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Annex for 2.4G Wi-Fi

Test Report No.: CTL2408147031-WF02

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FCC ID: 2BD5N-SURFERS2

1. Duty Cycle

1.1 Test Result

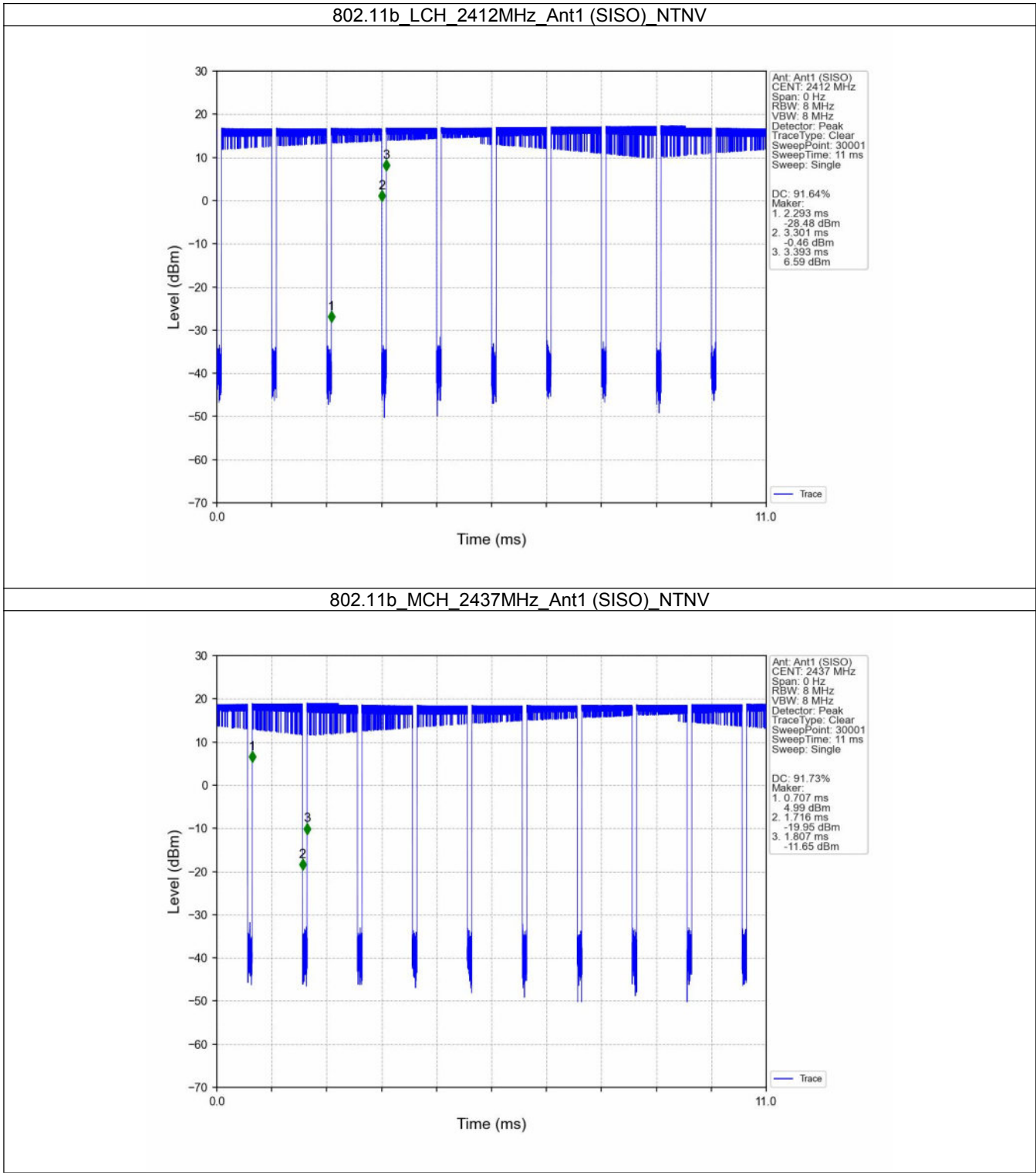
1.1.1 Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
802.11b	SISO	2412	1.008	1.100	91.64	0.38	0.03
		2437	1.009	1.100	91.73	0.38	0.03
		2462	1.009	1.100	91.73	0.38	0.03
802.11g	SISO	2412	0.617	0.669	92.23	0.35	0.00
		2437	0.616	0.669	92.08	0.36	0.03
		2462	0.616	0.669	92.08	0.36	0.03
802.11n (HT20)	SISO	2412	0.613	0.665	92.18	0.35	0.00
		2437	0.612	0.665	92.03	0.36	0.04
		2462	0.612	0.665	92.03	0.36	0.00
802.11n (HT40)	SISO	2422	0.612	0.665	92.03	0.36	0.04
		2437	0.613	0.665	92.18	0.35	0.04
		2452	0.613	0.665	92.18	0.35	0.04

FCC ID: 2BD5N-SURFERS2

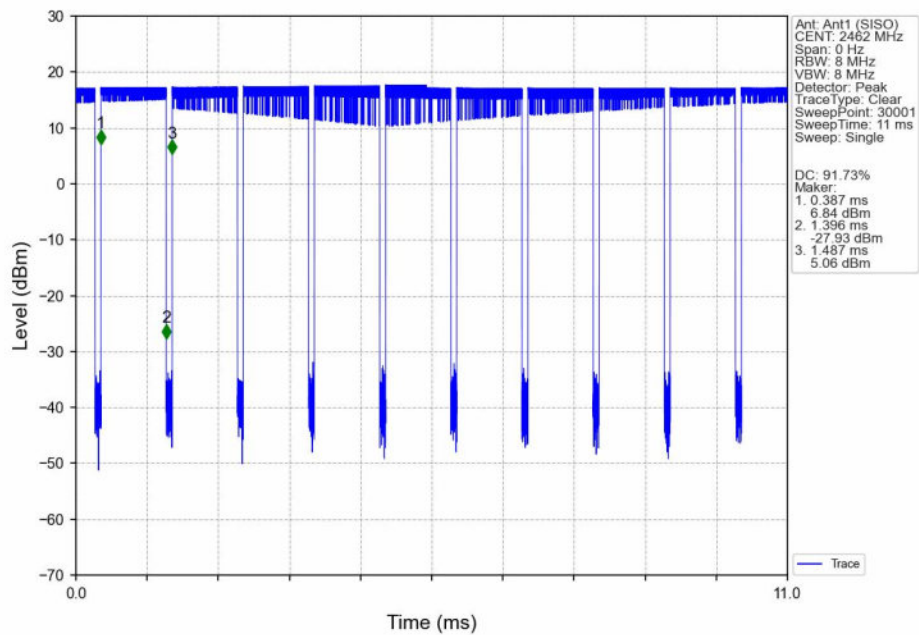
1.2 Test Graph

1.2.1 Ant1

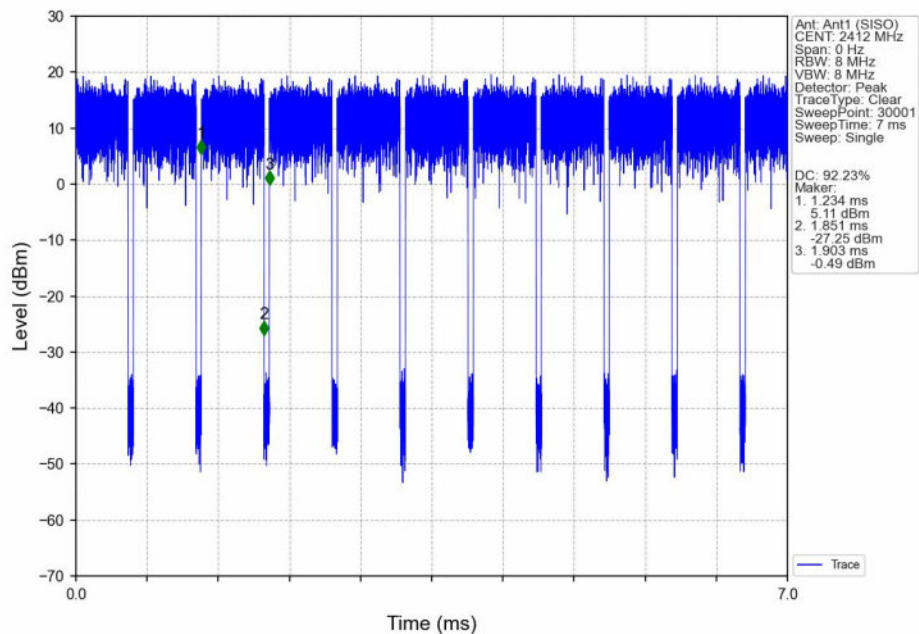


FCC ID: 2BD5N-SURFERS2

802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV

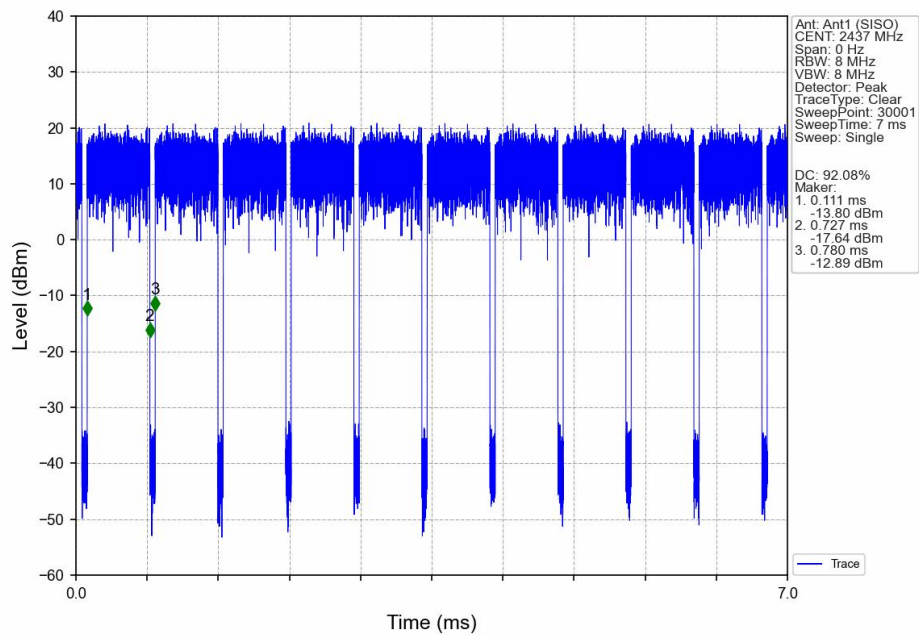


802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV

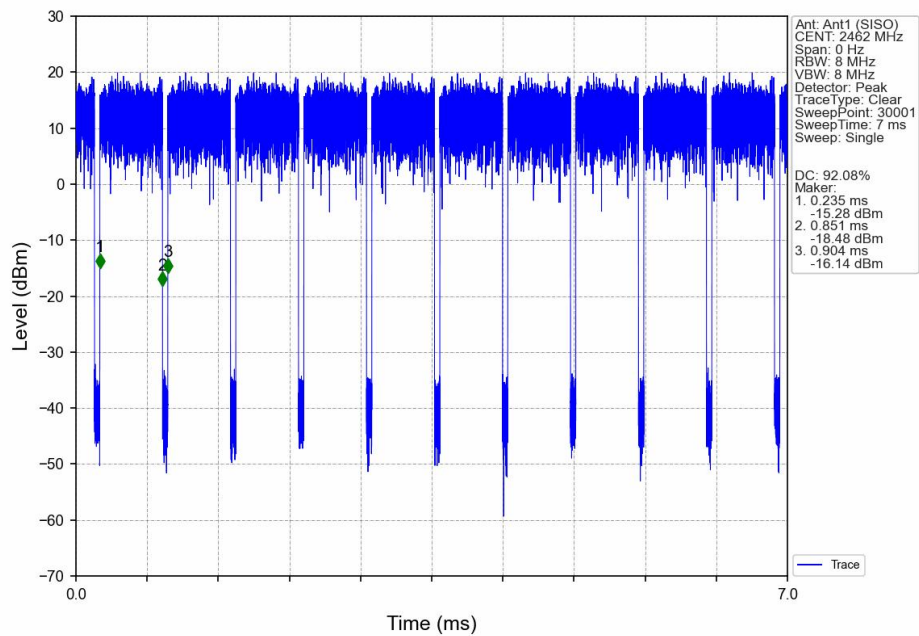


FCC ID: 2BD5N-SURFERS2

802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV

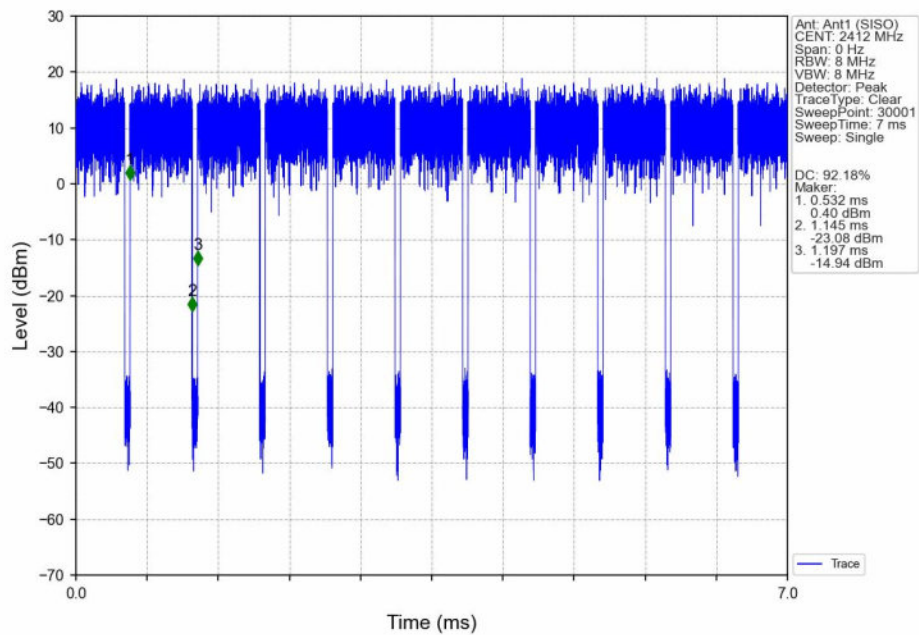


802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV

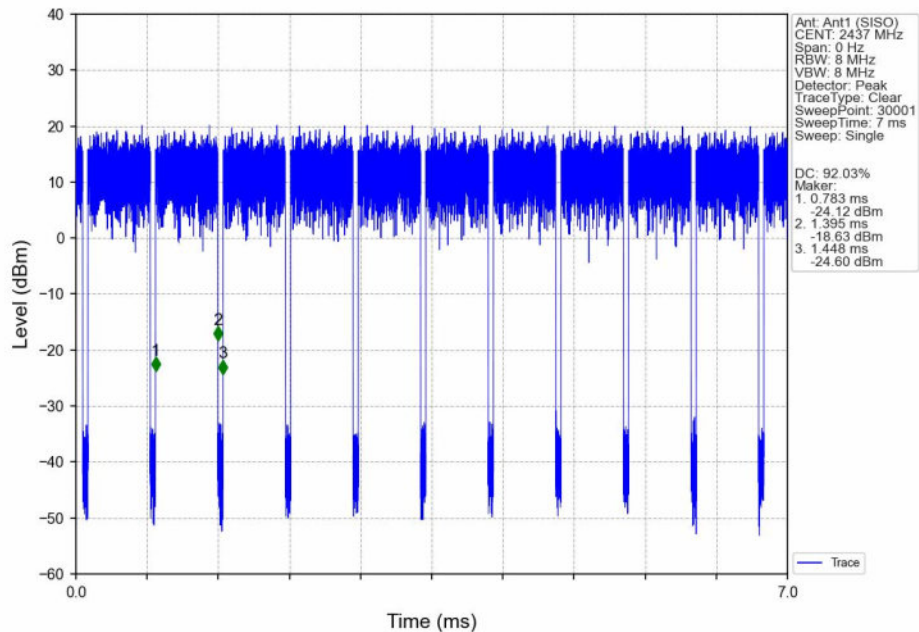


FCC ID: 2BD5N-SURFERS2

802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV

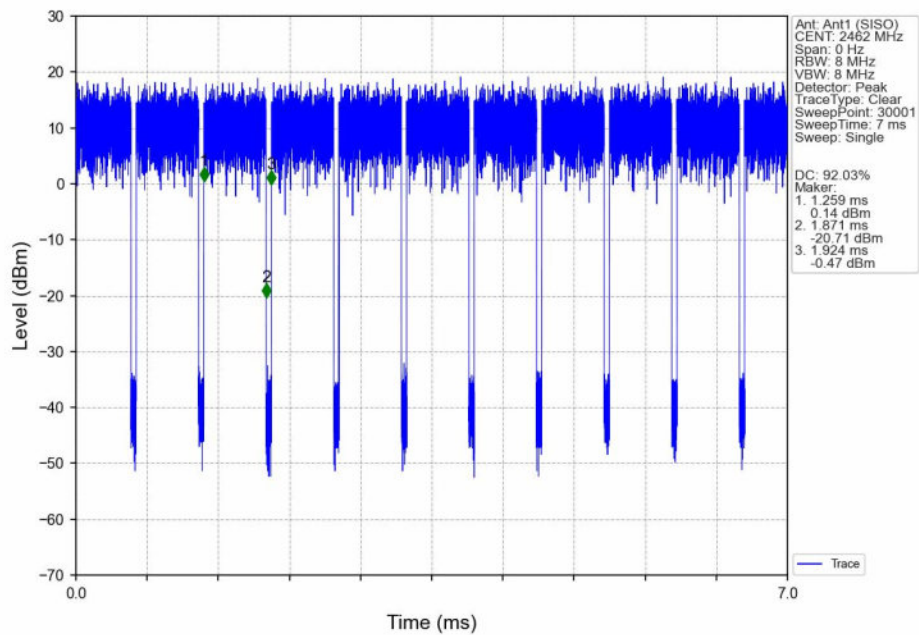


802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV

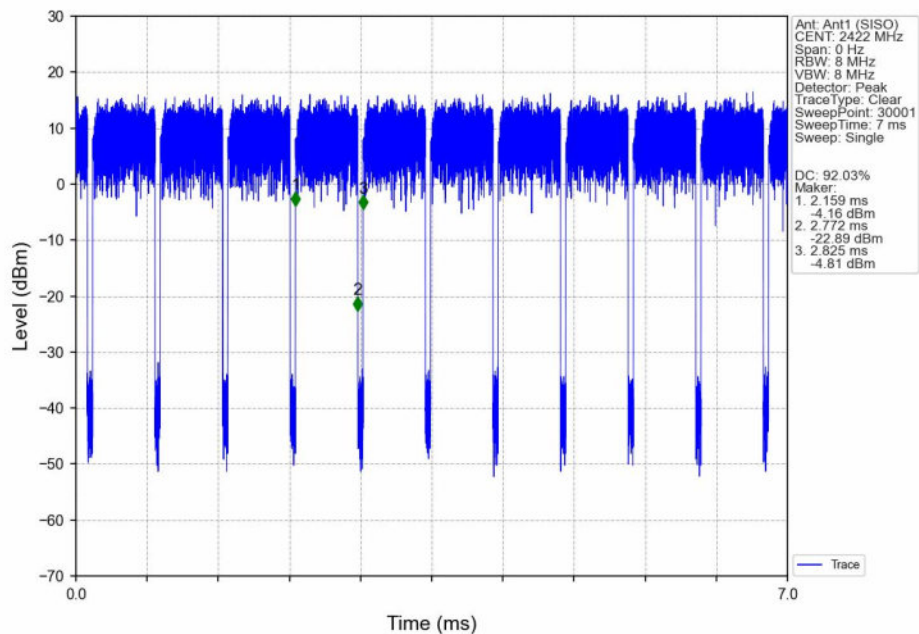


FCC ID: 2BD5N-SURFERS2

802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV

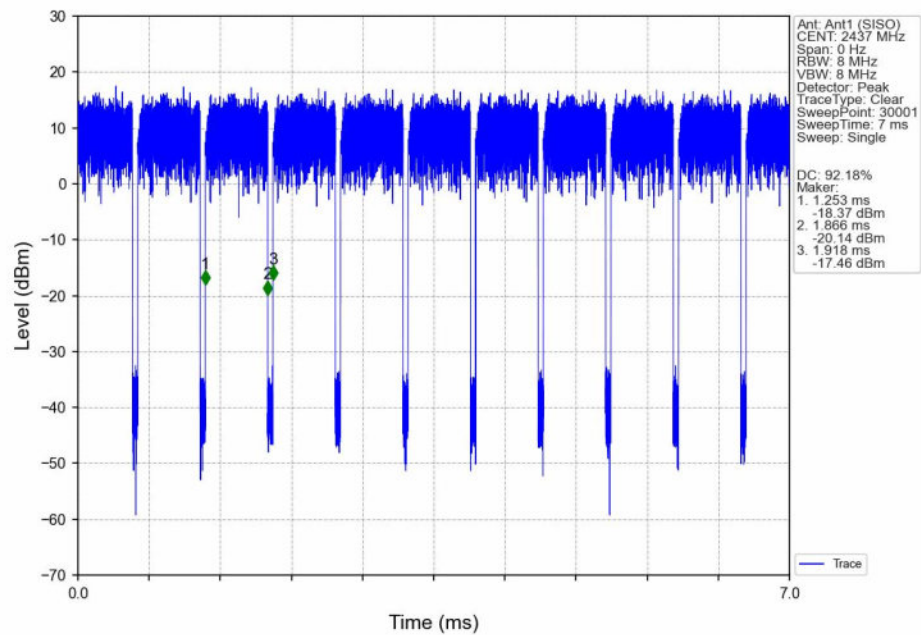


802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV

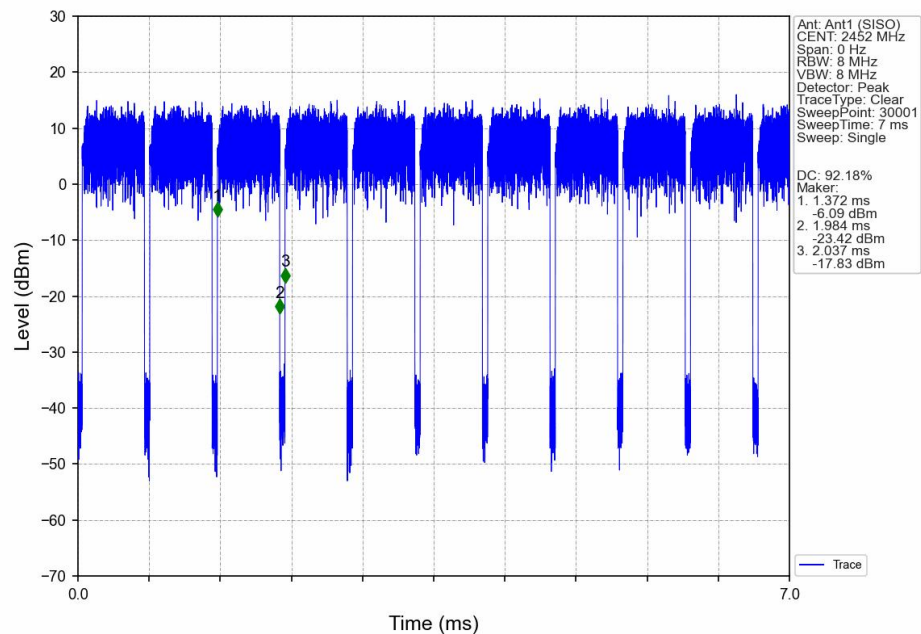


FCC ID: 2BD5N-SURFERS2

802.11n(HT40)_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



FCC ID: 2BD5N-SURFERS2

2. Bandwidth

2.1 Test Result

2.1.1 OBW

Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)		Verdict
				Result	Limit	
802.11b	SISO	2412	1	13.109	/	Pass
		2437	1	12.948	/	Pass
		2462	1	12.971	/	Pass
802.11g	SISO	2412	1	18.109	/	Pass
		2437	1	17.859	/	Pass
		2462	1	17.835	/	Pass
802.11n (HT20)	SISO	2412	1	18.847	/	Pass
		2437	1	18.670	/	Pass
		2462	1	18.675	/	Pass
802.11n (HT40)	SISO	2422	1	36.727	/	Pass
		2437	1	36.663	/	Pass
		2452	1	37.216	/	Pass

