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Annex for Bluetooth

Test Report No.: CTL2508258051-WF

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FCC ID: 2BRWN-SFX80

1. Bandwidth

1.1 Test Result

1.1.1 OBW

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.866	/	Pass
		2441	DH5	1	0.884	/	Pass
		2480	DH5	1	0.883	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.172	/	Pass
		2441	2DH5	1	1.179	/	Pass
		2480	2DH5	1	1.172	/	Pass
8DPSK	SISO	2402	3DH5	1	1.183	/	Pass
		2441	3DH5	1	1.192	/	Pass
		2480	3DH5	1	1.187	/	Pass

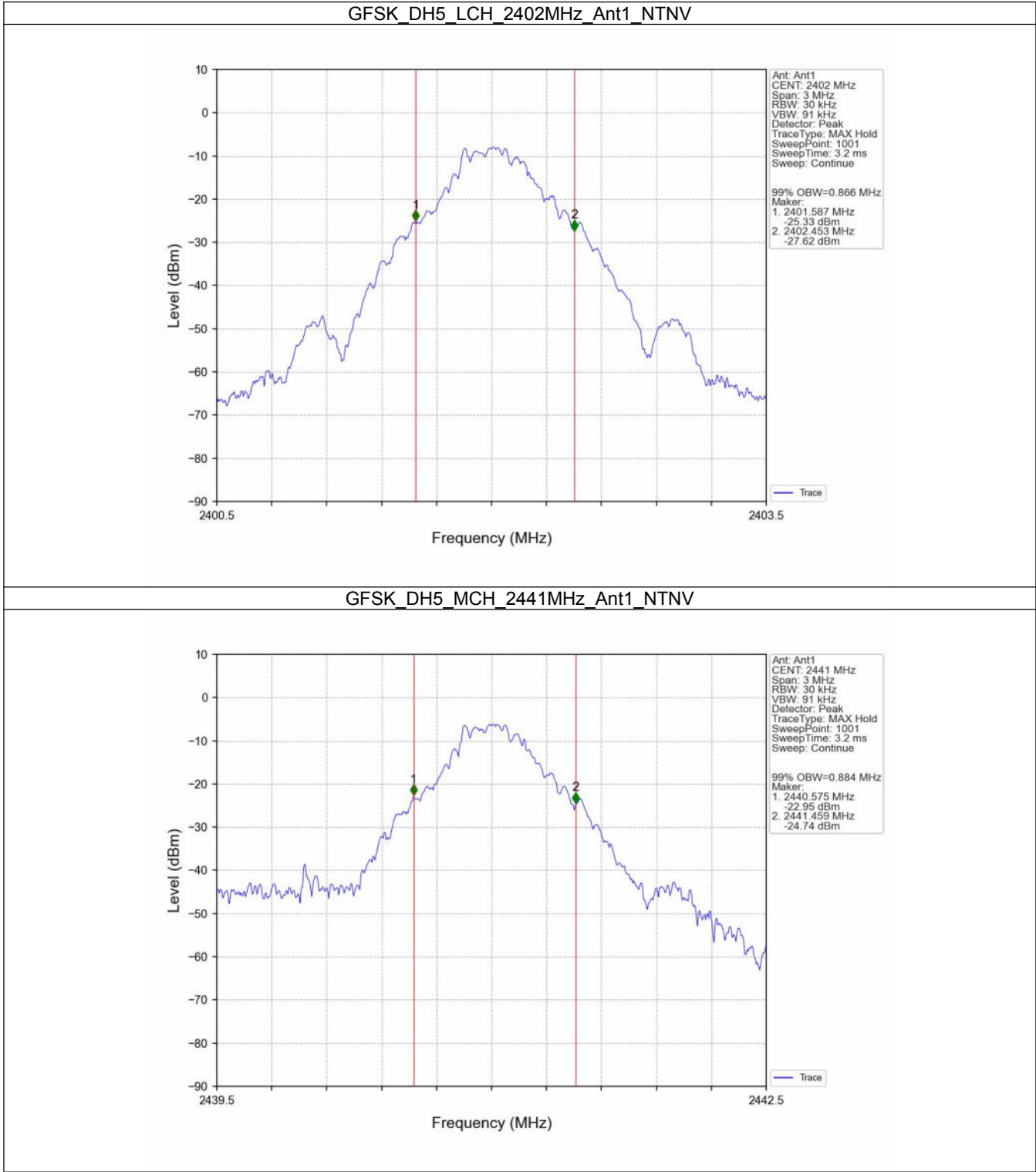
1.1.2 20dB BW

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.954	/	Pass
		2441	DH5	1	0.966	/	Pass
		2480	DH5	1	0.956	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.287	/	Pass
		2441	2DH5	1	1.316	/	Pass
		2480	2DH5	1	1.323	/	Pass
8DPSK	SISO	2402	3DH5	1	1.310	/	Pass
		2441	3DH5	1	1.311	/	Pass
		2480	3DH5	1	1.310	/	Pass

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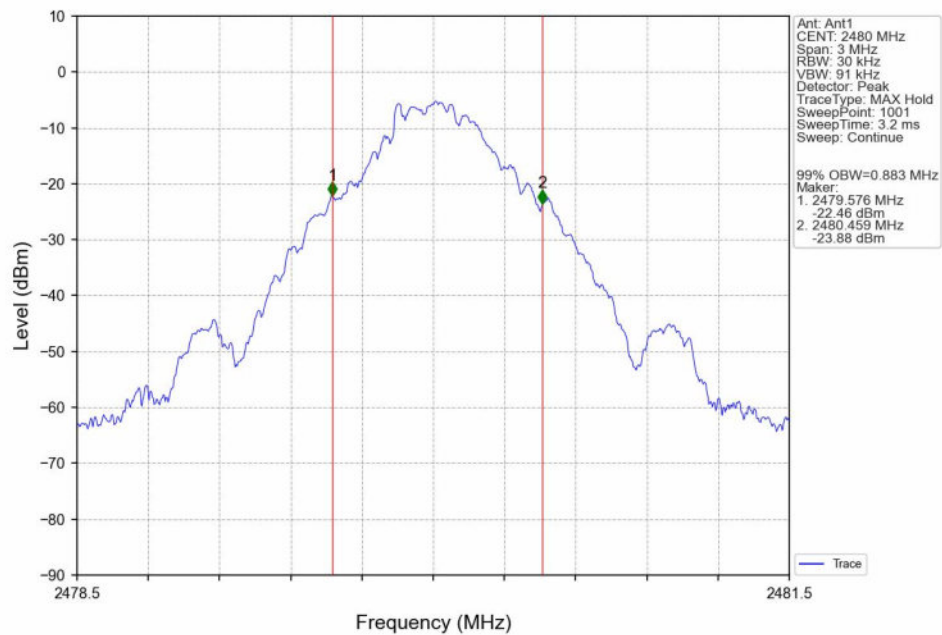
1.2 Test Graph

1.2.1 OBW

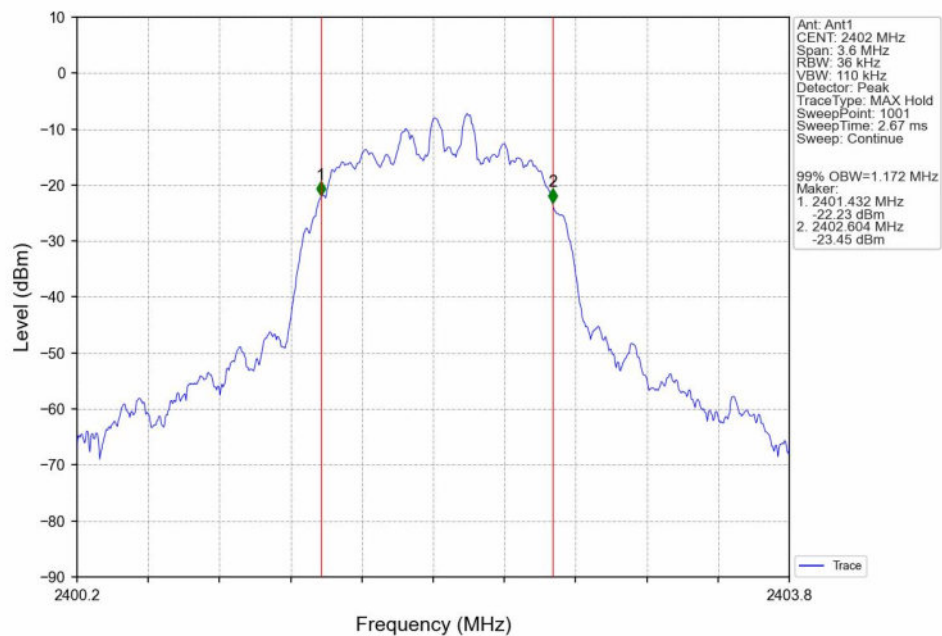


FCC ID: 2BRWN-SFX80

GFSK_DH5_HCH_2480MHz_Ant1_NTNV

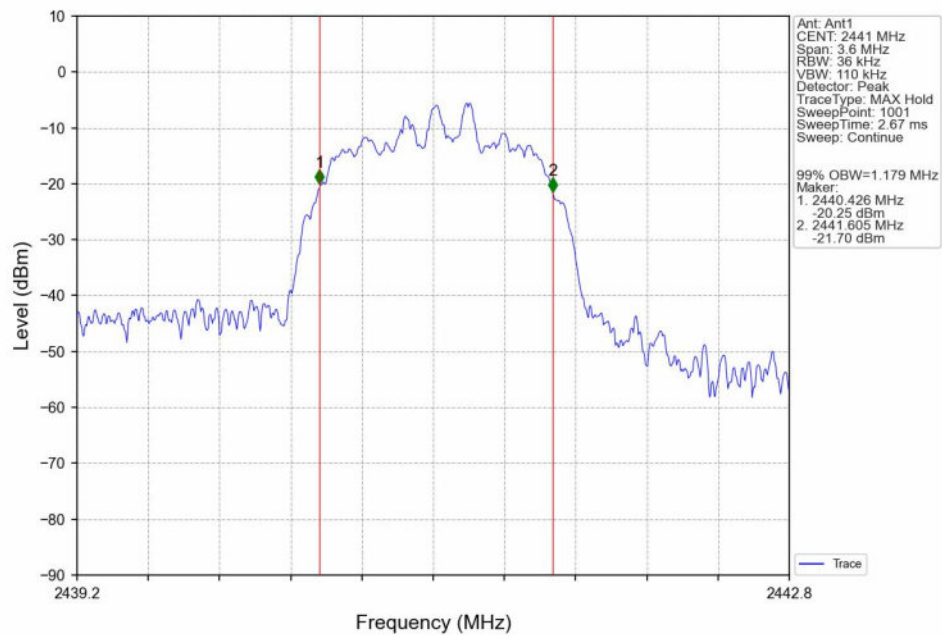


Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV

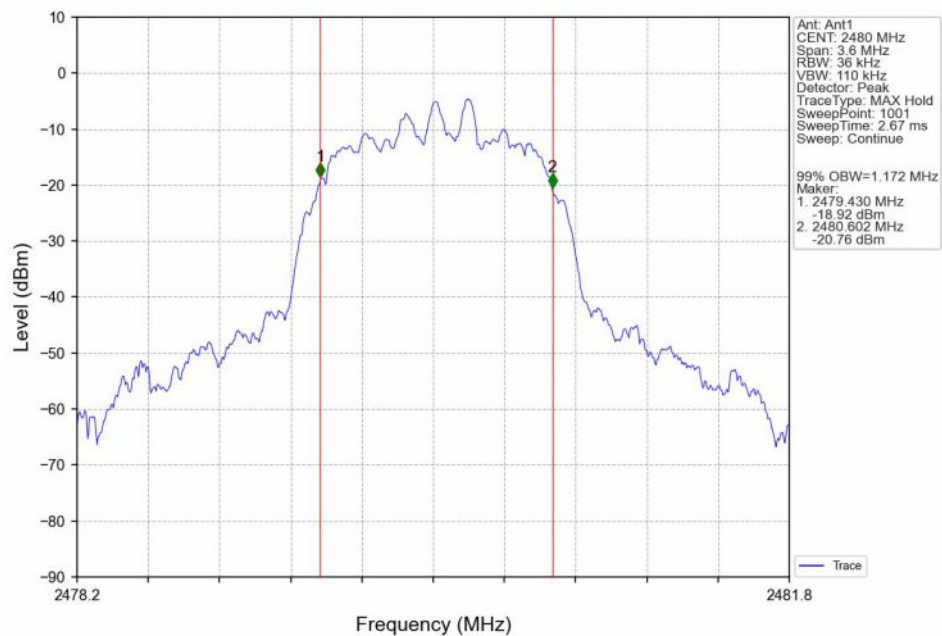


FCC ID: 2BRWN-SFX80

Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV

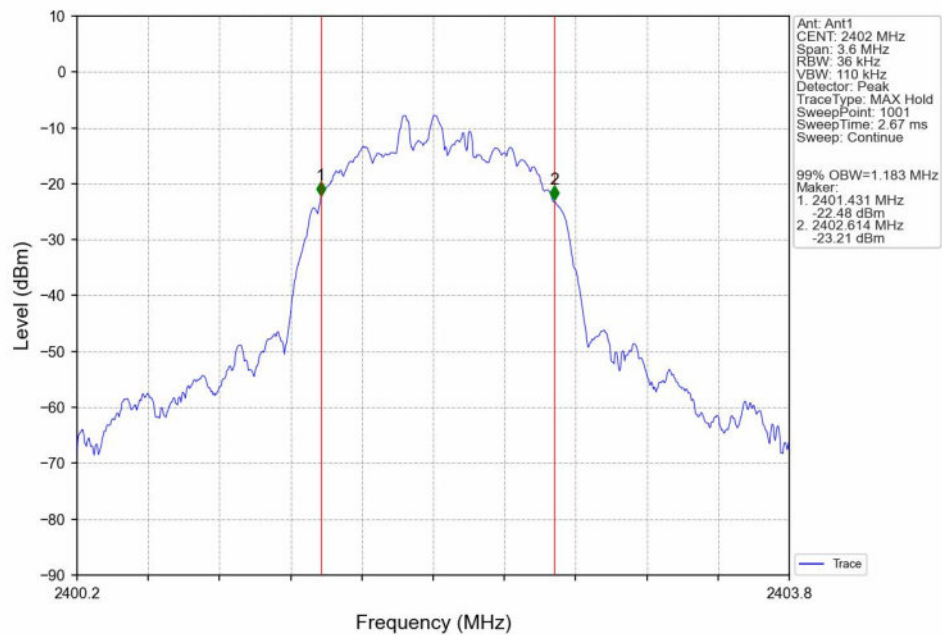


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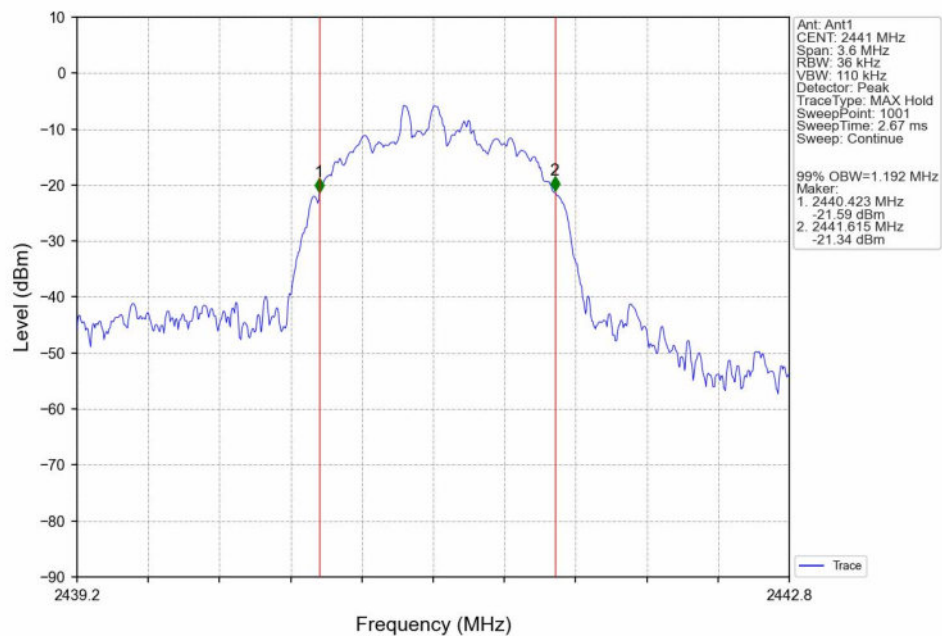


FCC ID: 2BRWN-SFX80

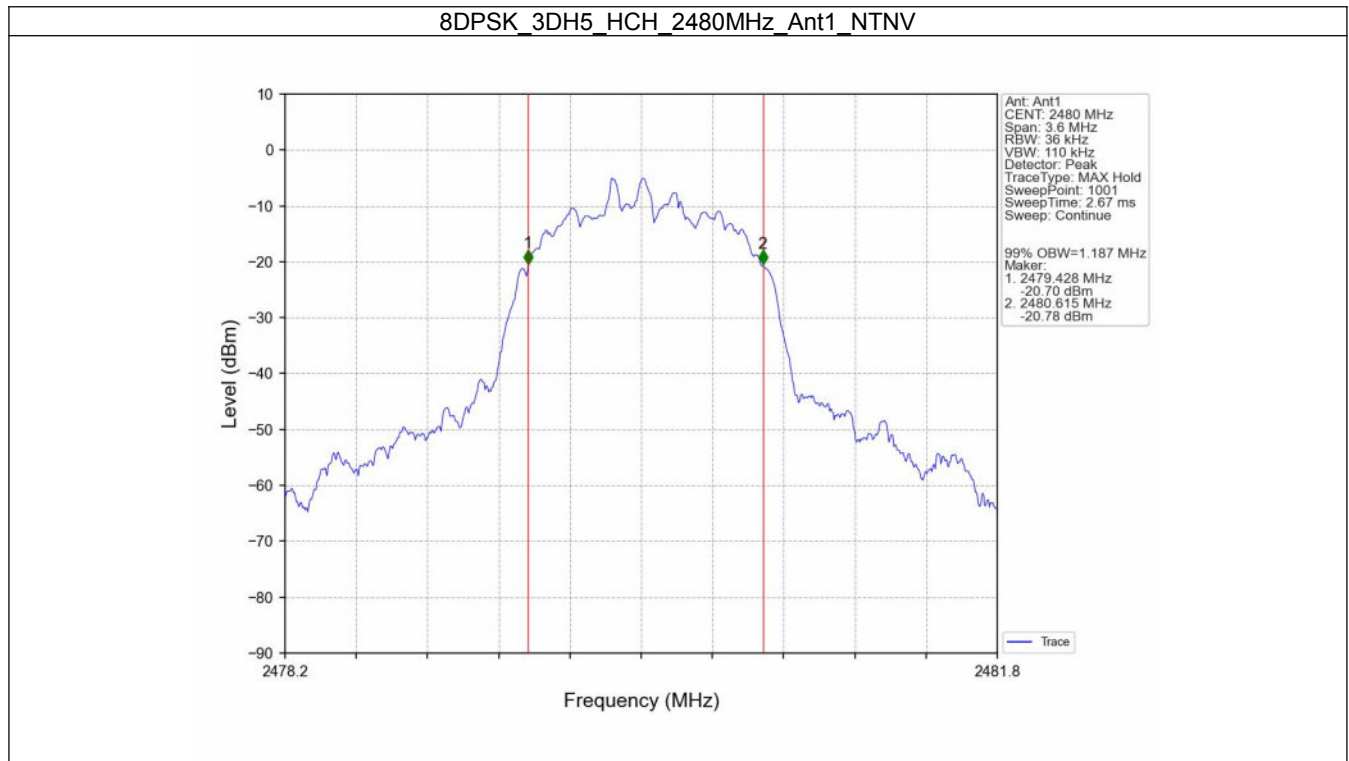
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV

