

Test Data for Bluetooth
Product Name: Laser Projector
Test Model: PJ90

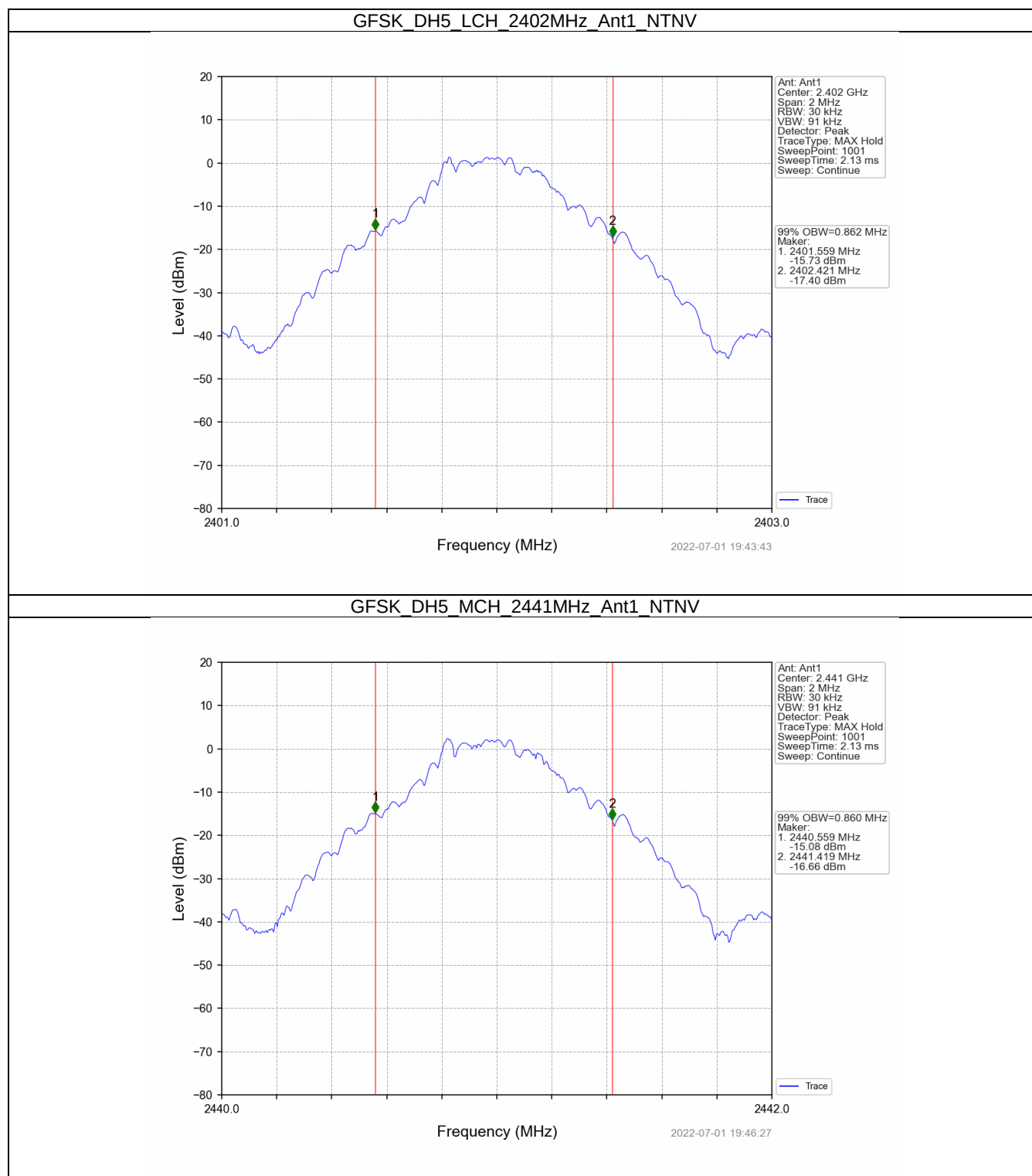
1. Bandwidth

1.1 OBW

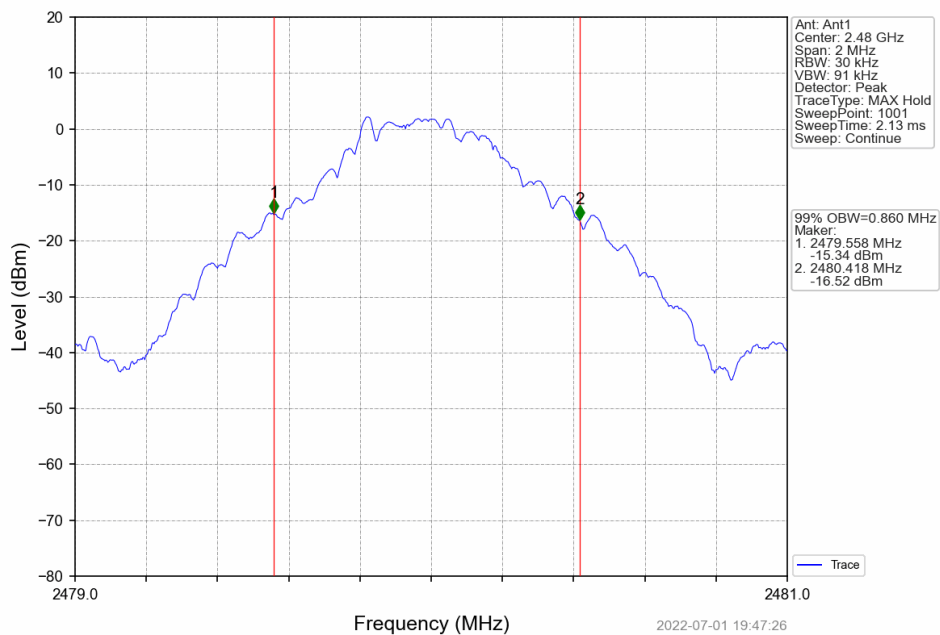
1.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz)	Verdict
					Result	
GFSK	SISO	2402	DH5	1	0.862	Pass
		2441	DH5	1	0.860	Pass
		2480	DH5	1	0.860	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.133	Pass
		2441	2DH5	1	1.135	Pass
		2480	2DH5	1	1.134	Pass
8DPSK	SISO	2402	3DH5	1	1.147	Pass
		2441	3DH5	1	1.146	Pass
		2480	3DH5	1	1.145	Pass

