



Annex for BT

Test Report No.: CTL2411203021-WF

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FCCID: 2BMNX-SPWBS

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	0.908	/	Pass
		2441	DH5	1	0.917	/	Pass
		2480	DH5	1	0.926	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.195	/	Pass
		2441	2DH5	1	1.200	/	Pass
		2480	2DH5	1	1.203	/	Pass
8DPSK	SISO	2402	3DH5	1	1.194	/	Pass
		2441	3DH5	1	1.195	/	Pass
		2480	3DH5	1	1.195	/	Pass

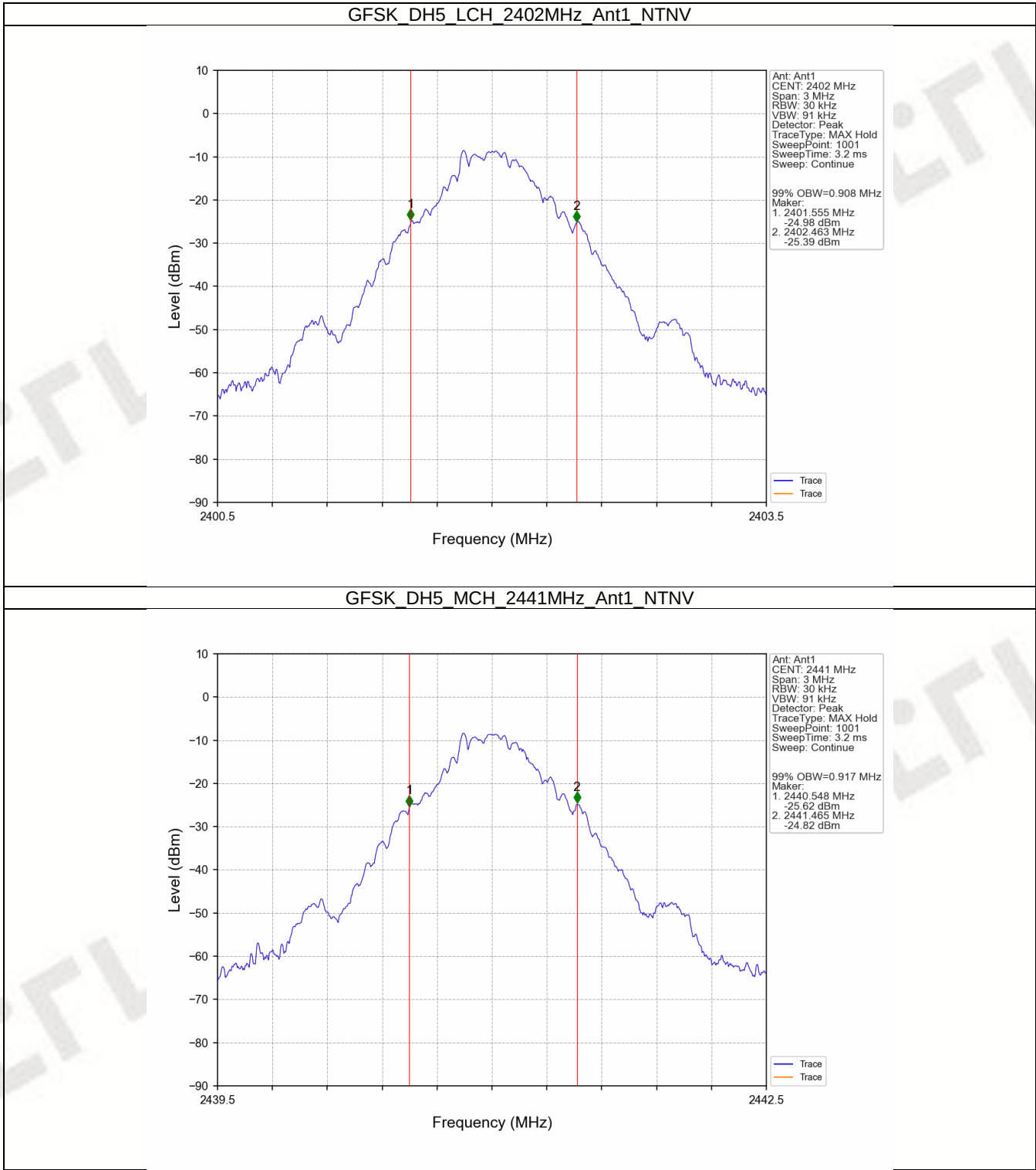
1.1.2 20dB BW

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	1.035	/	Pass
		2441	DH5	1	1.037	/	Pass
		2480	DH5	1	1.040	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.299	/	Pass
		2441	2DH5	1	1.323	/	Pass
		2480	2DH5	1	1.332	/	Pass
8DPSK	SISO	2402	3DH5	1	1.308	/	Pass
		2441	3DH5	1	1.304	/	Pass
		2480	3DH5	1	1.302	/	Pass

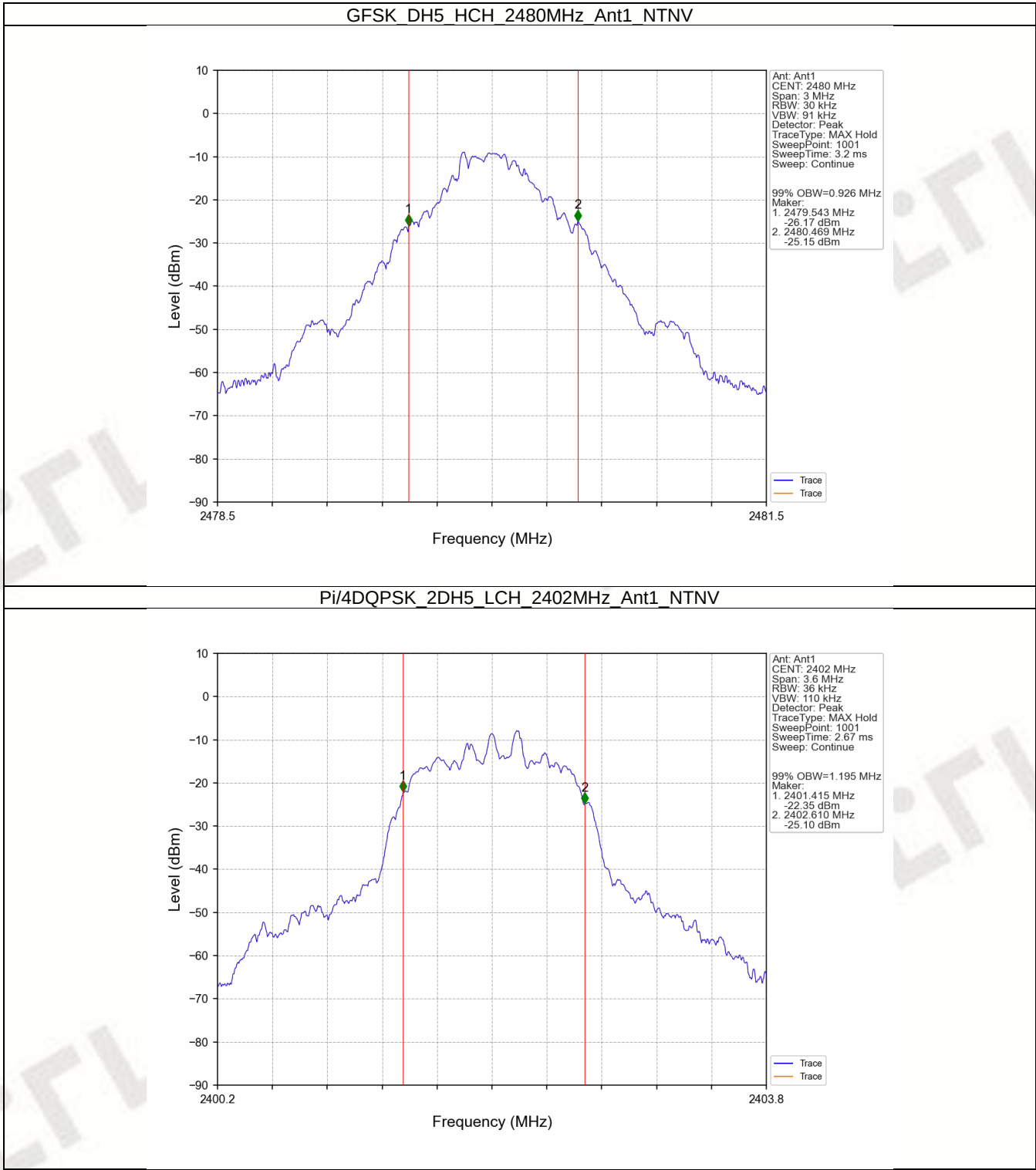
FCCID: 2BMNX-SPWBS

1.2 Test Graph

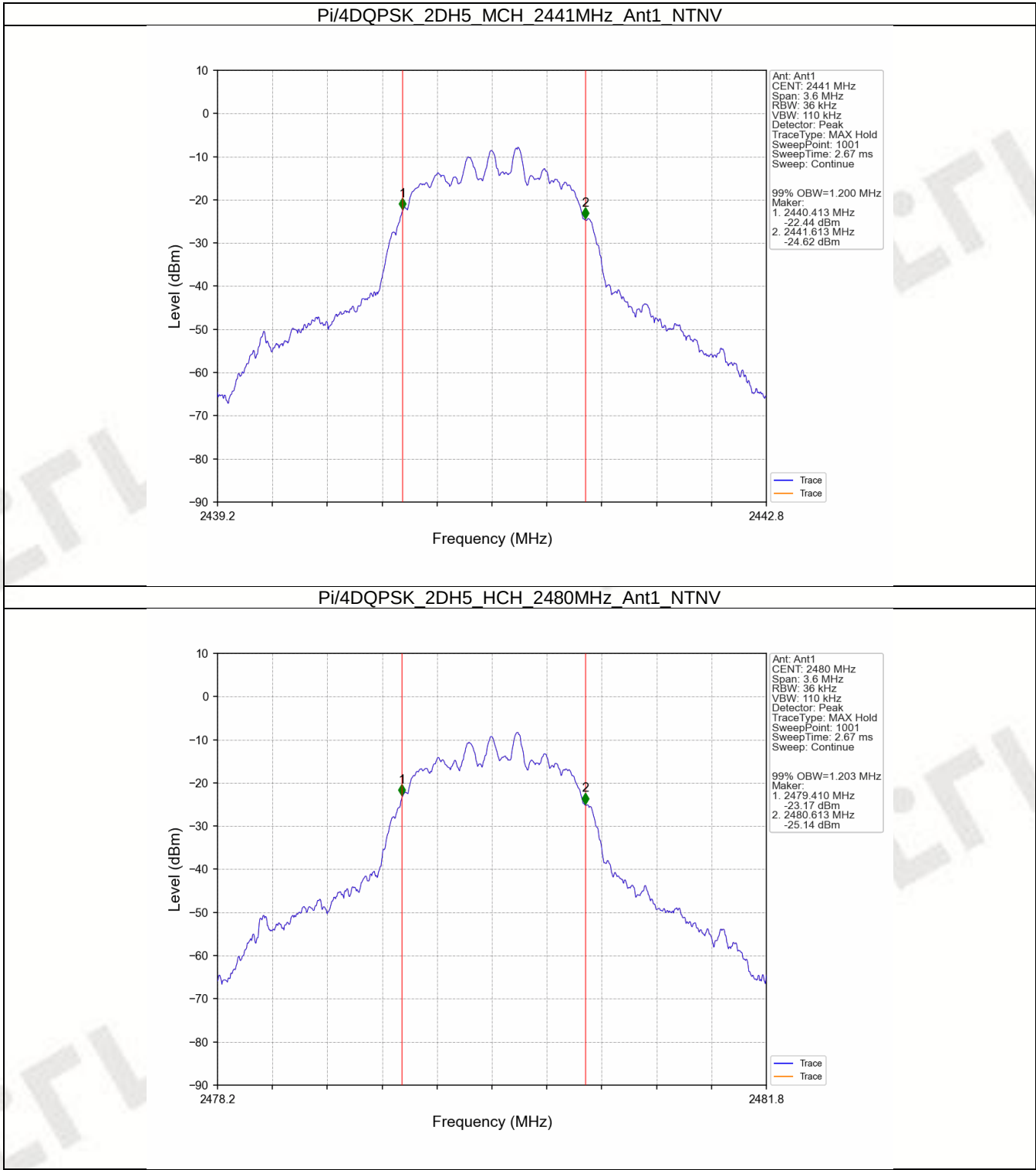
1.2.1 OBW



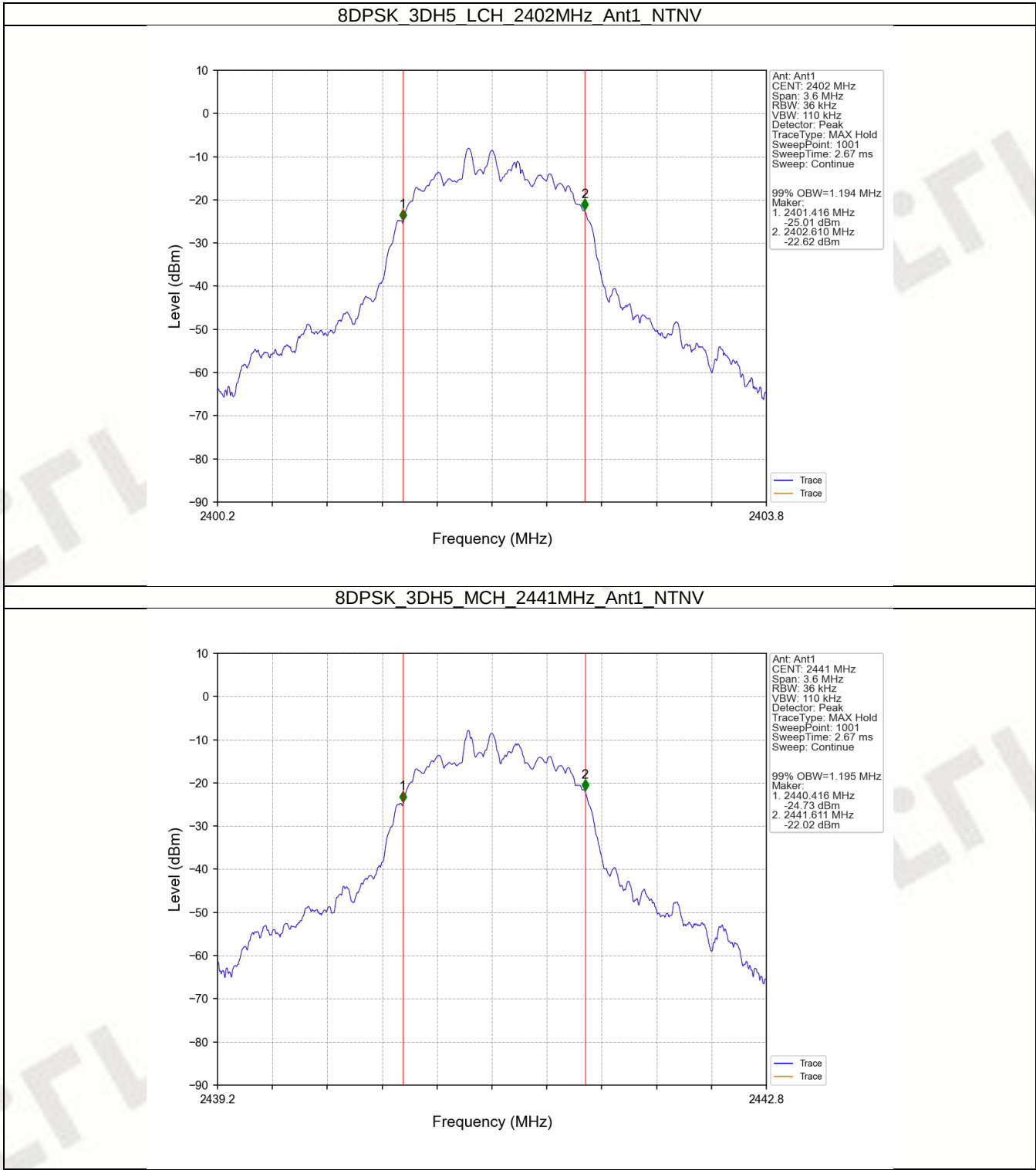
FCCID: 2BMNX-SPWBS



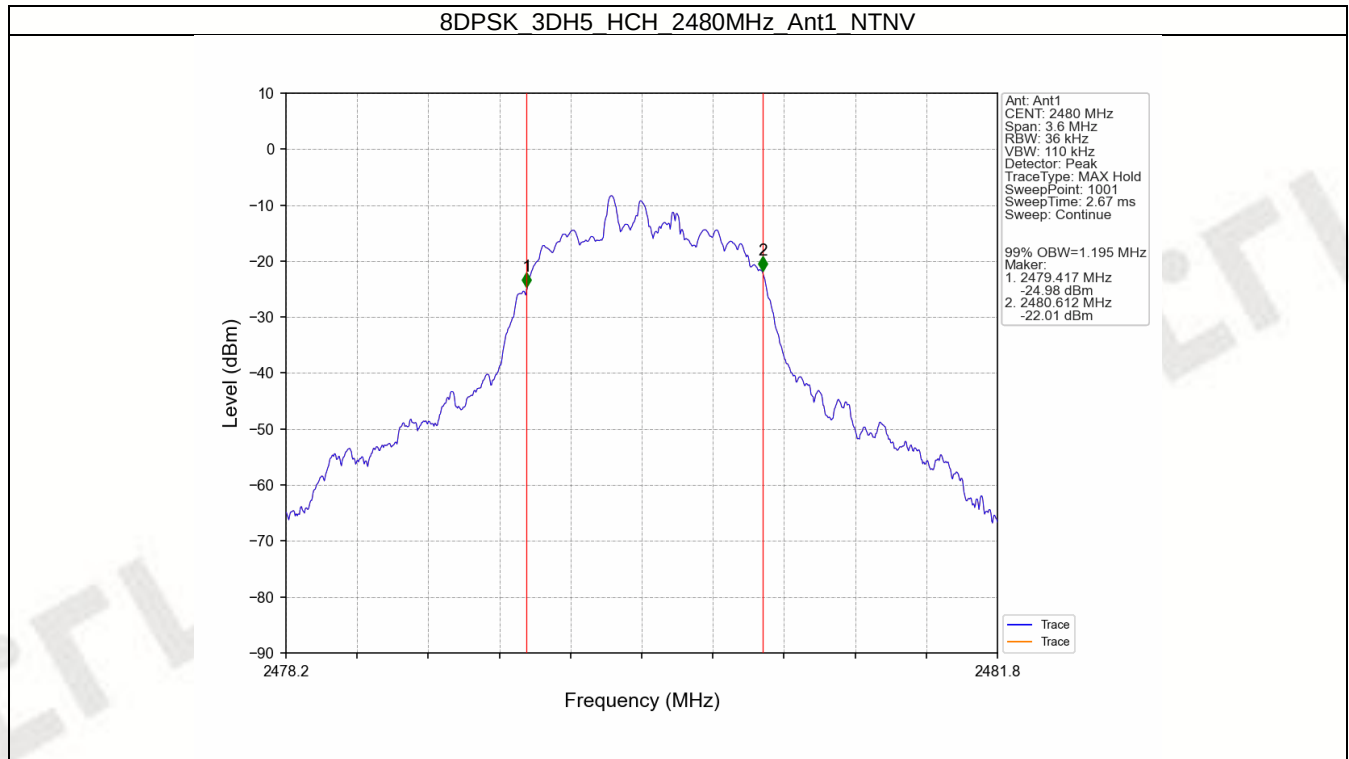
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FCCID: 2BMNX-SPWBS

