



Shenzhen CTL Testing Technology Co., Ltd.

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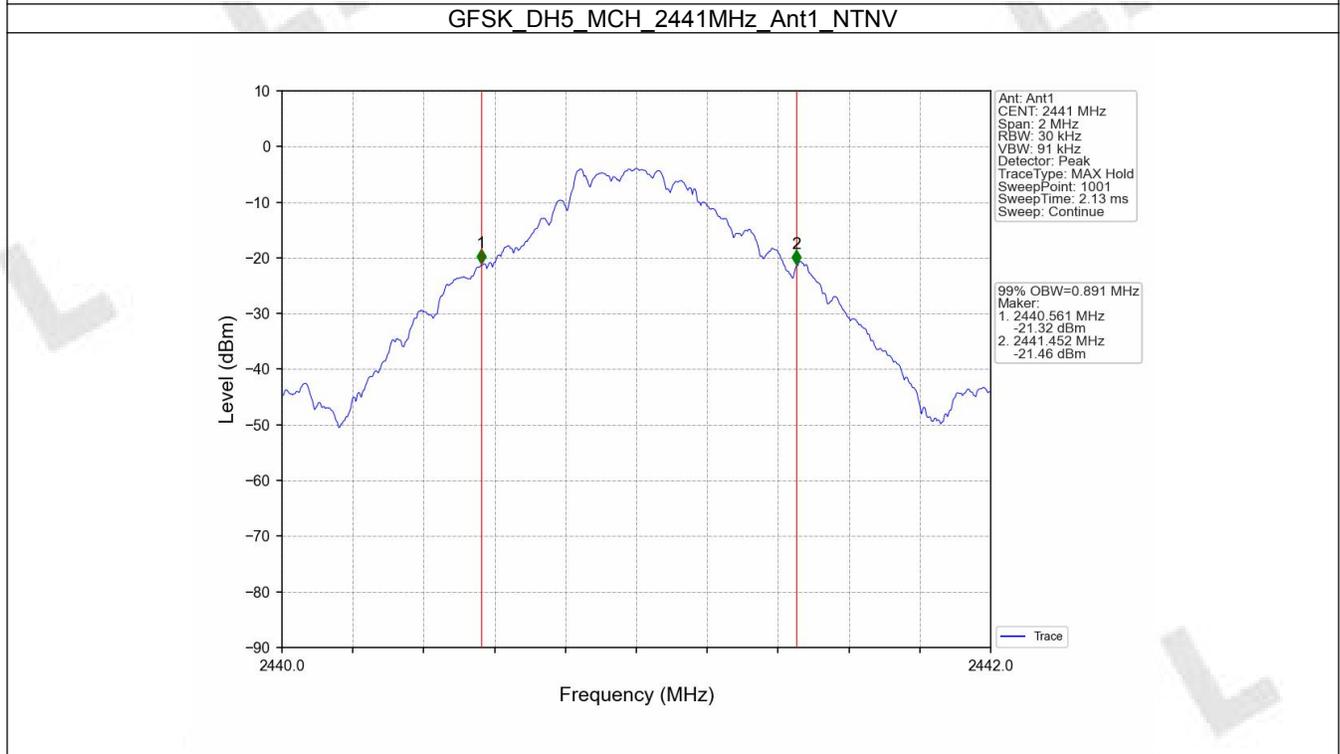
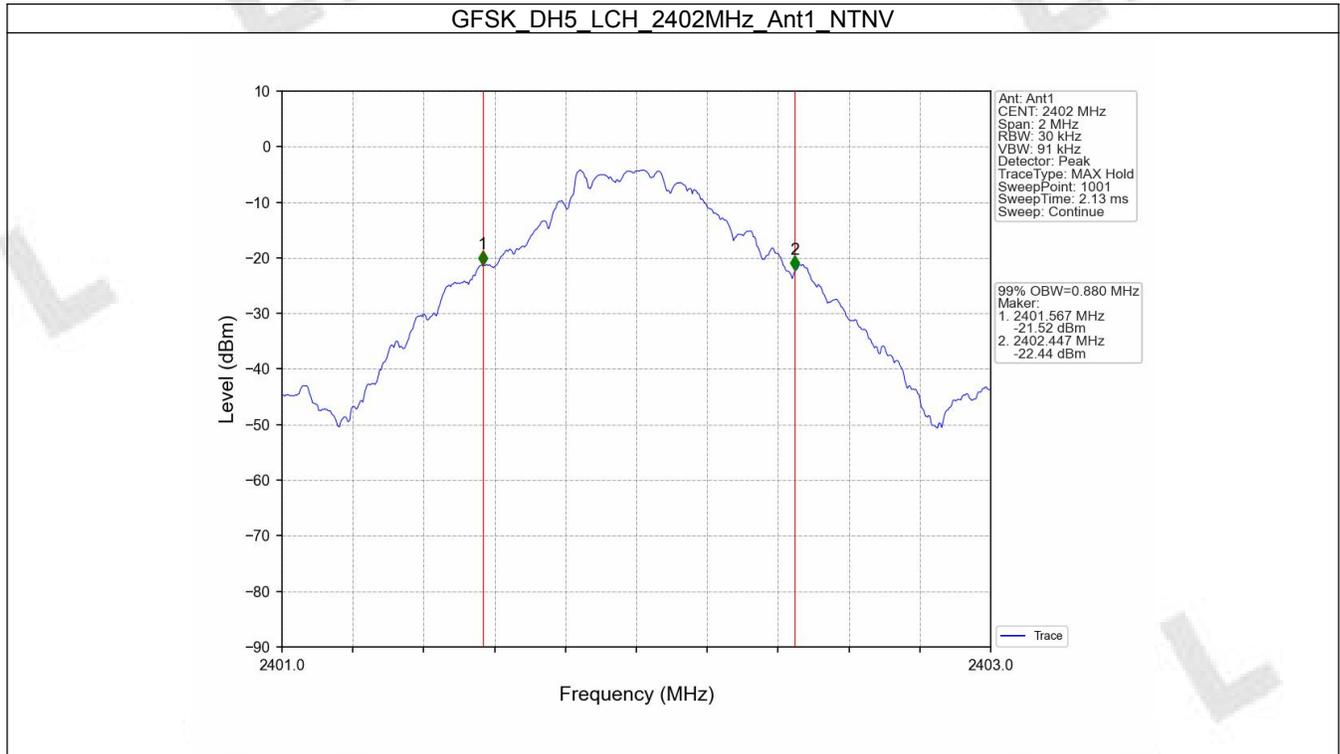
## 1. Bandwidth

### 1.1 OBW

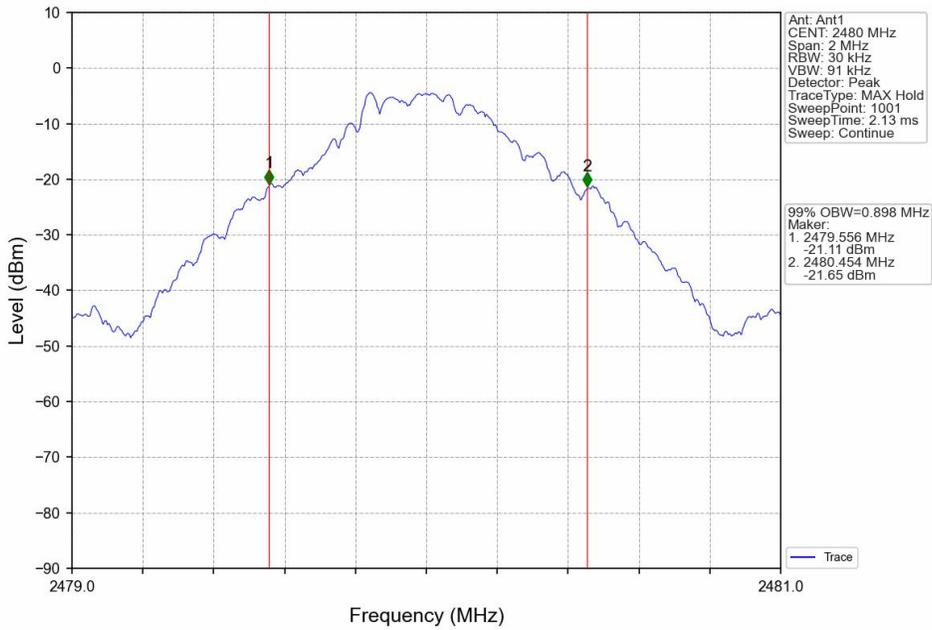
#### 1.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz)	Verdict
					Result	
GFSK	SISO	2402	DH5	1	0.880	Pass
		2441	DH5	1	0.891	Pass
		2480	DH5	1	0.898	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.177	Pass
		2441	2DH5	1	1.182	Pass
		2480	2DH5	1	1.188	Pass
8DPSK	SISO	2402	3DH5	1	1.184	Pass
		2441	3DH5	1	1.186	Pass
		2480	3DH5	1	1.192	Pass

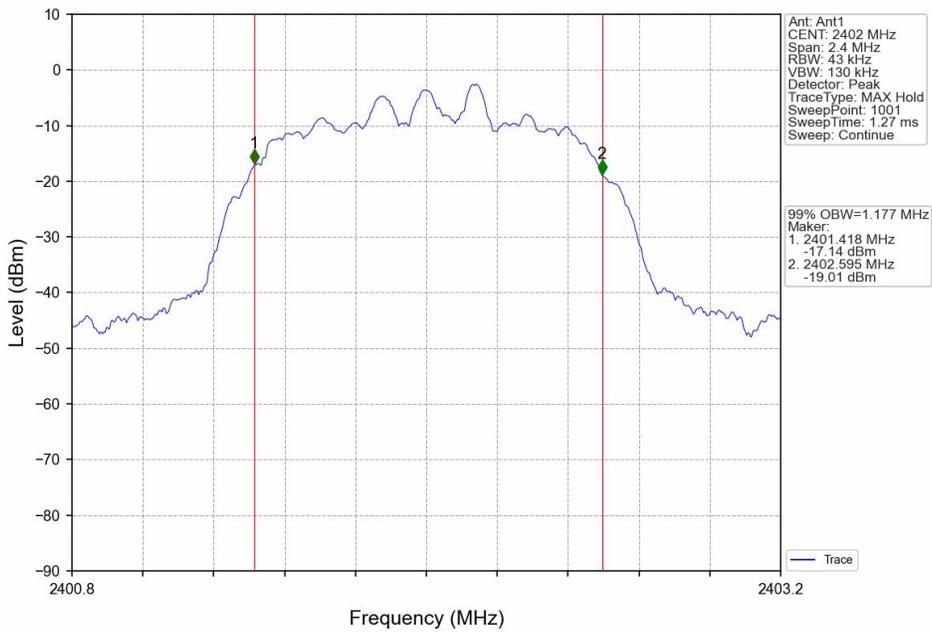
1.1.2 Test Graph



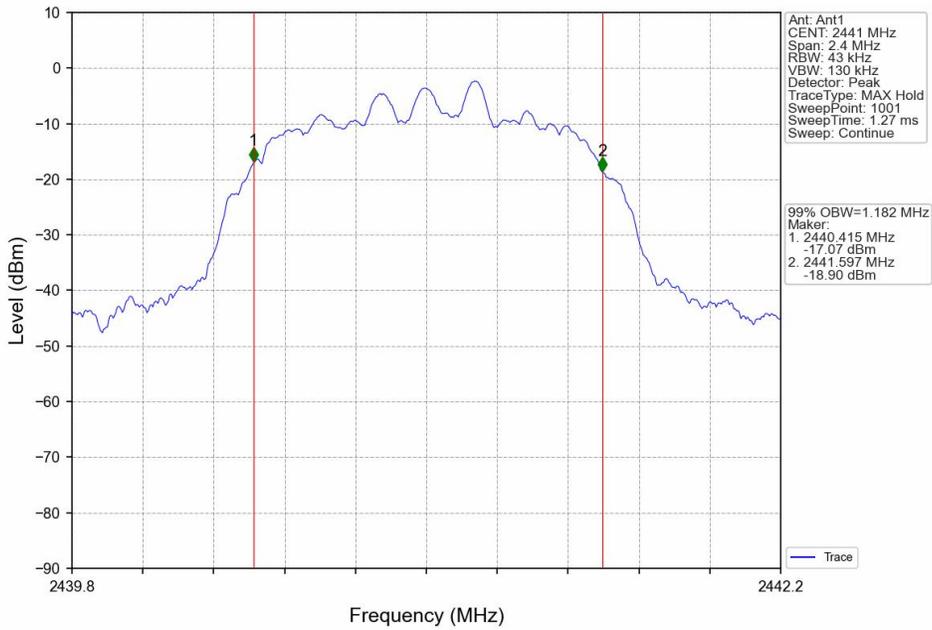
GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



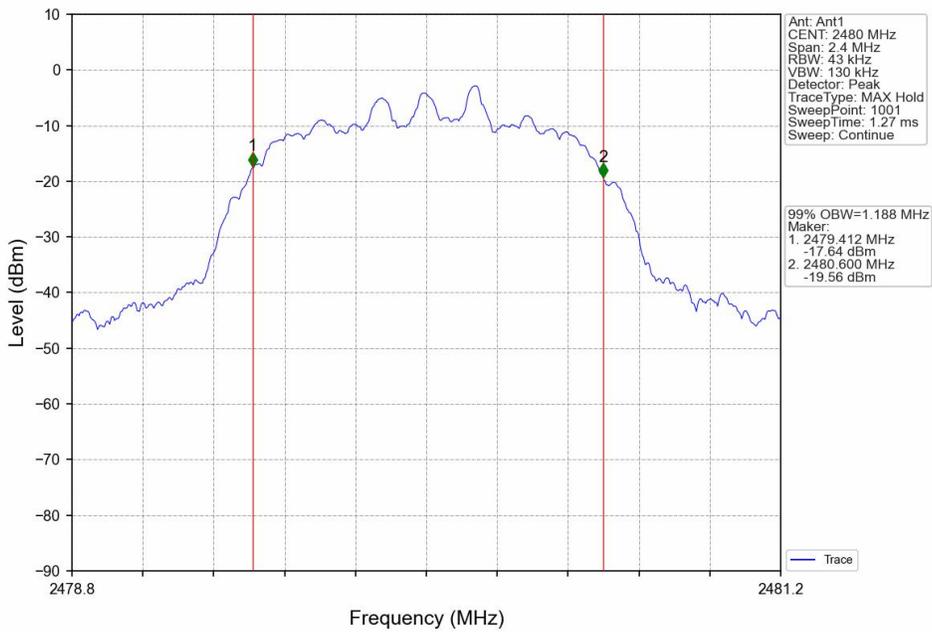
PI/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



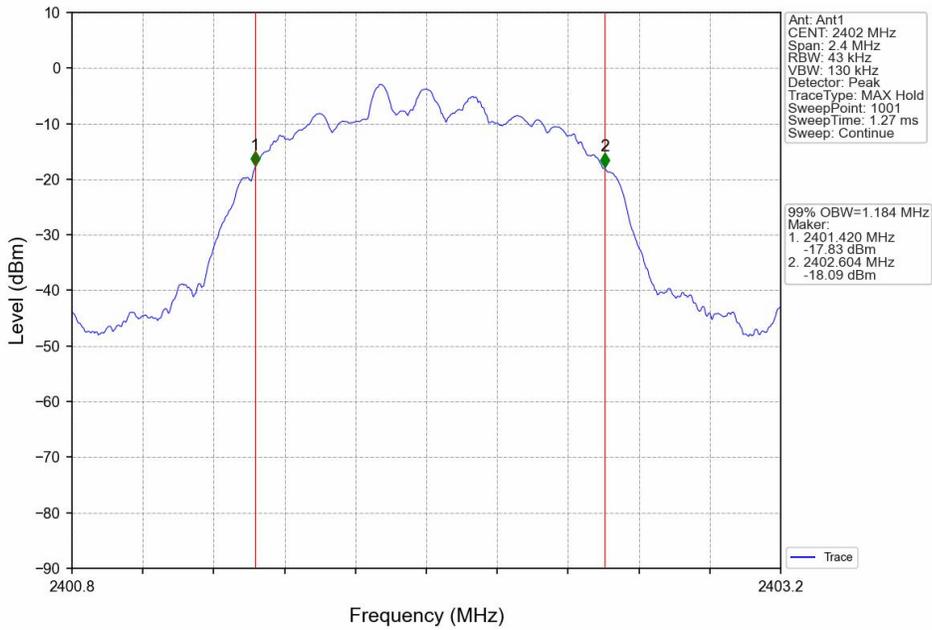
Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



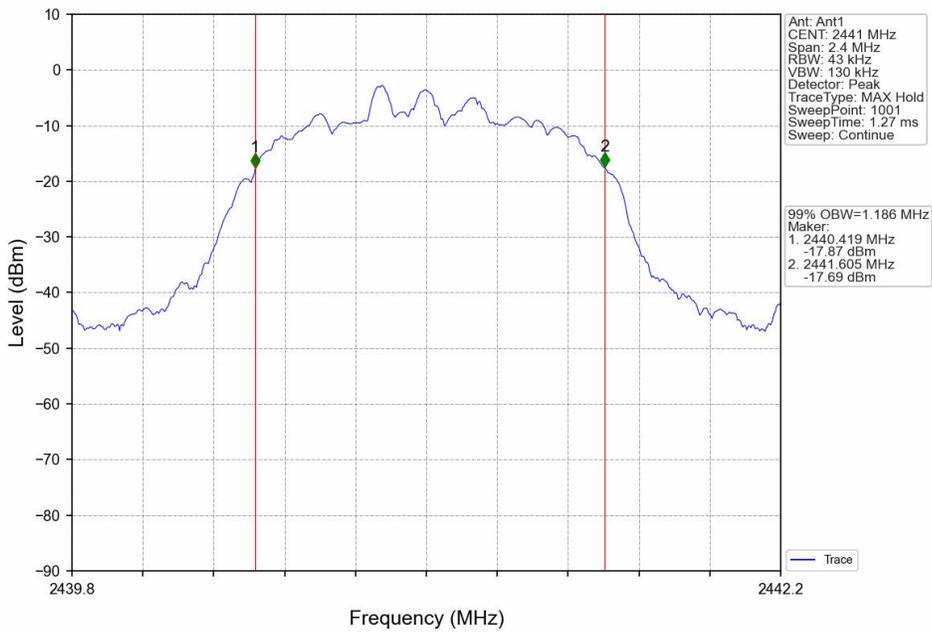
Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV

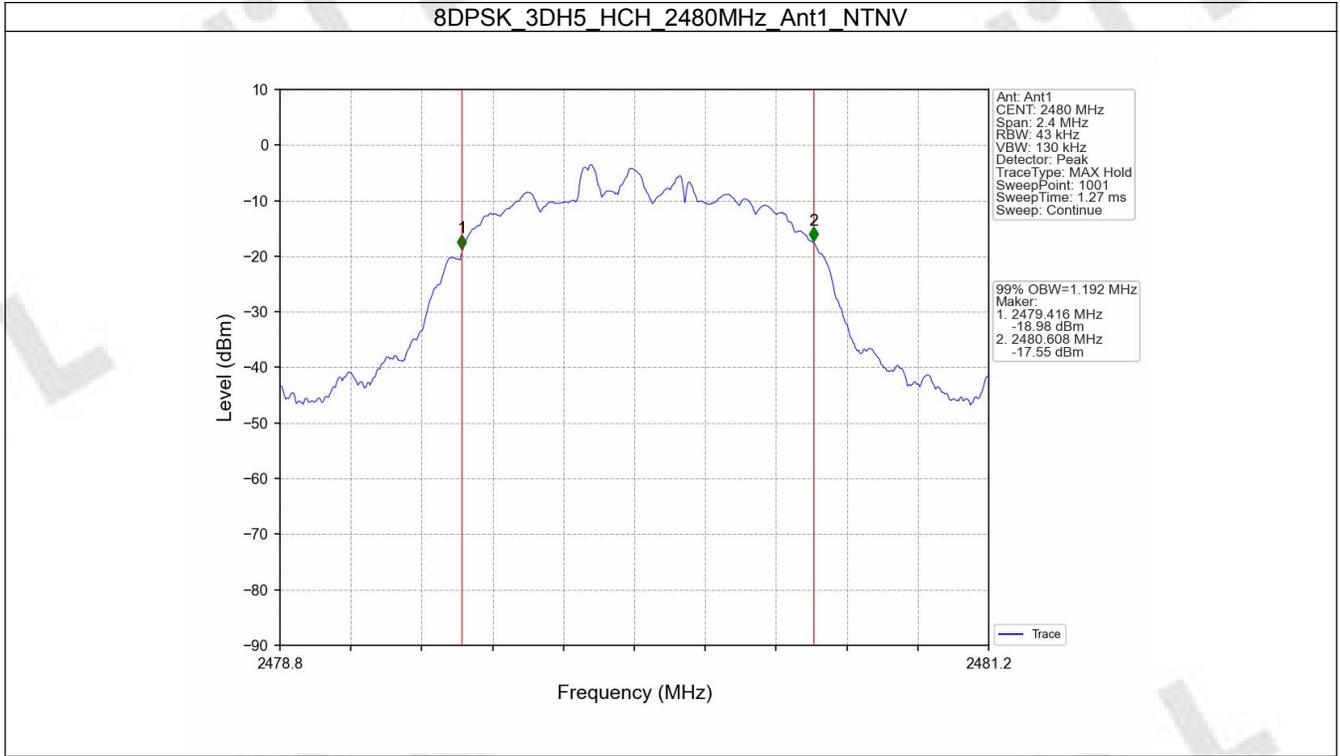


8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



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



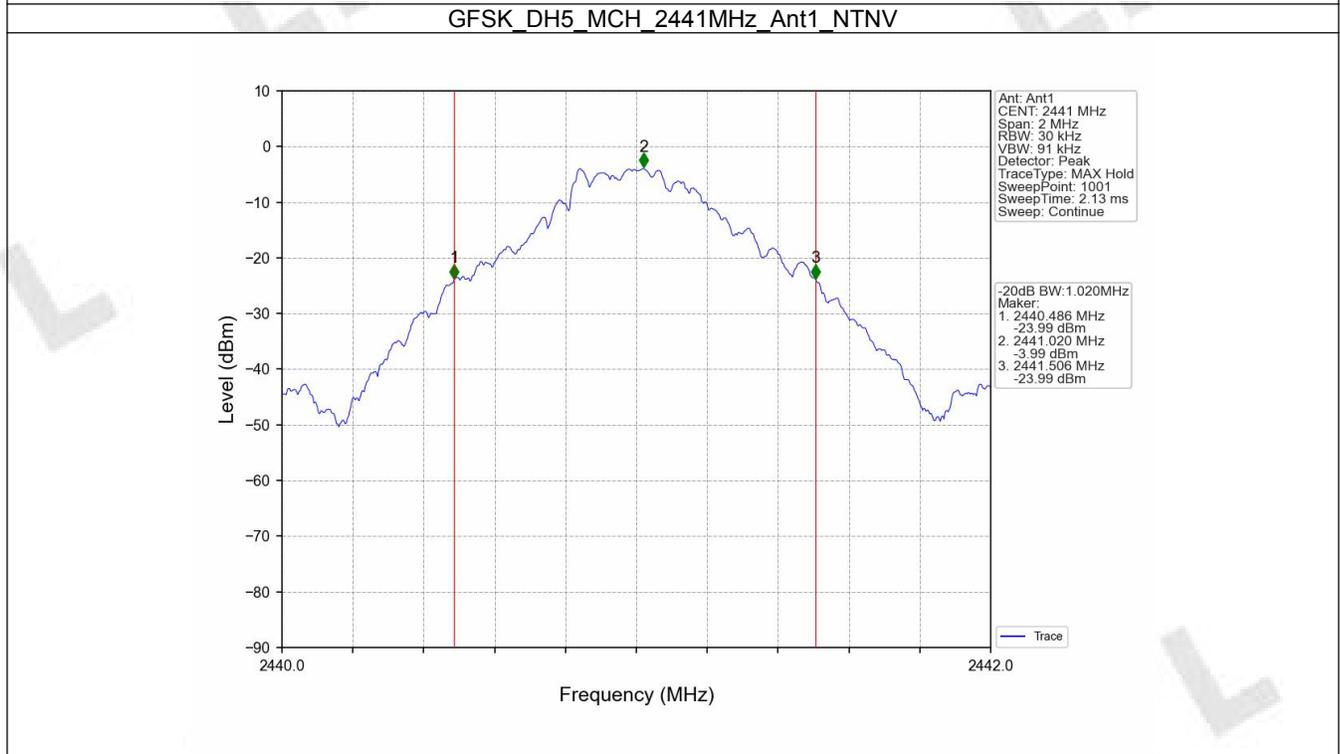
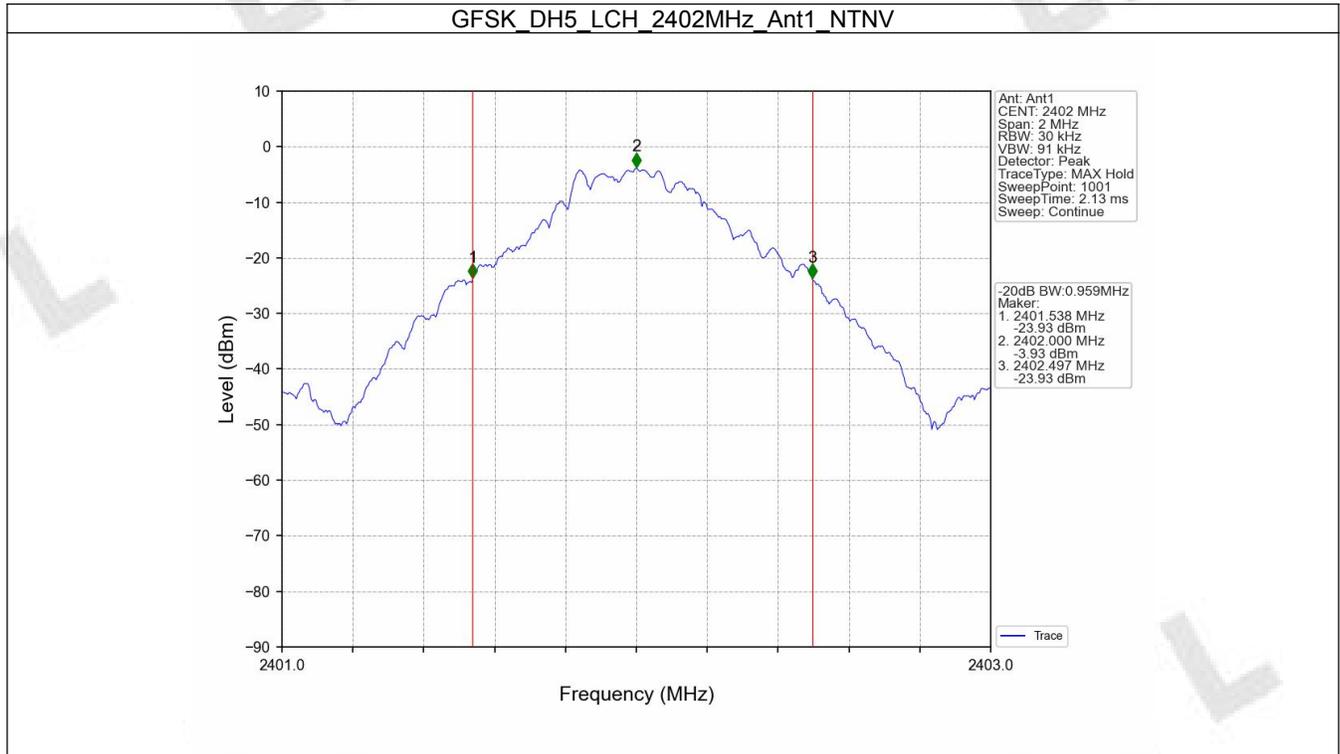


## 1.2 20dB BW

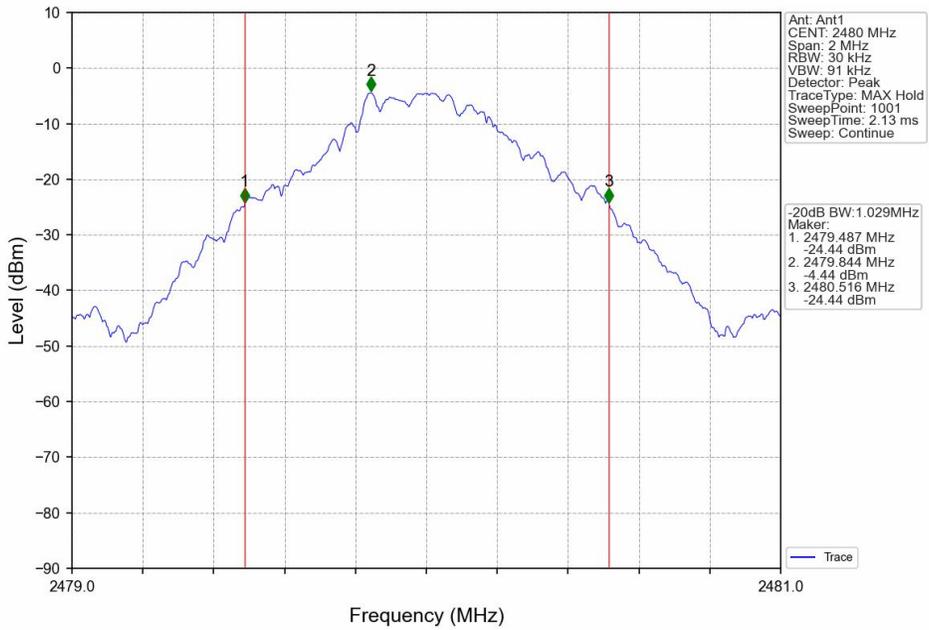
## 1.2.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)	Verdict
					Result	
GFSK	SISO	2402	DH5	1	0.959	Pass
		2441	DH5	1	1.020	Pass
		2480	DH5	1	1.029	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.297	Pass
		2441	2DH5	1	1.297	Pass
		2480	2DH5	1	1.319	Pass
8DPSK	SISO	2402	3DH5	1	1.315	Pass
		2441	3DH5	1	1.315	Pass
		2480	3DH5	1	1.314	Pass

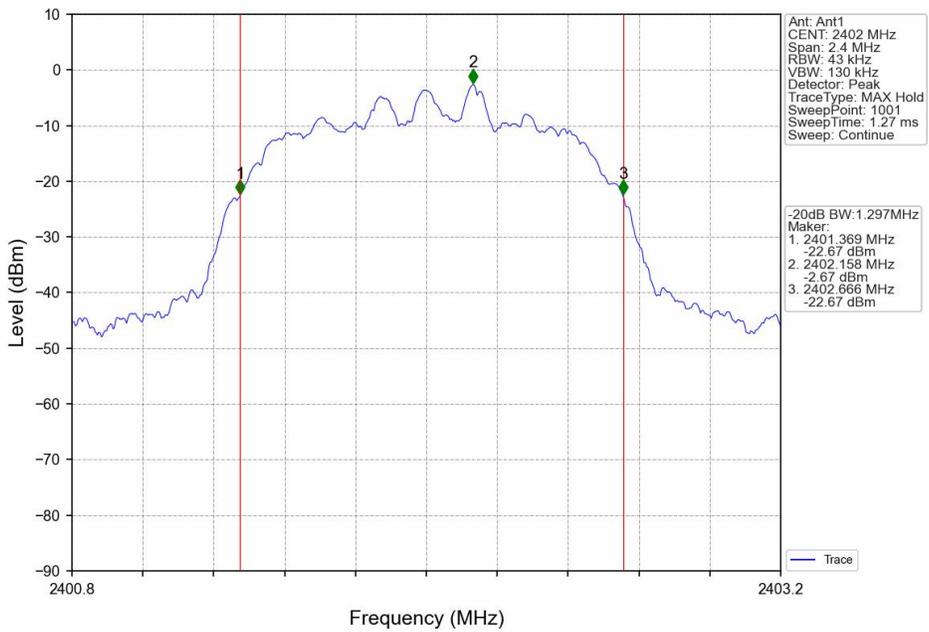
1.2.2 Test Graph



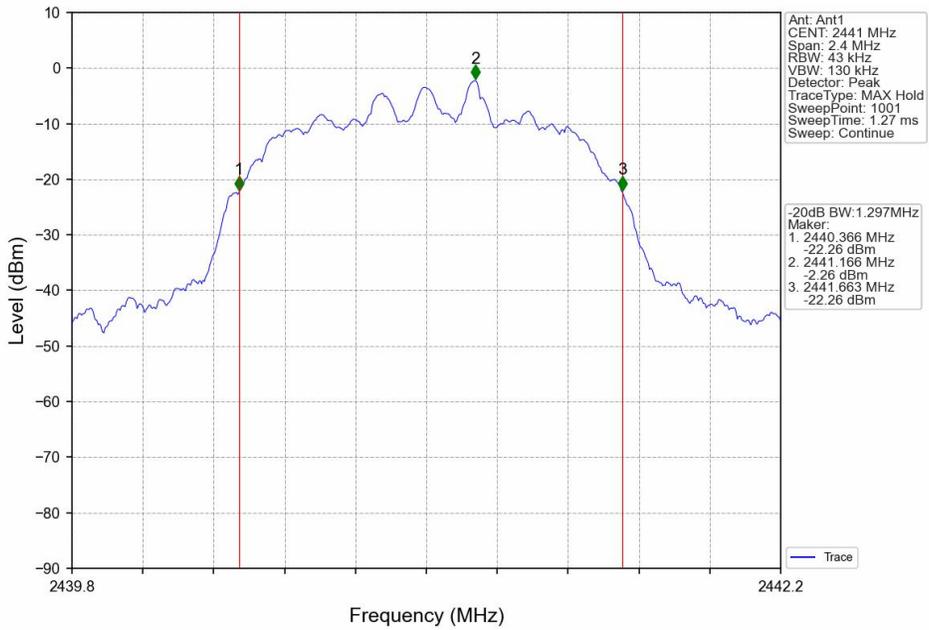
GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



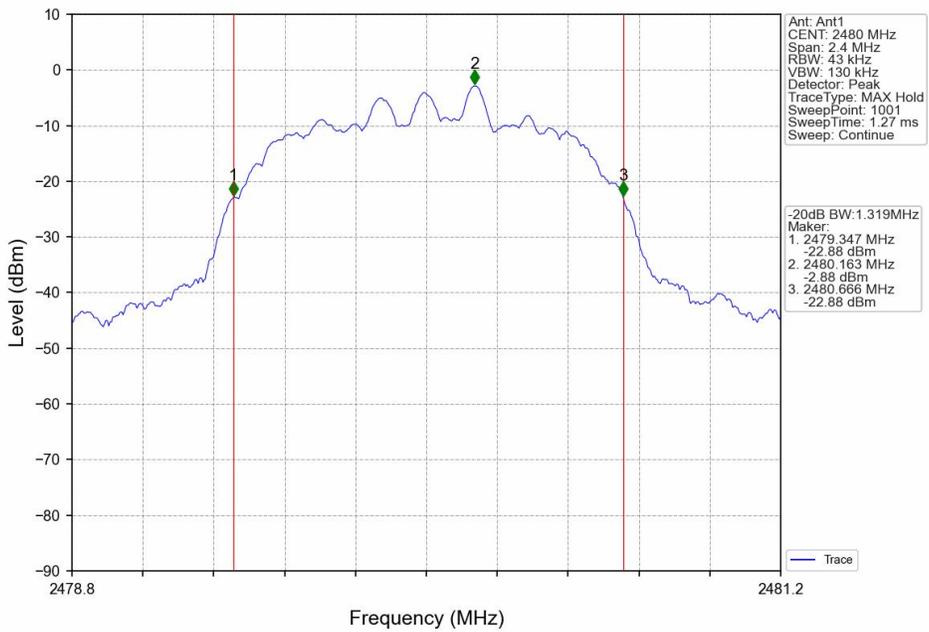
Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



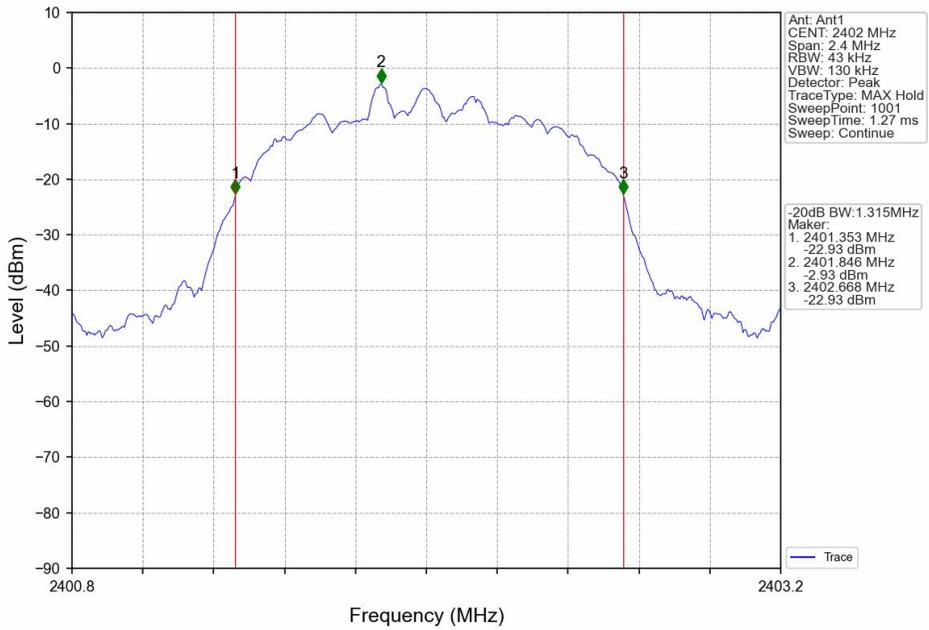
Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



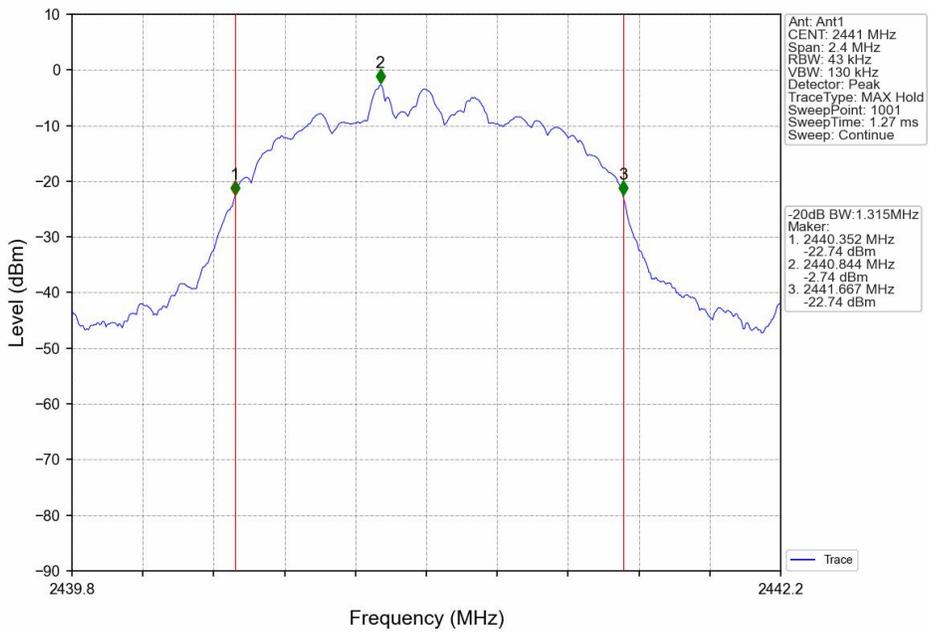
Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV

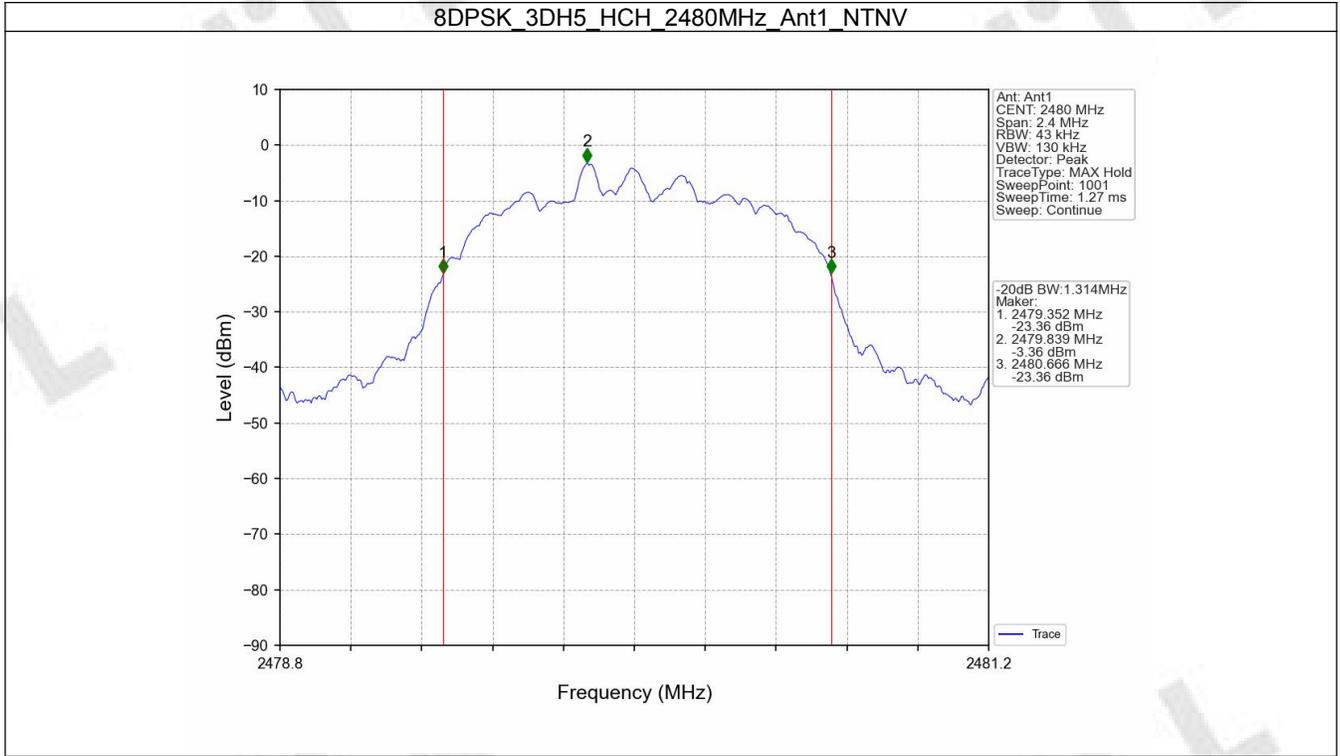


8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



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





## 2. Maximum Conducted Output Power

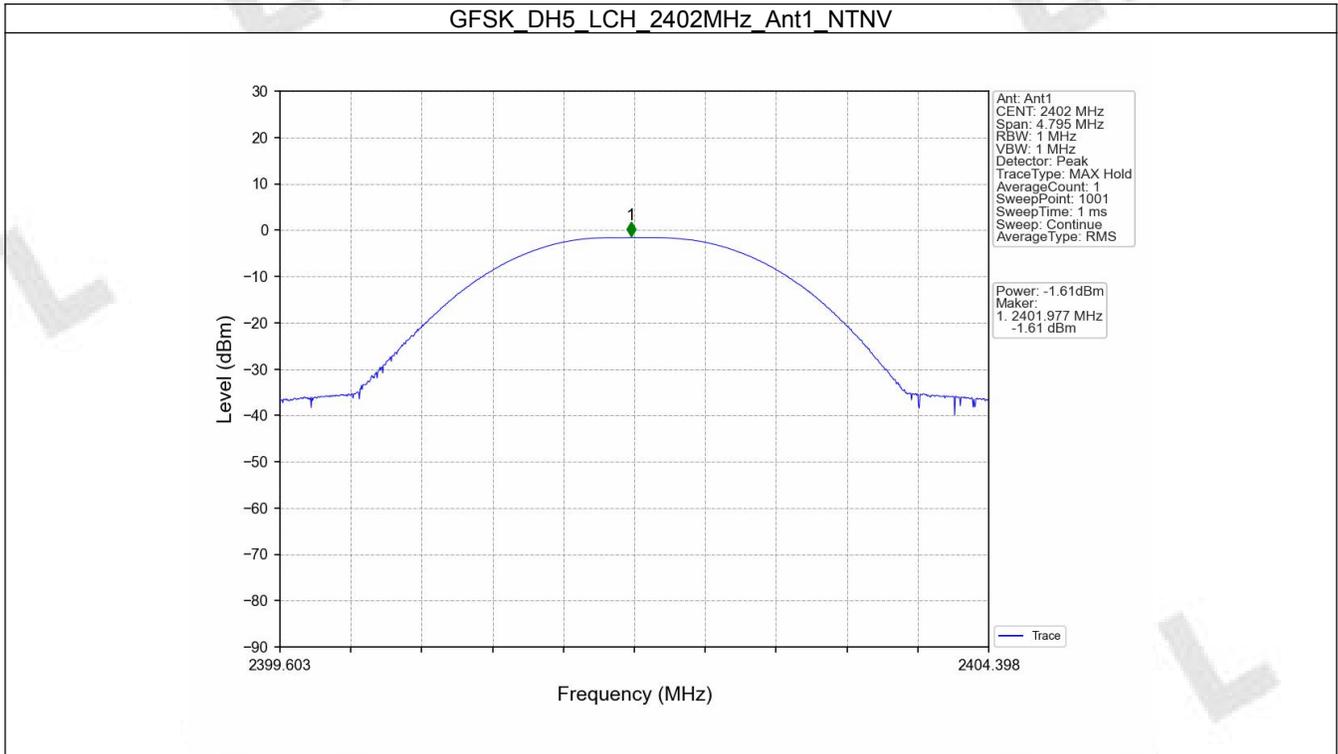
### 2.1 Power

#### 2.1.1 Test Result

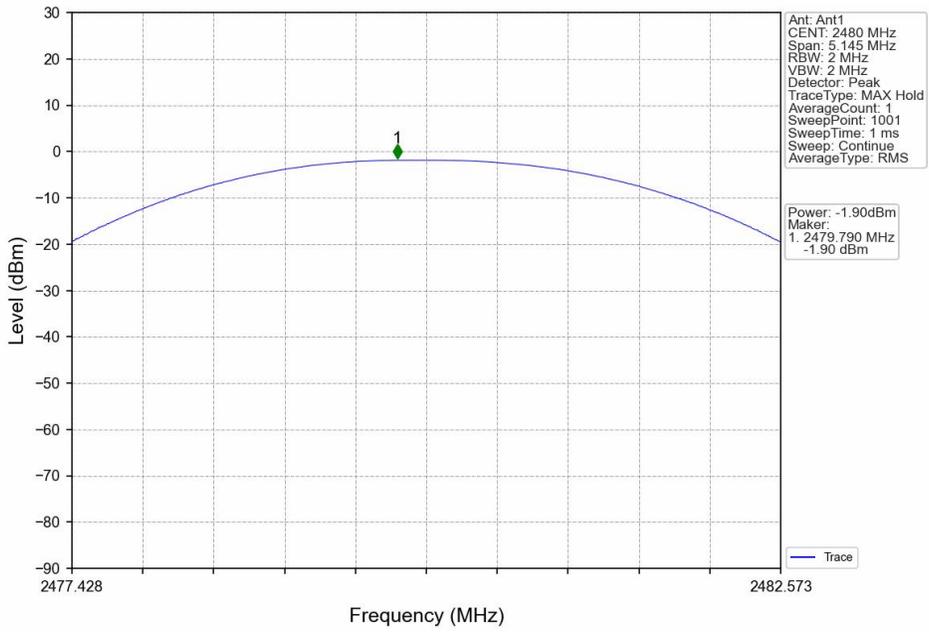
Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	-1.61	<=20.97	Pass
		2441	DH5	-1.39	<=20.97	Pass
		2480	DH5	-1.90	<=20.97	Pass
Pi/4DQPSK	SISO	2402	2DH5	-0.91	<=20.97	Pass
		2441	2DH5	-0.70	<=20.97	Pass
		2480	2DH5	-1.19	<=20.97	Pass
8DPSK	SISO	2402	3DH5	-0.55	<=20.97	Pass
		2441	3DH5	-0.33	<=20.97	Pass
		2480	3DH5	-0.81	<=20.97	Pass

