ANNEX D TEST DATA

For

Project No.:	8227EU122002W
Client:	Zhulu Electronic Technology (Shanghai) Co., Ltd
Product Name:	wireless headphones
Model No.:	B39
FCC ID:	2BDUD-B39
Technology:	Bluetooth BDR&EDR
Test Engineer:	Mikey zhu
Test Date:	2024-03-25

Test Summary

Item	Result
Duty Cycle	Pass
Bandwidth	Pass
Maximum Conducted Output Power	Pass
Carrier Frequency Separation	Pass
Number of Hopping Frequencies	Pass
Time of Occupancy (Dwell Time)	Pass
Unwanted Emissions In Non-restricted Frequency Bands	Pass

1. Bandwidth

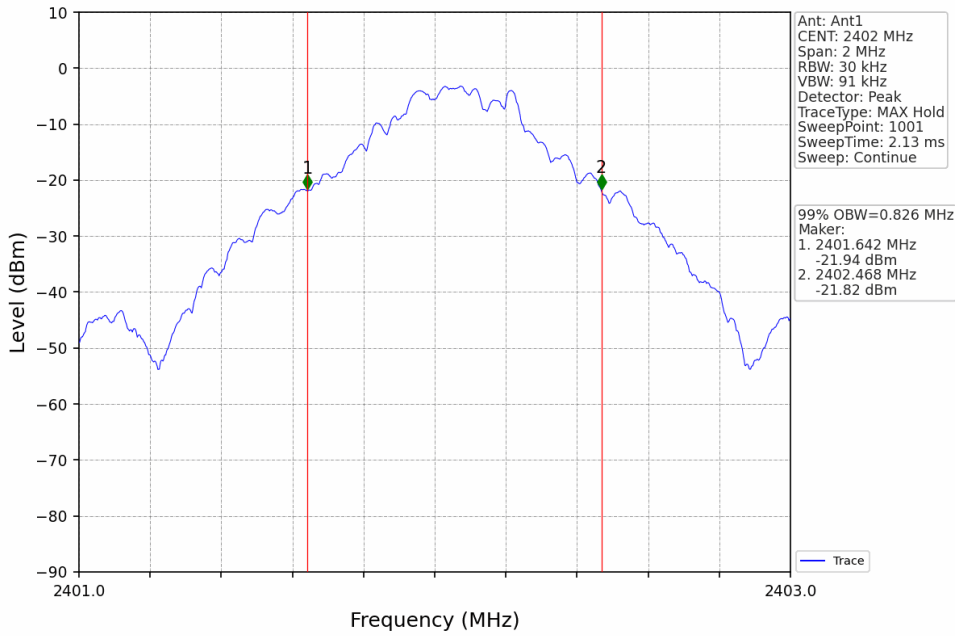
1.1 OBW

1.1.1 Test Result

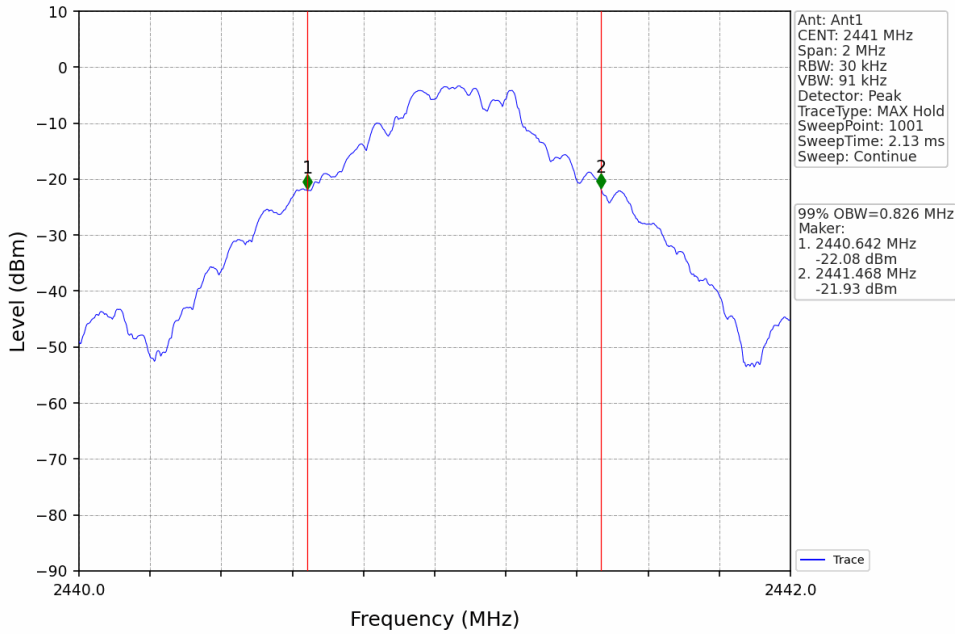
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz) Result	Verdict
GFSK	SISO	2402	DH5	1	0.826	Pass
		2441	DH5	1	0.826	Pass
		2480	DH5	1	0.825	Pass
π/4DQPSK	SISO	2402	2DH5	1	1.175	Pass
		2441	2DH5	1	1.175	Pass
		2480	2DH5	1	1.174	Pass
8DPSK	SISO	2402	3DH5	1	1.178	Pass
		2441	3DH5	1	1.177	Pass
		2480	3DH5	1	1.178	Pass

1.1.2 Test Graph

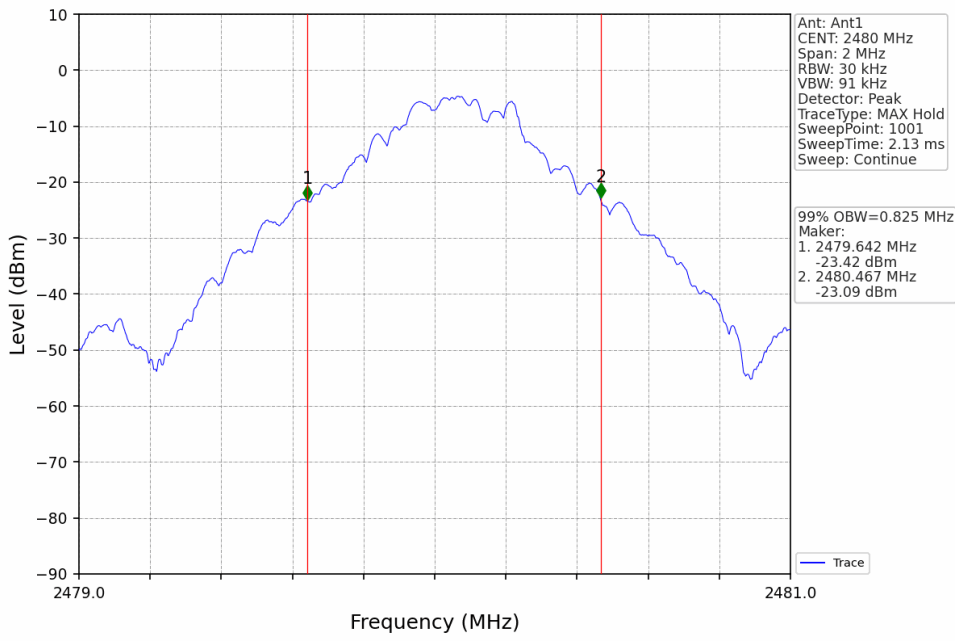
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



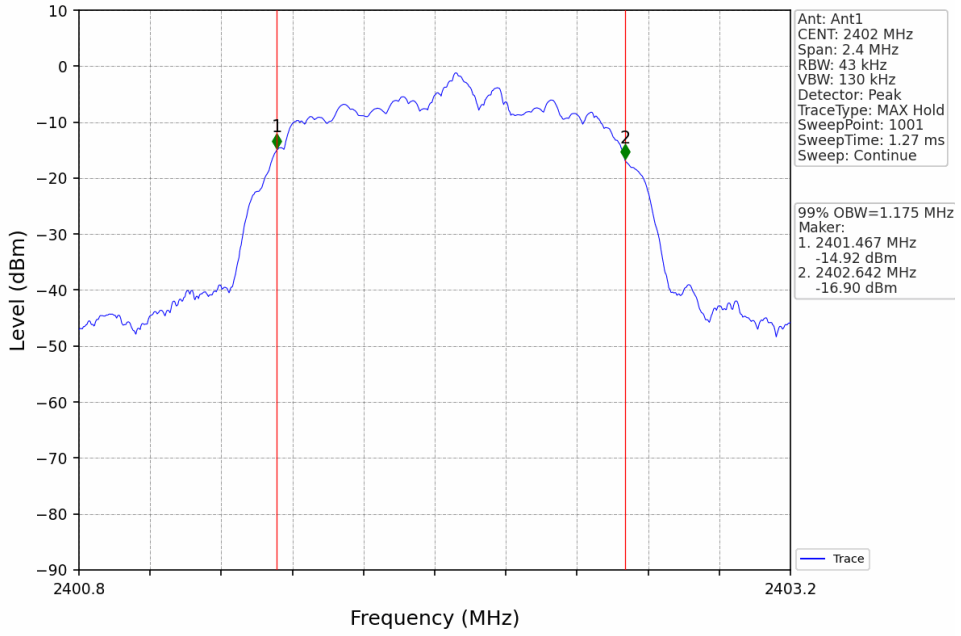
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



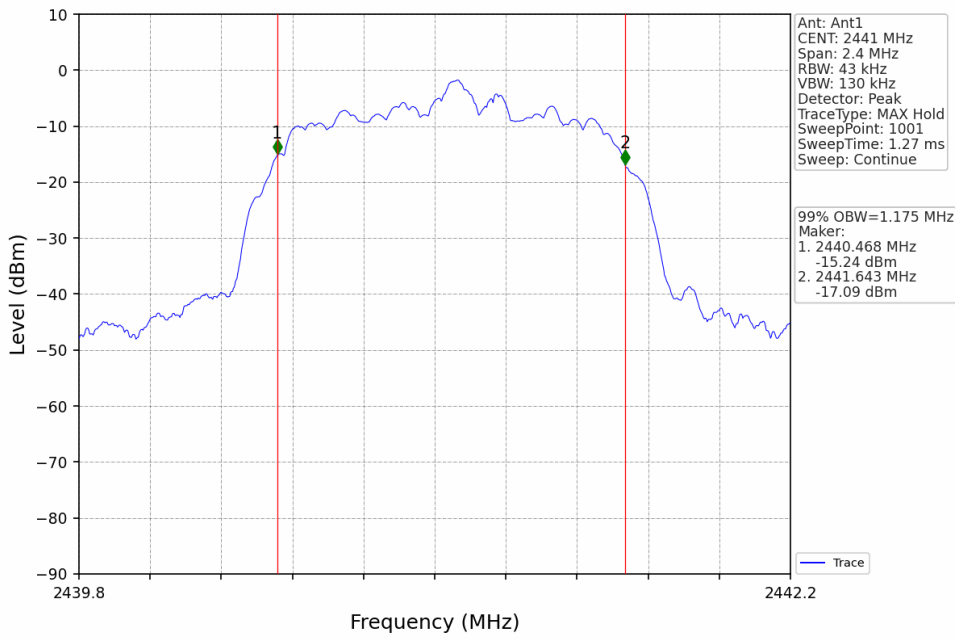
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



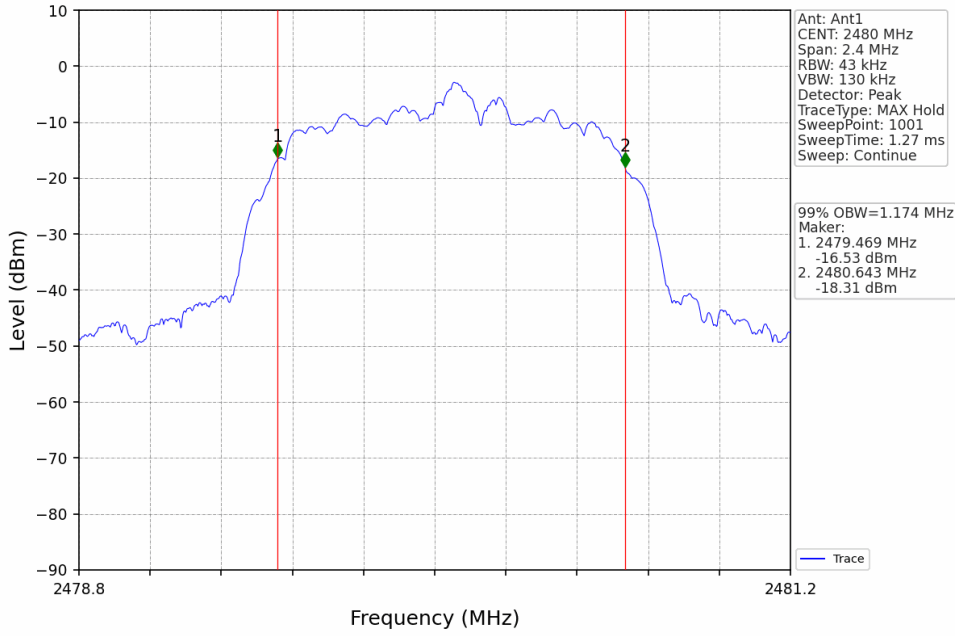
π/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



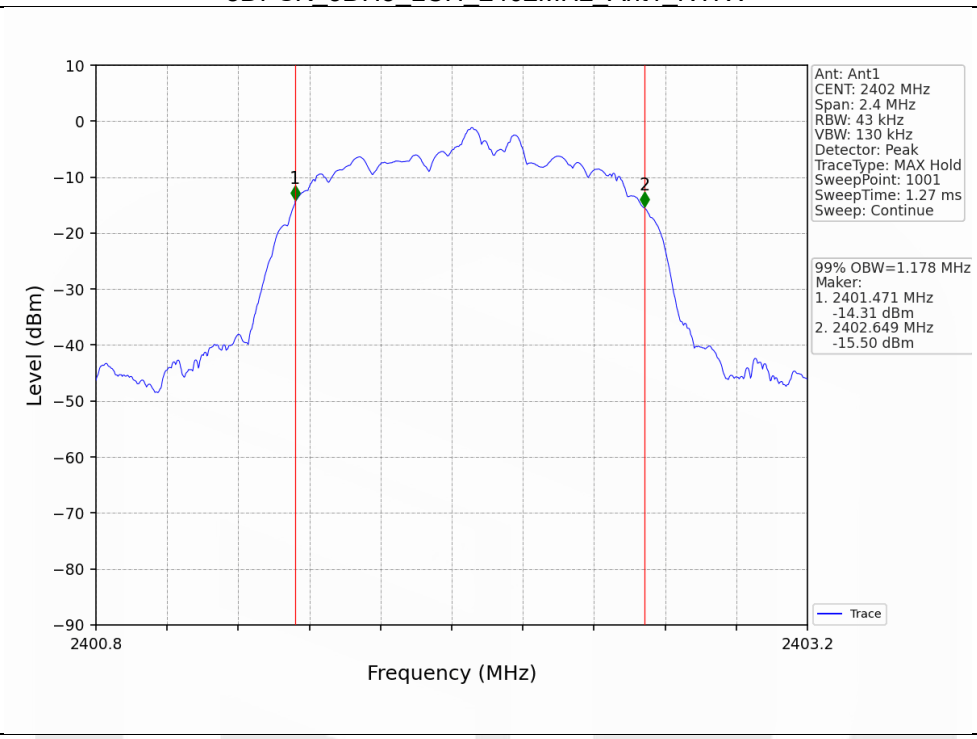
π/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



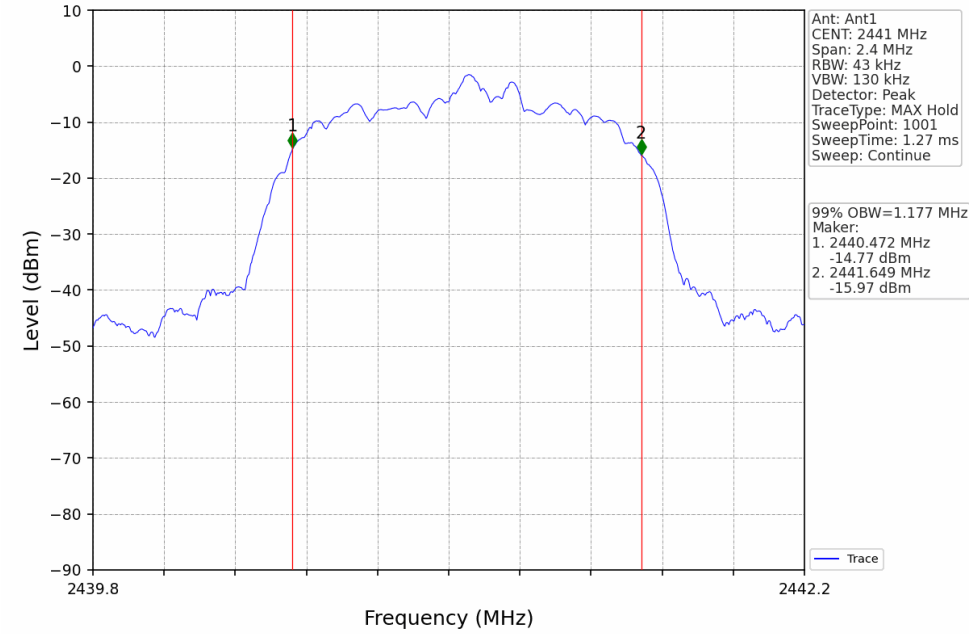
π/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



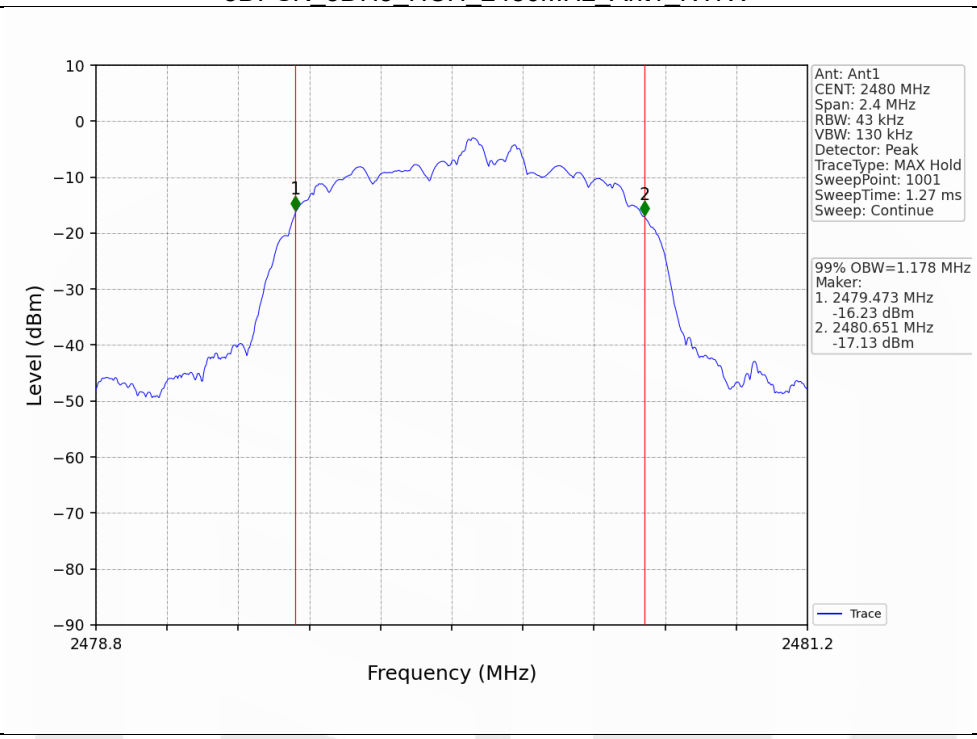
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



