

# Appendix A

Report No.:	CISRR24041811401
FCC ID:	2BFYP-HBL100
Product Name:	Karaoke Machine
Model No.:	HBL100
Test Engineer:	Lucas Huang
Supervised by:	Rory Huang

## Conducted Peak Output Power

### Test Result

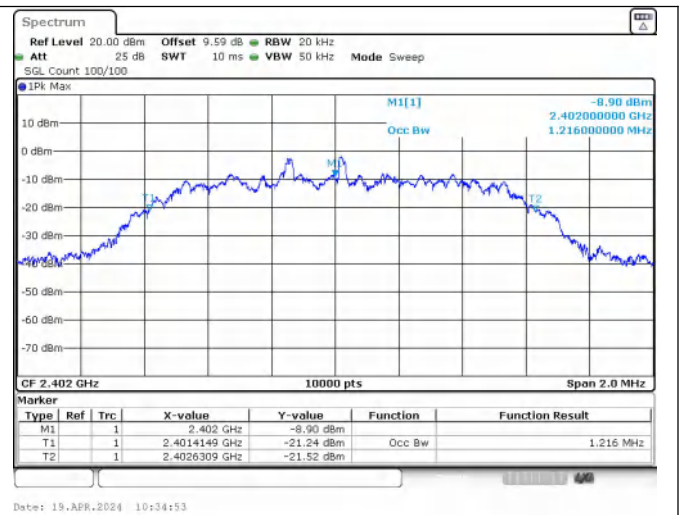
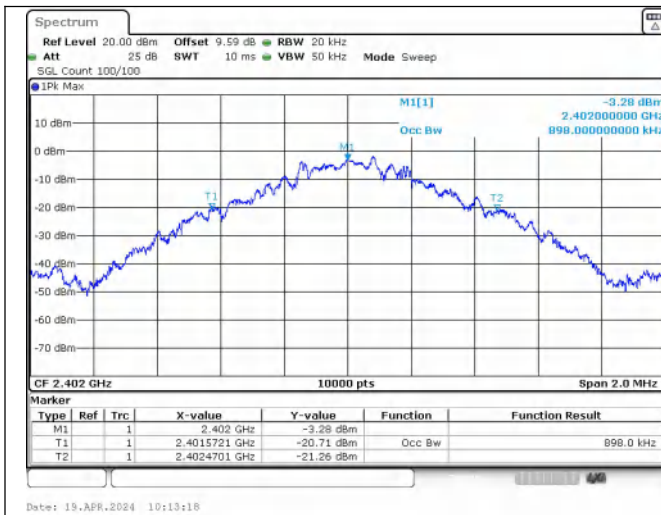
Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	1.668	1.468	30	PASS
		39	0.947	1.244		PASS
		78	0.993	1.257		PASS
$\pi/4$ DQPSK	2-DH5	0	2.029	1.595	20.97	PASS
		39	1.543	1.427		PASS
		78	1.645	1.460		PASS

## 99% Bandwidth

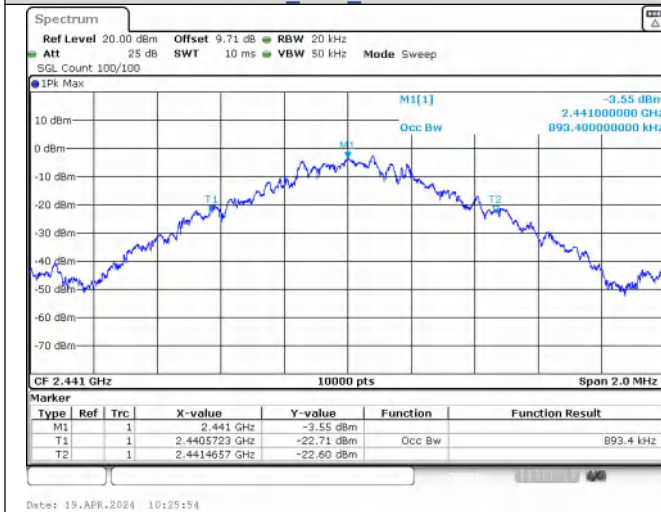
### Test Result

Modulation	Channel	99% BW (MHz)
GFSK	0	0.89800
	39	0.89340
	78	0.89340
$\pi$ /4DQPSK	0	1.2160
	39	1.2050
	78	1.2050

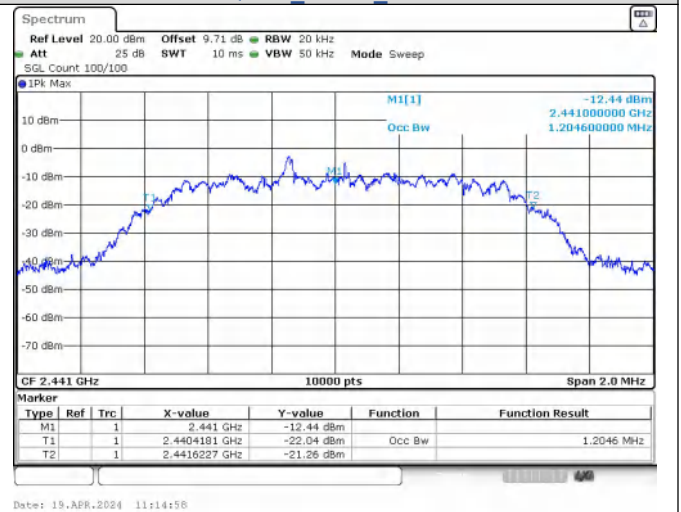
### Test Graphs



#### GFSK\_DH5\_Channel 0



#### $\pi$ /4DQPSK\_2-DH5\_Channel 0

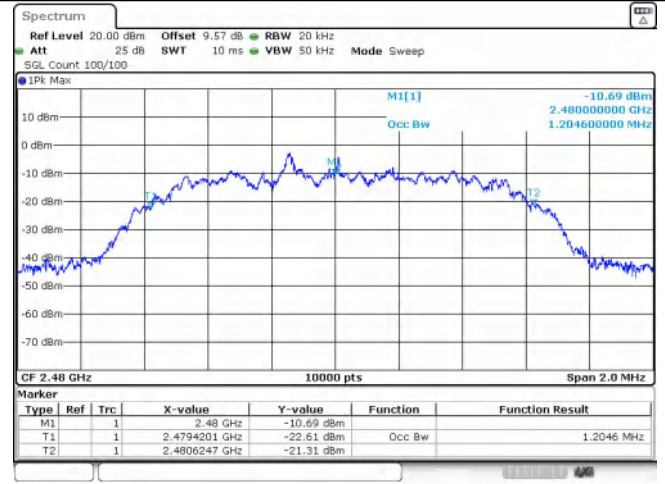


#### GFSK\_DH5\_Channel 39

#### $\pi$ /4DQPSK\_2-DH5\_Channel 39



GFSK\_DH5\_Channel 78



$\pi/4$ DQPSK\_2-DH5\_Channel 78

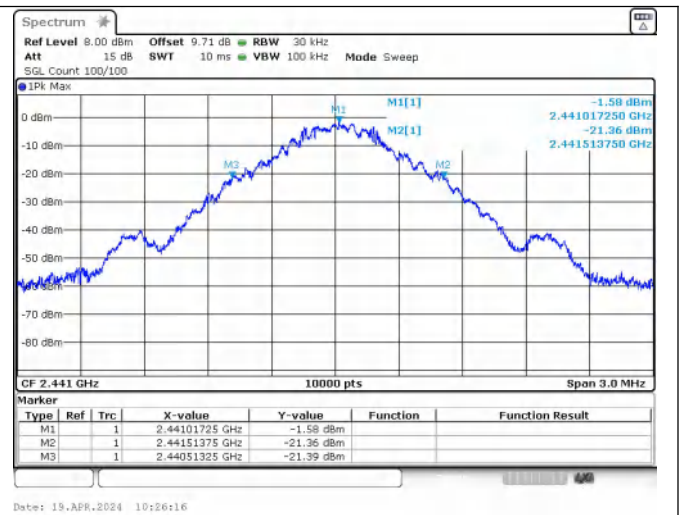
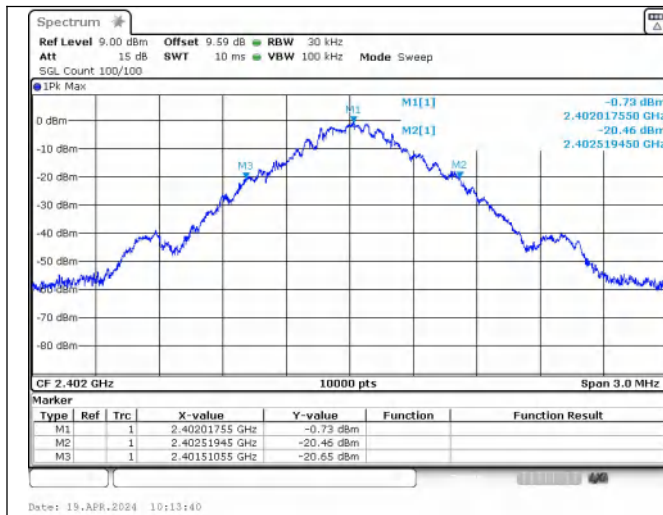
Date: 19.APR.2024 10:28:17

