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Annex for Bluetooth

Test Report No.: CTL2605222153-WF

TABLE OF CONTENTS

1. Bandwidth	2
2. Maximum Conducted Output Power	13
3. Carrier Frequency Separation	19
4. Number of Hopping Frequencies	22
5. Time of Occupancy (Dwell Time)	25
6. Unwanted Emissions In Non-restricted Frequency Bands	35

FCC ID: 2BWIABP1048B2

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	0.874	/	Pass
		2441	DH5	1	0.871	/	Pass
		2480	DH5	1	0.865	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.206	/	Pass
		2441	2DH5	1	1.198	/	Pass
		2480	2DH5	1	1.197	/	Pass
8DPSK	SISO	2402	3DH5	1	1.197	/	Pass
		2441	3DH5	1	1.197	/	Pass
		2480	3DH5	1	1.193	/	Pass

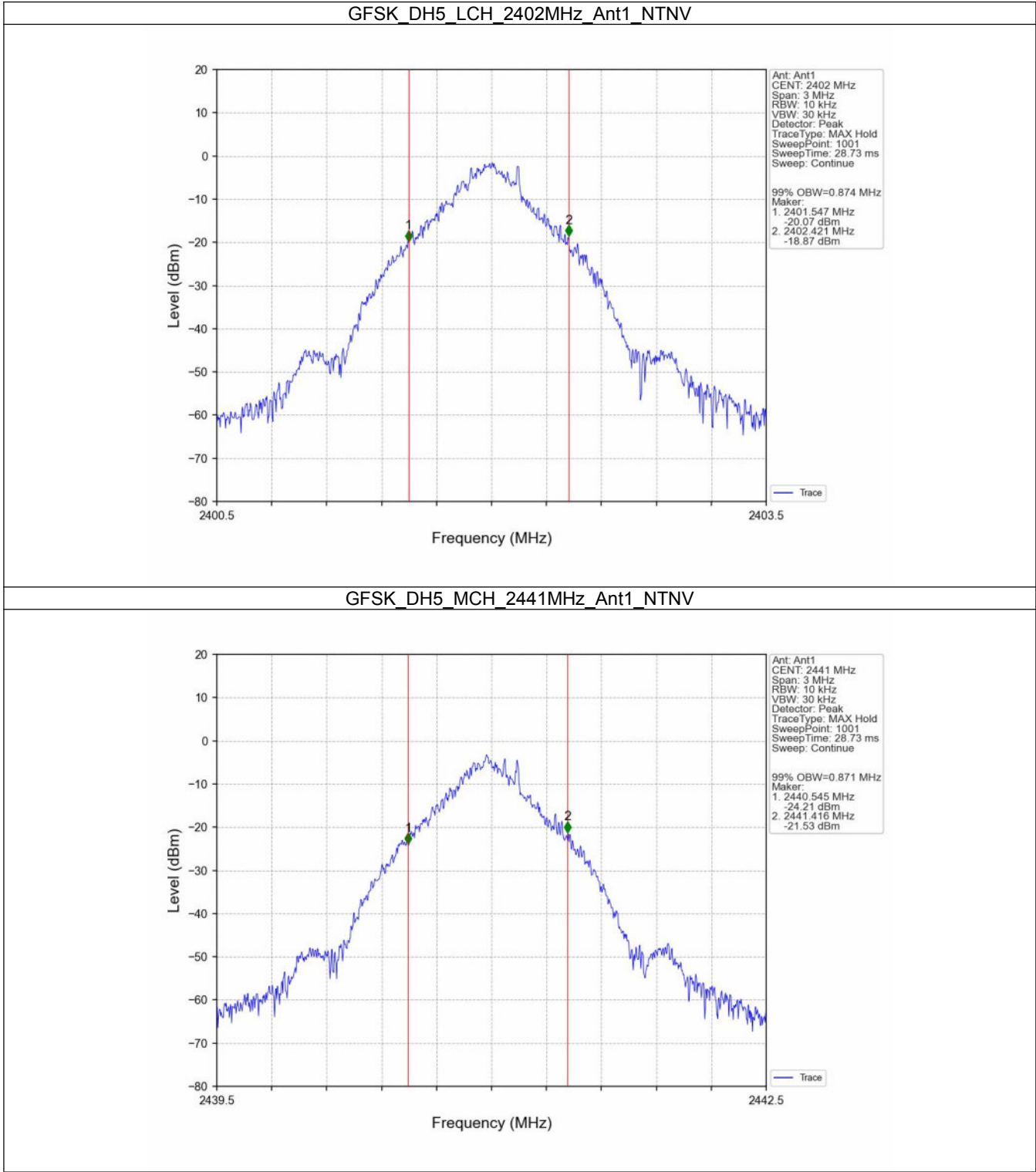
1.1.2 20dB BW

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.986	/	Pass
		2441	DH5	1	0.890	/	Pass
		2480	DH5	1	0.936	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.315	/	Pass
		2441	2DH5	1	1.299	/	Pass
		2480	2DH5	1	1.325	/	Pass
8DPSK	SISO	2402	3DH5	1	1.285	/	Pass
		2441	3DH5	1	1.285	/	Pass
		2480	3DH5	1	1.314	/	Pass

FCC ID: 2BWIABP1048B2

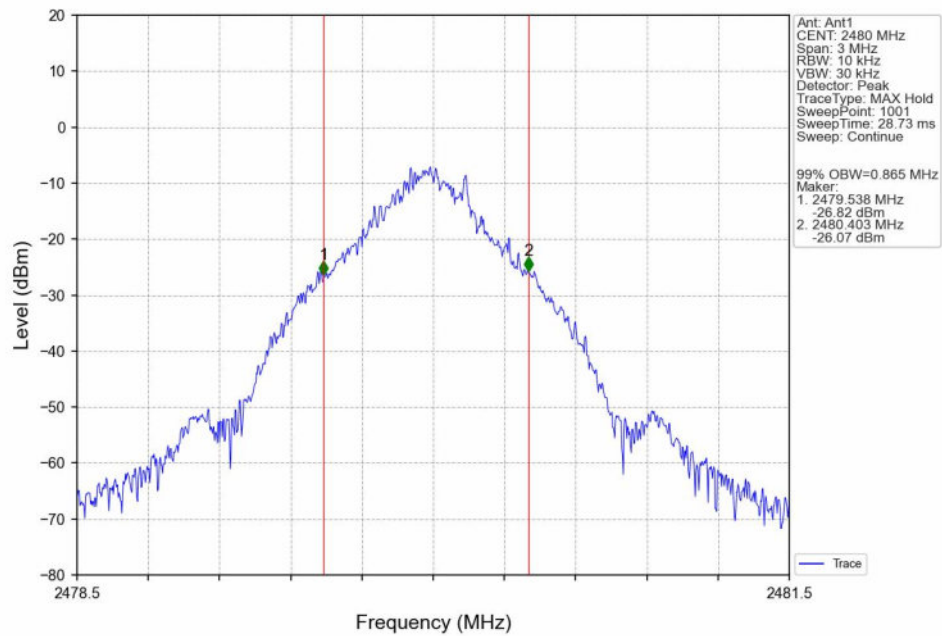
1.2 Test Graph

1.2.1 OBW

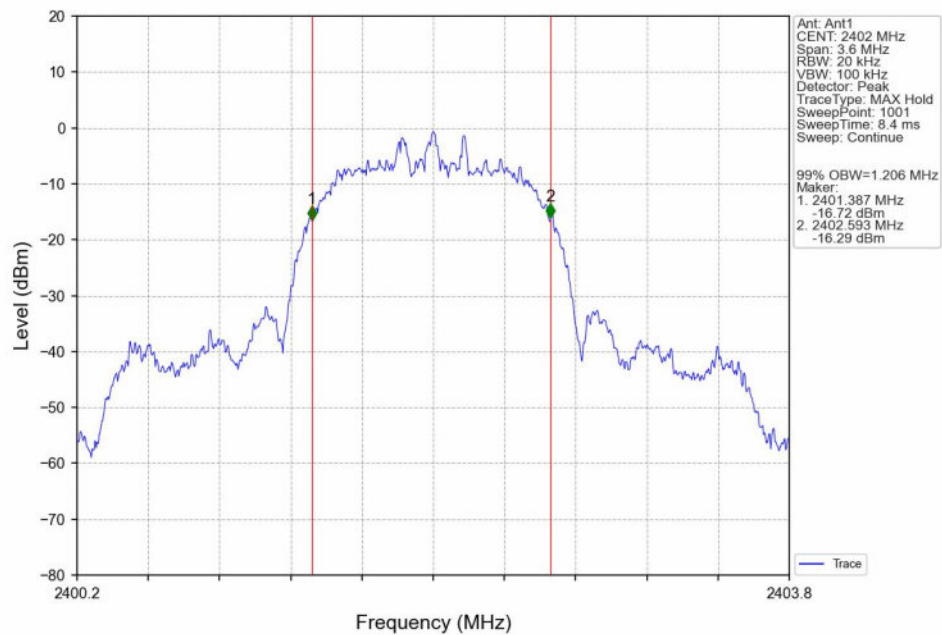


FCC ID: 2BWIABP1048B2

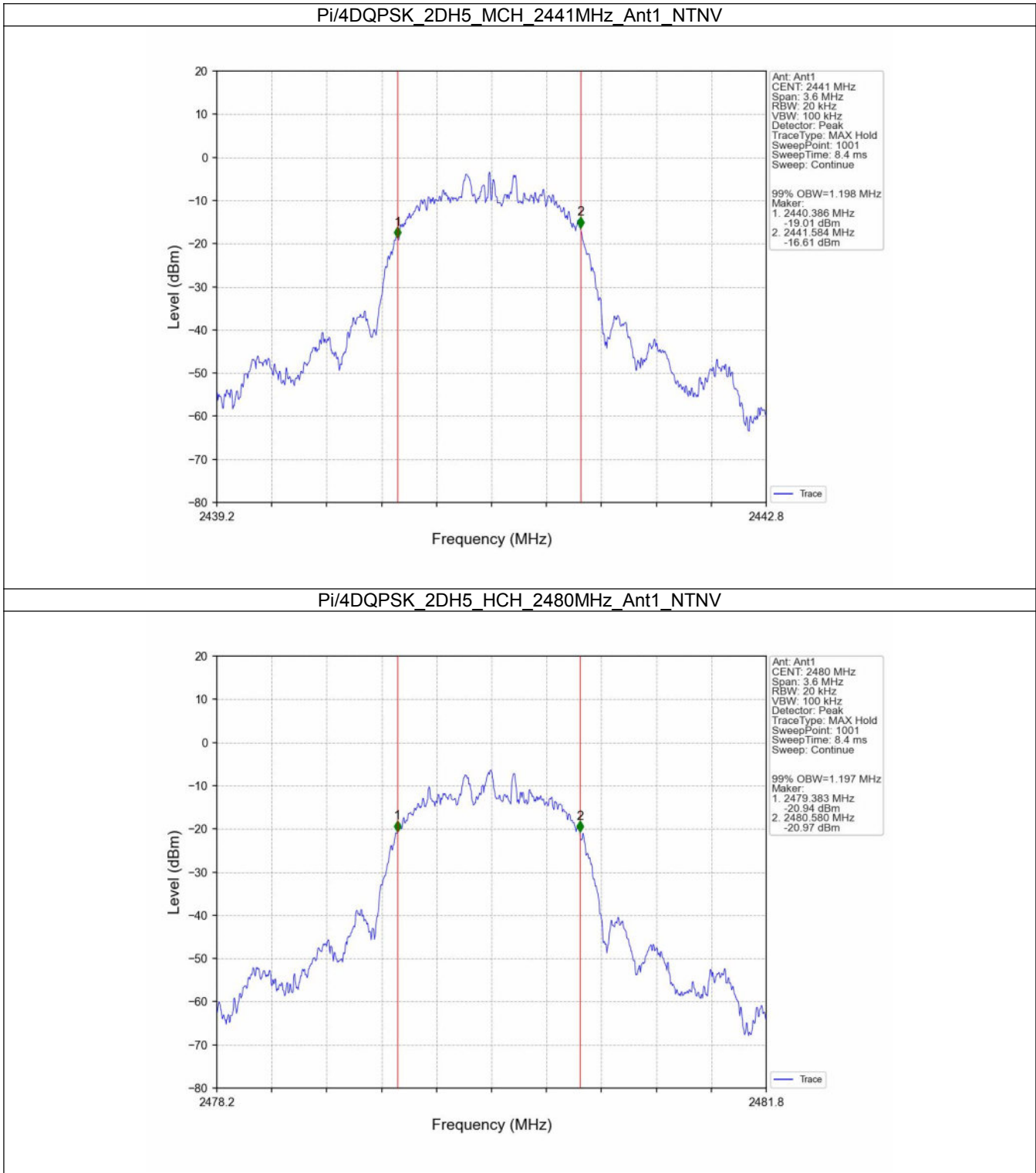
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV

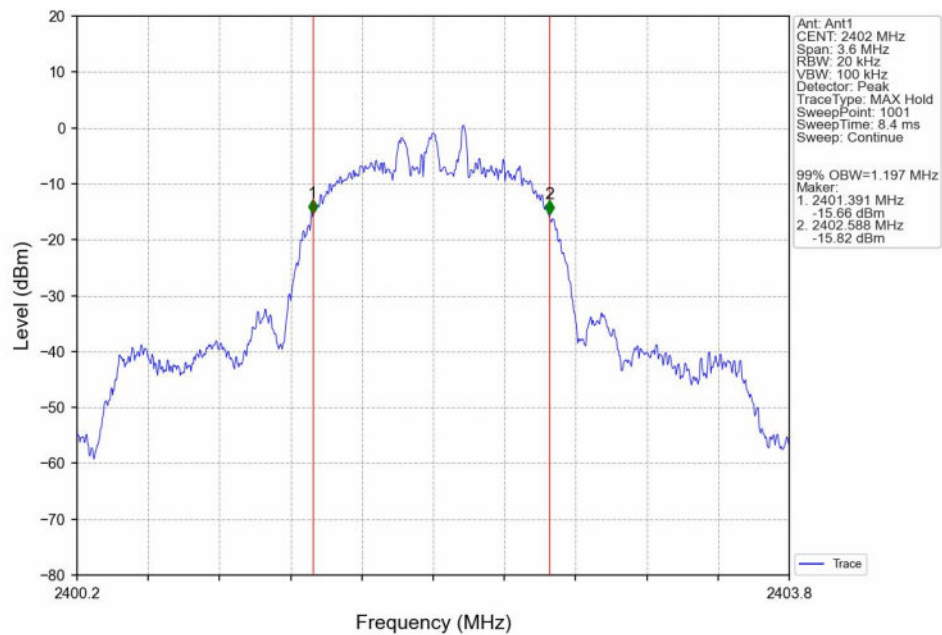


FCC ID: 2BWIABP1048B2

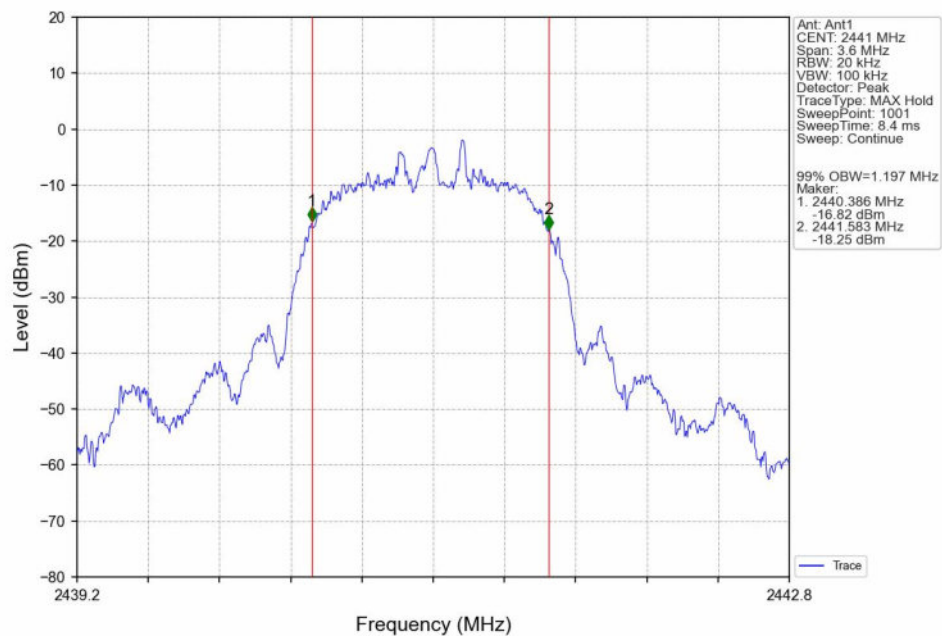


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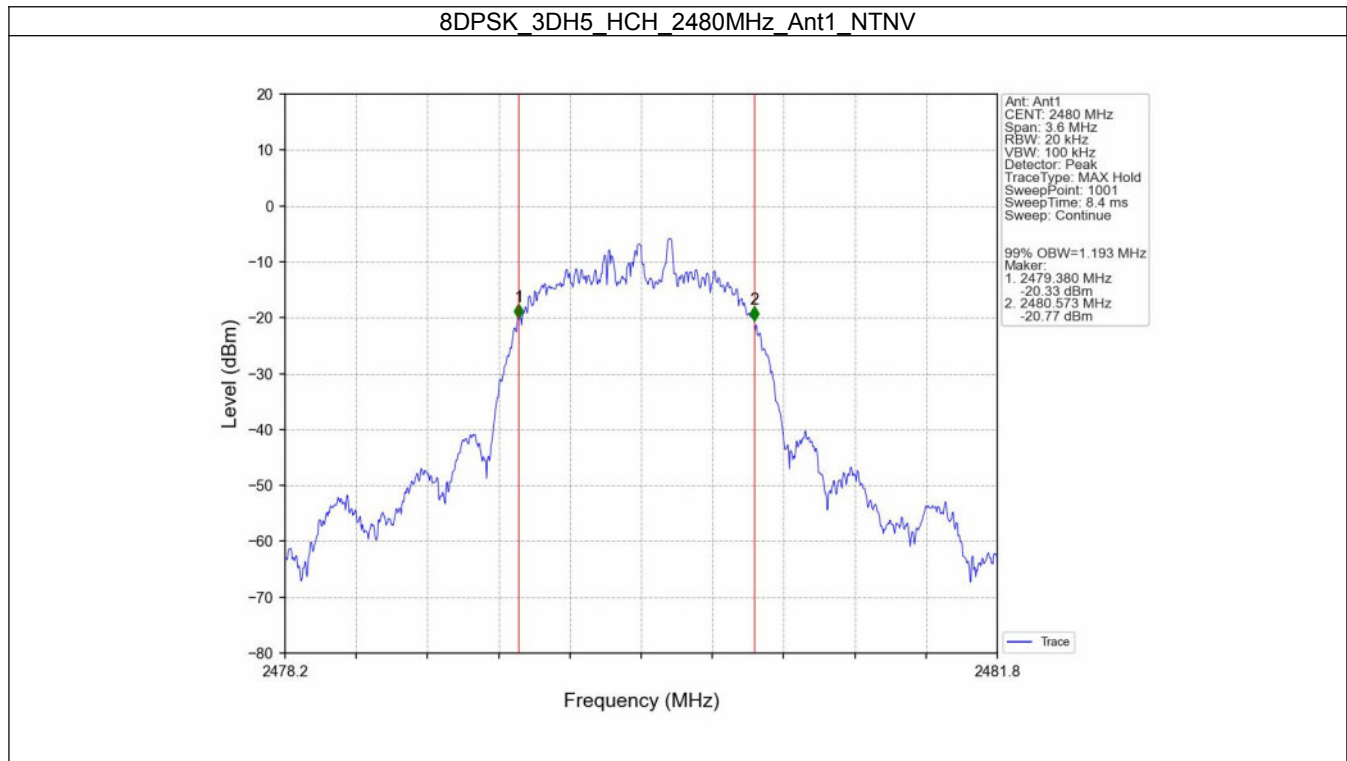
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



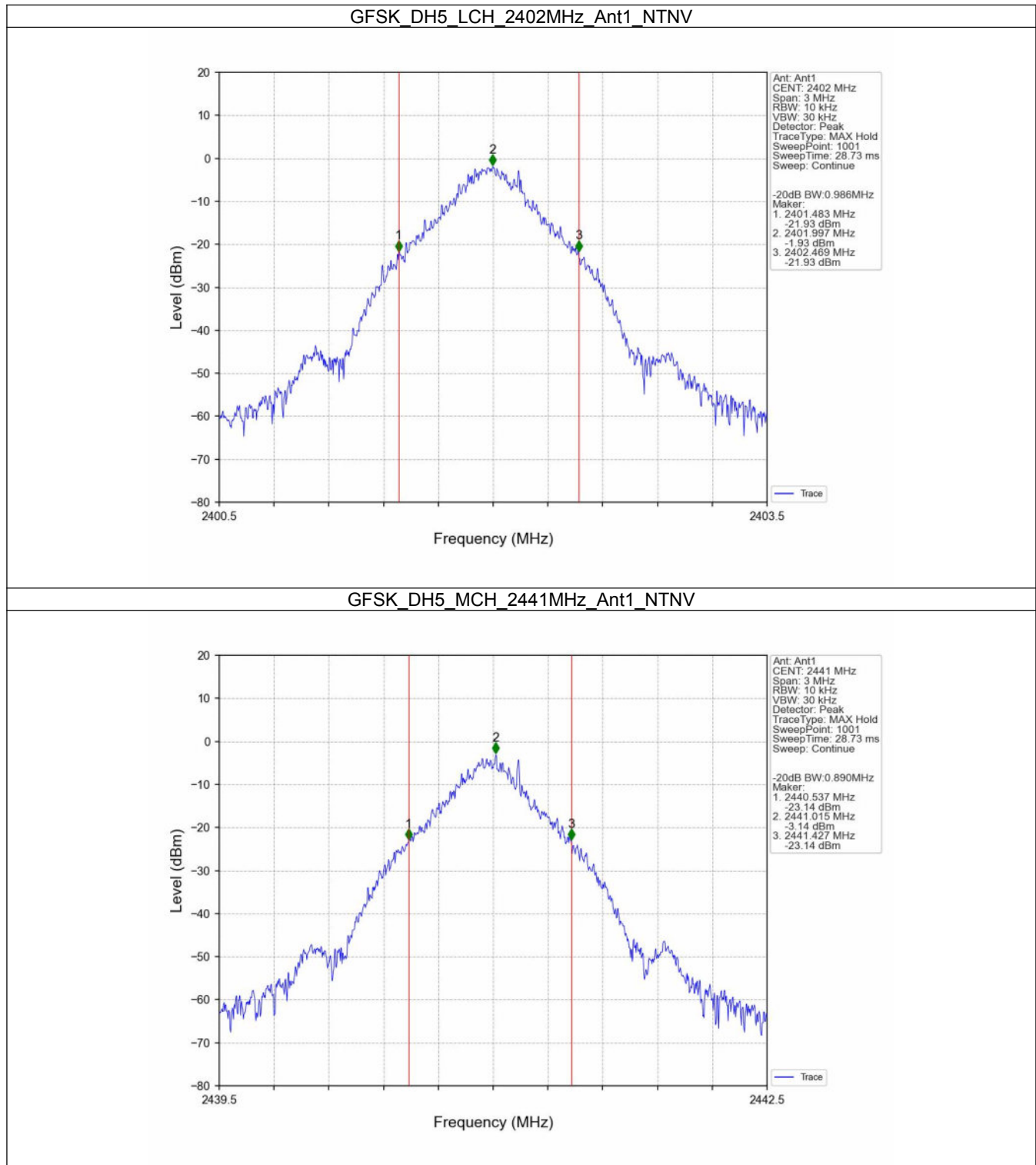
8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



