

## 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

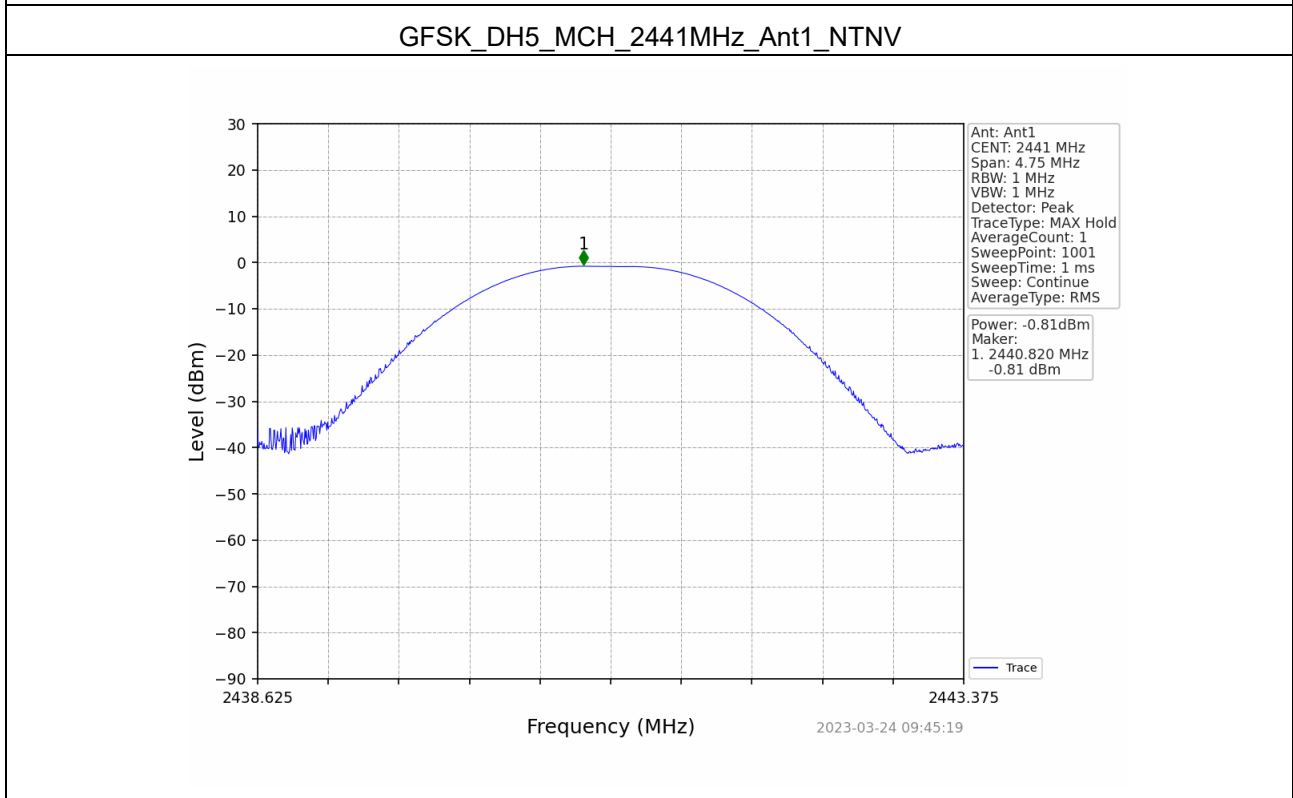
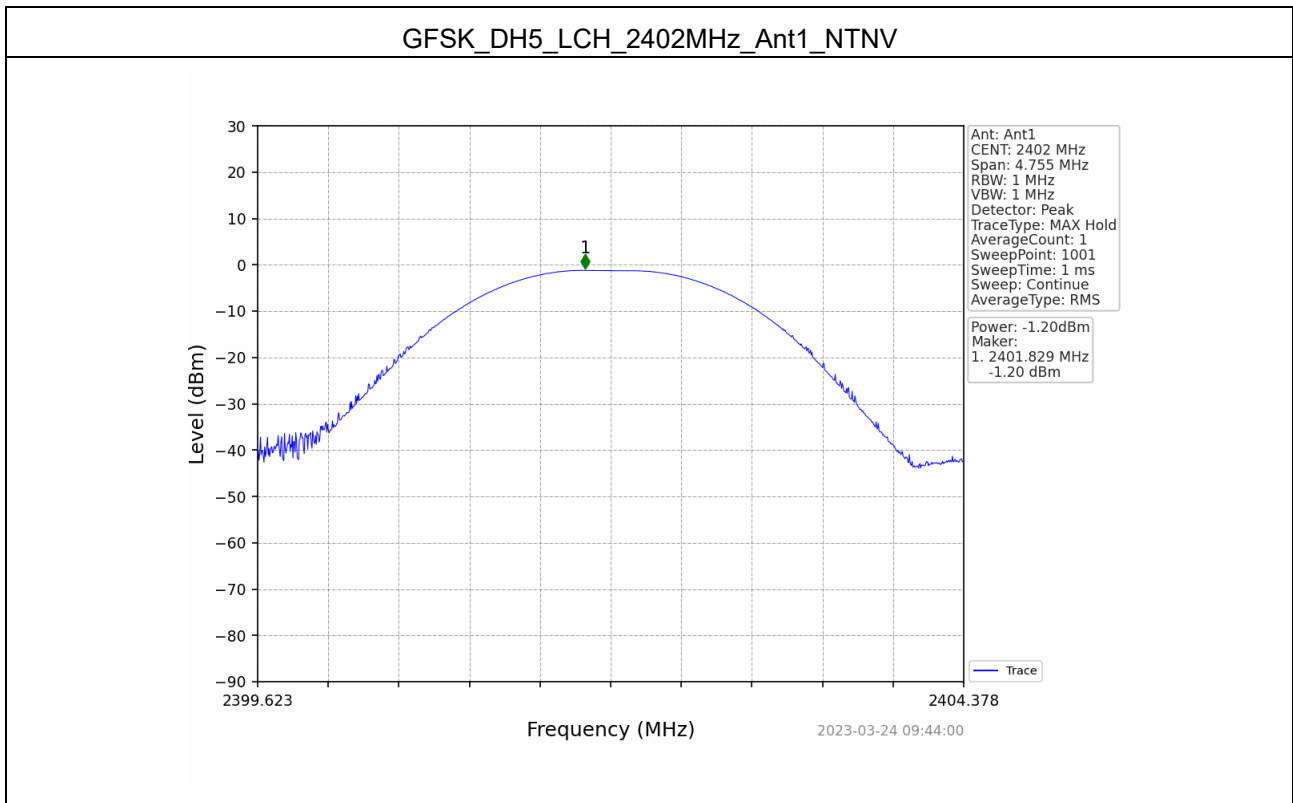
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# 1 Maximum Conducted Peak Output Power

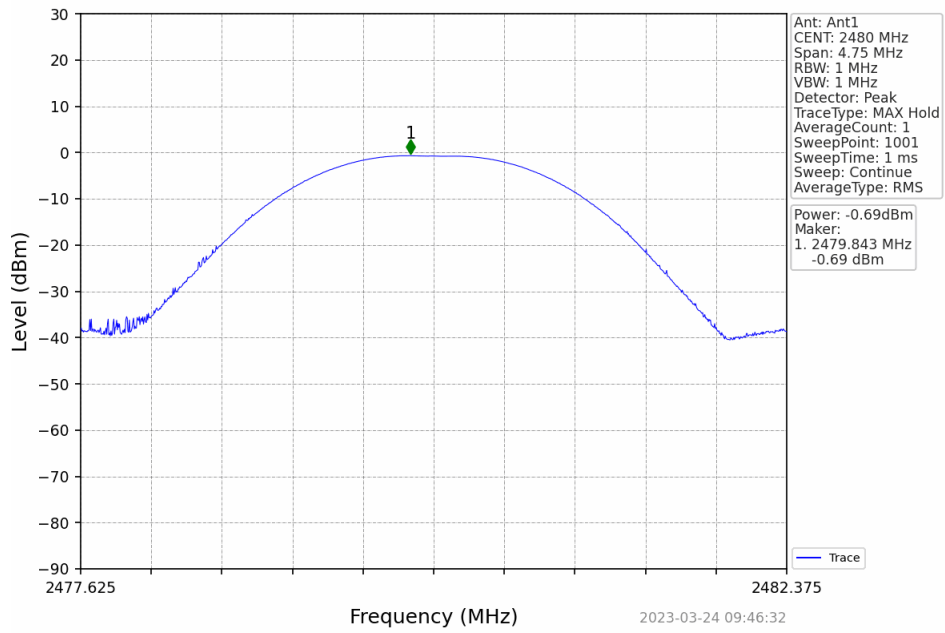
## 1.1 Test Result

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

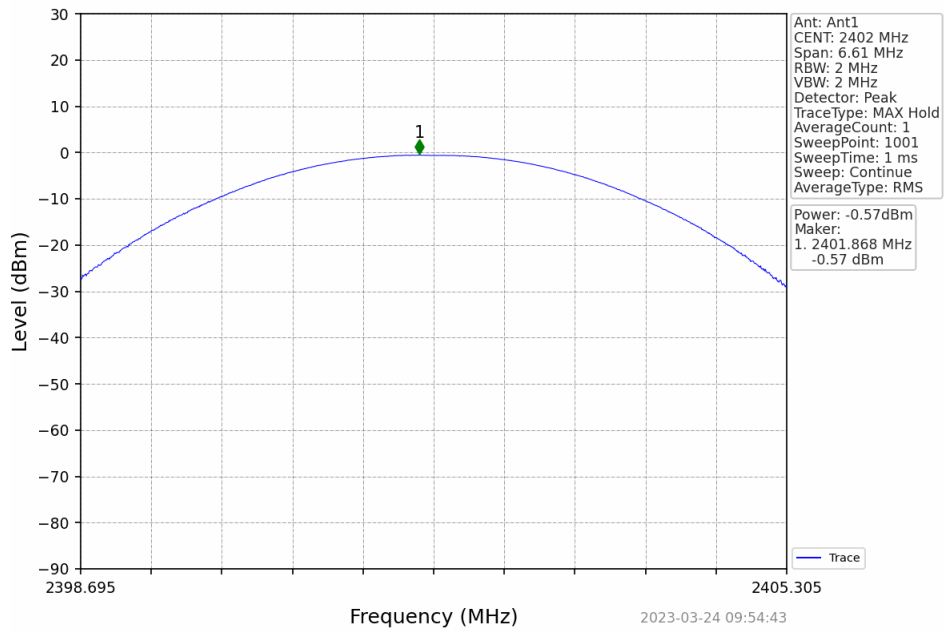
## 1.2 Test Graphs



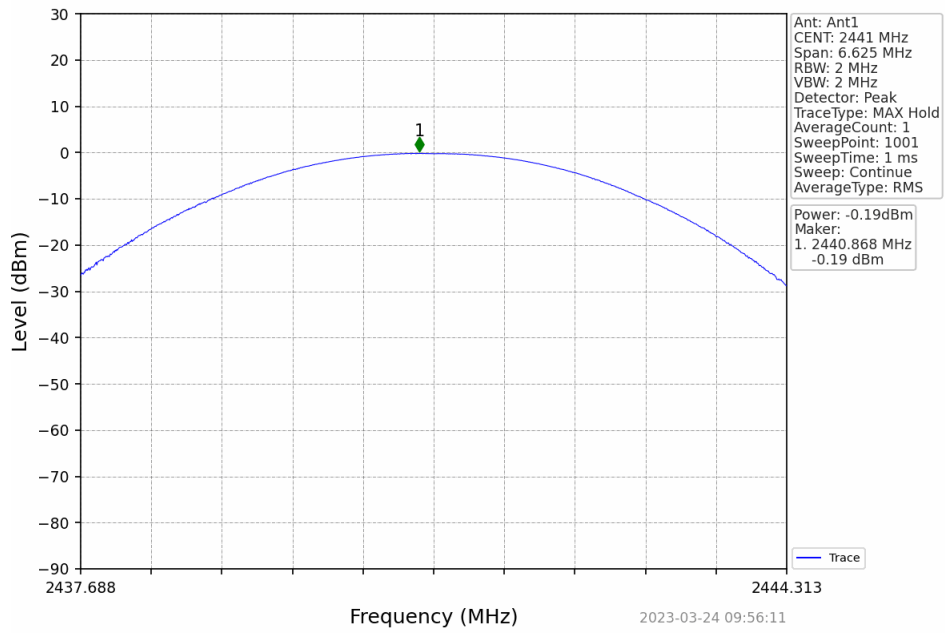
GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



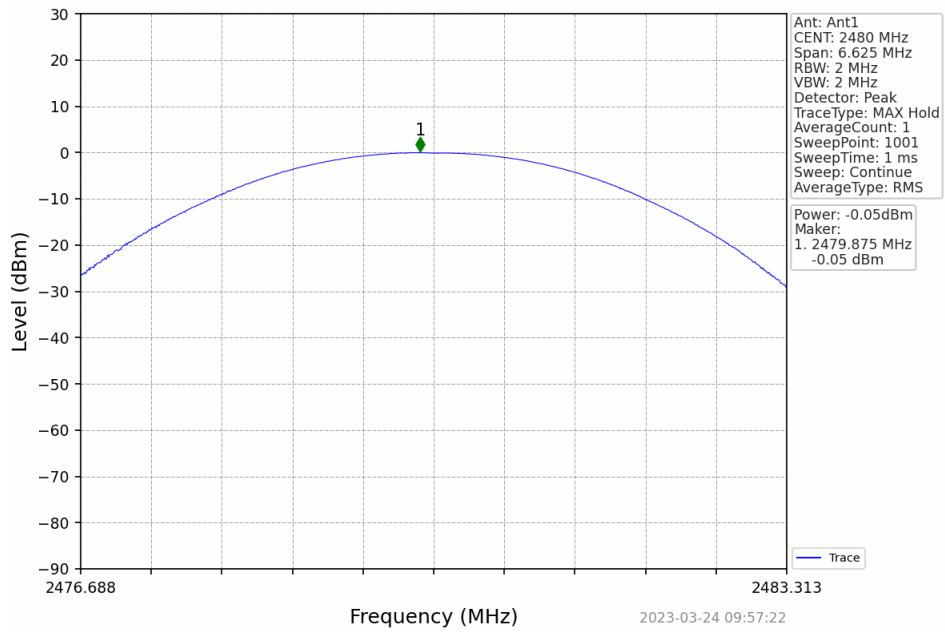
Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



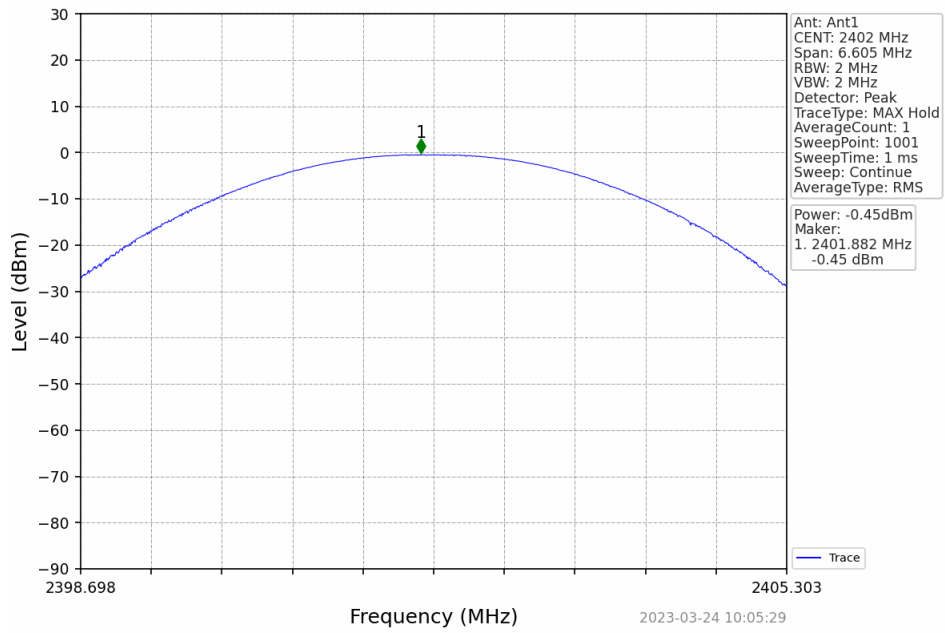
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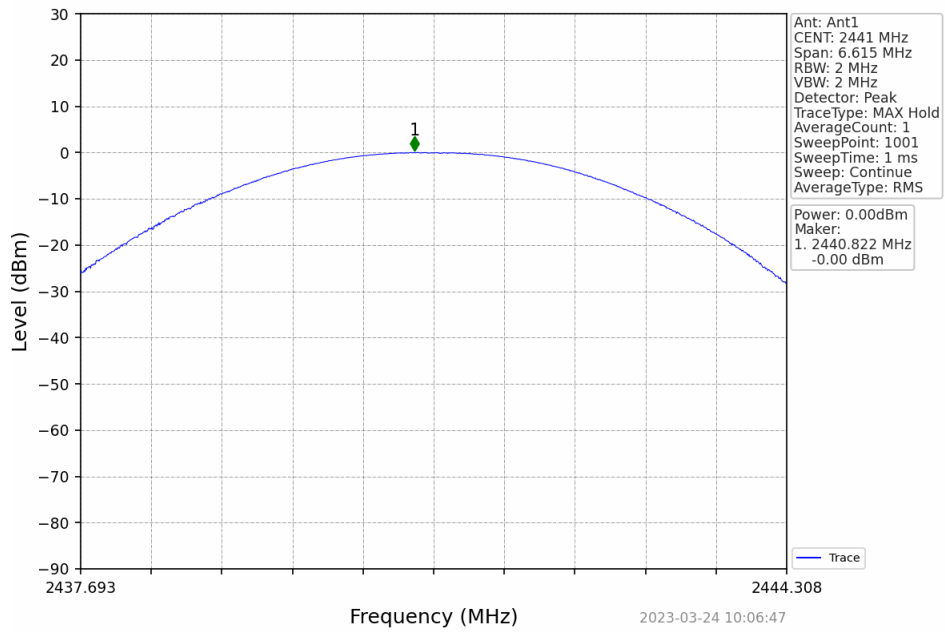
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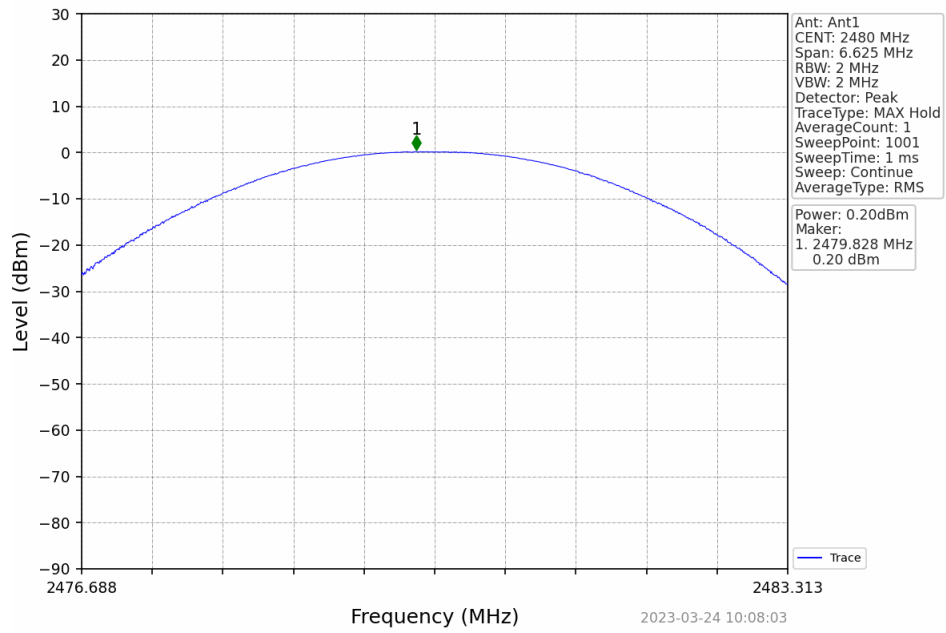
8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