Date: 19.APR.2024 11:17:06

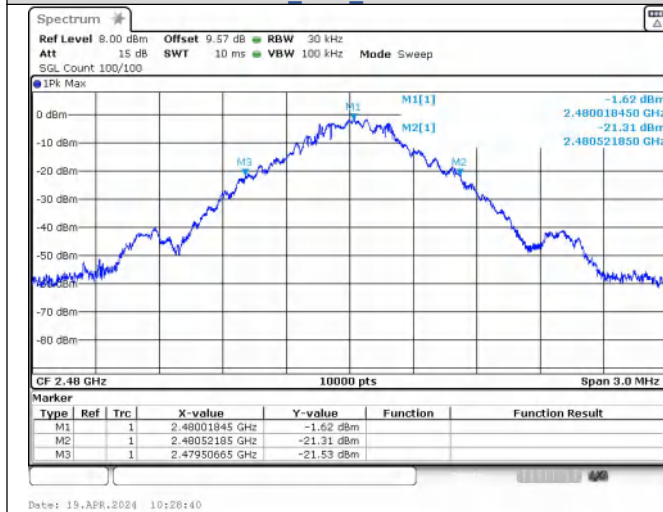
## 20dB Bandwidth Test Result

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	1.010
	39	2441 MHz	1.000
	78	2480 MHz	1.010
$\pi/4$ DQPSK	0	2402 MHz	1.320
	39	2441 MHz	1.320
	78	2480 MHz	1.320

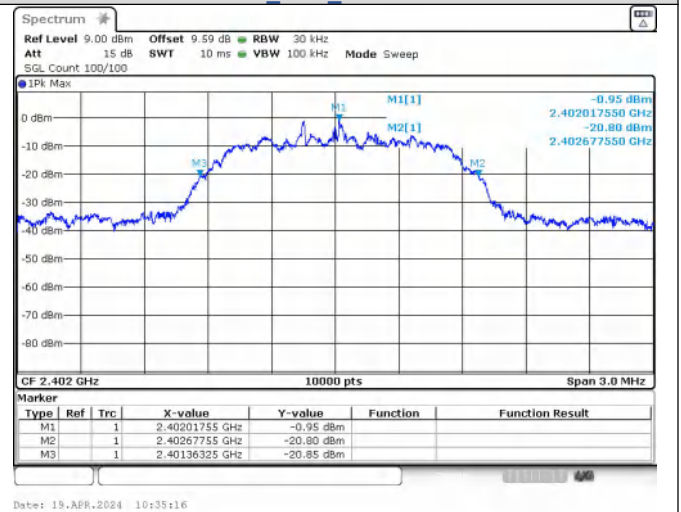
### Test Graphs



#### GFSK\_DH5\_Channel 0

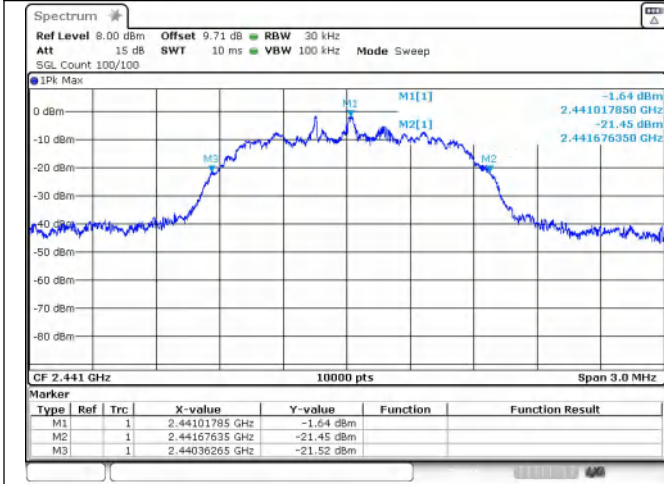


#### GFSK\_DH5\_Channel 39

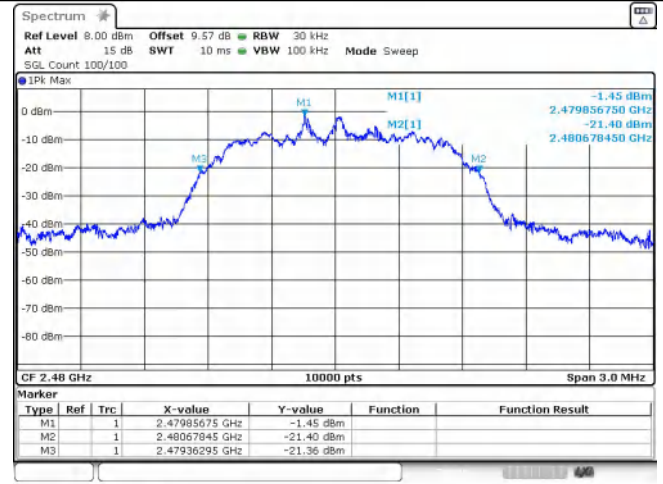


#### GFSK\_DH5\_Channel 78

#### $\pi/4$ DQPSK\_2-DH5\_Channel 0



**$\pi$ /4DQPSK\_2-DH5\_Channel 39**



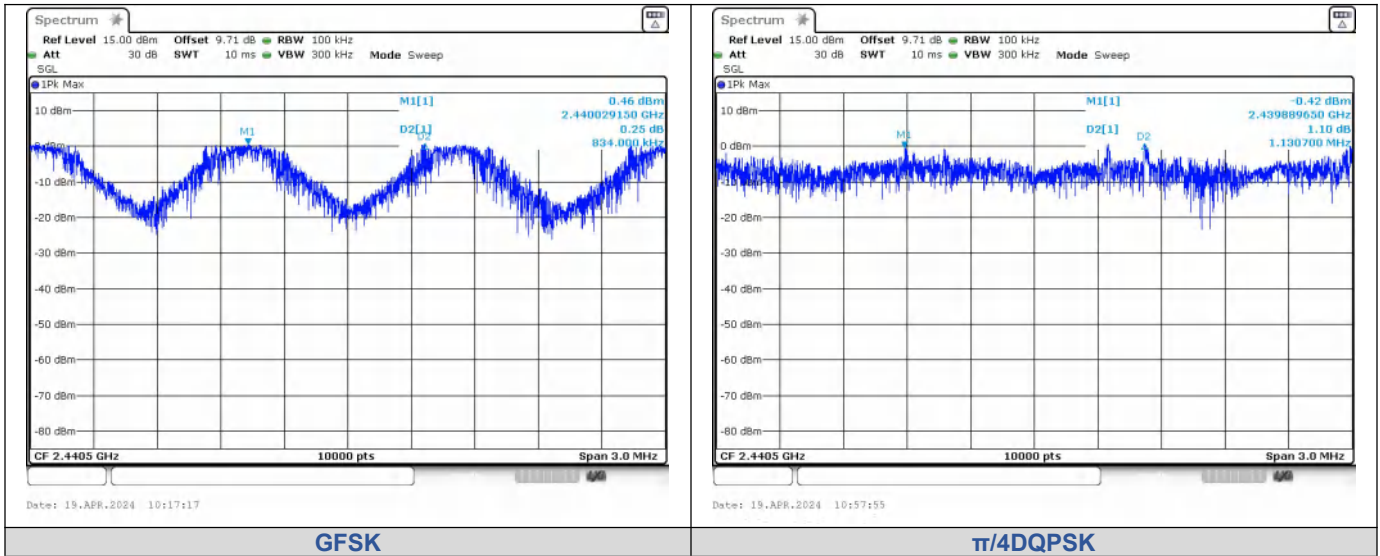
**$\pi$ /4DQPSK\_2-DH5\_Channel 78**

## Carrier Frequencies Separation

### Test Result

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2440.0291	2440.8632	0.8340	0.673	PASS
$\pi/4$ DQPSK	2-DH5	2439.8897	2441.0203	1.1307	0.88	PASS

