

Appendix RF Test Data for BT

Company: : Qingdao Wuzhi Intelligent Technology Co., Ltd.

EUT : Bluetooth Audio Power Amplifier

FCC ID: : 2A4WD-ZK-ST21

Model Number : ZK-ST21

Report No. : HTT202604437F01

Reviewed By : Heber He

1. Duty Cycle

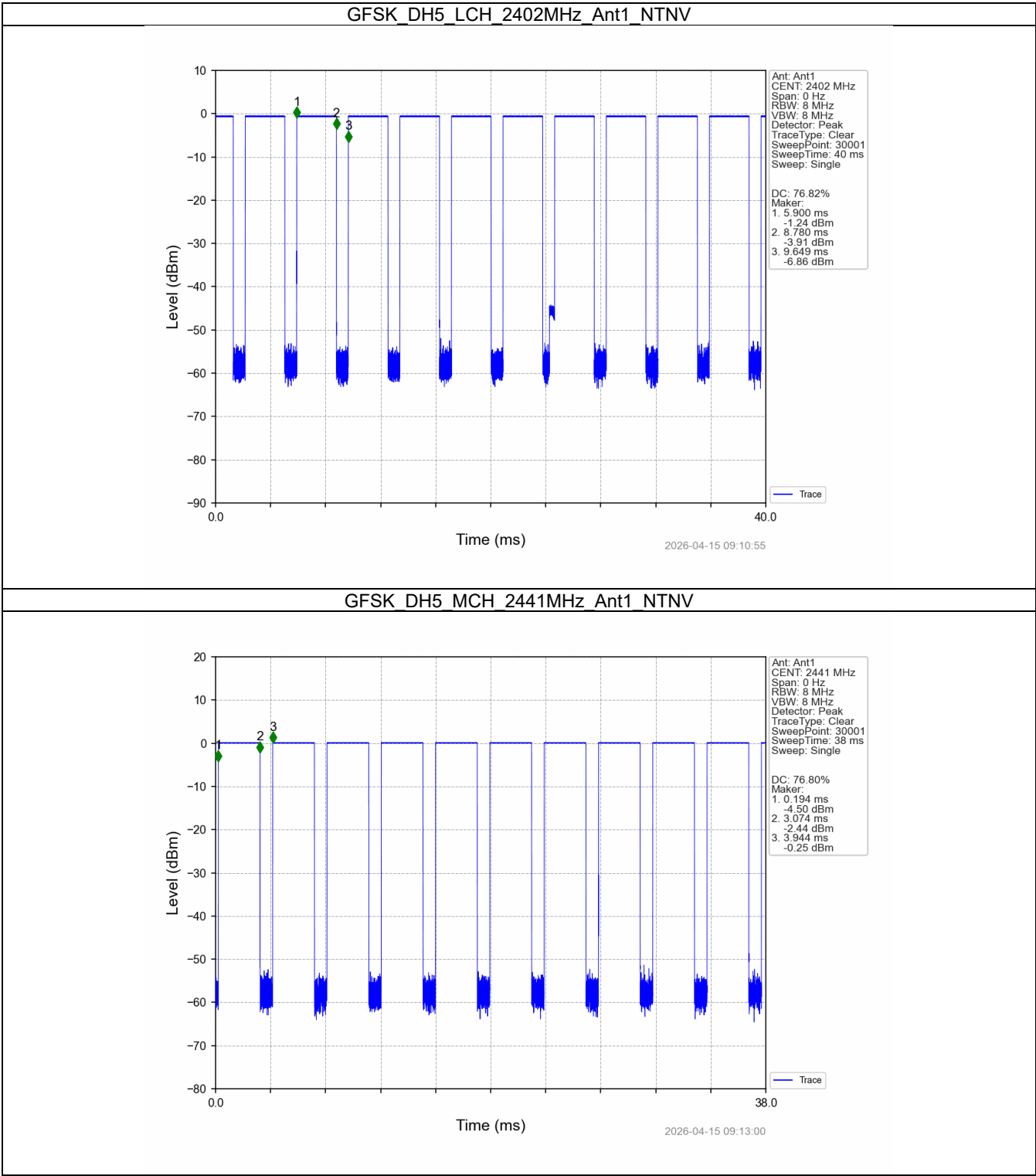
1.1 Test Result

1.1.1 Ant1

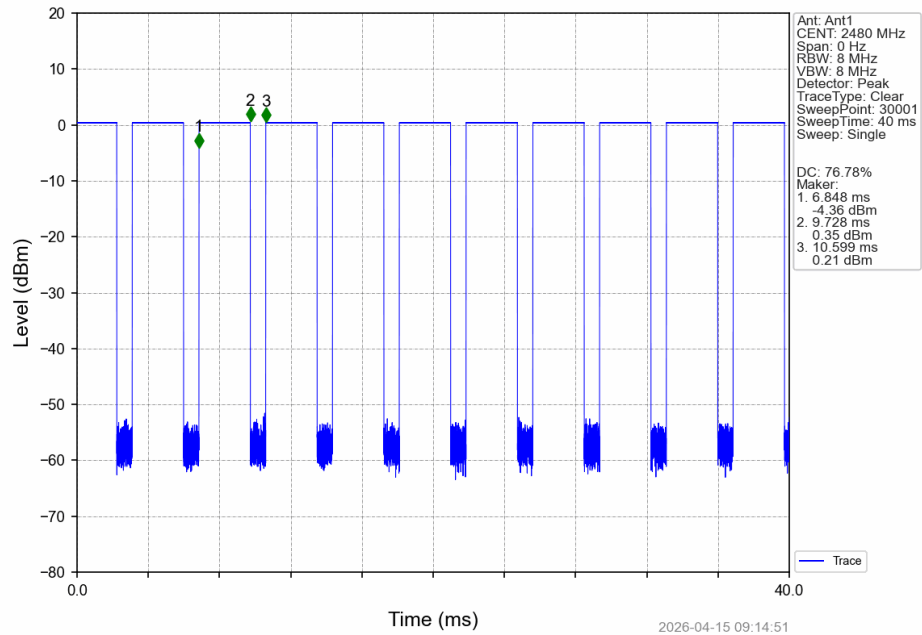
Ant1								
Mode	TX Type	Frequency (MHz)	Packet Type	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
GFSK	SISO	2402	DH5	2.880	3.749	76.82	1.15	0.01
		2441	DH5	2.880	3.750	76.80	1.15	0.03
		2480	DH5	2.880	3.751	76.78	1.15	0.03
Pi/4DQPSK	SISO	2402	2DH5	2.885	3.749	76.95	1.14	0.04
		2441	2DH5	2.887	3.751	76.97	1.14	0.03
		2480	2DH5	2.886	3.750	76.96	1.14	0.03

1.2 Test Graph

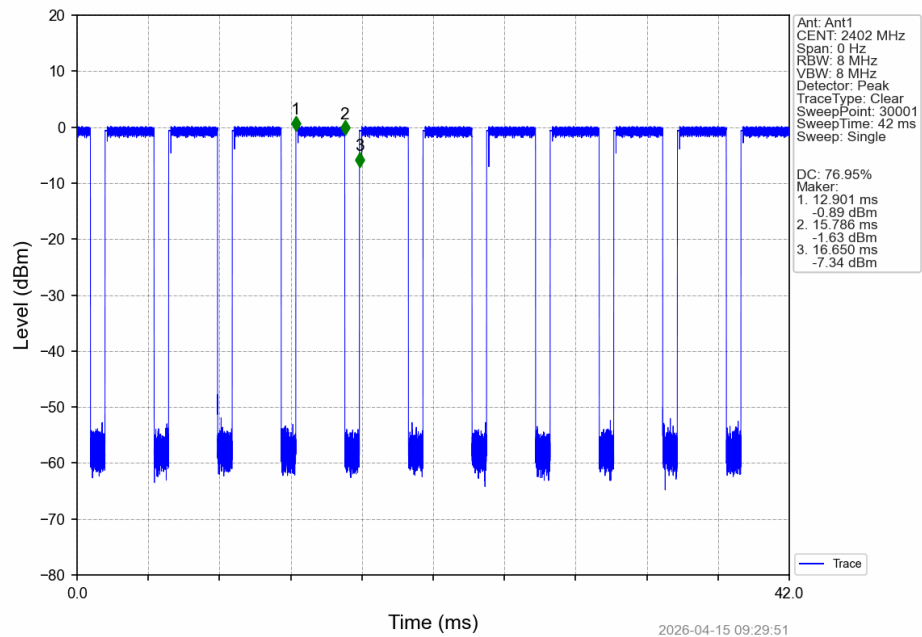
1.2.1 Ant1



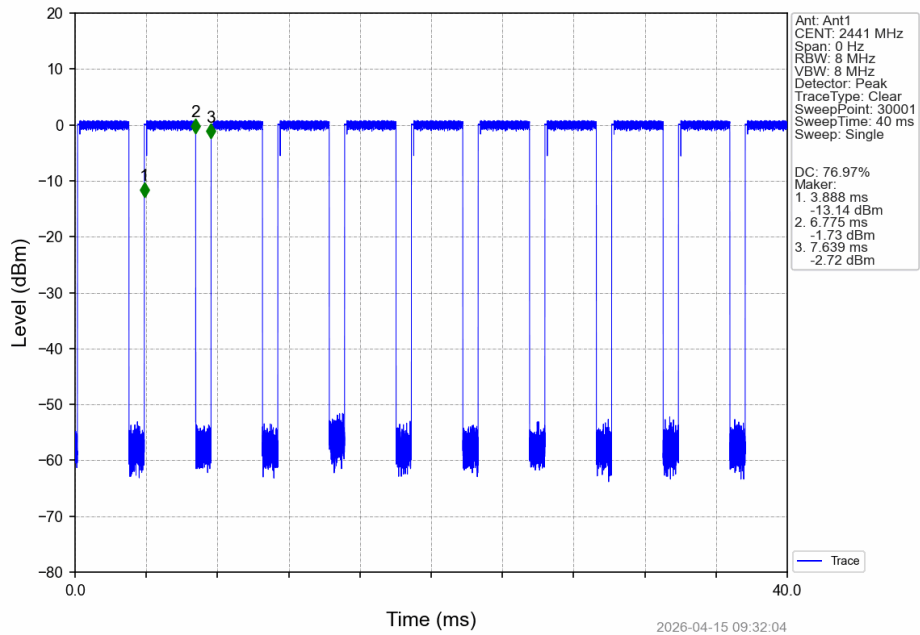
GFSK DH5_HCH_2480MHz_Ant1_NTNV



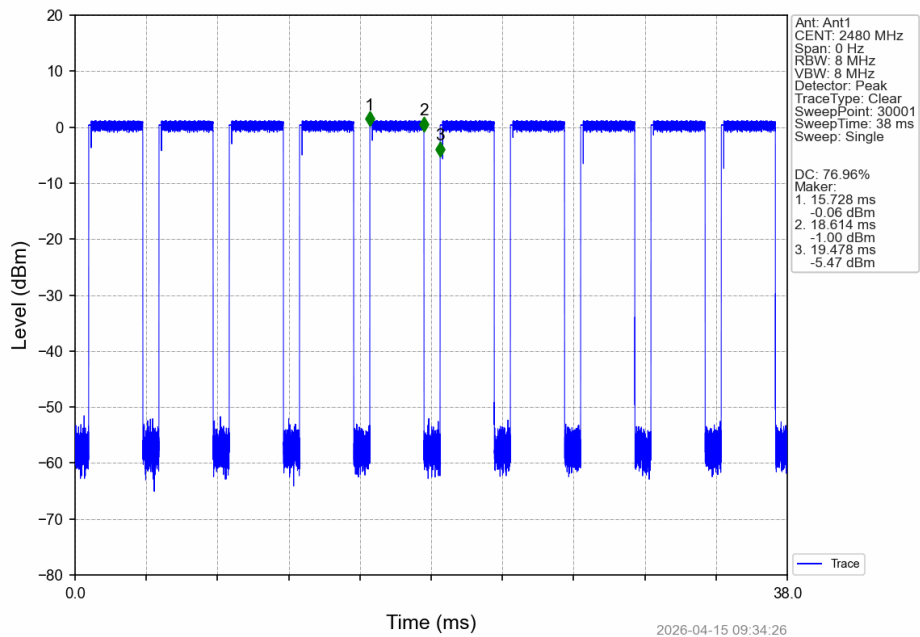
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



