

ANNEX D TEST DATA

For

Project No.:	8135EU012901W
Client:	Hong Kong Etech Groups Ltd.
Product Description:	Bluetooth speaker
Model No.:	BS780-2
FCC ID:	2A3ZO-BS780-2
Technology:	Bluetooth BDR&EDR
Test Engineer:	<i>Mikoy zhu</i>
Test Date:	2024-01-03

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

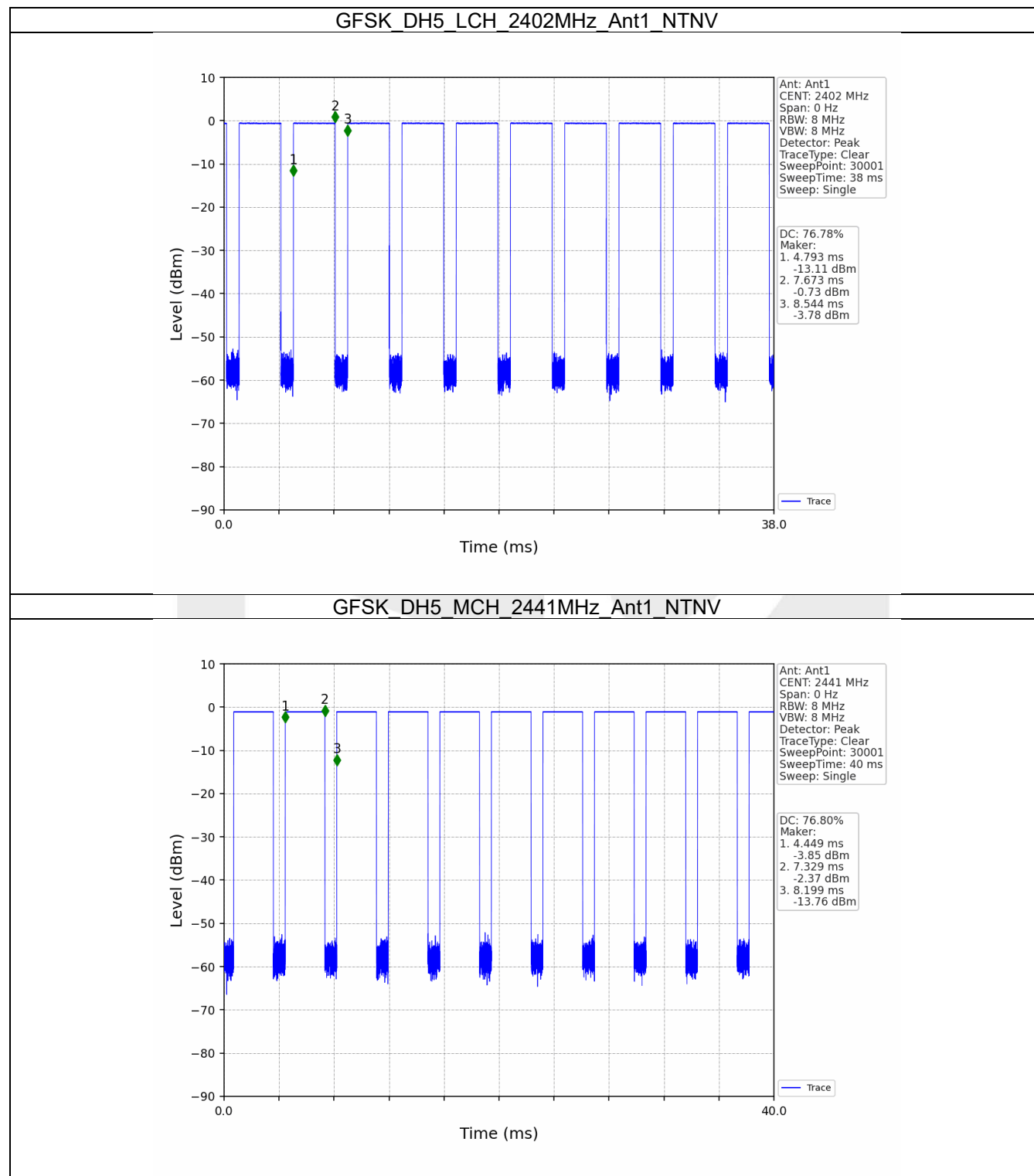
1. Duty Cycle

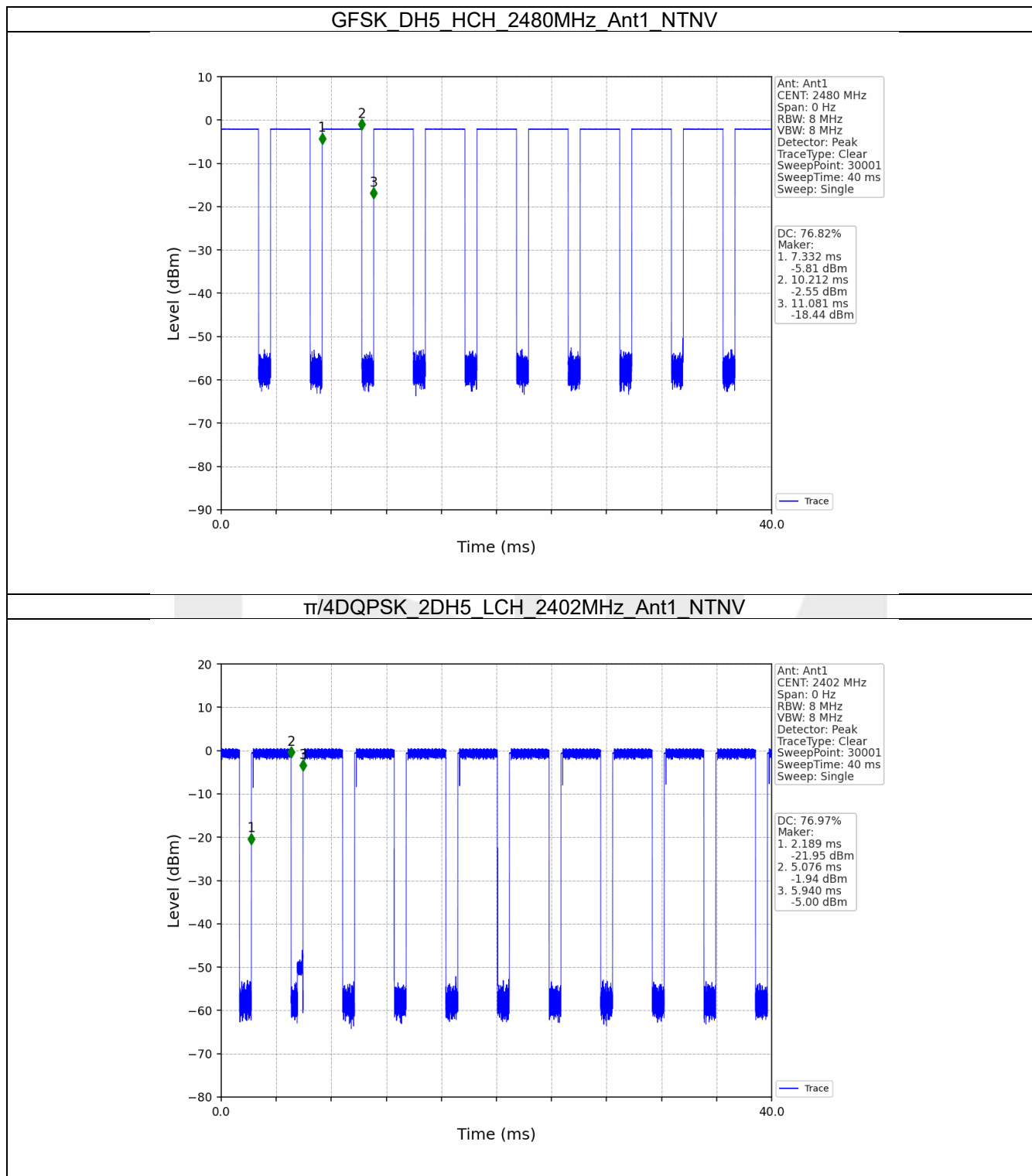
1.1 Ant1

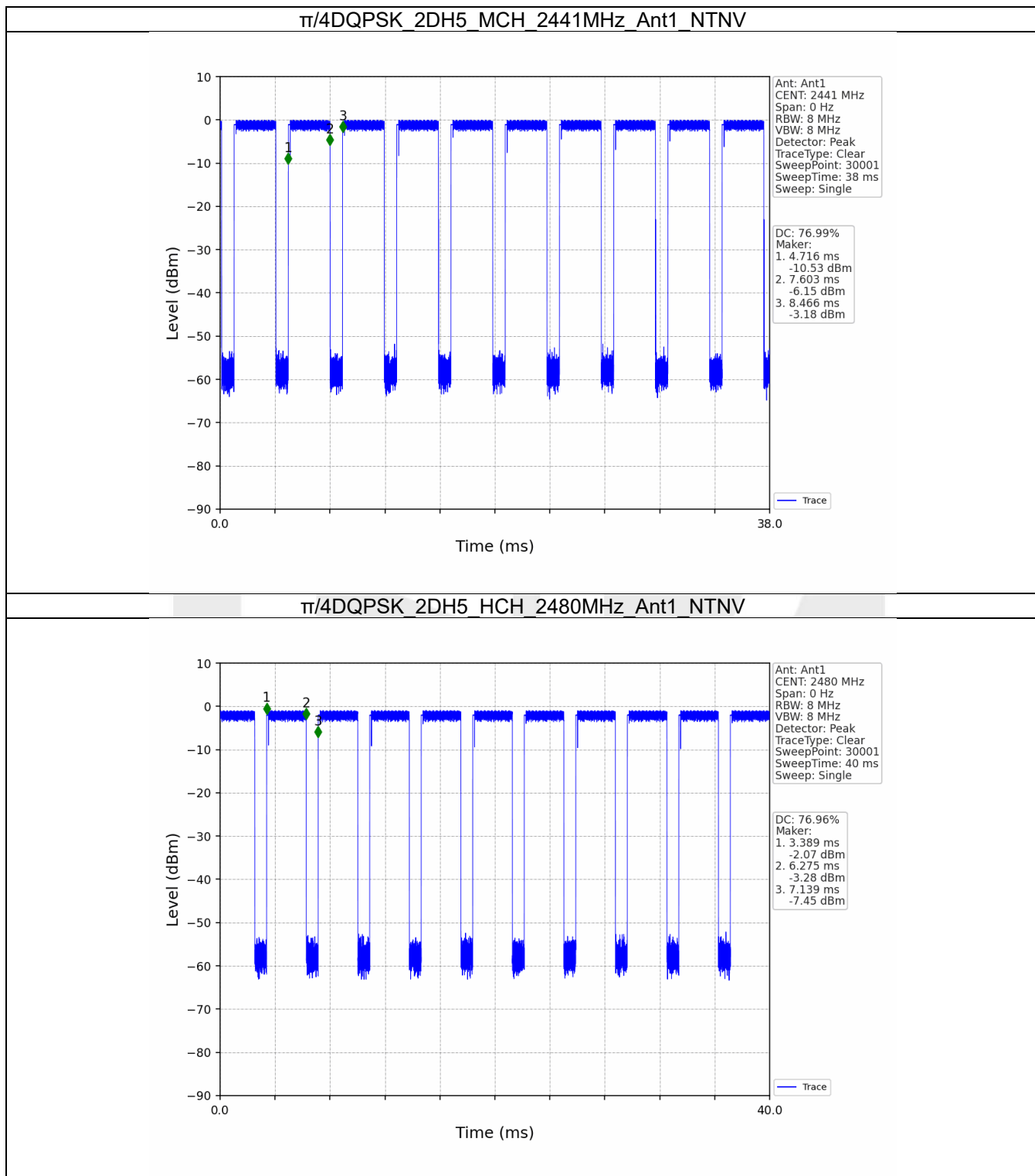
1.1.1 Test Result

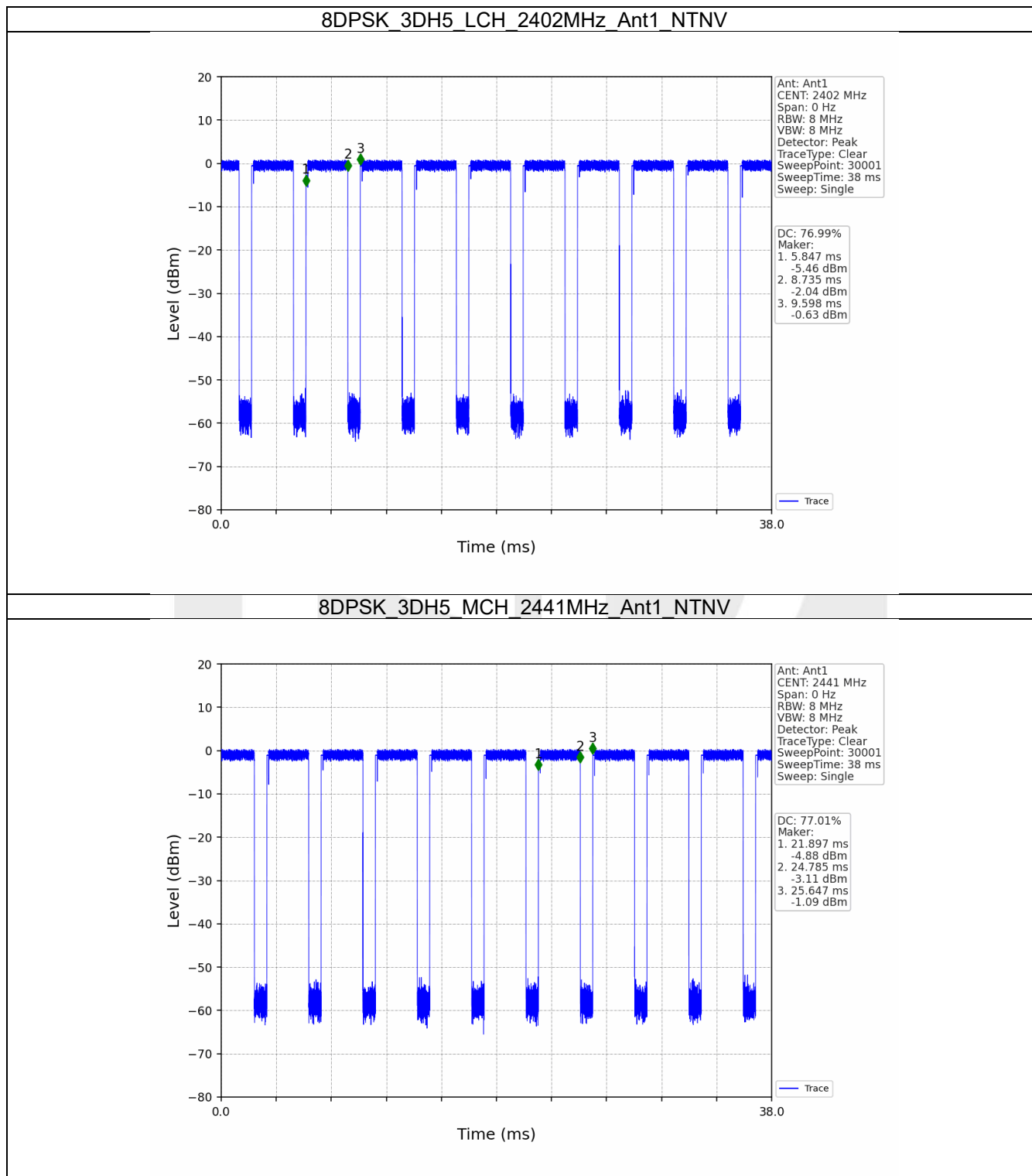
Ant1								
Mode	Tx Type	Frequency (MHz)	Packet Type	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
GFSK	SISO	2402	DH5	2.880	3.751	76.78	1.15	0.03
		2441	DH5	2.880	3.750	76.80	1.15	0.01
		2480	DH5	2.880	3.749	76.82	1.15	0.01
$\pi/4$ DQPSK	SISO	2402	2DH5	2.887	3.751	76.97	1.14	0.03
		2441	2DH5	2.887	3.750	76.99	1.14	0.03
		2480	2DH5	2.886	3.750	76.96	1.14	0.01
8DPSK	SISO	2402	3DH5	2.888	3.751	76.99	1.14	0.03
		2441	3DH5	2.888	3.750	77.01	1.13	0.03
		2480	3DH5	2.888	3.751	76.99	1.14	0.03