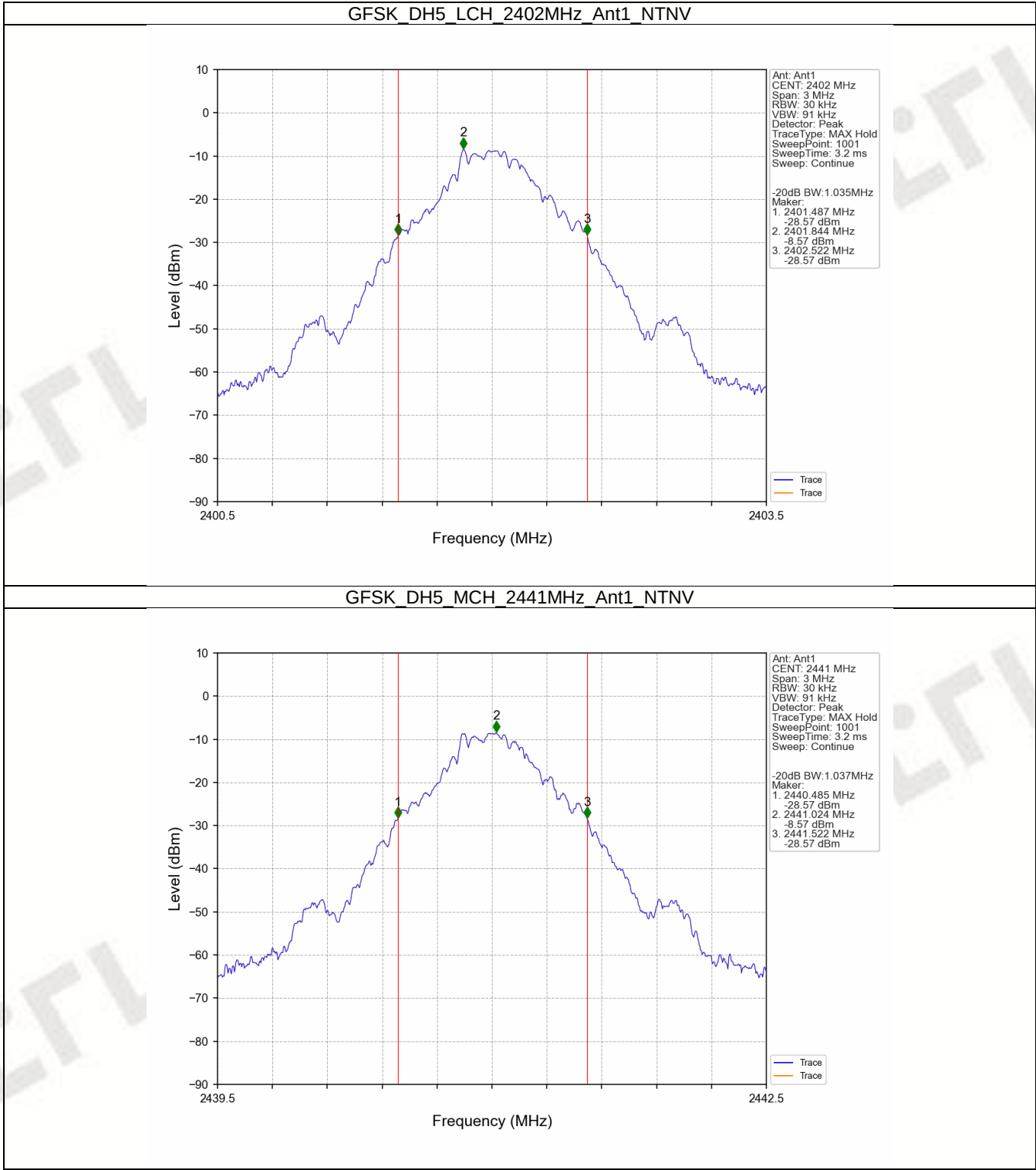


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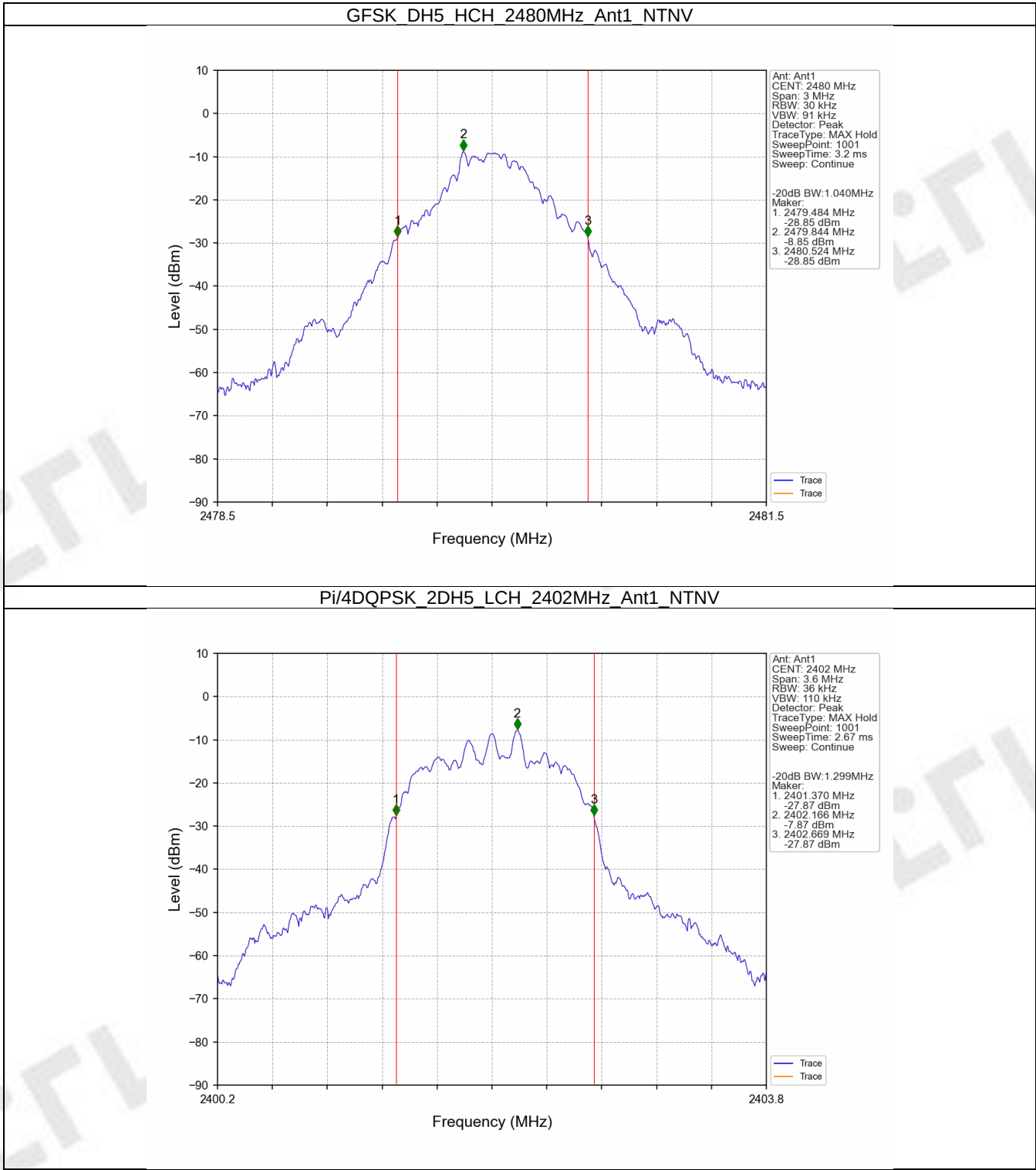


FCCID: 2BMNX-SPWBS

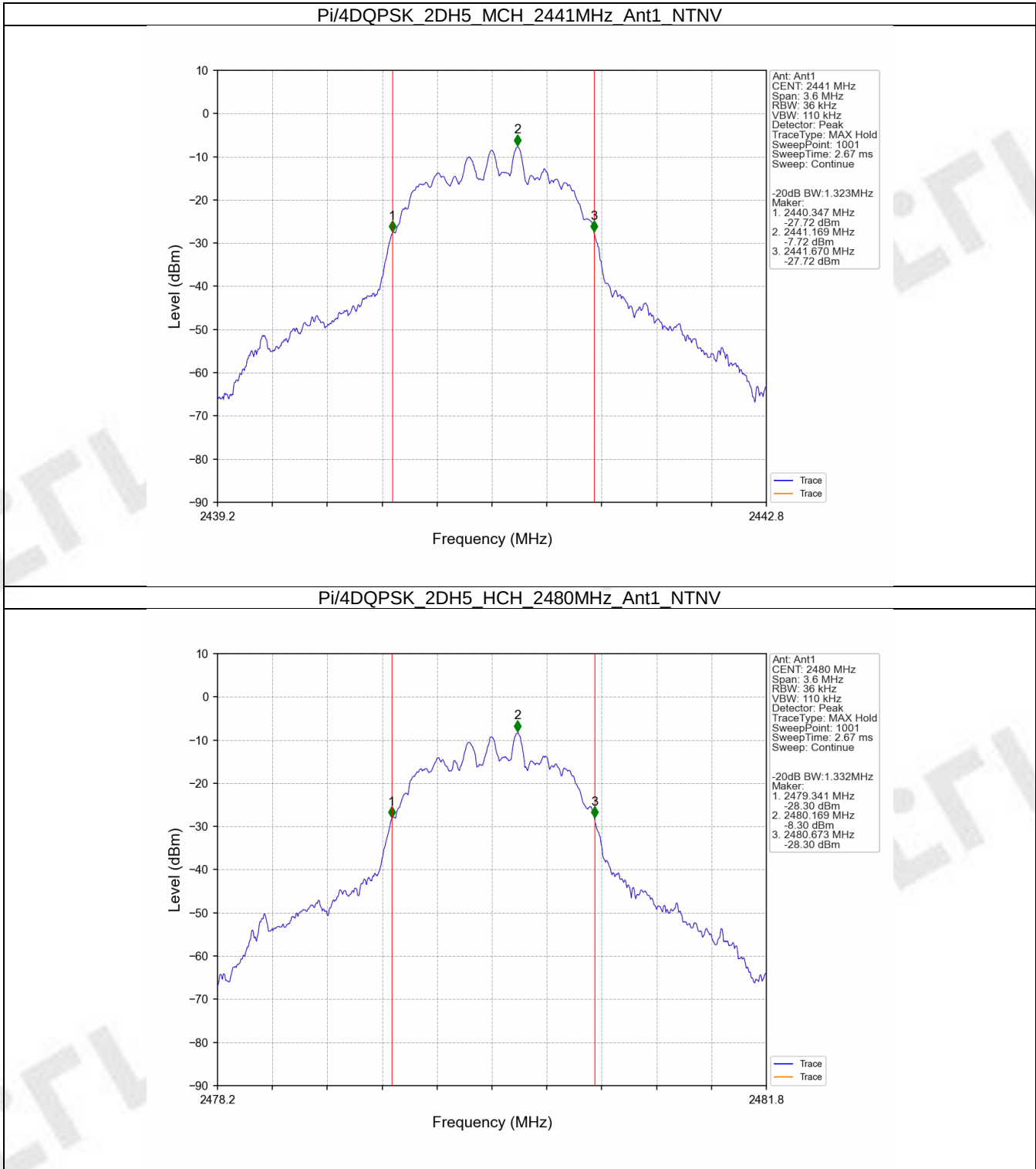
1.2.2 20dB BW



FCCID: 2BMNX-SPWBS

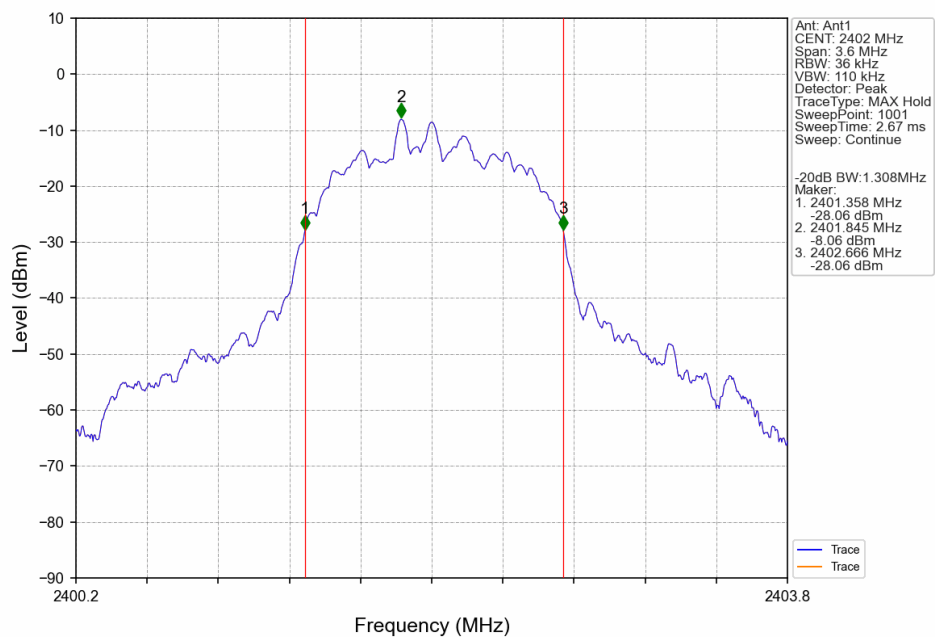


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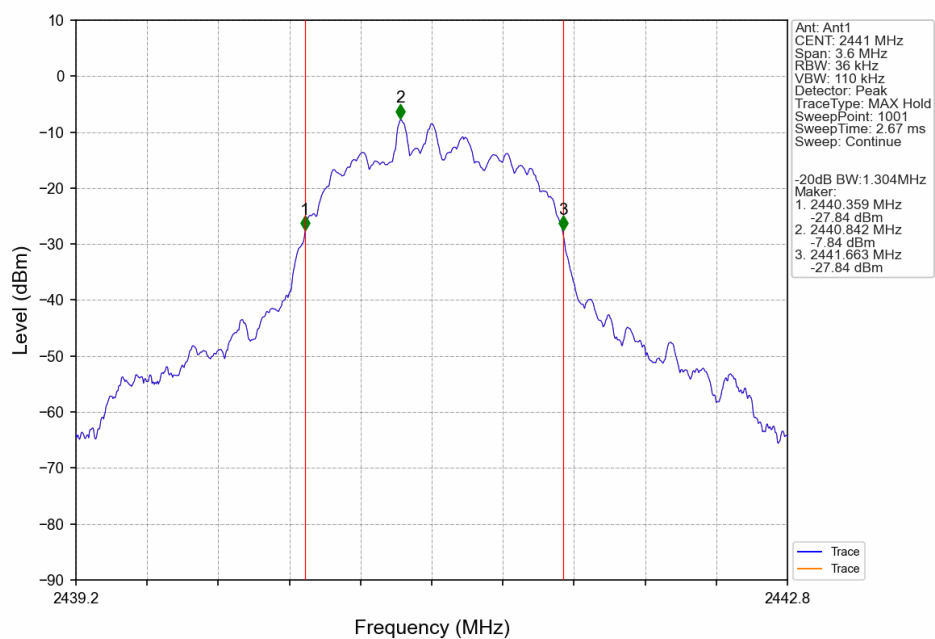


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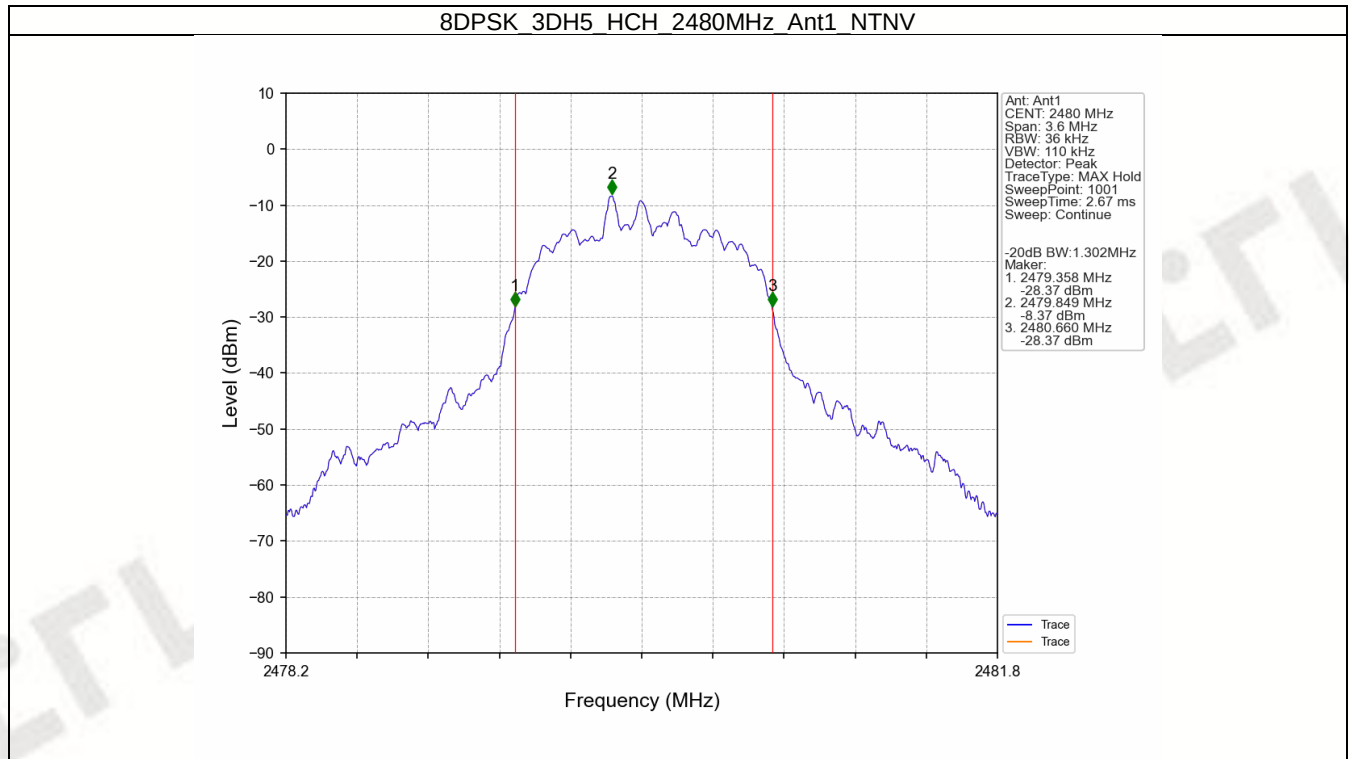
8DPSK 3DH5 LCH 2402MHz Ant1 NTN



8DPSK 3DH5 MCH 2441MHz Ant1 NTN



FCCID: 2BMNX-SPWBS



2. Maximum Conducted Output Power

2.1 Test Result

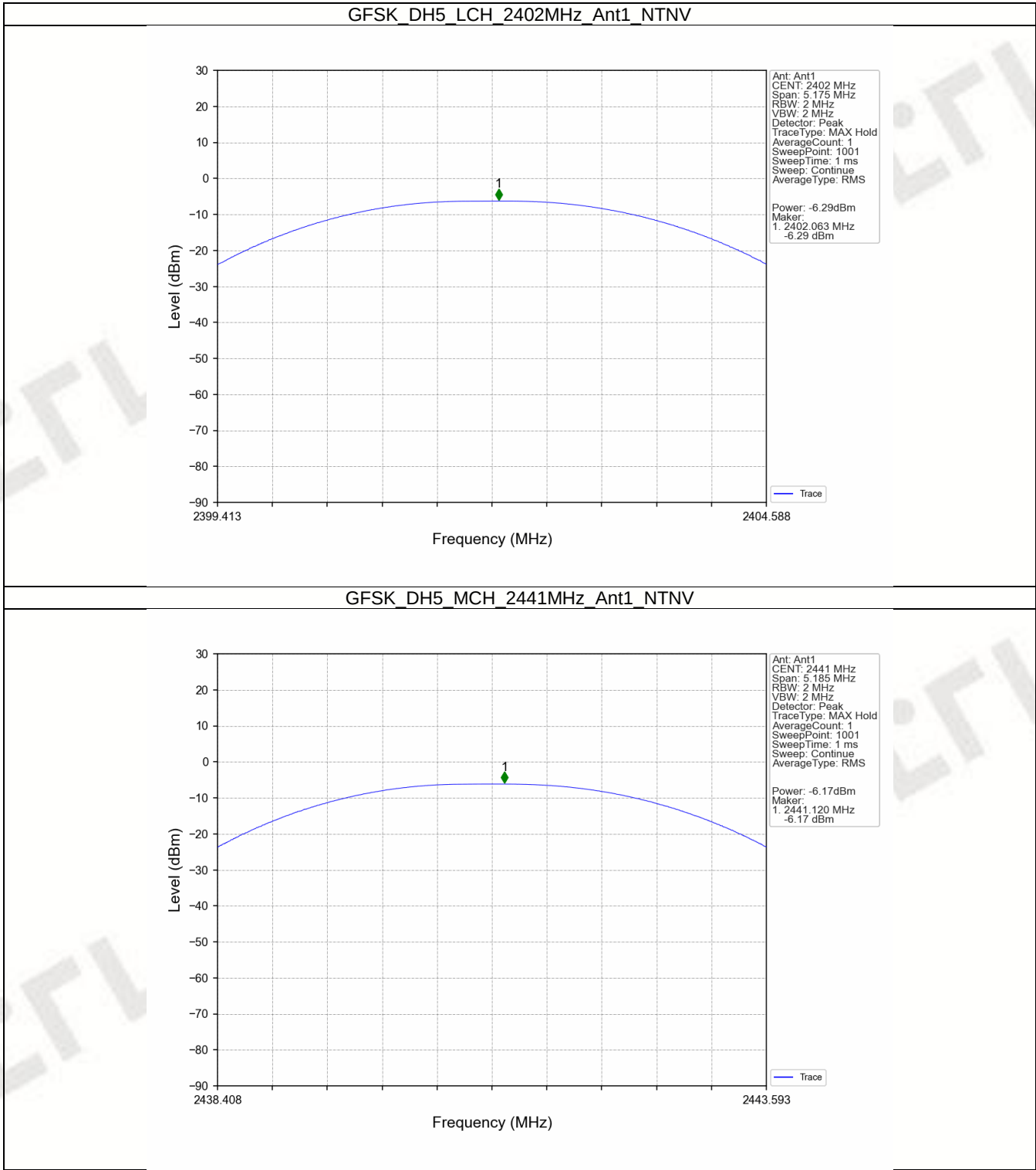
2.1.1 Power

Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	-6.29	<=20.97	Pass
		2441	DH5	-6.17	<=20.97	Pass
		2480	DH5	-6.66	<=20.97	Pass
Pi/4DQPSK	SISO	2402	2DH5	-5.50	<=20.97	Pass
		2441	2DH5	-5.35	<=20.97	Pass
		2480	2DH5	-5.84	<=20.97	Pass
8DPSK	SISO	2402	3DH5	-5.12	<=20.97	Pass
		2441	3DH5	-4.93	<=20.97	Pass
		2480	3DH5	-5.41	<=20.97	Pass
Note1: Antenna Gain: Ant1: 2.49dBi;						