2. Bandwidth

2.1 Test Result

2.1.1 OBW

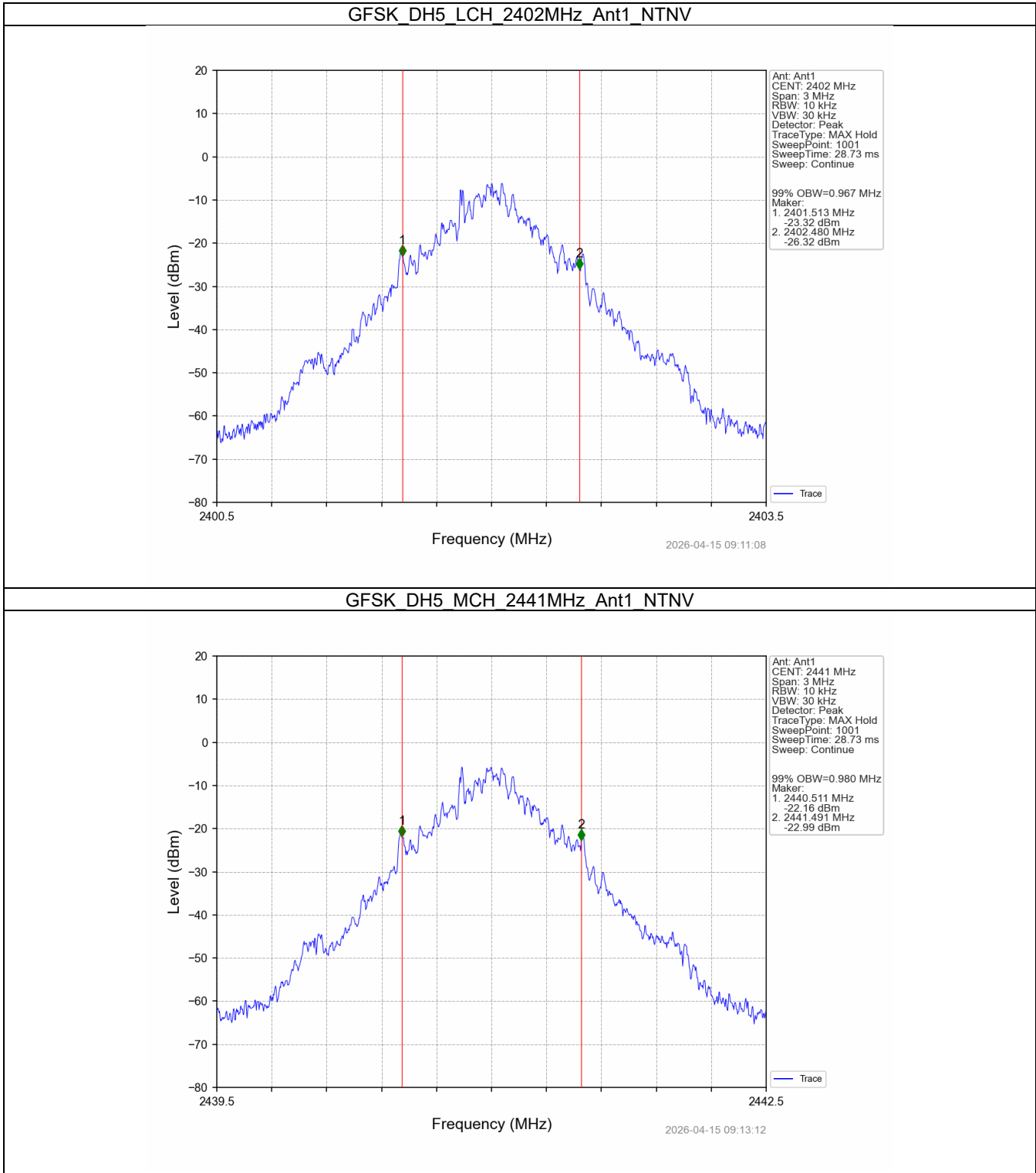
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.967	/	Pass
		2441	DH5	1	0.980	/	Pass
		2480	DH5	1	0.986	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.244	/	Pass
		2441	2DH5	1	1.265	/	Pass
		2480	2DH5	1	1.251	/	Pass

2.1.2 20dB BW

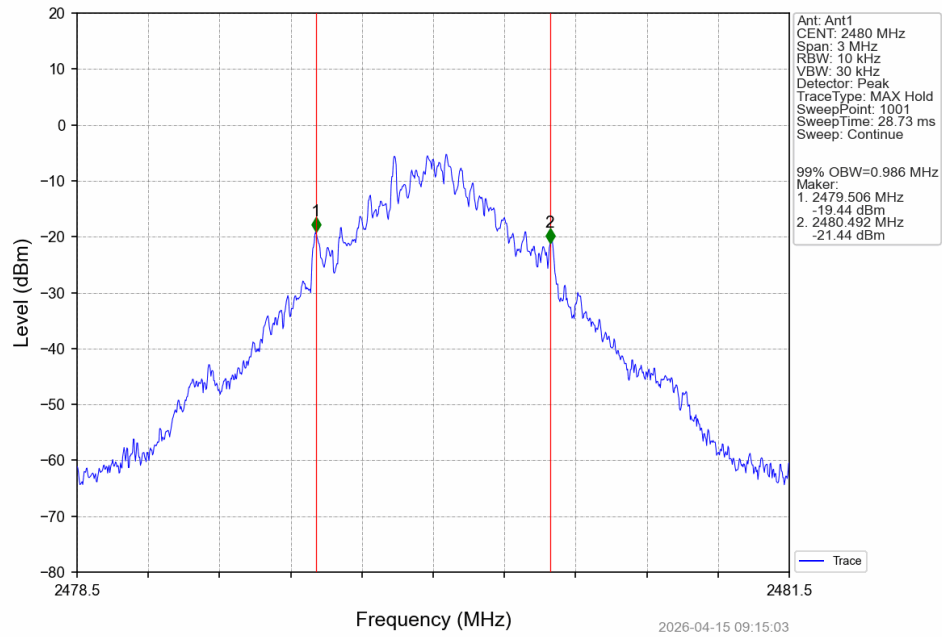
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	1.024	/	Pass
		2441	DH5	1	1.030	/	Pass
		2480	DH5	1	1.064	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.340	/	Pass
		2441	2DH5	1	1.354	/	Pass
		2480	2DH5	1	1.338	/	Pass

2.2 Test Graph

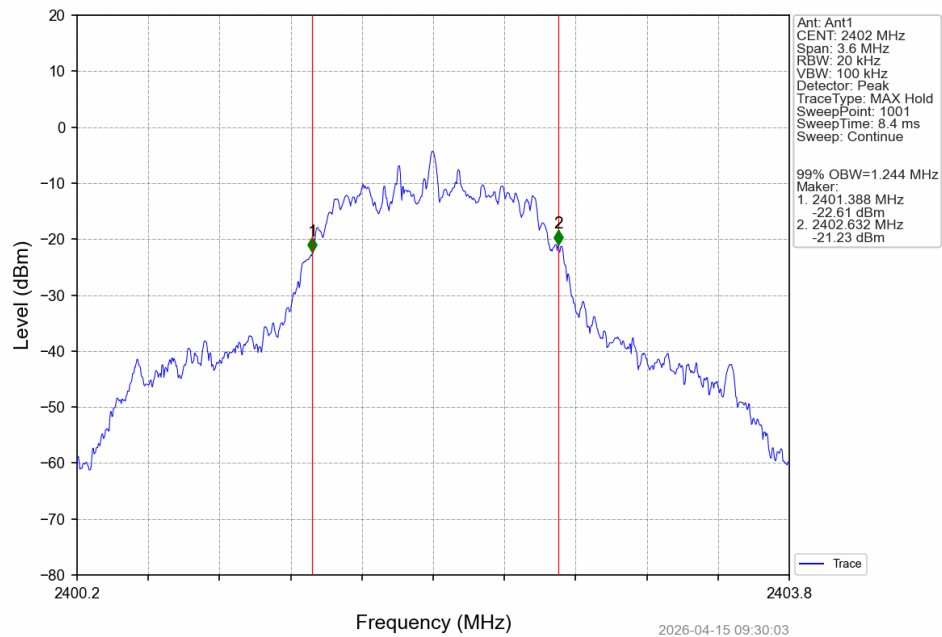
2.2.1 OBW



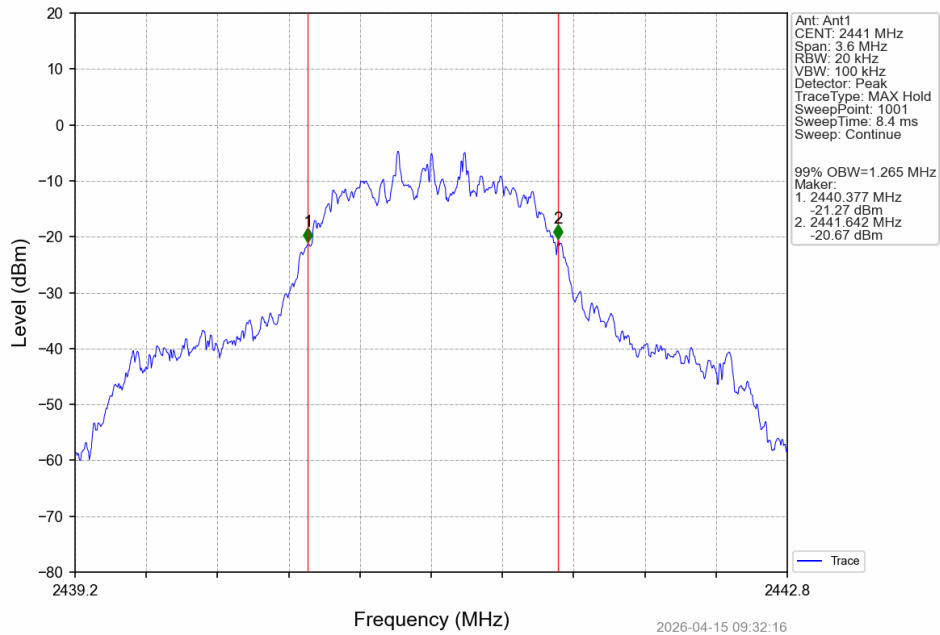
GFSK DH5_HCH_2480MHz_Ant1_NTNV



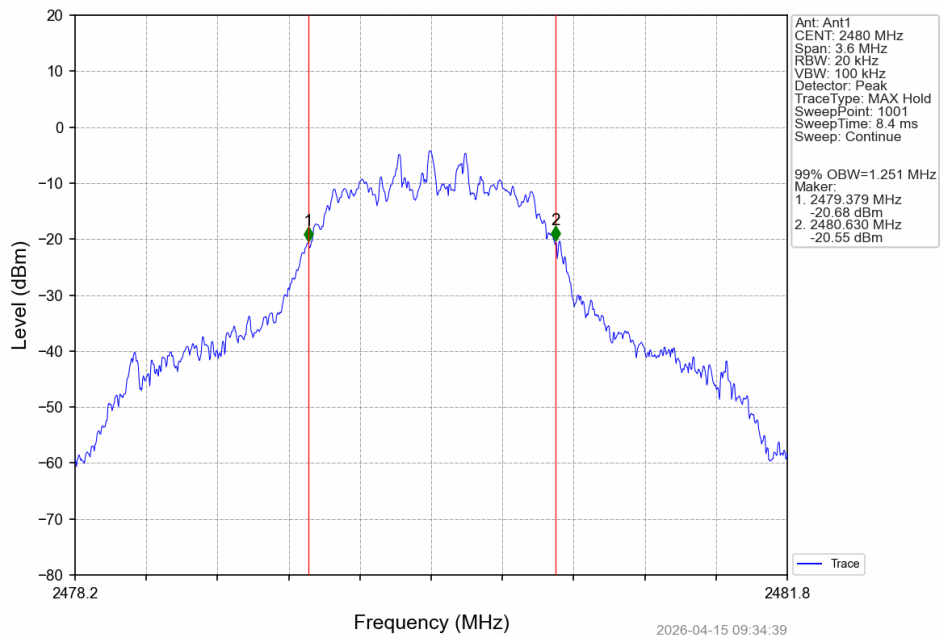
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



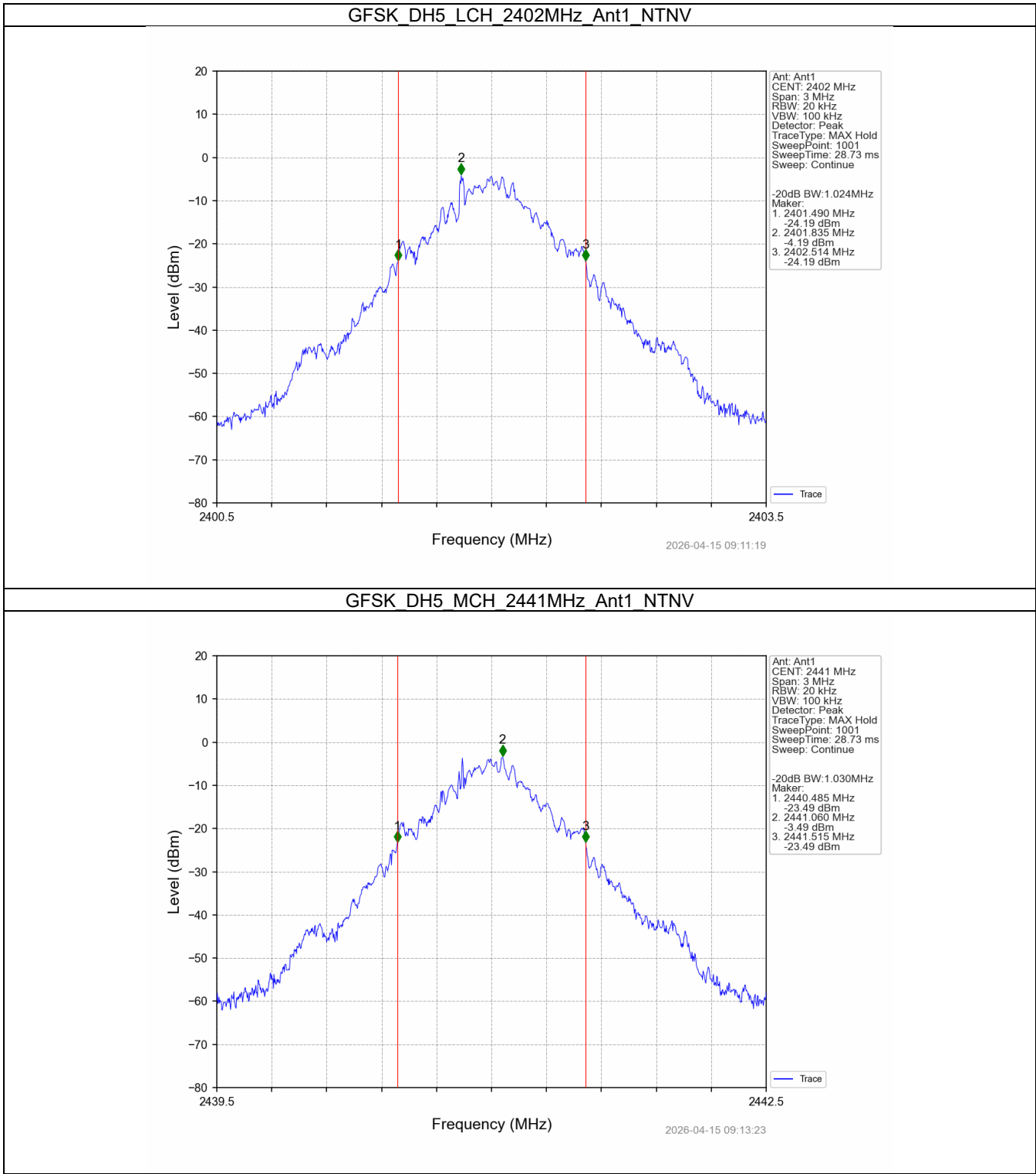
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



