

Test Data for Bluetooth

Product Name: Grace Link Internet Radio Device

Test Model: GDI-WHAL01

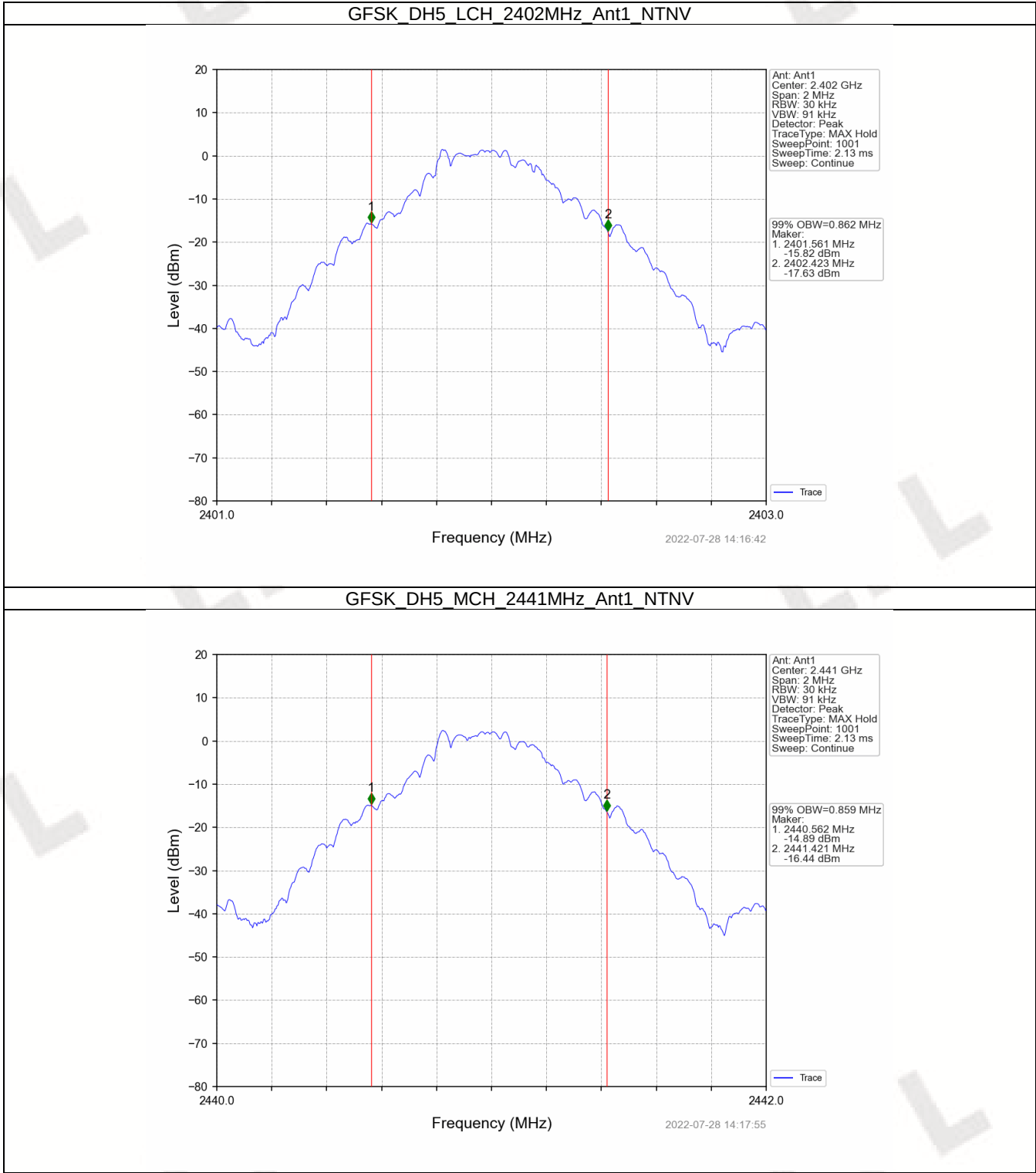
1. Bandwidth

1.1 OBW

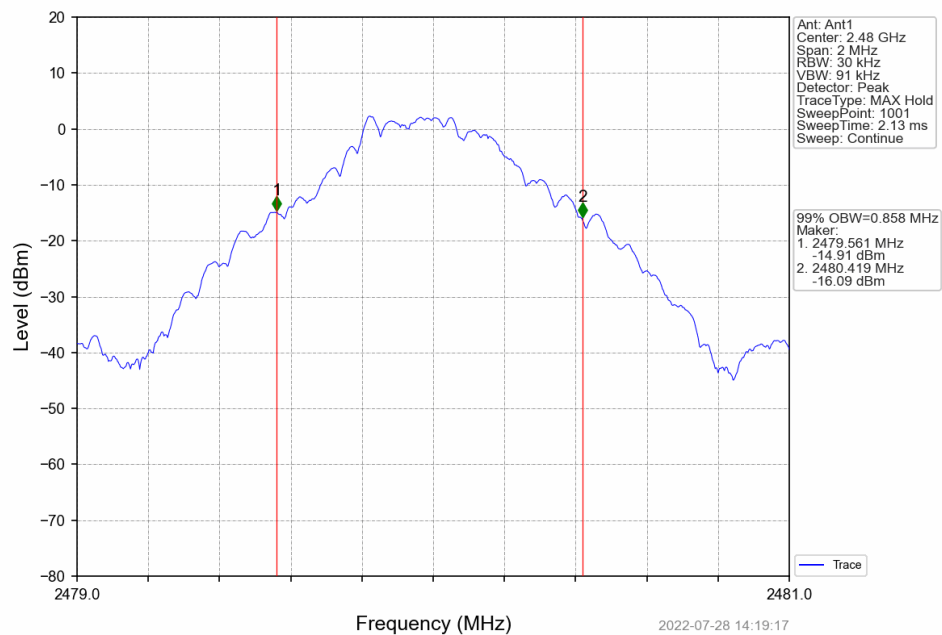
1.1.1 Test Result

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	0.859	Pass
		2480	DH5	1	0.858	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.135	Pass
		2441	2DH5	1	1.135	Pass
		2480	2DH5	1	1.135	Pass
8DPSK	SISO	2402	3DH5	1	1.129	Pass
		2441	3DH5	1	1.130	Pass
		2480	3DH5	1	1.123	Pass

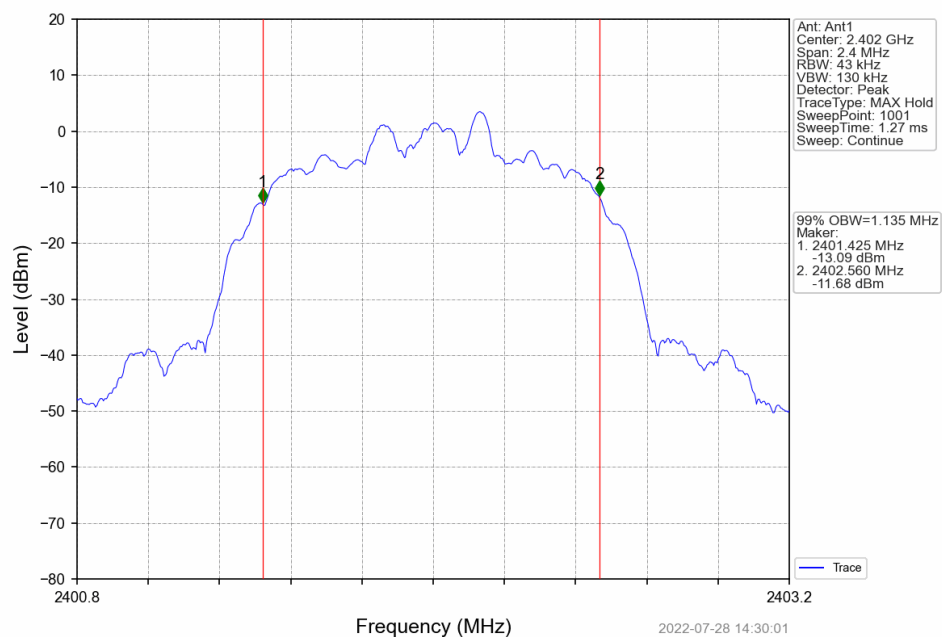
1.1.2 Test Graph



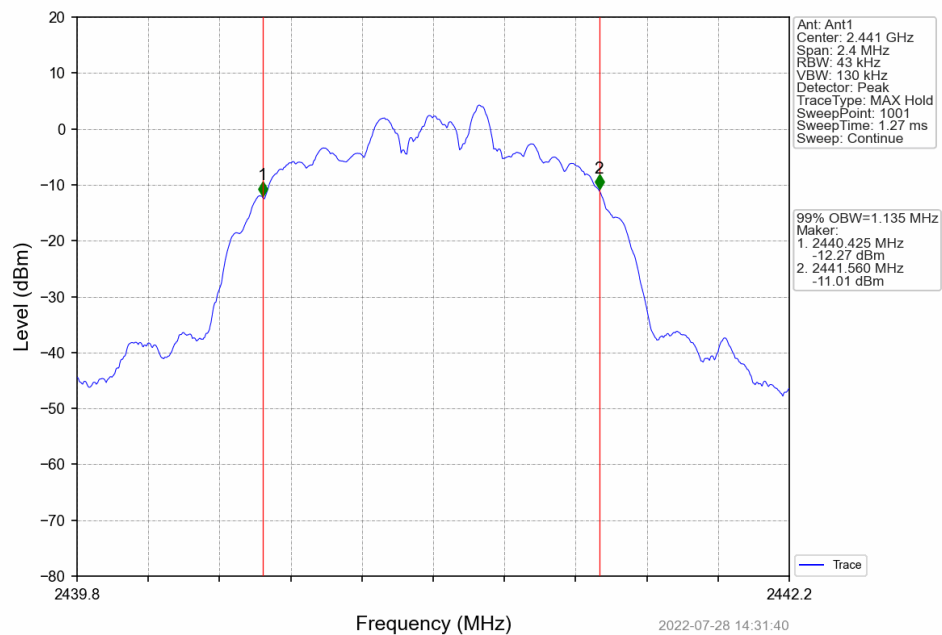
GFSK DH5 HCH 2480MHz Ant1 NTN



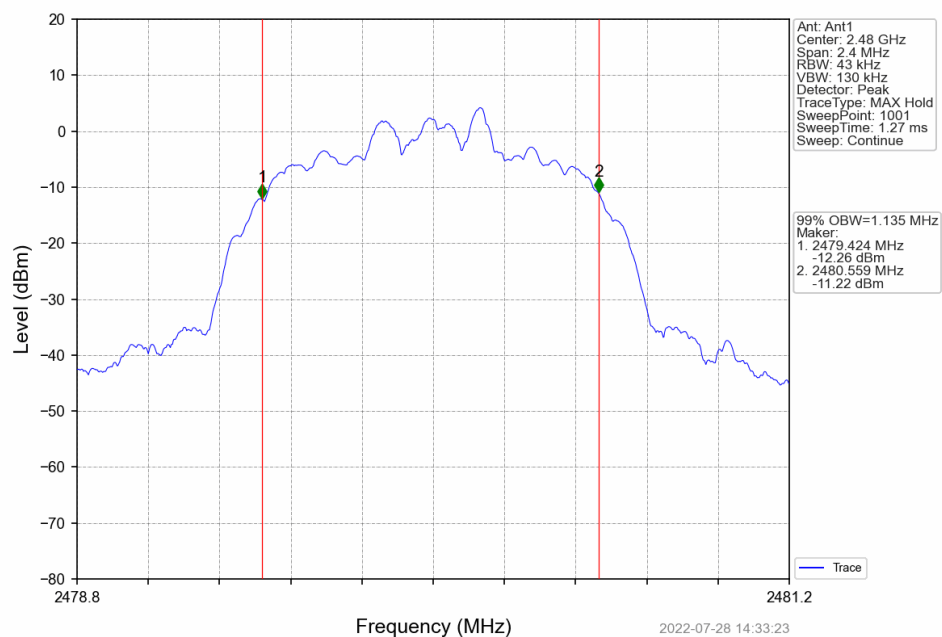
PI/4DQPSK 2DH5 LCH 2402MHz Ant1 NTN



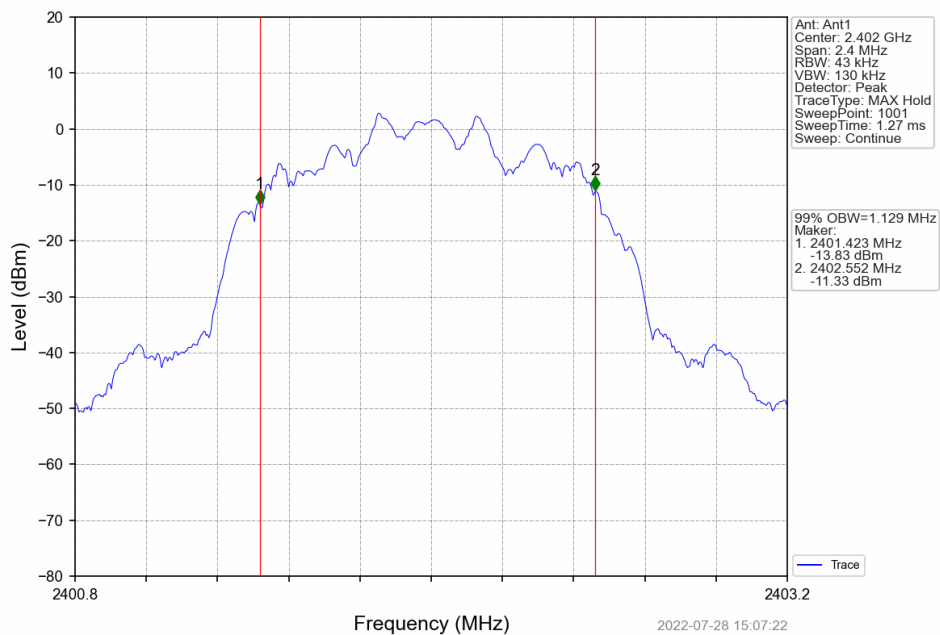
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



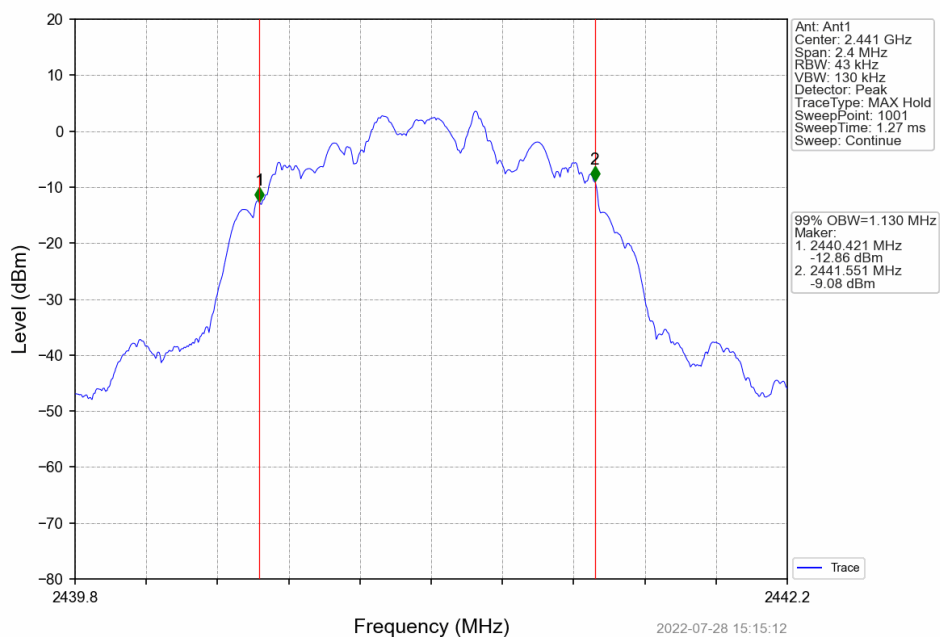
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

