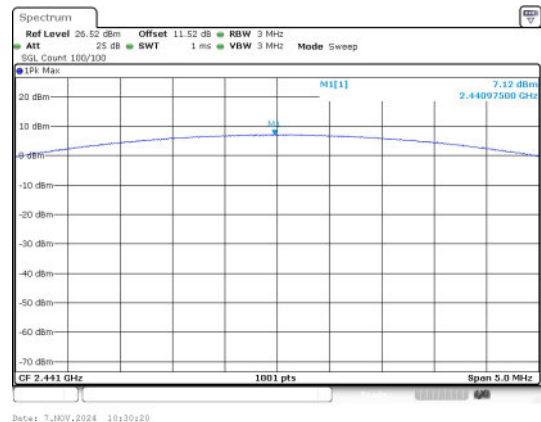
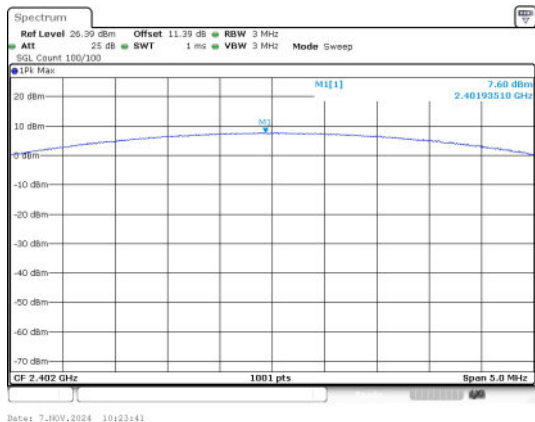
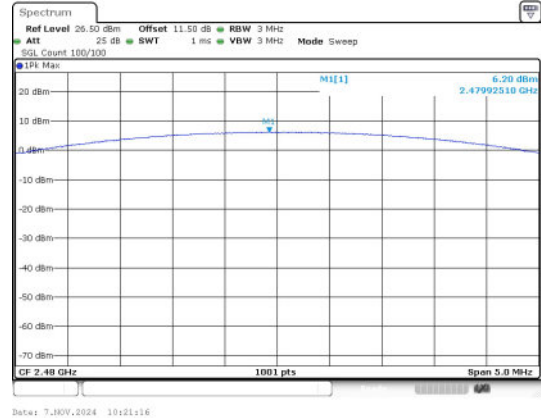
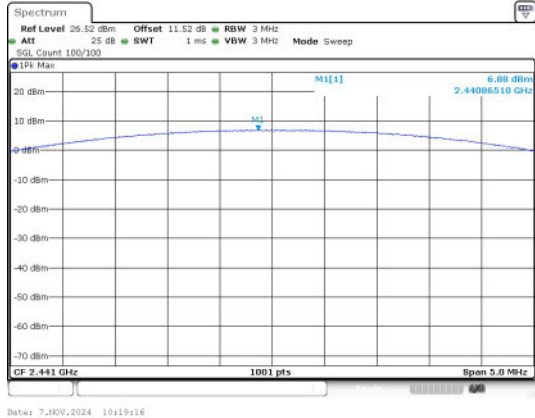
Peak Output Power
GFSK_Channel 39



Peak Output Power
GFSK_Channel 78



Peak Output Power
π/4DQPSK_Channel 0

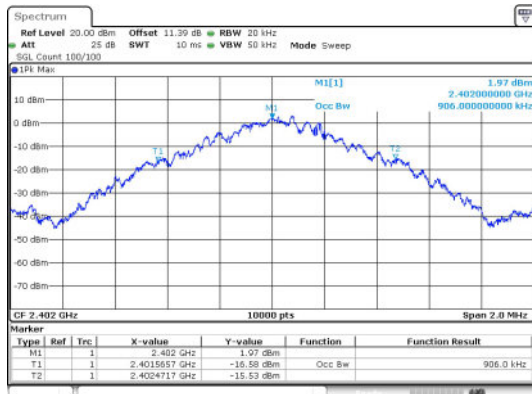


5) 99% Bandwidth

Test Result

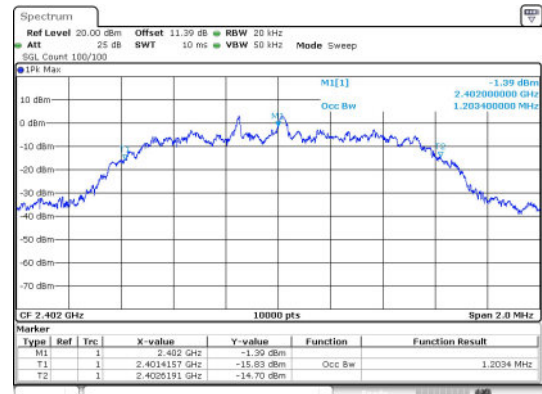
Modulation	Channel	Center Frequency (MHz)	99% BW (MHz)
GFSK	0	2402	0.90600
	39	2441	0.89800
	78	2480	0.89300
$\pi/4$ DQPSK	0	2402	1.2034
	39	2441	1.2038
	78	2480	1.2056
8DPSK	0	2402	1.2188
	39	2441	1.2206
	78	2480	1.2130