8DPSK\_3DH5\_MCH\_2441MHz\_Ant1\_NTNV



8DPSK\_3DH5\_HCH\_2480MHz\_Ant1\_NTNV



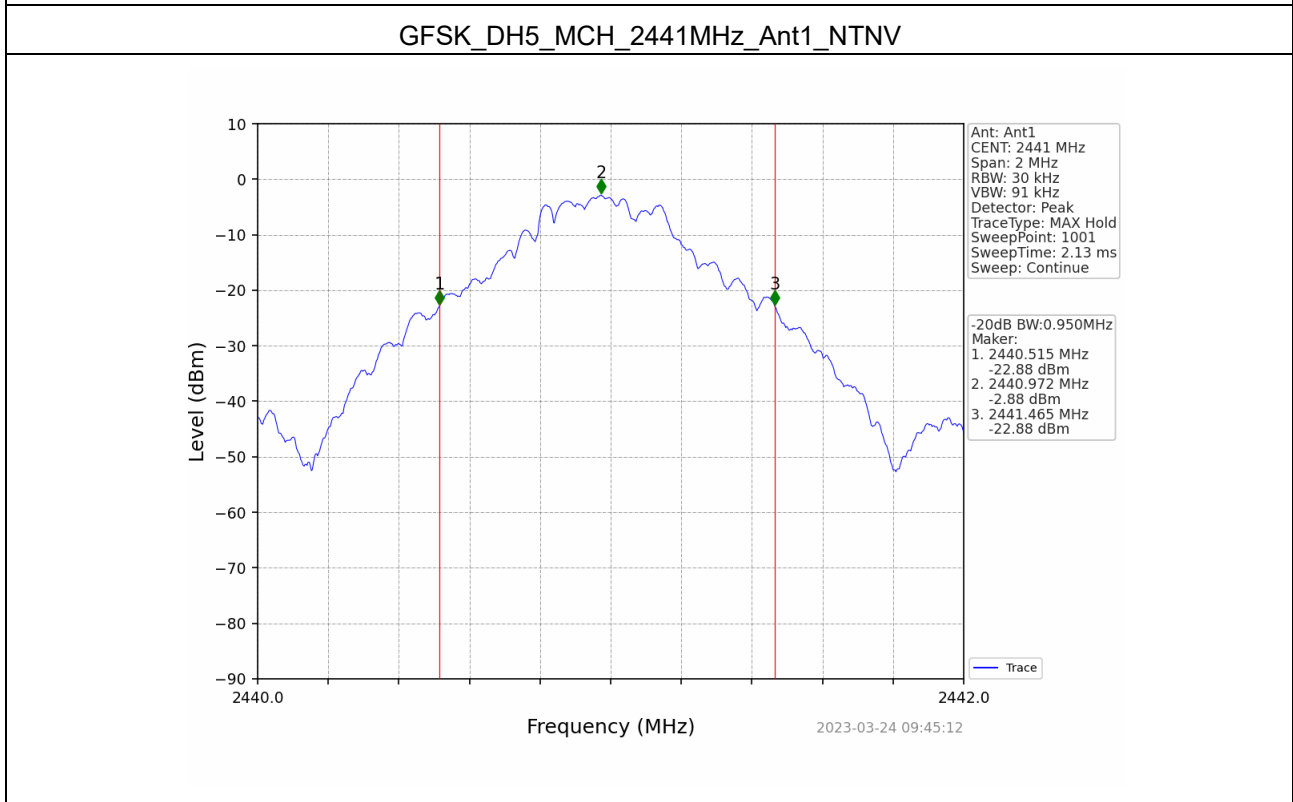
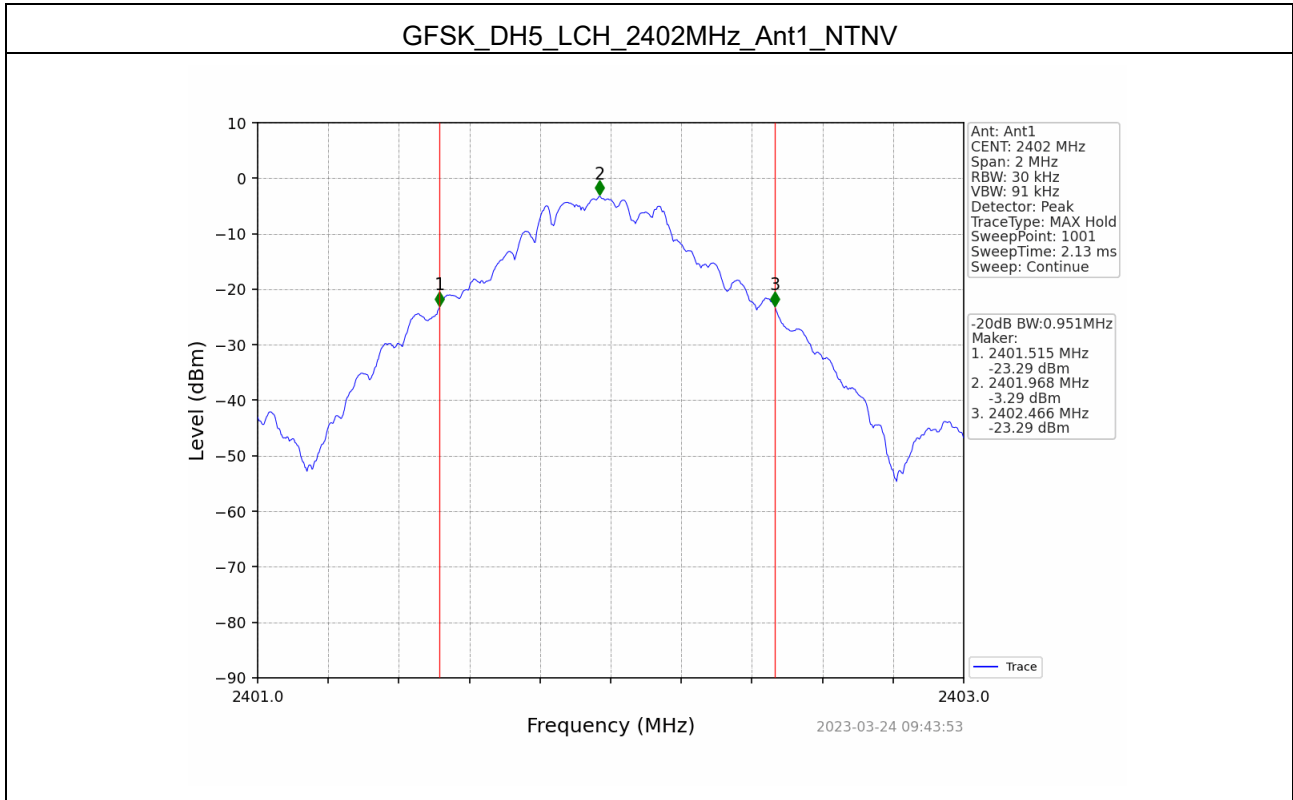


## 2 20dB Bandwidth

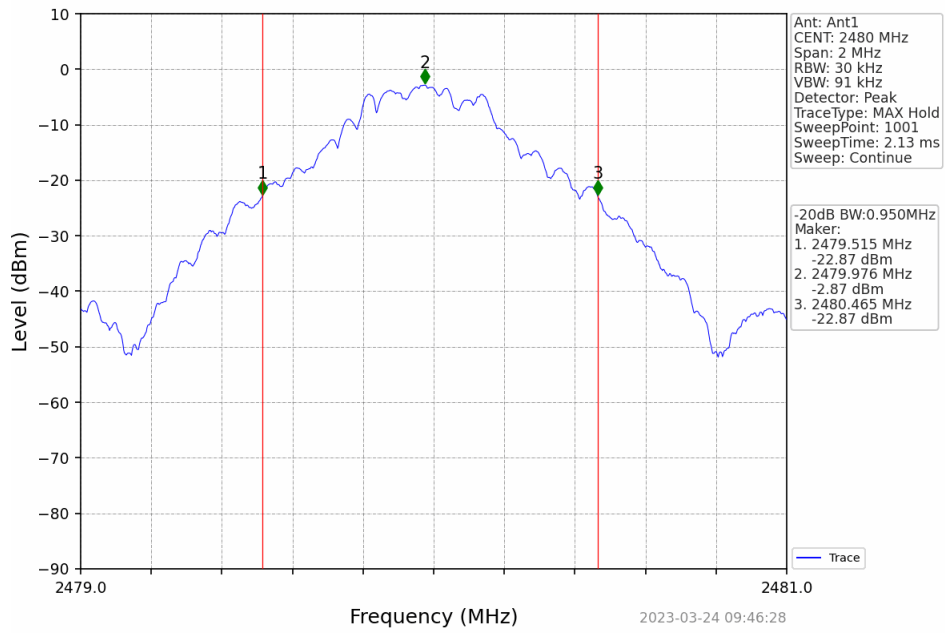
### 2.1 Test Result

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

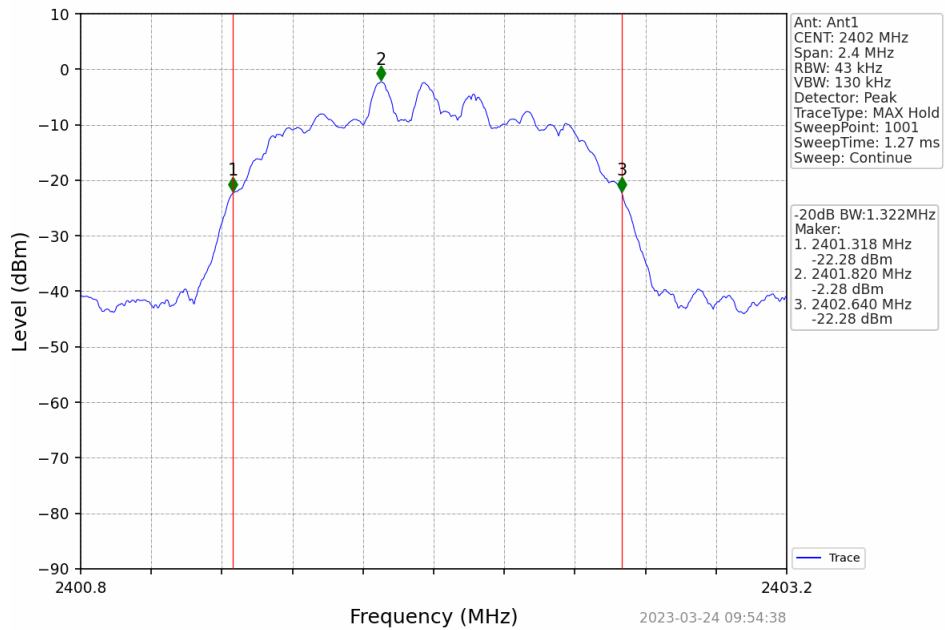
## 2.2 Test Graphs



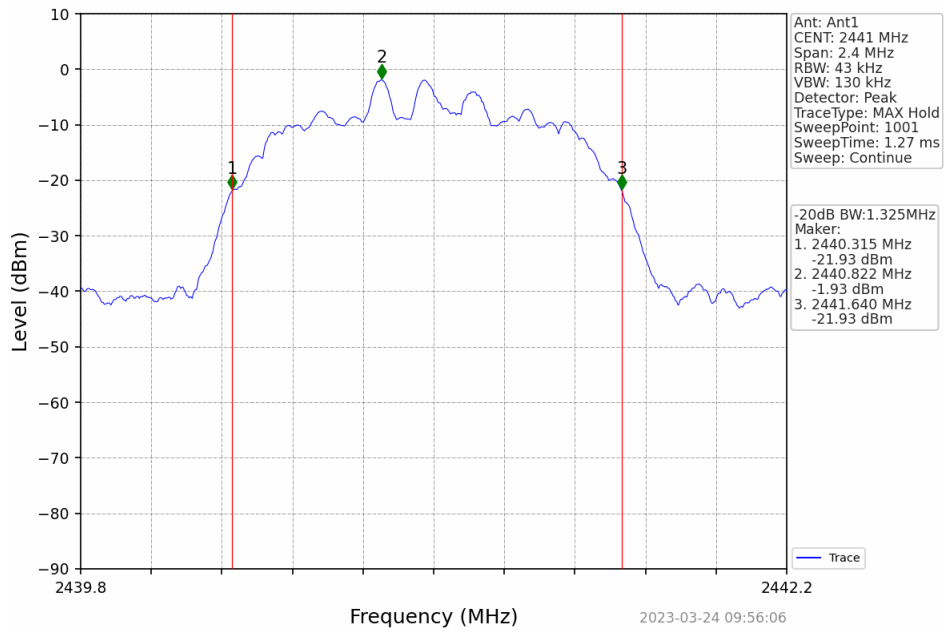
GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



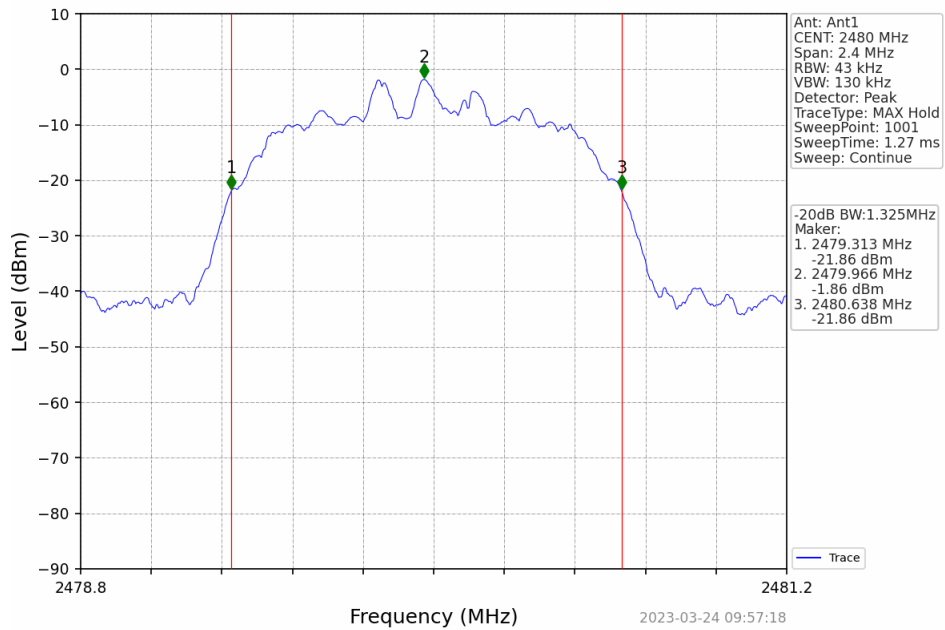
Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



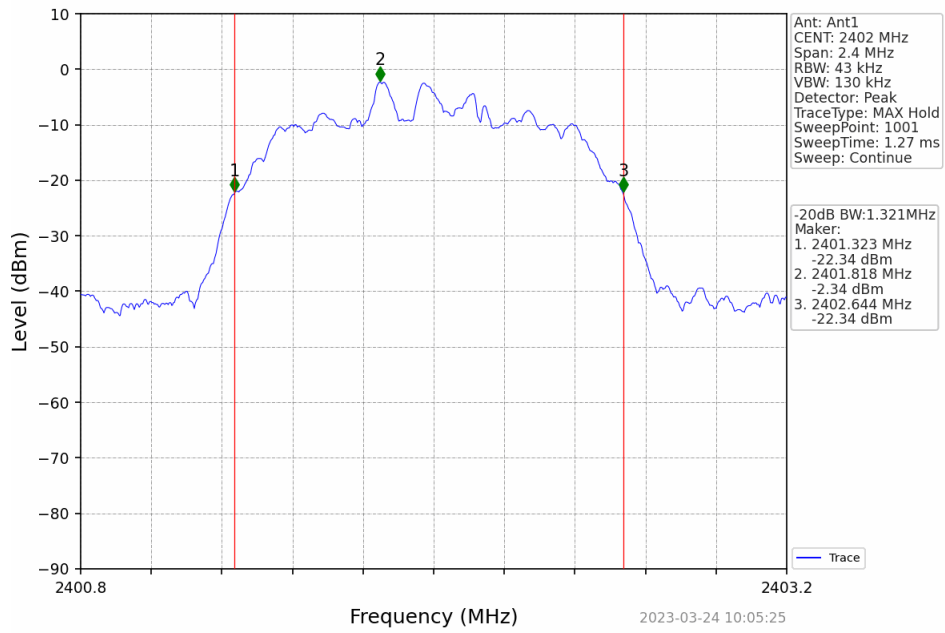
Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



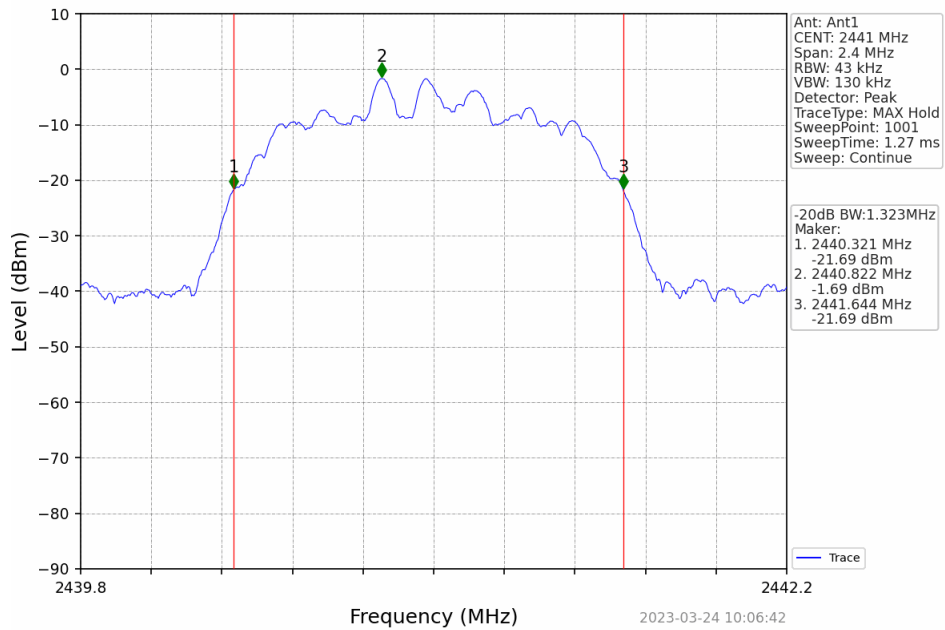
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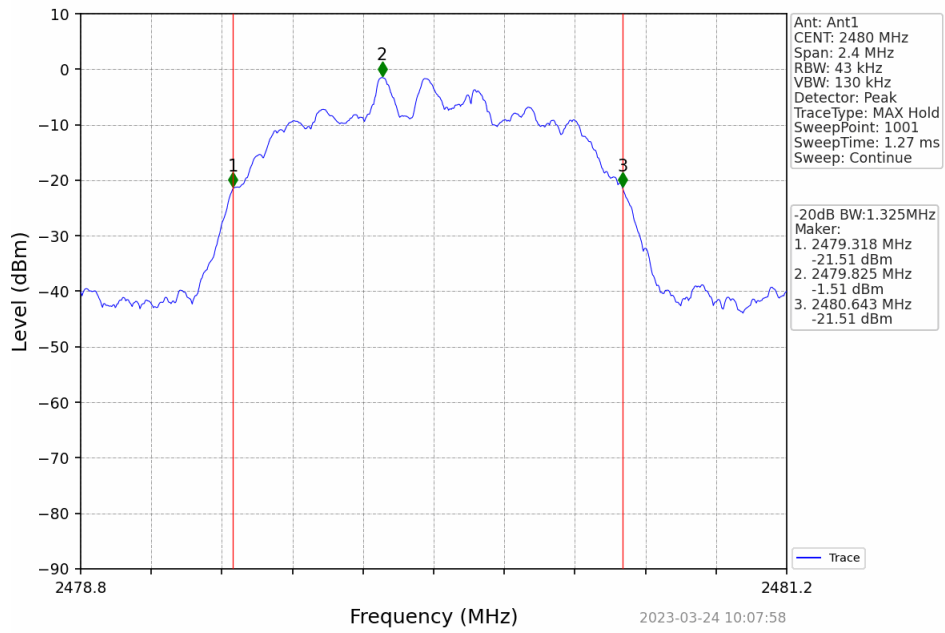
8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



