

Appendix RF Test Data for 2.4G WIFI

Company: : Zhongshan Kaisen Technology Co., Ltd

EUT : Smart Door Lock

FCC ID: : 2A4KZ-K12

Model Number : K12

Report No. : HTT202606334F01

Reviewed By : Heber He

1. Duty Cycle

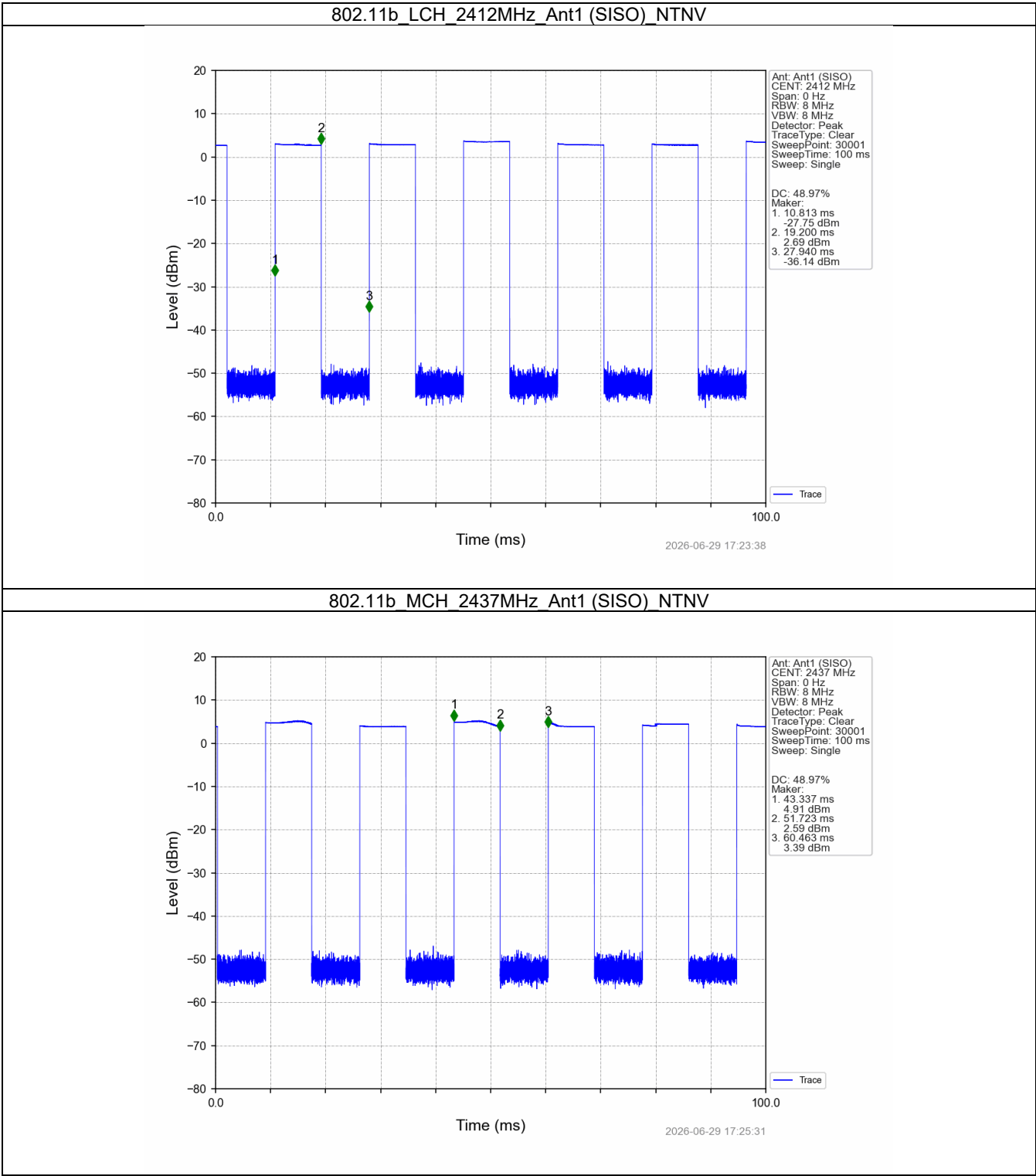
1.1 Test Result

1.1.1 Ant1

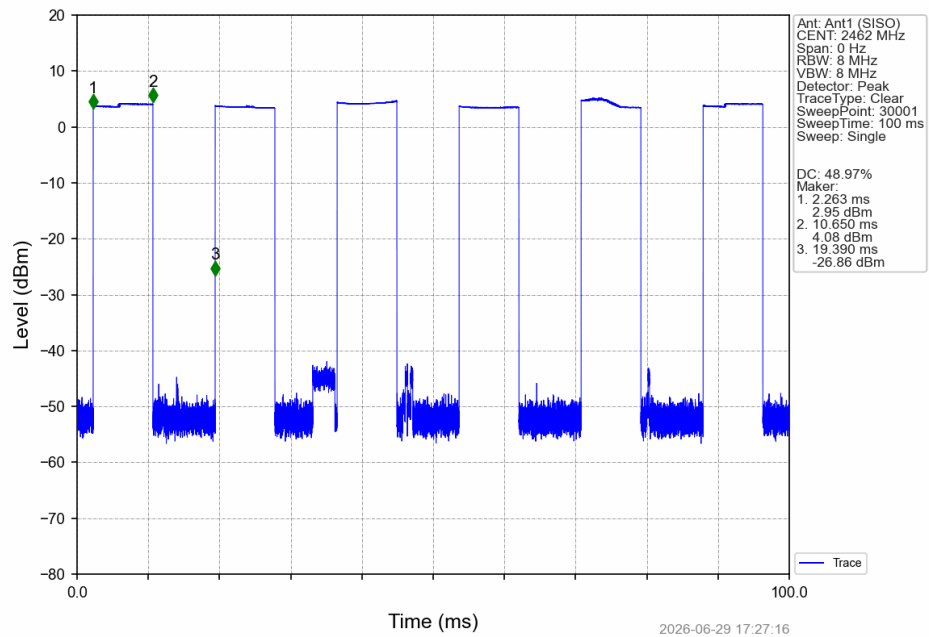
Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
802.11b	SISO	2412	8.387	17.127	48.97	3.10	0.02
		2437	8.386	17.126	48.97	3.10	0.02
		2462	8.387	17.127	48.97	3.10	0.02
802.11g	SISO	2412	5.434	14.174	38.34	4.16	0.02
		2437	5.434	14.174	38.34	4.16	0.02
		2462	5.433	14.173	38.33	4.16	0.02
802.11n (HT20)	SISO	2412	5.034	13.774	36.55	4.37	0.02
		2437	5.033	13.773	36.54	4.37	0.02
		2462	5.033	13.773	36.54	4.37	0.02
802.11n (HT40)	SISO	2422	2.446	11.186	21.87	6.60	0.01
		2437	2.447	11.187	21.87	6.60	0.01
		2452	2.447	11.187	21.87	6.60	0.01
802.11ax (HEW20)	SISO	2412	4.047	12.787	31.65	5.00	0.03
		2437	4.047	12.787	31.65	5.00	0.03
		2462	4.047	12.787	31.65	5.00	0.03
802.11ax (HEW40)	SISO	2422	2.043	10.786	18.94	7.23	0.03
		2437	2.047	10.790	18.97	7.22	0.03
		2452	2.043	10.786	18.94	7.23	0.03

