ANNEX D TEST DATA

For

Project No.:	8227EU010605W
Client:	Shenzhen Divoom Technology Co., Ltd.
Product Description:	Bluetooth Speaker
Model No.:	SongBird-SE
FCC ID:	A8ISONGBIRD-SE
Technology:	Bluetooth BDR&EDR
Test Engineer:	Mikey zhu
Test Date:	2024-03-25

Test Summary

Item	Result
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

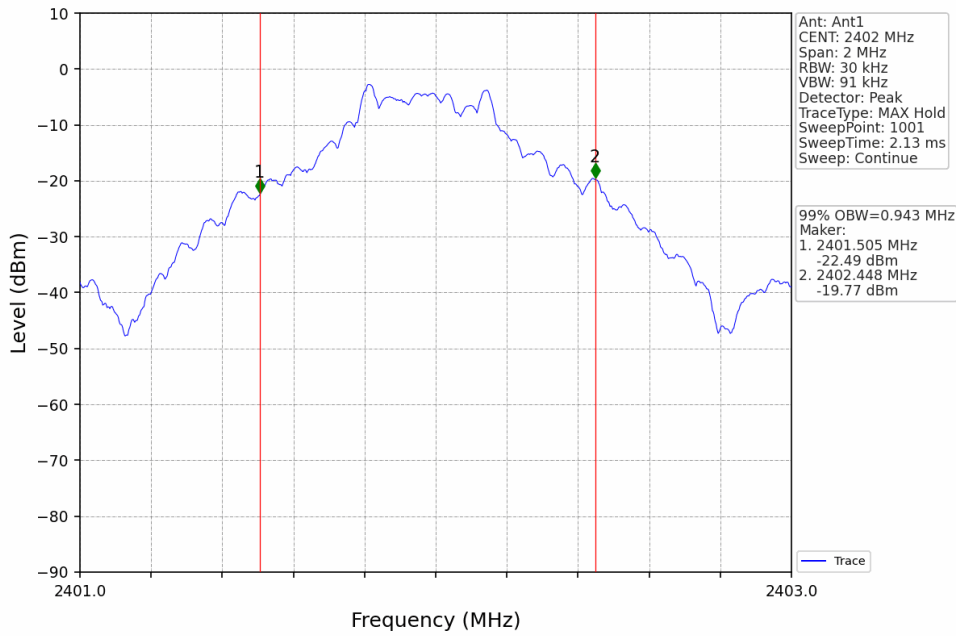
1.1 OBW

1.1.1 Test Result

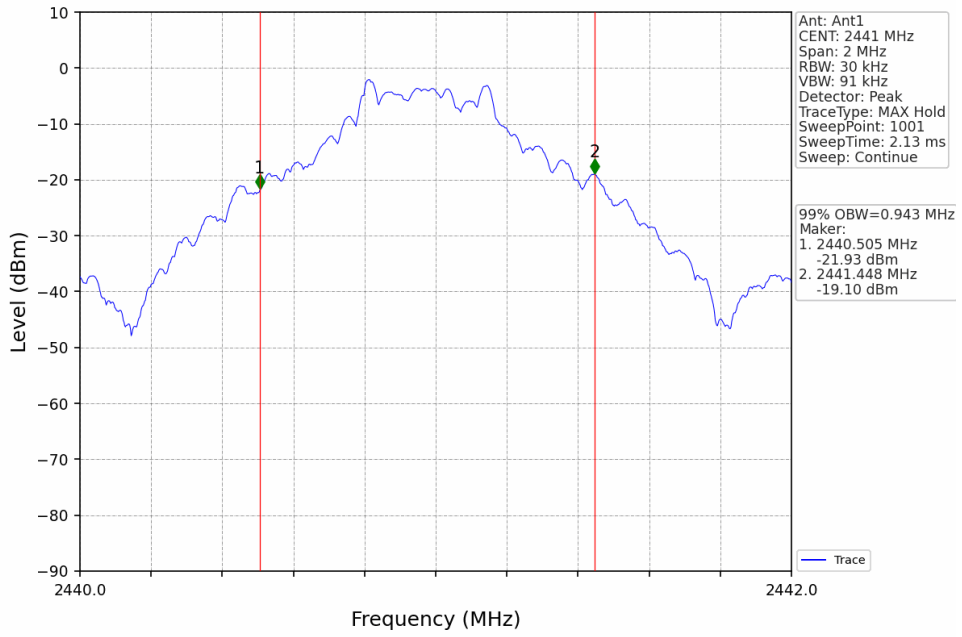
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz) Result	Verdict
GFSK	SISO	2402	DH5	1	0.943	Pass
		2441	DH5	1	0.943	Pass
		2480	DH5	1	0.940	Pass
π/4DQPSK	SISO	2402	2DH5	1	1.153	Pass
		2441	2DH5	1	1.156	Pass
		2480	2DH5	1	1.152	Pass
8DPSK	SISO	2402	3DH5	1	1.160	Pass
		2441	3DH5	1	1.160	Pass
		2480	3DH5	1	1.156	Pass

1.1.2 Test Graph

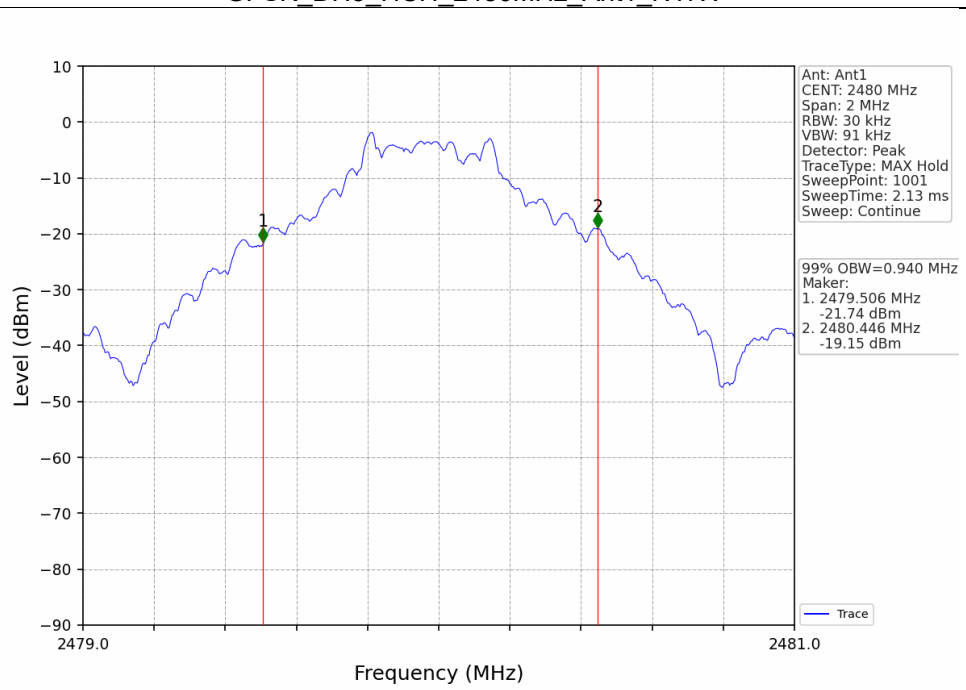
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



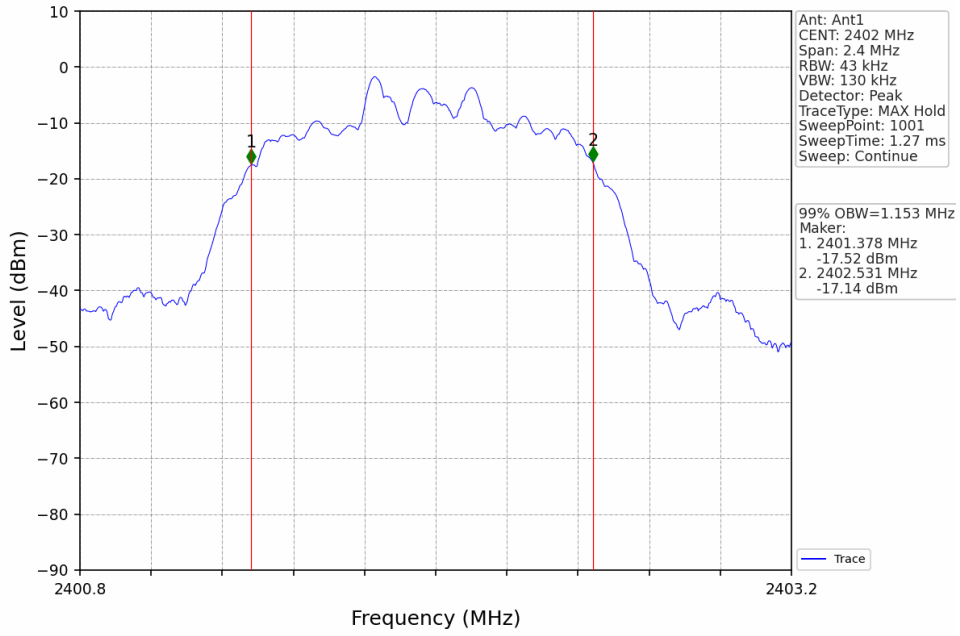
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



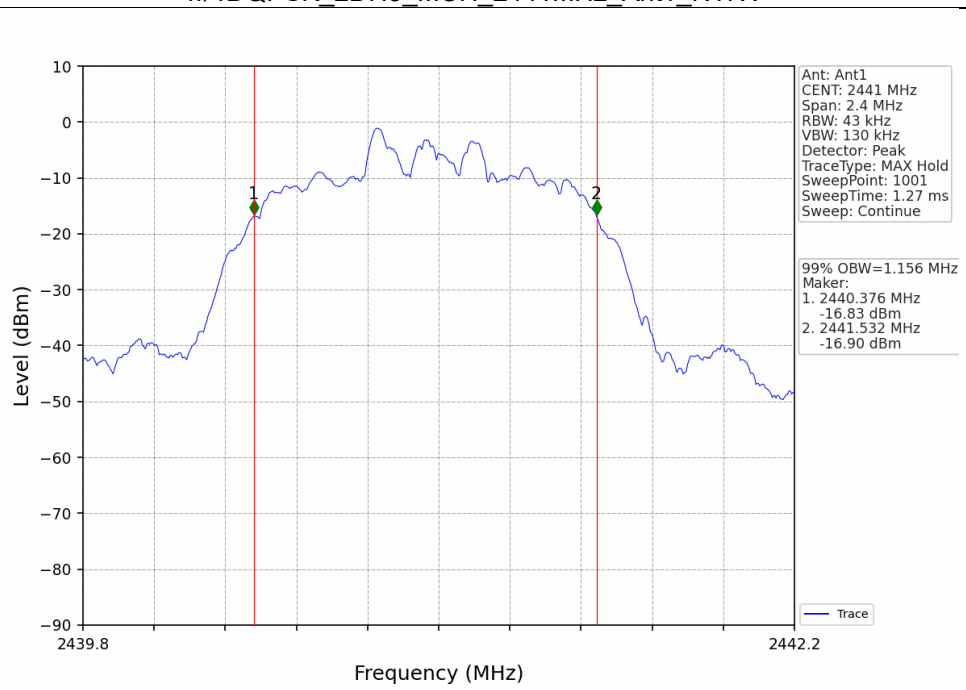
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



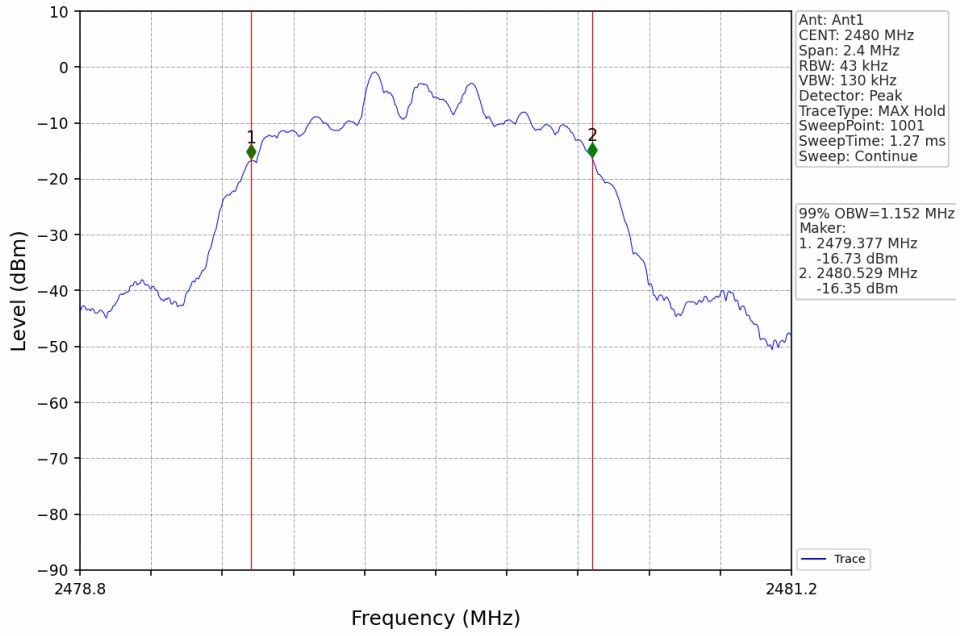
π/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



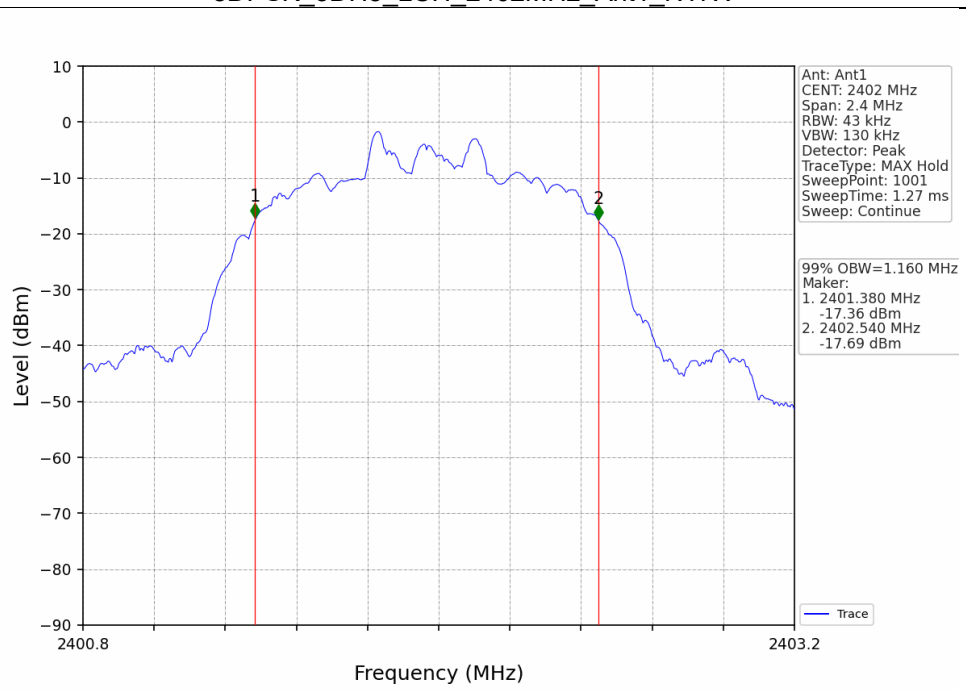
π/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



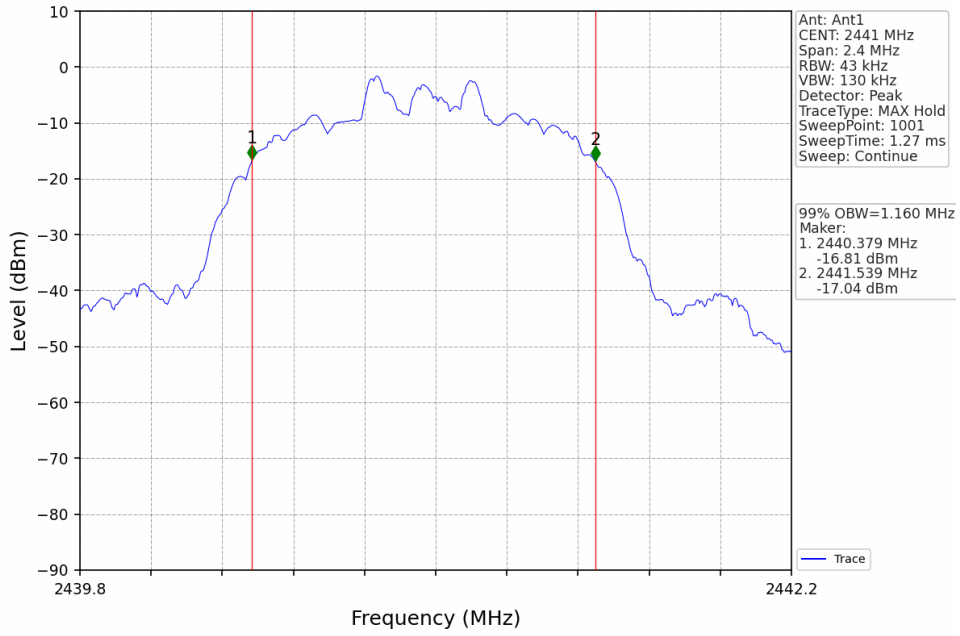
π/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



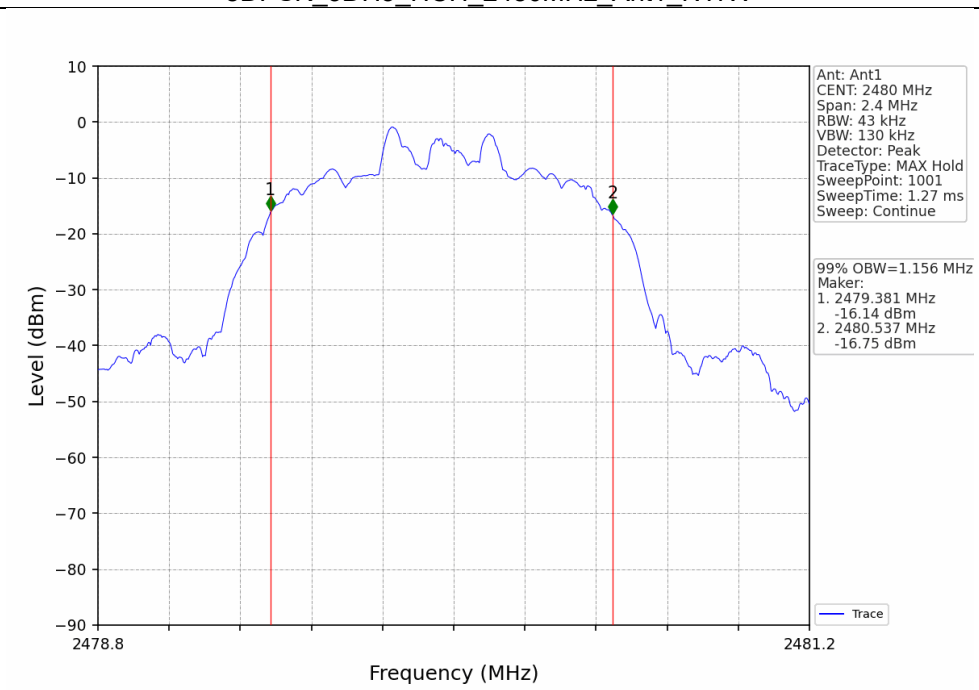
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