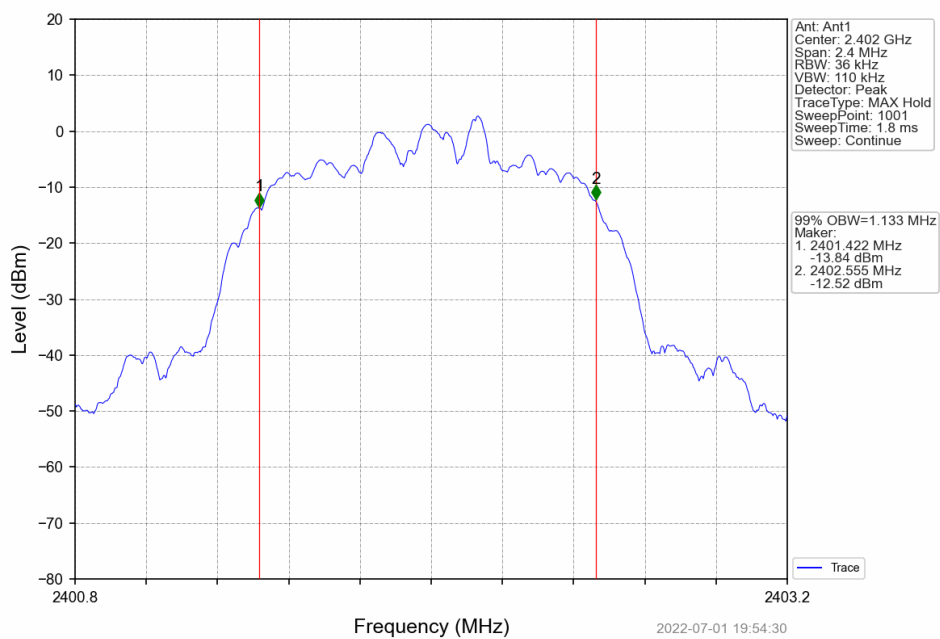
1.1.2 Test Graph



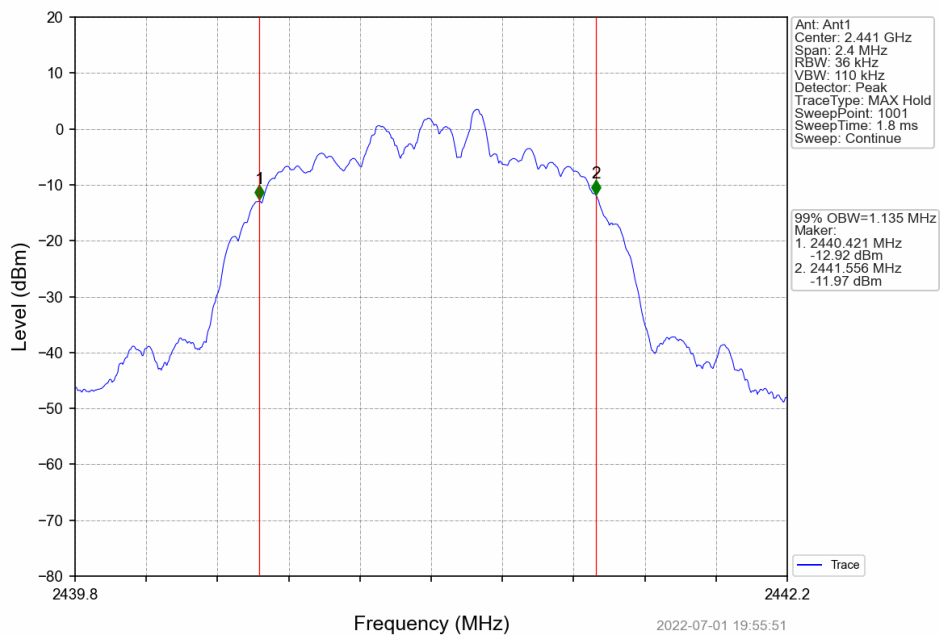
GFSK DH5 HCH 2480MHz Ant1 NTN



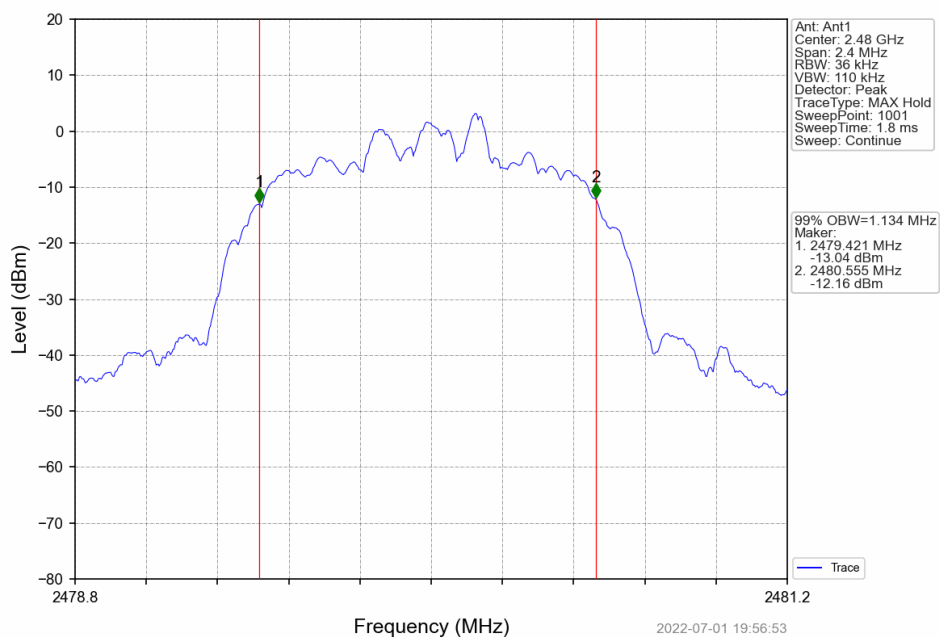
Pi/4DQPSK 2DH5 LCH 2402MHz Ant1 NTN



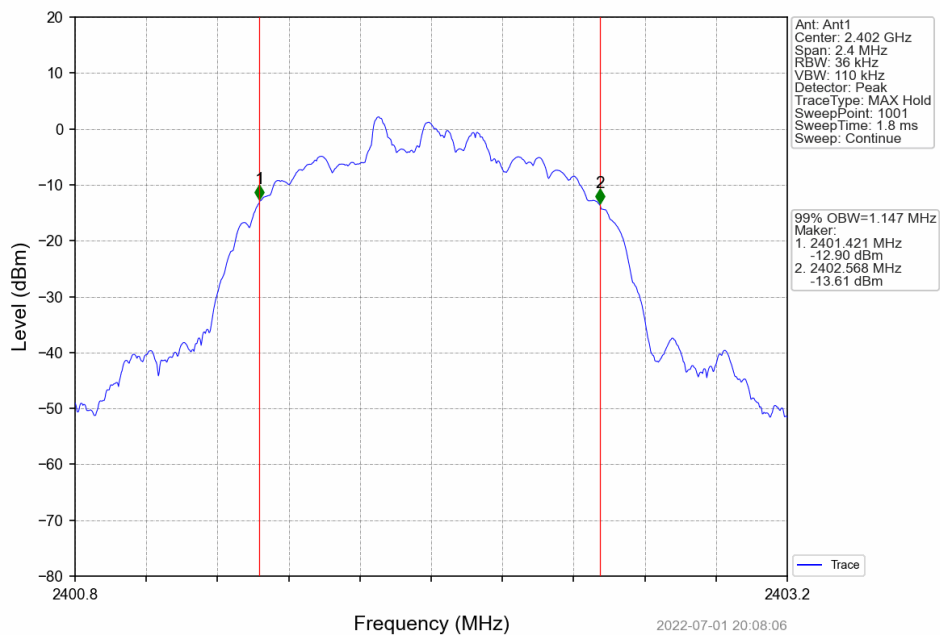
Pi/4DQPSK 2DH5 MCH 2441MHz Ant1 NTN



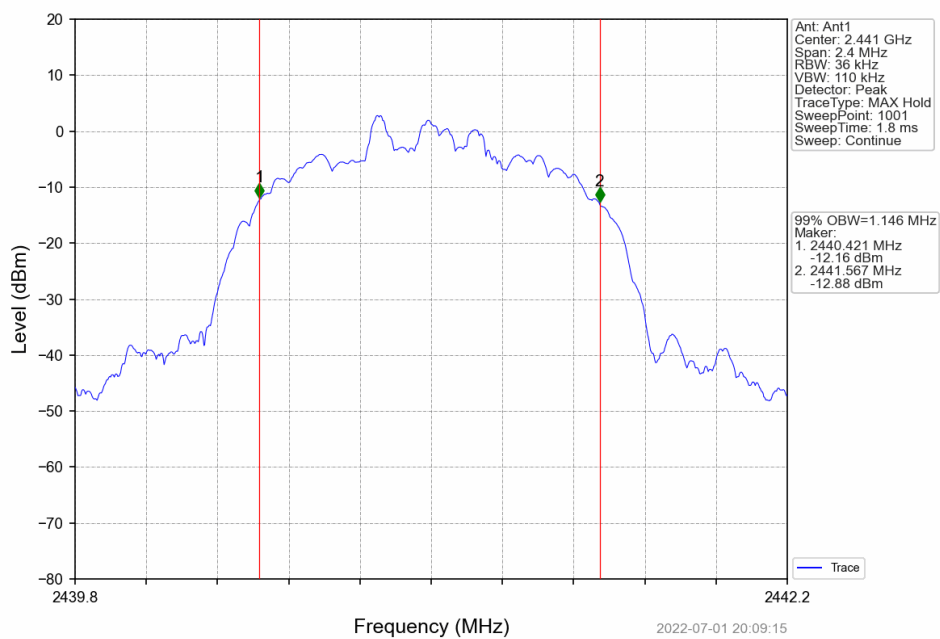
Pi/4DQPSK 2DH5 HCH 2480MHz Ant1 NTN

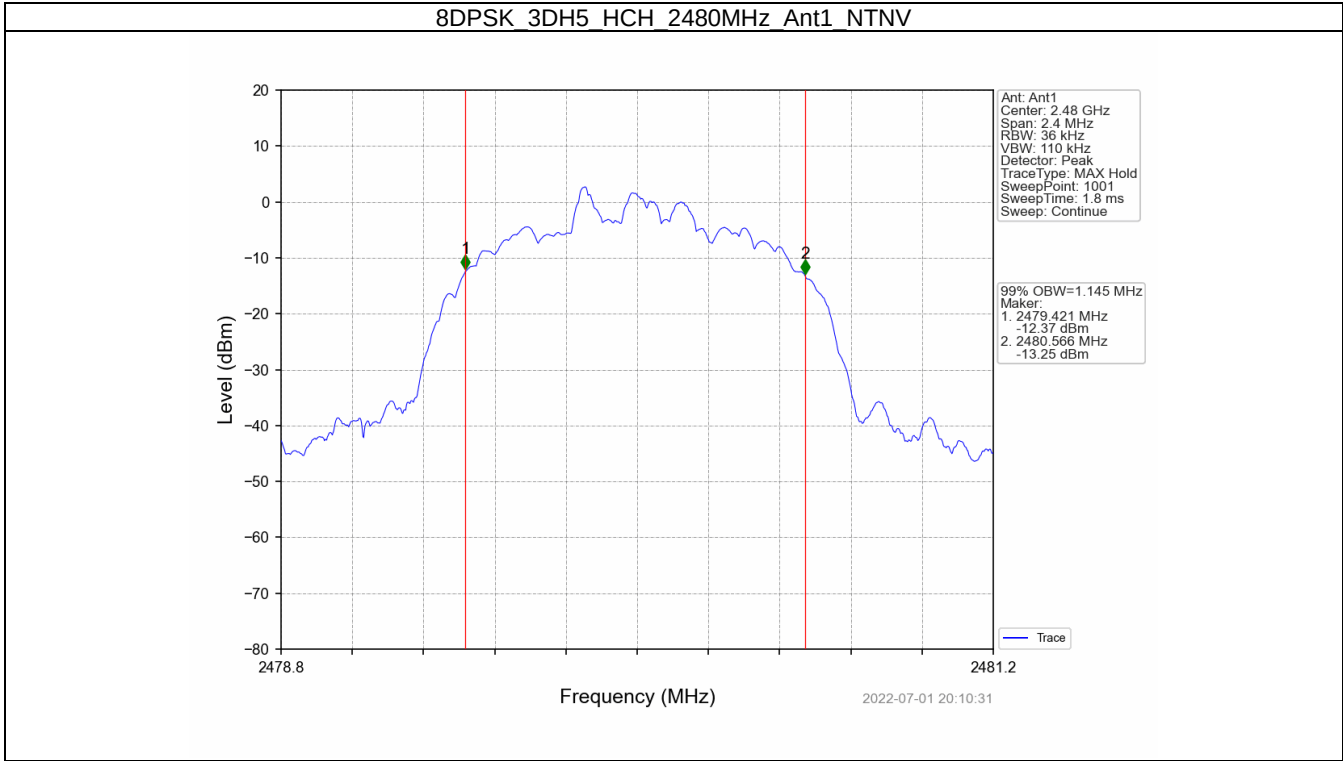


8DPSK 3DH5 LCH 2402MHz Ant1 NTN



8DPSK 3DH5 MCH 2441MHz Ant1 NTN



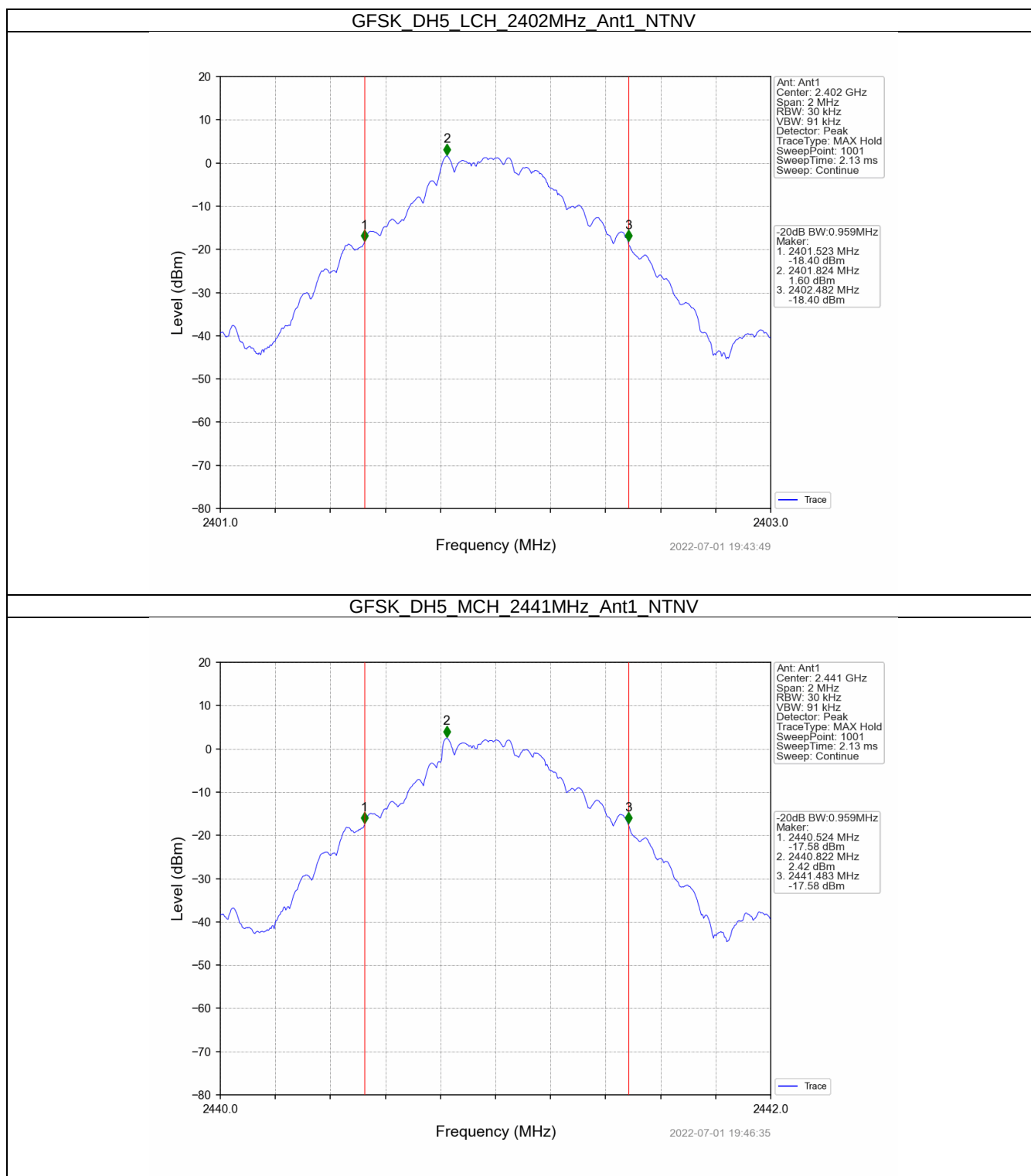


1.2 20dB BW

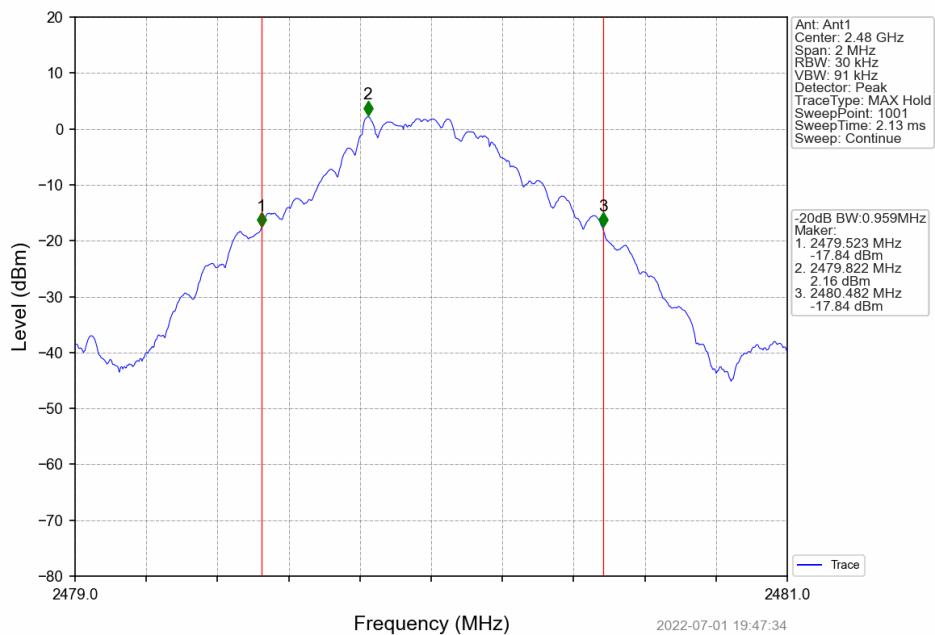
1.2.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)	Verdict
					Result	
GFSK	SISO	2402	DH5	1	0.959	Pass
		2441	DH5	1	0.959	Pass
		2480	DH5	1	0.959	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.214	Pass
		2441	2DH5	1	1.214	Pass
		2480	2DH5	1	1.214	Pass
8DPSK	SISO	2402	3DH5	1	1.280	Pass
		2441	3DH5	1	1.280	Pass
		2480	3DH5	1	1.280	Pass

