

Appendix A

RF Test Data for BR_EDR(Conducted Measurement)

Product Name: IW SHOWER IPX4 BT SPEAKER

Trade Mark: ETECH

Test Model: SP3588

Environmental Conditions

Temperature:	24.6°C
Relative Humidity:	51.4%
ATM Pressure:	101Kpa
Test Engineer:	Simba Huang
Supervised by:	Seal Chen

Contents

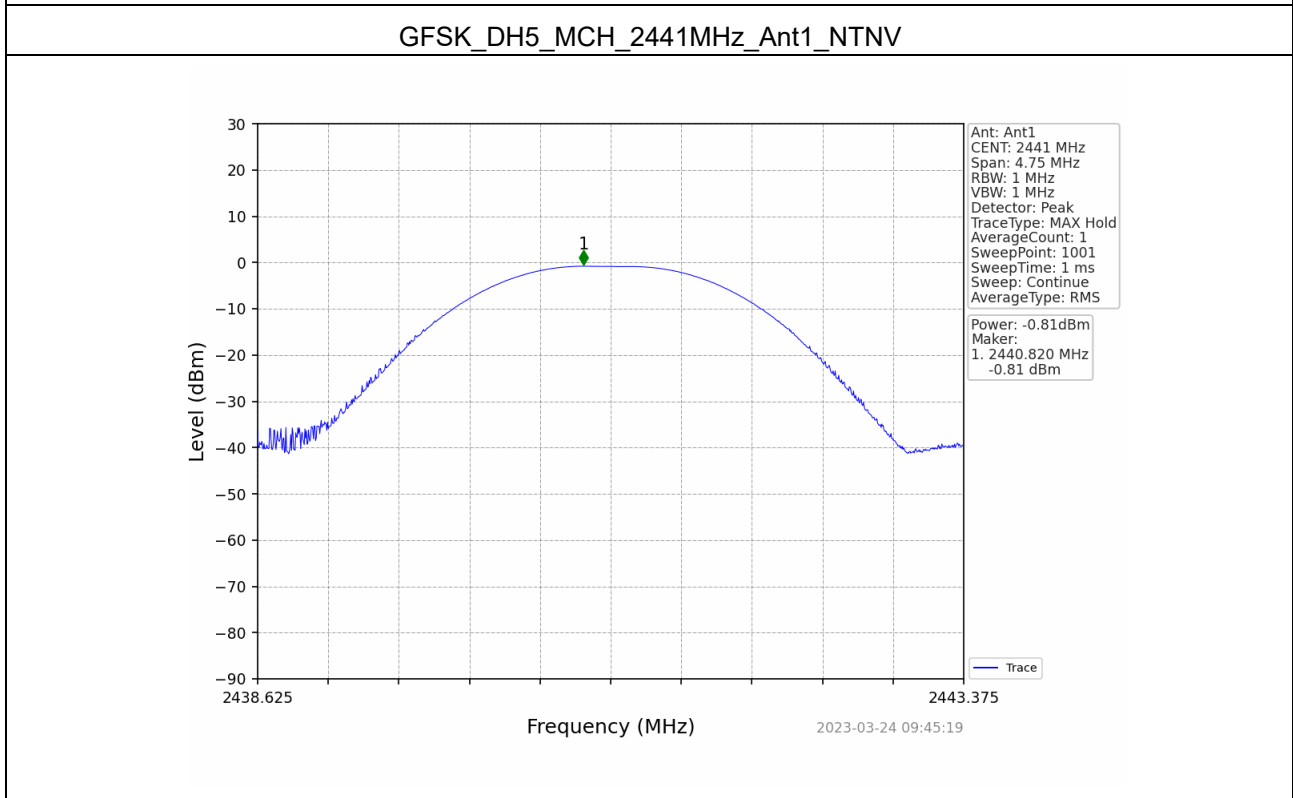
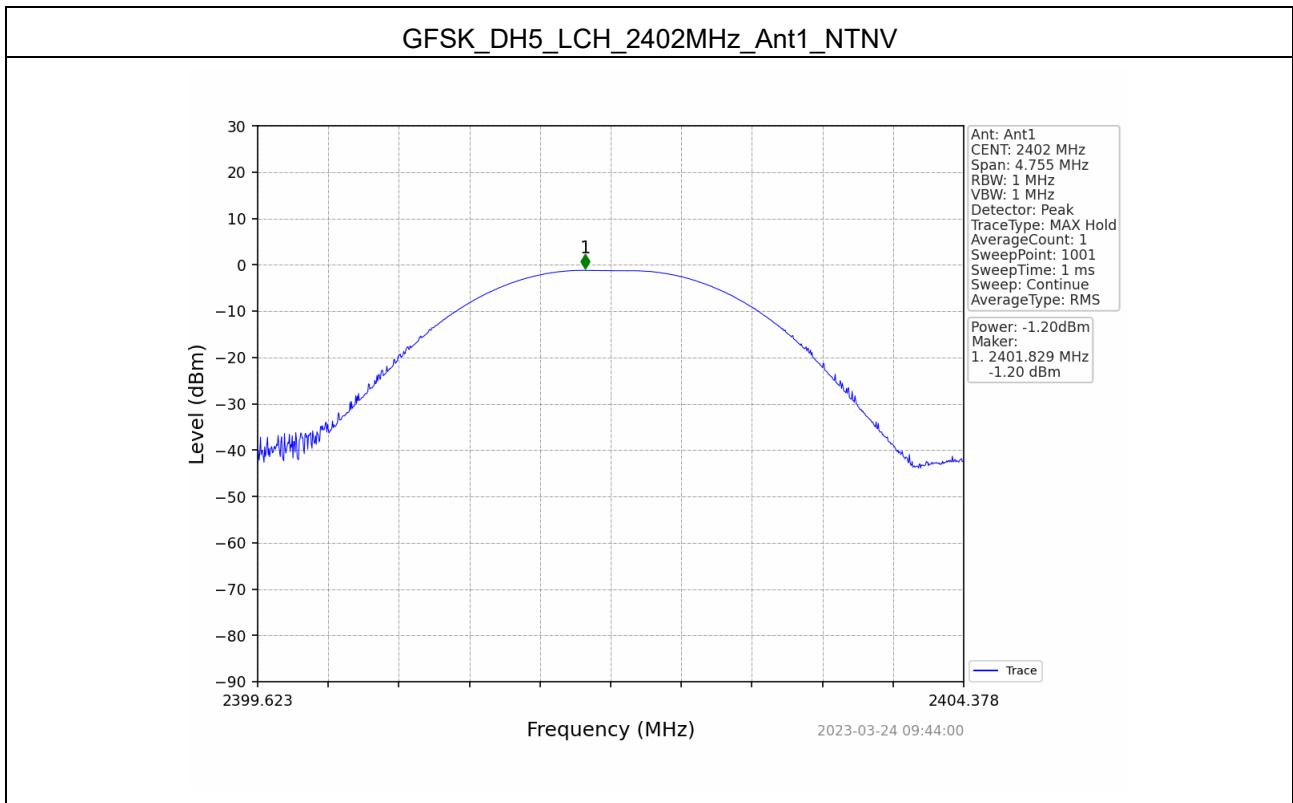
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1 Maximum Conducted Peak Output Power

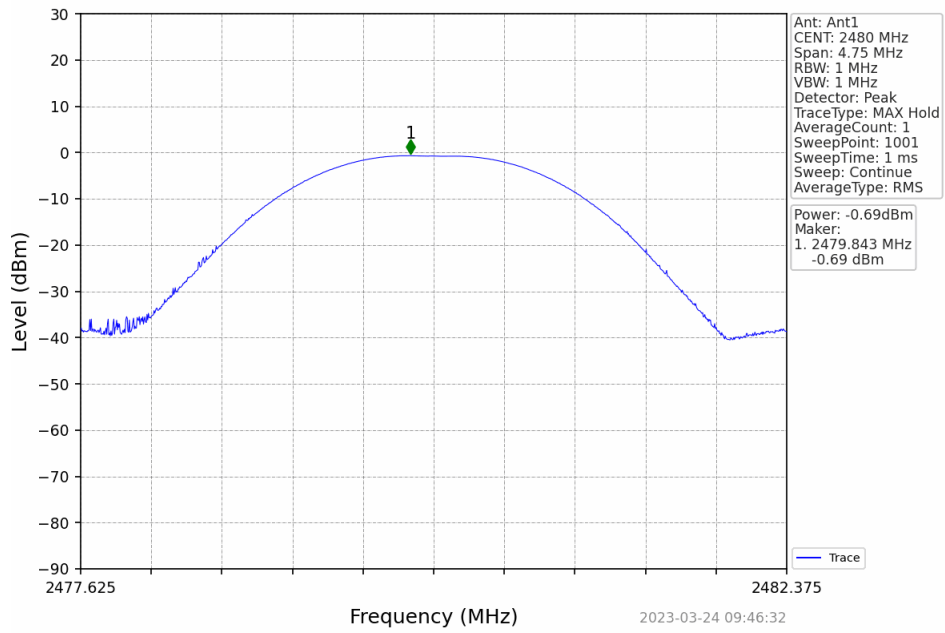
1.1 Test Result

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.20	≤ 21	Pass
	MCH	-0.81	≤ 21	Pass
	HCH	-0.69	≤ 21	Pass
$\pi/4$ DQPSK	LCH	-0.57	≤ 21	Pass
	MCH	-0.19	≤ 21	Pass
	HCH	-0.05	≤ 21	Pass
8DPSK	LCH	-0.45	≤ 21	Pass
	MCH	0.00	≤ 21	Pass
	HCH	0.20	≤ 21	Pass

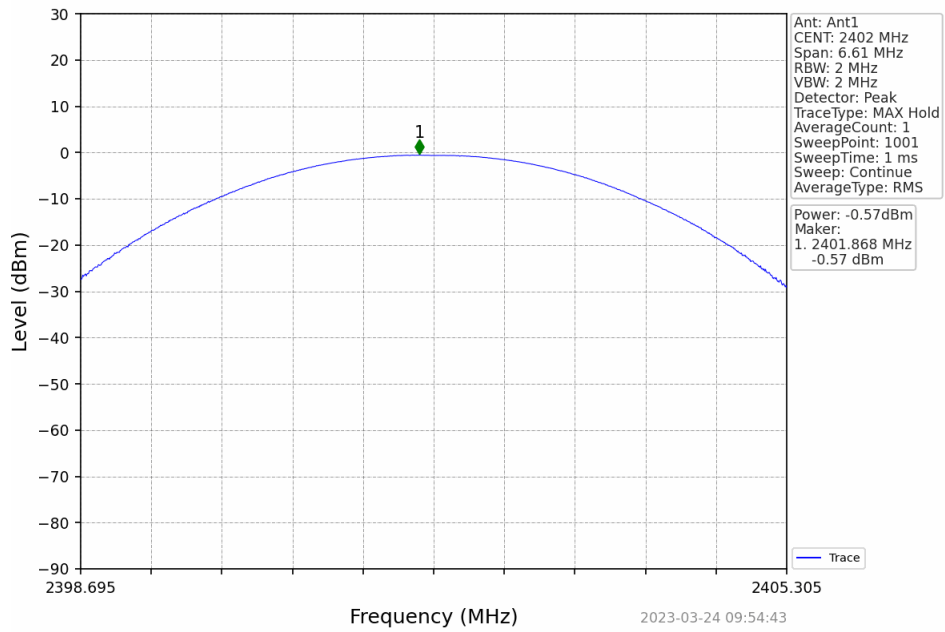
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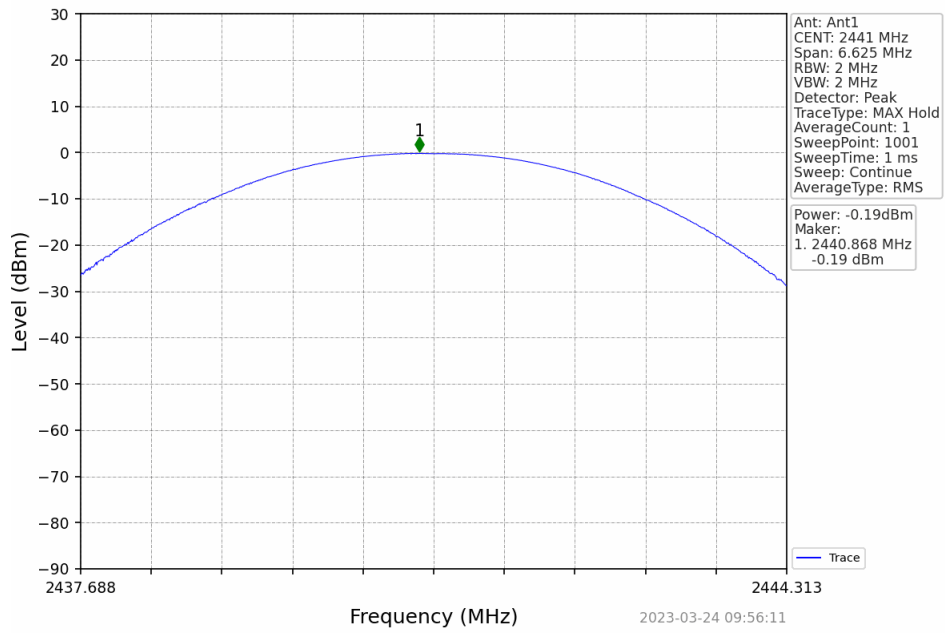
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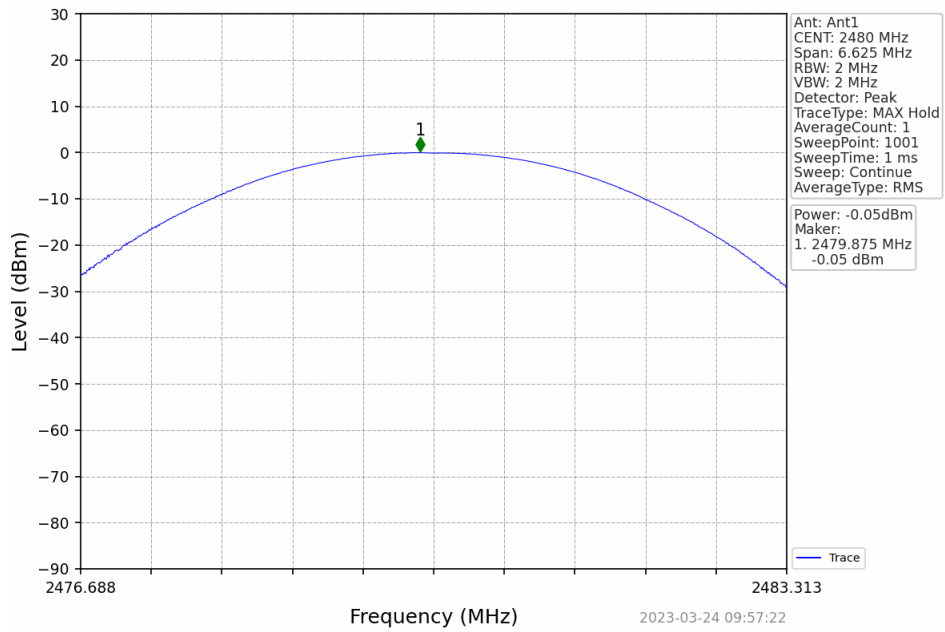
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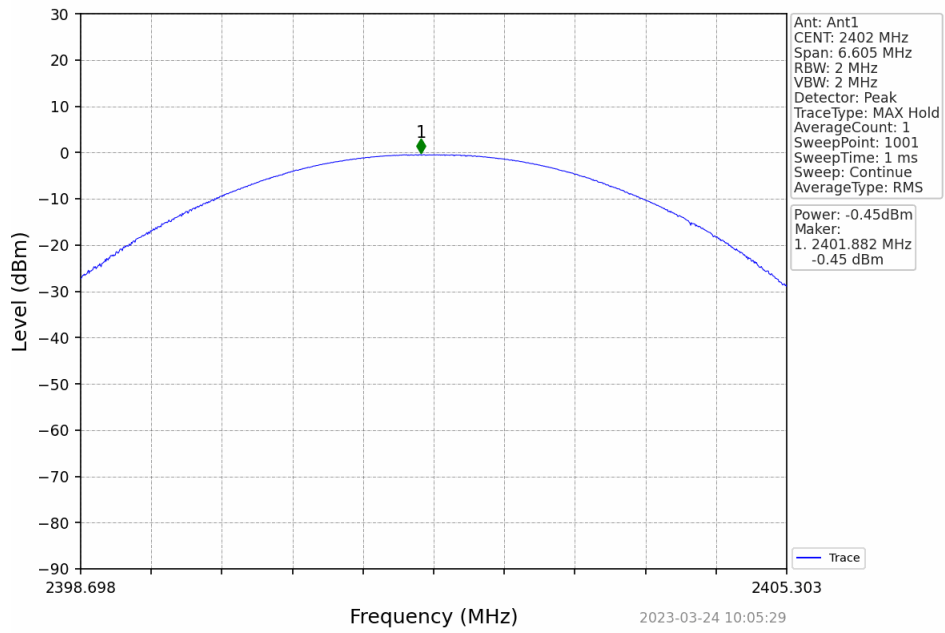
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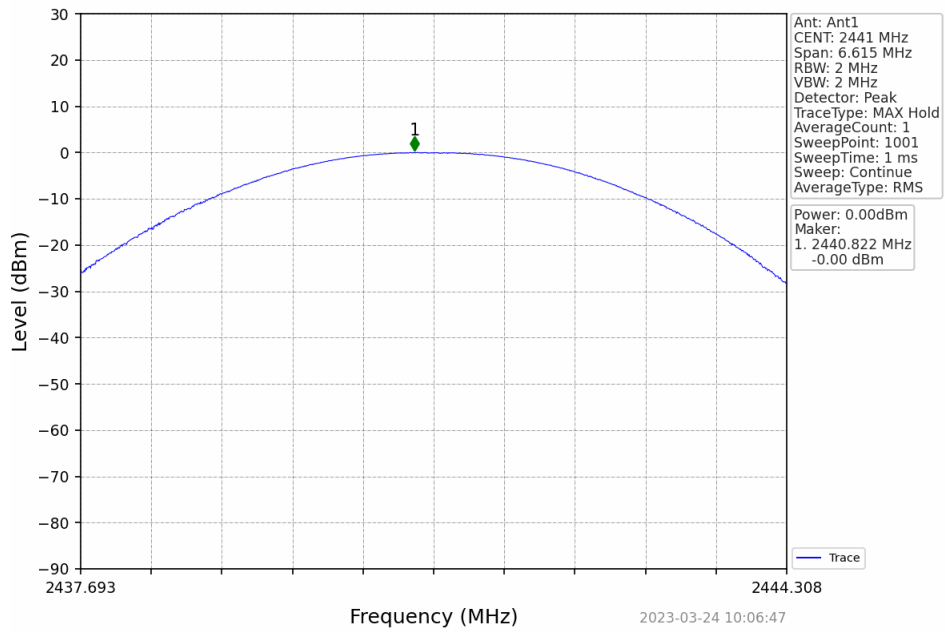
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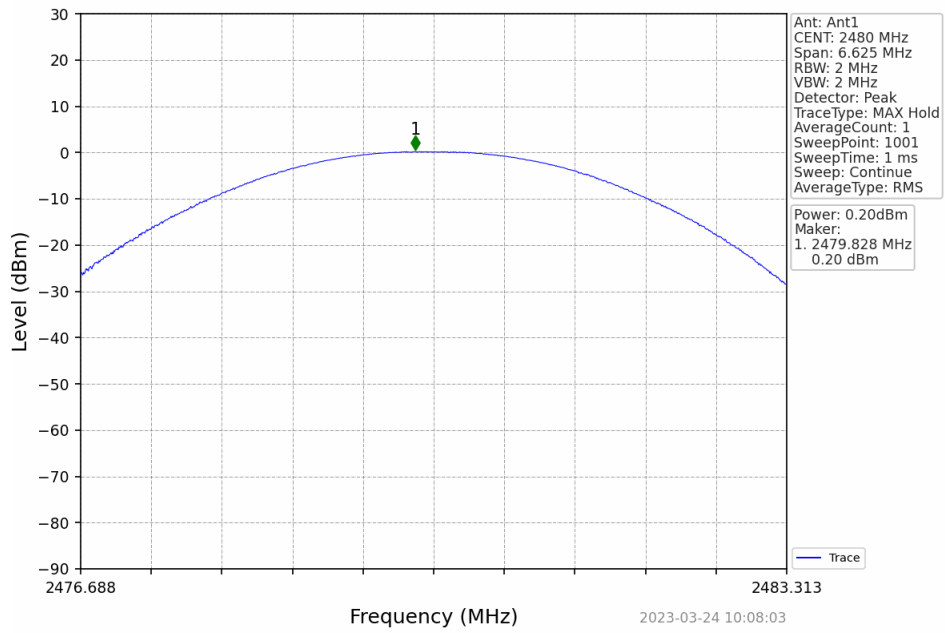
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8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV

