



Shenzhen CTL Testing Technology Co., Ltd.

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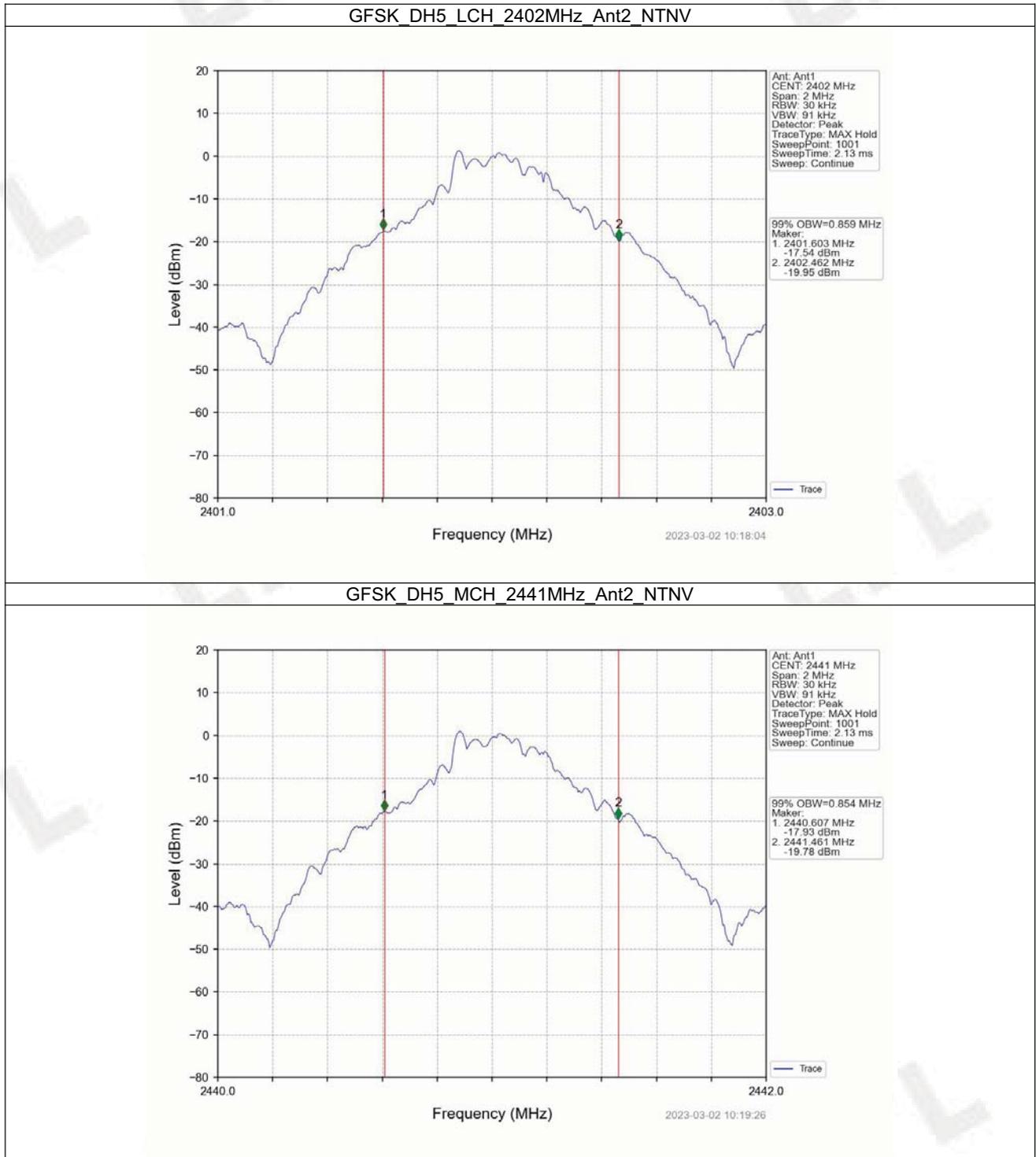
## 1. Bandwidth

### 1.1 OBW

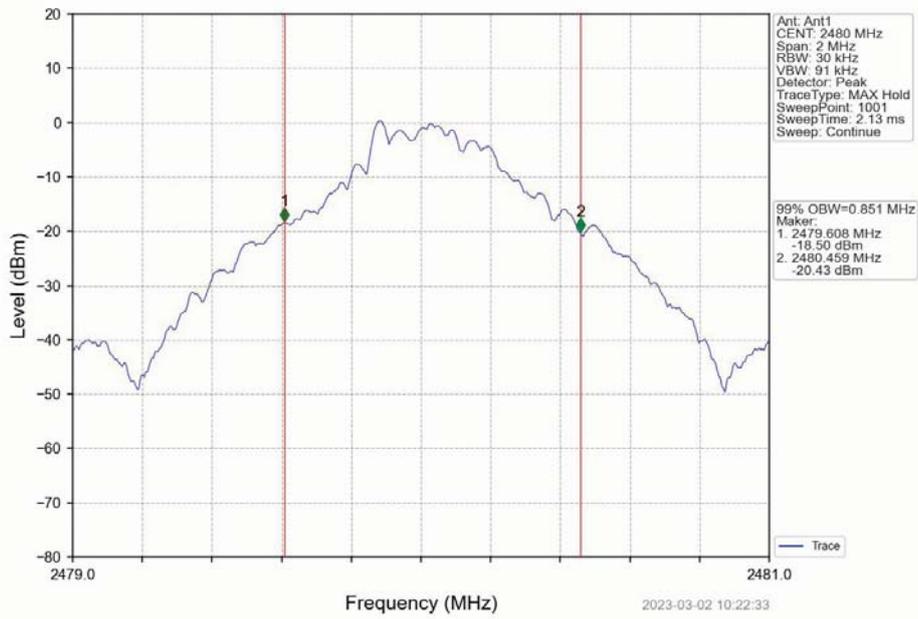
#### 1.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz)	Verdict
					Result	
GFSK	SISO	2402	DH5	2	0.859	Pass
		2441	DH5	2	0.854	Pass
		2480	DH5	2	0.851	Pass
Pi/4DQPSK	SISO	2402	2DH5	2	1.153	Pass
		2441	2DH5	2	1.152	Pass
		2480	2DH5	2	1.151	Pass
8DPSK	SISO	2402	3DH5	2	1.147	Pass
		2441	3DH5	2	1.149	Pass
		2480	3DH5	2	1.147	Pass

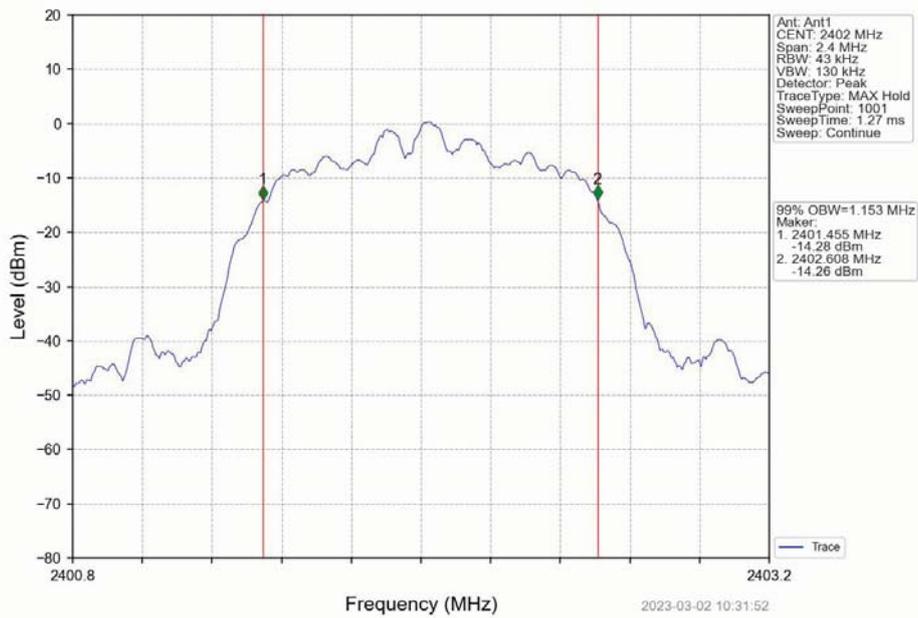
1.1.2 Test Graph



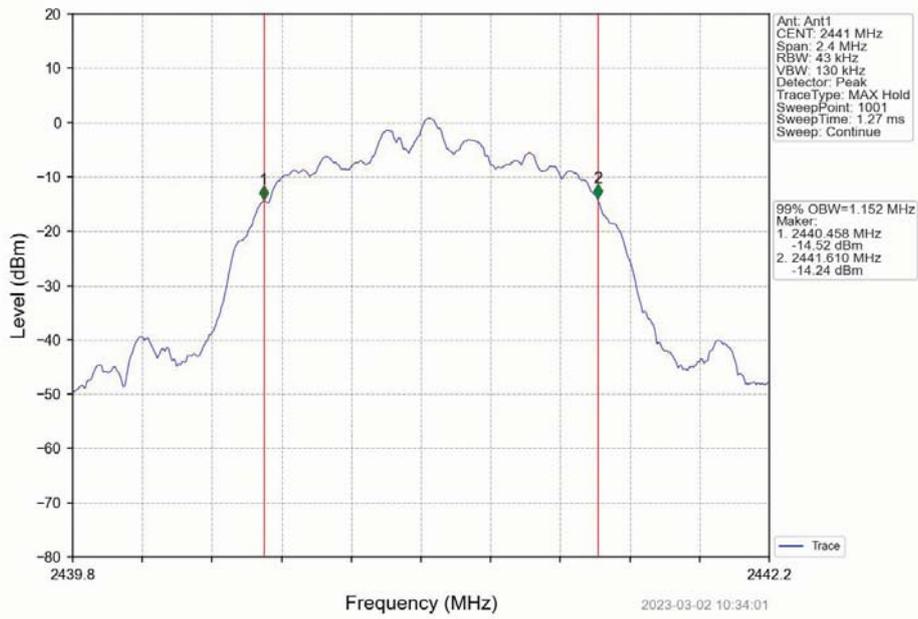
GFSK\_DH5\_HCH\_2480MHz\_Ant2\_NTNV



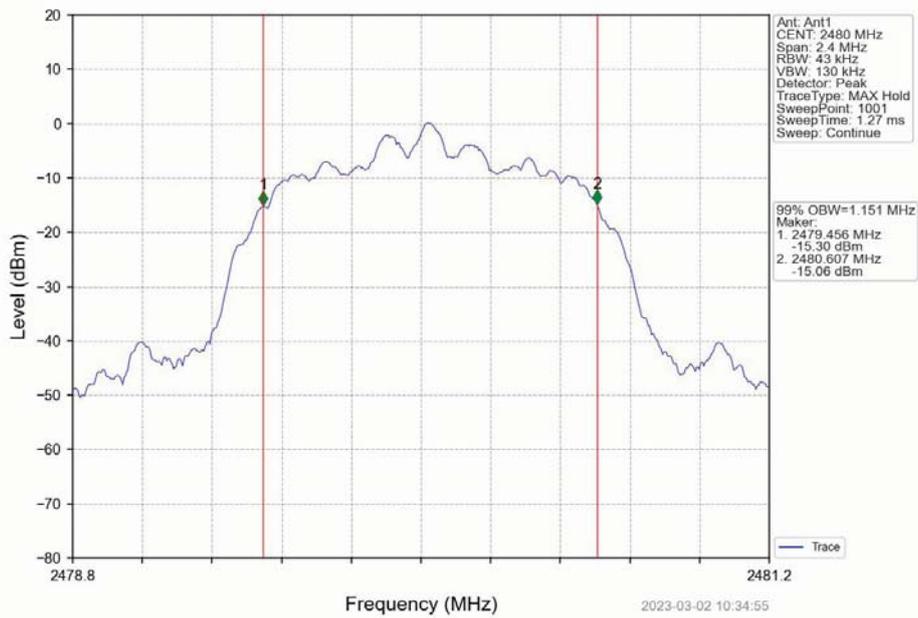
Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant2\_NTNV



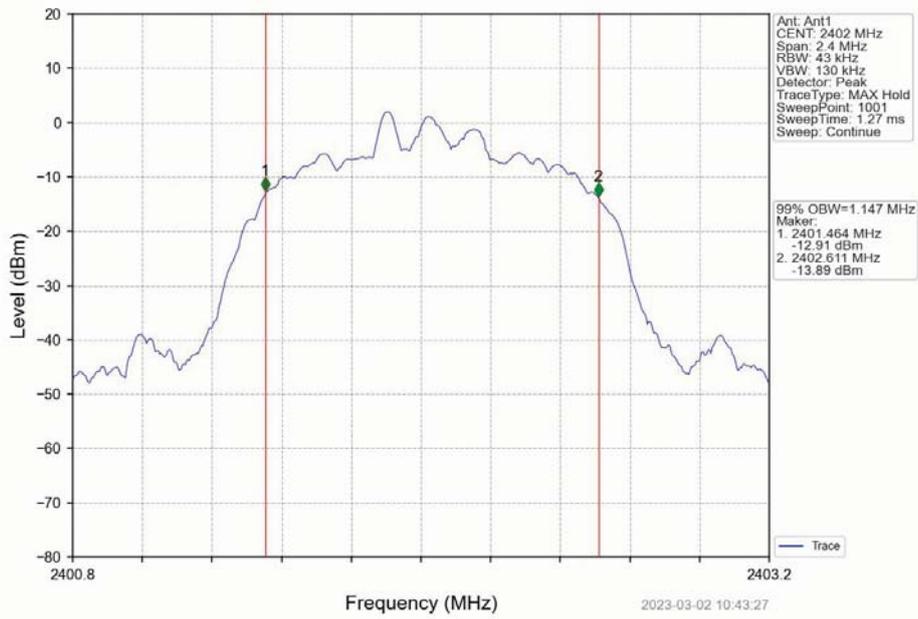
Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant2\_NTNV



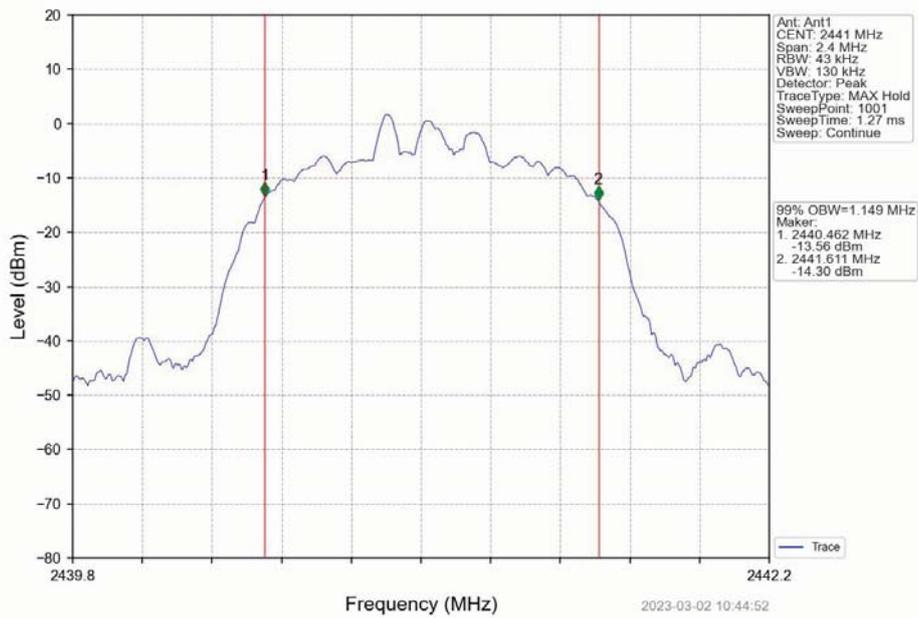
Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant2\_NTNV