### Test Graphs



## Conducted Out Of Band Emission

### Test Result

#### Non-Hopping

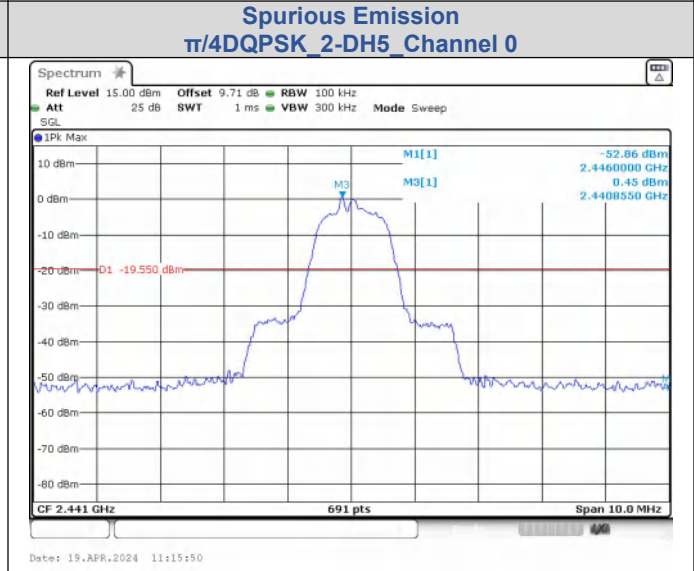
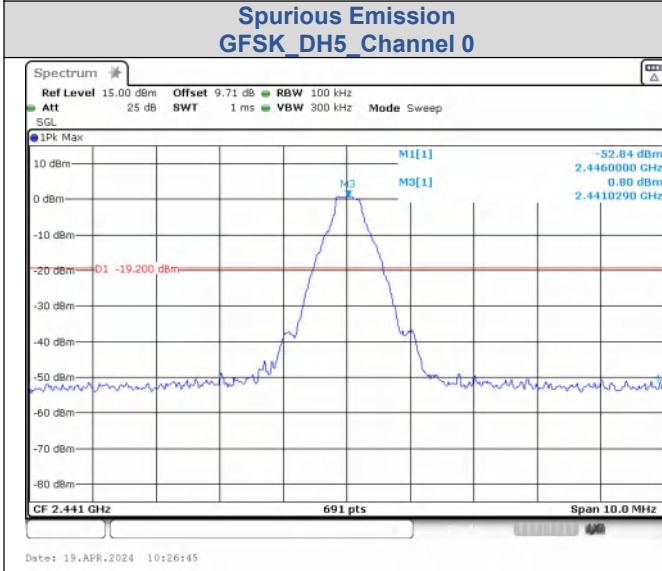
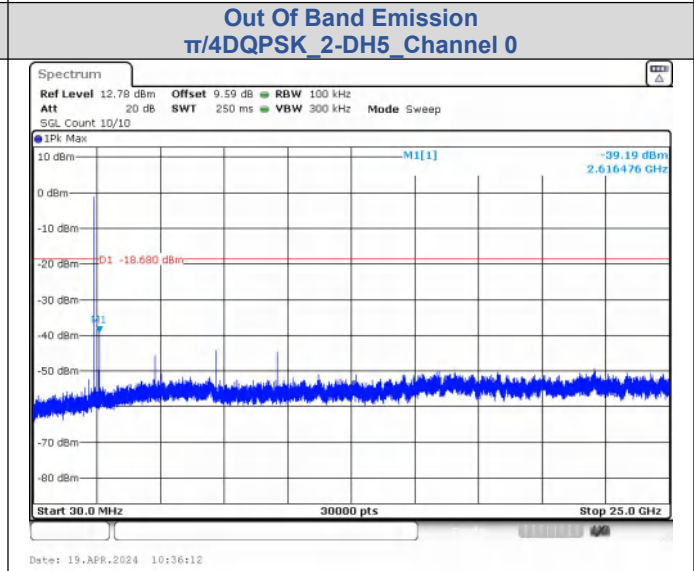
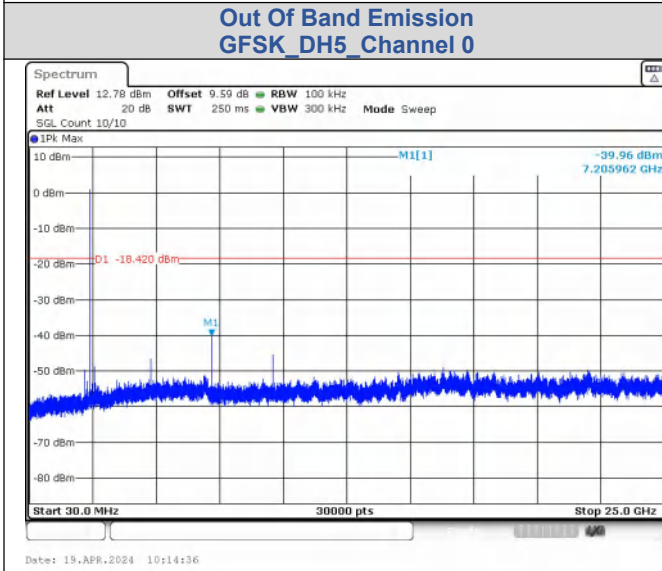
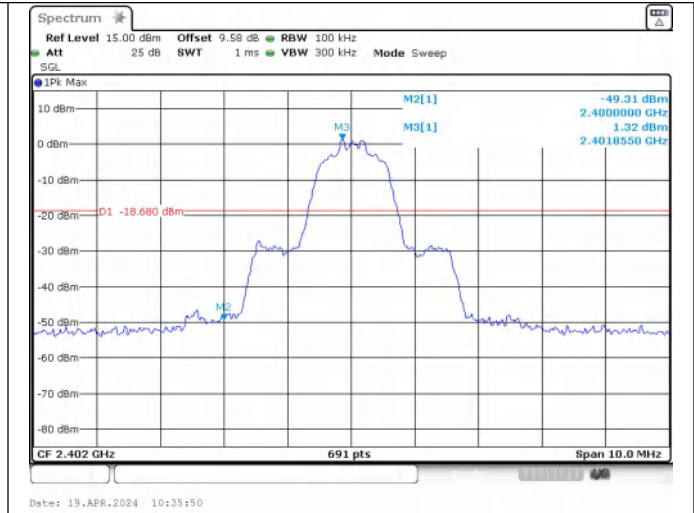
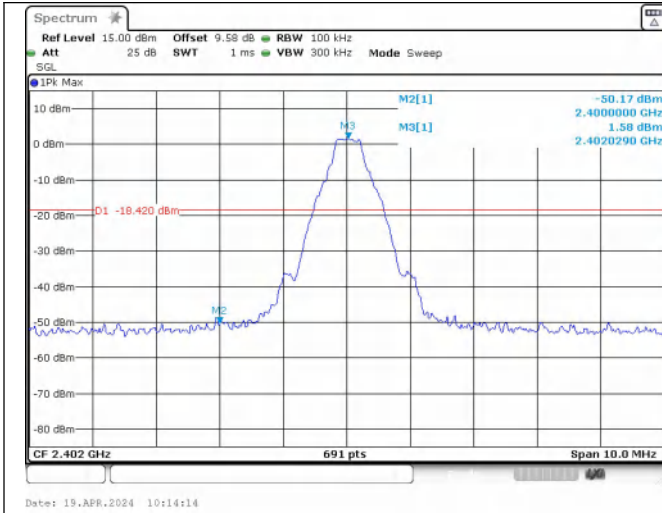
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-50.166	-18.42	-31.746	PASS
			7205.96	-39.965	-18.42	-21.545	PASS
		39	2596.50	-34.532	-19.2	-15.332	PASS
		78	2483.50	-53.061	-19.16	-33.901	PASS
			9920.20	-41.069	-19.16	-21.909	PASS
$\pi$ /4DQPSK	2-DH5	0	2400.00	-49.309	-18.68	-30.629	PASS
			2616.48	-39.194	-18.68	-20.514	PASS
		39	9763.72	-41.588	-19.55	-22.038	PASS
		78	2483.50	-52.006	-19.14	-32.866	PASS
			9920.20	-40.575	-19.14	-21.435	PASS