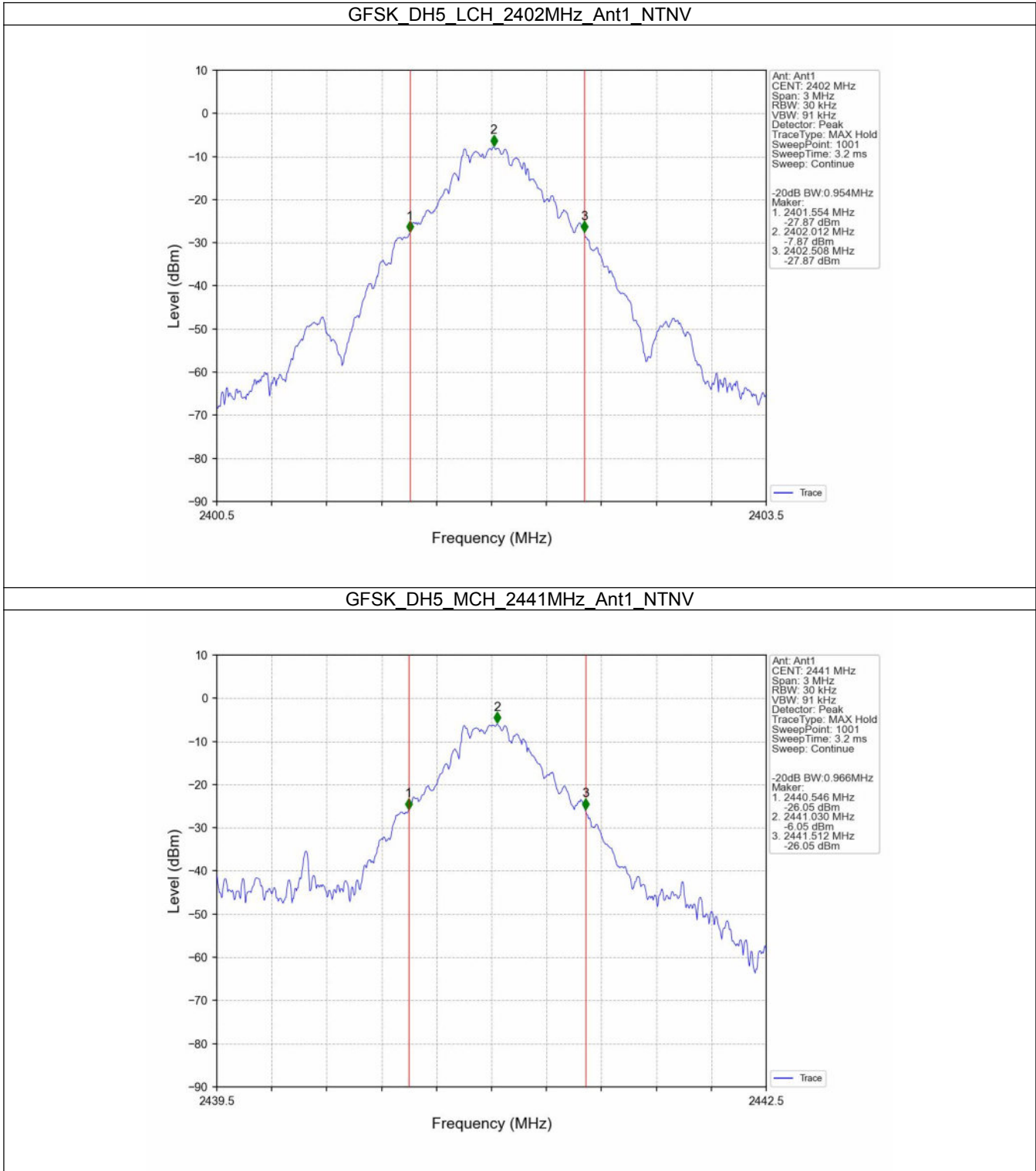


FCC ID: 2BRWN-SFX80



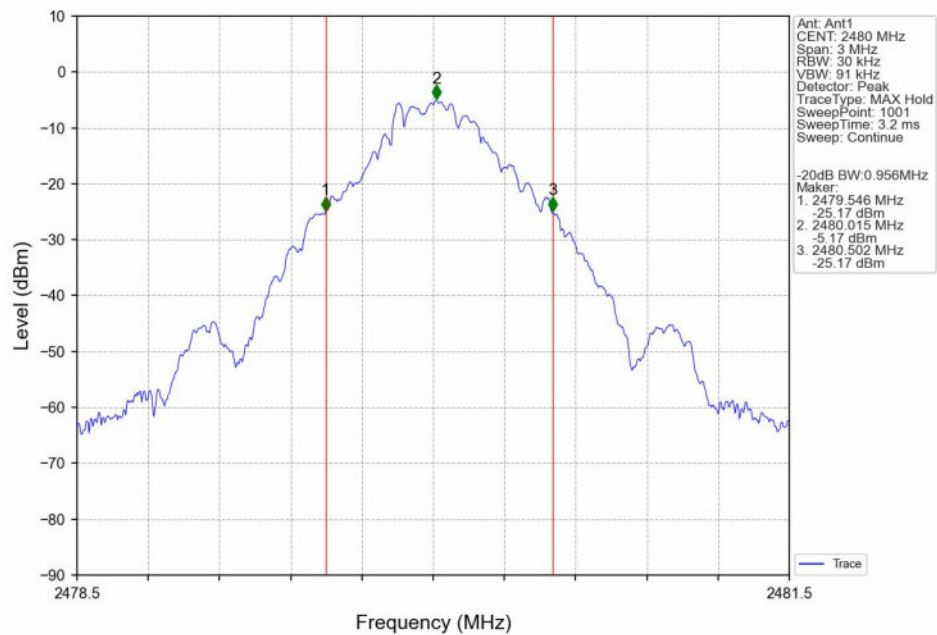
FCC ID: 2BRWN-SFX80

1.2.2 20dB BW

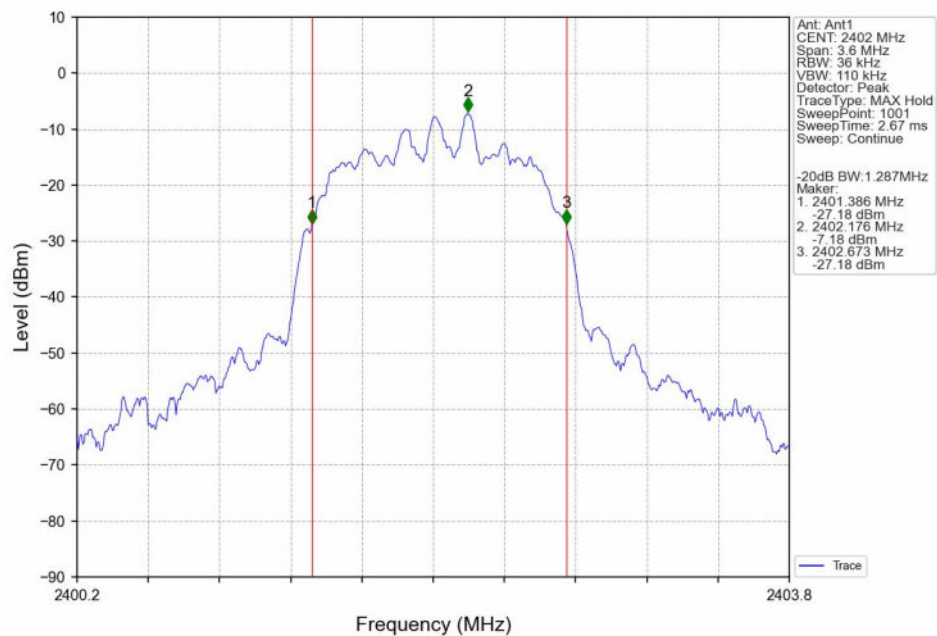


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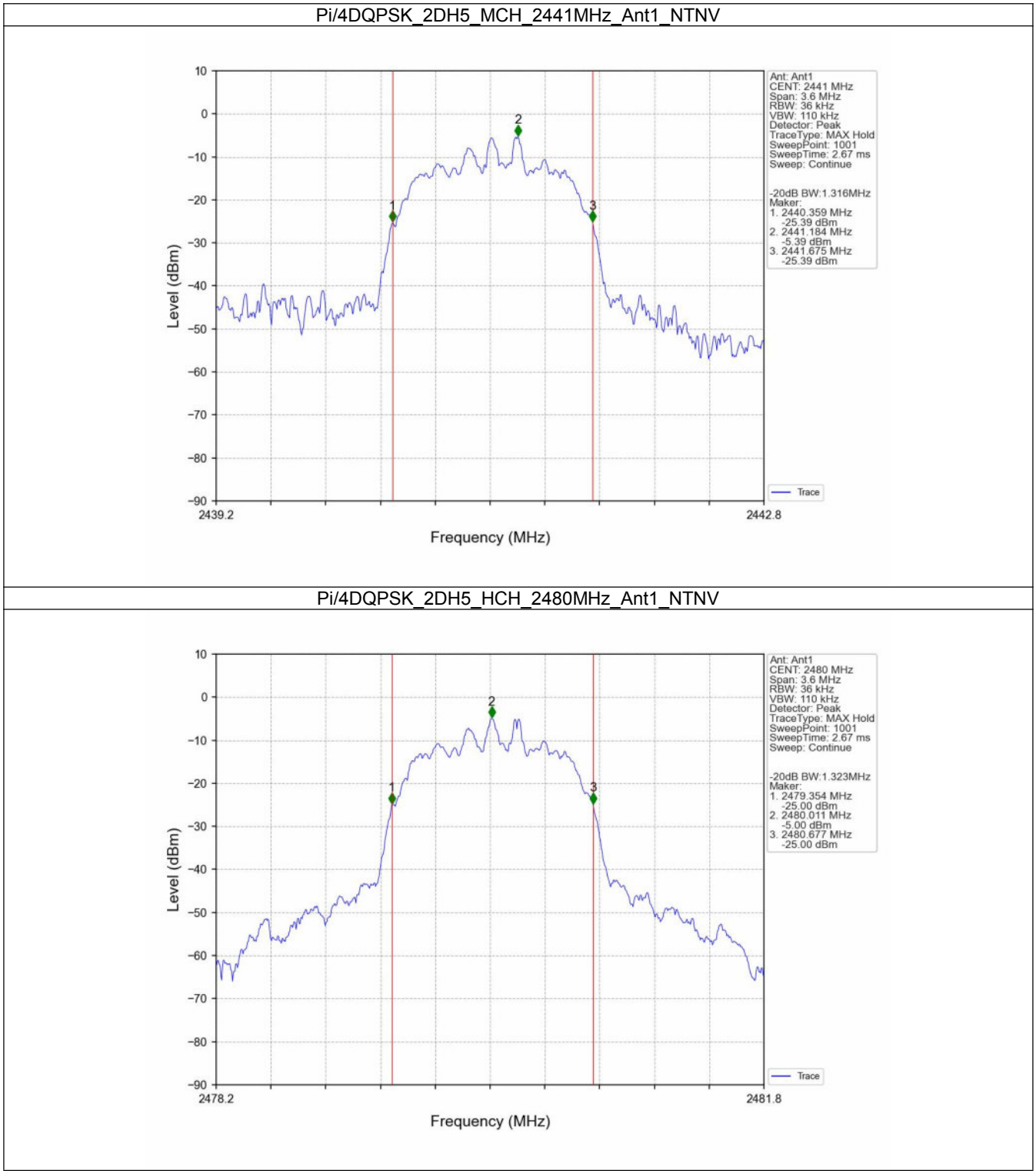
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Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV

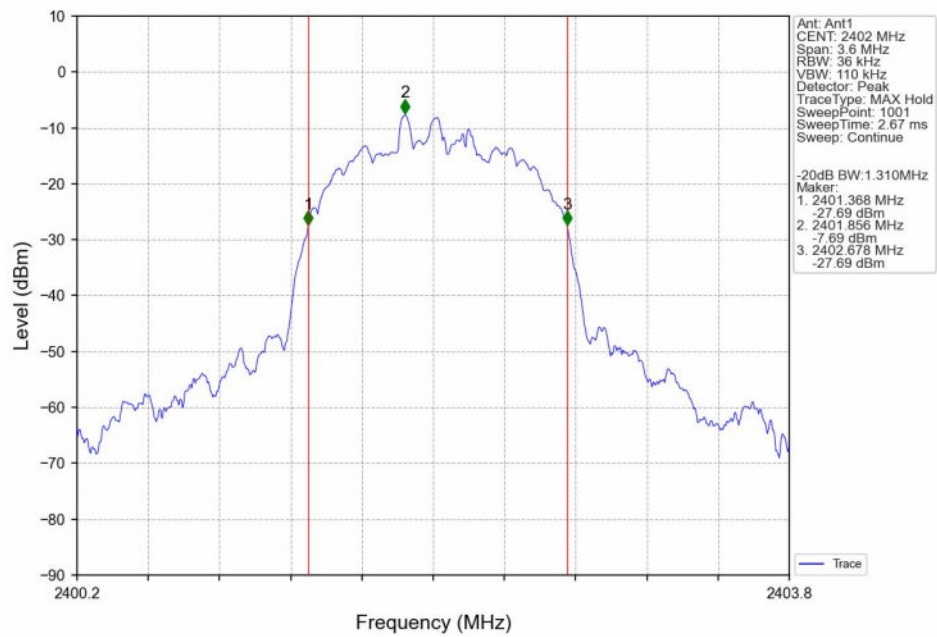


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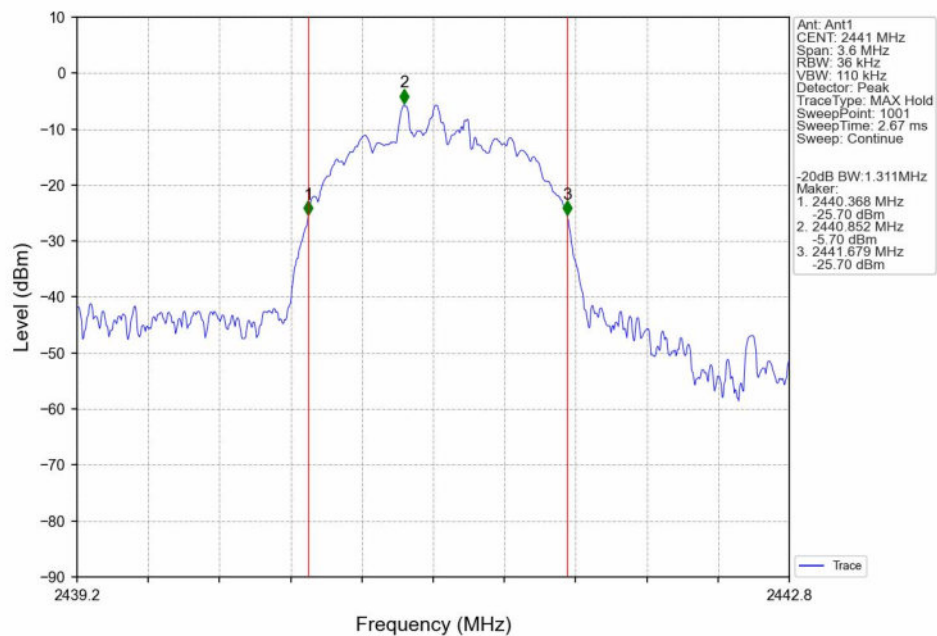


FCC ID: 2BRWN-SFX80

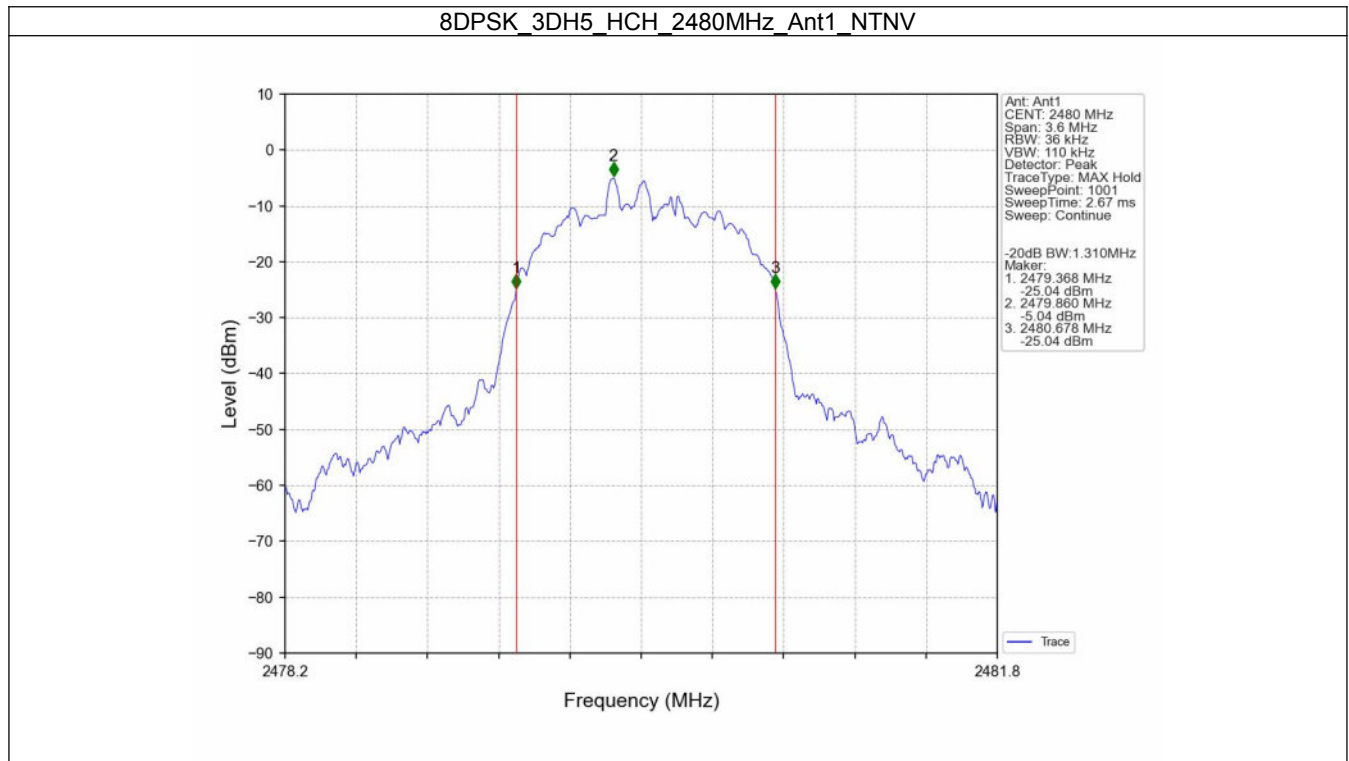
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



FCC ID: 2BRWN-SFX80



FCC ID: 2BRWN-SFX80

2. Maximum Conducted Output Power

2.1 Test Result

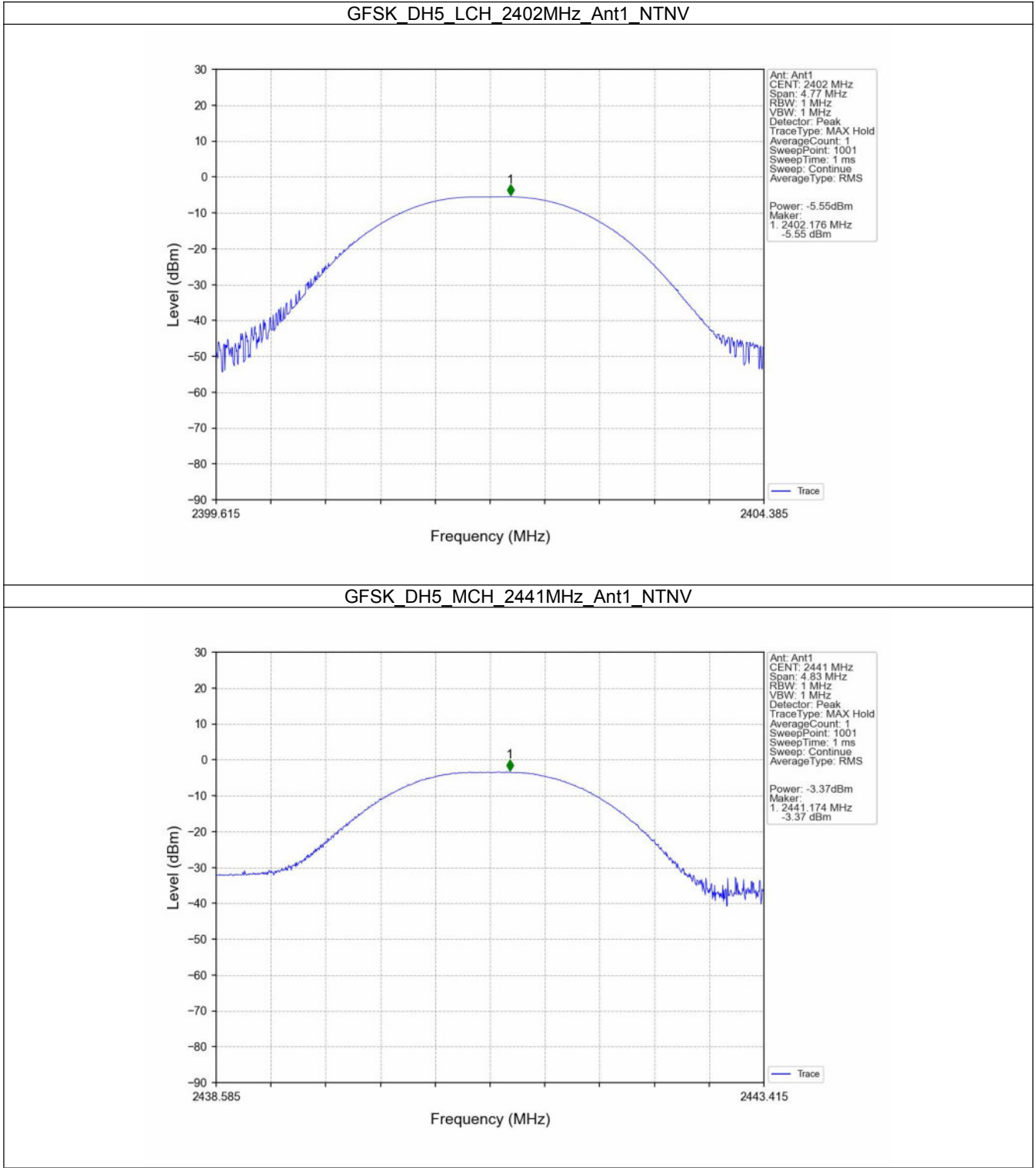
2.1.1 Power

Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	-5.55	<=30	Pass
		2441	DH5	-3.37	<=30	Pass
		2480	DH5	-2.89	<=30	Pass
Pi/4DQPSK	SISO	2402	2DH5	-4.73	<=20.97	Pass
		2441	2DH5	-2.68	<=20.97	Pass
		2480	2DH5	-2.09	<=20.97	Pass
8DPSK	SISO	2402	3DH5	-4.32	<=20.97	Pass
		2441	3DH5	-2.29	<=20.97	Pass
		2480	3DH5	-1.63	<=20.97	Pass
Note1: Antenna Gain: Ant1: 1.08dBi;						