1.2 Test Graph

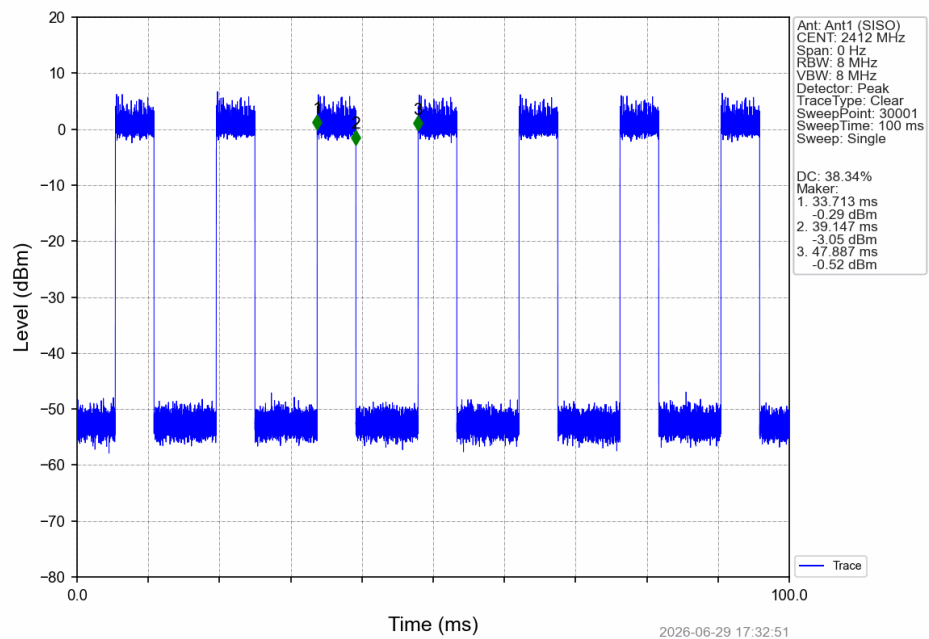
1.2.1 Ant1



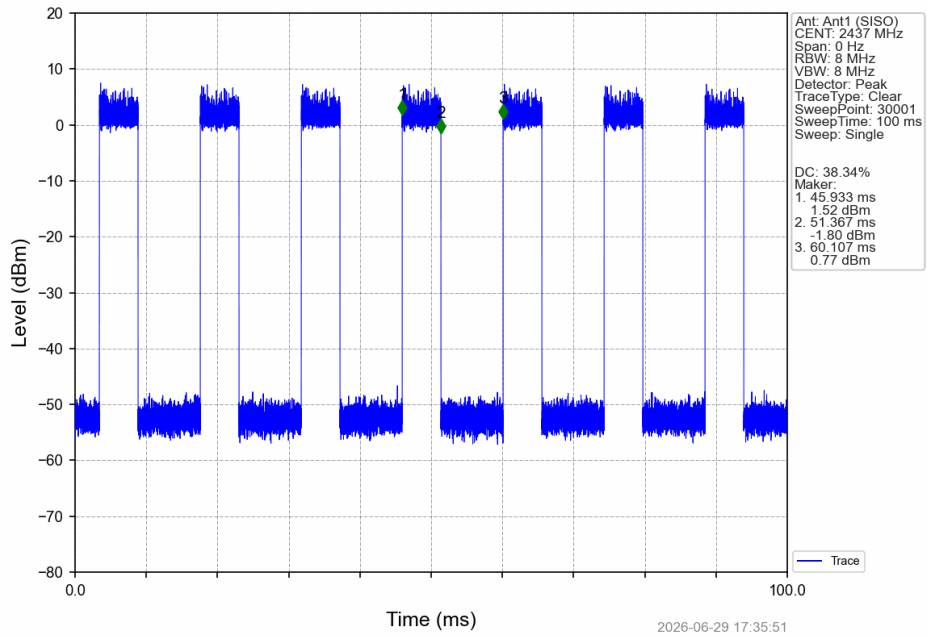
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



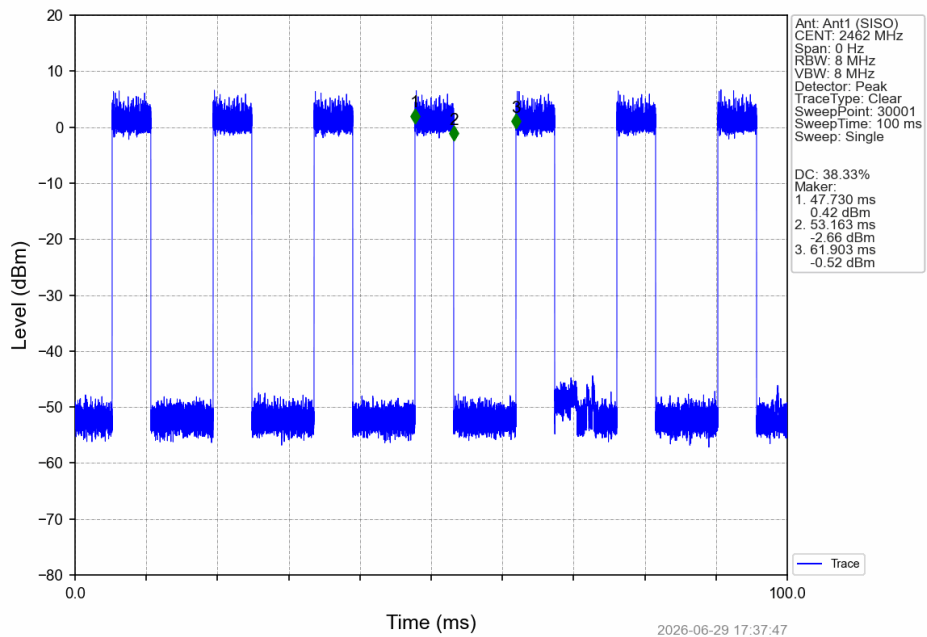
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