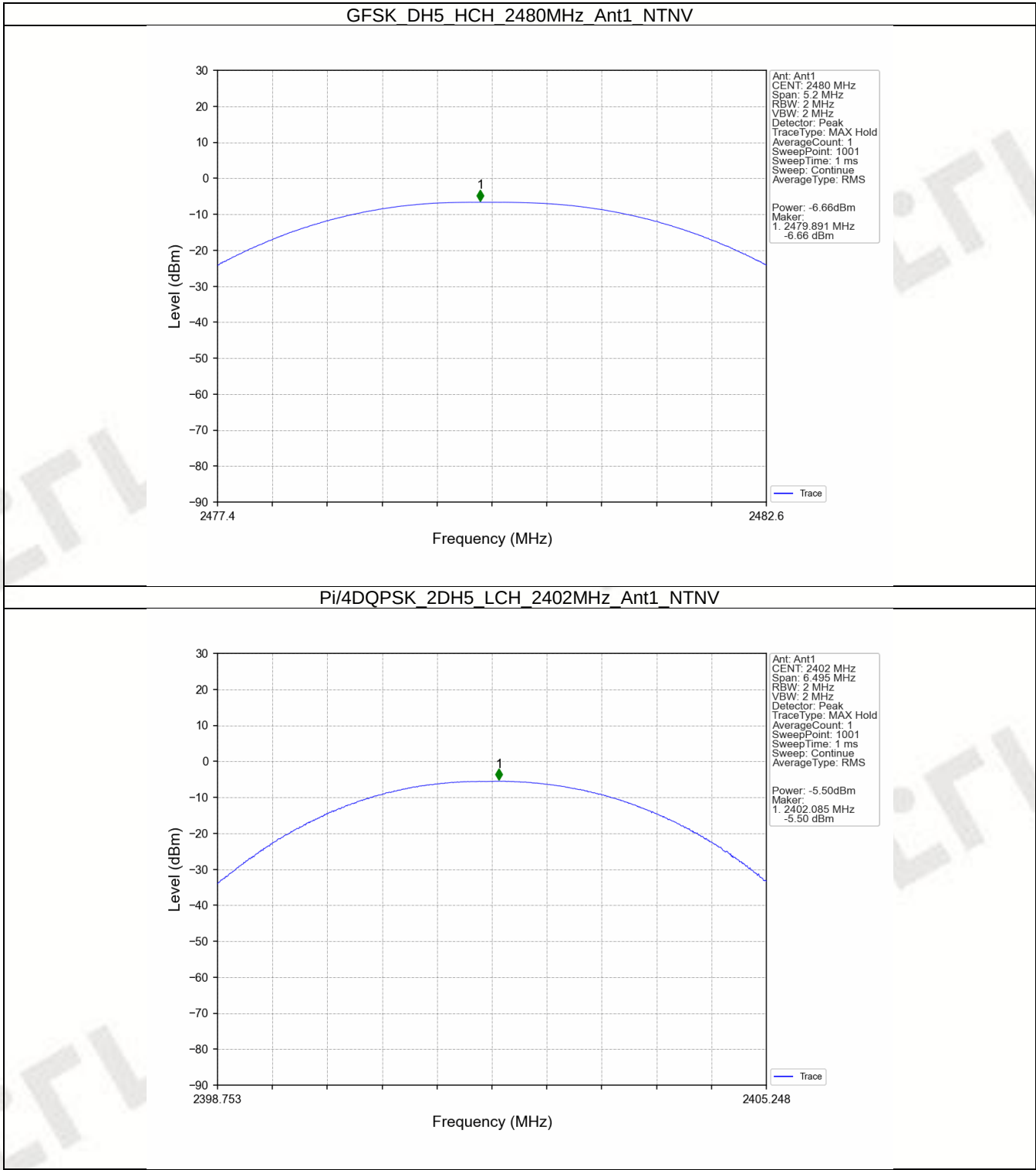
FCCID: 2BMNX-SPWBS

2.2 Test Graph

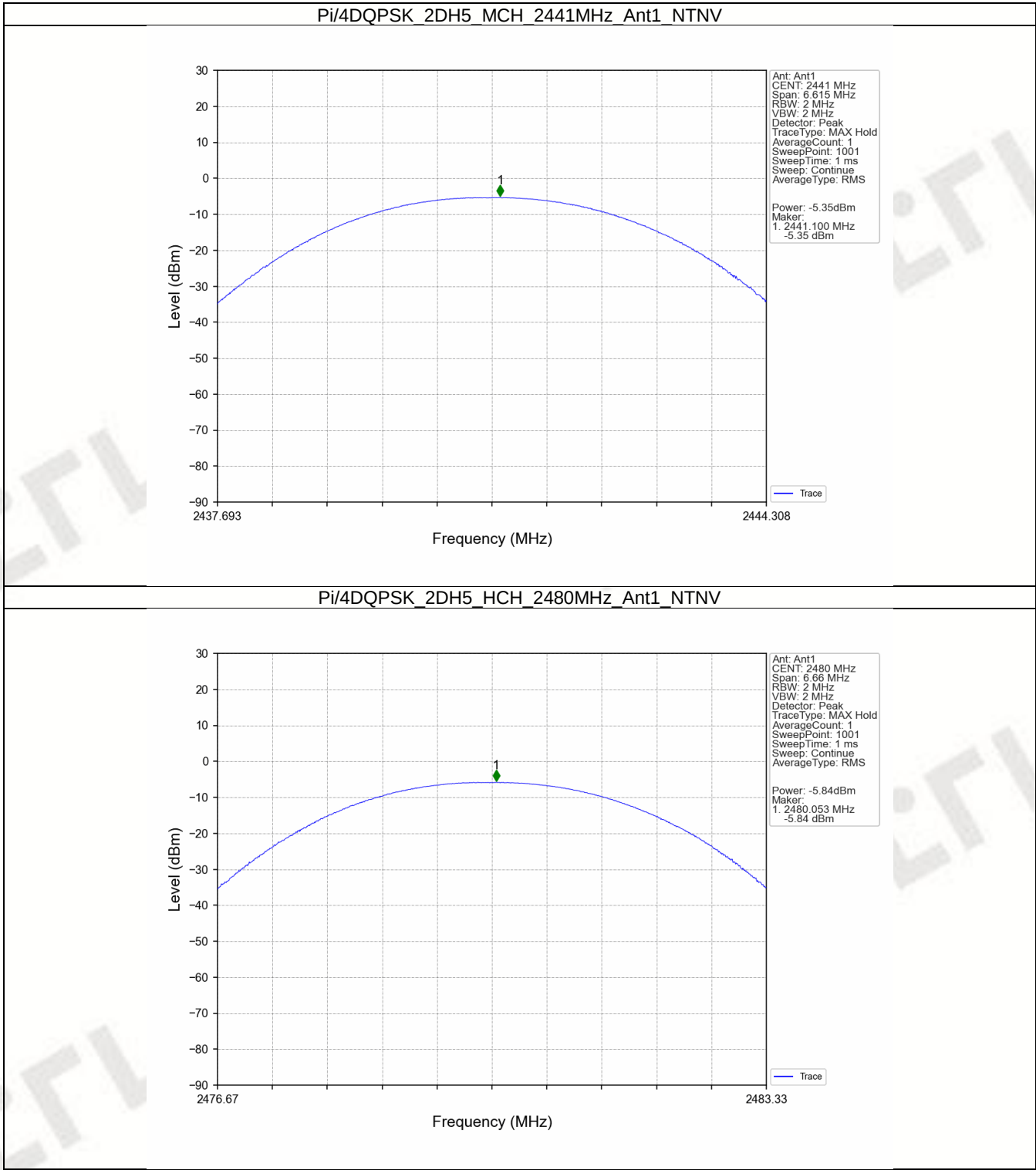
2.2.1 Power



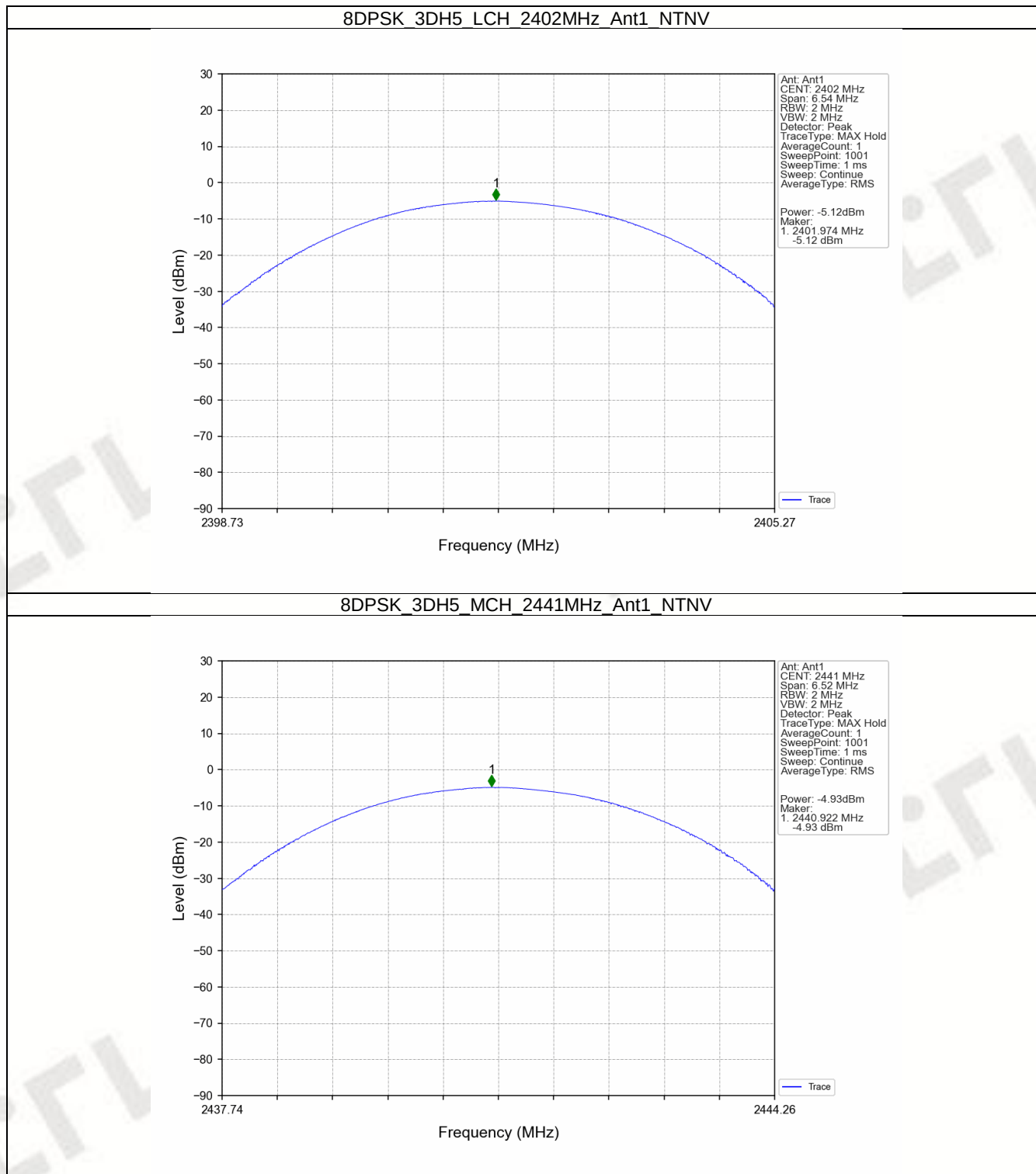
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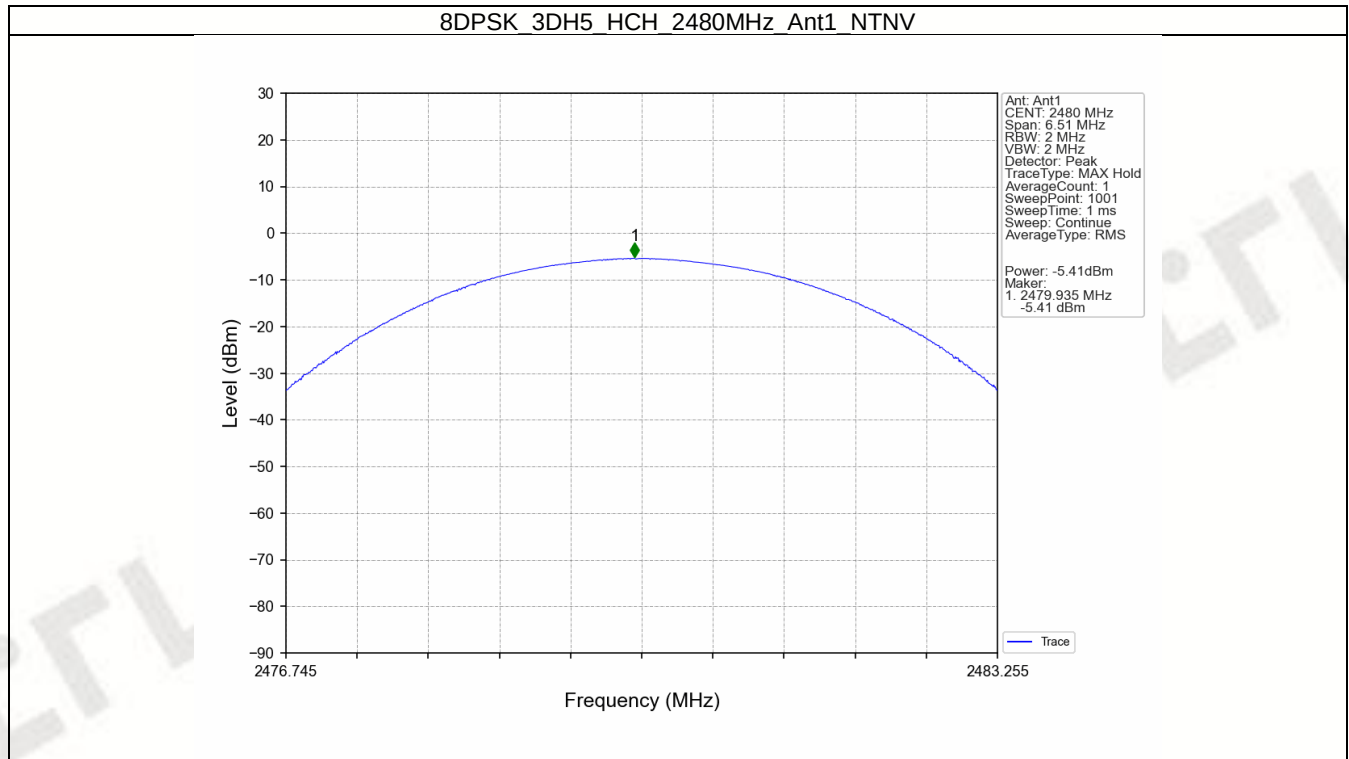
FCCID: 2BMNX-SPWBS



FCCID: 2BMNX-SPWBS



FCCID: 2BMNX-SPWBS



FCCID: 2BMNX-SPWBS

3. Carrier Frequency Separation

3.1 Test Result

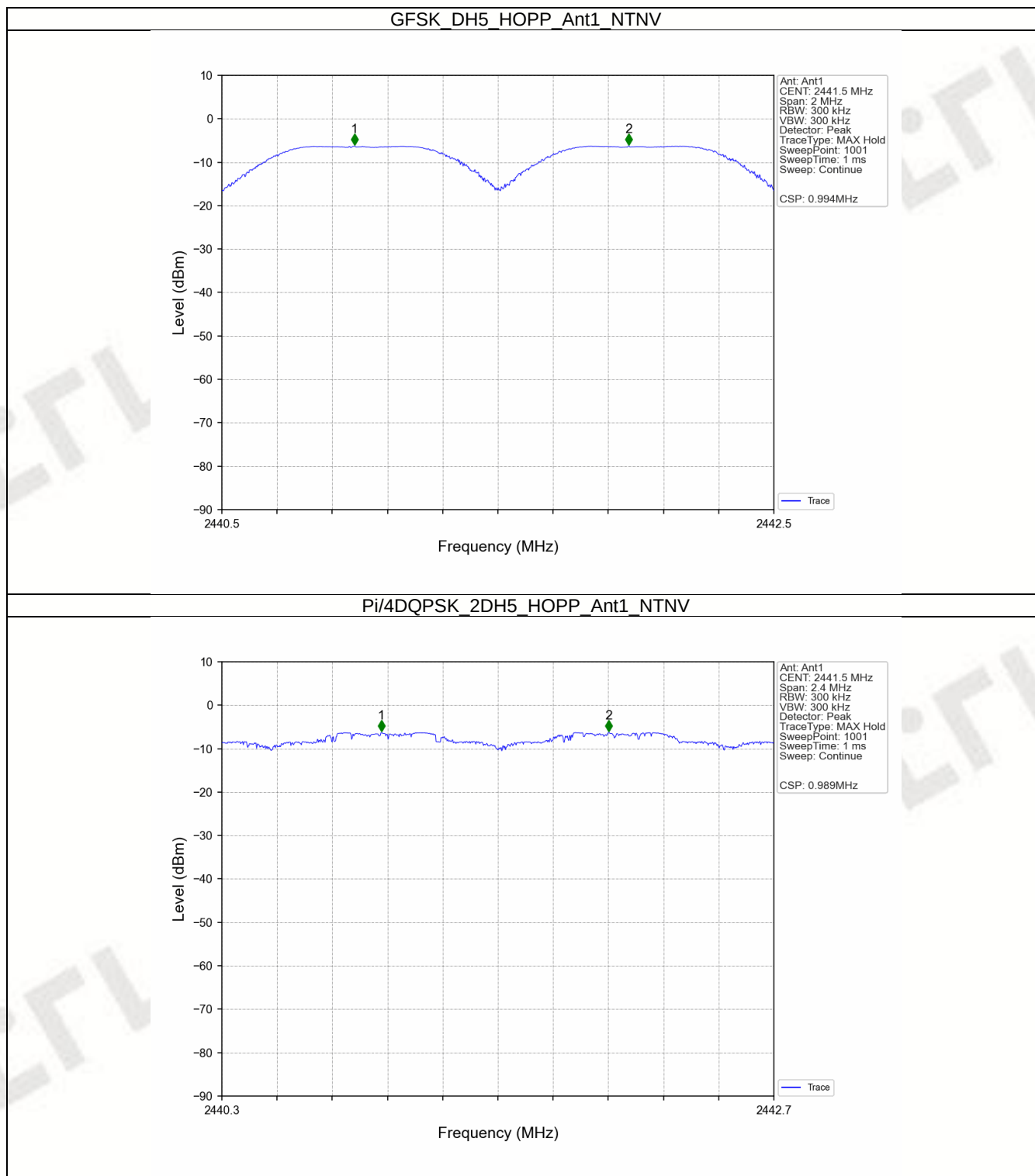
3.1.1 Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	0.994	1.040	≥ 0.693	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	0.989	1.332	≥ 0.888	Pass
8DPSK	SISO	HOPP	3DH5	1.001	1.308	≥ 0.872	Pass