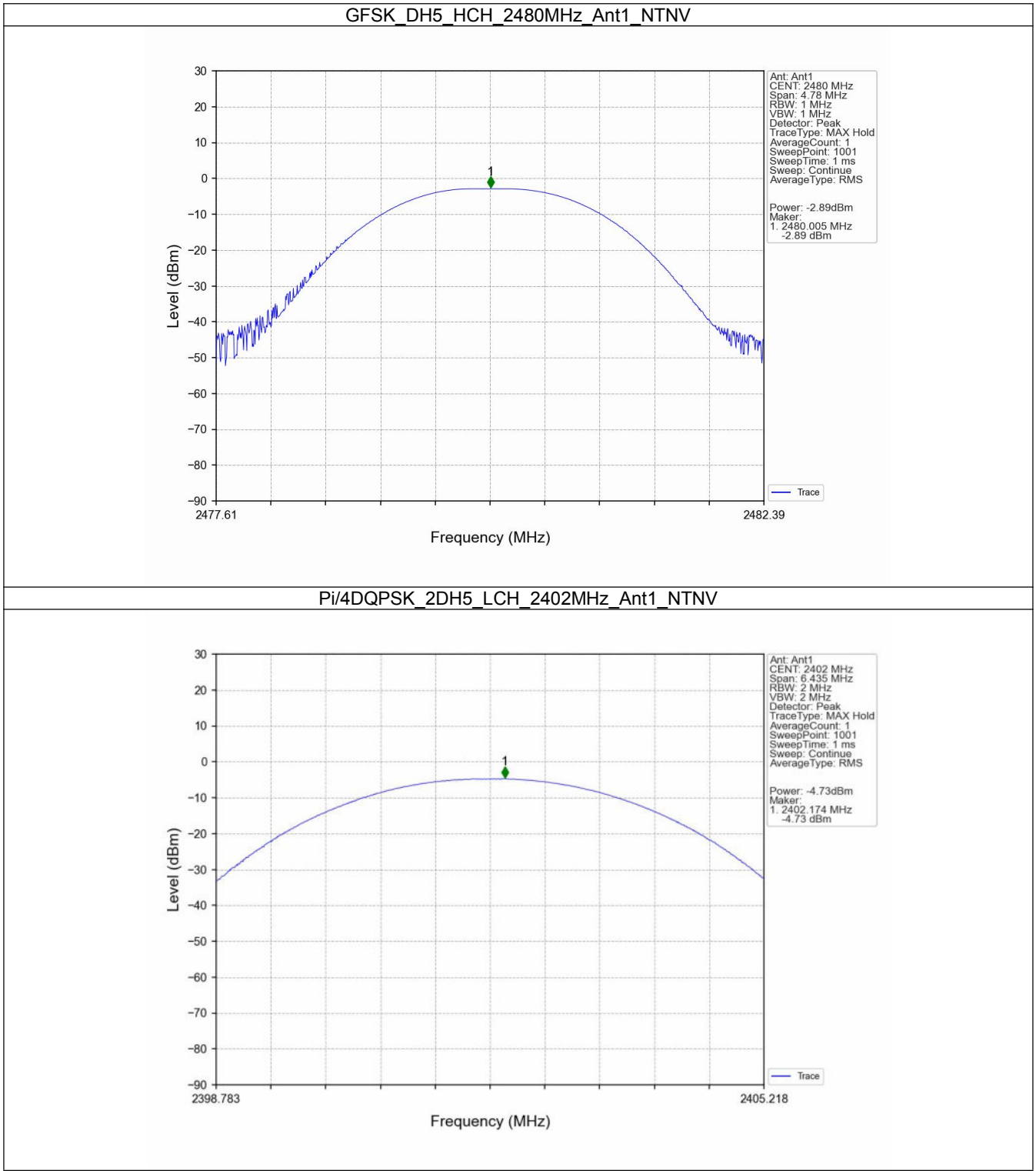
FCC ID: 2BRWN-SFX80

2.2 Test Graph

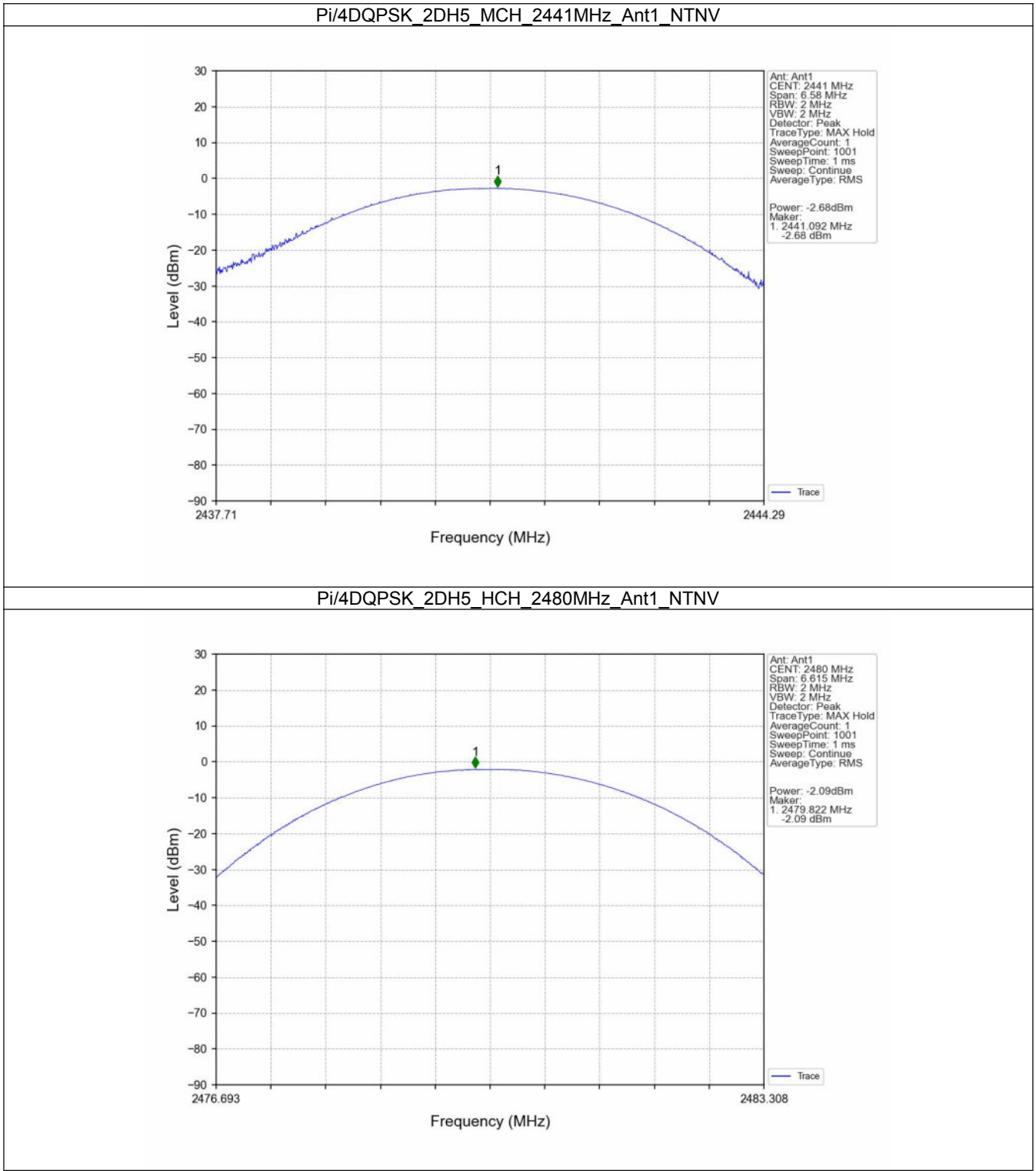
2.2.1 Power



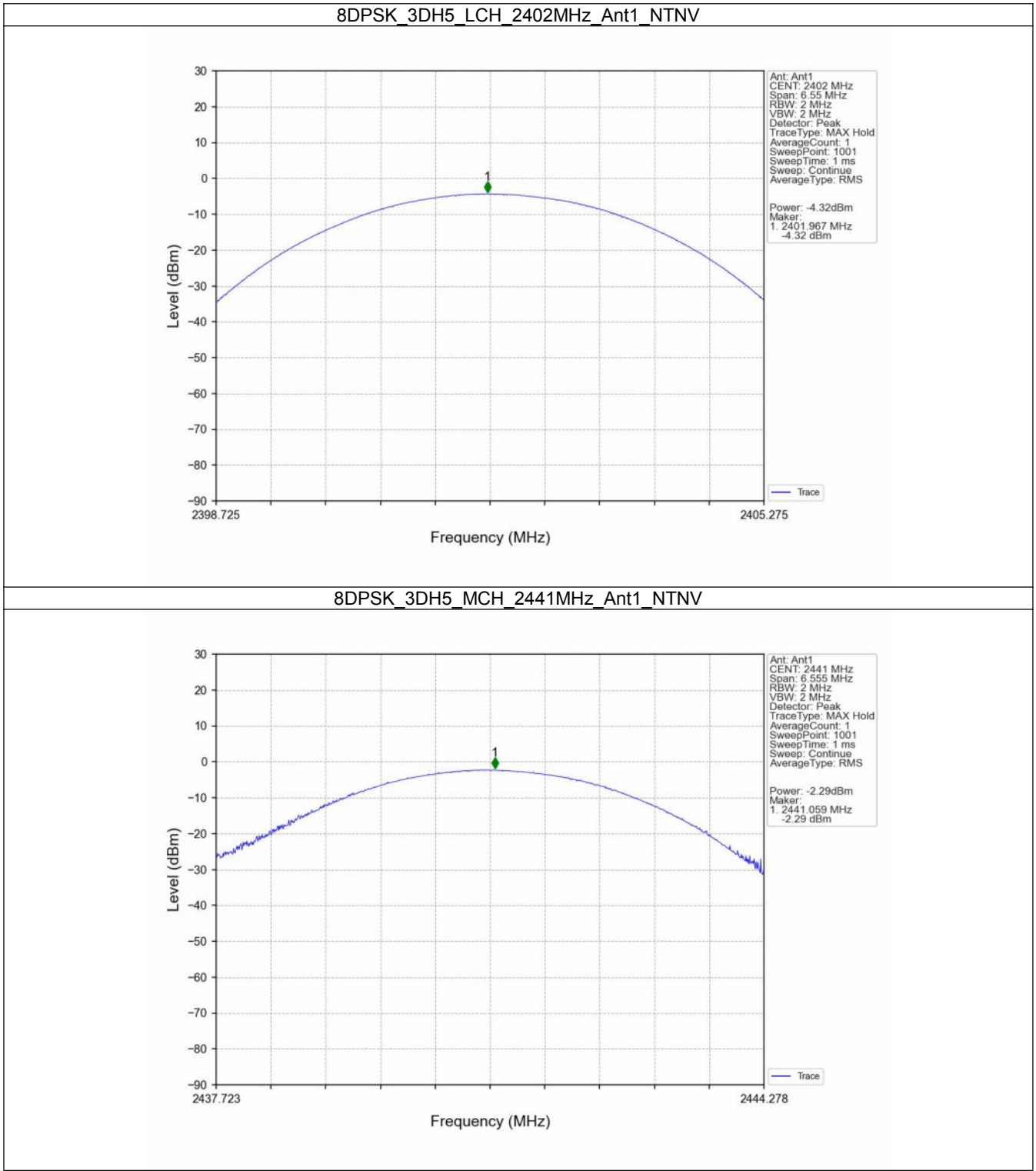
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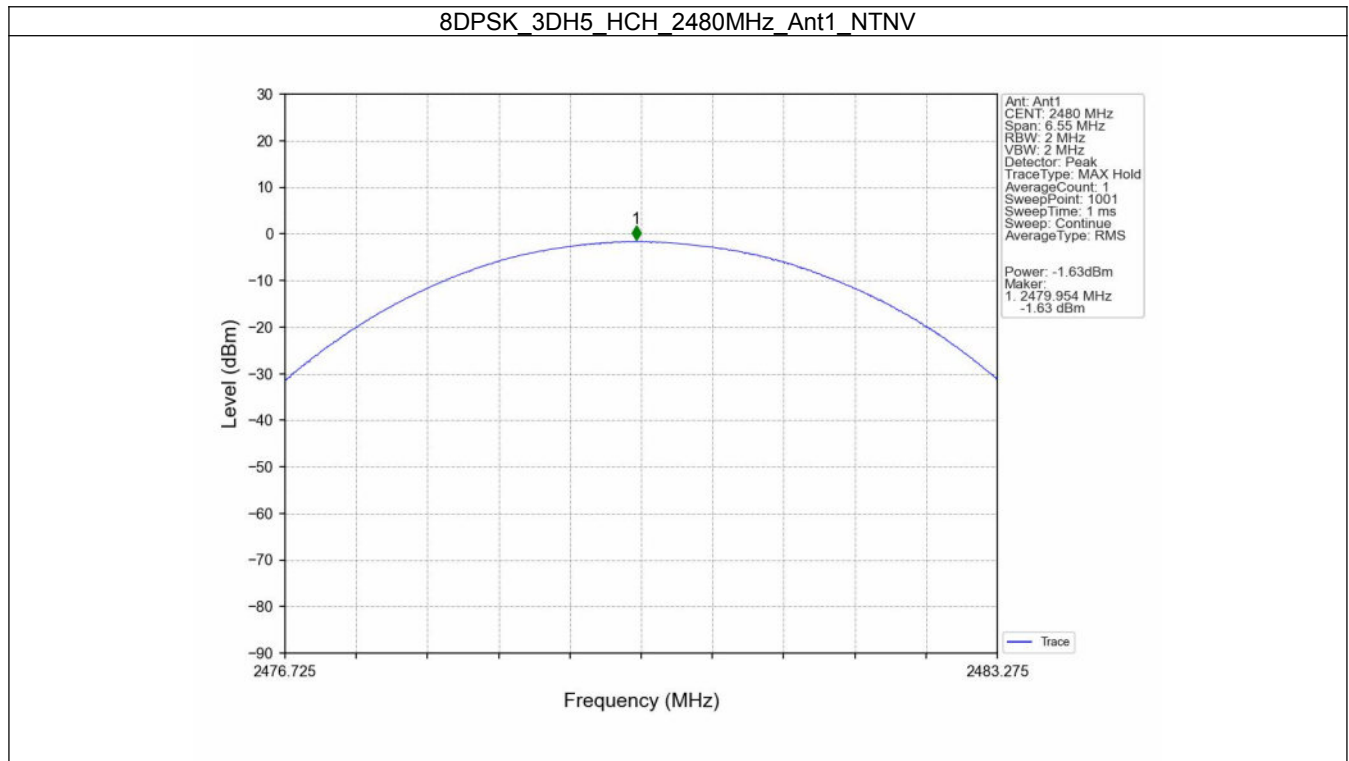
FCC ID: 2BRWN-SFX80



FCC ID: 2BRWN-SFX80



FCC ID: 2BRWN-SFX80



FCC ID: 2BRWN-SFX80

3. Carrier Frequency Separation

3.1 Test Result

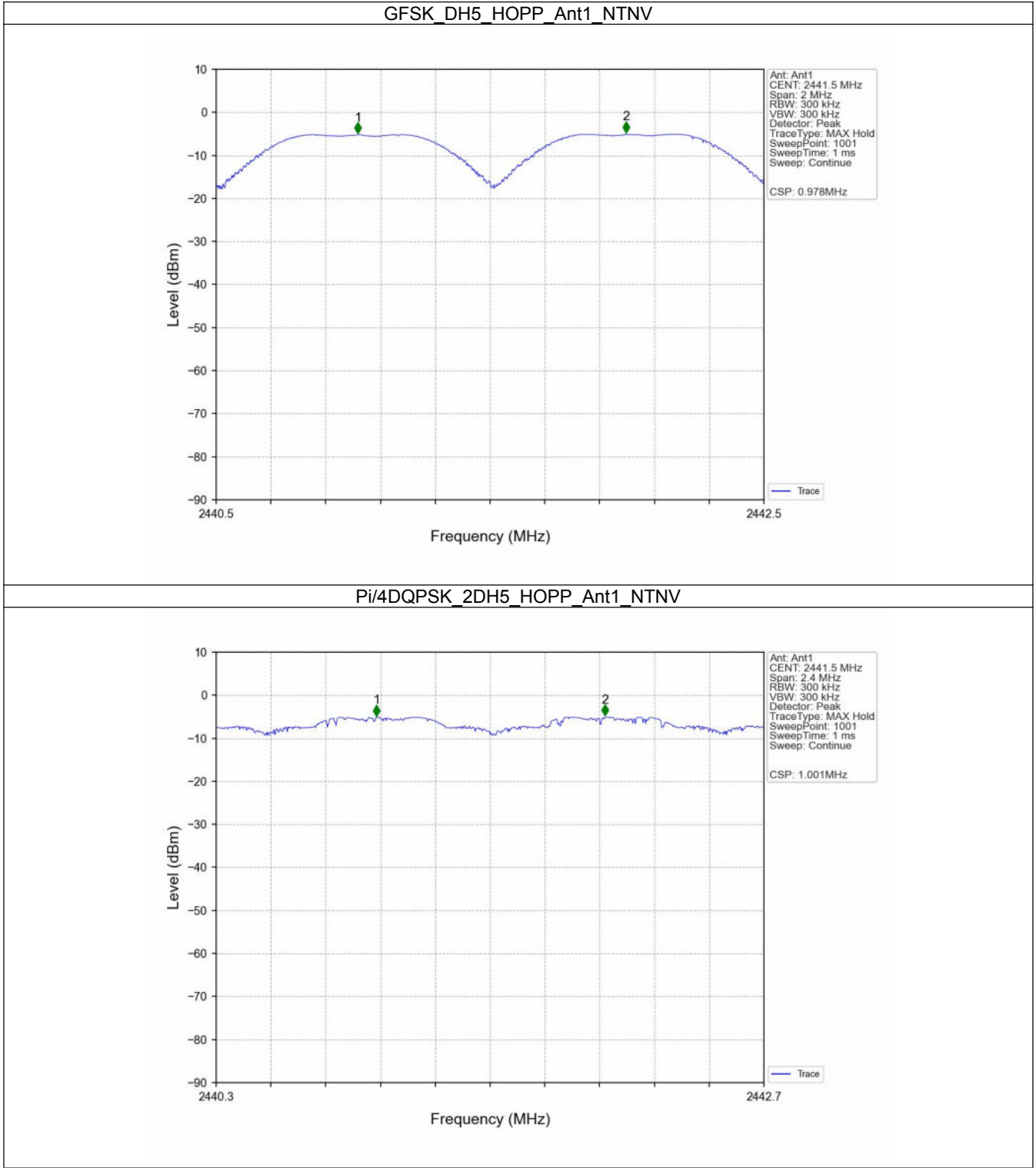
3.1.1 Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	0.978	1.005	≥ 0.67	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	1.001	1.313	≥ 0.875	Pass
8DPSK	SISO	HOPP	3DH5	1.001	1.311	≥ 0.874	Pass