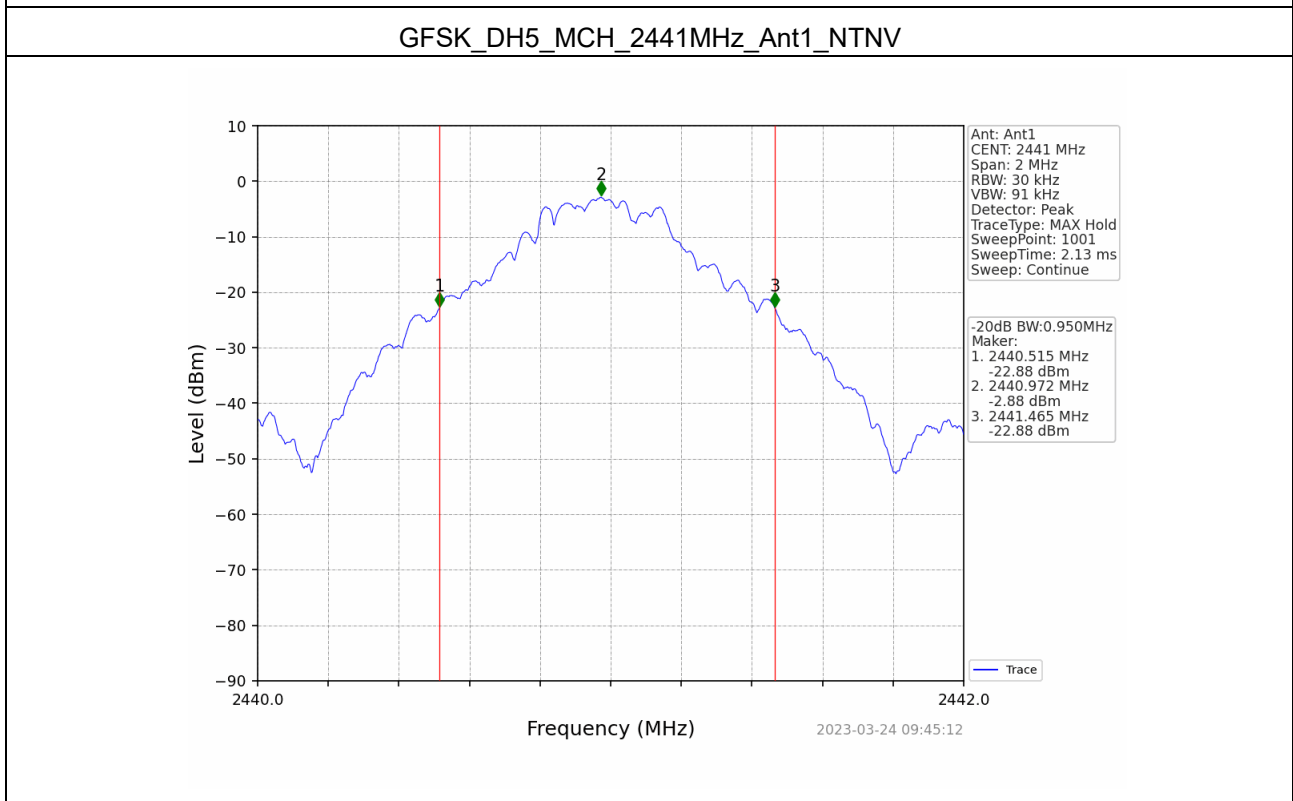
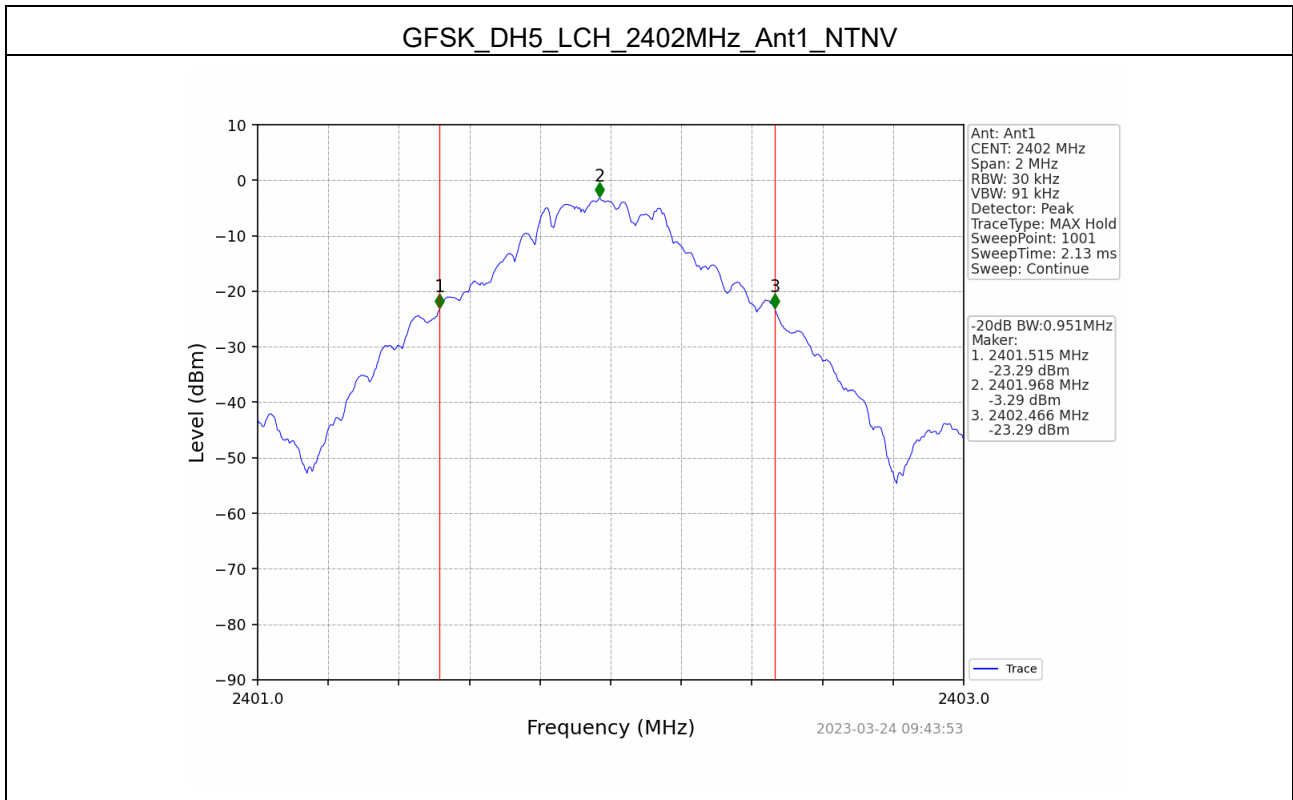


2 20dB Bandwidth

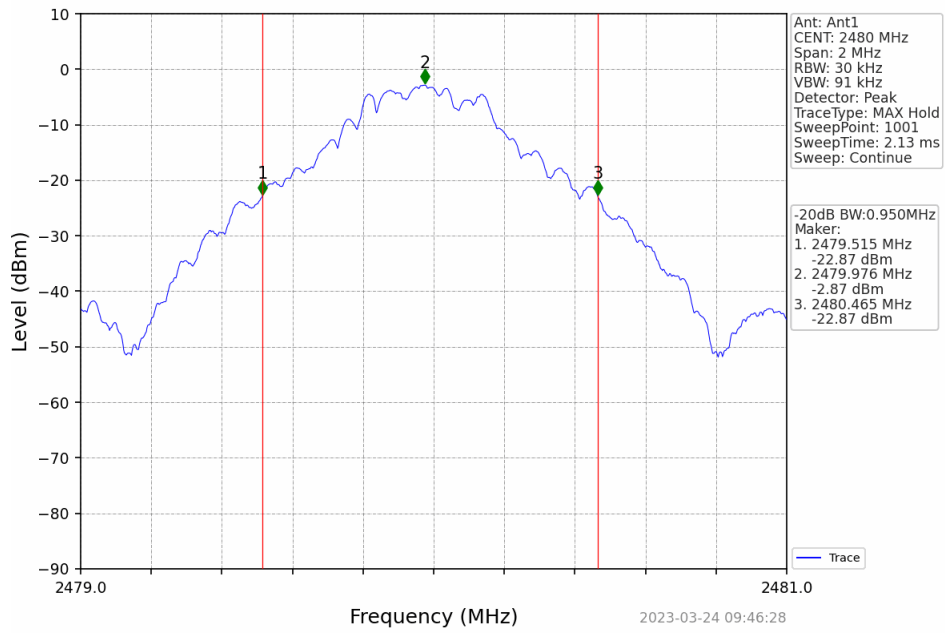
2.1 Test Result

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.951	Not Specified	Pass
	MCH	0.950	Not Specified	Pass
	HCH	0.950	Not Specified	Pass
$\pi/4$ DQPSK	LCH	1.322	Not Specified	Pass
	MCH	1.325	Not Specified	Pass
	HCH	1.325	Not Specified	Pass
8DPSK	LCH	1.321	Not Specified	Pass
	MCH	1.323	Not Specified	Pass
	HCH	1.325	Not Specified	Pass

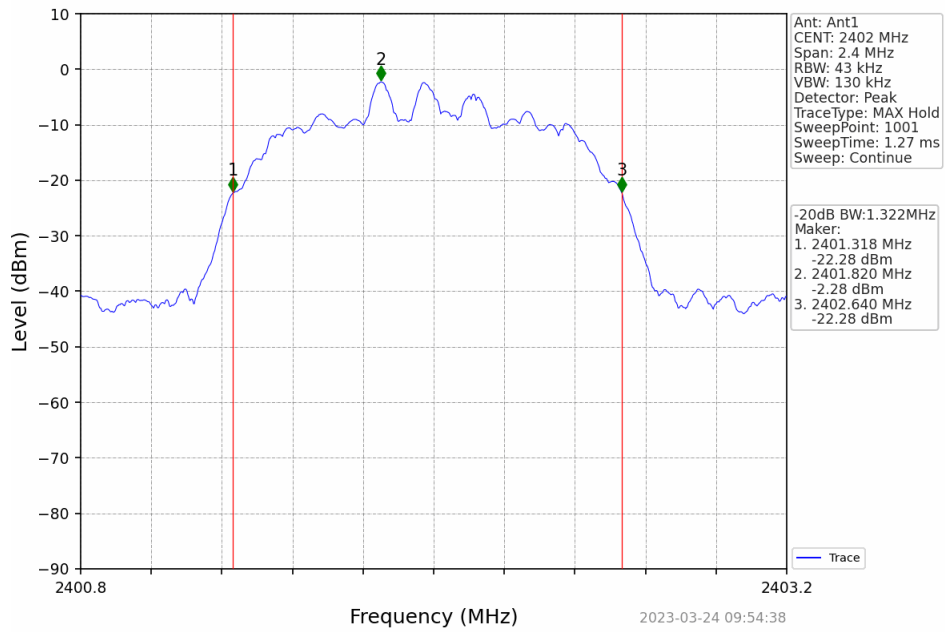
2.2 Test Graphs



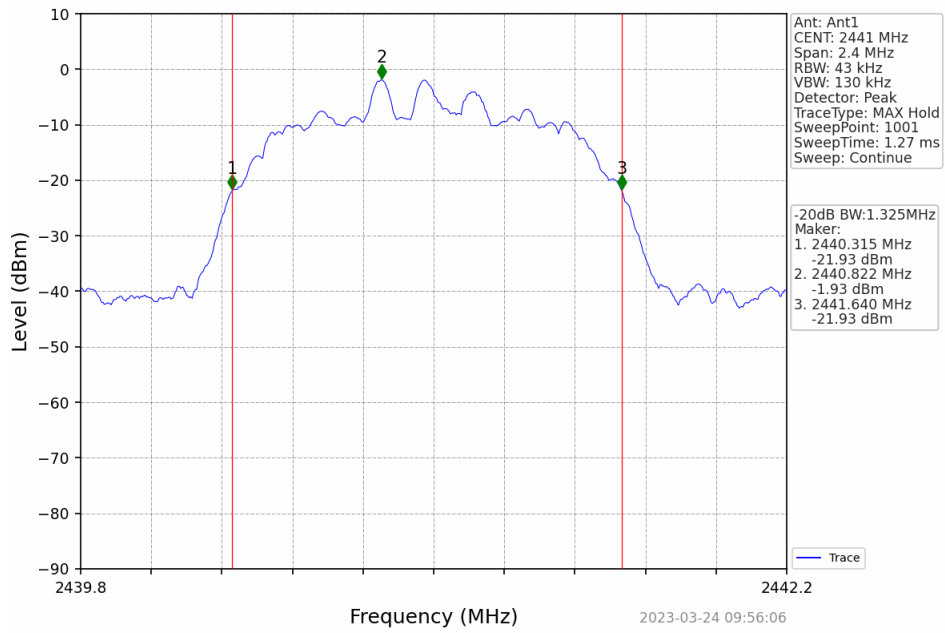
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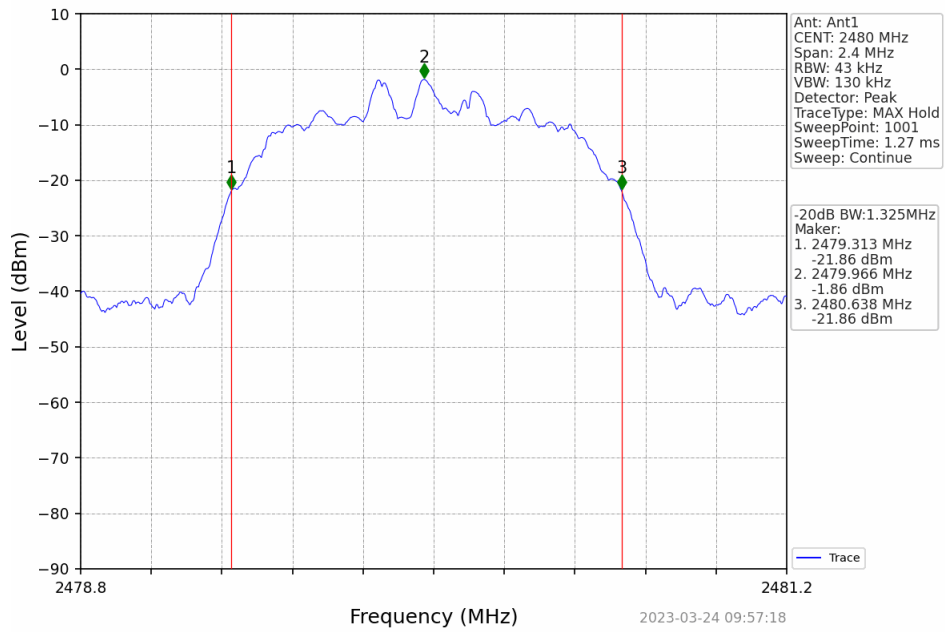
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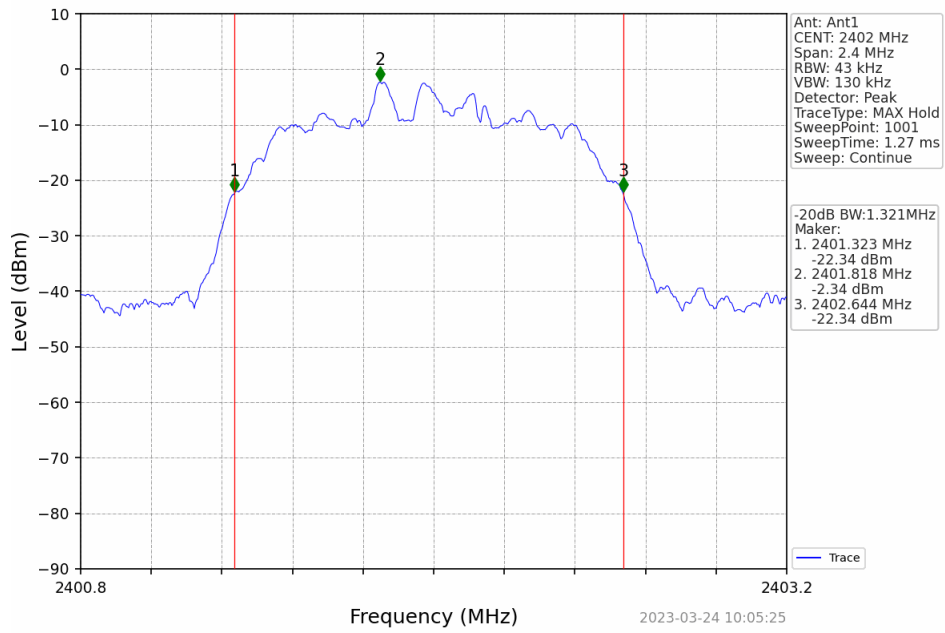
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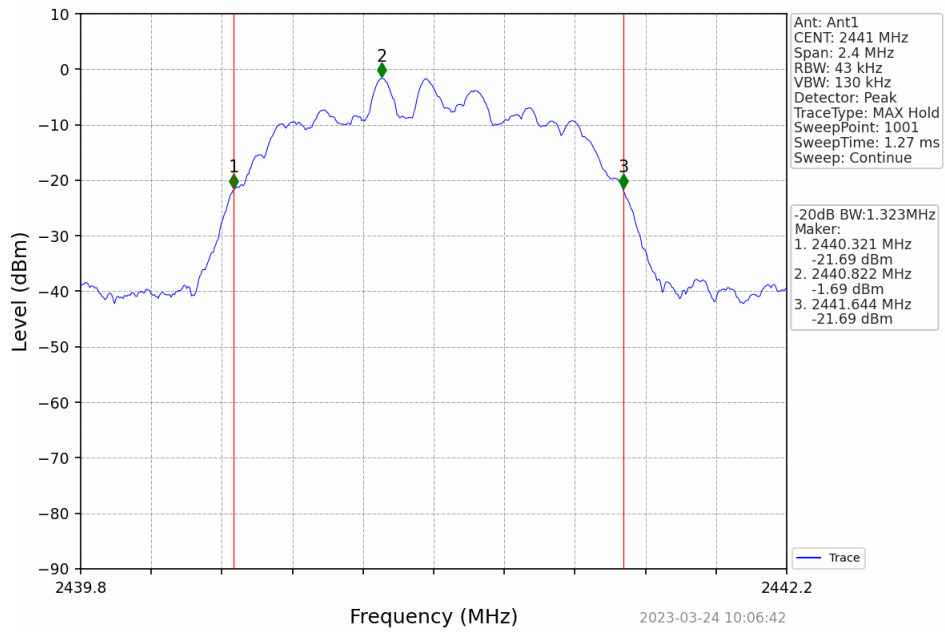
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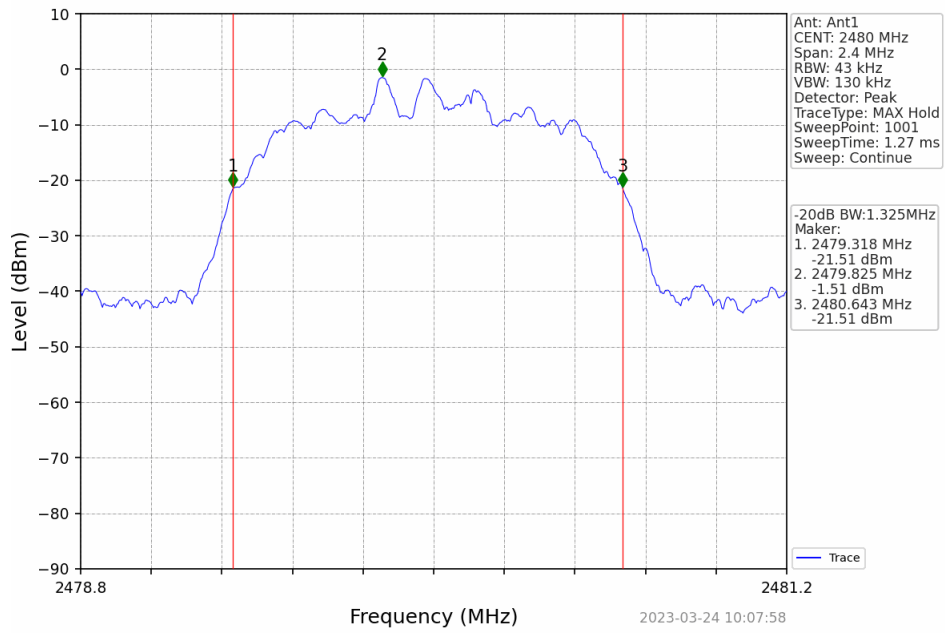
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8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV

