

Appendix Report

Report No.:	CISRR241224200
Test Engineer:	Mark Fu
Supervised by:	Rory Huang

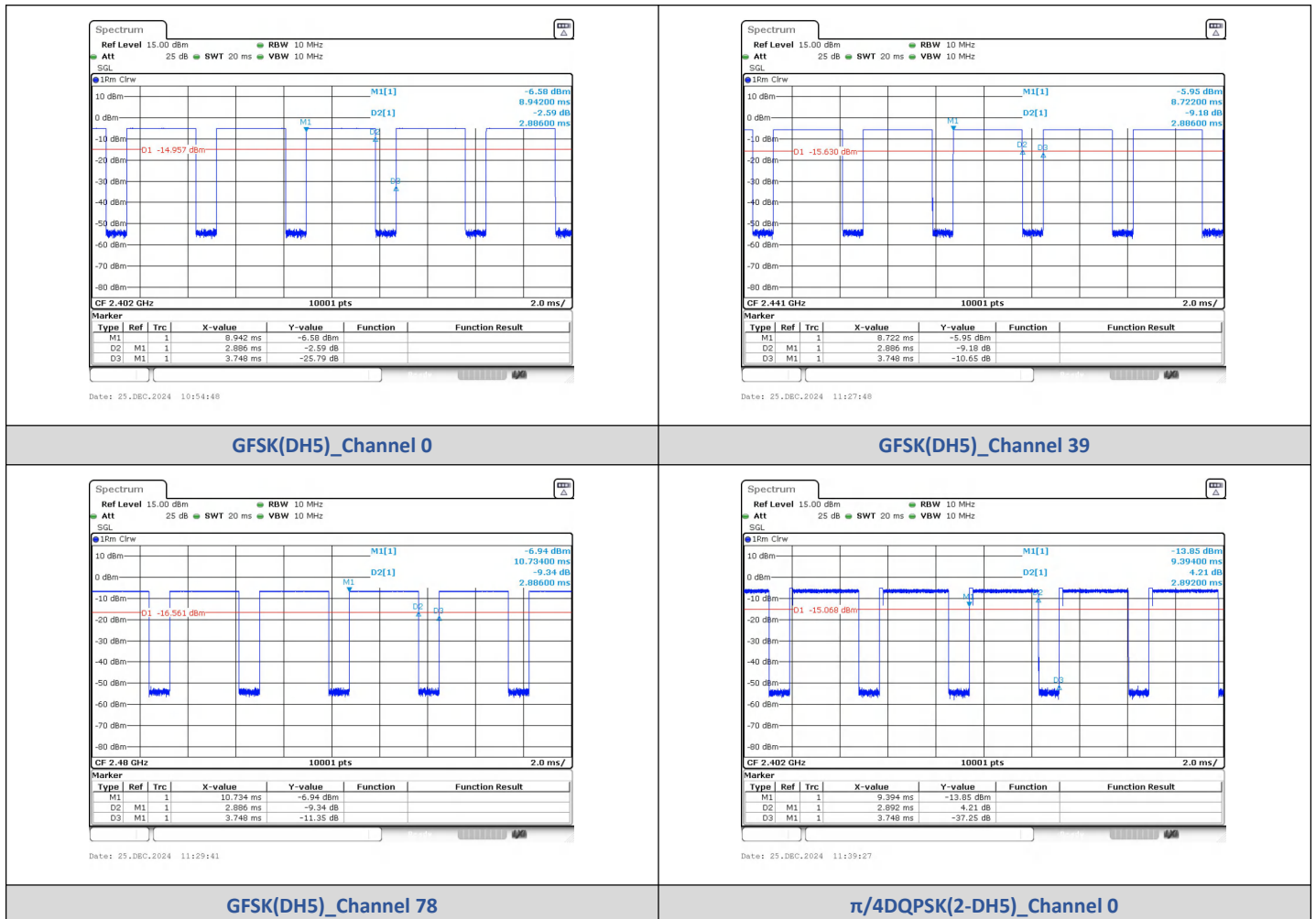
1) Duty Cycle

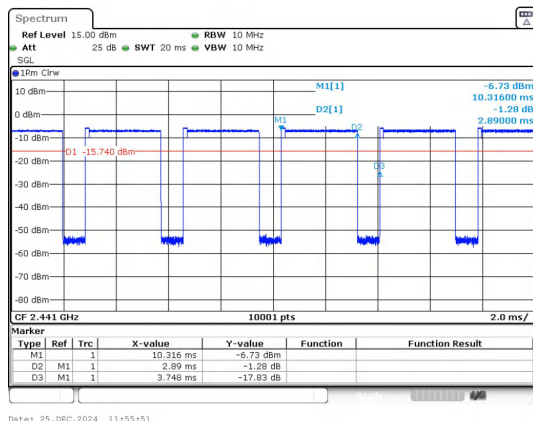
LEFT:

Test Result

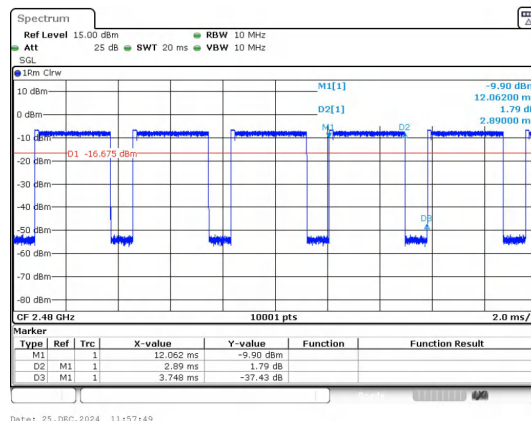
Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.886	3.748	77.00	0.7700	1.1351	0.3465
		39	2.886	3.748	77.00	0.7700	1.1351	0.3465
		78	2.886	3.748	77.00	0.7700	1.1351	0.3465
$\pi/4$ DQPSK	2-DH5	0	2.892	3.748	77.16	0.7716	1.1261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

Test Graphs





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



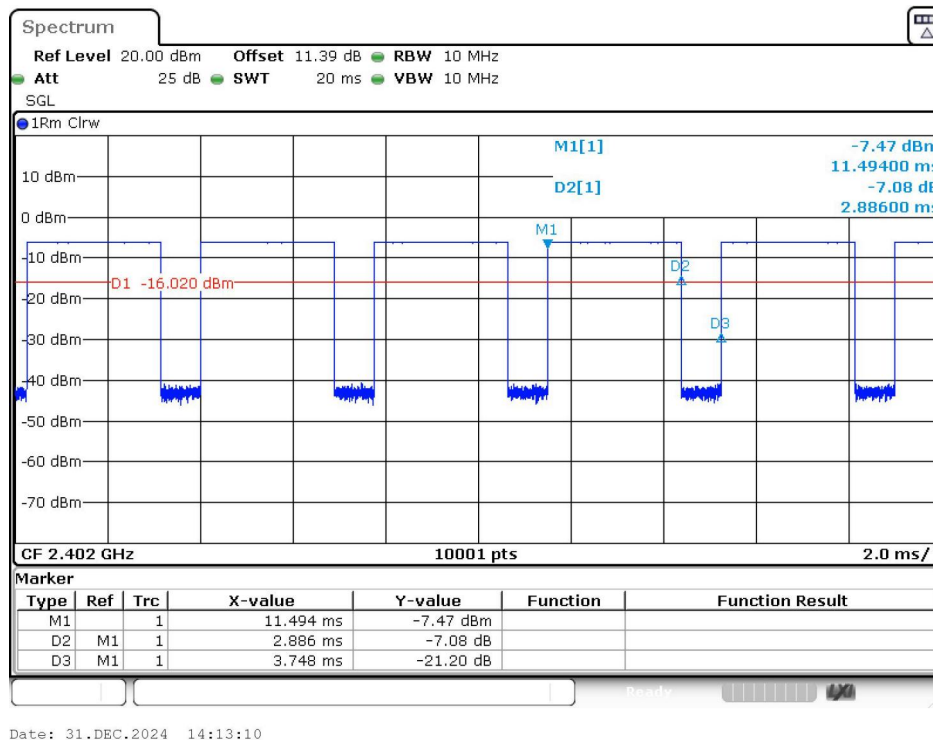
$\pi/4$ DQPSK(2-DH5)_Channel 78

RIGHT:

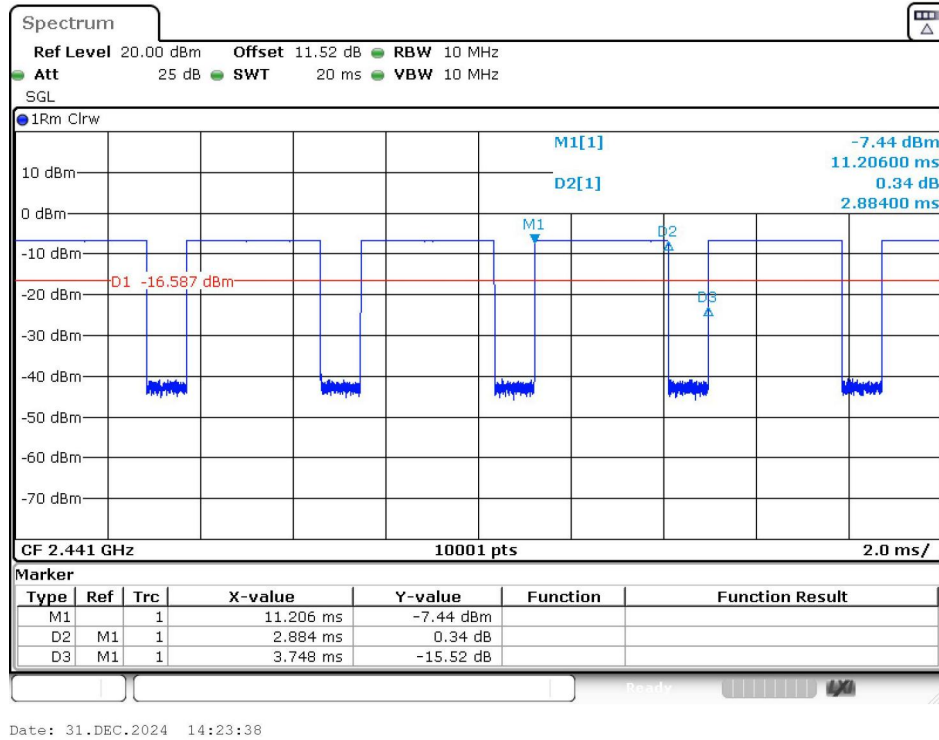
Test Result

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	0.3465
		39	2.884	3.748	76.95	0.7695	1.1379	0.3467
		78	2.884	3.748	76.95	0.7695	1.1379	0.3467
$\pi/4$ DQPSK	2-DH5	0	2.890	3.748	77.11	0.7711	1.1289	0.3460
		39	2.892	3.748	77.16	0.7716	1.1261	0.3458
		78	2.890	3.748	77.11	0.7711	1.1289	0.3460