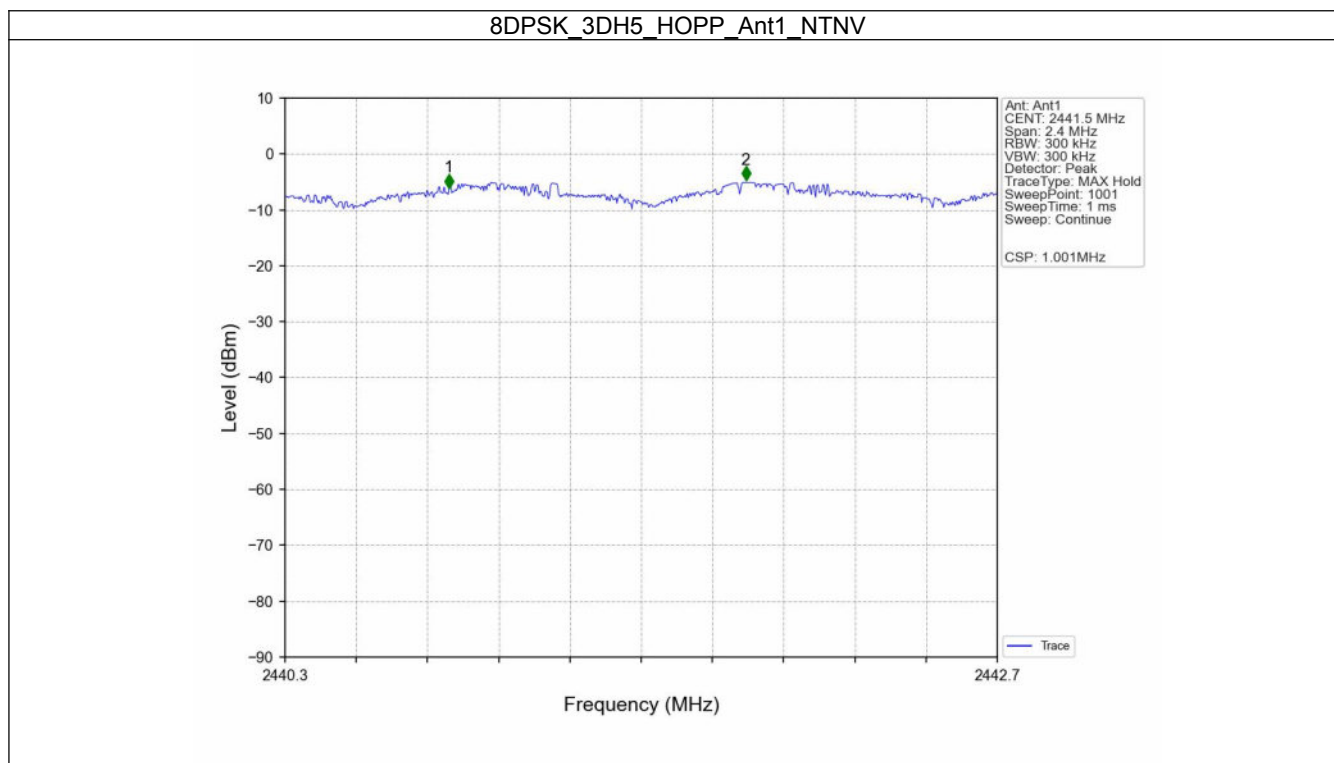
FCC ID: 2BRWN-SFX80

3.2 Test Graph

3.2.1 Ant1



FCC ID: 2BRWN-SFX80



FCC ID: 2BRWN-SFX80

4. Number of Hopping Frequencies

4.1 Test Result

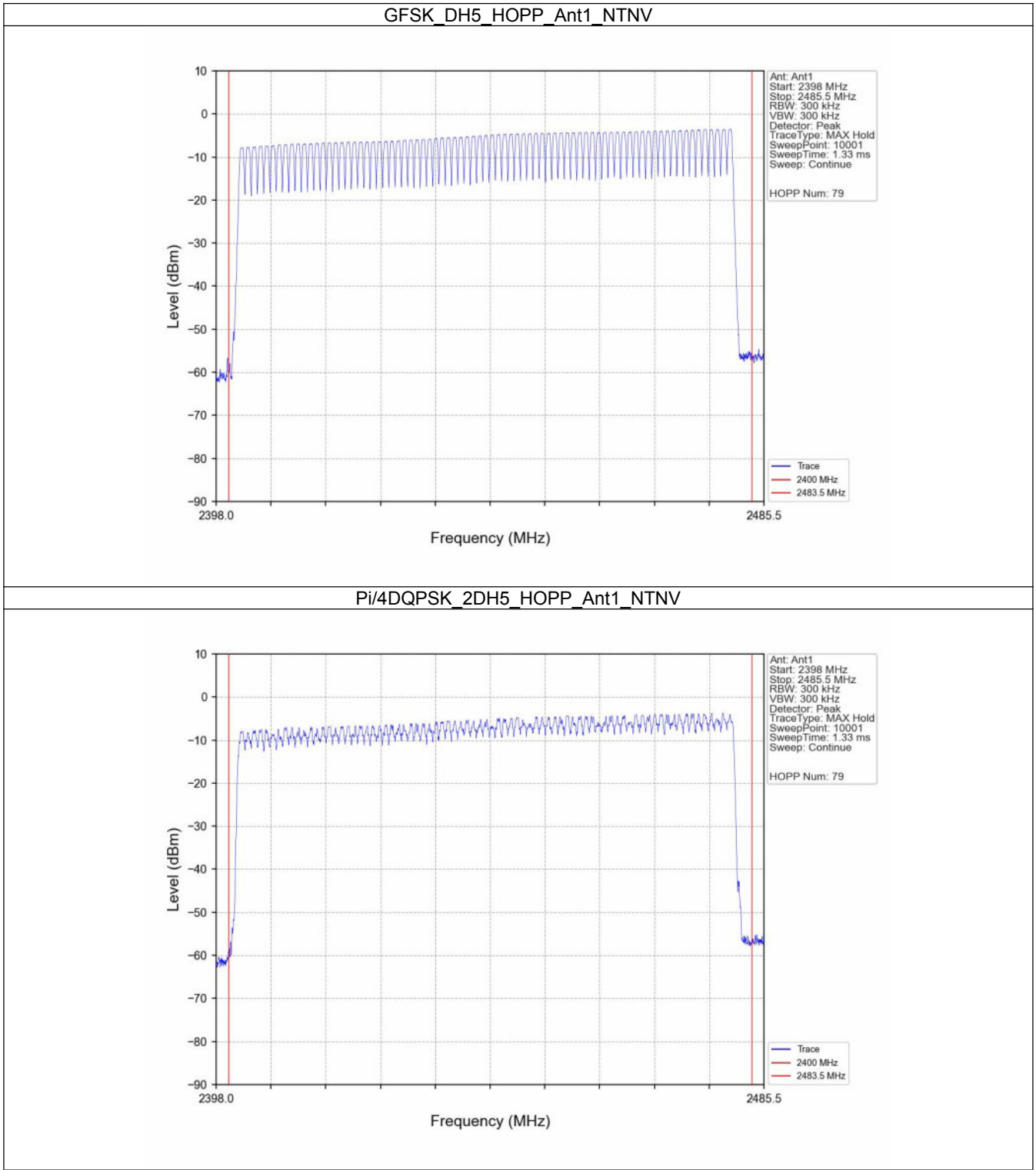
4.1.1 HoppNum

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

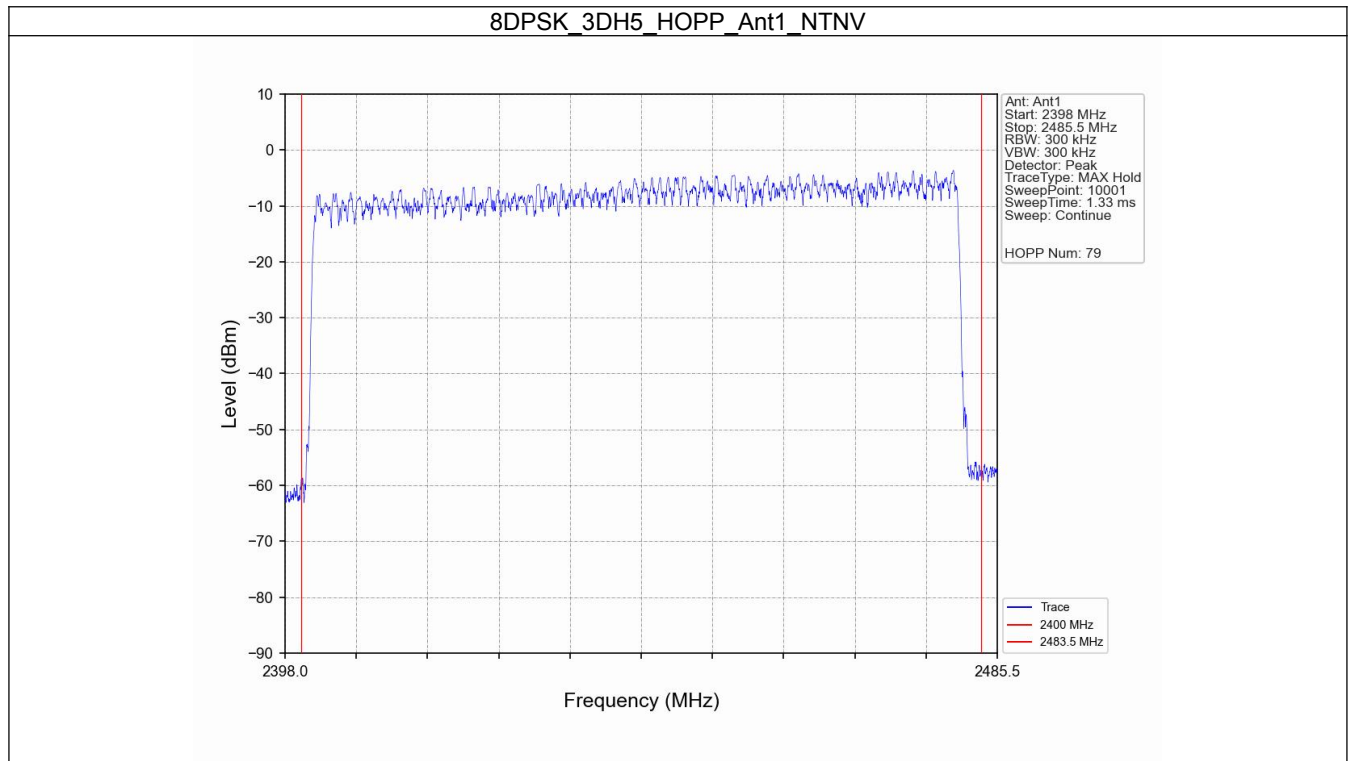
FCC ID: 2BRWN-SFX80

4.2 Test Graph

4.2.1 HoppNum



FCC ID: 2BRWN-SFX80



FCC ID: 2BRWN-SFX80

5. Time of Occupancy (Dwell Time)

5.1 Test Result

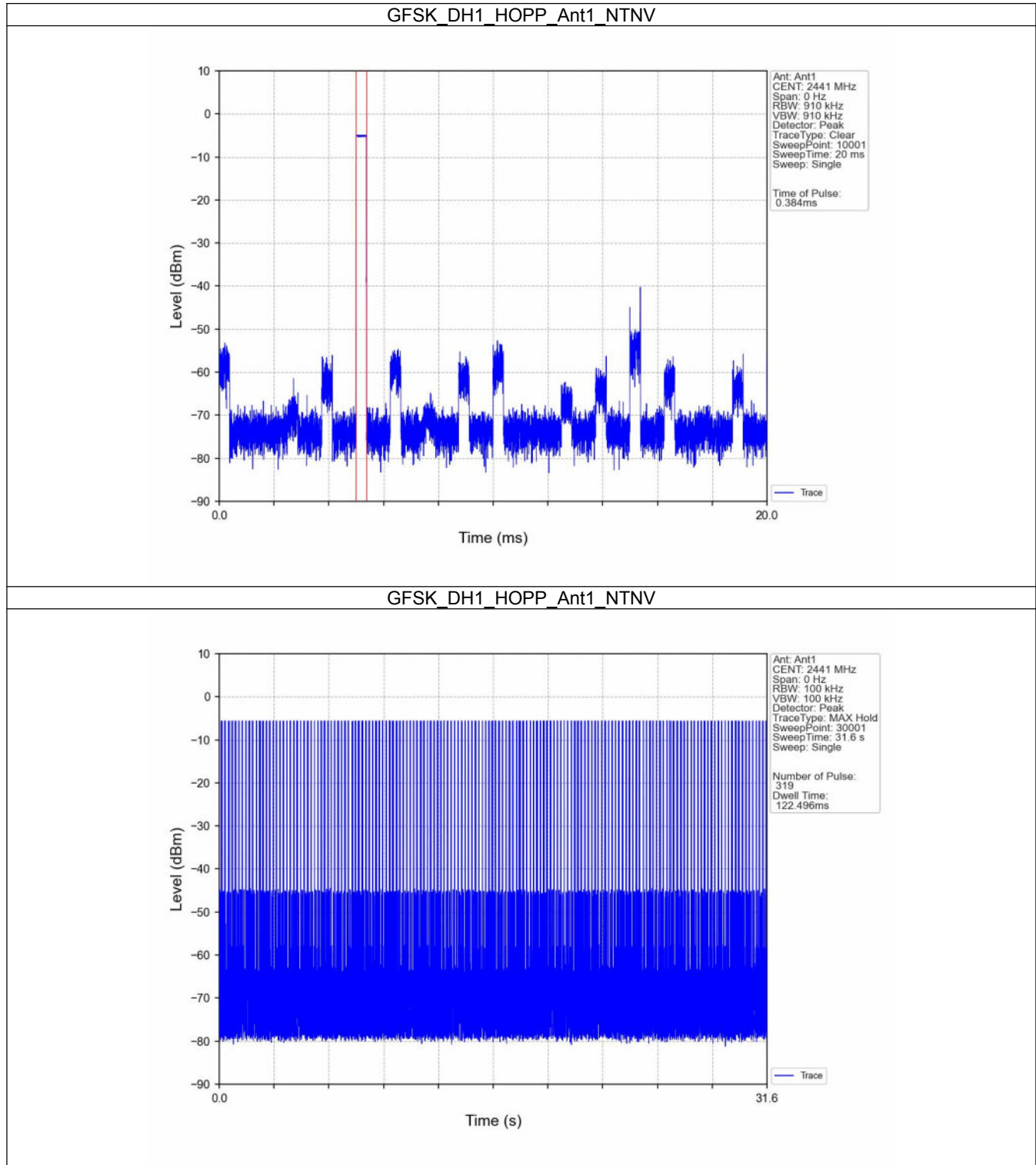
5.1.1 Ant1

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	0.384	31.600	319	122.496	<=400	Pass
			DH3	1.636	31.600	168	274.848	<=400	Pass
			DH5	2.890	31.600	106	306.340	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.390	31.600	318	124.020	<=400	Pass
			2DH3	1.648	31.600	154	253.792	<=400	Pass
			2DH5	2.896	31.600	106	306.976	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.396	31.600	320	126.720	<=400	Pass
			3DH3	1.648	31.600	154	253.792	<=400	Pass
			3DH5	2.896	31.600	101	292.496	<=400	Pass

FCC ID: 2BRWN-SFX80

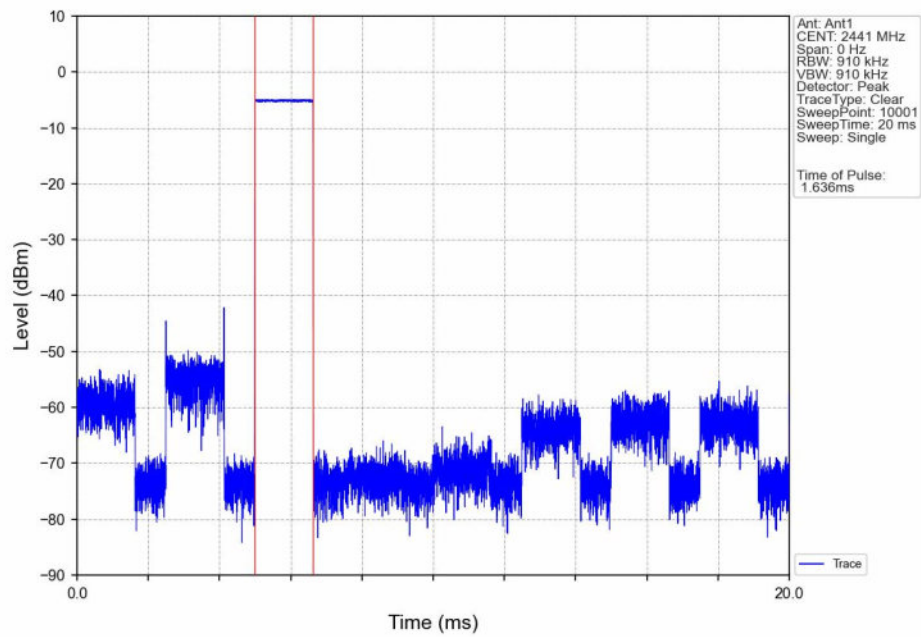
5.2 Test Graph

5.2.1 Ant1

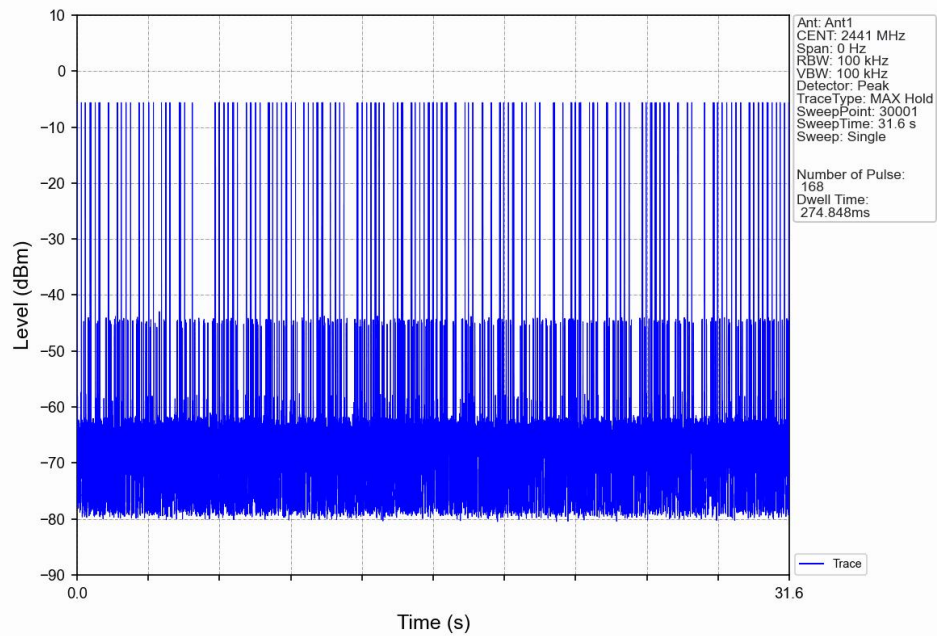


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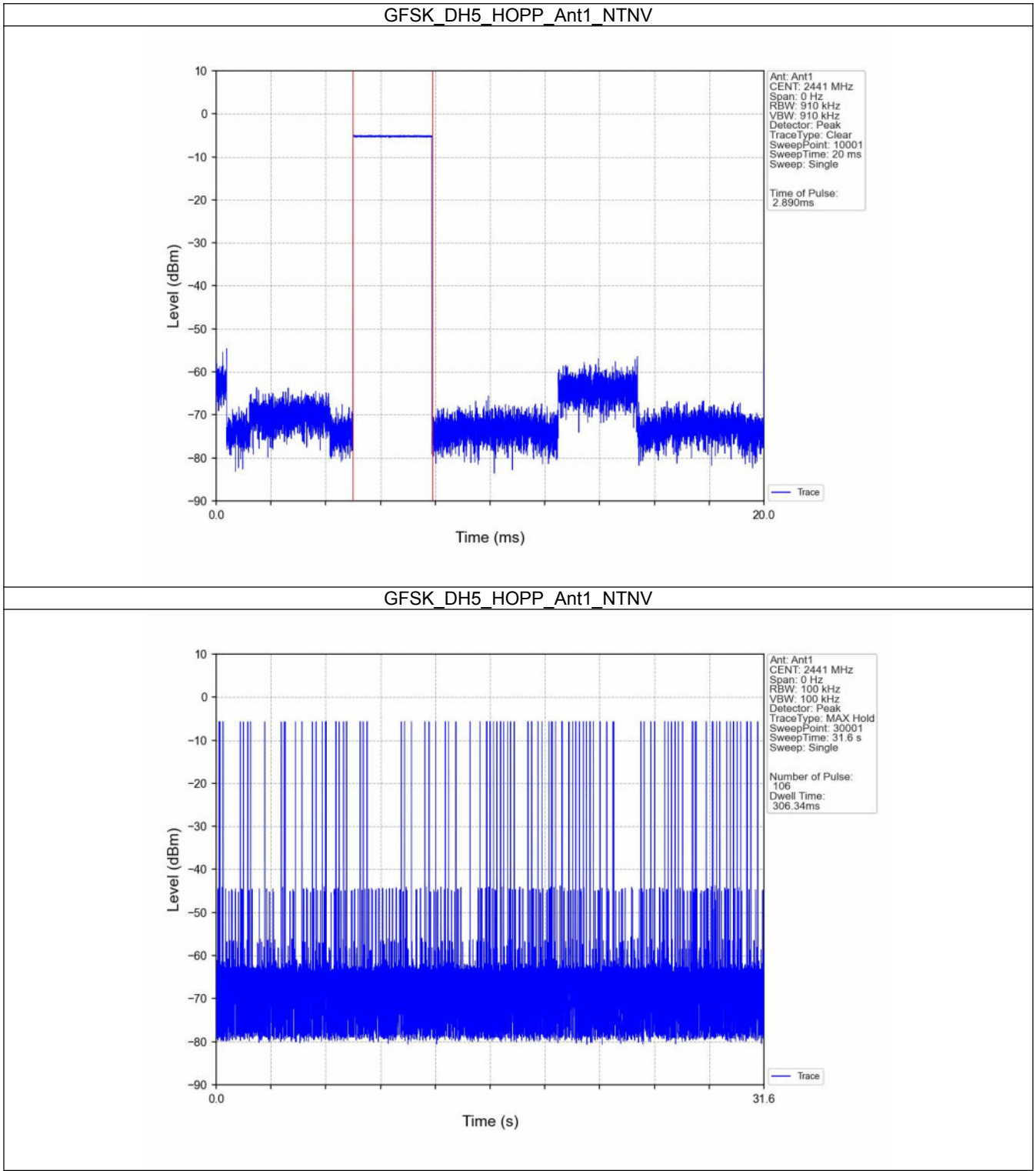
GFSK_DH3_HOPP_Ant1_NTNV