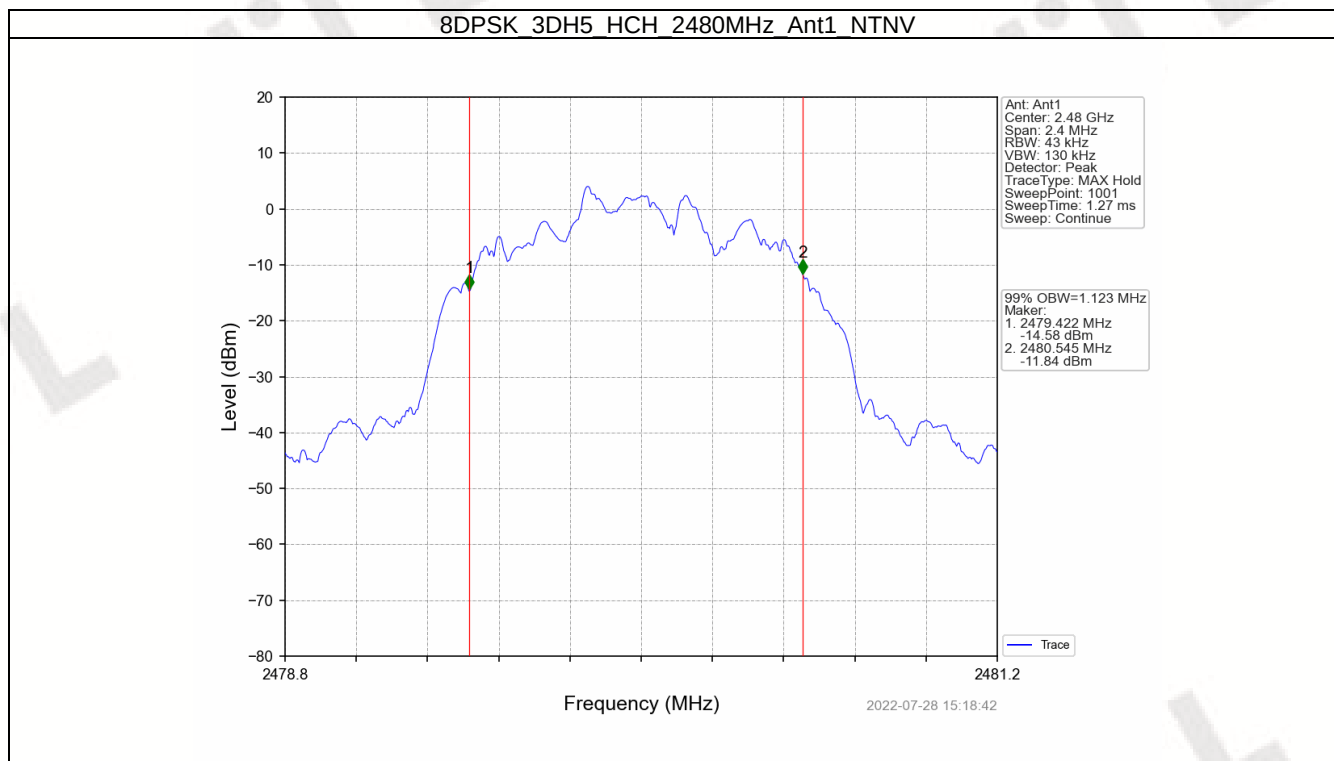


8DPSK 3DH5 LCH 2402MHz Ant1 NTN



8DPSK 3DH5 MCH 2441MHz Ant1 NTN



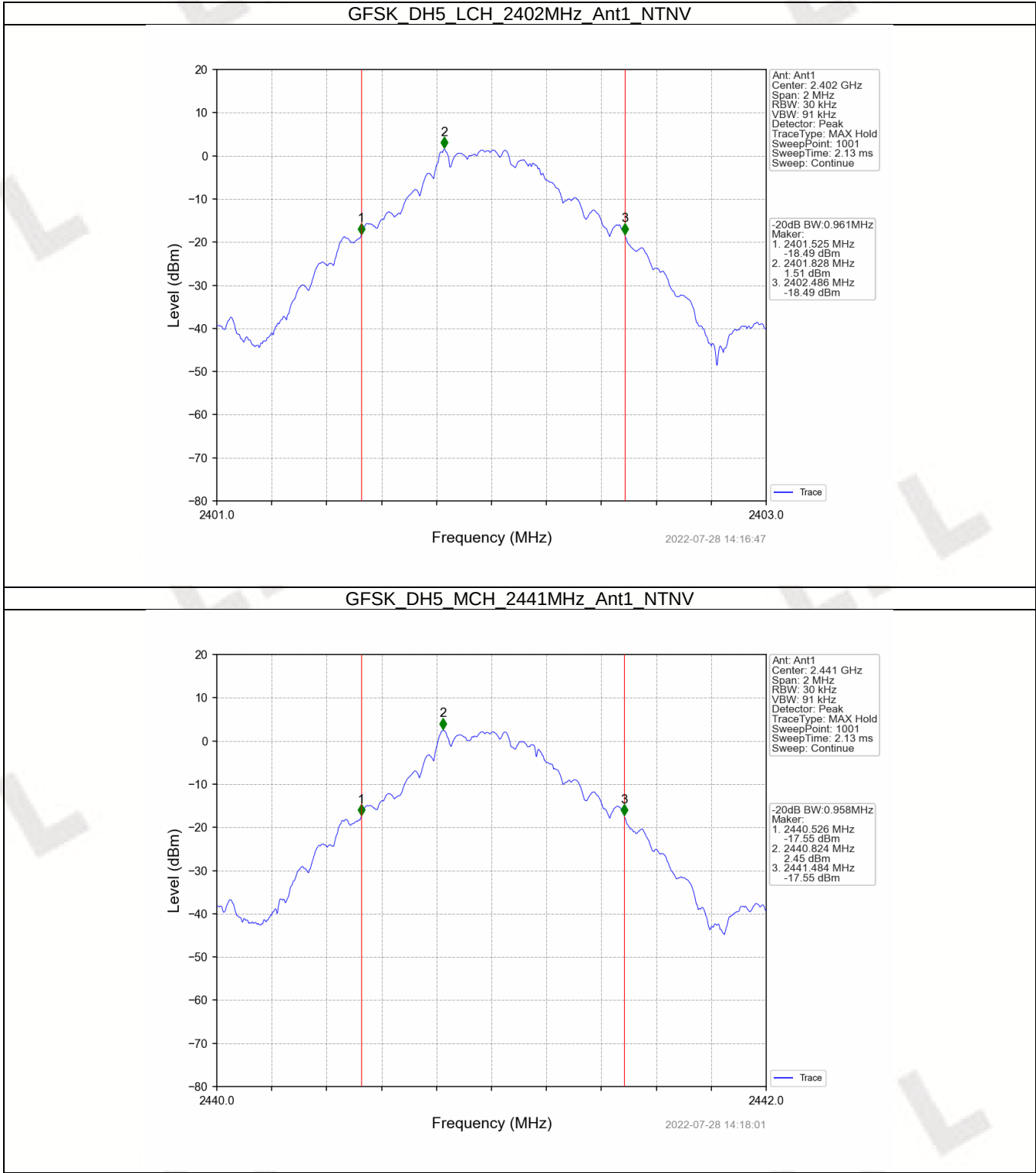


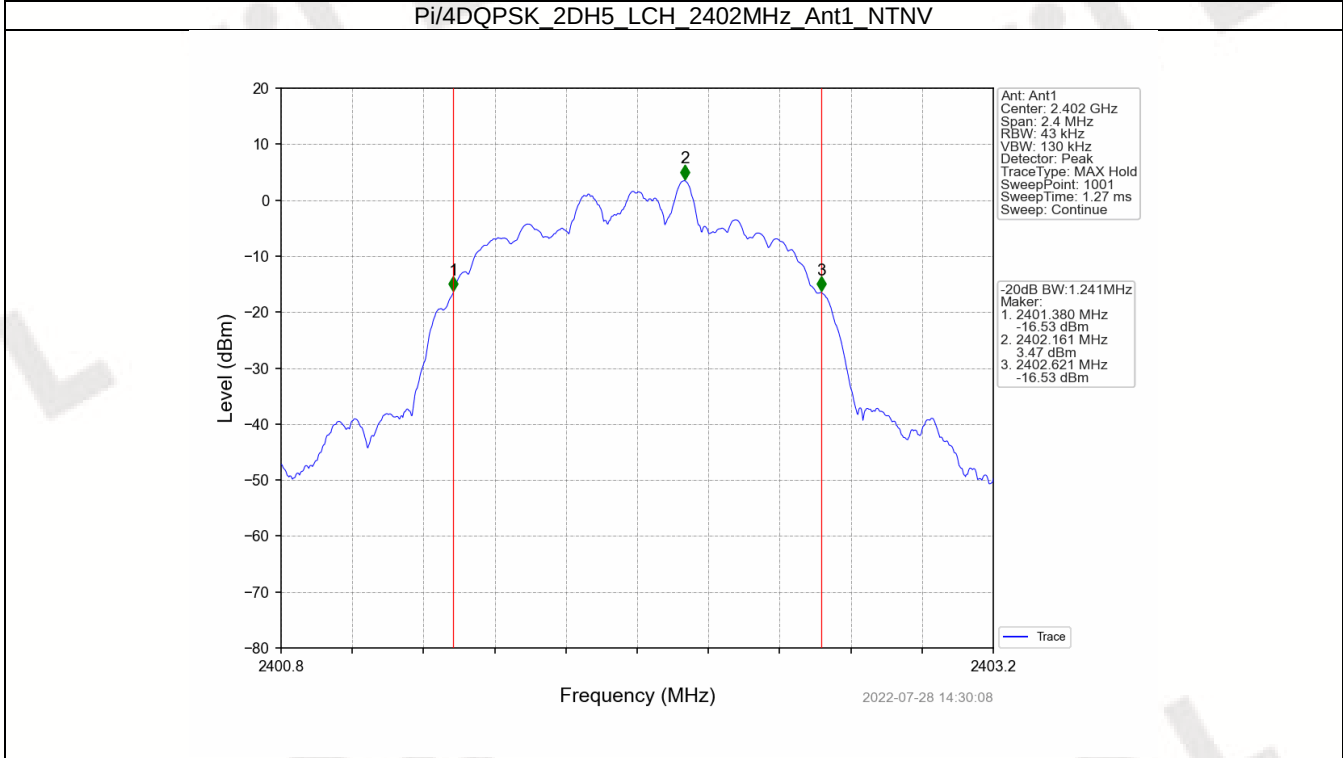
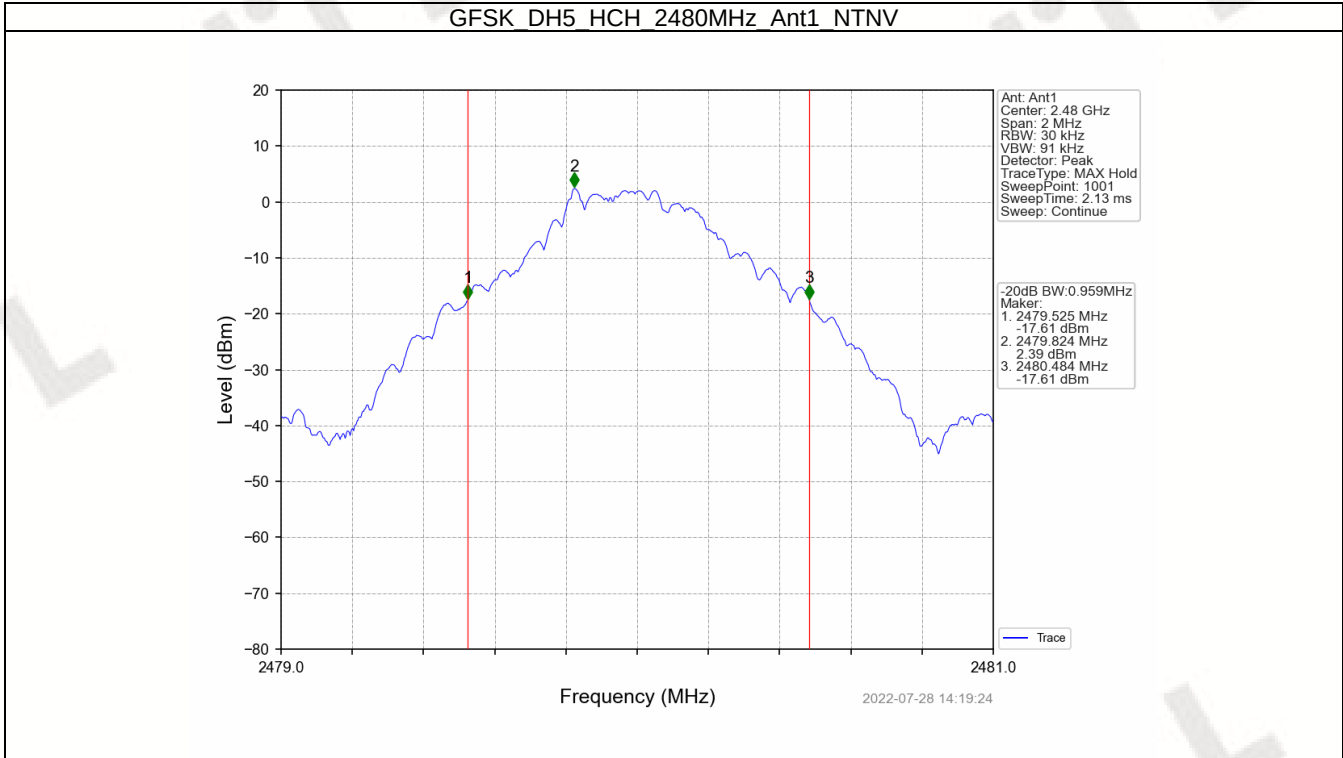
1.2 20dB BW

1.2.1 Test Result

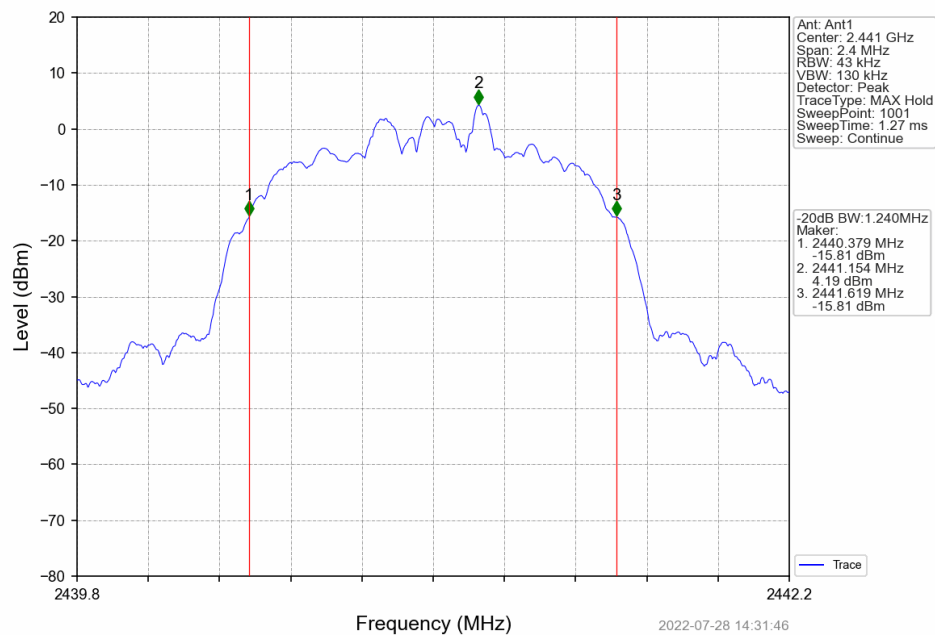
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)	Verdict
					Result	
GFSK	SISO	2402	DH5	1	0.961	Pass
		2441	DH5	1	0.958	Pass
		2480	DH5	1	0.959	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.241	Pass
		2441	2DH5	1	1.240	Pass
		2480	2DH5	1	1.223	Pass
8DPSK	SISO	2402	3DH5	1	1.269	Pass
		2441	3DH5	1	1.254	Pass
		2480	3DH5	1	1.254	Pass

1.2.2 Test Graph

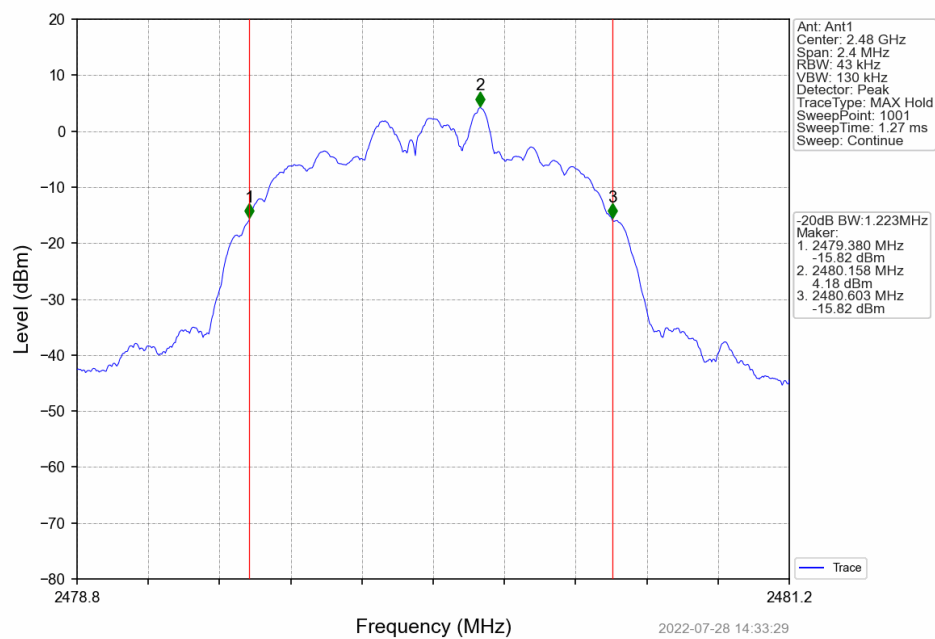




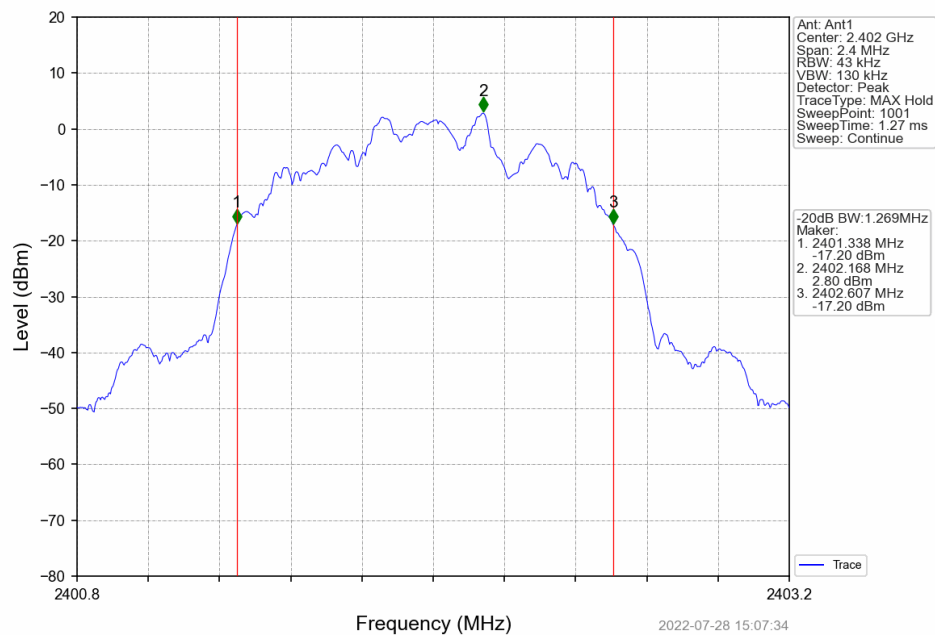
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



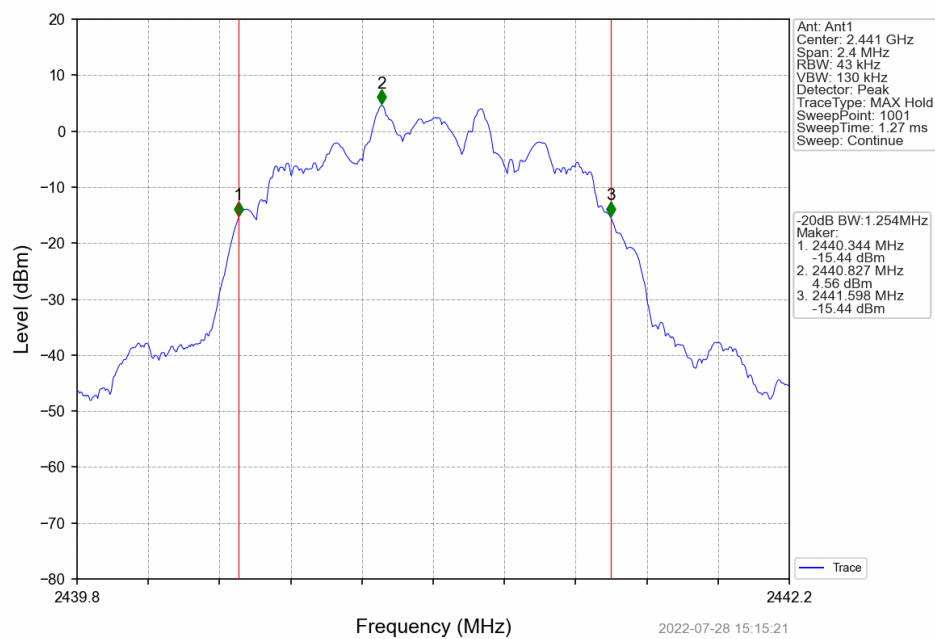
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