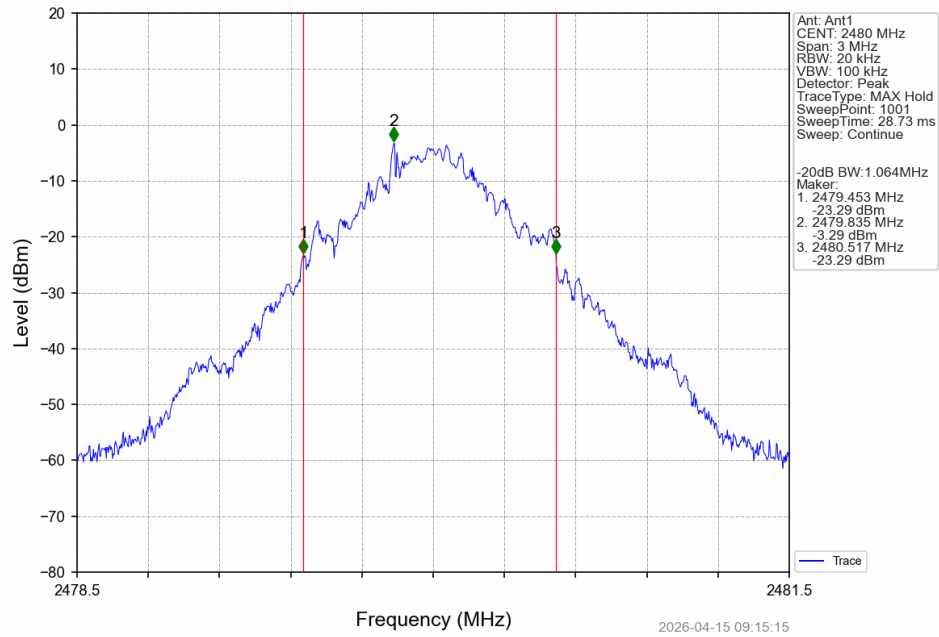
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



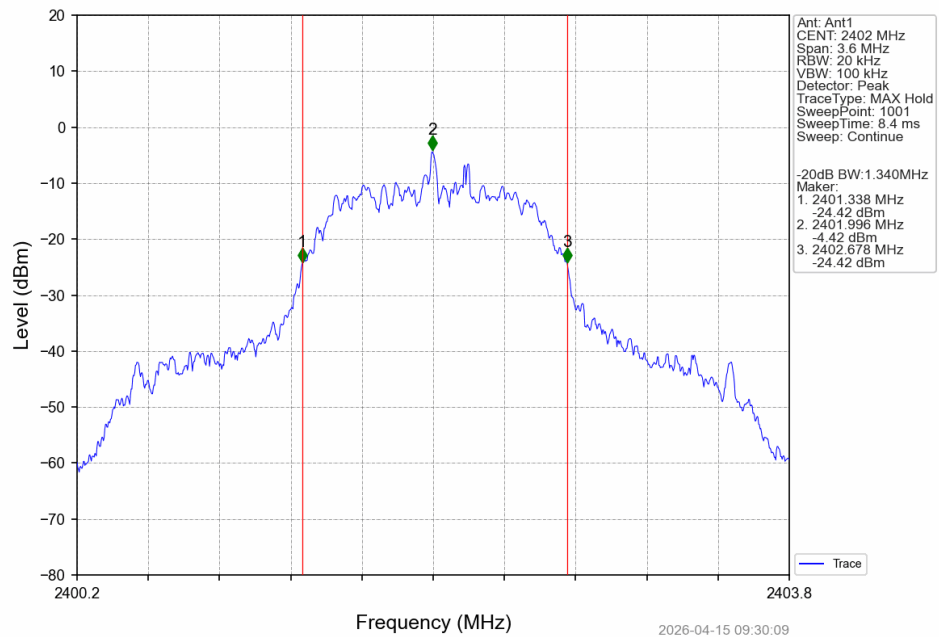
2.2.2 20dB BW



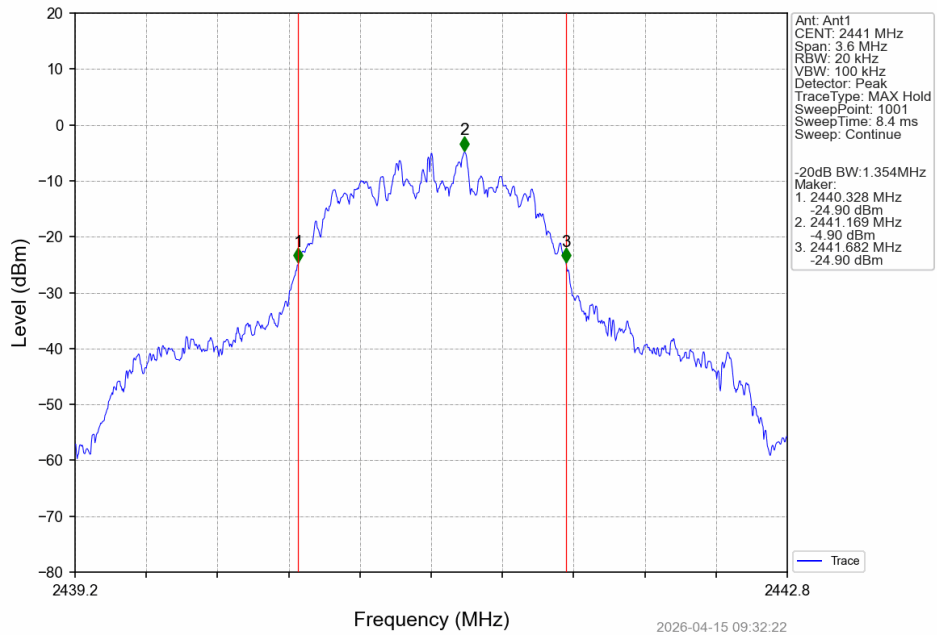
GFSK DH5_HCH_2480MHz_Ant1_NTNV



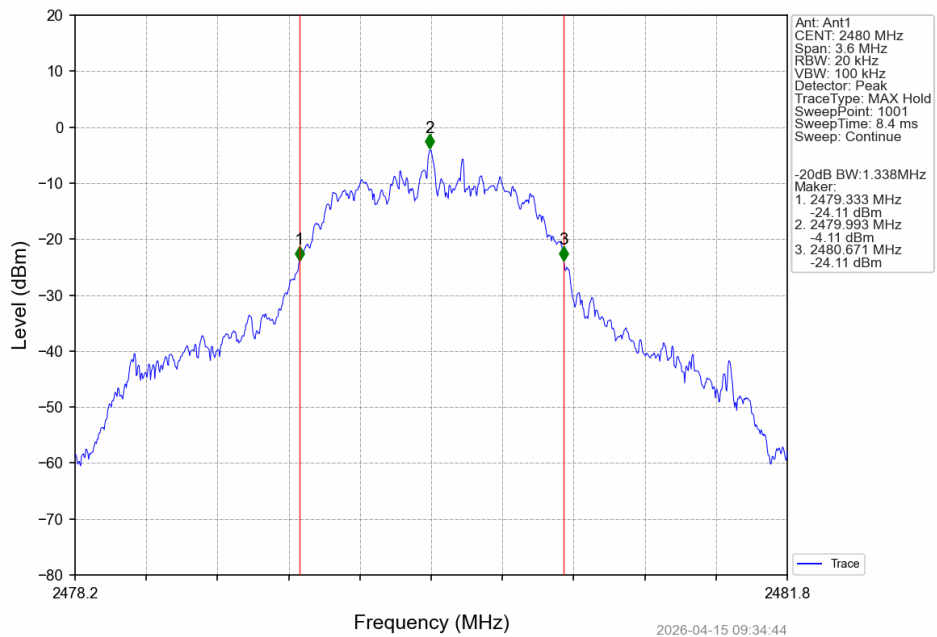
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



3. Maximum Conducted Output Power

3.1 Test Result

3.1.1 Power

Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	-0.58	≤ 20.97	Pass
		2441	DH5	0.13	≤ 20.97	Pass
		2480	DH5	0.43	≤ 20.97	Pass
Pi/4DQPSK	SISO	2402	2DH5	-0.03	≤ 20.97	Pass
		2441	2DH5	0.65	≤ 20.97	Pass
		2480	2DH5	1.06	≤ 20.97	Pass

4. Carrier Frequency Separation

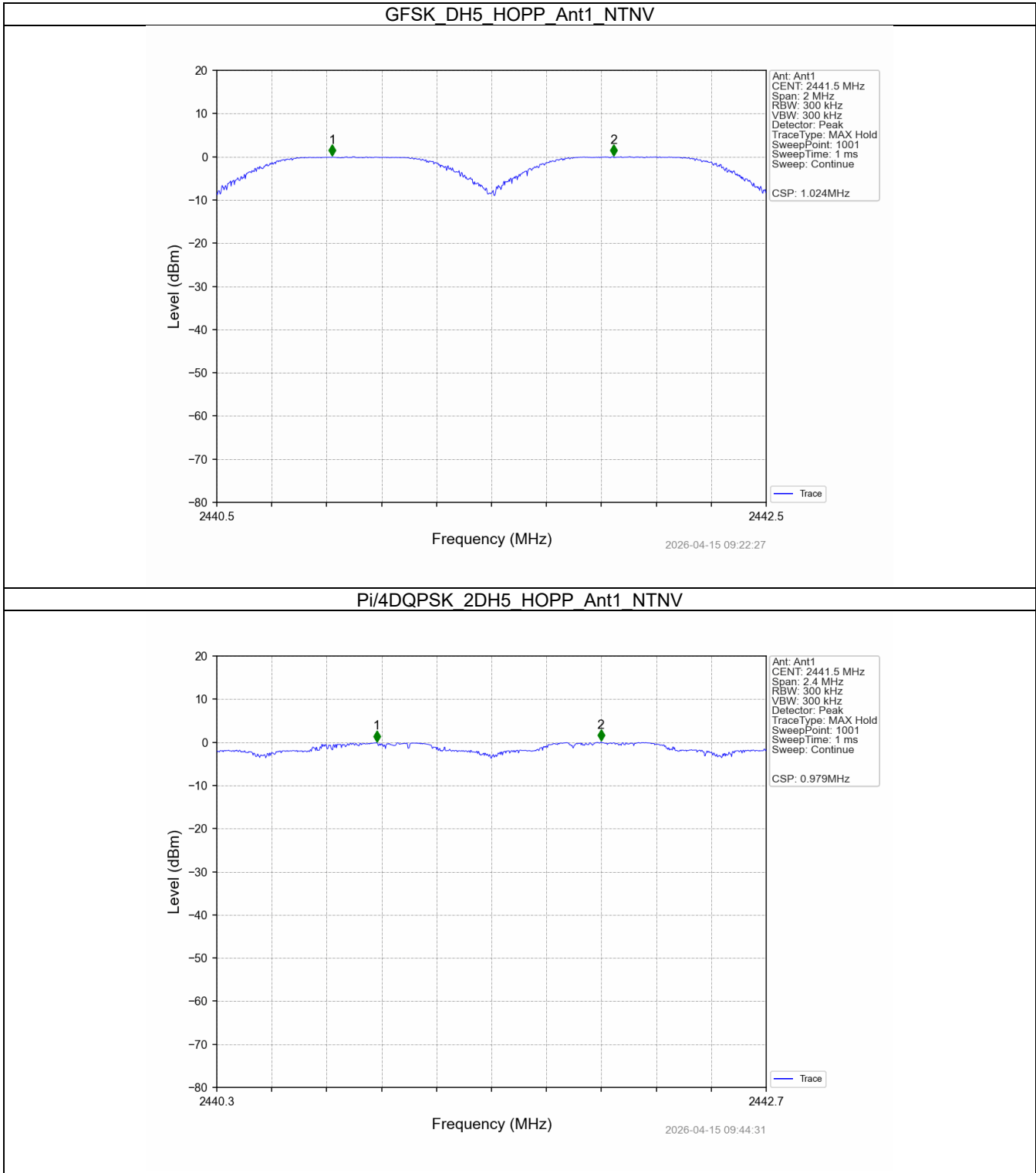
4.1 Test Result

4.1.1 Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	1.024	1.064	≥ 0.709	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	0.979	1.354	≥ 0.903	Pass