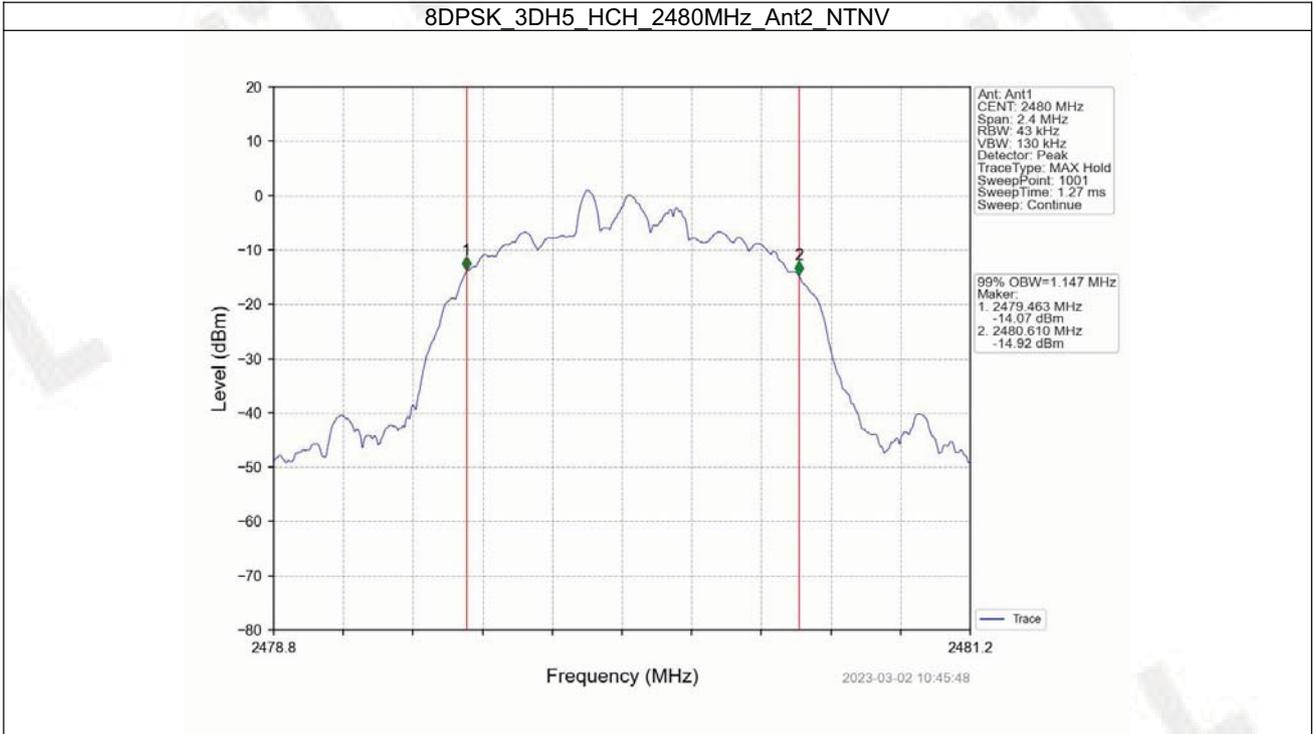


8DPSK\_3DH5\_LCH\_2402MHz\_Ant2\_NTNV



8DPSK\_3DH5\_MCH\_2441MHz\_Ant2\_NTNV



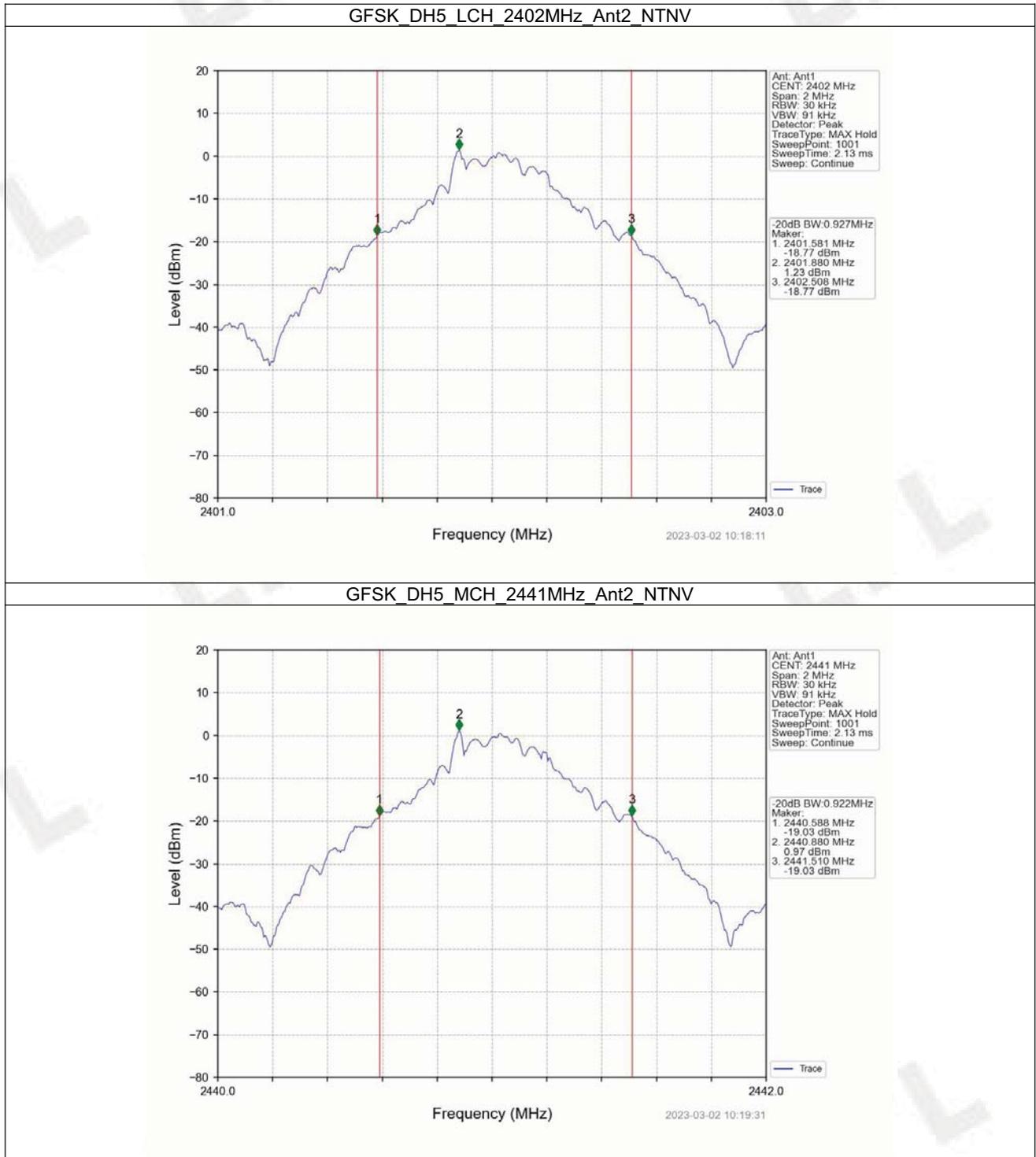


## 1.2 20dB BW

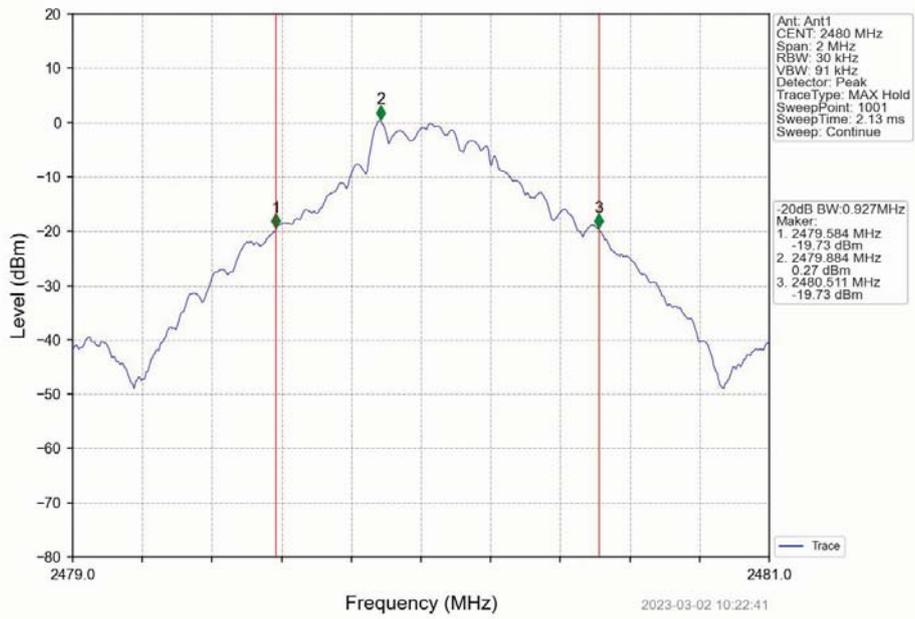
## 1.2.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)	Verdict
					Result	
GFSK	SISO	2402	DH5	2	0.927	Pass
		2441	DH5	2	0.922	Pass
		2480	DH5	2	0.927	Pass
Pi/4DQPSK	SISO	2402	2DH5	2	1.266	Pass
		2441	2DH5	2	1.264	Pass
		2480	2DH5	2	1.265	Pass
8DPSK	SISO	2402	3DH5	2	1.266	Pass
		2441	3DH5	2	1.269	Pass
		2480	3DH5	2	1.263	Pass

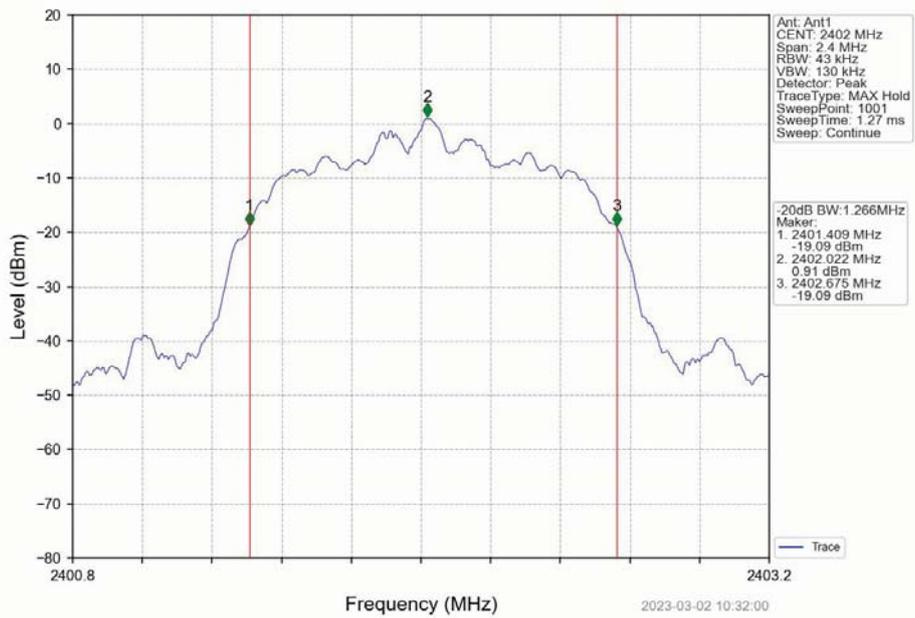
1.2.2 Test Graph



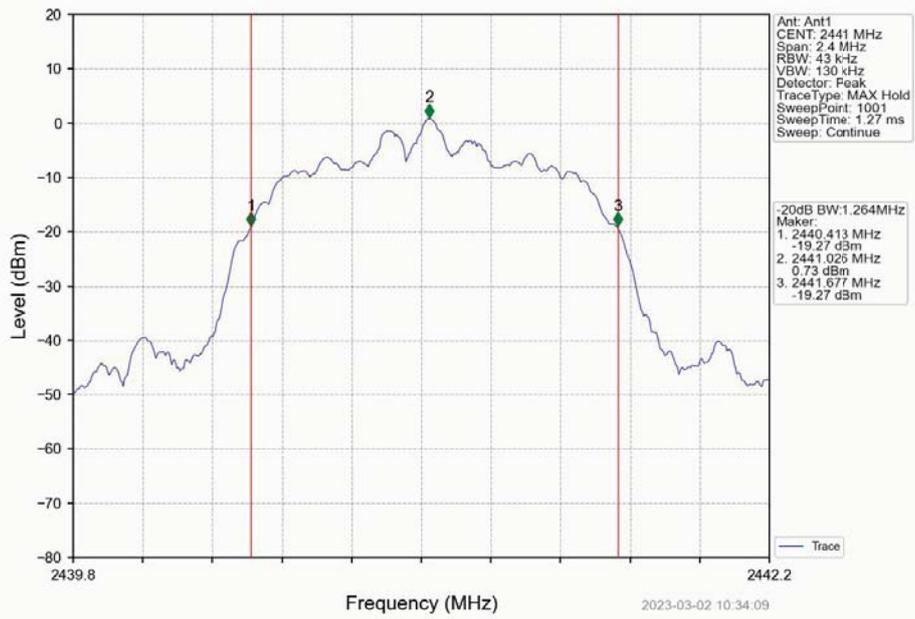
GFSK\_DH5\_HCH\_2480MHz\_Ant2\_NTNV



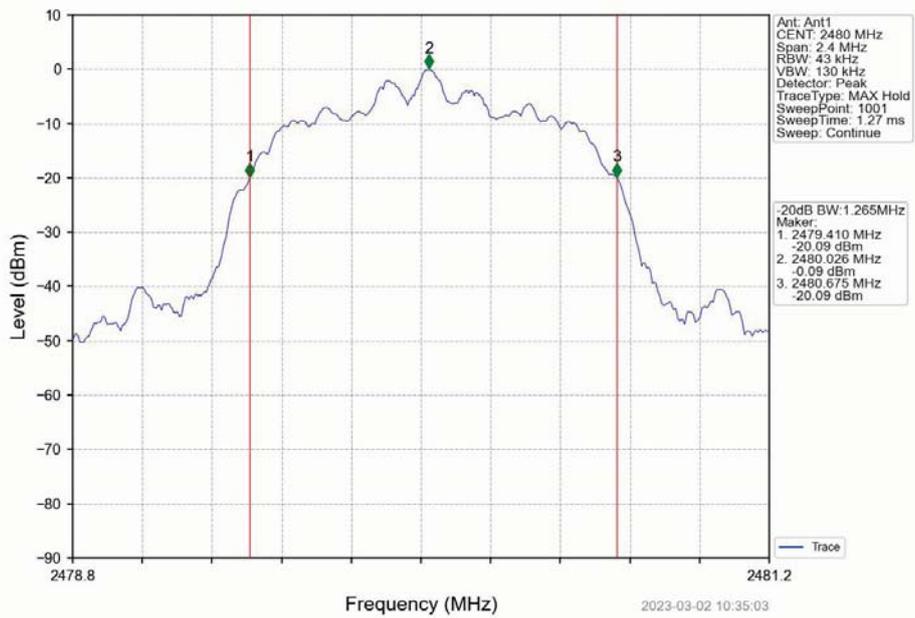
Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant2\_NTNV



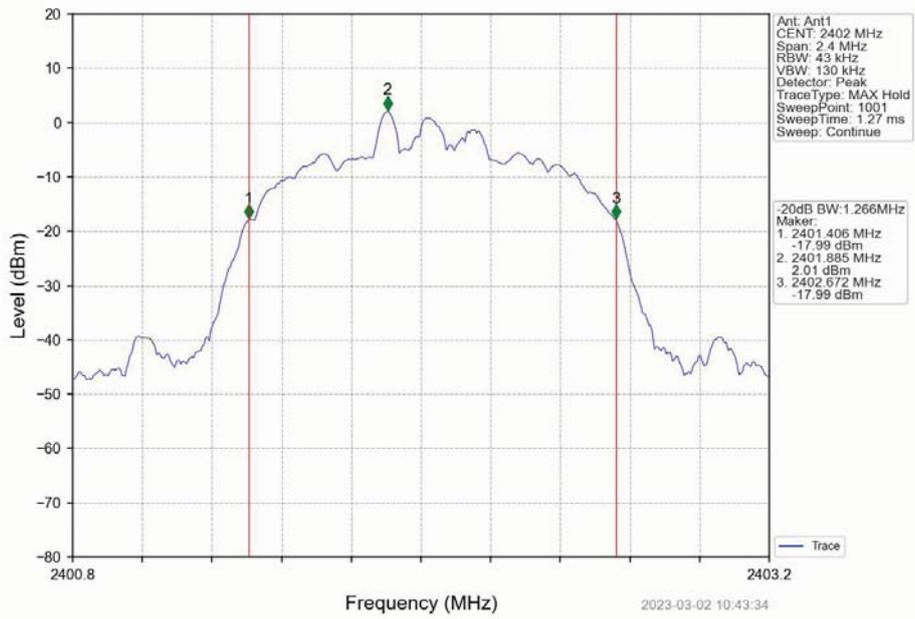
Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant2\_NTNV



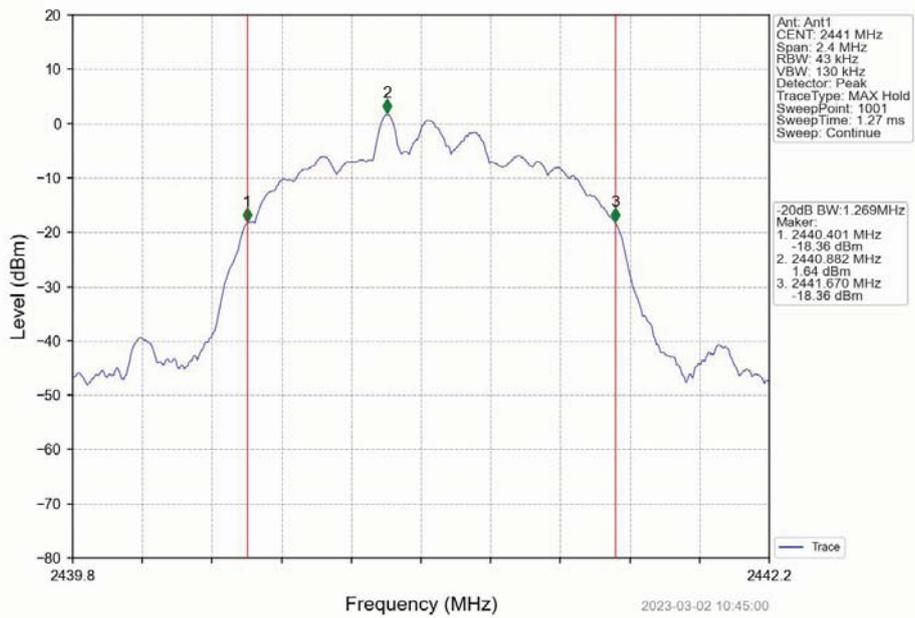
Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant2\_NTNV