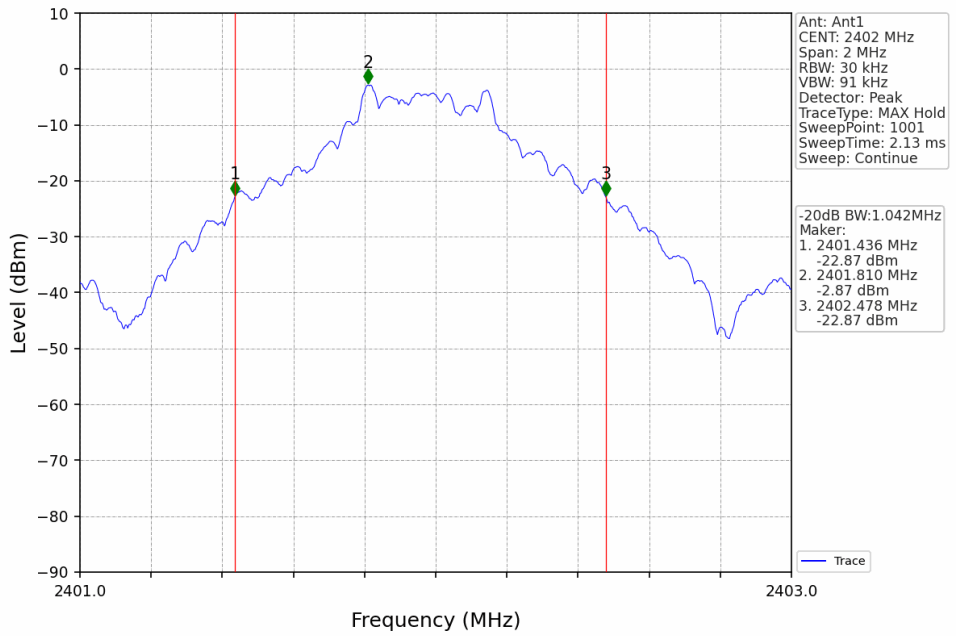
1.2 20dB BW

1.2.1 Test Result

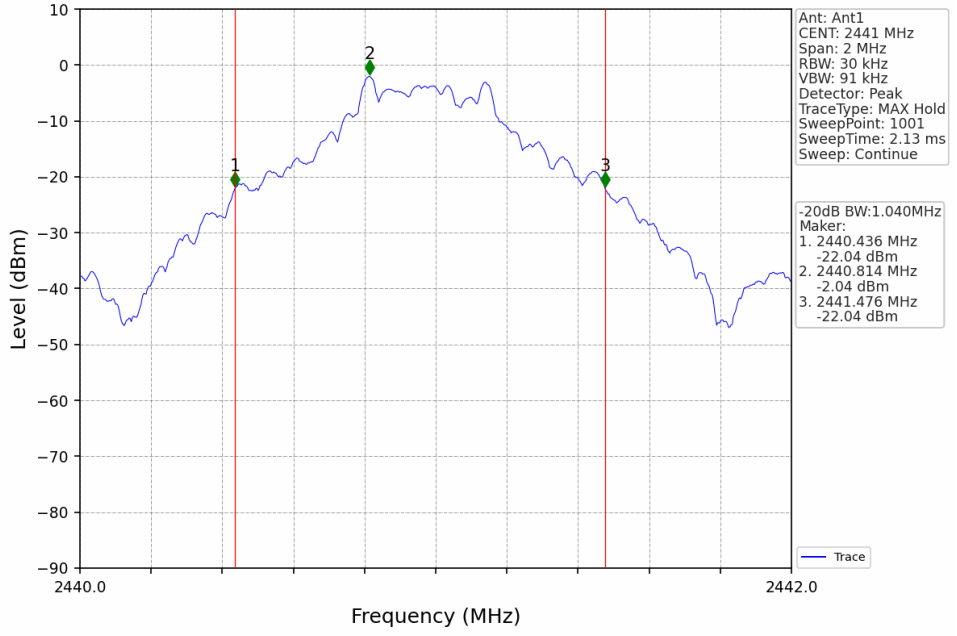
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz) Result	Verdict
GFSK	SISO	2402	DH5	1	1.042	Pass
		2441	DH5	1	1.040	Pass
		2480	DH5	1	1.038	Pass
π/4DQPSK	SISO	2402	2DH5	1	1.260	Pass
		2441	2DH5	1	1.255	Pass
		2480	2DH5	1	1.258	Pass
8DPSK	SISO	2402	3DH5	1	1.286	Pass
		2441	3DH5	1	1.286	Pass
		2480	3DH5	1	1.286	Pass

1.2.2 Test Graph

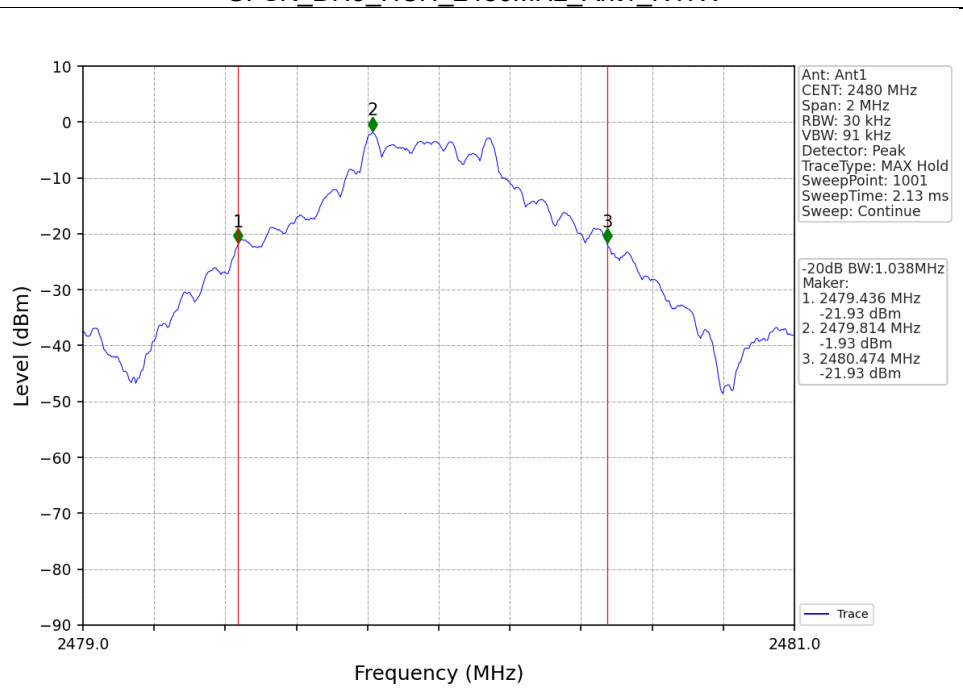
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



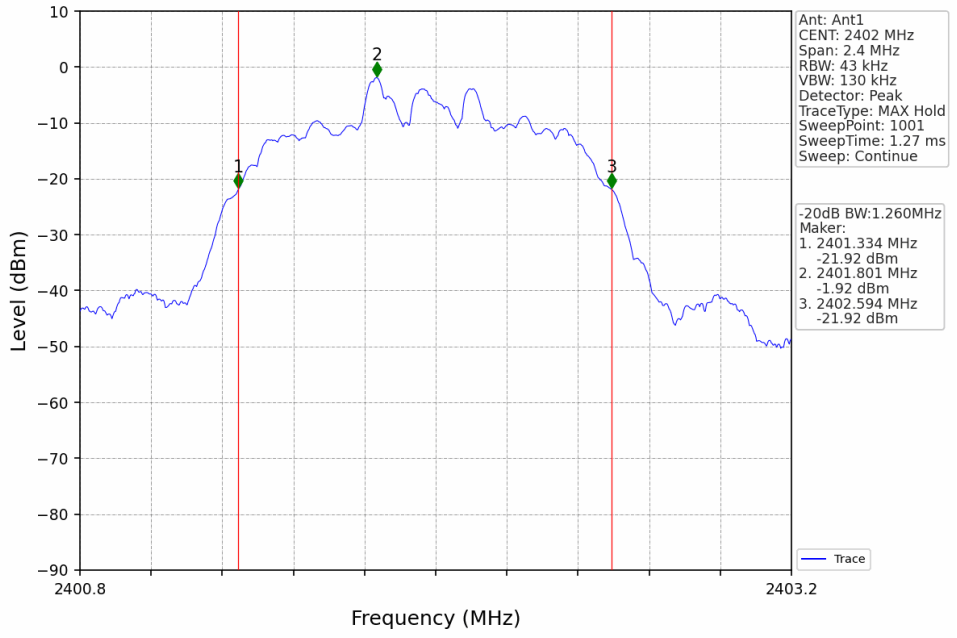
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



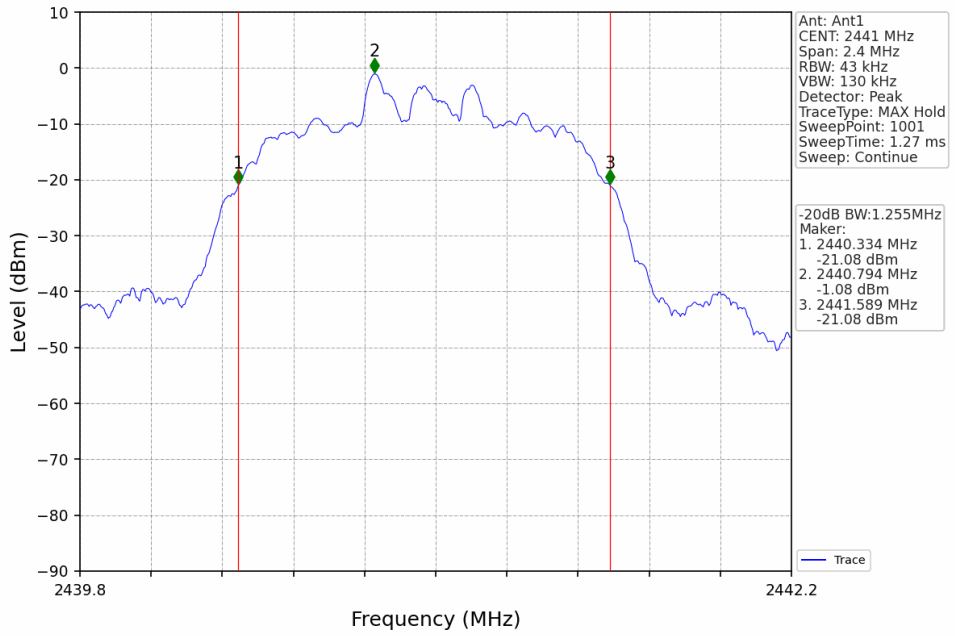
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



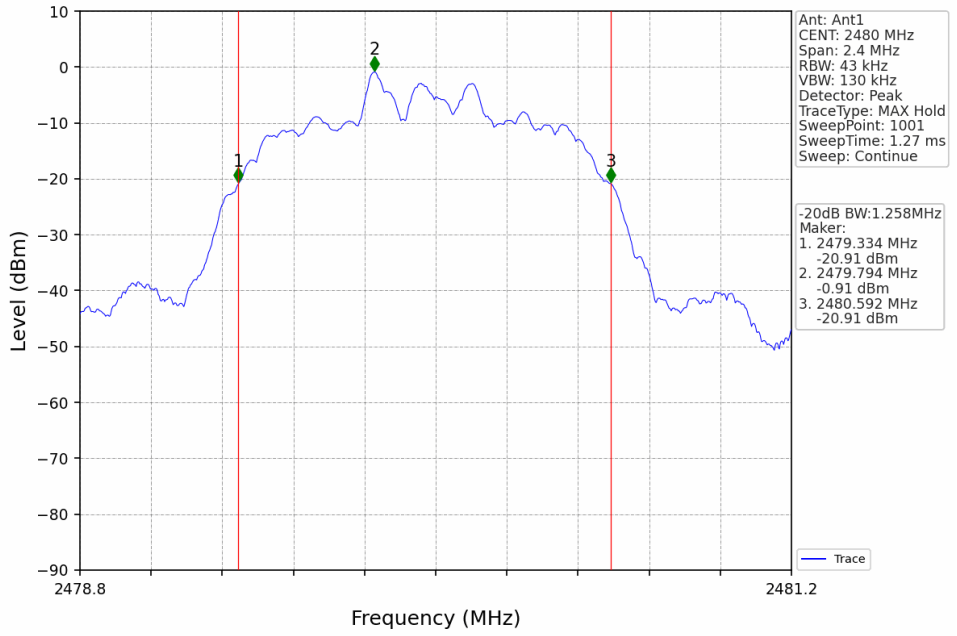
π/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



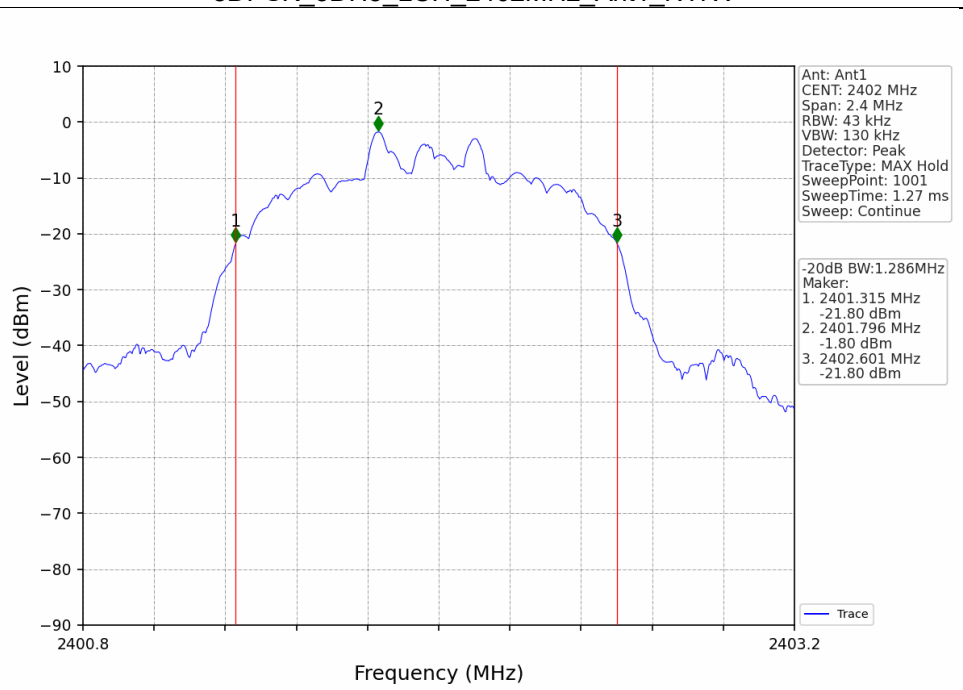
π/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



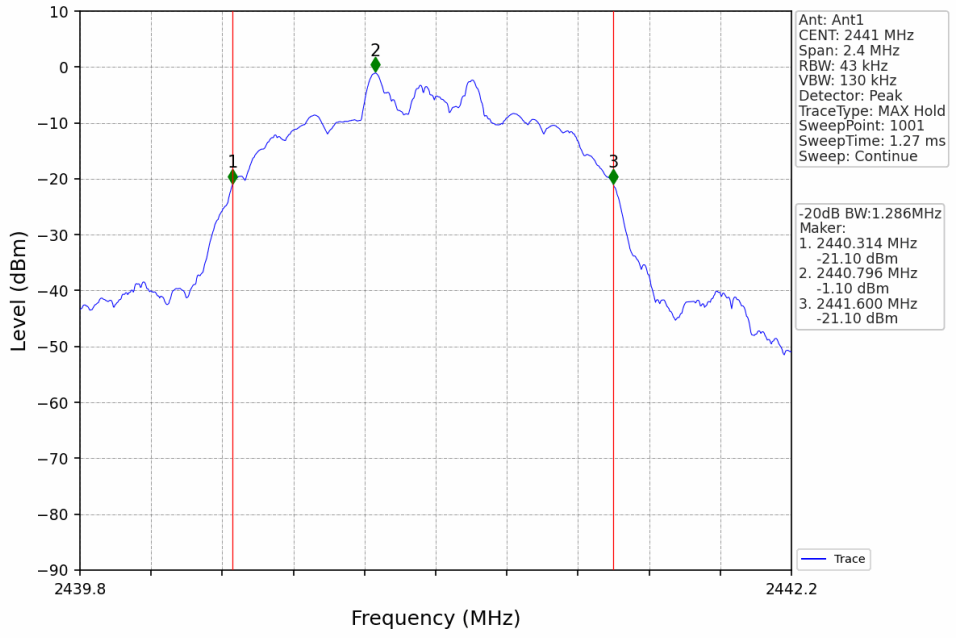
π/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



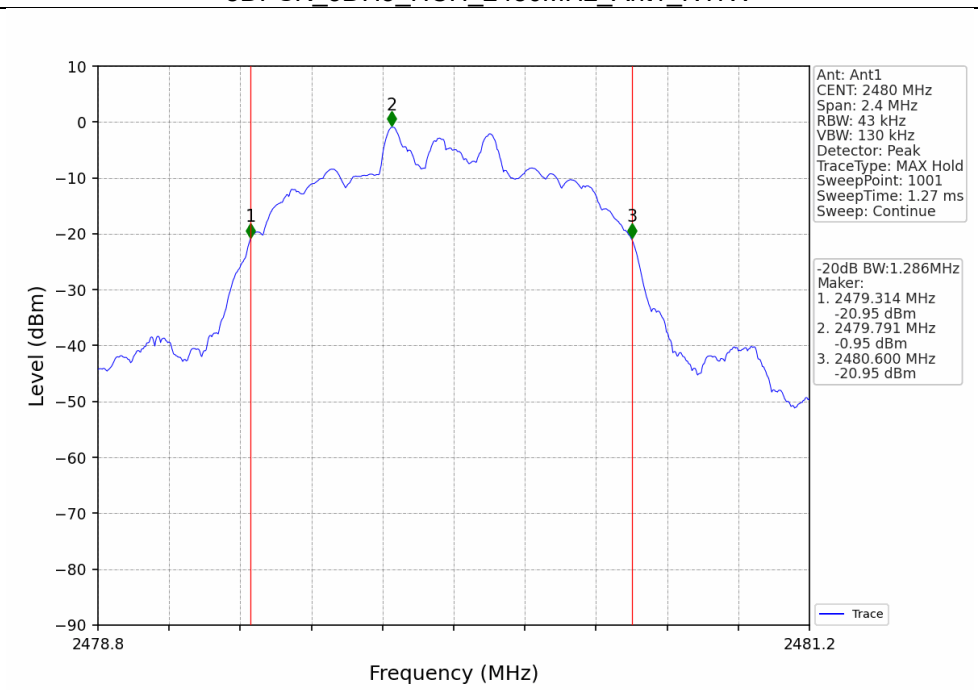
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



2. Maximum Conducted Output Power

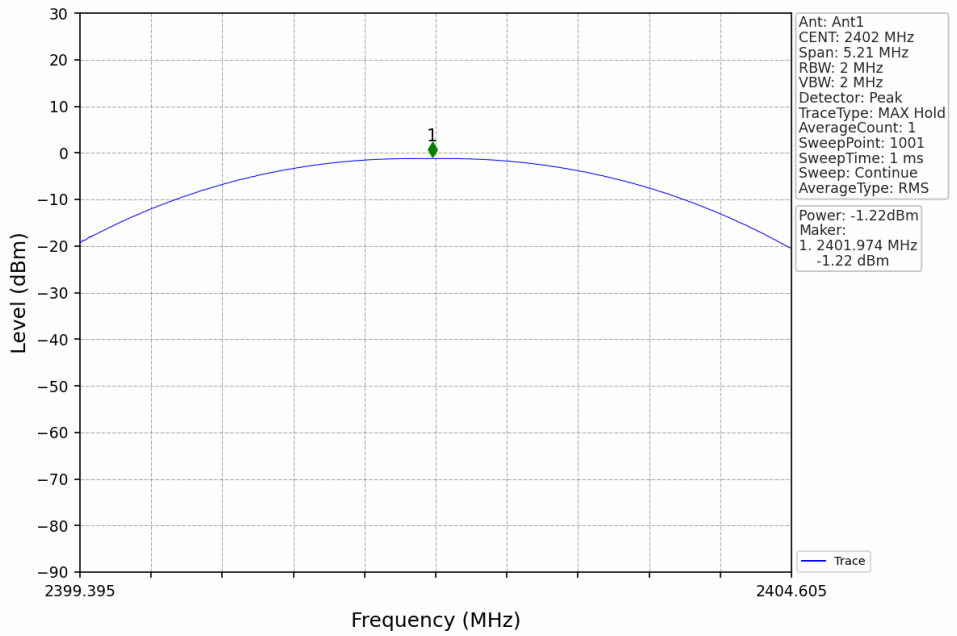
2.1 Power

2.1.1 Test Result

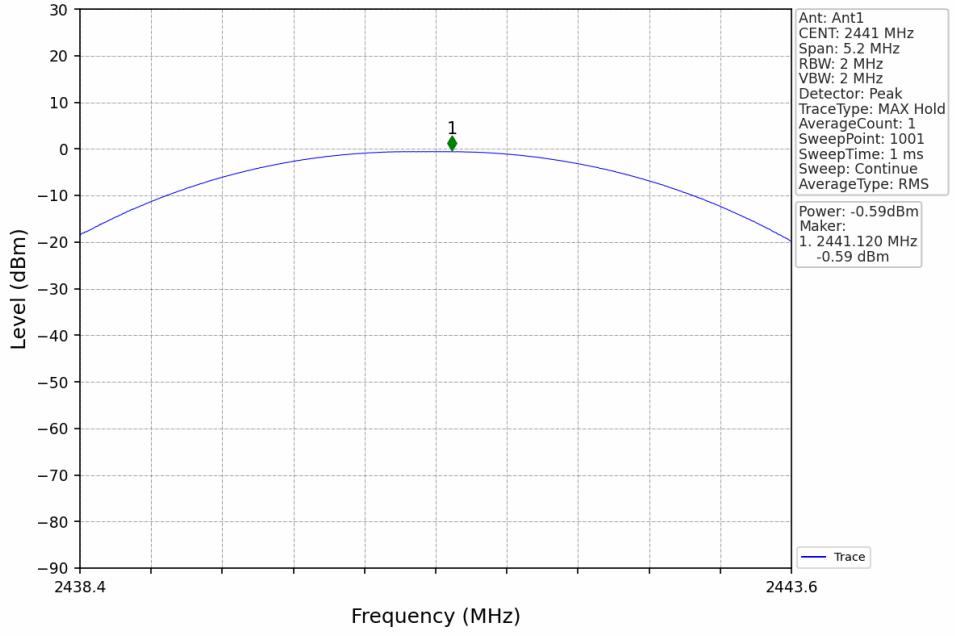
Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	-1.22	<=20.97	Pass
		2441	DH5	-0.59	<=20.97	Pass
		2480	DH5	-0.42	<=20.97	Pass
π/4DQPSK	SISO	2402	2DH5	-1.20	<=20.97	Pass
		2441	2DH5	-0.58	<=20.97	Pass
		2480	2DH5	-0.42	<=20.97	Pass
8DPSK	SISO	2402	3DH5	-1.23	<=20.97	Pass
		2441	3DH5	-0.59	<=20.97	Pass
		2480	3DH5	-0.41	<=20.97	Pass