4.2 Test Graph

4.2.1 Ant1



5. Number of Hopping Frequencies

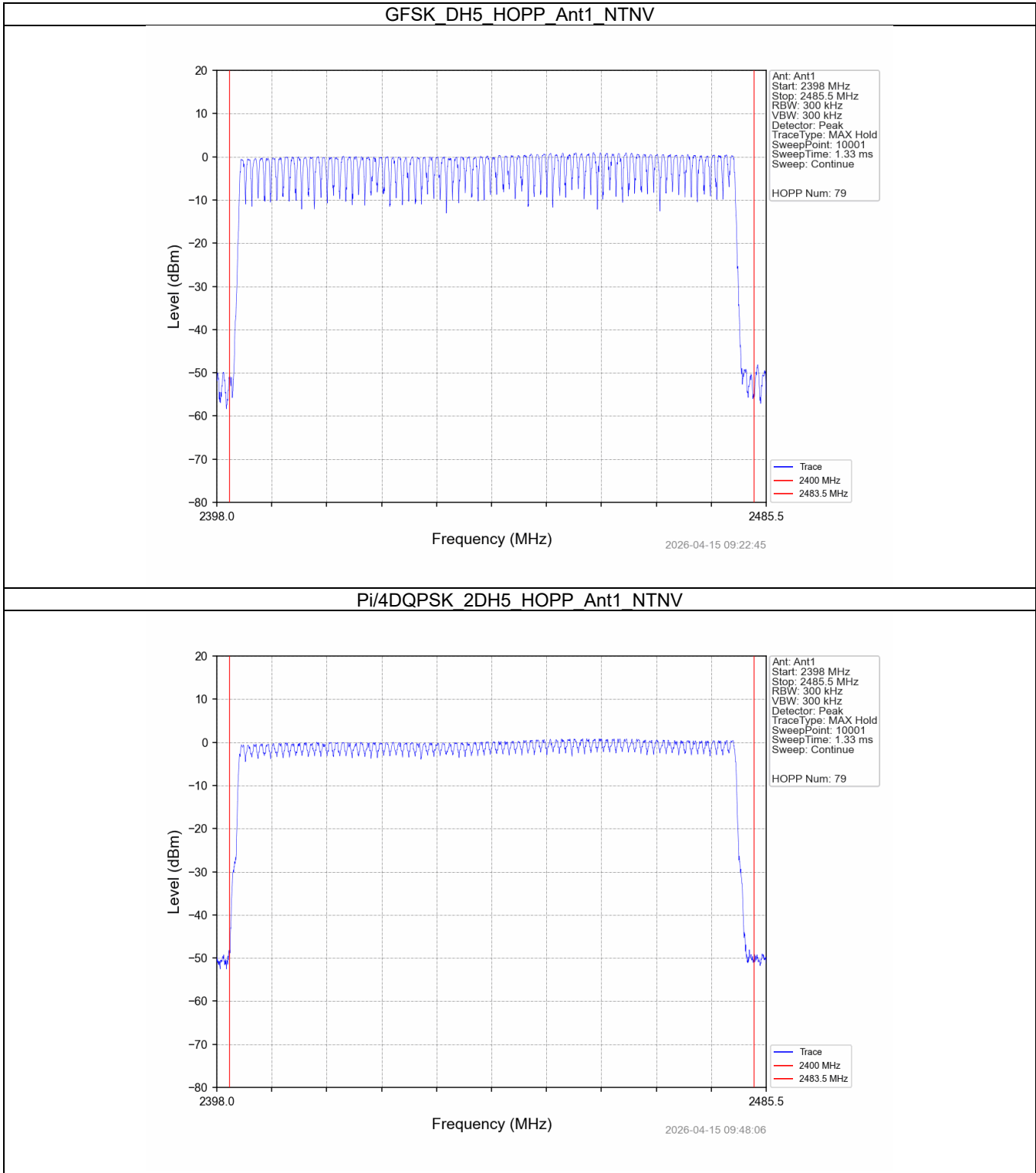
5.1 Test Result

5.1.1 HoppNum

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

5.2 Test Graph

5.2.1 HoppNum



6. Time of Occupancy (Dwell Time)

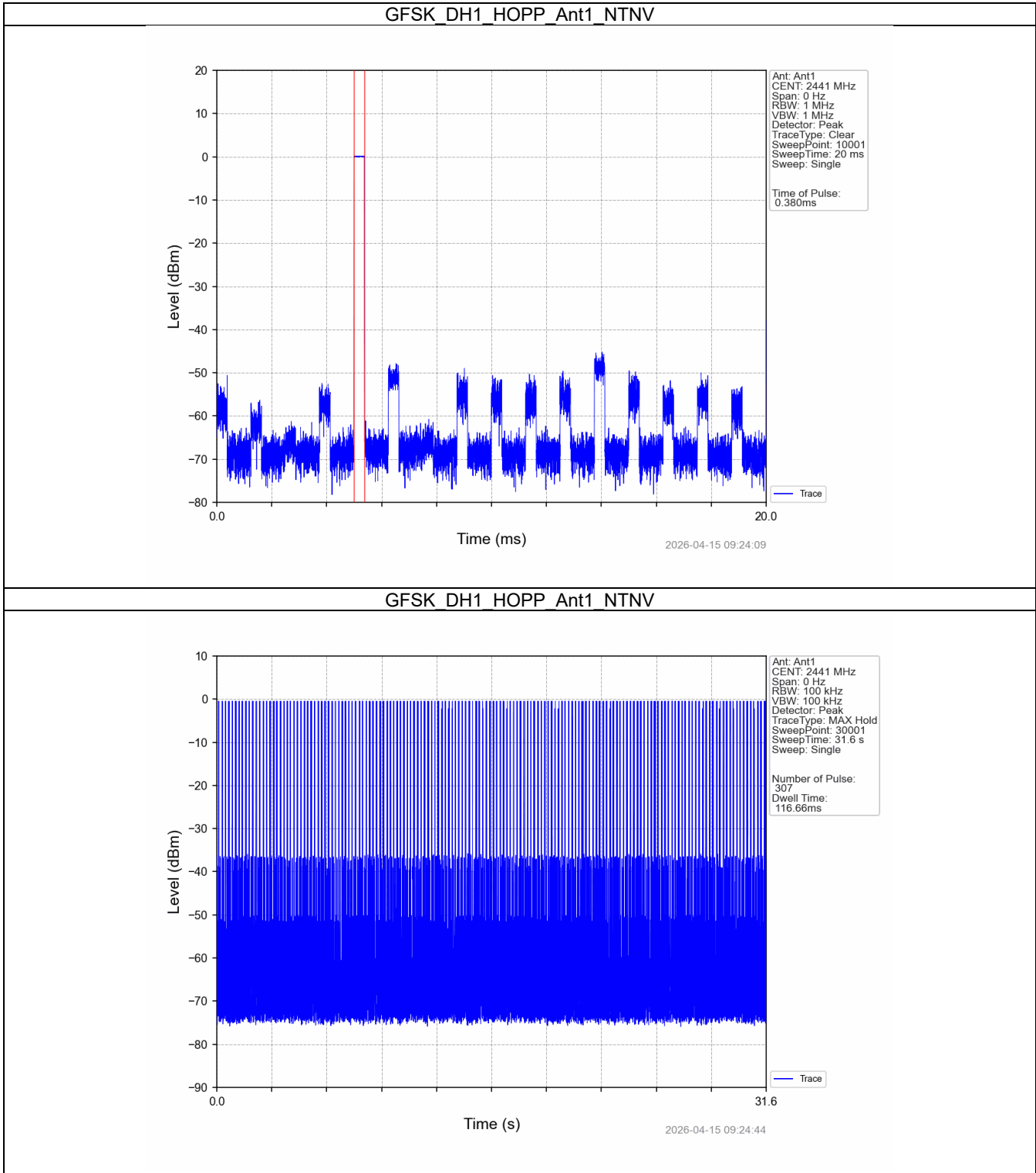
6.1 Test Result

6.1.1 Ant1

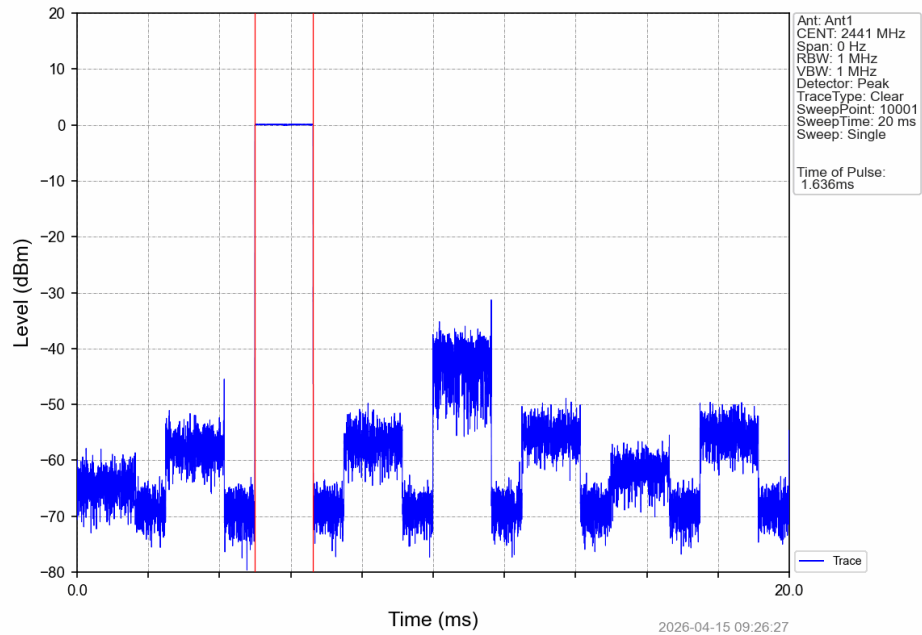
Ant1									
Mode	TX Type	Frequency (MHz)	Packet Type	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limit (ms)	Verdict
GFSK	SISO	HOPP	DH1	0.380	31.600	307	116.660	<=400	Pass
			DH3	1.636	31.600	159	260.124	<=400	Pass
			DH5	2.884	31.600	107	308.588	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.396	31.600	316	125.136	<=400	Pass
			2DH3	1.648	31.600	162	266.976	<=400	Pass
			2DH5	2.896	31.600	89	257.744	<=400	Pass

