



Shenzhen CTL Testing Technology Co., Ltd.

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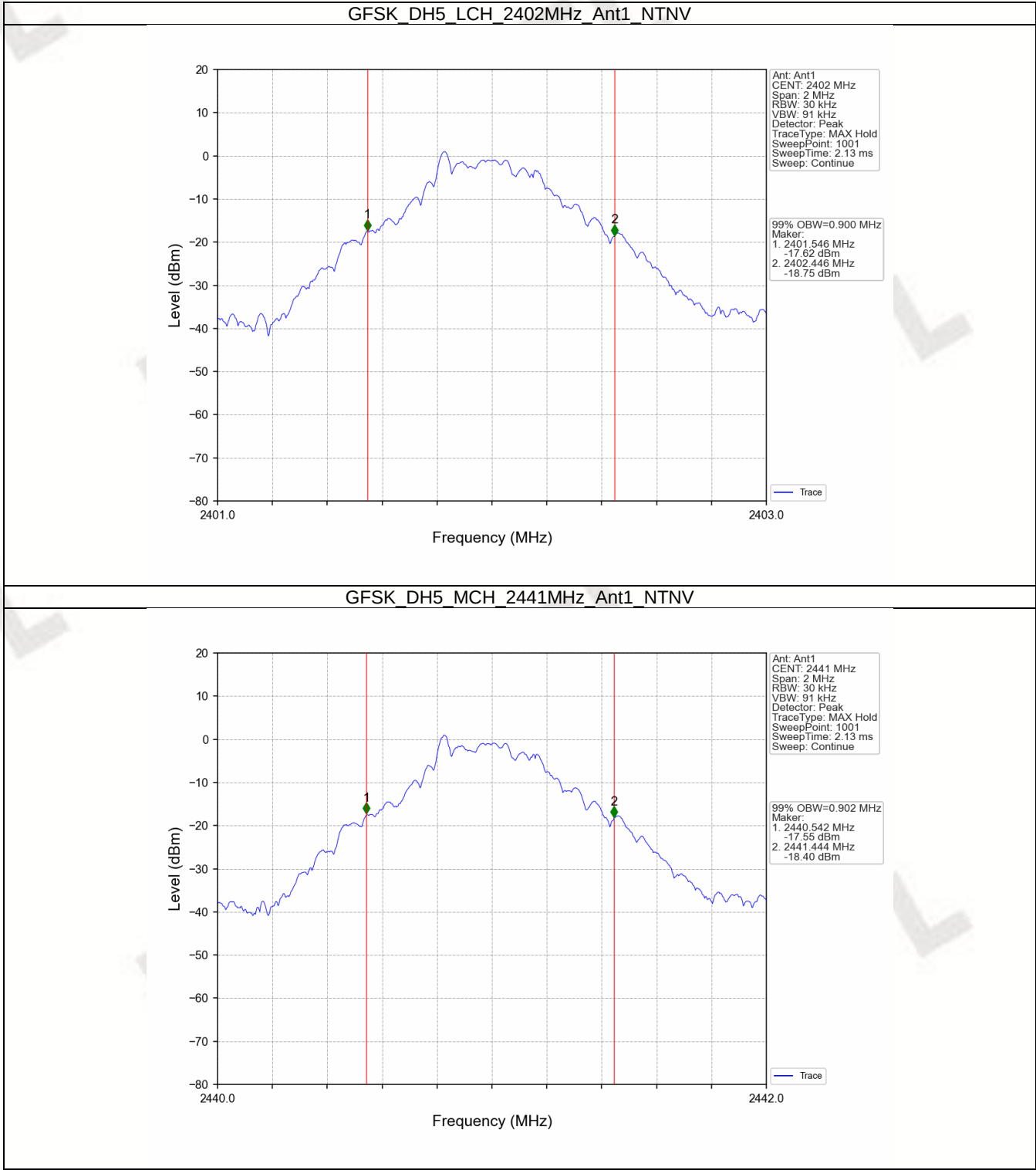
1. Bandwidth

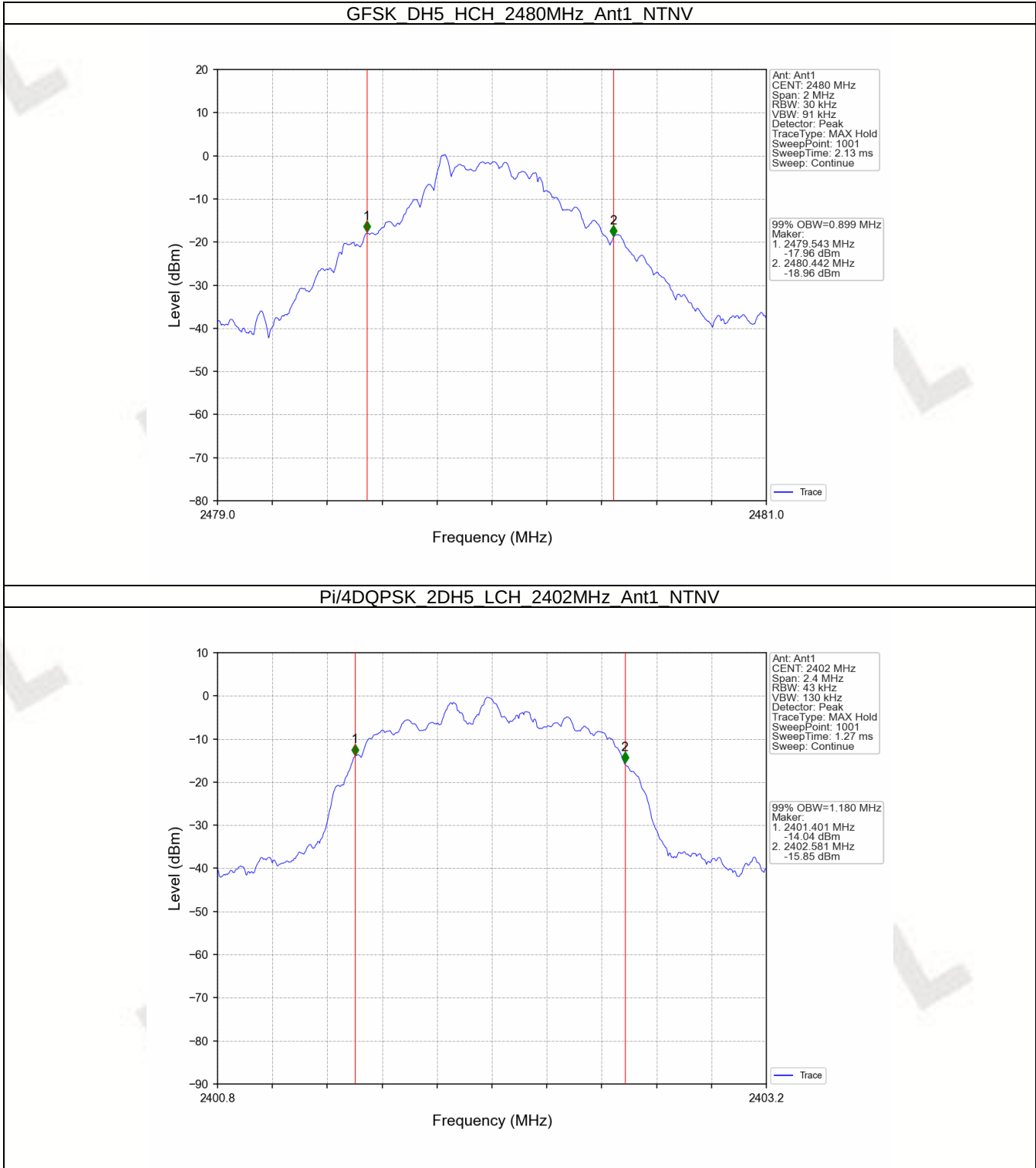
1.1 OBW

1.1.1 Test Result

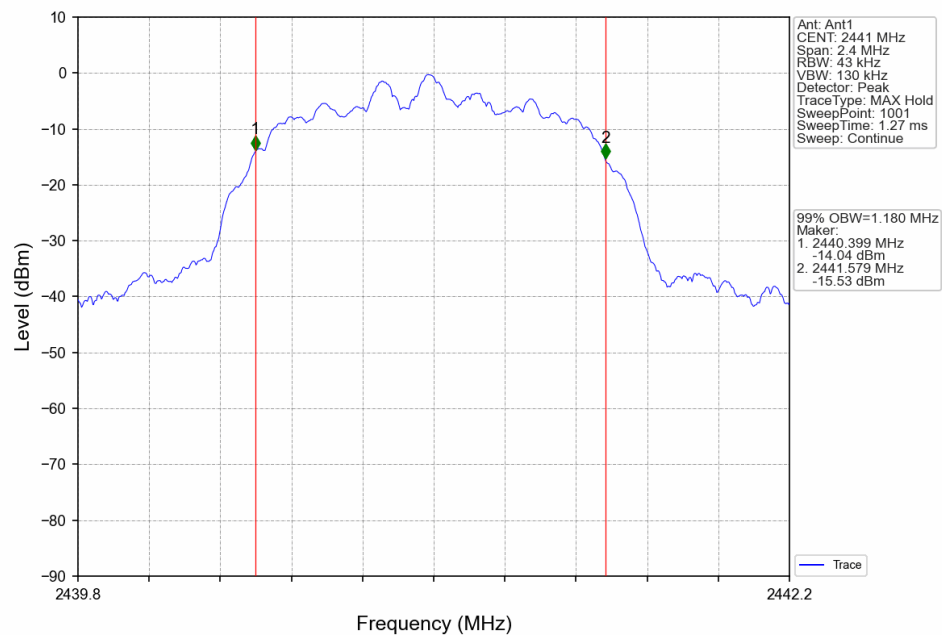
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.900	/	Pass
		2441	DH5	1	0.902	/	Pass
		2480	DH5	1	0.899	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.180	/	Pass
		2441	2DH5	1	1.180	/	Pass
		2480	2DH5	1	1.182	/	Pass
8DPSK	SISO	2402	3DH5	1	1.168	/	Pass
		2441	3DH5	1	1.167	/	Pass
		2480	3DH5	1	1.163	/	Pass