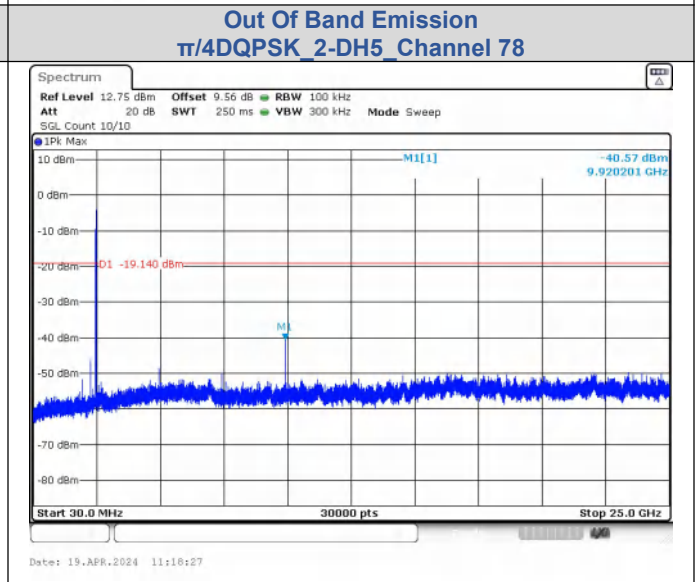
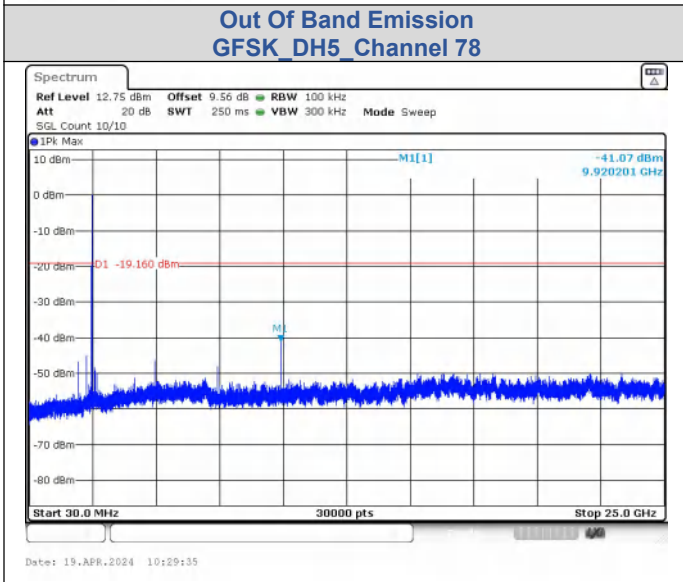
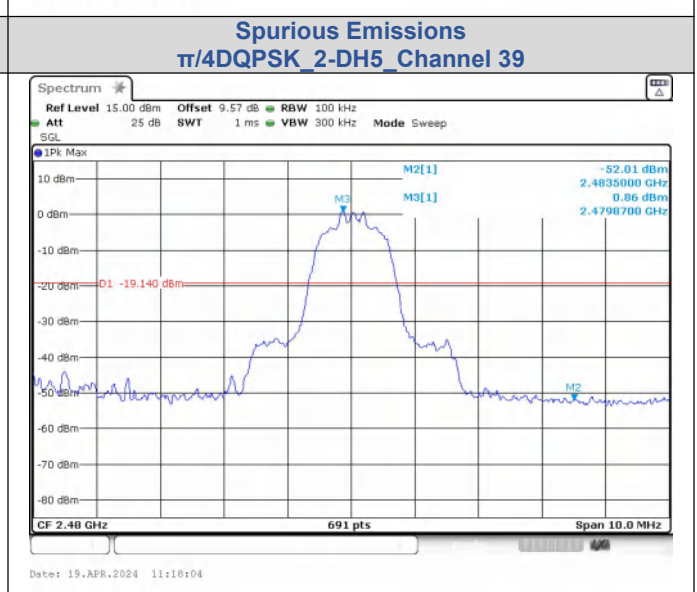
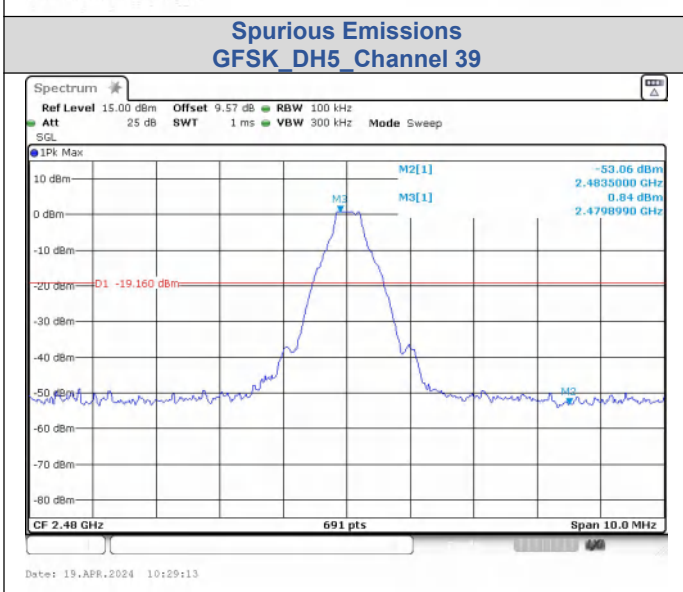
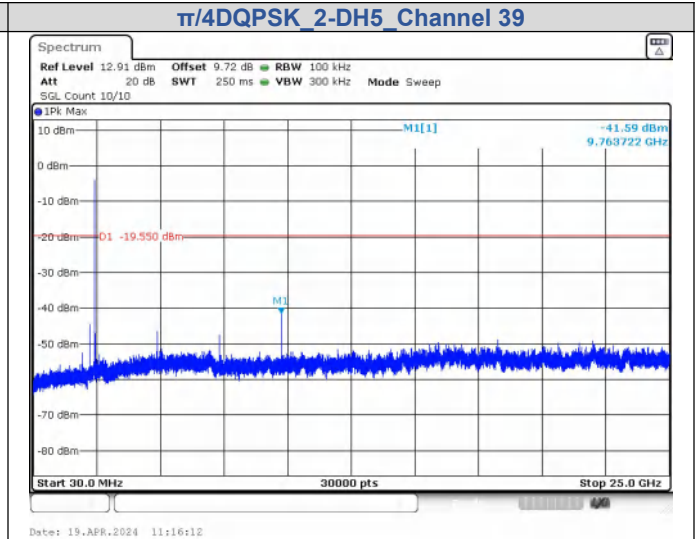
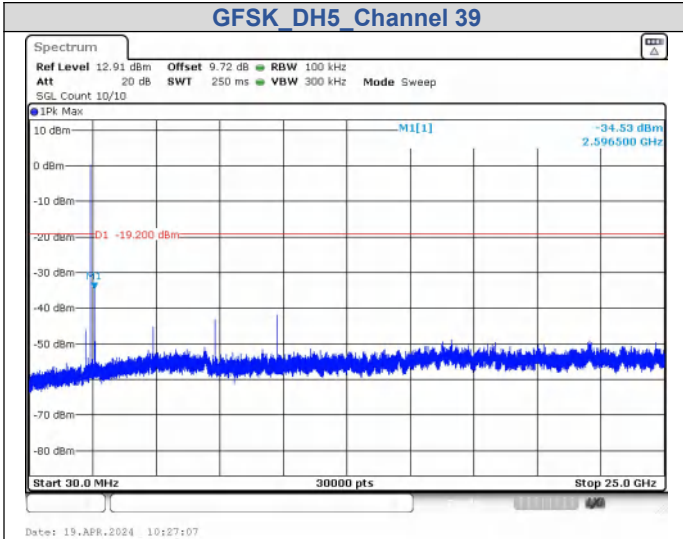
#### Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2397.26	-49.656	-18.43	-31.226	PASS
			2400.00	-51.081	-18.43	-32.651	PASS
			2483.50	-51.482	-19.12	-32.362	PASS
			2397.68	-50.013	-18.37	-31.643	PASS
			2400.00	-50.242	-18.37	-31.872	PASS
			2483.50	-50.637	-19.12	-31.517	PASS
$\pi$ /4DQPSK	2-DH5		2395.88	-50.167	-20.38	-29.787	PASS
			2400.00	-50.186	-20.38	-29.806	PASS
			2483.50	-50.671	-19.21	-31.461	PASS
			2398.26	-49.597	-18.57	-31.027	PASS
			2400.00	-51.251	-18.57	-32.681	PASS
			2483.50	-52.135	-19.29	-32.845	PASS

