



Shenzhen CTL Testing Technology Co., Ltd.

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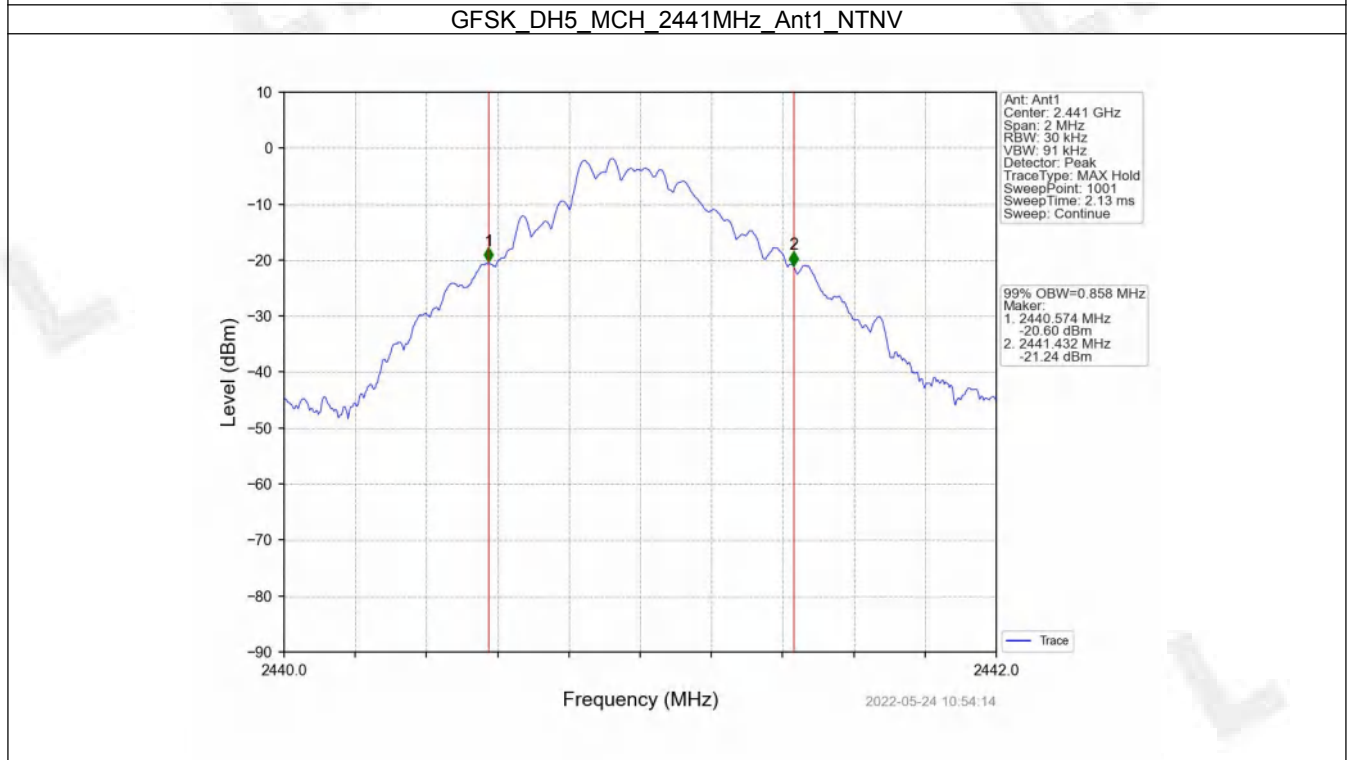
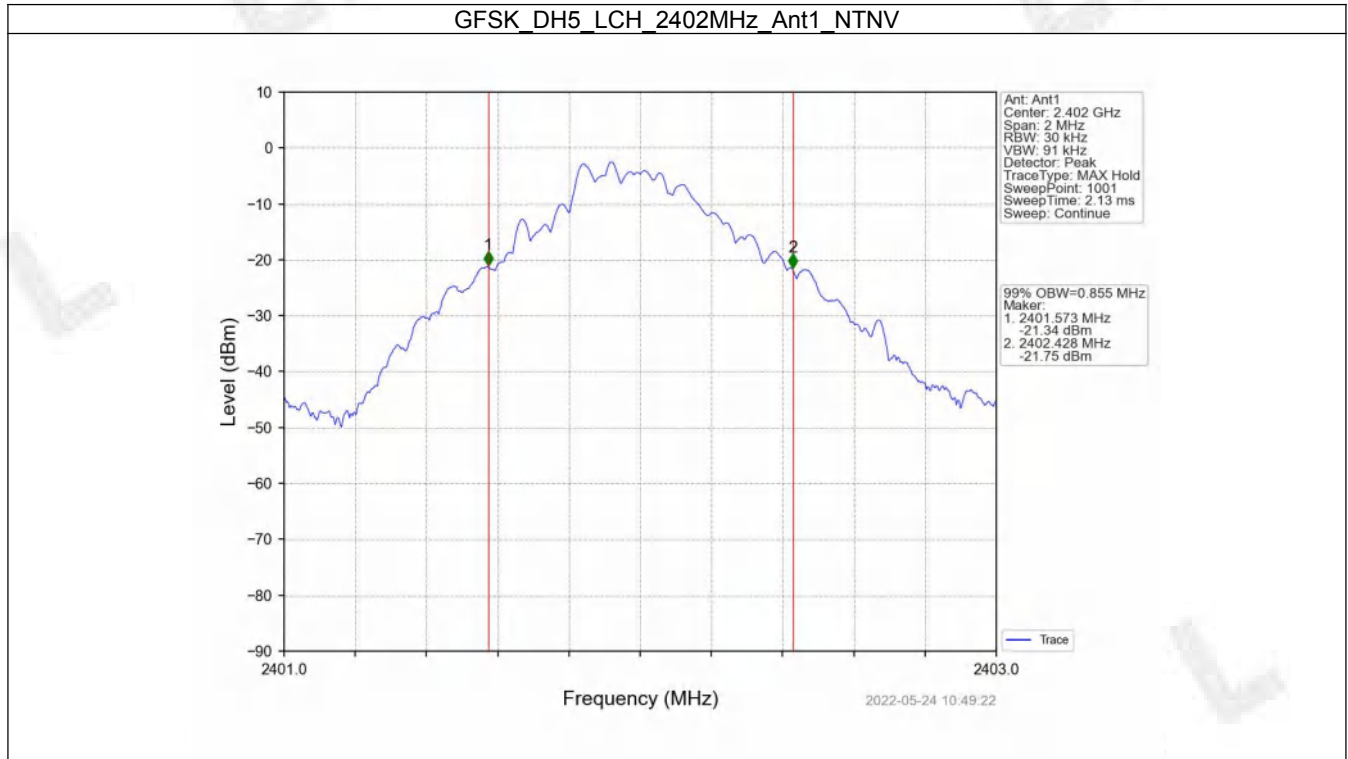
## 1. Bandwidth

### 1.1 OBW

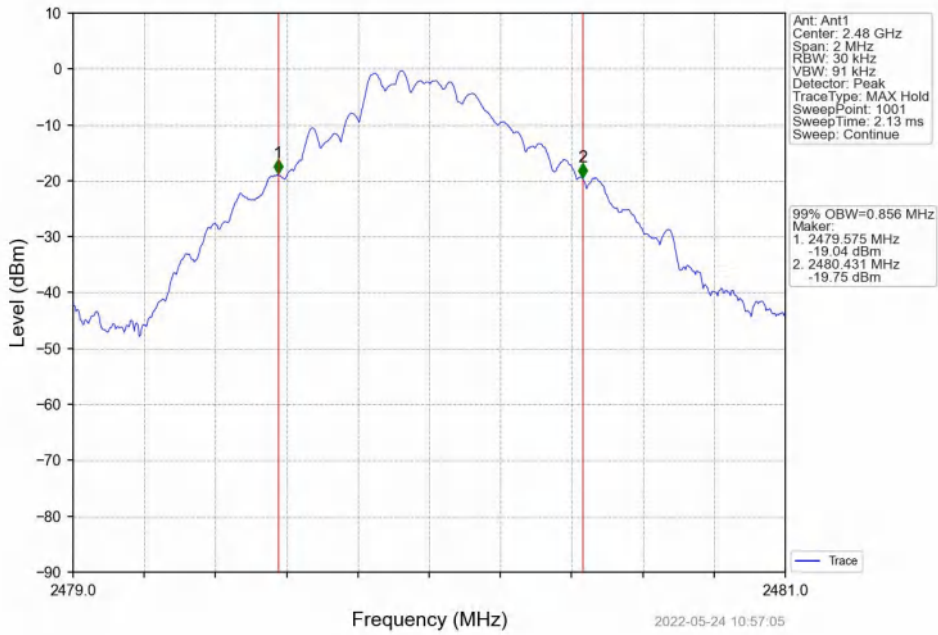
#### 1.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz)	Verdict
					Result	
GFSK	SISO	2402	DH5	1	0.855	Pass
		2441	DH5	1	0.858	Pass
		2480	DH5	1	0.856	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.197	Pass
		2441	2DH5	1	1.198	Pass
		2480	2DH5	1	1.201	Pass
8DPSK	SISO	2402	3DH5	1	1.198	Pass
		2441	3DH5	1	1.200	Pass
		2480	3DH5	1	1.197	Pass

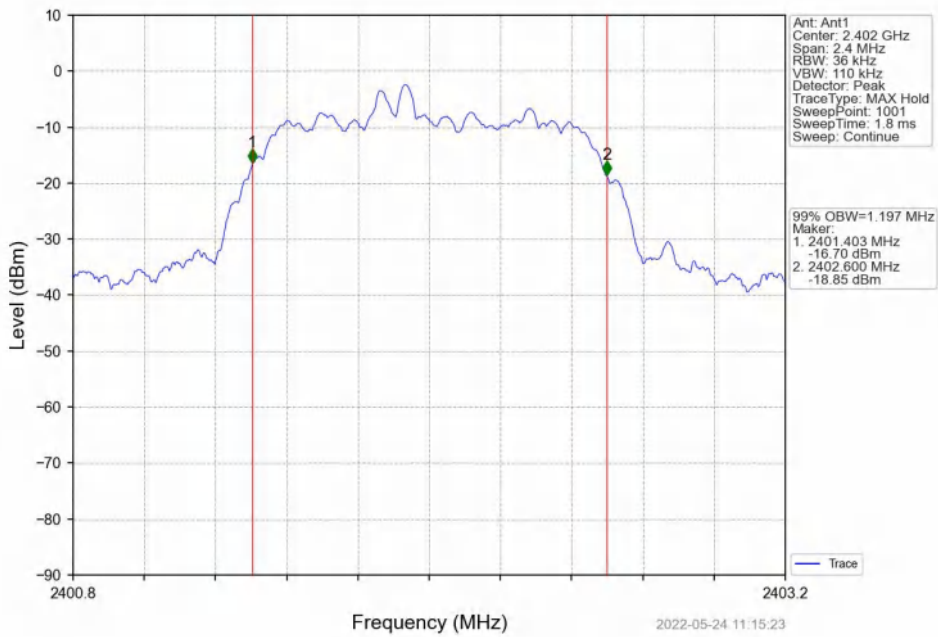
1.1.2 Test Graph



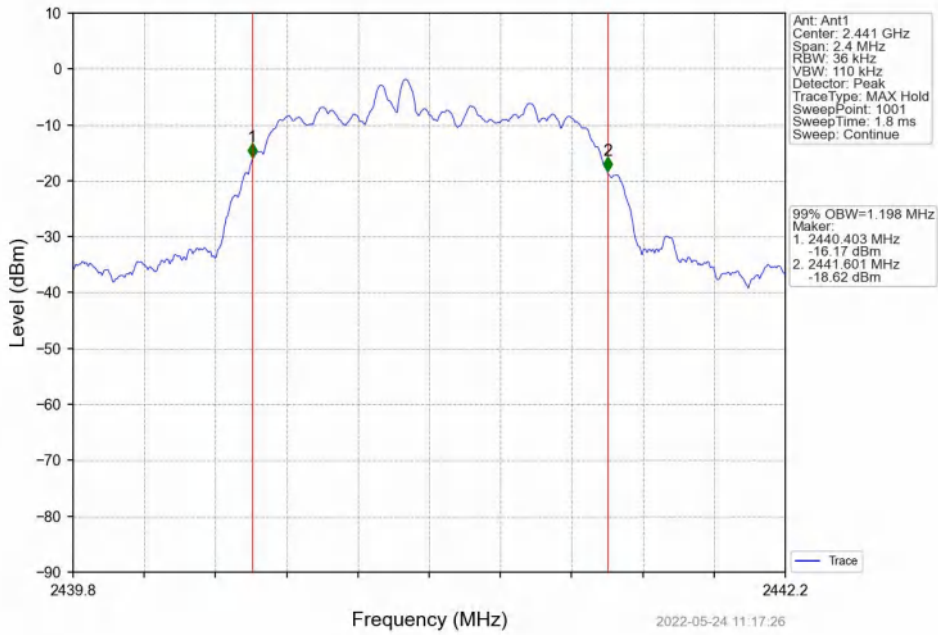
GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



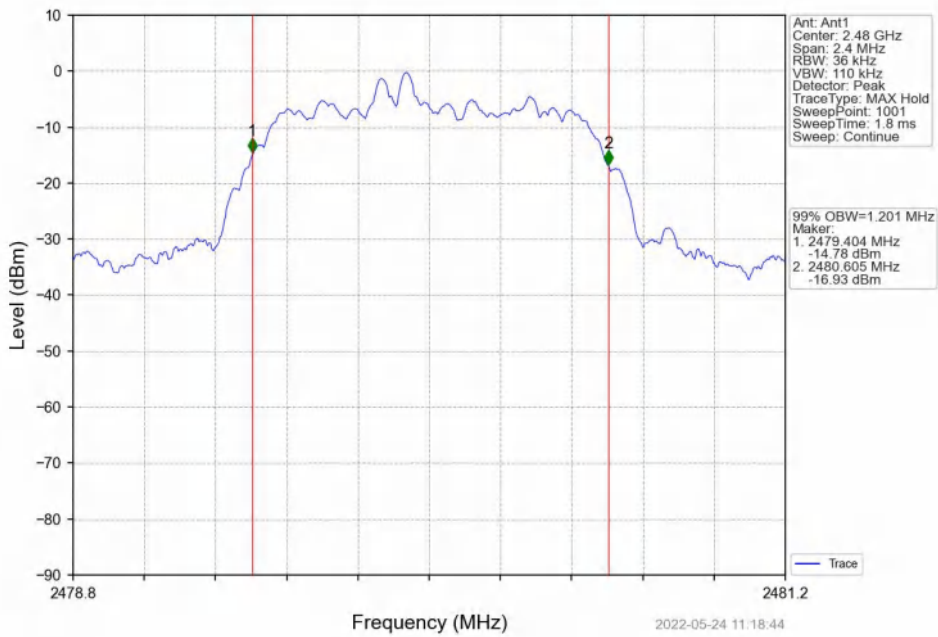
PI/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



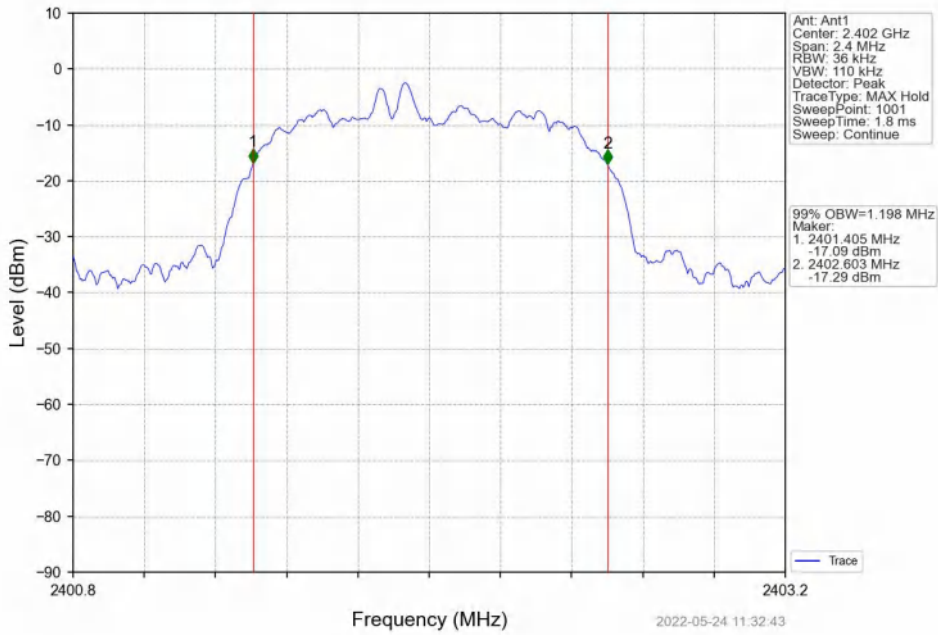
Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



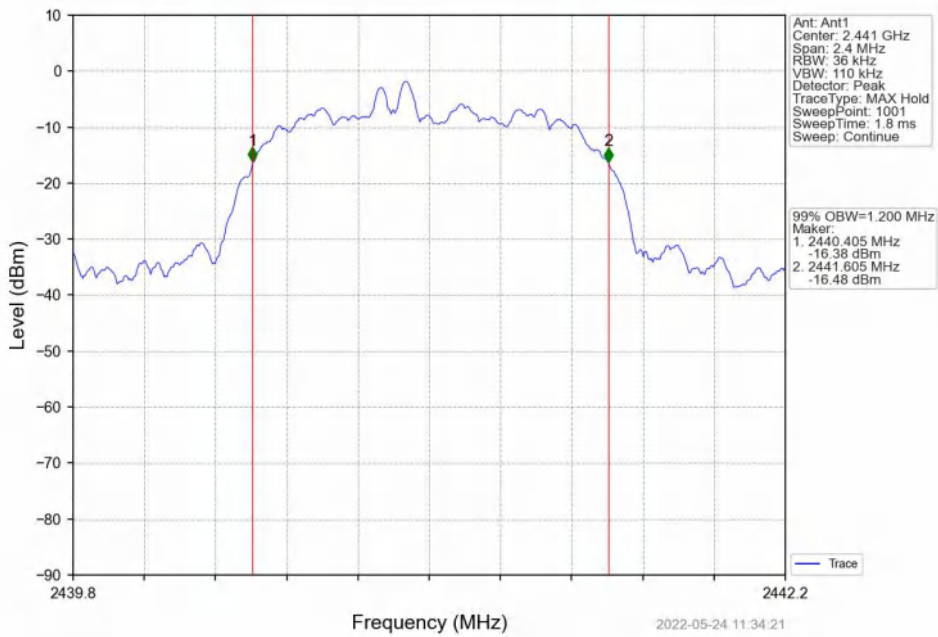
Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV