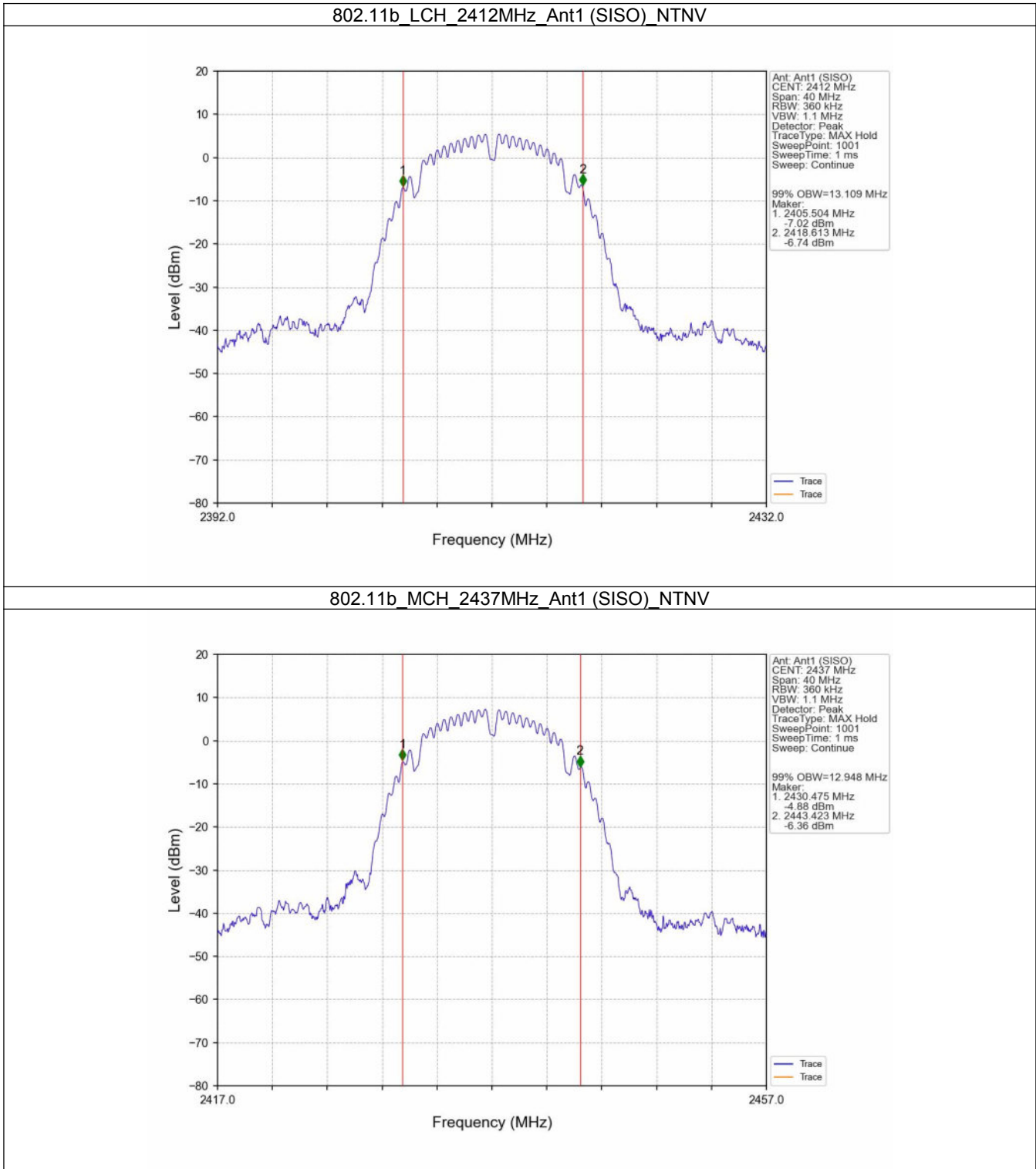
2.1.2 6dB BW

Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
802.11b	SISO	2412	1	9.581	≥ 0.5	Pass
		2437	1	9.116	≥ 0.5	Pass
		2462	1	9.532	≥ 0.5	Pass
802.11g	SISO	2412	1	16.374	≥ 0.5	Pass
		2437	1	15.959	≥ 0.5	Pass
		2462	1	15.907	≥ 0.5	Pass
802.11n (HT20)	SISO	2412	1	17.608	≥ 0.5	Pass
		2437	1	16.392	≥ 0.5	Pass
		2462	1	16.382	≥ 0.5	Pass
802.11n (HT40)	SISO	2422	1	35.143	≥ 0.5	Pass
		2437	1	35.155	≥ 0.5	Pass
		2452	1	35.689	≥ 0.5	Pass

