

ANNEX D TEST DATA

For

Project No.:	8236EU122504W
Client:	Jieyang Rongcheng District Yimeiruosi Electrical Appliance Factory (individual industrial and commercial households)
Product Name:	Astronaut Bluetooth speaker
Model No.:	Q1
FCC ID:	2BNPU-Q1
Technology:	Bluetooth BDR&EDR
Test Engineer:	<i>Mikey zhu</i>
Test Date:	2025-01-08

Test Summary

Item	Result
Duty Cycle	Pass
Bandwidth	Pass
Maximum Conducted Output Power	Pass
Carrier Frequency Separation	Pass
Number of Hopping Frequencies	Pass
Time of Occupancy (Dwell Time)	Pass
Unwanted Emissions In Non-restricted Frequency Bands	Pass

1. Duty Cycle

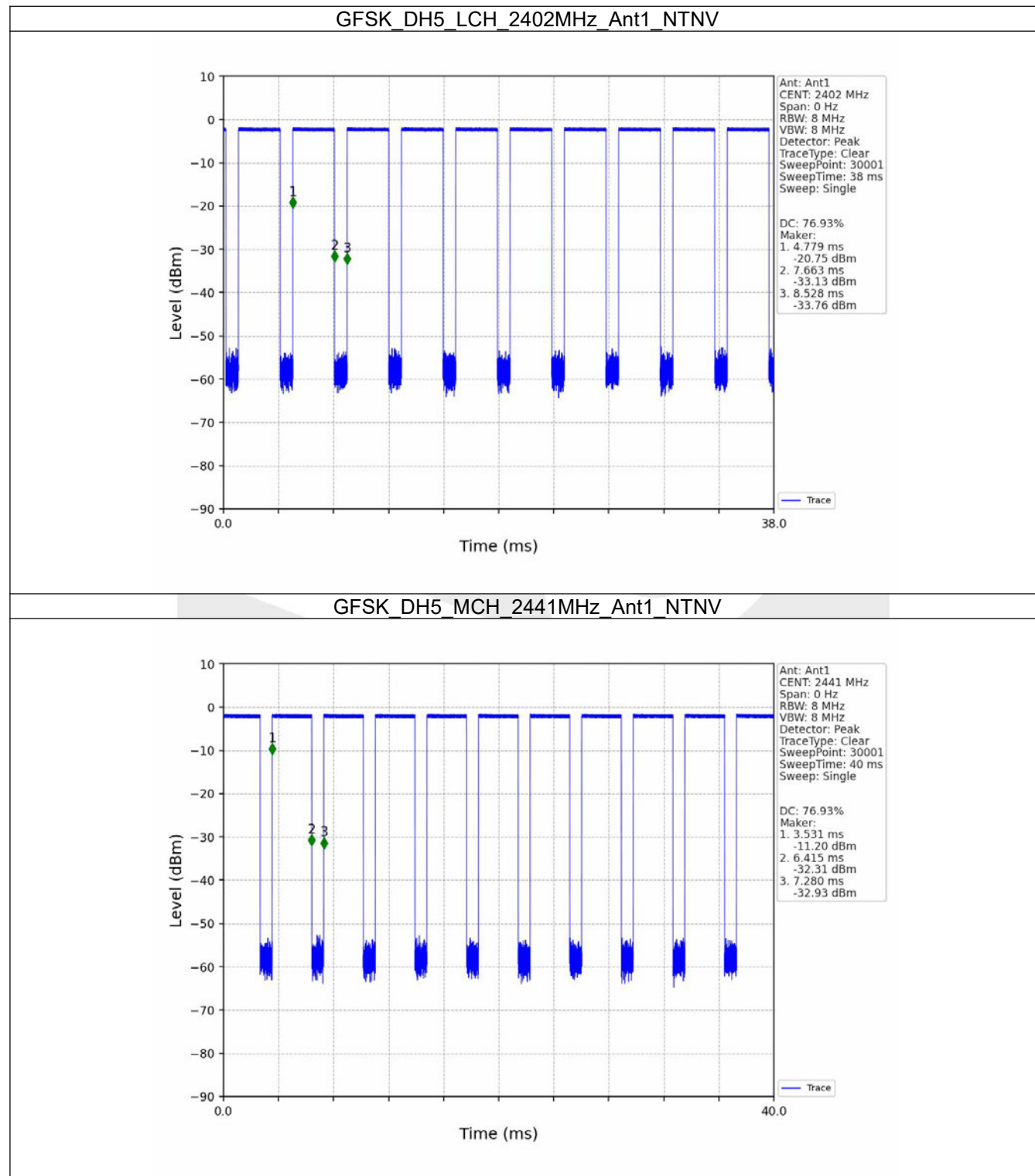
1.1 Test Result

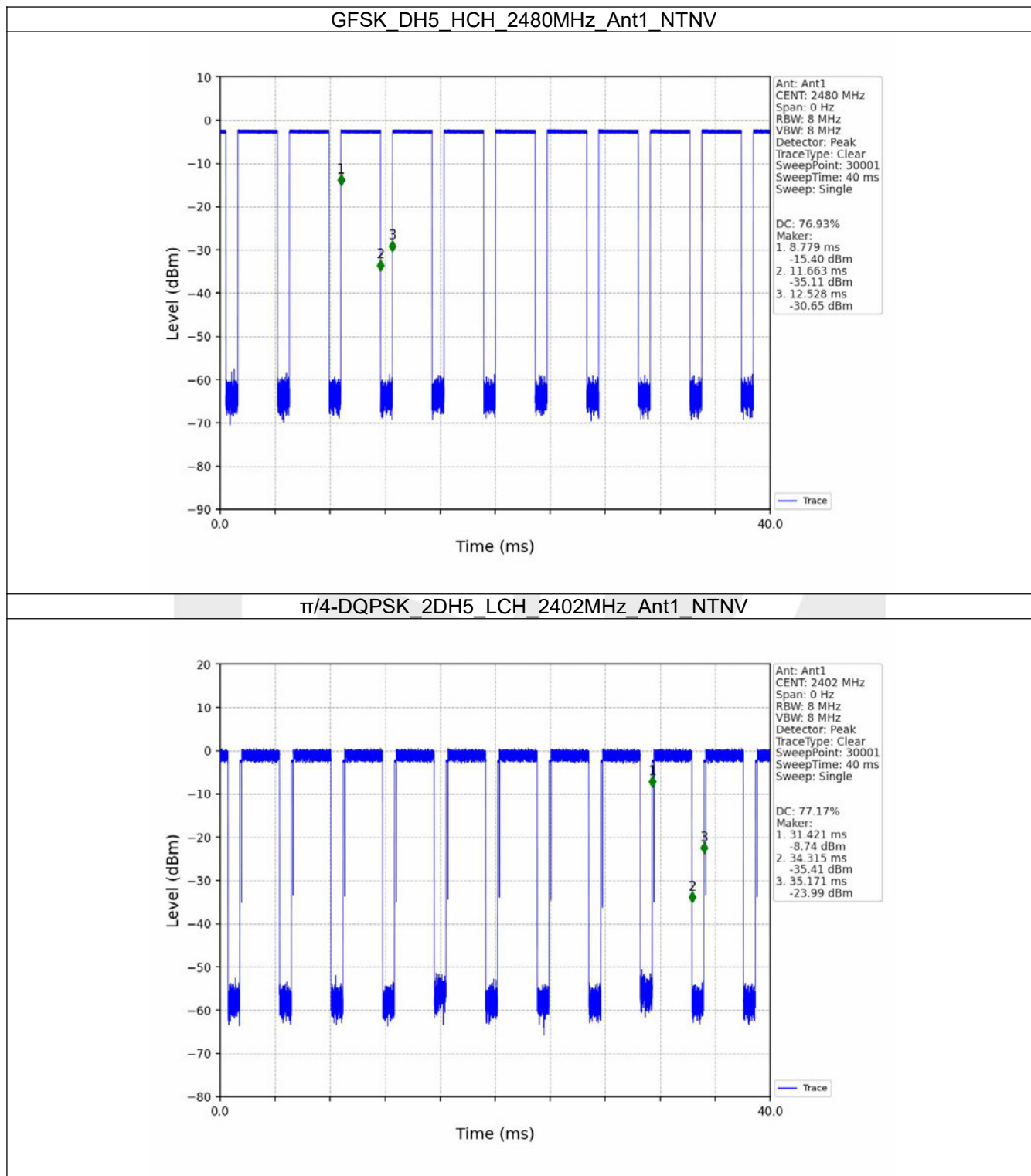
1.1.1 Ant1

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	2.884	3.749	76.93	1.14	0.01
		2441	DH5	2.884	3.749	76.93	1.14	0.04
		2480	DH5	2.884	3.749	76.93	1.14	0.04
$\pi/4$ -DQPSK	SISO	2402	2DH5	2.894	3.750	77.17	1.13	0.04
		2441	2DH5	2.894	3.751	77.15	1.13	0.03
		2480	2DH5	2.894	3.750	77.17	1.13	0.03

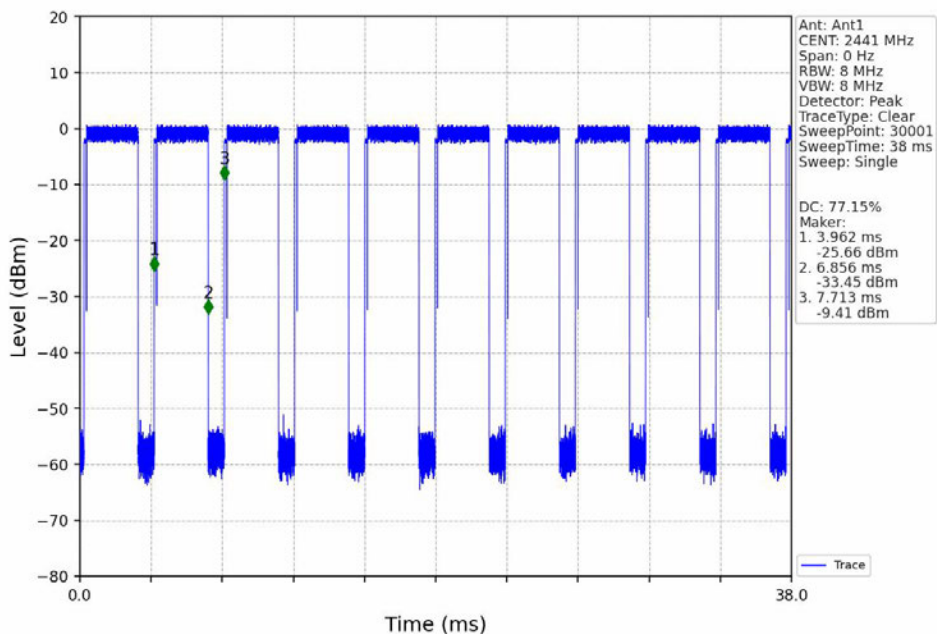
1.2 Test Graph

1.2.1 Ant1

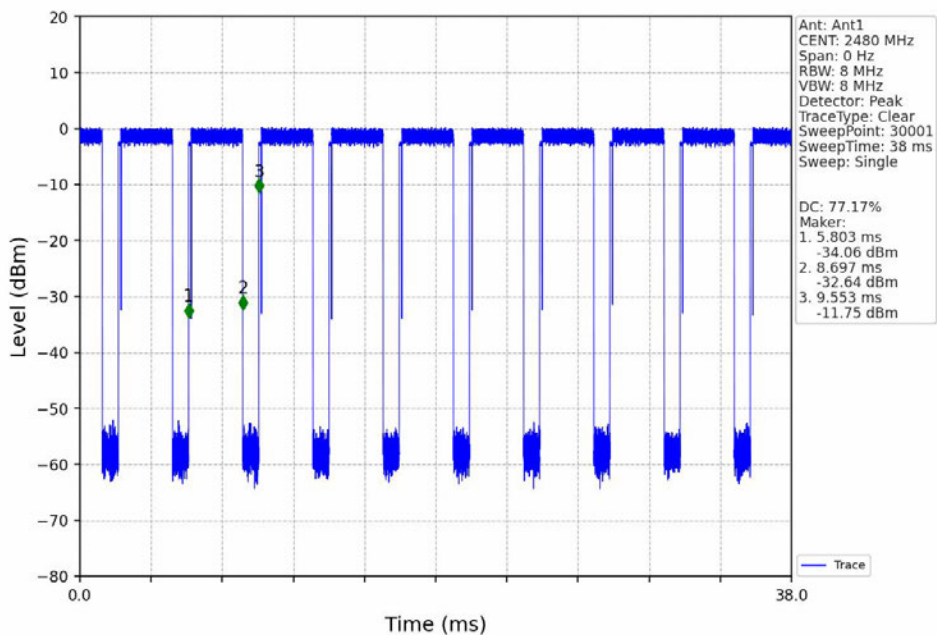




$\pi/4$ -DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



$\pi/4$ -DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



2. Bandwidth

2.1 Test Result

2.1.1 OBW

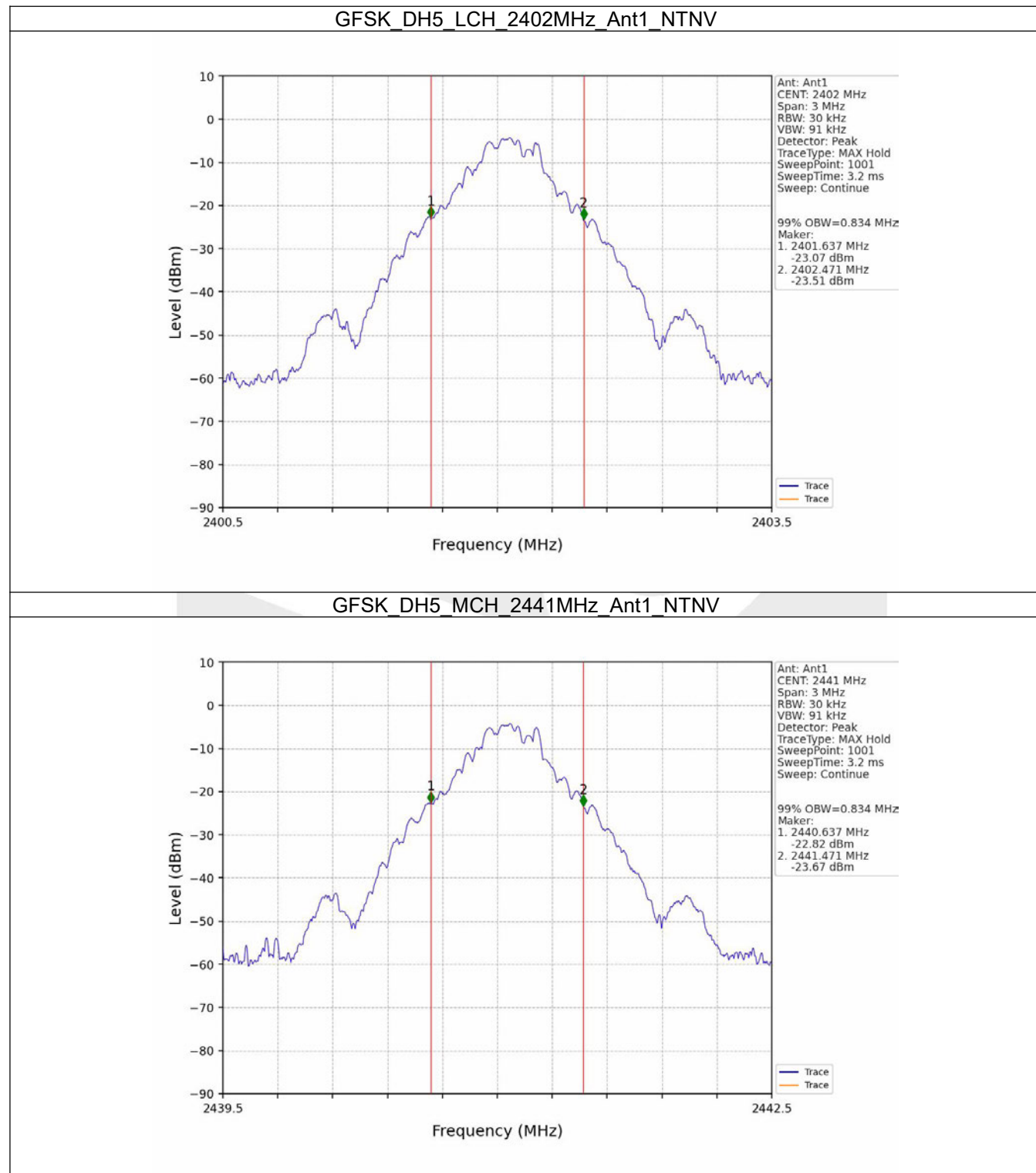
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.834	/	Pass
		2441	DH5	1	0.834	/	Pass
		2480	DH5	1	0.833	/	Pass
$\pi/4$ -DQPSK	SISO	2402	2DH5	1	1.175	/	Pass
		2441	2DH5	1	1.178	/	Pass
		2480	2DH5	1	1.177	/	Pass

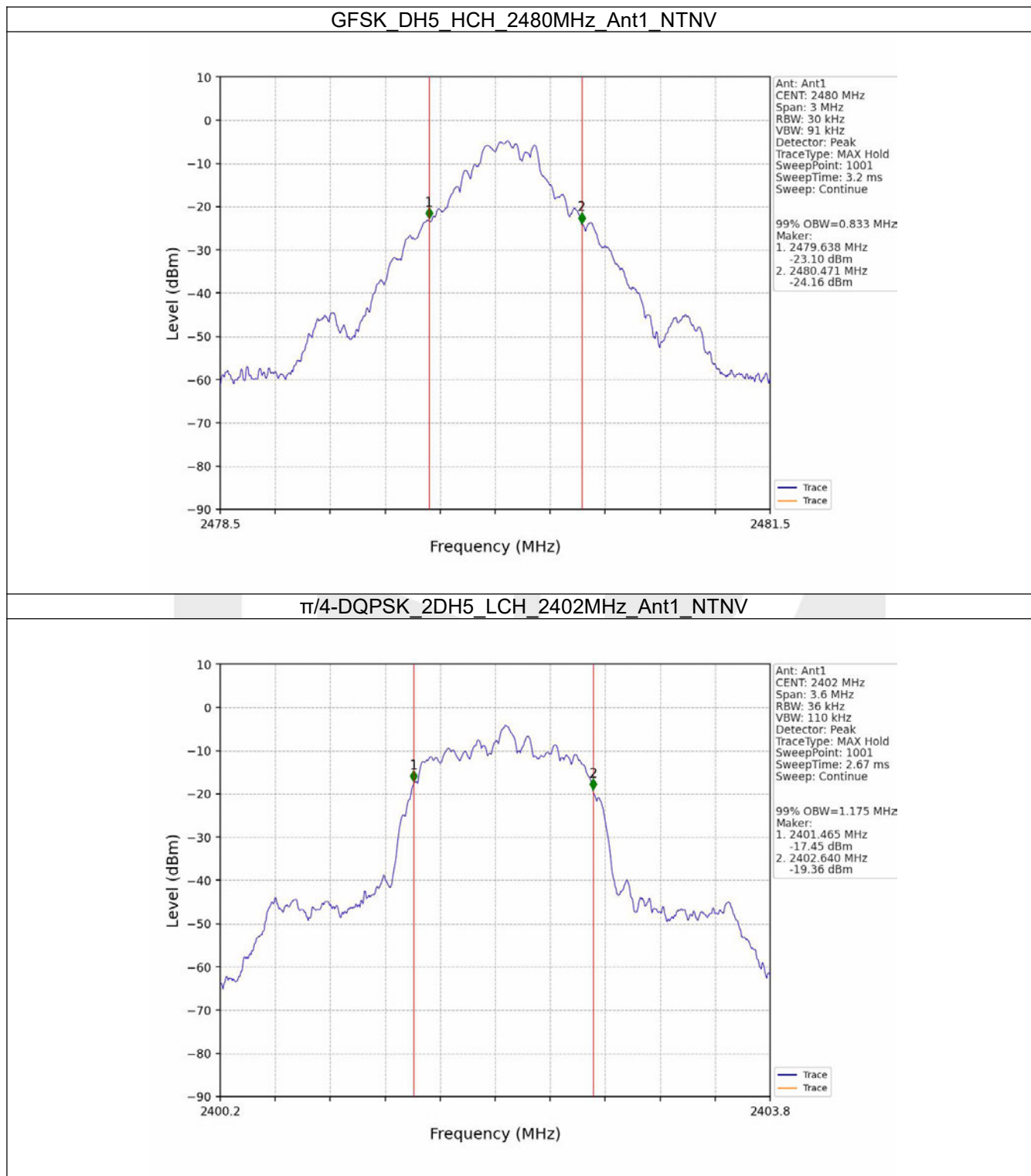
2.1.2 20dB BW

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.938	/	Pass
		2441	DH5	1	0.943	/	Pass
		2480	DH5	1	0.940	/	Pass
$\pi/4$ -DQPSK	SISO	2402	2DH5	1	1.292	/	Pass
		2441	2DH5	1	1.294	/	Pass
		2480	2DH5	1	1.297	/	Pass