### Test Graphs

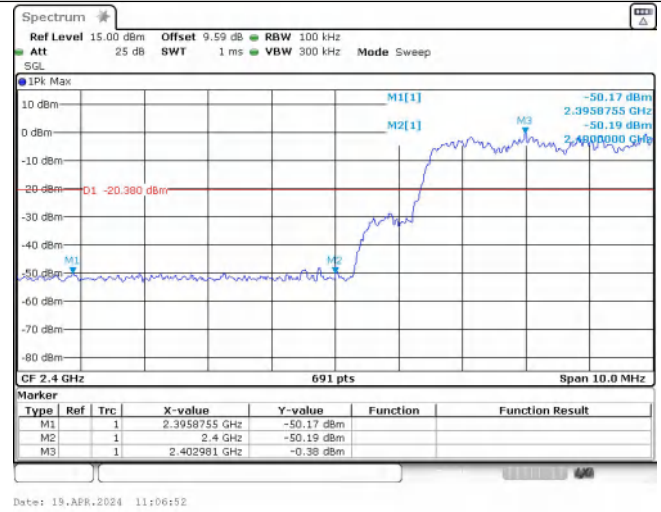
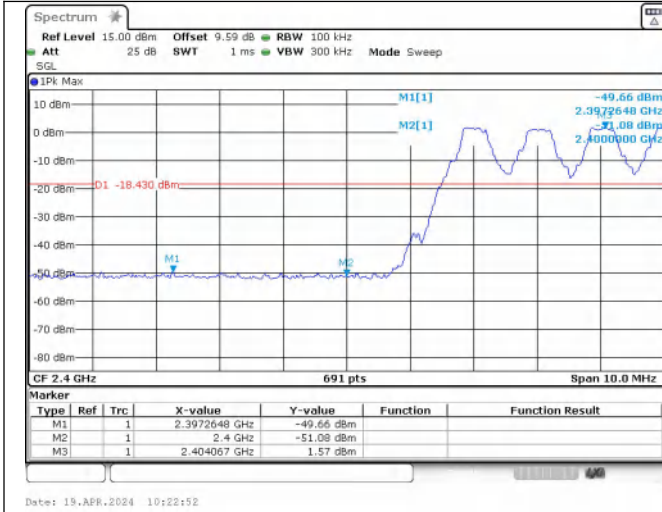






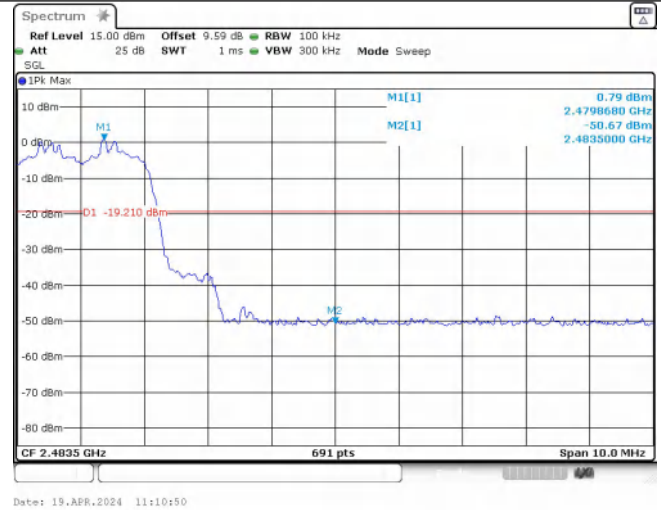
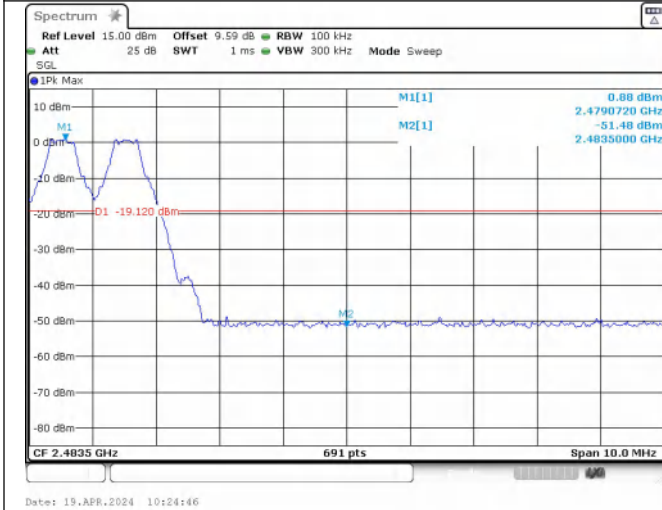
**Spurious Emission**  
GFSK\_DH5\_Channel 78

**Spurious Emission**  
 $\pi/4$ DQPSK\_2-DH5\_Channel 78



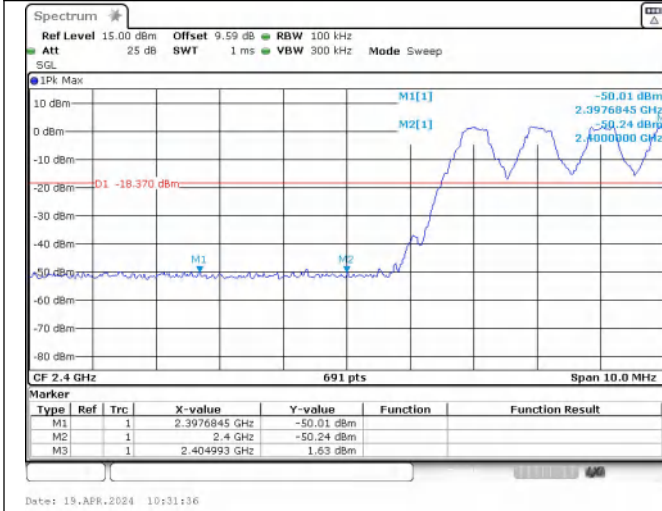
**Out Of Band Emission(Left)**  
GFSK\_DH5\_Channel Hopping

**Out Of Band Emission(Left)**  
 $\pi/4$ DQPSK\_2-DH5\_Channel Hopping

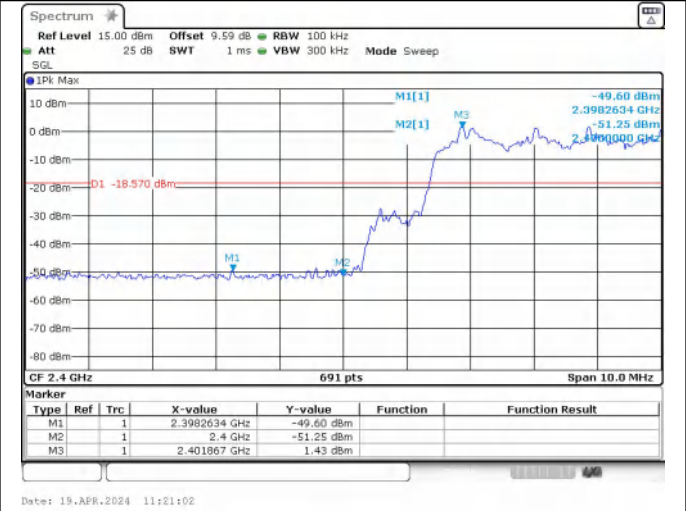


**Out Of Band Emission(Right)**  
GFSK\_DH5\_Channel Hopping

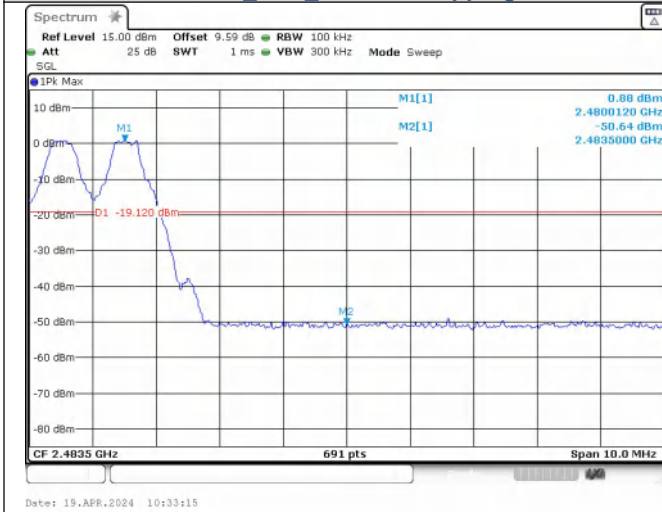
**Out Of Band Emission(Right)**  
 $\pi/4$ DQPSK\_2-DH5\_Channel Hopping