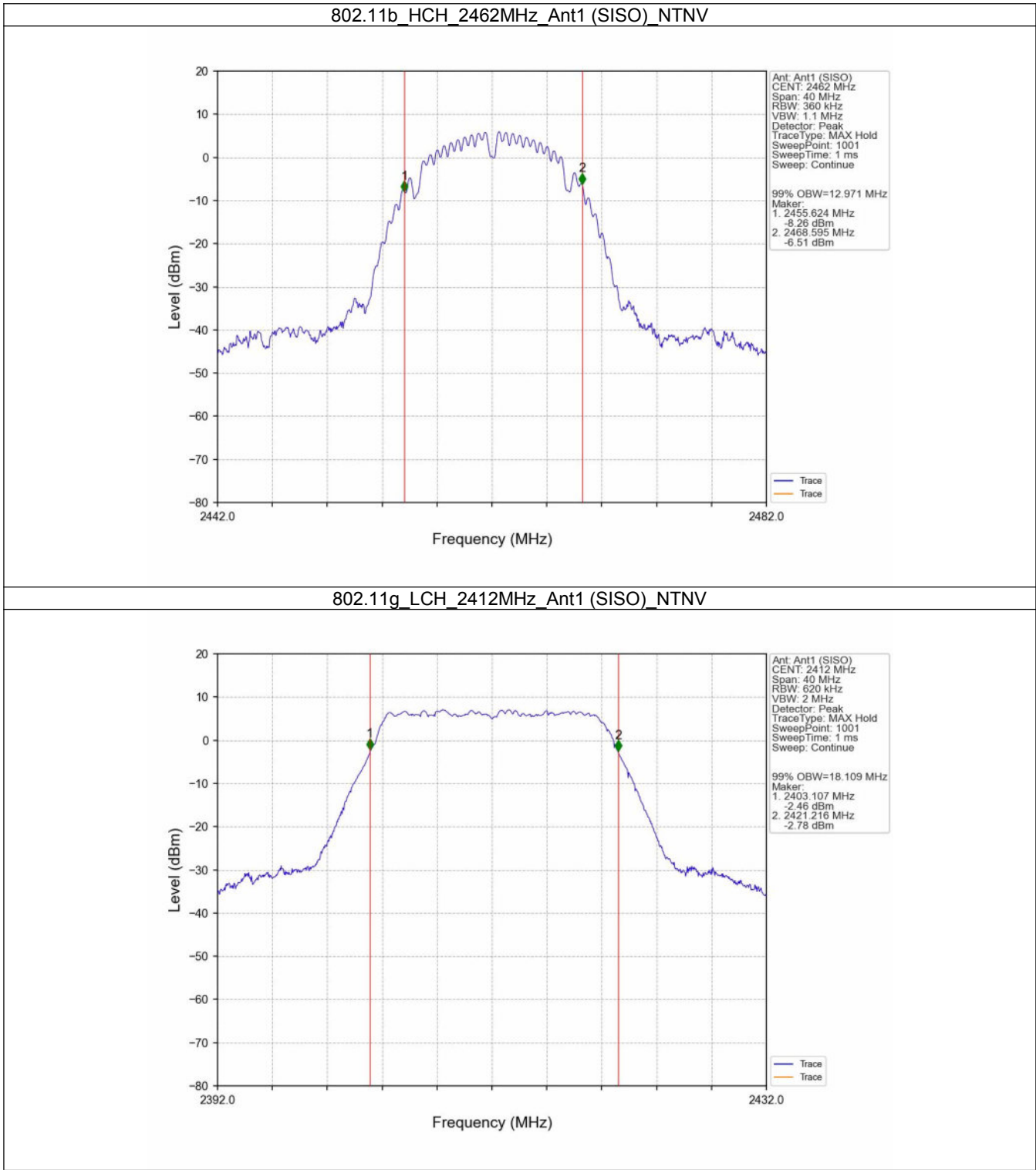
FCC ID: 2BD5N-SURFERS2

2.2 Test Graph

2.2.1 OBW

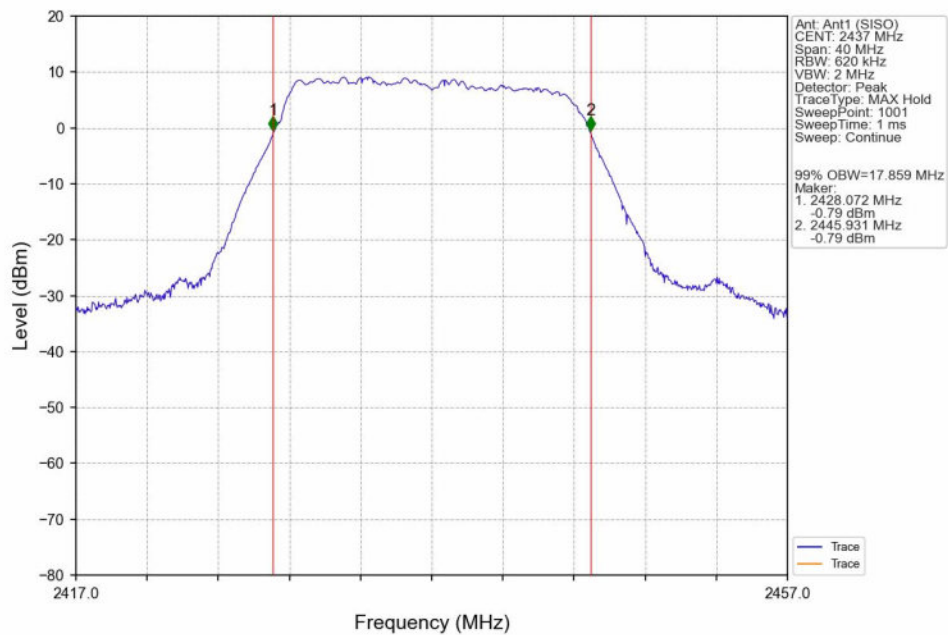


FCC ID: 2BD5N-SURFERS2

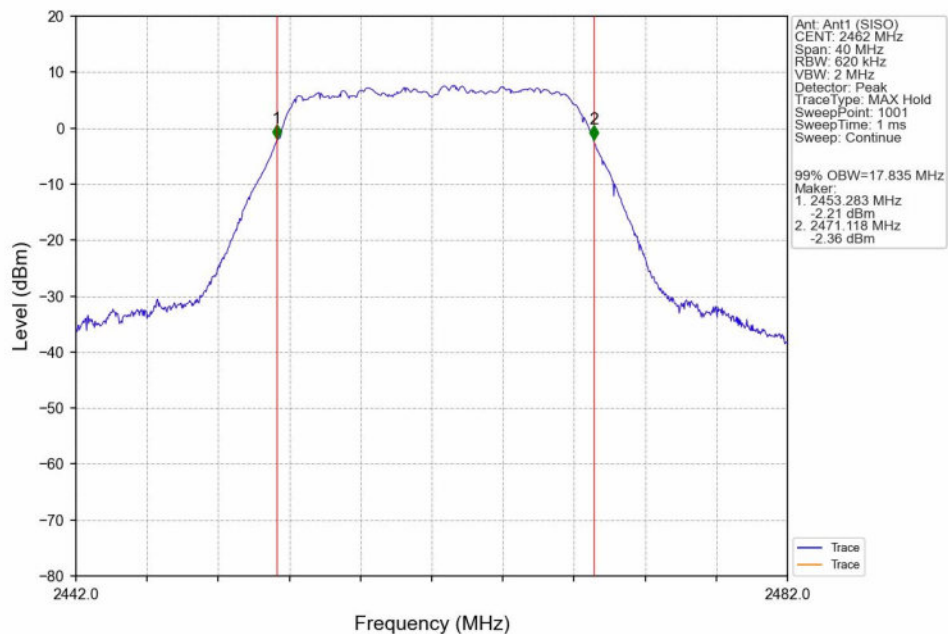


FCC ID: 2BD5N-SURFERS2

802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV

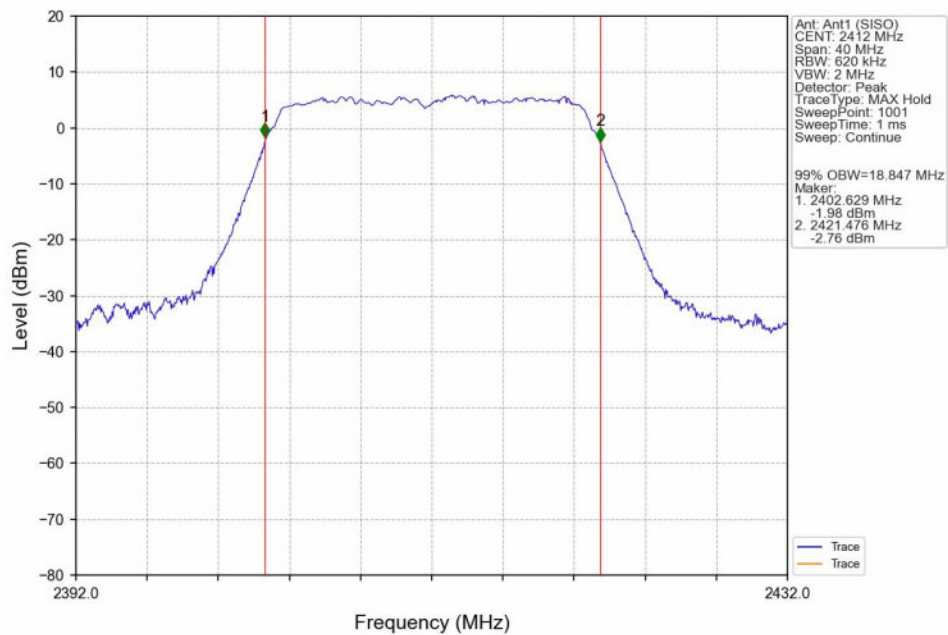


802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV

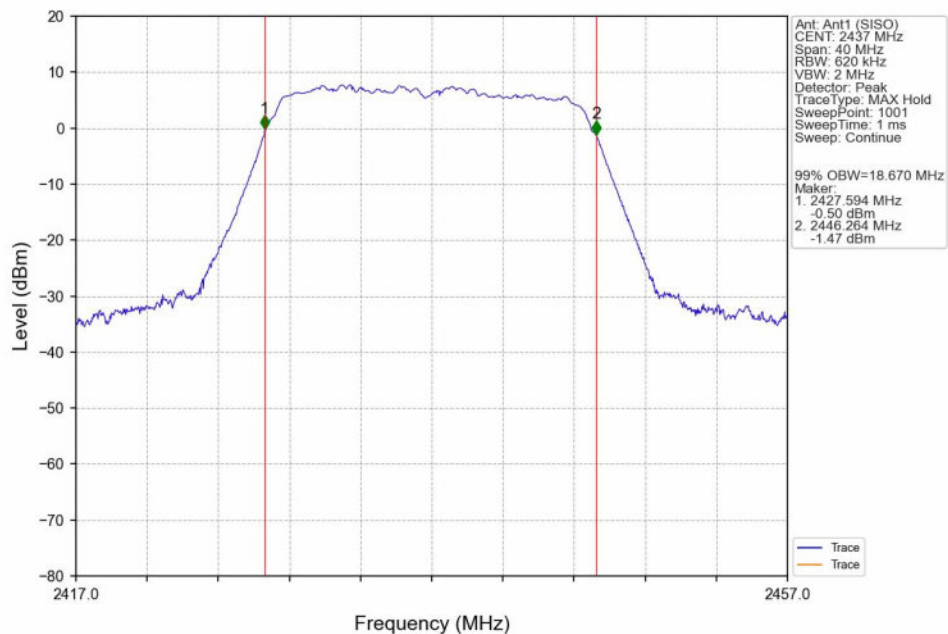


FCC ID: 2BD5N-SURFERS2

802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV

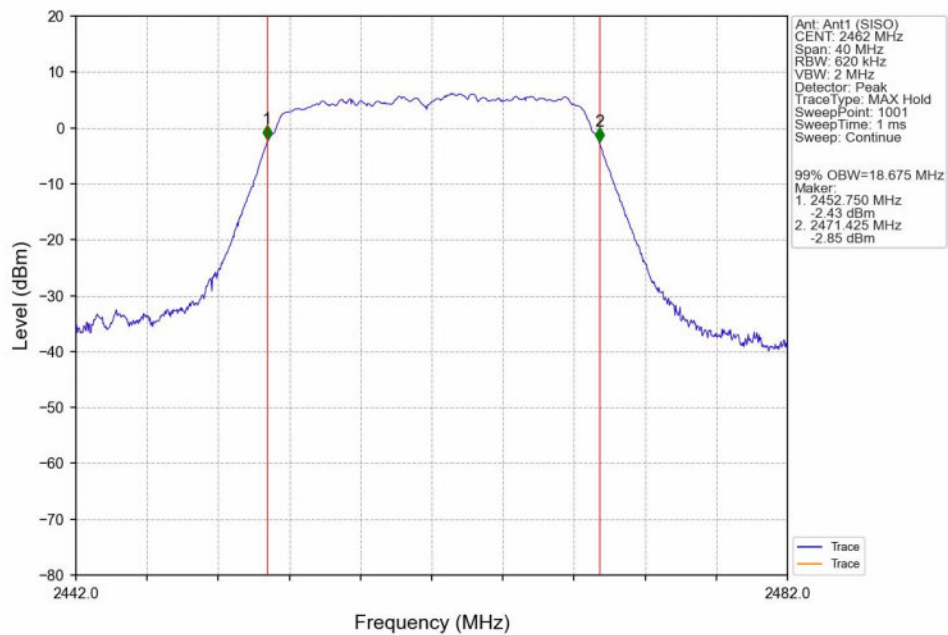


802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV

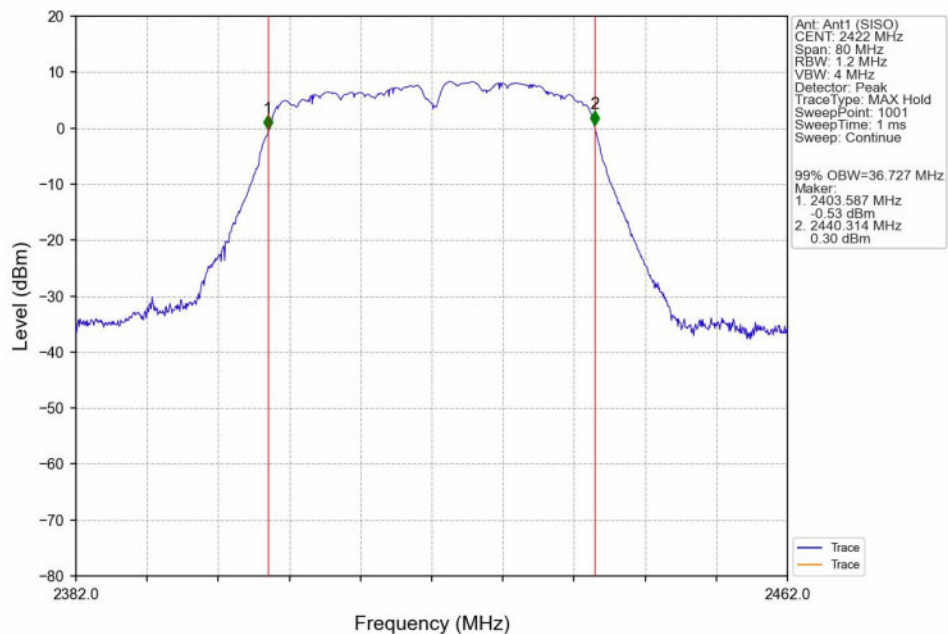


FCC ID: 2BD5N-SURFERS2

802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV

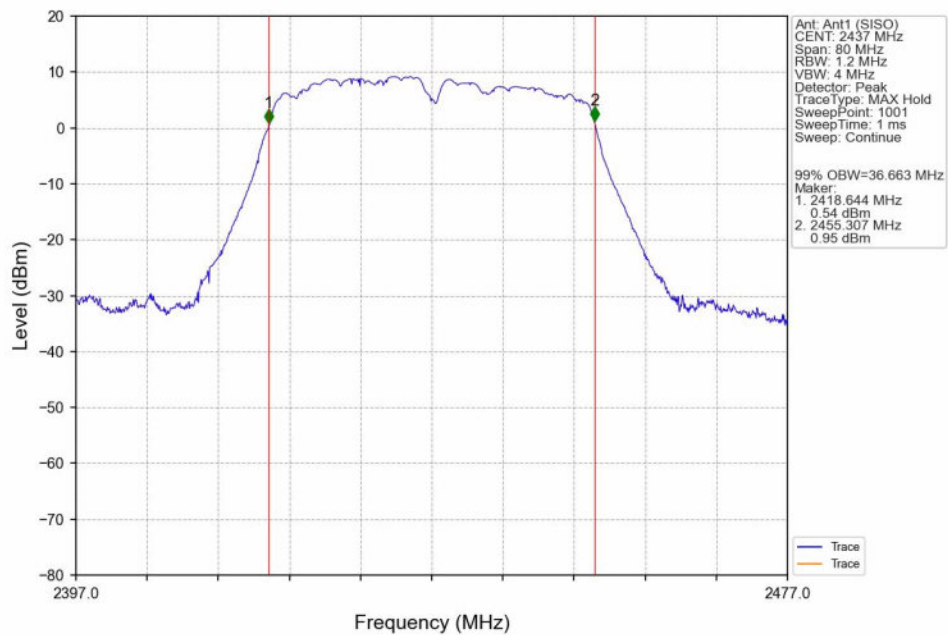


802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV

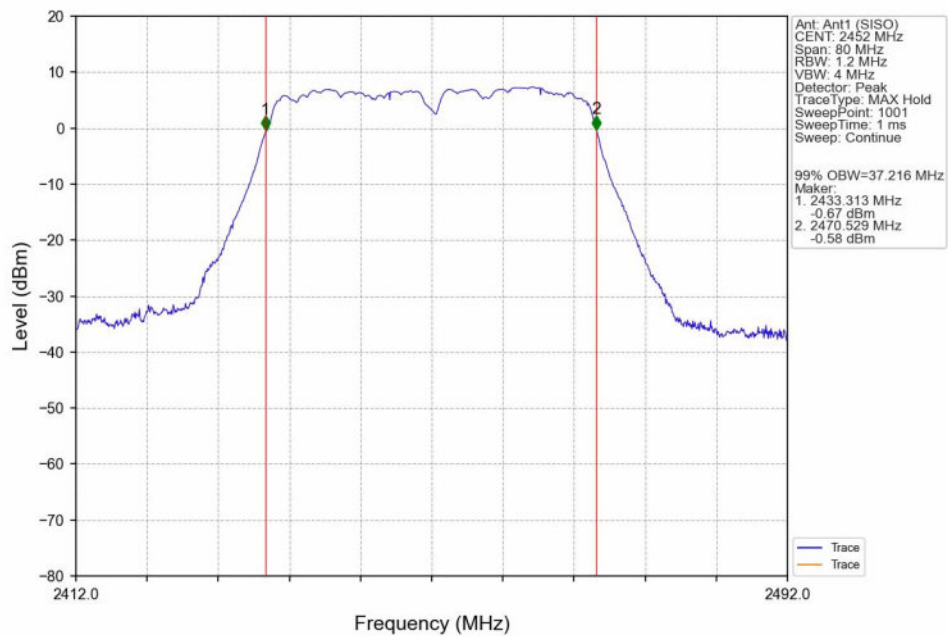


FCC ID: 2BD5N-SURFERS2

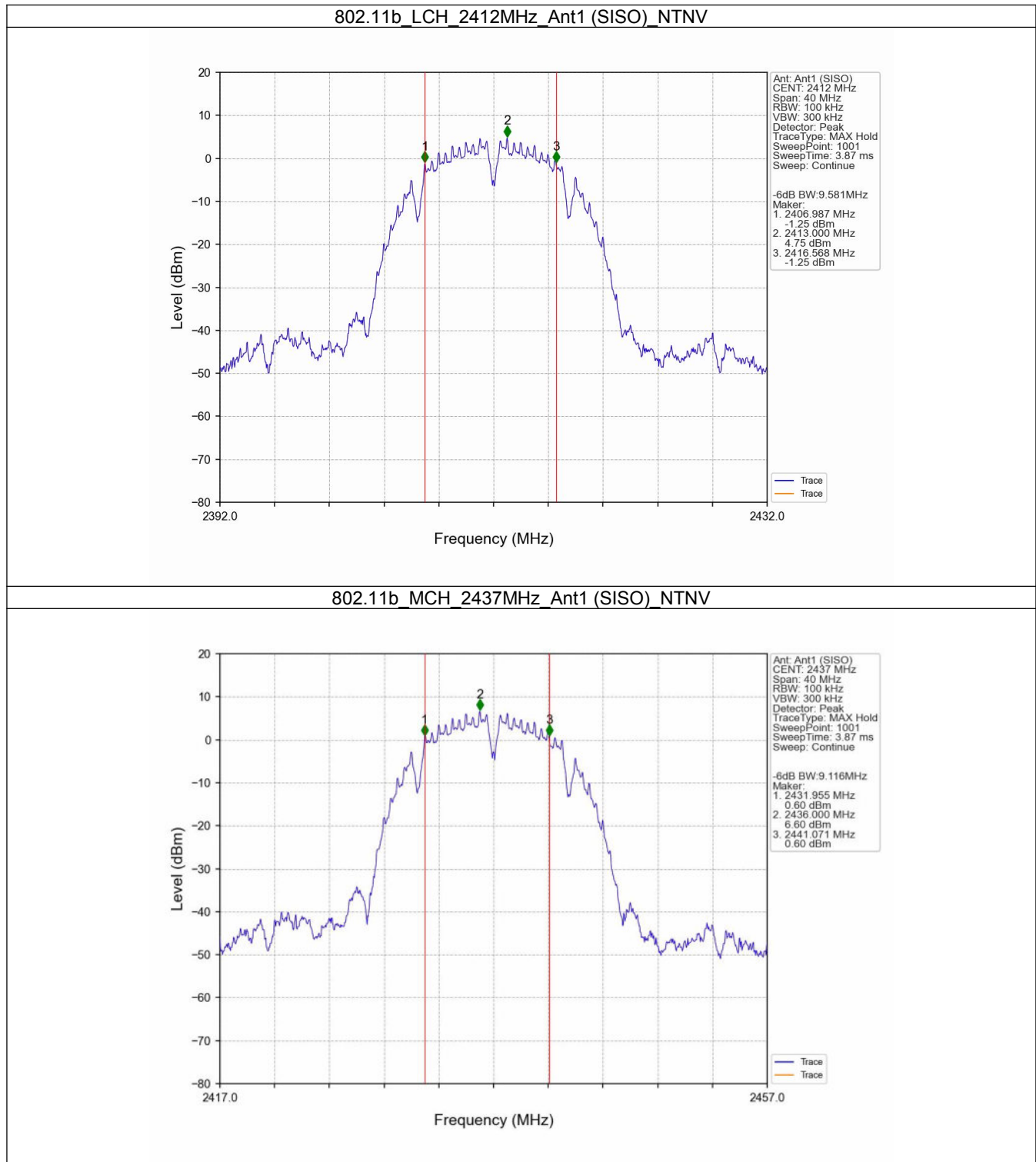
802.11n(HT40)_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV

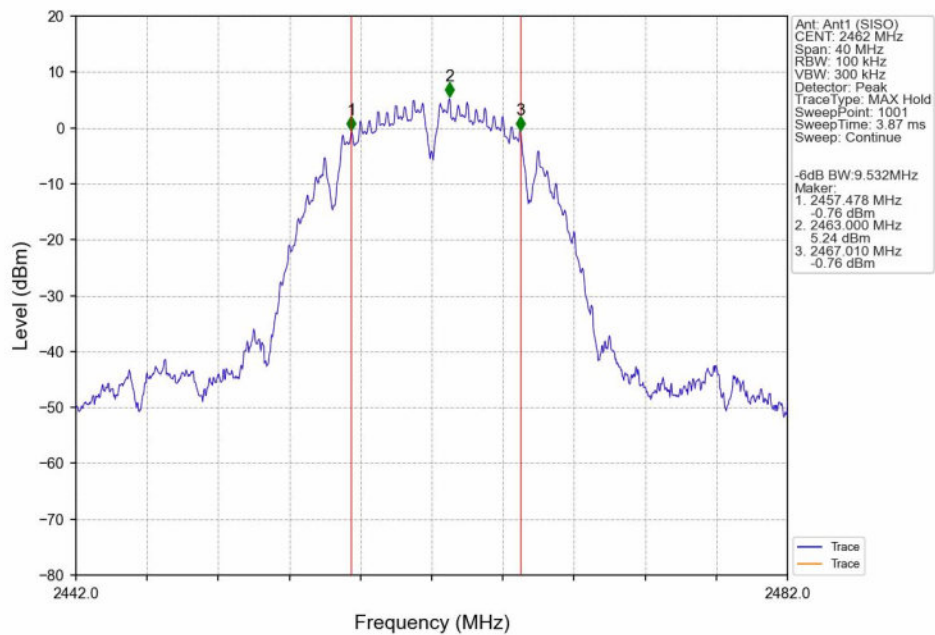


FCC ID: 2BD5N-SURFERS2

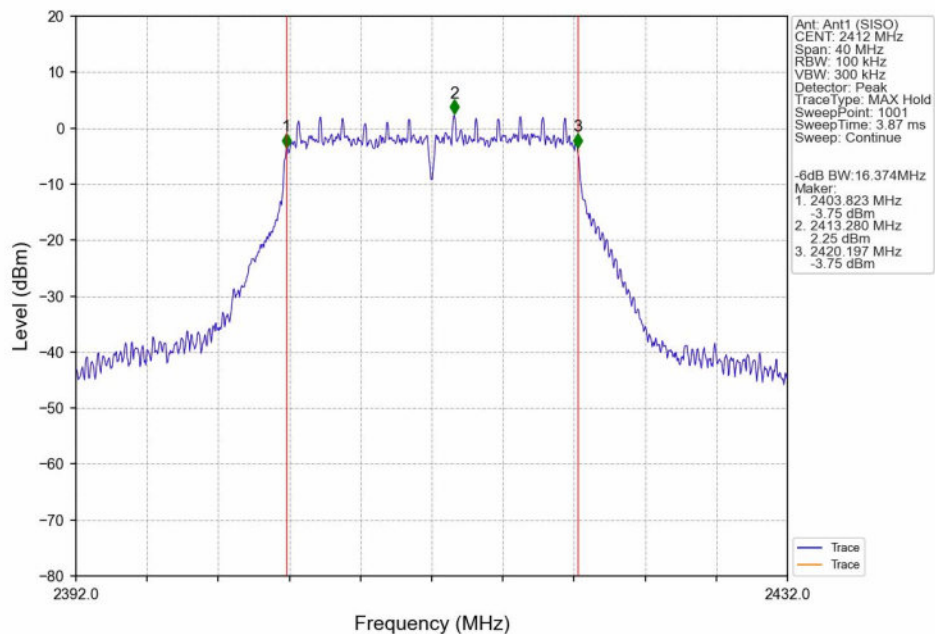
2.2.2 6dB BW

FCC ID: 2BD5N-SURFERS2

802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV

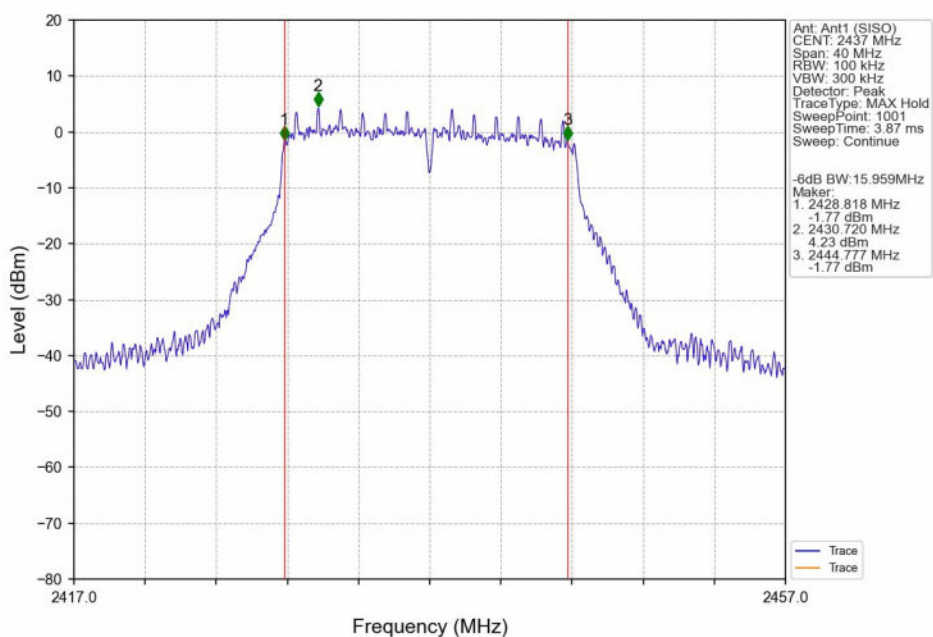


802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV

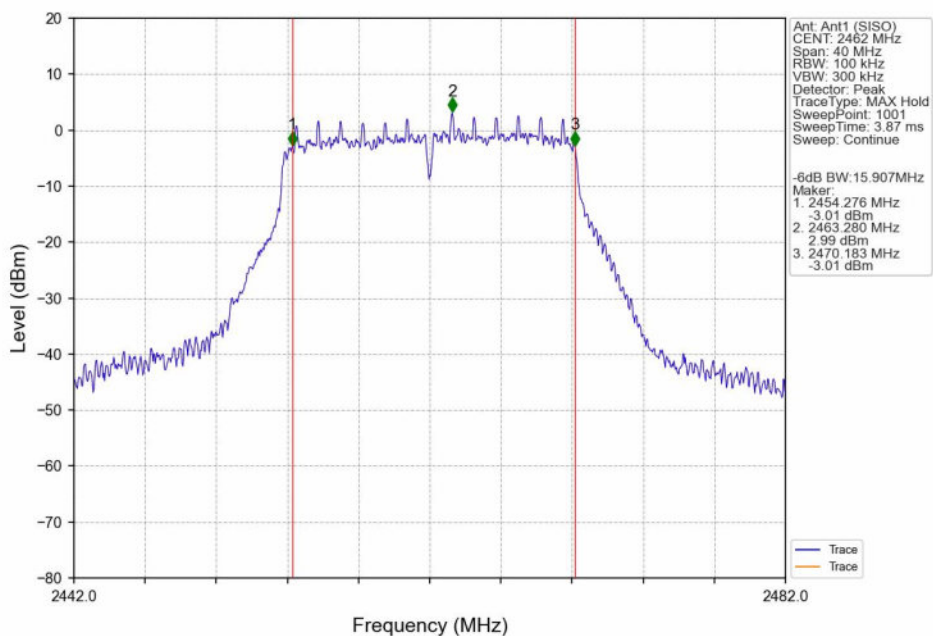


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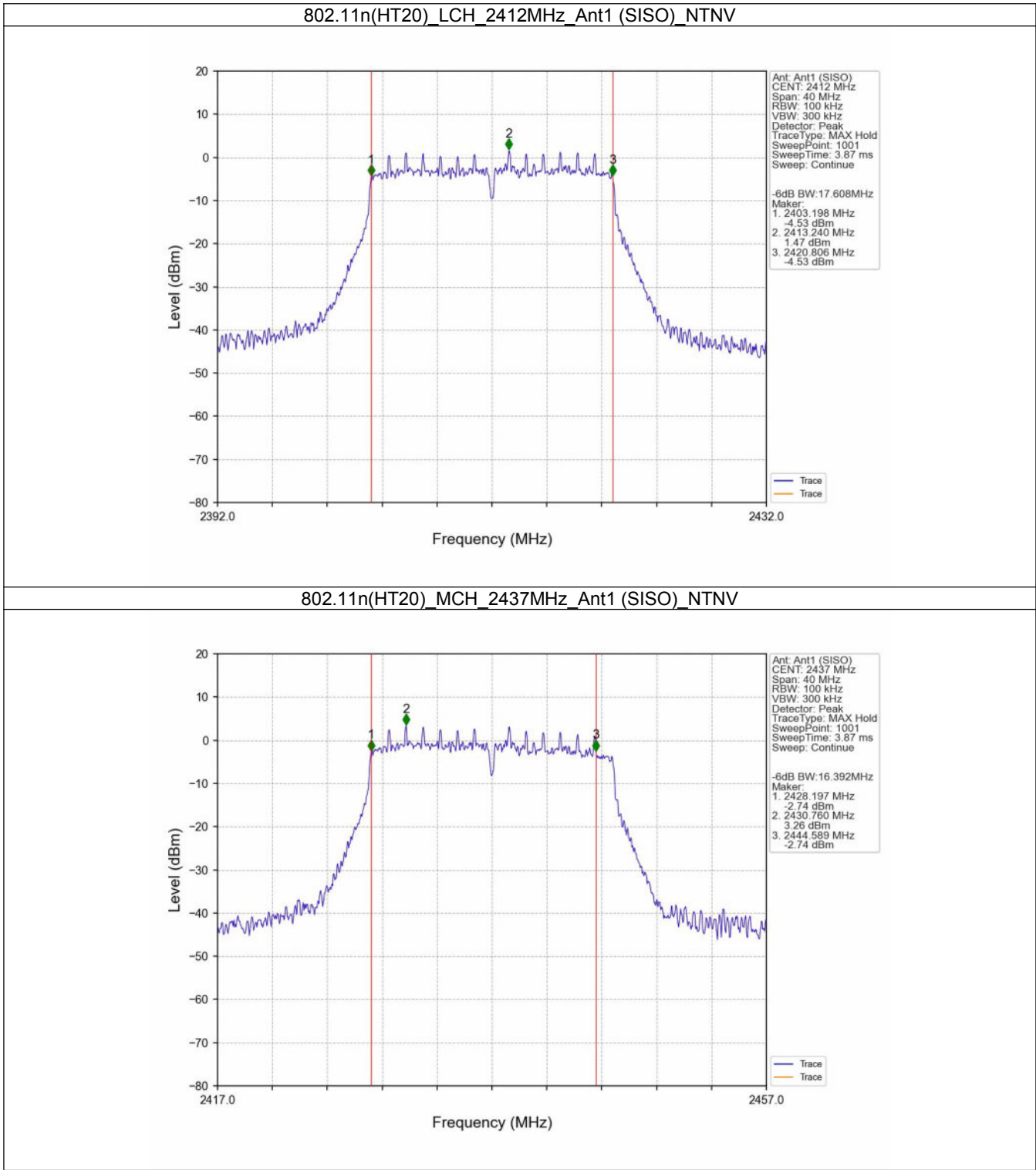
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV