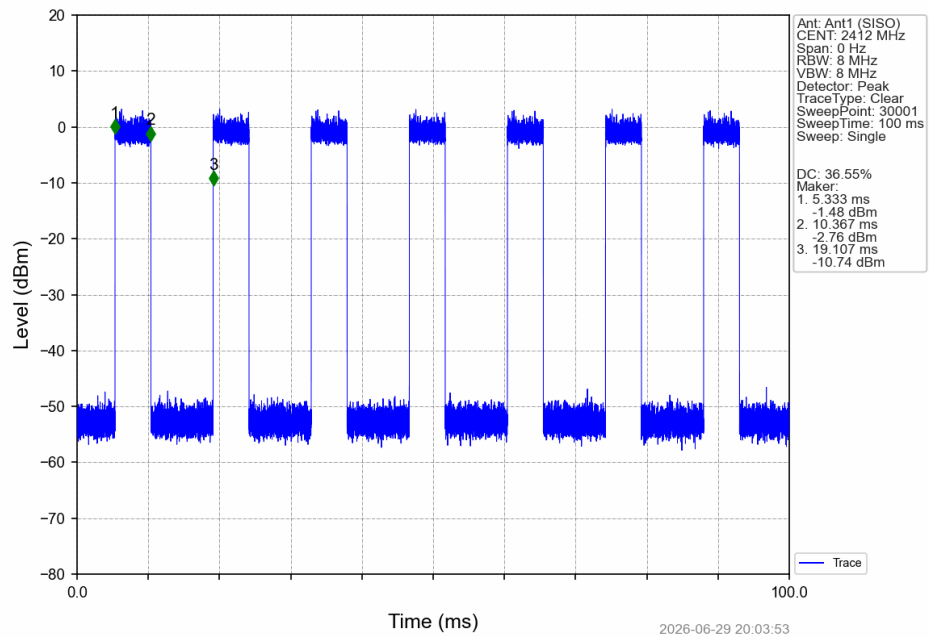
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



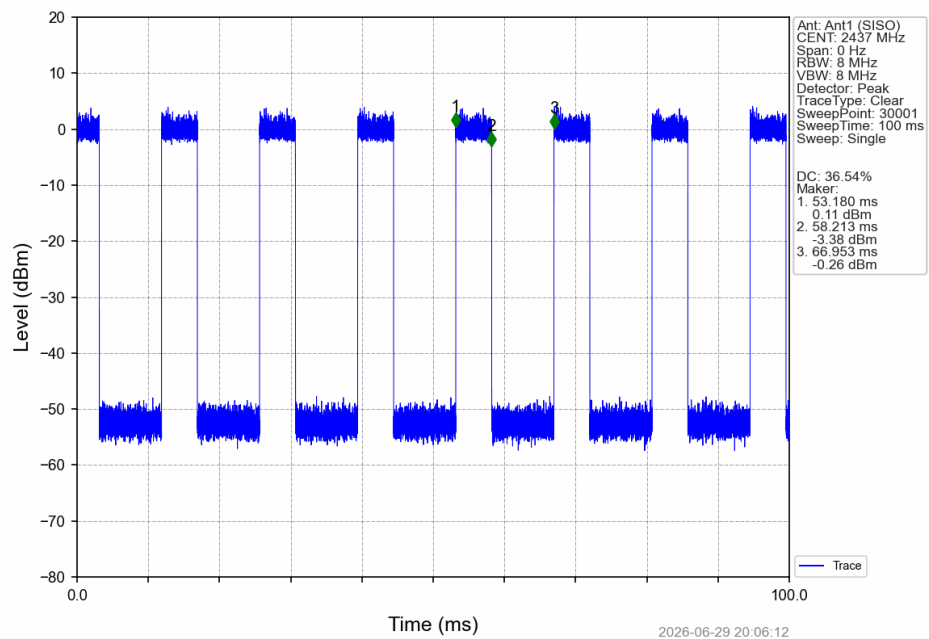
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