Test Graphs



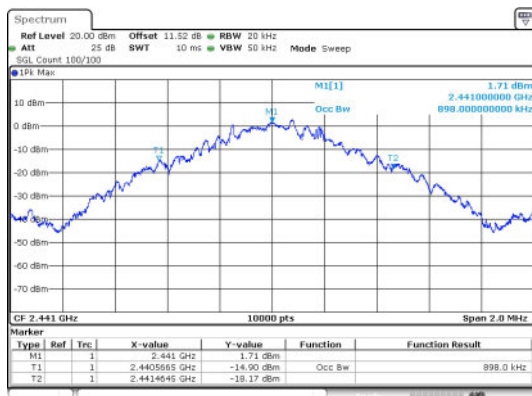
Date: 7.NOV.2024 09:53:27

GFSK_DH5_Channel 0



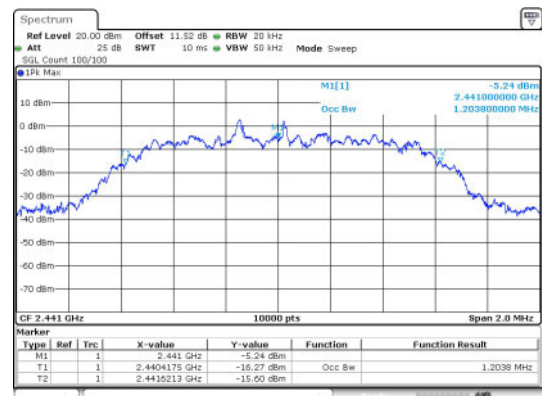
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$\pi/4$ DQPSK_2-DH5_Channel 0



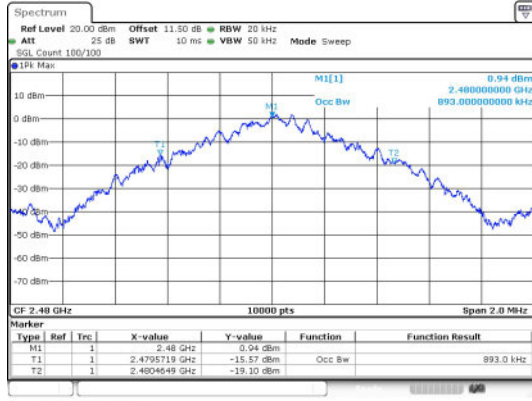
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GFSK_DH5_Channel 39



