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Annex for Bluetooth

Test Report No.: CTL2503041041-WF01

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FCCID: 2AZSQ-WA1

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	0.852	/	Pass
		2441	DH5	1	0.846	/	Pass
		2480	DH5	1	0.857	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.296	/	Pass
		2441	2DH5	1	1.302	/	Pass
		2480	2DH5	1	1.299	/	Pass
8DPSK	SISO	2402	3DH5	1	1.284	/	Pass
		2441	3DH5	1	1.271	/	Pass
		2480	3DH5	1	1.289	/	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	0.953	/	Pass
		2441	DH5	1	0.948	/	Pass
		2480	DH5	1	0.956	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.352	/	Pass
		2441	2DH5	1	1.368	/	Pass
		2480	2DH5	1	1.381	/	Pass
8DPSK	SISO	2402	3DH5	1	1.344	/	Pass

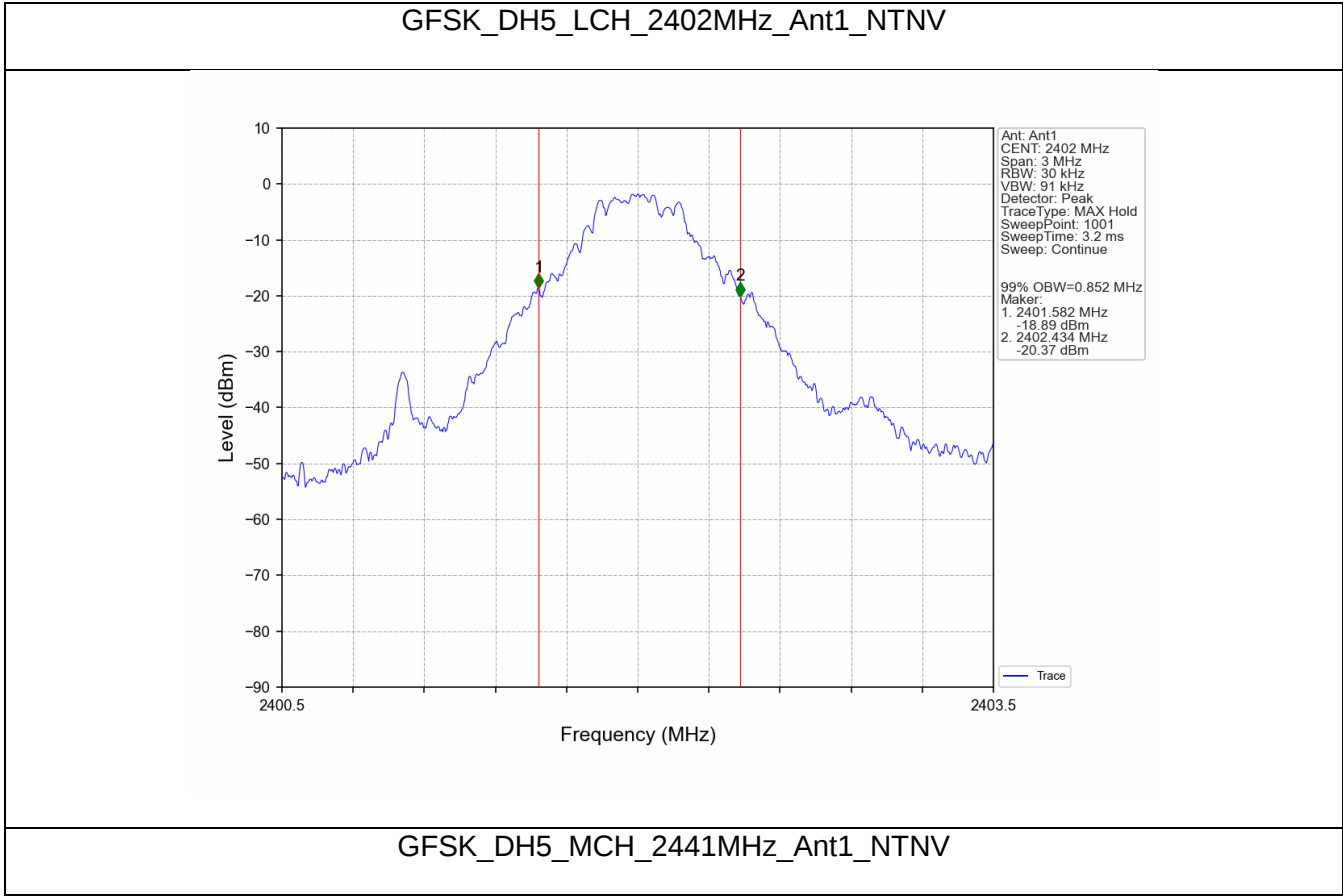
FCCID: 2AZSQ-WA1

		2441	3DH5	1	1.350	/	Pass
		2480	3DH5	1	1.365	/	Pass

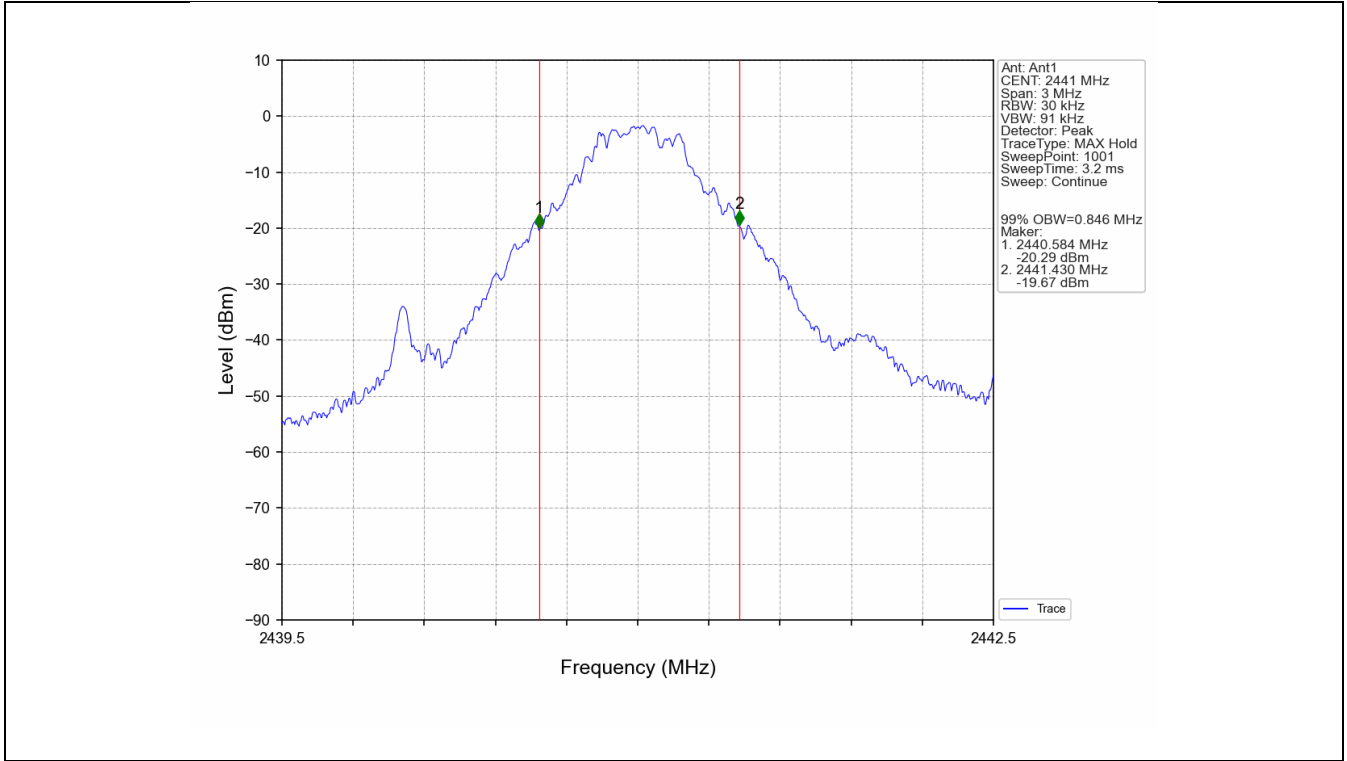
FCCID: 2AZSQ-WA1

1.2 Test Graph

1.2.1 OBW

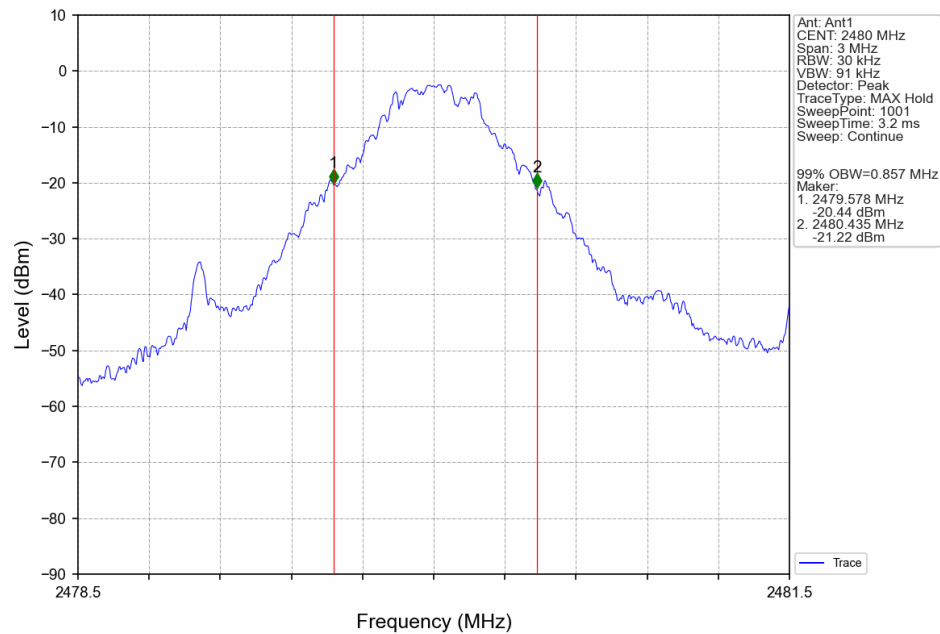


FCCID: 2AZSQ-WA1

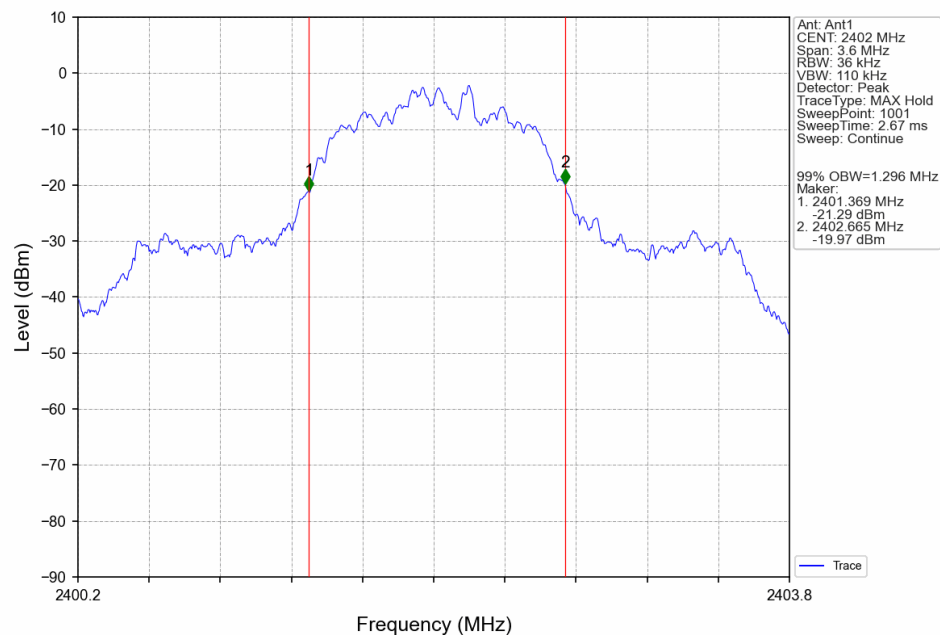


FCCID: 2AZSQ-WA1

GFSK_DH5_HCH_2480MHz_Ant1_NTNV

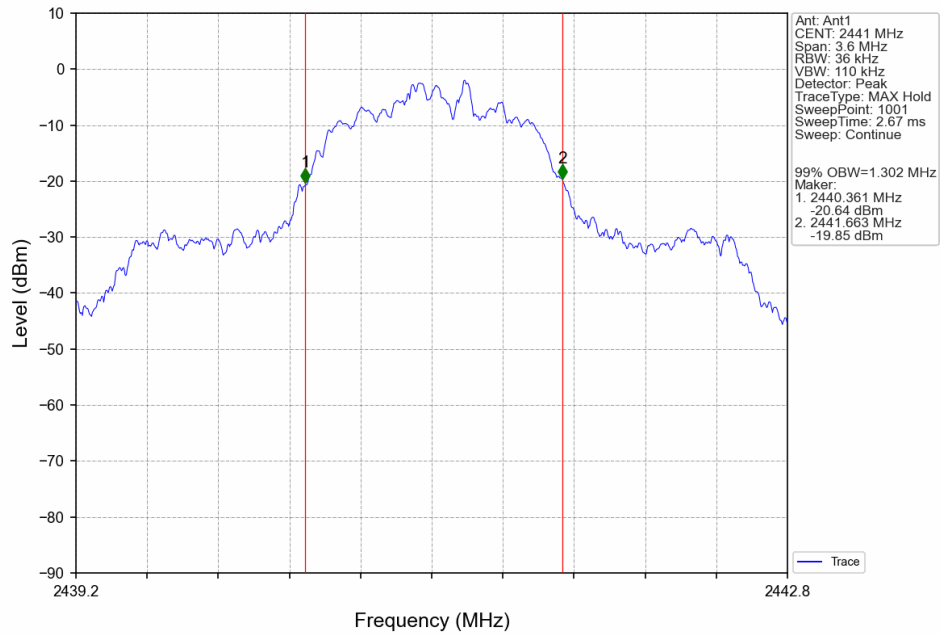


Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



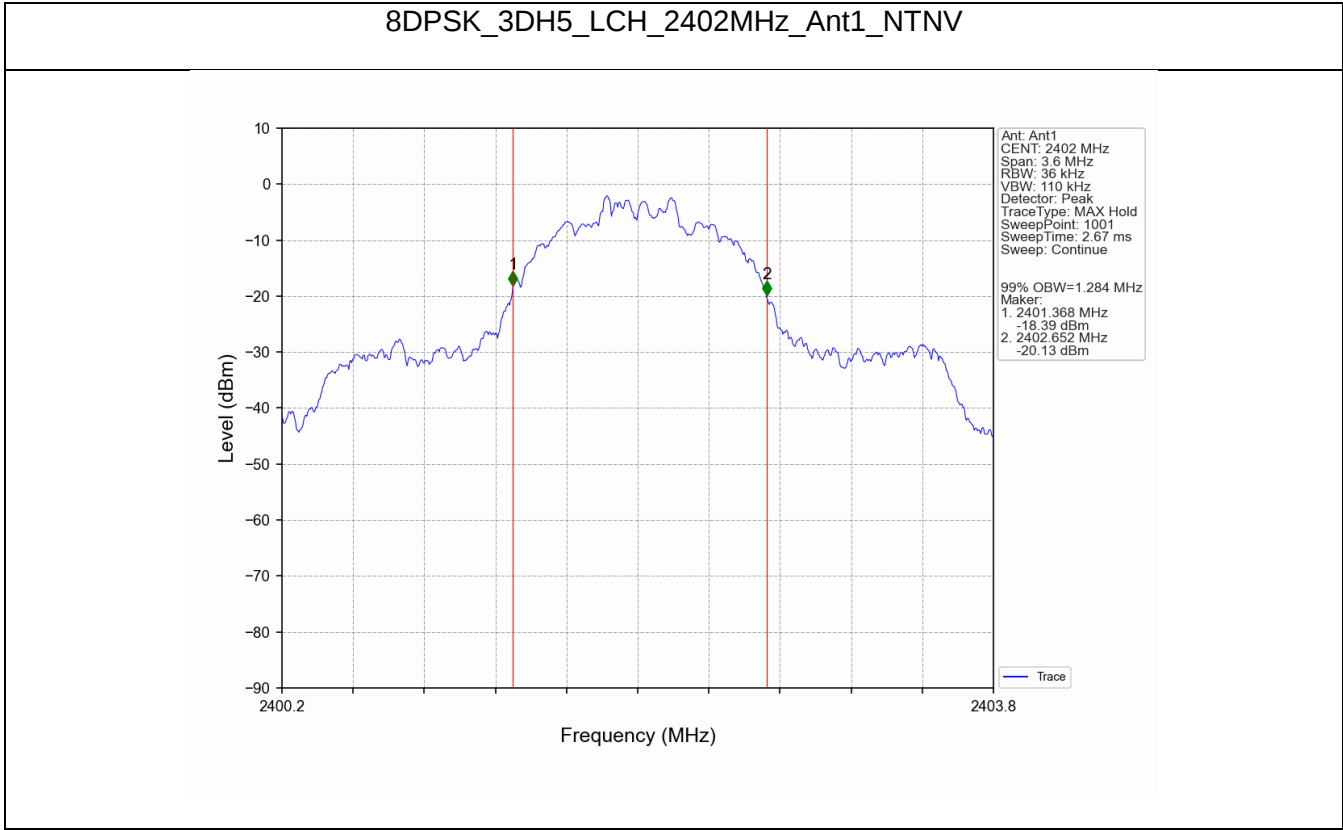
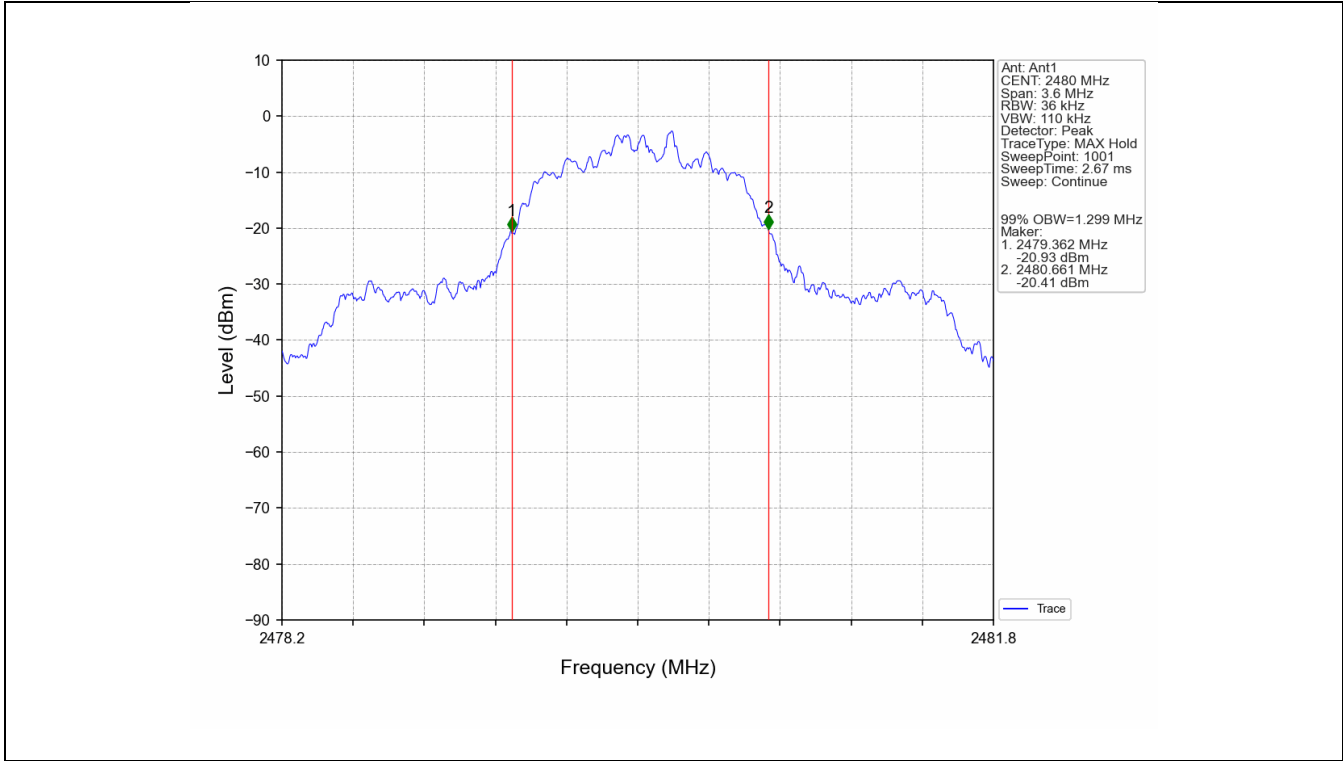
FCCID: 2AZSQ-WA1

Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV

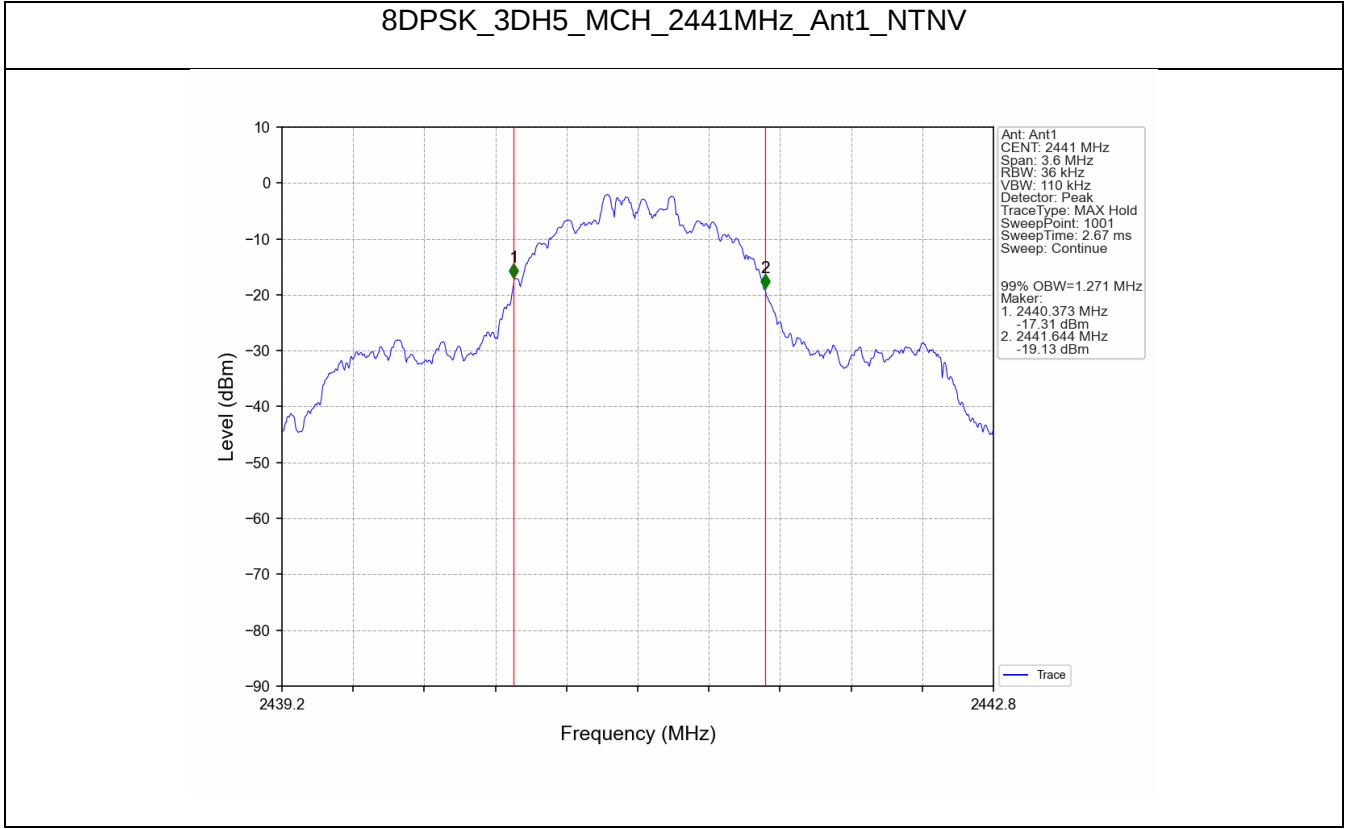


Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

FCCID: 2AZSQ-WA1

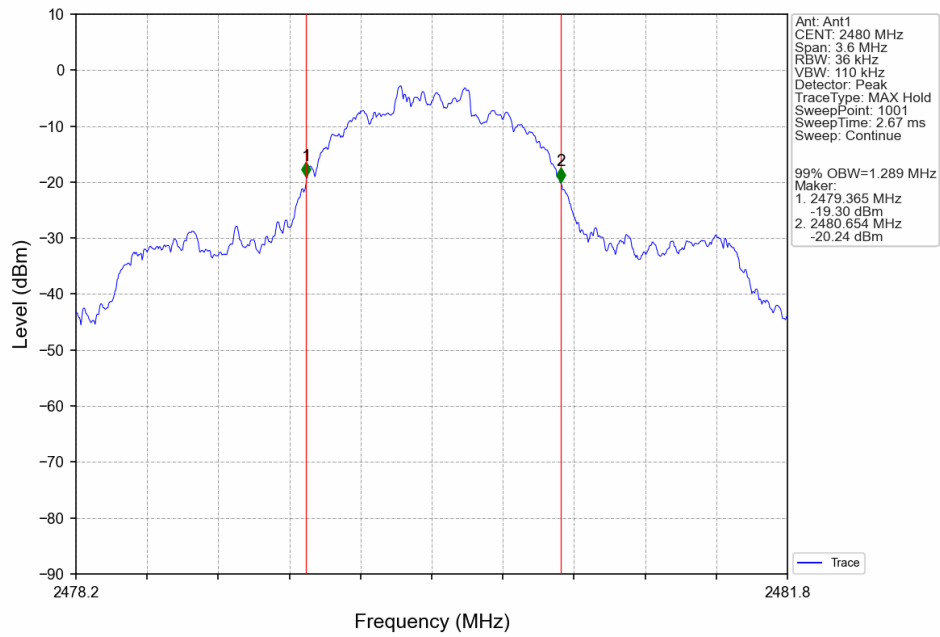


FCCID: 2AZSQ-WA1



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV

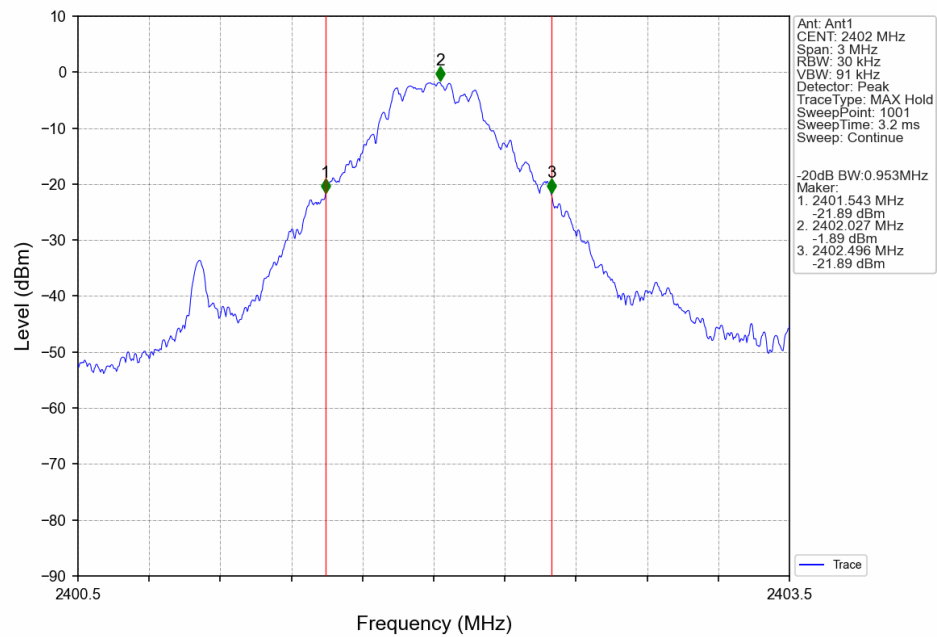
FCCID: 2AZSQ-WA1



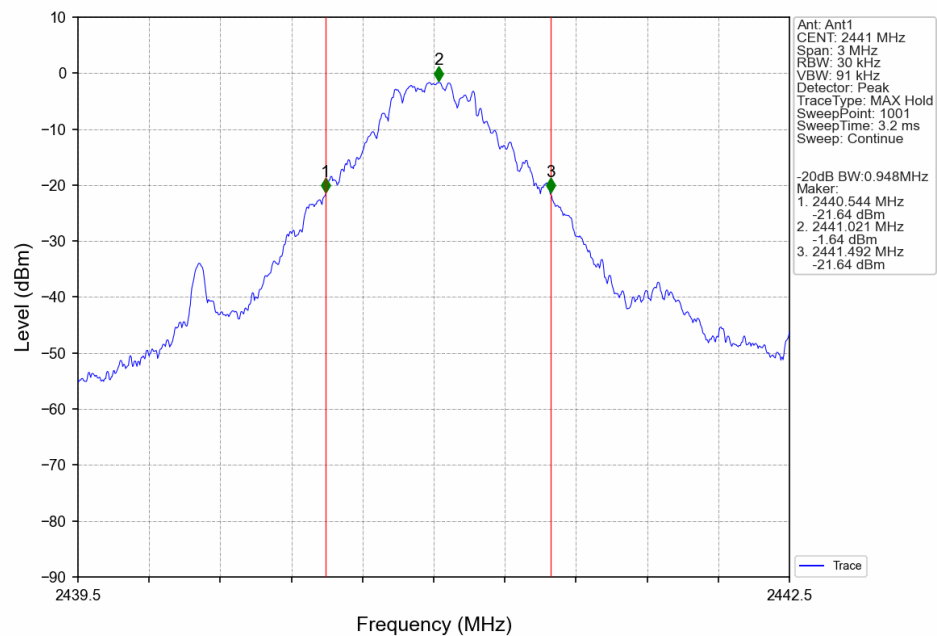
1.2.2 20dB BW

GFSK_DH5_LCH_2402MHz_Ant1_NTNV

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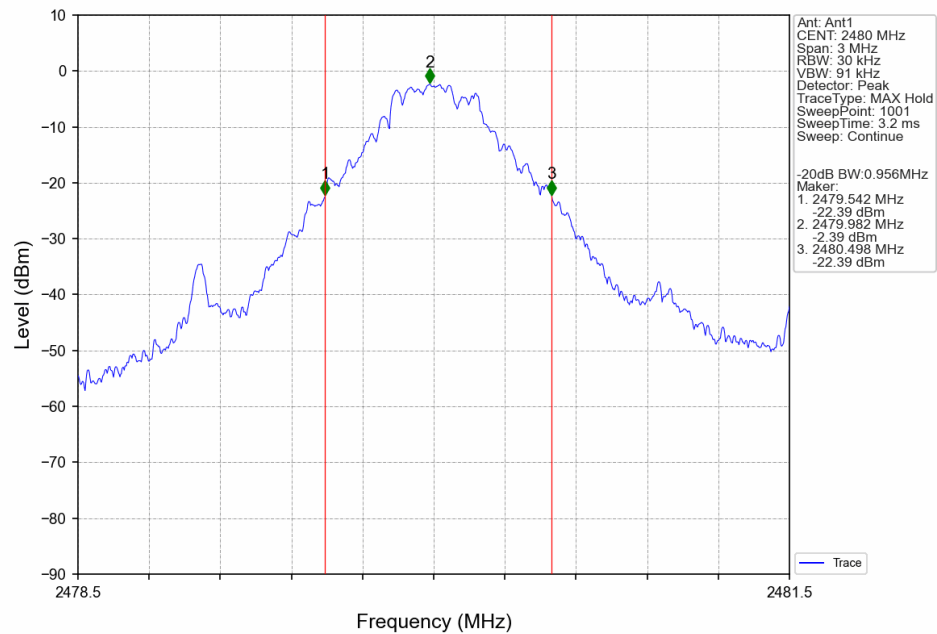


GFSK_DH5_MCH_2441MHz_Ant1_NTNV

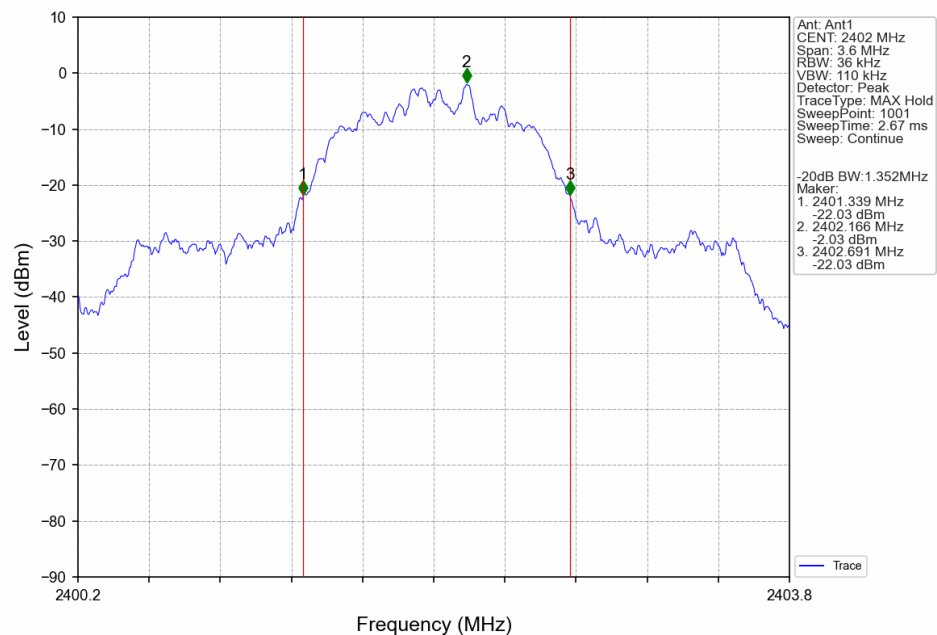


FCCID: 2AZSQ-WA1

GFSK_DH5_HCH_2480MHz_Ant1_NTNV

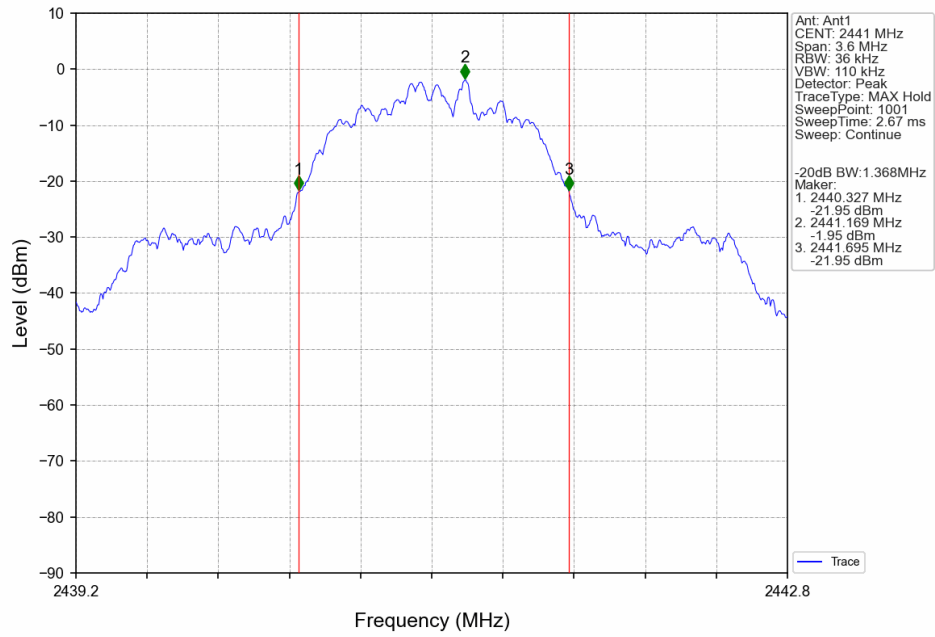


Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



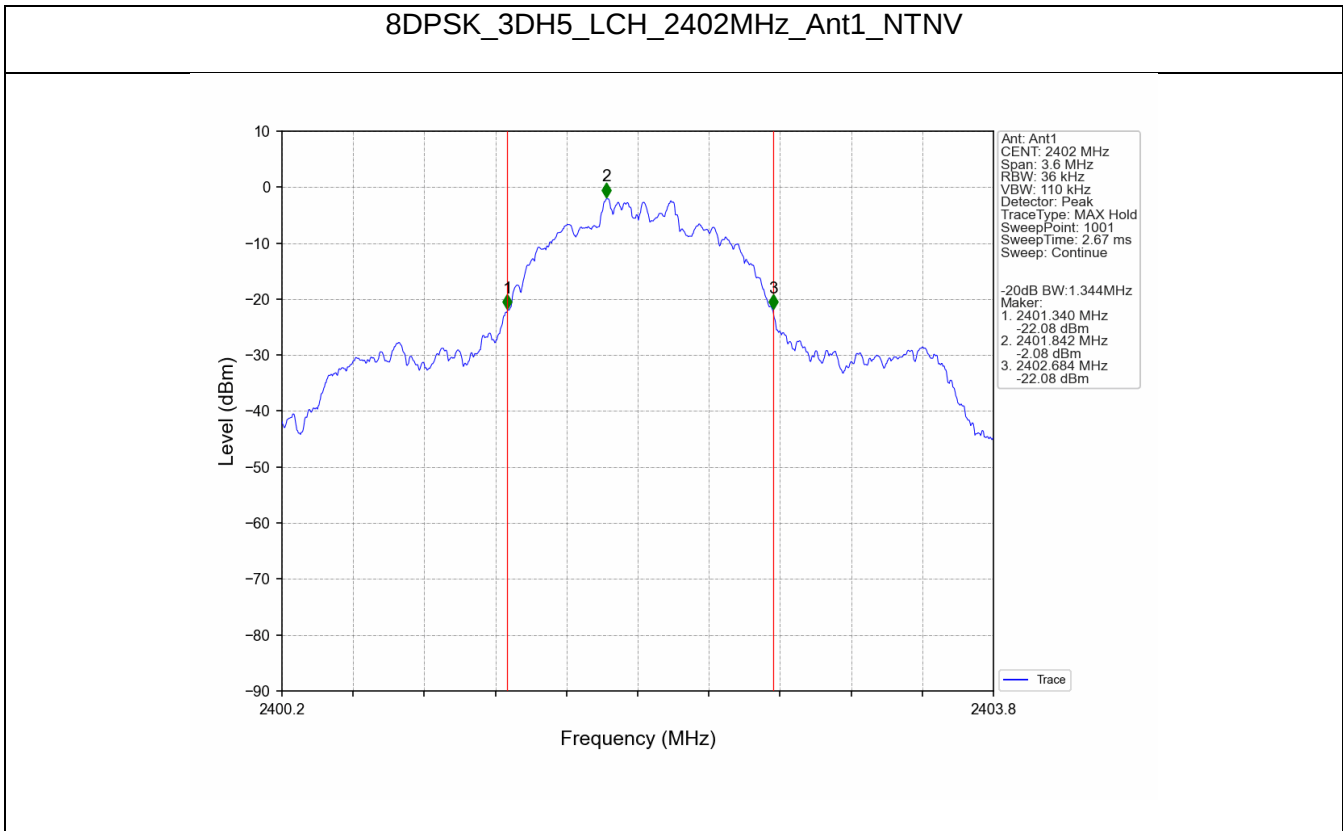
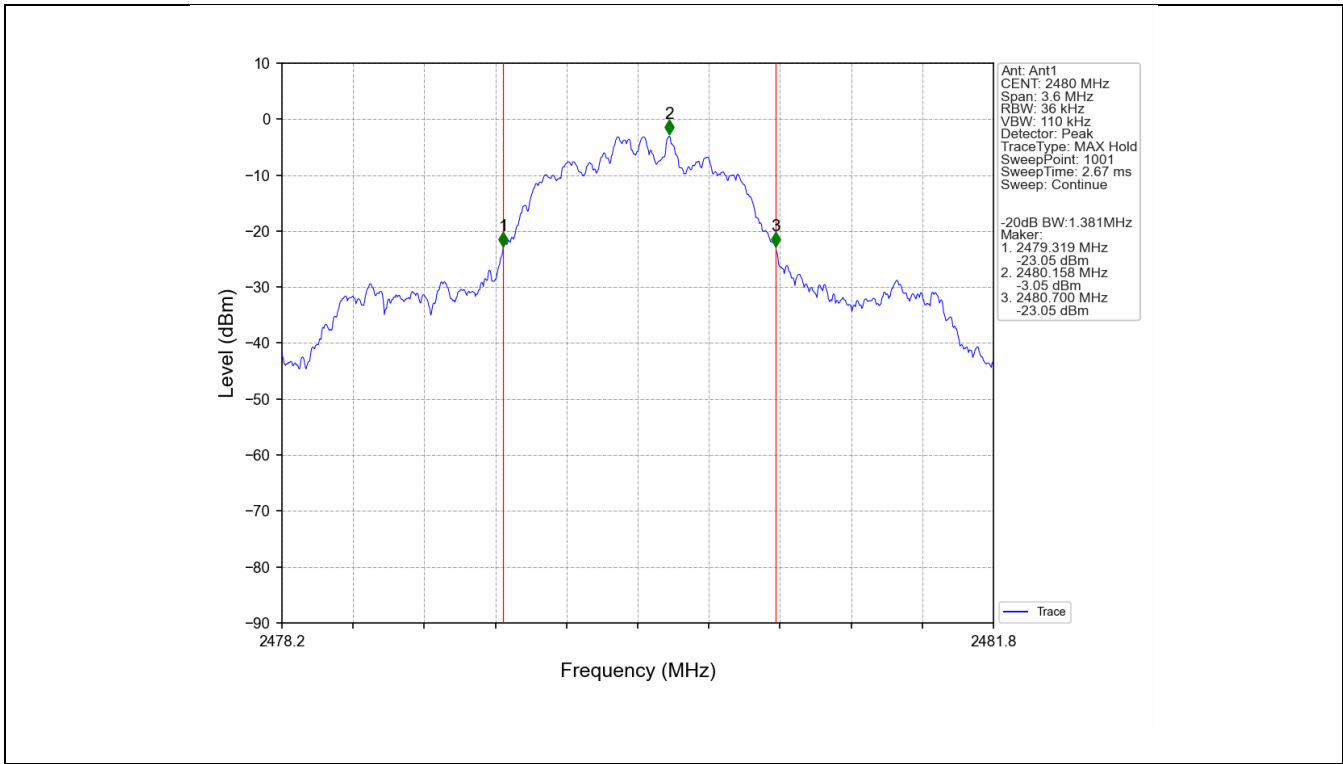
FCCID: 2AZSQ-WA1

Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV

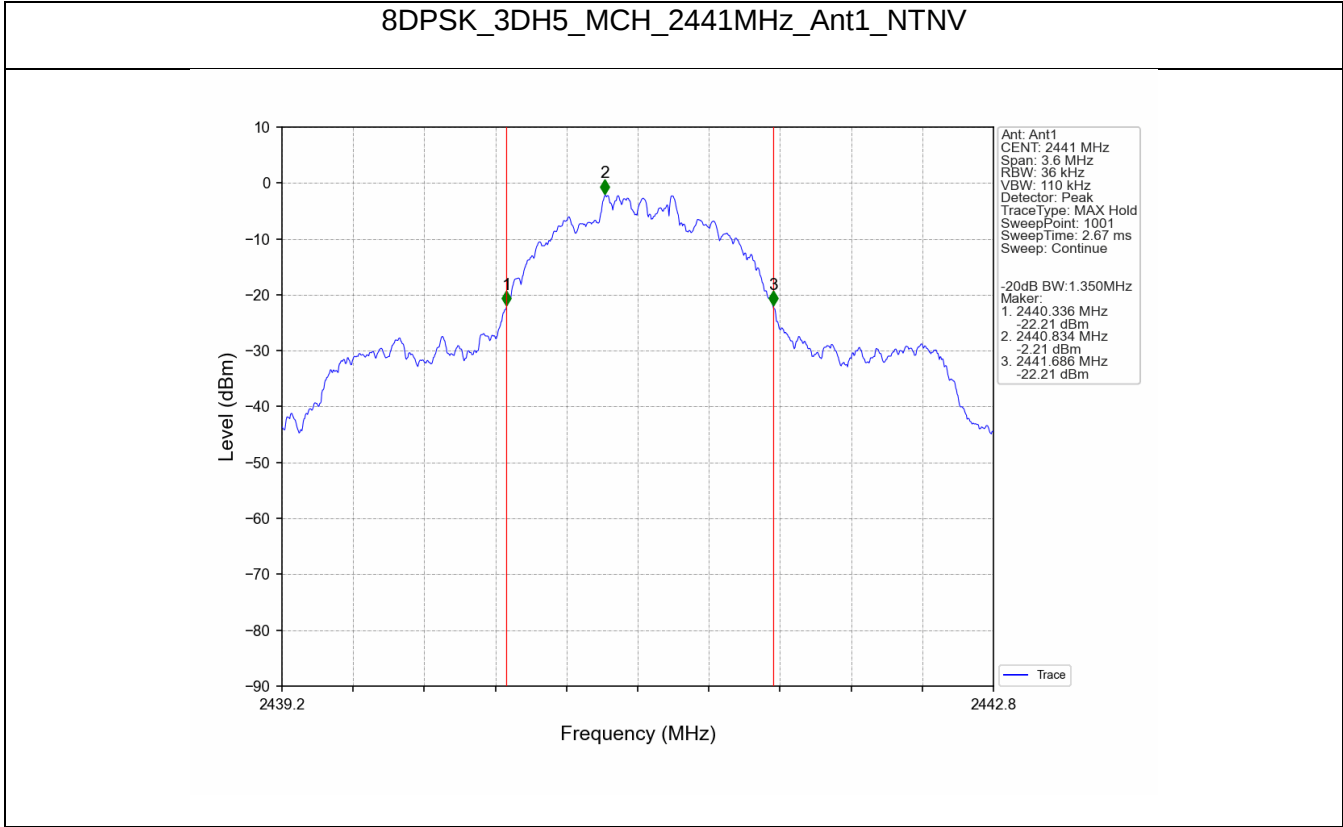


Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

FCCID: 2AZSQ-WA1

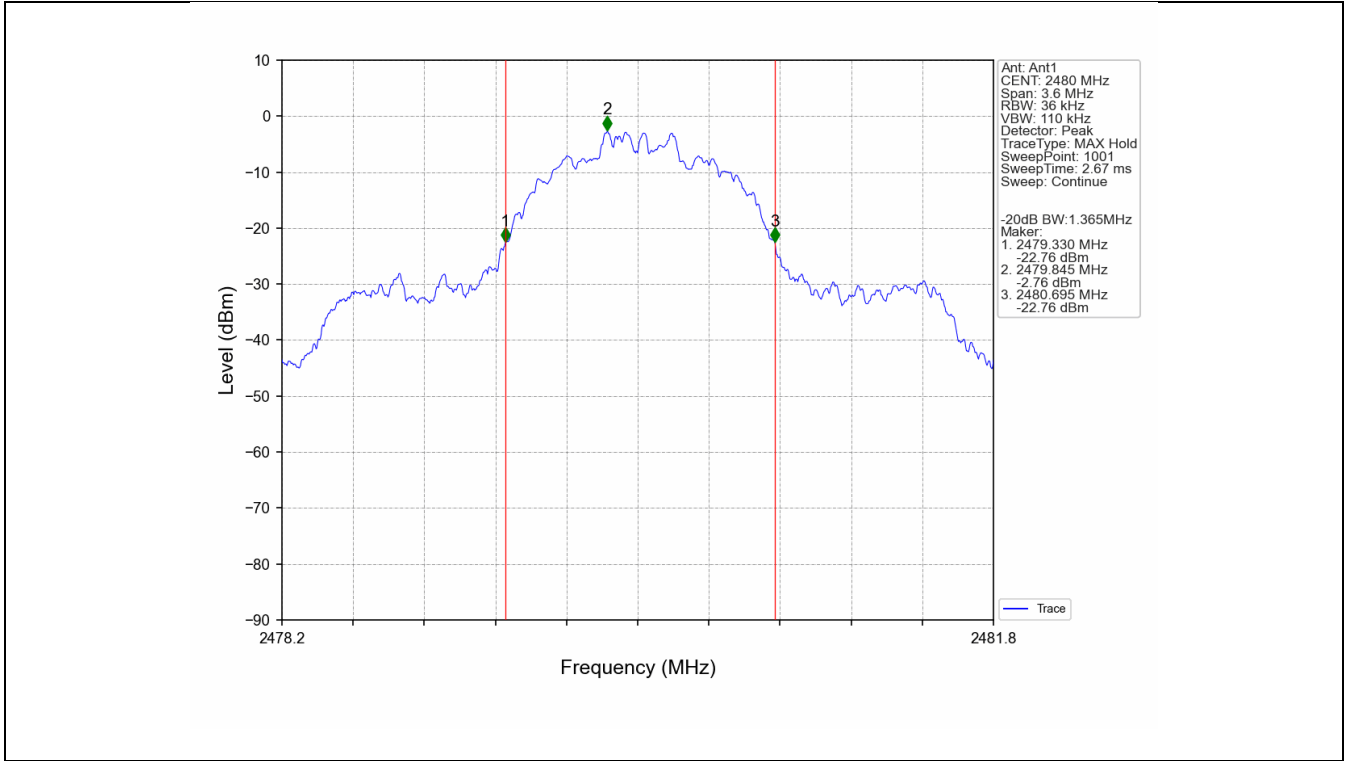


FCCID: 2AZSQ-WA1



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV

FCCID: 2AZSQ-WA1



FCCID: 2AZSQ-WA1

2. Maximum Conducted Output Power

2.1 Test Result

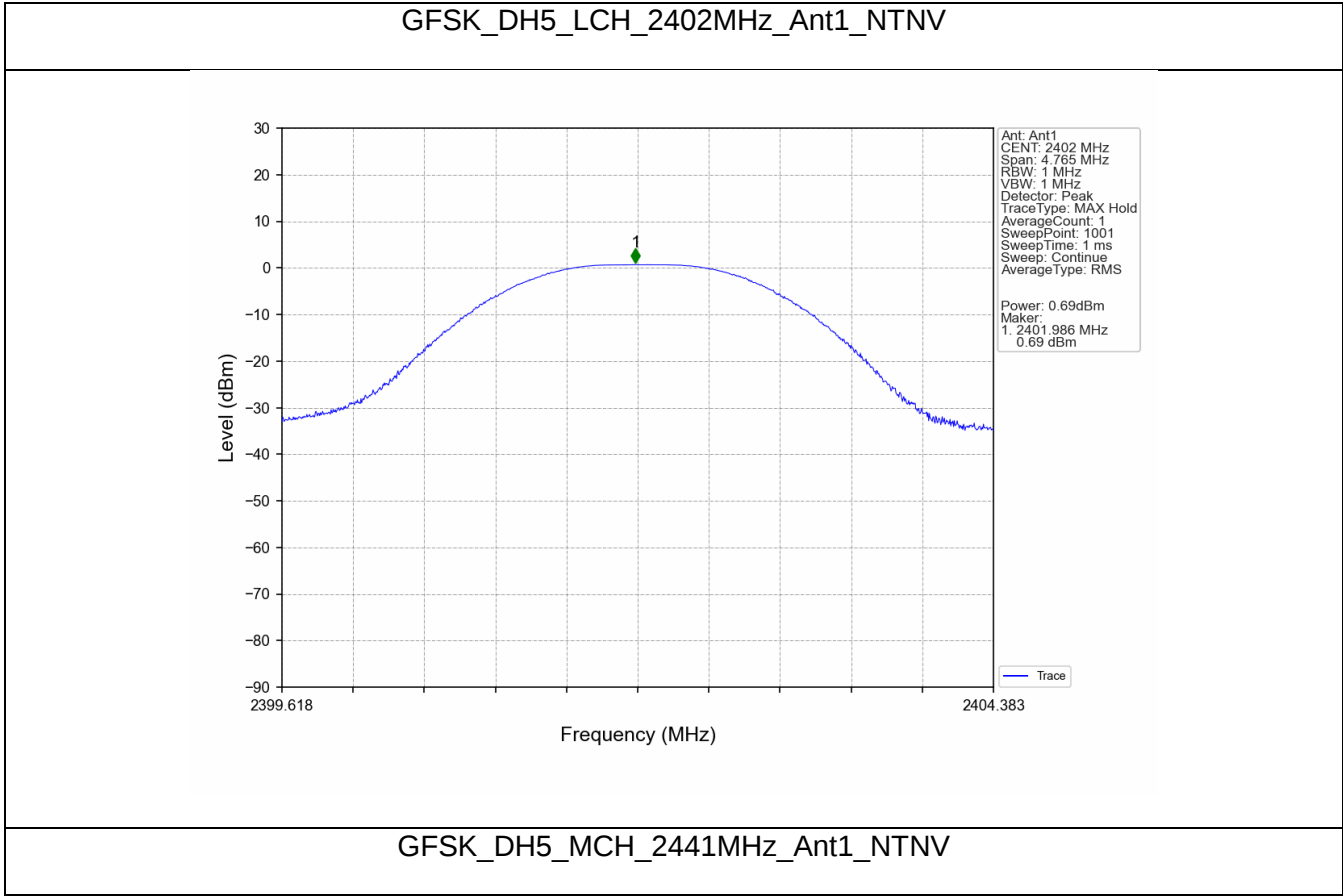
2.1.1 Power

Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	0.69	<=30	Pass
		2441	DH5	0.80	<=30	Pass
		2480	DH5	0.05	<=30	Pass
Pi/4DQPSK	SISO	2402	2DH5	1.77	<=20.97	Pass
		2441	2DH5	1.76	<=20.97	Pass
		2480	2DH5	0.97	<=20.97	Pass
8DPSK	SISO	2402	3DH5	2.00	<=20.97	Pass
		2441	3DH5	1.98	<=20.97	Pass
		2480	3DH5	1.21	<=20.97	Pass
Note1: Antenna Gain: Ant1: 2.00dBi;						