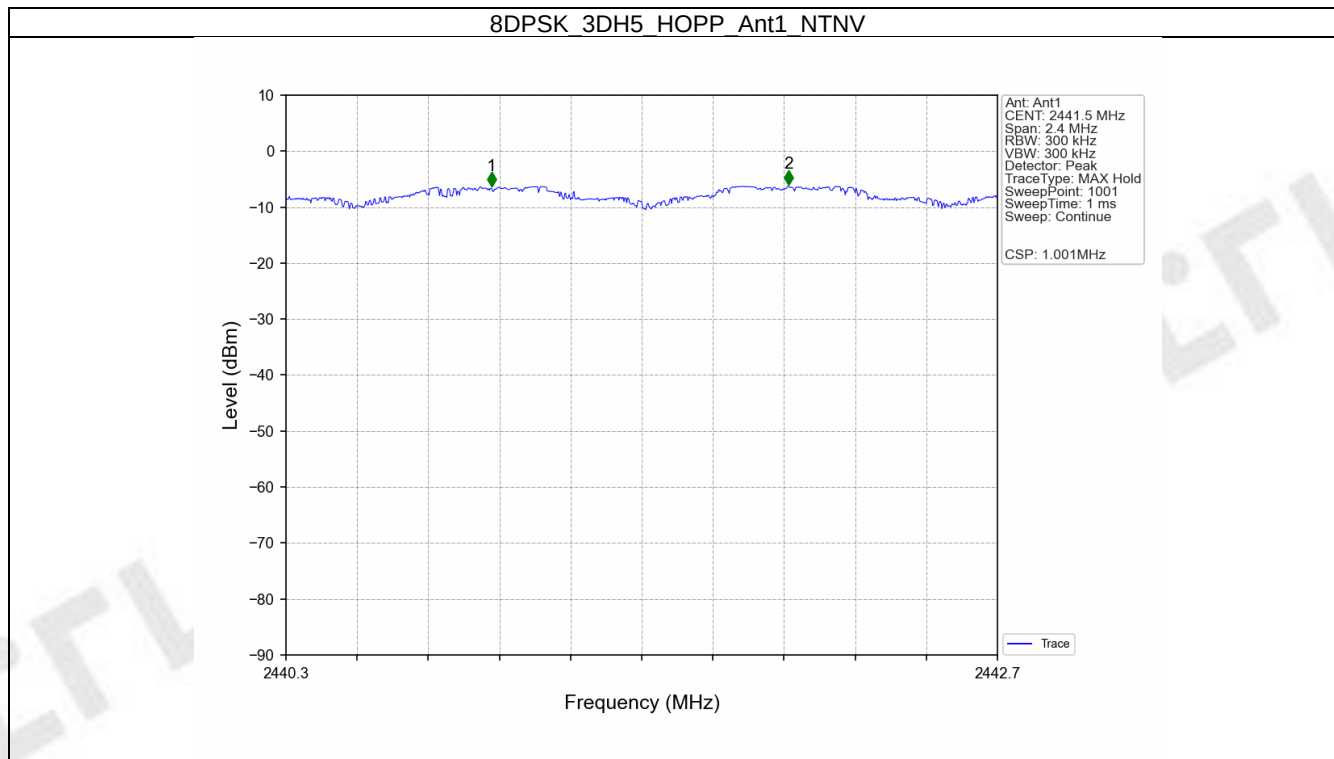
FCCID: 2BMNX-SPWBS

3.2 Test Graph

3.2.1 Ant1



FCCID: 2BMNX-SPWBS



4. Number of Hopping Frequencies

4.1 Test Result

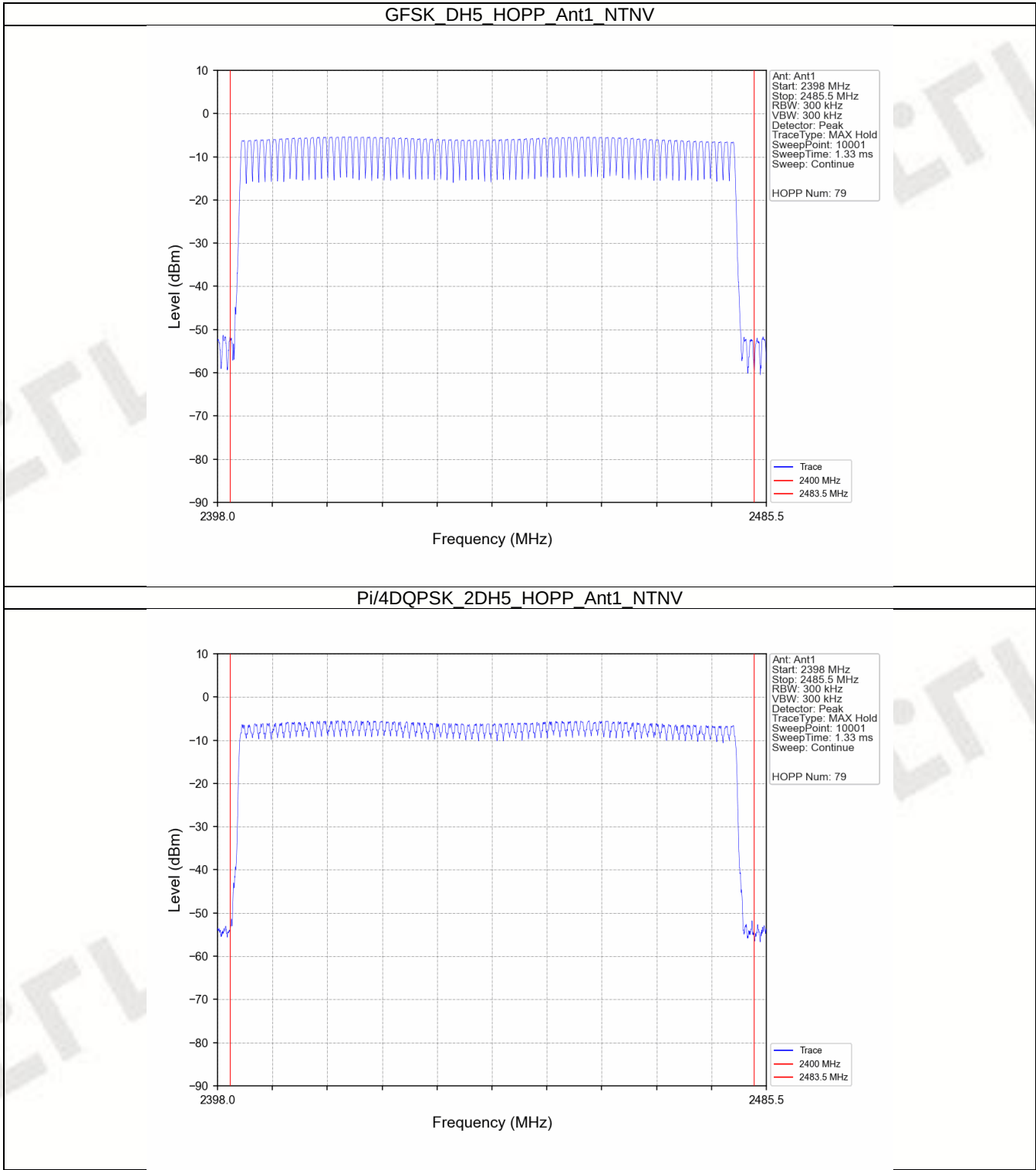
4.1.1 HoppNum

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

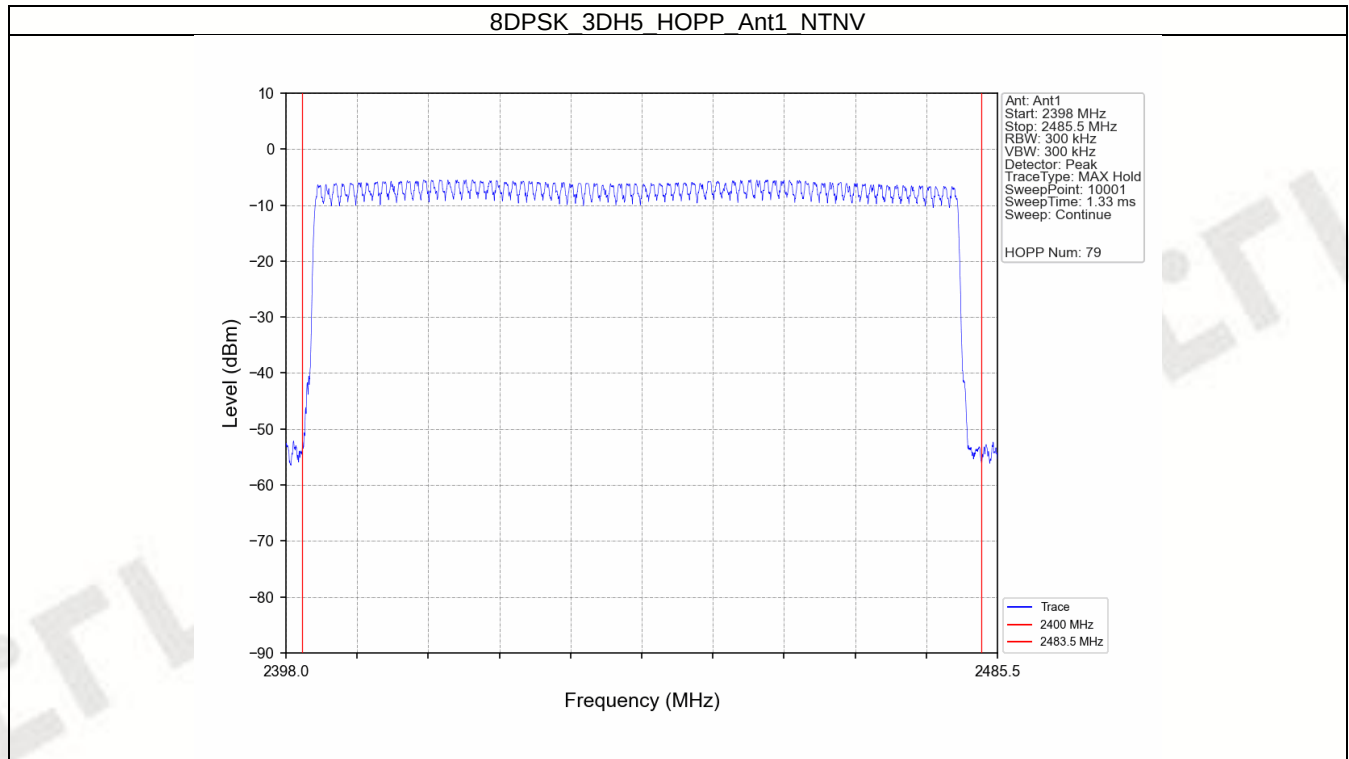
FCCID: 2BMNX-SPWBS

4.2 Test Graph

4.2.1 HoppNum



FCCID: 2BMNX-SPWBS



FCCID: 2BMNX-SPWBS

5. Time of Occupancy (Dwell Time)

5.1 Test Result

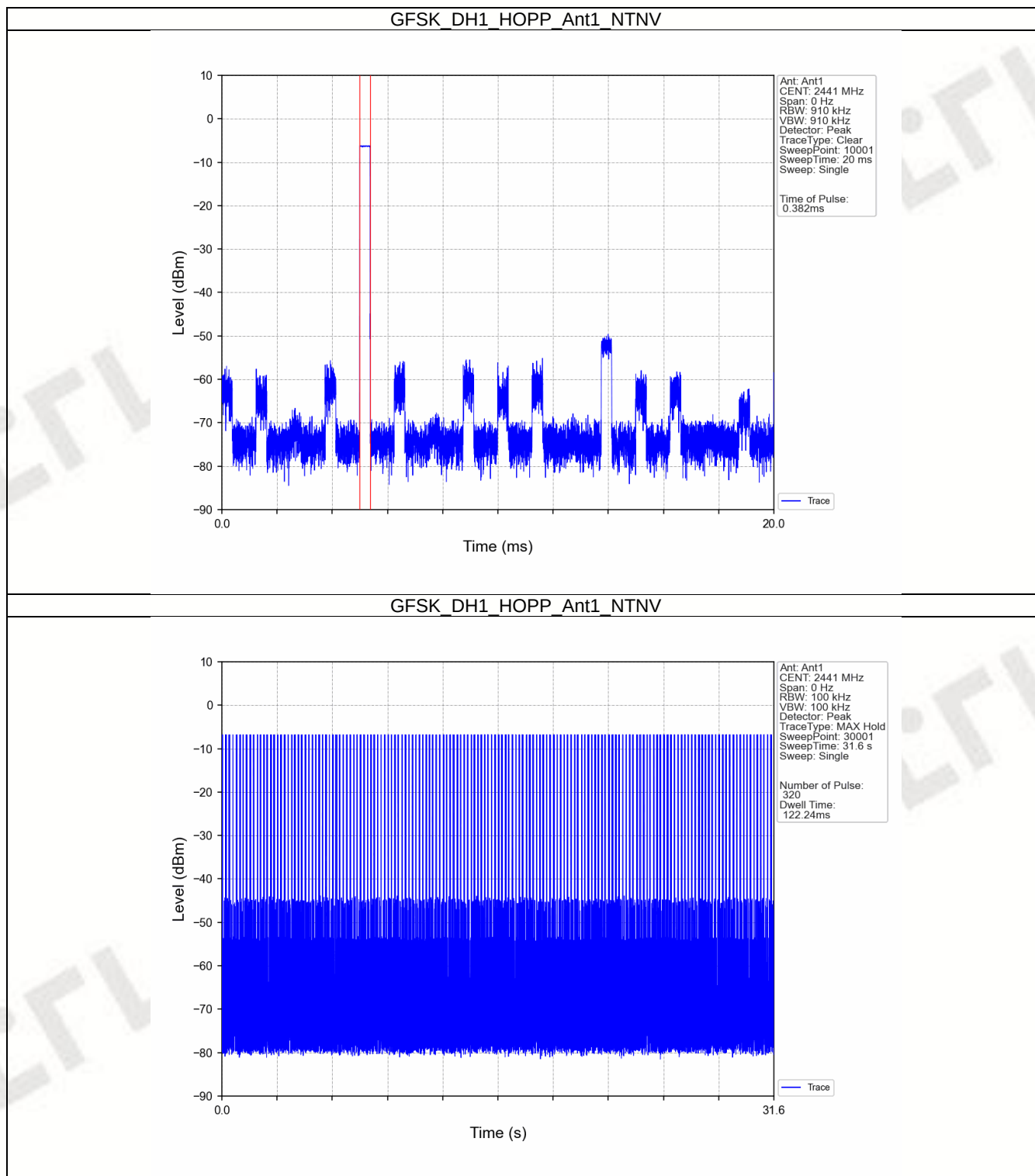
5.1.1 Ant1

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	0.382	31.600	320	122.240	<=400	Pass
			DH3	1.642	31.600	165	270.930	<=400	Pass
			DH5	2.886	31.600	113	326.118	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.390	31.600	315	122.850	<=400	Pass
			2DH3	1.644	31.600	164	269.616	<=400	Pass
			2DH5	2.896	31.600	120	347.520	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.390	31.600	319	124.410	<=400	Pass
			3DH3	1.642	31.600	154	252.868	<=400	Pass
			3DH5	2.894	31.600	105	303.870	<=400	Pass

FCCID: 2BMNX-SPWBS

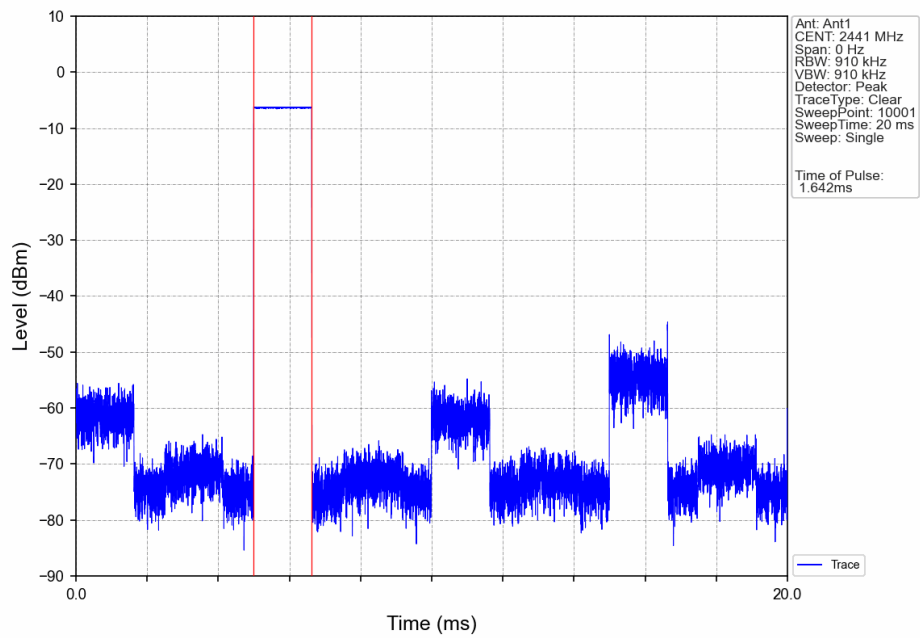
5.2 Test Graph

5.2.1 Ant1

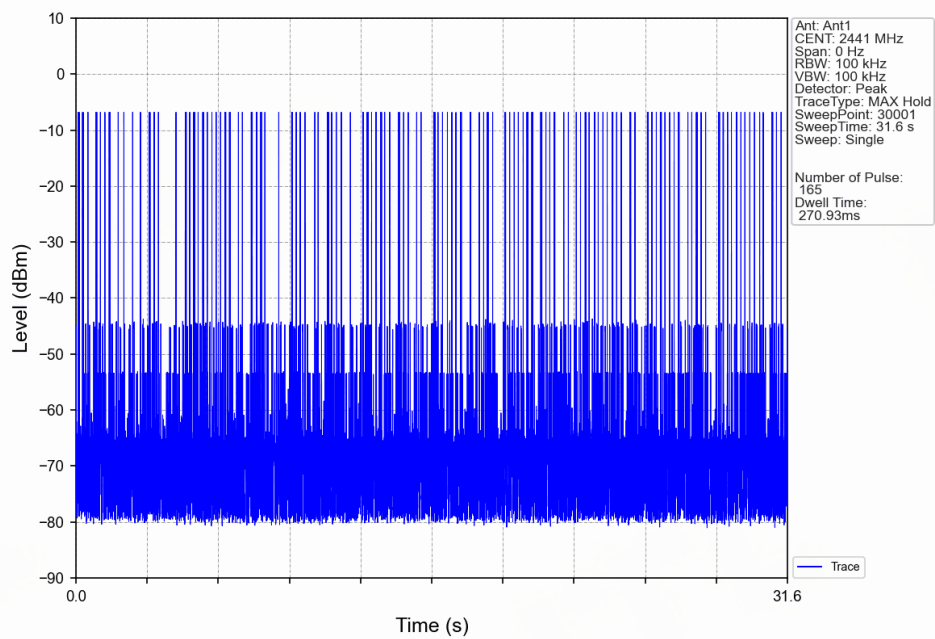


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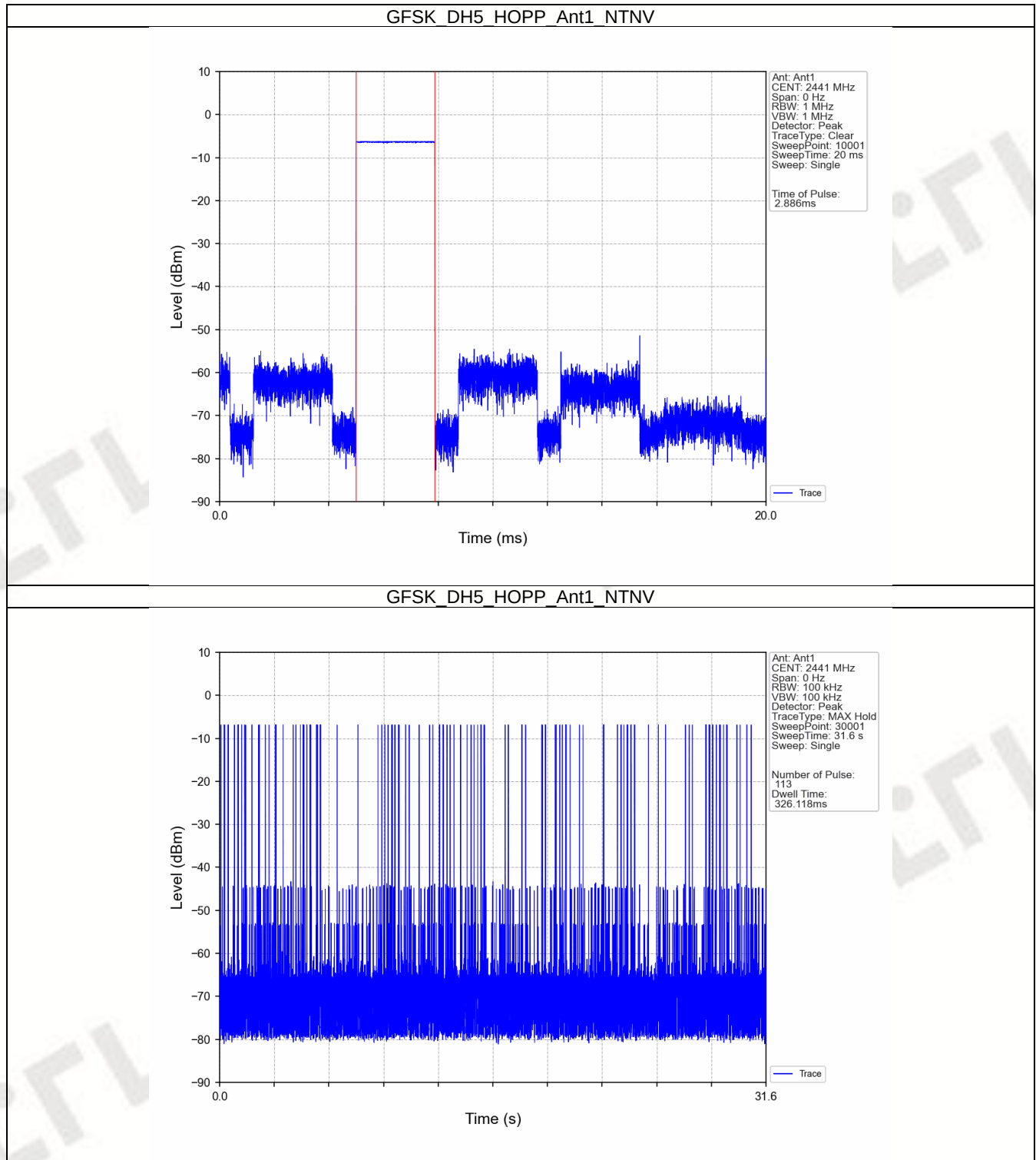
GFSK DH3 HOPP Ant1 NTN