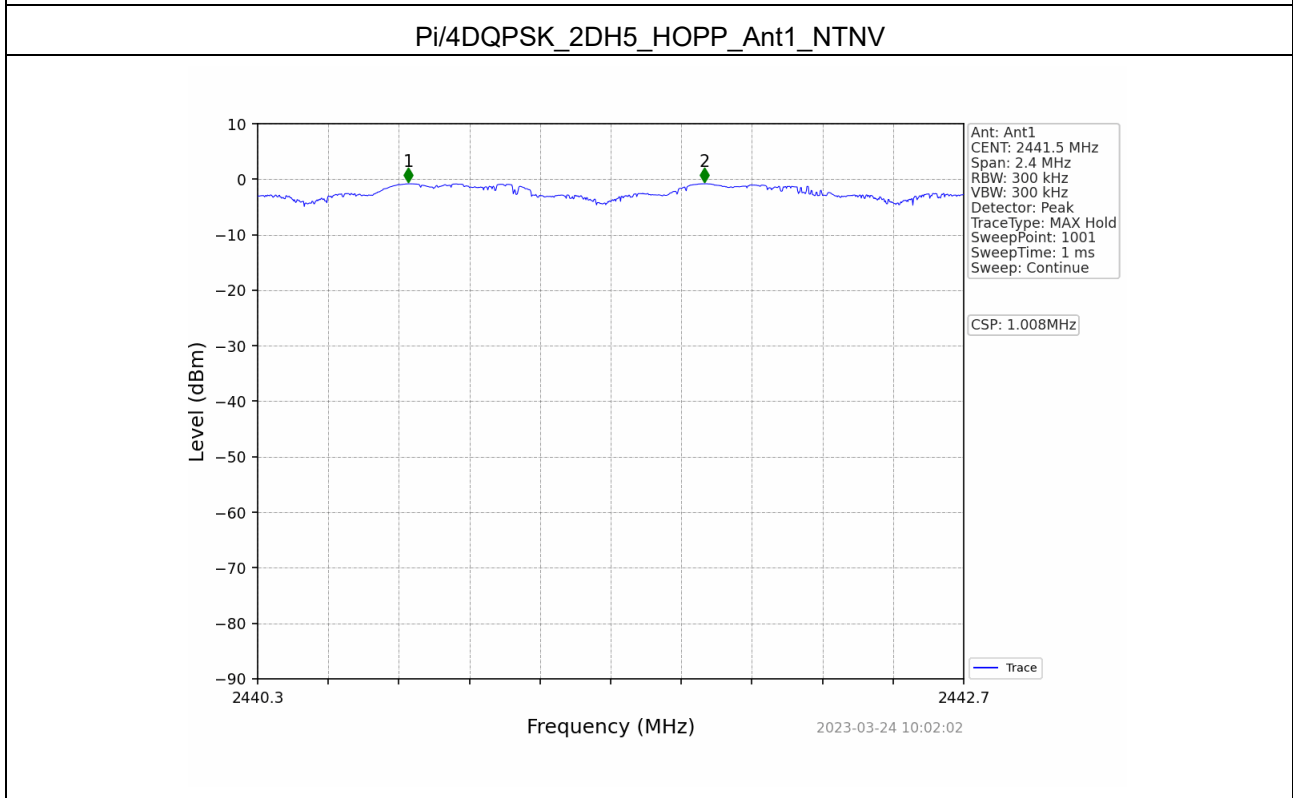
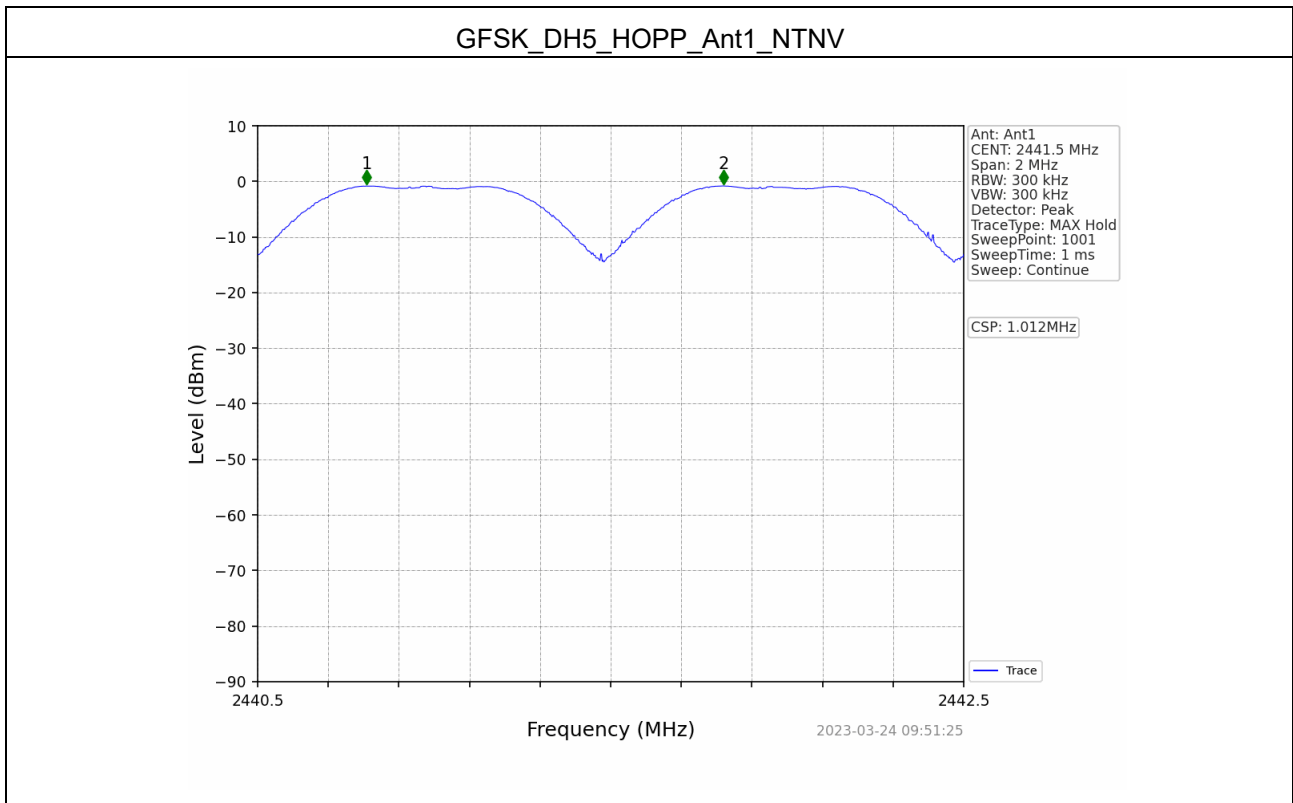


3 Carrier Frequency Separation

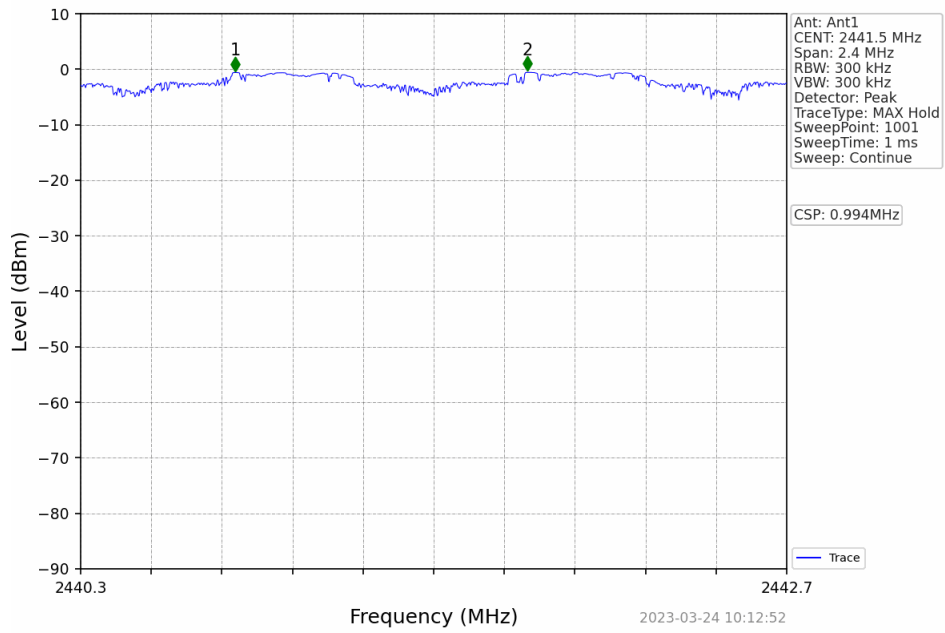
3.1 Test Result

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	MCH	1.012	≥ 0.951	Pass
$\pi/4$ DQPSK	MCH	1.008	≥ 0.883	Pass
8DPSK	MCH	0.994	≥ 0.883	Pass

3.2 Test Graphs



8DPSK_3DH5_HOPP_Ant1_NTNV

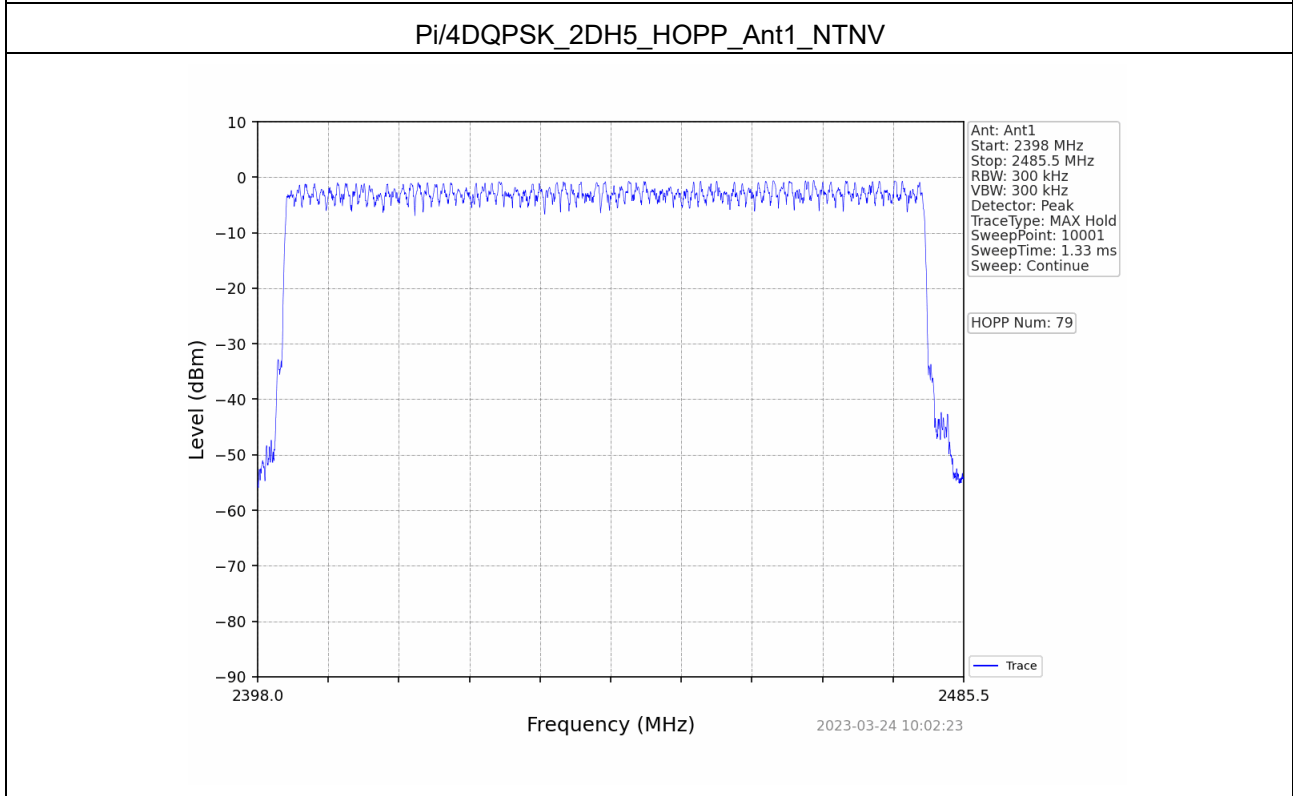
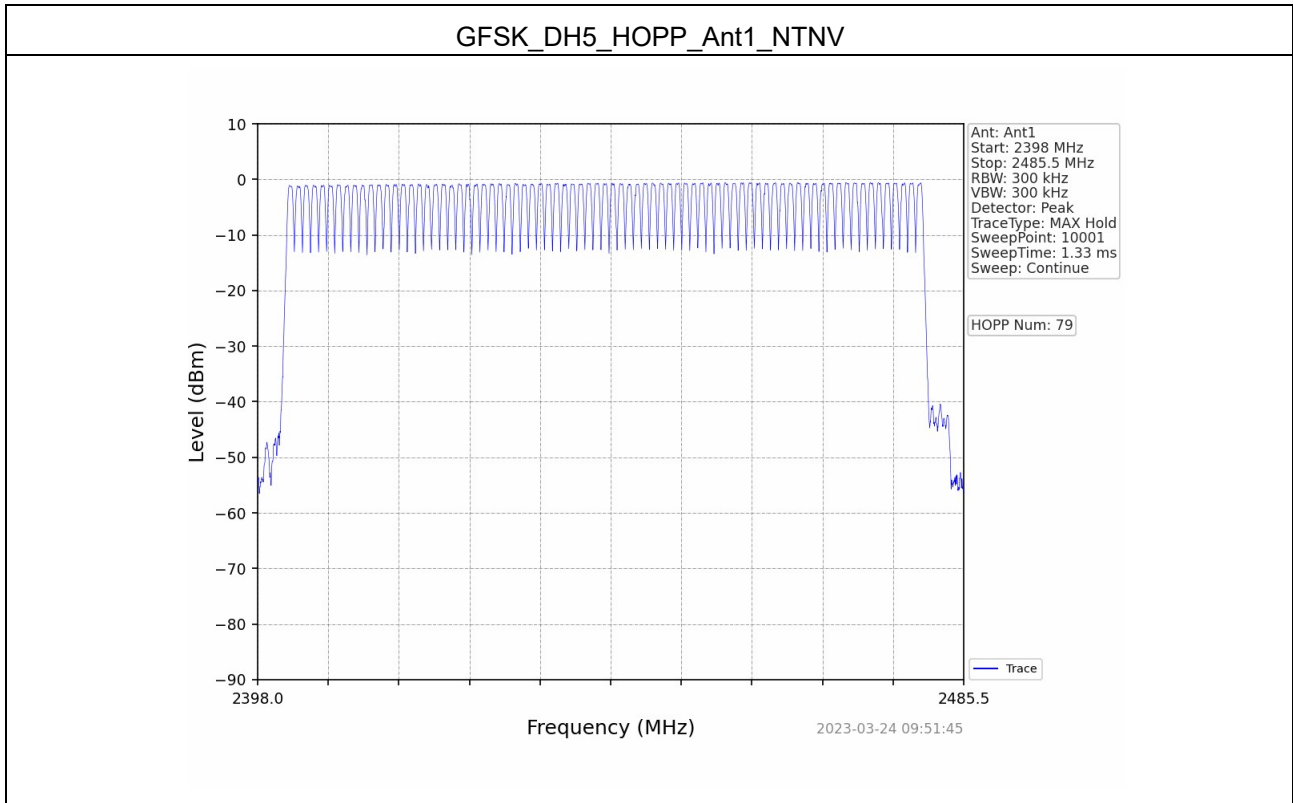


4 Hopping Channel Number

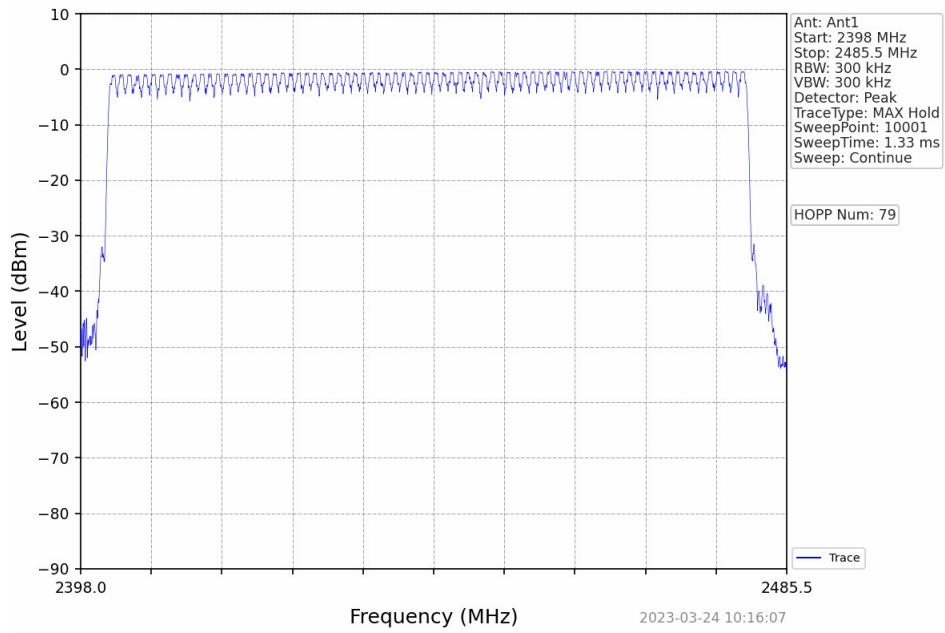
4.1 Test Result

Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	≥ 15	PASS
$\pi/4$ DQPSK	Hop	79	≥ 15	PASS
8DPSK	Hop	79	≥ 15	PASS

4.2 Test Graphs



8DPSK_3DH5_HOPP_Ant1_NTNV

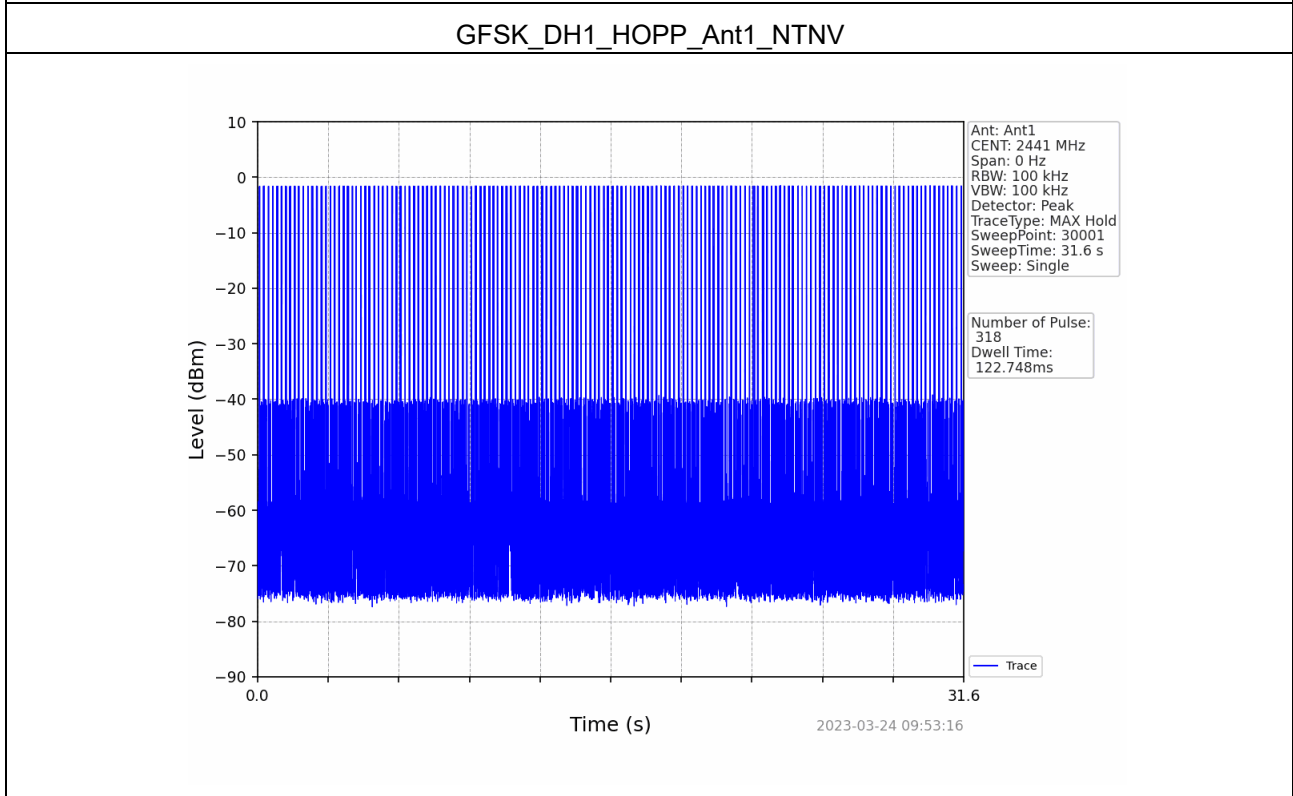
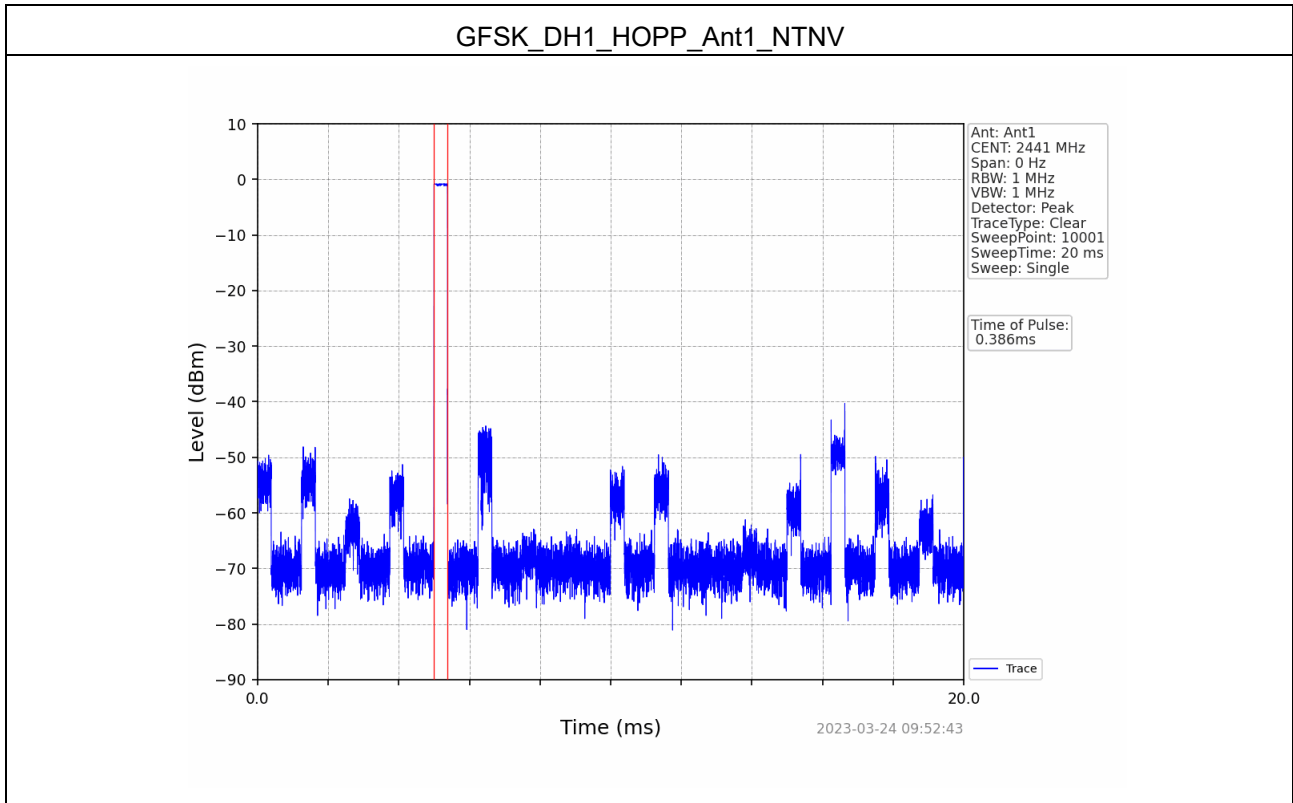