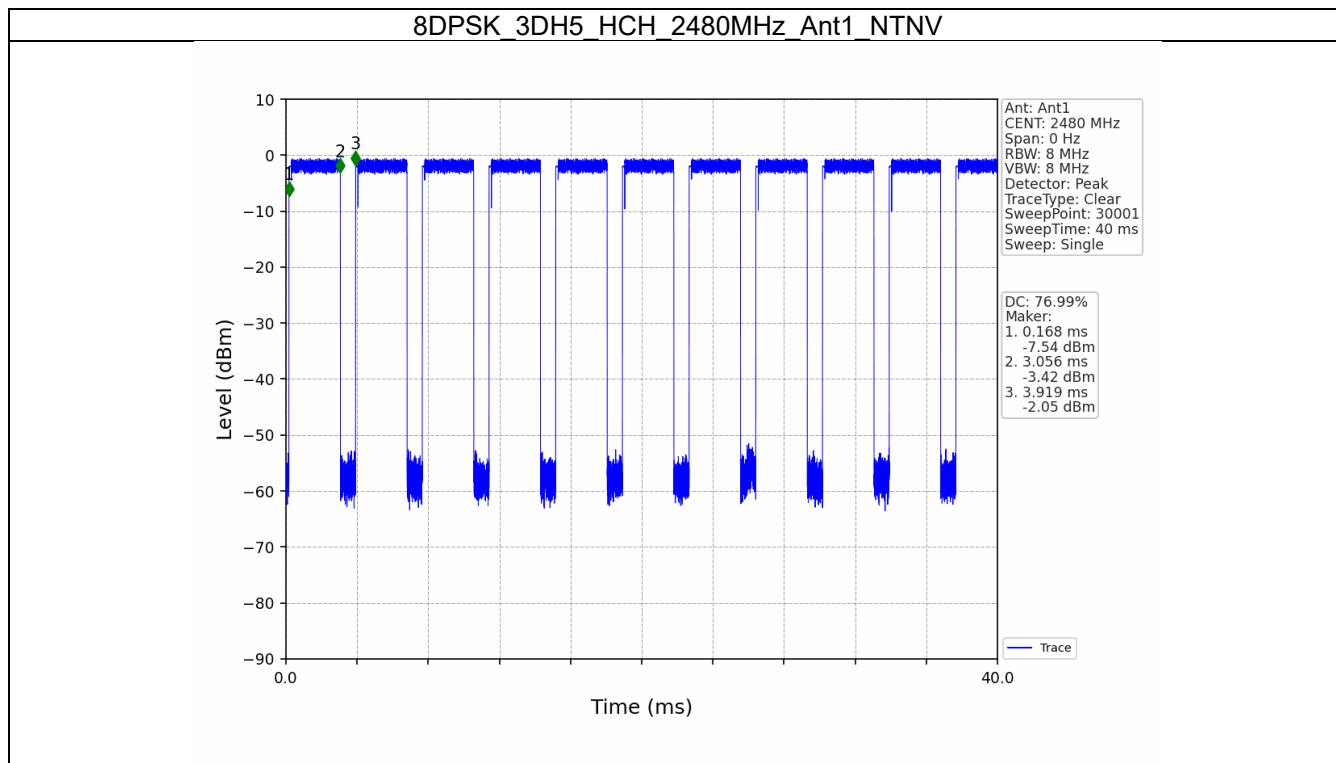
1.1.2 Test Graph











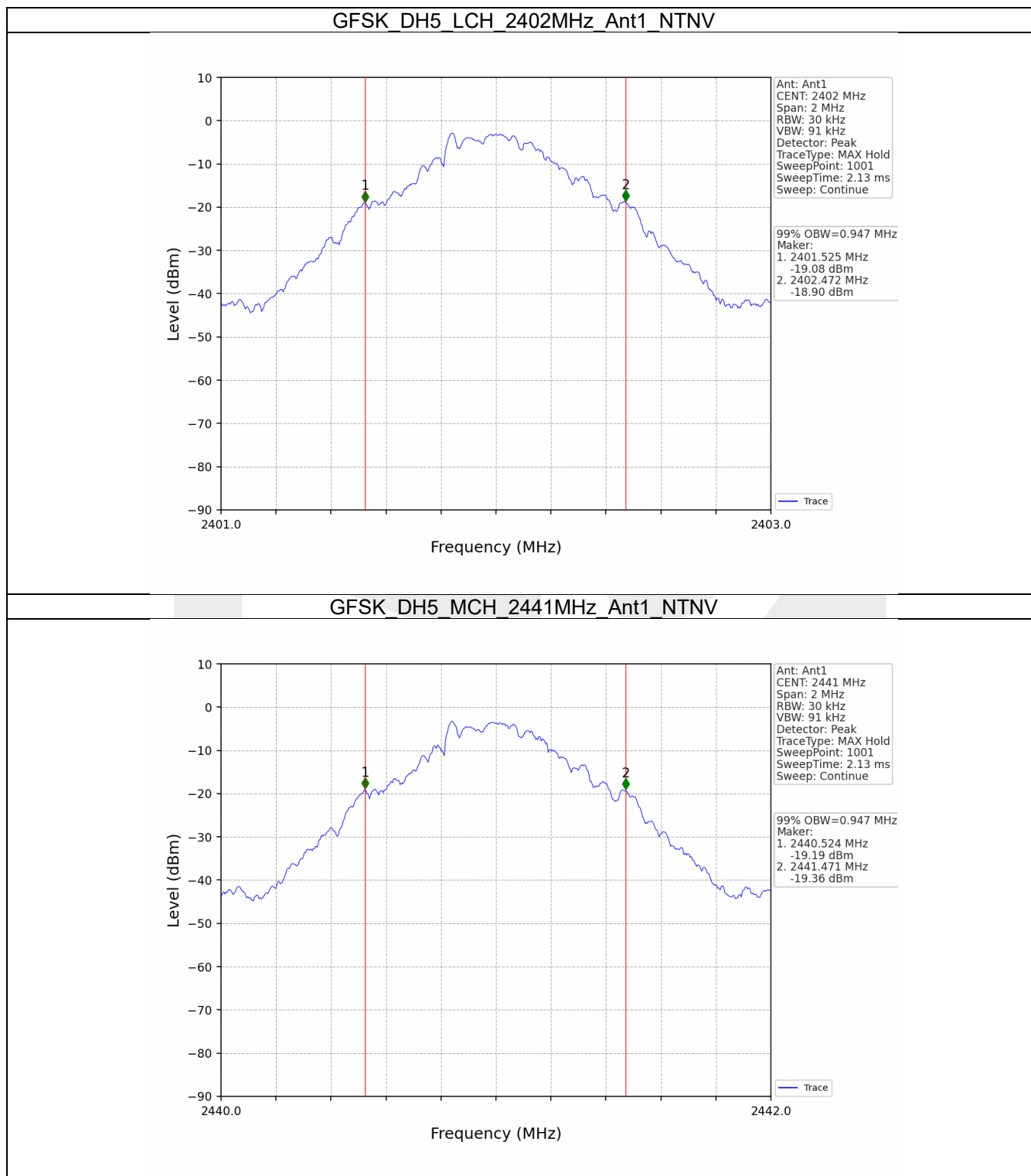
2. Bandwidth

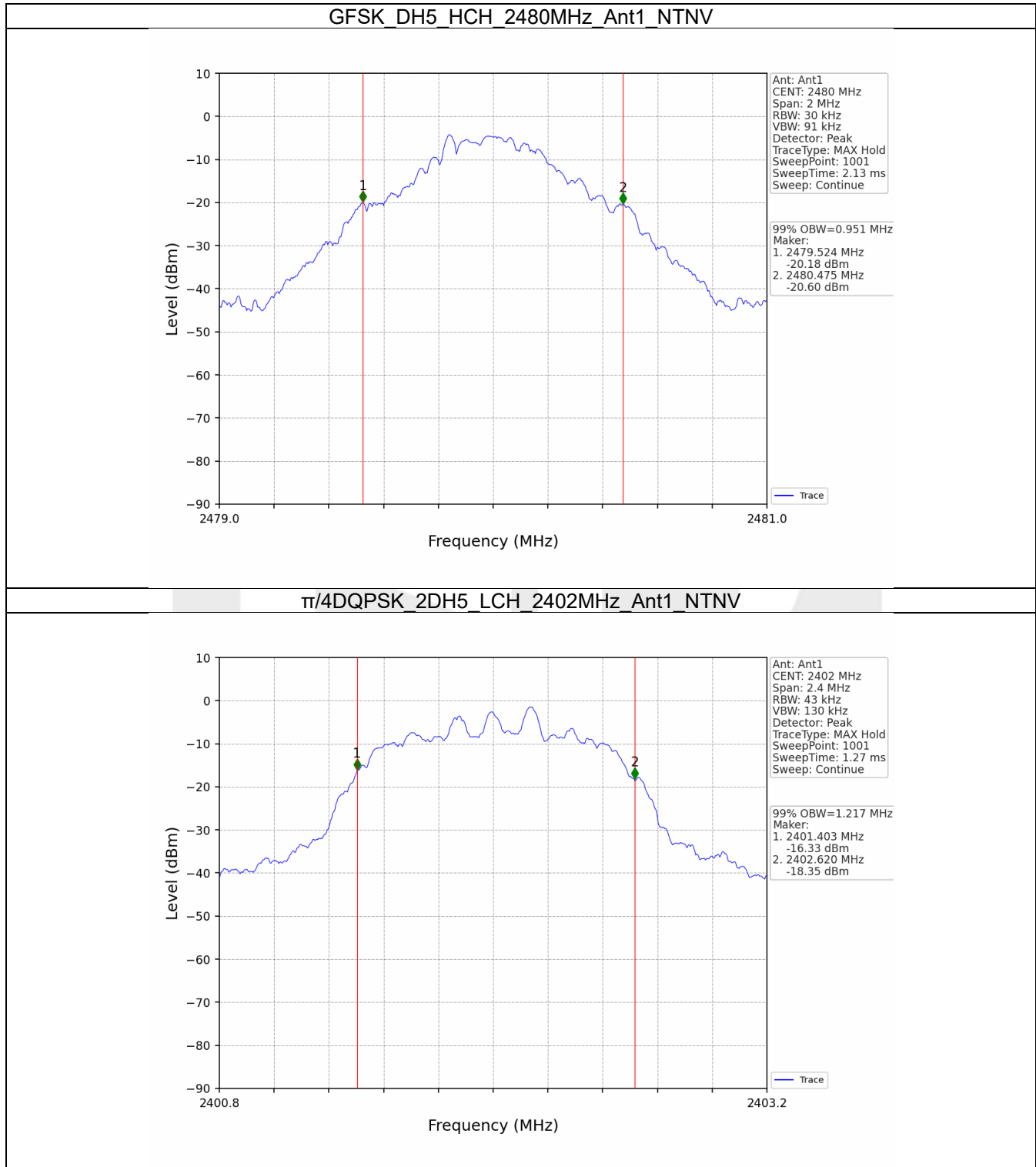
2.1 OBW

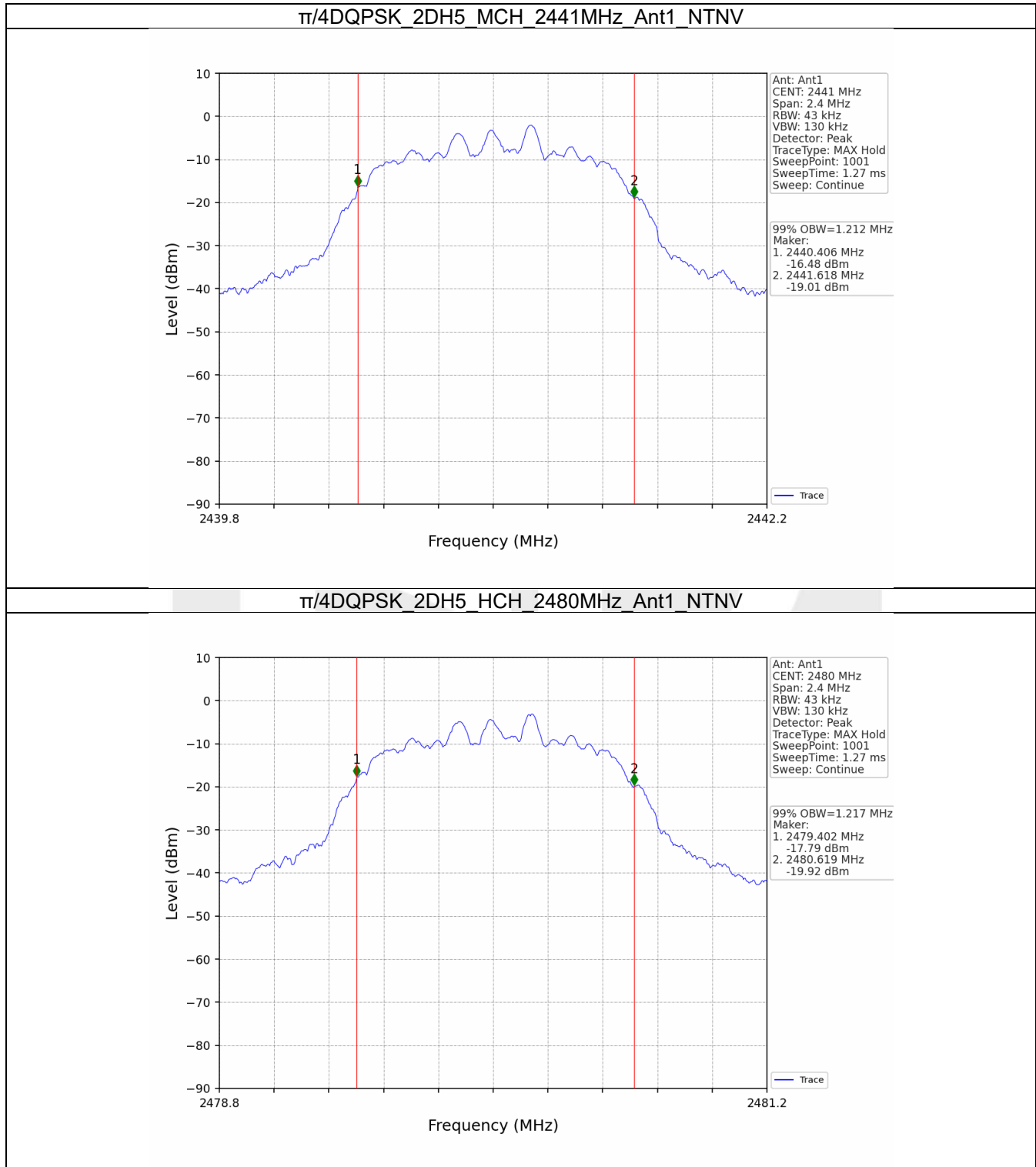
2.1.1 Test Result

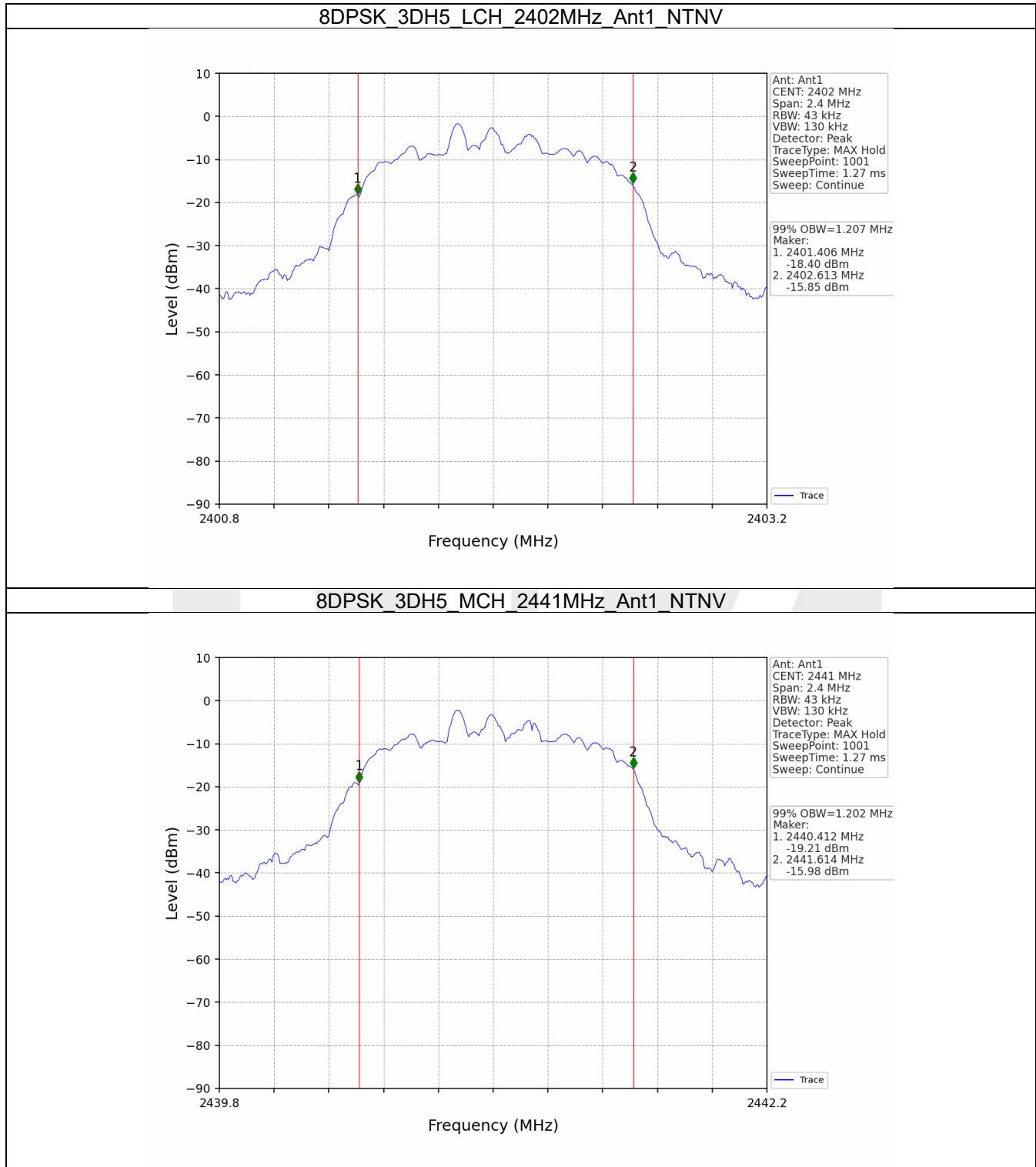
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz)	Verdict
					Result	
GFSK	SISO	2402	DH5	1	0.947	Pass
		2441	DH5	1	0.947	Pass
		2480	DH5	1	0.951	Pass
π /4DQPSK	SISO	2402	2DH5	1	1.217	Pass
		2441	2DH5	1	1.212	Pass
		2480	2DH5	1	1.217	Pass
8DPSK	SISO	2402	3DH5	1	1.207	Pass
		2441	3DH5	1	1.202	Pass
		2480	3DH5	1	1.199	Pass