GFSK_DH3_HOPP_Ant1_NTNV

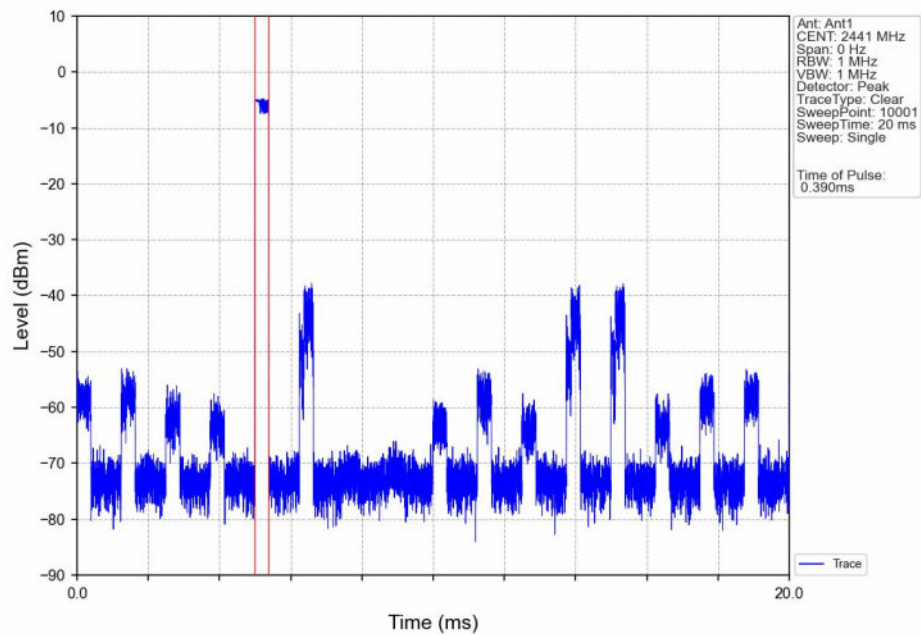


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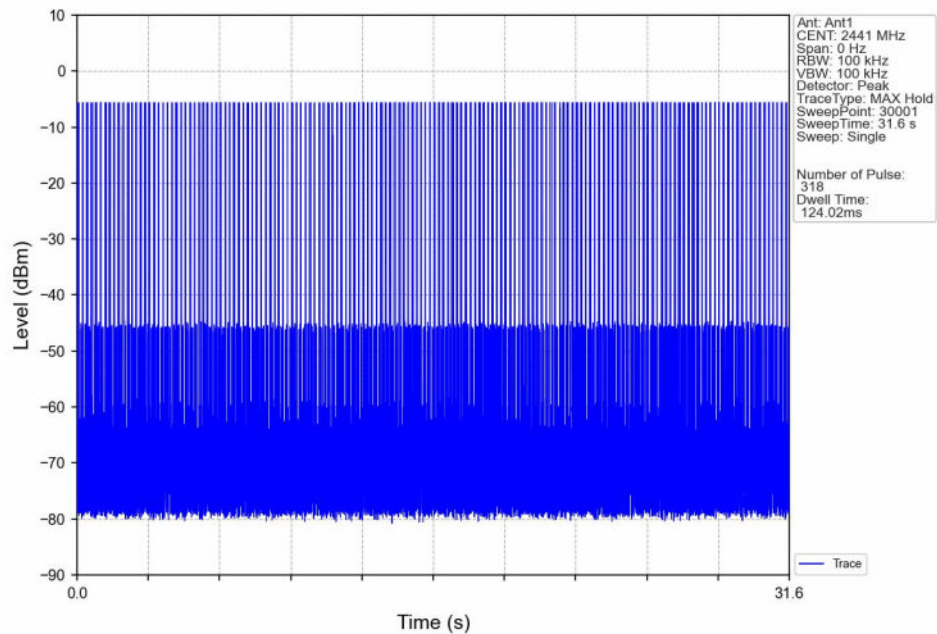


FCC ID: 2BRWN-SFX80

Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV

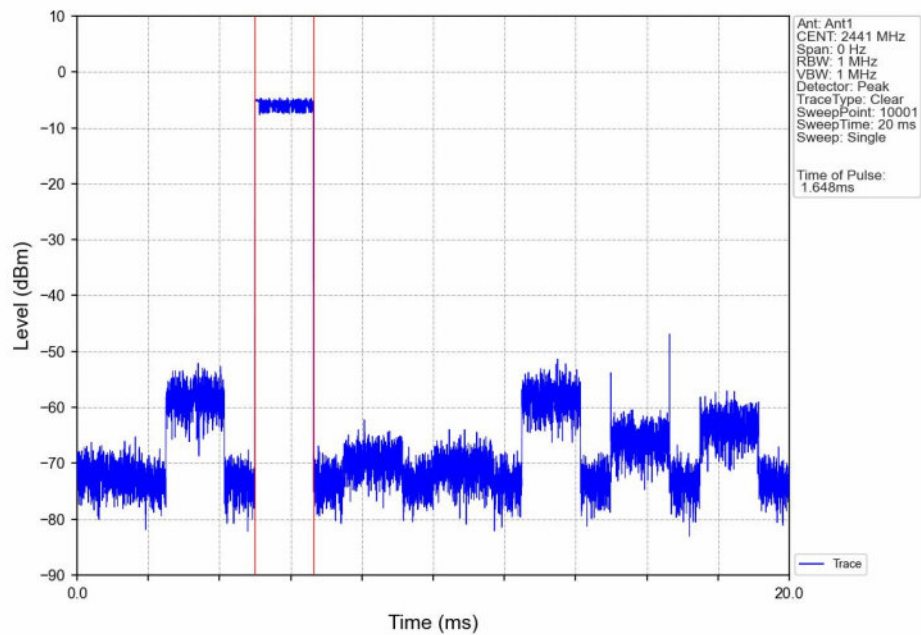


Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV

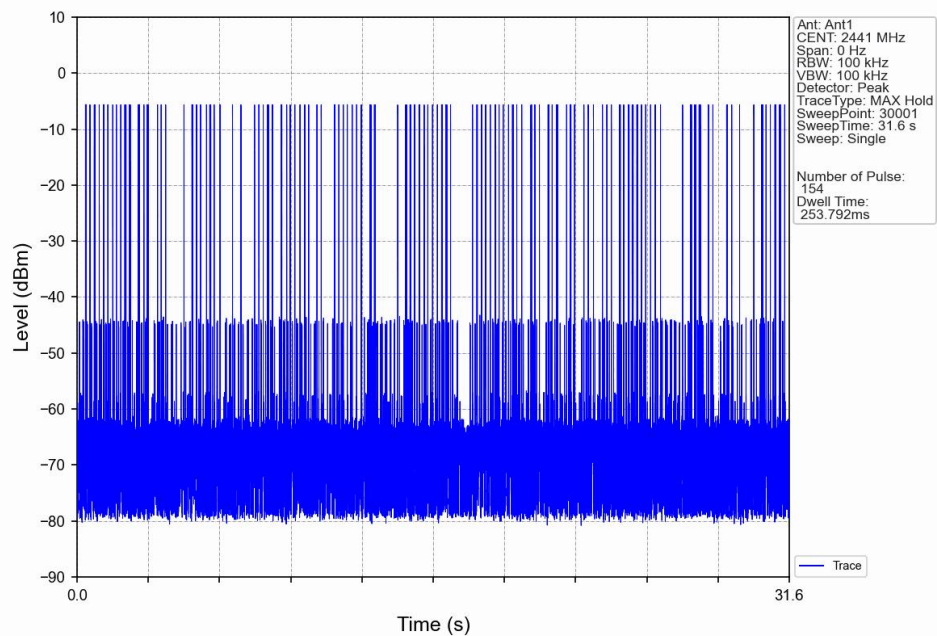


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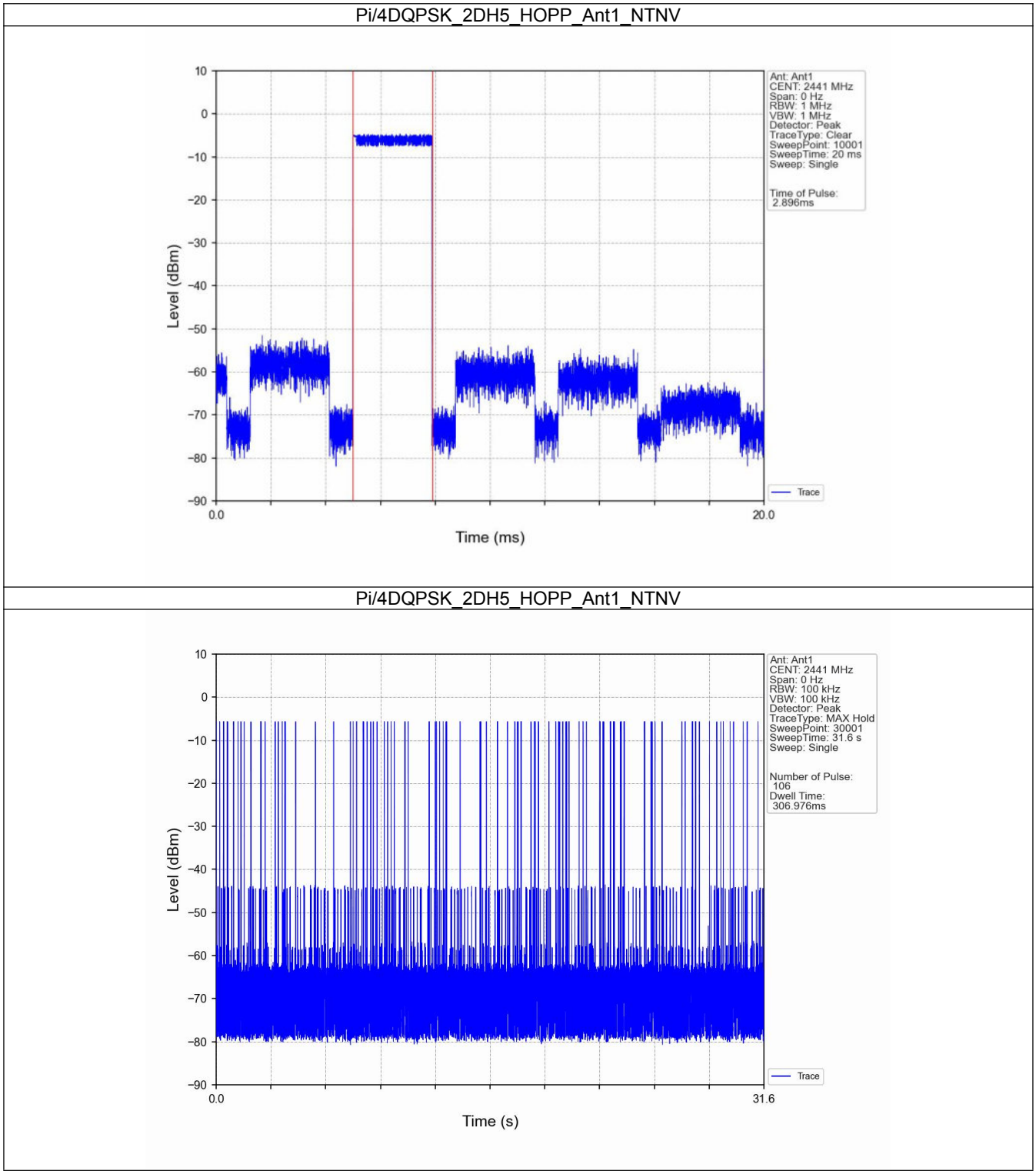
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Pi/4DQPSK_2DH3_HOPP_Ant1_NTNV

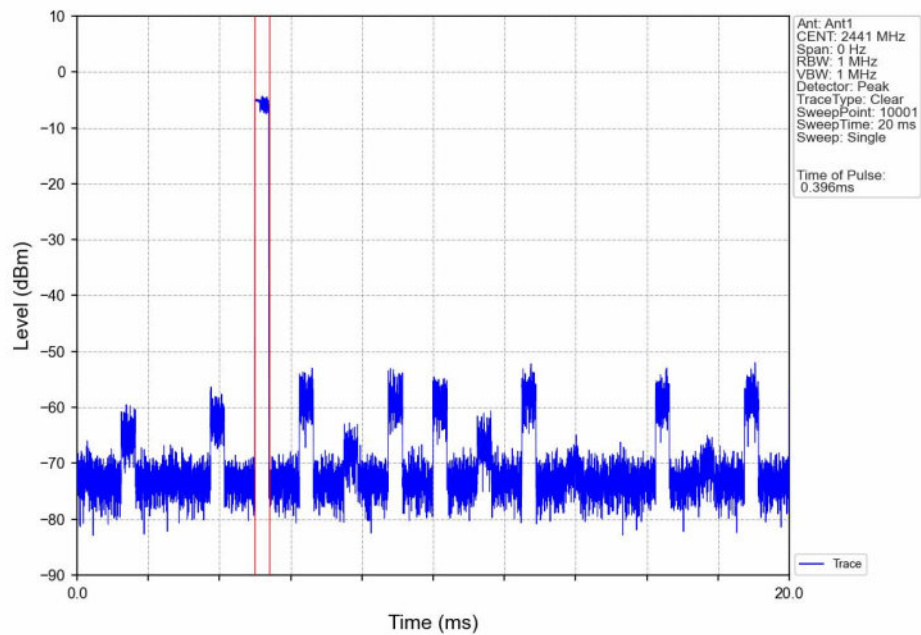


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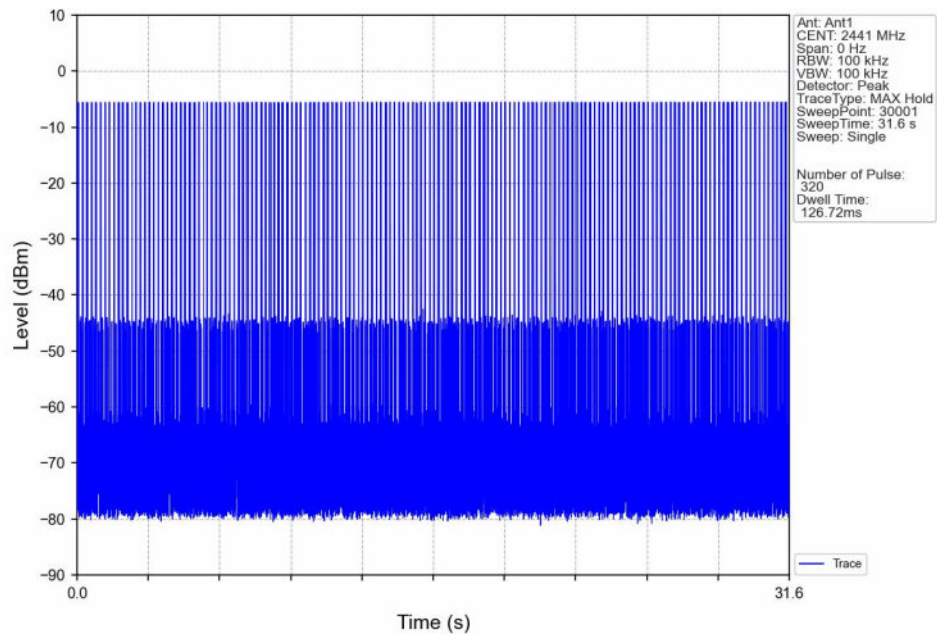


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8DPSK_3DH1_HOPP_Ant1_NTNV

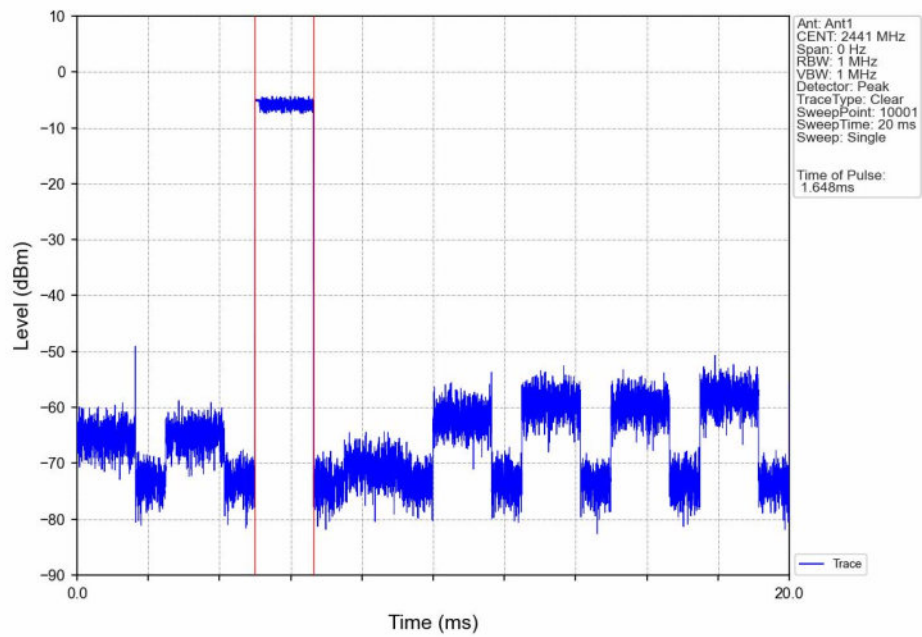


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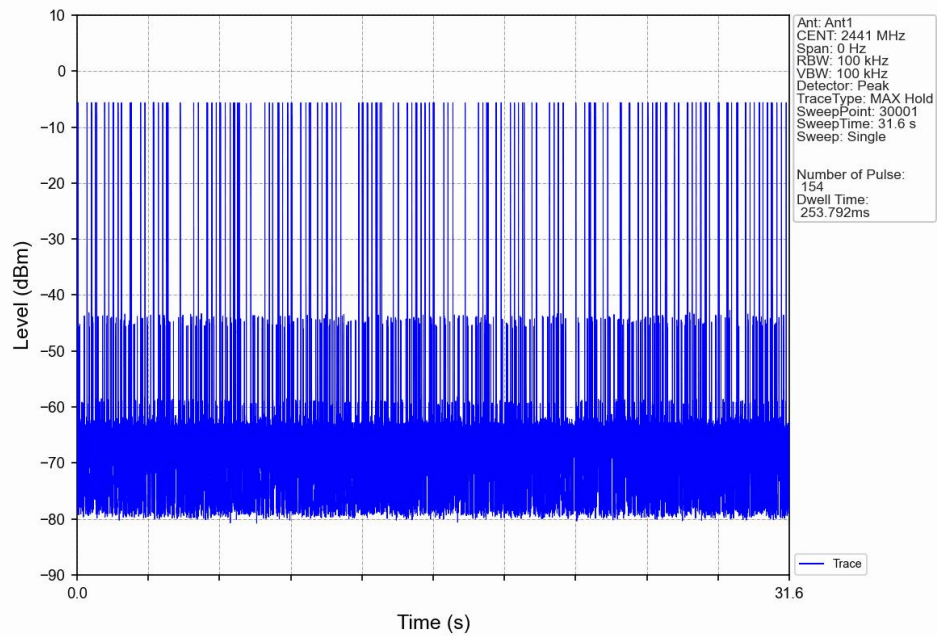