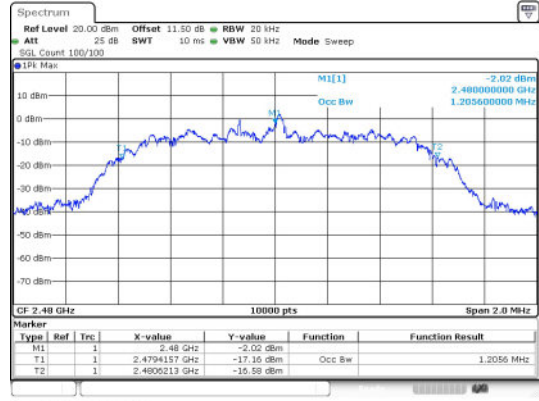
Date: 7.NOV.2024 10:18:46

$\pi/4$ DQPSK_2-DH5_Channel 39



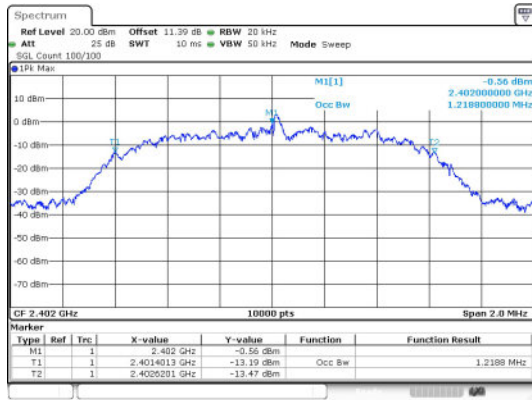
Date: 7.NOV.2024 10:10:14

GFSK_DH5_Channel 78



Date: 7.NOV.2024 10:10:16

$\pi/4$ DQPSK_2-DH5_Channel 78



Date: 7.NOV.2024 10:23:11

8DPSK_3-DH5_Channel 0



Date: 7.NOV.2024 10:29:49

8DPSK_3-DH5_Channel 39



Date: 7.NOV.2024 10:31:49

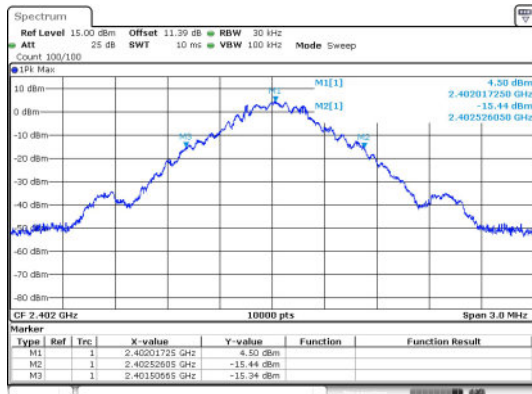
8DPSK_3-DH5_Channel 78

6) 20dB Bandwidth

Test Result

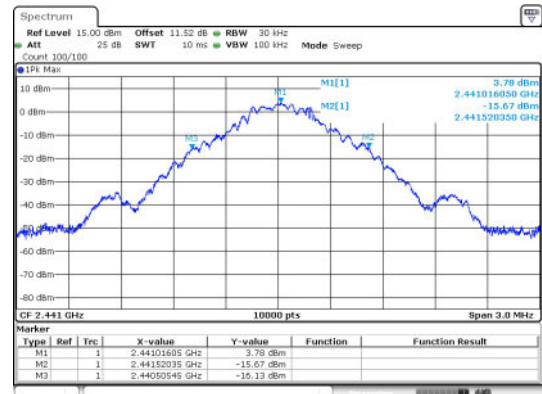
Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.020
	39	2441 MHz	1.010
	78	2480 MHz	1.020
$\pi/4$ DQPSK	0	2402 MHz	1.310
	39	2441 MHz	1.310
	78	2480 MHz	1.310
8DPSK	0	2402 MHz	1.300
	39	2441 MHz	1.300
	78	2480 MHz	1.310

Test Graphs



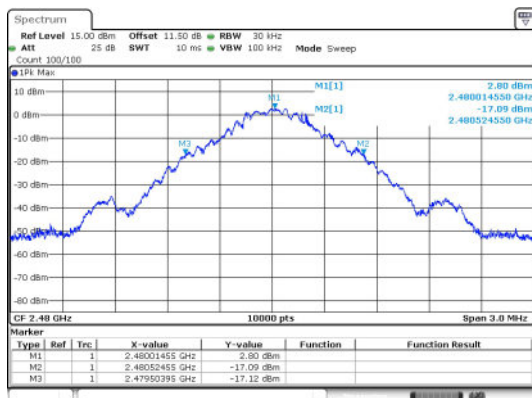
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GFSK_DH5_Channel 0



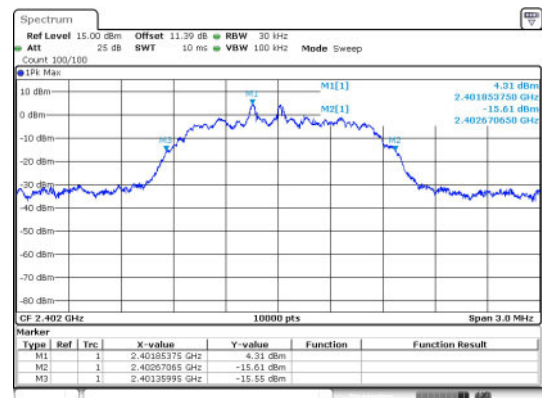
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GFSK_DH5_Channel 39