2.1.2 Test Graph

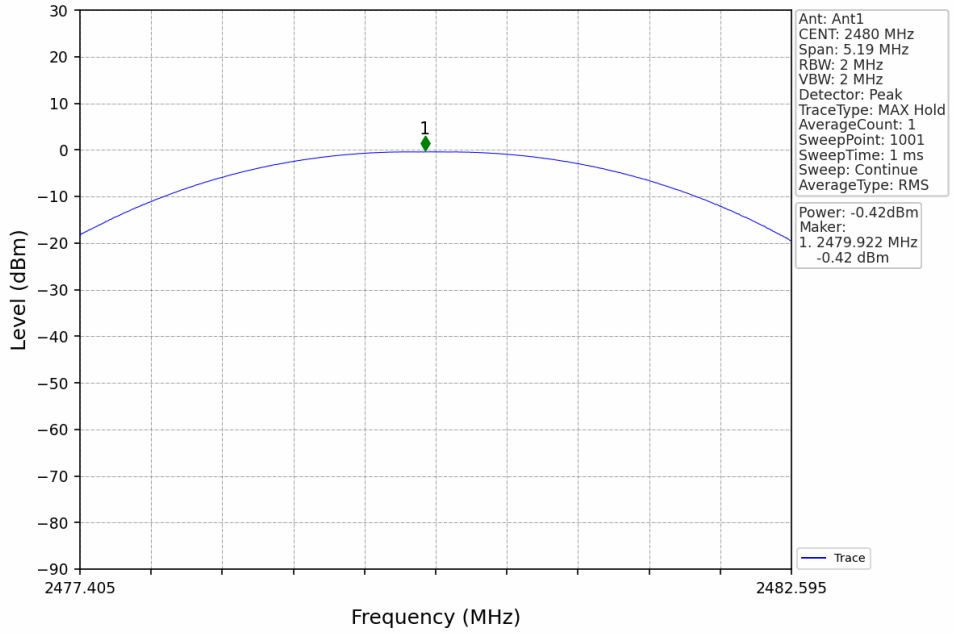
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



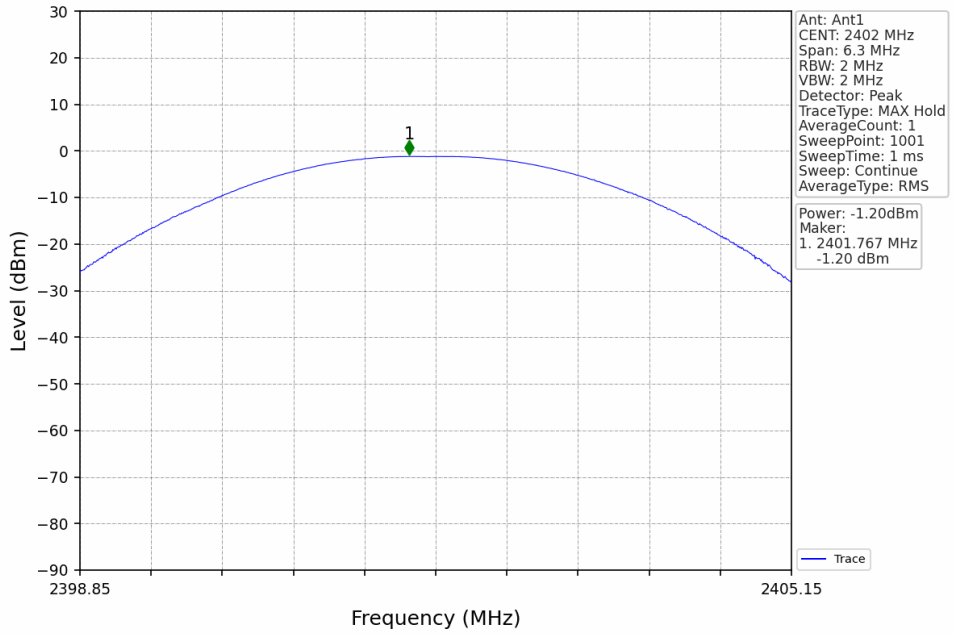
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



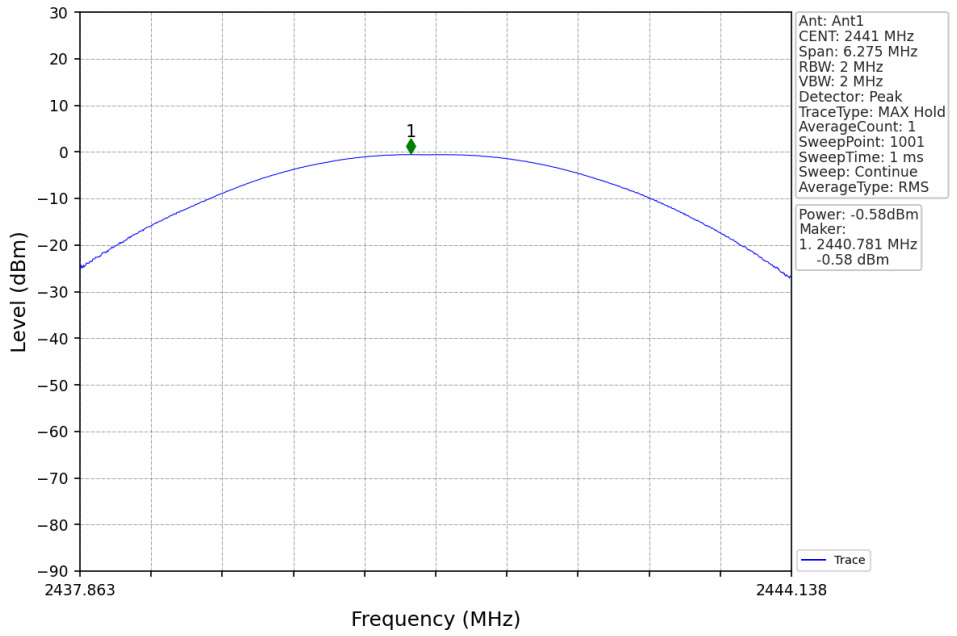
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



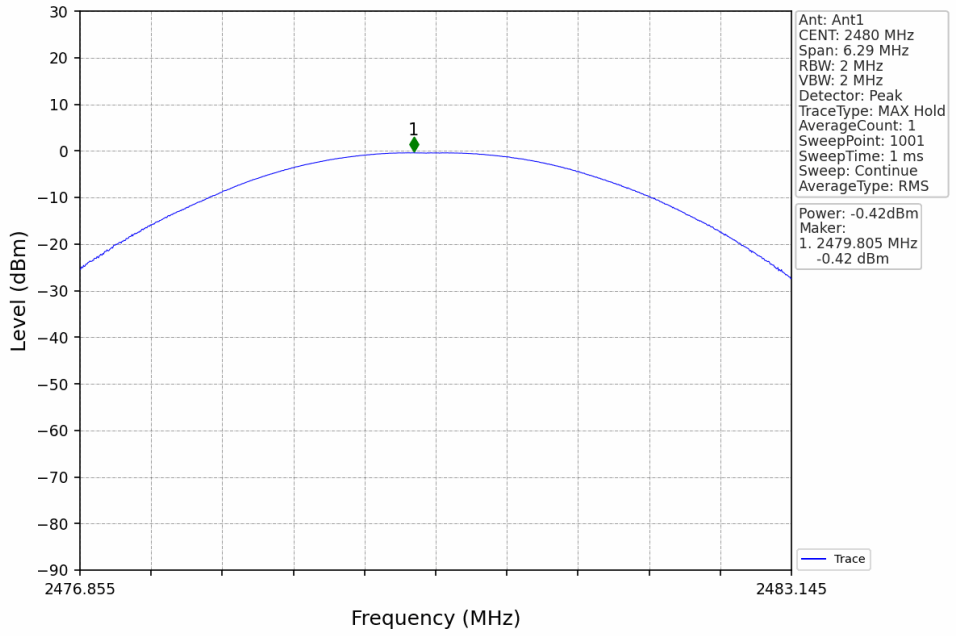
π/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



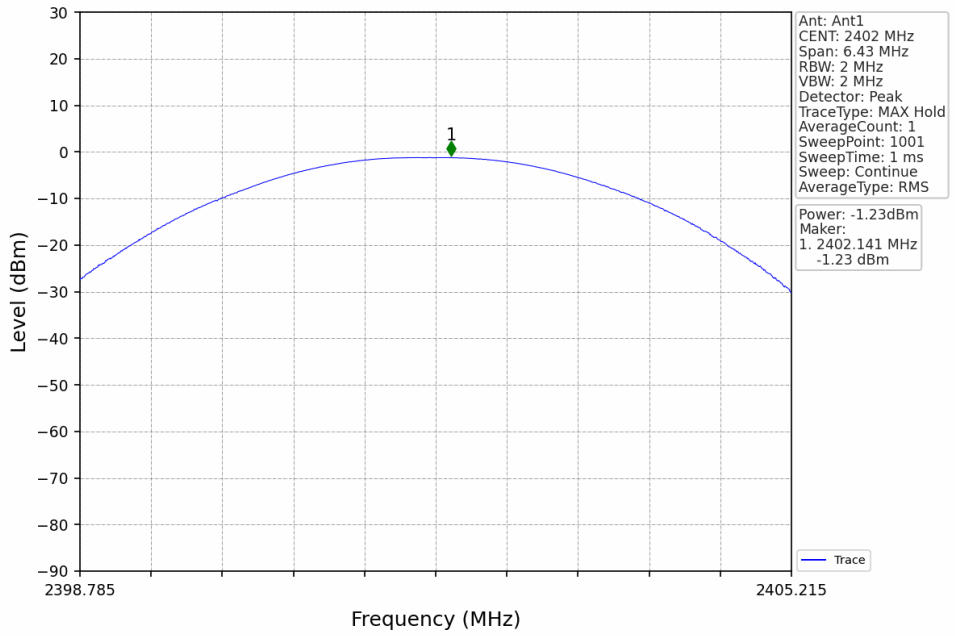
π/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



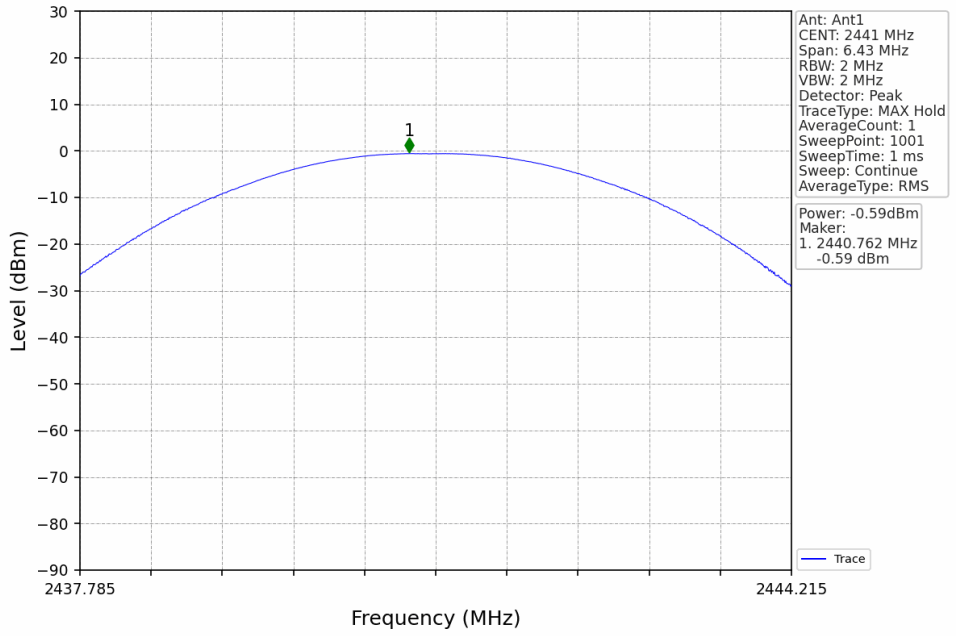
π/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



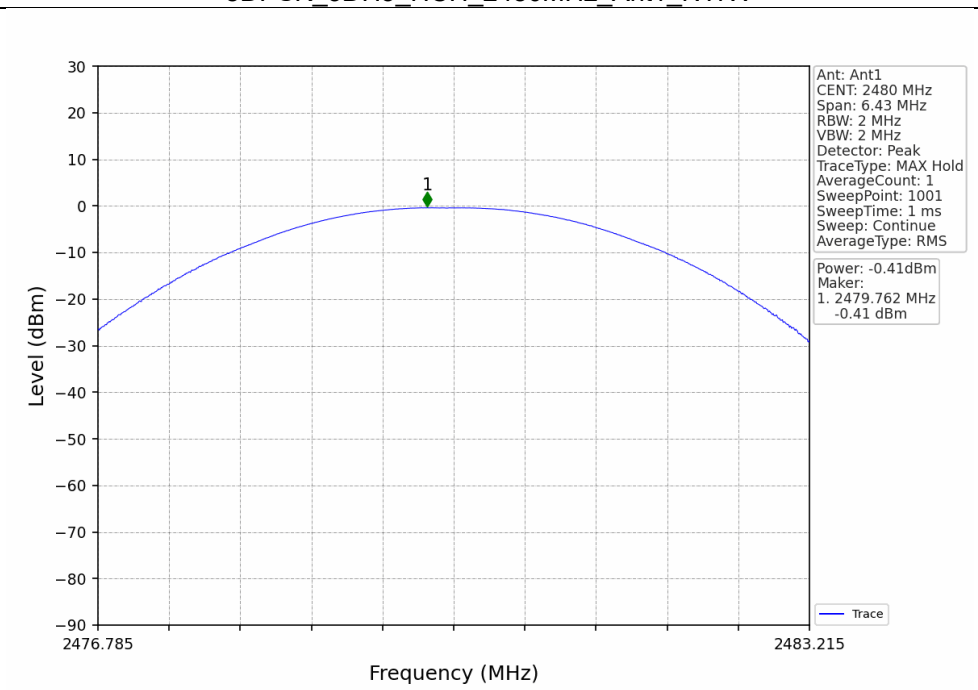
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



3. Carrier Frequency Separation

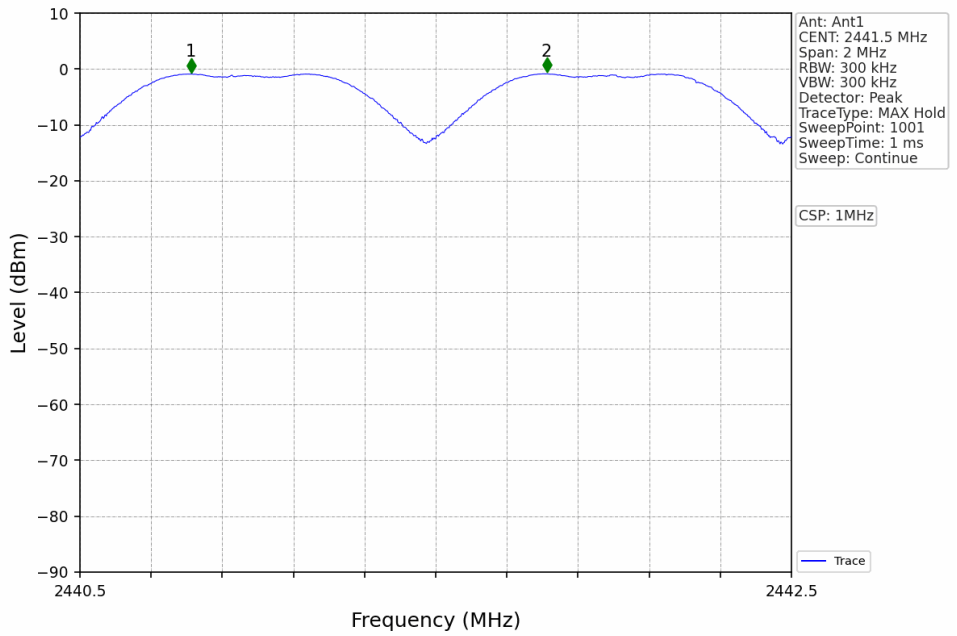
3.1 Ant1

3.1.1 Test Result

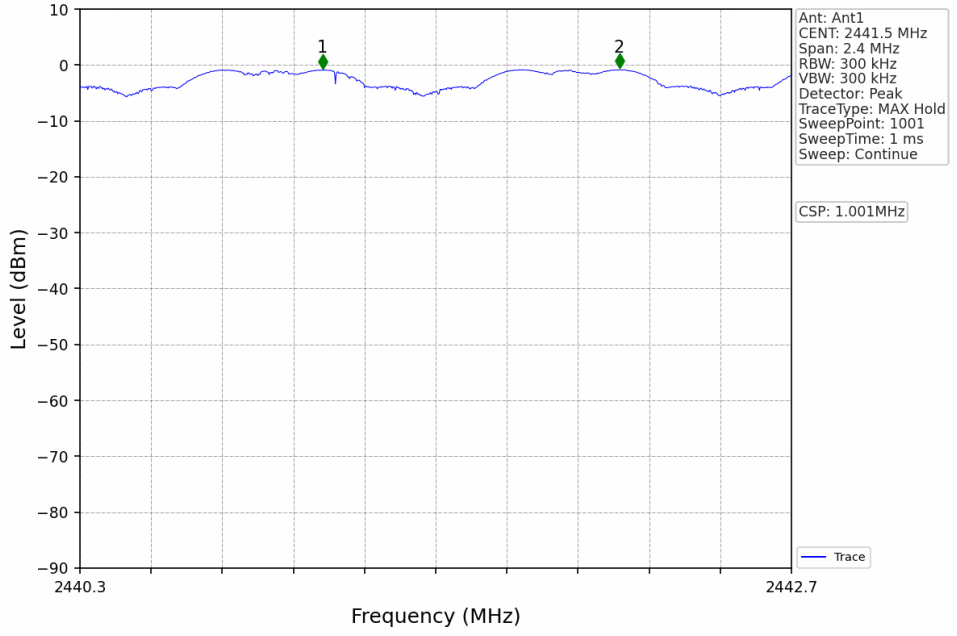
Ant1							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	1.000	1.042	>=0.695	Pass
π/4DQPSK	SISO	HOPP	2DH5	1.001	1.260	>=0.84	Pass
8DPSK	SISO	HOPP	3DH5	1.001	1.286	>=0.857	Pass