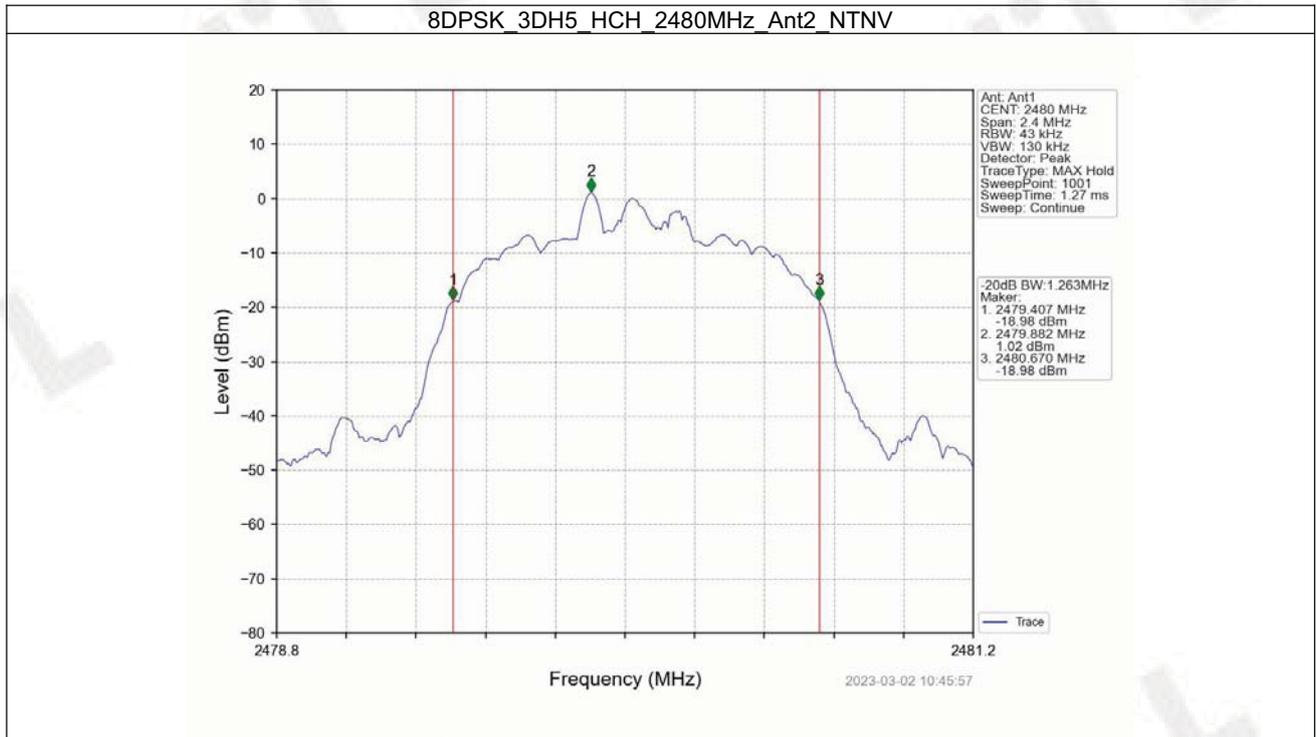


8DPSK\_3DH5\_LCH\_2402MHz\_Ant2\_NTNV



8DPSK\_3DH5\_MCH\_2441MHz\_Ant2\_NTNV





## 2. Maximum Conducted Output Power

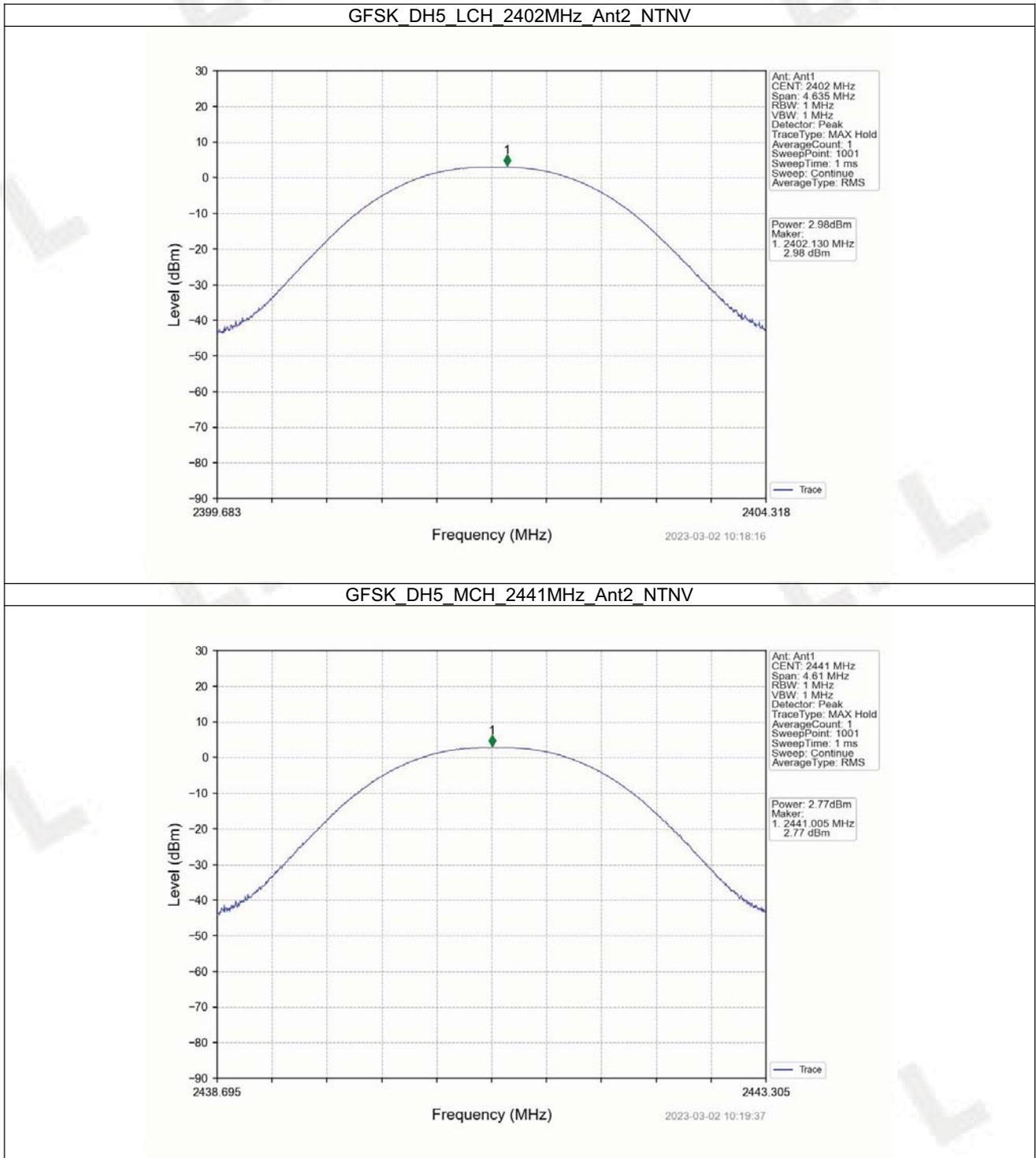
### 2.1 Power

#### 2.1.1 Test Result

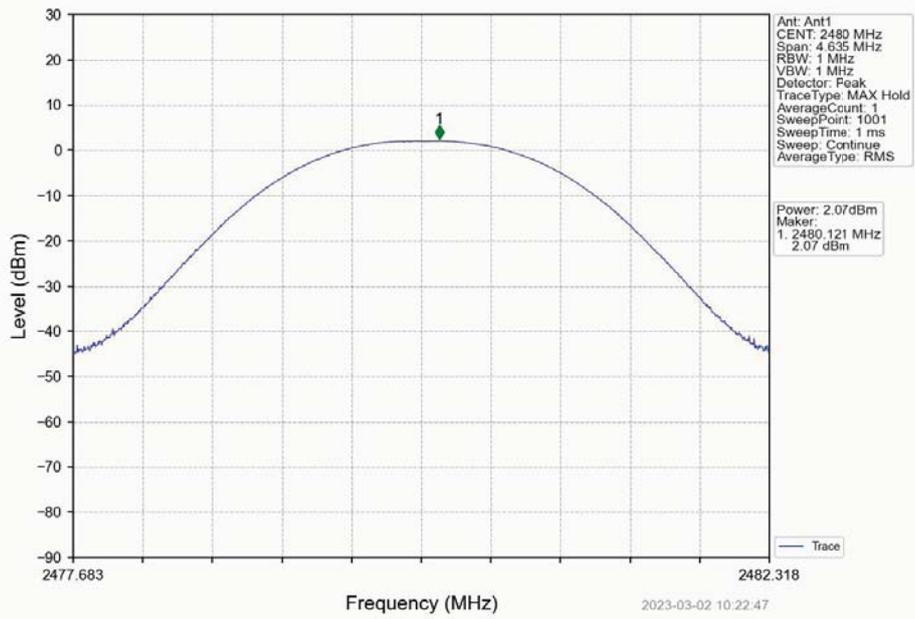
Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				Ant2	Limit	
GFSK	SISO	2402	DH5	2.98	<=30	Pass
		2441	DH5	2.77	<=30	Pass
		2480	DH5	2.07	<=30	Pass
Pi/4DQPSK	SISO	2402	2DH5	3.03	<=20.97	Pass
		2441	2DH5	2.77	<=20.97	Pass
		2480	2DH5	2.07	<=20.97	Pass
8DPSK	SISO	2402	3DH5	2.99	<=20.97	Pass
		2441	3DH5	2.69	<=20.97	Pass
		2480	3DH5	2.00	<=20.97	Pass

Note1: Antenna Gain: Ant2: 2.89dBi;

2.1.2 Test Graph



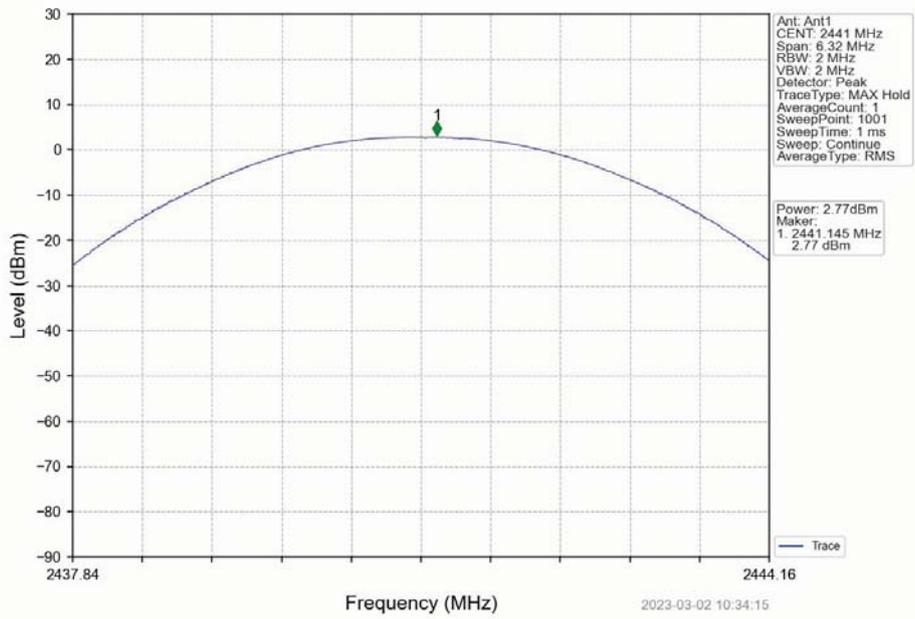
GFSK\_DH5\_HCH\_2480MHz\_Ant2\_NTNV



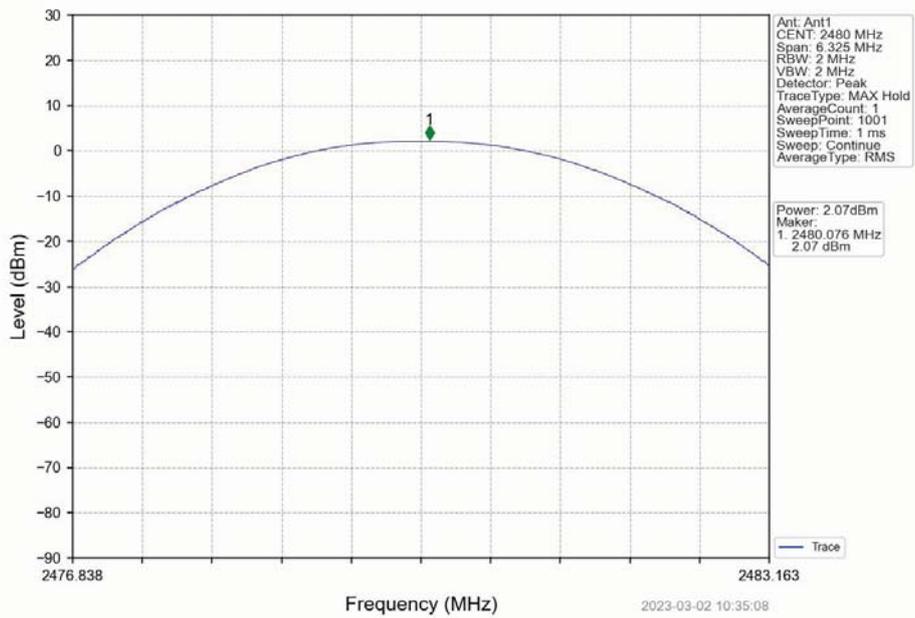
Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant2\_NTNV



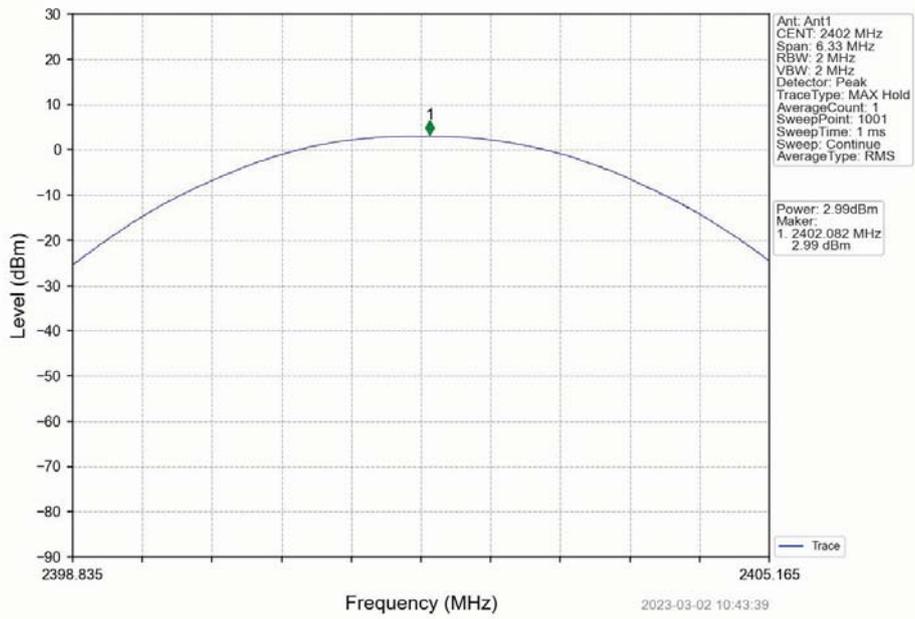
Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant2\_NTNV



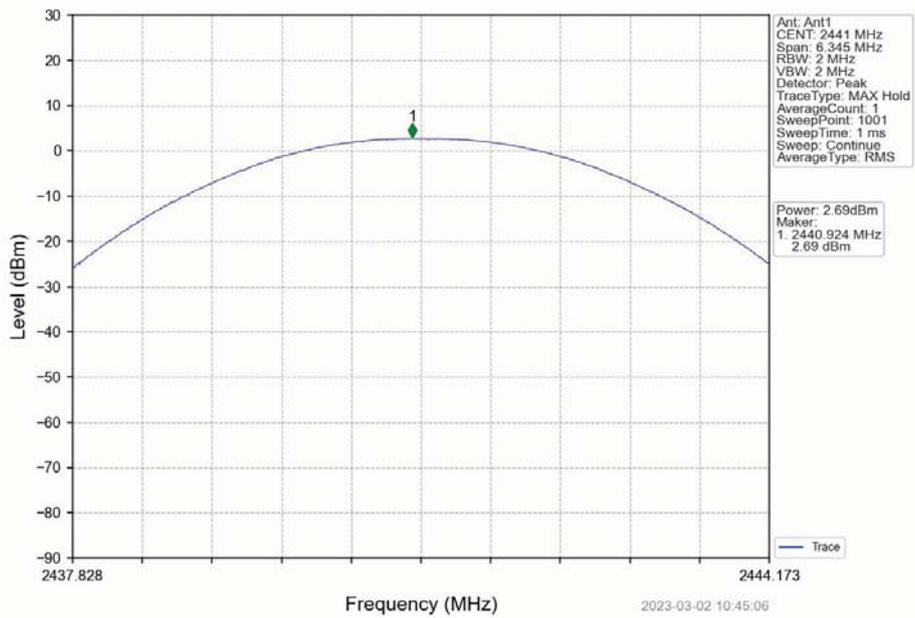
Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant2\_NTNV

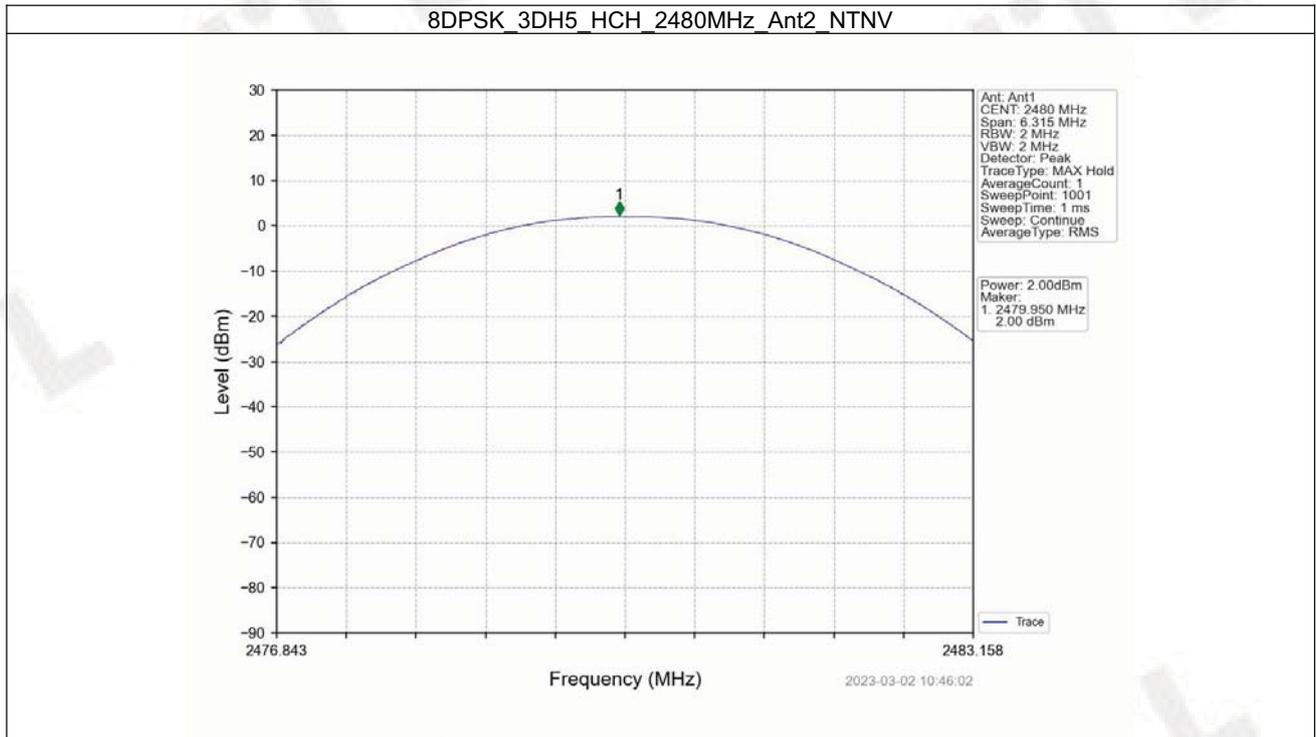


8DPSK\_3DH5\_LCH\_2402MHz\_Ant2\_NTNV



8DPSK\_3DH5\_MCH\_2441MHz\_Ant2\_NTNV





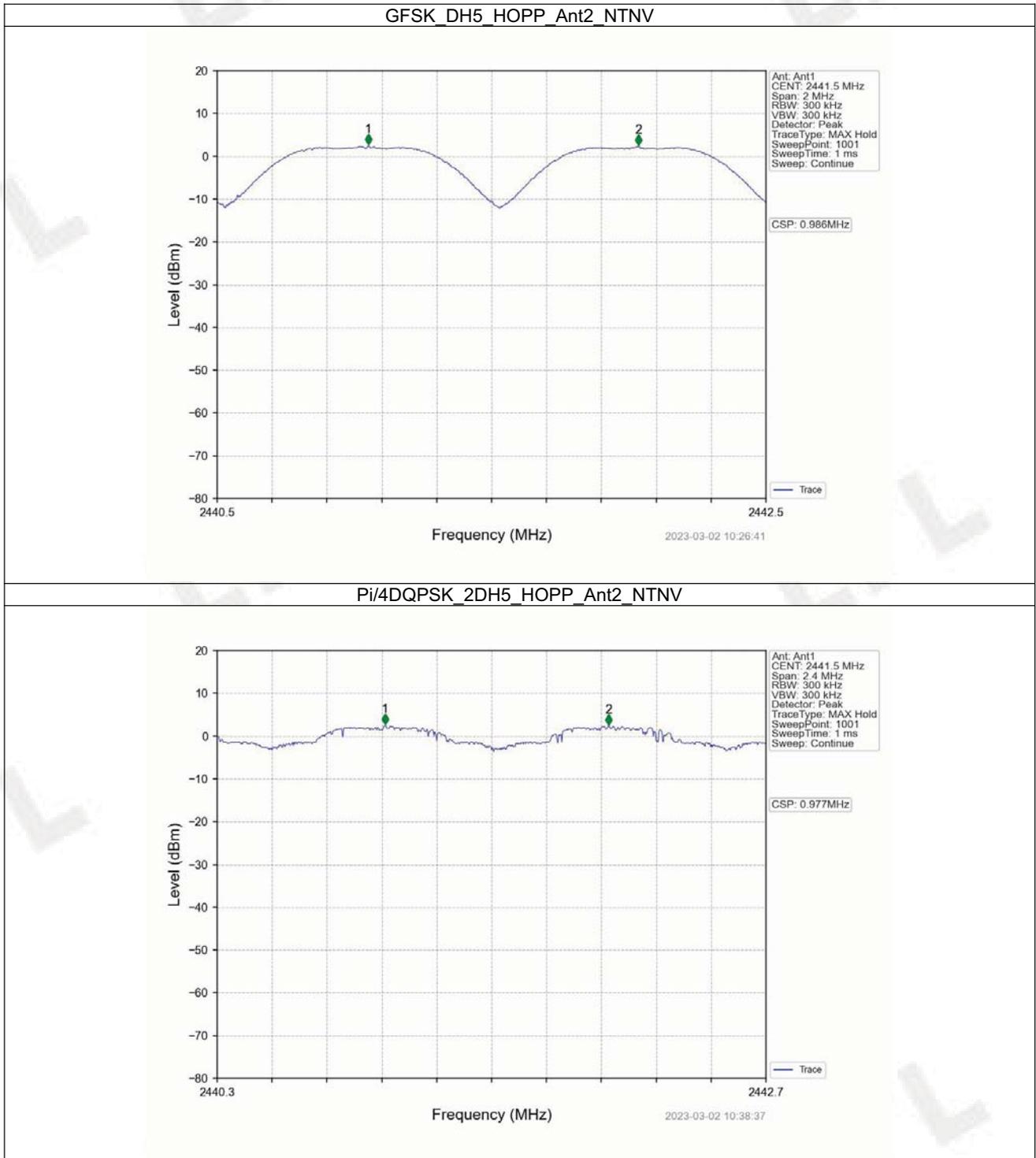
### 3. Carrier Frequency Separation

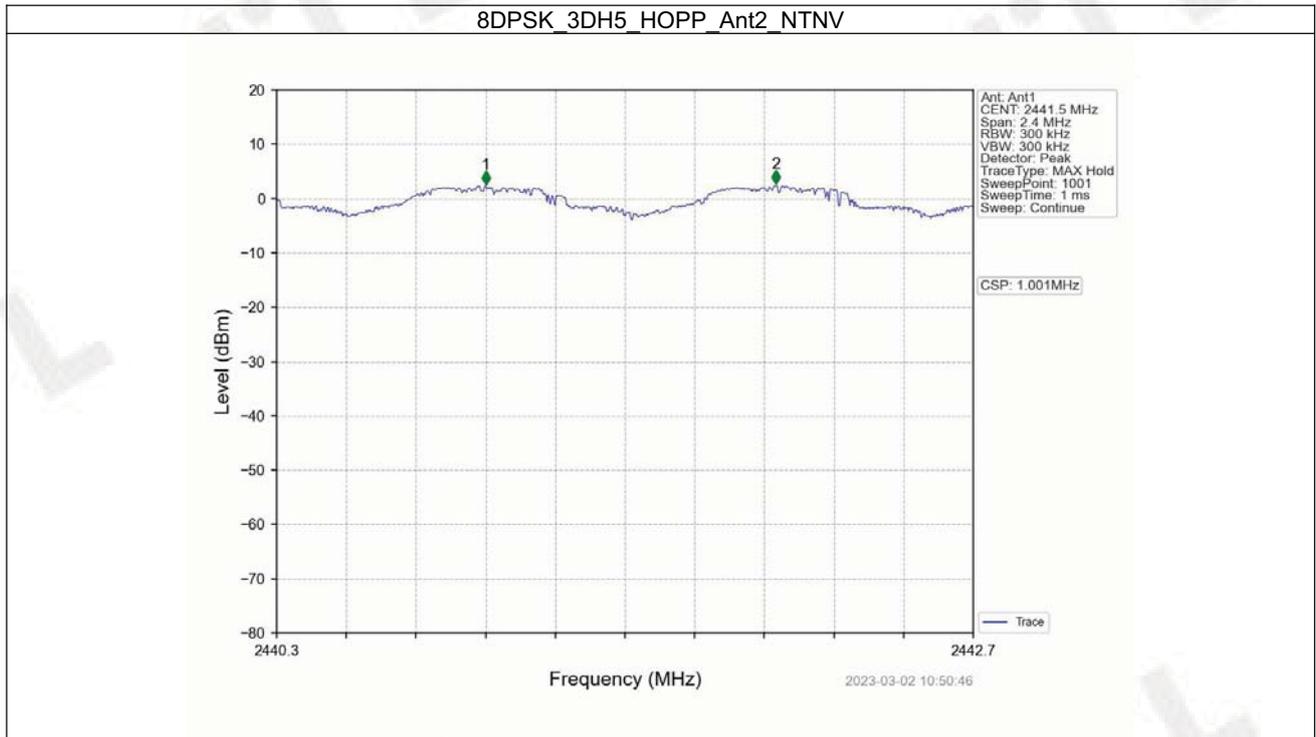
#### 3.1 Ant2

##### 3.1.1 Test Result

Ant2							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	0.986	0.927	$\geq 0.927$	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	0.977	1.266	$\geq 0.844$	Pass
8DPSK	SISO	HOPP	3DH5	1.001	1.269	$\geq 0.846$	Pass