1.1.2 Test Graph

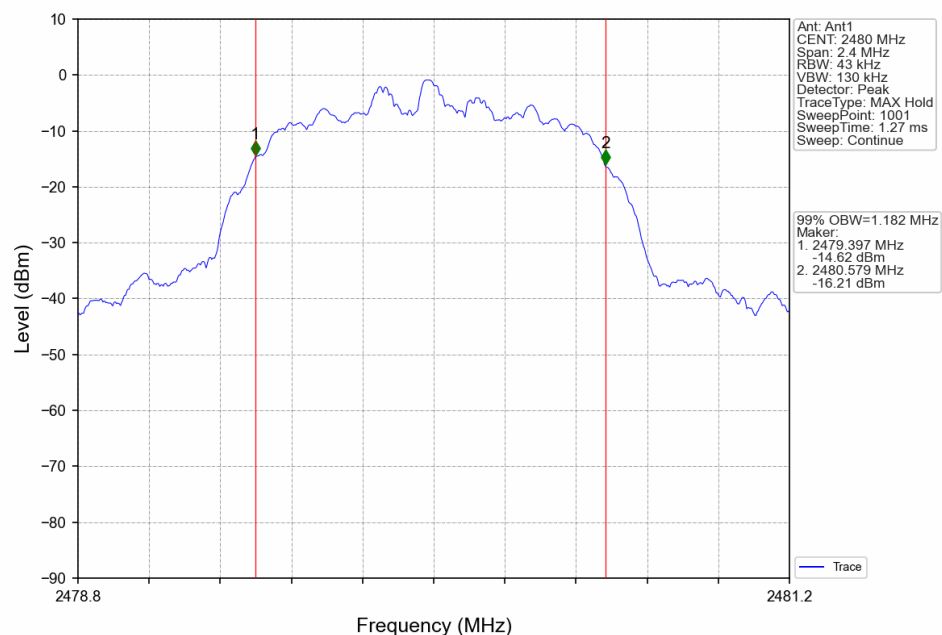


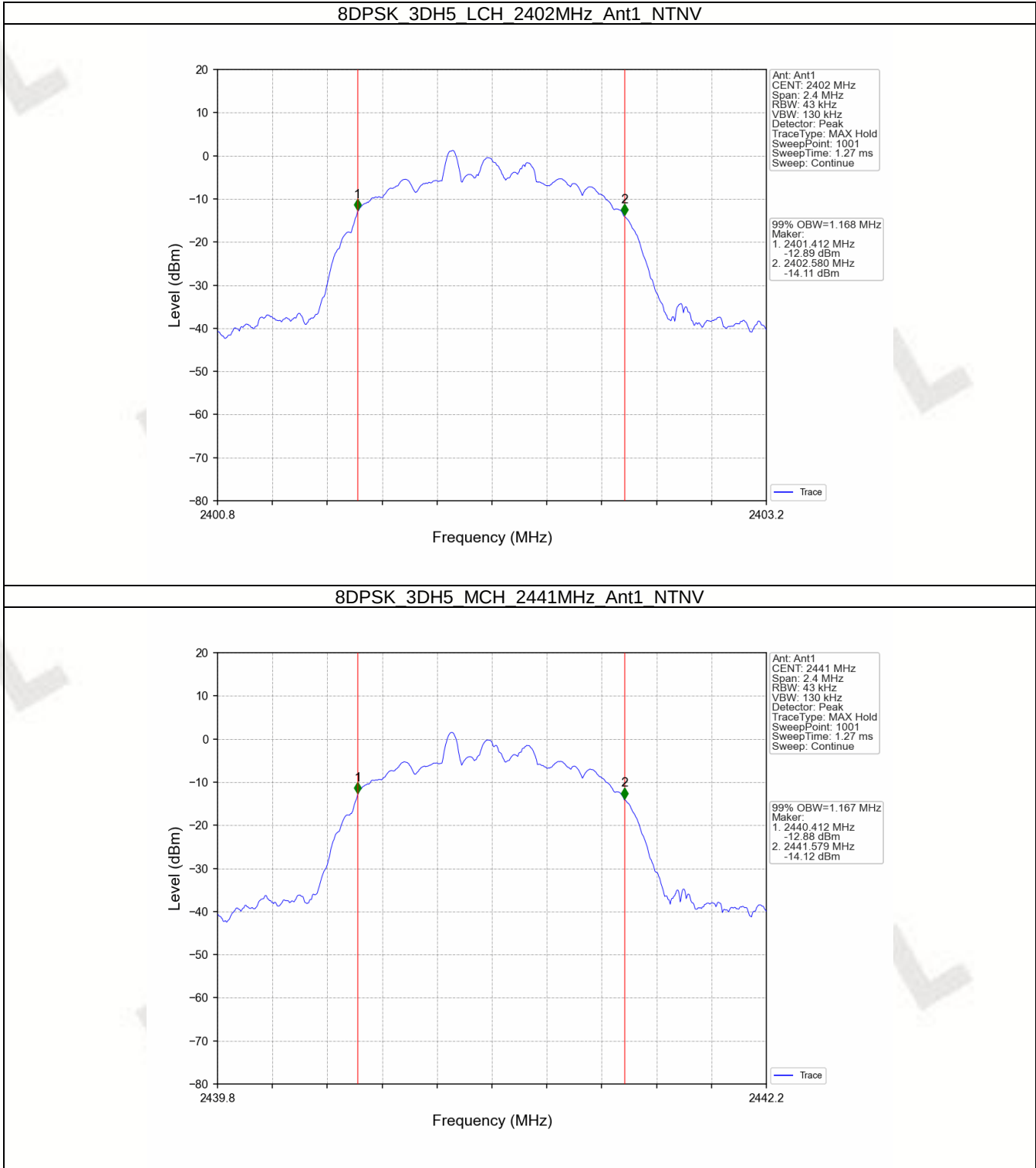


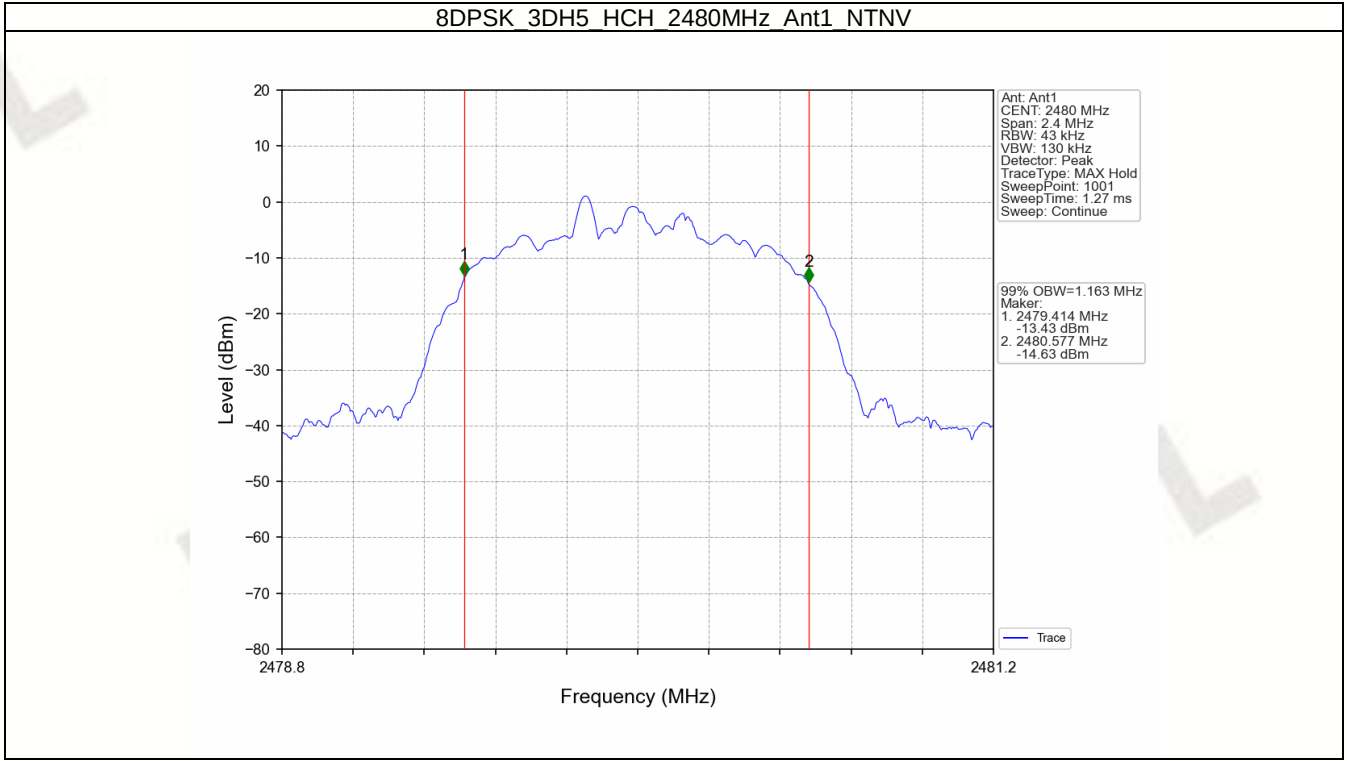
Pi/4DQPSK 2DH5 MCH 2441MHz Ant1 NTN



Pi/4DQPSK 2DH5 HCH 2480MHz Ant1 NTN





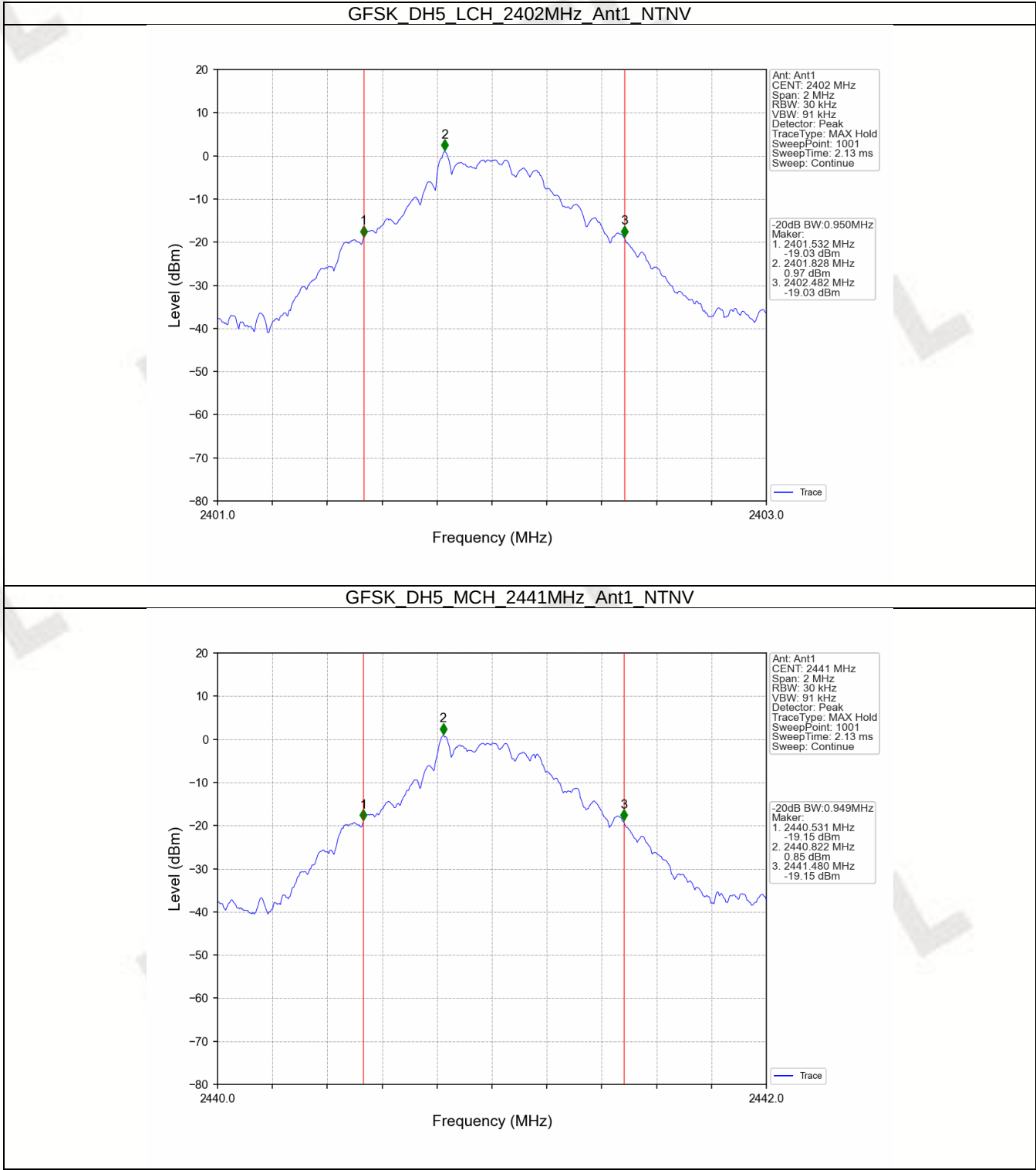


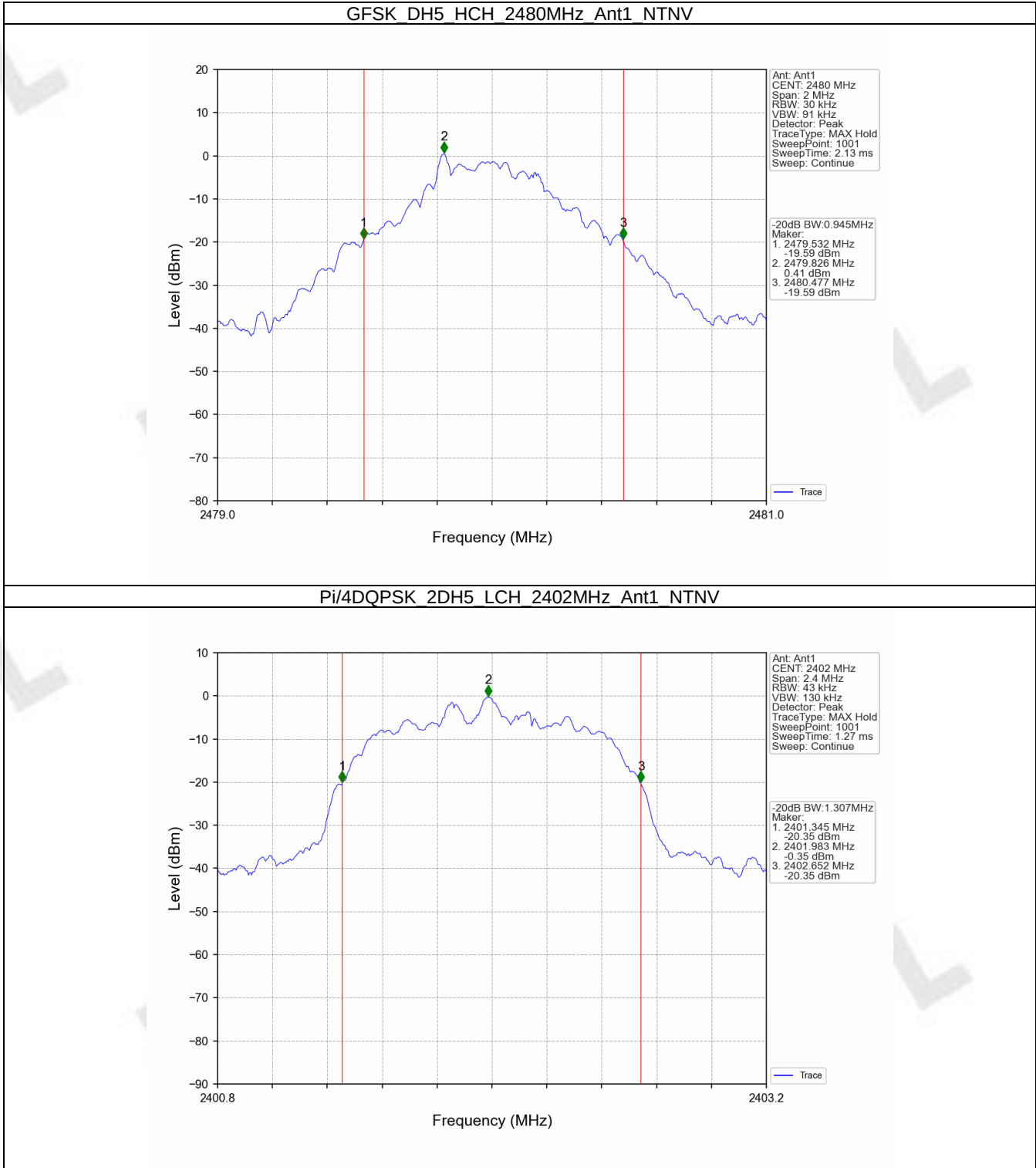
1.2 20dB BW

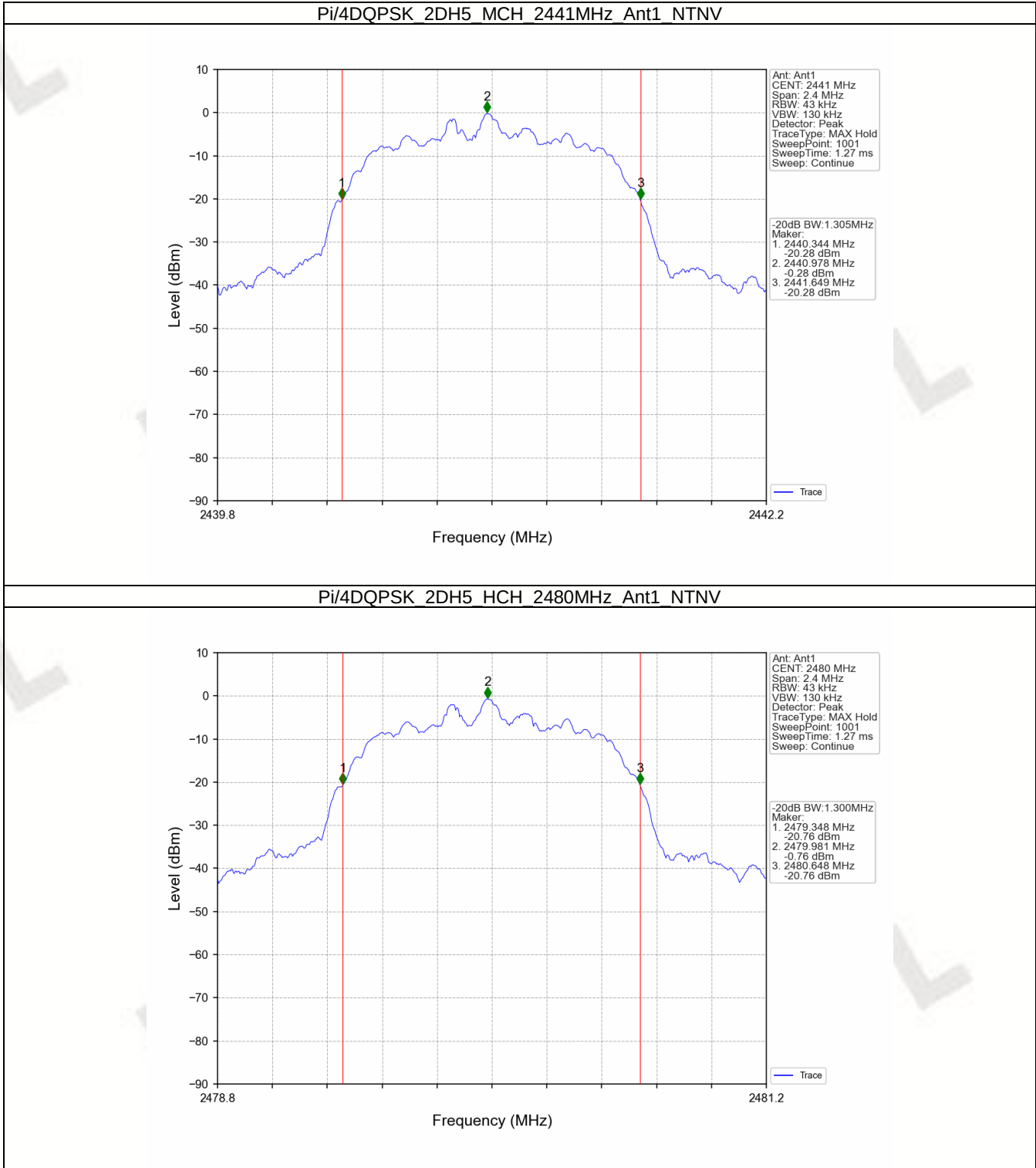
1.2.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.950	/	Pass
		2441	DH5	1	0.949	/	Pass
		2480	DH5	1	0.945	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.307	/	Pass
		2441	2DH5	1	1.305	/	Pass
		2480	2DH5	1	1.300	/	Pass
8DPSK	SISO	2402	3DH5	1	1.283	/	Pass
		2441	3DH5	1	1.282	/	Pass
		2480	3DH5	1	1.278	/	Pass