6.2 Test Graph

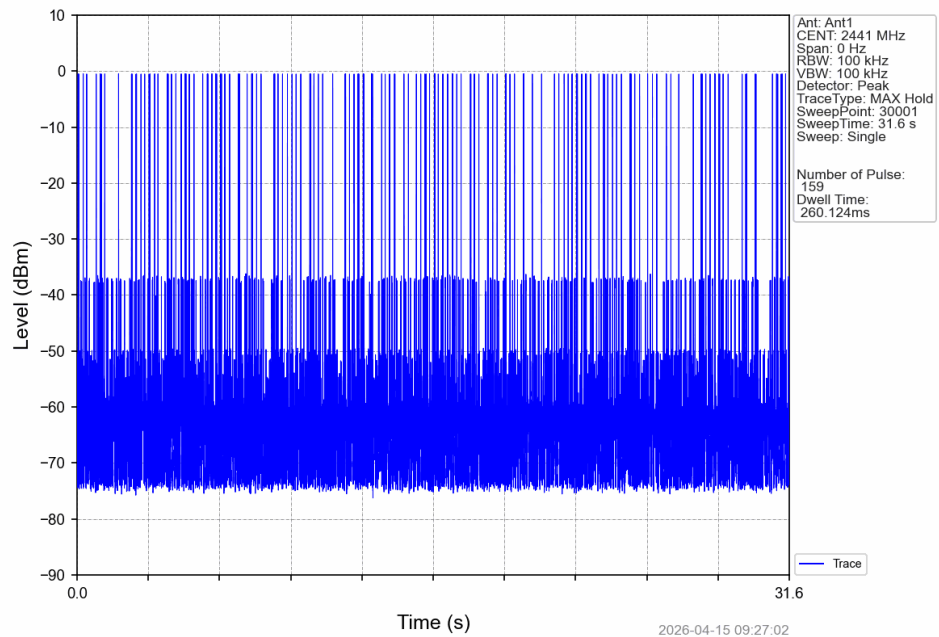
6.2.1 Ant1



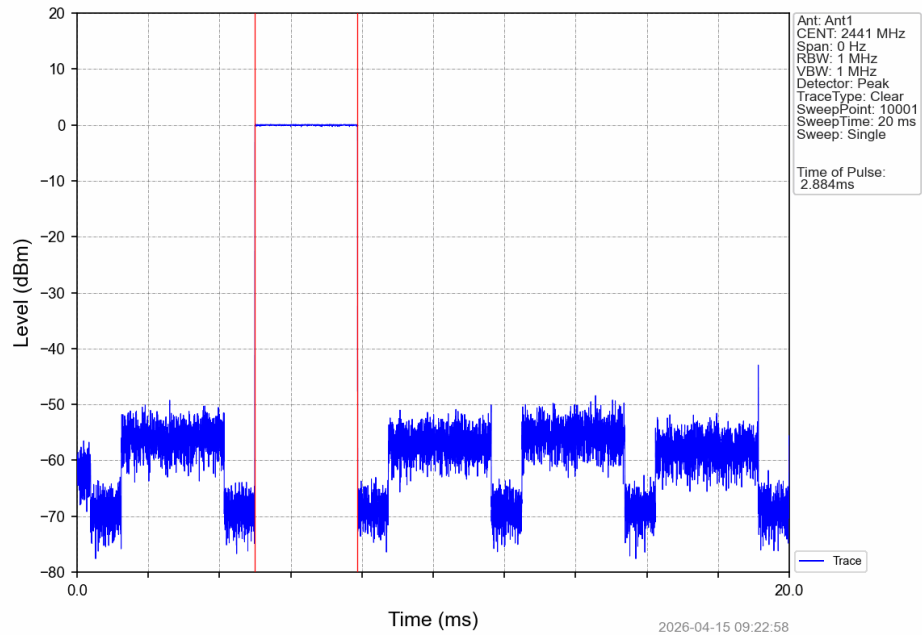
GFSK_DH3_HOPP_Ant1_NTNV



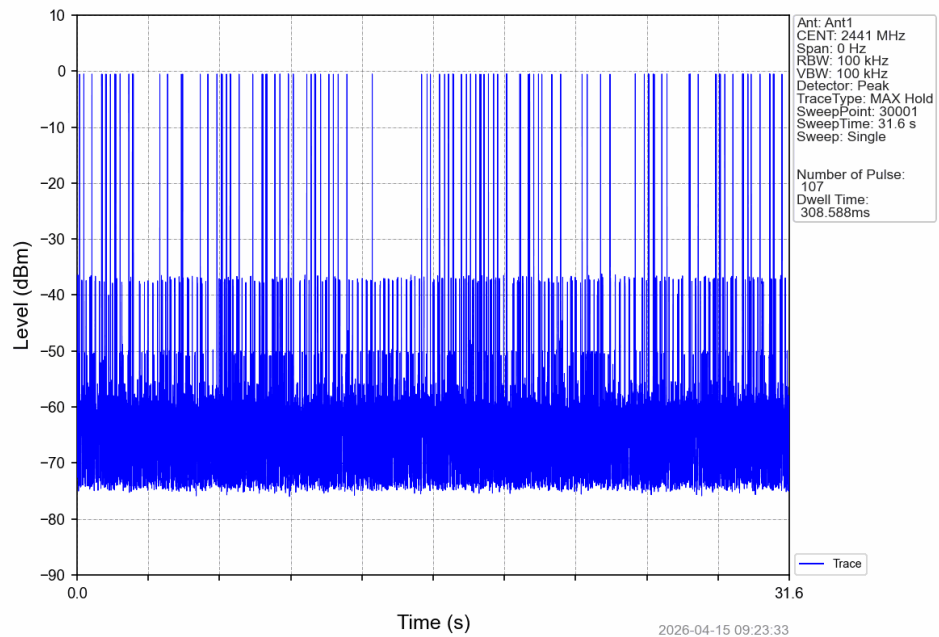
GFSK_DH3_HOPP_Ant1_NTNV



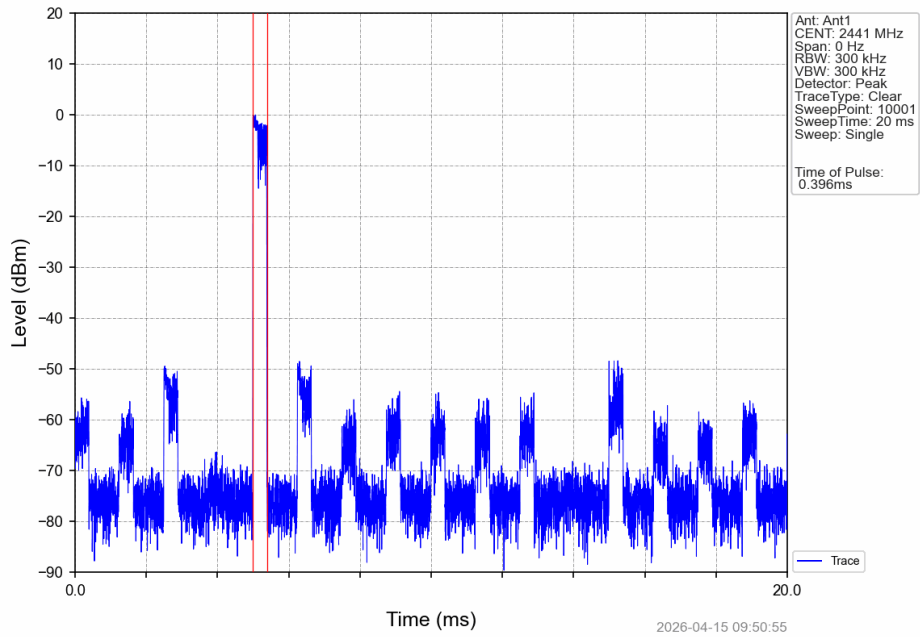
GFSK_DH5_HOPP_Ant1_NTNV



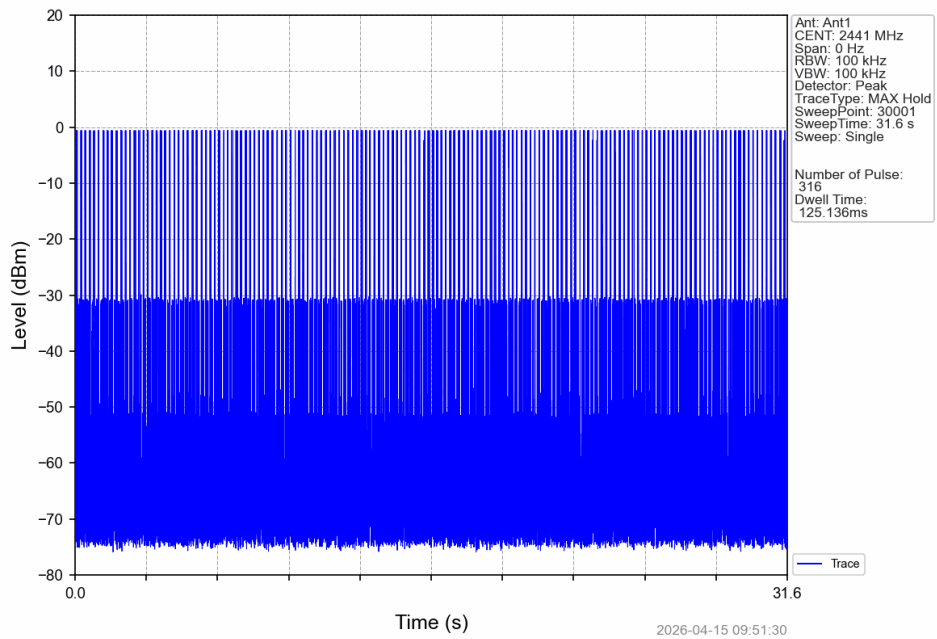
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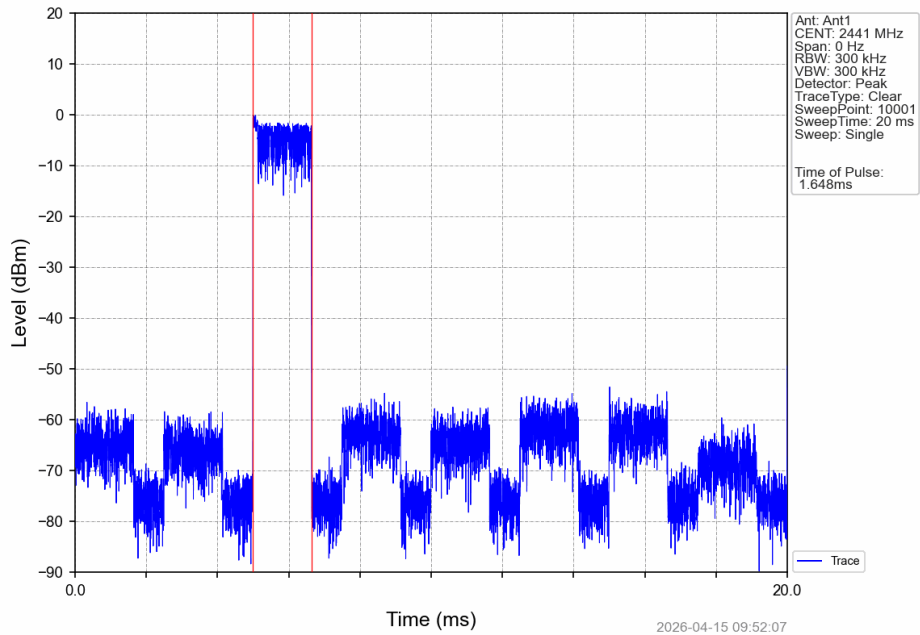
Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV



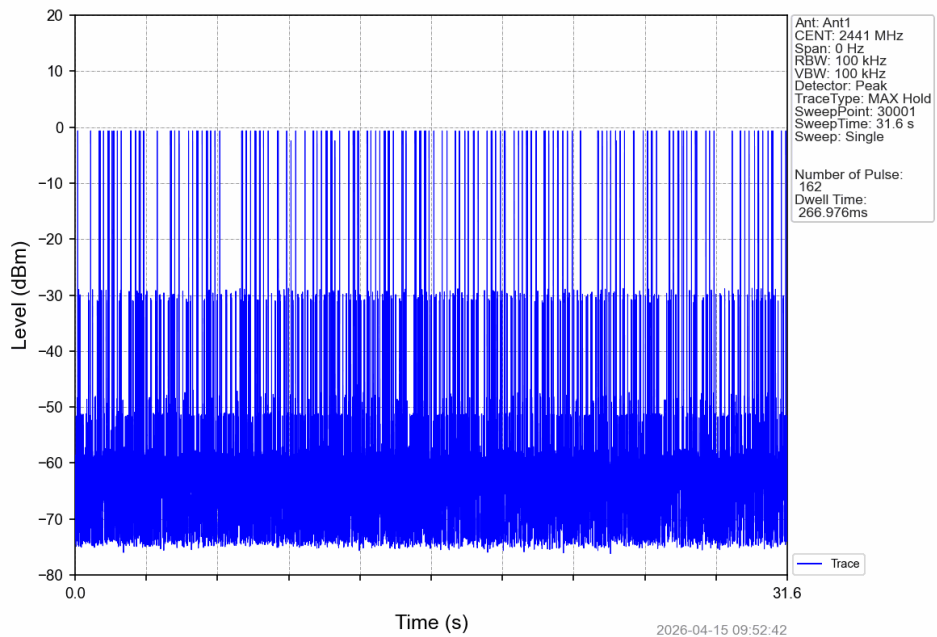
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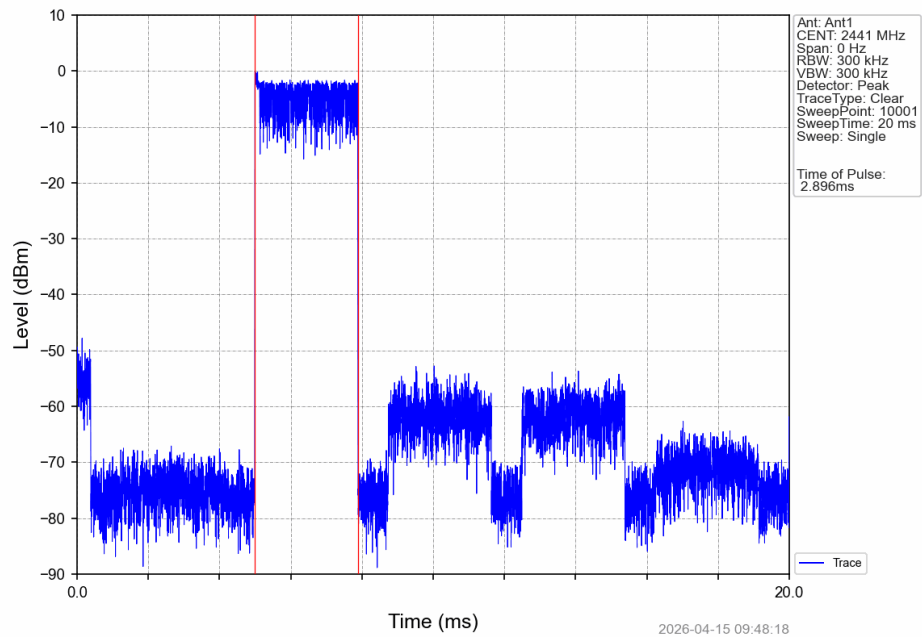
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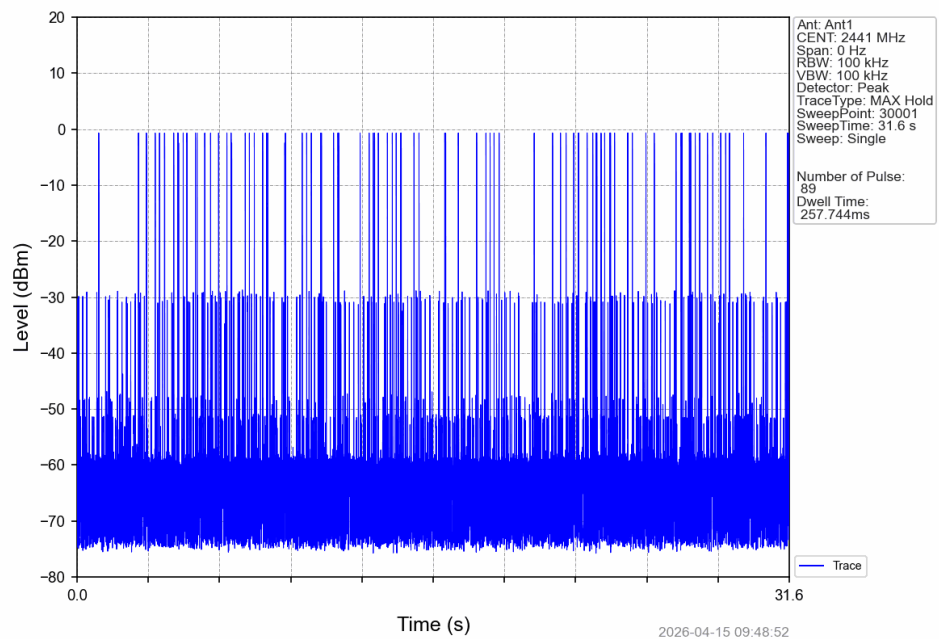
Pi/4DQPSK_2DH3_HOPP_Ant1_NTNV



Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



7. Unwanted Emissions In Non-restricted Frequency Bands

7.1 Test Result

7.1.1 Ref

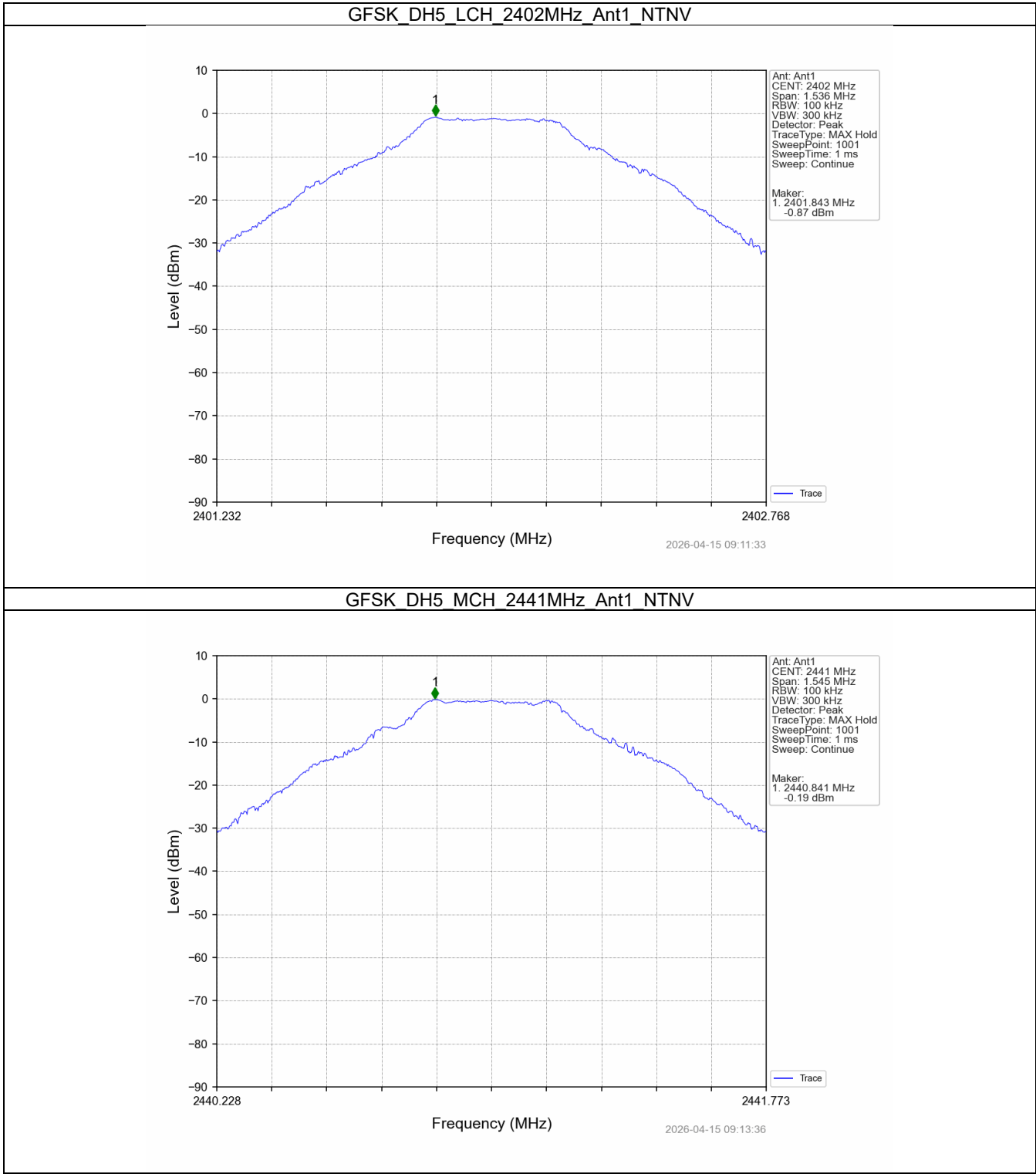
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	-0.87
		2441	DH5	1	-0.19
		2480	DH5	1	0.02
		HOPP	DH5	1	0.63
					0.63
Pi/4DQPSK	SISO	2402	2DH5	1	-0.89
		2441	2DH5	1	-0.20
		2480	2DH5	1	0.00
		HOPP	2DH5	1	0.46
					0.46