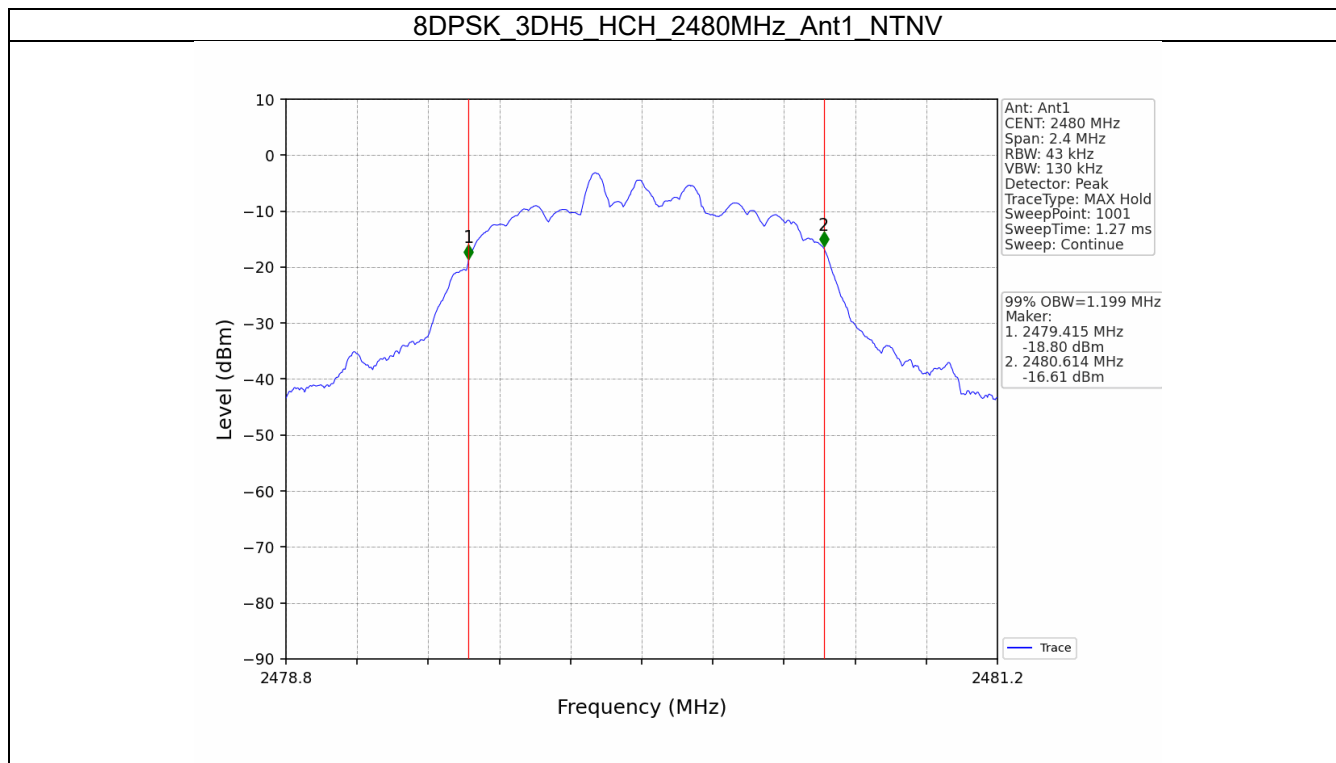
2.1.2 Test Graph









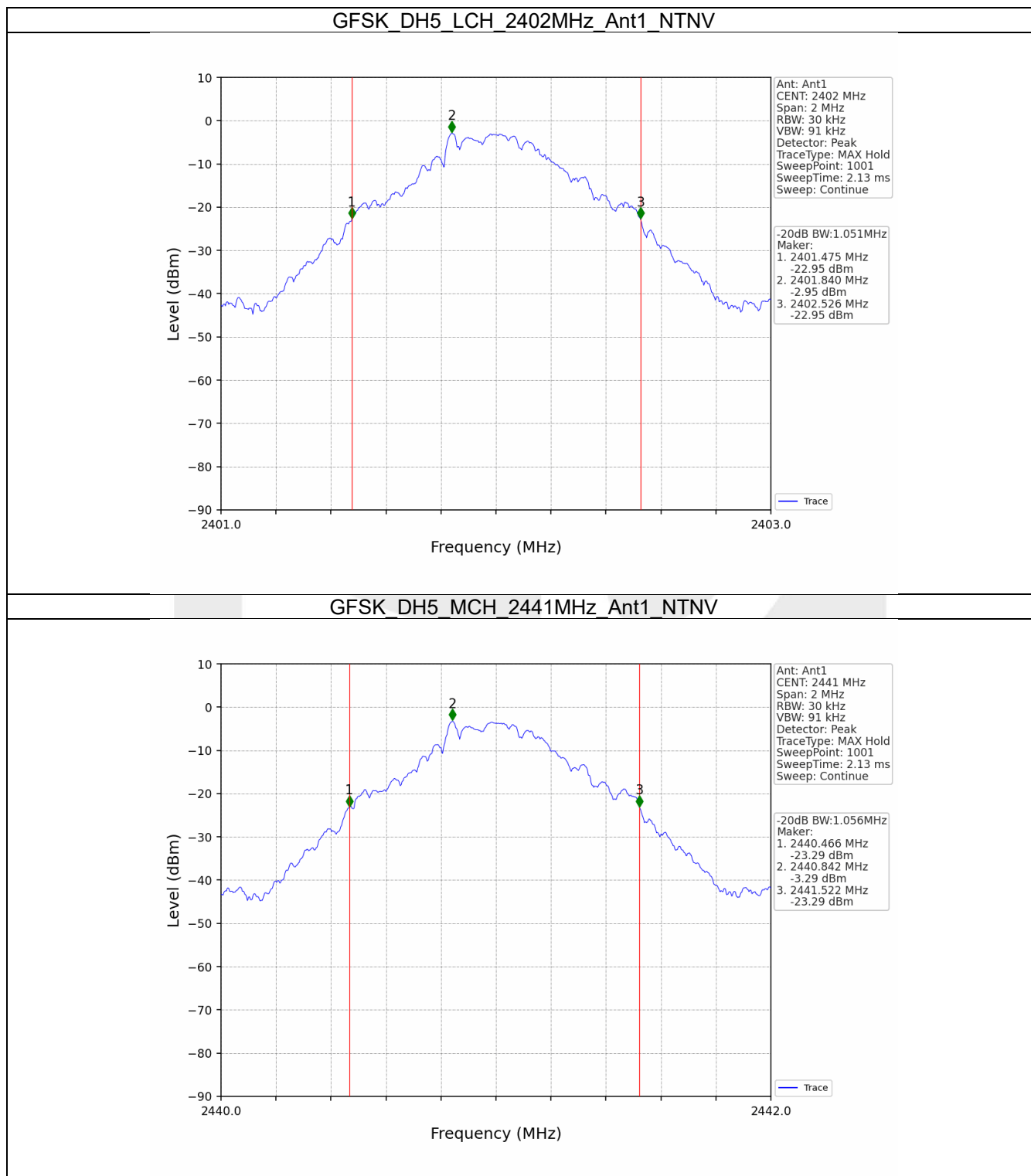


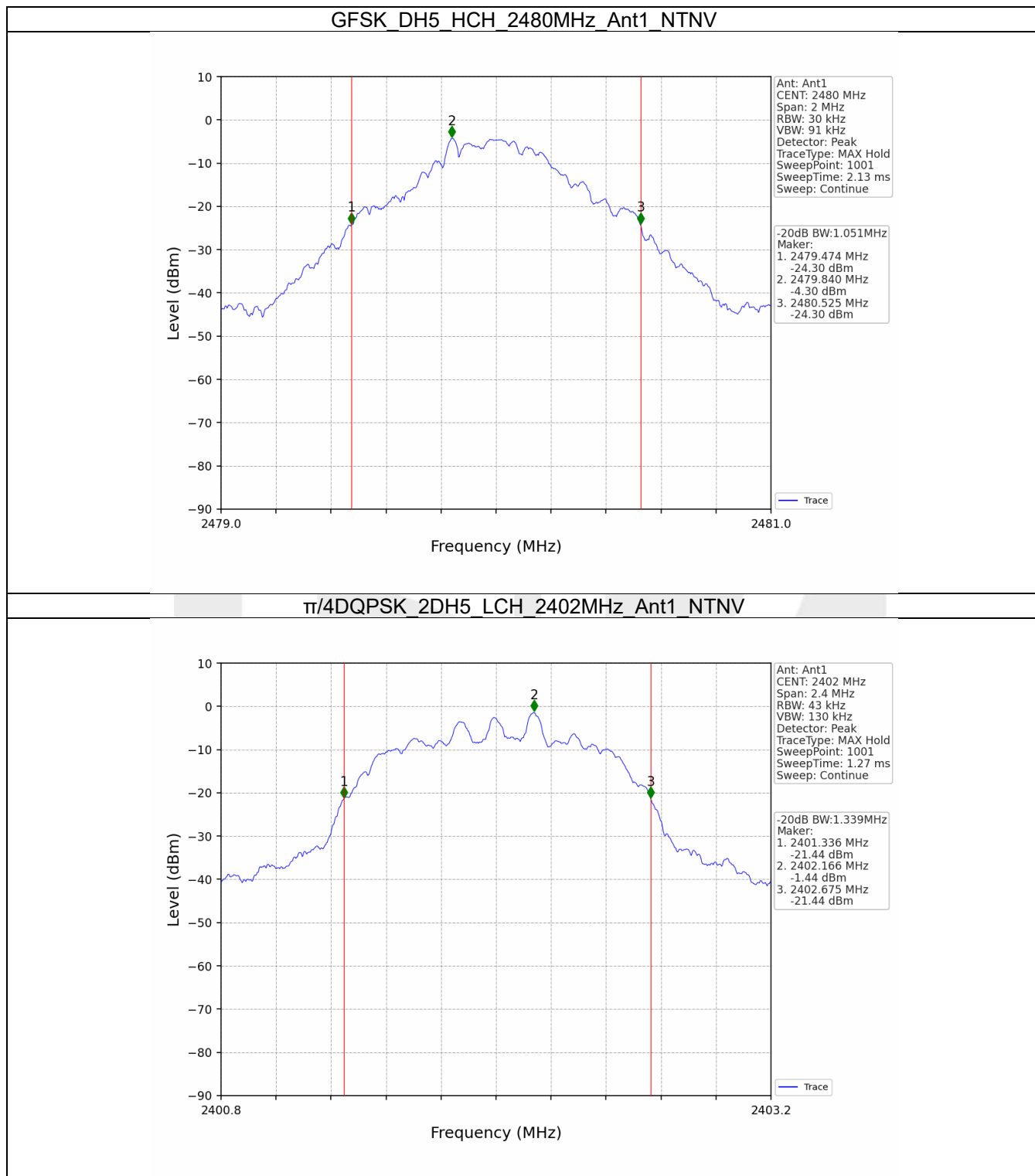
2.2 20dB BW

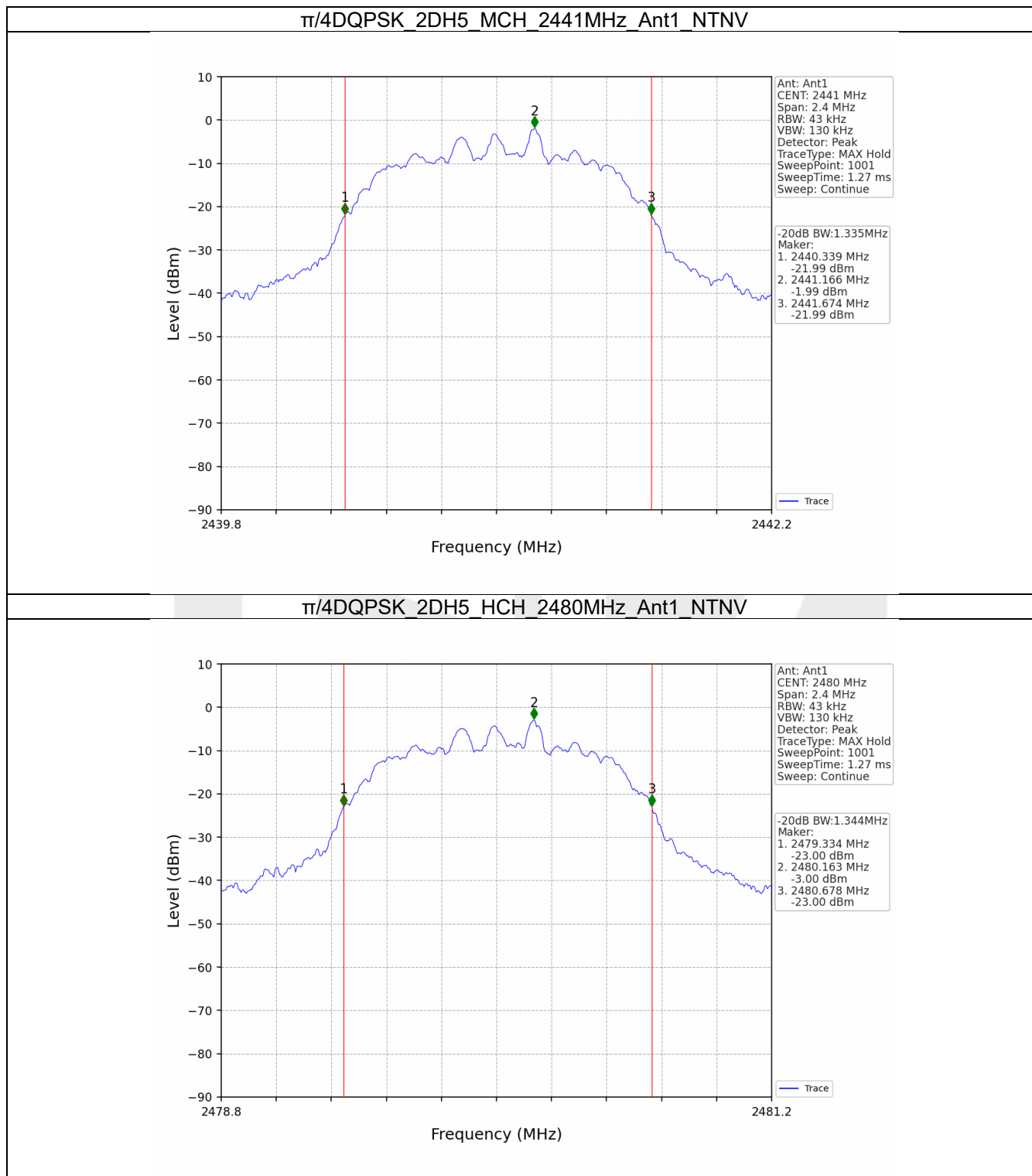
2.2.1 Test Result

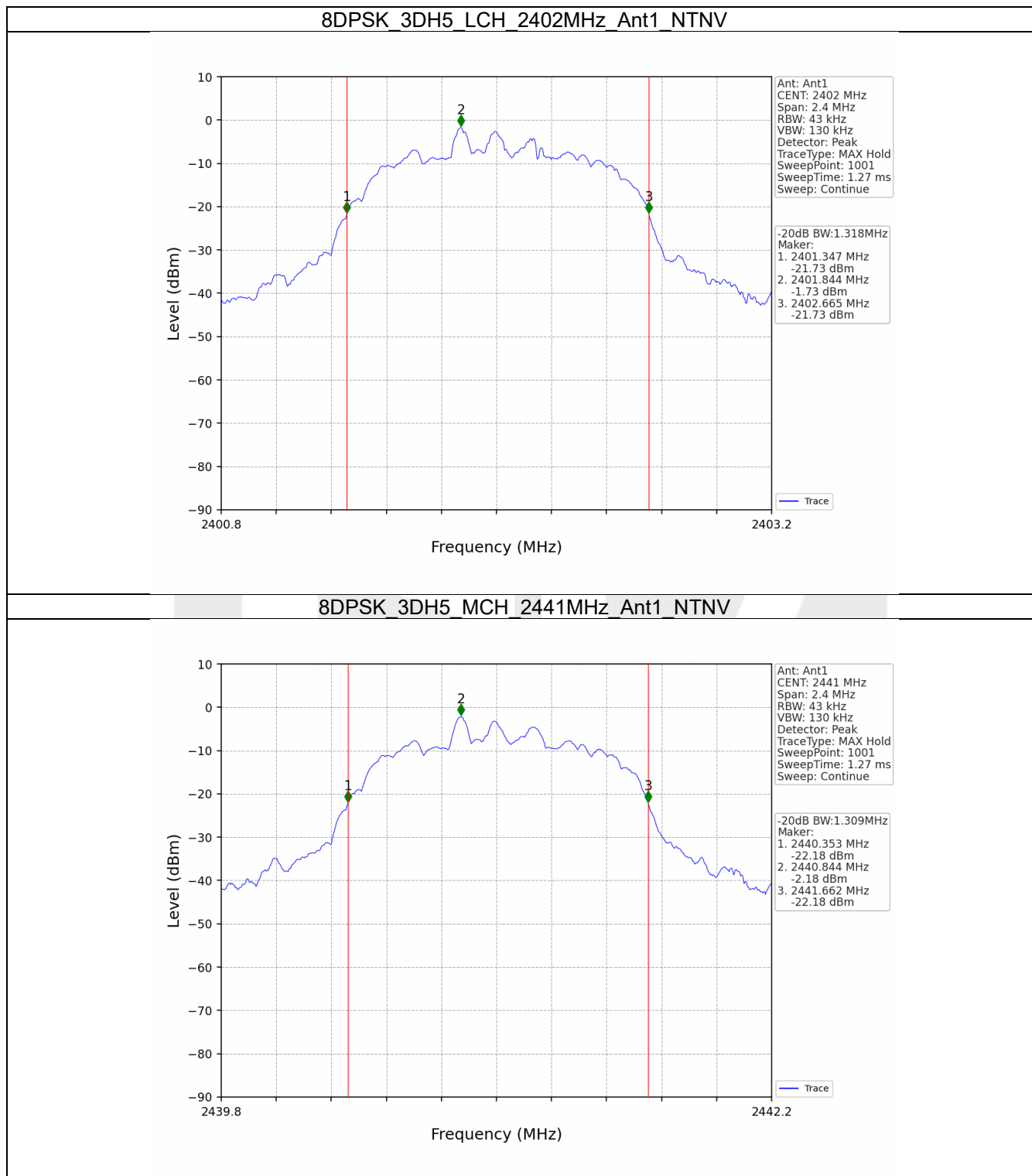
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)	Verdict
					Result	
GFSK	SISO	2402	DH5	1	1.051	Pass
		2441	DH5	1	1.056	Pass
		2480	DH5	1	1.051	Pass
$\pi/4$ DQPSK	SISO	2402	2DH5	1	1.339	Pass
		2441	2DH5	1	1.335	Pass
		2480	2DH5	1	1.344	Pass
8DPSK	SISO	2402	3DH5	1	1.318	Pass
		2441	3DH5	1	1.309	Pass
		2480	3DH5	1	1.308	Pass

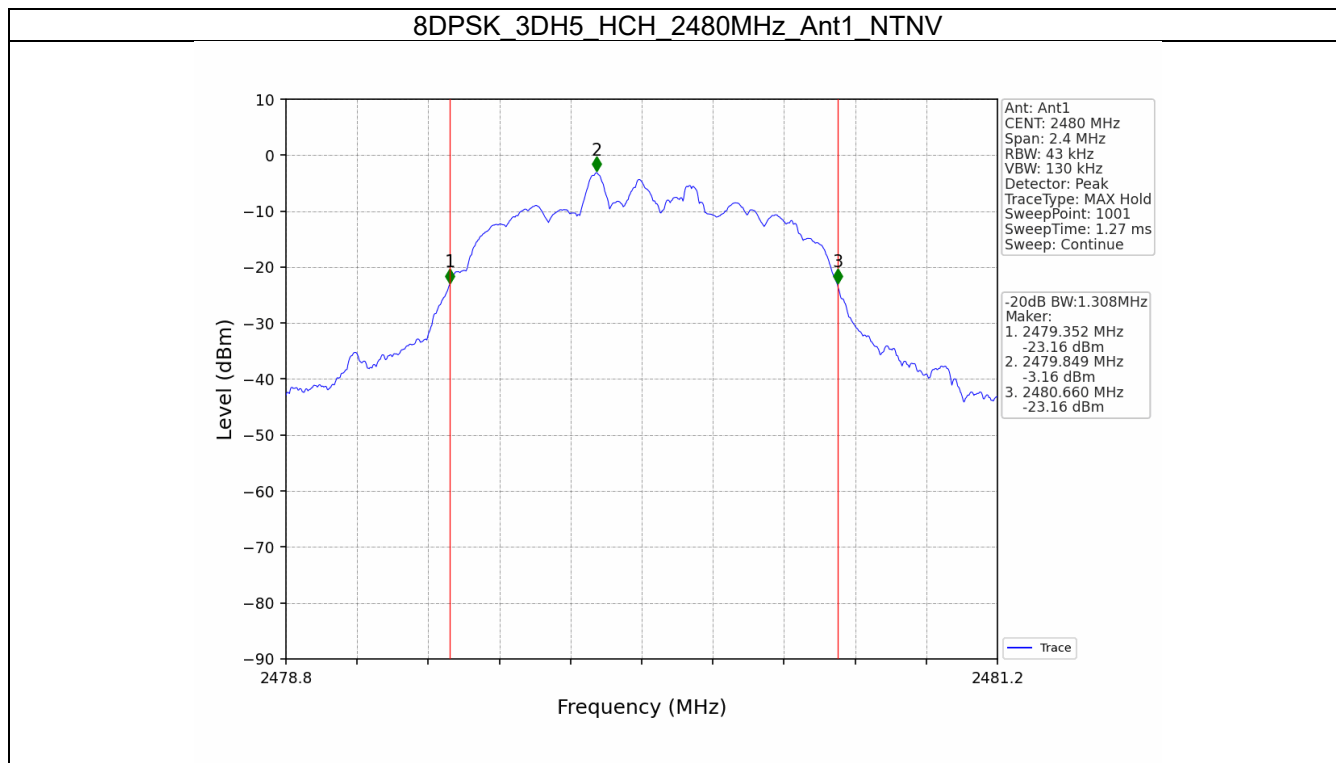
2.2.2 Test Graph











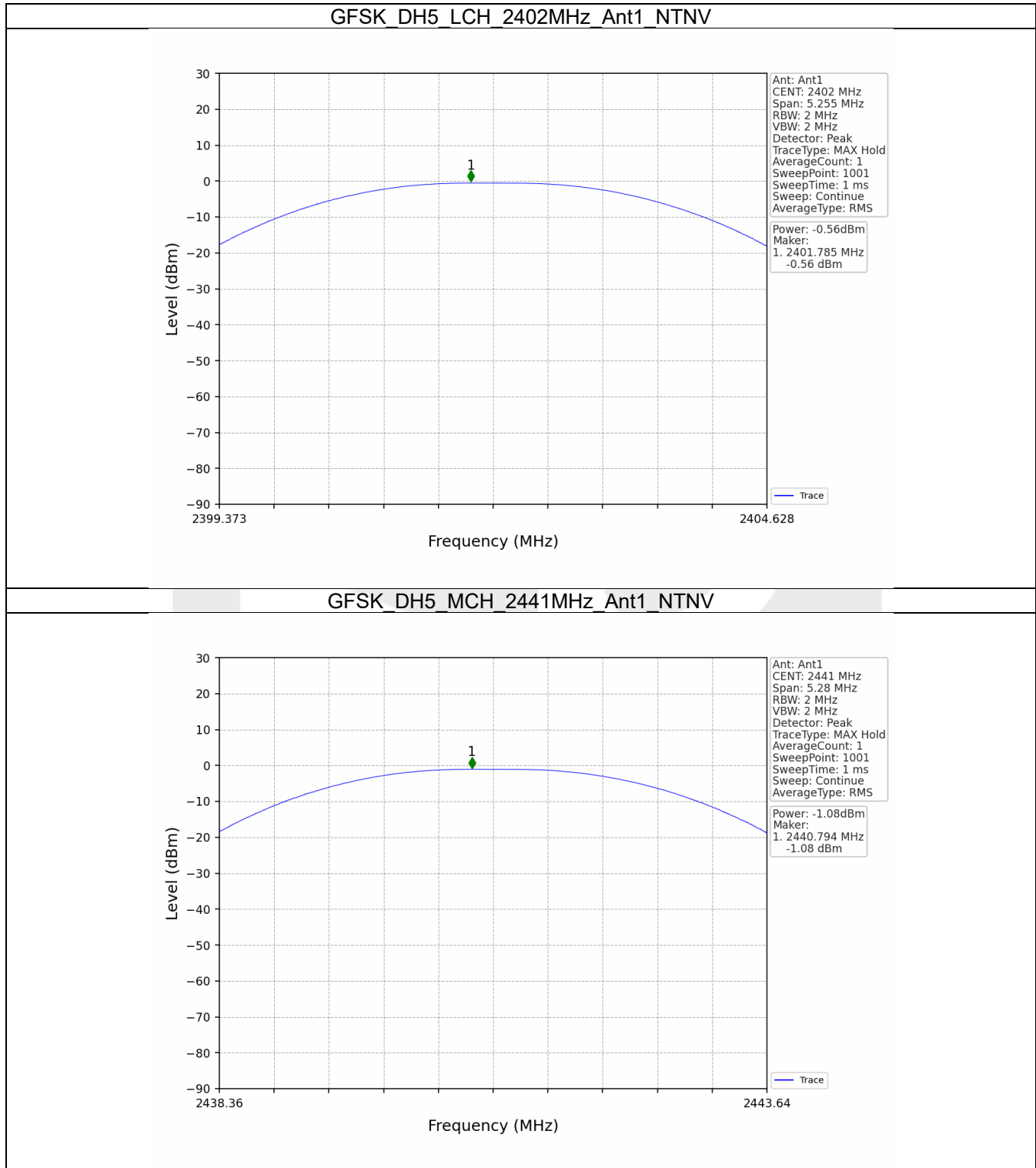
3. Maximum Conducted Output Power

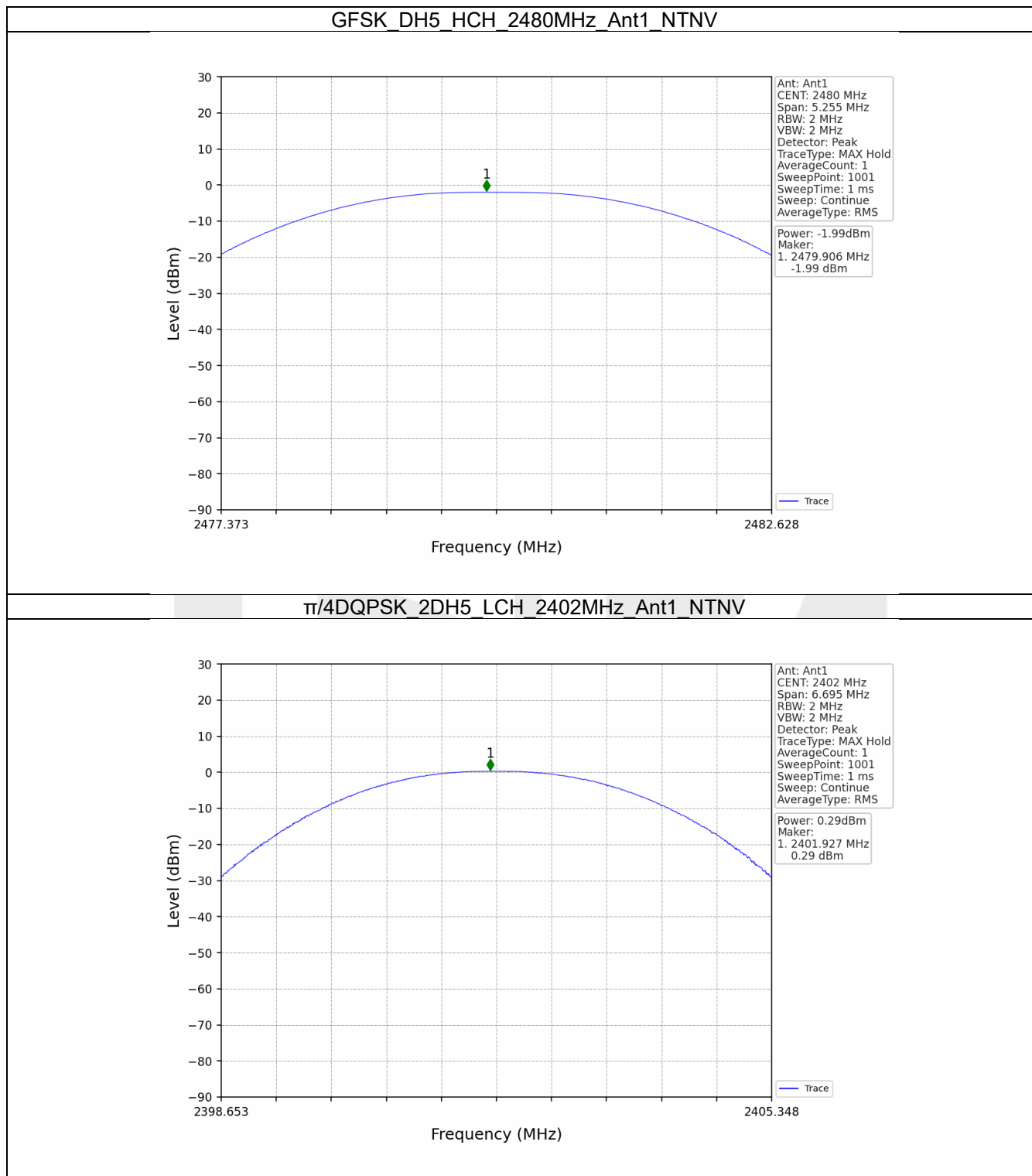
3.1 Power

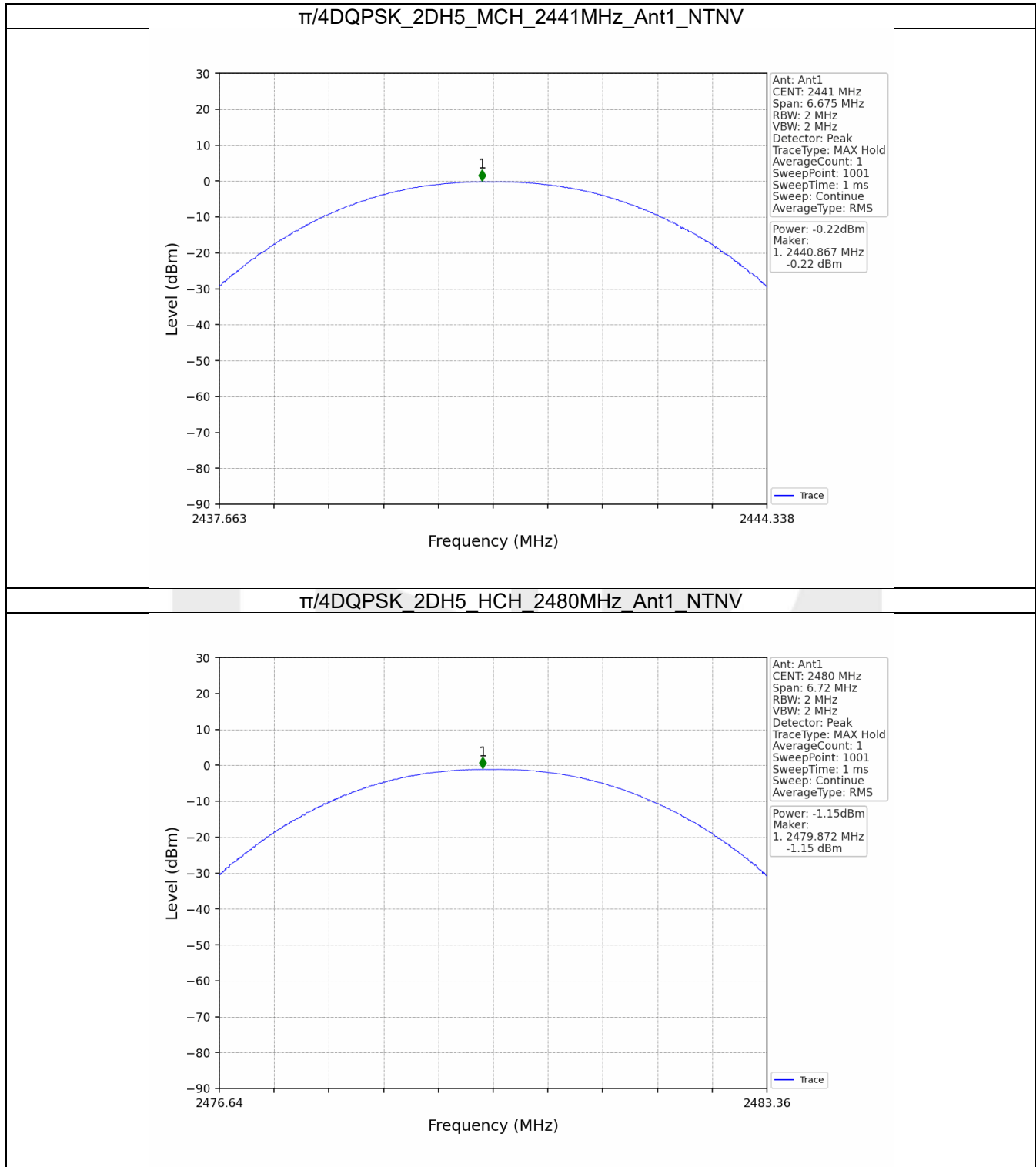
3.1.1 Test Result

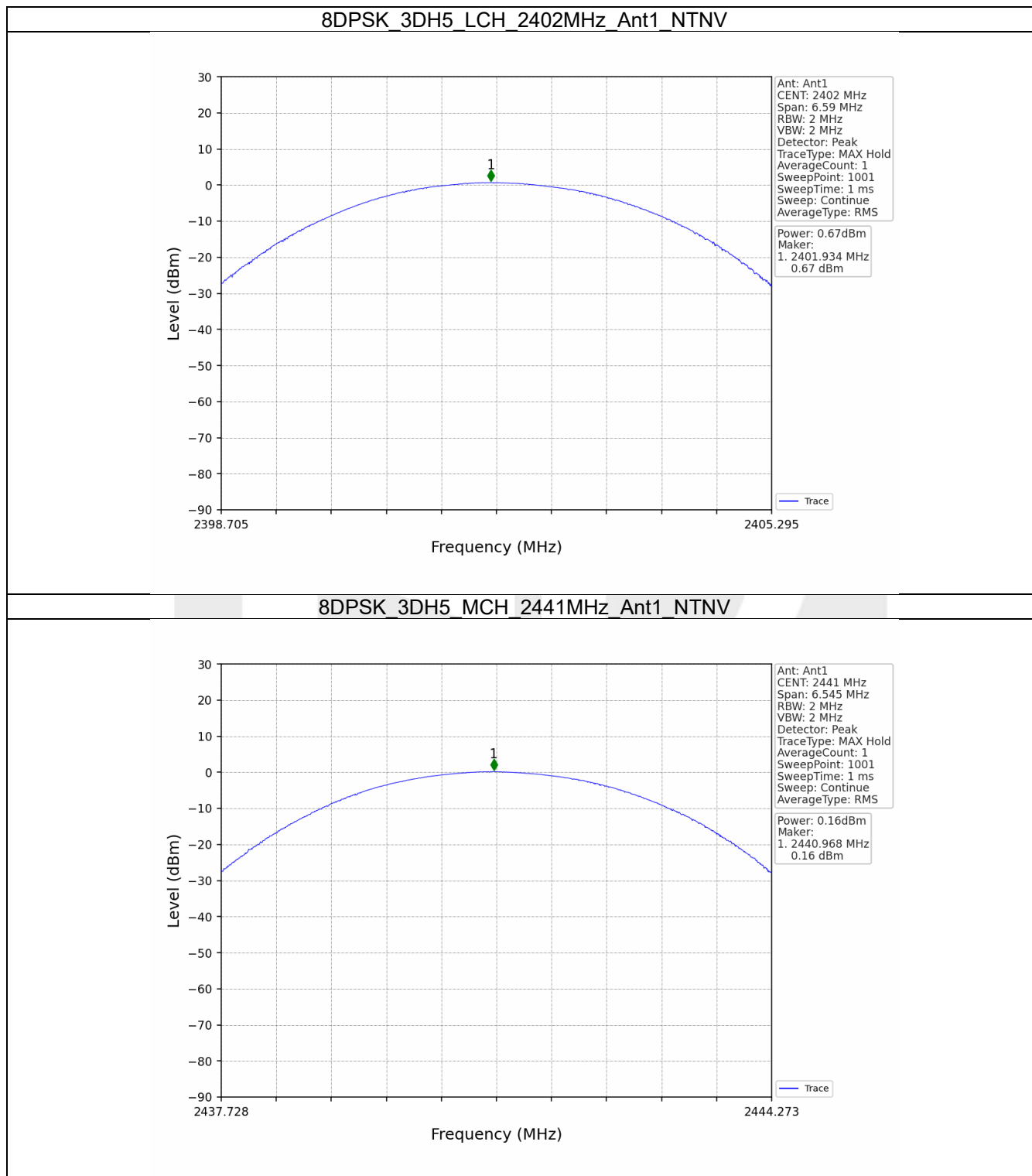
Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	-0.56	<=20.97	Pass
		2441	DH5	-1.08	<=20.97	Pass
		2480	DH5	-1.99	<=20.97	Pass
π /4DQPSK	SISO	2402	2DH5	0.29	<=20.97	Pass
		2441	2DH5	-0.22	<=20.97	Pass
		2480	2DH5	-1.15	<=20.97	Pass
8DPSK	SISO	2402	3DH5	0.67	<=20.97	Pass
		2441	3DH5	0.16	<=20.97	Pass
		2480	3DH5	-0.76	<=20.97	Pass

