



Shenzhen CTL Testing Technology Co., Ltd.

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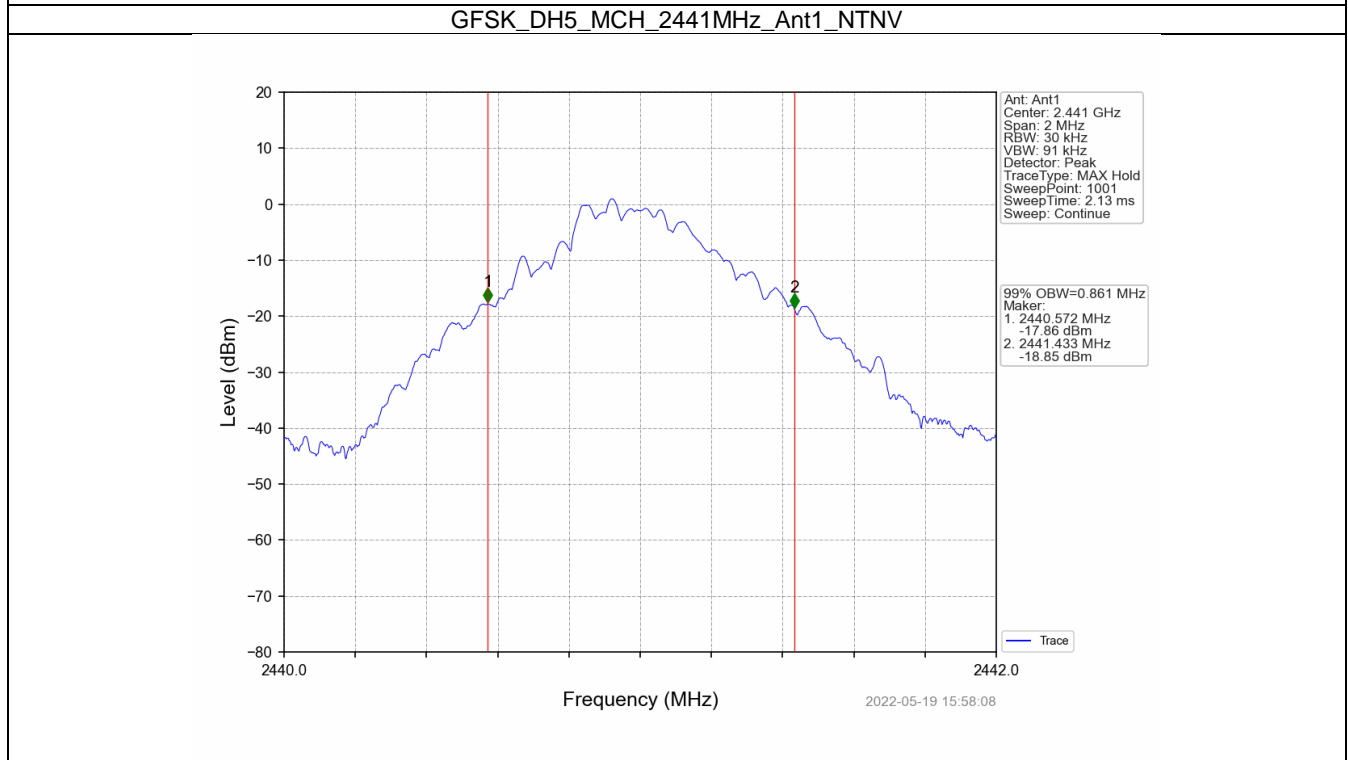
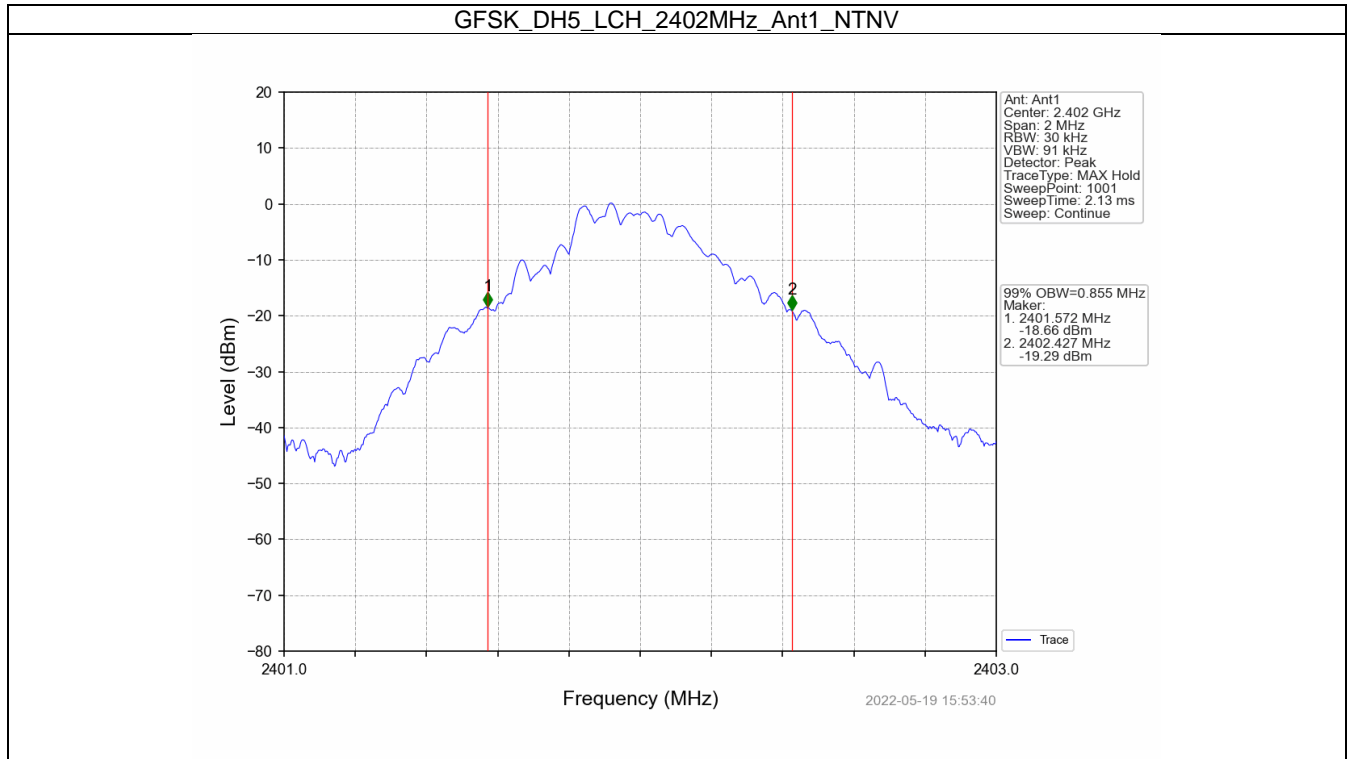
1. Bandwidth

1.1 OBW

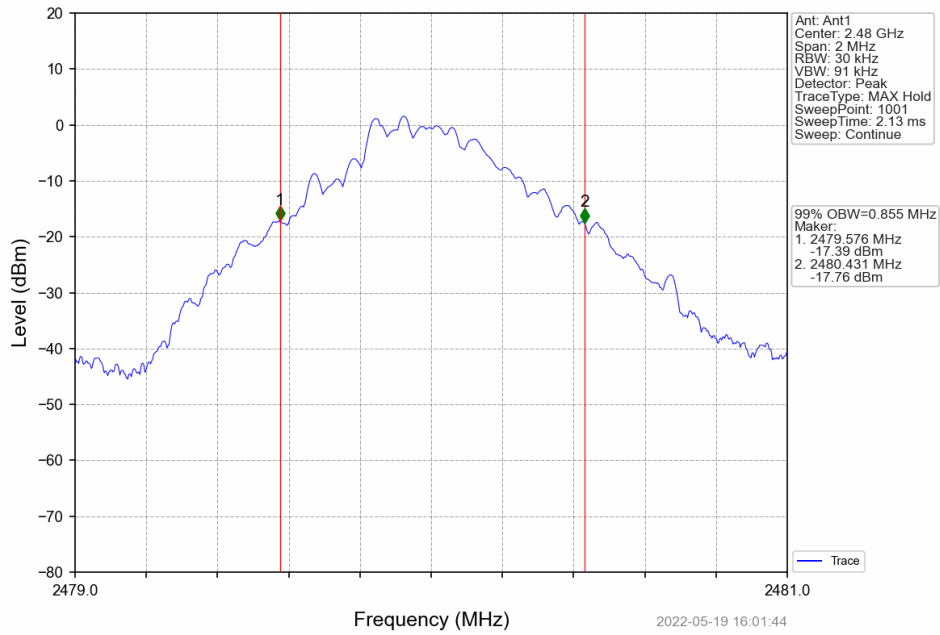
1.1.1 Test Result

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	0.861	Pass
		2480	DH5	1	0.855	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.186	Pass
		2441	2DH5	1	1.189	Pass
		2480	2DH5	1	1.193	Pass
8DPSK	SISO	2402	3DH5	1	1.189	Pass
		2441	3DH5	1	1.193	Pass
		2480	3DH5	1	1.197	Pass

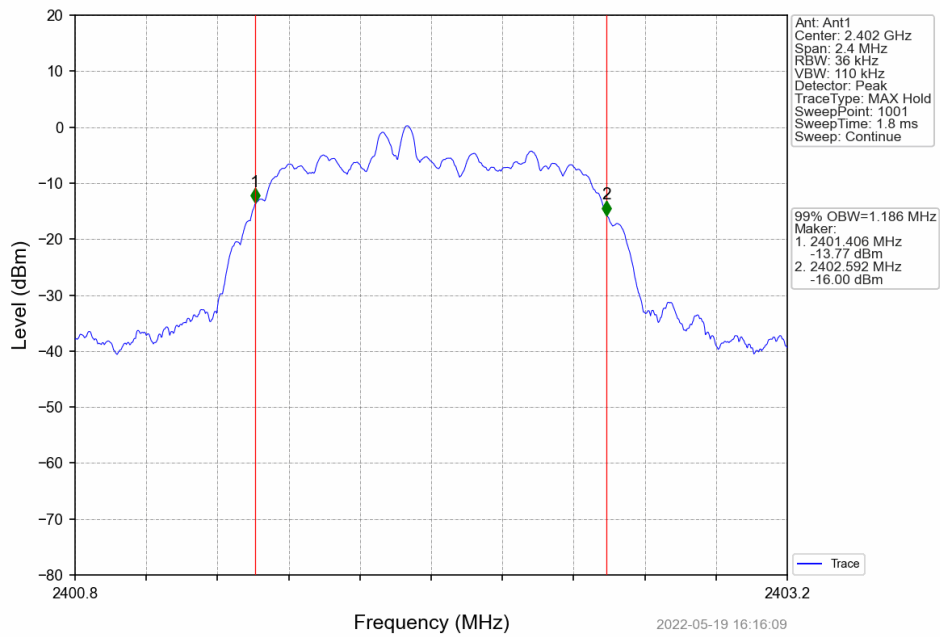
1.1.2 Test Graph



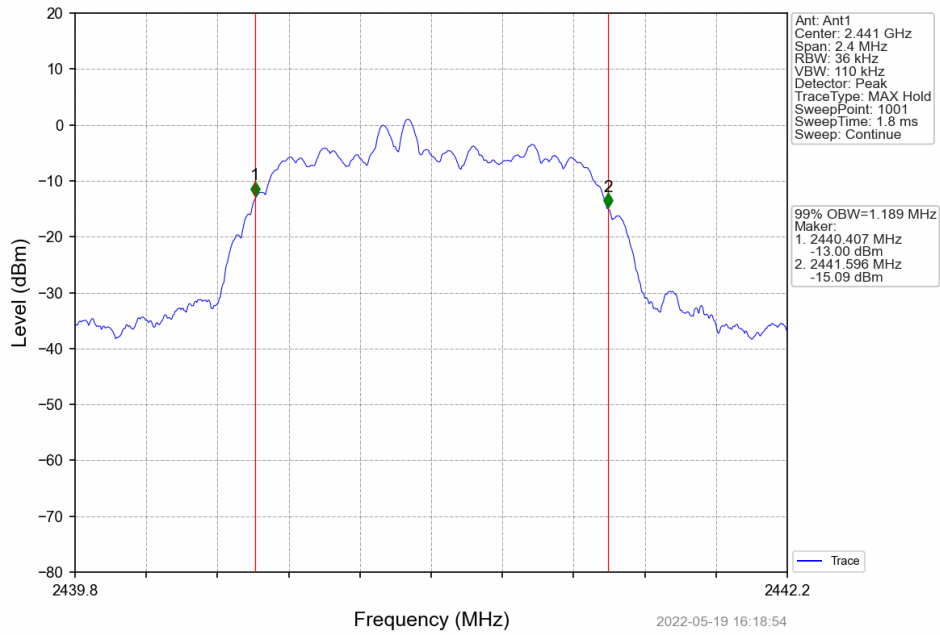
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



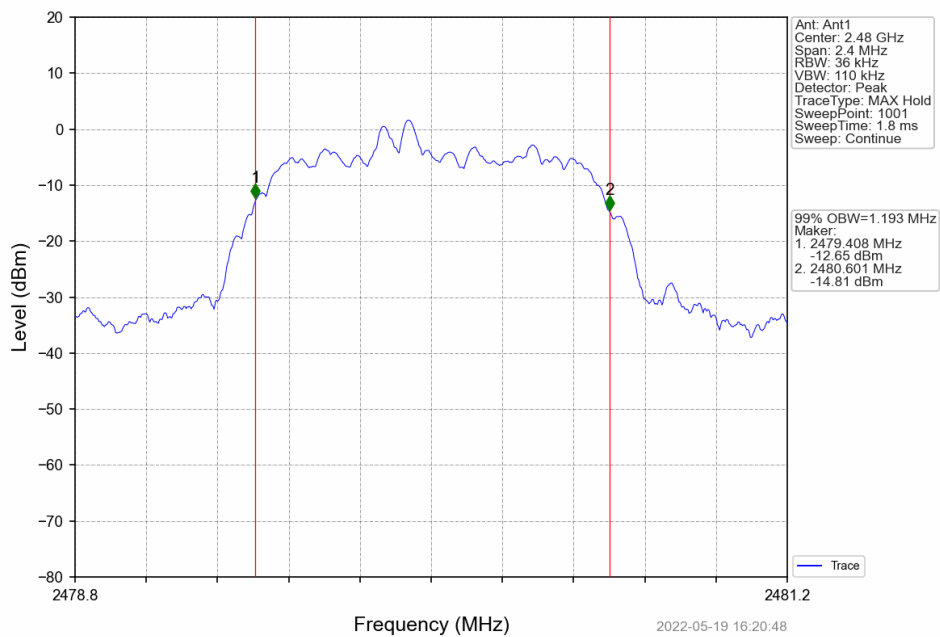
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



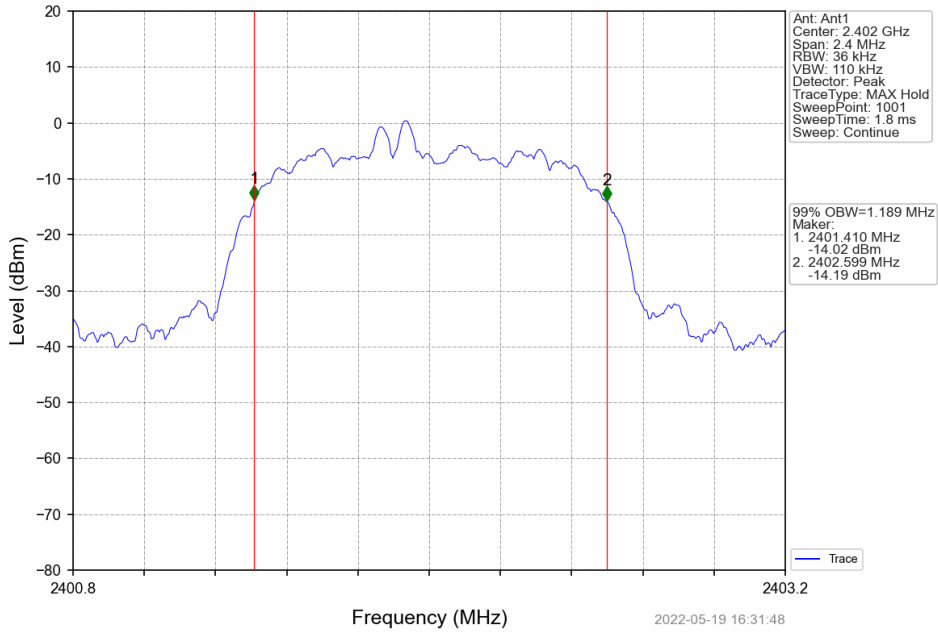
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



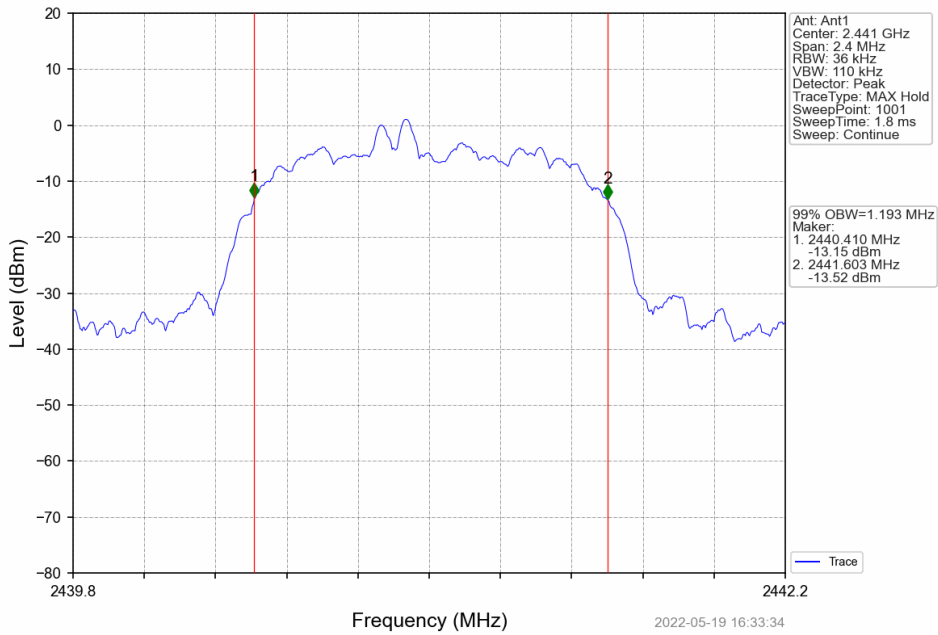
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