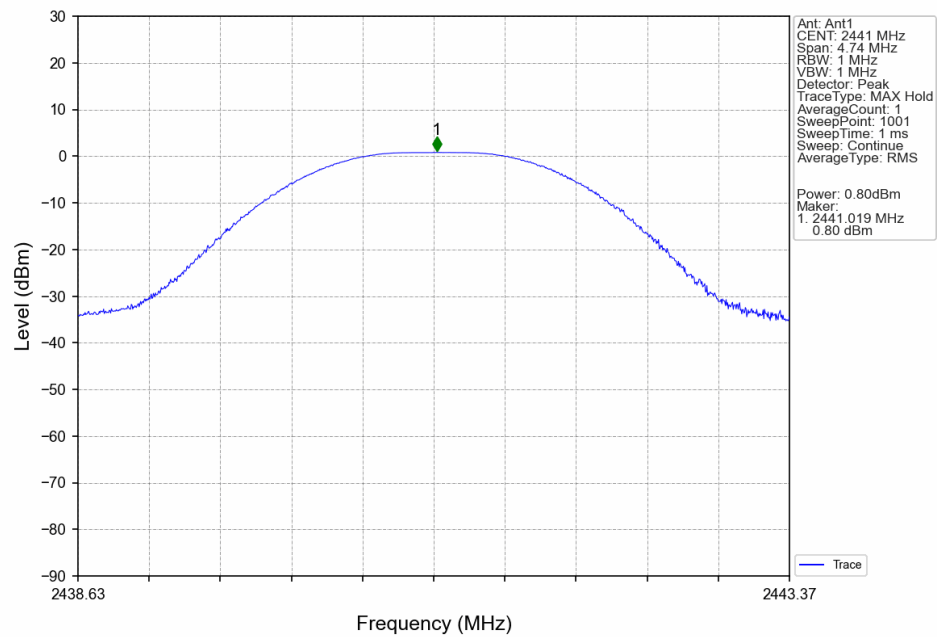
FCCID: 2AZSQ-WA1

2.2 Test Graph

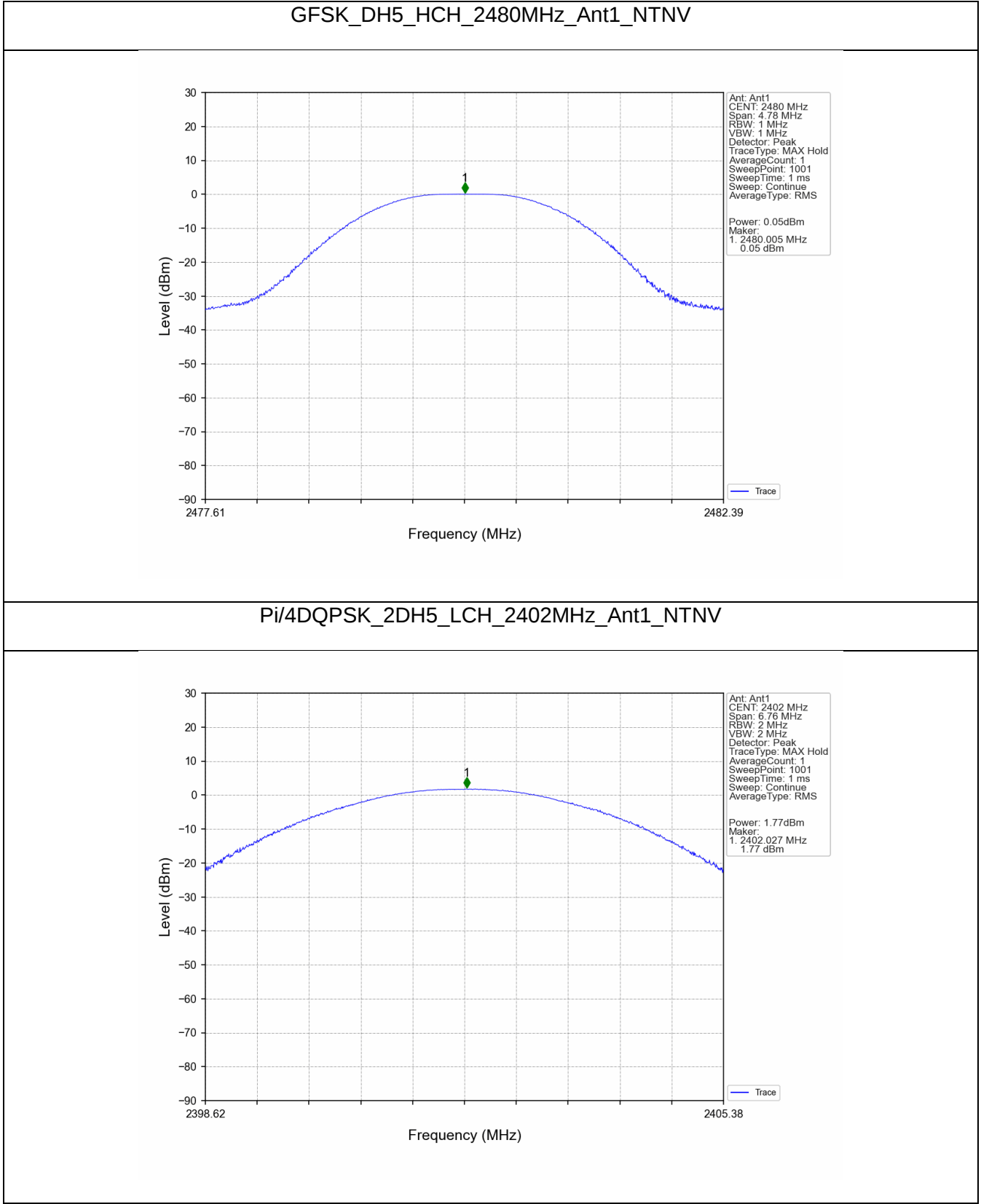
2.2.1 Power



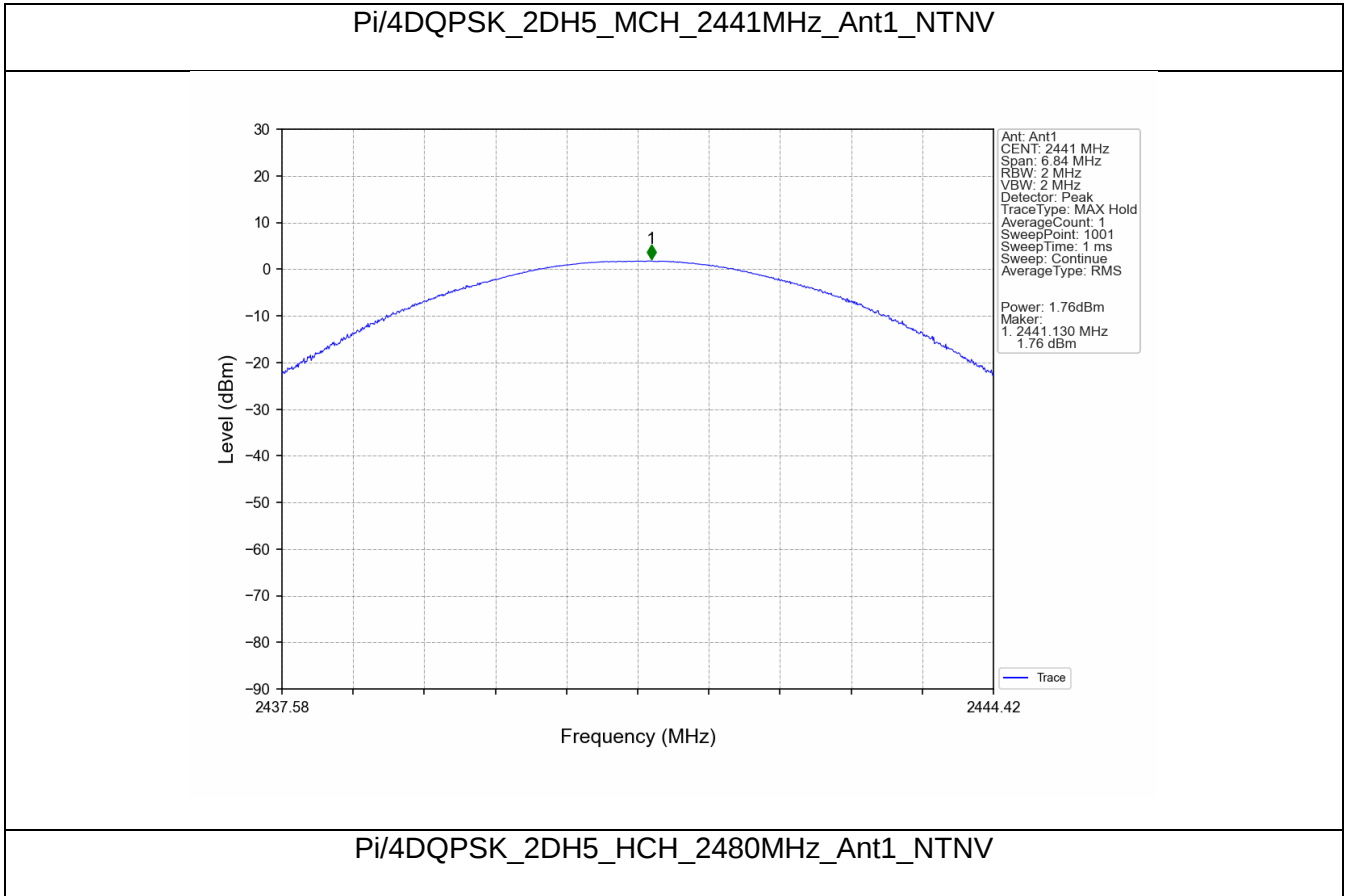
FCCID: 2AZSQ-WA1



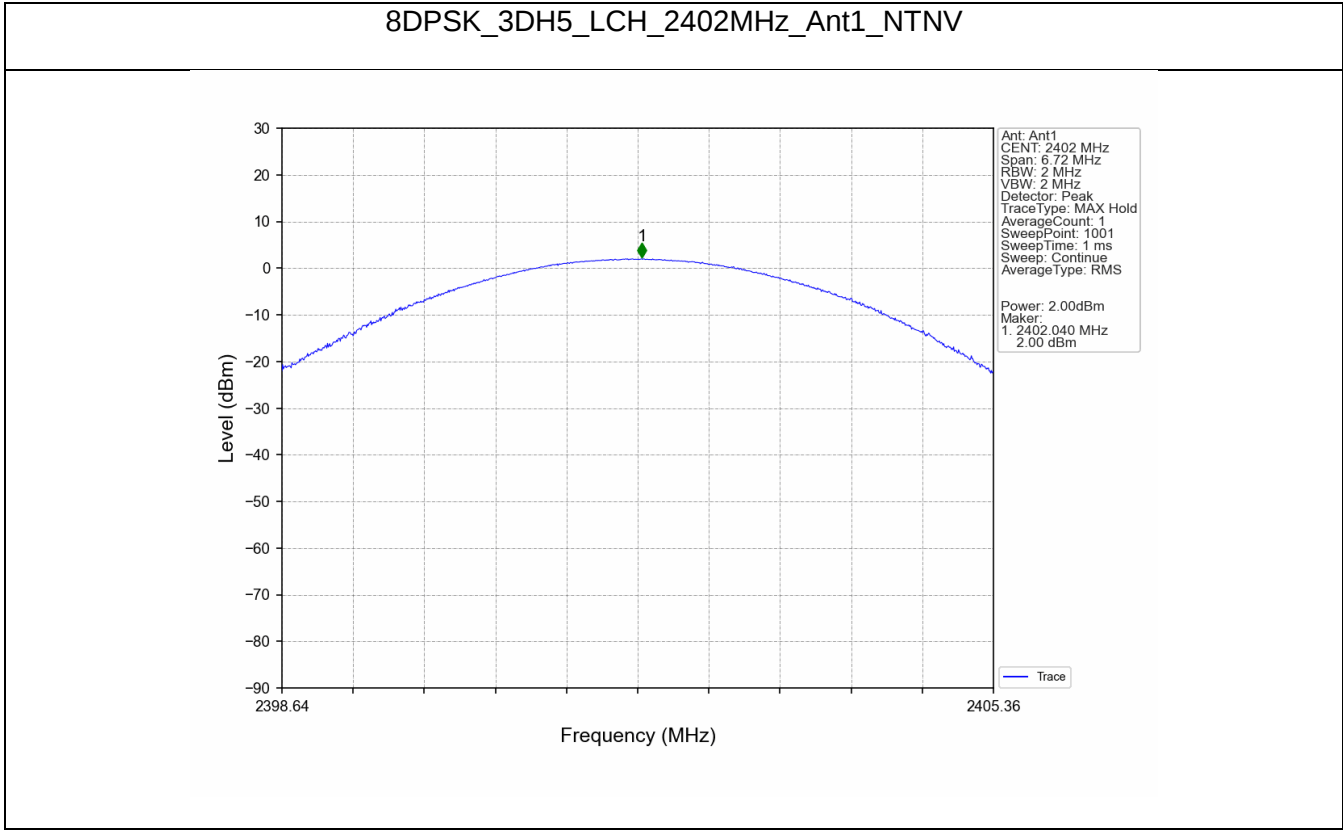
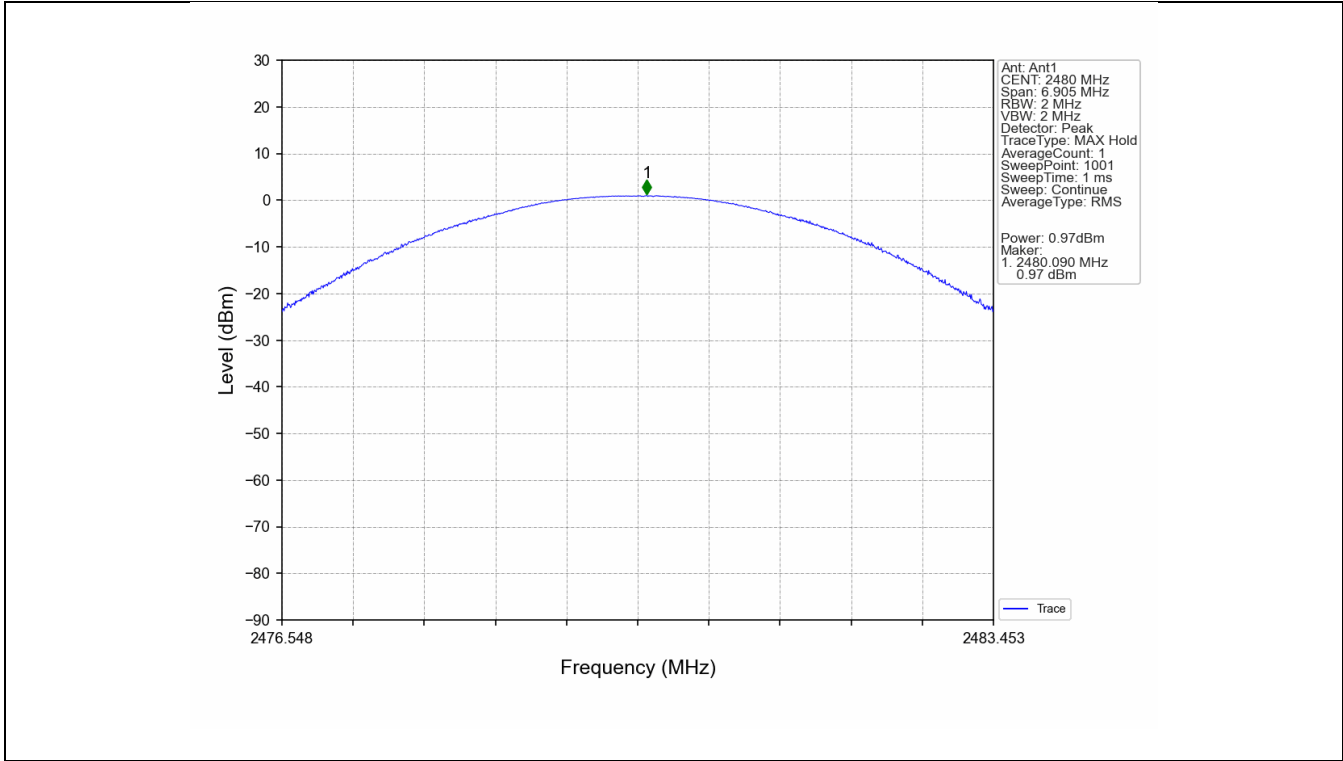
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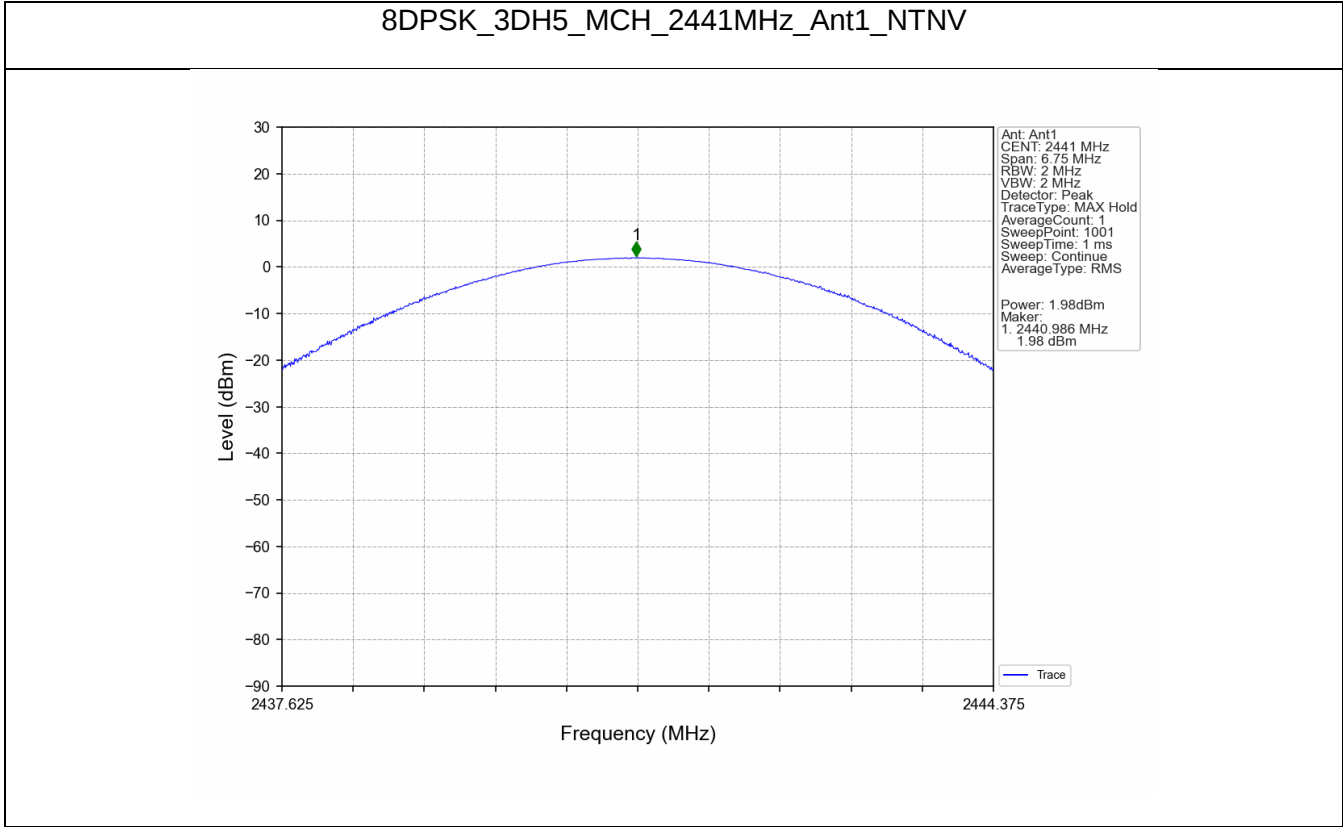
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FCCID: 2AZSQ-WA1

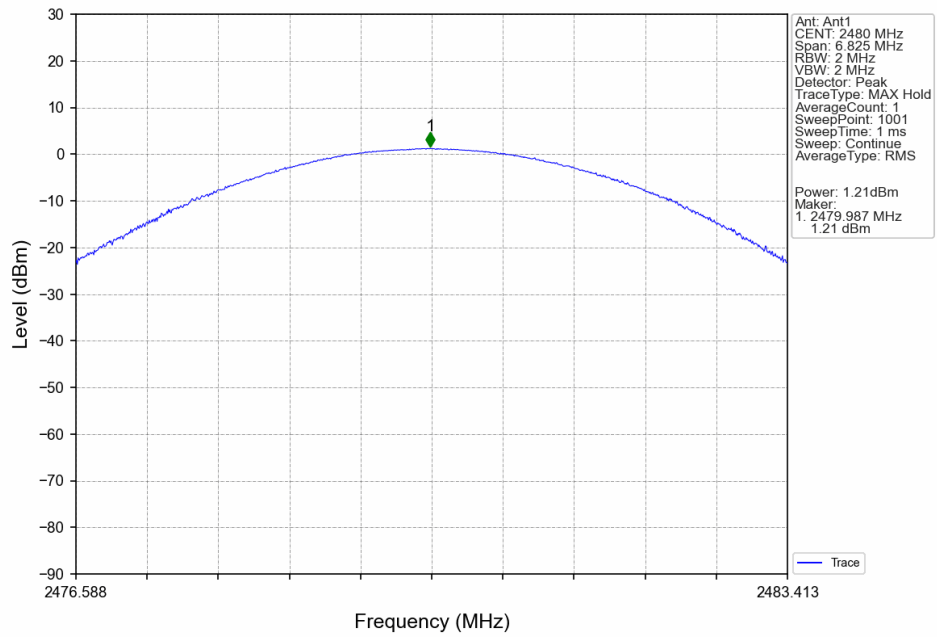


FCCID: 2AZSQ-WA1



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV

FCCID: 2AZSQ-WA1



FCCID: 2AZSQ-WA1

3. Carrier Frequency Separation

3.1 Test Result

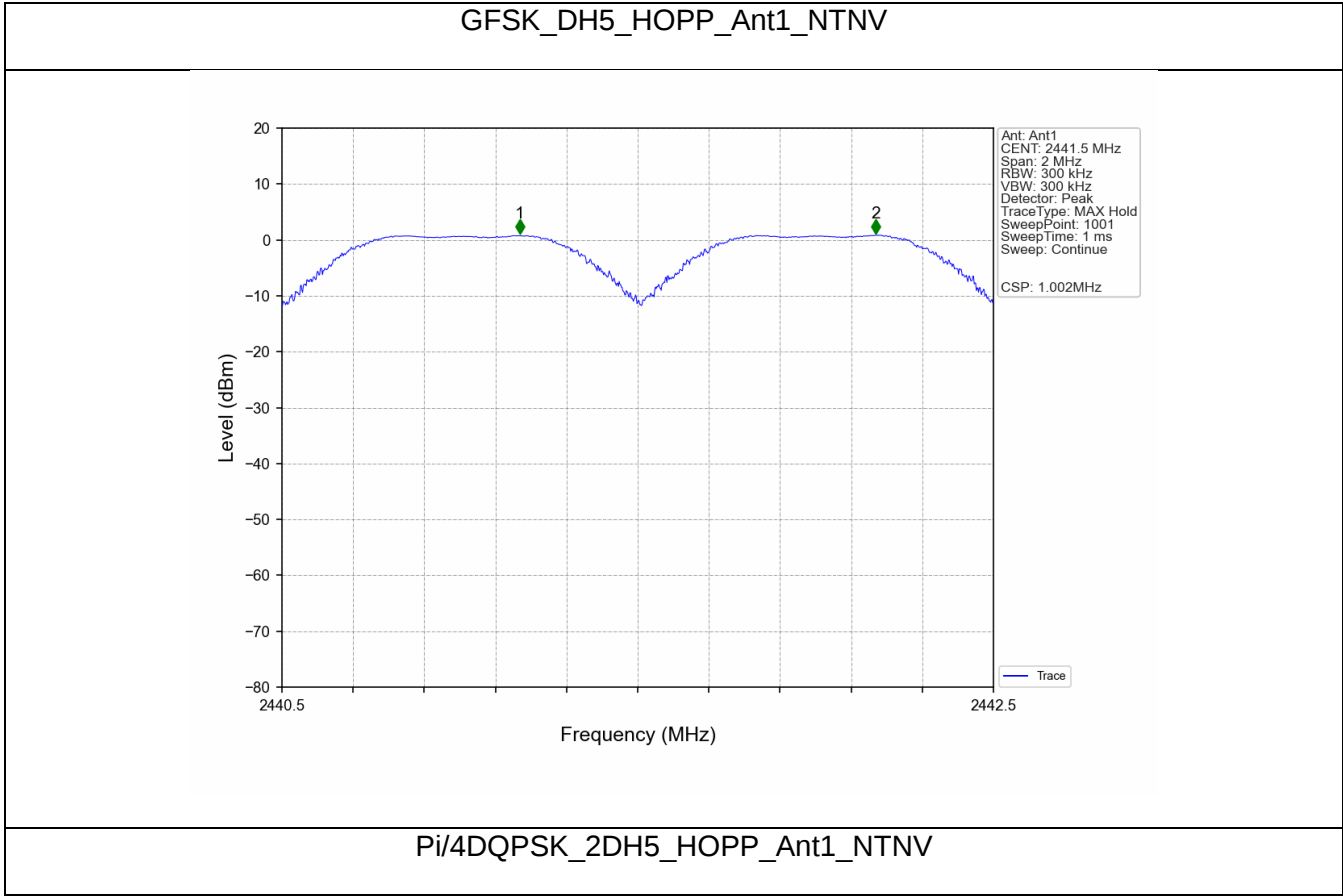
3.1.1 Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	1.002	0.956	≥ 0.956	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	1.001	1.381	≥ 0.921	Pass
8DPSK	SISO	HOPP	3DH5	0.998	1.365	≥ 0.91	Pass