Note1: Antenna Gain: Ant1: -4.67dBi;

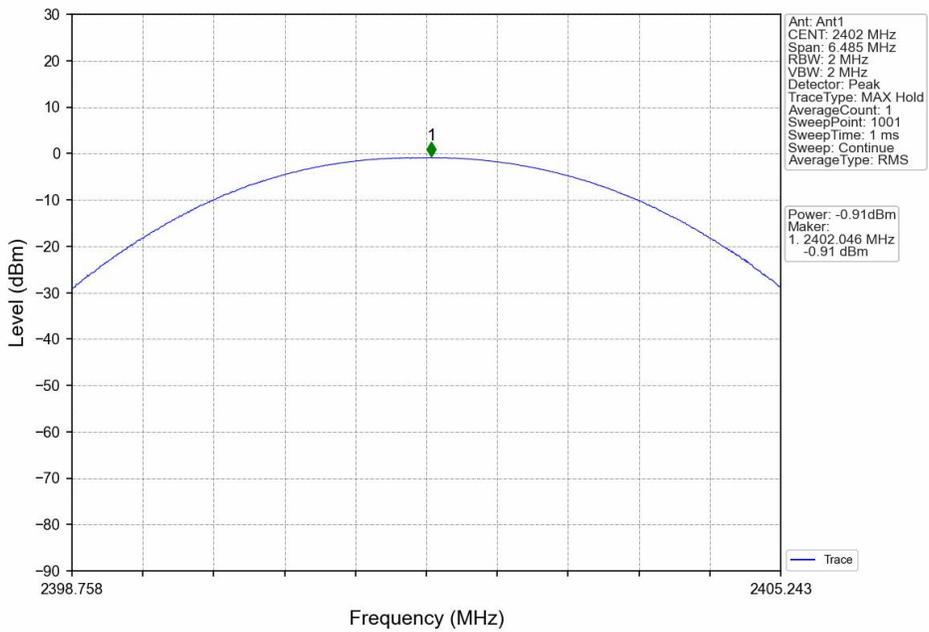
2.1.2 Test Graph



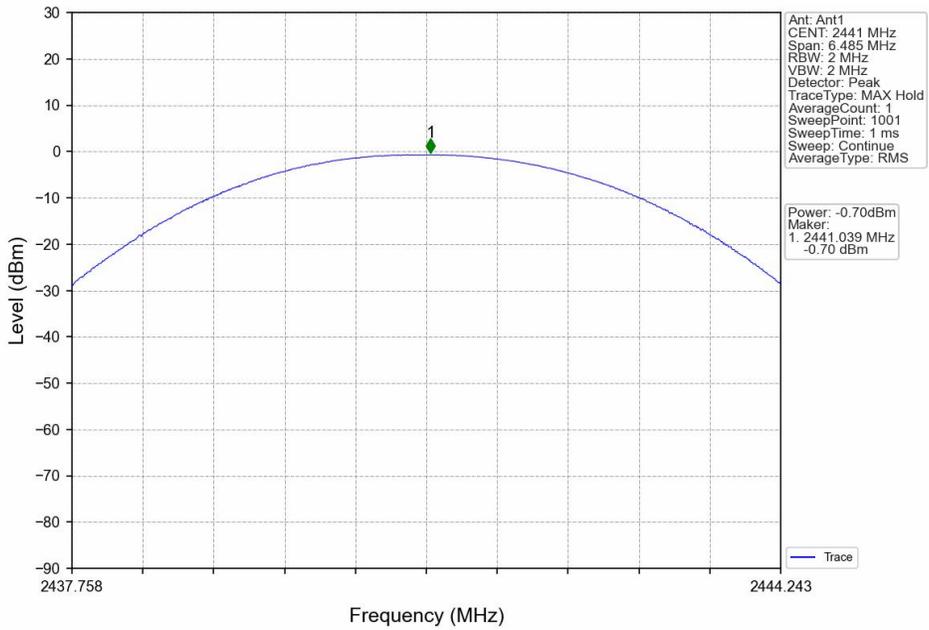
GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



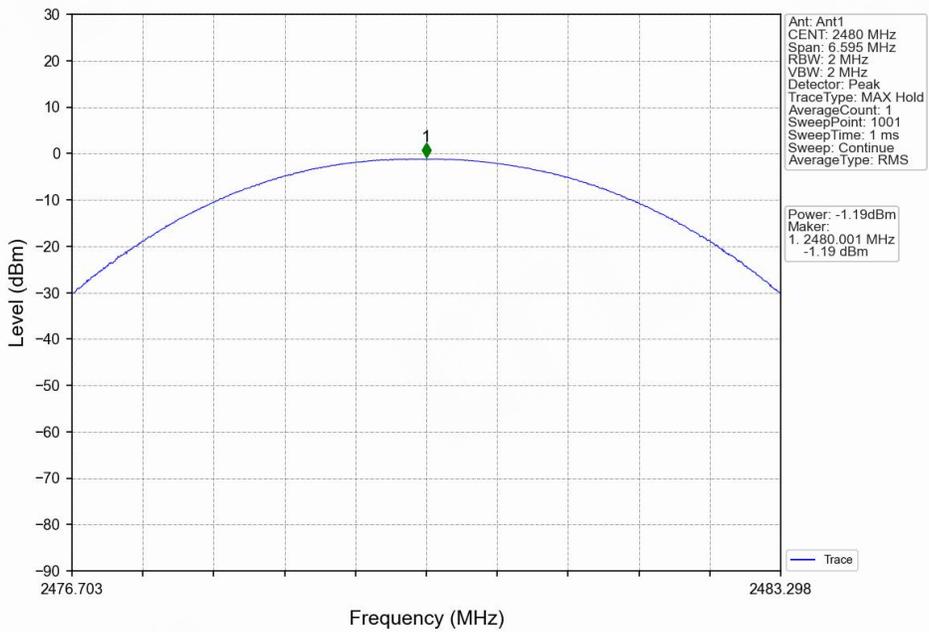
Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



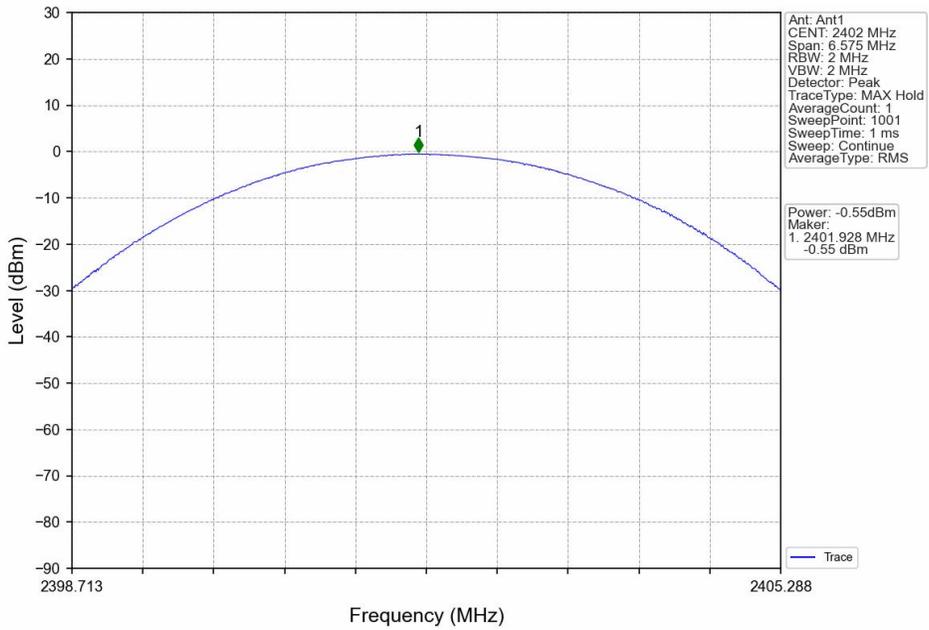
Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



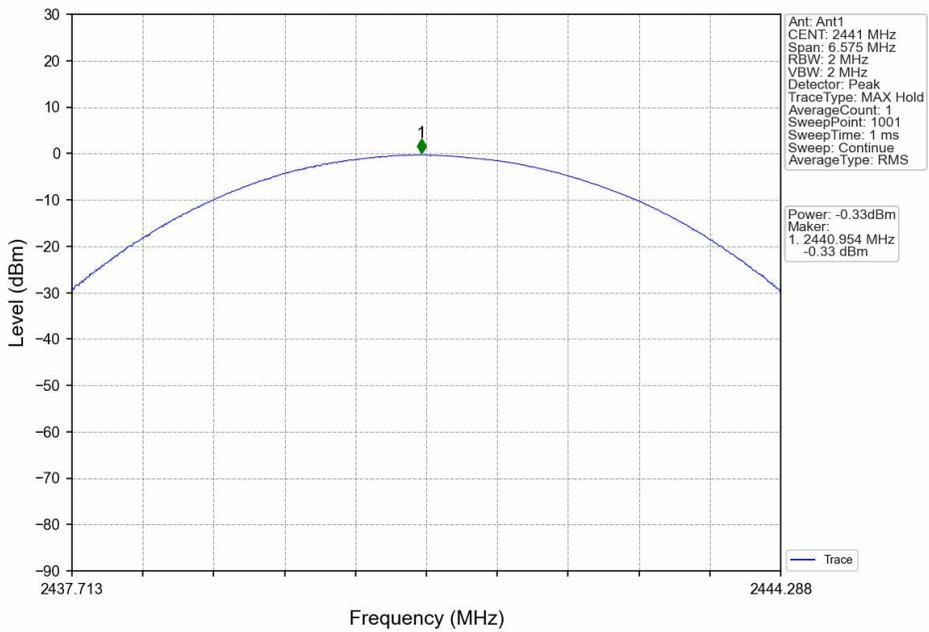
Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV

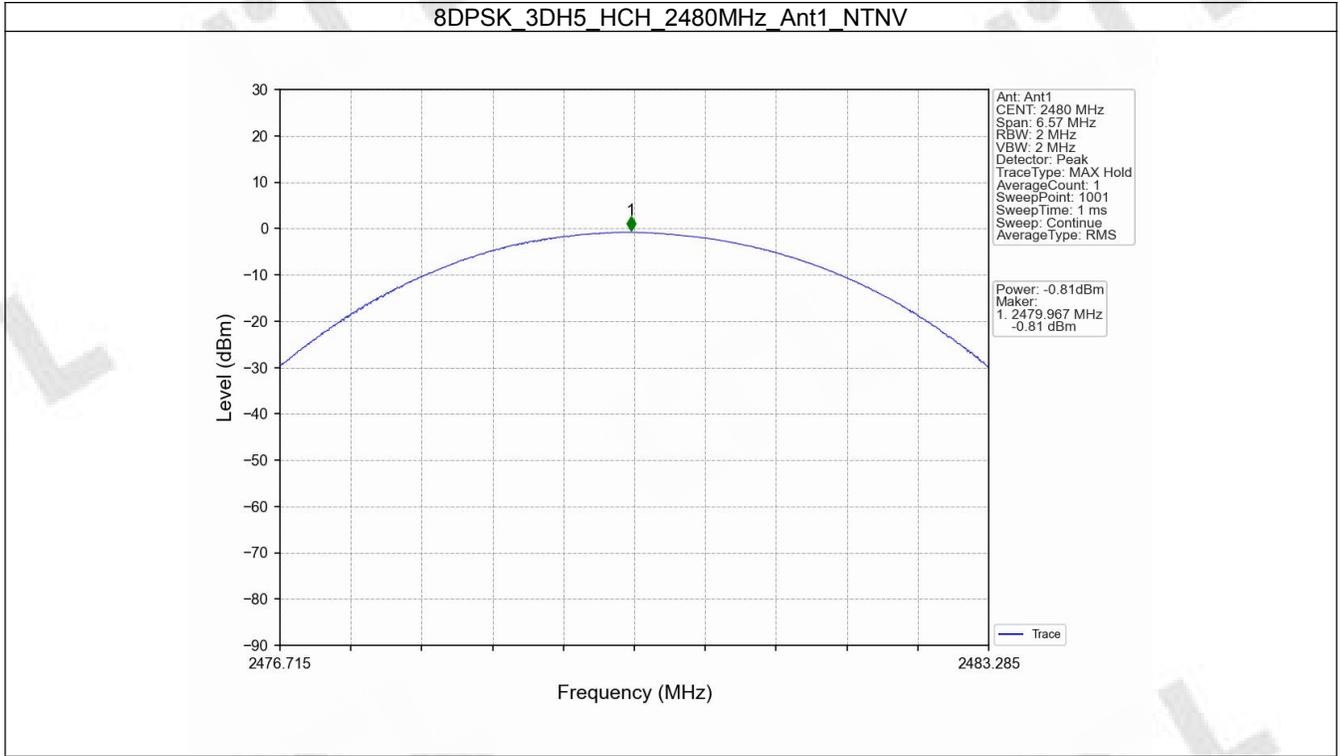


8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



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





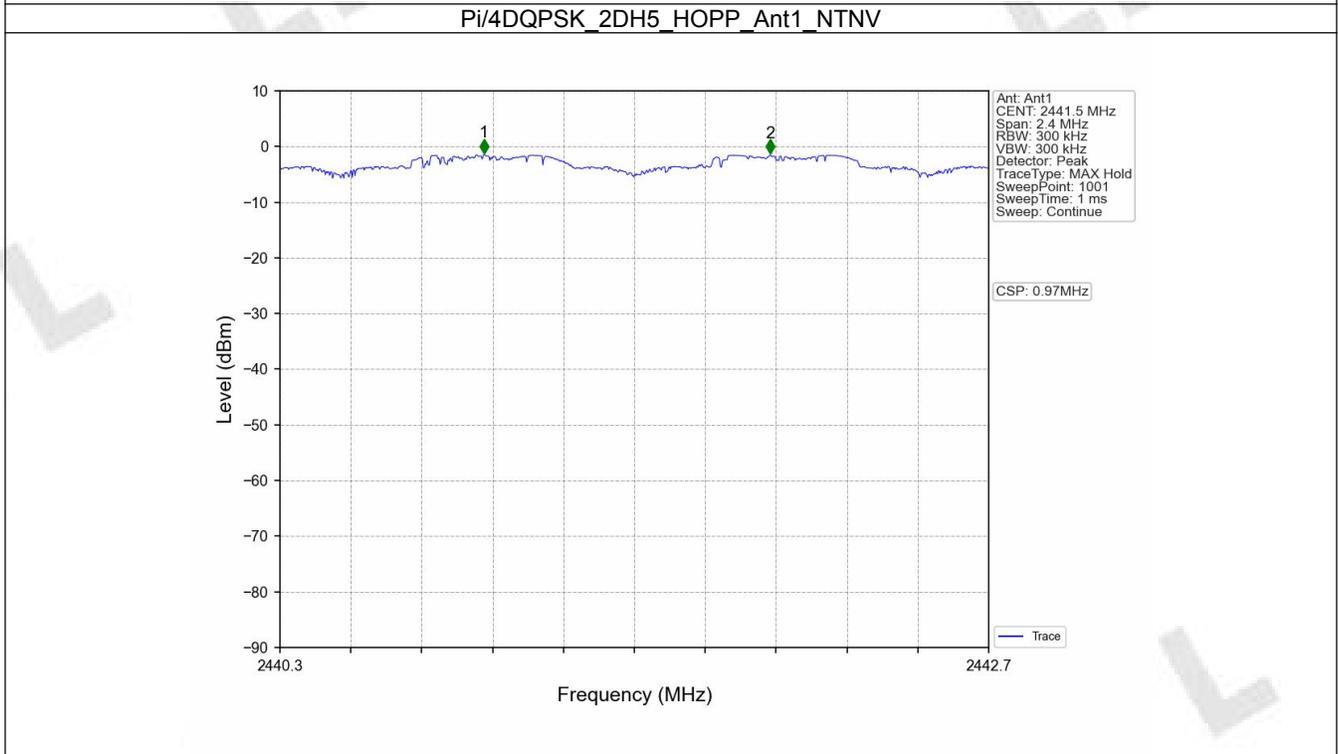
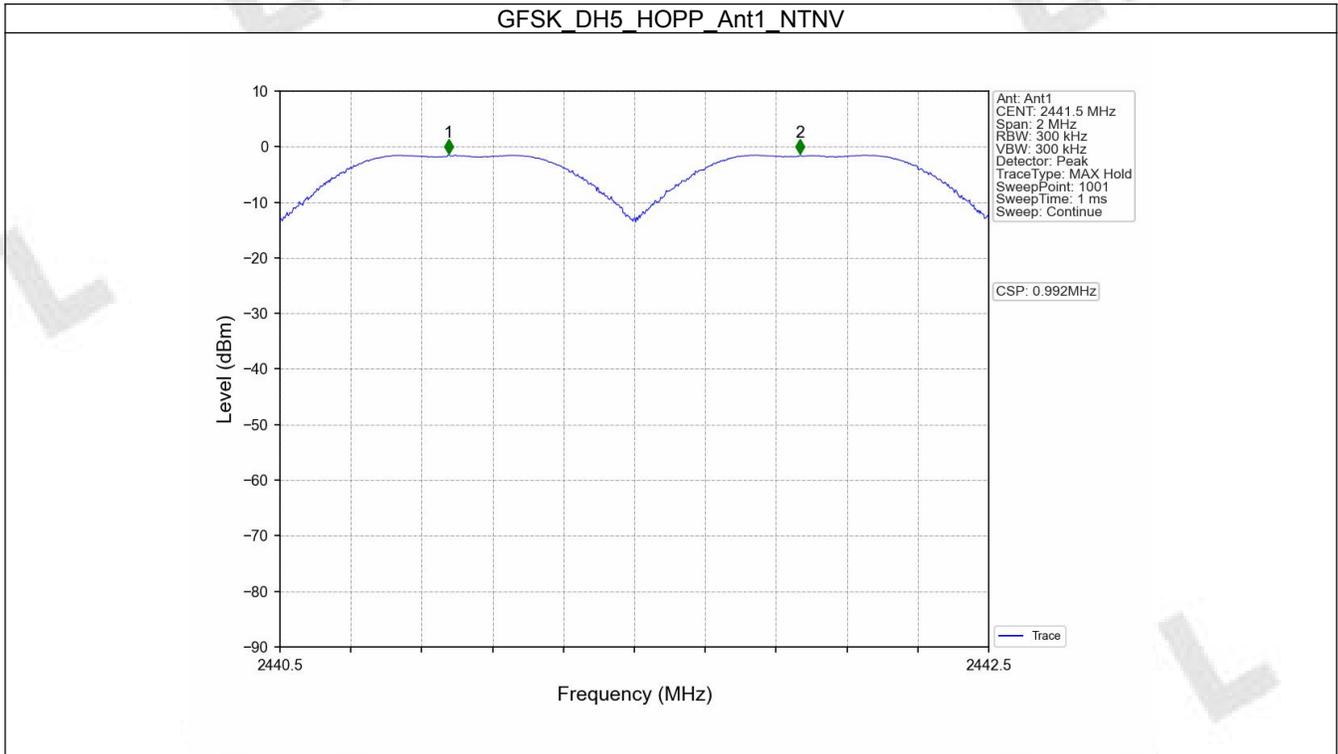
### 3. Carrier Frequency Separation