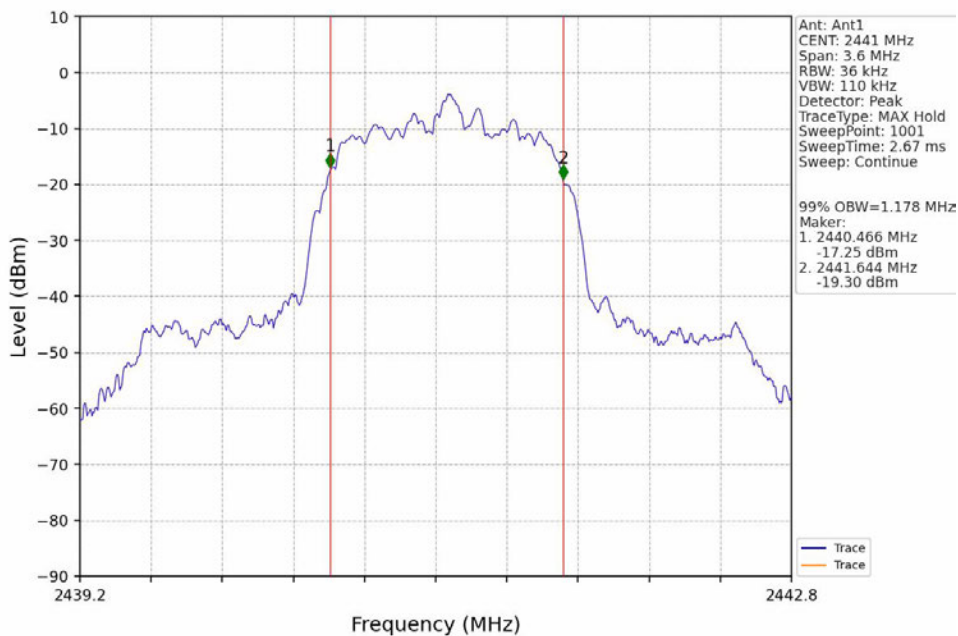
2.2 Test Graph

2.2.1 OBW

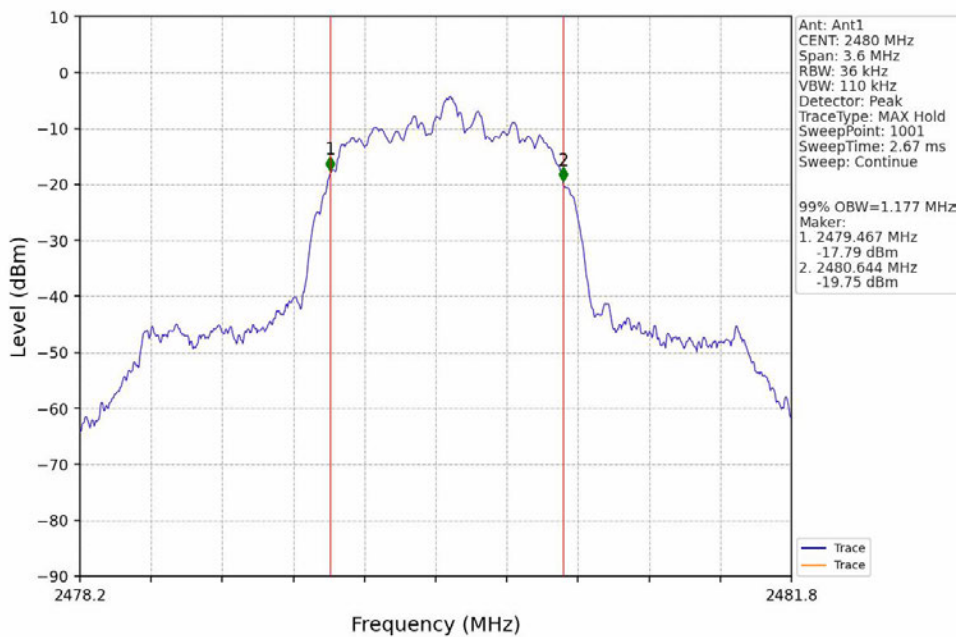




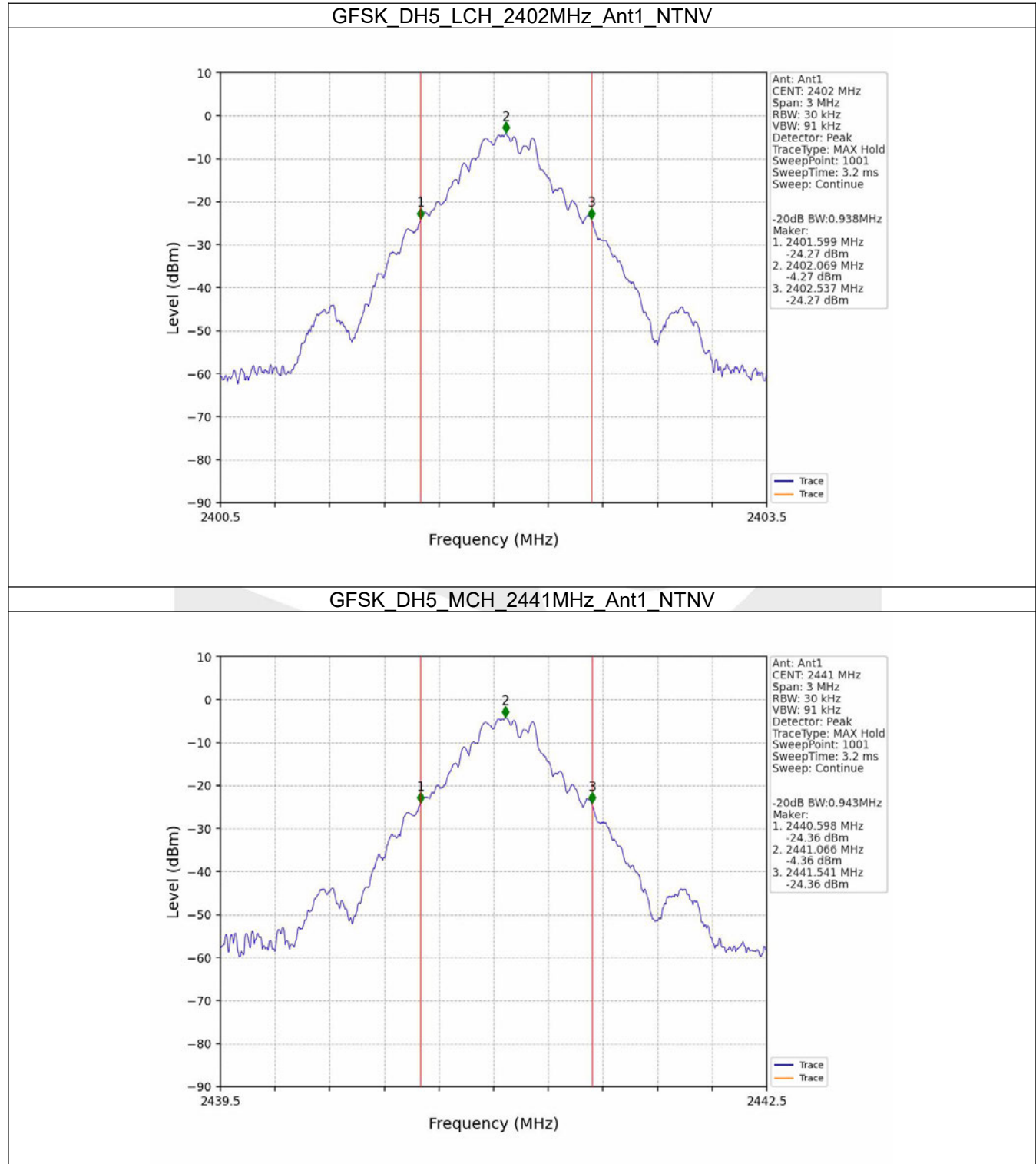
$\pi/4$ -DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



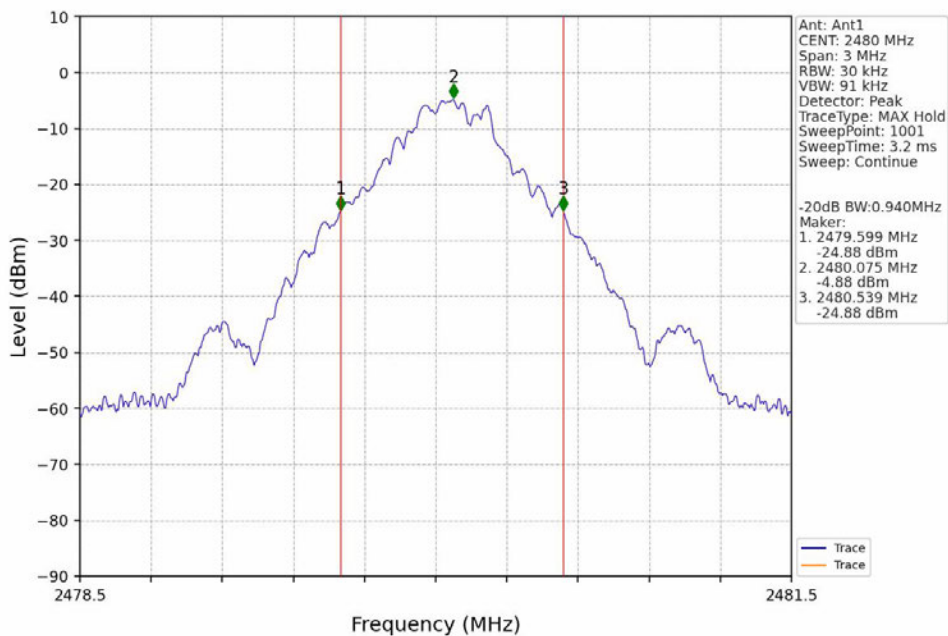
$\pi/4$ -DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



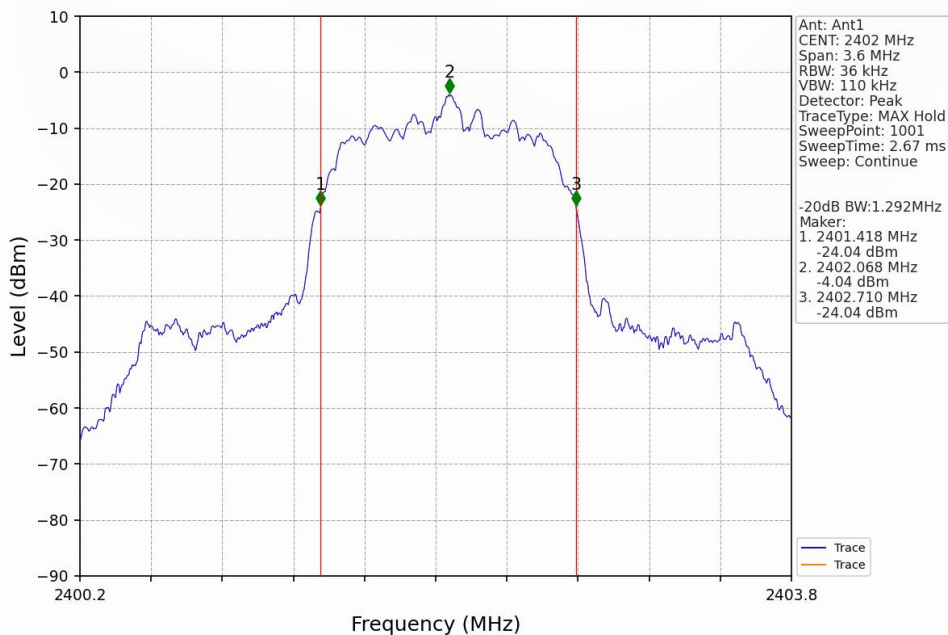
2.2.2 20dB BW



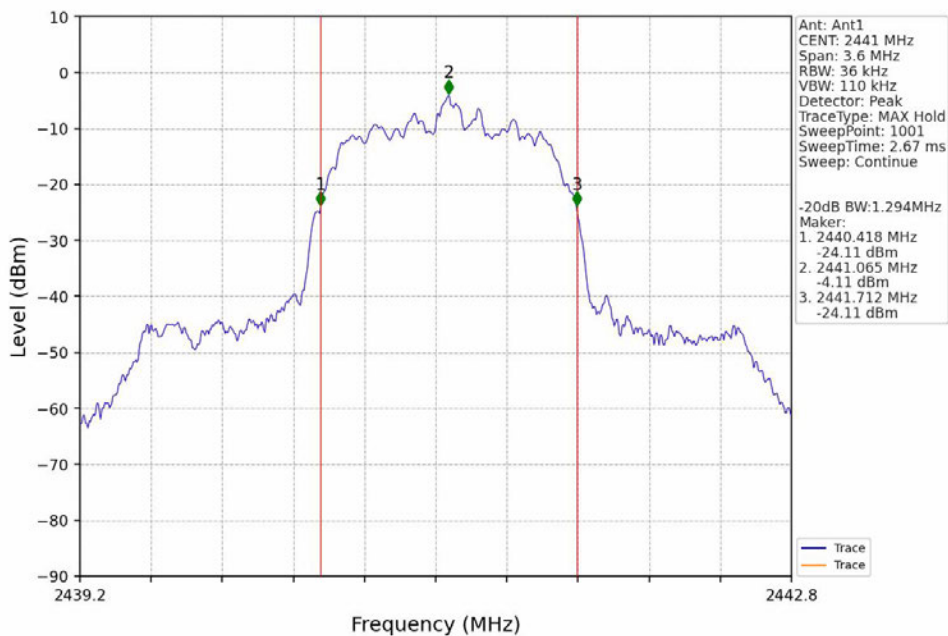
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



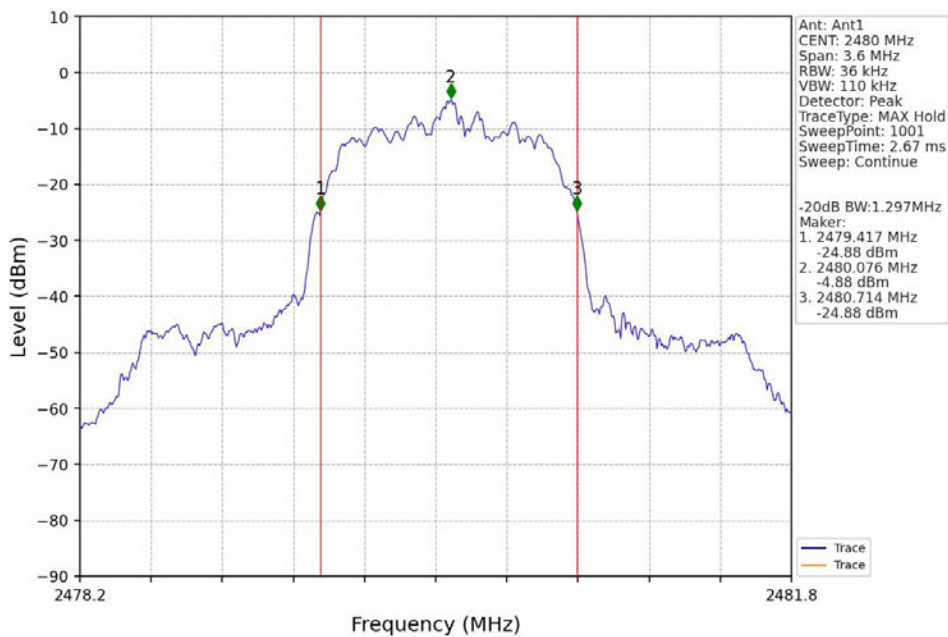
$\pi/4$ -DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



$\pi/4$ -DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



$\pi/4$ -DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



3. Maximum Conducted Output Power

3.1 Test Result

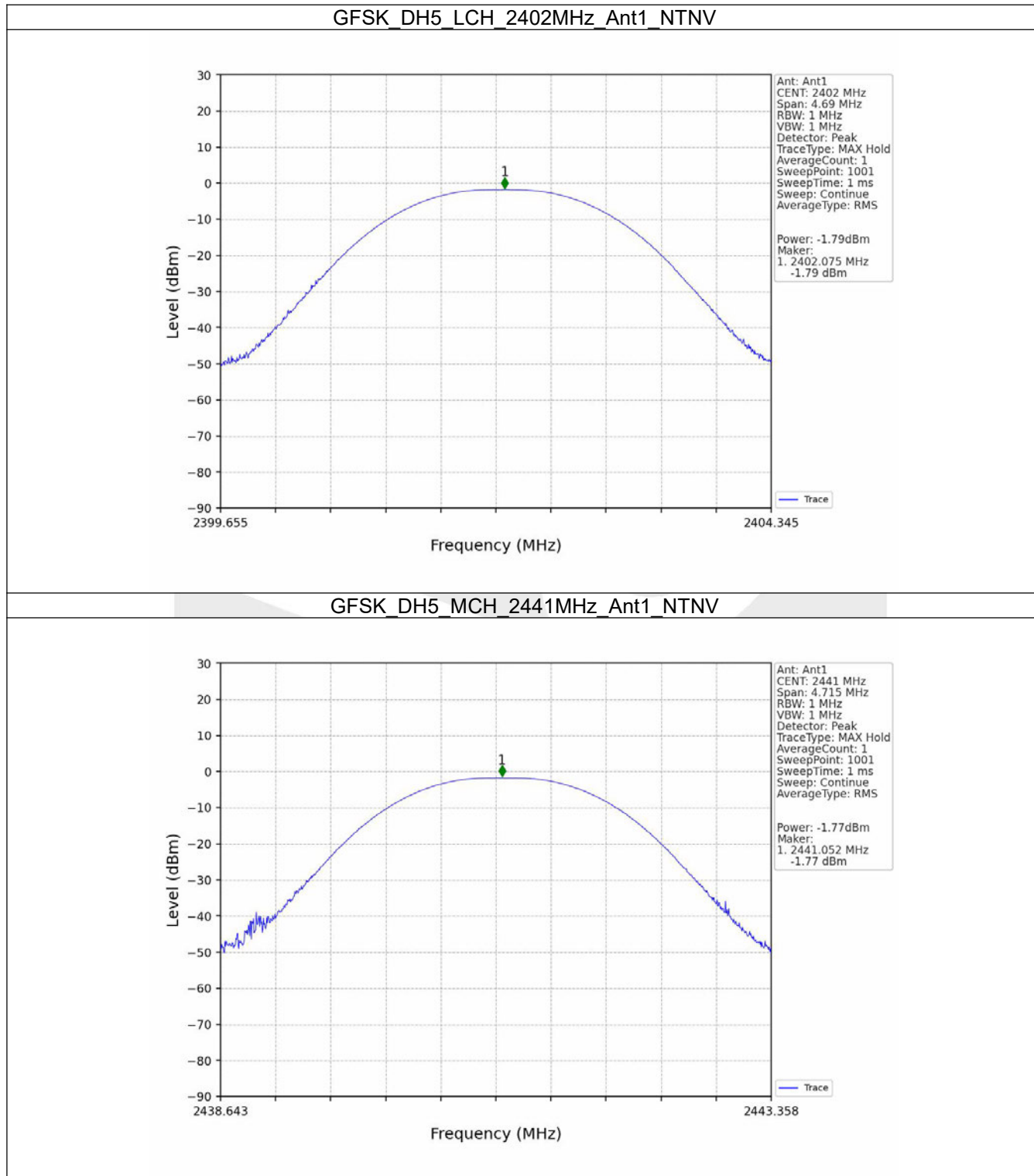
3.1.1 Power

Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	-1.79	<=30	Pass
		2441	DH5	-1.77	<=30	Pass
		2480	DH5	-2.29	<=30	Pass
$\pi/4$ -DQPSK	SISO	2402	2DH5	0.35	<=20.97	Pass
		2441	2DH5	0.55	<=20.97	Pass
		2480	2DH5	0.08	<=20.97	Pass