3.1.2 Test Graph

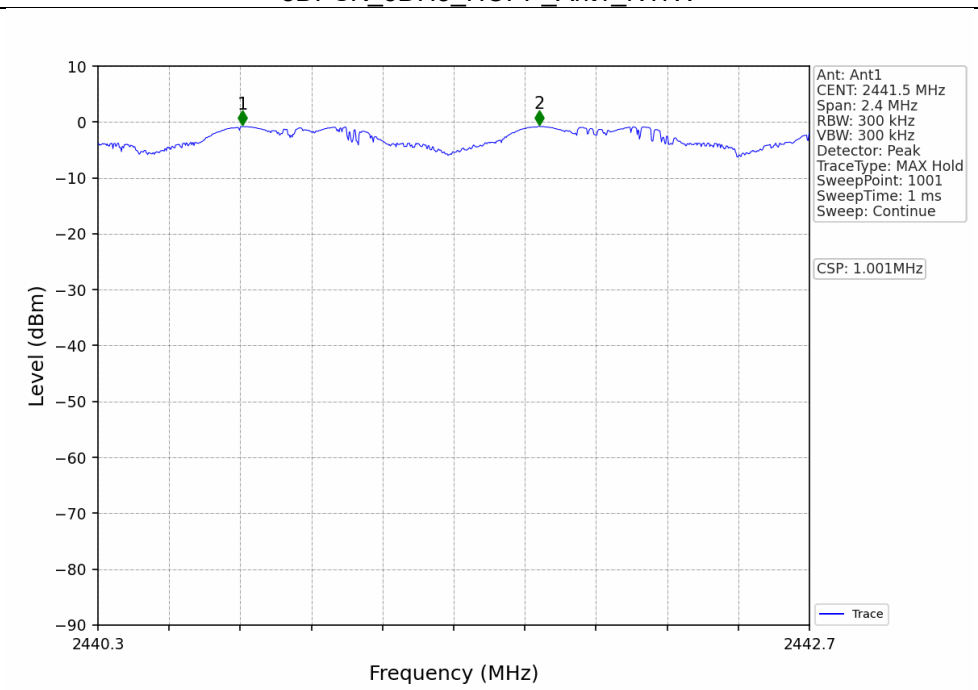
GFSK_DH5_HOPP_Ant1_NTNV



π/4DQPSK_2DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



4. Number of Hopping Frequencies

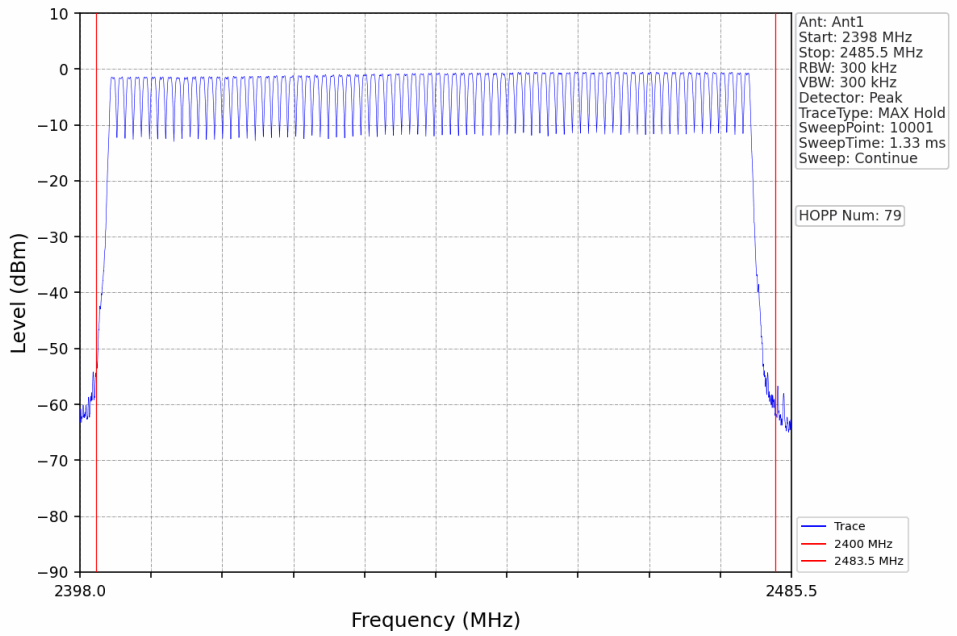
4.1 HoppNum

4.1.1 Test Result

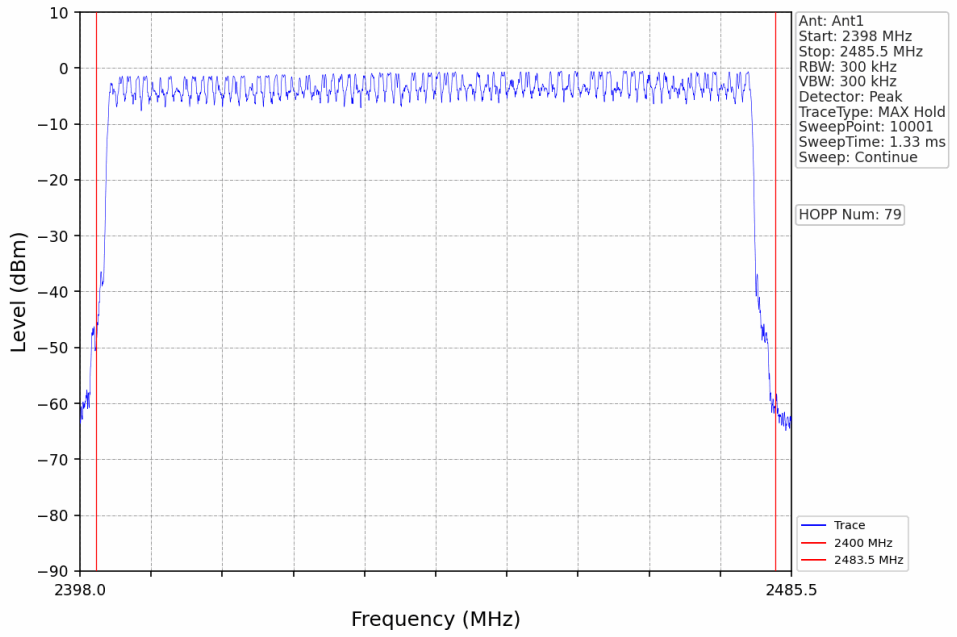
Mode	TX Type	Frequency (MHz)	Packet Type	Num of Hopping Frequencies		Verdict
				ANT1	Limit	
GFSK	SISO	HOPP	DH5	79	>=15	Pass
π/4DQPSK	SISO	HOPP	2DH5	79	>=15	Pass
8DPSK	SISO	HOPP	3DH5	79	>=15	Pass

4.1.2 Test Graph

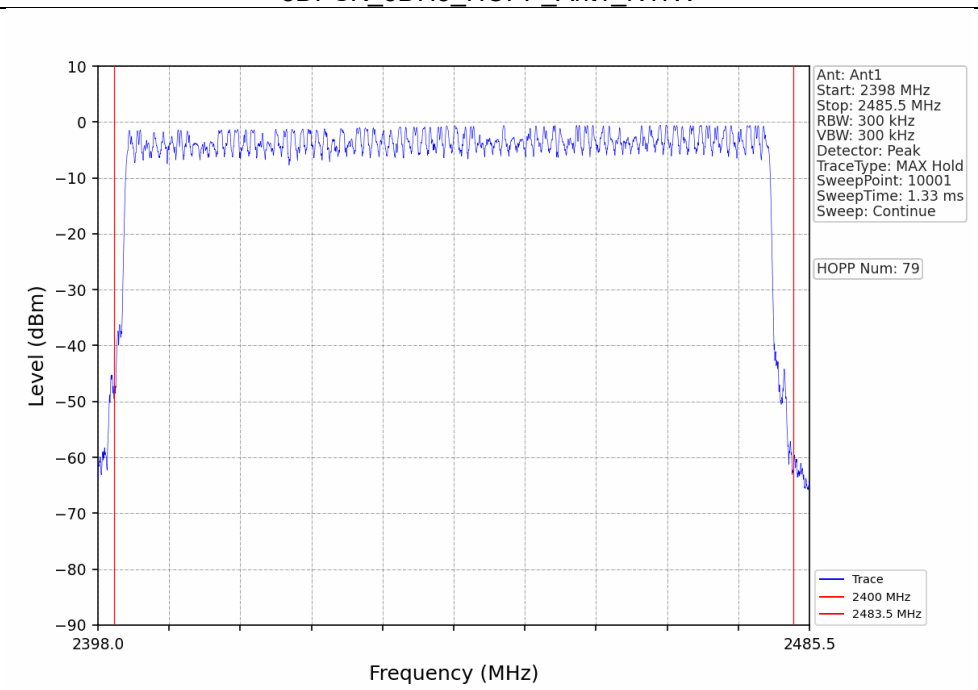
GFSK_DH5_HOPP_Ant1_NTNV



π/4DQPSK_2DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



5. Time of Occupancy (Dwell Time)

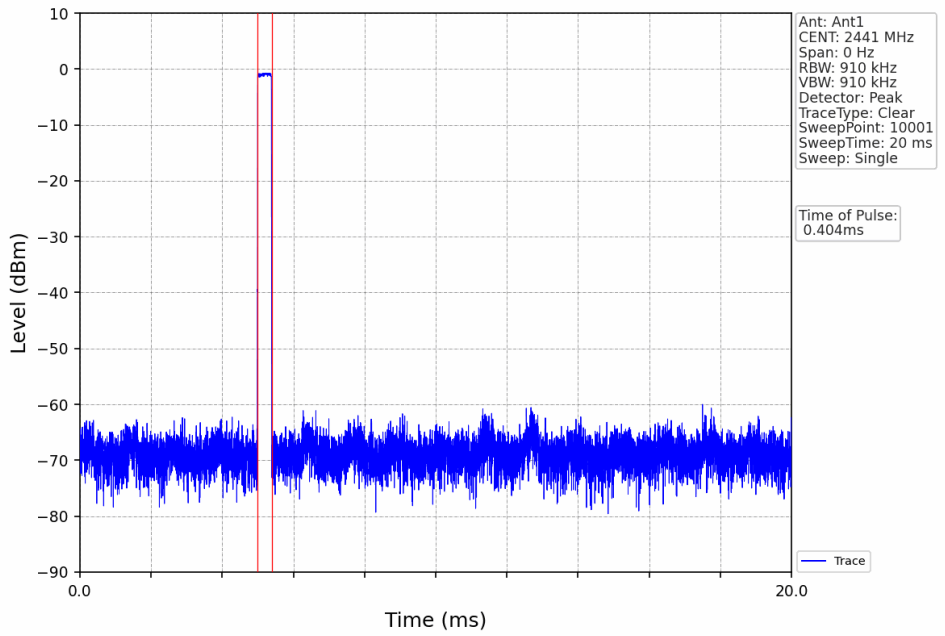
5.1 Ant1

5.1.1 Test Result

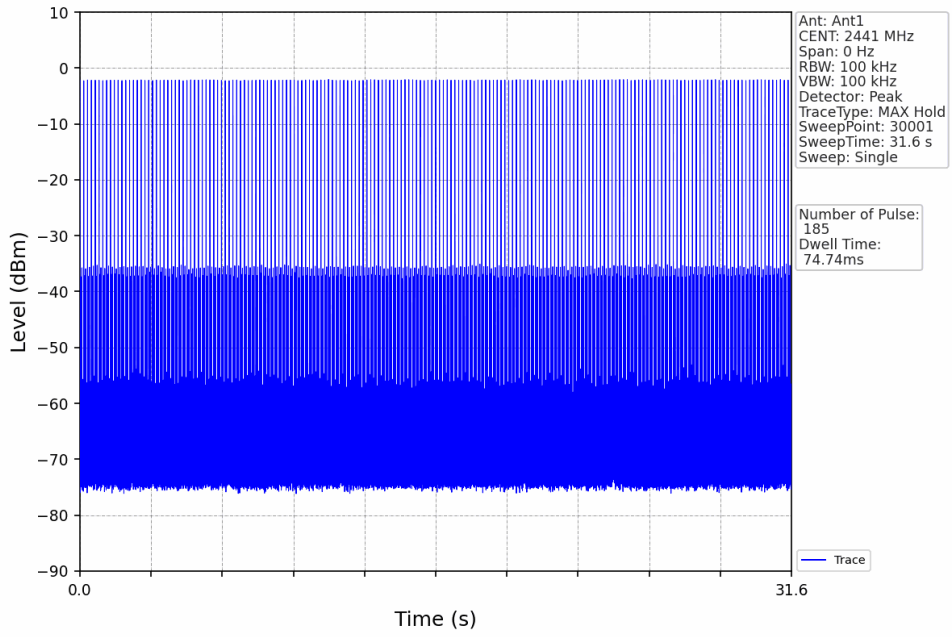
Ant1									
Mode	TX Type	Frequency (MHz)	Packet Type	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limit (ms)	Verdict
GFSK	SISO	HOPP	DH1	0.404	31.600	185	74.740	<=400	Pass
			DH3	1.660	31.600	158	262.280	<=400	Pass
			DH5	2.908	31.600	75	218.100	<=400	Pass
π/4DQPSK	SISO	HOPP	2DH1	0.402	31.600	339	136.278	<=400	Pass
			2DH3	1.654	31.600	164	271.256	<=400	Pass
			2DH5	2.902	31.600	105	304.710	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.400	31.600	332	132.800	<=400	Pass
			3DH3	1.652	31.600	161	265.972	<=400	Pass
			3DH5	2.902	31.600	78	226.356	<=400	Pass