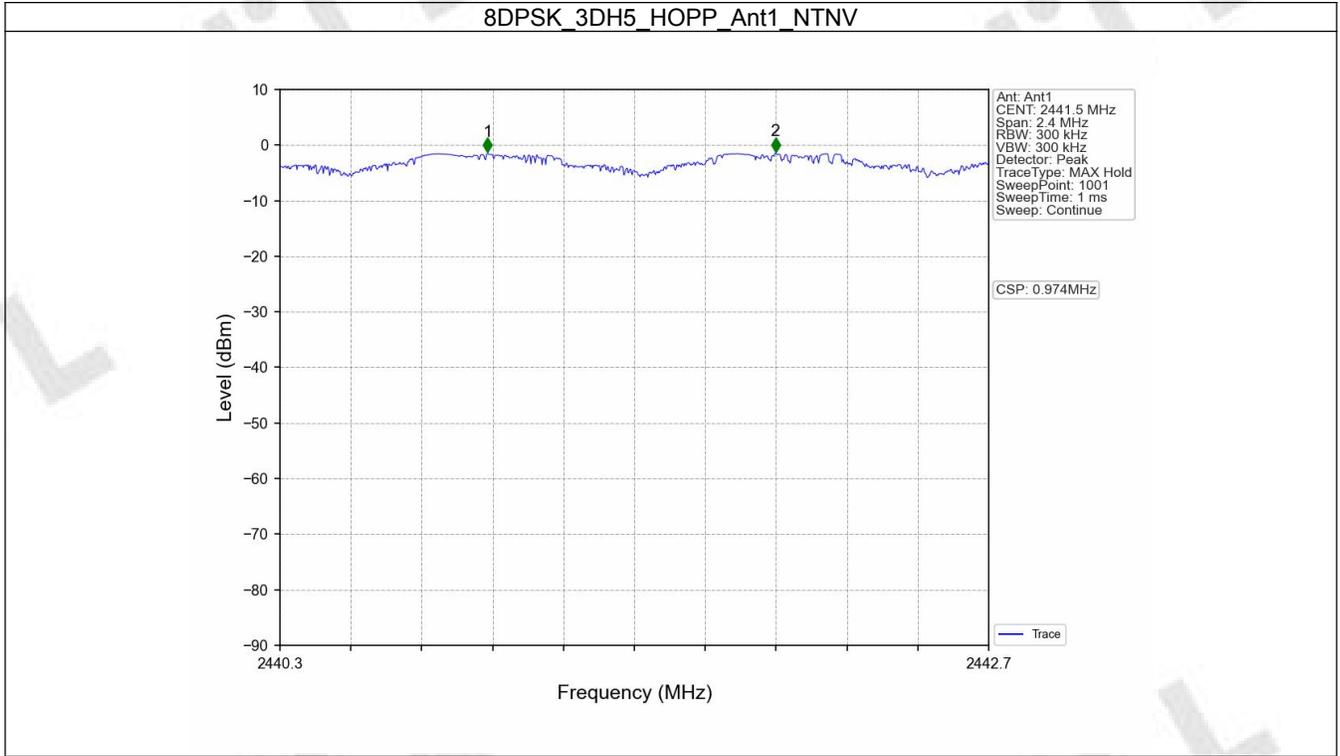
#### 3.1 Ant1

##### 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	0.992	1.029	$\geq 0.686$	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	0.970	1.319	$\geq 0.879$	Pass
8DPSK	SISO	HOPP	3DH5	0.974	1.315	$\geq 0.877$	Pass

3.1.2 Test Graph





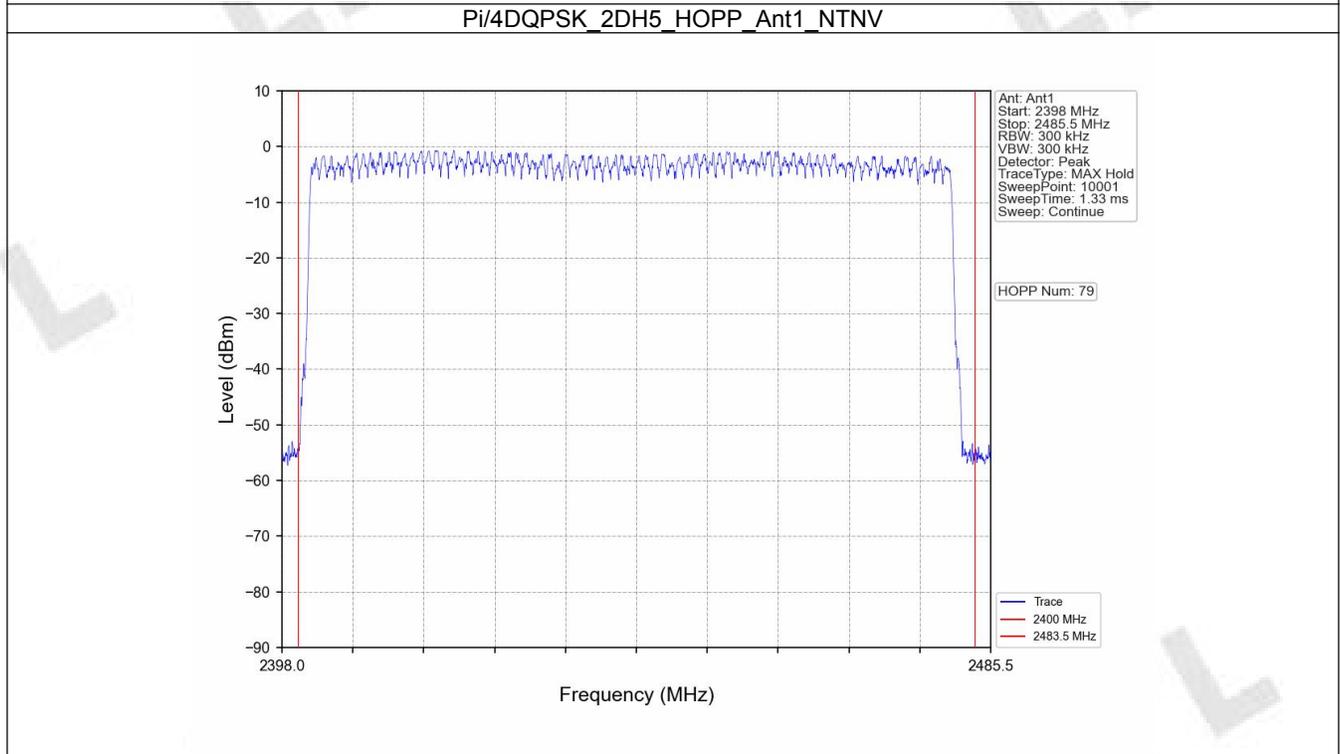
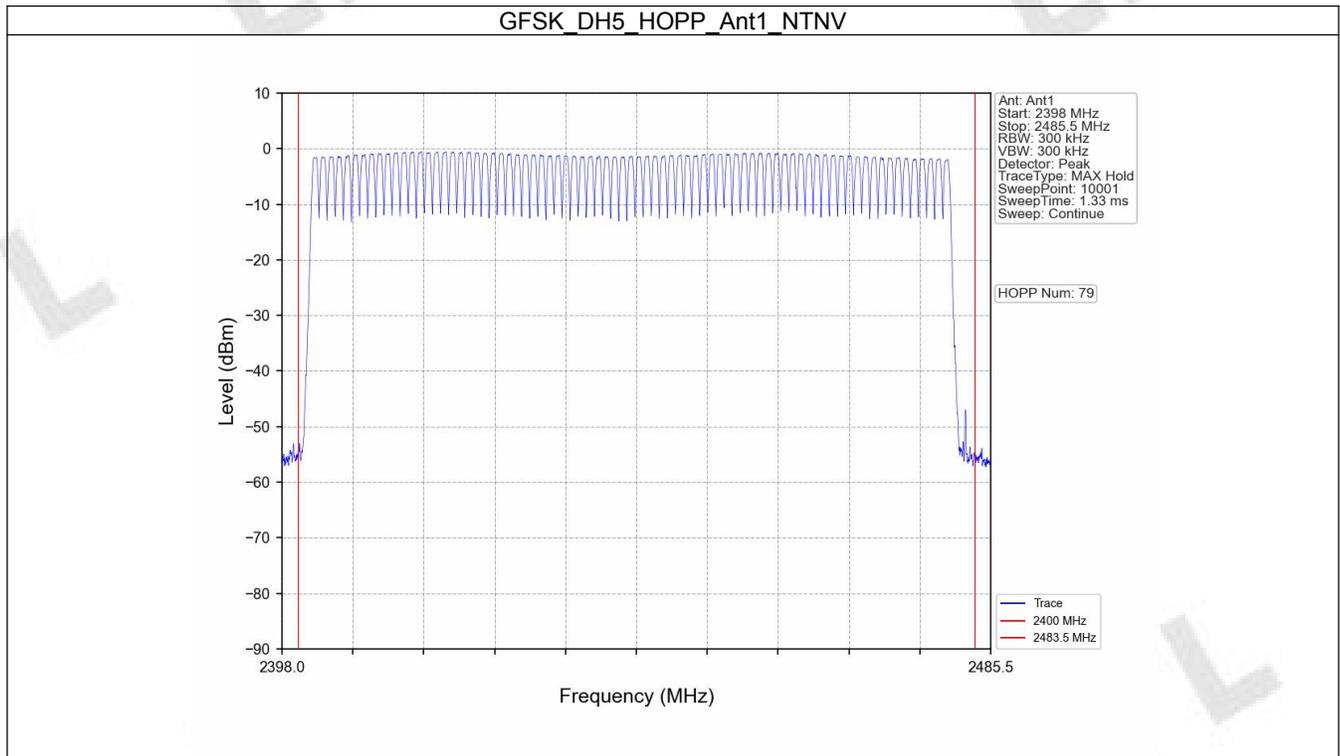
## 4. Number of Hopping Frequencies

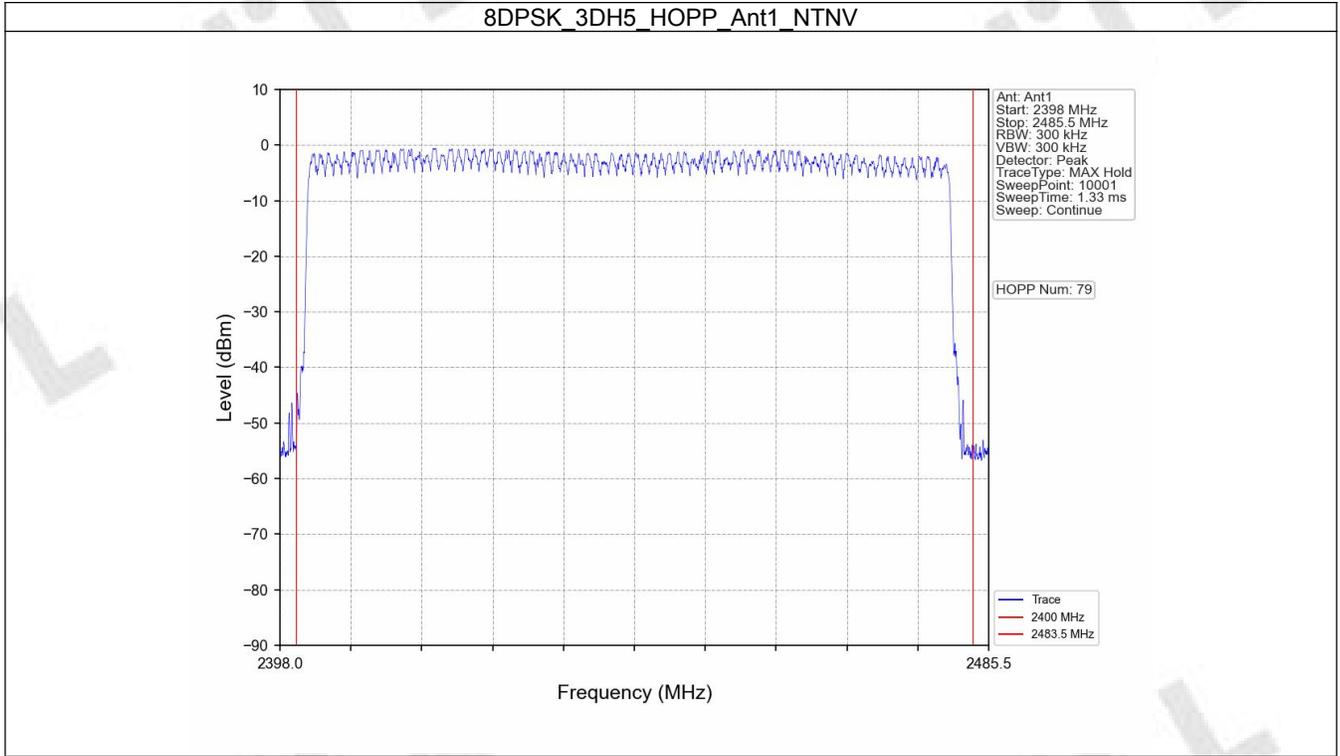
### 4.1 HoppNum

#### 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





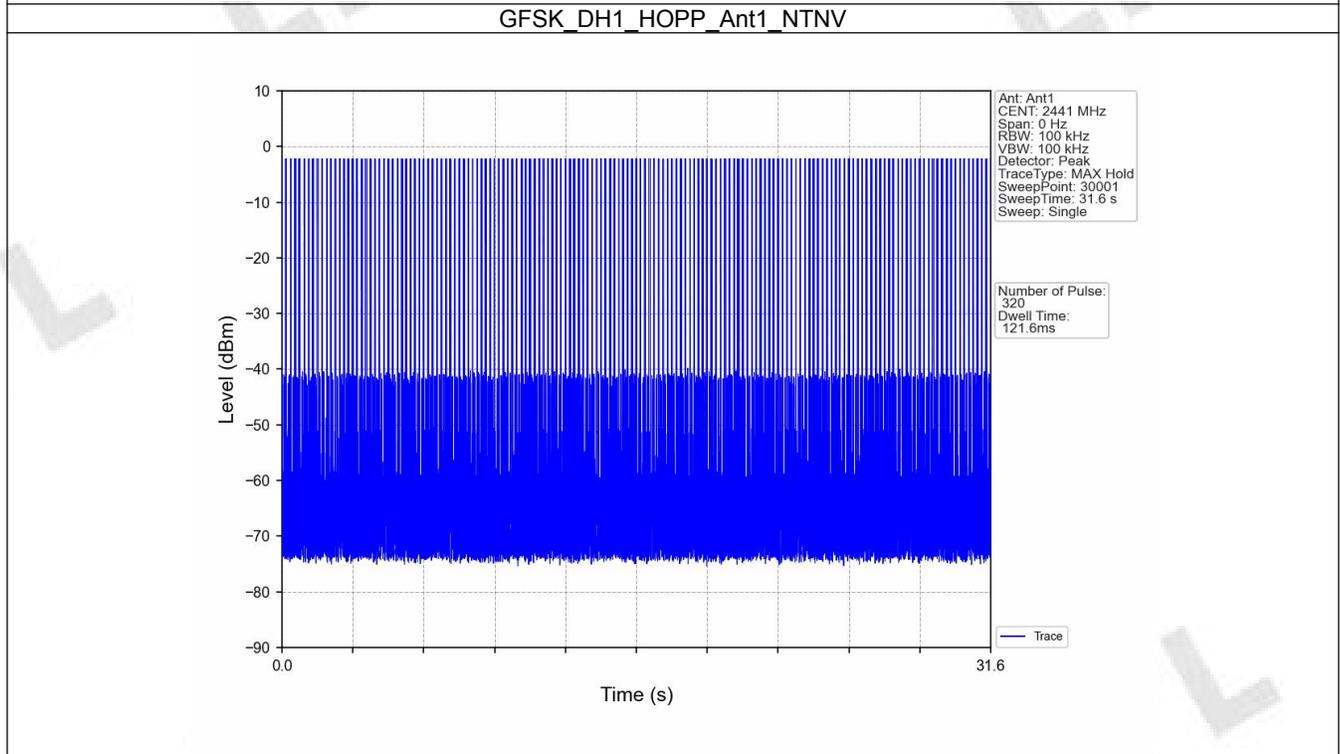
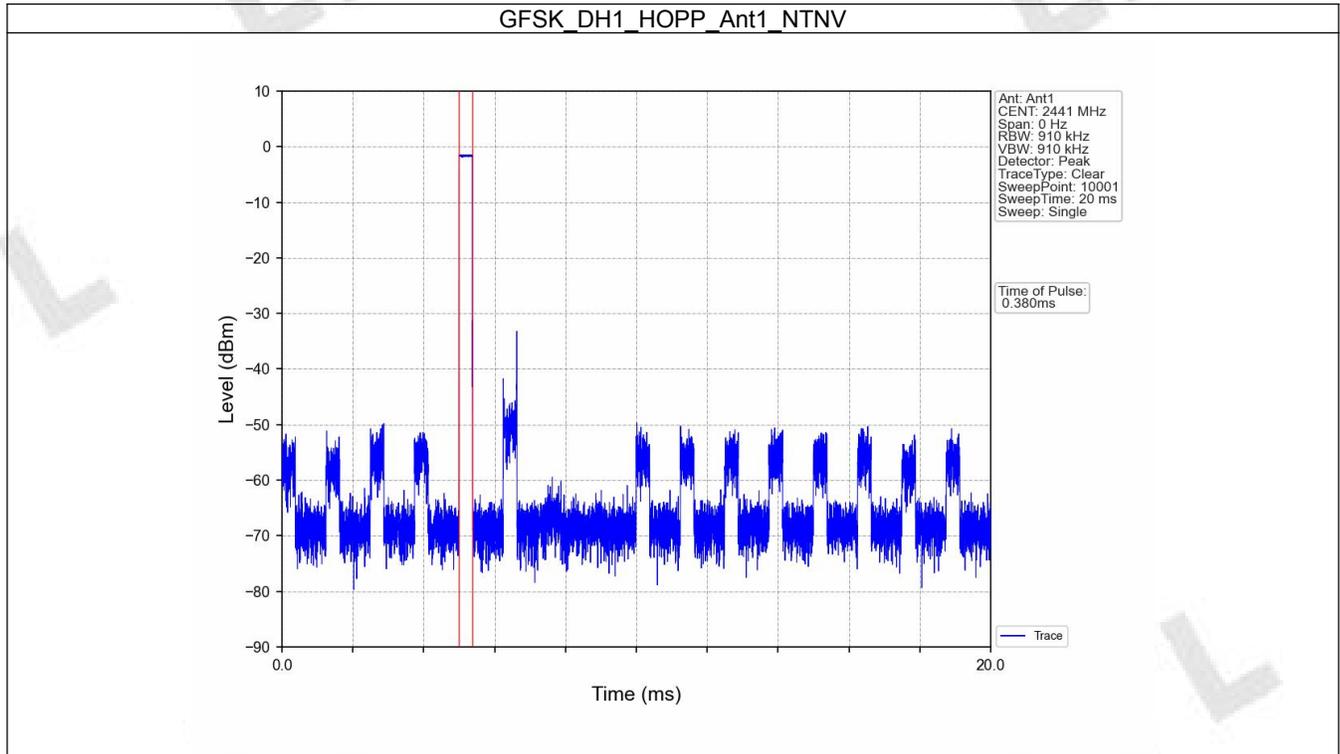
## 5. Time of Occupancy (Dwell Time)

### 5.1 Ant1

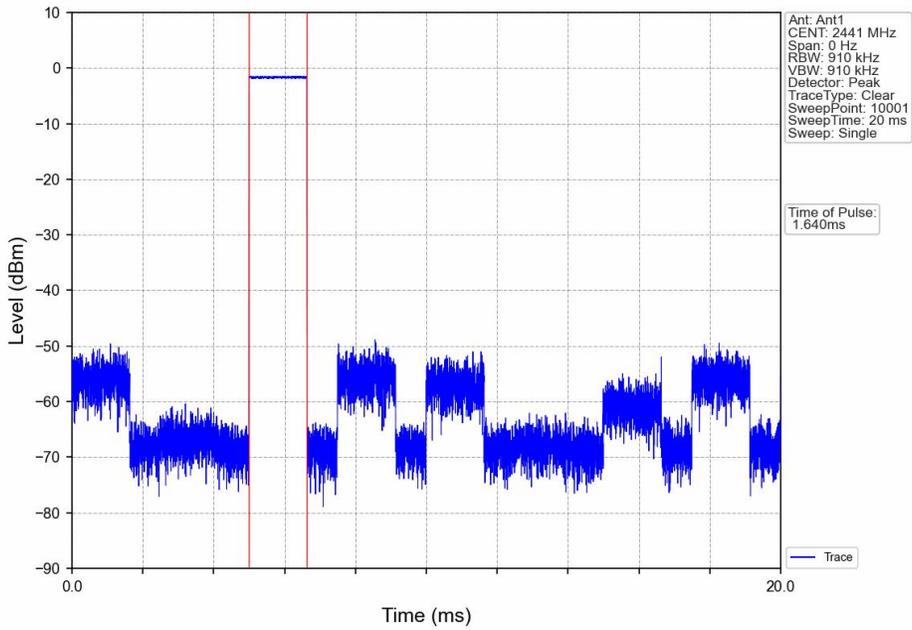
#### 5.1.1 Test Result

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	0.380	31.600	320	121.600	<=400	Pass
			DH3	1.640	31.600	156	255.840	<=400	Pass
			DH5	2.890	31.600	109	315.010	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.388	31.600	316	122.608	<=400	Pass
			2DH3	1.640	31.600	160	262.400	<=400	Pass
			2DH5	2.896	31.600	109	315.664	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.396	31.600	320	126.720	<=400	Pass
			3DH3	1.646	31.600	161	265.006	<=400	Pass
			3DH5	2.896	31.600	110	318.560	<=400	Pass