5 Dwell Time

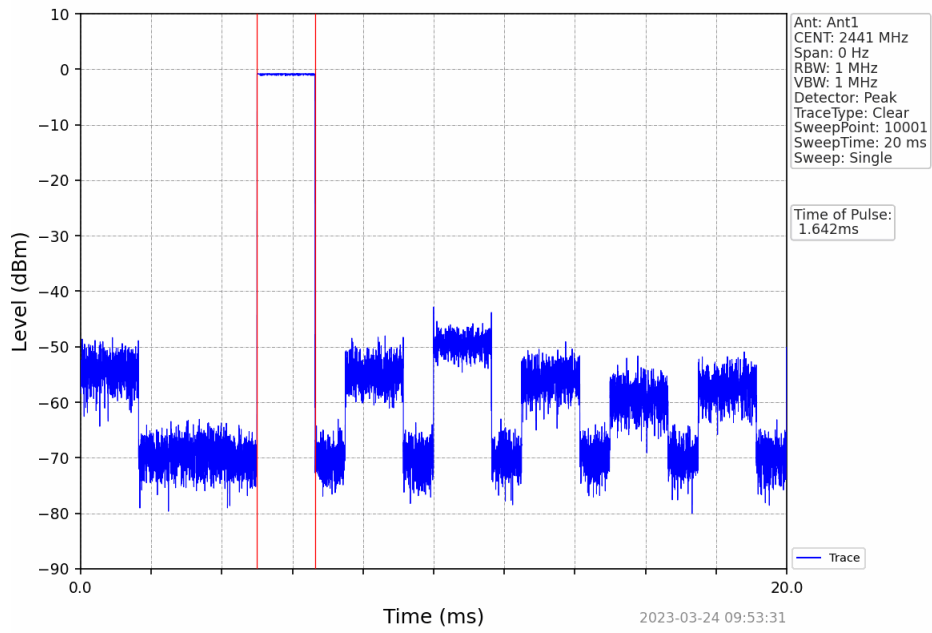
5.1 Test Result

Mode	Packet	Channel	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time[ms]	Limit [s]	Verdict
GFSK	DH5	LCH	0.386	31.600	318	122.748	0.4	Pass
		MCH	1.642	31.600	160	262.720	0.4	Pass
		HCH	2.892	31.600	110	318.120	0.4	Pass
$\pi/4$ DQPSK	2DH5	LCH	0.394	31.600	319	125.686	0.4	Pass
		MCH	1.648	31.600	164	270.272	0.4	Pass
		HCH	2.896	31.600	106	306.976	0.4	Pass
8DPSK	3DH5	LCH	6.678	31.600	54	360.612	0.4	Pass
		MCH	0.654	31.600	166	108.564	0.4	Pass
		HCH	0.906	31.600	117	106.002	0.4	Pass

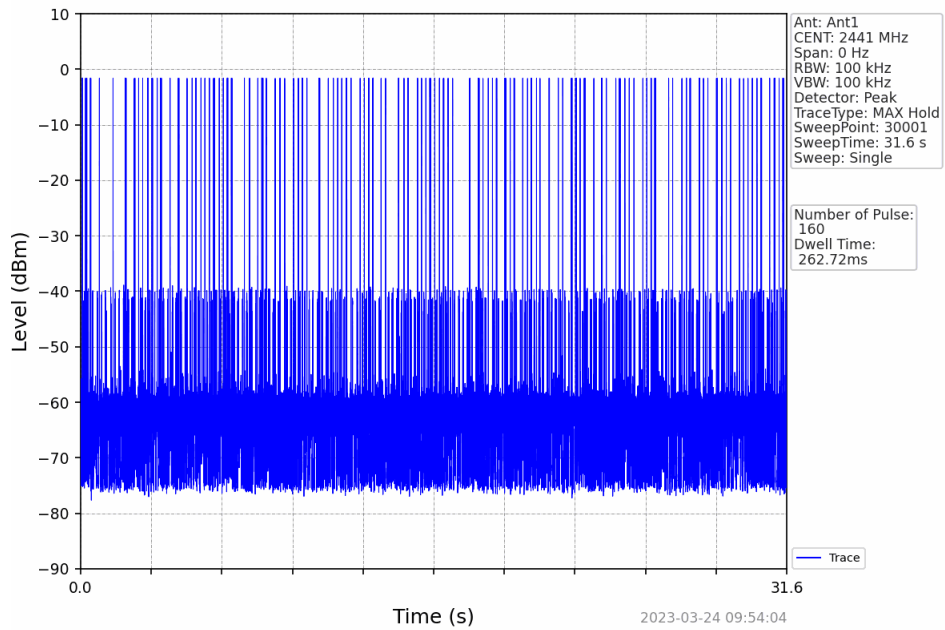
5.2 Test Graphs



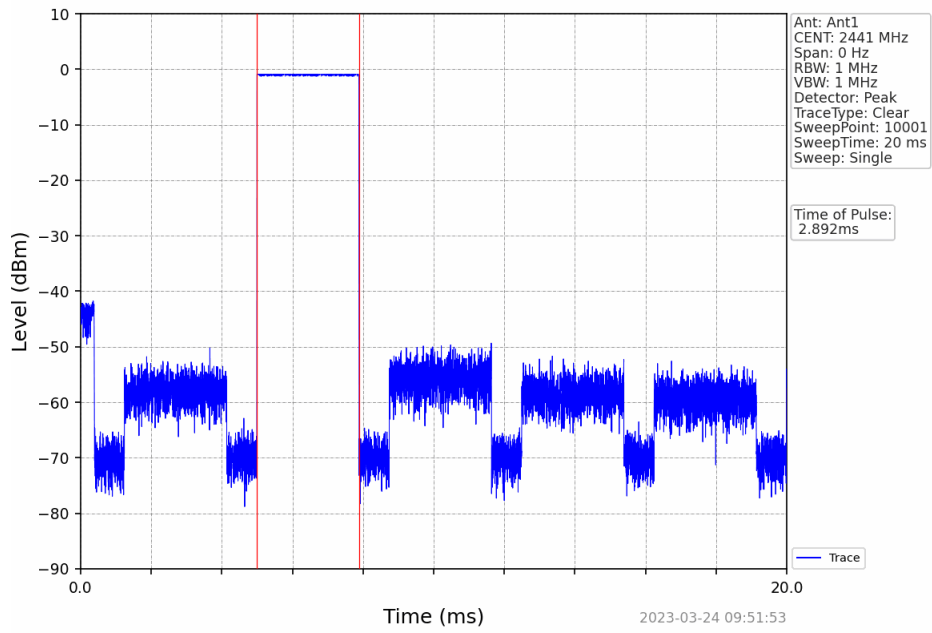
GFSK_DH3_HOPP_Ant1_NTNV



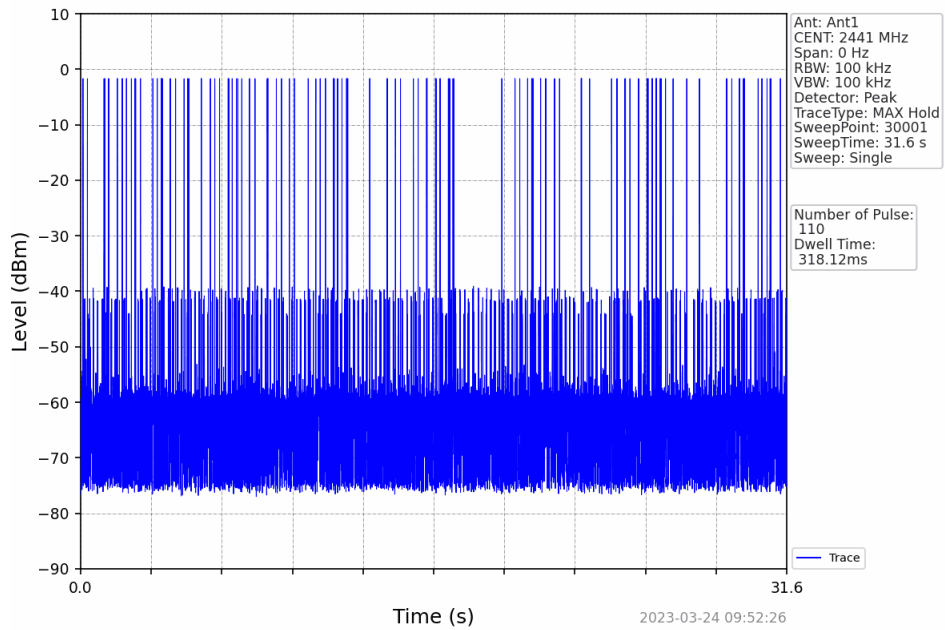
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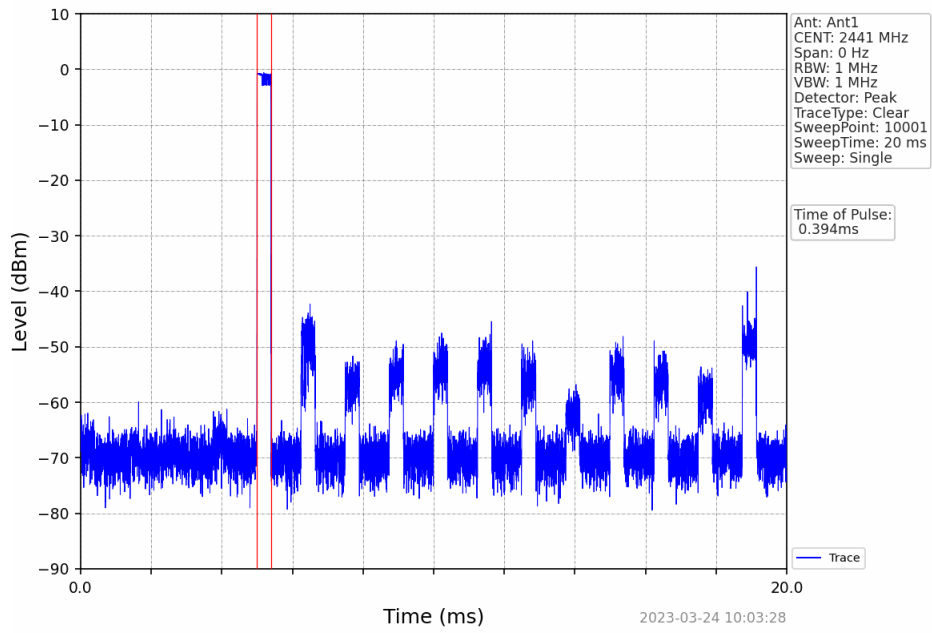
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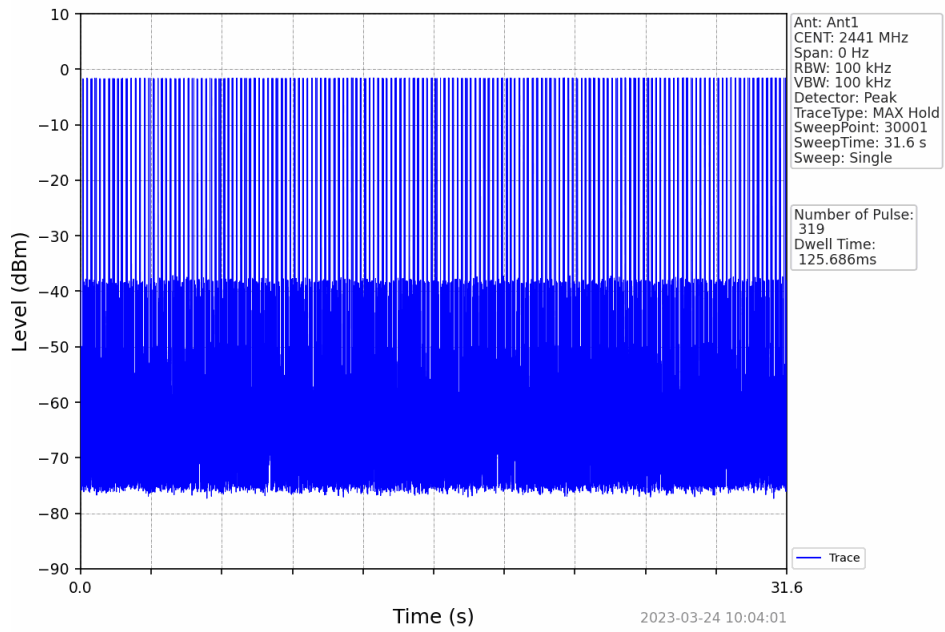
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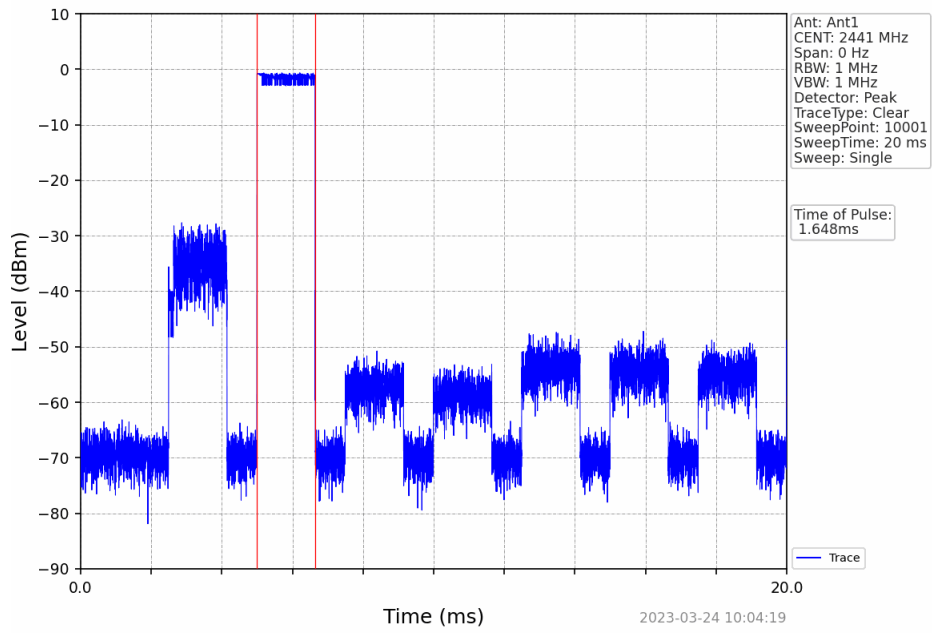
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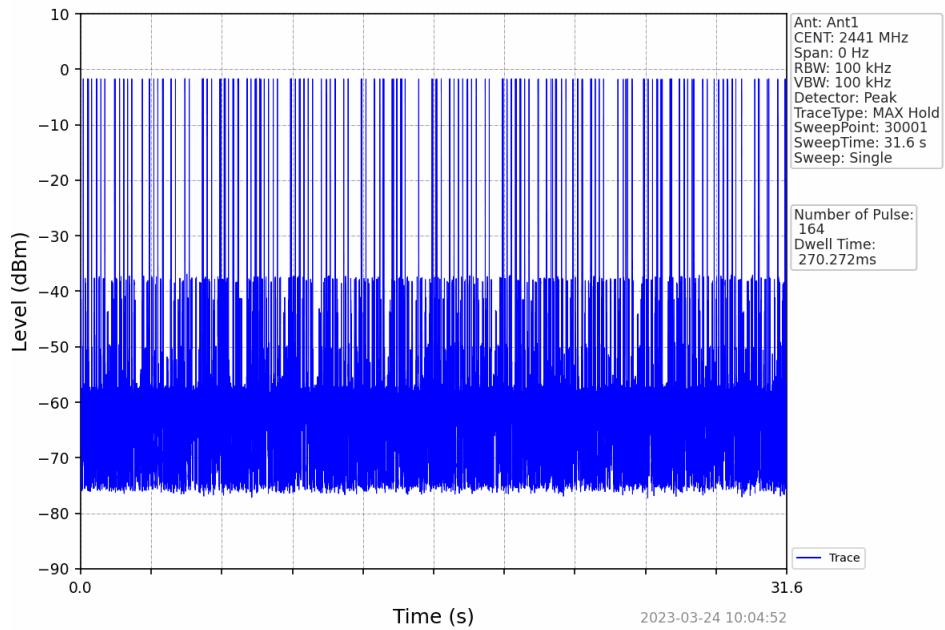
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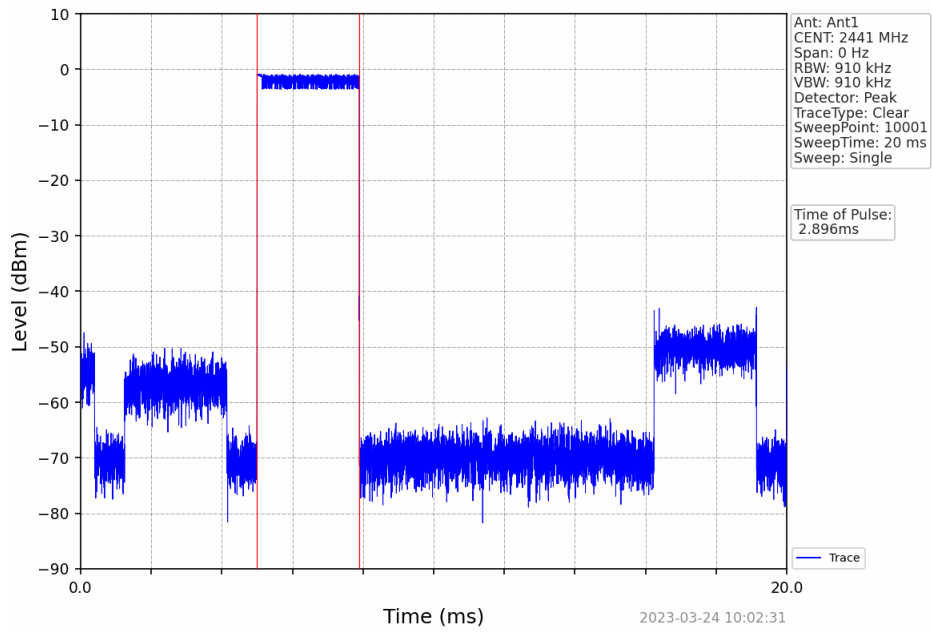
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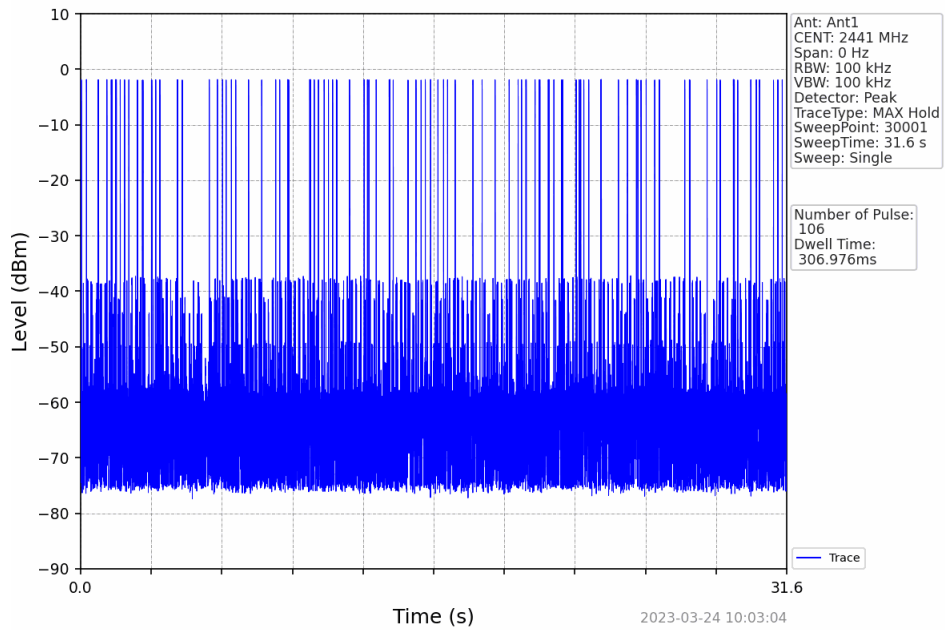
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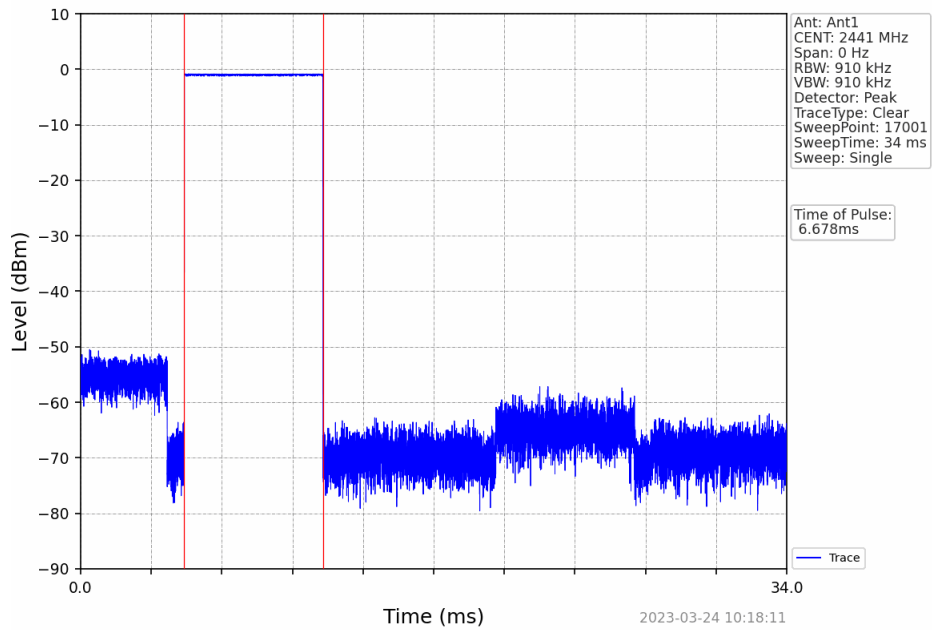
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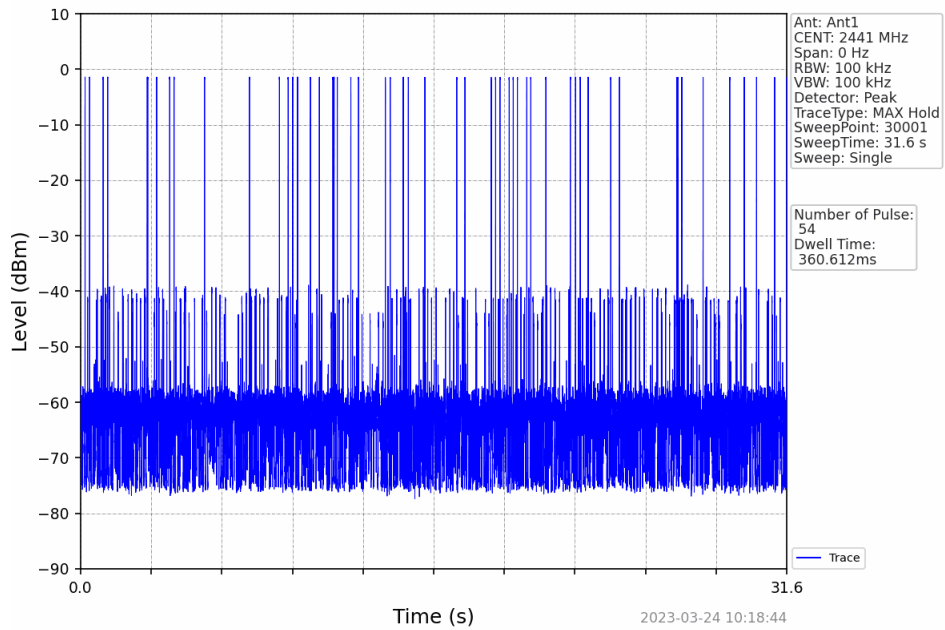
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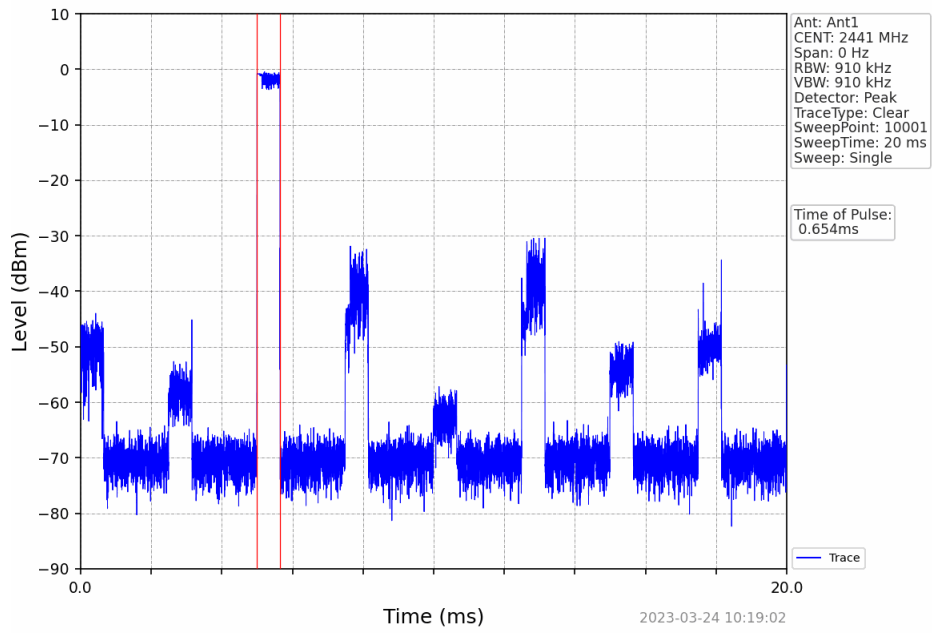
8DPSK_3DH1_HOPP_Ant1_NTNV