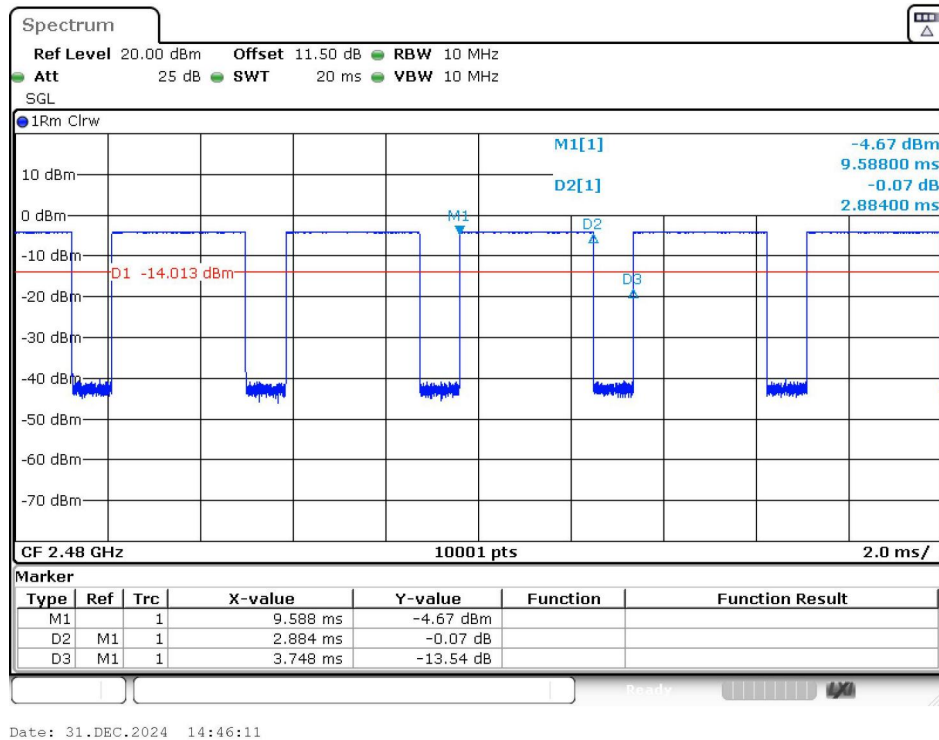
Test Graphs



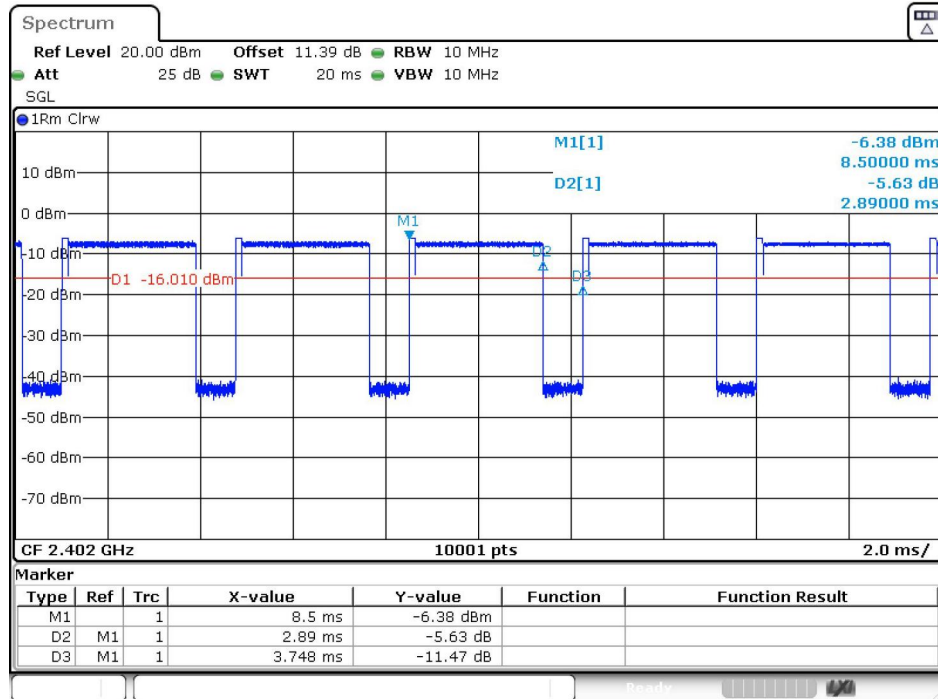
GFSK(DH5)_Channel 0



GFSK(DH5)_Channel 39

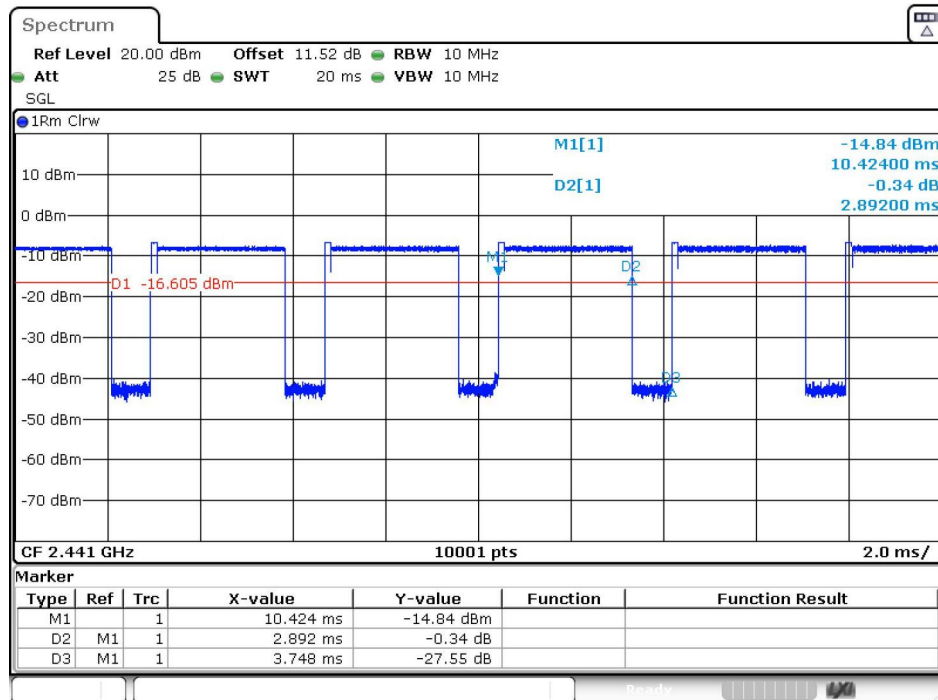


GFSK(DH5)_Channel 78



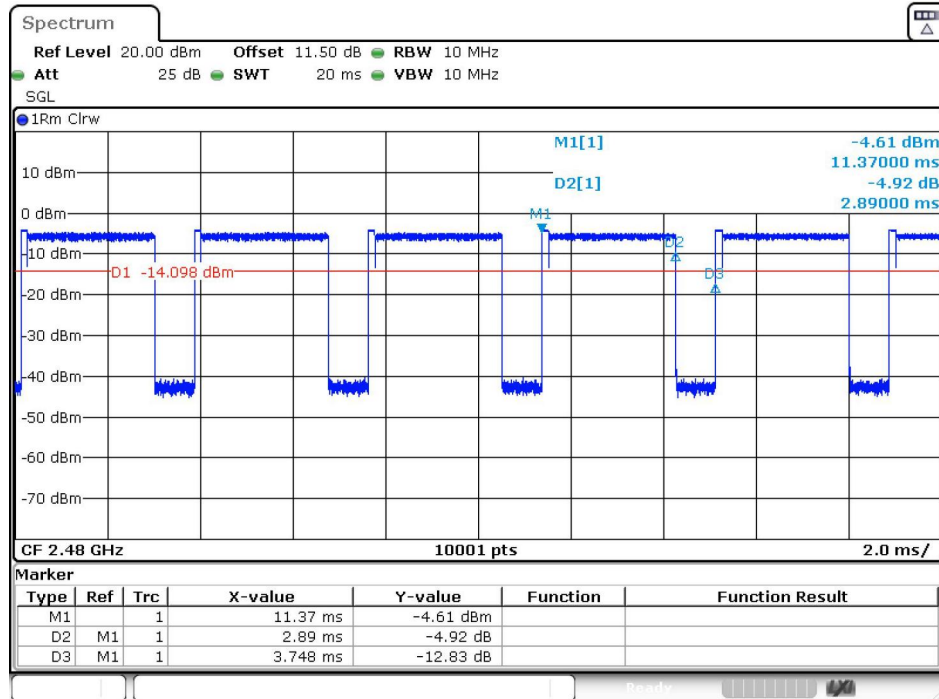
Date: 31.DEC.2024 14:28:23

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



Date: 31.DEC.2024 14:39:56

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



Date: 31.DEC.2024 14:48:14

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

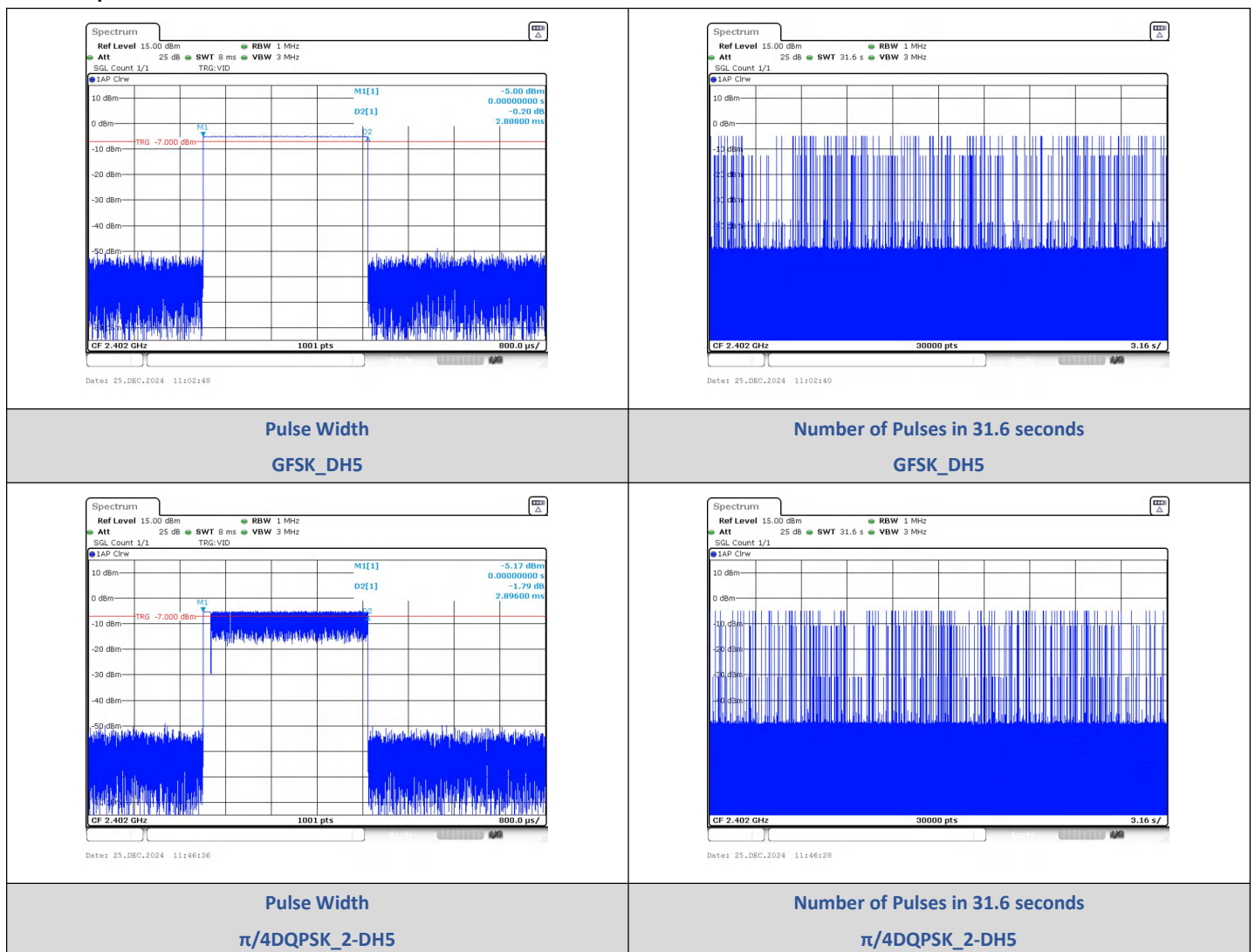
2) Dwell Time

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	120	346.56	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.896	110	318.56		PASS