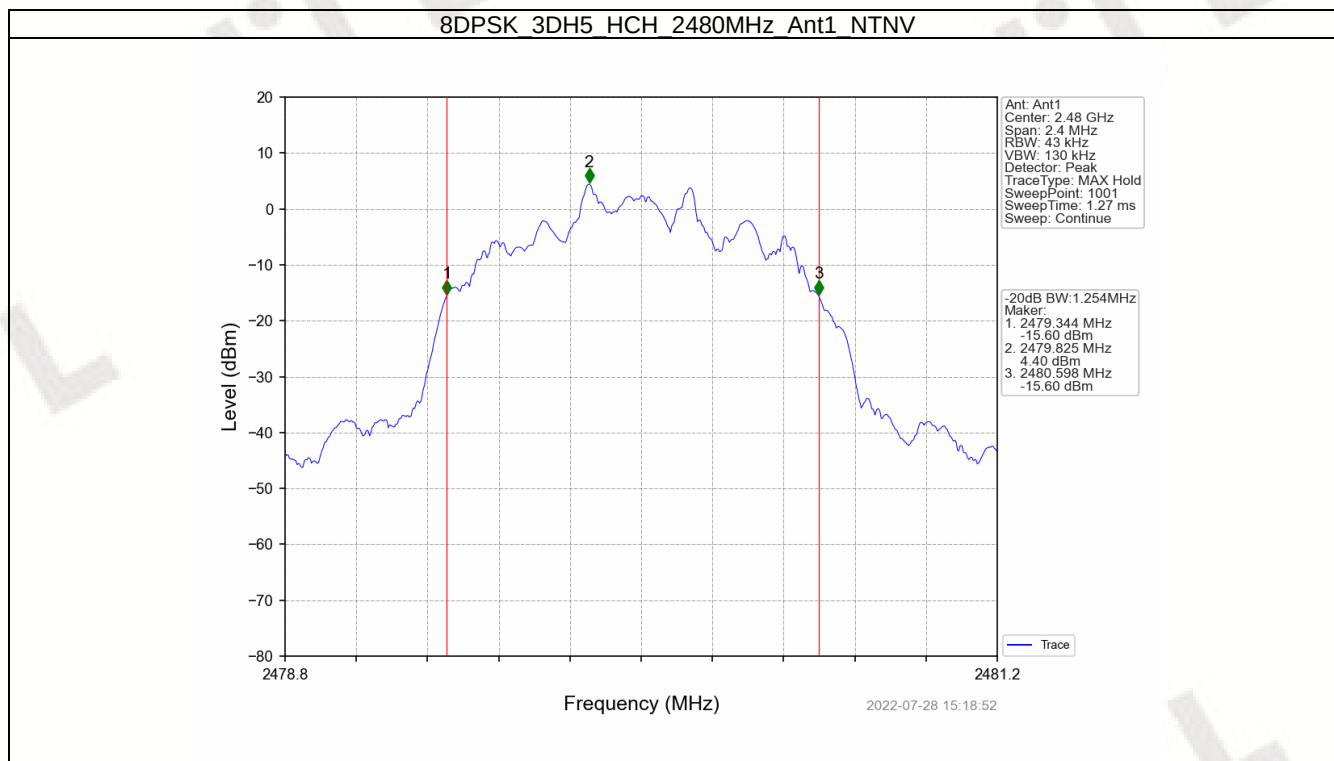


8DPSK 3DH5 LCH 2402MHz Ant1 NTN



8DPSK 3DH5 MCH 2441MHz Ant1 NTN





2. Maximum Conducted Output Power

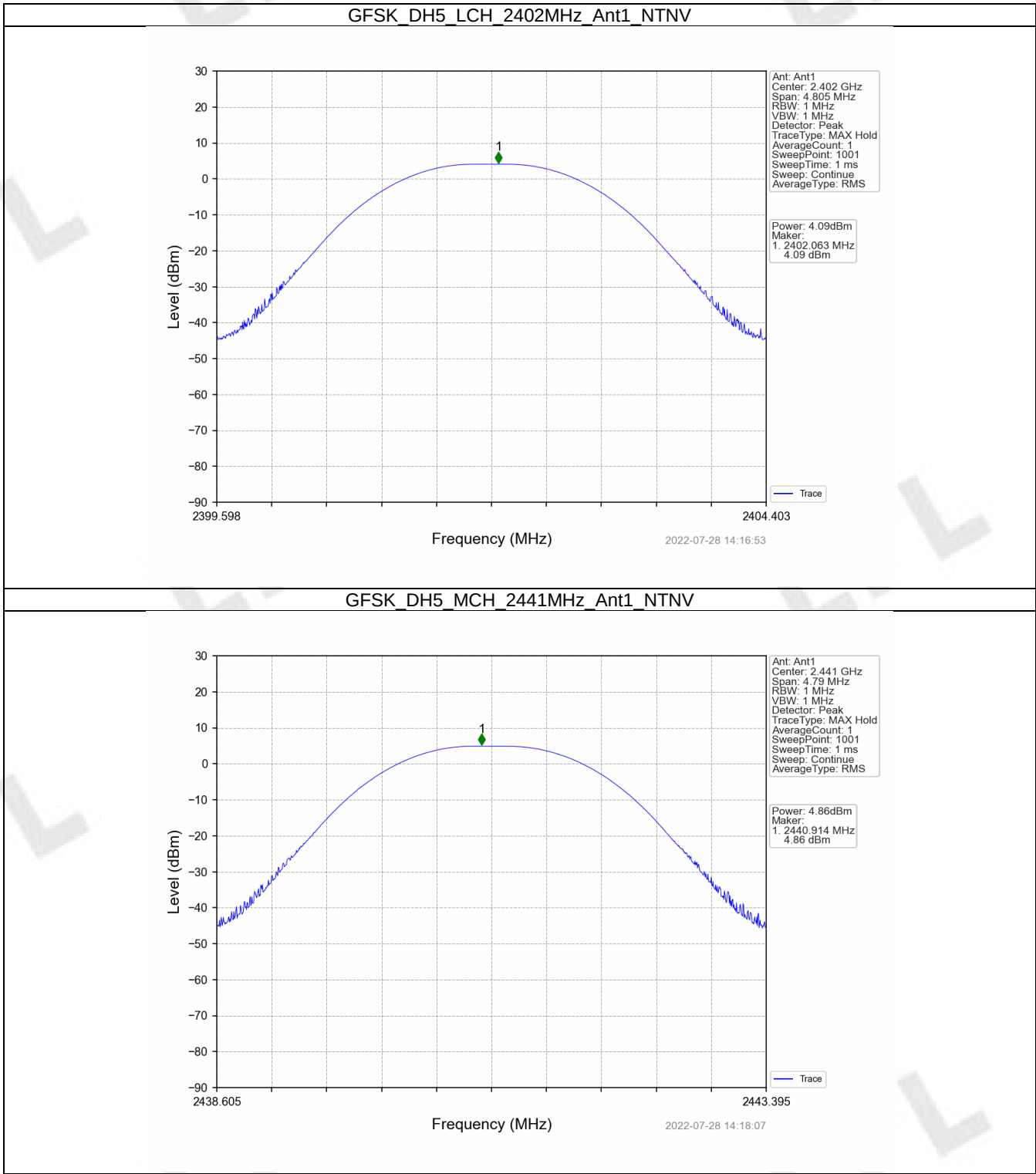
2.1 Power

2.1.1 Test Result

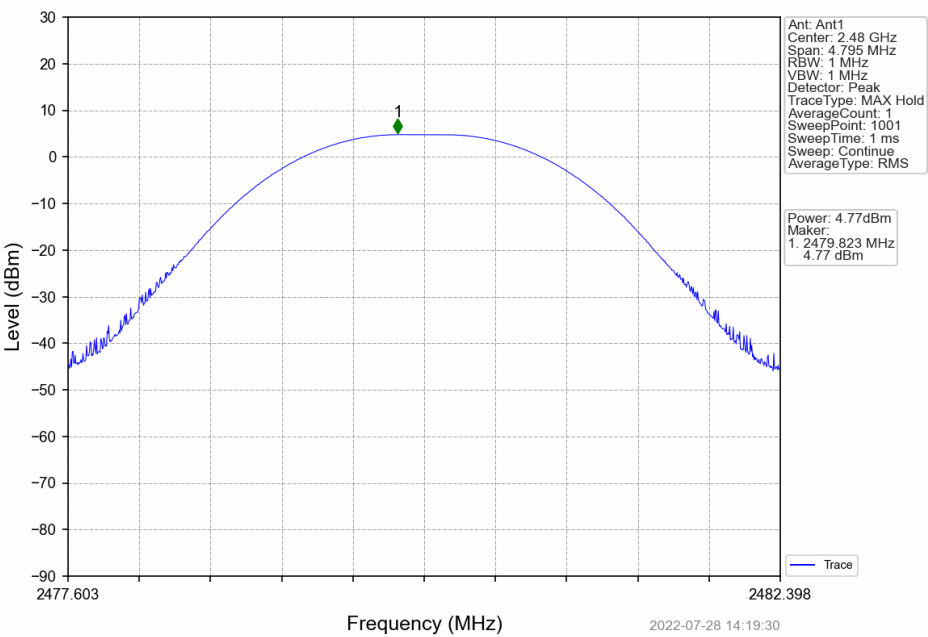
Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	4.09	<=30	Pass
		2441	DH5	4.86	<=30	Pass
		2480	DH5	4.77	<=30	Pass
Pi/4DQPSK	SISO	2402	2DH5	4.20	<=20.97	Pass
		2441	2DH5	5.00	<=20.97	Pass
		2480	2DH5	4.91	<=20.97	Pass
8DPSK	SISO	2402	3DH5	4.49	<=20.97	Pass
		2441	3DH5	5.38	<=20.97	Pass
		2480	3DH5	5.21	<=20.97	Pass

Note1: Antenna Gain: Ant1: 2.00dBi;

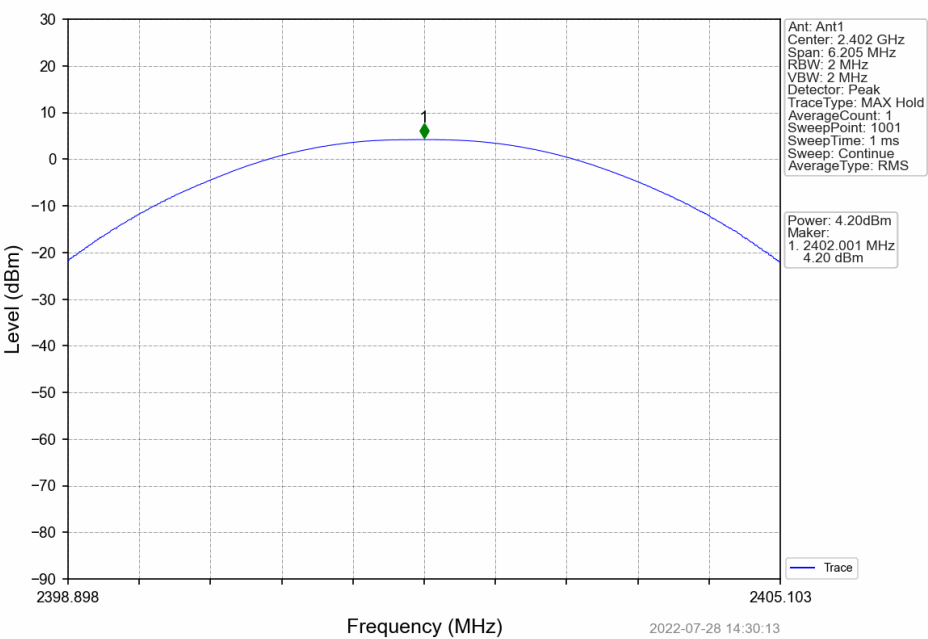
2.1.2 Test Graph



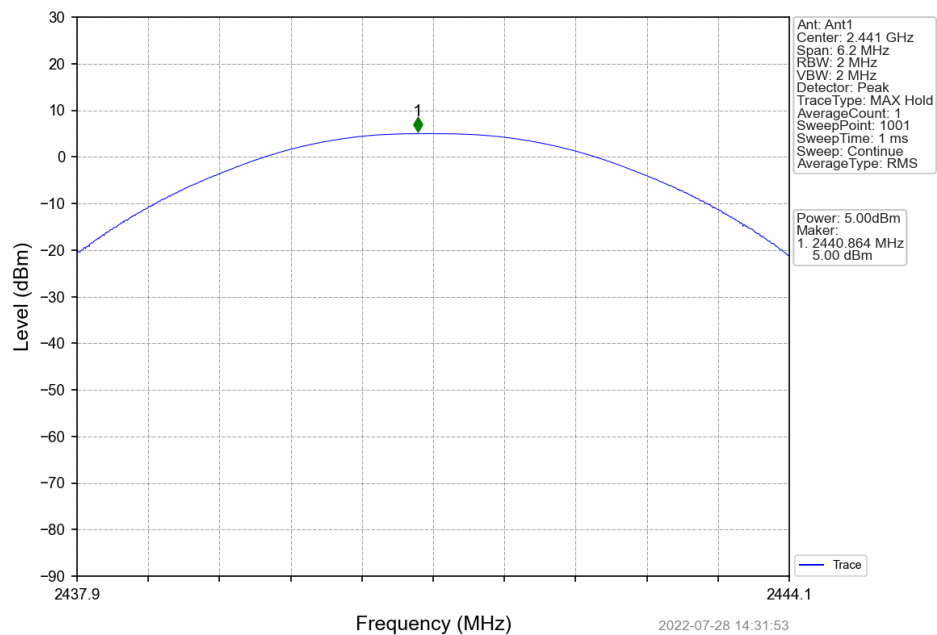
GFSK DH5 HCH 2480MHz Ant1 NTN



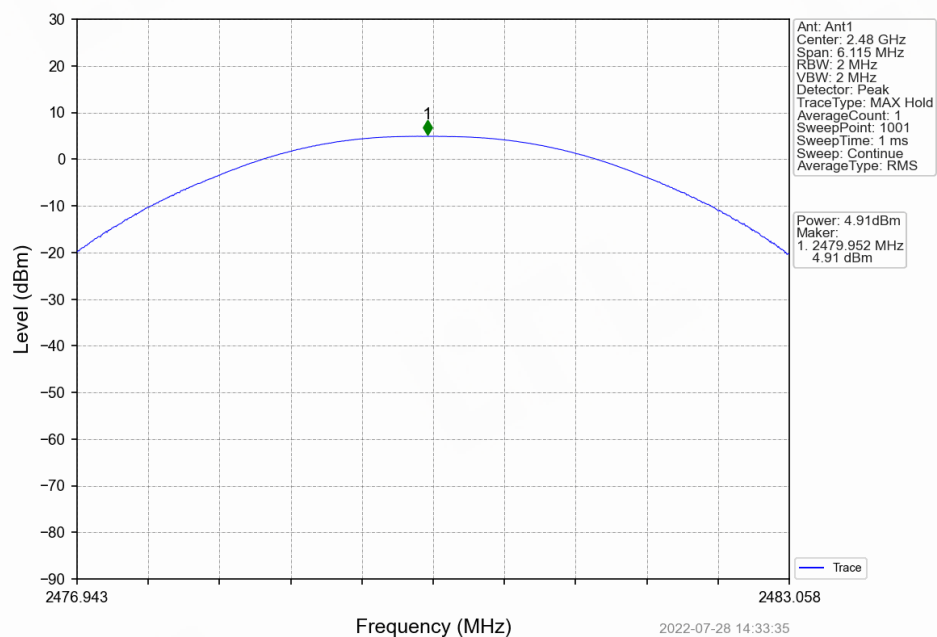
PI/4DQPSK 2DH5 LCH 2402MHz Ant1 NTN

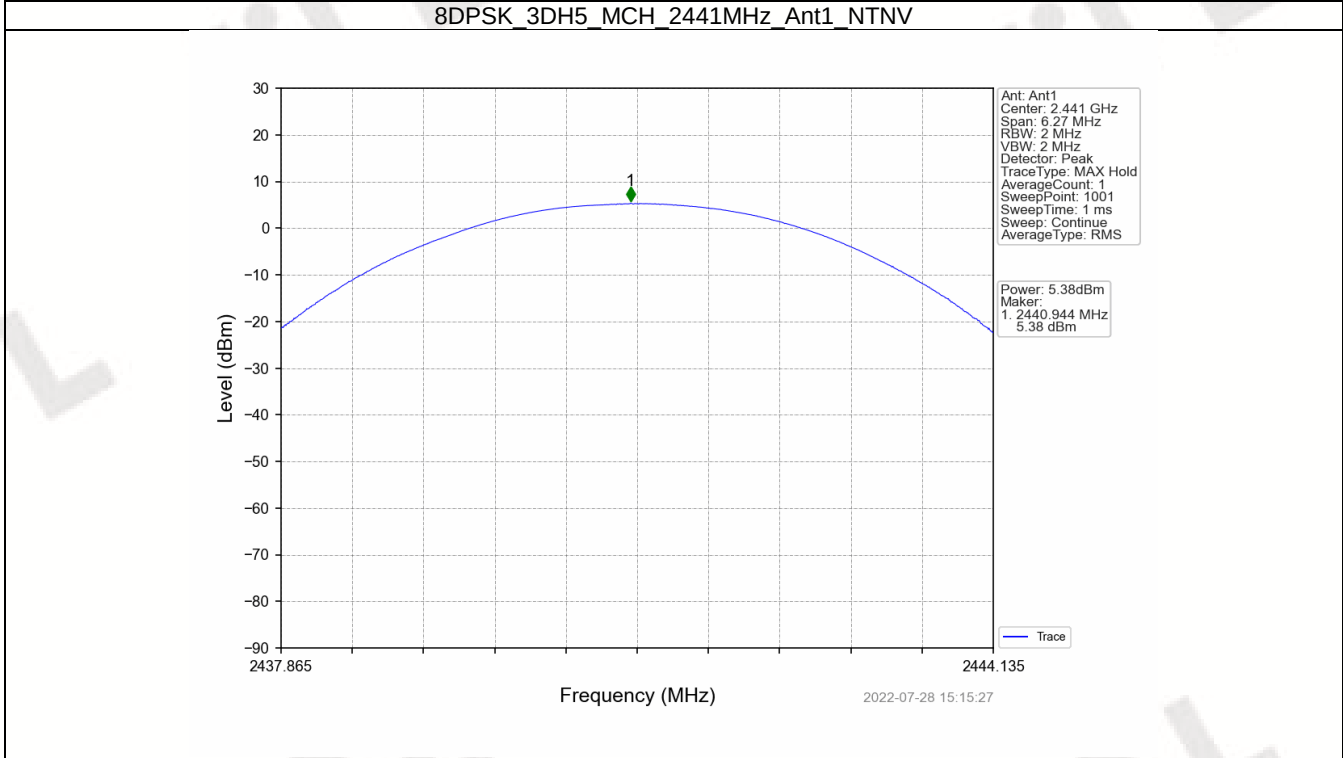
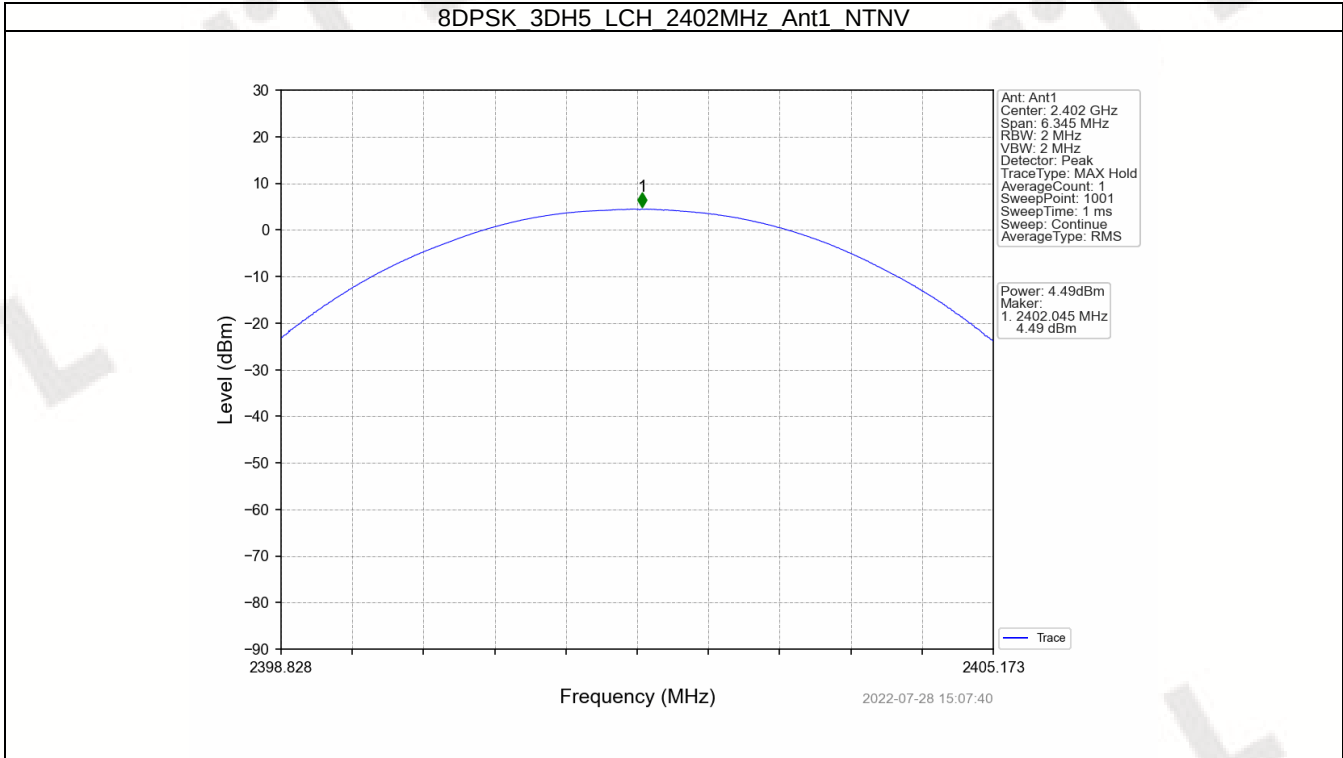