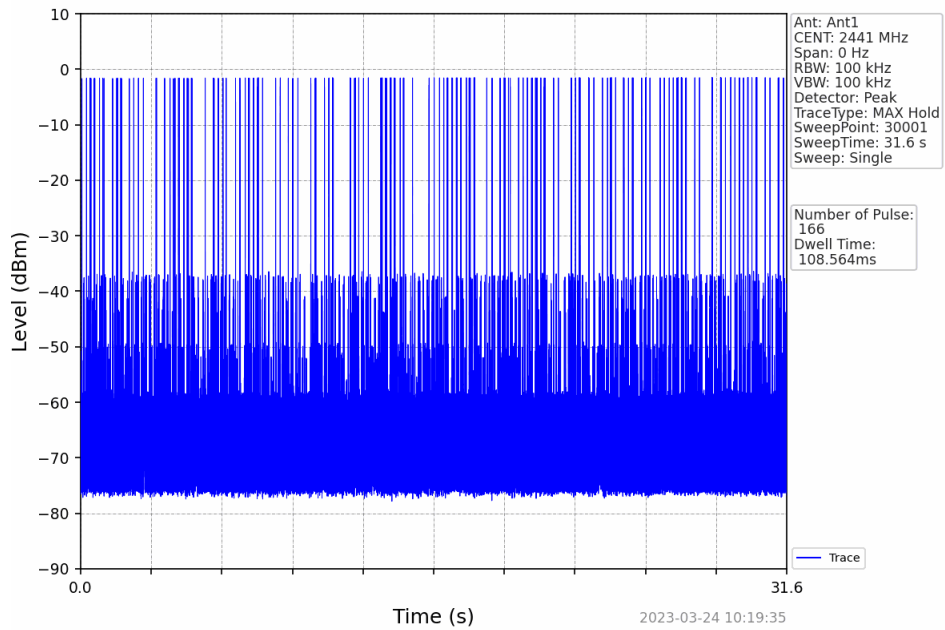
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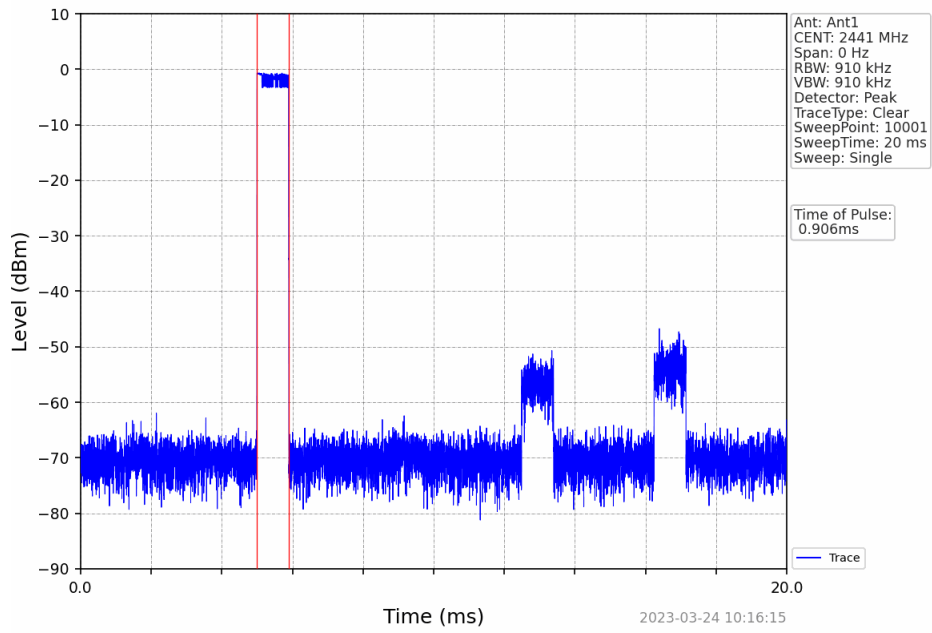
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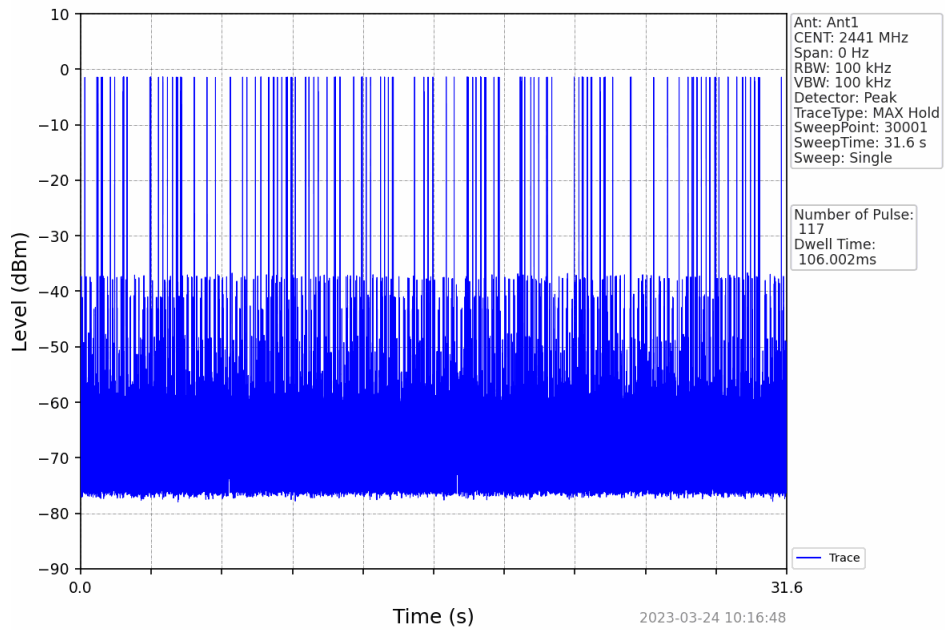
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8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV

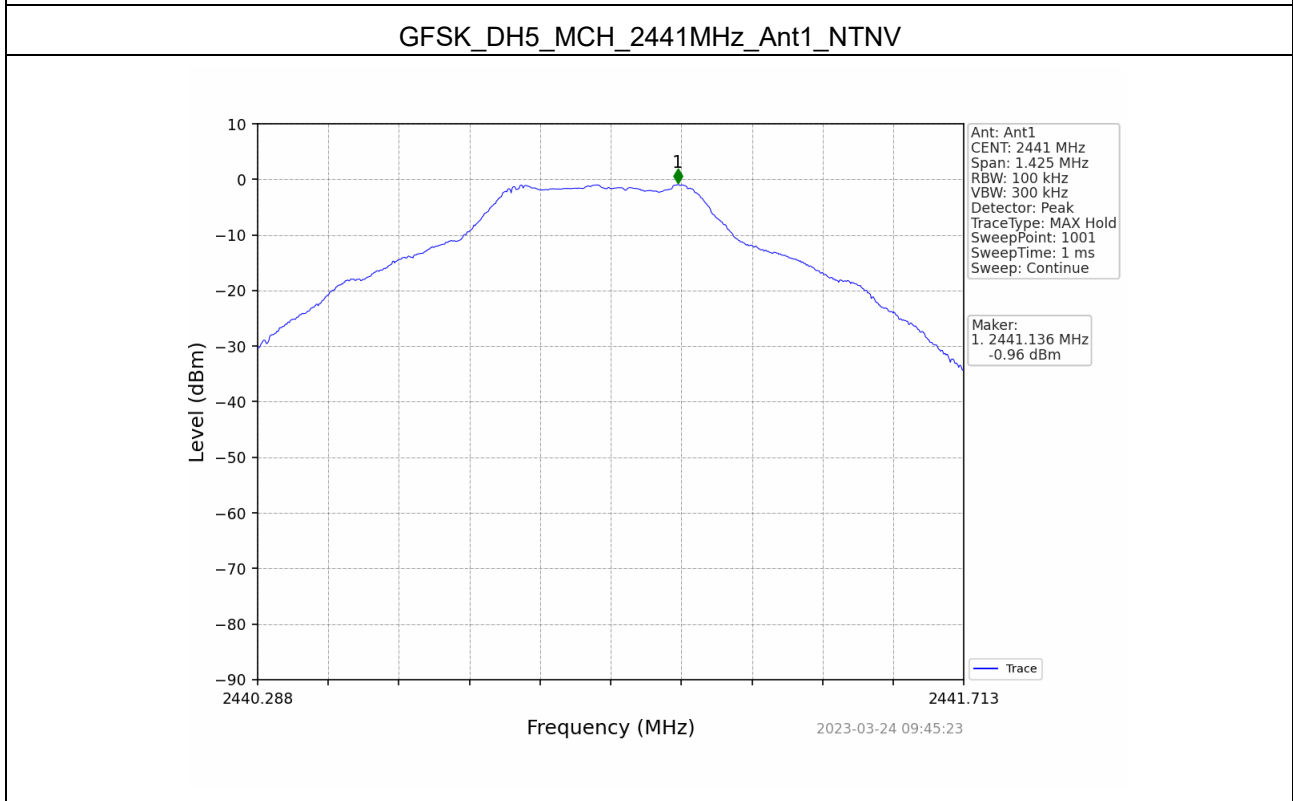
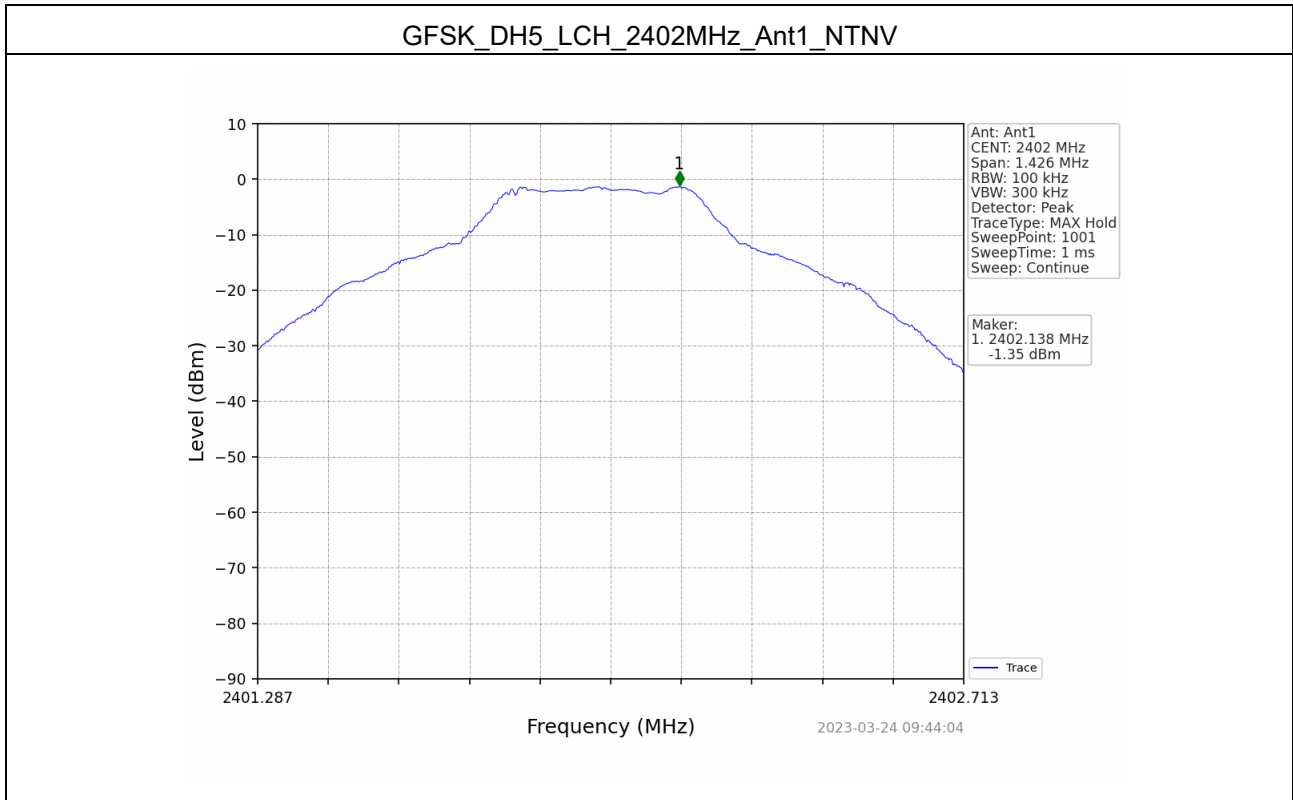