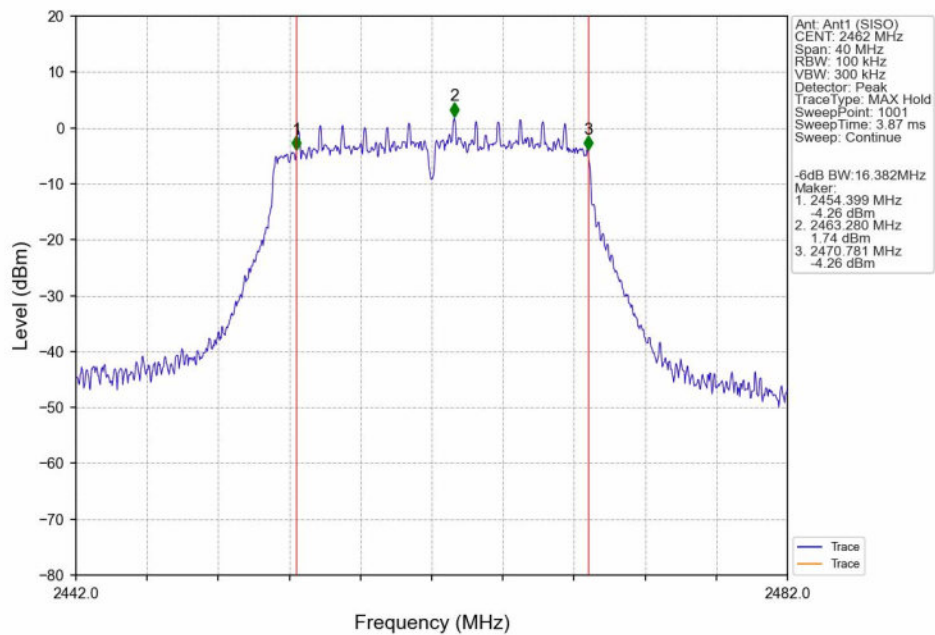


FCC ID: 2BD5N-SURFERS2

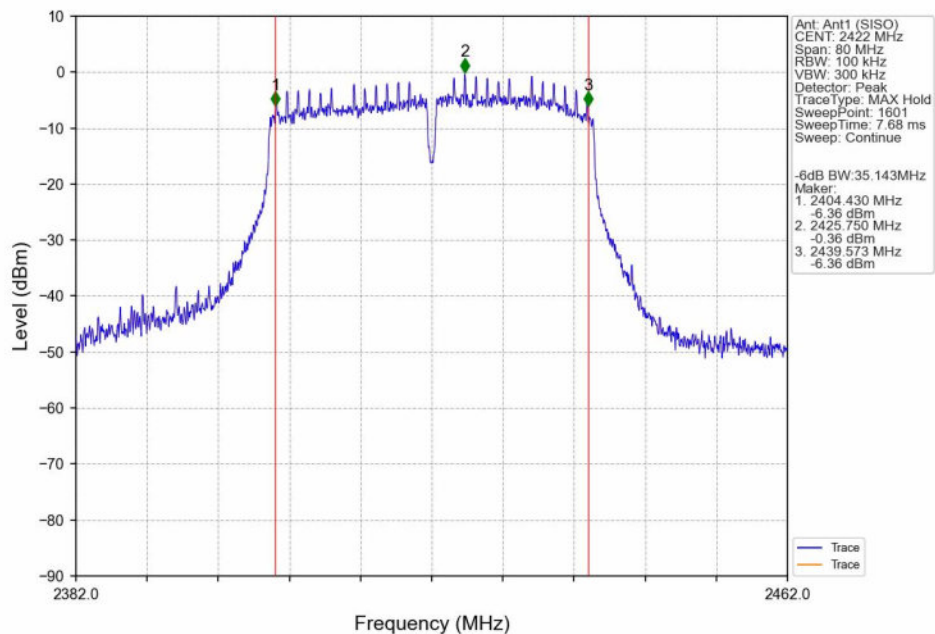


FCC ID: 2BD5N-SURFERS2

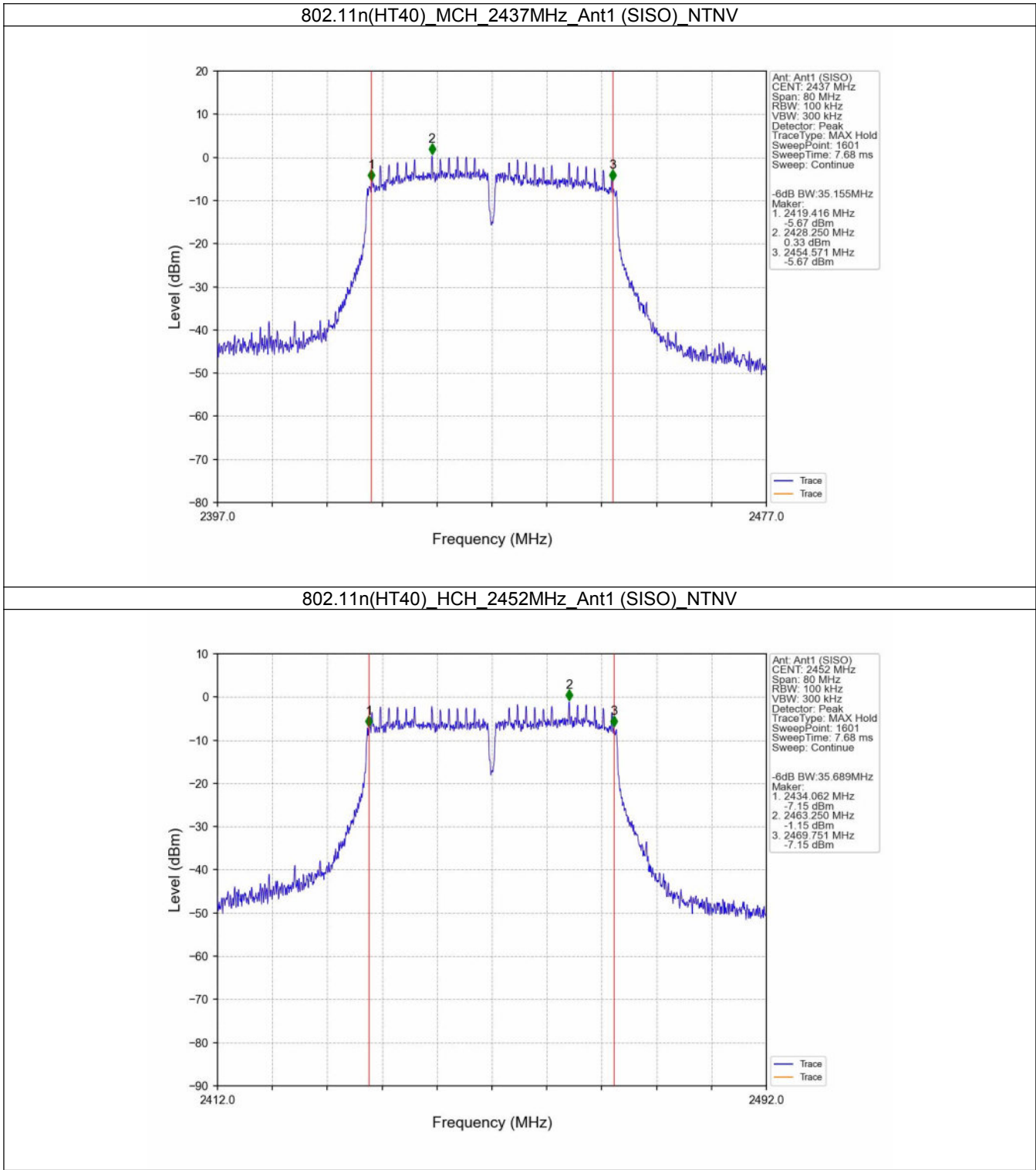
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



FCC ID: 2BD5N-SURFERS2



FCC ID: 2BD5N-SURFERS2

3. Maximum Conducted Output Power

3.1 Test Result

3.1.1 Power

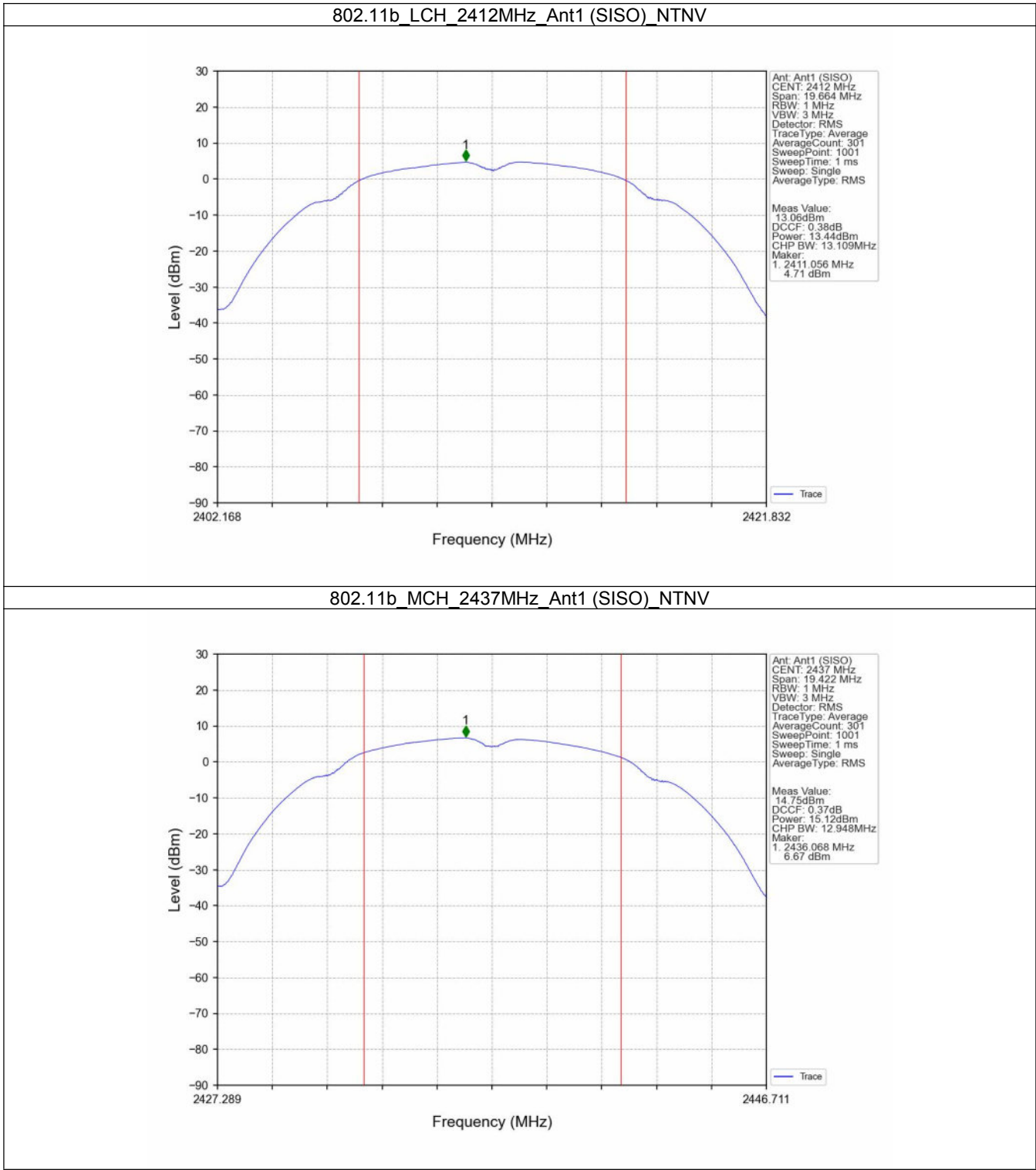
Mode	TX Type	Frequency (MHz)	Maximum Average Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
802.11b	SISO	2412	13.44	<=30	Pass
		2437	15.12	<=30	Pass
		2462	13.81	<=30	Pass
802.11g	SISO	2412	13.34	<=30	Pass
		2437	14.91	<=30	Pass
		2462	13.59	<=30	Pass
802.11n (HT20)	SISO	2412	12.41	<=30	Pass
		2437	13.86	<=30	Pass
		2462	12.36	<=30	Pass
802.11n (HT40)	SISO	2422	12.83	<=30	Pass
		2437	13.56	<=30	Pass
		2452	12.53	<=30	Pass

Note1: Antenna Gain: Ant1: 1.06dBi;

FCC ID: 2BD5N-SURFERS2

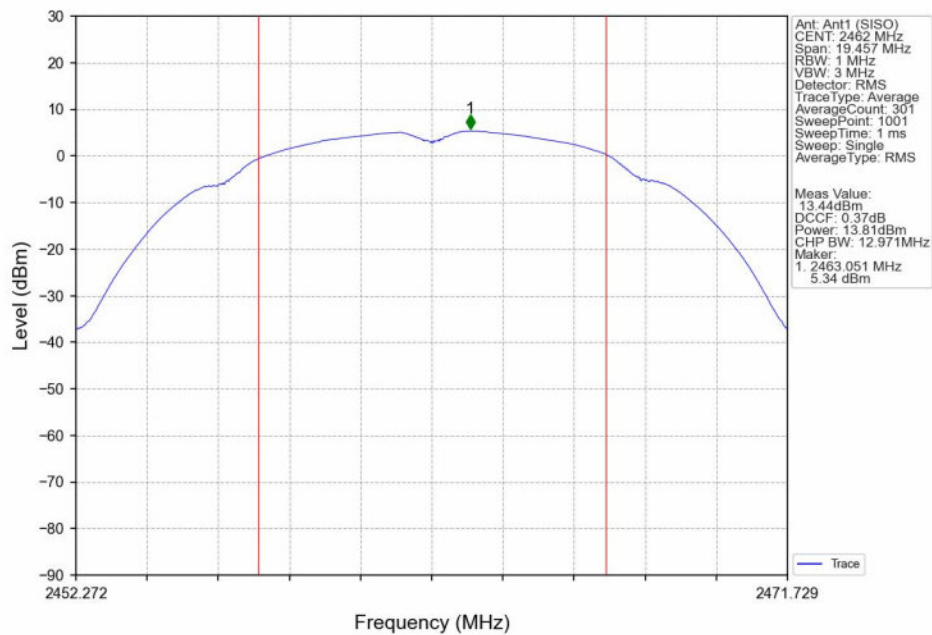
3.2 Test Graph

3.2.1 Power

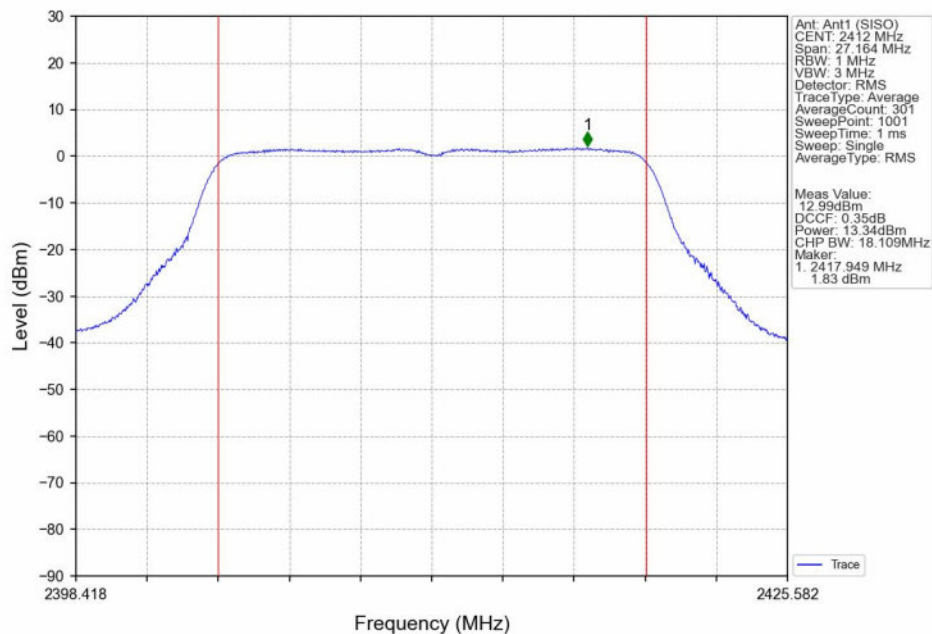


FCC ID: 2BD5N-SURFERS2

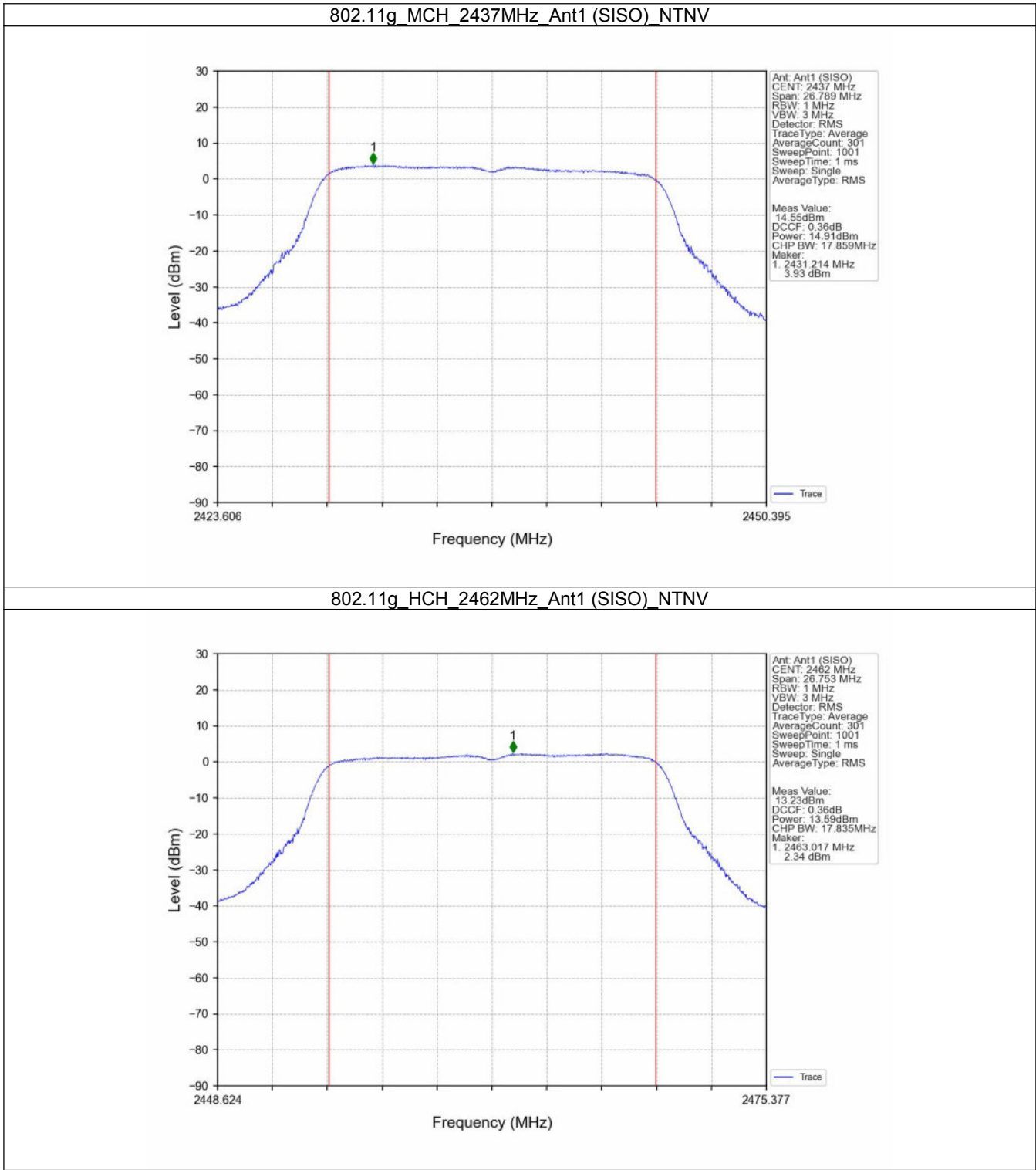
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV

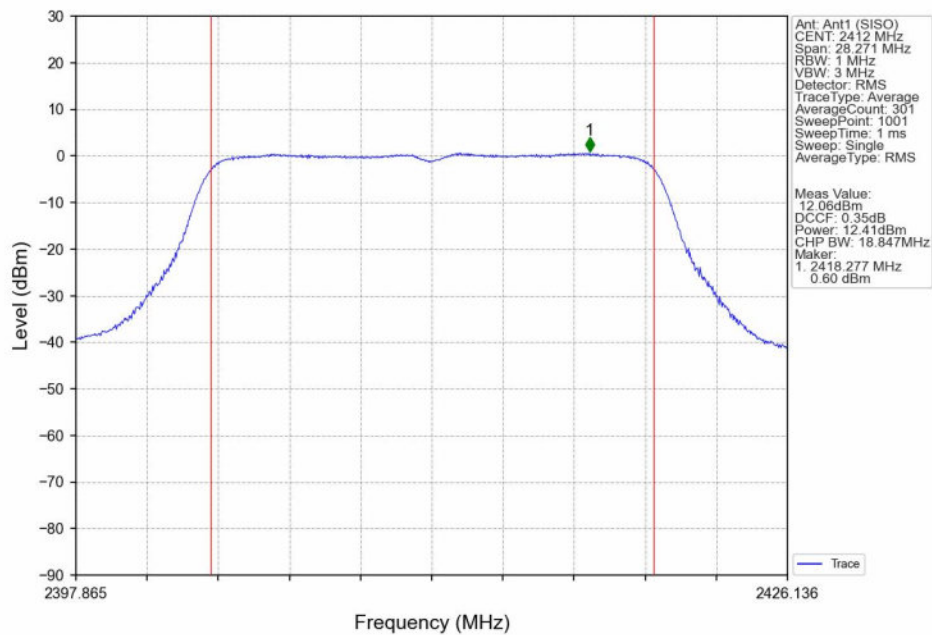


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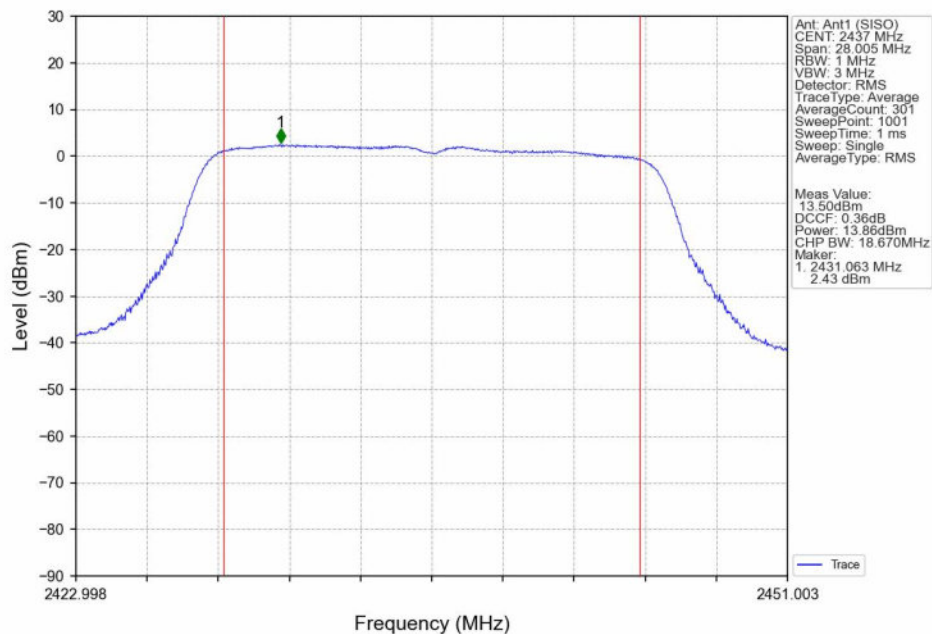


FCC ID: 2BD5N-SURFERS2

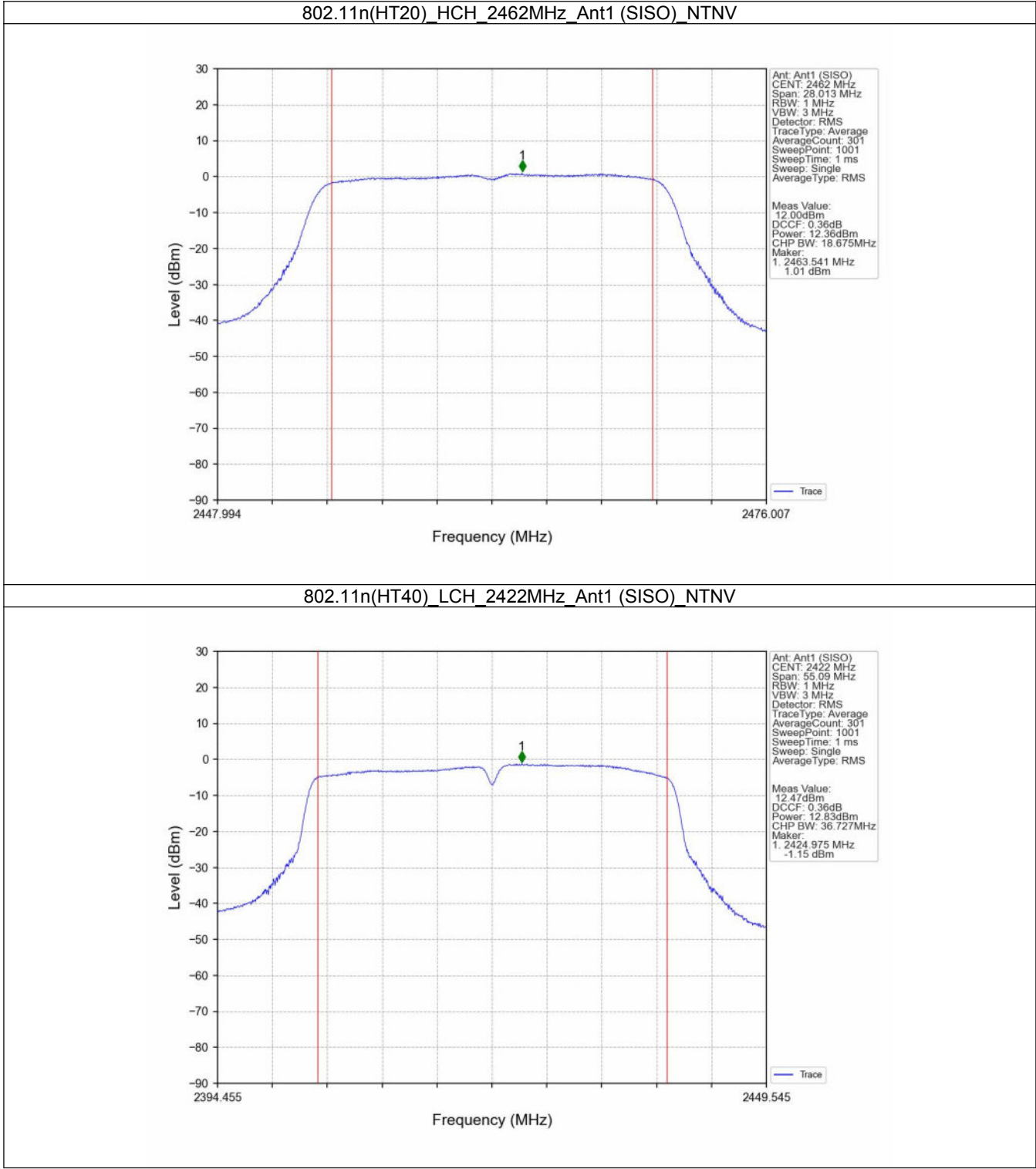
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV

