ANNEX E TEST DATA

For

Project No.:	8229EU012302W
Client:	Guangzhou MUNBYN Information Technology Co., Ltd.
Product Description:	Thermal Label Printer
Model No.:	RW402B
FCC ID:	2BF4E-RW402B
Technology:	Bluetooth BDR+EDR
Test Engineer:	Mikey zhu
Test Date:	2024-06-06

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. Duty Cycle

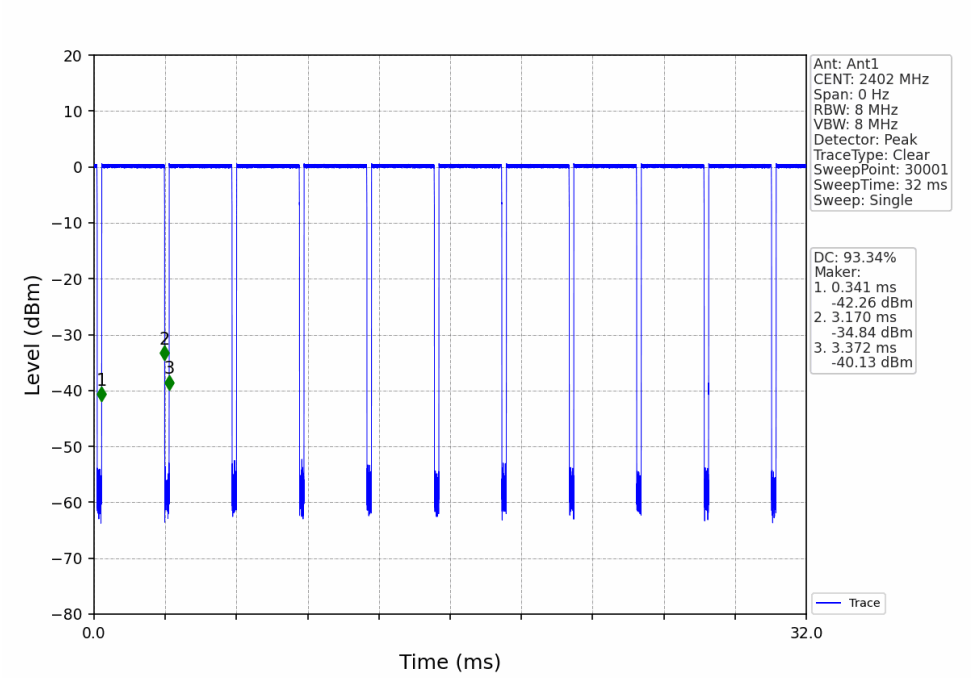
1.1 Ant1

1.1.1 Test Result

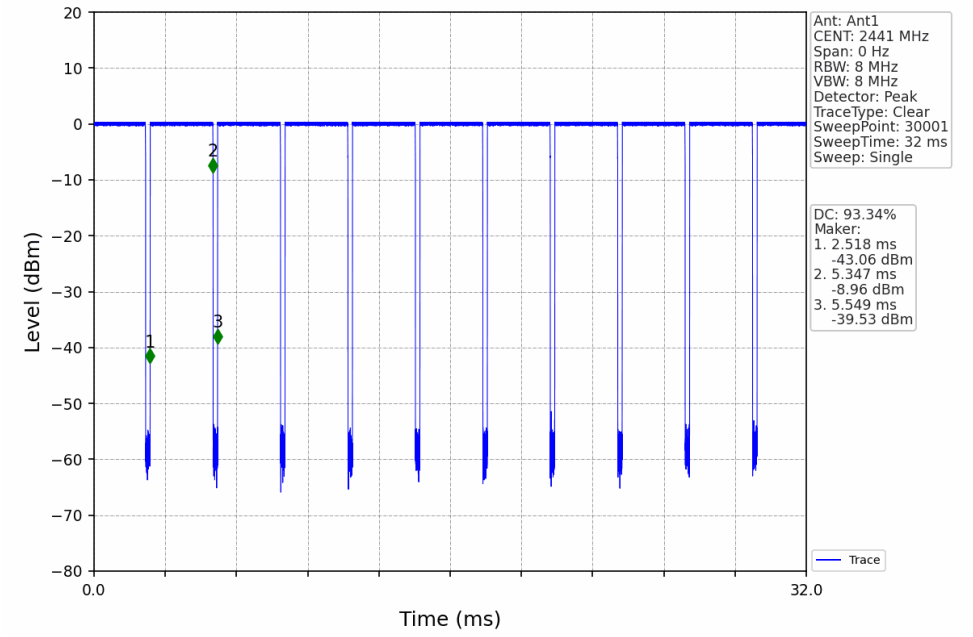
Ant1								
Mode	TX Type	Frequency (MHz)	Packet Type	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
GFSK	SISO	2402	DH5	2.829	3.031	93.34	0.30	0.03
		2441	DH5	2.829	3.031	93.34	0.30	0.03
		2480	DH5	2.829	3.030	93.37	0.30	0.03
π/4-DQPSK	SISO	2402	2DH5	2.820	3.022	93.32	0.30	0.03
		2441	2DH5	2.821	3.022	93.35	0.30	0.04
		2480	2DH5	2.821	3.022	93.35	0.30	0.04
8DPSK	SISO	2402	3DH5	2.823	3.028	93.23	0.30	0.04
		2441	3DH5	2.826	3.028	93.33	0.30	0.04
		2480	3DH5	2.827	3.029	93.33	0.30	0.04

1.1.2 Test Graph

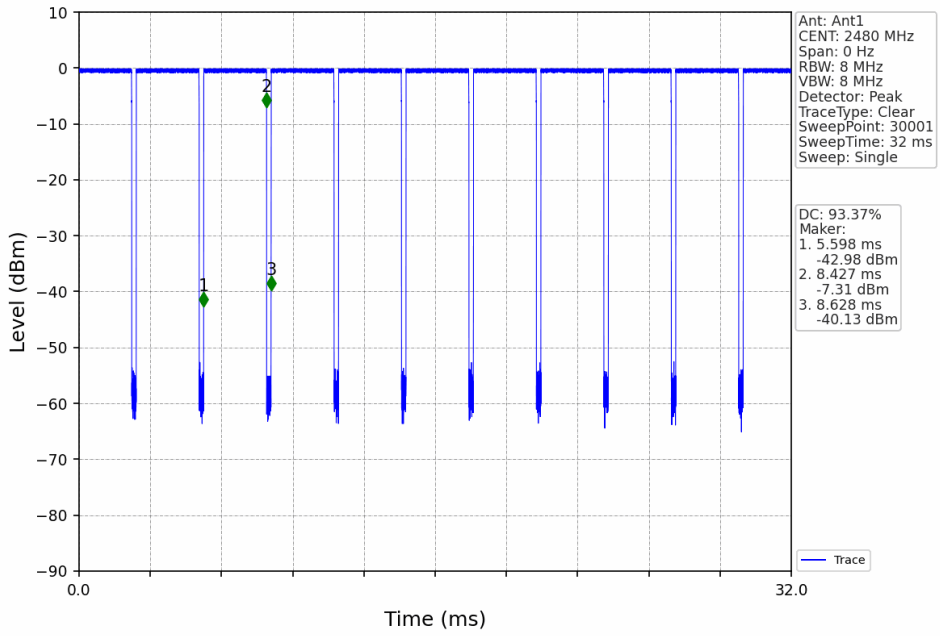
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



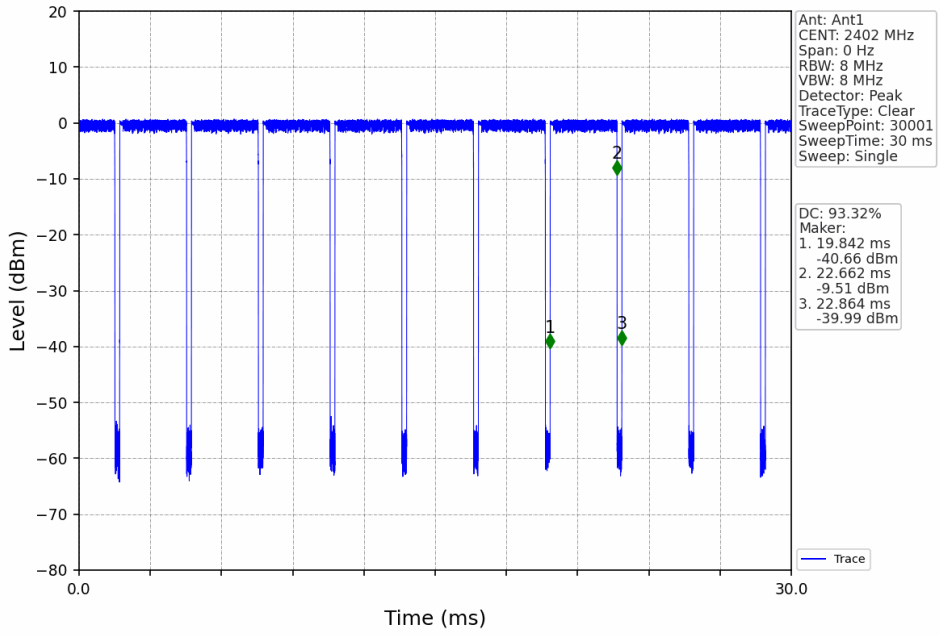
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



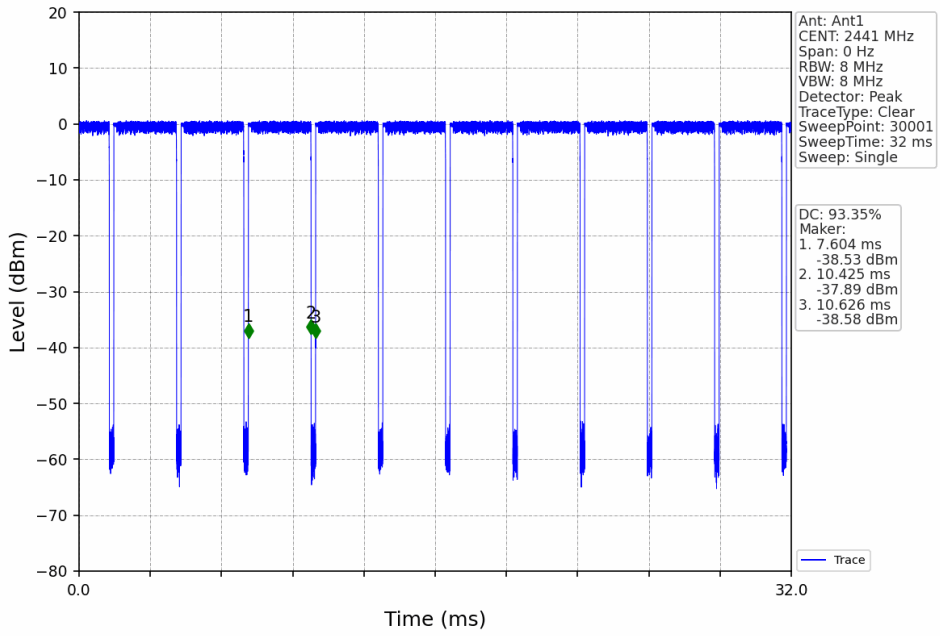
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



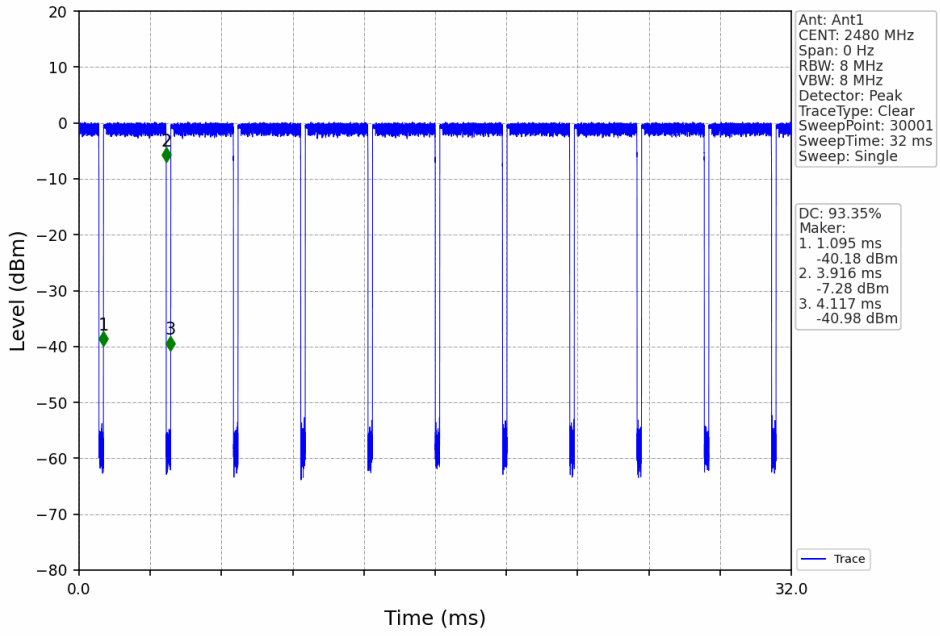
π/4-DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



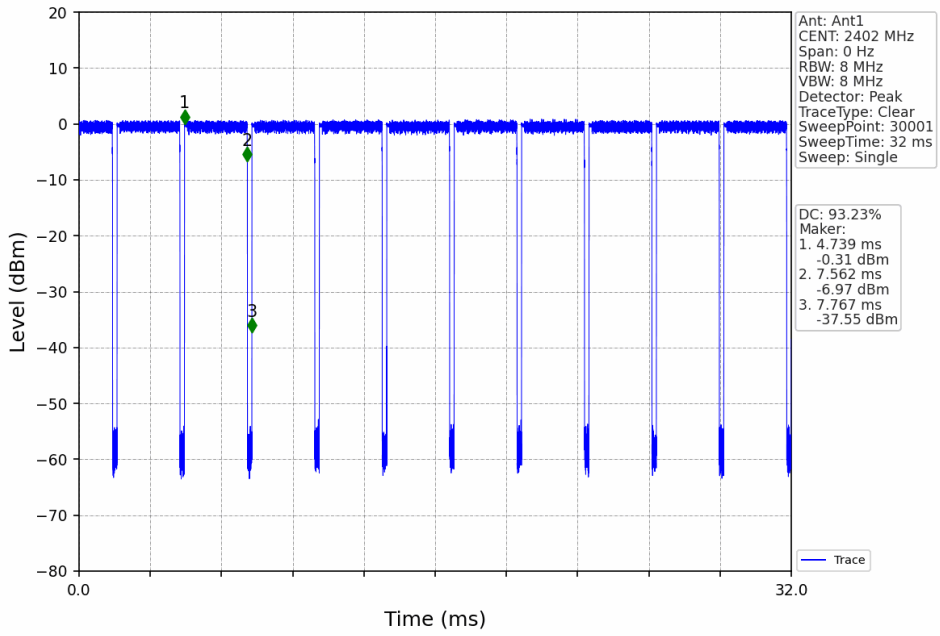
π/4-DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



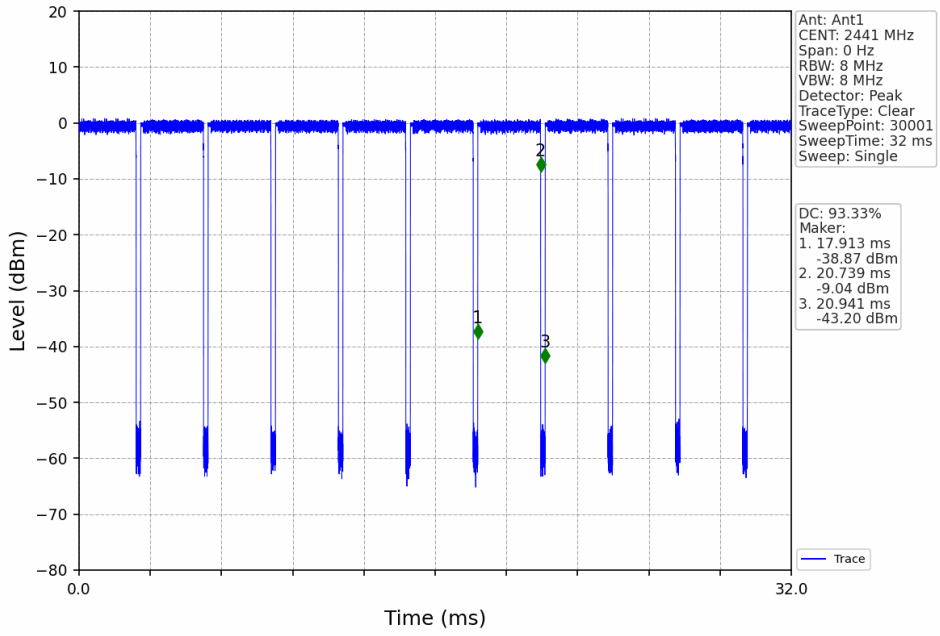
π/4-DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



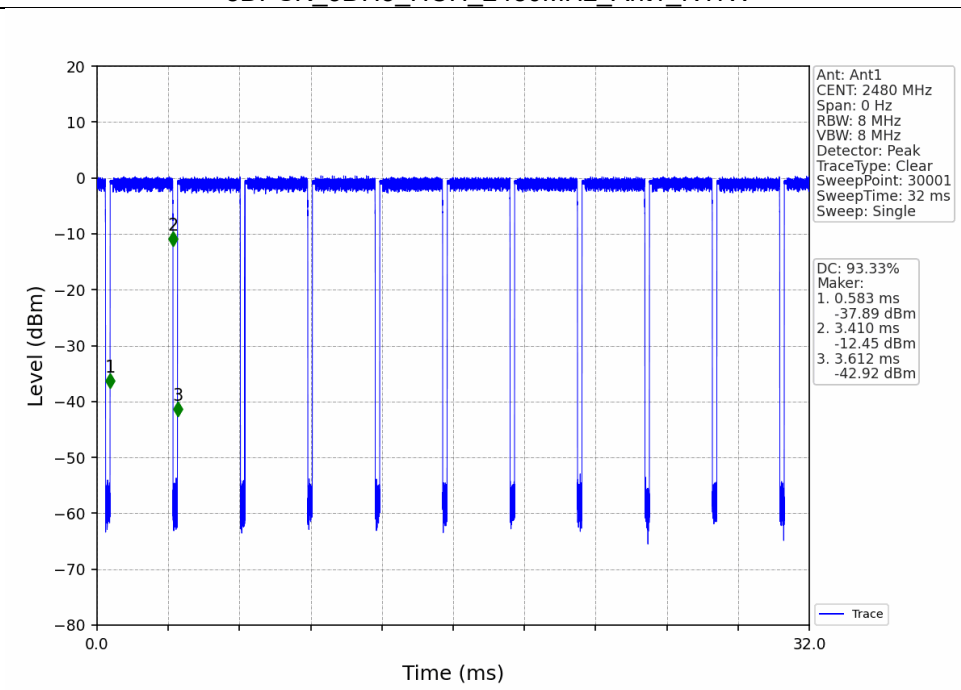
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



2. Bandwidth

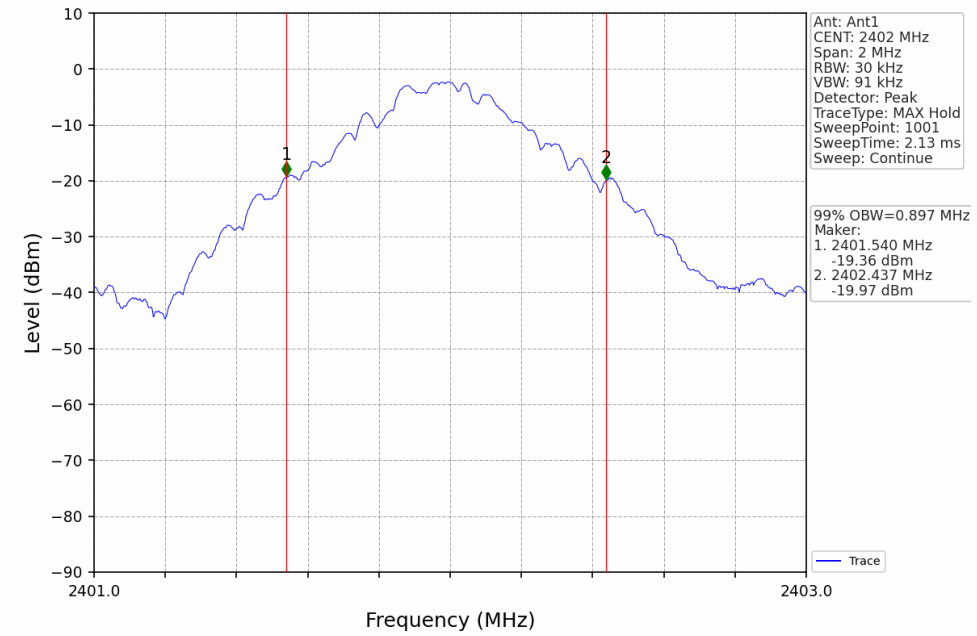
2.1 OBW

2.1.1 Test Result

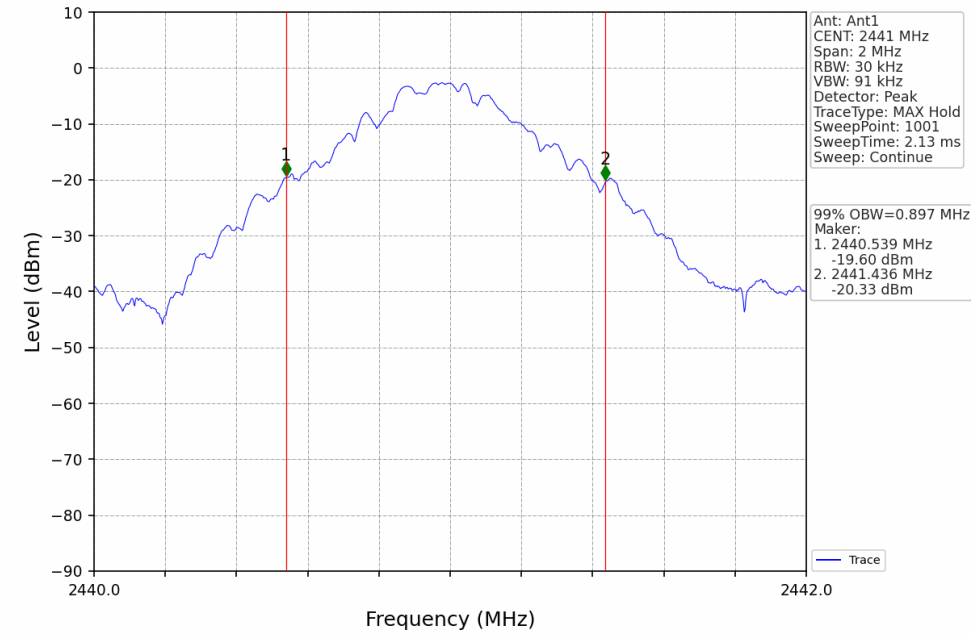
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.897	/	Pass
		2441	DH5	1	0.897	/	Pass
		2480	DH5	1	0.897	/	Pass
π/4-DQPSK	SISO	2402	2DH5	1	1.200	/	Pass
		2441	2DH5	1	1.198	/	Pass
		2480	2DH5	1	1.195	/	Pass
8DPSK	SISO	2402	3DH5	1	1.203	/	Pass
		2441	3DH5	1	1.200	/	Pass
		2480	3DH5	1	1.205	/	Pass

2.1.2 Test Graph

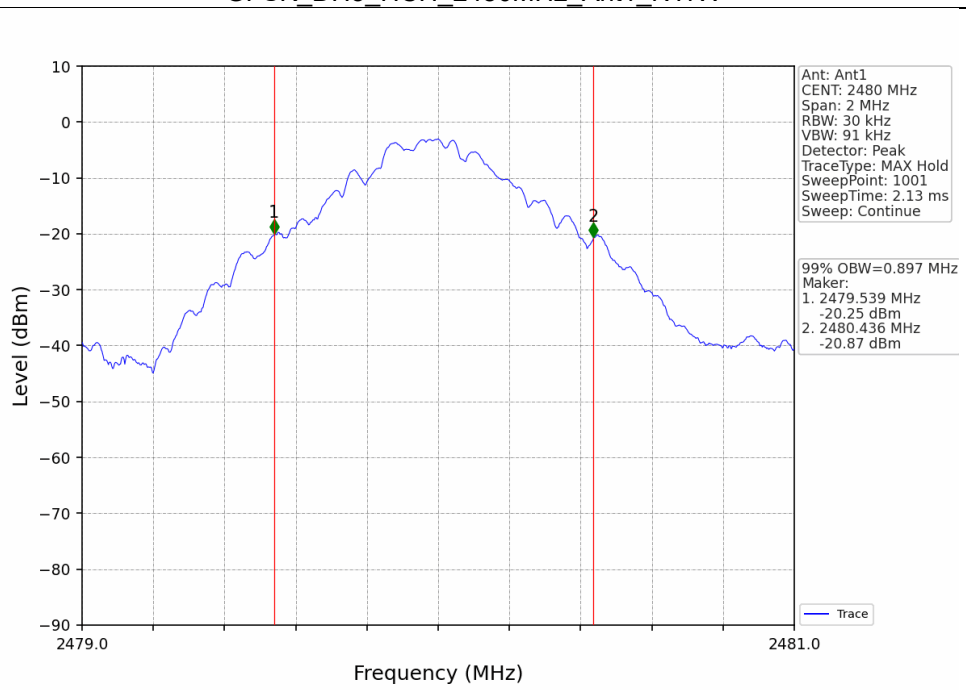
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