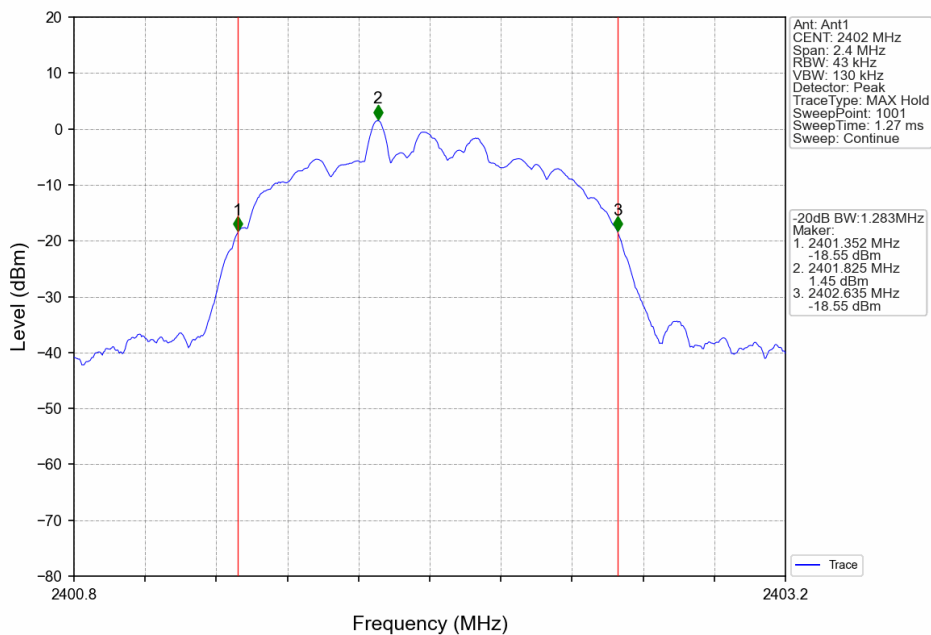
1.2.2 Test Graph



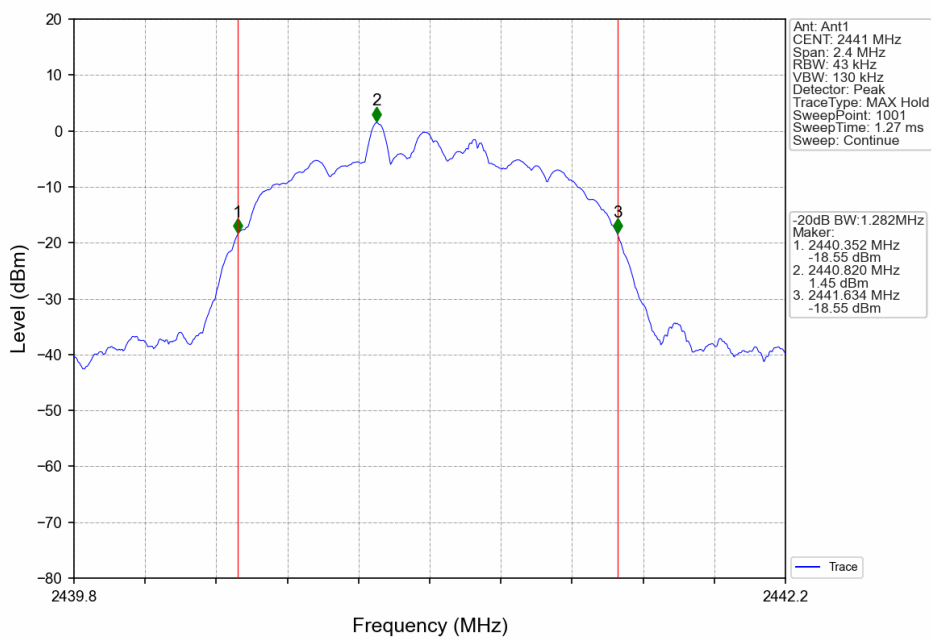


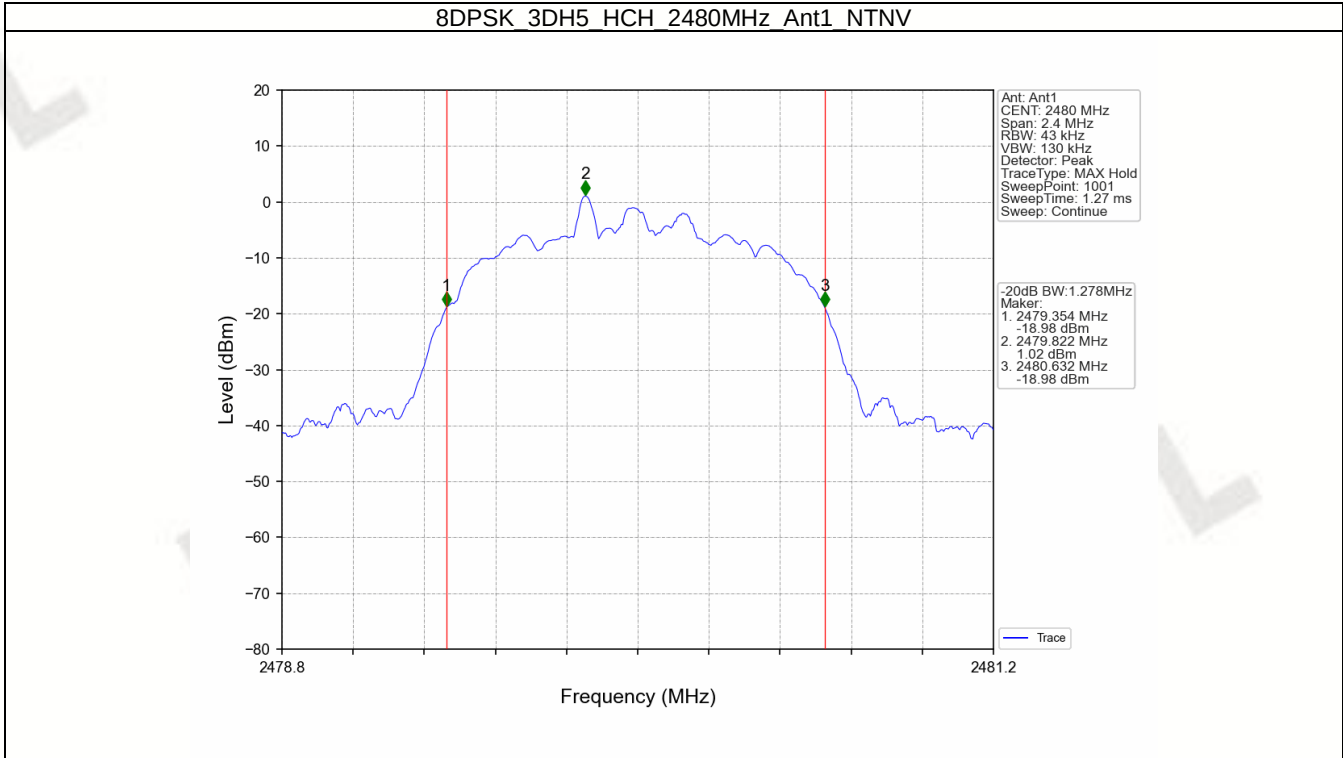


8DPSK 3DH5 LCH 2402MHz Ant1 NTV



8DPSK 3DH5 MCH 2441MHz Ant1 NTV





2. Maximum Conducted Output Power

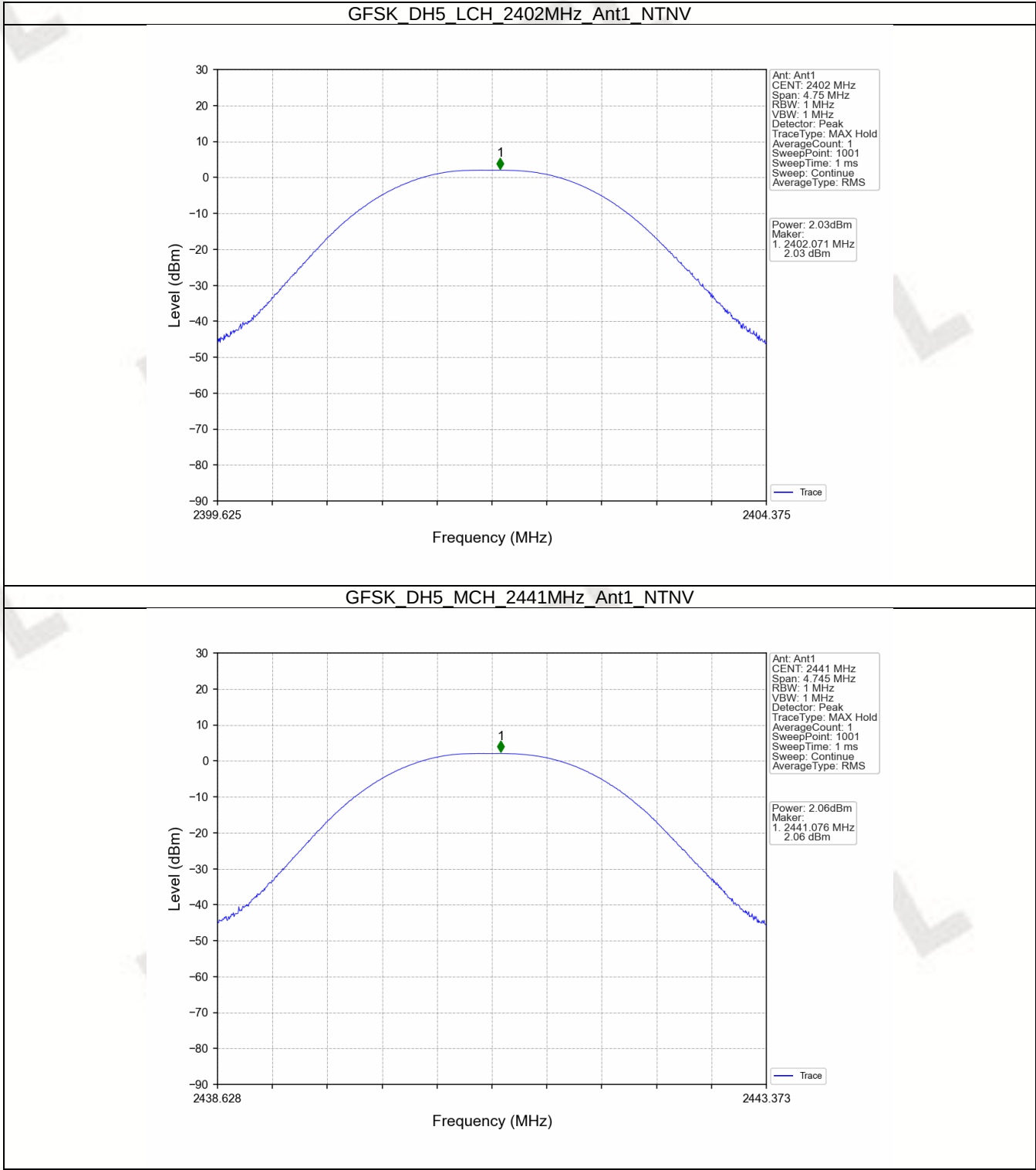
2.1 Power

2.1.1 Test Result

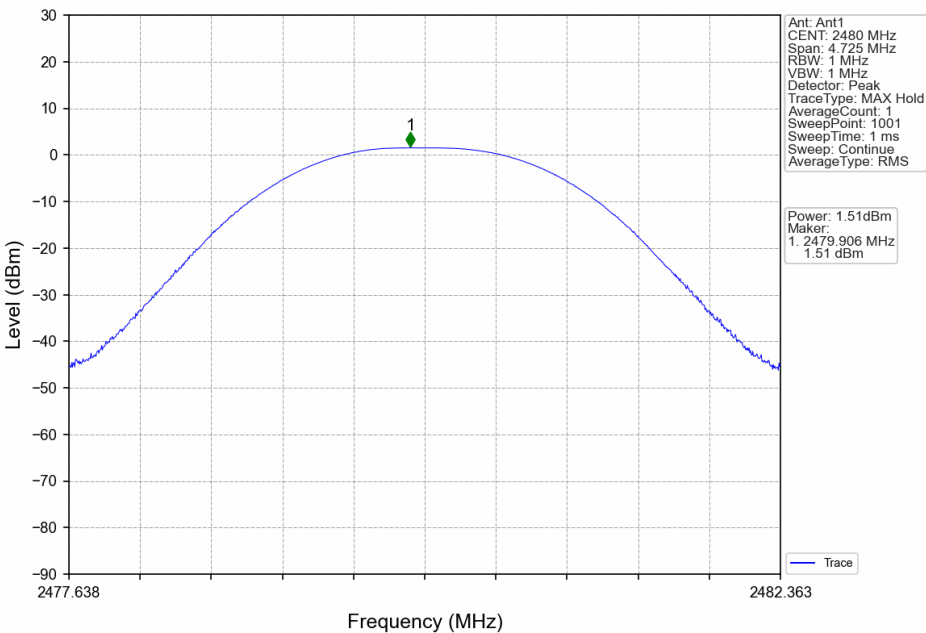
Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	2.03	≤ 30	Pass
		2441	DH5	2.06	≤ 30	Pass
		2480	DH5	1.51	≤ 30	Pass
PI/4DQPSK	SISO	2402	2DH5	2.56	≤ 20.97	Pass
		2441	2DH5	2.69	≤ 20.97	Pass
		2480	2DH5	2.02	≤ 20.97	Pass
8DPSK	SISO	2402	3DH5	3.01	≤ 20.97	Pass
		2441	3DH5	3.17	≤ 20.97	Pass
		2480	3DH5	2.59	≤ 20.97	Pass

Note1: Antenna Gain: Ant1: 1.50dBi;