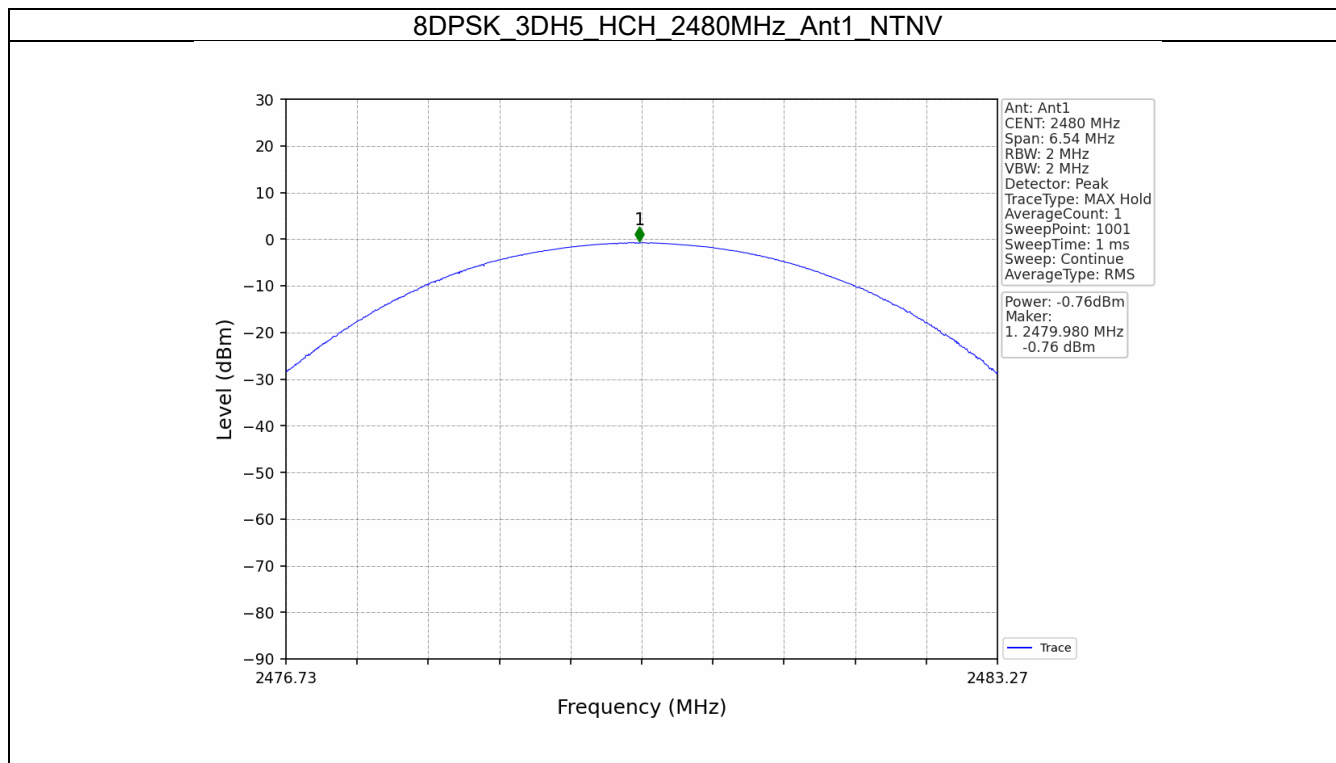
3.1.2 Test Graph











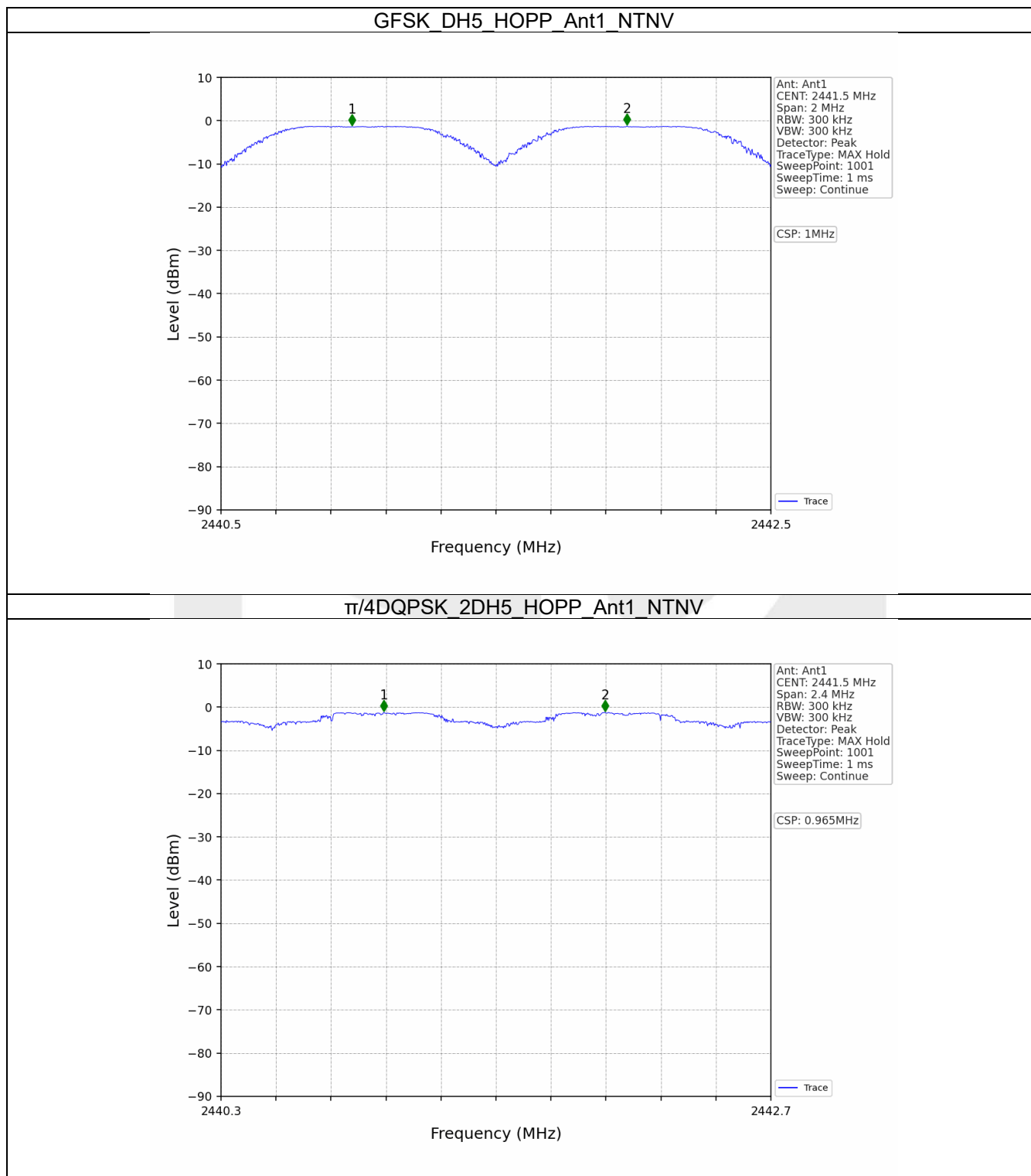
4. Carrier Frequency Separation

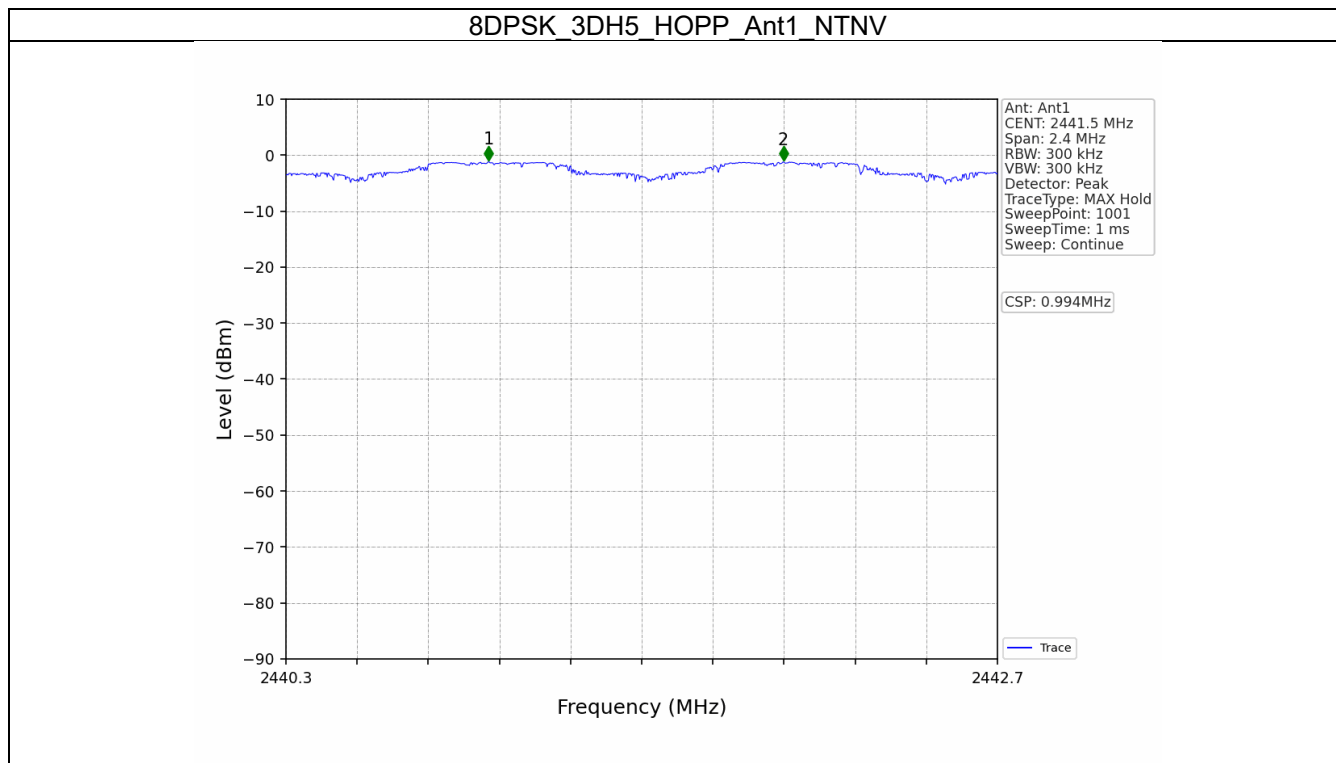
4.1 Ant1

4.1.1 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	1.056	≥ 0.704	Pass
$\pi/4$ DQPSK	SISO	HOPP	2DH5	0.965	1.344	≥ 0.896	Pass
8DPSK	SISO	HOPP	3DH5	0.994	1.318	≥ 0.879	Pass

4.1.2 Test Graph





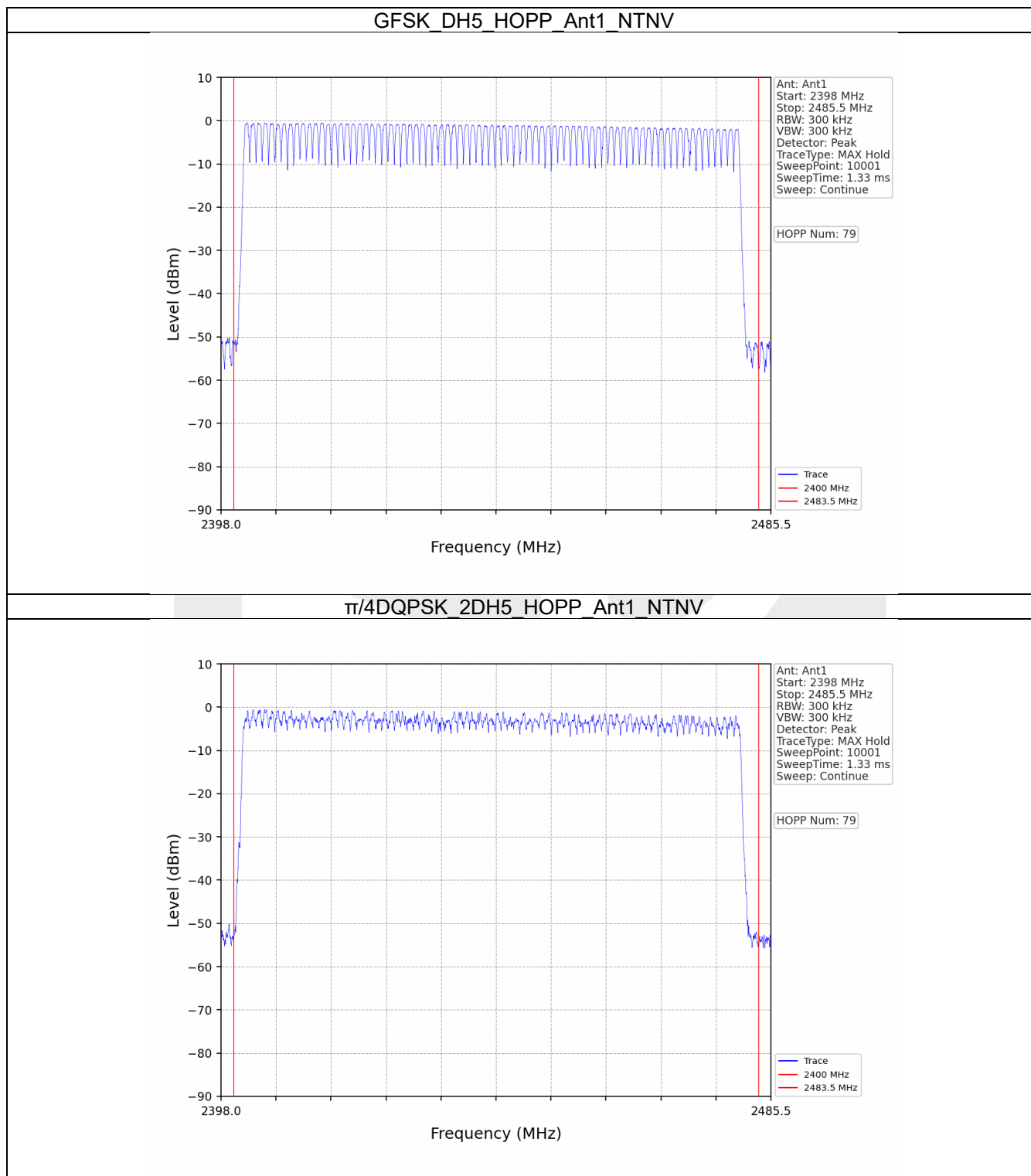
5. Number of Hopping Frequencies

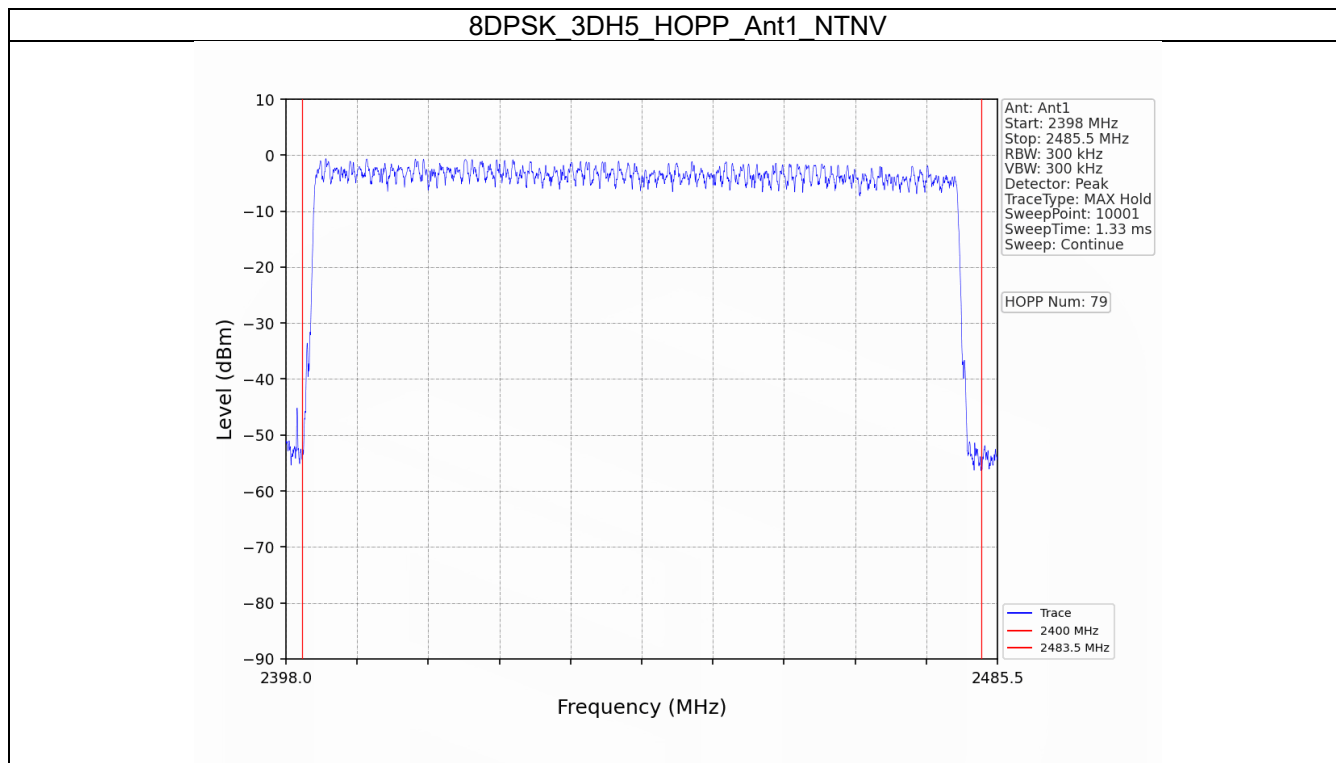
5.1 HoppNum

5.1.1 Test Result

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

5.1.2 Test Graph





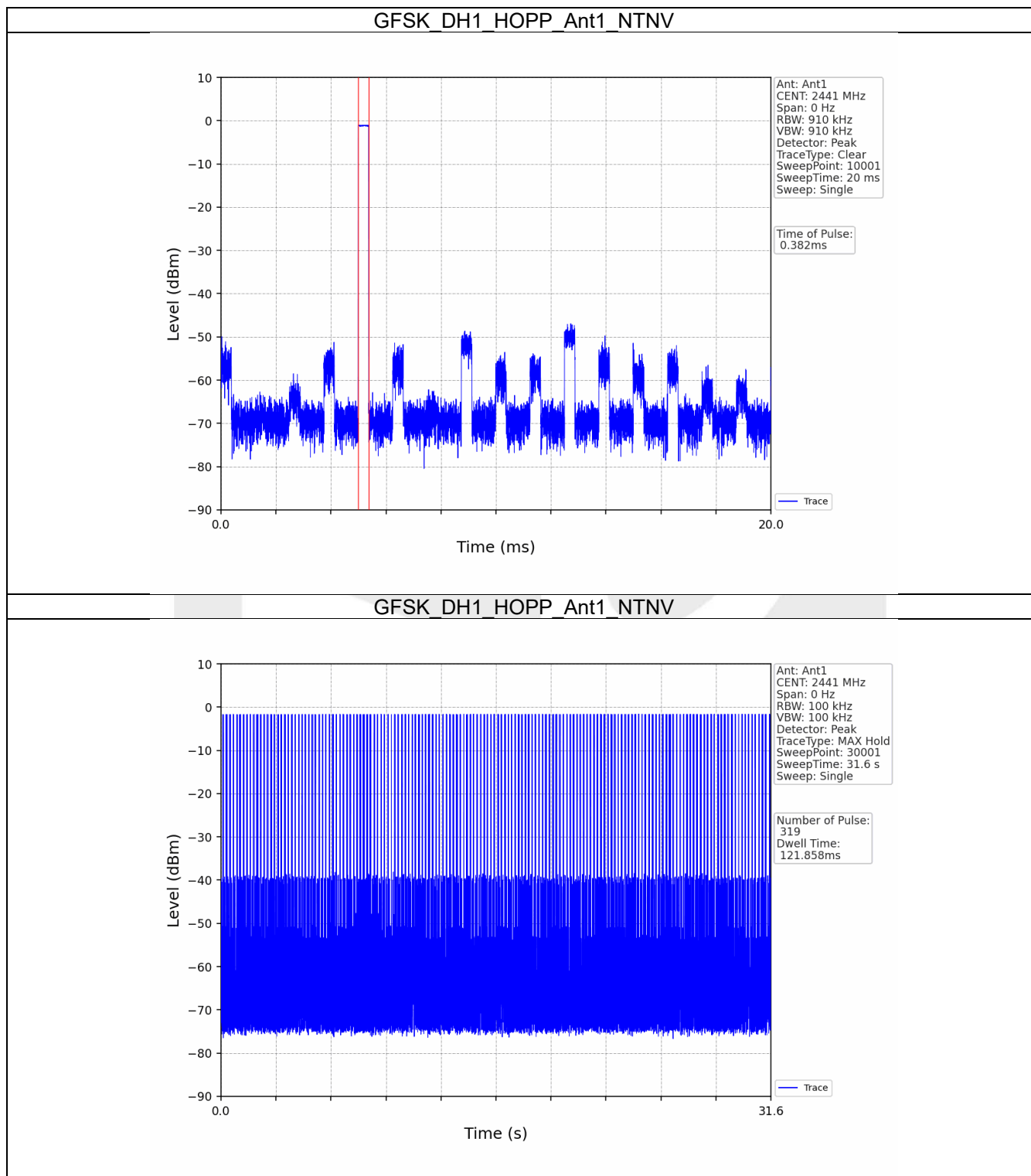
6. Time of Occupancy (Dwell Time)