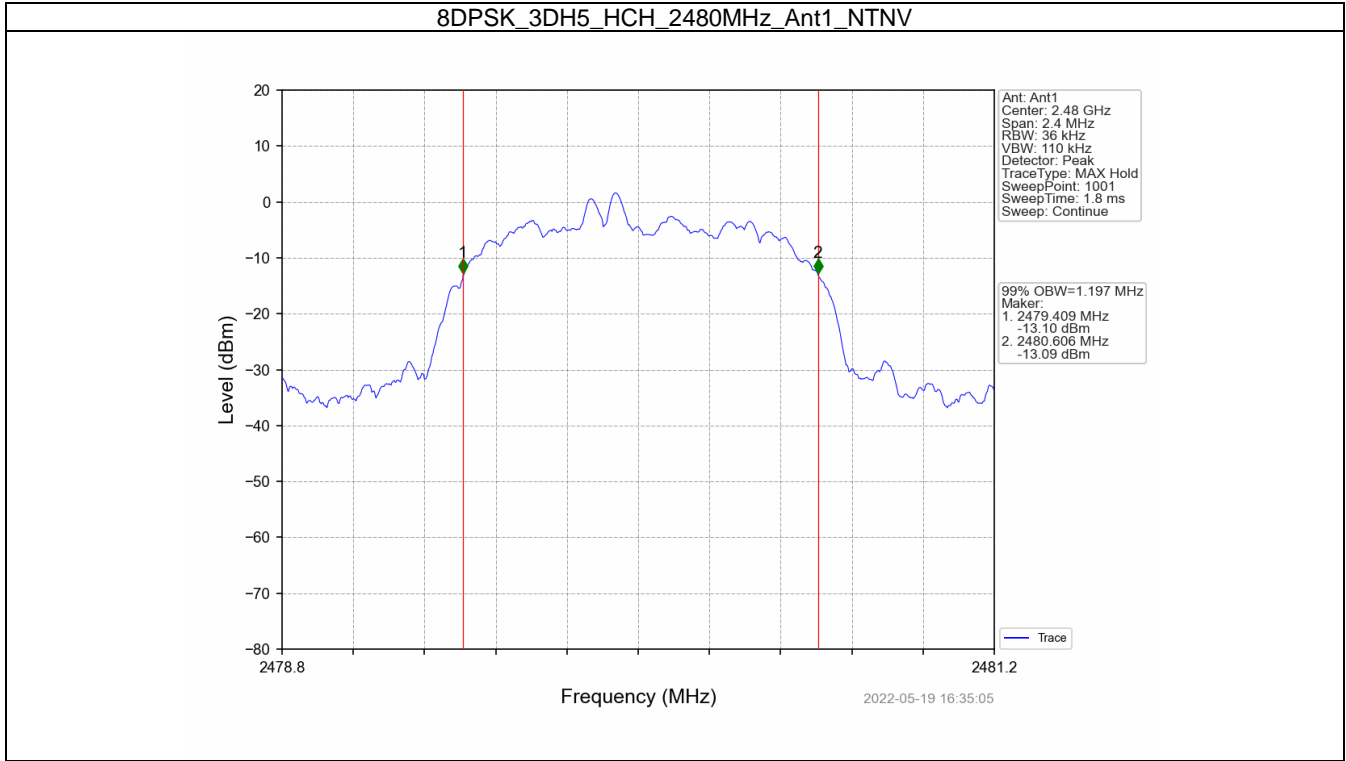


8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



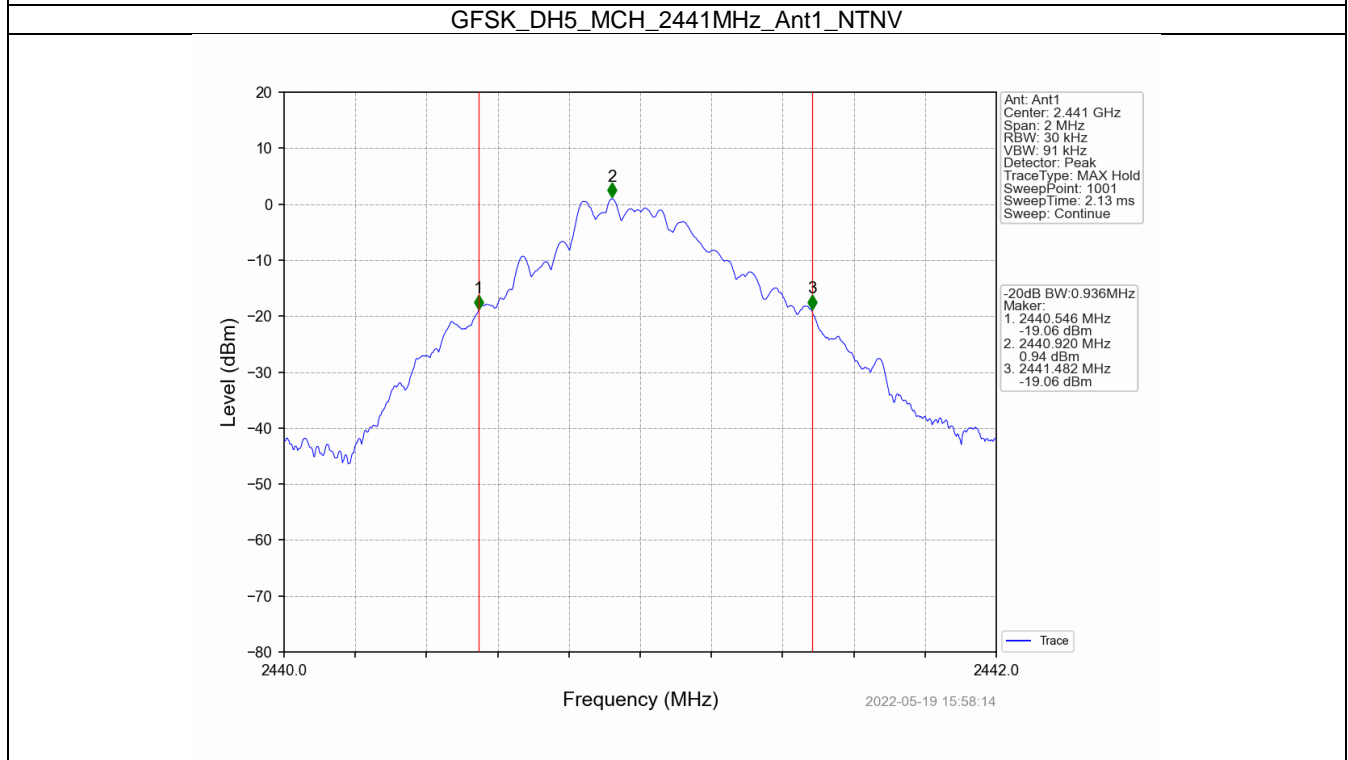
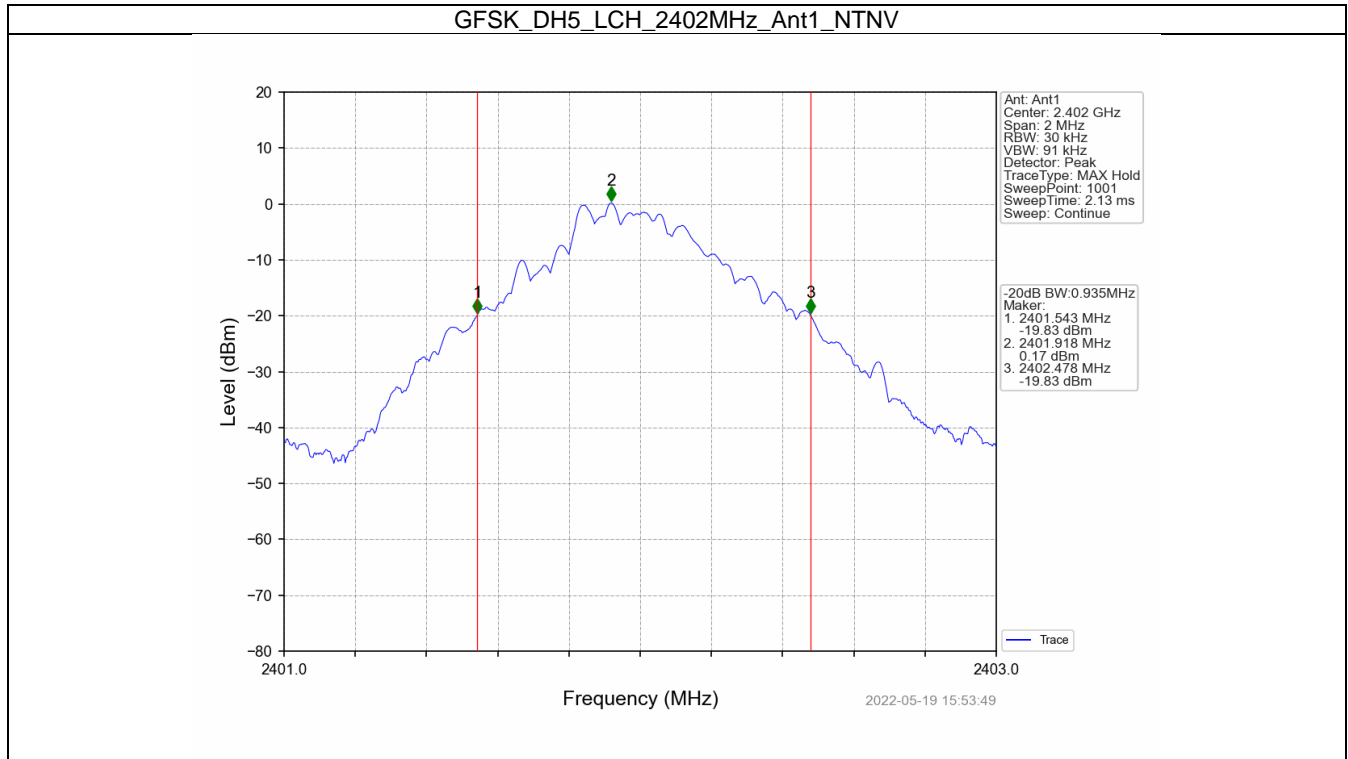


1.2 20dB BW

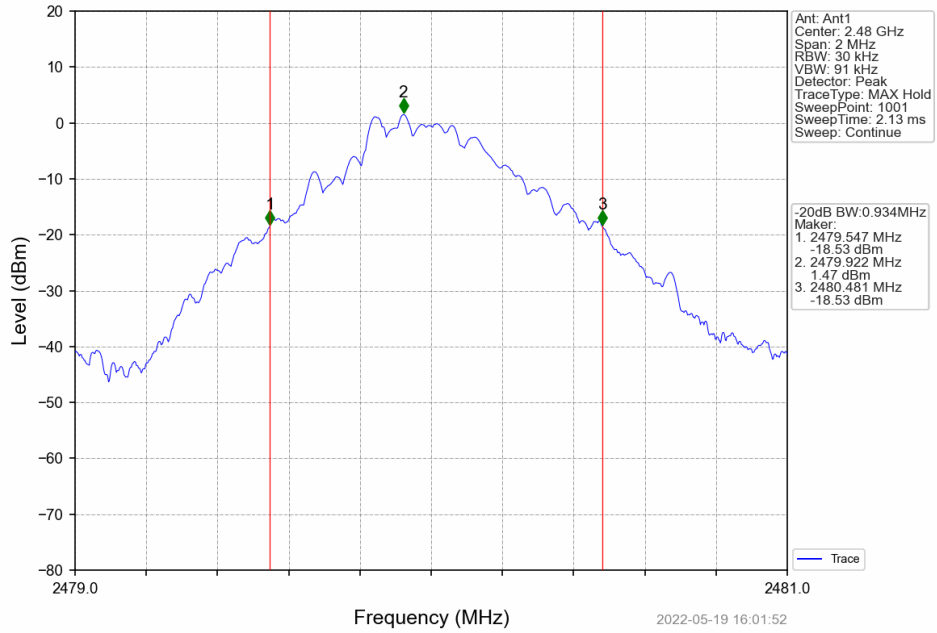
1.2.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)	Verdict
					Result	
GFSK	SISO	2402	DH5	1	0.935	Pass
		2441	DH5	1	0.936	Pass
		2480	DH5	1	0.934	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.294	Pass
		2441	2DH5	1	1.294	Pass
		2480	2DH5	1	1.294	Pass
8DPSK	SISO	2402	3DH5	1	1.304	Pass
		2441	3DH5	1	1.306	Pass
		2480	3DH5	1	1.304	Pass

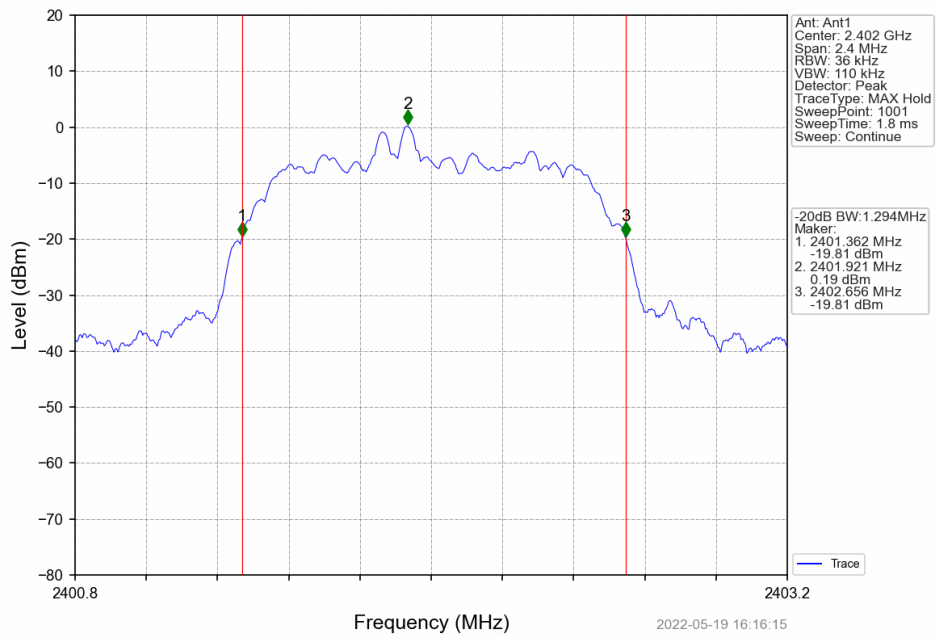
1.2.2 Test Graph



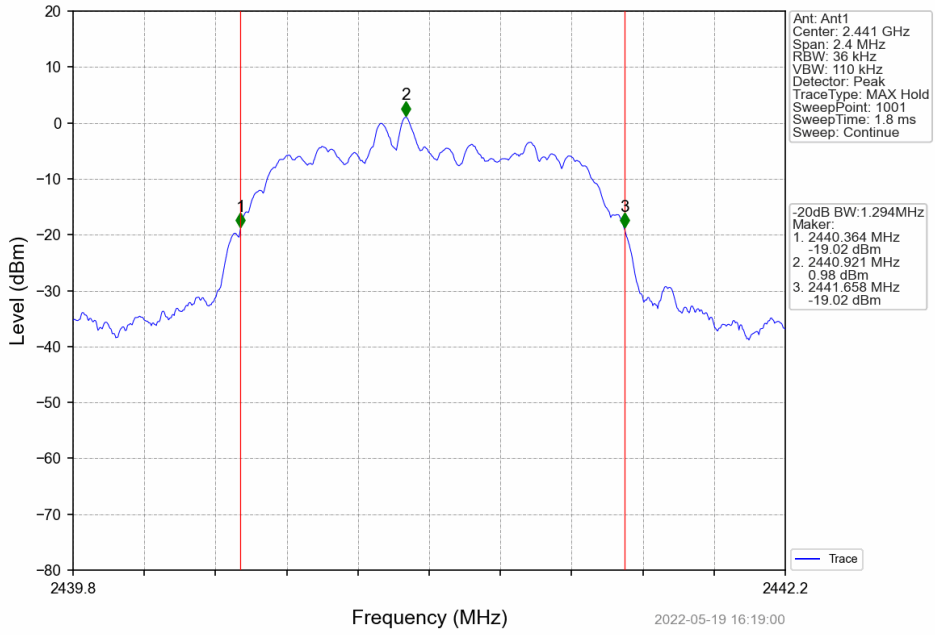
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



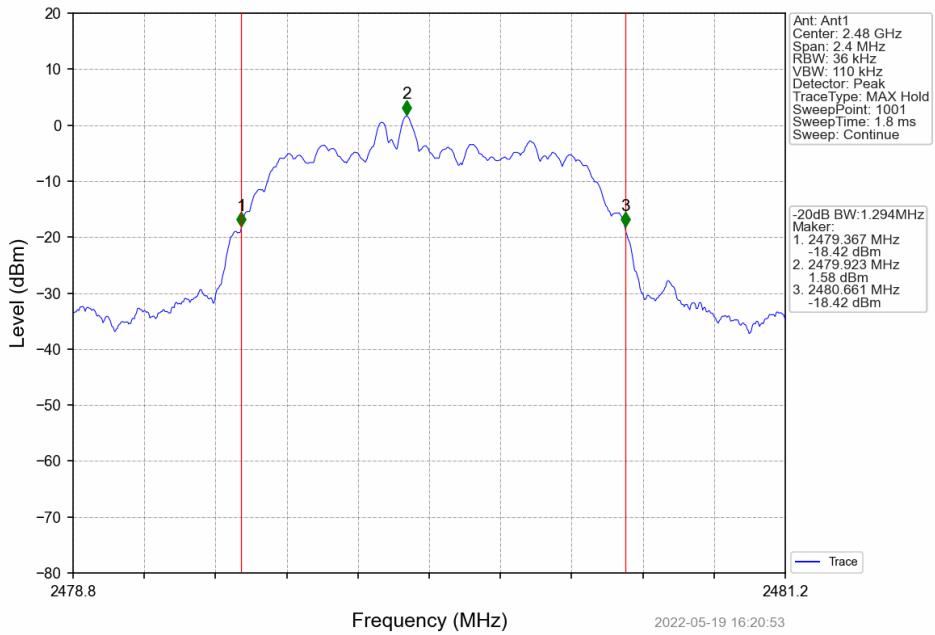
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



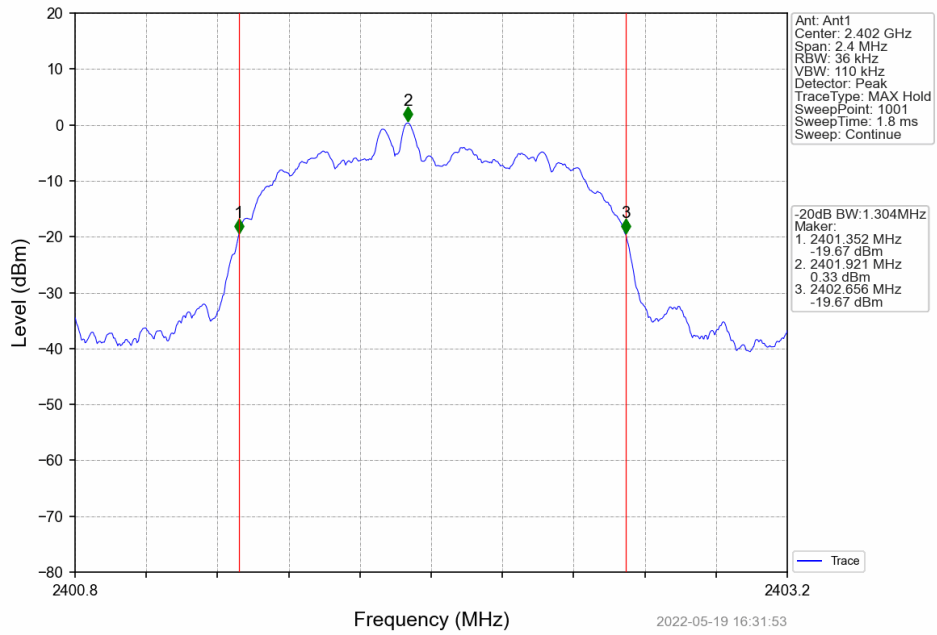
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



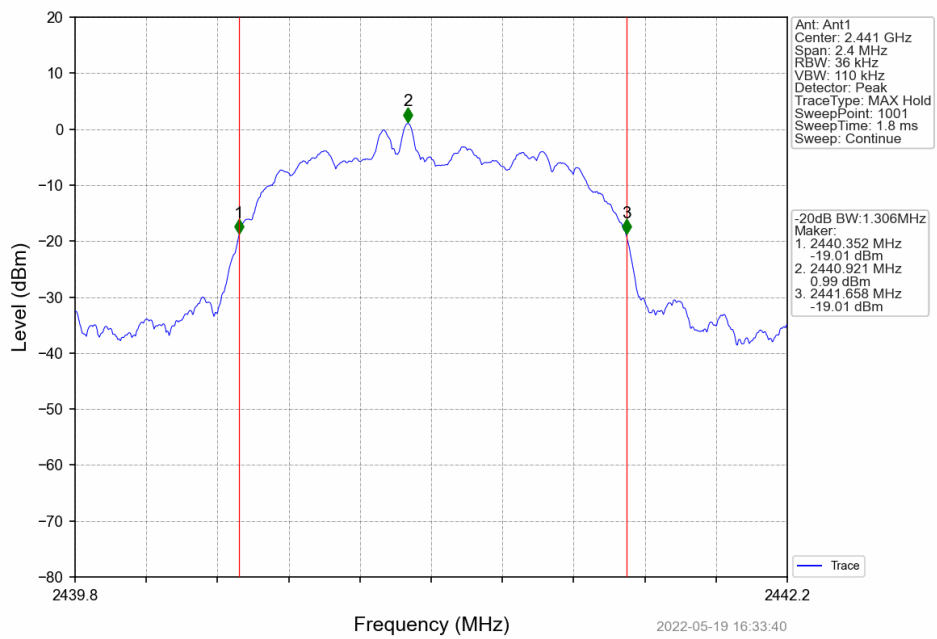
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

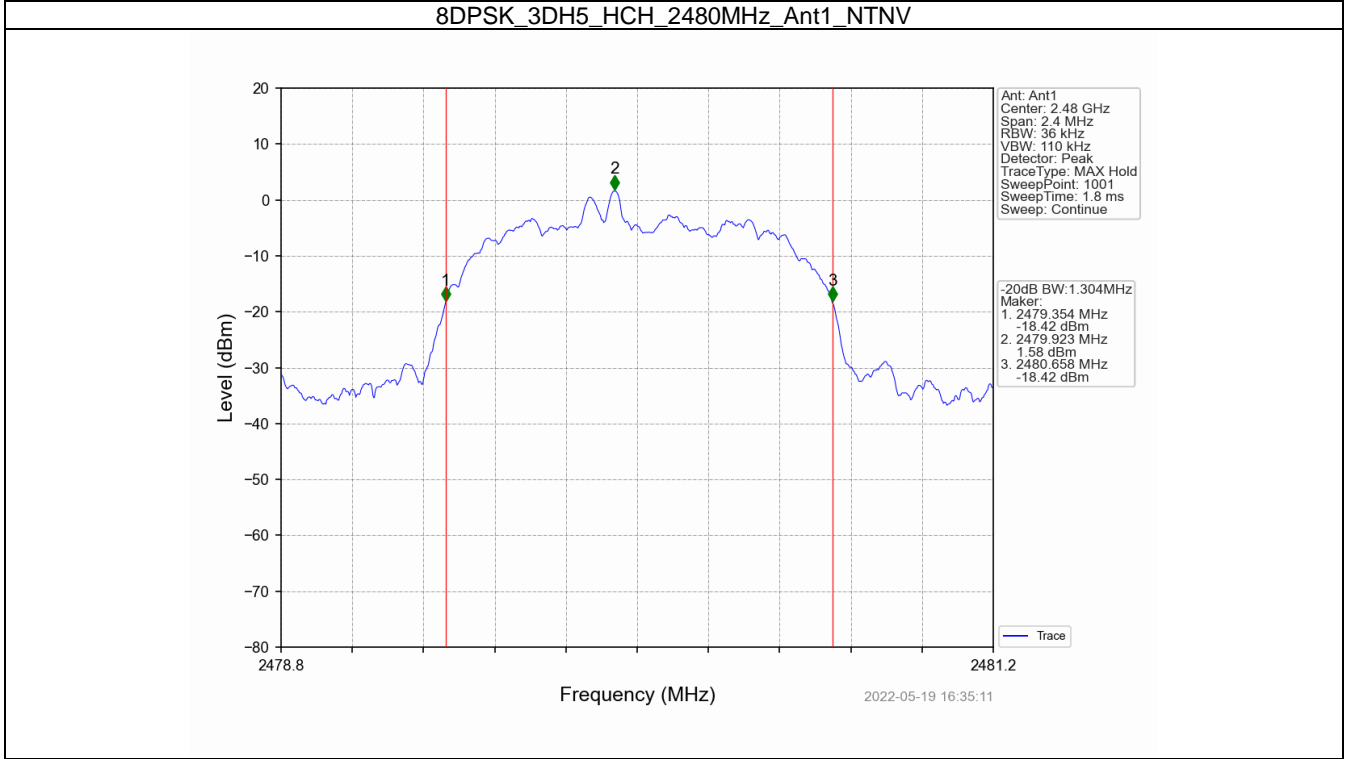


8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV





2. Maximum Conducted Output Power

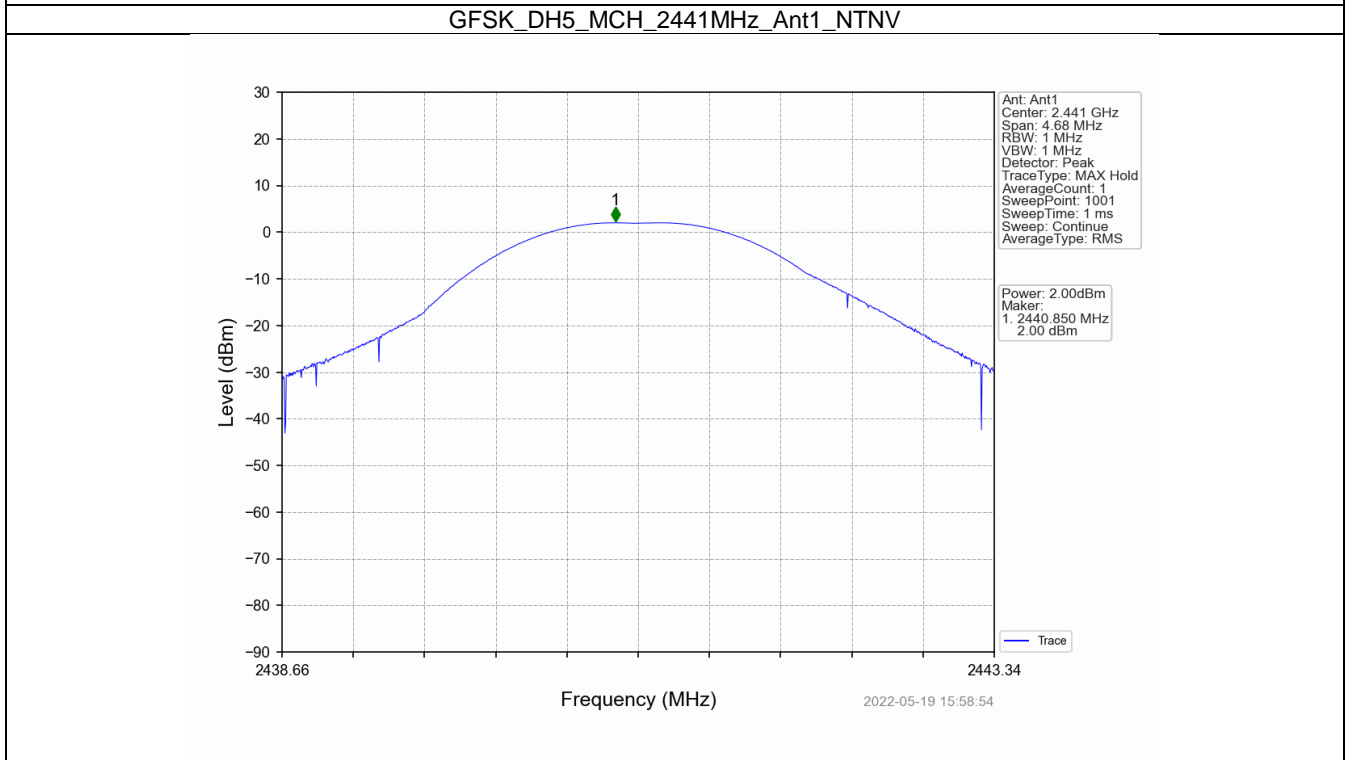
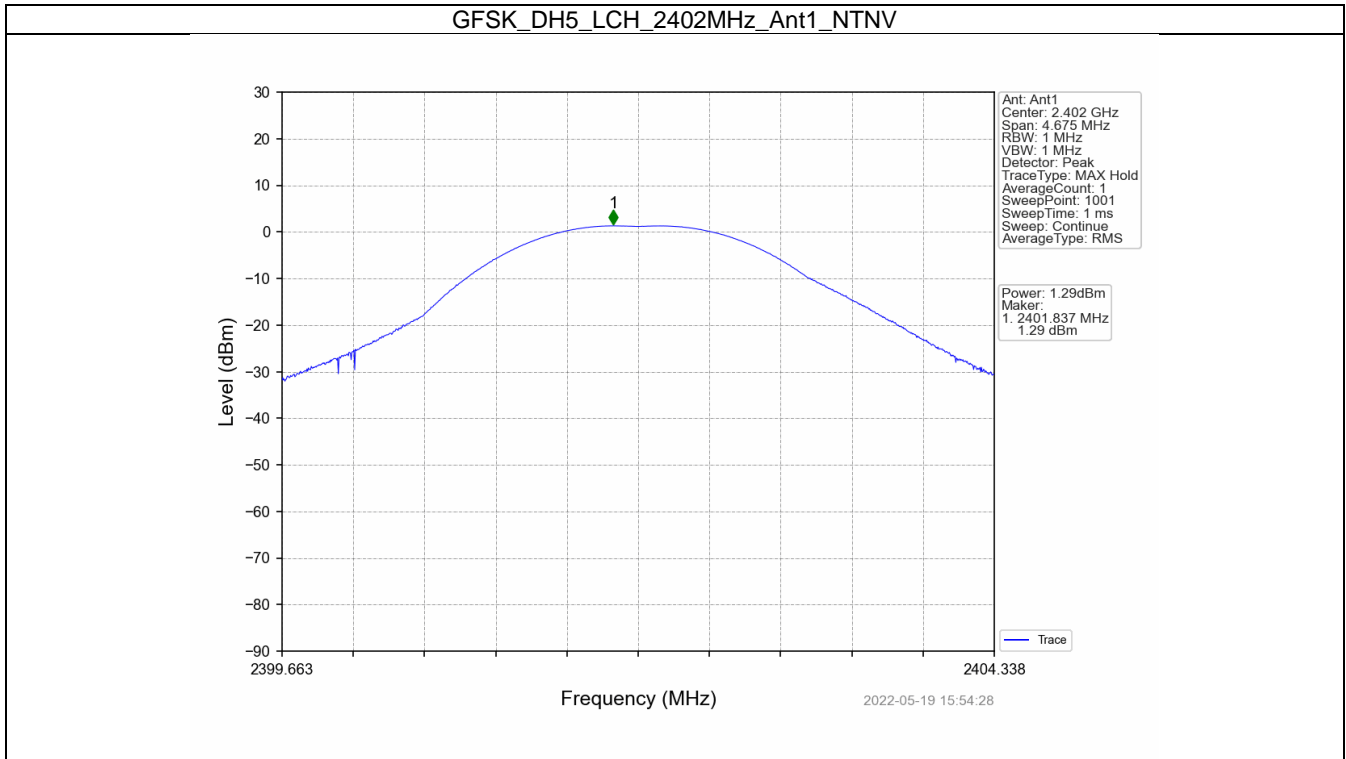
2.1 Power