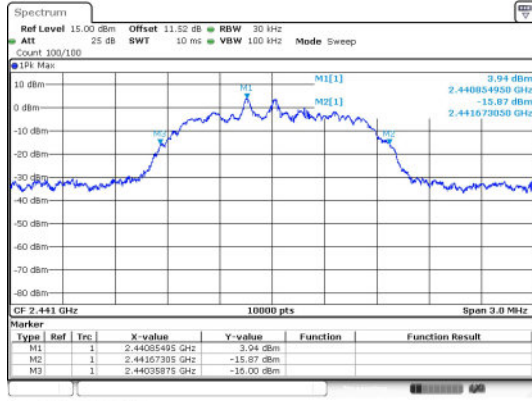
Date: 7.NOV.2024 10:11:32

GFSK_DH5_Channel 78



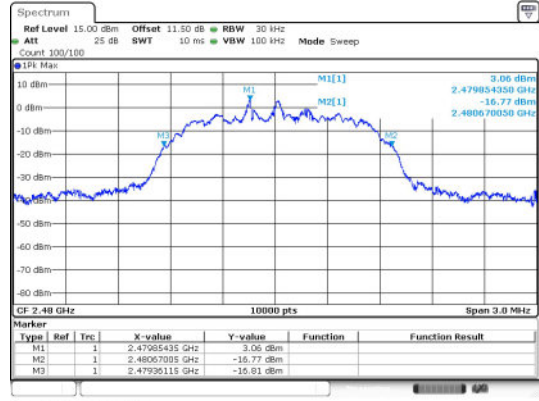
Date: 7.NOV.2024 10:12:19

$\pi/4$ DQPSK_2-DH5_Channel 0



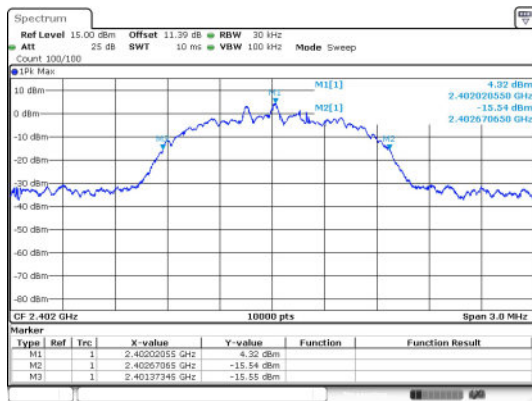
Date: 7.NOV.2024 10:19:04

$\pi/4$ DQPSK_2-DH5_Channel 39



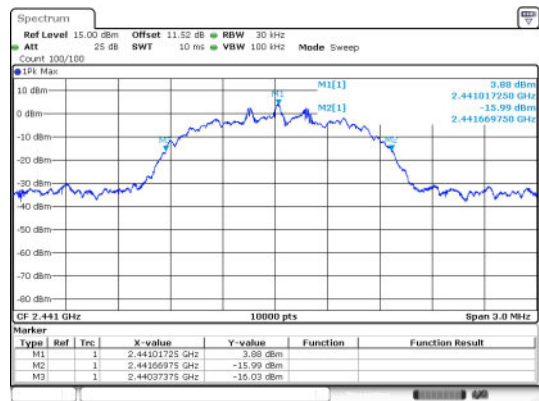
Date: 7.NOV.2024 10:21:04

$\pi/4$ DQPSK_2-DH5_Channel 78



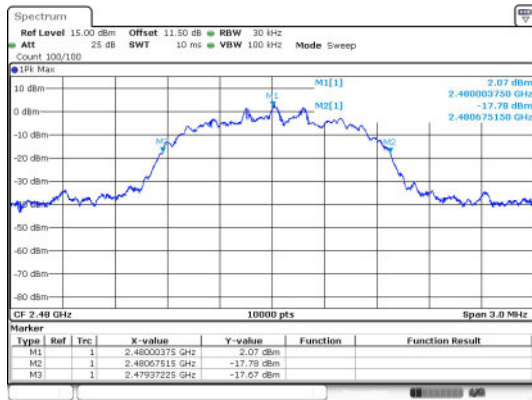
Date: 7.NOV.2024 10:23:29

8DPSK_3-DH5_Channel 30



Date: 7.NOV.2024 10:20:07

8DPSK_3-DH5_Channel 39



Date: 7.NOV.2024 10:32:07

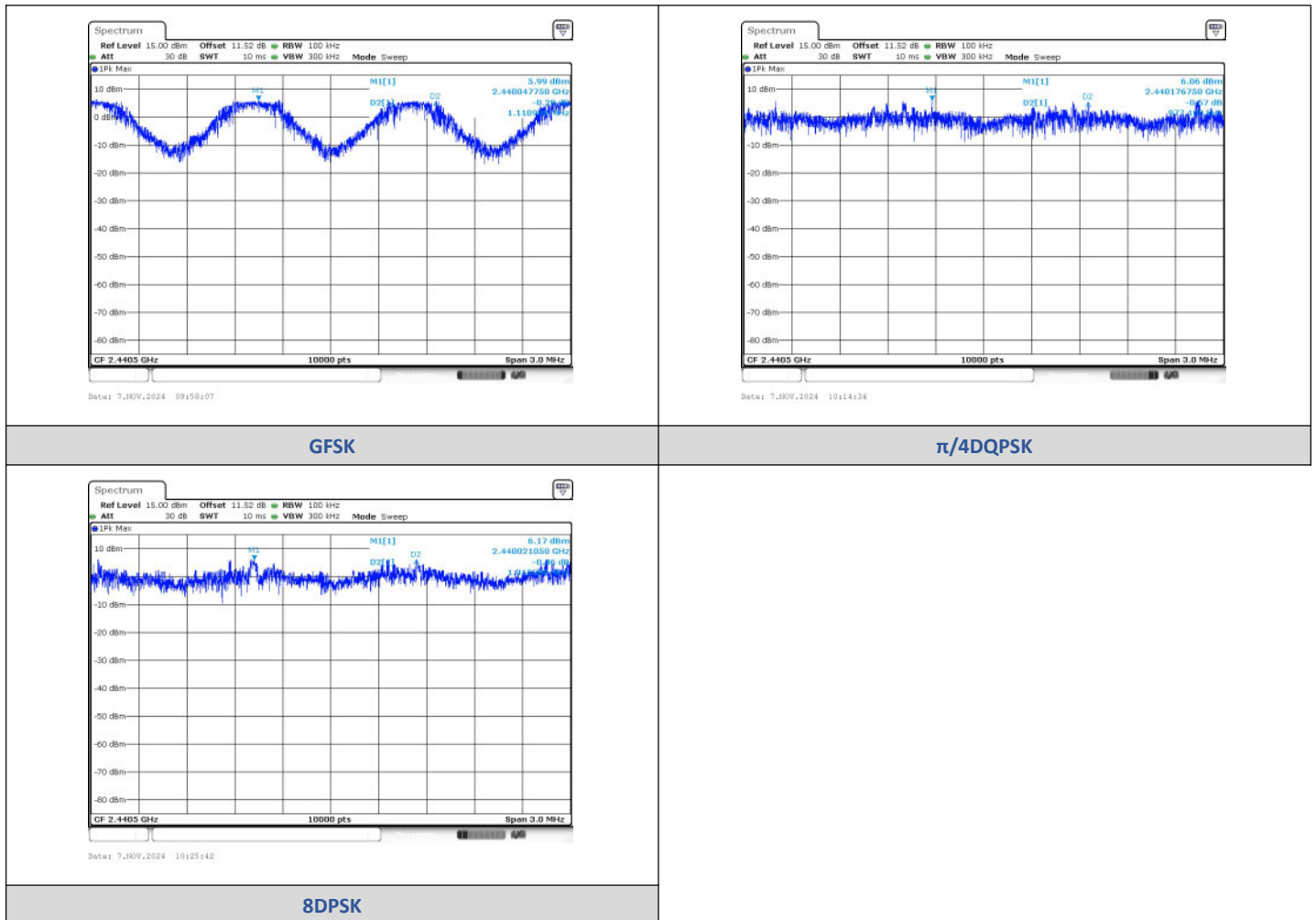
8DPSK_3-DH5_Channel 78

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	2440.0478	2441.1586	1.1109	1.020	PASS
$\pi/4$ DQPSK	2-DH5	2440.1768	2441.1539	0.9771	0.873	PASS
8DPSK	3-DH5	2440.021	2441.0365	1.0155	0.867	PASS