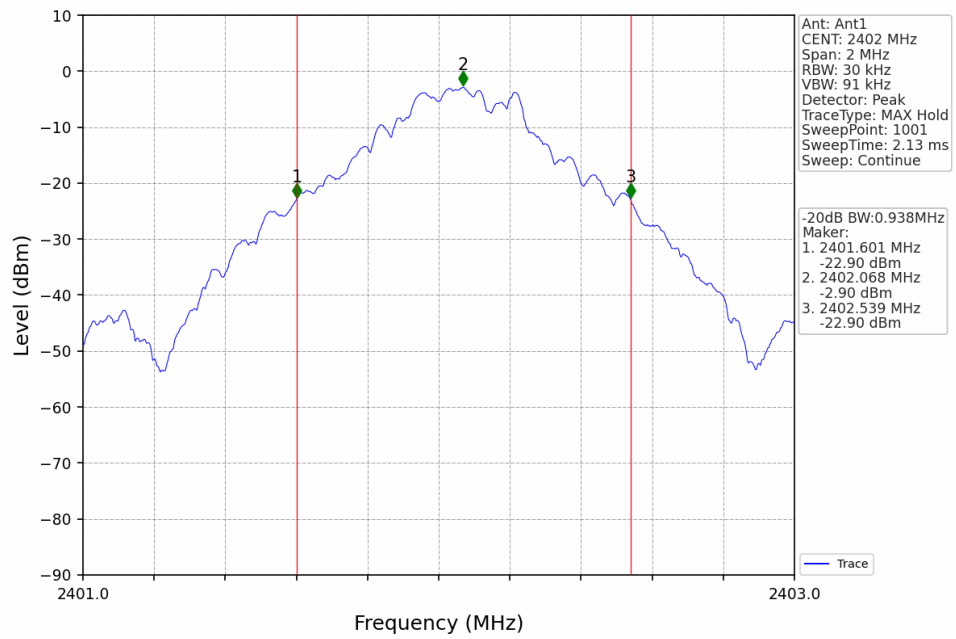
1.2 20dB BW

1.2.1 Test Result

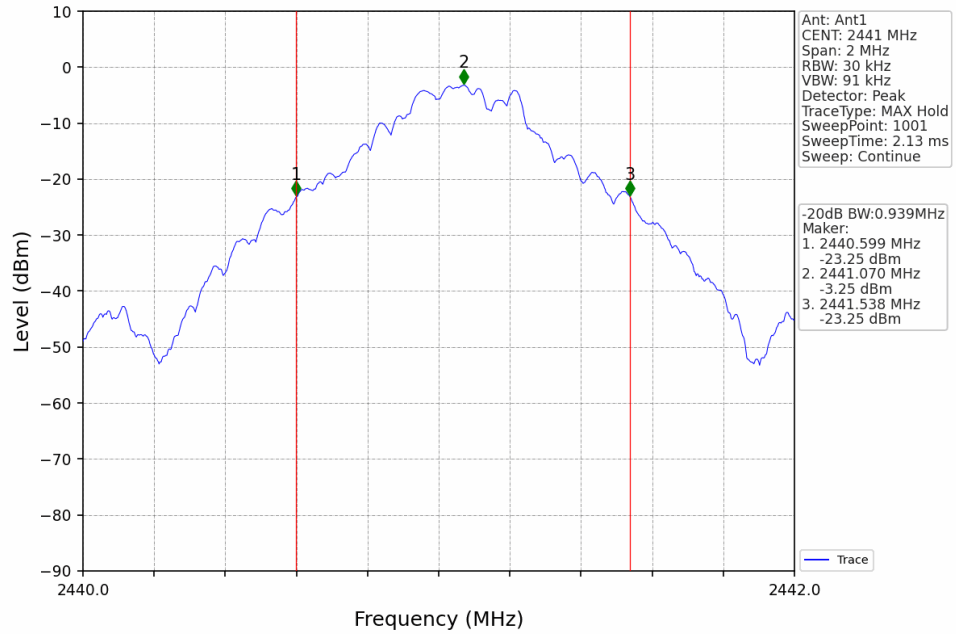
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz) Result	Verdict
GFSK	SISO	2402	DH5	1	0.938	Pass
		2441	DH5	1	0.939	Pass
		2480	DH5	1	0.937	Pass
π/4DQPSK	SISO	2402	2DH5	1	1.293	Pass
		2441	2DH5	1	1.295	Pass
		2480	2DH5	1	1.295	Pass
8DPSK	SISO	2402	3DH5	1	1.307	Pass
		2441	3DH5	1	1.311	Pass
		2480	3DH5	1	1.309	Pass

1.2.2 Test Graph

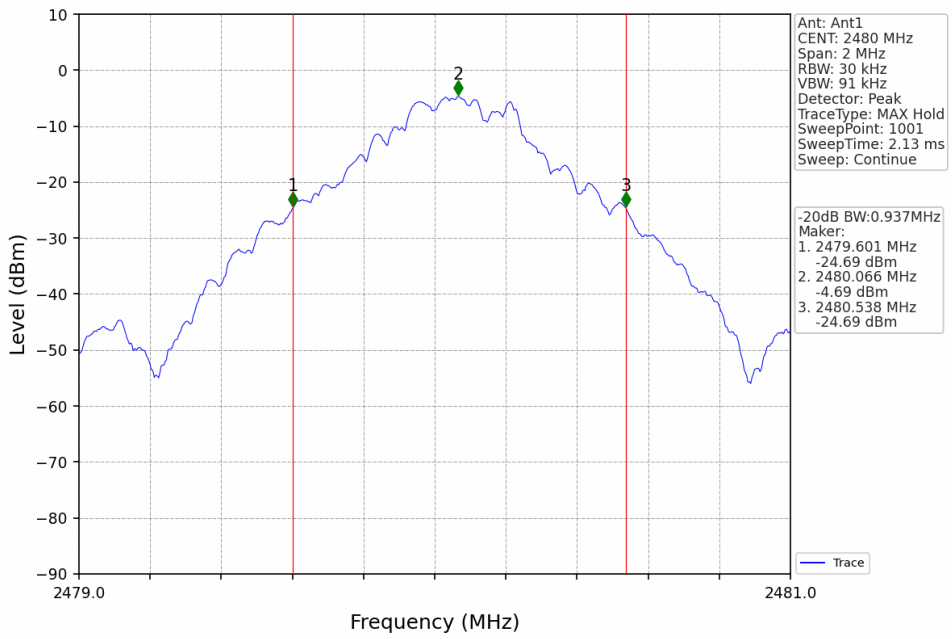
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



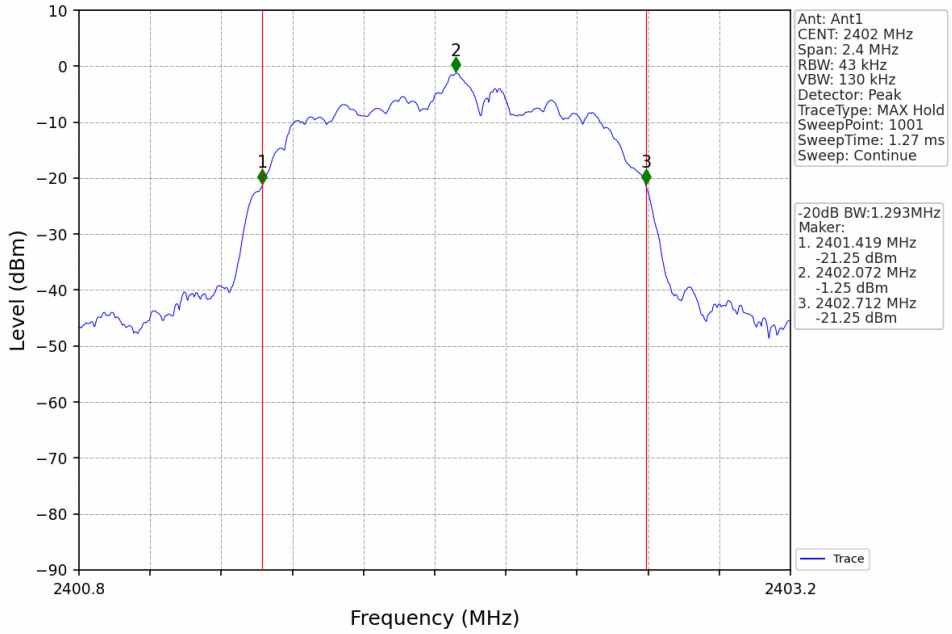
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



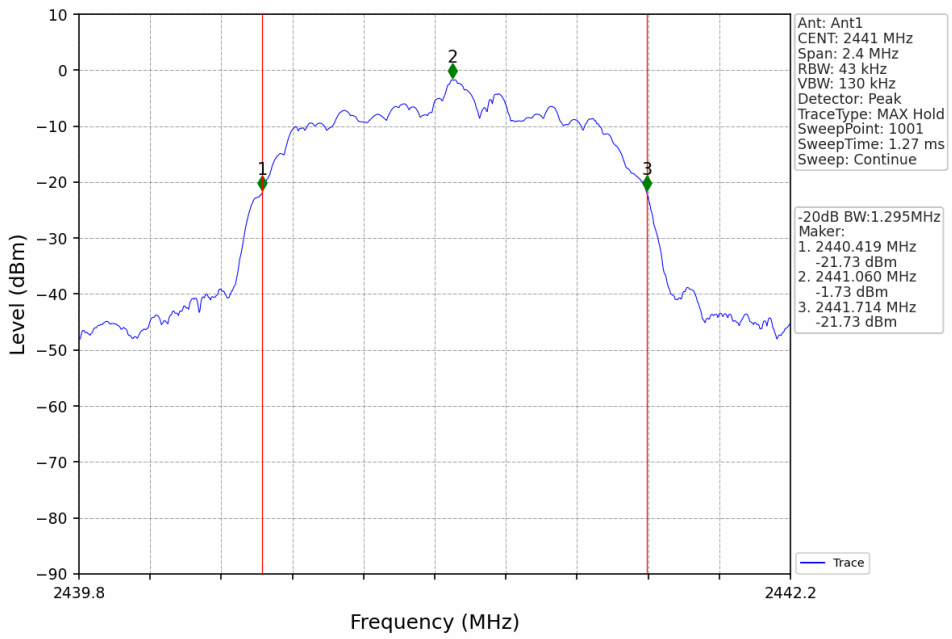
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



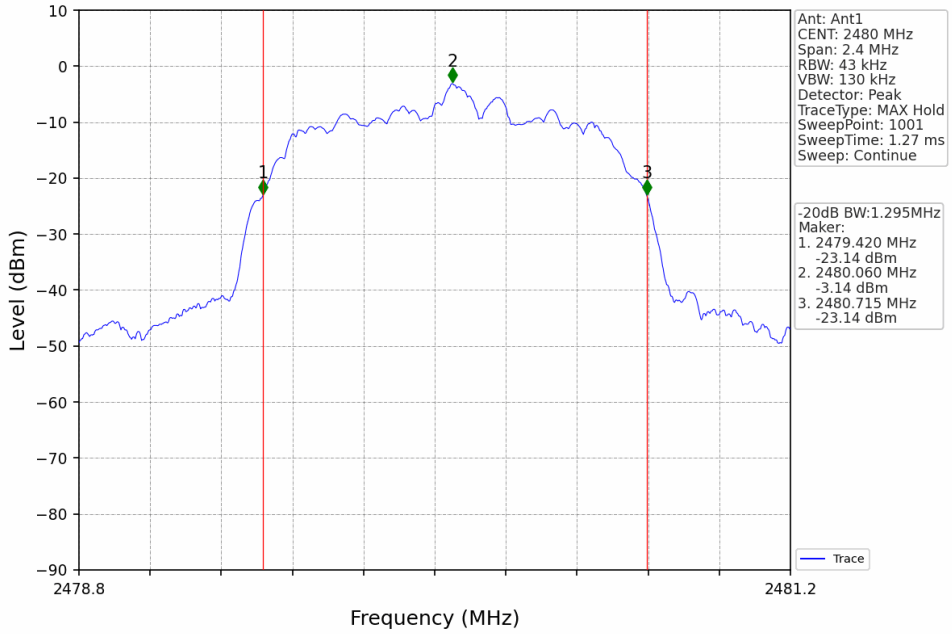
π/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



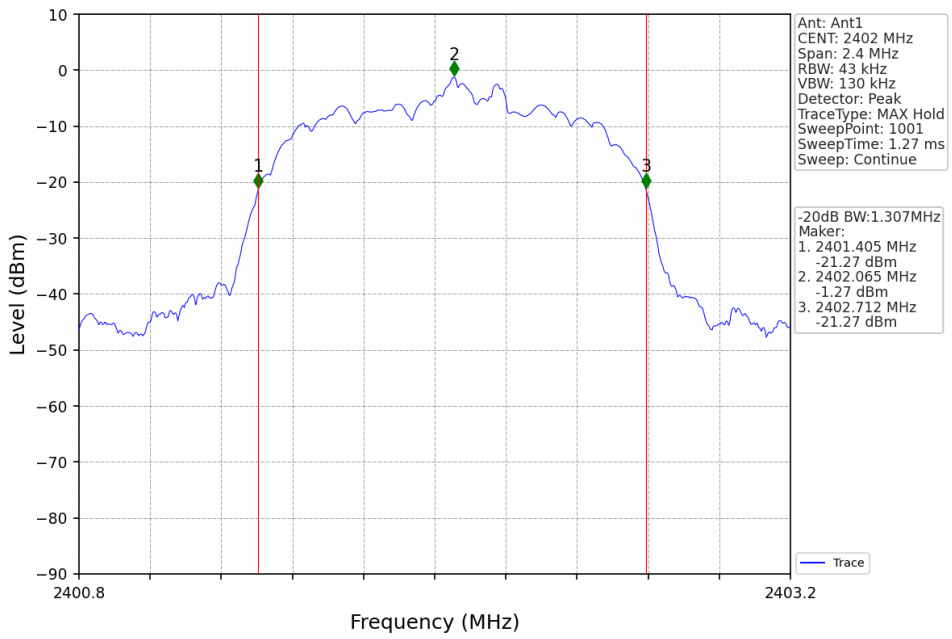
π/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



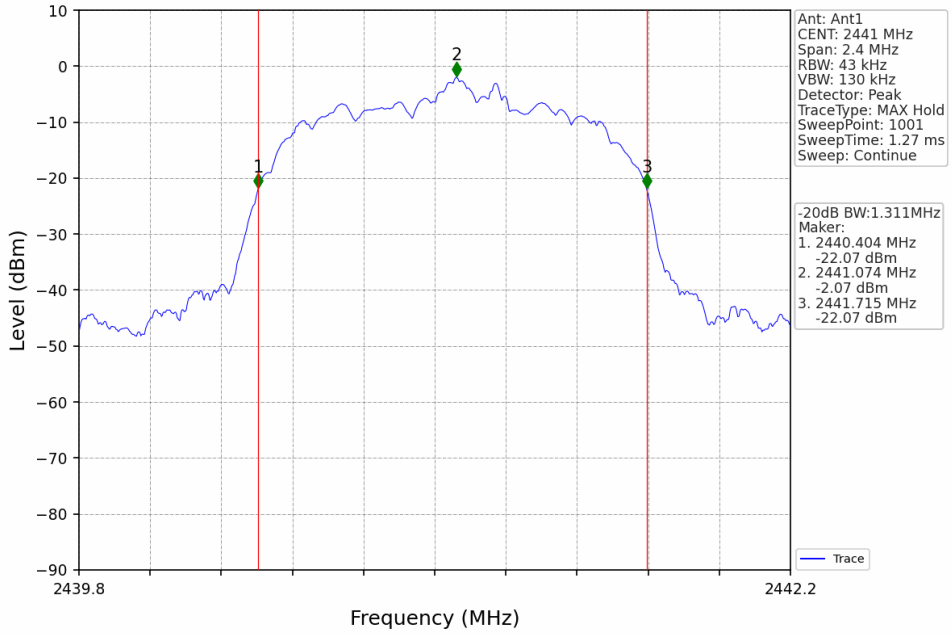
π/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



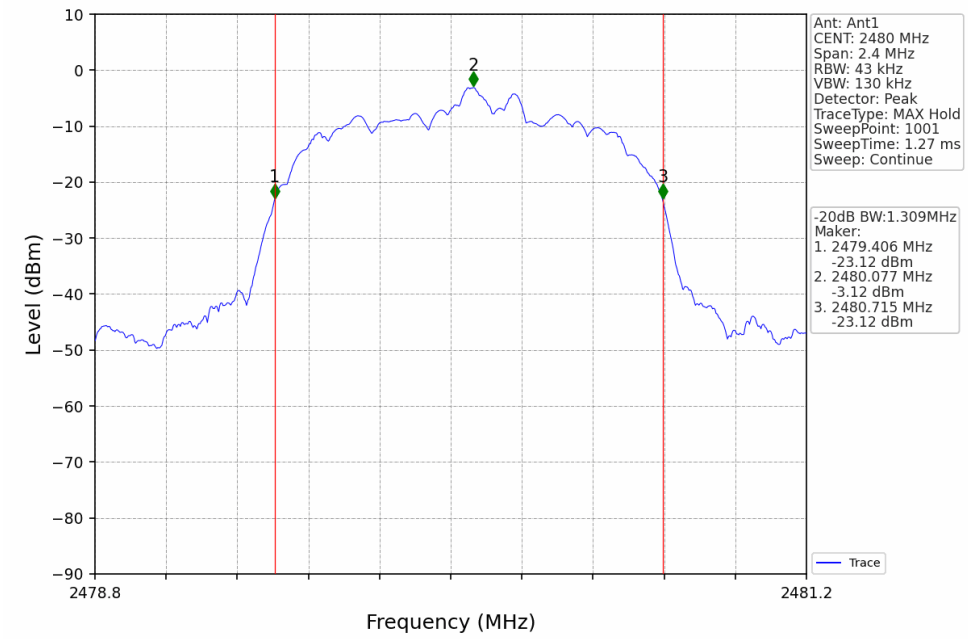
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



2. Maximum Conducted Output Power

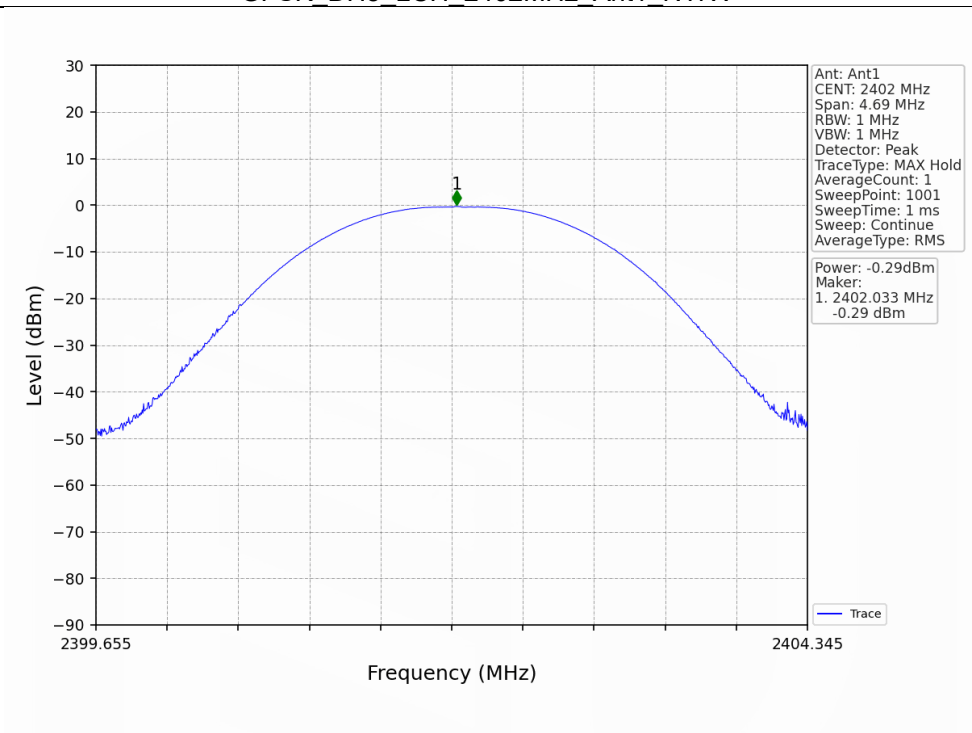
2.1 Power

2.1.1 Test Result

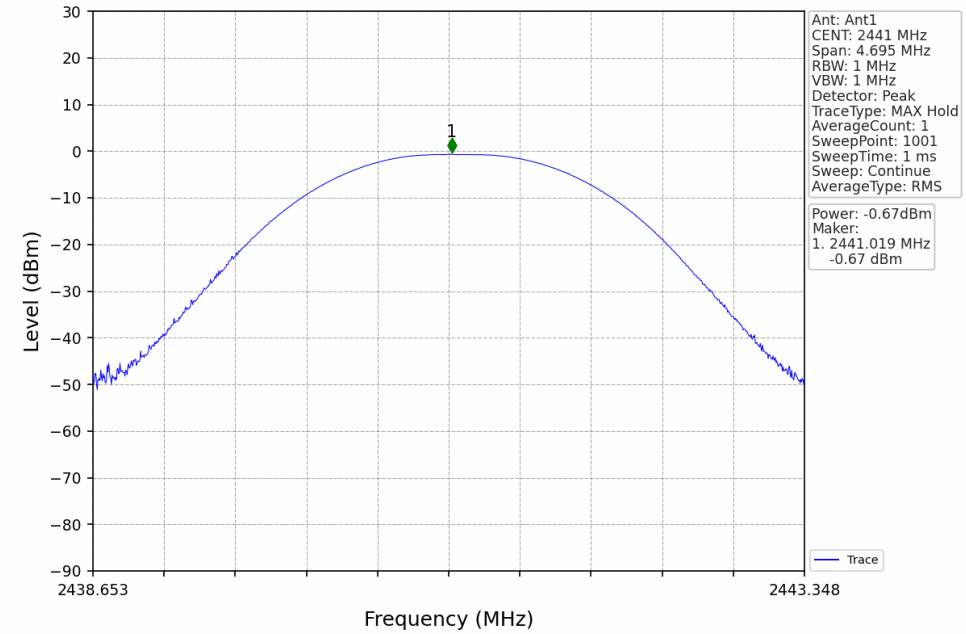
Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	-0.29	<=30	Pass
		2441	DH5	-0.67	<=30	Pass
		2480	DH5	-2.12	<=30	Pass
π/4DQPSK	SISO	2402	2DH5	2.13	<=20.97	Pass
		2441	2DH5	1.78	<=20.97	Pass
		2480	2DH5	0.41	<=20.97	Pass
8DPSK	SISO	2402	3DH5	2.62	<=20.97	Pass
		2441	3DH5	2.23	<=20.97	Pass
		2480	3DH5	0.85	<=20.97	Pass