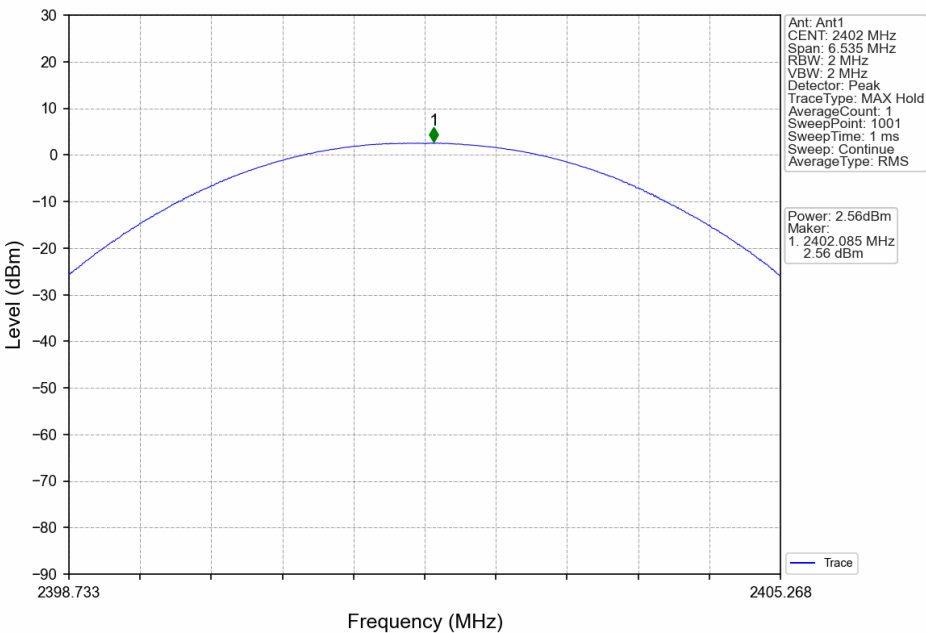
2.1.2 Test Graph



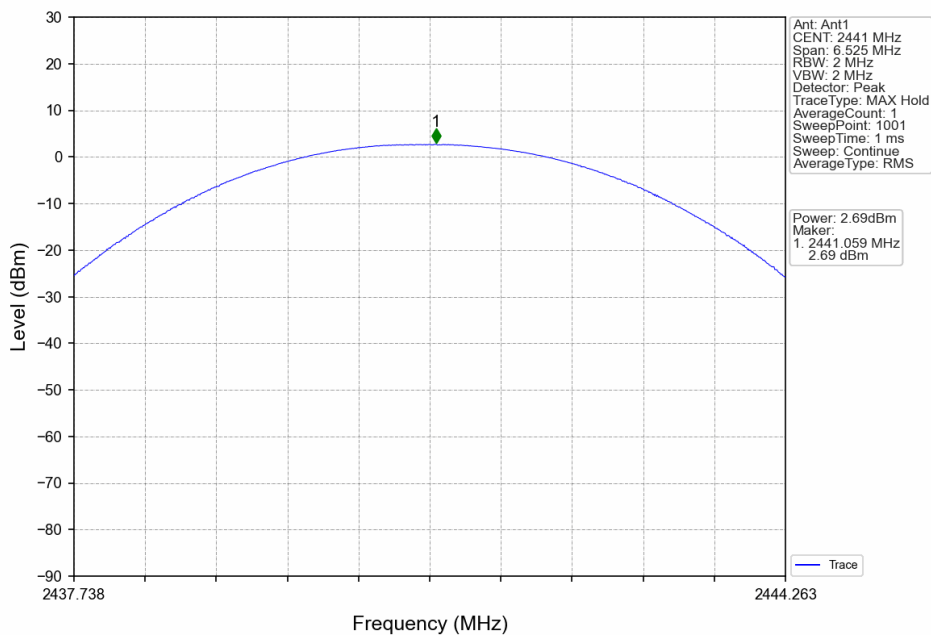
GFSK DH5 HCH 2480MHz Ant1 NTN



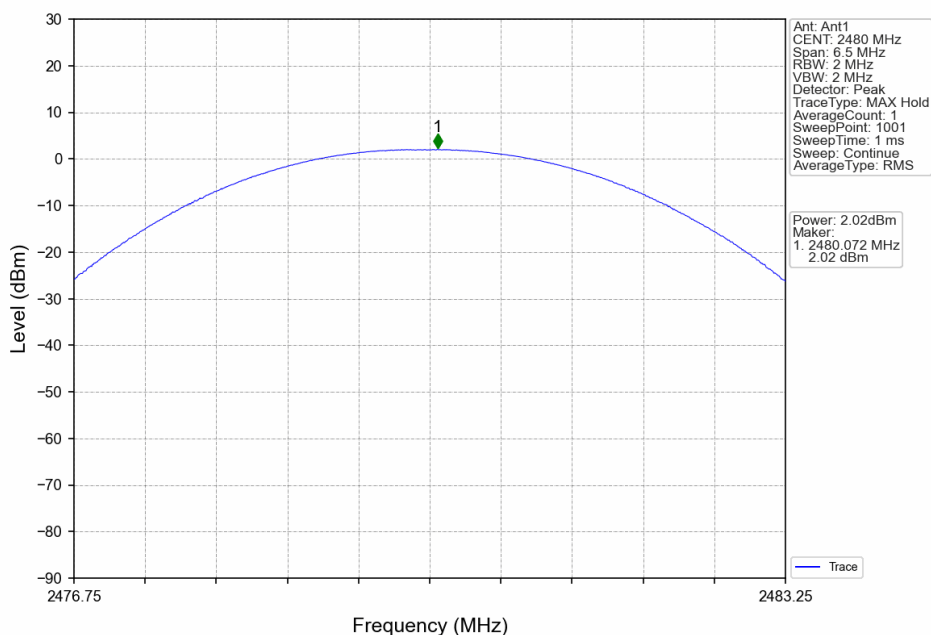
Pi/4DQPSK 2DH5 LCH 2402MHz Ant1 NTN

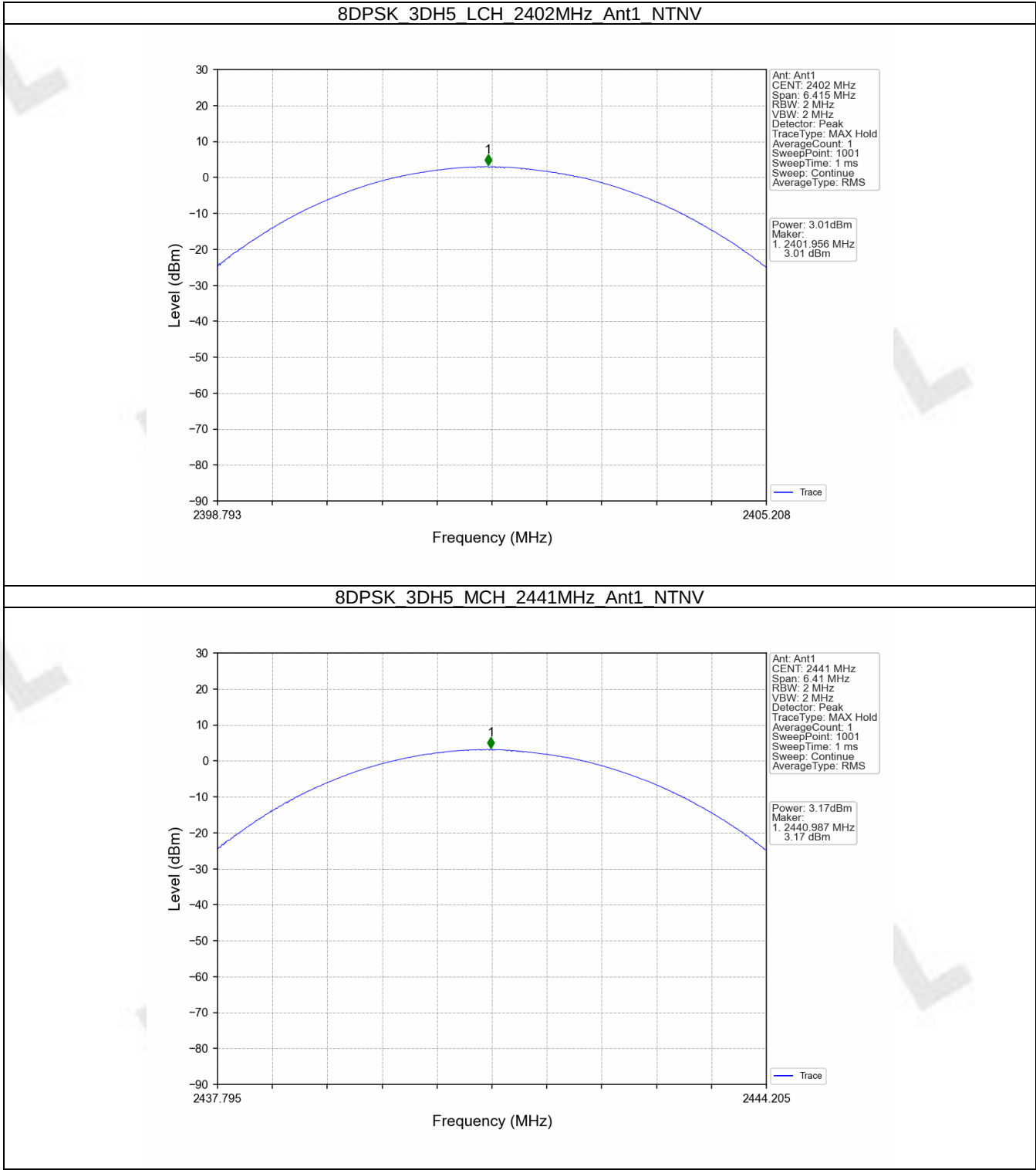


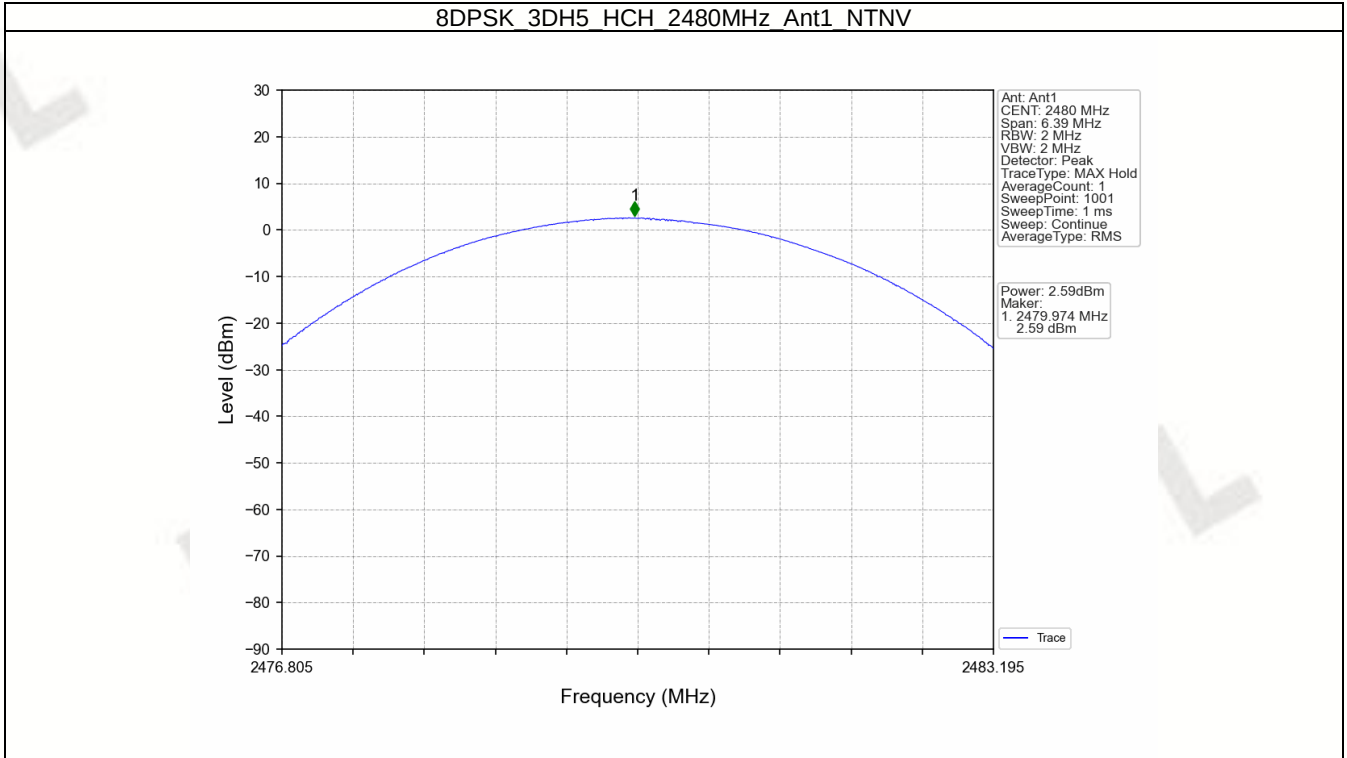
Pi/4DQPSK 2DH5 MCH 2441MHz Ant1 NTNV



Pi/4DQPSK 2DH5 HCH 2480MHz Ant1 NTNV







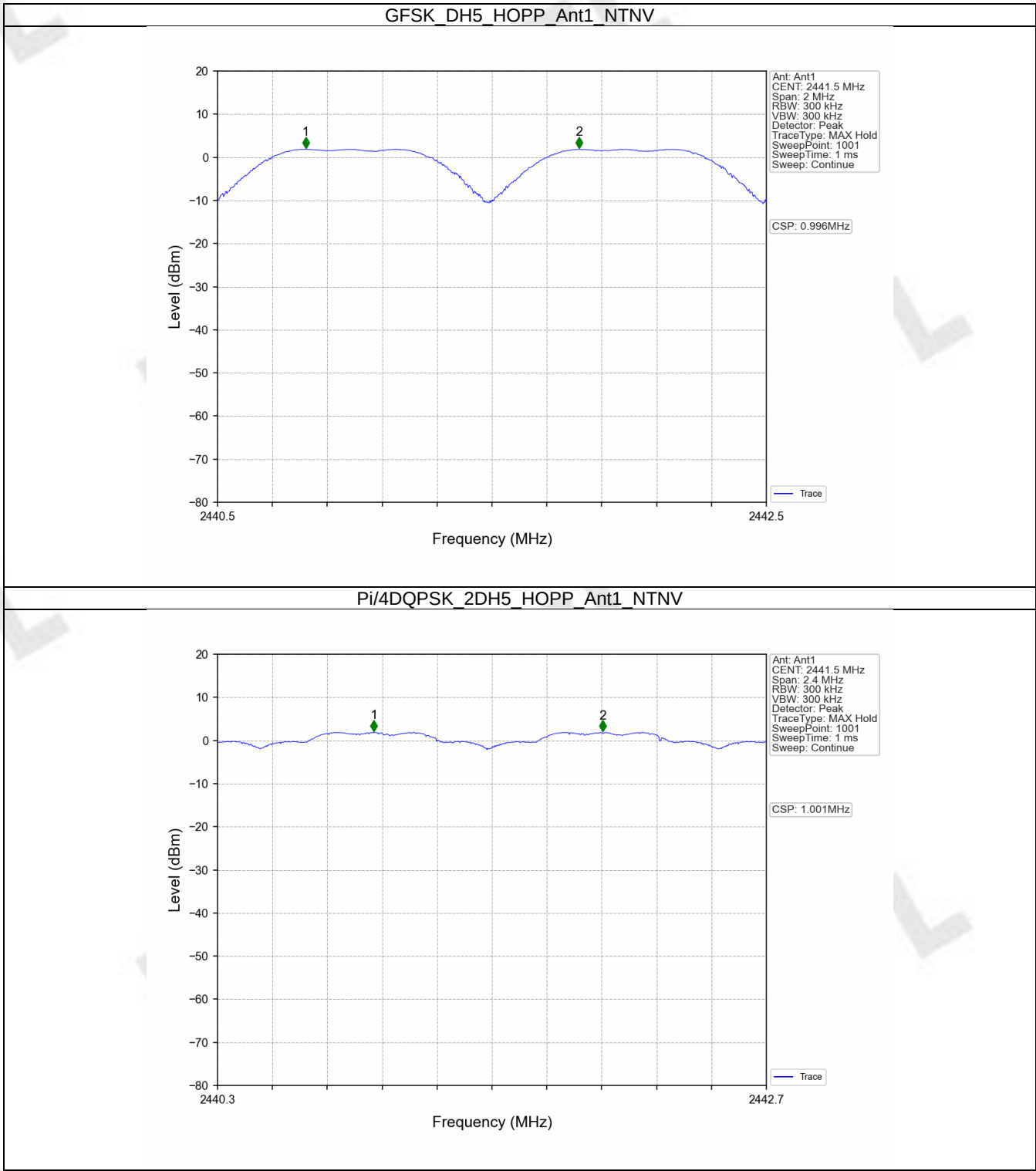
3. Carrier Frequency Separation

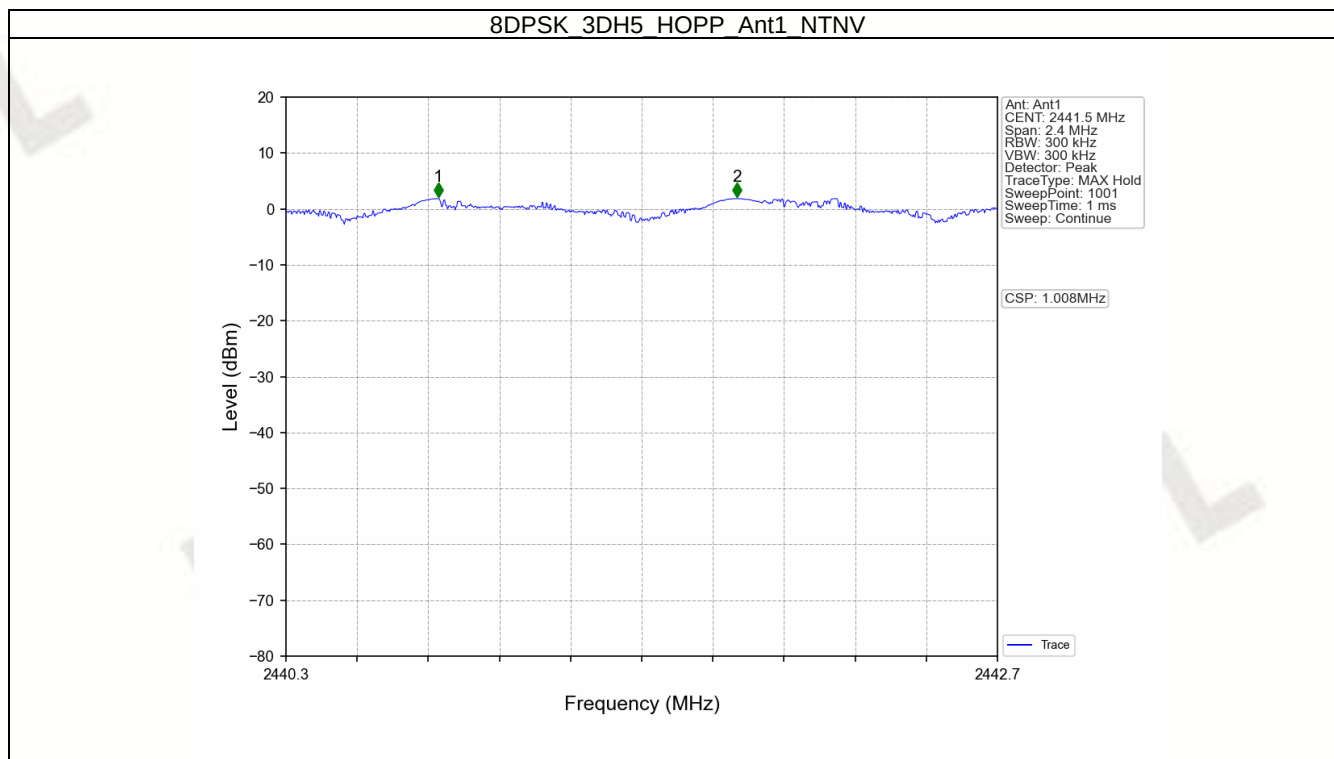
3.1 Ant1

3.1.1 Test Result

Ant1							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	0.996	0.950	≥ 0.95	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	1.001	1.307	≥ 0.871	Pass
8DPSK	SISO	HOPP	3DH5	1.008	1.283	≥ 0.855	Pass

3.1.2 Test Graph





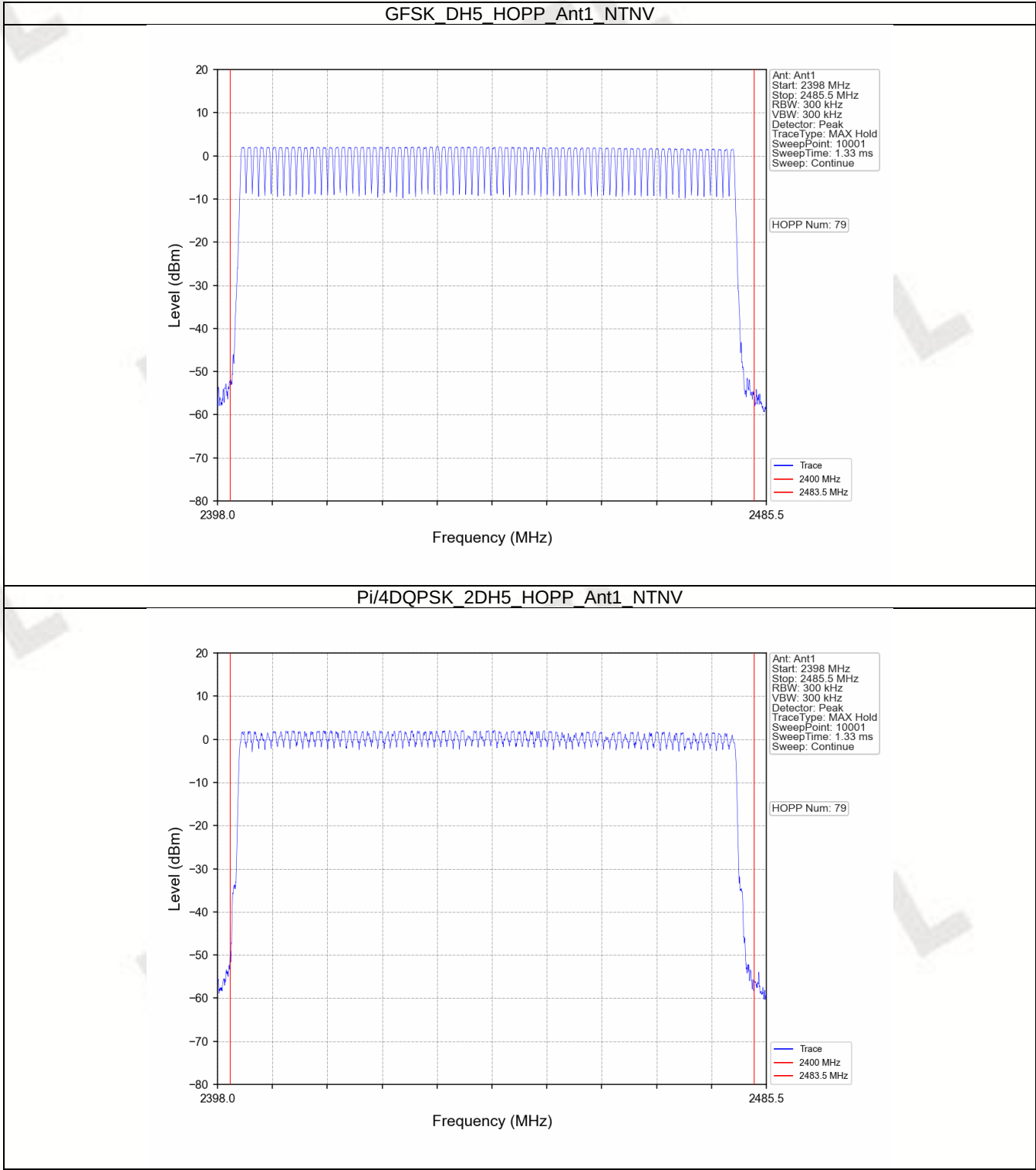
4. Number of Hopping Frequencies

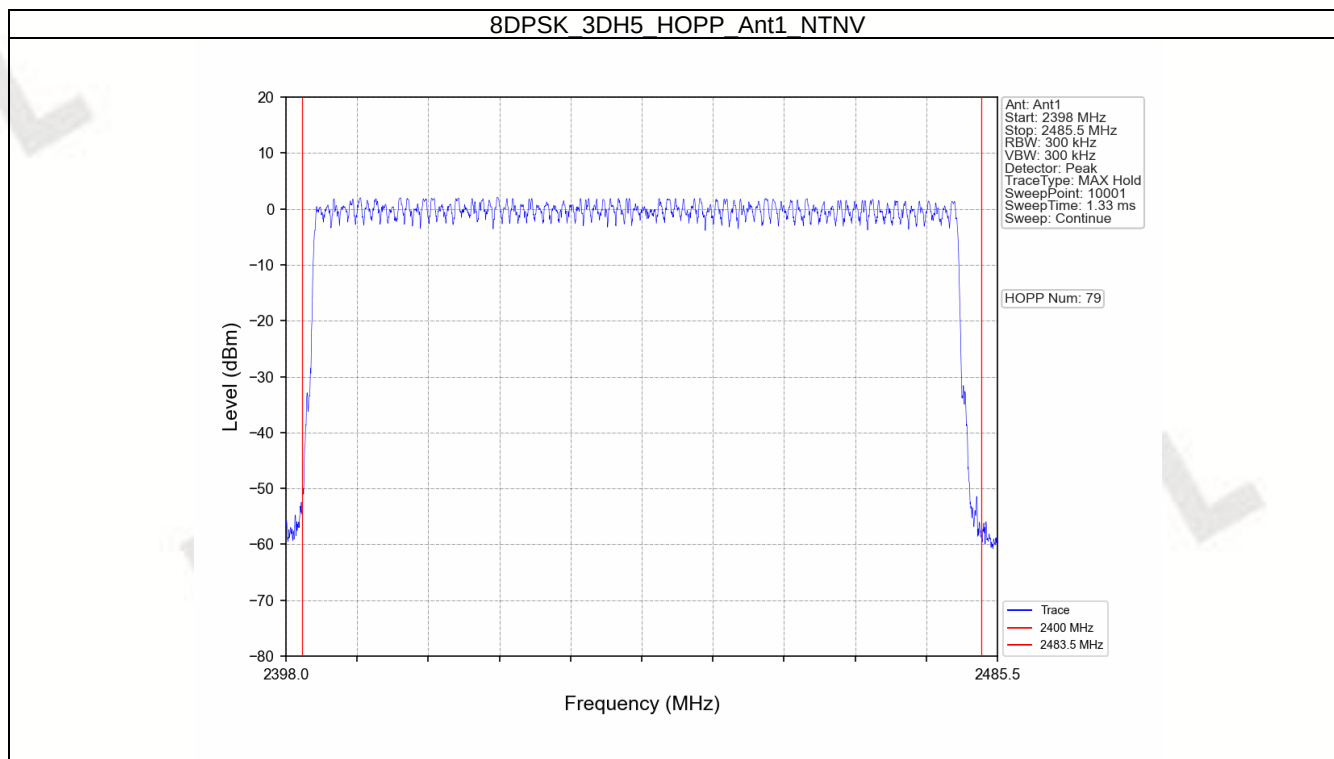
4.1 HoppNum

4.1.1 Test Result

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

4.1.2 Test Graph





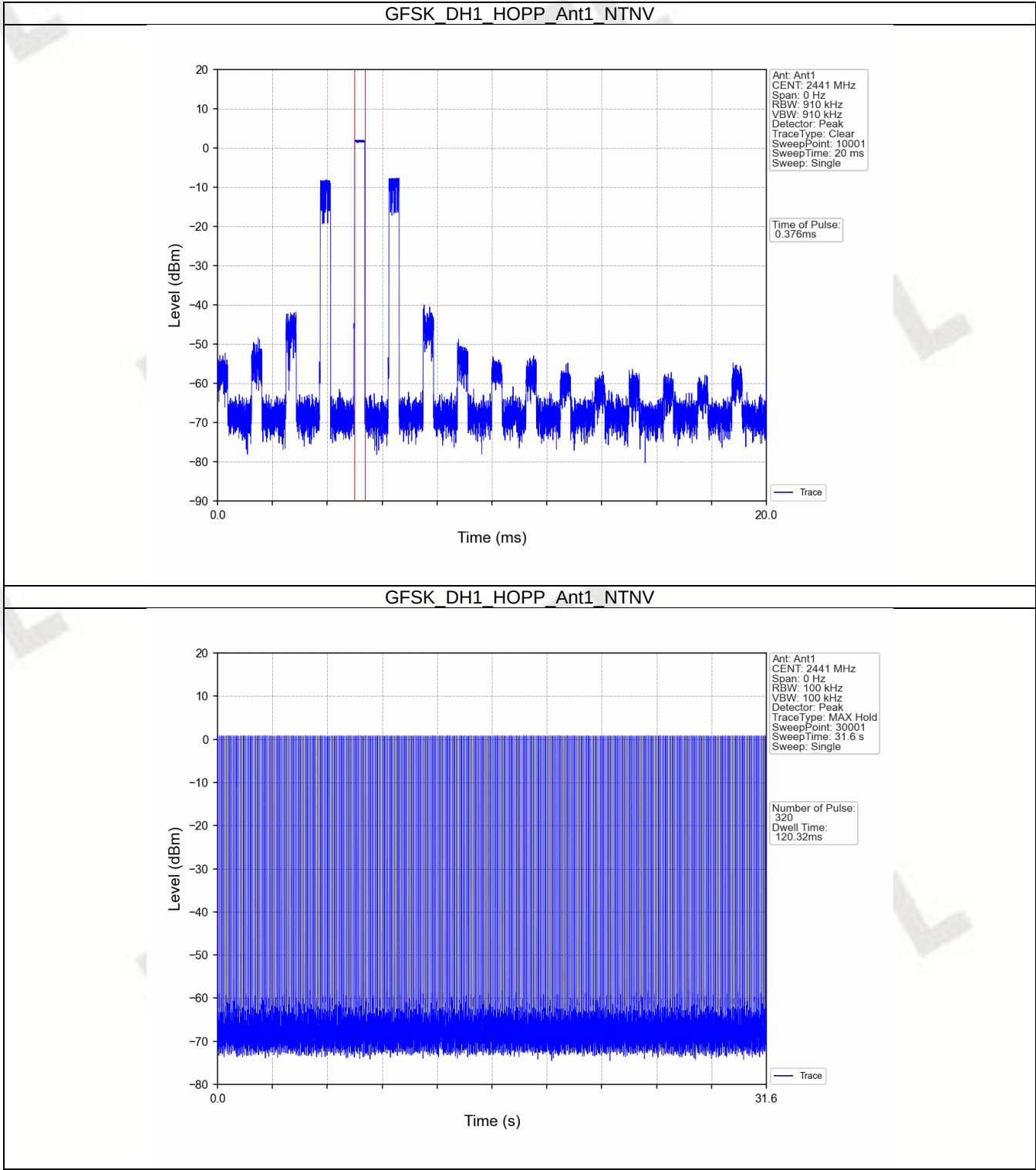
5. Time of Occupancy (Dwell Time)