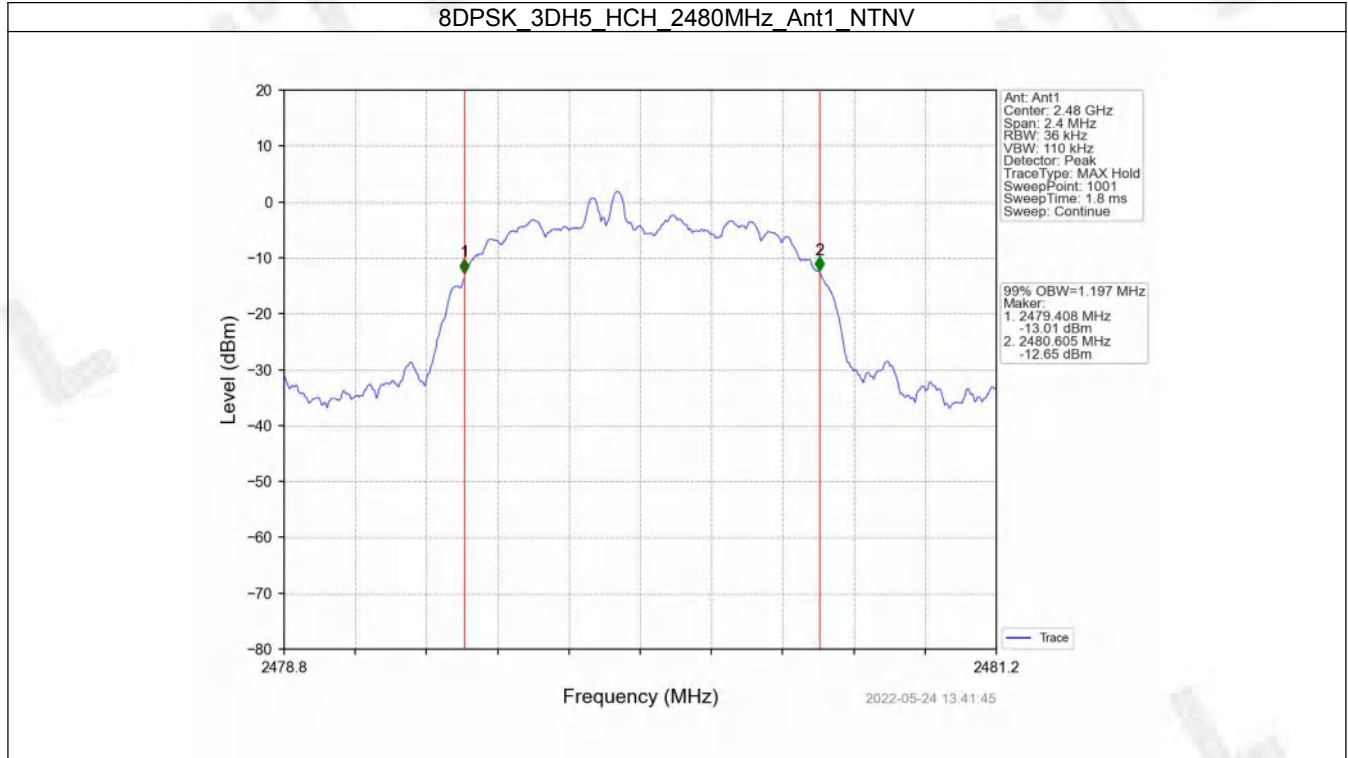


8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



8DPSK\_3DH5\_MCH\_2441MHz\_Ant1\_NTNV



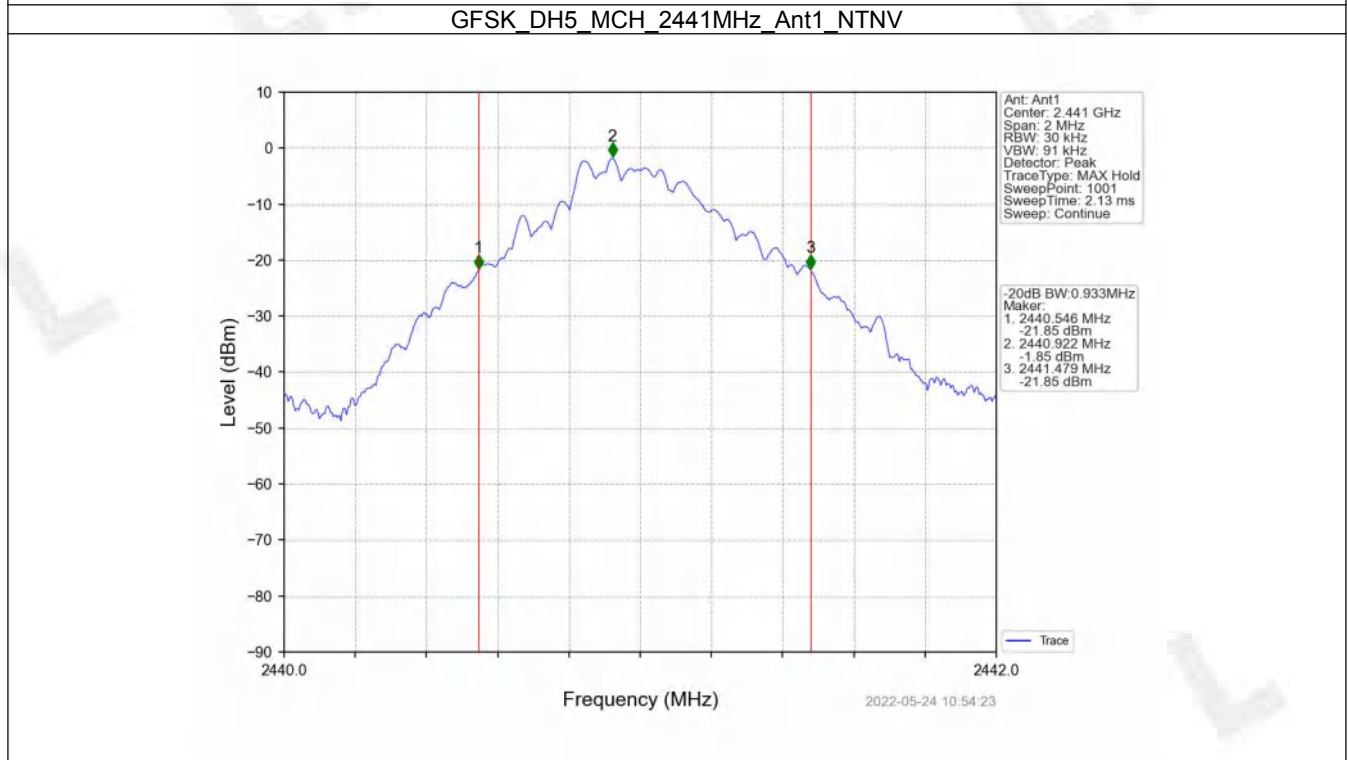
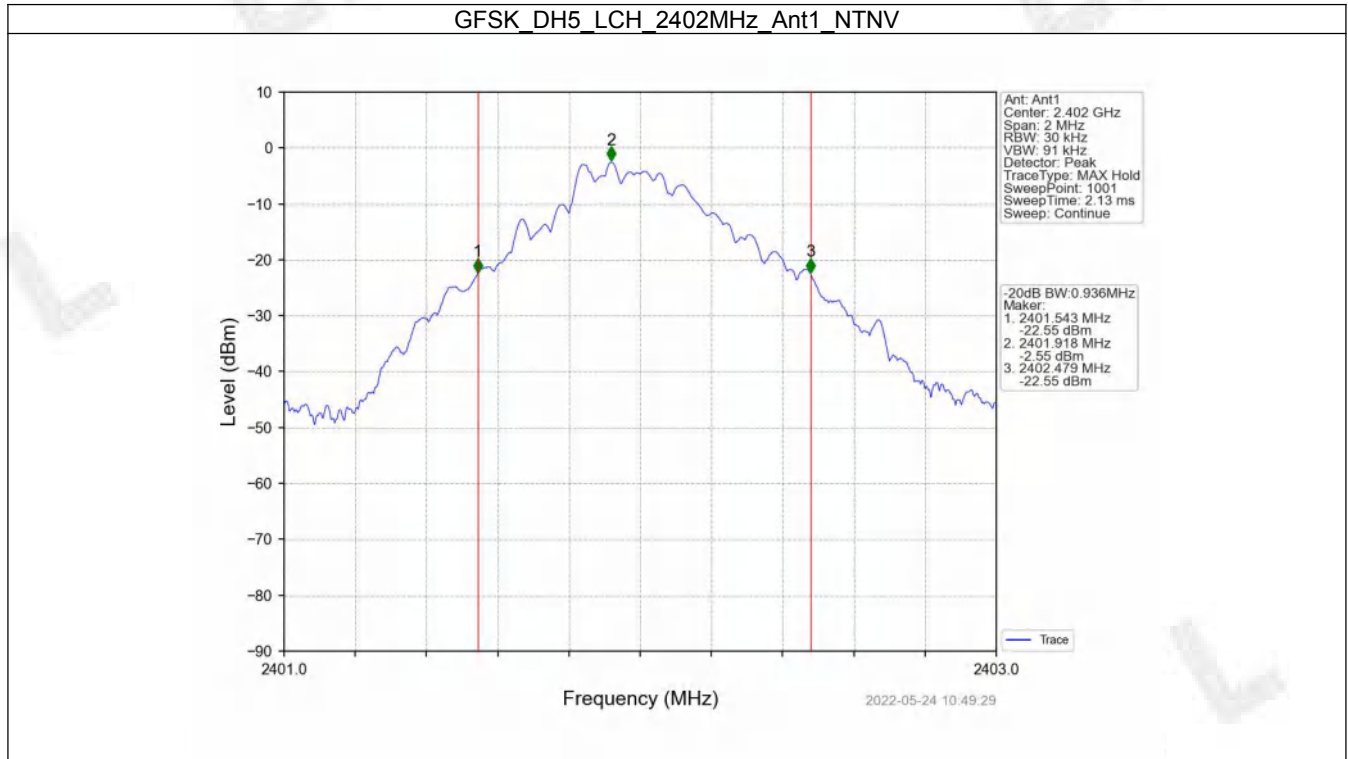


## 1.2 20dB BW

## 1.2.1 Test Result

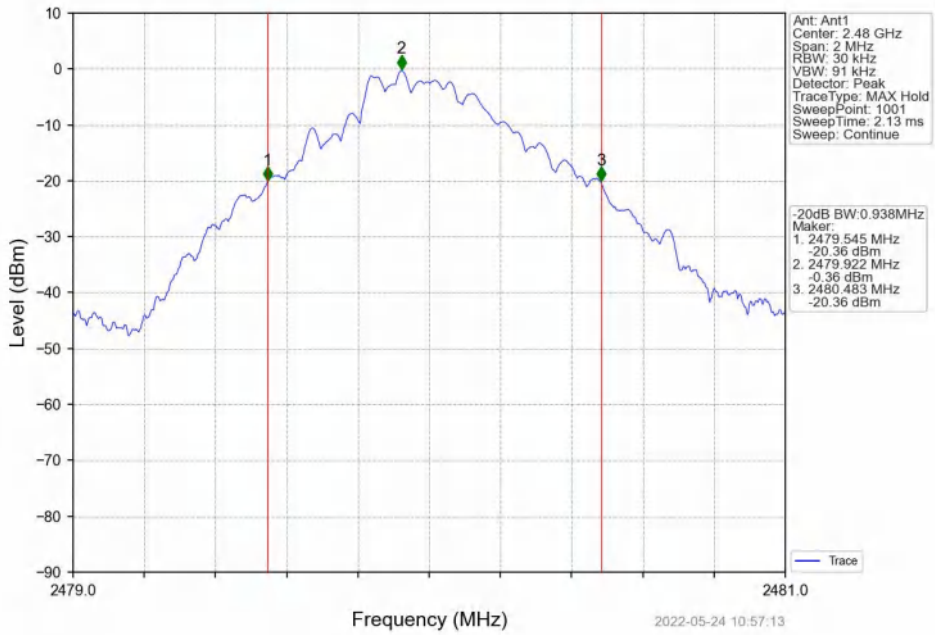
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)	Verdict
					Result	
GFSK	SISO	2402	DH5	1	0.936	Pass
		2441	DH5	1	0.933	Pass
		2480	DH5	1	0.938	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.296	Pass
		2441	2DH5	1	1.295	Pass
		2480	2DH5	1	1.295	Pass
8DPSK	SISO	2402	3DH5	1	1.303	Pass
		2441	3DH5	1	1.303	Pass
		2480	3DH5	1	1.306	Pass

1.2.2 Test Graph

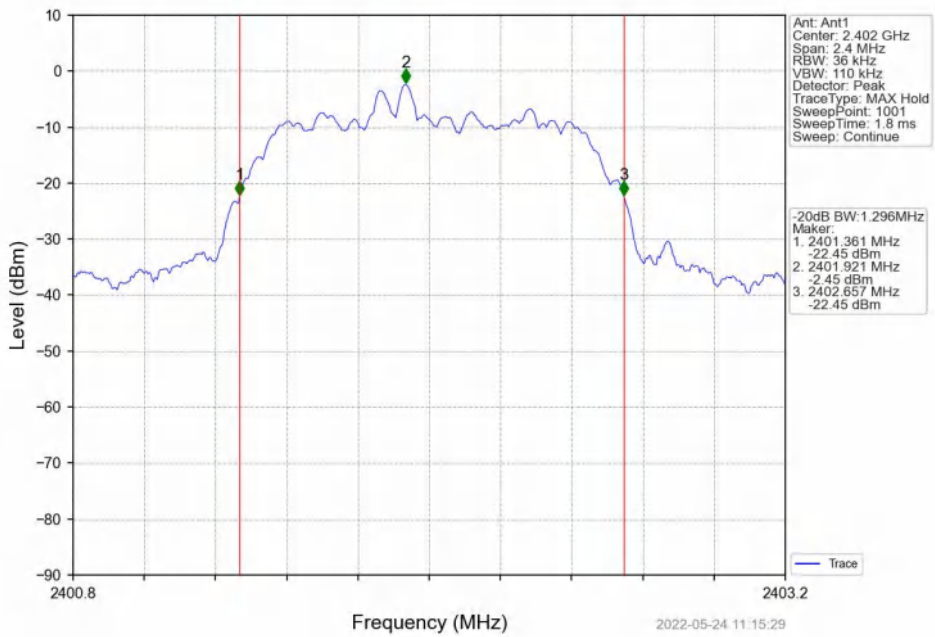




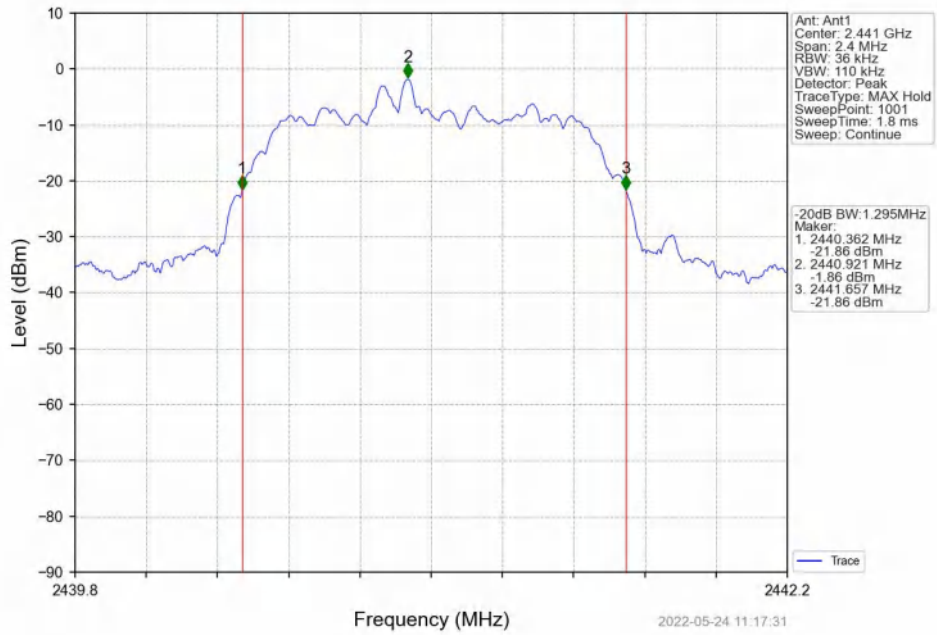
GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



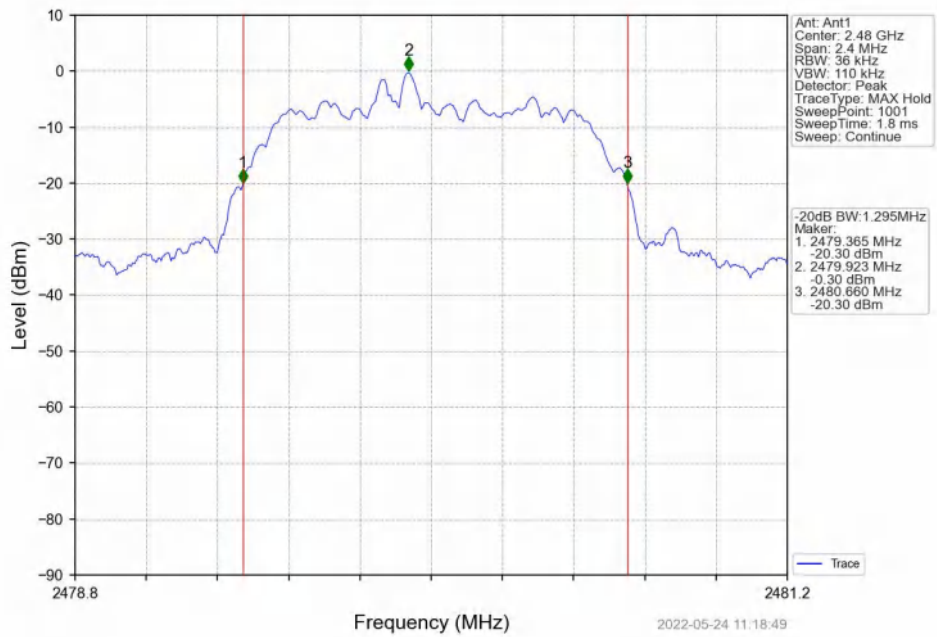
PI/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



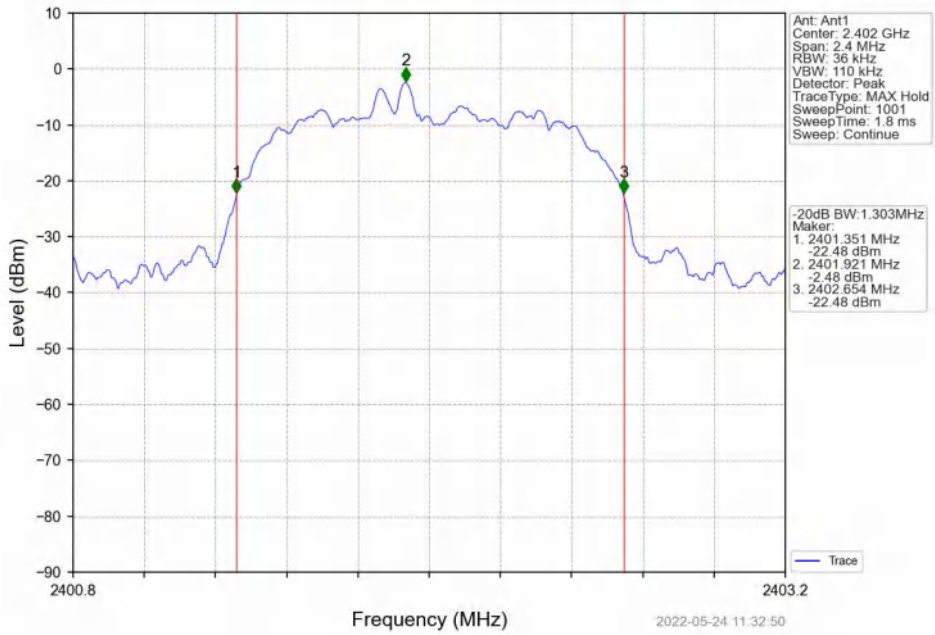
Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



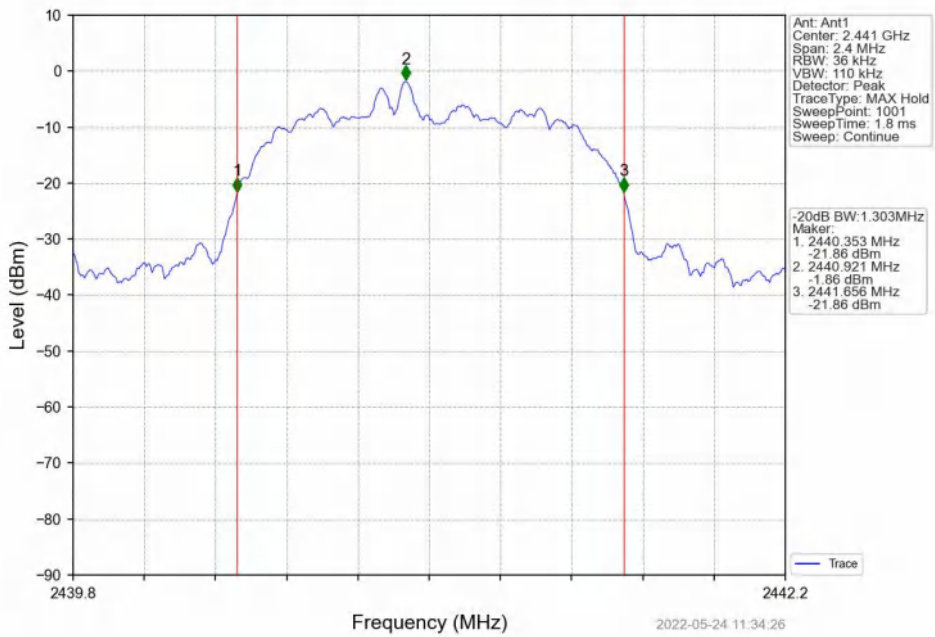
Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV