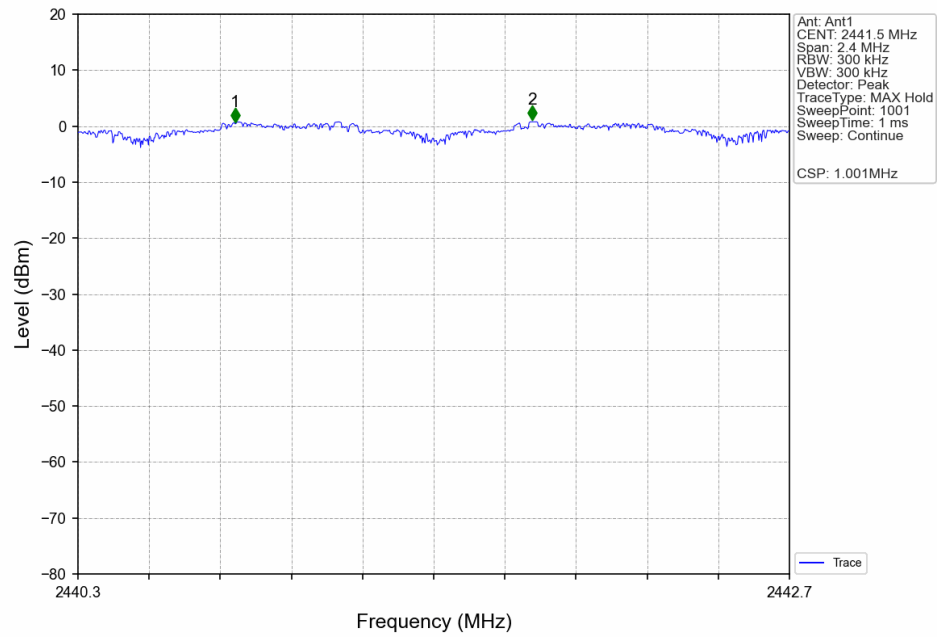
FCCID: 2AZSQ-WA1

3.2 Test Graph

3.2.1 Ant1

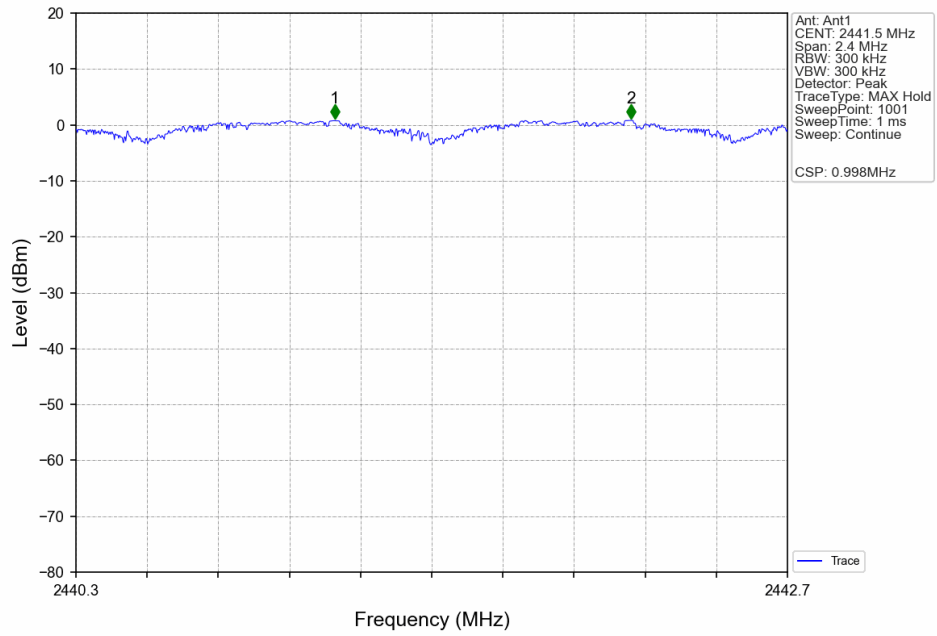


FCCID: 2AZSQ-WA1



FCCID: 2AZSQ-WA1

8DPSK_3DH5_HOPP_Ant1_NTNV



FCCID: 2AZSQ-WA1

4. Number of Hopping Frequencies

4.1 Test Result

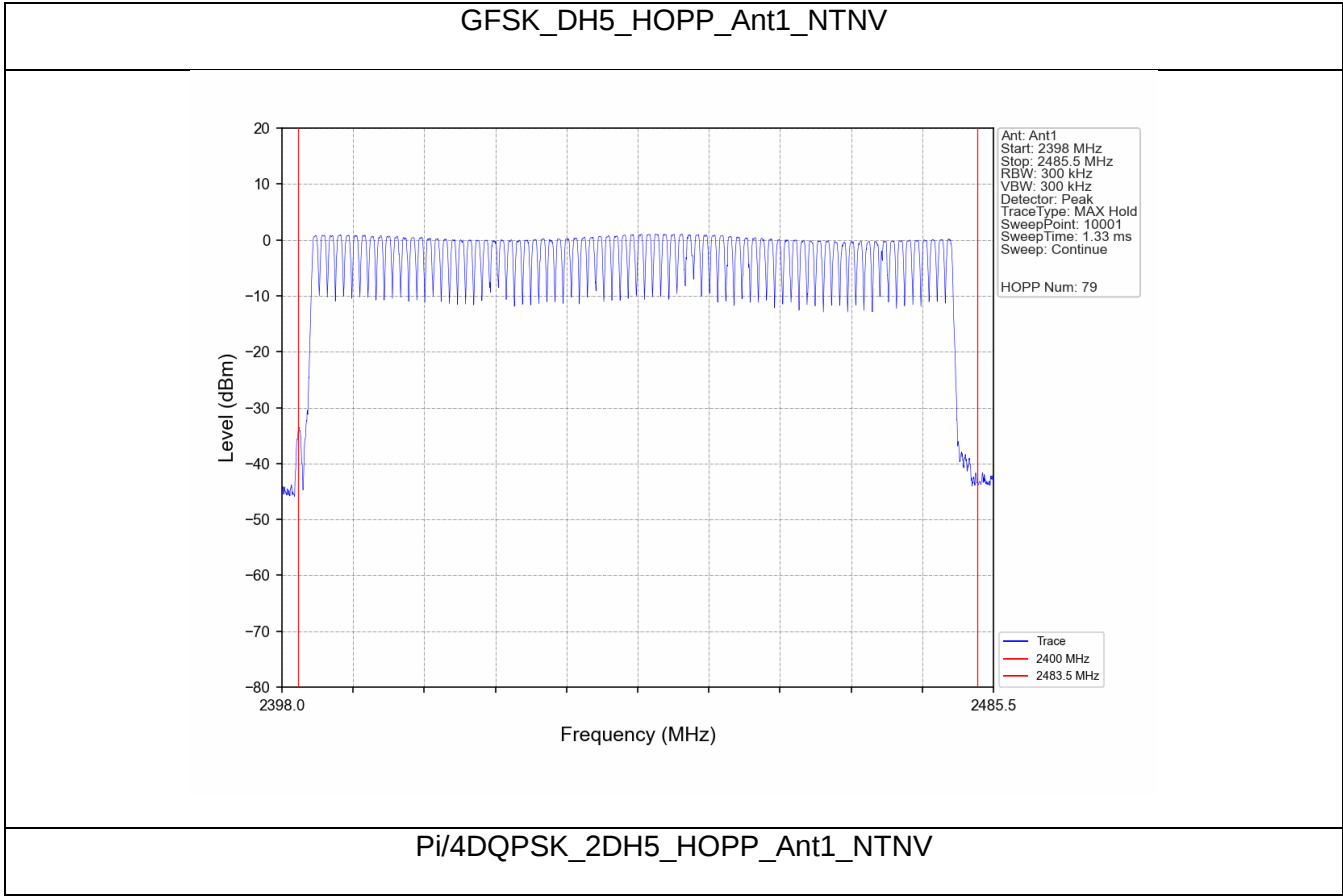
4.1.1 HoppNum

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

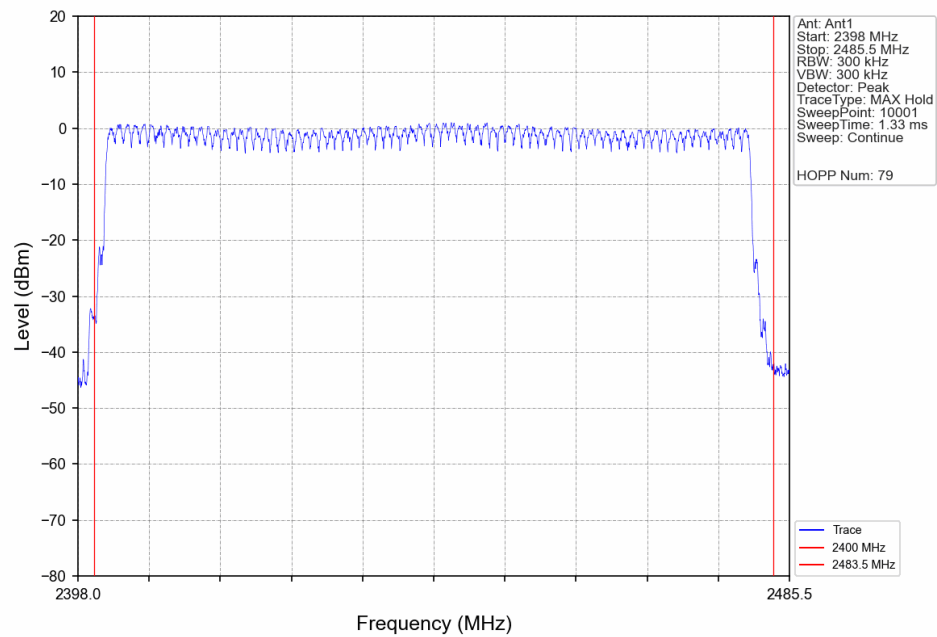
FCCID: 2AZSQ-WA1

4.2 Test Graph

4.2.1 HoppNum

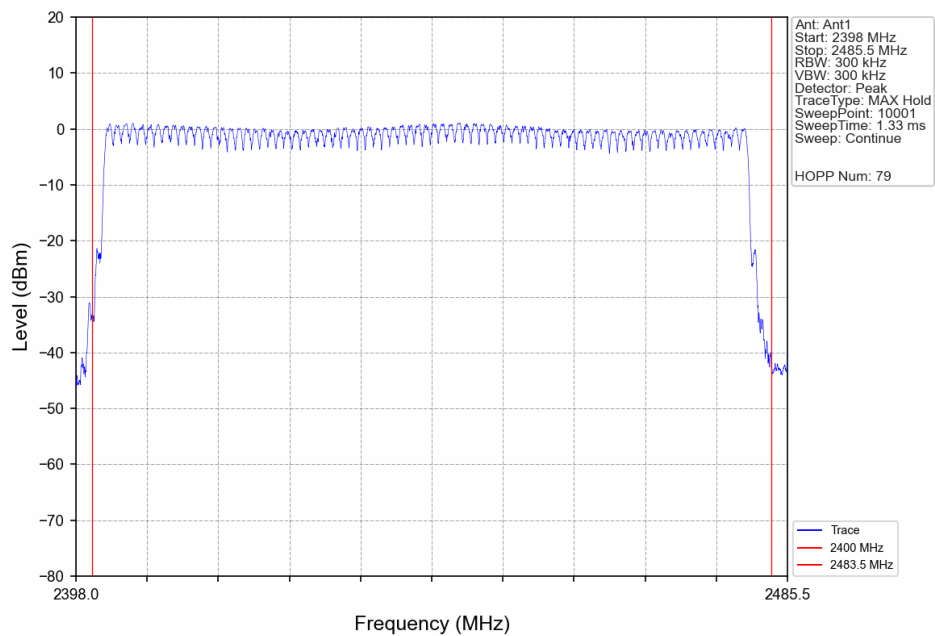


FCCID: 2AZSQ-WA1



FCCID: 2AZSQ-WA1

8DPSK_3DH5_HOPP_Ant1_NTNV



FCCID: 2AZSQ-WA1

5. Time of Occupancy (Dwell Time)

5.1 Test Result

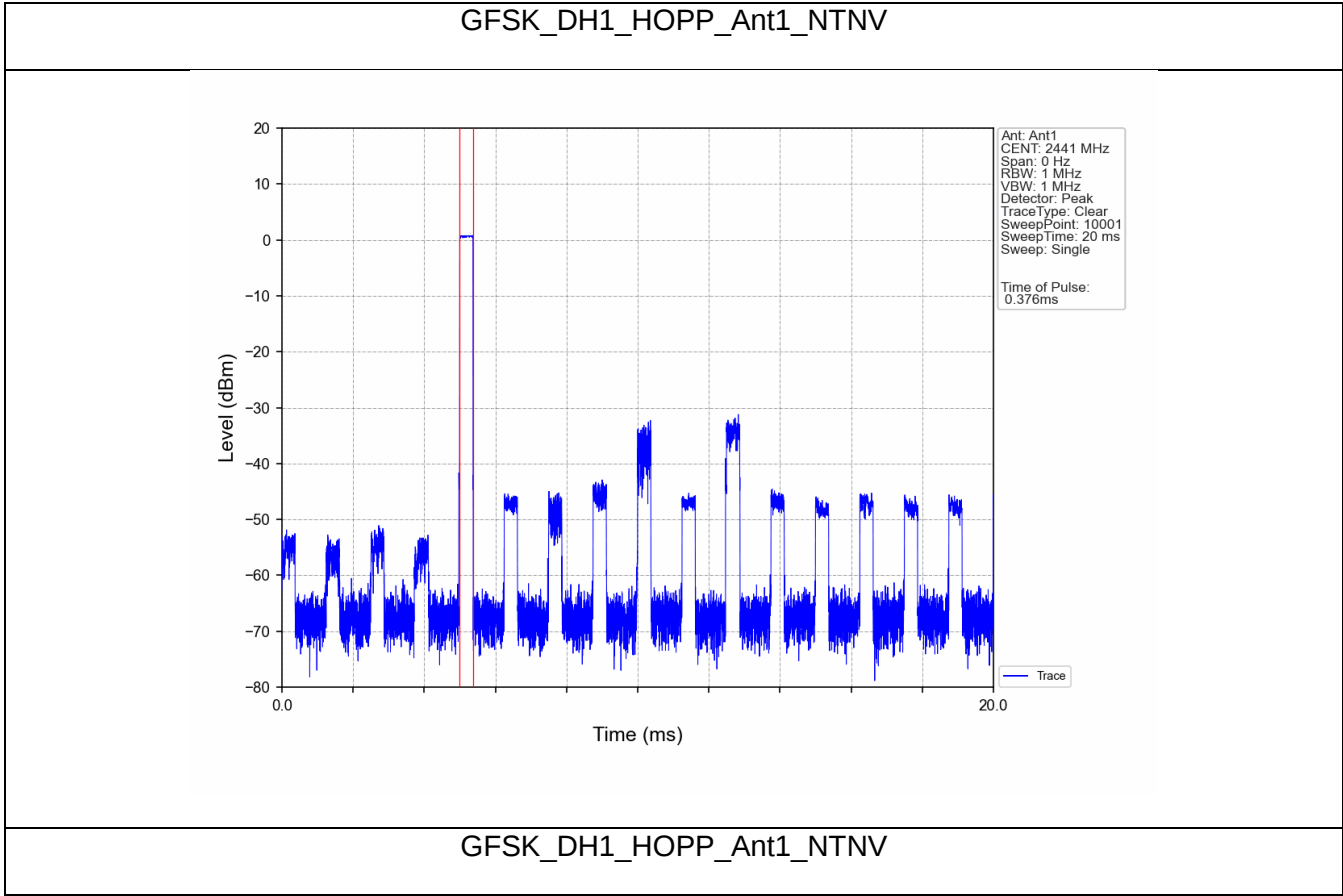
5.1.1 Ant1

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	0.376	31.600	320	120.320	<=400	Pass
			DH3	1.632	31.600	164	267.648	<=400	Pass
			DH5	2.878	31.600	73	210.094	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.384	31.600	320	122.880	<=400	Pass
			2DH3	1.636	31.600	165	269.940	<=400	Pass
			2DH5	2.884	31.600	75	216.300	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.386	31.600	320	123.520	<=400	Pass
			3DH3	1.634	31.600	165	269.610	<=400	Pass
			3DH5	2.888	31.600	87	251.256	<=400	Pass