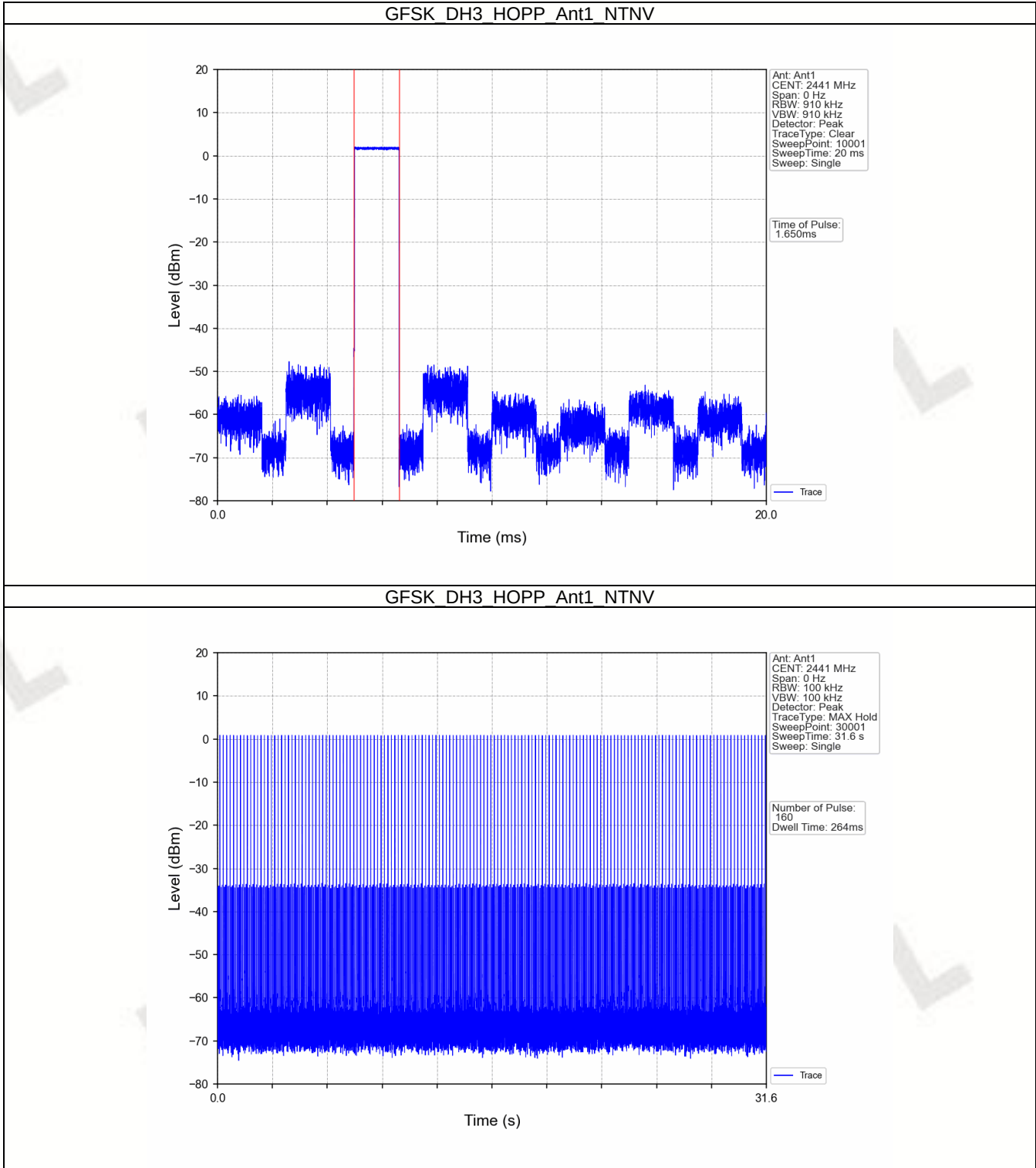
5.1 Ant1

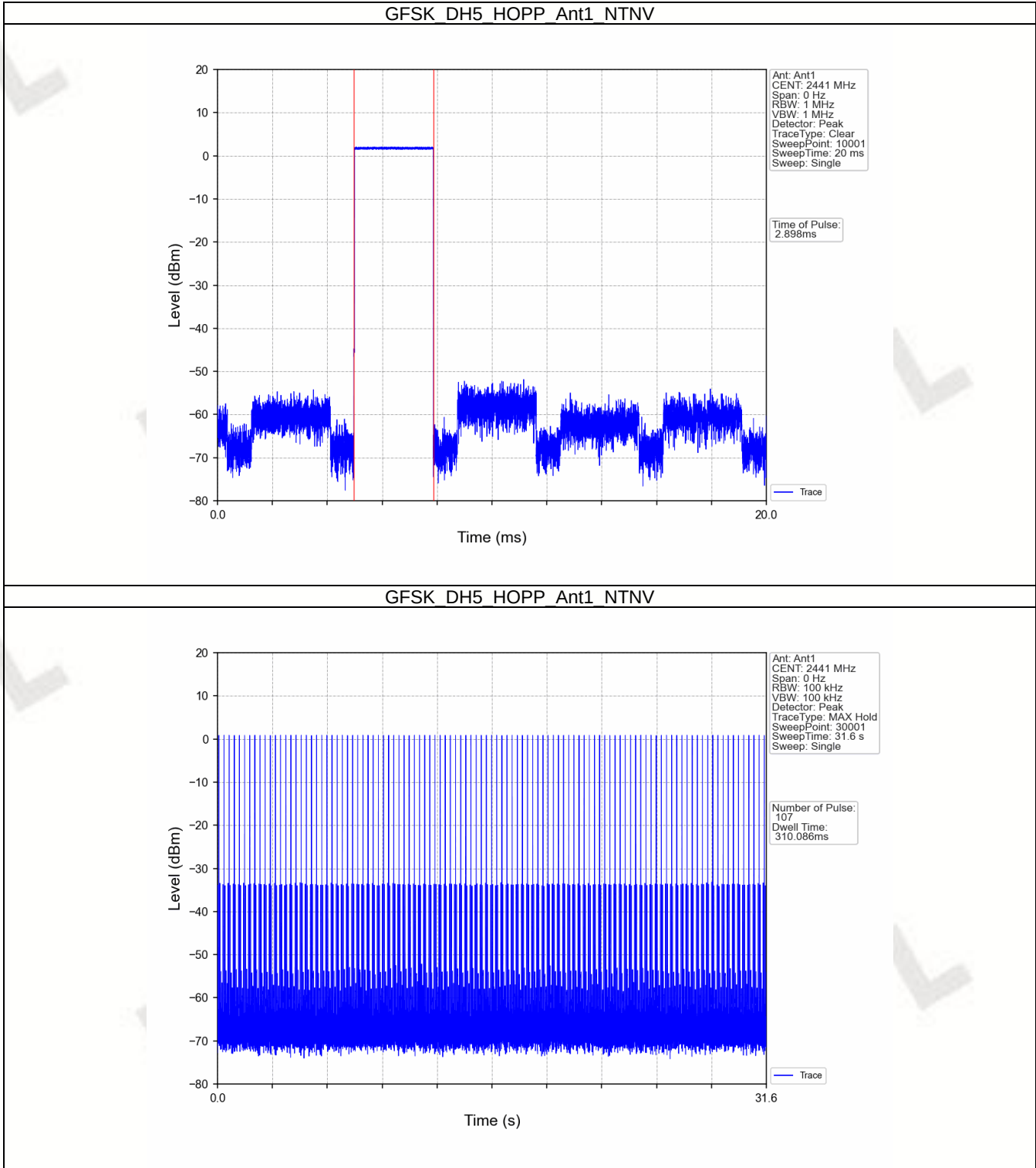
5.1.1 Test Result

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	0.376	31.600	320	120.320	<=400	Pass
			DH3	1.650	31.600	160	264.000	<=400	Pass
			DH5	2.898	31.600	107	310.086	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.380	31.600	320	121.600	<=400	Pass
			2DH3	1.662	31.600	160	265.920	<=400	Pass
			2DH5	2.910	31.600	106	308.460	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.382	31.600	320	122.240	<=400	Pass
			3DH3	1.658	31.600	160	265.280	<=400	Pass
			3DH5	2.912	31.600	106	308.672	<=400	Pass