2.1.2 Test Graph

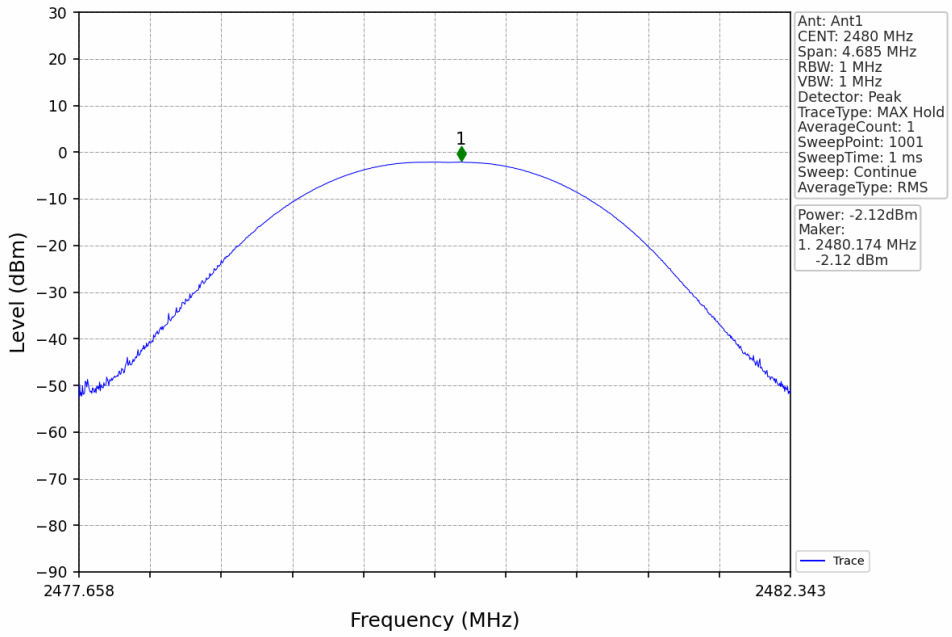
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



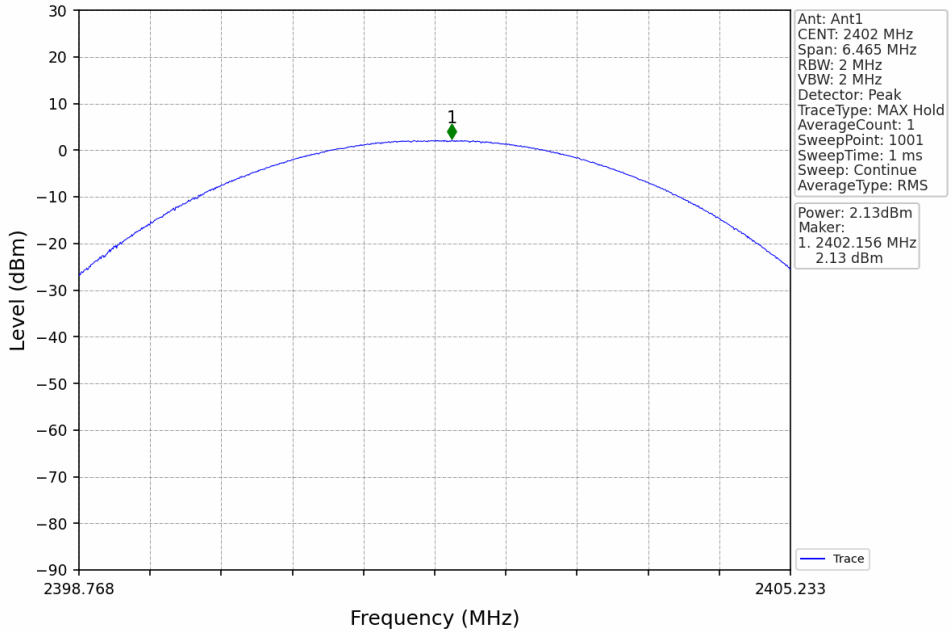
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



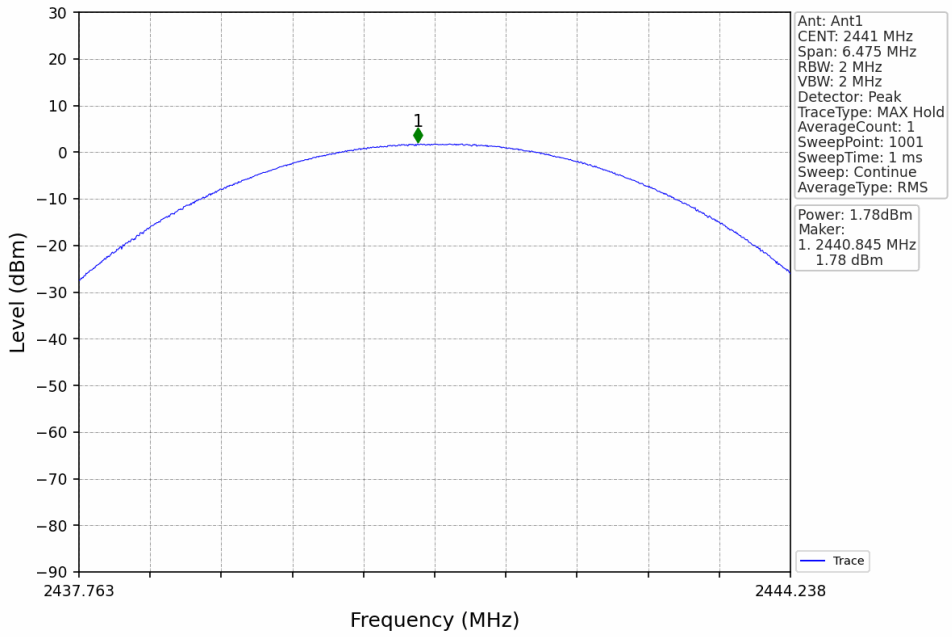
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



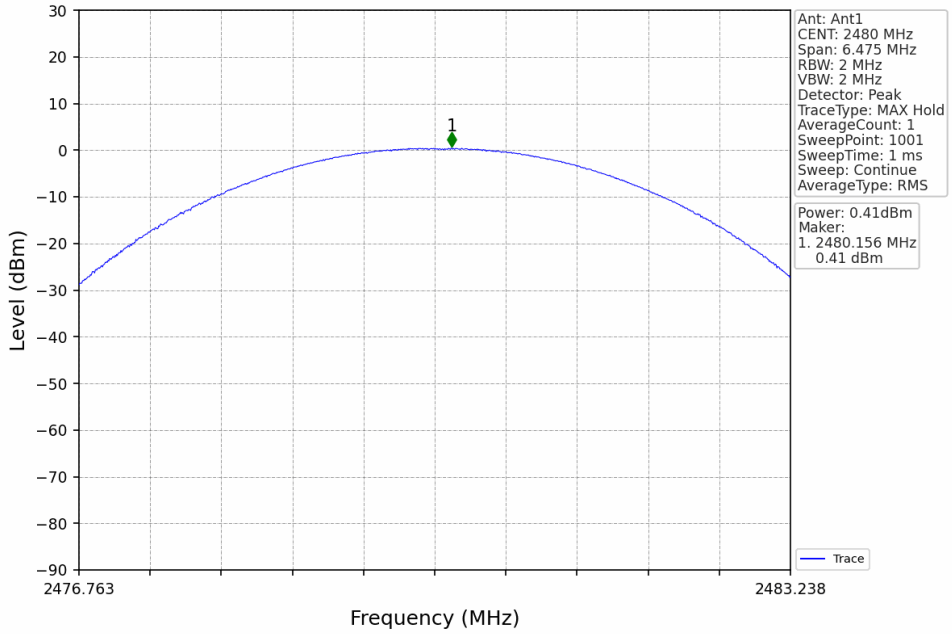
π/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



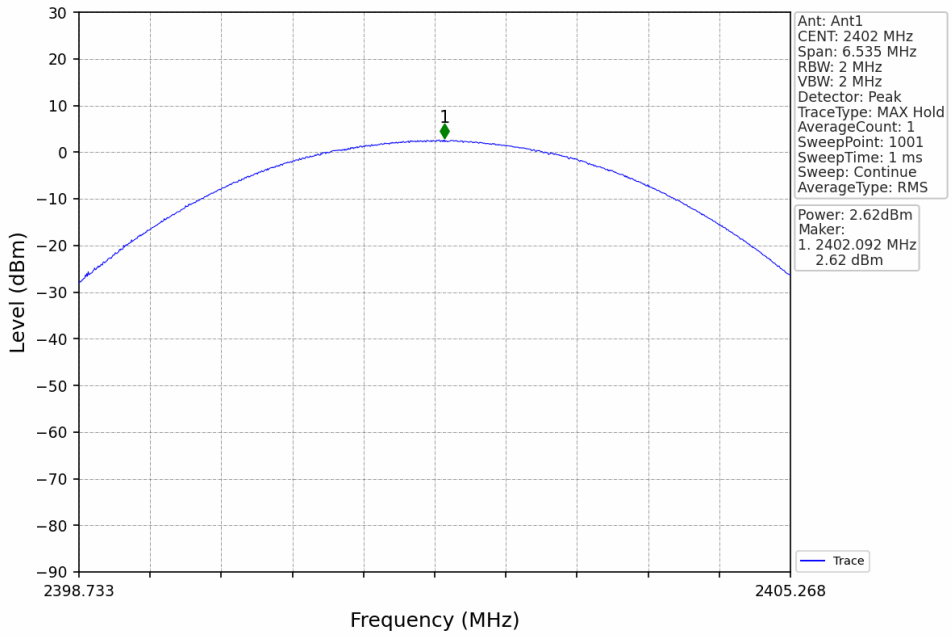
π/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



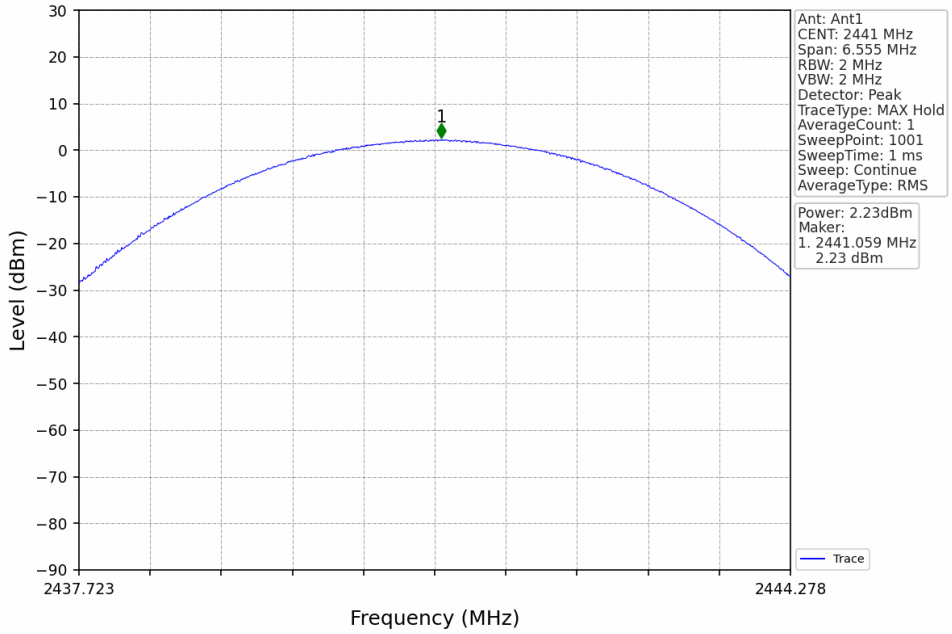
π/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



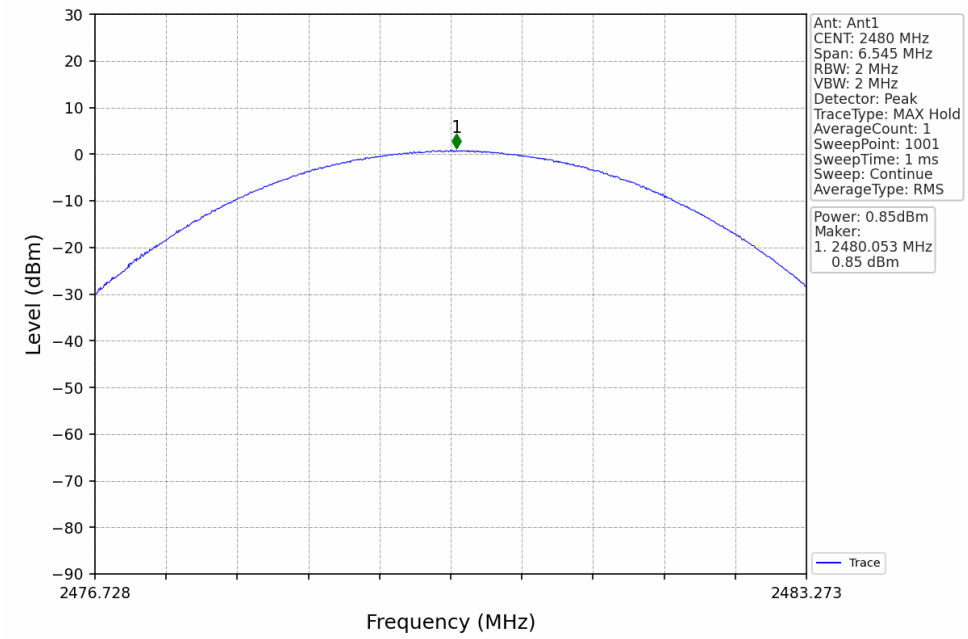
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



3. Carrier Frequency Separation

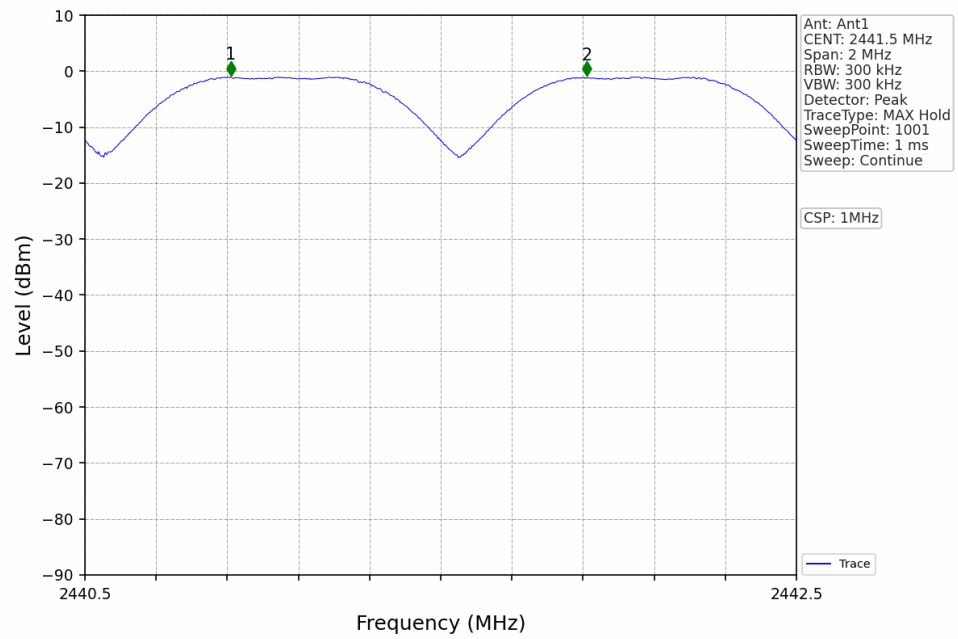
3.1 Ant1

3.1.1 Test Result

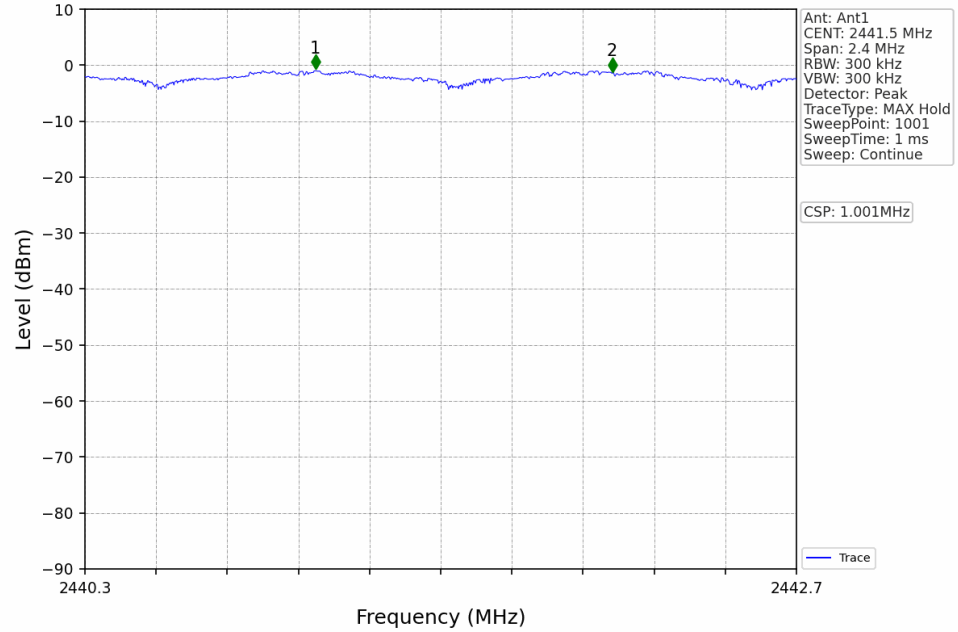
Ant1							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	1.000	0.939	>=0.939	Pass
π/4DQPSK	SISO	HOPP	2DH5	1.001	1.295	>=0.863	Pass
8DPSK	SISO	HOPP	3DH5	1.001	1.311	>=0.874	Pass