3.1.2 Test Graph





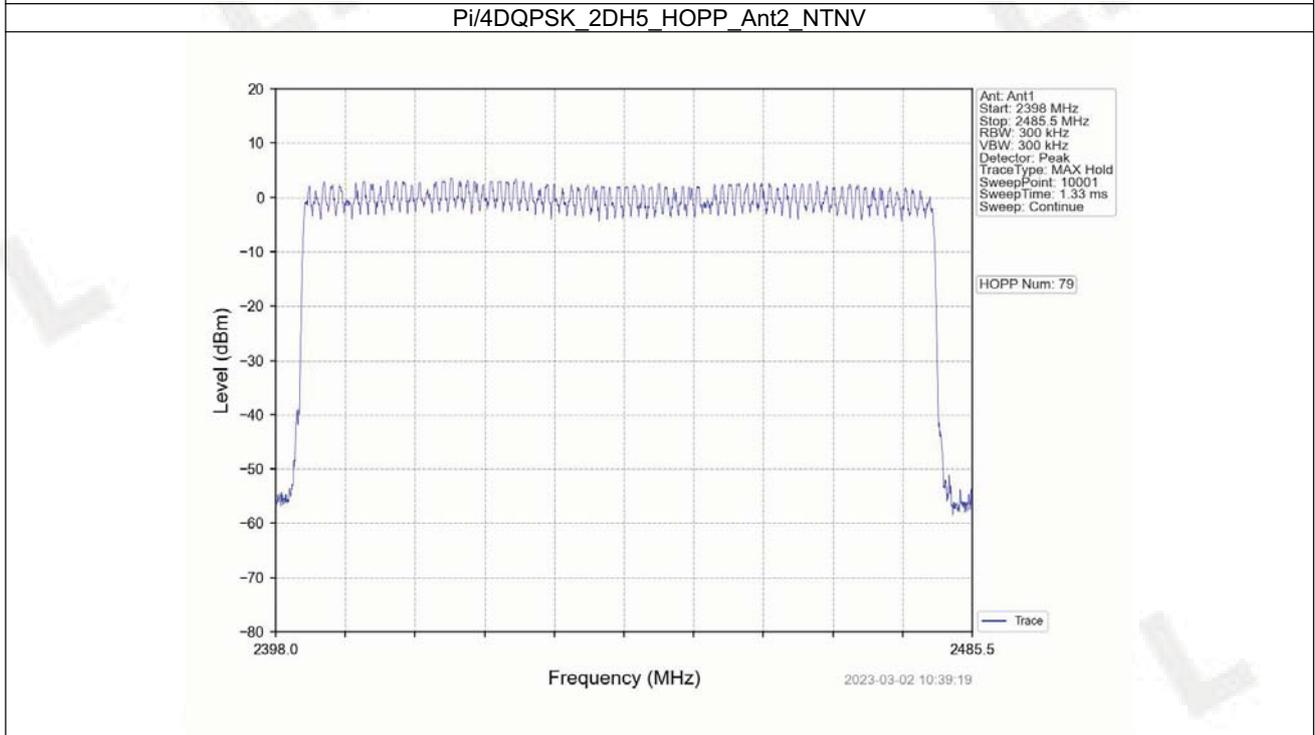
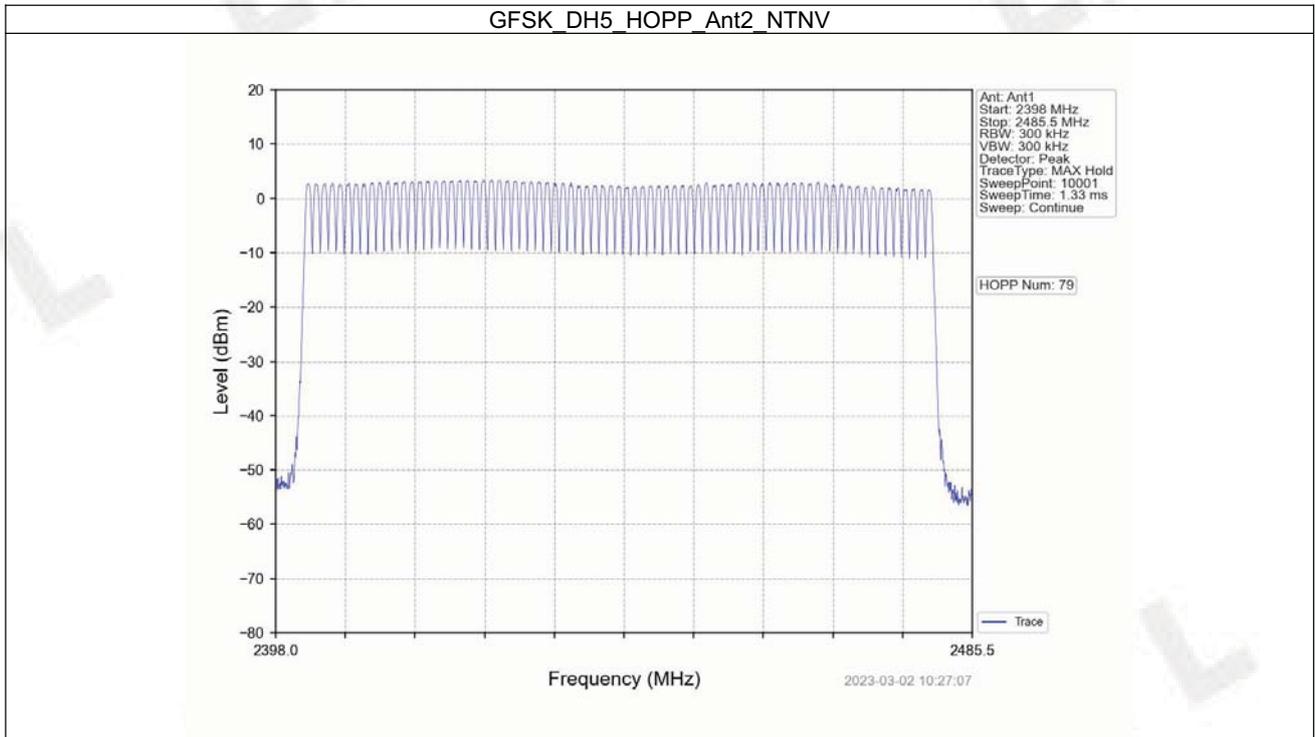
## 4. Number of Hopping Frequencies

### 4.1 HoppNum

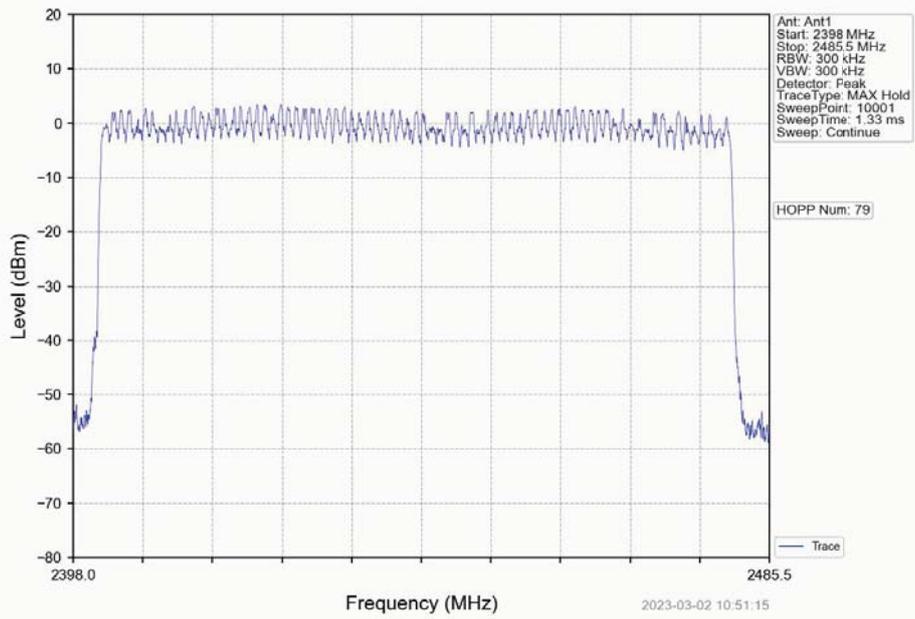
#### 4.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	Num of Hopping Frequencies		Verdict
				Ant2	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



8DPSK\_3DH5\_HOPP\_Ant2\_NTNV



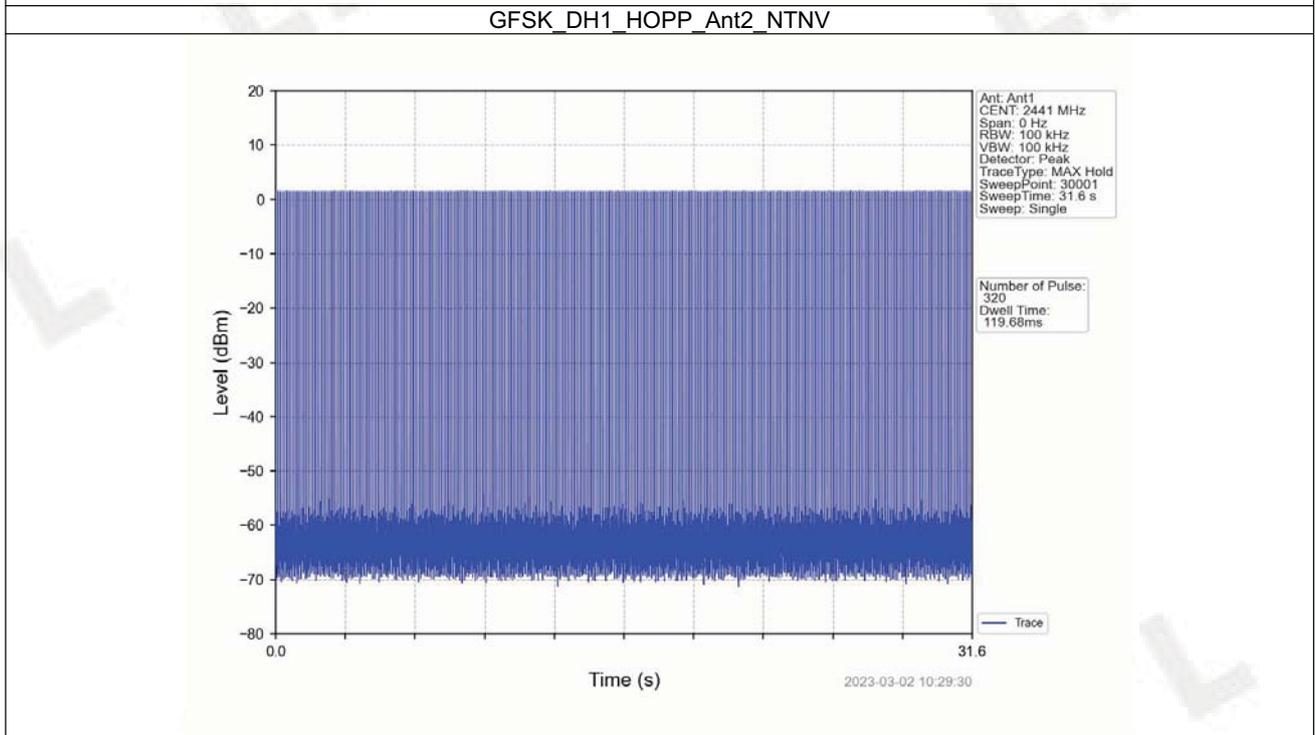
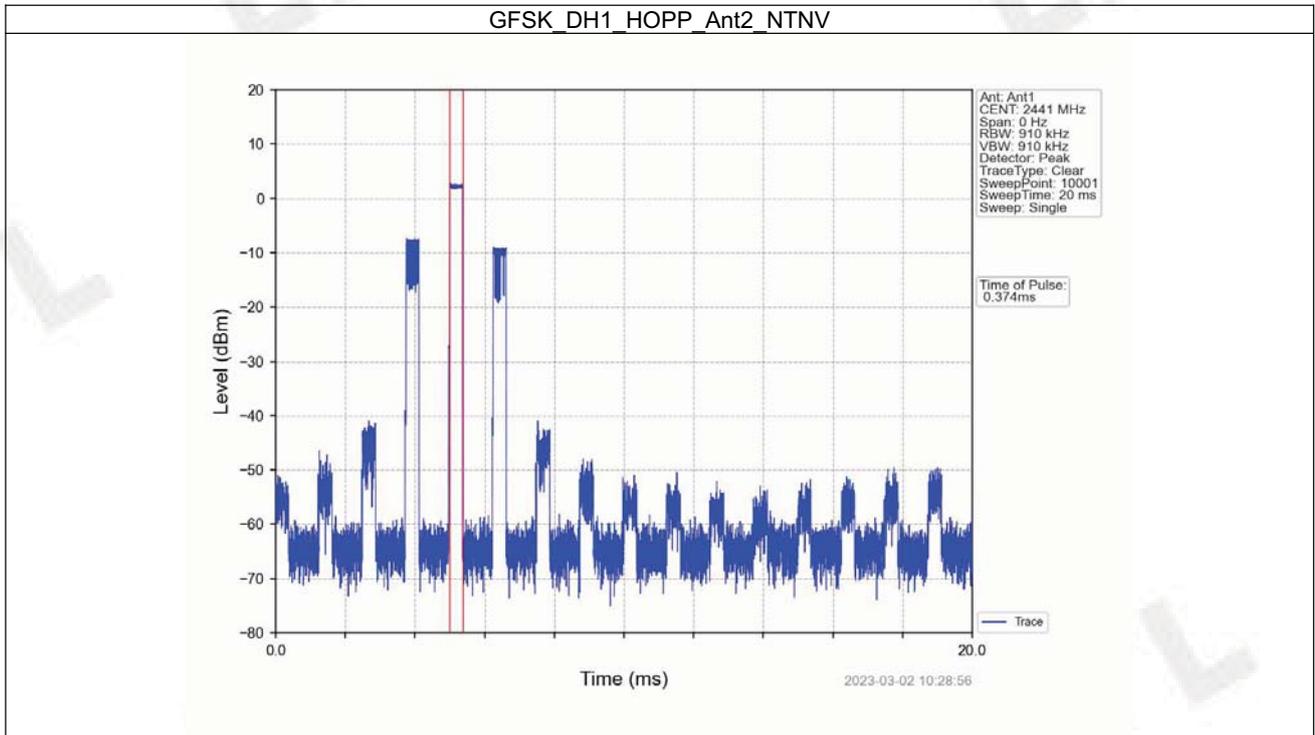
## 5. Time of Occupancy (Dwell Time)

### 5.1 Ant2

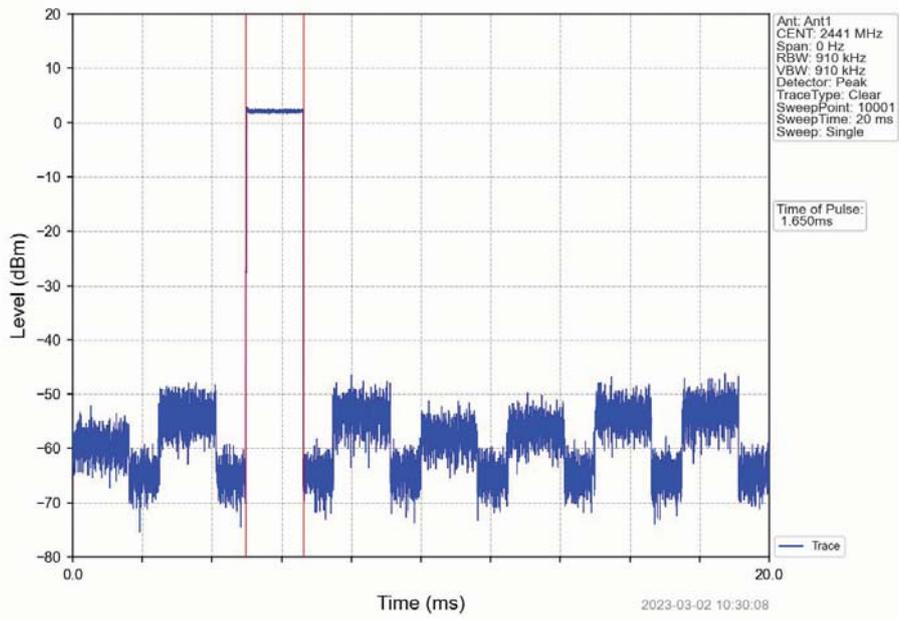
#### 5.1.1 Test Result

Ant2									
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	320	119.680	<=400	Pass
			DH3	1.650	31.600	160	264.000	<=400	Pass
			DH5	2.898	31.600	106	307.188	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.382	31.600	320	122.240	<=400	Pass
			2DH3	1.662	31.600	160	265.920	<=400	Pass
			2DH5	2.912	31.600	107	311.584	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.382	31.600	320	122.240	<=400	Pass
			3DH3	1.660	31.600	160	265.600	<=400	Pass
			3DH5	2.912	31.600	106	308.672	<=400	Pass