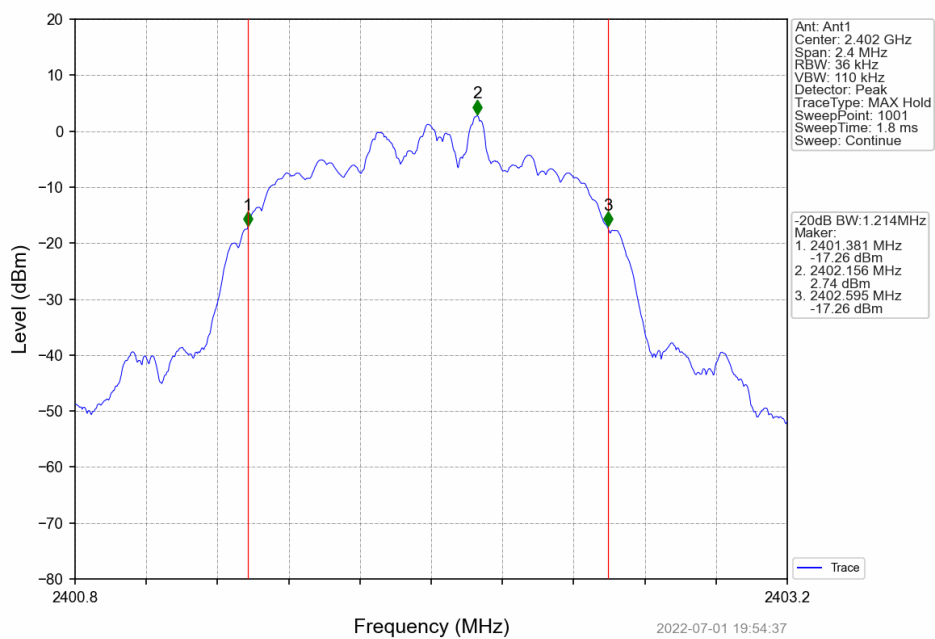
1.2.2 Test Graph

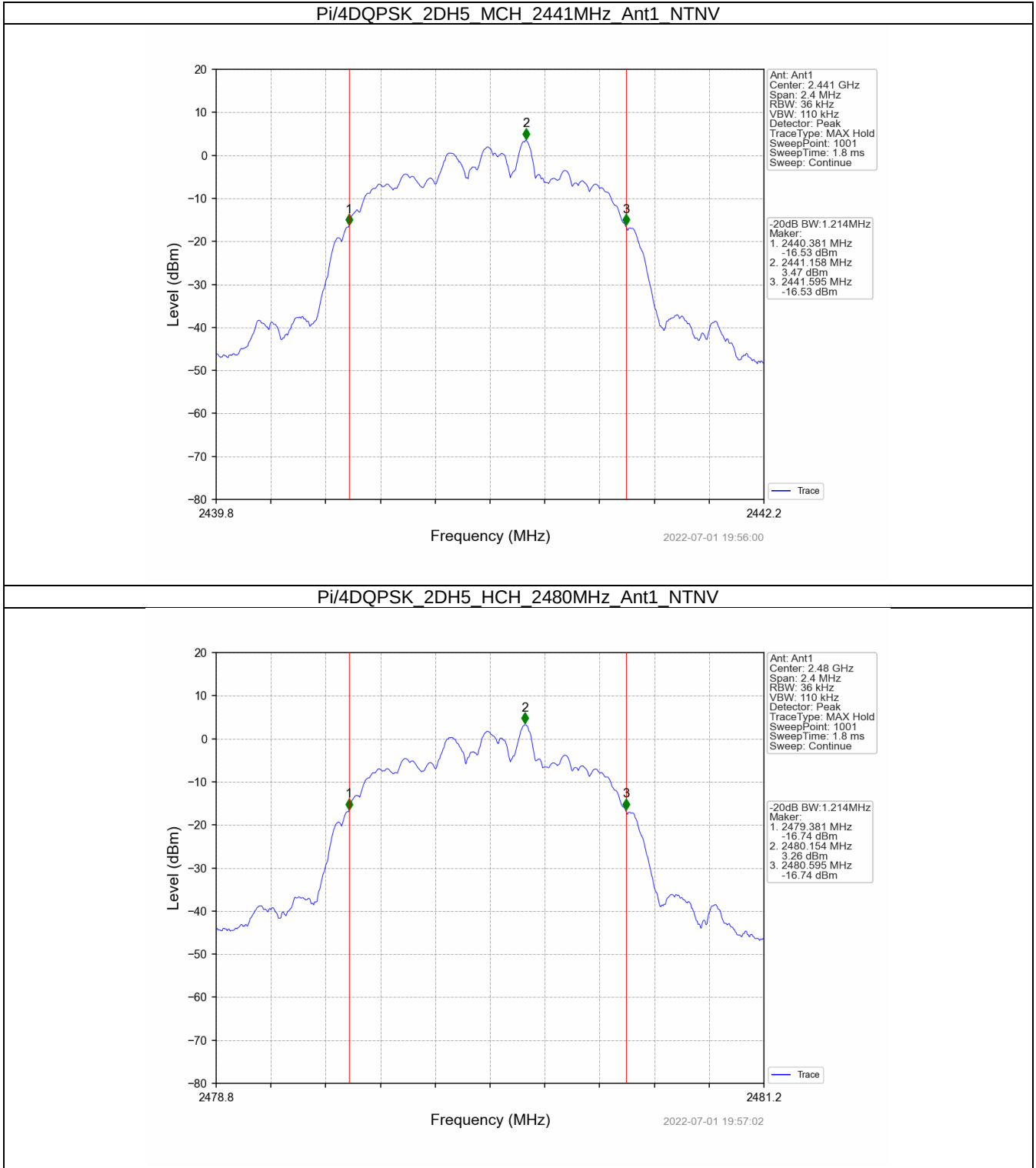


GFSK DH5 HCH 2480MHz Ant1 NTN

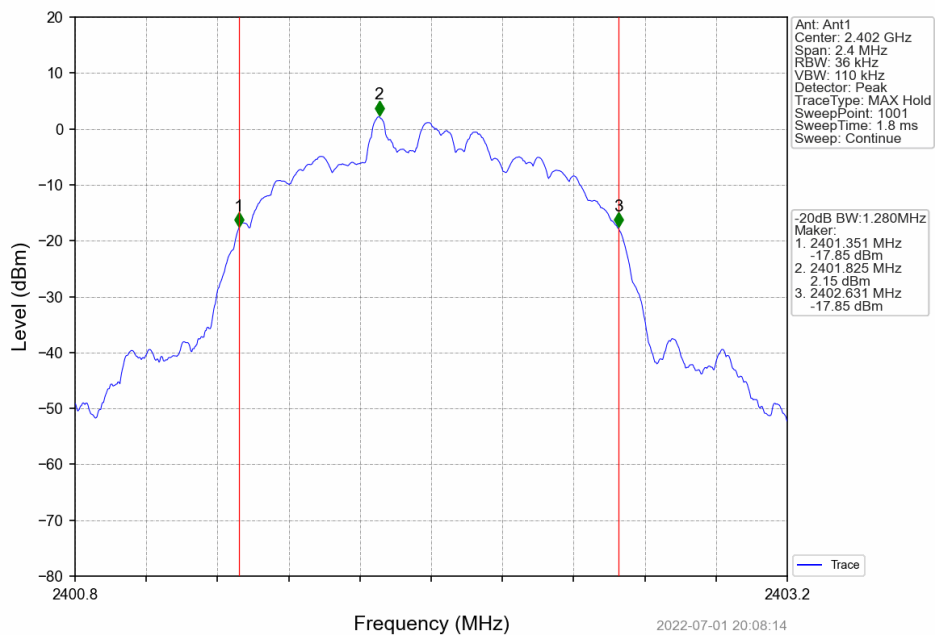


Pi/4DQPSK 2DH5 LCH 2402MHz Ant1 NTN

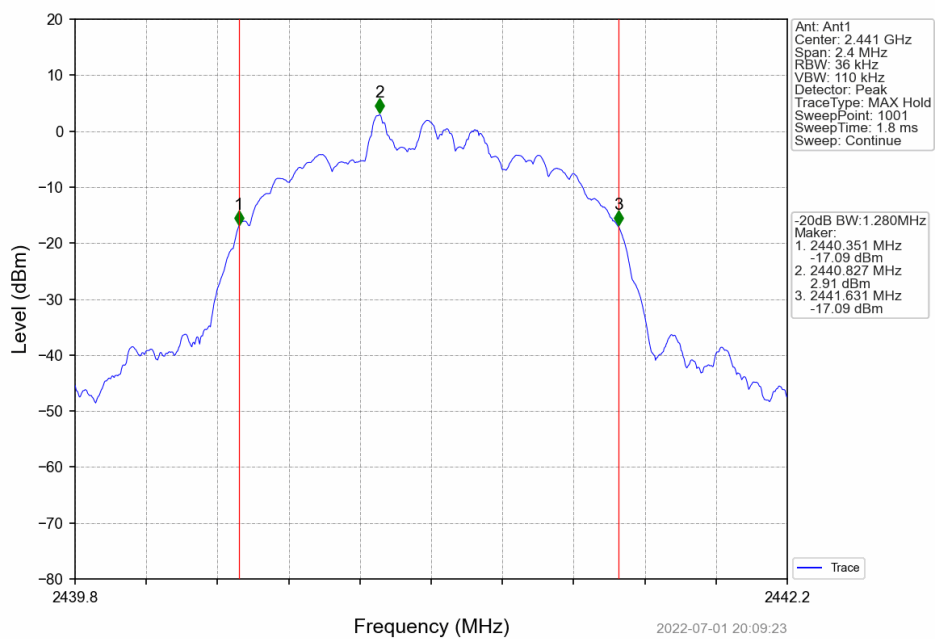


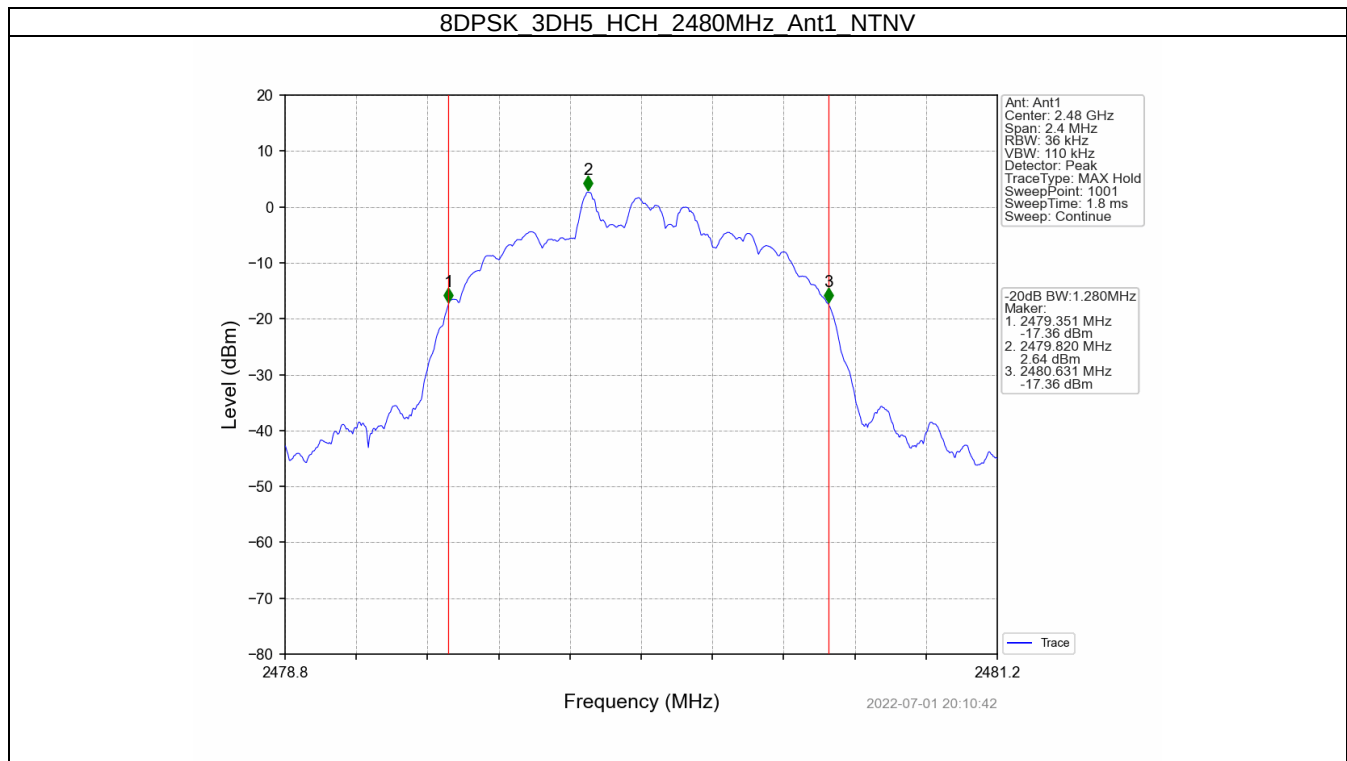


8DPSK 3DH5 LCH 2402MHz Ant1 NTN



8DPSK 3DH5 MCH 2441MHz Ant1 NTN





2. Maximum Conducted Output Power

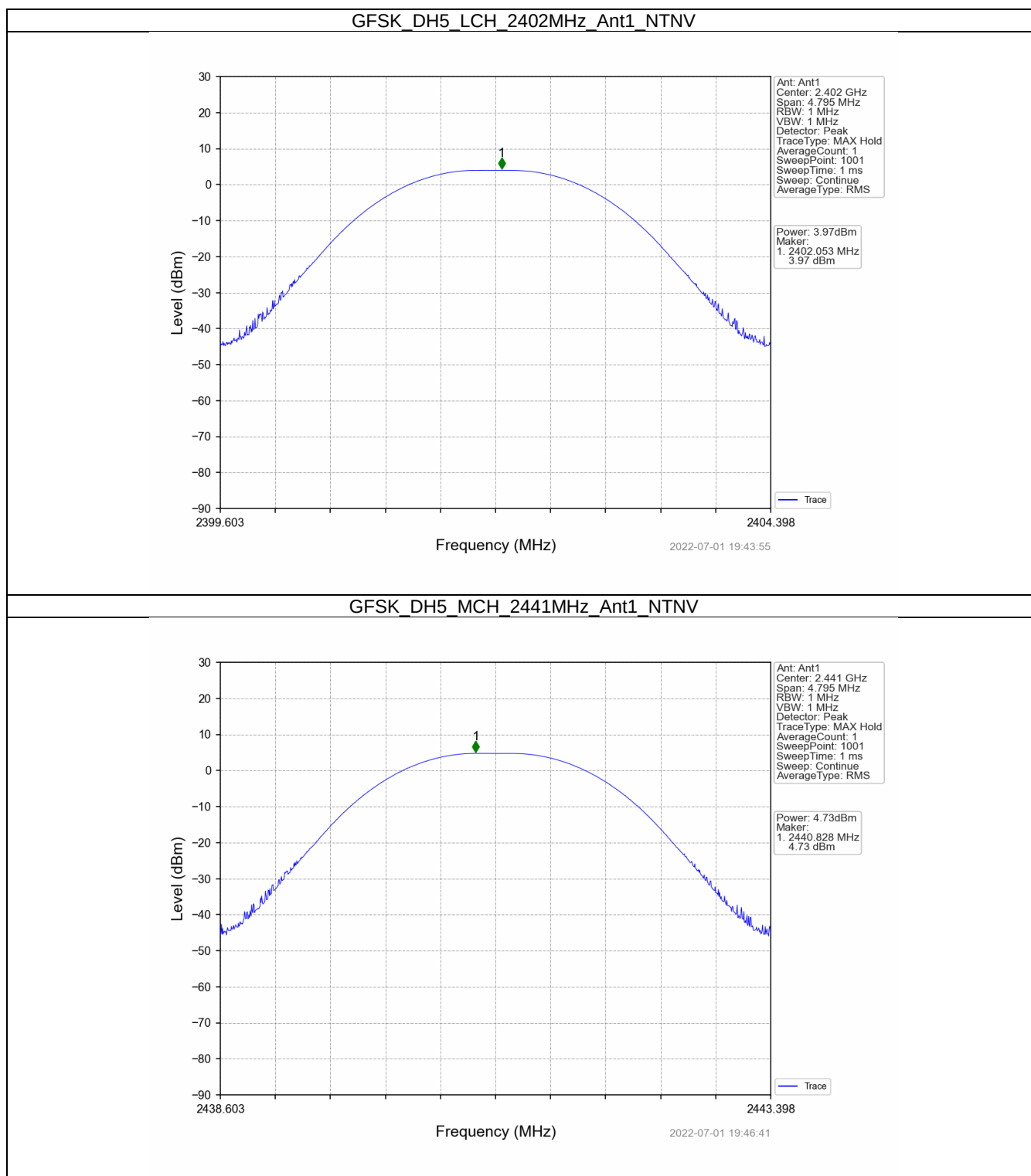
2.1 Power

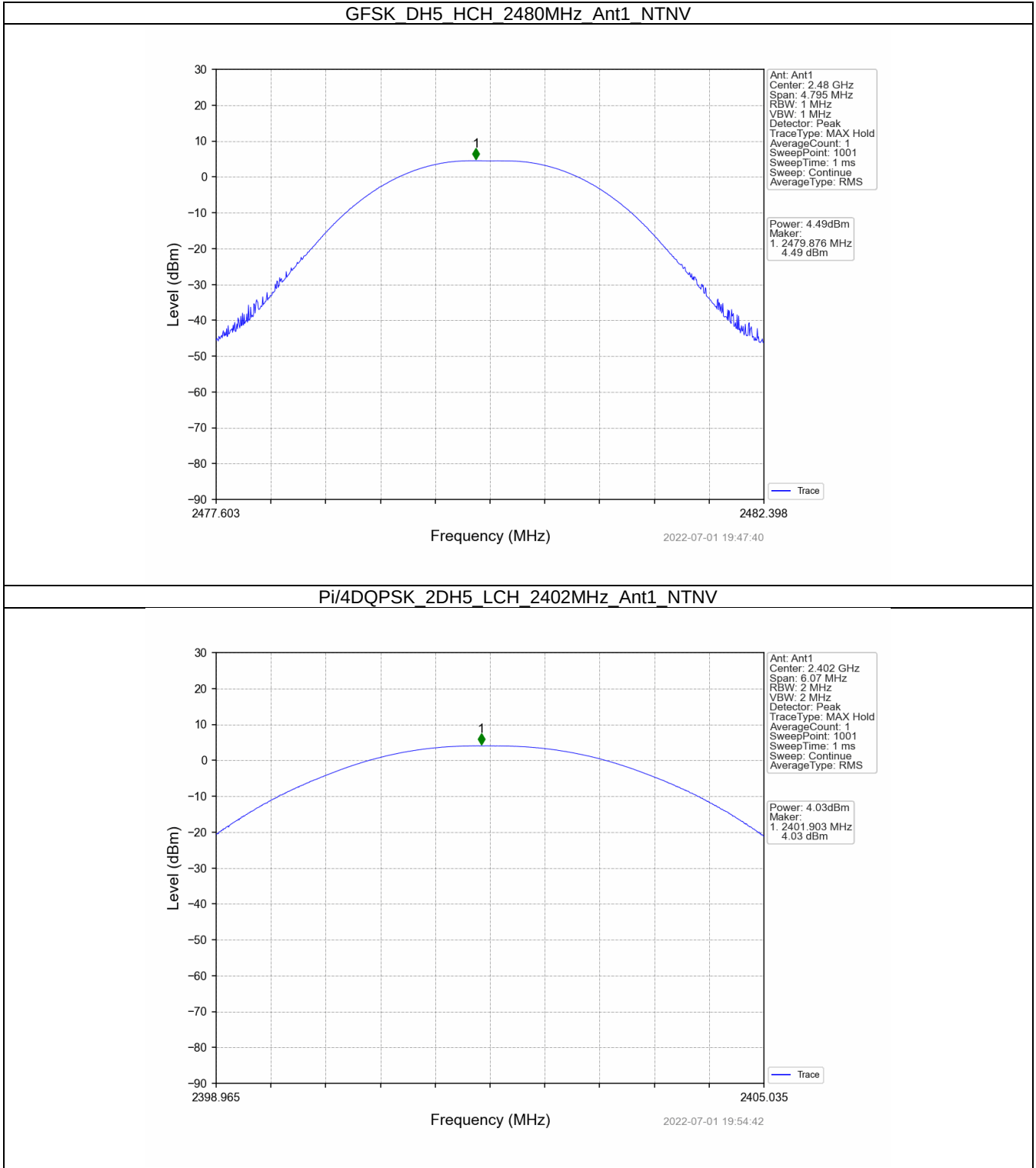
2.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	3.97	<=30	Pass
		2441	DH5	4.73	<=30	Pass
		2480	DH5	4.49	<=30	Pass
Pi/4DQPSK	SISO	2402	2DH5	4.03	<=20.97	Pass
		2441	2DH5	4.80	<=20.97	Pass
		2480	2DH5	4.58	<=20.97	Pass
8DPSK	SISO	2402	3DH5	4.43	<=20.97	Pass
		2441	3DH5	5.21	<=20.97	Pass
		2480	3DH5	4.98	<=20.97	Pass

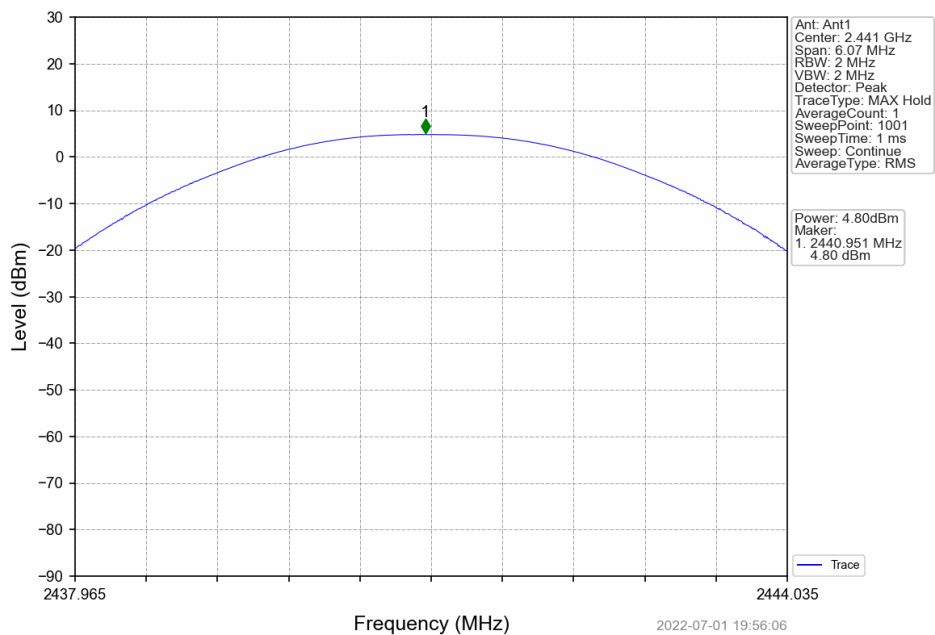
Note1: Antenna Gain: Ant1: 3.48dBi;

2.1.2 Test Graph

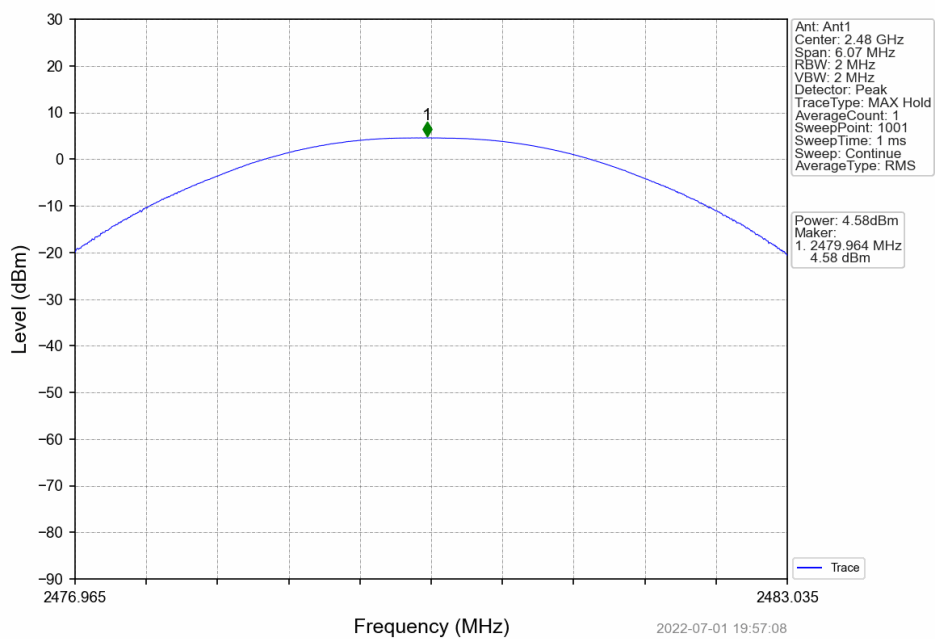




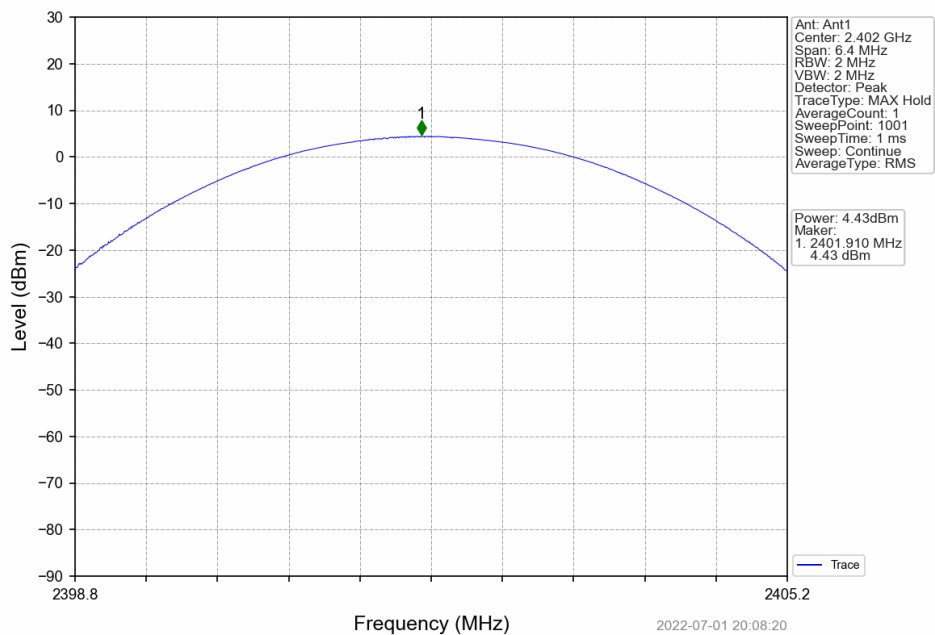
Pi/4DQPSK 2DH5 MCH 2441MHz Ant1 NTN



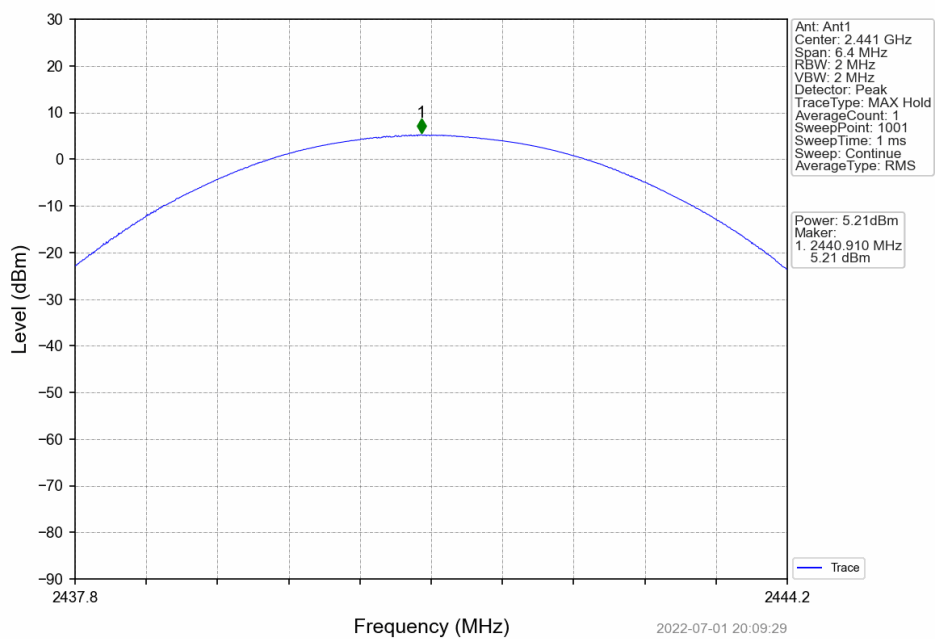
Pi/4DQPSK 2DH5 HCH 2480MHz Ant1 NTN

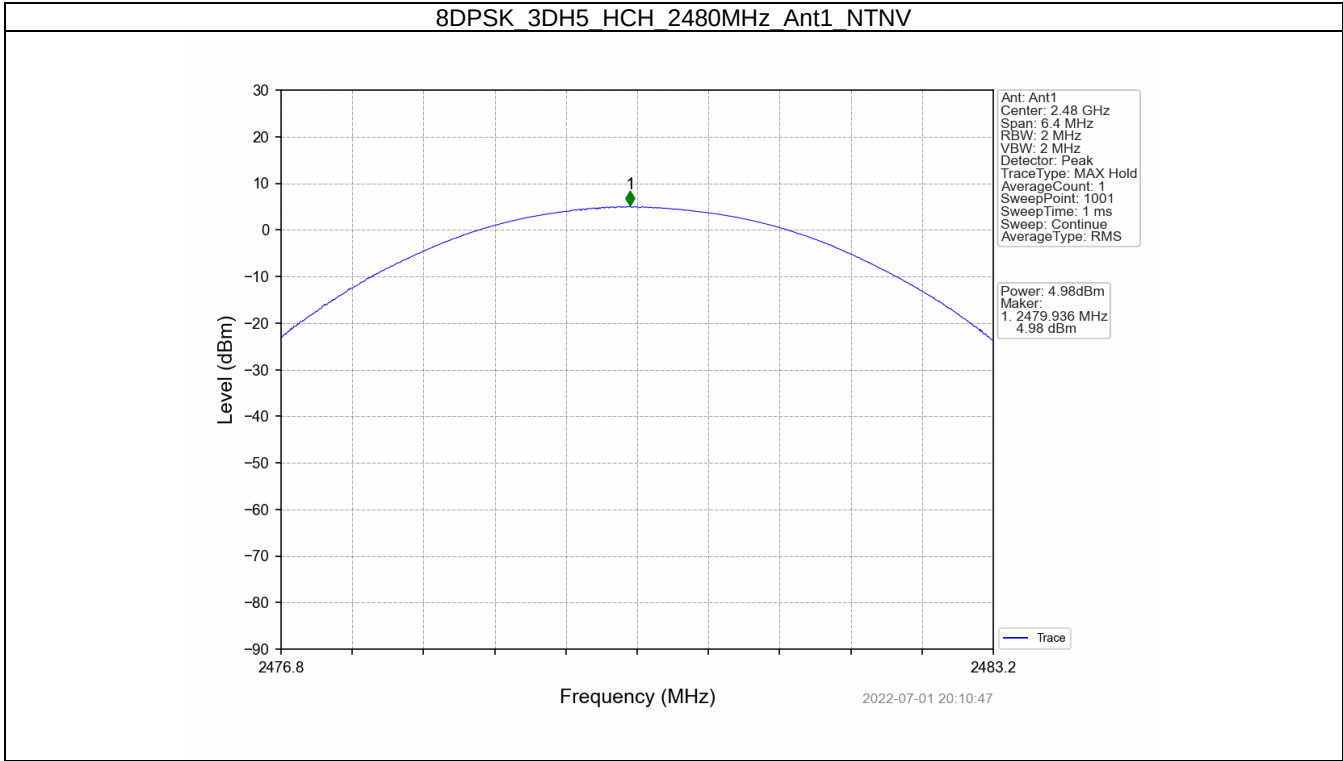


8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV





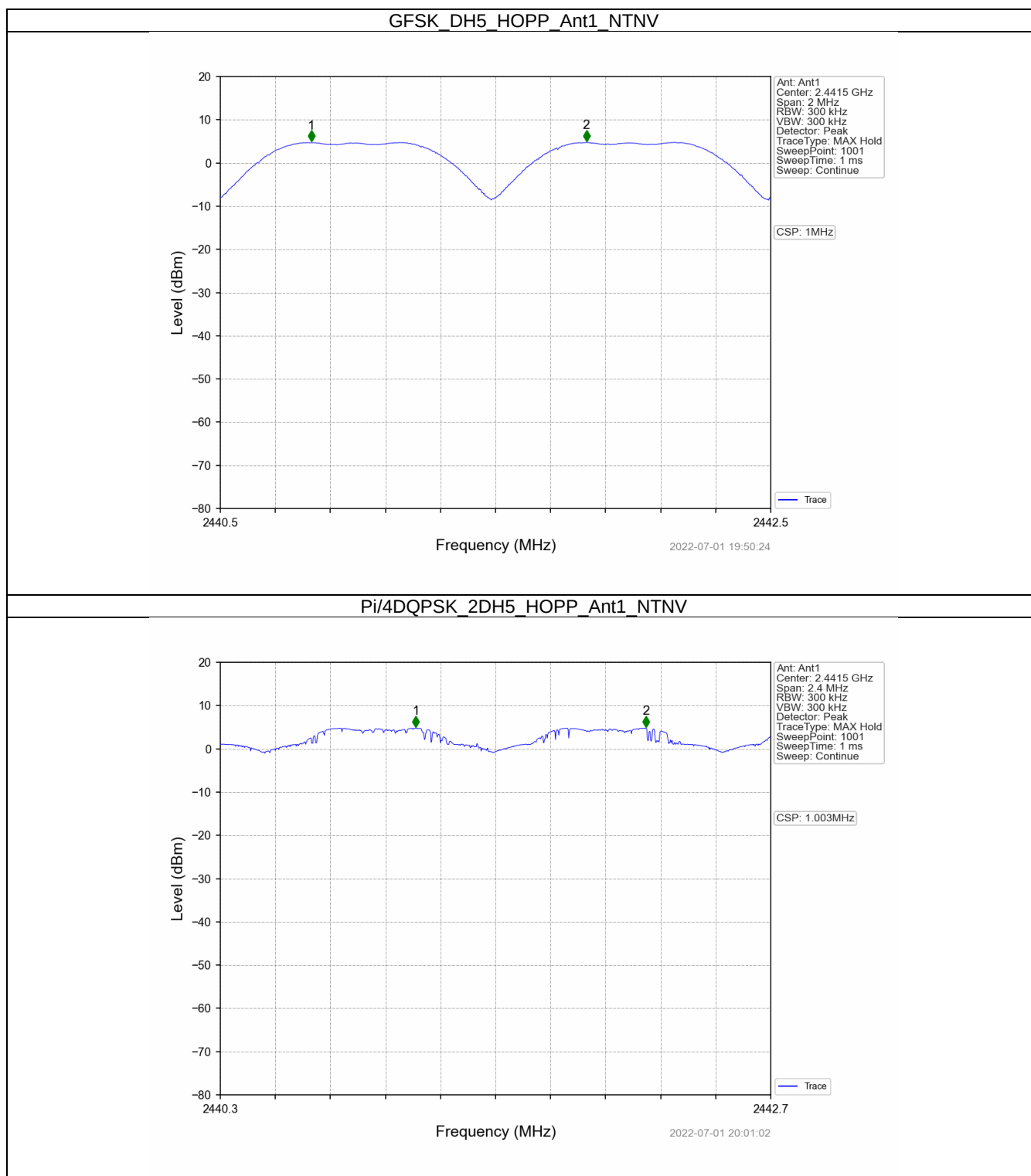
3. Carrier Frequency Separation

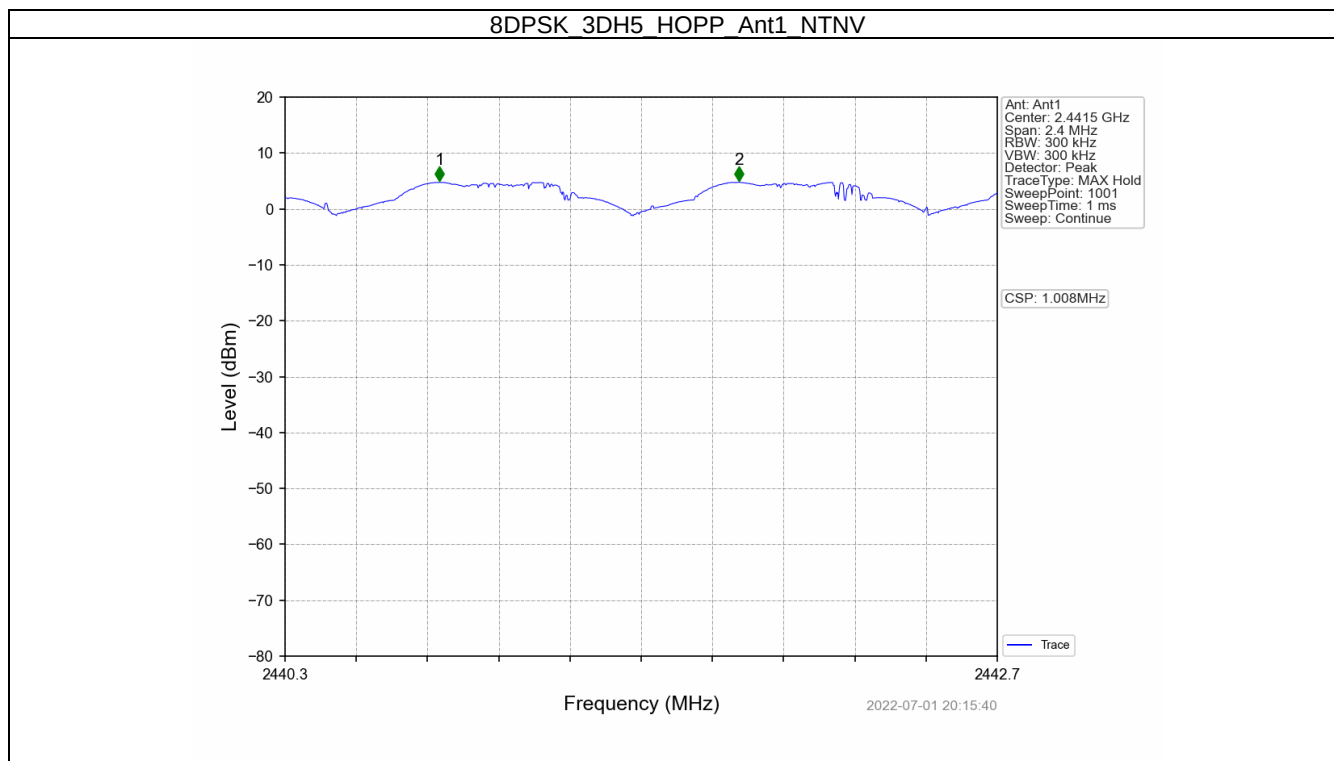
3.1 Ant1

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	1.000	0.959	≥ 0.959	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	1.003	1.214	≥ 0.809	Pass
8DPSK	SISO	HOPP	3DH5	1.008	1.280	≥ 0.853	Pass