2.1.1 Test Result

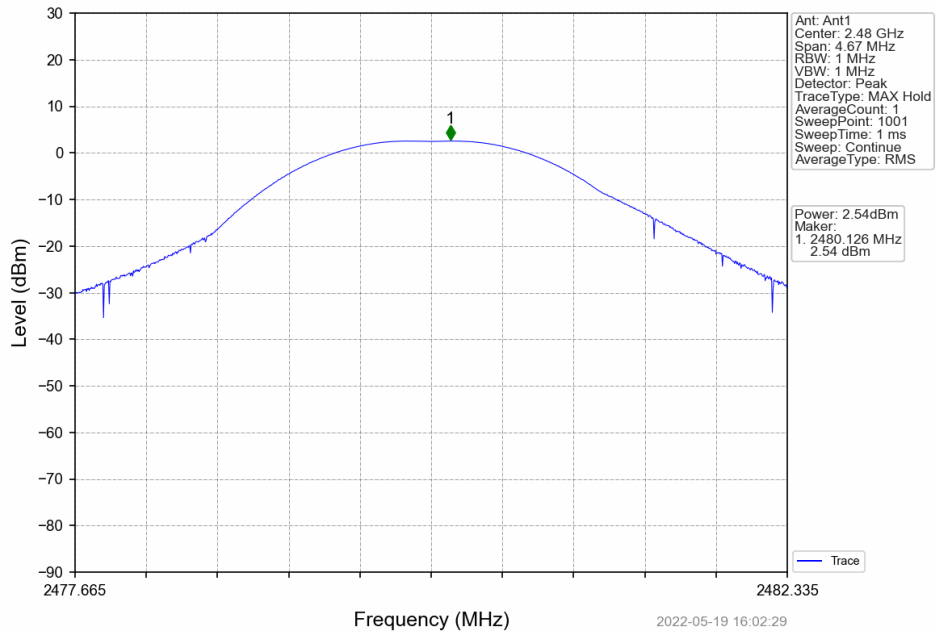
Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	1.29	<=30	Pass
		2441	DH5	2.00	<=30	Pass
		2480	DH5	2.54	<=30	Pass
Pi/4DQPSK	SISO	2402	2DH5	4.68	<=20.97	Pass
		2441	2DH5	5.58	<=20.97	Pass
		2480	2DH5	6.05	<=20.97	Pass
8DPSK	SISO	2402	3DH5	5.29	<=20.97	Pass
		2441	3DH5	6.13	<=20.97	Pass
		2480	3DH5	6.83	<=20.97	Pass

Note1: Antenna Gain: Ant1: 0.00dBi;

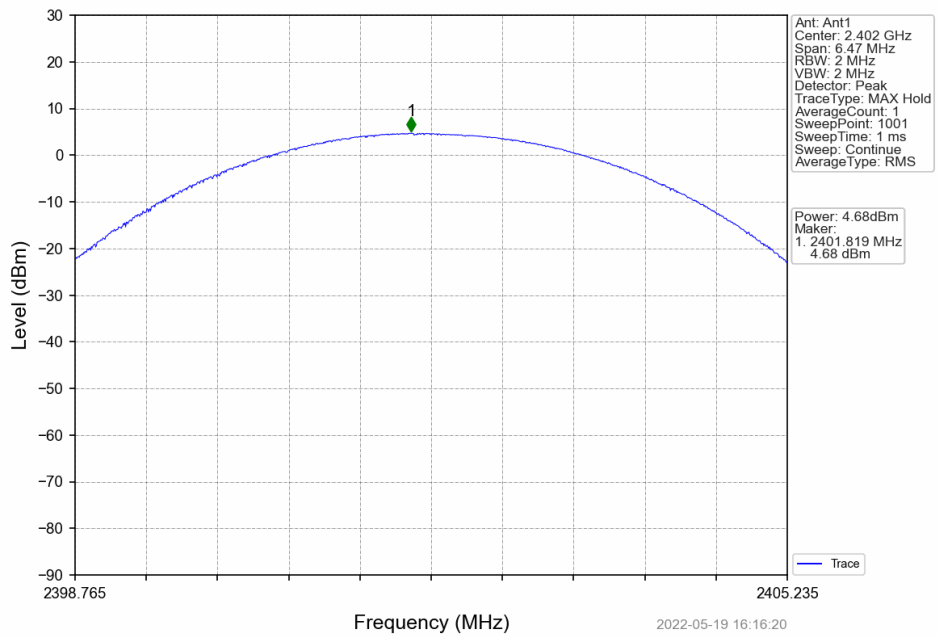
2.1.2 Test Graph



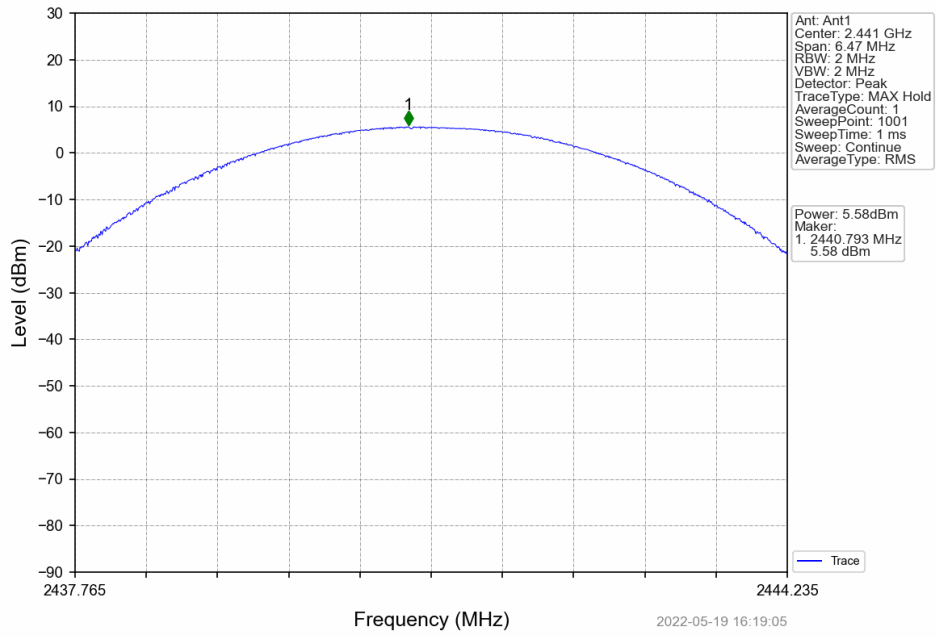
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



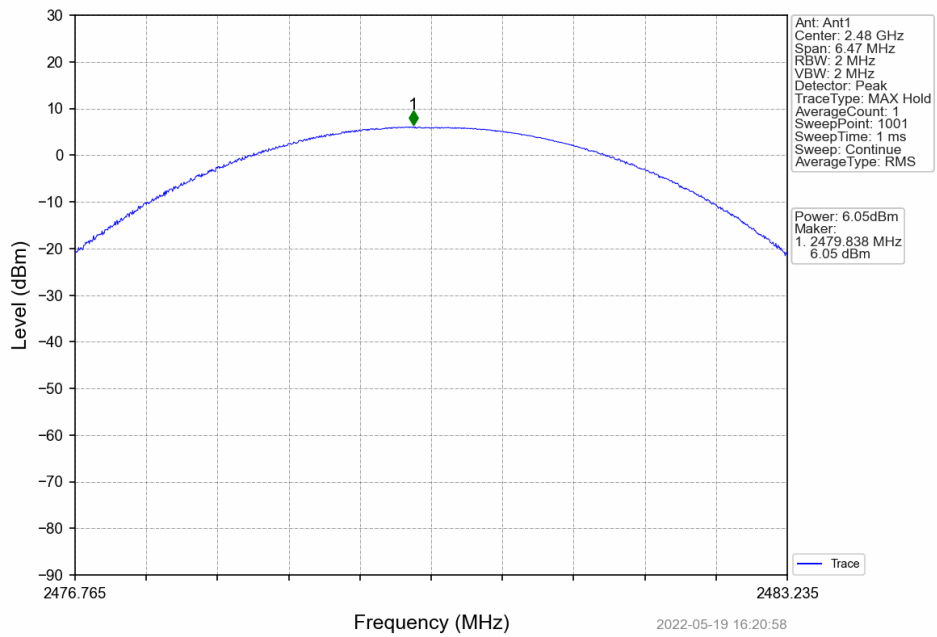
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



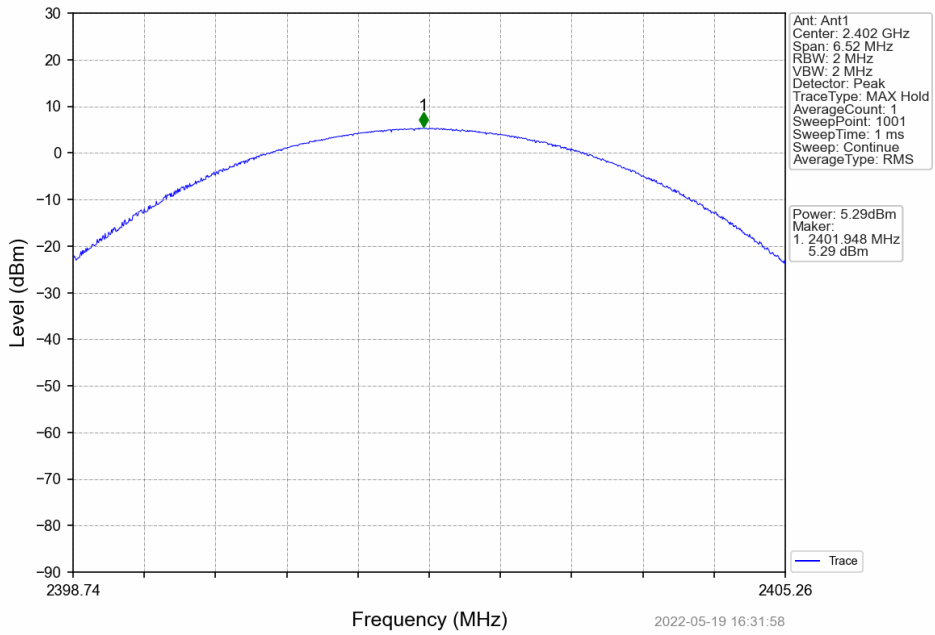
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



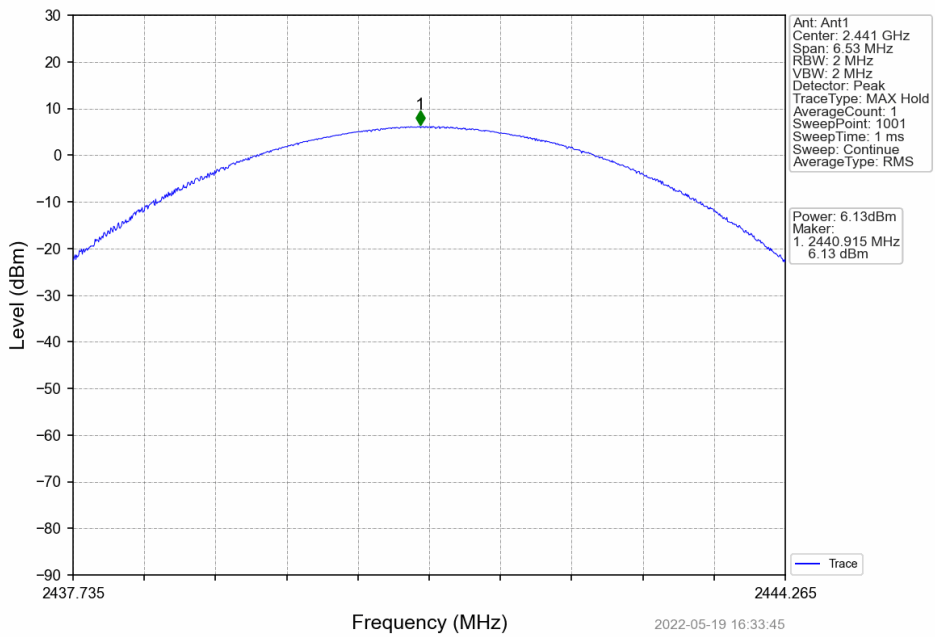
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

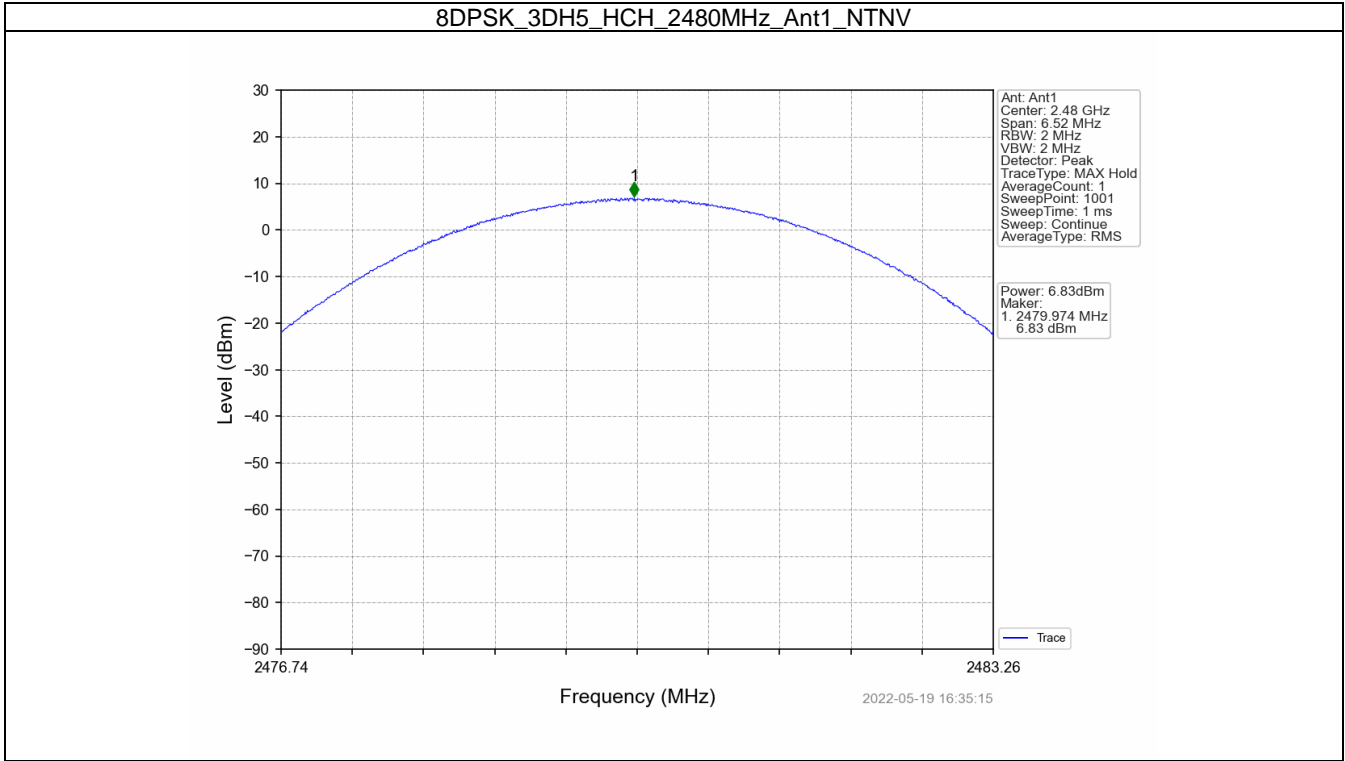


8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV





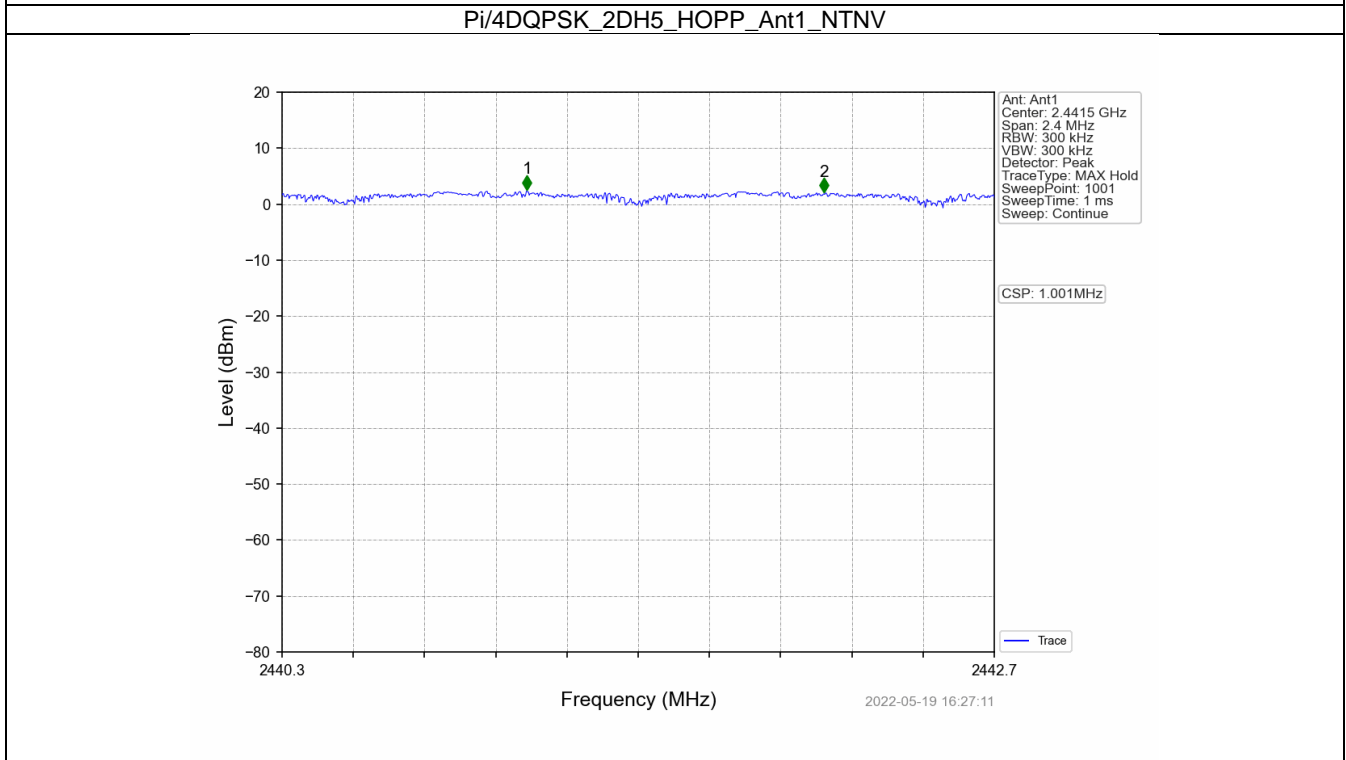
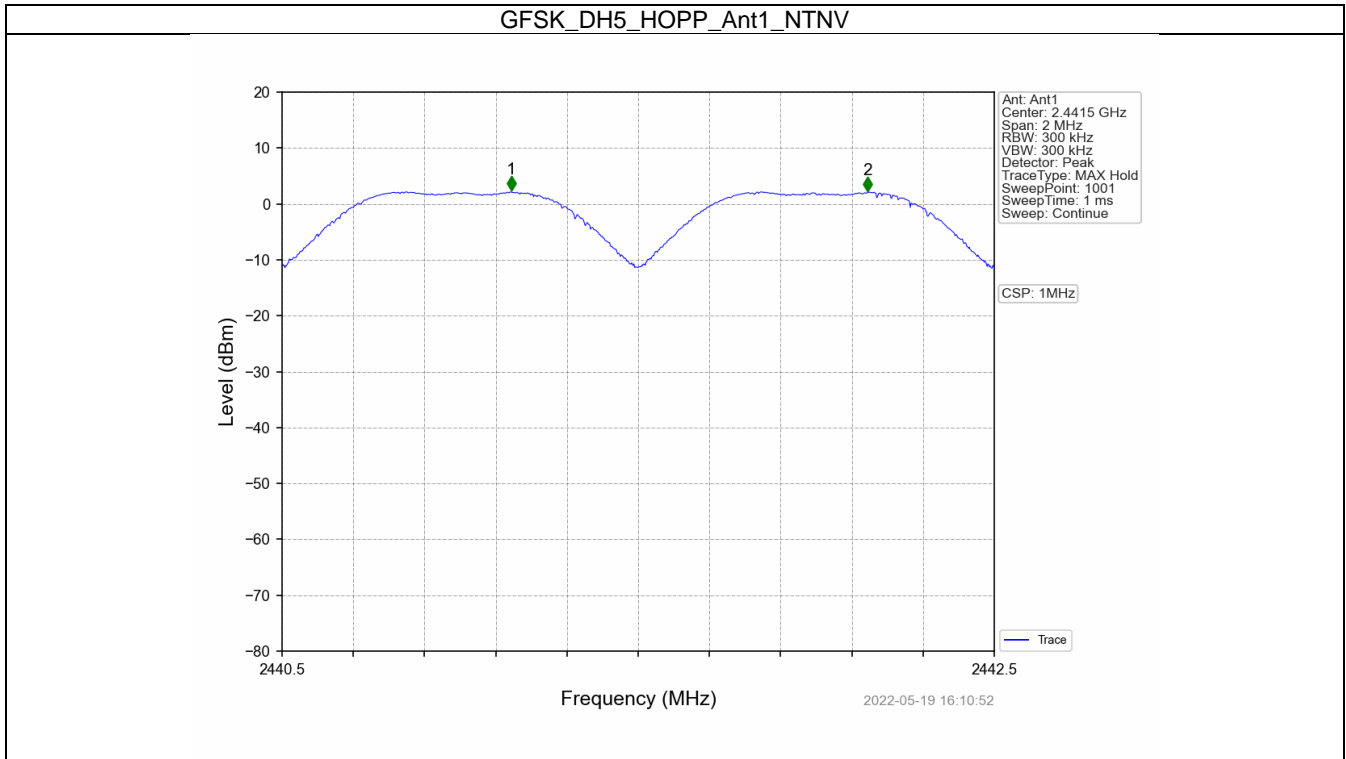
3. Carrier Frequency Separation