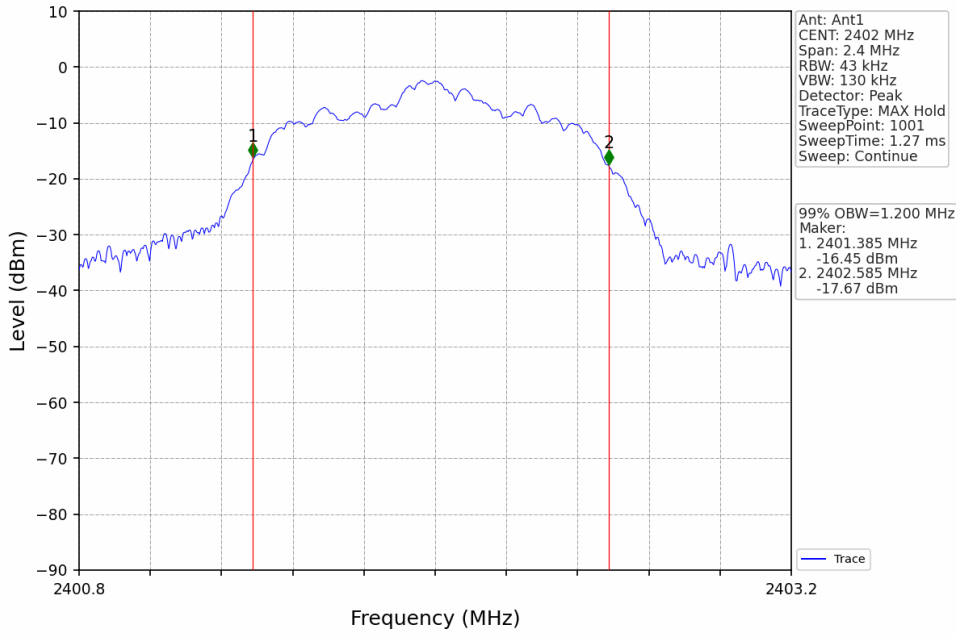
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



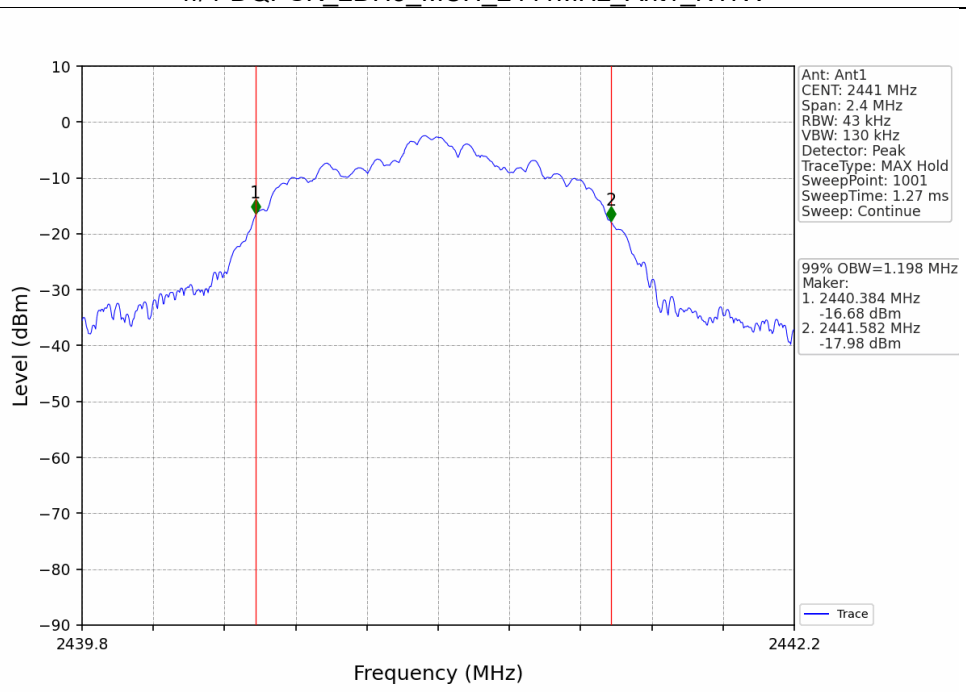
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



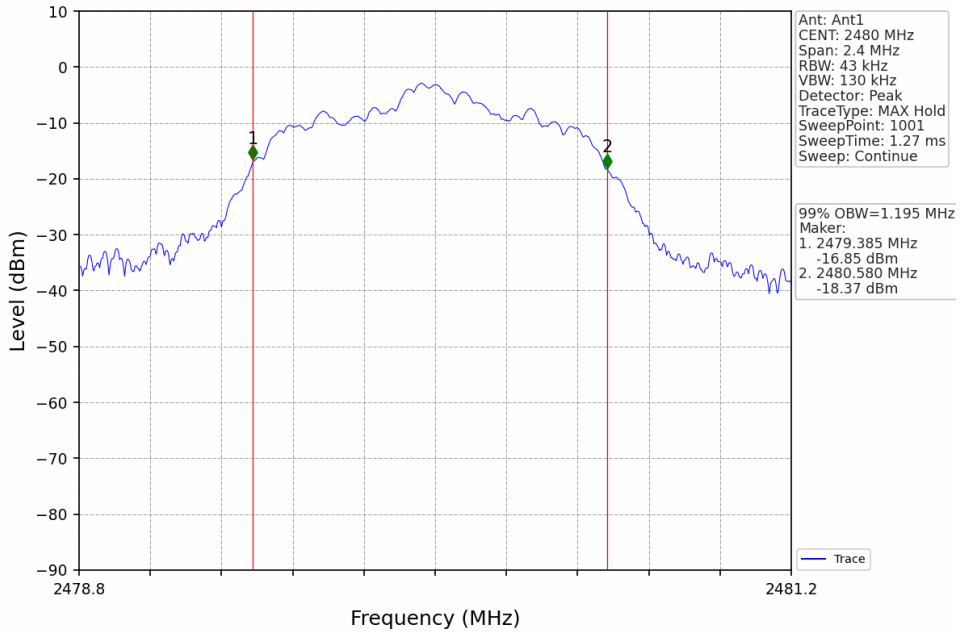
π/4-DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



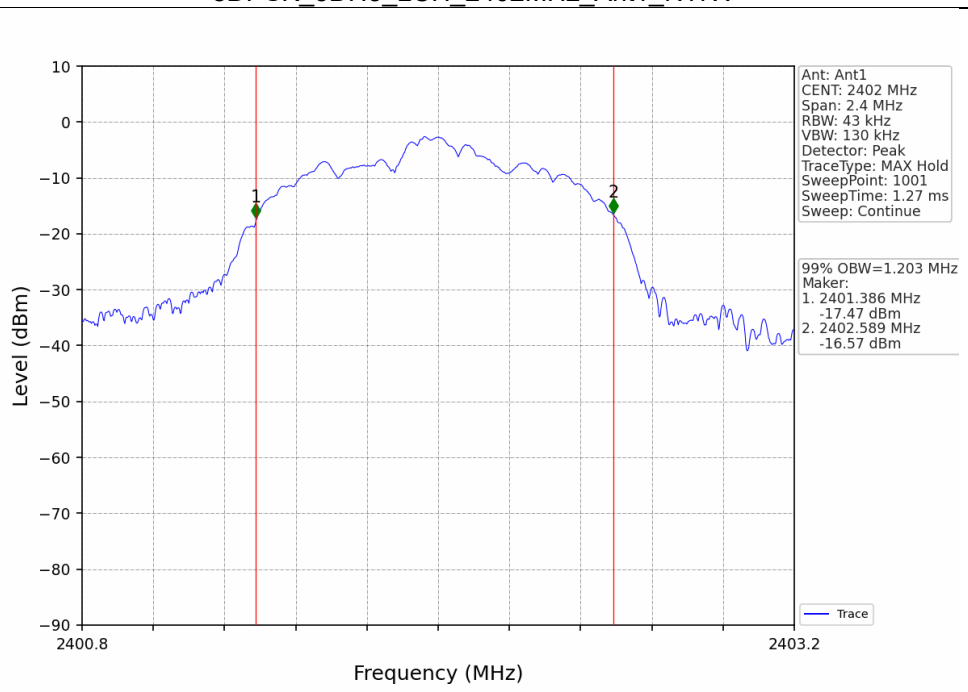
π/4-DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



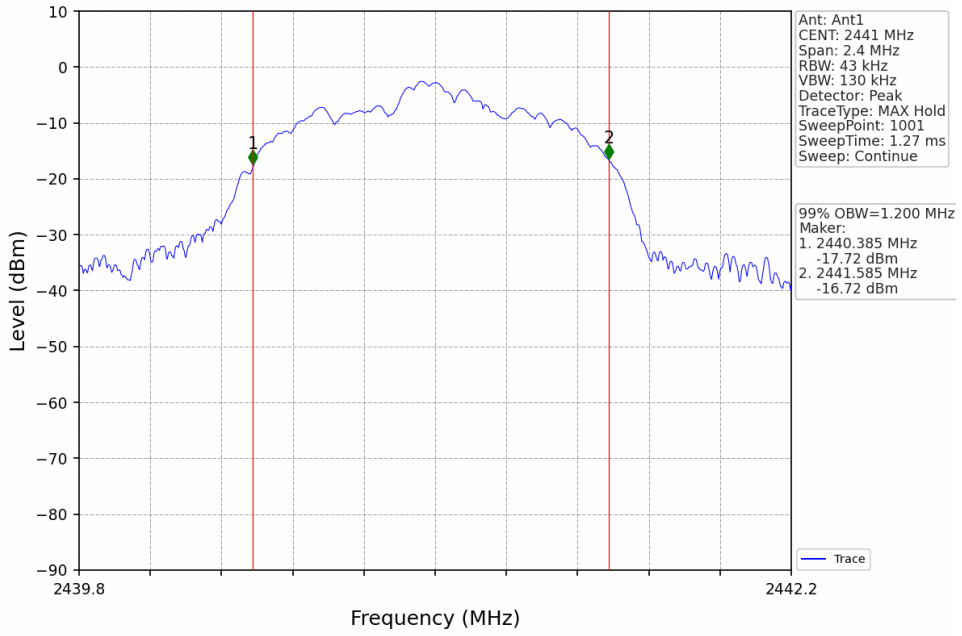
π/4-DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



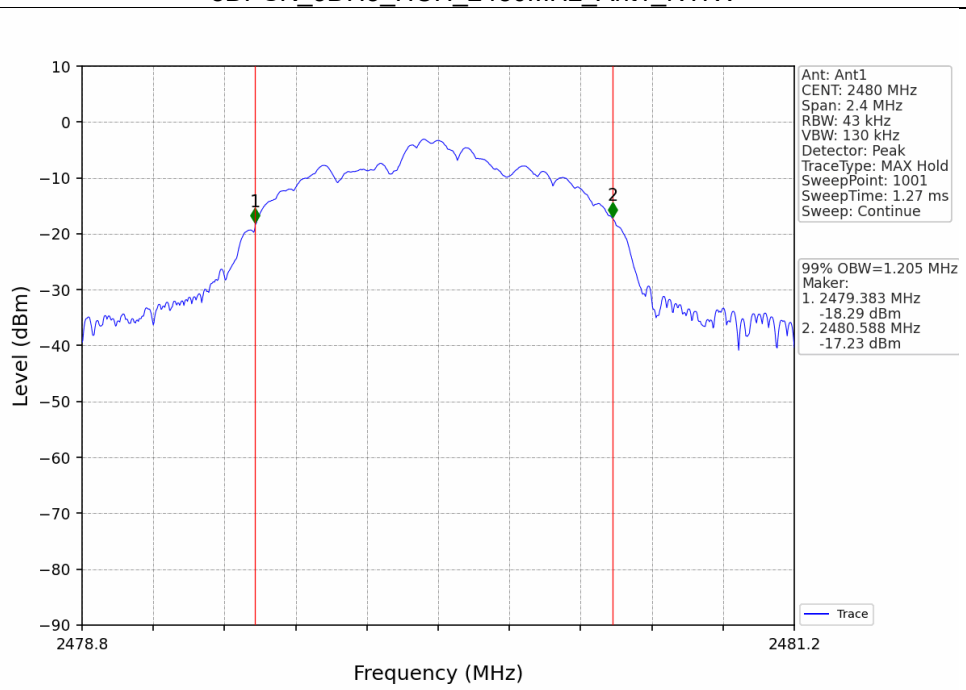
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



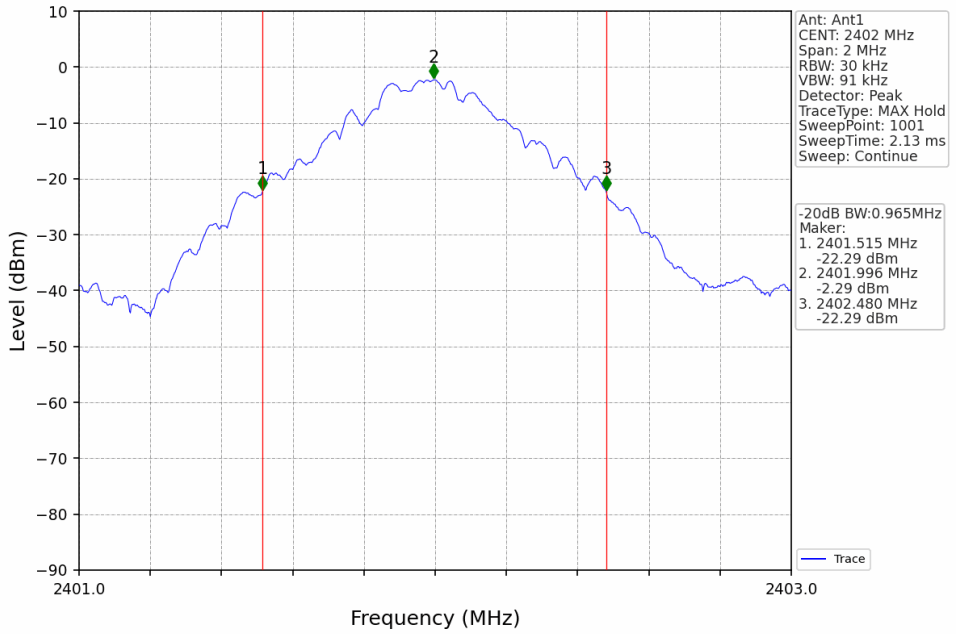
2.2 20dB BW

2.2.1 Test Result

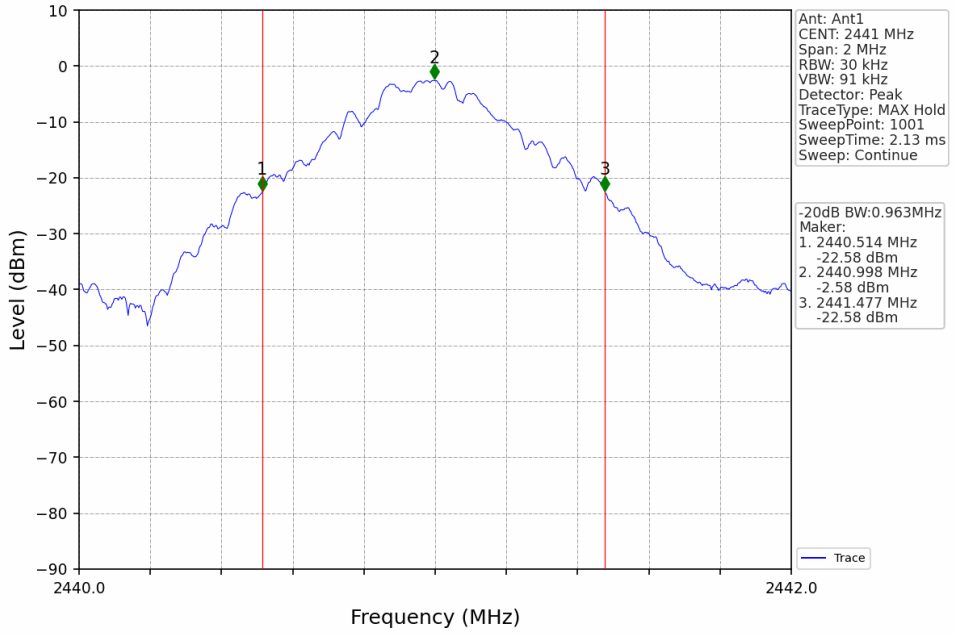
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.965	/	Pass
		2441	DH5	1	0.963	/	Pass
		2480	DH5	1	0.965	/	Pass
π/4-DQPSK	SISO	2402	2DH5	1	1.329	/	Pass
		2441	2DH5	1	1.326	/	Pass
		2480	2DH5	1	1.324	/	Pass
8DPSK	SISO	2402	3DH5	1	1.321	/	Pass
		2441	3DH5	1	1.323	/	Pass
		2480	3DH5	1	1.319	/	Pass

2.2.2 Test Graph

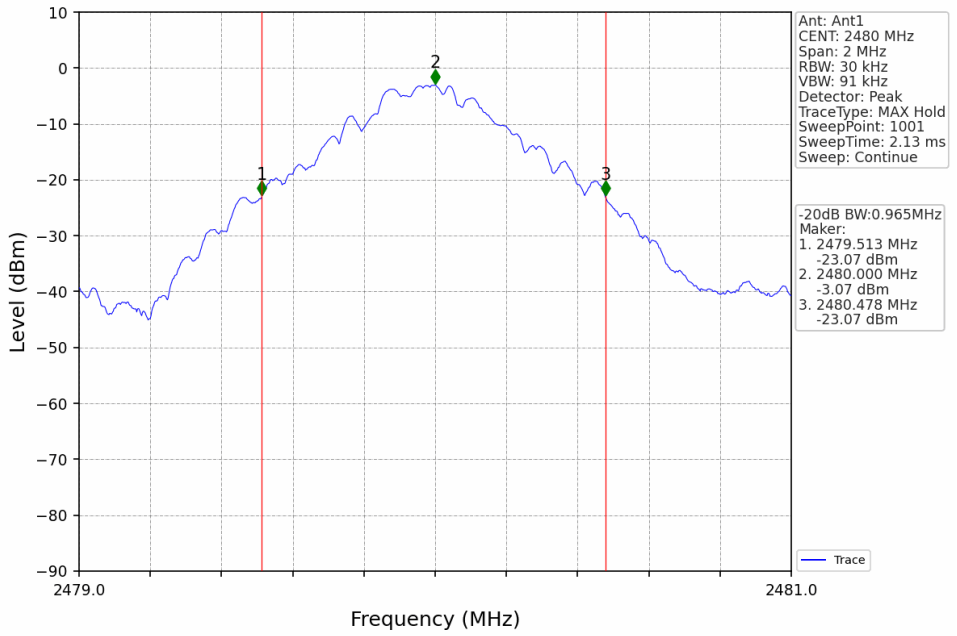
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



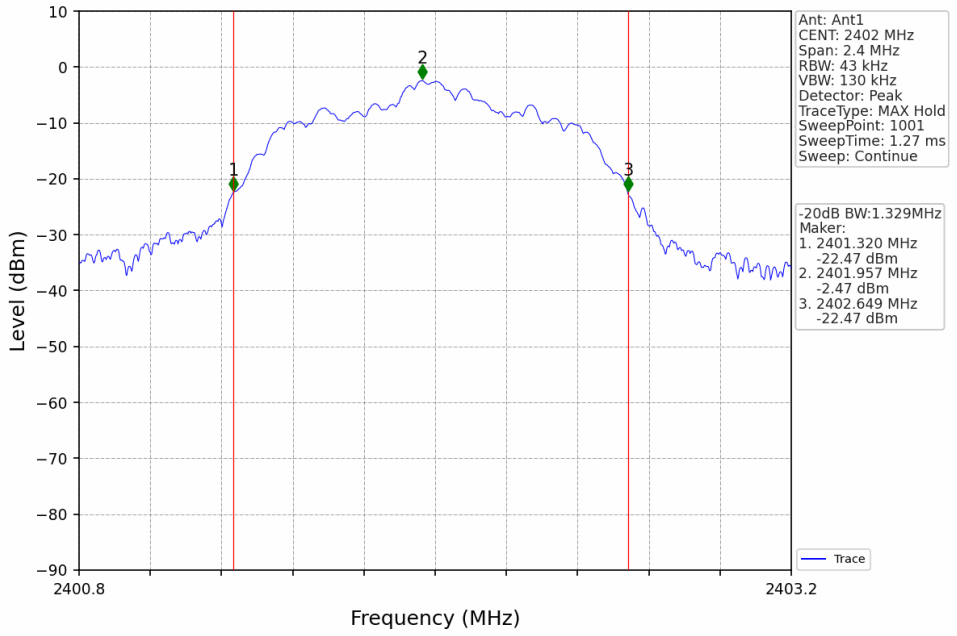
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



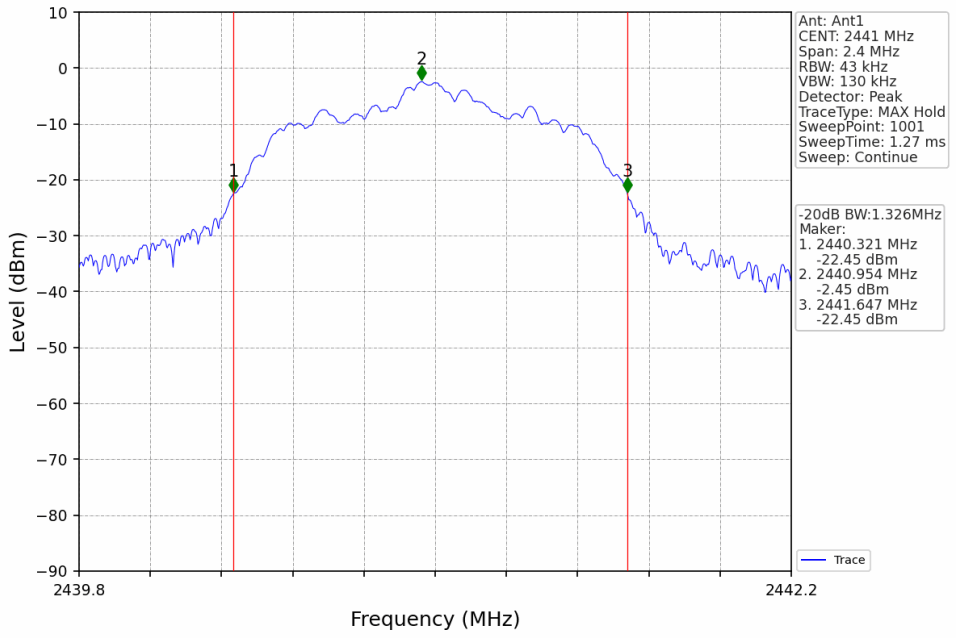
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



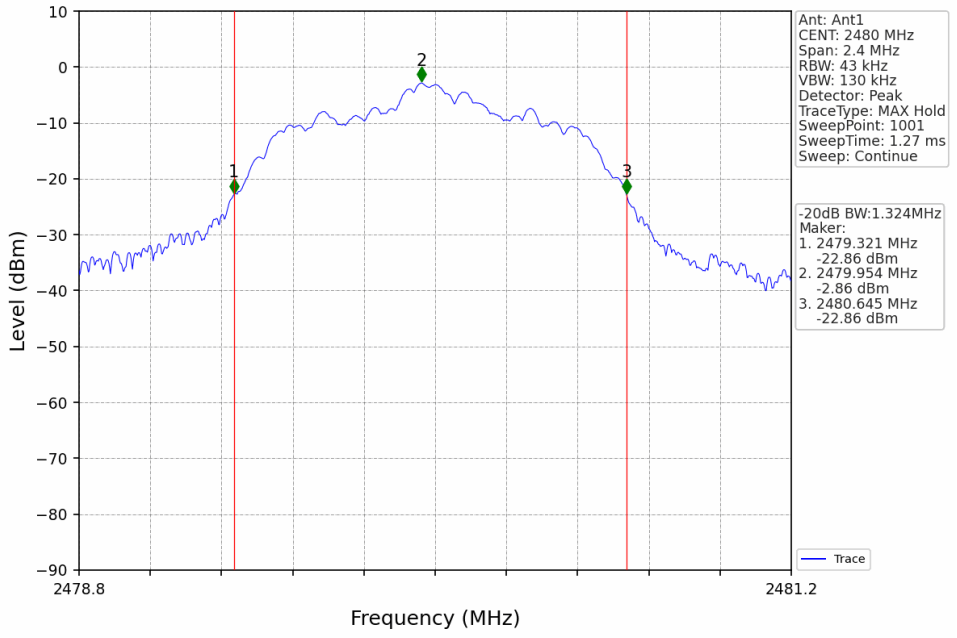
π/4-DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