3.1.2 Test Graph





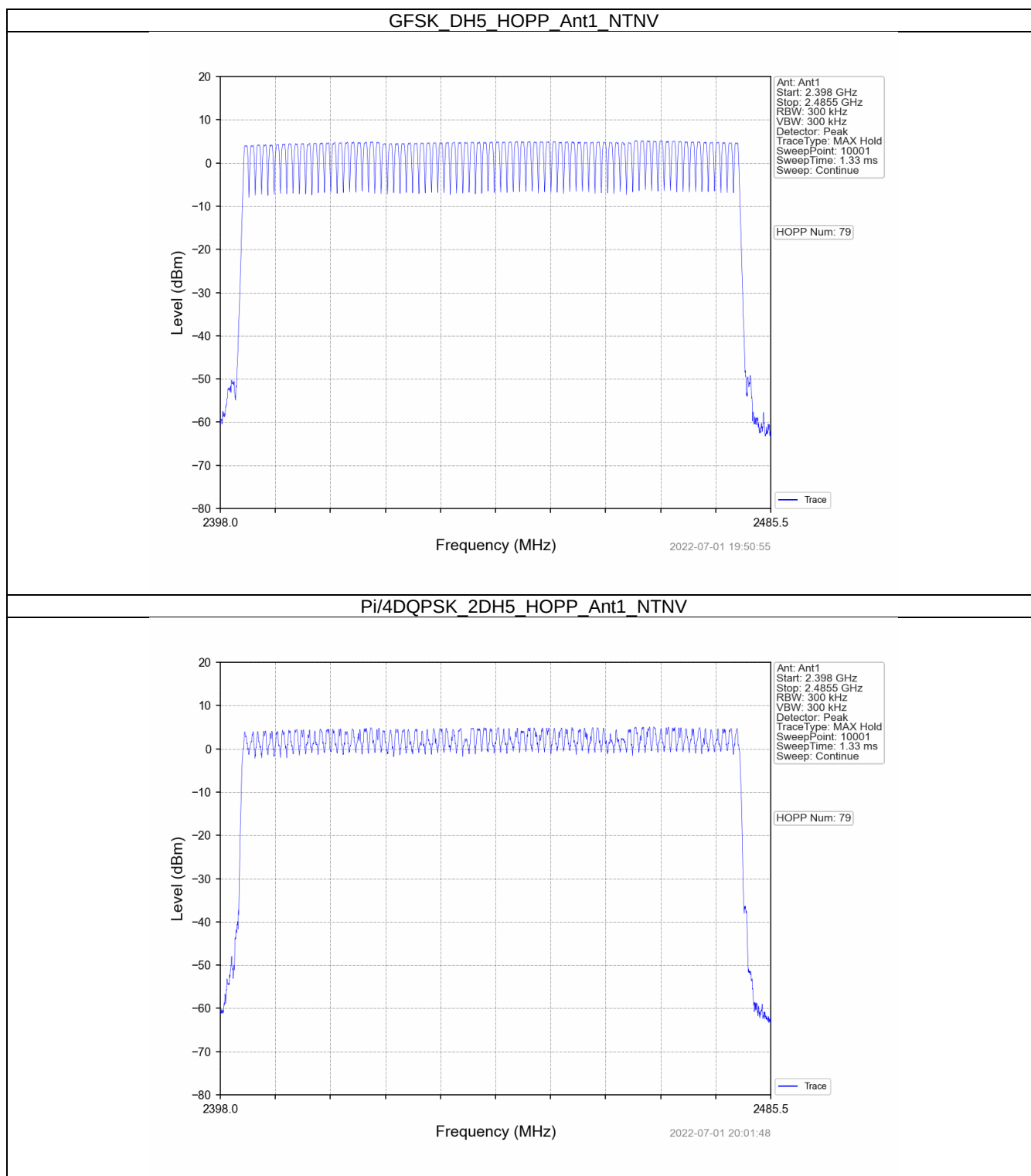
4. Number of Hopping Frequencies

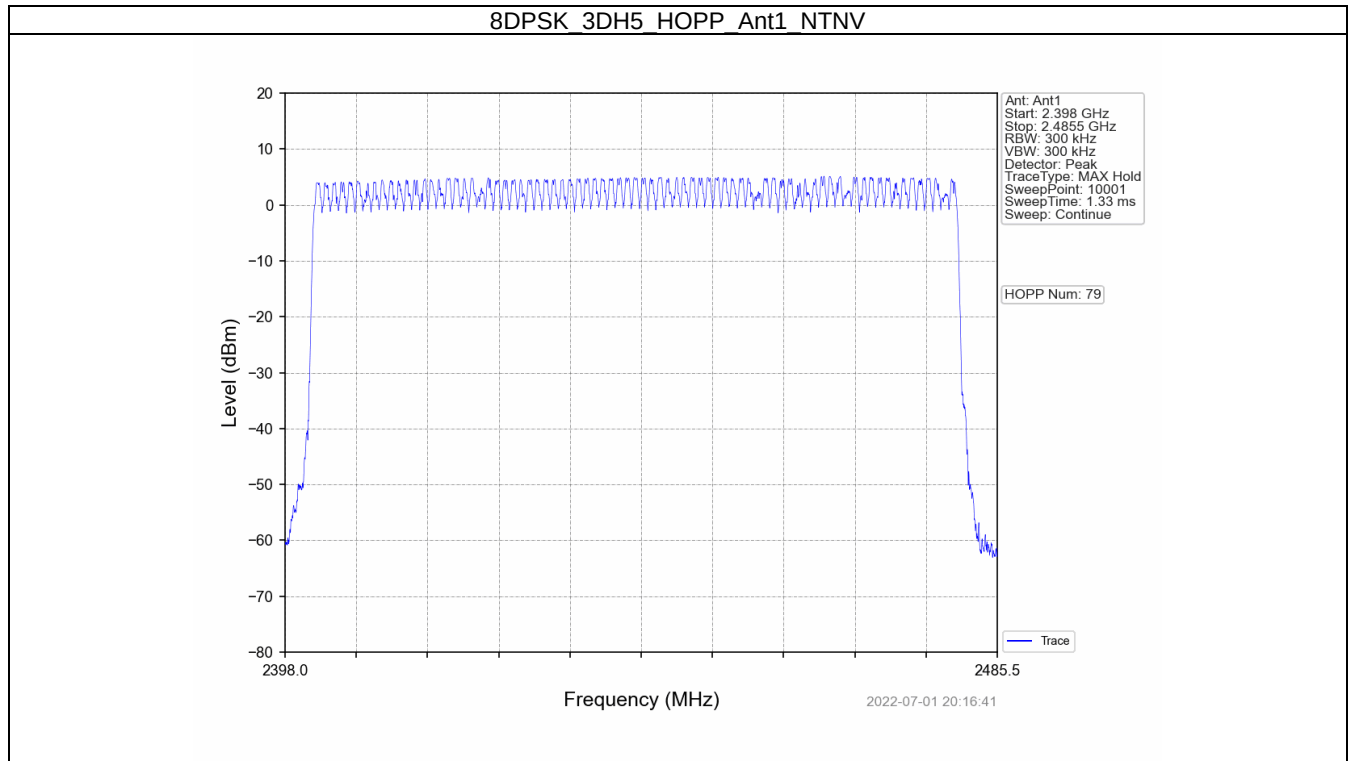
4.1 HoppNum

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





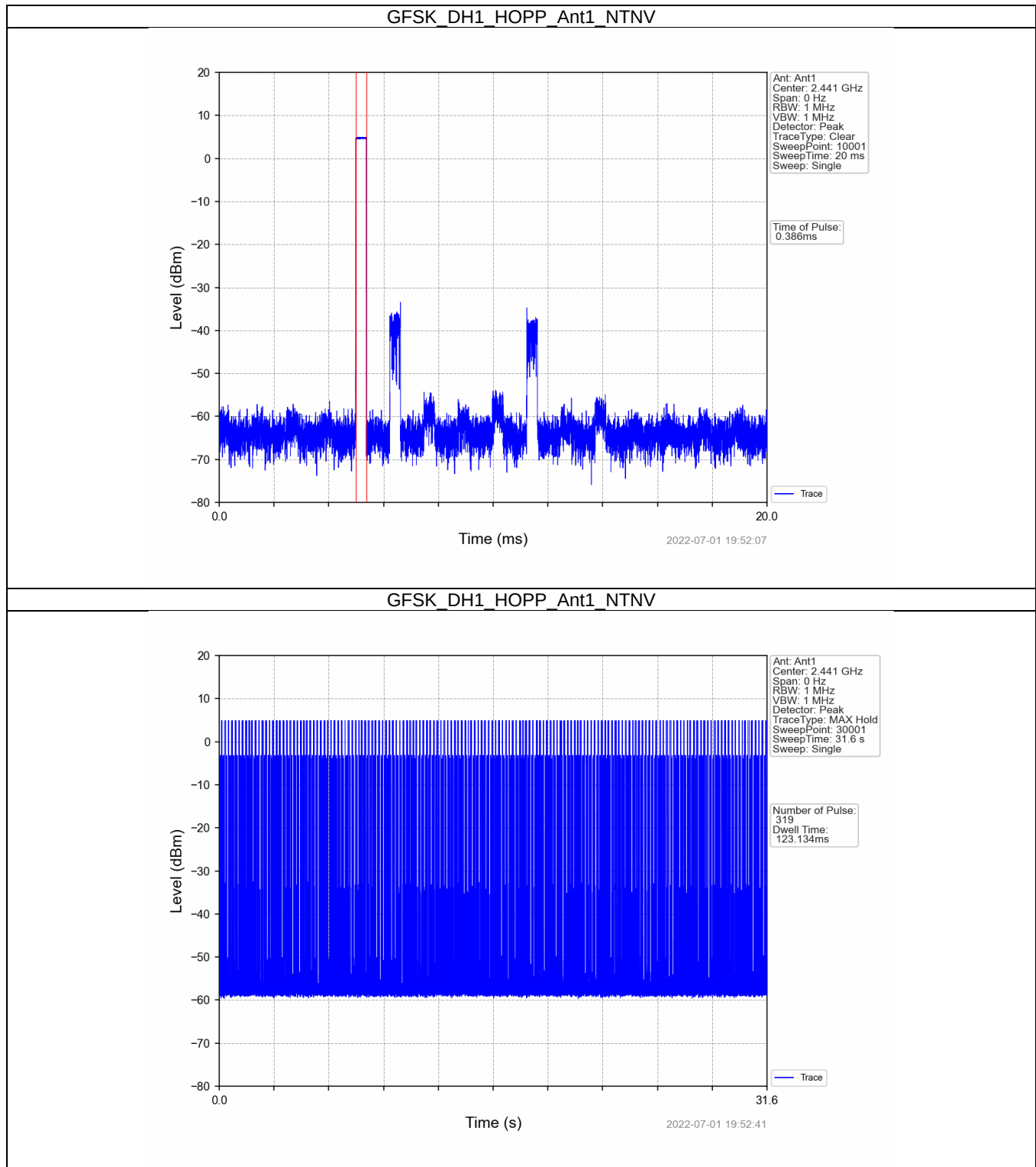
5. Time of Occupancy (Dwell Time)

5.1 Ant1

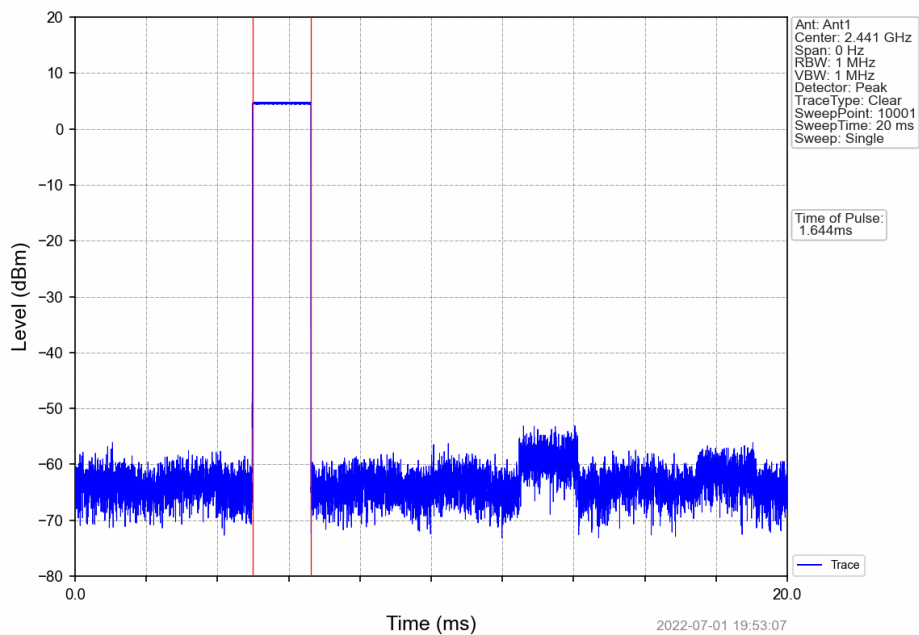
5.1.1 Test Result

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	0.386	31.600	319	123.134	<=400	Pass
			DH3	1.644	31.600	166	272.904	<=400	Pass
			DH5	2.892	31.600	110	318.120	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.404	31.600	320	129.280	<=400	Pass
			2DH3	1.646	31.600	163	268.298	<=400	Pass
			2DH5	2.900	31.600	110	319.000	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.394	31.600	320	126.080	<=400	Pass
			3DH3	1.646	31.600	149	245.254	<=400	Pass
			3DH5	2.902	31.600	96	278.592	<=400	Pass