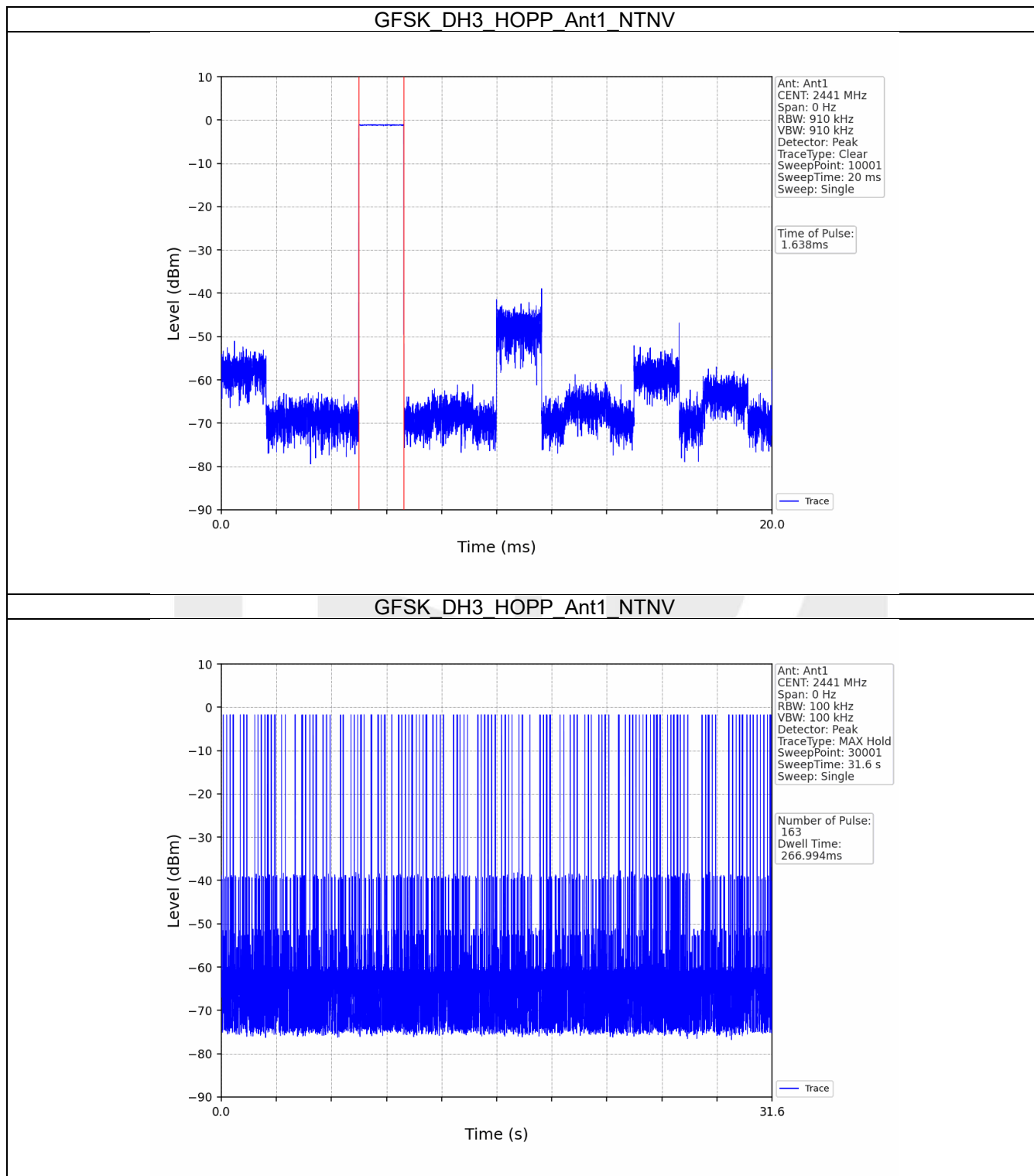
6.1 Ant1

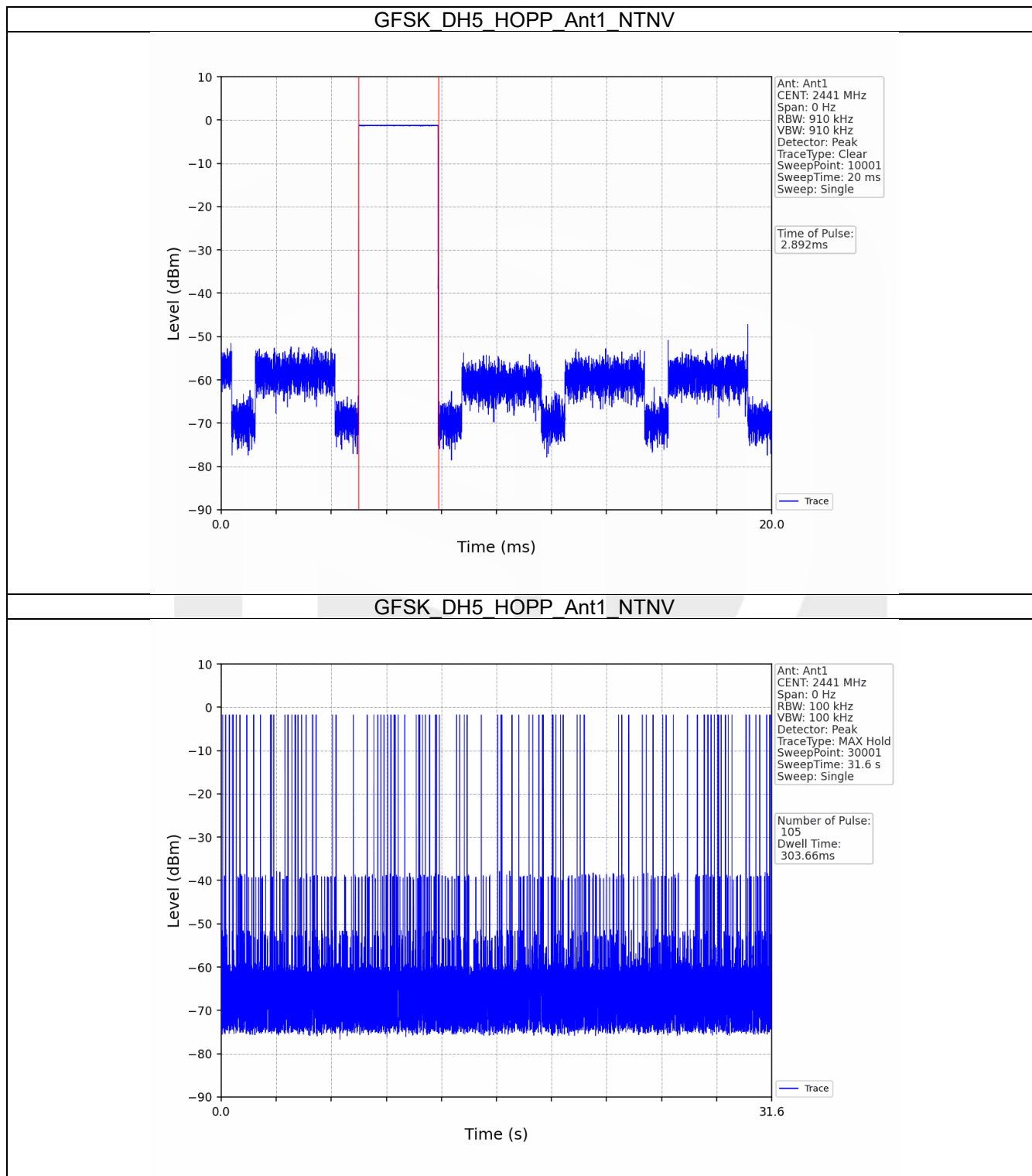
6.1.1 Test Result

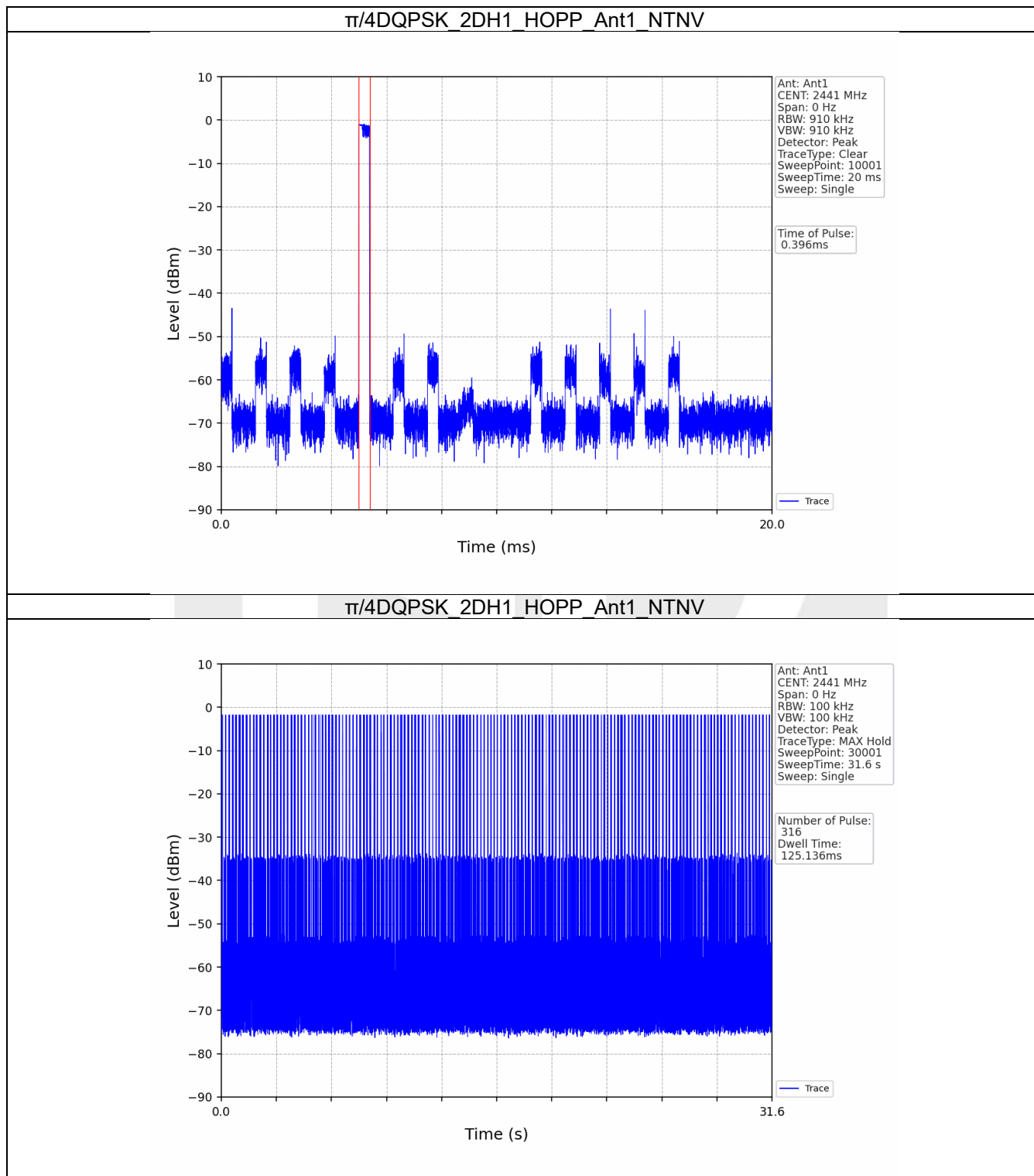
Ant1									
Mode	TX Type	Frequency (MHz)	Packet Type	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limit (ms)	Verdict
GFSK	SISO	HOPP	DH1	0.382	31.600	319	121.858	<=400	Pass
			DH3	1.638	31.600	163	266.994	<=400	Pass
			DH5	2.892	31.600	105	303.660	<=400	Pass
$\pi/4$ DQPSK	SISO	HOPP	2DH1	0.396	31.600	316	125.136	<=400	Pass
			2DH3	1.642	31.600	155	254.510	<=400	Pass
			2DH5	2.890	31.600	102	294.780	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.398	31.600	320	127.360	<=400	Pass
			3DH3	1.648	31.600	166	273.568	<=400	Pass
			3DH5	2.898	31.600	110	318.780	<=400	Pass