Test Graphs



8) Conducted Out Of Band Emission

Test Result

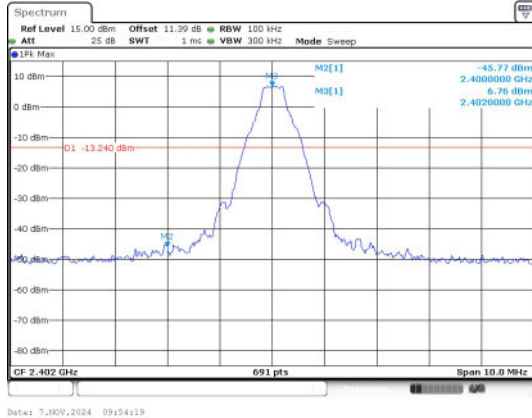
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-45.770	-13.24	-32.530	PASS
			4803.85	-40.937	-13.24	-27.697	PASS
		39	9763.72	-39.478	-13.78	-25.698	PASS
		78	2483.50	-50.780	-14.67	-36.110	PASS
			9920.20	-38.983	-14.67	-24.313	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-43.710	-13.34	-30.370	PASS
			4803.85	-44.206	-13.34	-30.866	PASS
		39	9763.72	-39.201	-14.1	-25.101	PASS
		78	2483.50	-49.800	-14.57	-35.230	PASS
			9920.20	-39.050	-14.57	-24.480	PASS
8DPSK	3-DH5	0	2400.00	-42.280	-13.58	-28.700	PASS
			4803.85	-43.270	-13.58	-29.690	PASS
		39	9763.72	-38.694	-14.22	-24.474	PASS
		78	2483.50	-50.590	-14.97	-35.620	PASS
			9920.20	-38.824	-14.97	-23.854	PASS

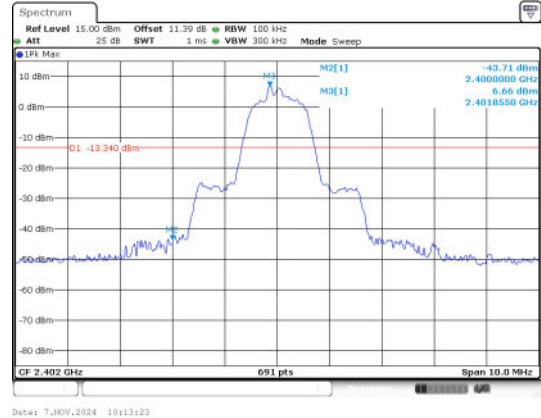
Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2397.00	-47.189	-13.39	-33.799	PASS
			2400.00	-47.650	-13.39	-34.260	PASS
			2483.50	-49.790	-14.73	-35.060	PASS
$\pi/4$ DQPSK	2-DH5		2397.79	-48.210	-13.38	-34.830	PASS
			2400.00	-51.530	-13.38	-38.150	PASS
			2483.50	-49.560	-14.57	-34.990	PASS
8DPSK	3-DH5		2395.77	-48.106	-13.92	-34.186	PASS
			2400.00	-50.410	-13.92	-36.490	PASS
			2483.50	-50.770	-17.36	-33.410	PASS

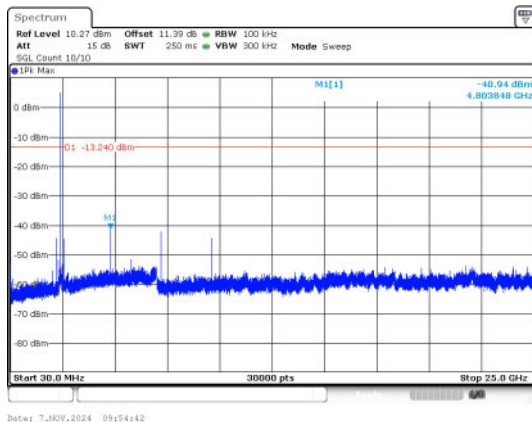
Test Graphs



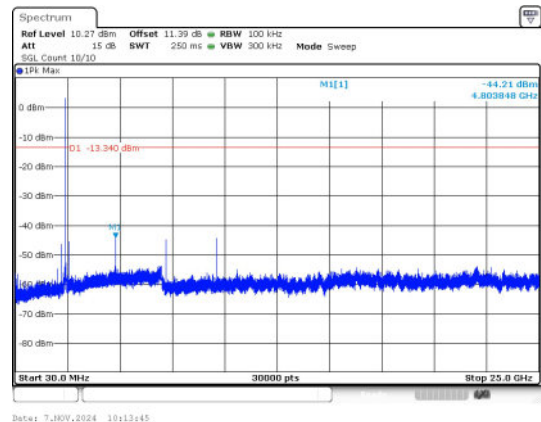
**Out Of Band Emission
GFSK_DH5_Channel 0**