8DPSK\_3DH5\_MCH\_2441MHz\_Ant1\_NTNV



### 8DPSK\_3DH5\_HCH\_2480MHz\_Ant1\_NTNV

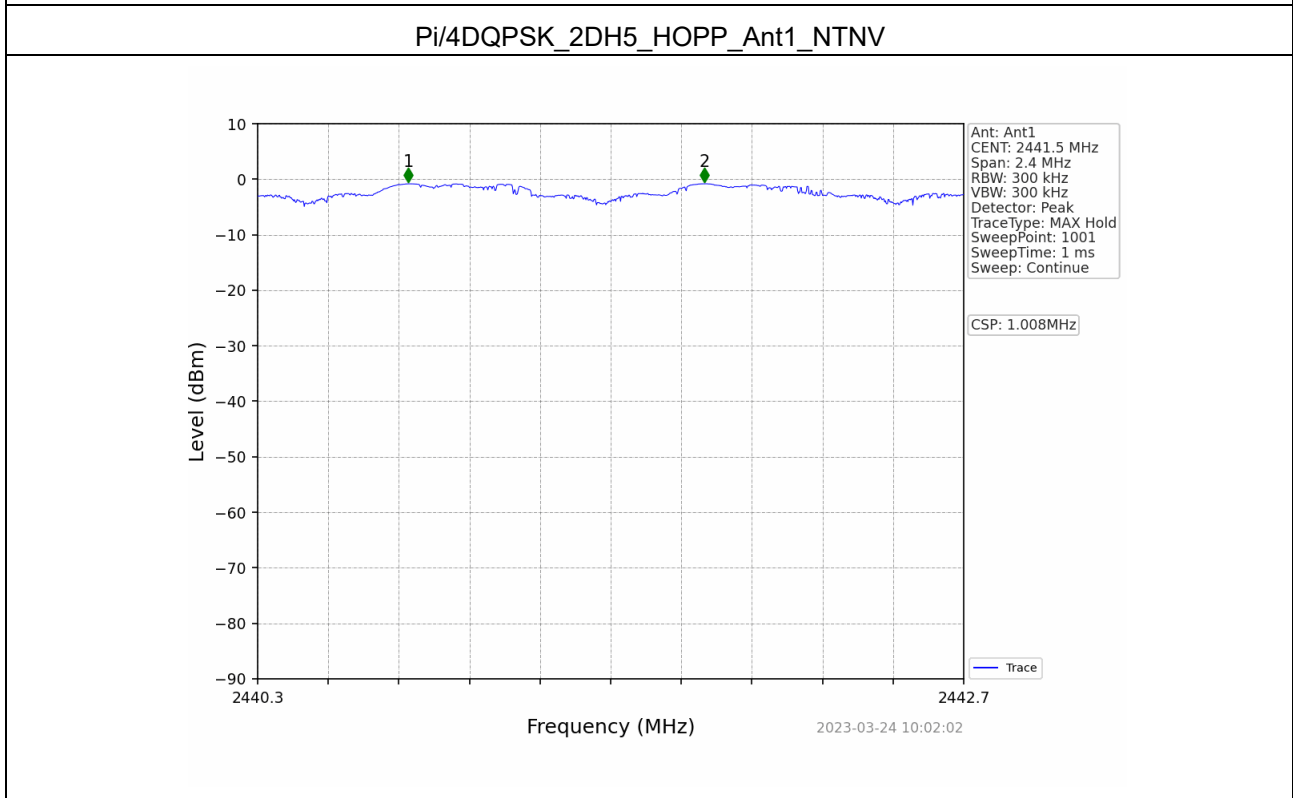
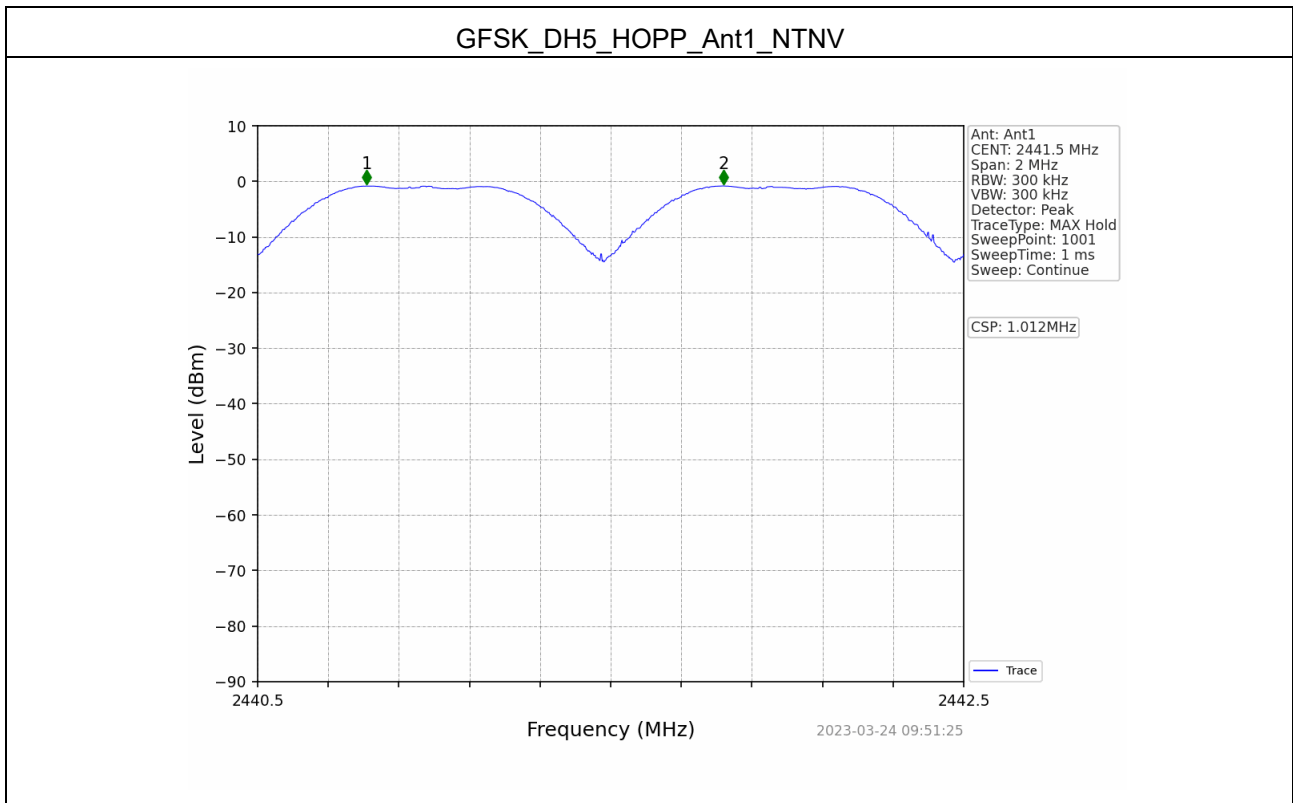


### 3 Carrier Frequency Separation

#### 3.1 Test Result

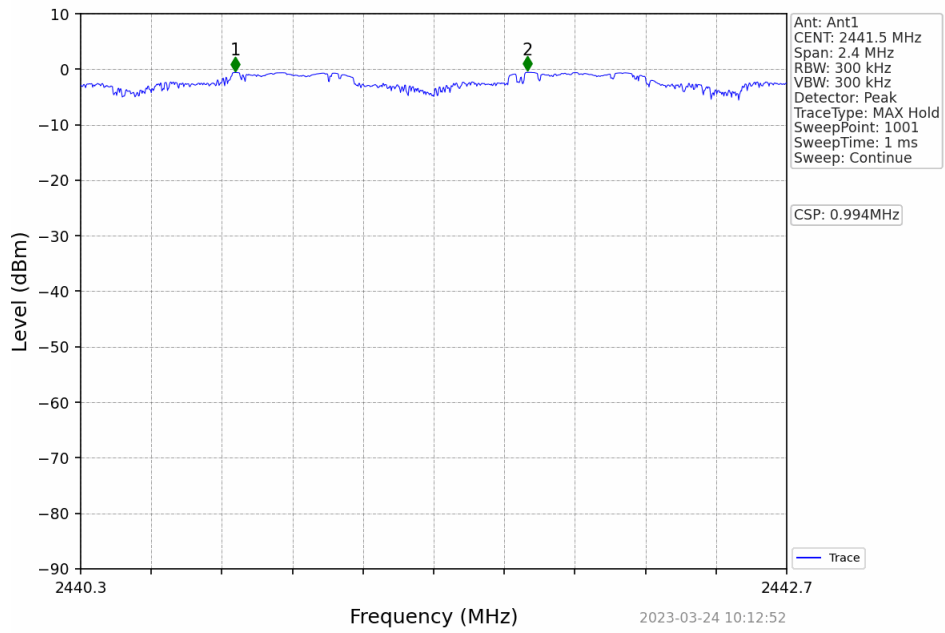
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	MCH	1.012	$\geq 0.951$	Pass
$\pi/4$ DQPSK	MCH	1.008	$\geq 0.883$	Pass
8DPSK	MCH	0.994	$\geq 0.883$	Pass

### 3.2 Test Graphs





### 8DPSK\_3DH5\_HOPP\_Ant1\_NTNV

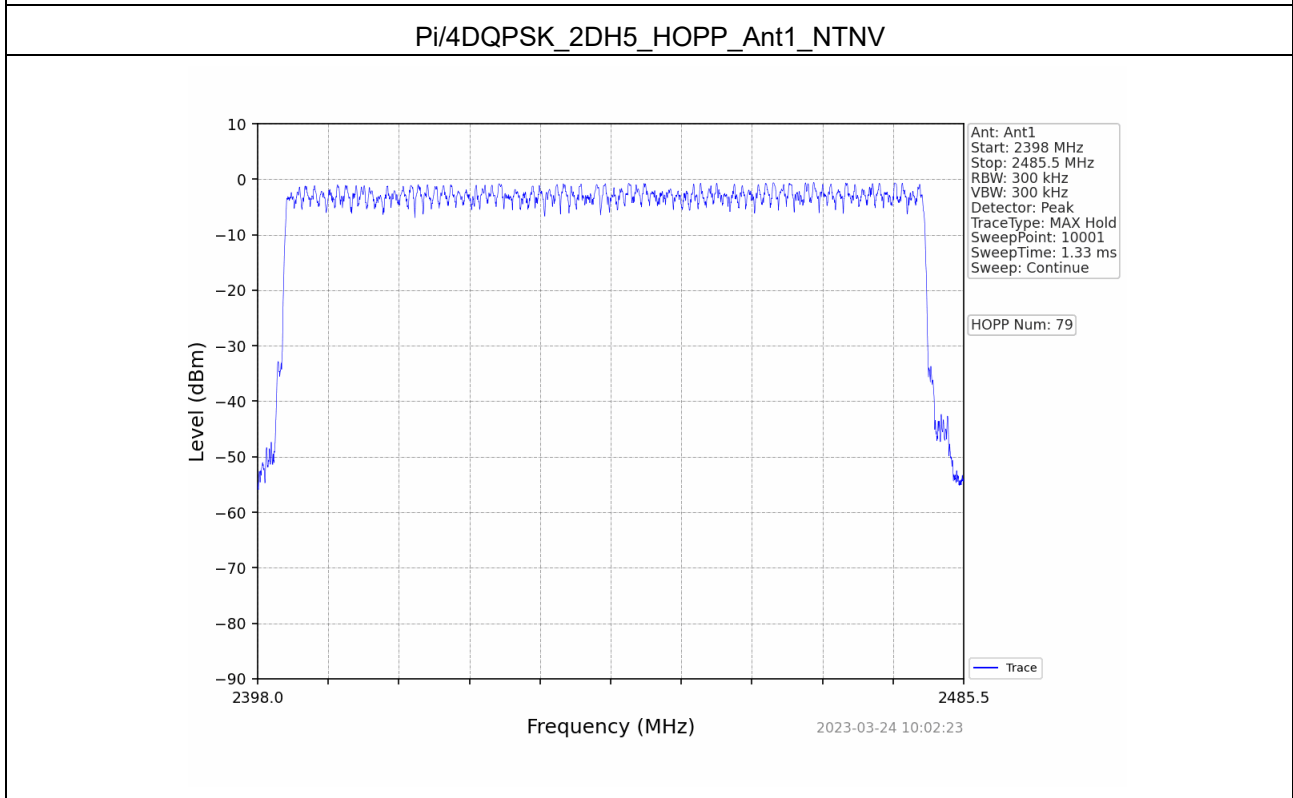
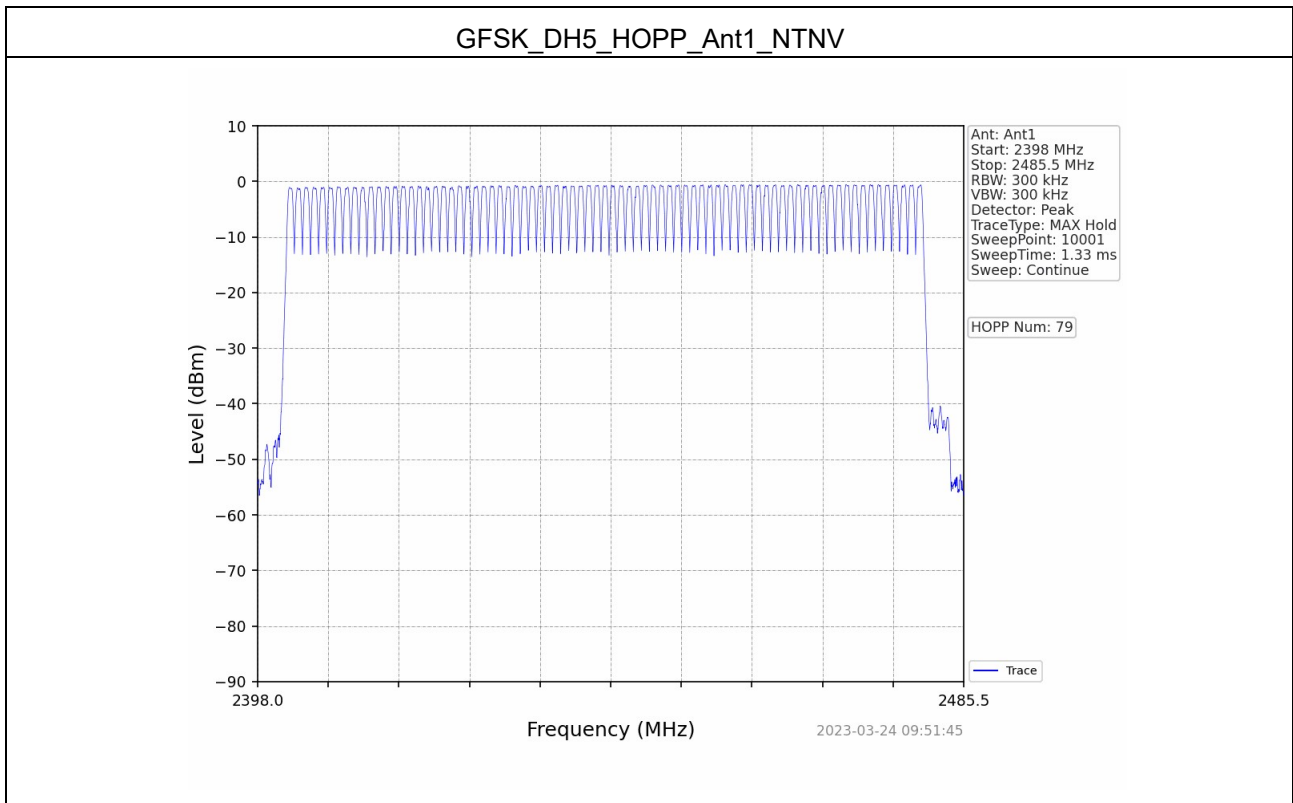