6 Conducted Spurious Emissions and Band Edges Test

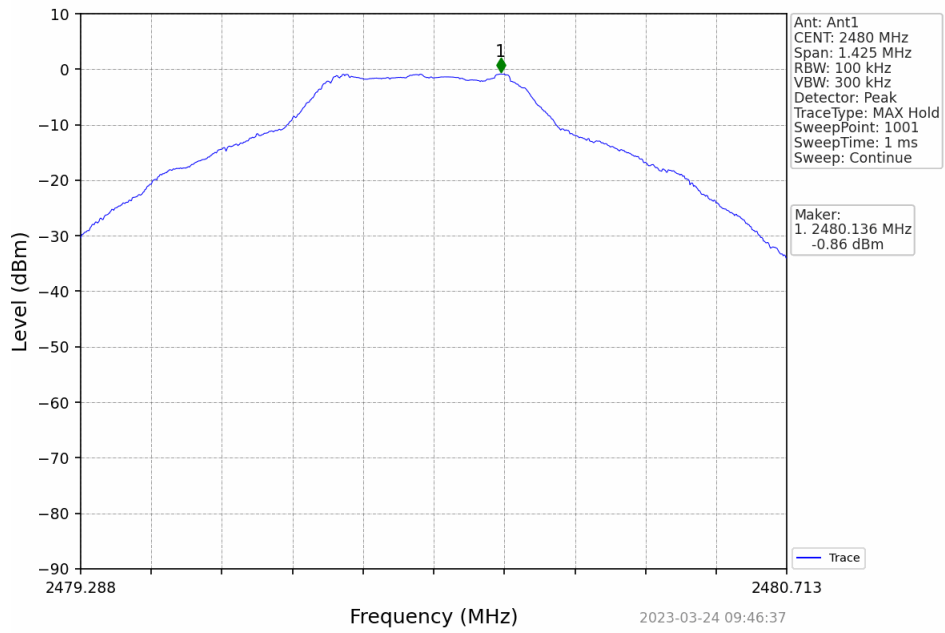
6.1 Test Result

Mode	Channel	Max. Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	-1.35	-20	Pass
	MCH	-0.96	-20	Pass
	HCH	-0.86	-20	Pass
$\pi/4$ DQPSK	LCH	-1.22	-20	Pass
	MCH	-0.82	-20	Pass
	HCH	-0.81	-20	Pass
8DPSK	LCH	-1.08	-20	Pass
	MCH	-0.61	-20	Pass
	HCH	-0.47	-20	Pass

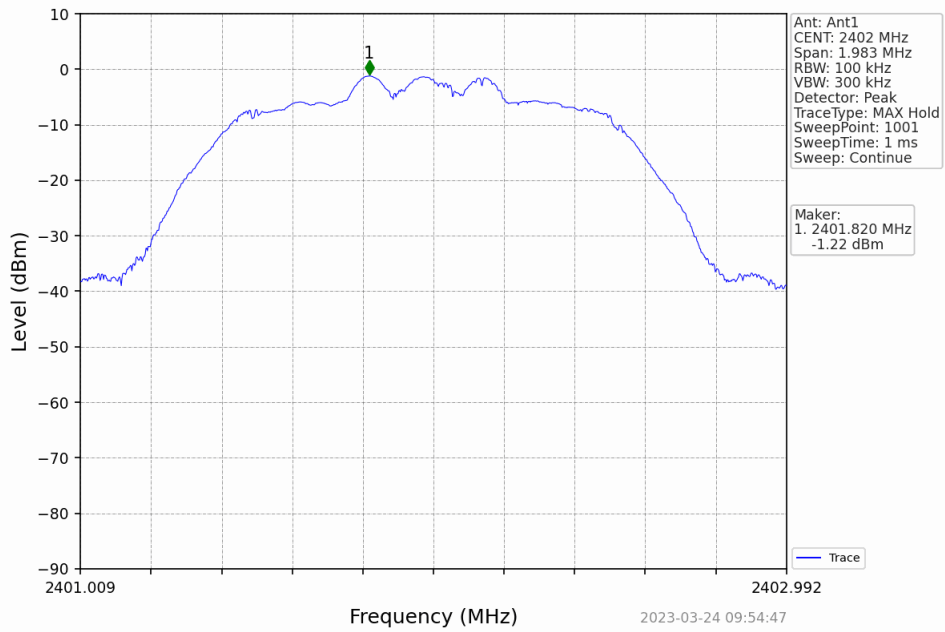
6.2 Test Graphs



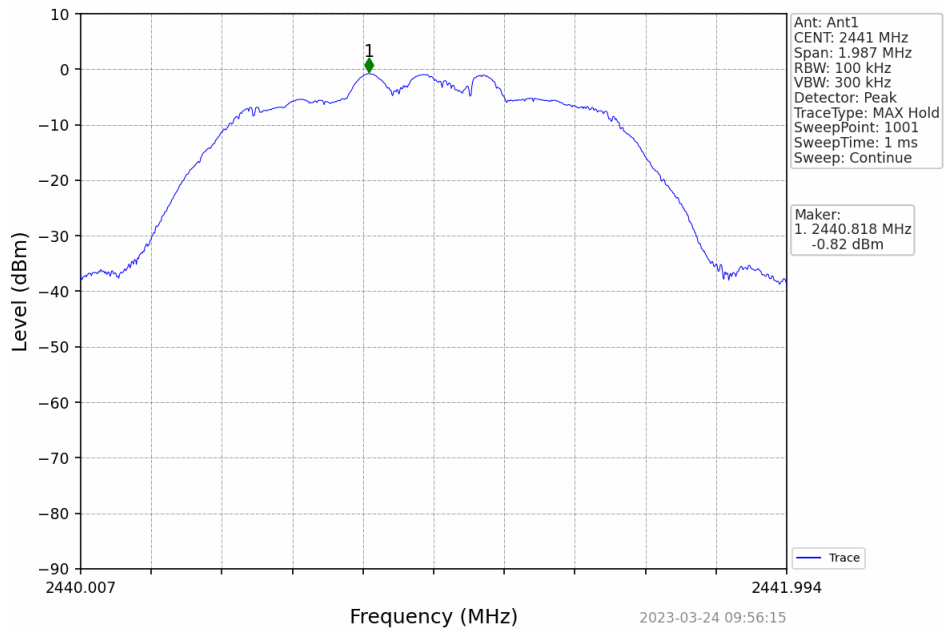
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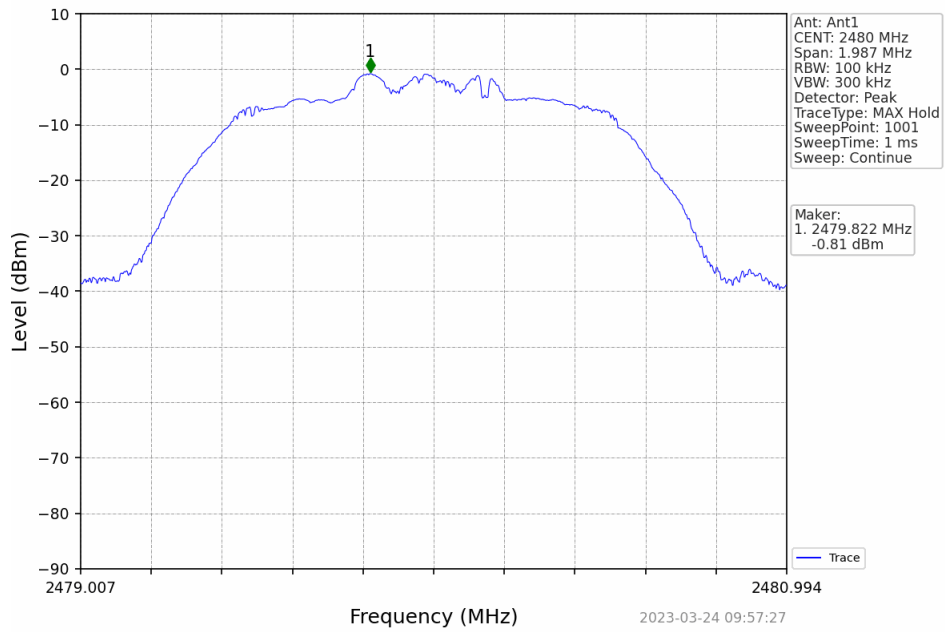
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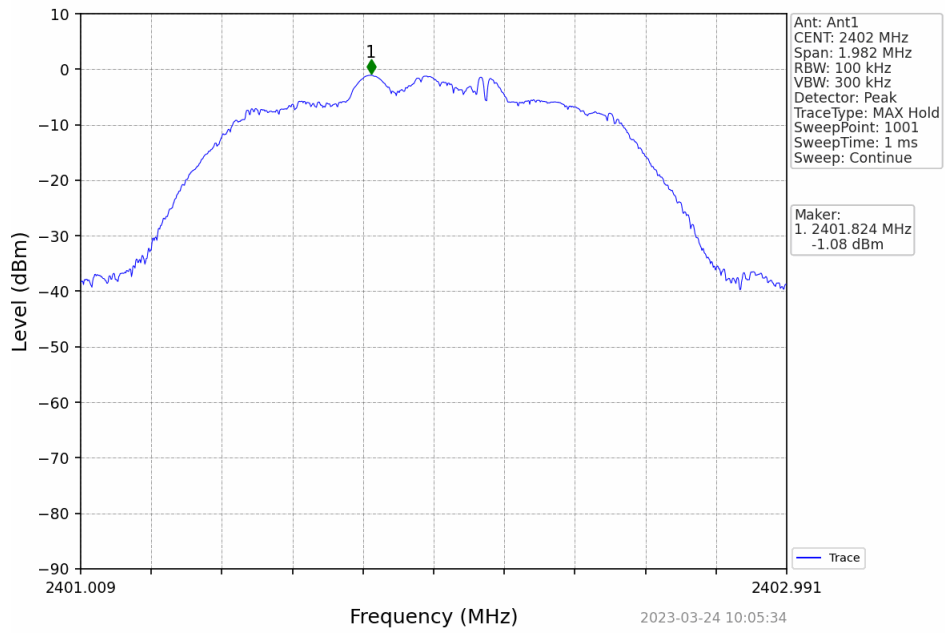
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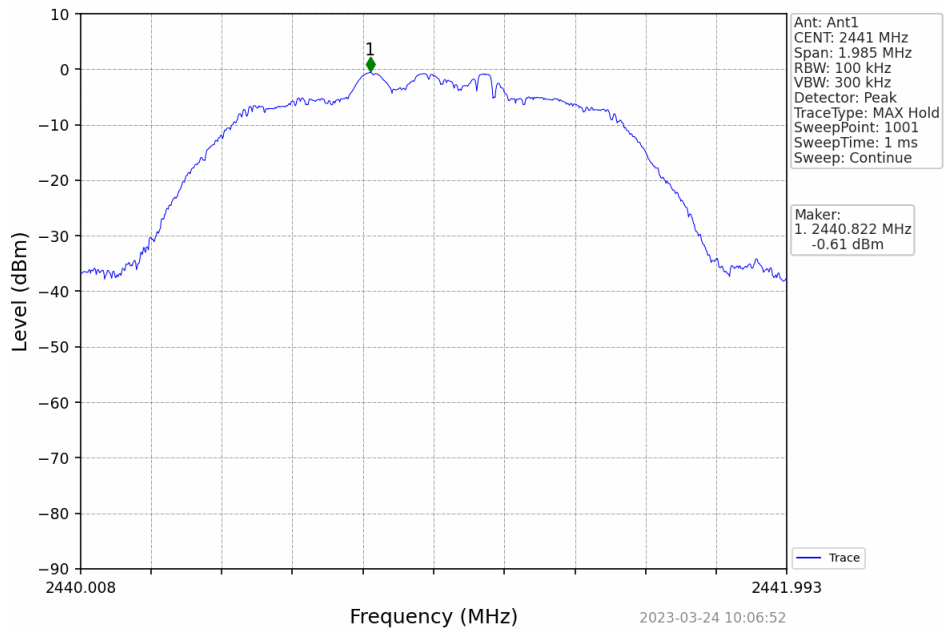
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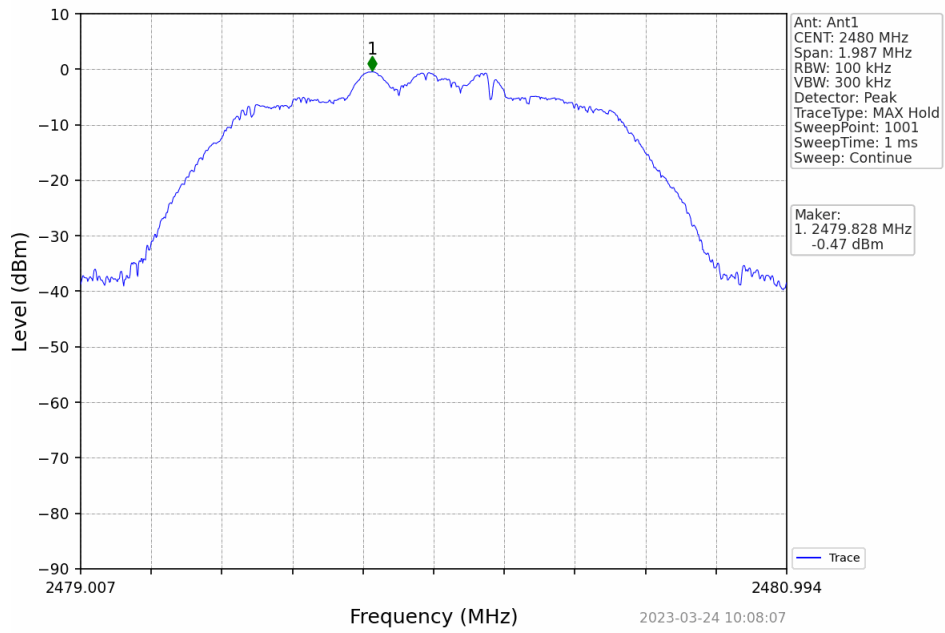
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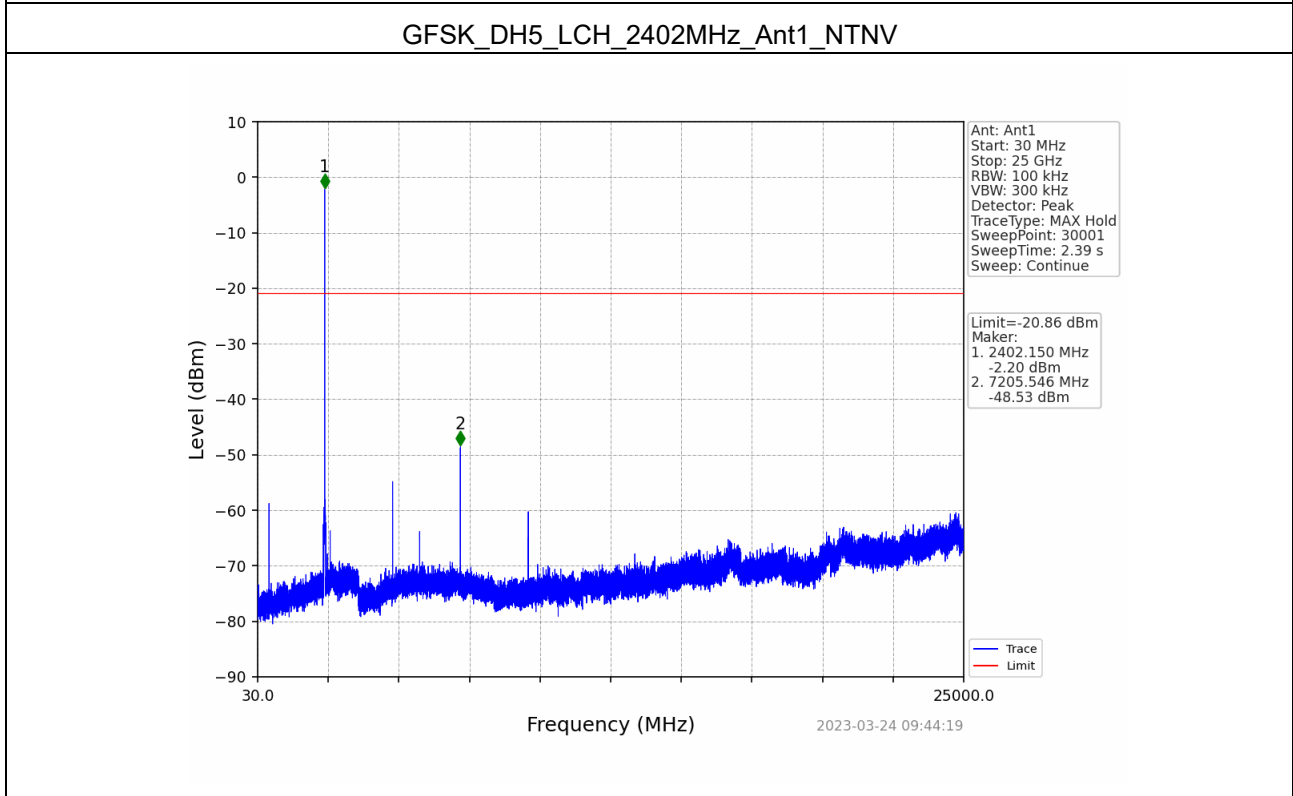
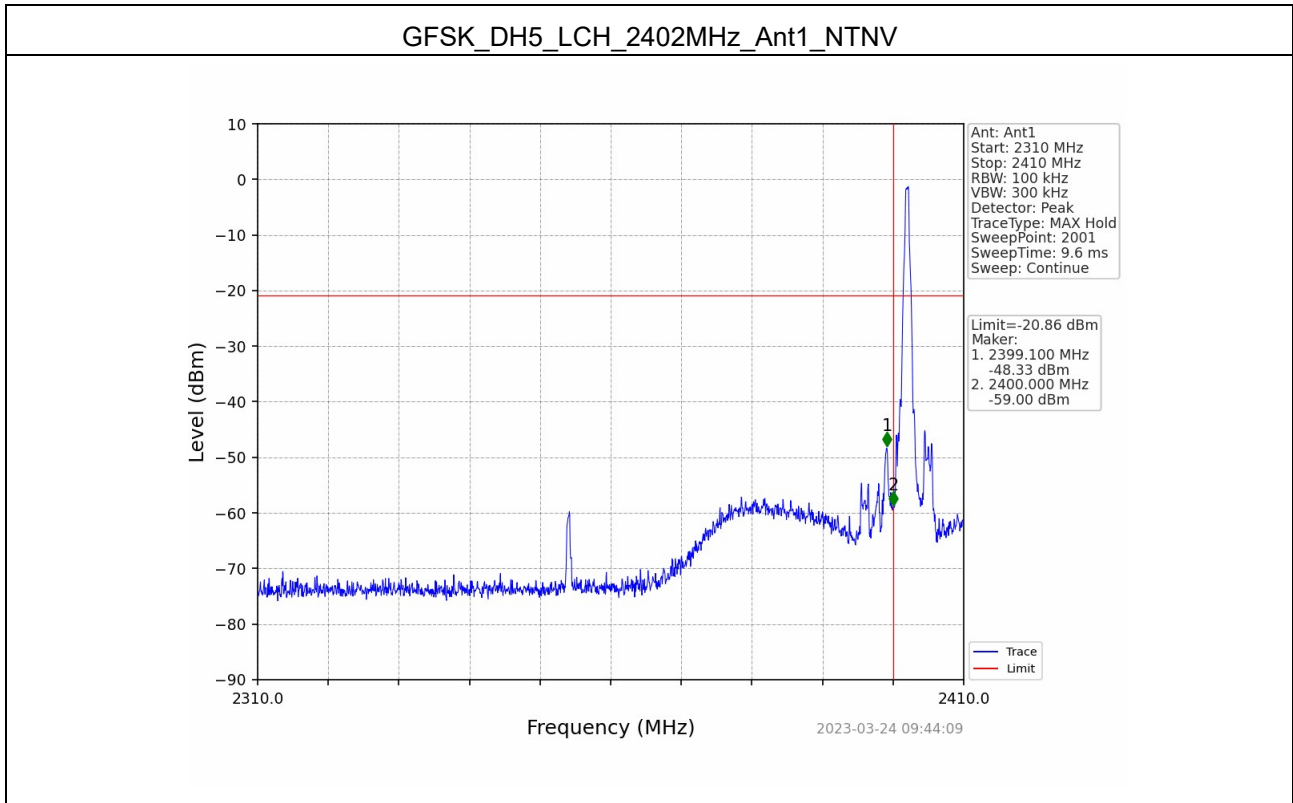
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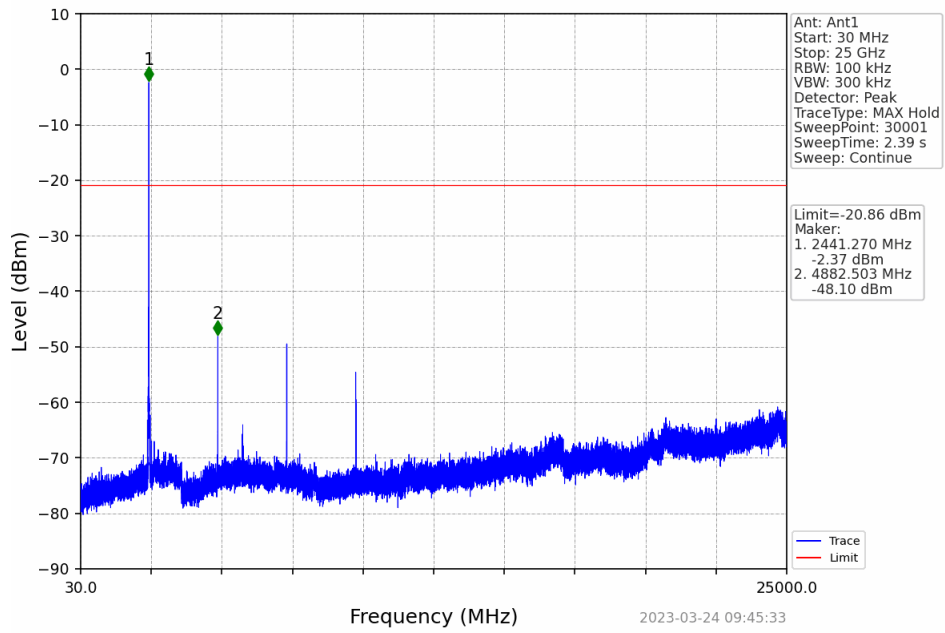
6.3 Conducted Spurious Emission