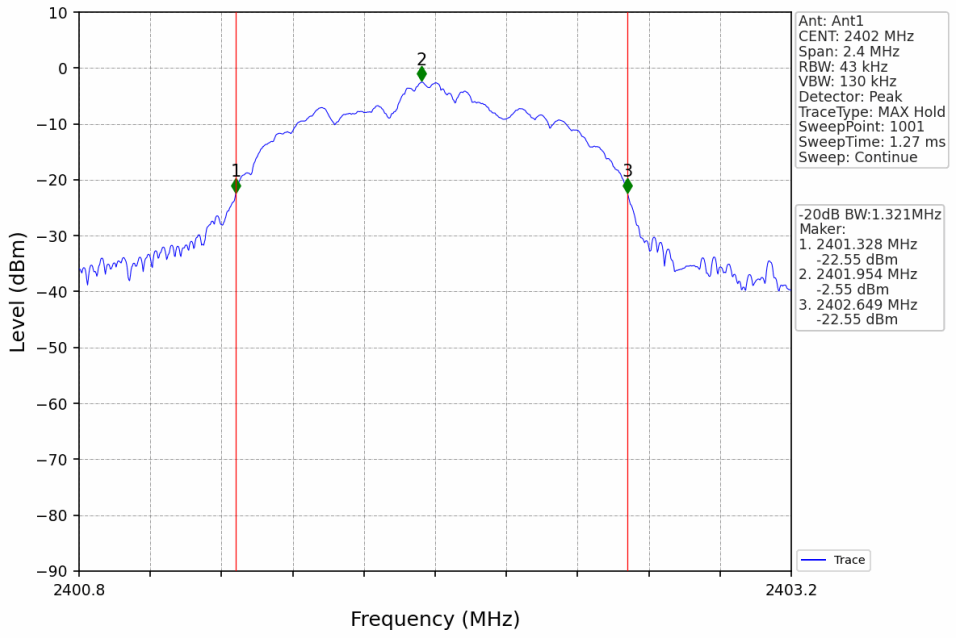
π/4-DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



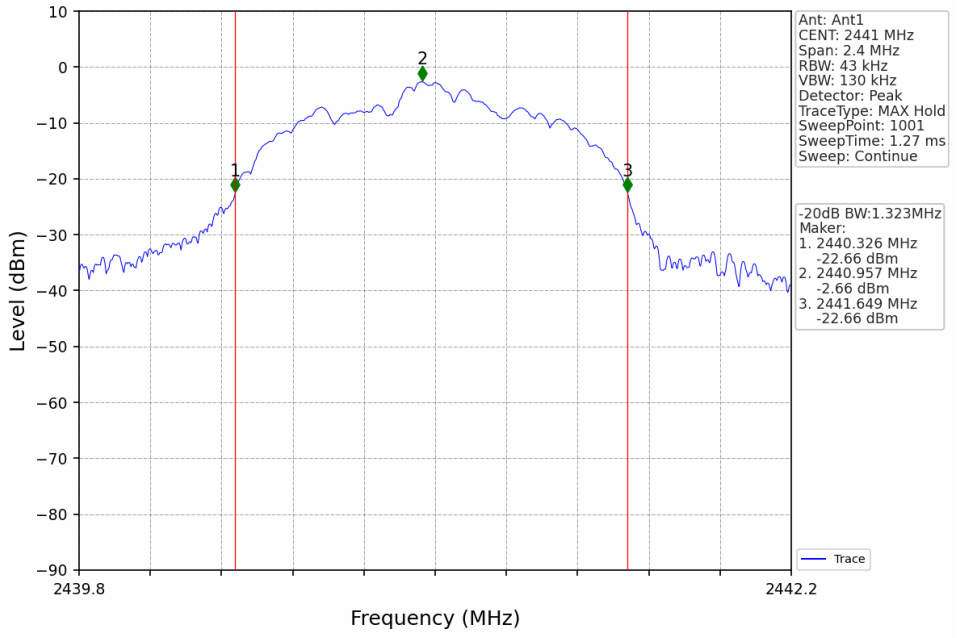
π/4-DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



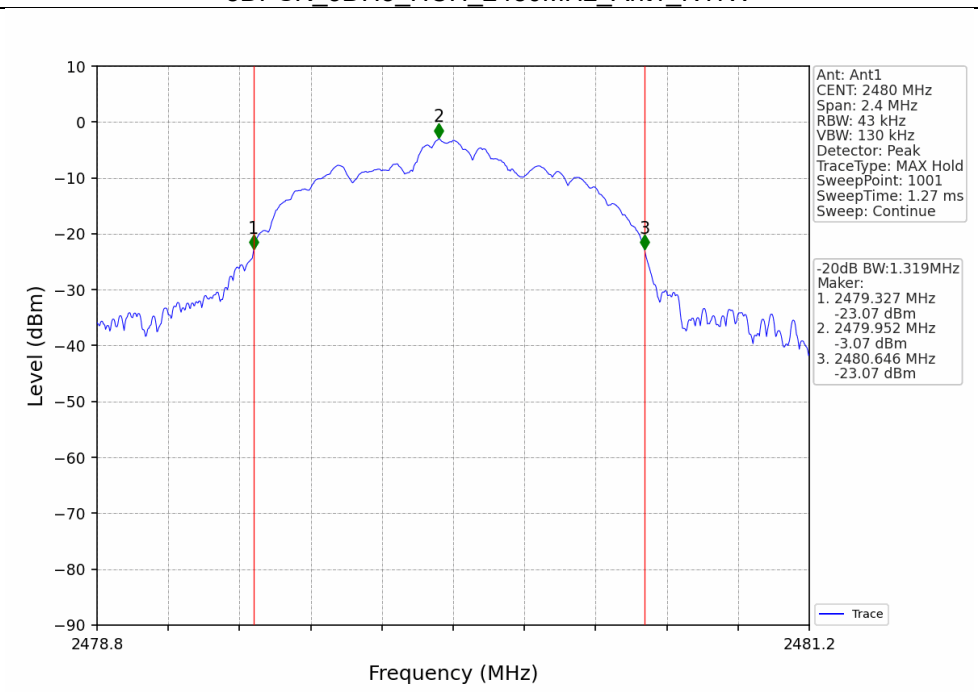
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



3. Maximum Conducted Output Power

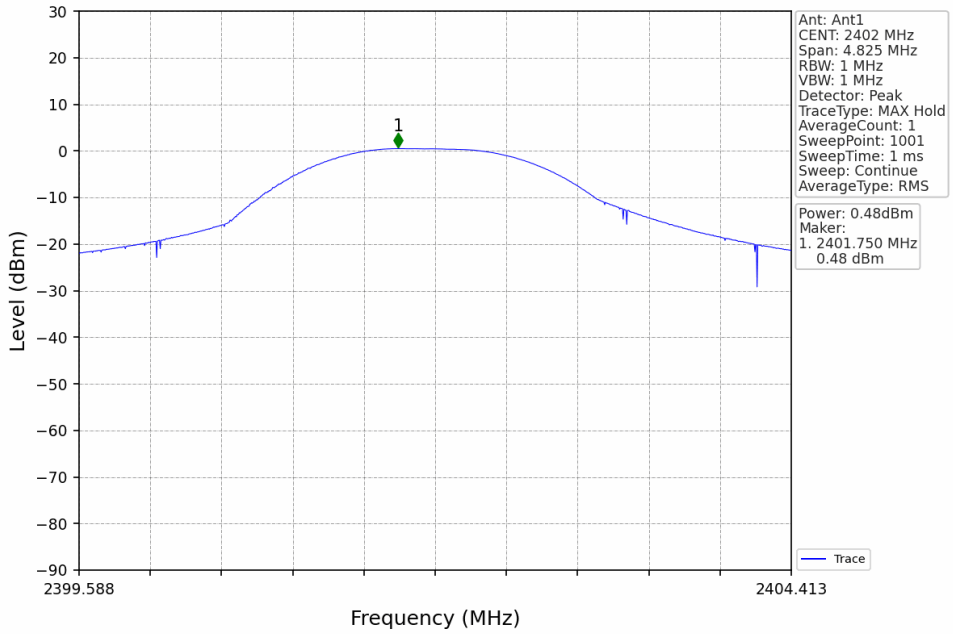
3.1 Power

3.1.1 Test Result

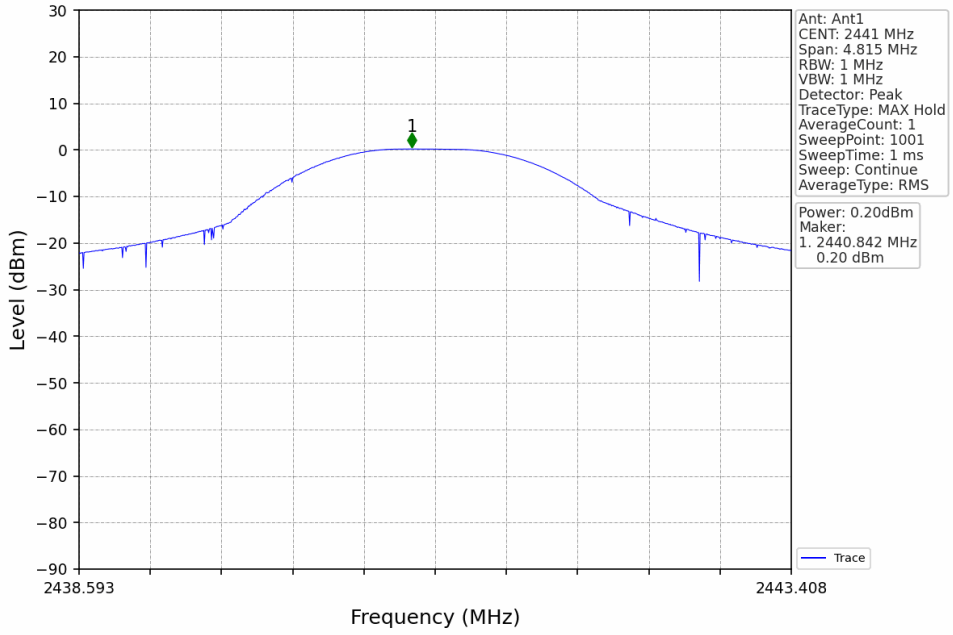
Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	0.48	<=30	Pass
		2441	DH5	0.20	<=30	Pass
		2480	DH5	-0.27	<=30	Pass
π/4-DQPSK	SISO	2402	2DH5	0.46	<=20.97	Pass
		2441	2DH5	0.40	<=20.97	Pass
		2480	2DH5	-0.06	<=20.97	Pass
8DPSK	SISO	2402	3DH5	0.70	<=20.97	Pass
		2441	3DH5	0.67	<=20.97	Pass
		2480	3DH5	0.24	<=20.97	Pass

3.1.2 Test Graph

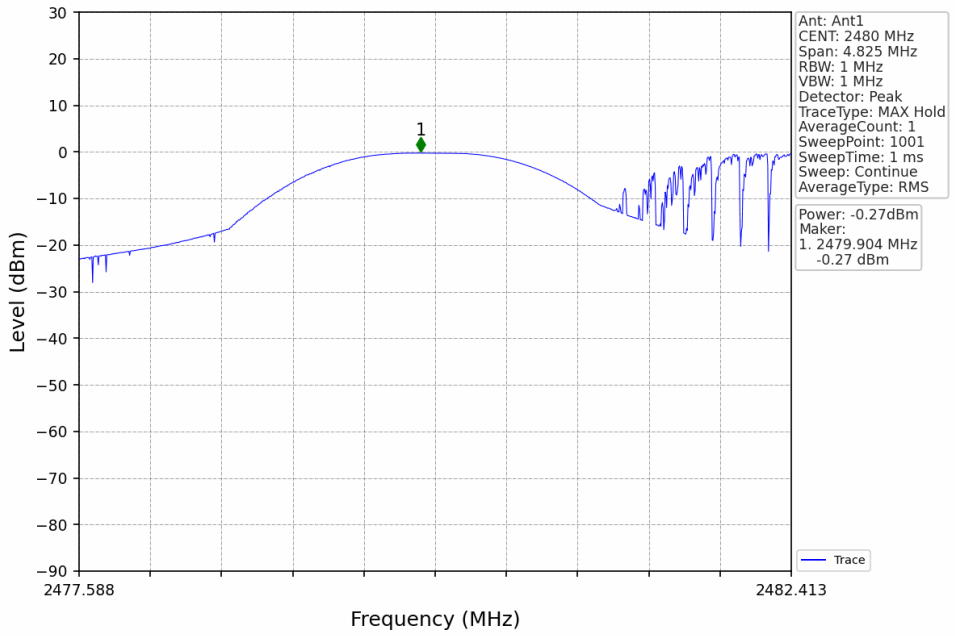
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



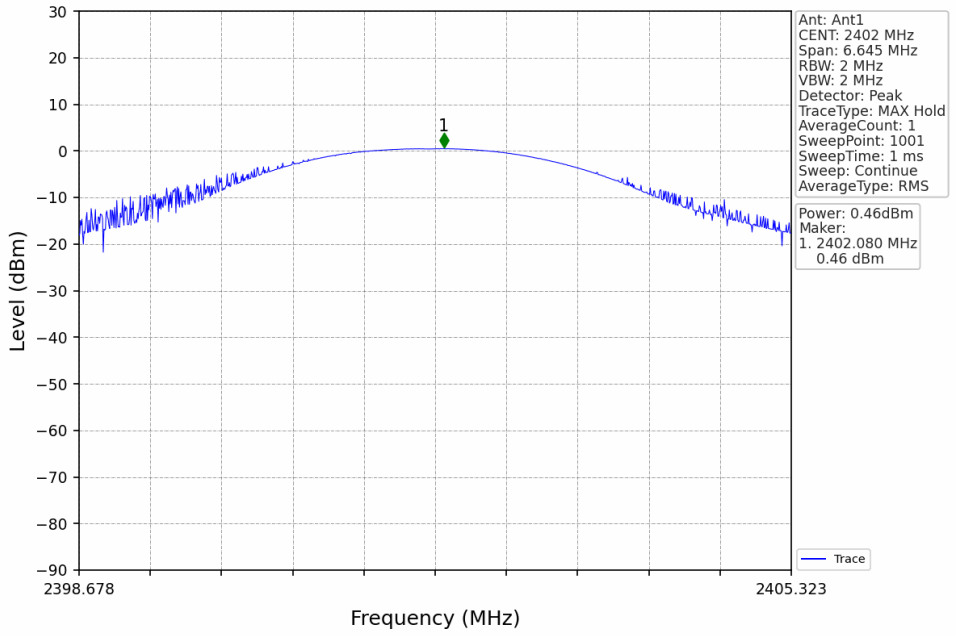
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



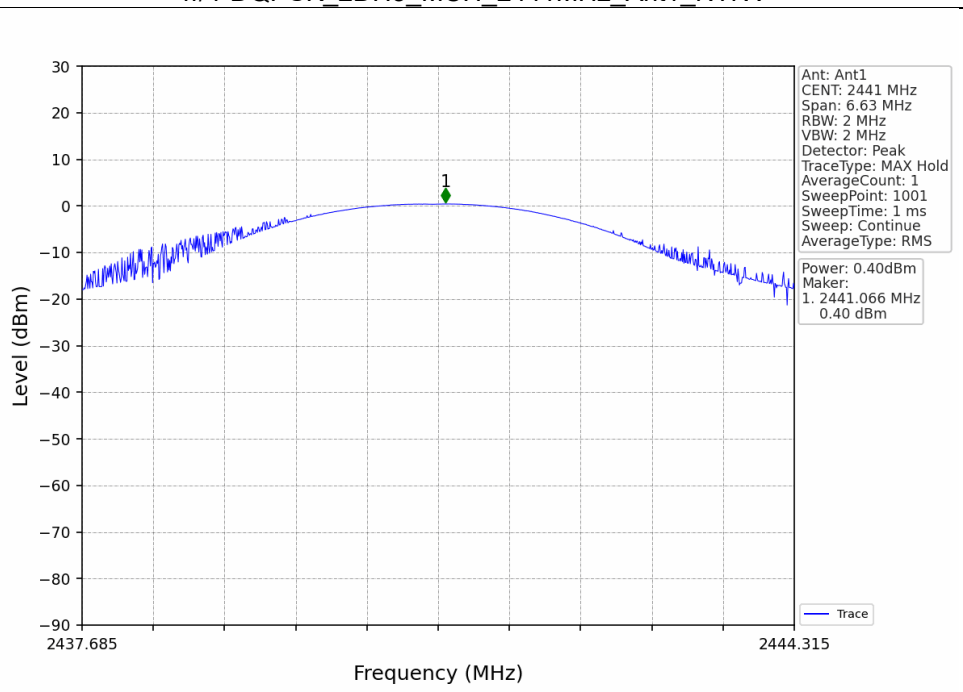
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



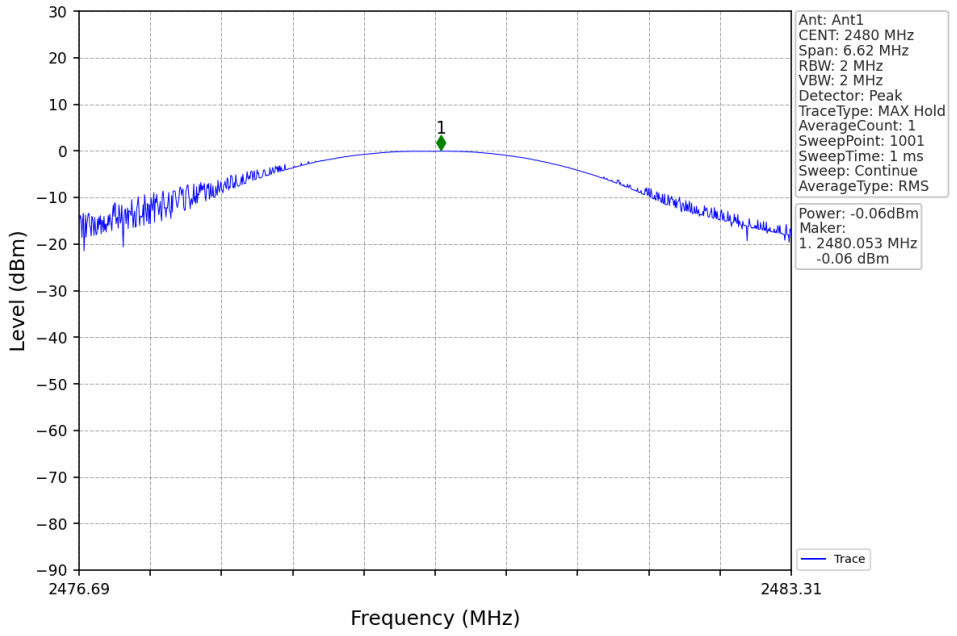
π/4-DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



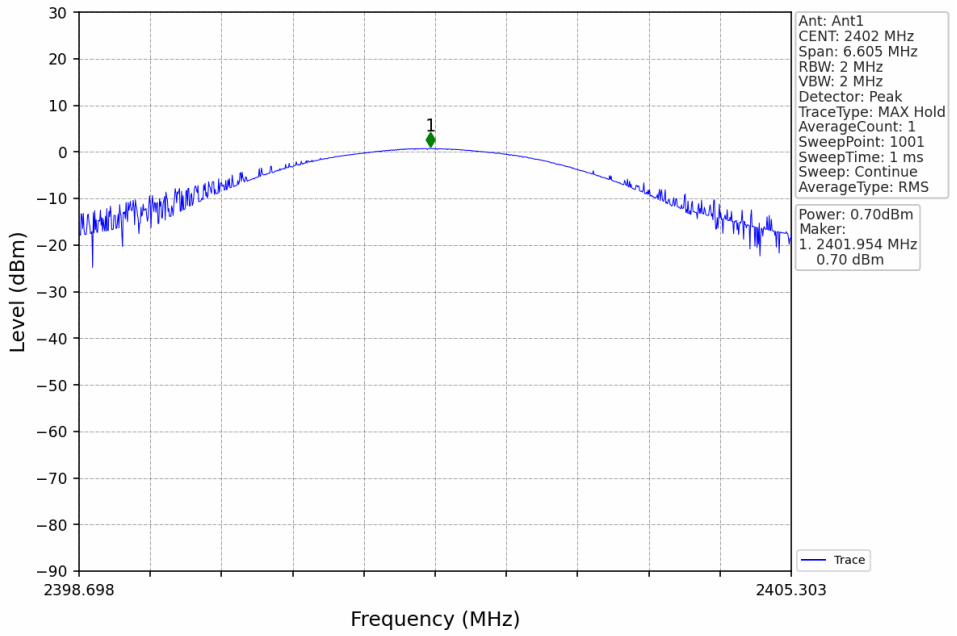
π/4-DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



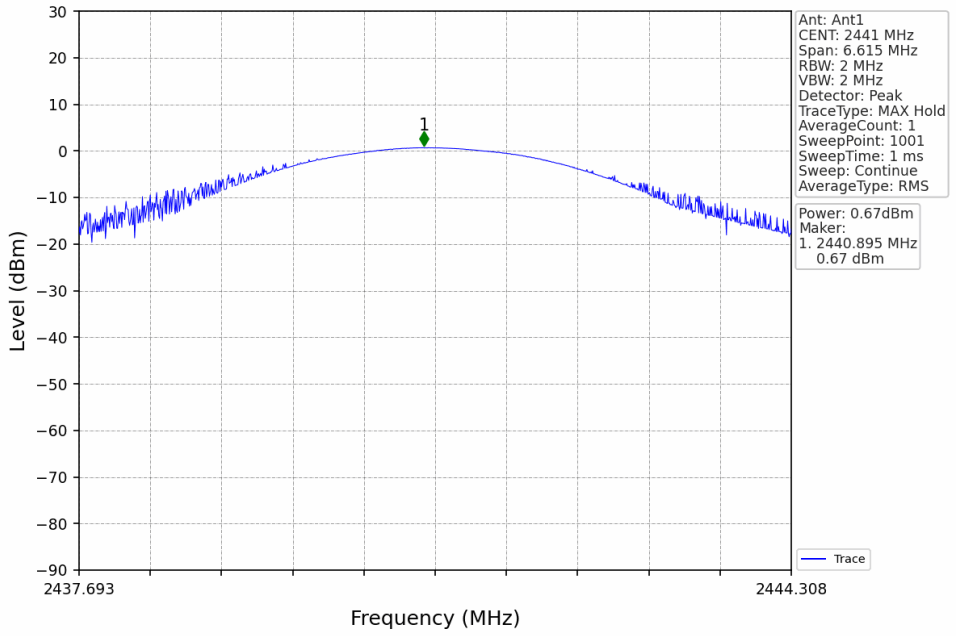
π/4-DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



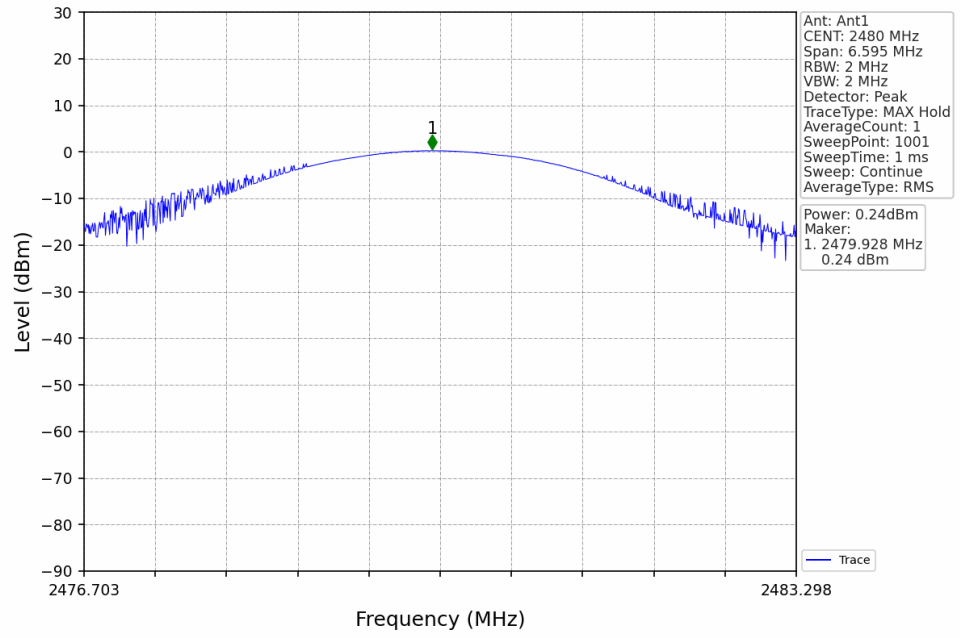
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