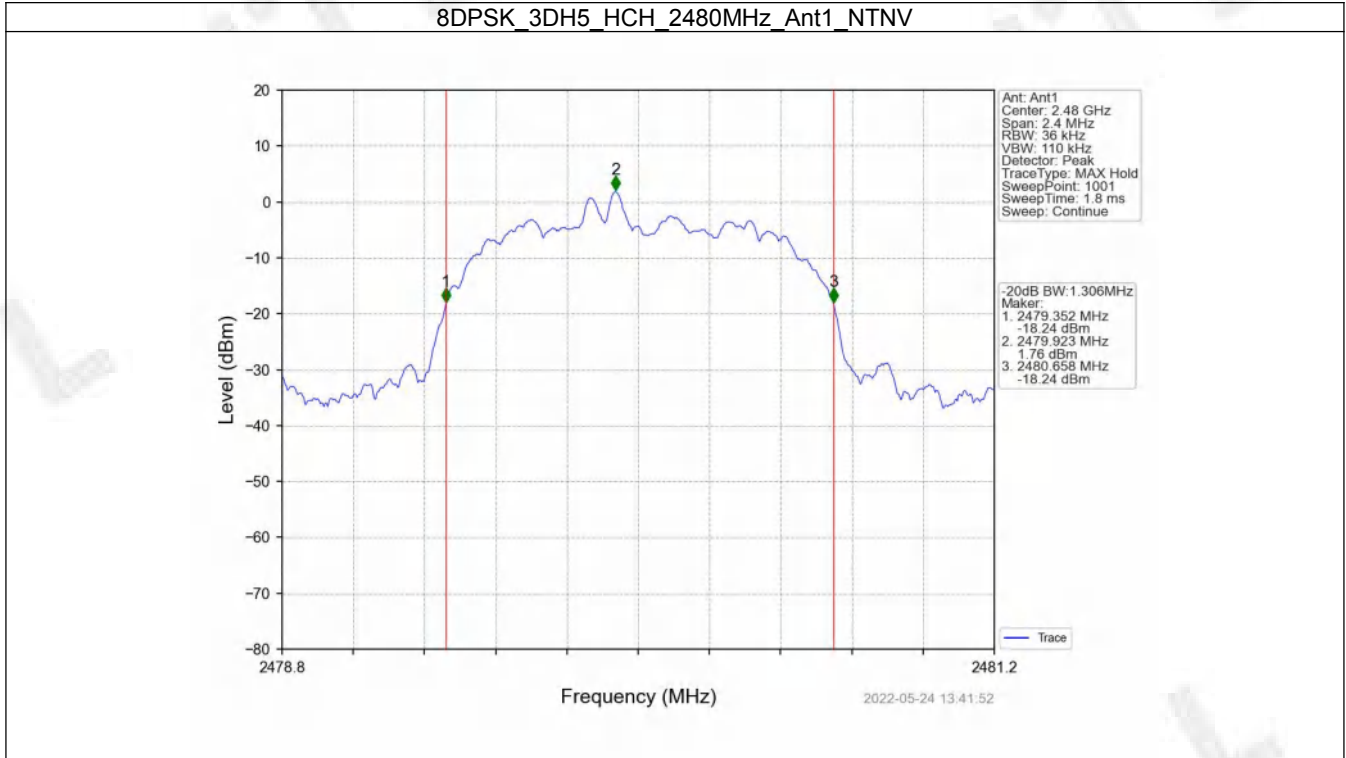


8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



8DPSK\_3DH5\_MCH\_2441MHz\_Ant1\_NTNV





## 2. Maximum Conducted Output Power

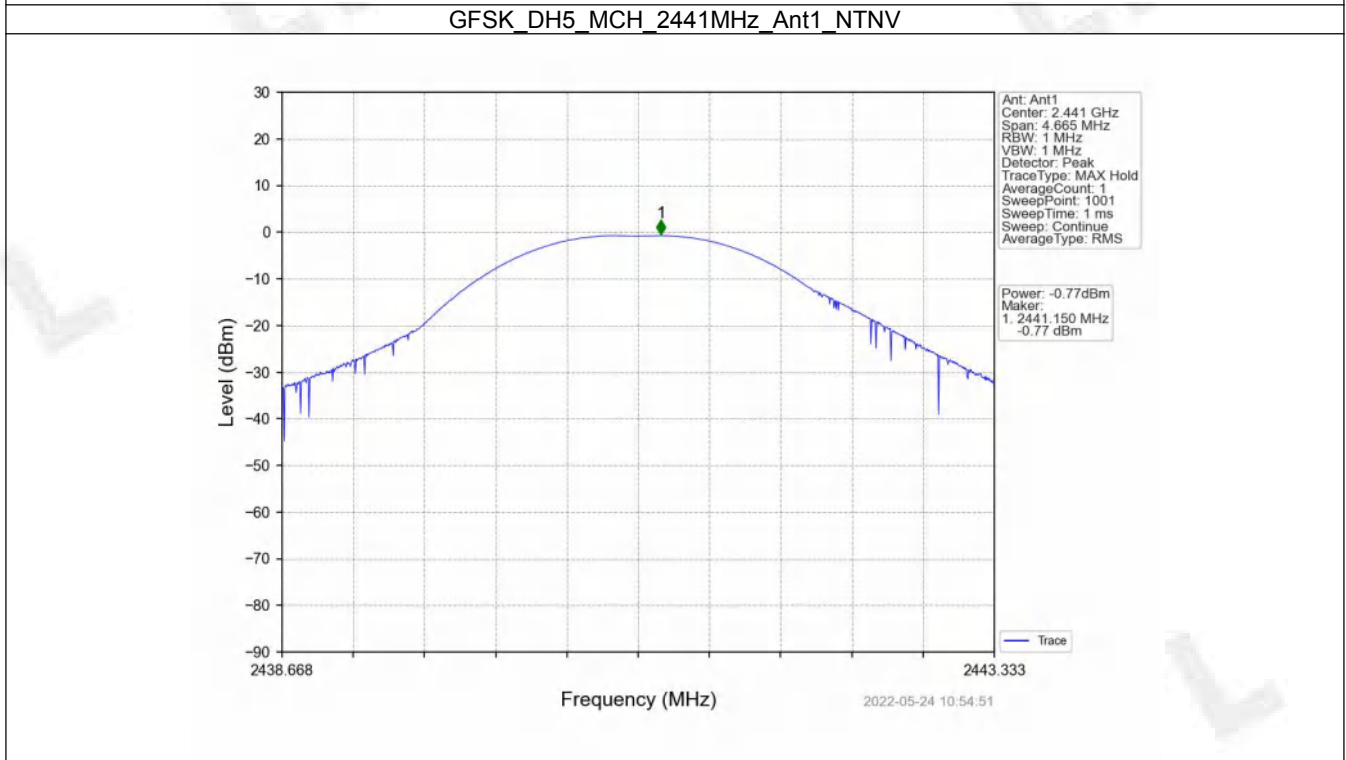
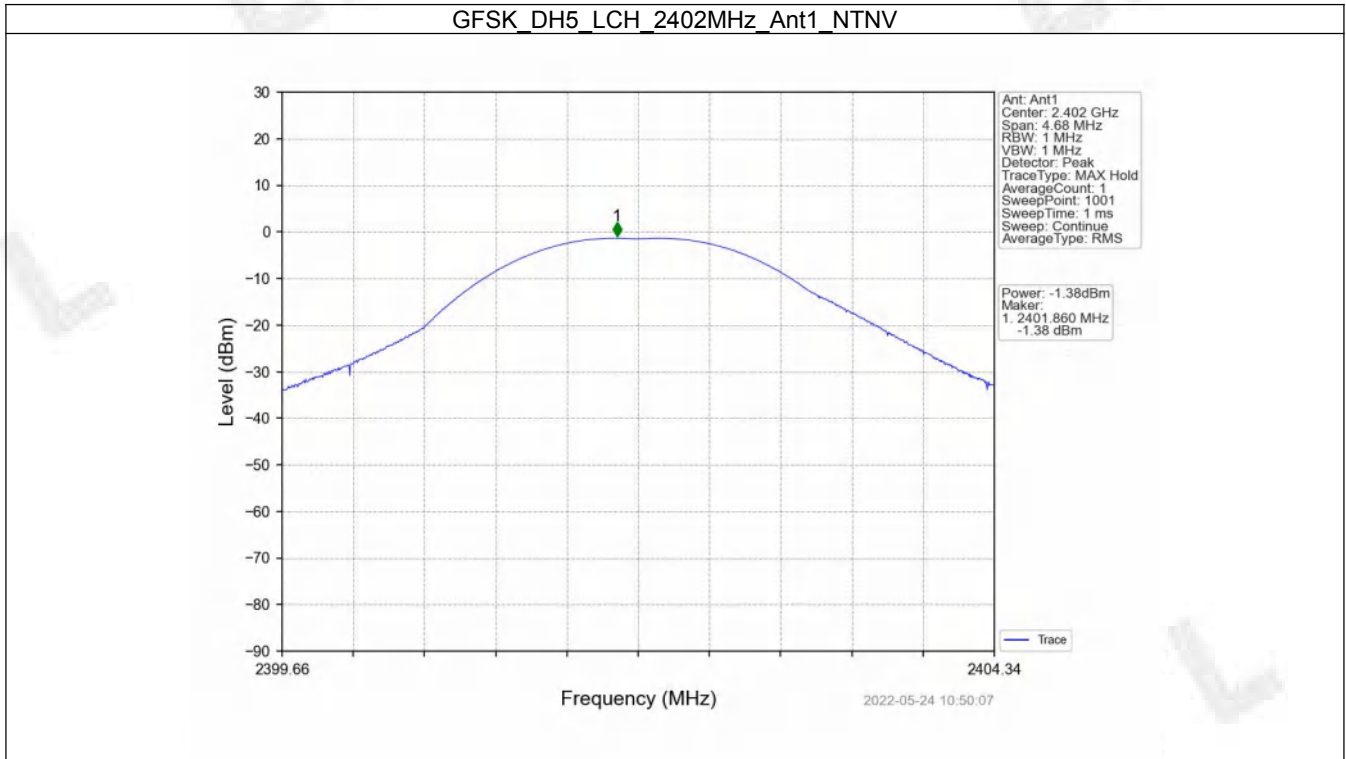
### 2.1 Power

#### 2.1.1 Test Result

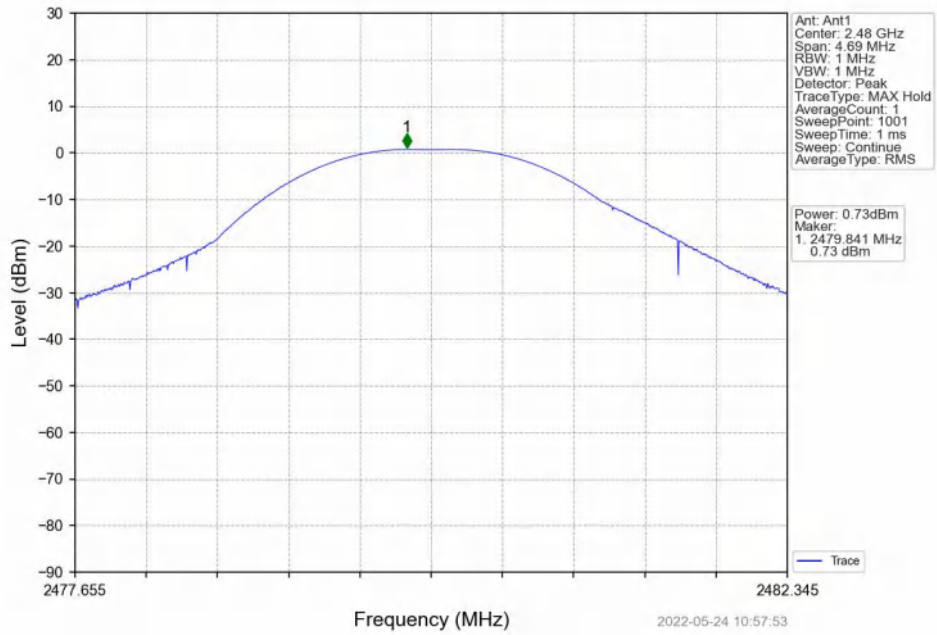
Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	-1.38	<=30	Pass
		2441	DH5	-0.77	<=30	Pass
		2480	DH5	0.73	<=30	Pass
Pi/4DQPSK	SISO	2402	2DH5	2.55	<=20.97	Pass
		2441	2DH5	3.13	<=20.97	Pass
		2480	2DH5	4.49	<=20.97	Pass
8DPSK	SISO	2402	3DH5	3.06	<=20.97	Pass
		2441	3DH5	3.71	<=20.97	Pass
		2480	3DH5	6.95	<=20.97	Pass

Note1: Antenna Gain: Ant1: 0.00dBi;

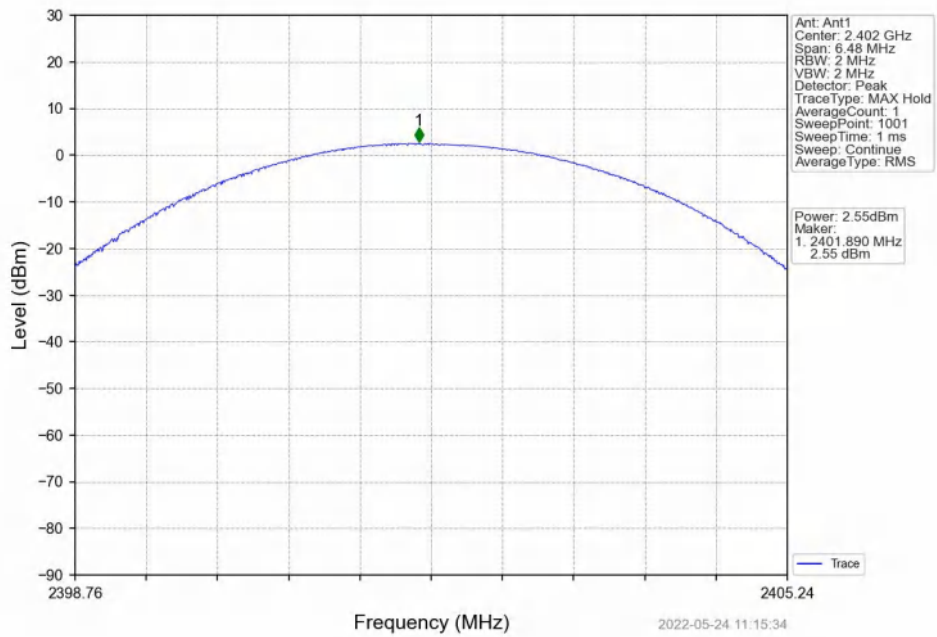
2.1.2 Test Graph



GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV

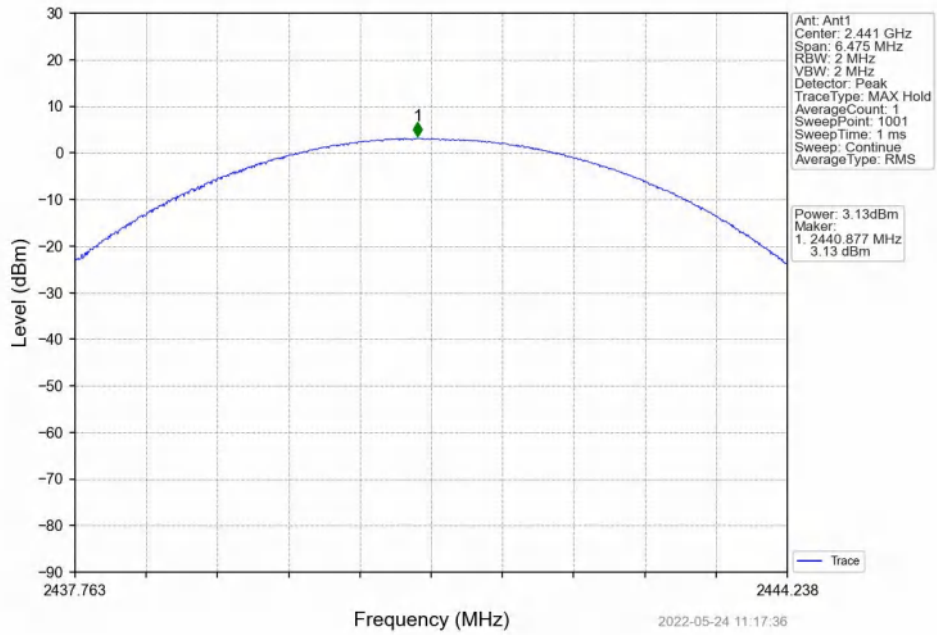


PI/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV

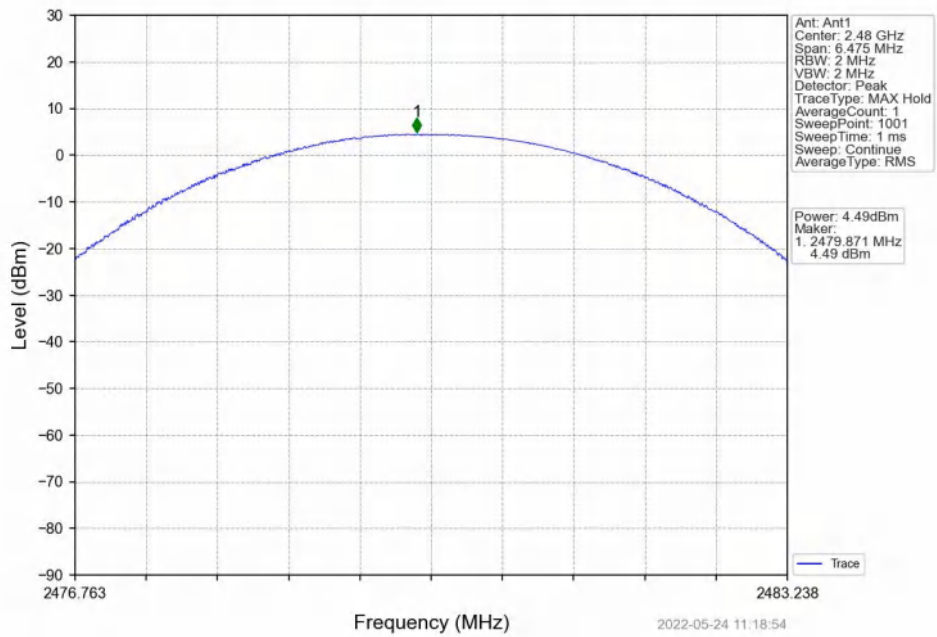




Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV

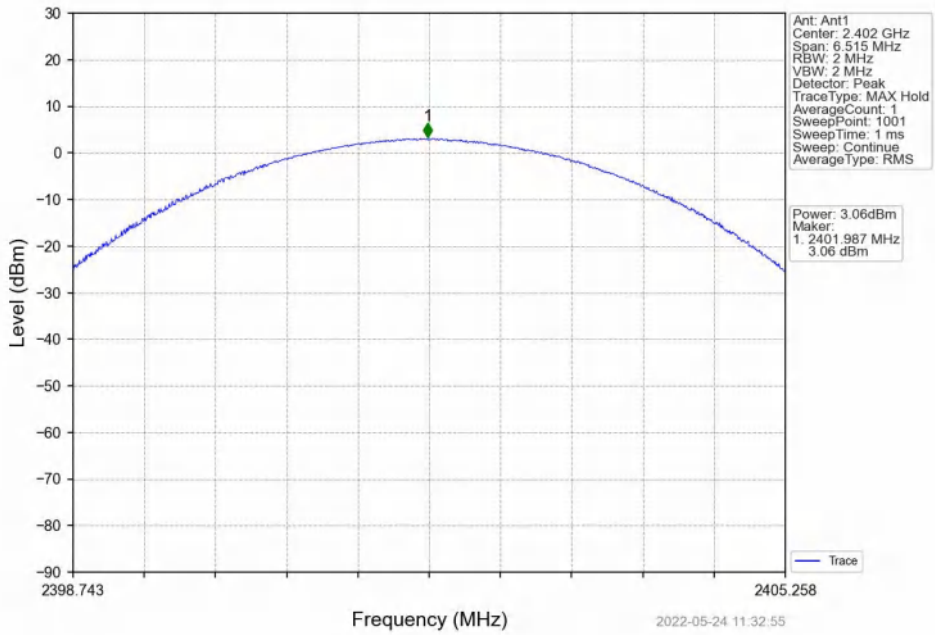


Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV

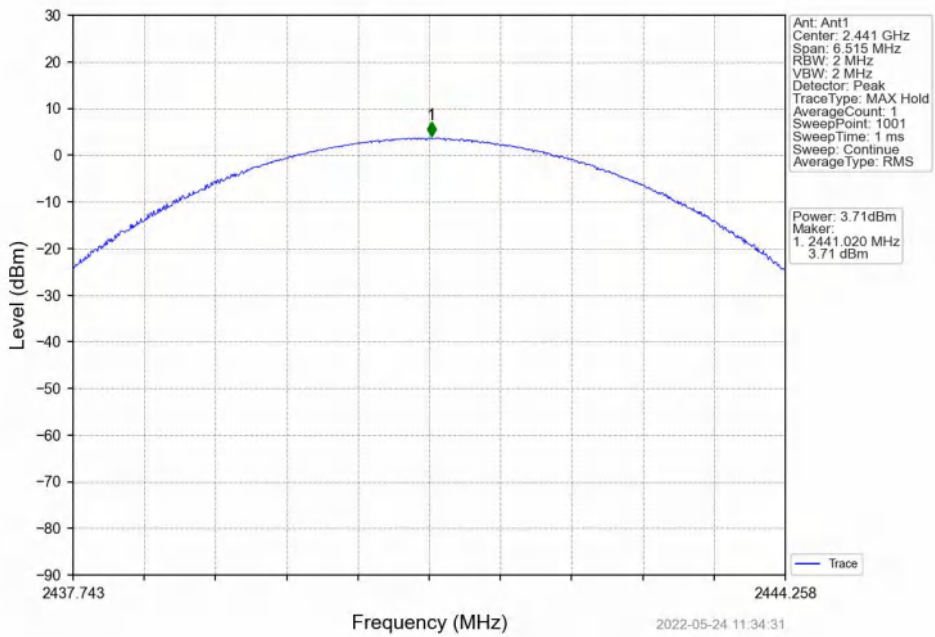


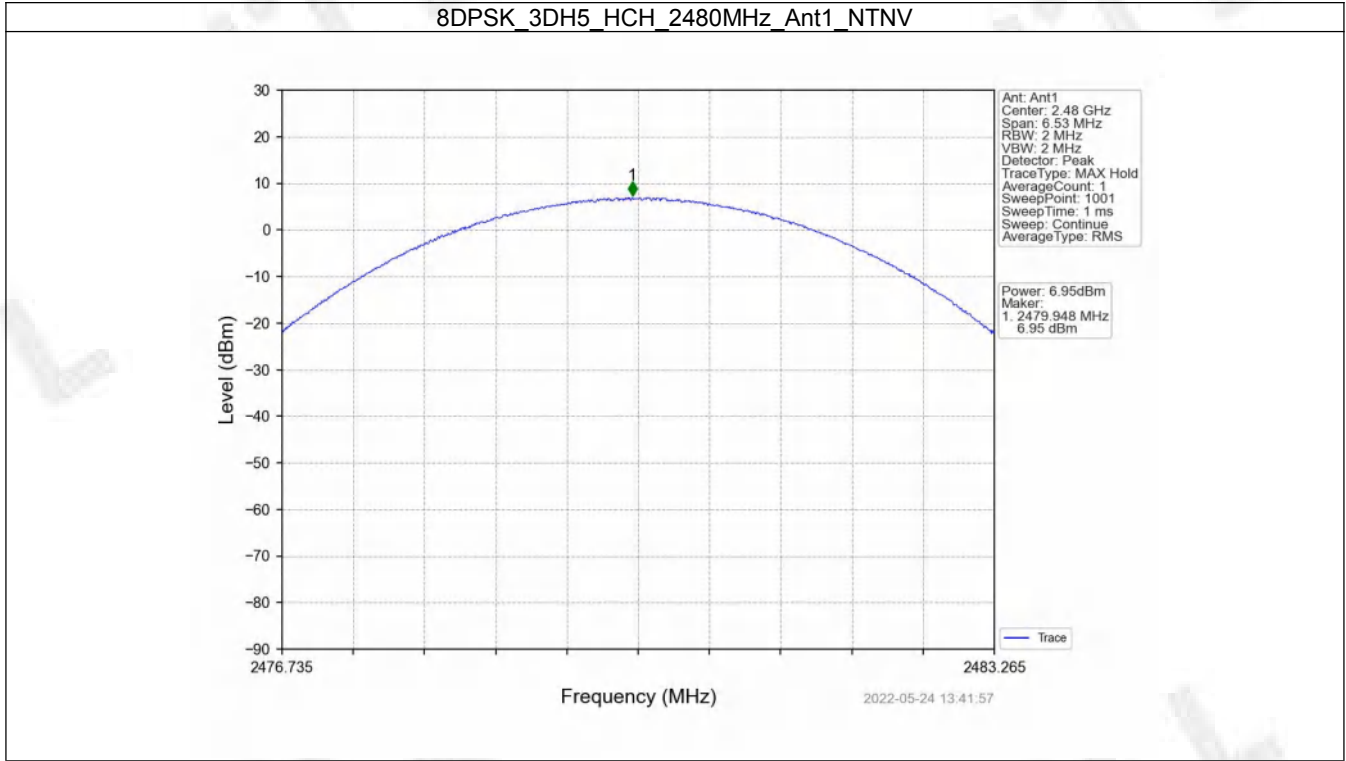


8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



8DPSK\_3DH5\_MCH\_2441MHz\_Ant1\_NTNV





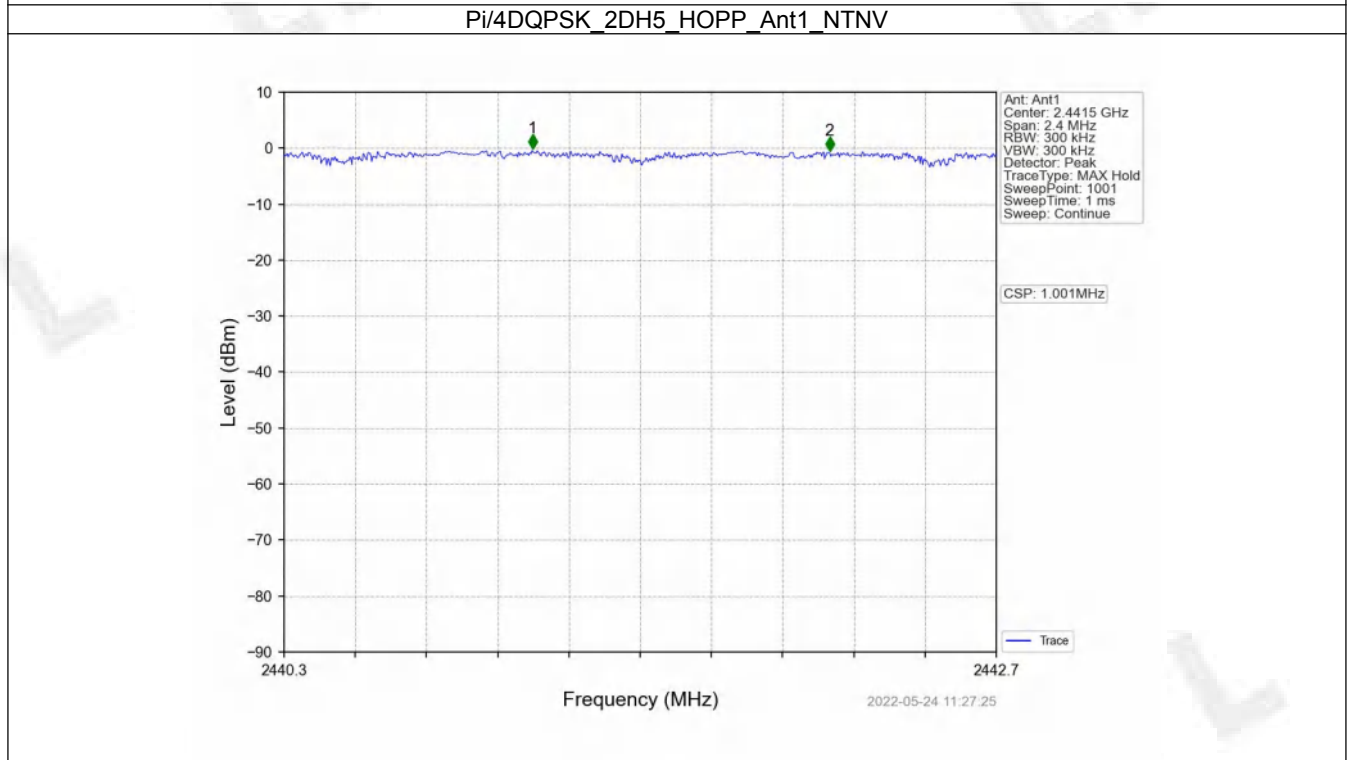
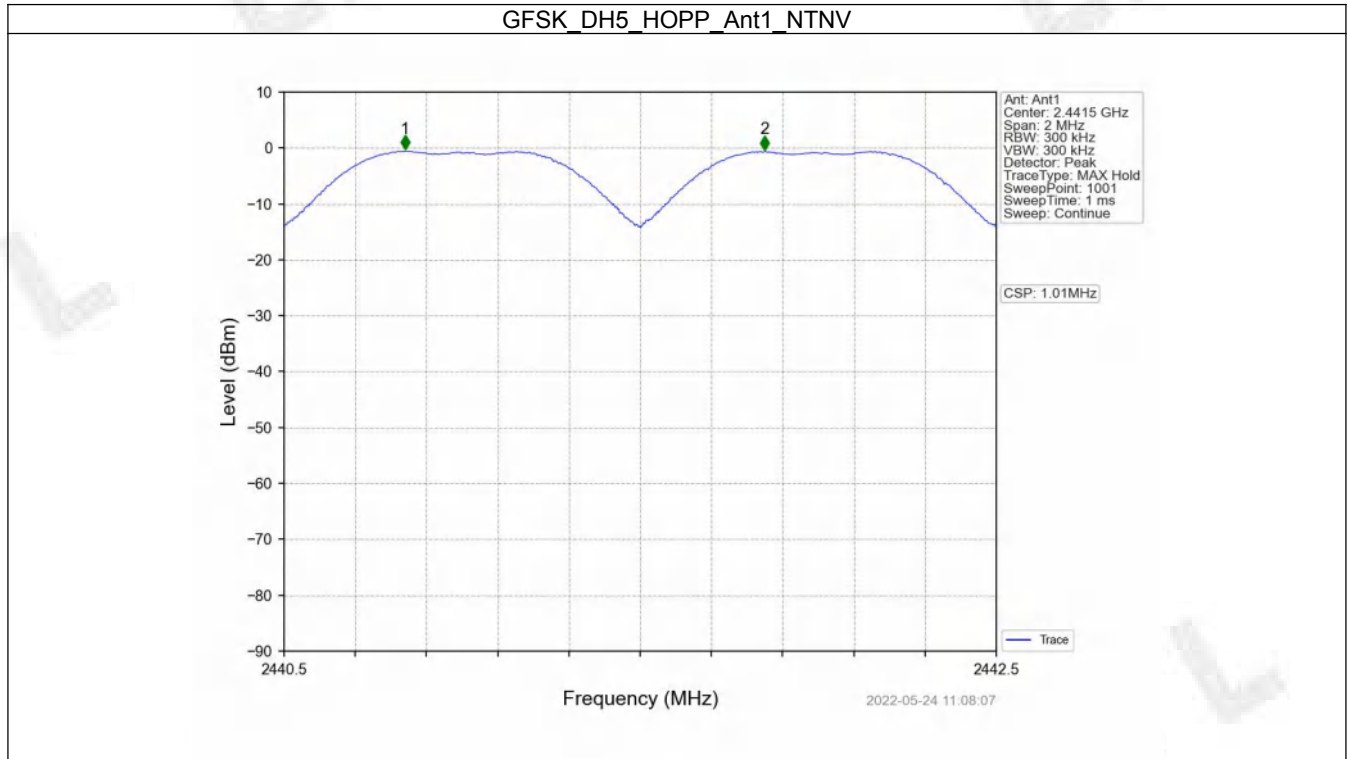
### 3. Carrier Frequency Separation