## 4 Hopping Channel Number

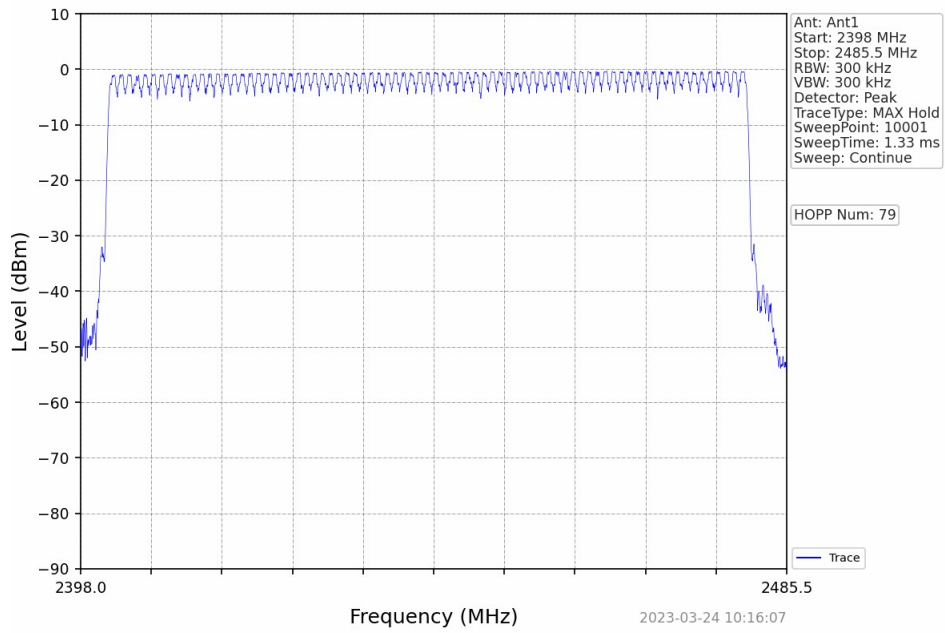
### 4.1 Test Result

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

## 4.2 Test Graphs



### 8DPSK\_3DH5\_HOPP\_Ant1\_NTNV

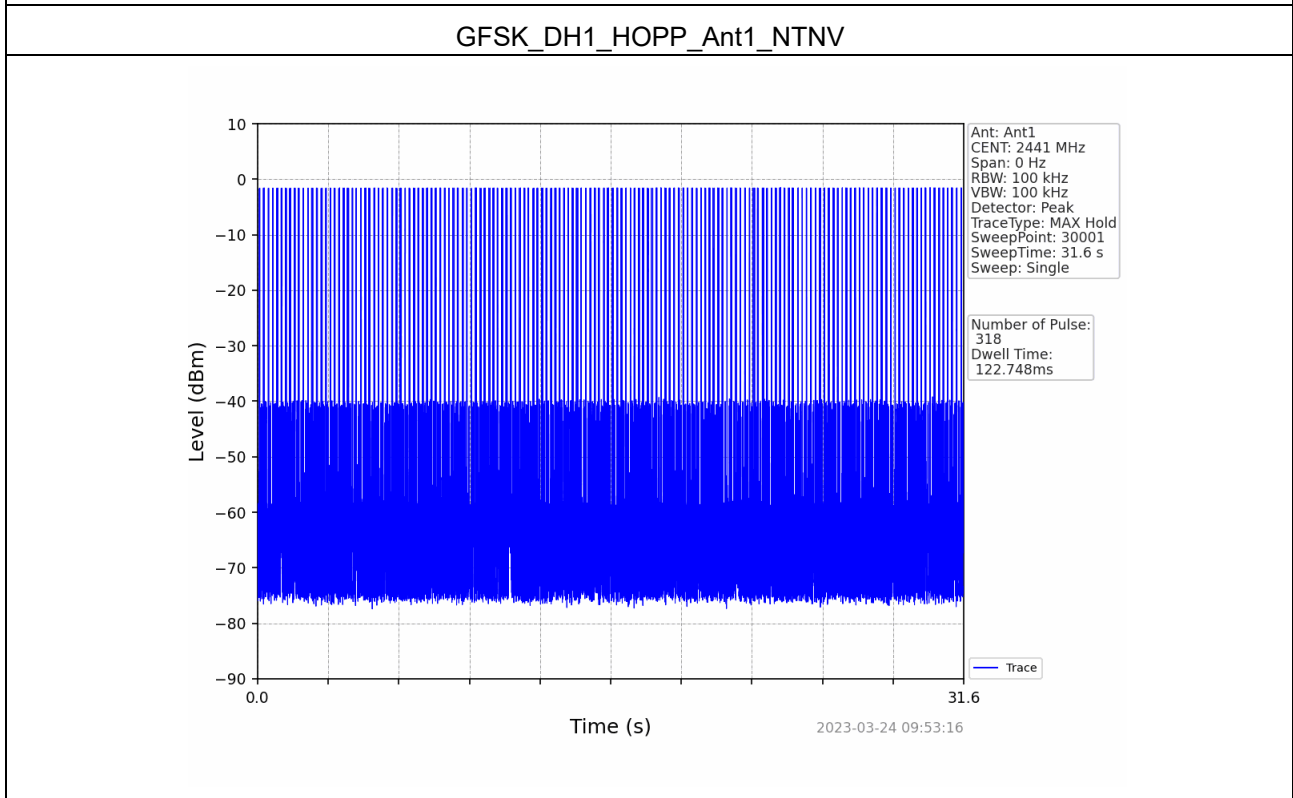
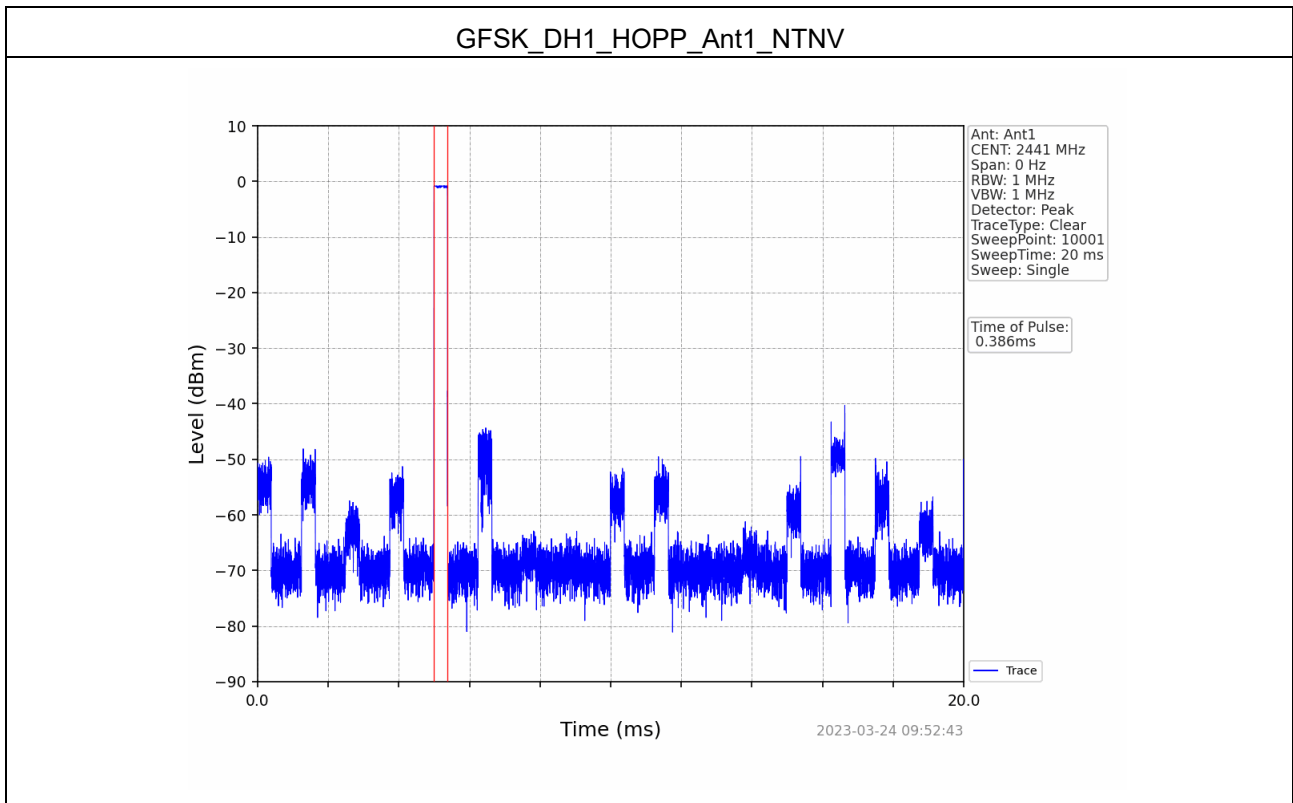