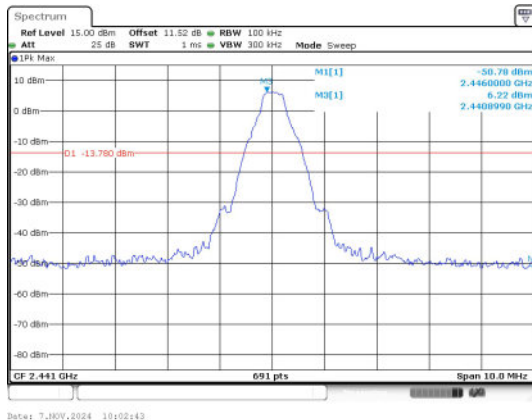
**Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 0**



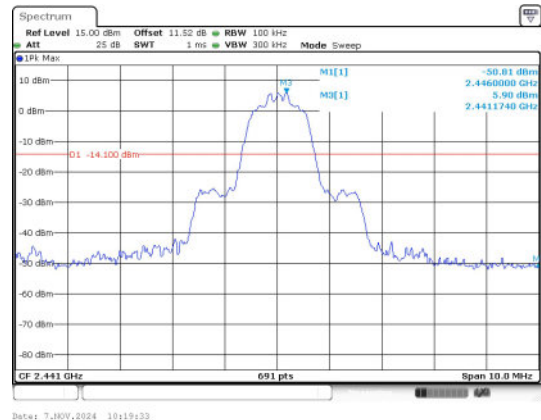
**30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0**



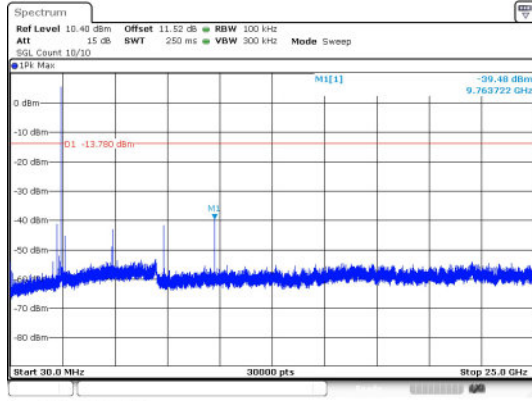
**30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 0**



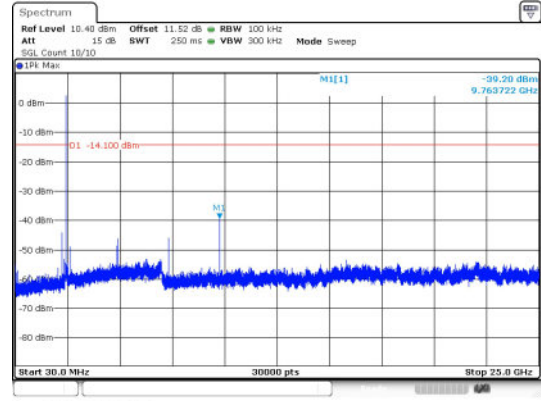
**Out Of Band Emission
GFSK_DH5_Channel 39**



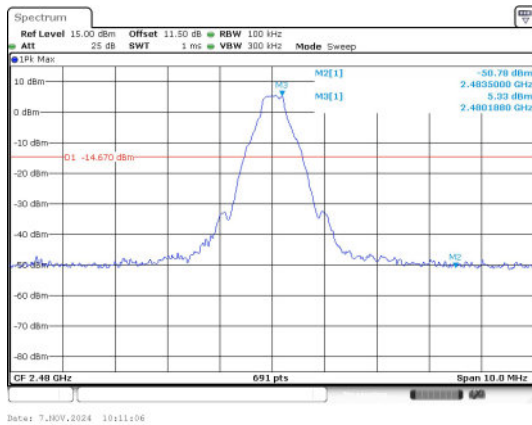
**Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39**



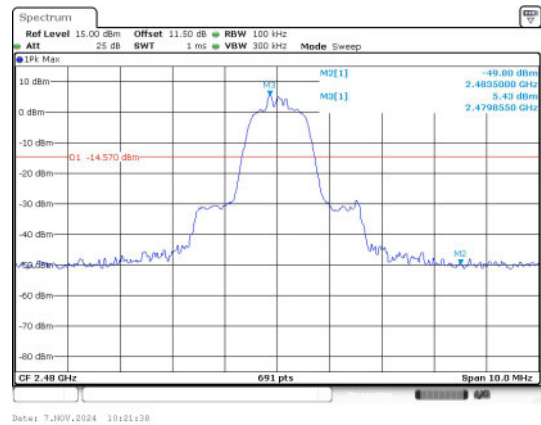
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



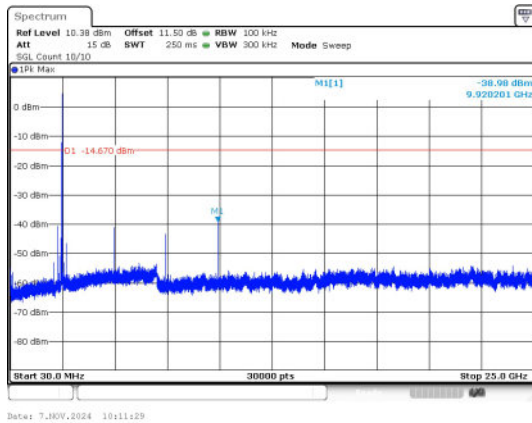
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39