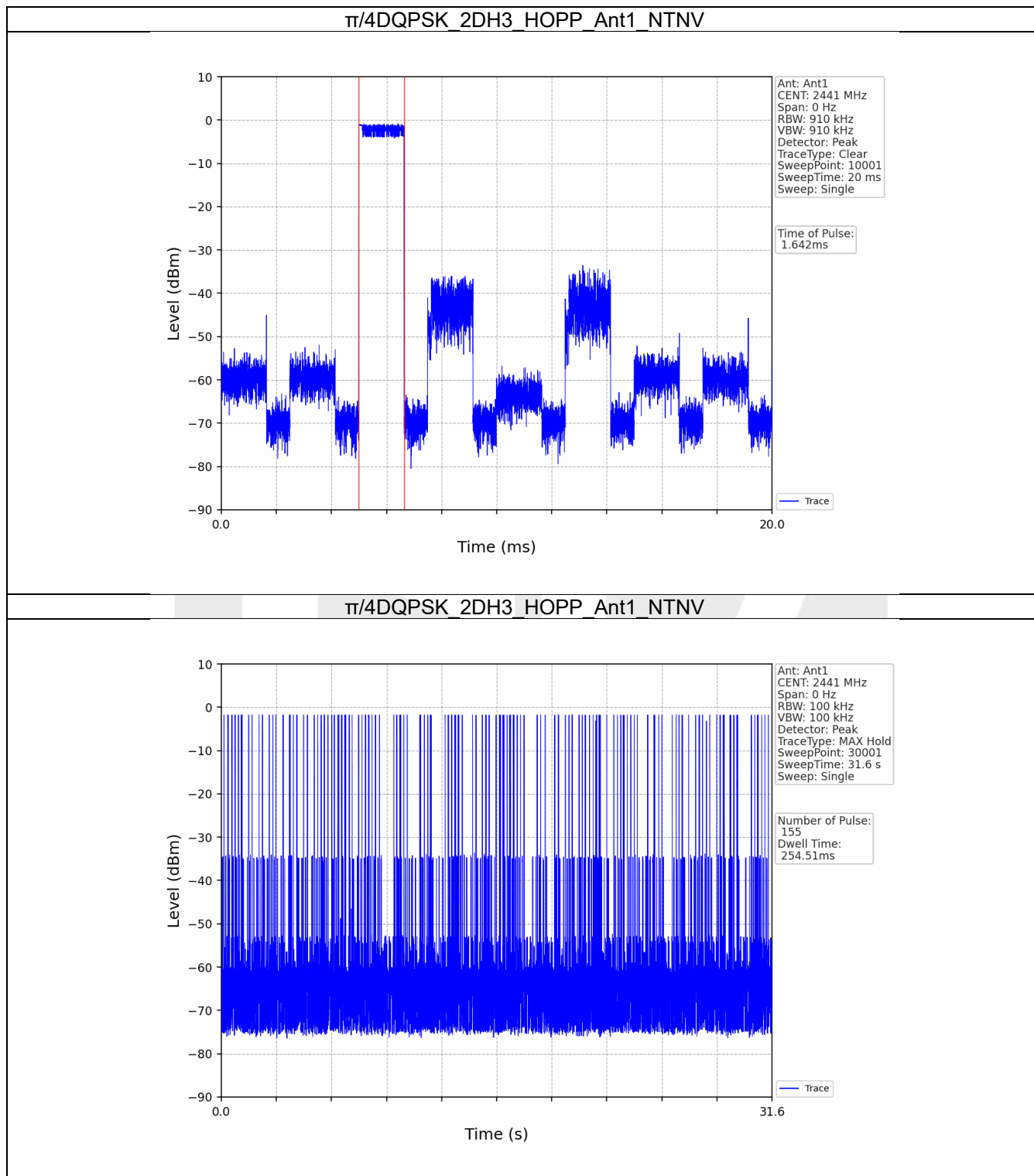
6.1.2 Test Graph

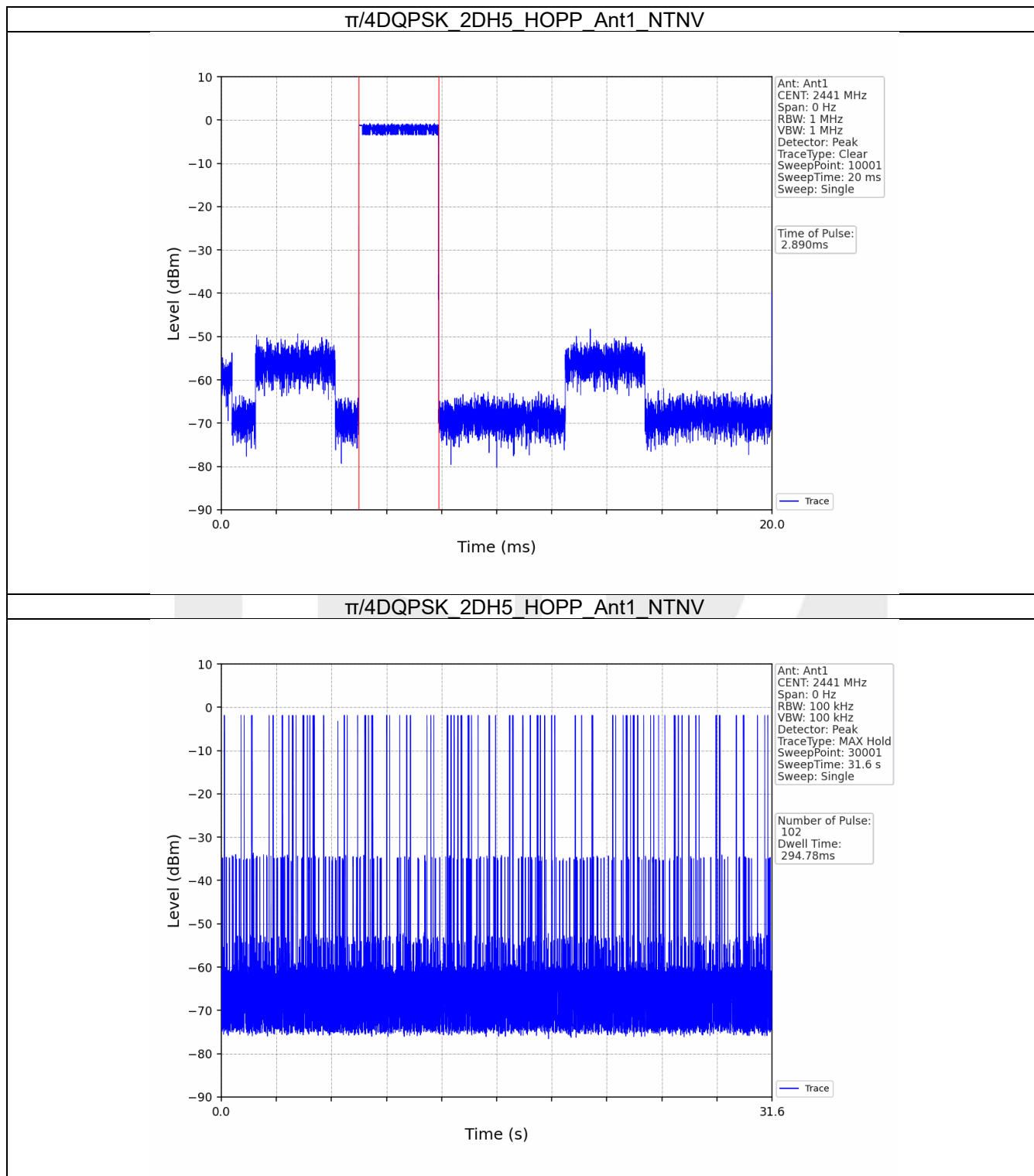


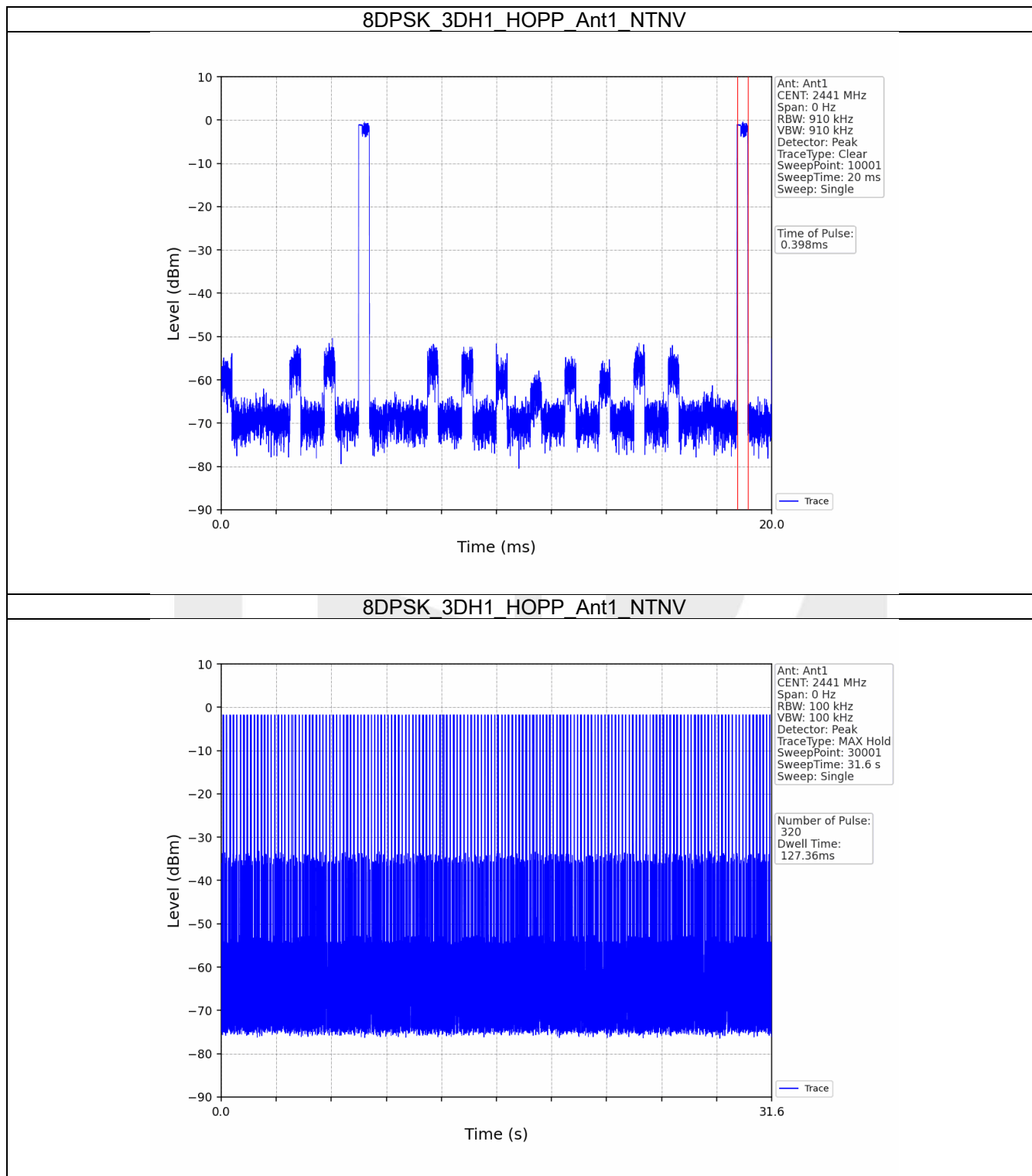


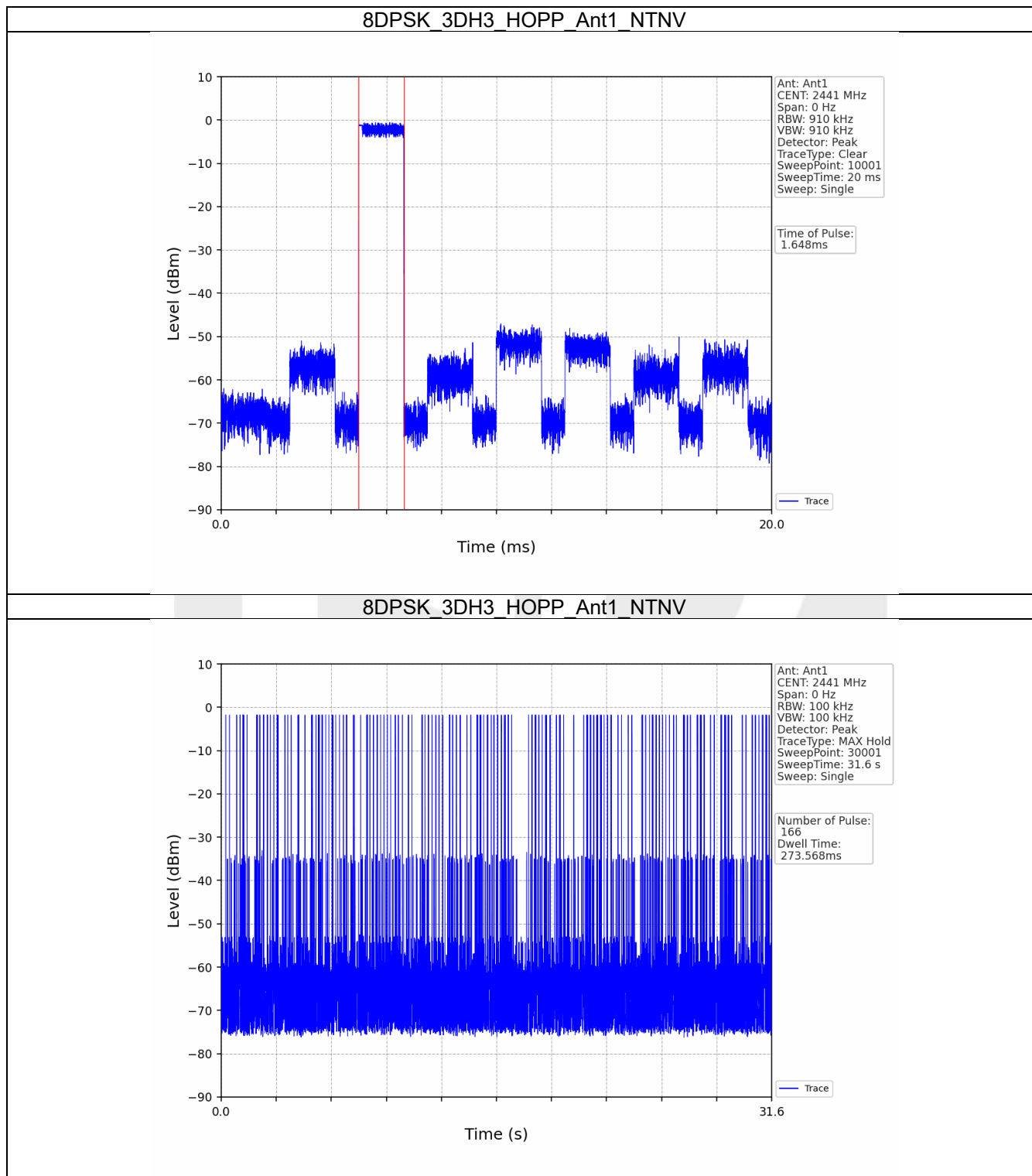


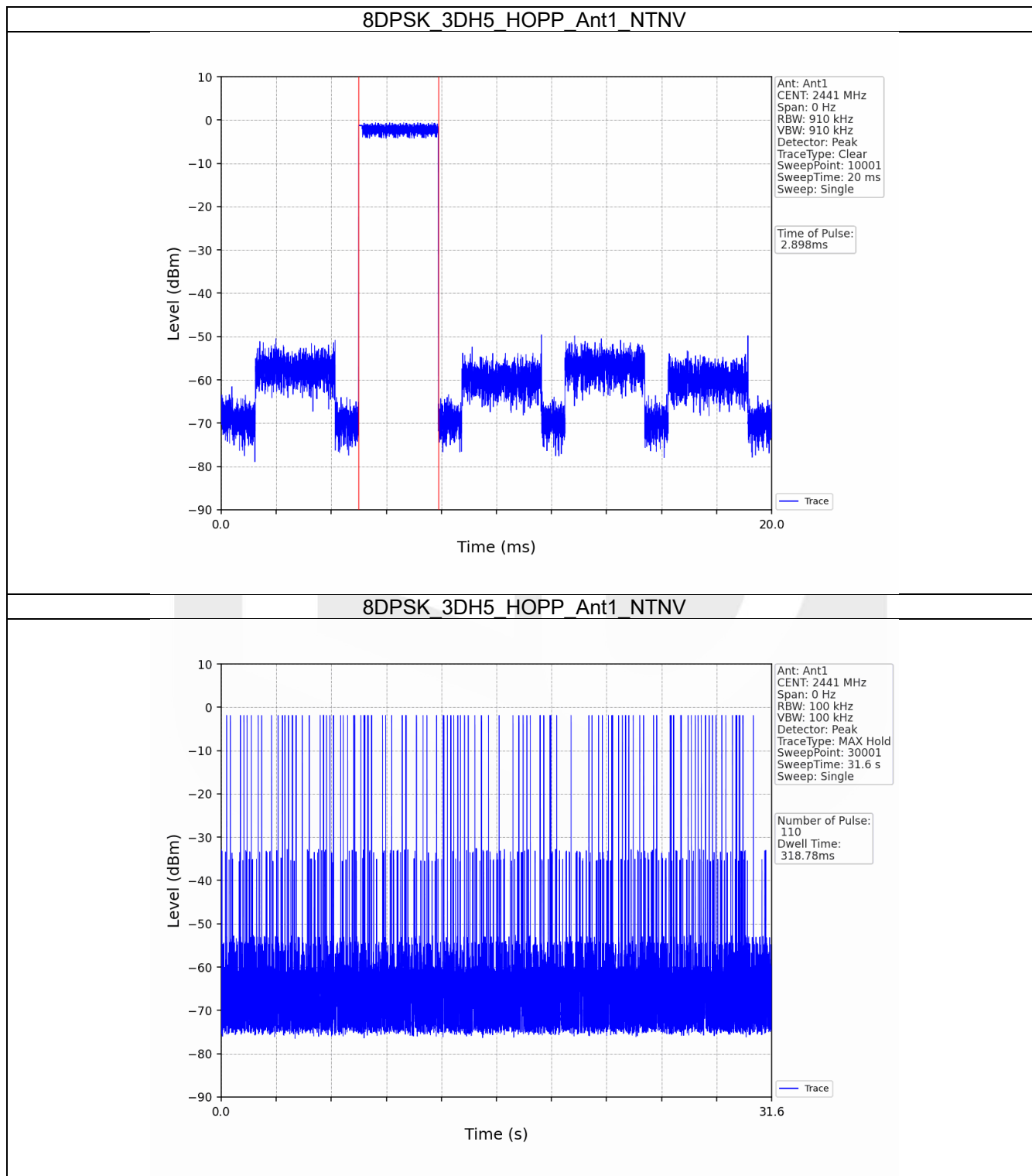












7. Unwanted Emissions In Non-restricted Frequency Bands

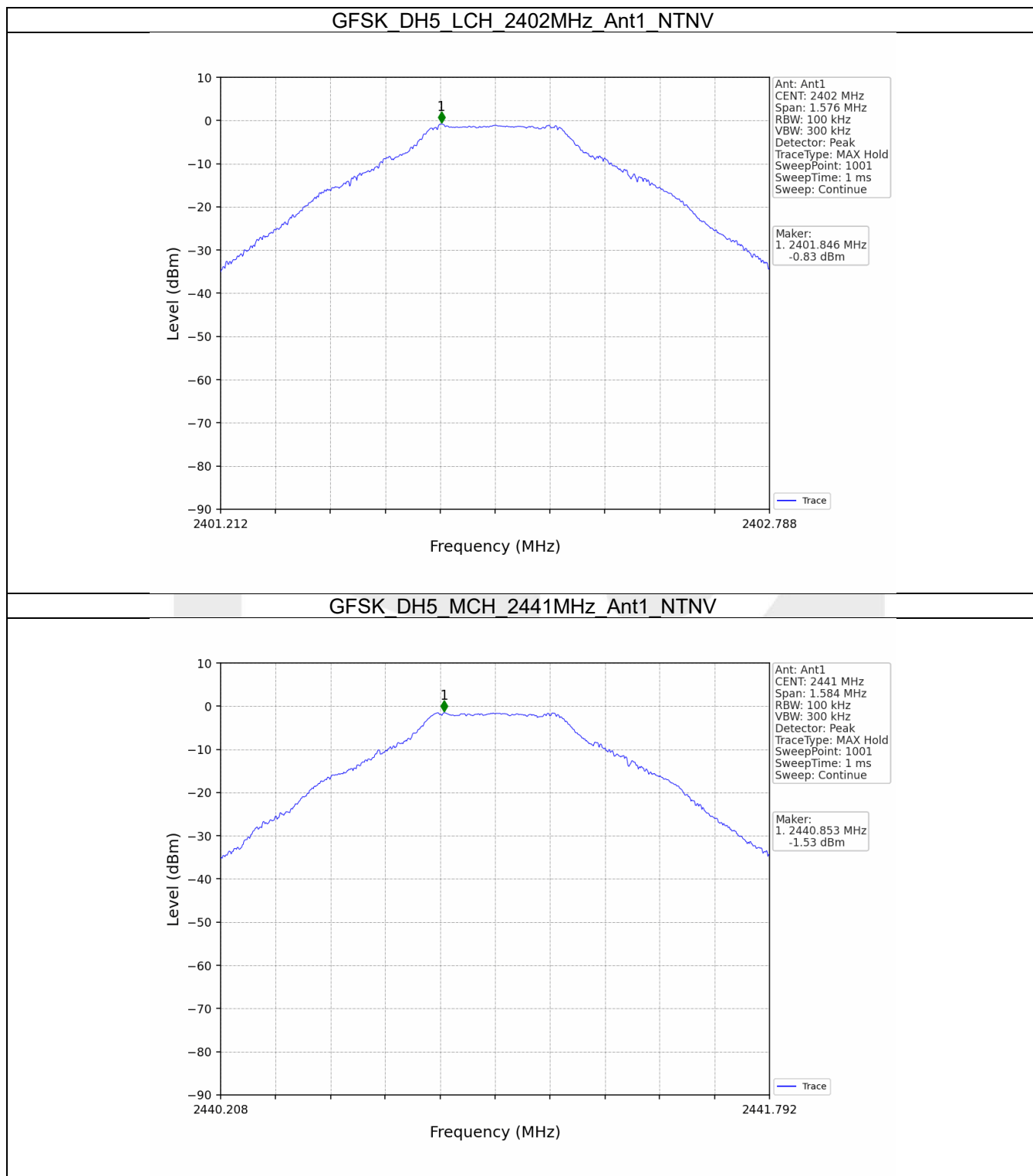
7.1 Ref

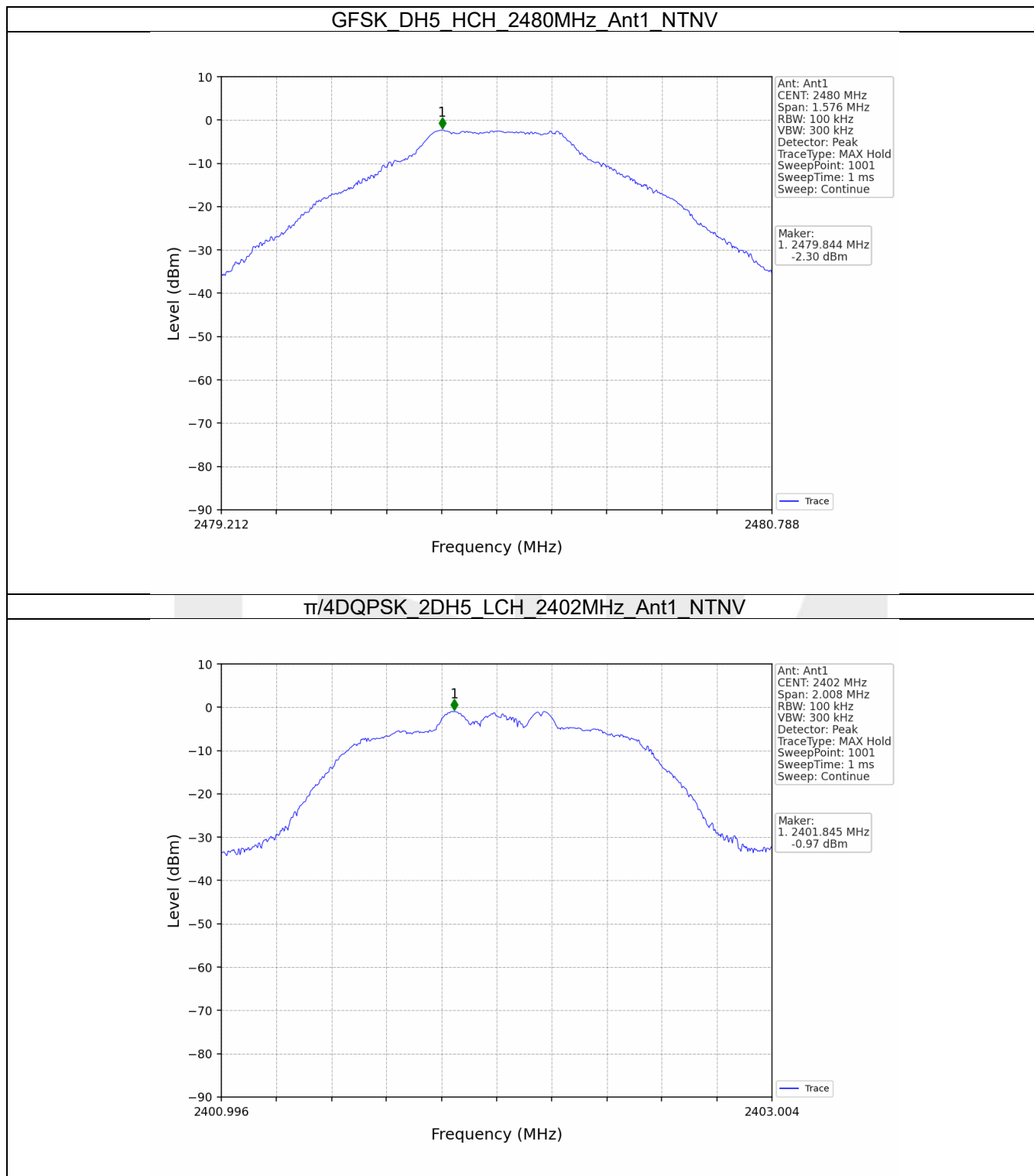
7.1.1 Test Result

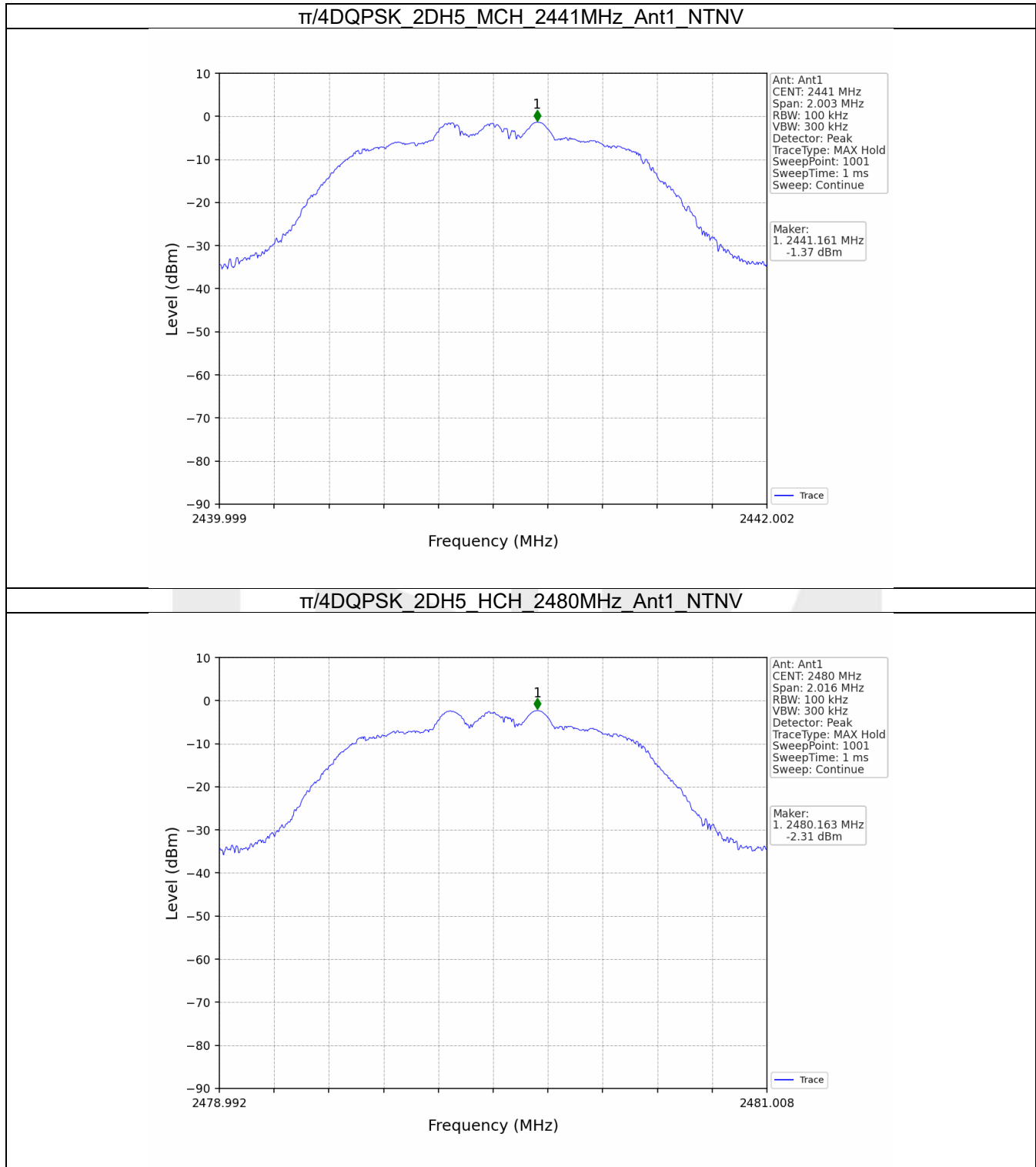
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	-0.83
		2441	DH5	1	-1.53
		2480	DH5	1	-2.30
$\pi/4$ DQPSK	SISO	2402	2DH5	1	-0.97
		2441	2DH5	1	-1.37
		2480	2DH5	1	-2.31
8DPSK	SISO	2402	3DH5	1	-0.83
		2441	3DH5	1	-1.53
		2480	3DH5	1	-2.30

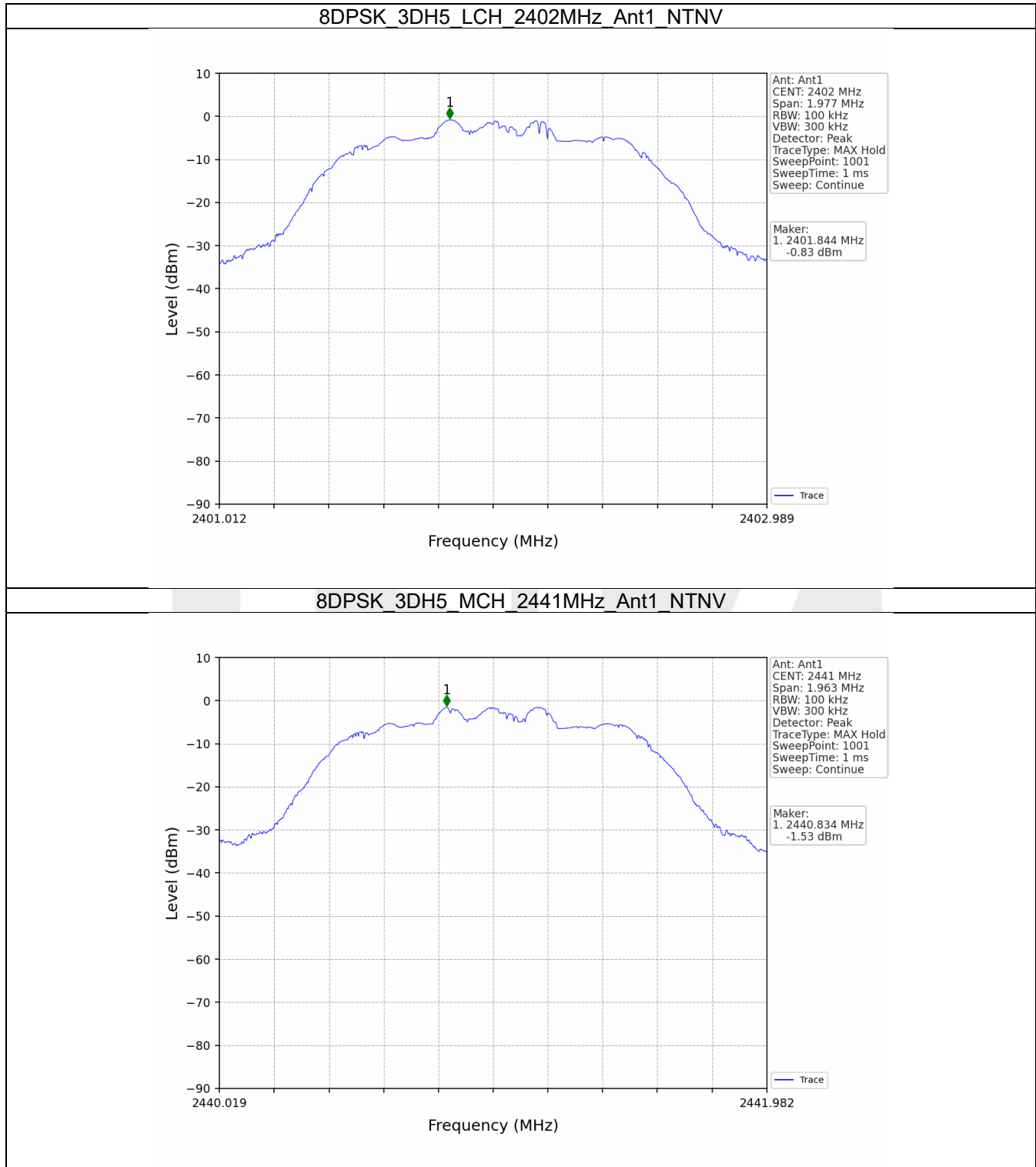
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.