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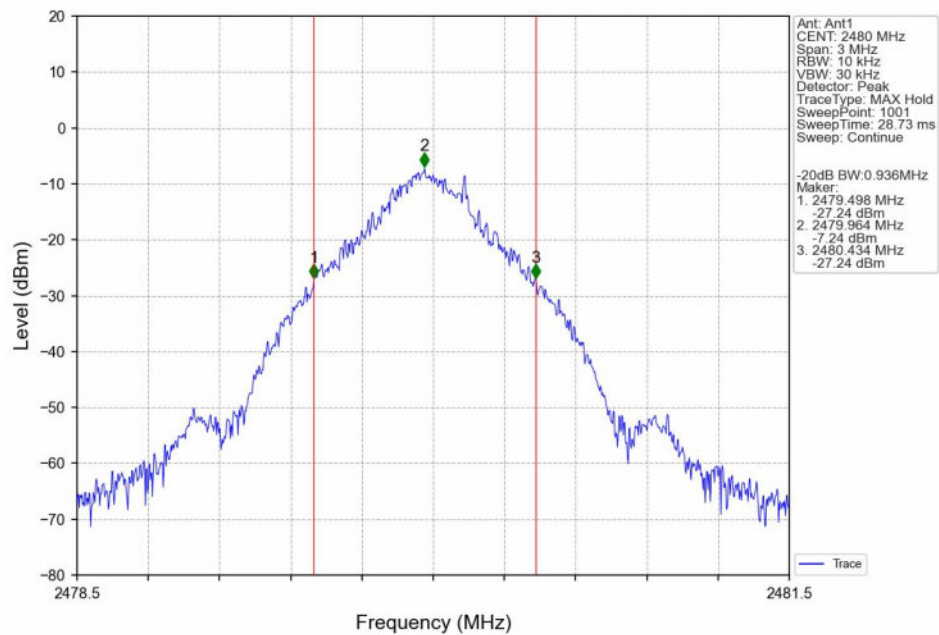


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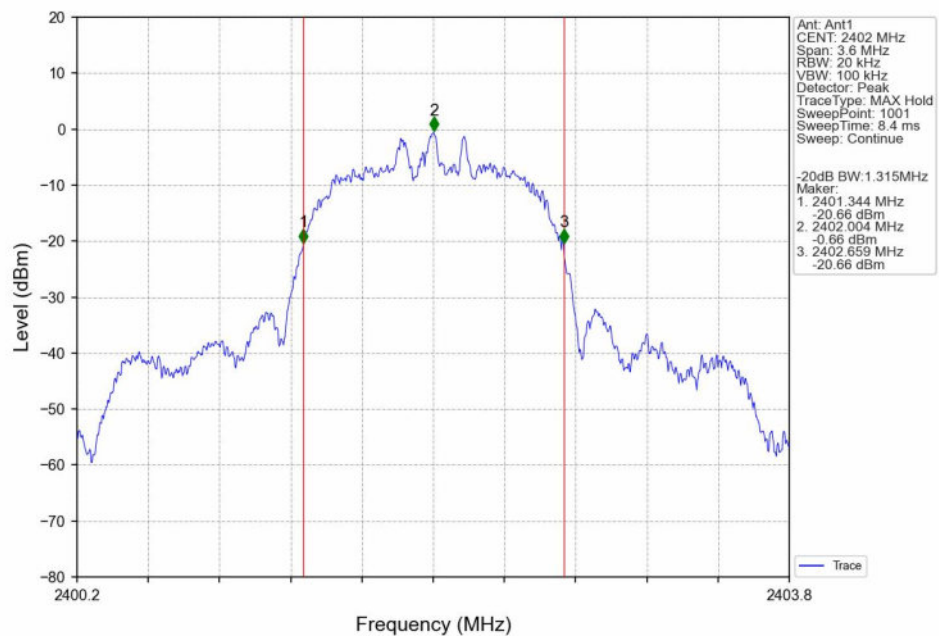
1.2.2 20dB BW

FCC ID: 2BWIABP1048B2

GFSK_DH5_HCH_2480MHz_Ant1_NTNV

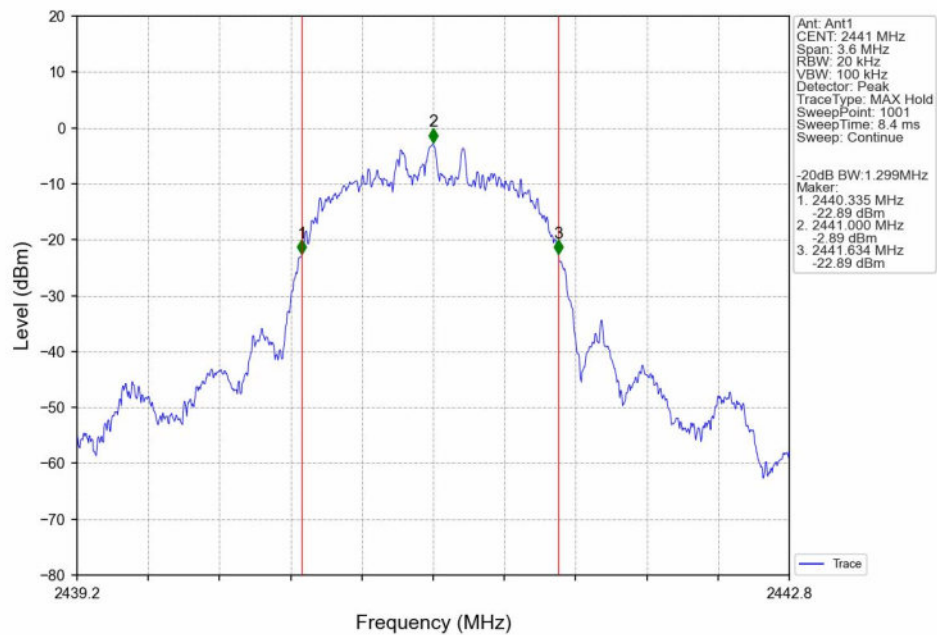


Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV

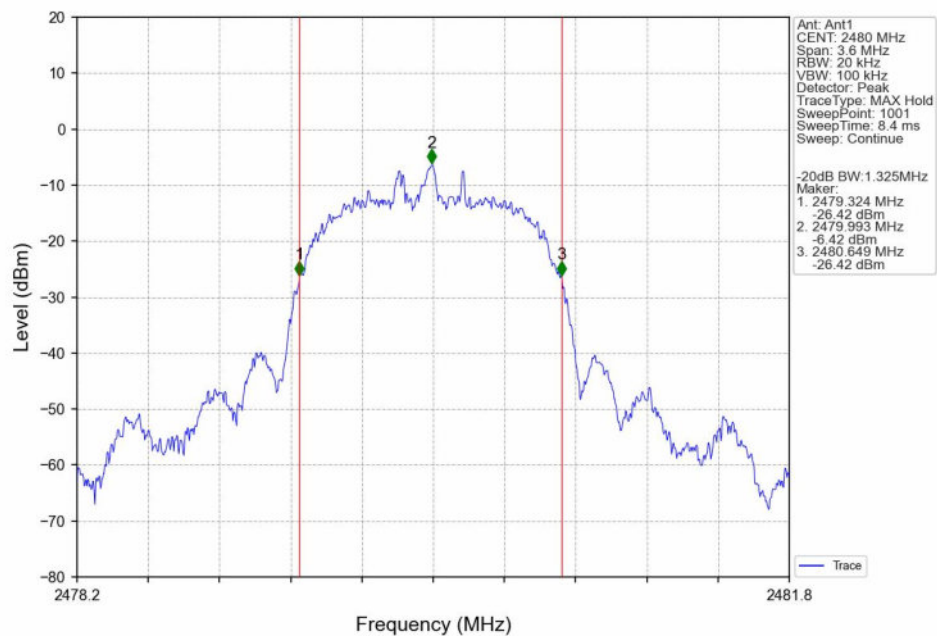


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Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV

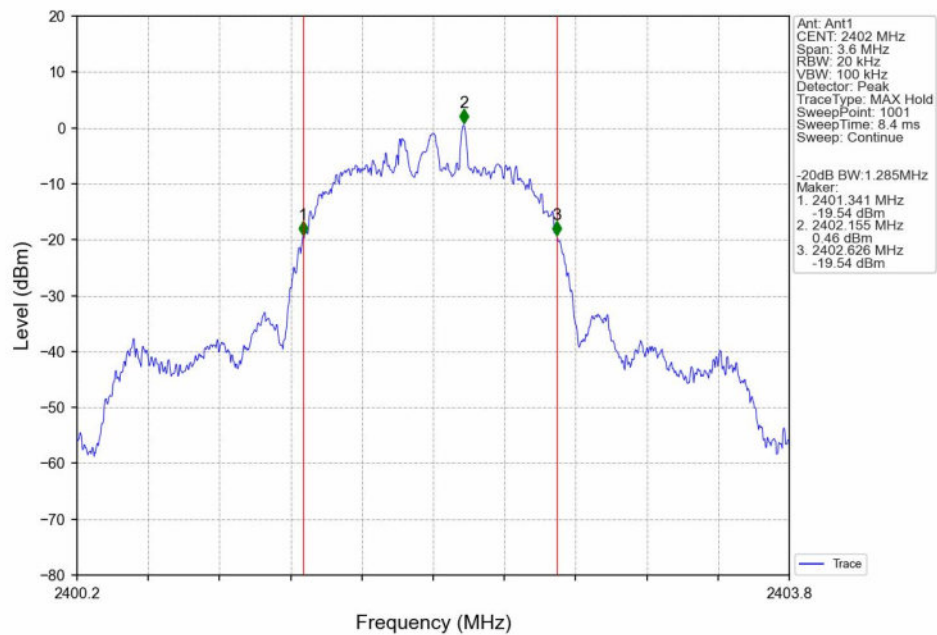


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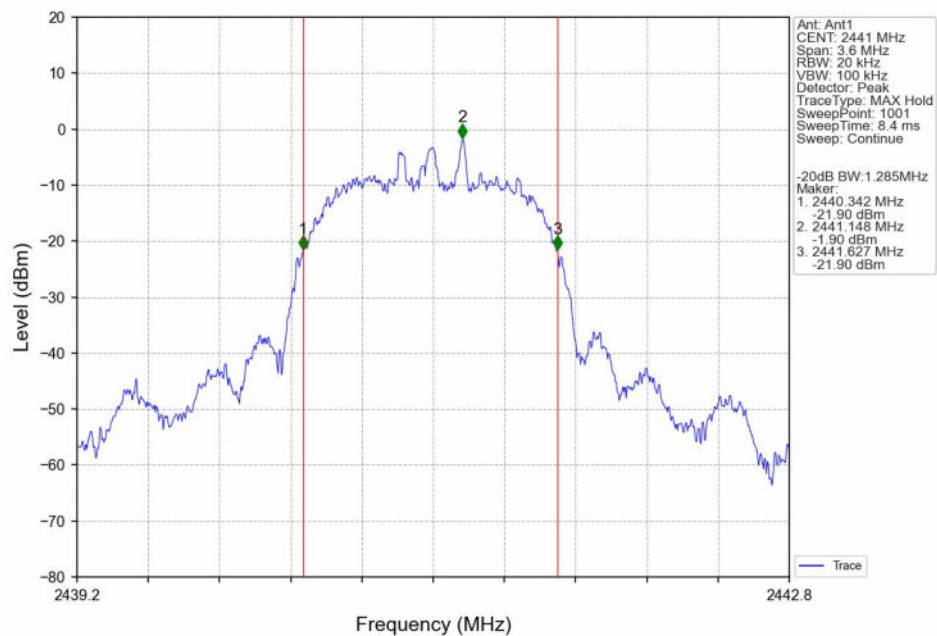


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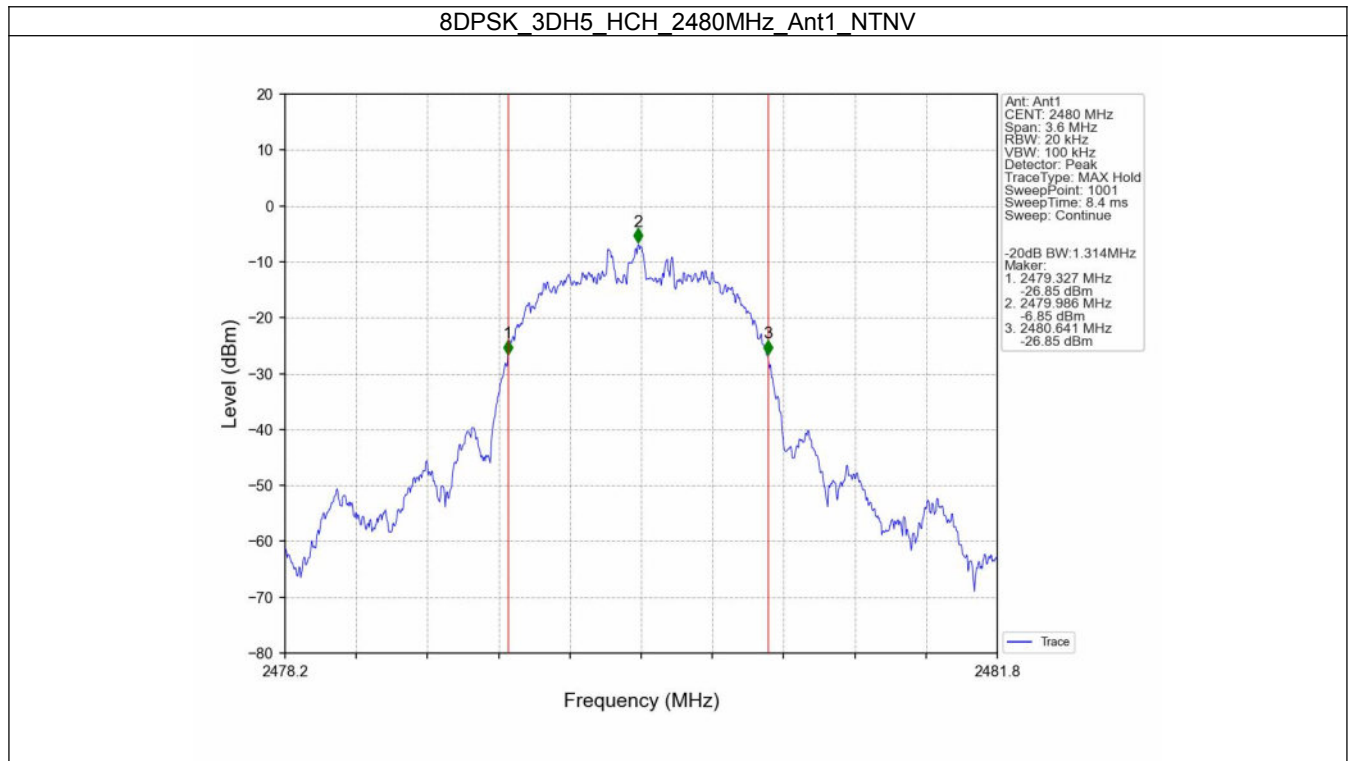
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



FCC ID: 2BWIABP1048B2



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2. Maximum Conducted Output Power

2.1 Test Result

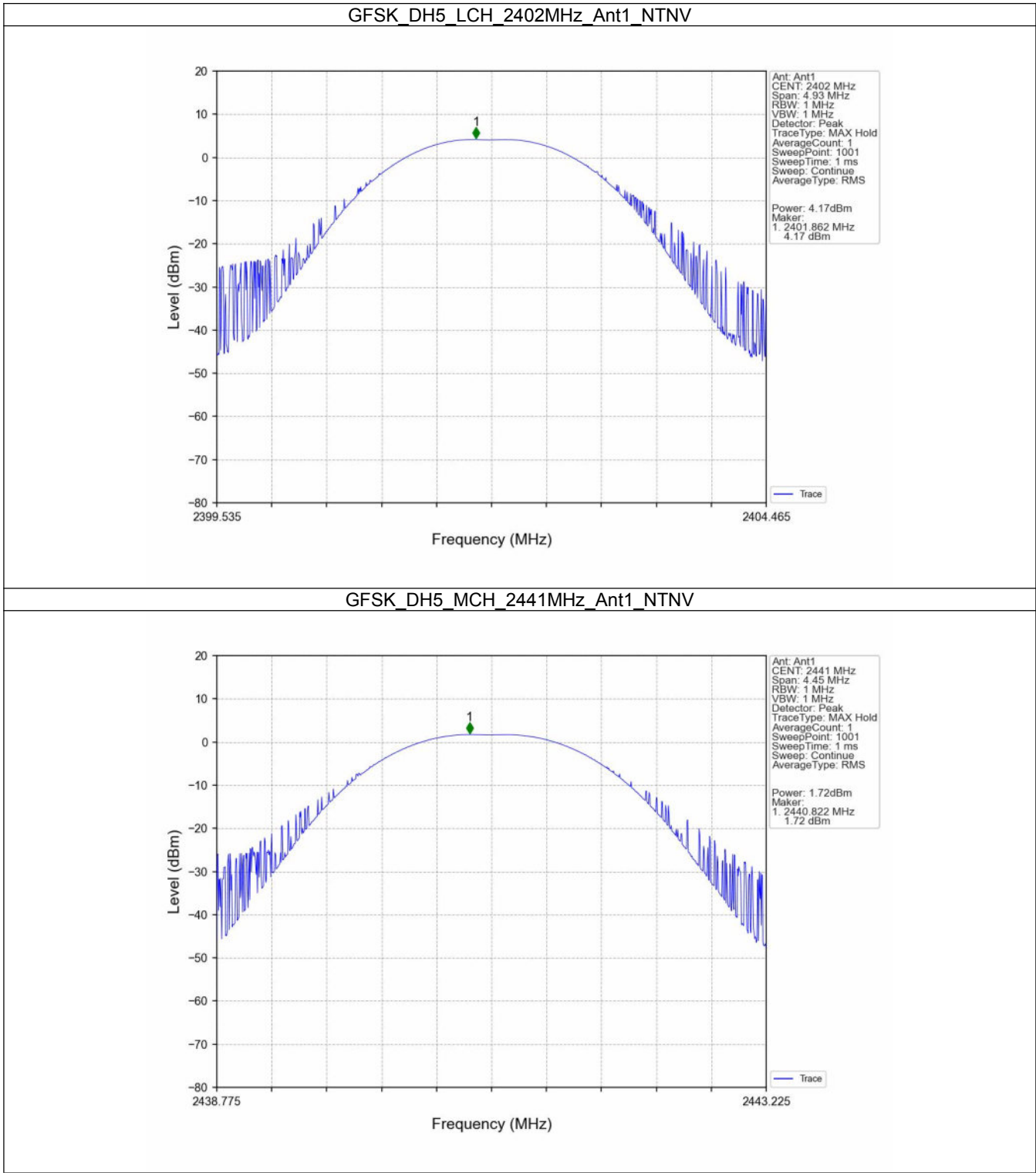
2.1.1 Power

Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	4.17	<=30	Pass
		2441	DH5	1.72	<=30	Pass
		2480	DH5	-1.80	<=30	Pass
Pi/4DQPSK	SISO	2402	2DH5	4.28	<=20.97	Pass
		2441	2DH5	2.03	<=20.97	Pass
		2480	2DH5	-1.47	<=20.97	Pass
8DPSK	SISO	2402	3DH5	4.48	<=20.97	Pass
		2441	3DH5	2.23	<=20.97	Pass
		2480	3DH5	-1.26	<=20.97	Pass
Note1: Antenna Gain: Ant1: 2.81dBi; Note2: RF Cable loss=0.5dB Note3: The test results include RF Cable loss.						