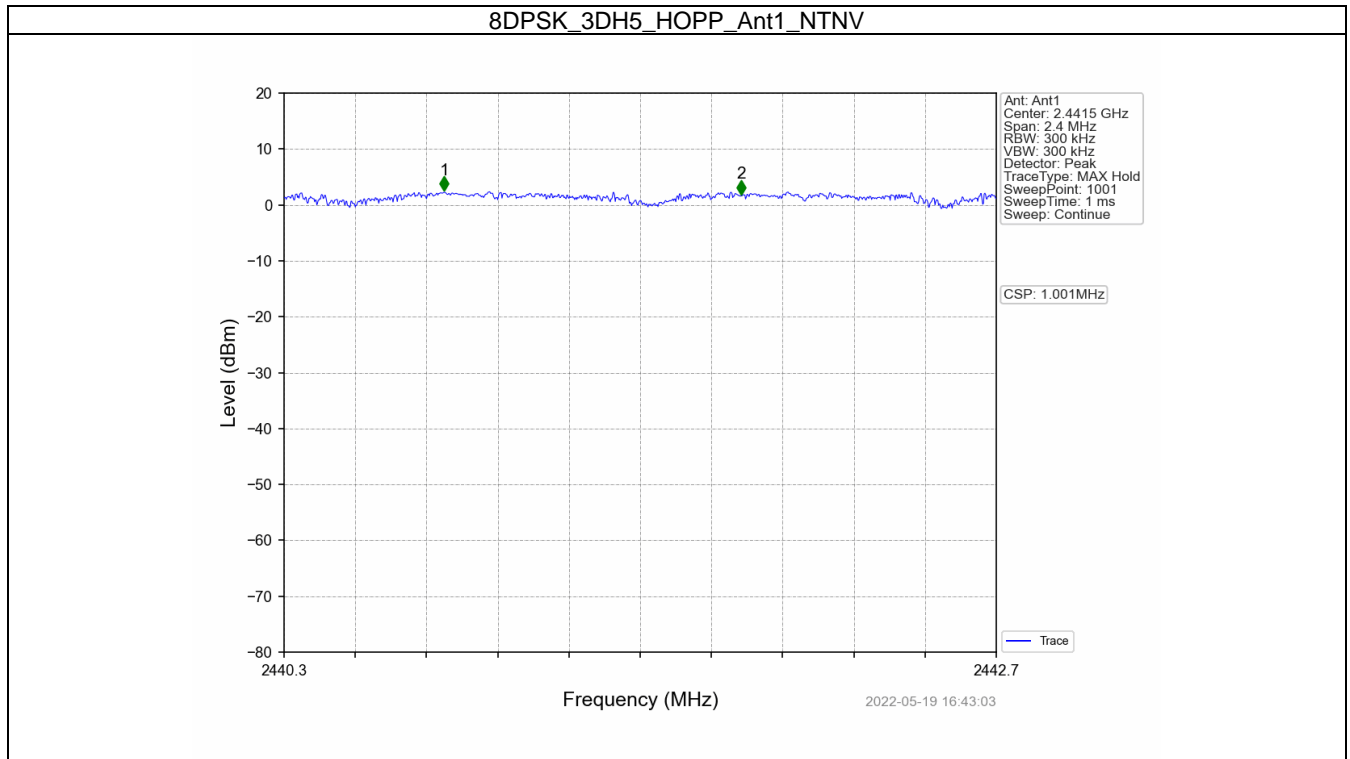
3.1 Ant1

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	1.000	0.936	≥ 0.936	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	1.001	1.294	≥ 0.863	Pass
8DPSK	SISO	HOPP	3DH5	1.001	1.306	≥ 0.871	Pass

3.1.2 Test Graph





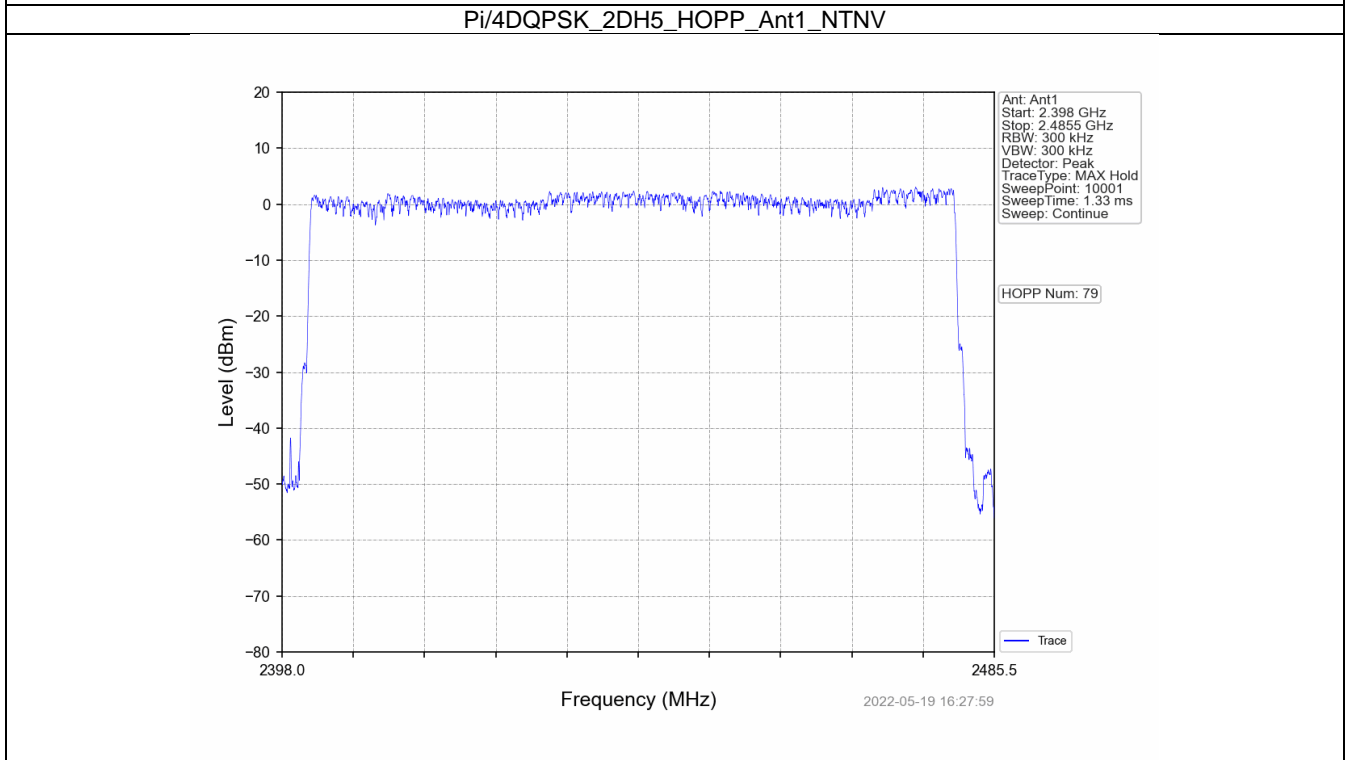
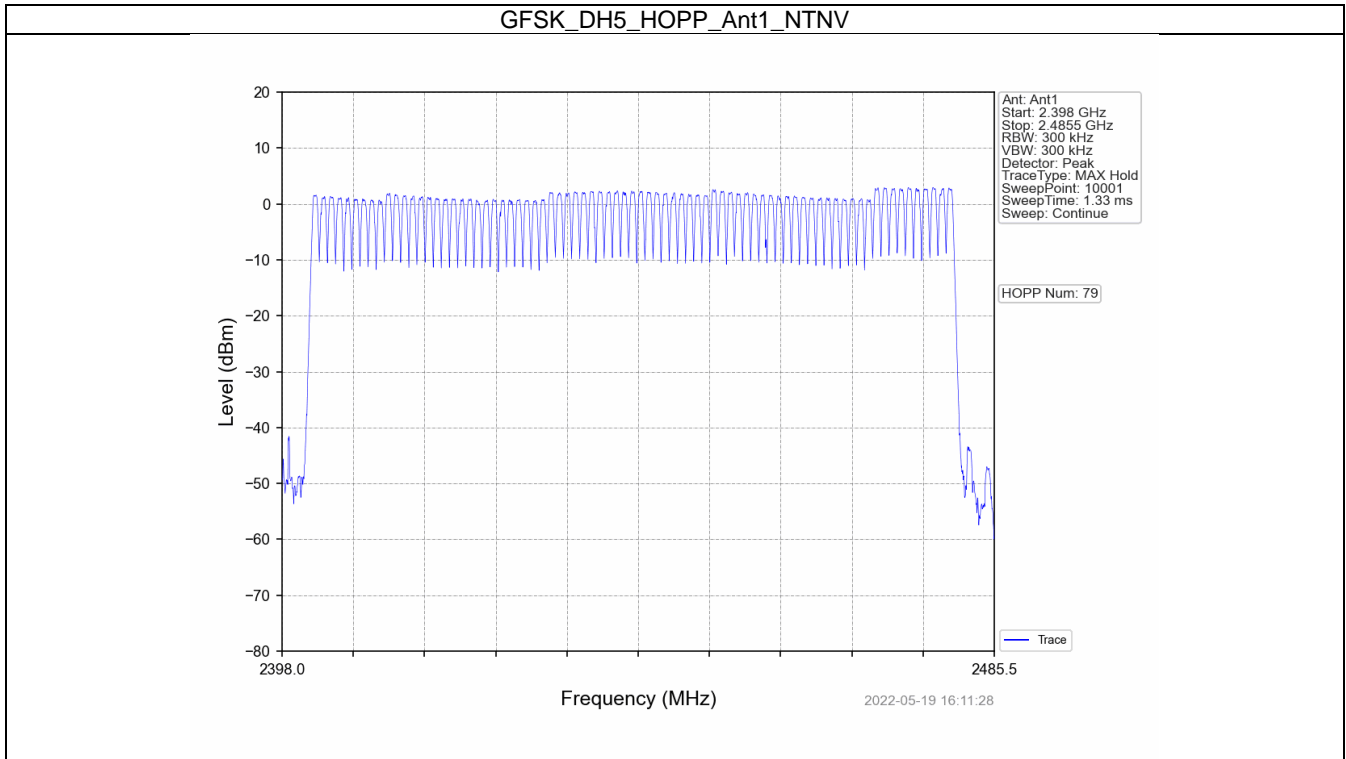
4. Number of Hopping Frequencies

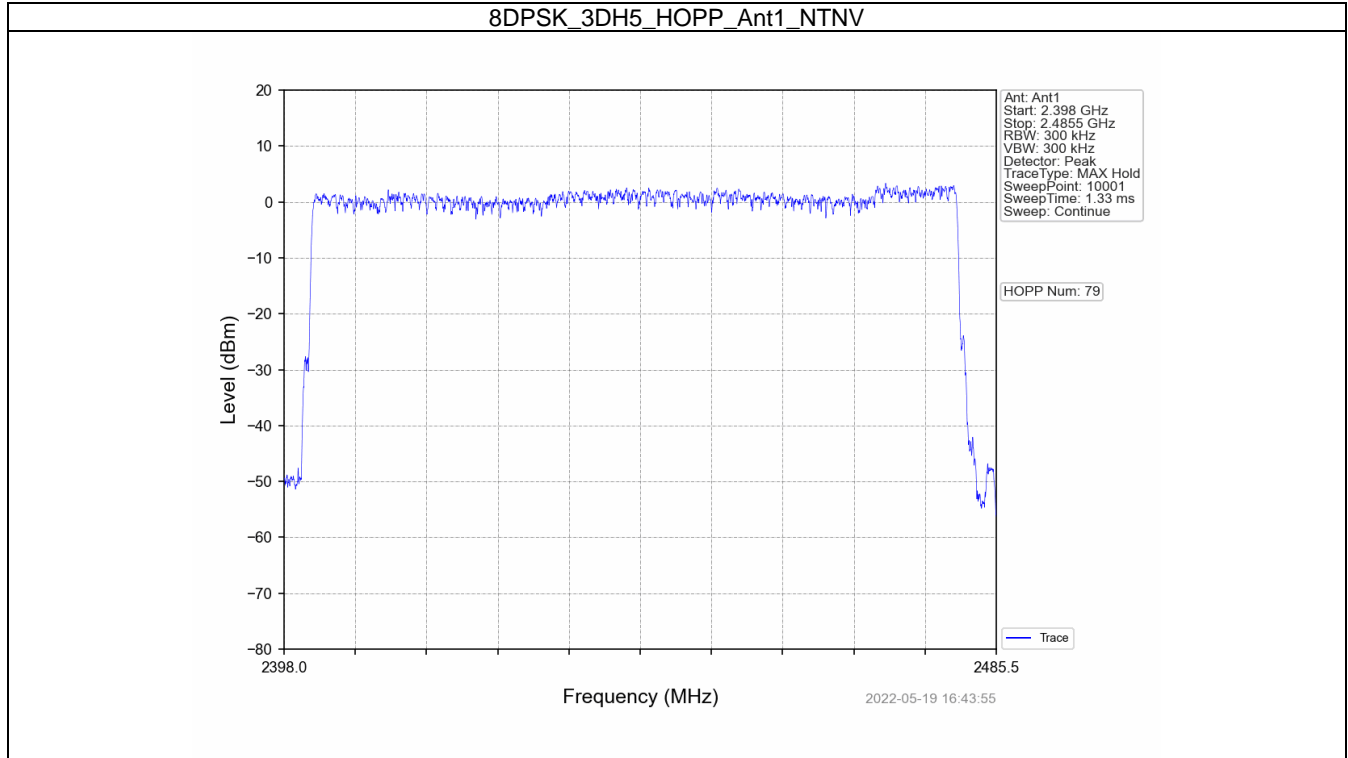
4.1 HoppNum

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





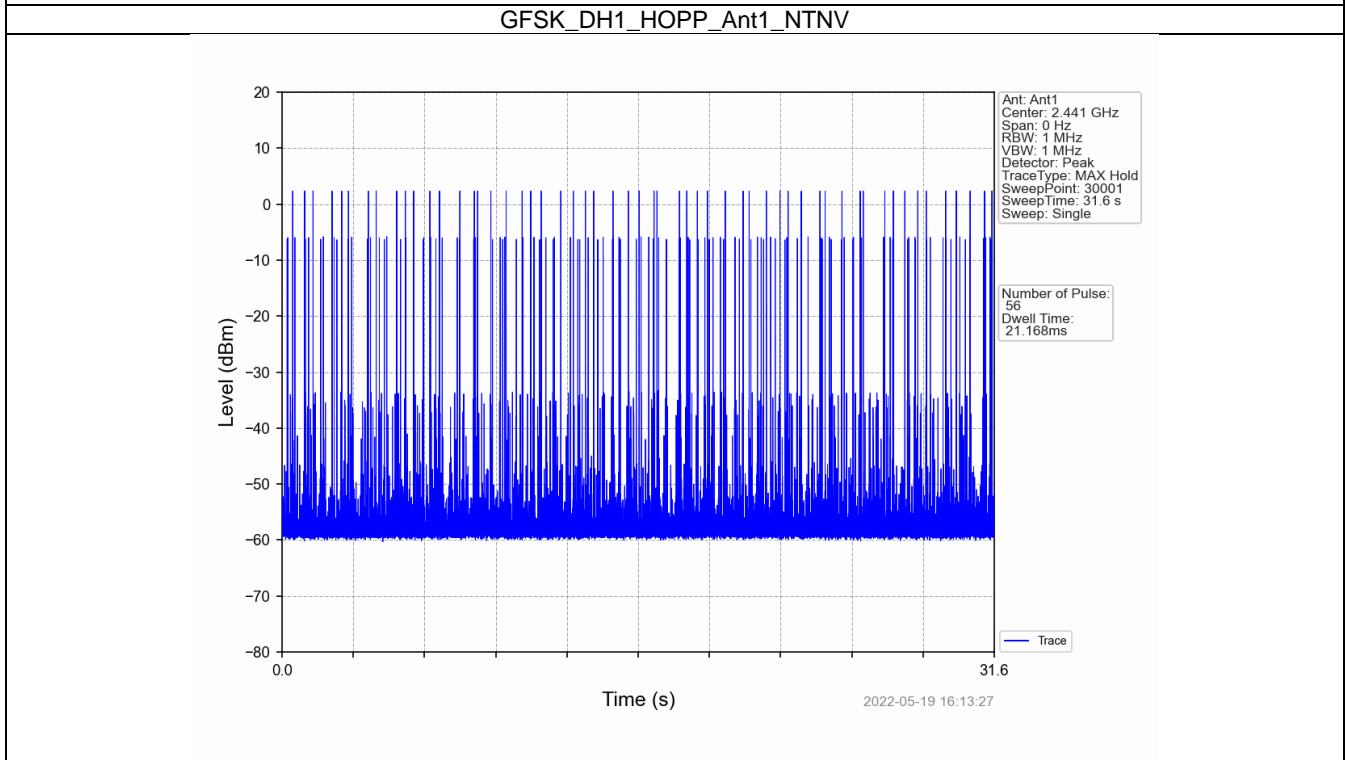
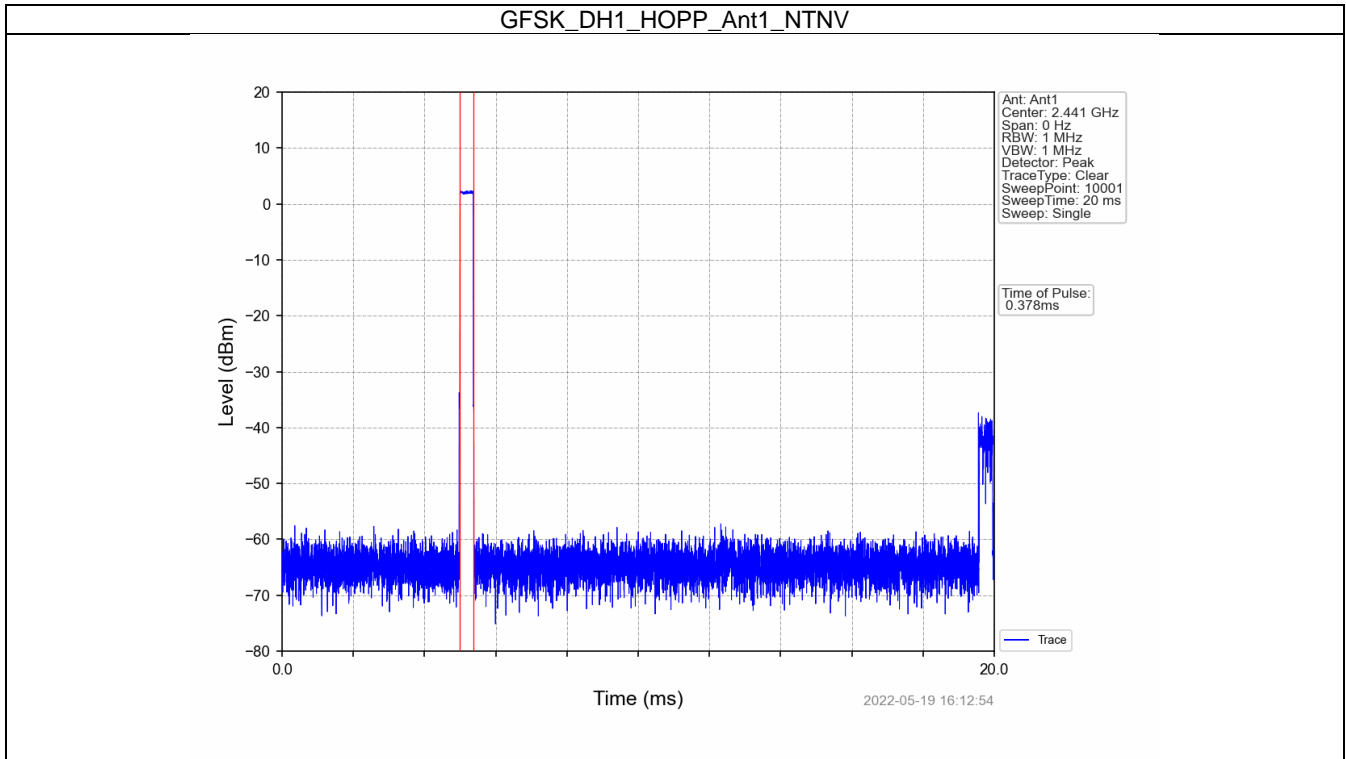
5. Time of Occupancy (Dwell Time)

5.1 Ant1

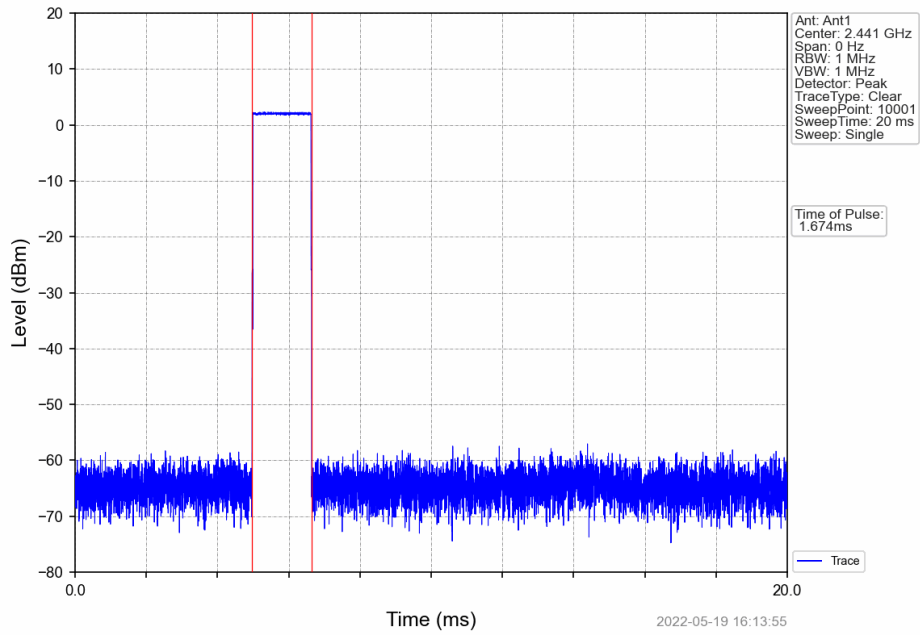
5.1.1 Test Result

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	0.378	31.600	56	21.168	<=400	Pass
			DH3	1.674	31.600	48	80.352	<=400	Pass
			DH5	2.922	31.600	41	119.802	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.426	31.600	54	23.004	<=400	Pass
			2DH3	1.678	31.600	48	80.544	<=400	Pass
			2DH5	2.926	31.600	40	117.040	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.426	31.600	55	23.430	<=400	Pass
			3DH3	1.678	31.600	47	78.866	<=400	Pass
			3DH5	2.886	31.600	39	112.554	<=400	Pass