4. Carrier Frequency Separation

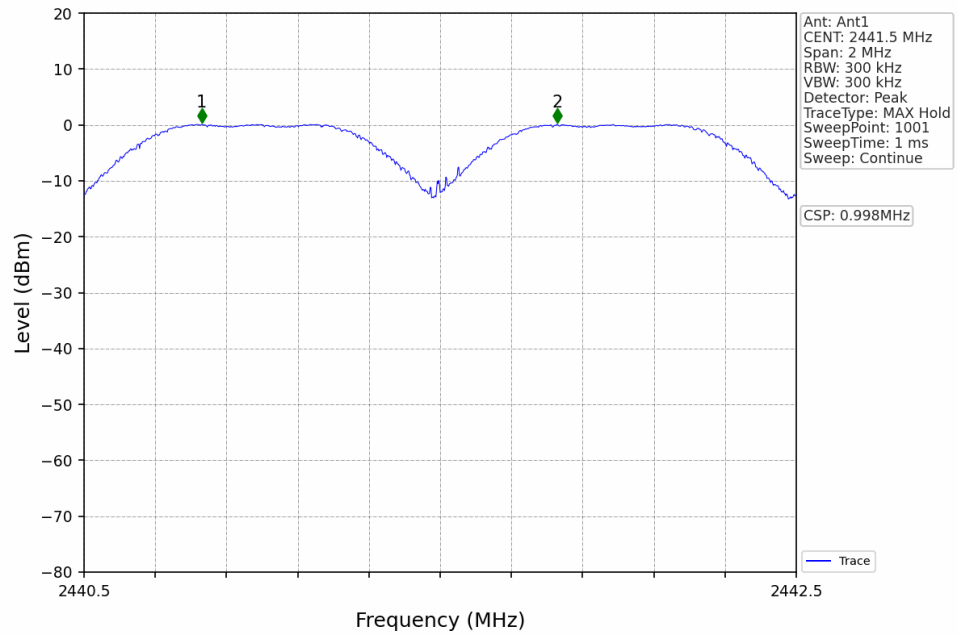
4.1 Ant1

4.1.1 Test Result

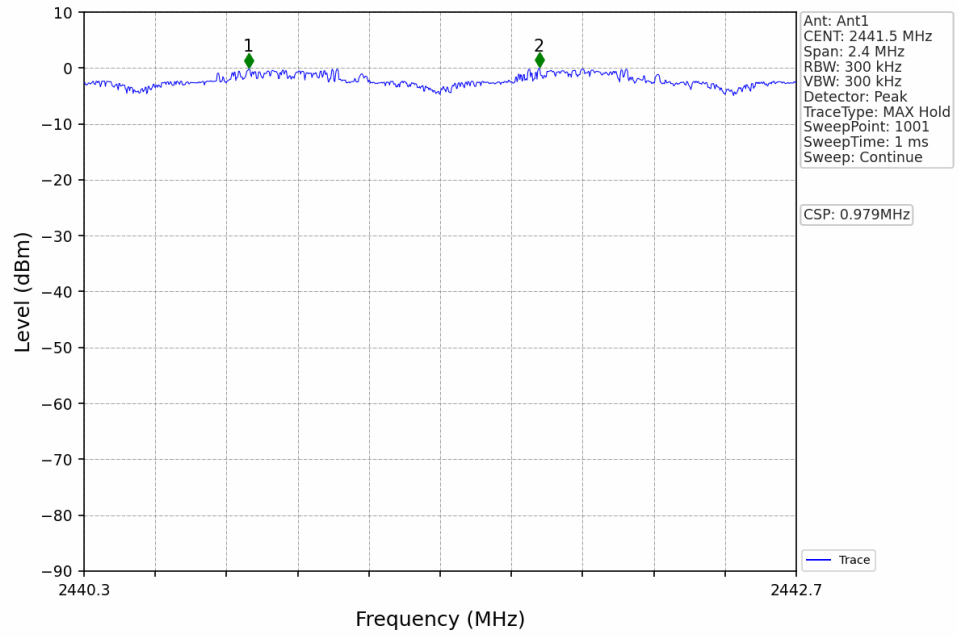
Ant1							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	0.998	0.965	>=0.965	Pass
π/4-DQPSK	SISO	HOPP	2DH5	0.979	1.329	>=0.886	Pass
8DPSK	SISO	HOPP	3DH5	1.001	1.323	>=0.882	Pass

4.1.2 Test Graph

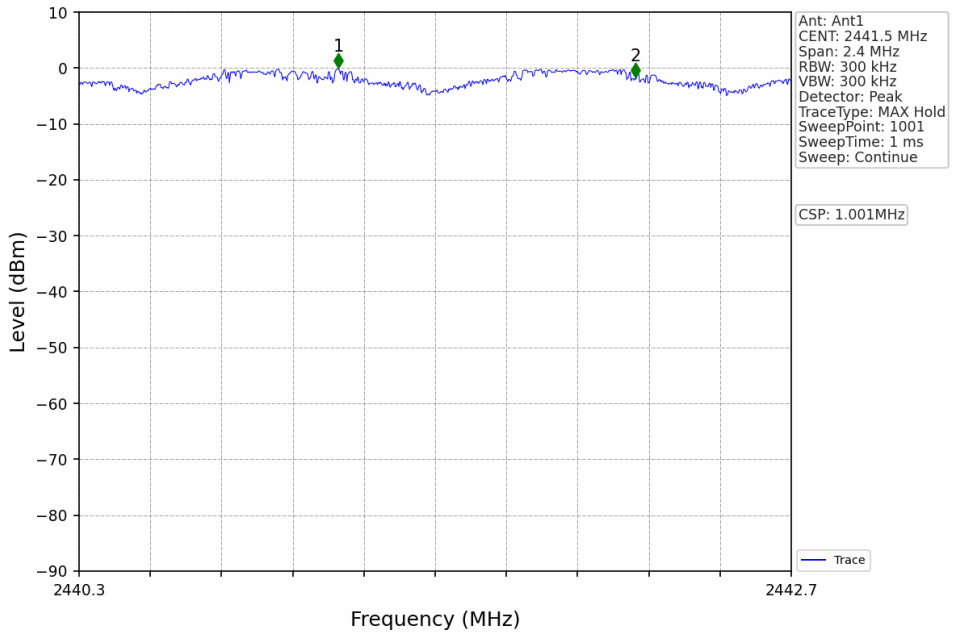
GFSK_DH5_HOPP_Ant1_NTNV



π/4-DQPSK_2DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



5. Number of Hopping Frequencies

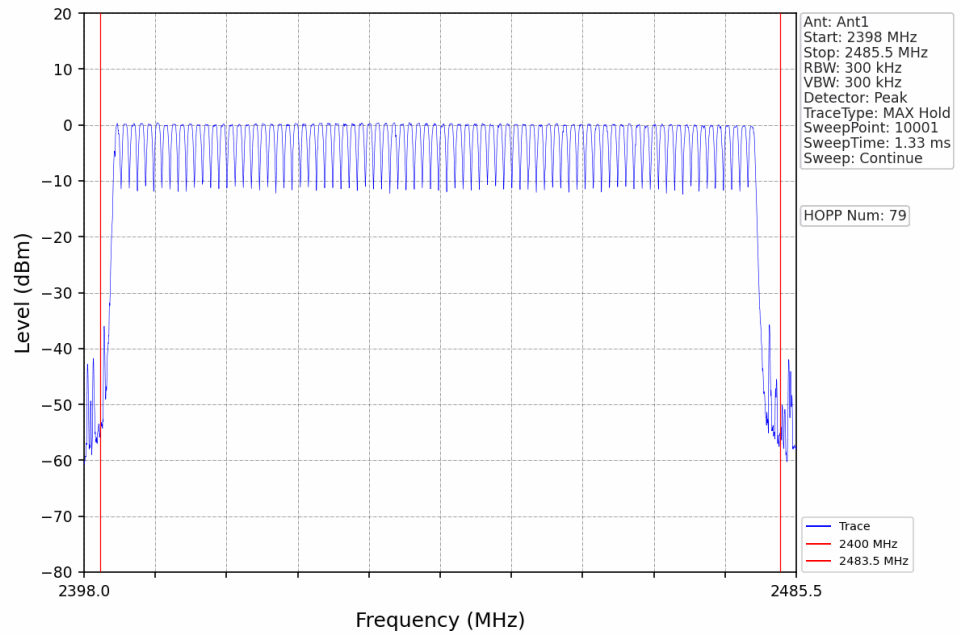
5.1 HoppNum

5.1.1 Test Result

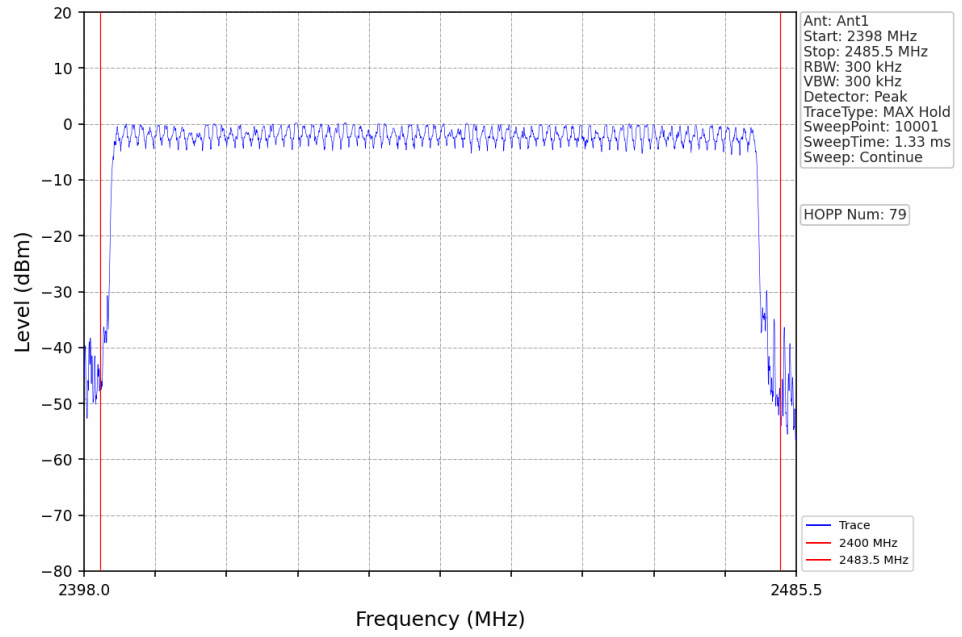
Mode	TX Type	Frequency (MHz)	Packet Type	Num of Hopping Frequencies		Verdict
				ANT1	Limit	
GFSK	SISO	HOPP	DH5	79	>=15	Pass
π/4-DQPSK	SISO	HOPP	2DH5	79	>=15	Pass
8DPSK	SISO	HOPP	3DH5	79	>=15	Pass

5.1.2 Test Graph

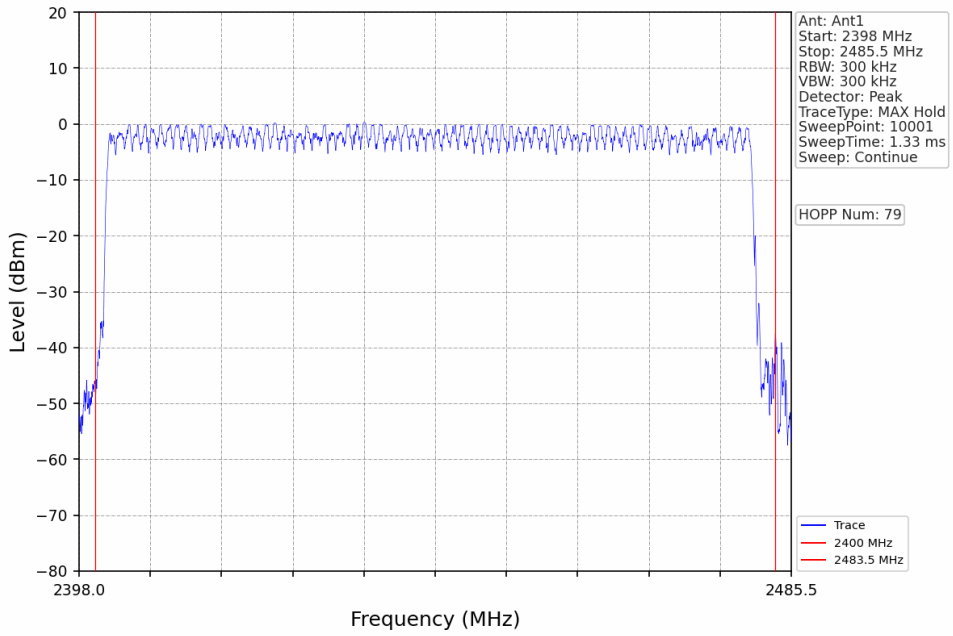
GFSK_DH5_HOPP_Ant1_NTNV



π/4-DQPSK_2DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



6. Time of Occupancy (Dwell Time)

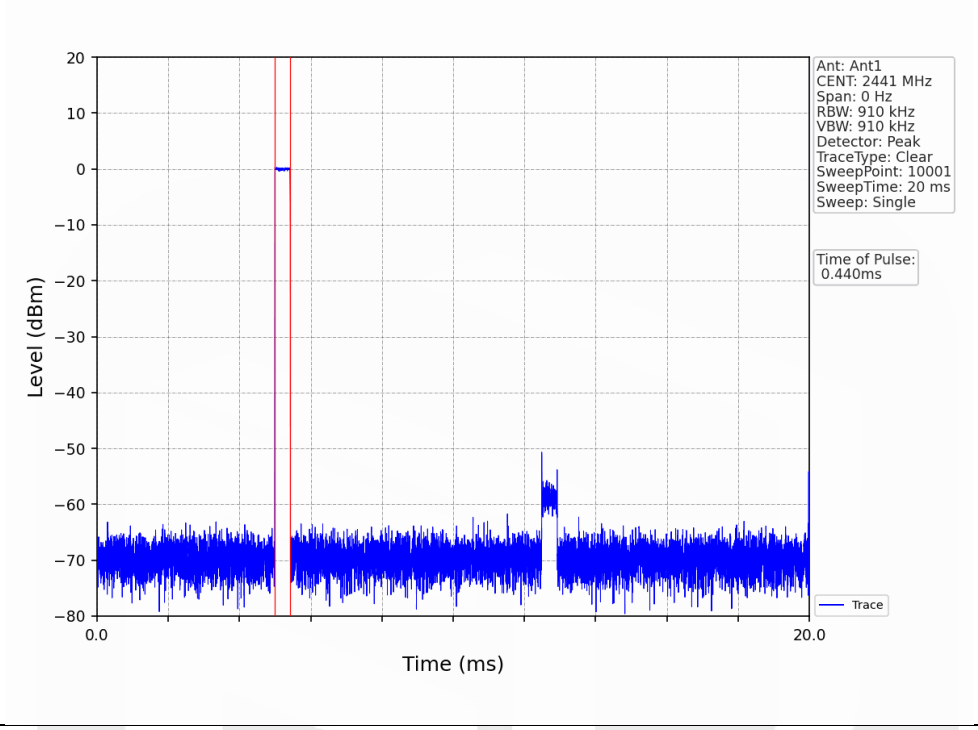
6.1 Ant1

6.1.1 Test Result

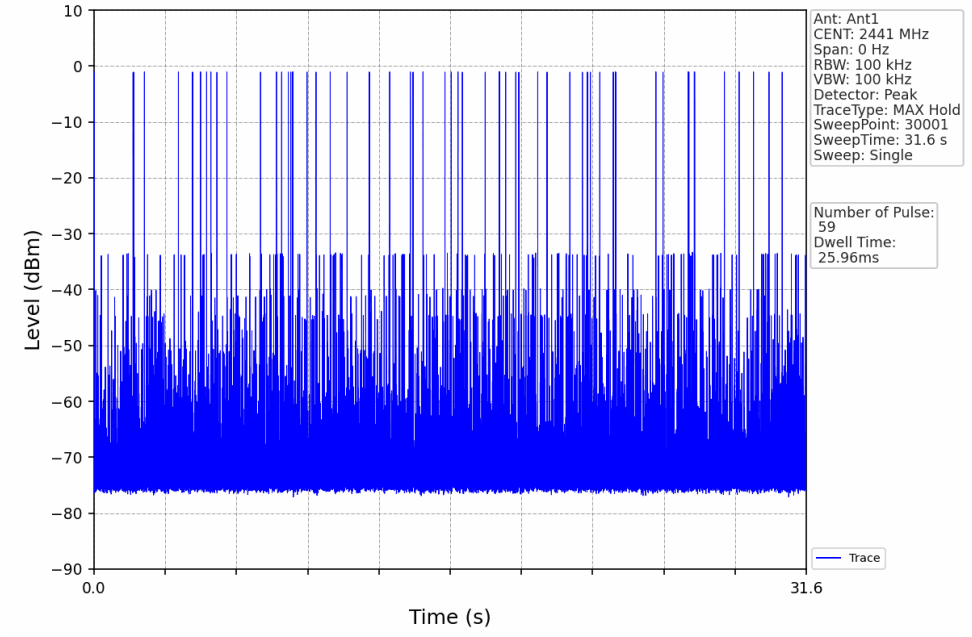
Ant1									
Mode	TX Type	Frequency (MHz)	Packet Type	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limit (ms)	Verdict
GFSK	SISO	HOPP	DH1	0.440	31.600	59	25.960	<=400	Pass
			DH3	1.636	31.600	54	88.344	<=400	Pass
			DH5	2.838	31.600	39	110.682	<=400	Pass
π/4-DQPSK	SISO	HOPP	2DH1	0.500	31.600	47	23.500	<=400	Pass
			2DH3	1.698	31.600	36	61.128	<=400	Pass
			2DH5	2.900	31.600	40	116.000	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.422	31.600	49	20.678	<=400	Pass
			3DH3	1.678	31.600	45	75.510	<=400	Pass
			3DH5	2.772	31.600	33	91.476	<=400	Pass