3.1.2 Test Graph

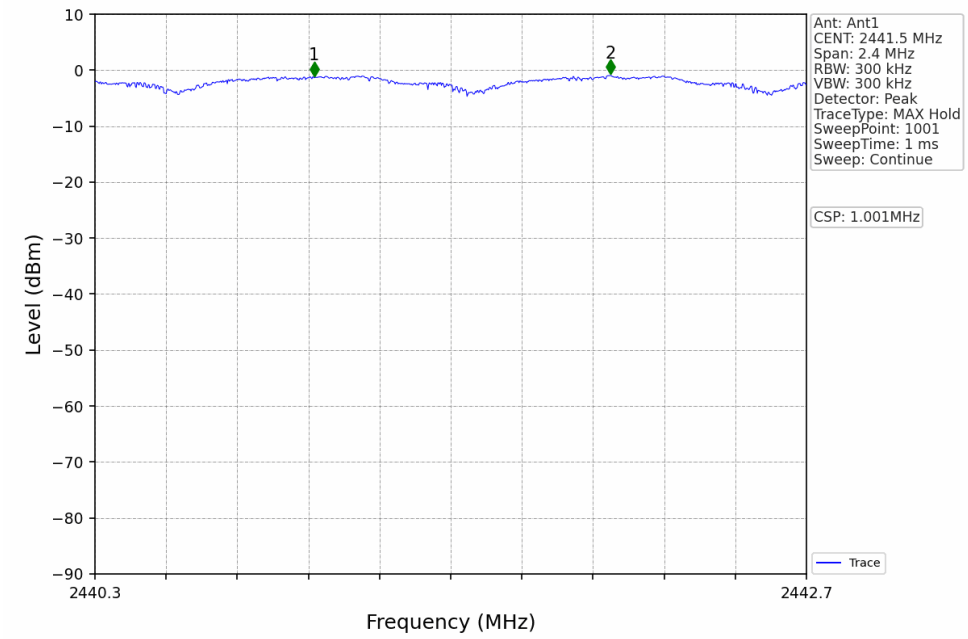
GFSK_DH5_HOPP_Ant1_NTNV



π/4DQPSK_2DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



4. Number of Hopping Frequencies

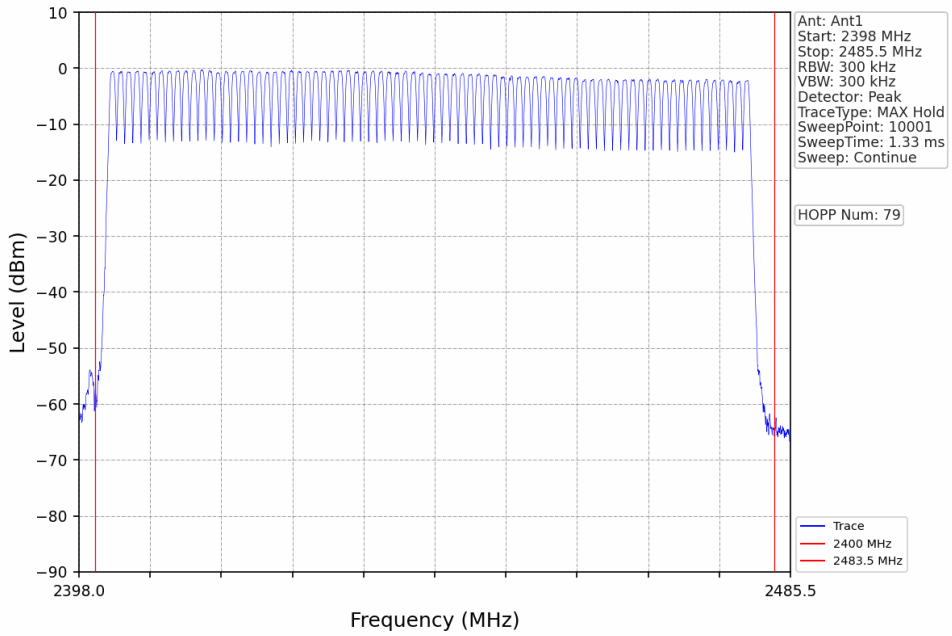
4.1 HoppNum

4.1.1 Test Result

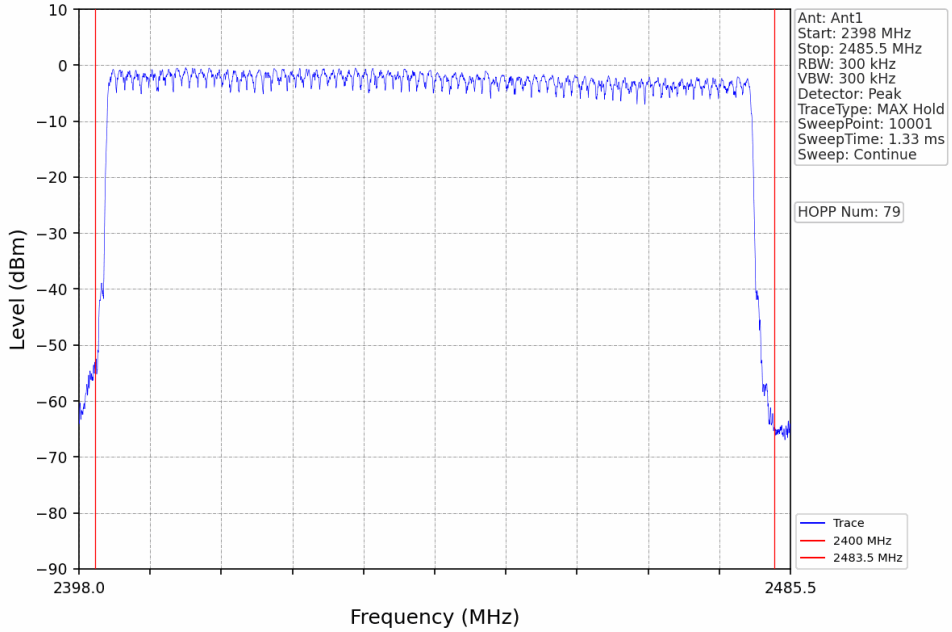
Mode	TX Type	Frequency (MHz)	Packet Type	Num of Hopping Frequencies		Verdict
				ANT1	Limit	
GFSK	SISO	HOPP	DH5	79	>=15	Pass
π/4DQPSK	SISO	HOPP	2DH5	79	>=15	Pass
8DPSK	SISO	HOPP	3DH5	79	>=15	Pass

4.1.2 Test Graph

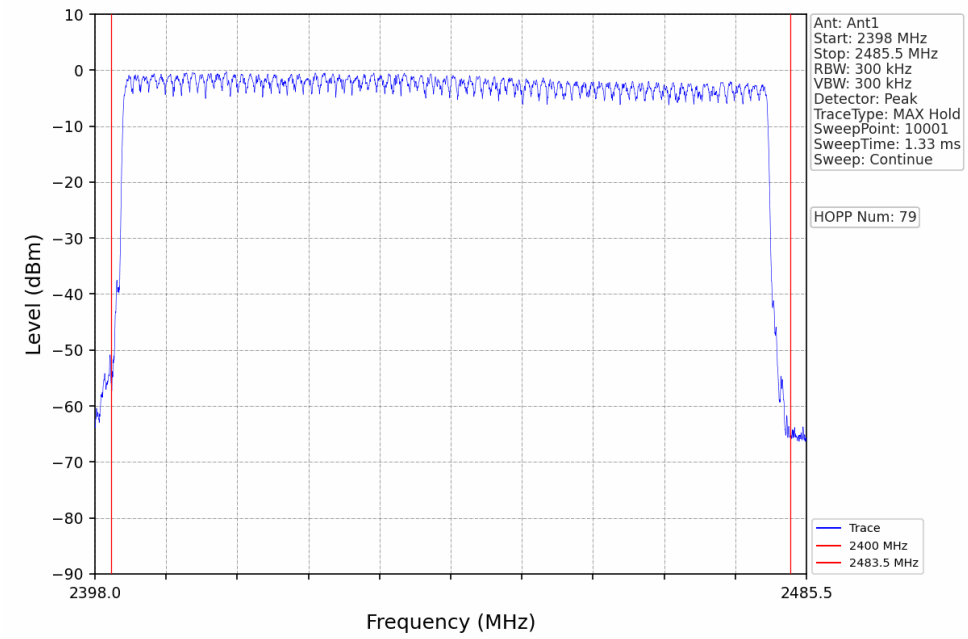
GFSK_DH5_HOPP_Ant1_NTNV



π/4DQPSK_2DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



5. Time of Occupancy (Dwell Time)

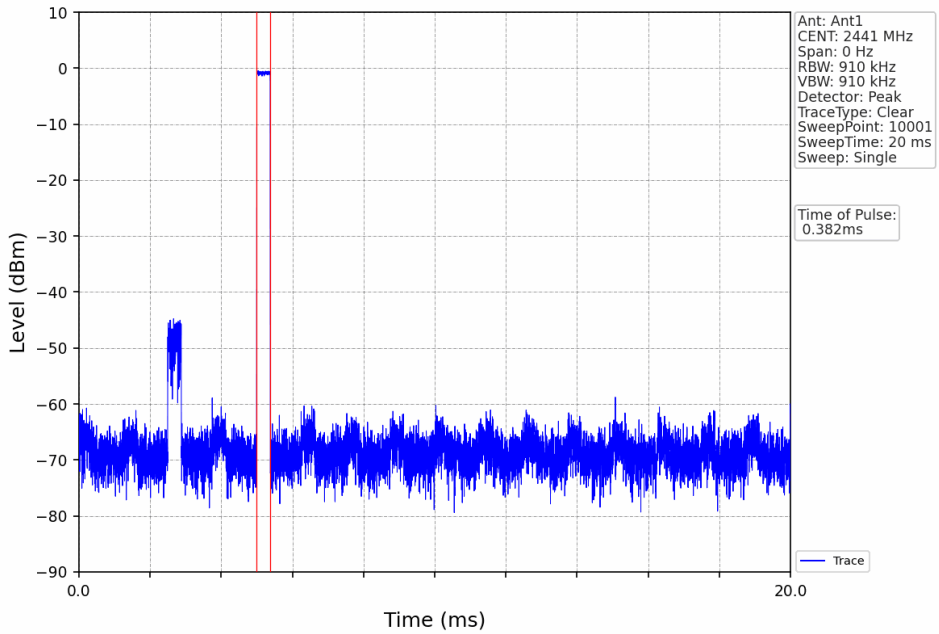
5.1 Ant1

5.1.1 Test Result

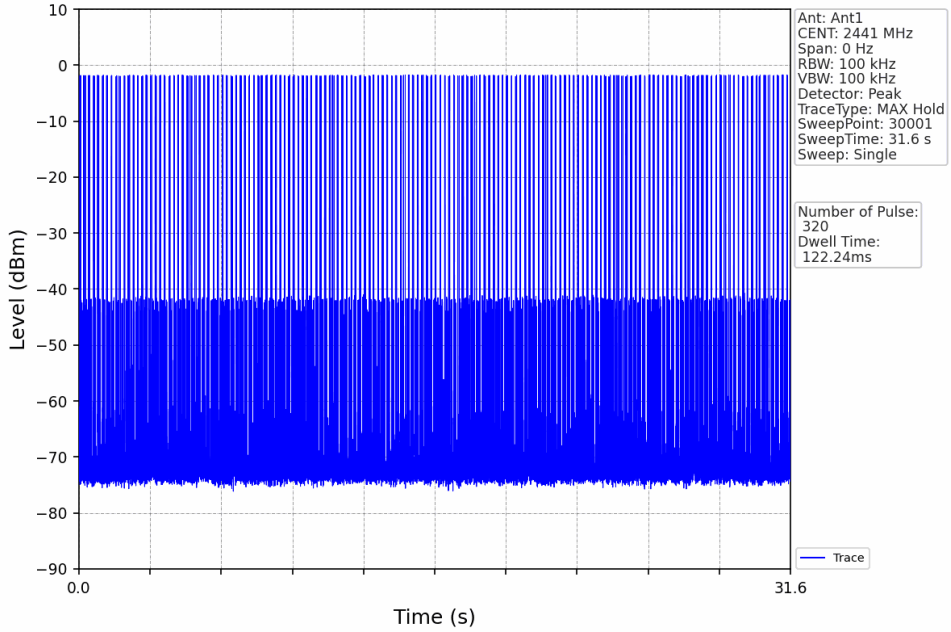
Ant1									
Mode	TX Type	Frequency (MHz)	Packet Type	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limit (ms)	Verdict
GFSK	SISO	HOPP	DH1	0.382	31.600	320	122.240	<=400	Pass
			DH3	1.638	31.600	160	262.080	<=400	Pass
			DH5	2.888	31.600	110	317.680	<=400	Pass
π/4DQPSK	SISO	HOPP	2DH1	0.392	31.600	320	125.440	<=400	Pass
			2DH3	1.650	31.600	162	267.300	<=400	Pass
			2DH5	2.898	31.600	120	347.760	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.392	31.600	320	125.440	<=400	Pass
			3DH3	1.648	31.600	158	260.384	<=400	Pass
			3DH5	2.898	31.600	117	339.066	<=400	Pass