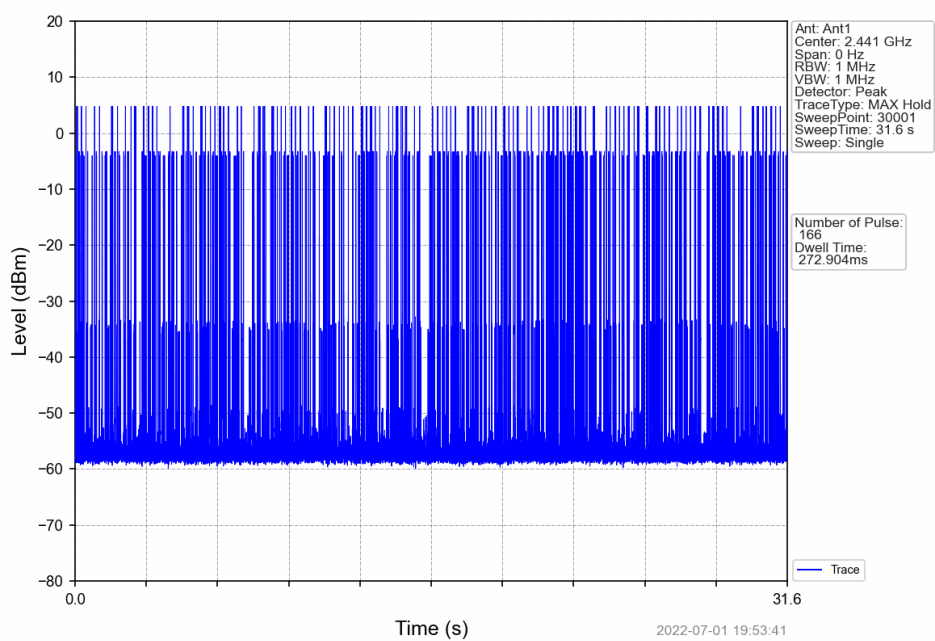
5.1.2 Test Graph



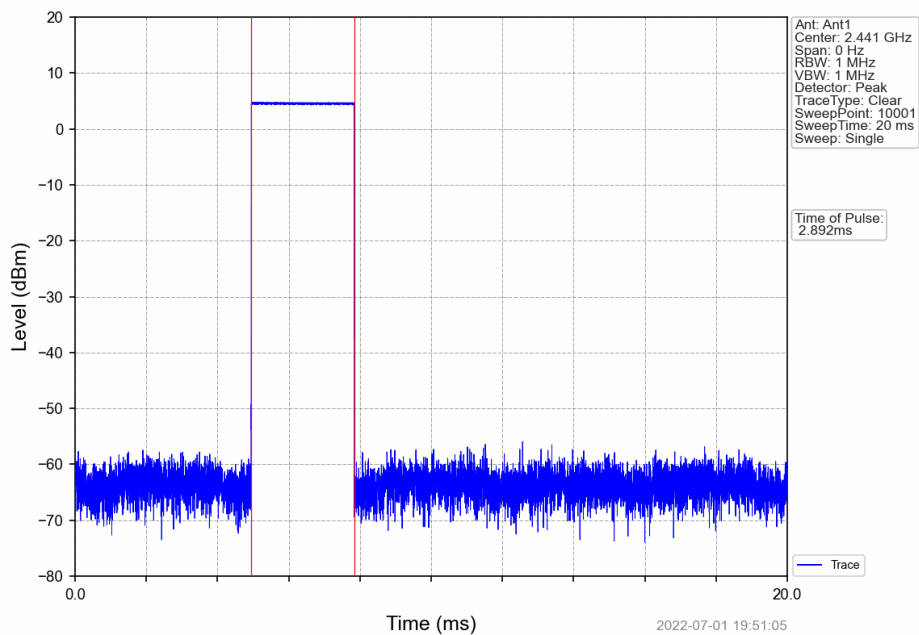
GFSK DH3 HOPP Ant1 NTN



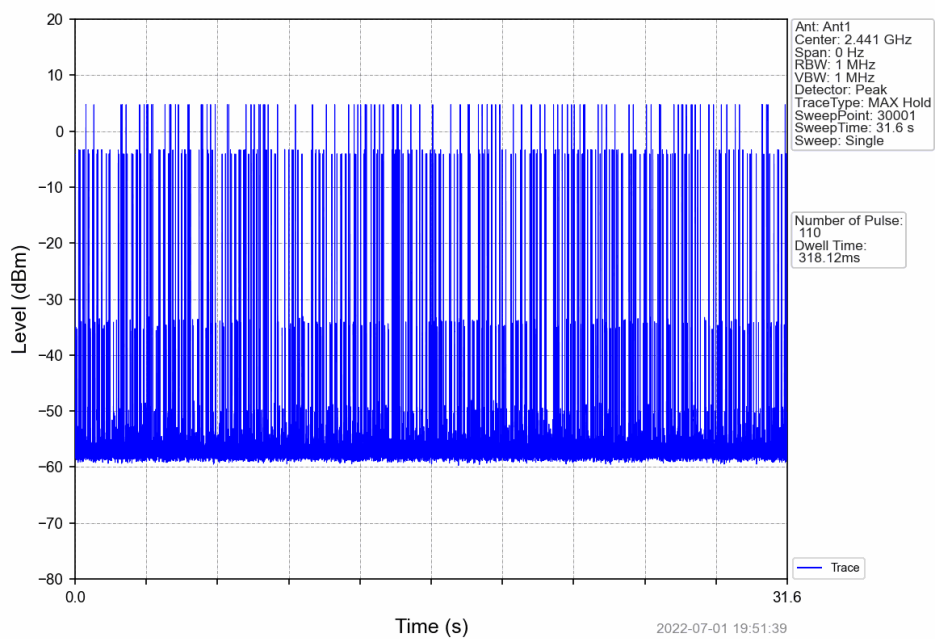
GFSK_DH3_HOPP_Ant1_NTNV

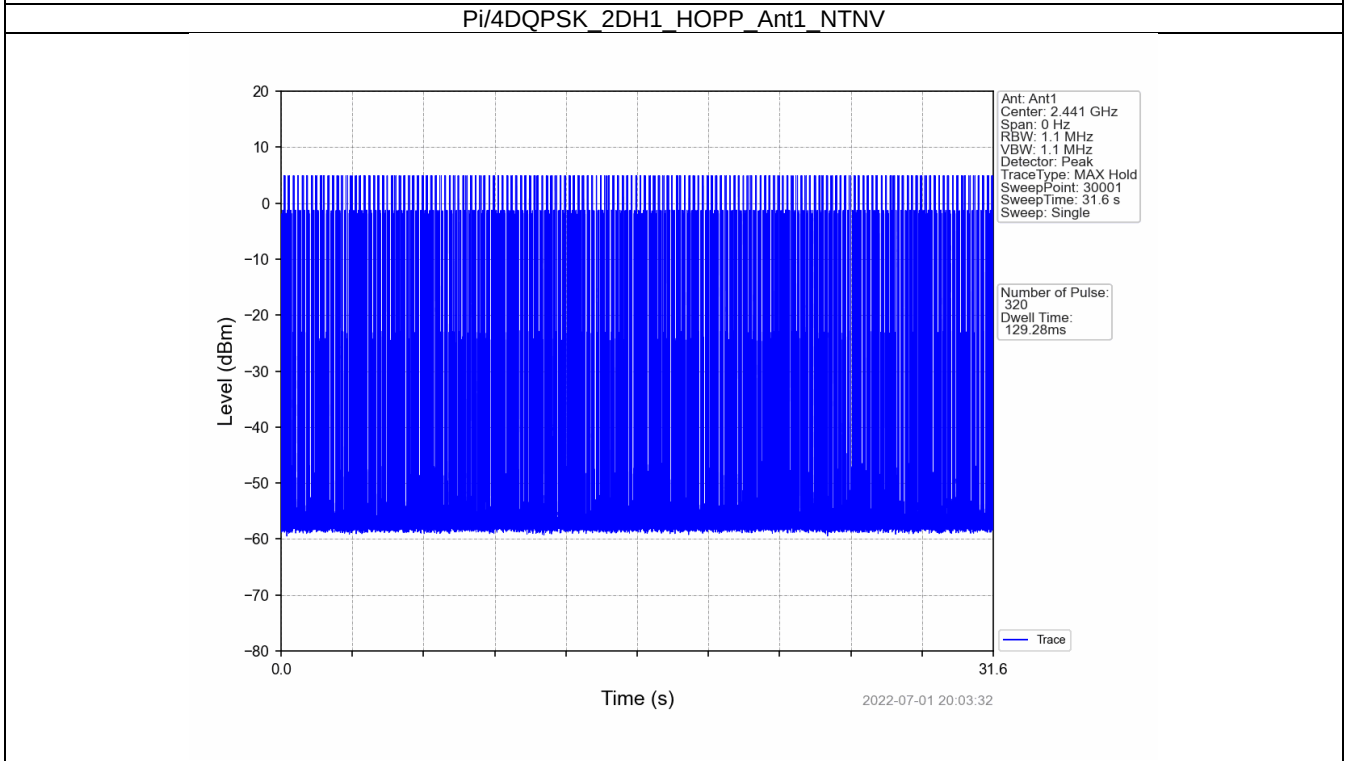
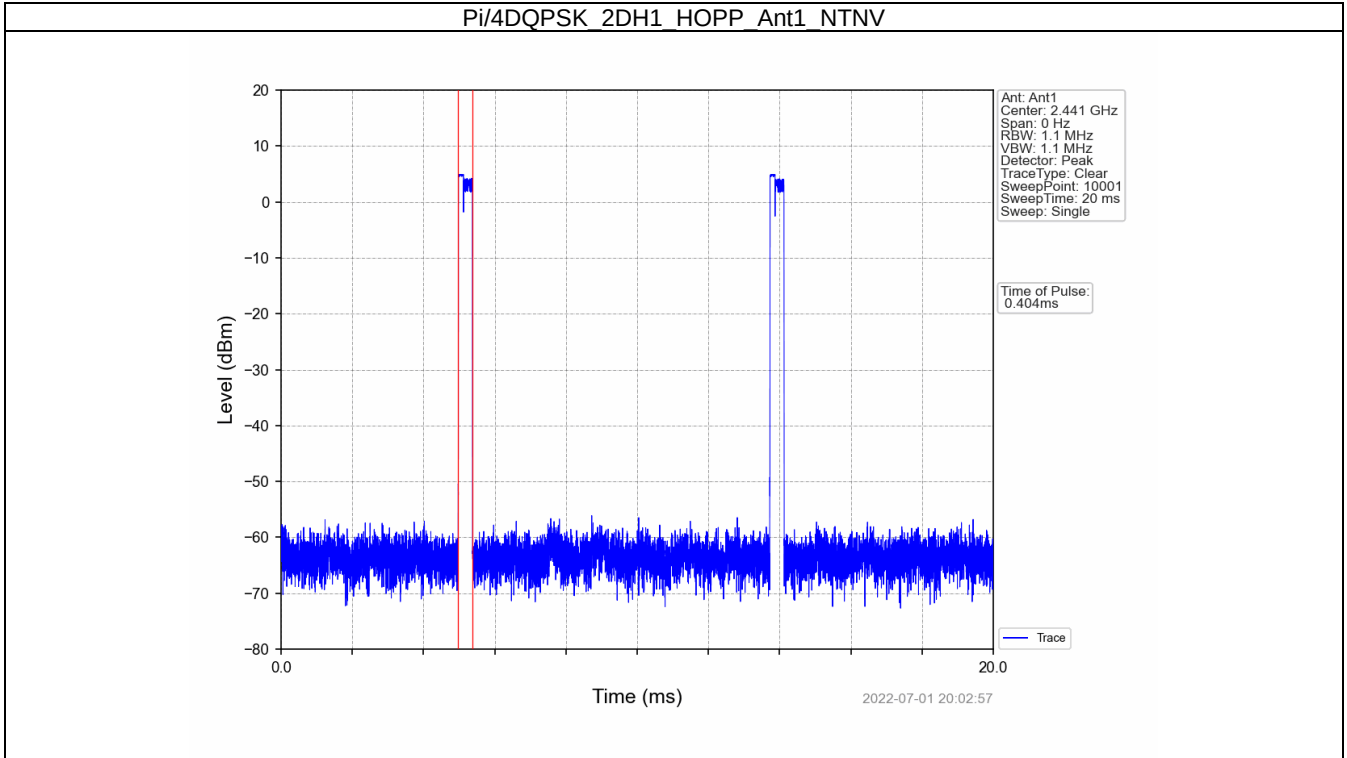


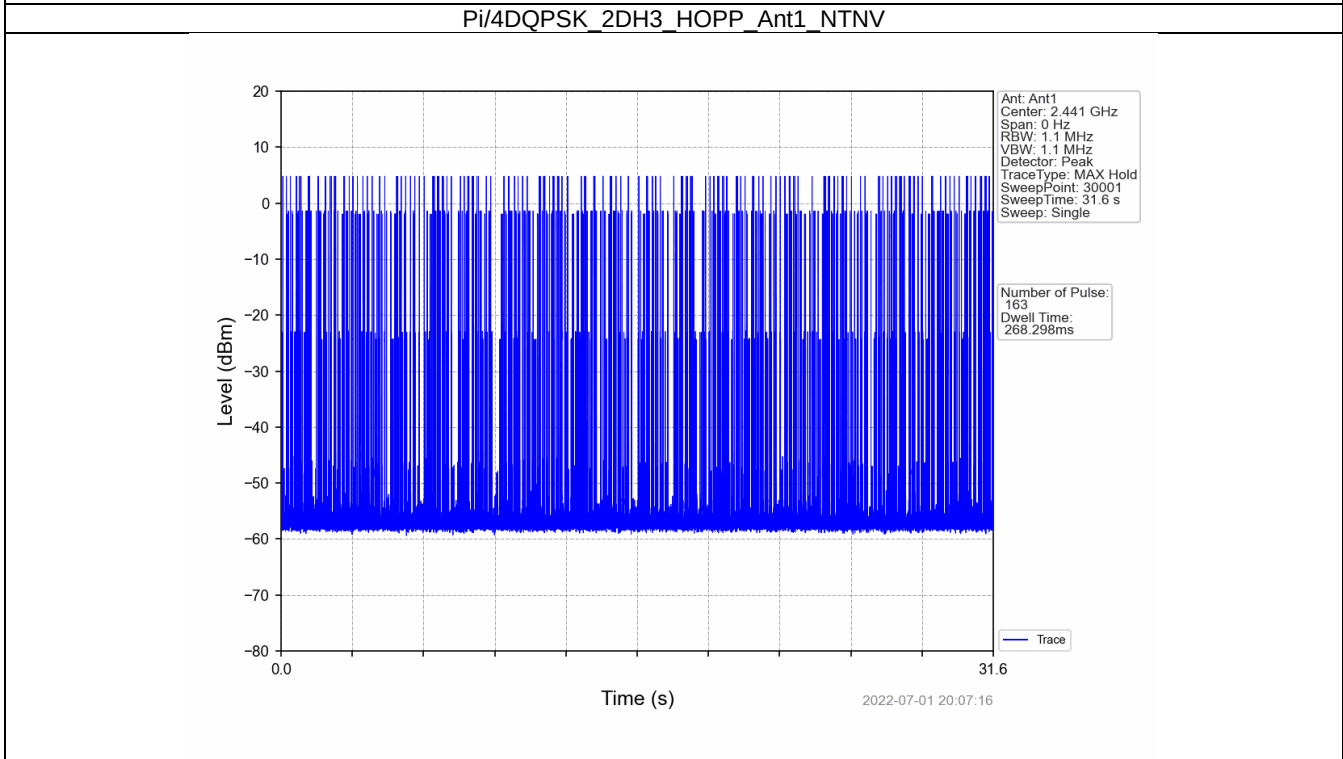
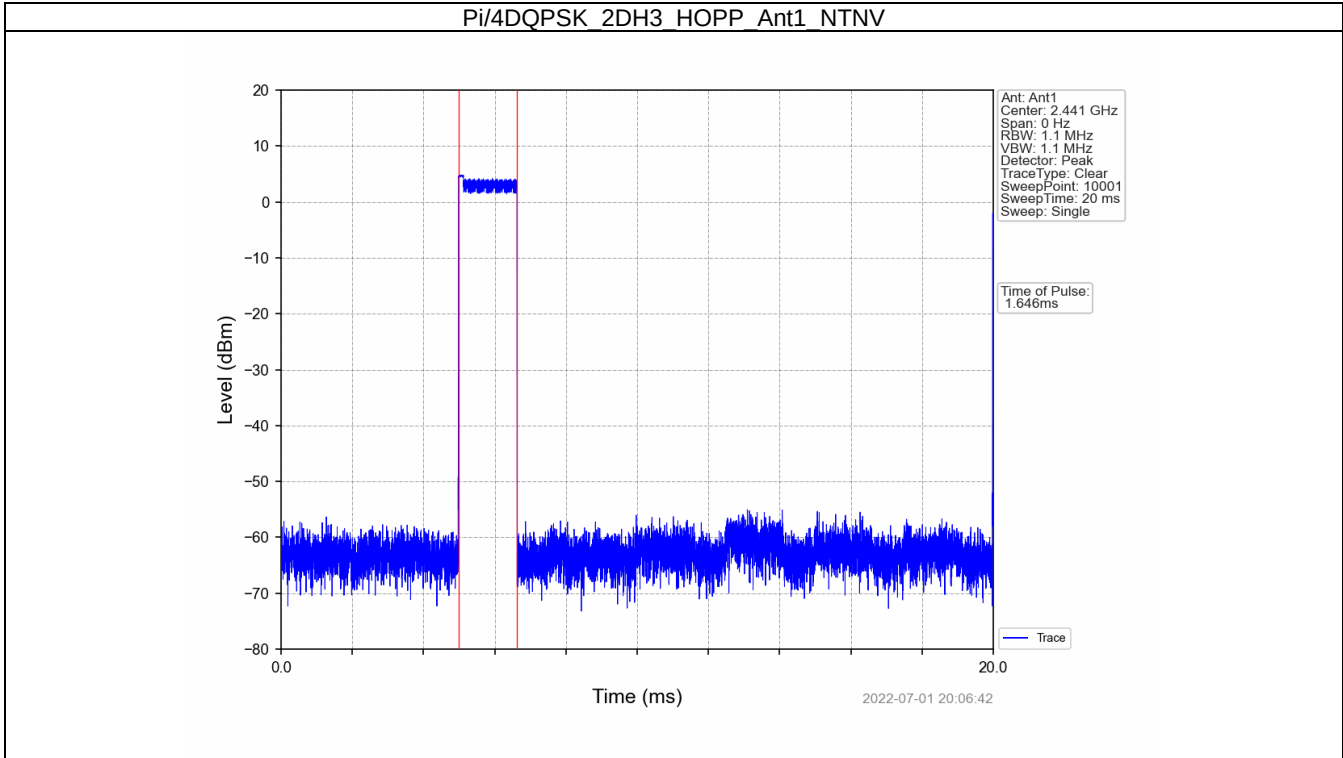
GFSK DH5 HOPP Ant1 NTN

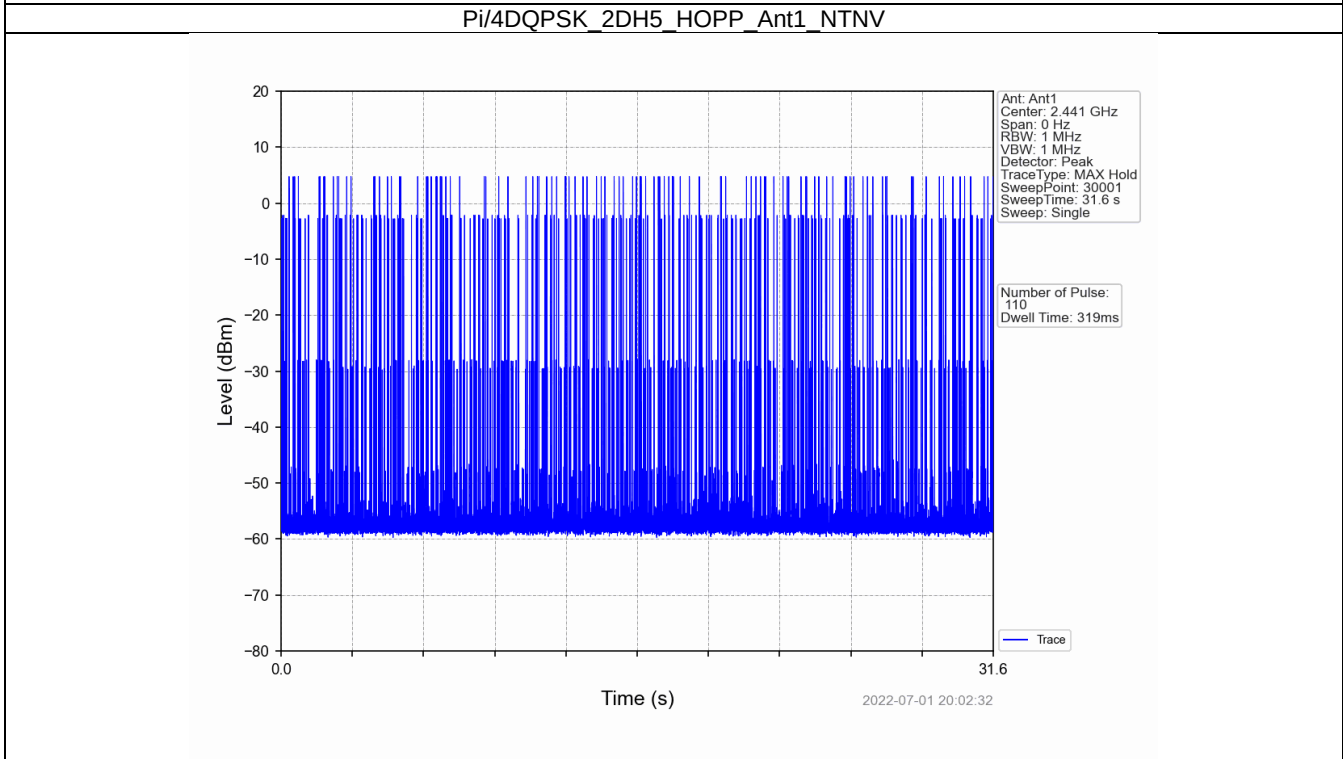
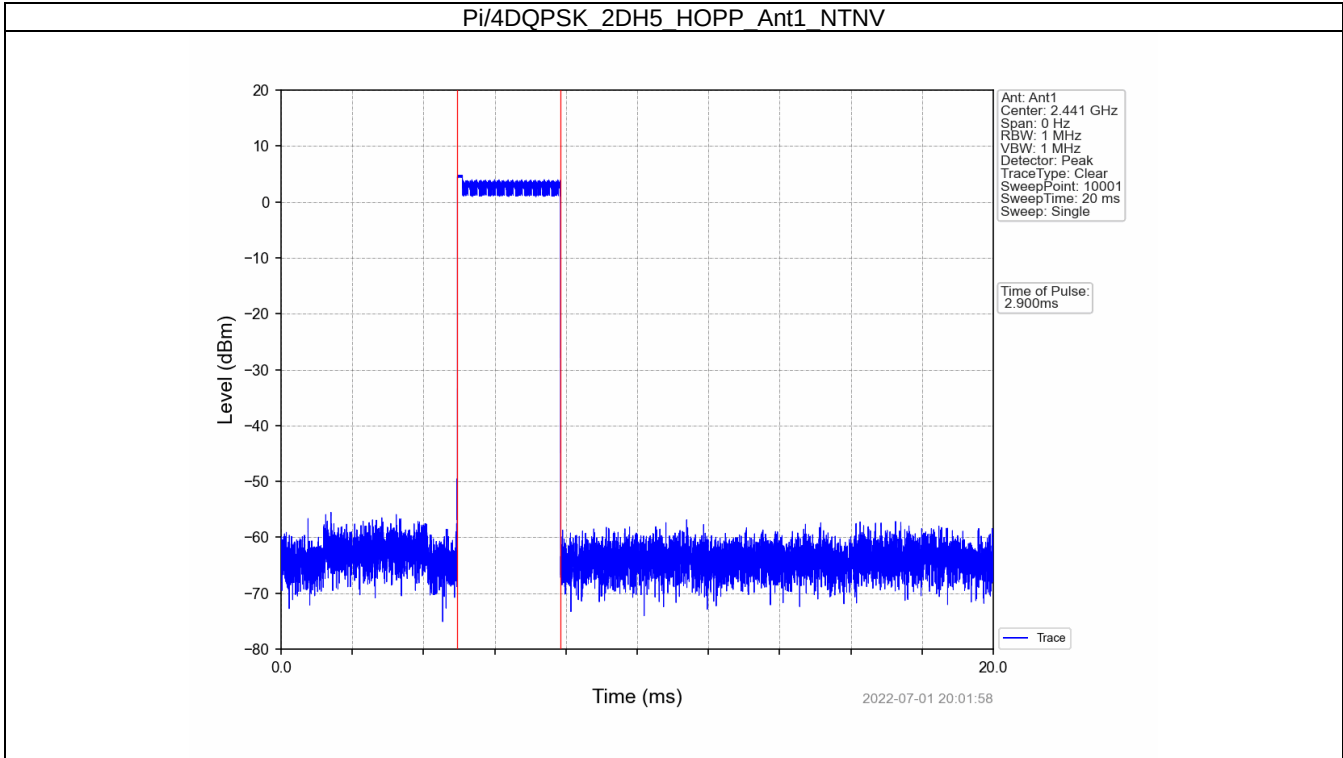