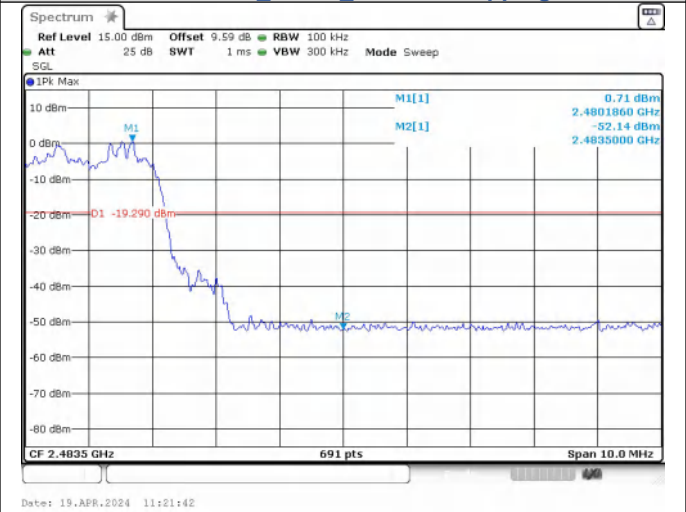
**Out Of Band Emission(Left)  
GFSK\_DH5\_Channel Hopping**



**Out Of Band Emission(Left)  
 $\pi/4$ DQPSK\_2-DH5\_Channel Hopping**



**Out Of Band Emission(Right)  
GFSK\_DH5\_Channel Hopping**



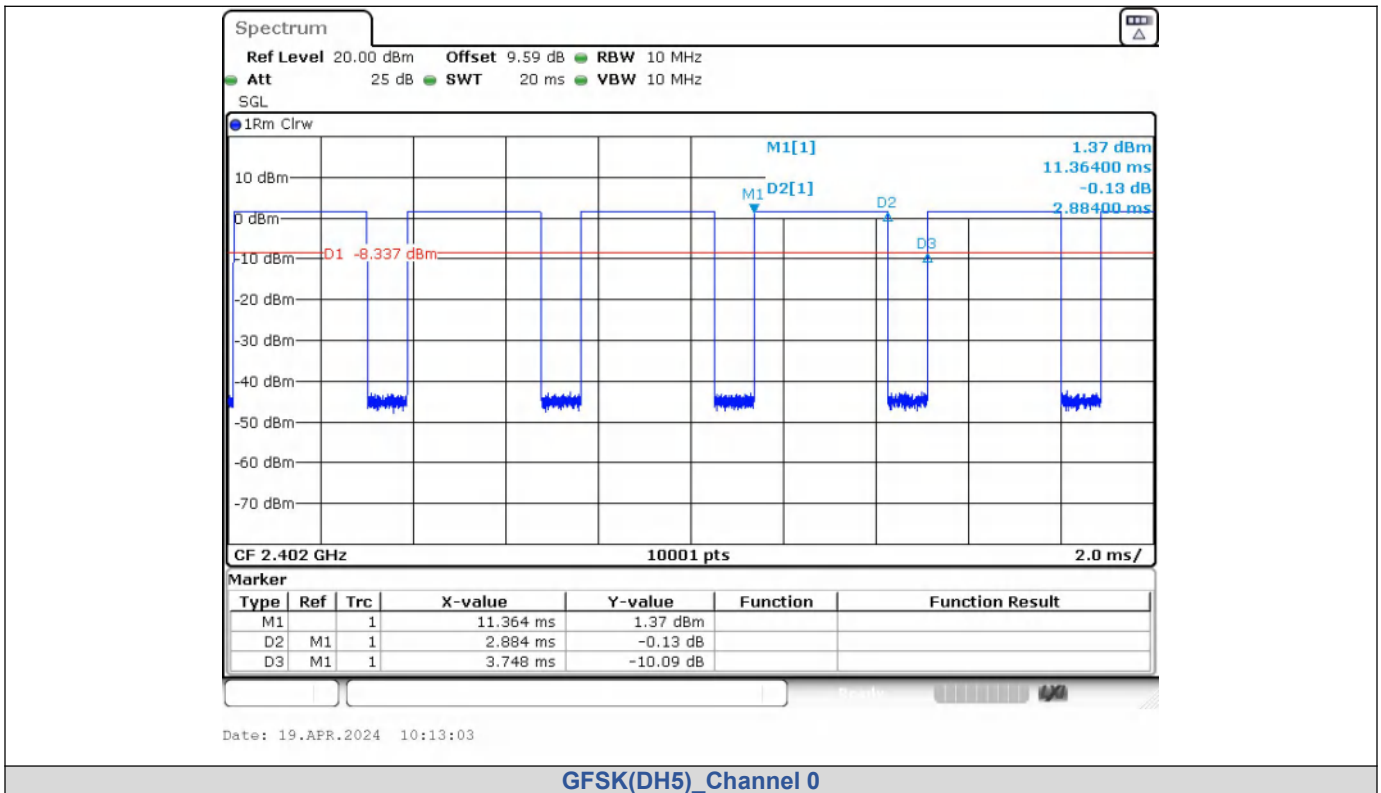
**Out Of Band Emission(Right)  
 $\pi/4$ DQPSK\_2-DH5\_Channel Hopping**

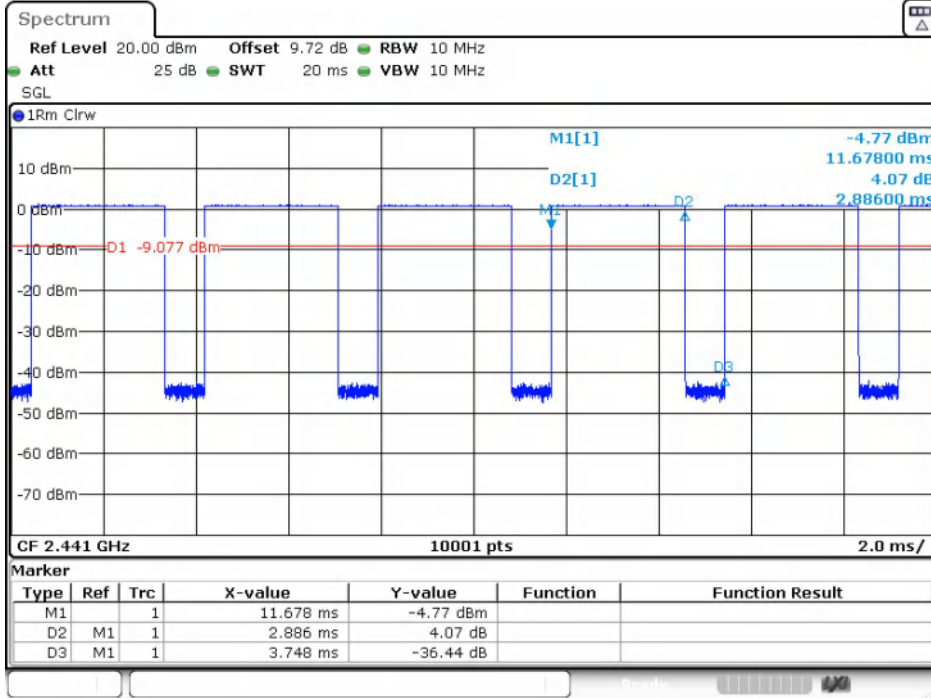
## Duty Cycle

### Test Result

Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.884	3.748	76.95	0.7695	1.1379	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	2.890	3.748	77.11	0.7711	1.1289	0.35