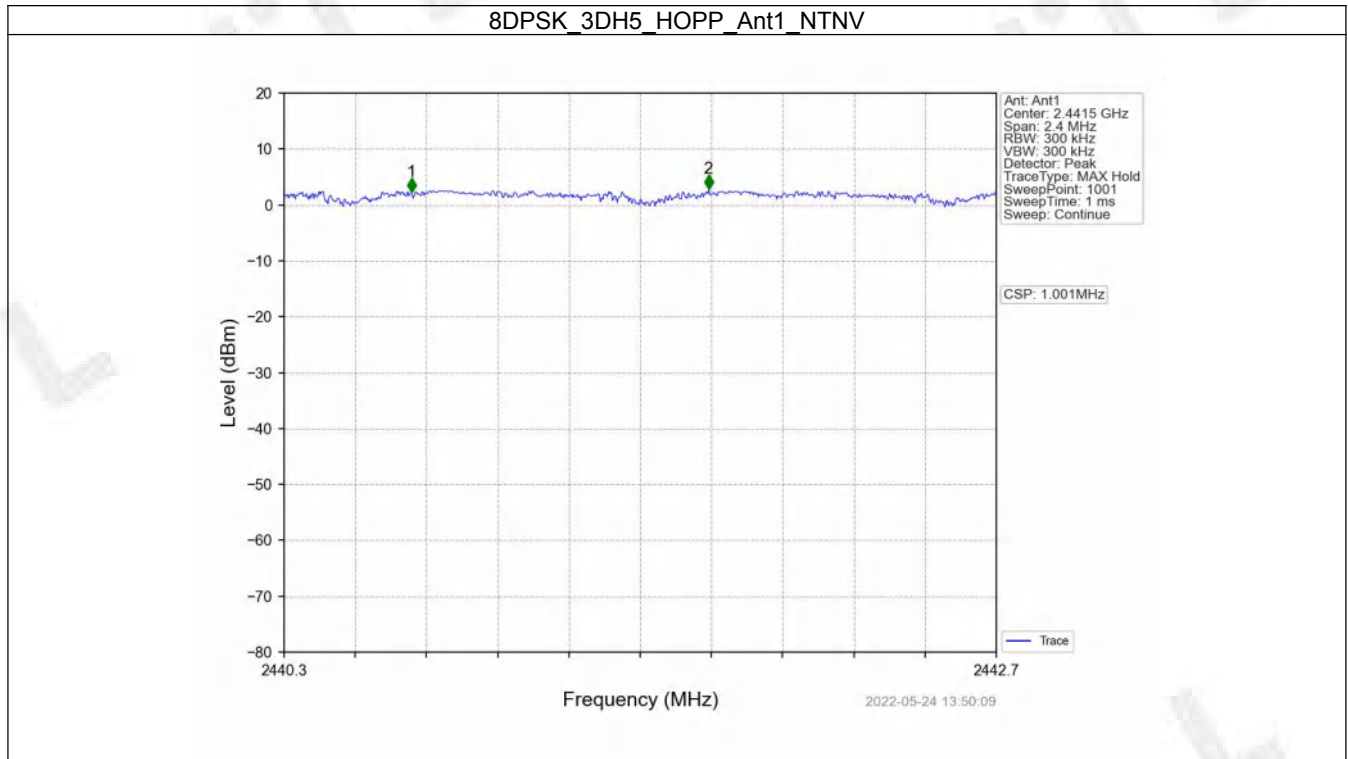
#### 3.1 Ant1

##### 3.1.1 Test Result

Ant1							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	1.010	0.938	$\geq 0.938$	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	1.001	1.296	$\geq 0.864$	Pass
8DPSK	SISO	HOPP	3DH5	1.001	1.306	$\geq 0.871$	Pass

3.1.2 Test Graph





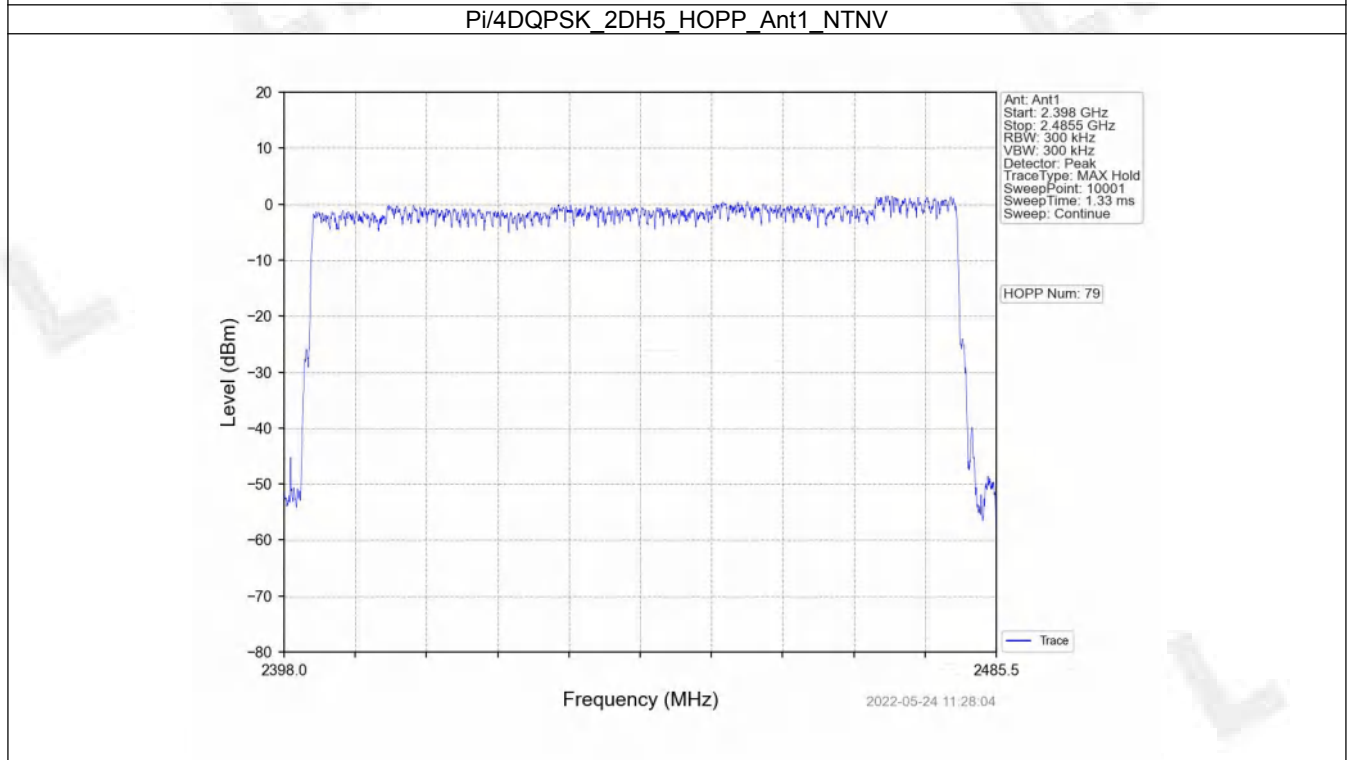
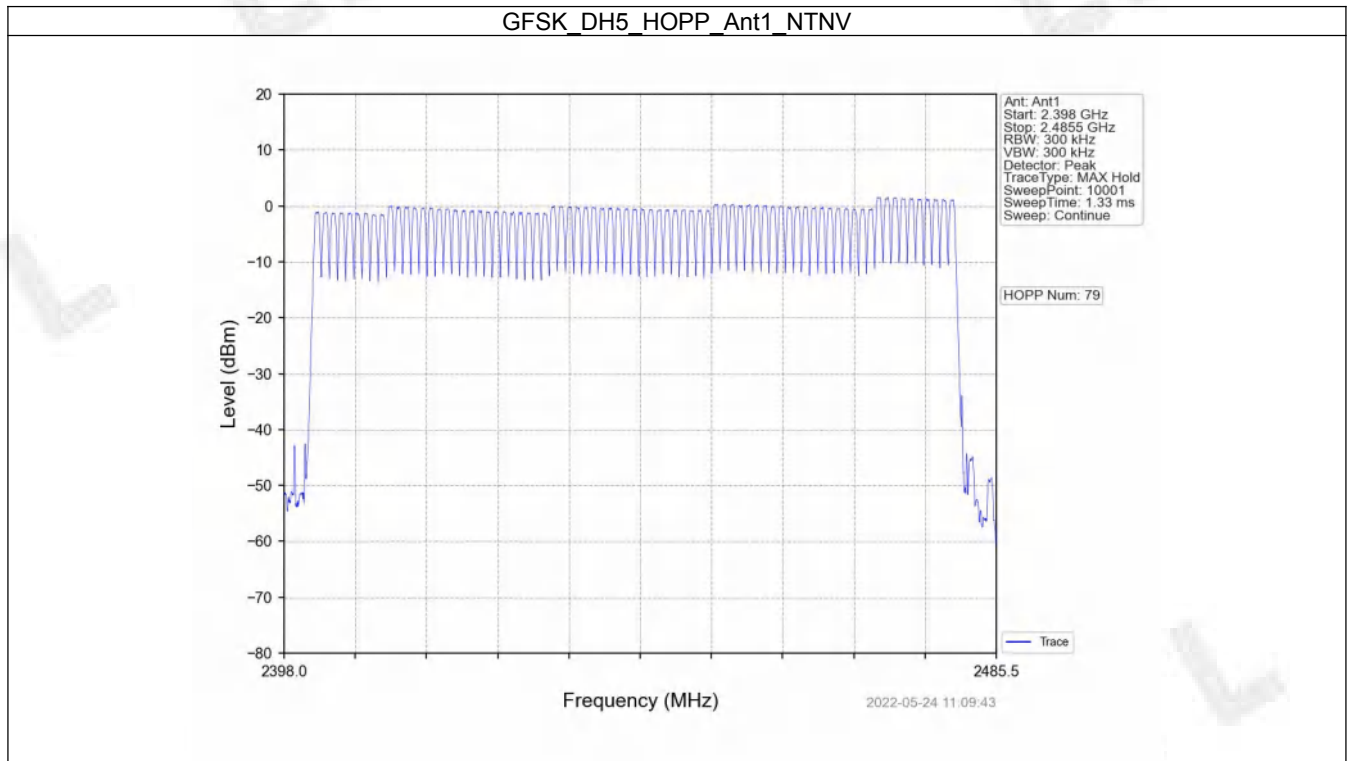
## 4. Number of Hopping Frequencies

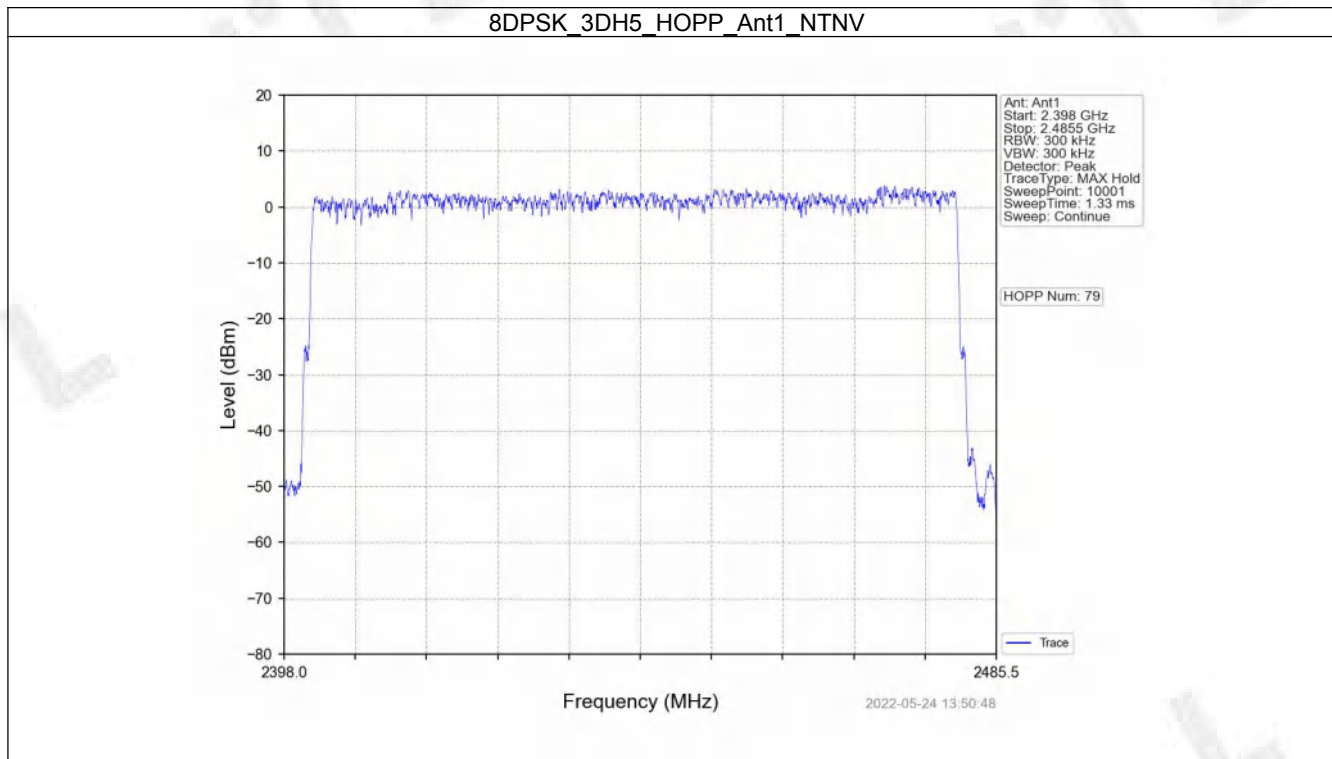
### 4.1 HoppNum

#### 4.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	Num of Hopping Frequencies		Verdict
				ANT1	Limit	
GFSK	SISO	HOPP	DH5	79	>=15	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	79	>=15	Pass
8DPSK	SISO	HOPP	3DH5	79	>=15	Pass

4.1.2 Test Graph







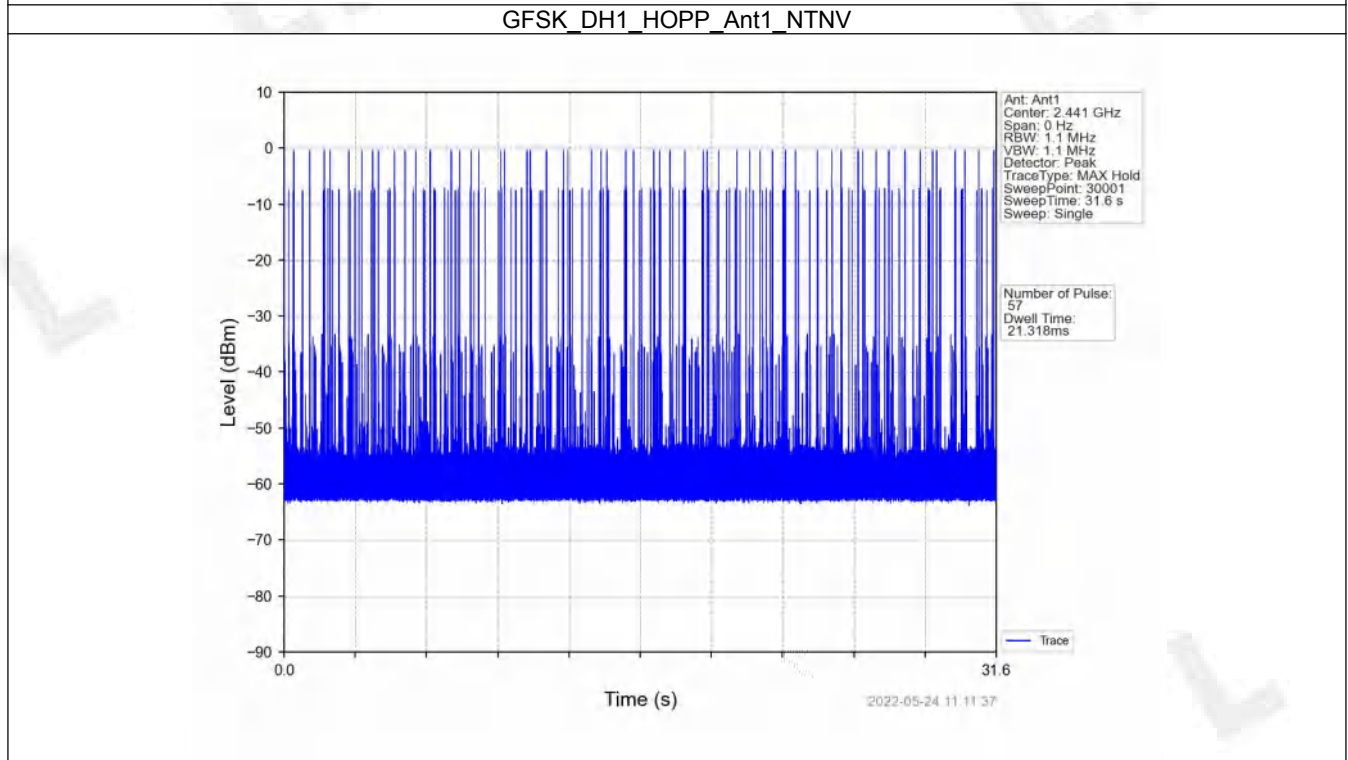
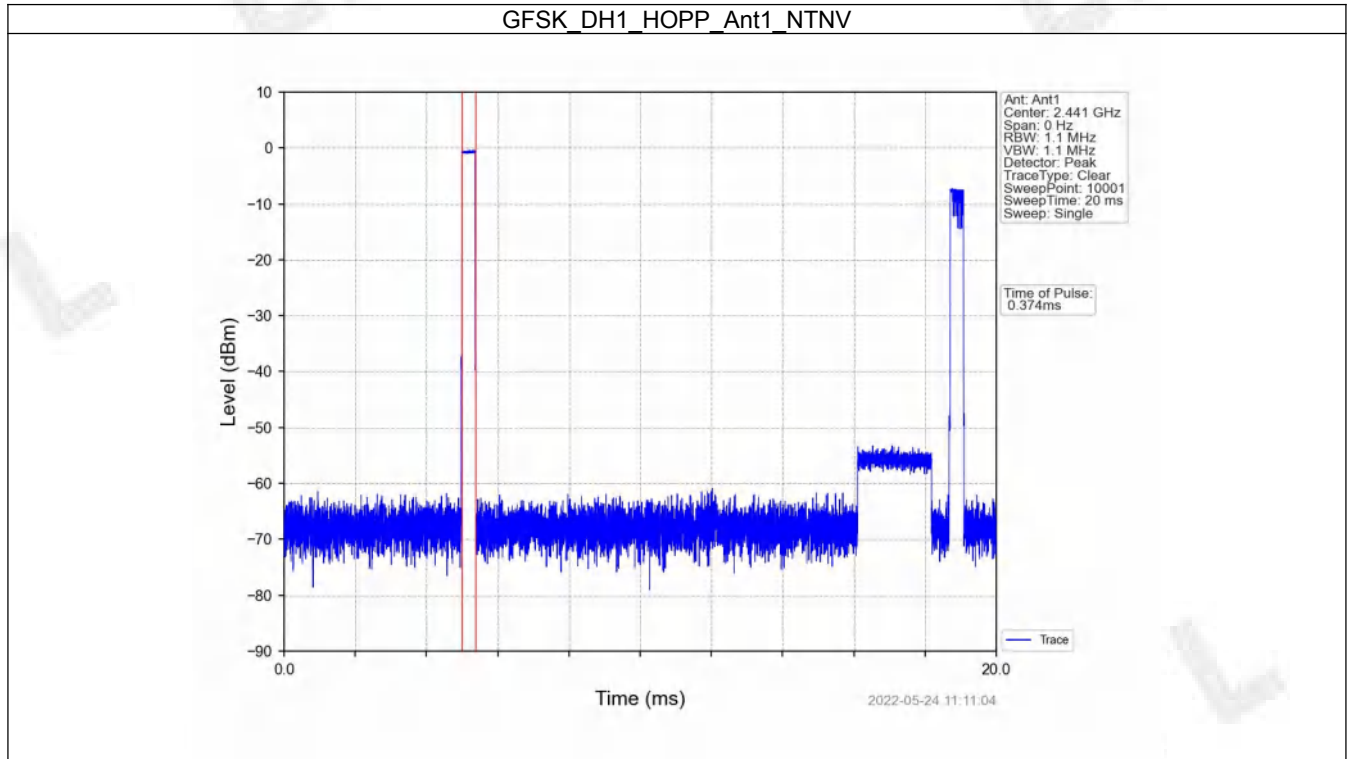
## 5. Time of Occupancy (Dwell Time)