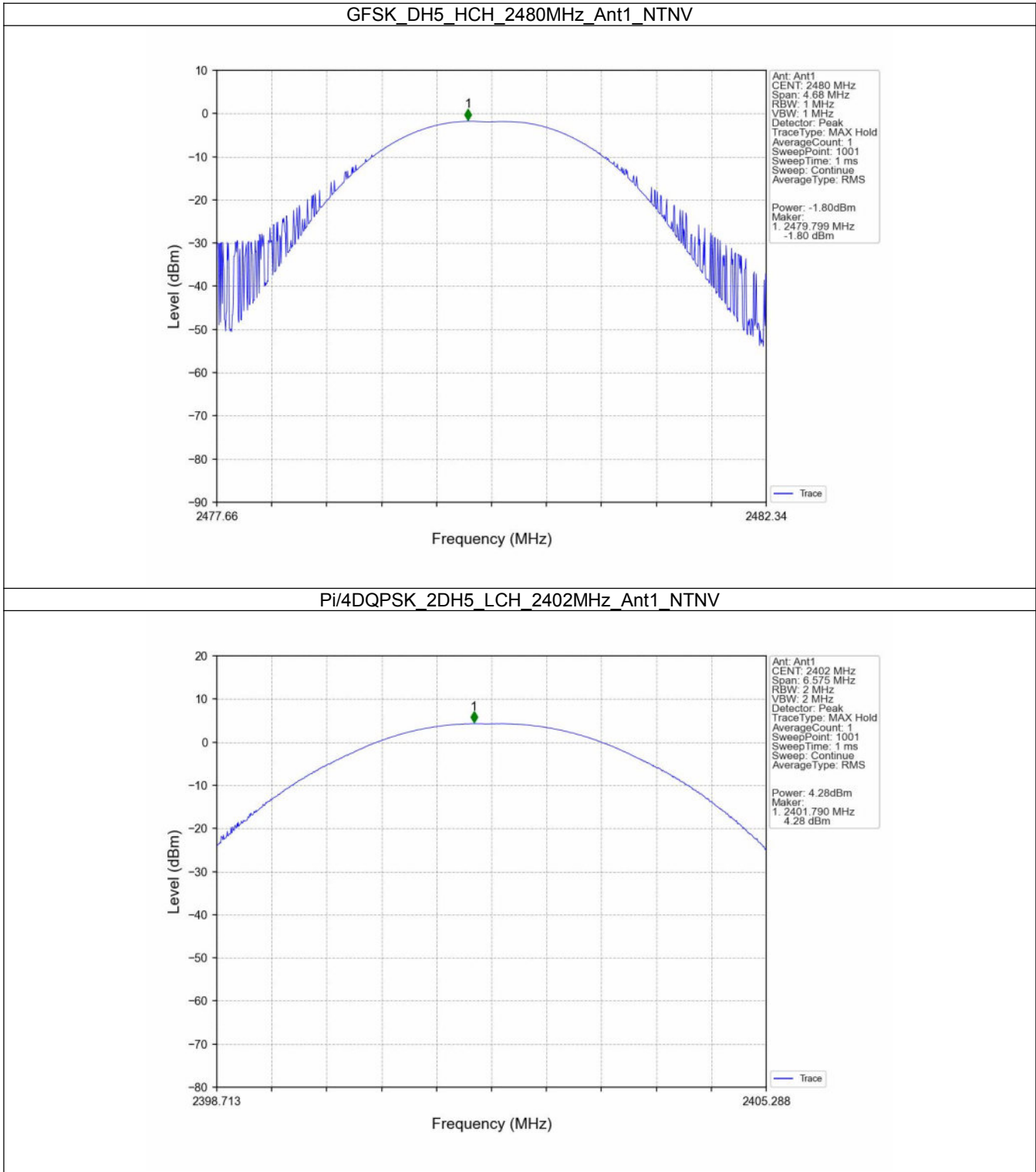
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2.2 Test Graph

2.2.1 Power

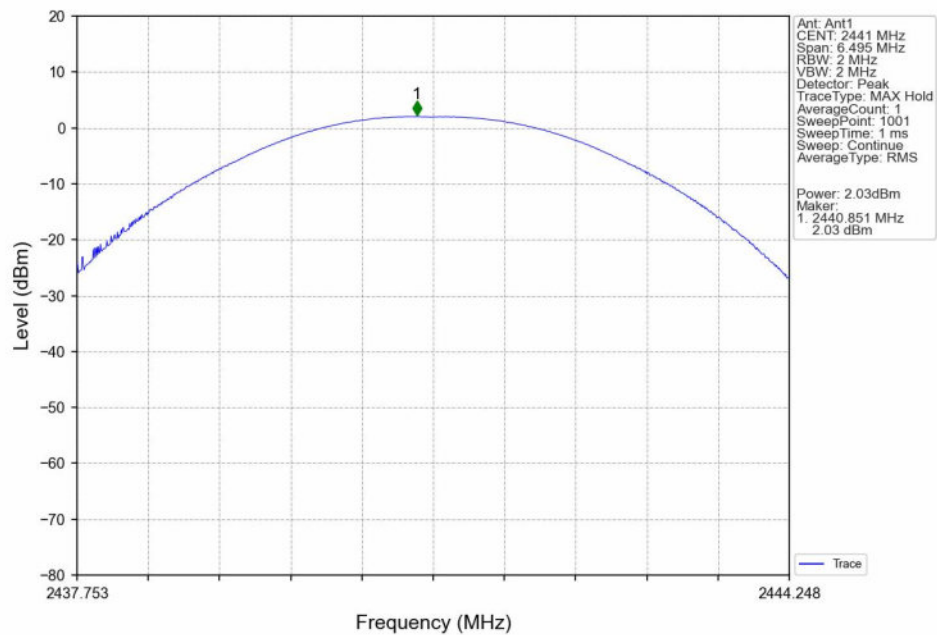


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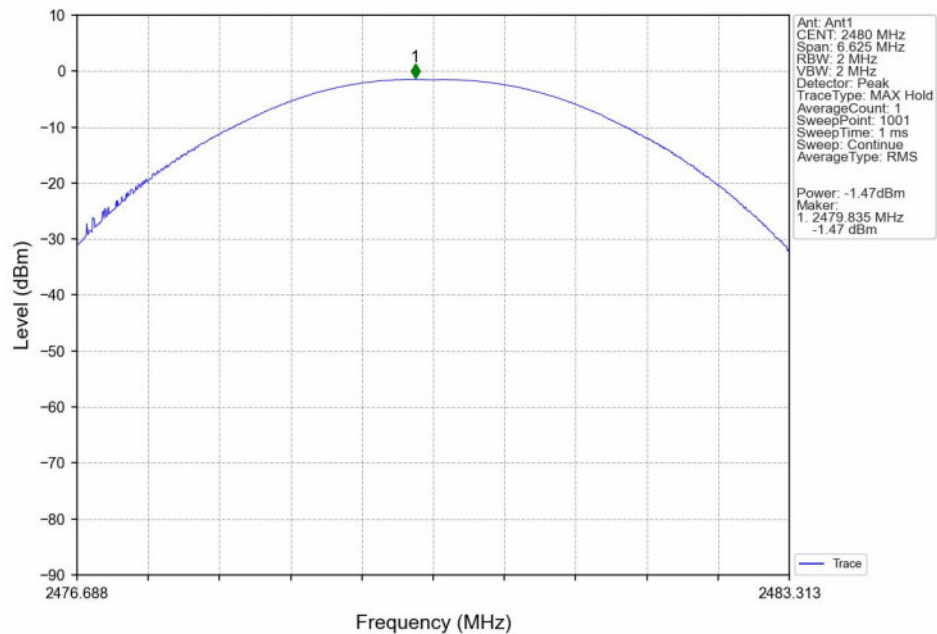


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Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV

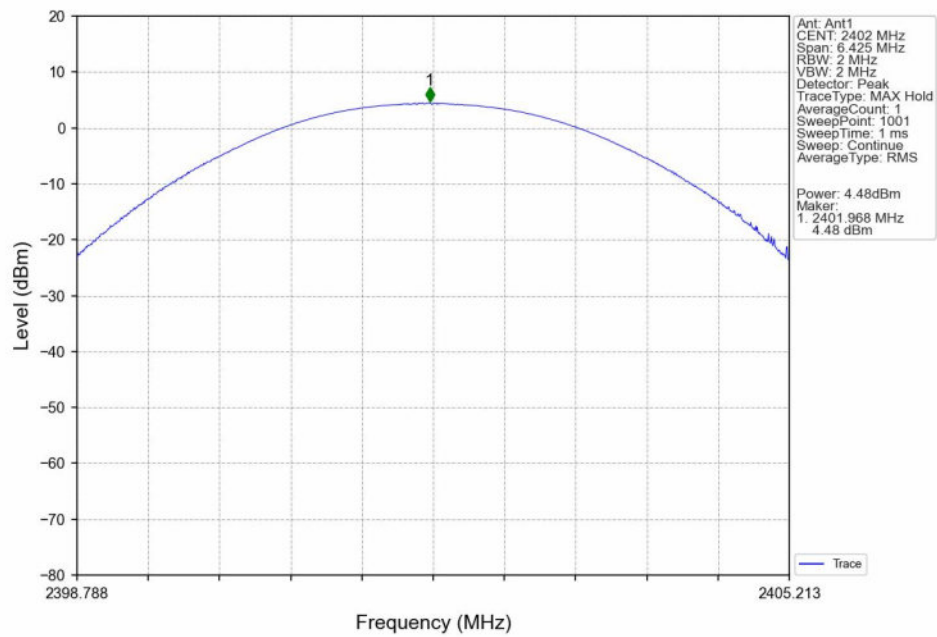


Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

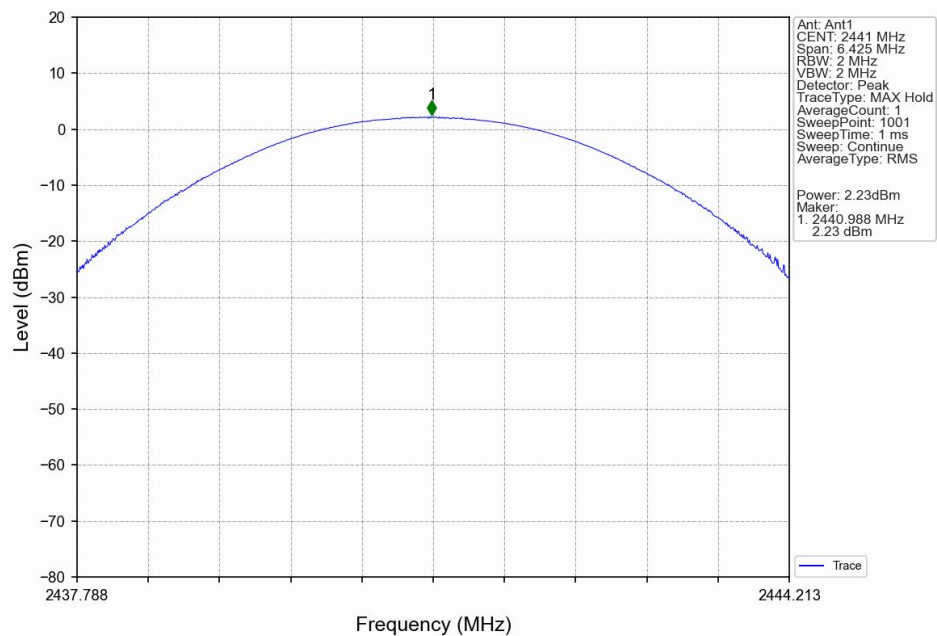


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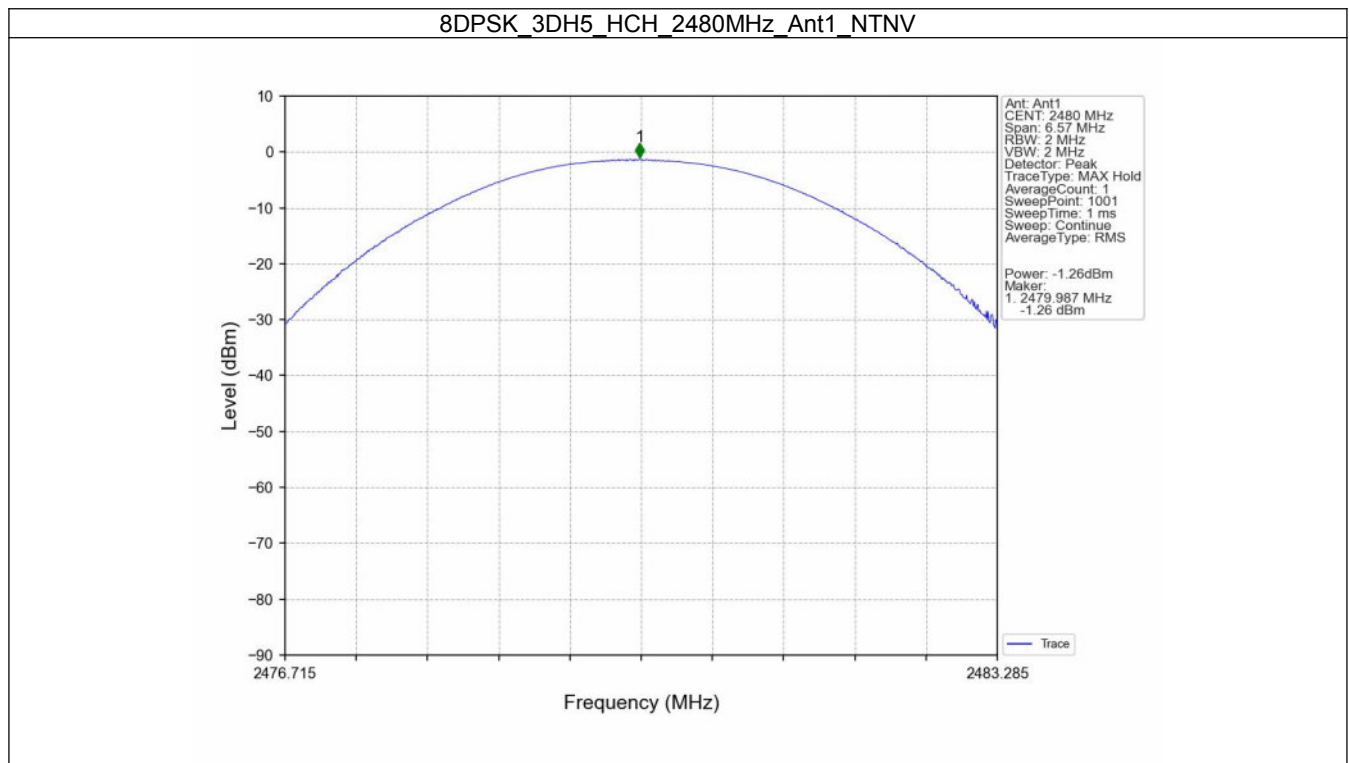
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



FCC ID: 2BWIABP1048B2



FCC ID: 2BWIABP1048B2

3. Carrier Frequency Separation

3.1 Test Result

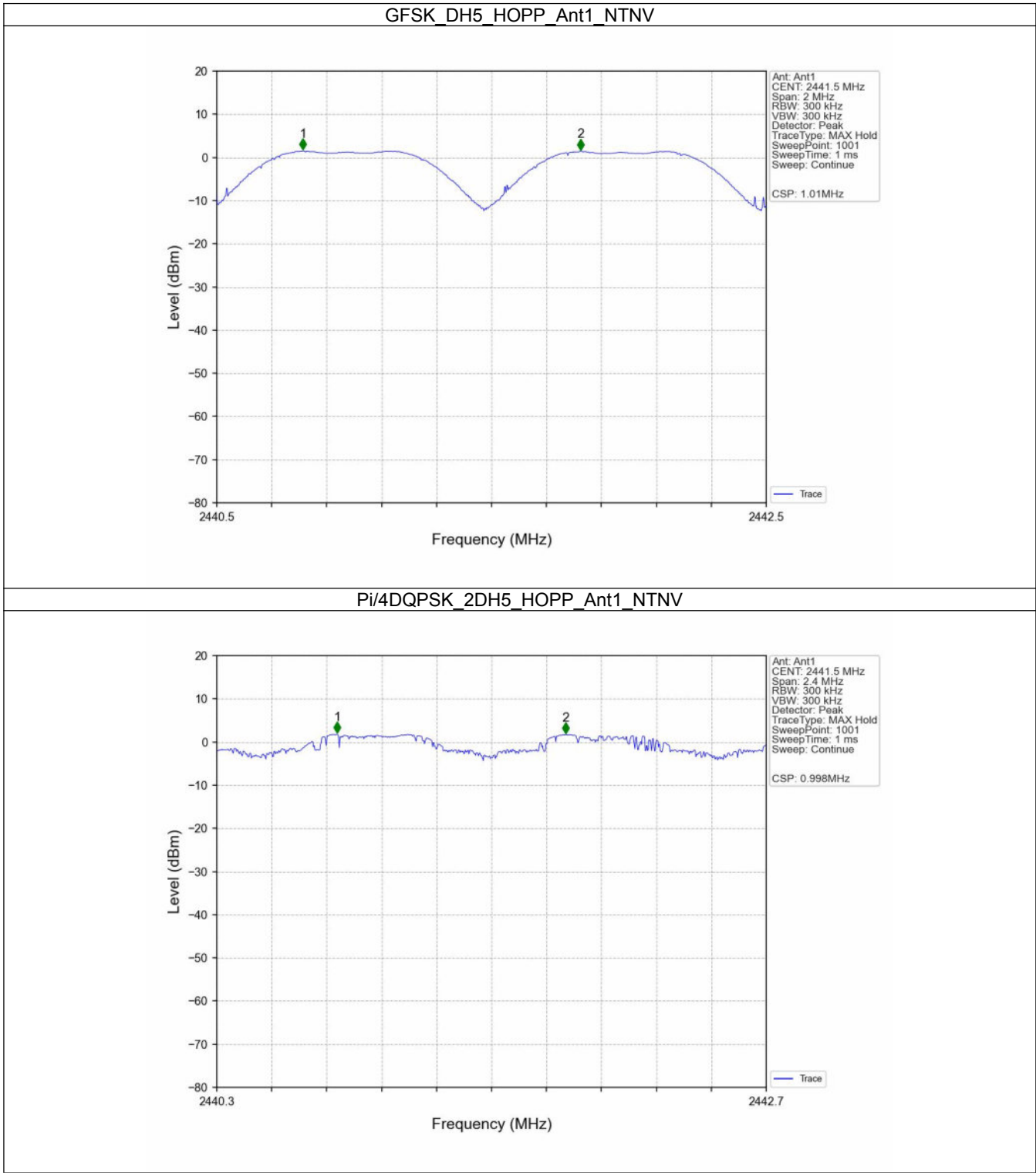
3.1.1 Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	1.010	0.986	≥ 0.986	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	0.998	1.325	≥ 0.883	Pass
8DPSK	SISO	HOPP	3DH5	1.025	1.314	≥ 0.876	Pass