5.1.2 Test Graph

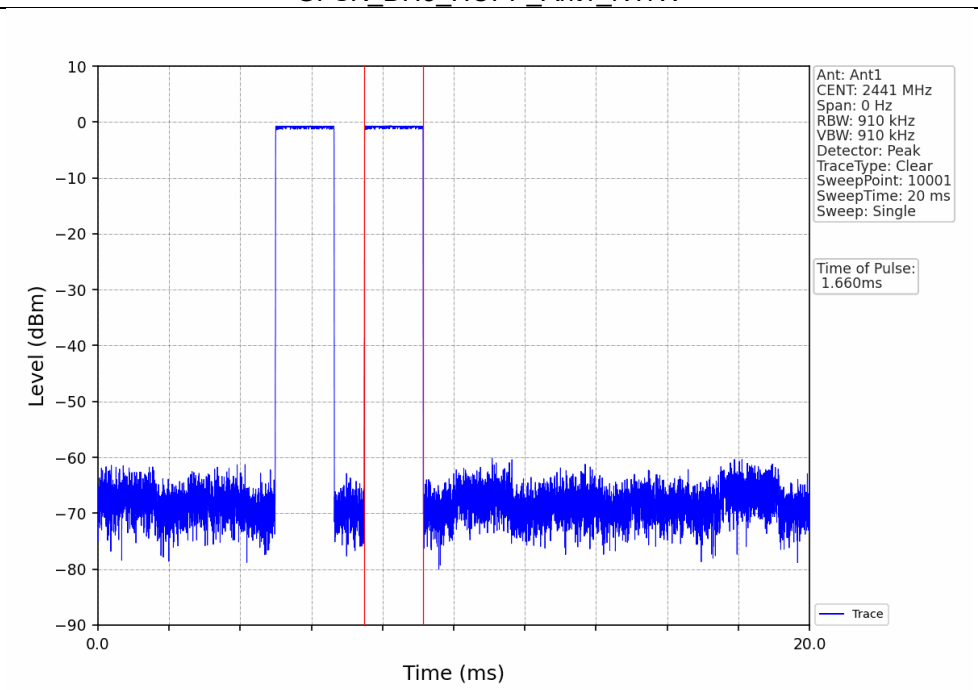
GFSK_DH1_HOPP_Ant1_NTNV



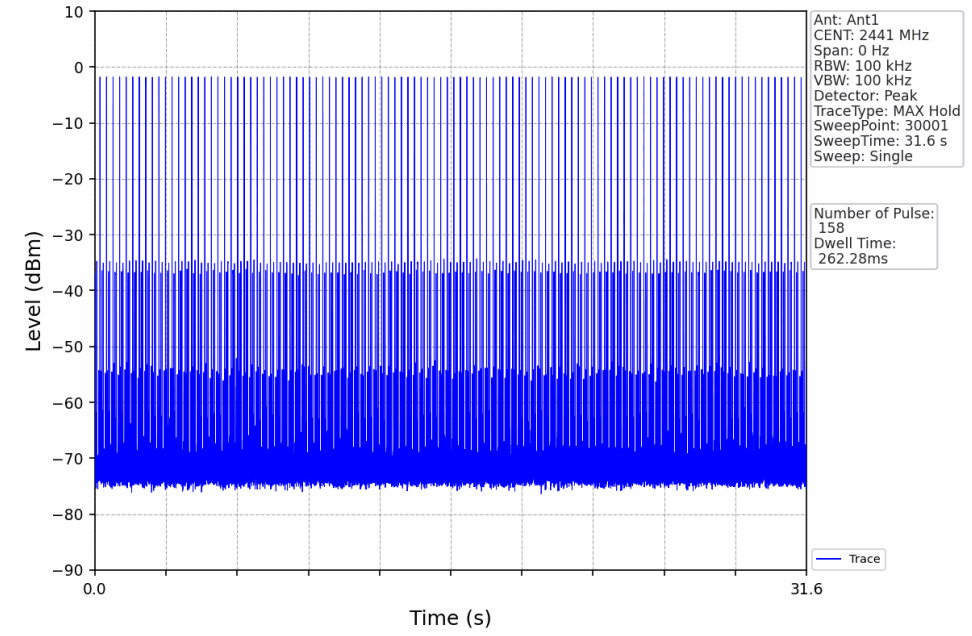
GFSK_DH1_HOPP_Ant1_NTNV



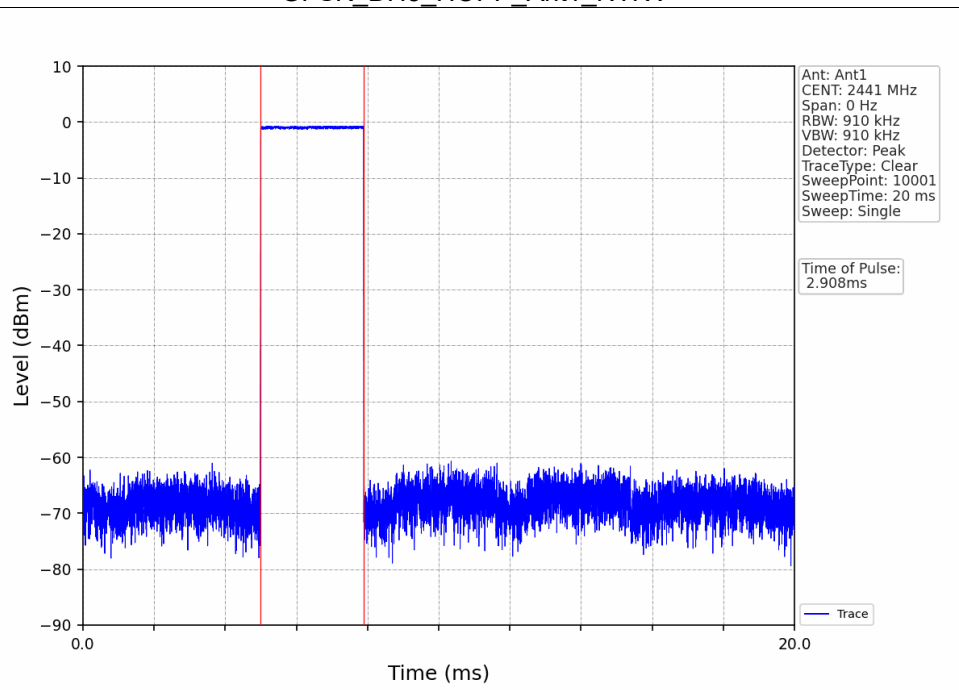
GFSK_DH3_HOPP_Ant1_NTNV



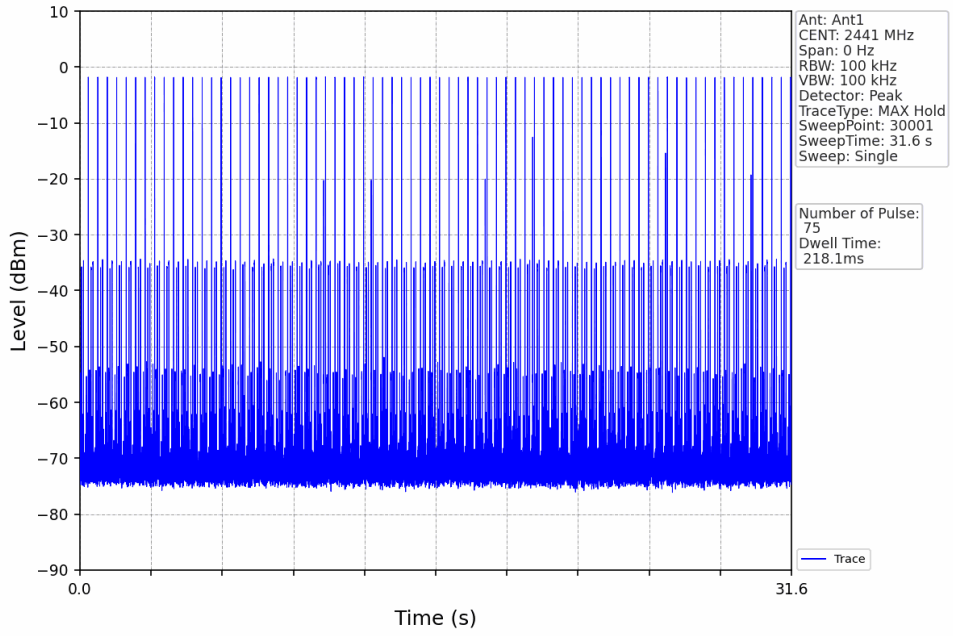
GFSK_DH3_HOPP_Ant1_NTNV



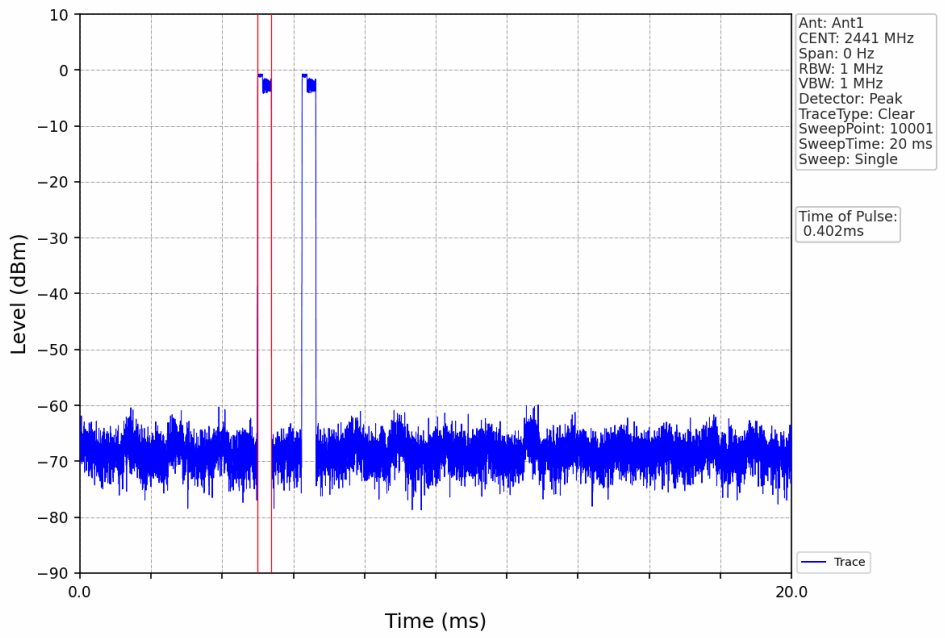
GFSK_DH5_HOPP_Ant1_NTNV



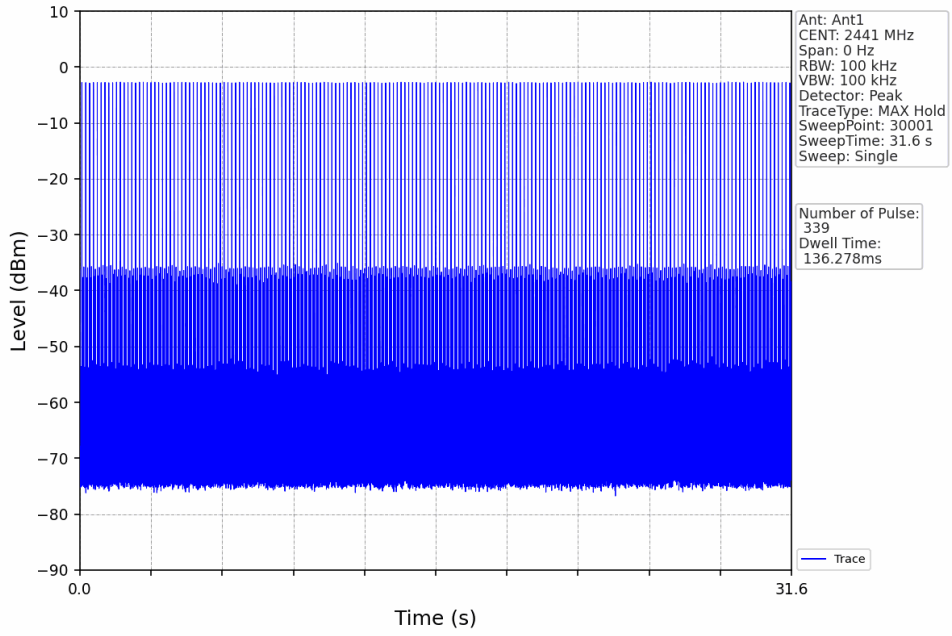
GFSK_DH5_HOPP_Ant1_NTNV



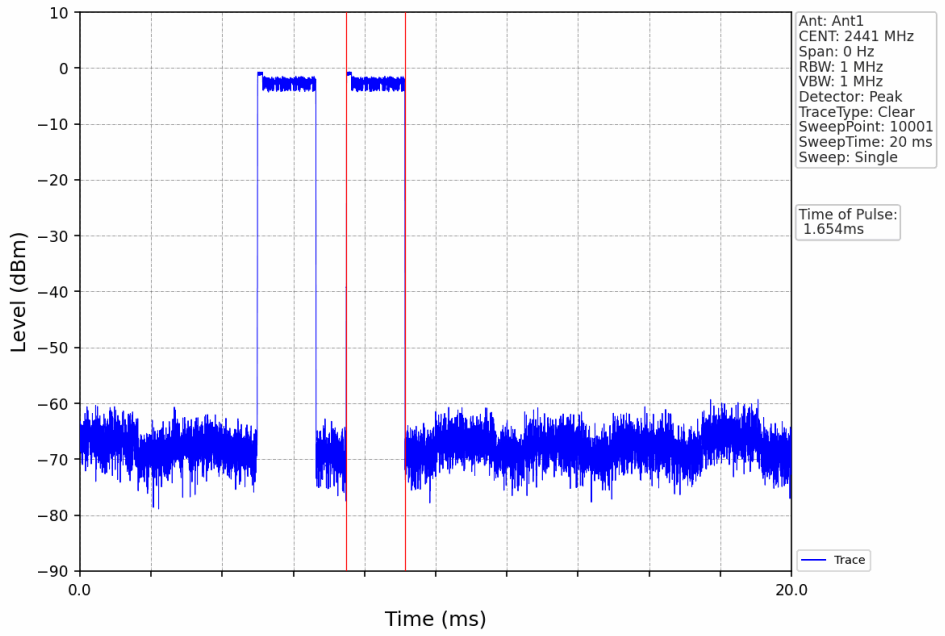
π/4DQPSK_2DH1_HOPP_Ant1_NTNV



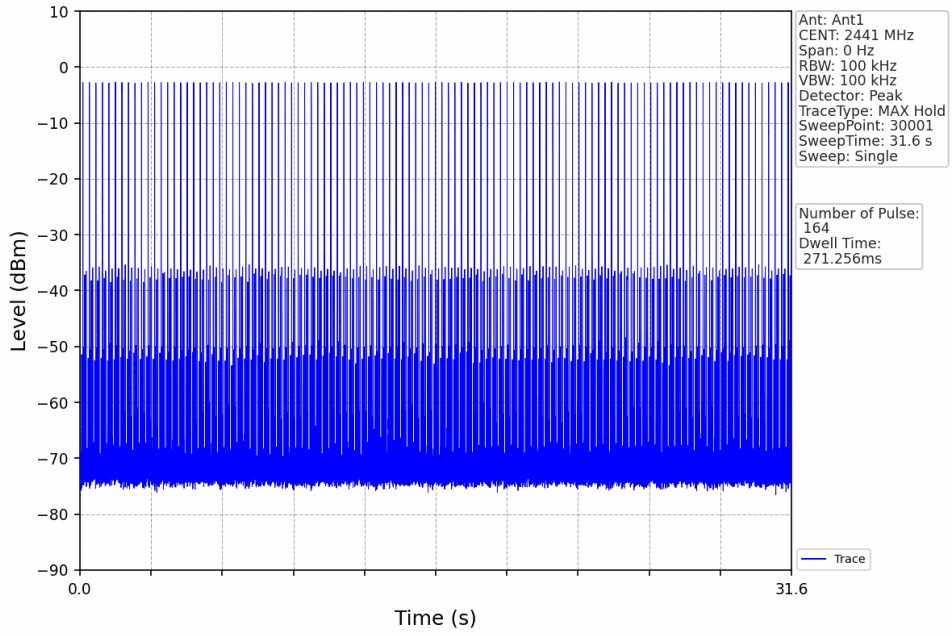
π/4DQPSK_2DH1_HOPP_Ant1_NTNV



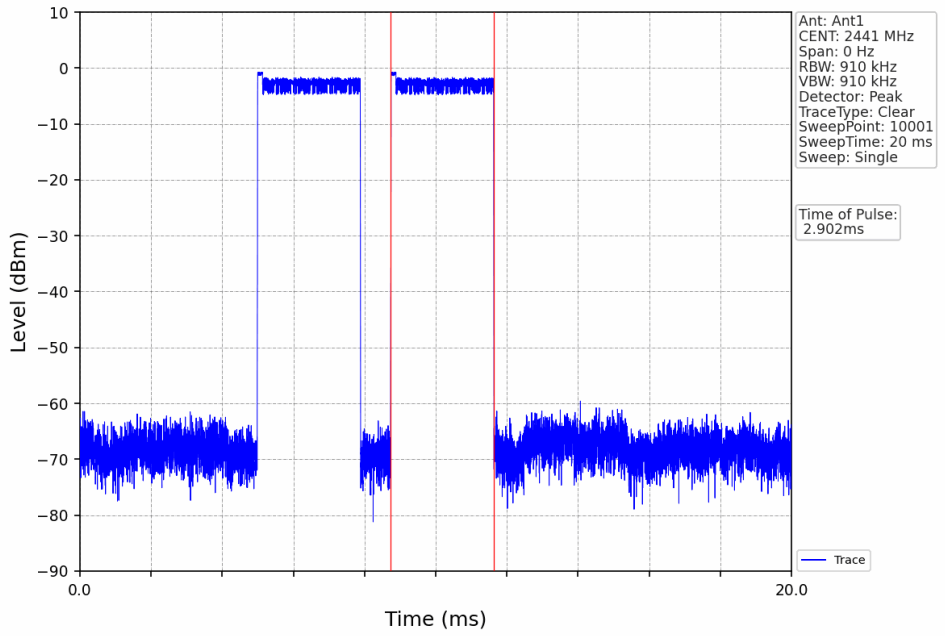
π/4DQPSK_2DH3_HOPP_Ant1_NTNV



π/4DQPSK_2DH3_HOPP_Ant1_NTNV



π/4DQPSK_2DH5_HOPP_Ant1_NTNV



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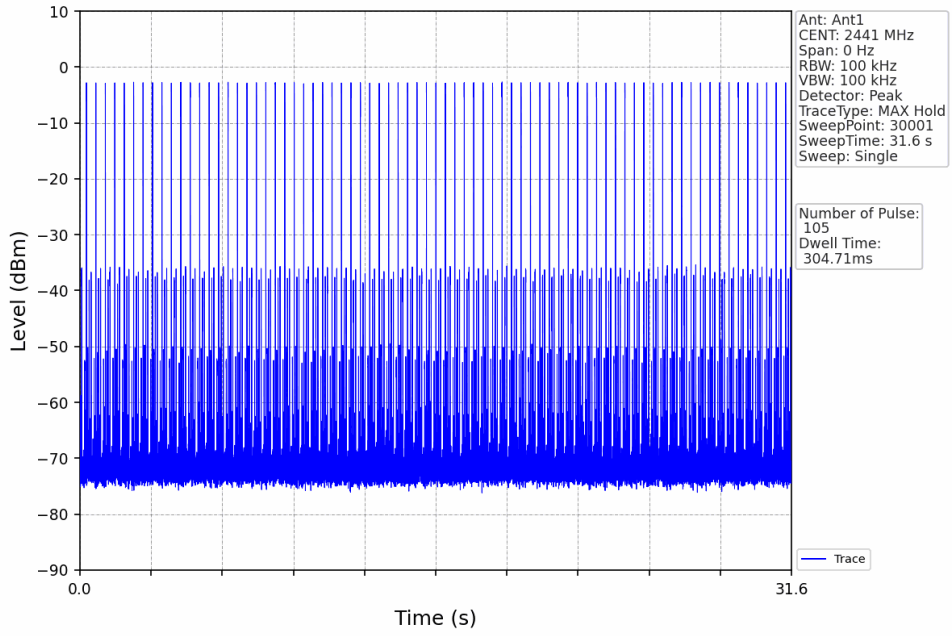
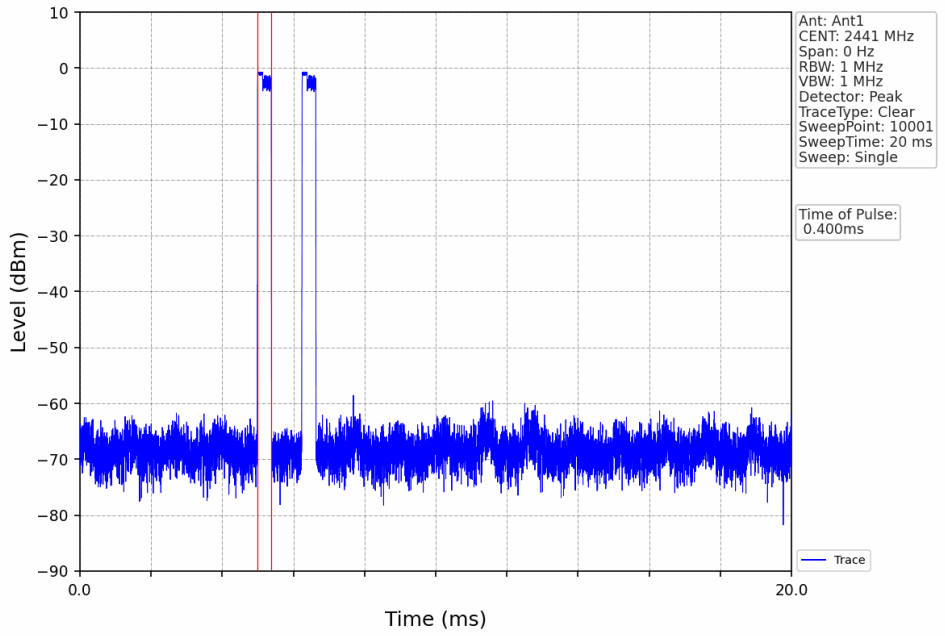


8DPSK_3DH1_HOPP_Ant1_NTNV



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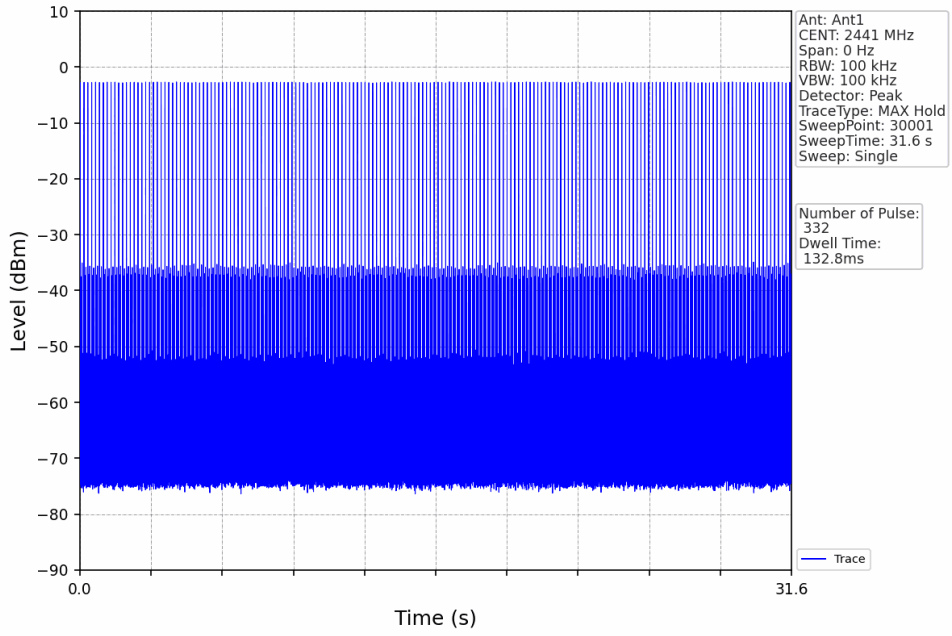

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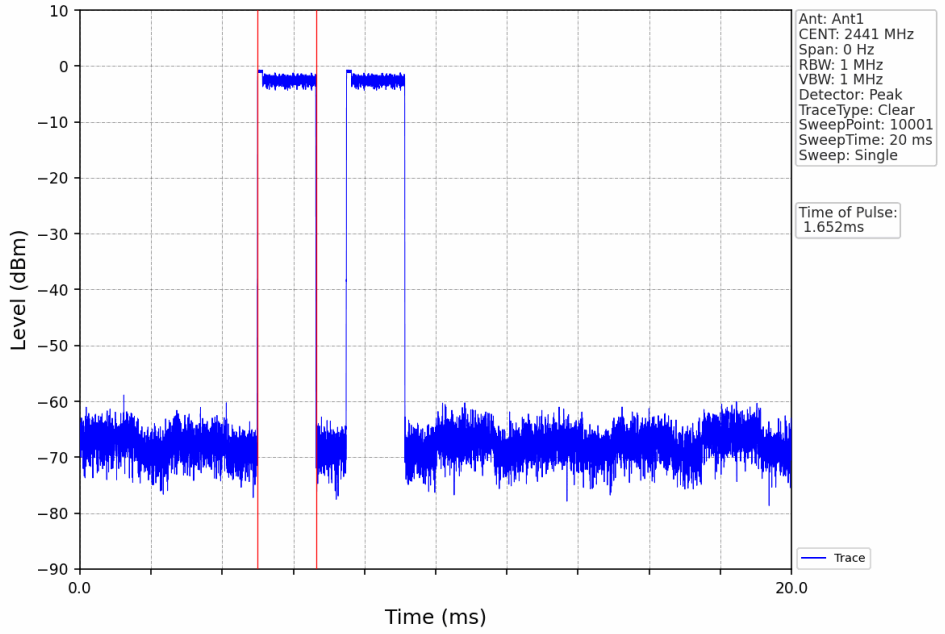

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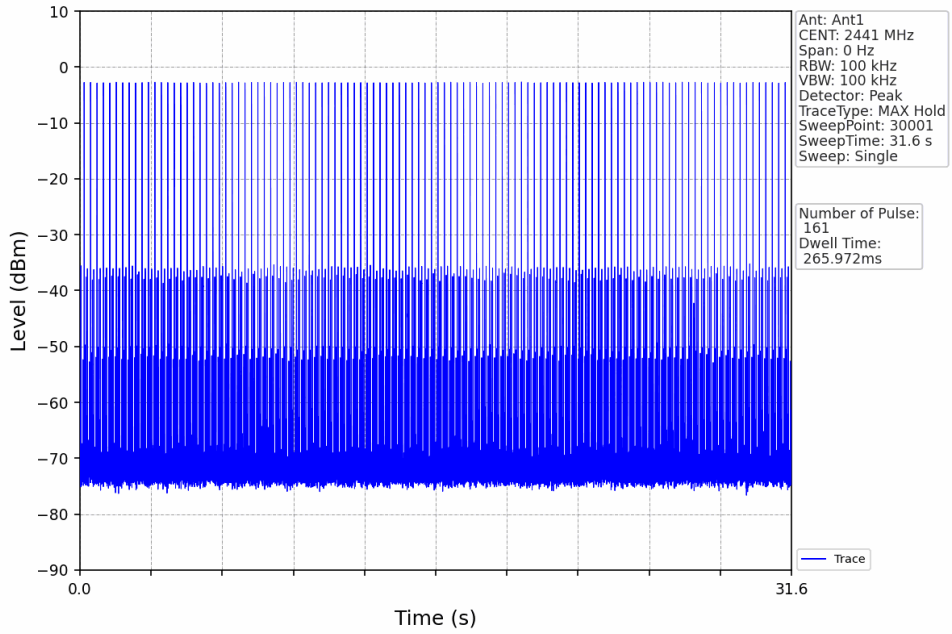
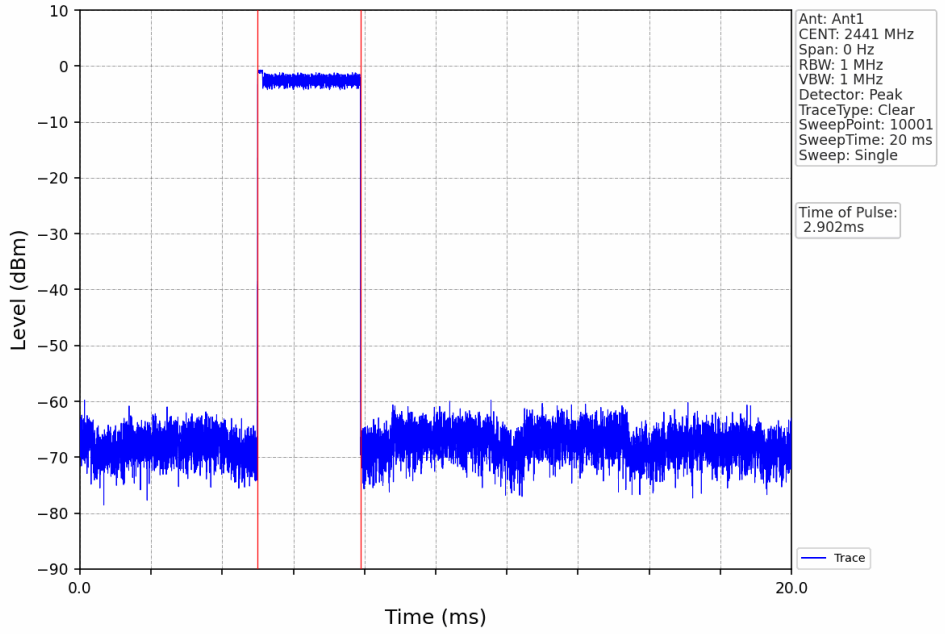
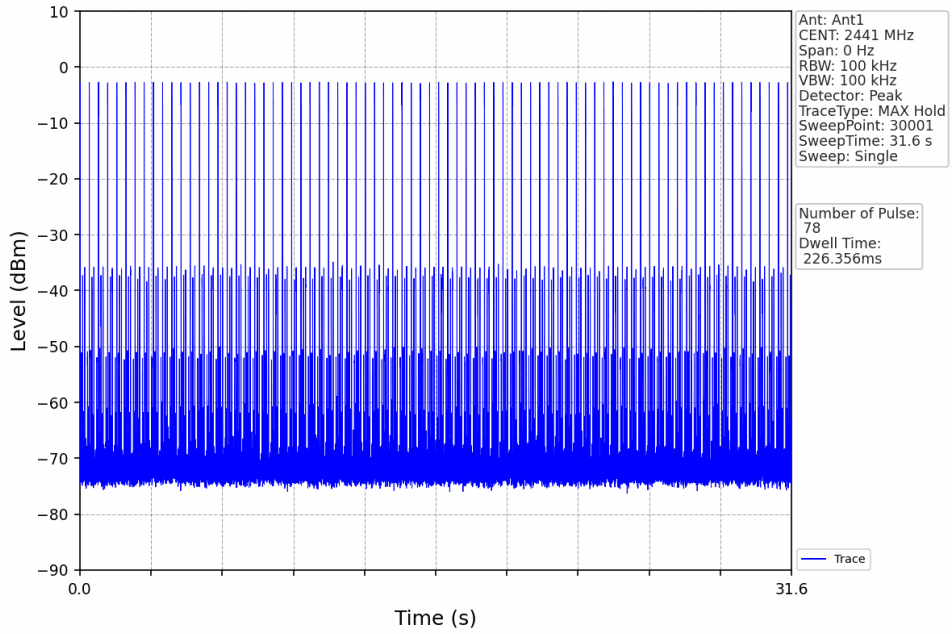