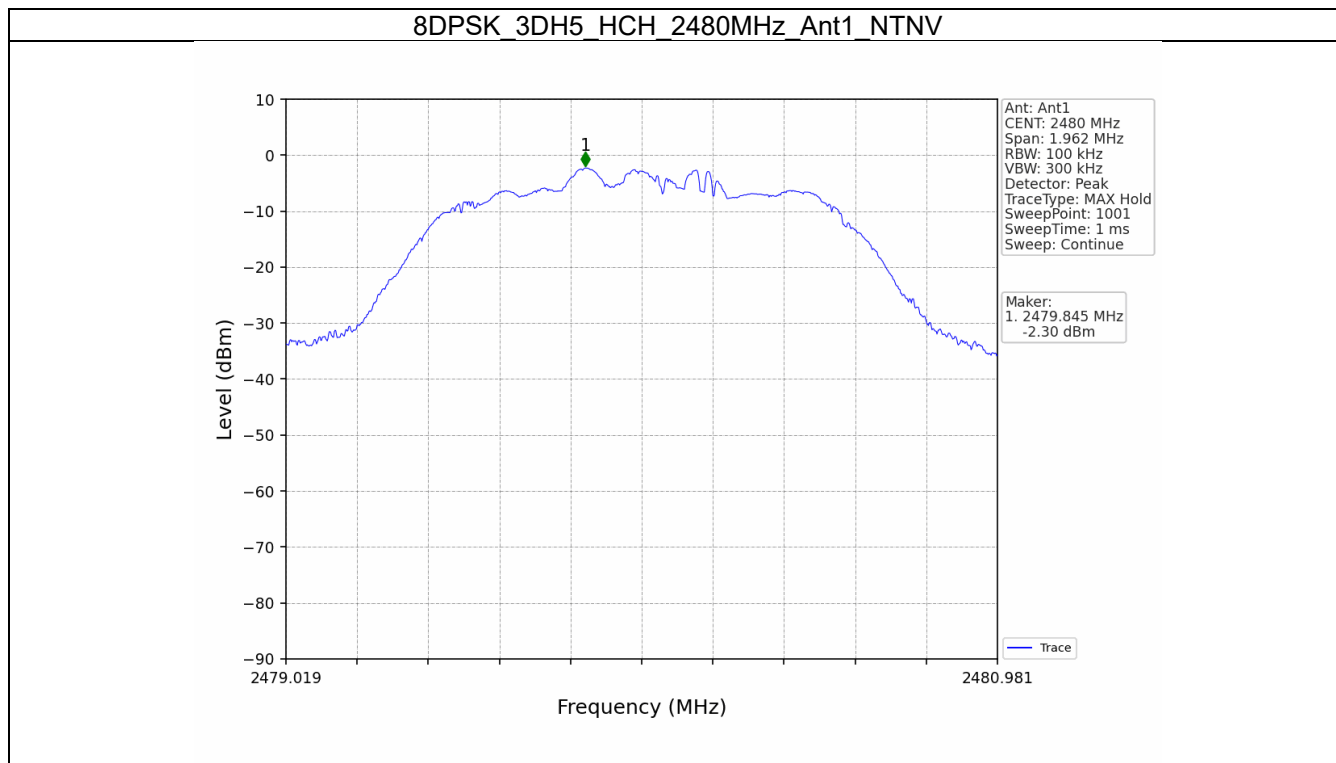
7.1.2 Test Graph











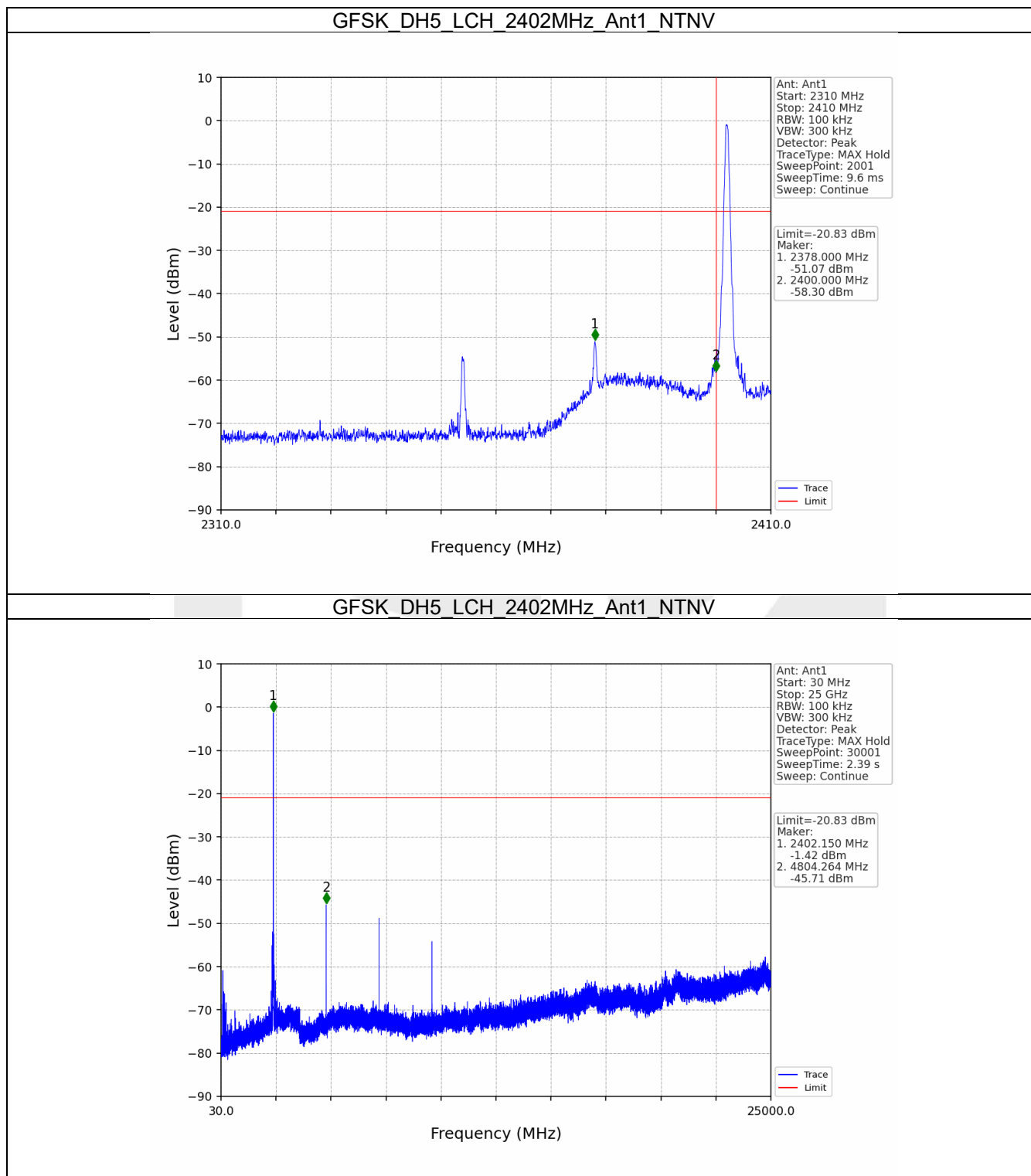
7.2 CSE

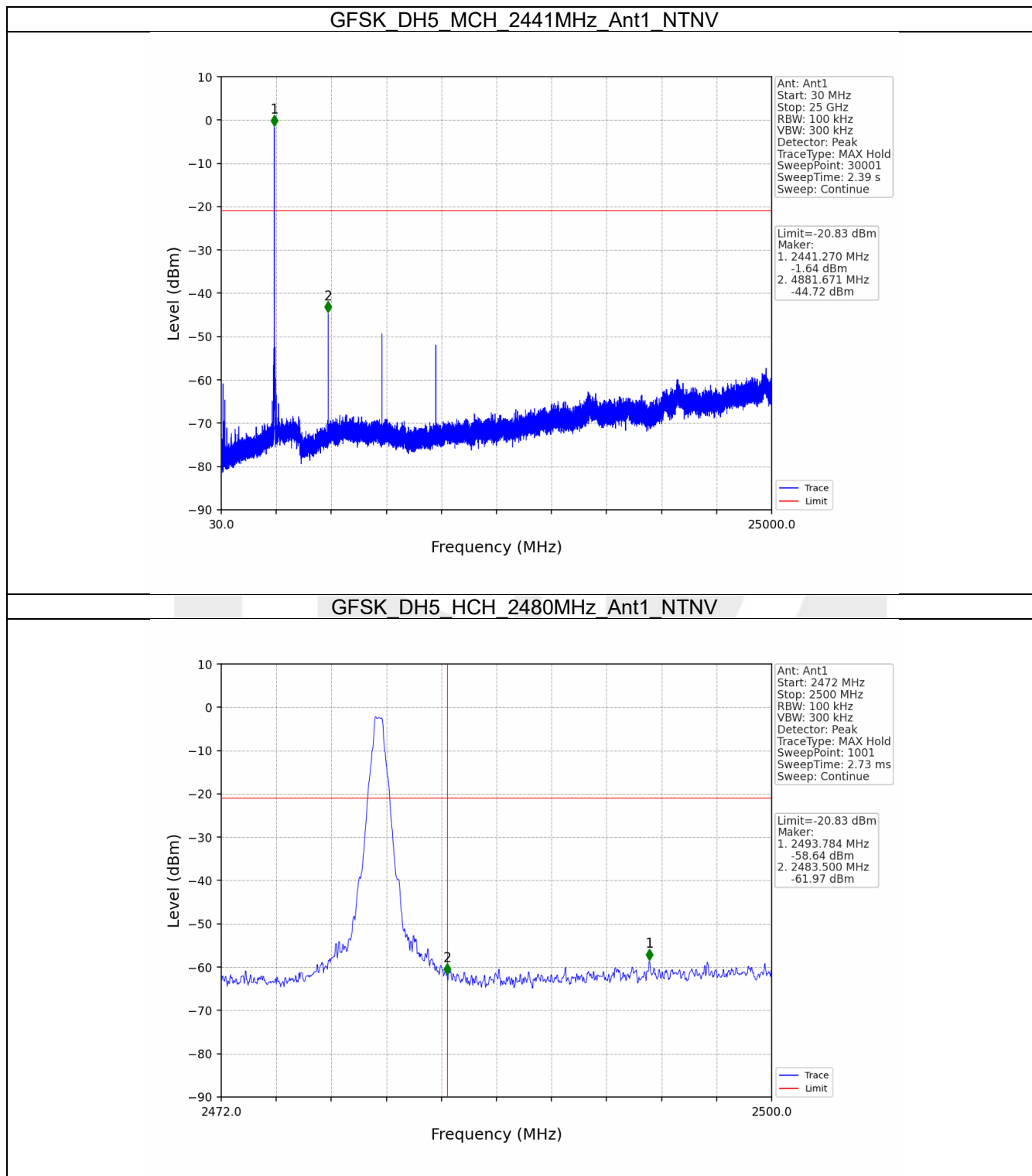
7.2.1 Test Result

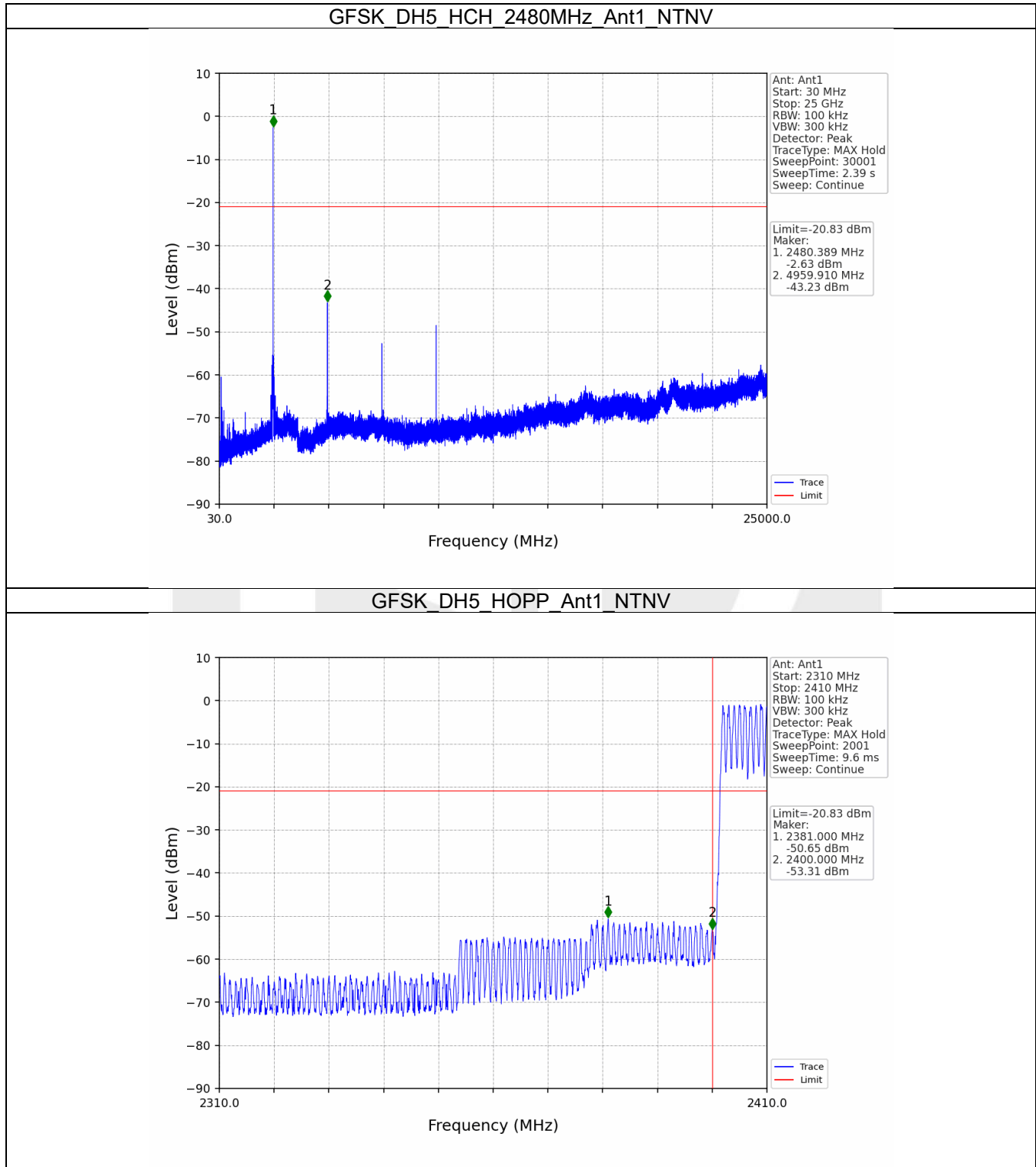
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	-0.83	-20.83	Pass
		2441	DH5	1	-0.83	-20.83	Pass
		2480	DH5	1	-0.83	-20.83	Pass
		HOPP	DH5	1	-0.83	-20.83	Pass
$\pi/4$ DQPSK	SISO	2402	2DH5	1	-0.97	-20.97	Pass
		2441	2DH5	1	-0.97	-20.97	Pass
		2480	2DH5	1	-0.97	-20.97	Pass
		HOPP	2DH5	1	-0.97	-20.97	Pass
8DPSK	SISO	2402	3DH5	1	-0.83	-20.83	Pass
		2441	3DH5	1	-0.83	-20.83	Pass
		2480	3DH5	1	-0.83	-20.83	Pass
		HOPP	3DH5	1	-0.83	-20.83	Pass

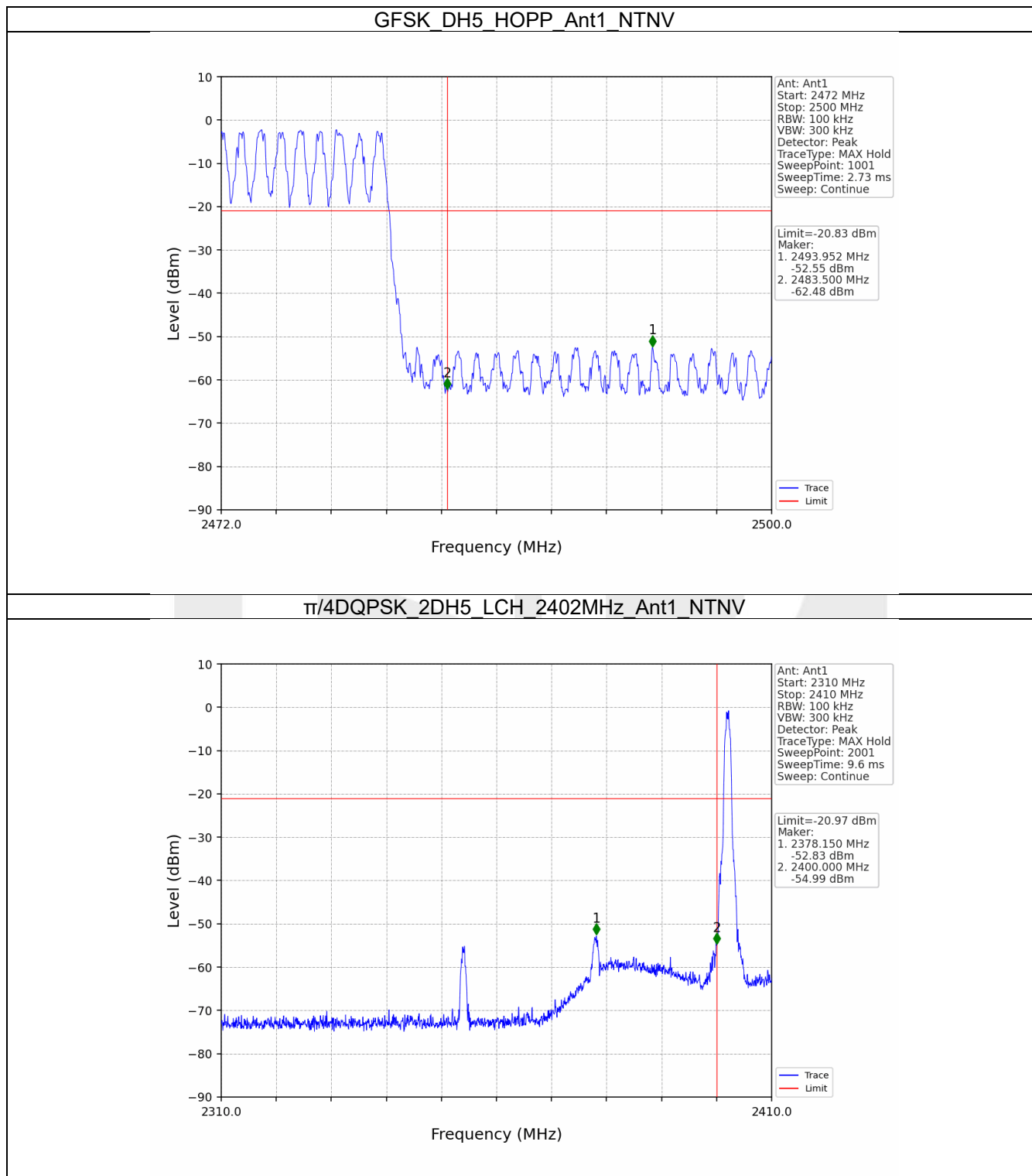
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.