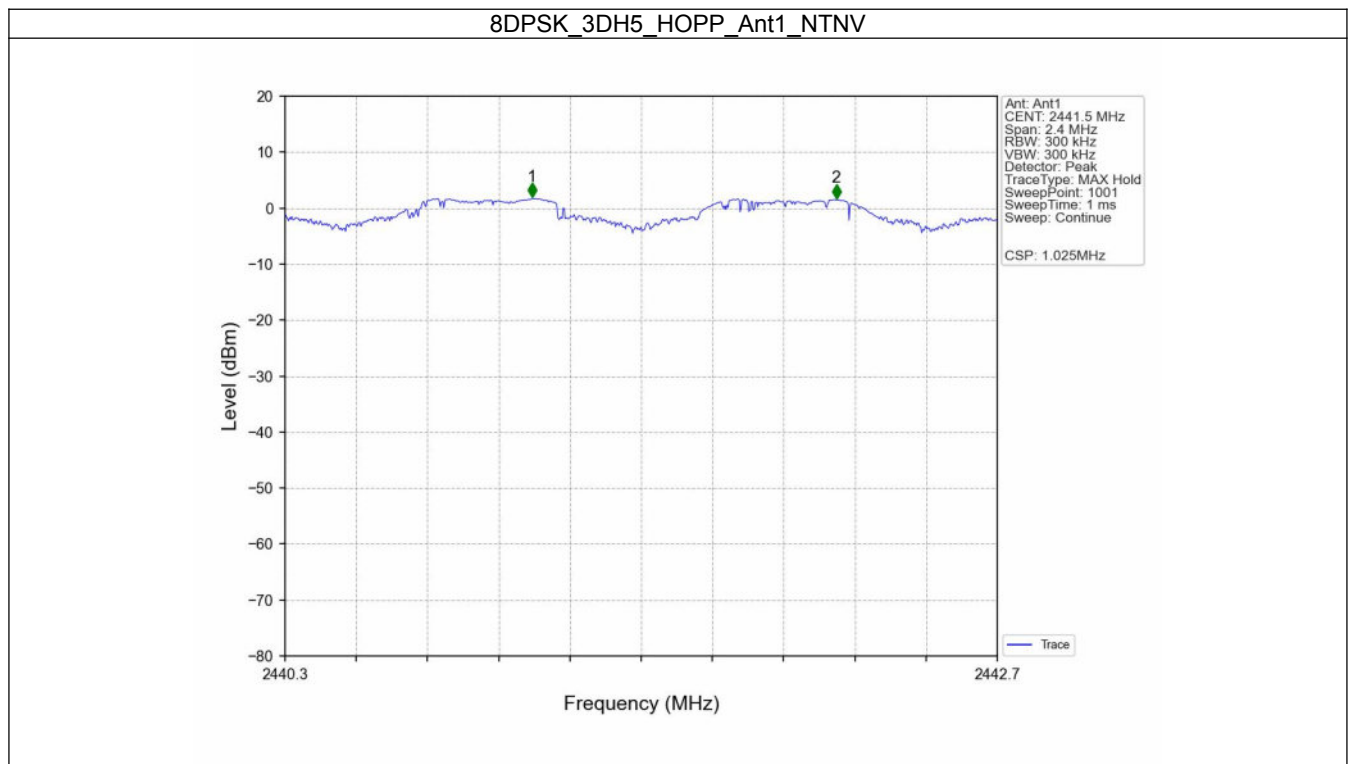
FCC ID: 2BWIABP1048B2

3.2 Test Graph

3.2.1 Ant1



FCC ID: 2BWIABP1048B2



FCC ID: 2BWIABP1048B2

4. Number of Hopping Frequencies

4.1 Test Result

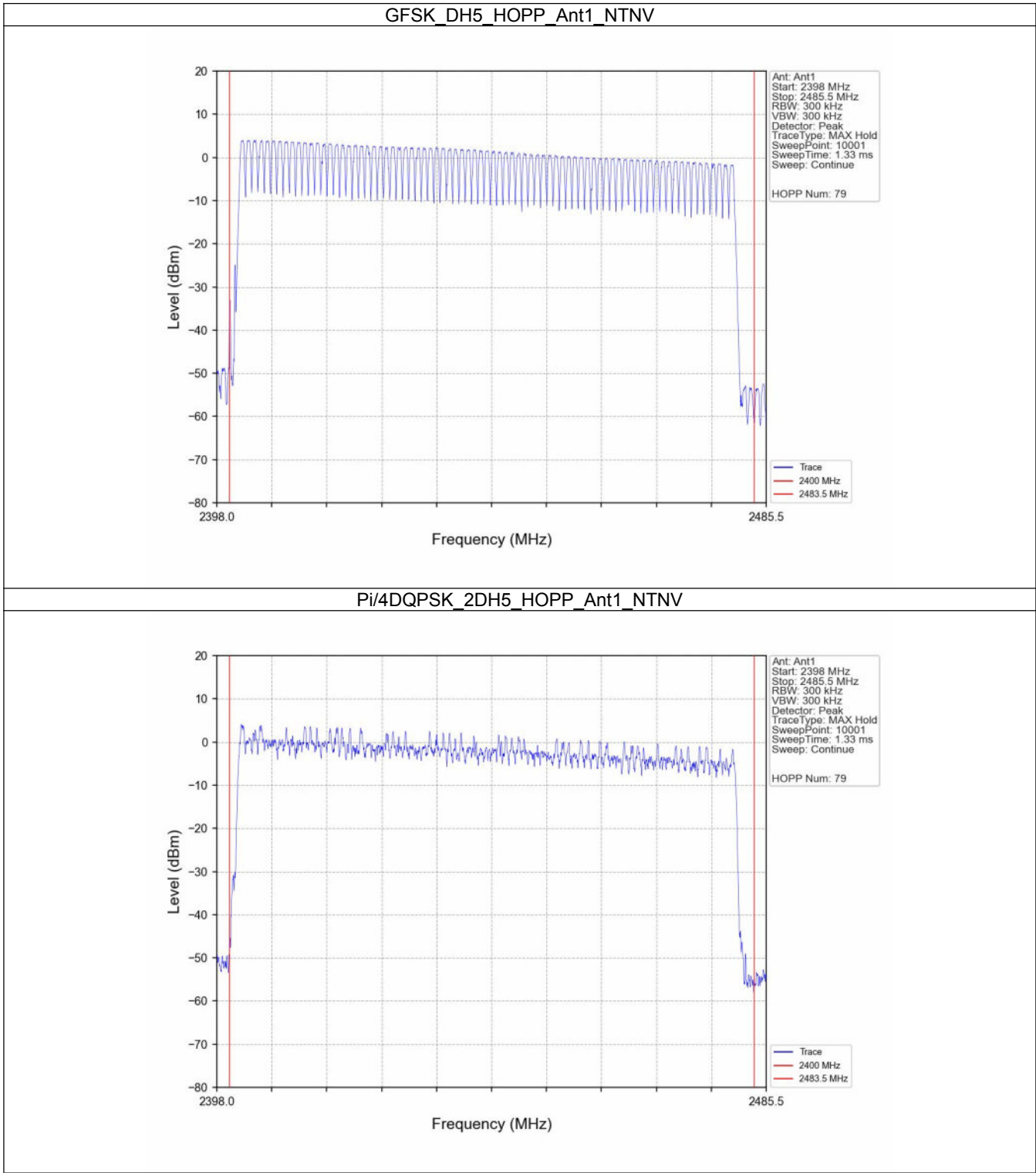
4.1.1 HoppNum

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

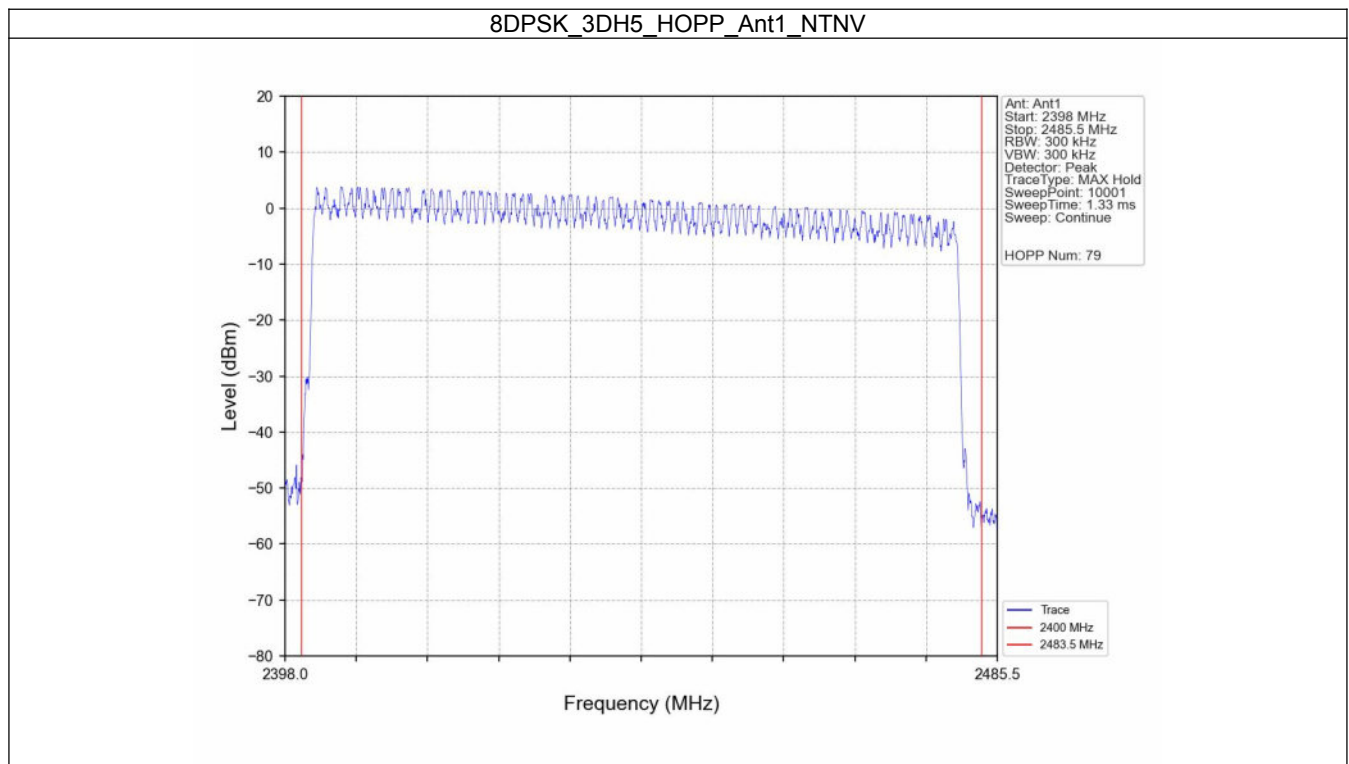
FCC ID: 2BWIABP1048B2

4.2 Test Graph

4.2.1 HoppNum



FCC ID: 2BWIABP1048B2



FCC ID: 2BWIABP1048B2

5. Time of Occupancy (Dwell Time)

5.1 Test Result

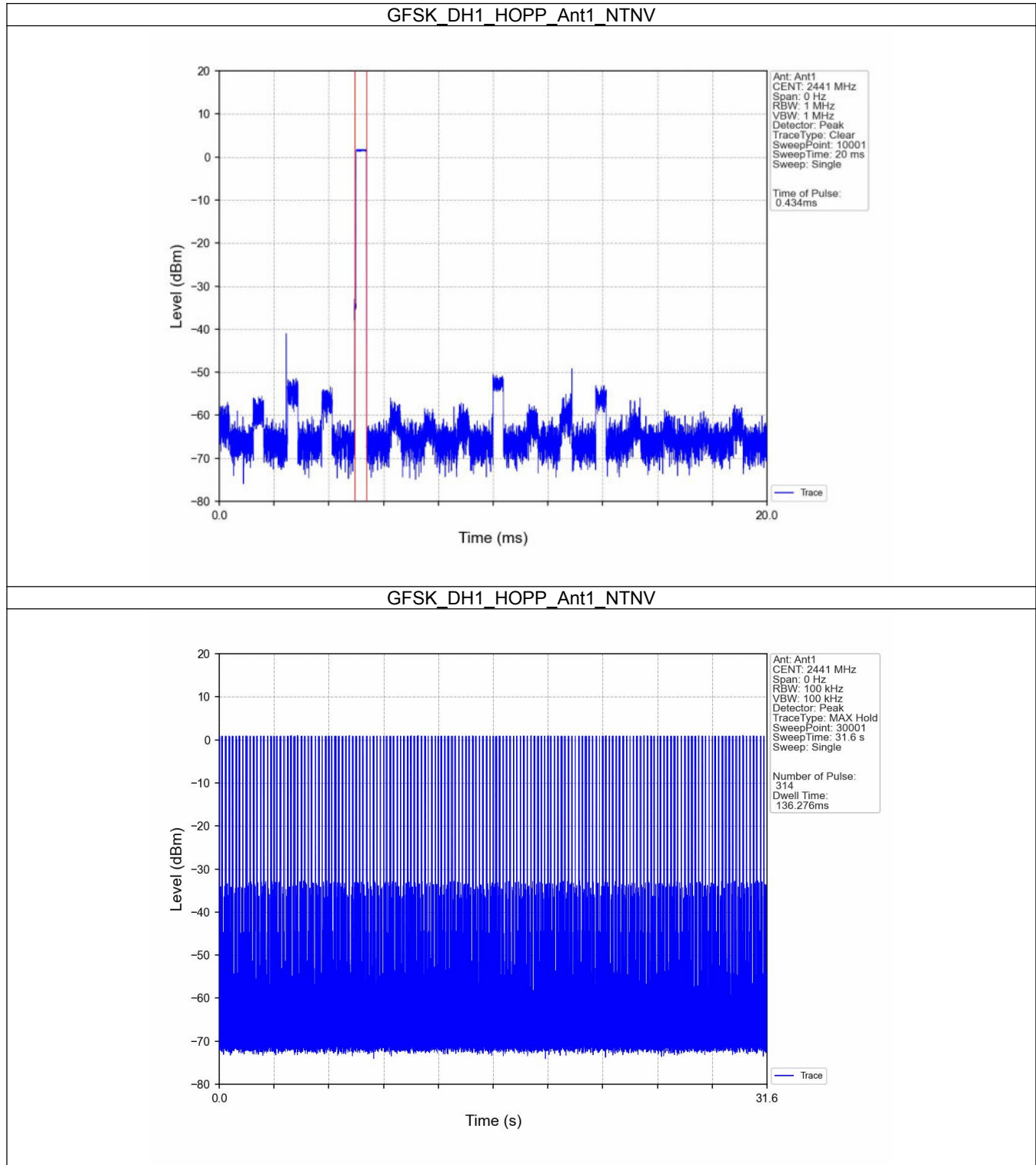
5.1.1 Ant1

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	0.434	31.600	314	136.276	<=400	Pass
			DH3	1.698	31.600	173	293.754	<=400	Pass
			DH5	2.946	31.600	108	318.168	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.450	31.600	314	141.300	<=400	Pass
			2DH3	1.700	31.600	174	295.800	<=400	Pass
			2DH5	2.950	31.600	110	324.500	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.390	31.600	314	122.460	<=400	Pass
			3DH3	1.702	31.600	173	294.446	<=400	Pass
			3DH5	2.952	31.600	100	295.200	<=400	Pass

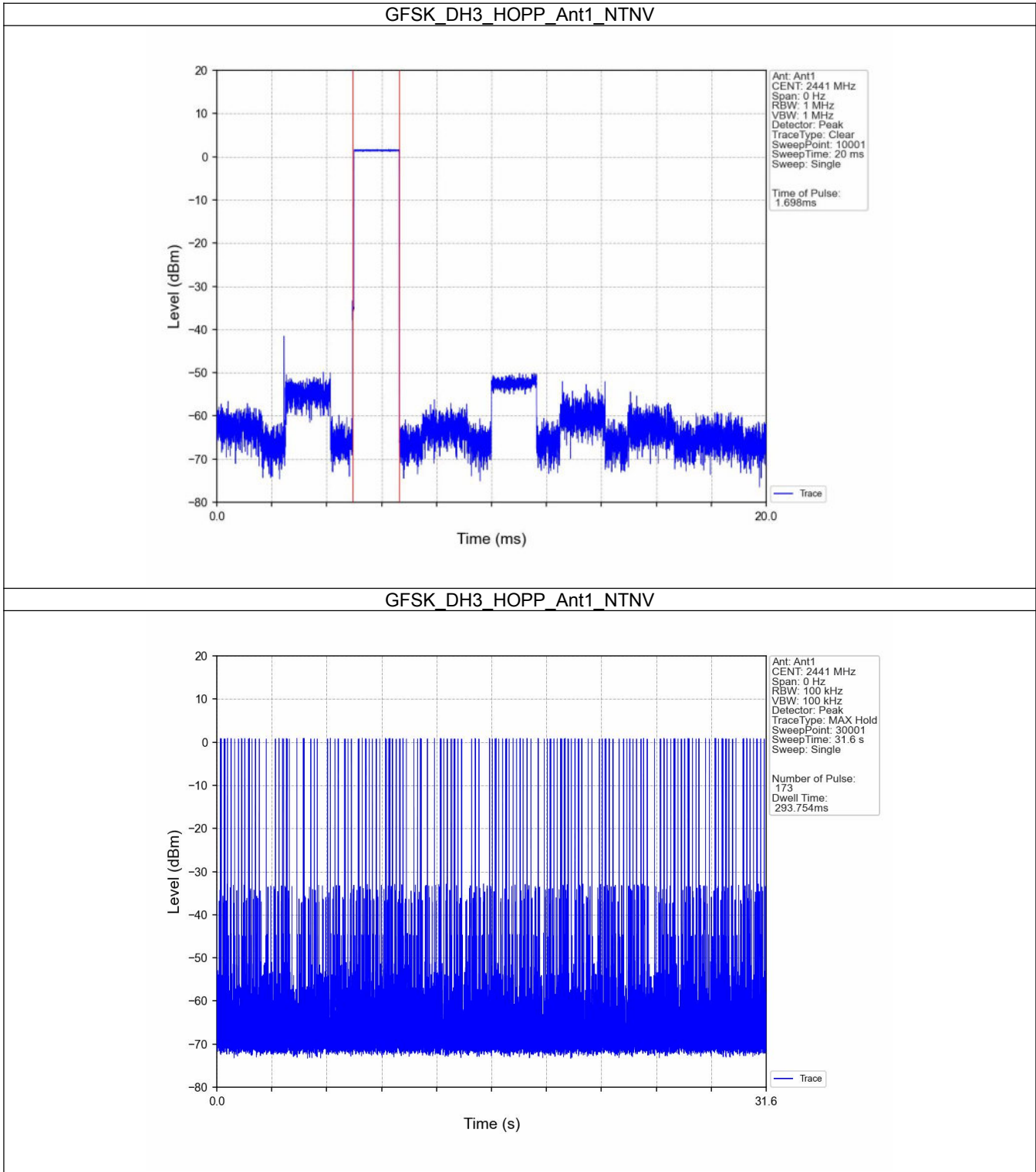
FCC ID: 2BWIABP1048B2

5.2 Test Graph

5.2.1 Ant1

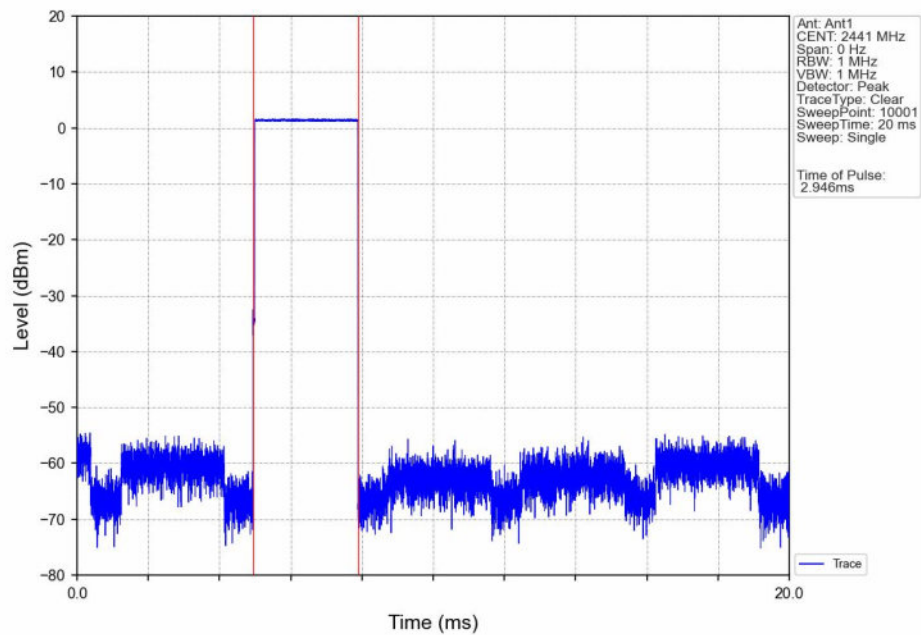


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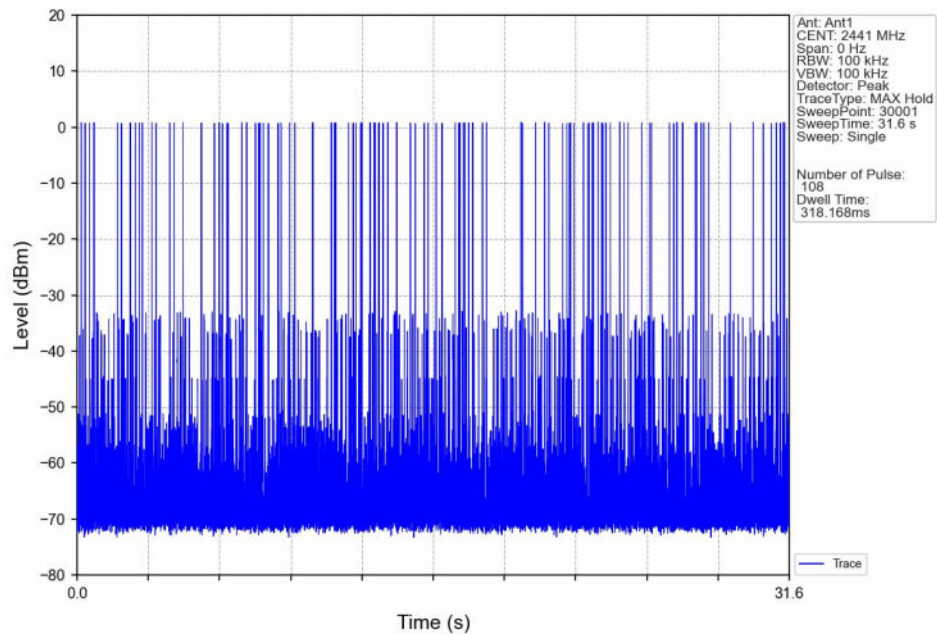


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GFSK_DH5_HOPP_Ant1_NTNV

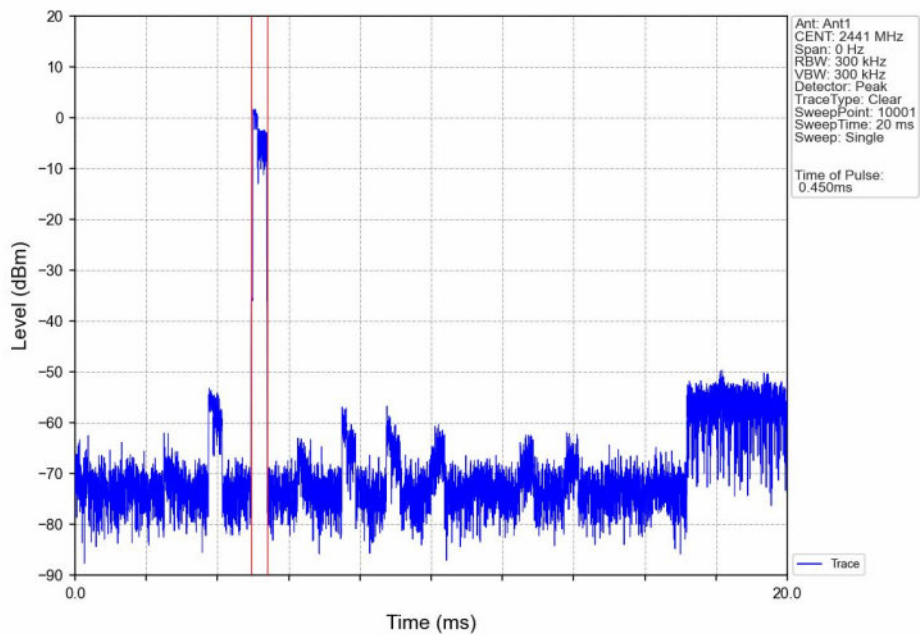


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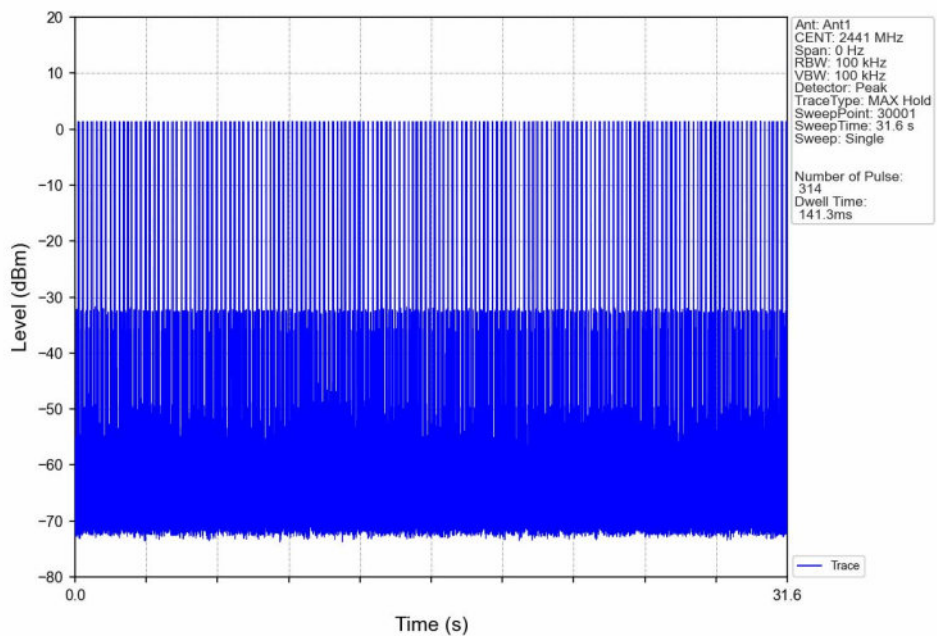