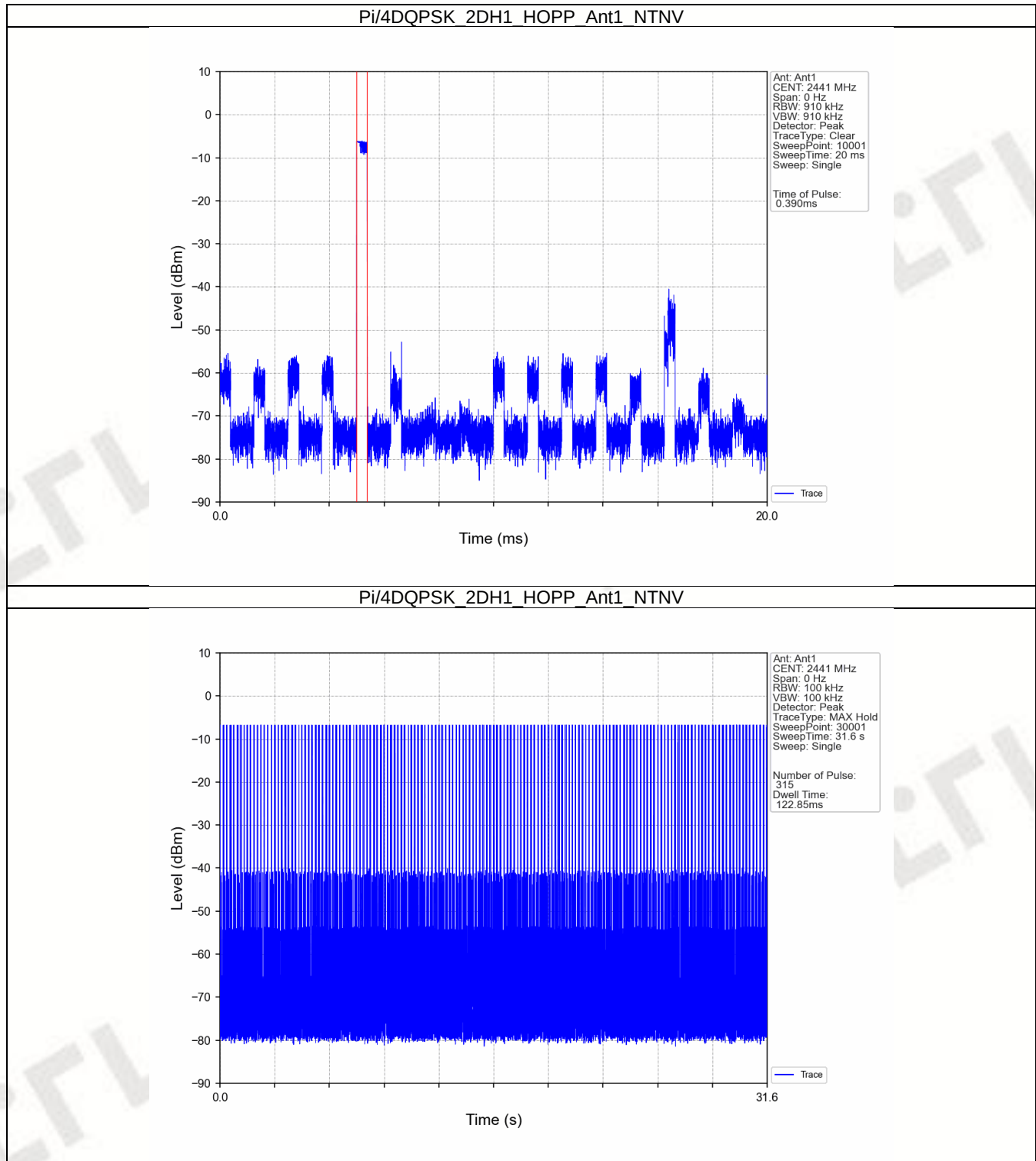
GFSK_DH3_HOPP_Ant1_NTNV



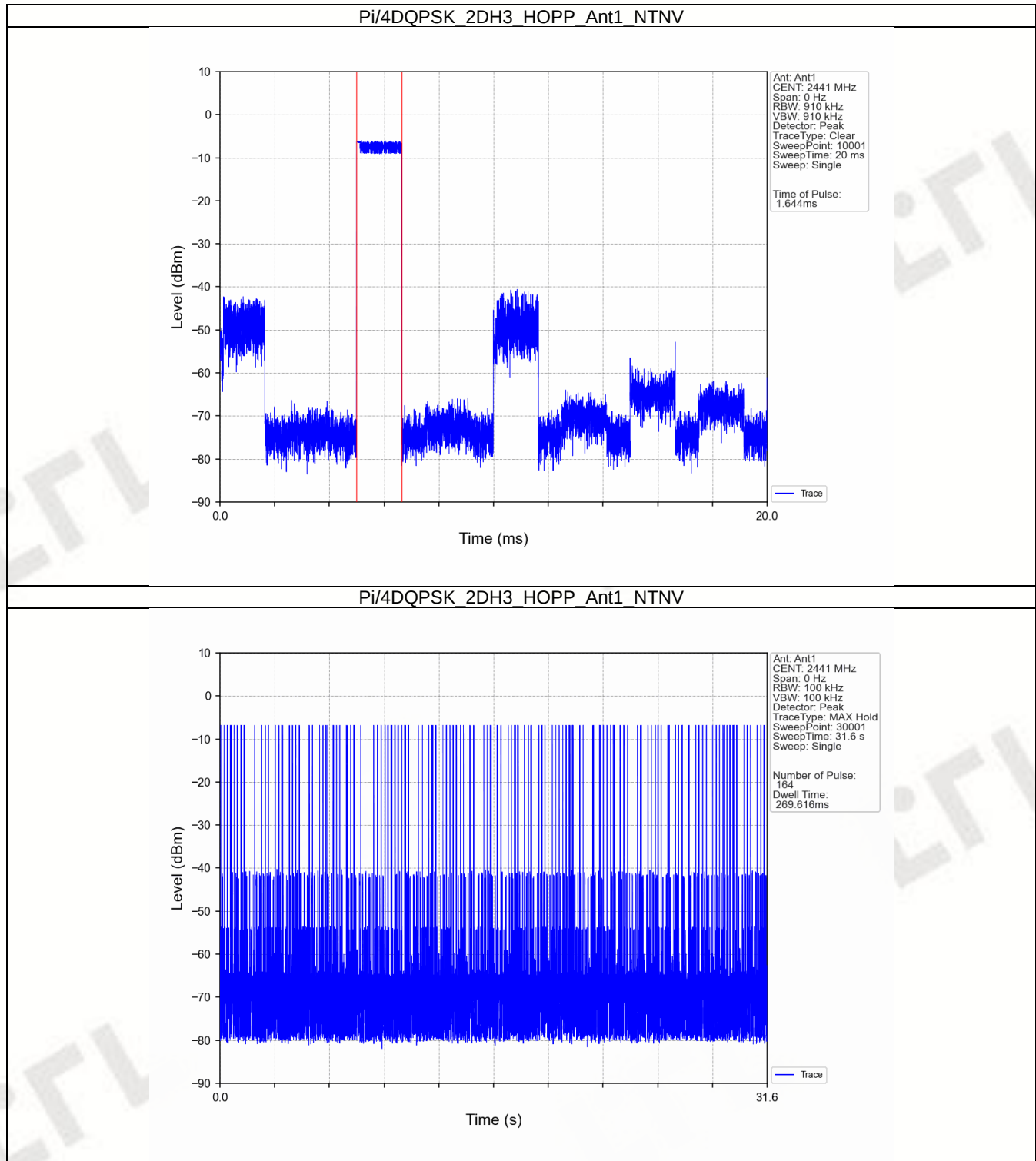
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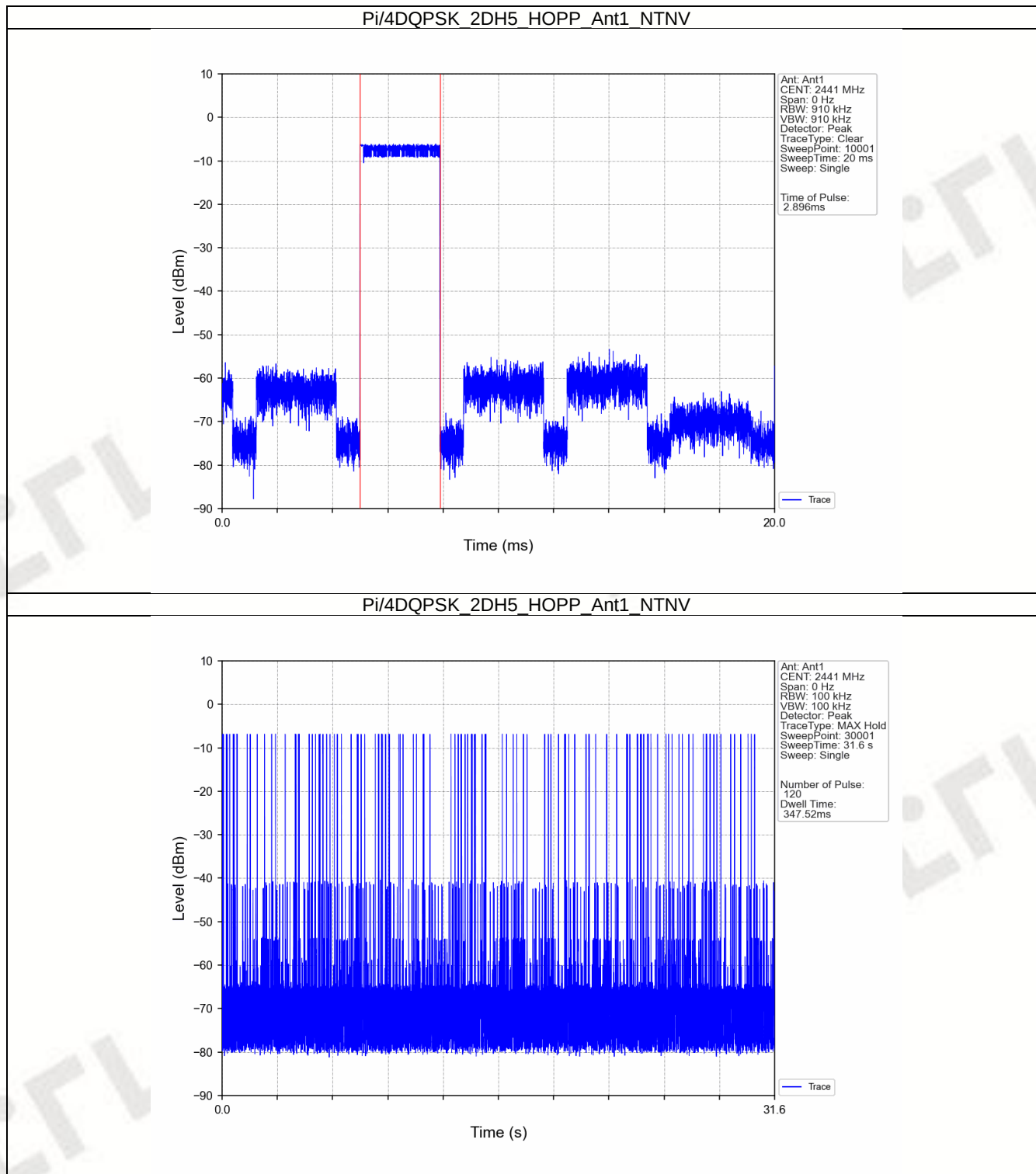
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FCCID: 2BMNX-SPWBS

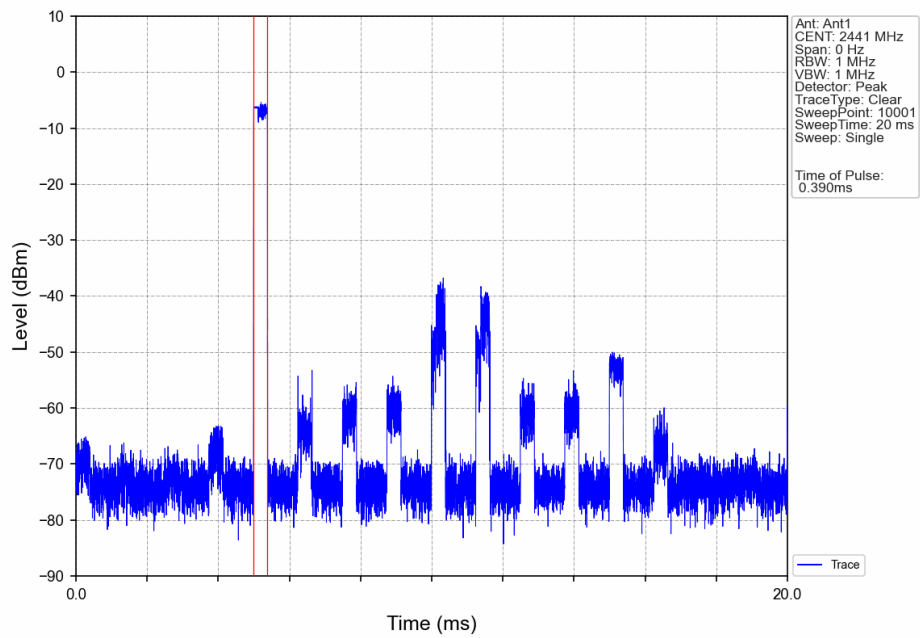


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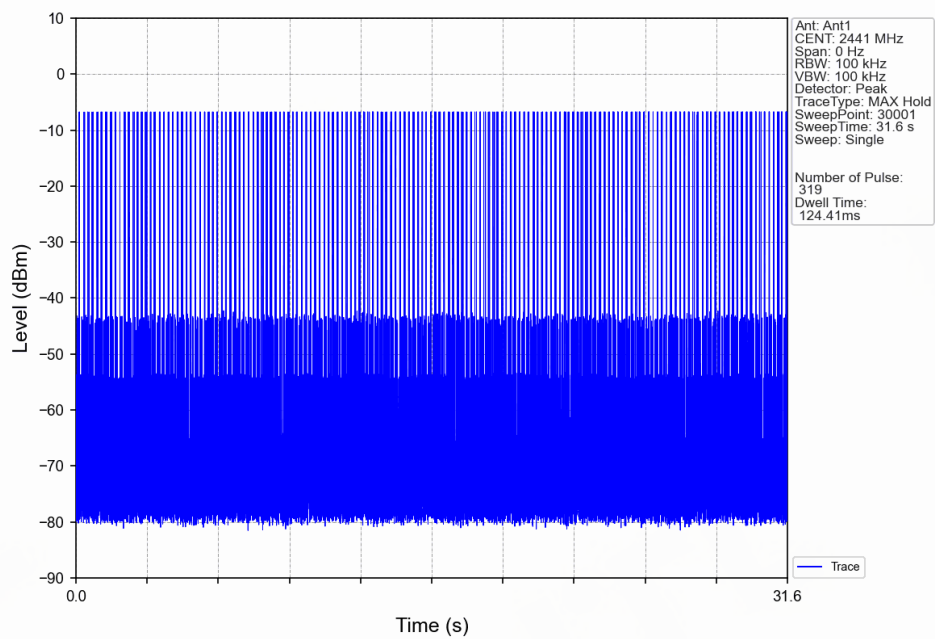


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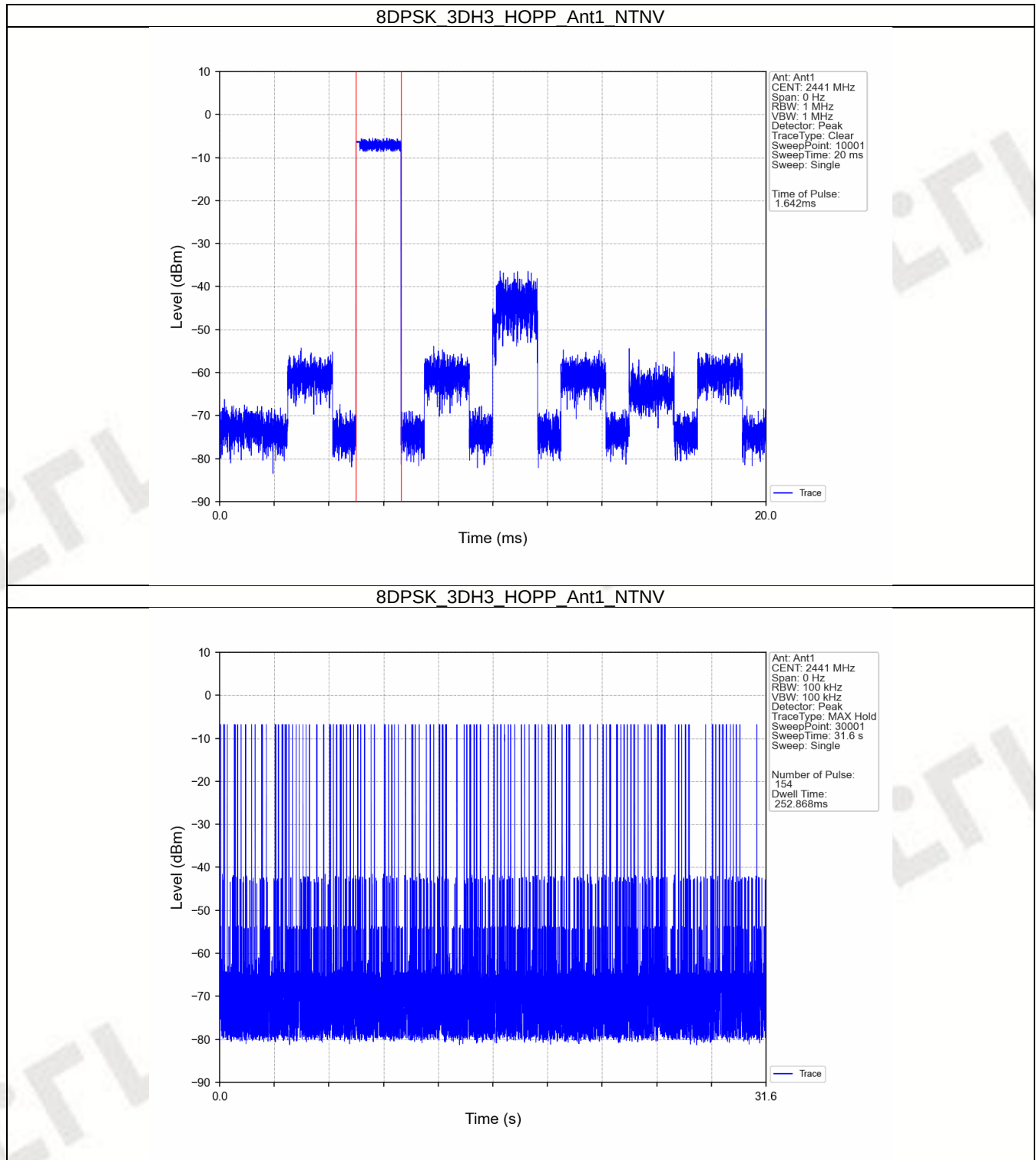
8DPSK 3DH1 HOPP Ant1 NTV



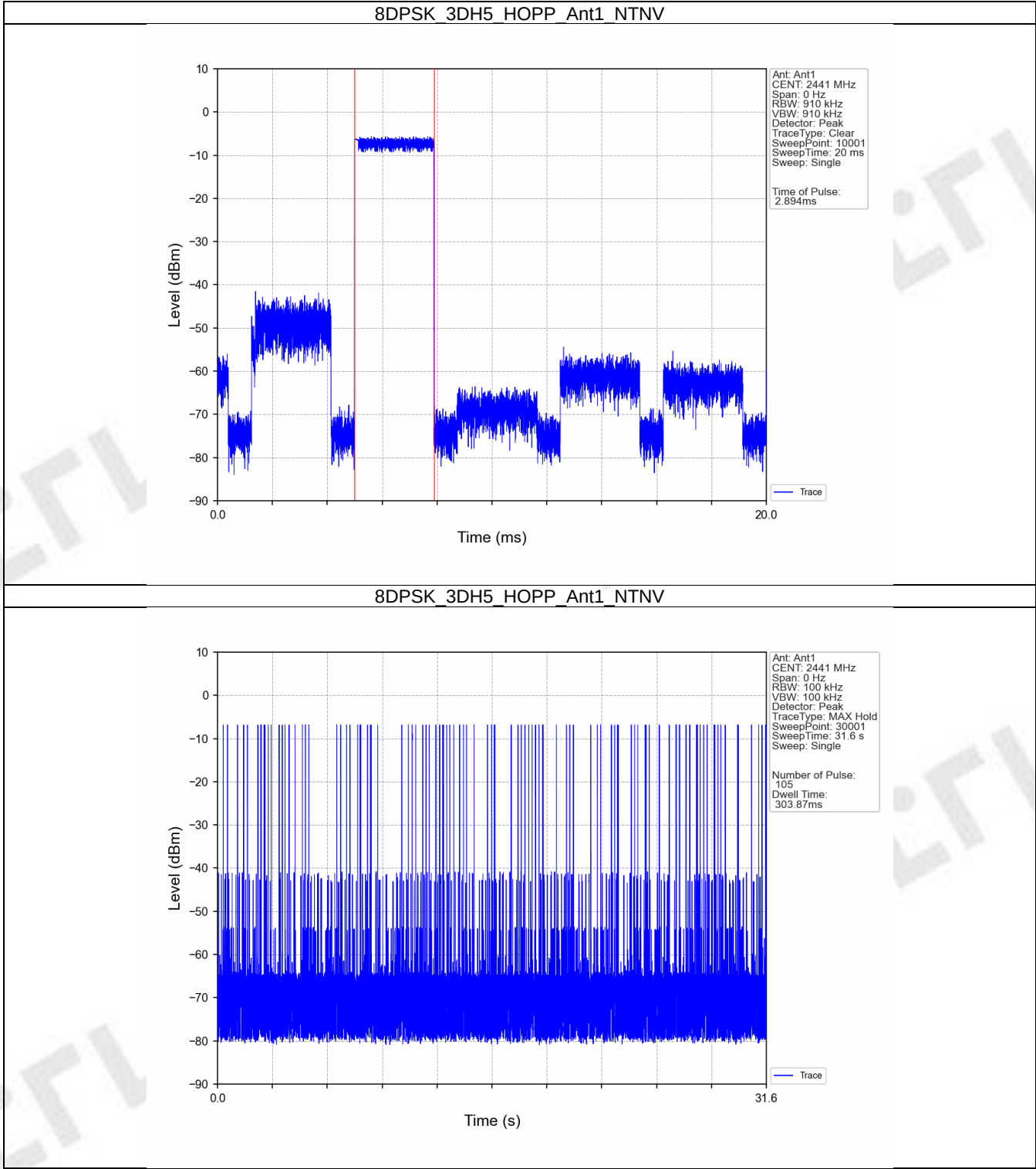
8DPSK_3DH1_HOPP_Ant1_NTV



FCCID: 2BMNX-SPWBS



FCCID: 2BMNX-SPWBS



FCCID: 2BMNX-SPWBS

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	-6.45
		2441	DH5	1	-6.33
		2480	DH5	1	-6.84
Pi/4DQPSK	SISO	2402	2DH5	1	-6.47
		2441	2DH5	1	-6.33
		2480	2DH5	1	-6.84
8DPSK	SISO	2402	3DH5	1	-6.56
		2441	3DH5	1	-6.32
		2480	3DH5	1	-6.83