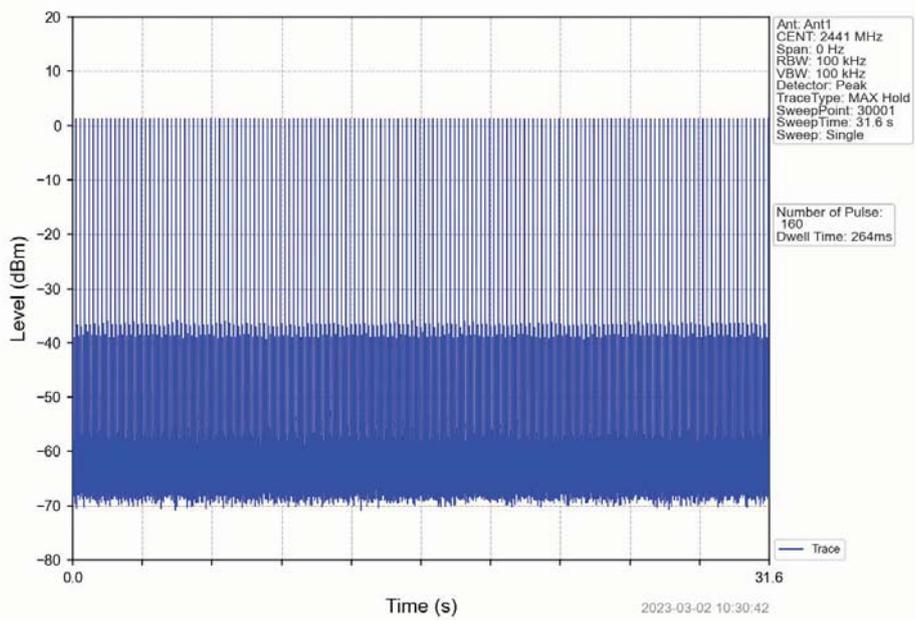
5.1.2 Test Graph



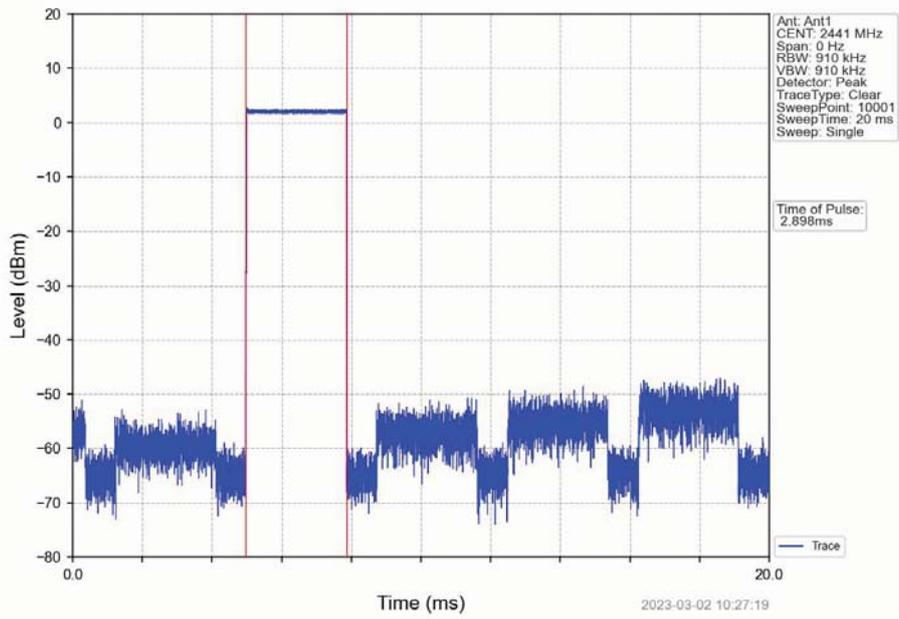
GFSK\_DH3\_HOPP\_Ant2\_NTNV



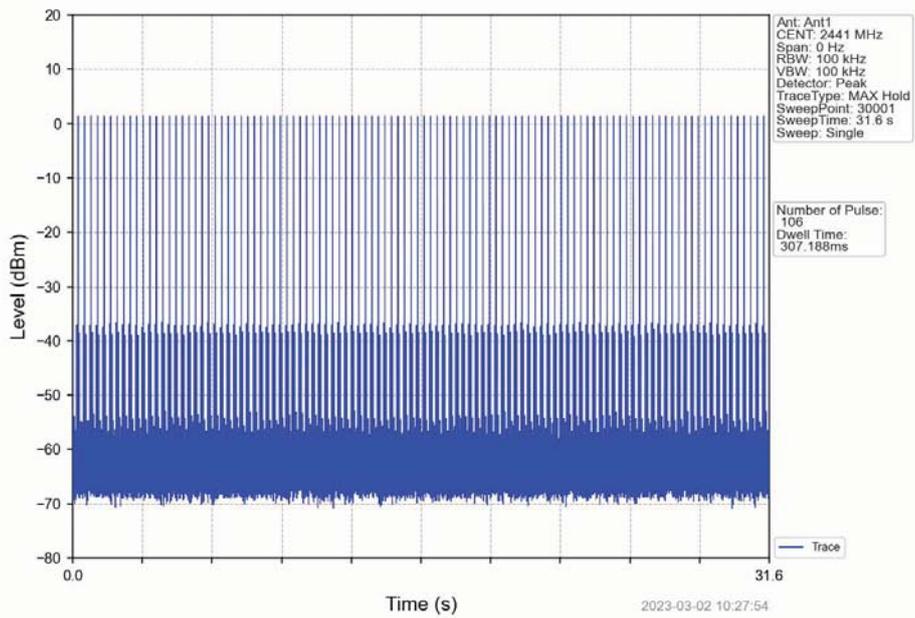
GFSK\_DH3\_HOPP\_Ant2\_NTNV



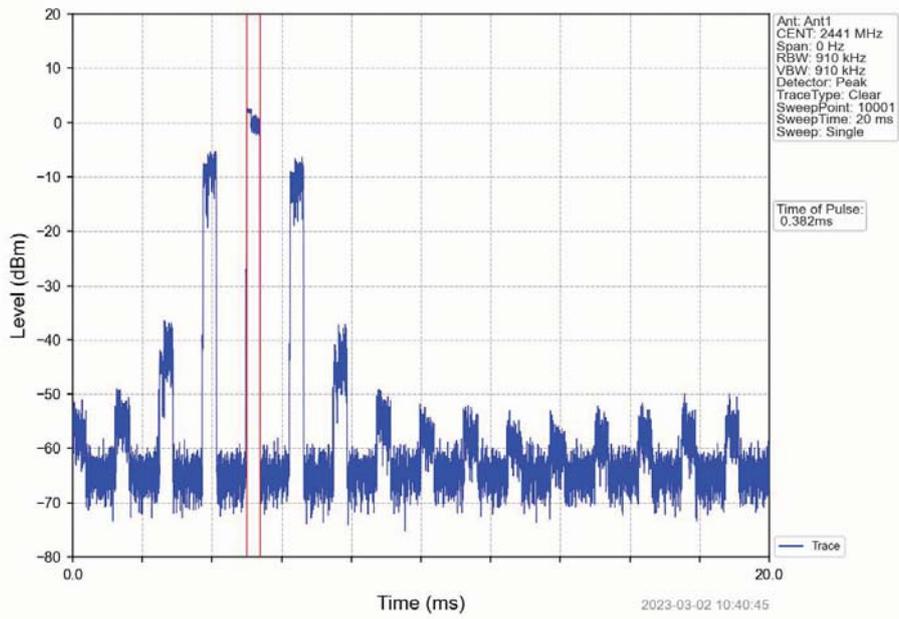
GFSK\_DH5\_HOPP\_Ant2\_NTNV



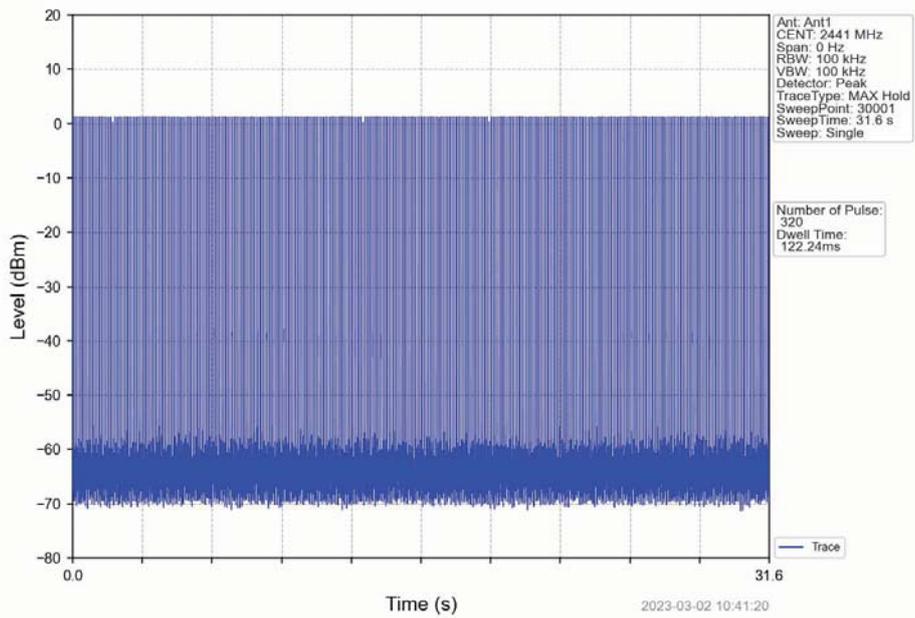
GFSK\_DH5\_HOPP\_Ant2\_NTNV



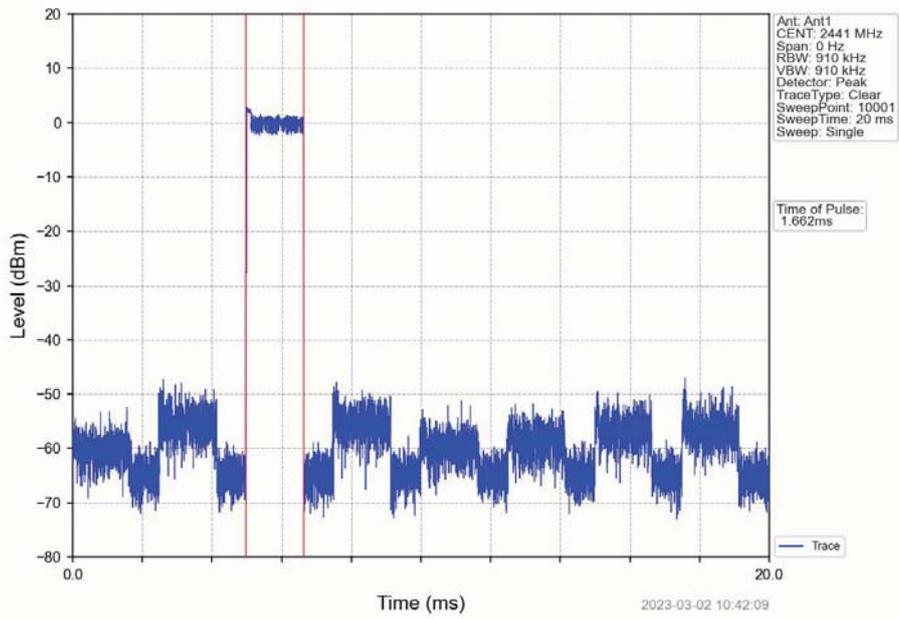
Pi/4DQPSK\_2DH1\_HOPP\_Ant2\_NTNV



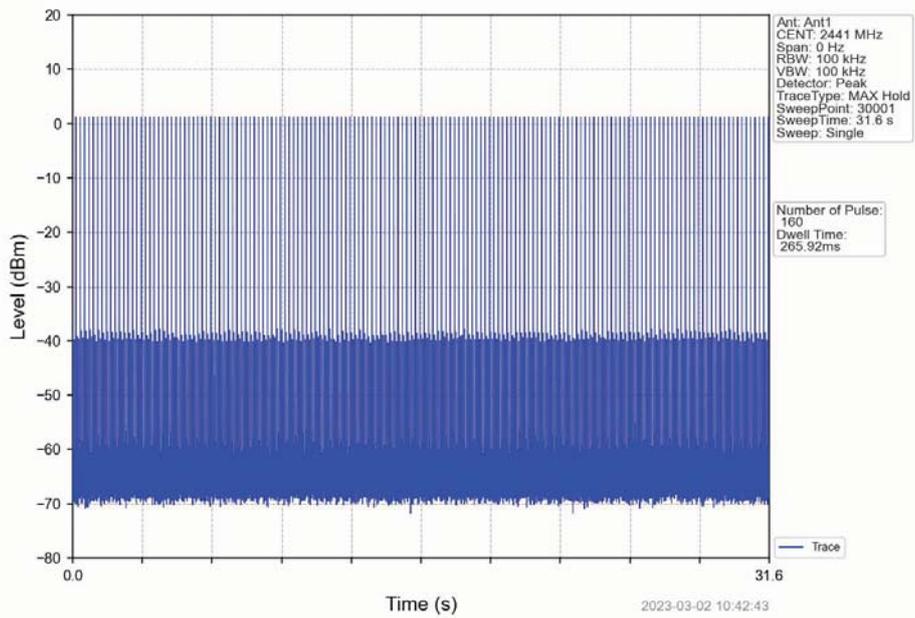
Pi/4DQPSK\_2DH1\_HOPP\_Ant2\_NTNV



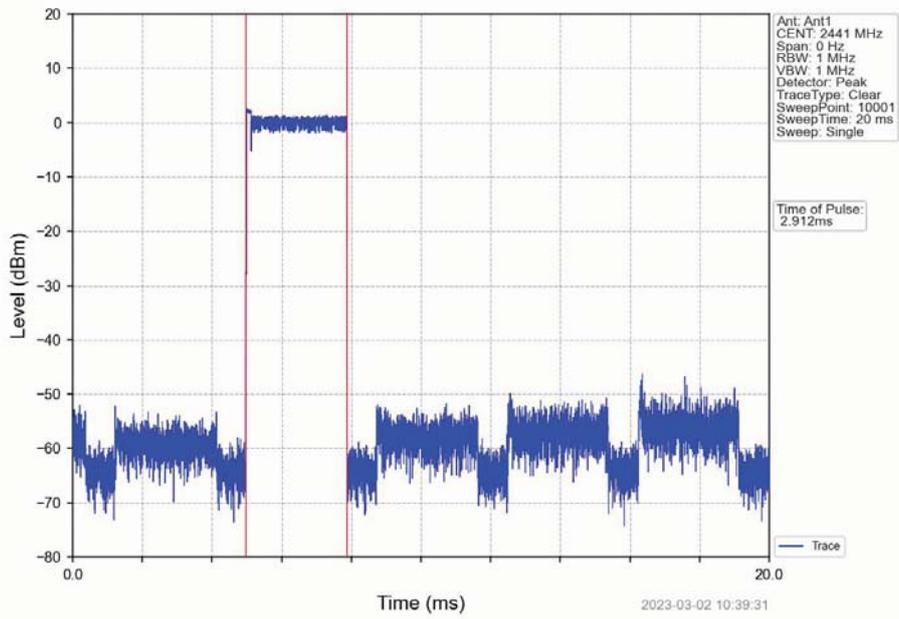
Pi/4DQPSK\_2DH3\_HOPP\_Ant2\_NTNV



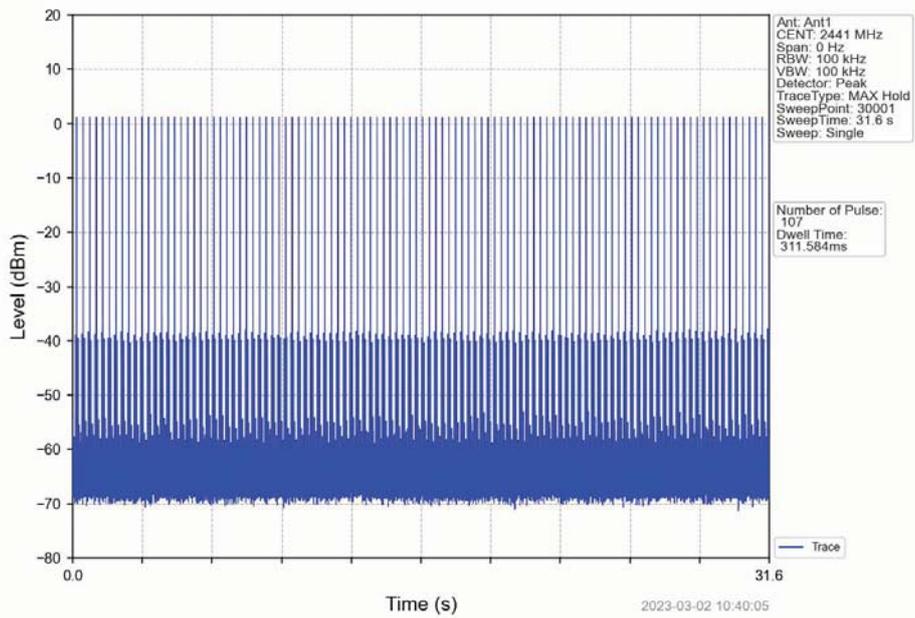
Pi/4DQPSK\_2DH3\_HOPP\_Ant2\_NTNV



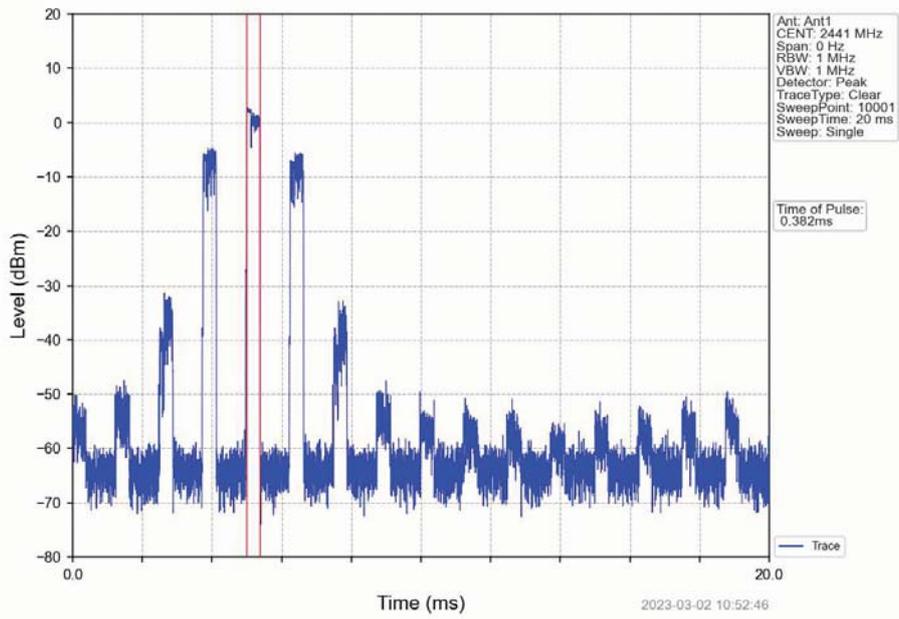
Pi/4DQPSK\_2DH5\_HOPP\_Ant2\_NTNV



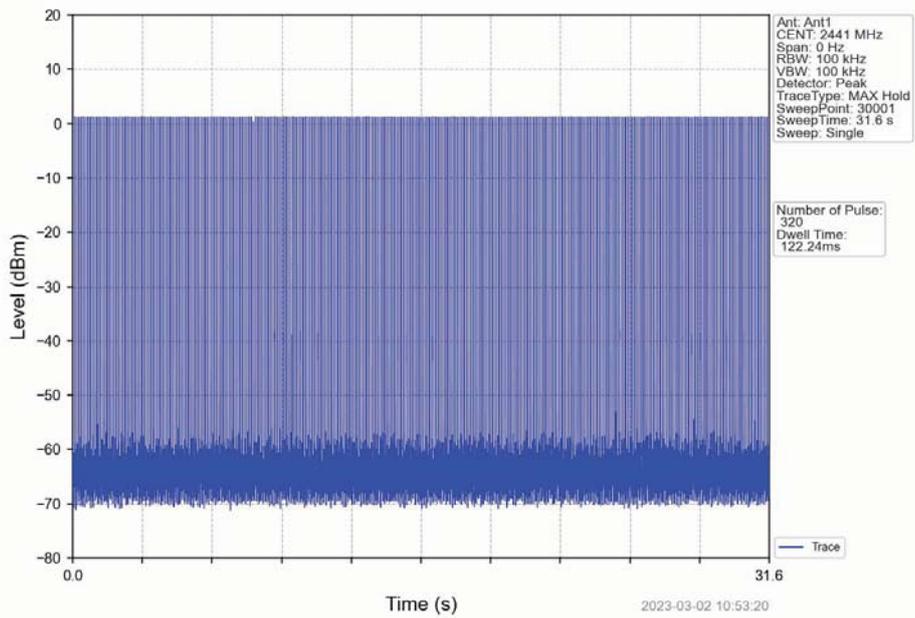
Pi/4DQPSK\_2DH5\_HOPP\_Ant2\_NTNV



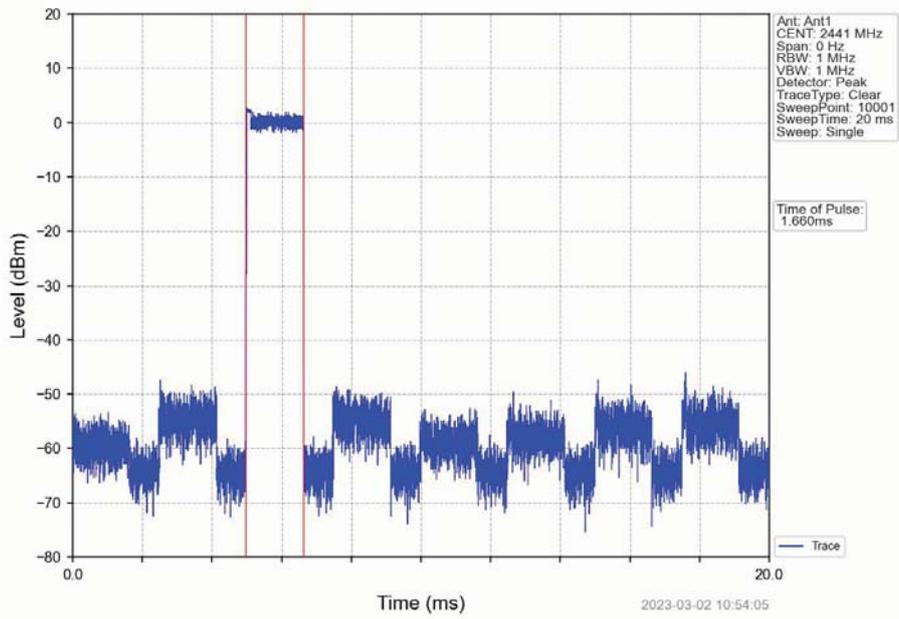
8DPSK\_3DH1\_HOPP\_Ant2\_NTNV



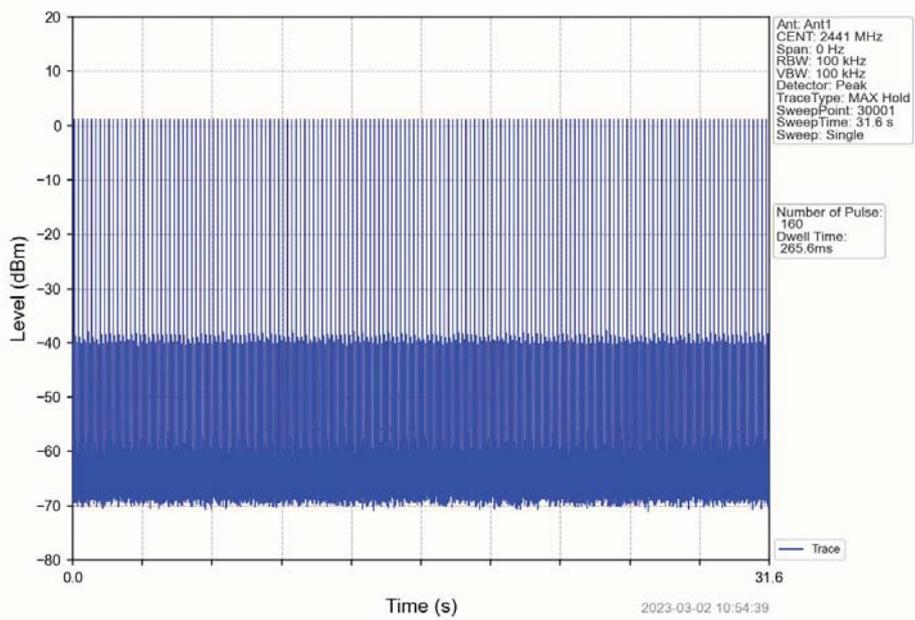
8DPSK\_3DH1\_HOPP\_Ant2\_NTNV



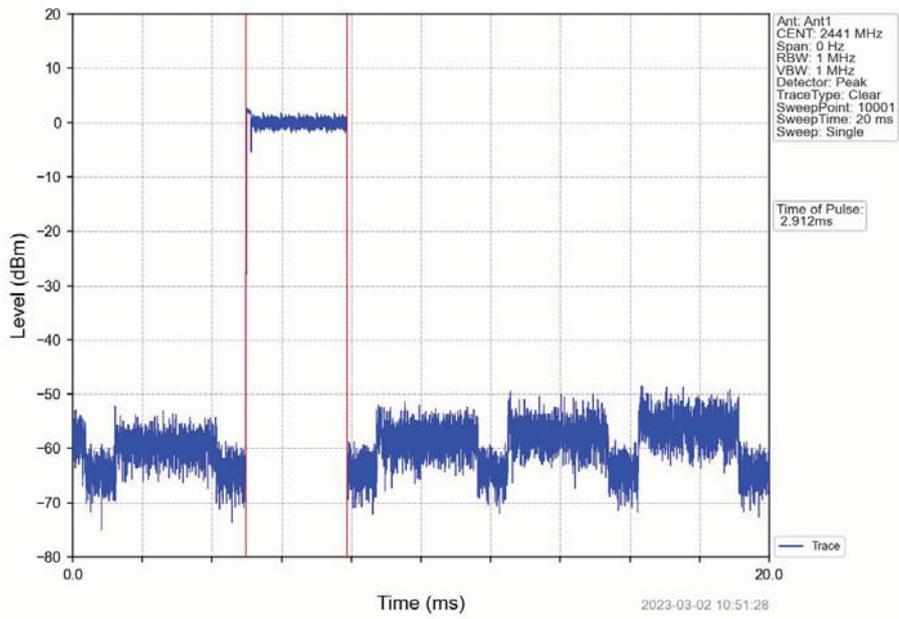