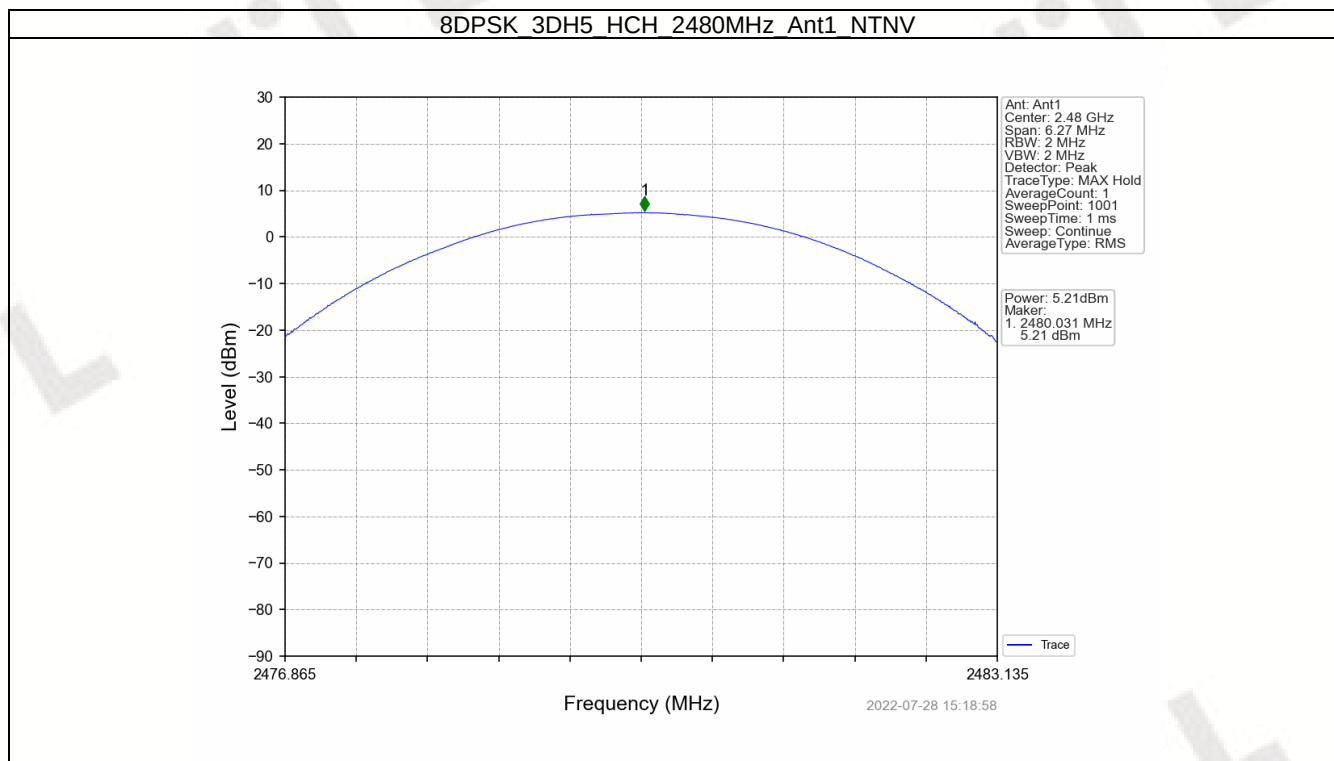
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV







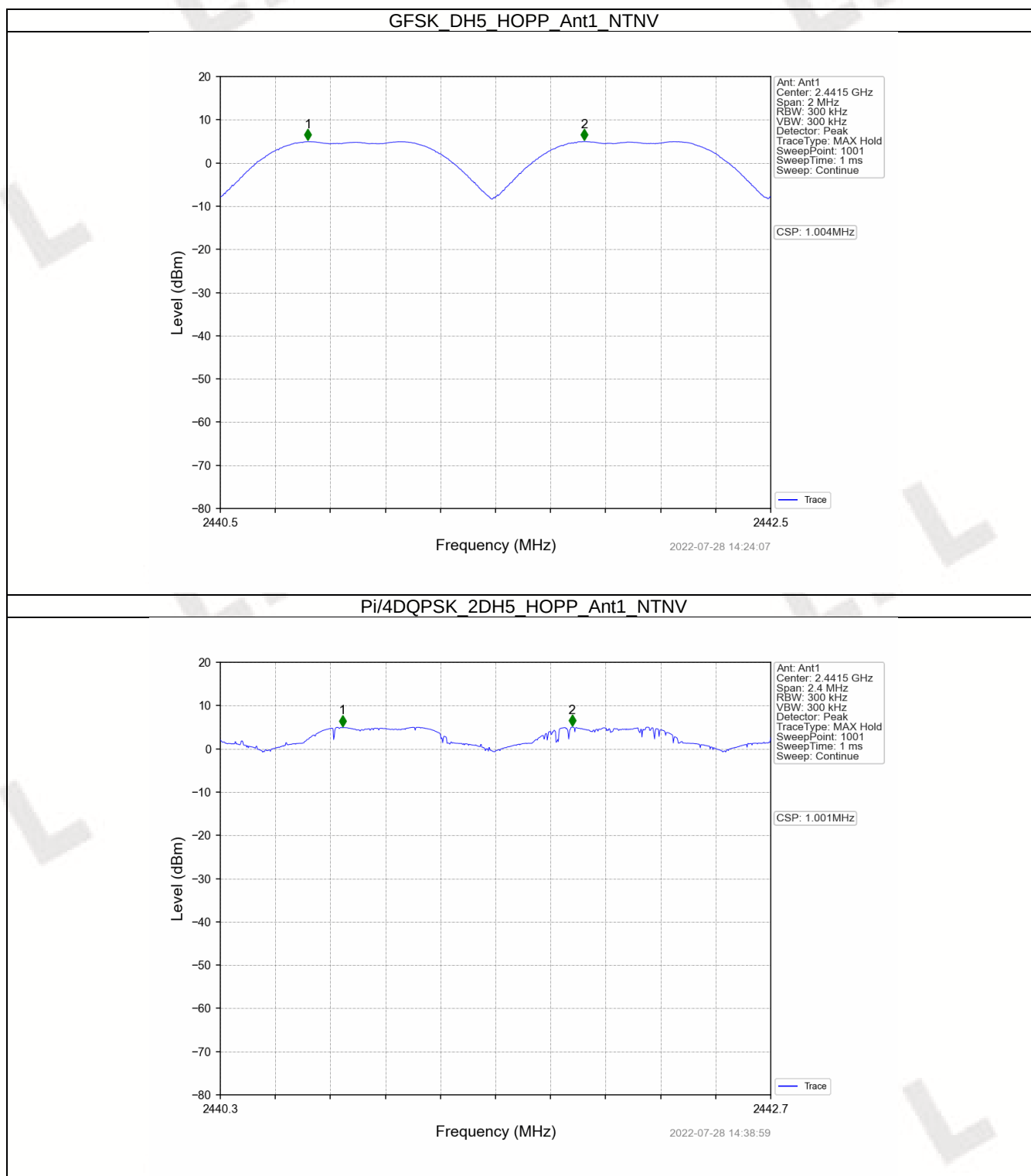
3. Carrier Frequency Separation

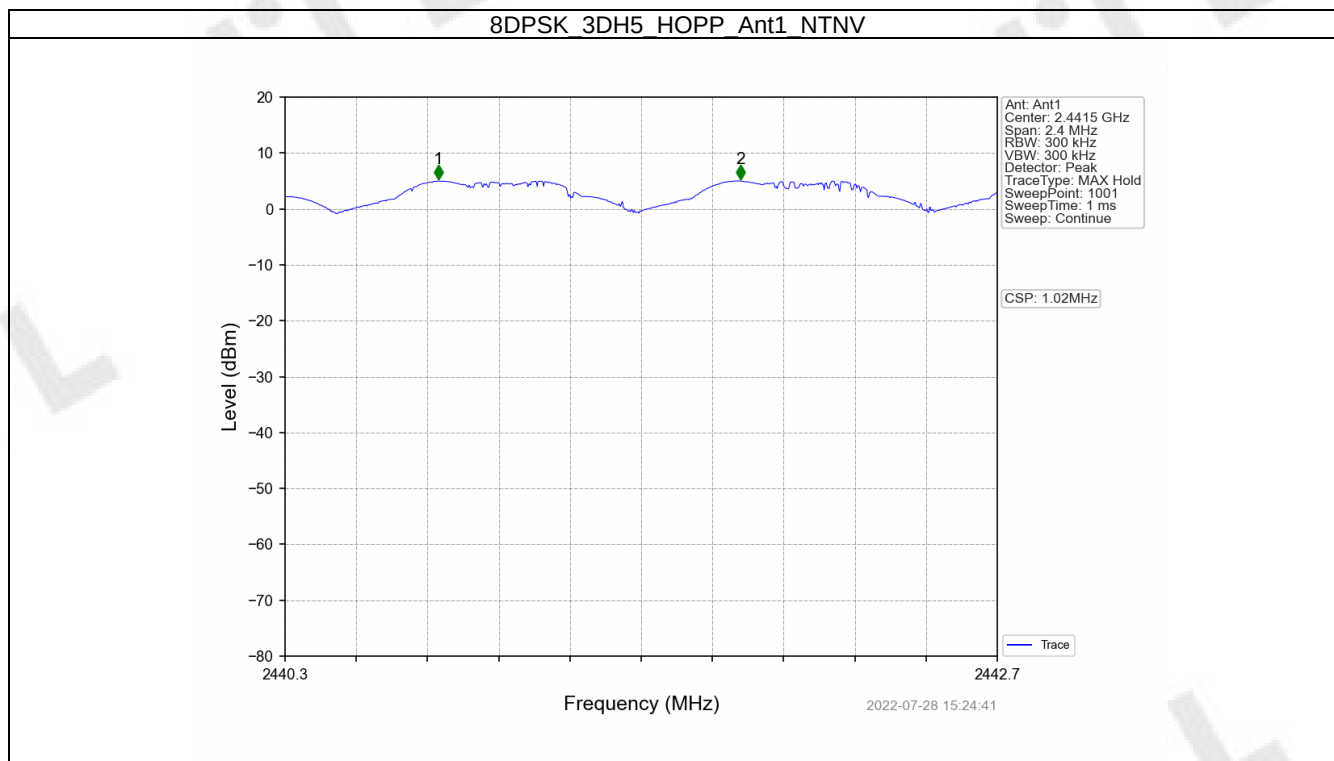
3.1 Ant1

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	1.004	0.961	≥ 0.961	Pass
PI/4DQPSK	SISO	HOPP	2DH5	1.001	1.241	≥ 0.827	Pass
8DPSK	SISO	HOPP	3DH5	1.020	1.269	≥ 0.846	Pass

3.1.2 Test Graph





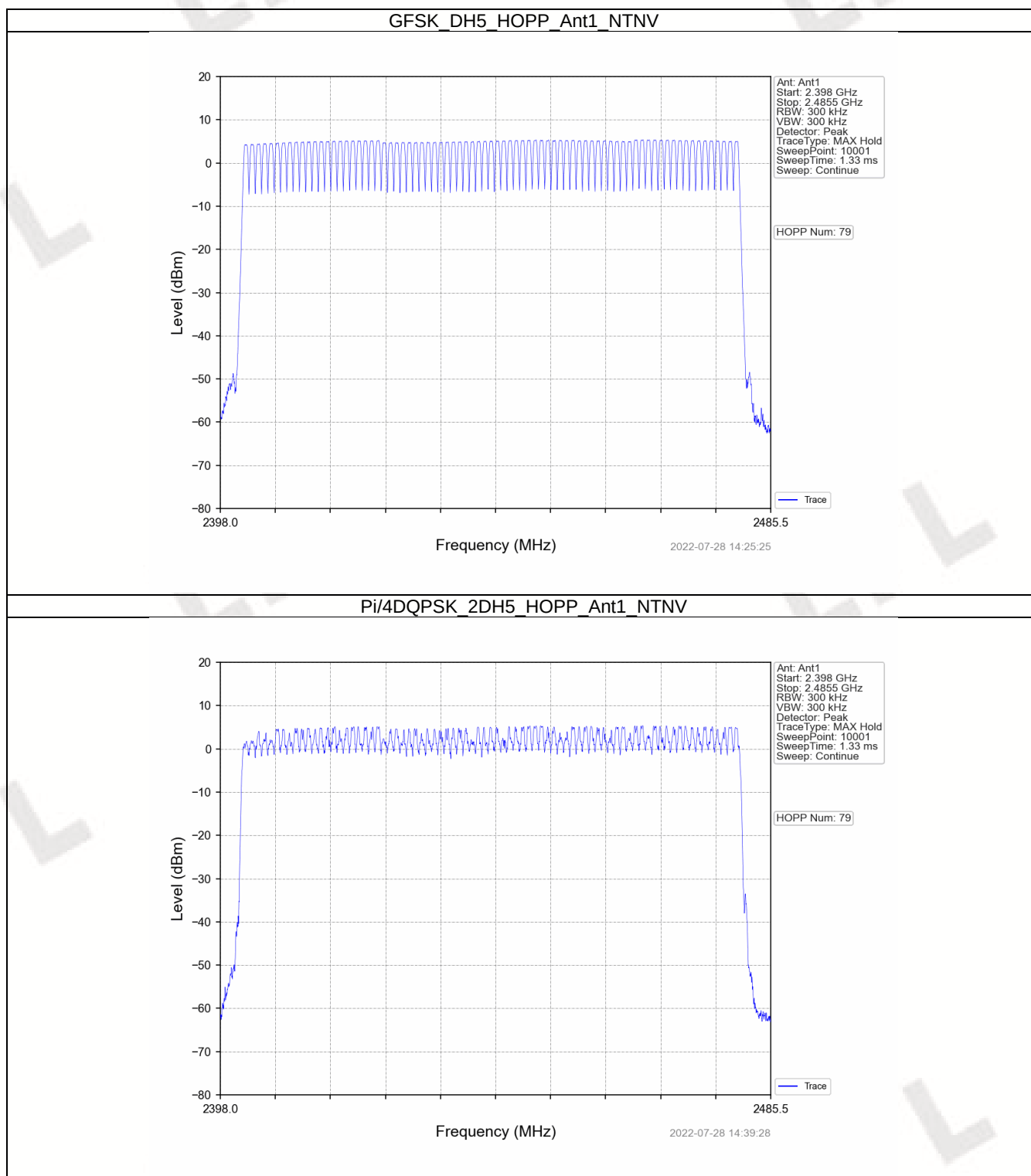
4. Number of Hopping Frequencies

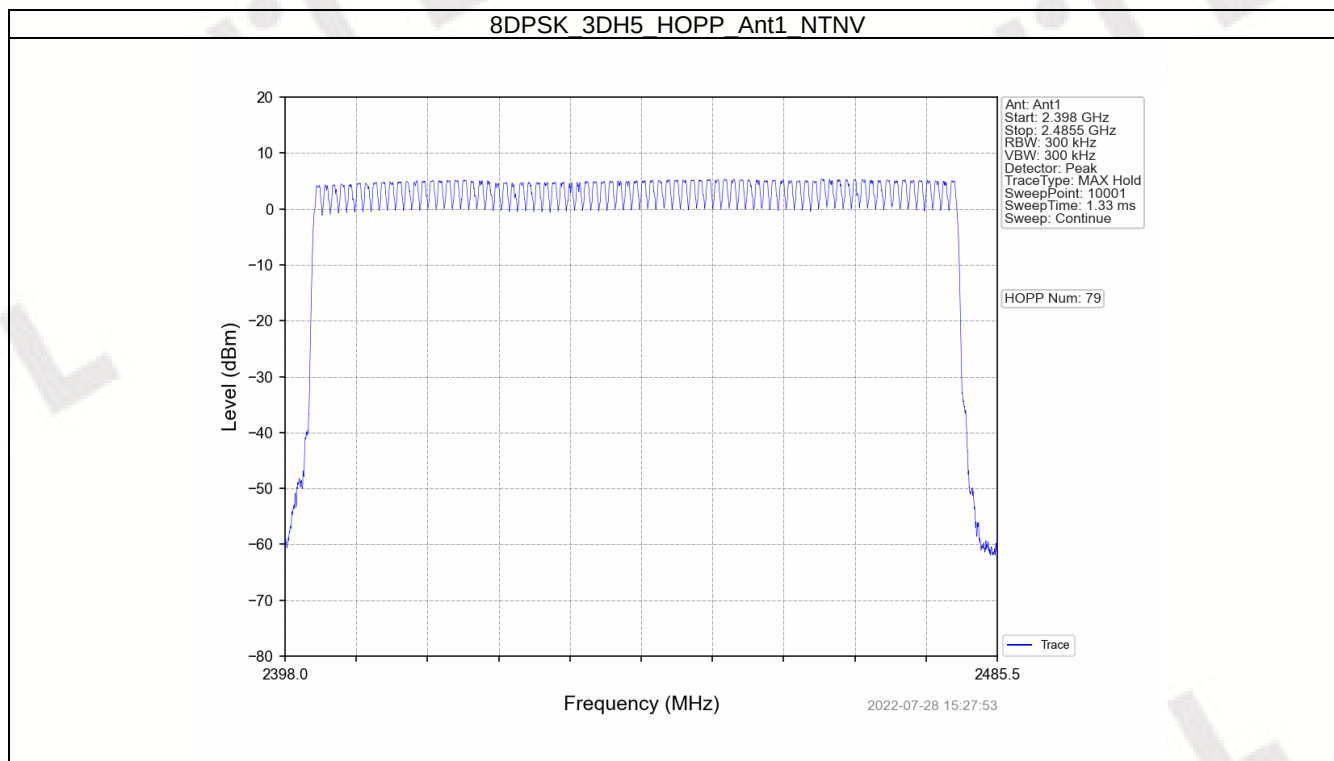
4.1 HoppNum

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





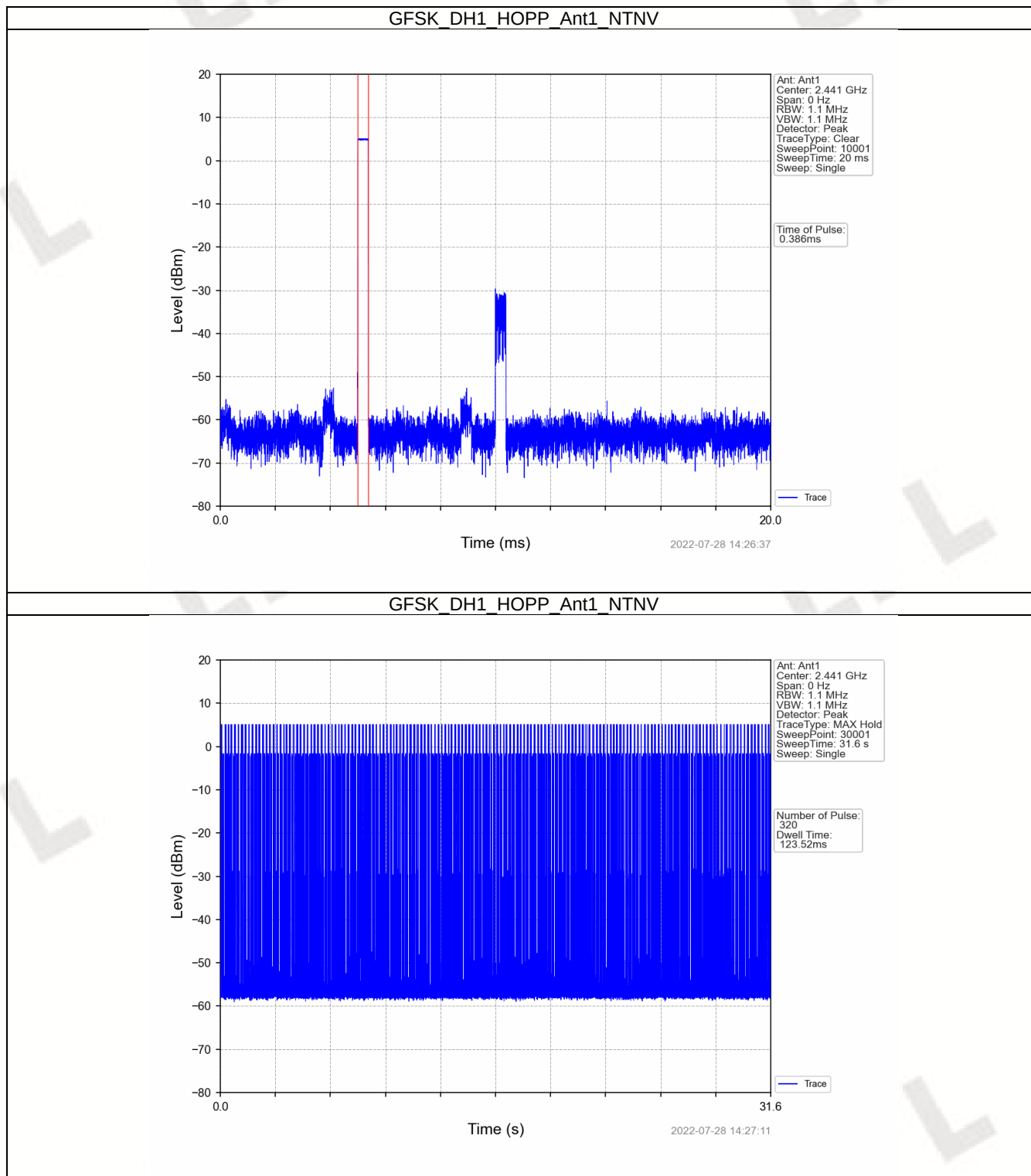
5. Time of Occupancy (Dwell Time)