### 5.1 Ant1

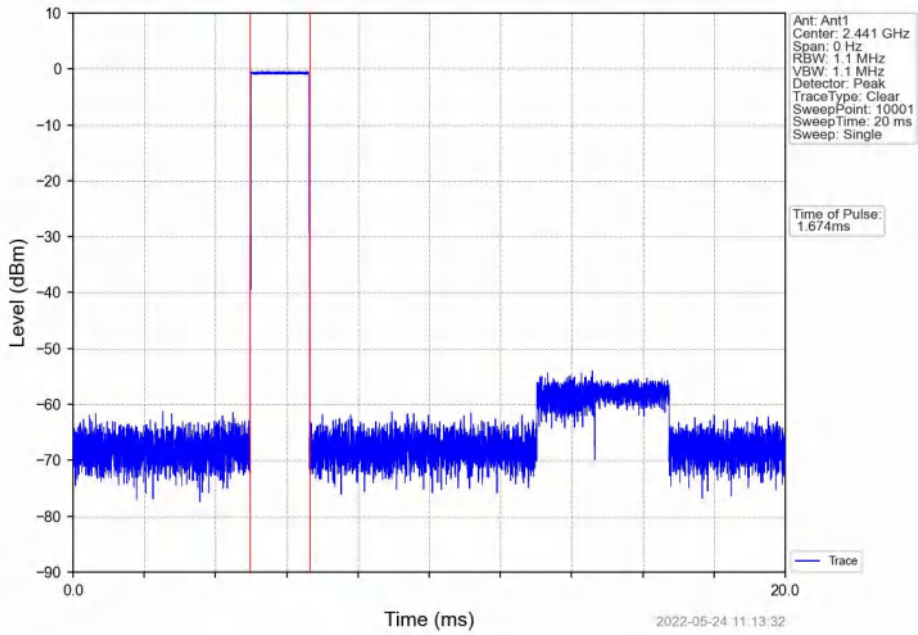
#### 5.1.1 Test Result

Ant1									
Mode	TX Type	Frequency (MHz)	Packet Type	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limit (ms)	Verdict
GFSK	SISO	HOPP	DH1	0.374	31.600	57	21.318	<=400	Pass
			DH3	1.674	31.600	48	80.352	<=400	Pass
			DH5	2.880	31.600	41	118.080	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.424	31.600	57	24.168	<=400	Pass
			2DH3	1.676	31.600	48	80.448	<=400	Pass
			2DH5	2.924	31.600	41	119.884	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.426	31.600	56	23.856	<=400	Pass
			3DH3	1.676	31.600	48	80.448	<=400	Pass
			3DH5	2.926	31.600	42	122.892	<=400	Pass