8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



6. Unwanted Emissions In Non-restricted Frequency Bands

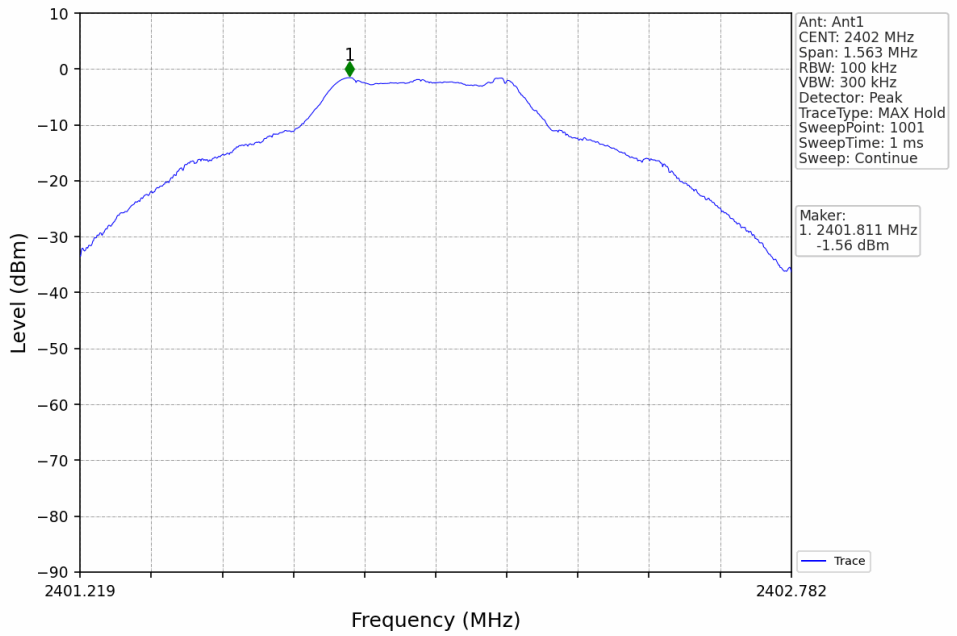
6.1 Ref

6.1.1 Test Result

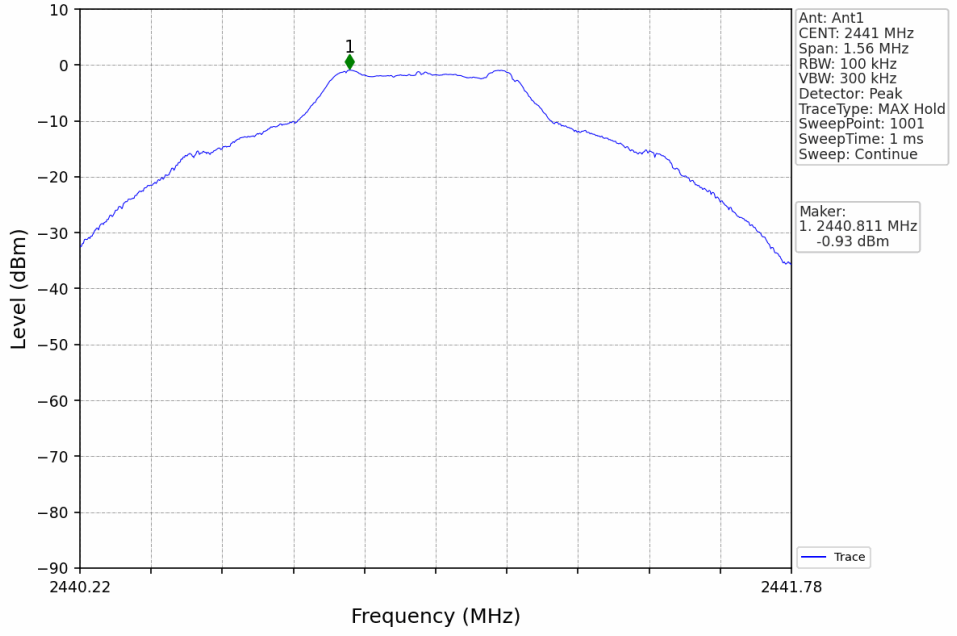
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	-1.56
		2441	DH5	1	-0.93
		2480	DH5	1	-0.71
π/4DQPSK	SISO	2402	2DH5	1	-1.58
		2441	2DH5	1	-0.88
		2480	2DH5	1	-0.74
8DPSK	SISO	2402	3DH5	1	-1.56
		2441	3DH5	1	-0.92
		2480	3DH5	1	-0.69
Note1: Refer to FCC Part 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

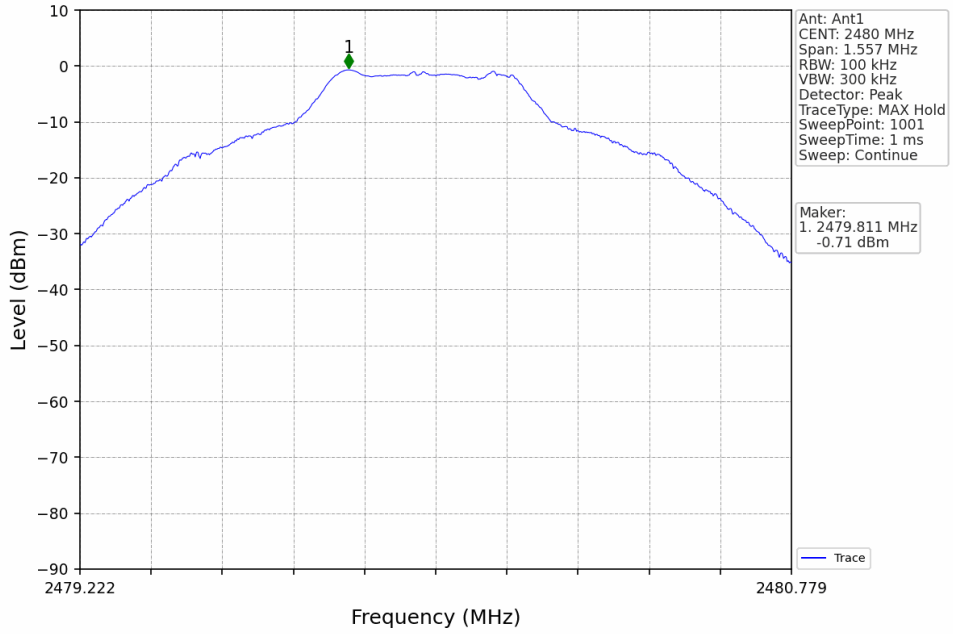
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



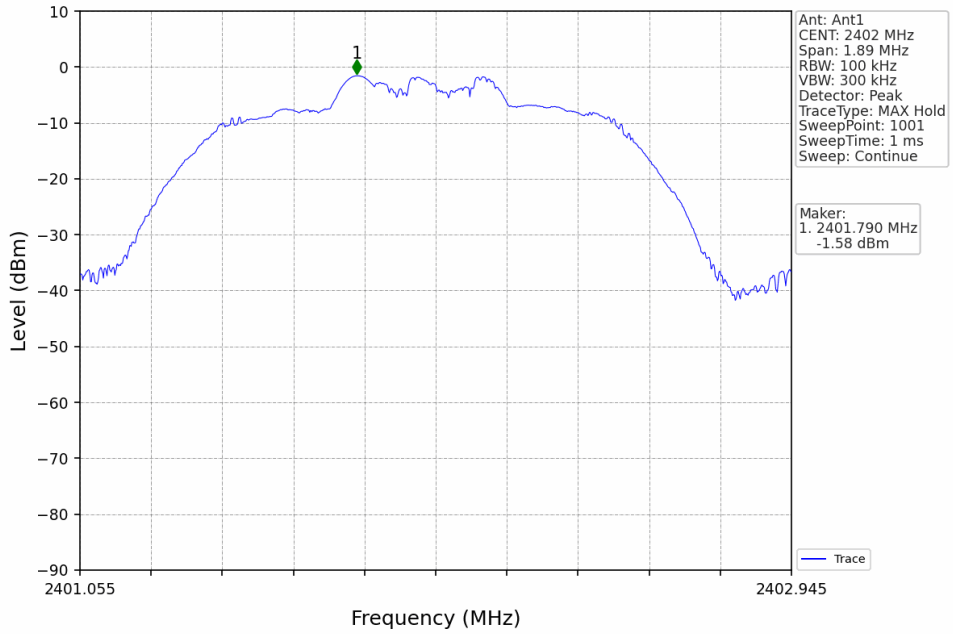
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



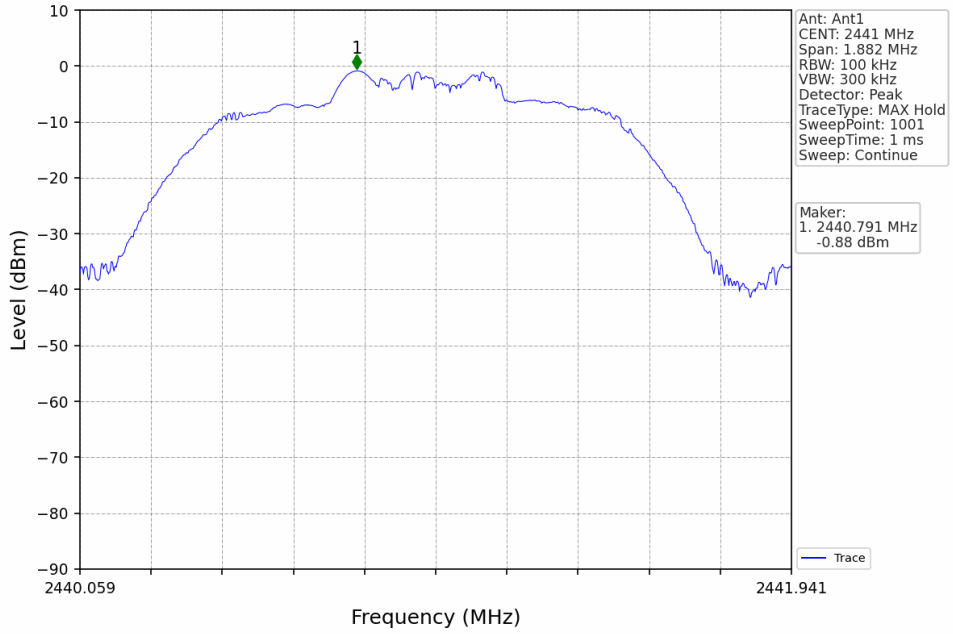
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



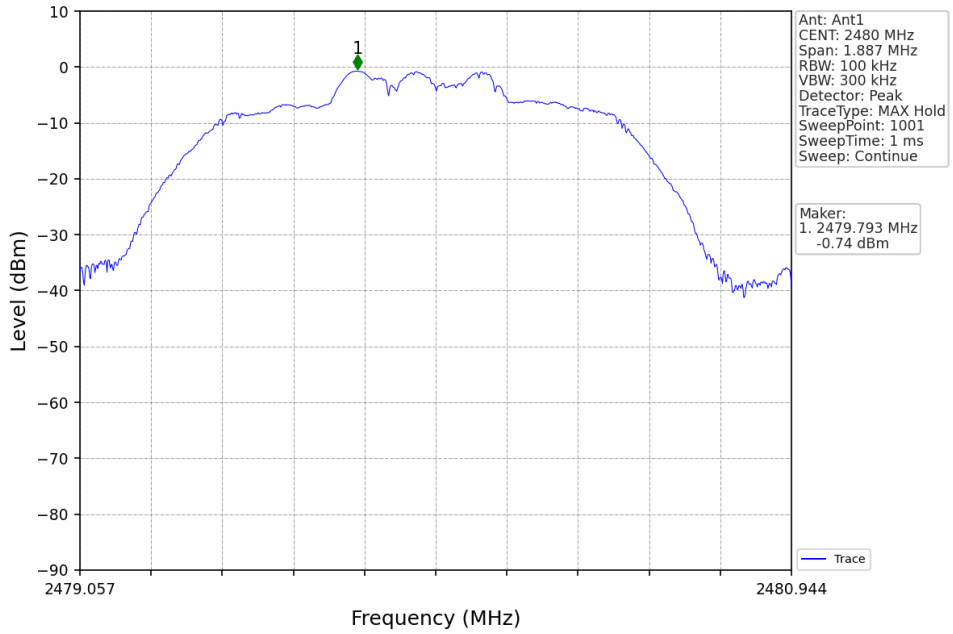
π/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



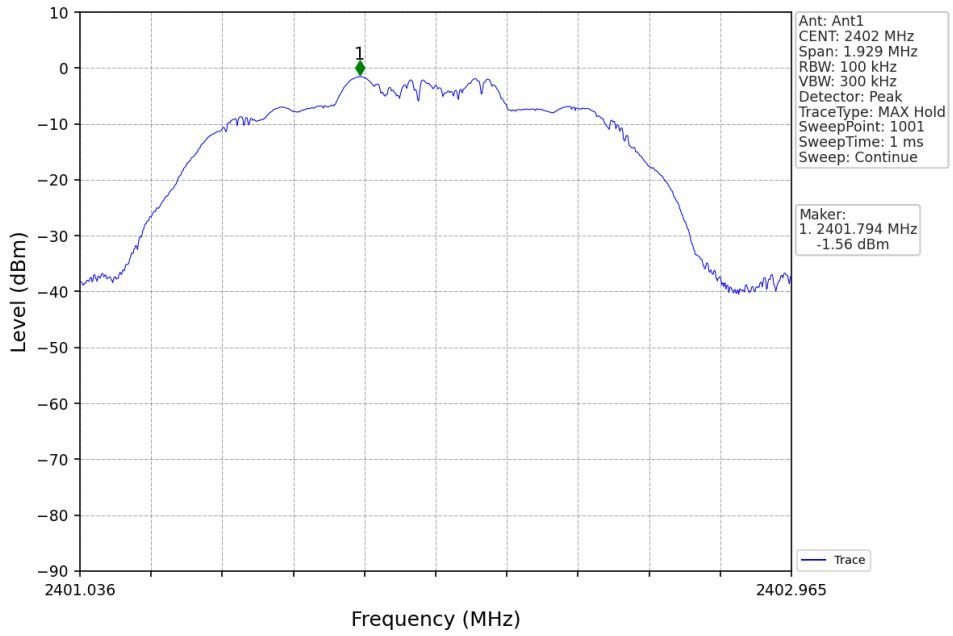
π/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



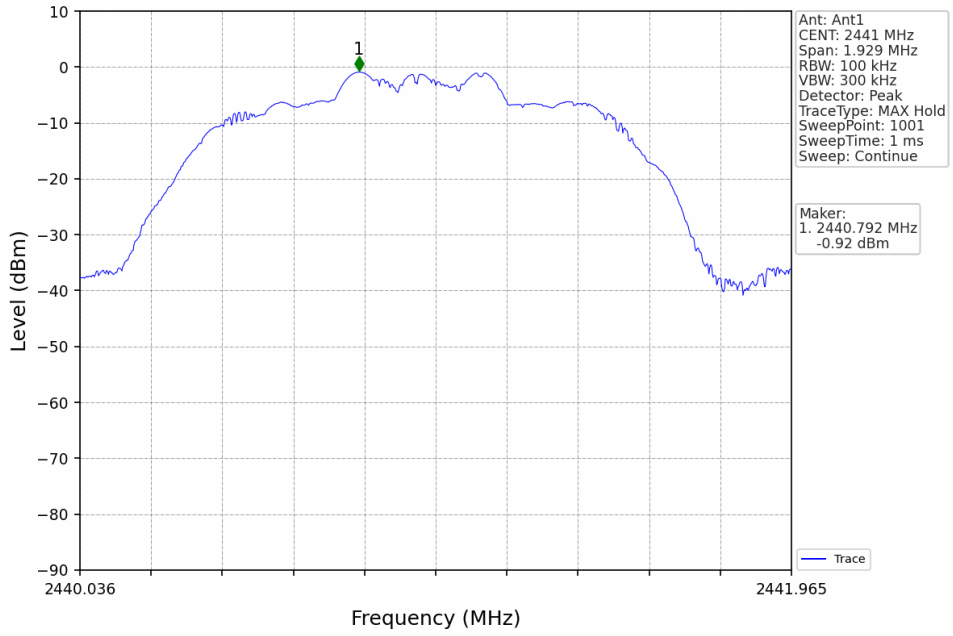
π/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



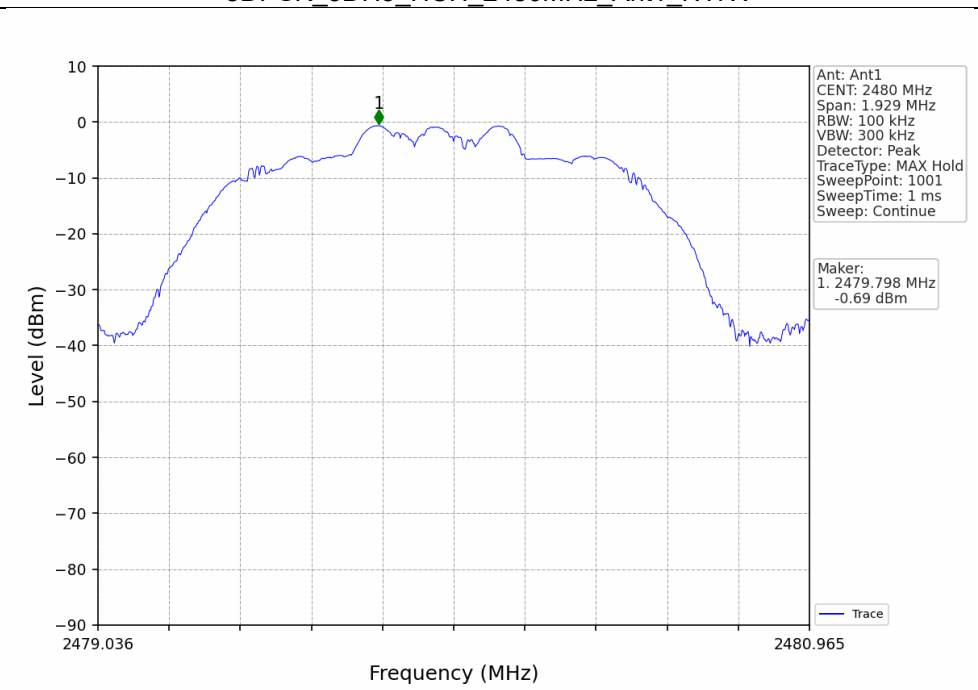
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