5.1 Ant1

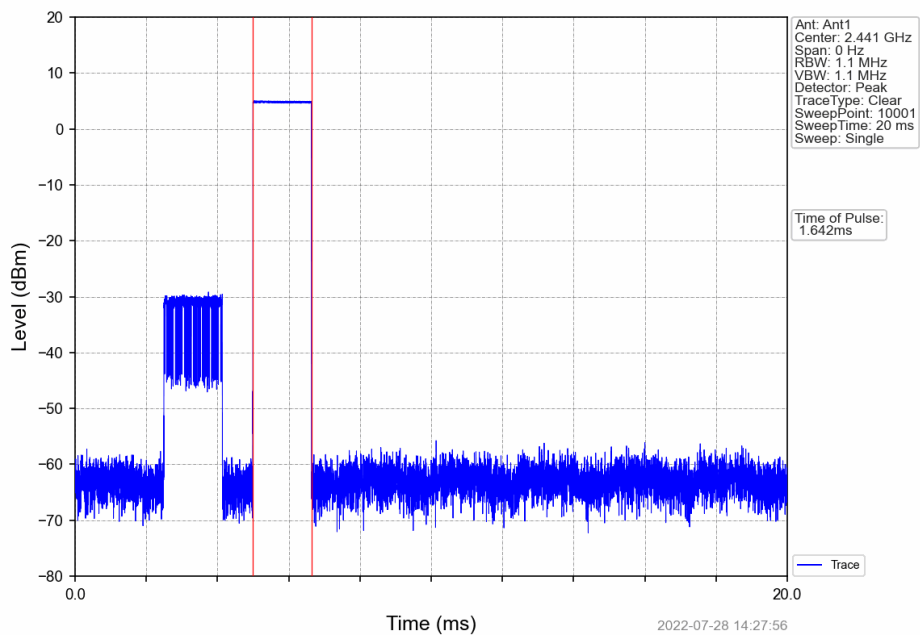
5.1.1 Test Result

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	320	123.520	<=400	Pass
			DH3	1.642	31.600	152	249.584	<=400	Pass
			DH5	2.896	31.600	101	292.496	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.394	31.600	320	126.080	<=400	Pass
			2DH3	1.646	31.600	163	268.298	<=400	Pass
			2DH5	2.904	31.600	104	302.016	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.396	31.600	319	126.324	<=400	Pass
			3DH3	1.646	31.600	165	271.590	<=400	Pass
			3DH5	2.906	31.600	111	322.566	<=400	Pass

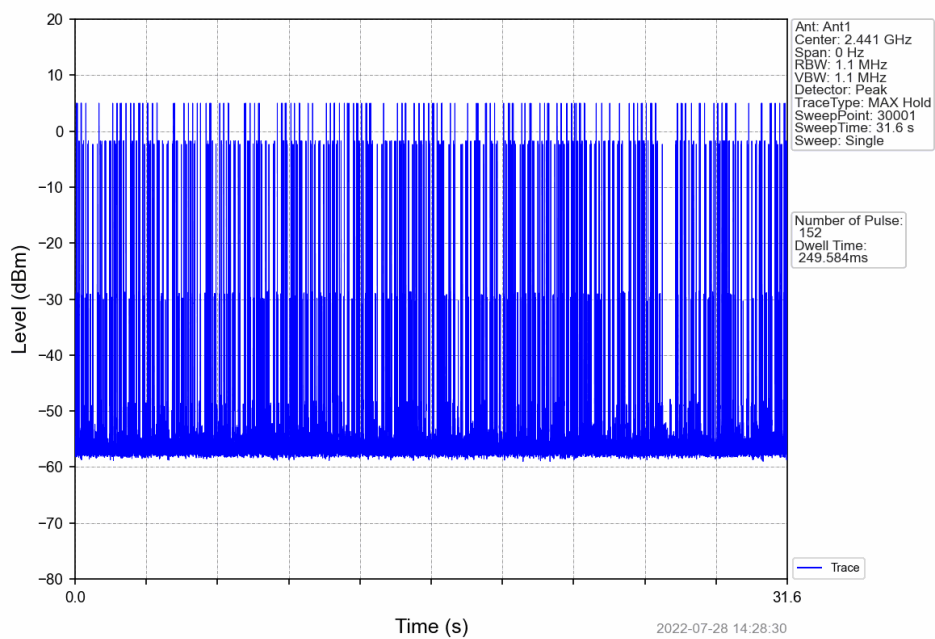
5.1.2 Test Graph



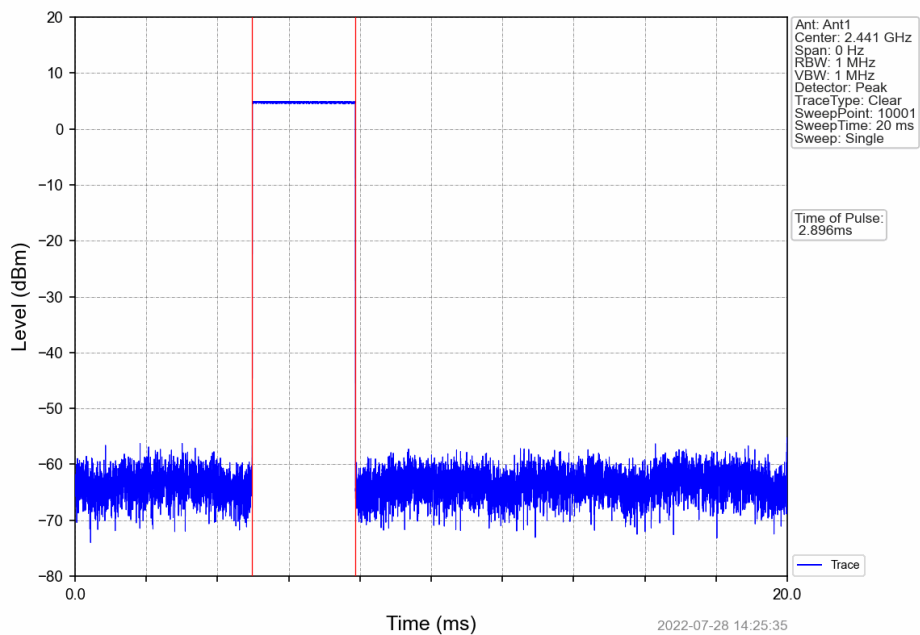
GFSK DH3 HOPP Ant1 NTN



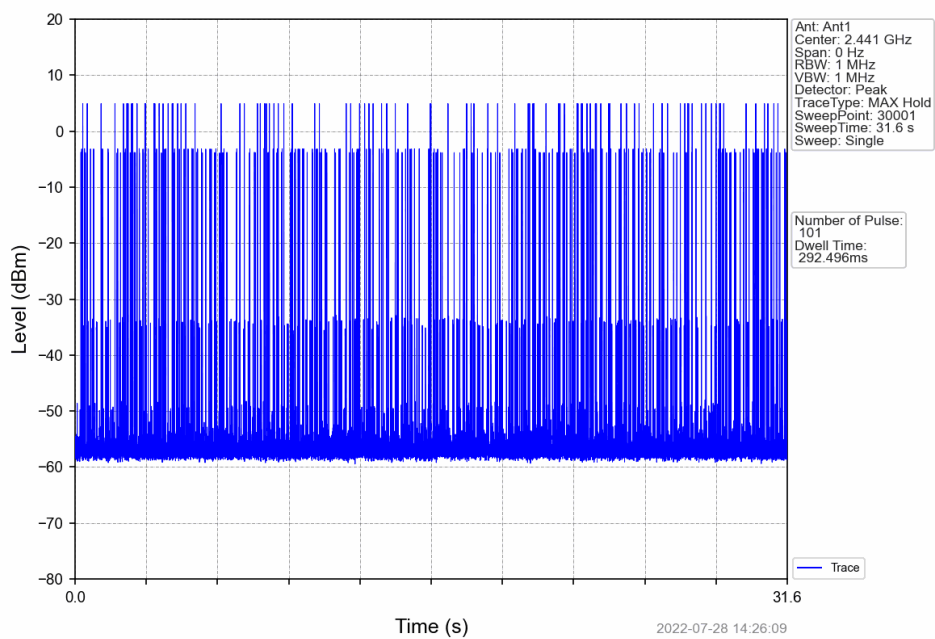
GFSK_DH3_HOPP_Ant1_NTNV



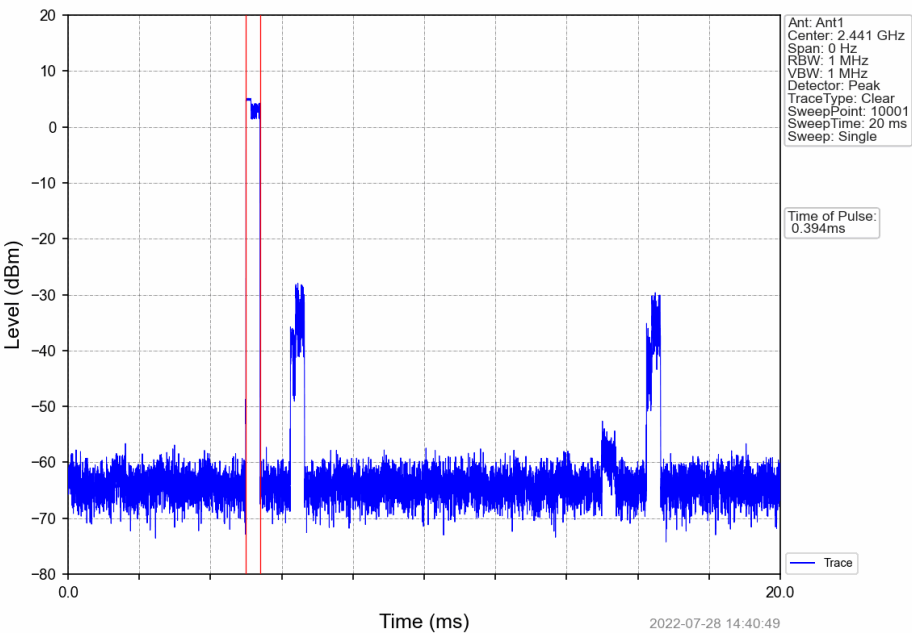
GFSK DH5 HOPP Ant1 NTN



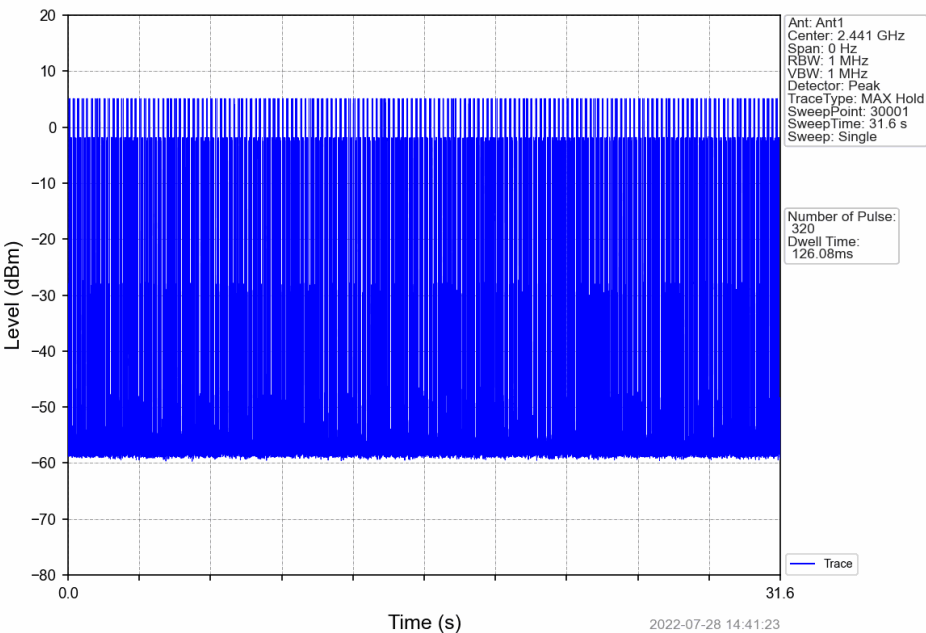
GFSK_DH5_HOPP_Ant1_NTNV



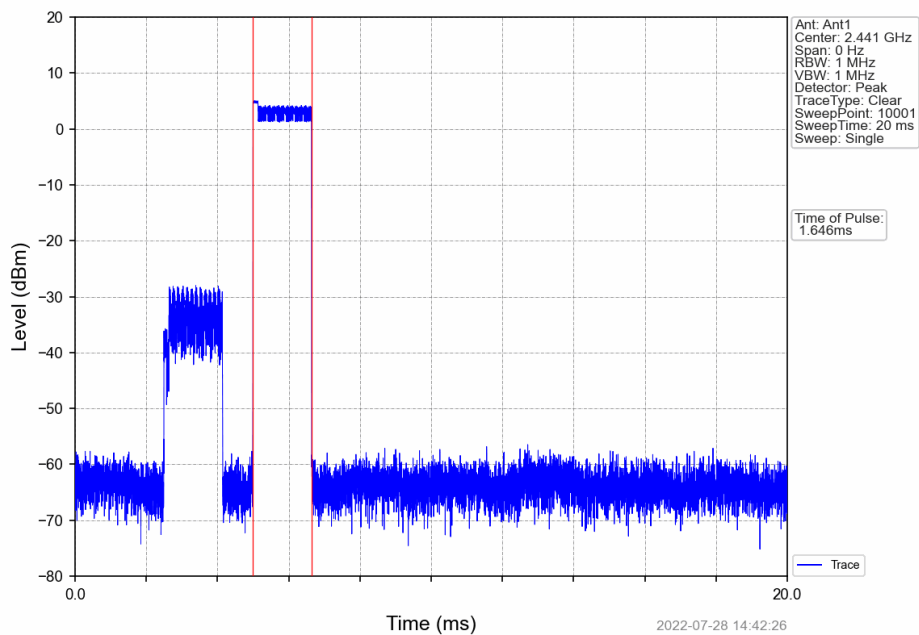
Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV



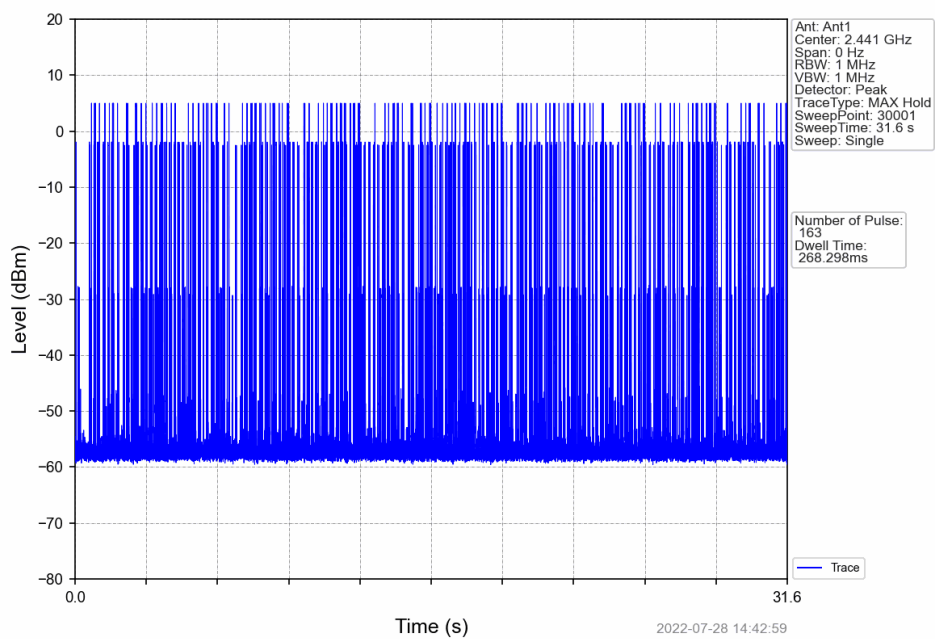
Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV



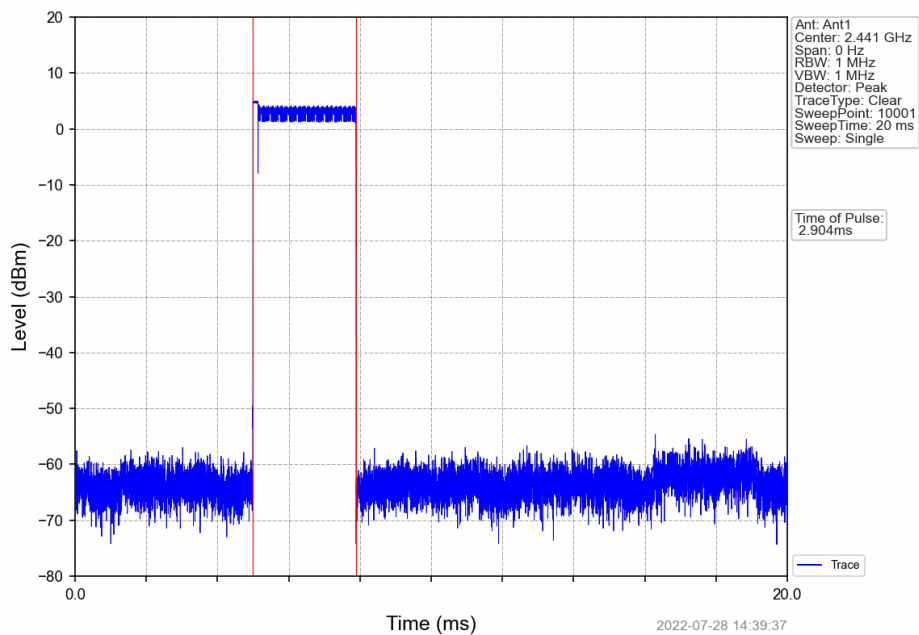
Pi/4DQPSK_2DH3_HOPP_Ant1_NTNV



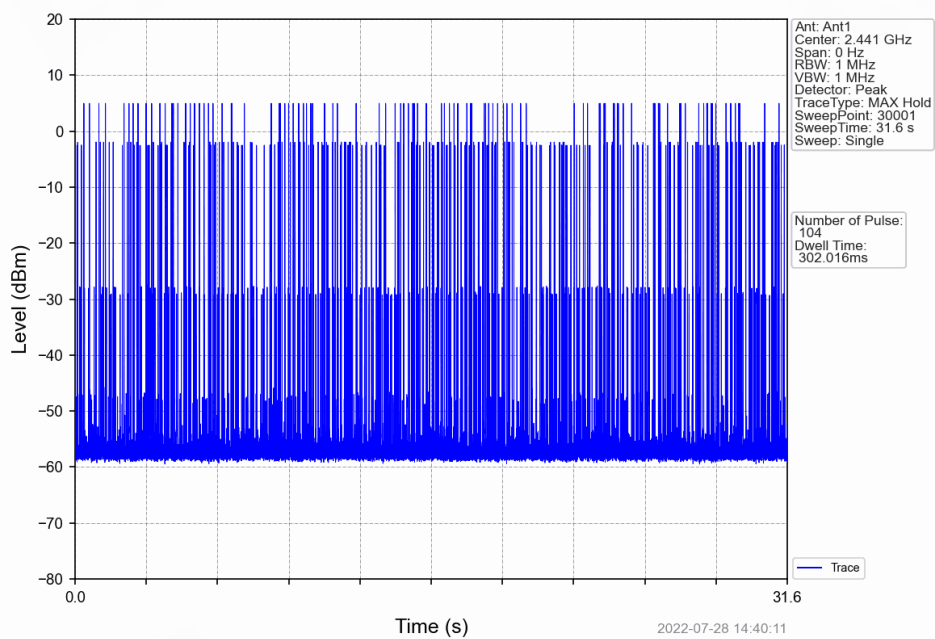
Pi/4DQPSK_2DH3_HOPP_Ant1_NTNV



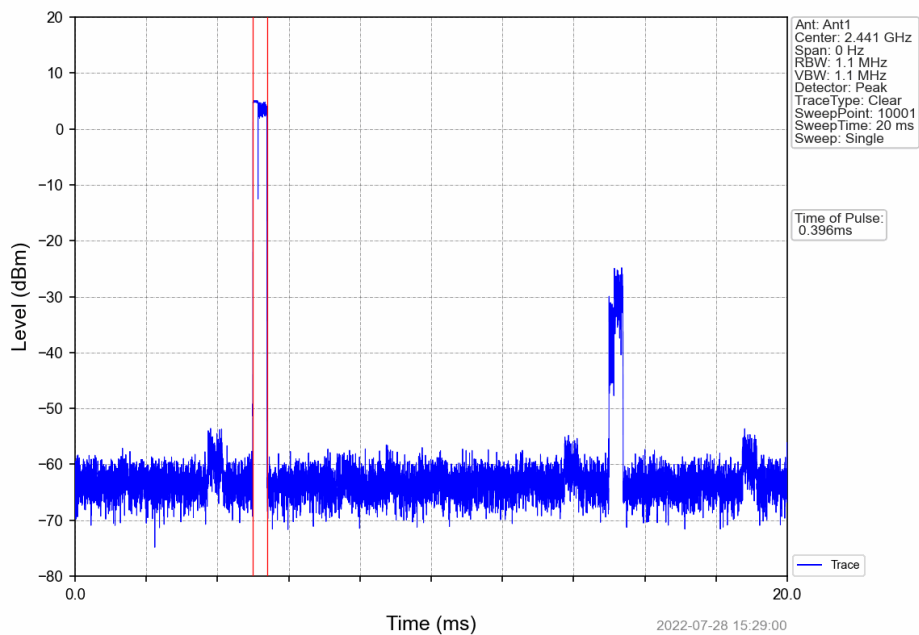
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



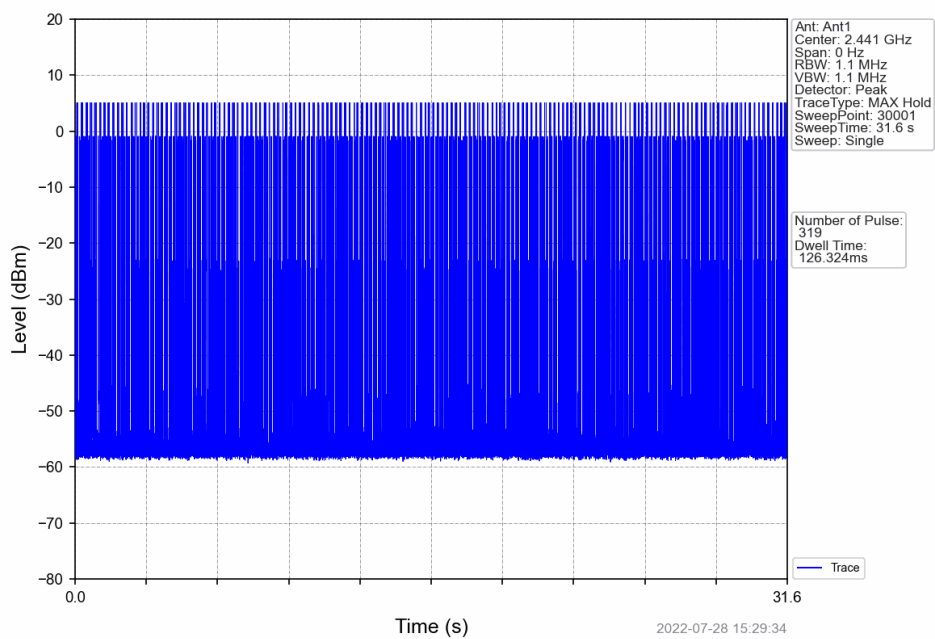
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



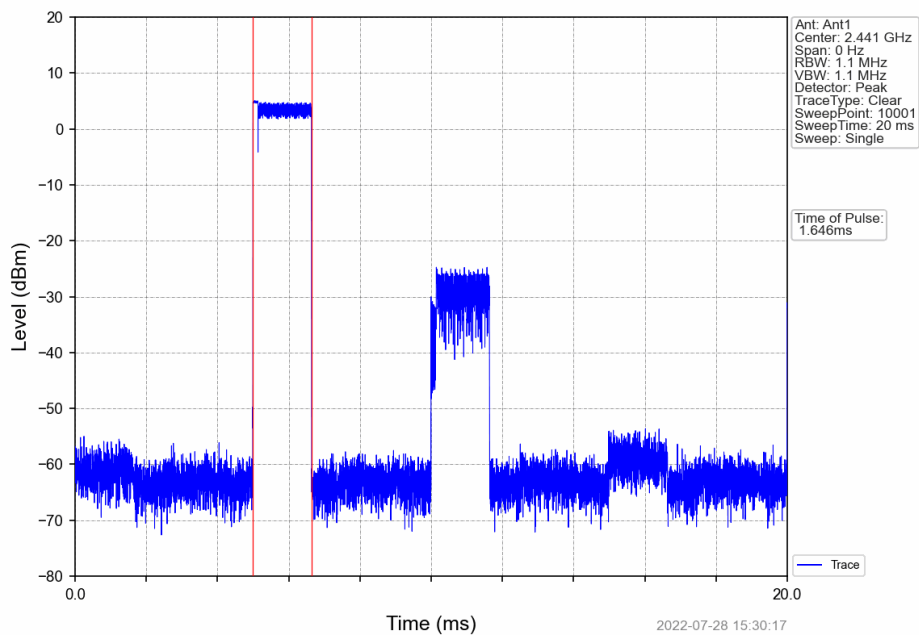
8DPSK 3DH1 HOPP Ant1 NTN



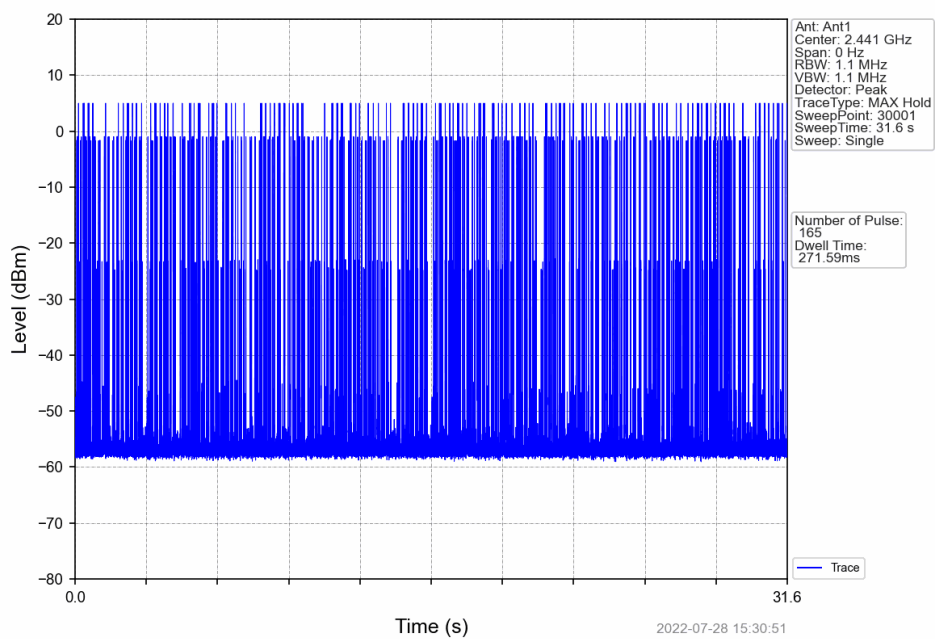
8DPSK 3DH1 HOPP Ant1 NTN



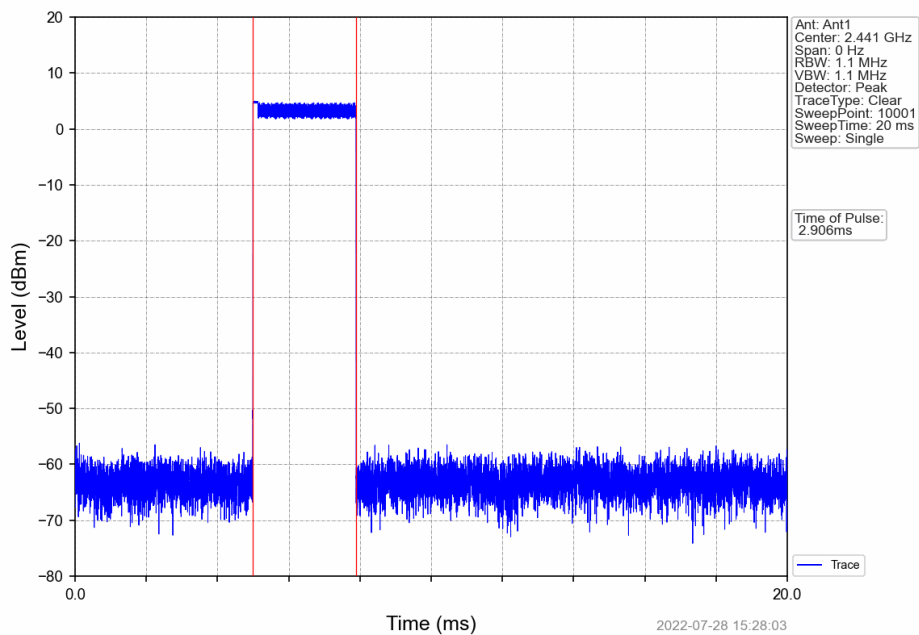
8DPSK 3DH3 HOPP Ant1 NTN



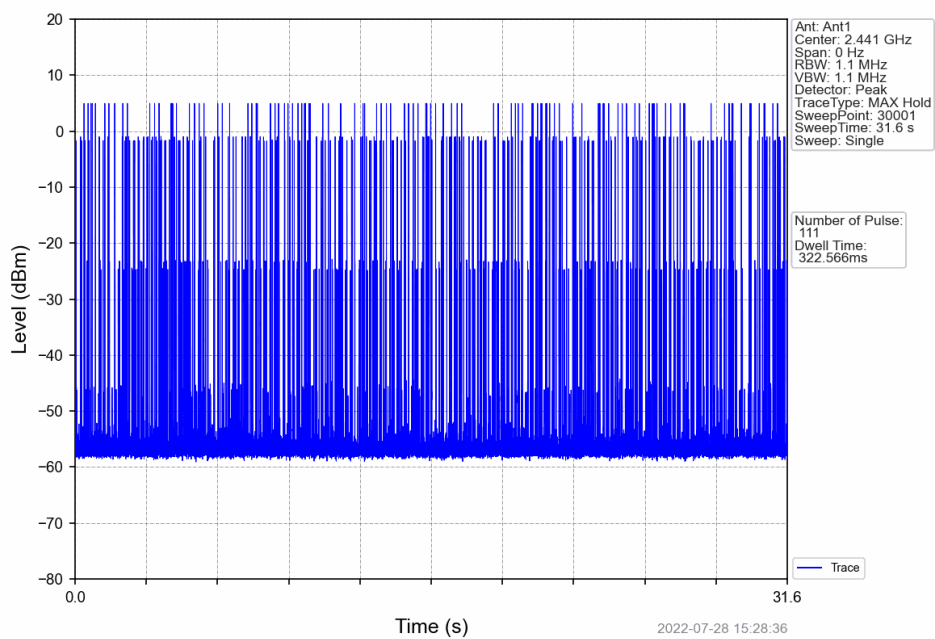
8DPSK_3DH3_HOPP_Ant1_NTN



8DPSK 3DH5 HOPP Ant1 NTN



8DPSK 3DH5 HOPP Ant1 NTN



6. Unwanted Emissions InStandard Non-restricted Frequency Bands

6.1 Ref

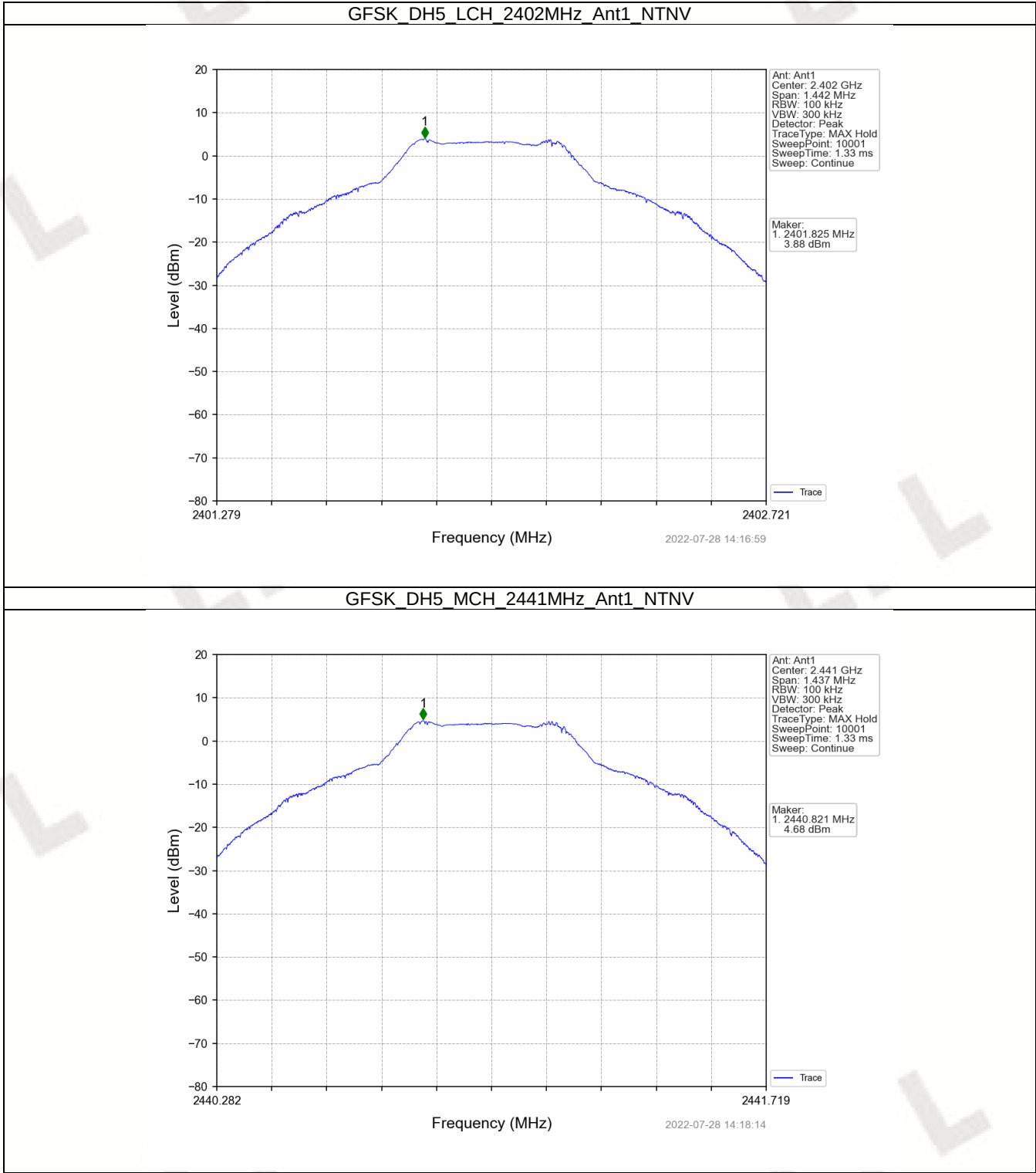
6.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	3.88
		2441	DH5	1	4.68
		2480	DH5	1	4.56
Pi/4DQPSK	SISO	2402	2DH5	1	3.93
		2441	2DH5	1	4.77
		2480	2DH5	1	4.66
8DPSK	SISO	2402	3DH5	1	3.99
		2441	3DH5	1	4.81
		2480	3DH5	1	4.71

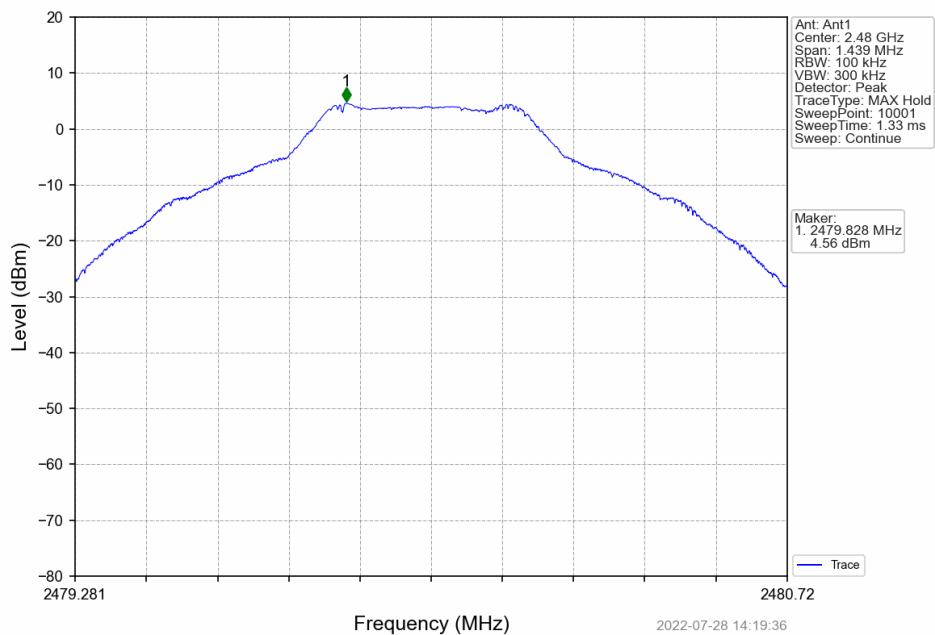
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.