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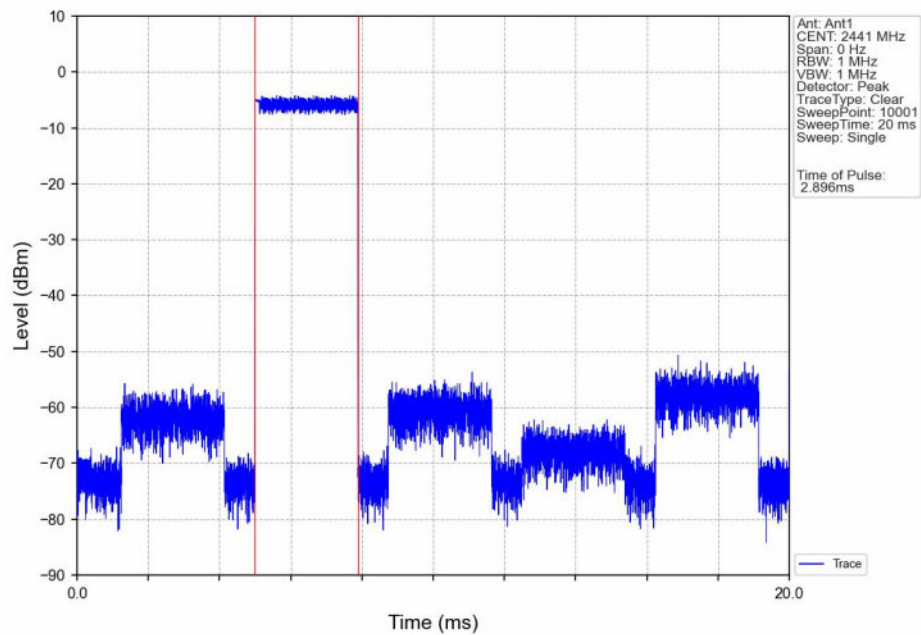


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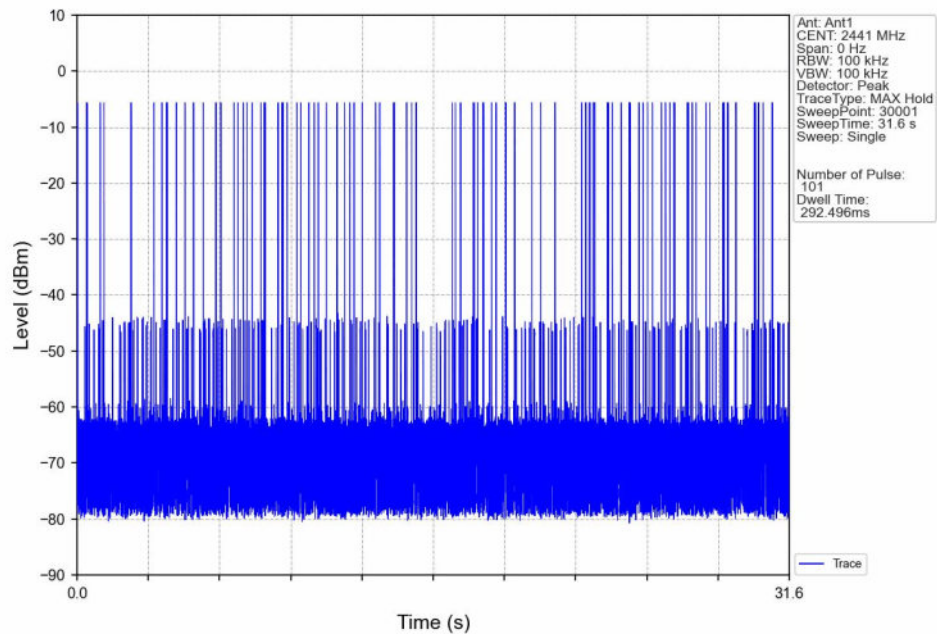


FCC ID: 2BRWN-SFX80

8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



FCC ID: 2BRWN-SFX80

6. Unwanted Emissions In Non-restricted Frequency Bands

6.1 Test Result

6.1.1 Ref

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	-8.06
		2441	DH5	1	-5.37
		2480	DH5	1	-4.18
Pi/4DQPSK	SISO	2402	2DH5	1	-7.99
		2441	2DH5	1	-5.28
		2480	2DH5	1	-4.02
8DPSK	SISO	2402	3DH5	1	-7.95
		2441	3DH5	1	-5.23
		2480	3DH5	1	-4.07

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.

6.1.2 CSE

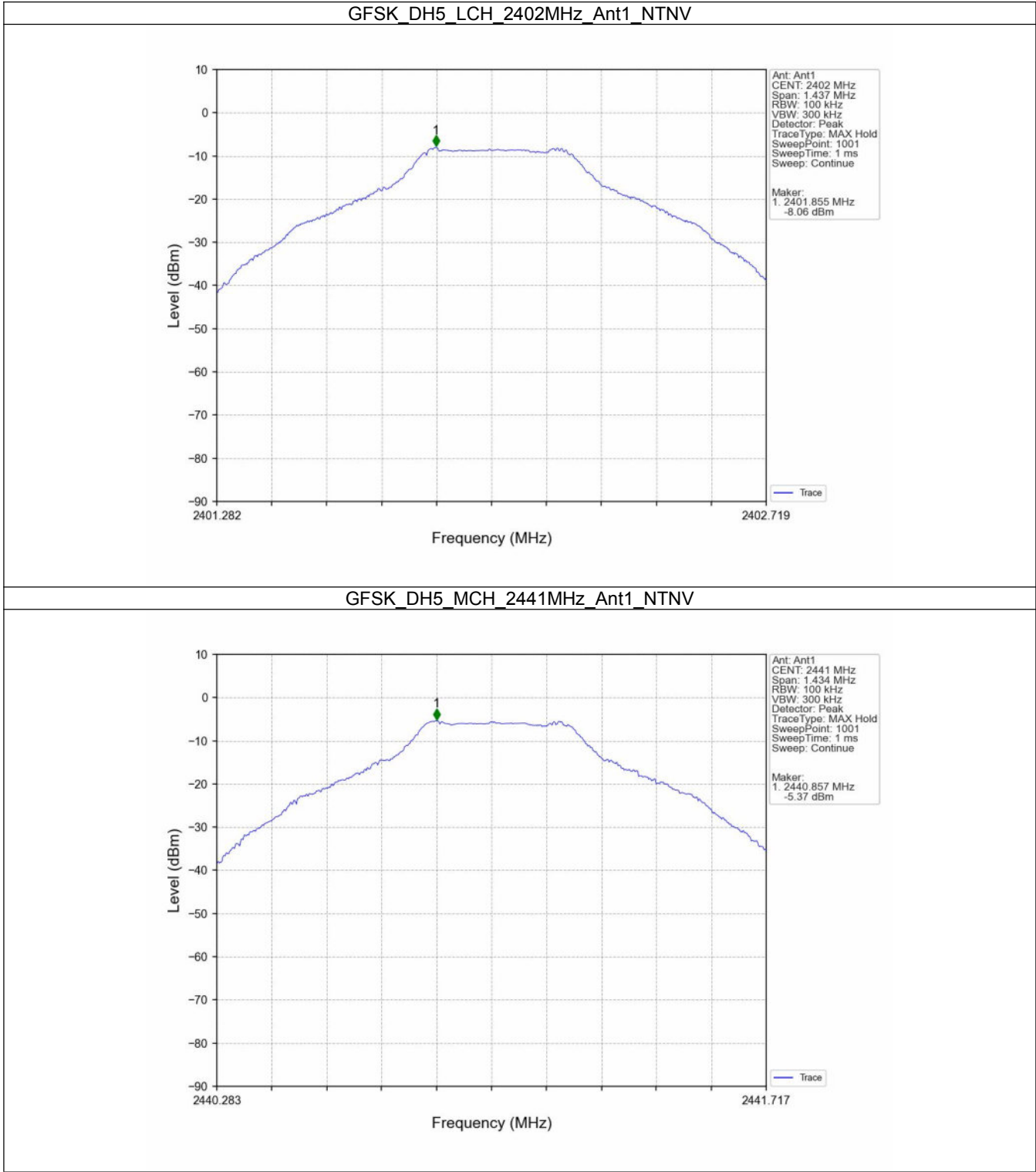
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	-4.18	-24.18	Pass
		2441	DH5	1	-4.18	-24.18	Pass
		2480	DH5	1	-4.18	-24.18	Pass
		HOPP	DH5	1	-4.18	-24.18	Pass
					-4.18	-24.18	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	-4.02	-24.02	Pass
		2441	2DH5	1	-4.02	-24.02	Pass
		2480	2DH5	1	-4.02	-24.02	Pass
		HOPP	2DH5	1	-4.02	-24.02	Pass
					-4.02	-24.02	Pass
8DPSK	SISO	2402	3DH5	1	-4.07	-24.07	Pass
		2441	3DH5	1	-4.07	-24.07	Pass
		2480	3DH5	1	-4.07	-24.07	Pass
		HOPP	3DH5	1	-4.07	-24.07	Pass
					-4.07	-24.07	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.

FCC ID: 2BRWN-SFX80

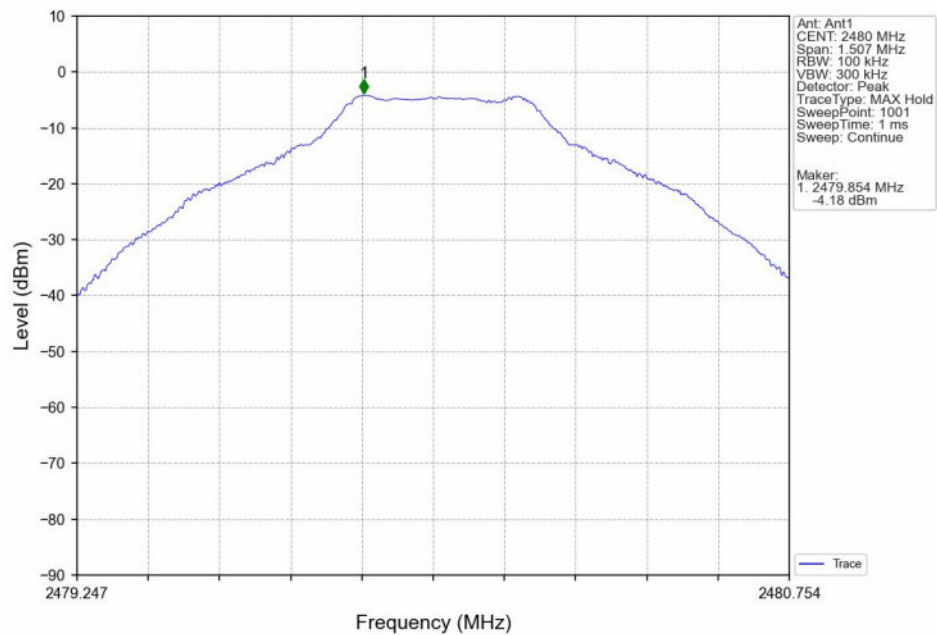
6.2 Test Graph

6.2.1 Ref

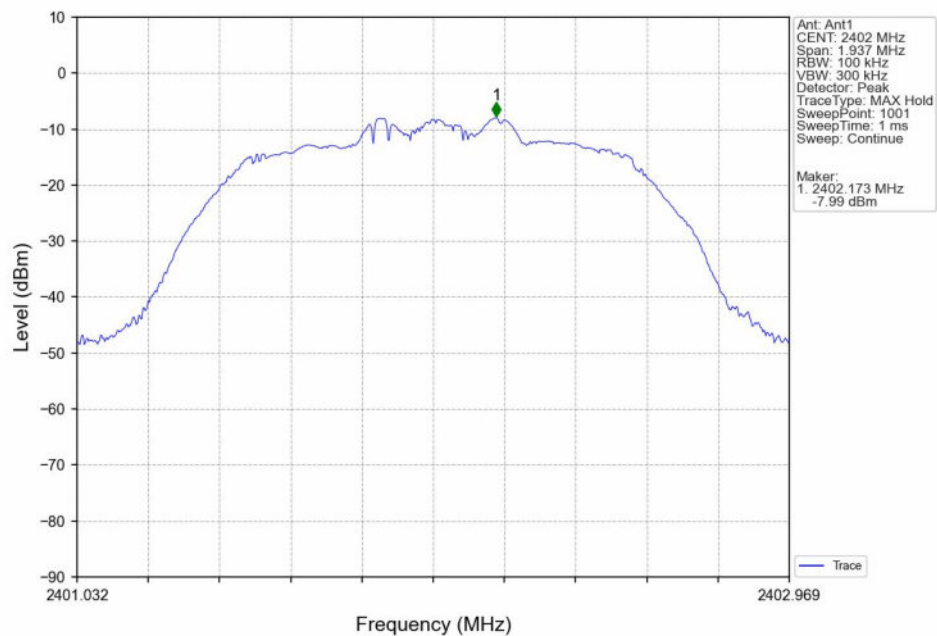


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GFSK_DH5_HCH_2480MHz_Ant1_NTNV