## 5 Dwell Time

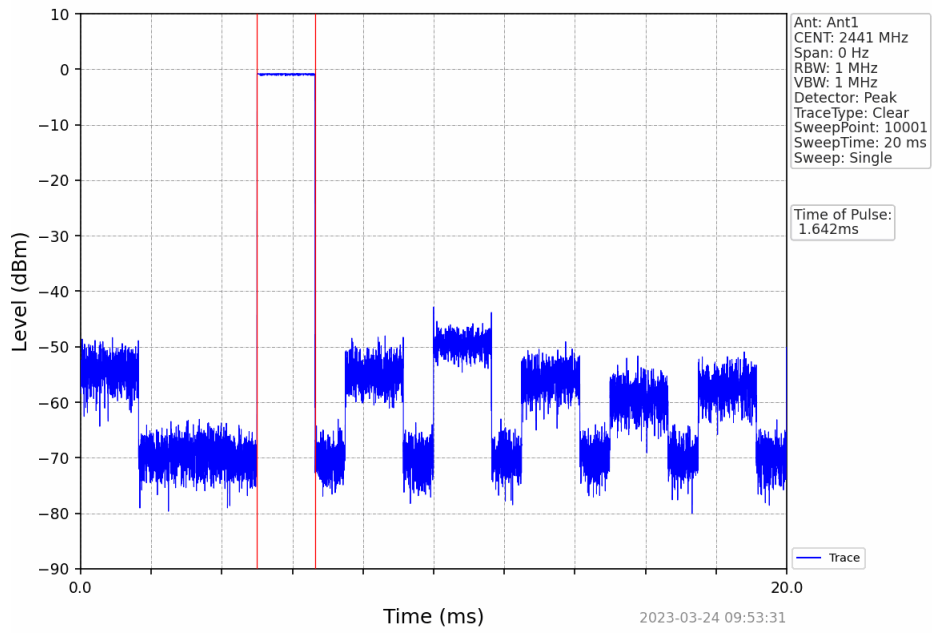
### 5.1 Test Result

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

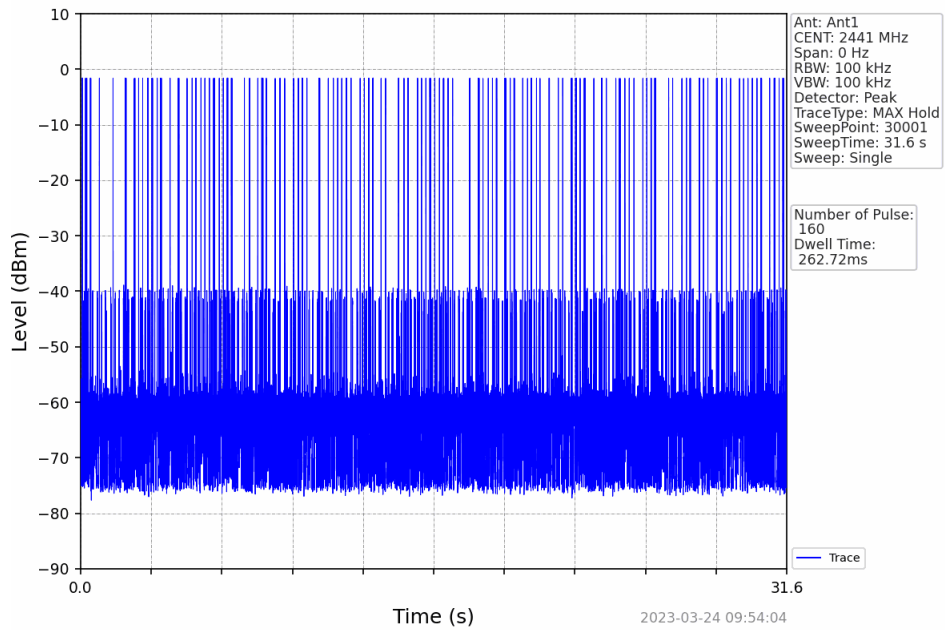
## 5.2 Test Graphs



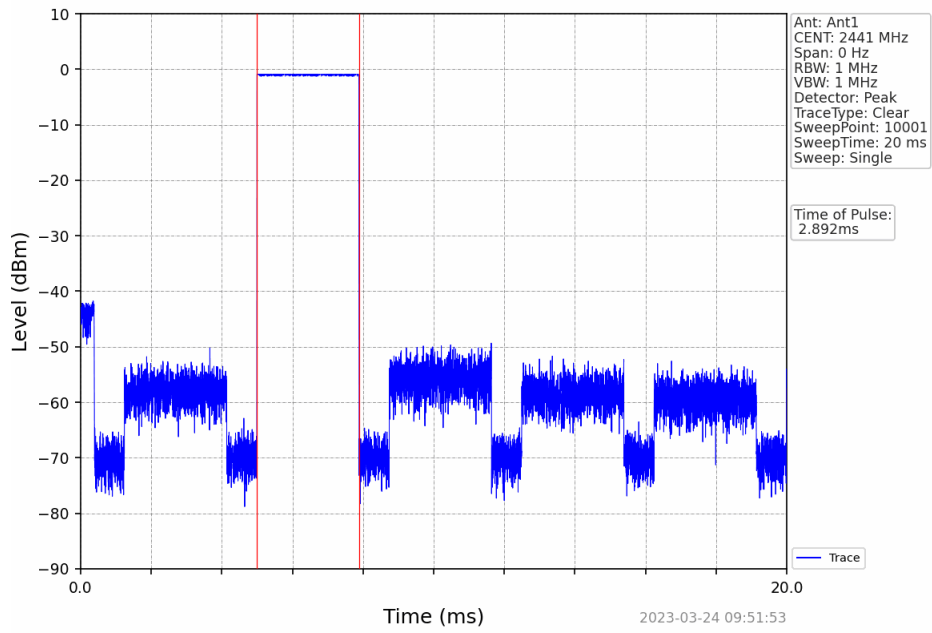
### GFSK\_DH3\_HOPP\_Ant1\_NTNV



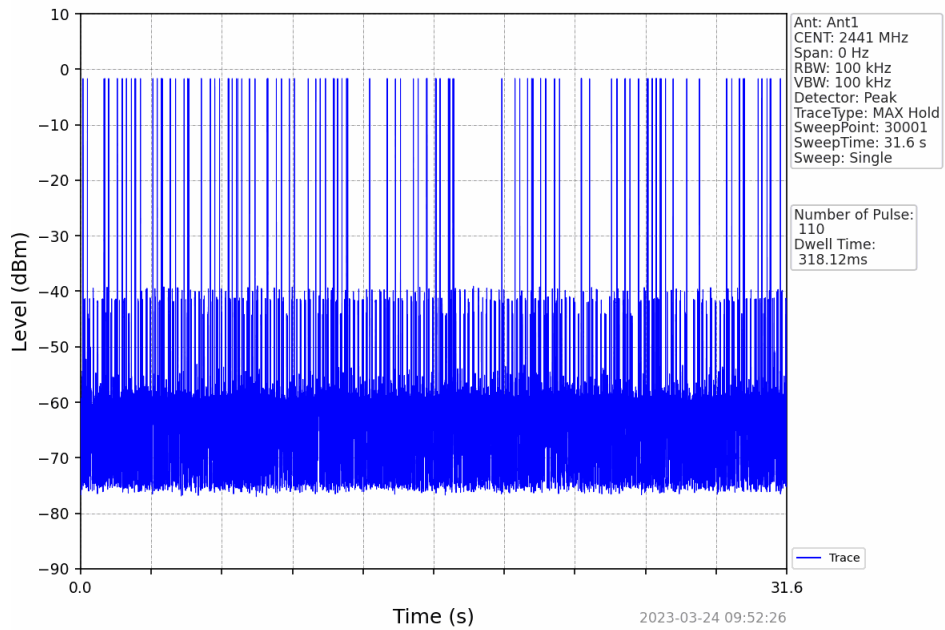
### GFSK\_DH3\_HOPP\_Ant1\_NTNV



### GFSK\_DH5\_HOPP\_Ant1\_NTNV

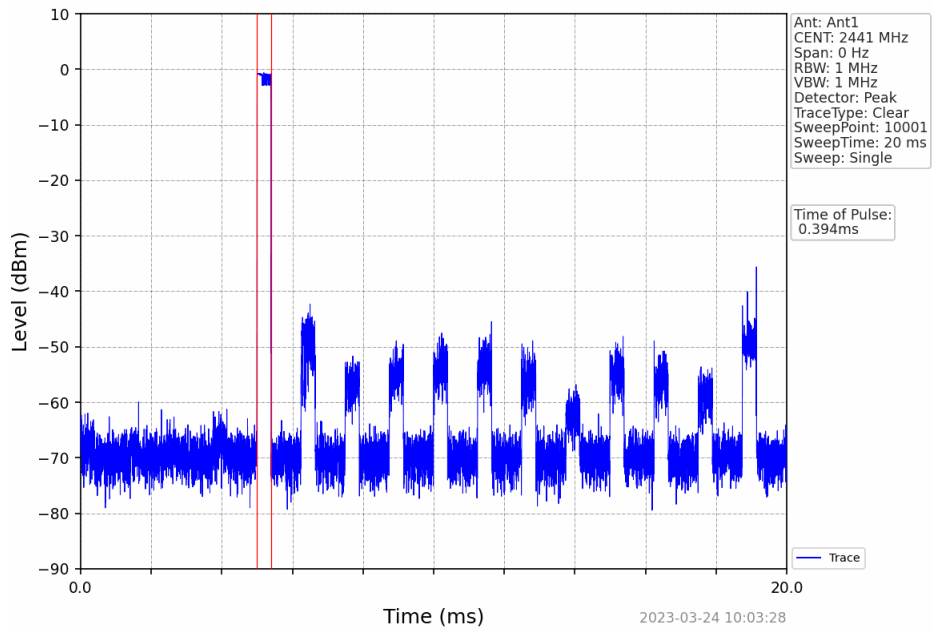


### GFSK\_DH5\_HOPP\_Ant1\_NTNV

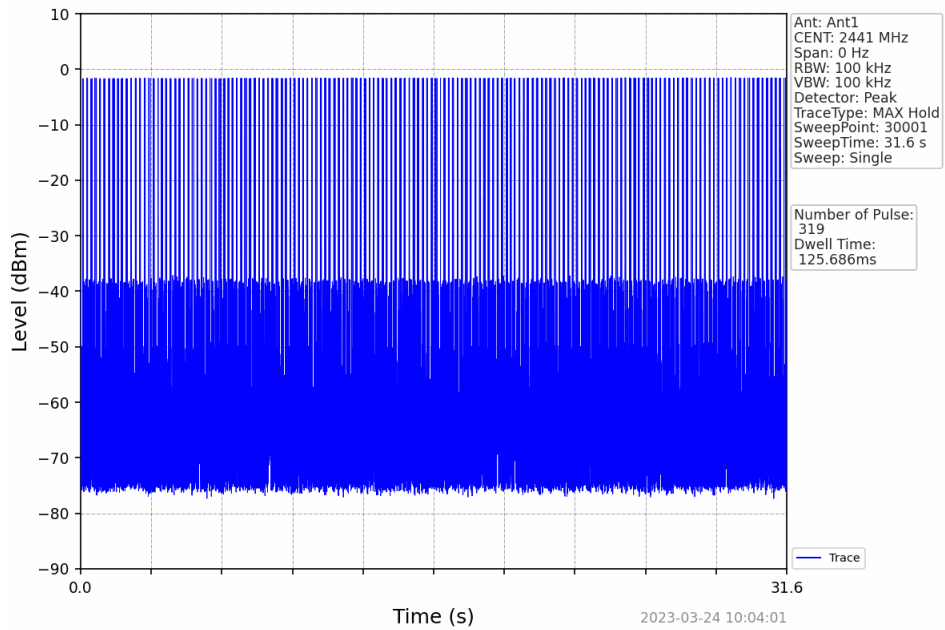




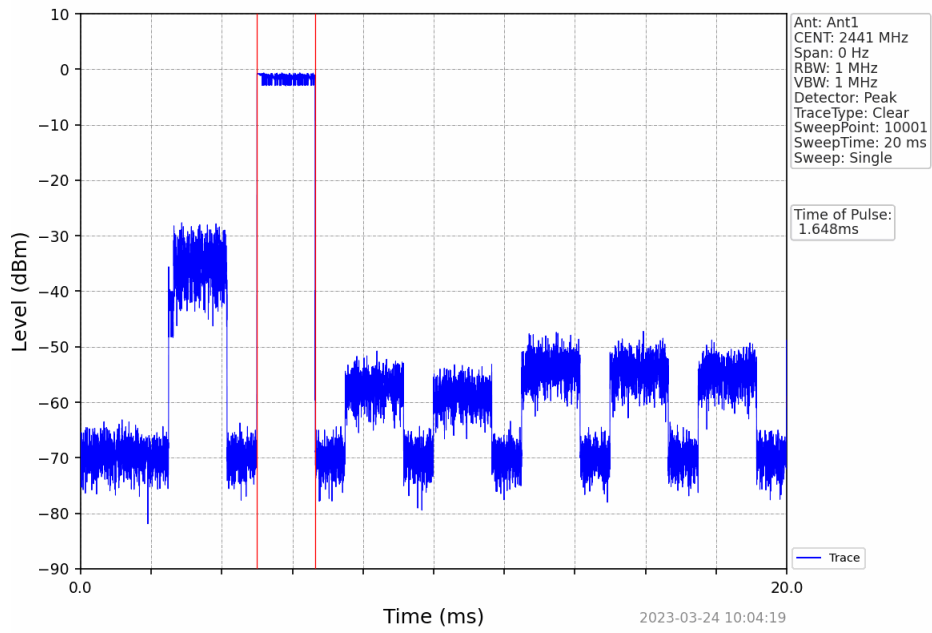
### Pi/4DQPSK\_2DH1\_HOPP\_Ant1\_NTNV



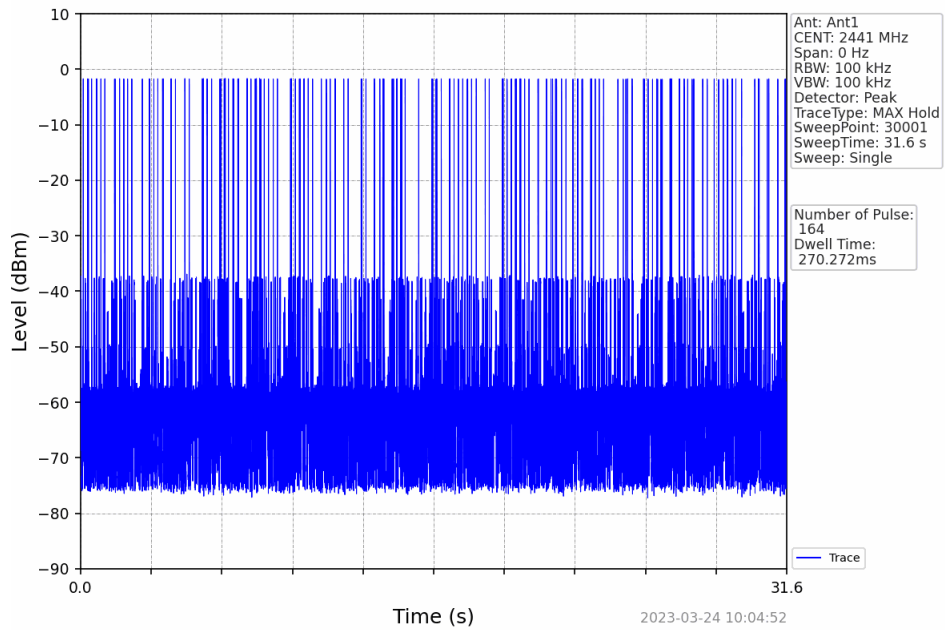
### Pi/4DQPSK\_2DH1\_HOPP\_Ant1\_NTNV



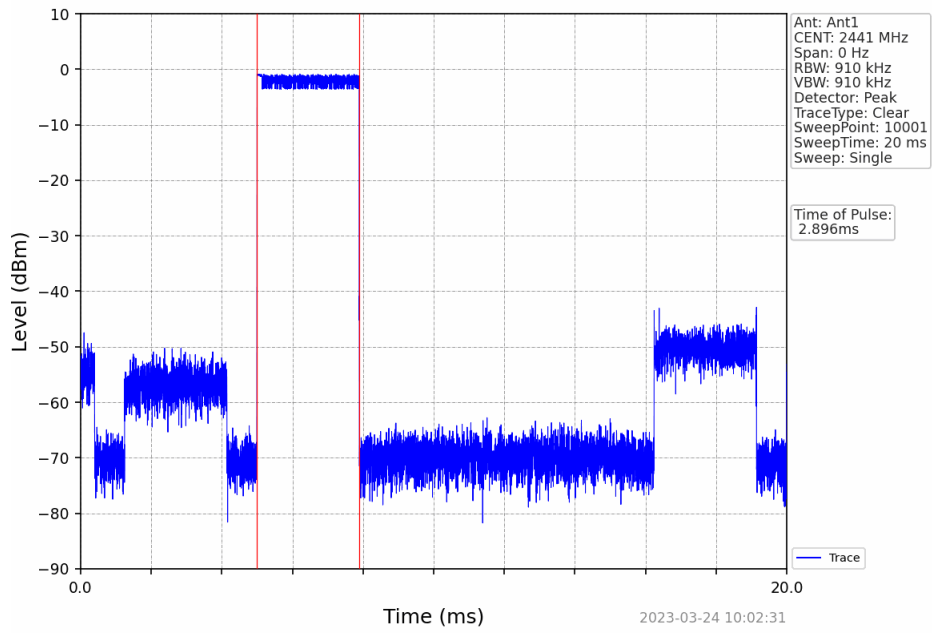
### Pi/4DQPSK\_2DH3\_HOPP\_Ant1\_NTNV



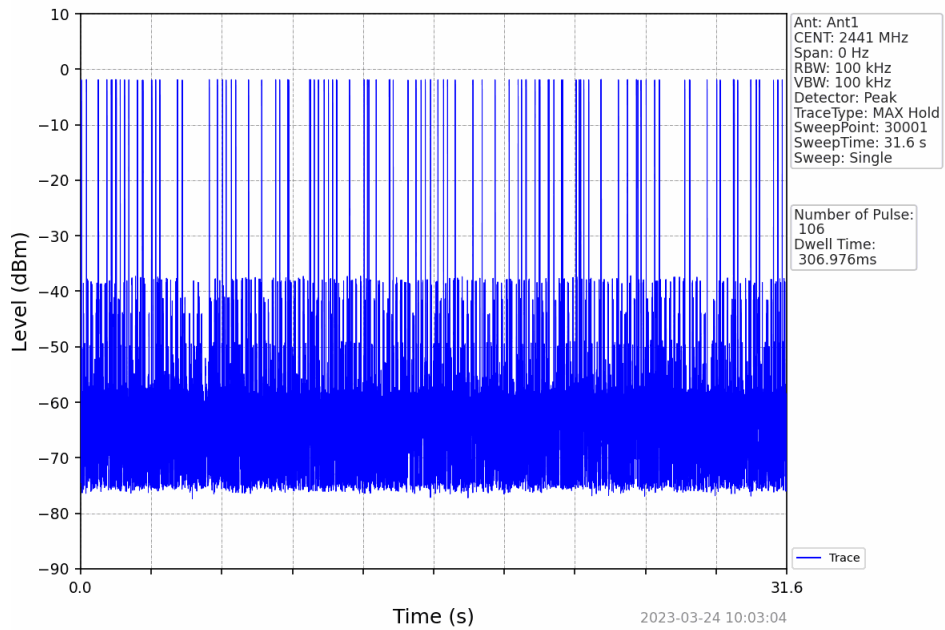
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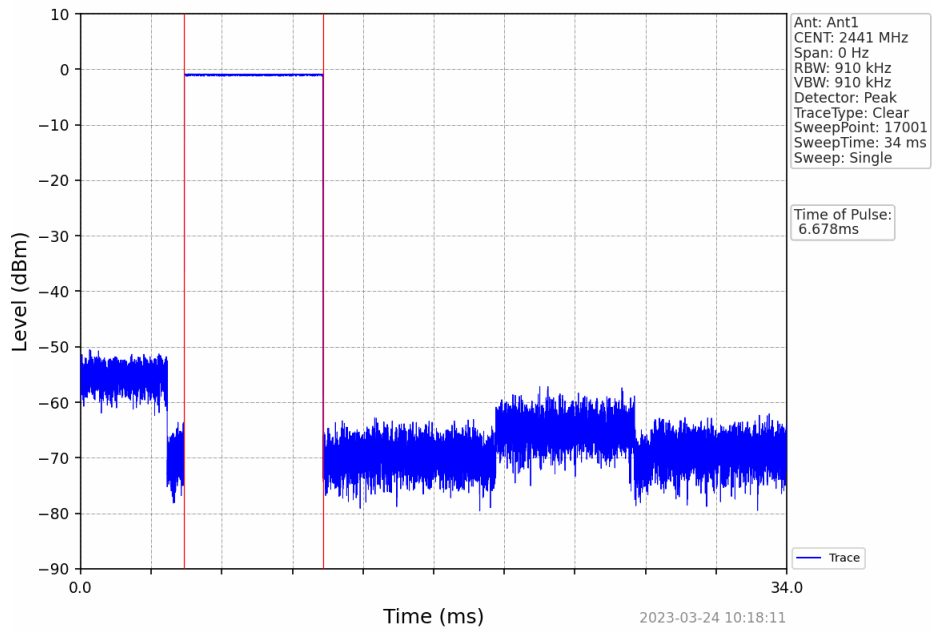
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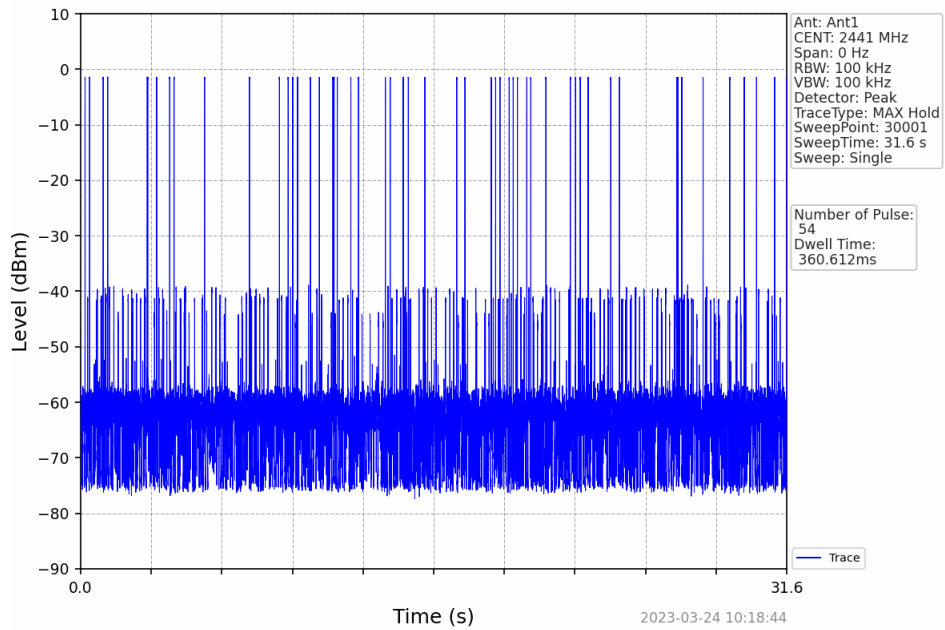
### Pi/4DQPSK\_2DH5\_HOPP\_Ant1\_NTNV



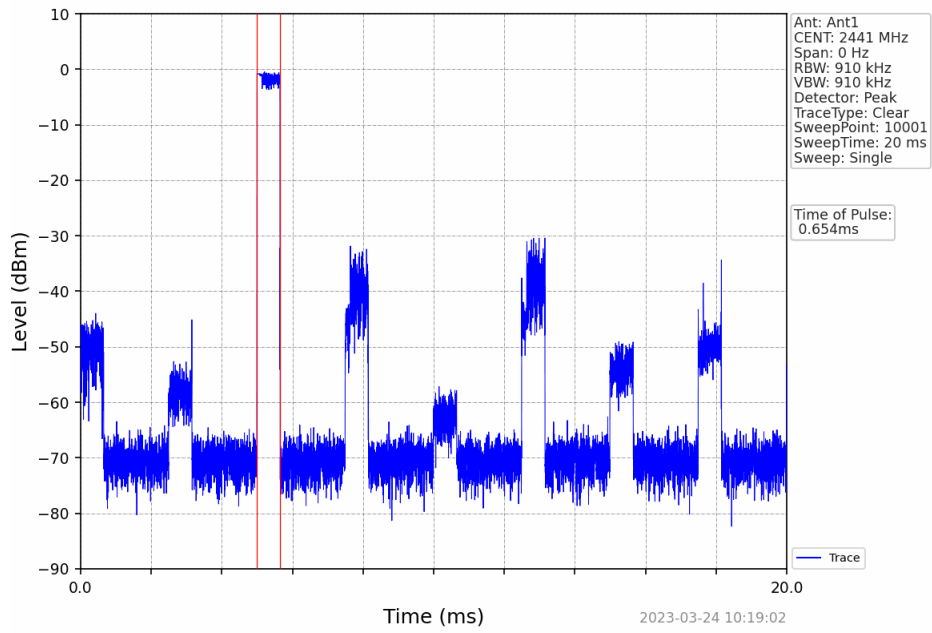
### 8DPSK\_3DH1\_HOPP\_Ant1\_NTNV



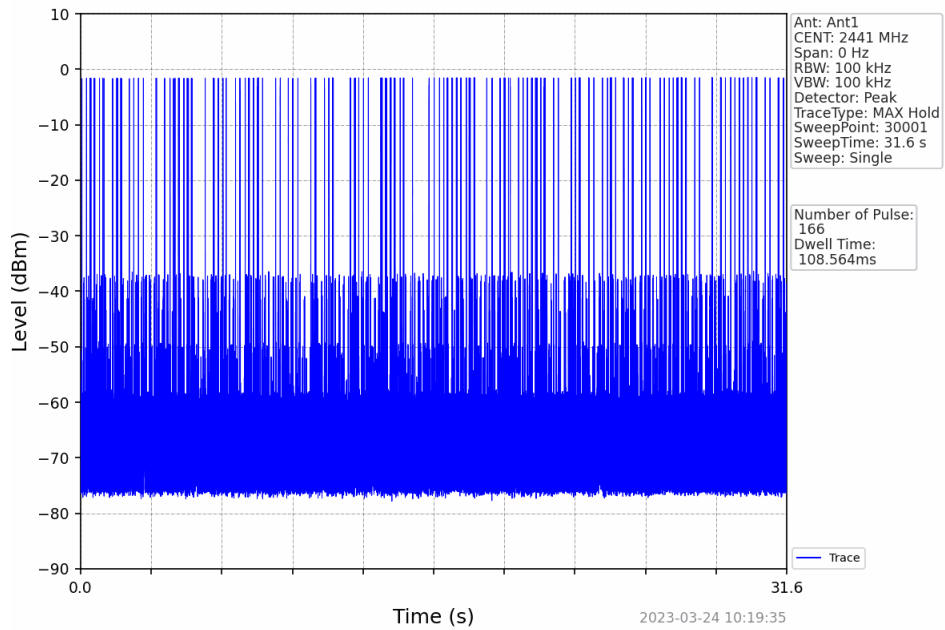
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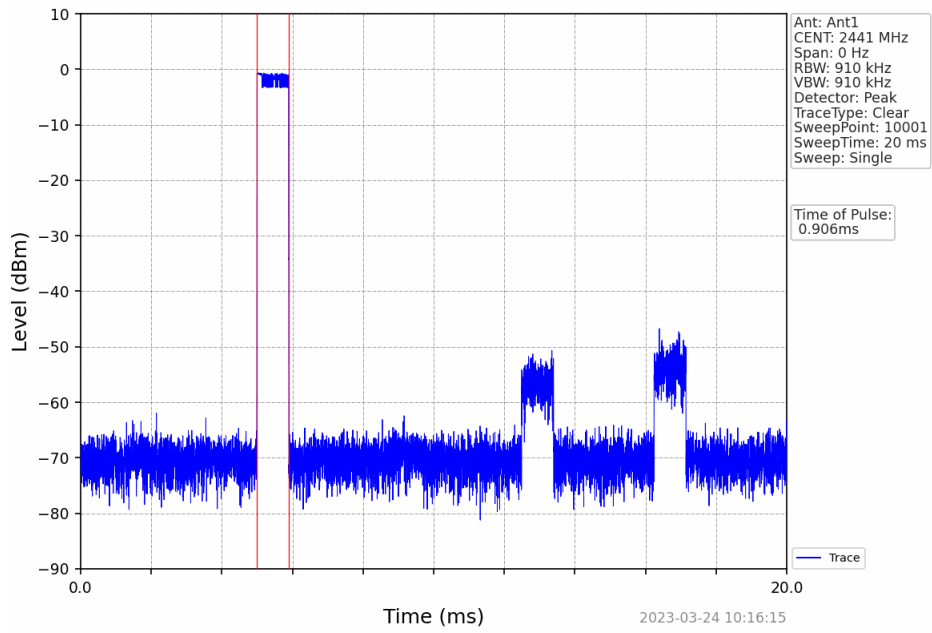
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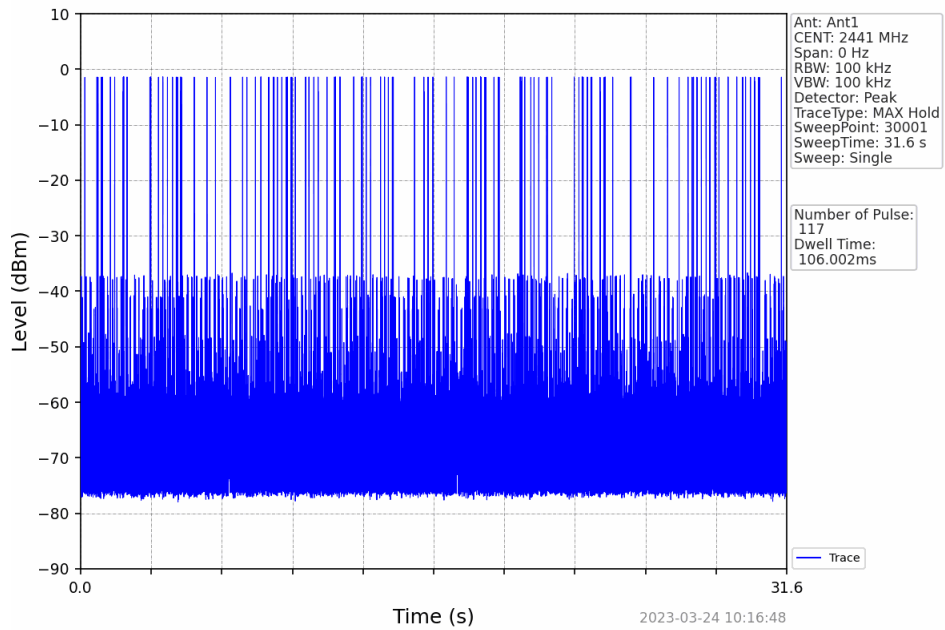
### 8DPSK\_3DH3\_HOPP\_Ant1\_NTNV



### 8DPSK\_3DH5\_HOPP\_Ant1\_NTNV



### 8DPSK\_3DH5\_HOPP\_Ant1\_NTNV

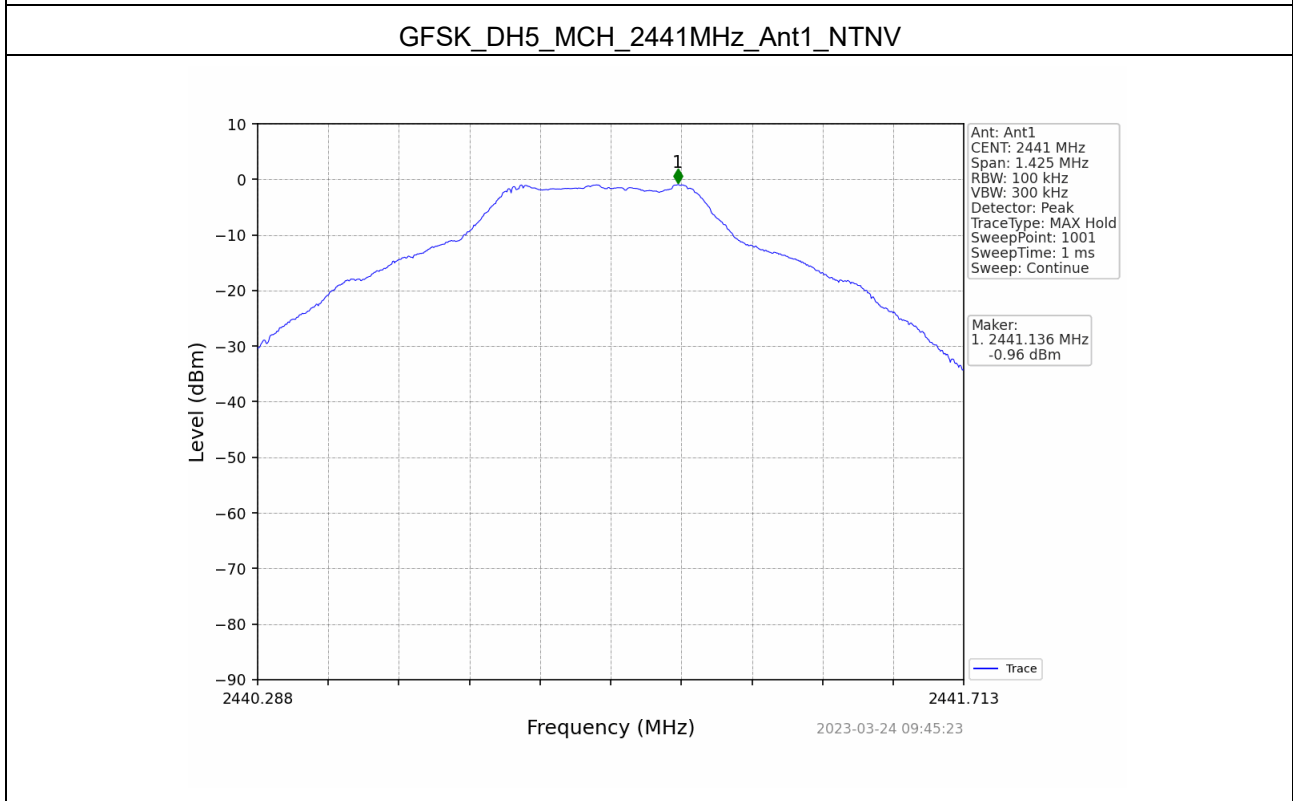
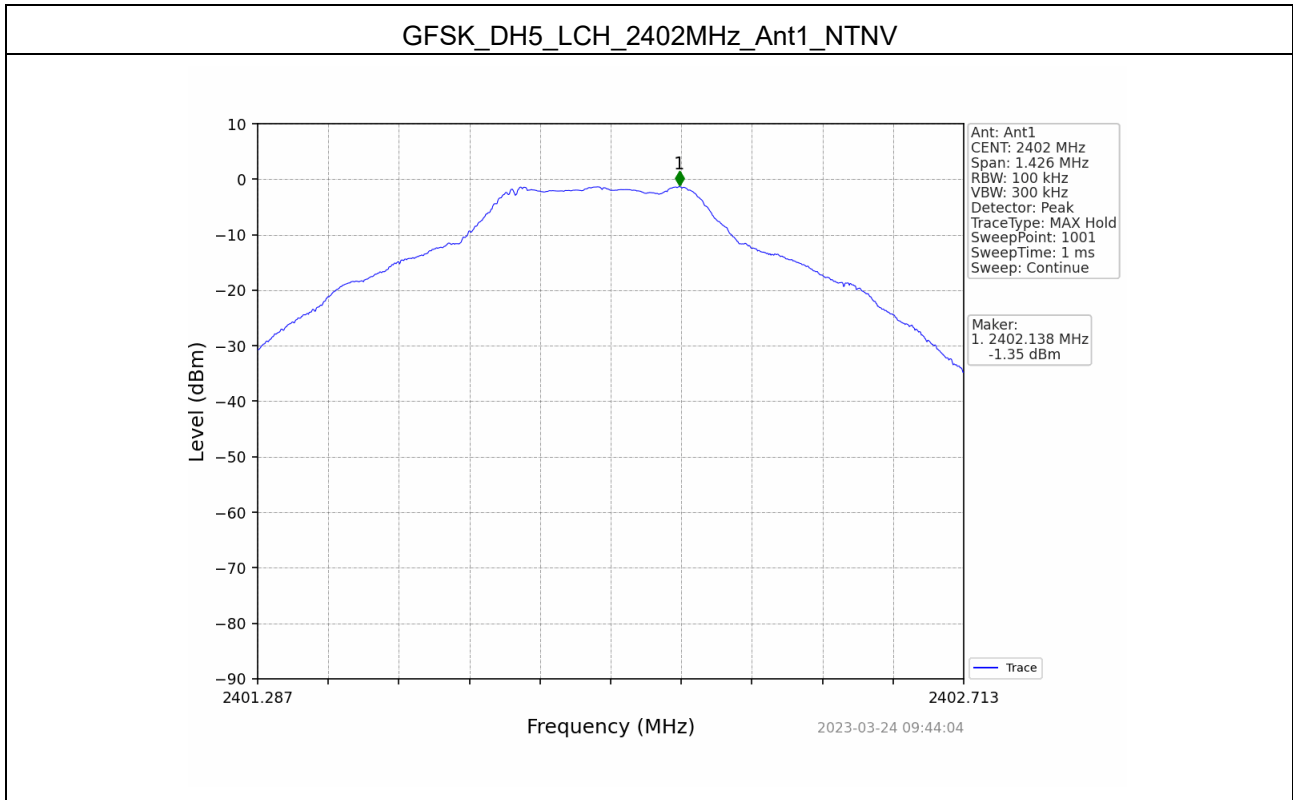