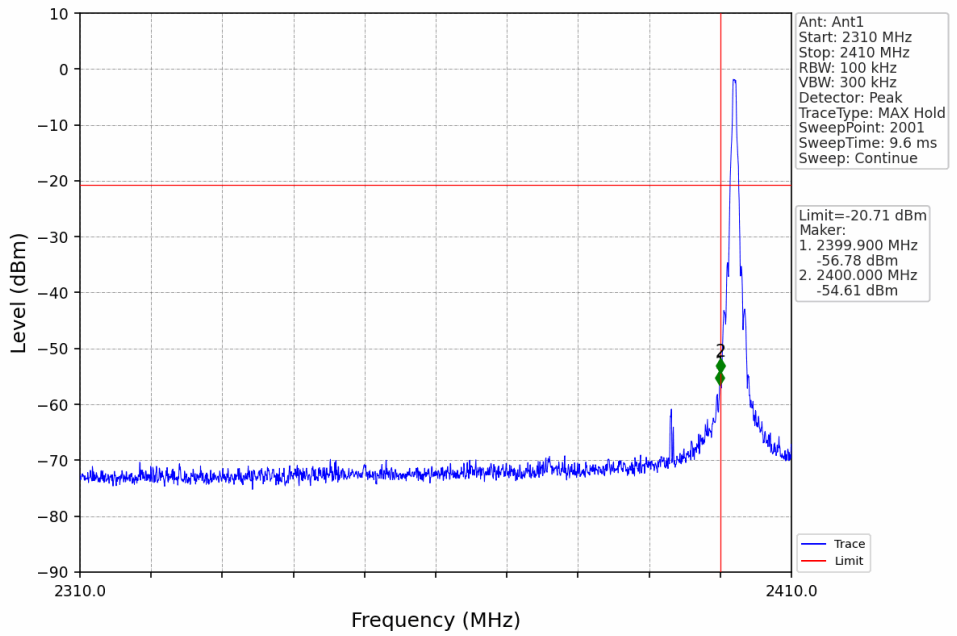
6.2 CSE

6.2.1 Test Result

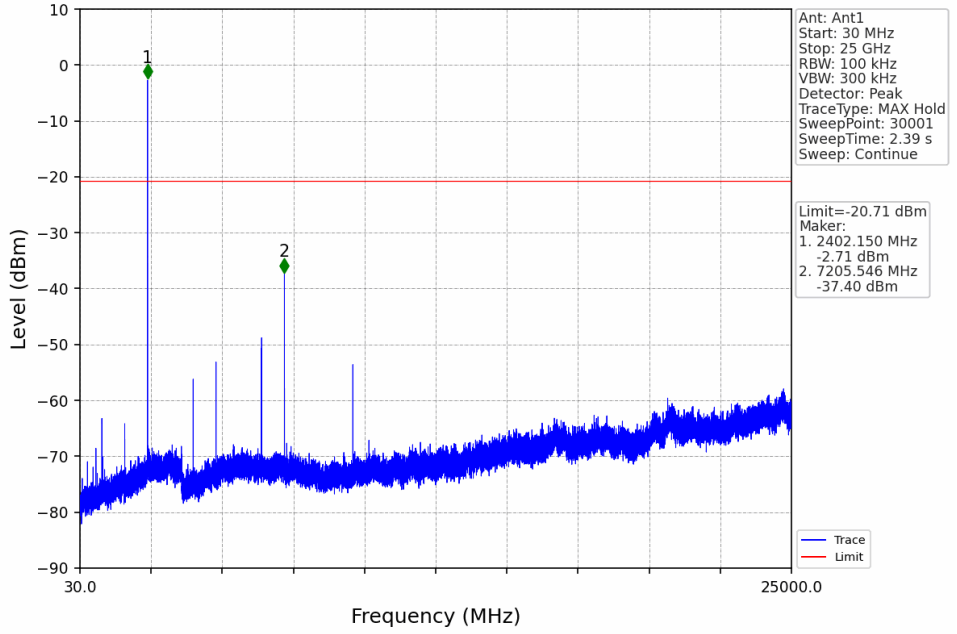
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	-0.71	-20.71	Pass
		2441	DH5	1	-0.71	-20.71	Pass
		2480	DH5	1	-0.71	-20.71	Pass
		HOPP	DH5	1	-0.71	-20.71	Pass
π/4DQPSK	SISO	2402	2DH5	1	-0.74	-20.74	Pass
		2441	2DH5	1	-0.74	-20.74	Pass
		2480	2DH5	1	-0.74	-20.74	Pass
		HOPP	2DH5	1	-0.74	-20.74	Pass
8DPSK	SISO	2402	3DH5	1	-0.69	-20.69	Pass
		2441	3DH5	1	-0.69	-20.69	Pass
		2480	3DH5	1	-0.69	-20.69	Pass
		HOPP	3DH5	1	-0.69	-20.69	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

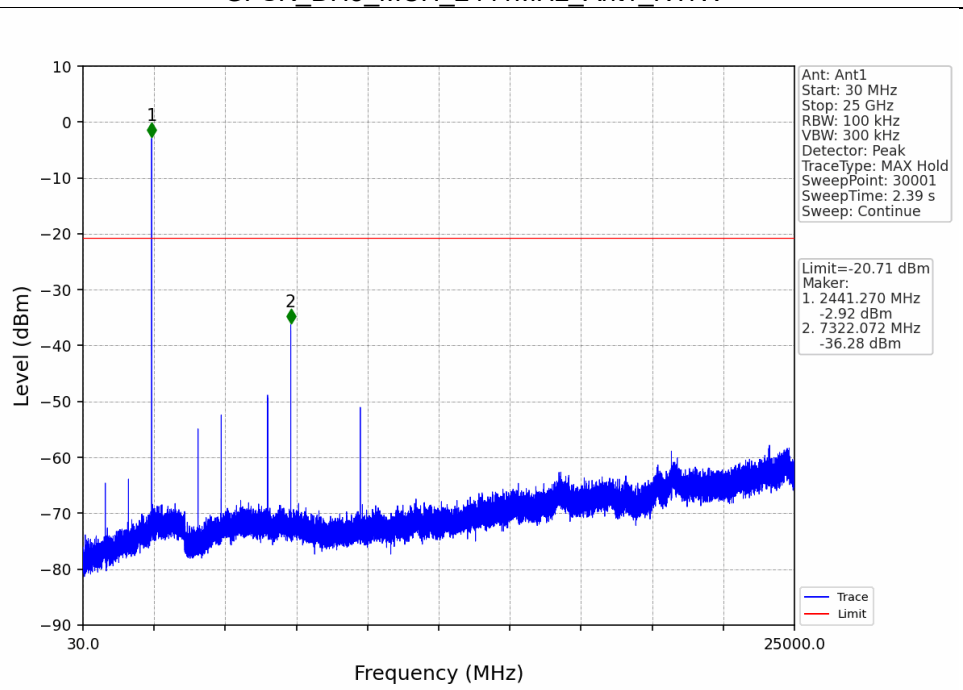
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



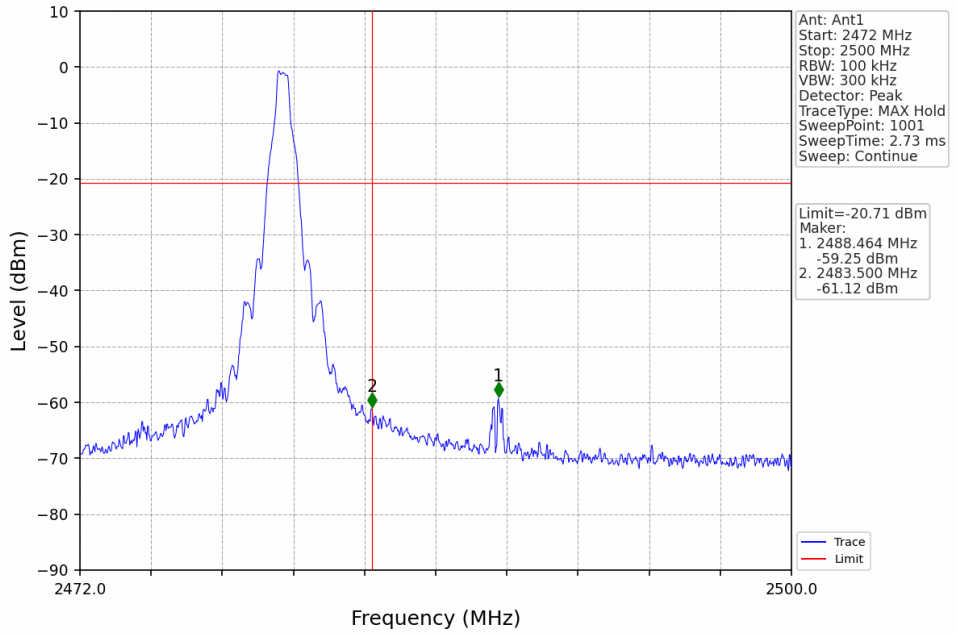
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



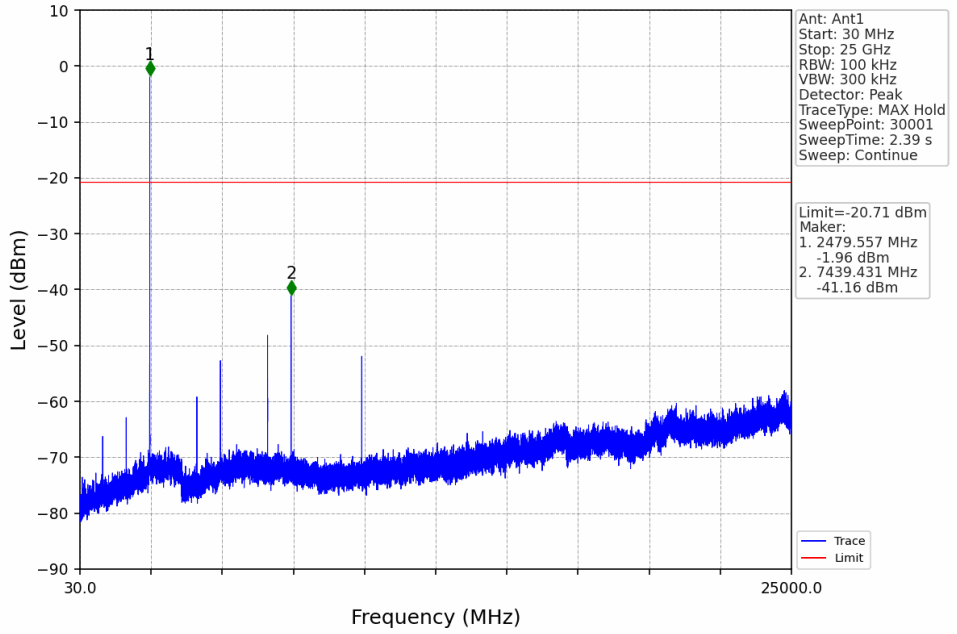
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



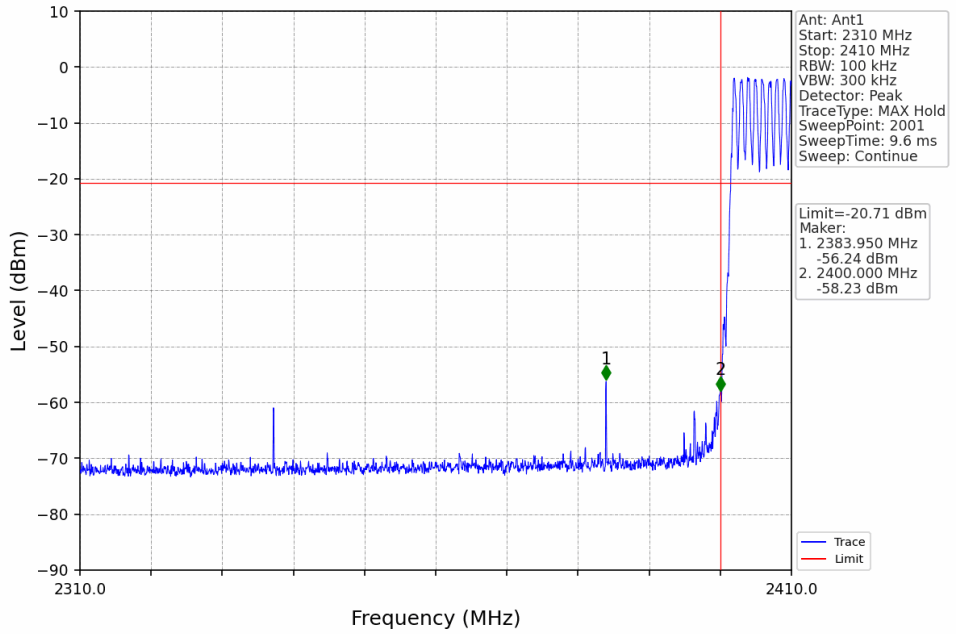
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



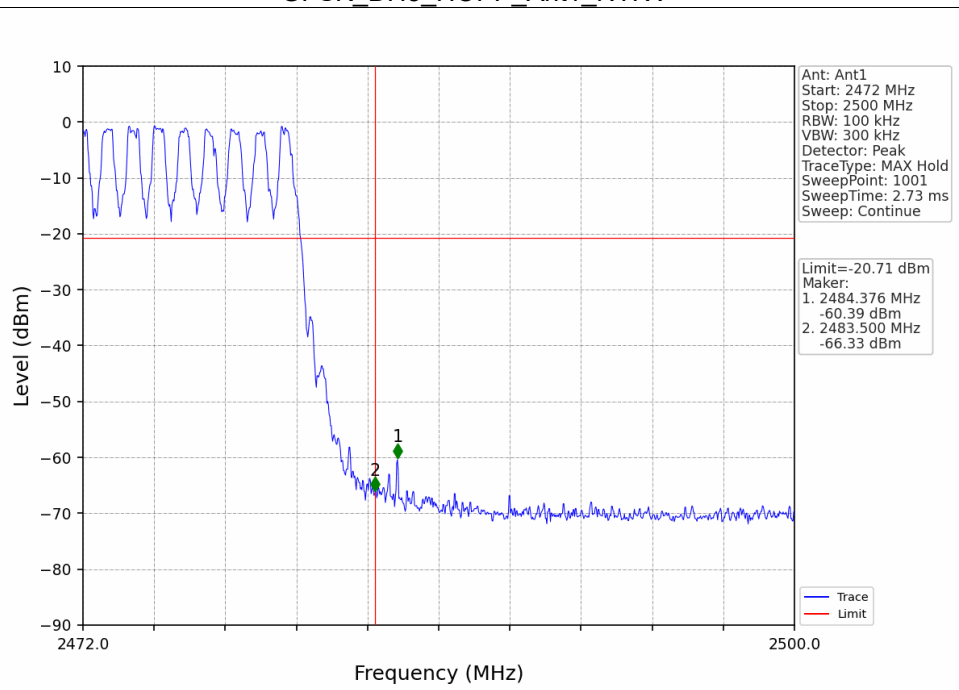
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



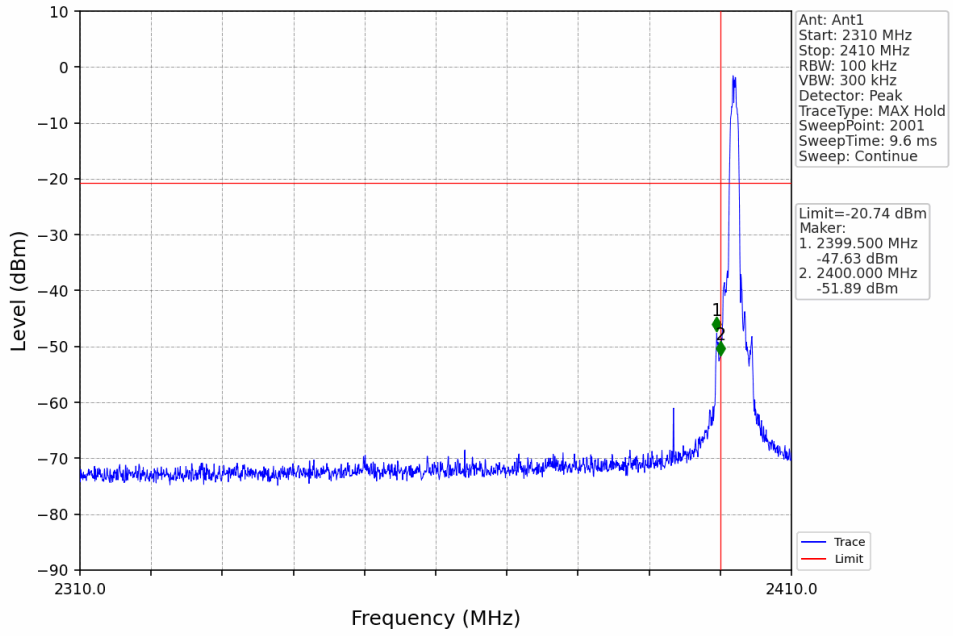
GFSK_DH5_HOPP_Ant1_NTNV



GFSK_DH5_HOPP_Ant1_NTNV



π/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



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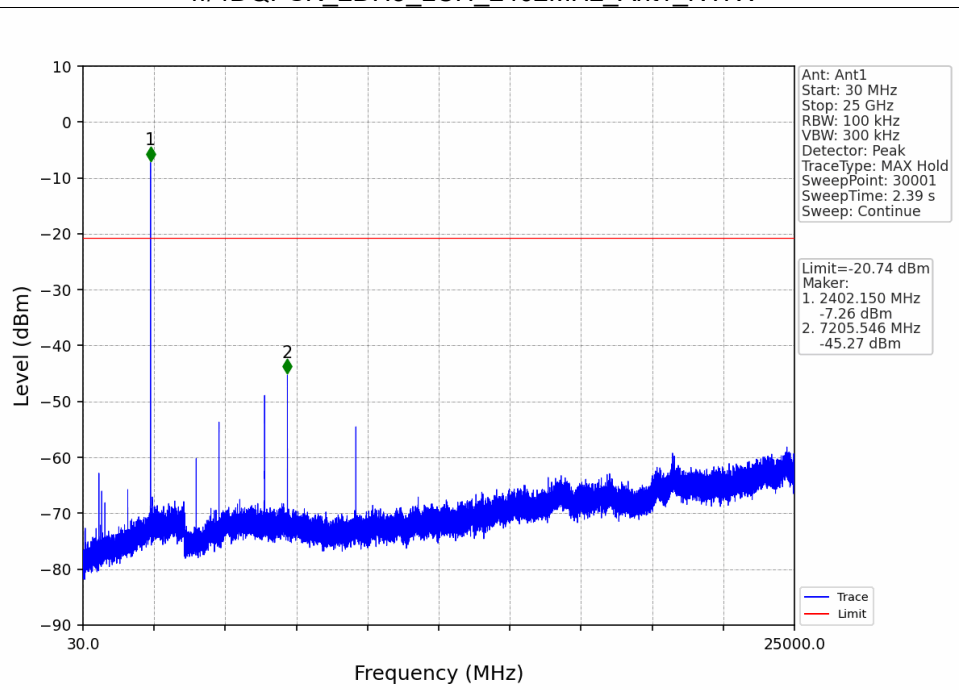
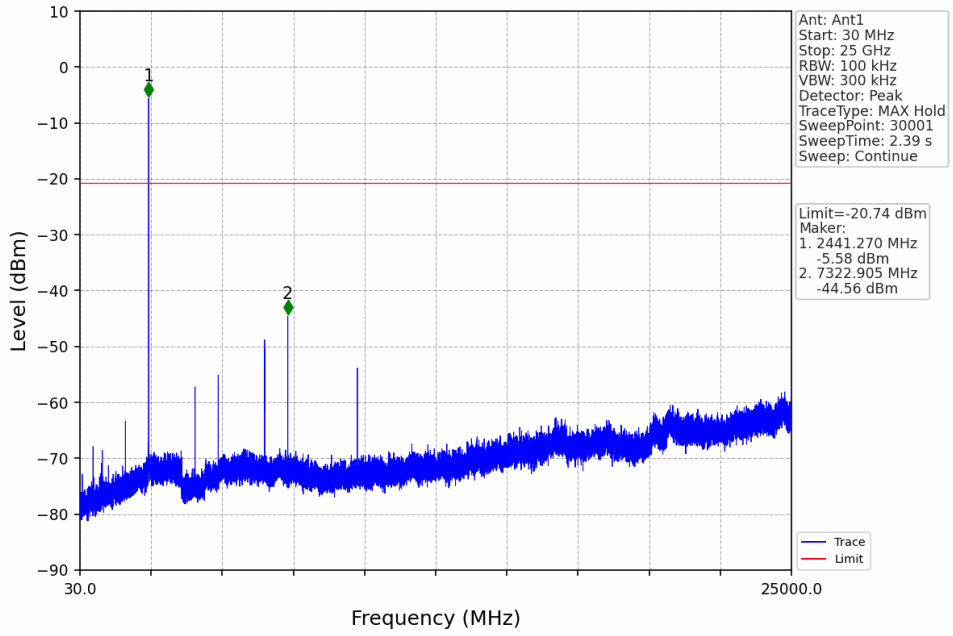