7.1.2 CSE

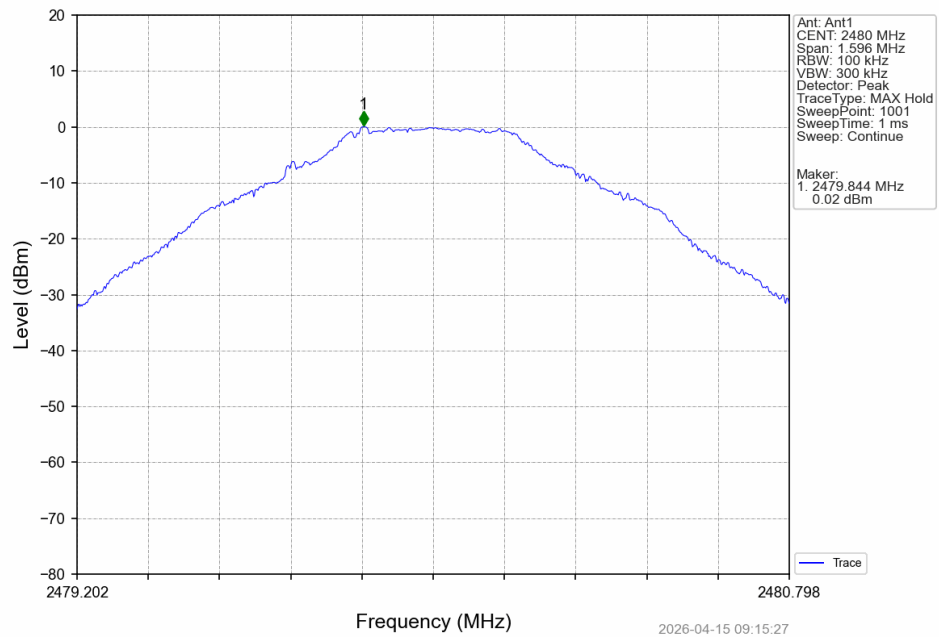
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	-0.87	-20.87	Pass
		2441	DH5	1	-0.19	-20.19	Pass
		2480	DH5	1	0.02	-19.98	Pass
		HOPP	DH5	1	0.63	-19.37	Pass
					0.63	-19.37	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	-0.89	-20.89	Pass
		2441	2DH5	1	-0.20	-20.20	Pass
		2480	2DH5	1	0.00	-20.00	Pass
		HOPP	2DH5	1	0.46	-19.54	Pass
					0.46	-19.54	Pass

7.2 Test Graph

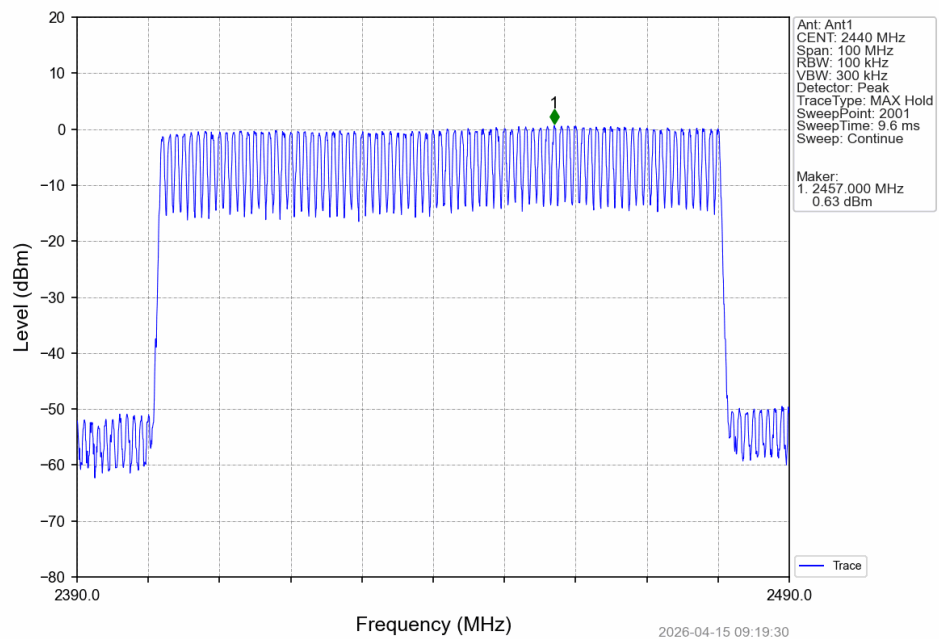
7.2.1 Ref



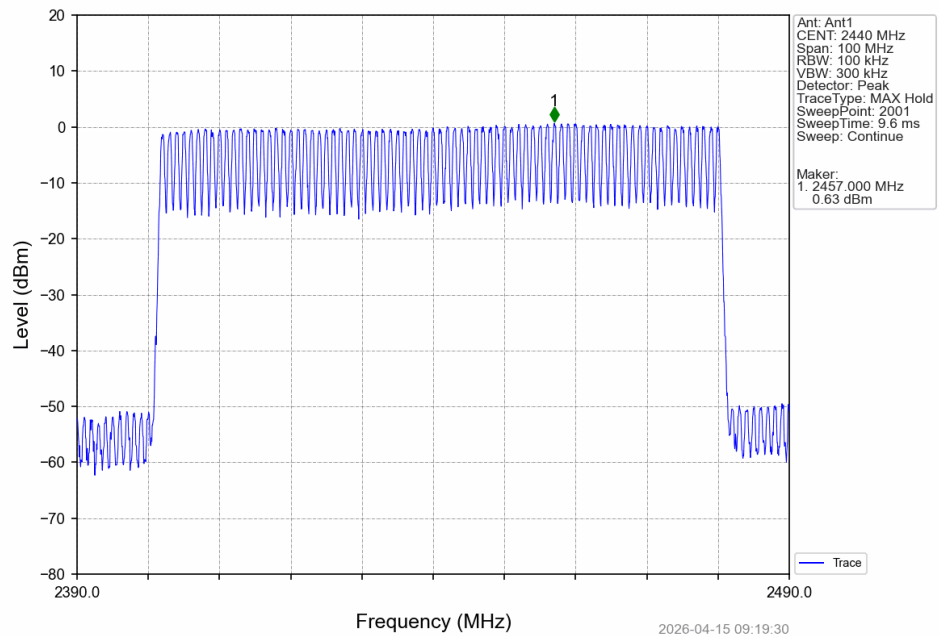
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



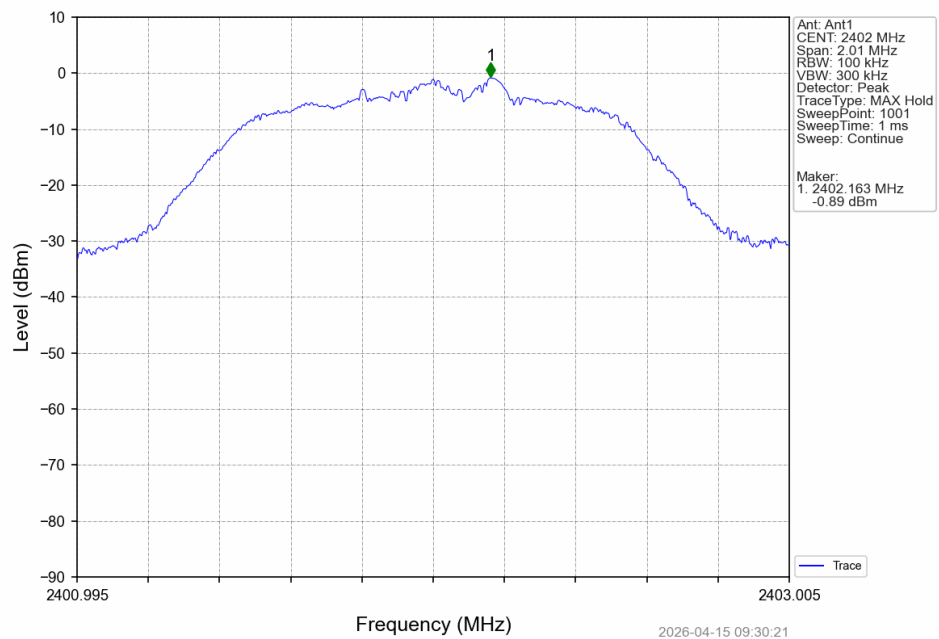
GFSK_DH5_HOPP_Ant1_NTNV



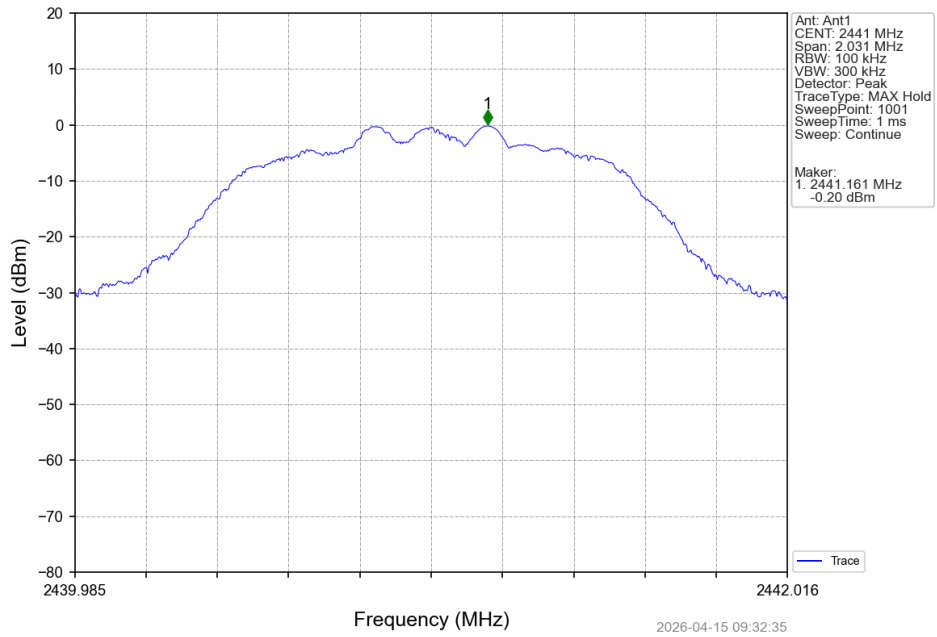
GFSK_DH5_HOPP_Ant1_NTNV



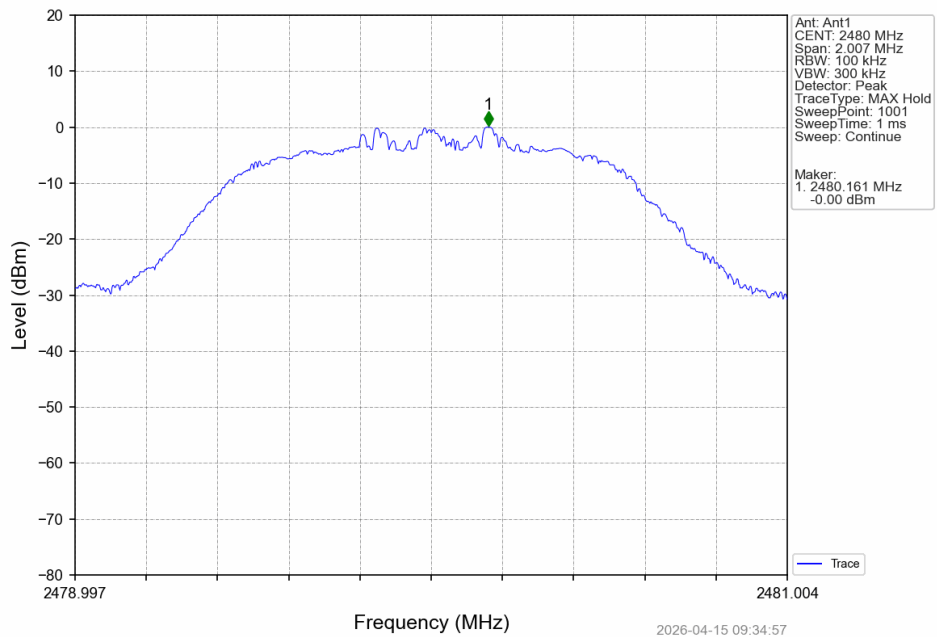
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