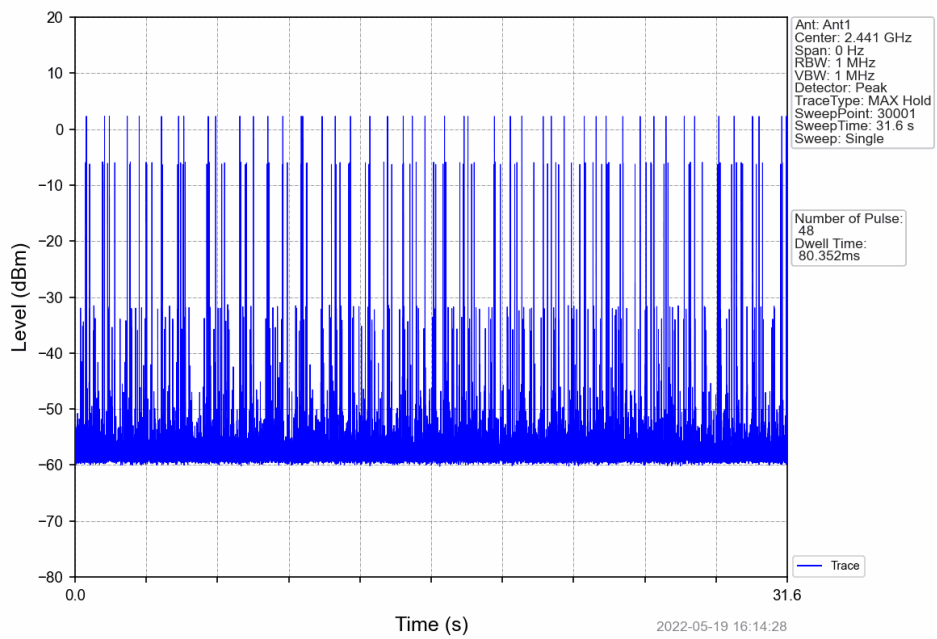
5.1.2 Test Graph



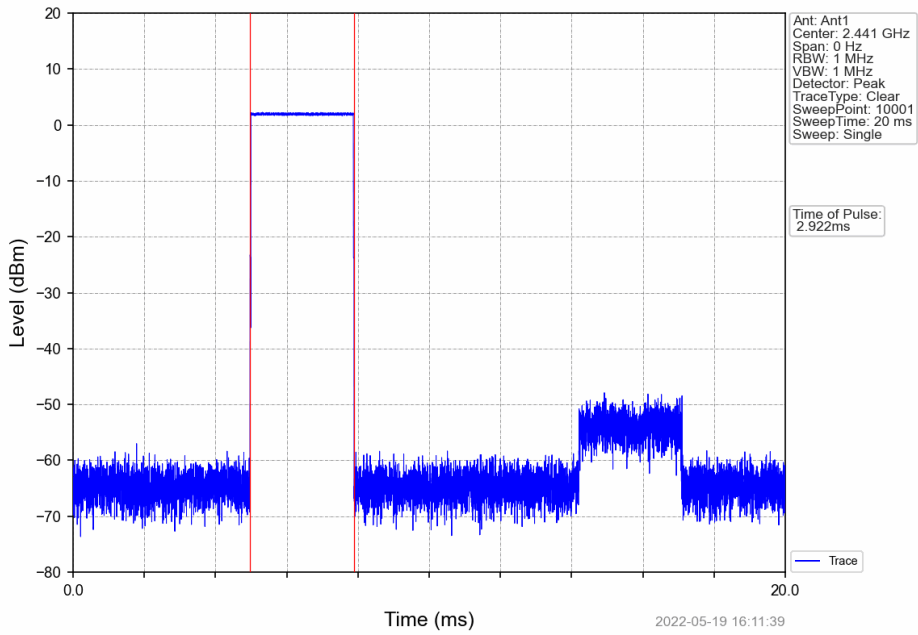
GFSK_DH3_HOPP_Ant1_NTNV



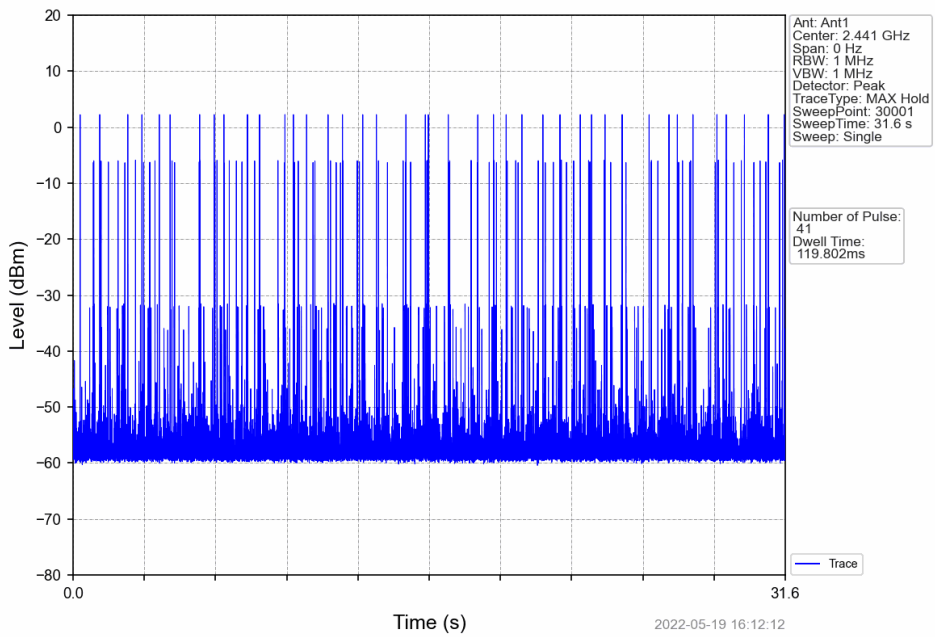
GFSK_DH3_HOPP_Ant1_NTNV



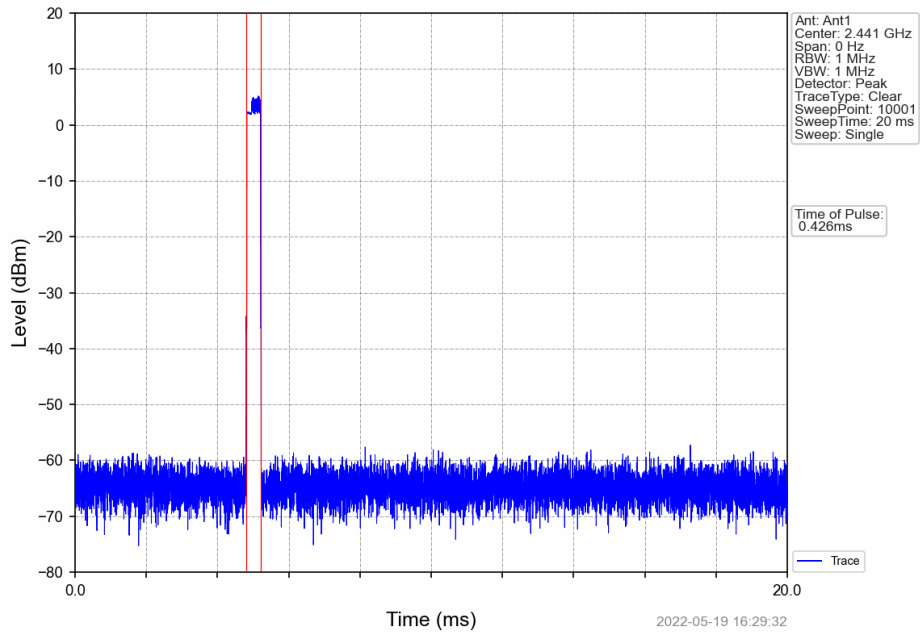
GFSK_DH5_HOPP_Ant1_NTNV



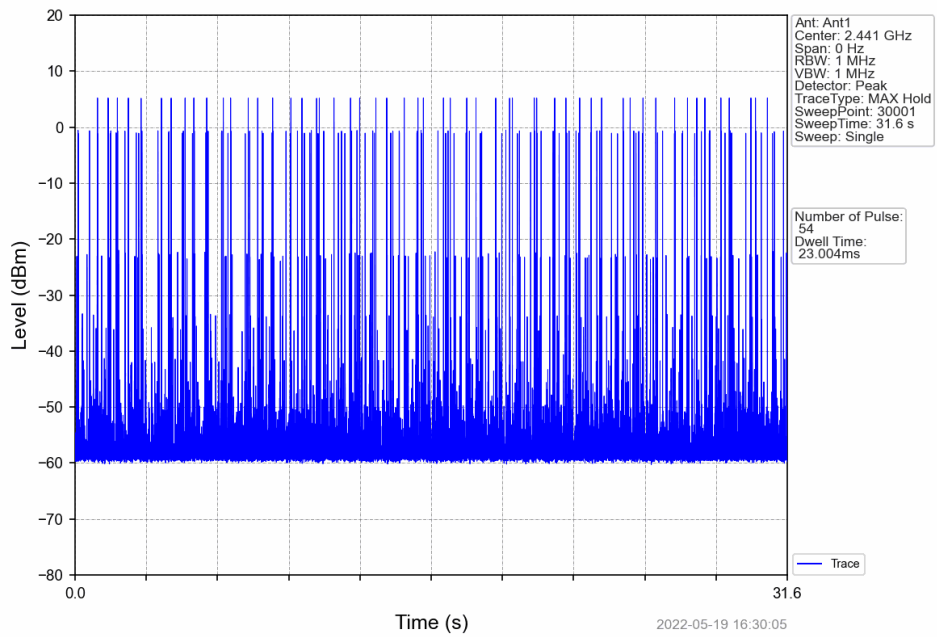
GFSK_DH5_HOPP_Ant1_NTNV



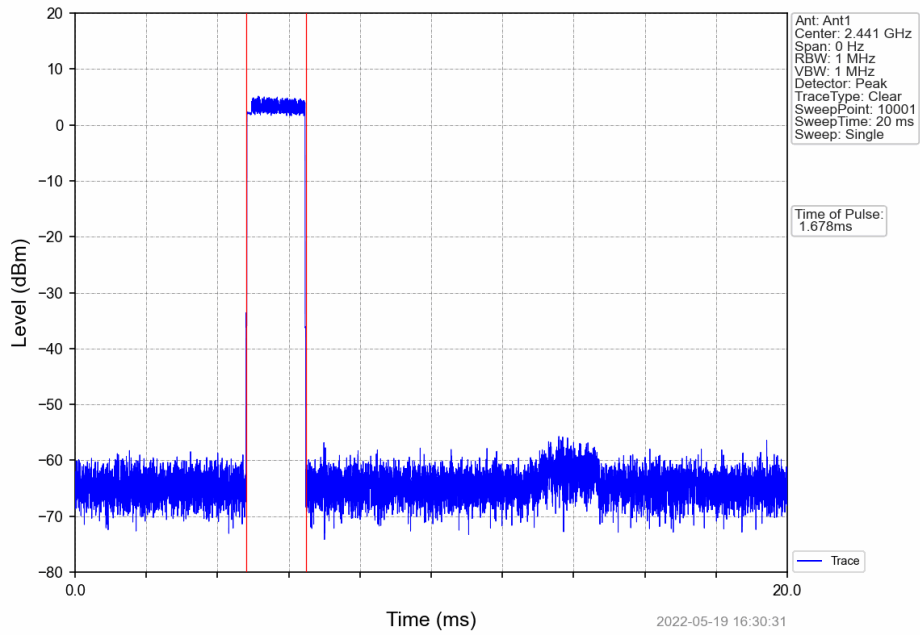
Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV



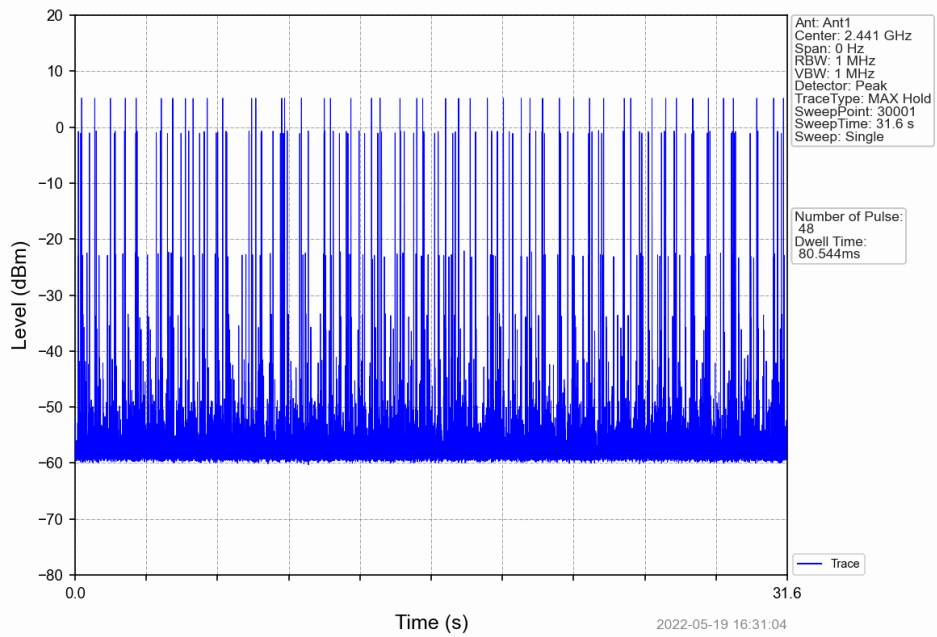
Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV



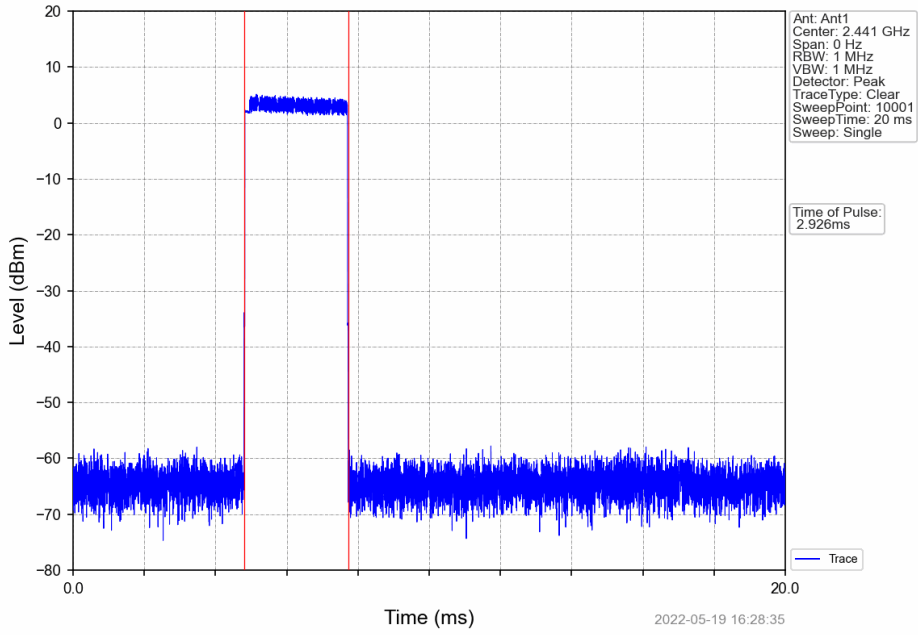
Pi/4DQPSK_2DH3_HOPP_Ant1_NTNV



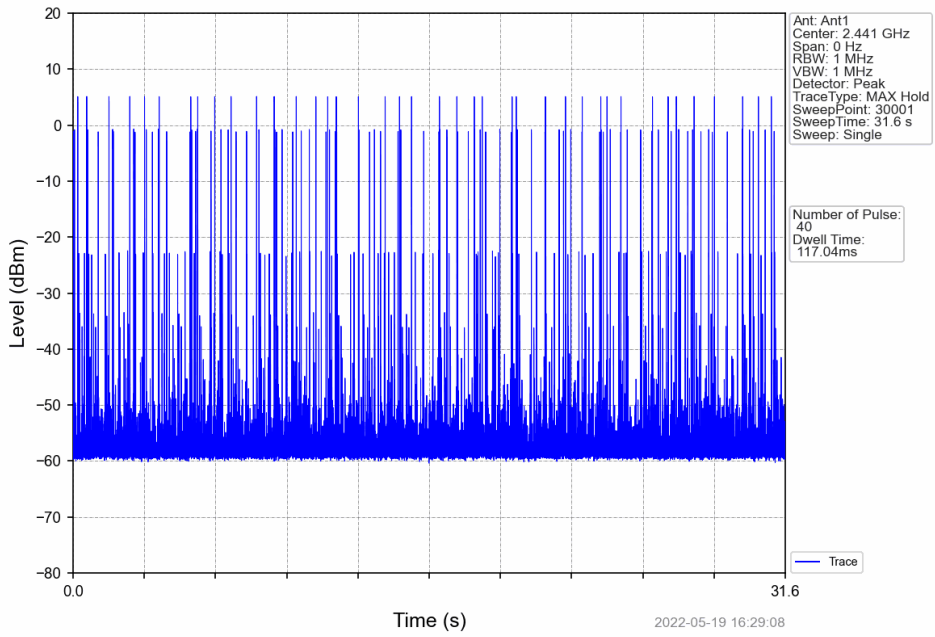
Pi/4DQPSK_2DH3_HOPP_Ant1_NTNV



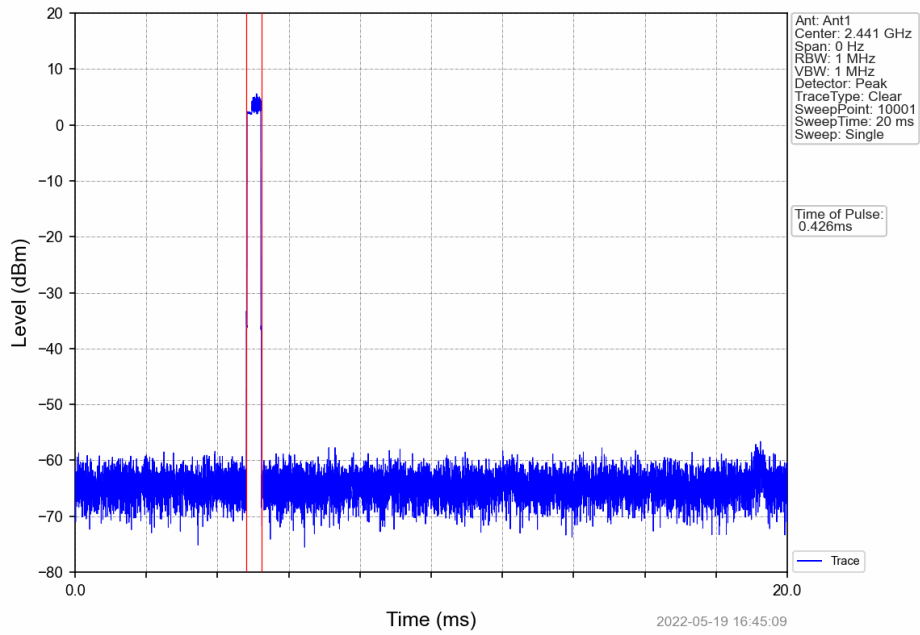
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



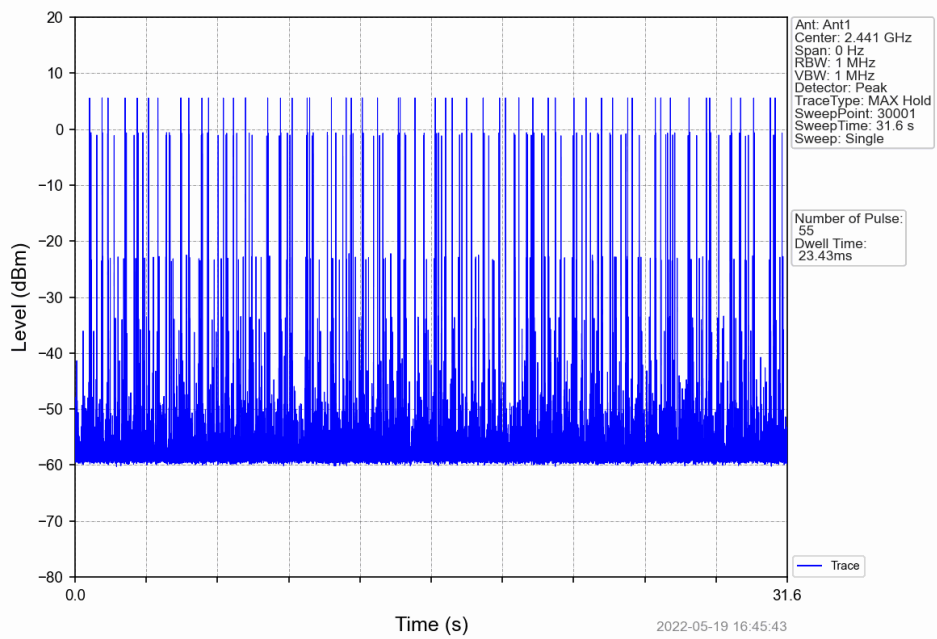
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