6.1.2 Test Graph

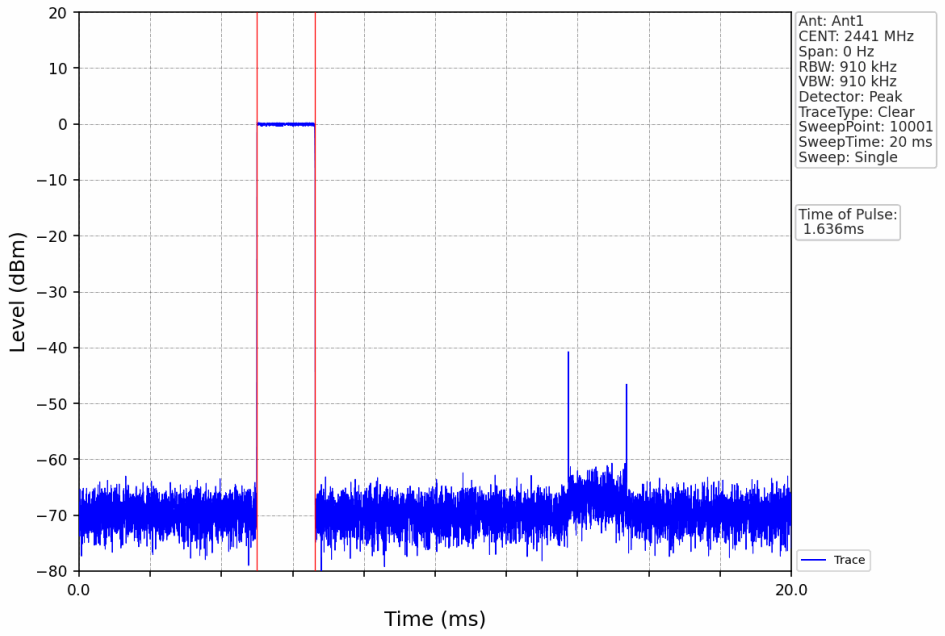
GFSK_DH1_HOPP_Ant1_NTNV



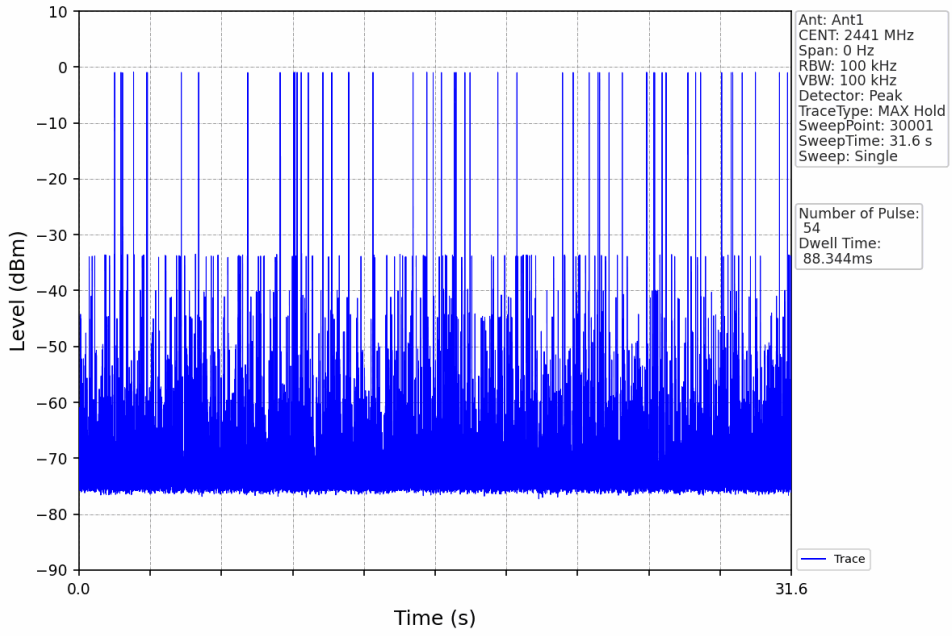
GFSK_DH1_HOPP_Ant1_NTNV



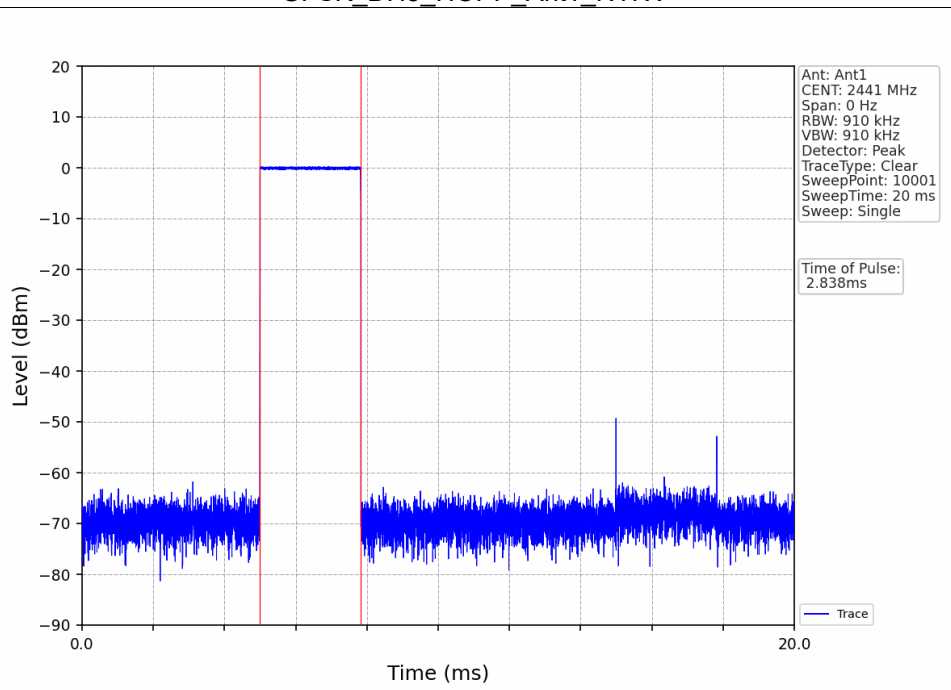
GFSK_DH3_HOPP_Ant1_NTNV



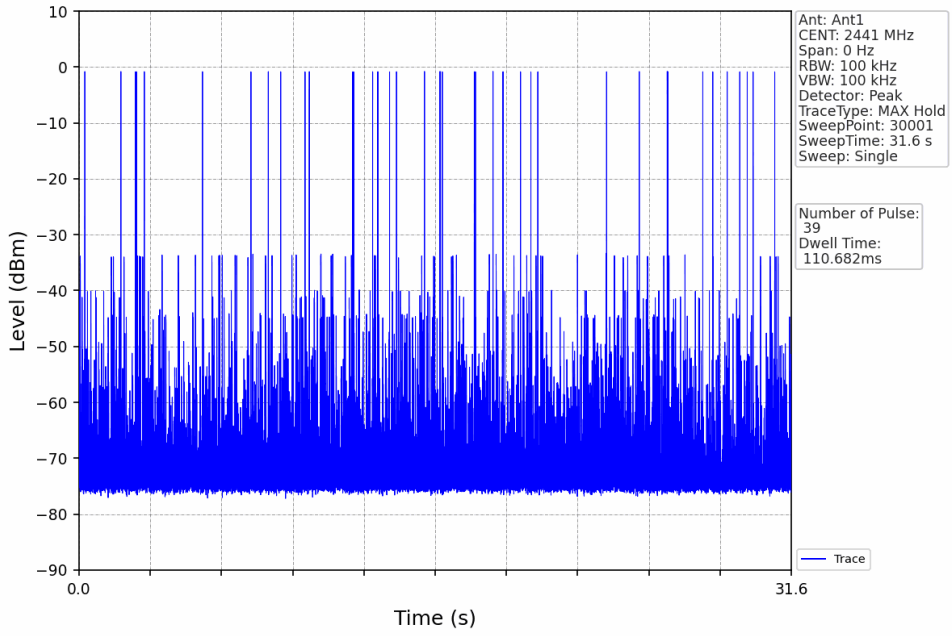
GFSK_DH3_HOPP_Ant1_NTNV



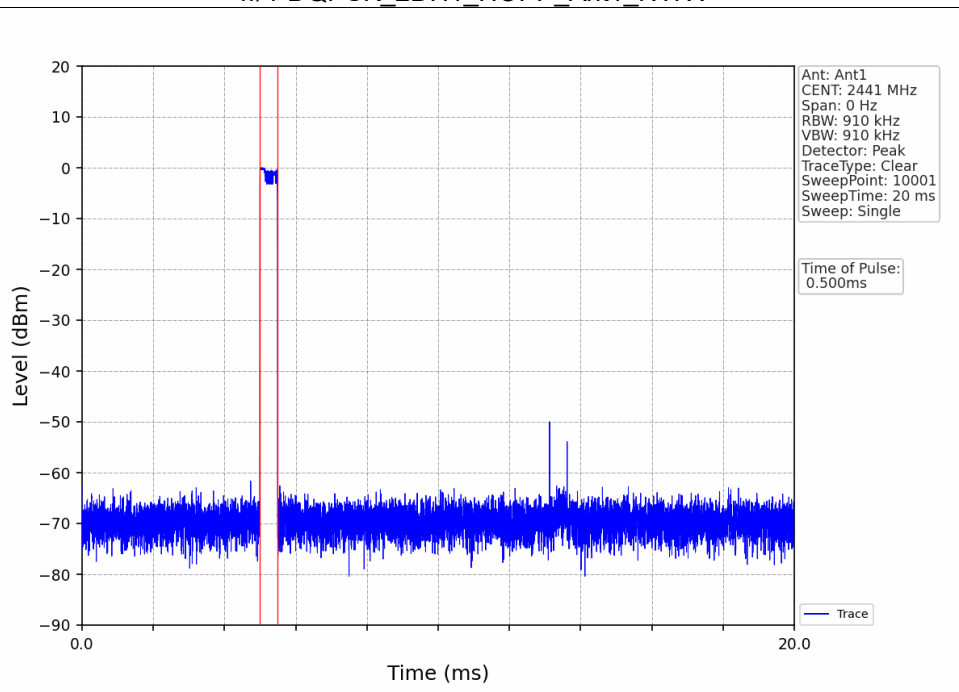
GFSK_DH5_HOPP_Ant1_NTNV



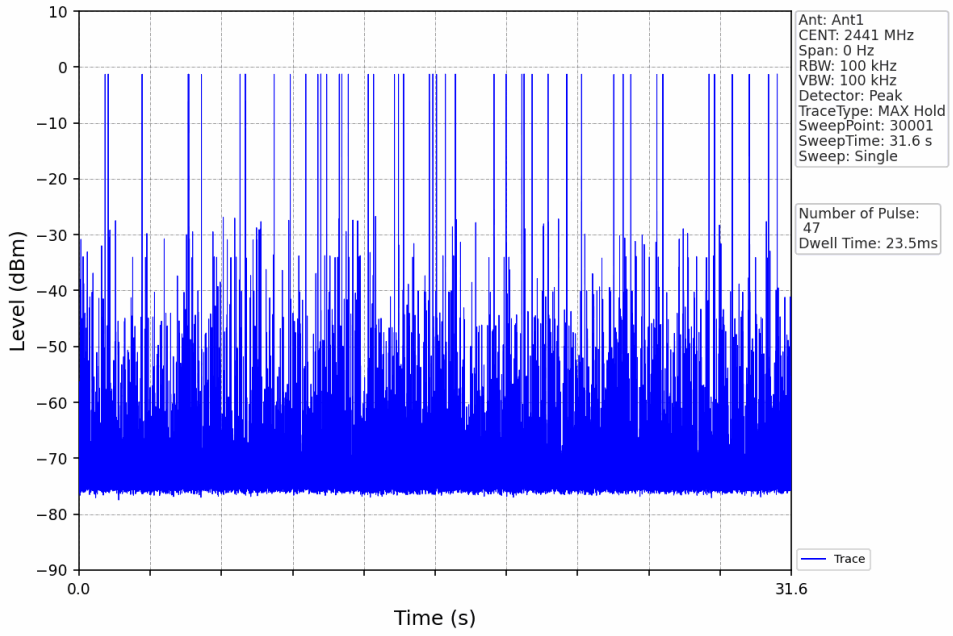
GFSK_DH5_HOPP_Ant1_NTNV



π/4-DQPSK_2DH1_HOPP_Ant1_NTNV



π/4-DQPSK_2DH1_HOPP_Ant1_NTNV



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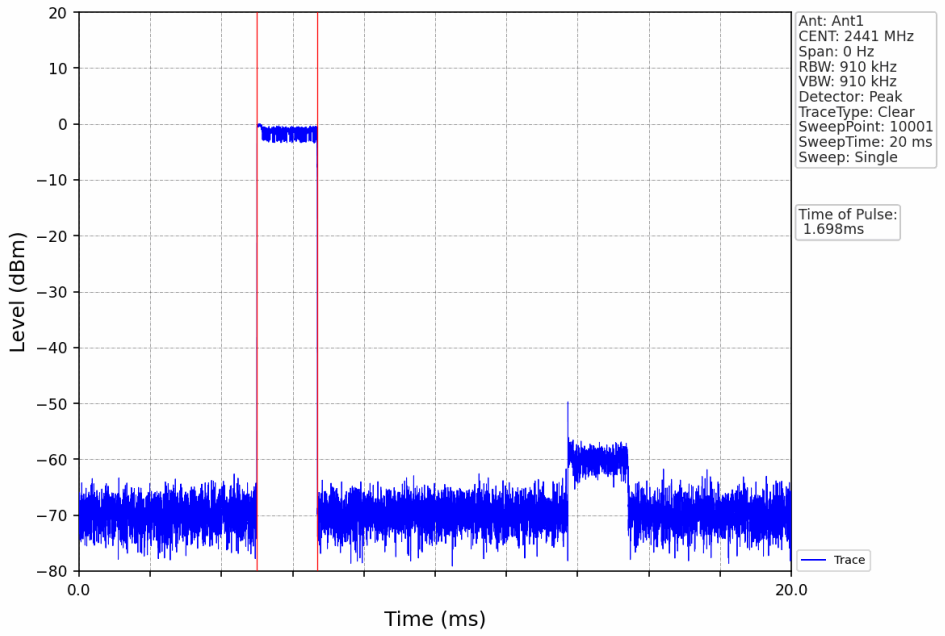

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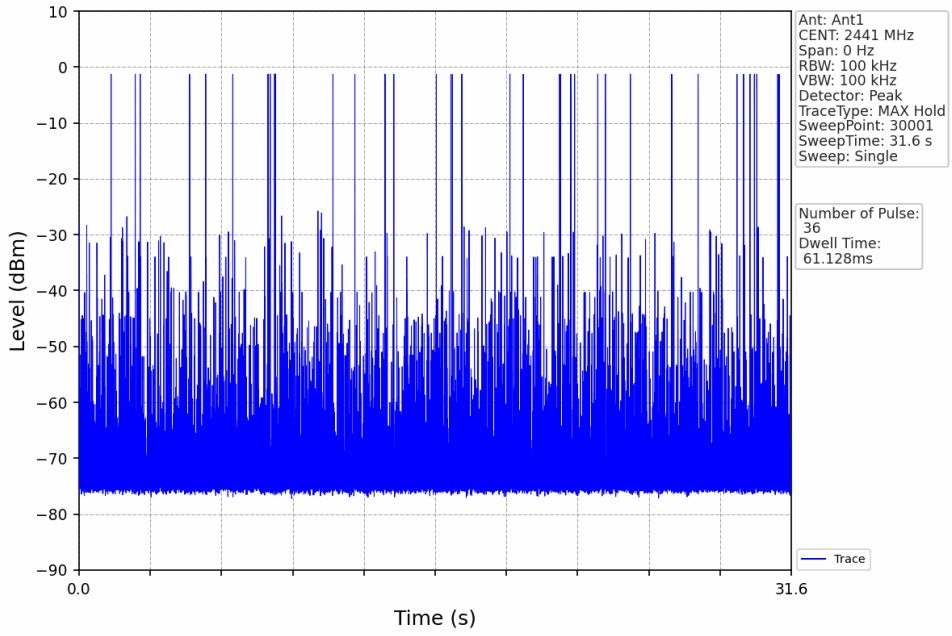

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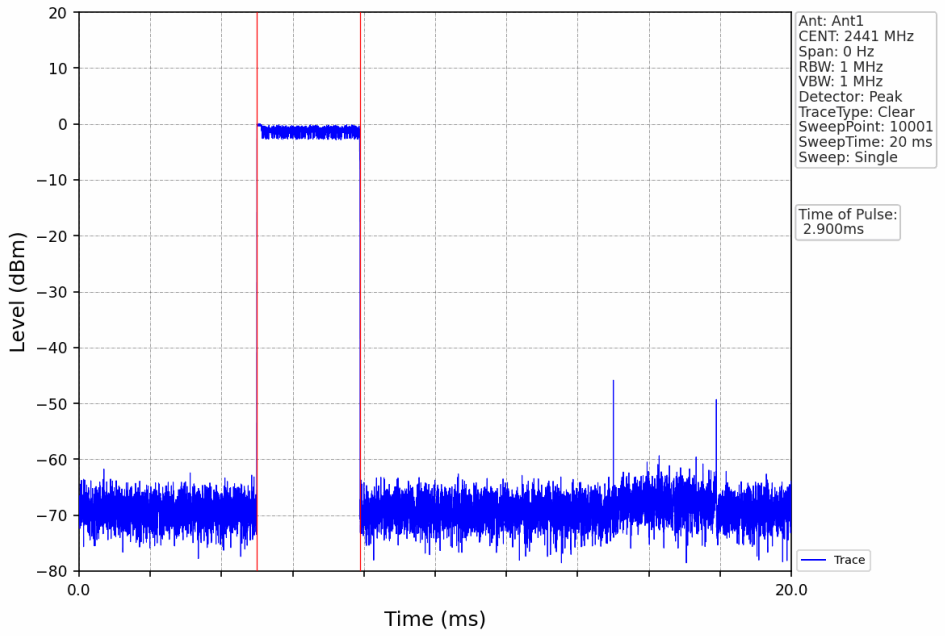
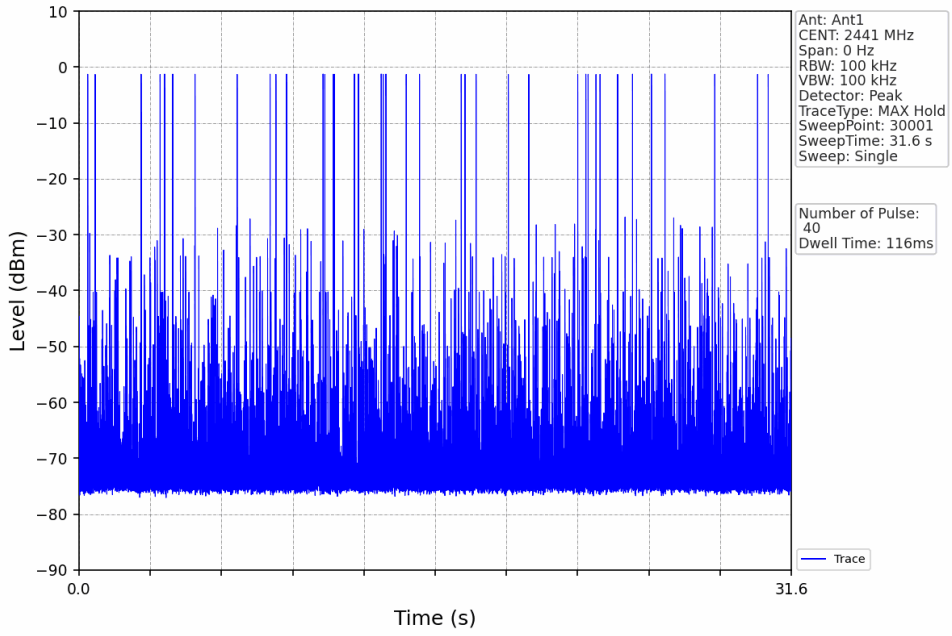
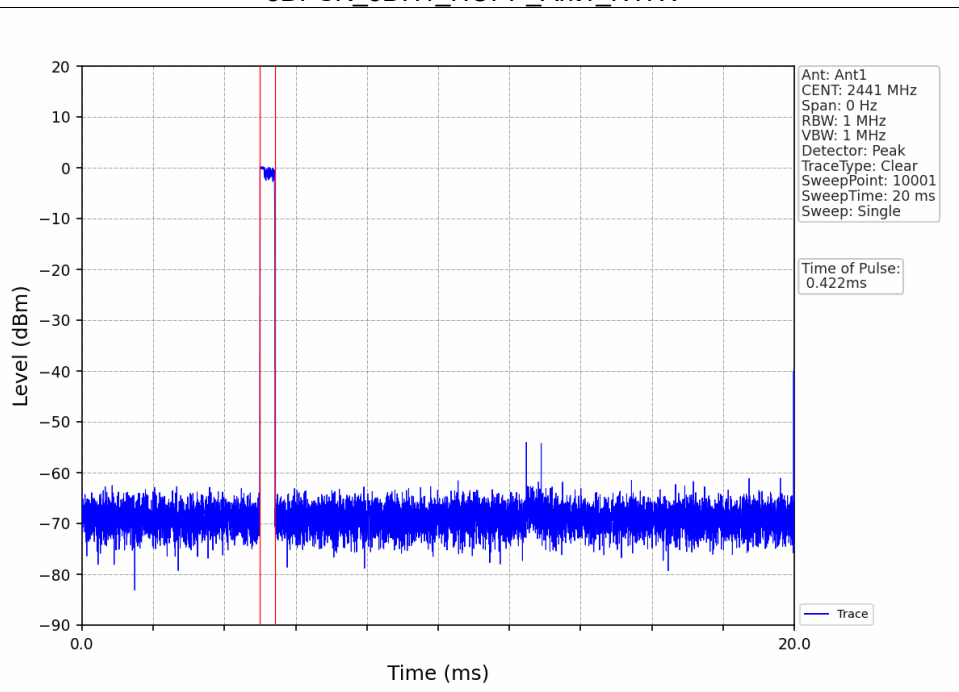


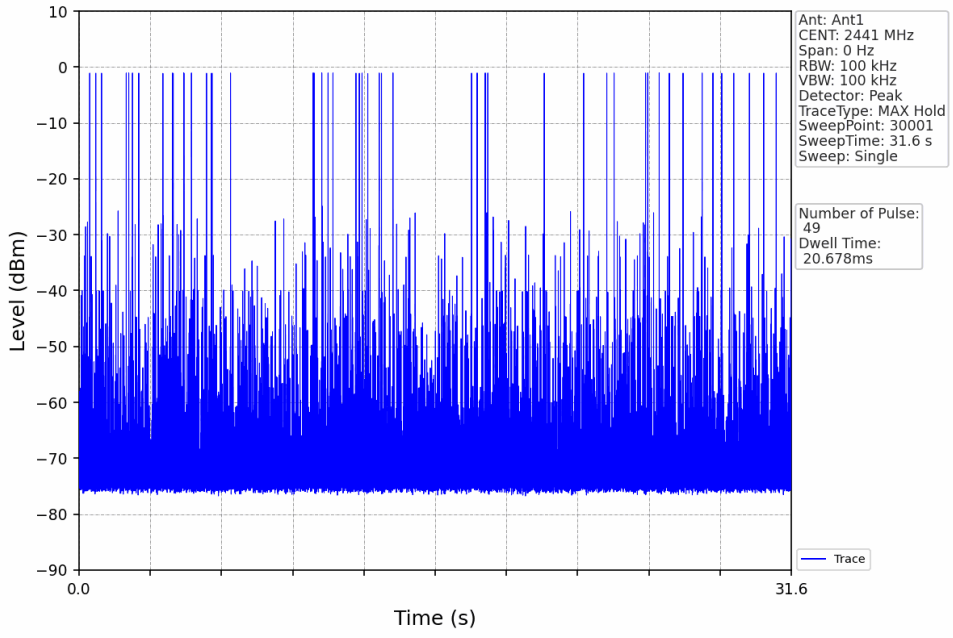
π/4-DQPSK_2DH5_HOPP_Ant1_NTNV



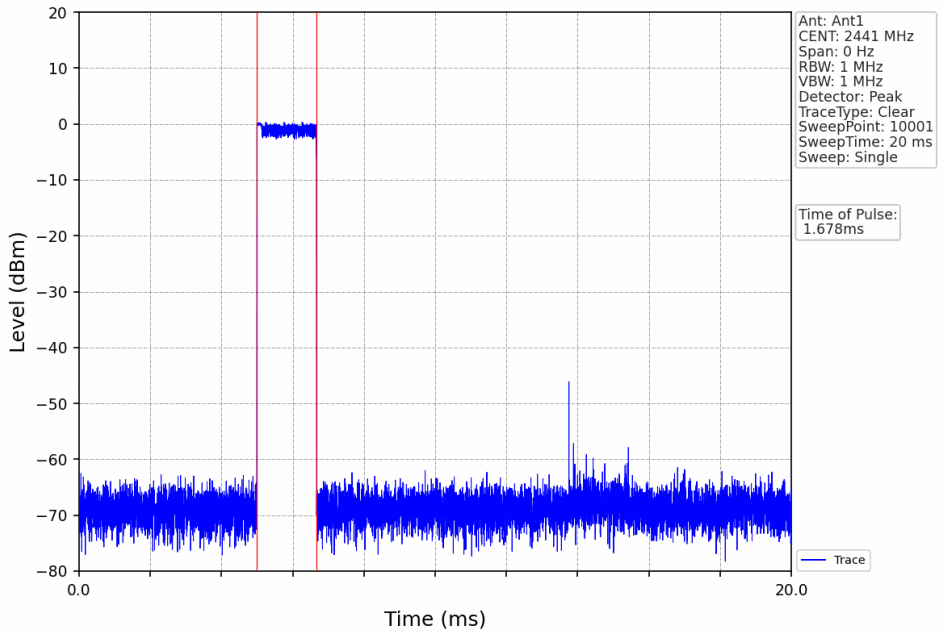
8DPSK_3DH1_HOPP_Ant1_NTNV



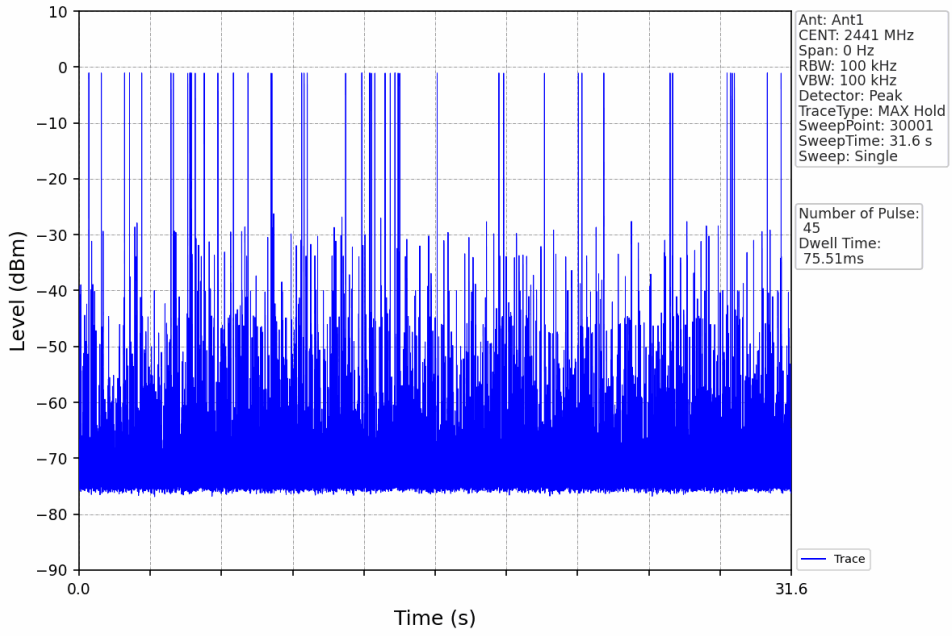
8DPSK_3DH1_HOPP_Ant1_NTNV



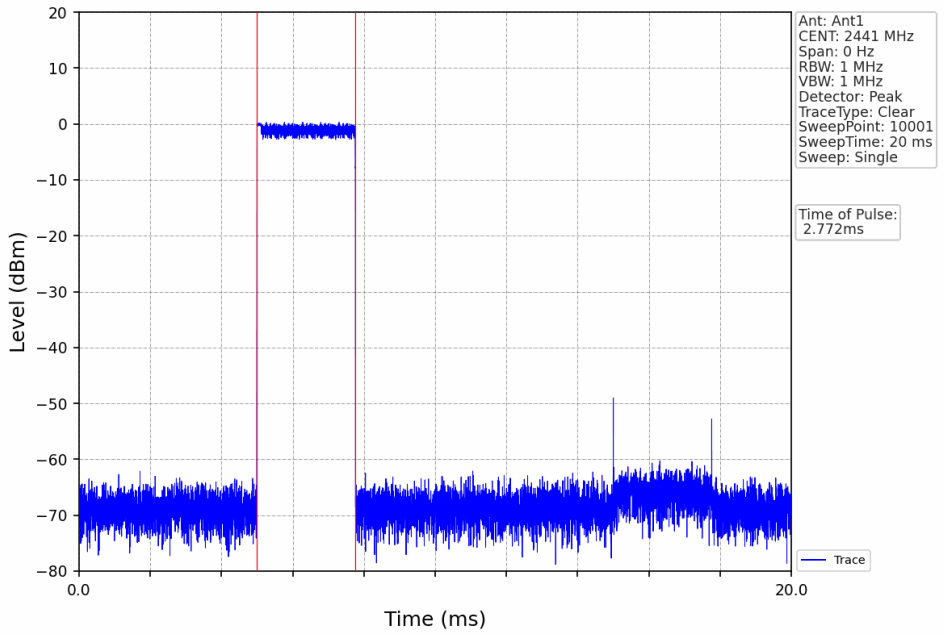
8DPSK_3DH3_HOPP_Ant1_NTNV



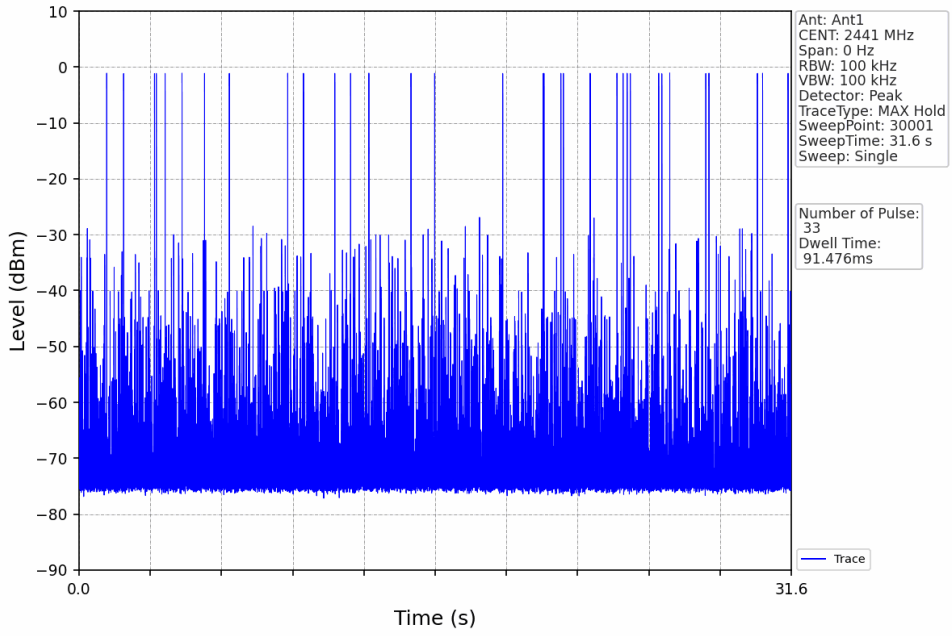
8DPSK_3DH3_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



7. Unwanted Emissions In Non-restricted Frequency Bands

7.1 Test Result

7.1.1 Ref

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	-0.33
		2441	DH5	1	-0.53
		2480	DH5	1	-0.99
		HOPP	DH5	1	-1.09
					-1.09
Pi/4DQPSK	SISO	2402	2DH5	1	-1.10
		2441	2DH5	1	-1.11
		2480	2DH5	1	-1.61
		HOPP	2DH5	1	-1.51
					-1.51
8DPSK	SISO	2402	3DH5	1	-1.27
		2441	3DH5	1	-1.22
		2480	3DH5	1	-1.69
		HOPP	3DH5	1	-1.55
					-1.55
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.					