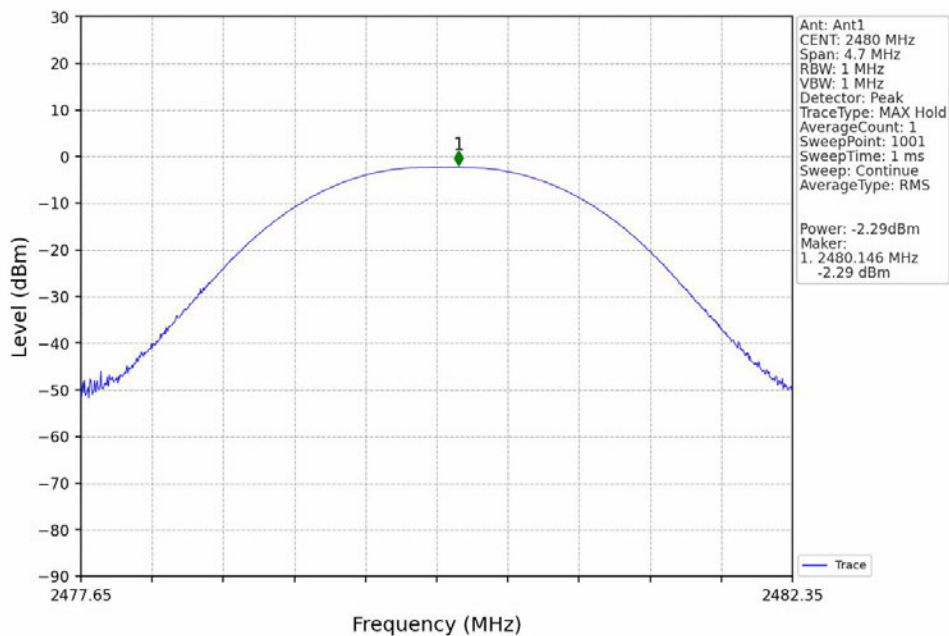
Note1: Antenna Gain: Ant1: 2.499dBi;

3.2 Test Graph

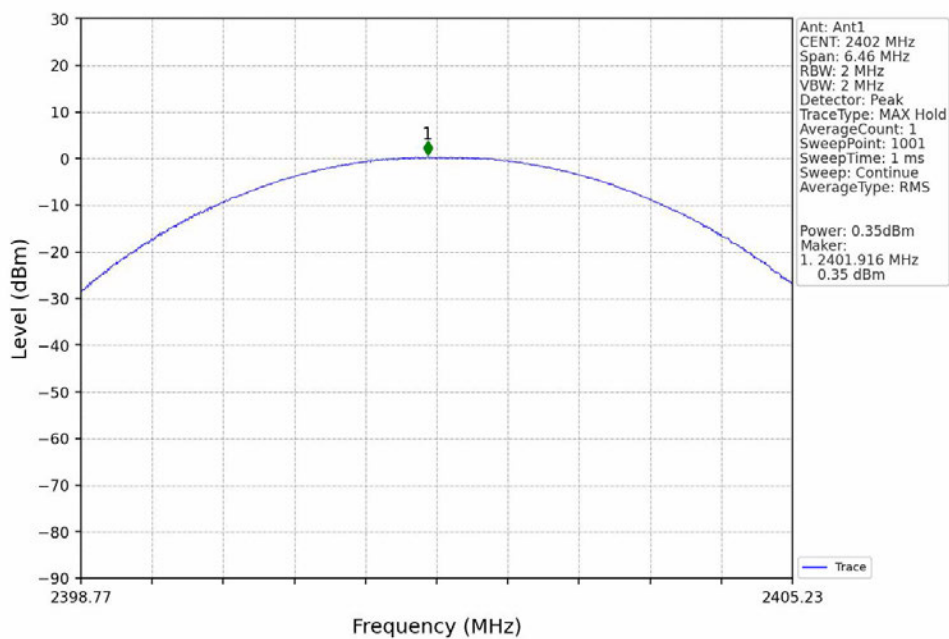
3.2.1 Power



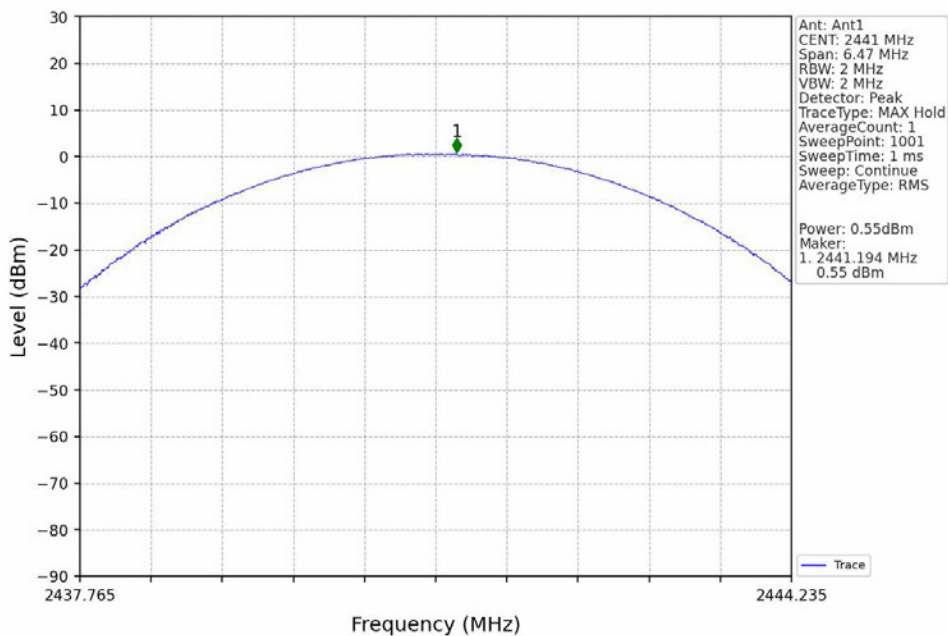
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



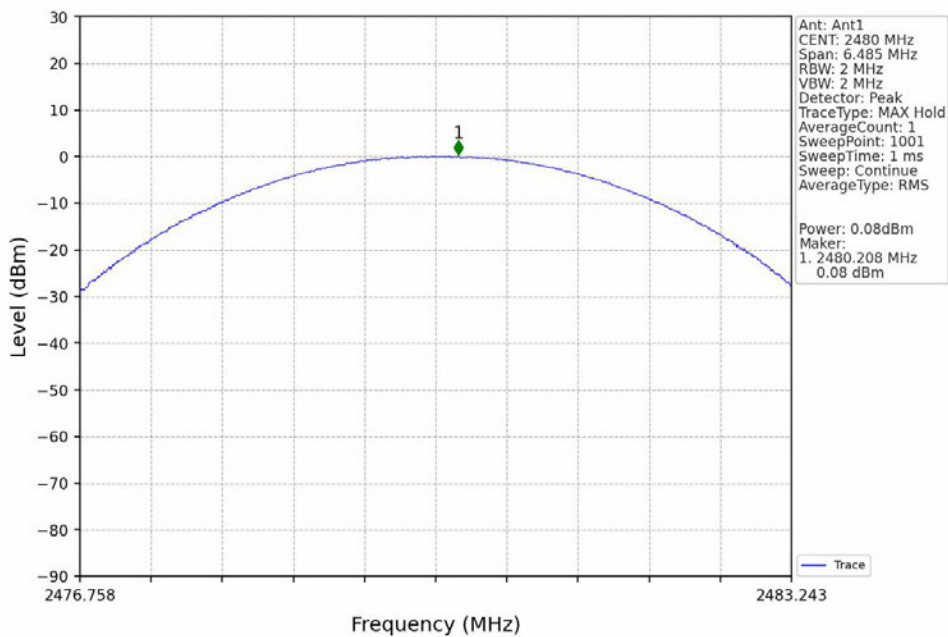
$\pi/4$ -DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



$\pi/4$ -DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



$\pi/4$ -DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



4. Carrier Frequency Separation

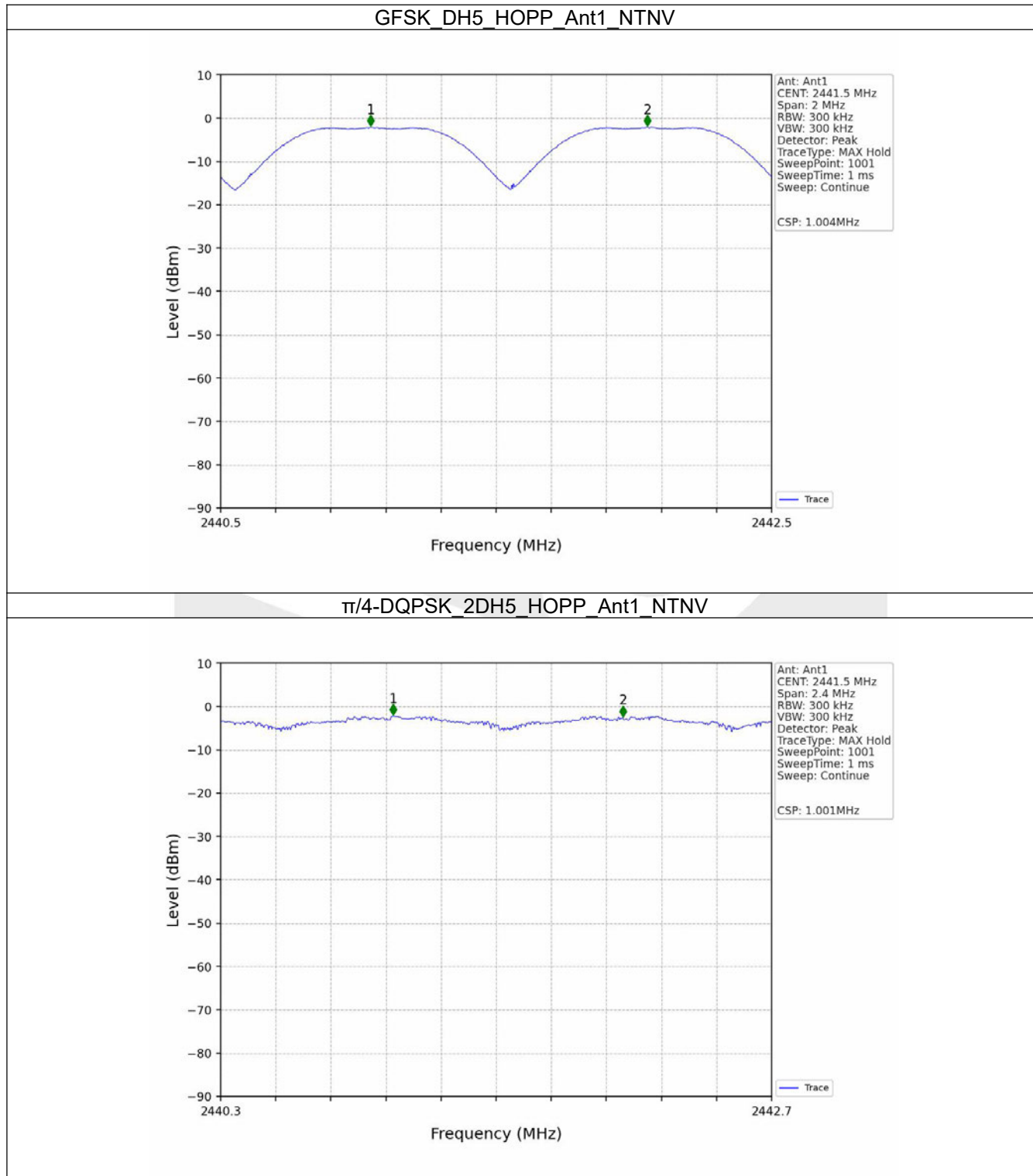
4.1 Test Result

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	1.004	0.943	≥ 0.943	Pass
$\pi/4$ -DQPSK	SISO	HOPP	2DH5	1.001	1.297	≥ 0.865	Pass

4.2 Test Graph

4.2.1 Ant1



5. Number of Hopping Frequencies

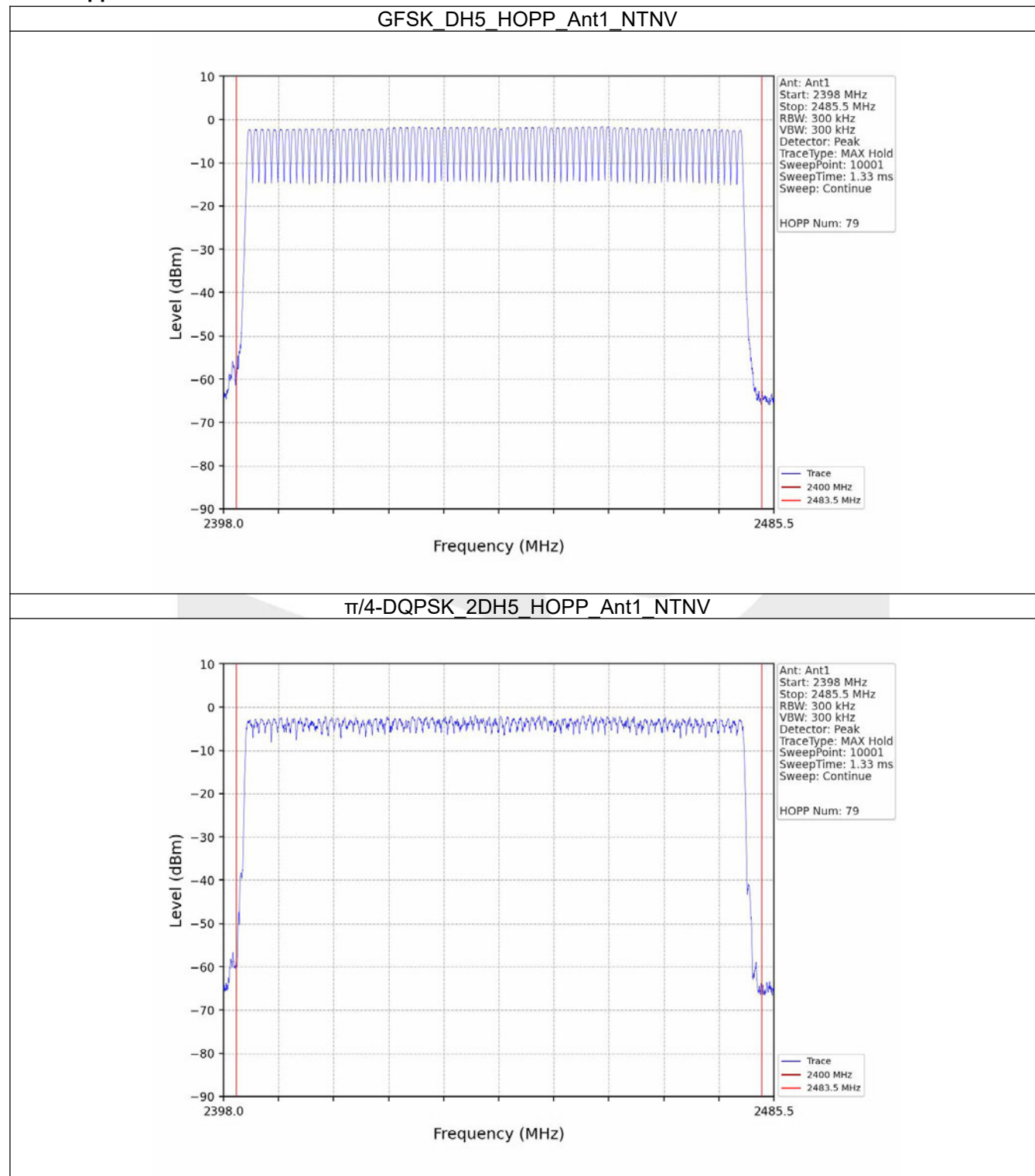
5.1 Test Result

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
$\pi/4$ -DQPSK	SISO	HOPP	2DH5	79	≥ 15	Pass