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.

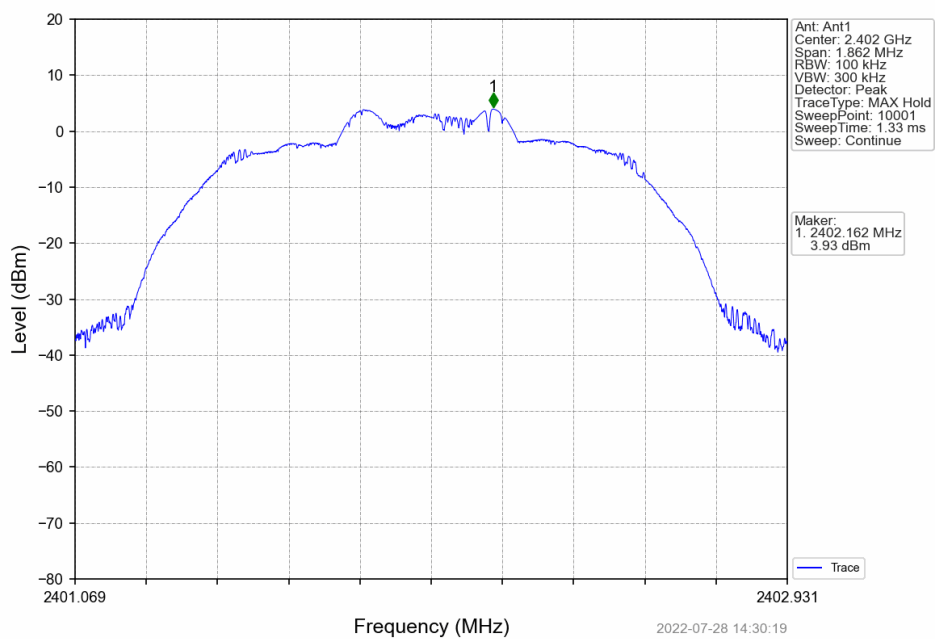
6.1.2 Test Graph



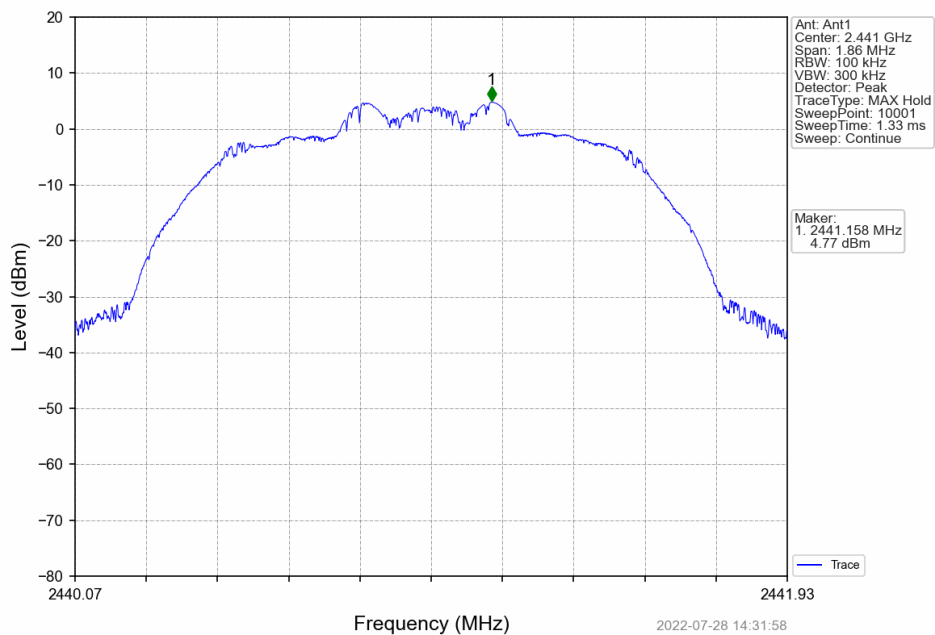
GFSK DH5 HCH 2480MHz Ant1 NTV



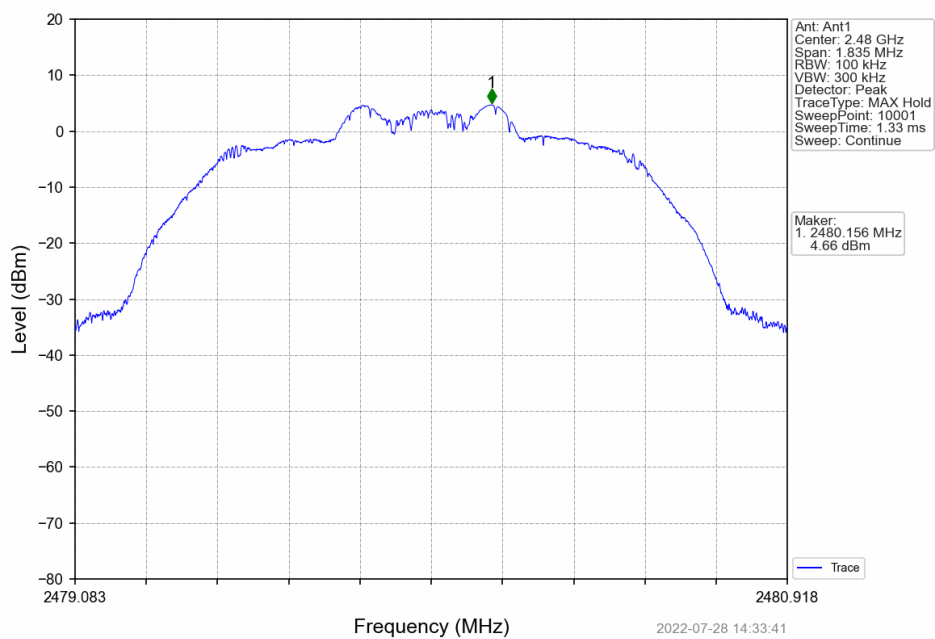
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



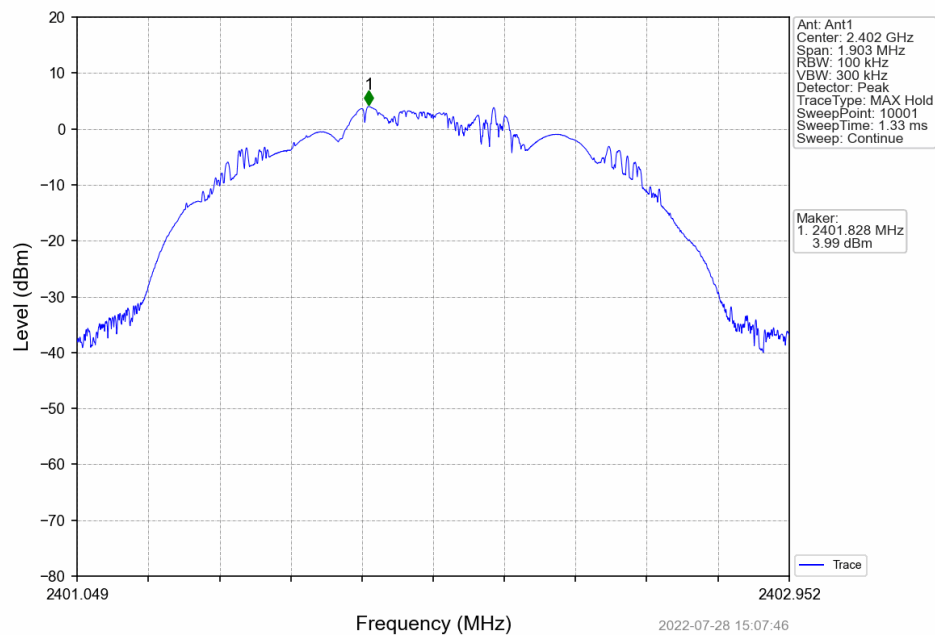
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



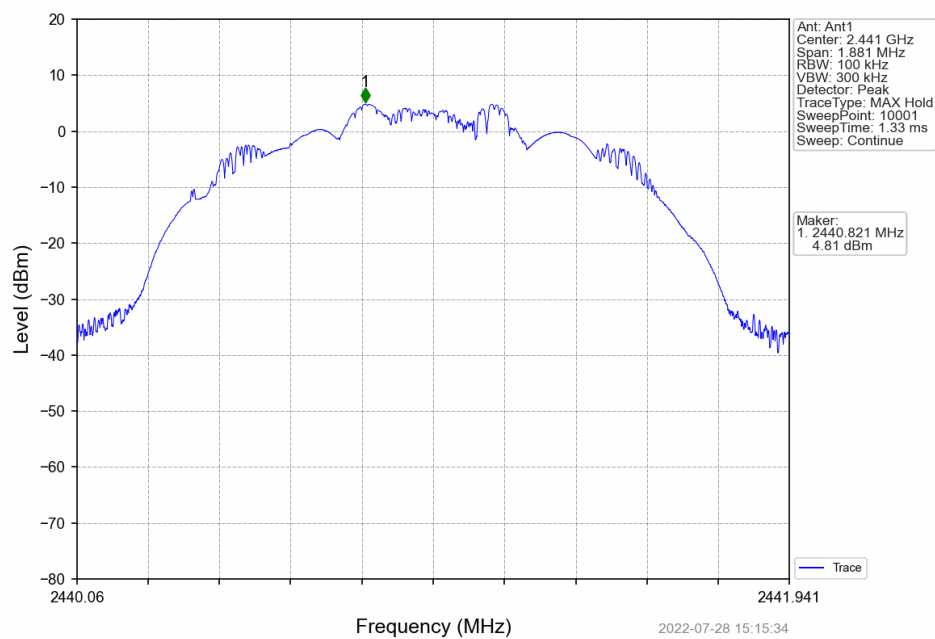
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

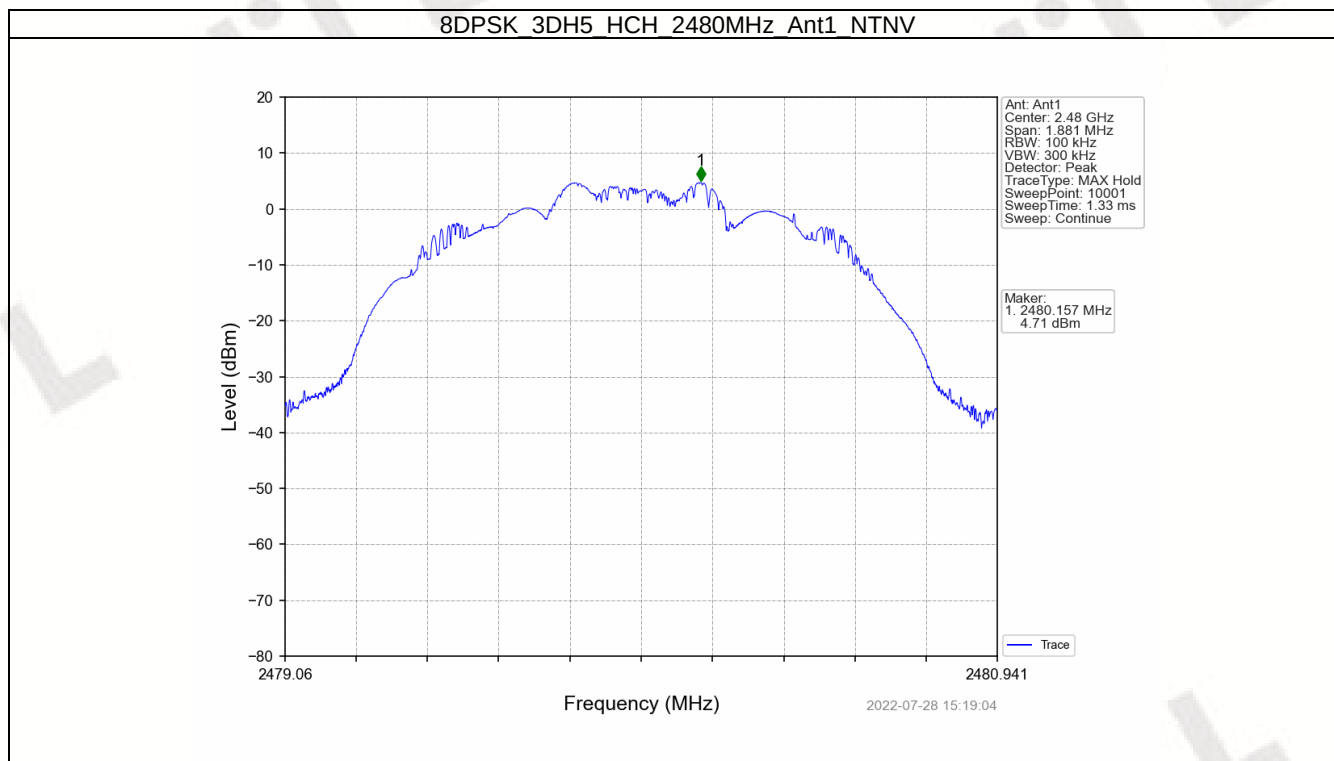


8DPSK 3DH5 LCH 2402MHz Ant1 NTN



8DPSK 3DH5 MCH 2441MHz Ant1 NTN





6.2 CSE

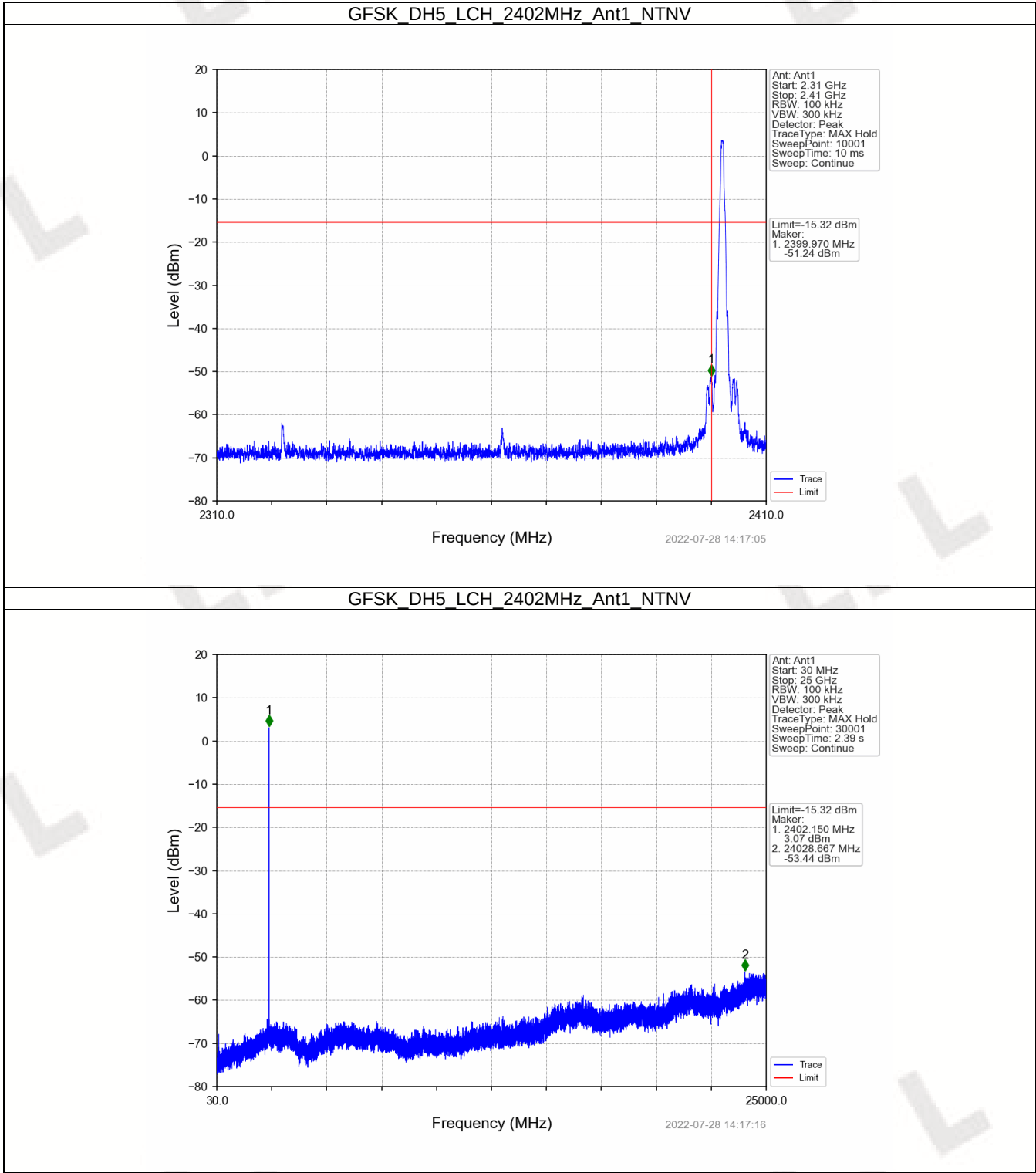
6.2.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	4.68	-15.32	Pass
		2441	DH5	1	4.68	-15.32	Pass
		2480	DH5	1	4.68	-15.32	Pass
		HOPP	DH5	1	4.68	-15.32	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	4.77	-15.23	Pass
		2441	2DH5	1	4.77	-15.23	Pass
		2480	2DH5	1	4.77	-15.23	Pass
		HOPP	2DH5	1	4.77	-15.23	Pass
8DPSK	SISO	2402	3DH5	1	4.81	-15.19	Pass
		2441	3DH5	1	4.81	-15.19	Pass
		2480	3DH5	1	4.81	-15.19	Pass
		HOPP	3DH5	1	4.81	-15.19	Pass

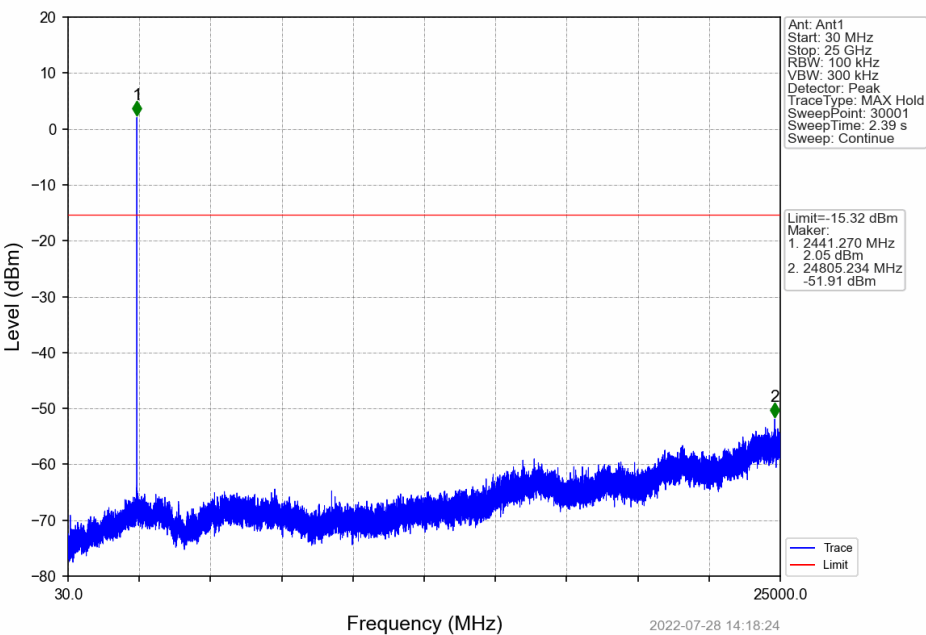
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.