Test Graphs



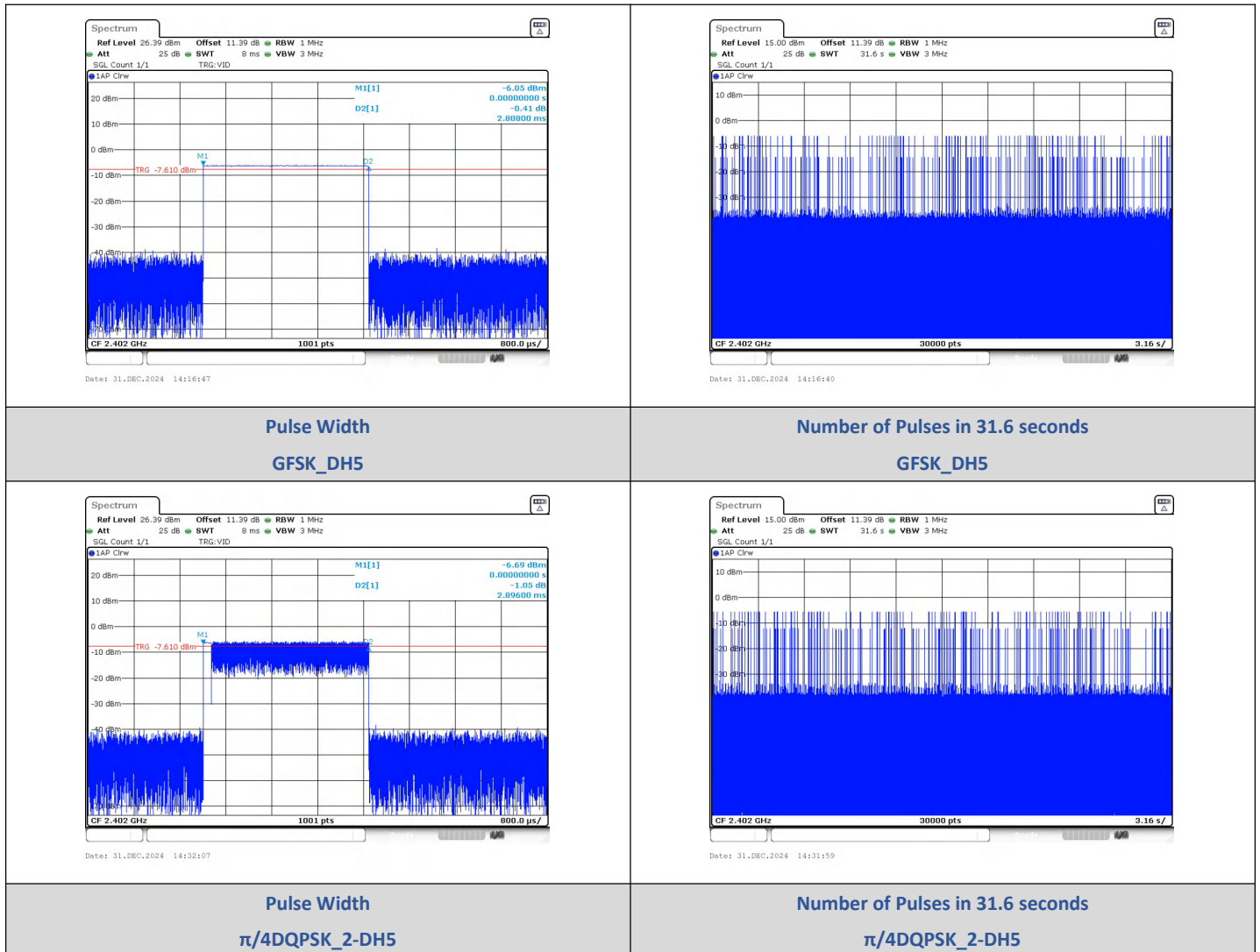
RIGHT:

Test Result

Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0	2.888	108	311.9	< 400	PASS

$\pi/4$ DQPSK	2-DH5	(2402MHz)	2.896	112	324.35		PASS
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Test Graphs



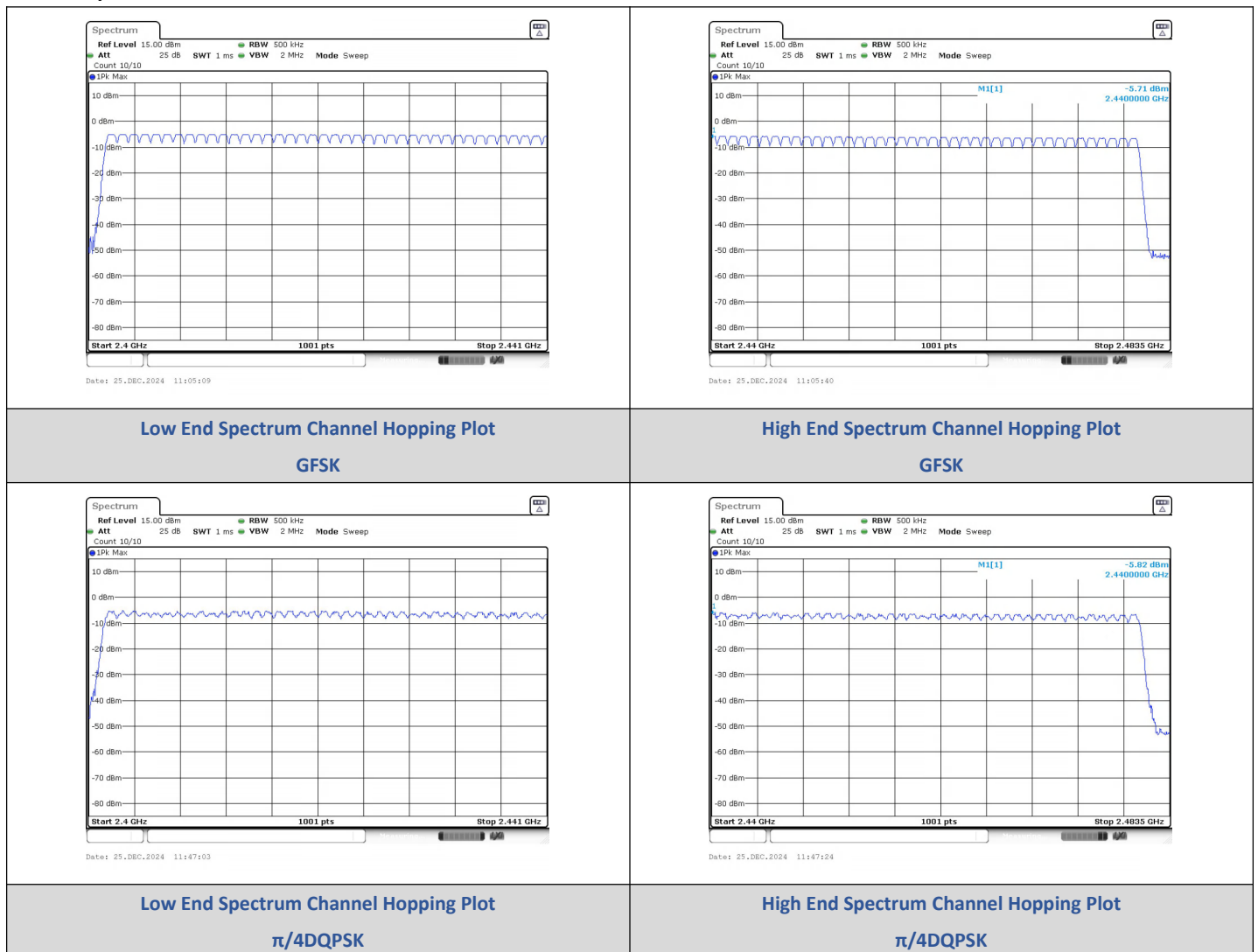
3) Number Of Hopping Channel

LEFT:

Test Result

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

Test Graphs

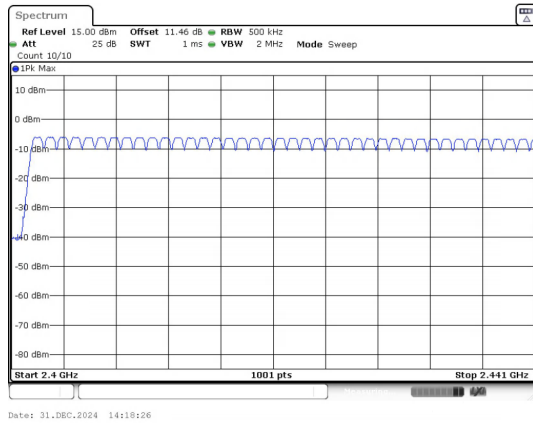


RIGHT:

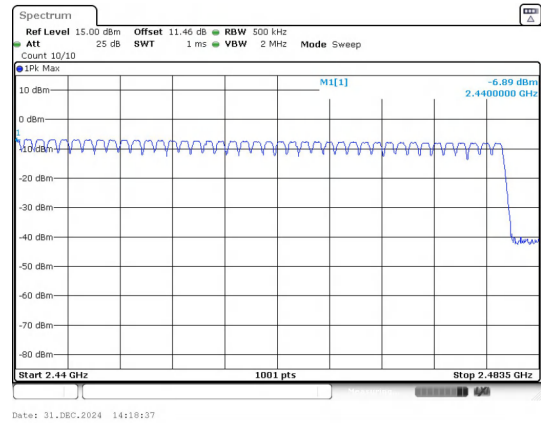
Test Result

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

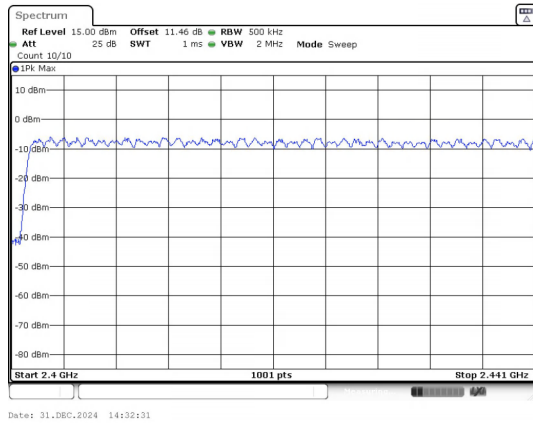
Test Graphs



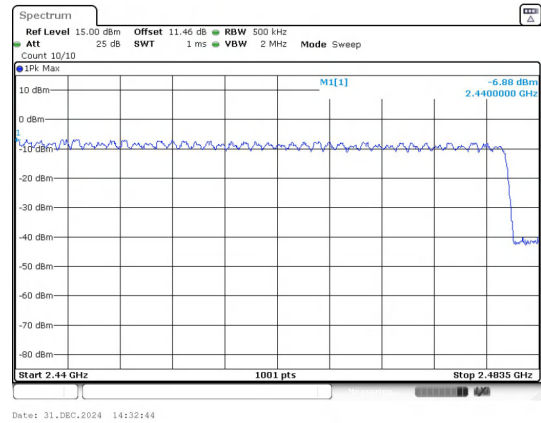
Low End Spectrum Channel Hopping Plot
GFSK



High End Spectrum Channel Hopping Plot
GFSK



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



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

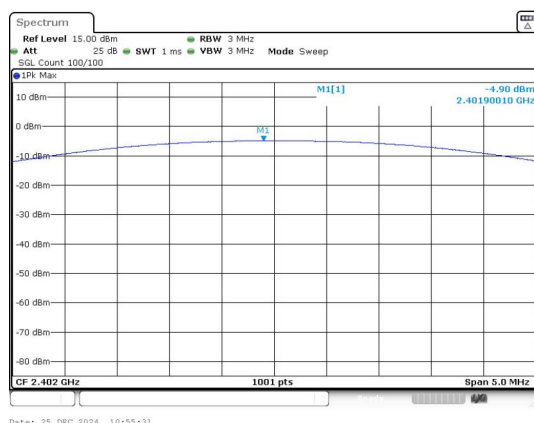
4) Conducted Output Power

LEFT:

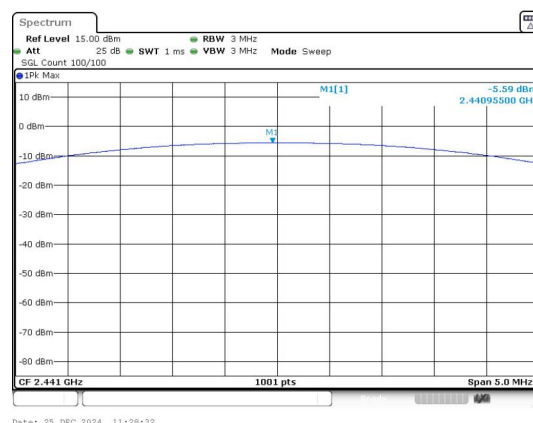
Test Result

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	-4.90	0.32	≤30	PASS
		39	-5.59	0.28		PASS
		78	-6.51	0.22		PASS
$\pi/4$ DQPSK	2-DH5	0	-4.45	0.36	≤20.97	PASS
		39	-5.11	0.31		PASS
		78	-6.00	0.25		PASS

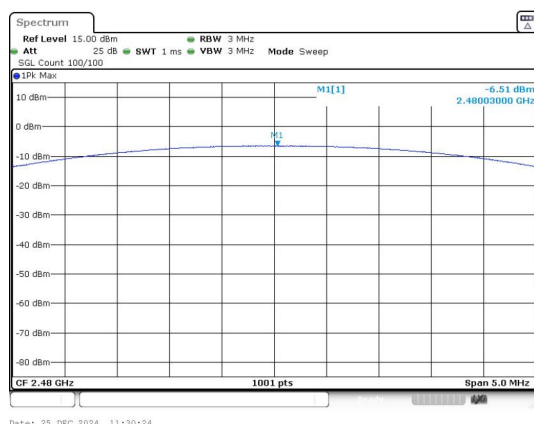
Test Graphs



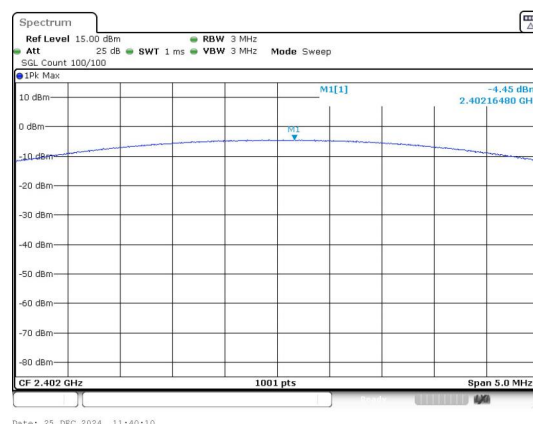
Peak Output Power
GFSK_Channel 0



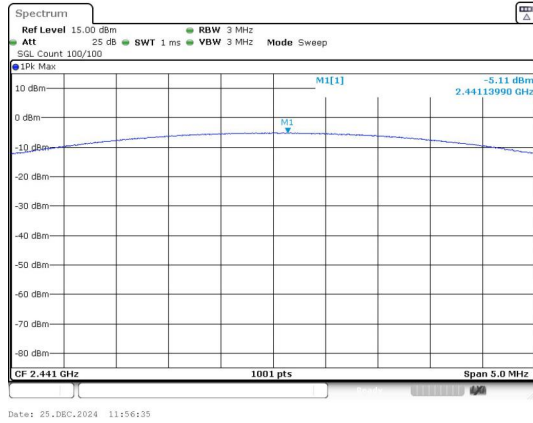
Peak Output Power
GFSK_Channel 39



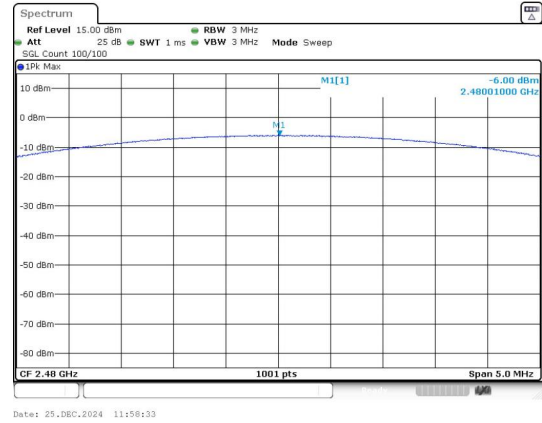
Peak Output Power
GFSK_Channel 78



Peak Output Power
 $\pi/4$ DQPSK_Channel 0



Peak Output Power
 $\pi/4$ DQPSK_Channel 39



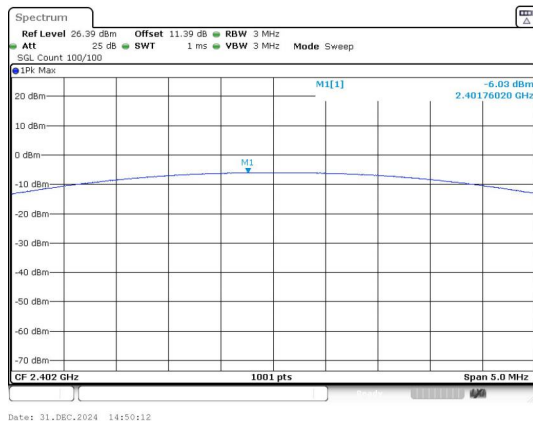
Peak Output Power
 $\pi/4$ DQPSK_Channel 78

RIGHT:

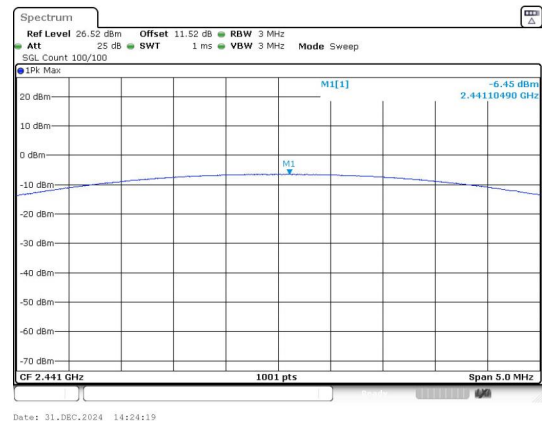
Test Result

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	-6.03	0.25	≤ 30	PASS
		39	-6.45	0.23		PASS
		78	-4.01	0.40		PASS
$\pi/4$ DQPSK	2-DH5	0	-5.01	0.32	≤ 20.97	PASS
		39	-5.68	0.27		PASS
		78	-3.27	0.47		PASS