5.2 Test Graph

5.2.1 HoppNum



6. Time of Occupancy (Dwell Time)

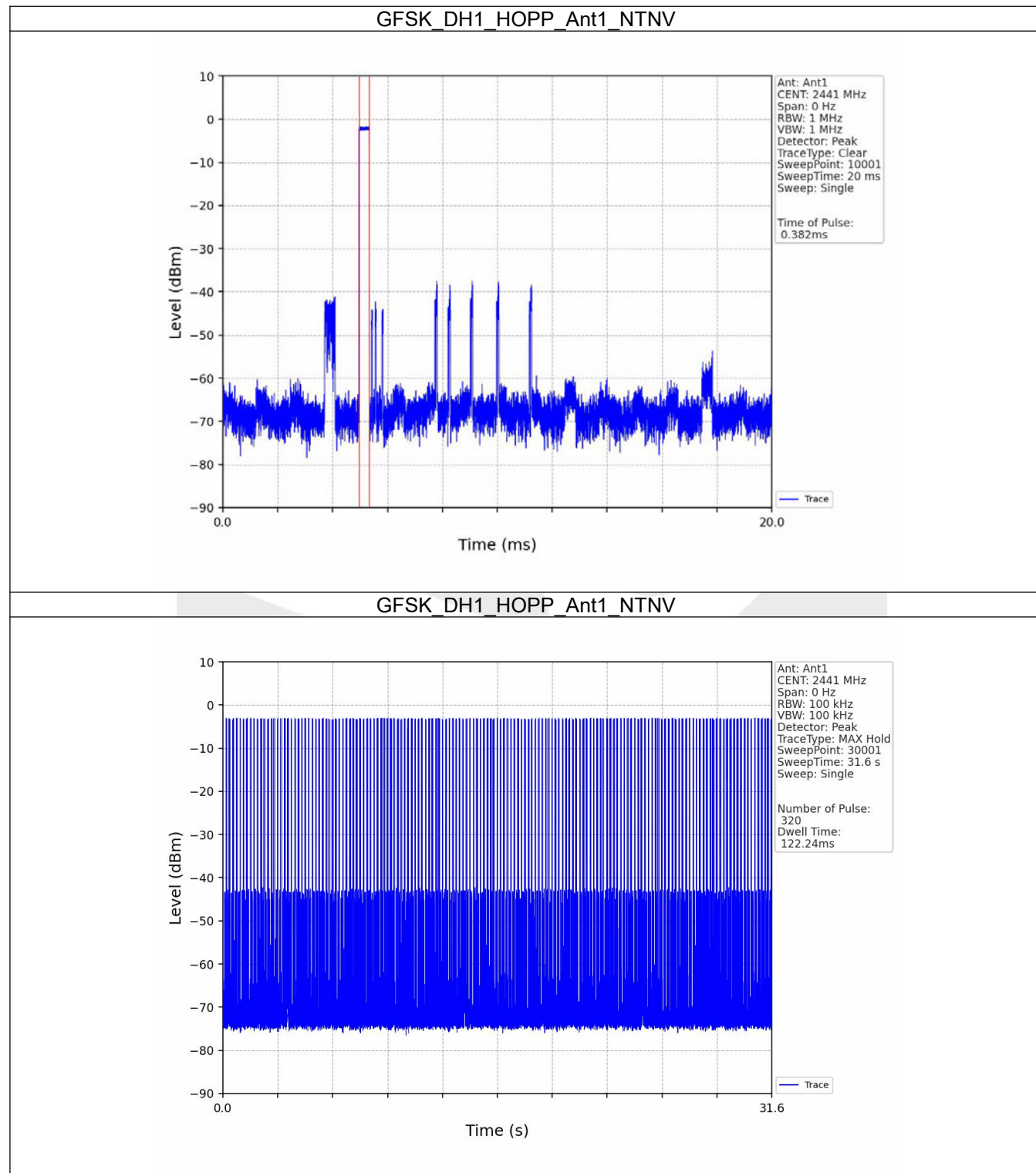
6.1 Test Result

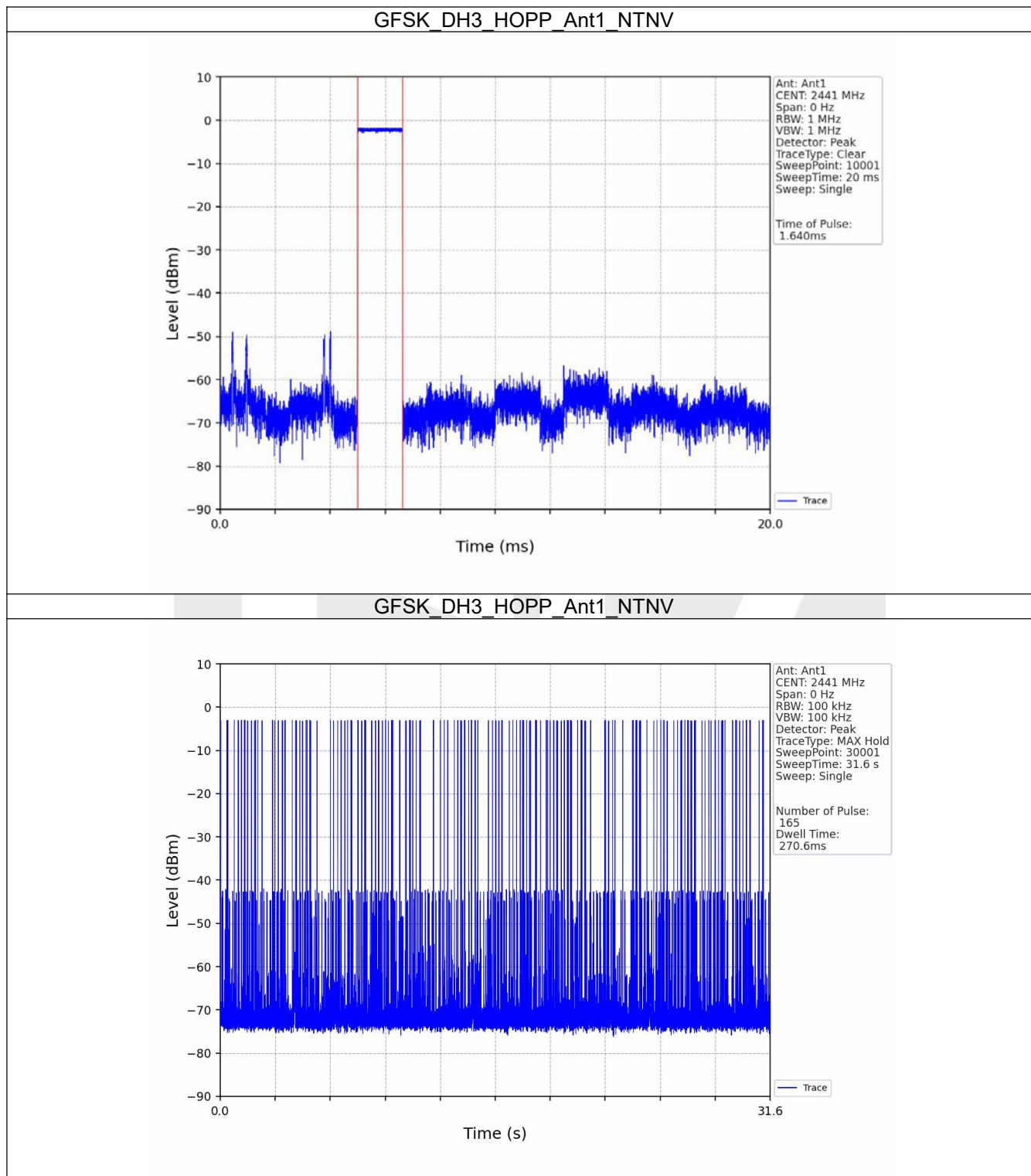
6.1.1 Ant1

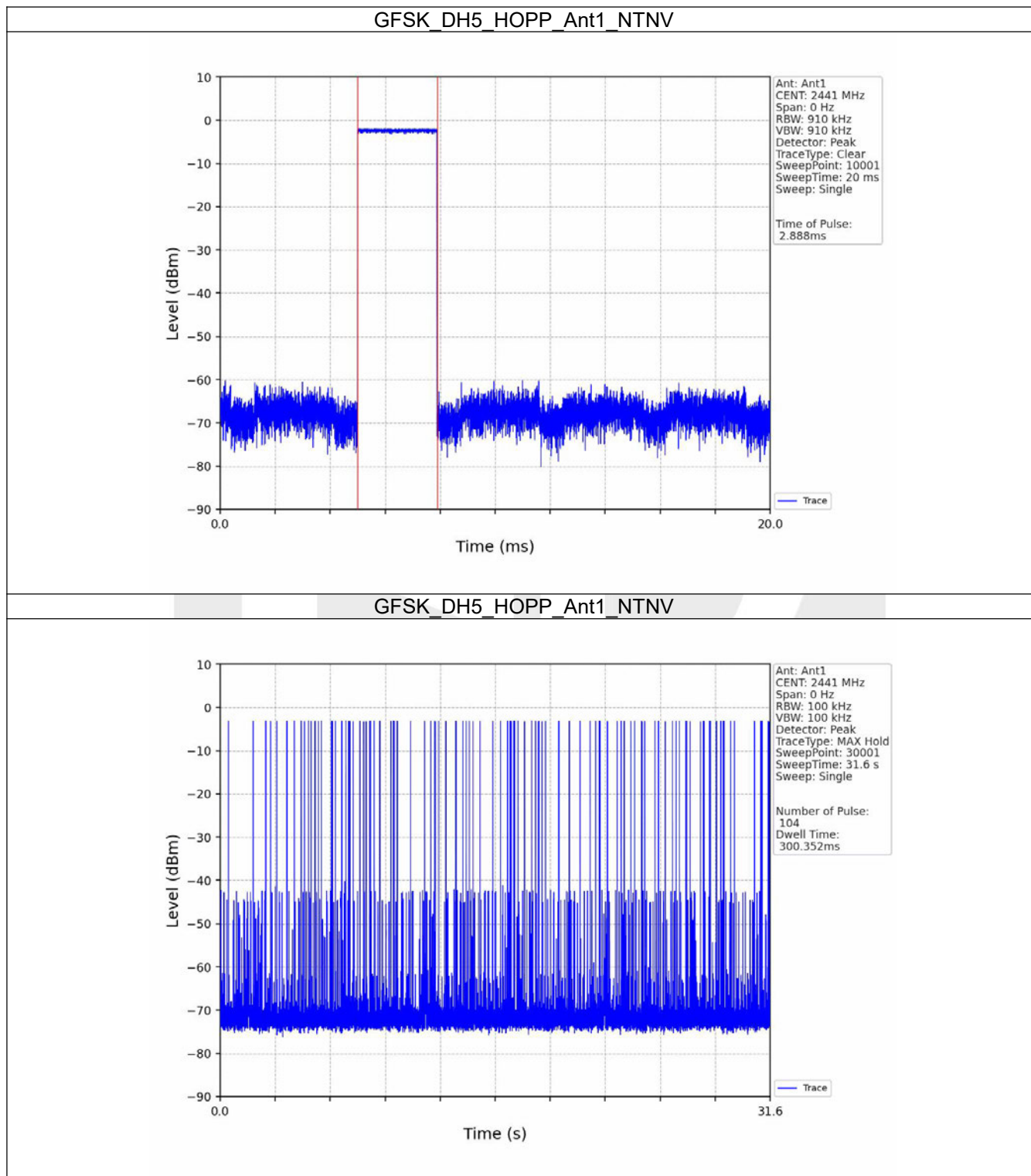
Ant1									
Mode	TX Type	Frequency (MHz)	Packet Type	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limit (ms)	Verdict
GFSK	SISO	HOPP	DH1	0.382	31.600	320	122.240	<=400	Pass
			DH3	1.640	31.600	165	270.600	<=400	Pass
			DH5	2.888	31.600	104	300.352	<=400	Pass
$\pi/4$ -DQPSK	SISO	HOPP	2DH1	0.392	31.600	317	124.264	<=400	Pass
			2DH3	1.650	31.600	163	268.950	<=400	Pass
			2DH5	2.896	31.600	108	312.768	<=400	Pass

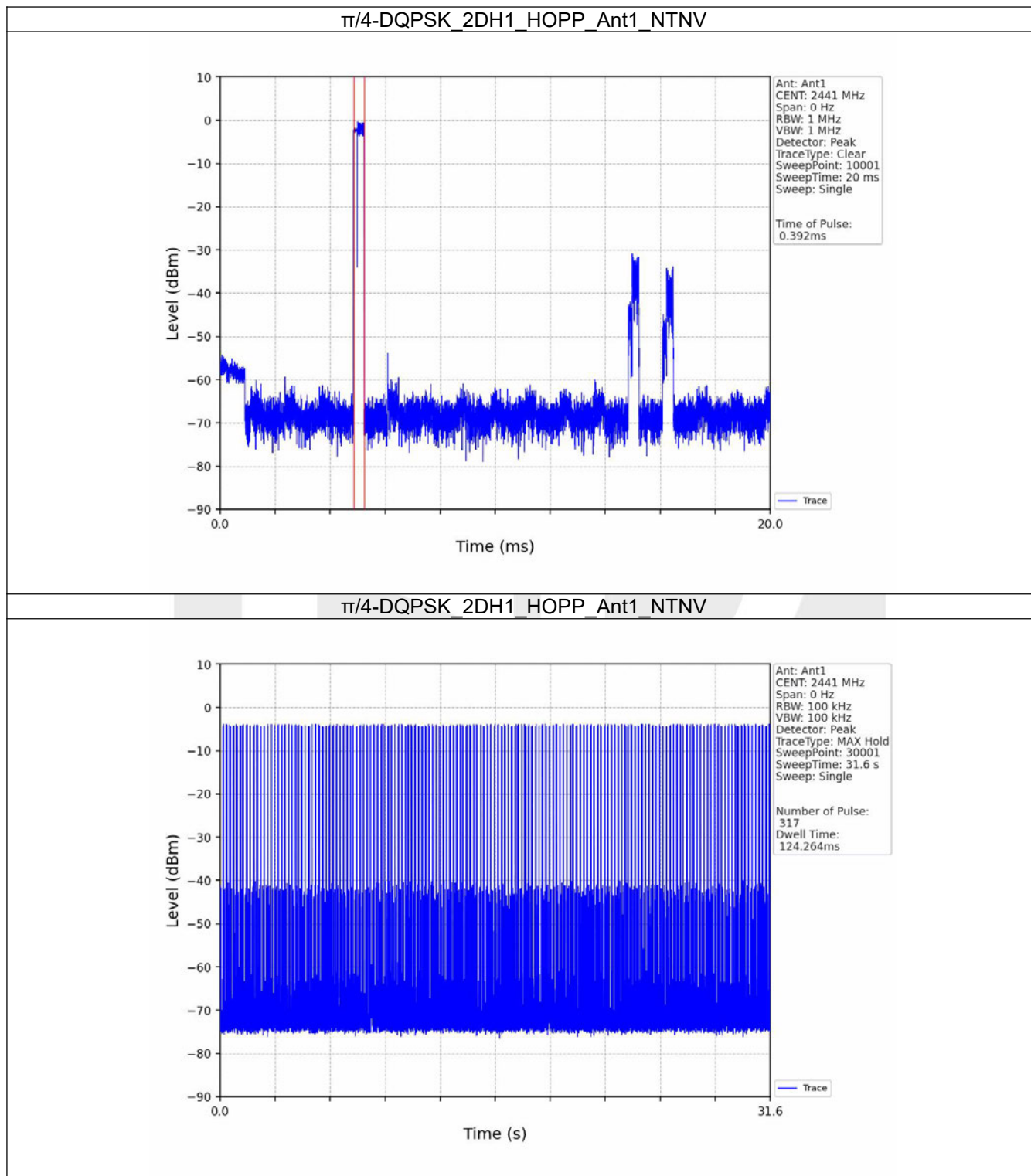
6.2 Test Graph

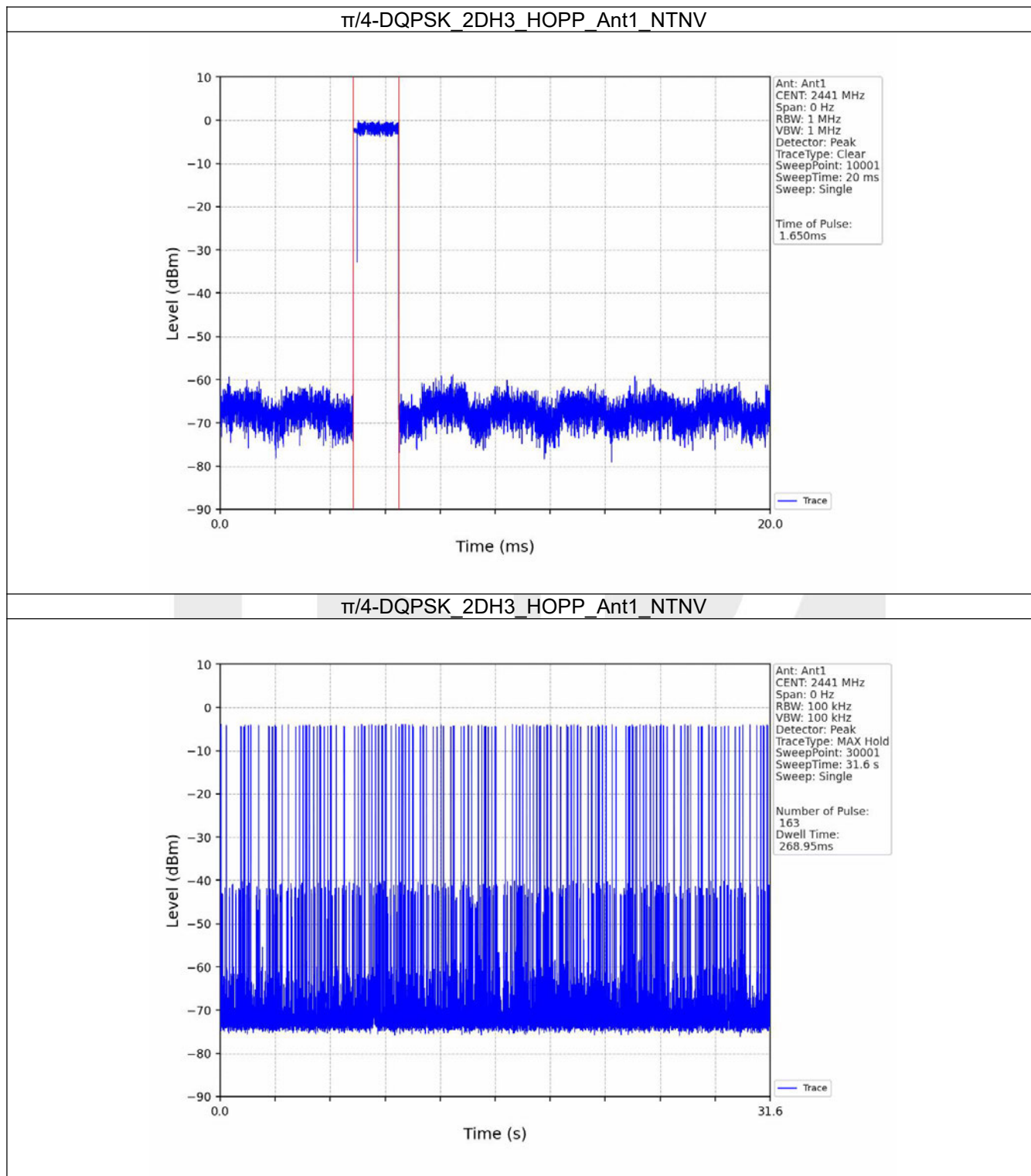
6.2.1 Ant1

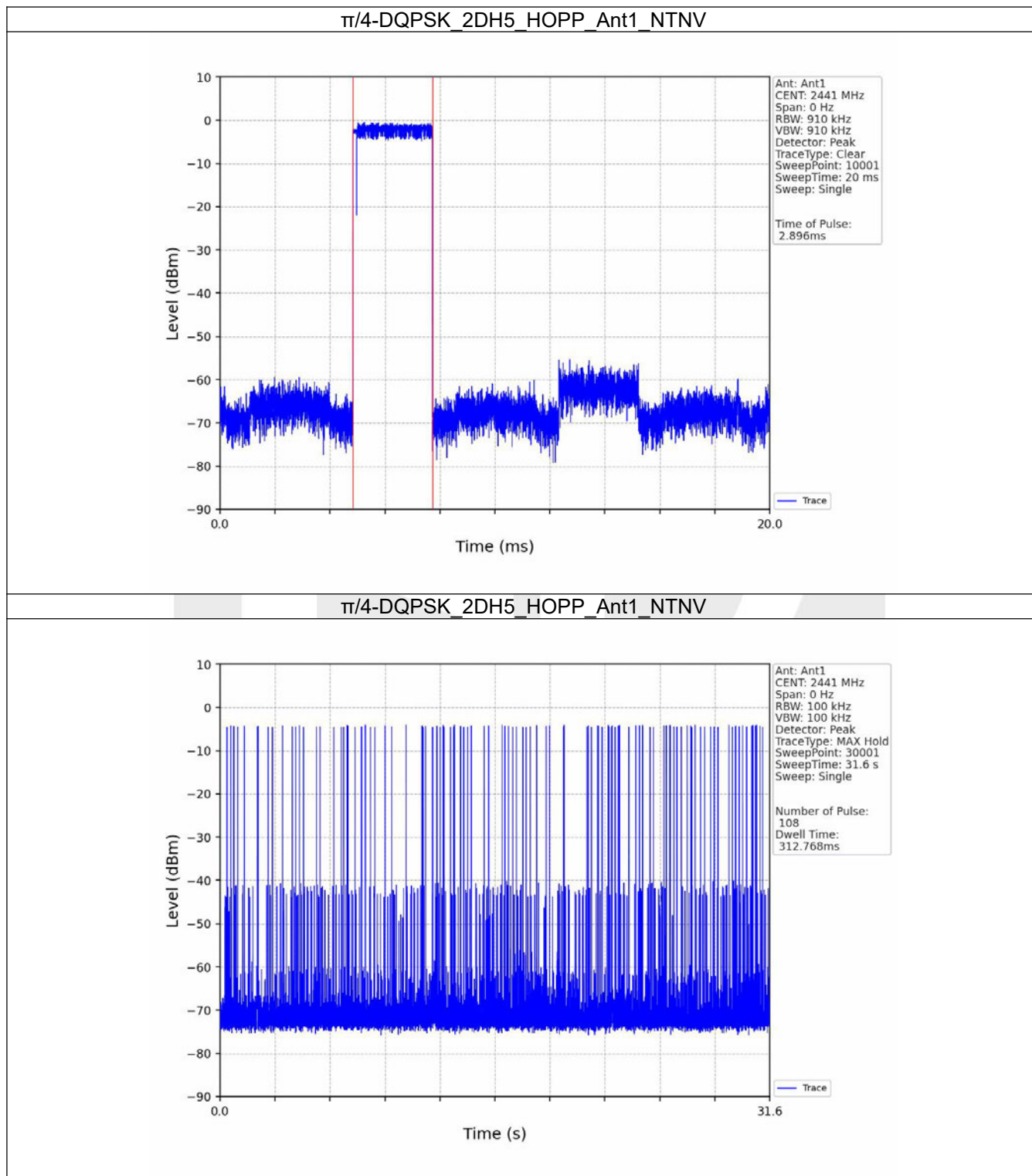












7. Unwanted Emissions In Non-restricted Frequency Bands

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	-2.23
		2441	DH5	1	-2.05
		2480	DH5	1	-2.54
		HOPP	DH5	1	-1.81
					-1.81
$\pi/4$ -DQPSK	SISO	2402	2DH5	1	-2.66
		2441	2DH5	1	-2.51
		2480	2DH5	1	-2.70
		HOPP	2DH5	1	-1.43
					-1.43

Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.