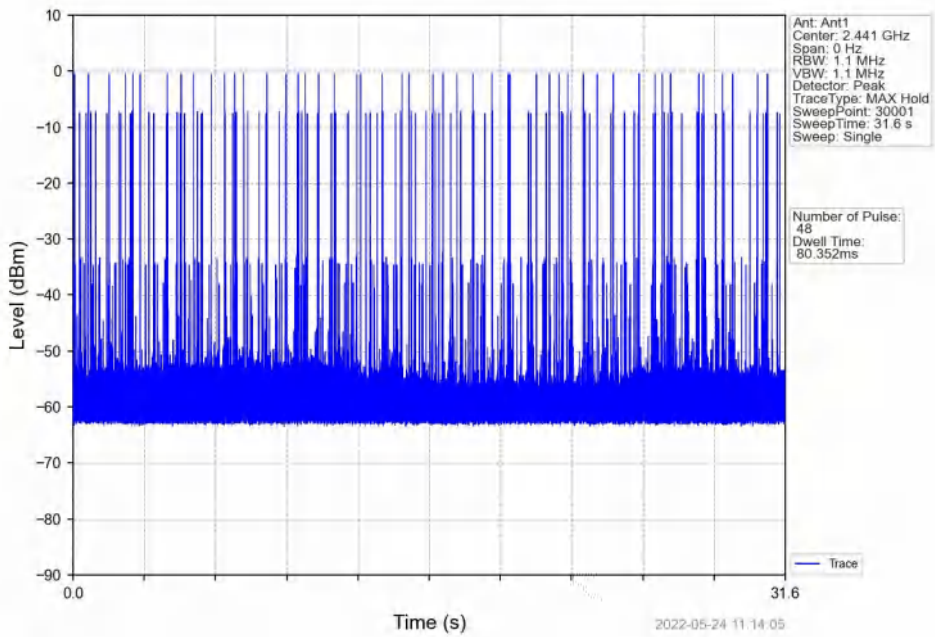
5.1.2 Test Graph



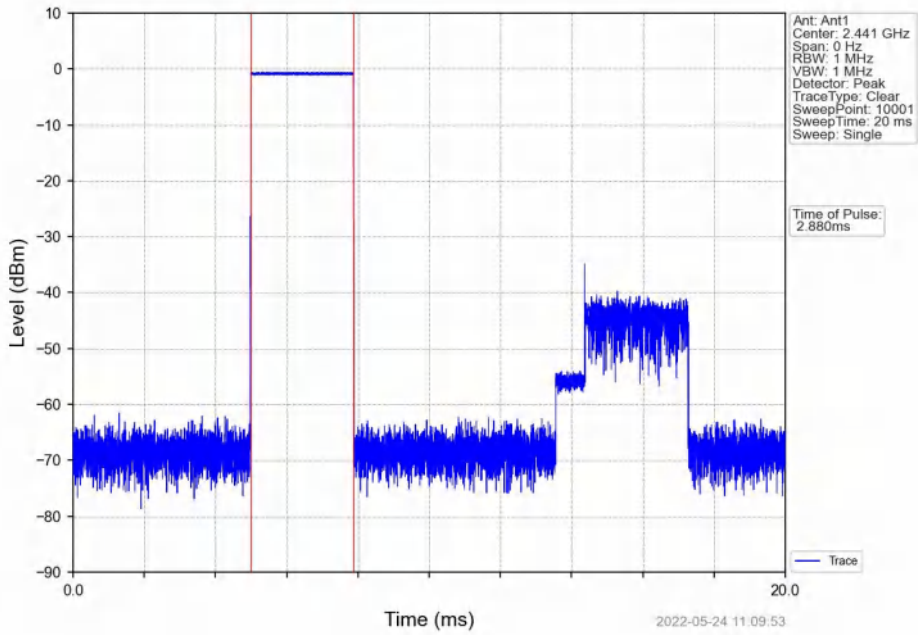
GFSK\_DH3\_HOPP\_Ant1\_NTNV



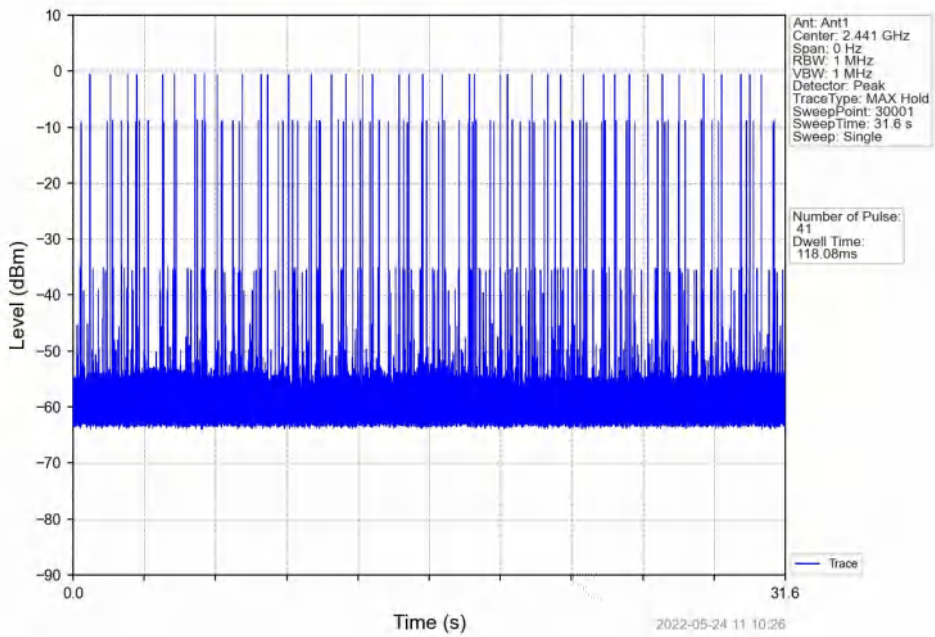
GFSK\_DH3\_HOPP\_Ant1\_NTNV



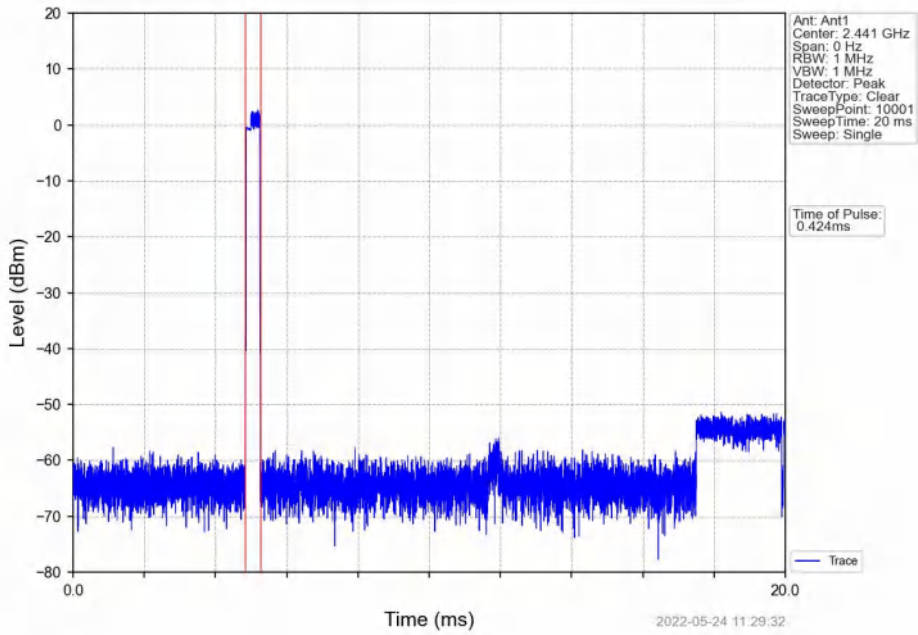
GFSK\_DH5\_HOPP\_Ant1\_NTNV



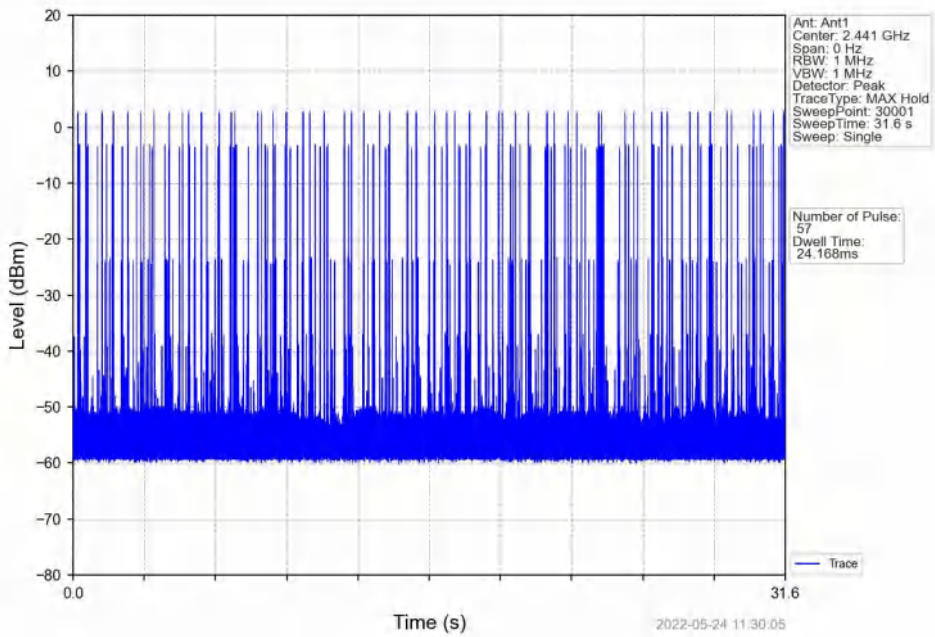
GFSK\_DH5\_HOPP\_Ant1\_NTNV



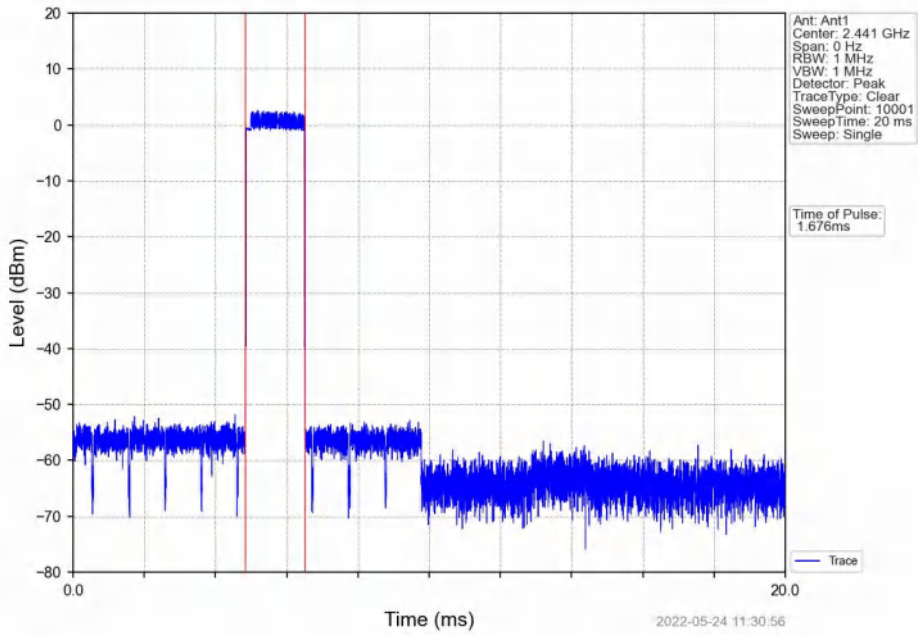
Pi/4DQPSK\_2DH1\_HOPP\_Ant1\_NTNV



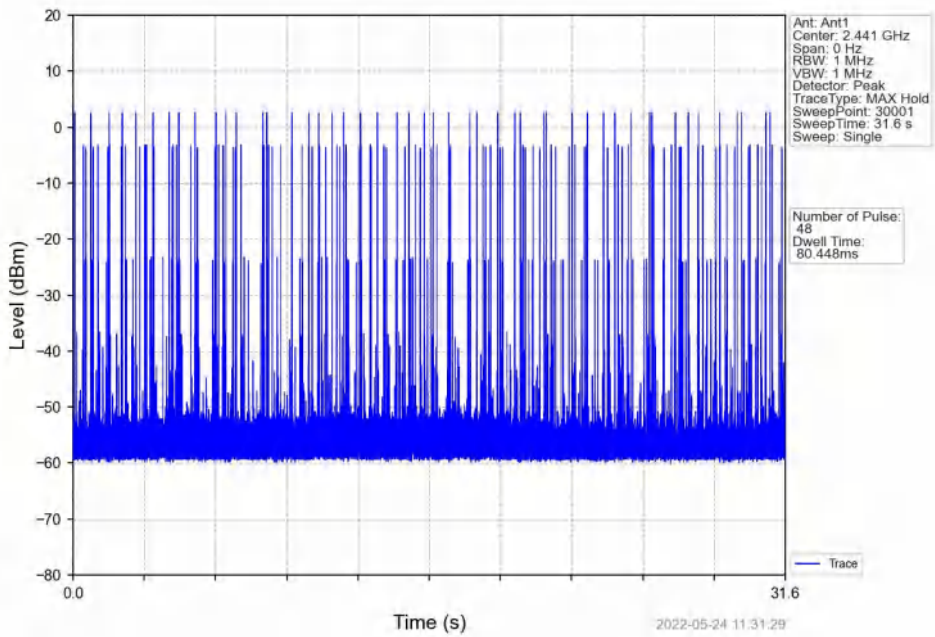
Pi/4DQPSK\_2DH1\_HOPP\_Ant1\_NTNV



Pi/4DQPSK\_2DH3\_HOPP\_Ant1\_NTNV

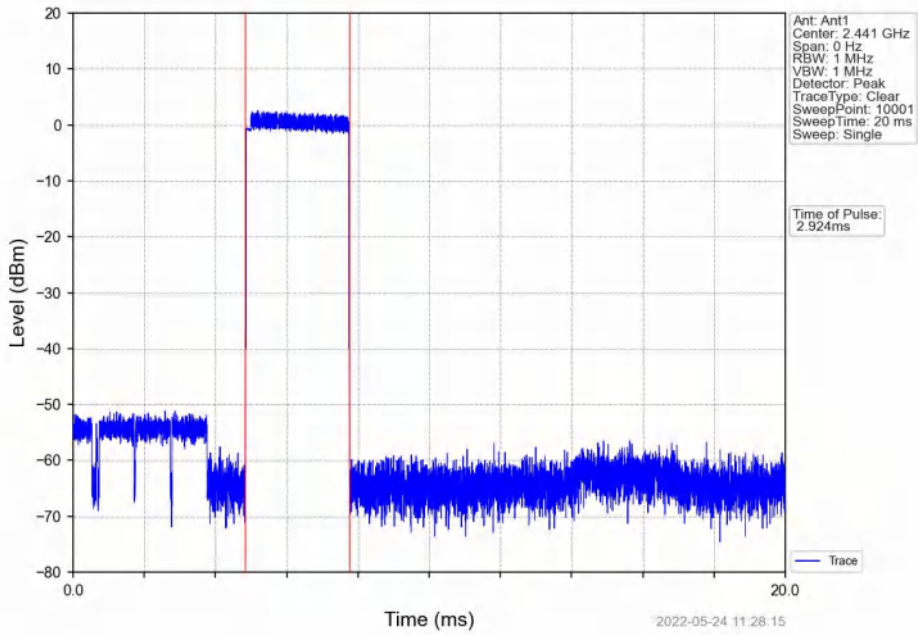


Pi/4DQPSK\_2DH3\_HOPP\_Ant1\_NTNV

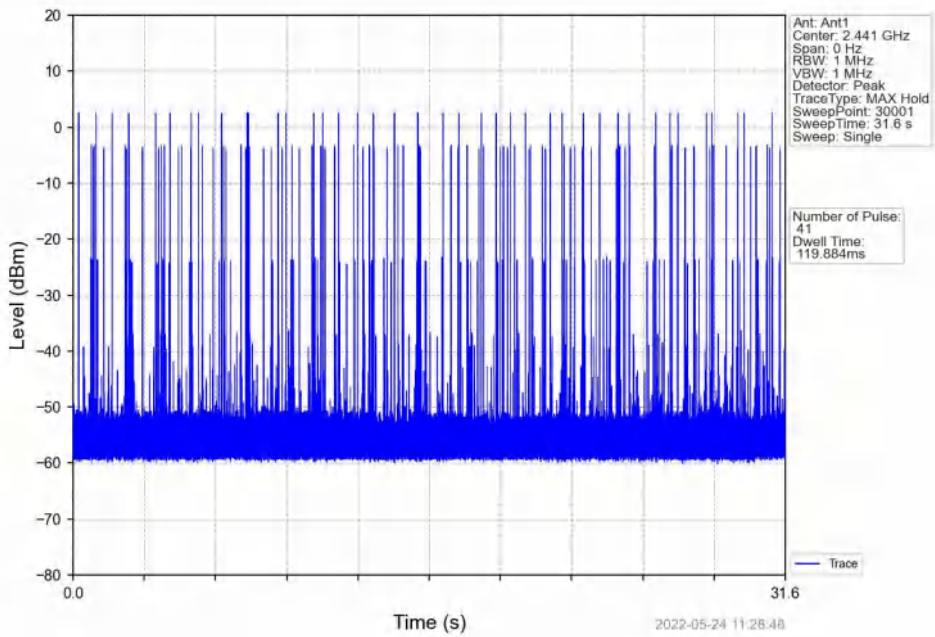




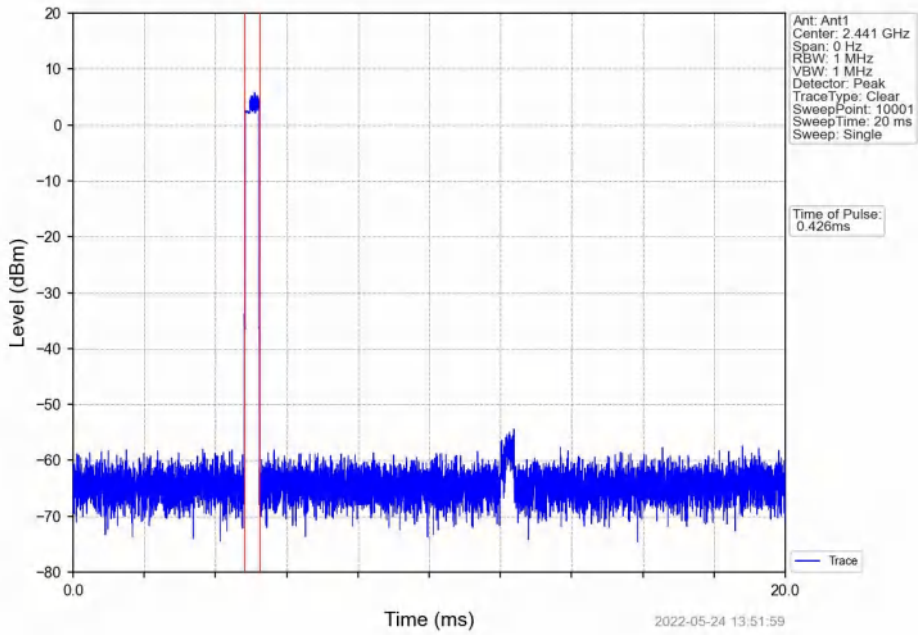
Pi/4DQPSK\_2DH5\_HOPP\_Ant1\_NTNV



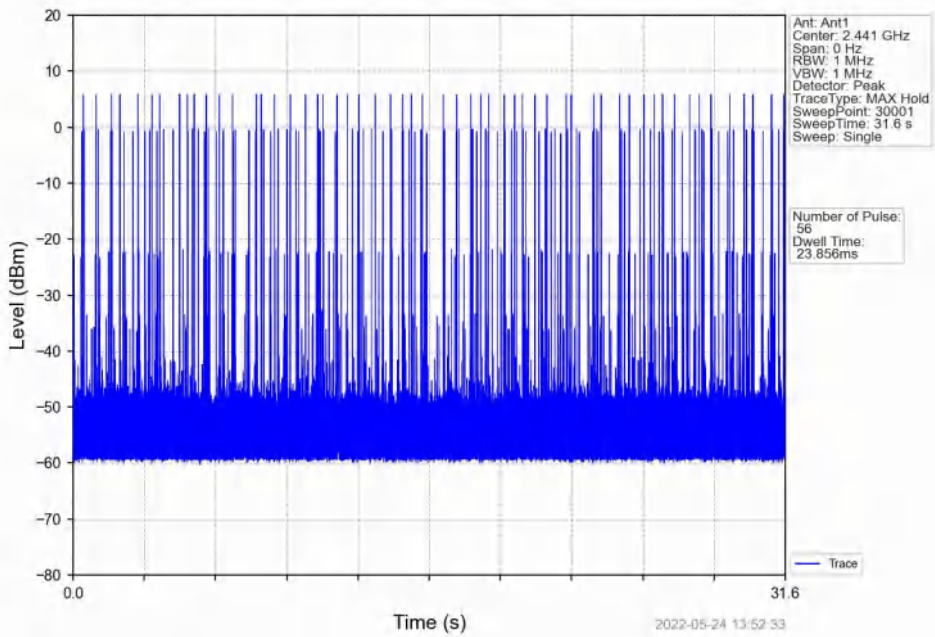
Pi/4DQPSK\_2DH5\_HOPP\_Ant1\_NTNV



8DPSK\_3DH1\_HOPP\_Ant1\_NTNV

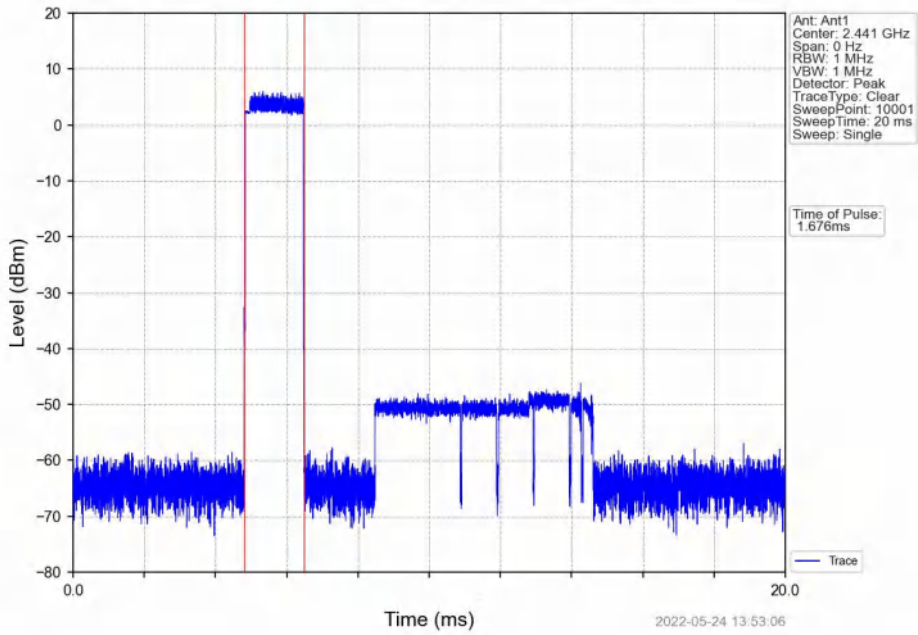


8DPSK\_3DH1\_HOPP\_Ant1\_NTNV

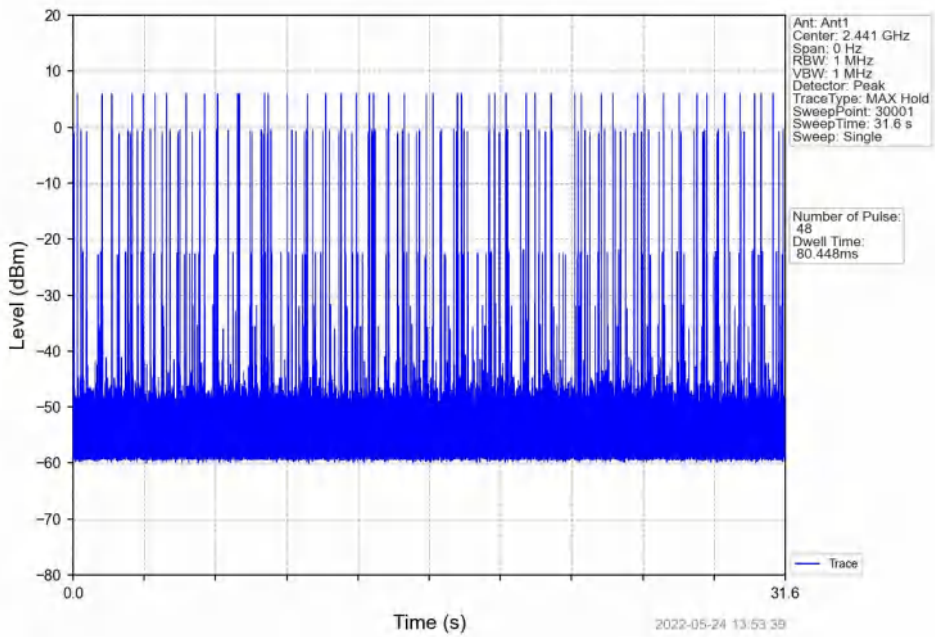




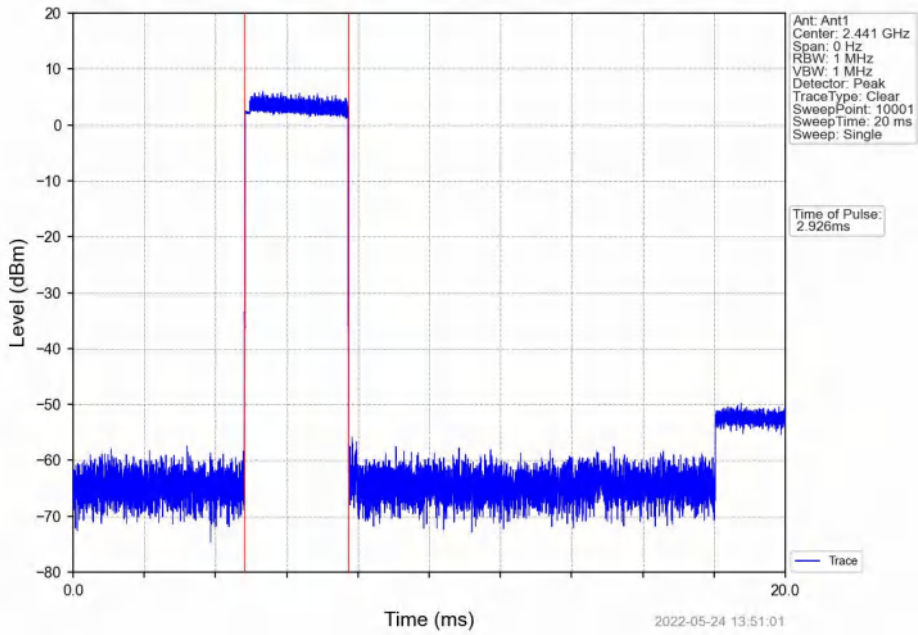
8DPSK\_3DH3\_HOPP\_Ant1\_NTNV



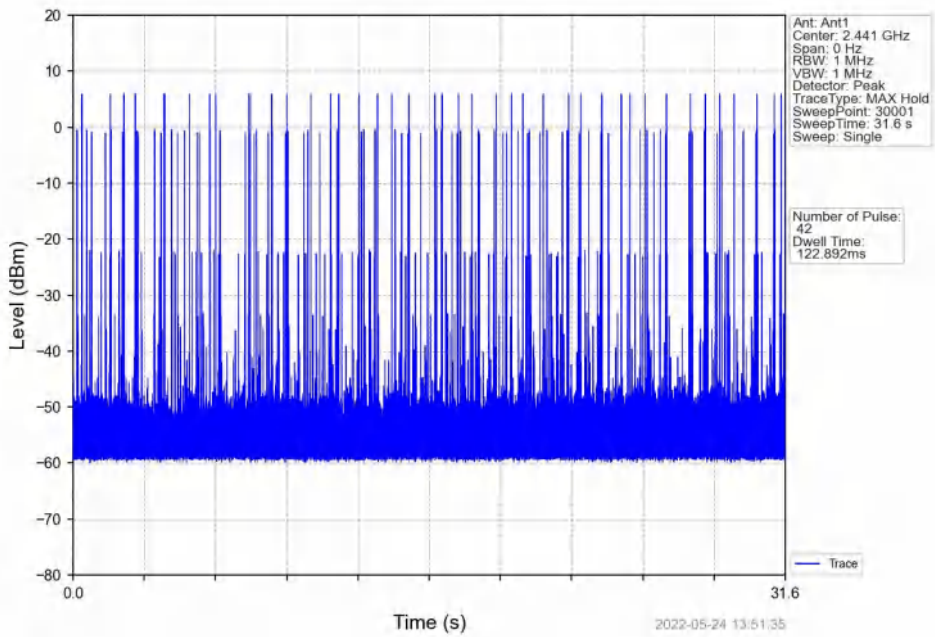
8DPSK\_3DH3\_HOPP\_Ant1\_NTNV



8DPSK\_3DH5\_HOPP\_Ant1\_NTNV



8DPSK\_3DH5\_HOPP\_Ant1\_NTNV



## 6. Unwanted Emissions In Non-restricted Frequency Bands

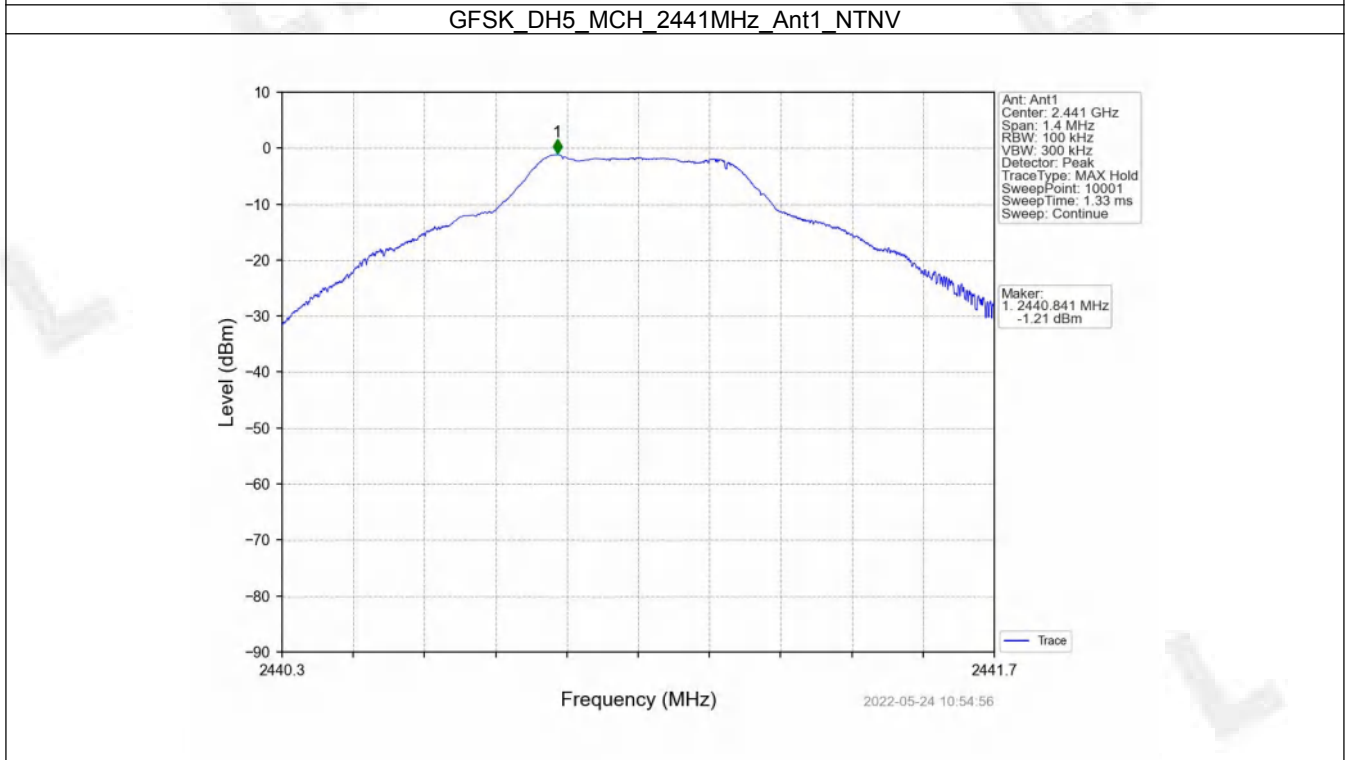
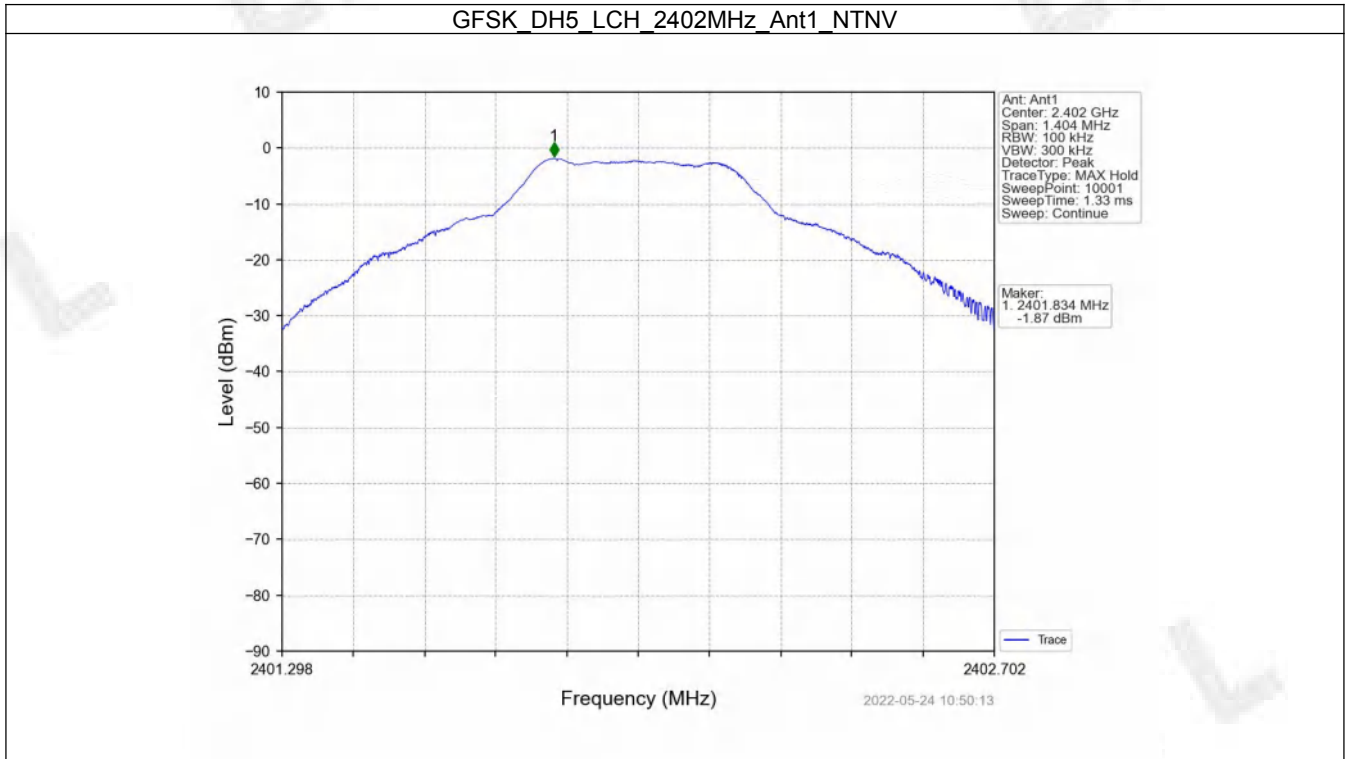
### 6.1 Ref

#### 6.1.1 Test Result

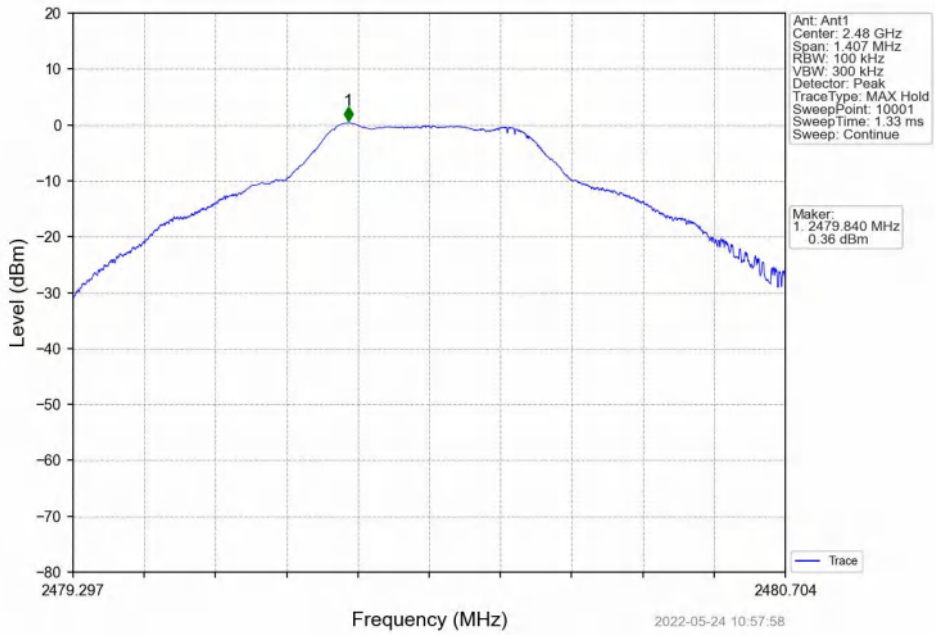
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	-1.87
		2441	DH5	1	-1.21
		2480	DH5	1	0.36
Pi/4DQPSK	SISO	2402	2DH5	1	-1.81
		2441	2DH5	1	-1.18
		2480	2DH5	1	0.40
8DPSK	SISO	2402	3DH5	1	-1.91
		2441	3DH5	1	-1.29
		2480	3DH5	1	2.39

Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.  
Note2: RBW = 1MHz was used during the pre-test. The final test will be performed at RBW=100kHz while the margin is less than 3dB.

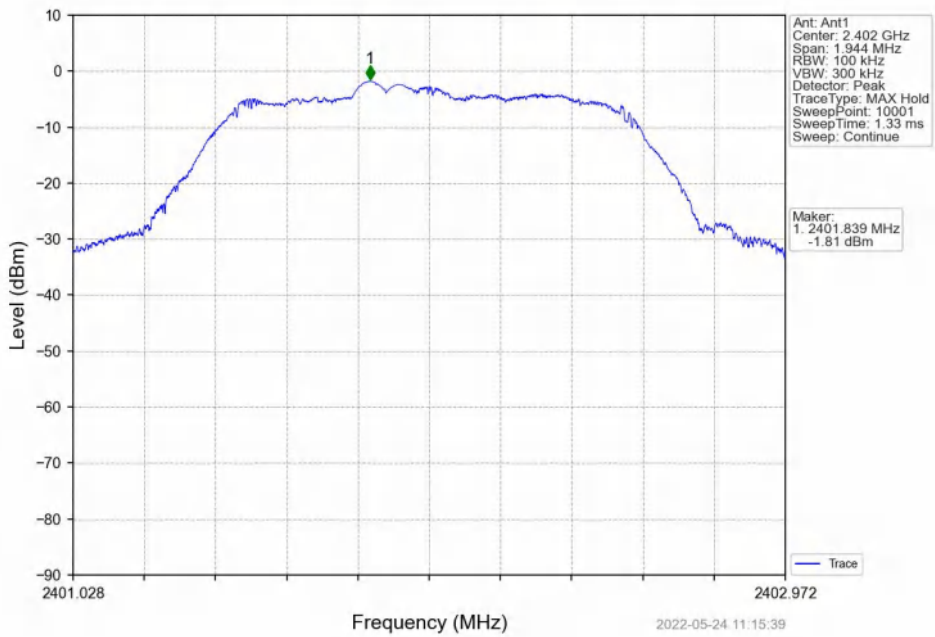
6.1.2 Test Graph



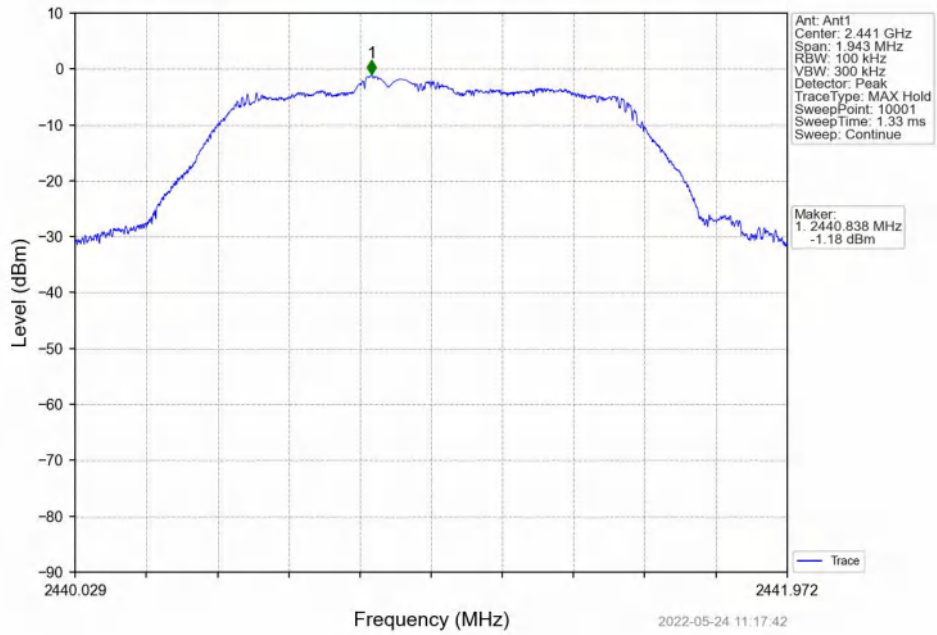
GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



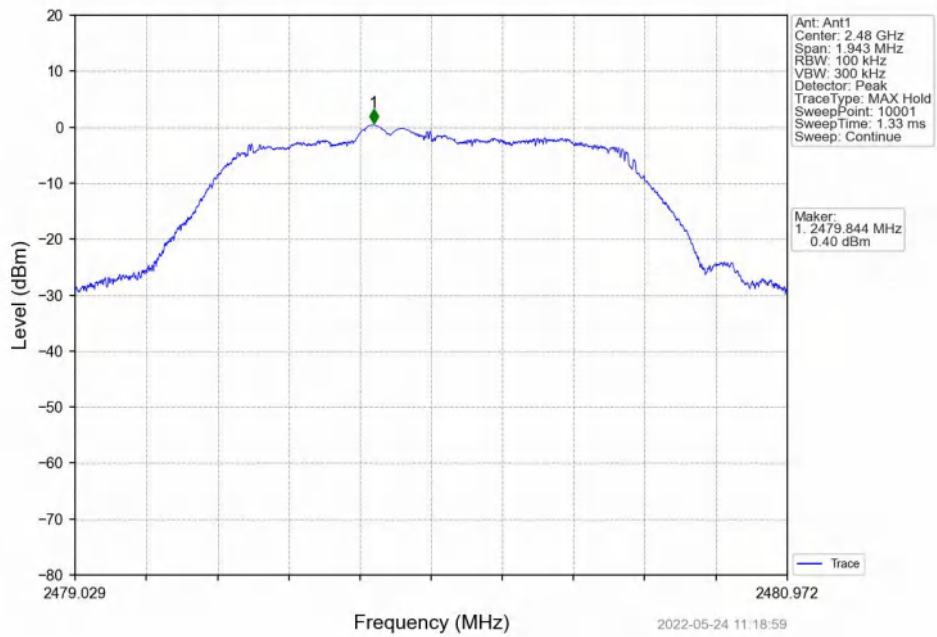
PI/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