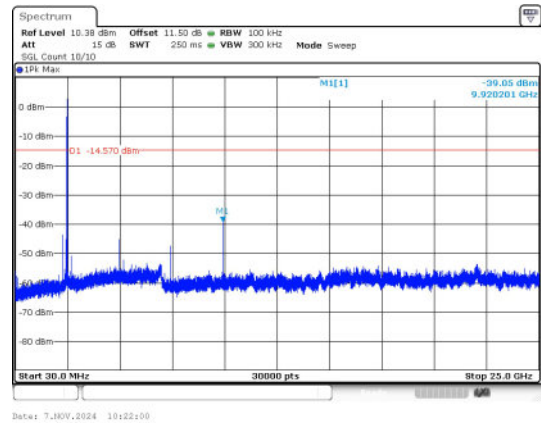
Out Of Band Emission
GFSK_DH5_Channel 78



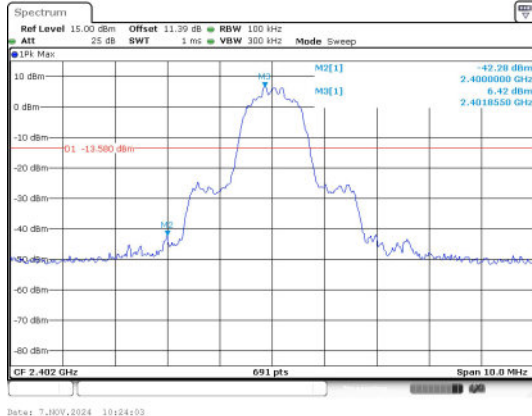
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78