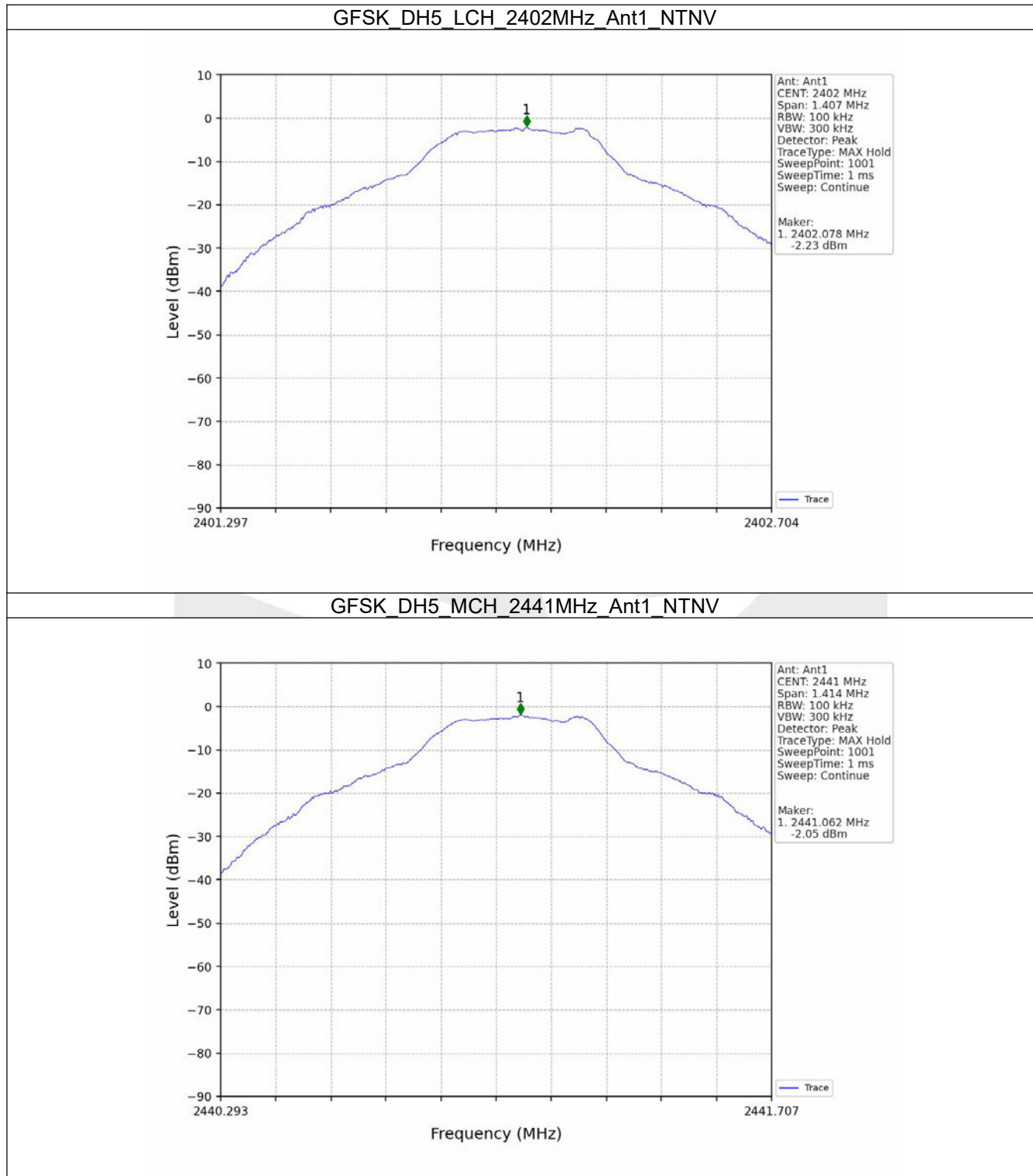
7.1.2 CSE

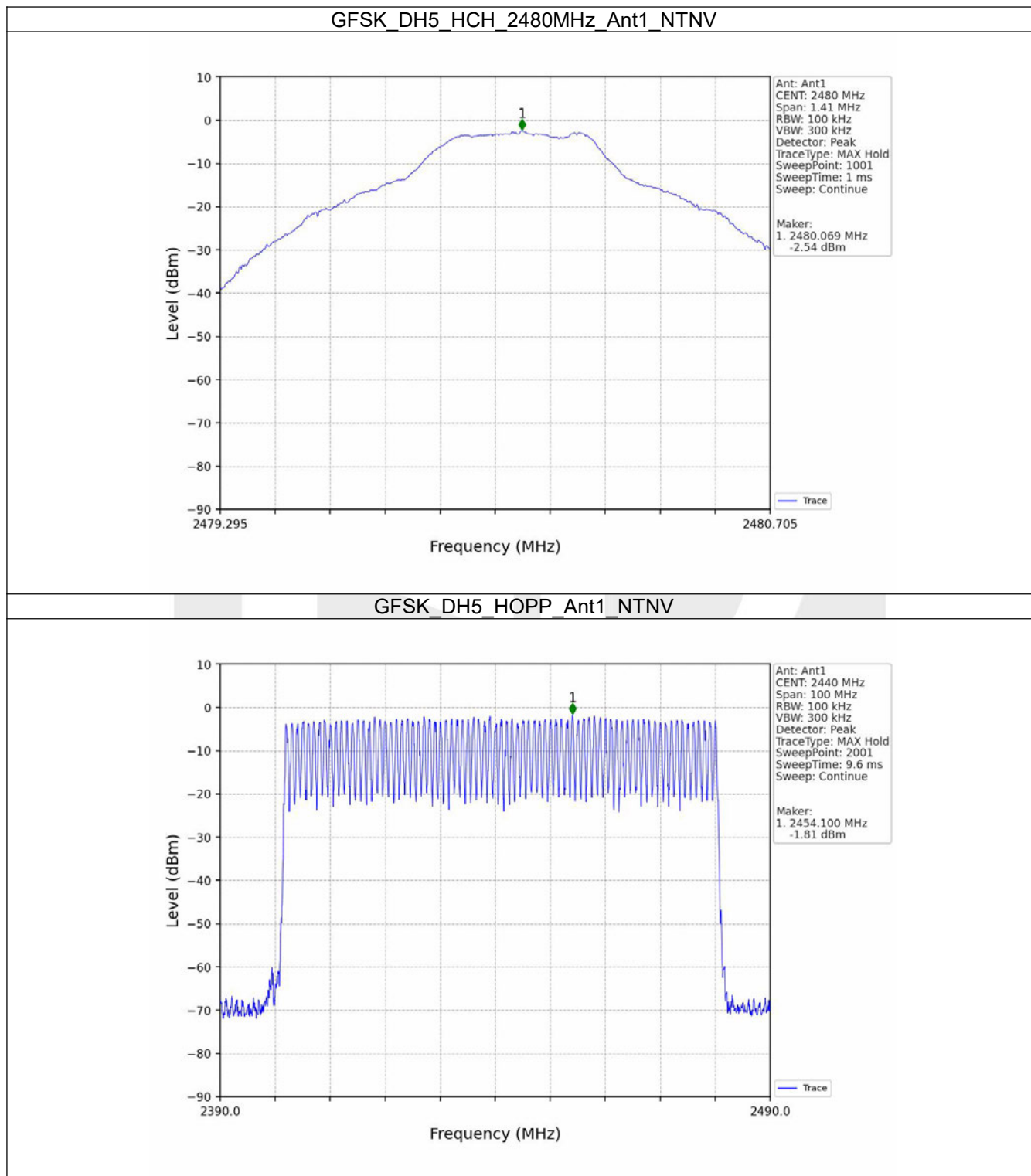
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	-2.23	-22.23	Pass
		2441	DH5	1	-2.05	-22.05	Pass
		2480	DH5	1	-2.54	-22.54	Pass
		HOPP	DH5	1	-1.81	-21.81	Pass
					-1.81	-21.81	Pass
$\pi/4$ -DQPSK	SISO	2402	2DH5	1	-2.66	-22.66	Pass
		2441	2DH5	1	-2.51	-22.51	Pass
		2480	2DH5	1	-2.70	-22.70	Pass
		HOPP	2DH5	1	-1.43	-21.43	Pass
					-1.43	-21.43	Pass

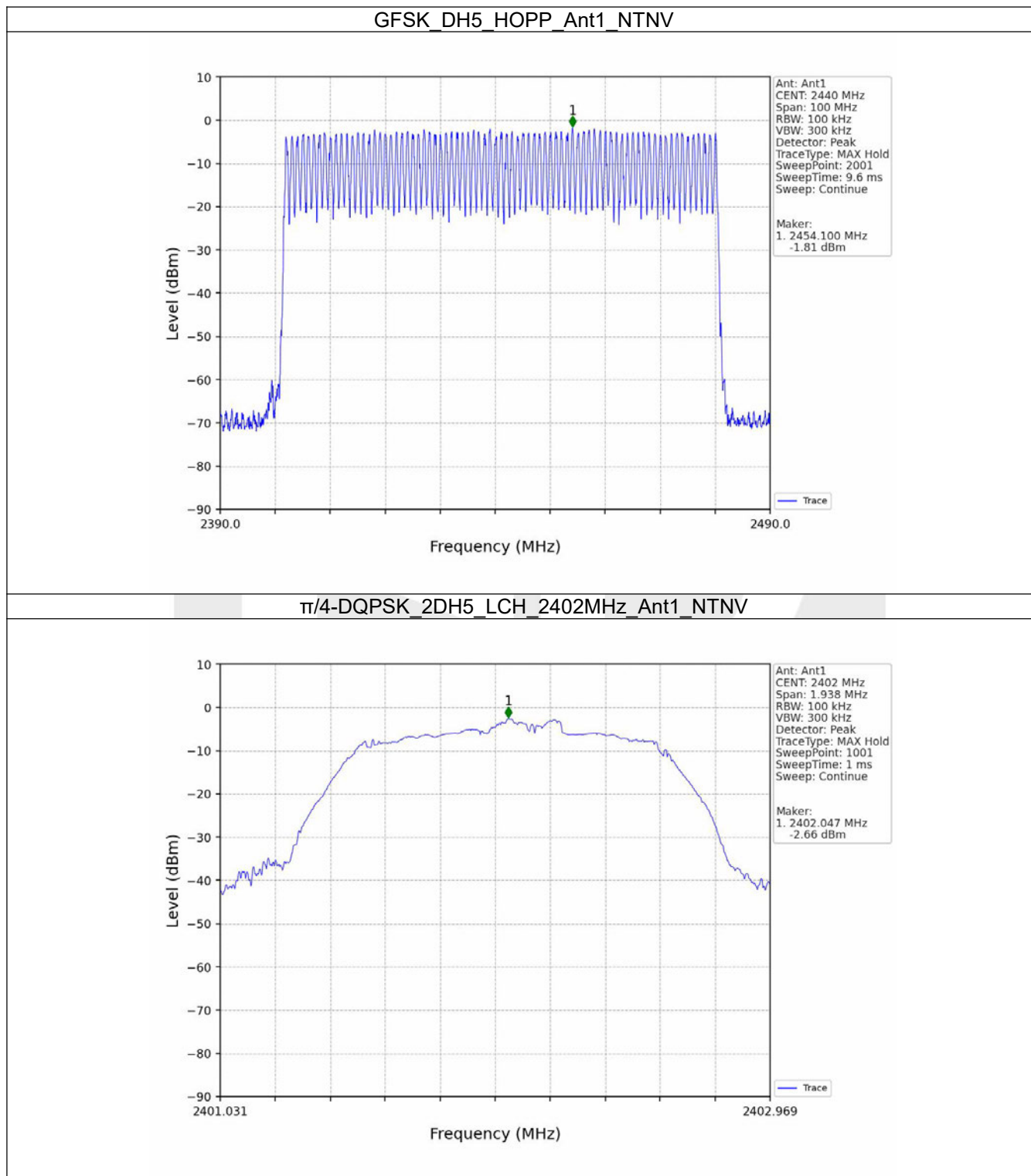
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.