## 6 Conducted Spurious Emissions and Band Edges Test

### 6.1 Test Result

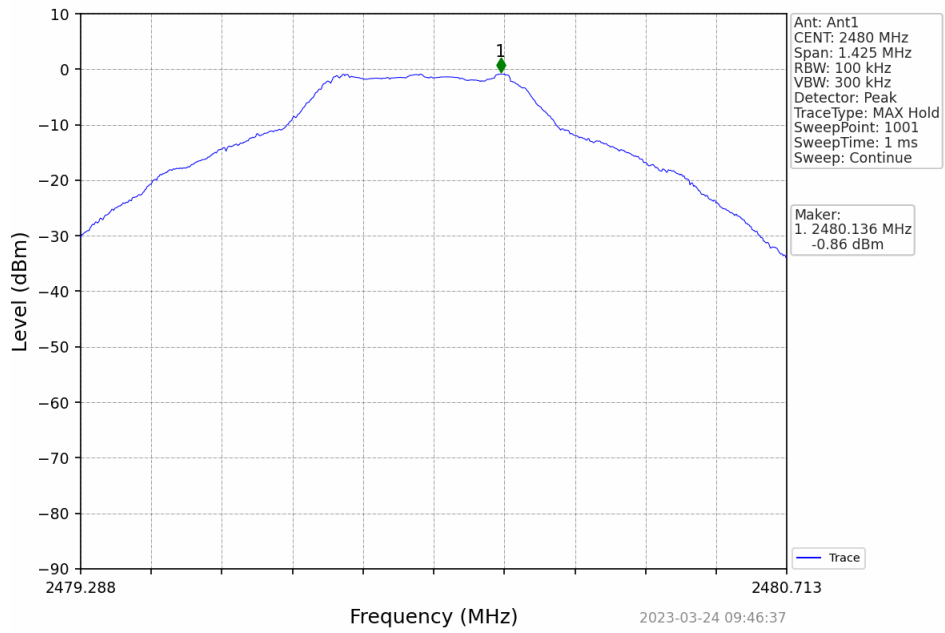
Mode	Channel	Max. Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	-1.35	-20	Pass
	MCH	-0.96	-20	Pass
	HCH	-0.86	-20	Pass
$\pi/4$ DQPSK	LCH	-1.22	-20	Pass
	MCH	-0.82	-20	Pass
	HCH	-0.81	-20	Pass
8DPSK	LCH	-1.08	-20	Pass
	MCH	-0.61	-20	Pass
	HCH	-0.47	-20	Pass

## 6.2 Test Graphs

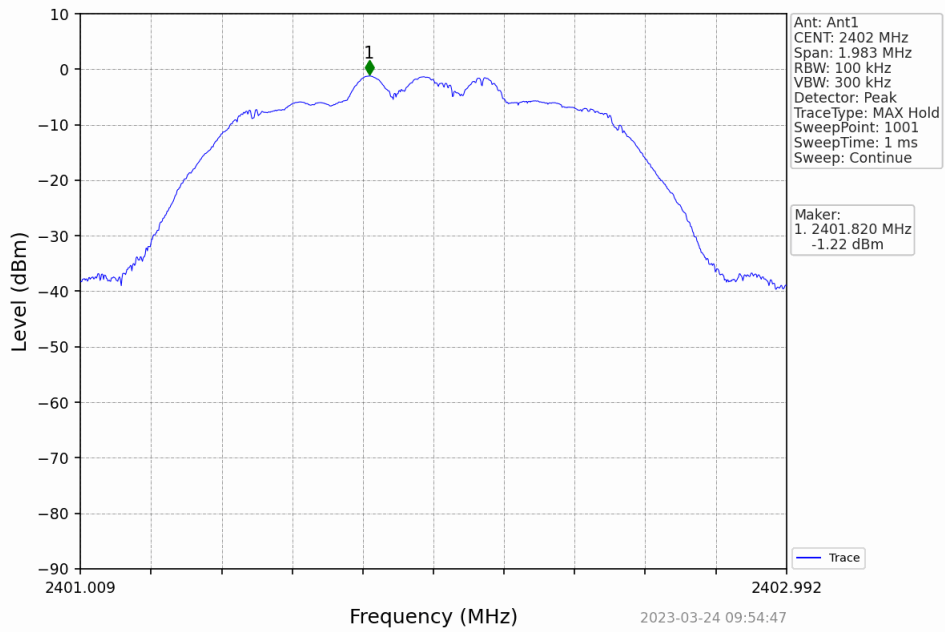




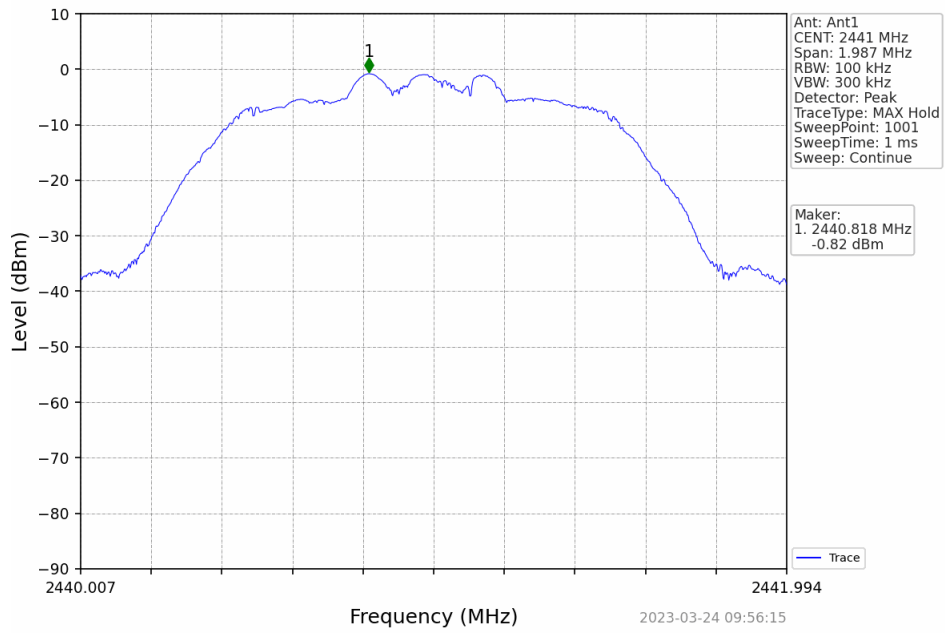
### GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



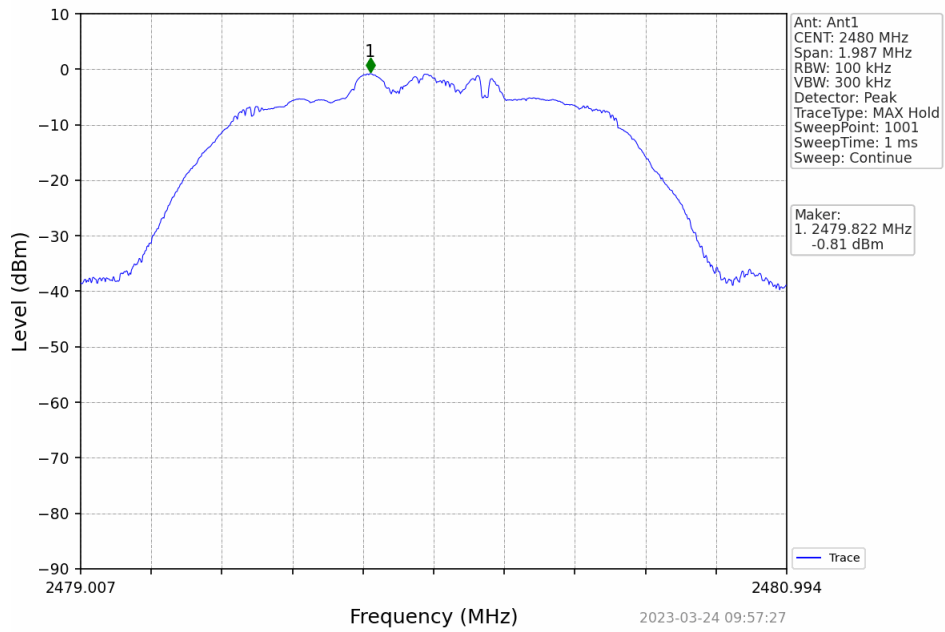
### Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



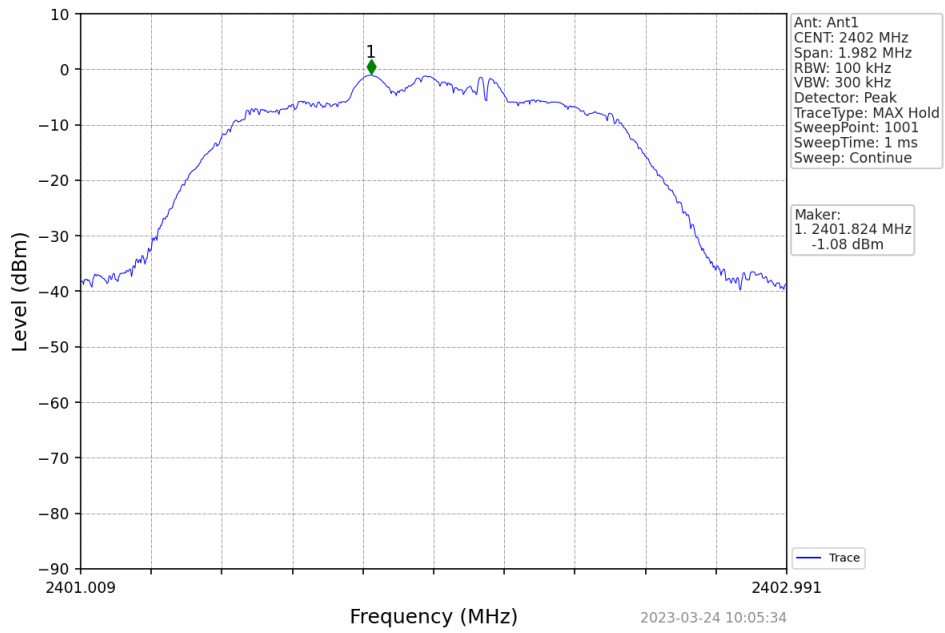
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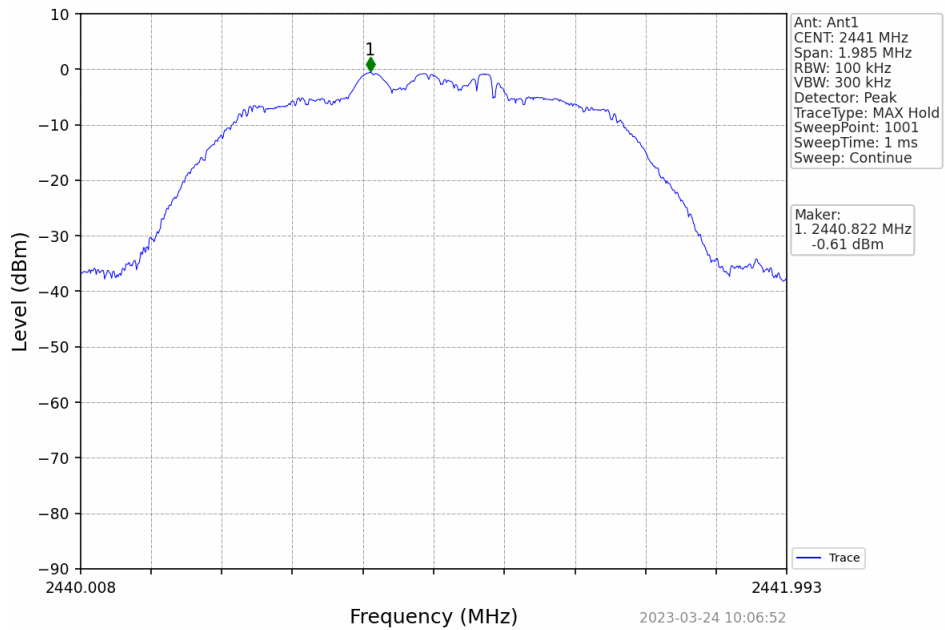
Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV



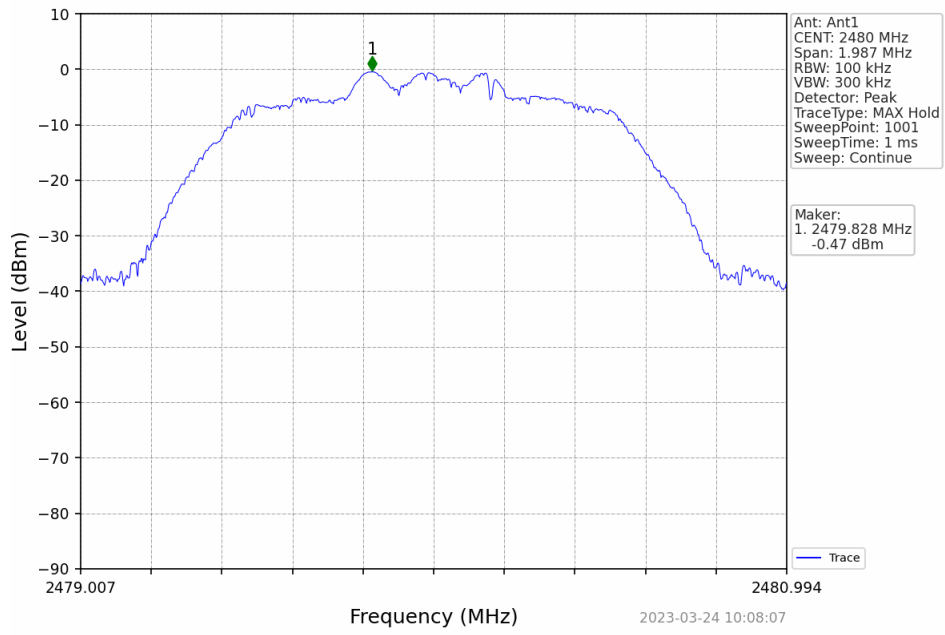
### 8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



### 8DPSK\_3DH5\_MCH\_2441MHz\_Ant1\_NTNV



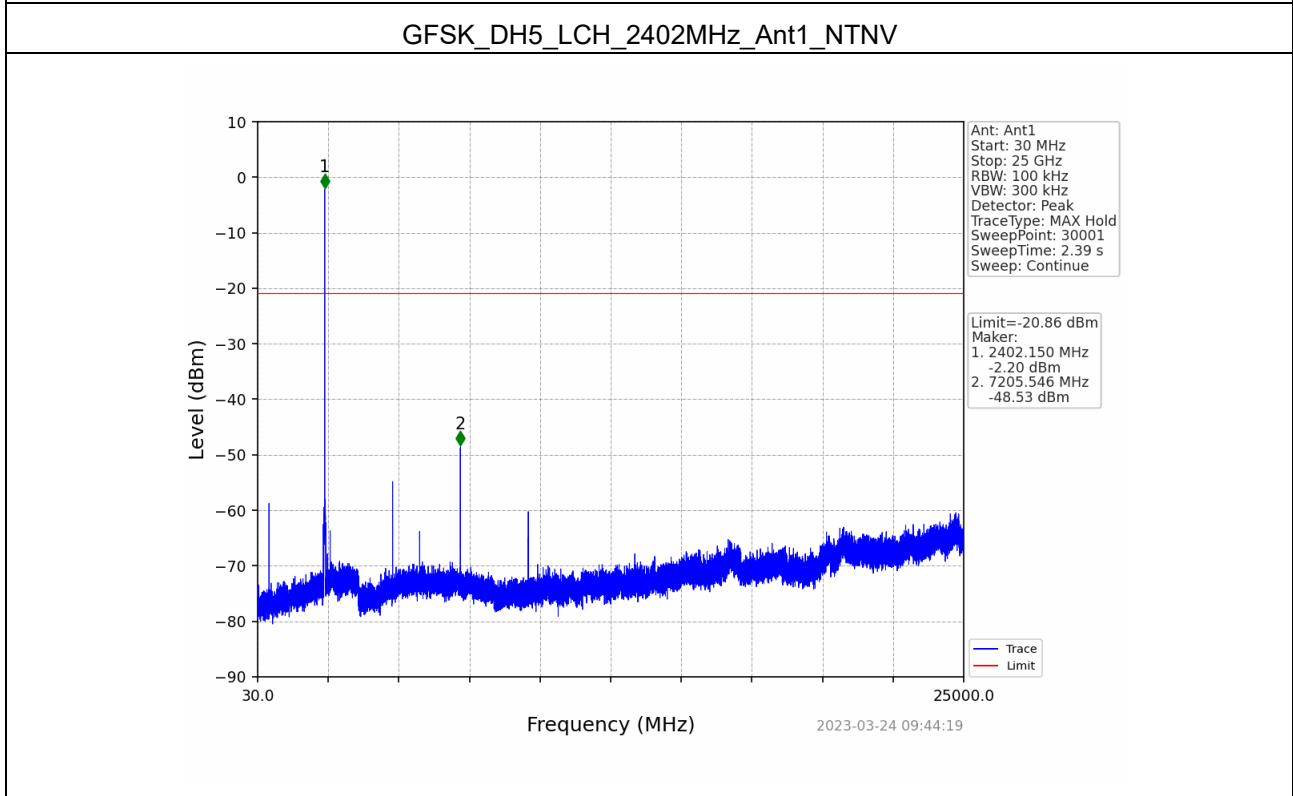
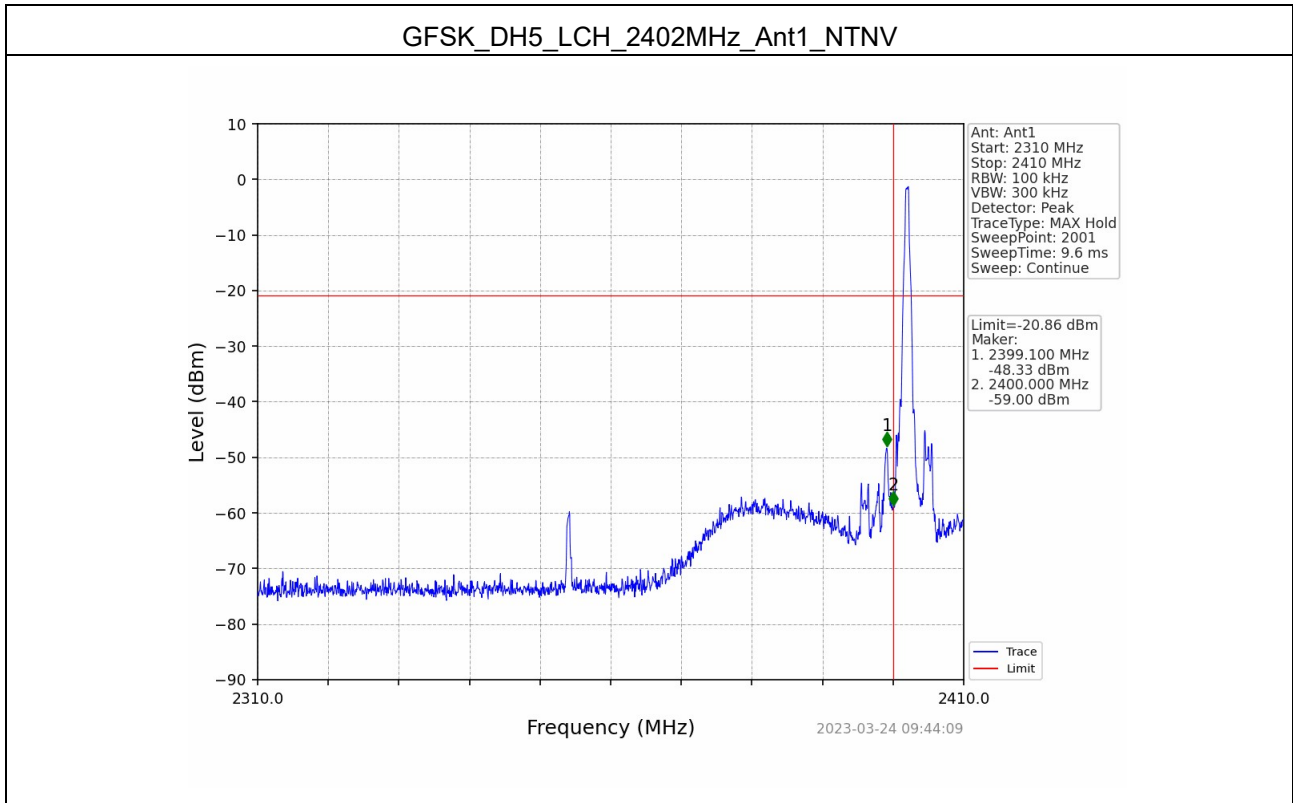
8DPSK\_3DH5\_HCH\_2480MHz\_Ant1\_NTNV