GFSK_DH5_HOPP_Ant1_NTNV

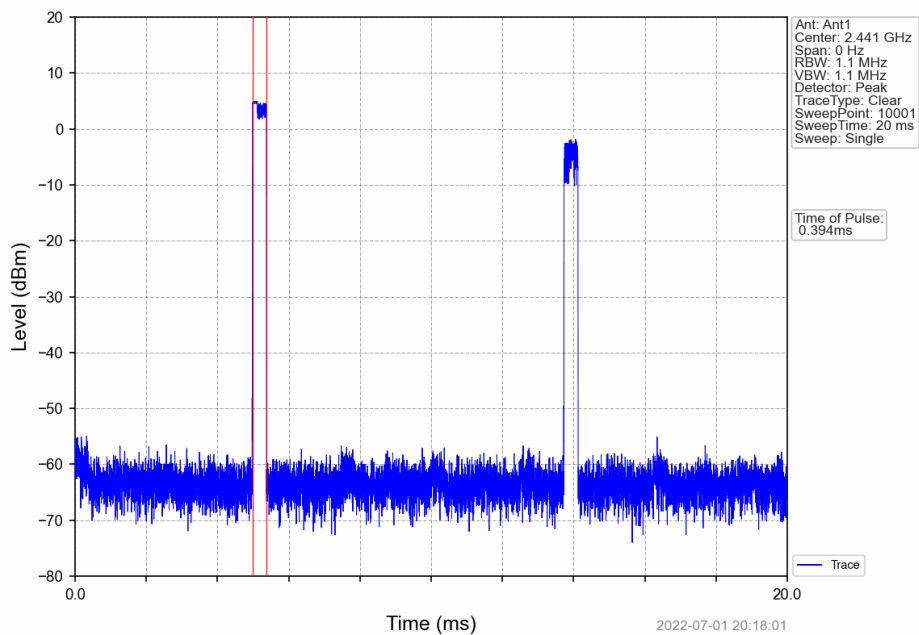




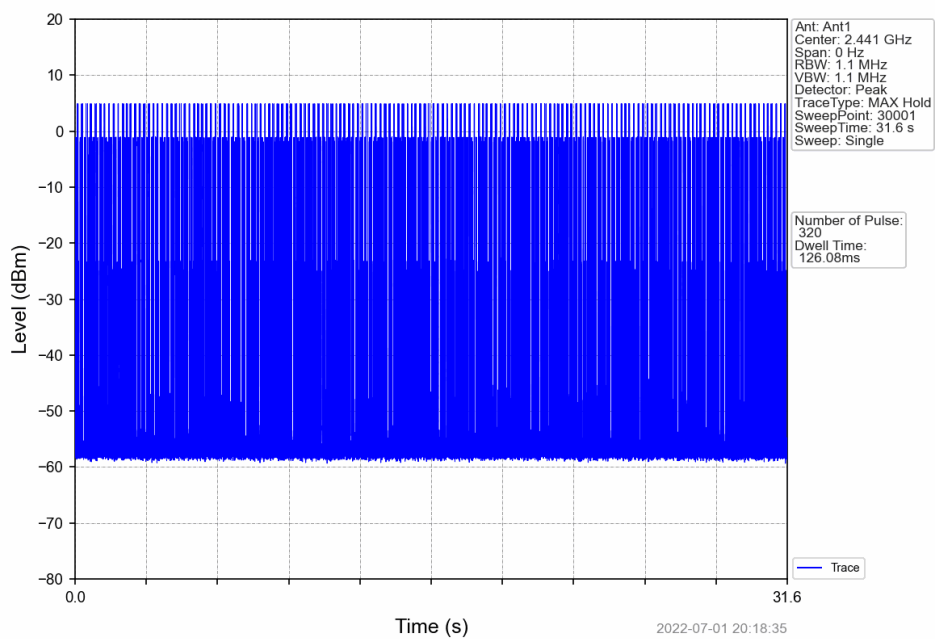




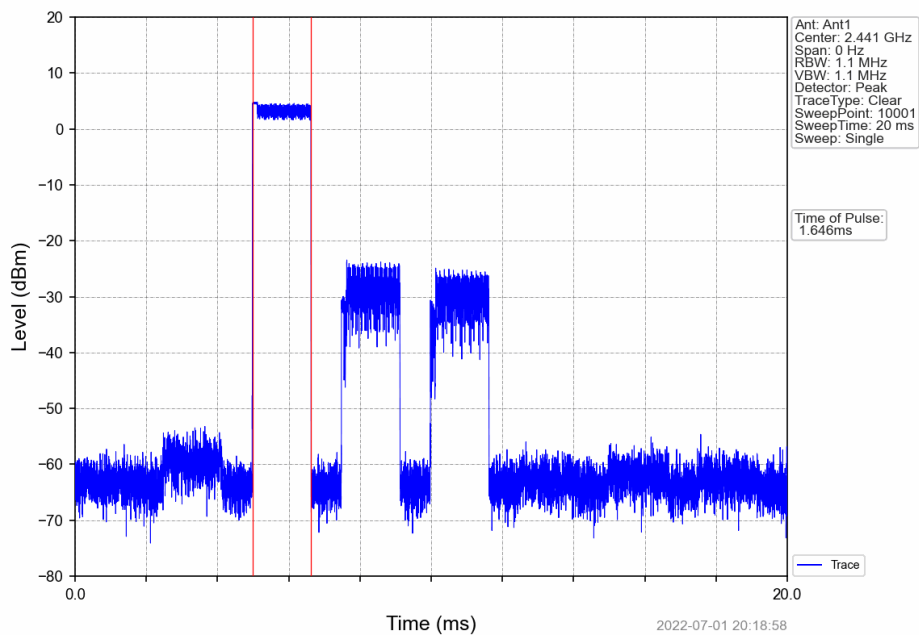
8DPSK 3DH1 HOPP Ant1 NTN



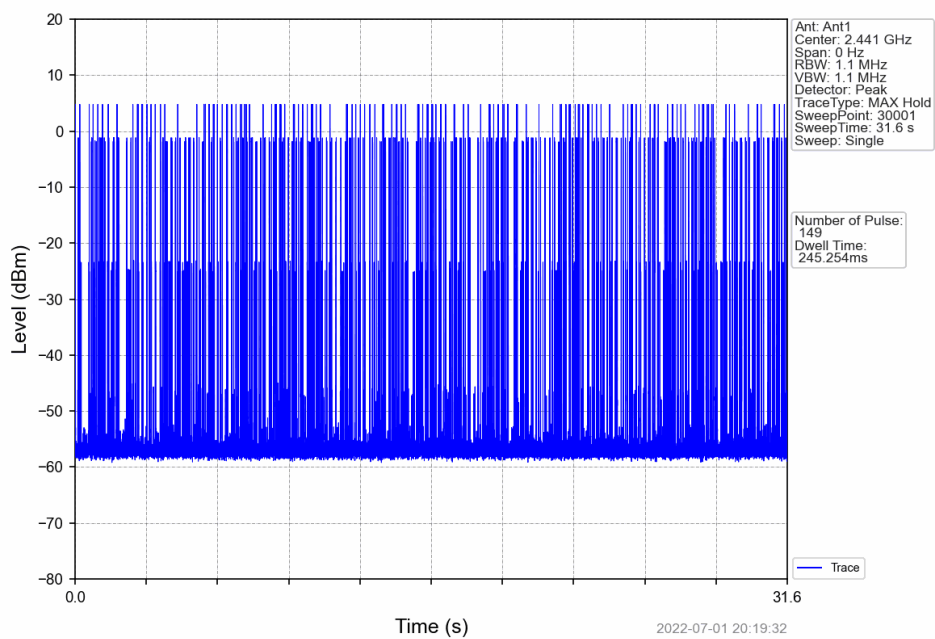
8DPSK_3DH1_HOPP_Ant1_NTN



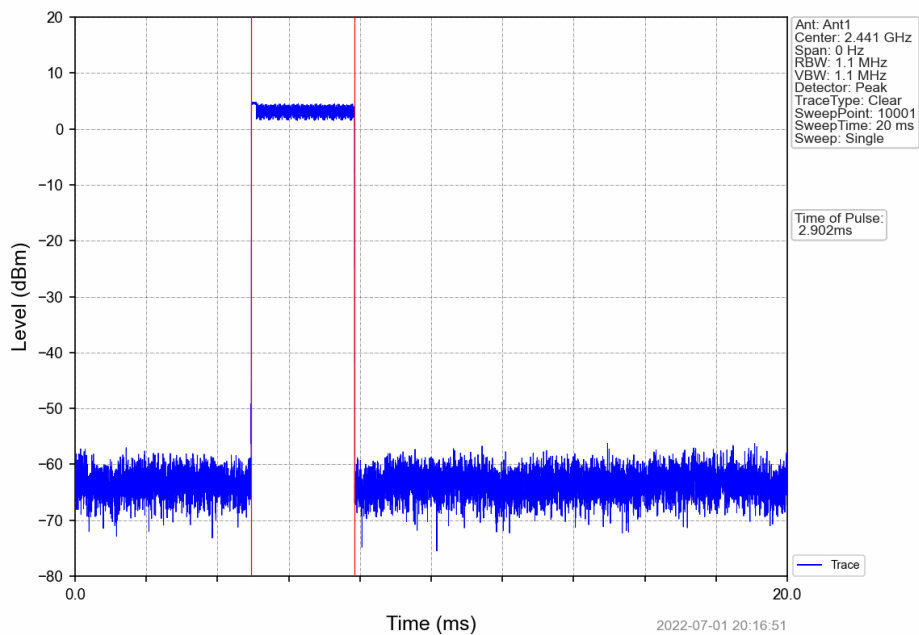
8DPSK 3DH3 HOPP_Ant1_NTNV



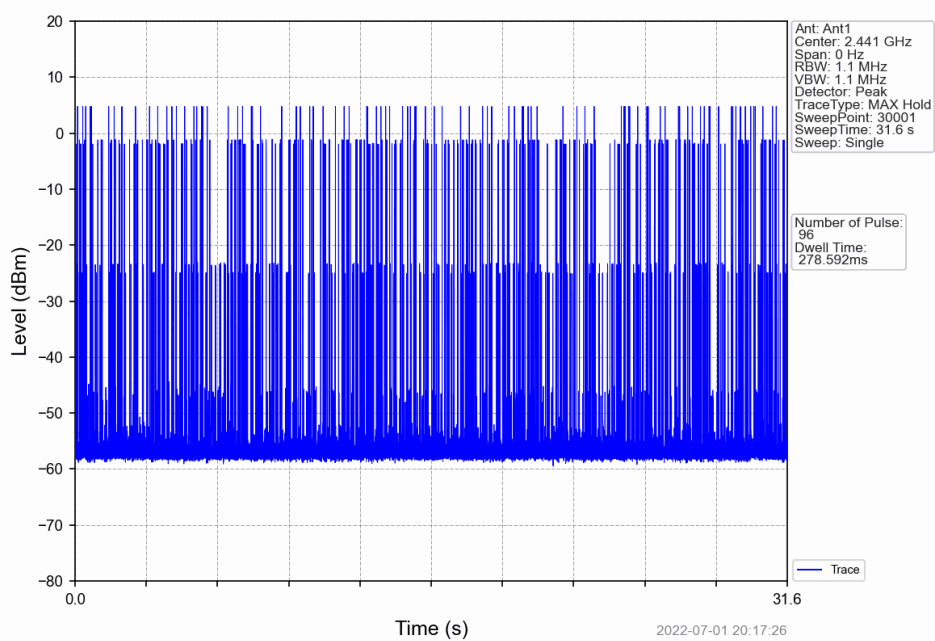
8DPSK_3DH3_HOPP_Ant1_NTNV



8DPSK 3DH5 HOPP Ant1 NTN



8DPSK_3DH5_HOPP_Ant1_NTNV



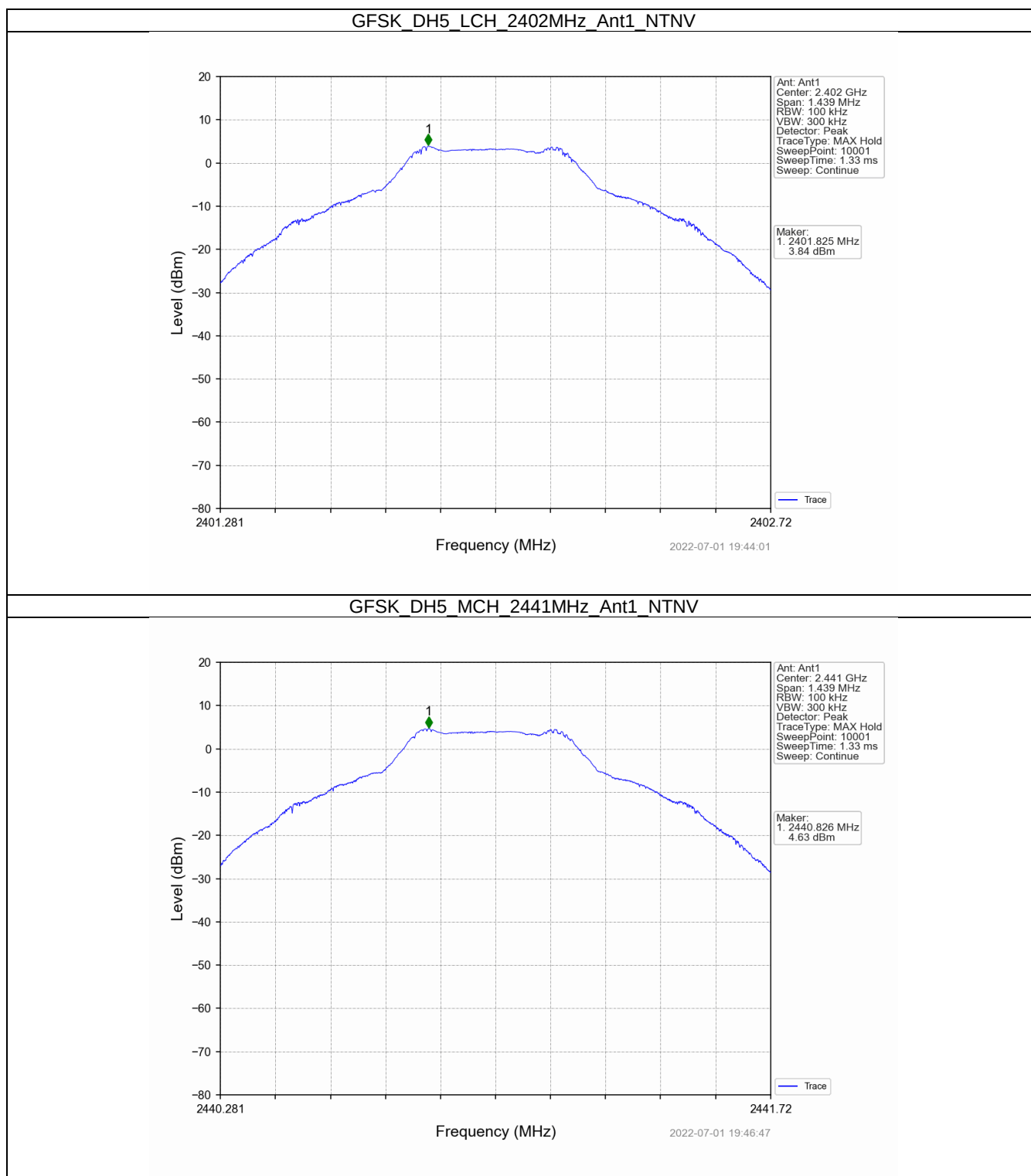
6. Unwanted Emissions InStandard Non-restricted Frequency Bands

6.1 Ref

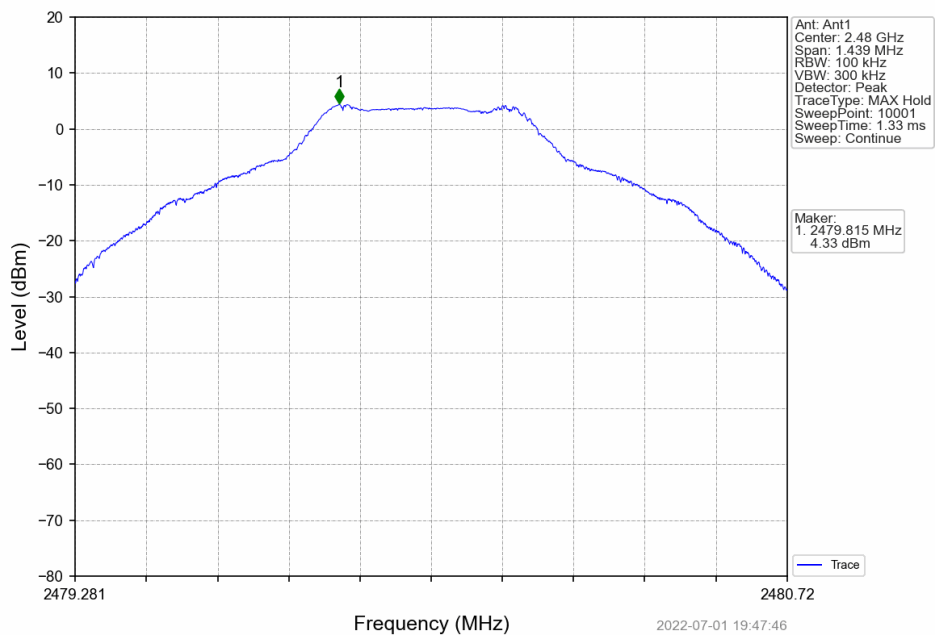
6.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	3.84
		2441	DH5	1	4.63
		2480	DH5	1	4.33
Pi/4DQPSK	SISO	2402	2DH5	1	3.86
		2441	2DH5	1	4.65
		2480	2DH5	1	4.39
8DPSK	SISO	2402	3DH5	1	3.84
		2441	3DH5	1	4.62
		2480	3DH5	1	4.37
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.					
Note2: RBW = 1MHz was used during the pre-test. The final test will be performed at RBW=100kHz while the margin is less than 3dB.					

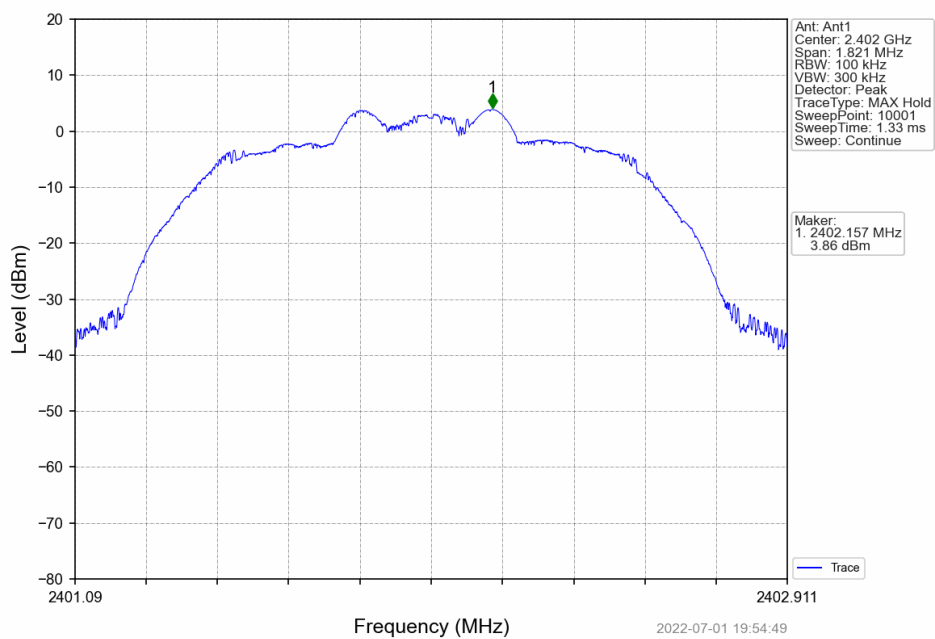
6.1.2 Test Graph



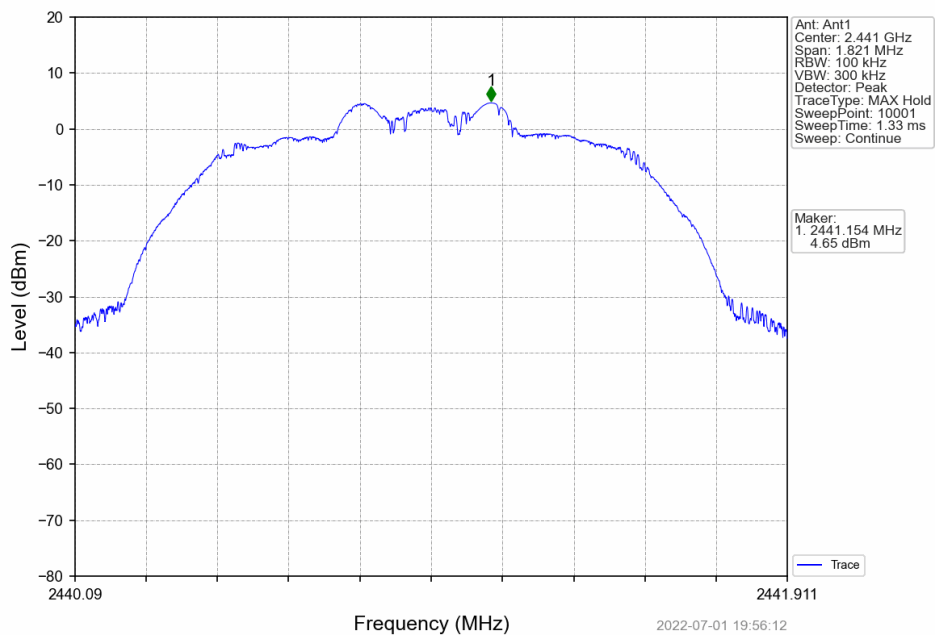
GFSK DH5 HCH 2480MHz Ant1 NTNV



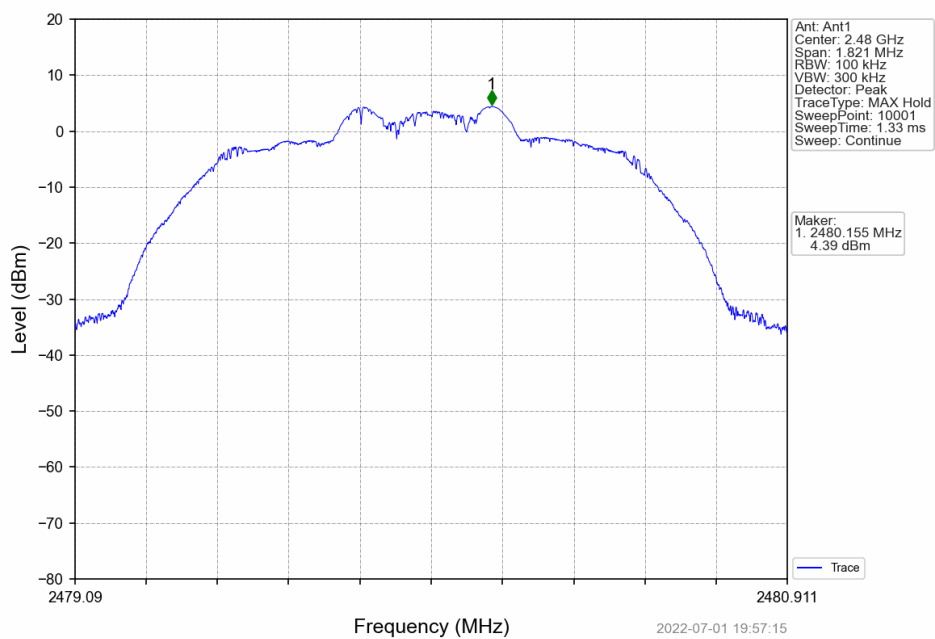
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



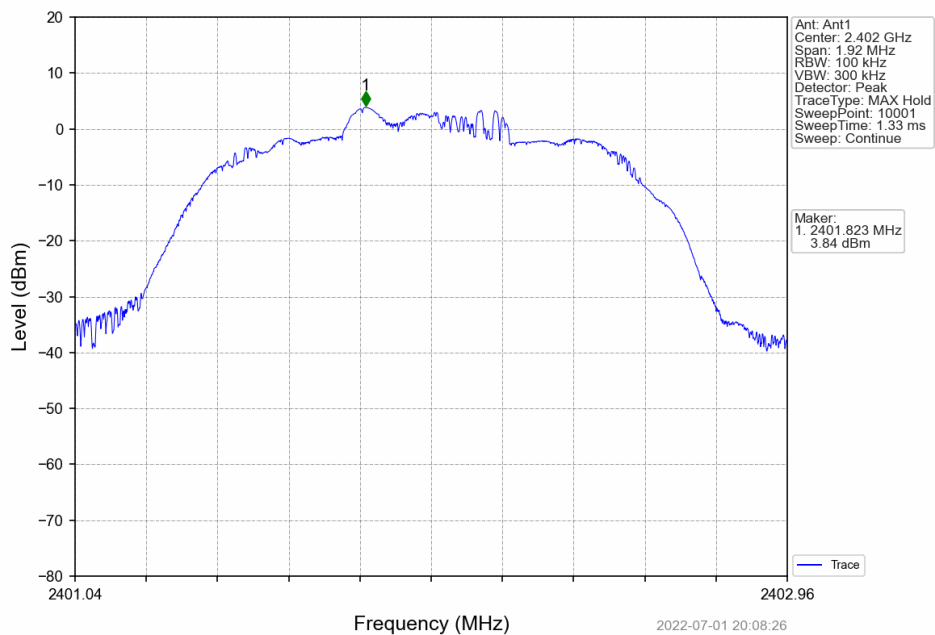
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