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.

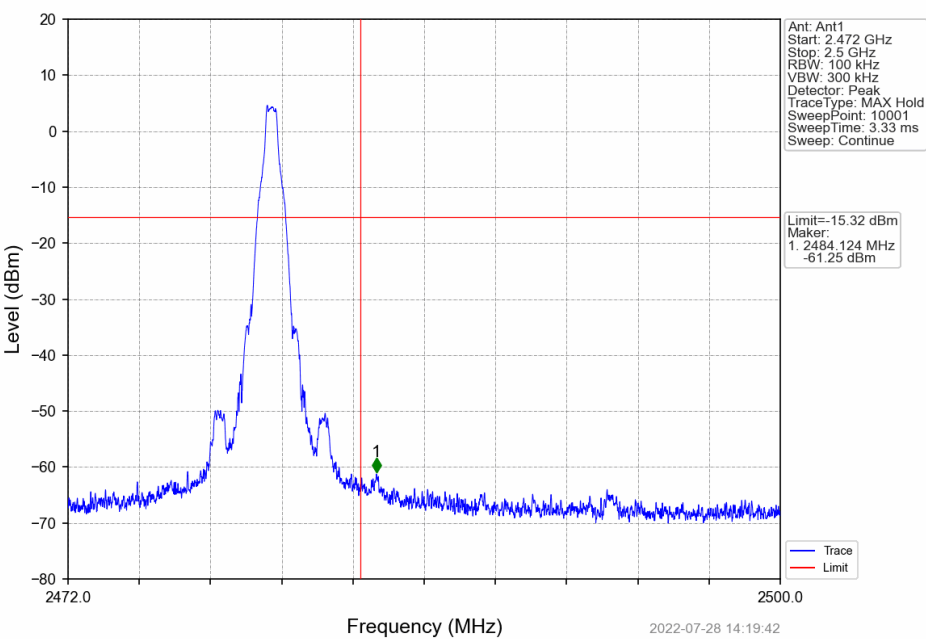
6.2.2 Test Graph



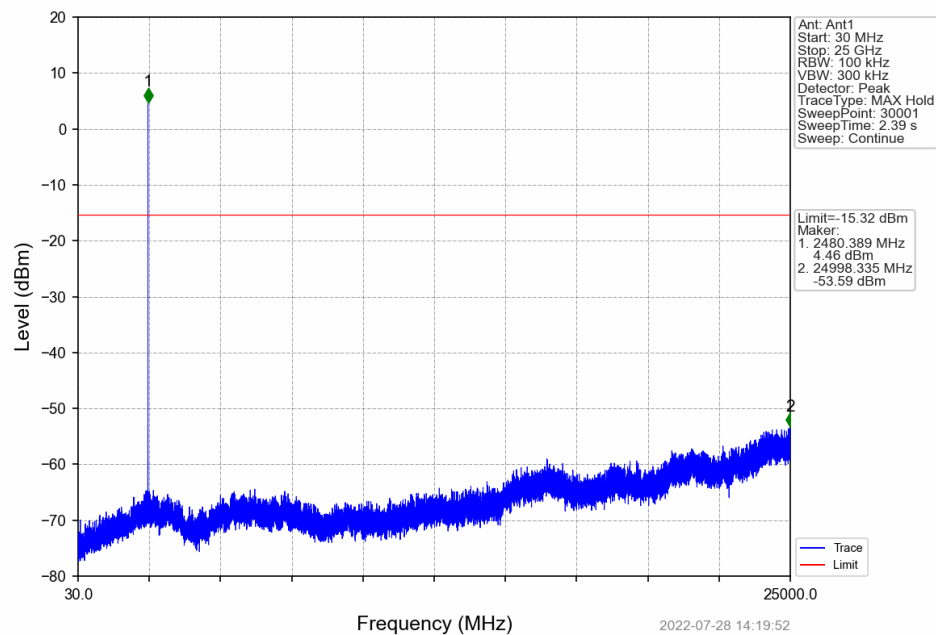
GFSK DH5 MCH 2441MHz Ant1 NTN



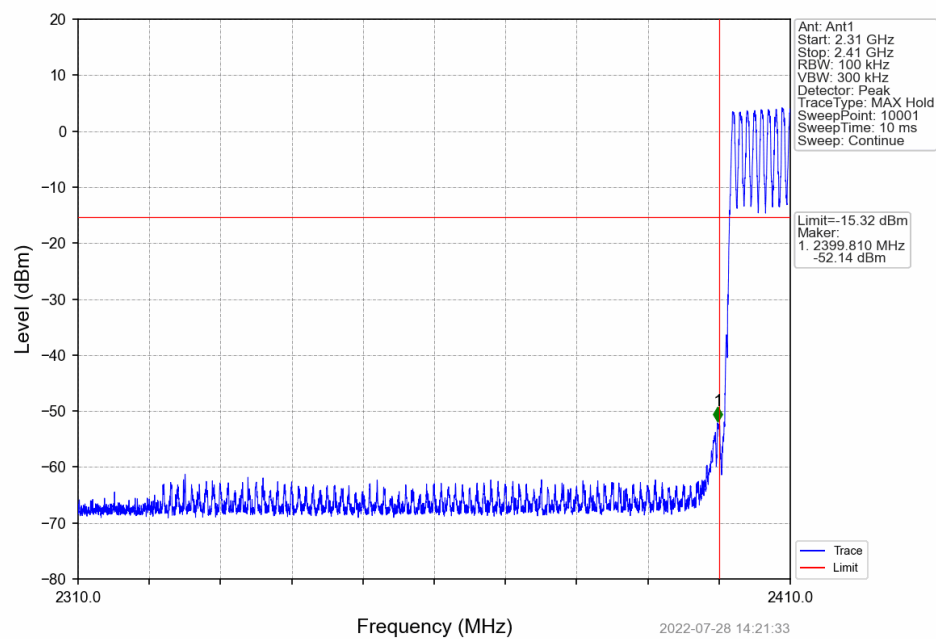
GFSK_DH5_HCH_2480MHz_Ant1_NTN



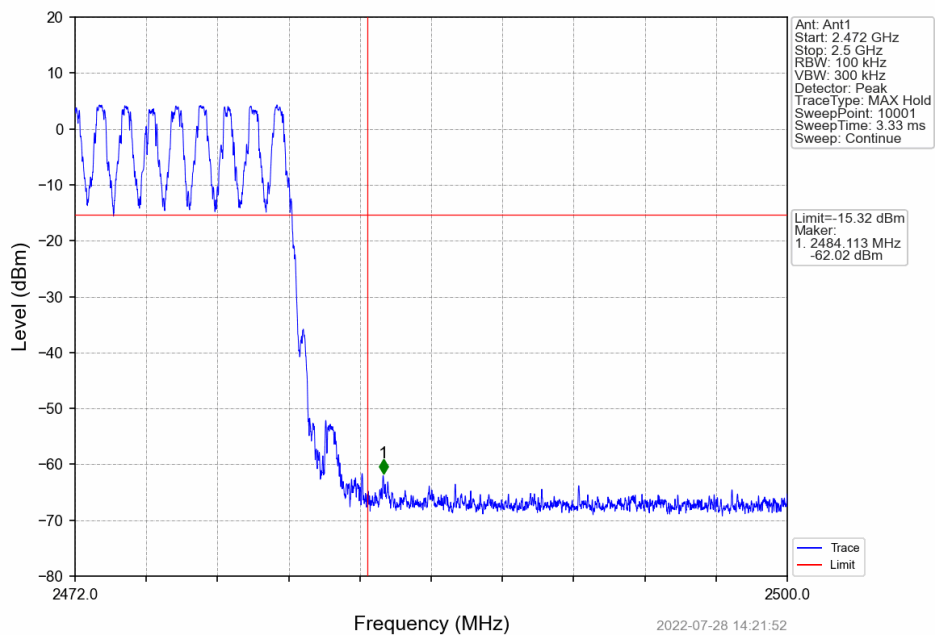
GFSK DH5 HCH 2480MHz Ant1 NTN



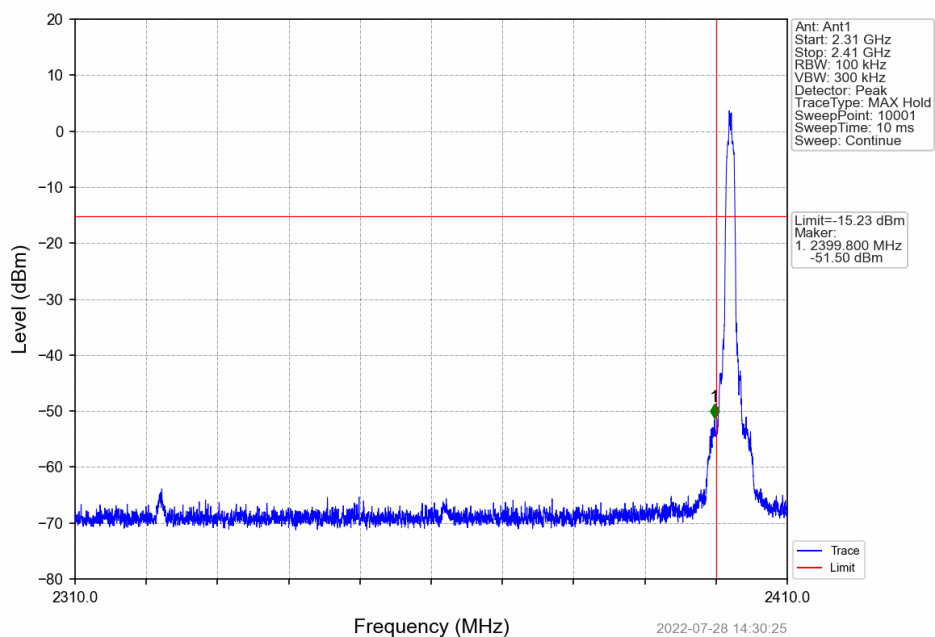
GFSK_DH5_HOPP_Ant1_NTNV



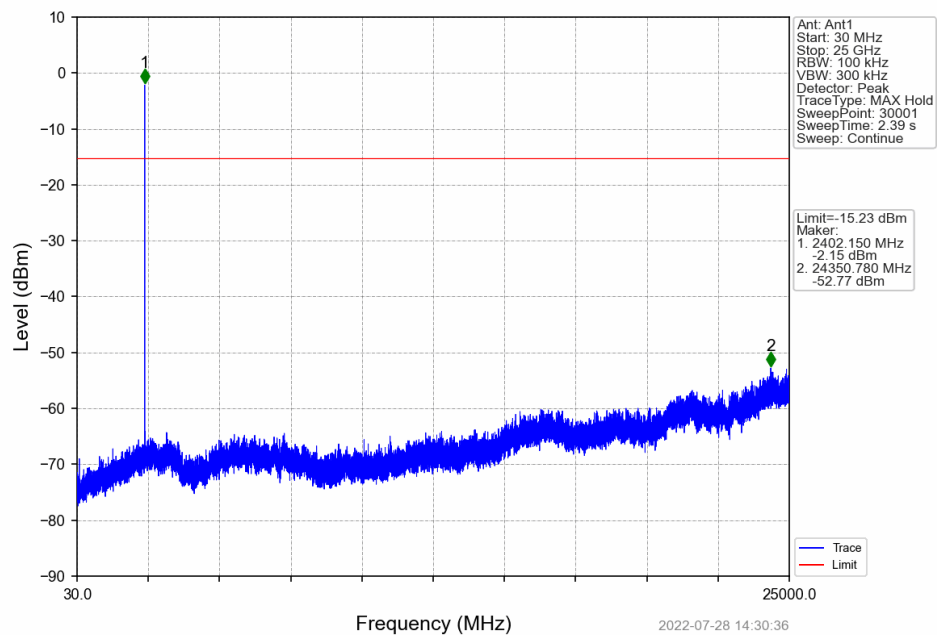
GFSK DH5 HOPP Ant1 NTN



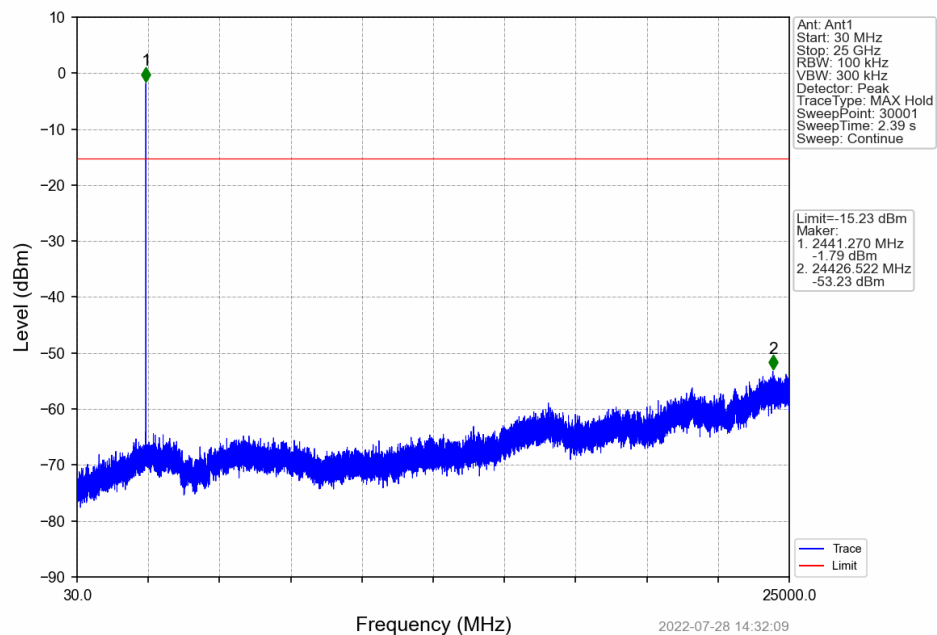
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTN



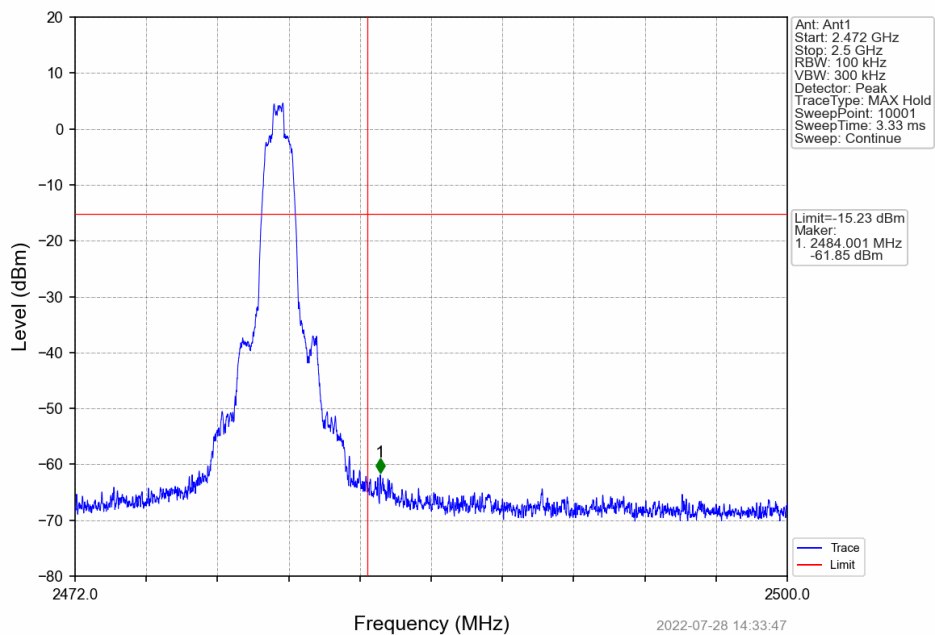
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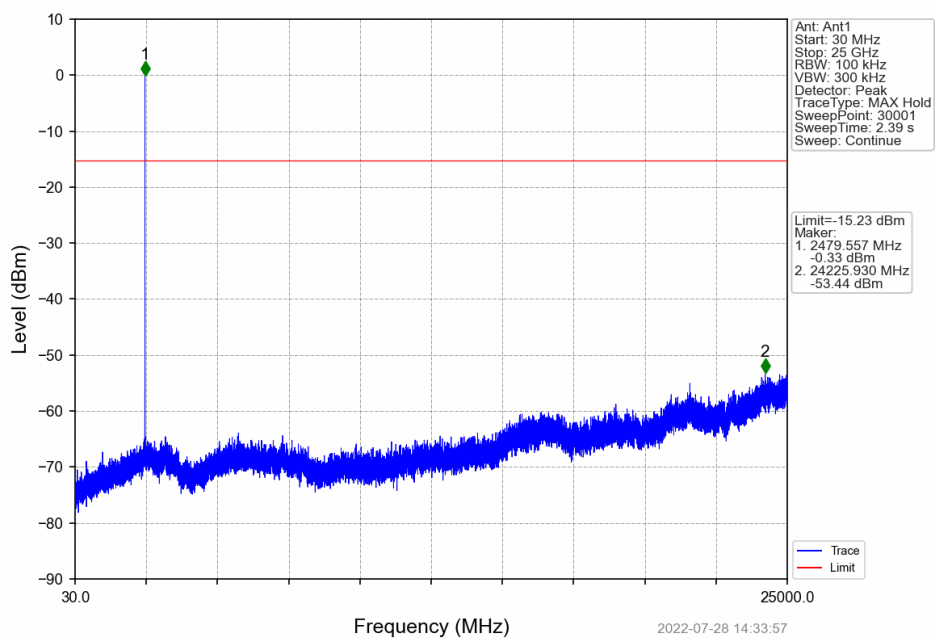
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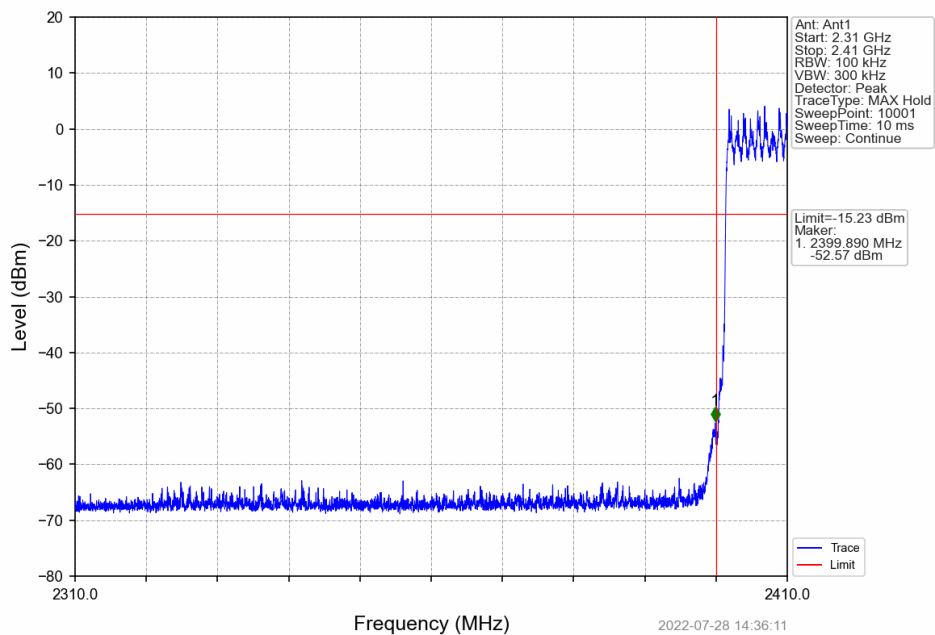
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



Pi/4DQPSK 2DH5_HOPP_Ant1_NTNV



Pi/4DQPSK 2DH5_HOPP_Ant1_NTNV