7.2 Test Graph

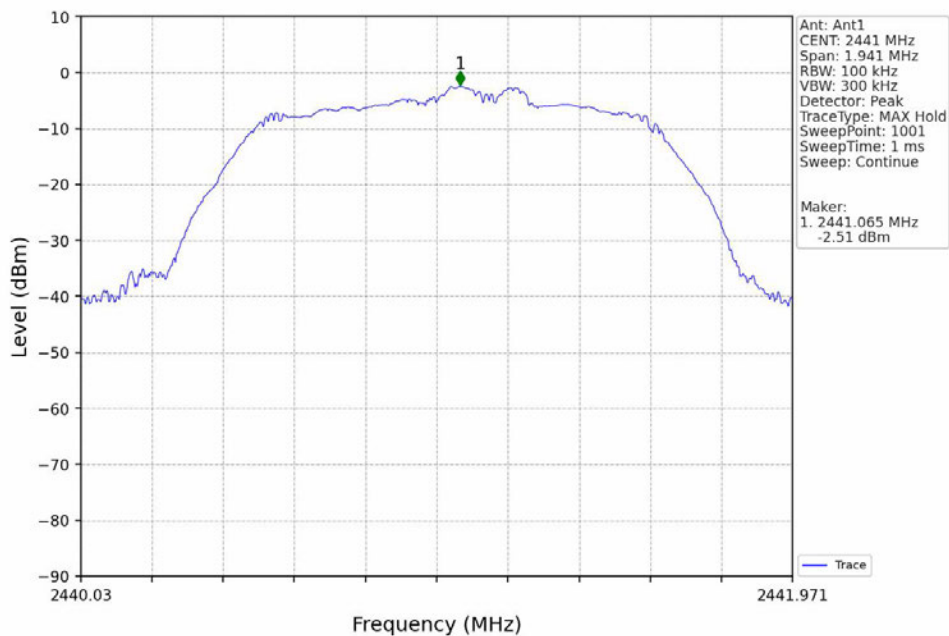
7.2.1 Ref



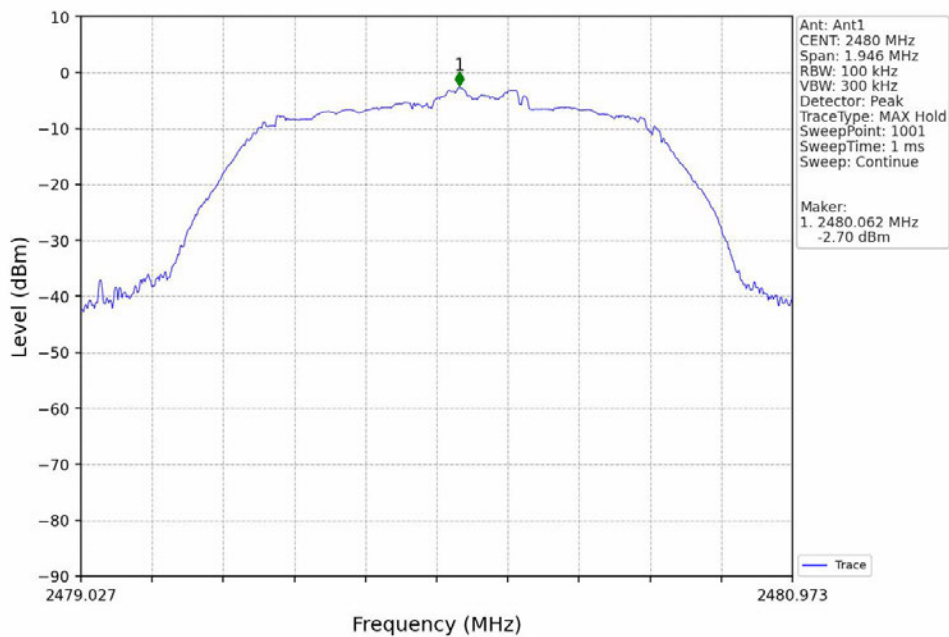


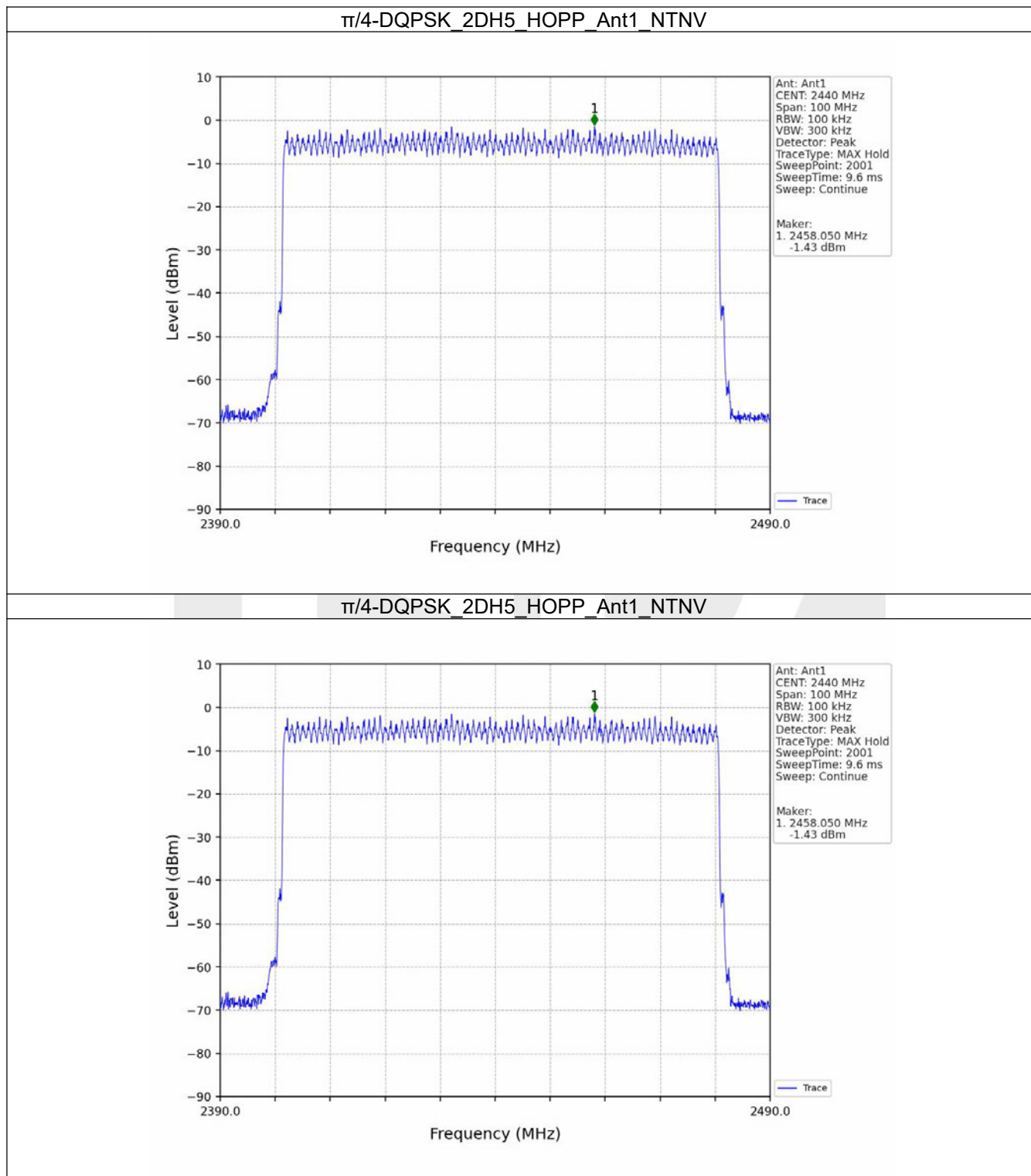


$\pi/4$ -DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV

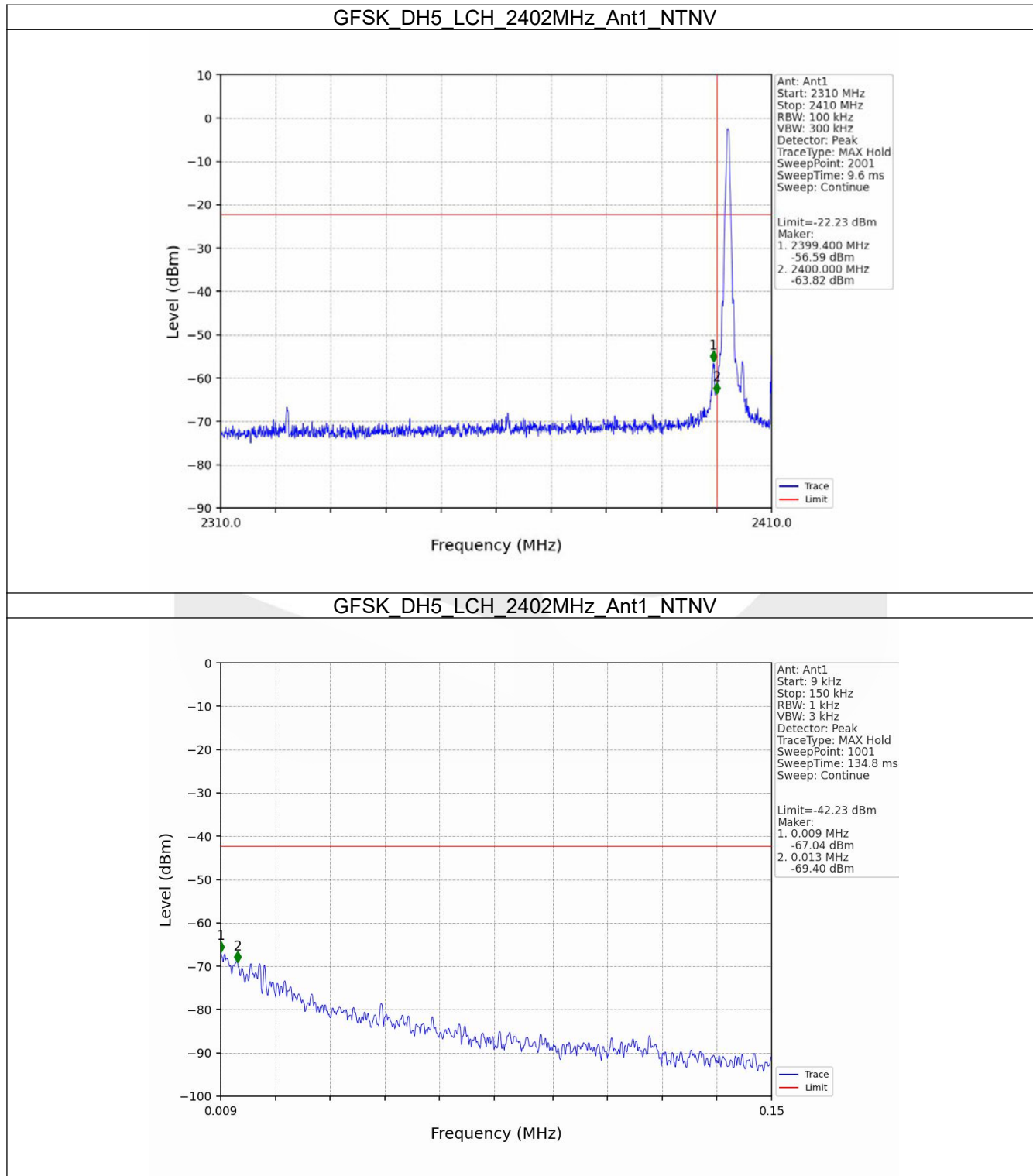


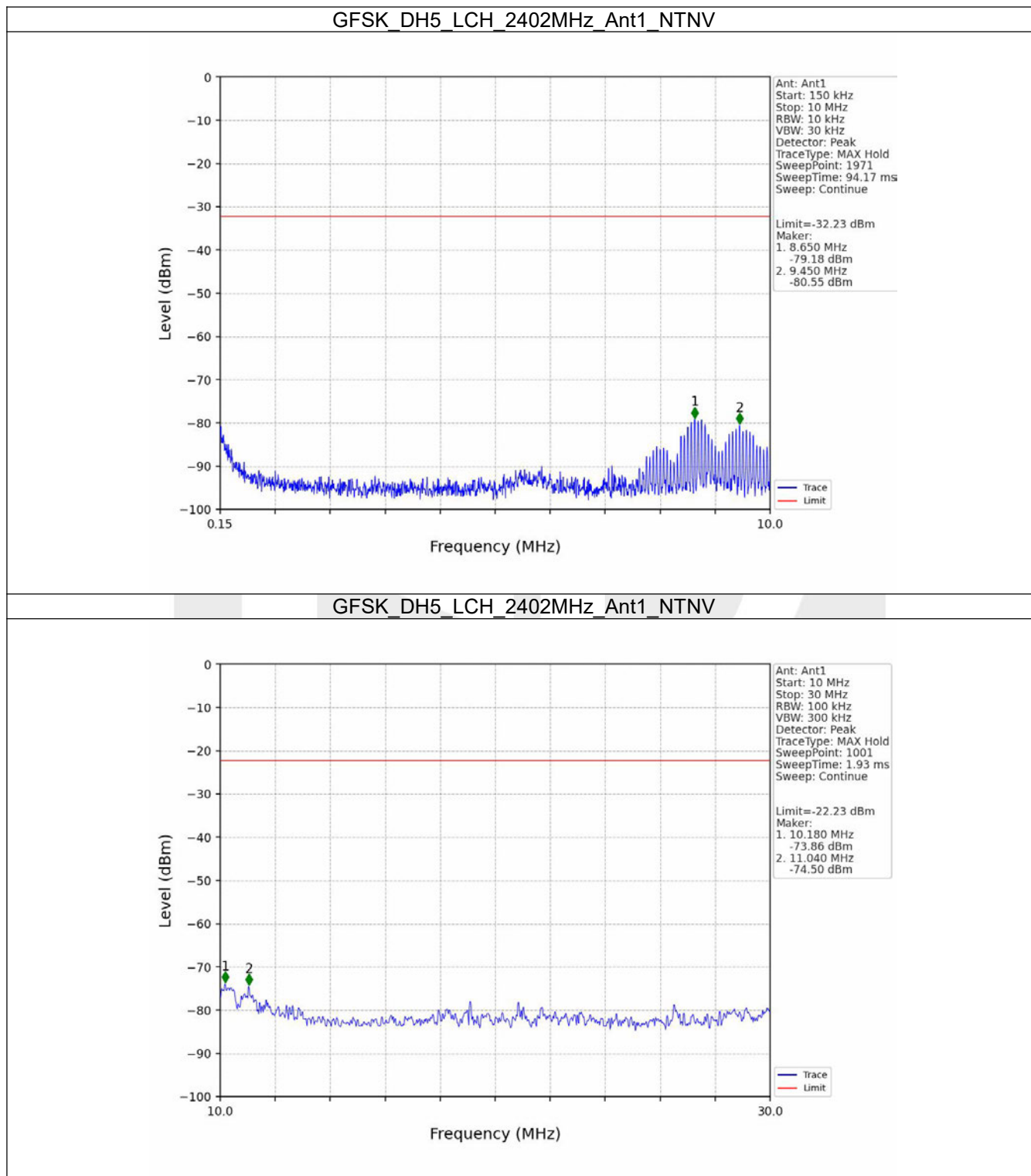
$\pi/4$ -DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

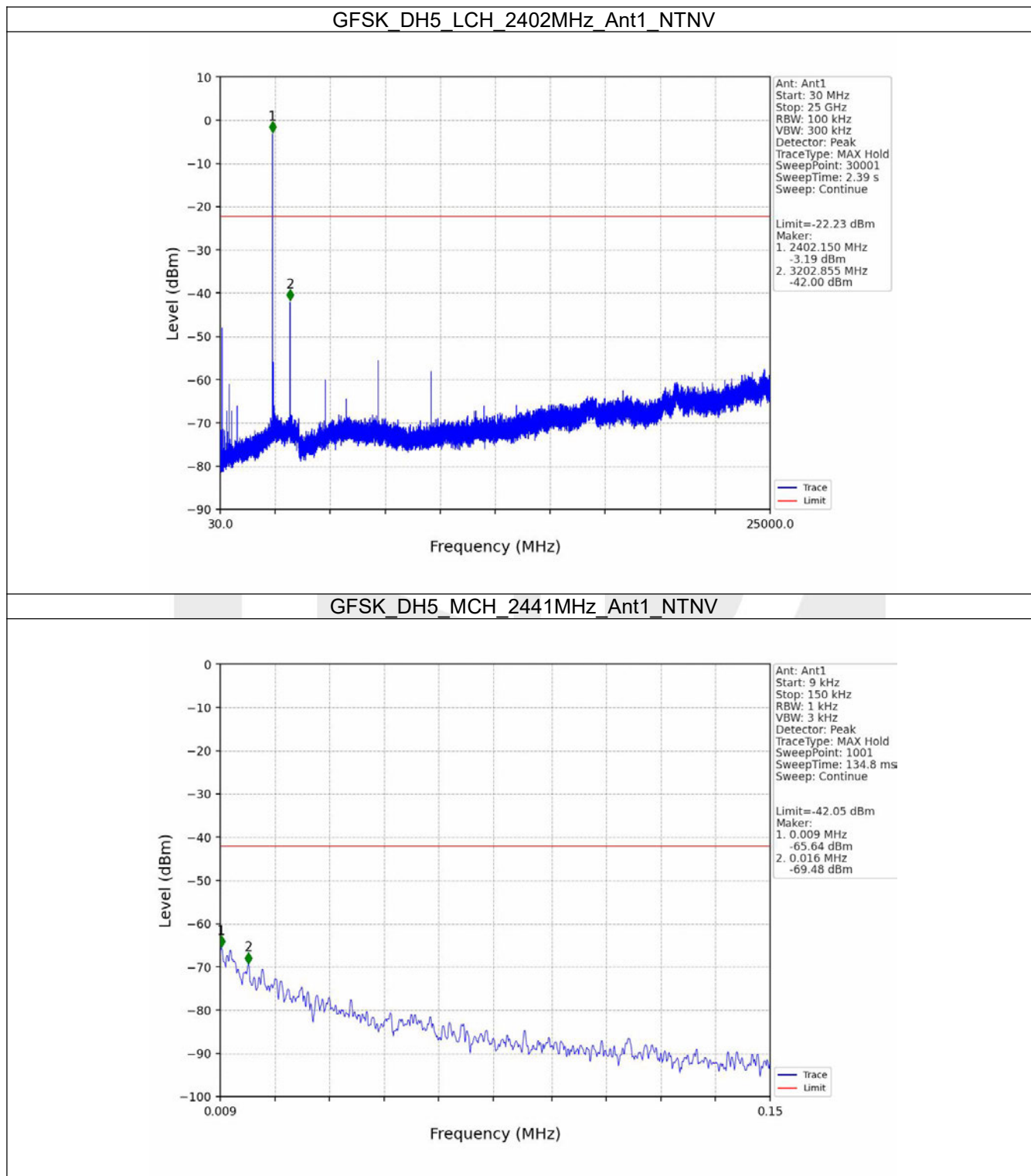




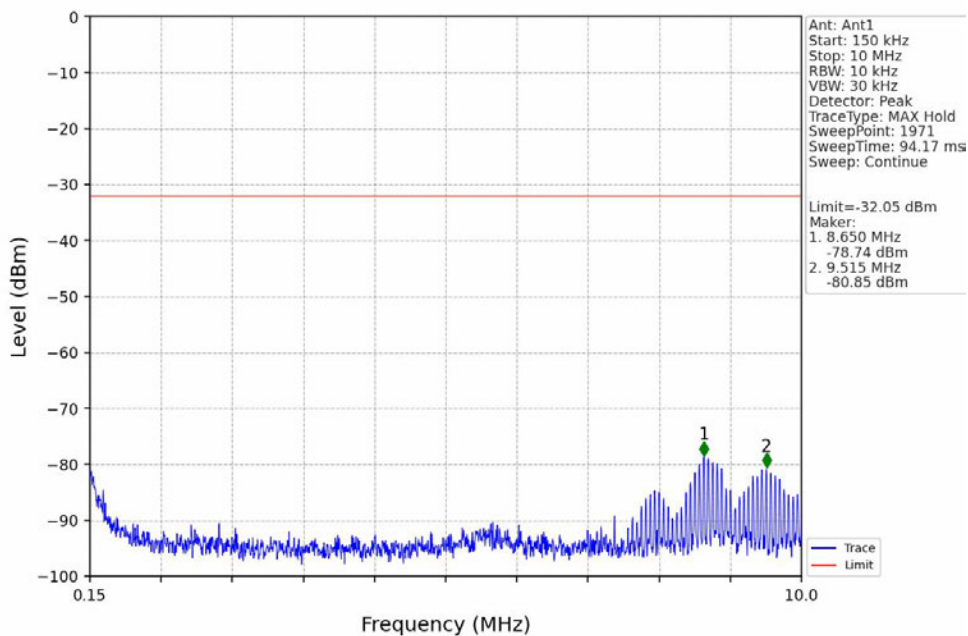
7.2.2 CSE



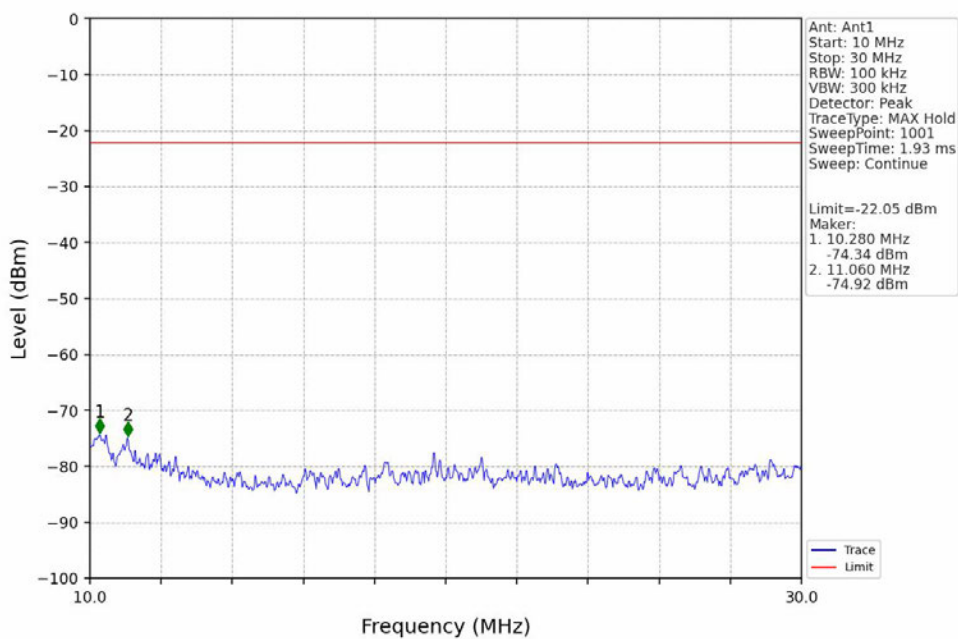




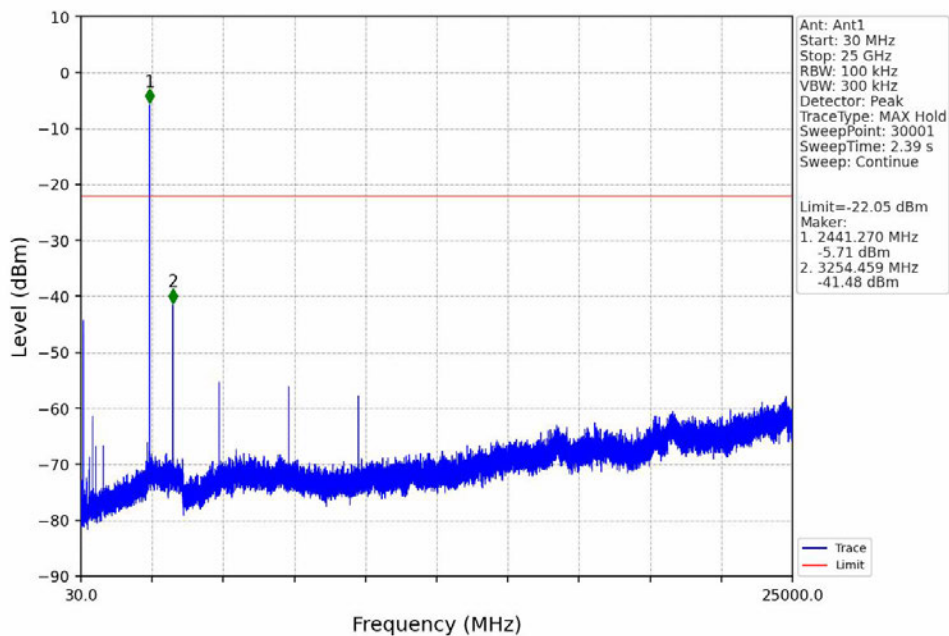
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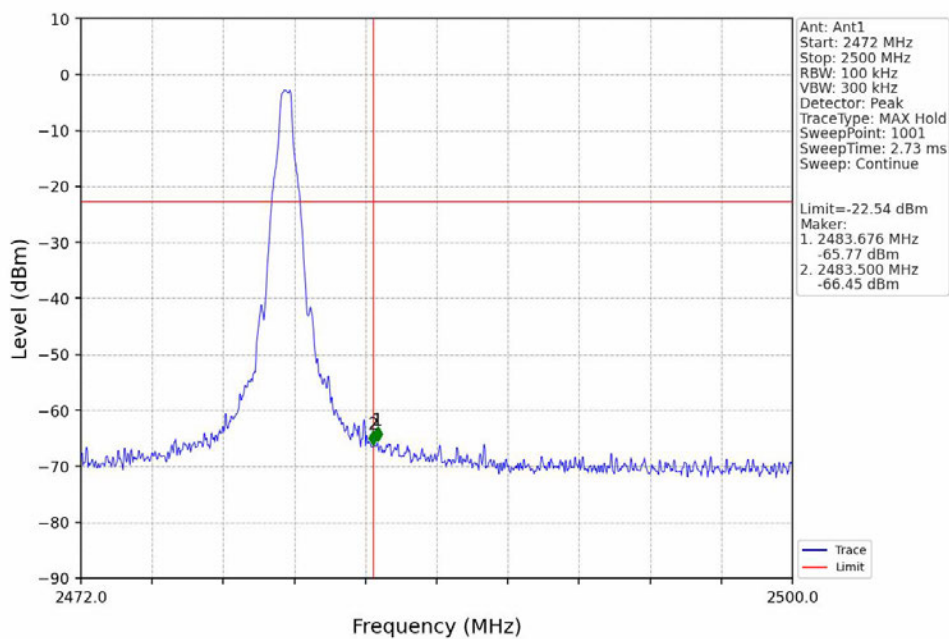
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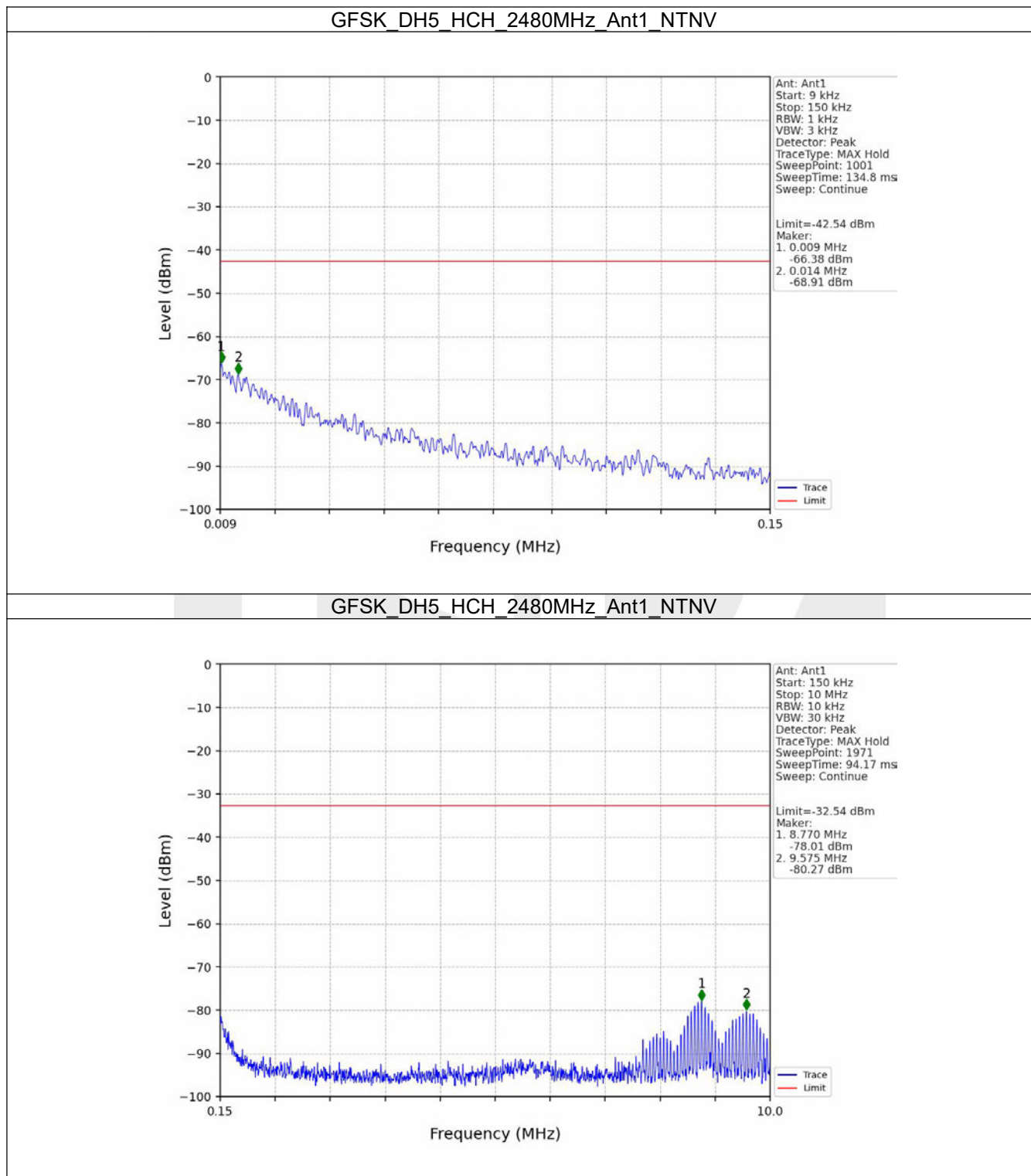