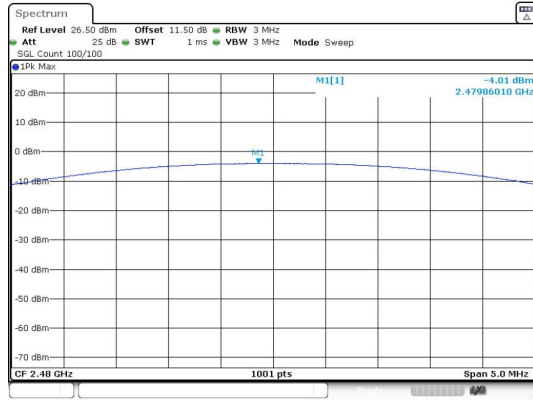
Test Graphs



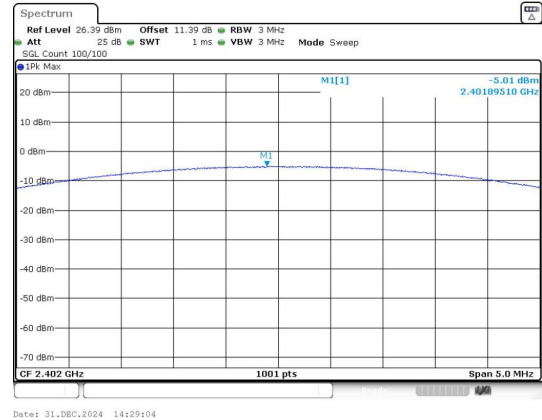
Peak Output Power
GFSK_Channel 0



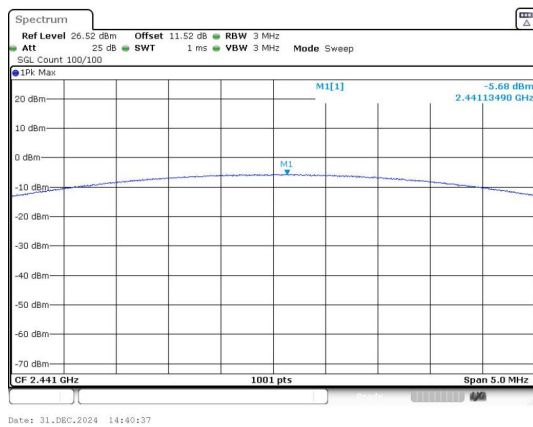
Peak Output Power
GFSK_Channel 39



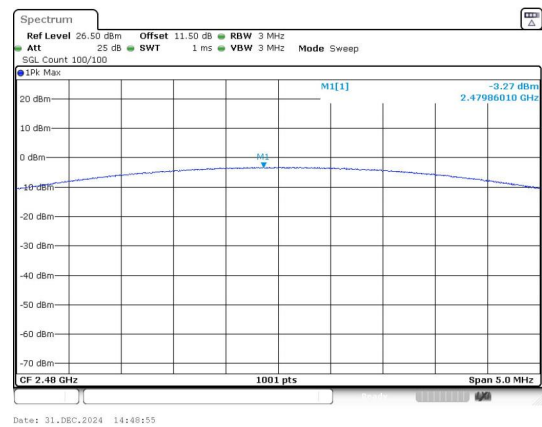
Peak Output Power
GFSK_Channel 78



Peak Output Power
 $\pi/4$ DQPSK_Channel 0



Peak Output Power
 $\pi/4$ DQPSK_Channel 39



Peak Output Power
 $\pi/4$ DQPSK_Channel 78

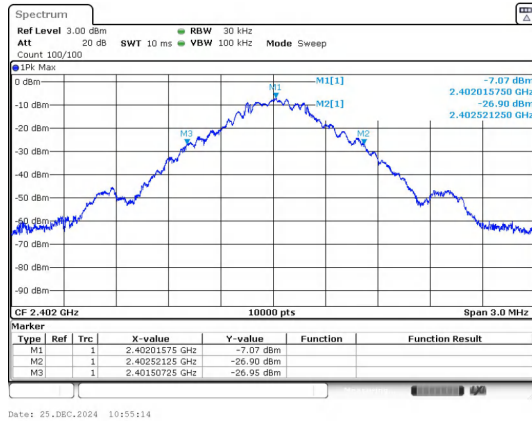
5) 20dB Bandwidth

LEFT:

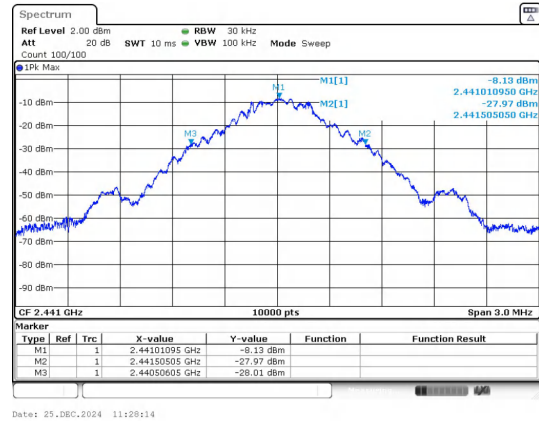
Test Result

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.010
	39	2441 MHz	1.000
	78	2480 MHz	0.9900
π /4QPSK	0	2402 MHz	1.310
	39	2441 MHz	1.310
	78	2480 MHz	1.310

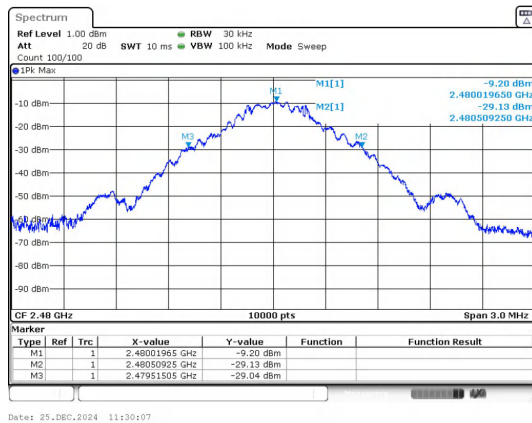
Test Graphs



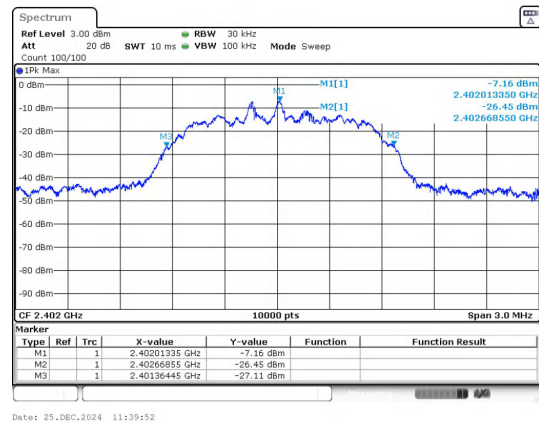
GFSK_DH5_Channel 0



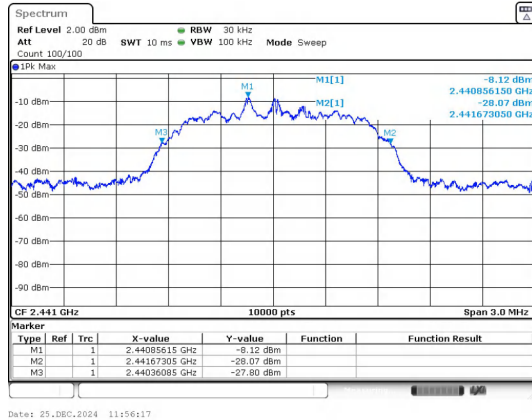
GFSK_DH5_Channel 39



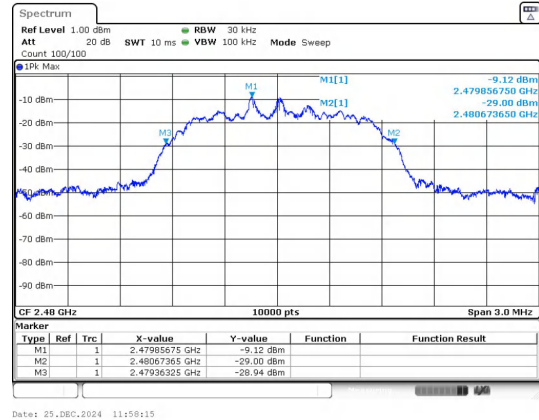
GFSK_DH5_Channel 78



π /4QPSK_2-DH5_Channel 0



$\pi/4$ DQPSK_2-DH5_Channel 39



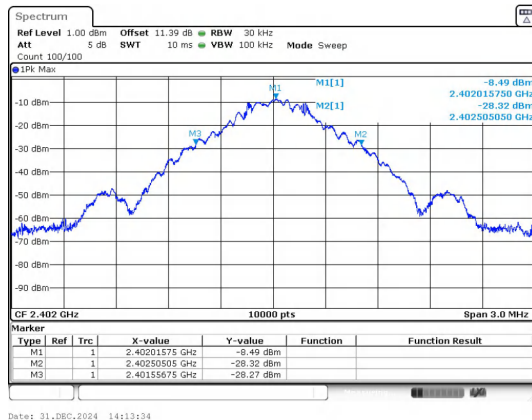
$\pi/4$ DQPSK_2-DH5_Channel 78

RIGHT:

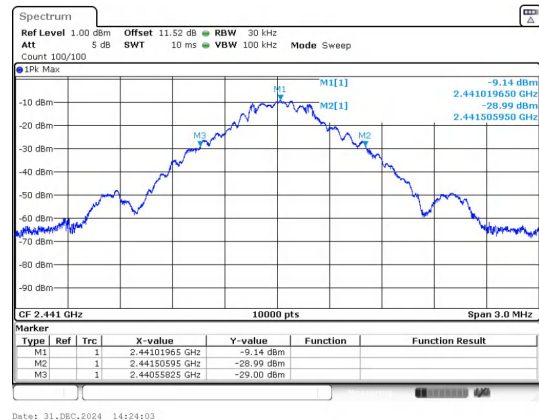
Test Result

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	0.9500
	39	2441 MHz	0.9500
	78	2480 MHz	0.9600
$\pi/4$ DQPSK	0	2402 MHz	1.280
	39	2441 MHz	1.310
	78	2480 MHz	1.280