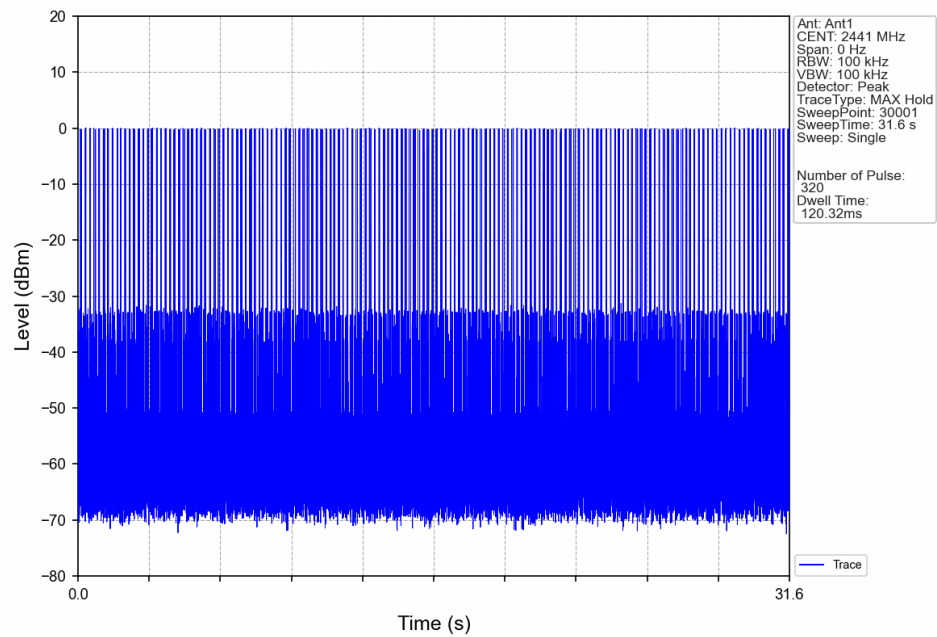
FCCID: 2AZSQ-WA1

5.2 Test Graph

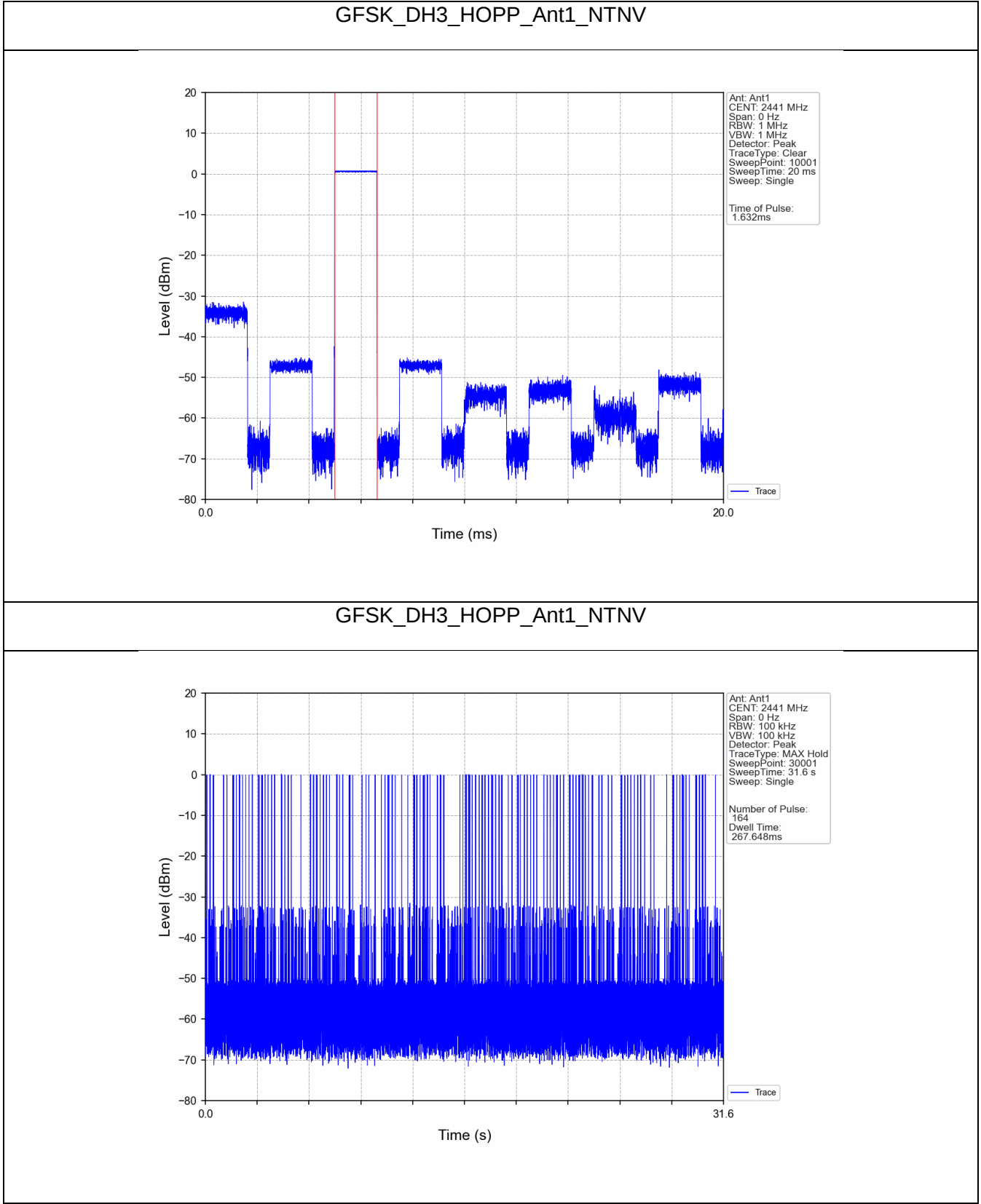
5.2.1 Ant1



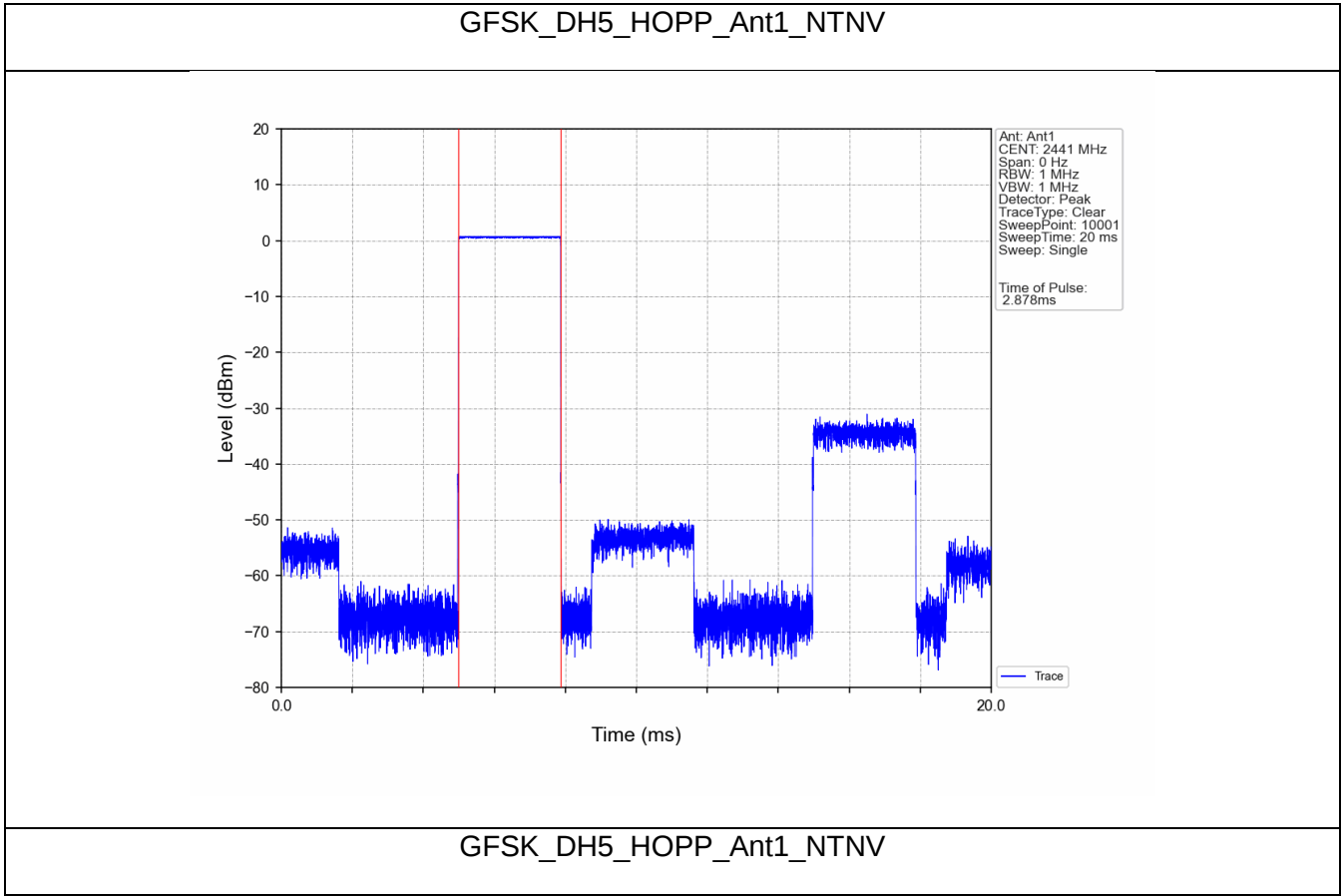
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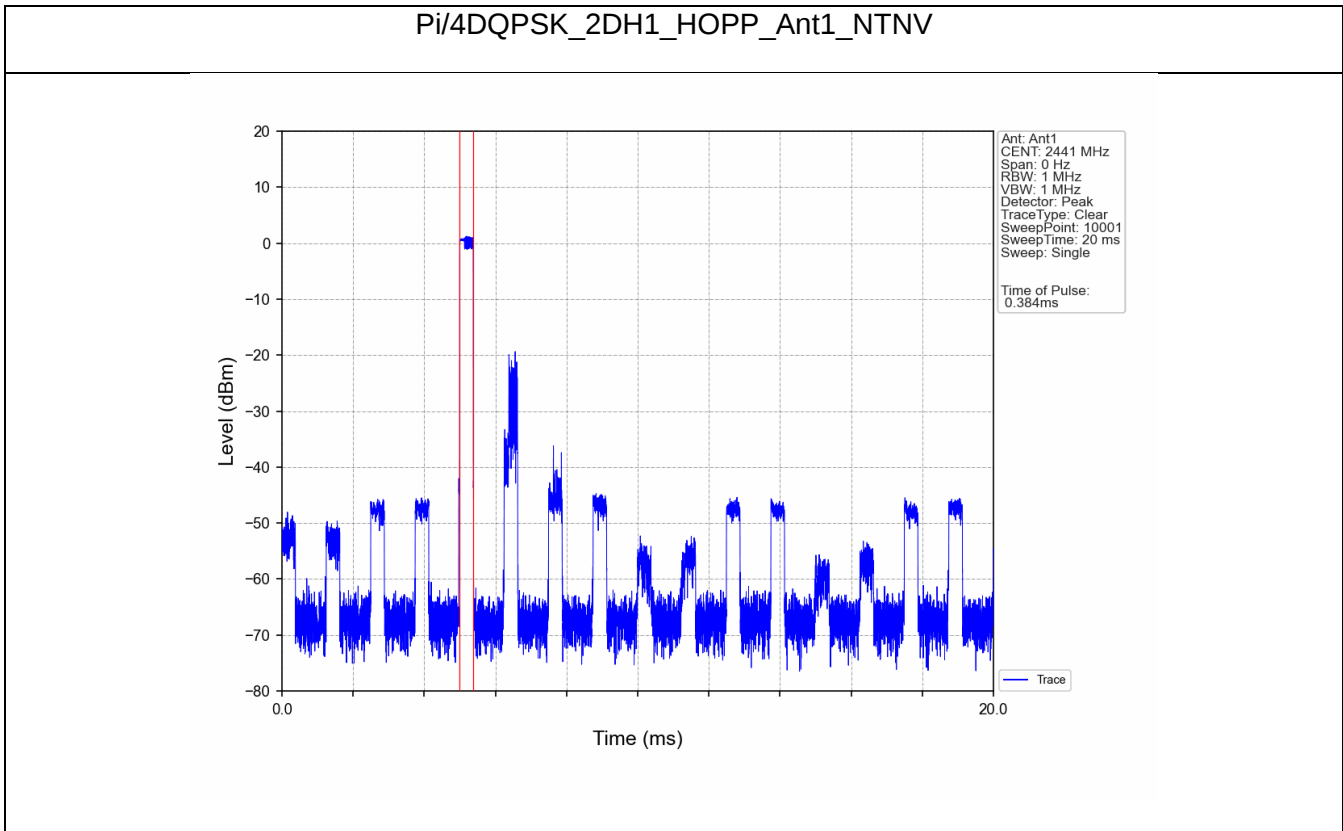
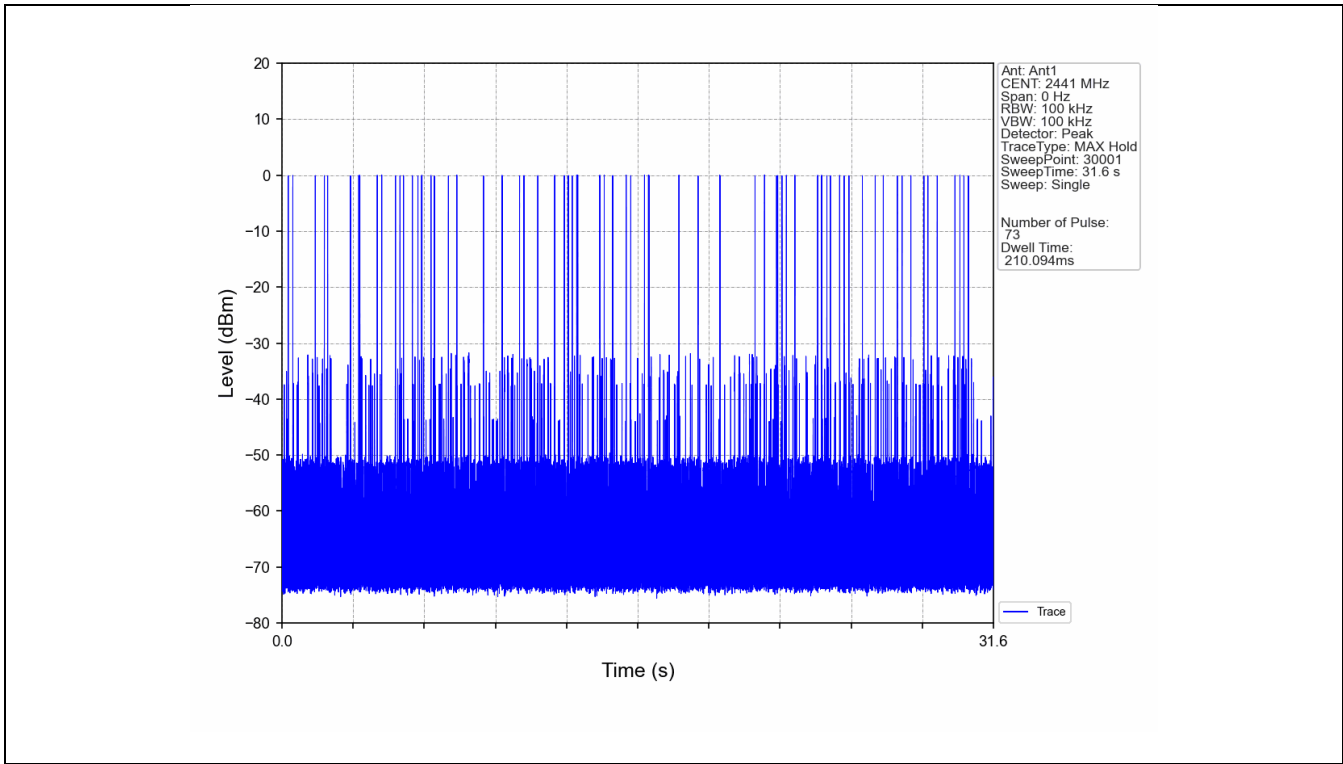
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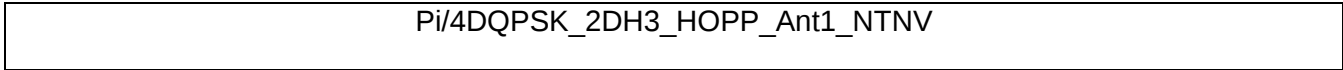
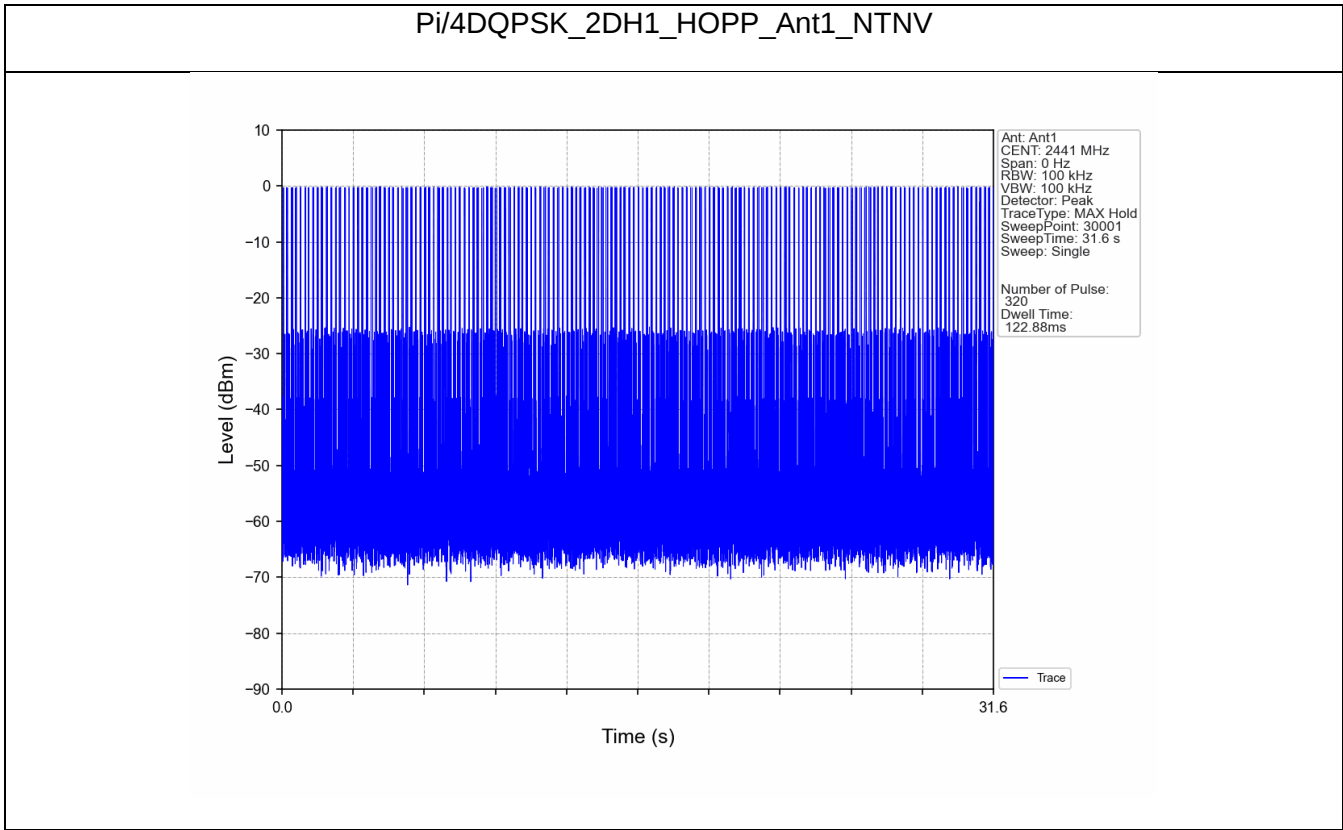
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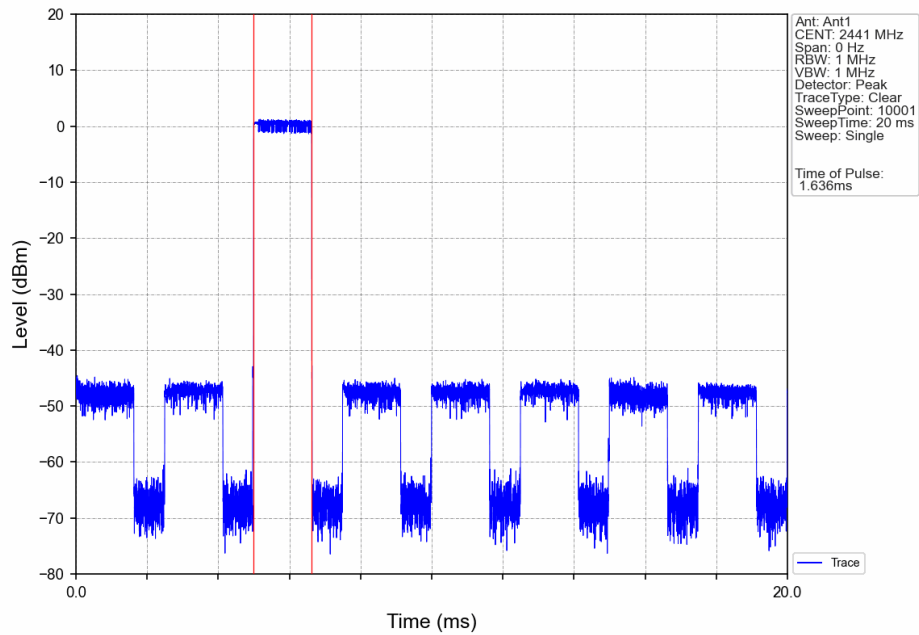
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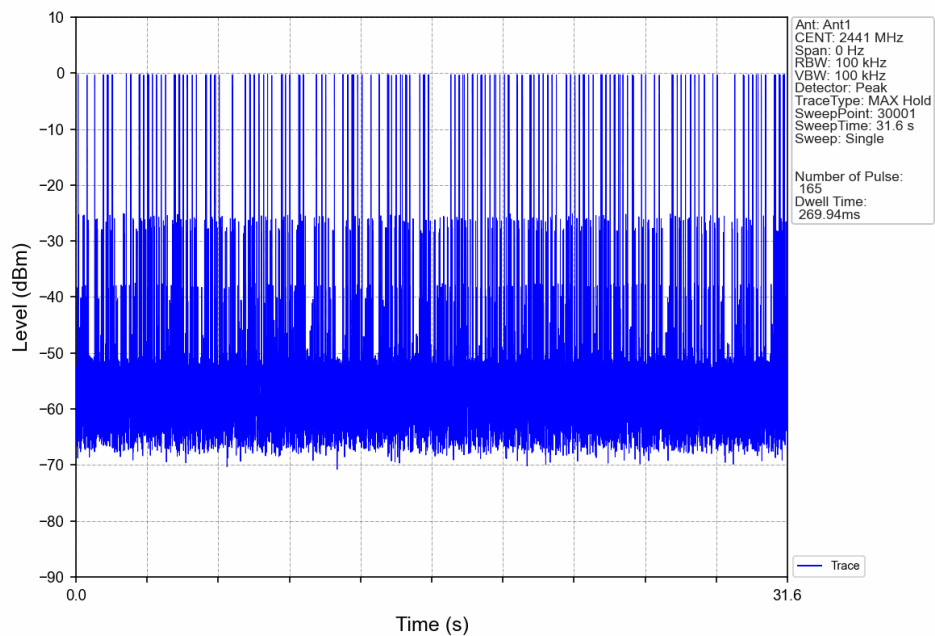
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FCCID: 2AZSQ-WA1

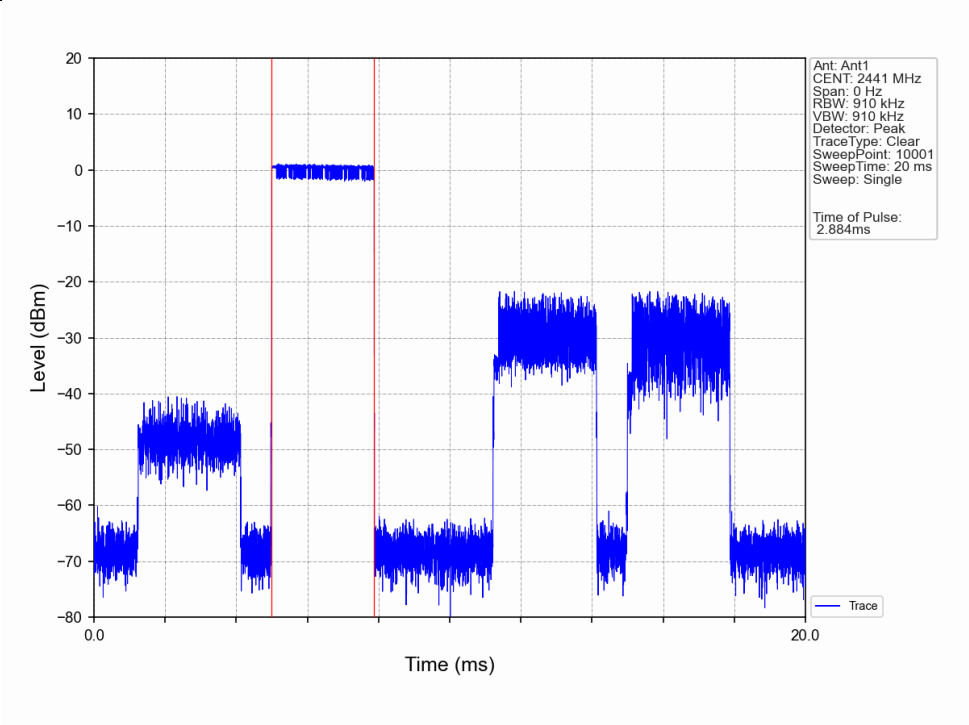


Pi/4DQPSK_2DH3_HOPP_Ant1_NTNV

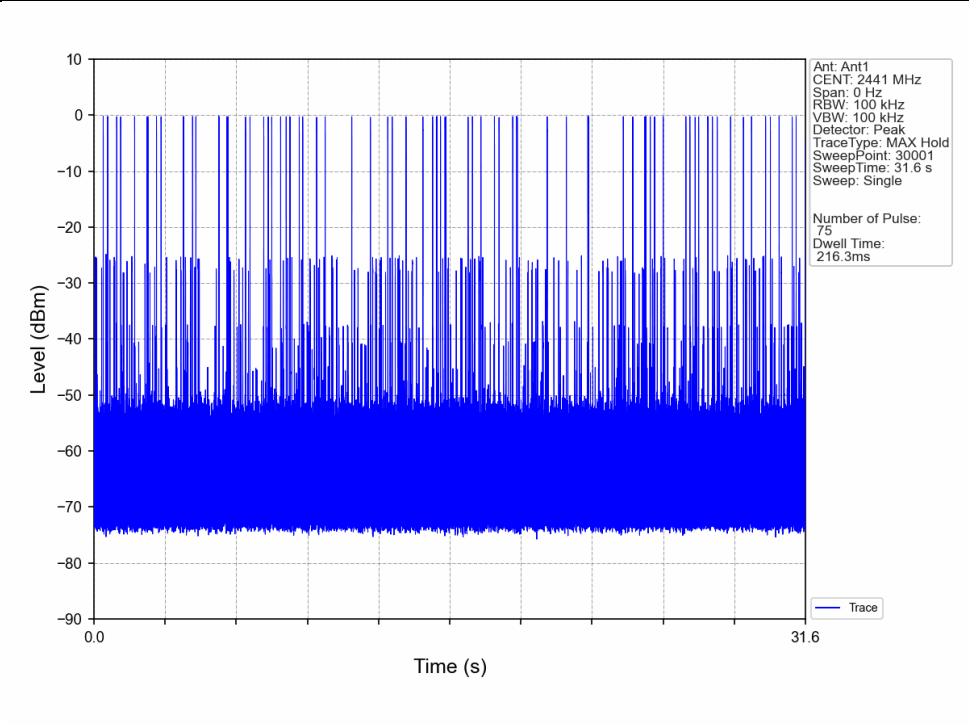


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Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV

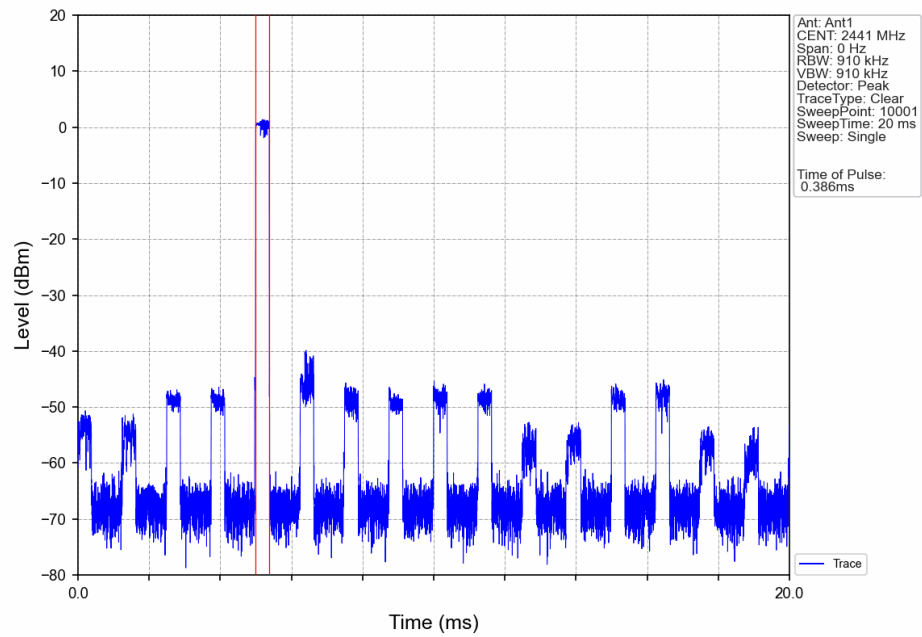


Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



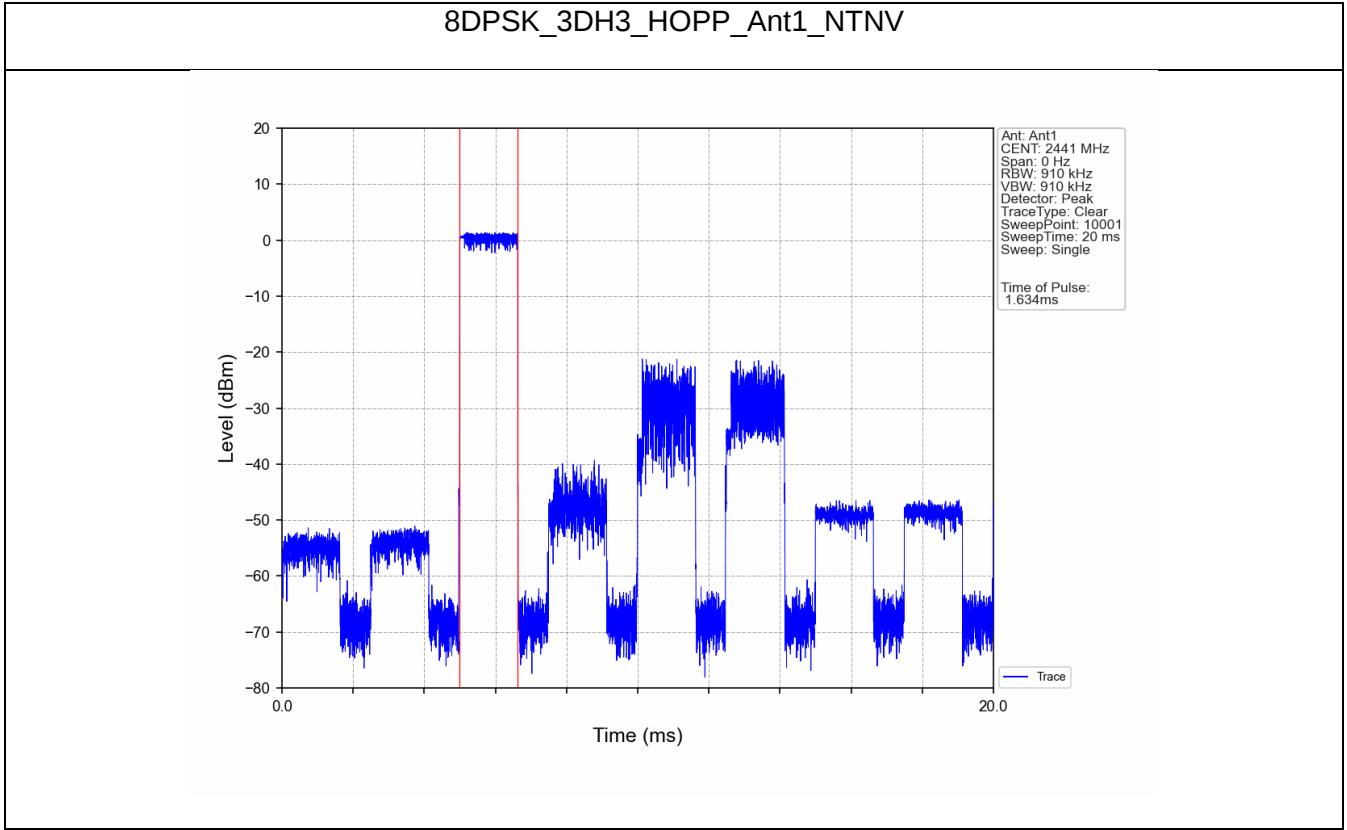
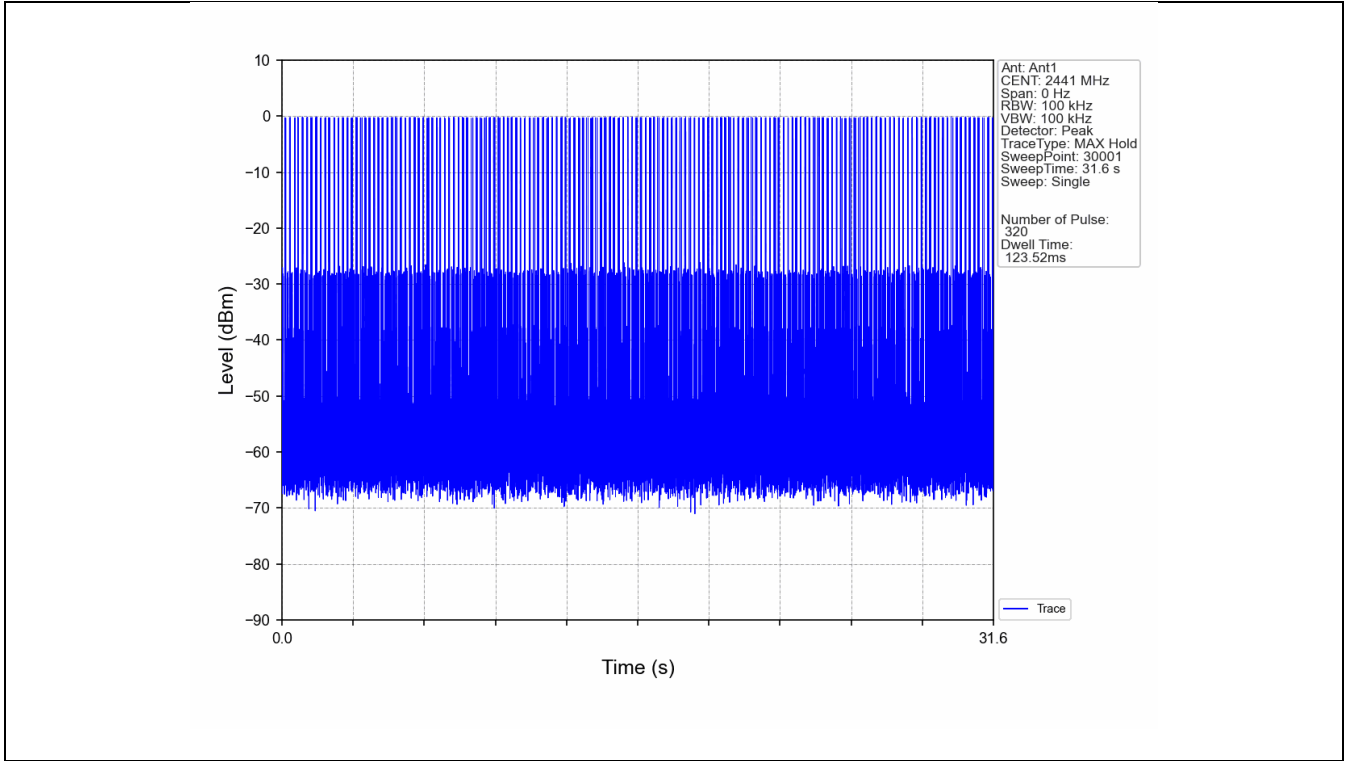
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8DPSK_3DH1_HOPP_Ant1_NTNV