5.1.2 Test Graph

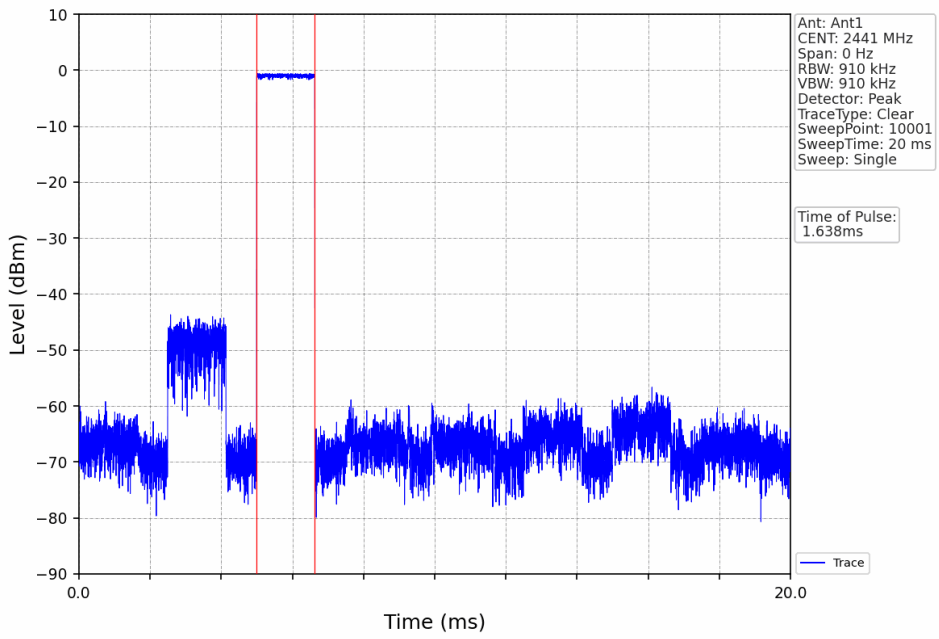
GFSK_DH1_HOPP_Ant1_NTNV



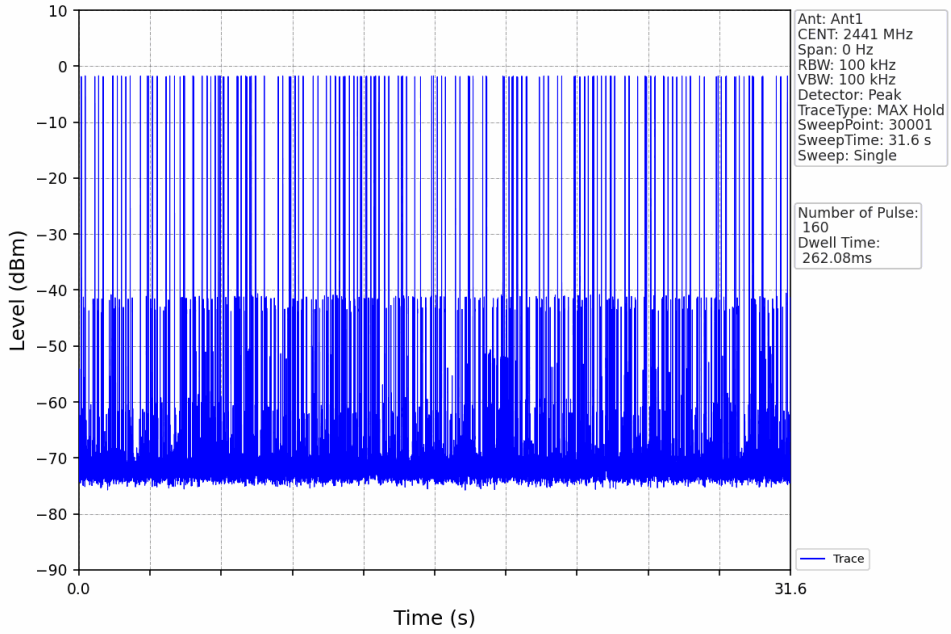
GFSK_DH1_HOPP_Ant1_NTNV



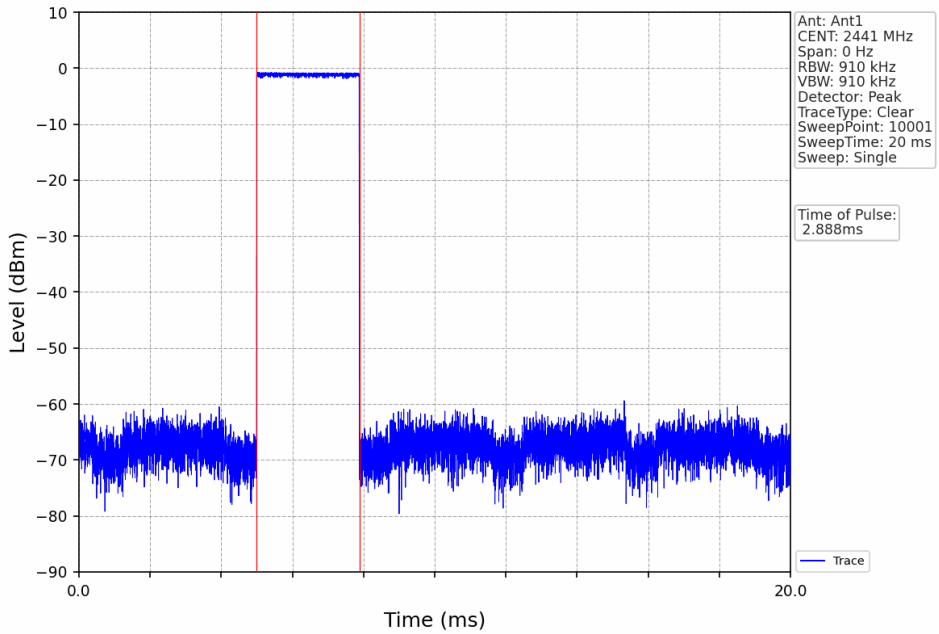
GFSK_DH3_HOPP_Ant1_NTNV



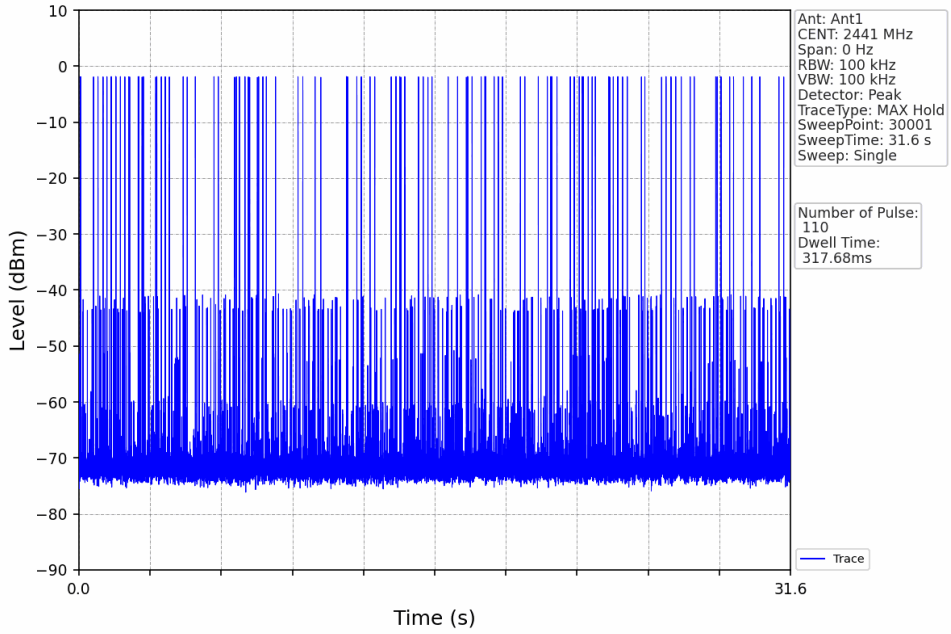
GFSK_DH3_HOPP_Ant1_NTNV



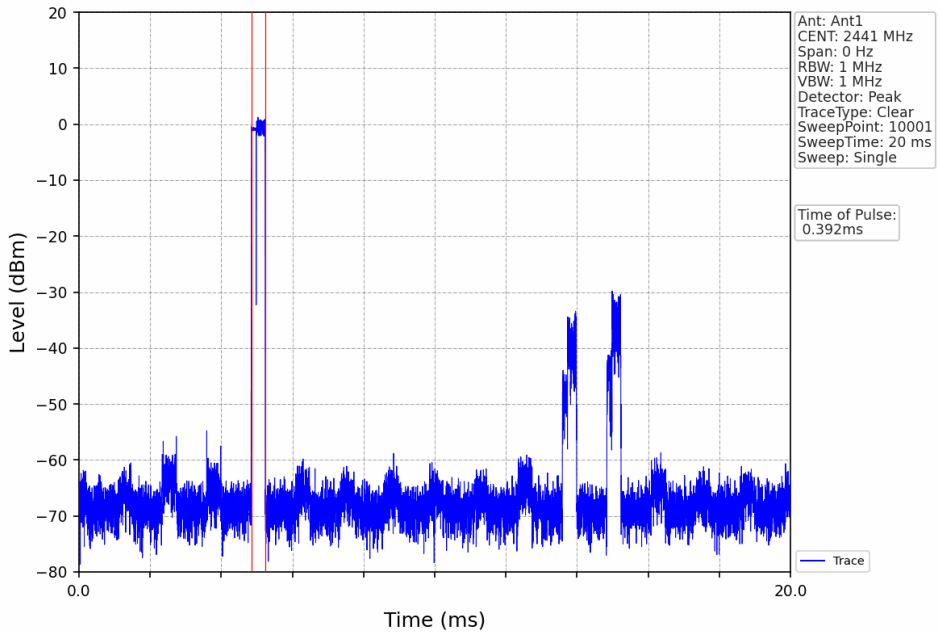
GFSK_DH5_HOPP_Ant1_NTNV



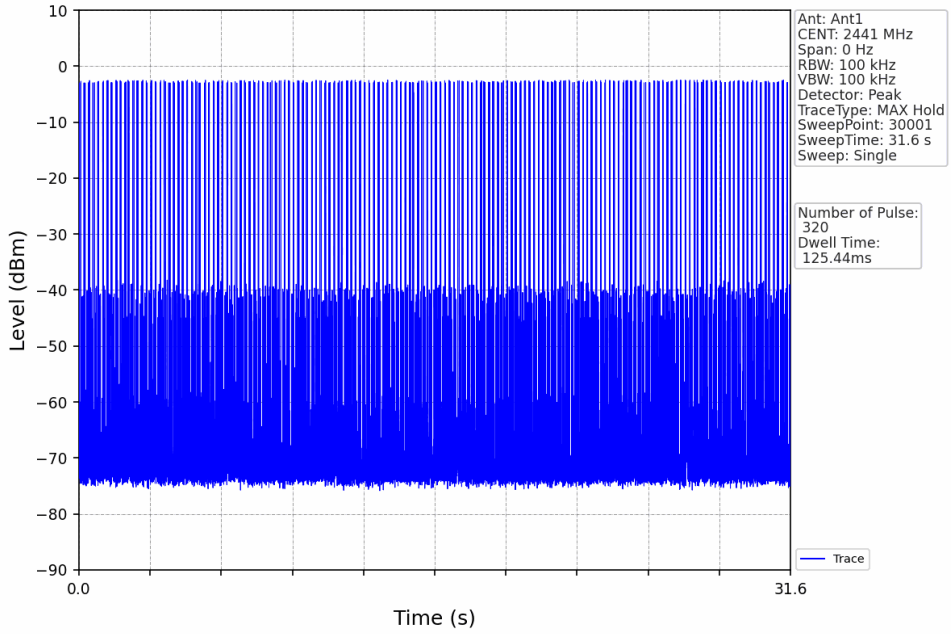
GFSK_DH5_HOPP_Ant1_NTNV



π/4DQPSK_2DH1_HOPP_Ant1_NTNV



π/4DQPSK_2DH1_HOPP_Ant1_NTNV



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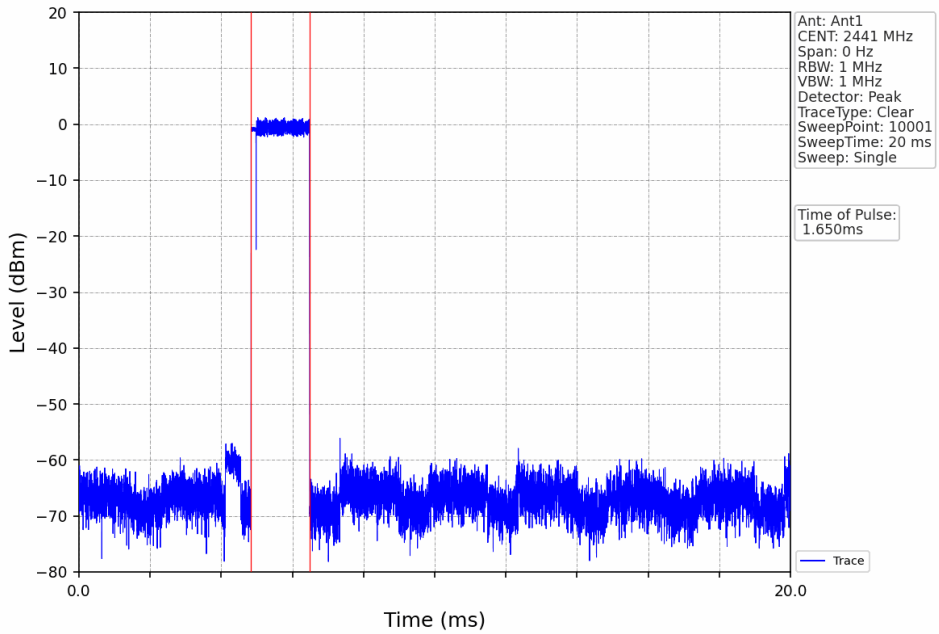

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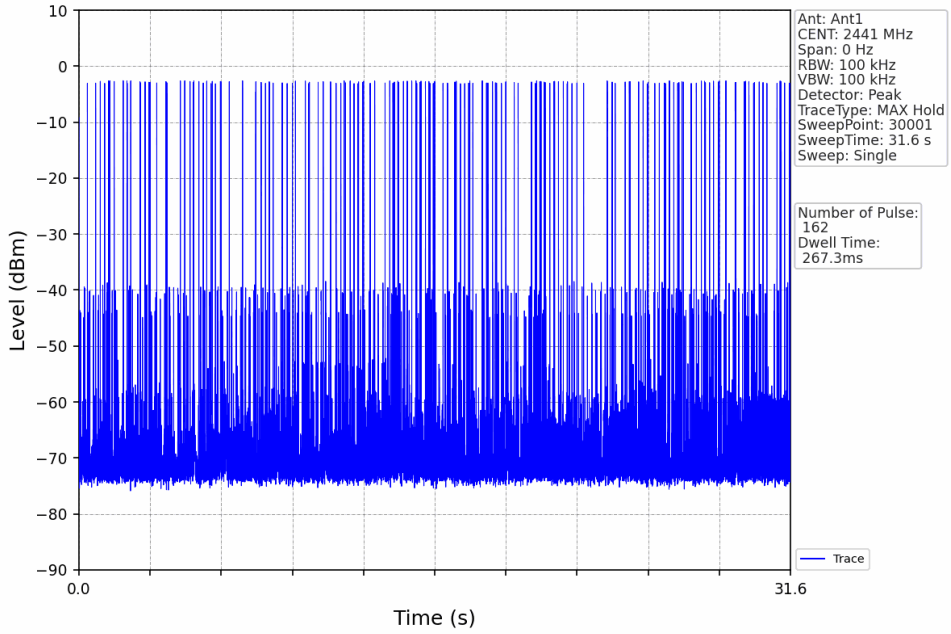

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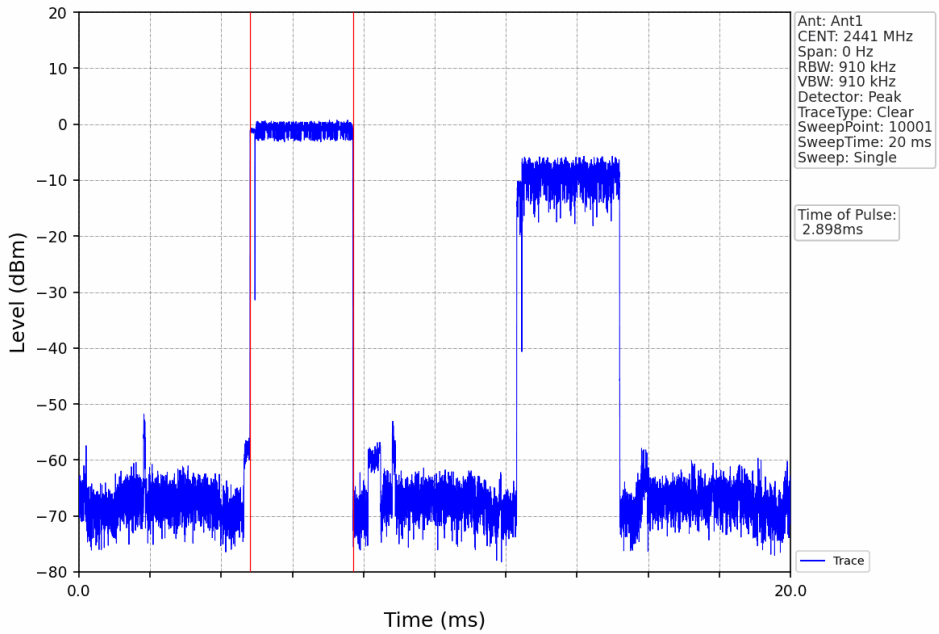

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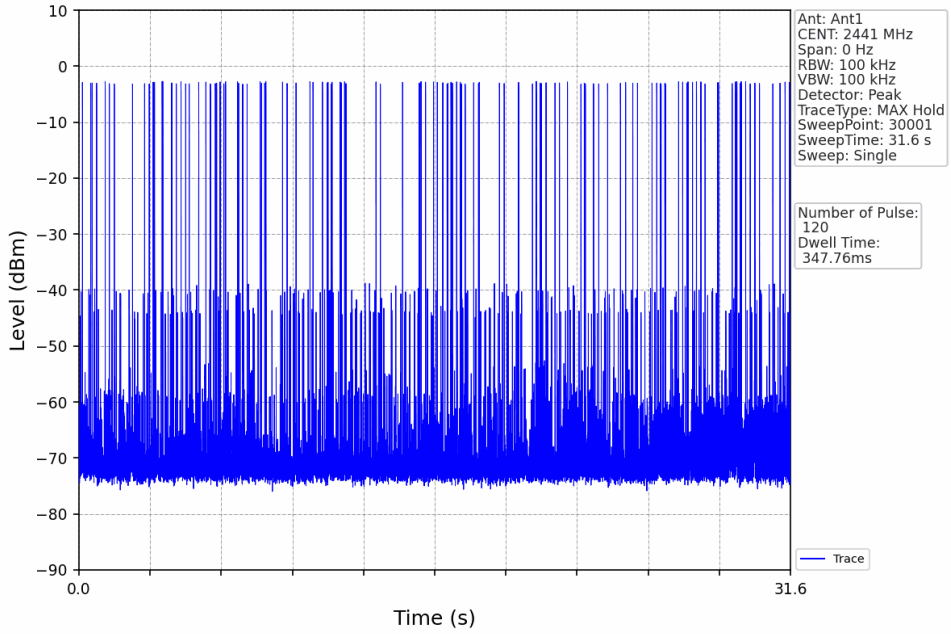

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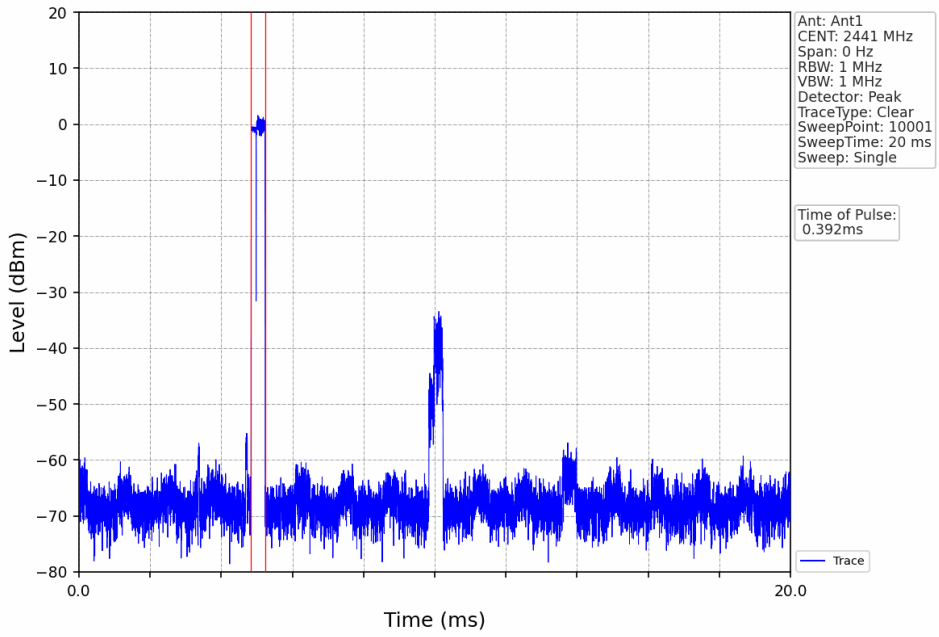

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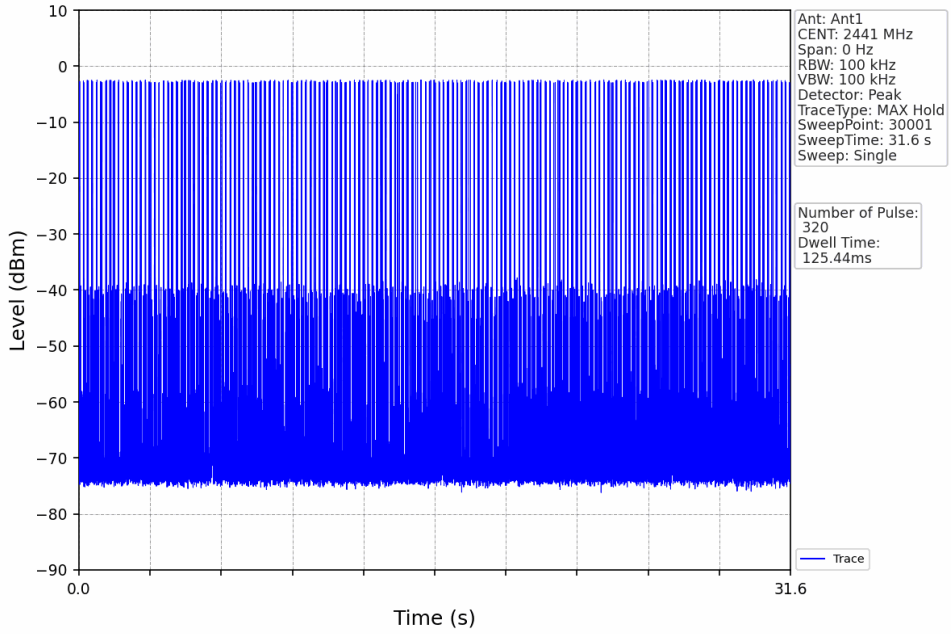

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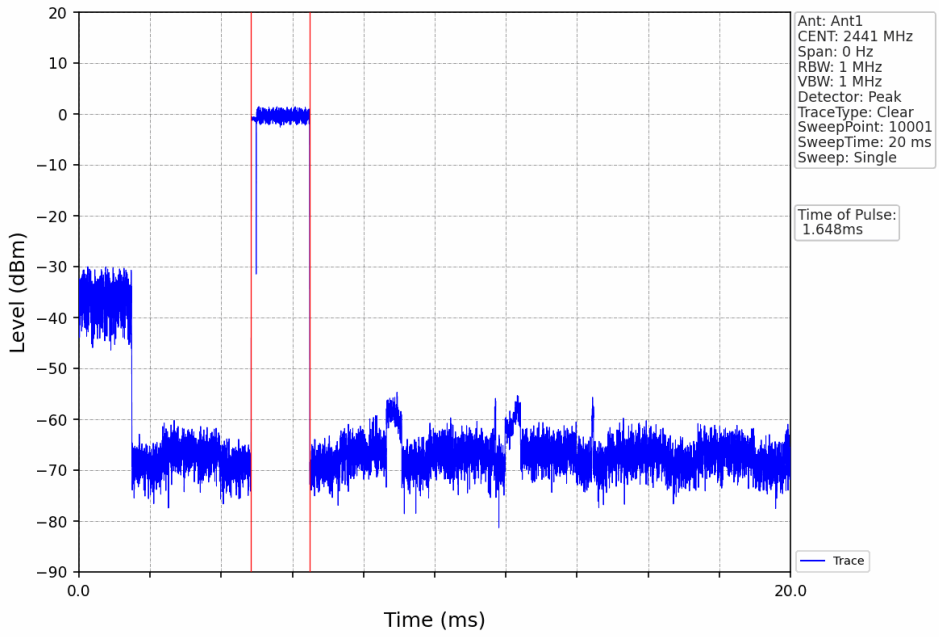

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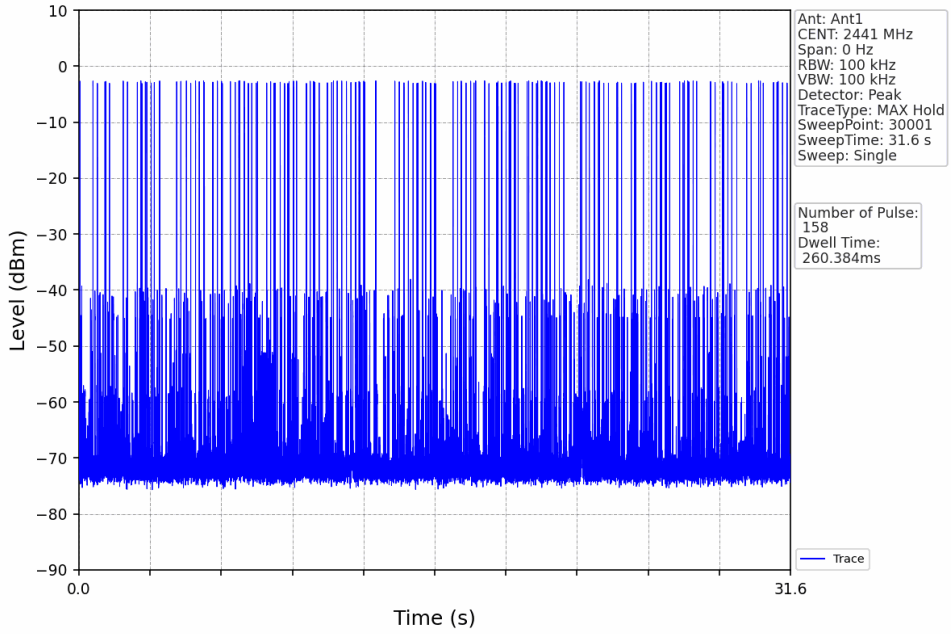

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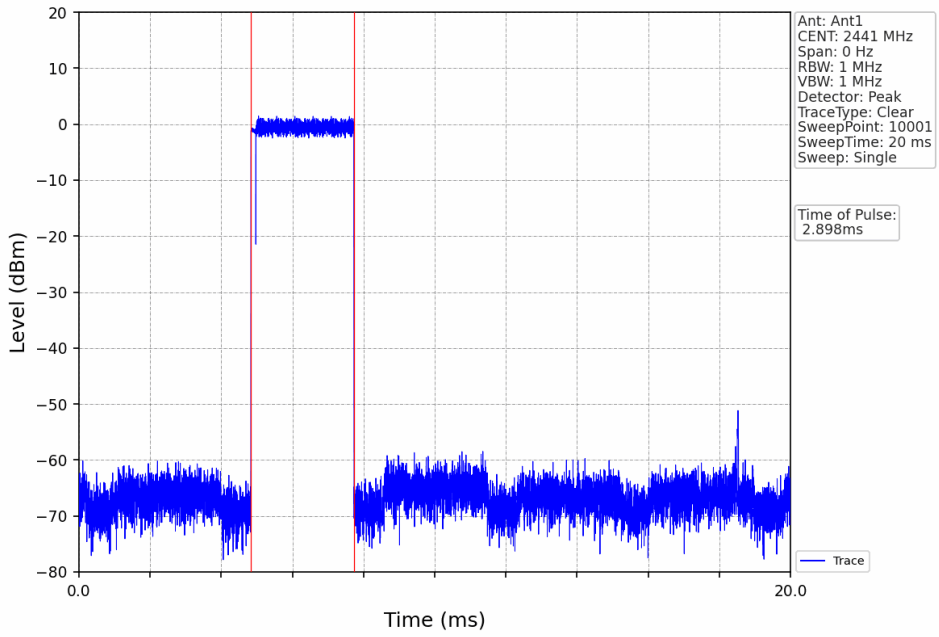