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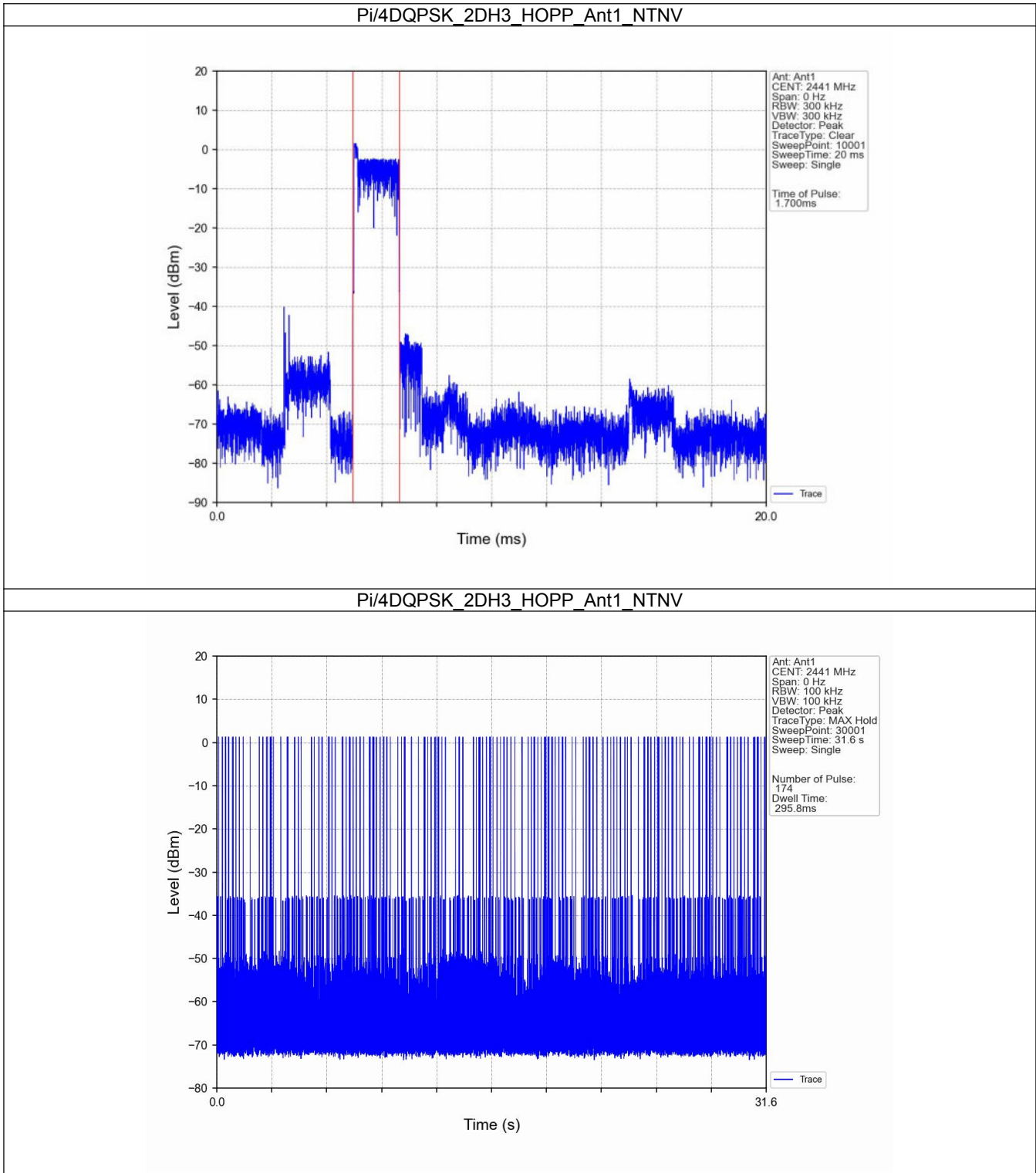
Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV



Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV

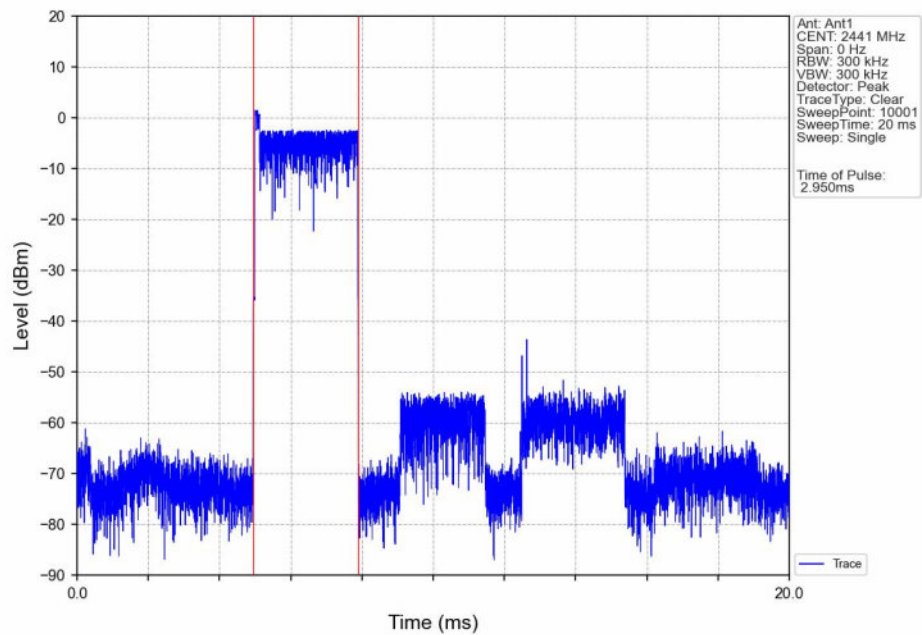


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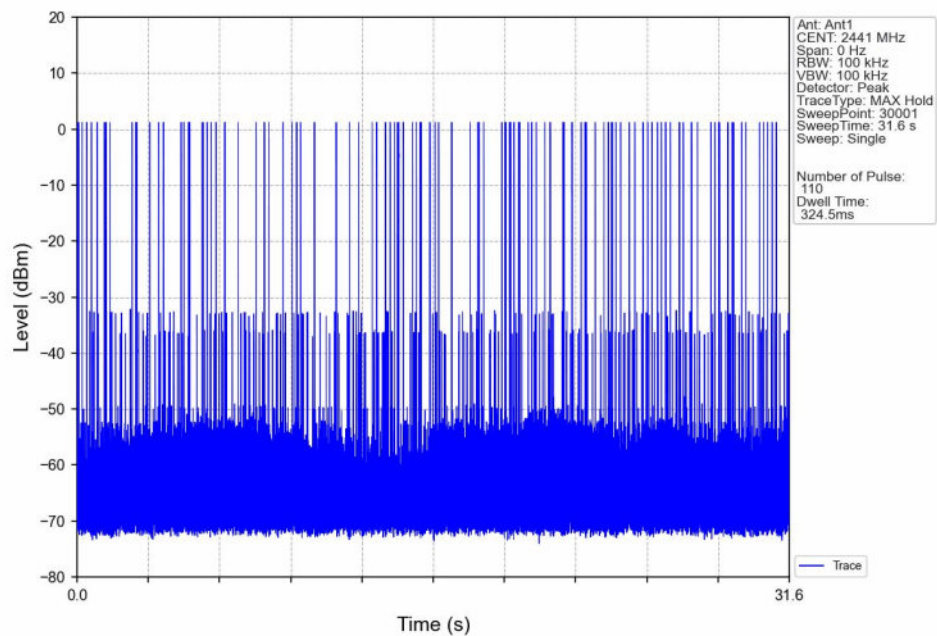


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Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV

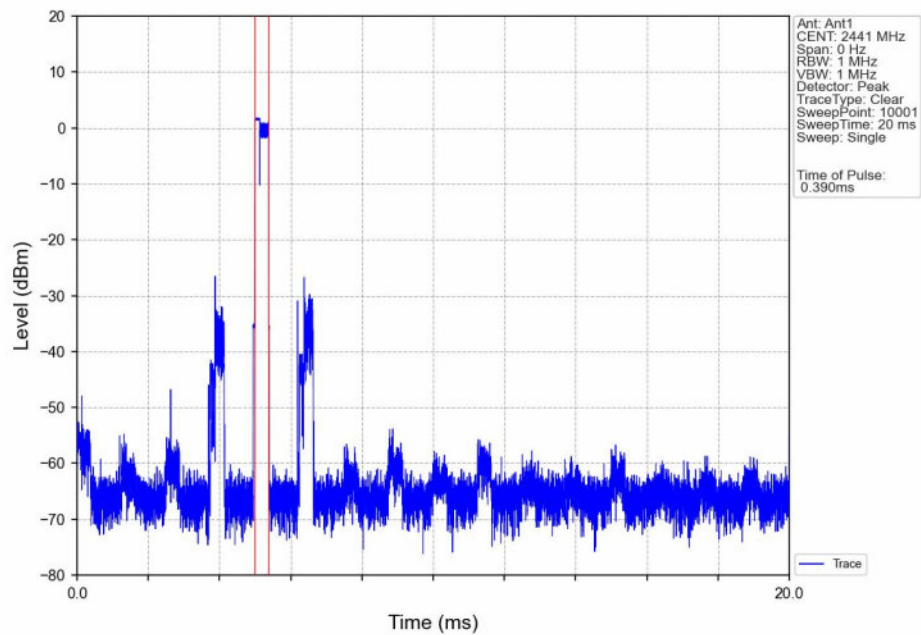


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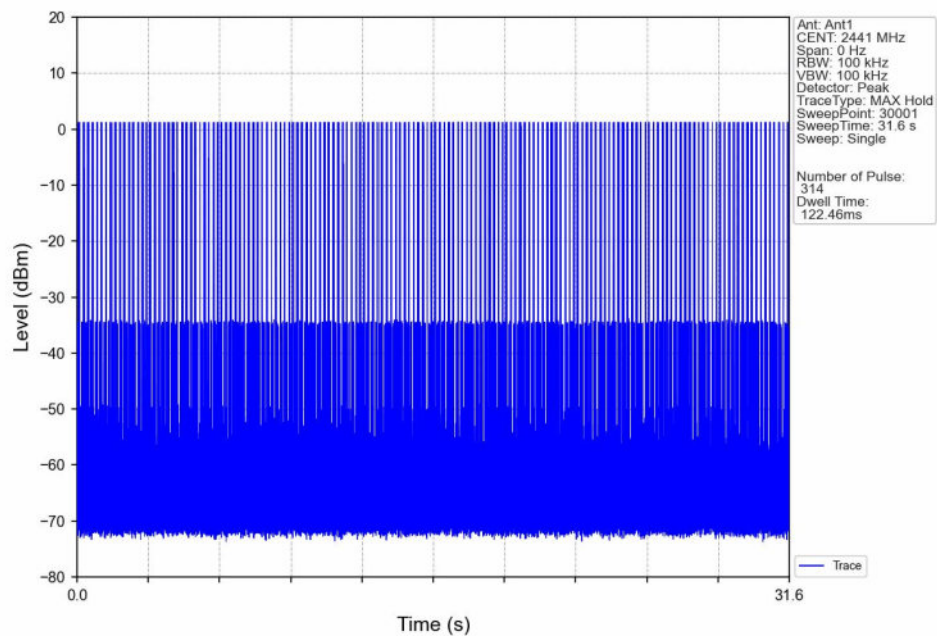


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8DPSK_3DH1_HOPP_Ant1_NTNV

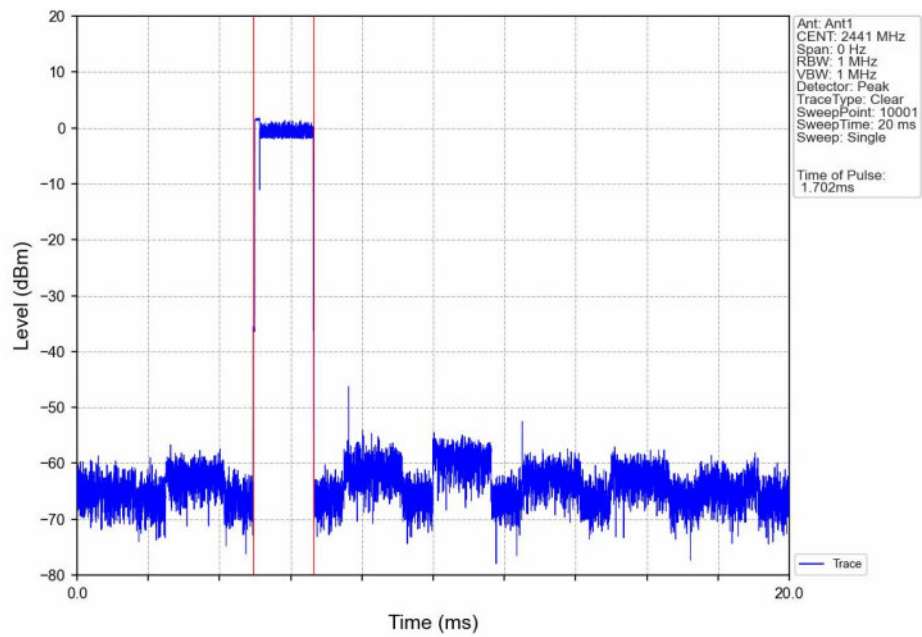


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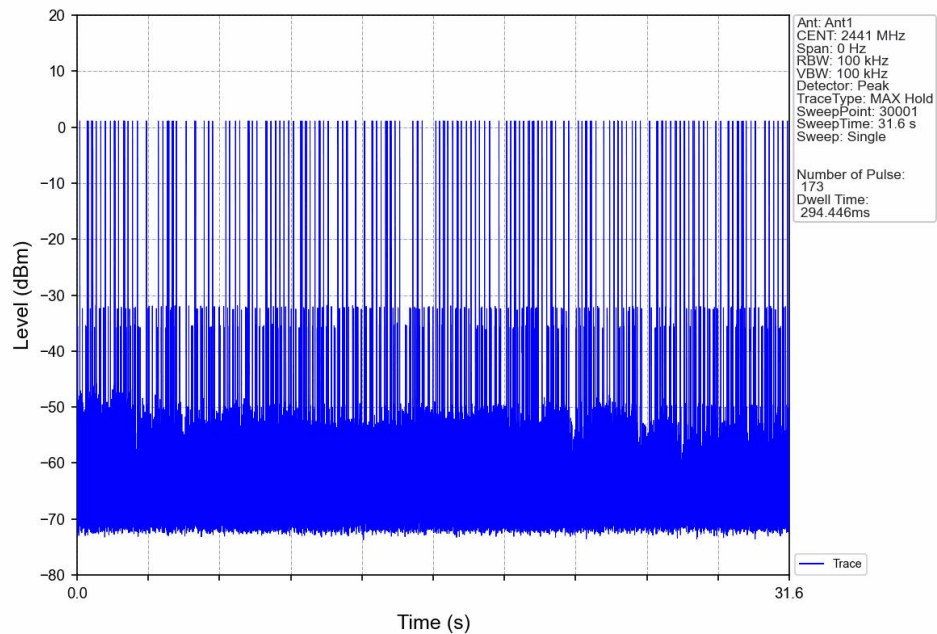


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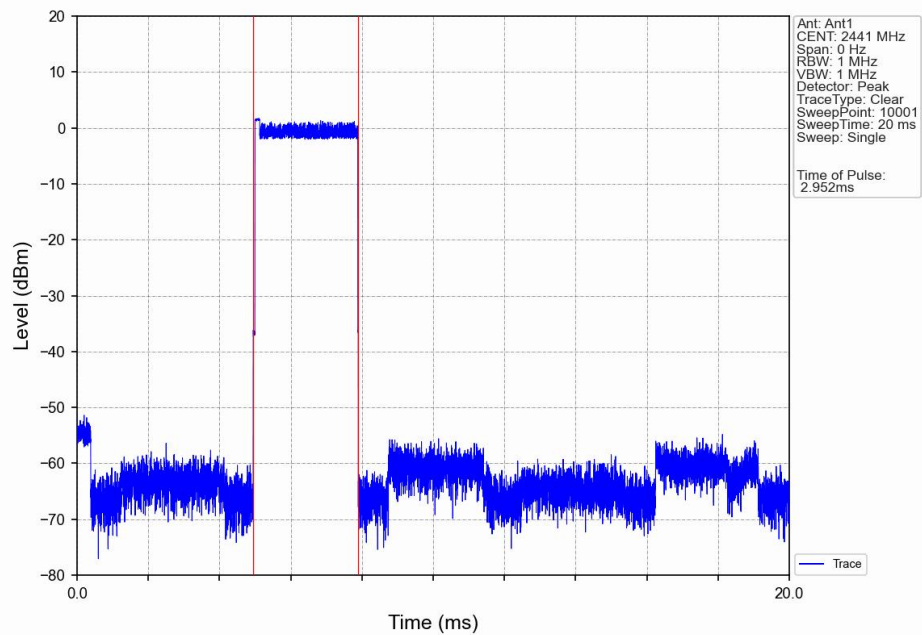


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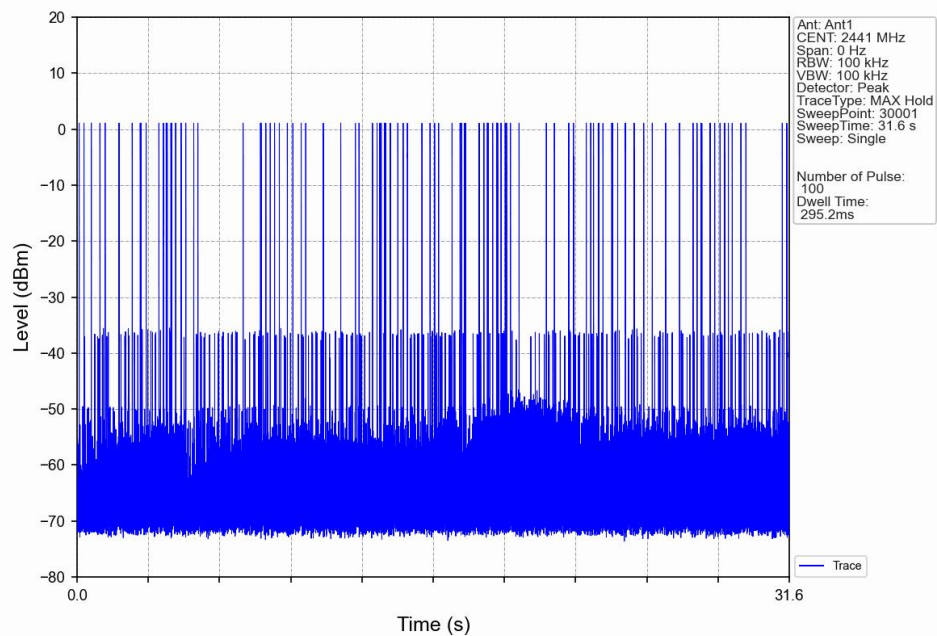


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8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



FCC ID: 2BWIABP1048B2

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	3.89
		2441	DH5	1	1.47
		2480	DH5	1	-2.05
		HOPP	DH5	1	3.57
					3.57
Pi/4DQPSK	SISO	2402	2DH5	1	4.13
		2441	2DH5	1	1.81
		2480	2DH5	1	-1.70
		HOPP	2DH5	1	3.94
					3.94
8DPSK	SISO	2402	3DH5	1	3.96
		2441	3DH5	1	1.63
		2480	3DH5	1	-1.86
		HOPP	3DH5	1	3.97
					3.97

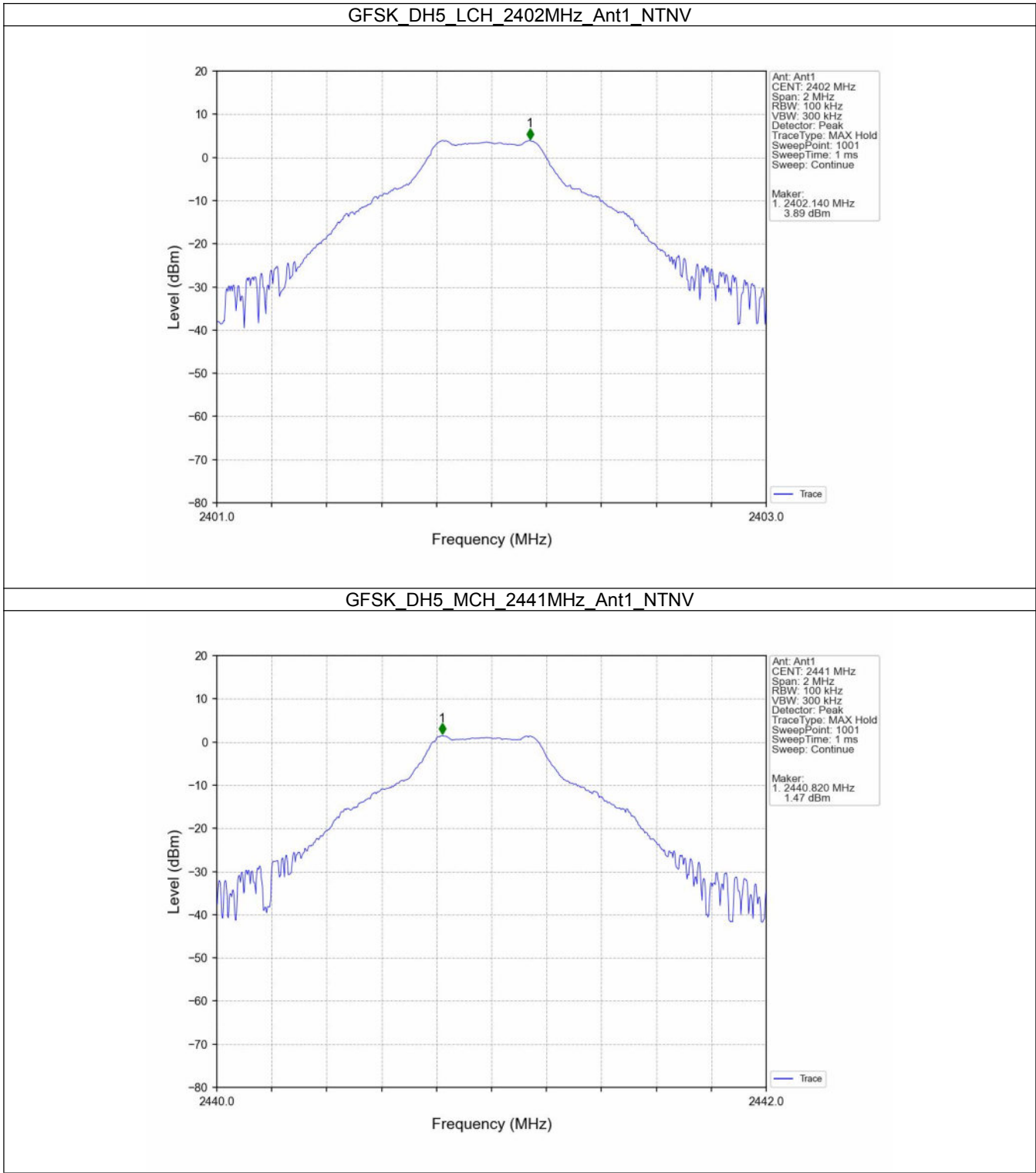
6.1.2 CSE

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	3.89	-16.11	Pass
		2441	DH5	1	1.47	-18.53	Pass
		2480	DH5	1	-2.05	-22.05	Pass
		HOPP	DH5	1	3.57	-16.43	Pass
					3.57	-16.43	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	4.13	-15.87	Pass
		2441	2DH5	1	1.81	-18.19	Pass
		2480	2DH5	1	-1.70	-21.70	Pass
		HOPP	2DH5	1	3.94	-16.06	Pass
					3.94	-16.06	Pass
8DPSK	SISO	2402	3DH5	1	3.96	-16.04	Pass
		2441	3DH5	1	1.63	-18.37	Pass
		2480	3DH5	1	-1.86	-21.86	Pass
		HOPP	3DH5	1	3.97	-16.03	Pass
					3.97	-16.03	Pass