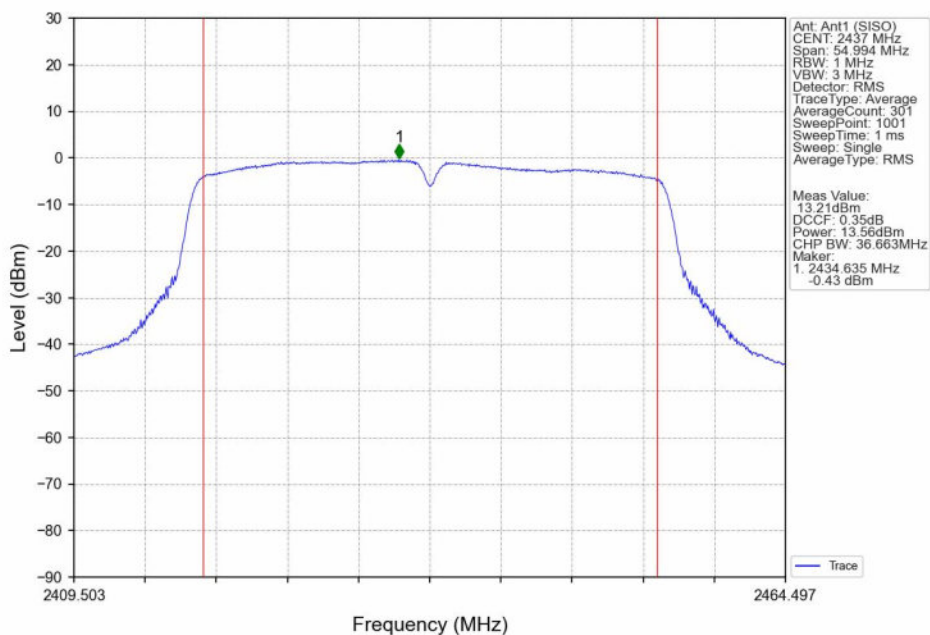


FCC ID: 2BD5N-SURFERS2

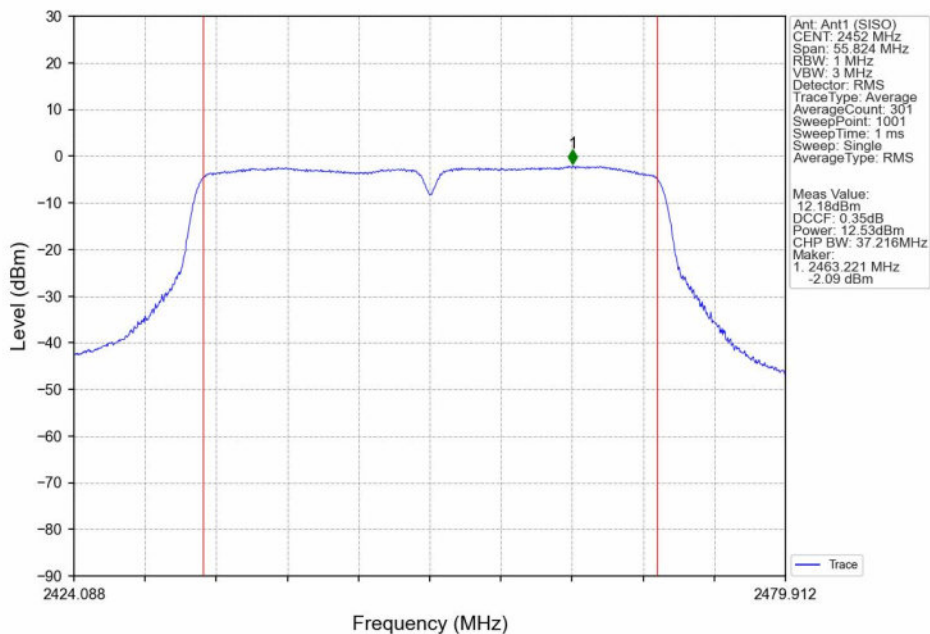


FCC ID: 2BD5N-SURFERS2

802.11n(HT40)_MCH_2437MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



FCC ID: 2BD5N-SURFERS2

4. Maximum Power Spectral Density

4.1 Test Result

4.1.1 PSD

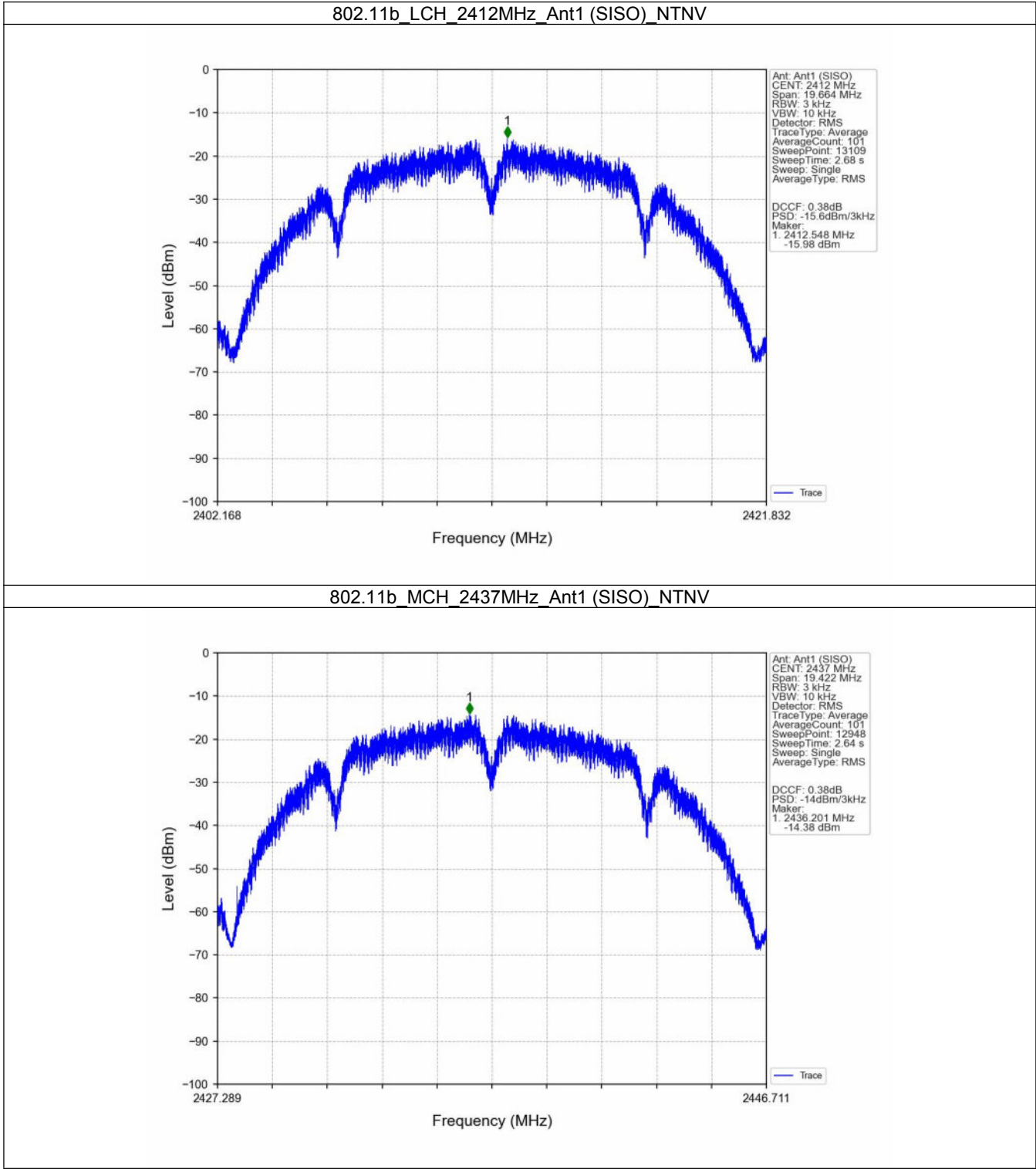
Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/3kHz)		Verdict
			ANT1	Limit	
802.11b	SISO	2412	-15.60	<=8	Pass
		2437	-14.00	<=8	Pass
		2462	-15.13	<=8	Pass
802.11g	SISO	2412	-16.47	<=8	Pass
		2437	-14.75	<=8	Pass
		2462	-15.94	<=8	Pass
802.11n (HT20)	SISO	2412	-16.77	<=8	Pass
		2437	-15.22	<=8	Pass
		2462	-17.02	<=8	Pass
802.11n (HT40)	SISO	2422	-18.28	<=8	Pass
		2437	-18.74	<=8	Pass
		2452	-19.48	<=8	Pass

Note1: Antenna Gain: Ant1: 1.06dBi;

FCC ID: 2BD5N-SURFERS2

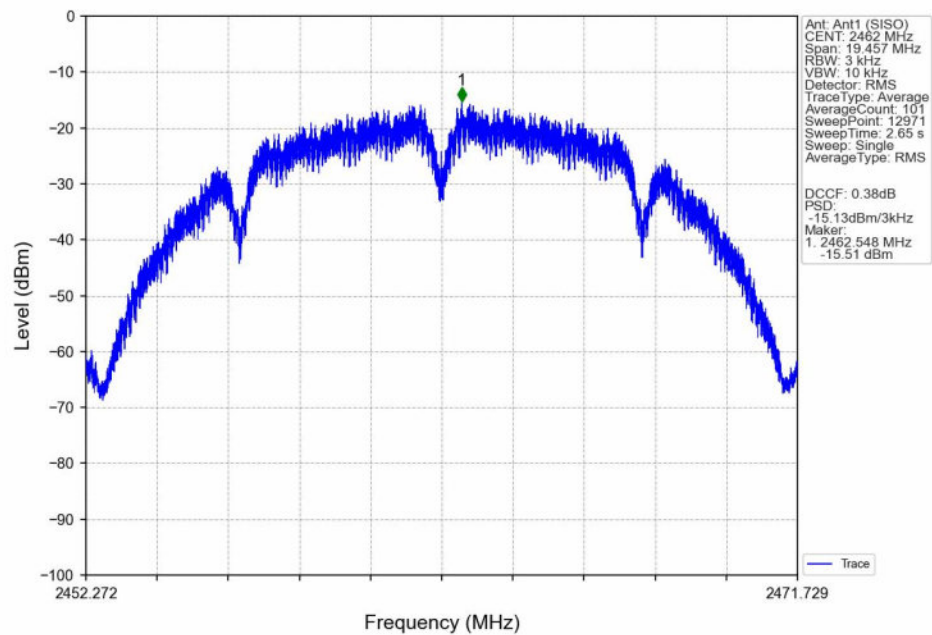
4.2 Test Graph

4.2.1 PSD

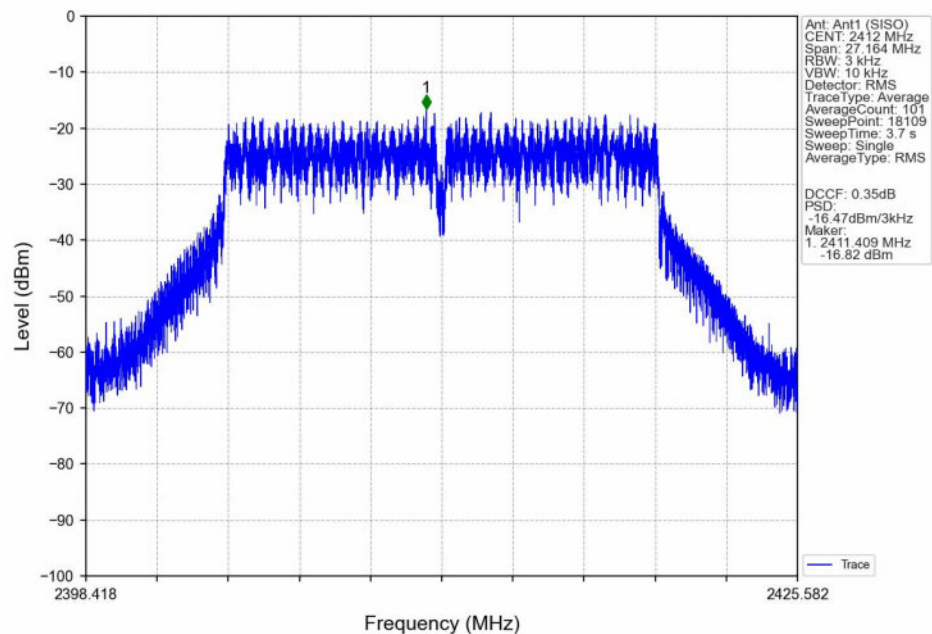


FCC ID: 2BD5N-SURFERS2

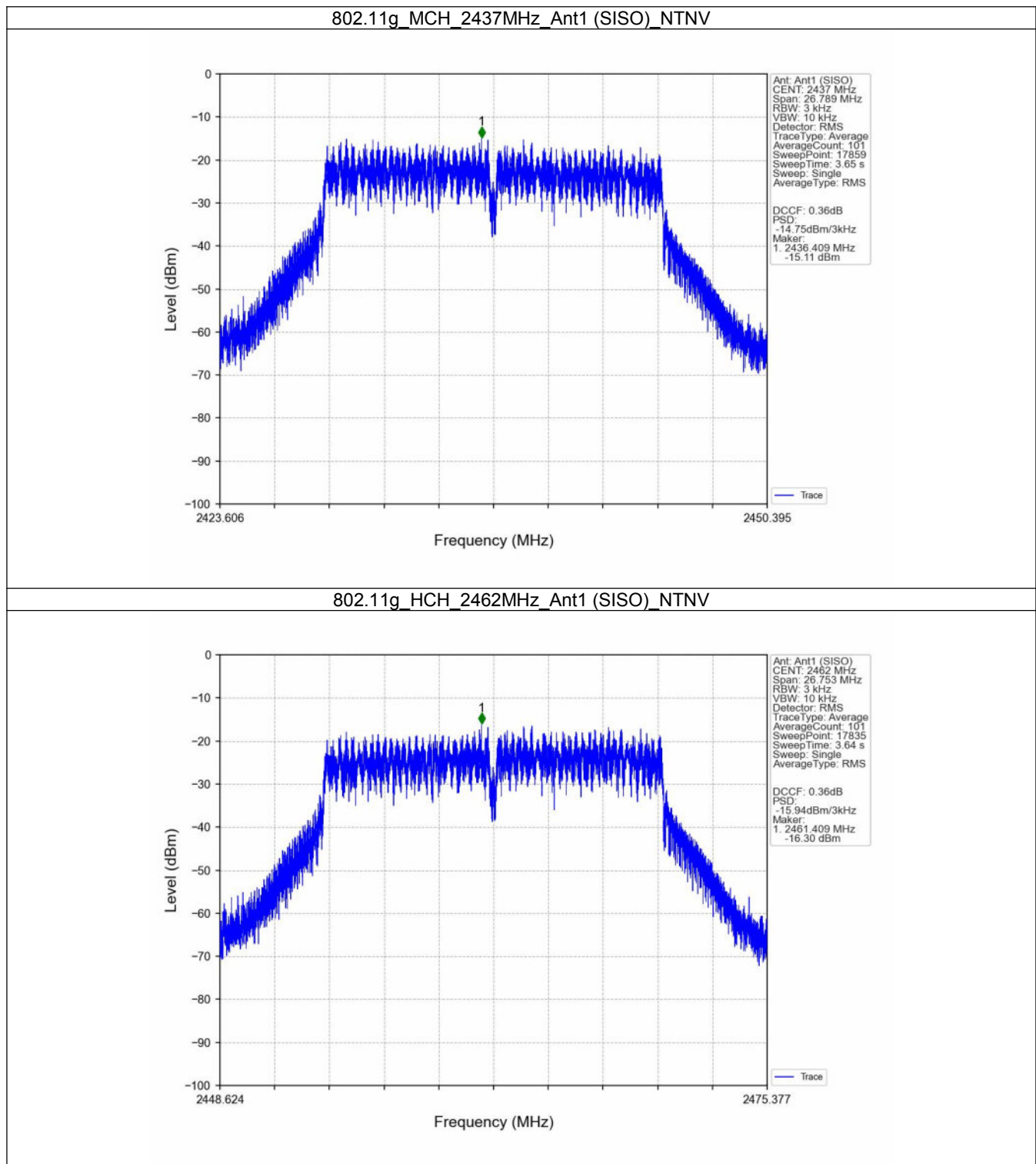
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV