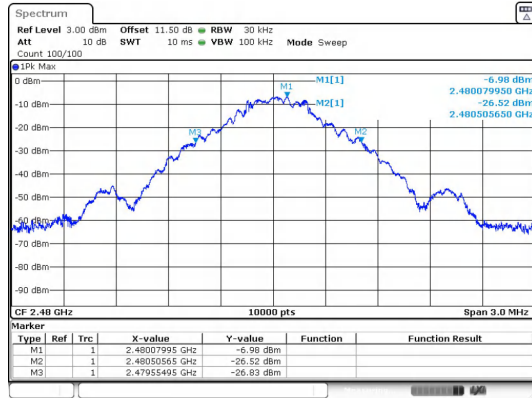
Test Graphs



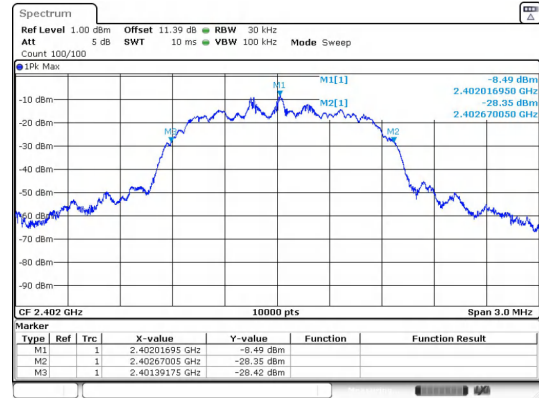
GFSK_DH5_Channel 0



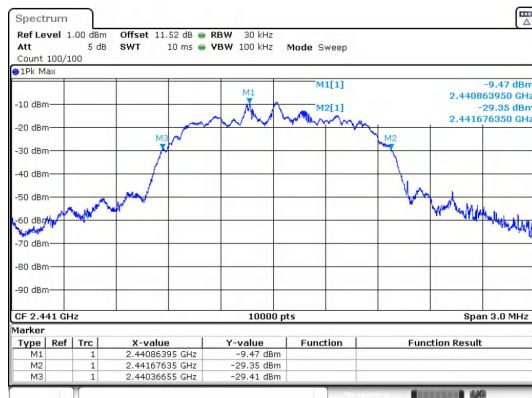
GFSK_DH5_Channel 39



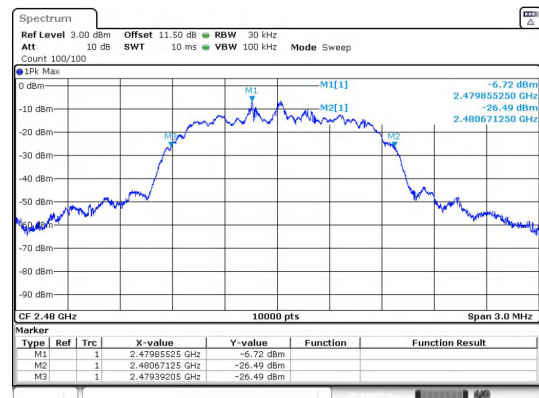
GFSK_DH5_Channel 78



$\pi/4$ DQPSK_2-DH5_Channel 0



$\pi/4$ DQPSK_2-DH5_Channel 39



$\pi/4$ DQPSK_2-DH5_Channel 78

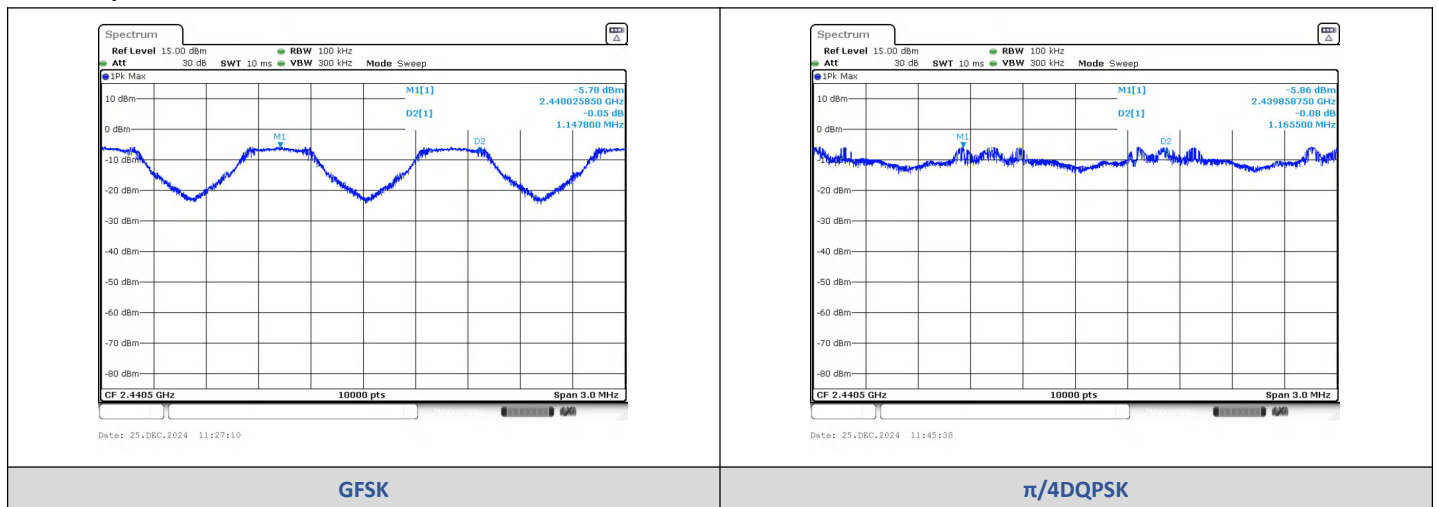
6) Carrier Frequencies Separation

LEFT:

Test Result

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2440.0258	2441.1737	1.1478	1.01	PASS
$\pi/4$ DQPSK	2-DH5	2439.8587	2441.0242	1.1655	0.873	PASS

Test Graphs

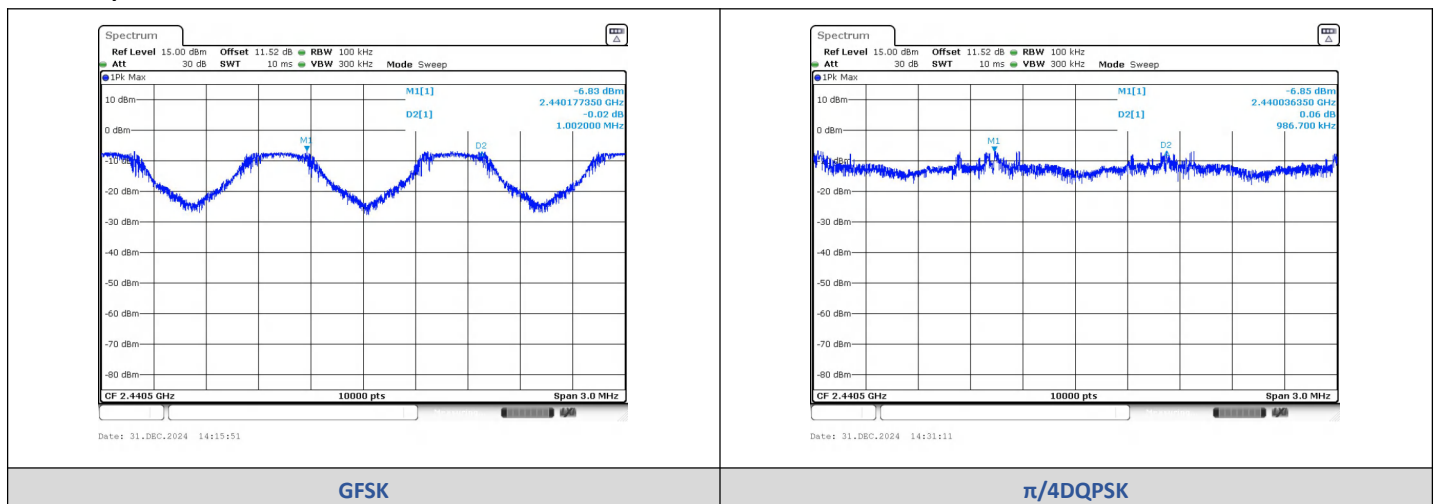


RIGHT:

Test Result

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2440.1773	2441.1793	1.0020	0.9600	PASS
$\pi/4$ DQPSK	2-DH5	2440.0363	2441.023	0.9867	0.853	PASS

Test Graphs



7) Conducted Out Of Band Emission

LEFT:

Test Result

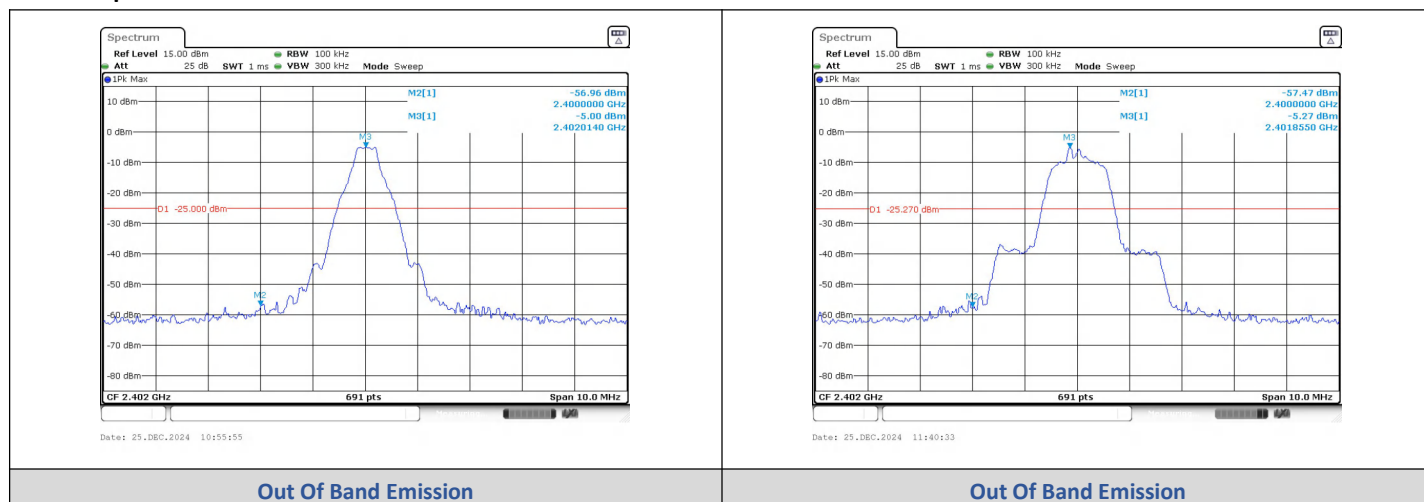
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-56.960	-25.0	-31.960	PASS
			6976.24	-44.726	-25.0	-19.726	PASS
		39	6207.16	-44.851	-25.79	-19.061	PASS
		78	2483.50	-61.940	-26.69	-35.250	PASS
			22003.2	-43.962	-26.69	-17.272	PASS
π /4DQPSK	2-DH5	0	2400.00	-57.470	-25.27	-32.200	PASS
			6857.21	-44.092	-25.27	-18.822	PASS
		39	6906.32	-44.059	-25.84	-18.219	PASS
		78	2483.50	-62.100	-26.79	-35.310	PASS
			6346.16	-45.012	-26.79	-18.222	PASS

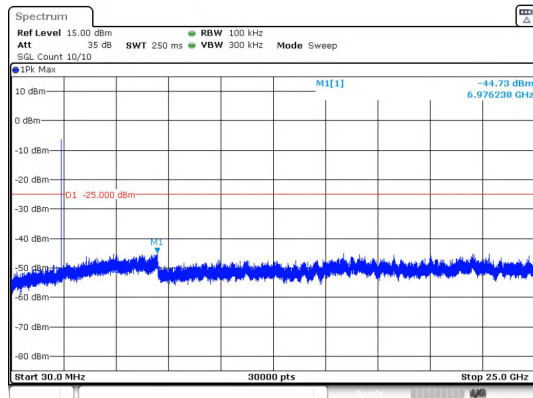
Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2395.95	-56.824	-24.96	-31.864	PASS
			2400.00	-59.360	-24.96	-34.400	PASS
			2483.50	-60.220	-26.53	-33.690	PASS
π /4DQPSK	2-DH5		2400.00	-58.370	-25.25	-33.120	PASS
			2483.50	-60.530	-27.15	-33.380	PASS