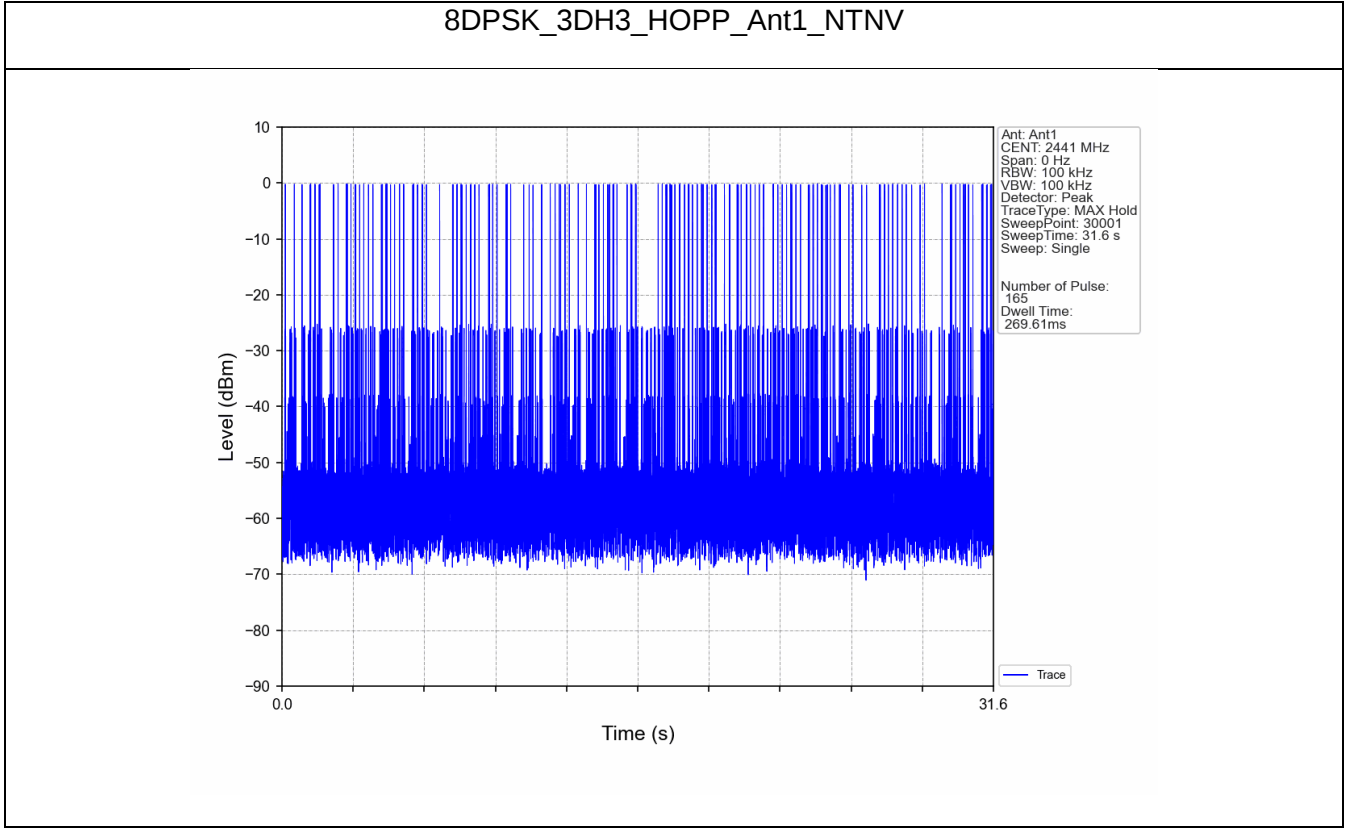


8DPSK_3DH1_HOPP_Ant1_NTNV

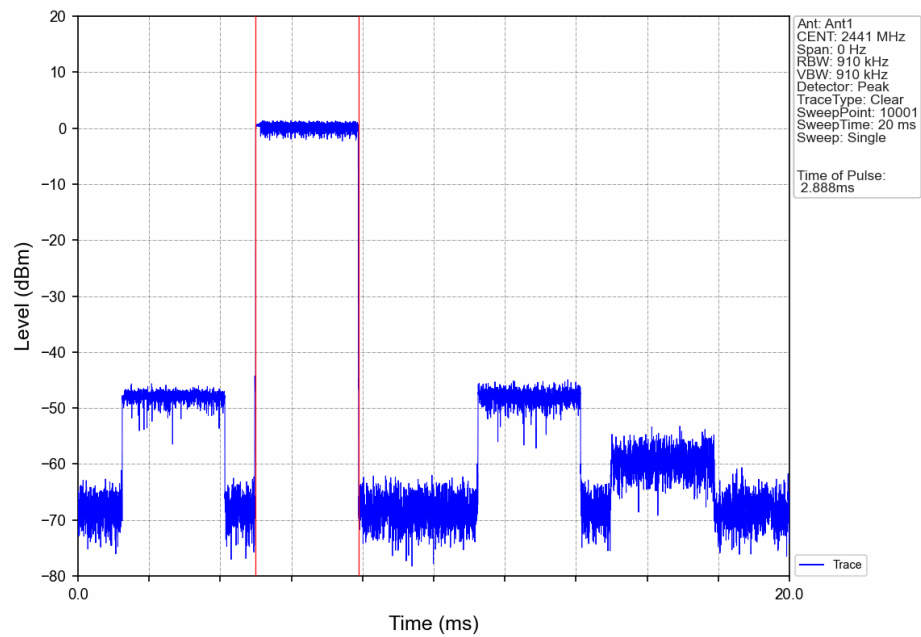
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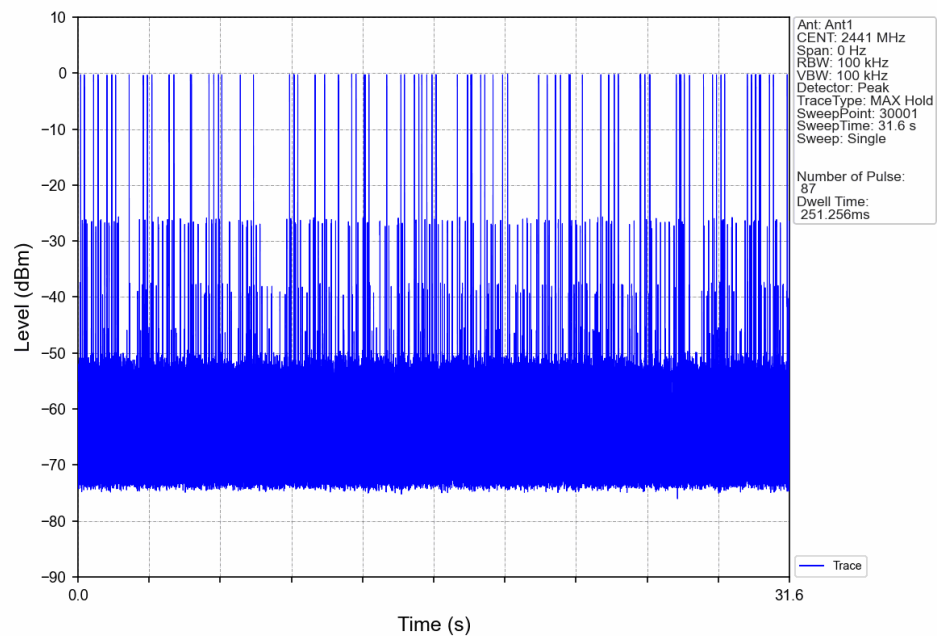
FCCID: 2AZSQ-WA1



FCCID: 2AZSQ-WA1



8DPSK_3DH5_HOPP_Ant1_NTNV



FCCID: 2AZSQ-WA1

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	0.46
		2441	DH5	1	0.52
		2480	DH5	1	-0.18
Pi/4DQPSK	SISO	2402	2DH5	1	0.43
		2441	2DH5	1	0.50
		2480	2DH5	1	-0.34
8DPSK	SISO	2402	3DH5	1	0.50
		2441	3DH5	1	0.49
		2480	3DH5	1	-0.16
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 CSE

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	0.52	-19.48	Pass
		2441	DH5	1	0.52	-19.48	Pass
		2480	DH5	1	0.52	-19.48	Pass
		HOPP	DH5	1	0.52	-19.48	Pass
					0.52	-19.48	Pass

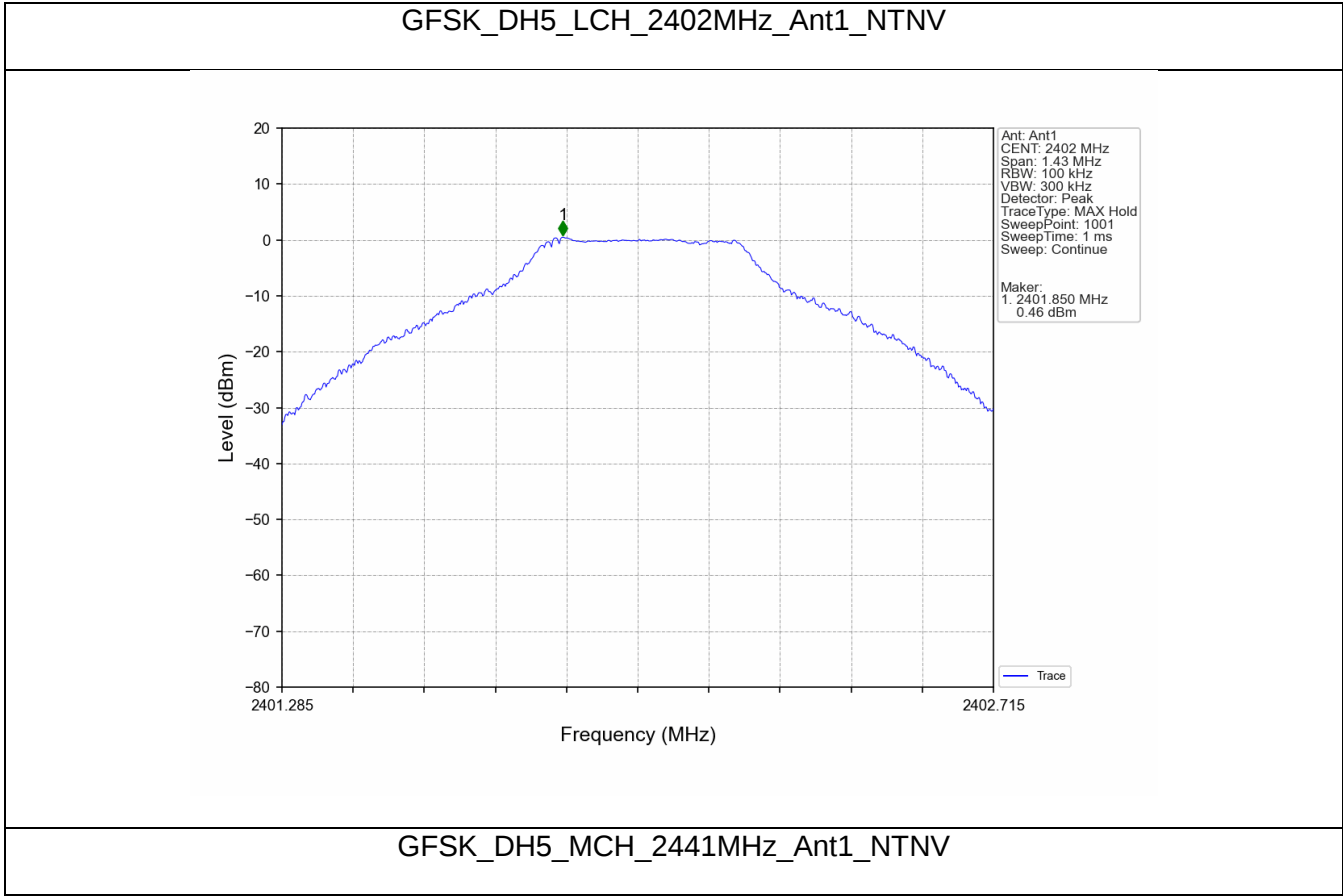
FCCID: 2AZSQ-WA1

Pi/4DQPSK	SISO	2402	2DH5	1	0.50	-19.50	Pass
		2441	2DH5	1	0.50	-19.50	Pass
		2480	2DH5	1	0.50	-19.50	Pass
		HOPP	2DH5	1	0.50	-19.50	Pass
					0.50	-19.50	Pass
8DPSK	SISO	2402	3DH5	1	0.50	-19.50	Pass
		2441	3DH5	1	0.50	-19.50	Pass
		2480	3DH5	1	0.50	-19.50	Pass
		HOPP	3DH5	1	0.50	-19.50	Pass
					0.50	-19.50	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.							

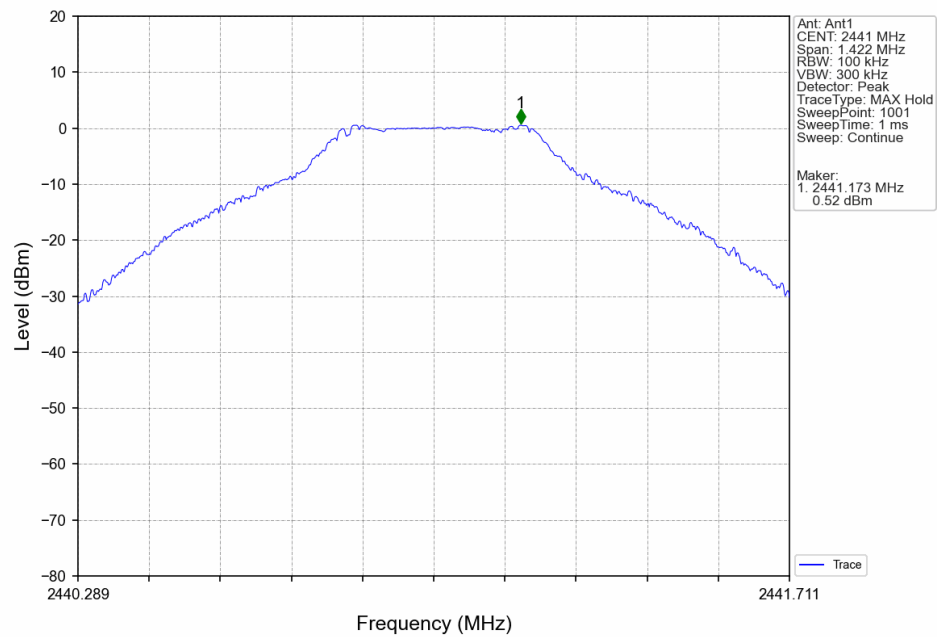
FCCID: 2AZSQ-WA1

6.2 Test Graph

6.2.1 Ref

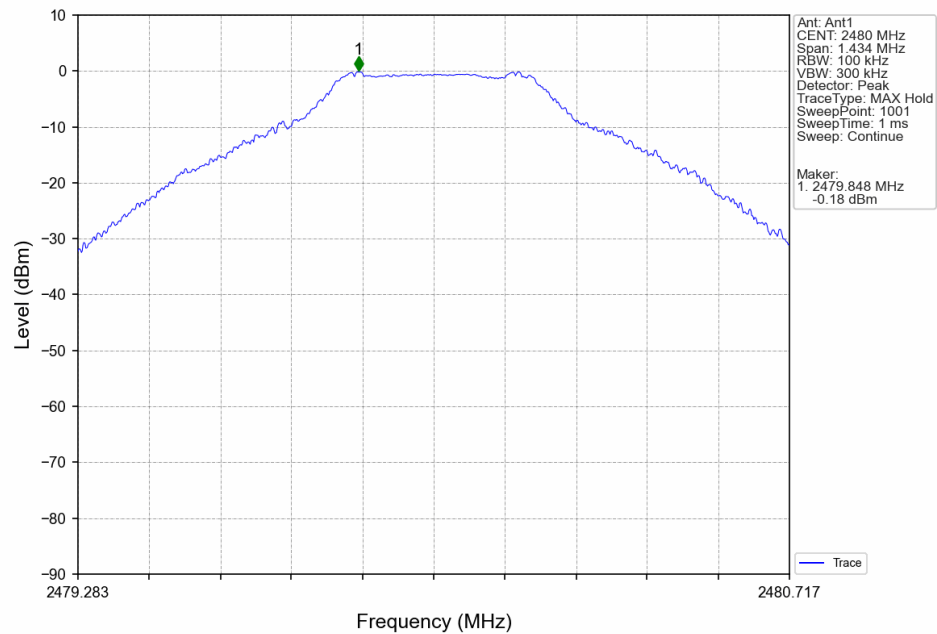


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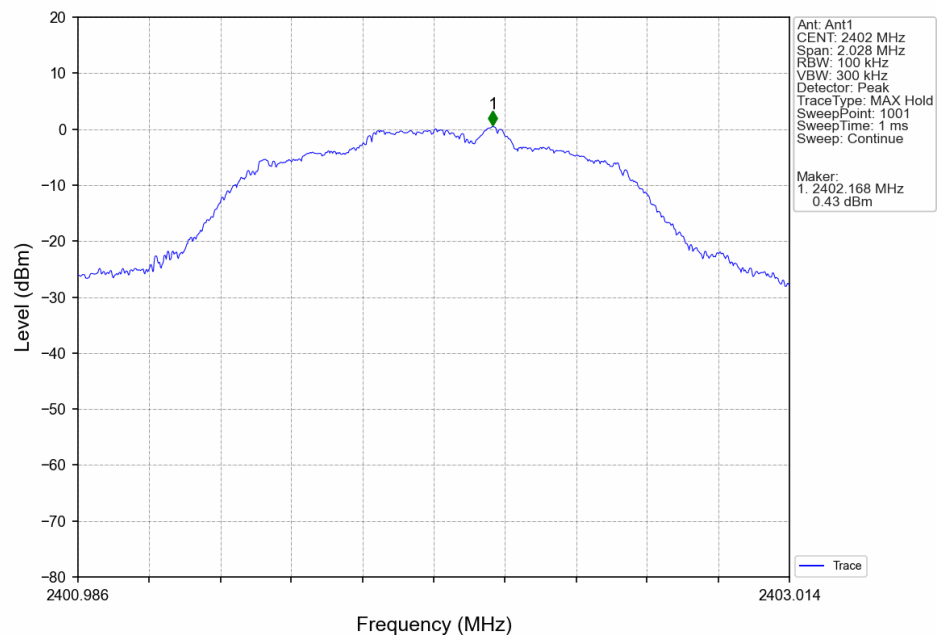


FCCID: 2AZSQ-WA1

GFSK_DH5_HCH_2480MHz_Ant1_NTNV

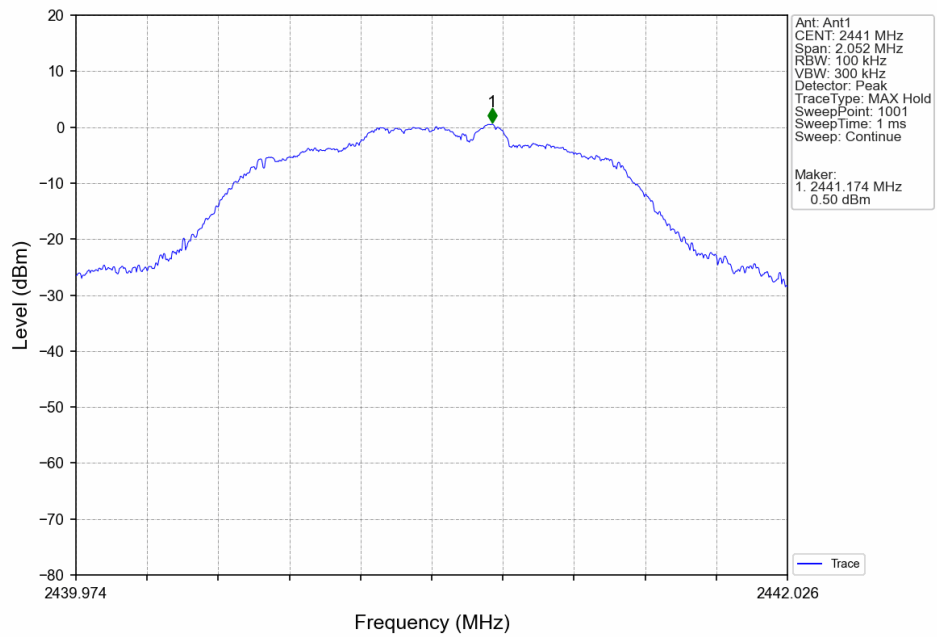


Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



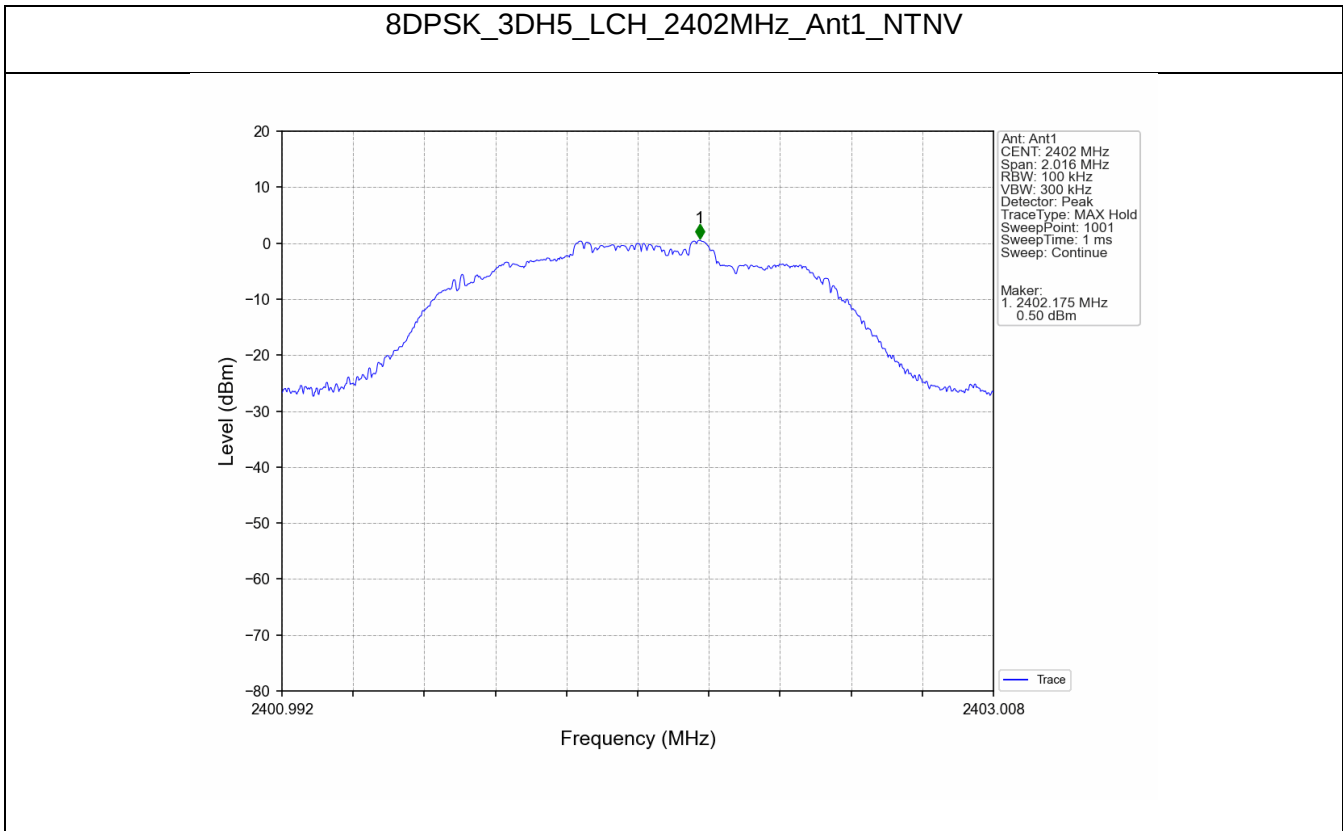
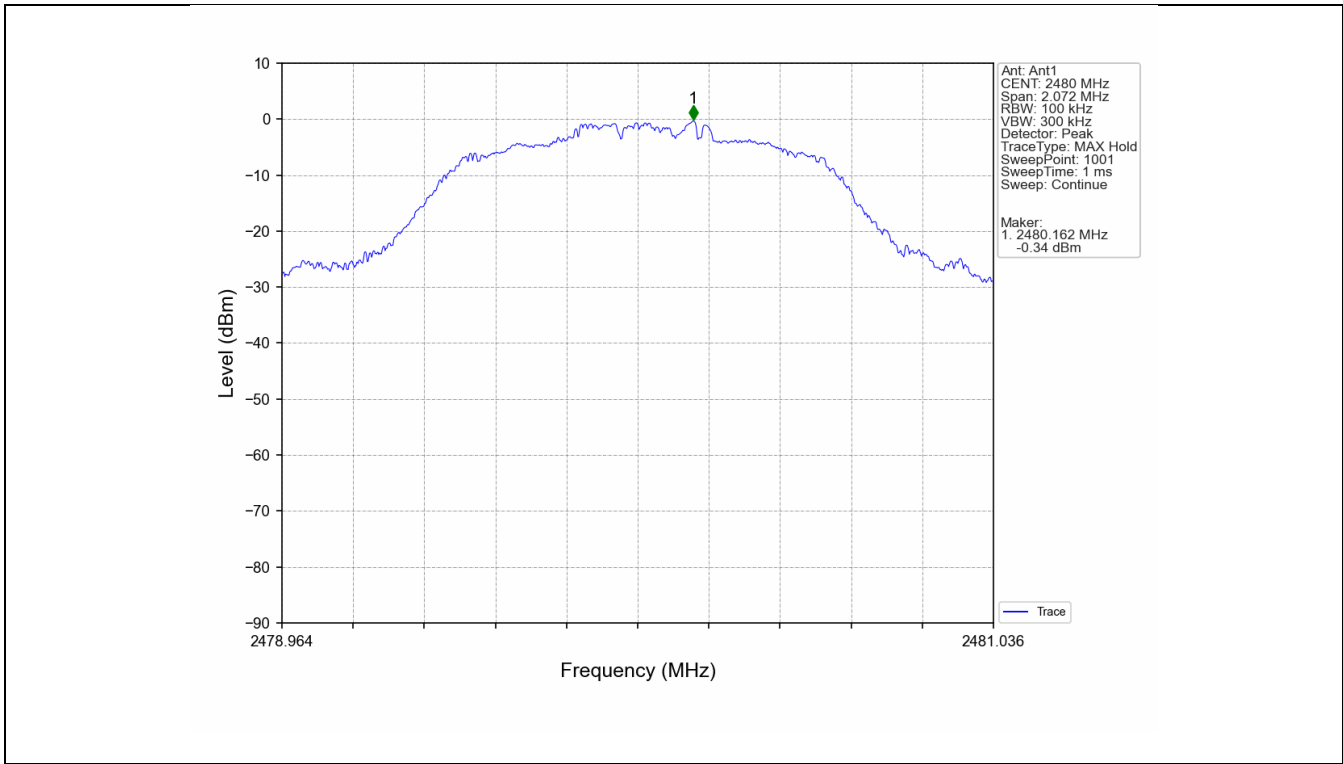
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Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