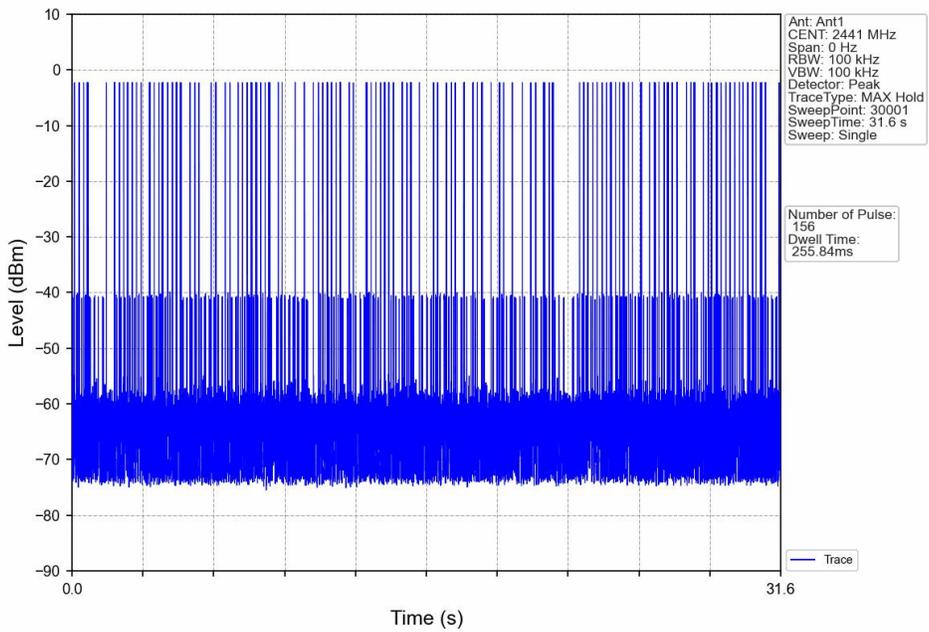
### 5.1.2 Test Graph



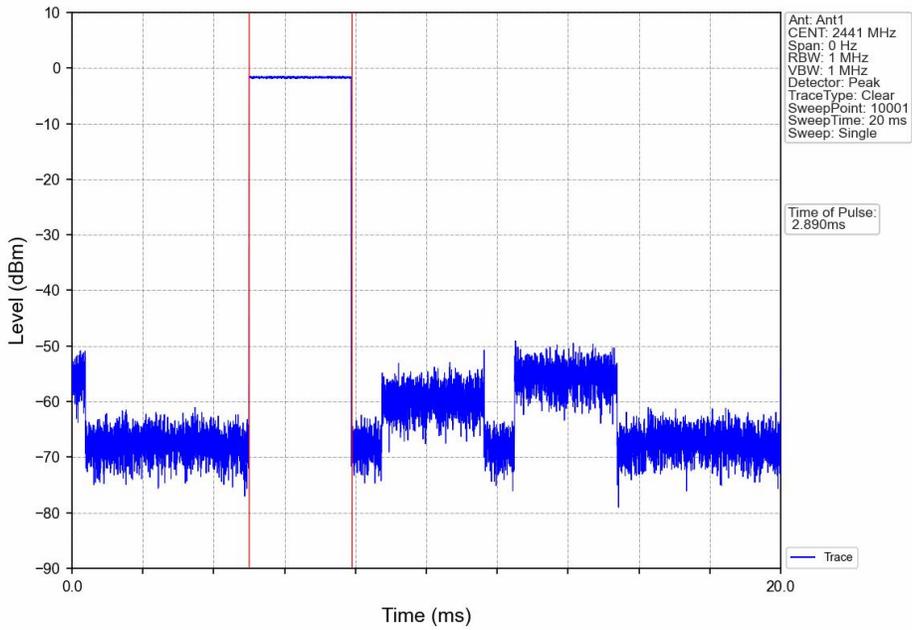
GFSK\_DH3\_HOPP\_Ant1\_NTNV



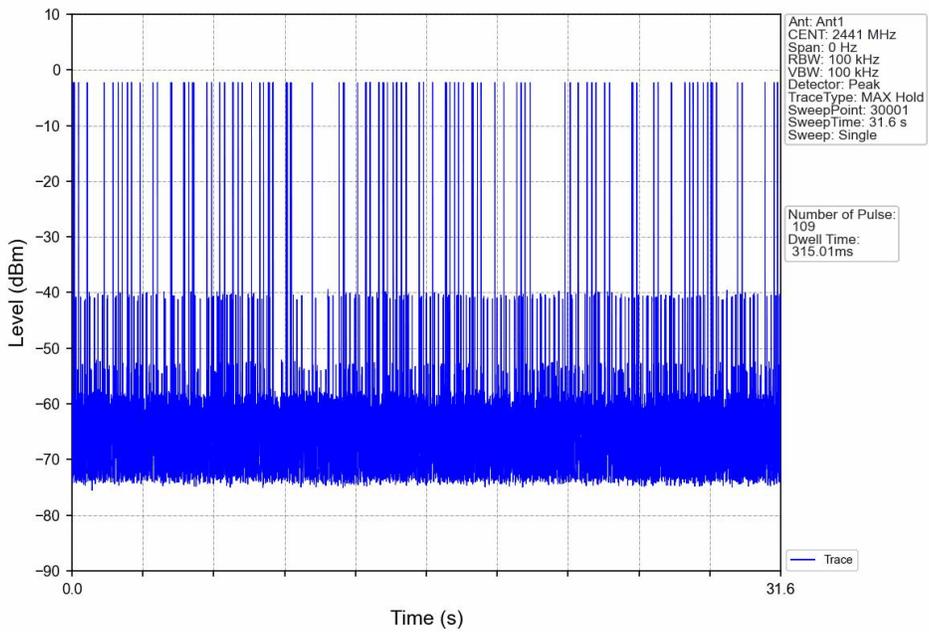
GFSK\_DH3\_HOPP\_Ant1\_NTNV



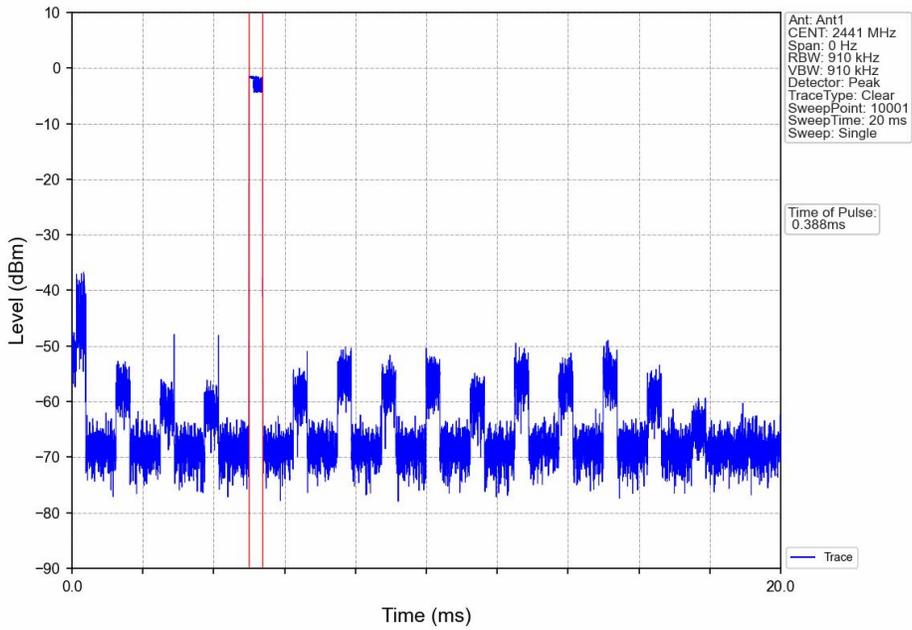
GFSK\_DH5\_HOPP\_Ant1\_NTNV



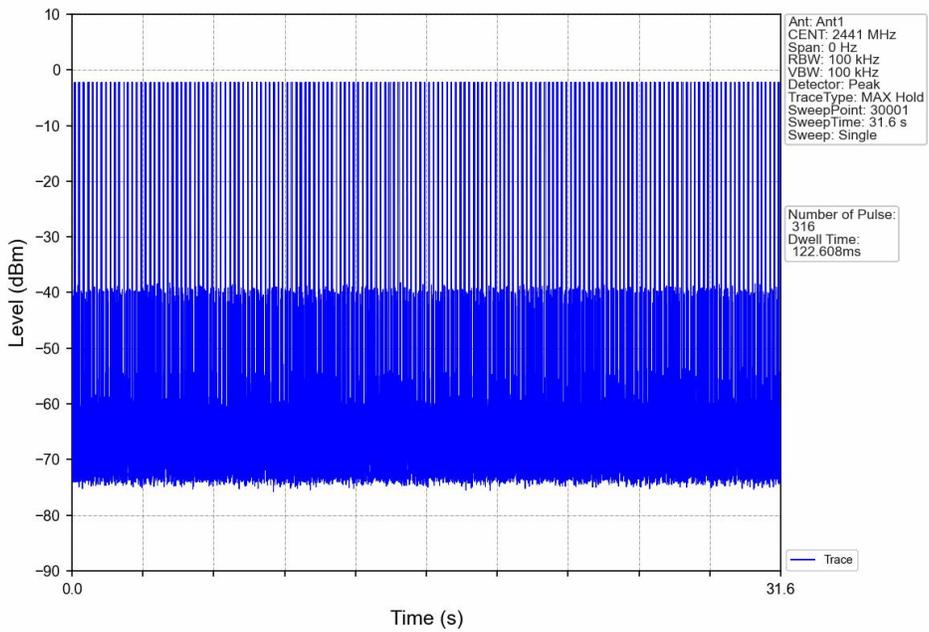
GFSK\_DH5\_HOPP\_Ant1\_NTNV



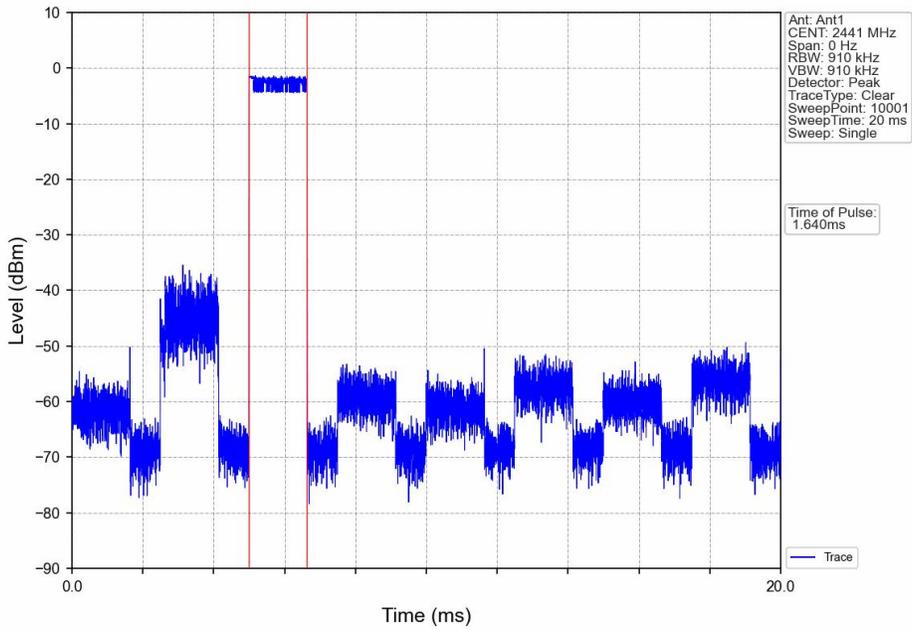
Pi/4DQPSK\_2DH1\_HOPP\_Ant1\_NTNV



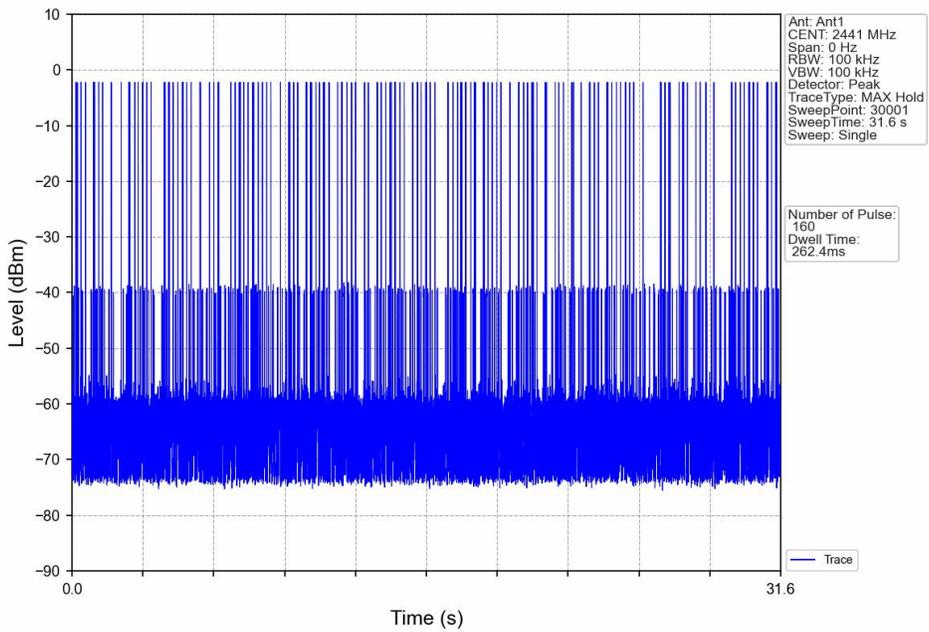
Pi/4DQPSK\_2DH1\_HOPP\_Ant1\_NTNV



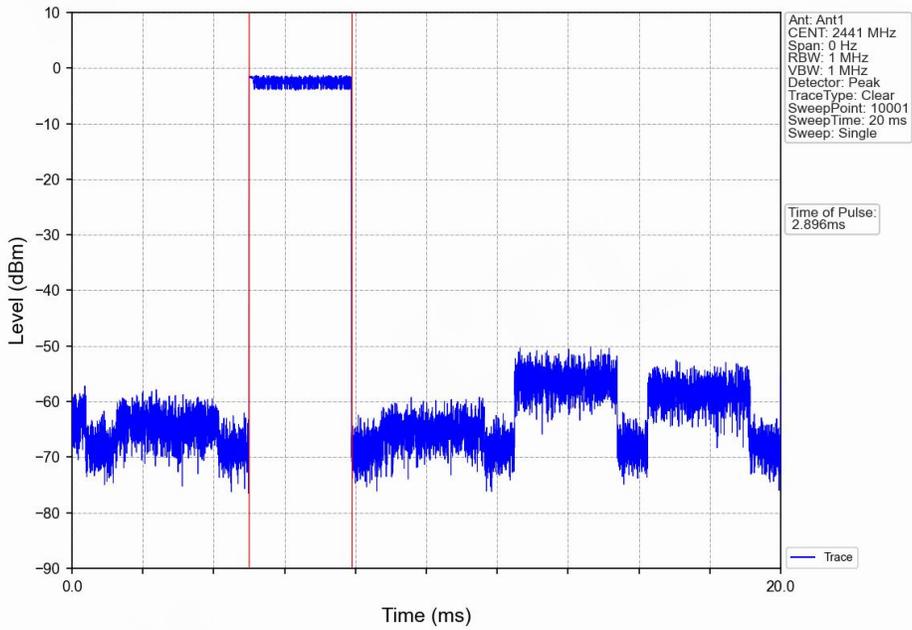
Pi/4DQPSK\_2DH3\_HOPP\_Ant1\_NTNV



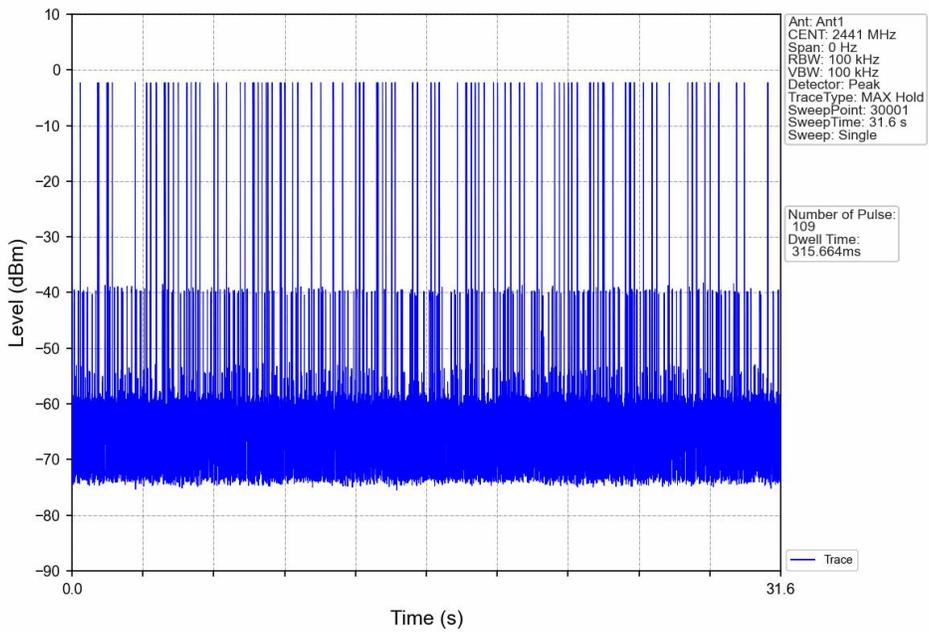
Pi/4DQPSK\_2DH3\_HOPP\_Ant1\_NTNV



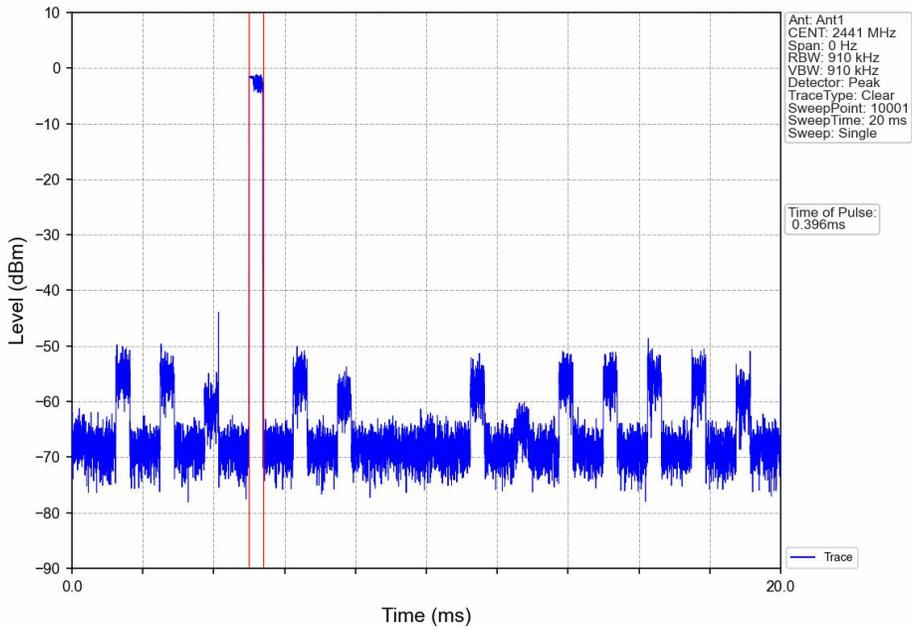
Pi/4DQPSK\_2DH5\_HOPP\_Ant1\_NTNV



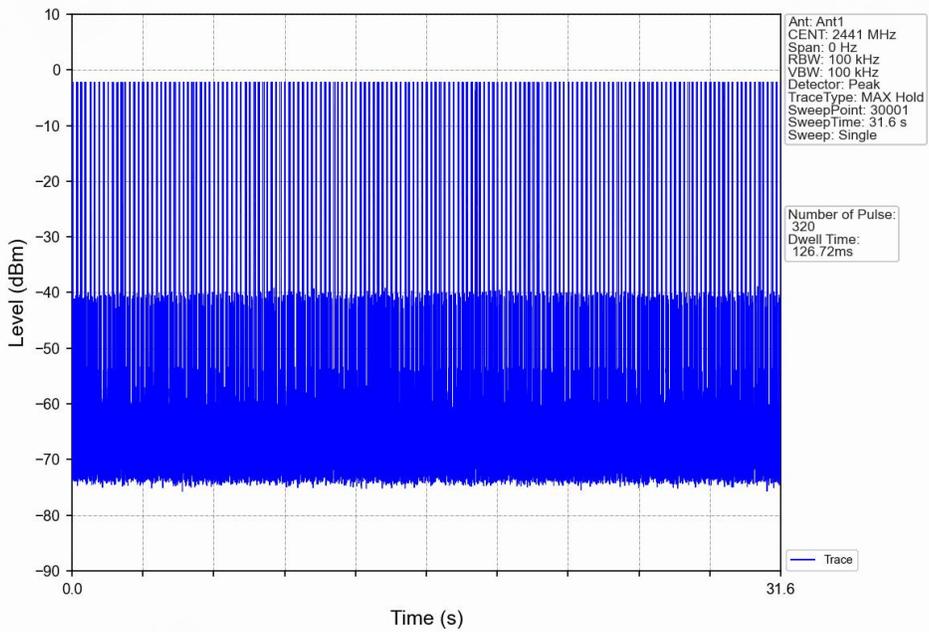
Pi/4DQPSK\_2DH5\_HOPP\_Ant1\_NTNV



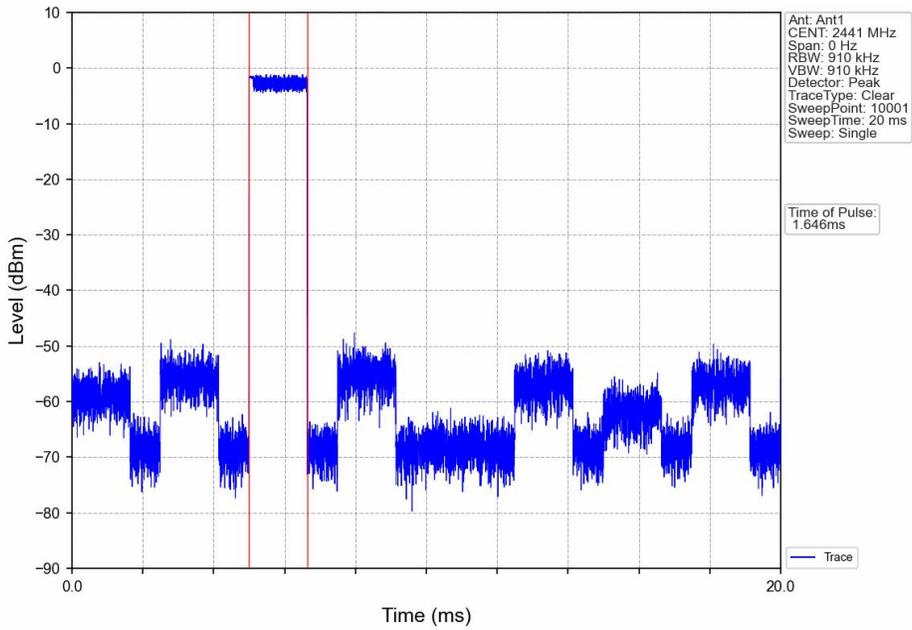
8DPSK\_3DH1\_HOPP\_Ant1\_NTNV



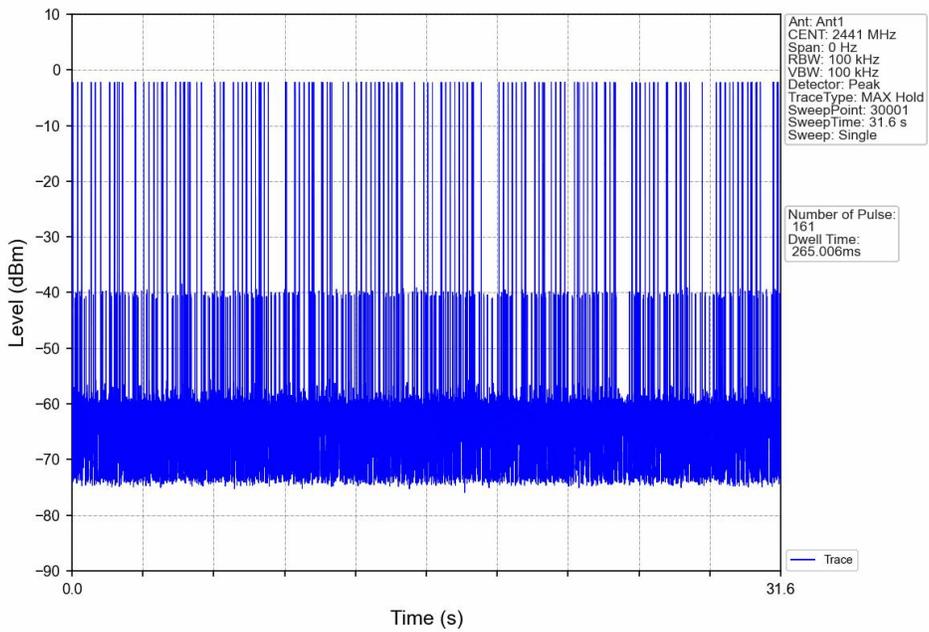
8DPSK\_3DH1\_HOPP\_Ant1\_NTNV



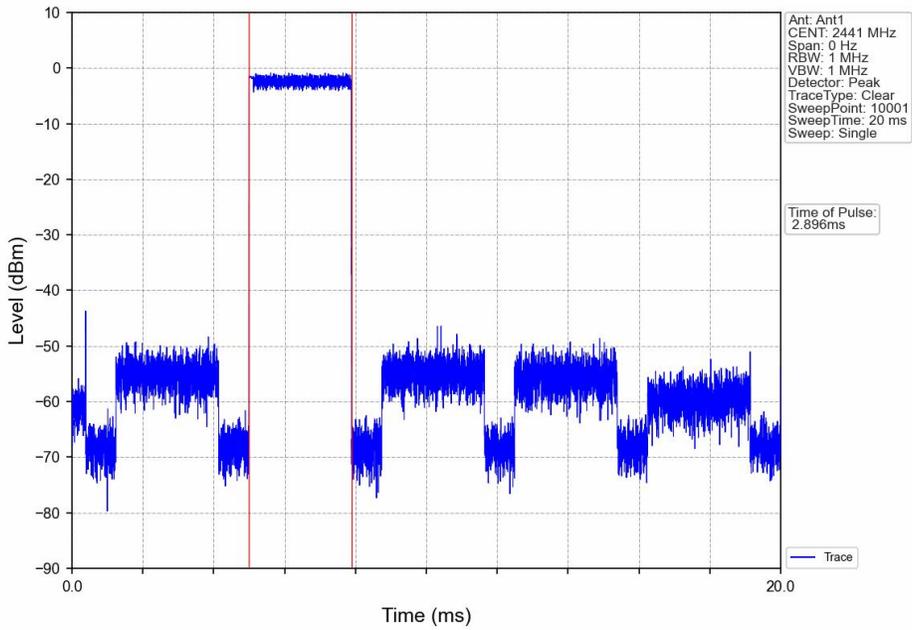
8DPSK\_3DH3\_HOPP\_Ant1\_NTNV



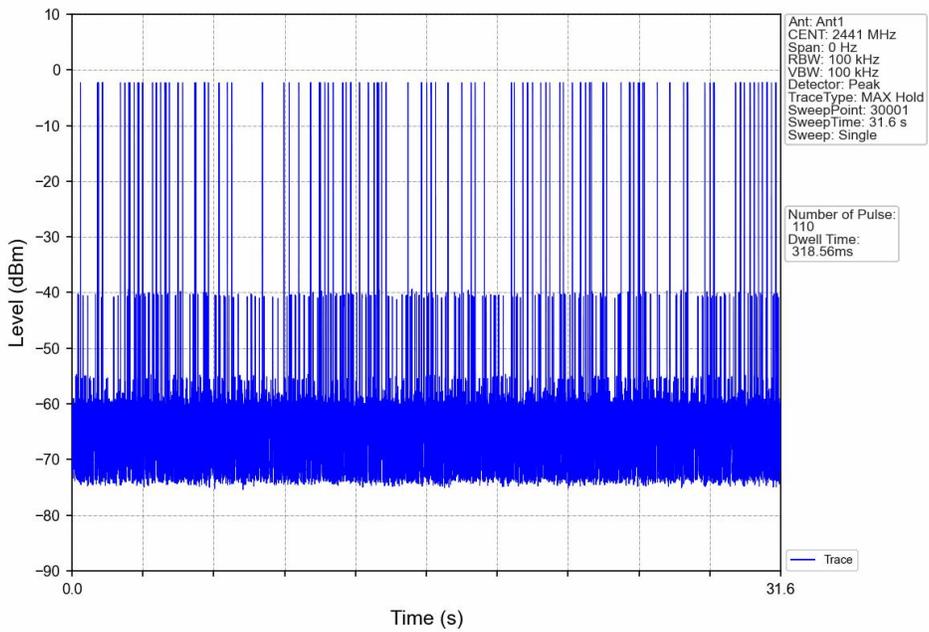
8DPSK\_3DH3\_HOPP\_Ant1\_NTNV



8DPSK\_3DH5\_HOPP\_Ant1\_NTNV



8DPSK\_3DH5\_HOPP\_Ant1\_NTNV



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

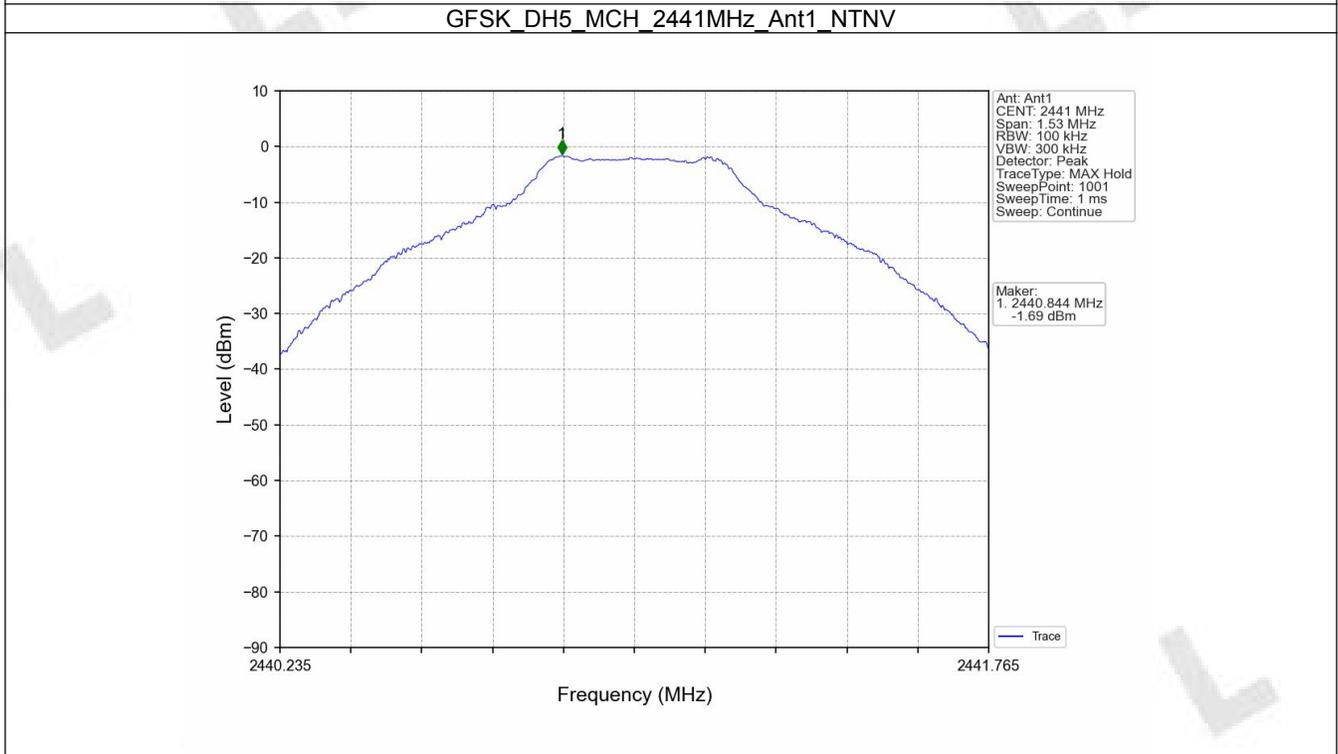
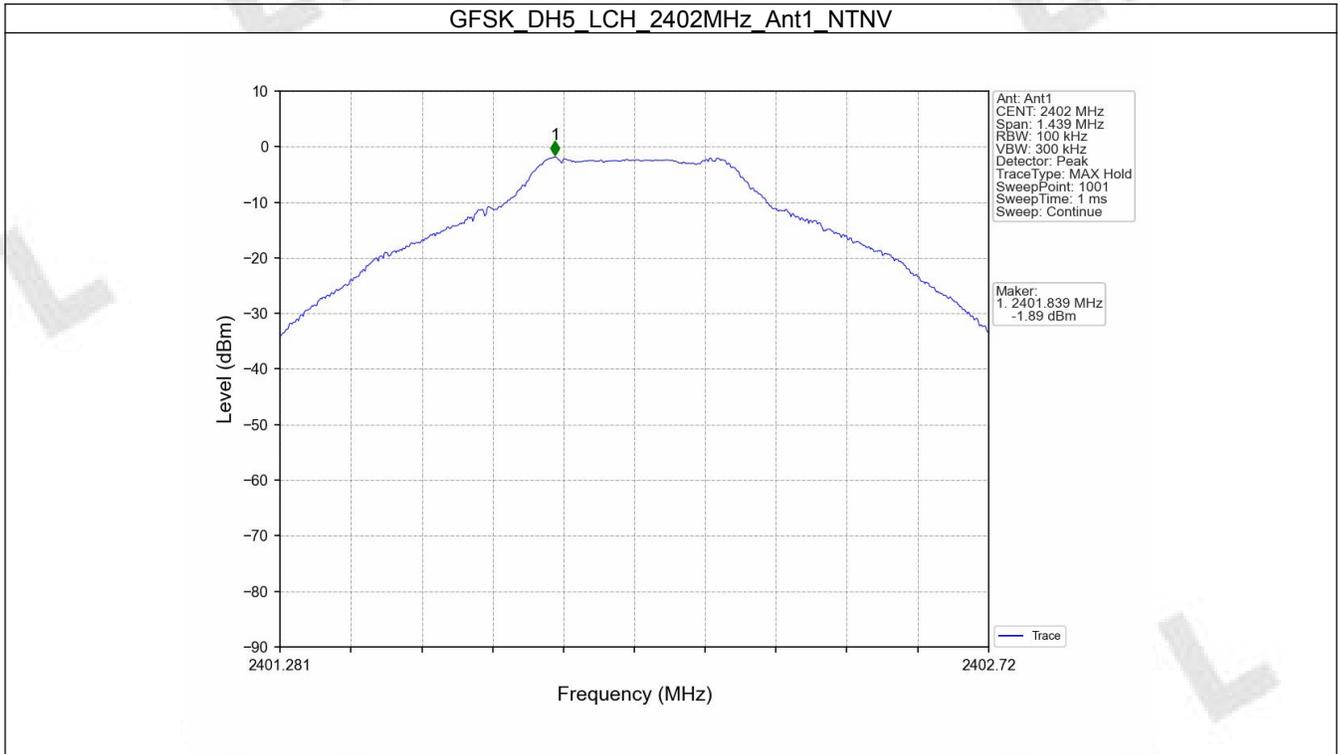
### 6.1 Ref

#### 6.1.1 Test Result

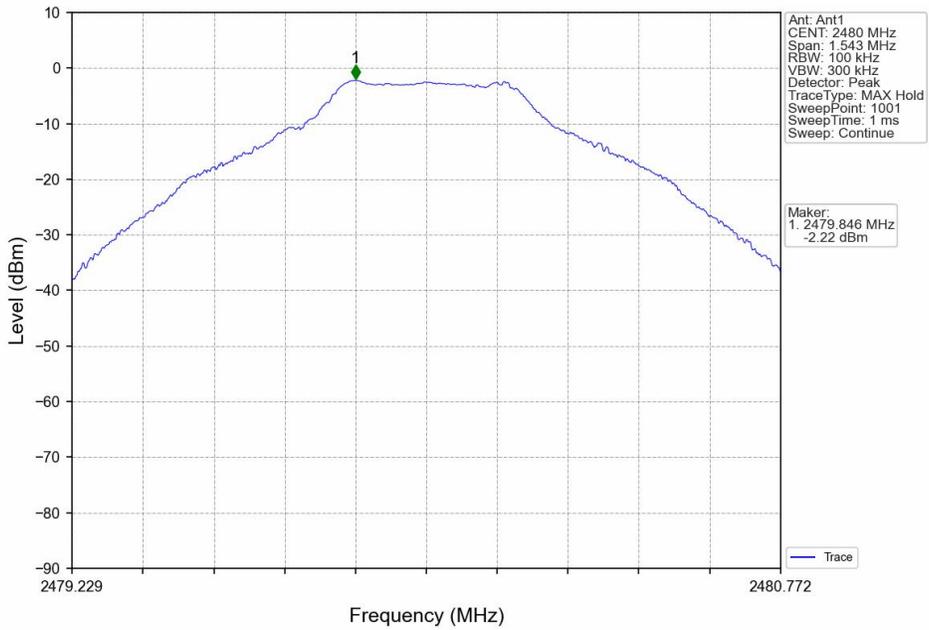
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	-1.89
		2441	DH5	1	-1.69
		2480	DH5	1	-2.22
Pi/4DQPSK	SISO	2402	2DH5	1	-1.86
		2441	2DH5	1	-1.81
		2480	2DH5	1	-2.27
8DPSK	SISO	2402	3DH5	1	-1.98
		2441	3DH5	1	-1.81
		2480	3DH5	1	-2.25

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.

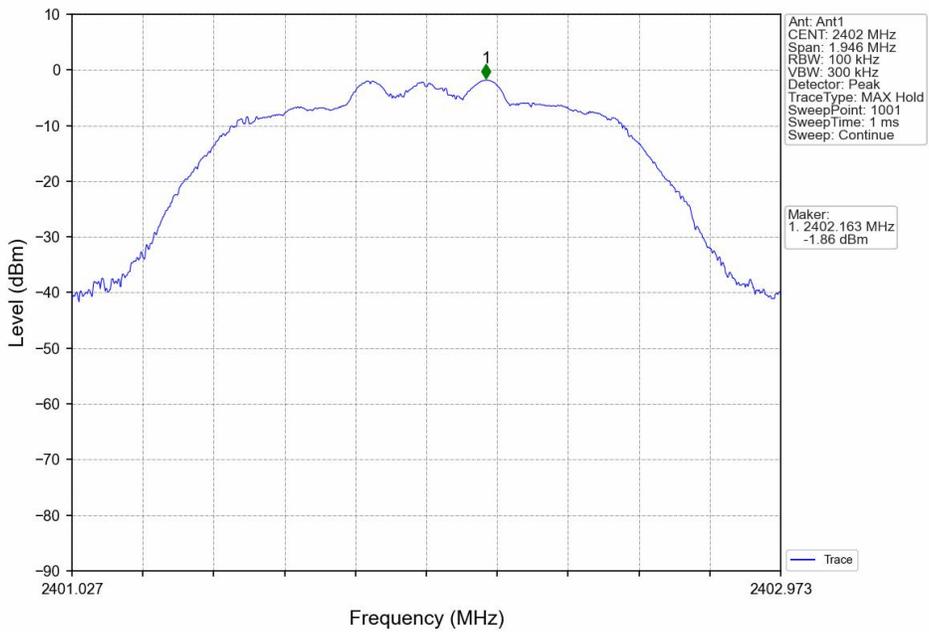
6.1.2 Test Graph



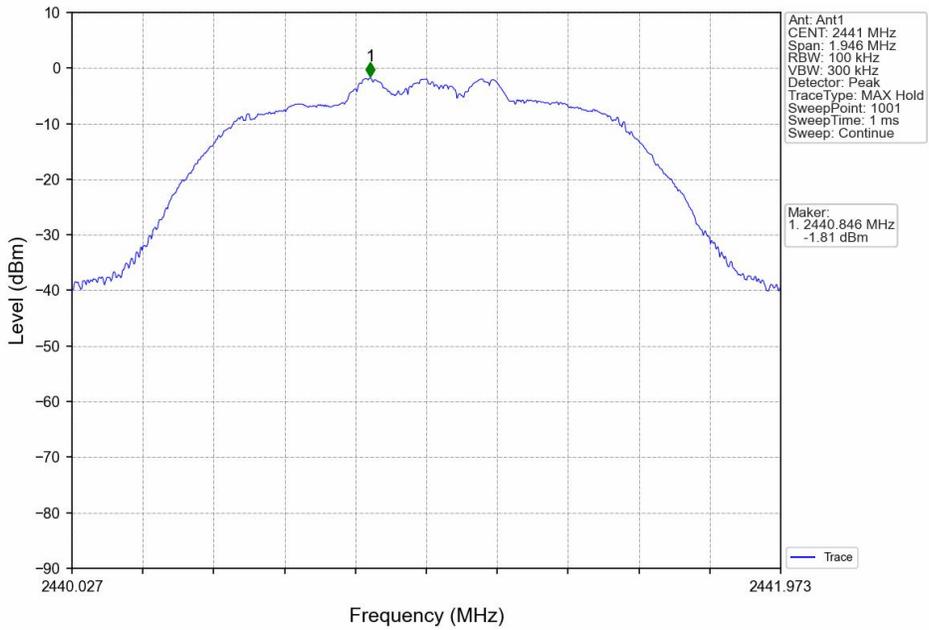
GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



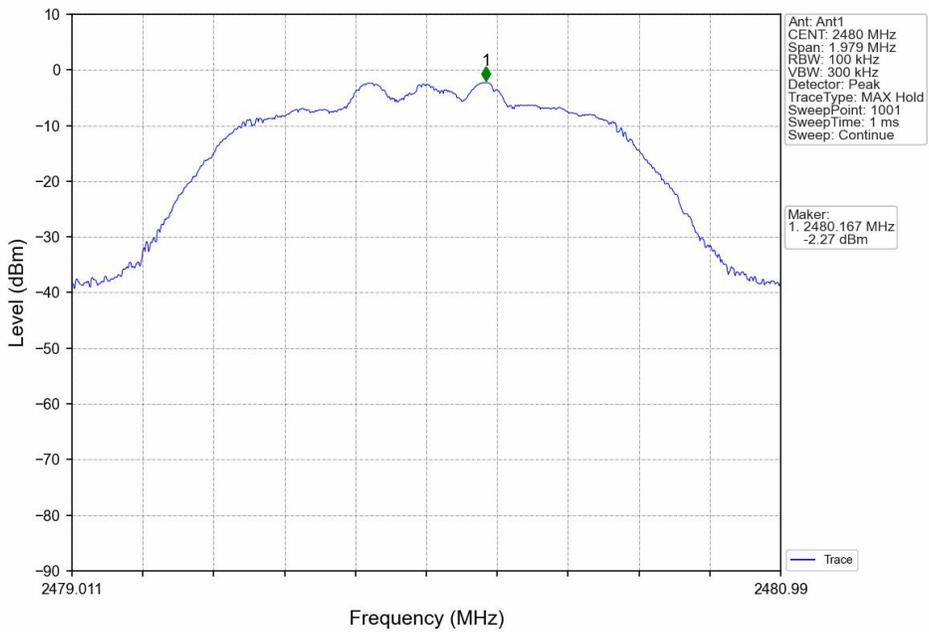
Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



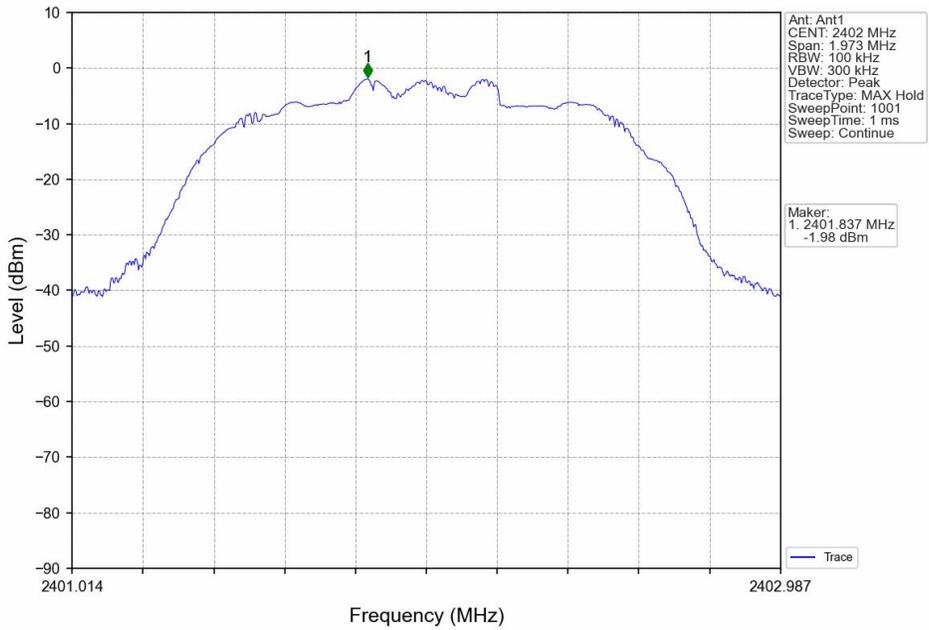
Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



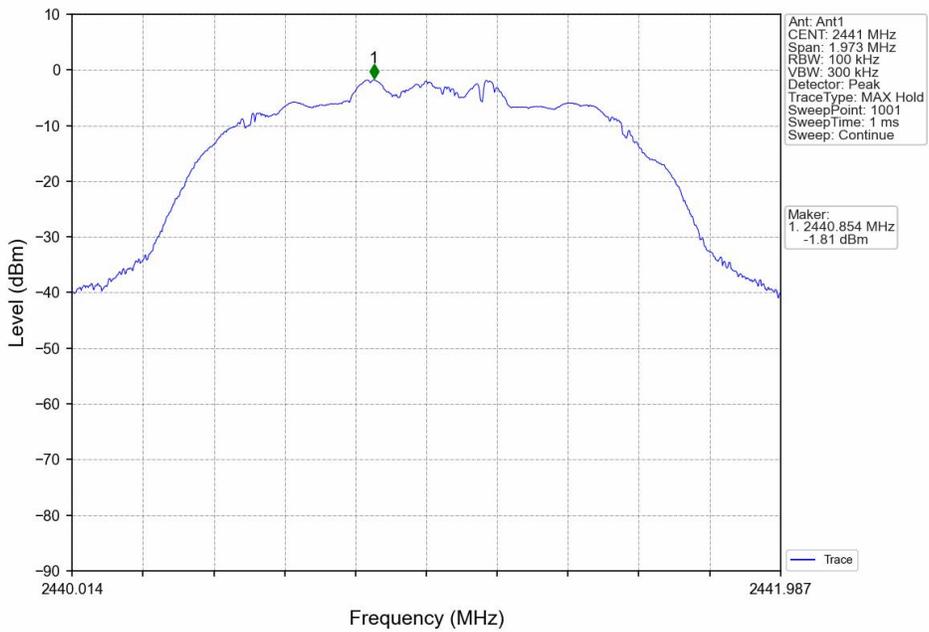
Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV