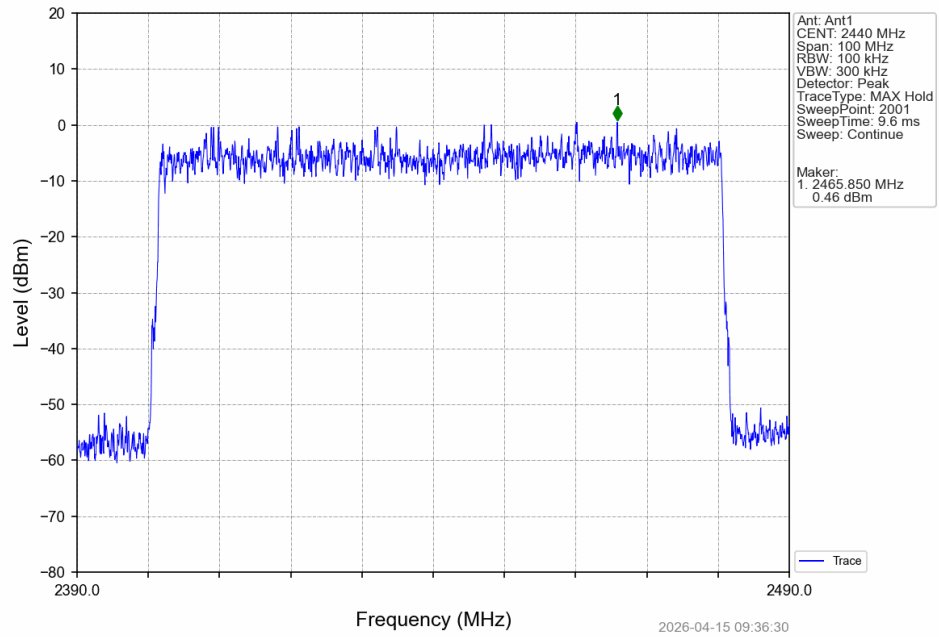
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



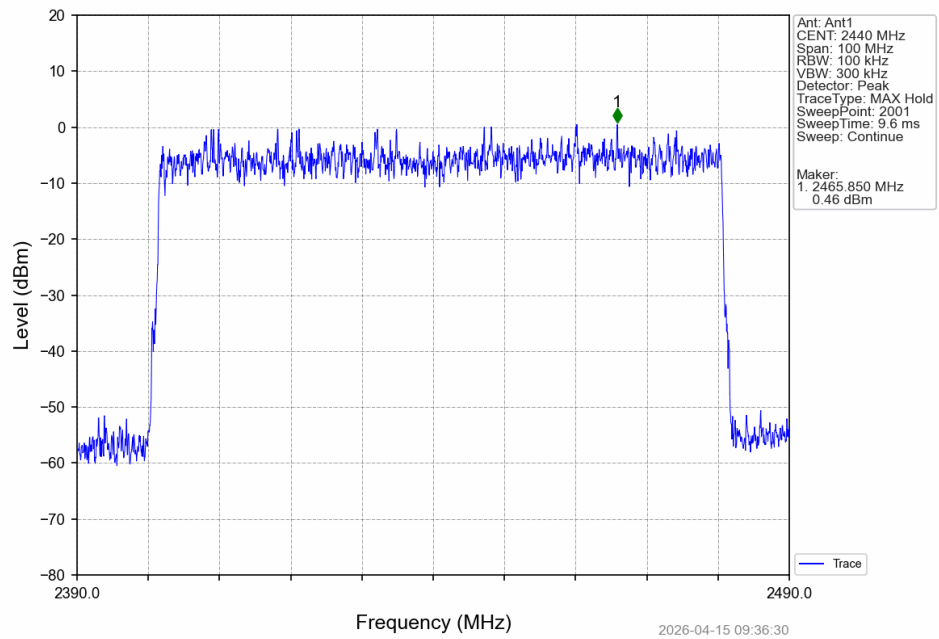
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



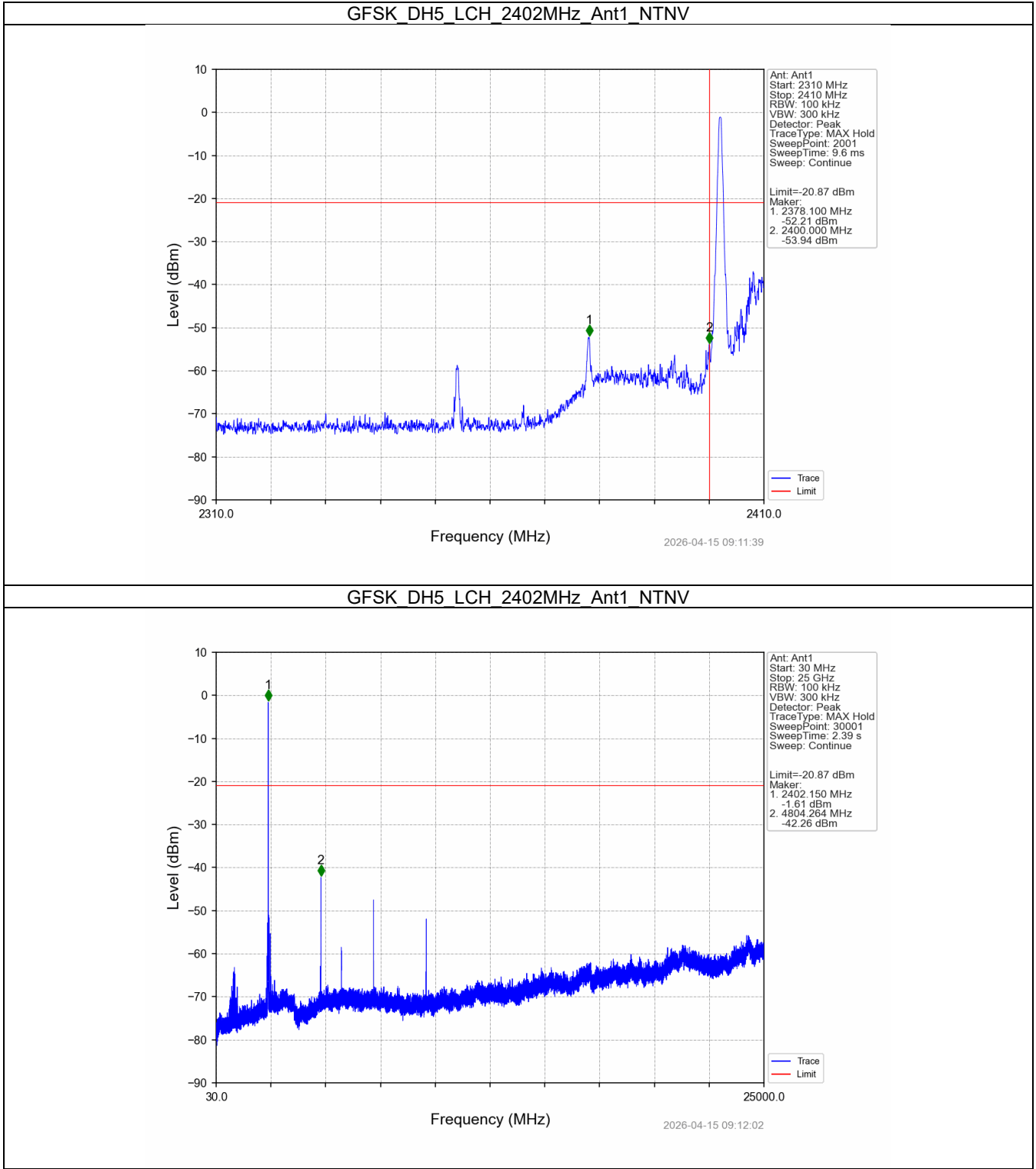
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



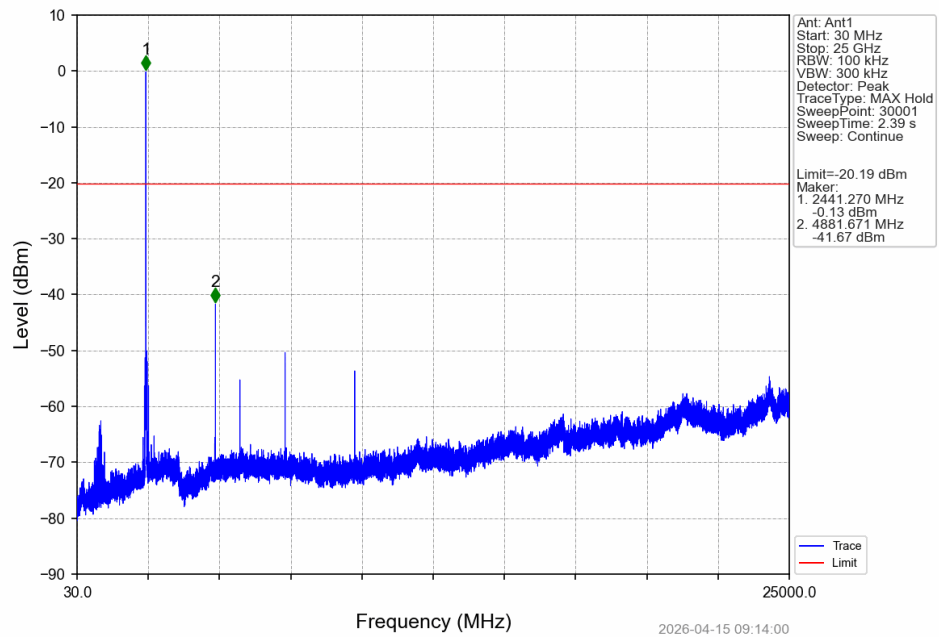
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



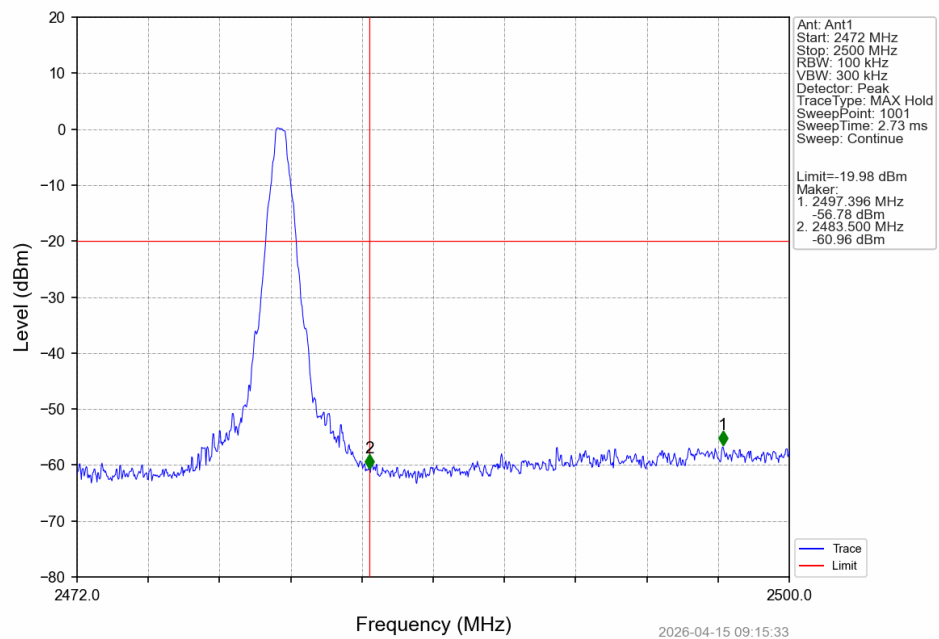
7.2.2 CSE



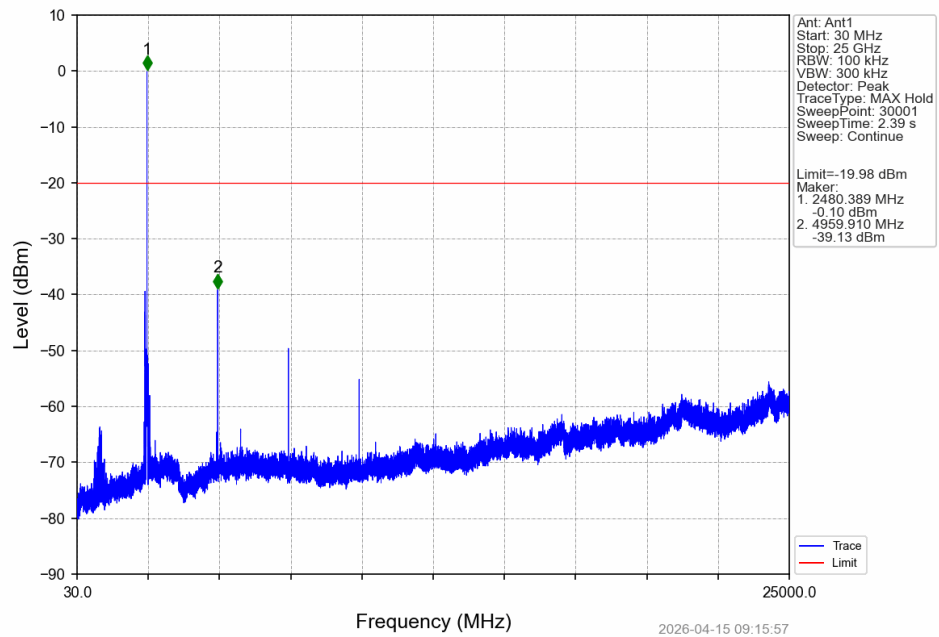
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



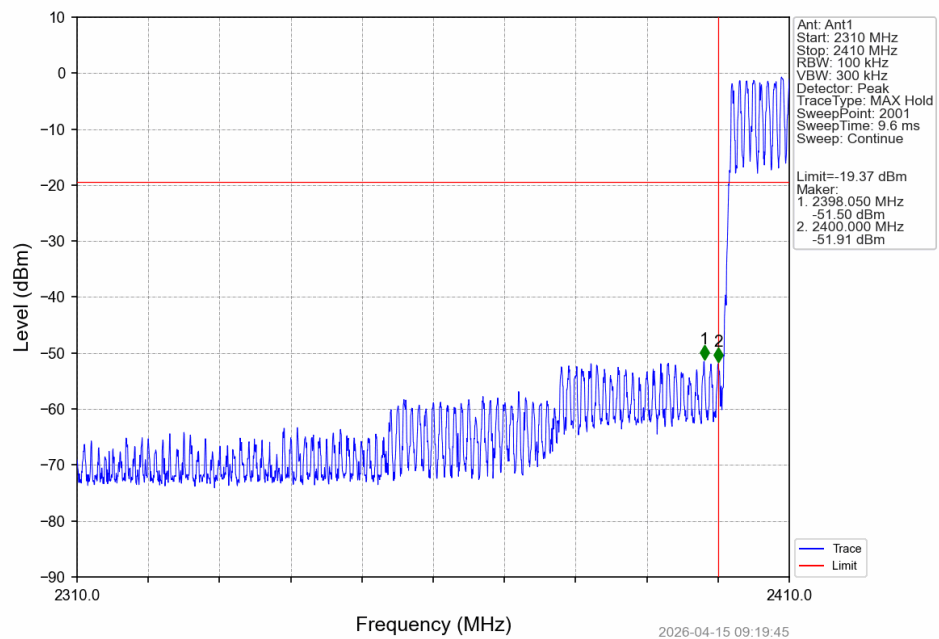
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