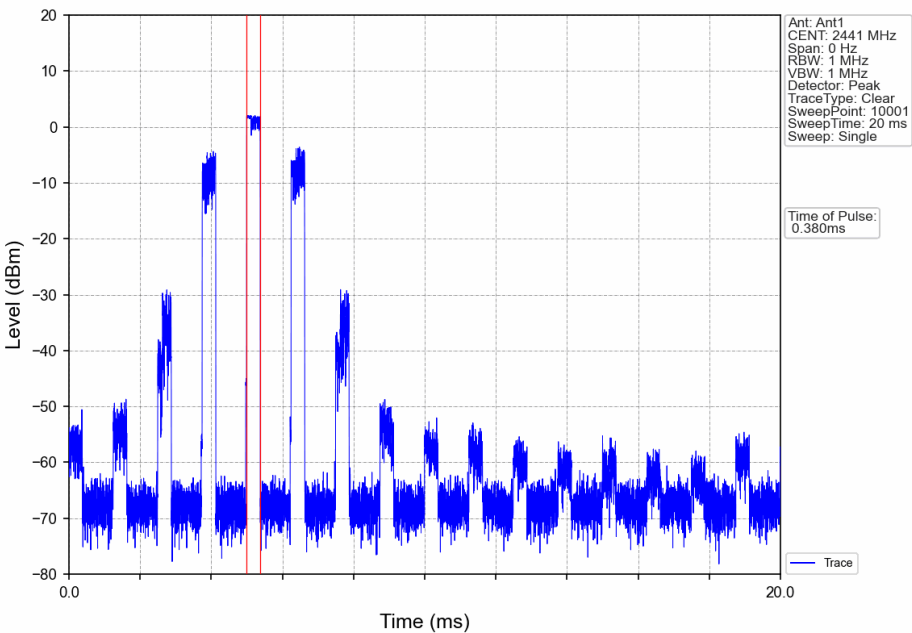
5.1.2 Test Graph



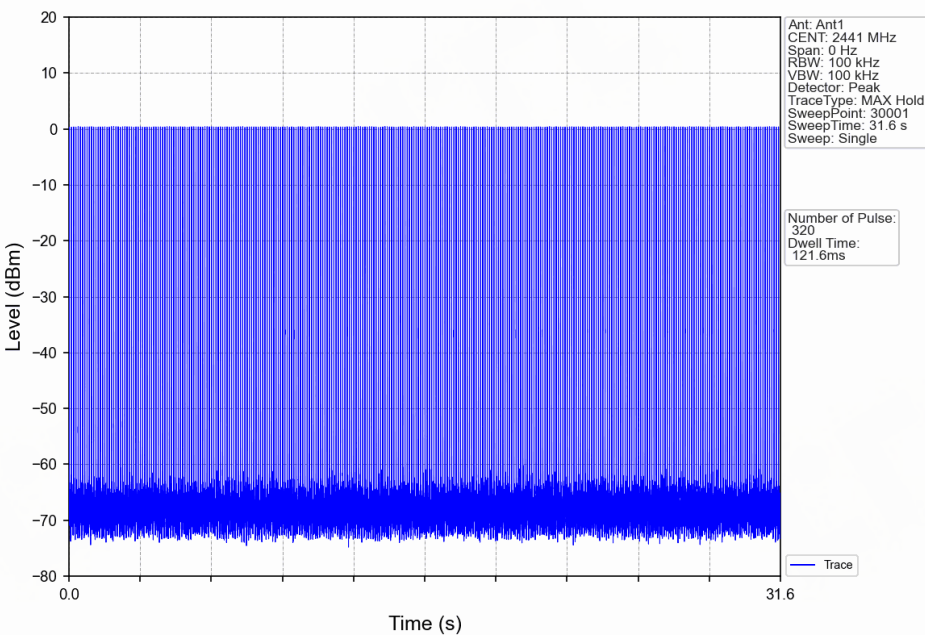




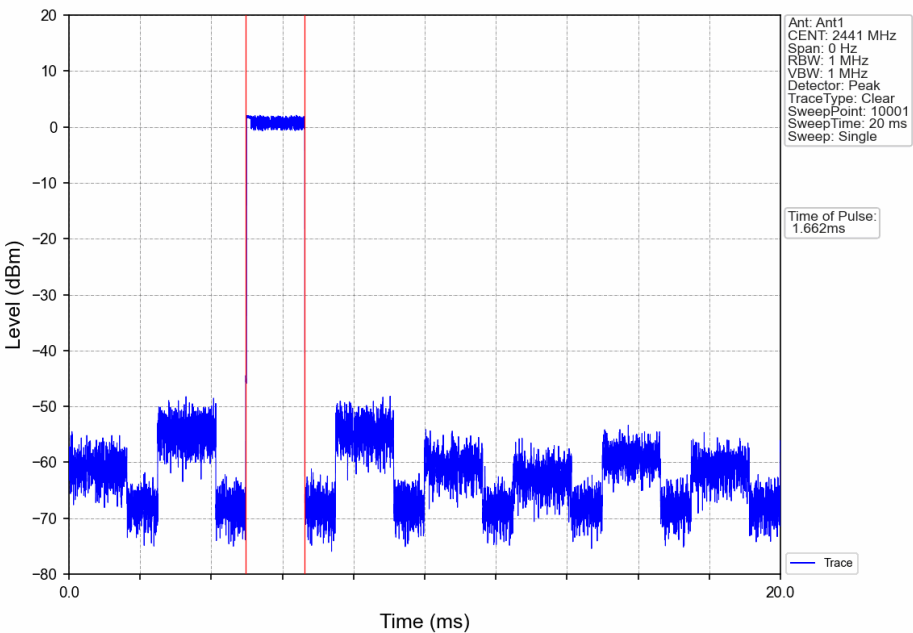
Pi/4DQPSK 2DH1 HOPP Ant1 NTN



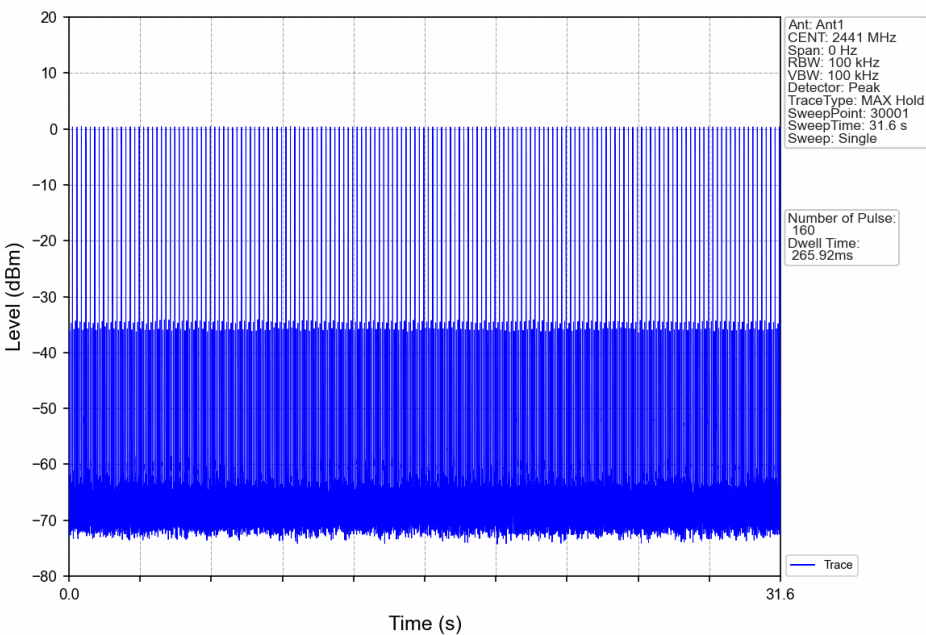
Pi/4DQPSK 2DH1 HOPP Ant1 NTN



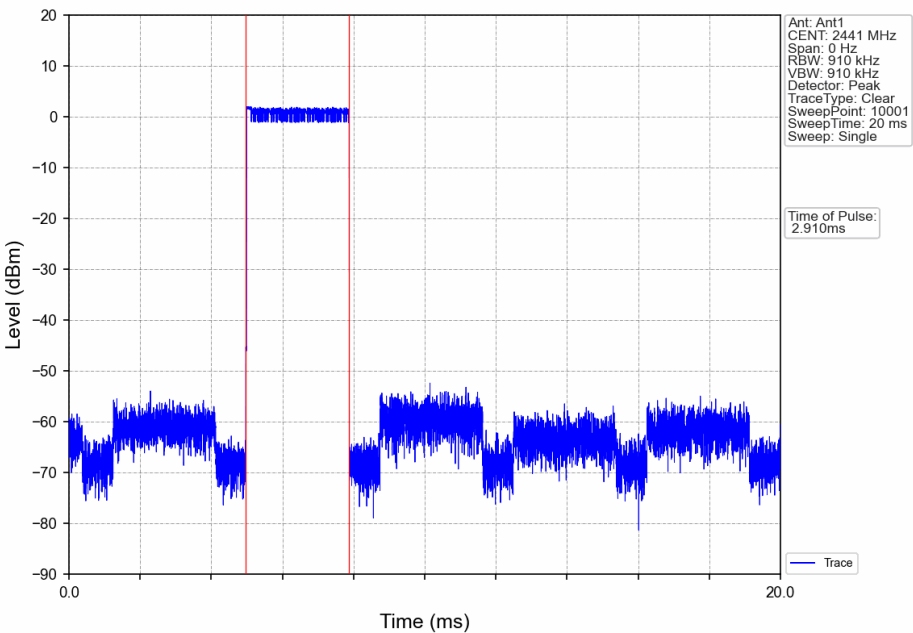
Pi/4DQPSK 2DH3 HOPP Ant1 NTN



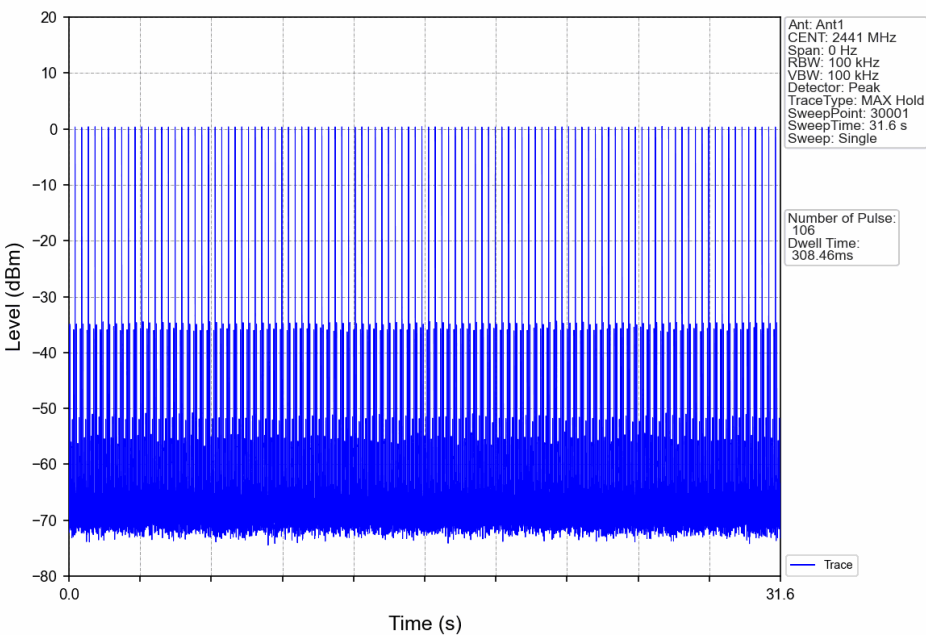
Pi/4DQPSK 2DH3 HOPP Ant1 NTN

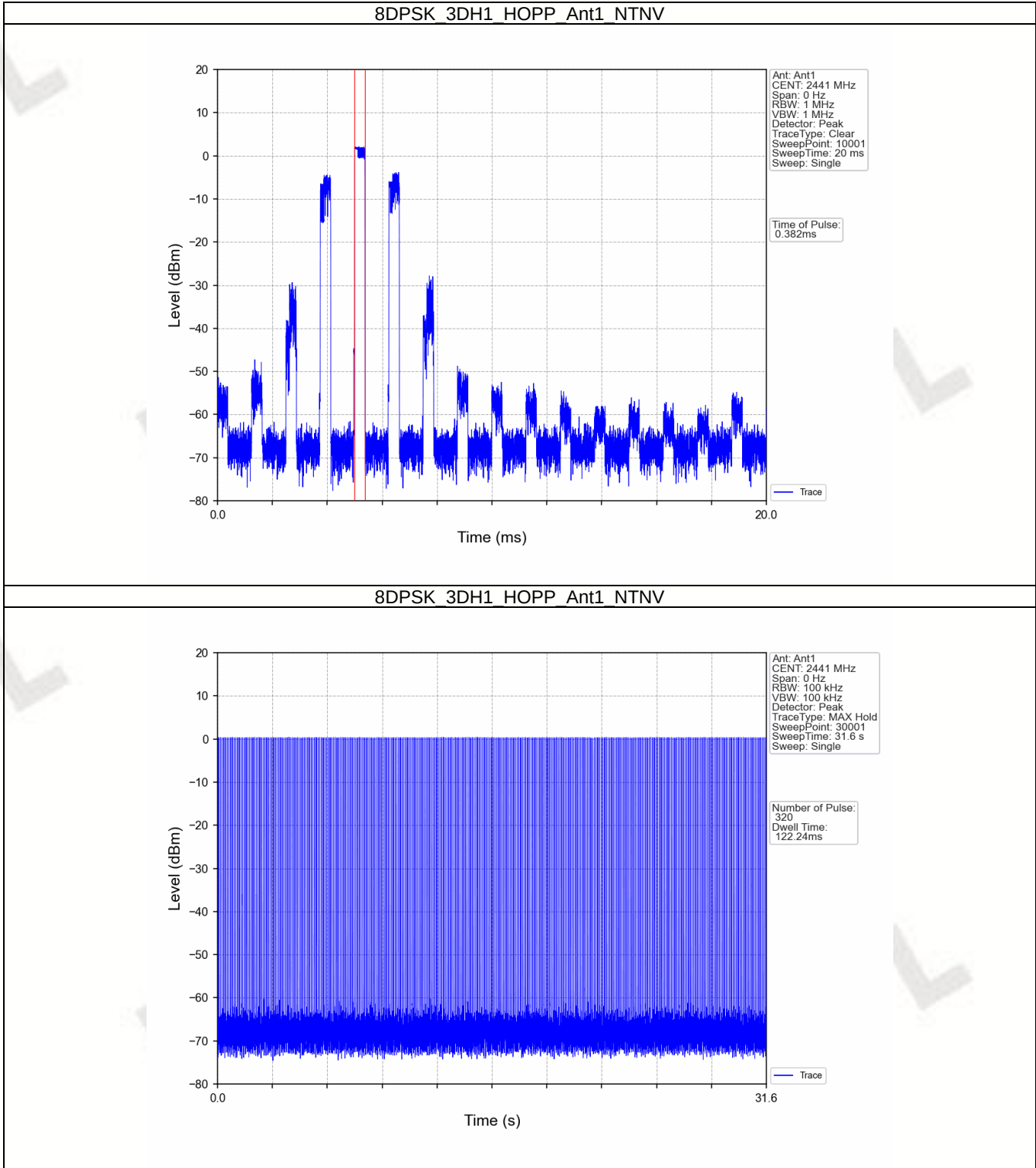


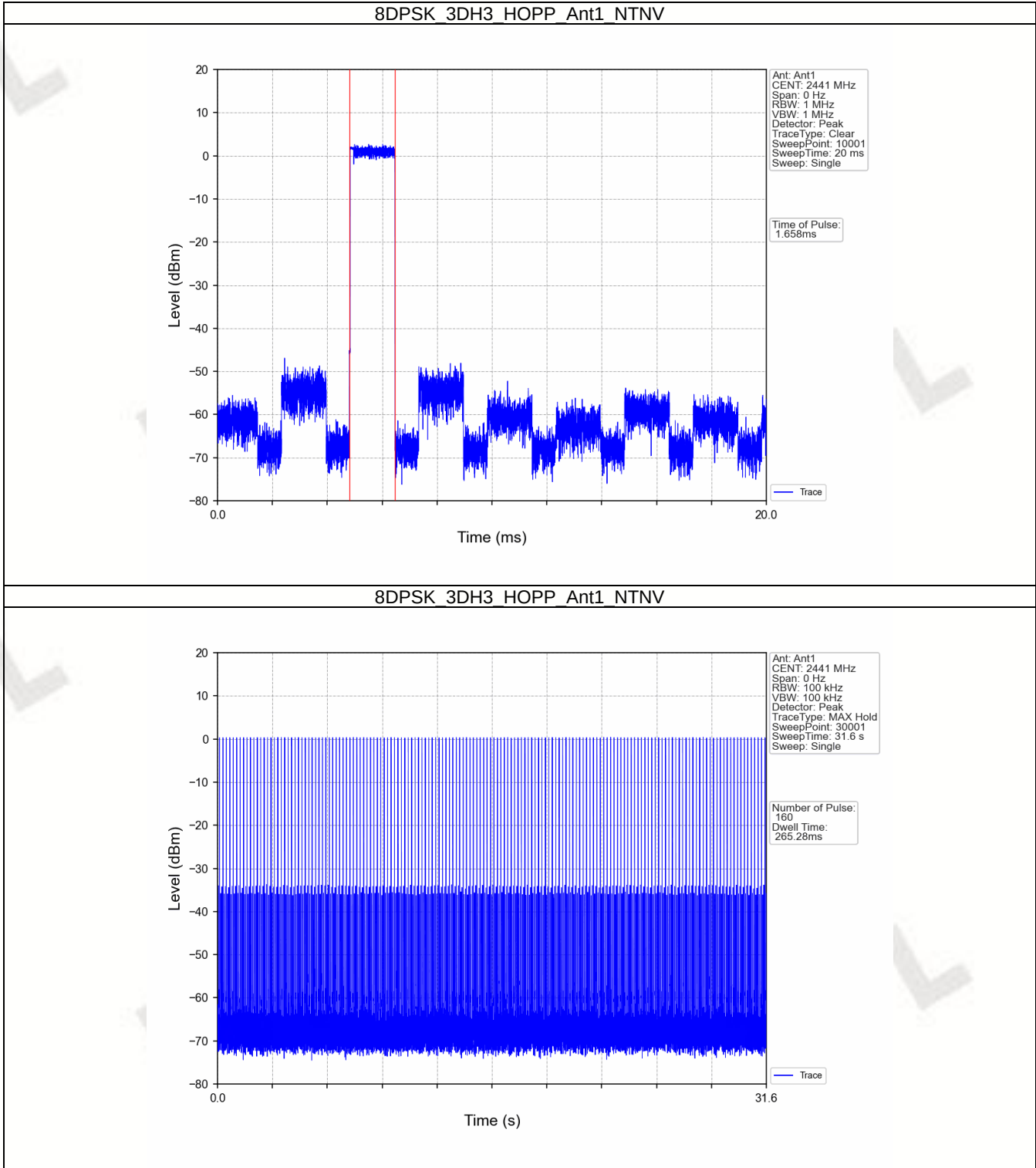
Pi/4DQPSK 2DH5 HOPP Ant1 NTN

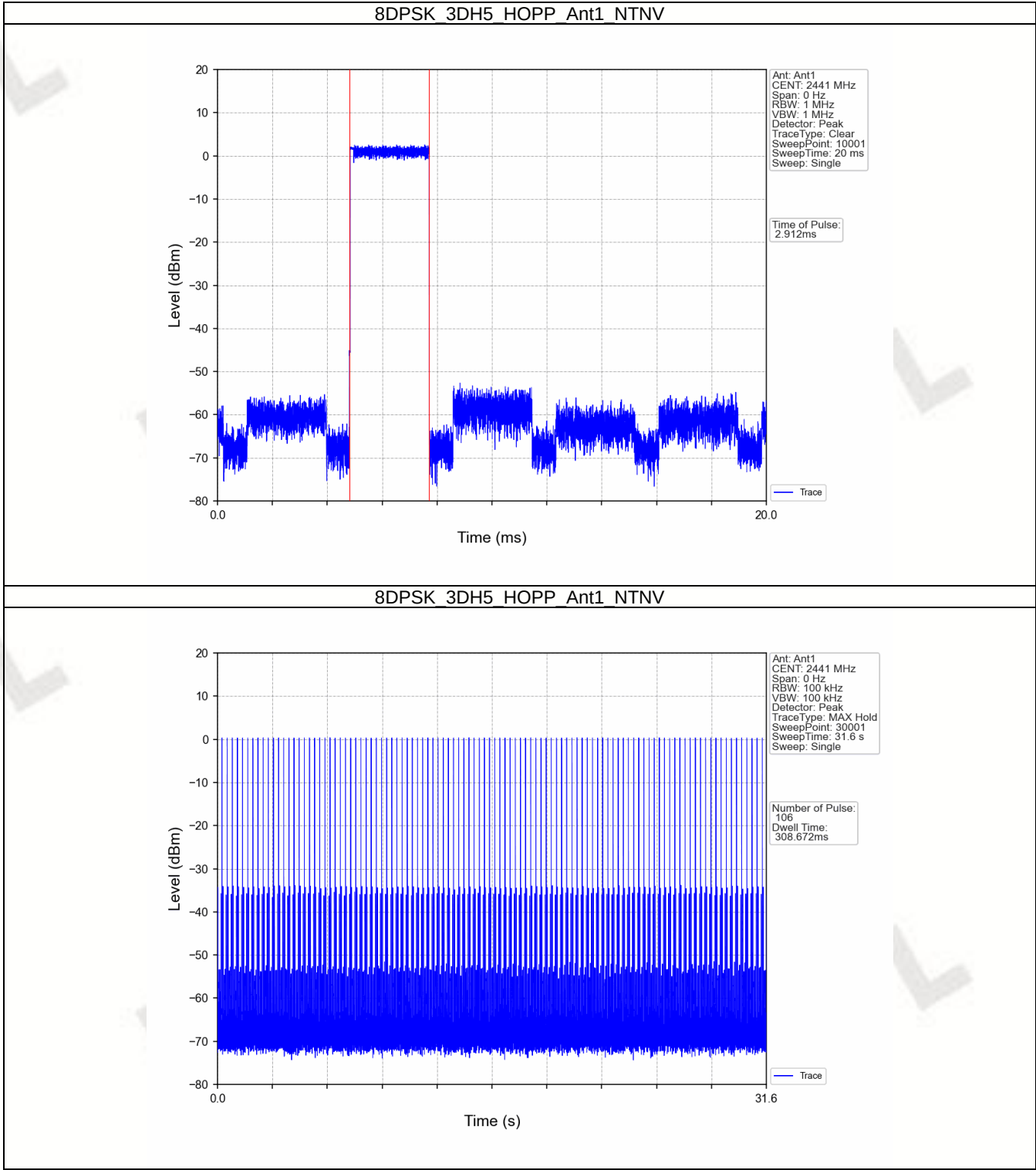


Pi/4DQPSK 2DH5 HOPP Ant1 NTN









6. Unwanted Emissions In Non-restricted Frequency Bands

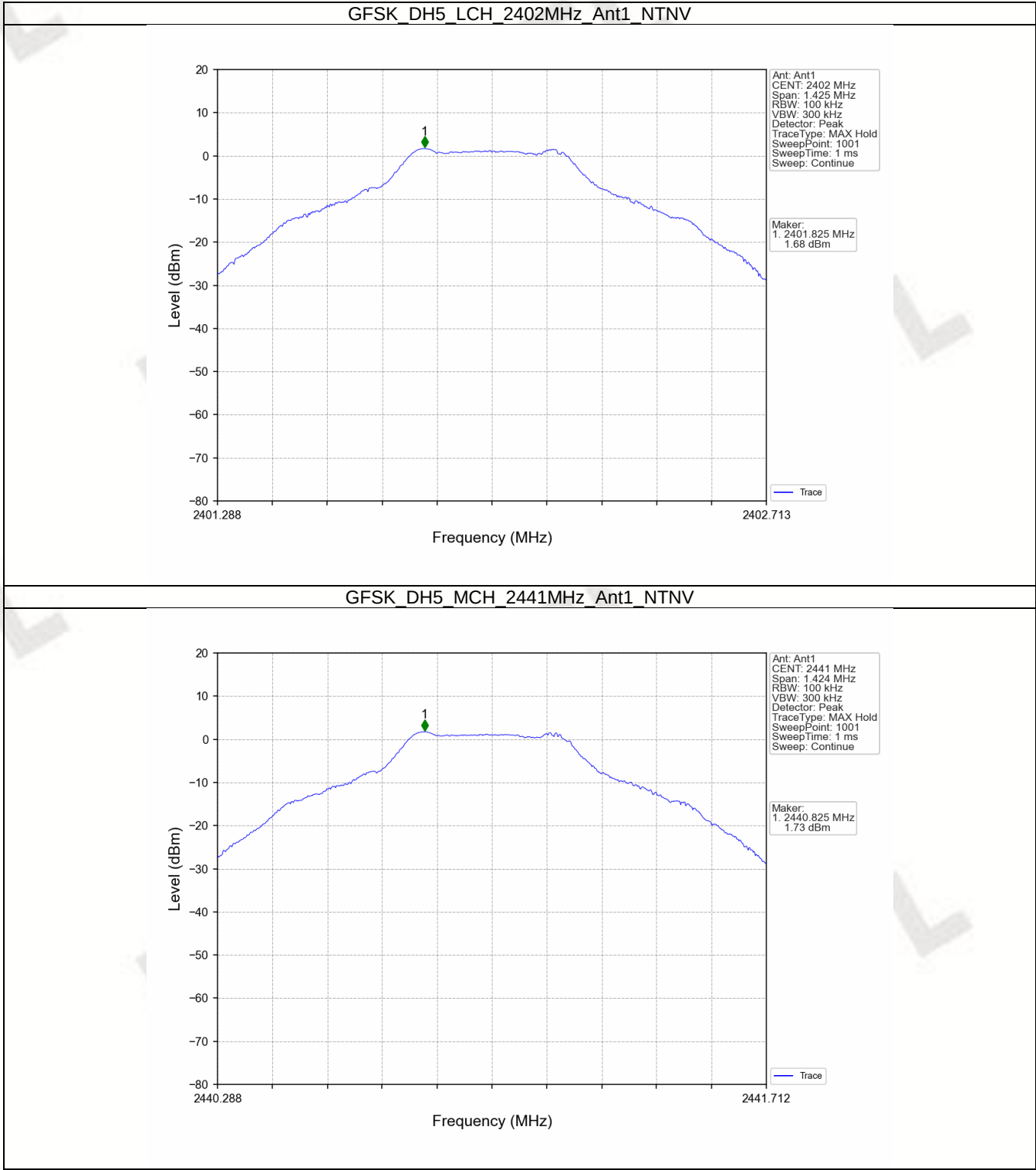
6.1 Ref

6.1.1 Test Result

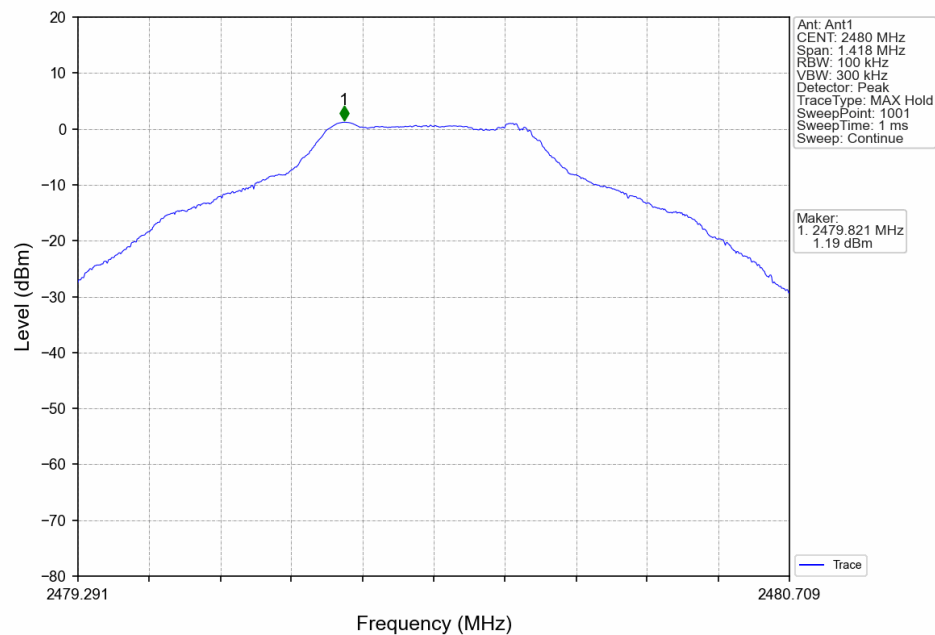
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	1.68
		2441	DH5	1	1.73
		2480	DH5	1	1.19
Pi/4DQPSK	SISO	2402	2DH5	1	1.39
		2441	2DH5	1	1.50
		2480	2DH5	1	1.00
8DPSK	SISO	2402	3DH5	1	1.57
		2441	3DH5	1	1.68
		2480	3DH5	1	1.17

Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.