π/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



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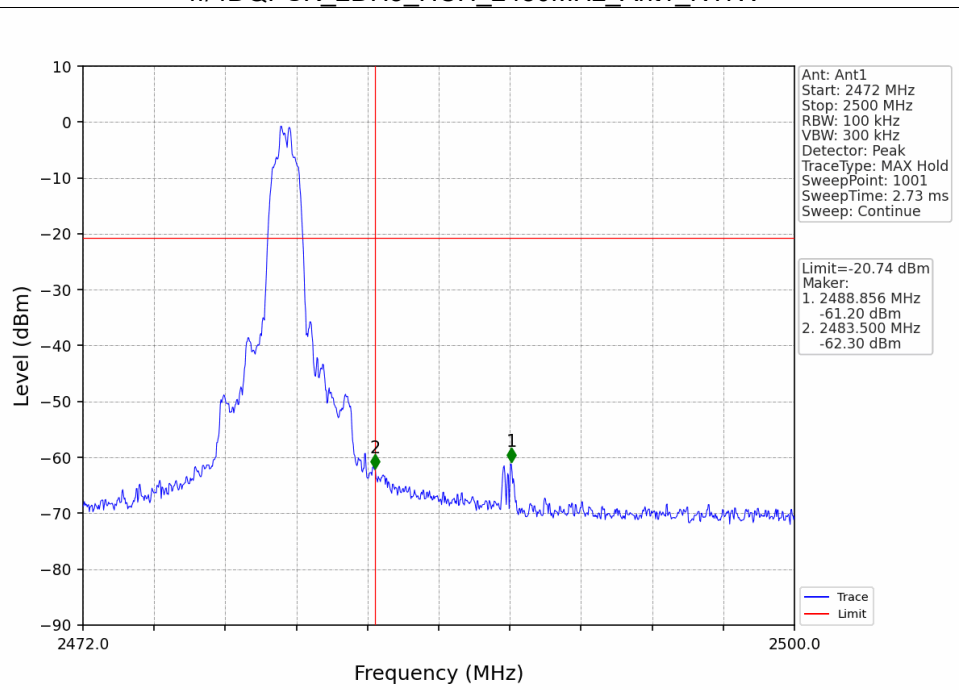
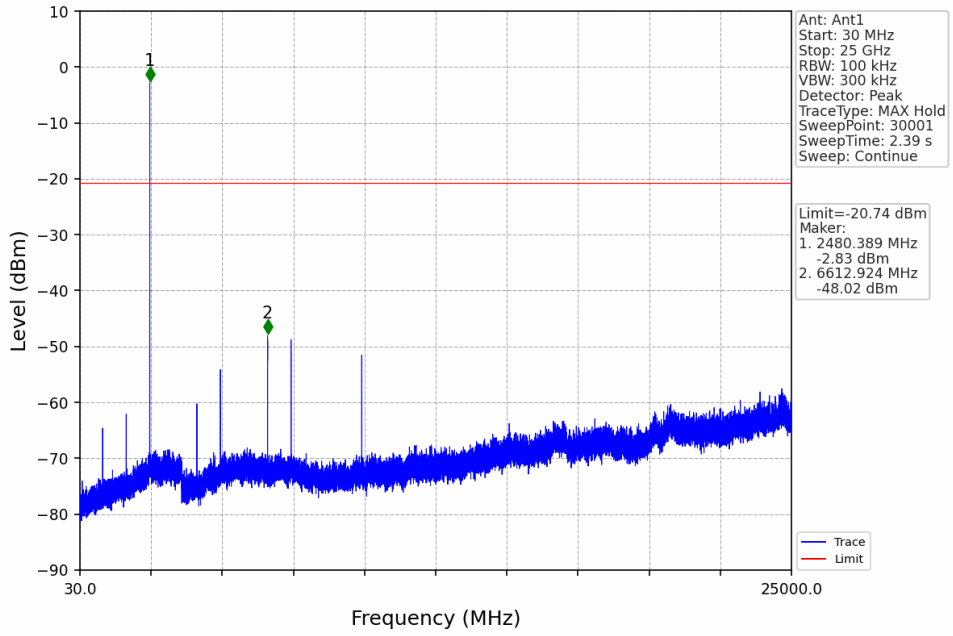
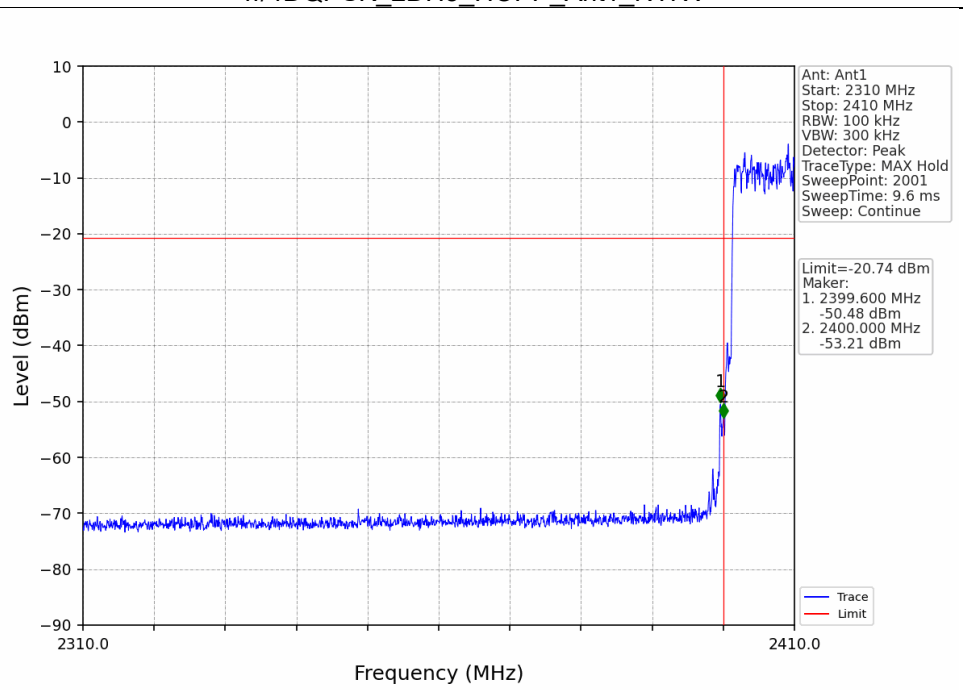


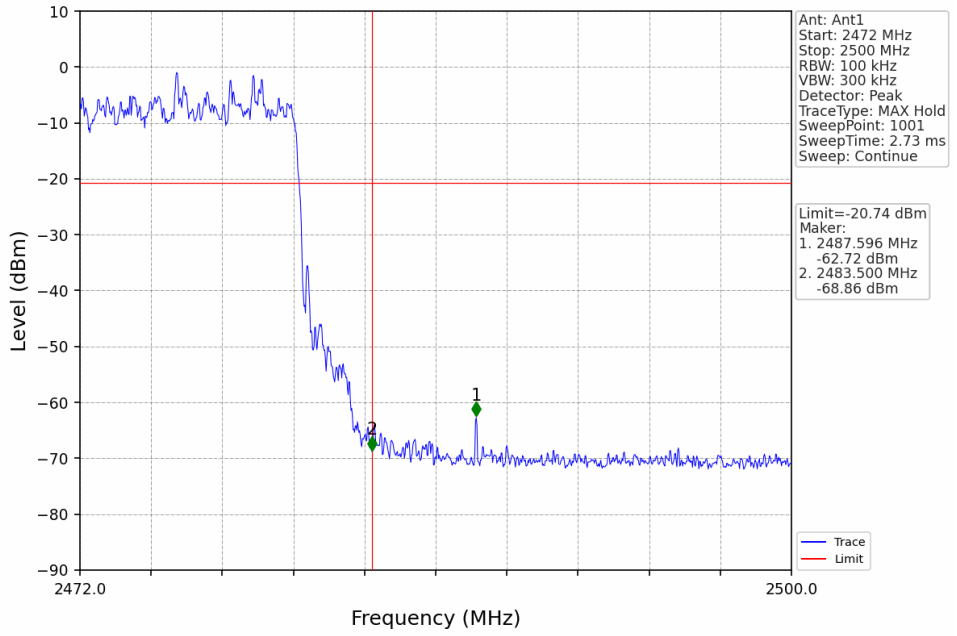
π/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



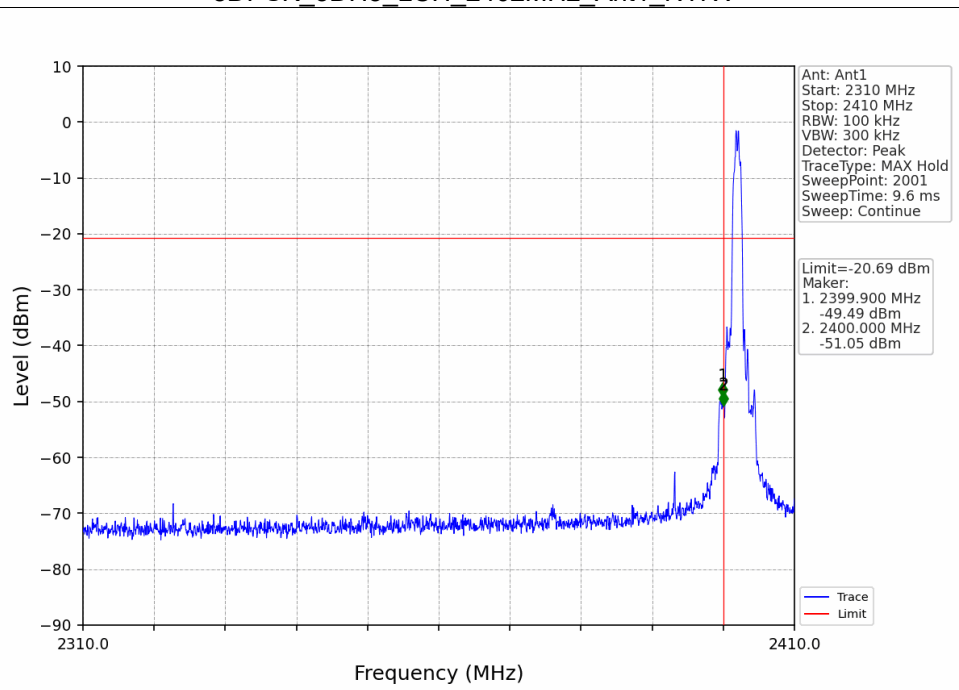
π/4DQPSK_2DH5_HOPP_Ant1_NTNV



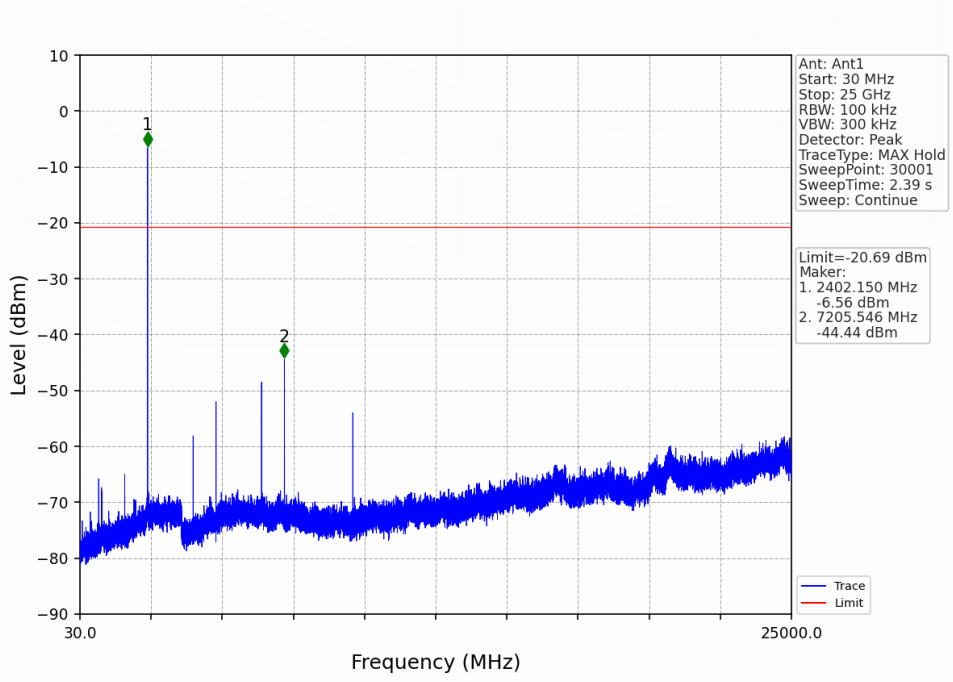
π/4DQPSK_2DH5_HOPP_Ant1_NTNV



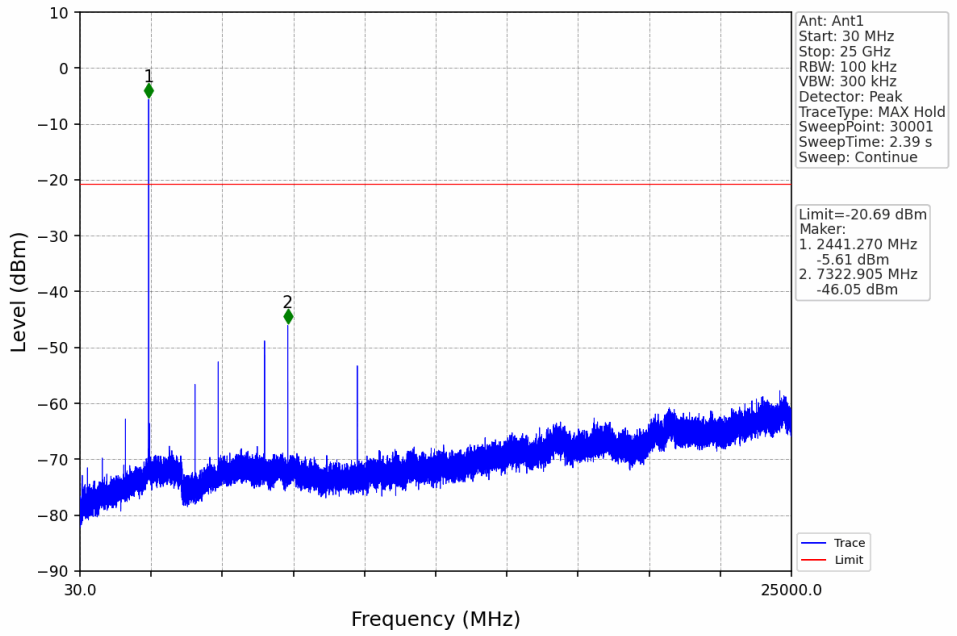
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



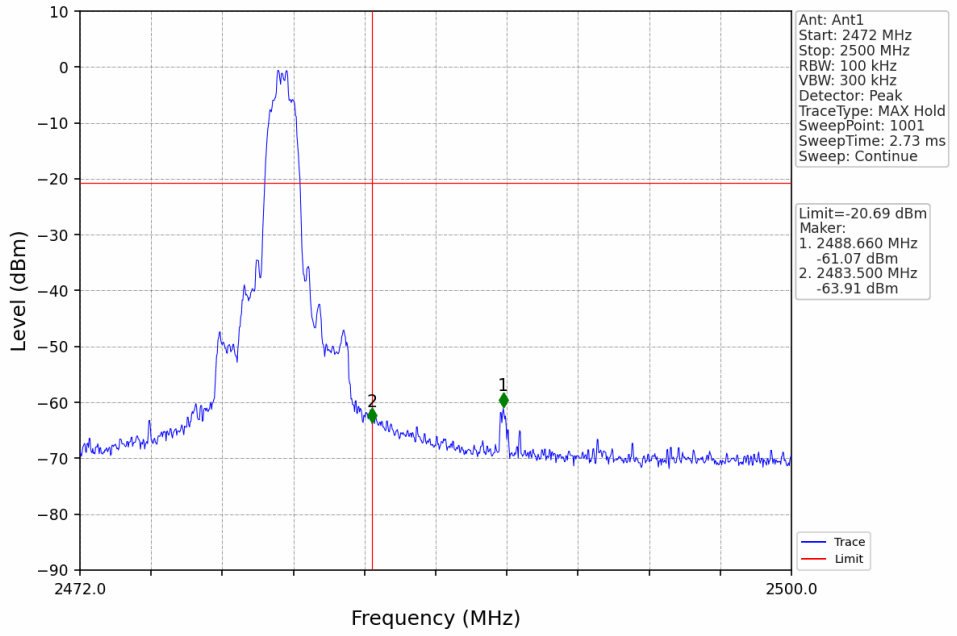
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



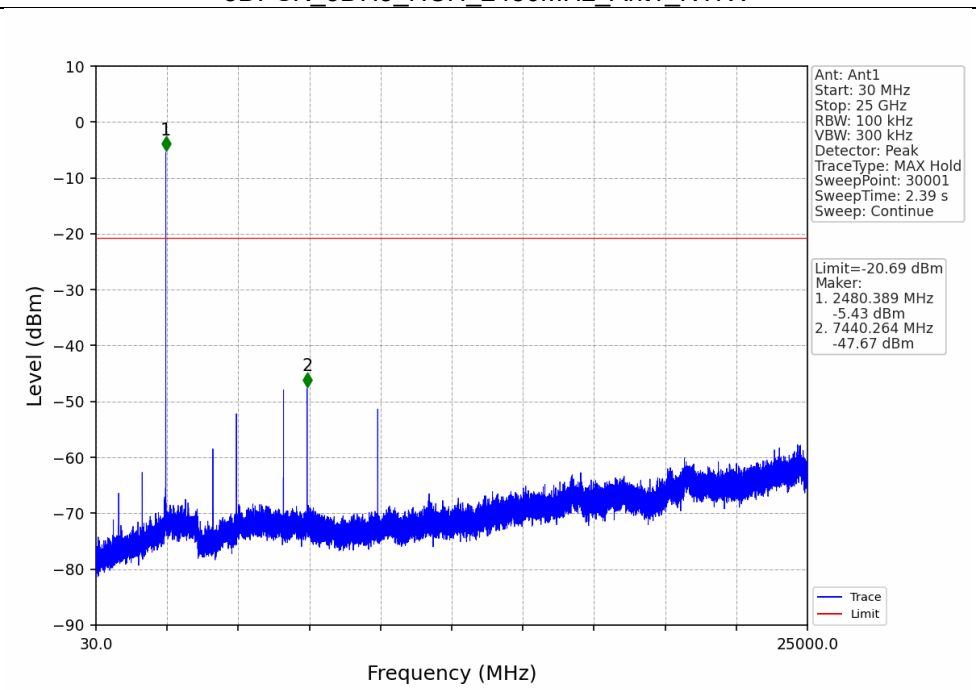
8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



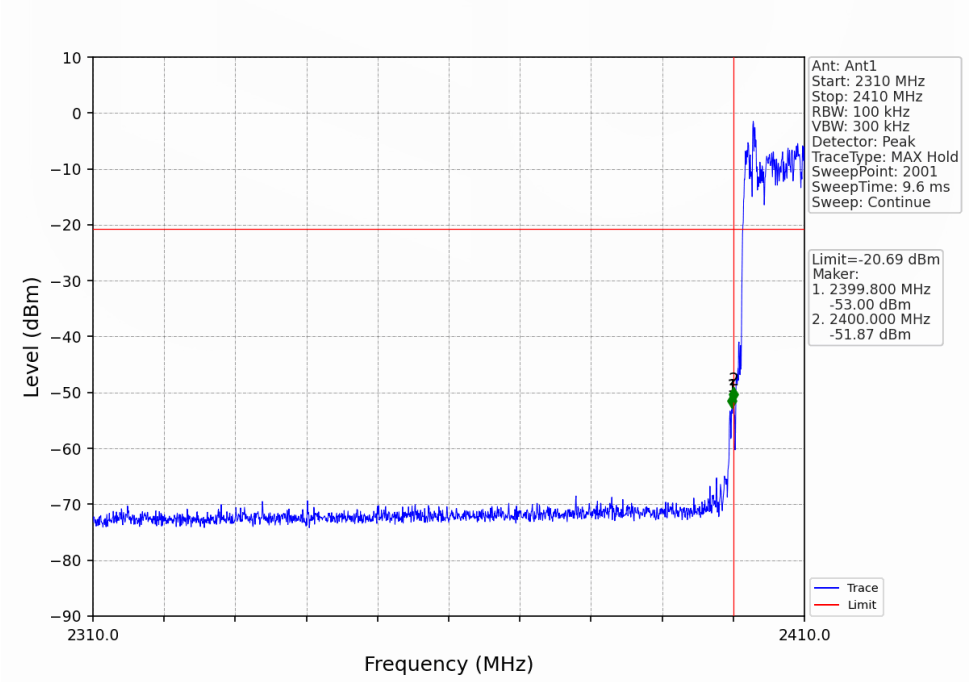
8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



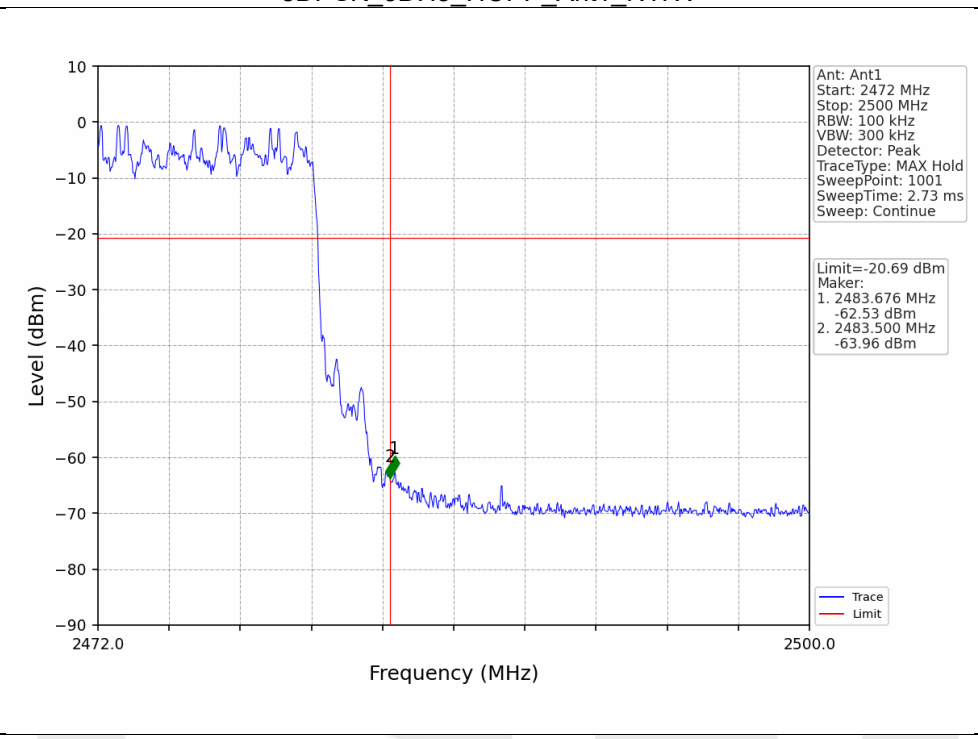
8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



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