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

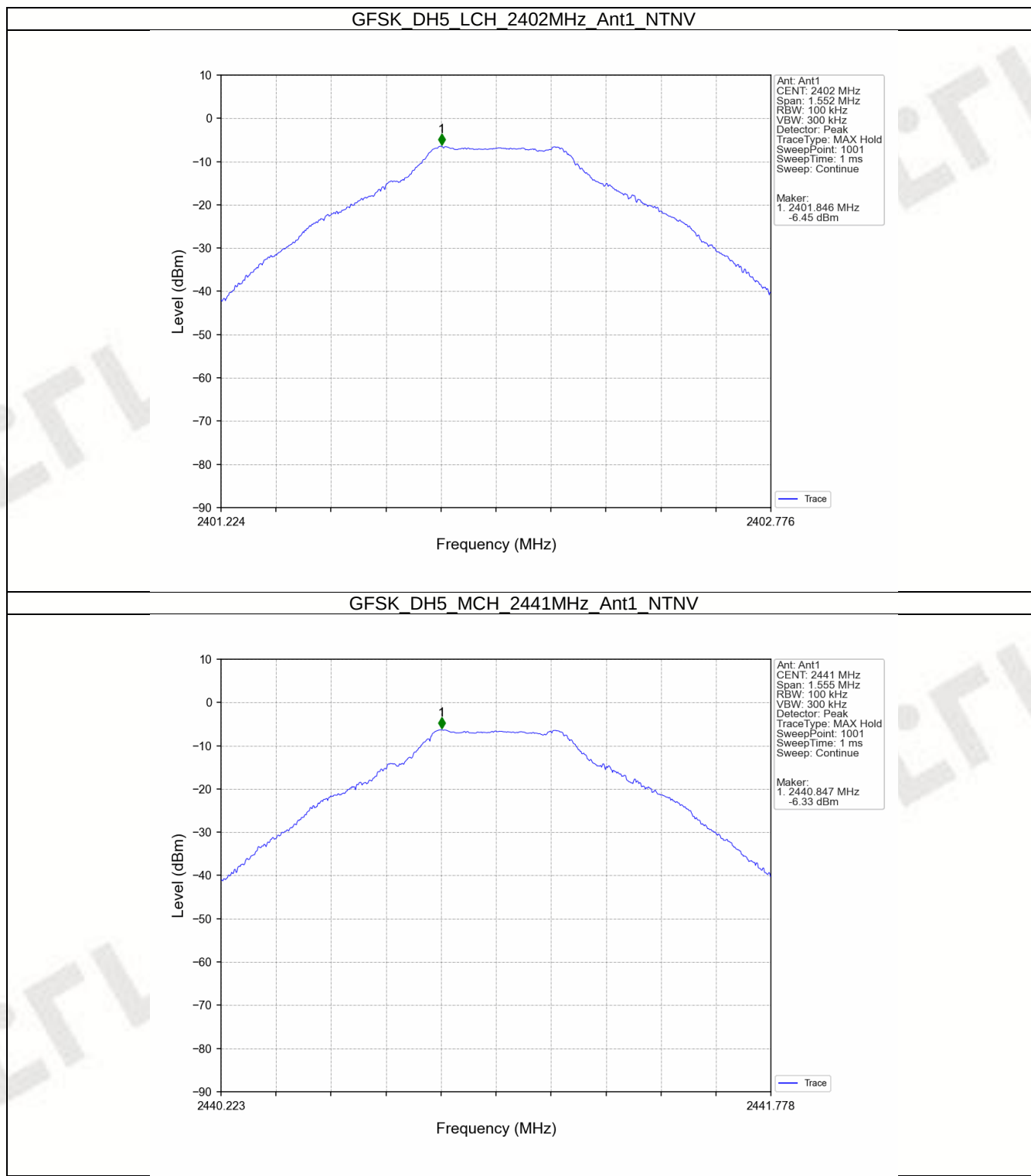
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	-6.33	-26.33	Pass
		2441	DH5	1	-6.33	-26.33	Pass
		2480	DH5	1	-6.33	-26.33	Pass
		HOPP	DH5	1	-6.33	-26.33	Pass
					-6.33	-26.33	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	-6.33	-26.33	Pass
		2441	2DH5	1	-6.33	-26.33	Pass
		2480	2DH5	1	-6.33	-26.33	Pass
		HOPP	2DH5	1	-6.33	-26.33	Pass
					-6.33	-26.33	Pass
8DPSK	SISO	2402	3DH5	1	-6.32	-26.32	Pass
		2441	3DH5	1	-6.32	-26.32	Pass
		2480	3DH5	1	-6.32	-26.32	Pass
		HOPP	3DH5	1	-6.32	-26.32	Pass
					-6.32	-26.32	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: 2BMNX-SPWBS

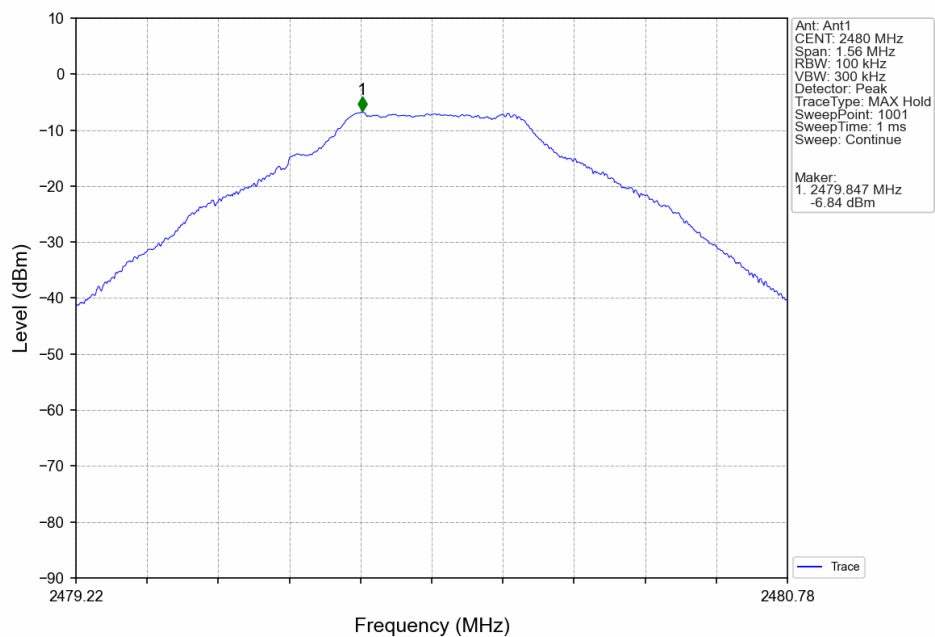
6.2 Test Graph

6.2.1 Ref

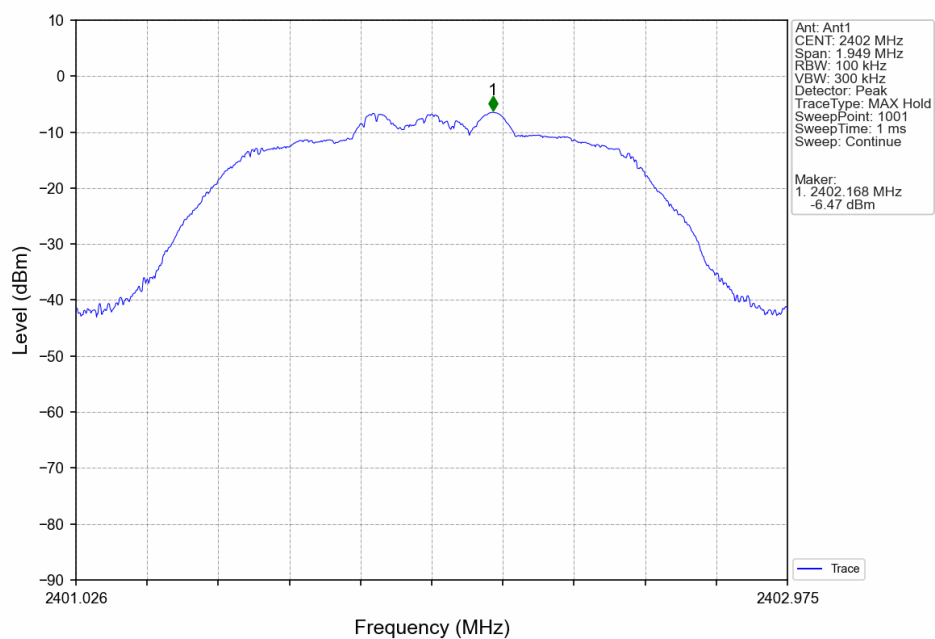


FCCID: 2BMNX-SPWBS

GFSK DH5 HCH 2480MHz Ant1 NTV

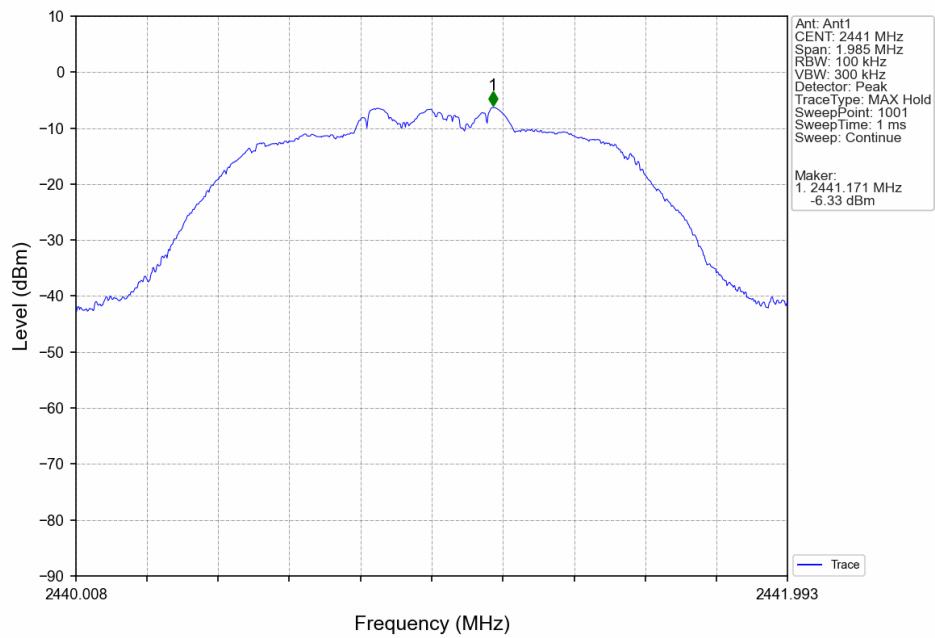


Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV

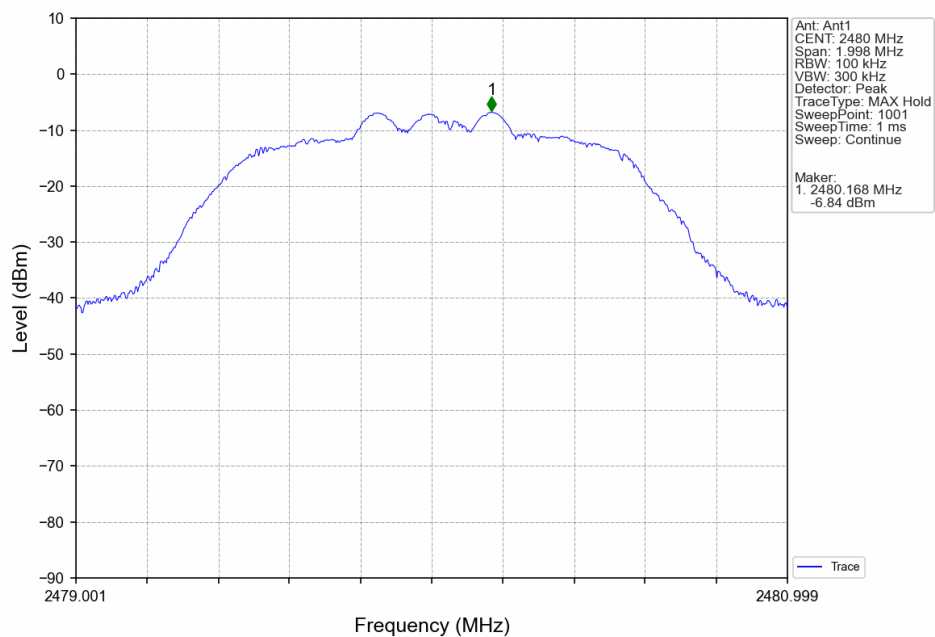


FCCID: 2BMNX-SPWBS

Pi/4DQPSK 2DH5 MCH 2441MHz Ant1 NTN

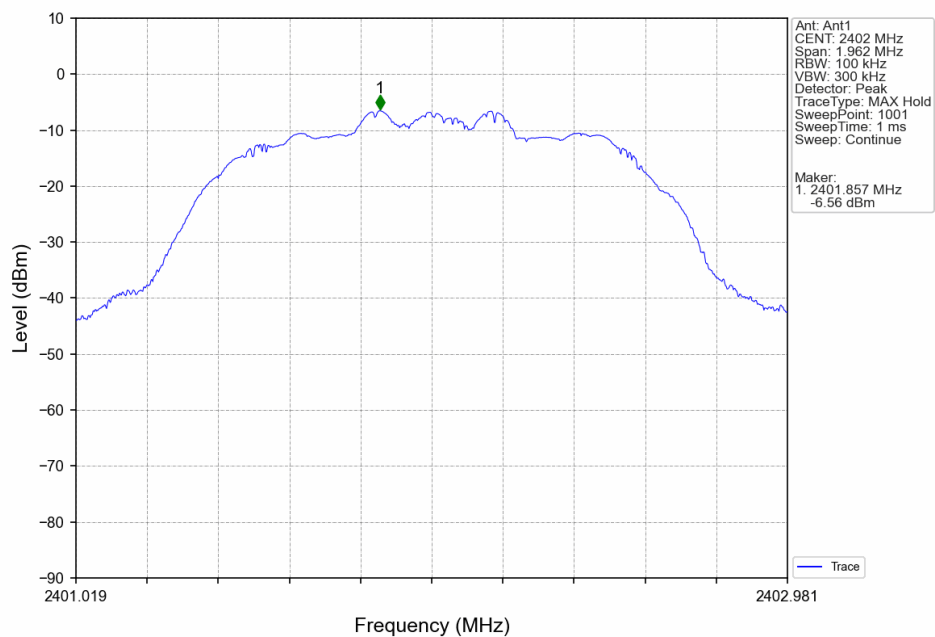


Pi/4DQPSK 2DH5 HCH 2480MHz Ant1 NTN

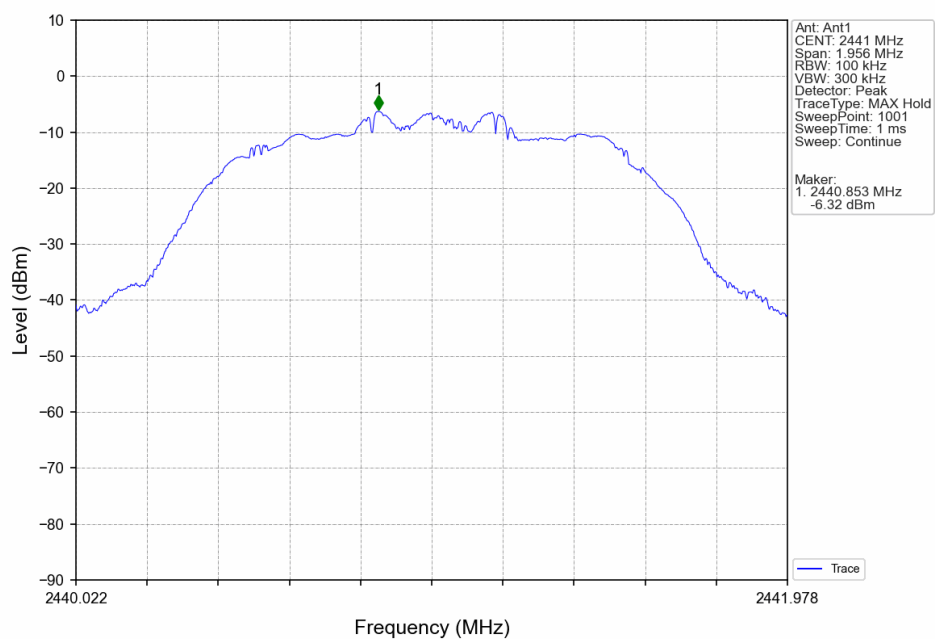


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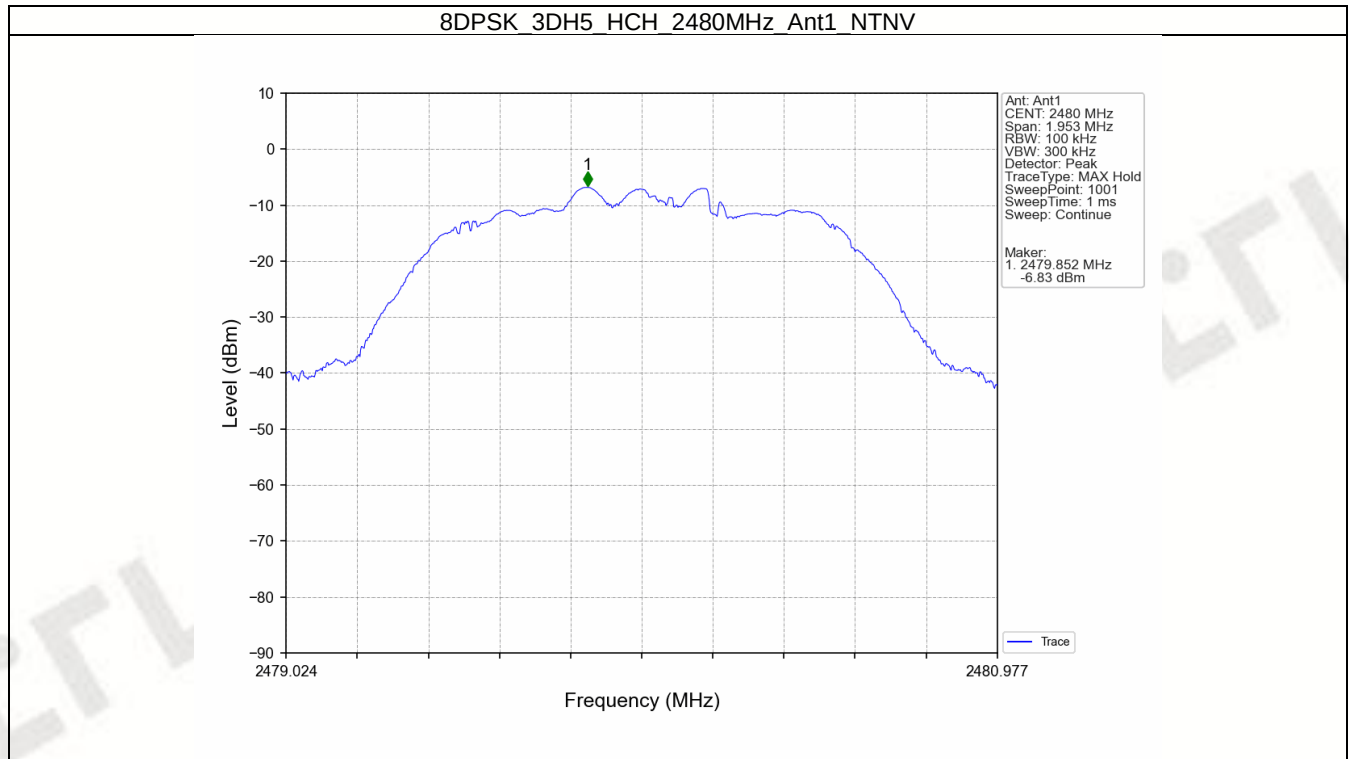
8DPSK 3DH5 LCH 2402MHz Ant1 NTN