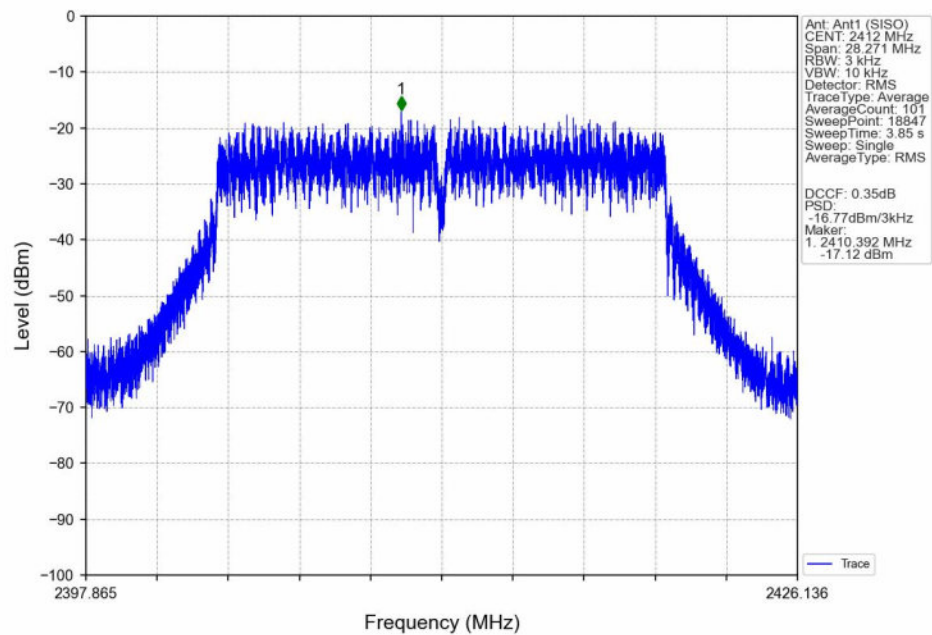


FCC ID: 2BD5N-SURFERS2

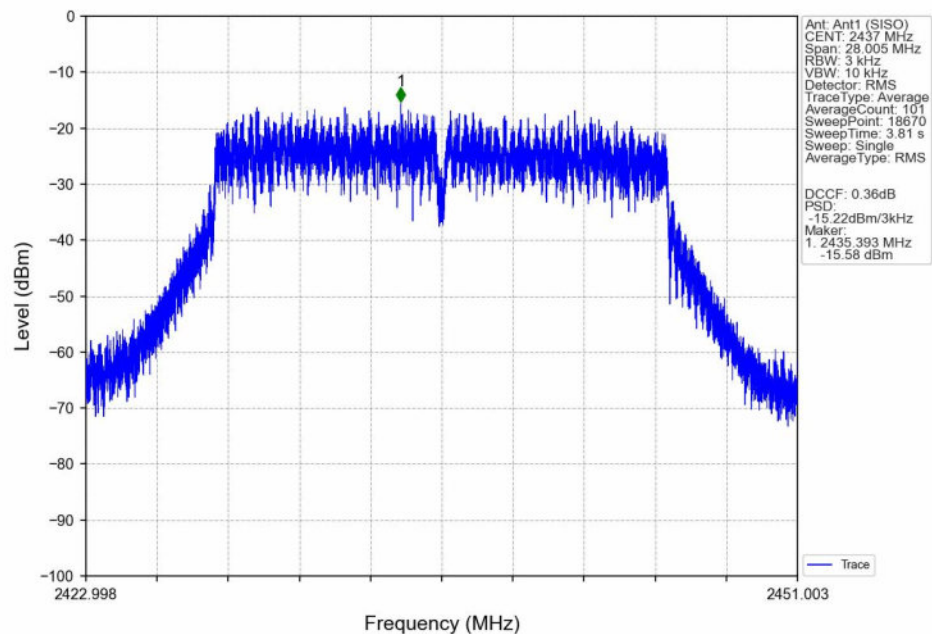


FCC ID: 2BD5N-SURFERS2

802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV

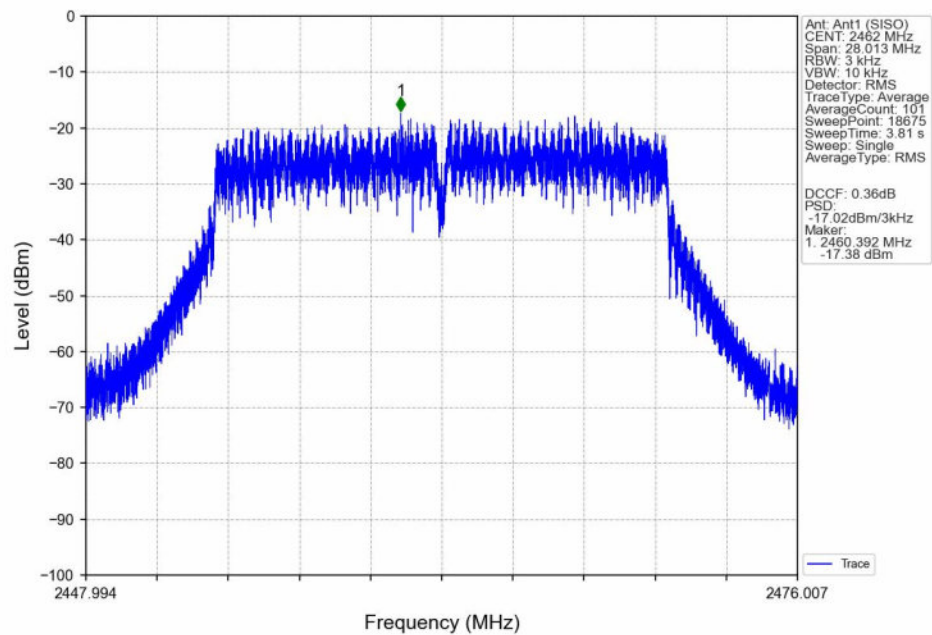


802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV

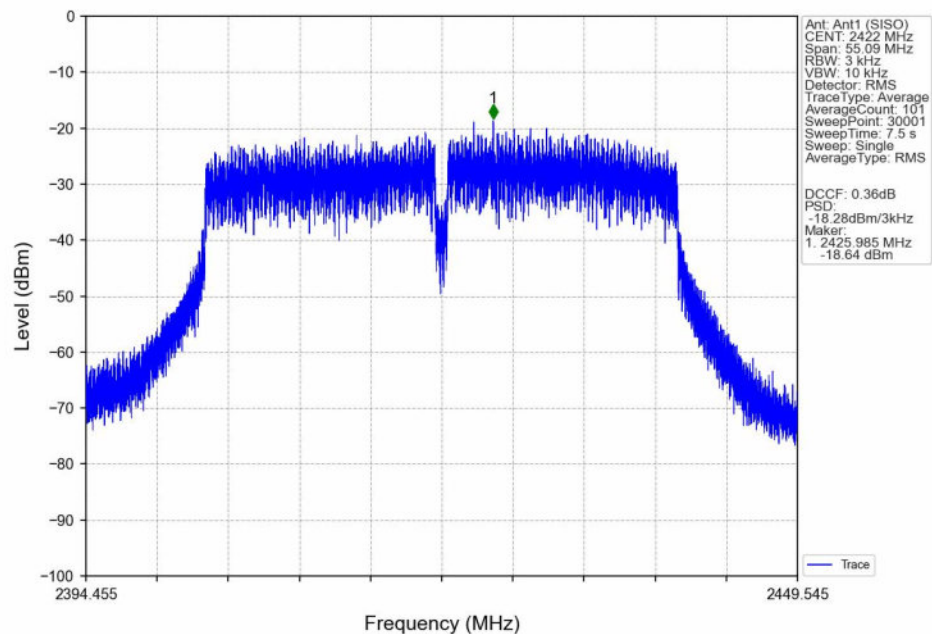


FCC ID: 2BD5N-SURFERS2

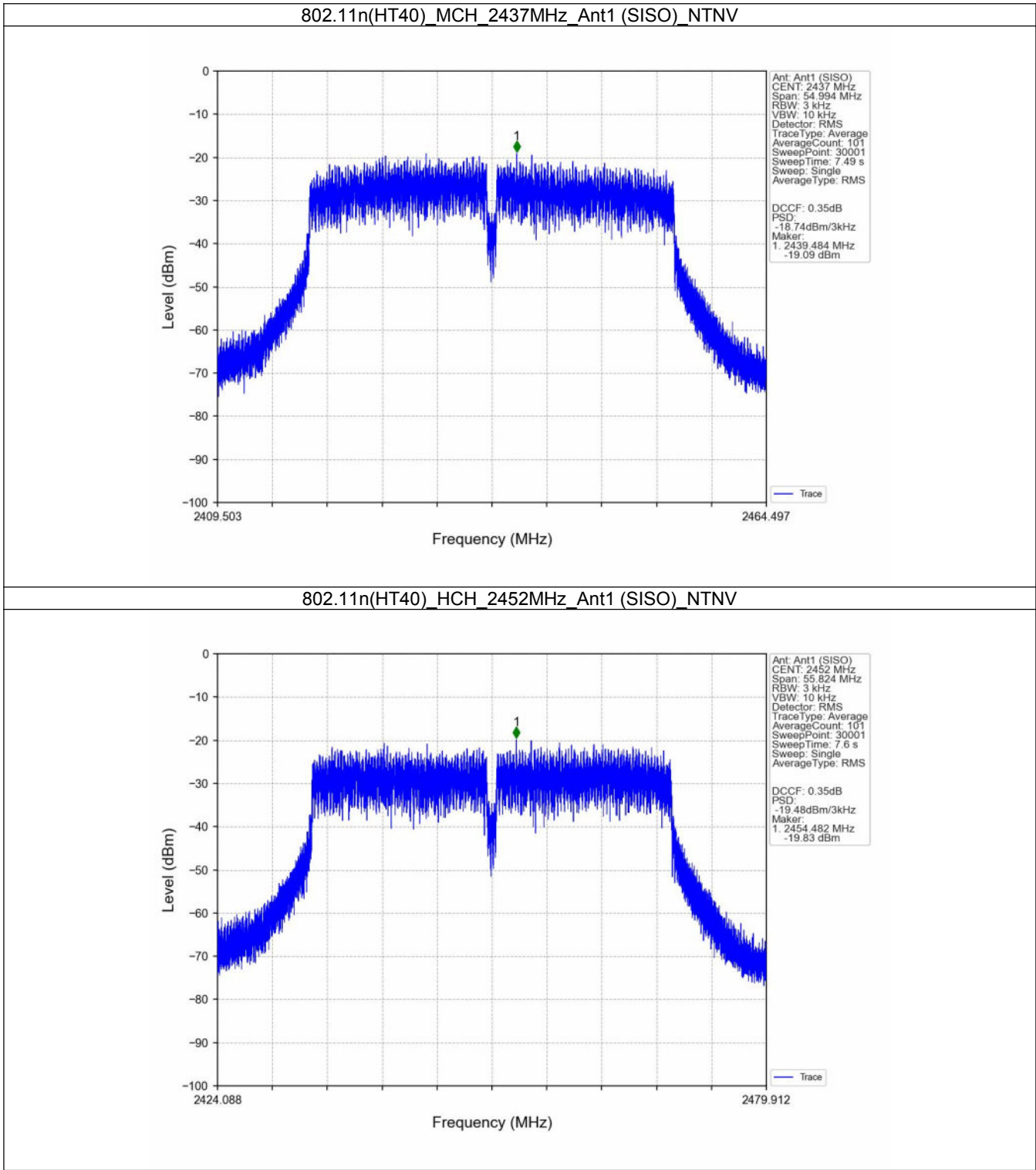
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



FCC ID: 2BD5N-SURFERS2



5. Unwanted Emissions In Non-restricted Frequency Bands

5.1 Test Result

5.1.1 Ref

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)
802.11b	SISO	2412	1	4.66
		2437	1	6.37
		2462	1	5.17
802.11g	SISO	2412	1	2.34
		2437	1	4.18
		2462	1	2.78
802.11n (HT20)	SISO	2412	1	1.51
		2437	1	3.20
		2462	1	1.82
802.11n (HT40)	SISO	2422	1	-0.18
		2437	1	0.32
		2452	1	-1.05

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.

5.1.2 CSE

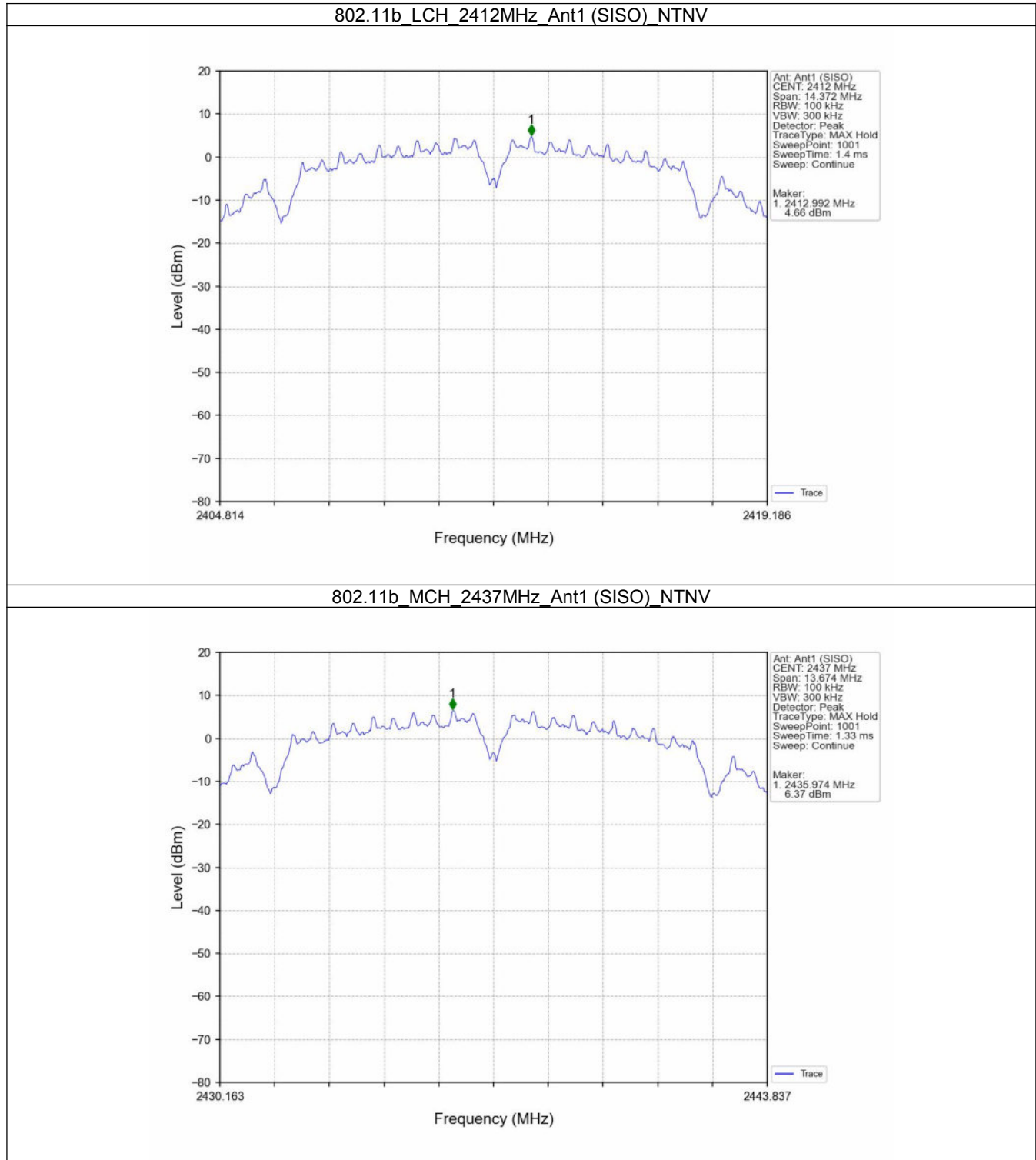
Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
802.11b	SISO	2412	1	6.37	-23.63	Pass
		2437	1	6.37	-23.63	Pass
		2462	1	6.37	-23.63	Pass
802.11g	SISO	2412	1	4.18	-25.82	Pass
		2437	1	4.18	-25.82	Pass
		2462	1	4.18	-25.82	Pass
802.11n (HT20)	SISO	2412	1	3.20	-26.80	Pass
		2437	1	3.20	-26.80	Pass
		2462	1	3.20	-26.80	Pass
802.11n (HT40)	SISO	2422	1	0.32	-29.68	Pass
		2437	1	0.32	-29.68	Pass
		2452	1	0.32	-29.68	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.

FCC ID: 2BD5N-SURFERS2

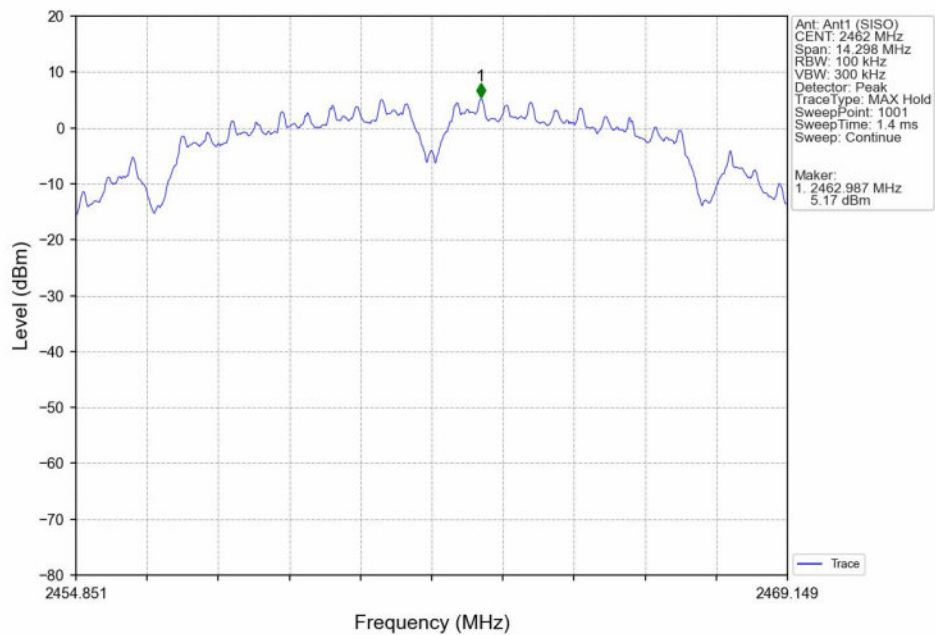
5.2 Test Graph

5.2.1 Ref

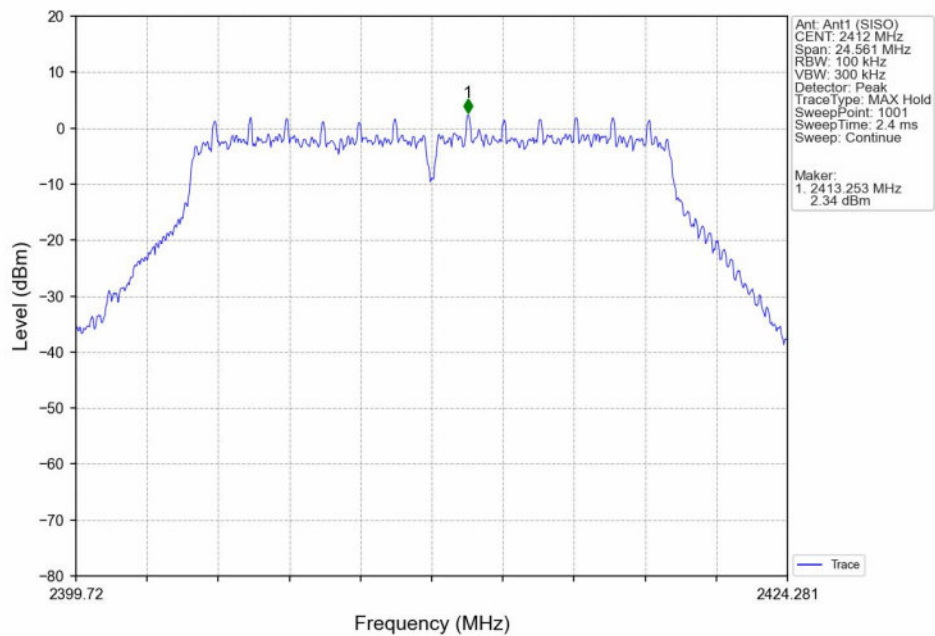


FCC ID: 2BD5N-SURFERS2

802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV

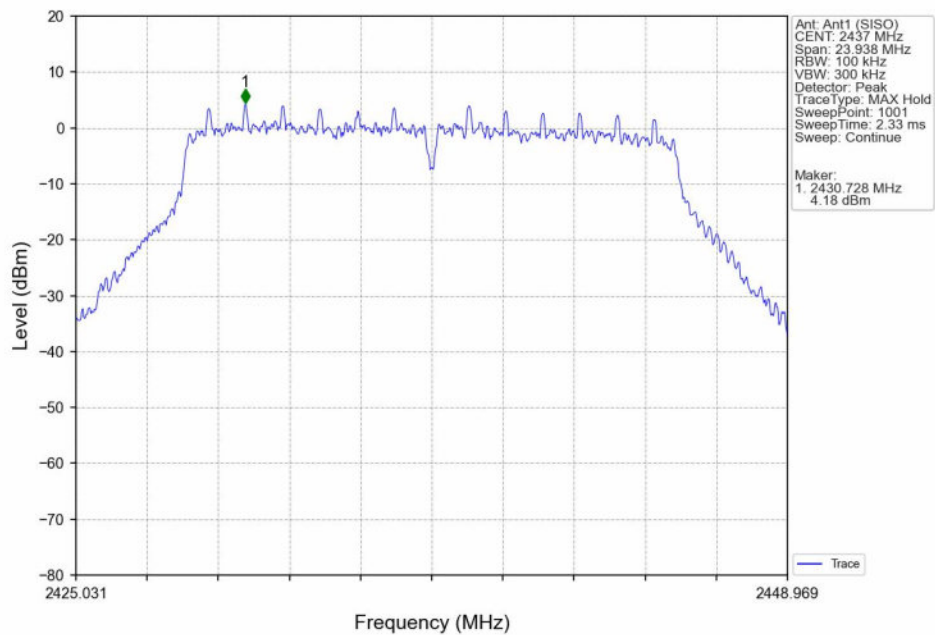


802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV

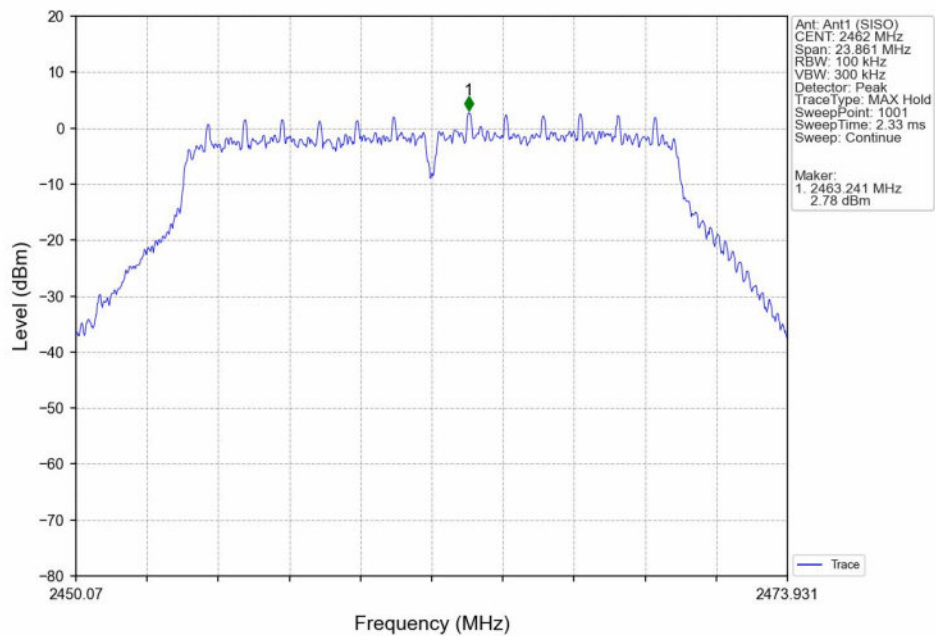


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802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV

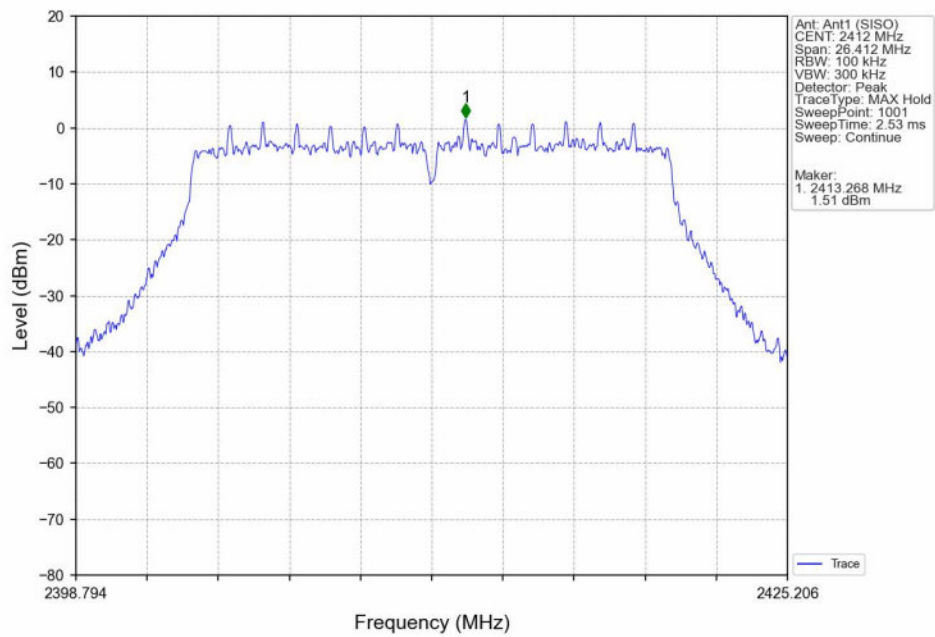


802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV

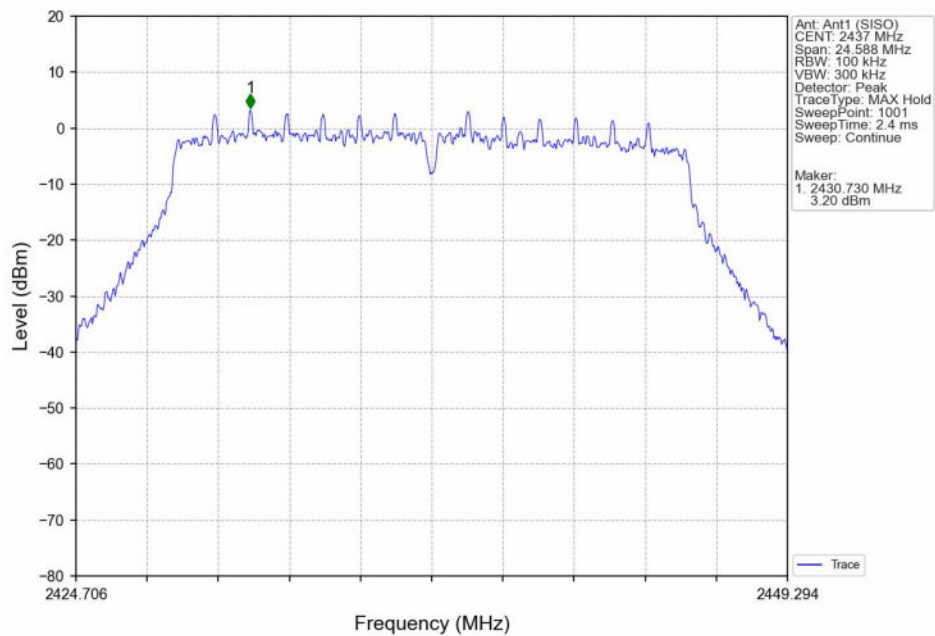


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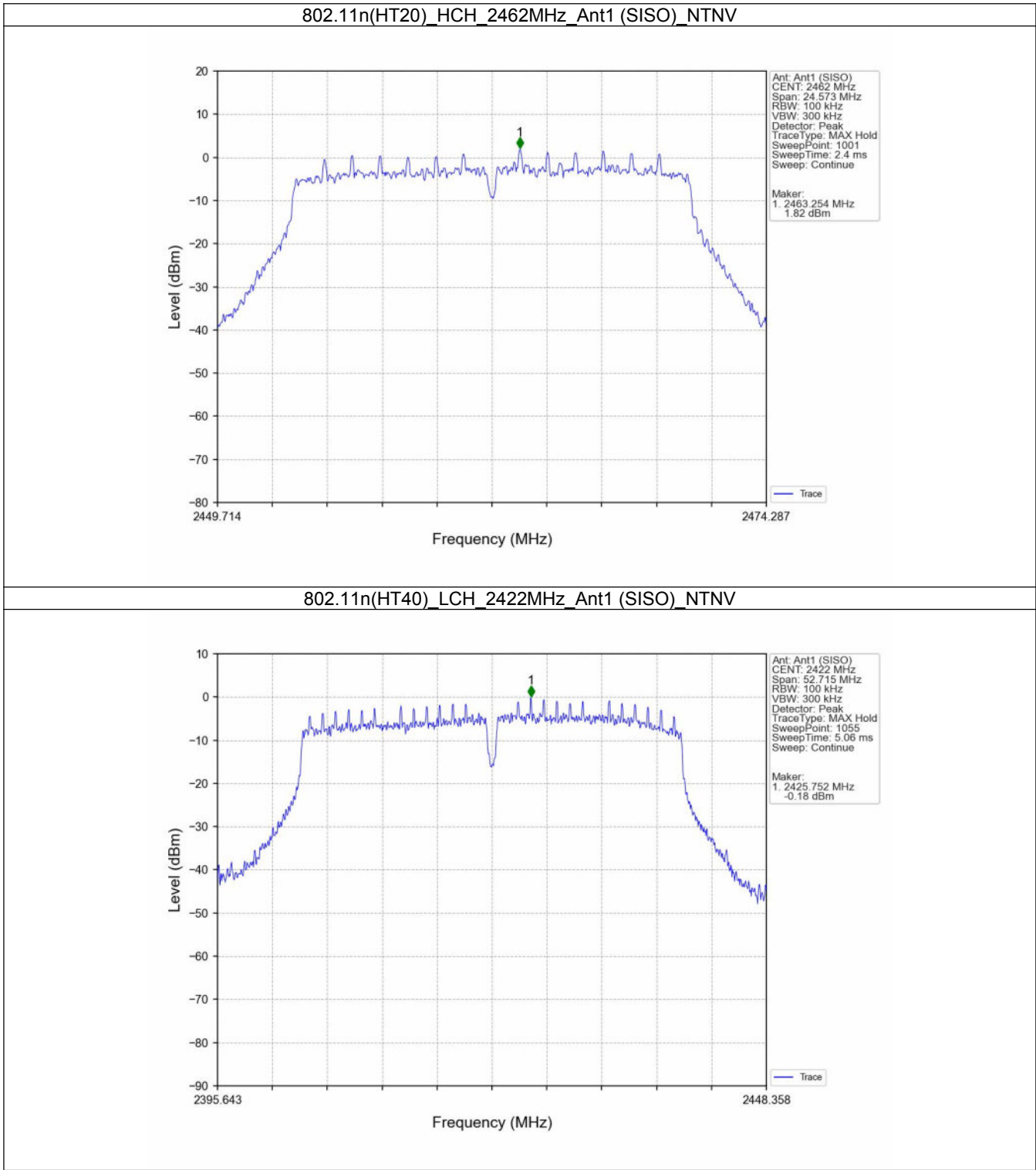
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV

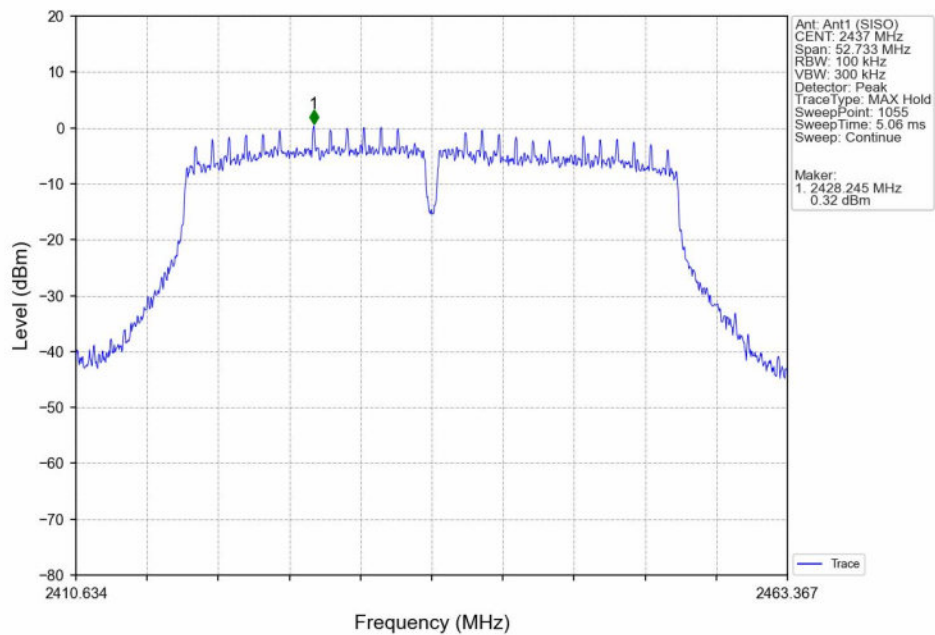


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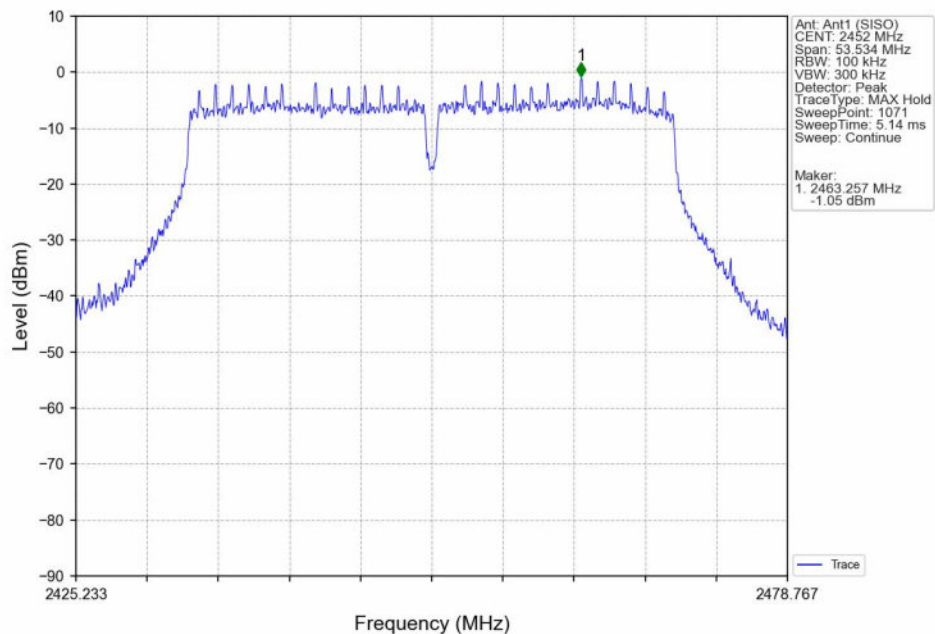


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802.11n(HT40)_MCH_2437MHz_Ant1 (SISO)_NTNV

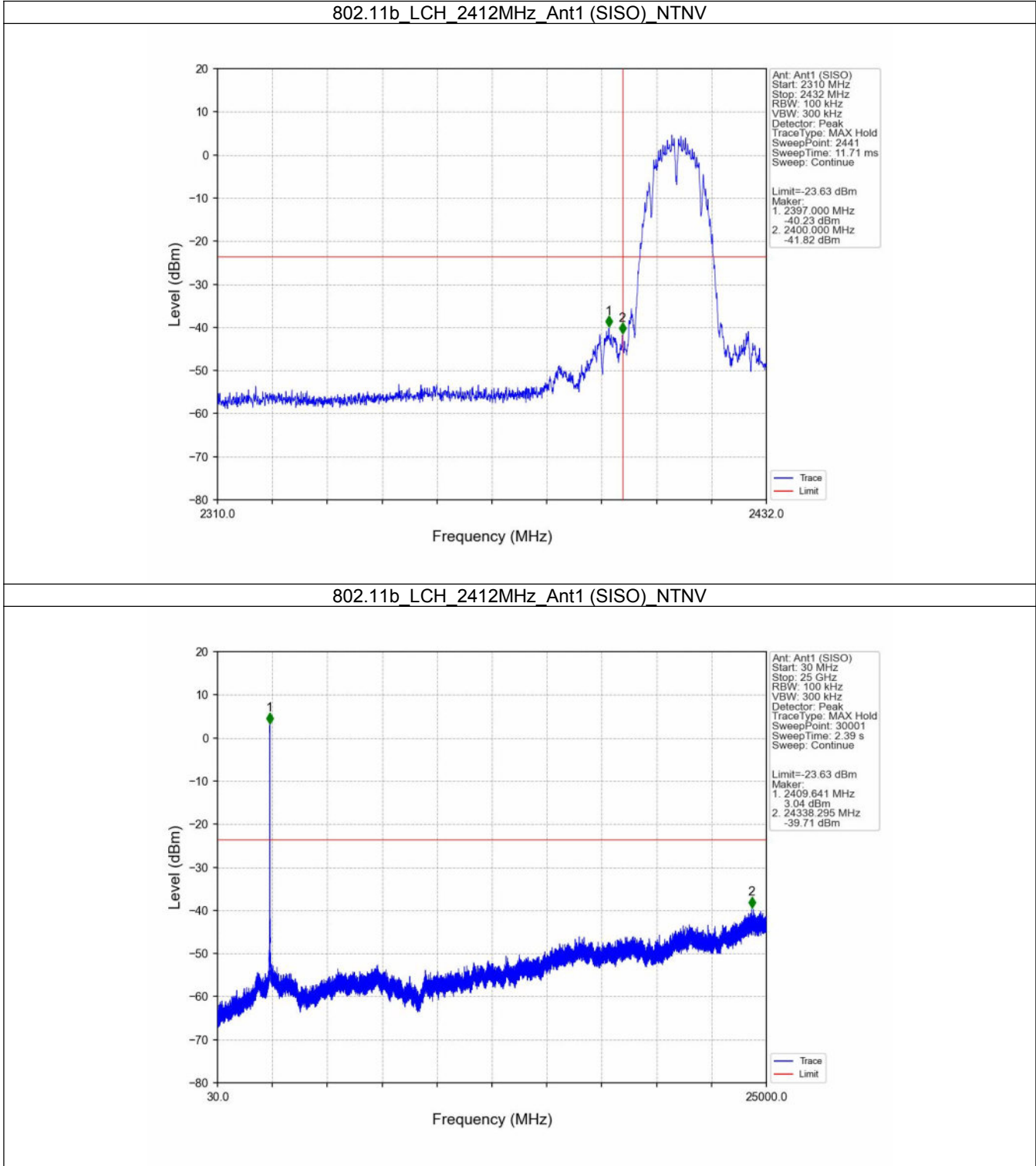


802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV

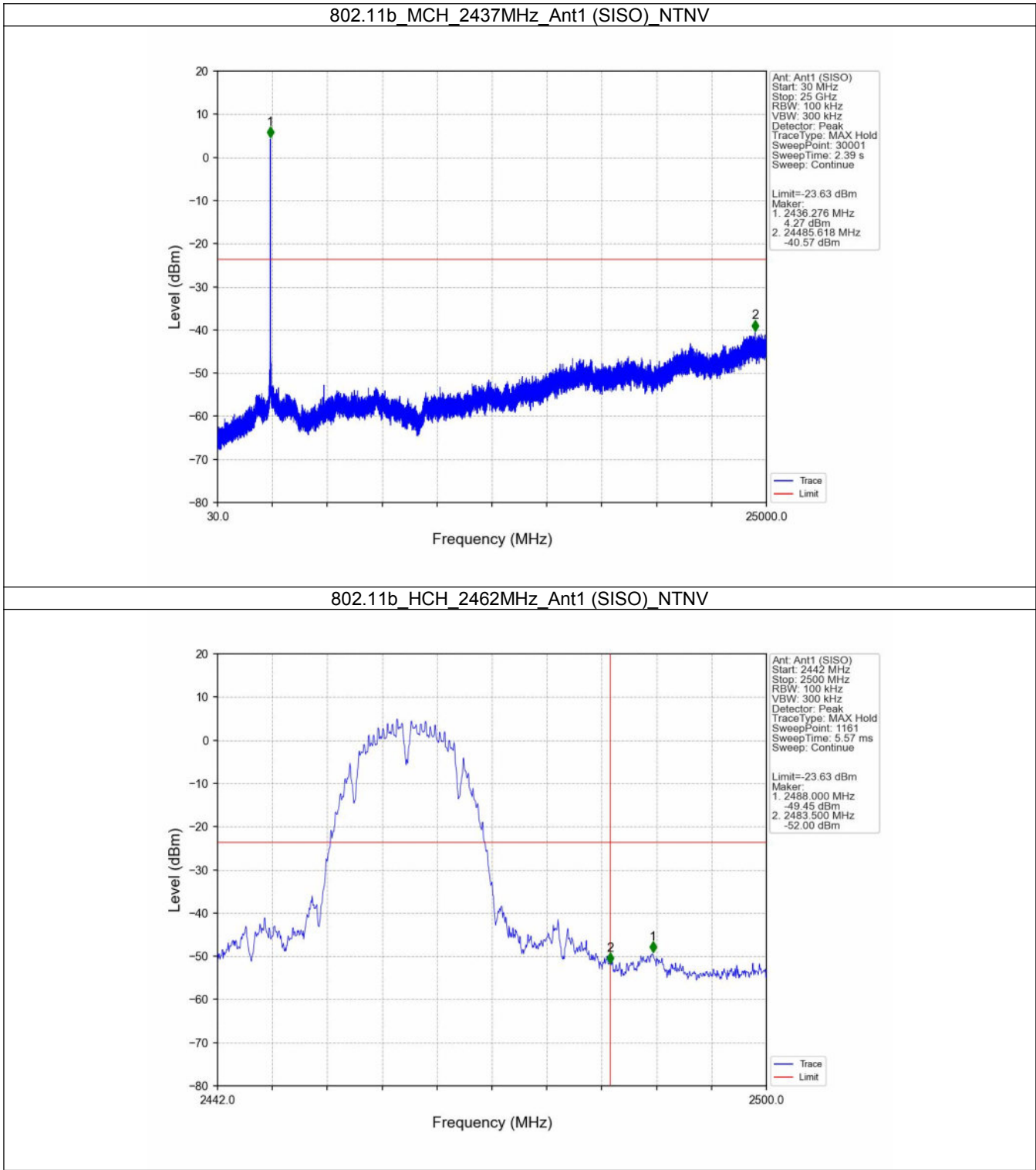


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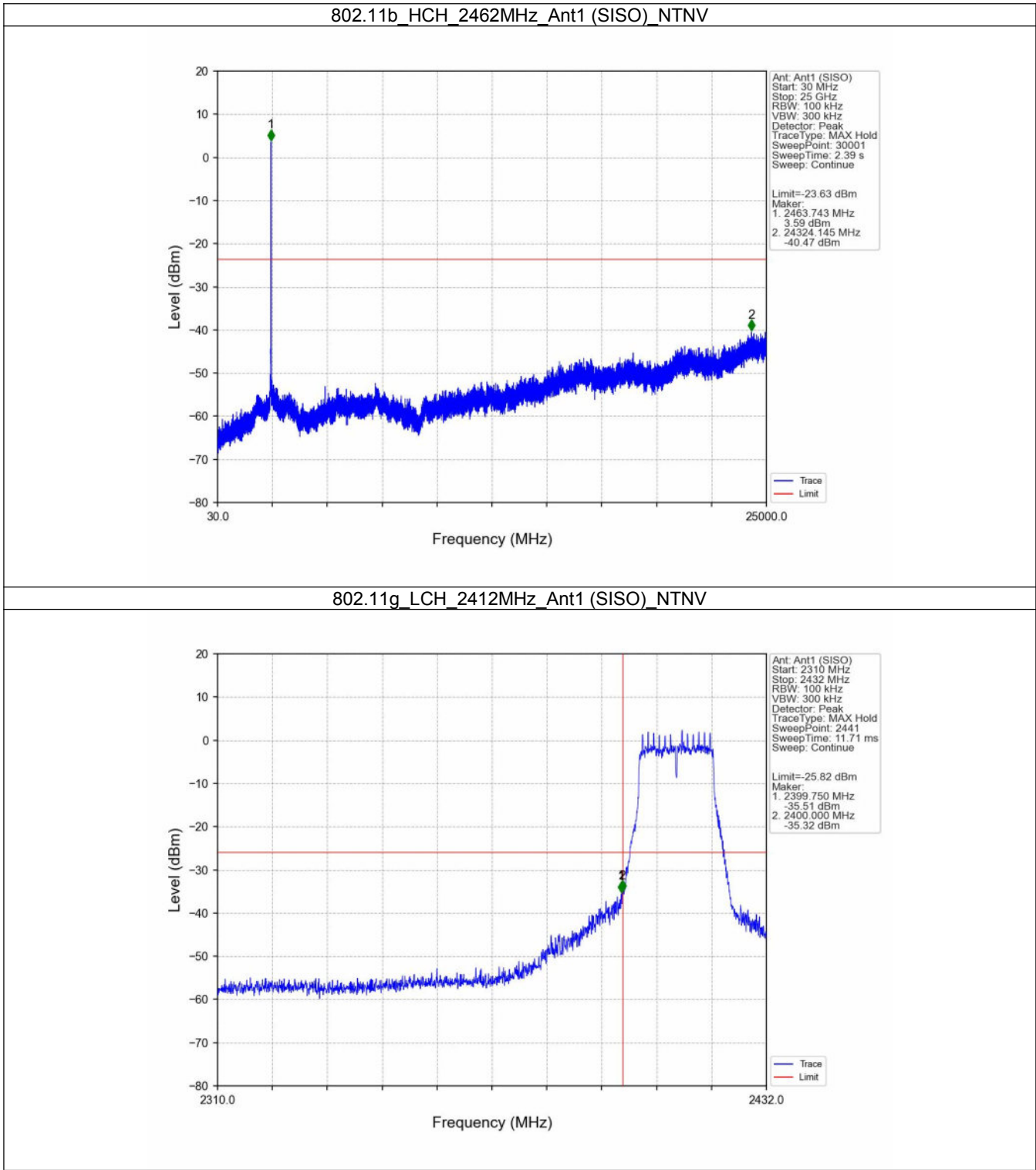
5.2.2 CSE



FCC ID: 2BD5N-SURFERS2

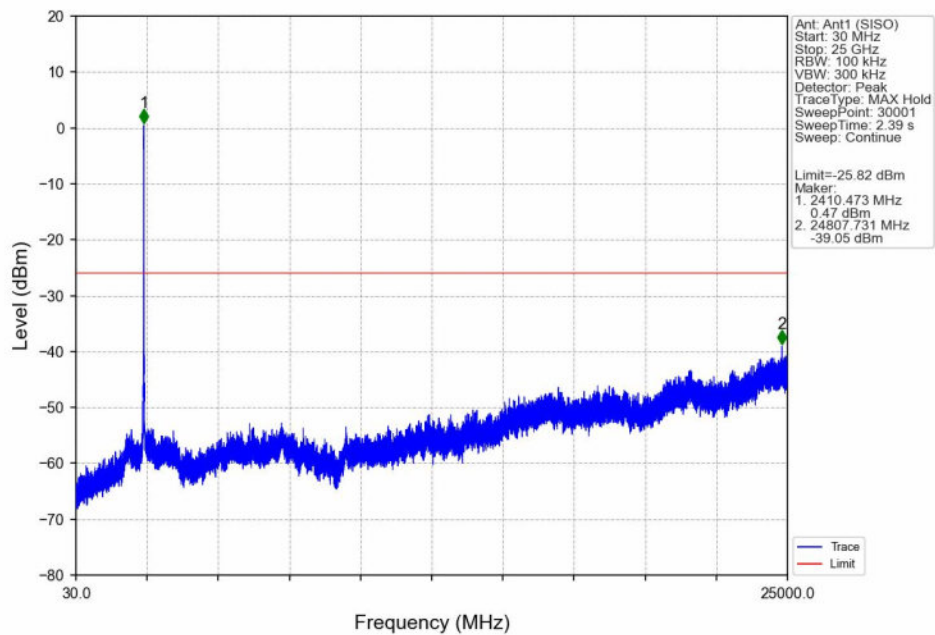


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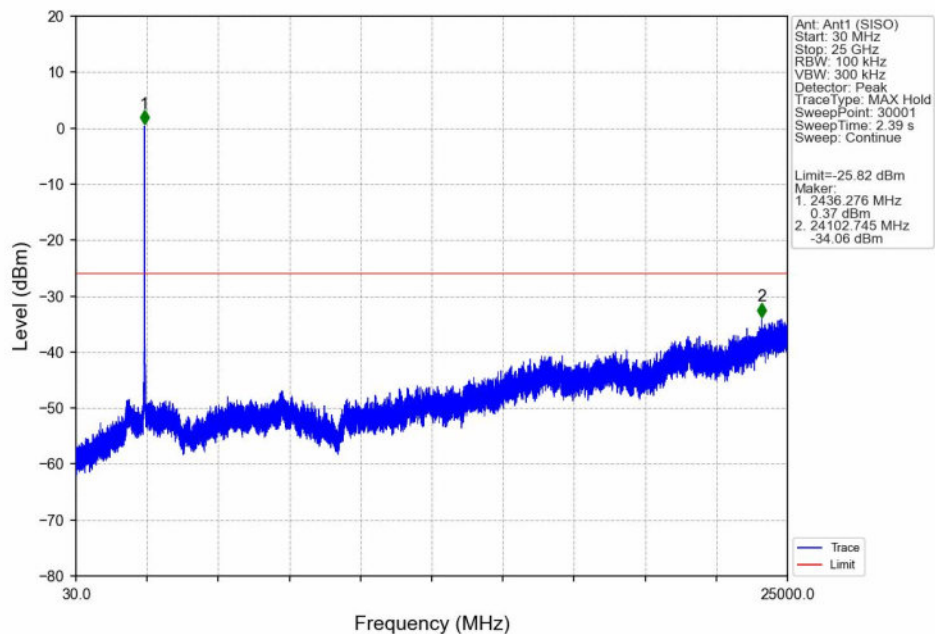