8DPSK\_3DH3\_HOPP\_Ant2\_NTNV



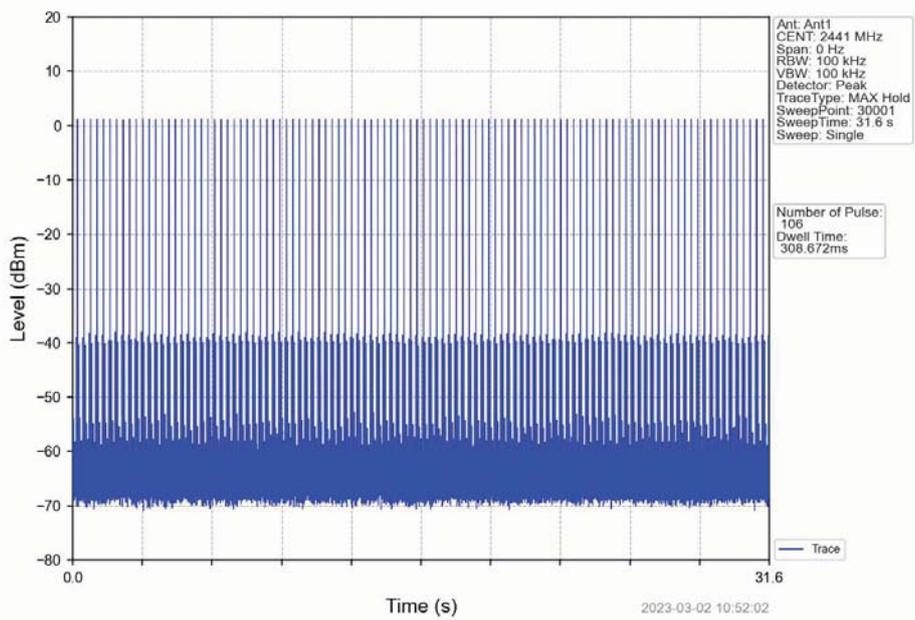
8DPSK\_3DH3\_HOPP\_Ant2\_NTNV



8DPSK\_3DH5\_HOPP\_Ant2\_NTNV



8DPSK\_3DH5\_HOPP\_Ant2\_NTNV



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

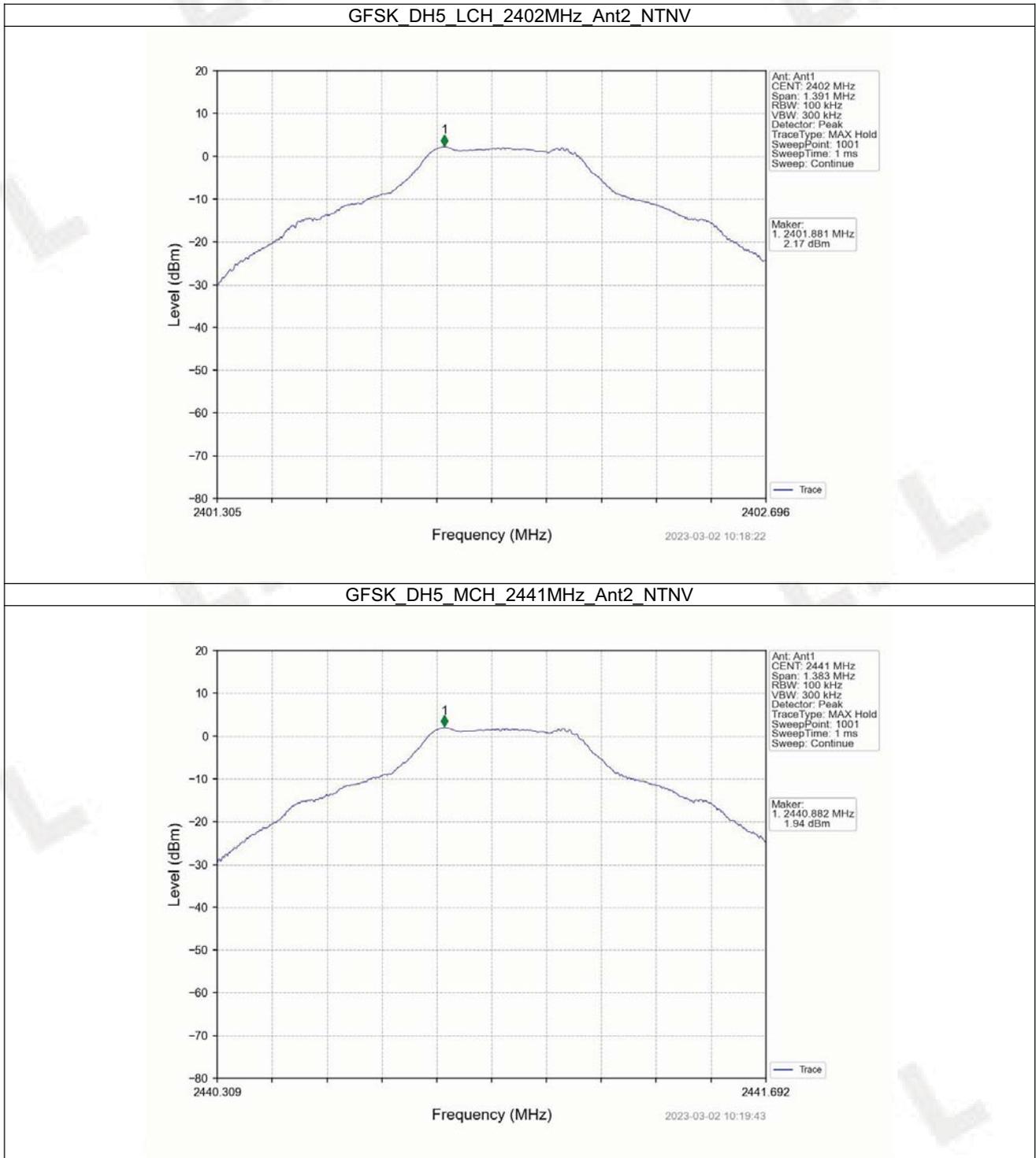
### 6.1 Ref

#### 6.1.1 Test Result

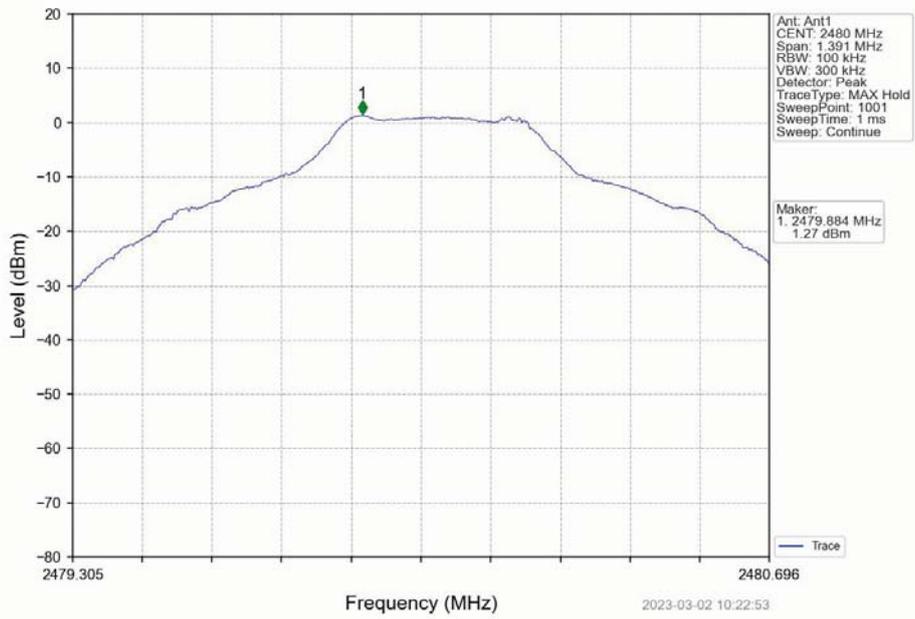
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	2	2.17
		2441	DH5	2	1.94
		2480	DH5	2	1.27
Pi/4DQPSK	SISO	2402	2DH5	2	1.99
		2441	2DH5	2	1.65
		2480	2DH5	2	1.03
8DPSK	SISO	2402	3DH5	2	2.14
		2441	3DH5	2	1.78
		2480	3DH5	2	1.11

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.

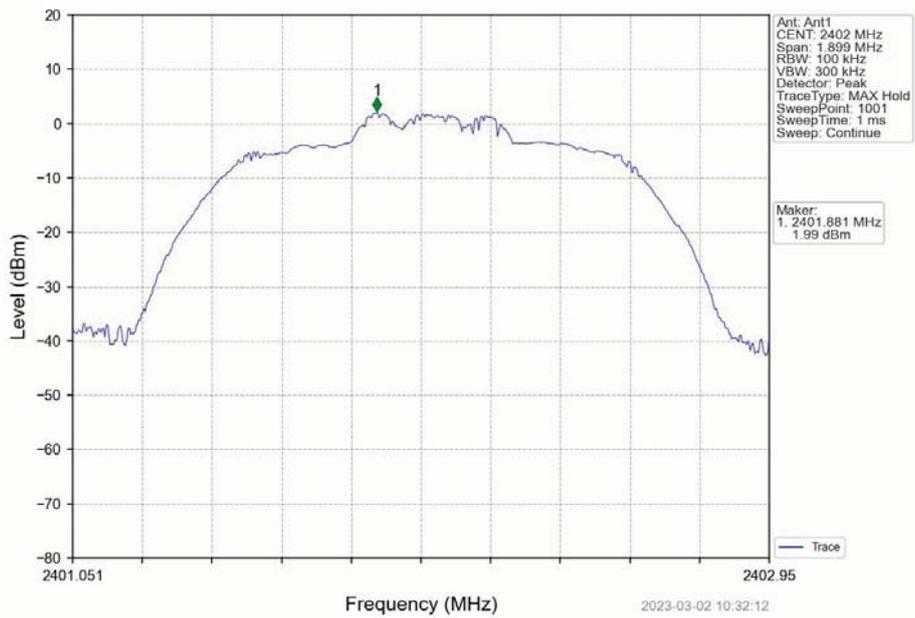
6.1.2 Test Graph



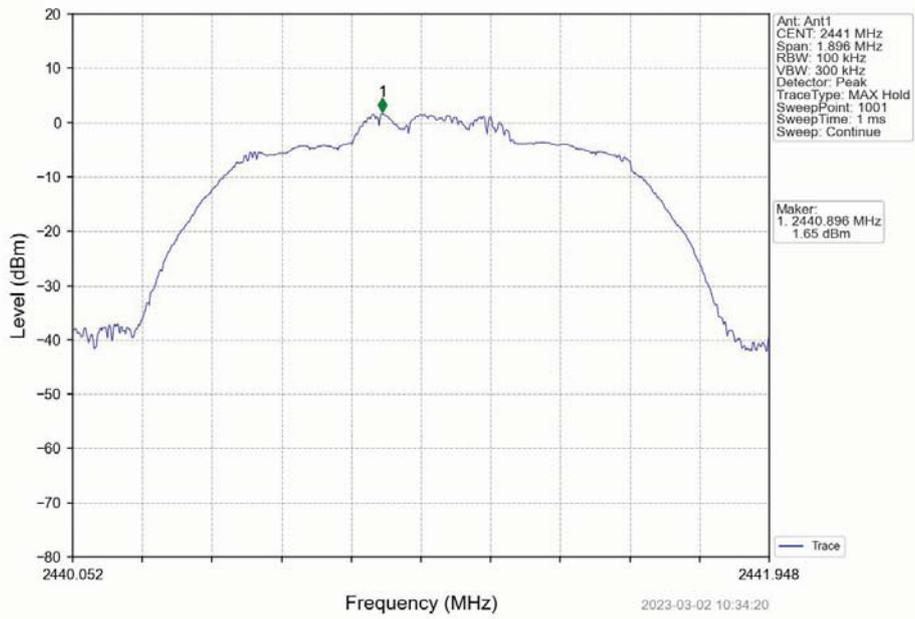
GFSK\_DH5\_HCH\_2480MHz\_Ant2\_NTNV



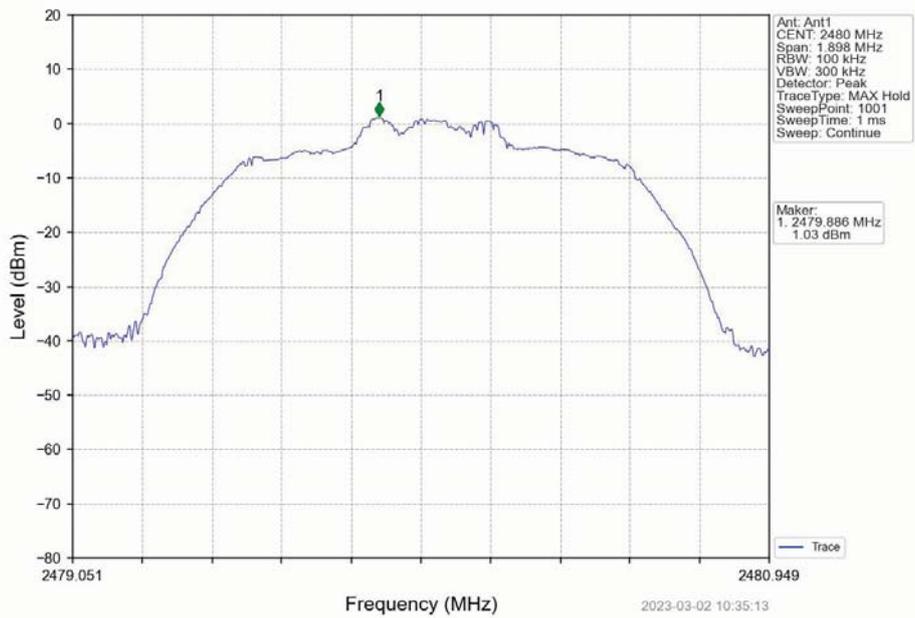
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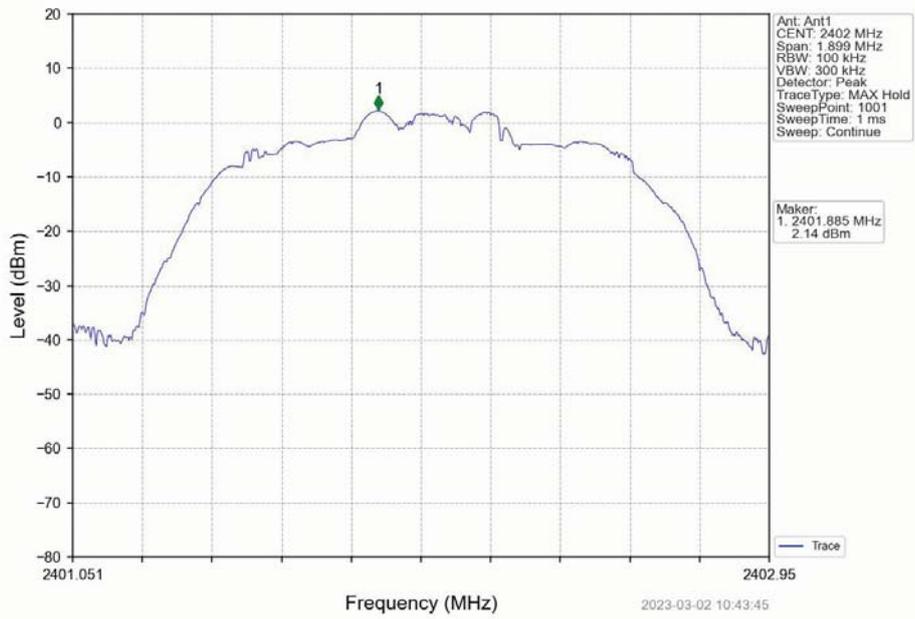
Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant2\_NTNV