FCC ID: 2BWIABP1048B2

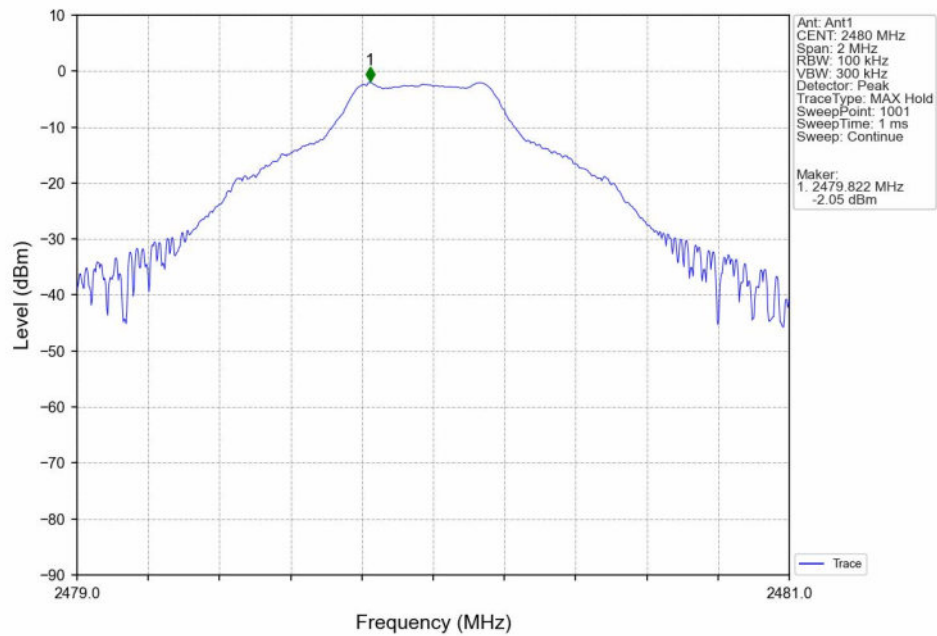
6.2 Test Graph

6.2.1 Ref

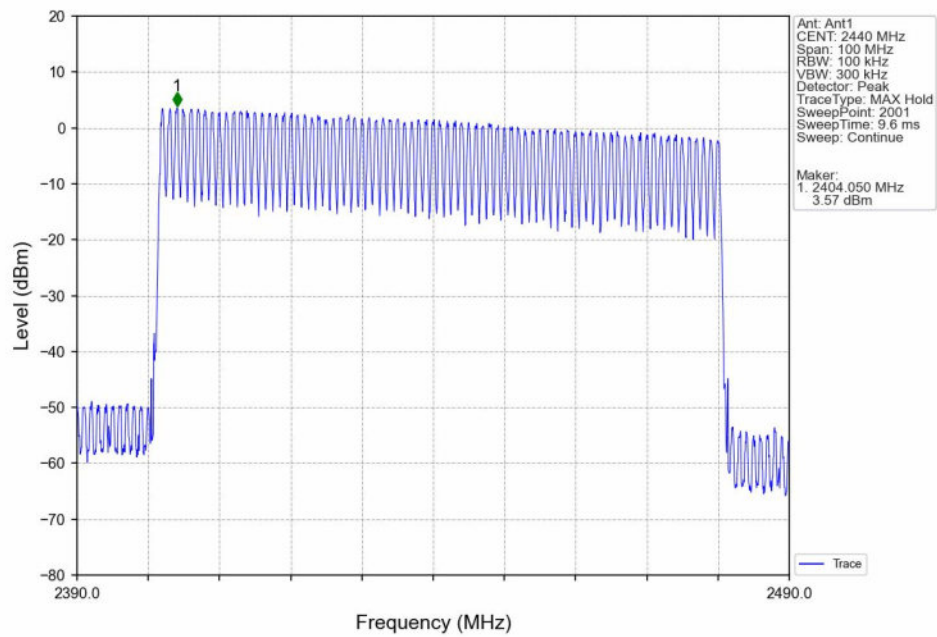


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GFSK_DH5_HCH_2480MHz_Ant1_NTNV

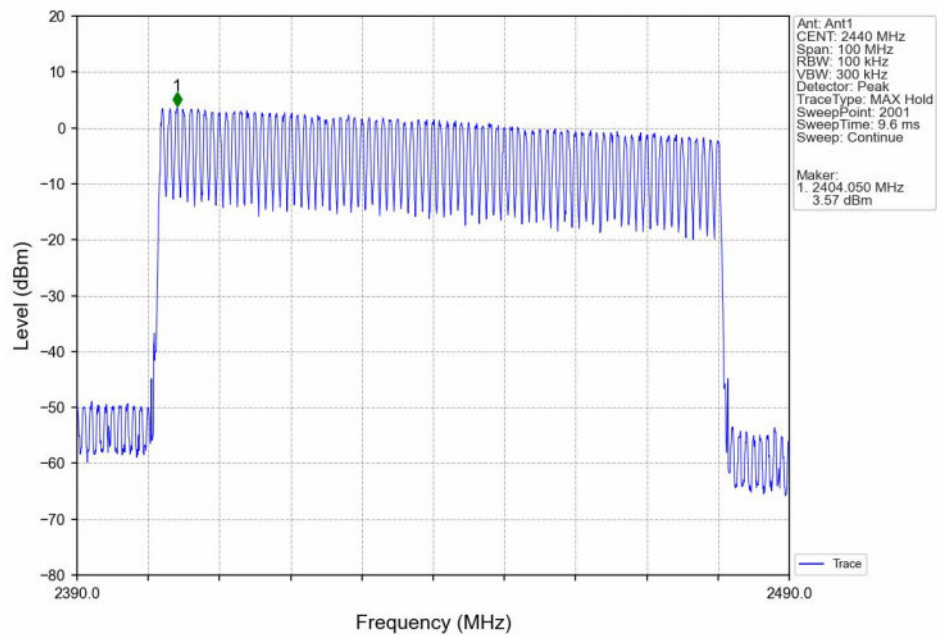


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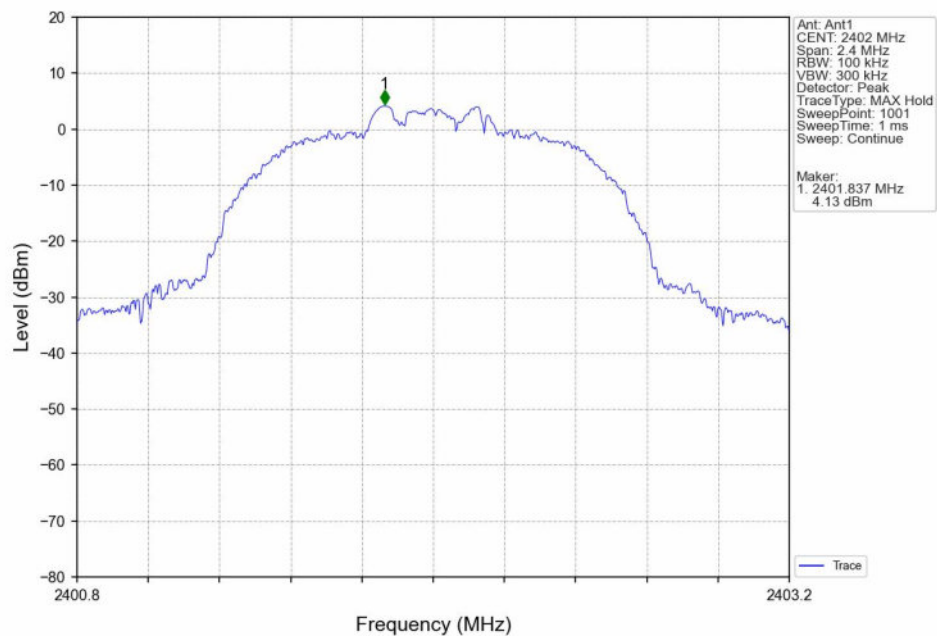


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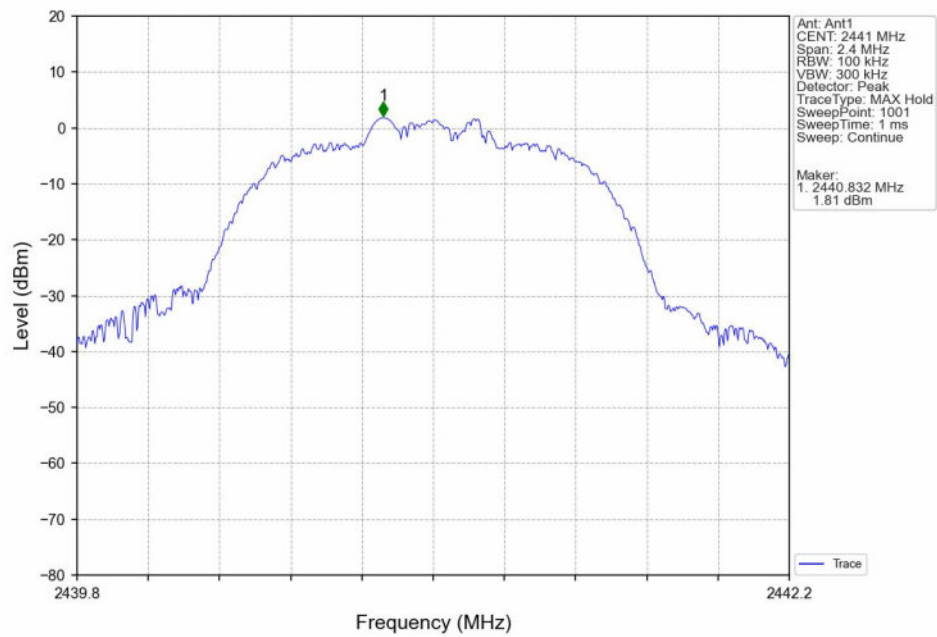


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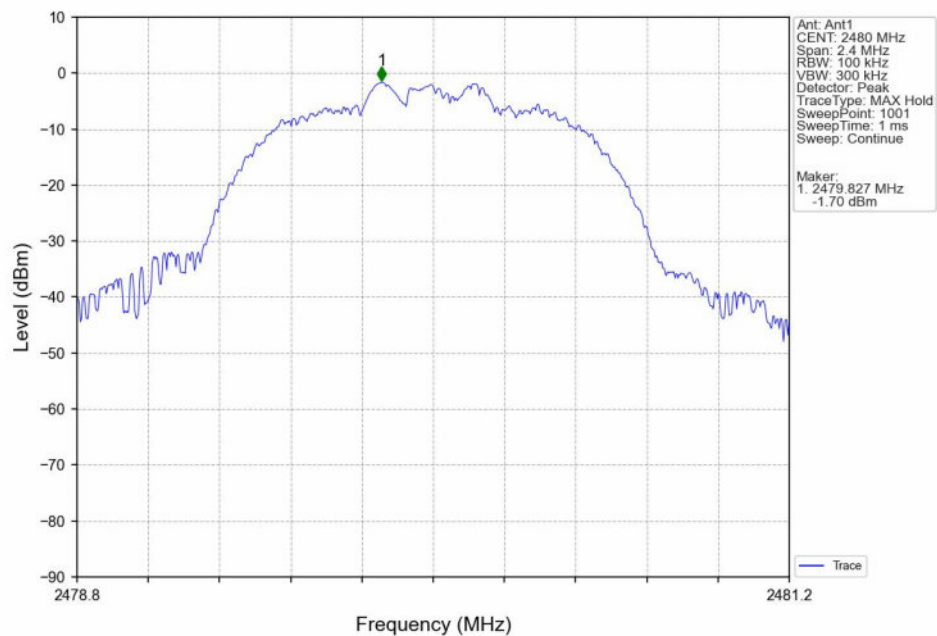


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Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV

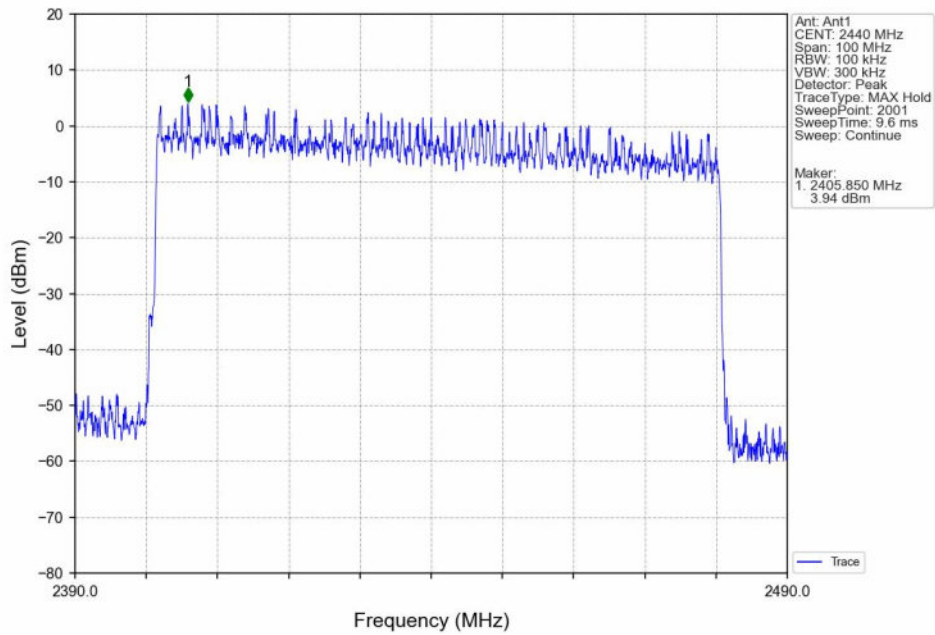


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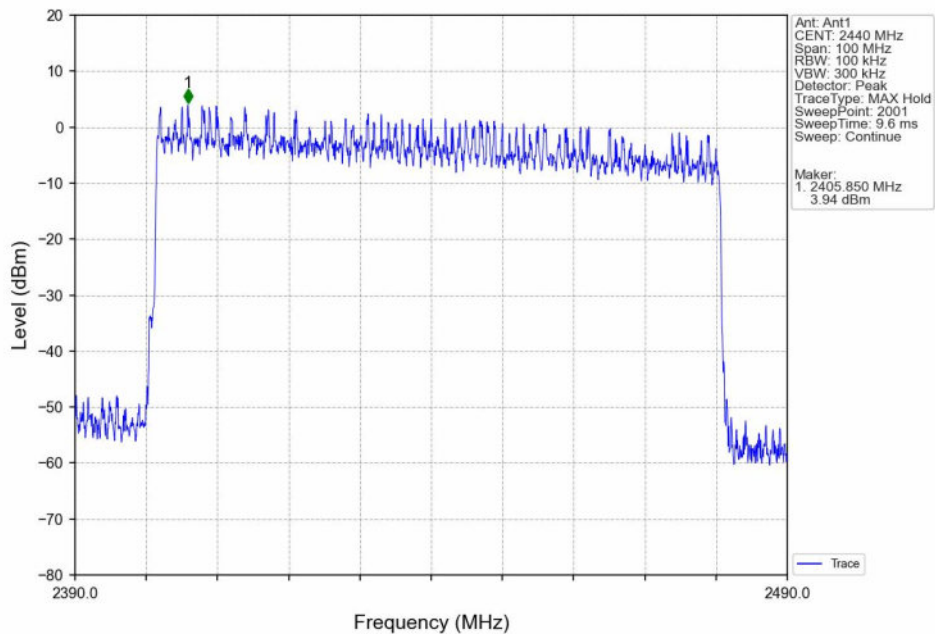


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Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV

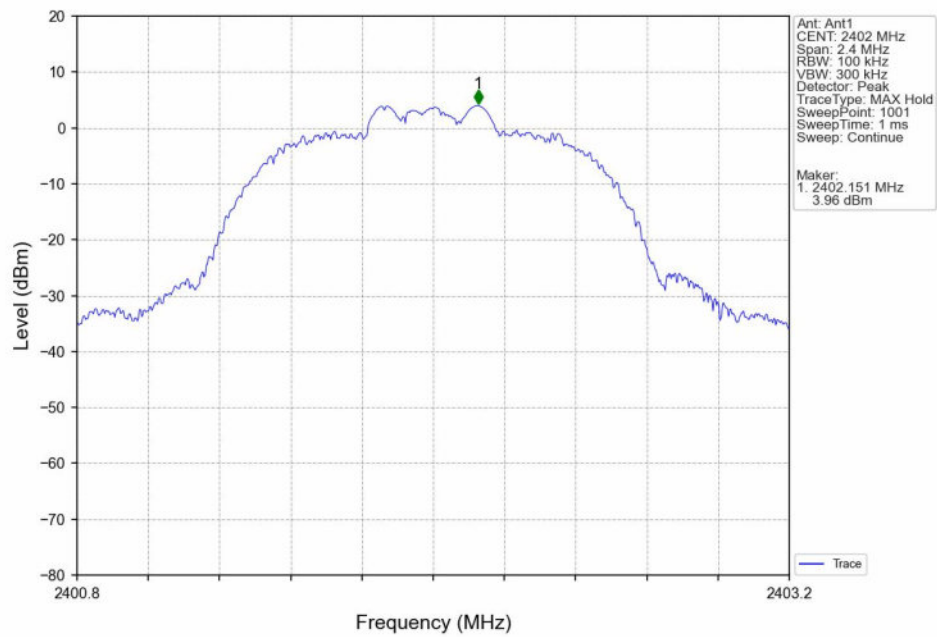


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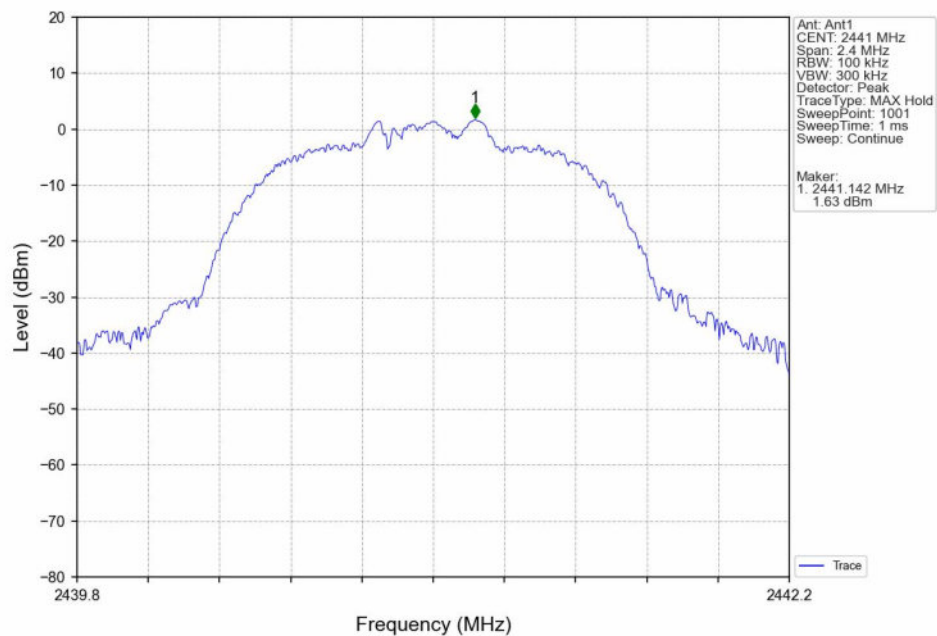