8DPSK 3DH5 MCH 2441MHz Ant1 NTN

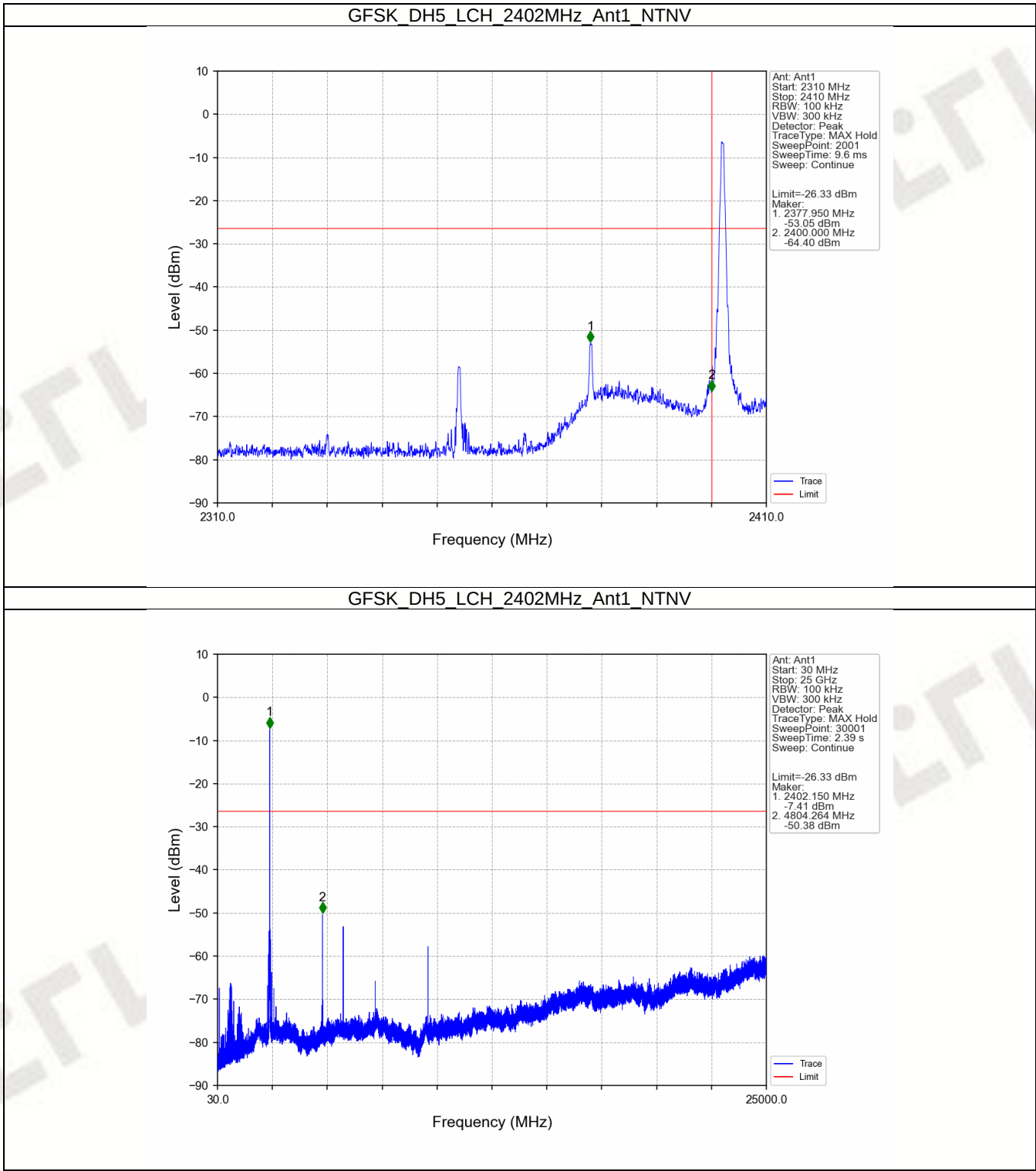


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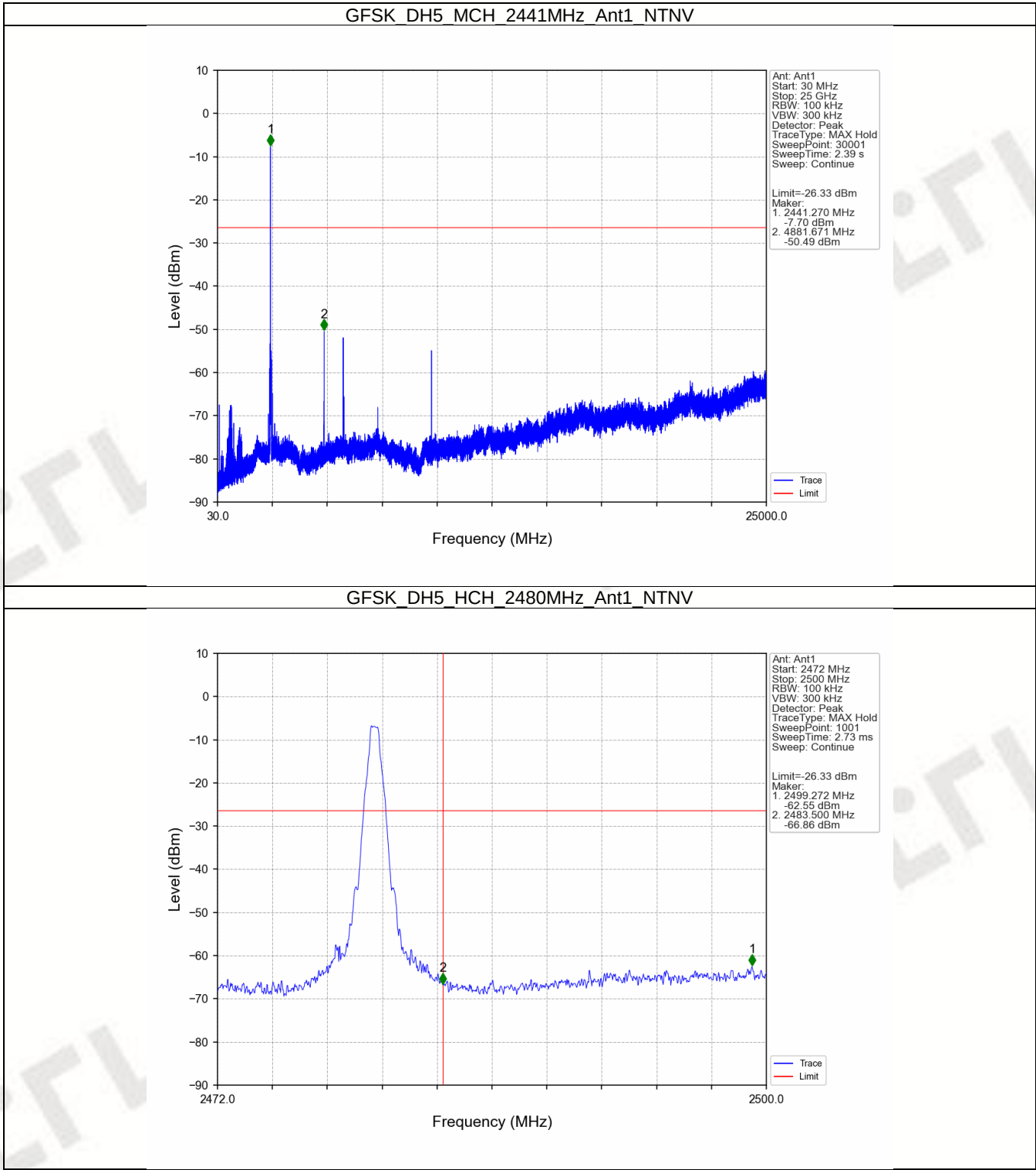


FCCID: 2BMNX-SPWBS

6.2.2 CSE

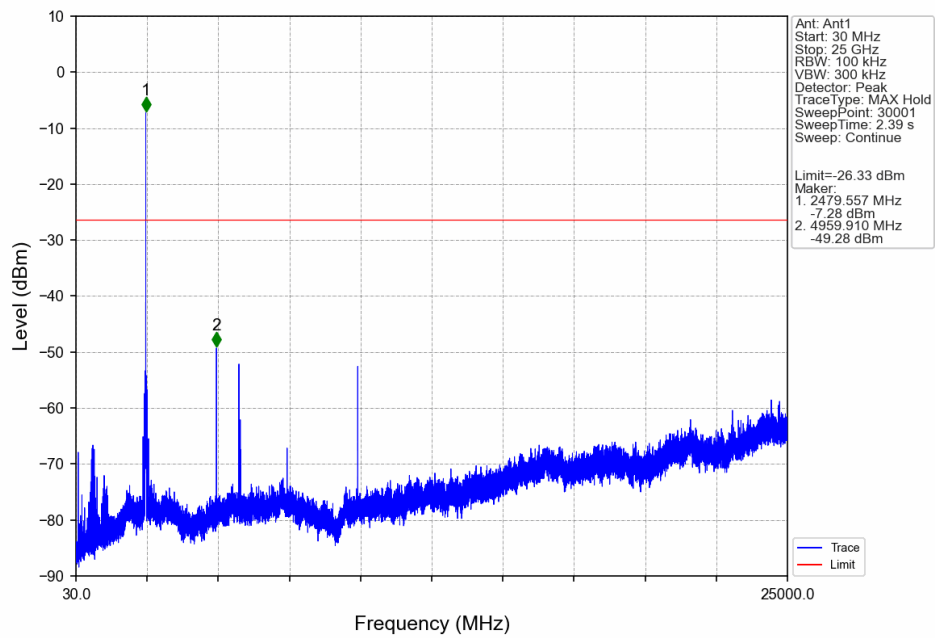


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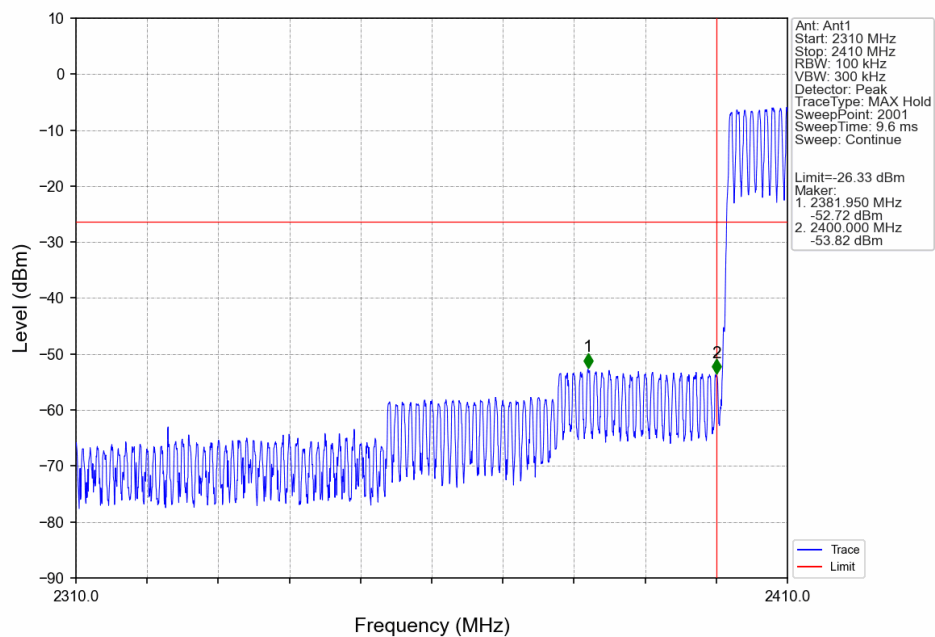


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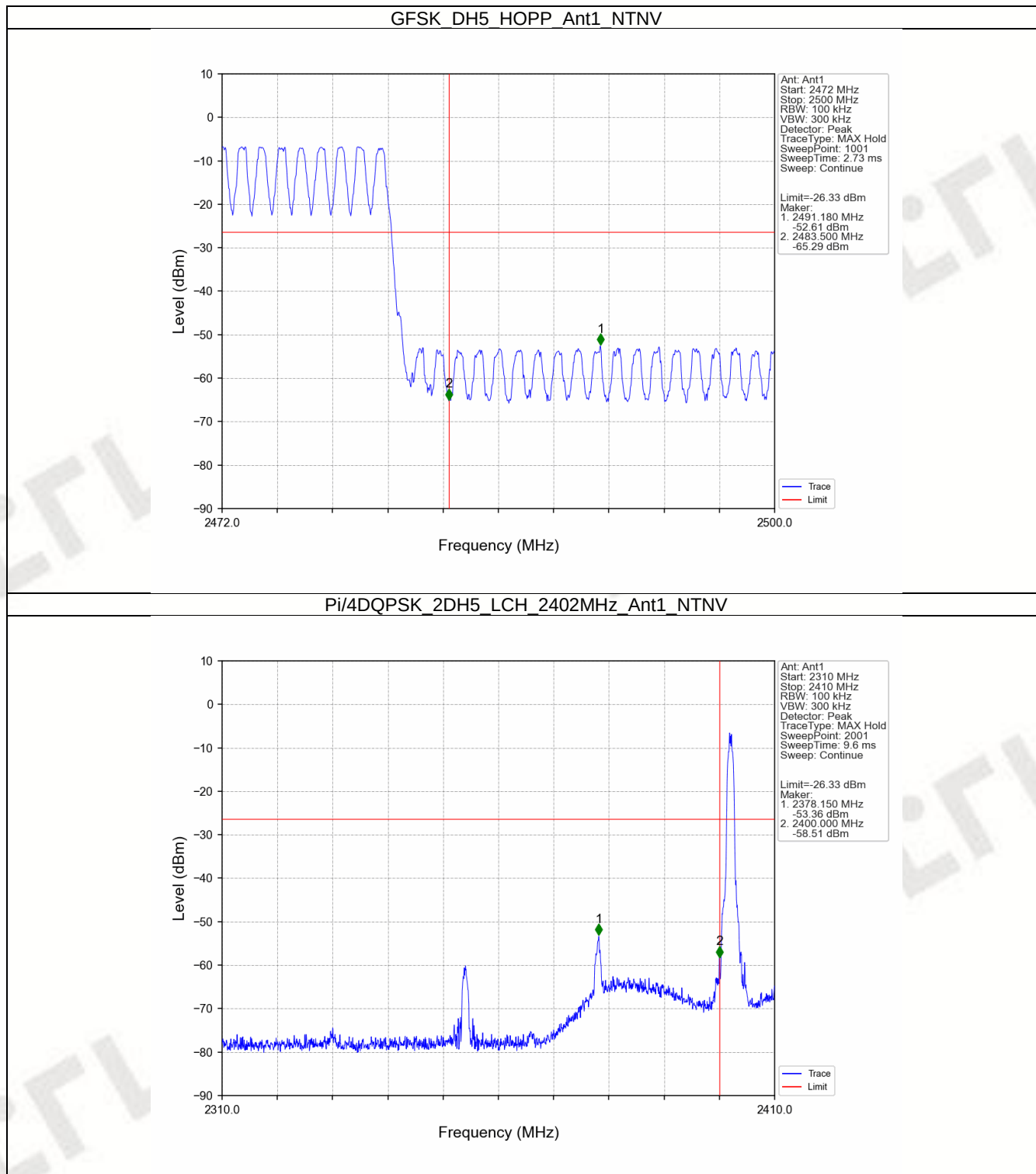
GFSK DH5 HCH 2480MHz Ant1 NTN



GFSK_DH5_HOPP_Ant1_NTNV

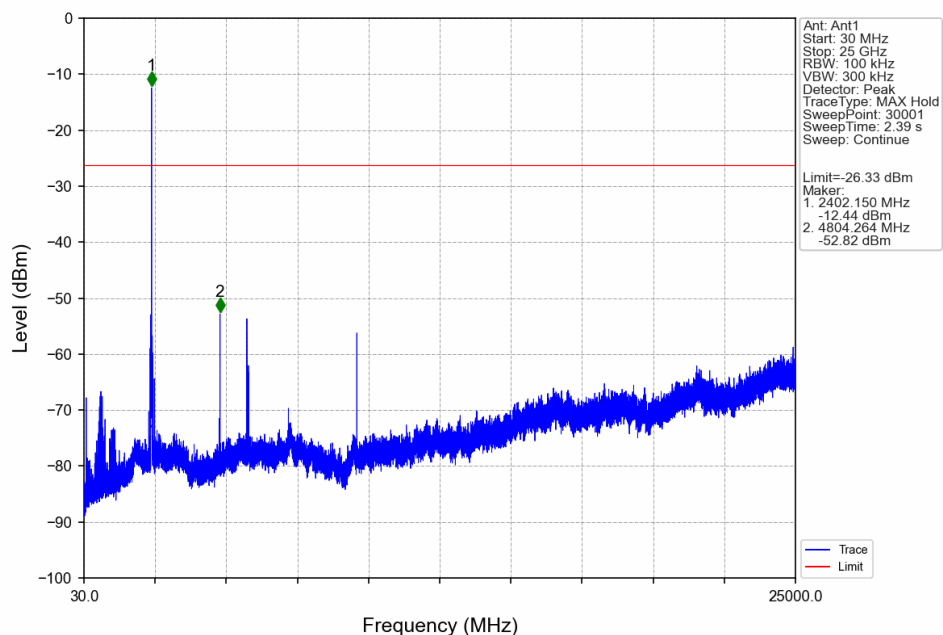


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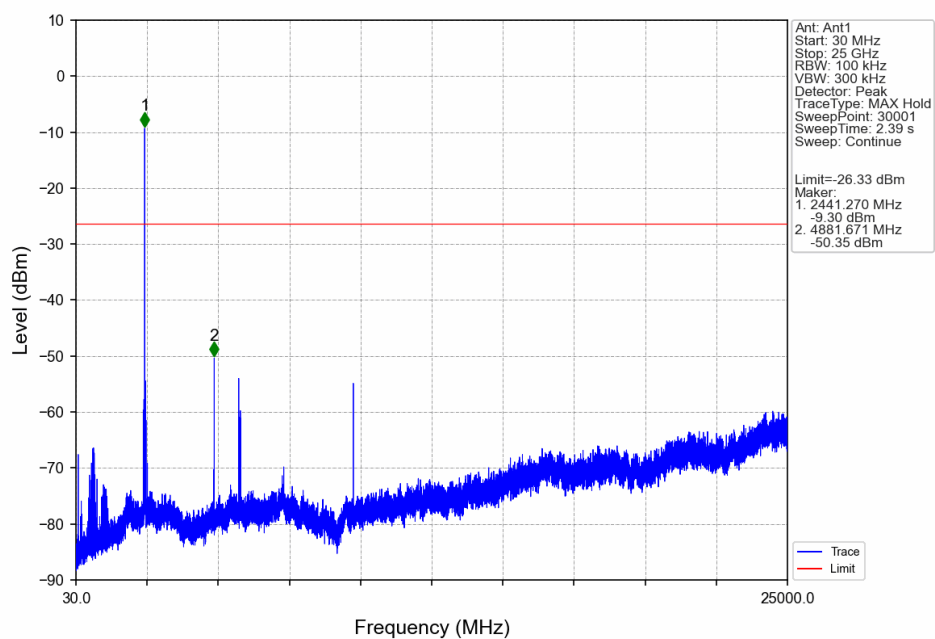