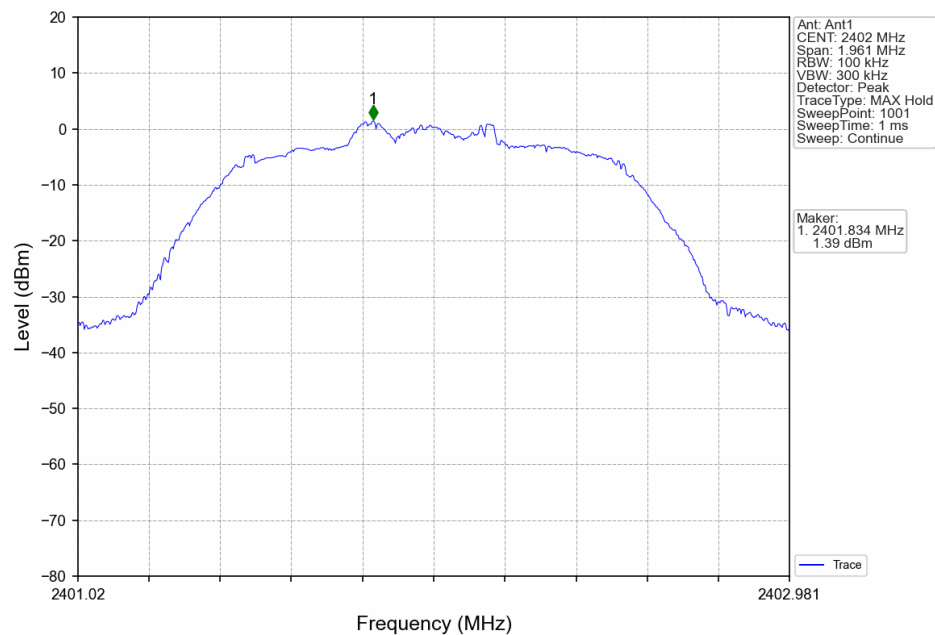
6.1.2 Test Graph



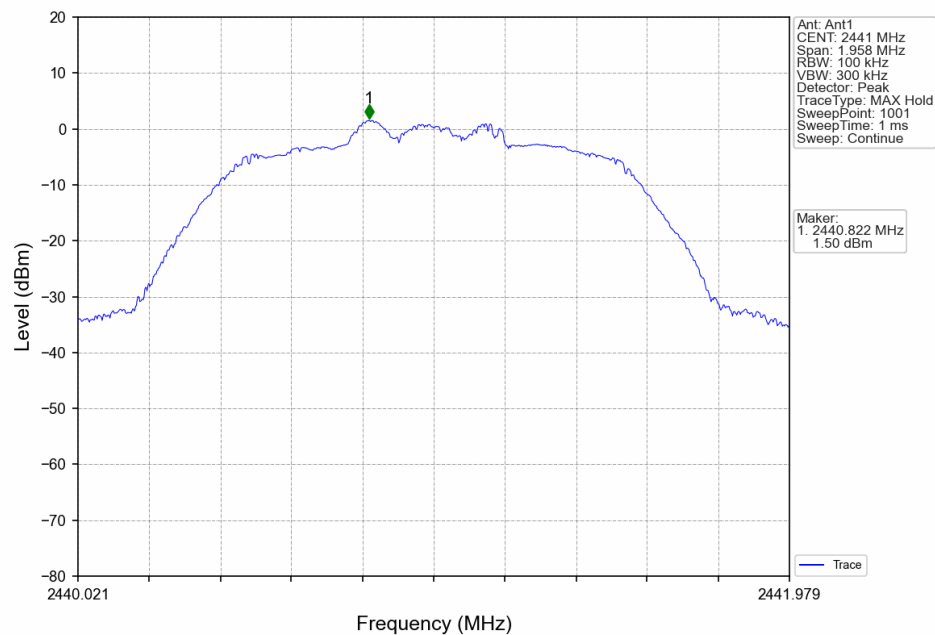
GFSK DH5 HCH 2480MHz Ant1 NTNV



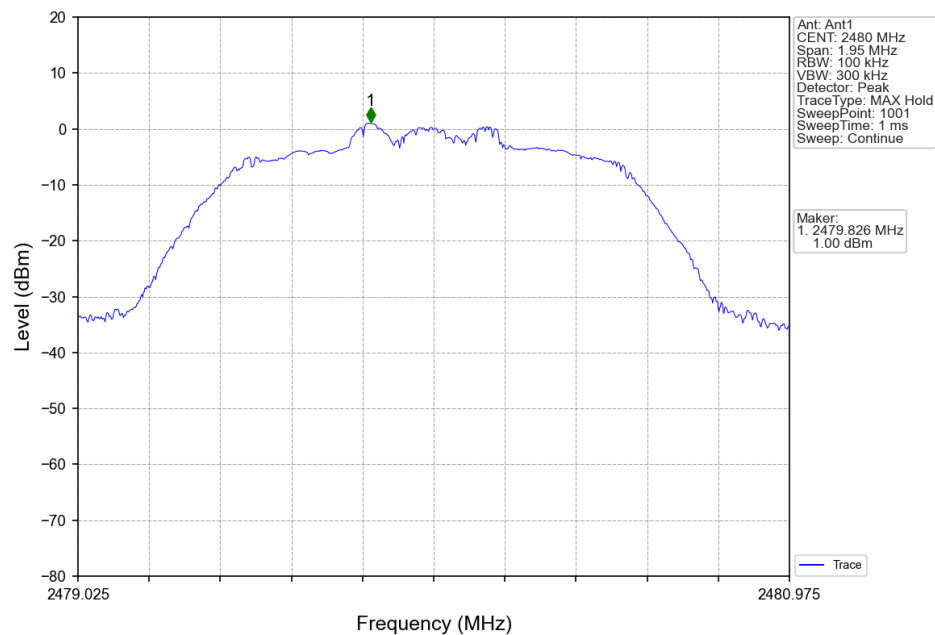
Pi/4DQPSK 2DH5 LCH 2402MHz Ant1 NTNV



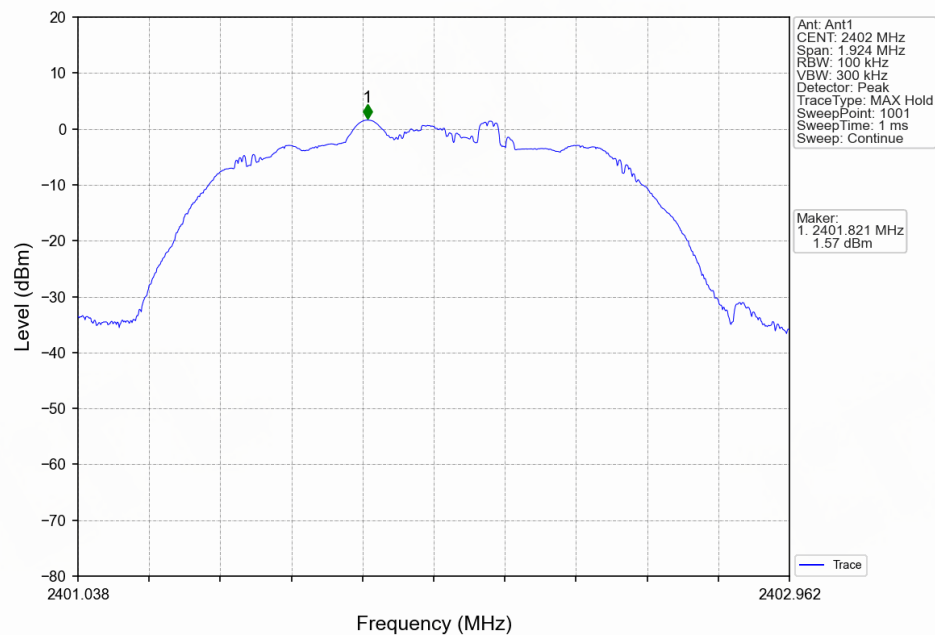
Pi/4DQPSK 2DH5 MCH 2441MHz Ant1 NTNV



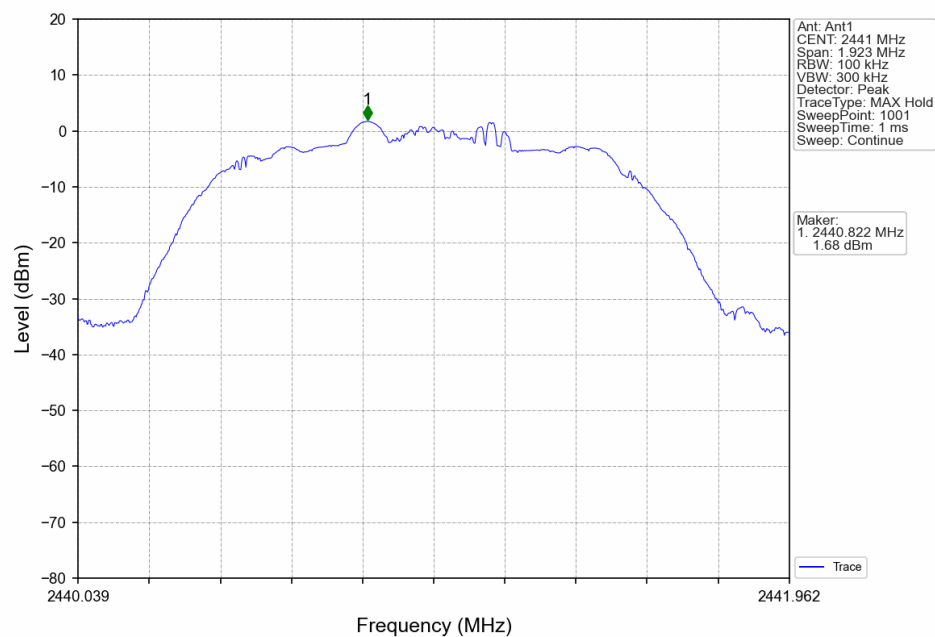
Pi/4DQPSK 2DH5 HCH 2480MHz Ant1 NTNV

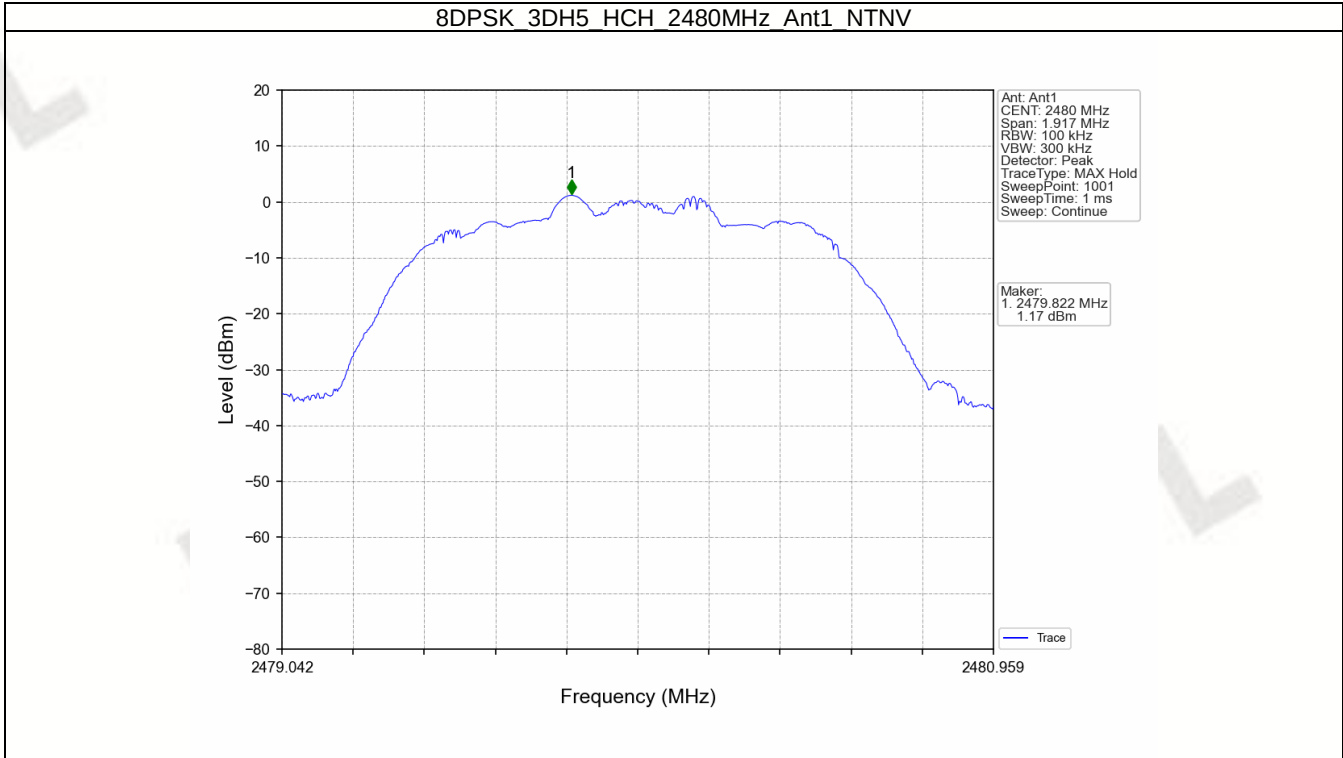


8DPSK 3DH5 LCH 2402MHz Ant1 NTV



8DPSK 3DH5 MCH 2441MHz Ant1 NTV

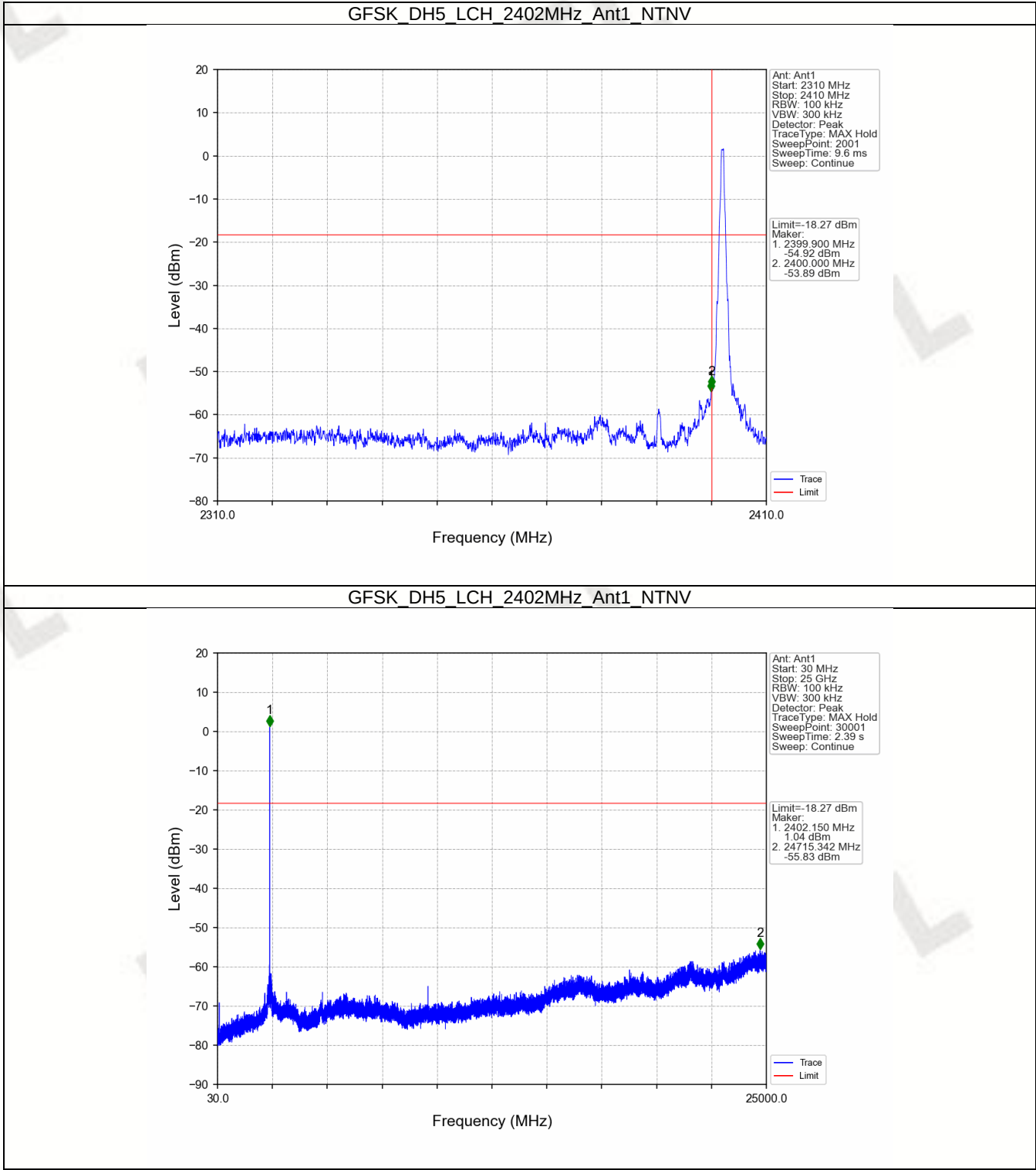




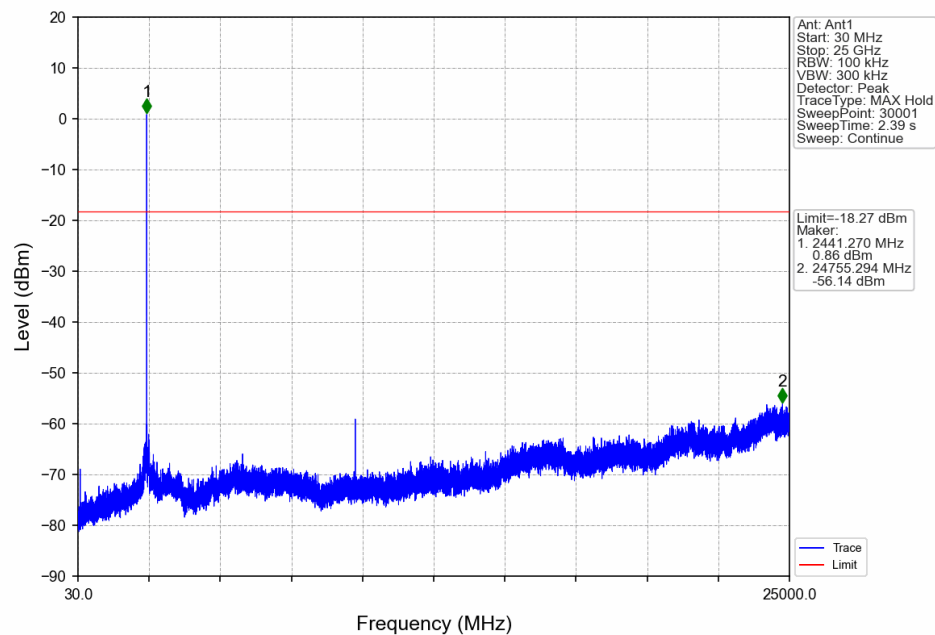
6.2.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	1.73	-18.27	Pass
		2441	DH5	1	1.73	-18.27	Pass
		2480	DH5	1	1.73	-18.27	Pass
		HOPP	DH5	1	1.73	-18.27	Pass
					1.73	-18.27	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.50	-18.50	Pass
		2441	2DH5	1	1.50	-18.50	Pass
		2480	2DH5	1	1.50	-18.50	Pass