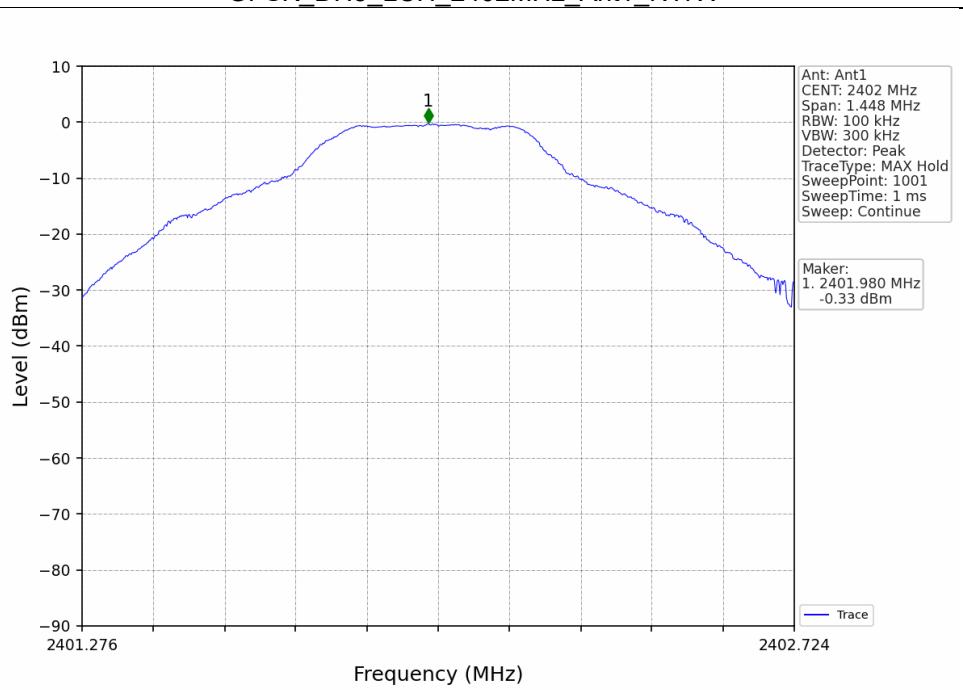
7.1.2 CSE

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	-0.33	-20.33	Pass
		2441	DH5	1	-0.53	-20.53	Pass
		2480	DH5	1	-0.99	-20.99	Pass
		HOPP	DH5	1	-1.09	-21.09	Pass
					-1.09	-21.09	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	-1.10	-21.10	Pass
		2441	2DH5	1	-1.11	-21.11	Pass
		2480	2DH5	1	-1.61	-21.61	Pass
		HOPP	2DH5	1	-1.51	-21.51	Pass
					-1.51	-21.51	Pass
8DPSK	SISO	2402	3DH5	1	-1.27	-21.27	Pass
		2441	3DH5	1	-1.22	-21.22	Pass
		2480	3DH5	1	-1.69	-21.69	Pass
		HOPP	3DH5	1	-1.55	-21.55	Pass
					-1.55	-21.55	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.							

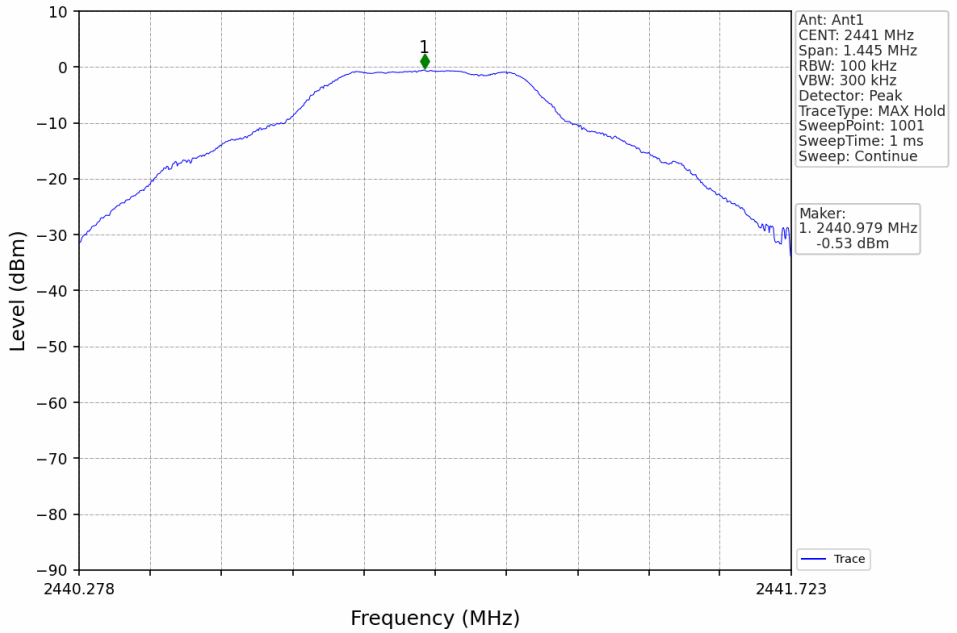
7.2 Test Graph

7.2.1 Ref

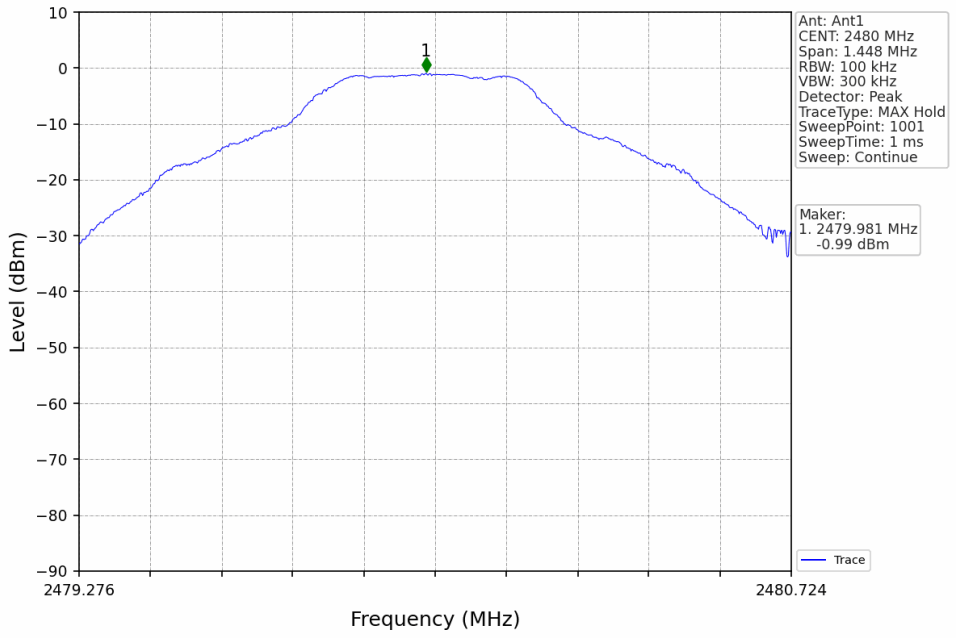
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



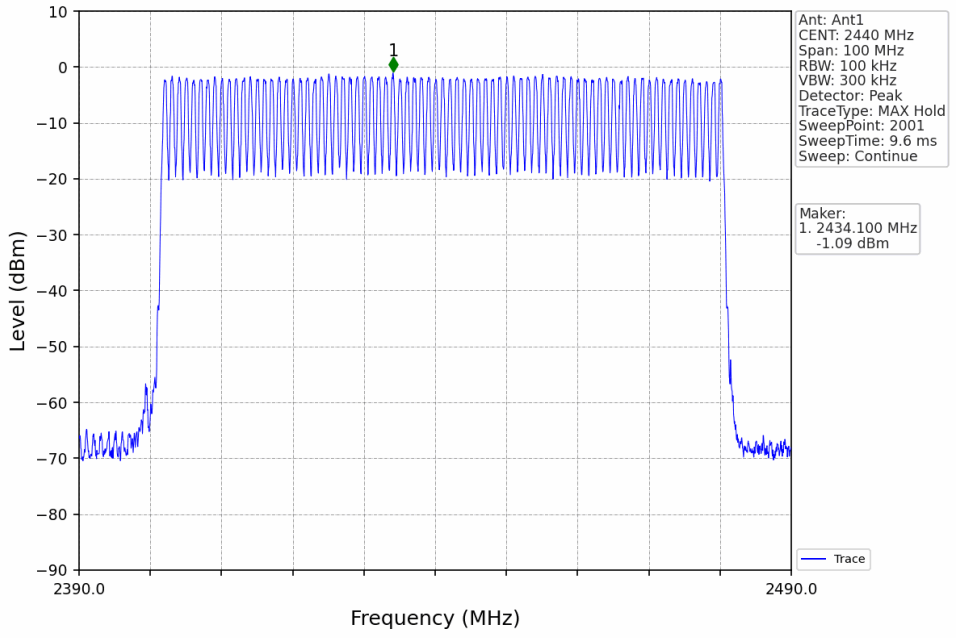
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



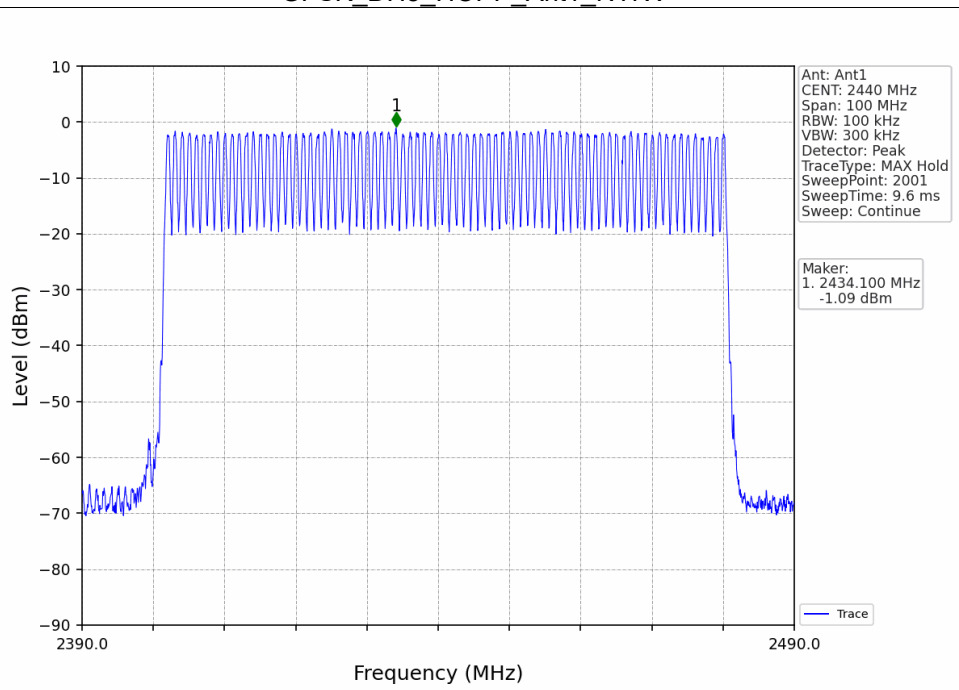
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



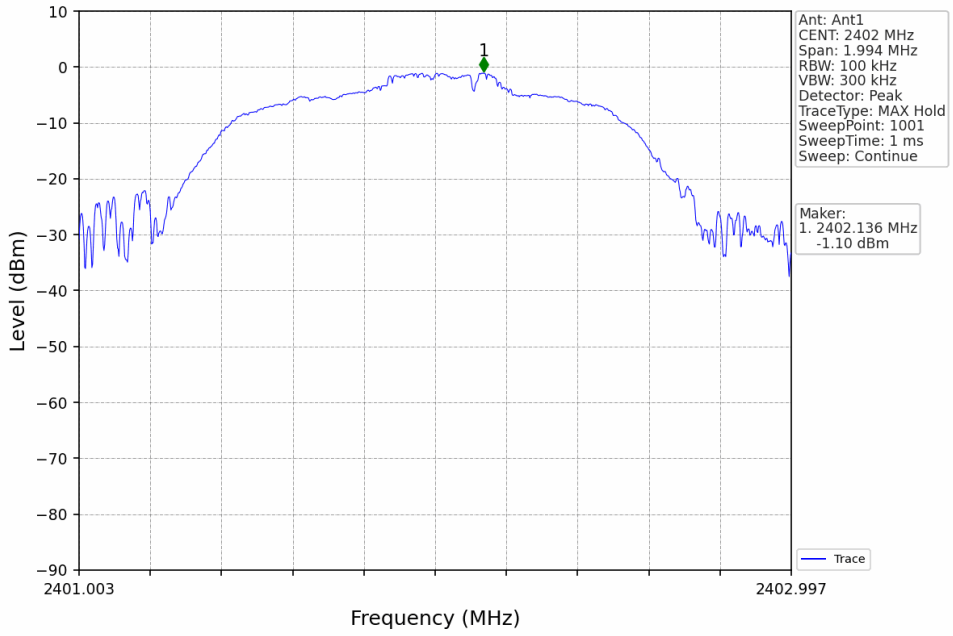
GFSK_DH5_HOPP_Ant1_NTNV



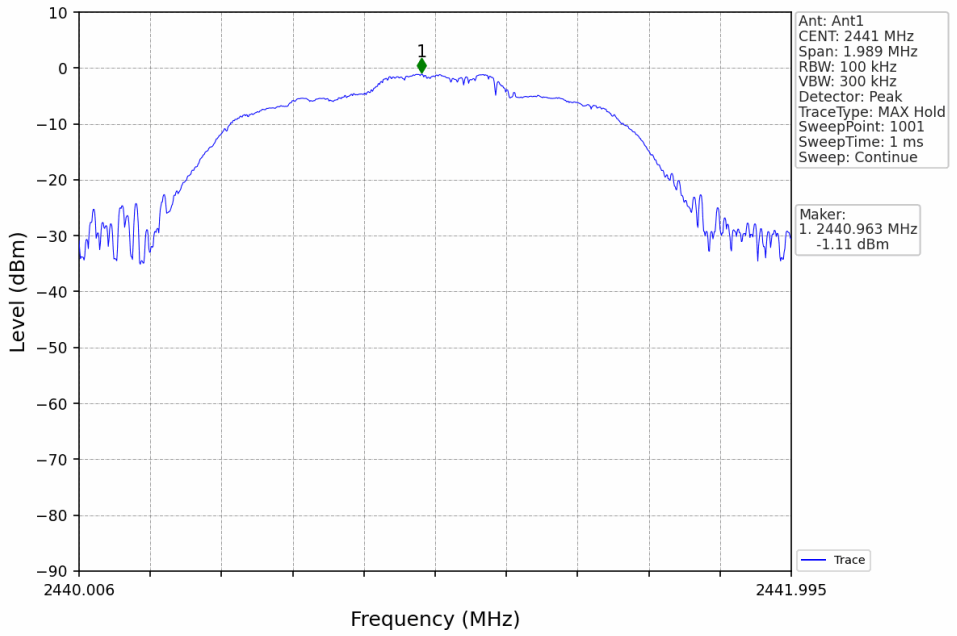
GFSK_DH5_HOPP_Ant1_NTNV



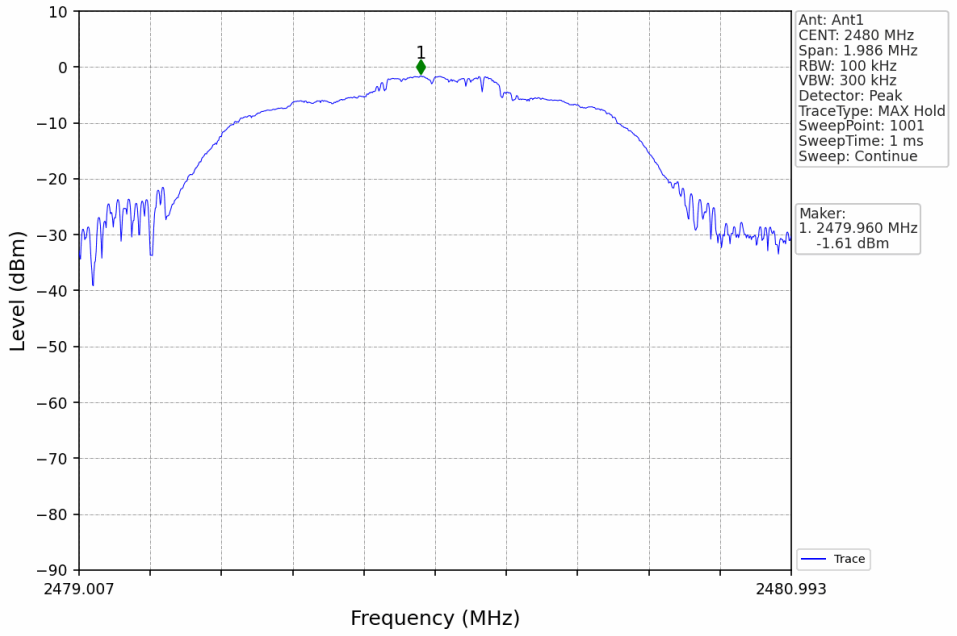
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



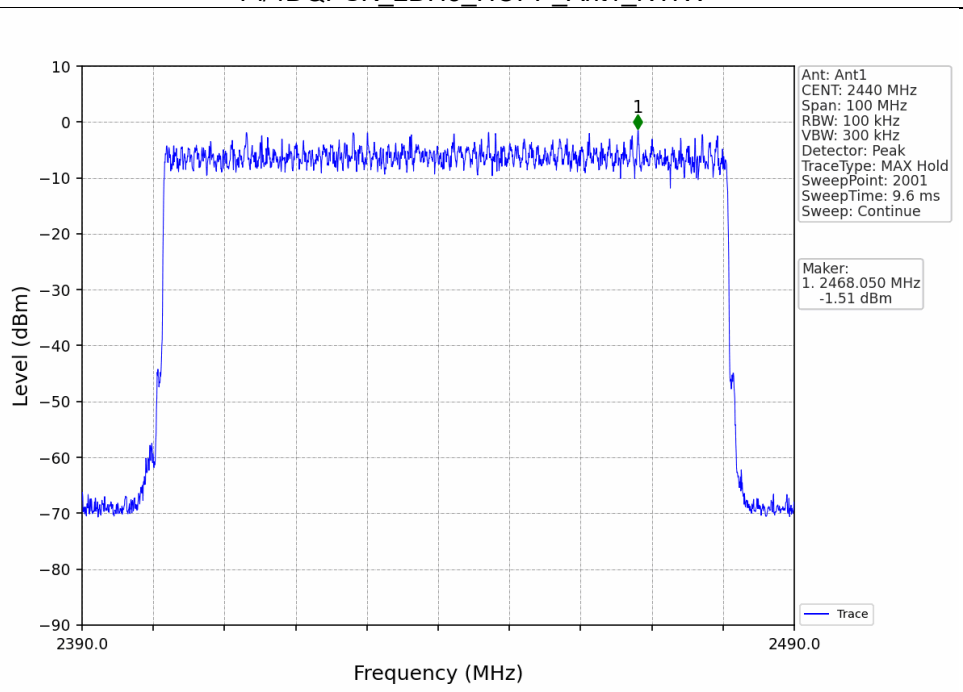
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



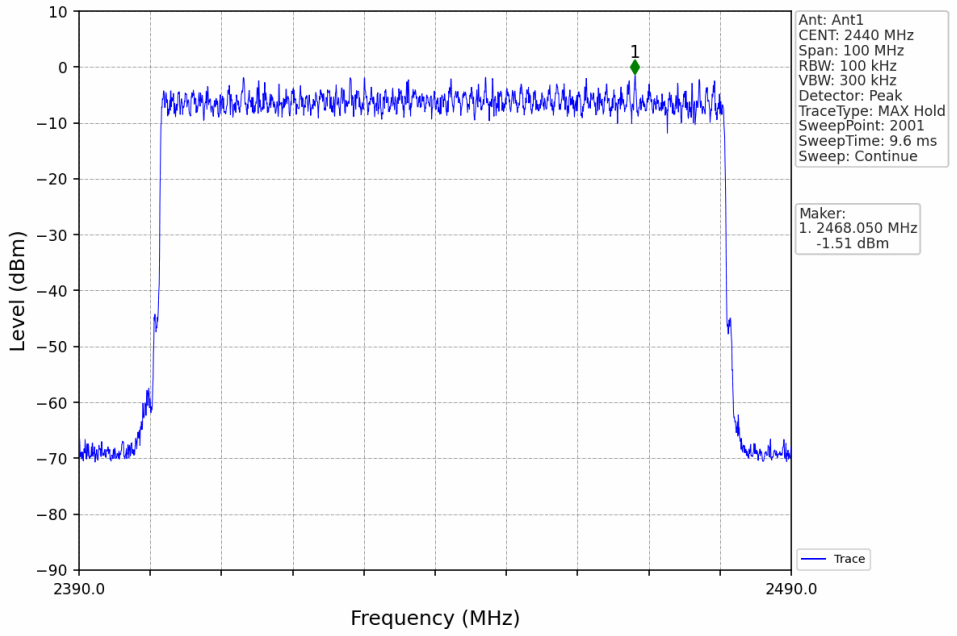
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



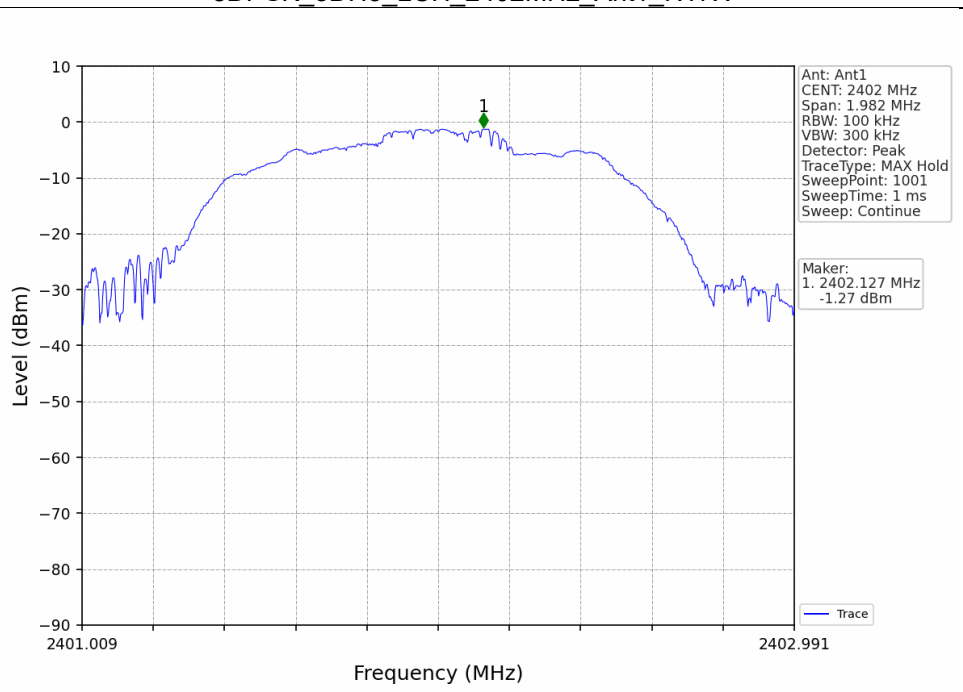
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