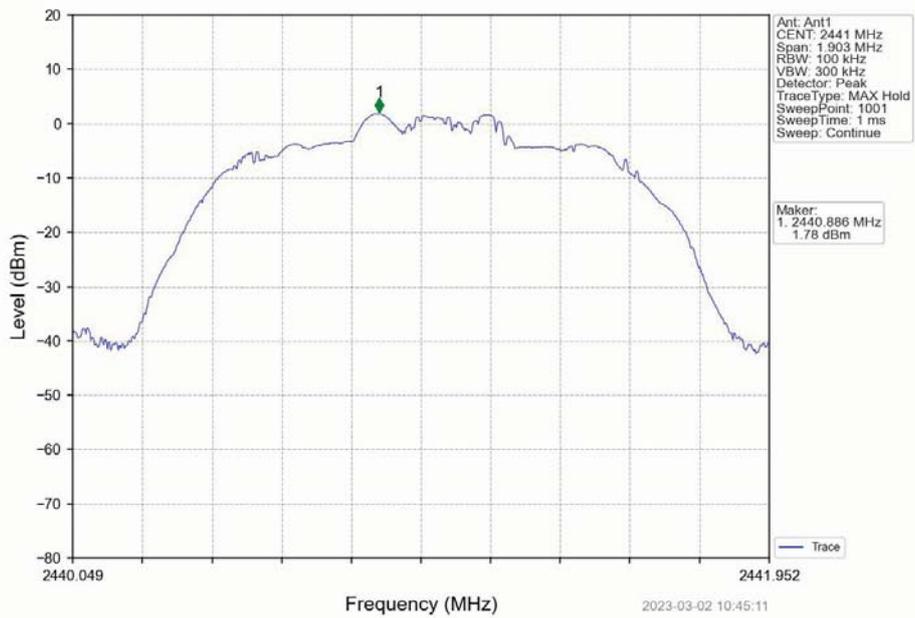
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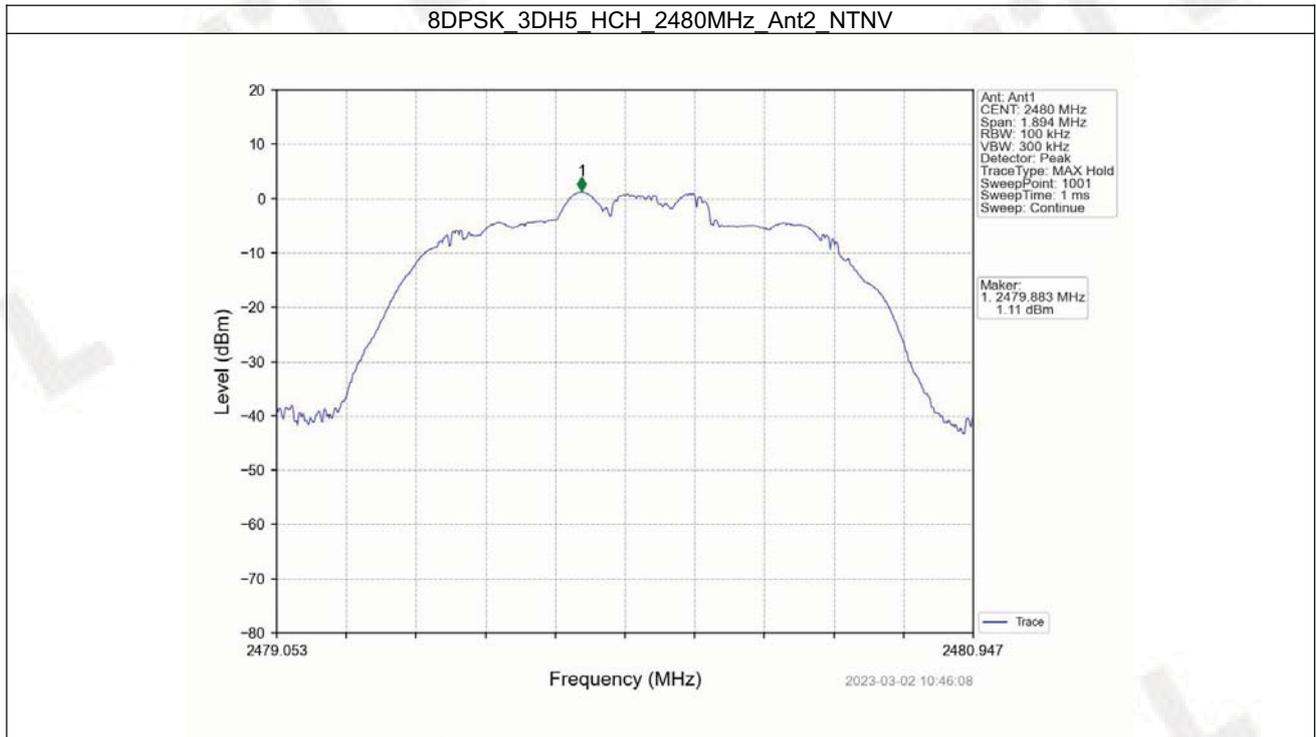


8DPSK\_3DH5\_LCH\_2402MHz\_Ant2\_NTNV



8DPSK\_3DH5\_MCH\_2441MHz\_Ant2\_NTNV





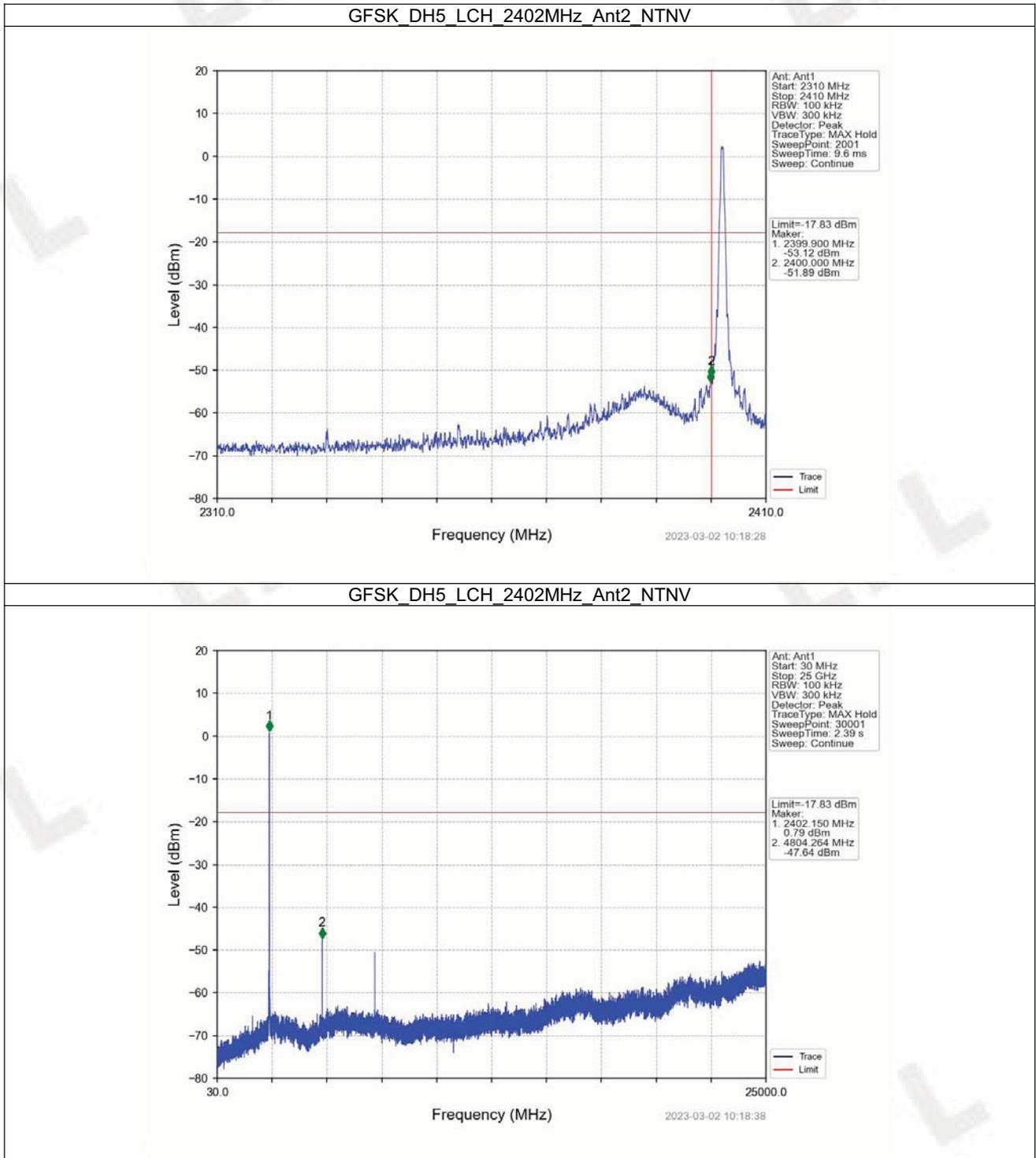
## 6.2 CSE

## 6.2.1 Test Result

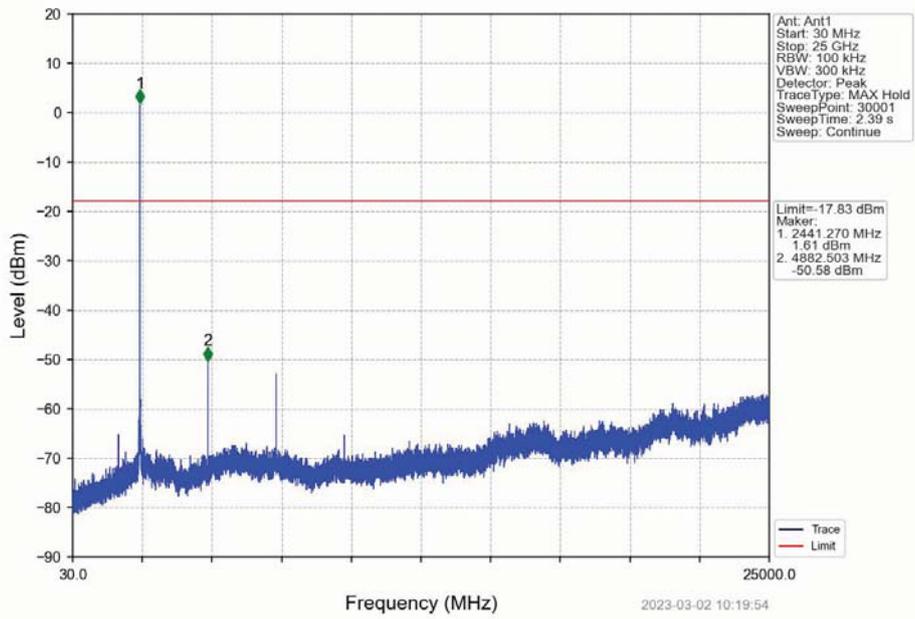
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	2	2.17	-17.83	Pass
		2441	DH5	2	2.17	-17.83	Pass
		2480	DH5	2	2.17	-17.83	Pass
		HOPP	DH5	2	2.17	-17.83	Pass
Pi/4DQPSK	SISO	2402	2DH5	2	1.99	-18.01	Pass
		2441	2DH5	2	1.99	-18.01	Pass
		2480	2DH5	2	1.99	-18.01	Pass
		HOPP	2DH5	2	1.99	-18.01	Pass
8DPSK	SISO	2402	3DH5	2	2.14	-17.86	Pass
		2441	3DH5	2	2.14	-17.86	Pass
		2480	3DH5	2	2.14	-17.86	Pass
		HOPP	3DH5	2	2.14	-17.86	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.

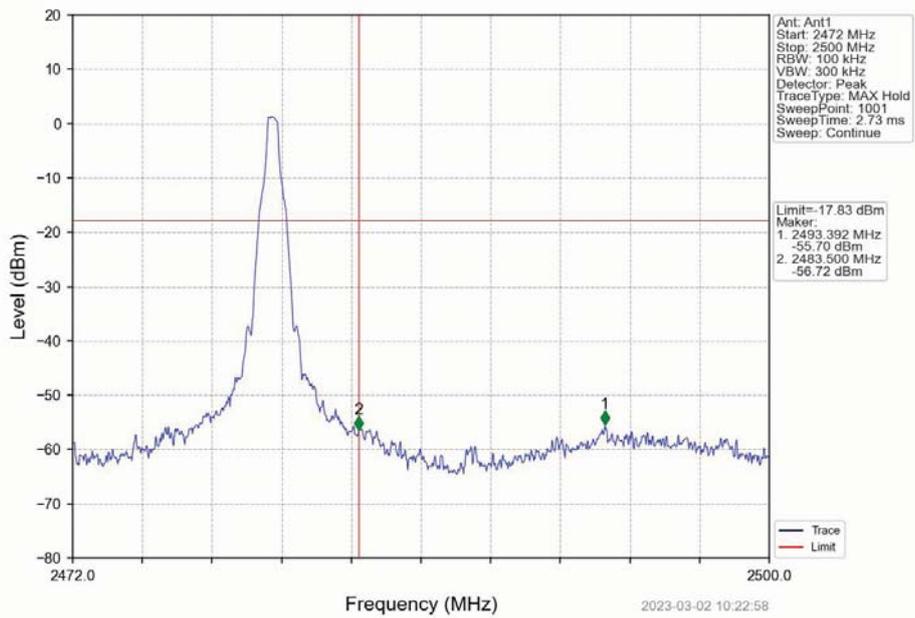
6.2.2 Test Graph



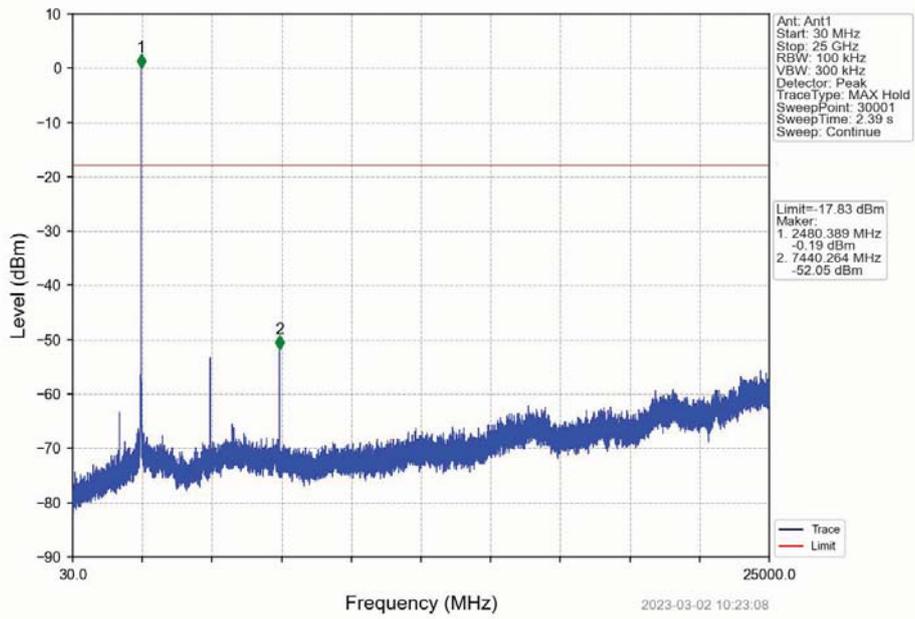
GFSK\_DH5\_MCH\_2441MHz\_Ant2\_NTNV



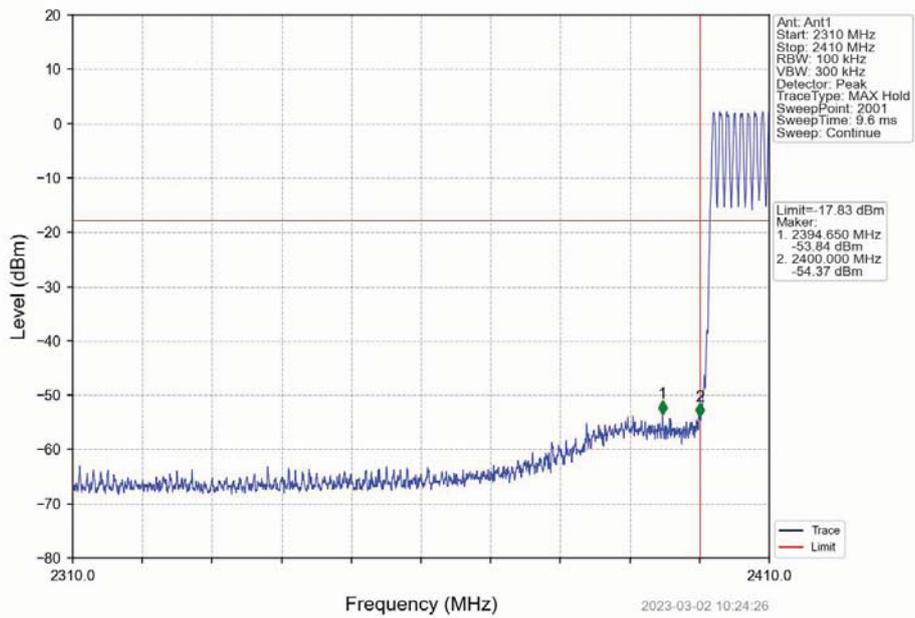
GFSK\_DH5\_HCH\_2480MHz\_Ant2\_NTNV



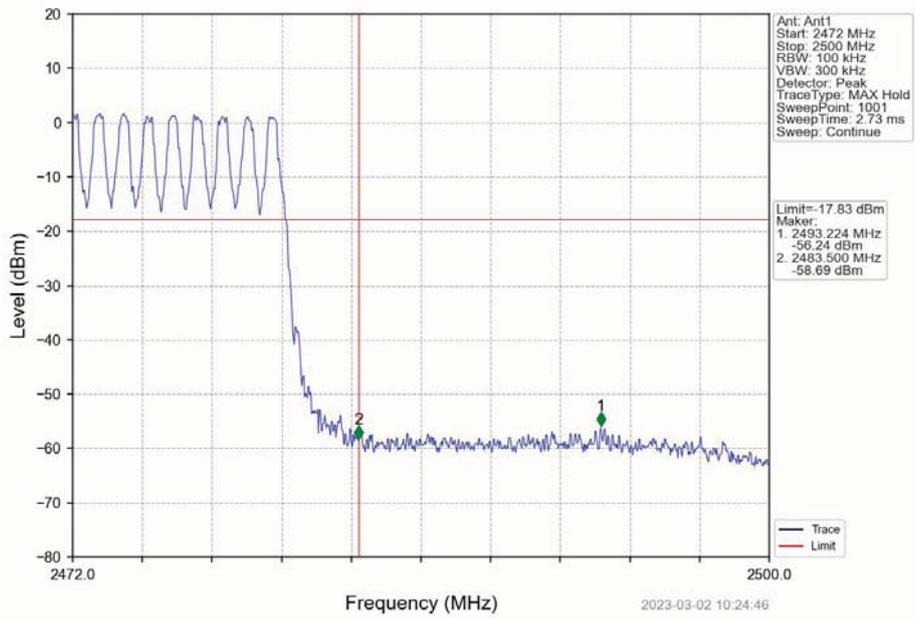
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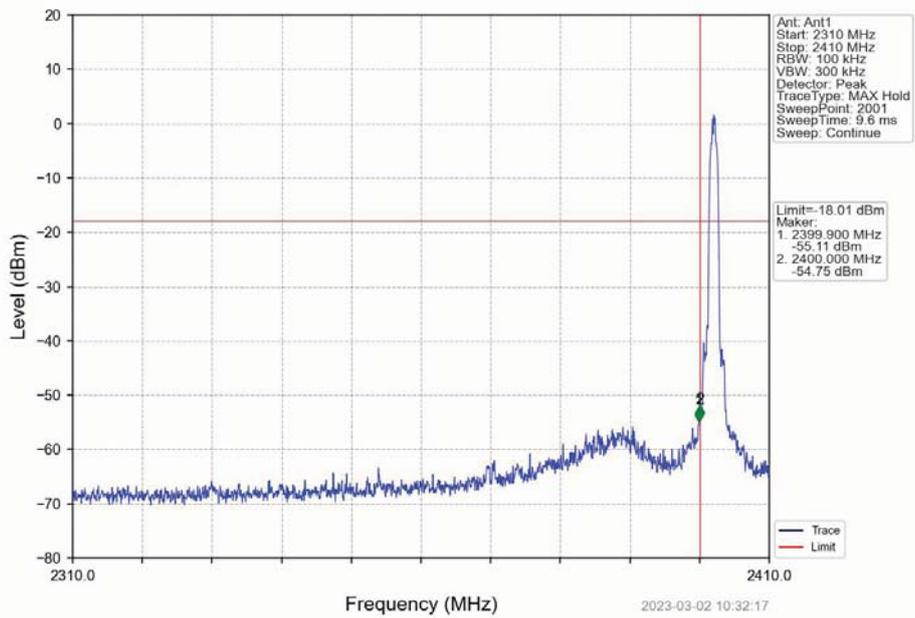
GFSK\_DH5\_HOPP\_Ant2\_NTNV