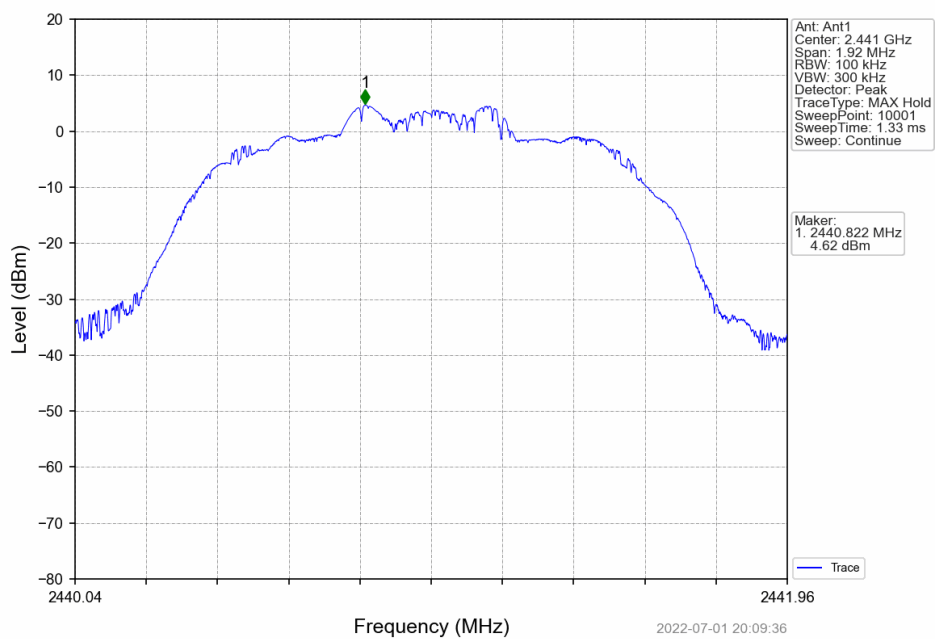
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

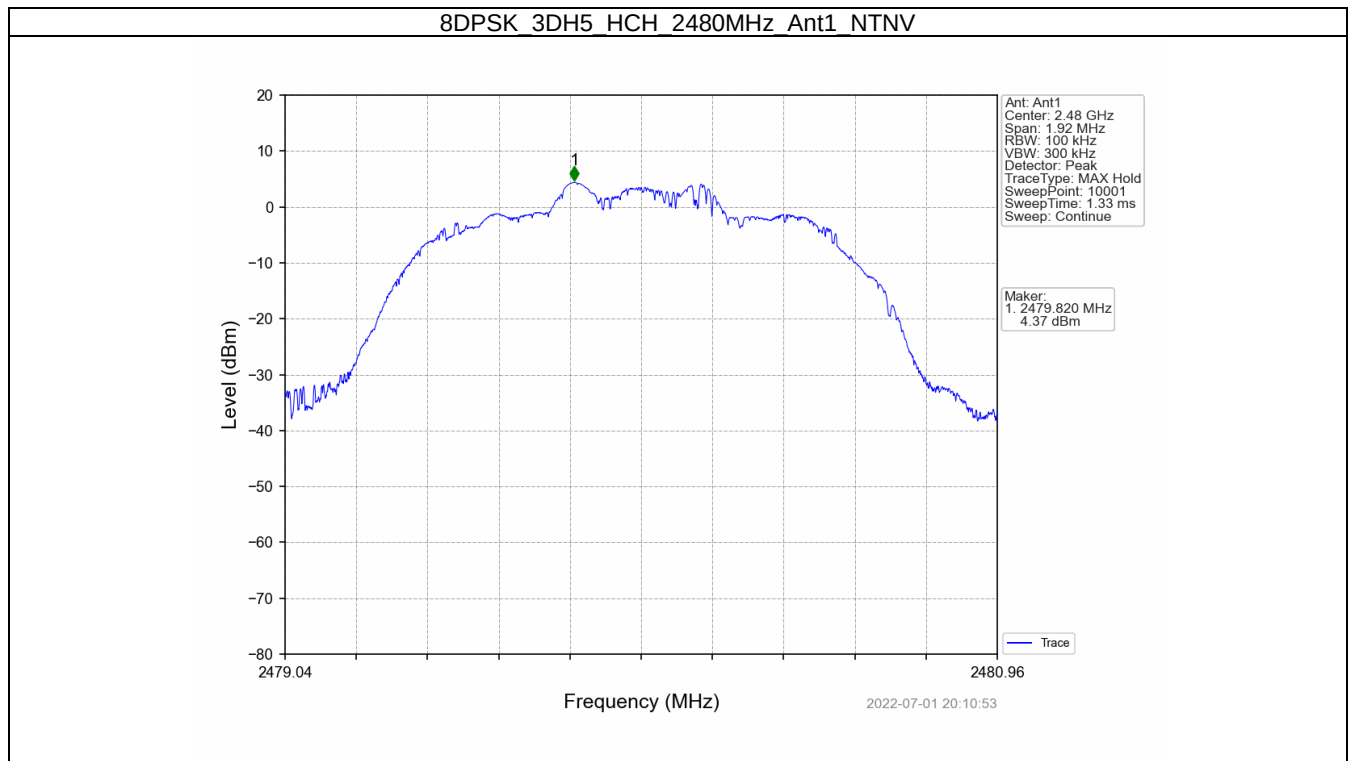


8DPSK 3DH5 LCH 2402MHz Ant1 NTN



8DPSK 3DH5 MCH 2441MHz Ant1 NTN





6.2 CSE

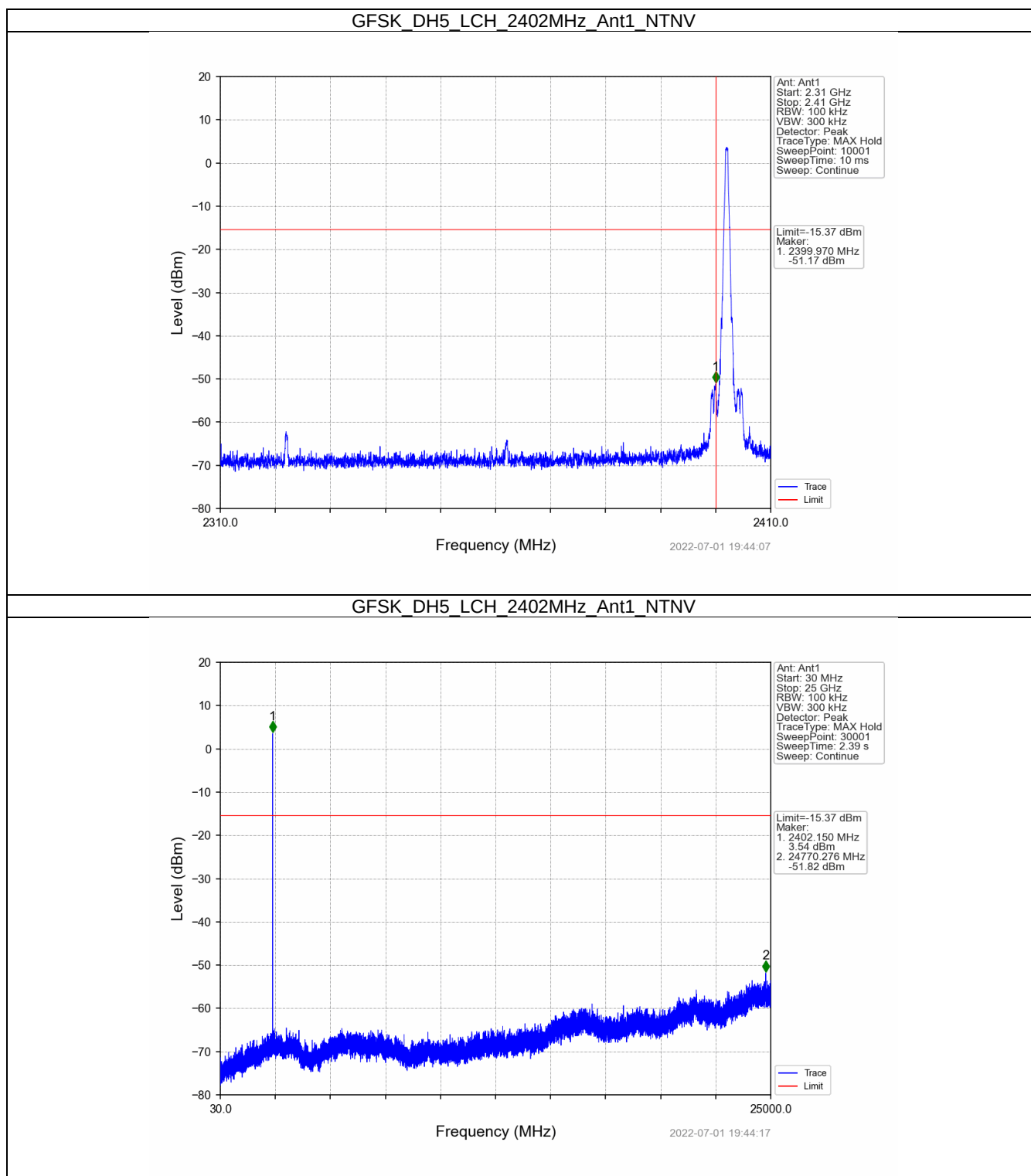
6.2.1 Test Result

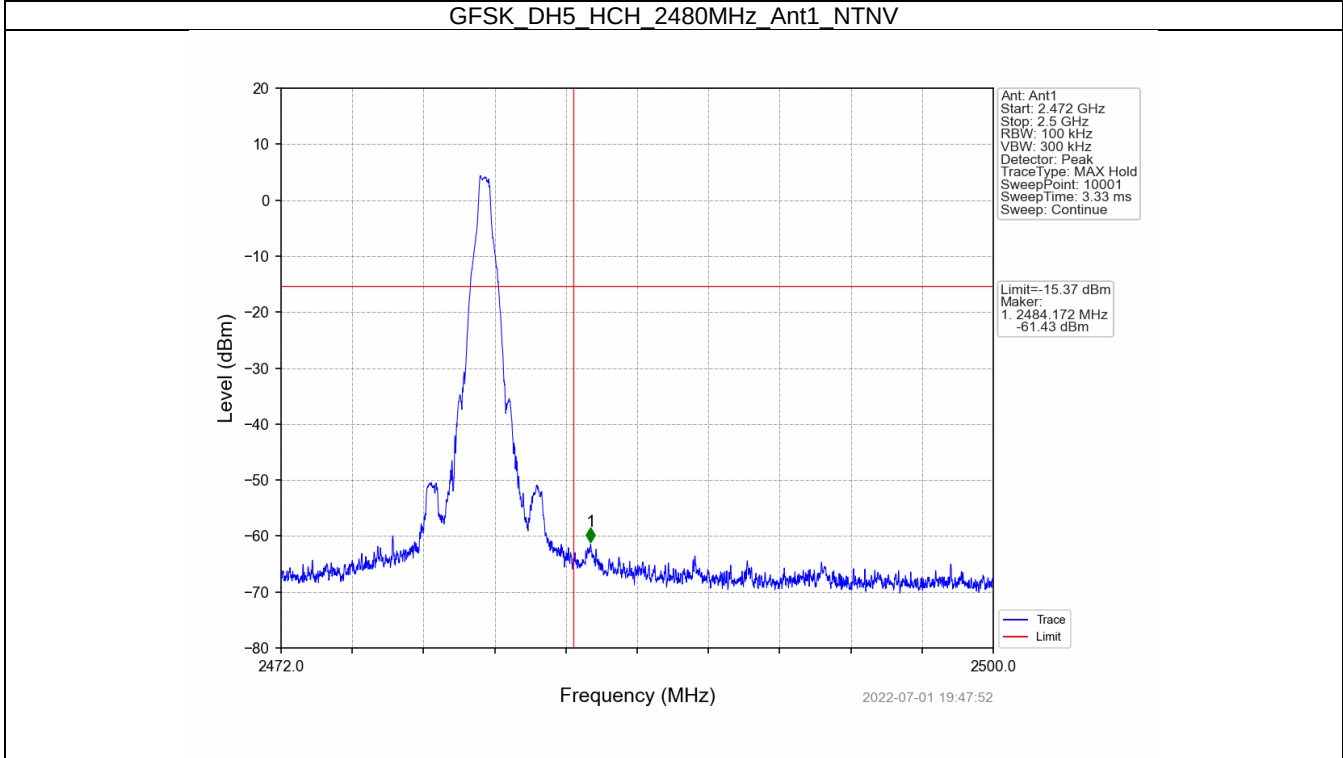
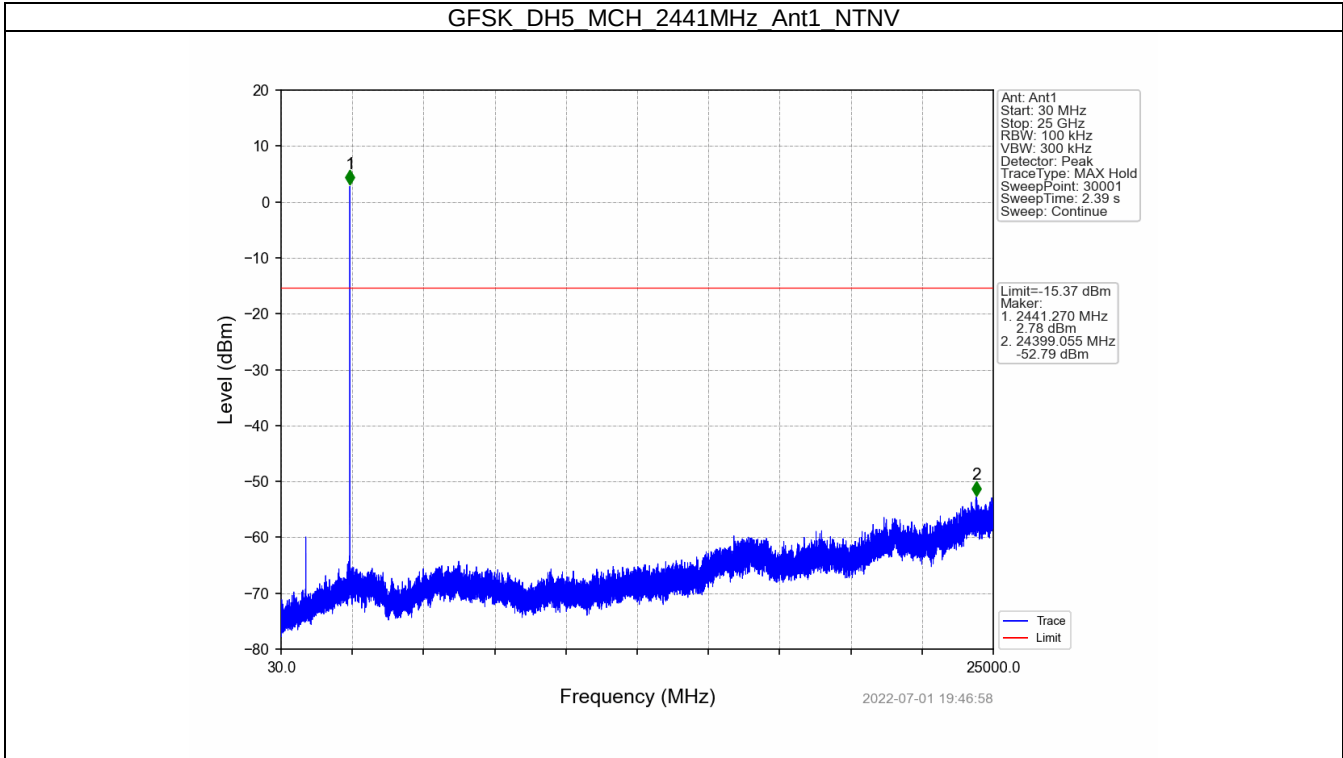
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	4.63	-15.37	Pass
		2441	DH5	1	4.63	-15.37	Pass
		2480	DH5	1	4.63	-15.37	Pass
		HOPP	DH5	1	4.63	-15.37	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	4.65	-15.35	Pass
		2441	2DH5	1	4.65	-15.35	Pass
		2480	2DH5	1	4.65	-15.35	Pass
		HOPP	2DH5	1	4.65	-15.35	Pass
8DPSK	SISO	2402	3DH5	1	4.62	-15.38	Pass
		2441	3DH5	1	4.62	-15.38	Pass
		2480	3DH5	1	4.62	-15.38	Pass
		HOPP	3DH5	1	4.62	-15.38	Pass

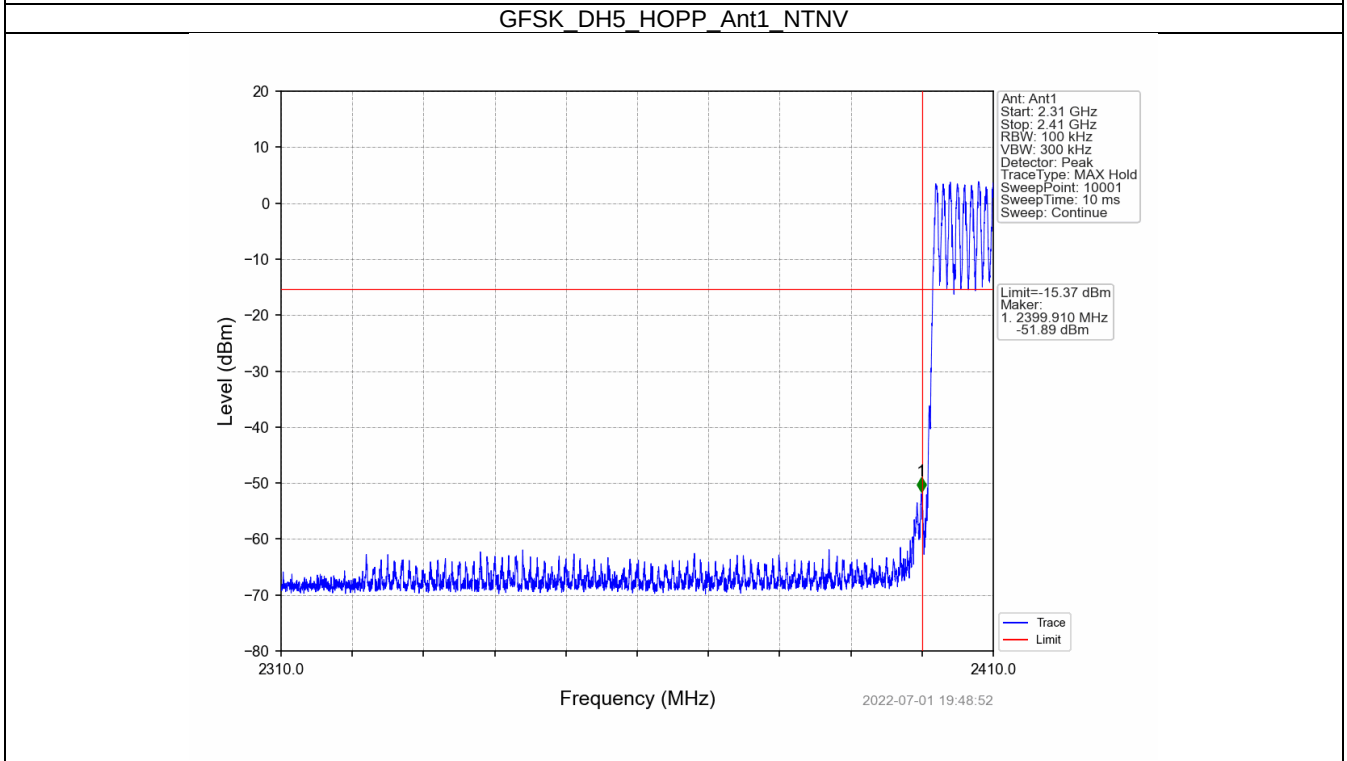
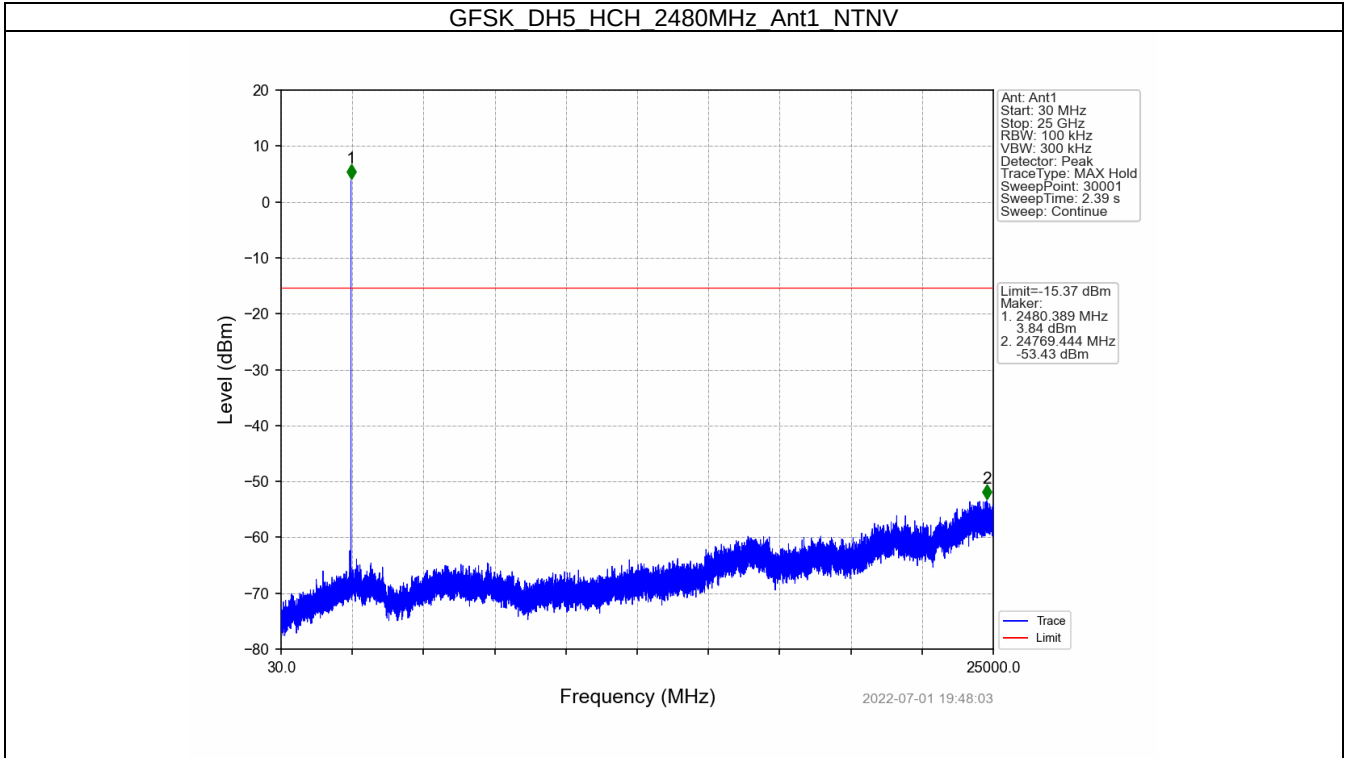
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.