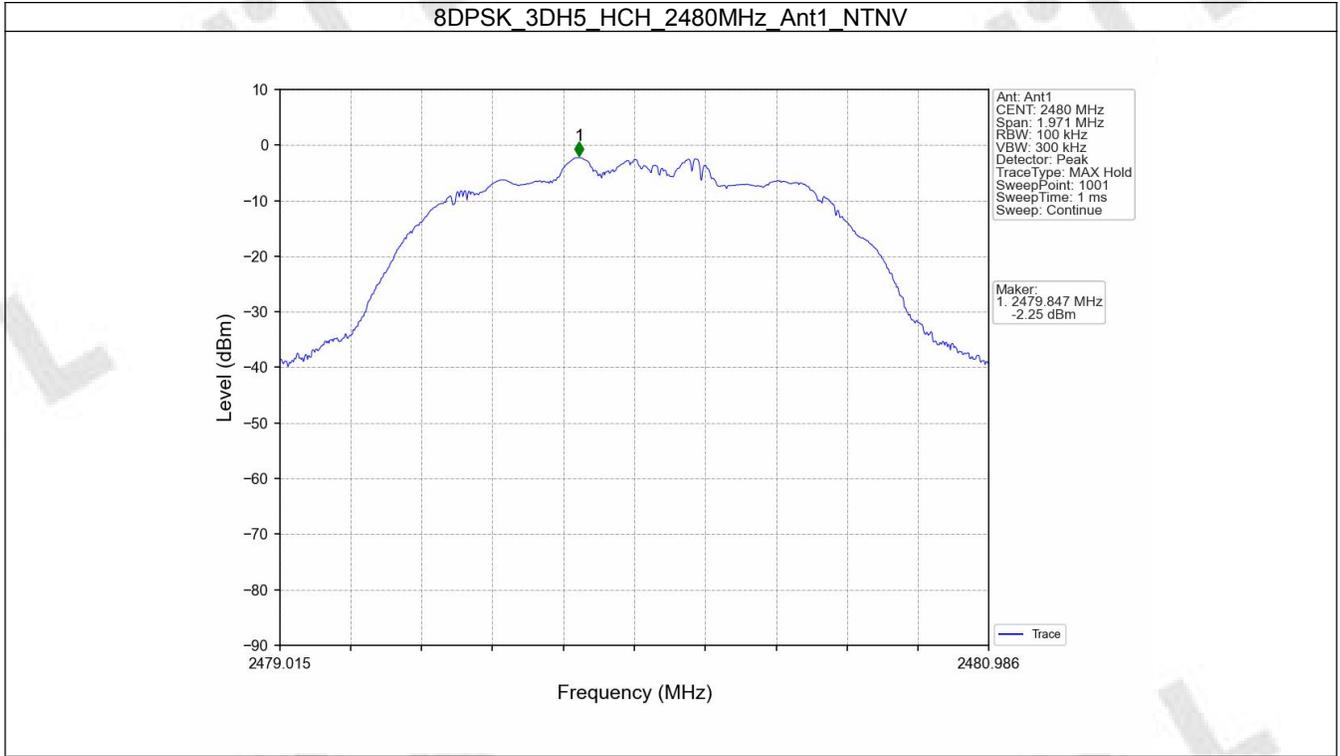


8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



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





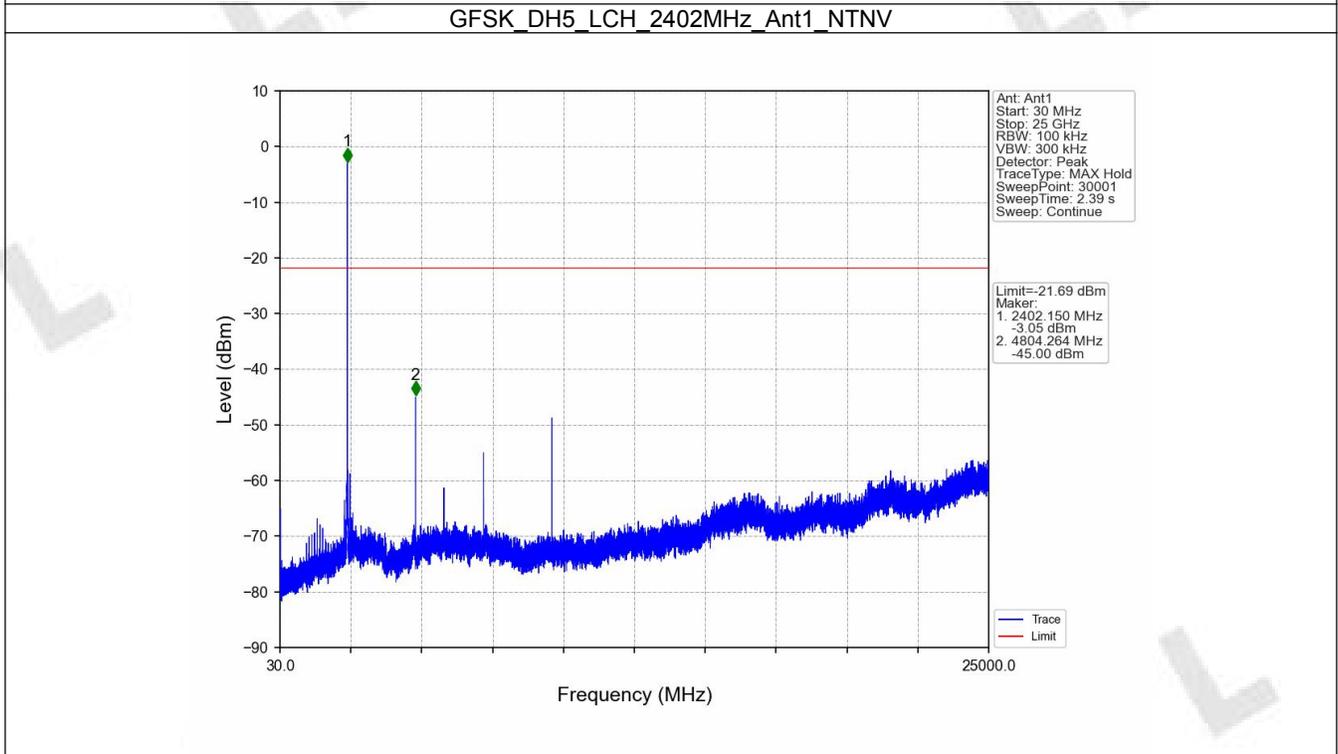
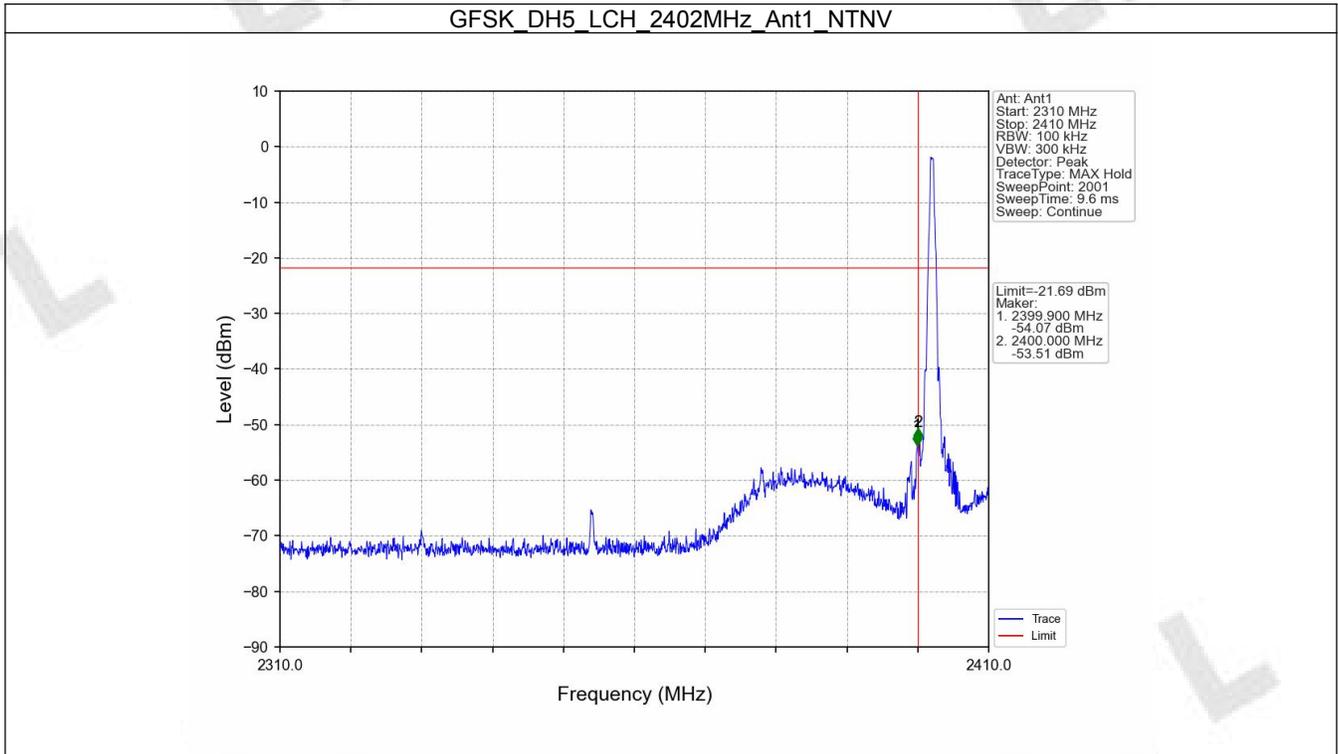
## 6.2 CSE

## 6.2.1 Test Result

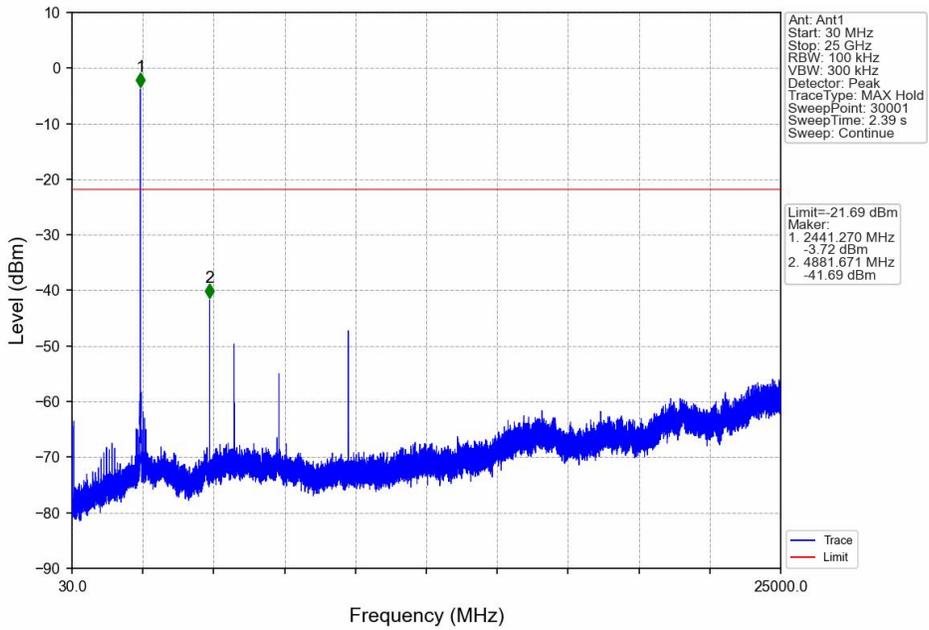
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	-1.69	-21.69	Pass
		2441	DH5	1	-1.69	-21.69	Pass
		2480	DH5	1	-1.69	-21.69	Pass
		HOPP	DH5	1	-1.69	-21.69	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	-1.81	-21.81	Pass
		2441	2DH5	1	-1.81	-21.81	Pass
		2480	2DH5	1	-1.81	-21.81	Pass
		HOPP	2DH5	1	-1.81	-21.81	Pass
8DPSK	SISO	2402	3DH5	1	-1.81	-21.81	Pass
		2441	3DH5	1	-1.81	-21.81	Pass
		2480	3DH5	1	-1.81	-21.81	Pass
		HOPP	3DH5	1	-1.81	-21.81	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.

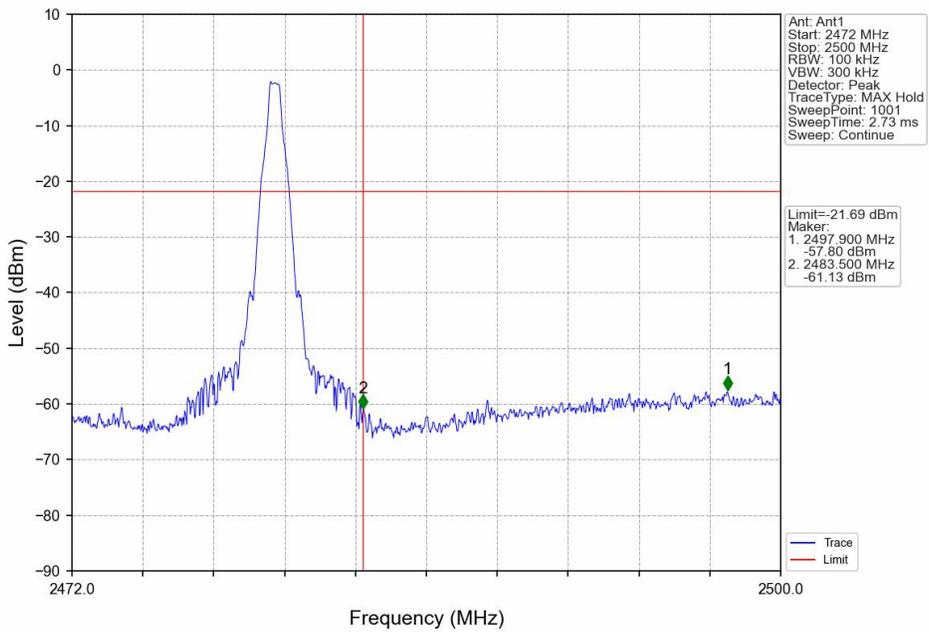
6.2.2 Test Graph



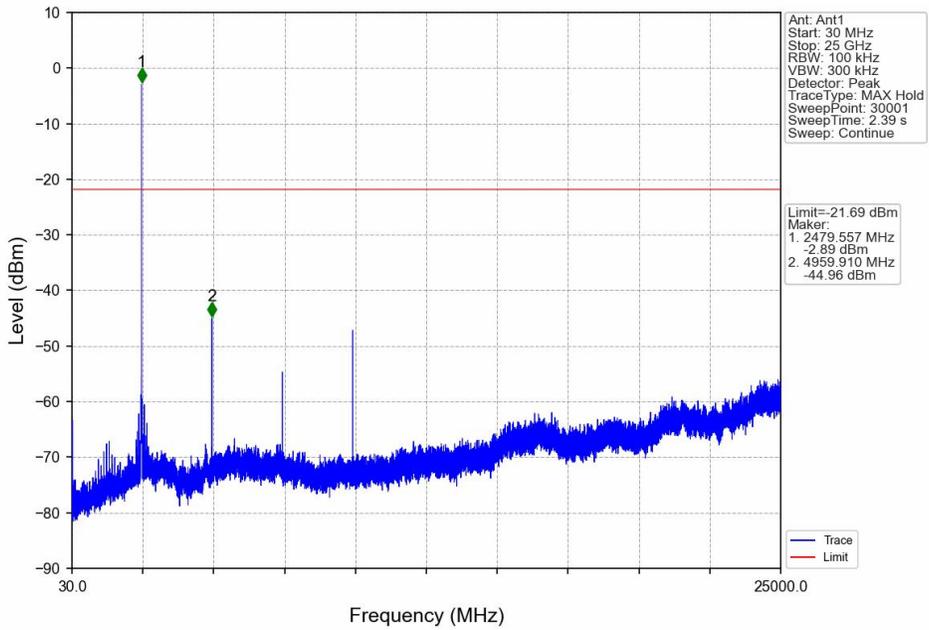
GFSK\_DH5\_MCH\_2441MHz\_Ant1\_NTNV



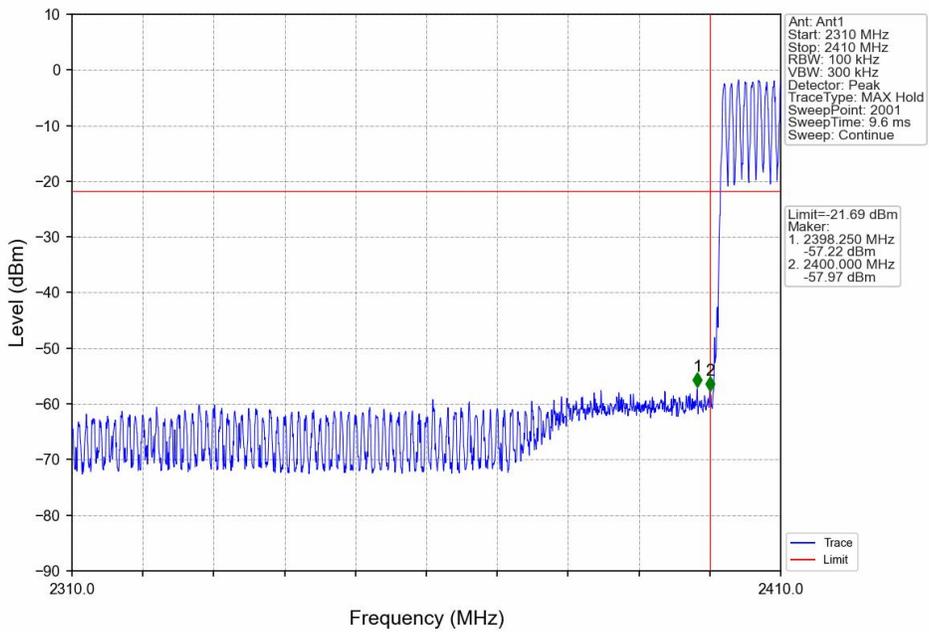
GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV

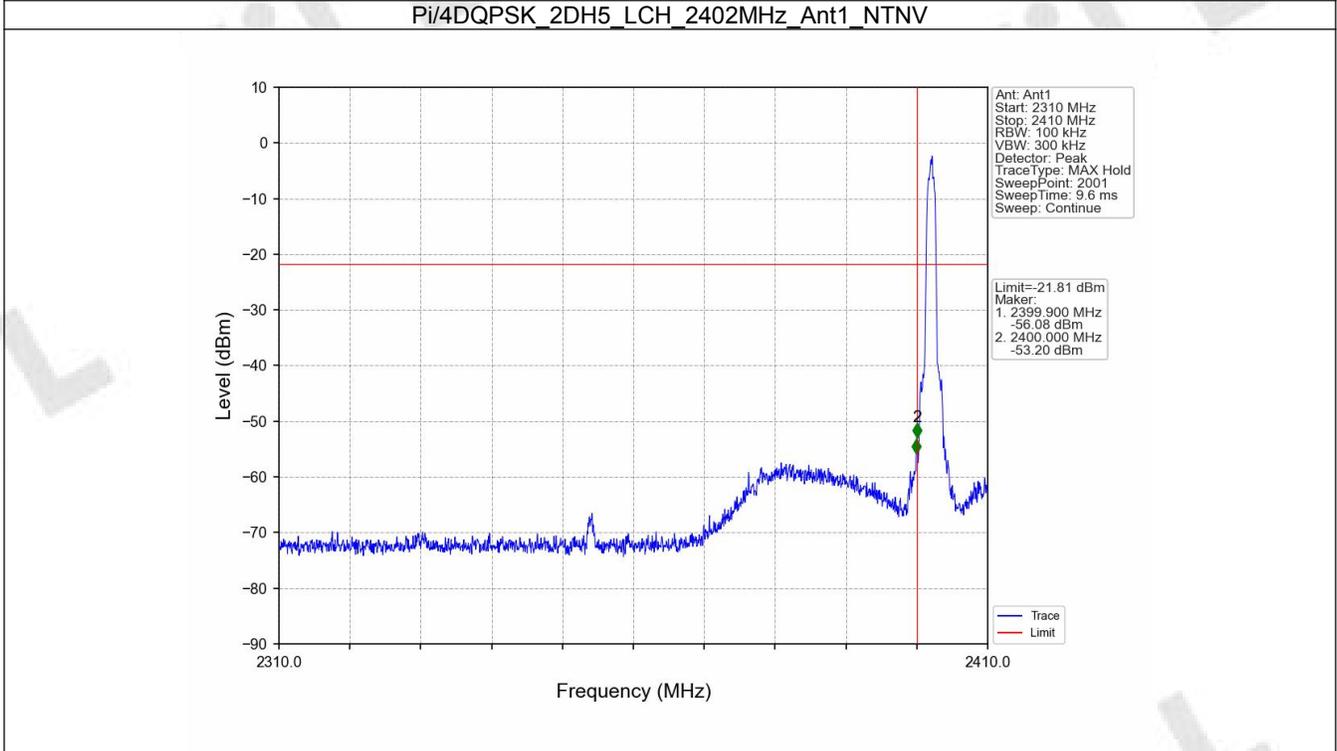
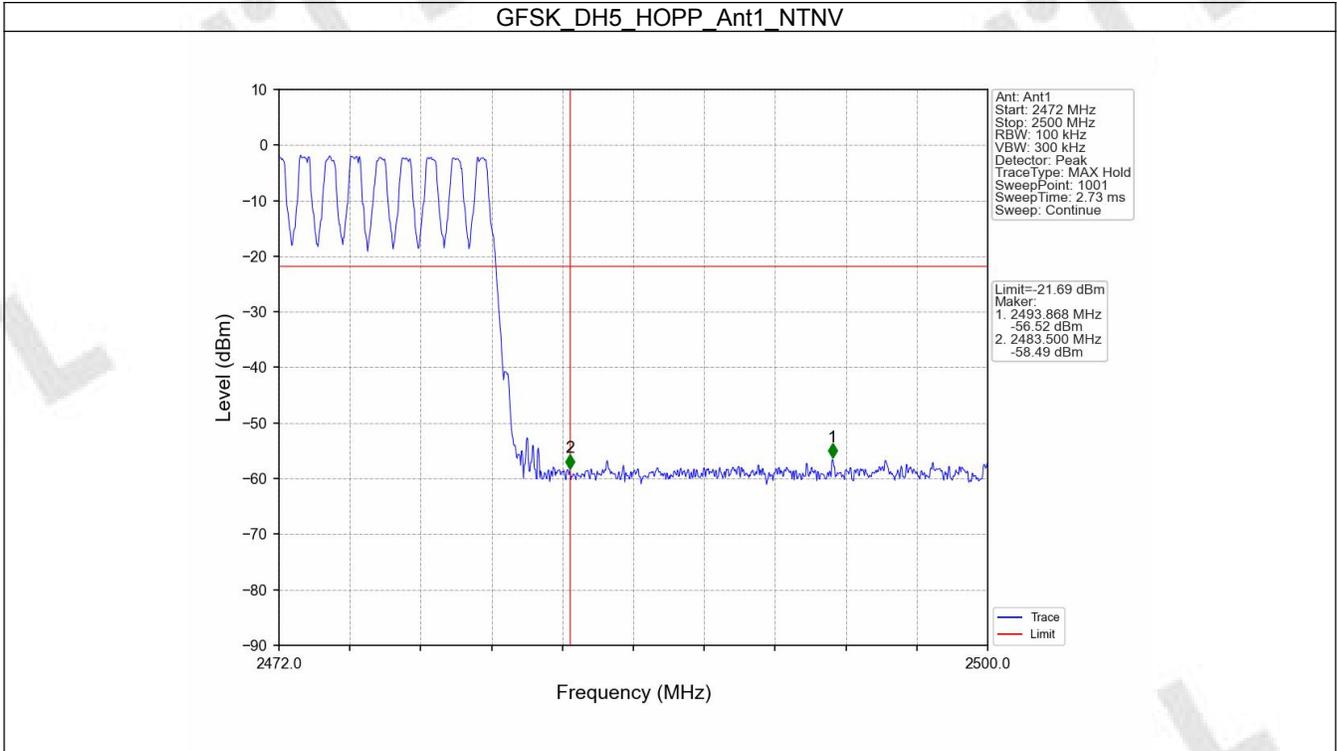


GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV

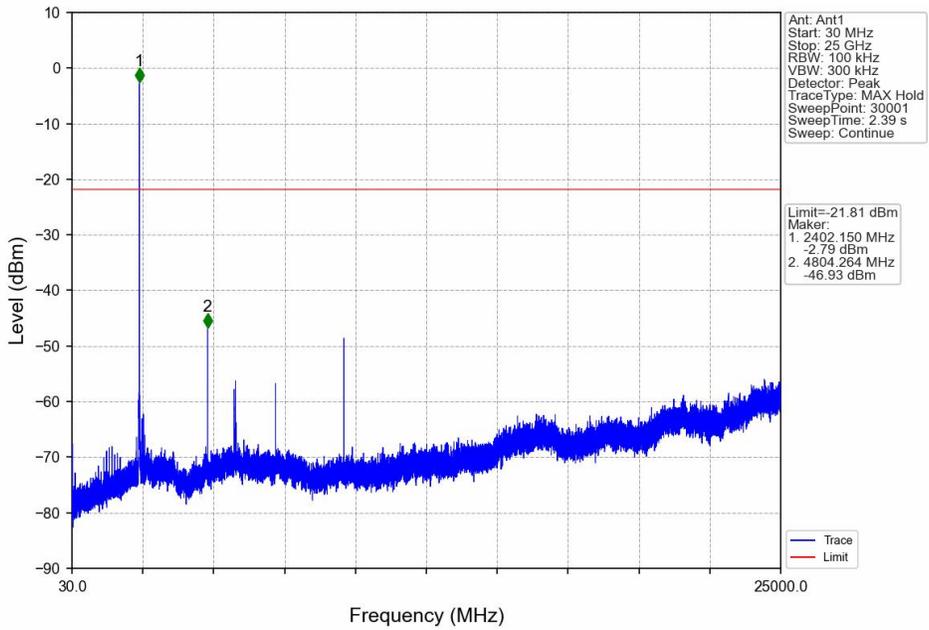


GFSK\_DH5\_HOPP\_Ant1\_NTNV

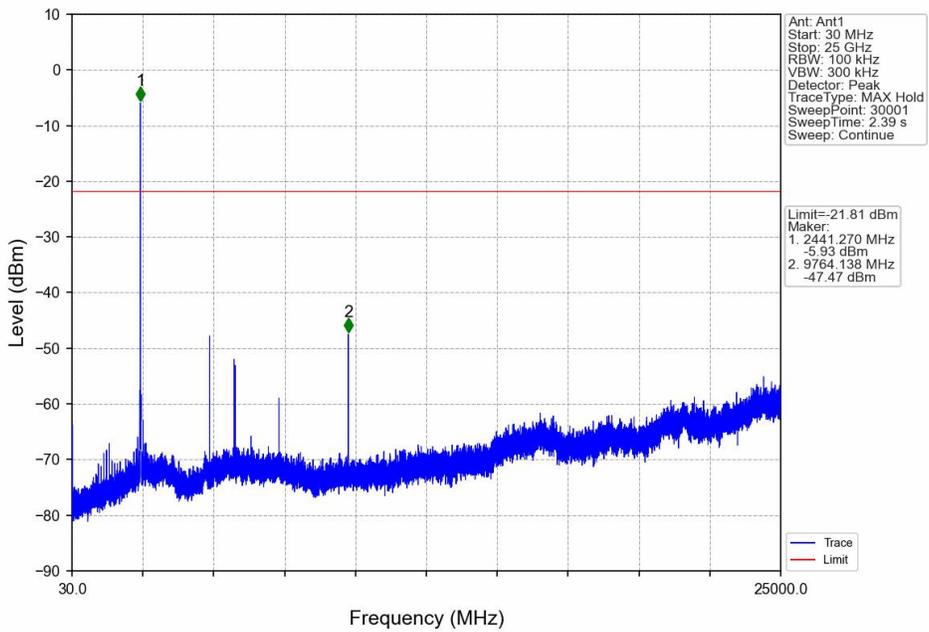




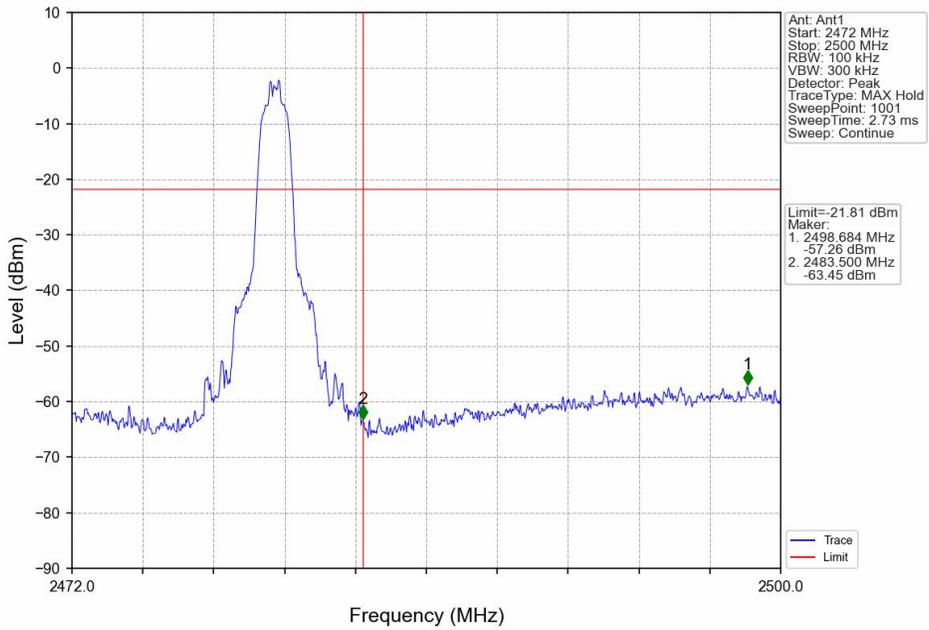
Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



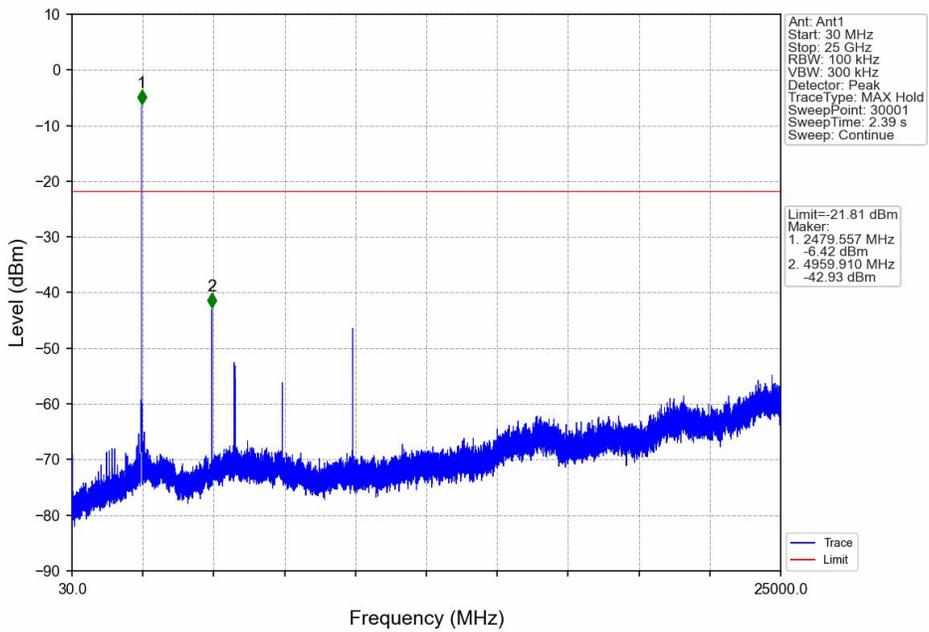
Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



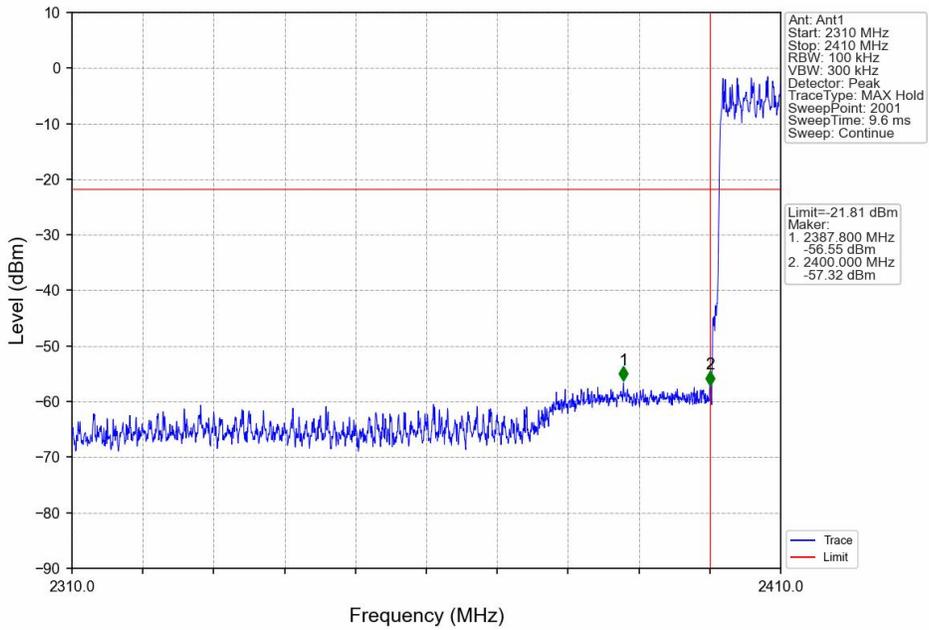
Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV



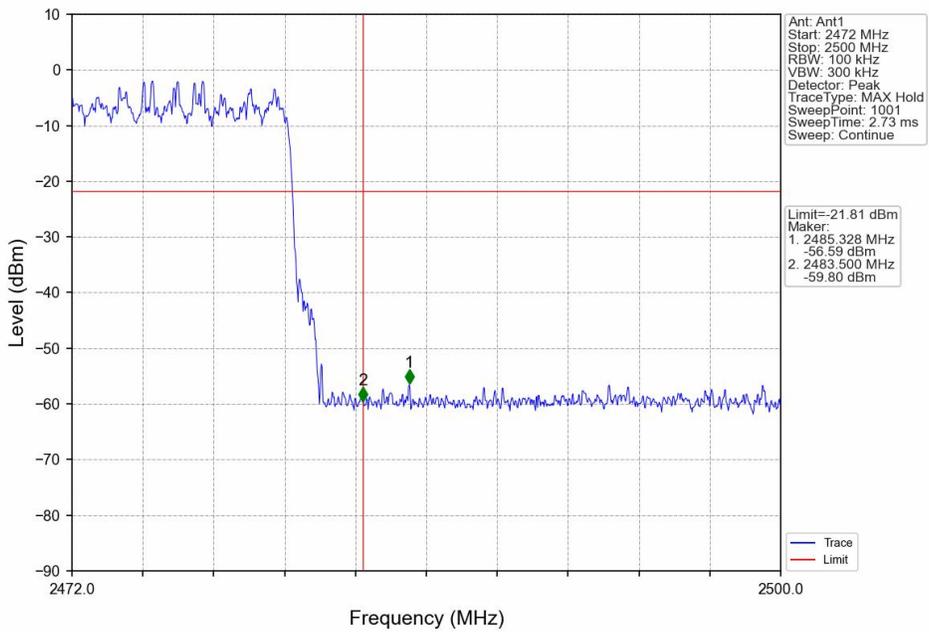
Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV



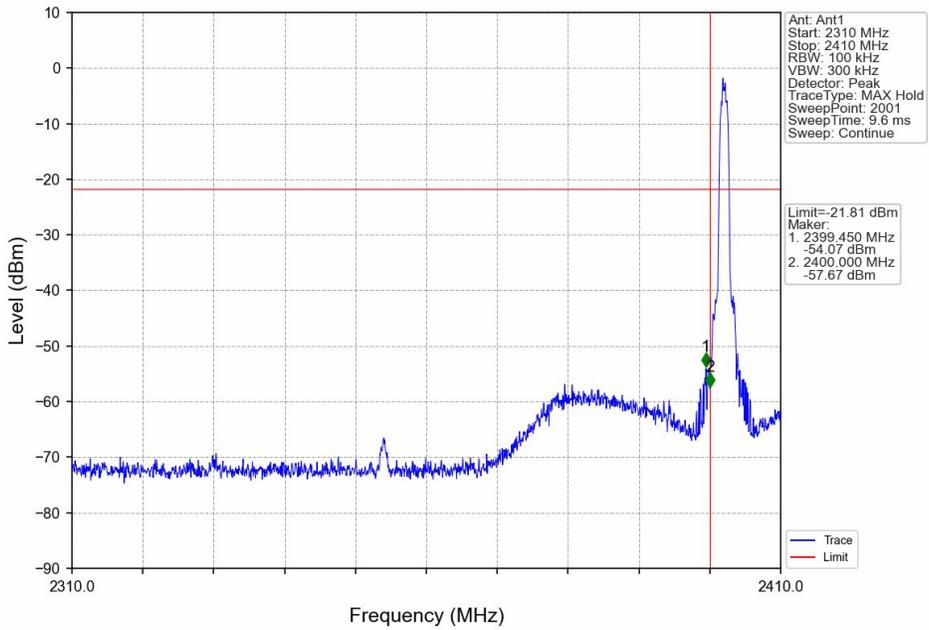
Pi/4DQPSK\_2DH5\_HOPP\_Ant1\_NTNV



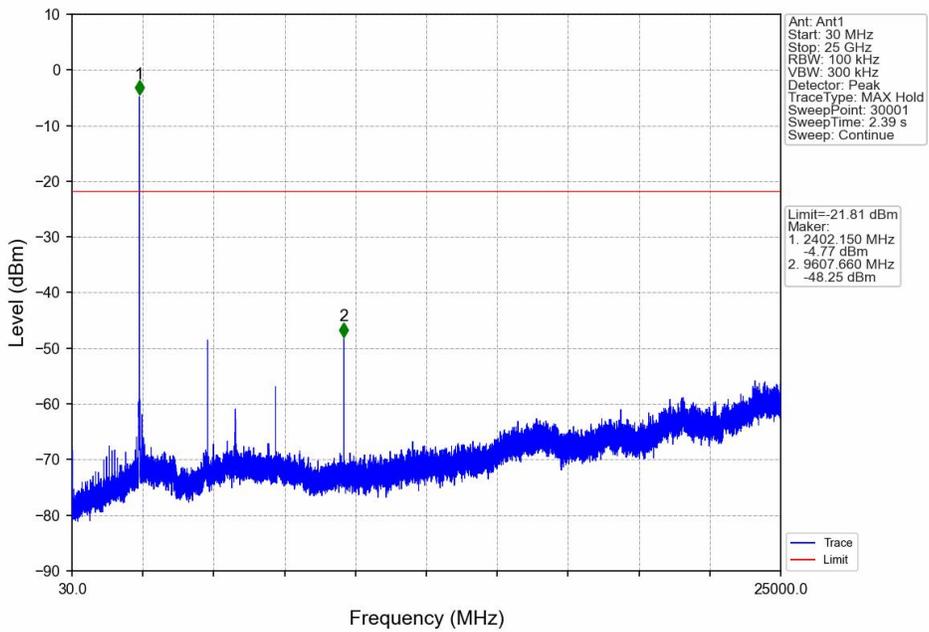
Pi/4DQPSK\_2DH5\_HOPP\_Ant1\_NTNV



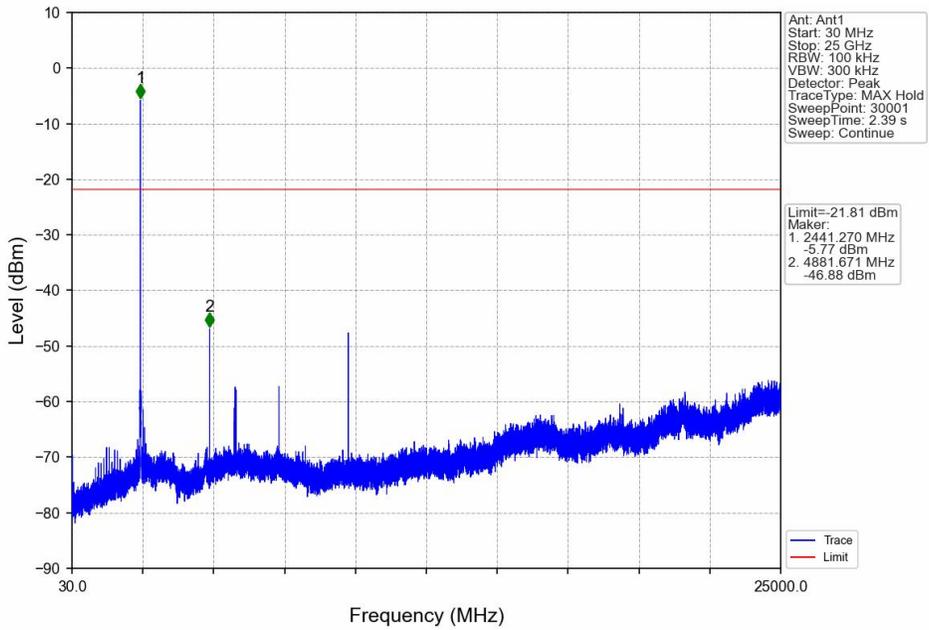
8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



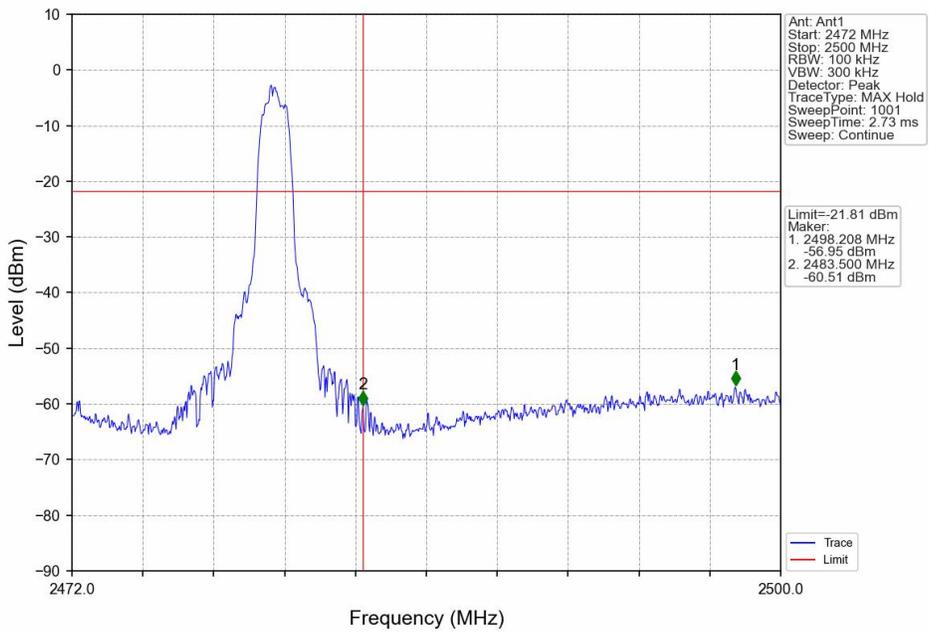
8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



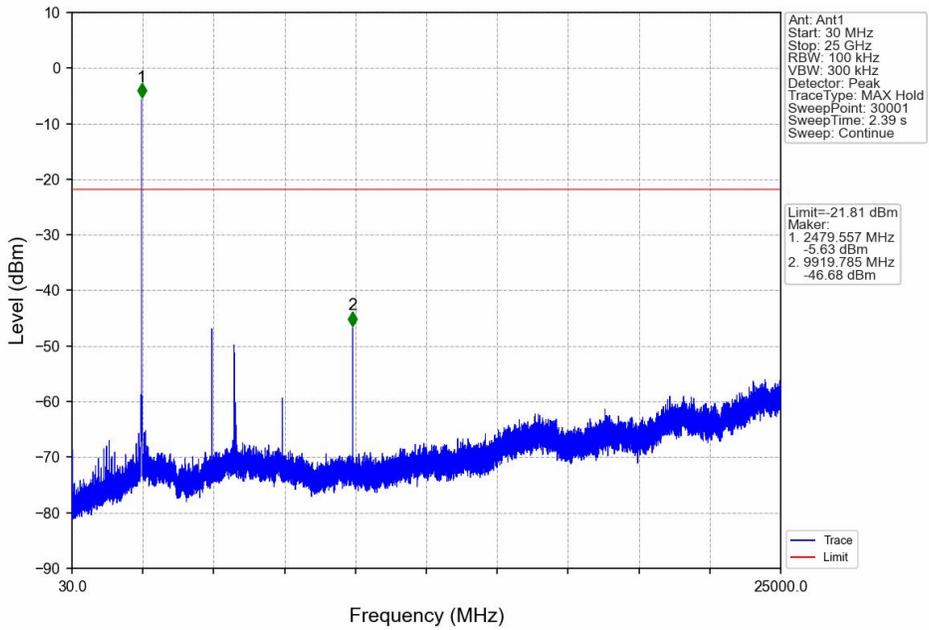
8DPSK\_3DH5\_MCH\_2441MHz\_Ant1\_NTNV



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



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



8DPSK\_3DH5\_HOPP\_Ant1\_NTNV