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802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV

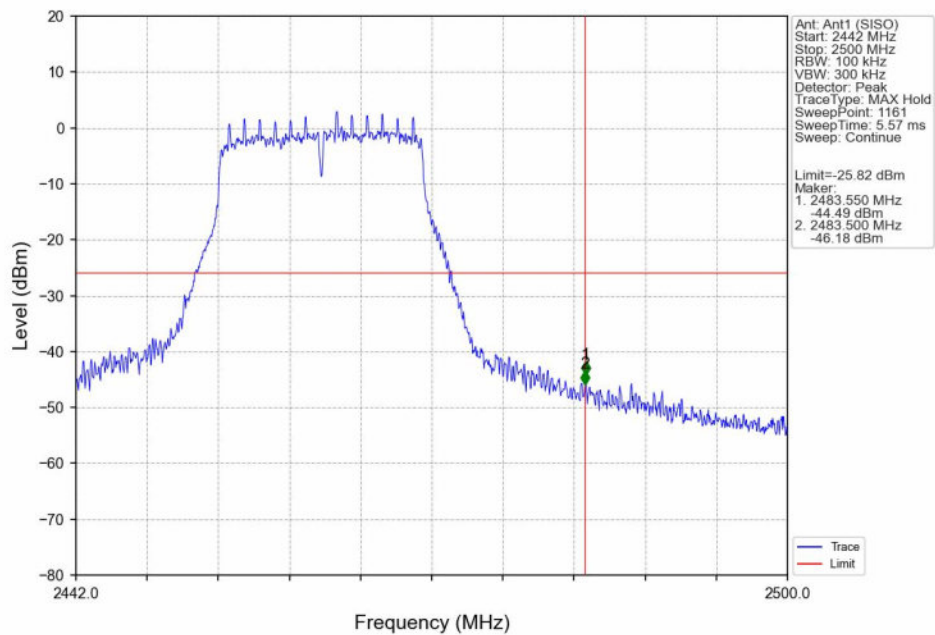


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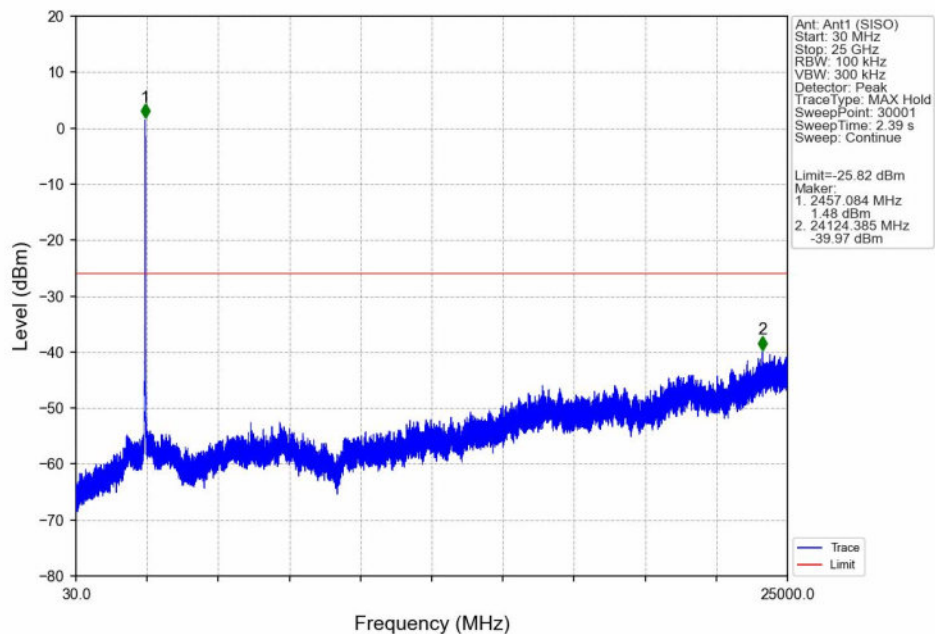


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802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV

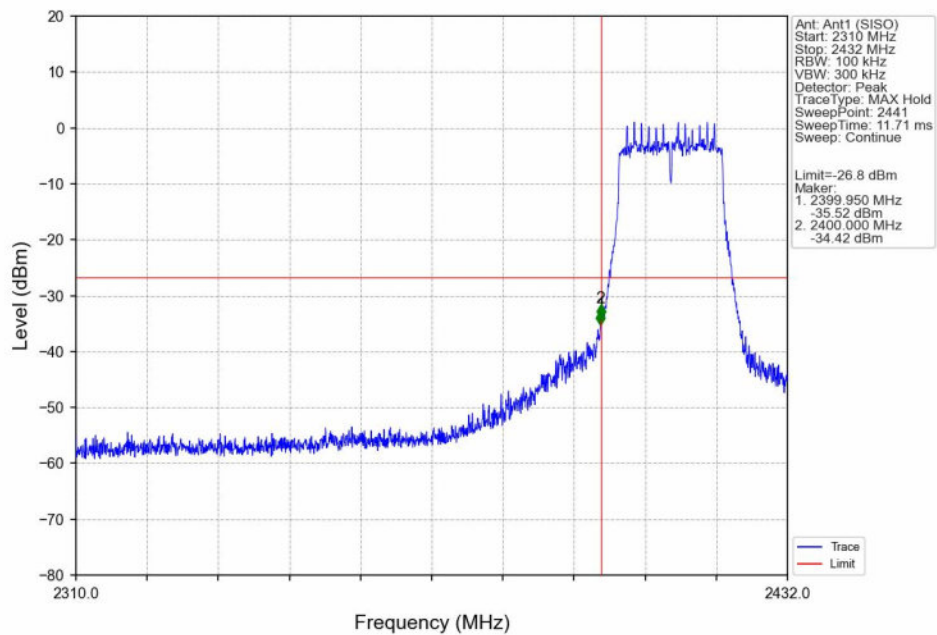


802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV

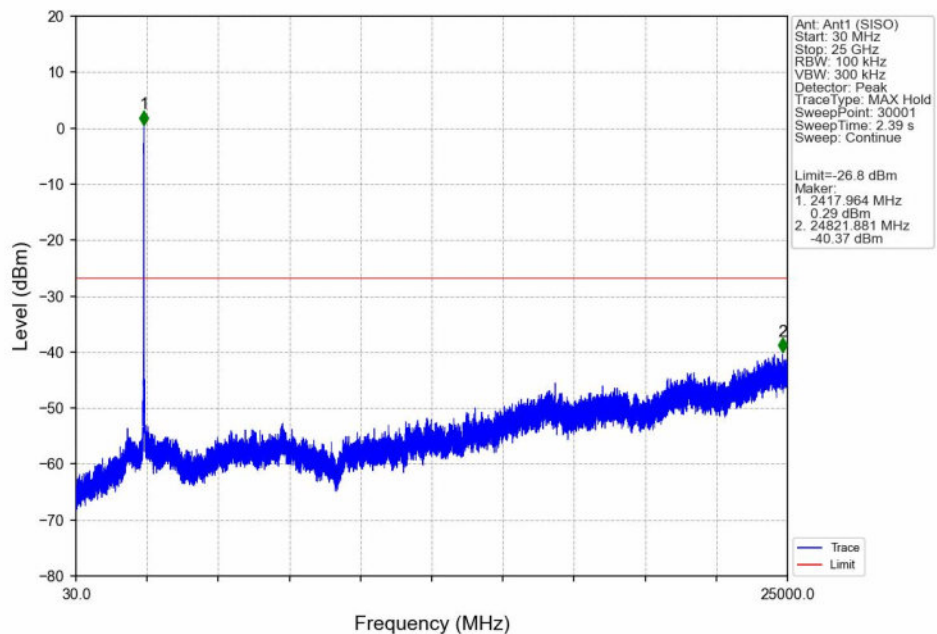


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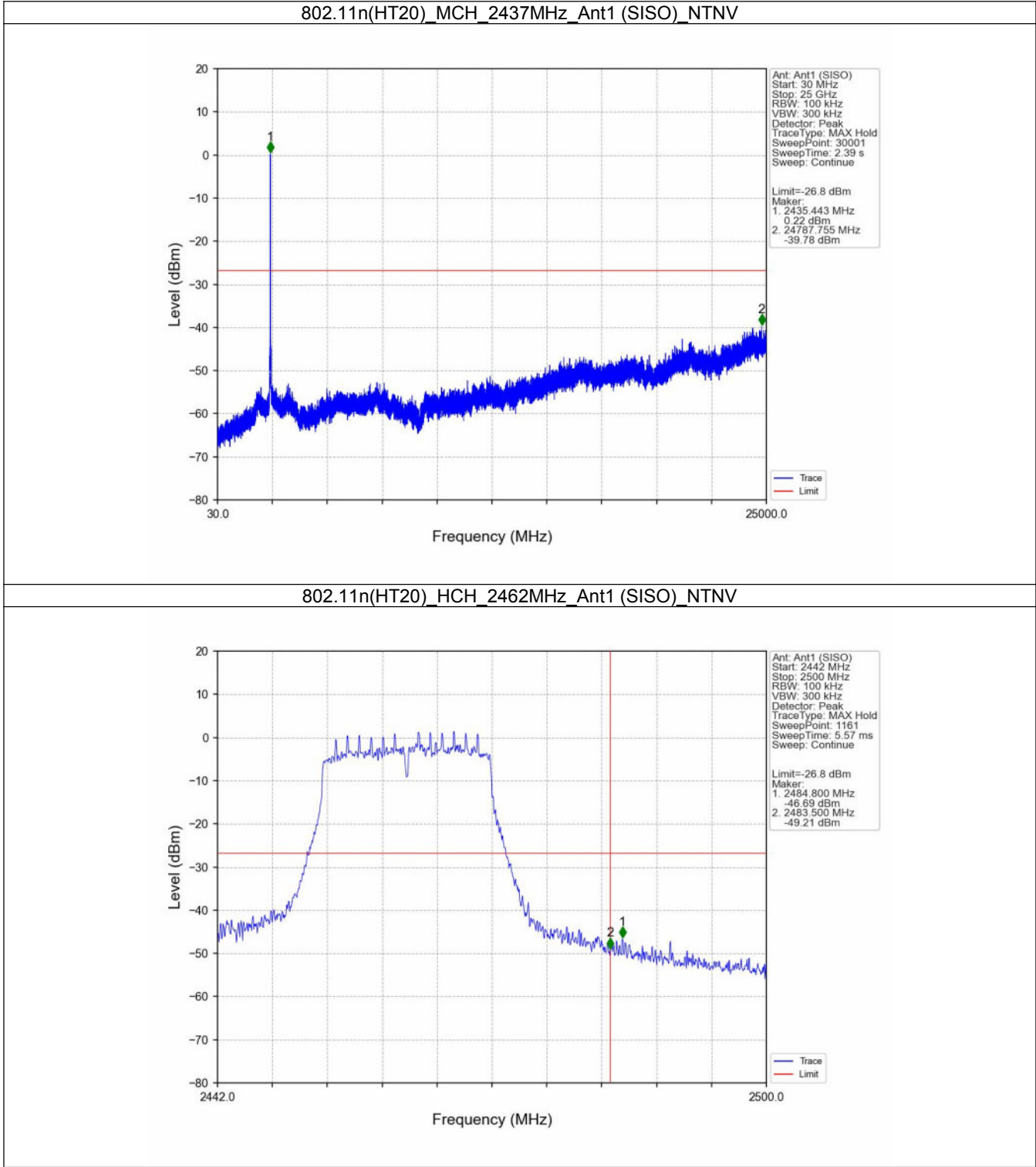
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



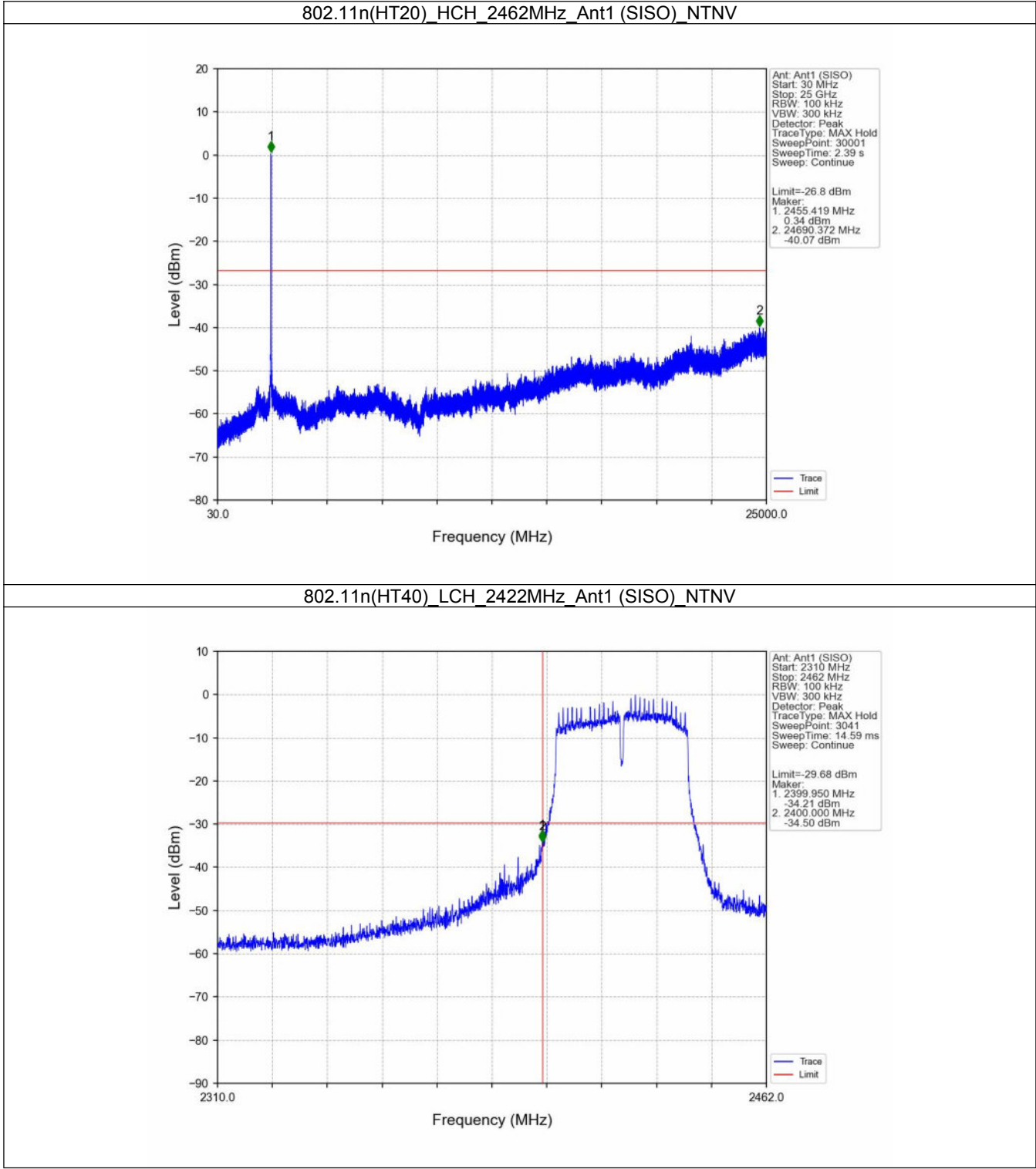
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



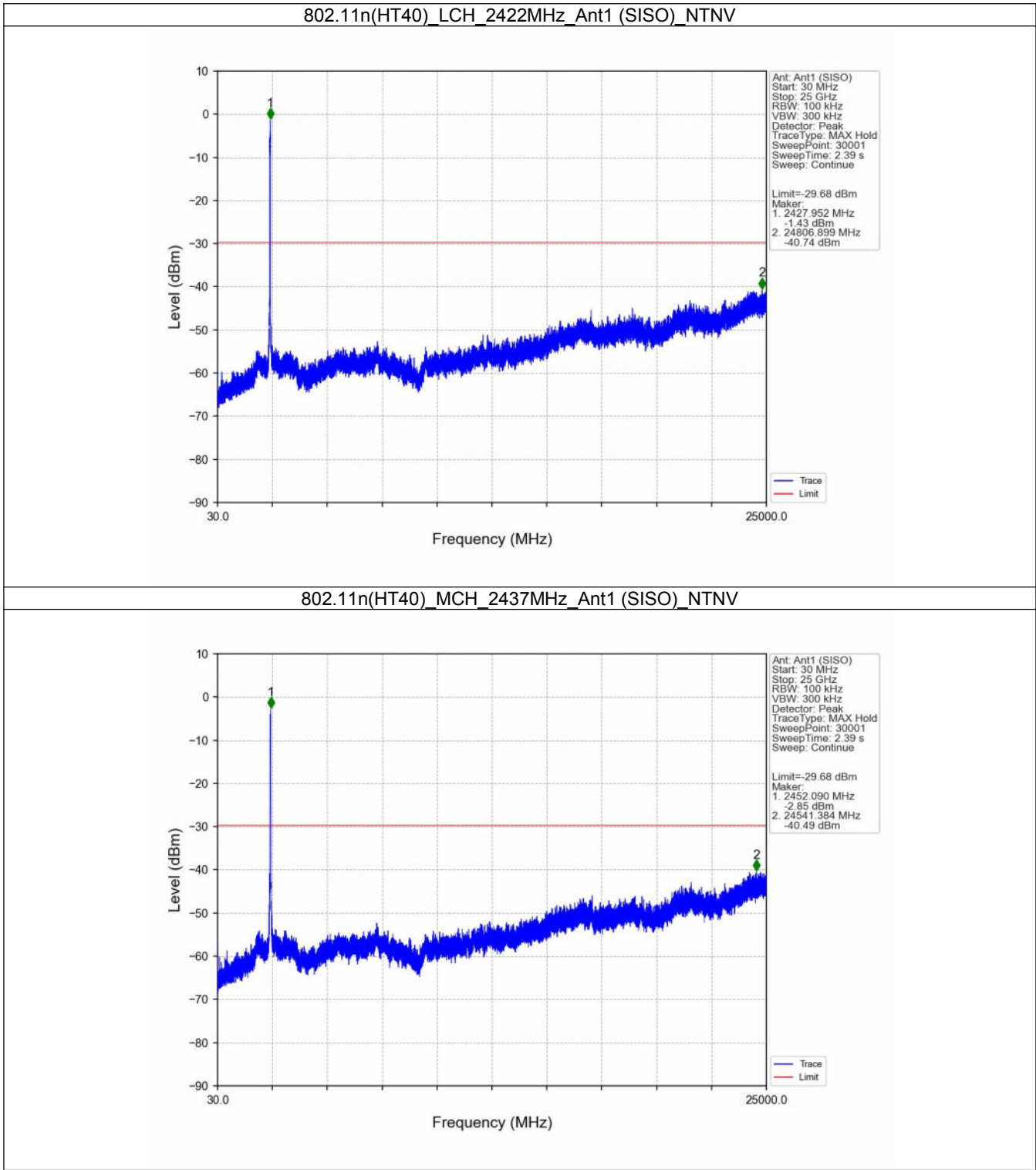
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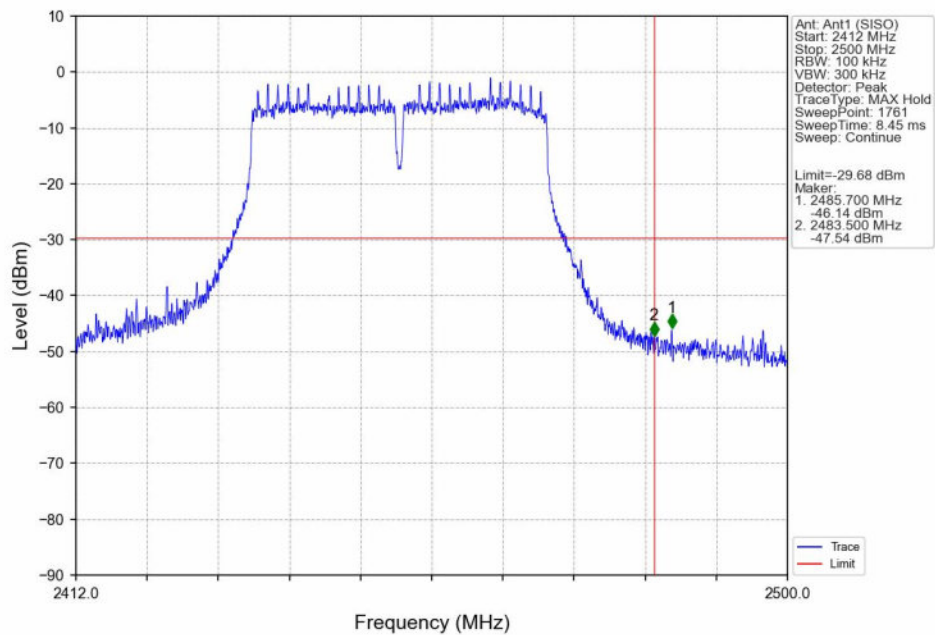


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FCC ID: 2BD5N-SURFERS2

802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV