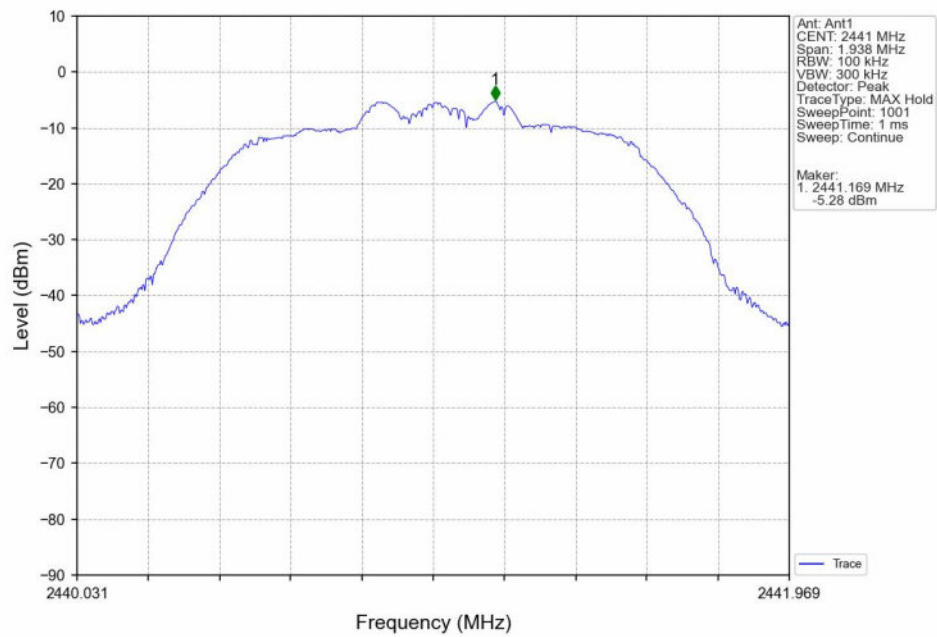


Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV

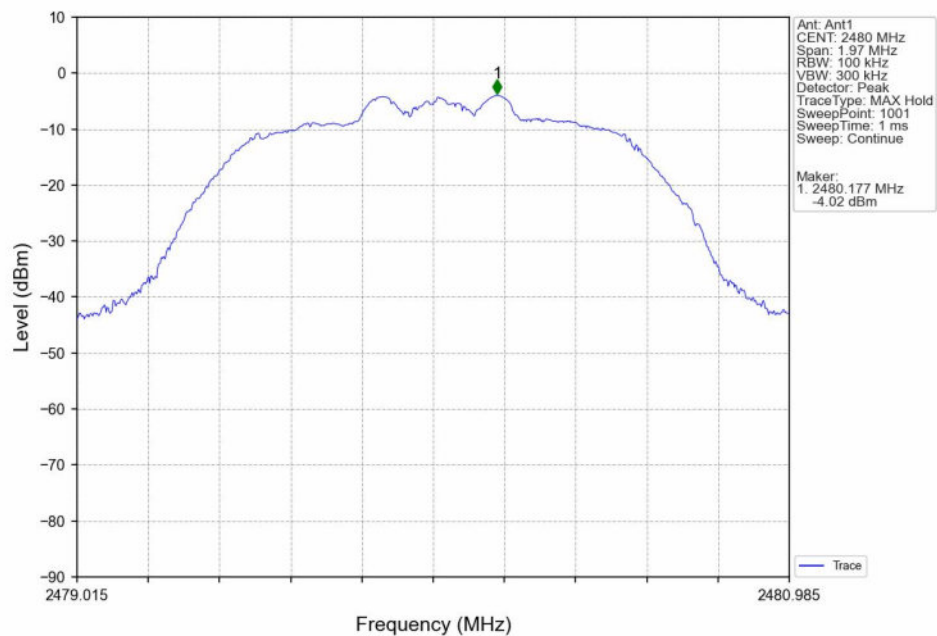


FCC ID: 2BRWN-SFX80

Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV

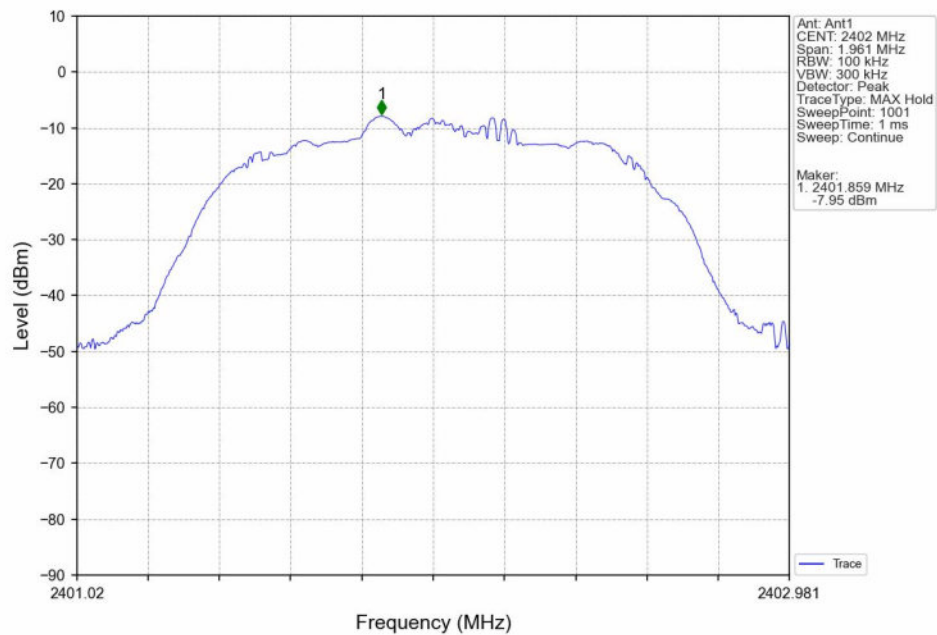


Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

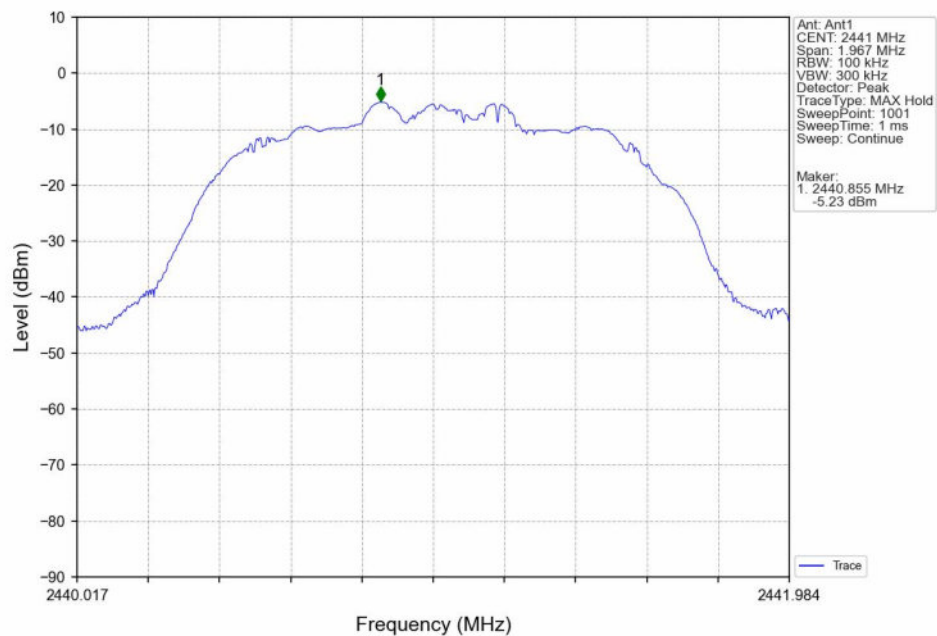


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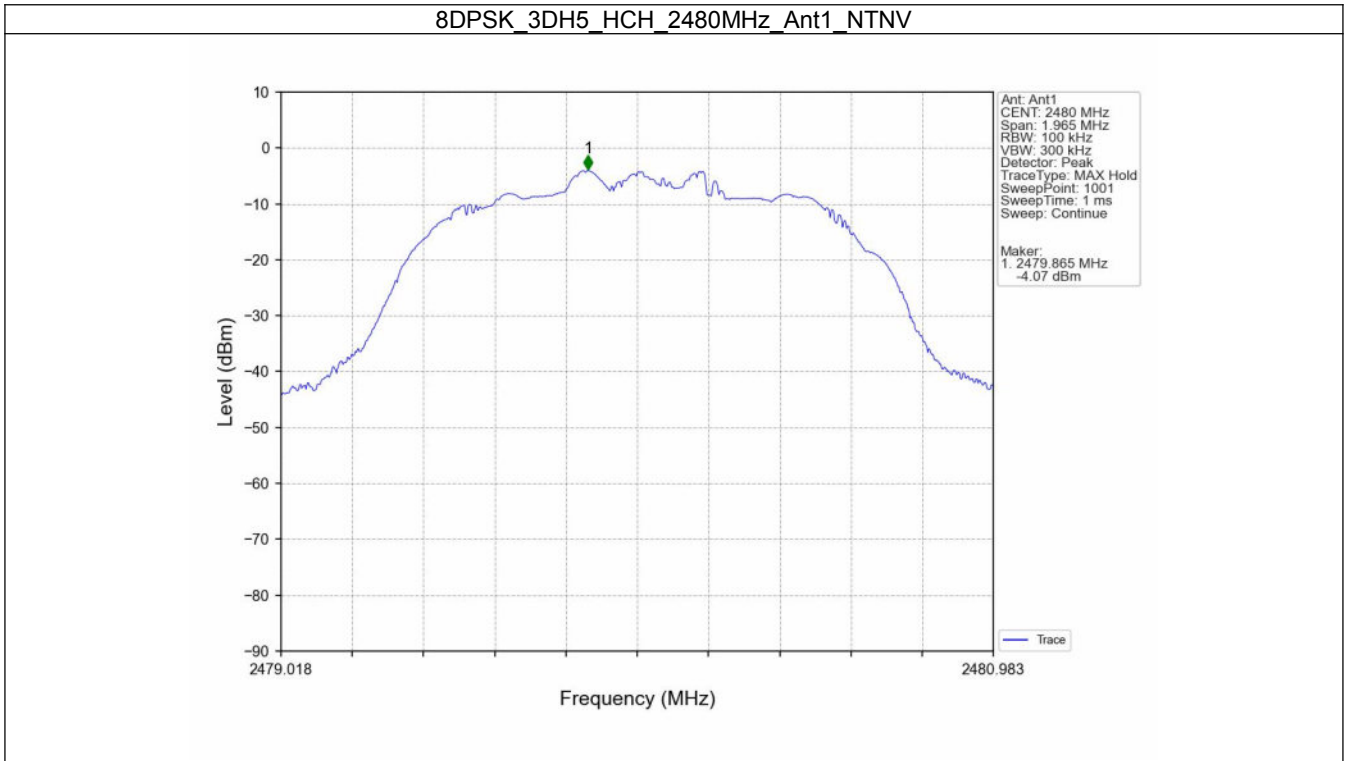
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV

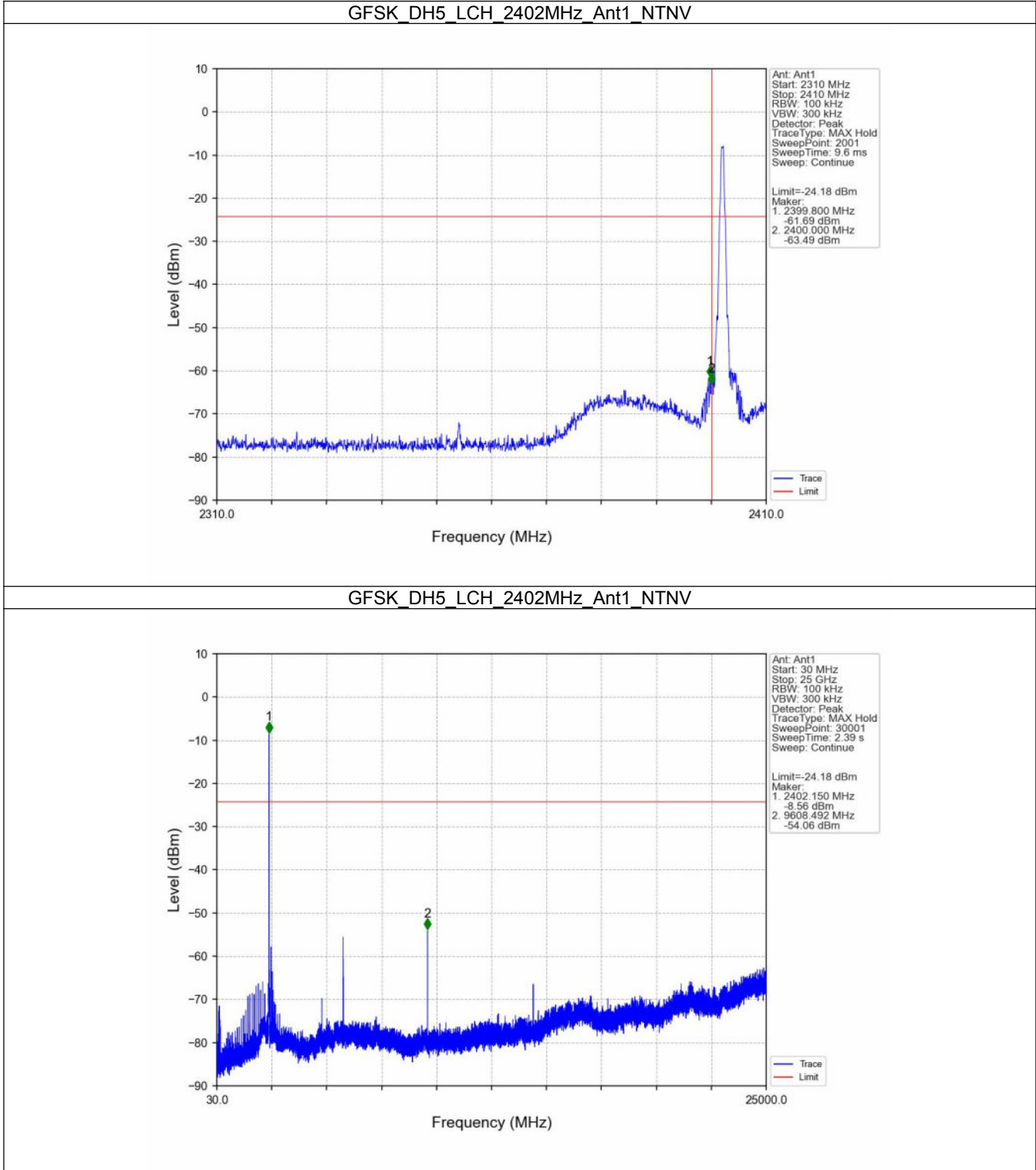


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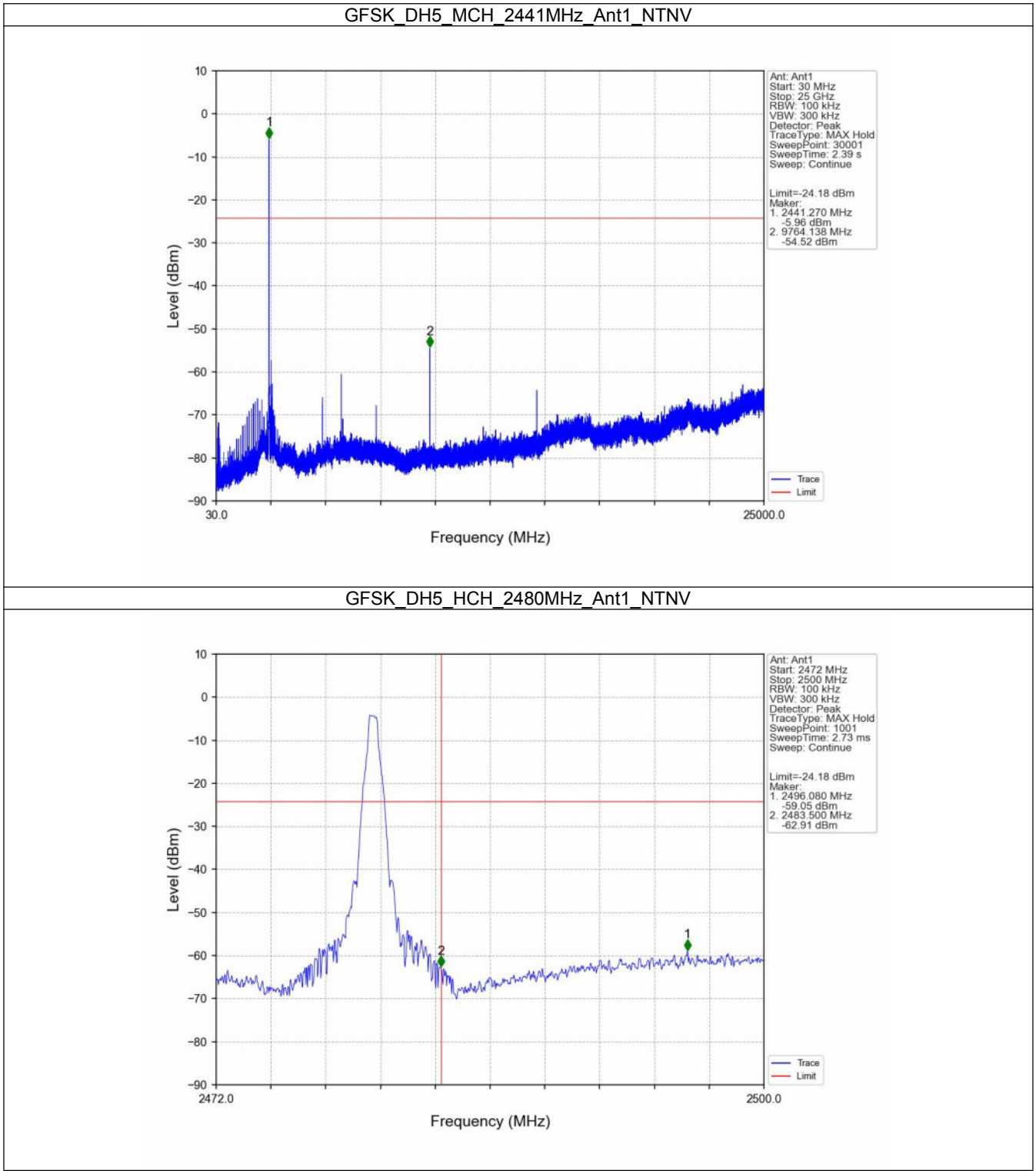


FCC ID: 2BRWN-SFX80

6.2.2 CSE

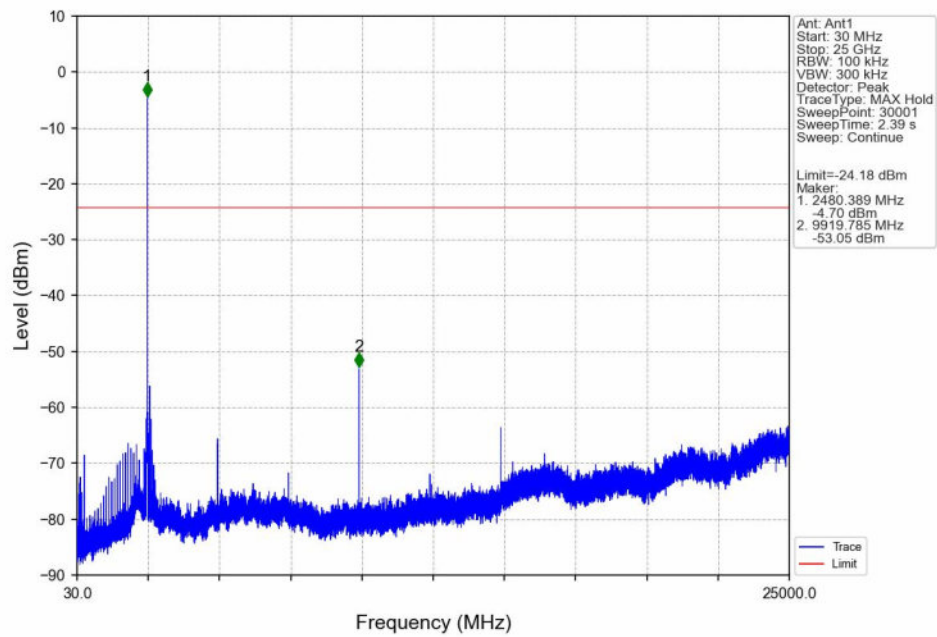


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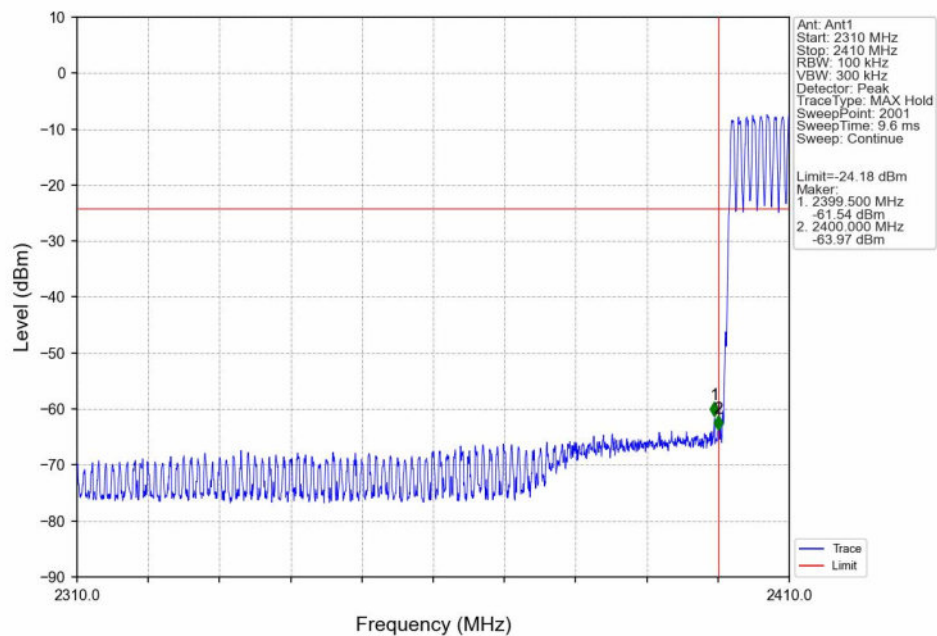


FCC ID: 2BRWN-SFX80

GFSK_DH5_HCH_2480MHz_Ant1_NTNV

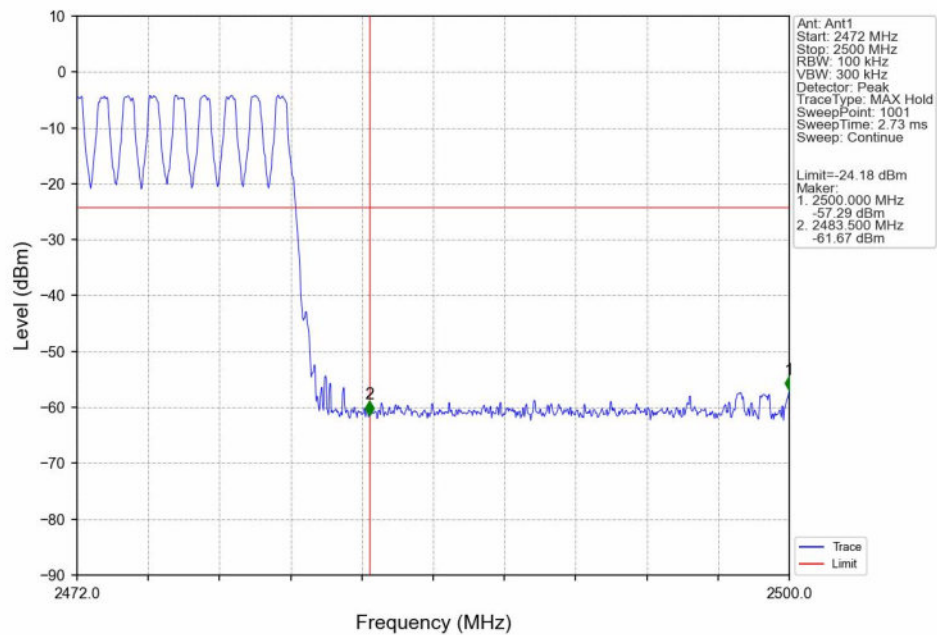


GFSK_DH5_HOPP_2410MHz_Ant1_NTNV

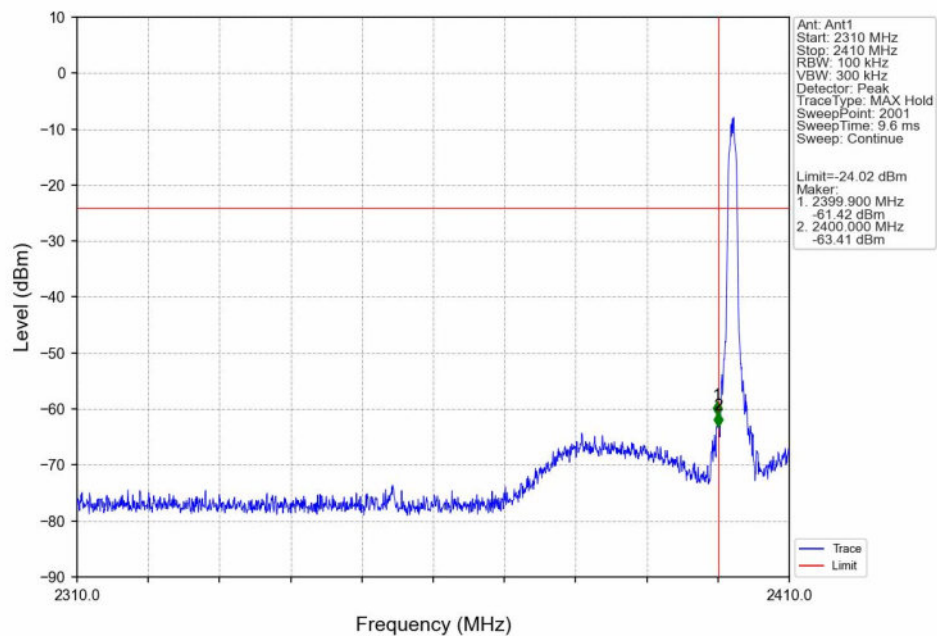


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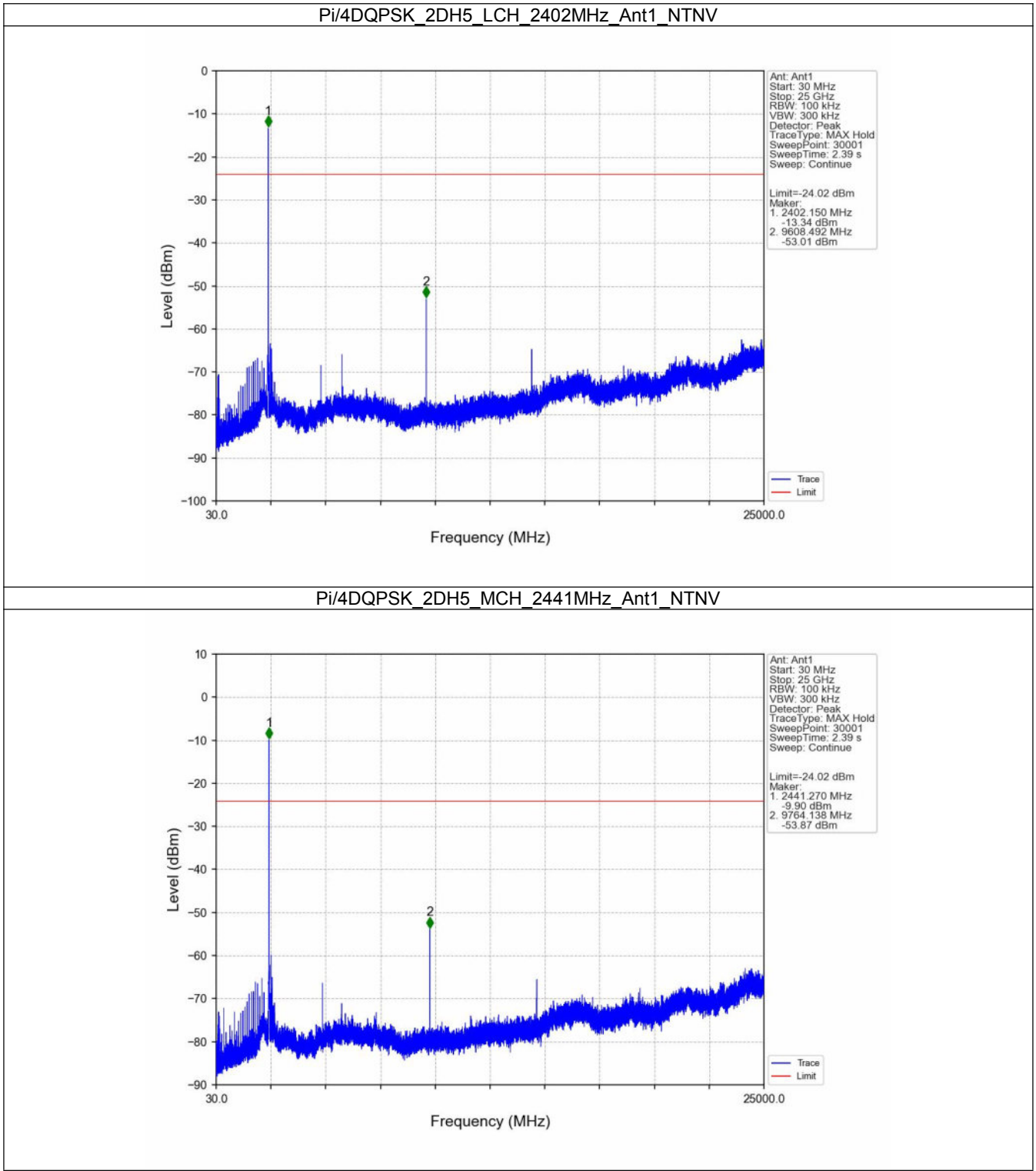
GFSK_DH5_HOPP_Ant1_NTNV