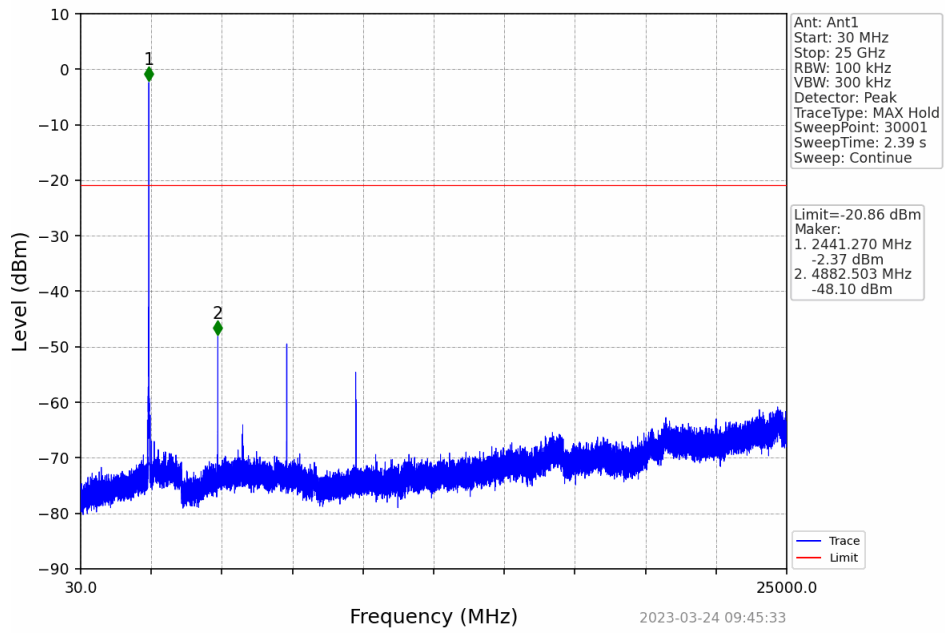
### 6.3 Conducted Spurious Emission

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

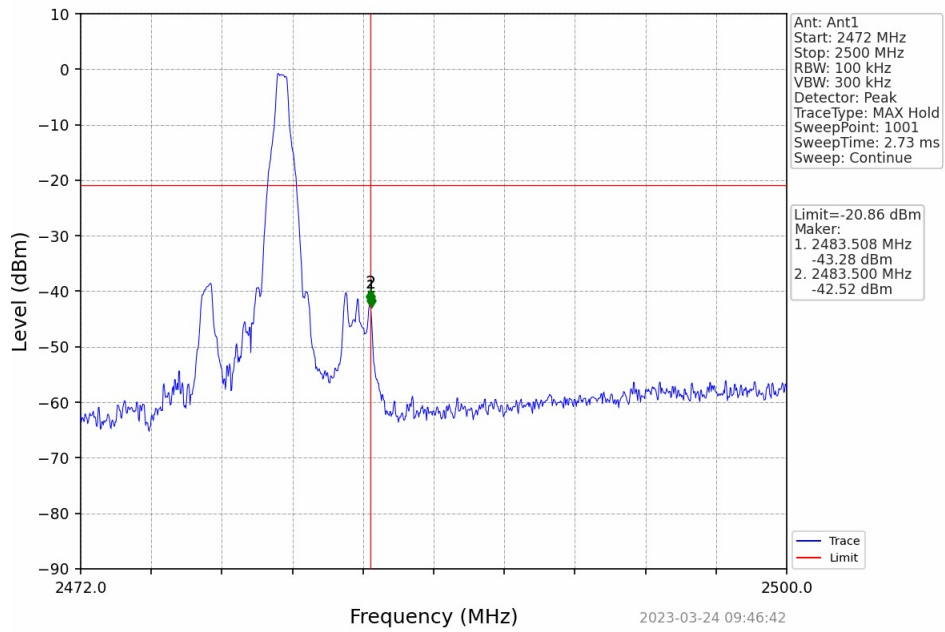
## 6.4 Test Graphs



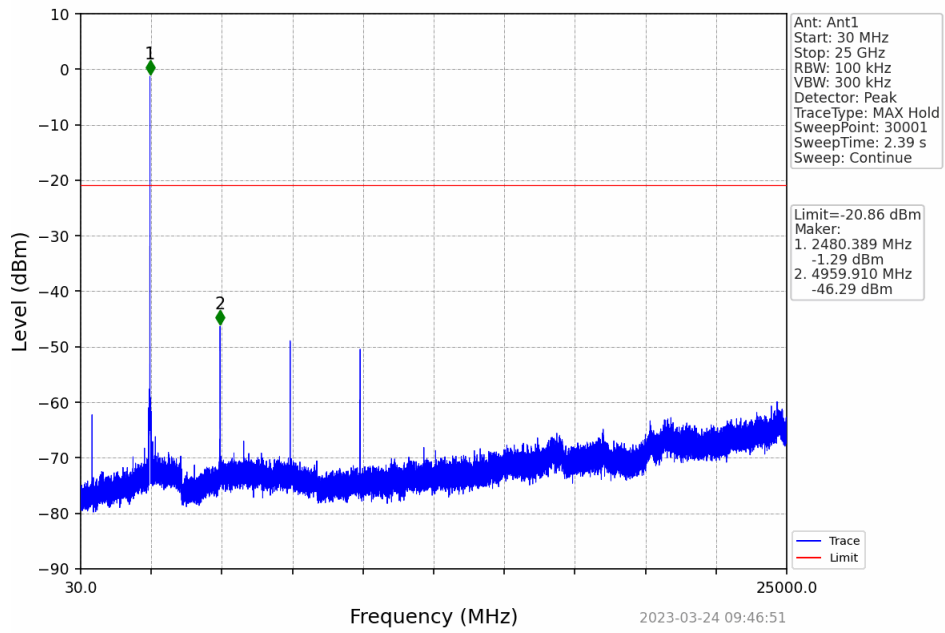
GFSK\_DH5\_MCH\_2441MHz\_Ant1\_NTNV



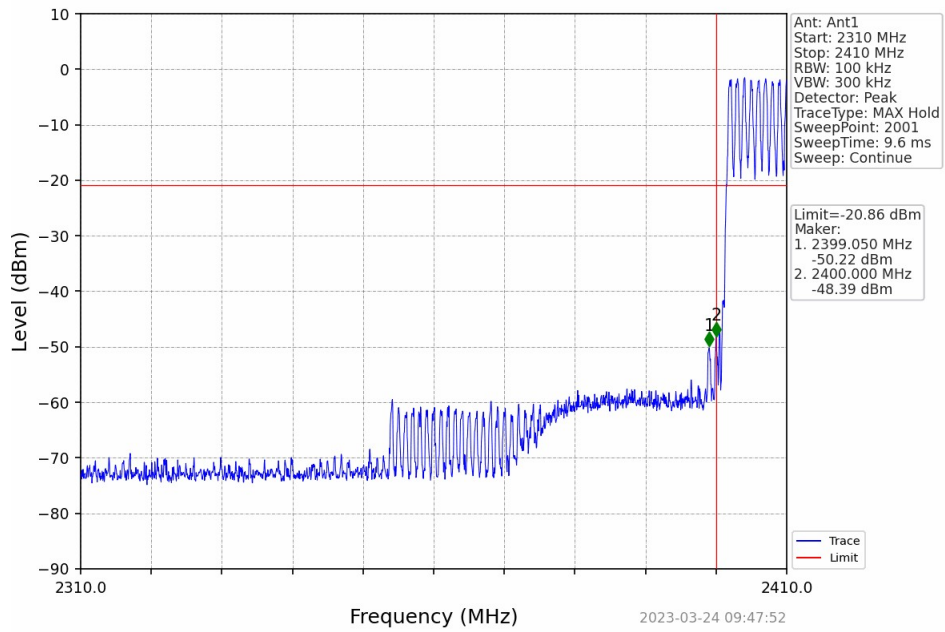
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GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV

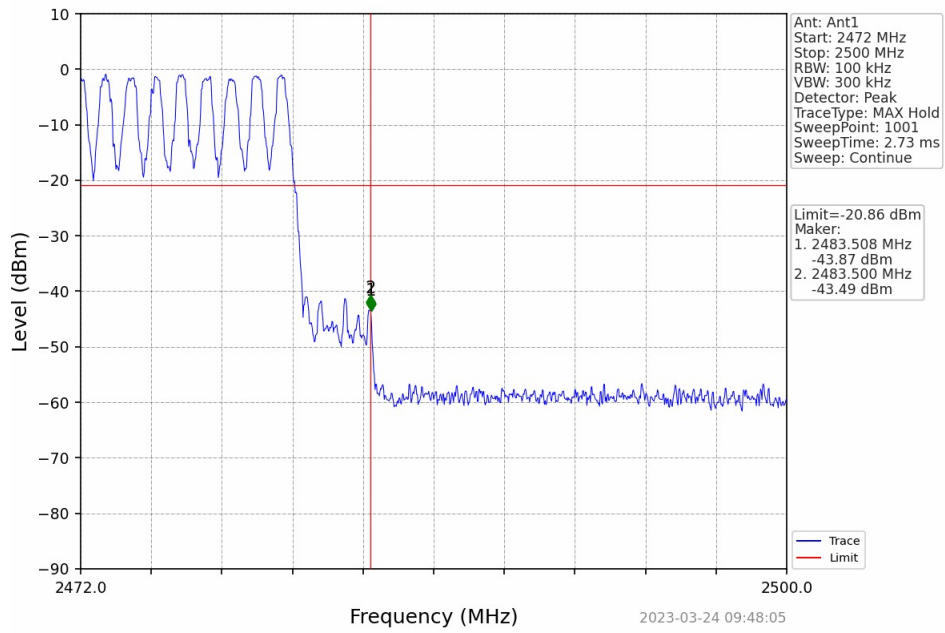


GFSK\_DH5\_HOPP\_Ant1\_NTNV

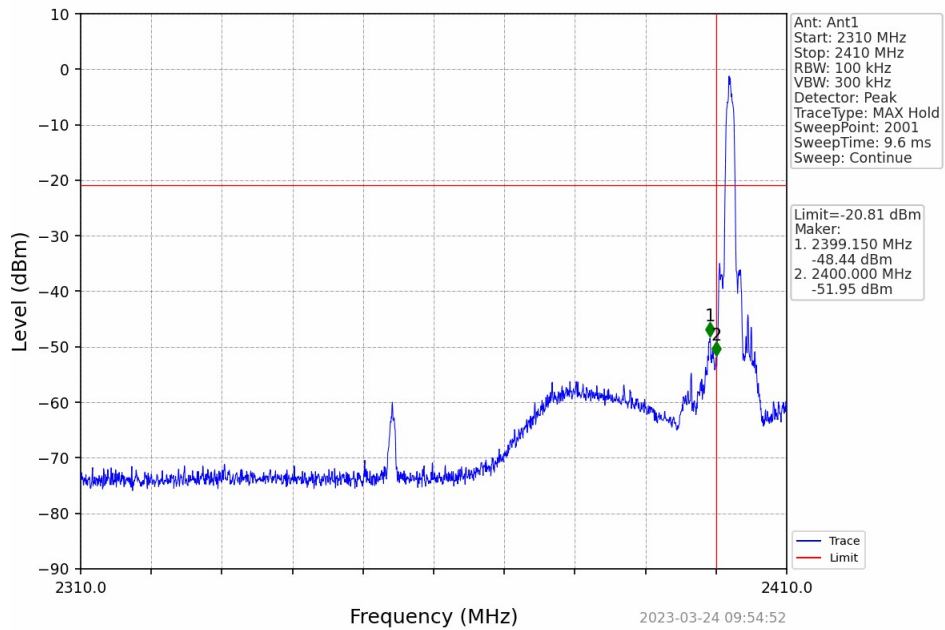




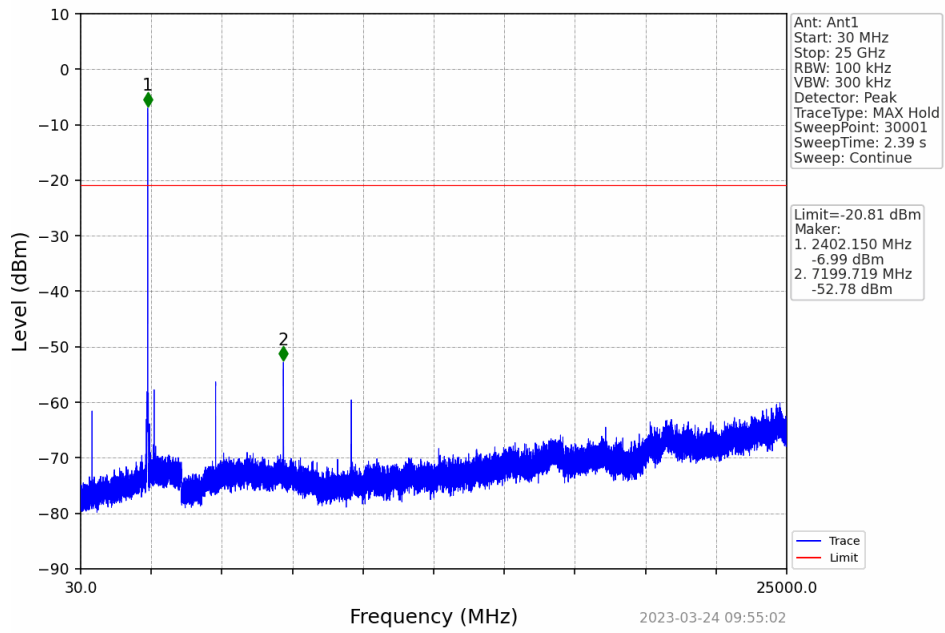
GFSK\_DH5\_HOPP\_Ant1\_NTNV



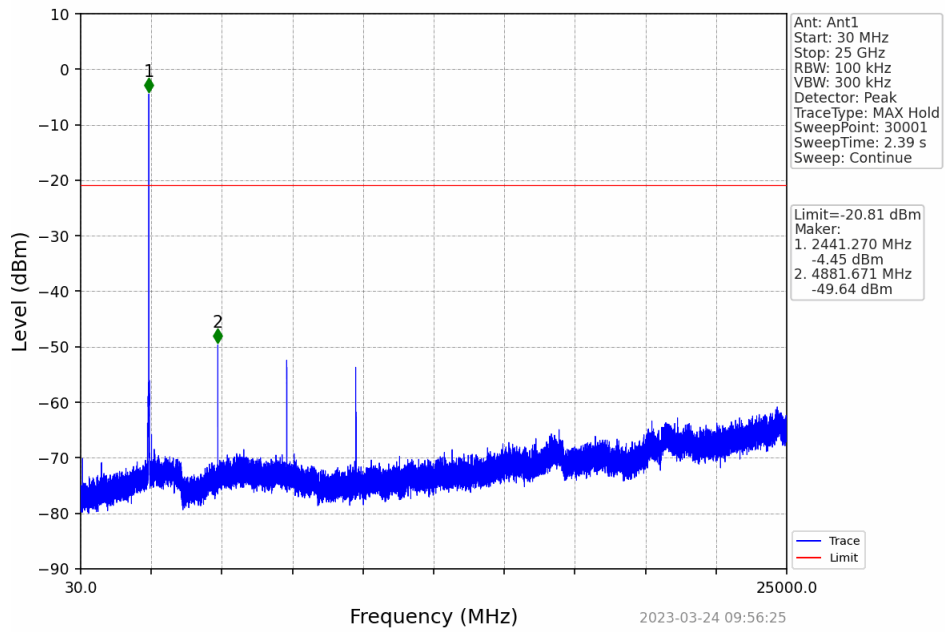
Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