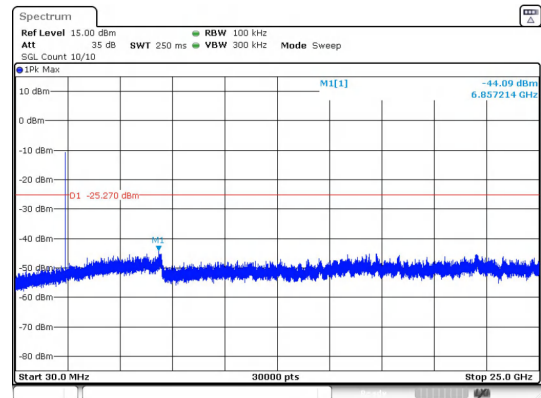
Test Graphs



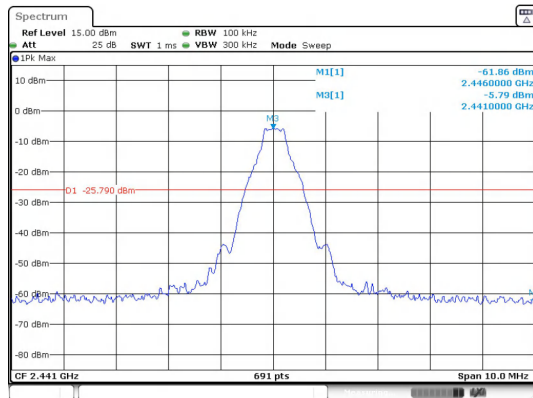
GFSK_DH5_Channel 0



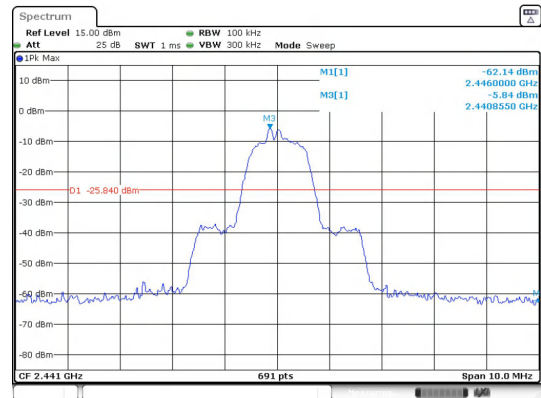
$\pi/4$ DQPSK_2-DH5_Channel 0



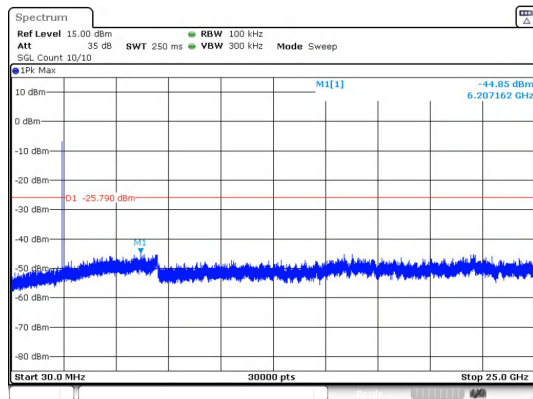
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



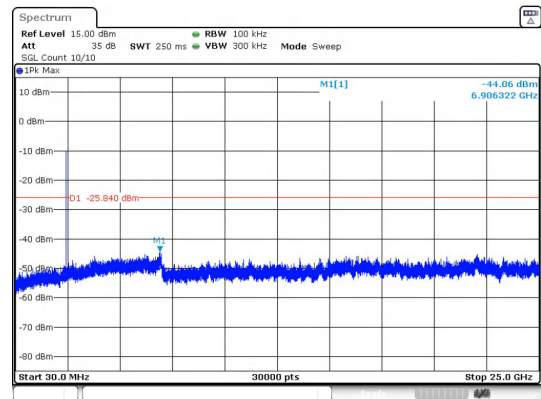
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 0



Out Of Band Emission
GFSK_DH5_Channel 39

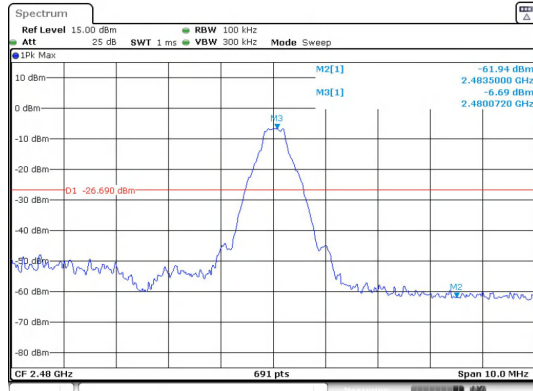


Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39



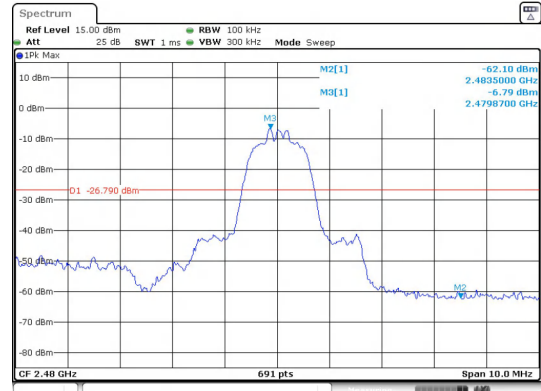
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39

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



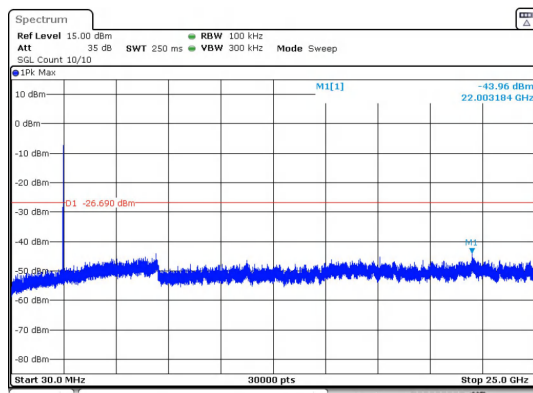
Date: 25.DEC.2024 11:30:47

Out Of Band Emission
GFSK_DH5_Channel 78



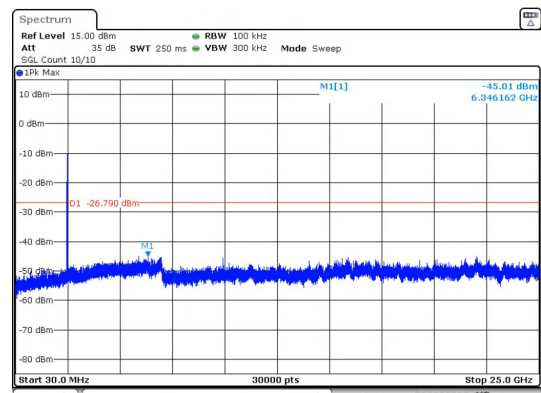
Date: 25.DEC.2024 11:58:56

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



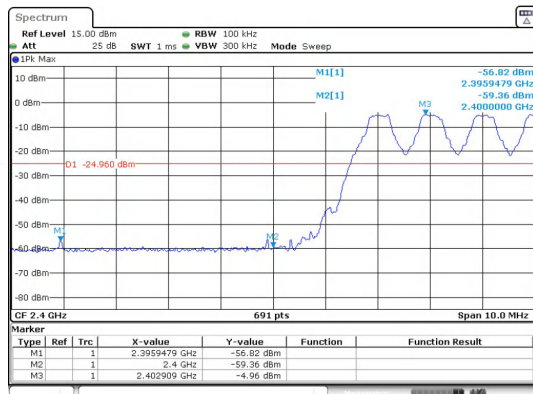
Date: 25.DEC.2024 11:31:09

30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



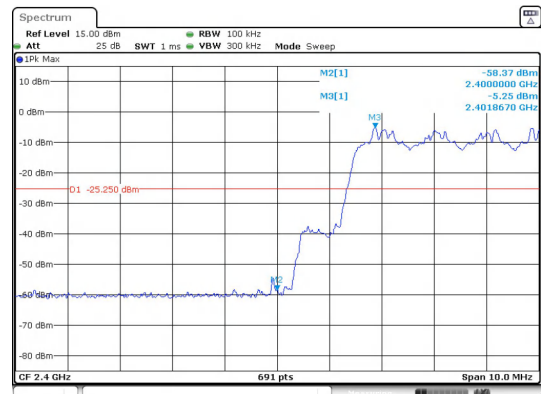
Date: 25.DEC.2024 11:59:18

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



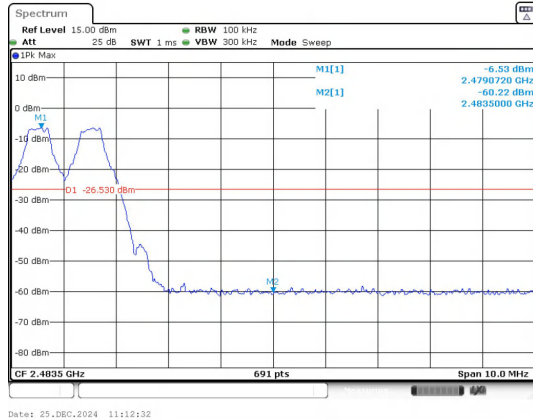
Date: 25.DEC.2024 11:09:46

Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping

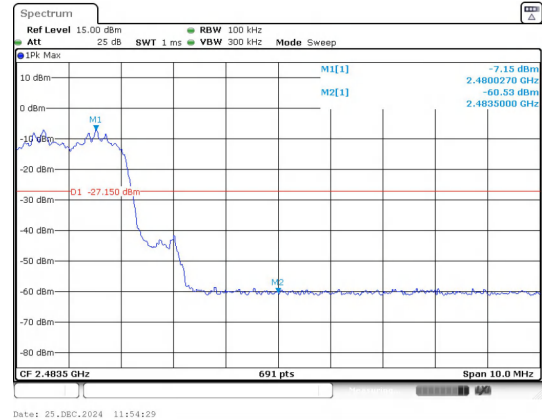


Date: 25.DEC.2024 11:52:09

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

RIGHT:

Test Result

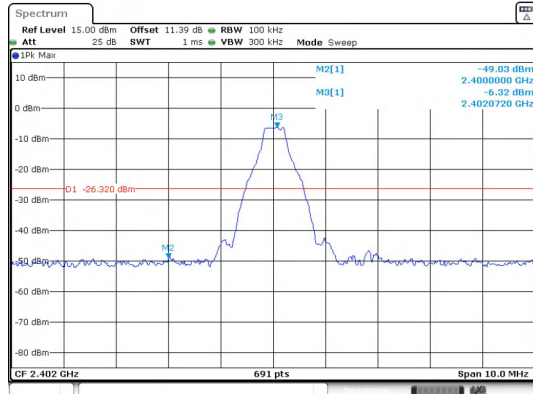
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-49.030	-26.32	-22.710	PASS
			9608.08	-45.802	-26.32	-19.482	PASS
		39	838.61	-35.538	-26.75	-8.788	PASS
		78	2483.50	-49.860	-24.25	-25.610	PASS
			9920.20	-41.114	-24.25	-16.864	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-49.010	-26.08	-22.930	PASS
			9608.08	-45.754	-26.08	-19.674	PASS
		39	9763.72	-43.263	-26.79	-16.473	PASS
		78	834.45	-33.419	-24.16	-9.259	PASS
			2483.50	-50.590	-24.16	-26.430	PASS

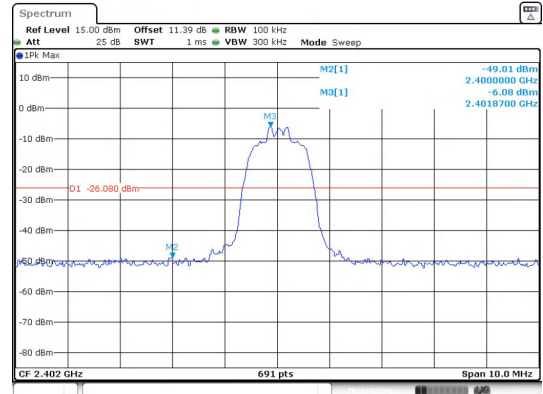
Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2397.97	-48.076	-26.13	-21.946	PASS
			2400.00	-50.000	-26.13	-23.870	PASS
			2483.50	-49.110	-28.1	-21.010	PASS
$\pi/4$ DQPSK	2-DH5		2397.55	-47.824	-26.15	-21.674	PASS
			2400.00	-48.150	-26.15	-22.000	PASS
			2483.50	-49.000	-28.14	-20.860	PASS