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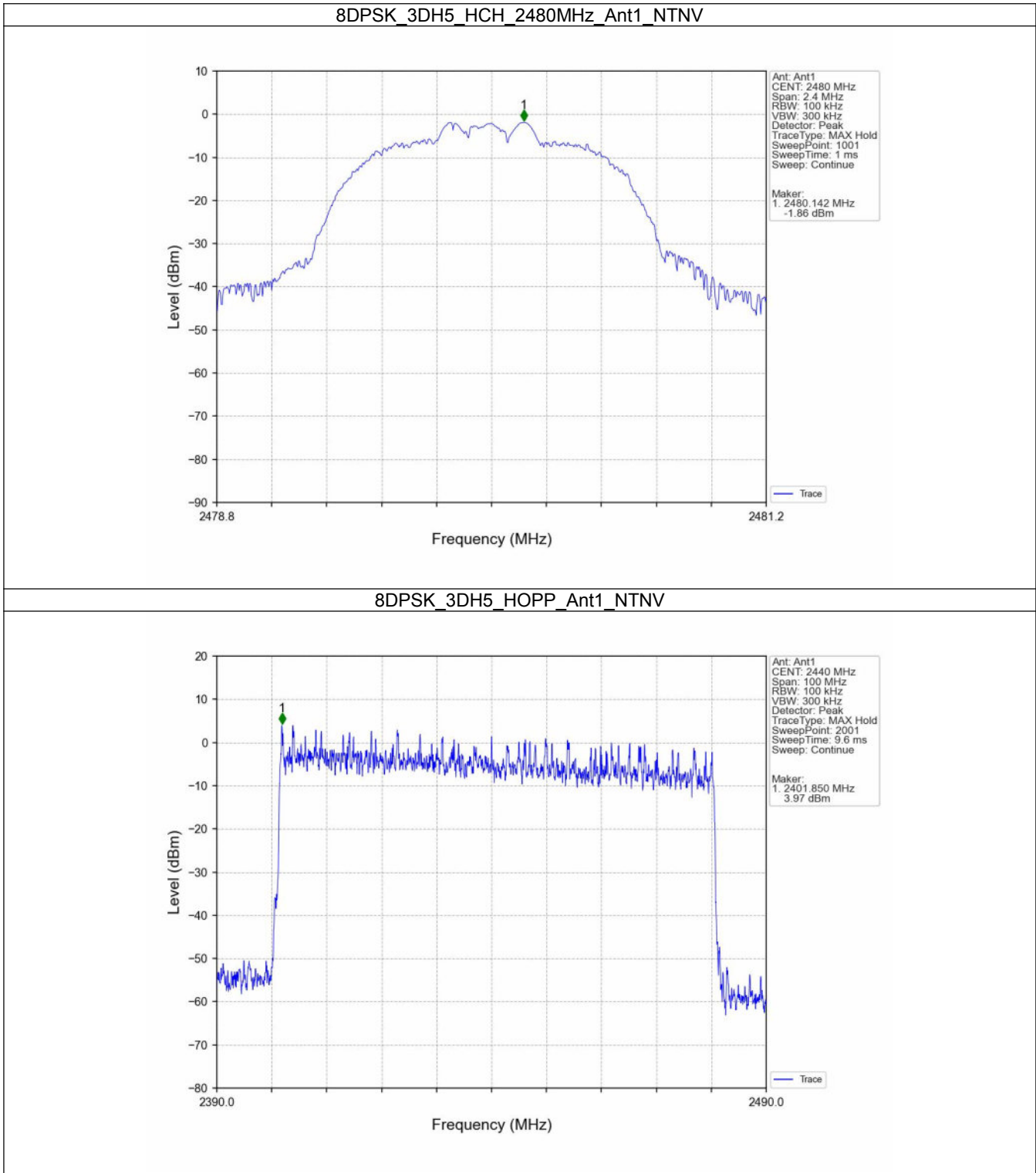
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



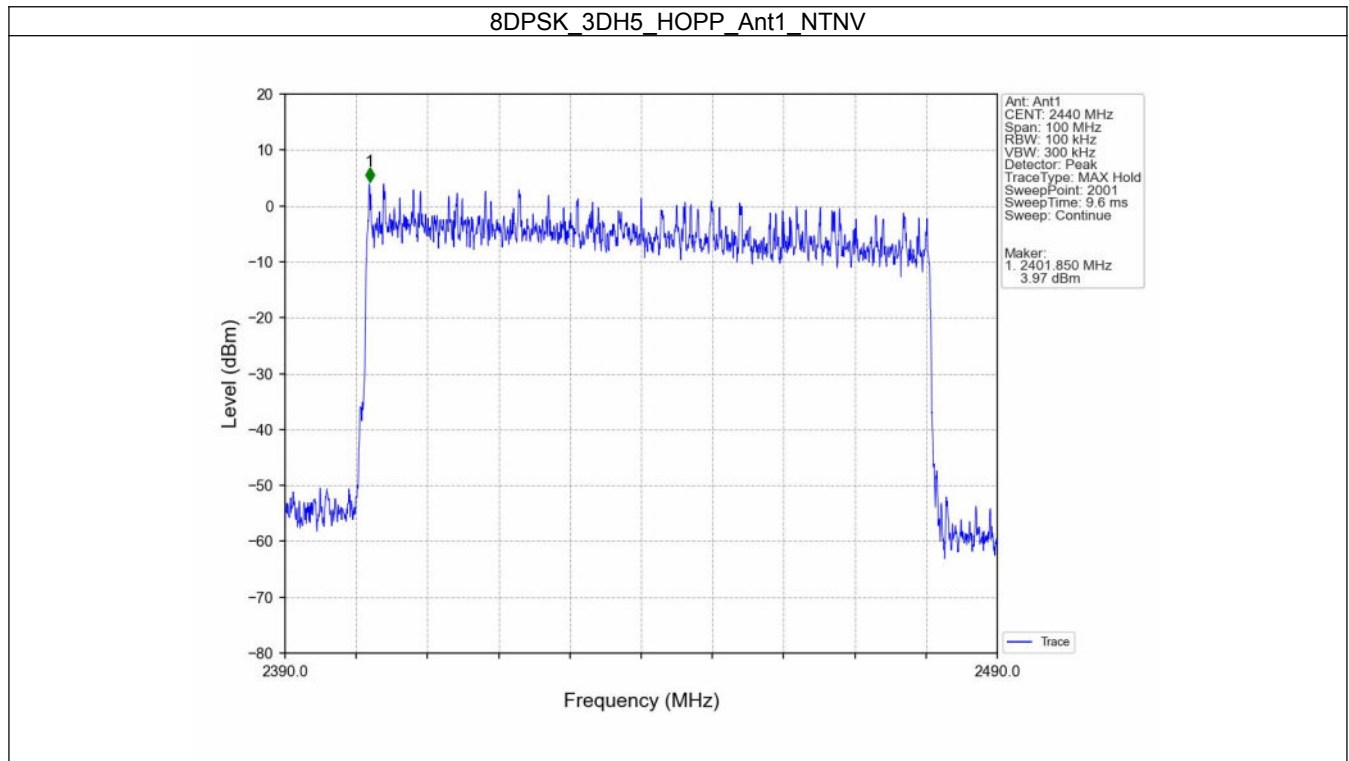
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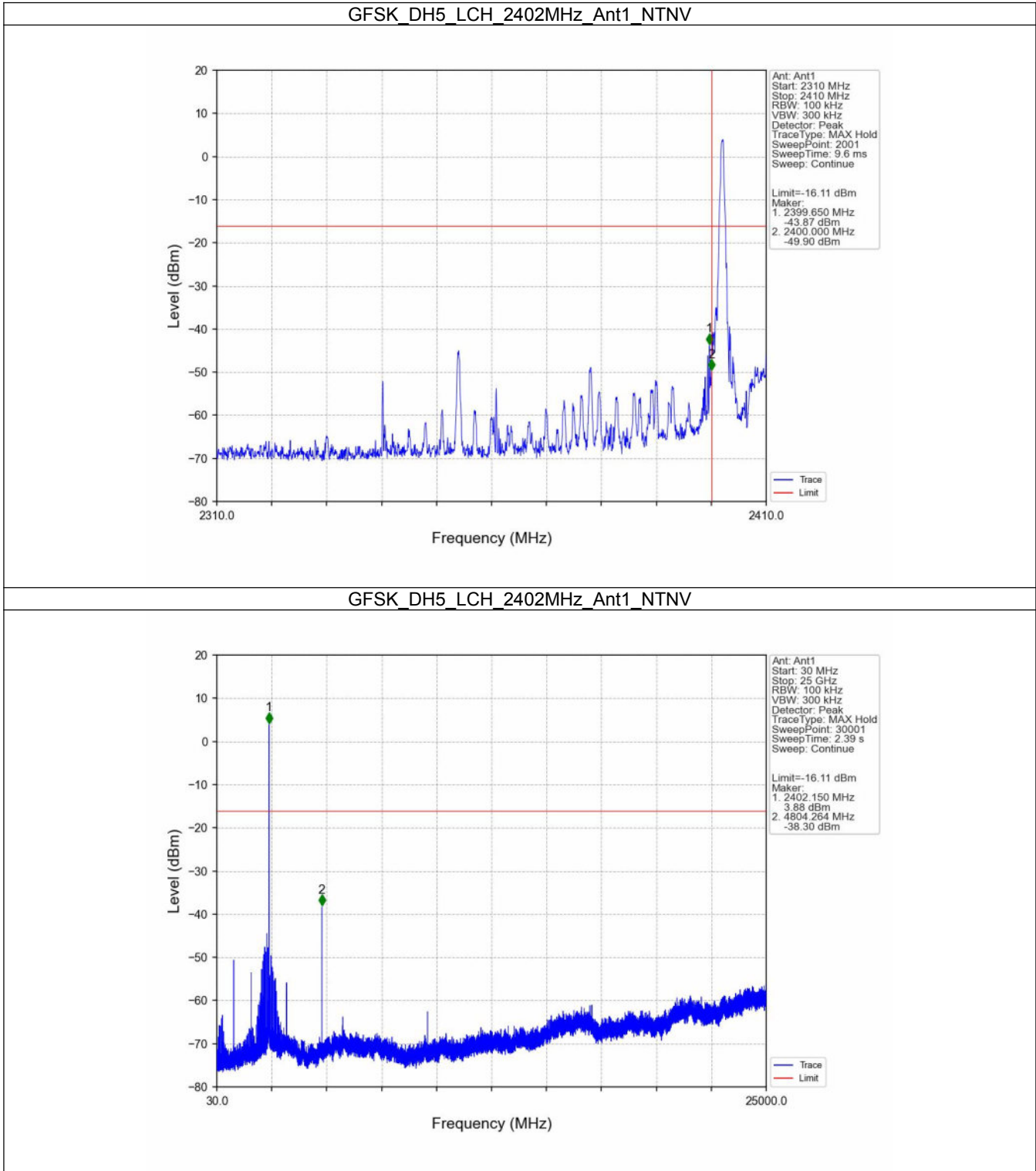


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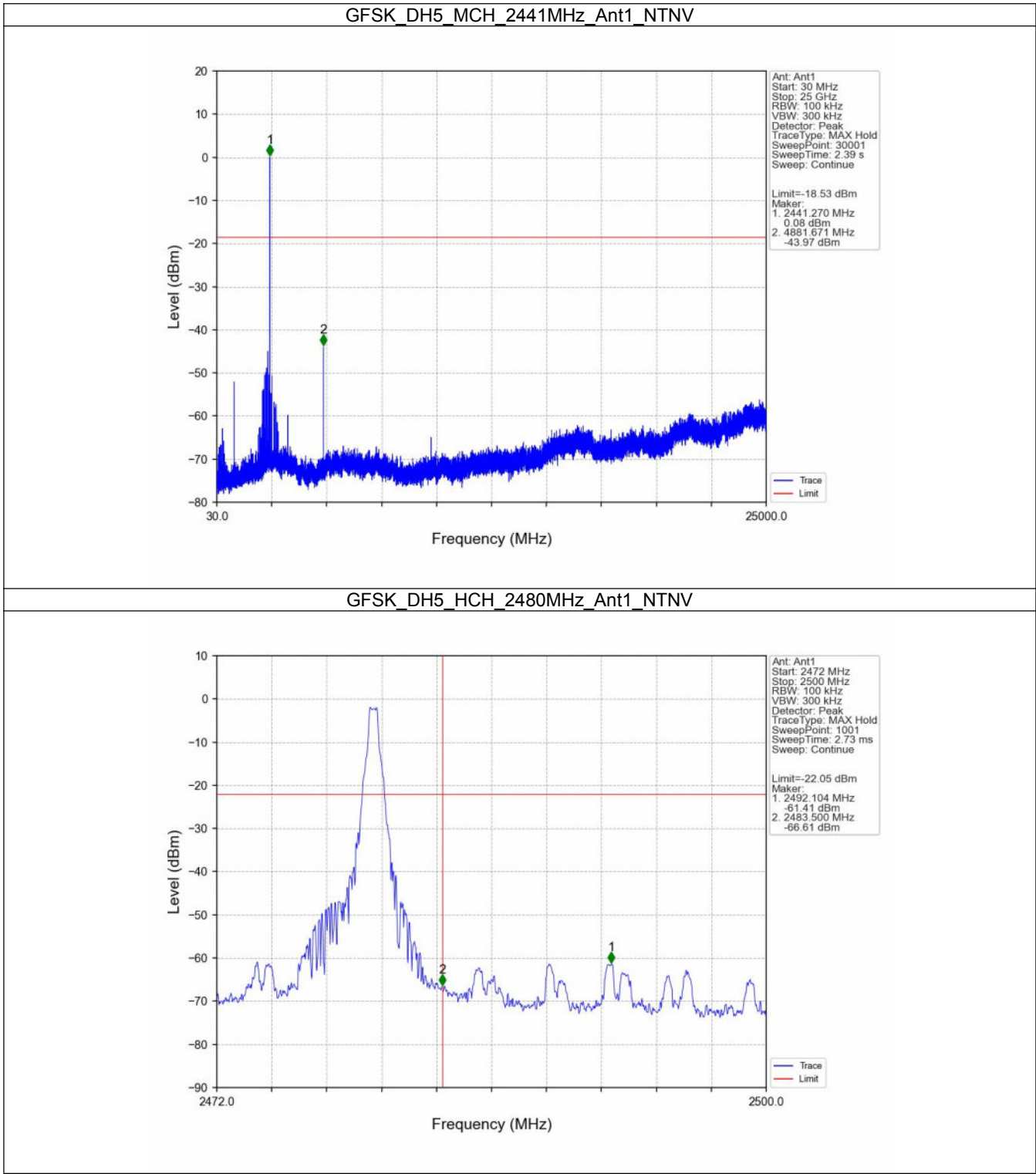


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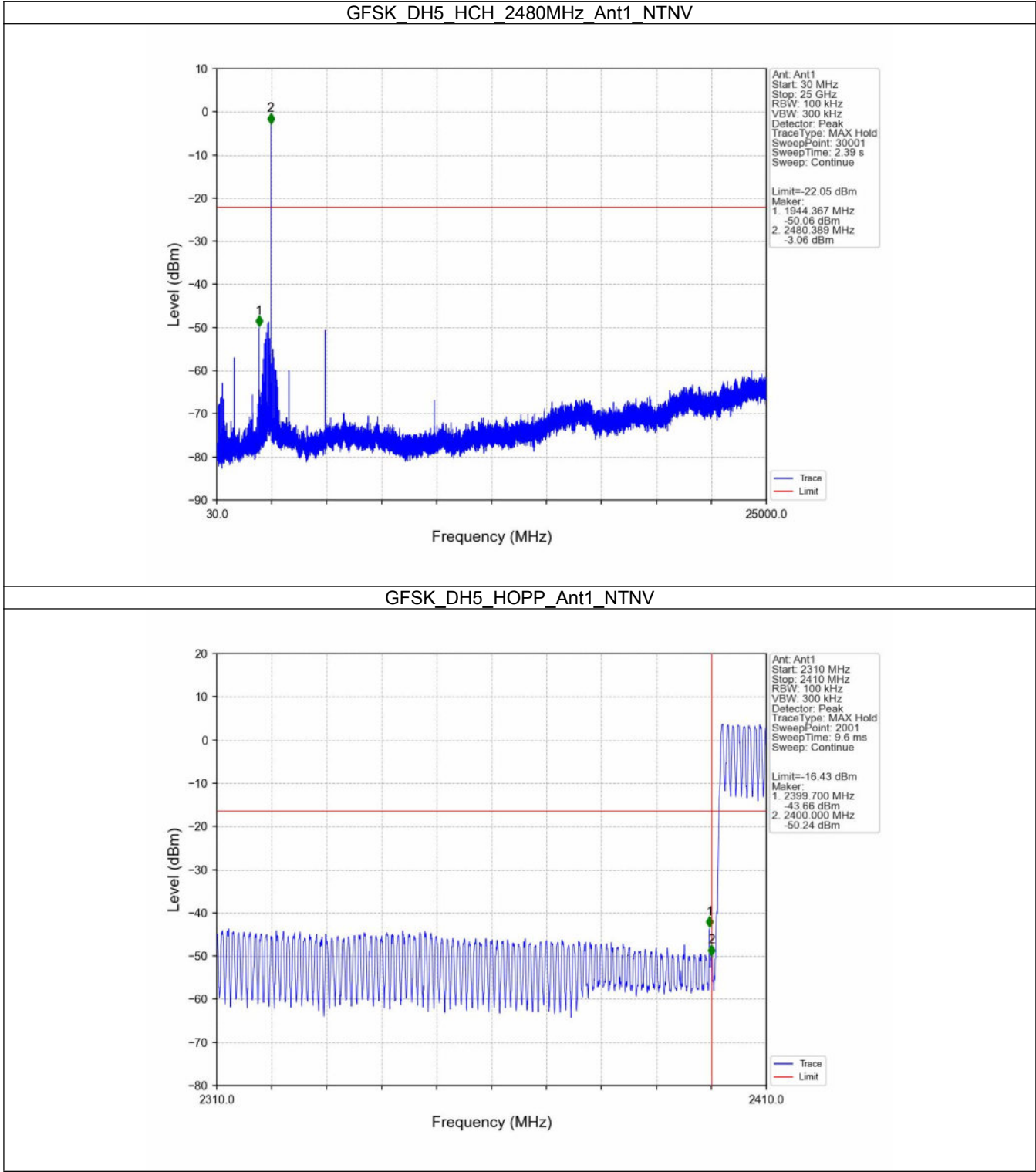
6.2.2 CSE



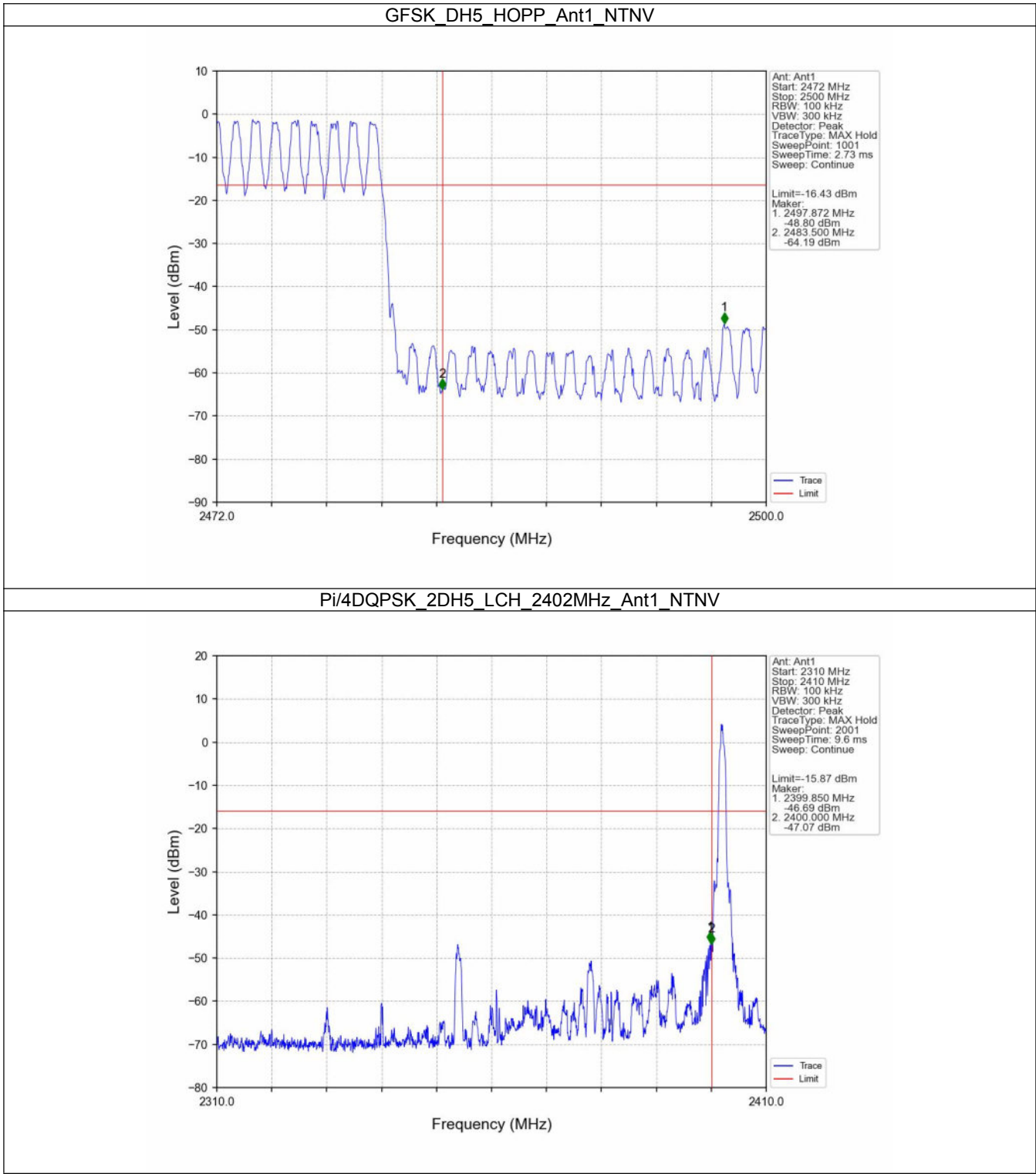
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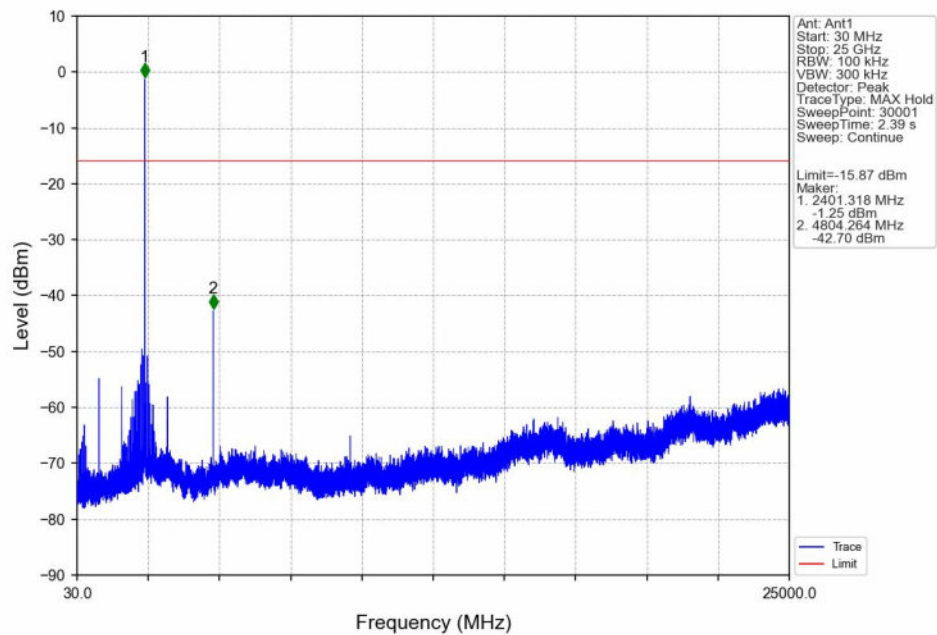