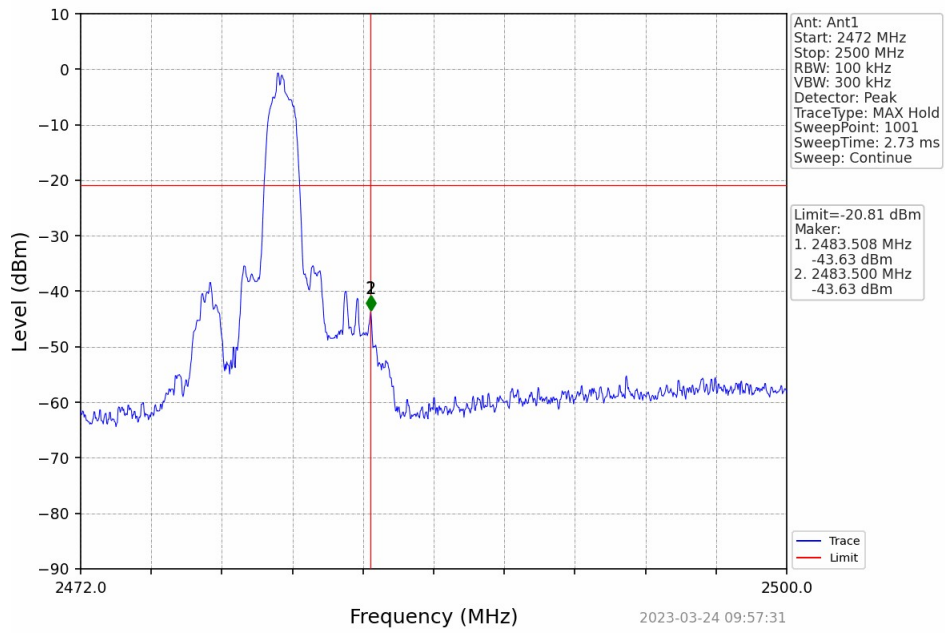
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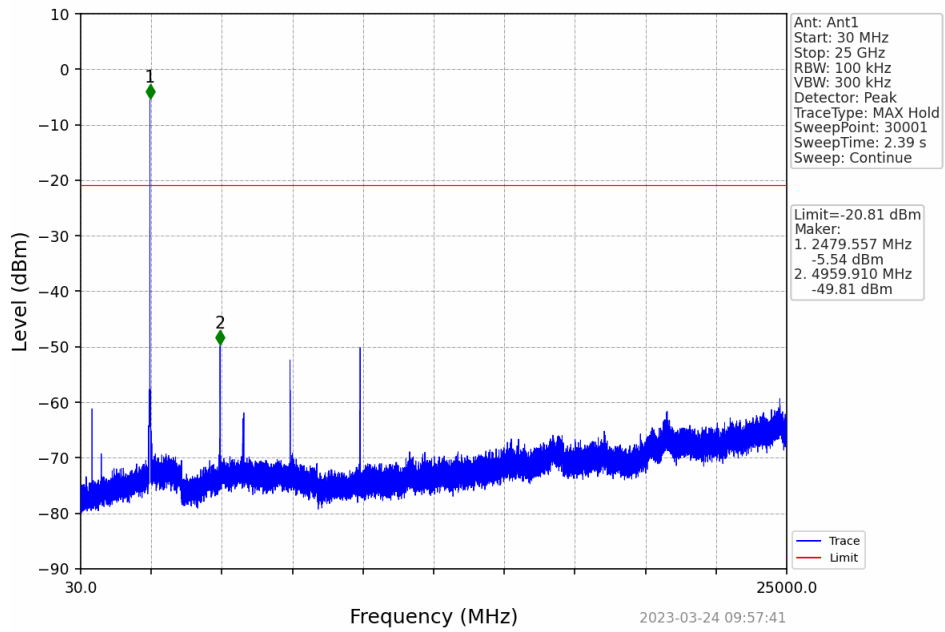
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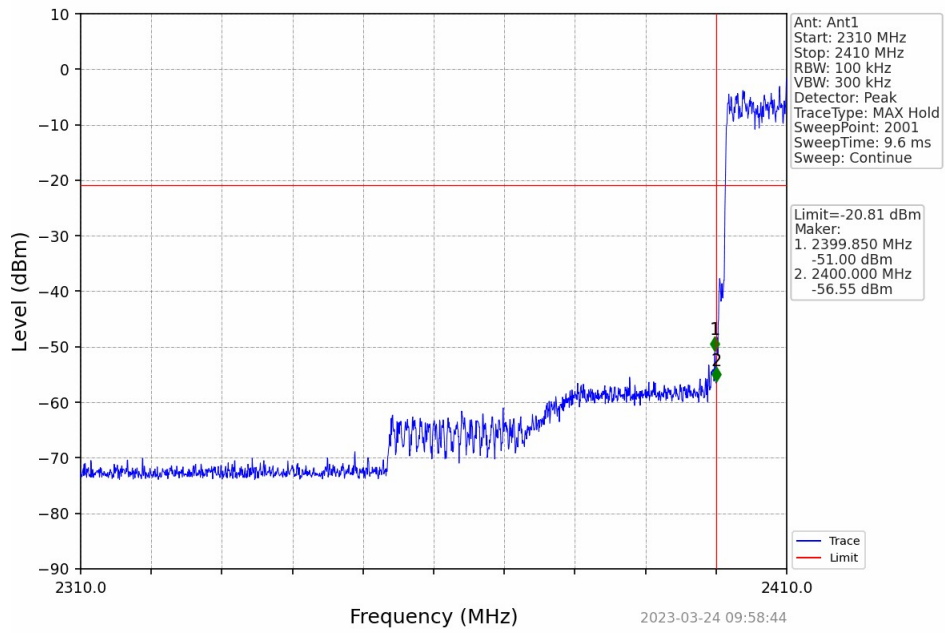
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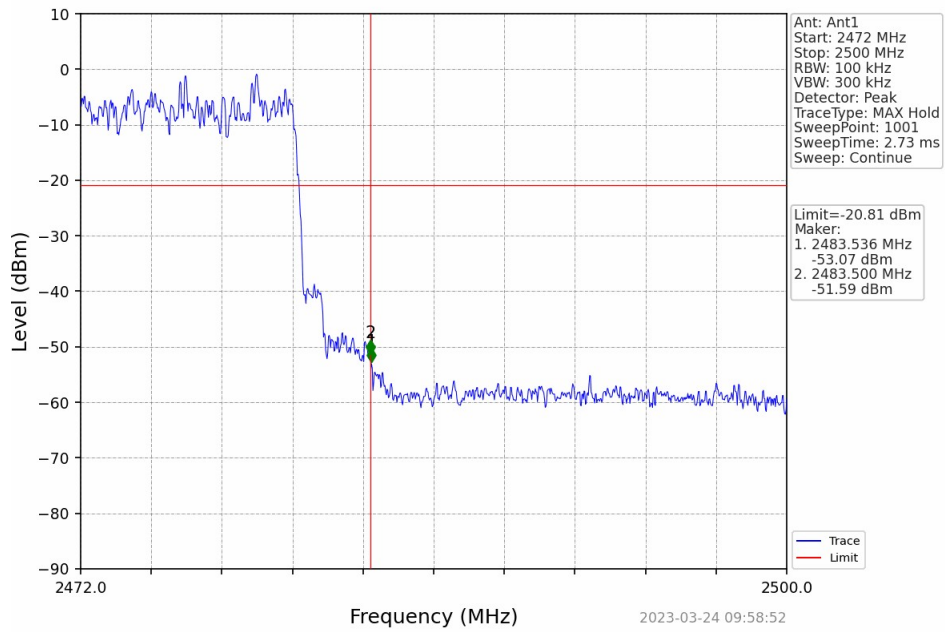
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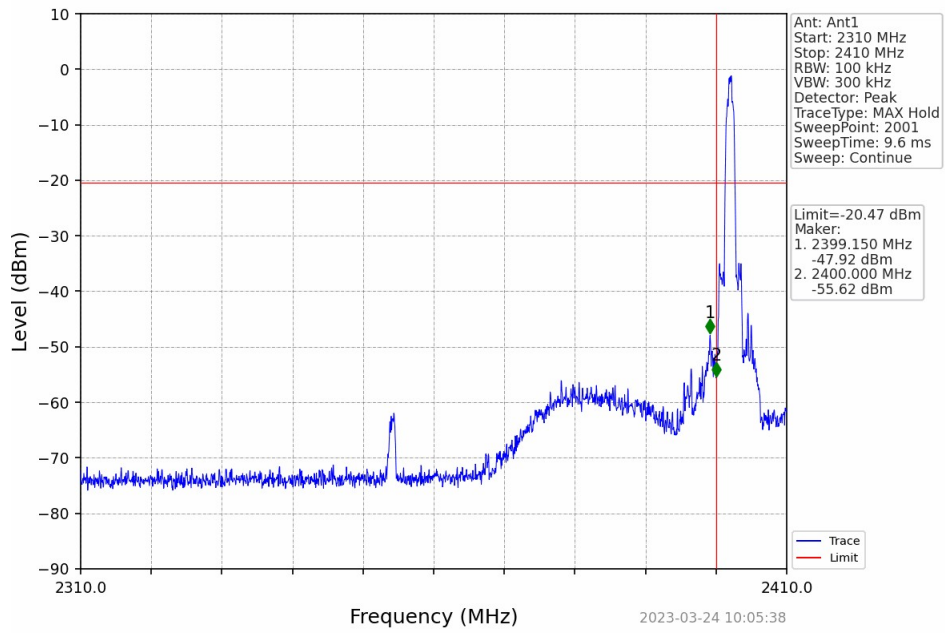
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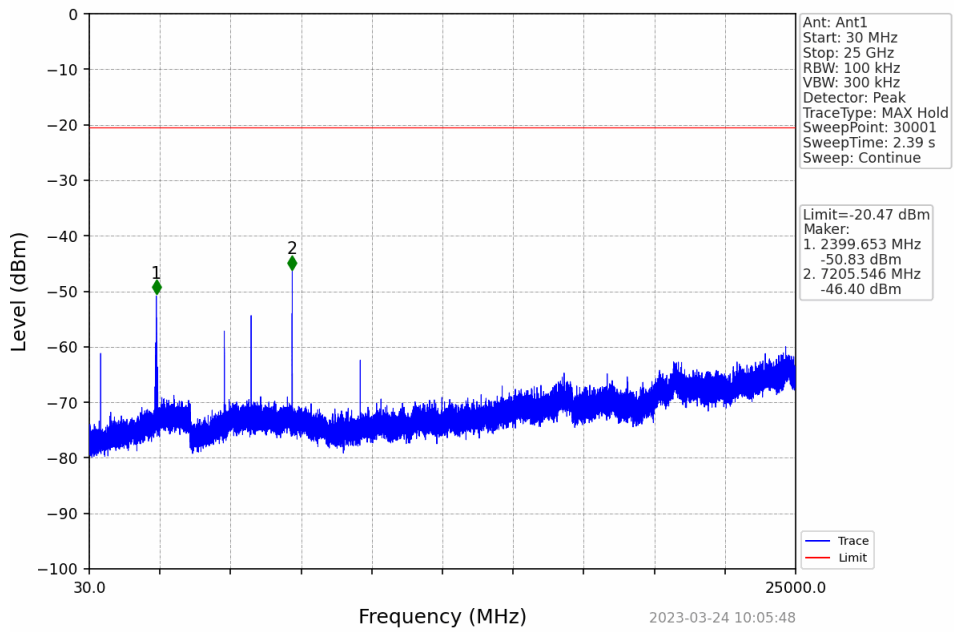
Pi/4DQPSK\_2DH5\_HOPP\_Ant1\_NTNV



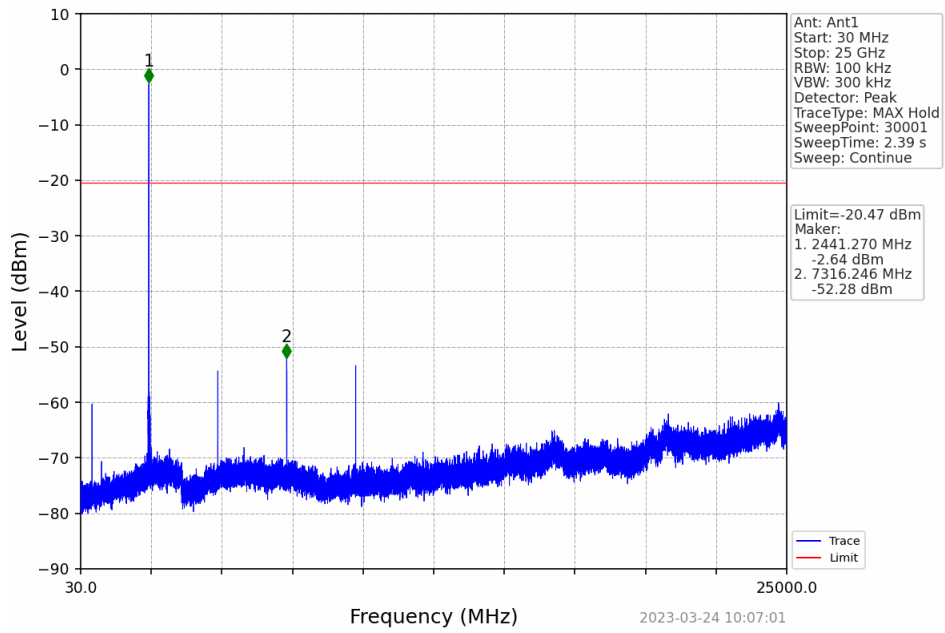
8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



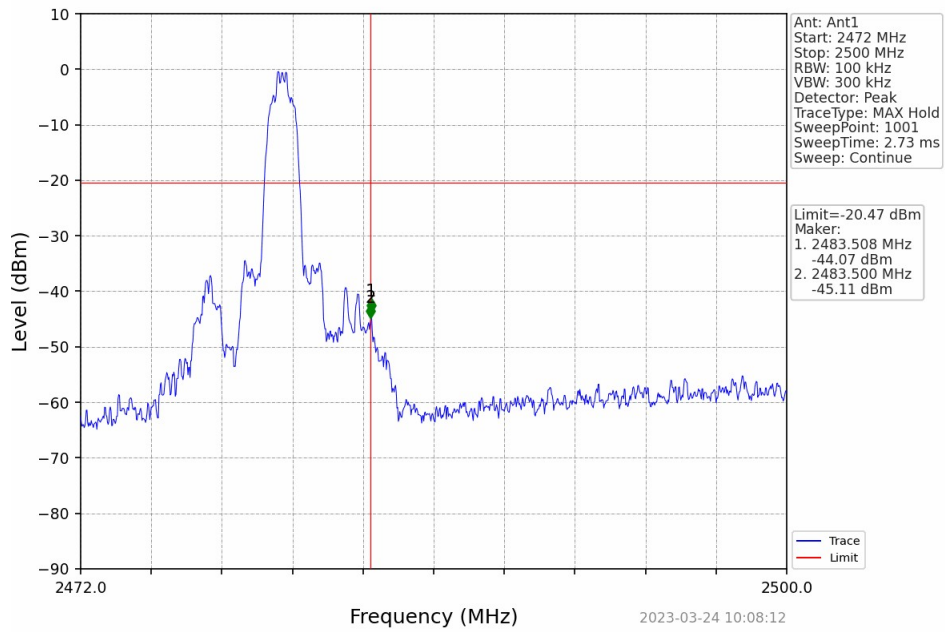
8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



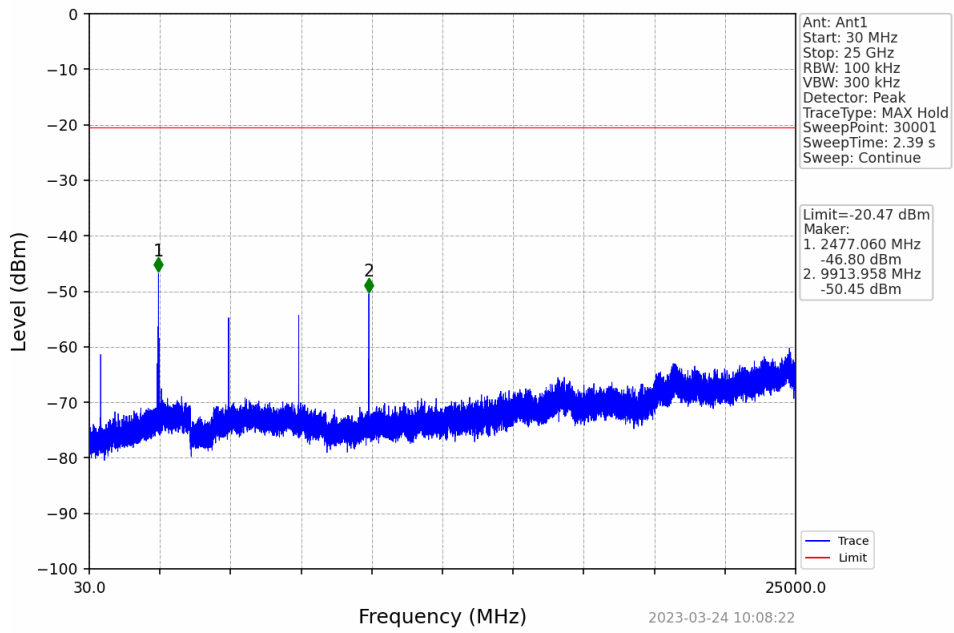
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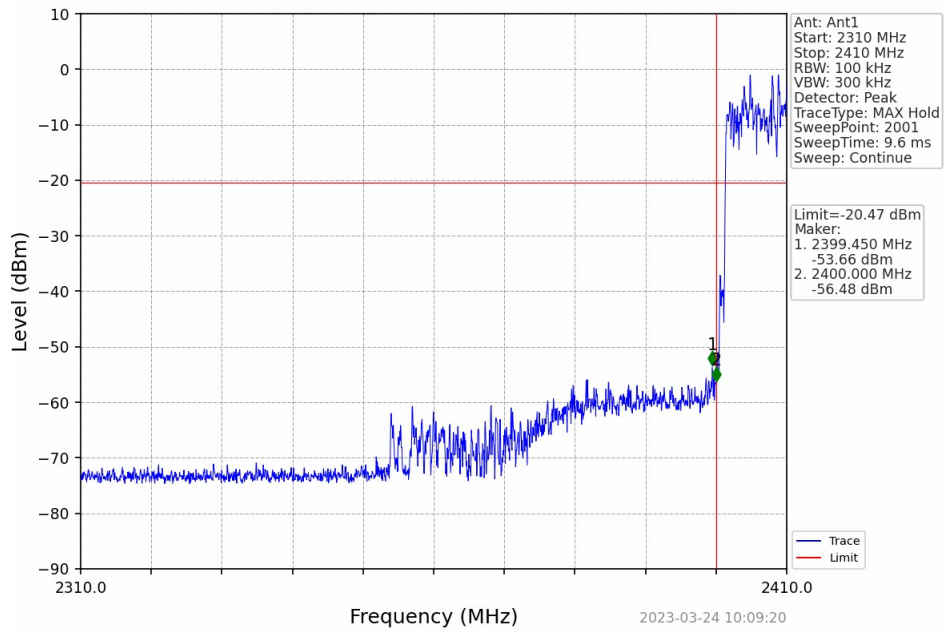
8DPSK\_3DH5\_HCH\_2480MHz\_Ant1\_NTNV



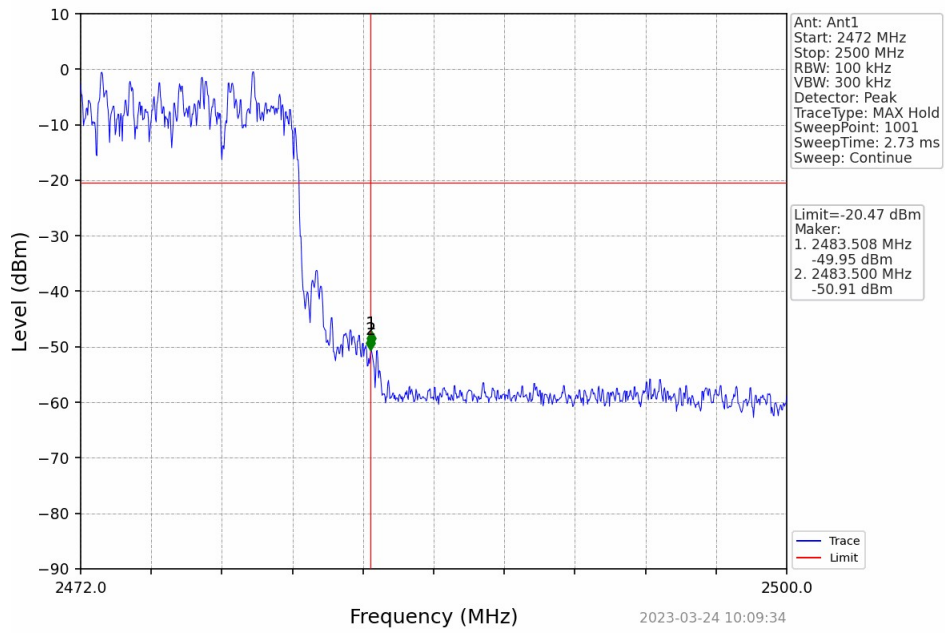
8DPSK\_3DH5\_HCH\_2480MHz\_Ant1\_NTNV



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: $\pi/4$ -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.....