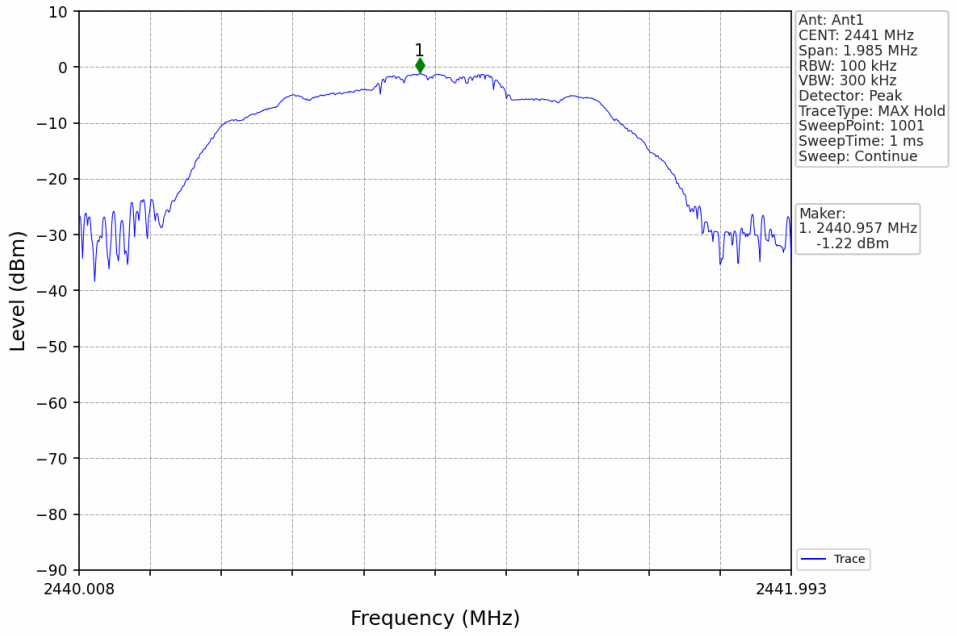
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



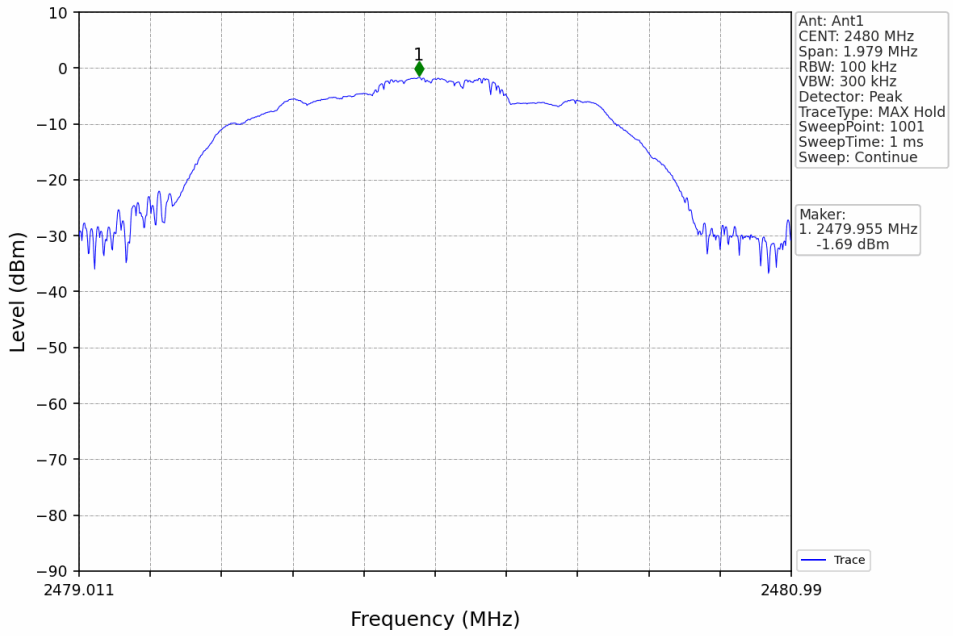
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



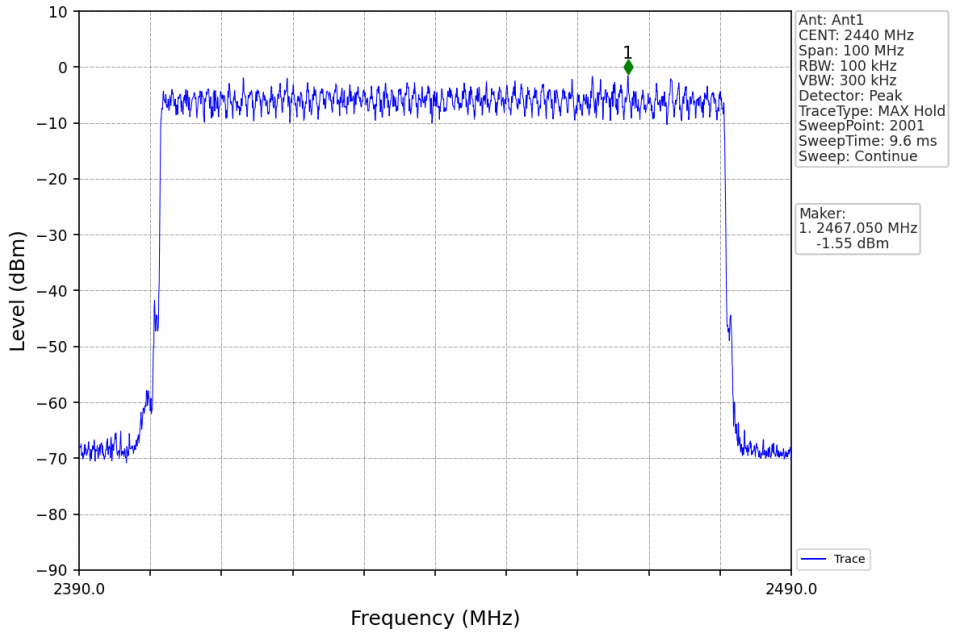
8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



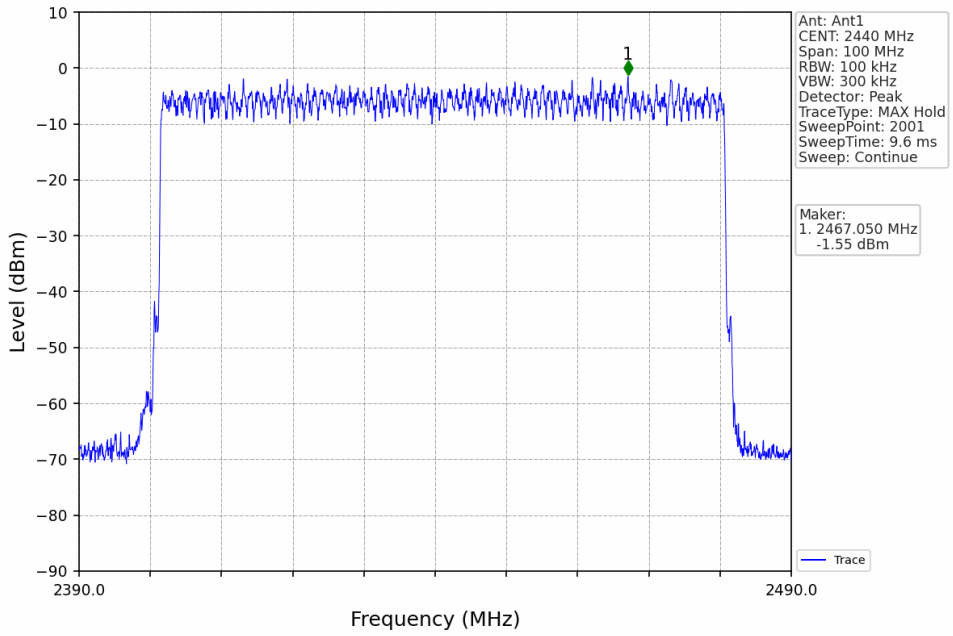
8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV

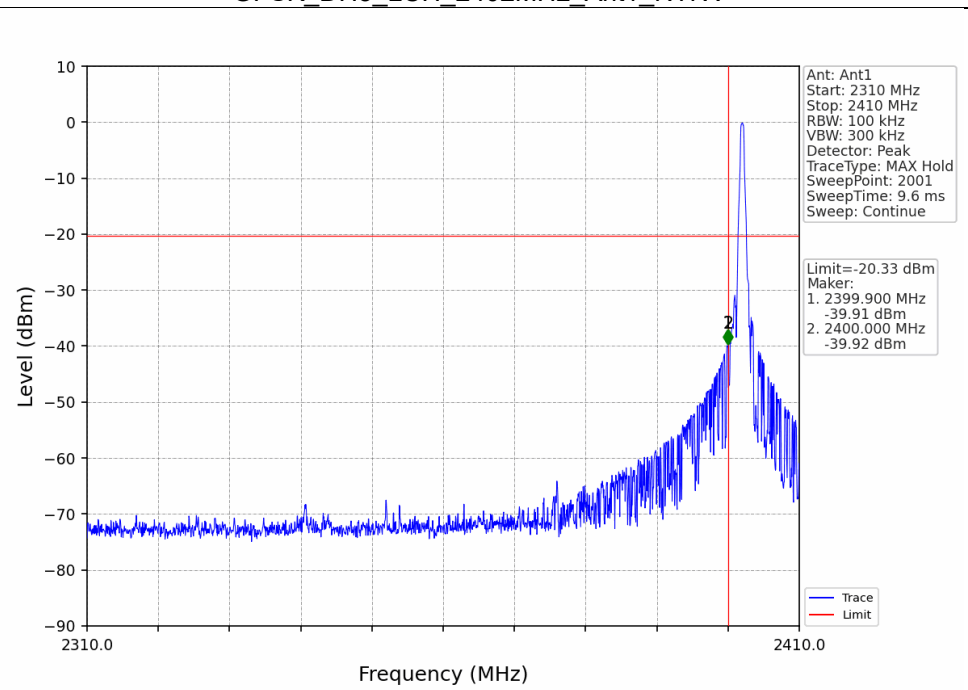


8DPSK_3DH5_HOPP_Ant1_NTNV

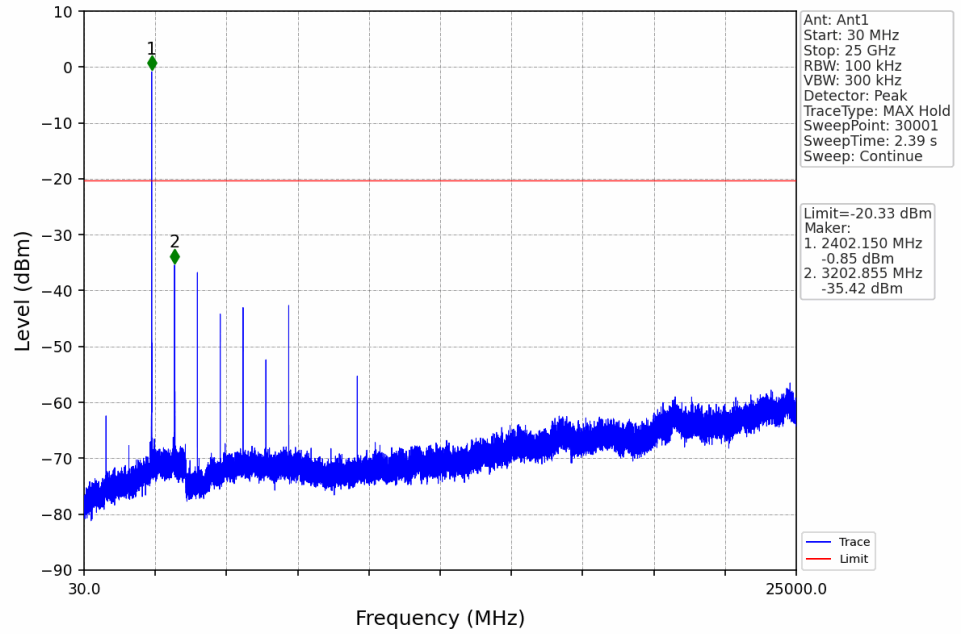


7.2.2 CSE

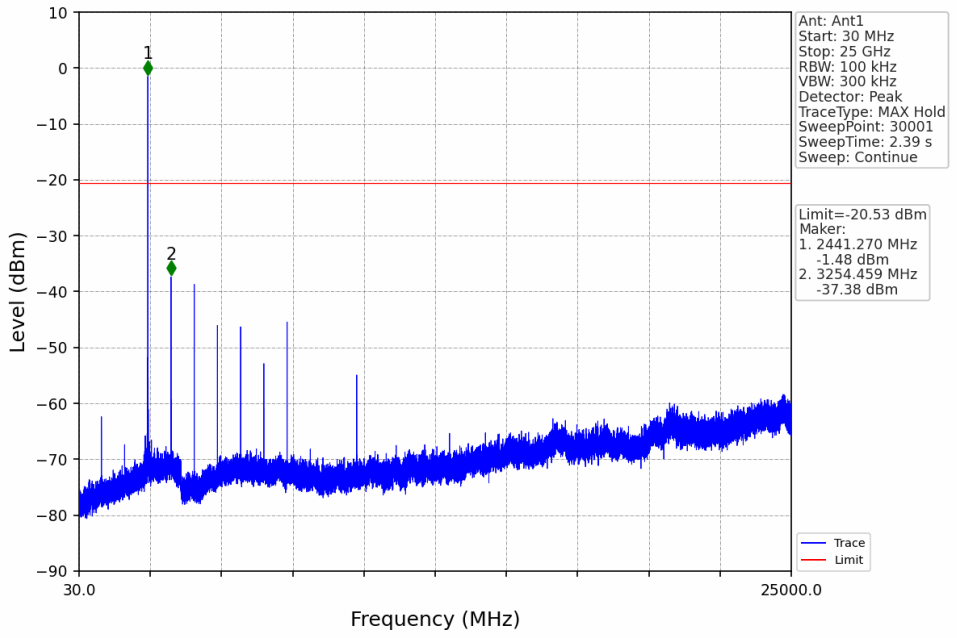
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



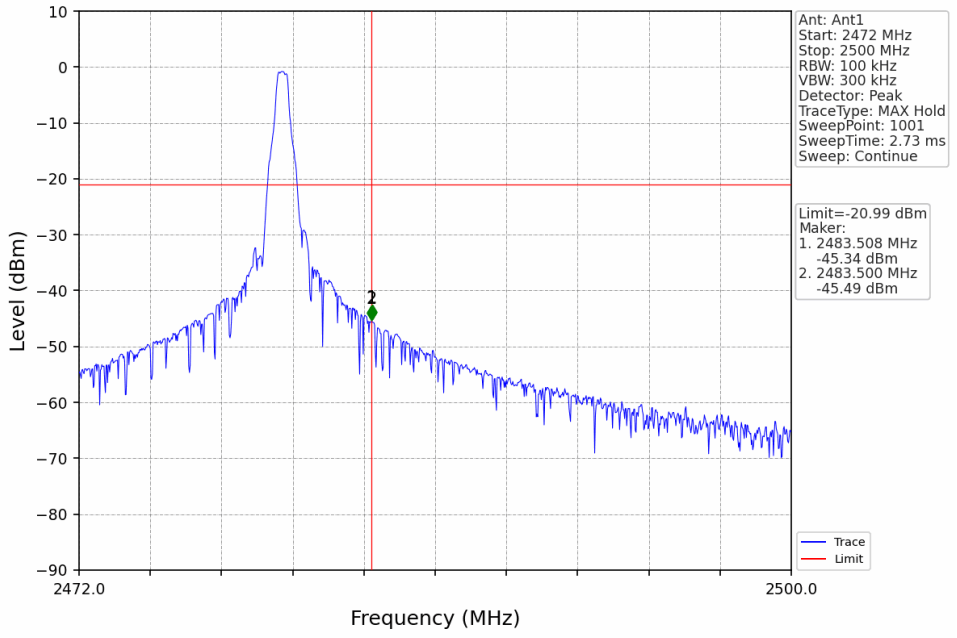
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



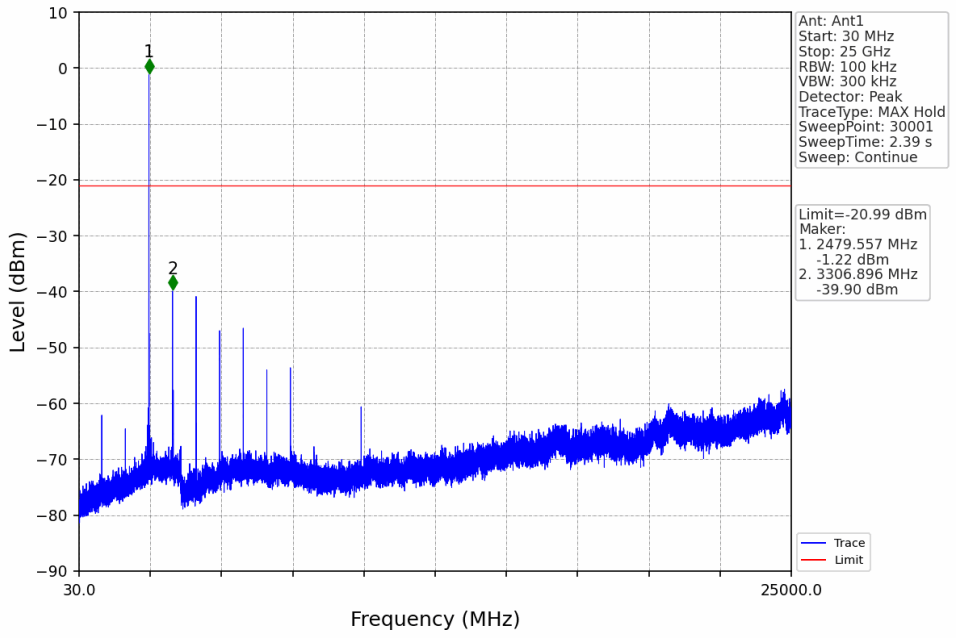
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



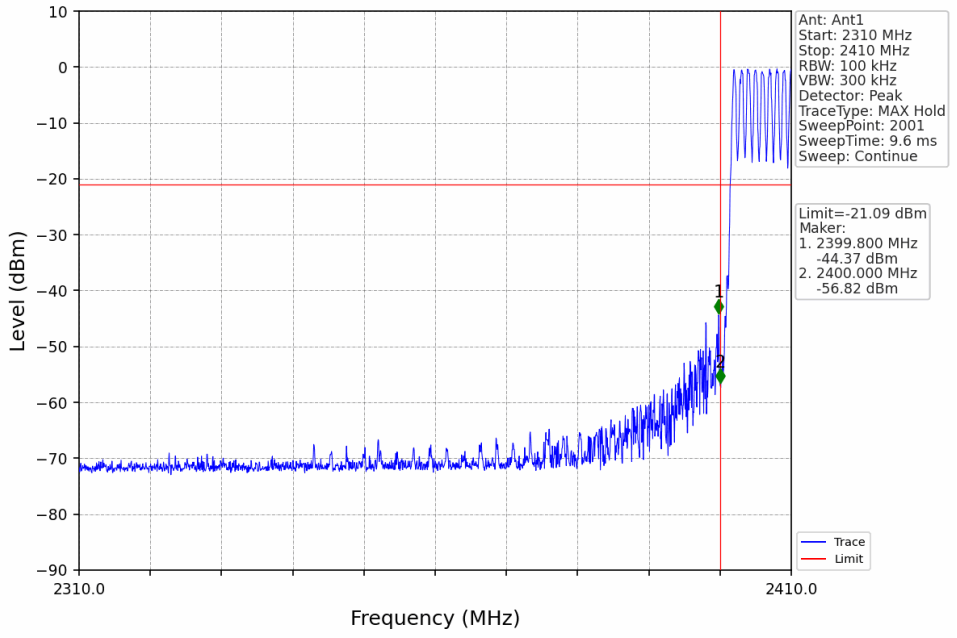
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



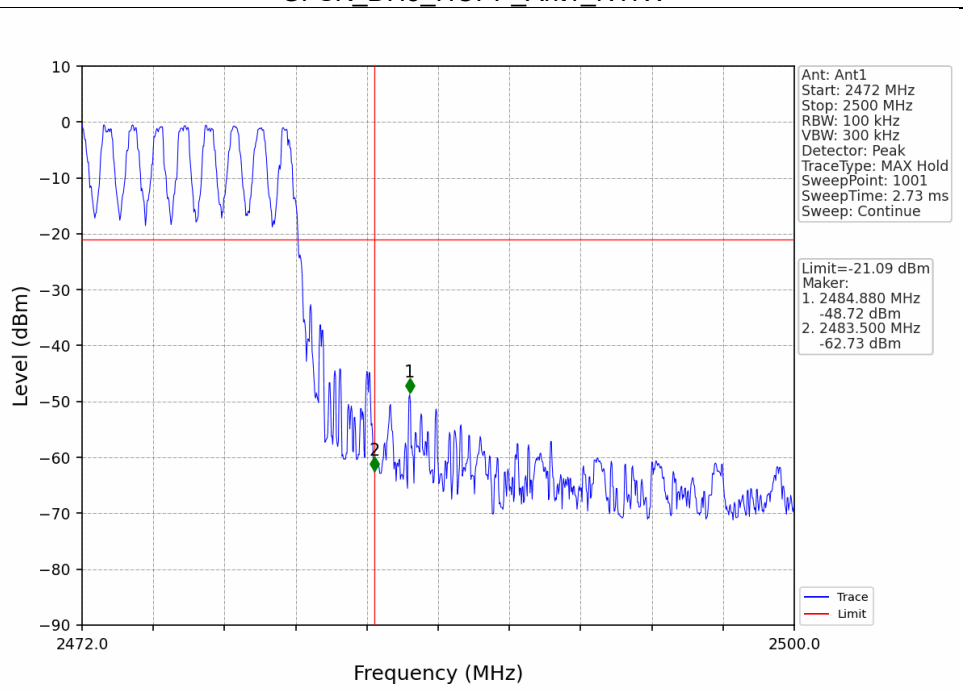
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



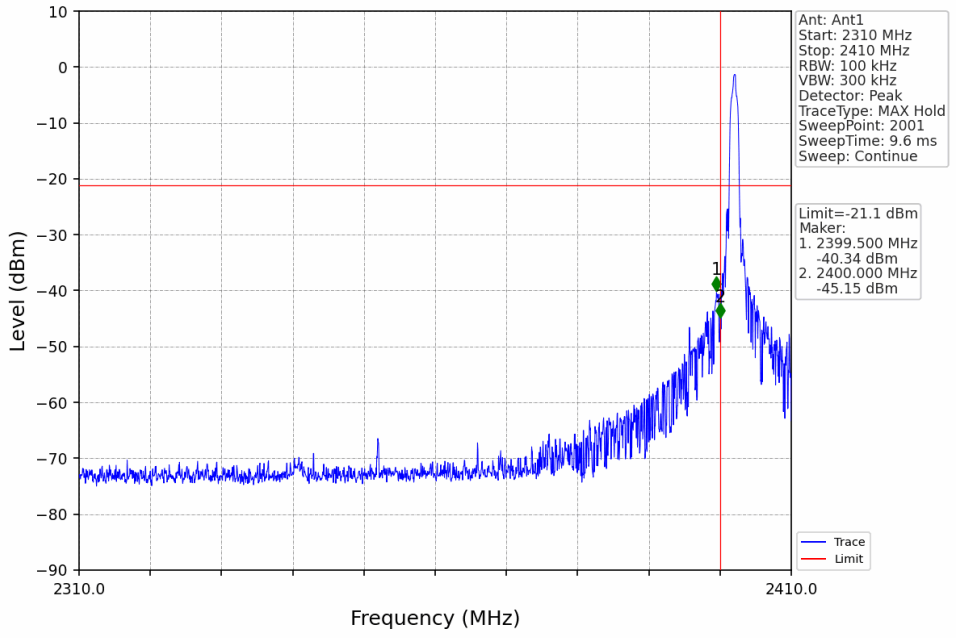
GFSK_DH5_HOPP_Ant1_NTNV



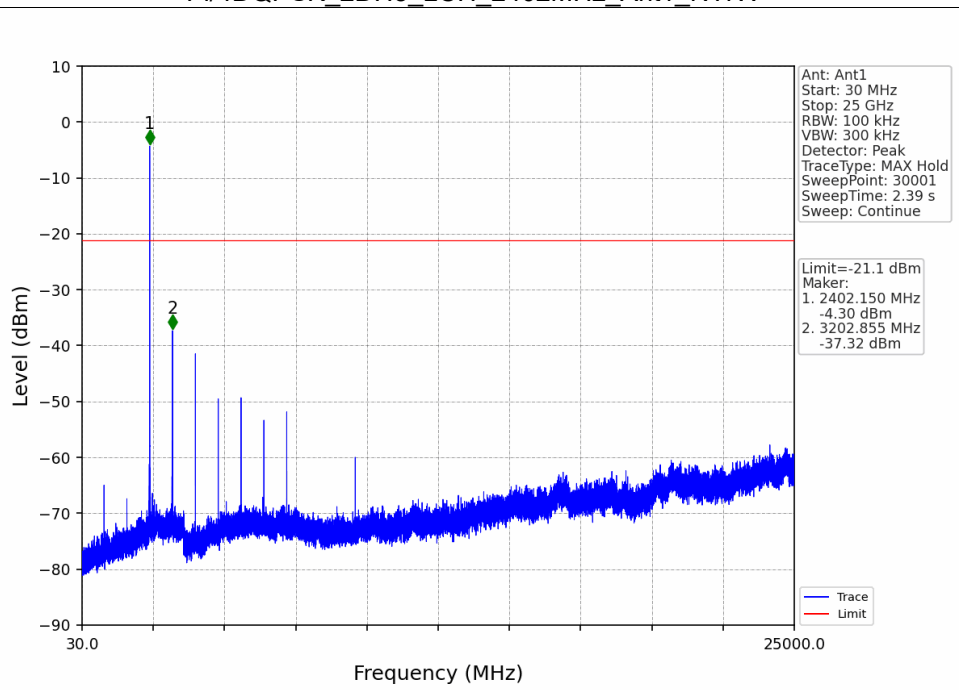
GFSK_DH5_HOPP_Ant1_NTNV



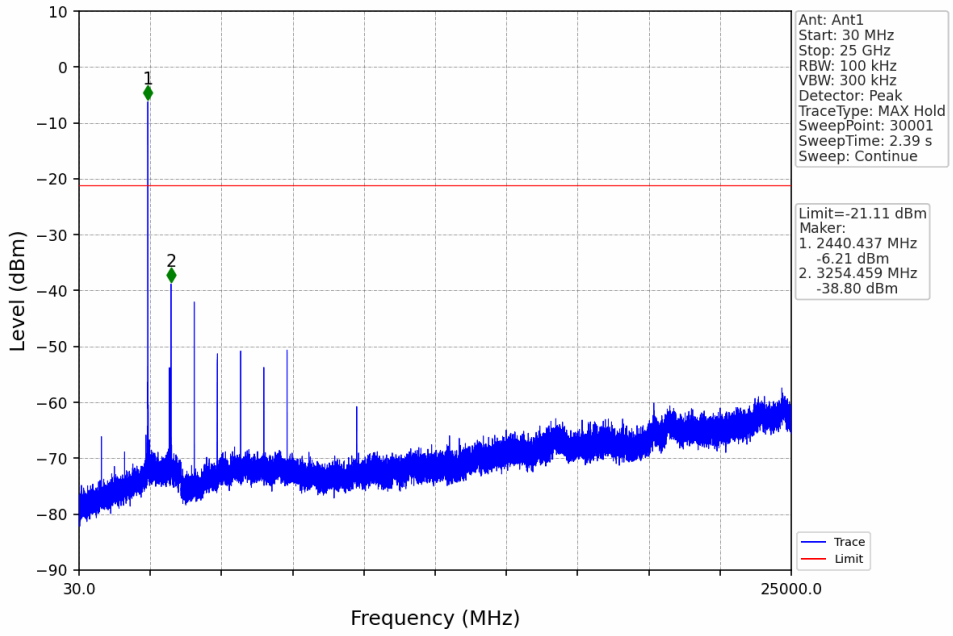
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