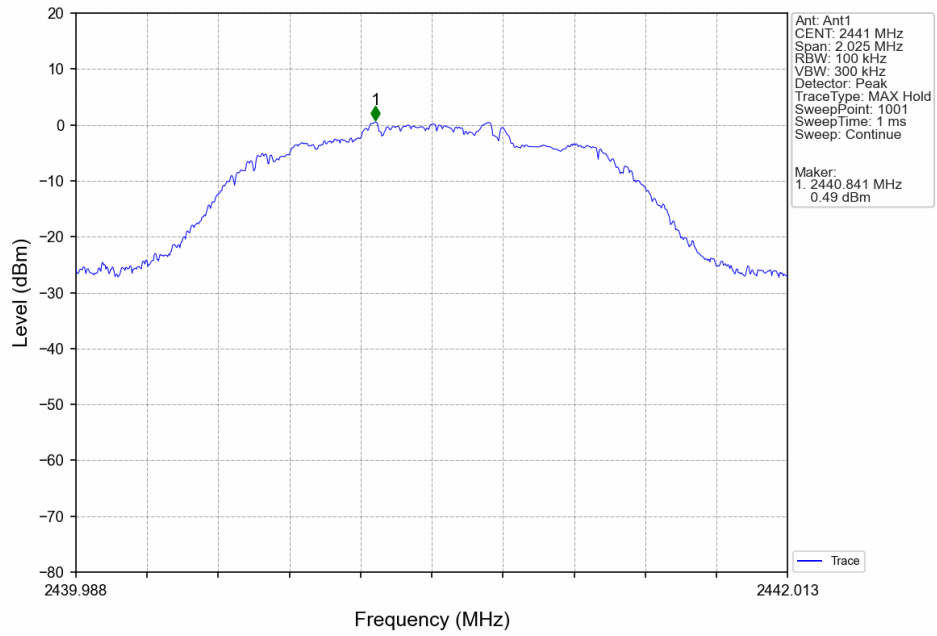
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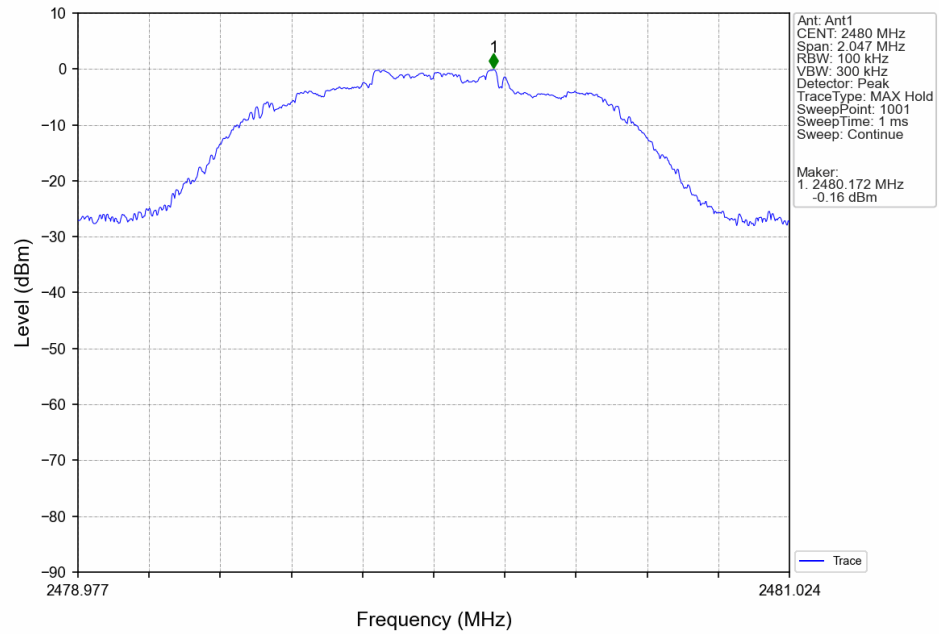
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8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



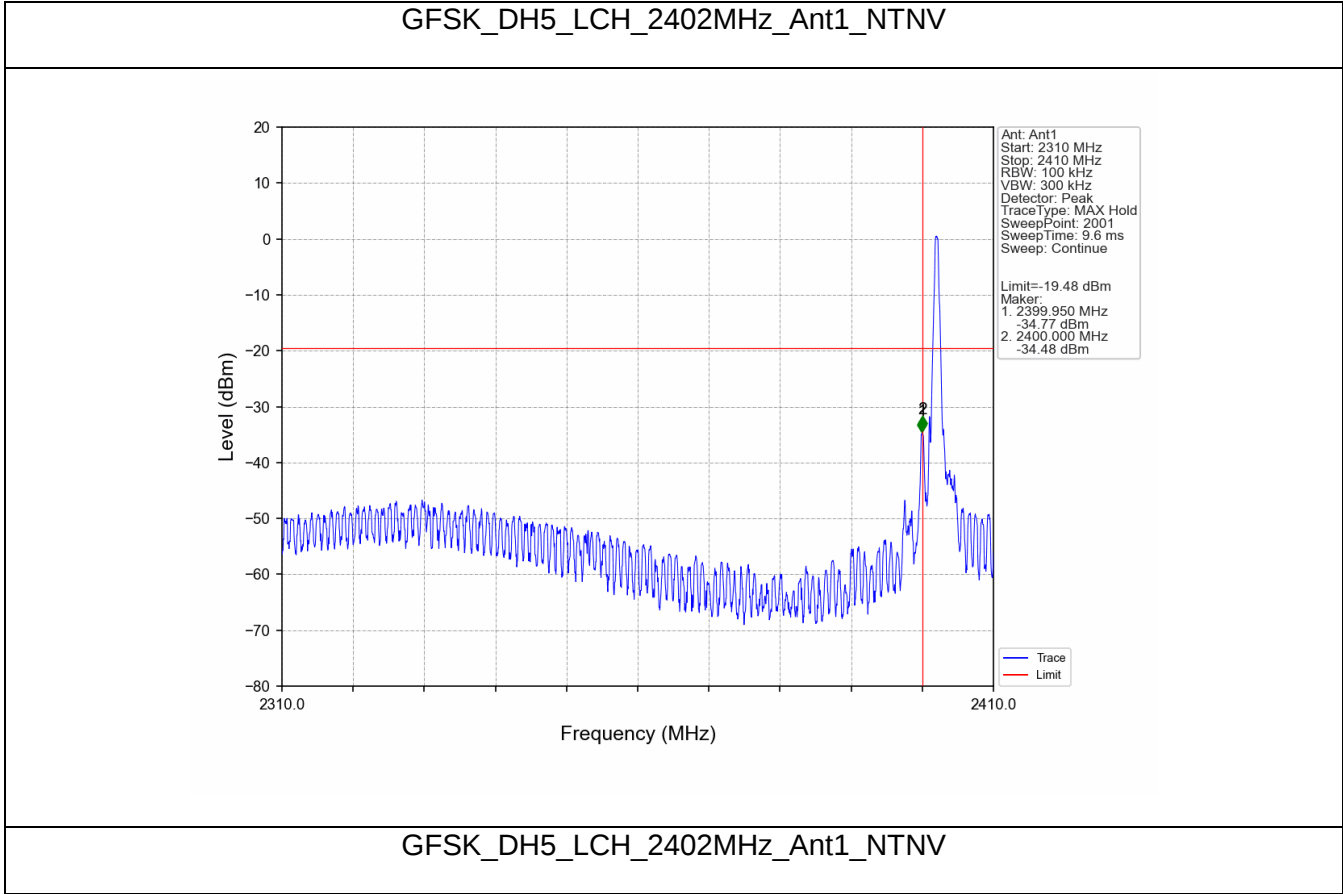
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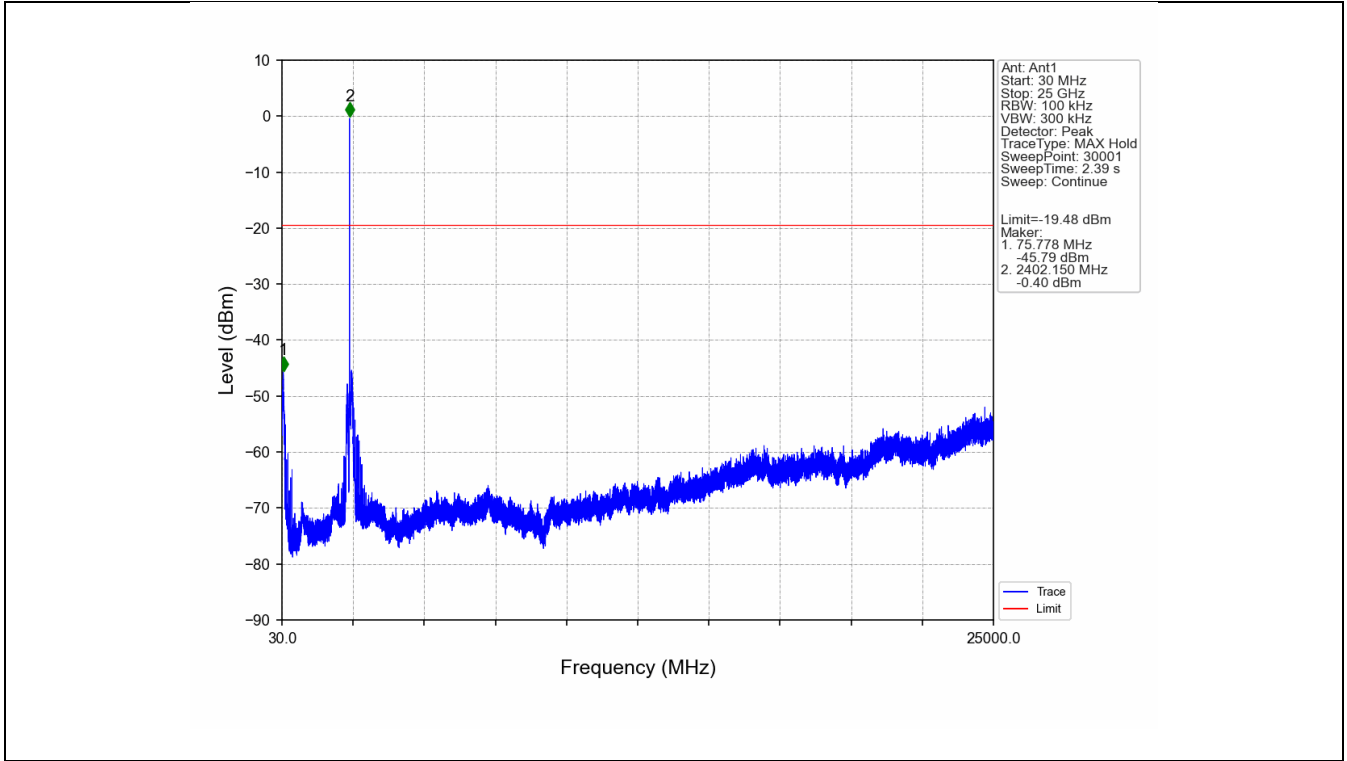


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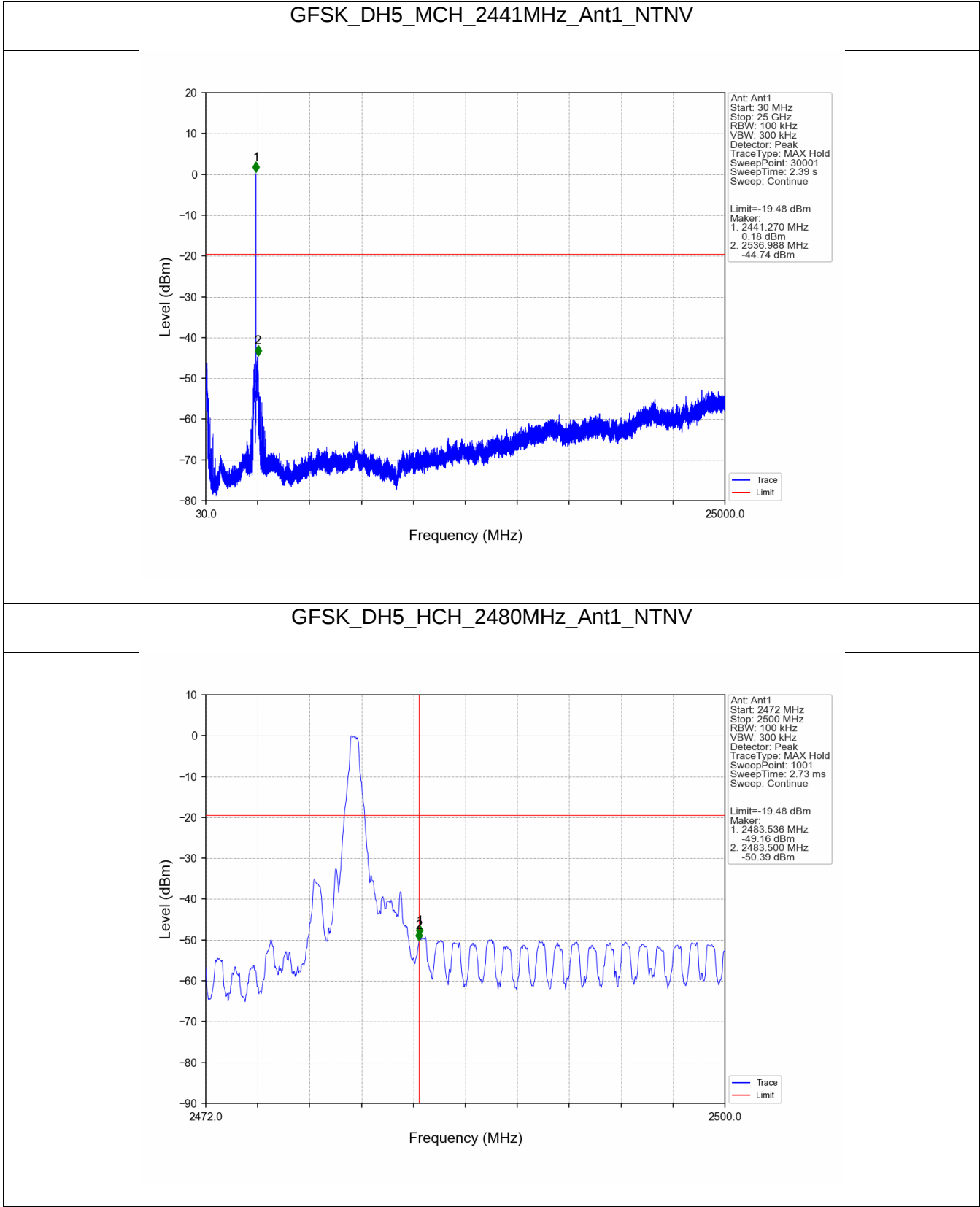
6.2.2 CSE