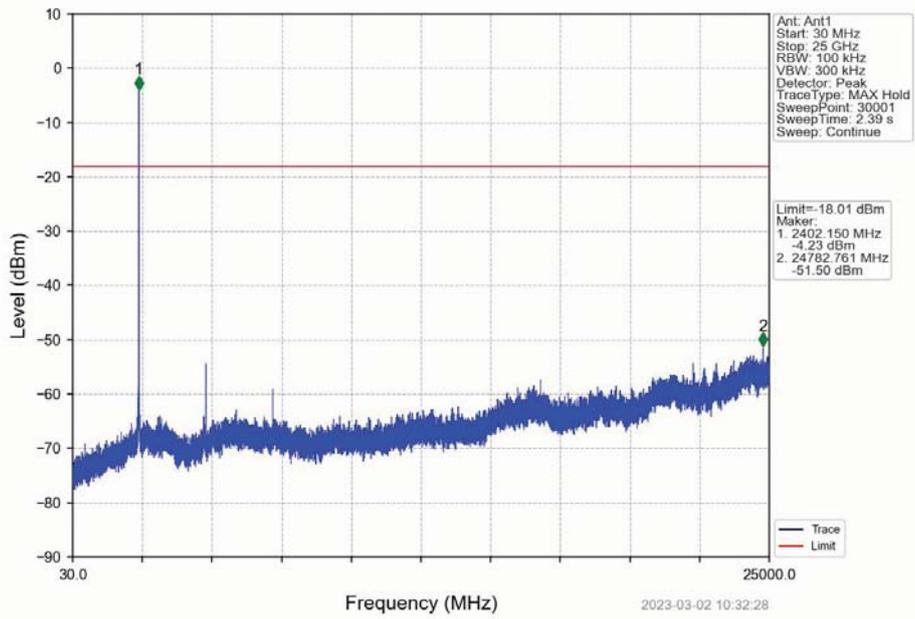
GFSK\_DH5\_HOPP\_Ant2\_NTNV



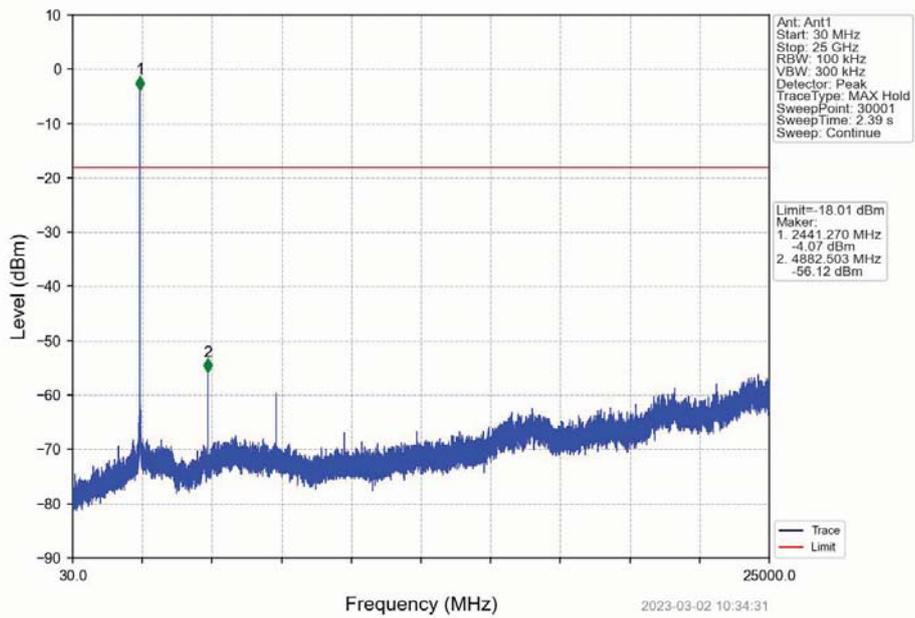
Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant2\_NTNV



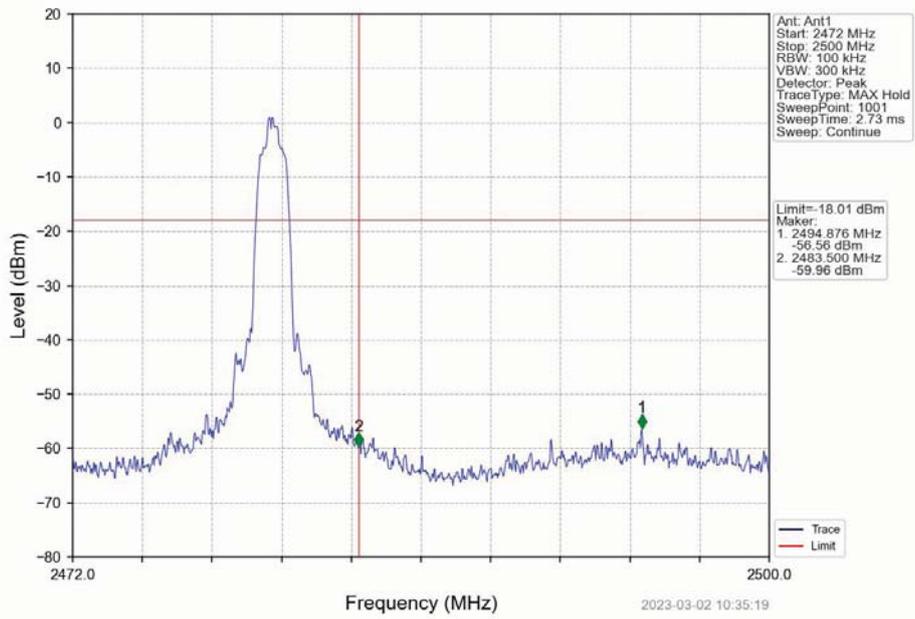
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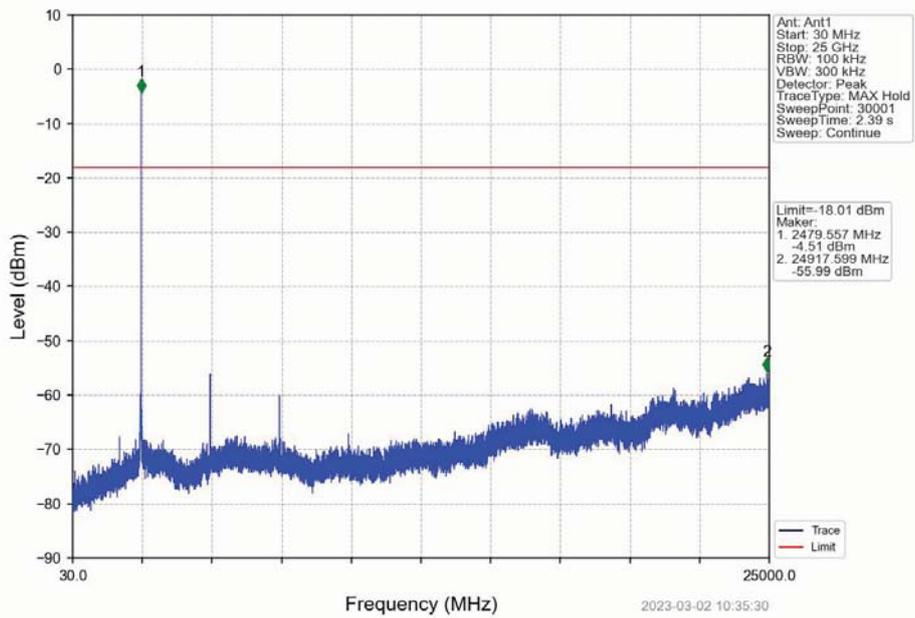
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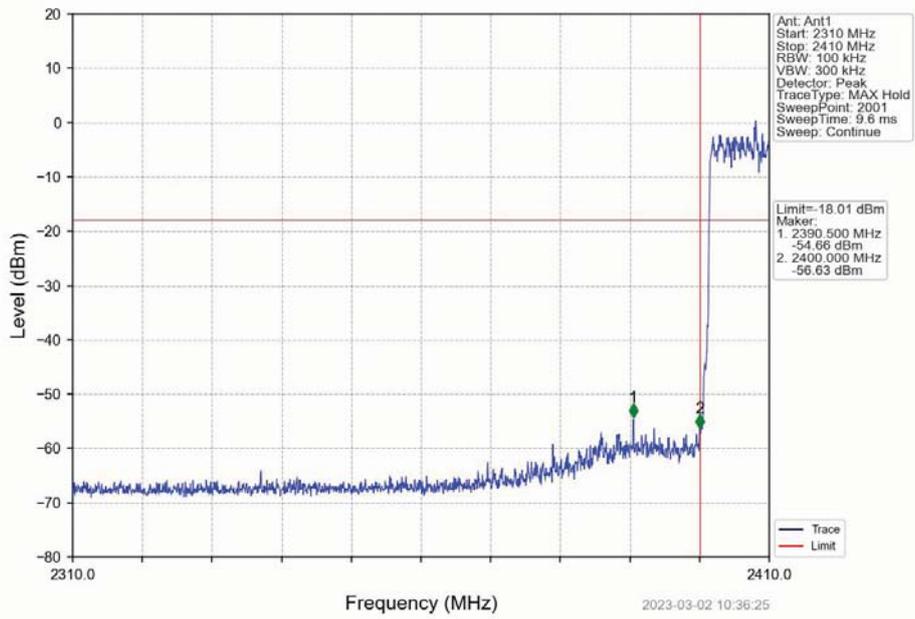
Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant2\_NTNV



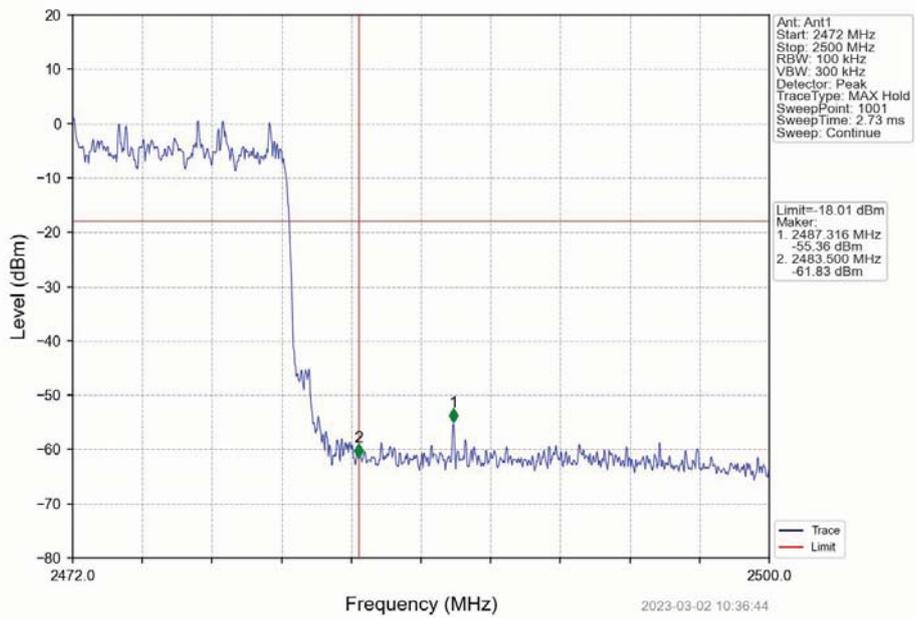
Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant2\_NTNV



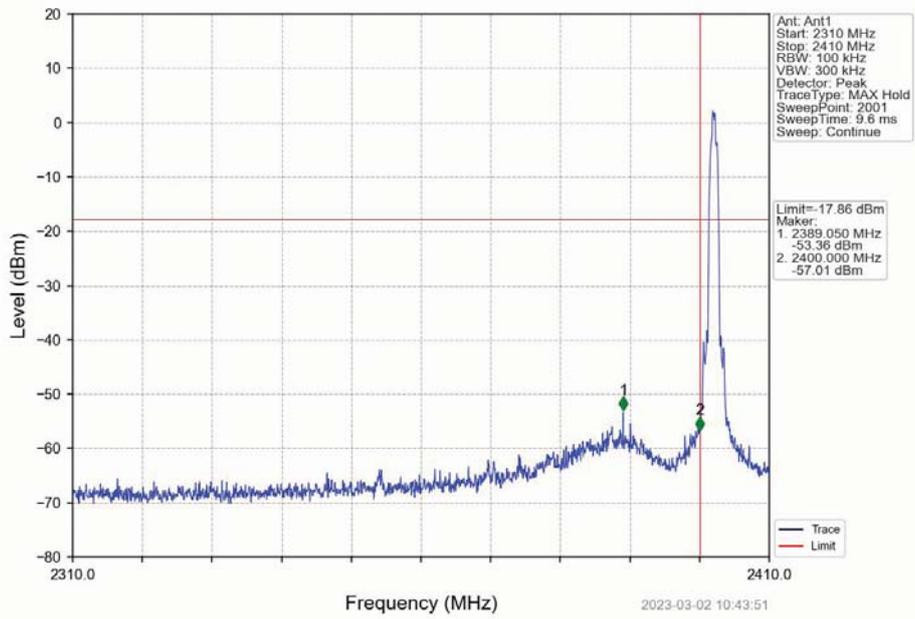
Pi/4DQPSK\_2DH5\_HOPP\_Ant2\_NTNV



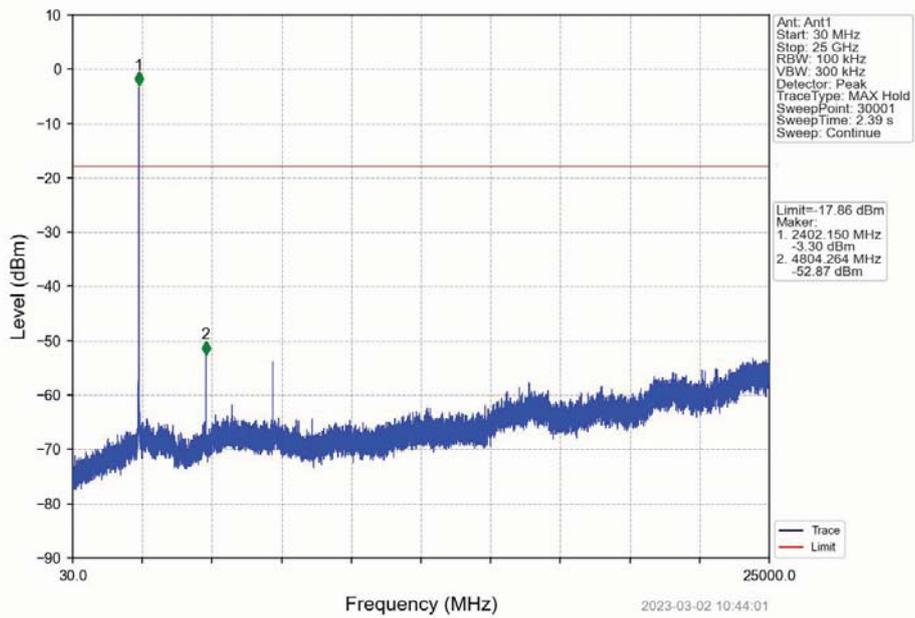
Pi/4DQPSK\_2DH5\_HOPP\_Ant2\_NTNV



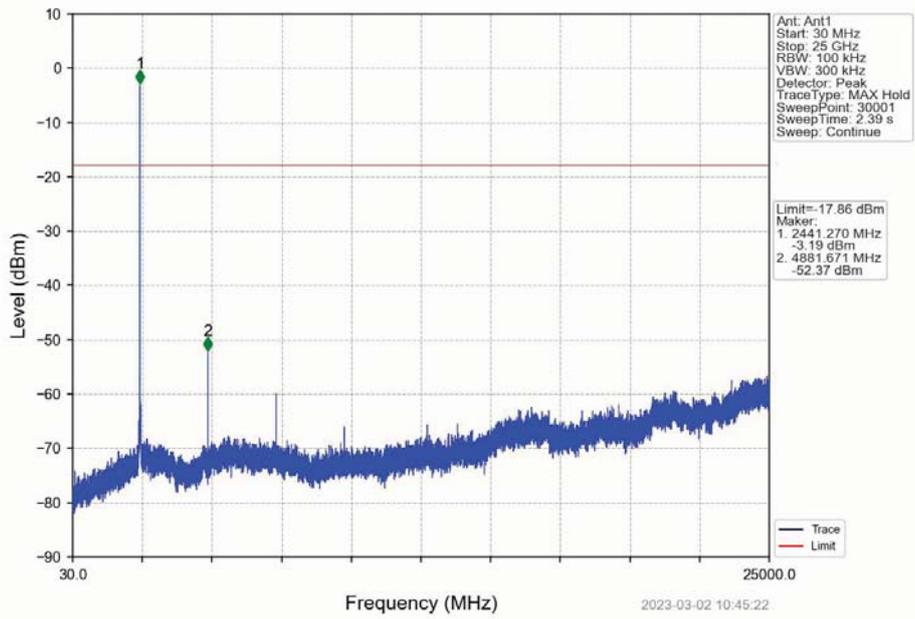
8DPSK\_3DH5\_LCH\_2402MHz\_Ant2\_NTNV



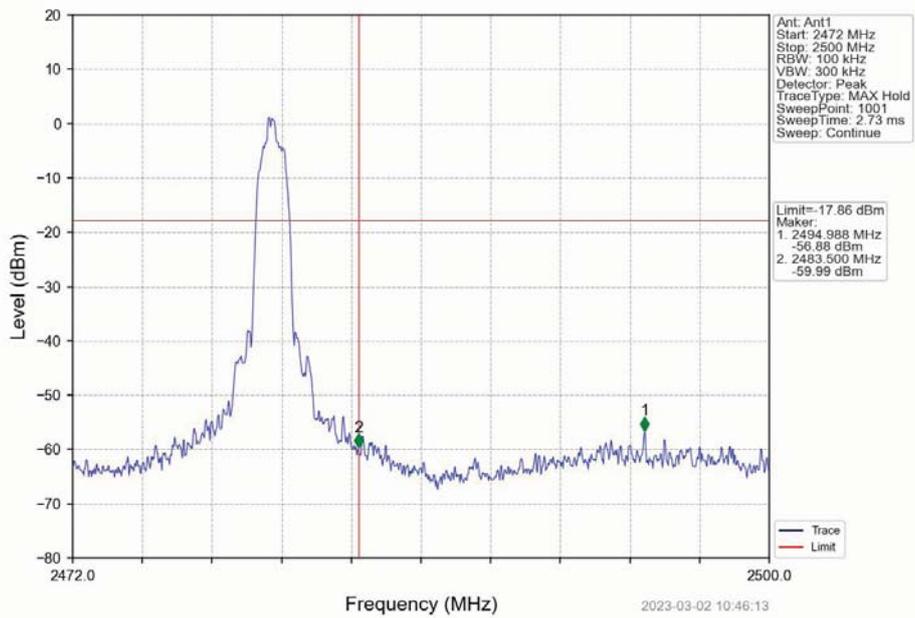
8DPSK\_3DH5\_LCH\_2402MHz\_Ant2\_NTNV



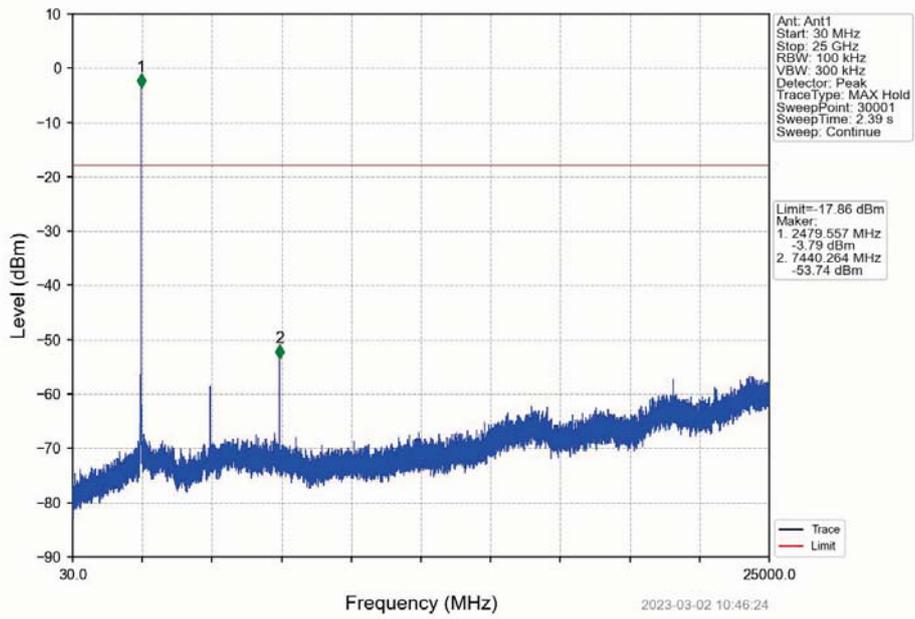
8DPSK\_3DH5\_MCH\_2441MHz\_Ant2\_NTNV



8DPSK\_3DH5\_HCH\_2480MHz\_Ant2\_NTNV



8DPSK\_3DH5\_HCH\_2480MHz\_Ant2\_NTNV



8DPSK\_3DH5\_HOPP\_Ant2\_NTNV