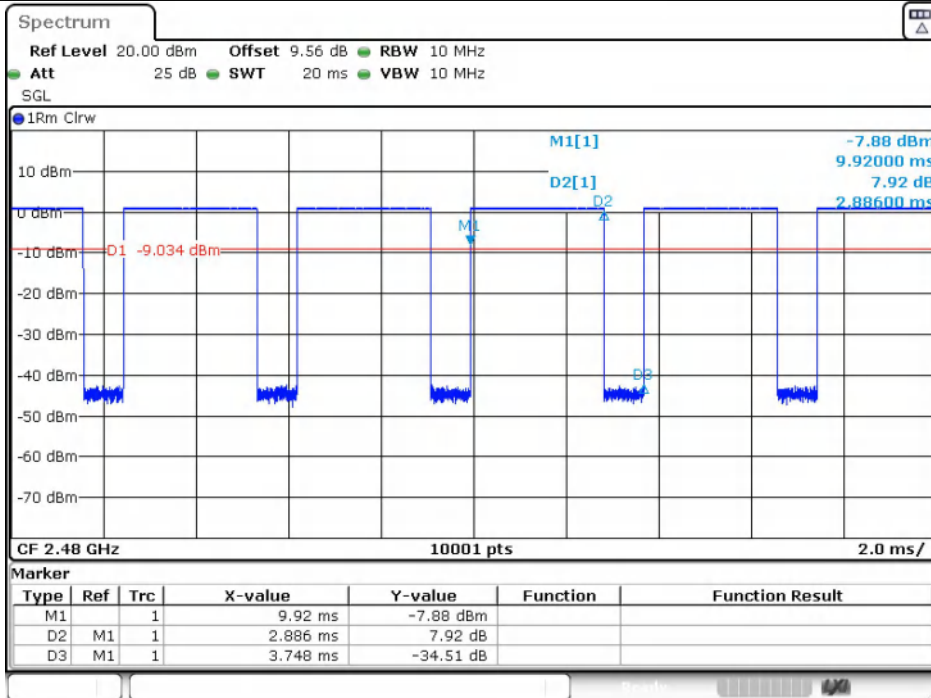
### Test Graphs





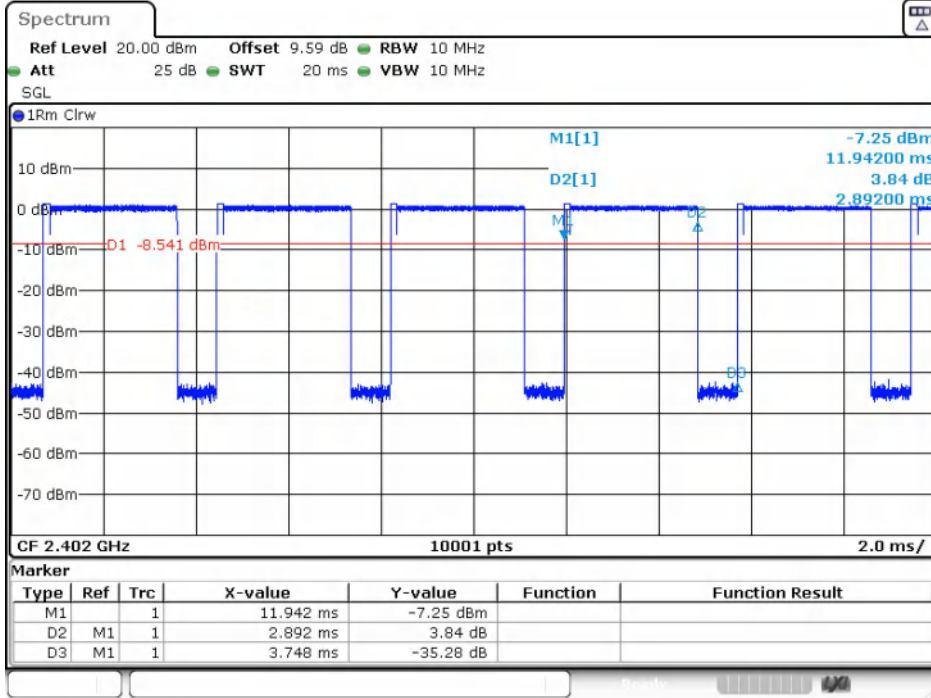
Date: 19.APR.2024 10:25:40

GFSK(DH5)\_Channel 39



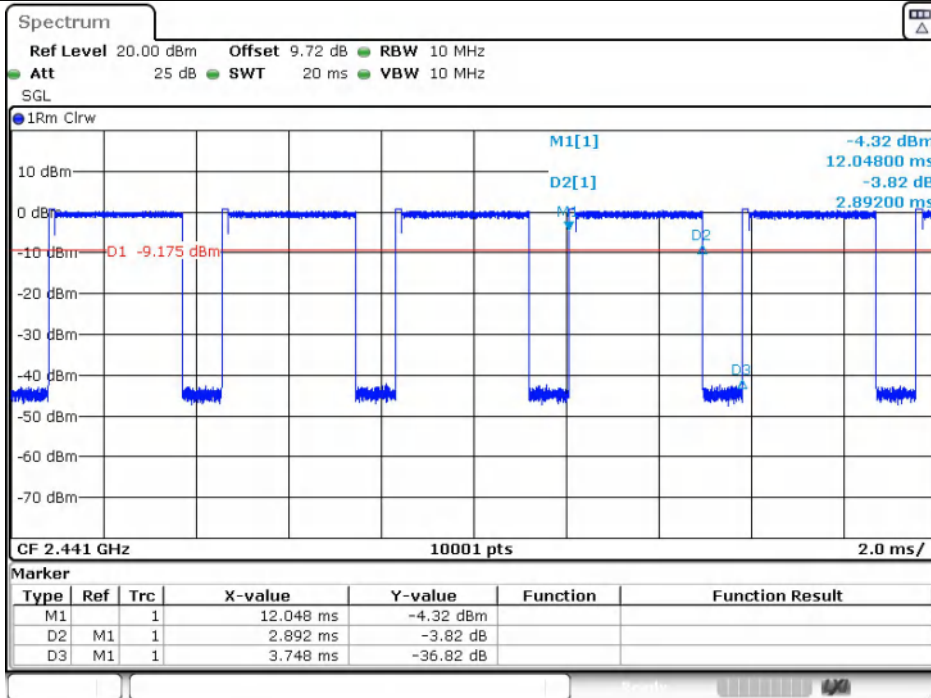
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GFSK(DH5)\_Channel 78



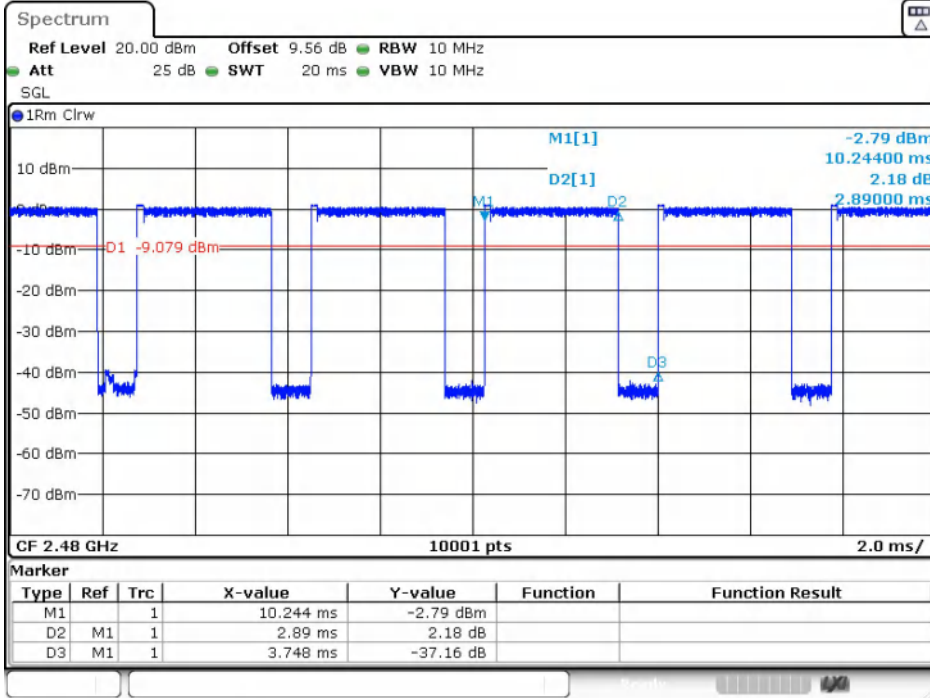
Date: 19.APR.2024 10:34:39

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



Date: 19.APR.2024 11:14:44

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



Date: 19.APR.2024 11:16:54

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

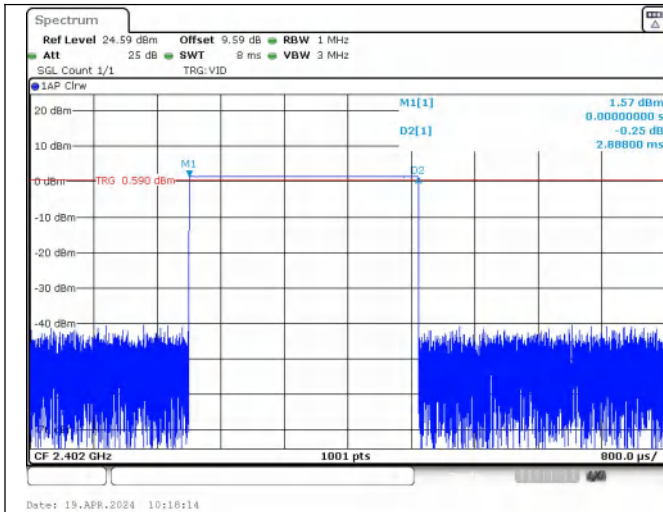


## Dwell Time

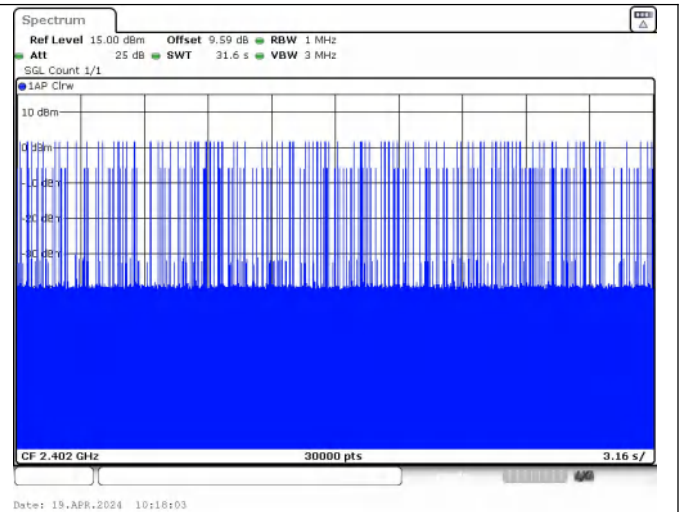
### Test Result

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	117	337.9	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.888	107	309.02		PASS