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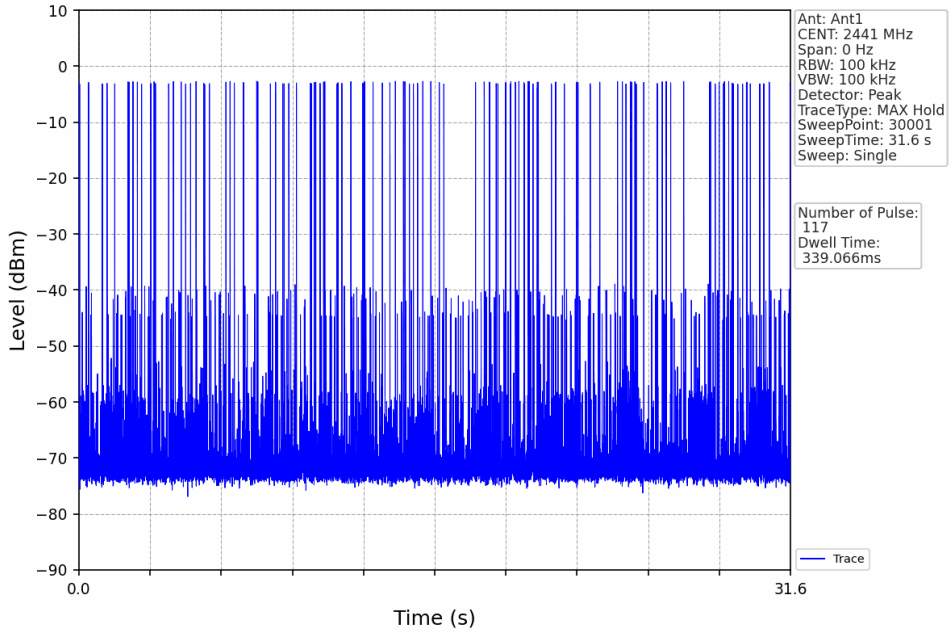


6. Unwanted Emissions In Non-restricted Frequency Bands

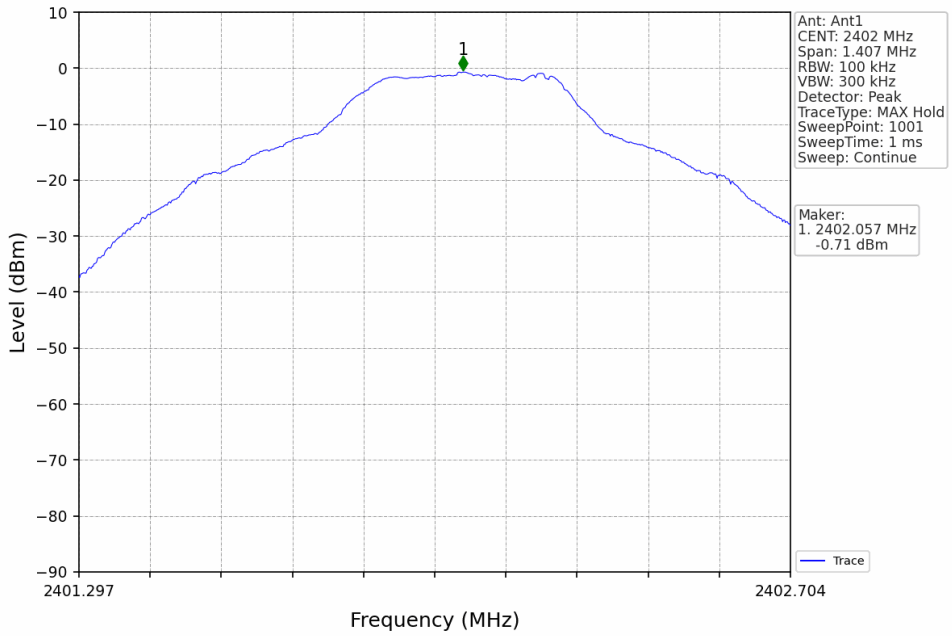
6.1 Ref

6.1.1 Test Result

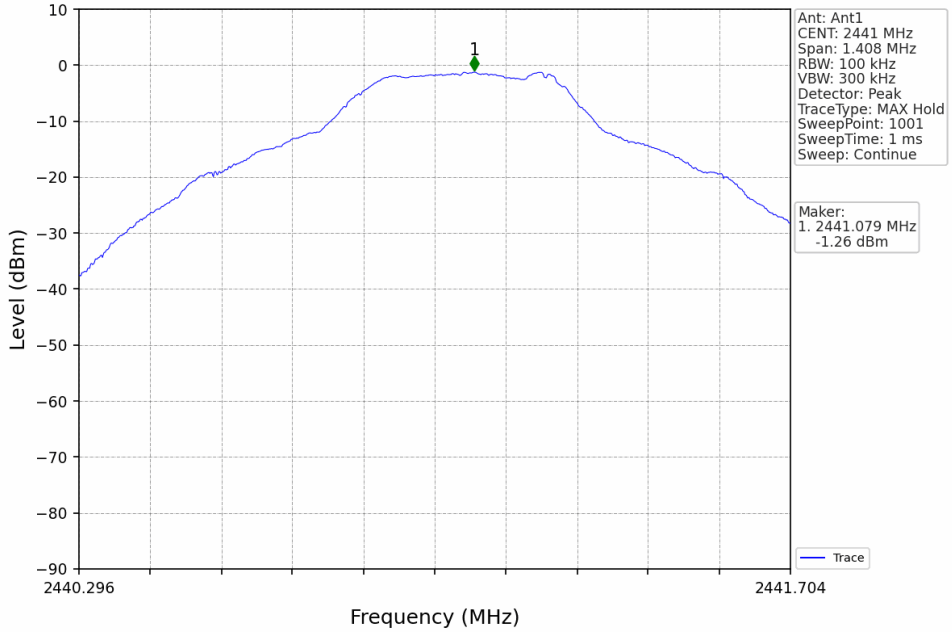
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	-0.71
		2441	DH5	1	-1.26
		2480	DH5	1	-2.70
π/4DQPSK	SISO	2402	2DH5	1	-0.70
		2441	2DH5	1	-1.44
		2480	2DH5	1	-2.30
8DPSK	SISO	2402	3DH5	1	-0.65
		2441	3DH5	1	-1.04
		2480	3DH5	1	-2.57
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.					

6.1.2 Test Graph

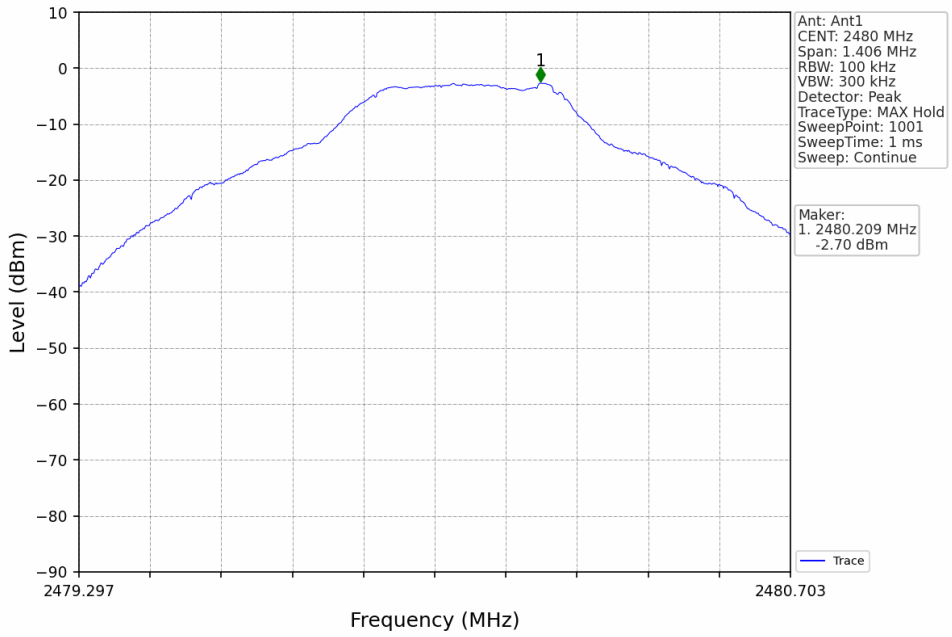
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



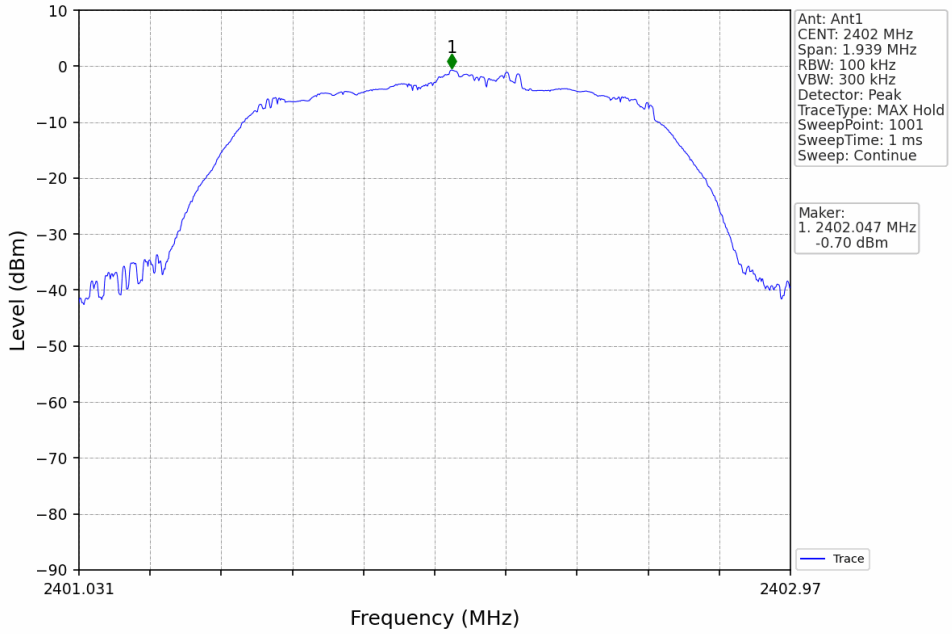
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



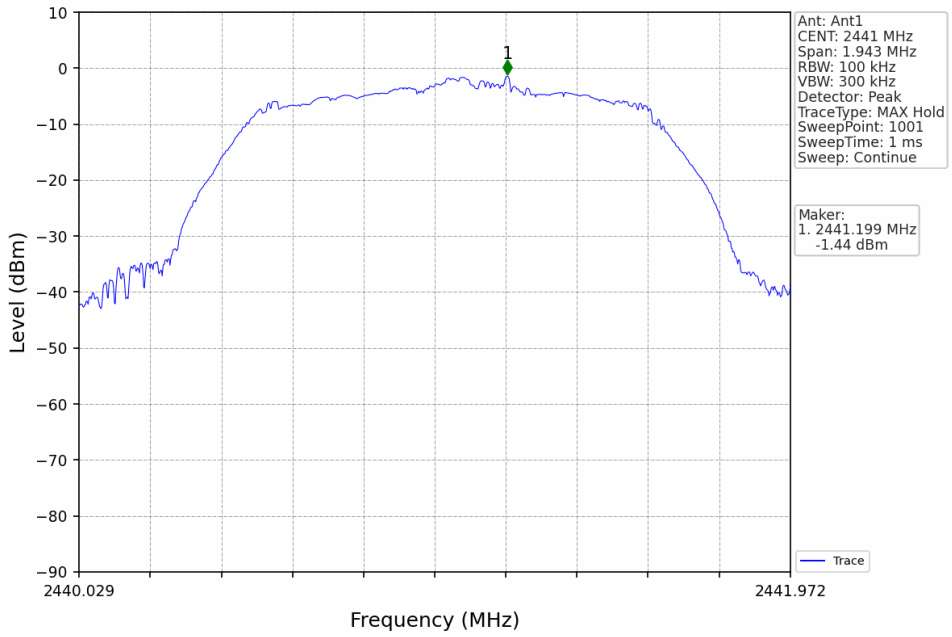
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



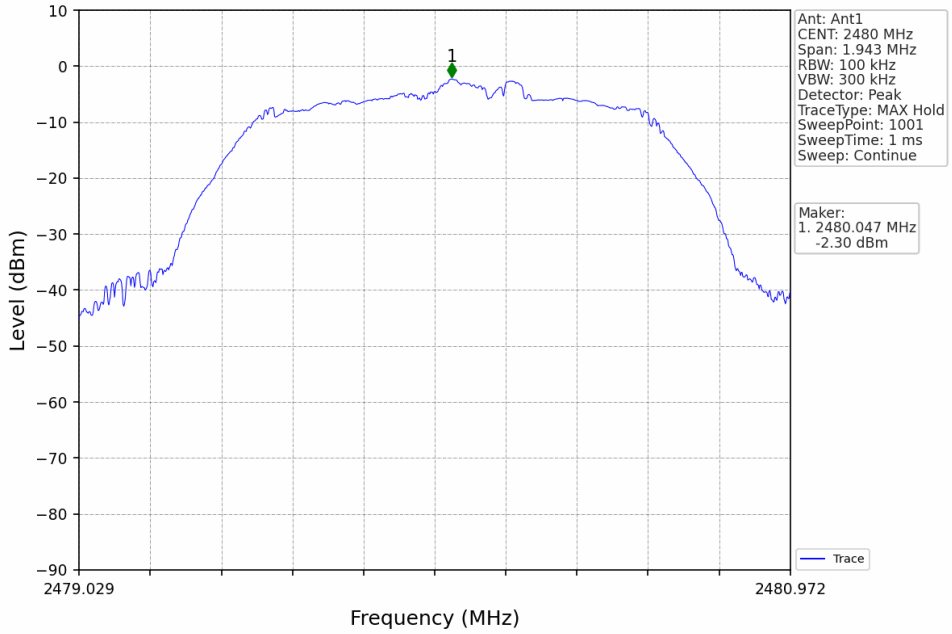
π/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



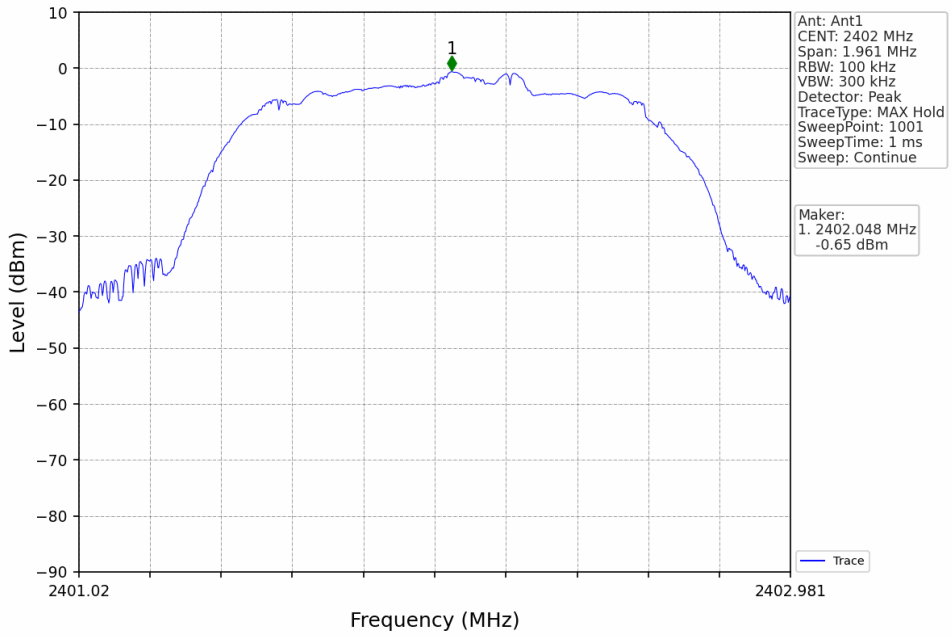
π/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



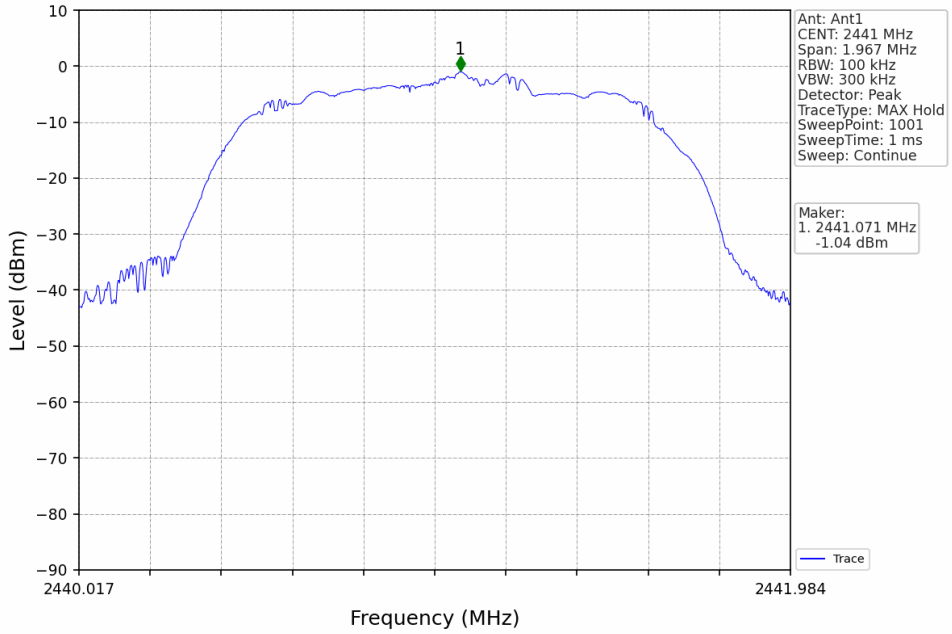
π/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



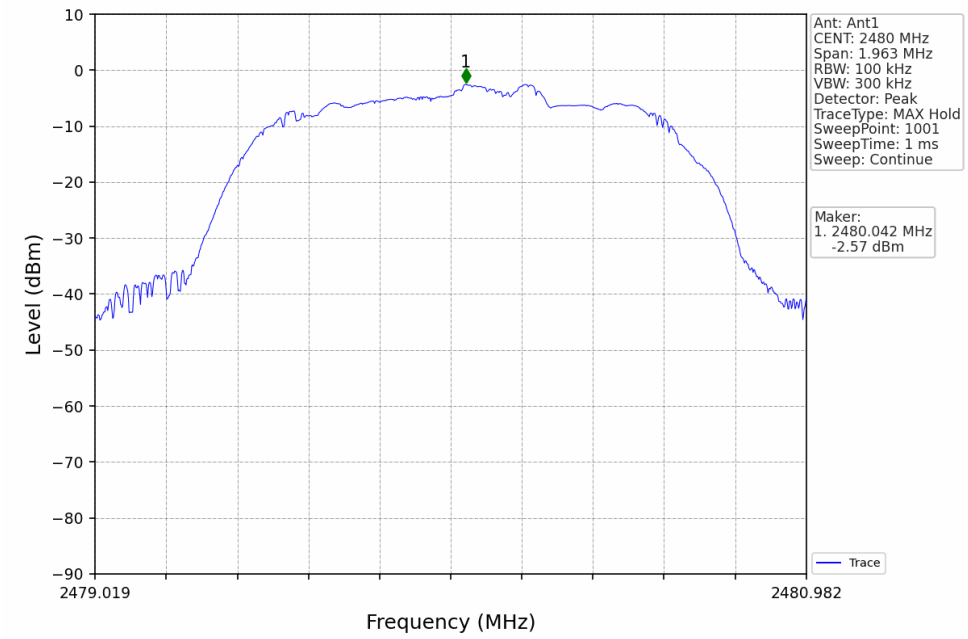
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