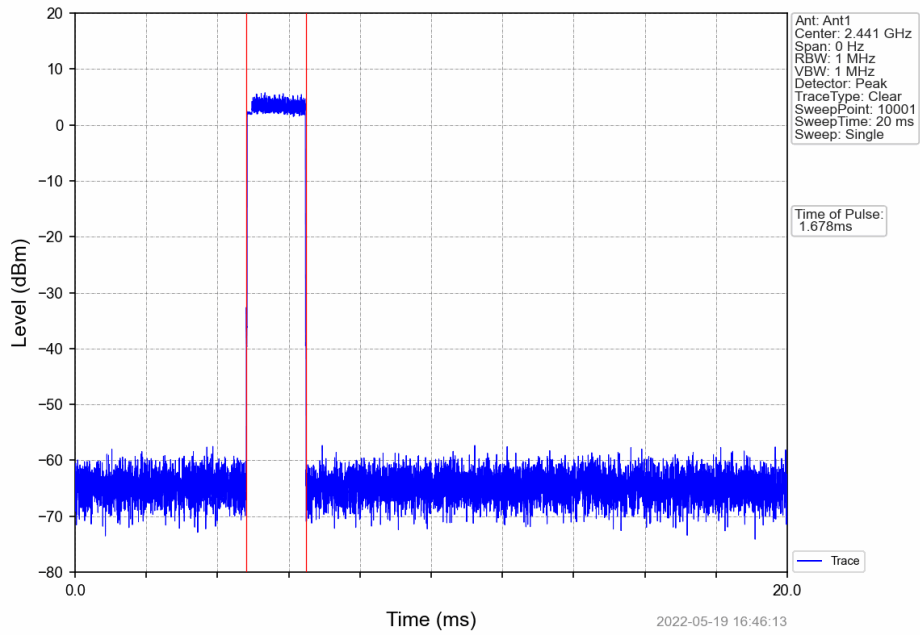
8DPSK_3DH1_HOPP_Ant1_NTNV



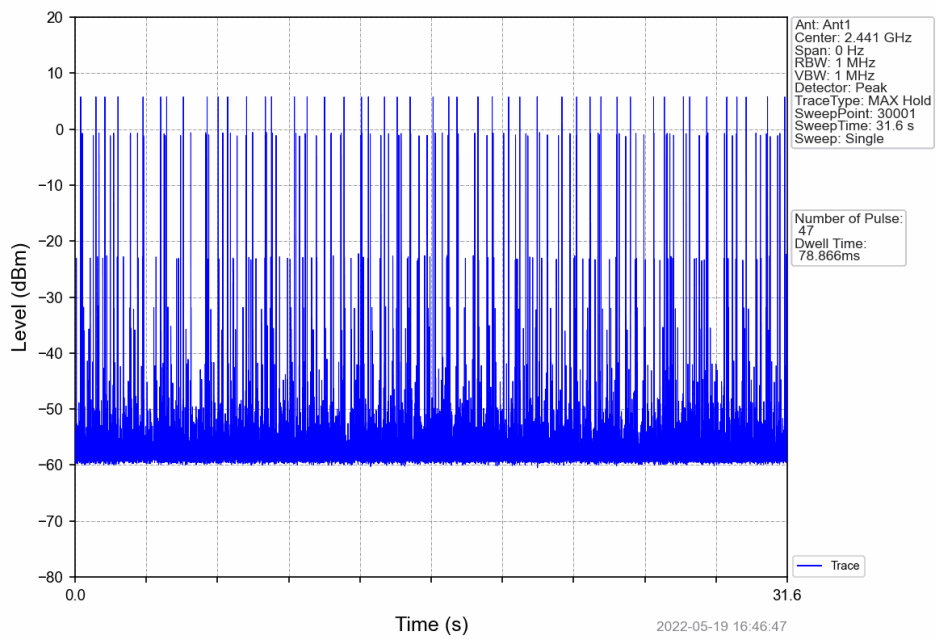
8DPSK_3DH1_HOPP_Ant1_NTNV



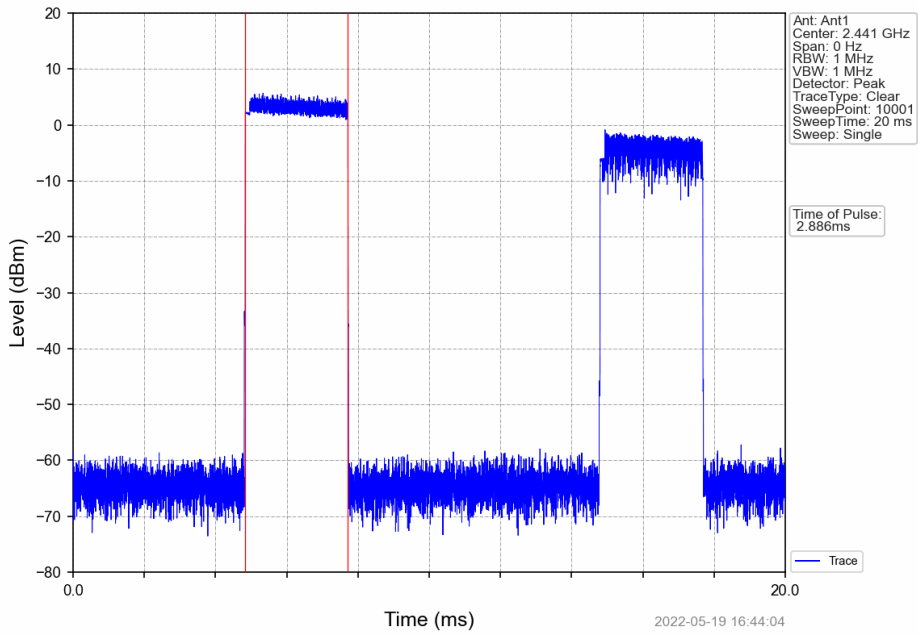
8DPSK_3DH3_HOPP_Ant1_NTNV



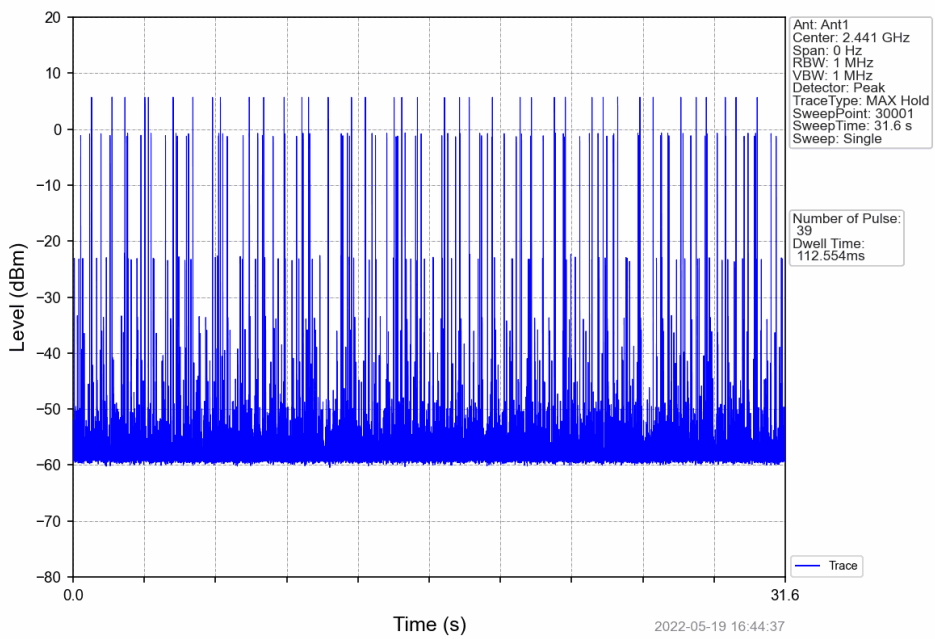
8DPSK_3DH3_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



6. Unwanted Emissions In Non-restricted Frequency Bands

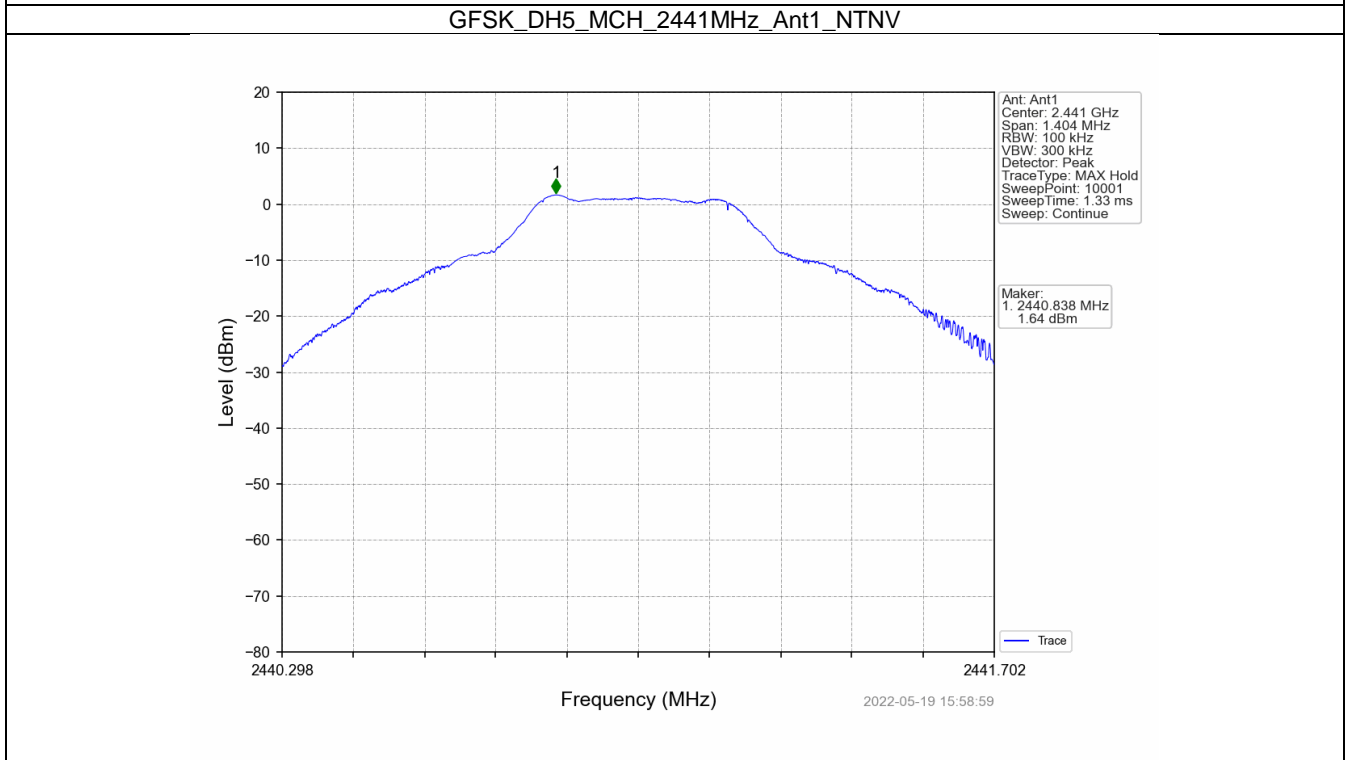
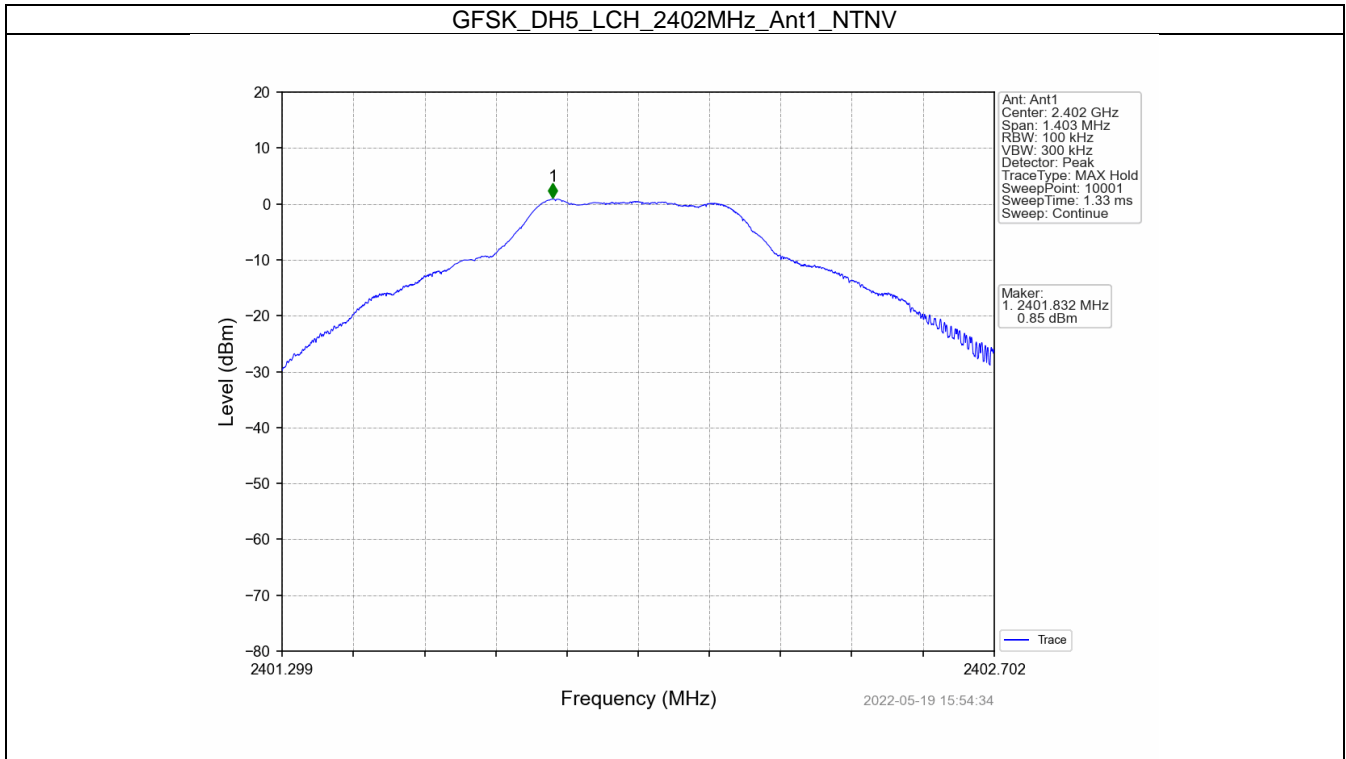
6.1 Ref

6.1.1 Test Result

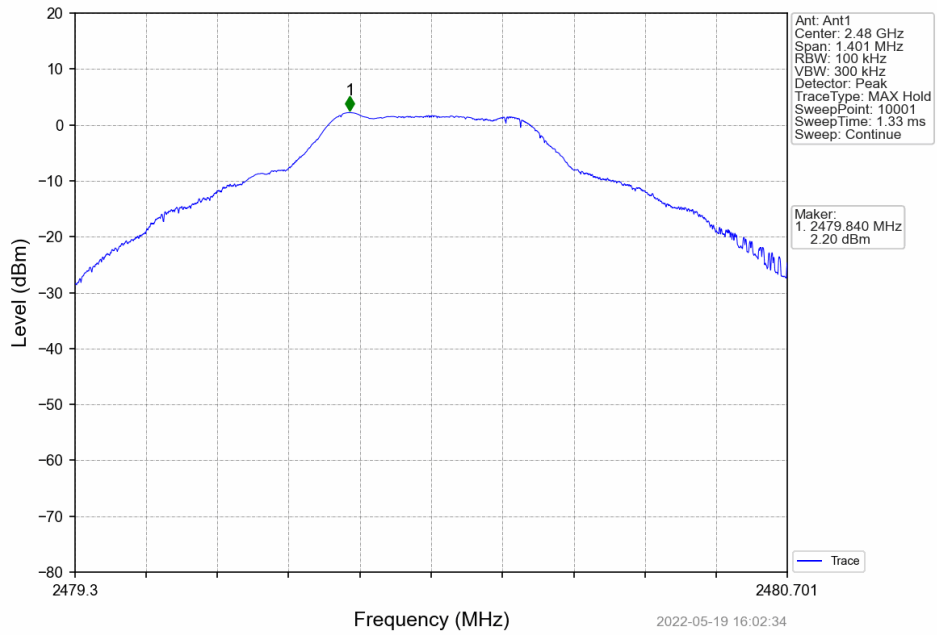
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	0.85
		2441	DH5	1	1.64
		2480	DH5	1	2.20
Pi/4DQPSK	SISO	2402	2DH5	1	0.90
		2441	2DH5	1	1.66
		2480	2DH5	1	2.25
8DPSK	SISO	2402	3DH5	1	0.94
		2441	3DH5	1	1.69
		2480	3DH5	1	2.26

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.

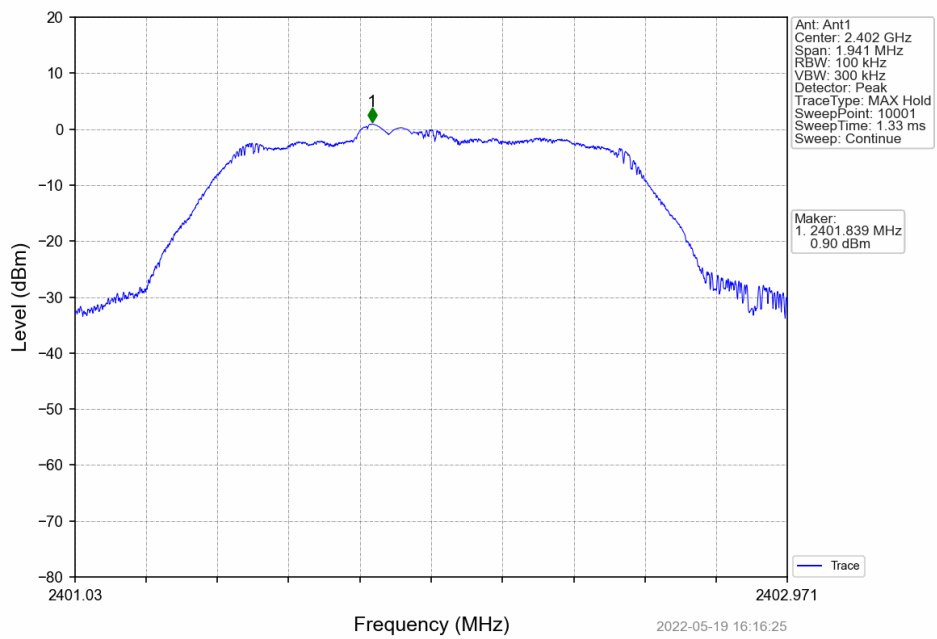
6.1.2 Test Graph



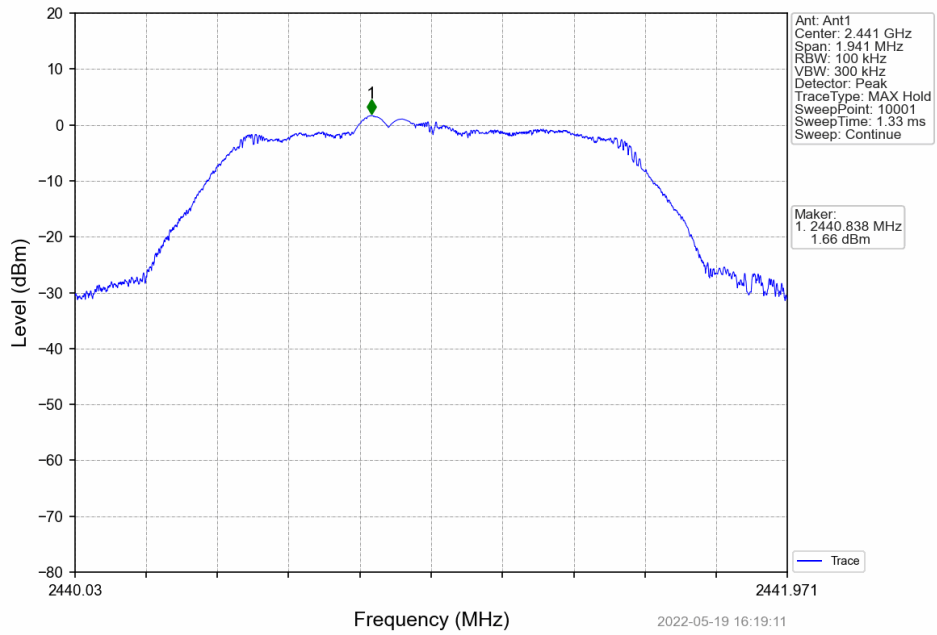
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



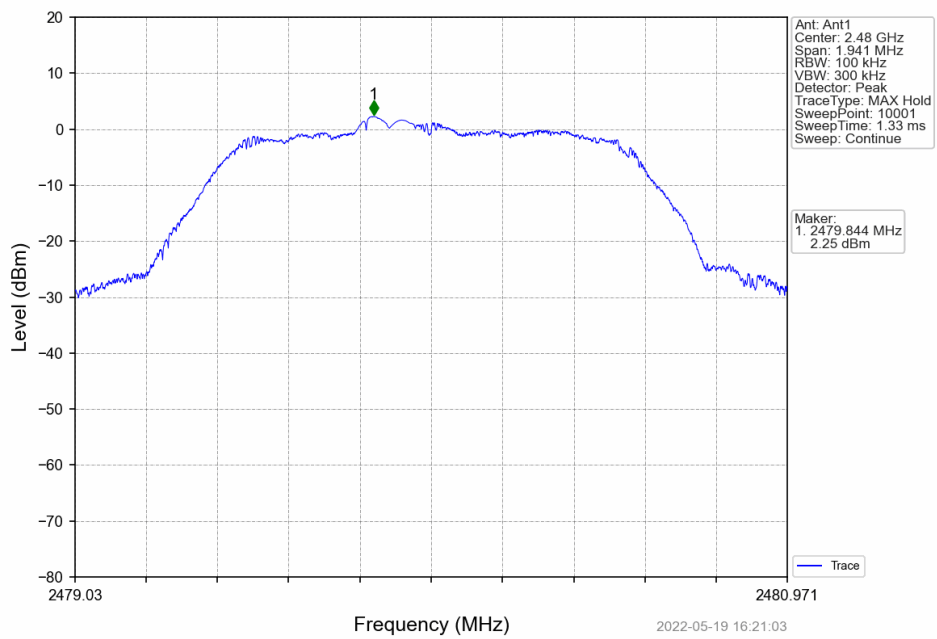
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



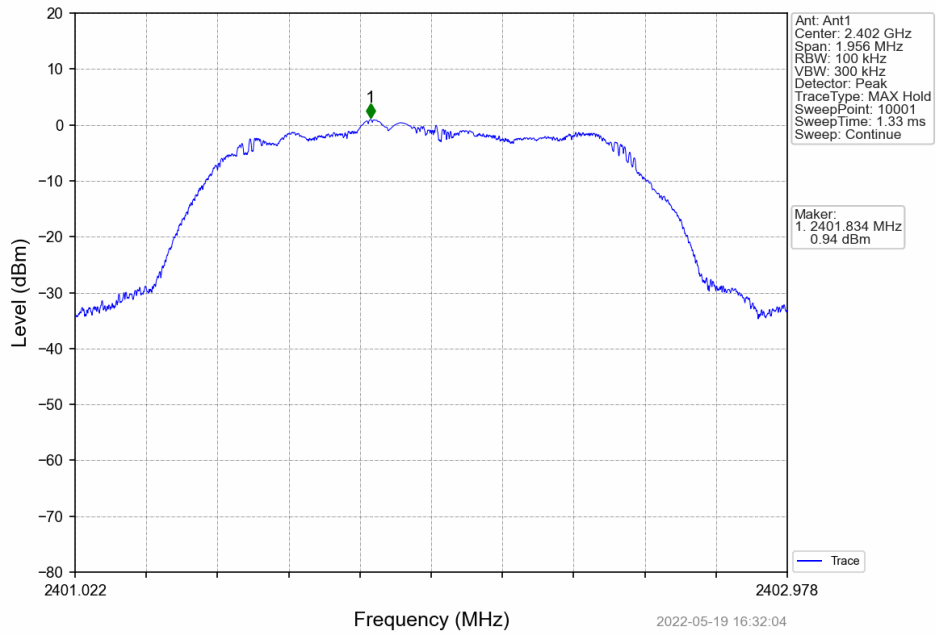
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