		HOPP	2DH5	1	1.50	-18.50	Pass
					1.50	-18.50	Pass
8DPSK	SISO	2402	3DH5	1	1.68	-18.32	Pass
		2441	3DH5	1	1.68	-18.32	Pass
		2480	3DH5	1	1.68	-18.32	Pass
		HOPP	3DH5	1	1.68	-18.32	Pass
					1.68	-18.32	Pass
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.							

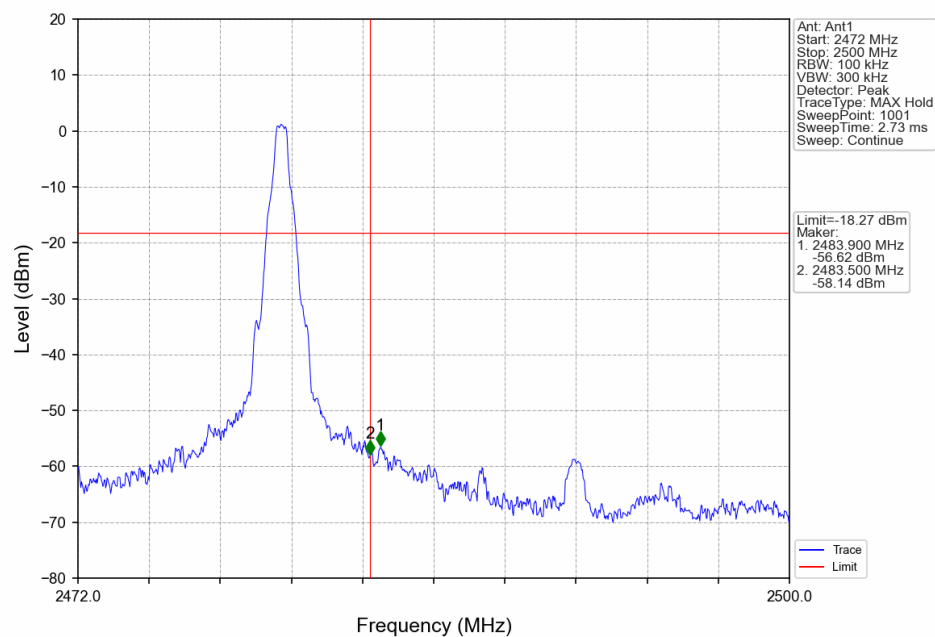
6.2.2 Test Graph



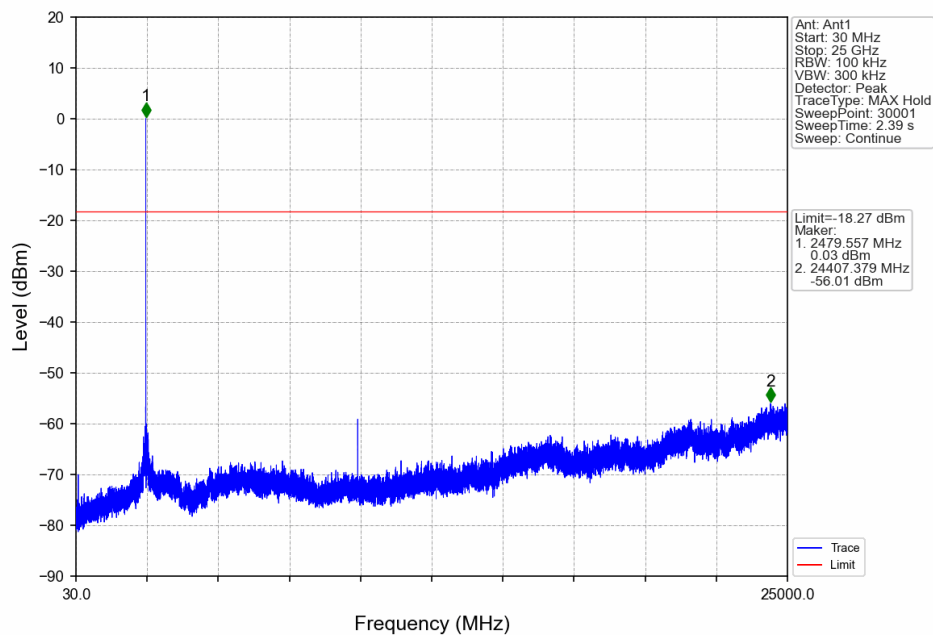
GFSK DH5 MCH 2441MHz Ant1 NTNV



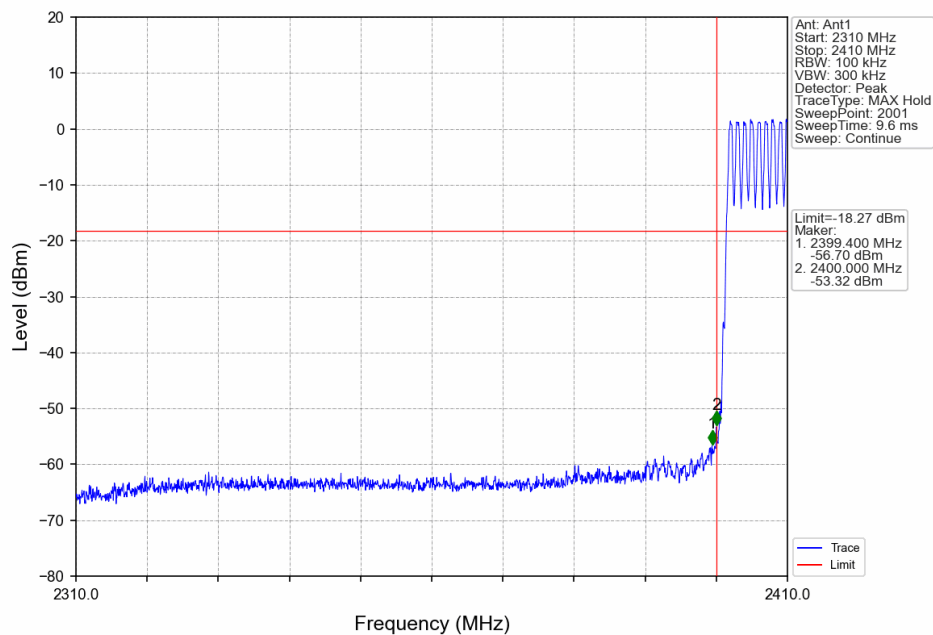
GFSK DH5 HCH 2480MHz Ant1 NTNV

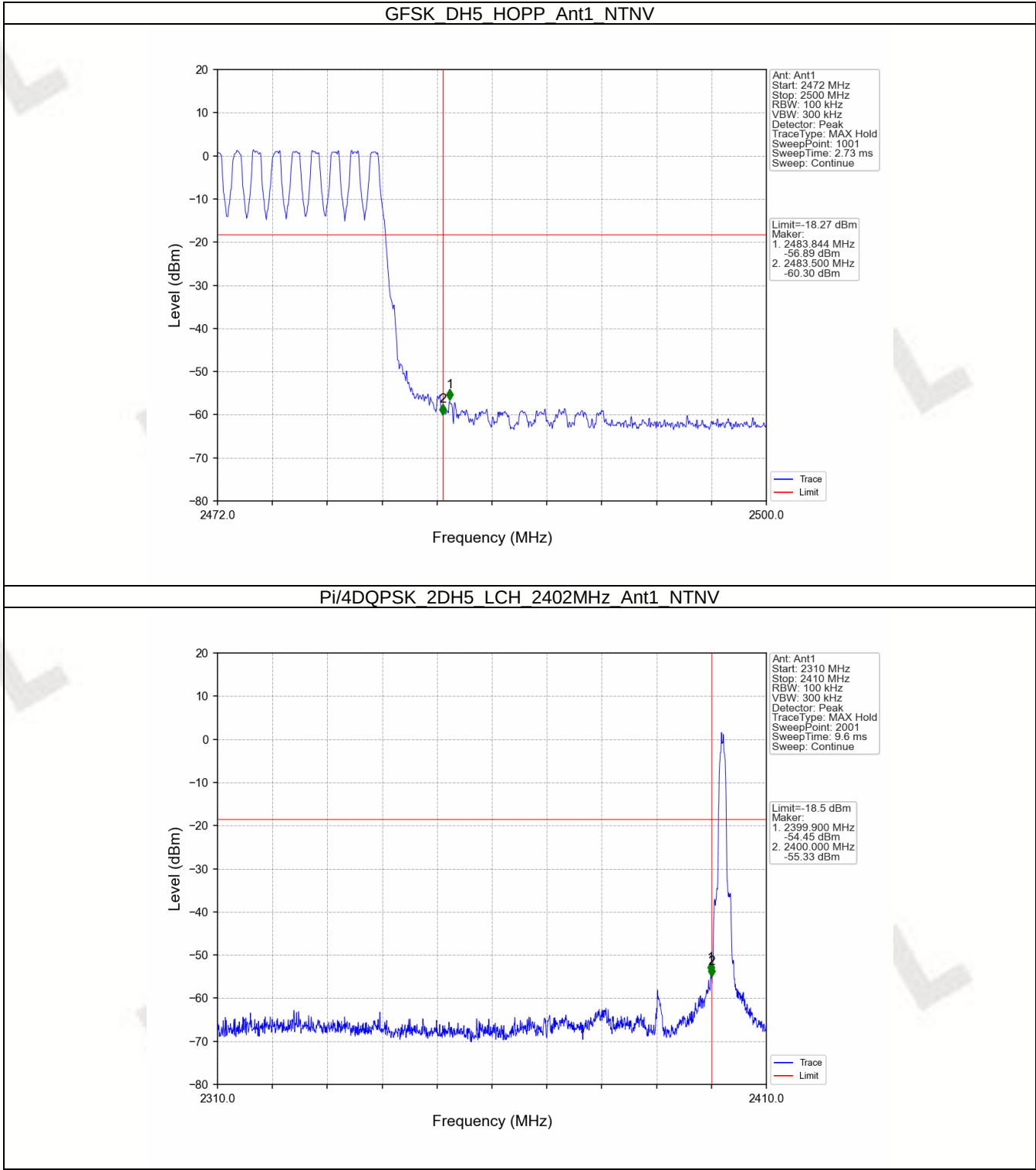


GFSK DH5 HCH 2480MHz Ant1 NTV

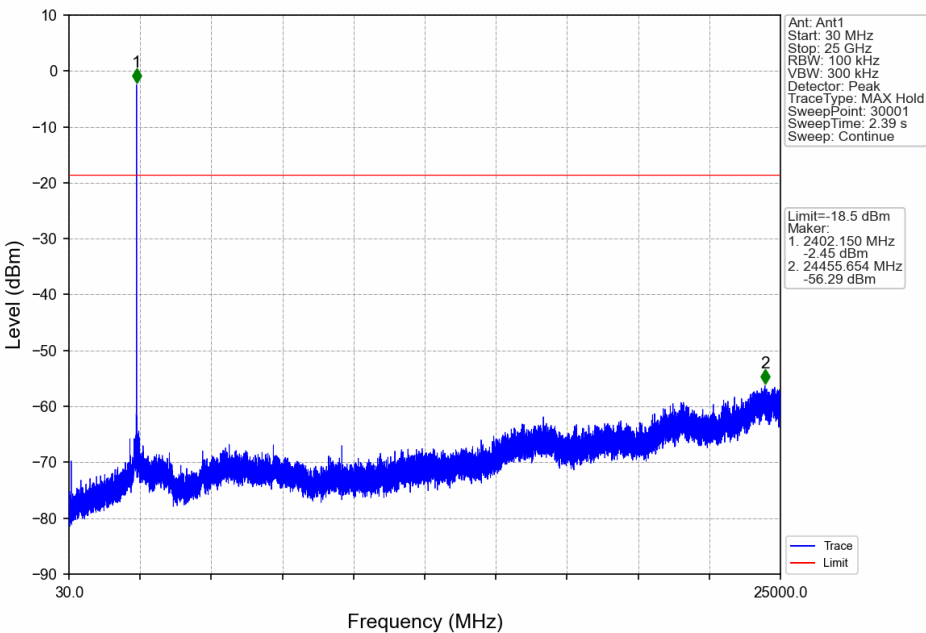


GFSK DH5 HOPP Ant1 NTV

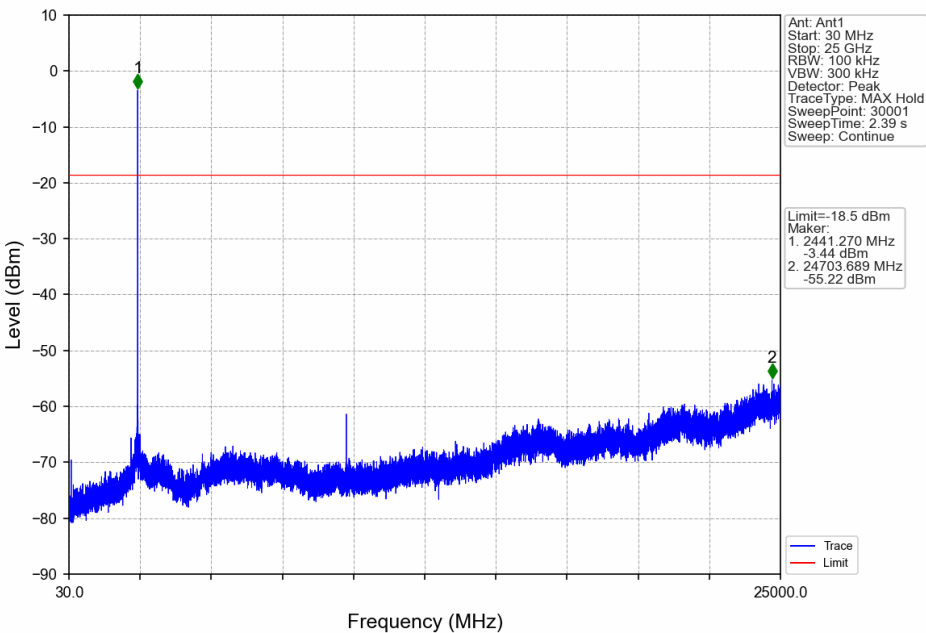




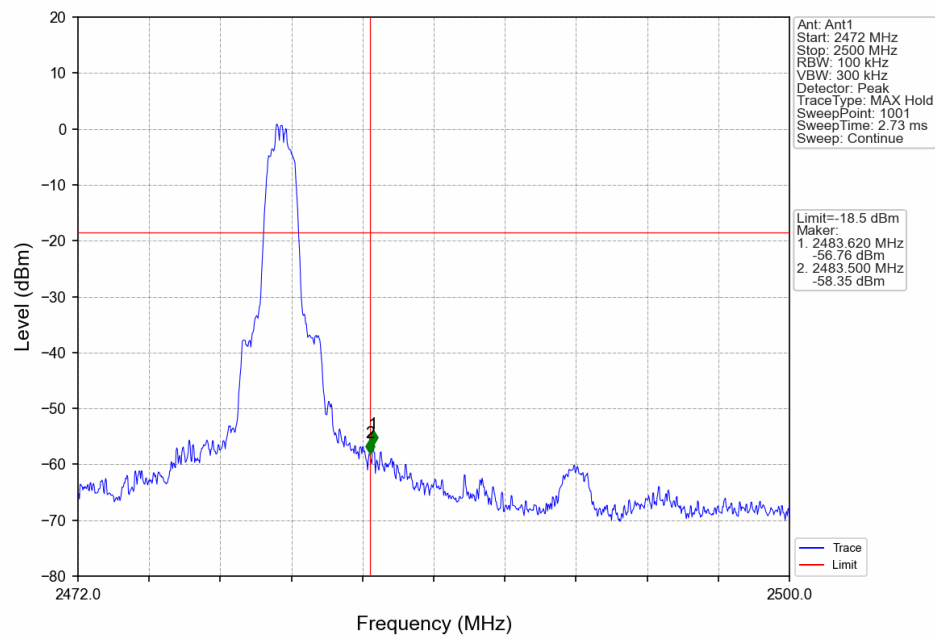
Pi/4DQPSK 2DH5 LCH 2402MHz Ant1 NTN



Pi/4DQPSK 2DH5 MCH 2441MHz Ant1 NTN



Pi/4DQPSK 2DH5 HCH 2480MHz Ant1 NTN



Pi/4DQPSK 2DH5 HCH 2480MHz Ant1 NTN