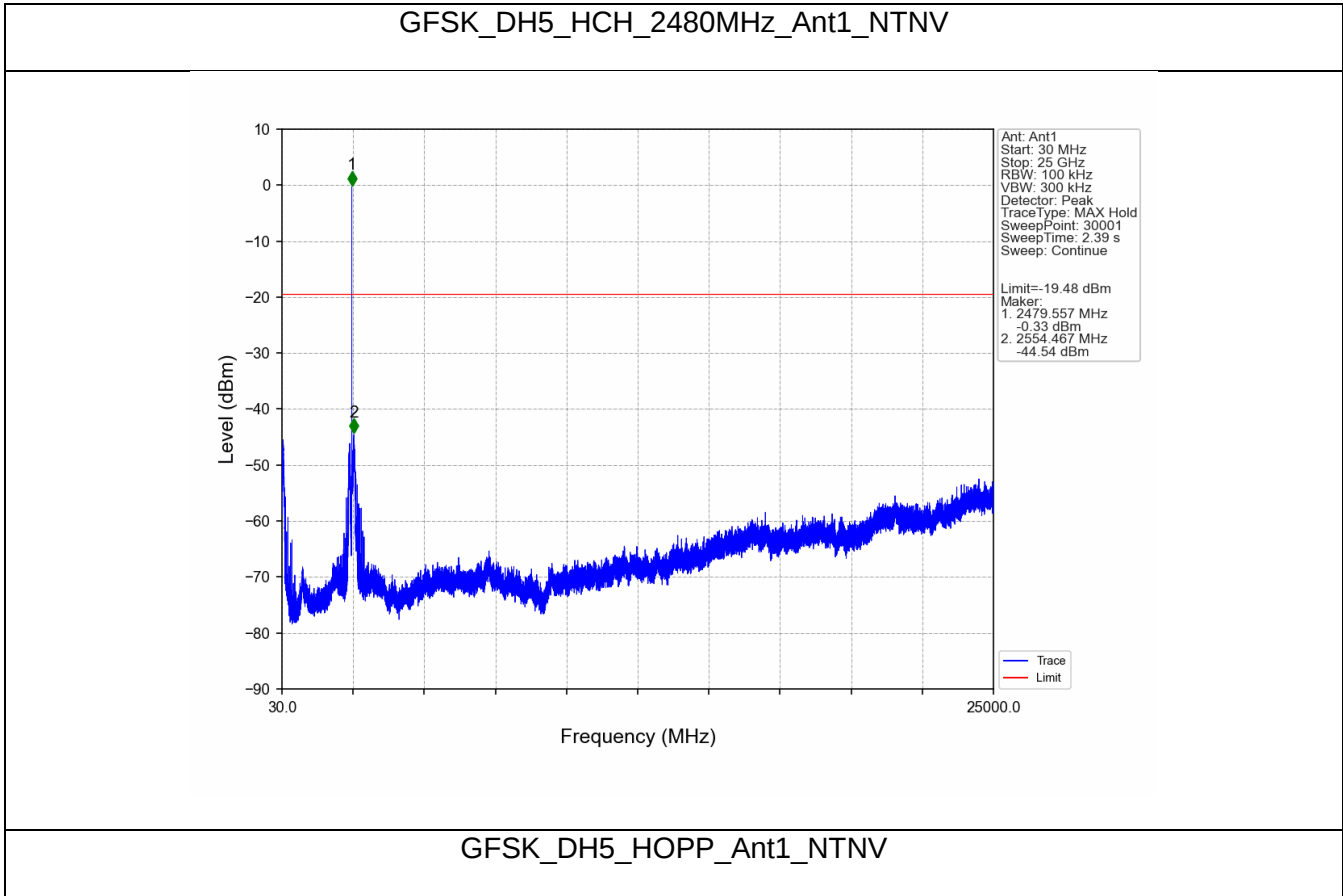
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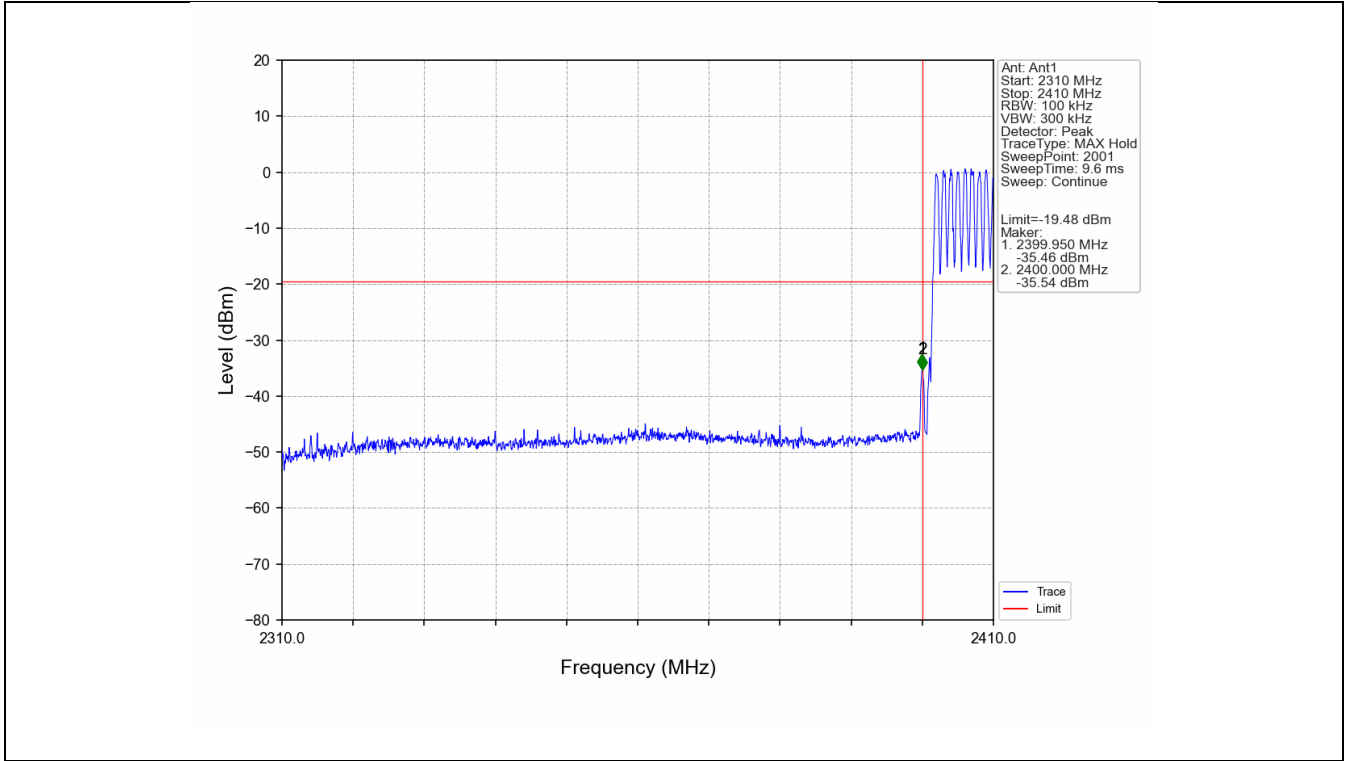
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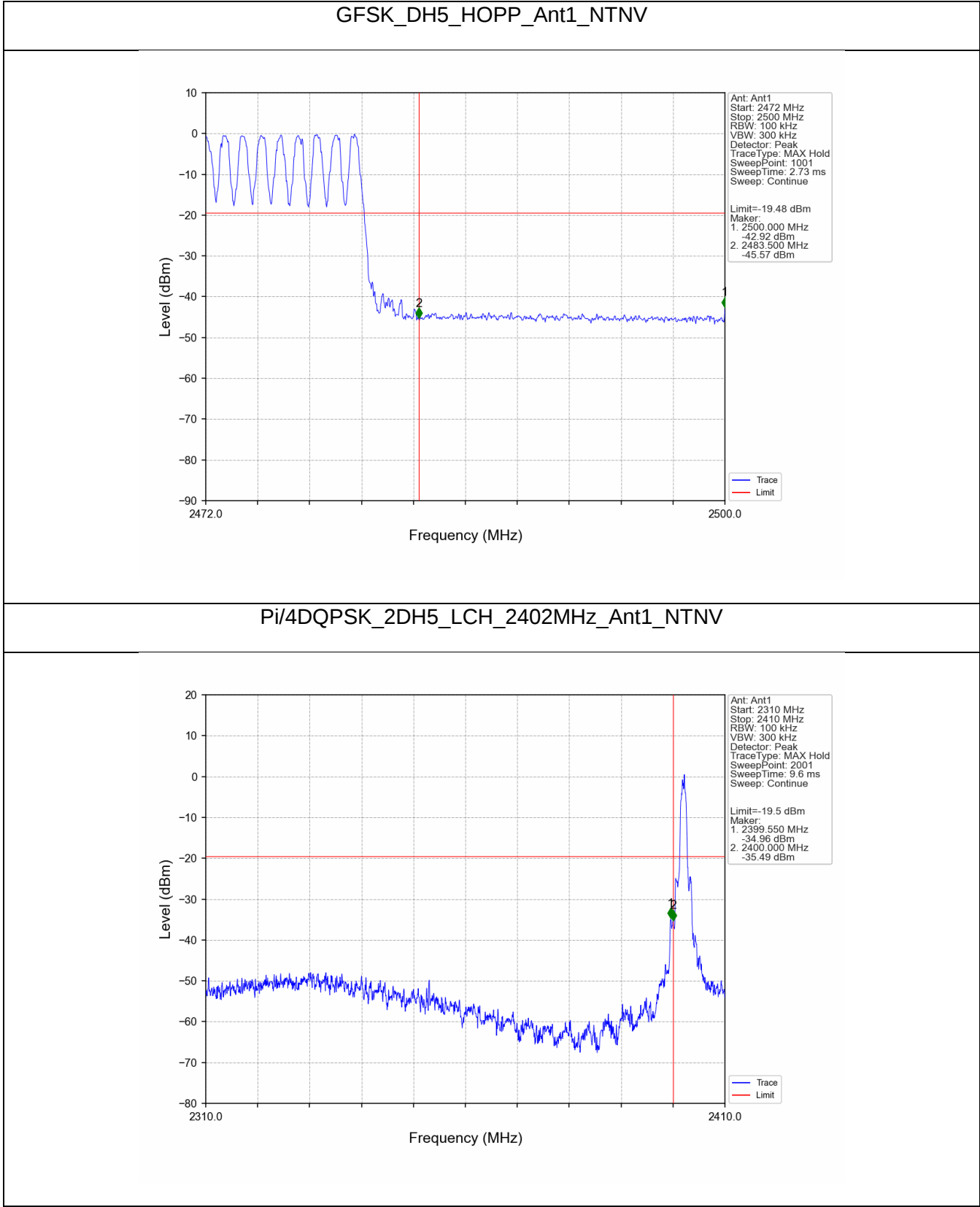
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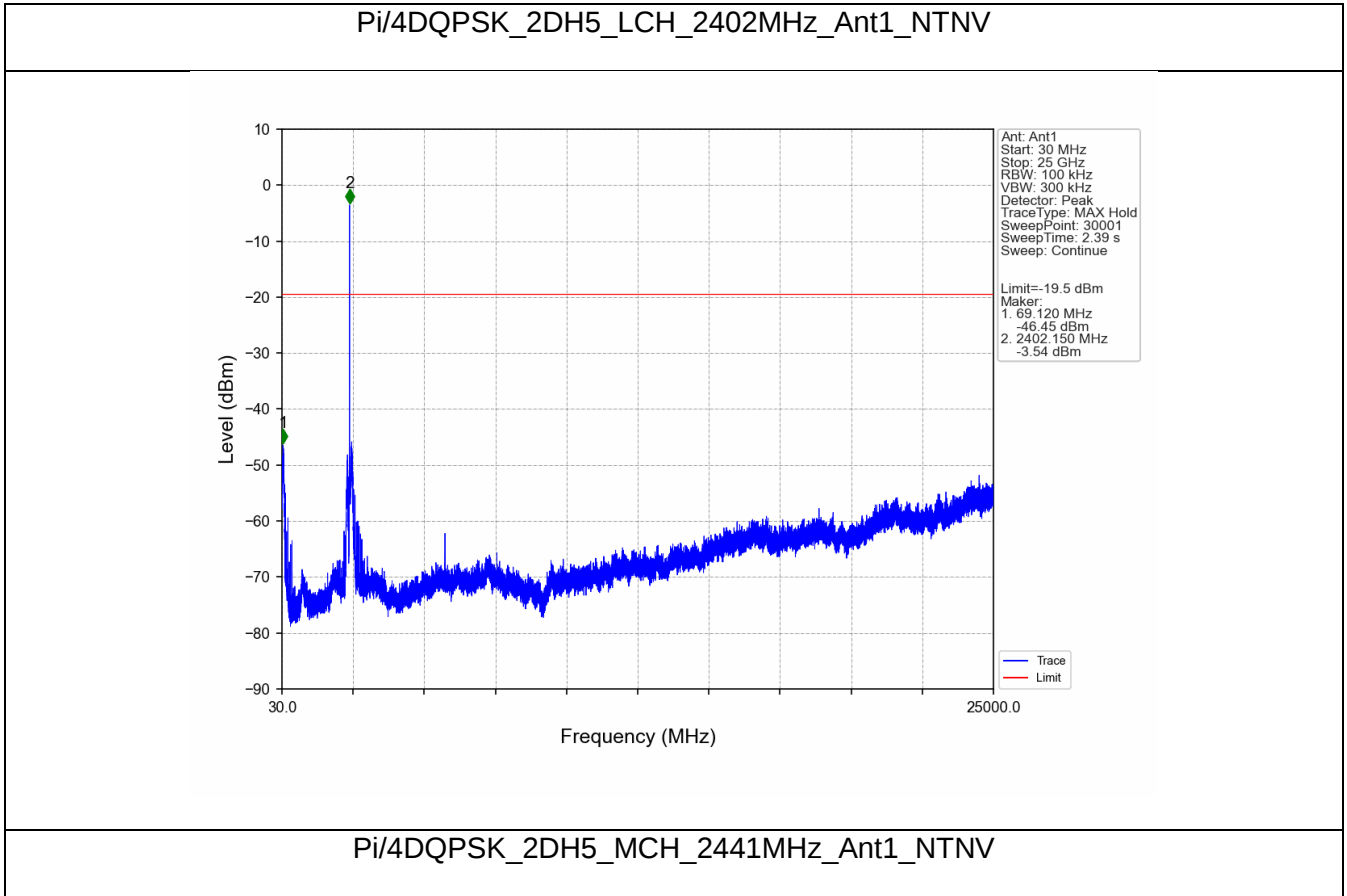
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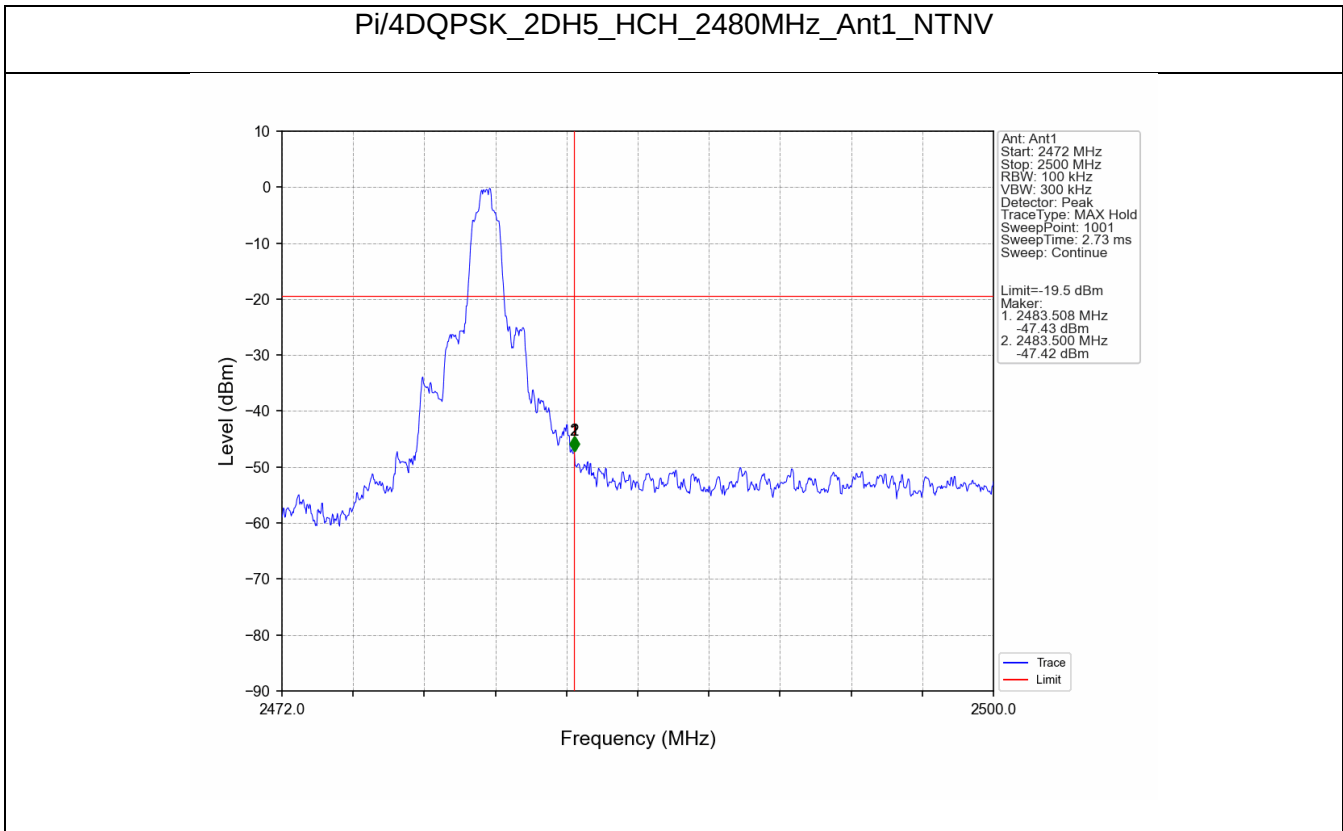
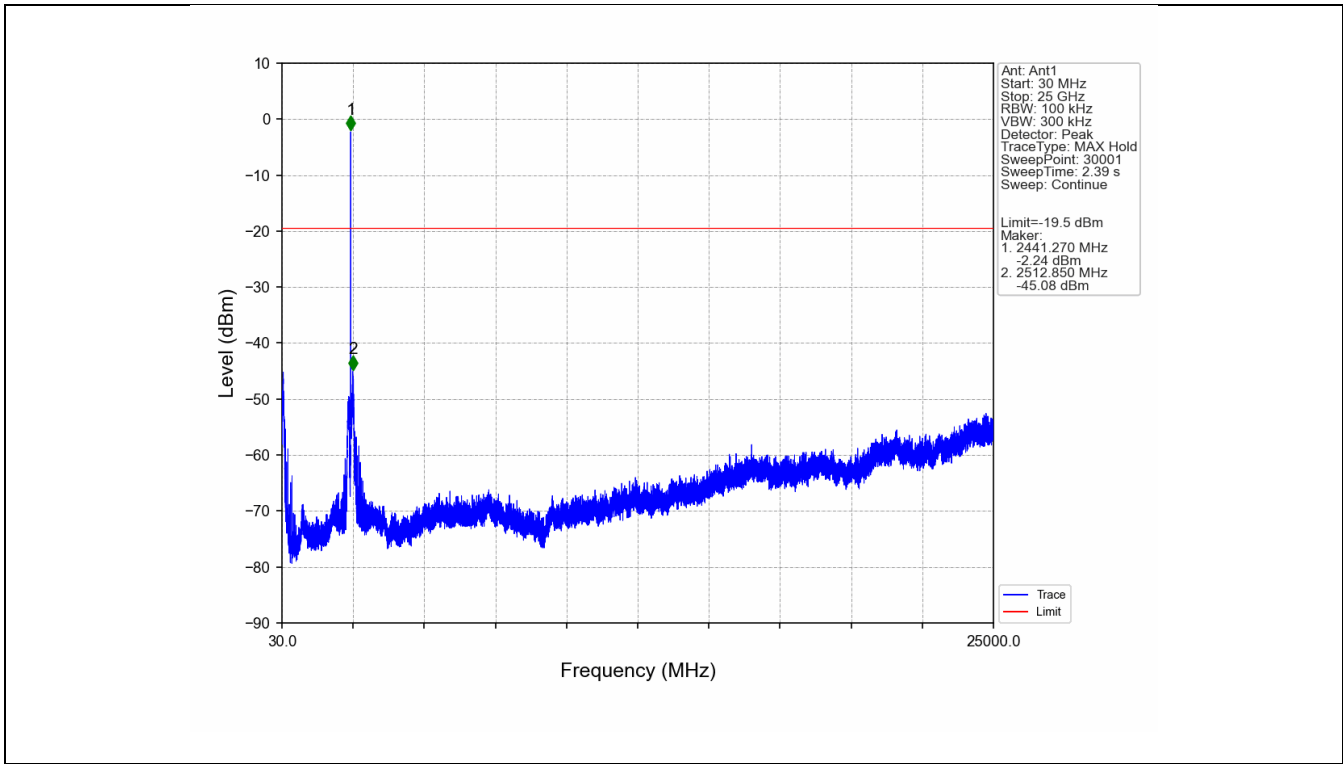
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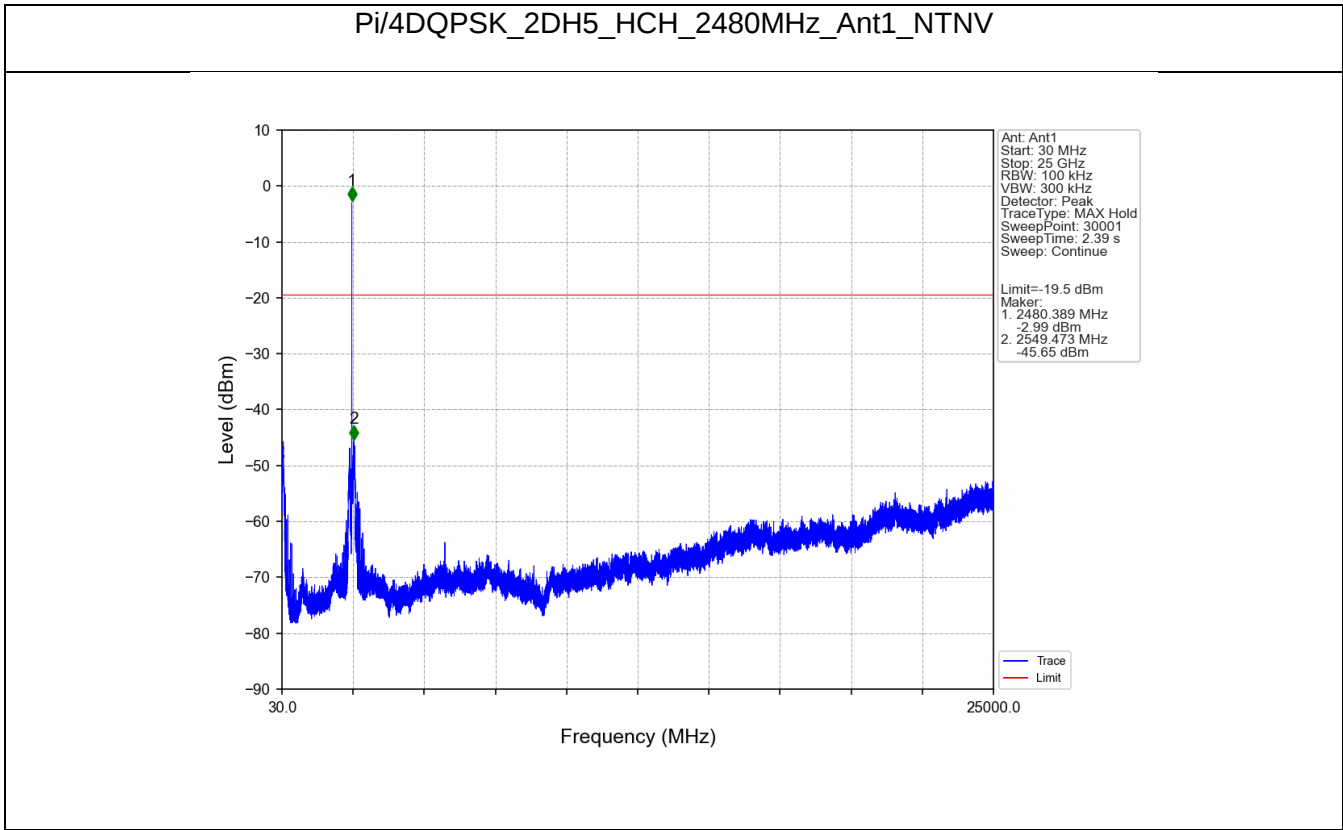
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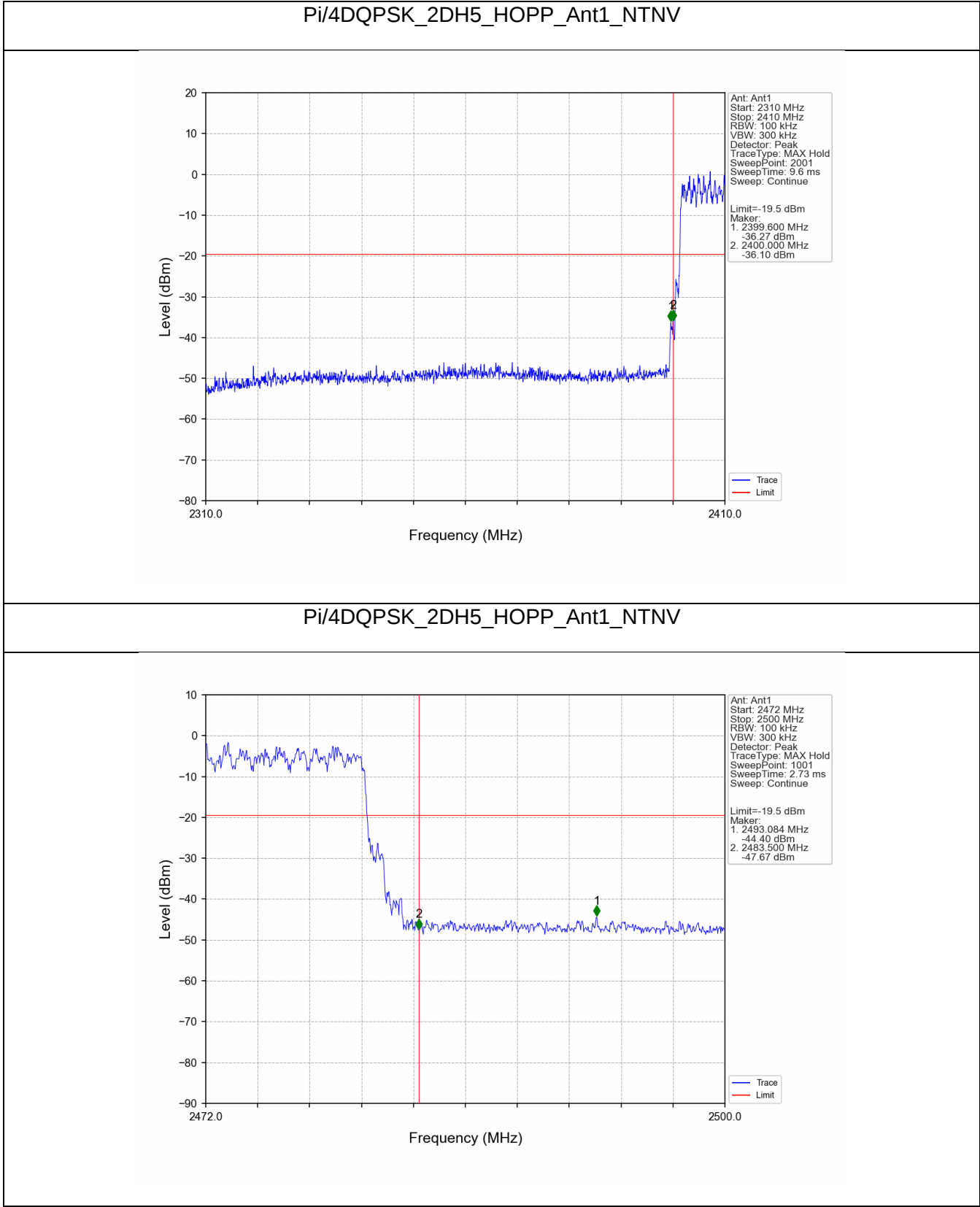
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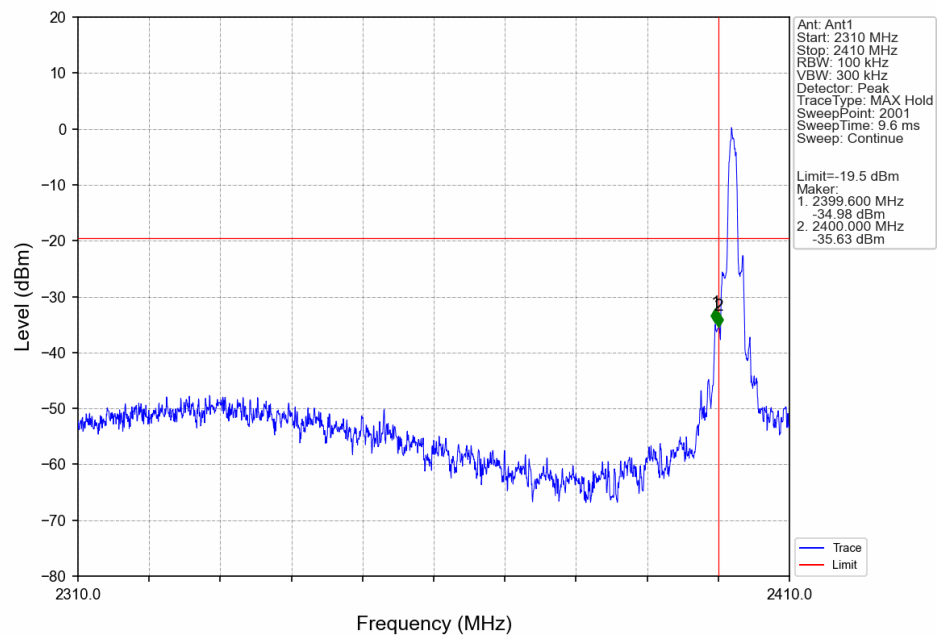


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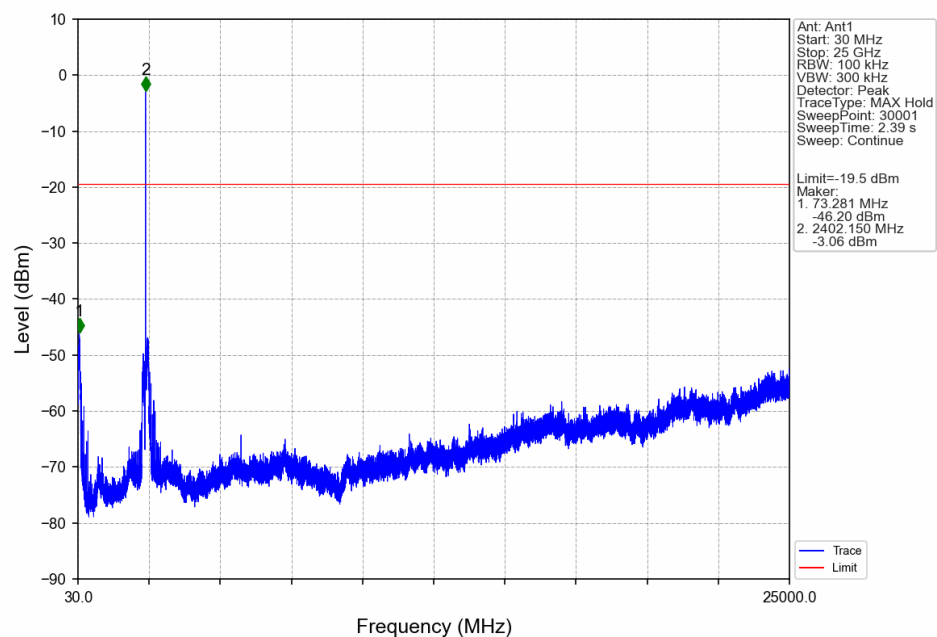


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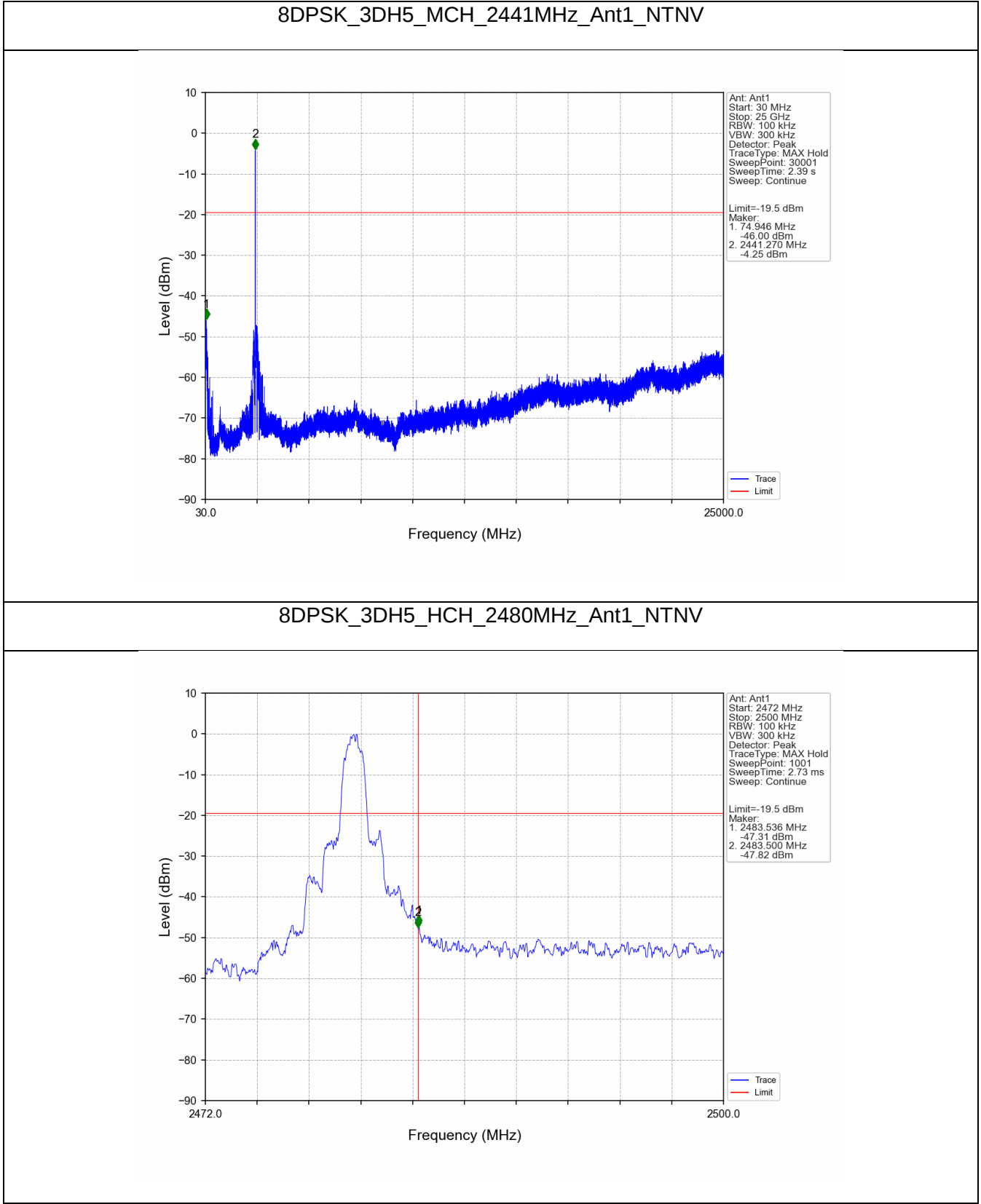
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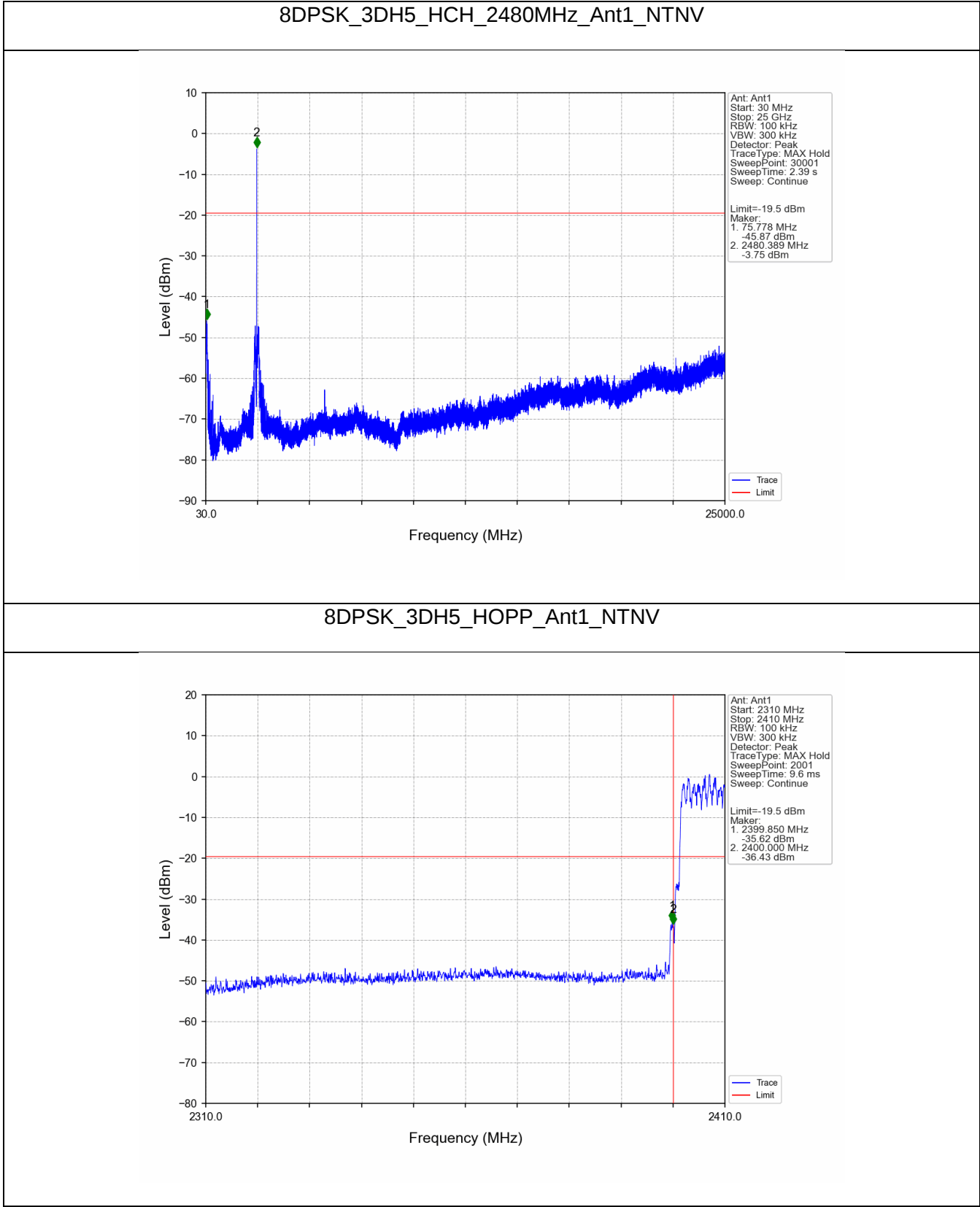
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FCCID: 2AZSQ-WA1



FCCID: 2AZSQ-WA1



FCCID: 2AZSQ-WA1