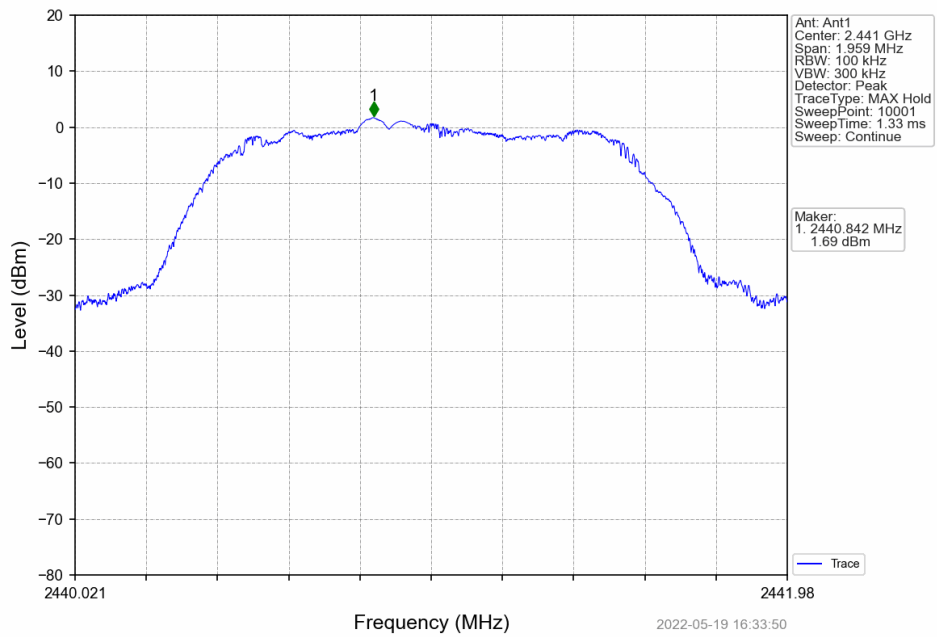
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

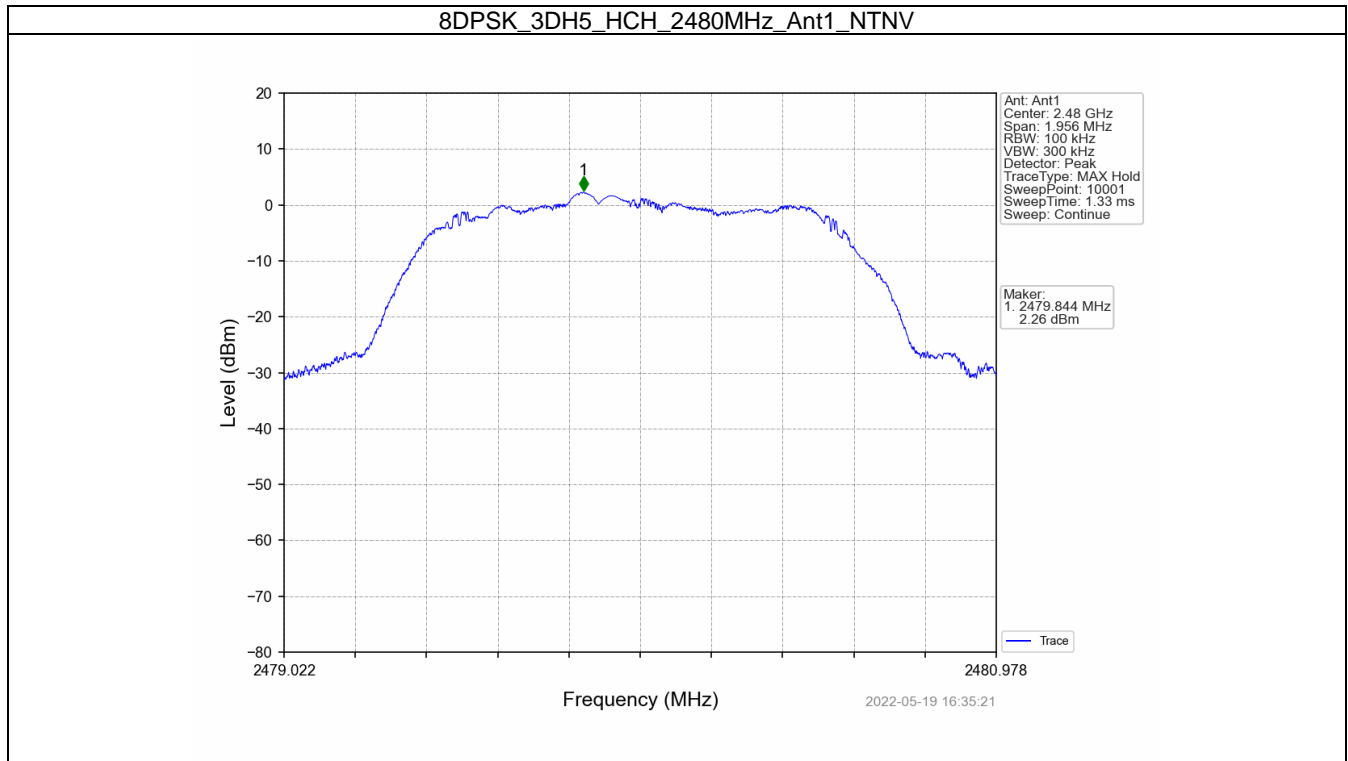


8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV





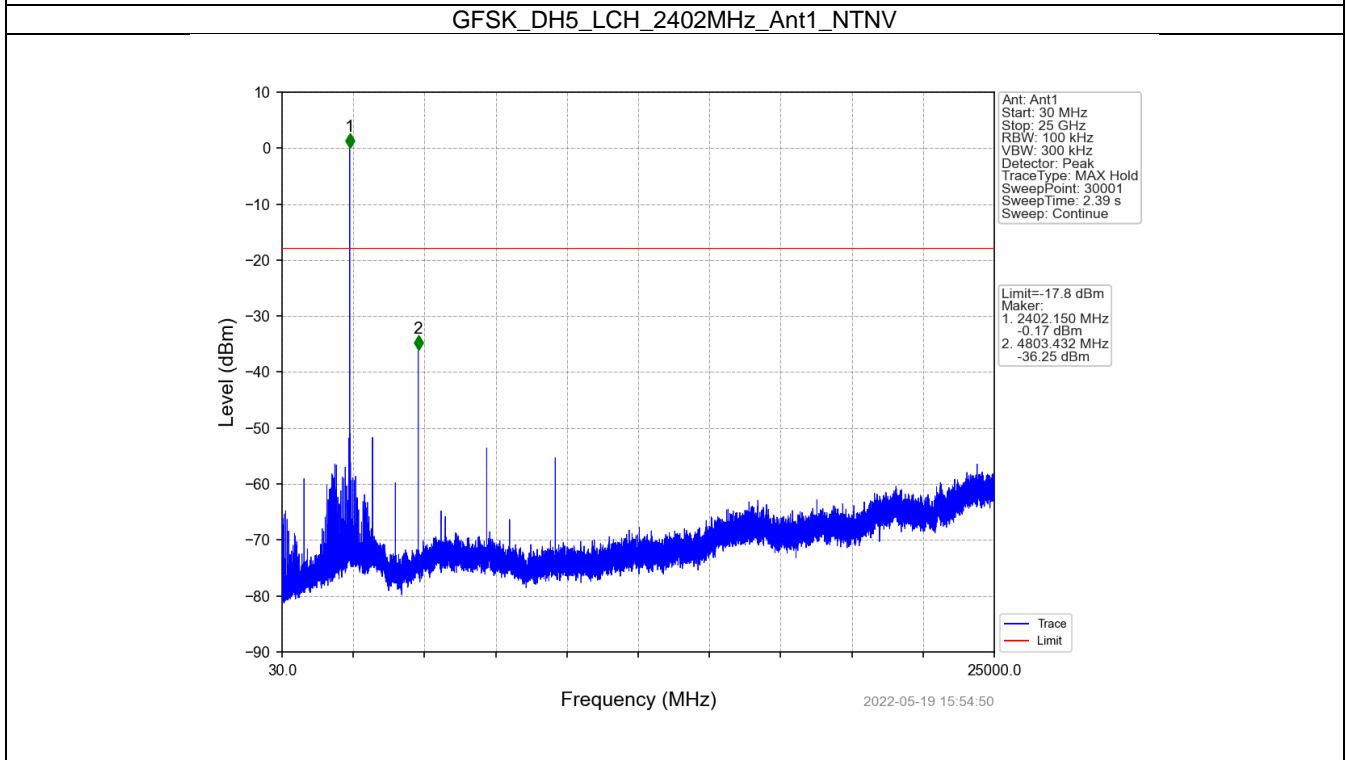
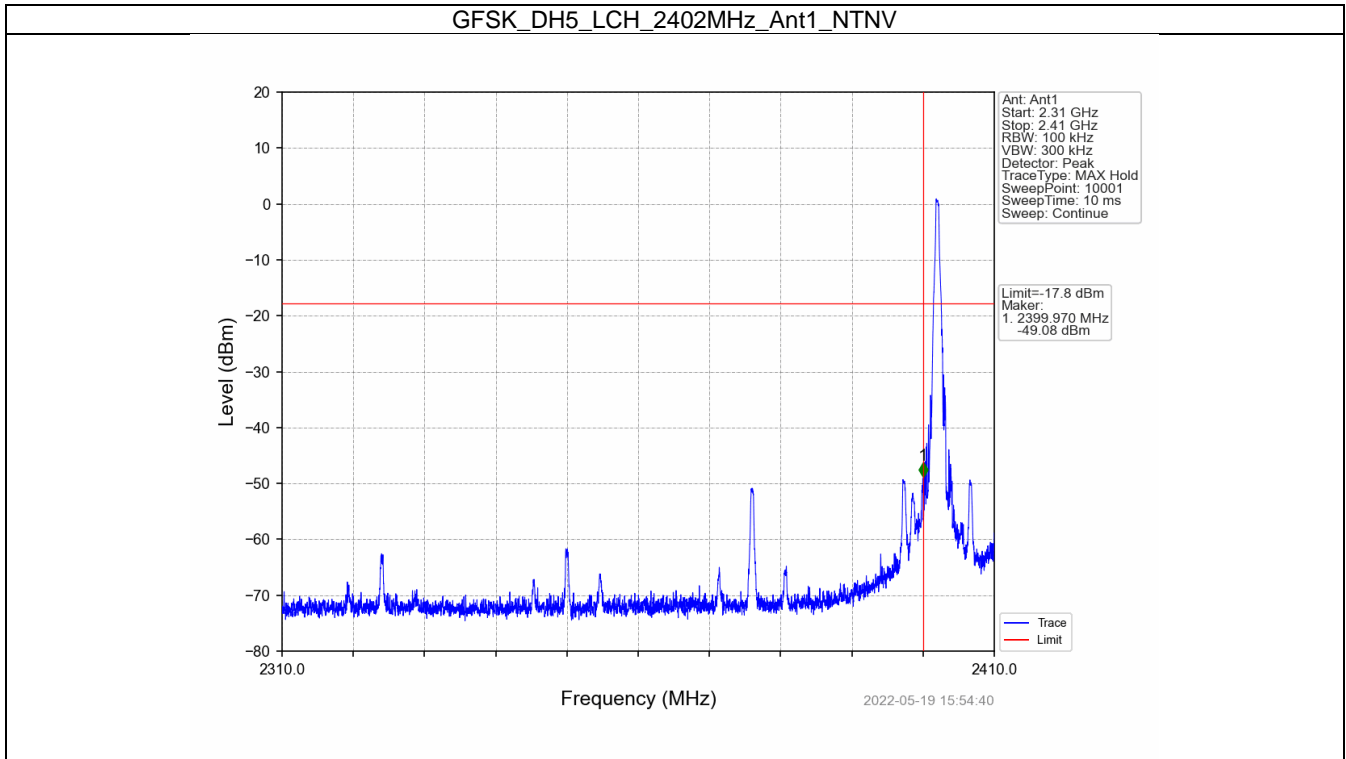
6.2 CSE

6.2.1 Test Result

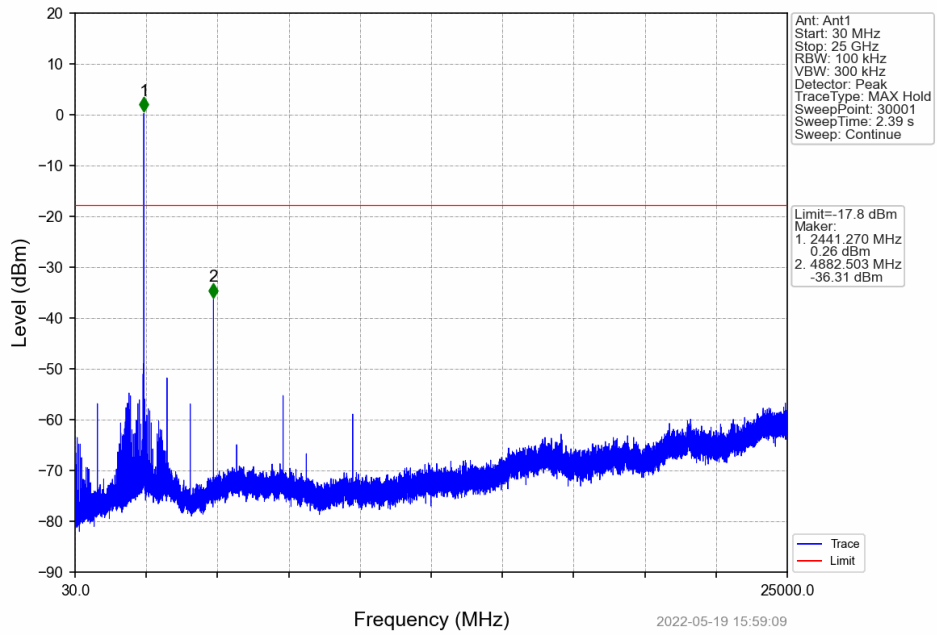
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	2.20	-17.80	Pass
		2441	DH5	1	2.20	-17.80	Pass
		2480	DH5	1	2.20	-17.80	Pass
		HOPP	DH5	1	2.20	-17.80	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	2.25	-17.75	Pass
		2441	2DH5	1	2.25	-17.75	Pass
		2480	2DH5	1	2.25	-17.75	Pass
		HOPP	2DH5	1	2.25	-17.75	Pass
8DPSK	SISO	2402	3DH5	1	2.26	-17.74	Pass
		2441	3DH5	1	2.26	-17.74	Pass
		2480	3DH5	1	2.26	-17.74	Pass
		HOPP	3DH5	1	2.26	-17.74	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.

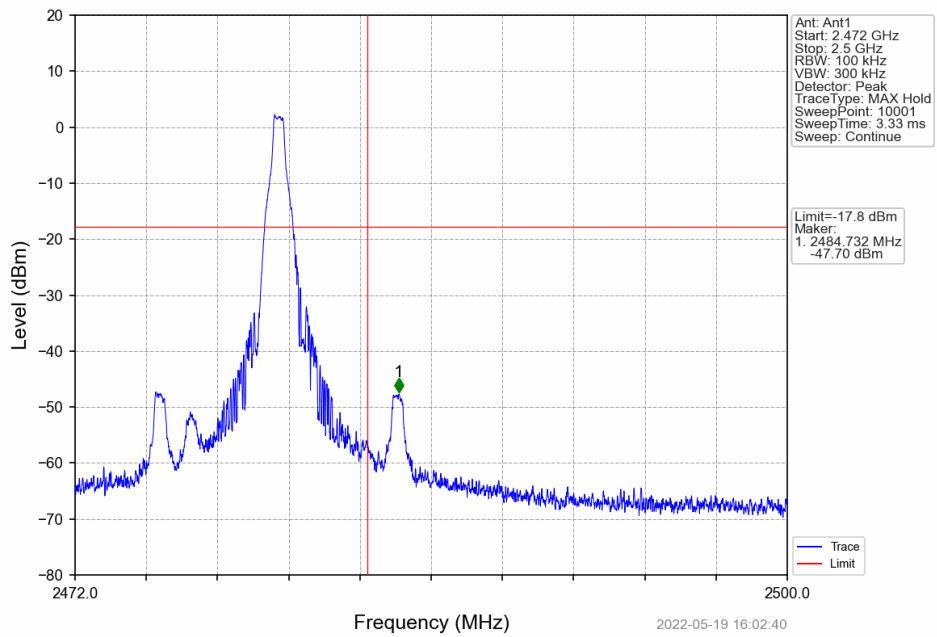
6.2.2 Test Graph



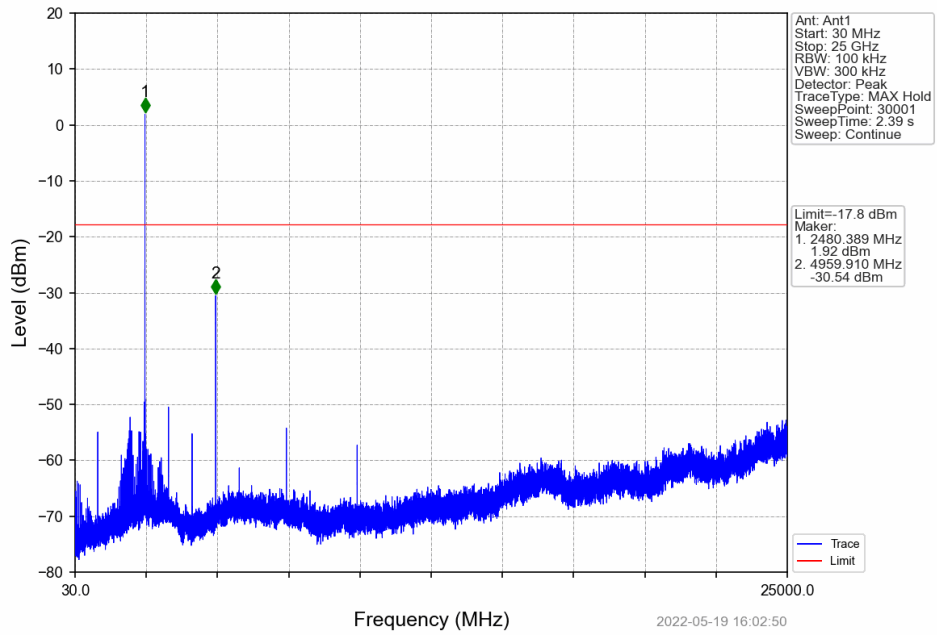
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



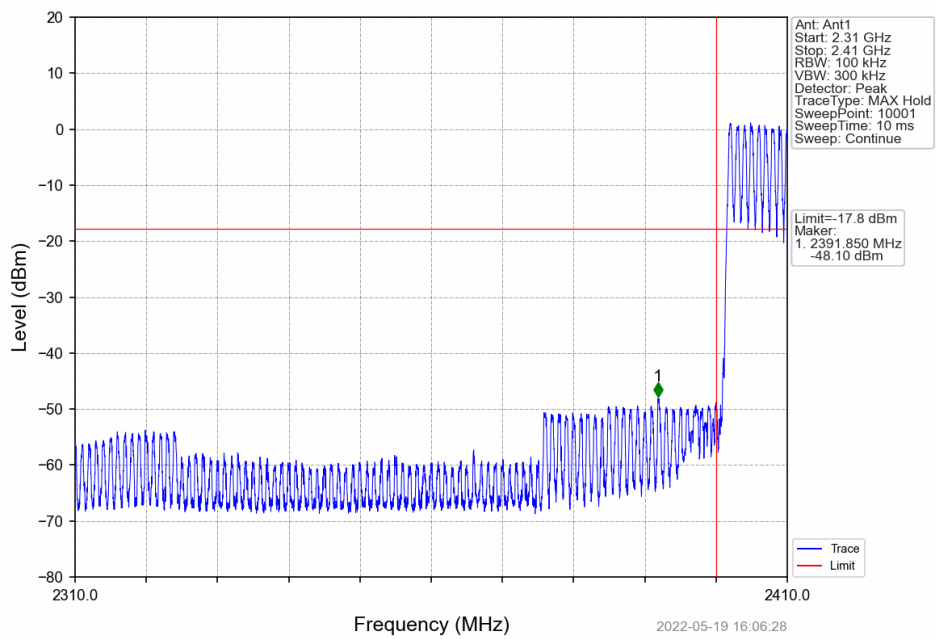
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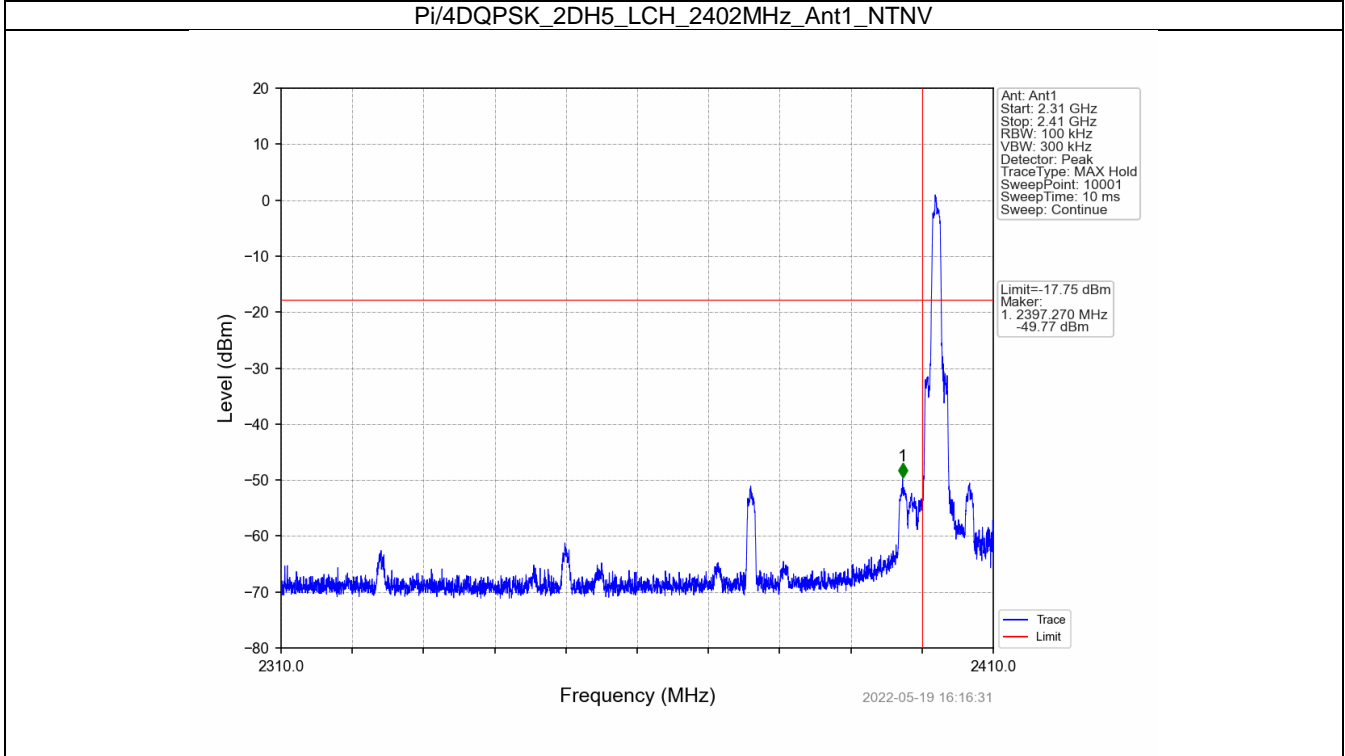
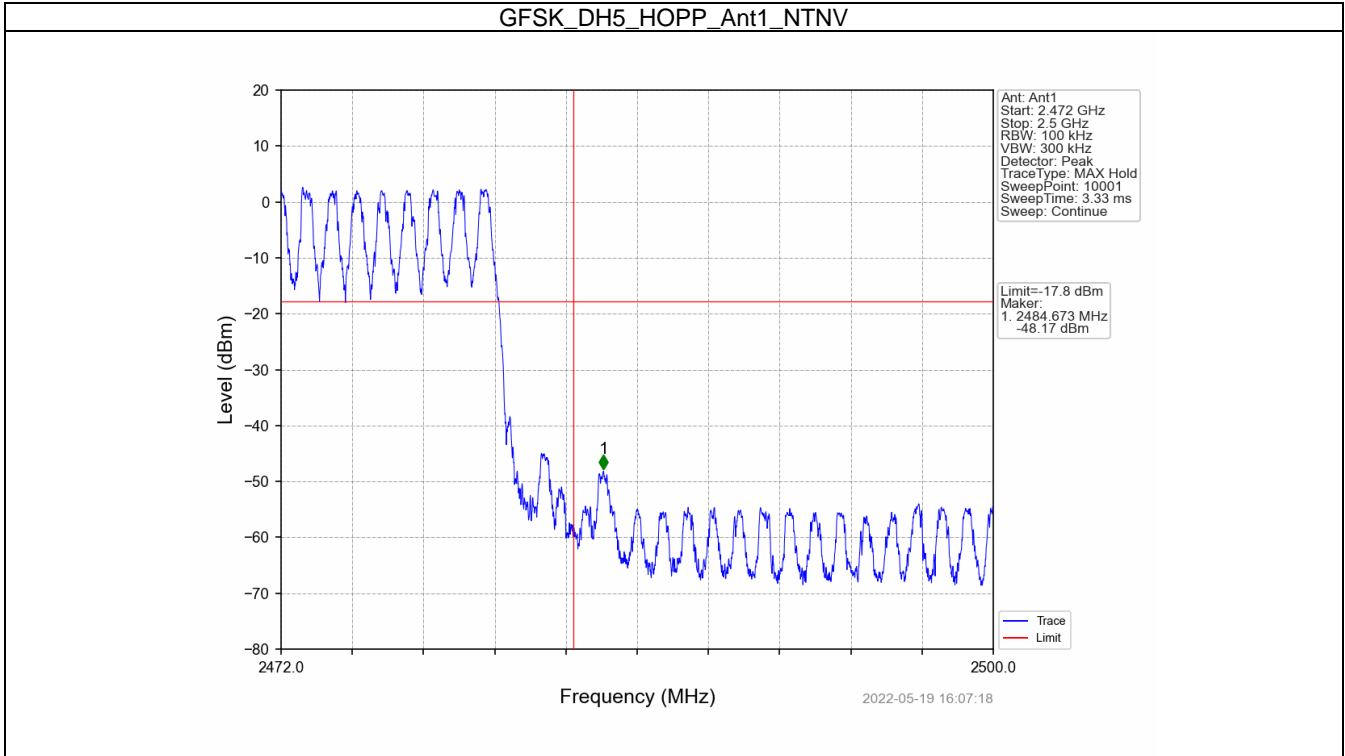