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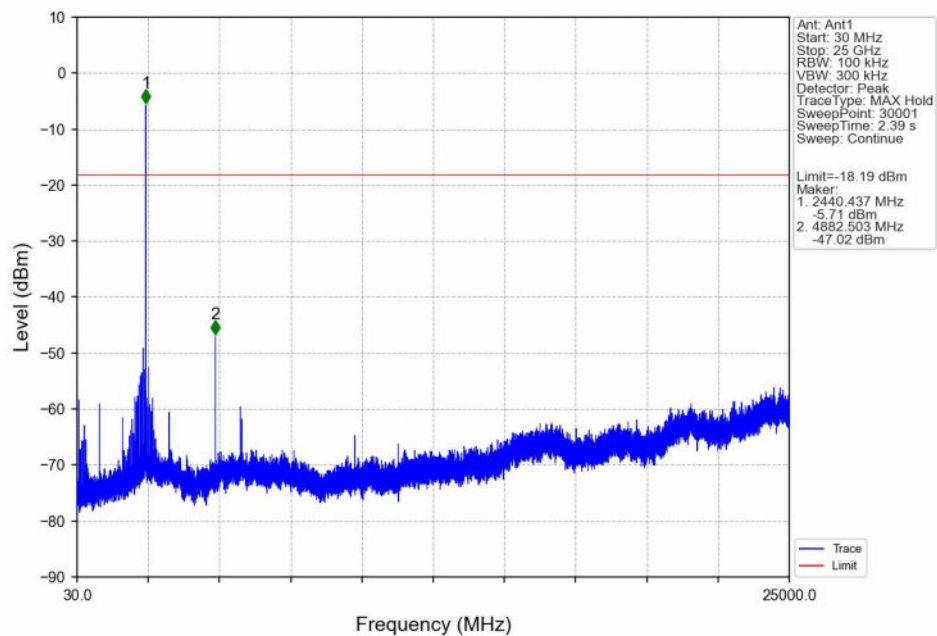


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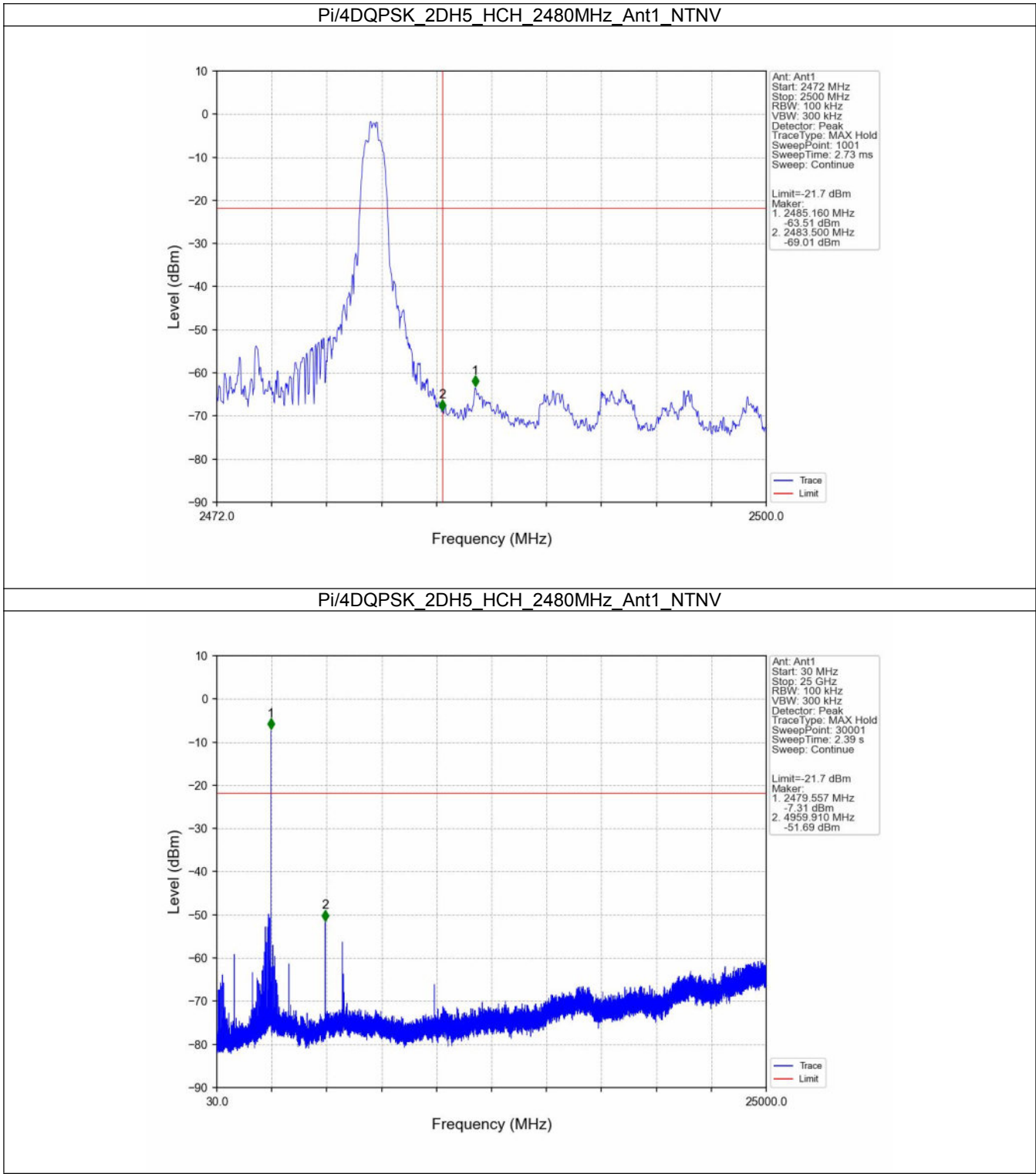
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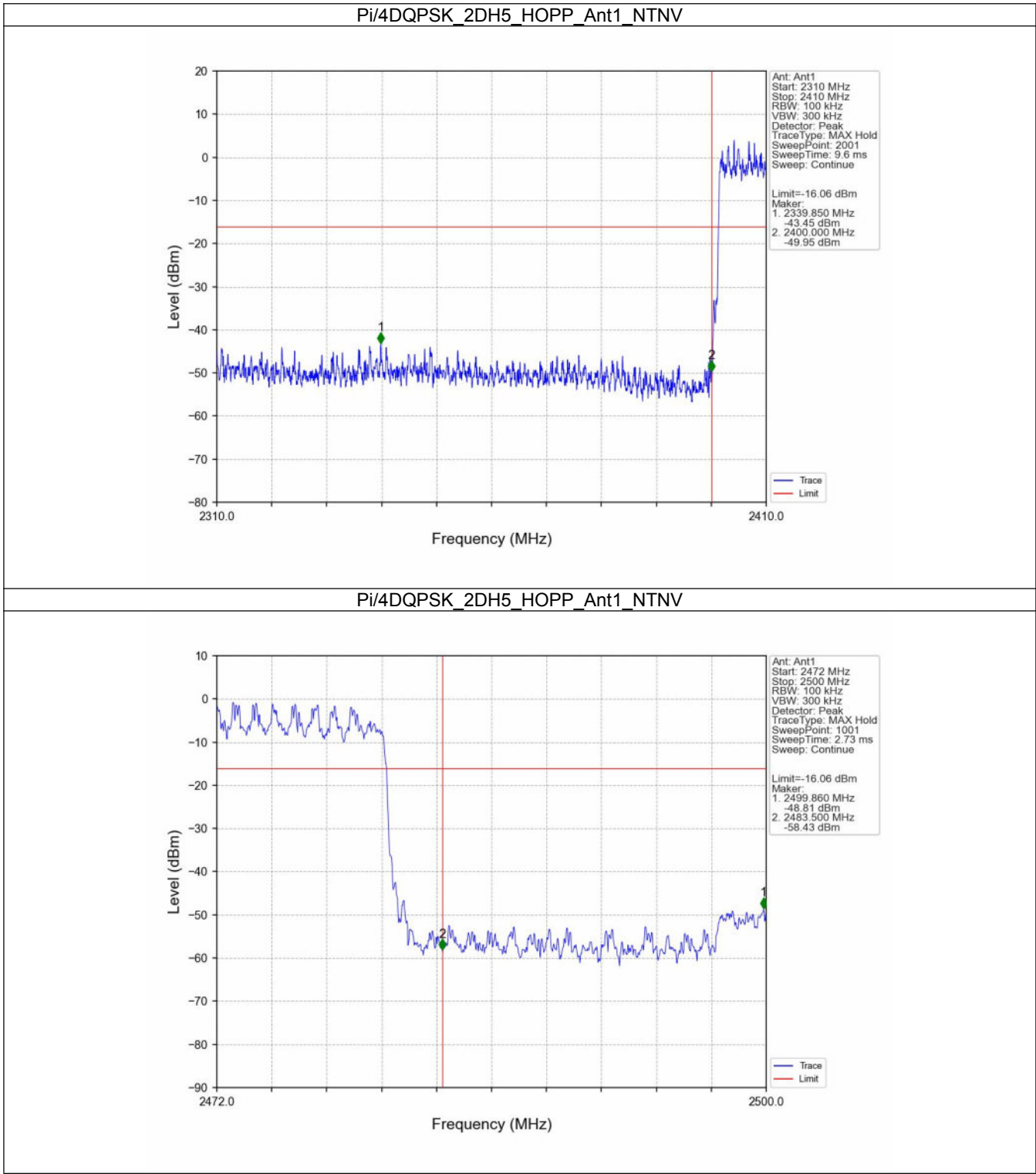
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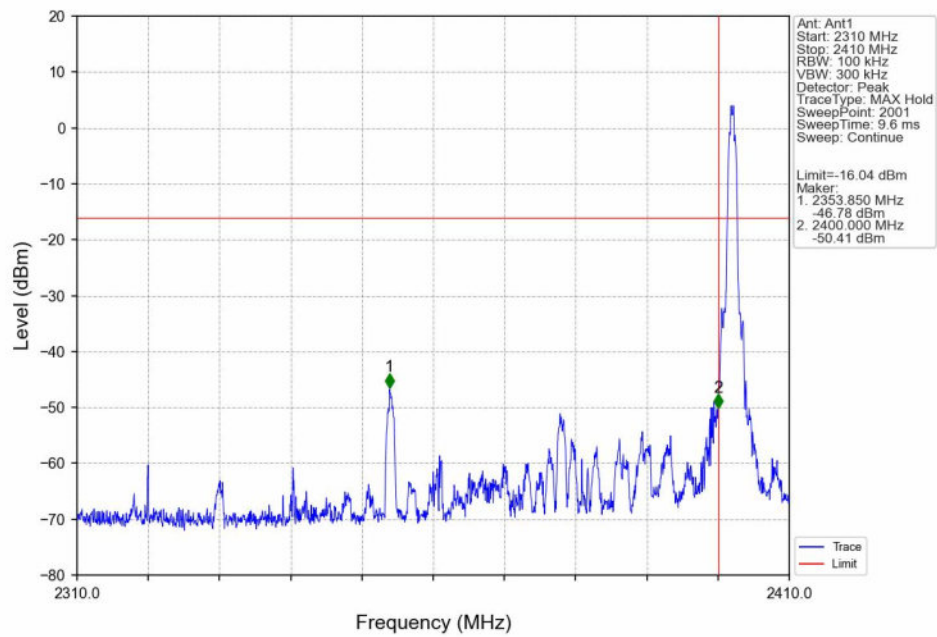


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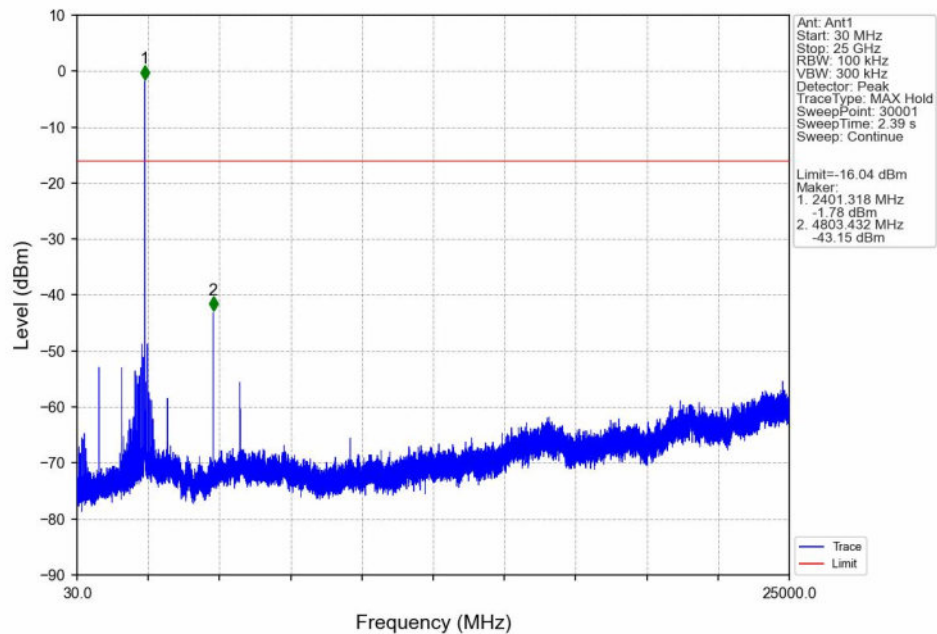


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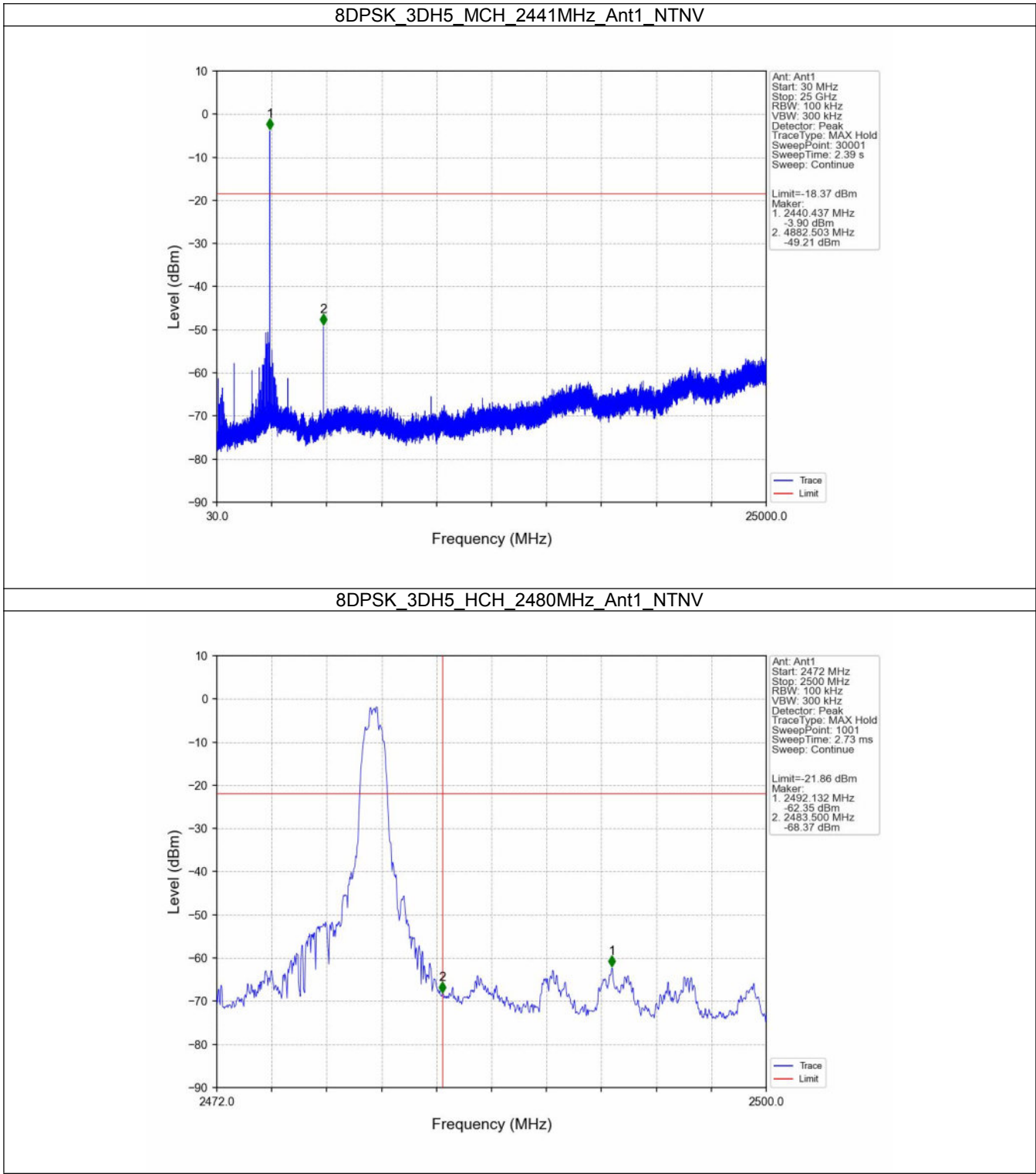
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV

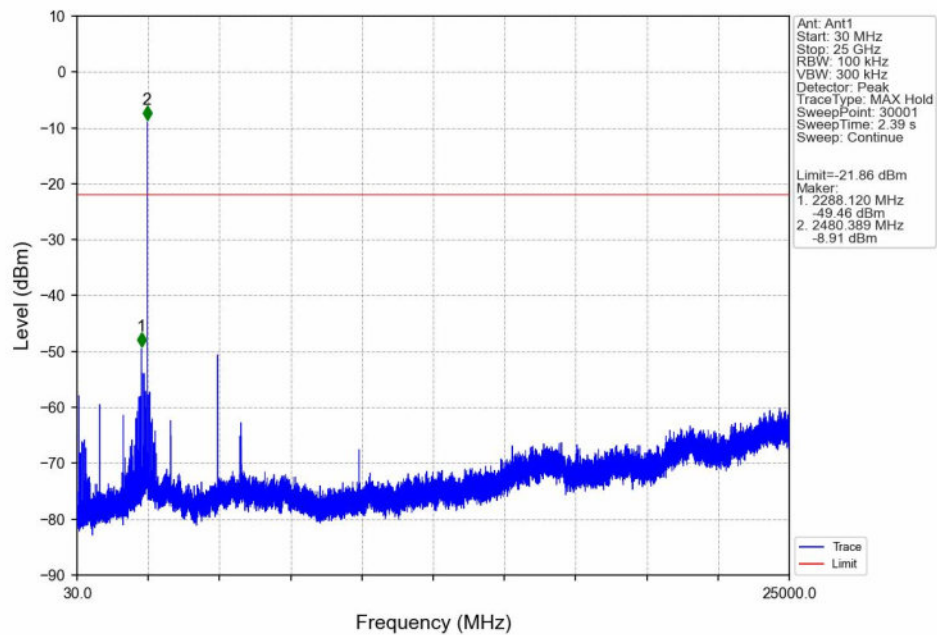


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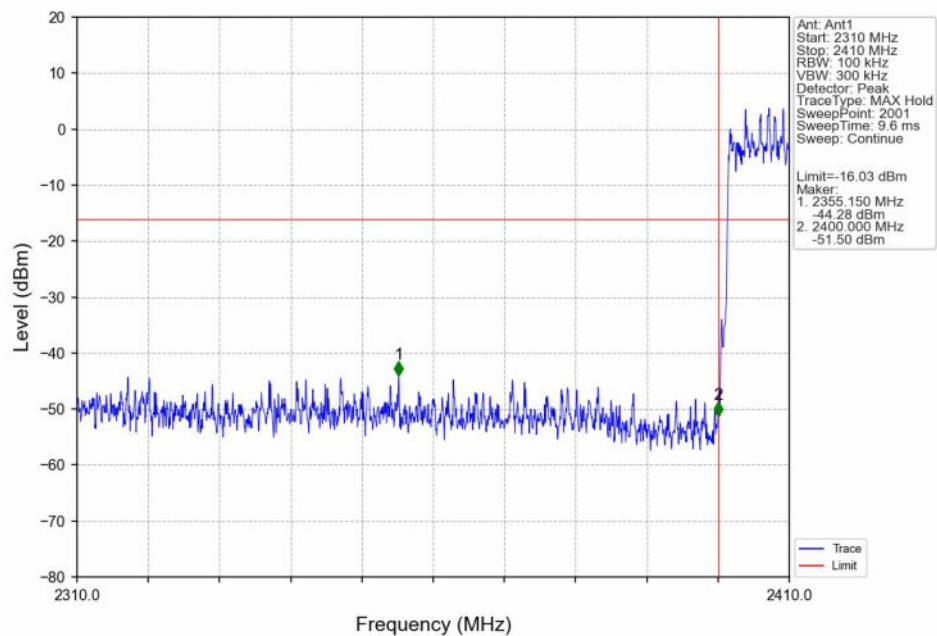


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8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



FCC ID: 2BWIABP1048B2