Note2: RBW = 1MHz was used during the pre-test. The final test will be performed at RBW=100kHz while the margin is less than 3dB.

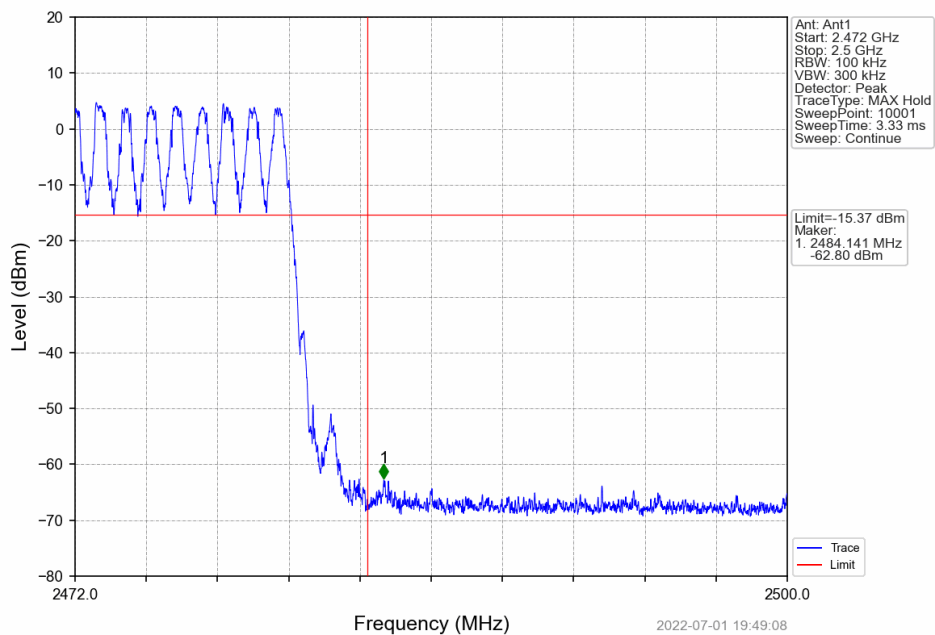
6.2.2 Test Graph



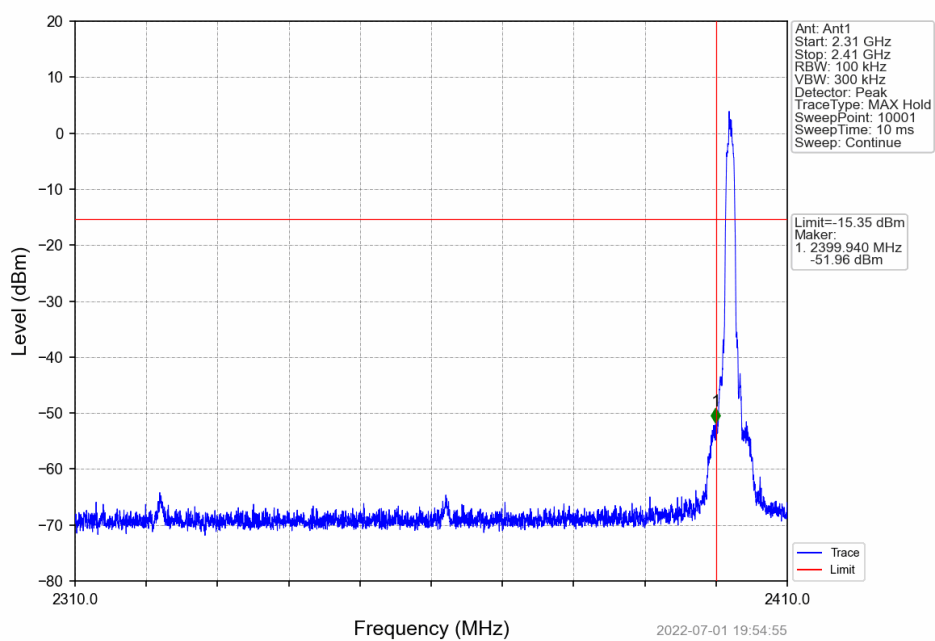




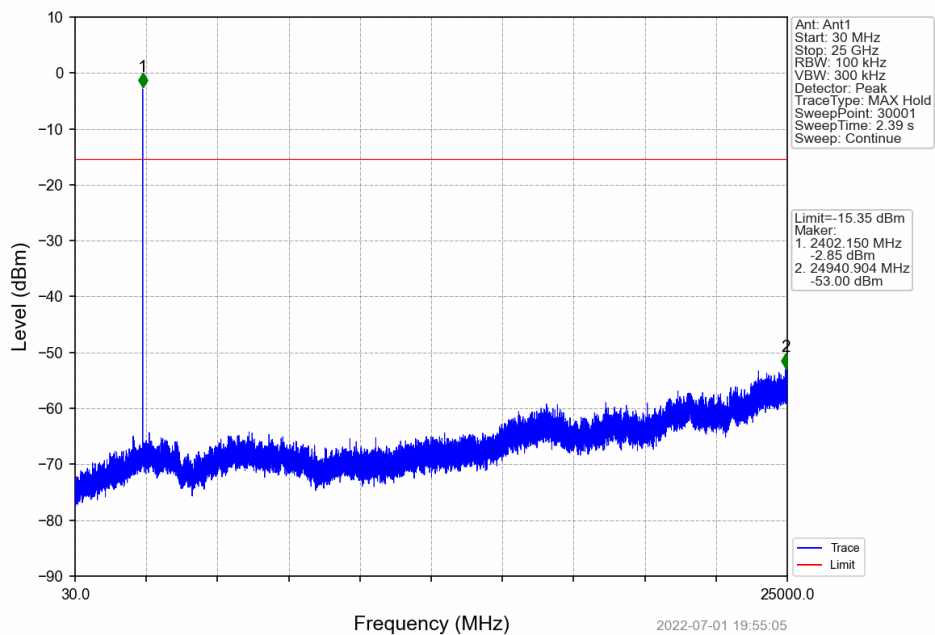
GFSK DH5 HOPP Ant1 NTN



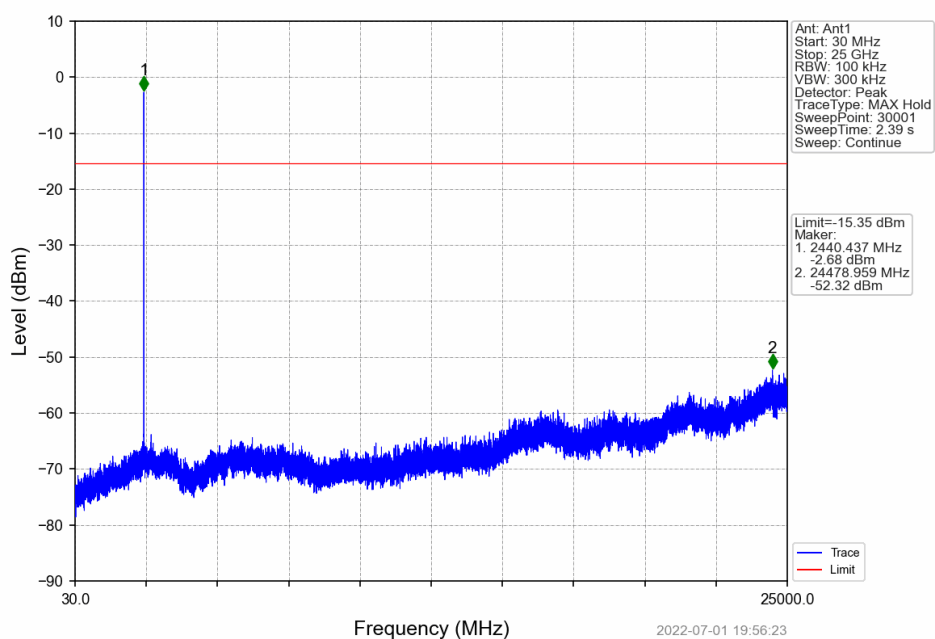
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTN

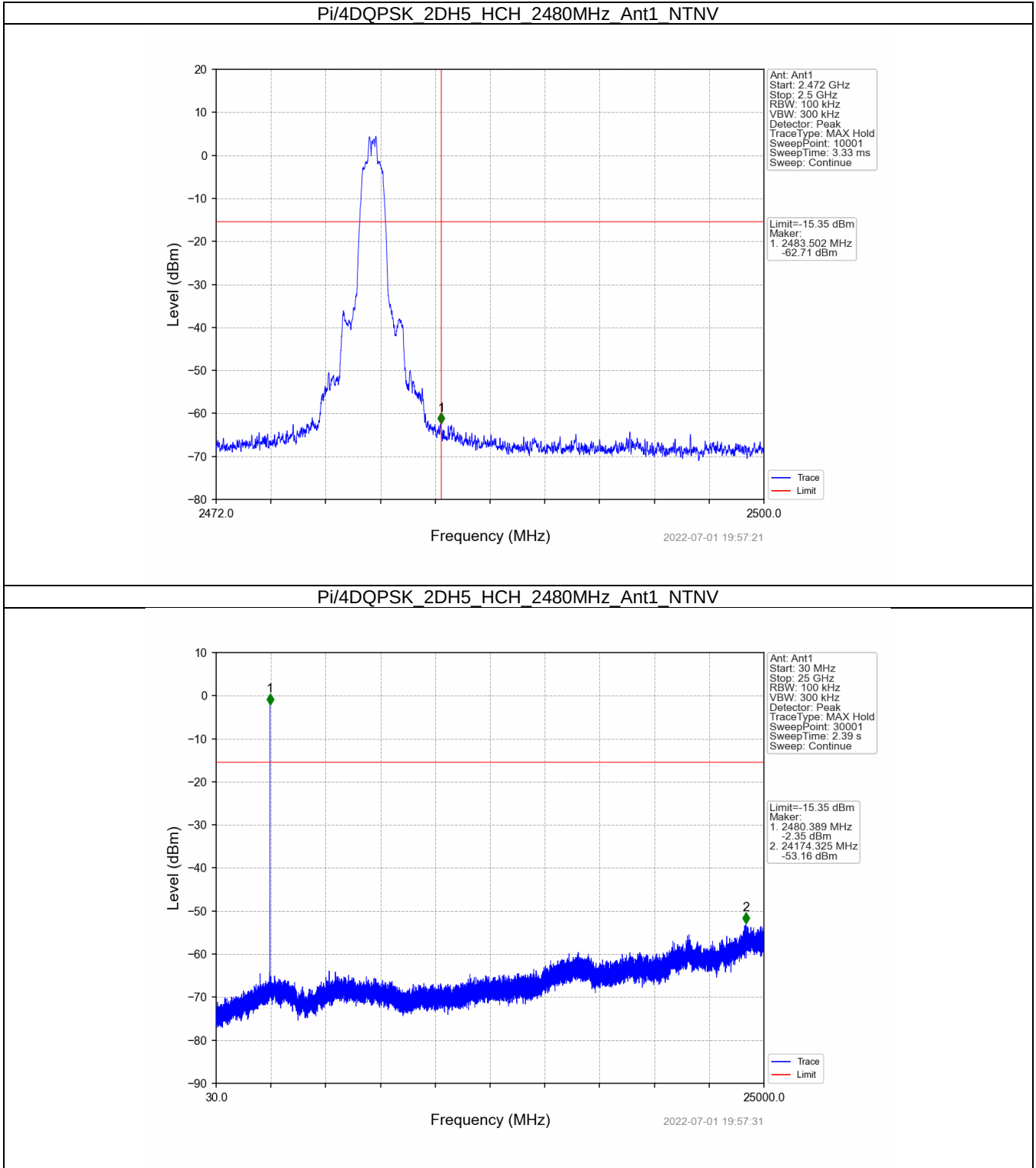


Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV

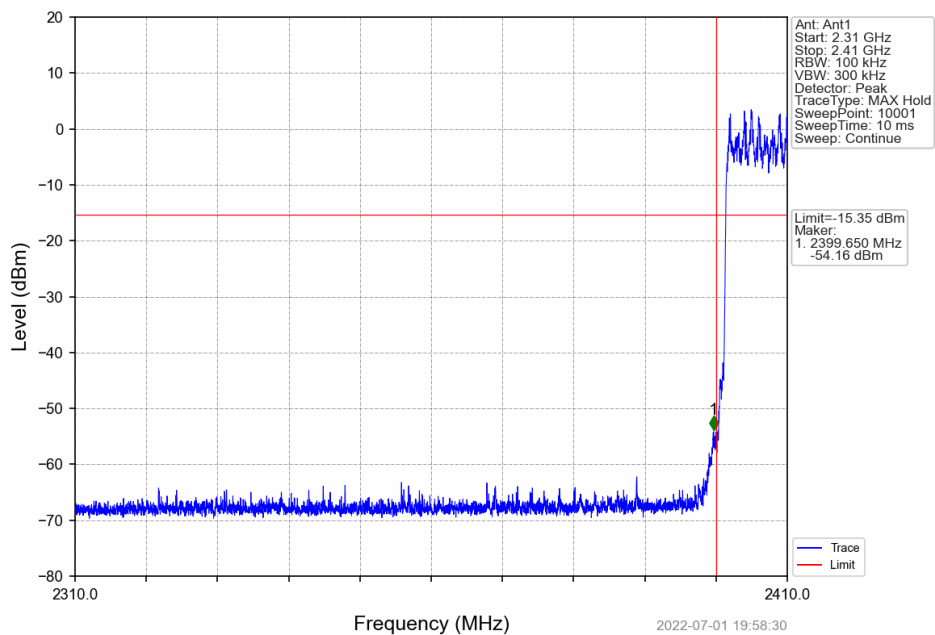


Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV

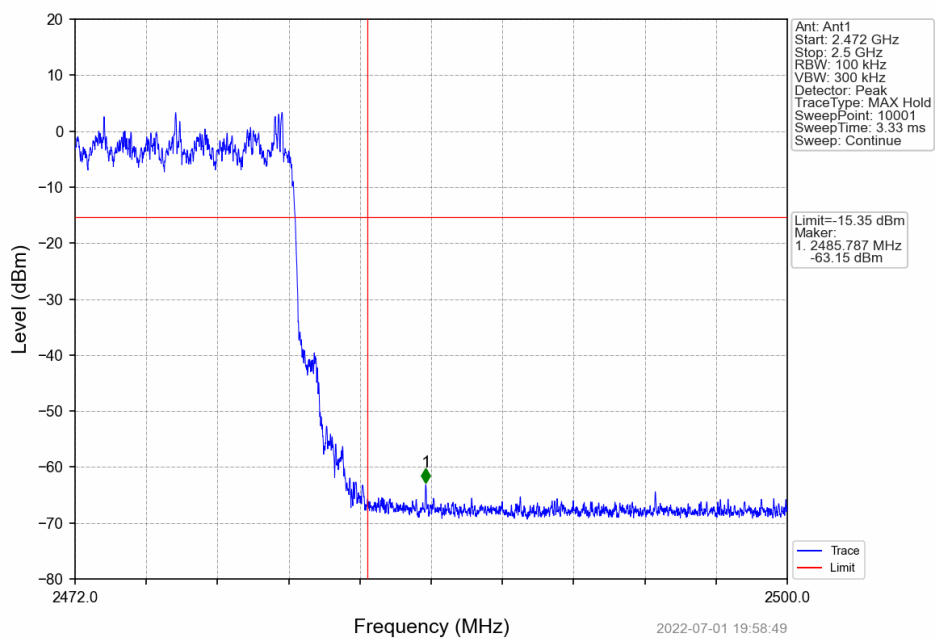




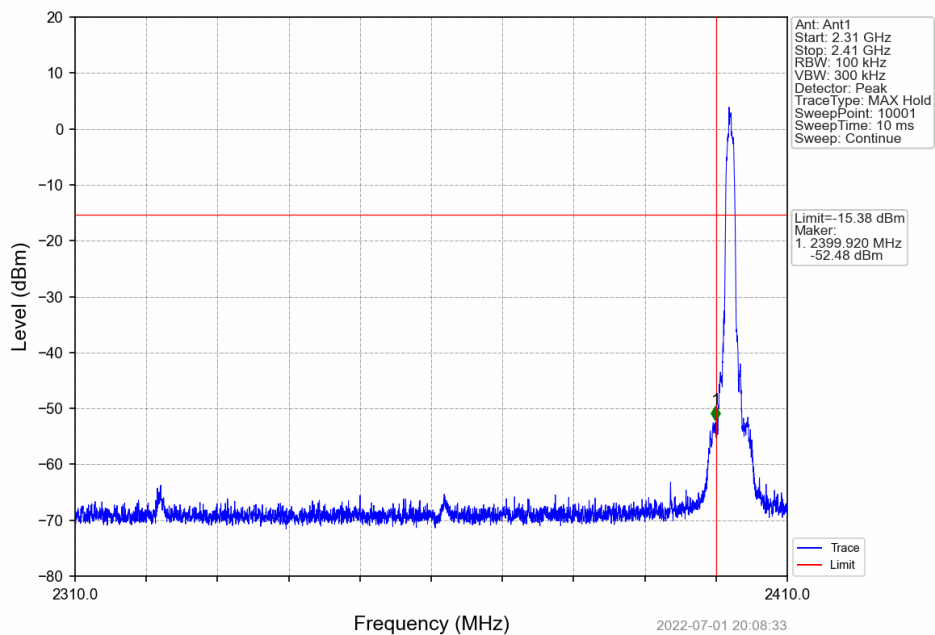
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



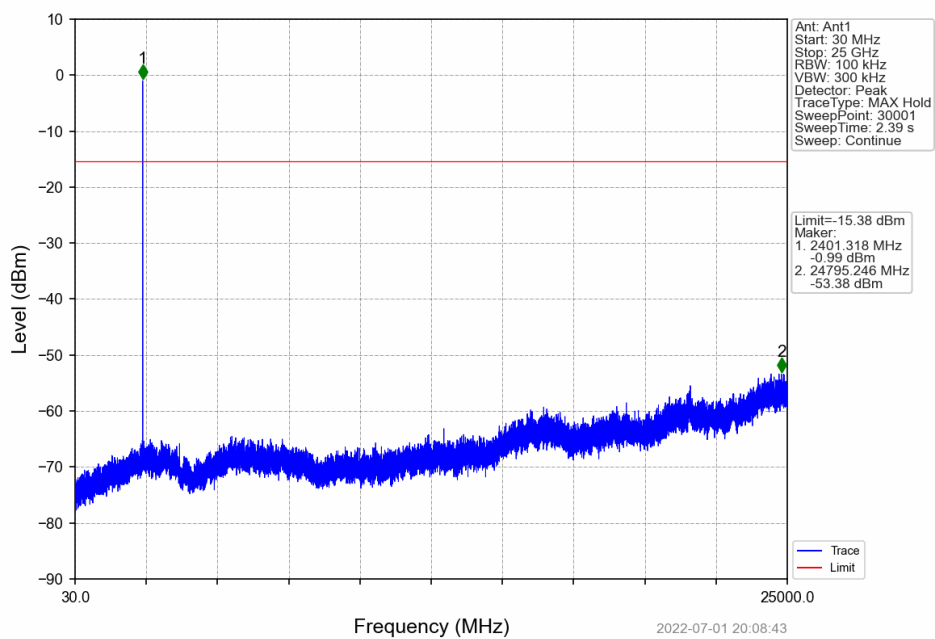
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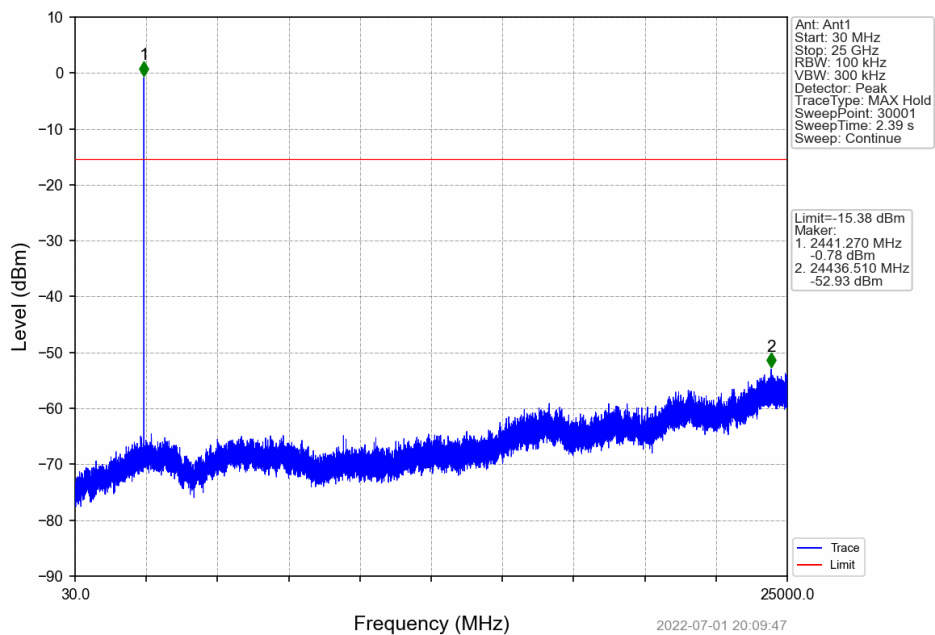
8DPSK 3DH5 LCH 2402MHz Ant1 NTNV



8DPSK 3DH5 LCH 2402MHz Ant1 NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV