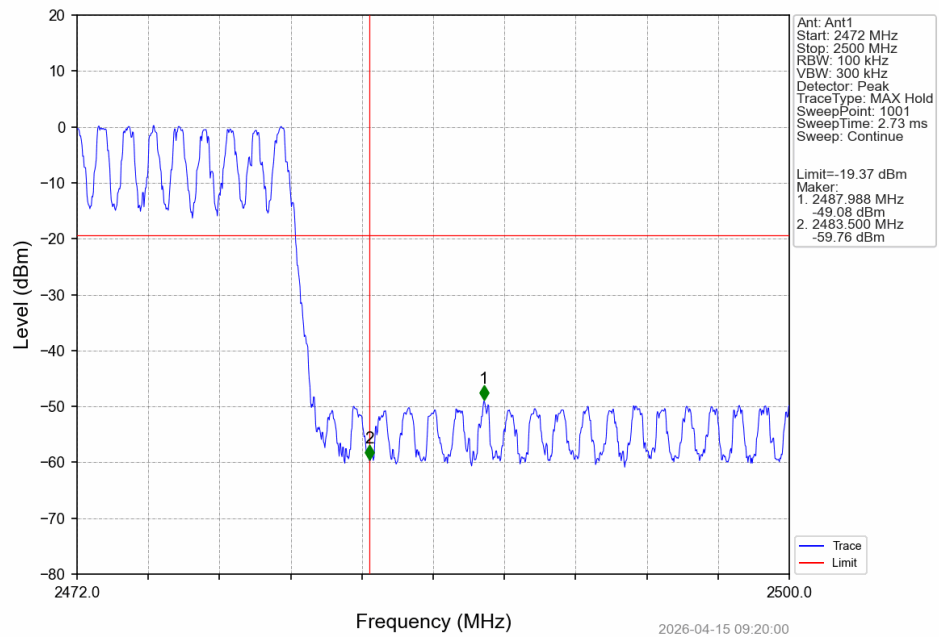
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



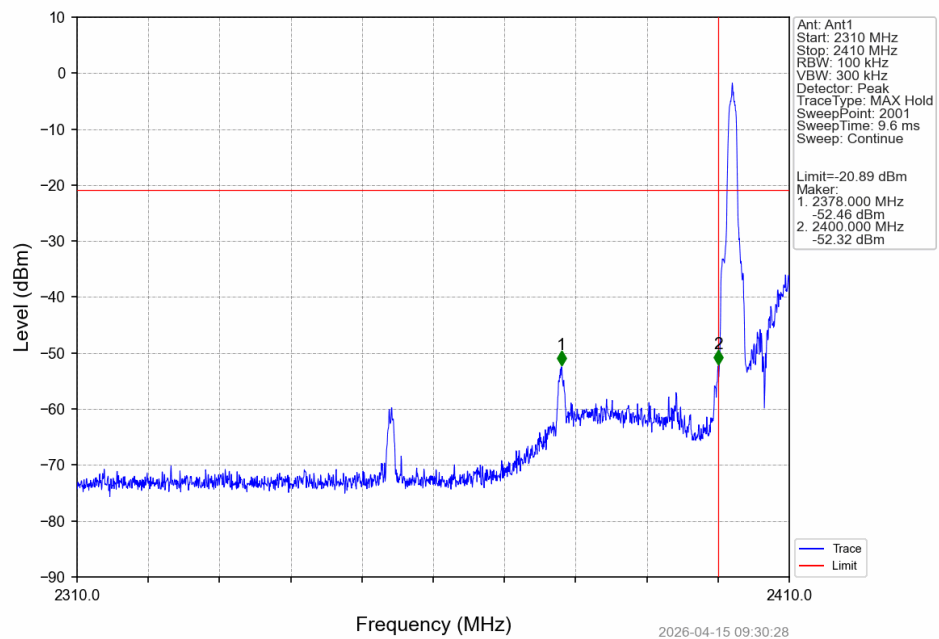
GFSK_DH5_HOPP_Ant1_NTNV



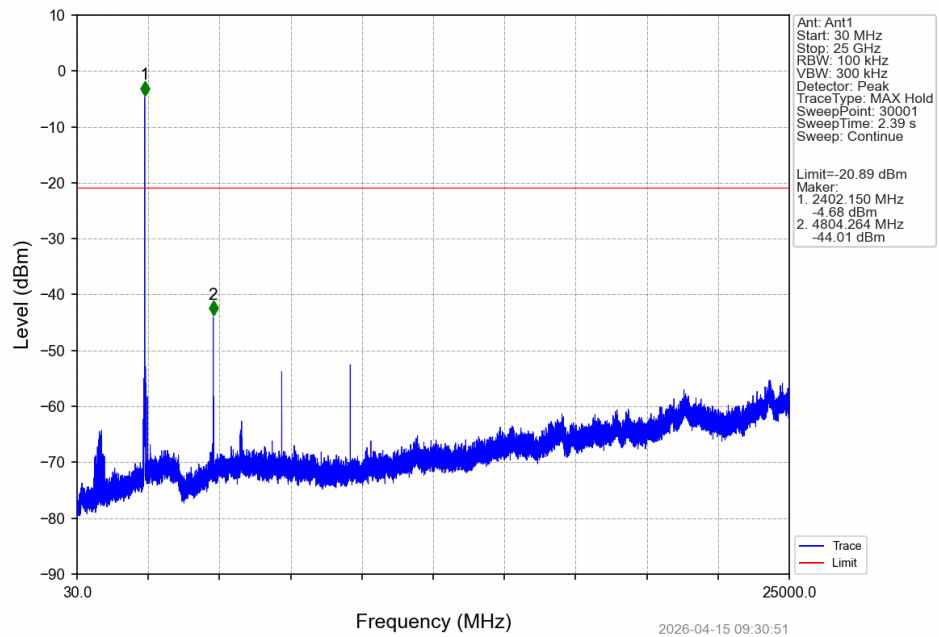
GFSK_DH5_HOPP_Ant1_NTNV



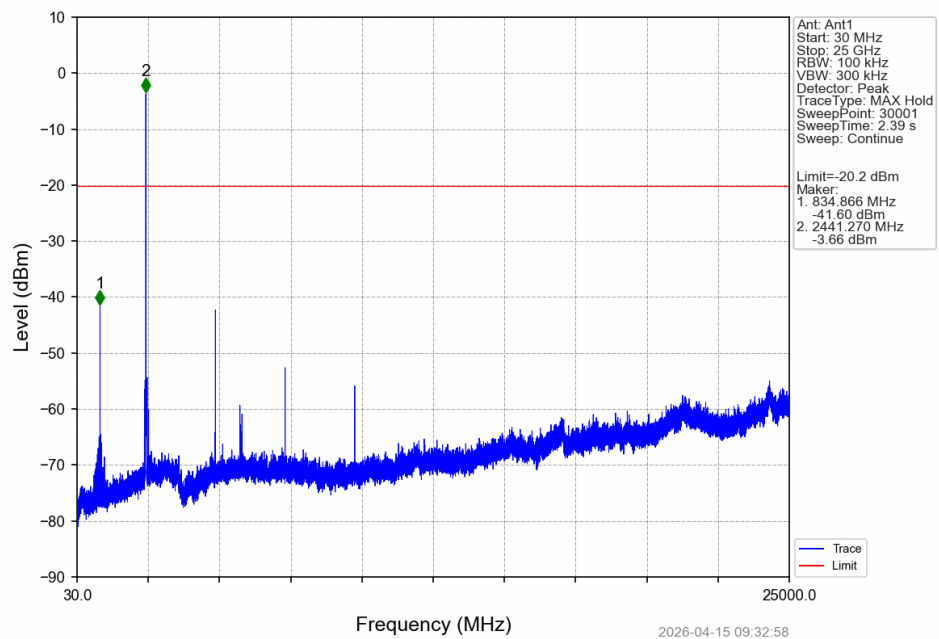
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



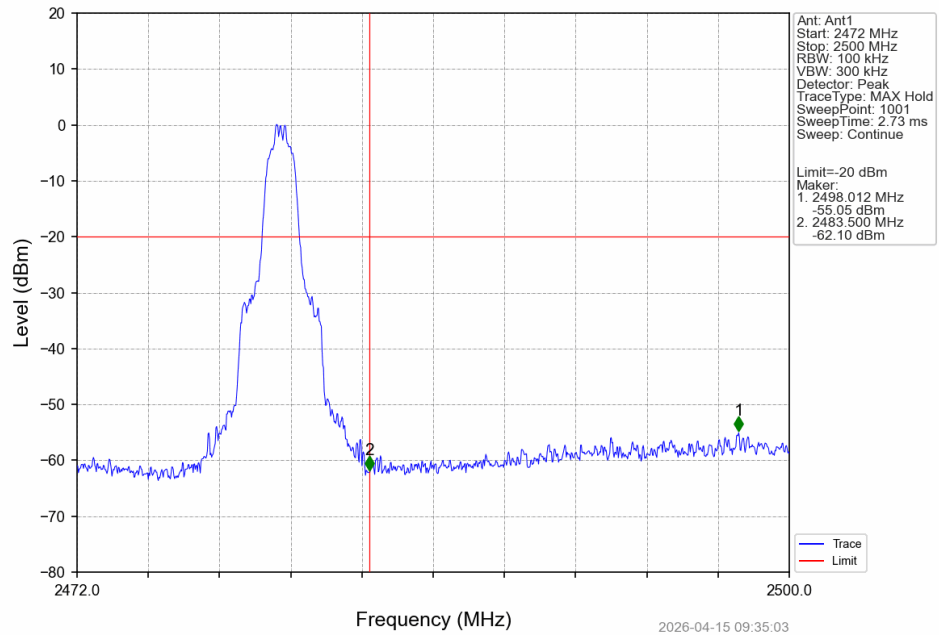
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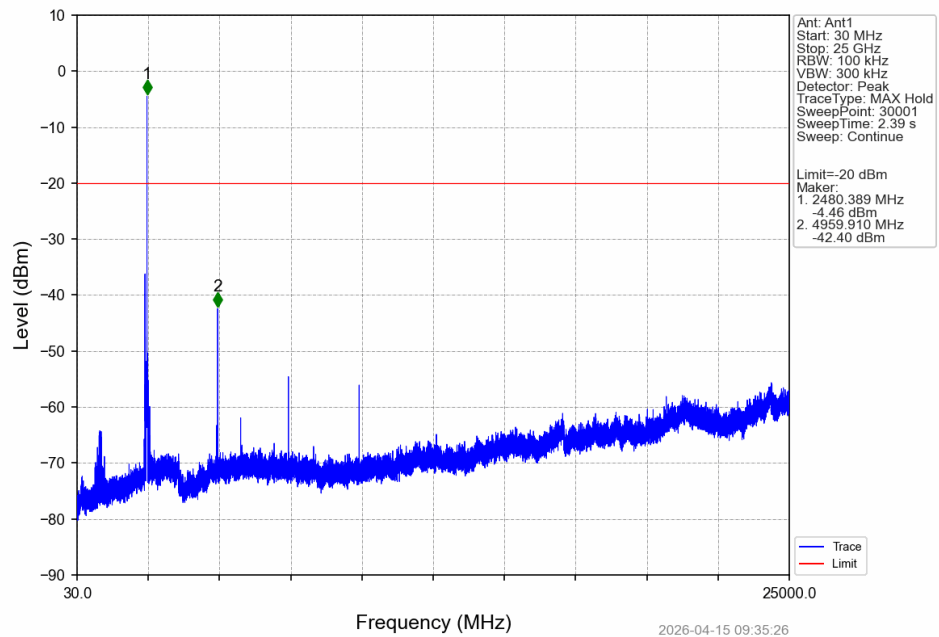
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



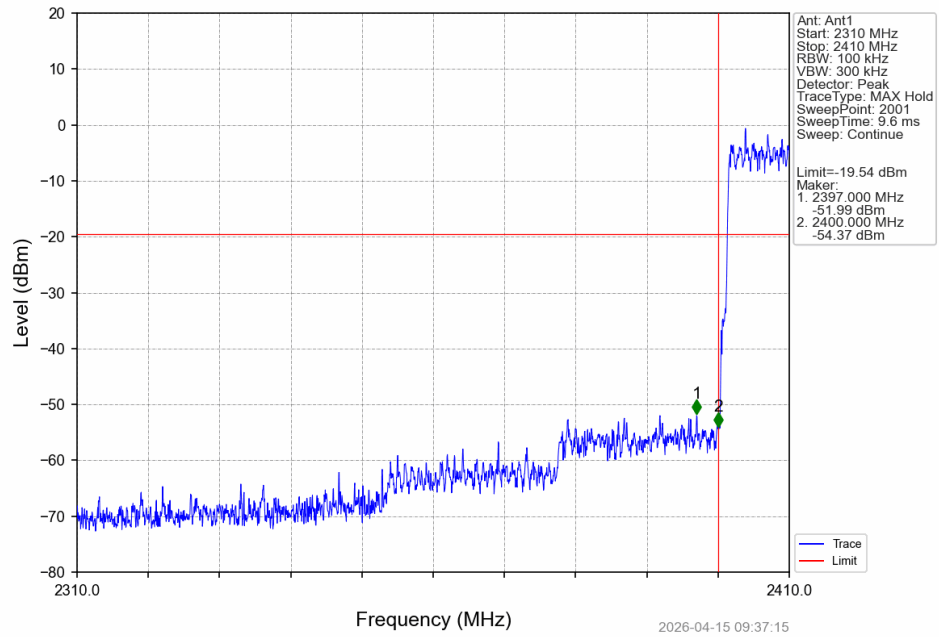
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV