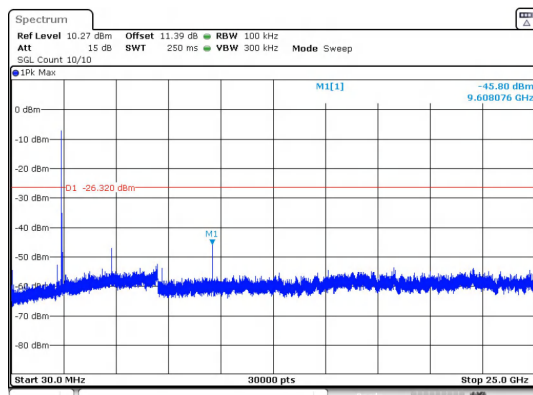
Test Graphs



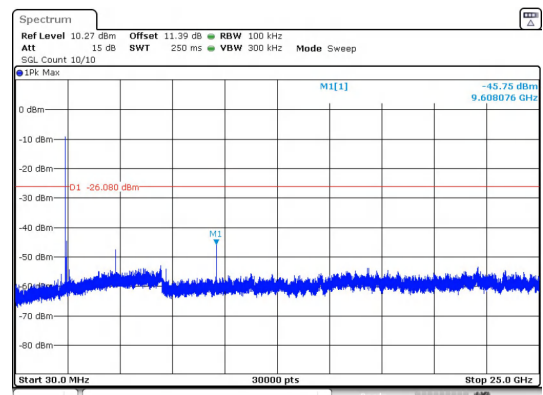
Out Of Band Emission
GFSK_DH5_Channel 0



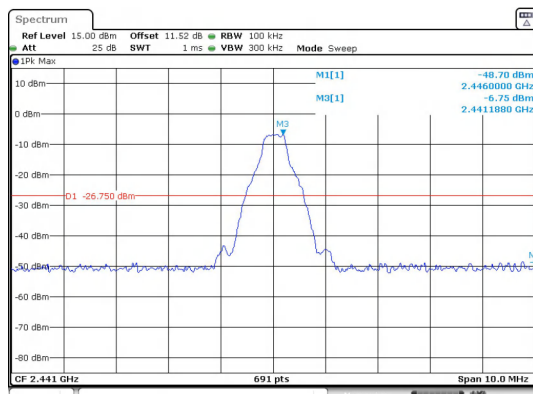
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 0



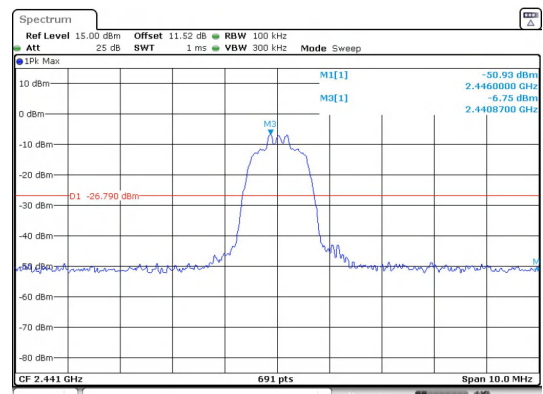
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



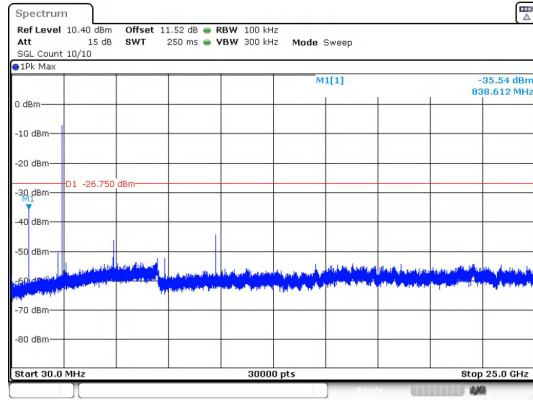
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 0



Out Of Band Emission
GFSK_DH5_Channel 39

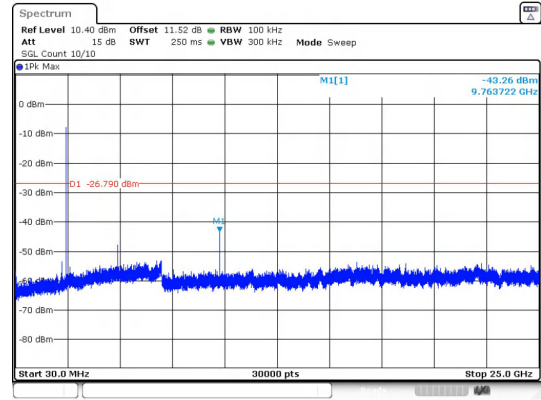


Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39



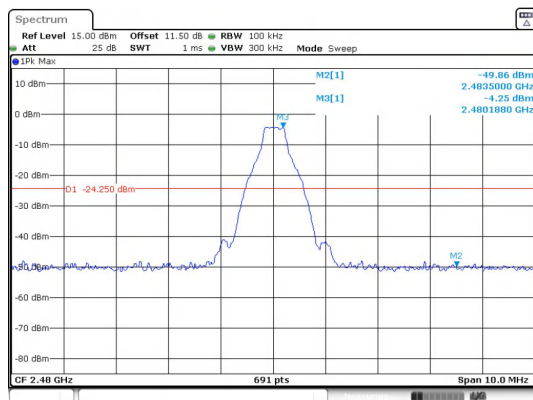
Date: 31.DEC.2024 14:24:58

30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



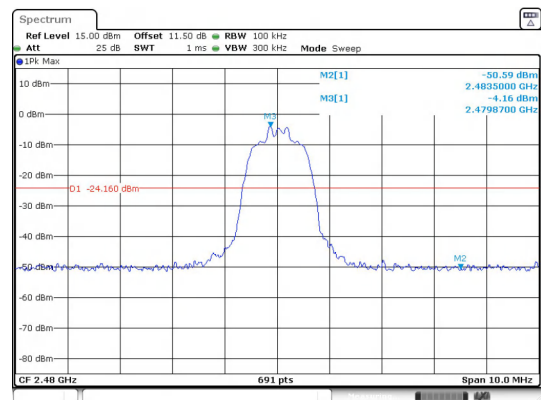
Date: 31.DEC.2024 14:41:16

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



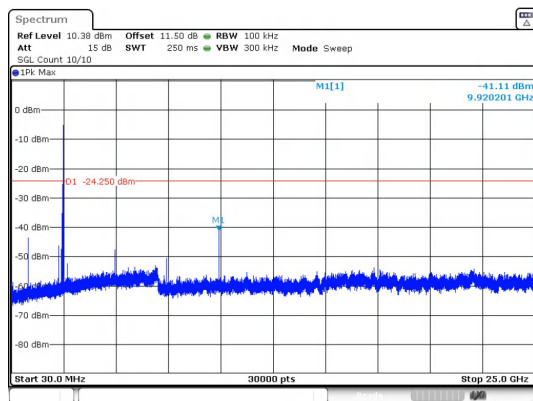
Date: 31.DEC.2024 14:47:14

Out Of Band Emission
GFSK_DH5_Channel 78



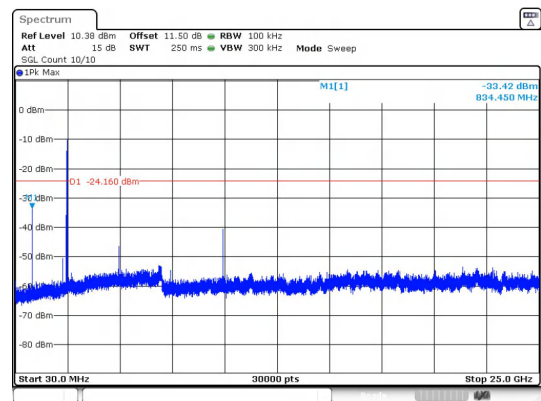
Date: 31.DEC.2024 14:45:09

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



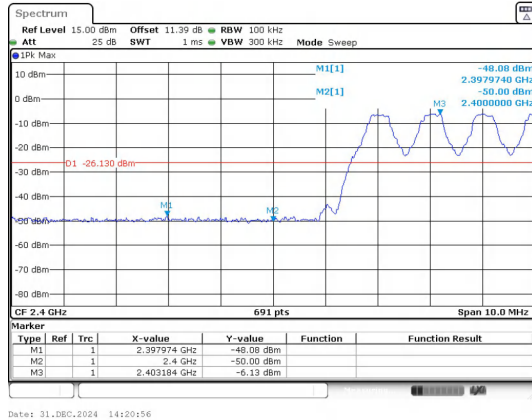
Date: 31.DEC.2024 14:47:36

30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78

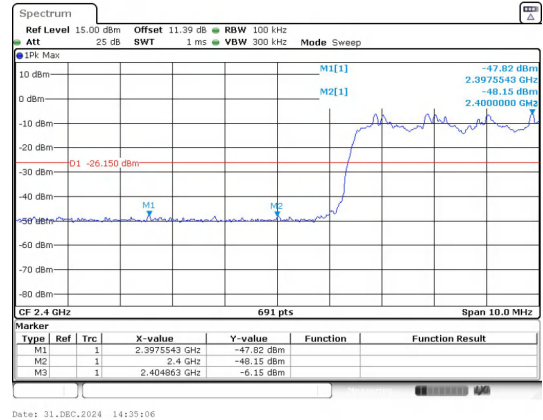


Date: 31.DEC.2024 14:45:31

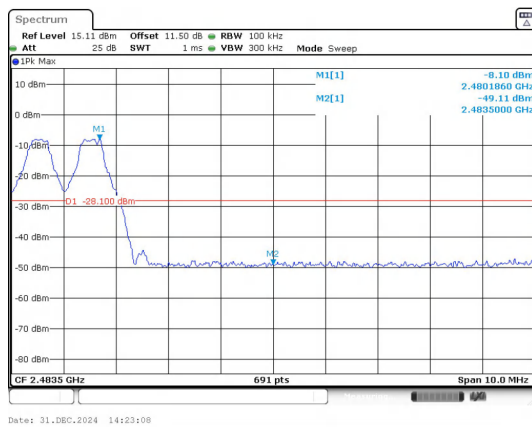
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 78



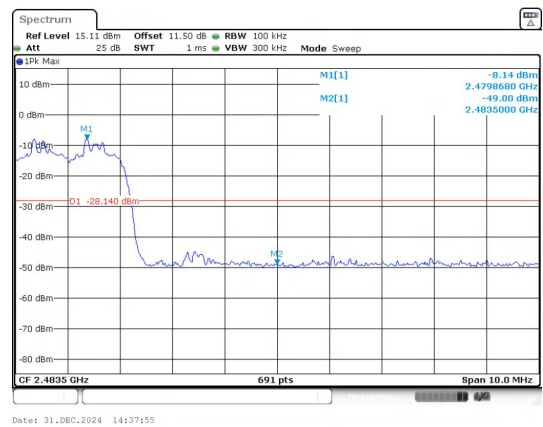
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



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

-----End of the report-----