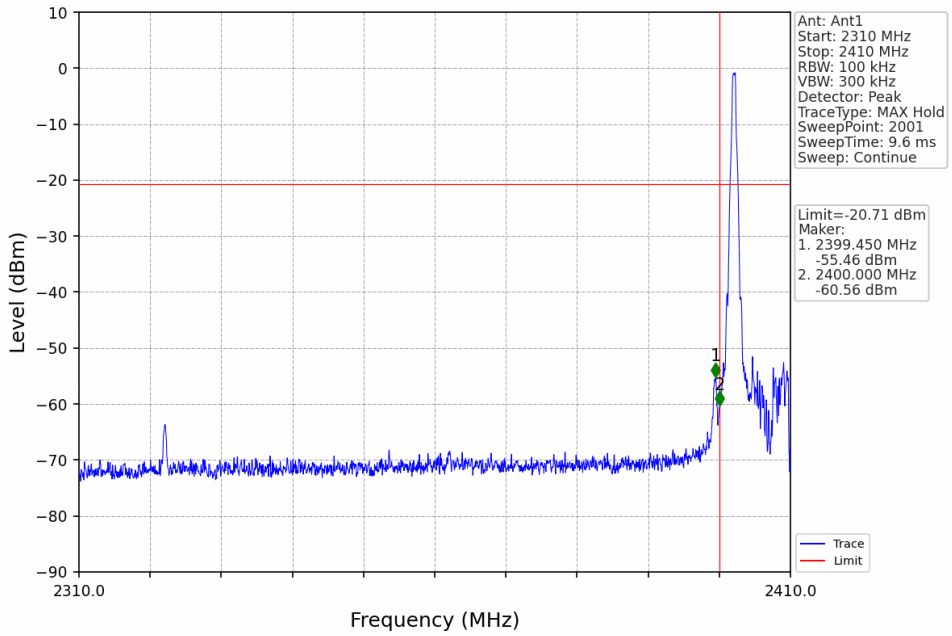
6.2 CSE

6.2.1 Test Result

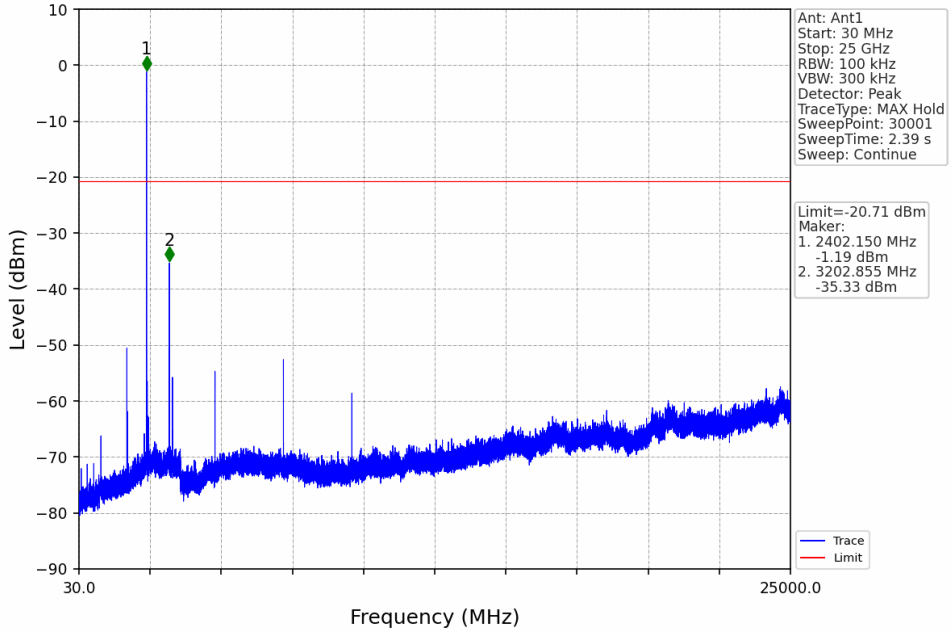
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	-0.71	-20.71	Pass
		2441	DH5	1	-0.71	-20.71	Pass
		2480	DH5	1	-0.71	-20.71	Pass
		HOPP	DH5	1	-0.71	-20.71	Pass
π/4DQPSK	SISO	2402	2DH5	1	-0.70	-20.70	Pass
		2441	2DH5	1	-0.70	-20.70	Pass
		2480	2DH5	1	-0.70	-20.70	Pass
		HOPP	2DH5	1	-0.70	-20.70	Pass
8DPSK	SISO	2402	3DH5	1	-0.65	-20.65	Pass
		2441	3DH5	1	-0.65	-20.65	Pass
		2480	3DH5	1	-0.65	-20.65	Pass
		HOPP	3DH5	1	-0.65	-20.65	Pass
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.							

6.2.2 Test Graph

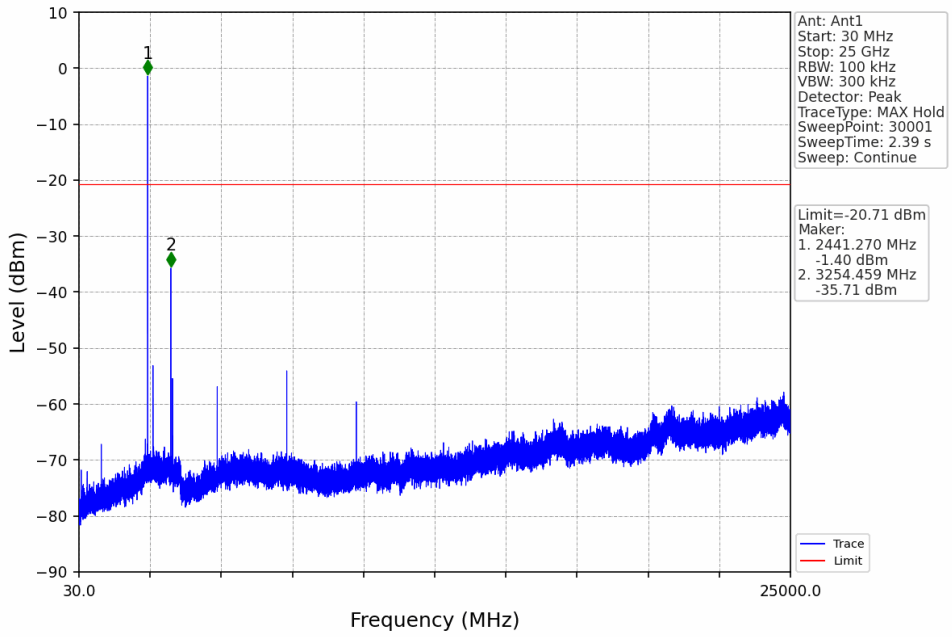
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



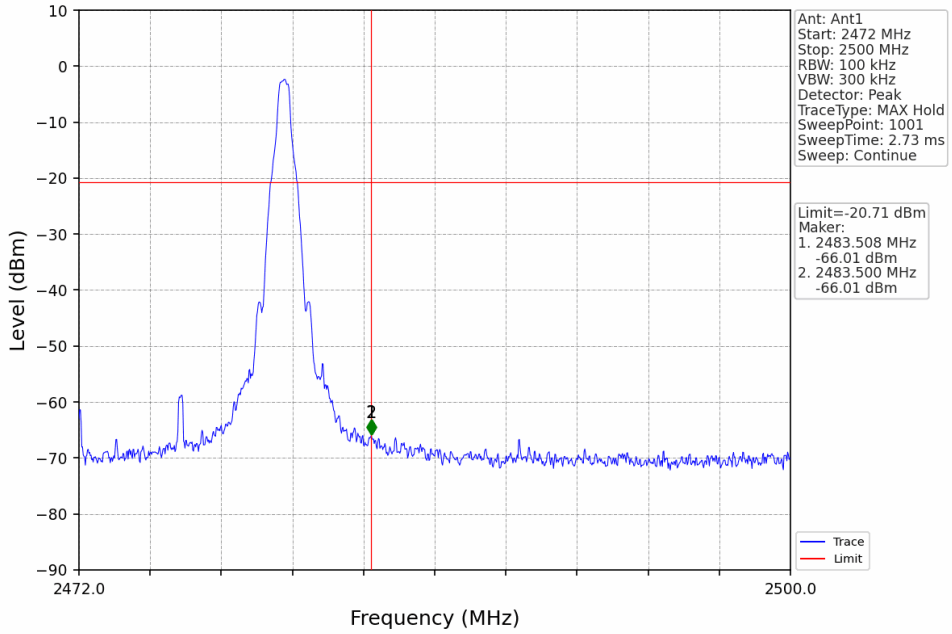
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



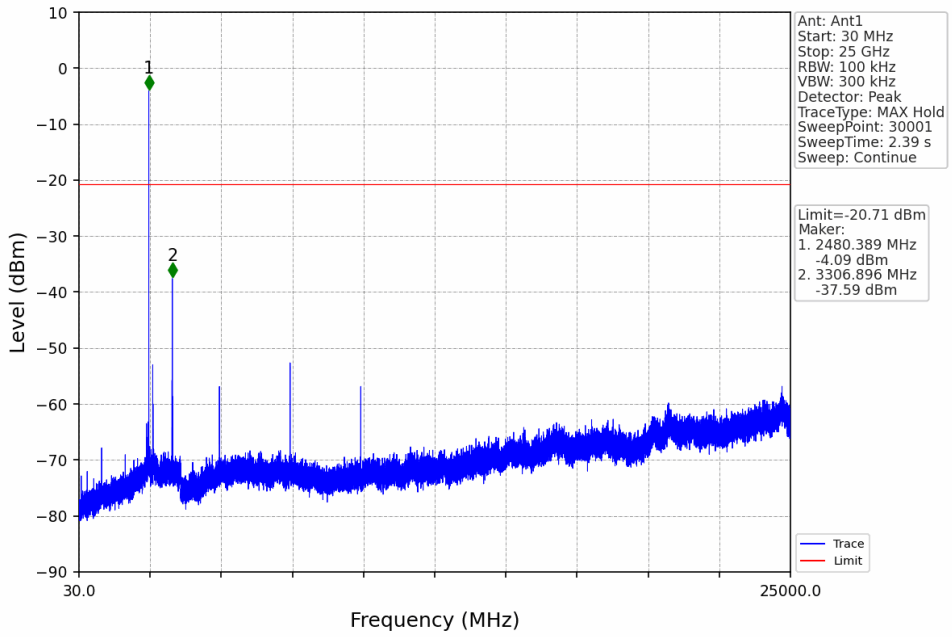
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



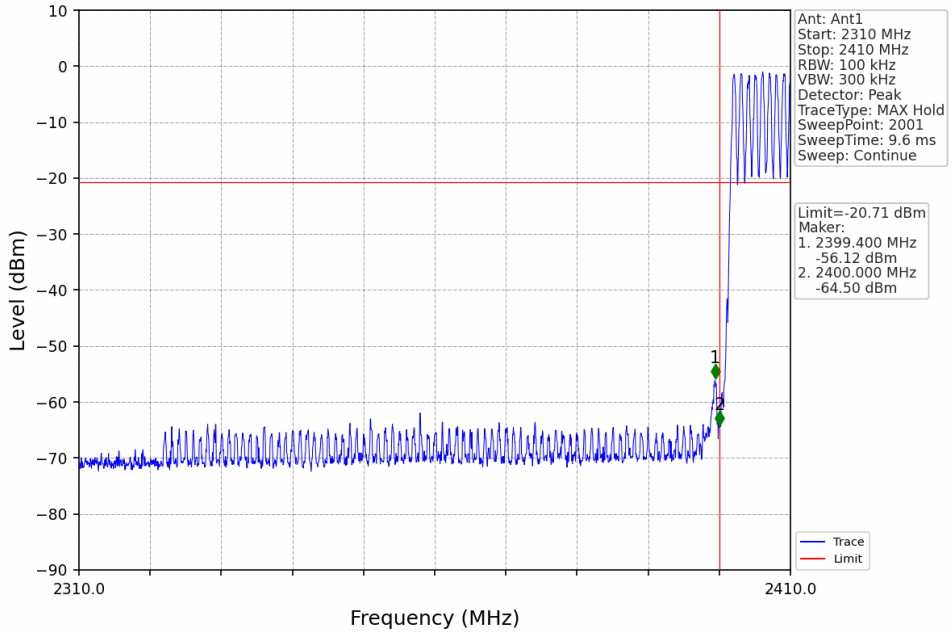
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



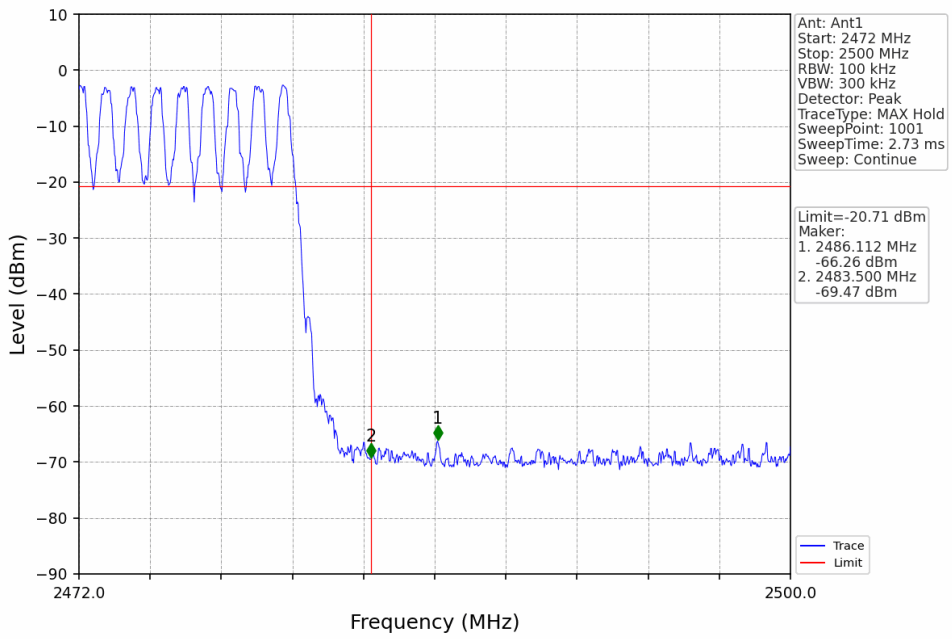
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



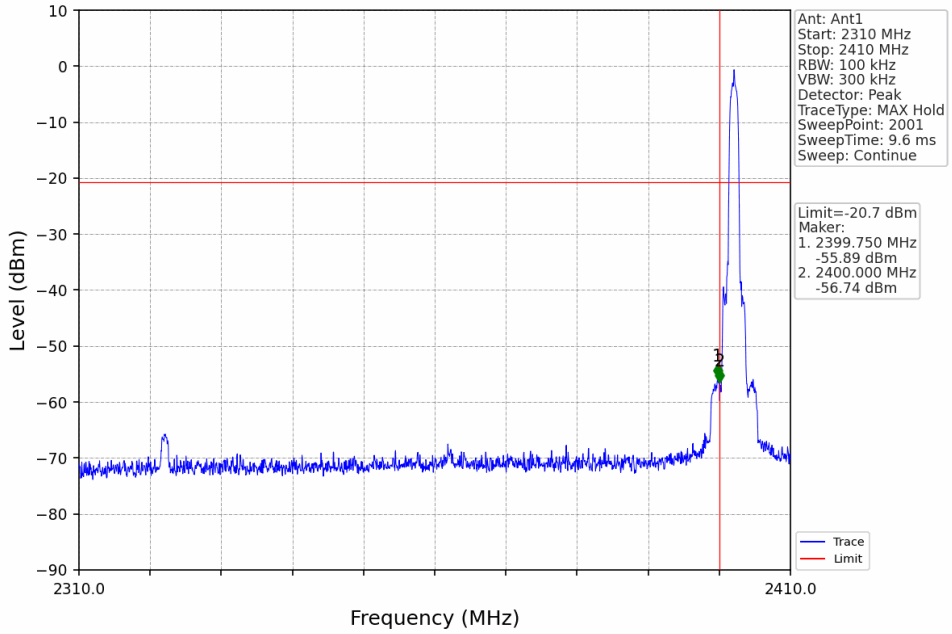
GFSK_DH5_HOPP_Ant1_NTNV



GFSK_DH5_HOPP_Ant1_NTNV



π/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



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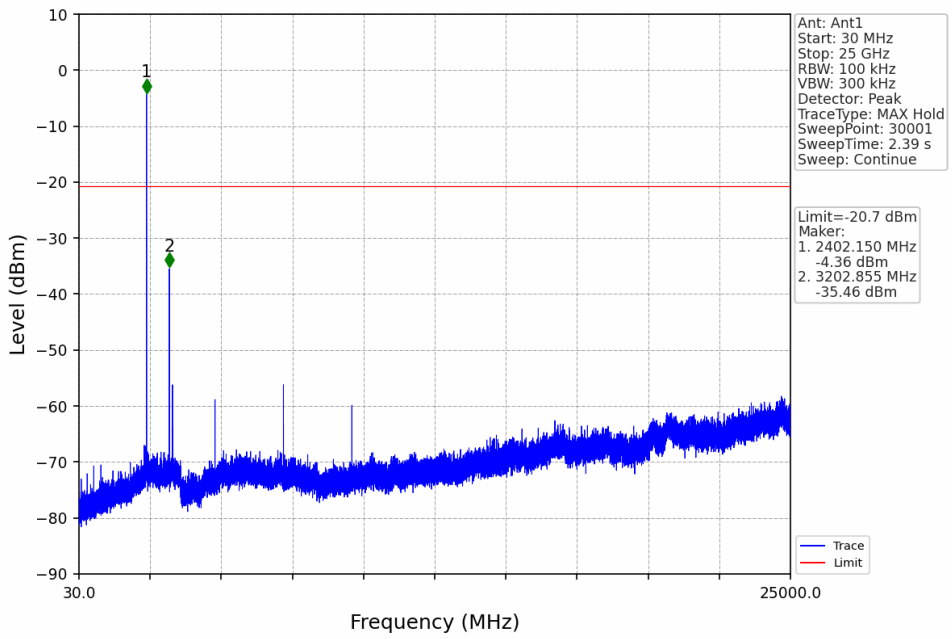

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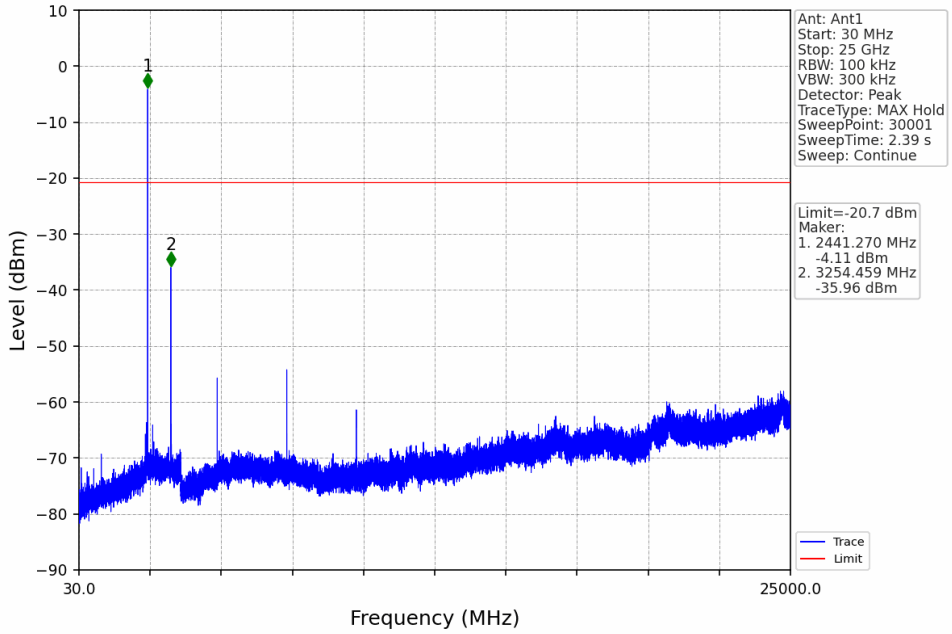
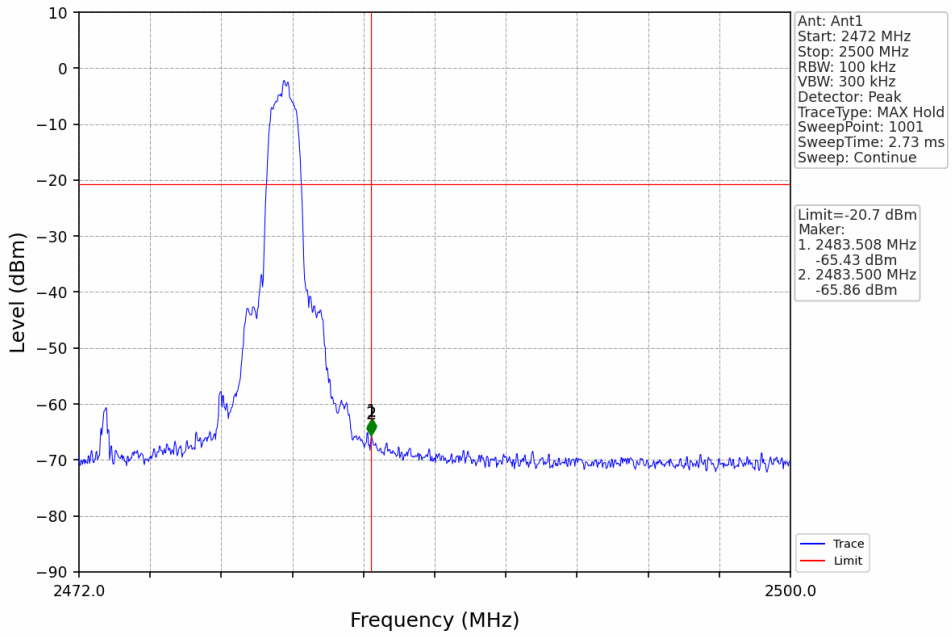