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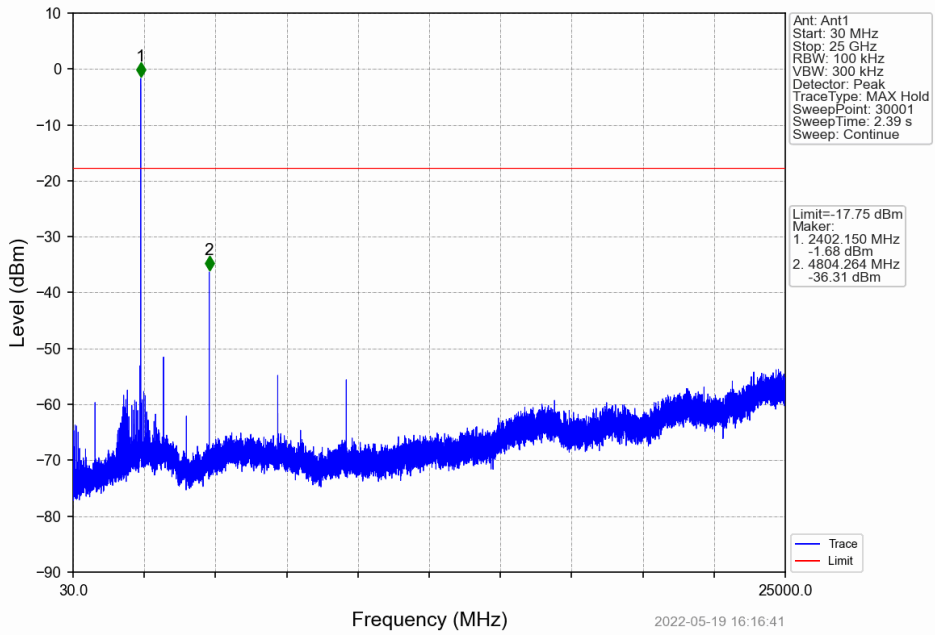


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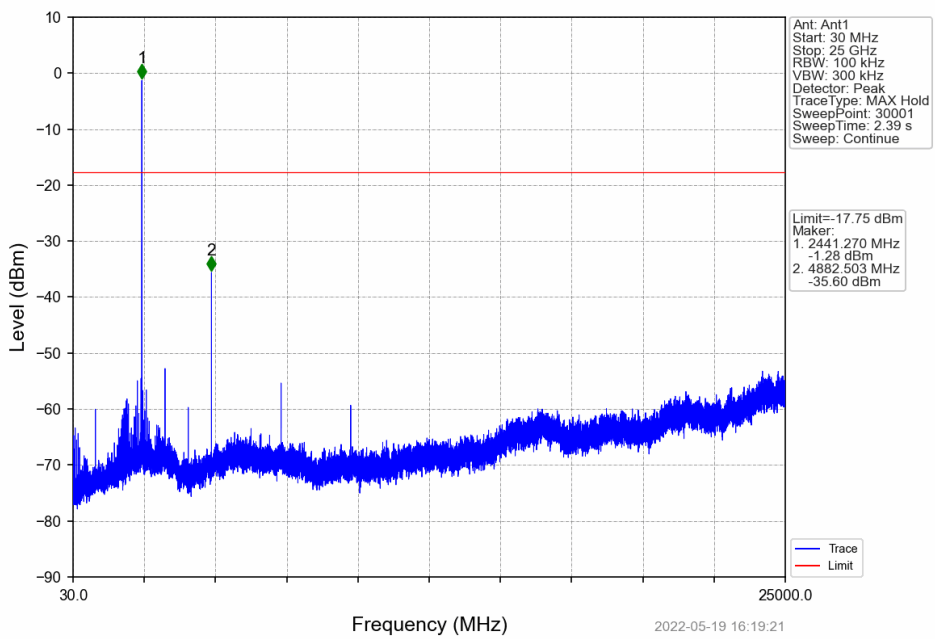




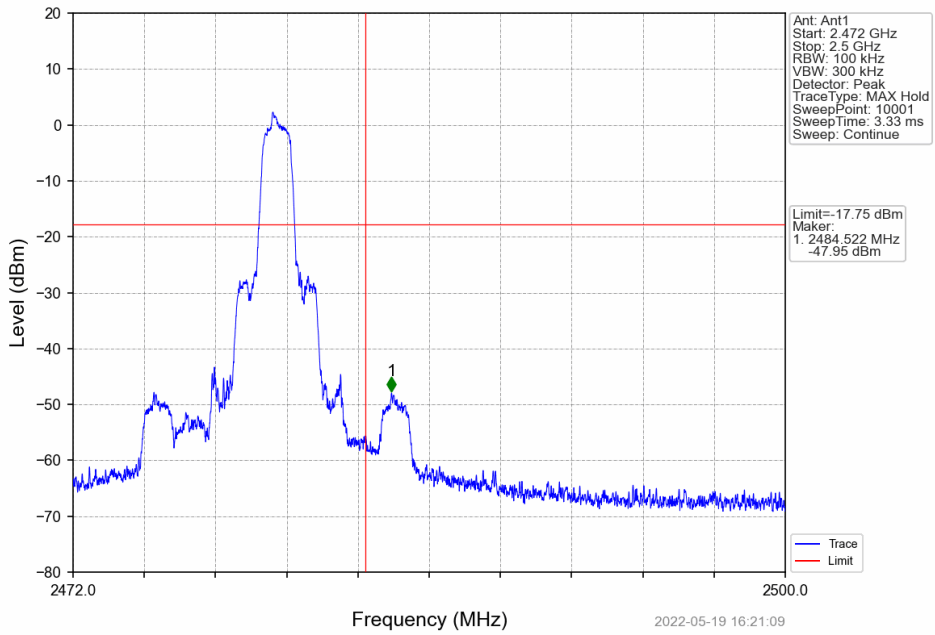
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



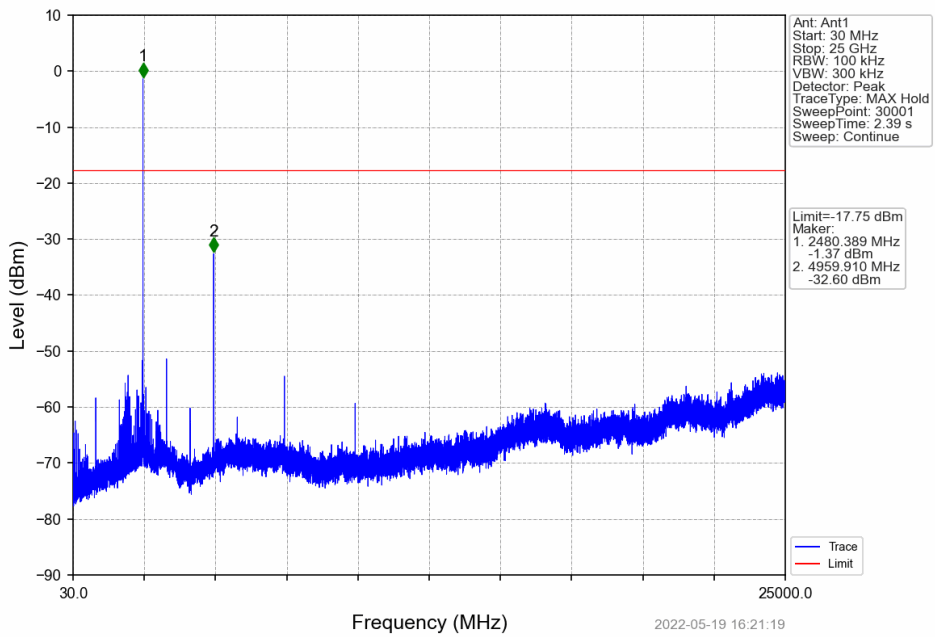
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



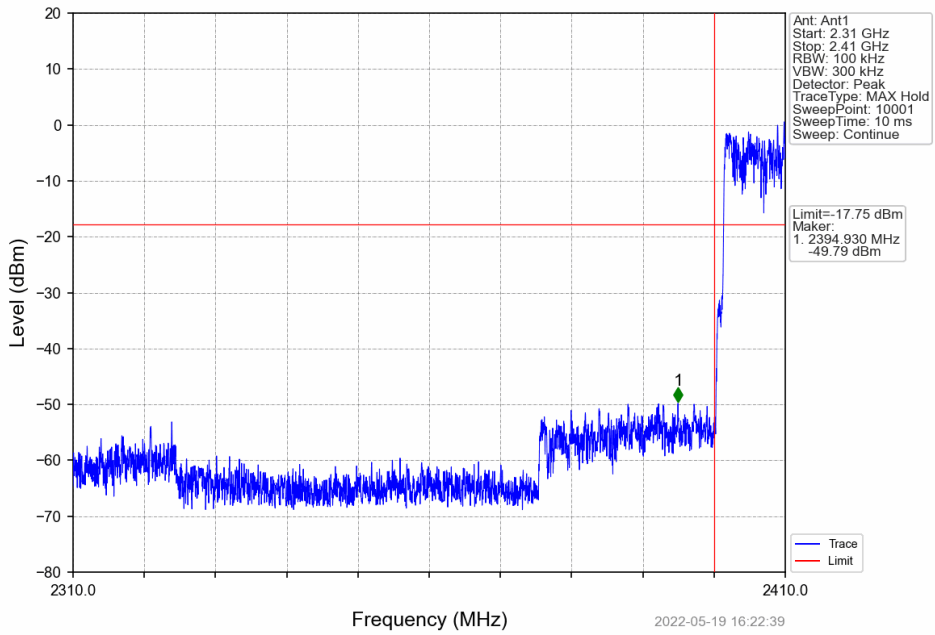
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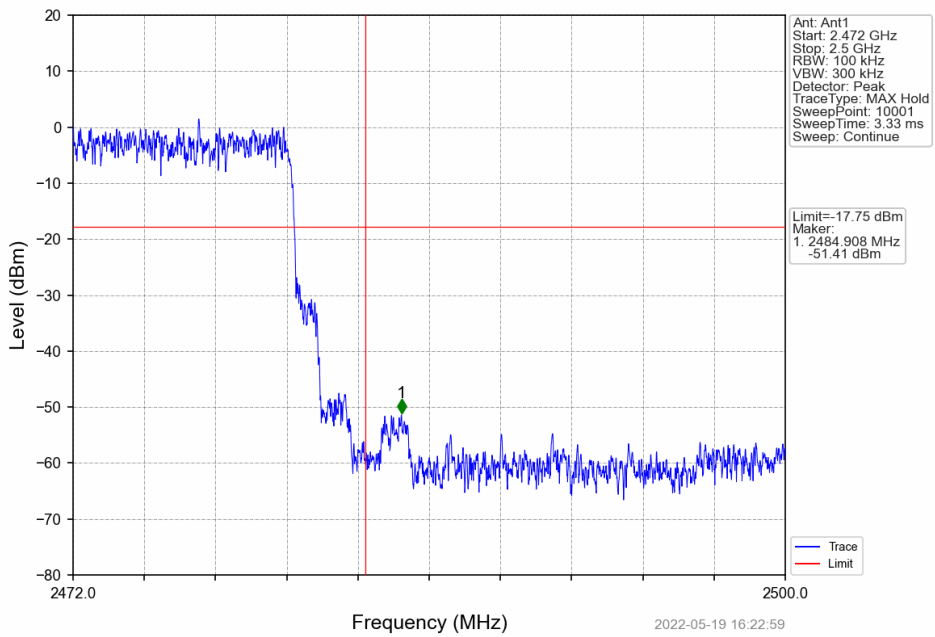
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



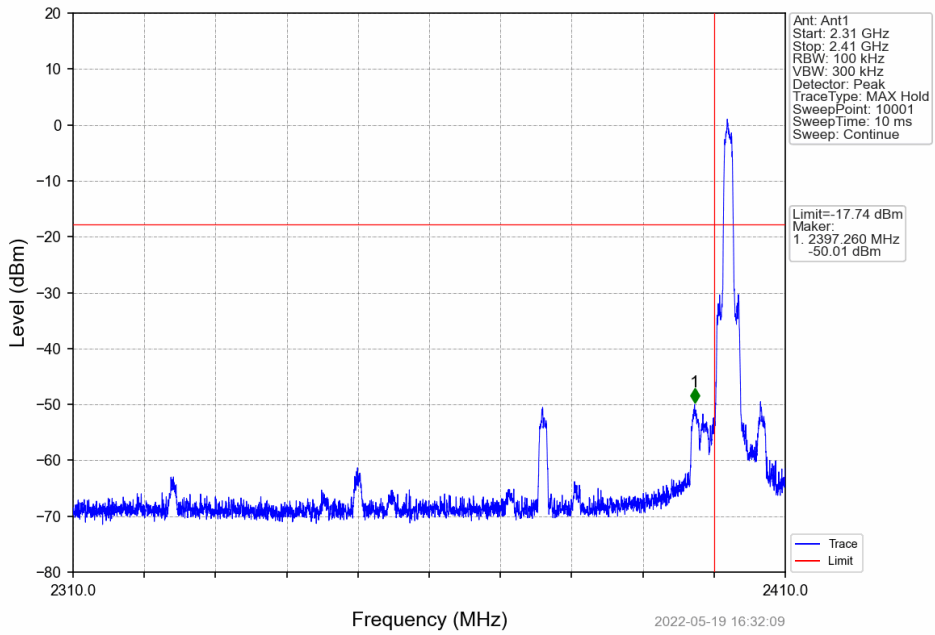
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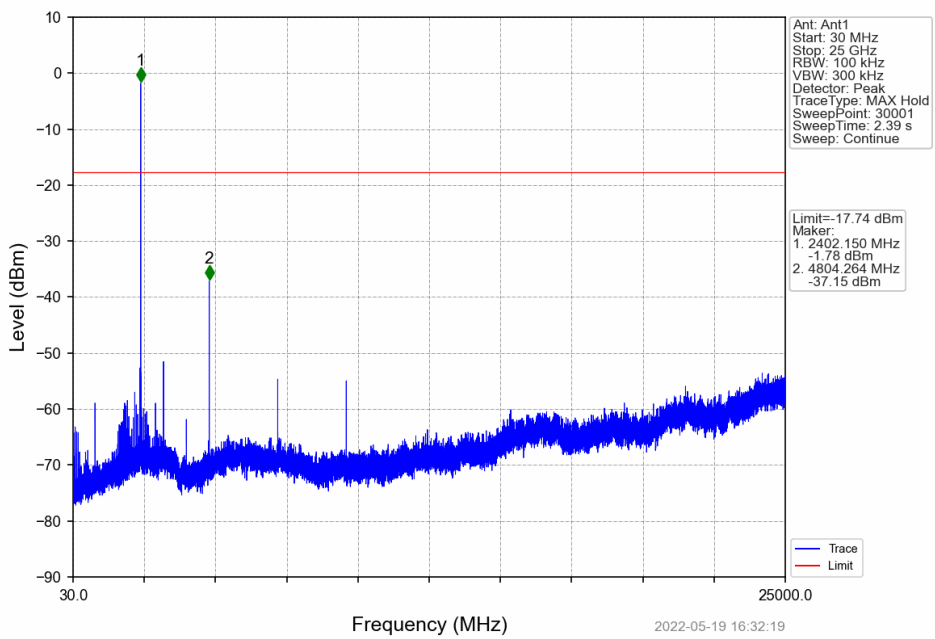
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



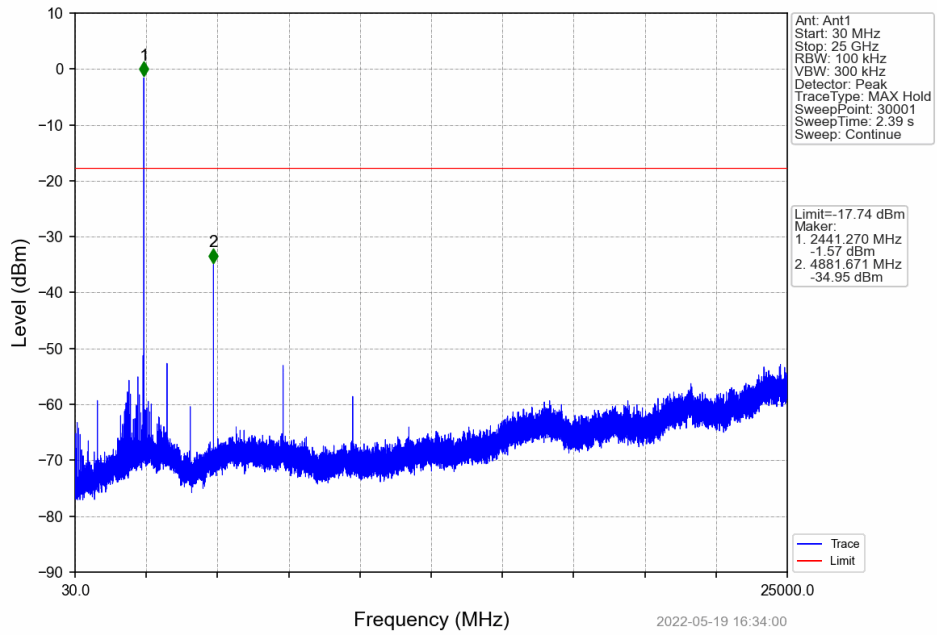
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



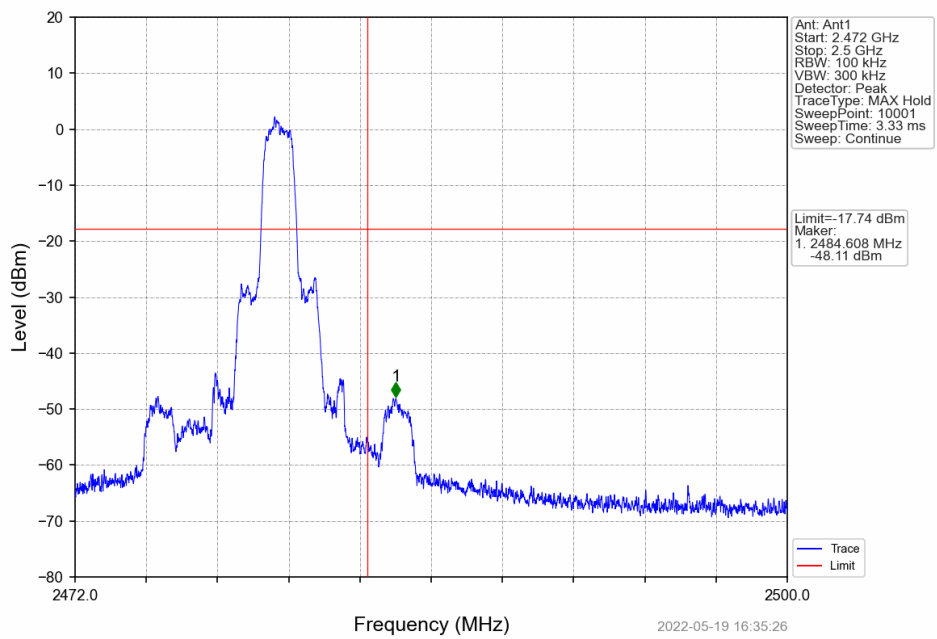
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



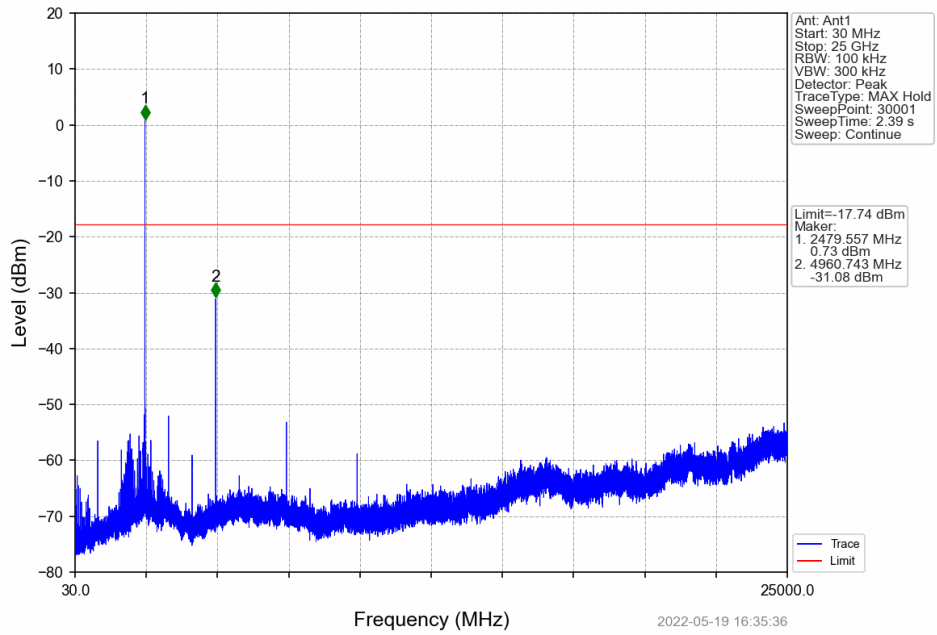
8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV