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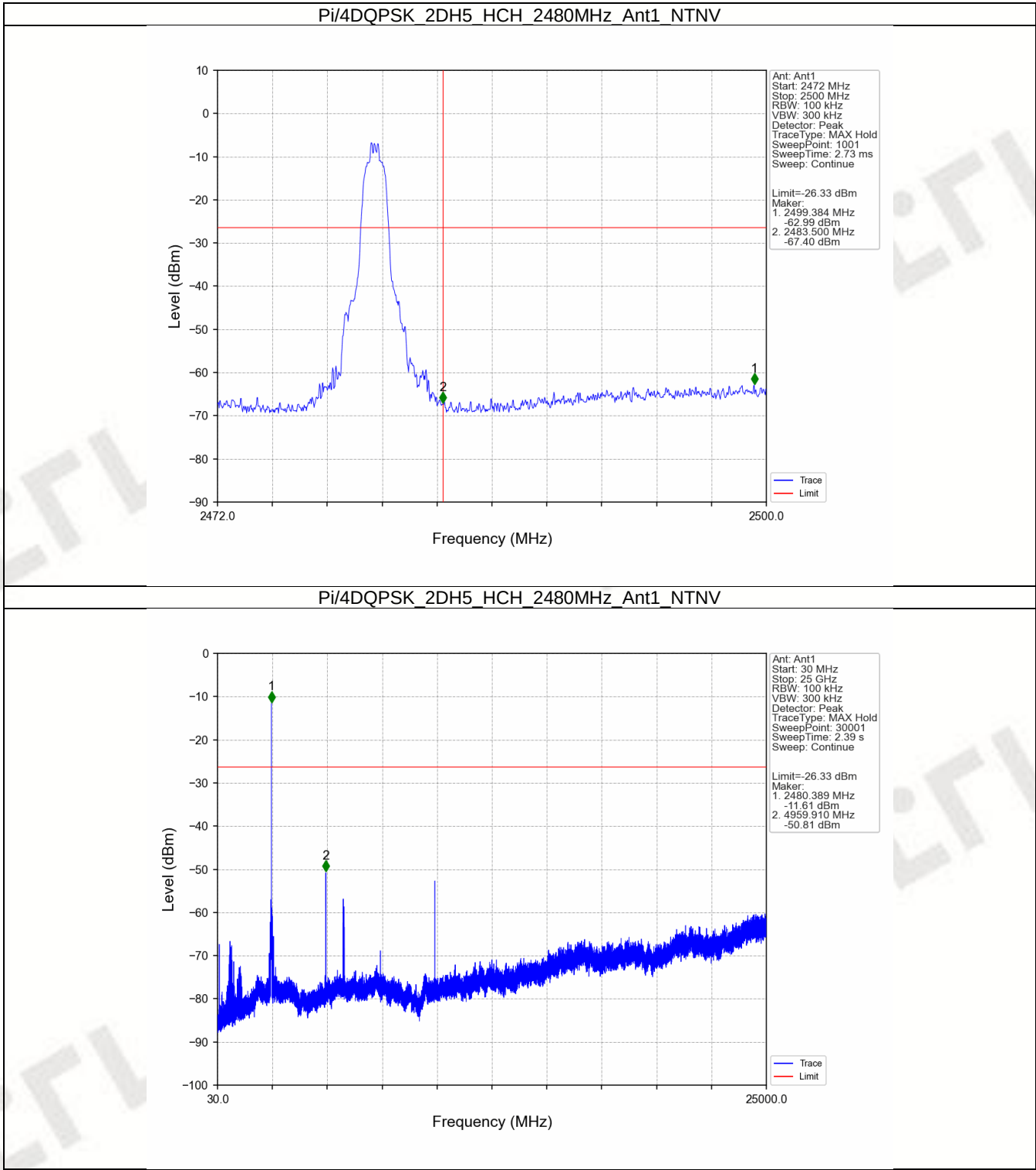
Pi/4DQPSK 2DH5 LCH 2402MHz Ant1 NTN



Pi/4DQPSK 2DH5_MCH_2441MHz_Ant1_NTN

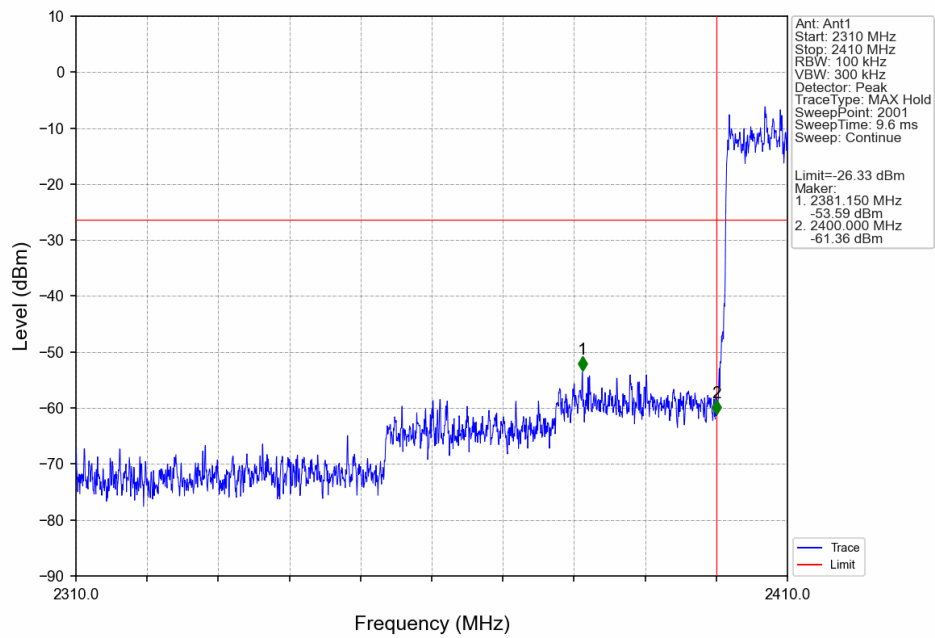


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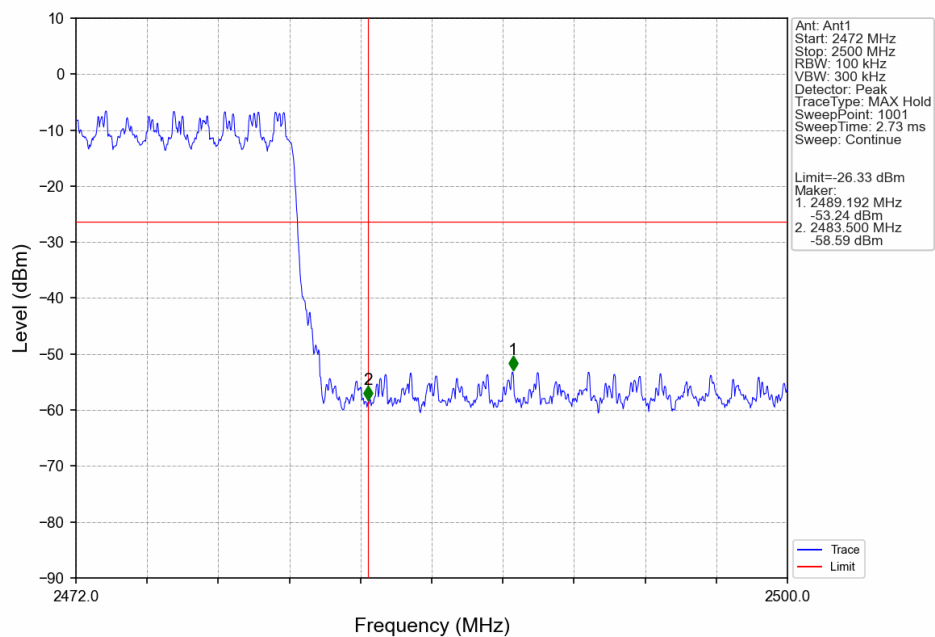


FCCID: 2BMNX-SPWBS

Pi/4DQPSK 2DH5 HOPP Ant1 NTN

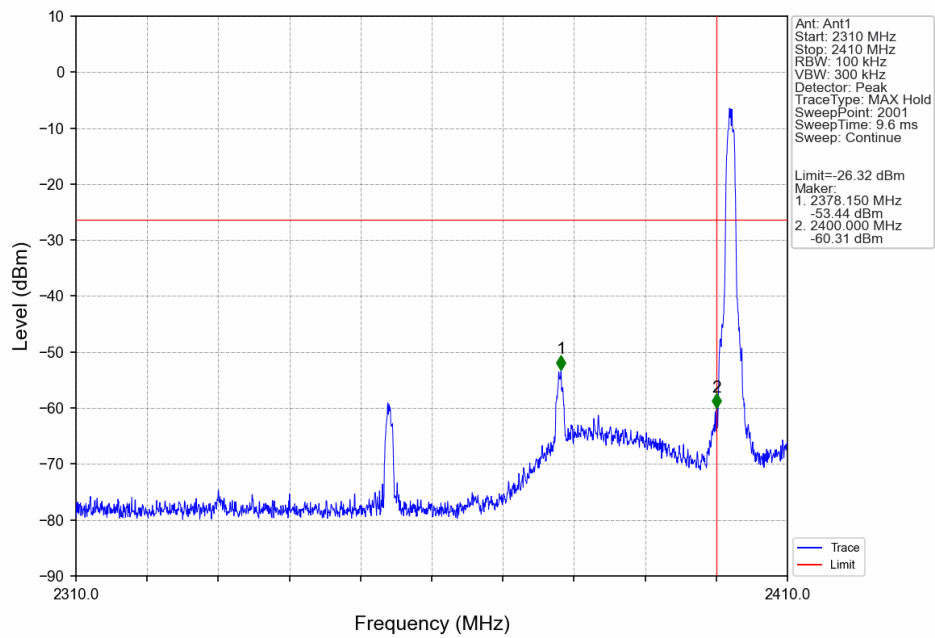


Pi/4DQPSK_2DH5_HOPP_Ant1_NTN

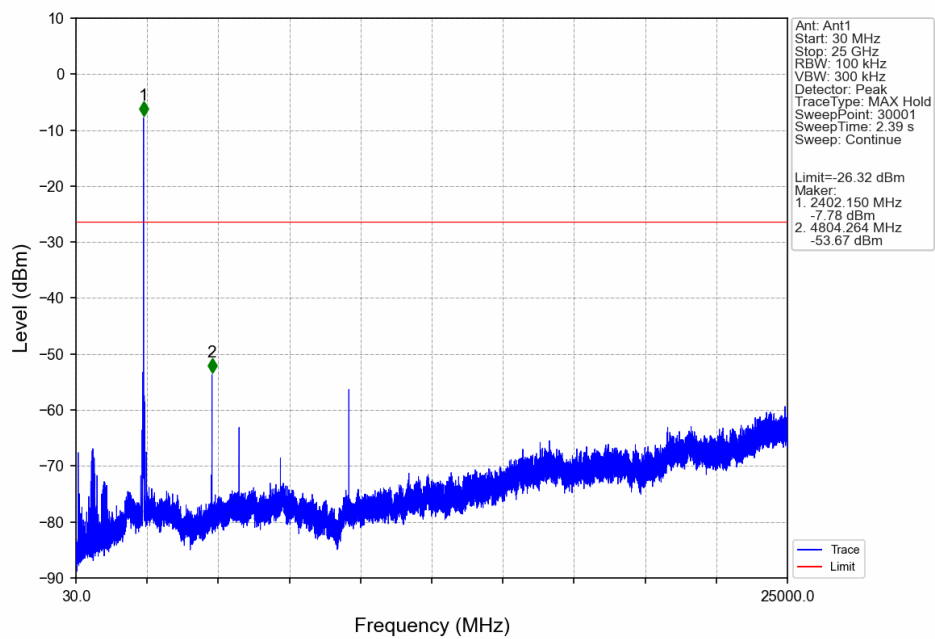


FCCID: 2BMNX-SPWBS

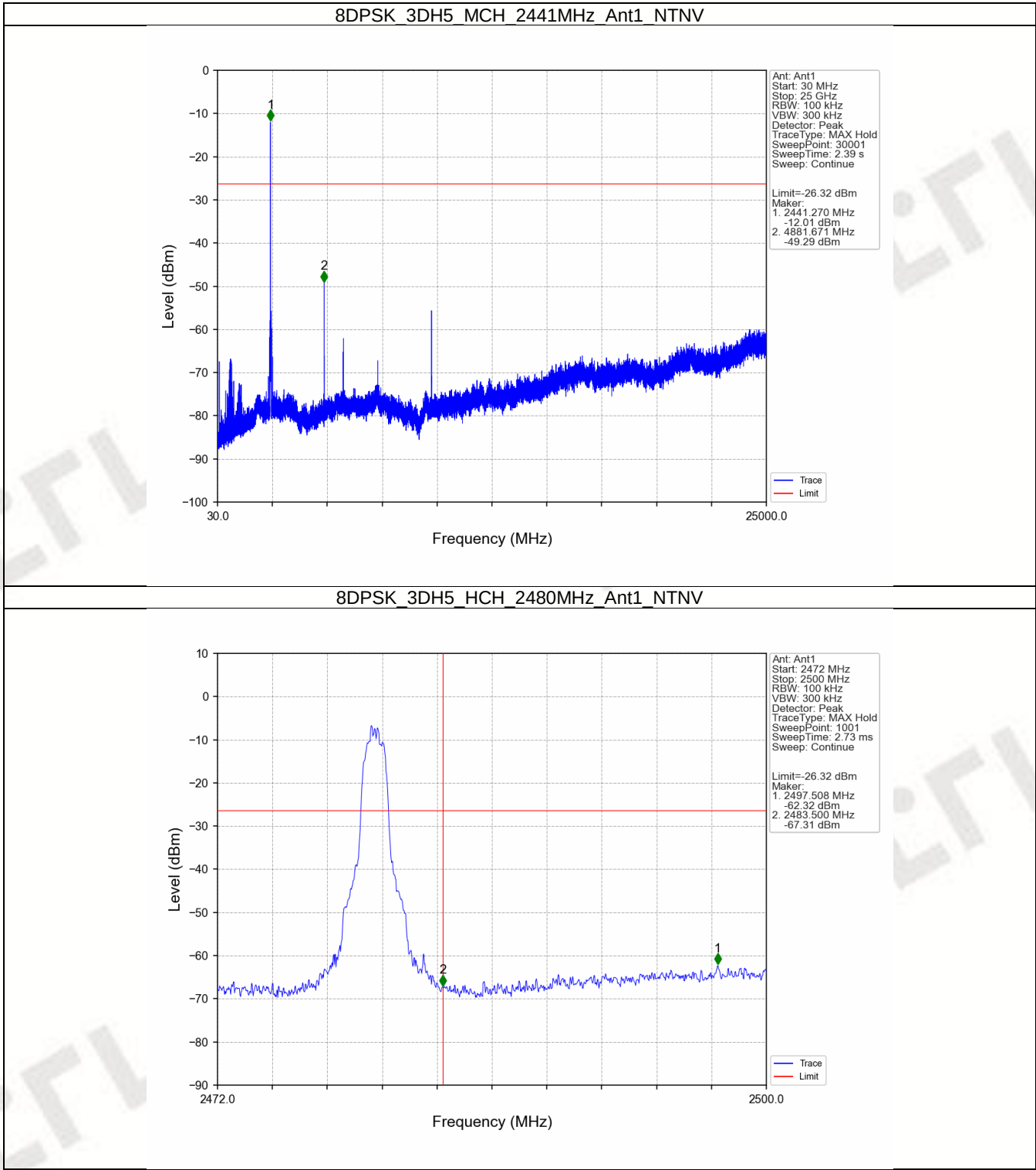
8DPSK 3DH5 LCH 2402MHz Ant1 NTN



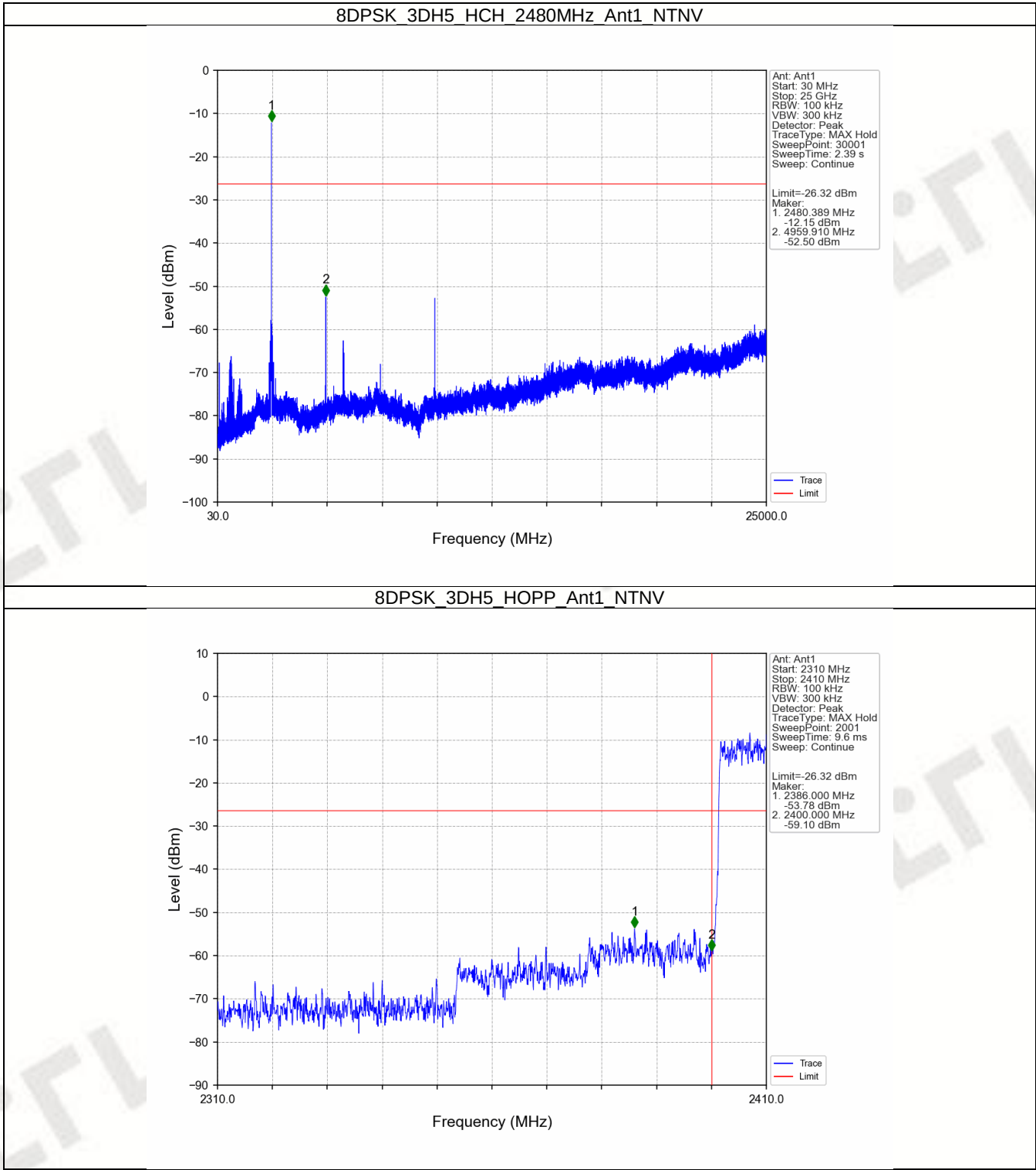
8DPSK_3DH5_LCH_2402MHz_Ant1_NTN



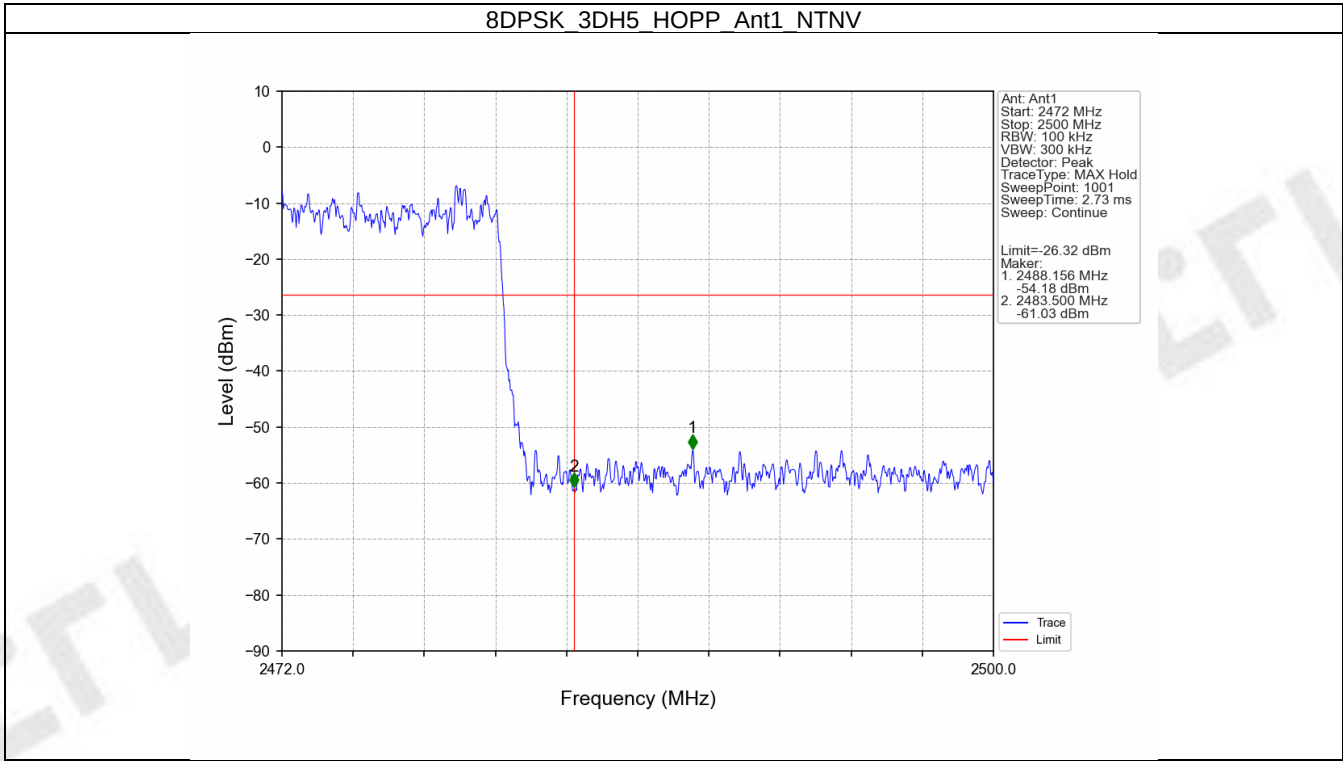
FCCID: 2BMNX-SPWBS



FCCID: 2BMNX-SPWBS



FCCID: 2BMNX-SPWBS



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7. Form731

7.1 Test Result

7.1.1 Form731

Lower Freq (MHz)	High Freq (MHz)	MAX Power (W)	MAX Power (dBm)
2402	2480	0.0003	-4.93