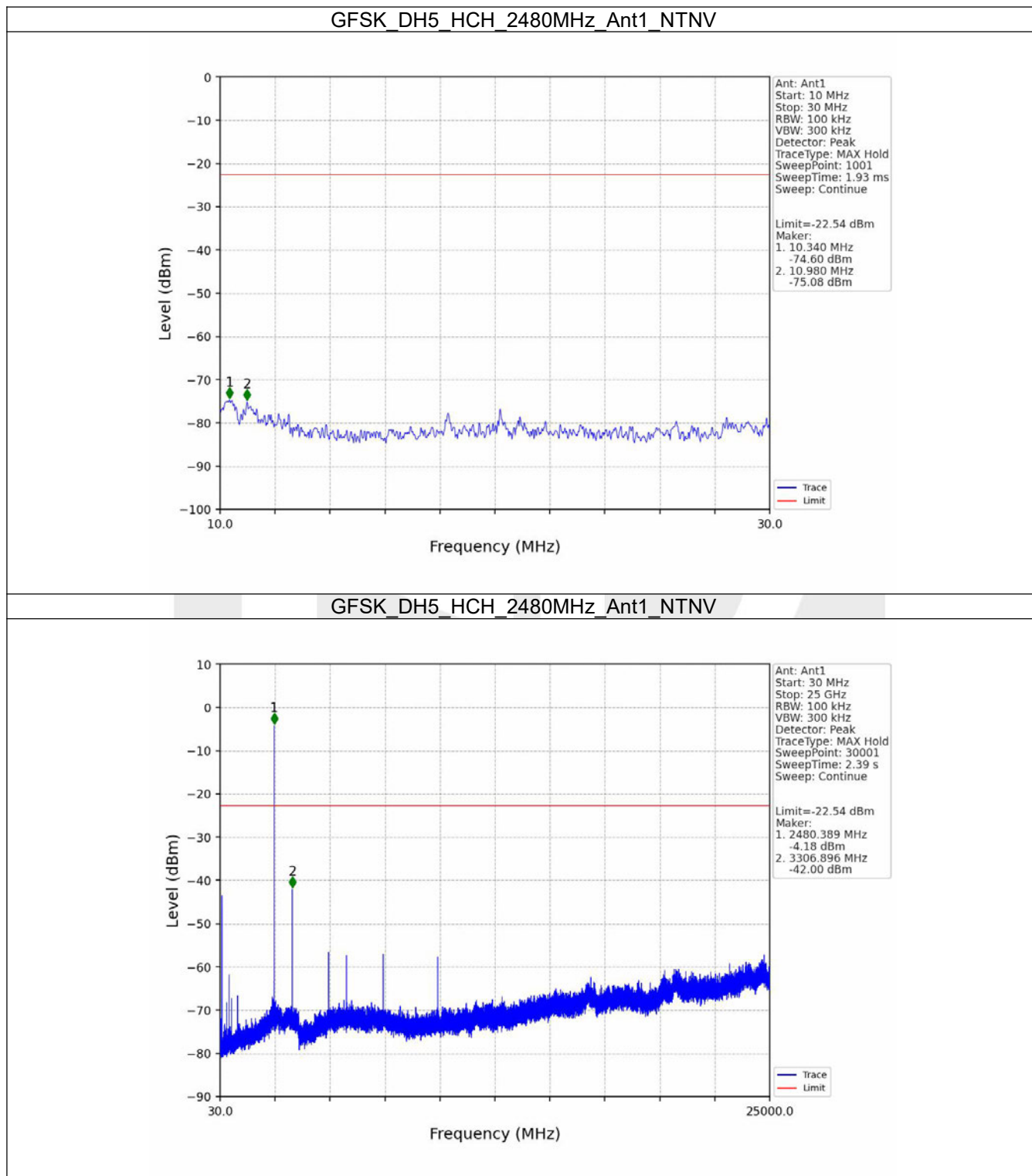
GFSK_DH5_MCH_2441MHz_Ant1_NTNV

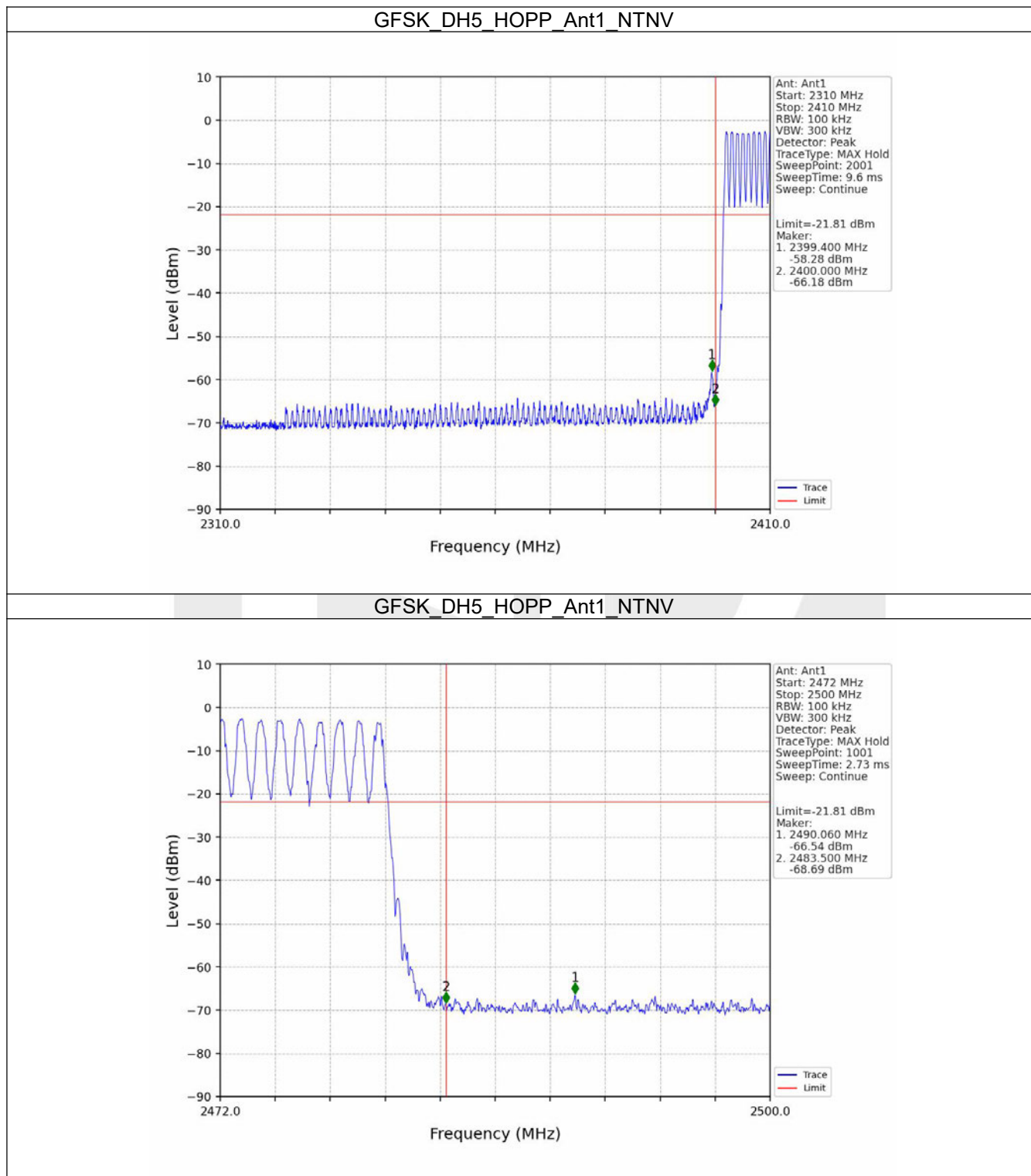


GFSK_DH5_HCH_2480MHz_Ant1_NTNV

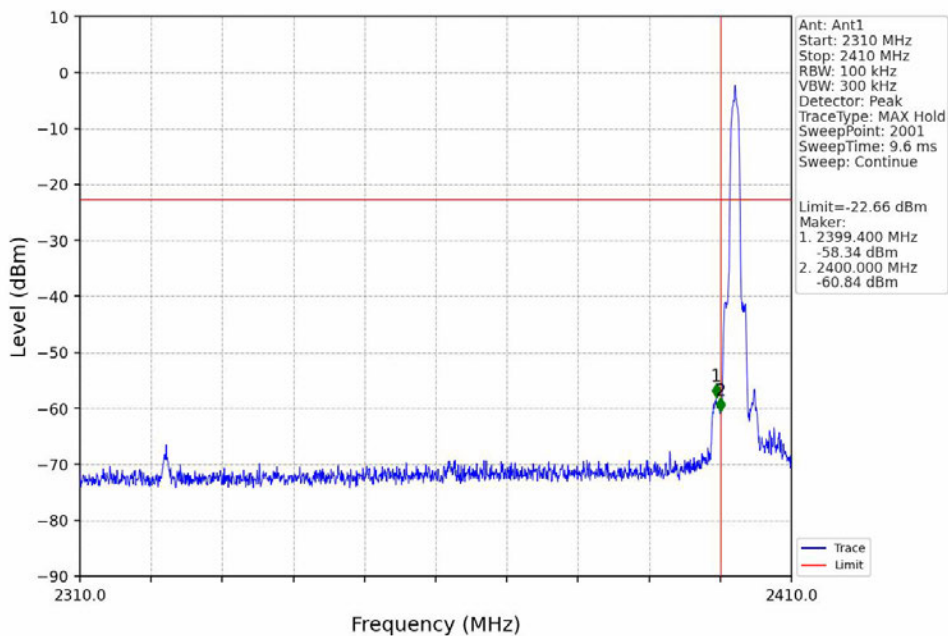




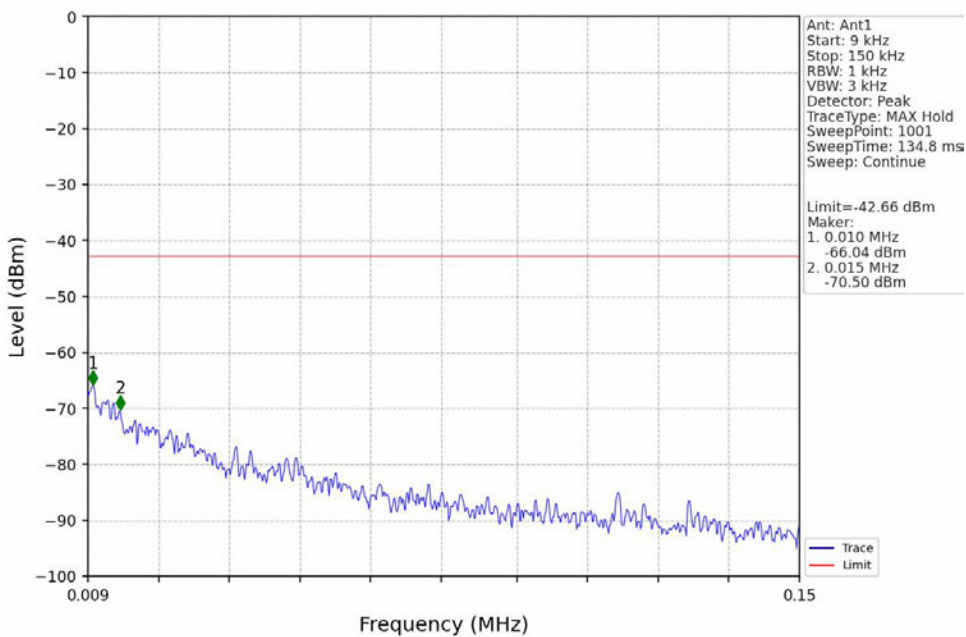




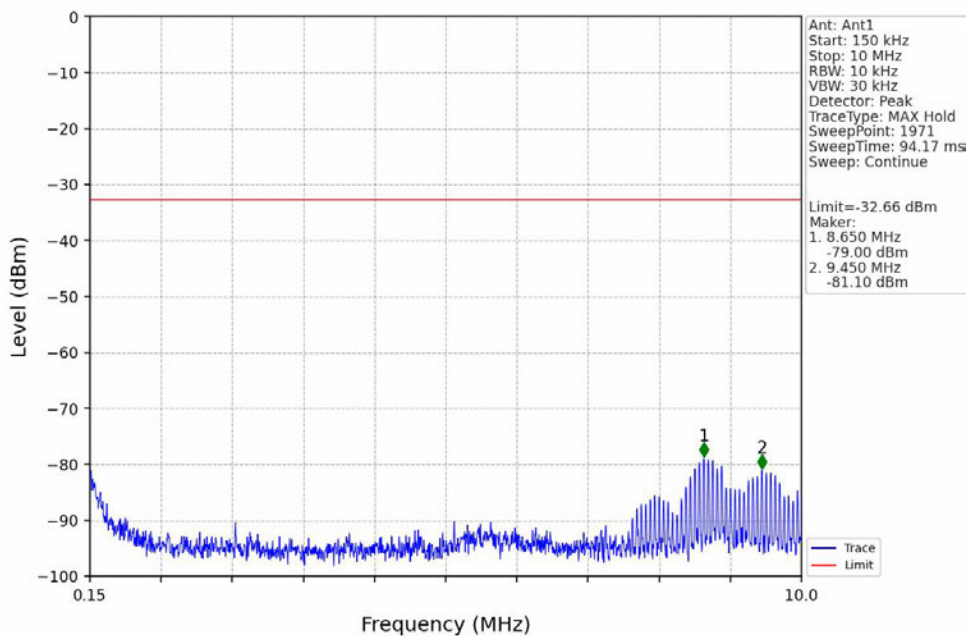
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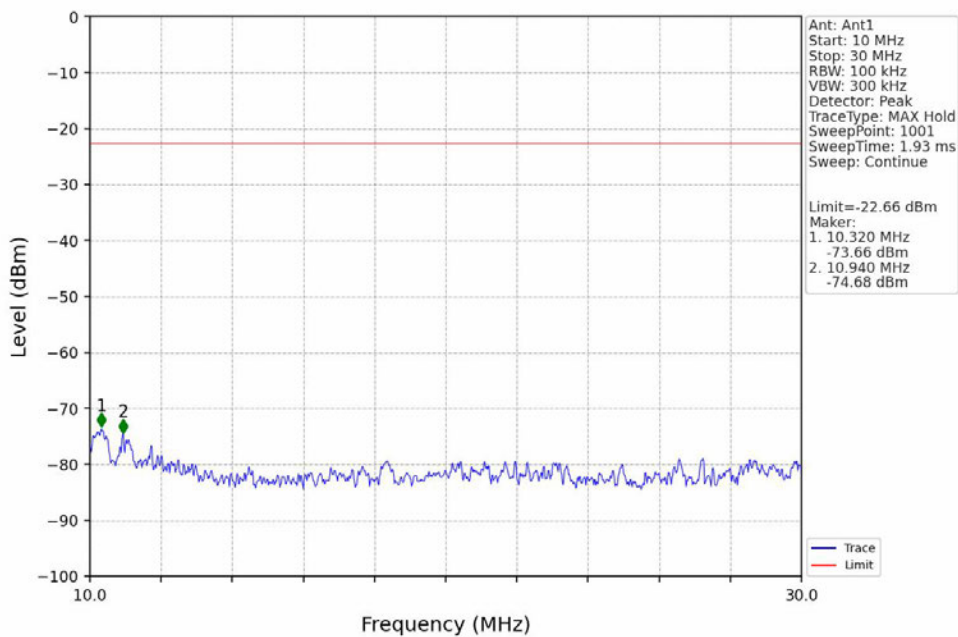
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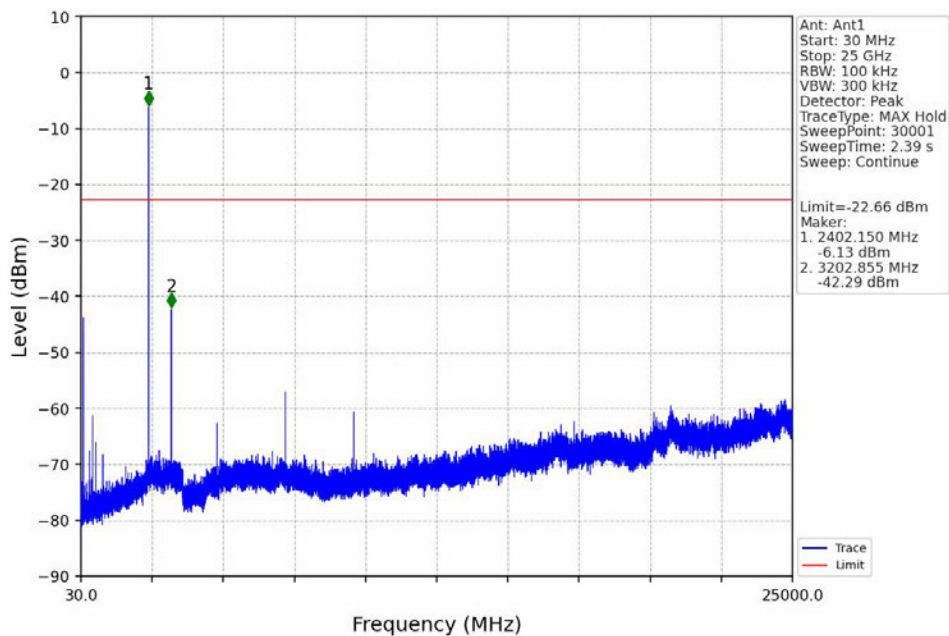
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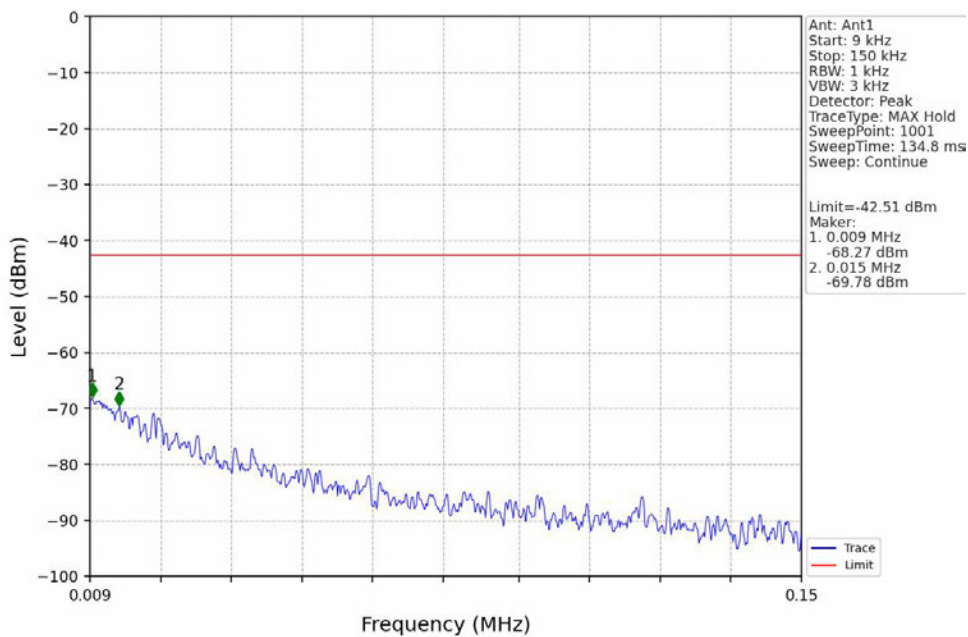
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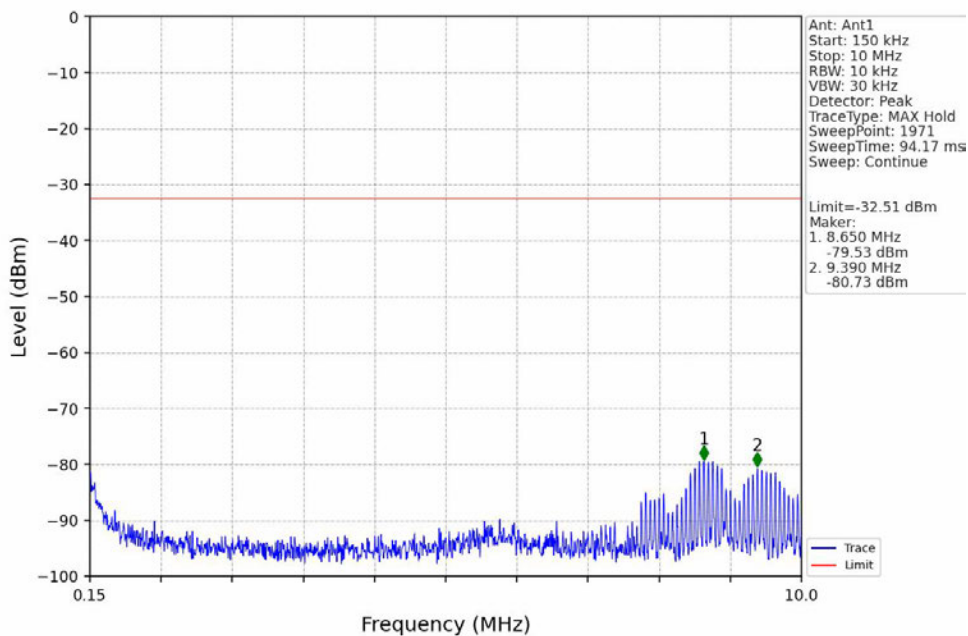
$\pi/4$ -DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