π/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



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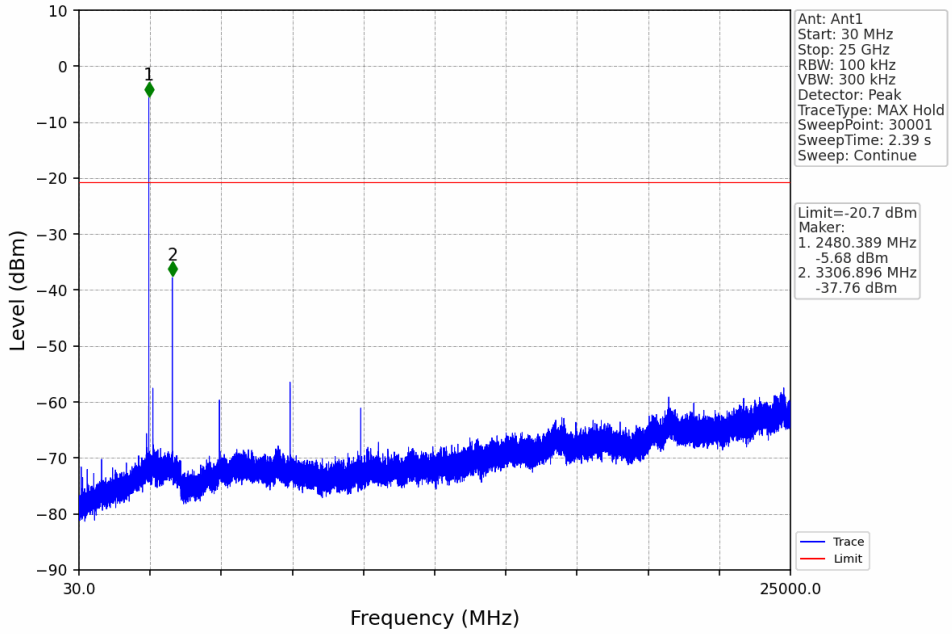

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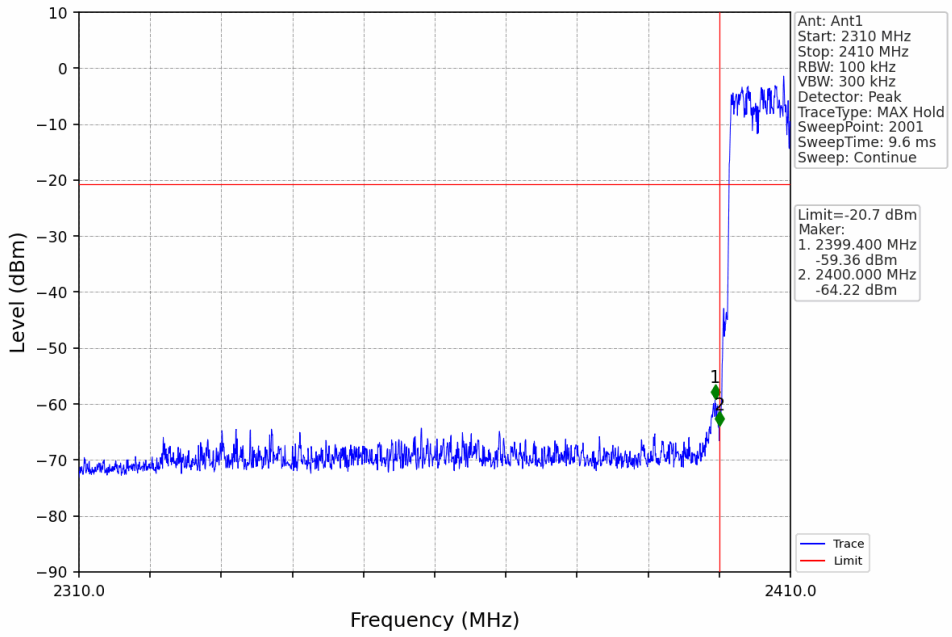

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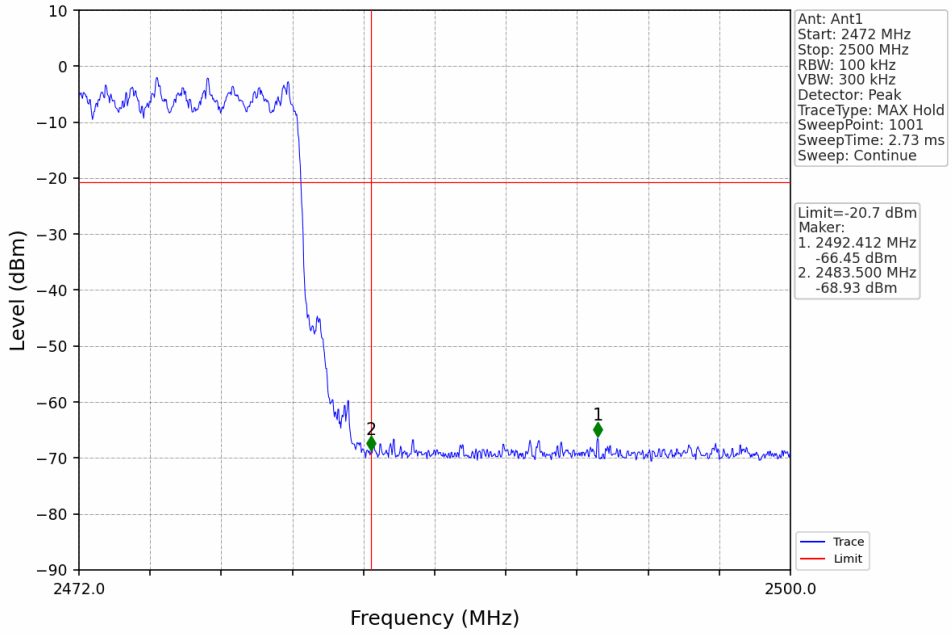
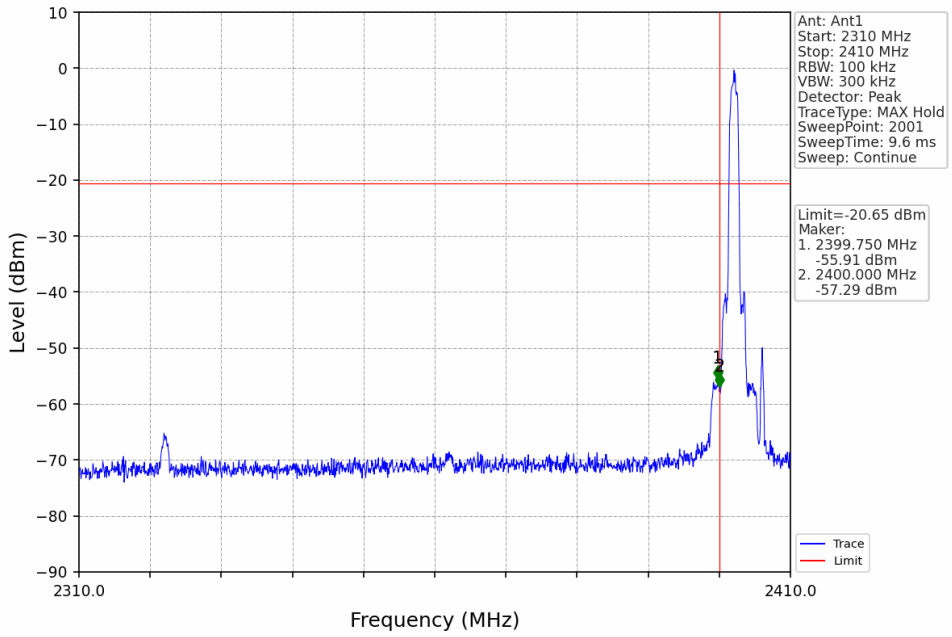
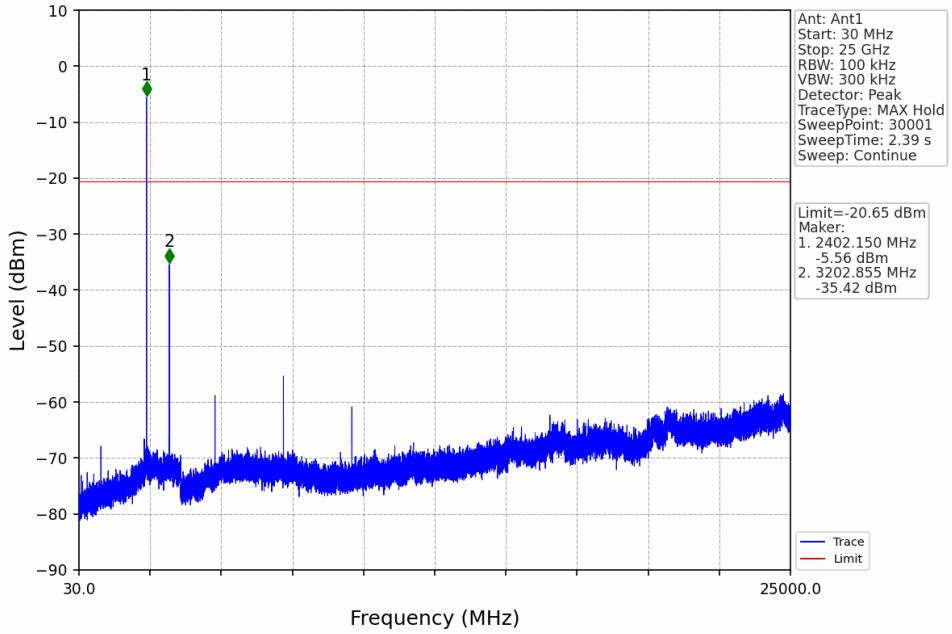


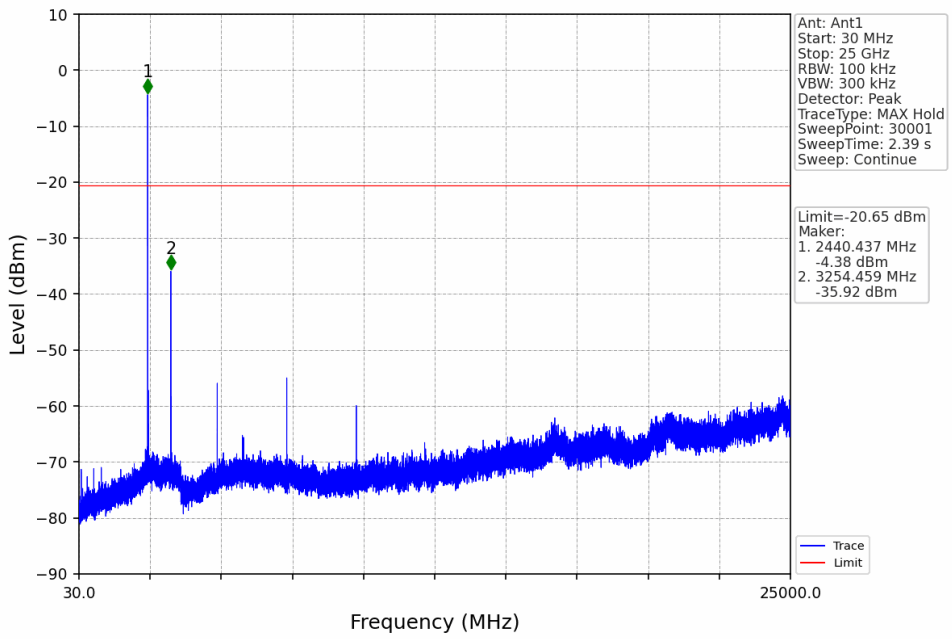
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



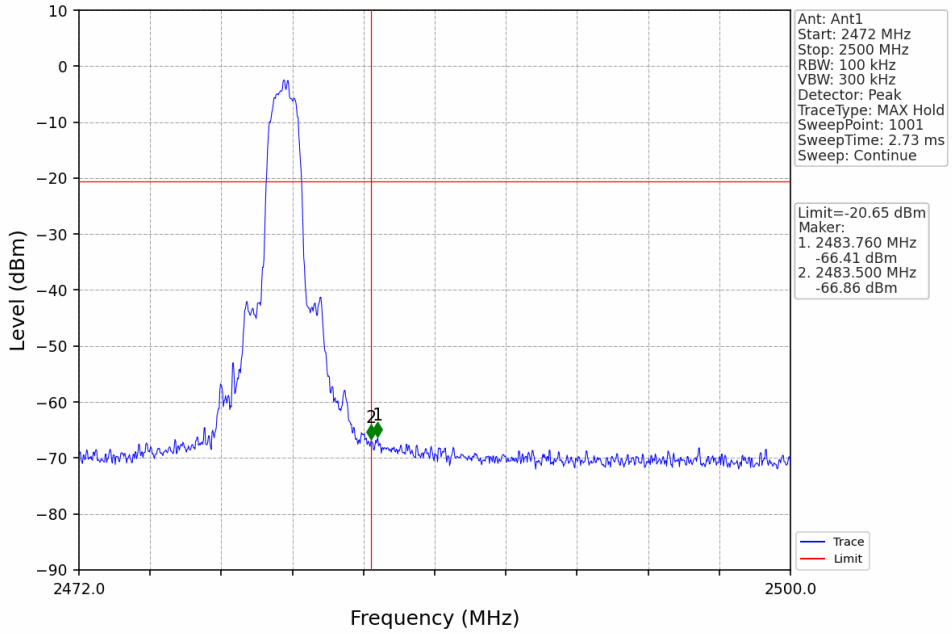
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



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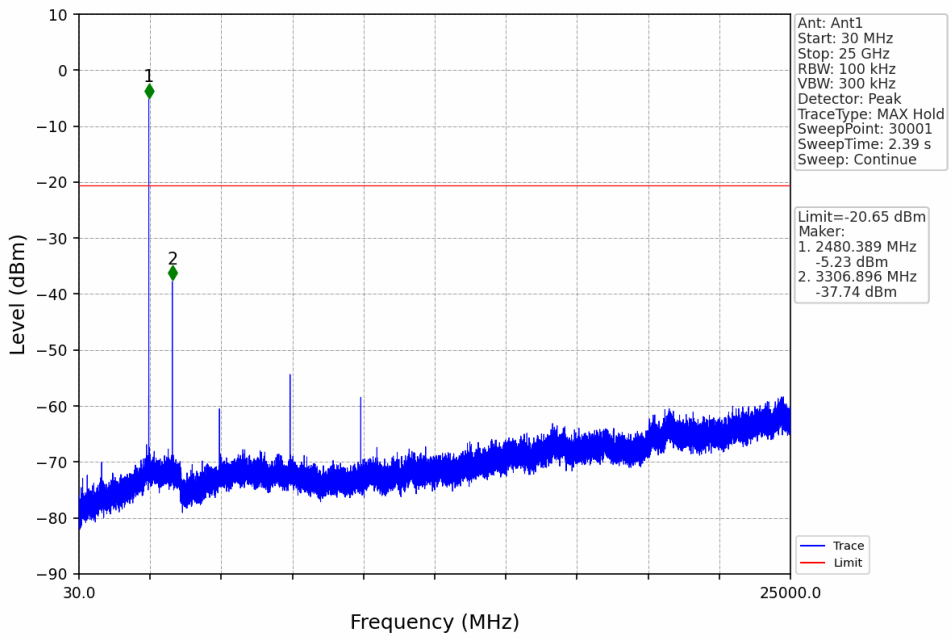
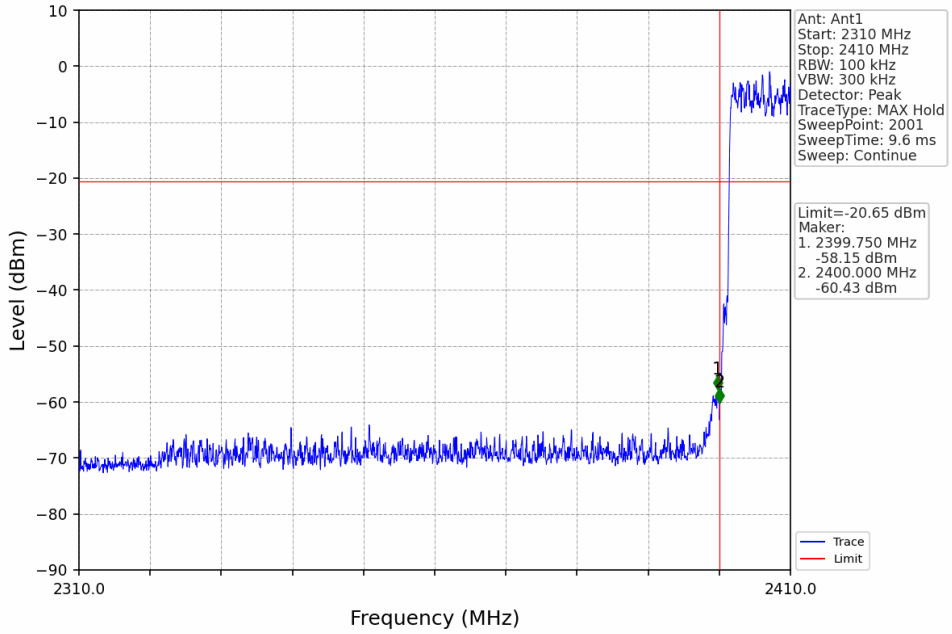
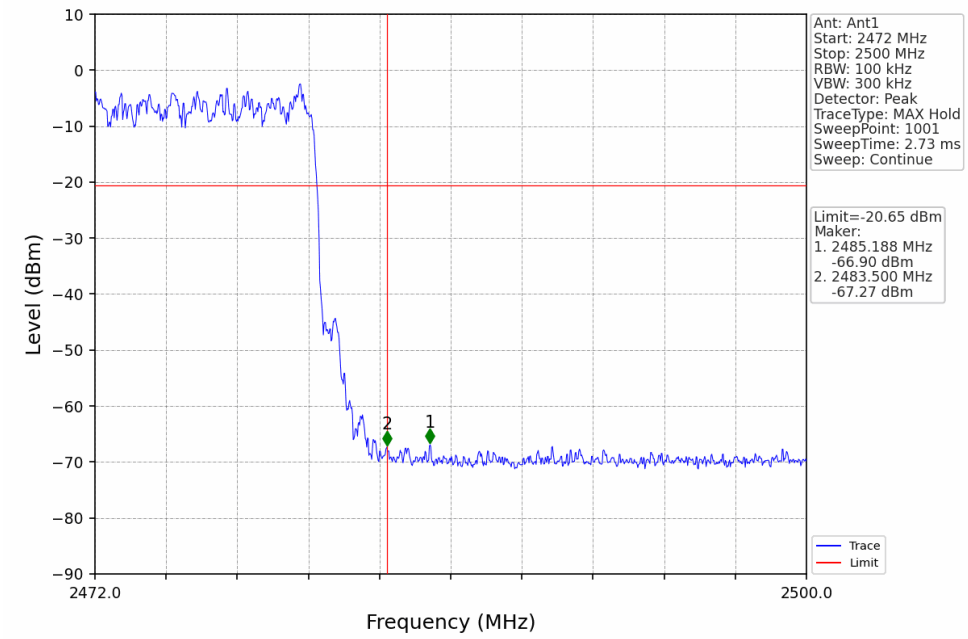


8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



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