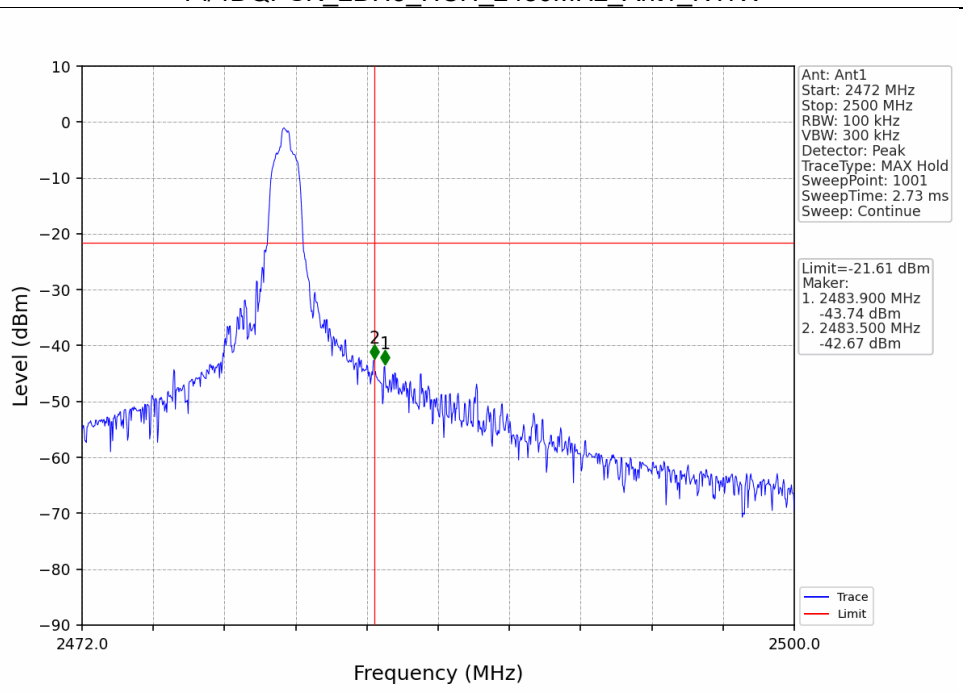
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



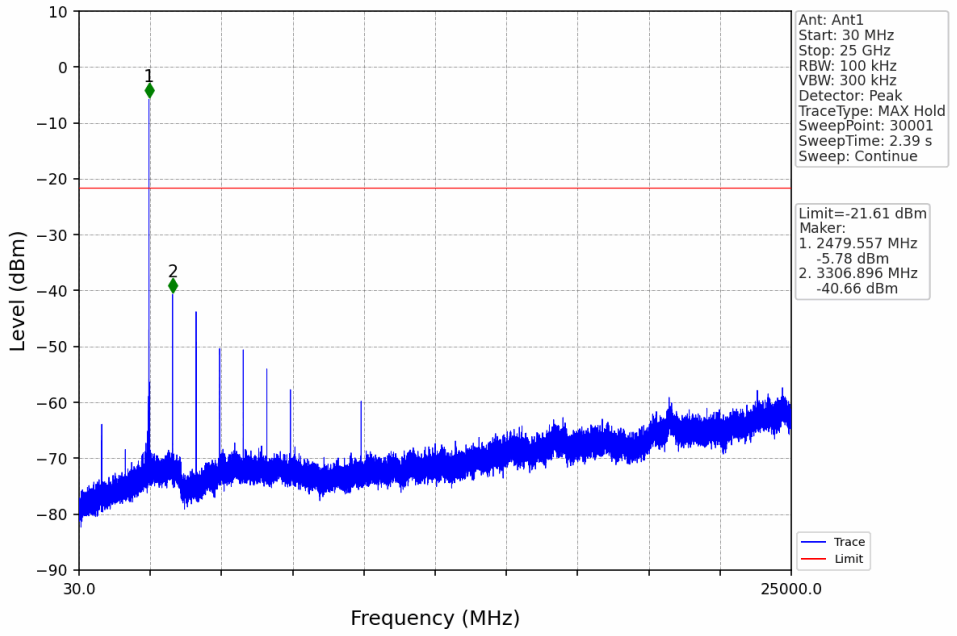
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



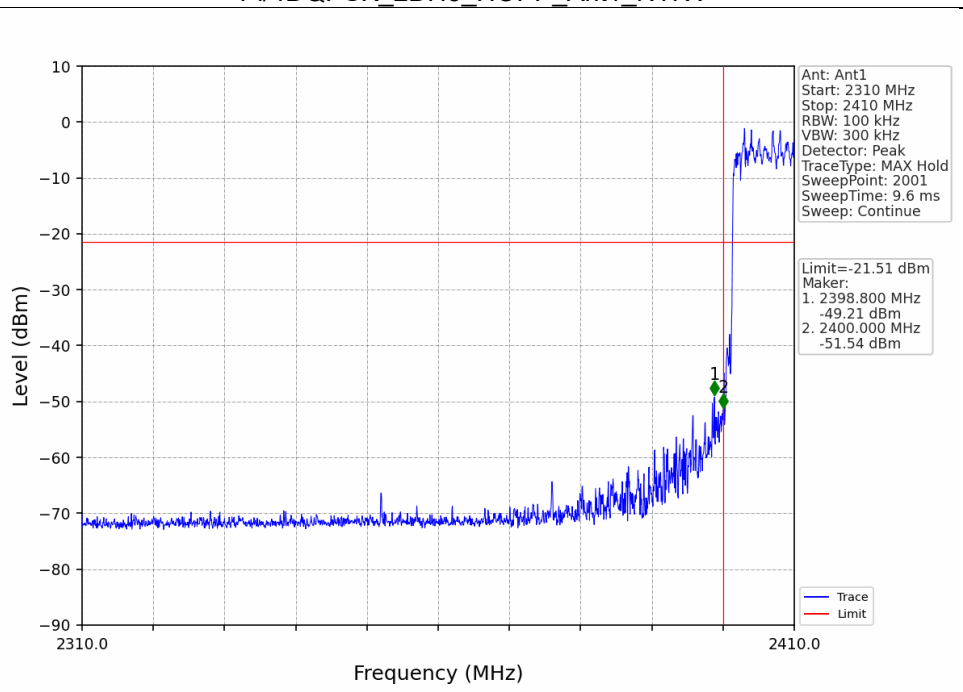
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



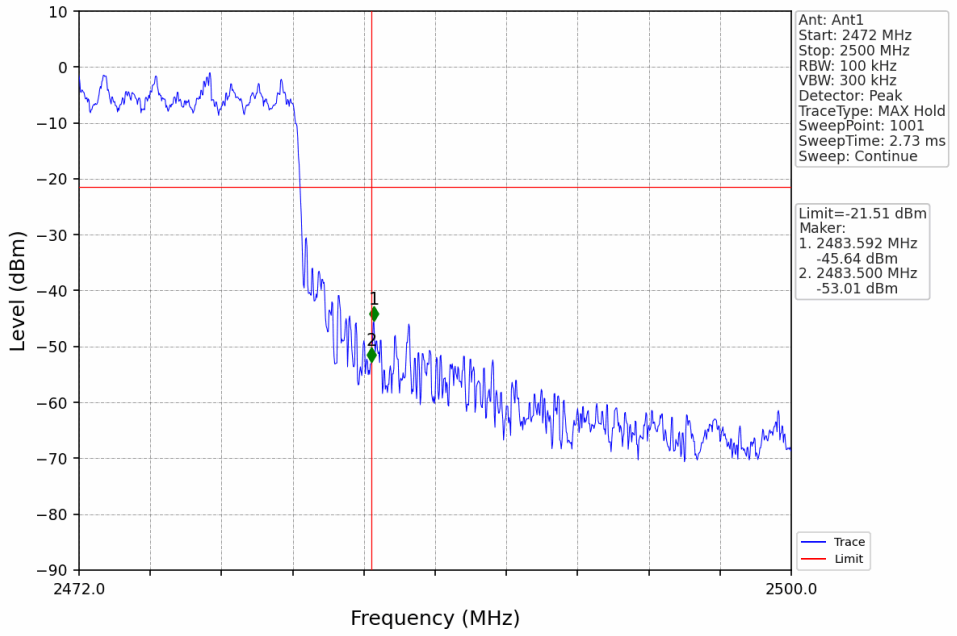
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



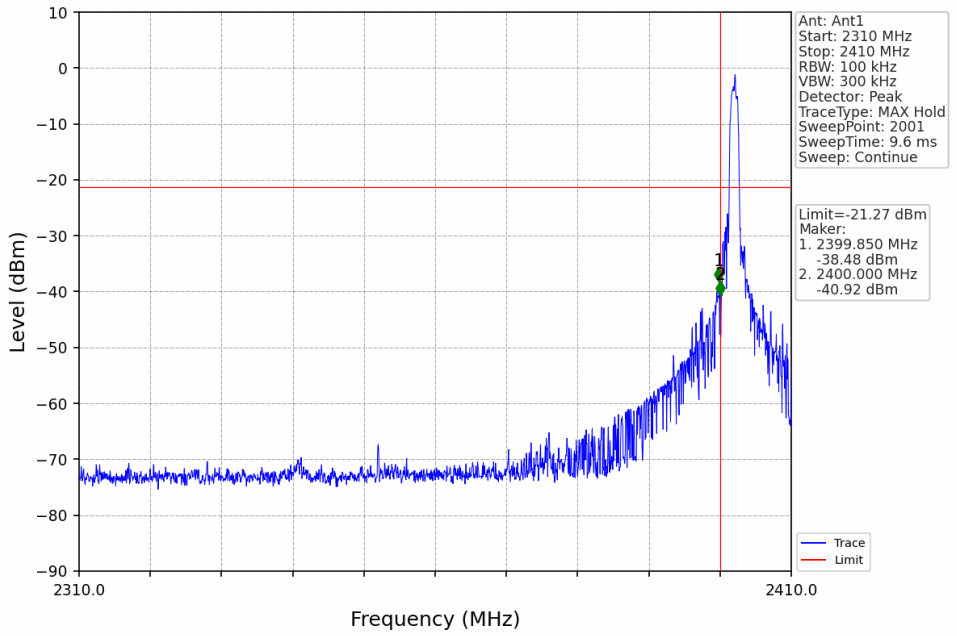
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



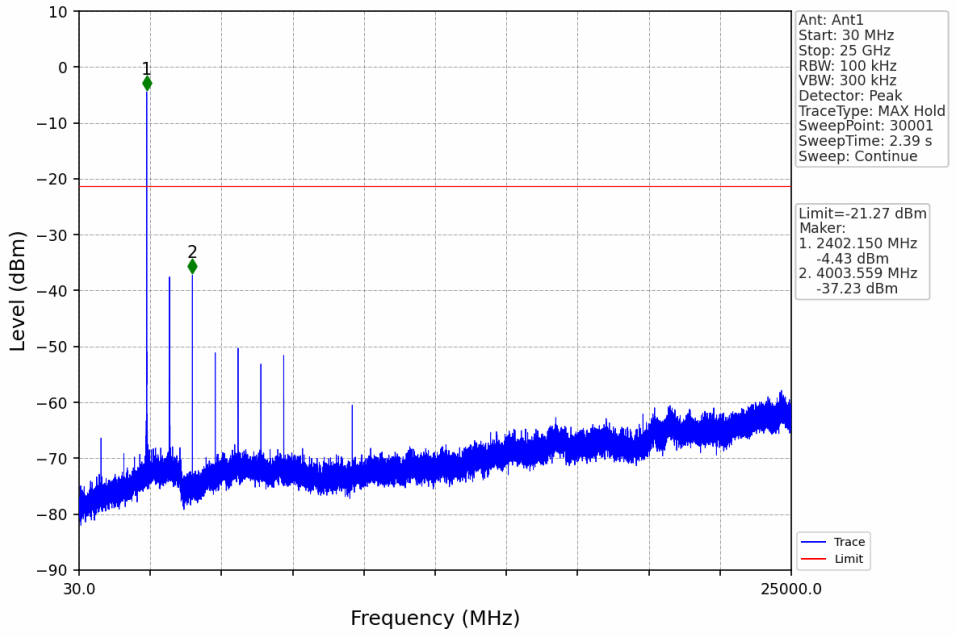
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



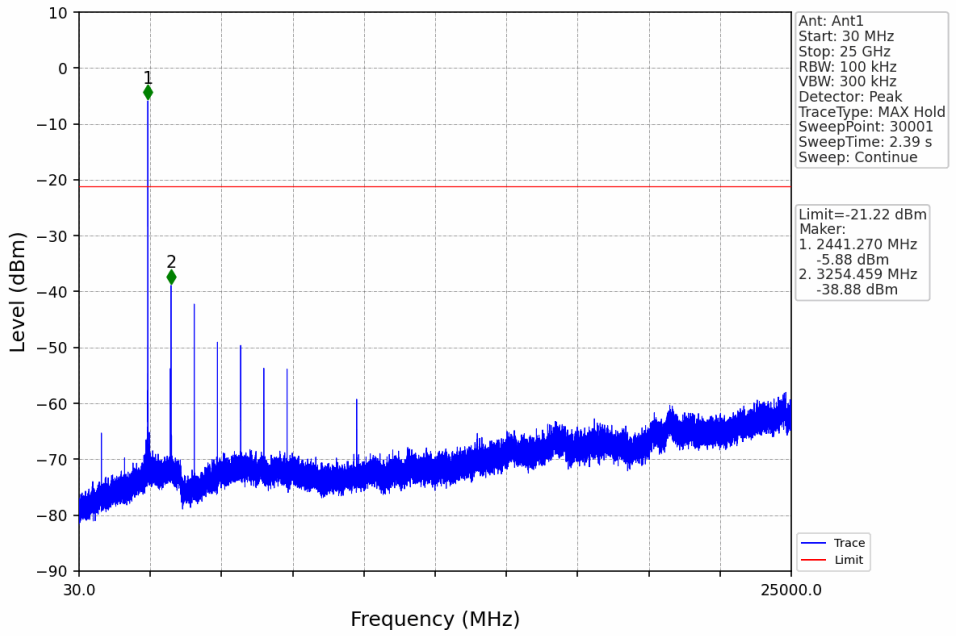
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



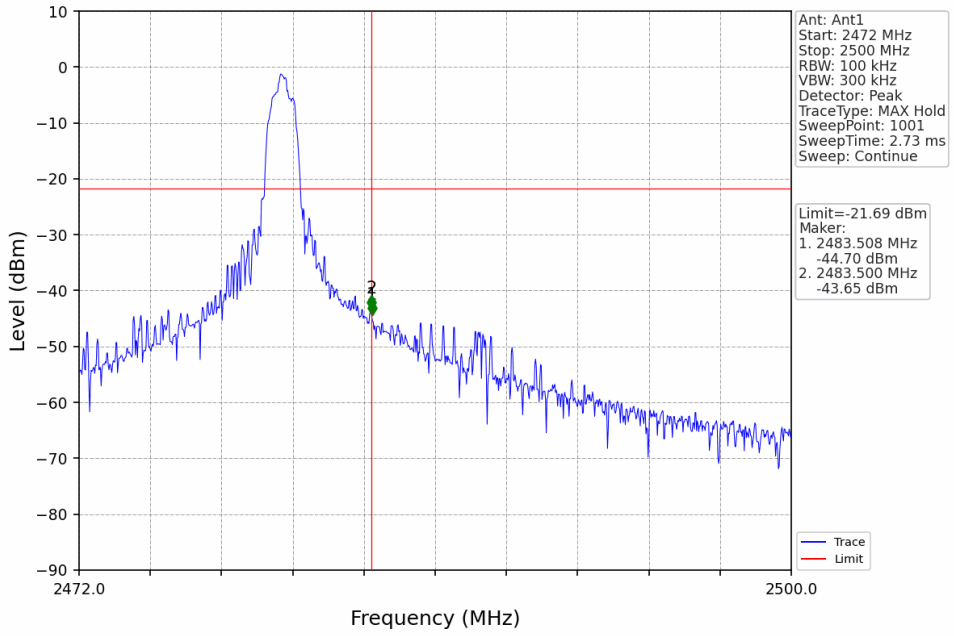
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



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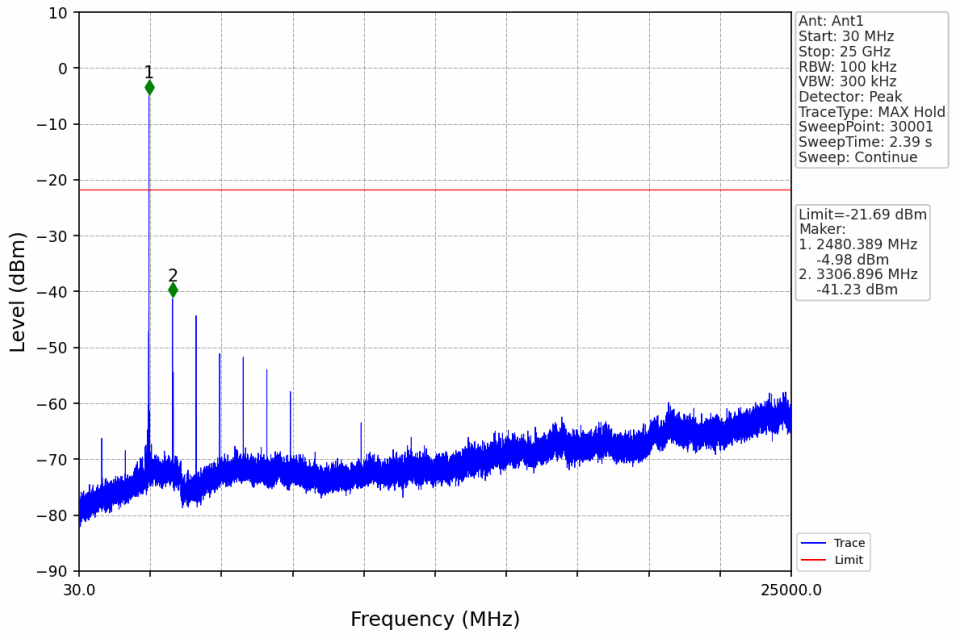

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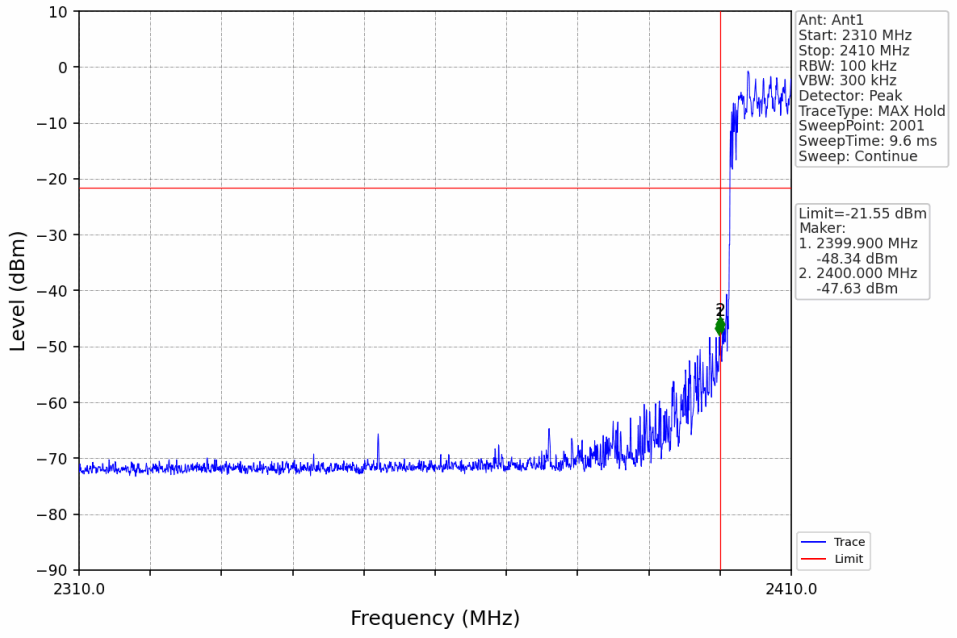
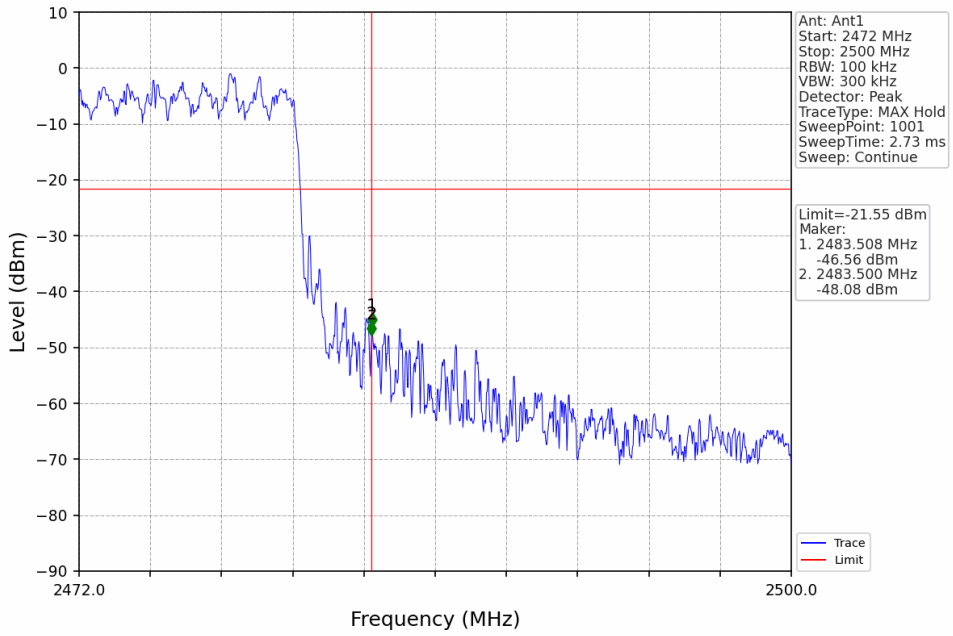


8DPSK_3DH5_HOPP_Ant1_NTNV



--------- End of Report -------