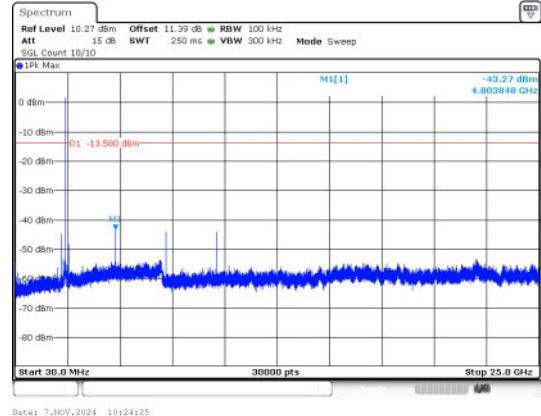


30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 78



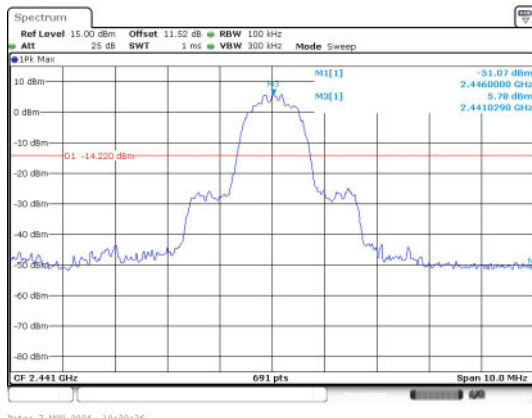
Date: 7.NOV.2024 10:24:03

Out Of Band Emission
8DPSK_3-DH5_Channel 0



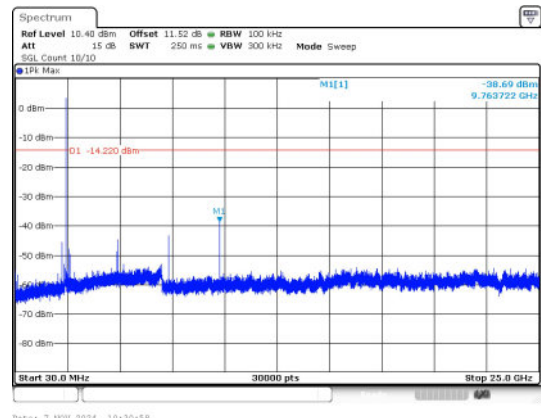
Date: 7.NOV.2024 10:24:25

30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



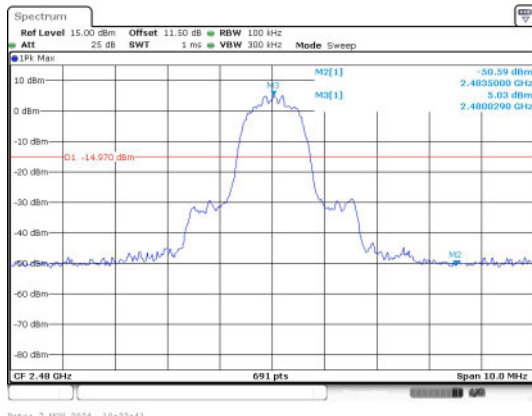
Date: 7.NOV.2024 10:30:36

Out Of Band Emission
8DPSK_3-DH5_Channel 39



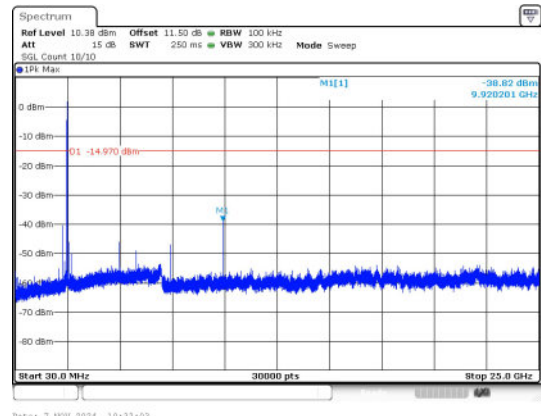
Date: 7.NOV.2024 10:30:58

30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



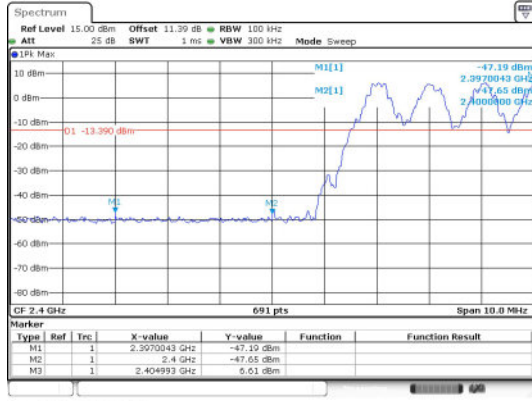
Date: 7.NOV.2024 10:32:41

Out Of Band Emission
8DPSK_3-DH5_Channel 78



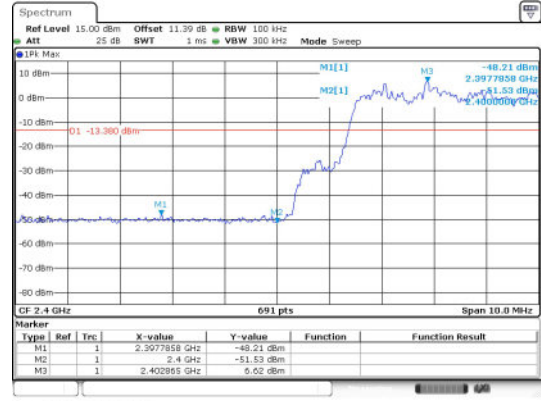
Date: 7.NOV.2024 10:33:03

30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



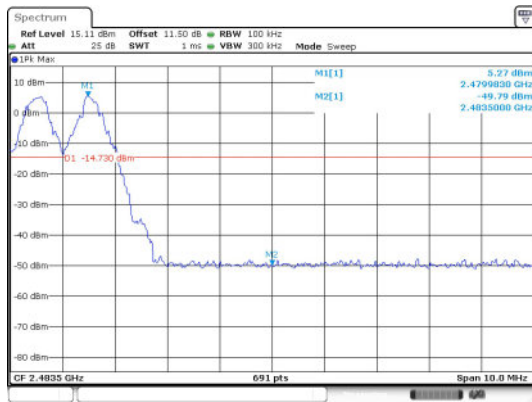
Date: 7.NOV.2024 10:00:36

Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



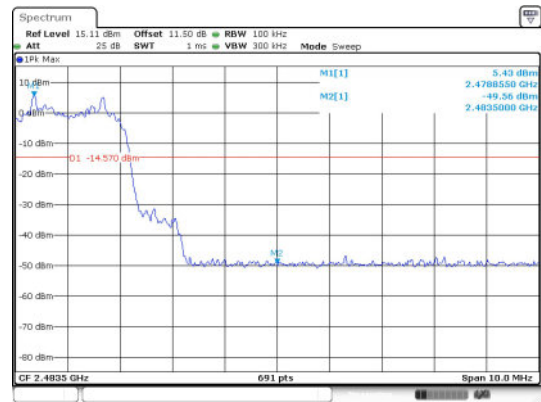
Date: 7.NOV.2024 10:17:19

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



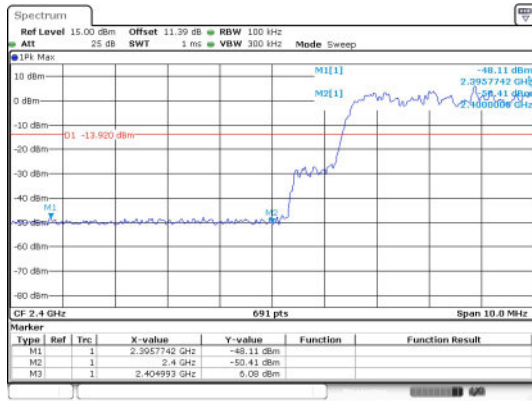
Date: 7.NOV.2024 10:01:00

Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



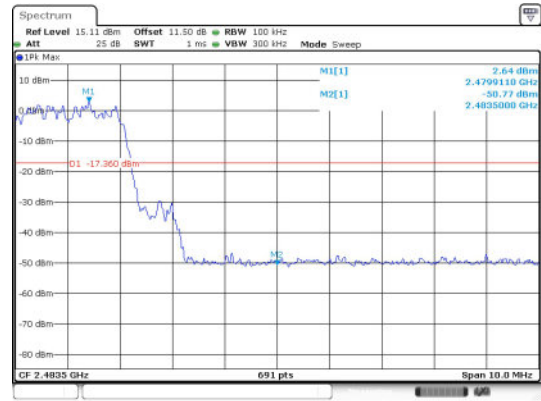
Date: 7.NOV.2024 10:17:55

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



Date: 7.NOV.2024 10:28:38

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



Date: 7.NOV.2024 10:29:00

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

-----The End-----