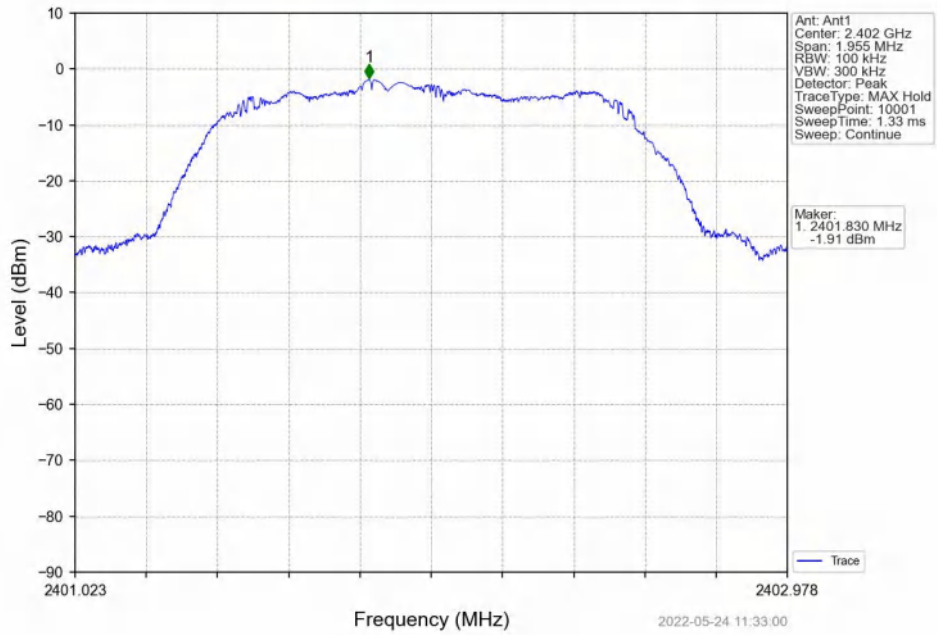
Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



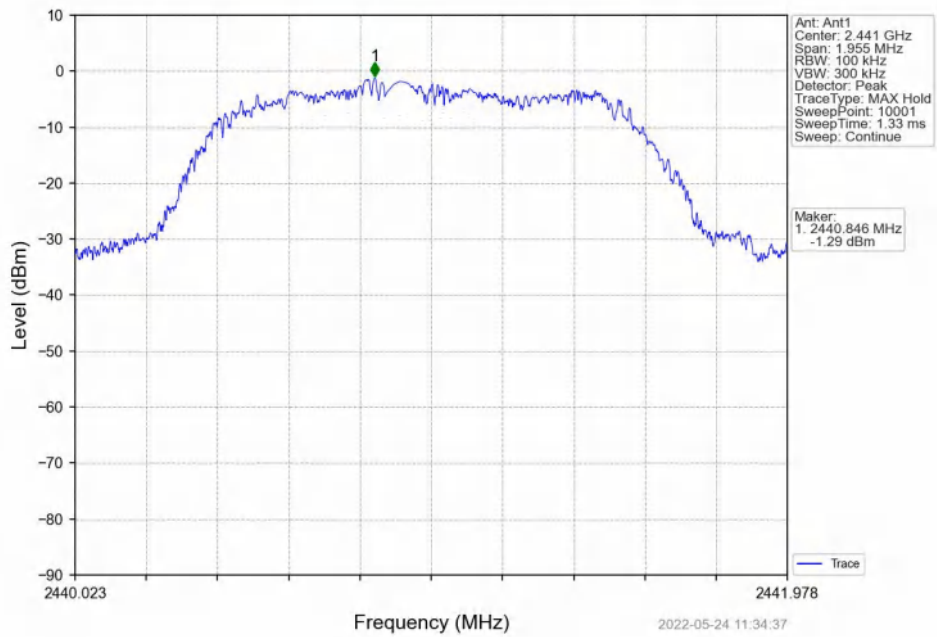
Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV



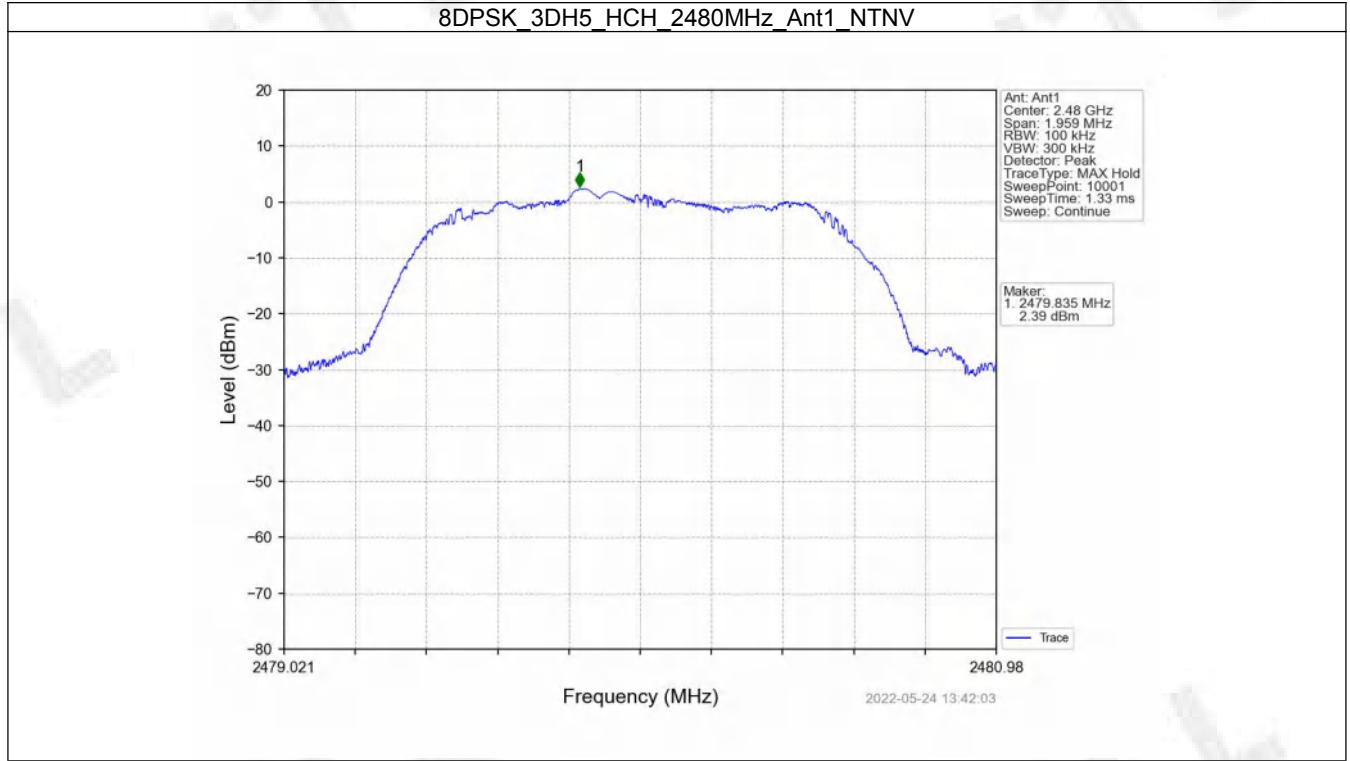
8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



8DPSK\_3DH5\_MCH\_2441MHz\_Ant1\_NTNV









## 6.2 CSE

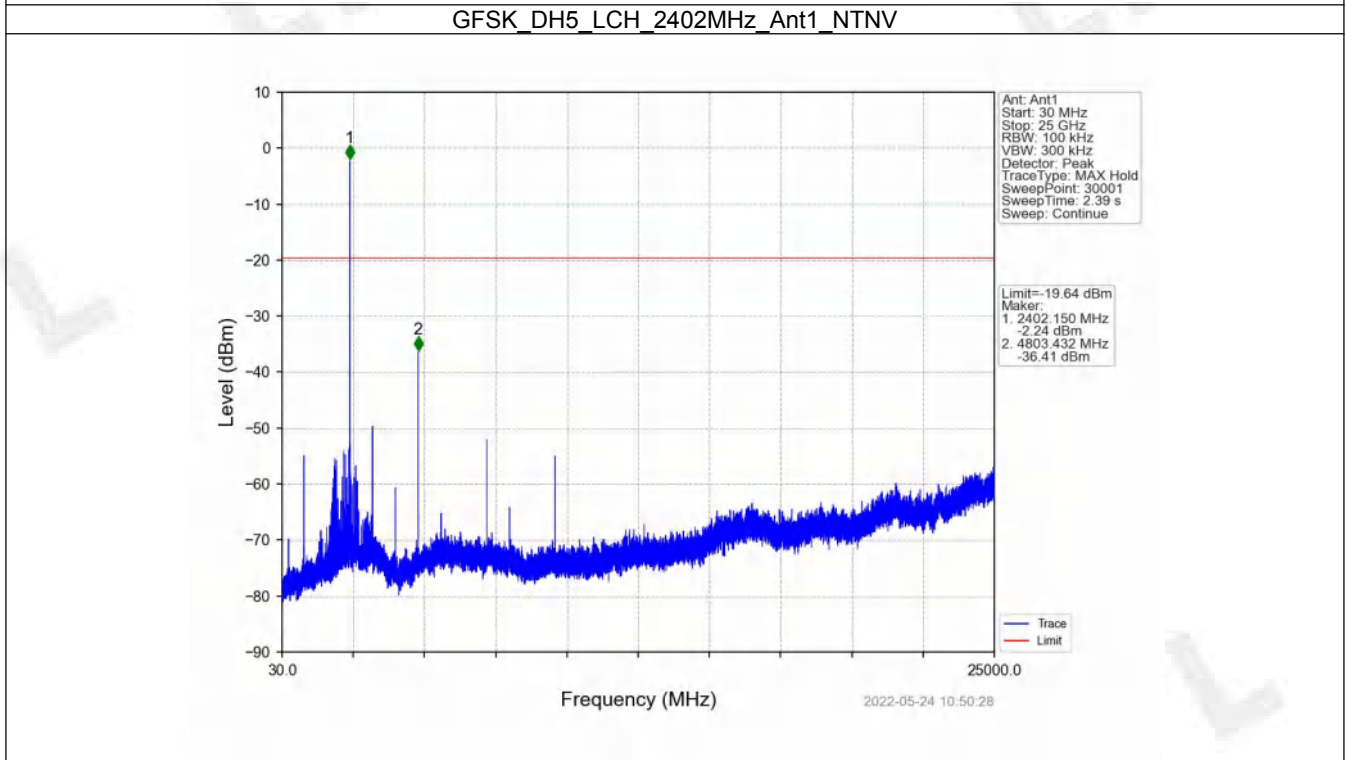
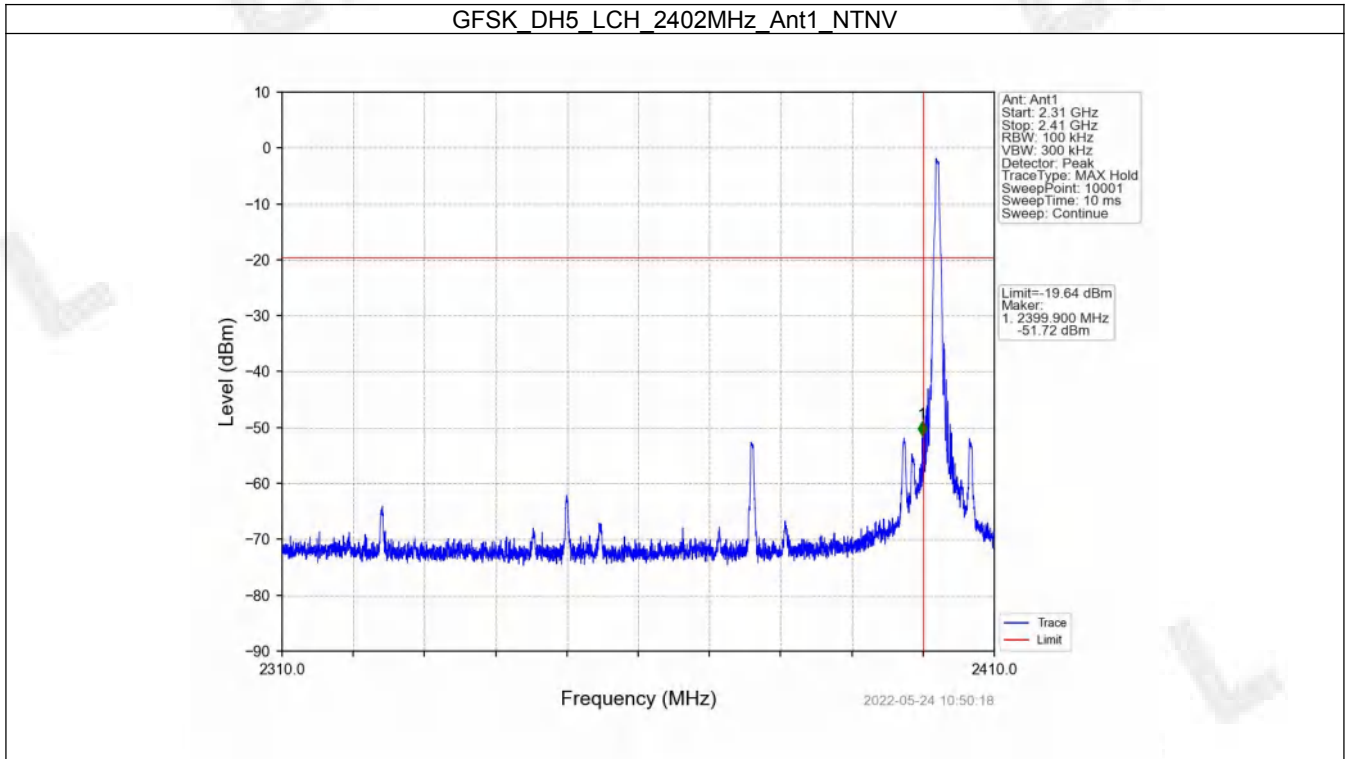
## 6.2.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	0.36	-19.64	Pass
		2441	DH5	1	0.36	-19.64	Pass
		2480	DH5	1	0.36	-19.64	Pass
		HOPP	DH5	1	0.36	-19.64	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	0.40	-19.60	Pass
		2441	2DH5	1	0.40	-19.60	Pass
		2480	2DH5	1	0.40	-19.60	Pass
		HOPP	2DH5	1	0.40	-19.60	Pass
8DPSK	SISO	2402	3DH5	1	2.39	-17.61	Pass
		2441	3DH5	1	2.39	-17.61	Pass
		2480	3DH5	1	2.39	-17.61	Pass
		HOPP	3DH5	1	2.39	-17.61	Pass

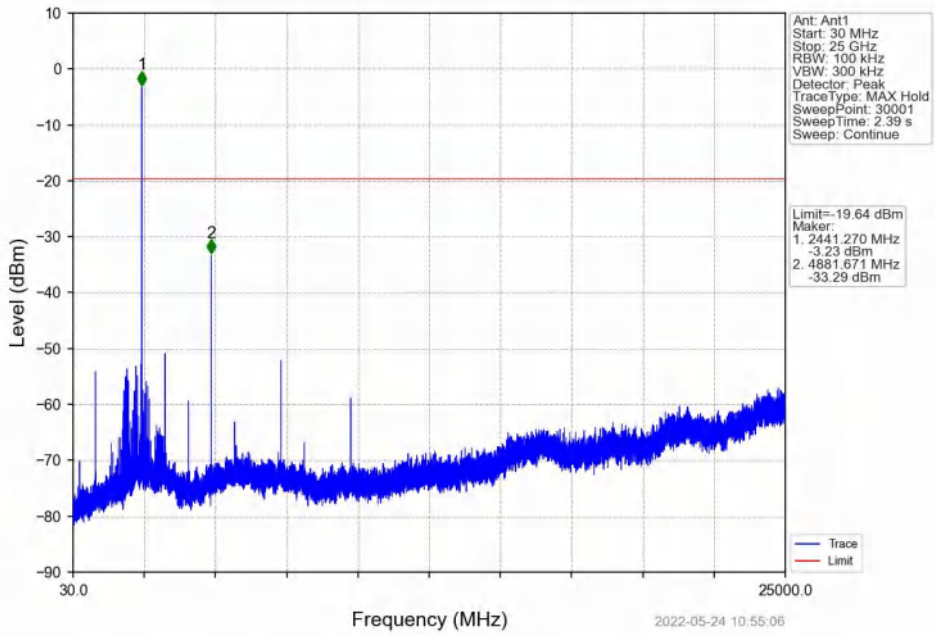
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.

Note2: RBW = 1MHz was used during the pre-test. The final test will be performed at RBW=100kHz while the margin is less than 3dB.

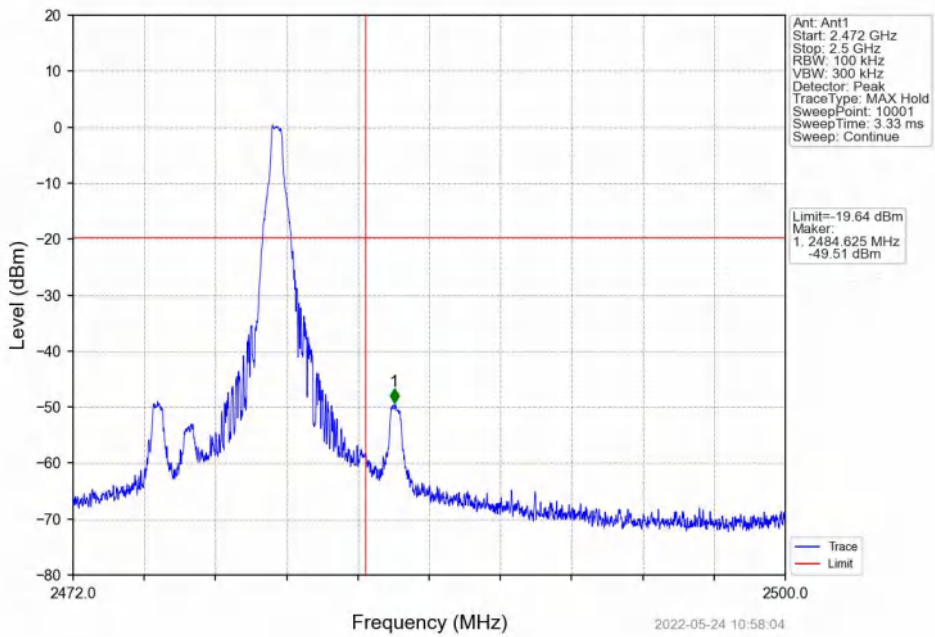
6.2.2 Test Graph



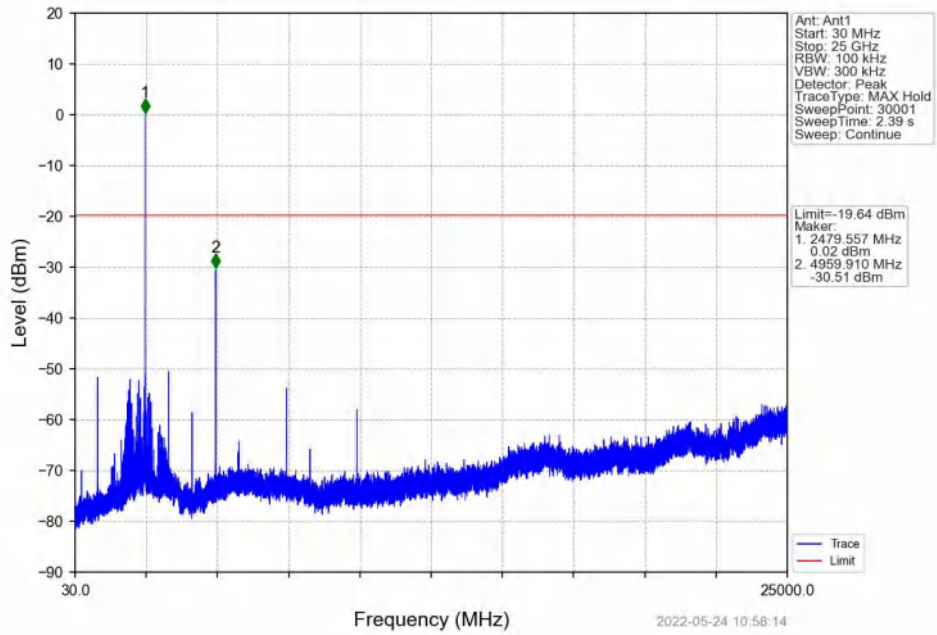
GFSK\_DH5\_MCH\_2441MHz\_Ant1\_NTNV



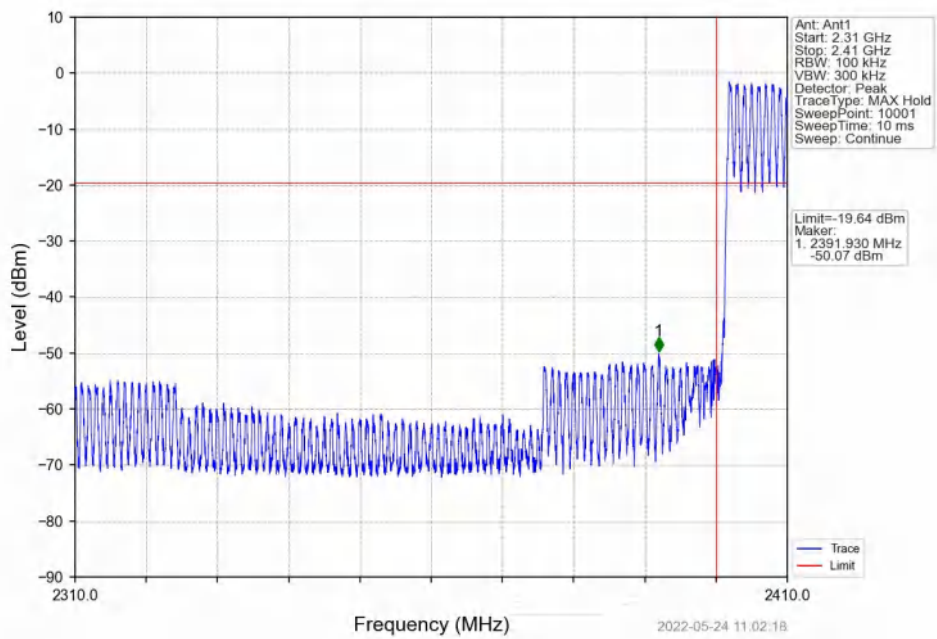
GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