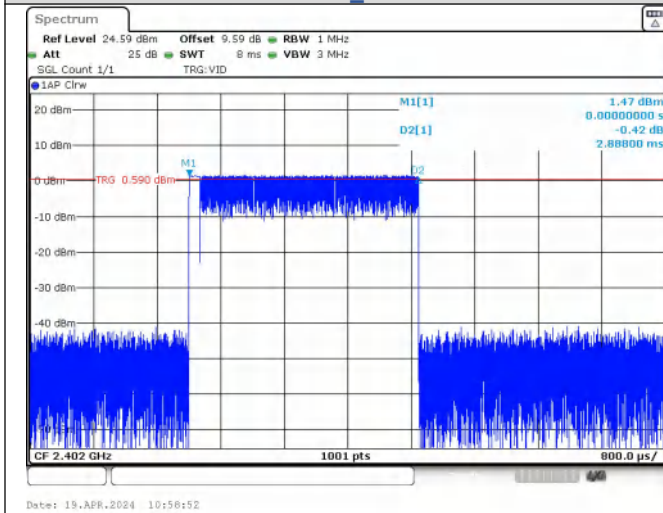
### Test Graphs



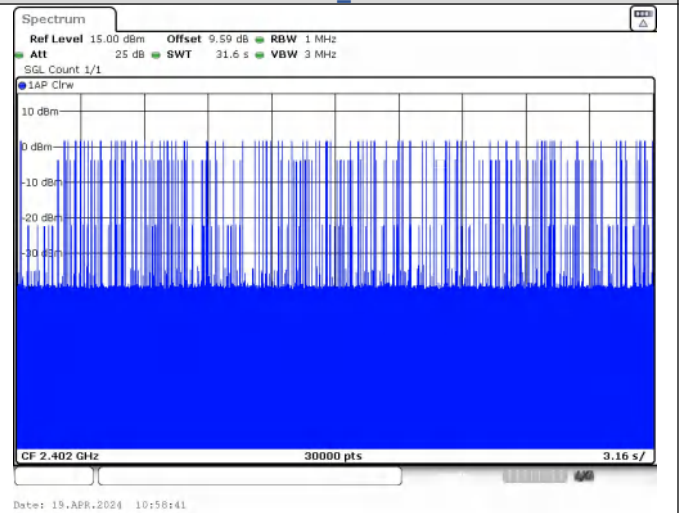
**Pulse Width  
GFSK\_DH5**



**Number of Pulses in 31.6 seconds  
GFSK\_DH5**



**Pulse Width  
 $\pi/4$ DQPSK\_2-DH5**



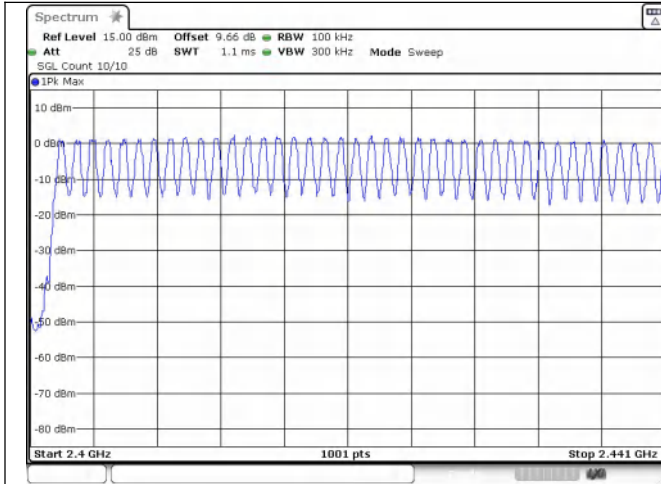
**Number of Pulses in 31.6 seconds  
 $\pi/4$ DQPSK\_2-DH5**

## Number Of Hopping Channel

### Test Result

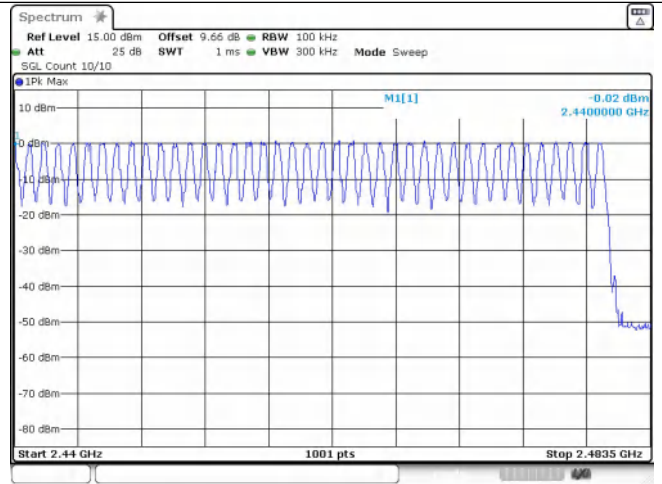
Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
$\pi/4$ DQPSK	2-DH5	79	15	PASS

### Test Graphs



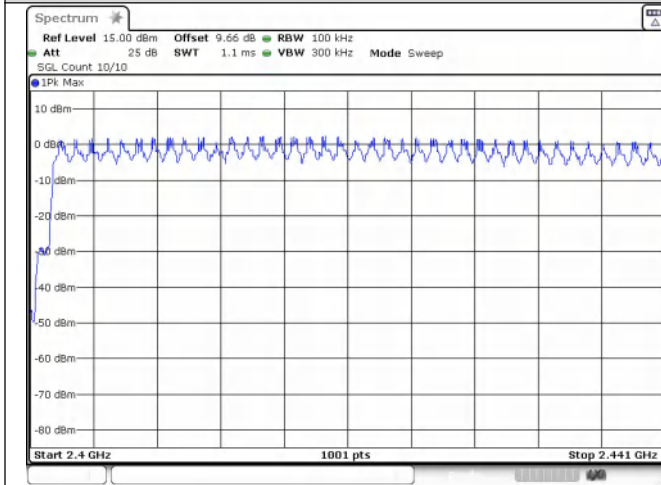
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Low End Spectrum Channel Hopping Plot  
GFSK



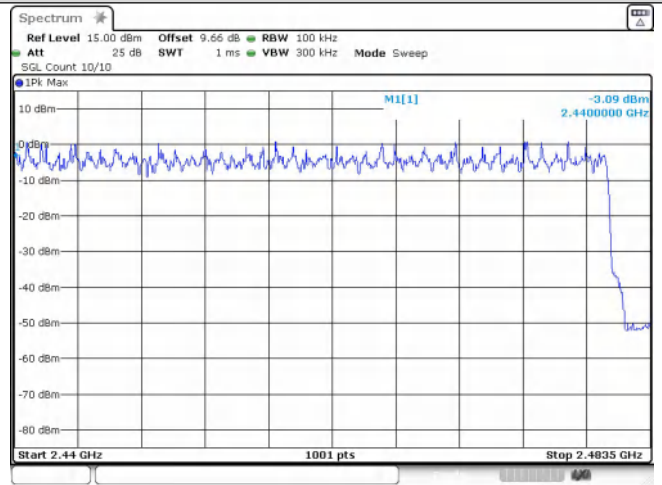
Date: 19.APR.2024 10:20:36

High End Spectrum Channel Hopping Plot  
GFSK



Date: 19.APR.2024 11:04:47

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



Date: 19.APR.2024 11:05:54

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