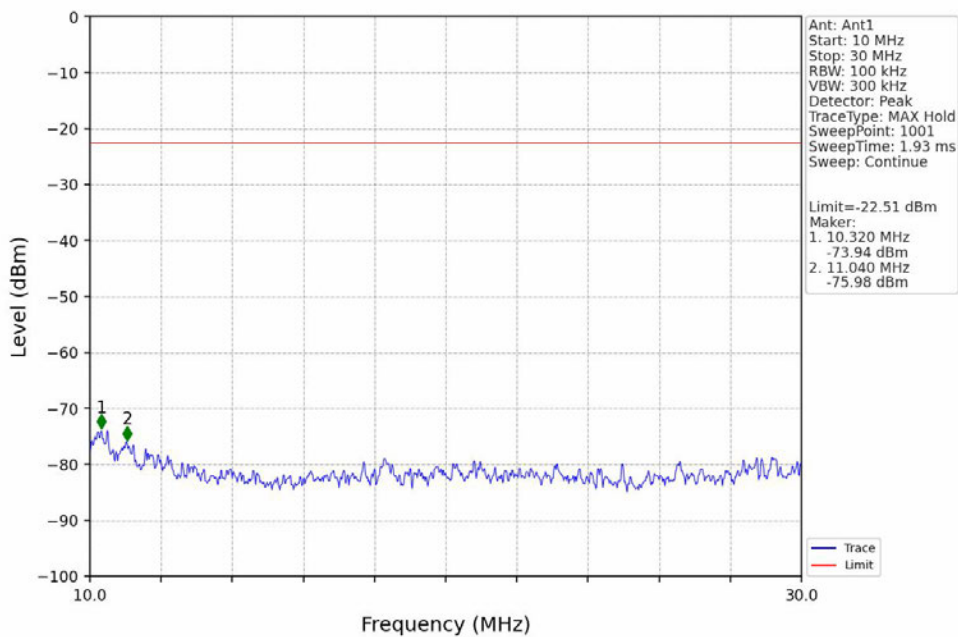
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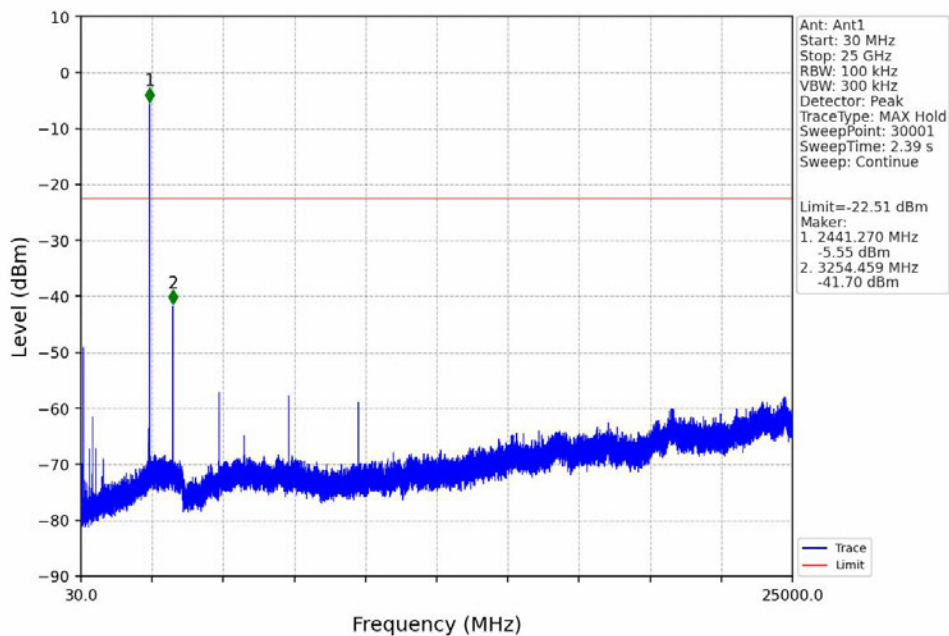
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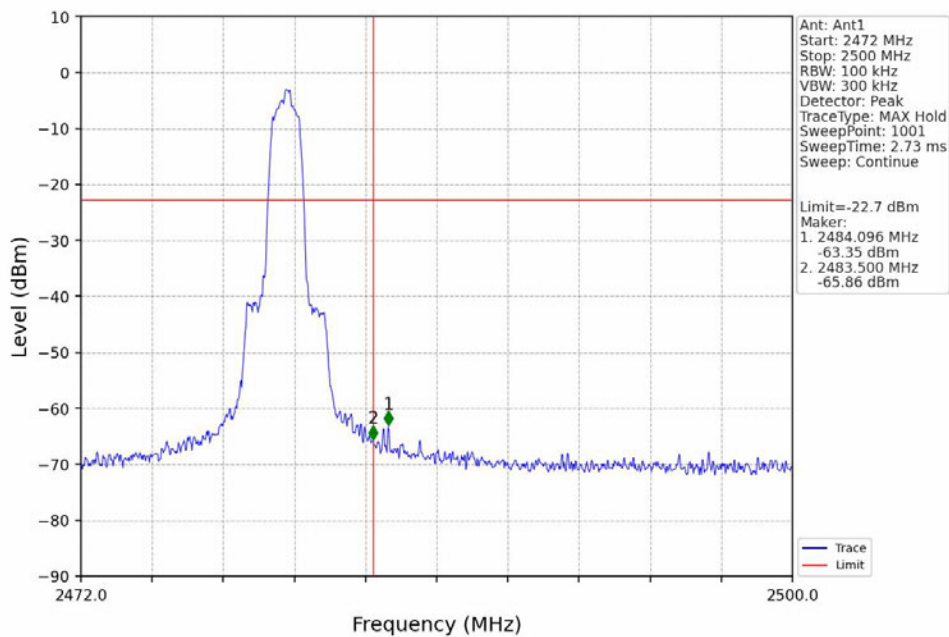
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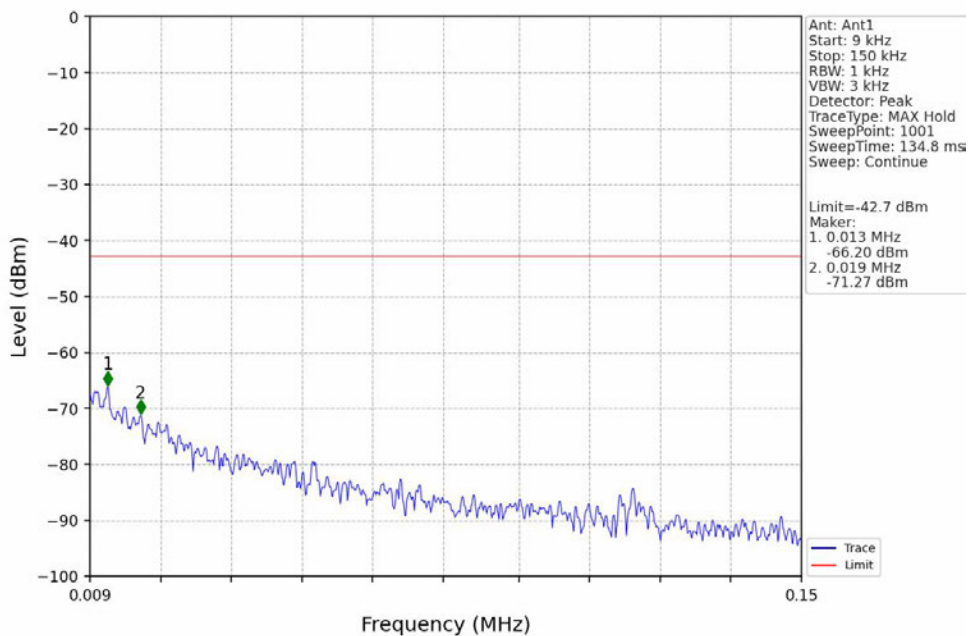
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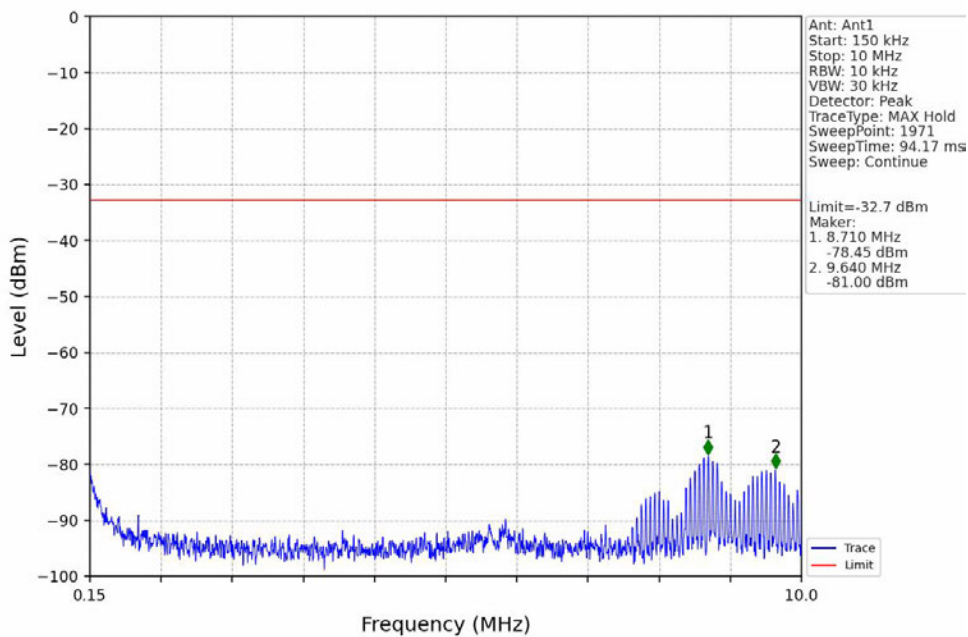
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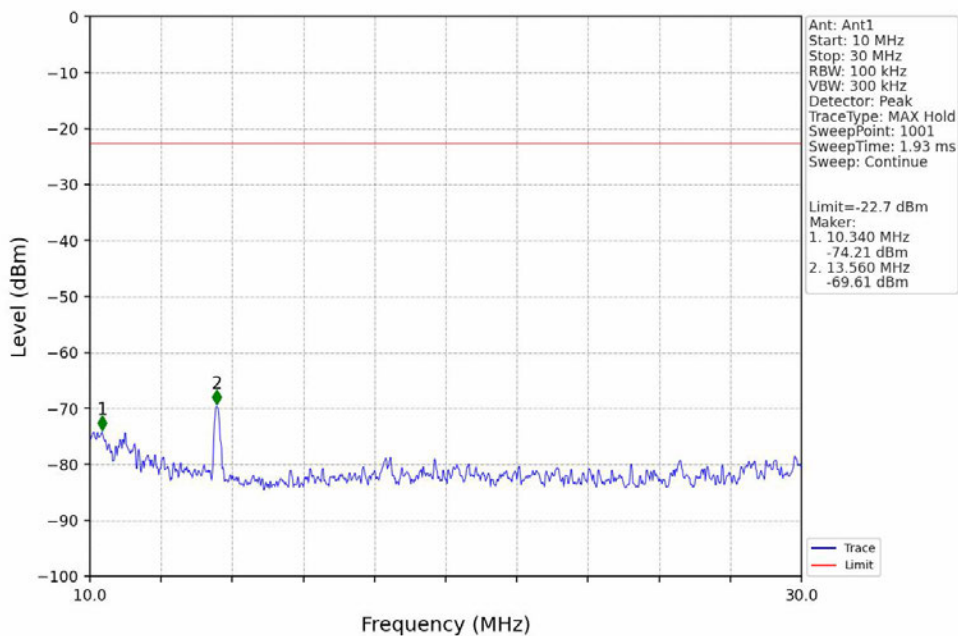
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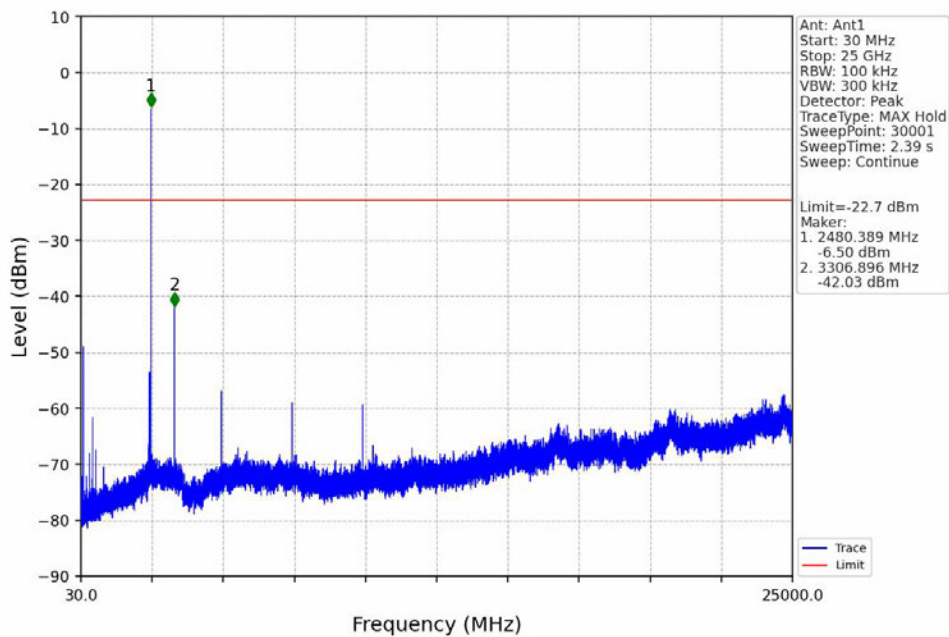
$\pi/4$ -DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

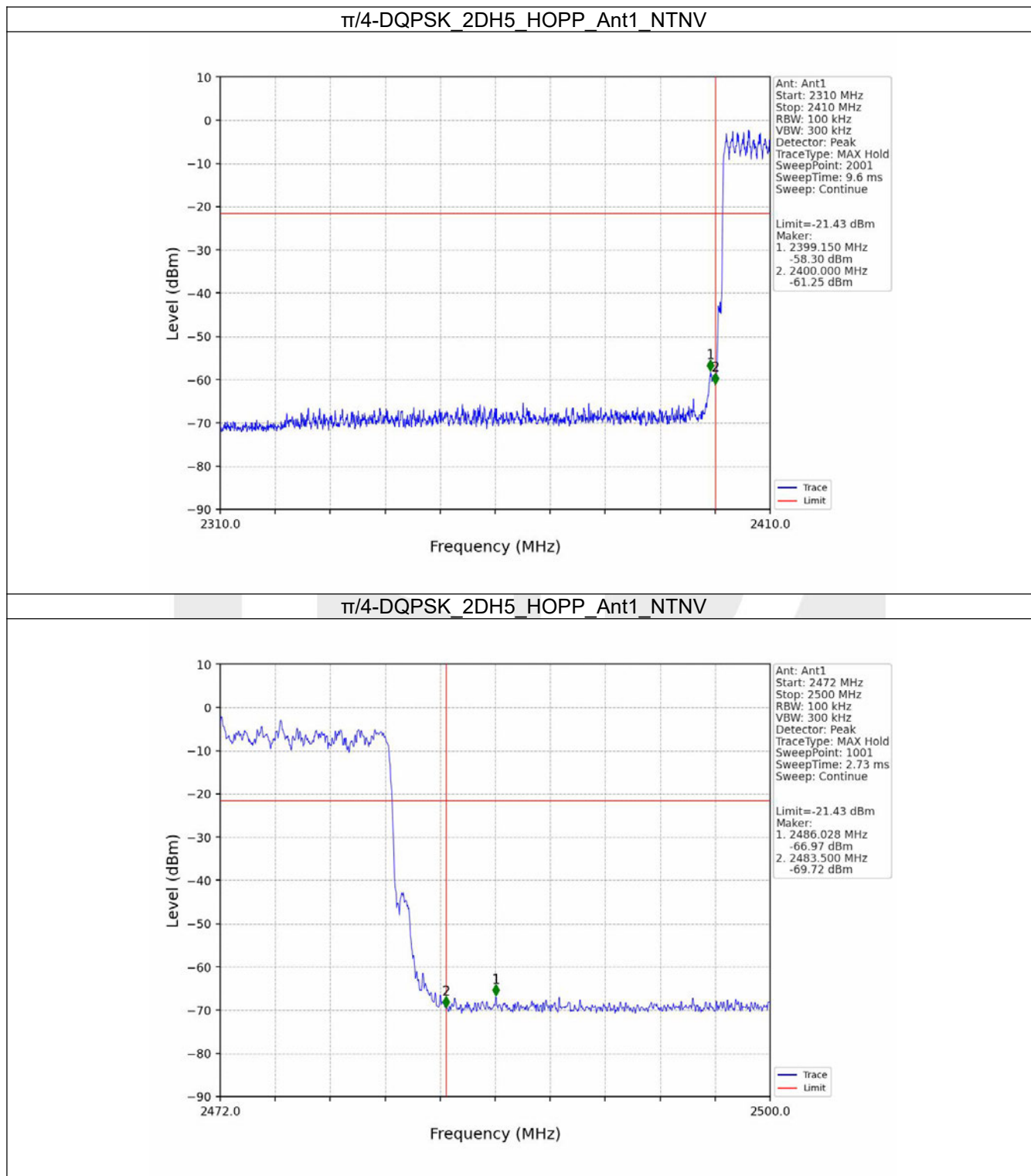


$\pi/4$ -DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



$\pi/4$ -DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV





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