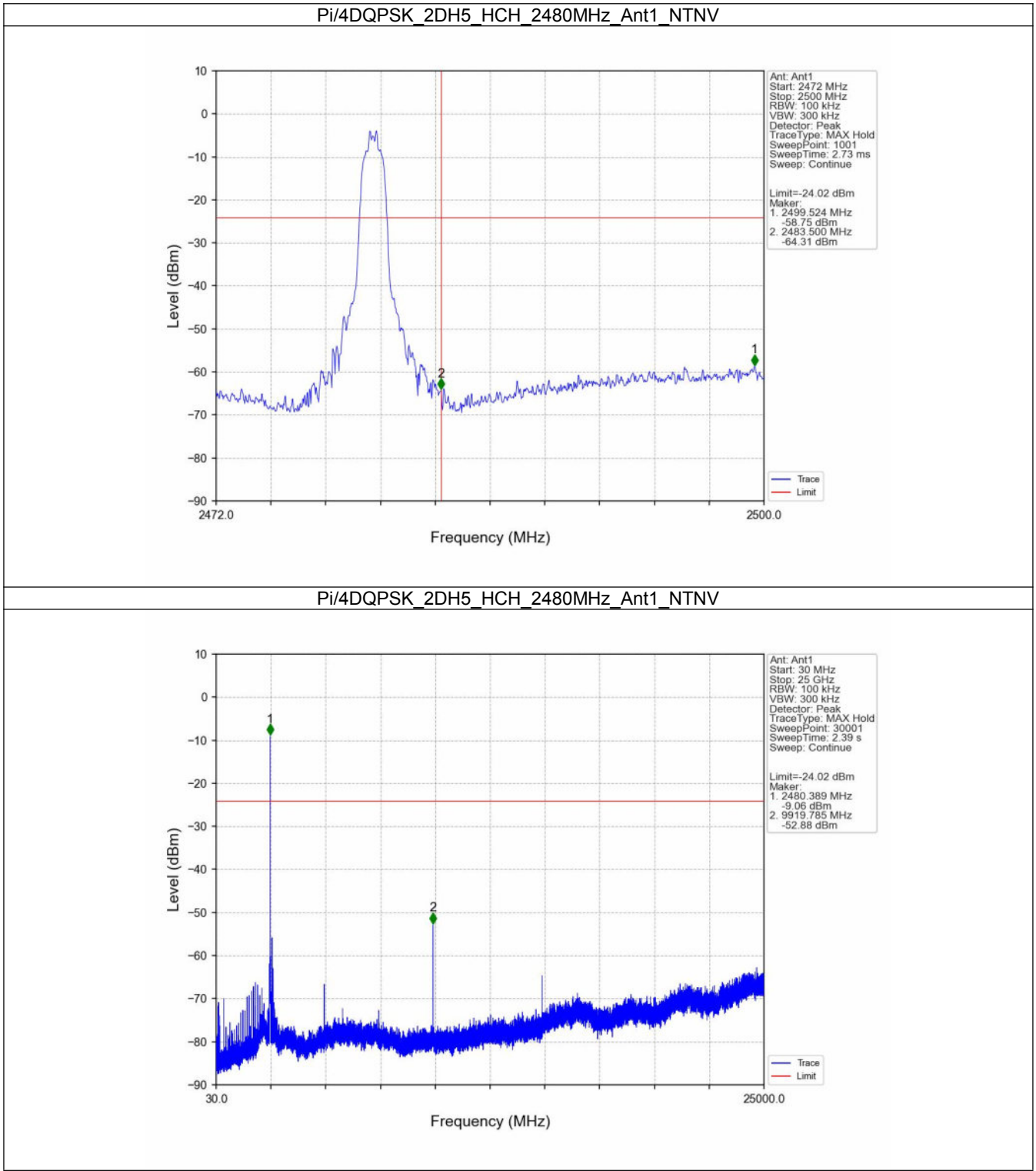
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



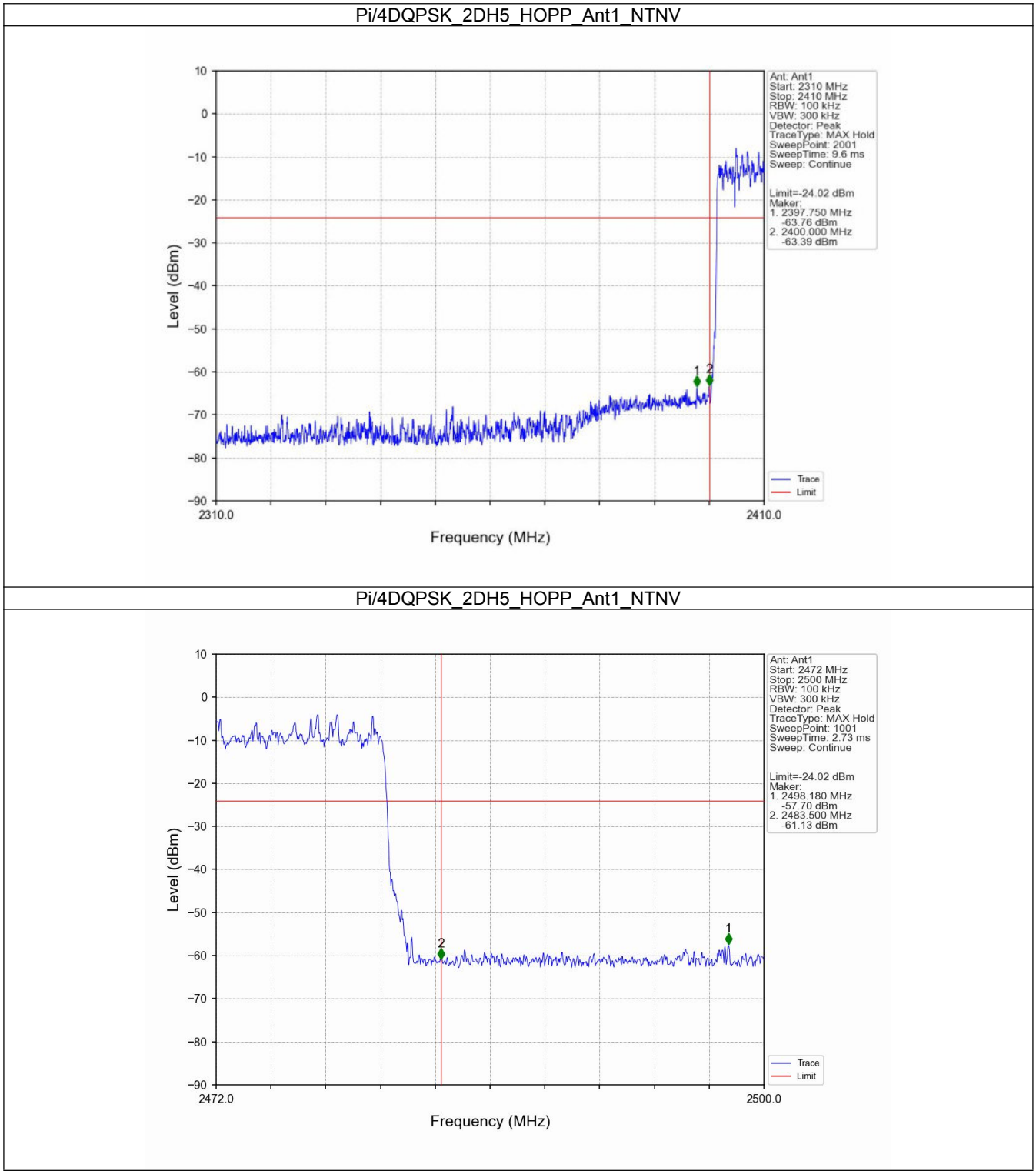
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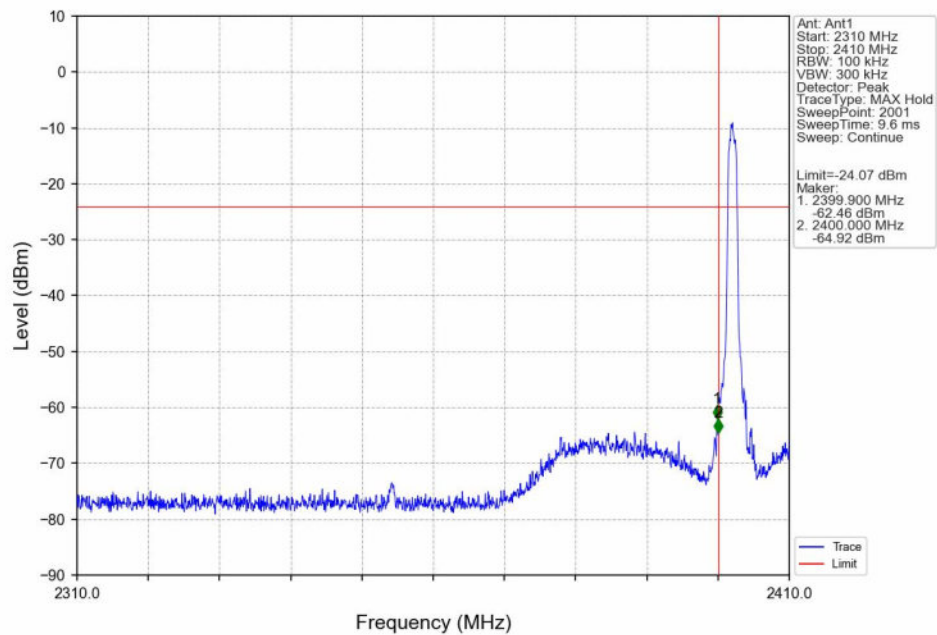


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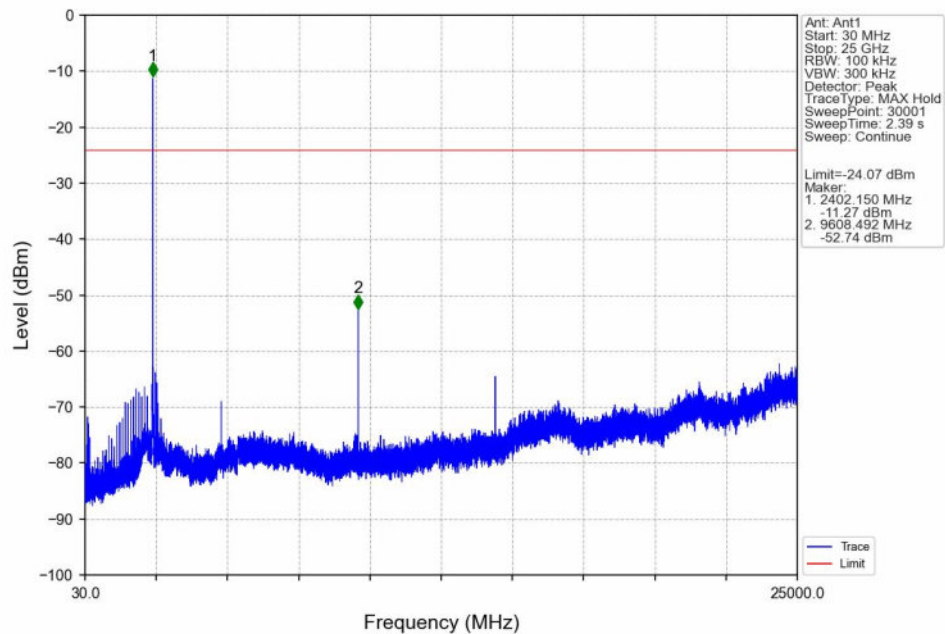


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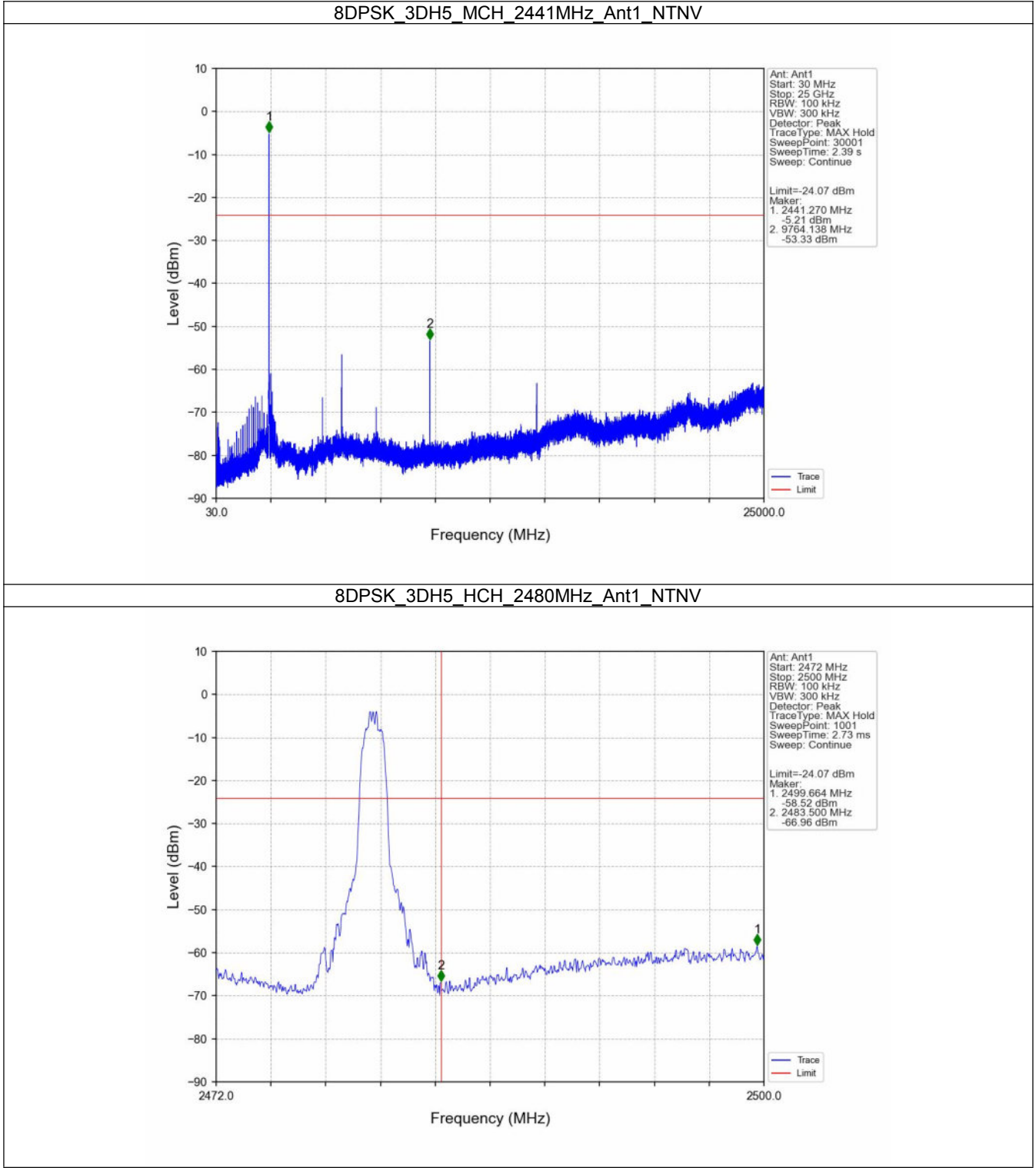
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV

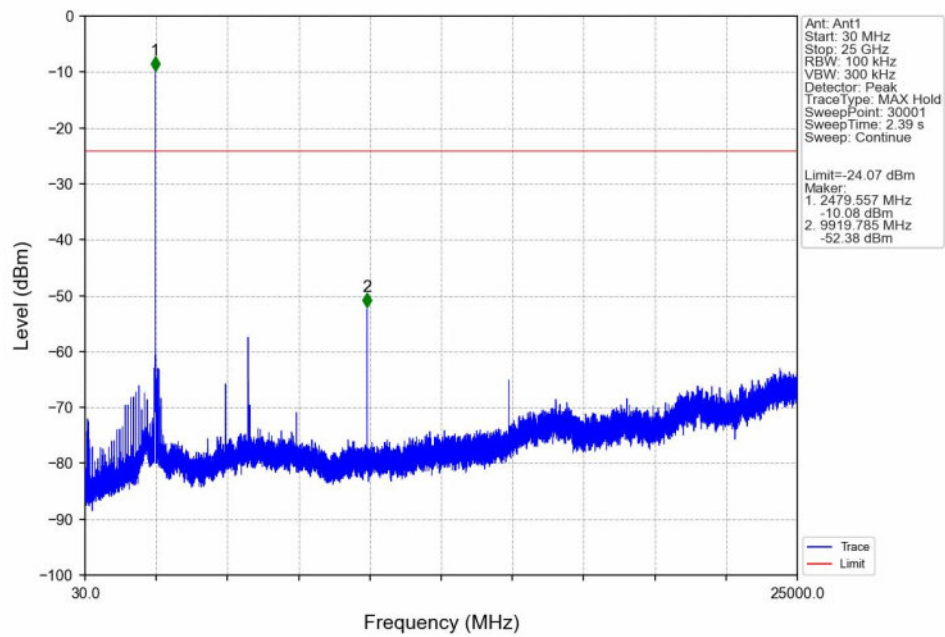


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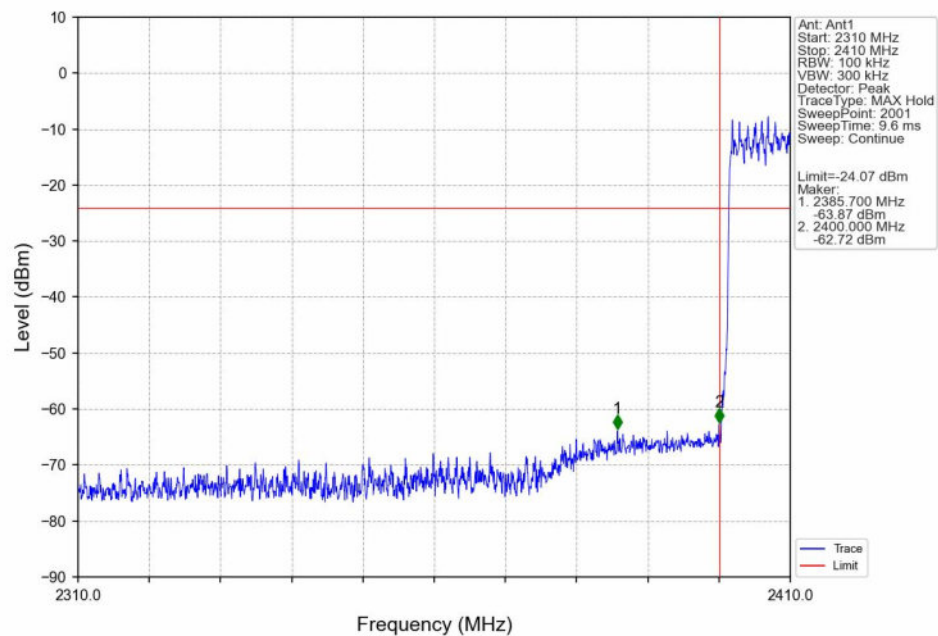


FCC ID: 2BRWN-SFX80

8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



FCC ID: 2BRWN-SFX80