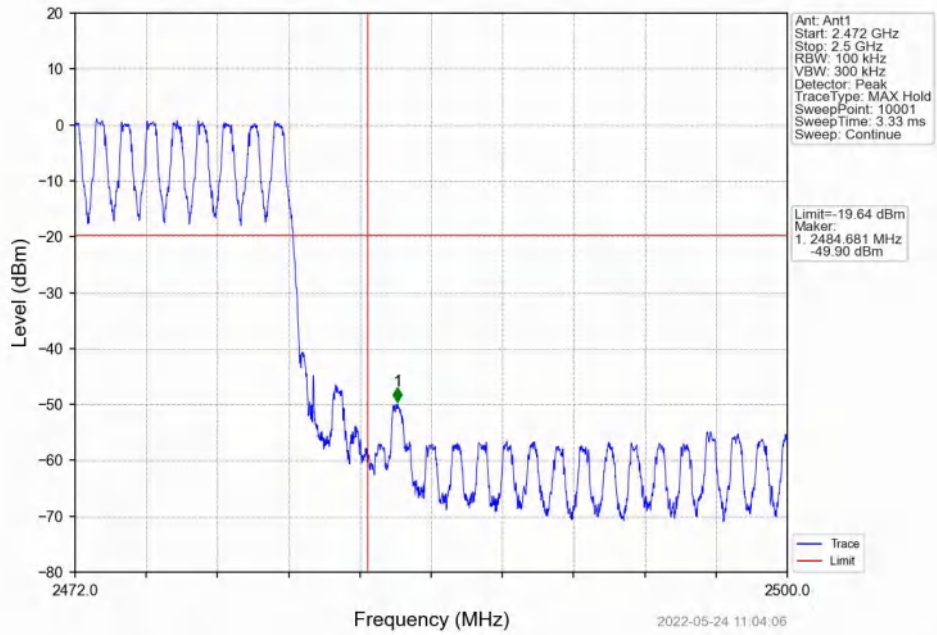
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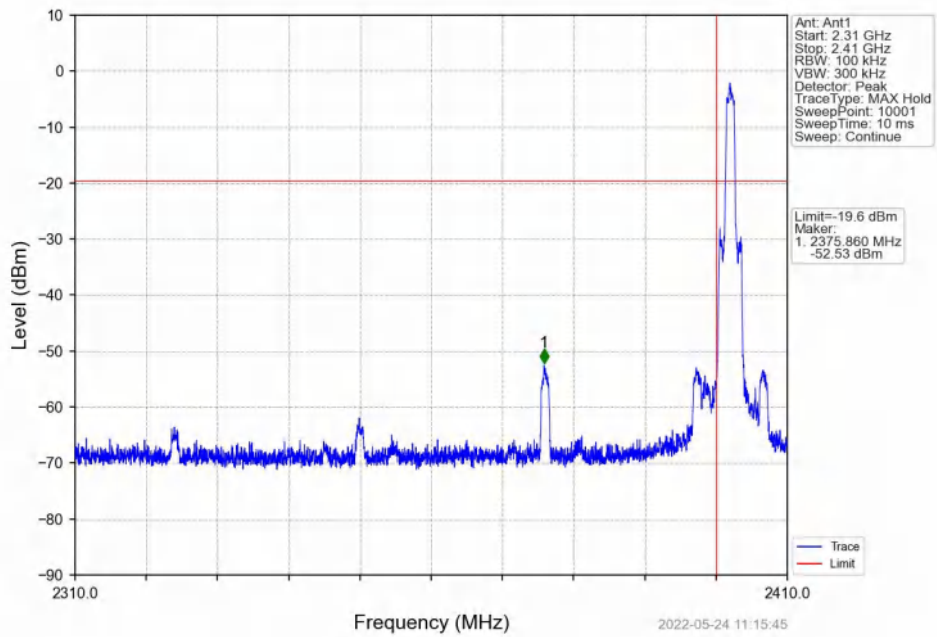
GFSK\_DH5\_HOPP\_Ant1\_NTNV



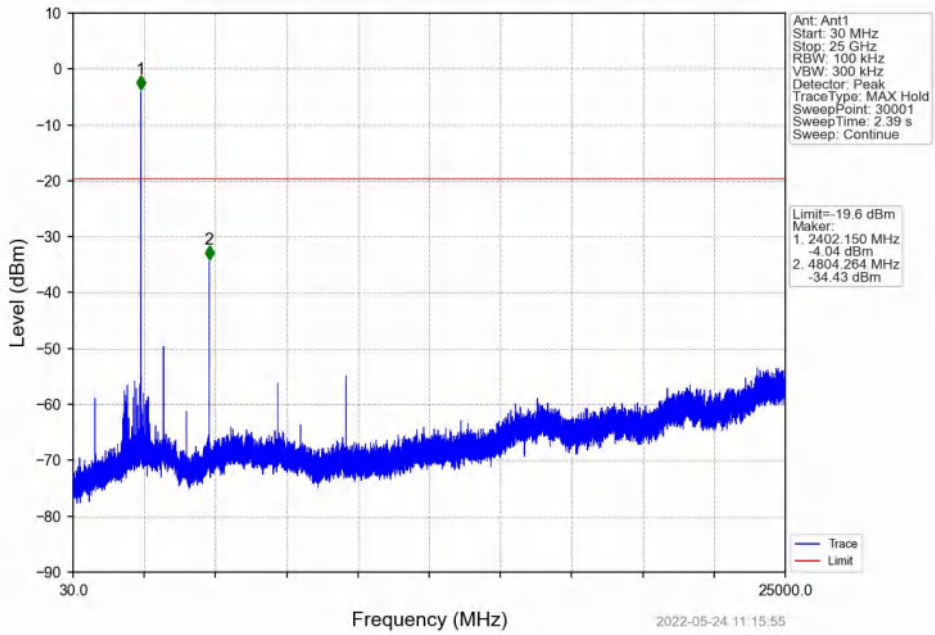
GFSK\_DH5\_HOPP\_Ant1\_NTNV



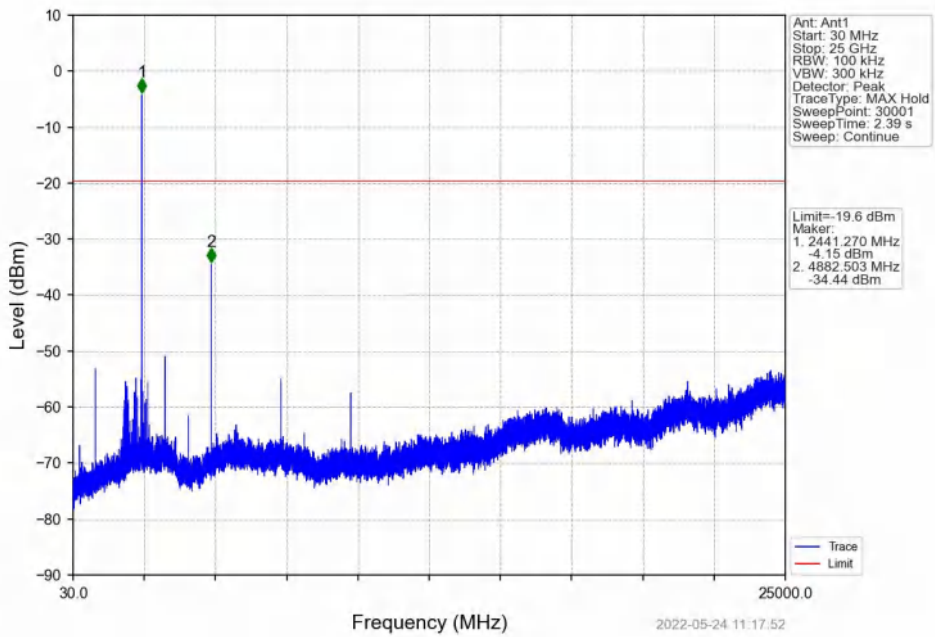
Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV

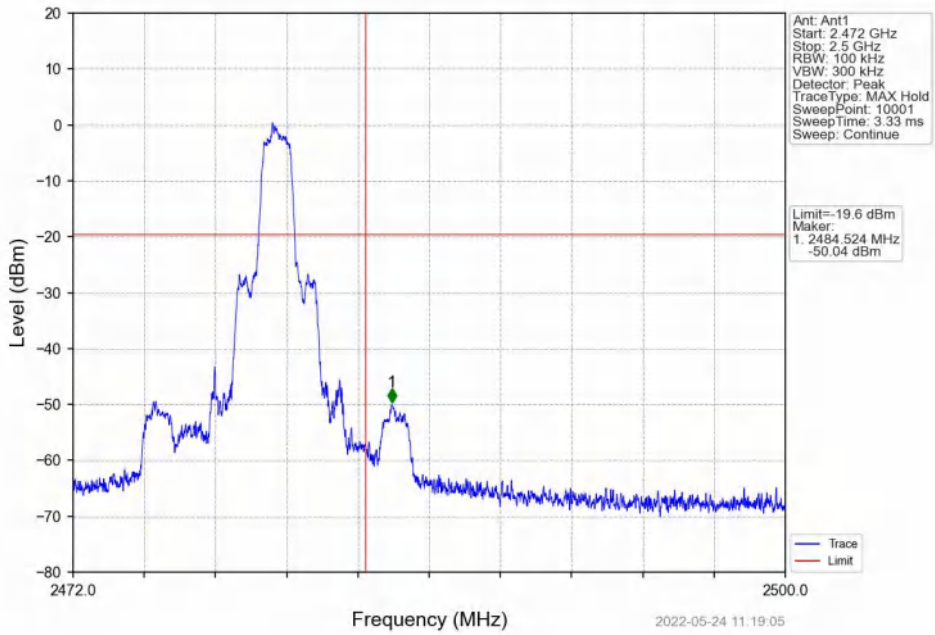


Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV

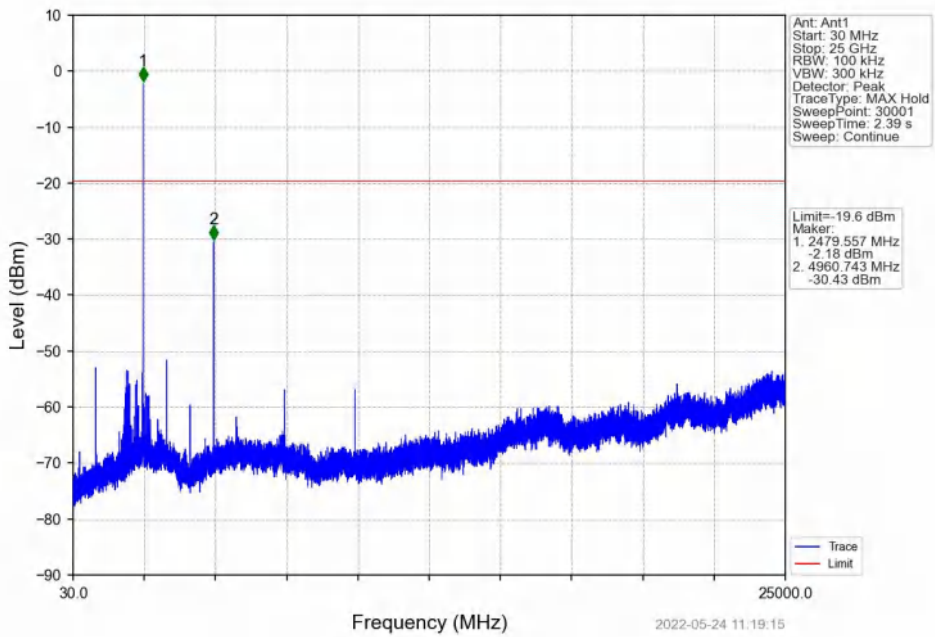




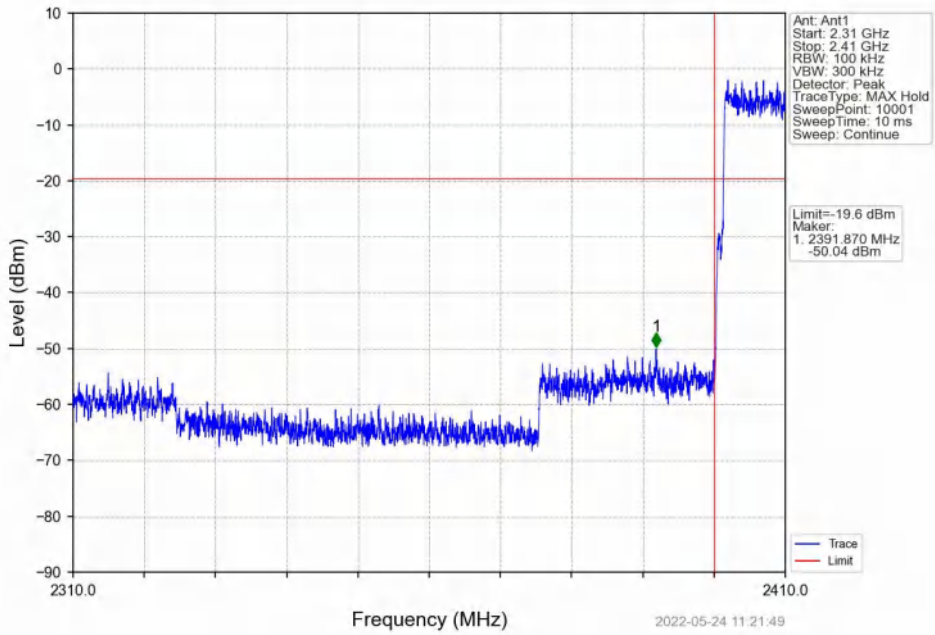
Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV



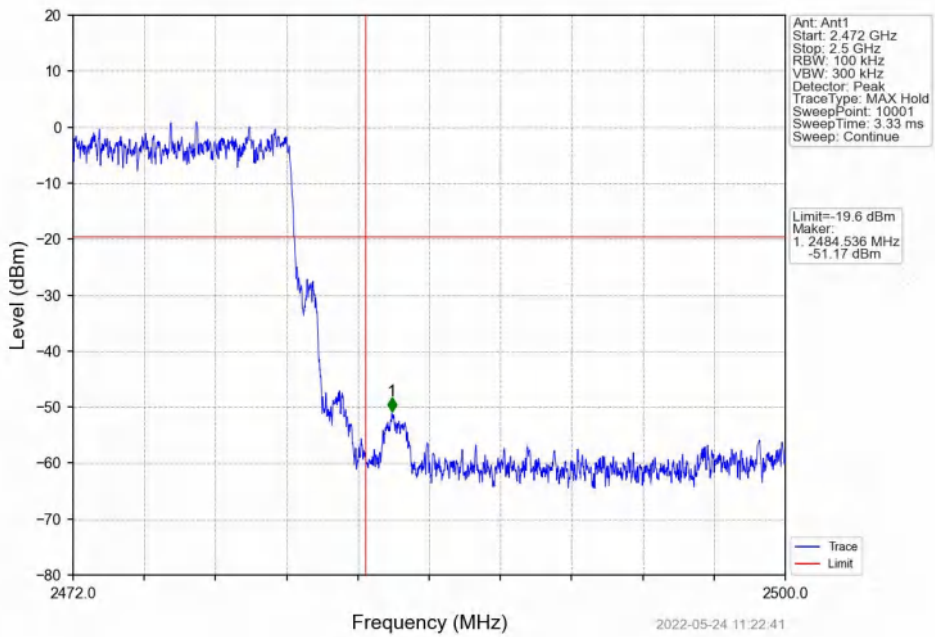
Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV



Pi/4DQPSK\_2DH5\_HOPP\_Ant1\_NTNV

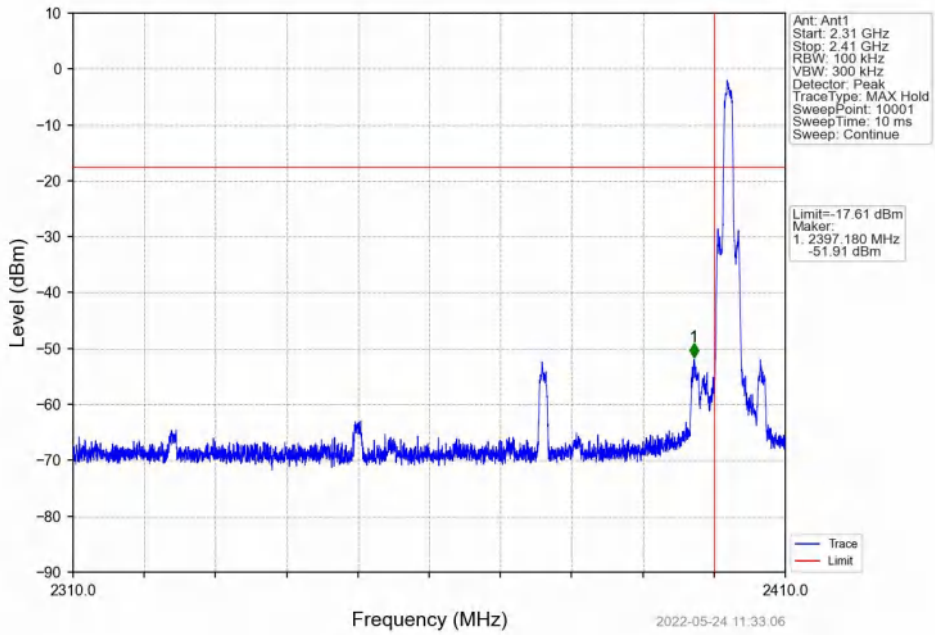


Pi/4DQPSK\_2DH5\_HOPP\_Ant1\_NTNV

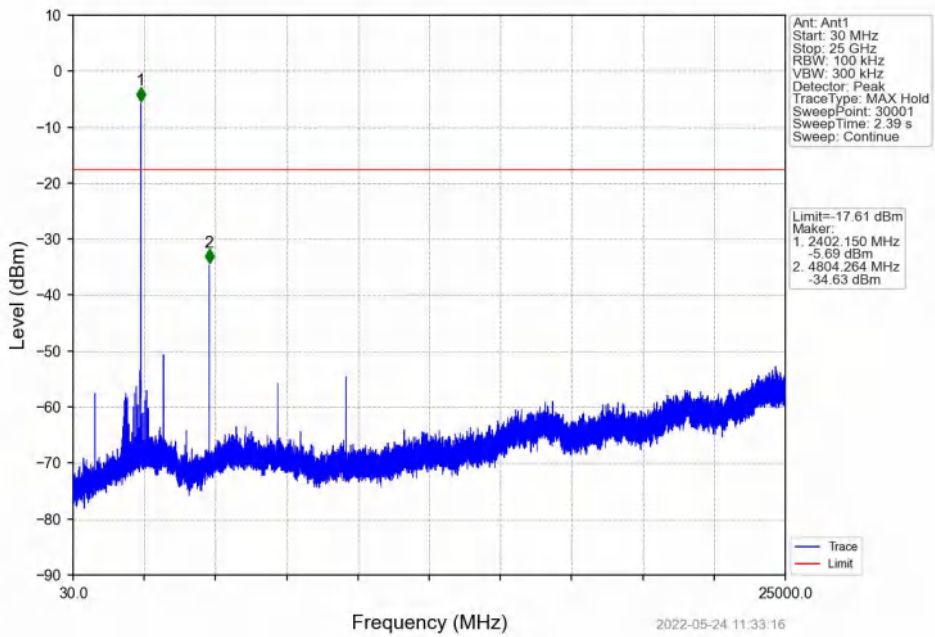




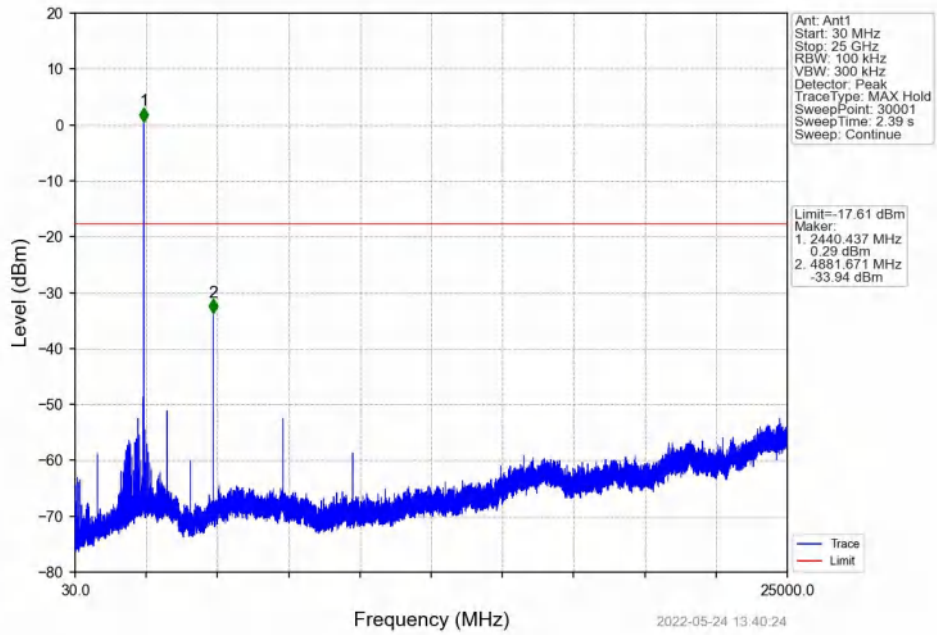
8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



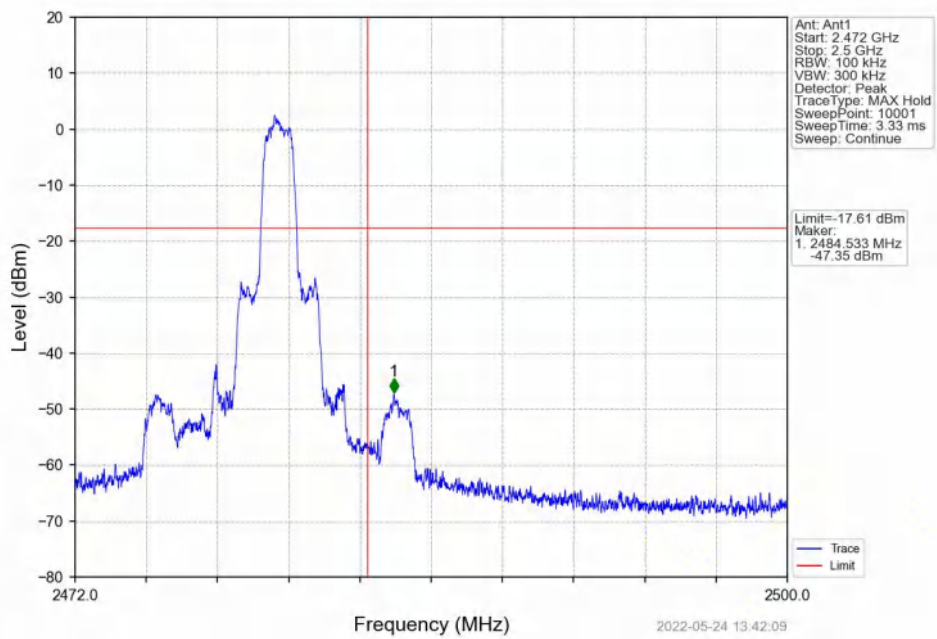
8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



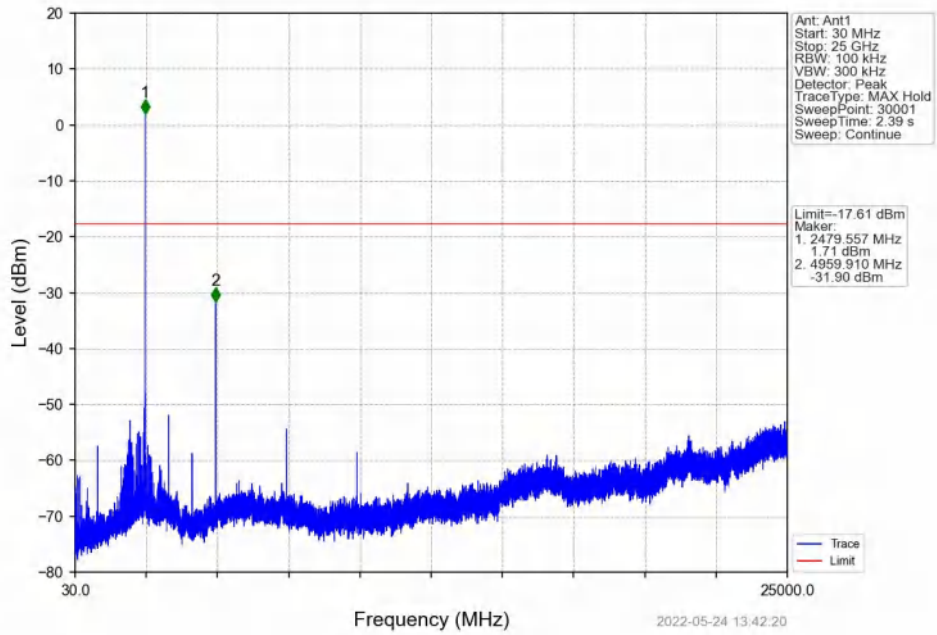
8DPSK\_3DH5\_MCH\_2441MHz\_Ant1\_NTNV



8DPSK\_3DH5\_HCH\_2480MHz\_Ant1\_NTNV



8DPSK\_3DH5\_HCH\_2480MHz\_Ant1\_NTNV



8DPSK\_3DH5\_HOPP\_Ant1\_NTNV