Mode	Channel	Carrier Frequency [MHz]	Frequency Hopping	Max Spurious Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	2402	Off	-0.86	-20.86	Pass
			On	-0.86	-20.86	Pass
	HCH	2480	Off	-0.86	-20.86	Pass
			On	-0.86	-20.86	Pass
$\pi/4$ DQPSK	LCH	2402	Off	-0.81	-20.81	Pass
			On	-0.81	-20.81	Pass
	HCH	2480	Off	-0.81	-20.81	Pass
			On	-0.81	-20.81	Pass
8DPSK	LCH	2402	Off	-0.47	-20.47	Pass
			On	-0.47	-20.47	Pass
	HCH	2480	Off	-0.47	-20.47	Pass
			On	-0.47	-20.47	Pass

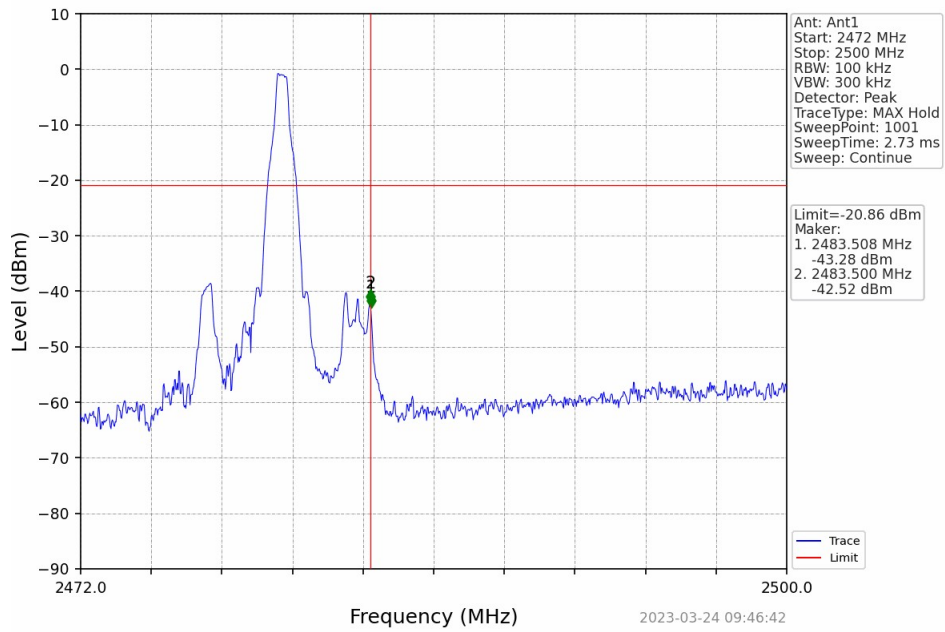
6.4 Test Graphs



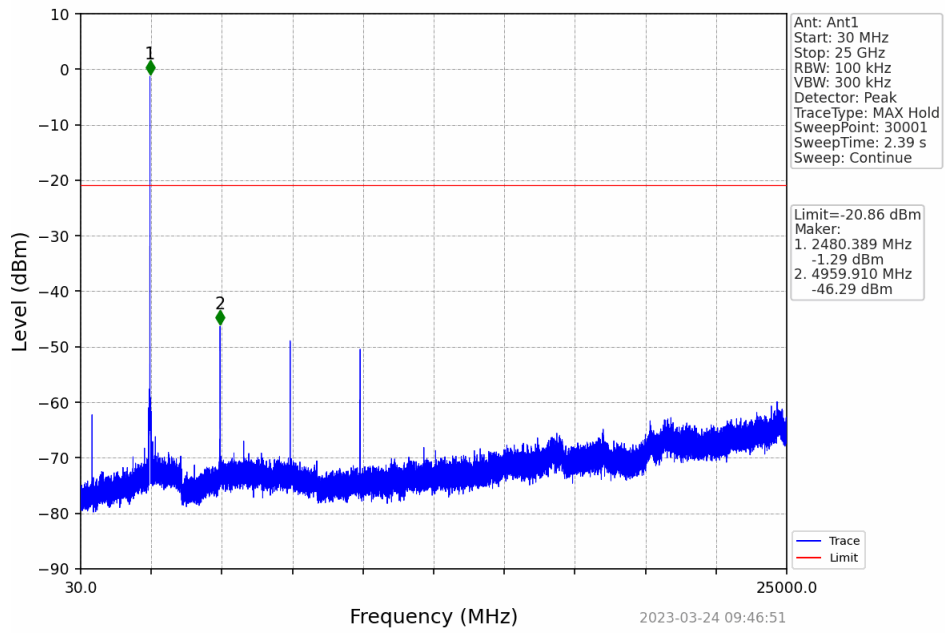
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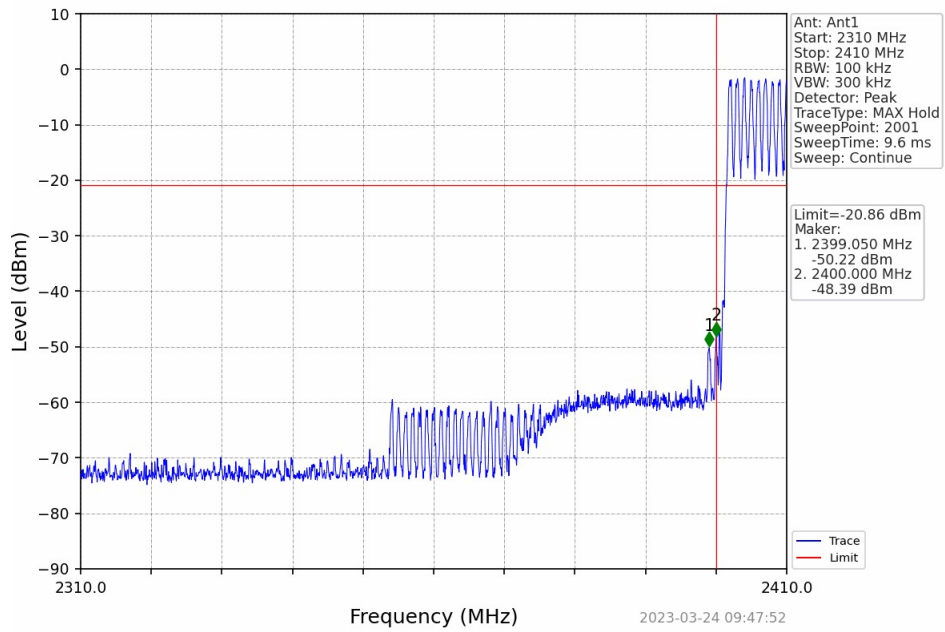
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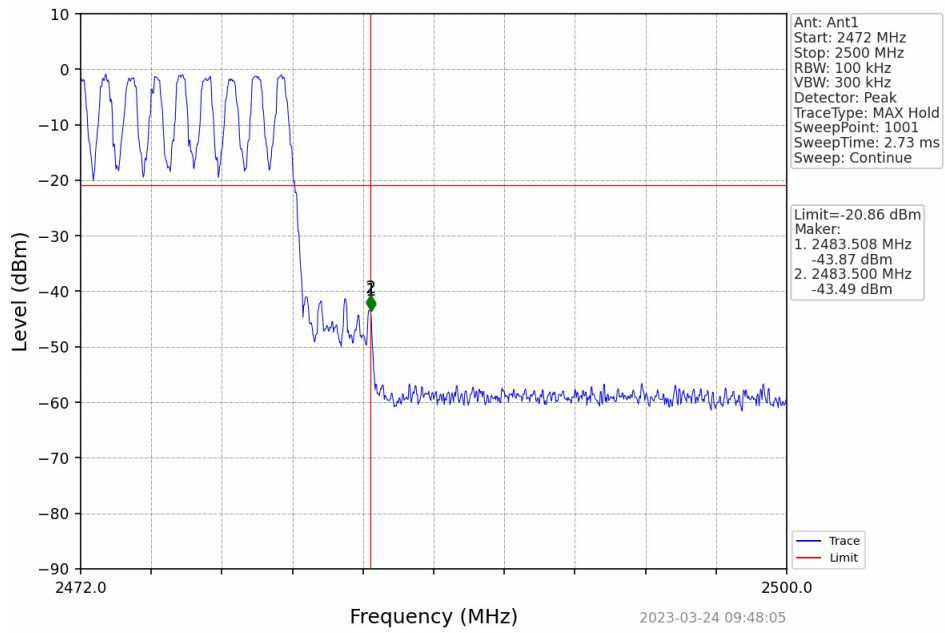
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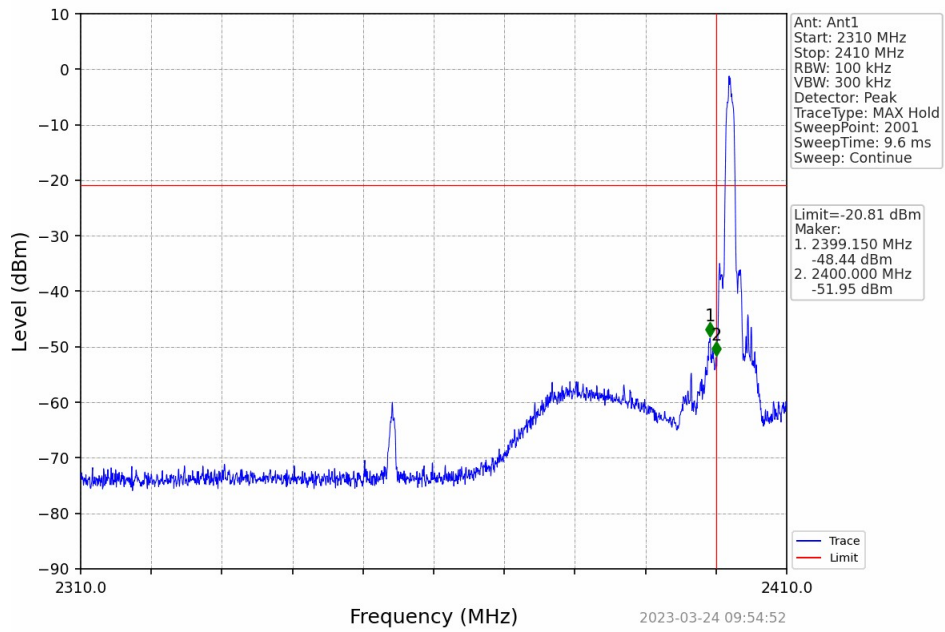
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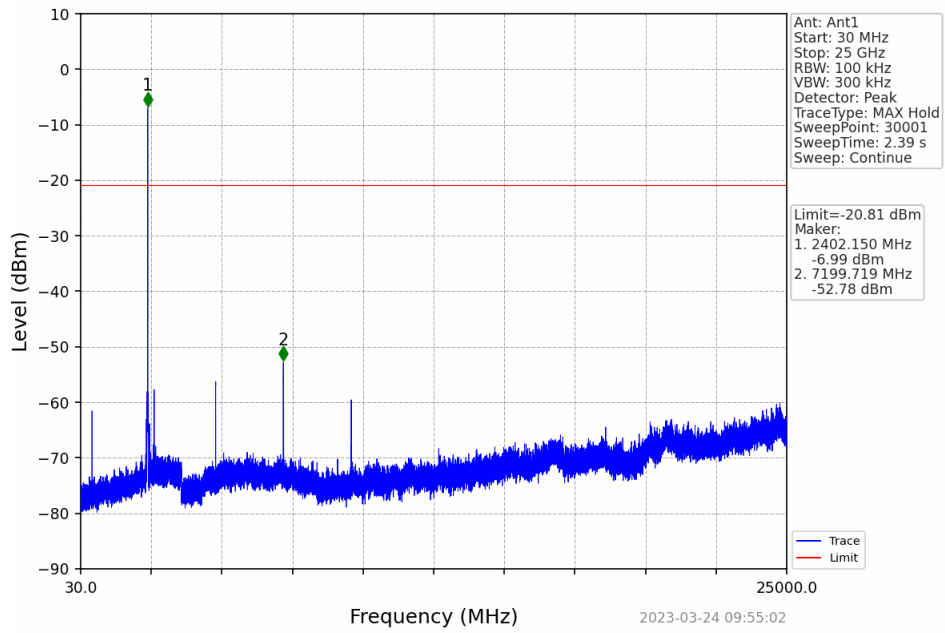
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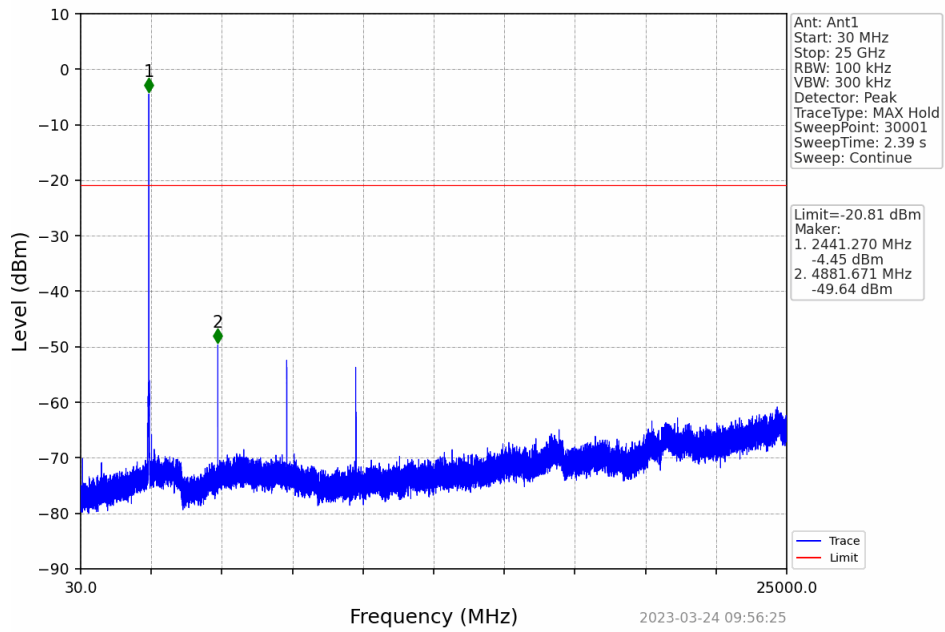
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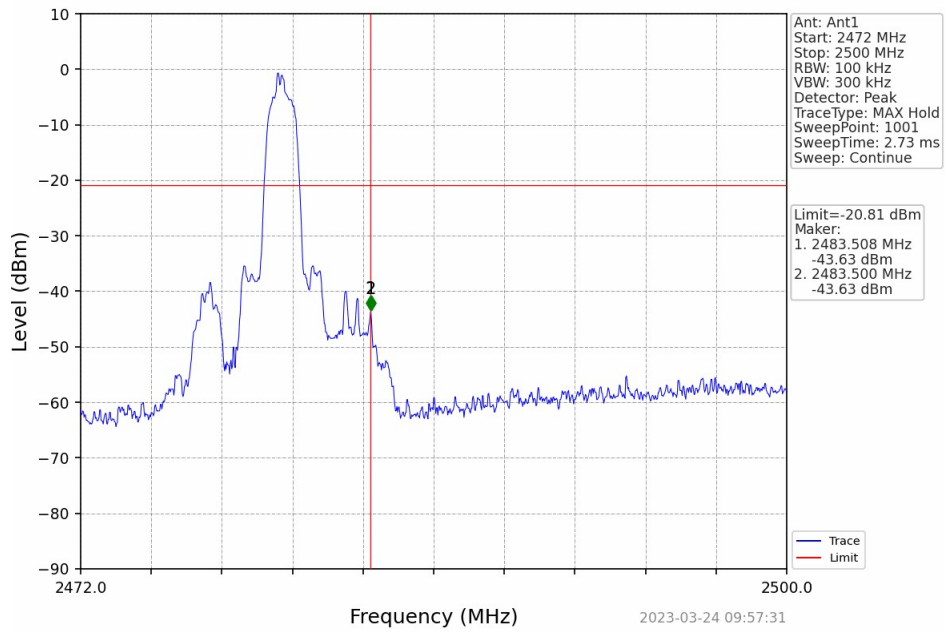
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