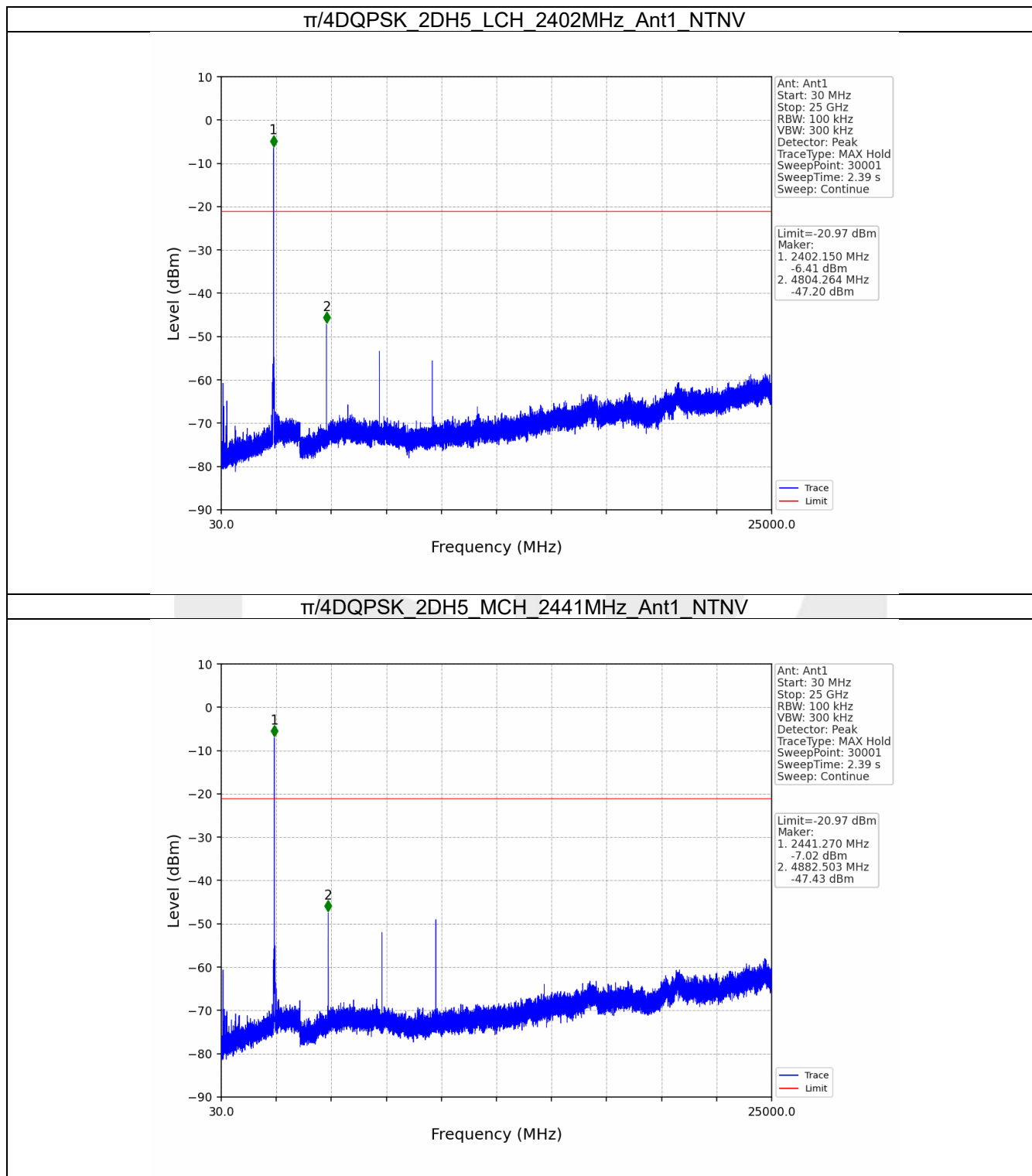
7.2.2 Test Graph

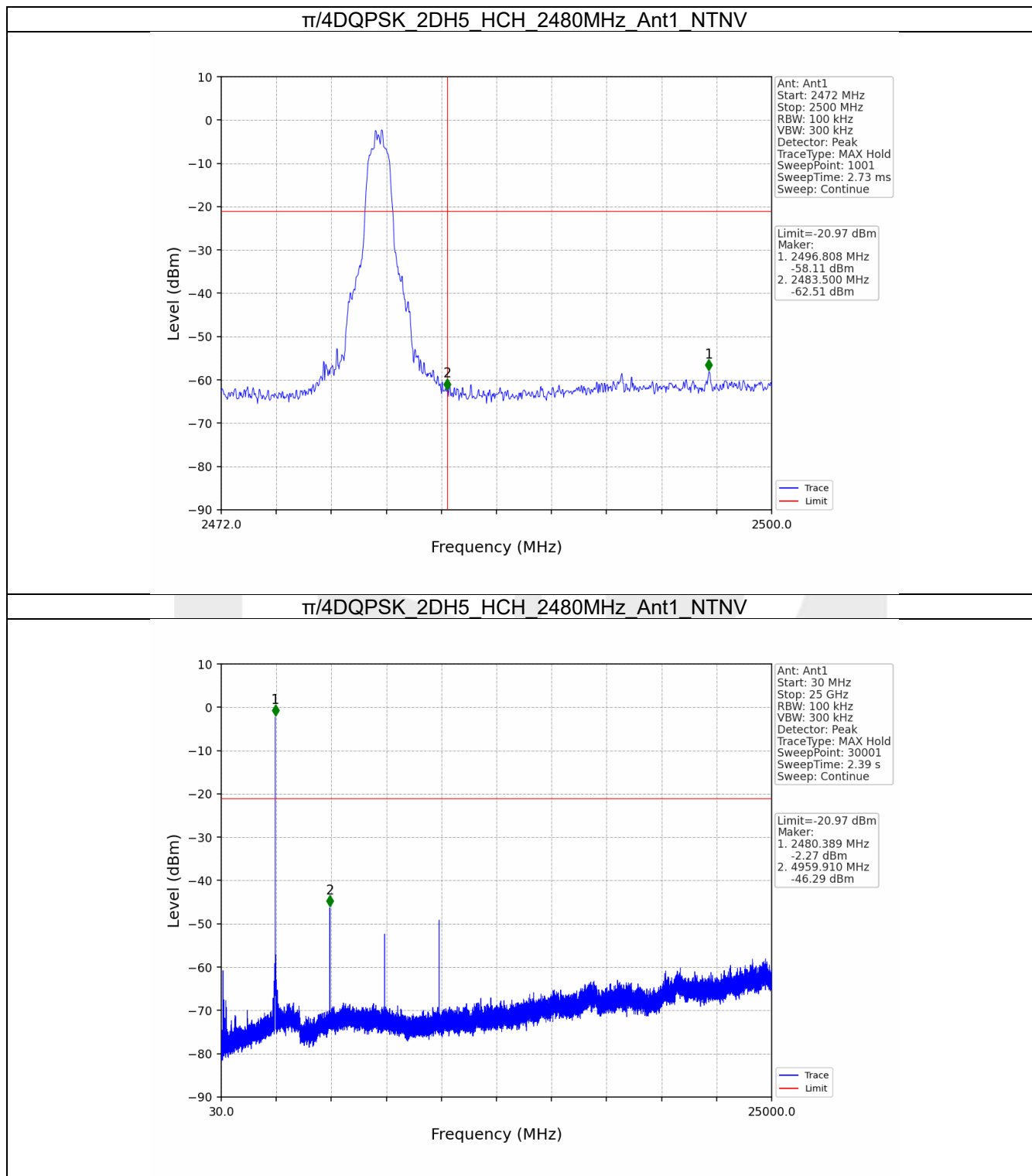


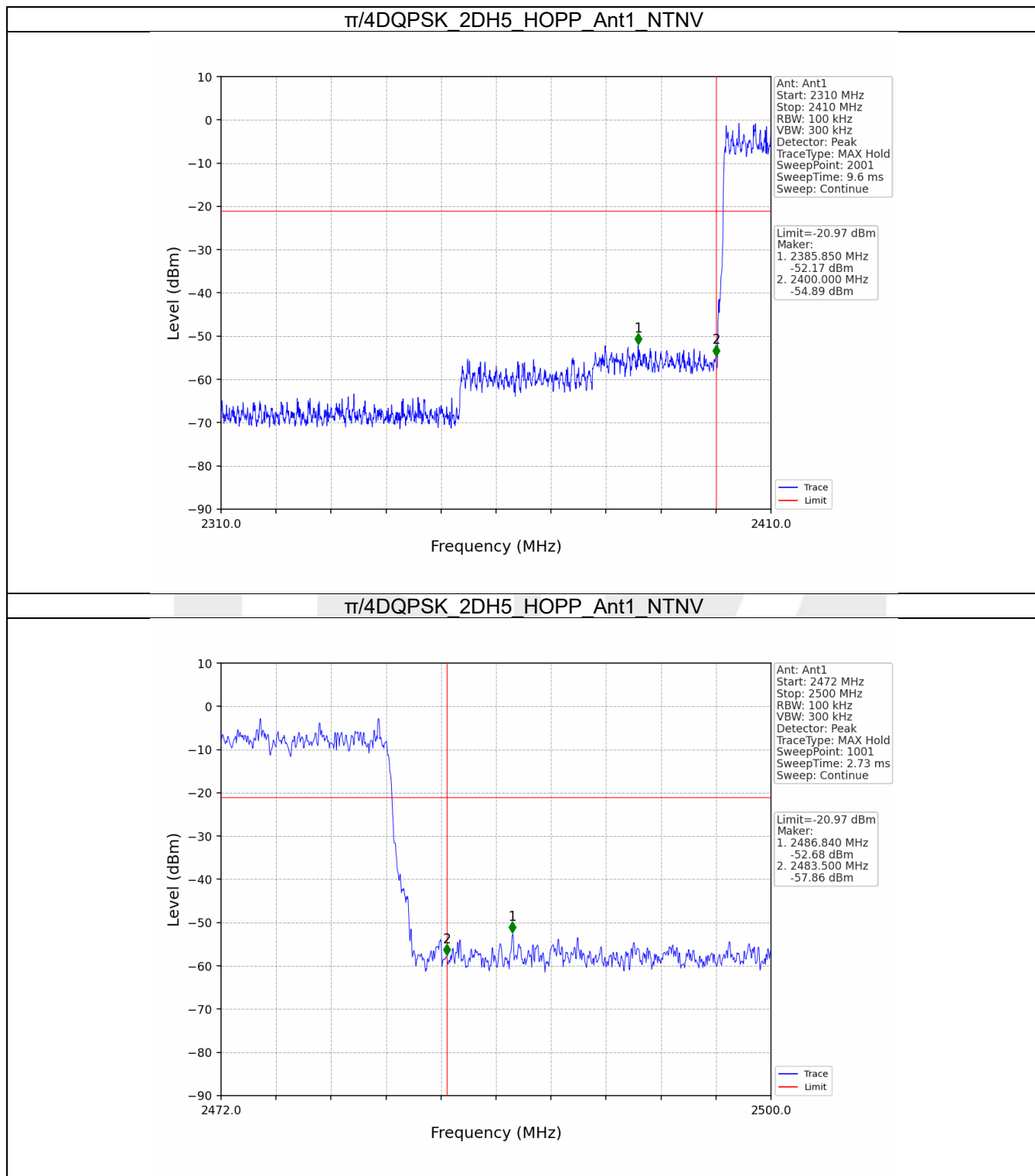


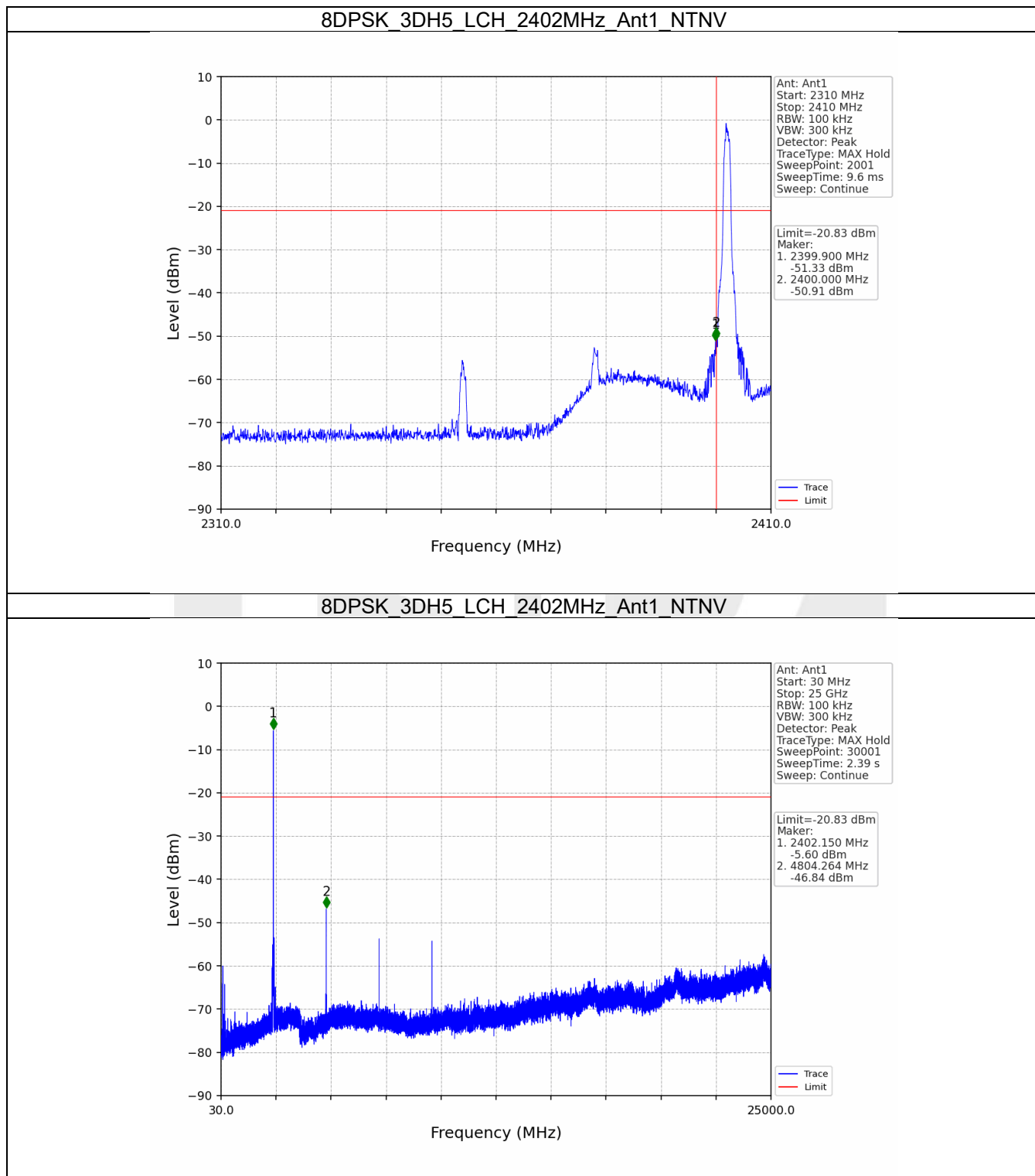


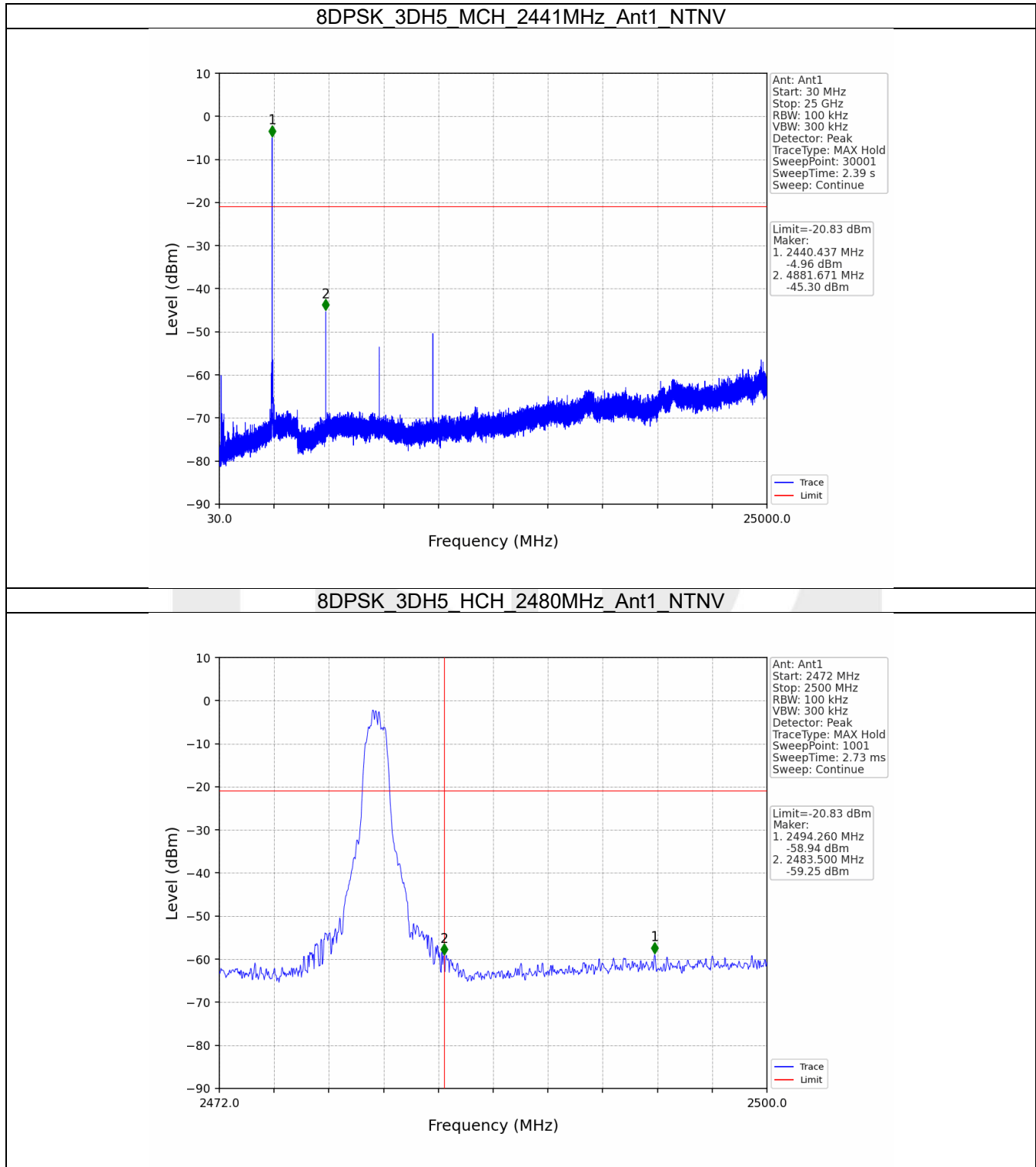


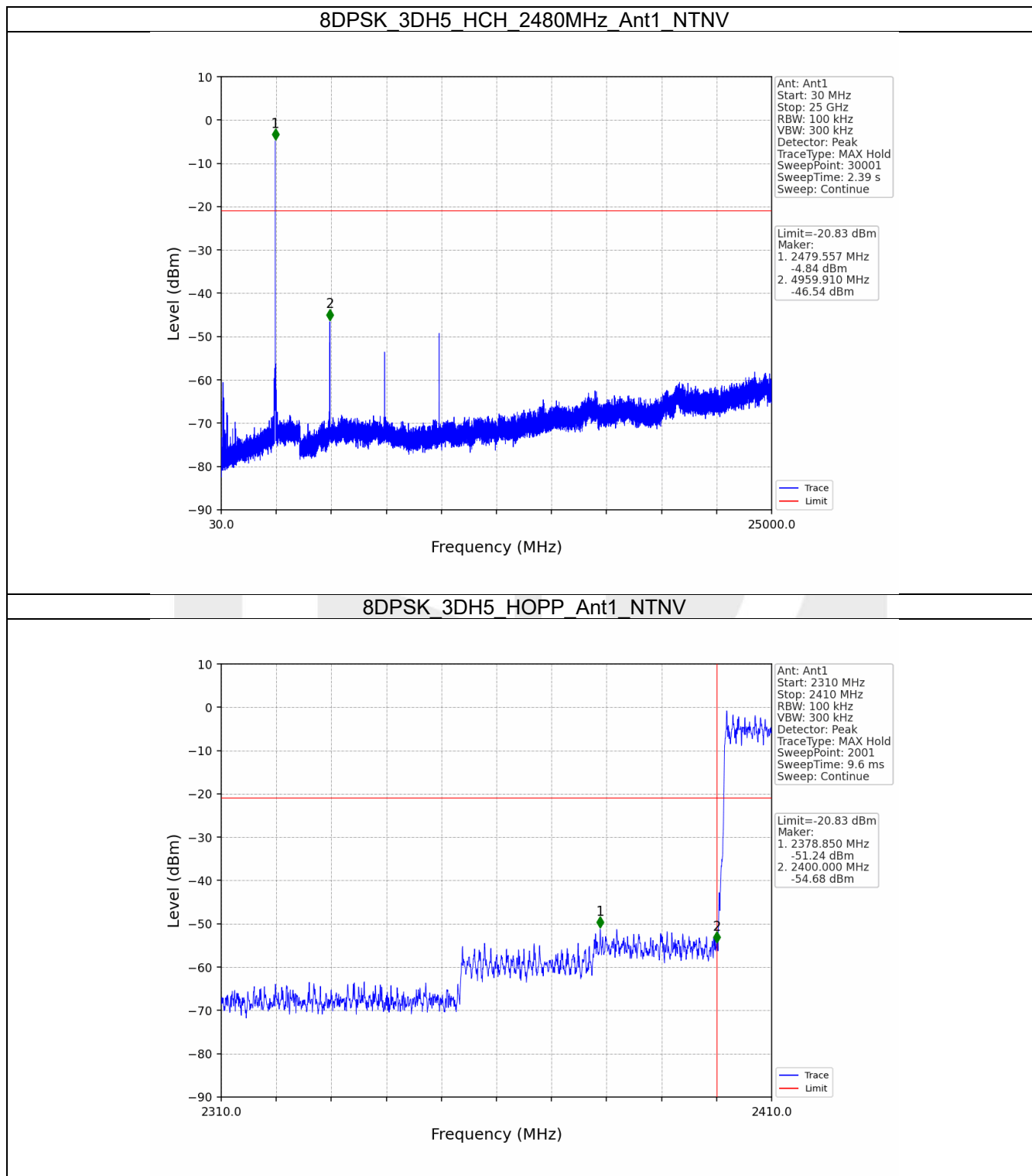


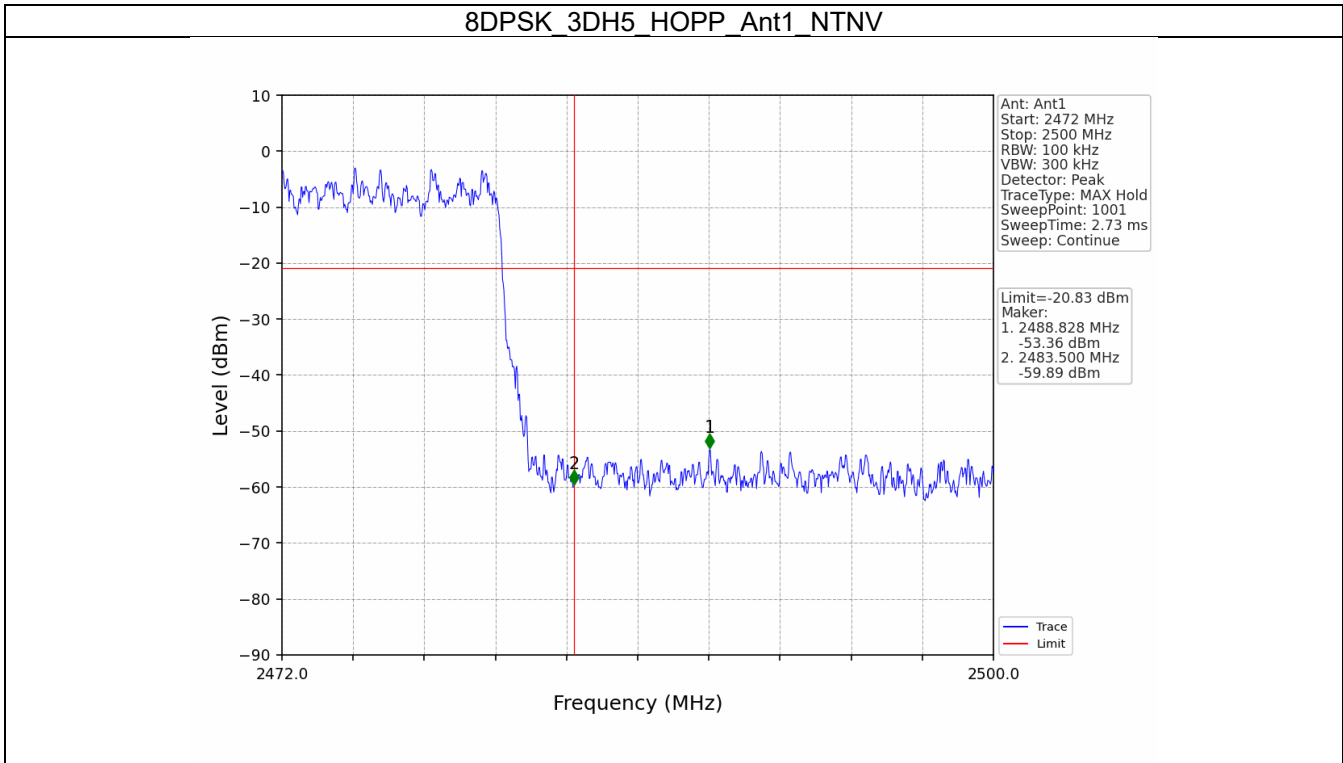












----- End of Report -----