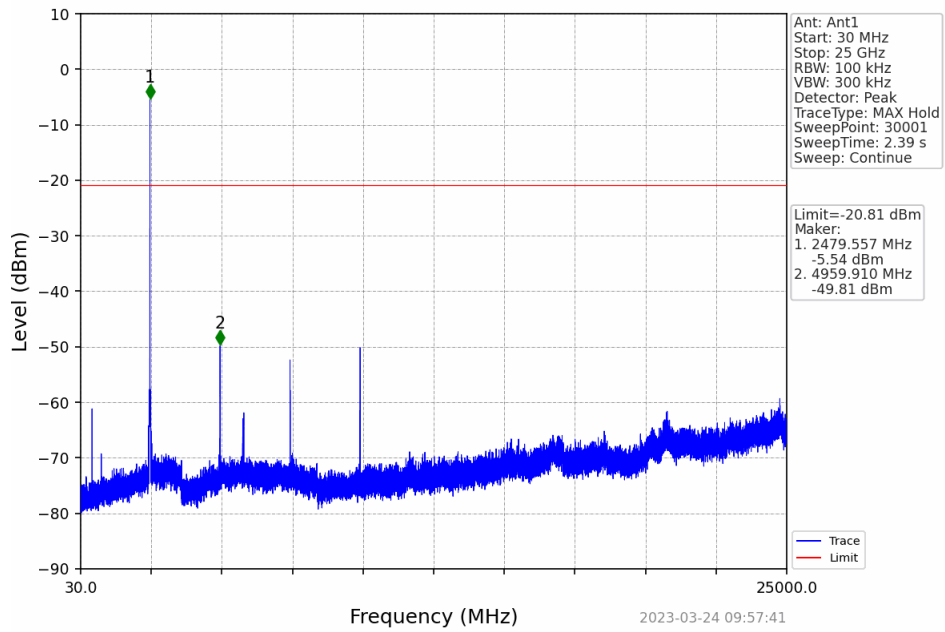
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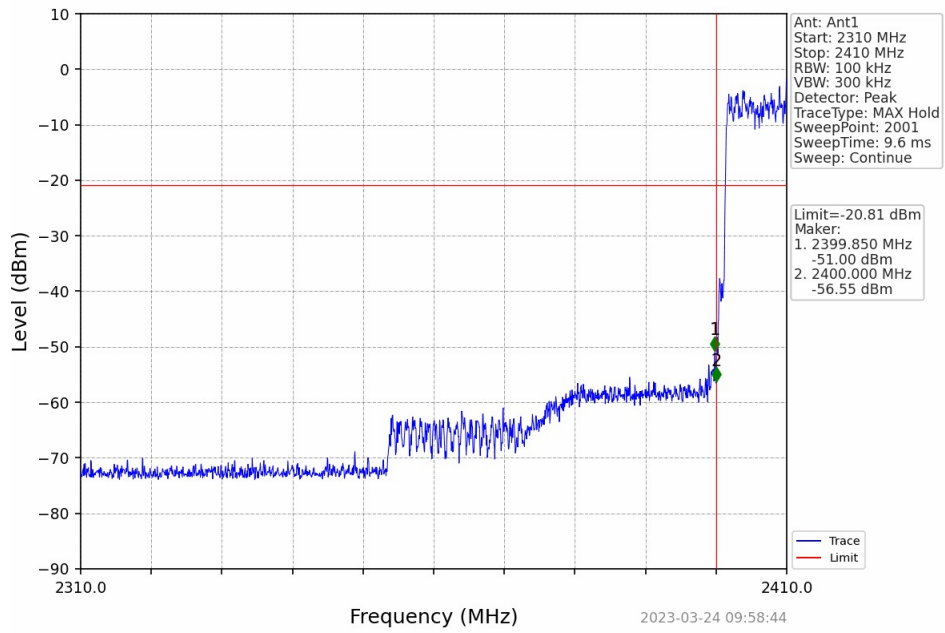
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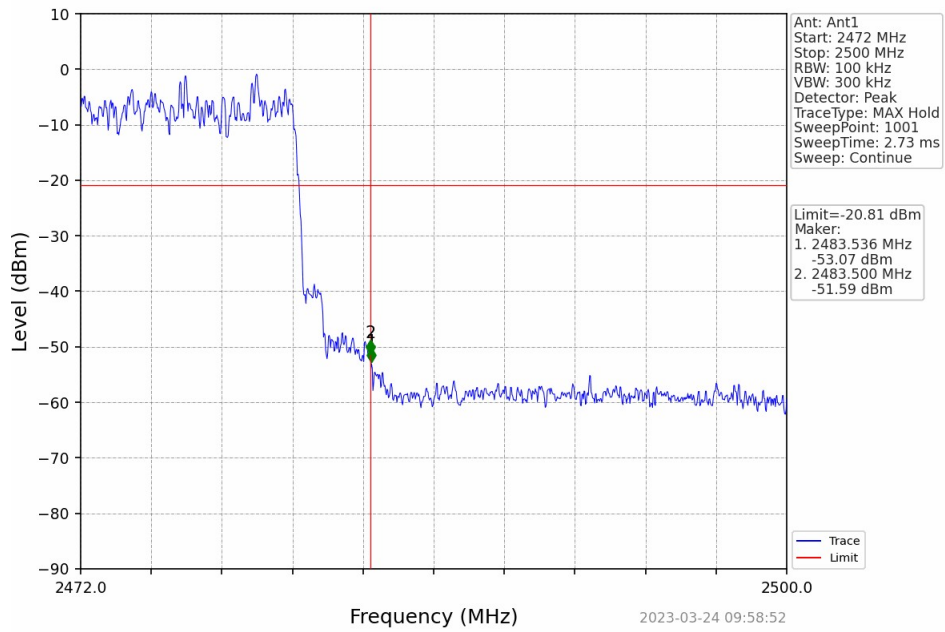
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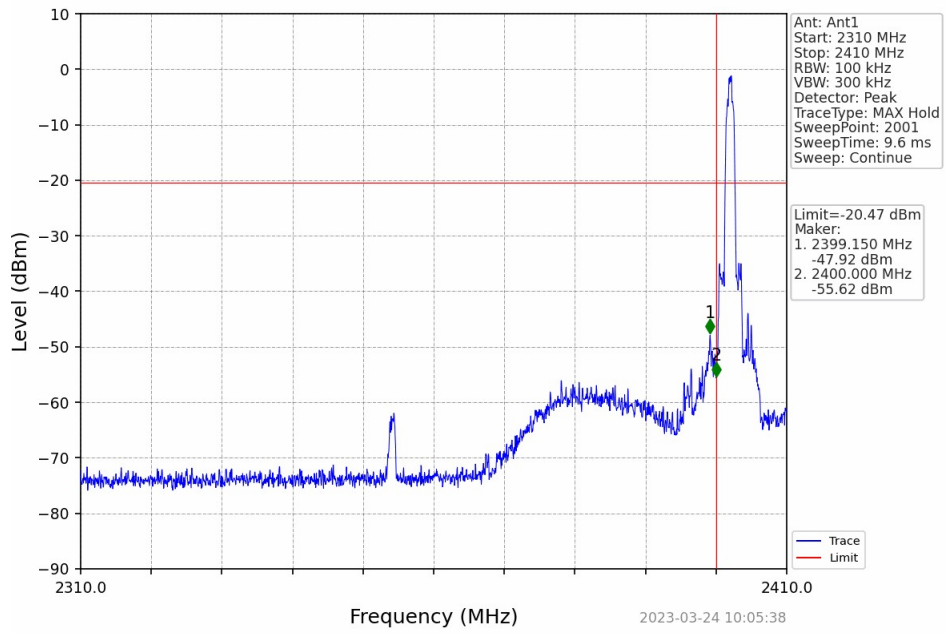
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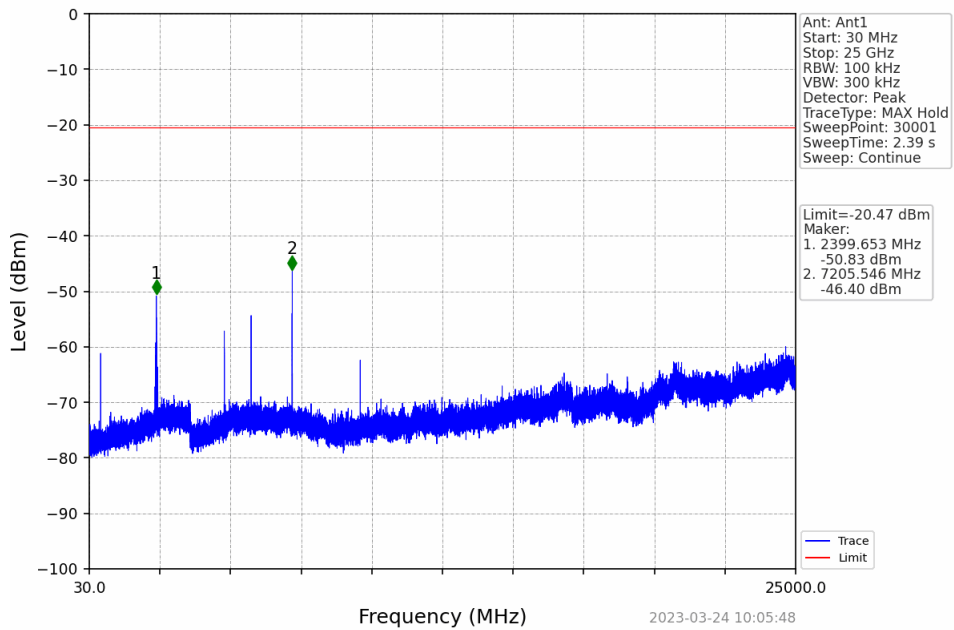
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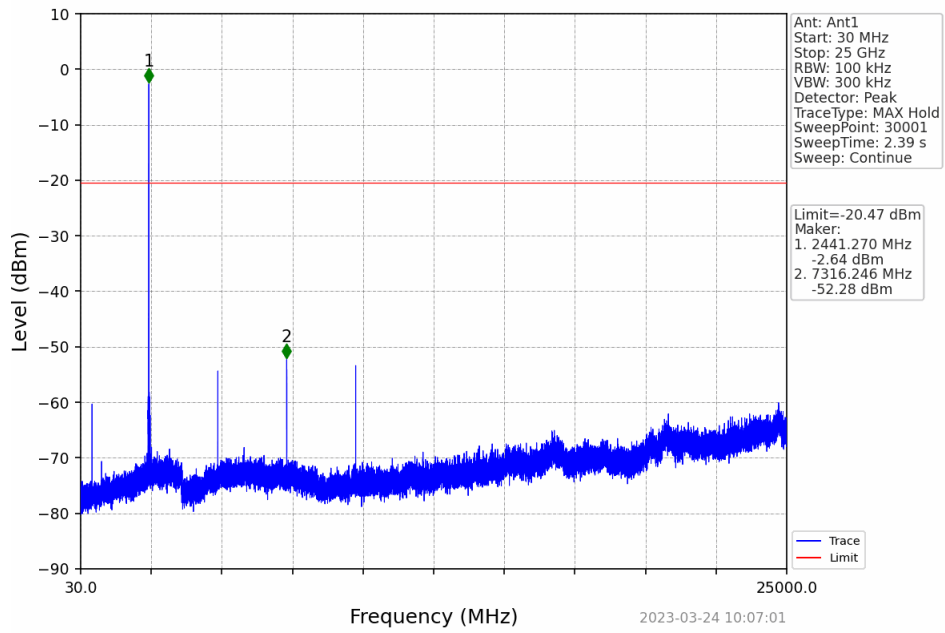
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



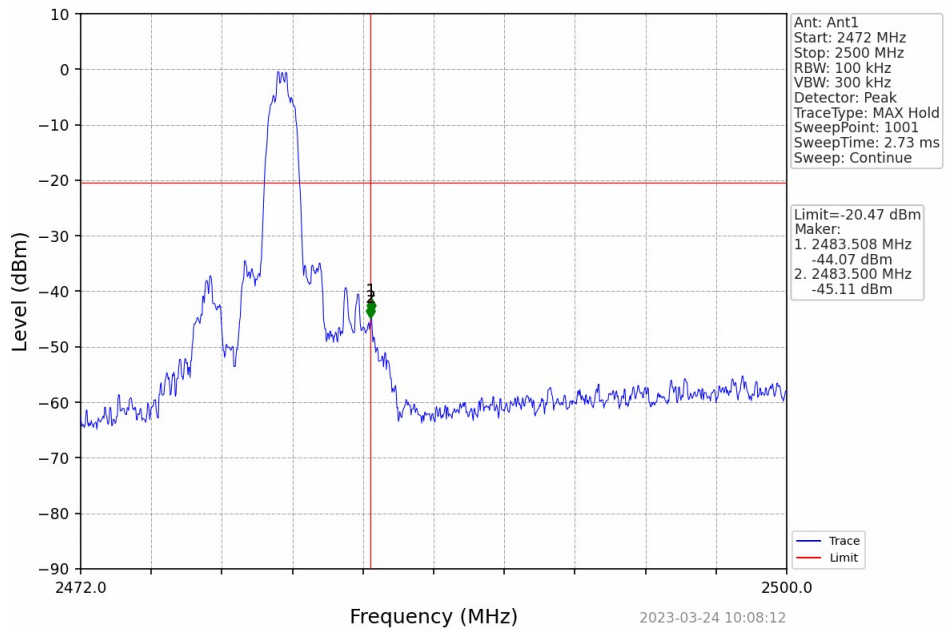
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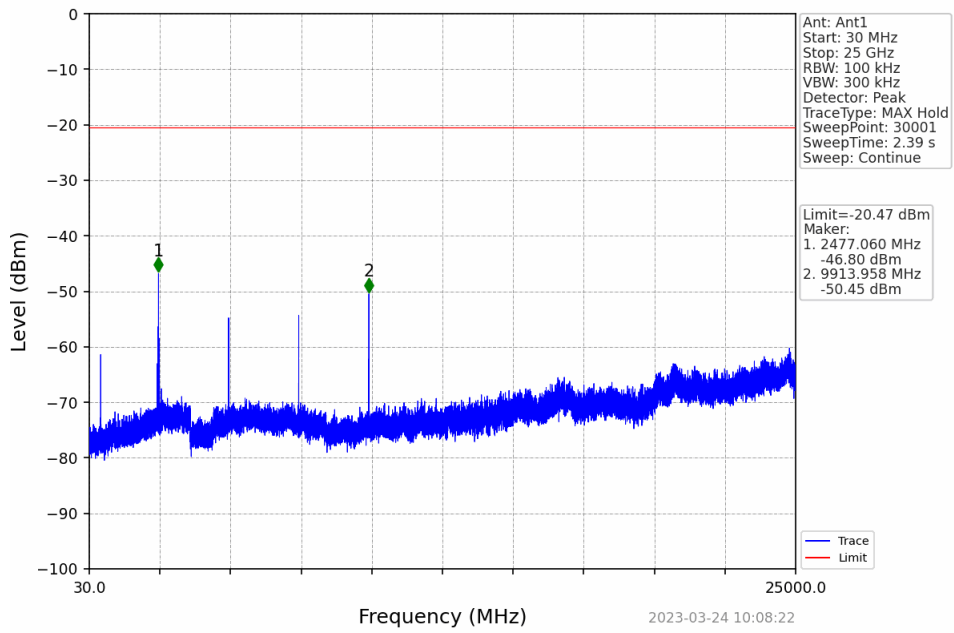
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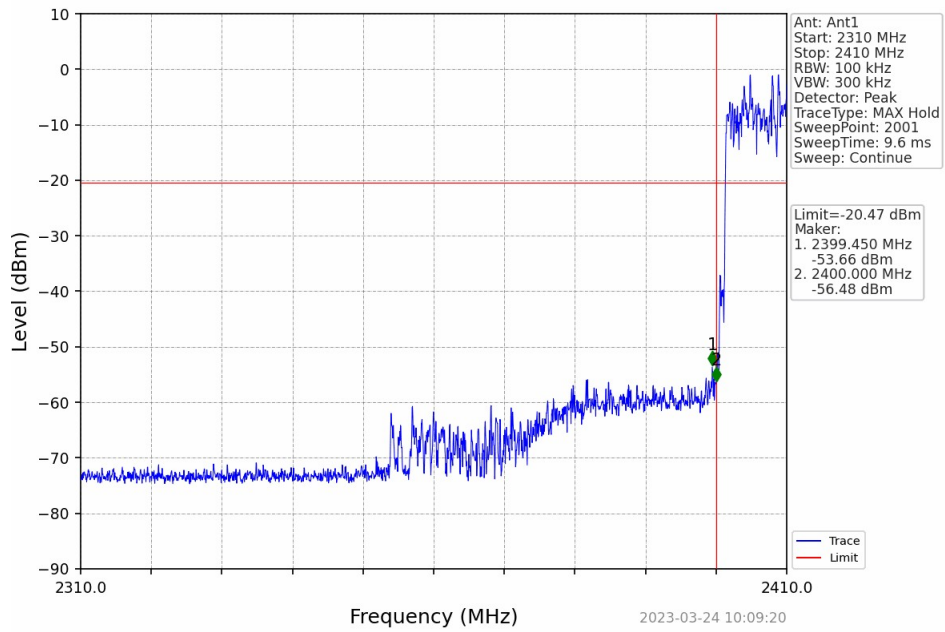
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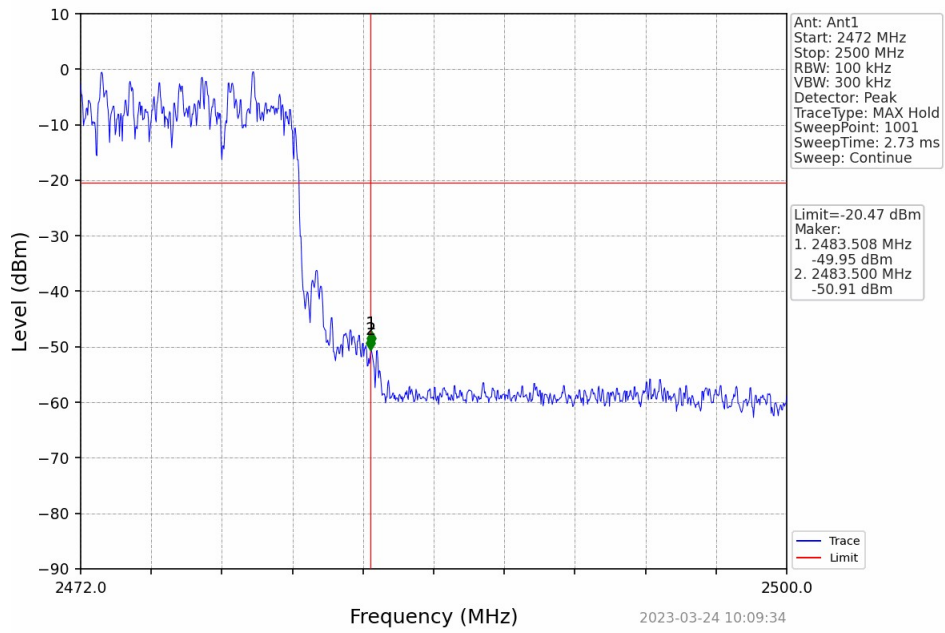
8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



7 Restrict-band Band-edge Test

7.1 Test Result

Test Mode: GFKS										
Pol.	Frequen cy (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV/ m)	Margin (dB)	Detect or Type	Result
Low Channel: 2402MHz										
H	2310.00	45.09	29.15	3.41	34.01	43.64	74.00	-30.36	PK	PASS
H	2390.00	62.20	29.16	3.43	34.01	60.78	74.00	-13.22	PK	PASS
V	2310.00	45.85	29.15	3.41	34.01	44.40	74.00	-29.60	PK	PASS
V	2390.00	64.47	29.16	3.43	34.01	63.05	74.00	-10.95	PK	PASS
H	2310.00	35.14	29.15	3.41	34.01	33.69	54.00	-20.31	AV	PASS
H	2390.00	46.51	29.16	3.43	34.01	45.09	54.00	-8.91	AV	PASS
V	2310.00	35.24	29.15	3.41	34.01	33.79	54.00	-20.21	AV	PASS
V	2390.00	48.37	29.16	3.43	34.01	46.95	54.00	-7.05	AV	PASS
High Channel: 2480MHz										
H	2483.50	47.46	29.28	3.53	34.03	46.24	74.00	-27.76	PK	PASS
H	2500.00	46.21	29.30	3.56	34.03	45.04	74.00	-28.96	PK	PASS
V	2483.50	48.67	29.28	3.53	34.03	47.45	74.00	-26.55	PK	PASS
V	2500.00	47.42	29.30	3.56	34.03	46.25	74.00	-27.75	PK	PASS
H	2483.50	37.99	29.28	3.53	34.03	36.77	54.00	-17.23	AV	PASS
H	2500.00	35.68	29.30	3.56	34.03	34.51	54.00	-19.49	AV	PASS
V	2483.50	39.39	29.28	3.53	34.03	38.17	54.00	-15.83	AV	PASS
V	2500.00	35.79	29.30	3.56	34.03	34.62	54.00	-19.38	AV	PASS

Test Mode: π/4-DQPSK										
Pol.	Frequen cy (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV/ m)	Margin (dB)	Detect or Type	Result
Low Channel: 2402MHz										
H	2310.00	45.28	29.15	3.41	34.01	43.83	74.00	-30.17	PK	PASS
H	2390.00	62.41	29.16	3.43	34.01	60.99	74.00	-13.01	PK	PASS
V	2310.00	46.05	29.15	3.41	34.01	44.60	74.00	-29.40	PK	PASS
V	2390.00	64.70	29.16	3.43	34.01	63.28	74.00	-10.72	PK	PASS
H	2310.00	35.28	29.15	3.41	34.01	33.83	54.00	-20.17	AV	PASS
H	2390.00	46.66	29.16	3.43	34.01	45.24	54.00	-8.76	AV	PASS
V	2310.00	35.40	29.15	3.41	34.01	33.95	54.00	-20.05	AV	PASS
V	2390.00	48.54	29.16	3.43	34.01	47.12	54.00	-6.88	AV	PASS
High Channel: 2480MHz										
H	2483.50	47.66	29.28	3.53	34.03	46.44	74.00	-27.56	PK	PASS
H	2500.00	46.38	29.30	3.56	34.03	45.21	74.00	-28.79	PK	PASS
V	2483.50	48.91	29.28	3.53	34.03	47.69	74.00	-26.31	PK	PASS
V	2500.00	47.61	29.30	3.56	34.03	46.44	74.00	-27.56	PK	PASS
H	2483.50	38.14	29.28	3.53	34.03	36.92	54.00	-17.08	AV	PASS
H	2500.00	35.80	29.30	3.56	34.03	34.63	54.00	-19.37	AV	PASS
V	2483.50	39.55	29.28	3.53	34.03	38.33	54.00	-15.67	AV	PASS
V	2500.00	35.92	29.30	3.56	34.03	34.75	54.00	-19.25	AV	PASS

Test Mode: 8-DPSK										
Pol.	Frequen cy (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV/ m)	Margin (dB)	Detect or Type	Result
Low Channel: 2402MHz										
H	2310.00	45.49	29.15	3.41	34.01	44.04	74.00	-29.96	PK	PASS
H	2390.00	62.65	29.16	3.43	34.01	61.23	74.00	-12.77	PK	PASS
V	2310.00	46.28	29.15	3.41	34.01	44.83	74.00	-29.17	PK	PASS
V	2390.00	64.96	29.16	3.43	34.01	63.54	74.00	-10.46	PK	PASS
H	2310.00	35.45	29.15	3.41	34.01	34.00	54.00	-20.00	AV	PASS
H	2390.00	46.84	29.16	3.43	34.01	45.42	54.00	-8.58	AV	PASS
V	2310.00	35.58	29.15	3.41	34.01	34.13	54.00	-19.87	AV	PASS
V	2390.00	48.74	29.16	3.43	34.01	47.32	54.00	-6.68	AV	PASS
High Channel: 2480MHz										
H	2483.50	47.90	29.28	3.53	34.03	46.68	74.00	-27.32	PK	PASS
H	2500.00	46.58	29.30	3.56	34.03	45.41	74.00	-28.59	PK	PASS
V	2483.50	49.18	29.28	3.53	34.03	47.96	74.00	-26.04	PK	PASS
V	2500.00	47.82	29.30	3.56	34.03	46.65	74.00	-27.35	PK	PASS
H	2483.50	38.30	29.28	3.53	34.03	37.08	54.00	-16.92	AV	PASS
H	2500.00	35.93	29.30	3.56	34.03	34.76	54.00	-19.24	AV	PASS
V	2483.50	39.73	29.28	3.53	34.03	38.51	54.00	-15.49	AV	PASS
V	2500.00	36.07	29.30	3.56	34.03	34.90	54.00	-19.10	AV	PASS

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit

.....End.....