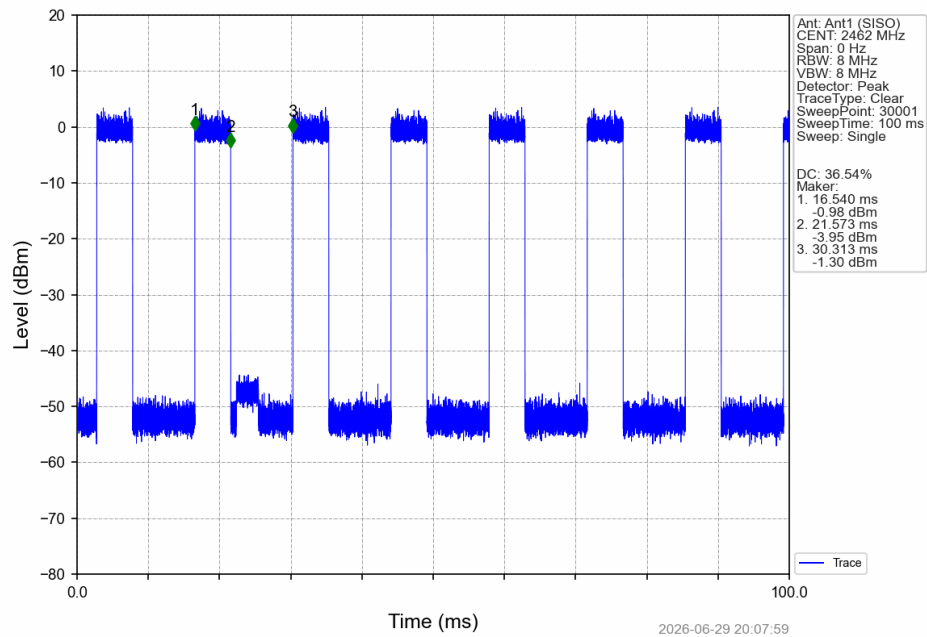
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



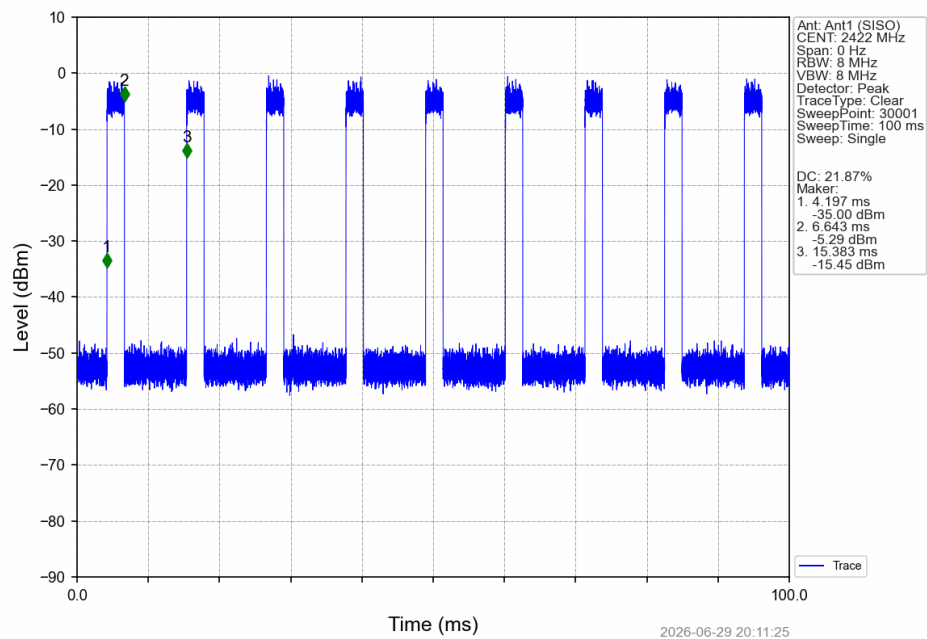
802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



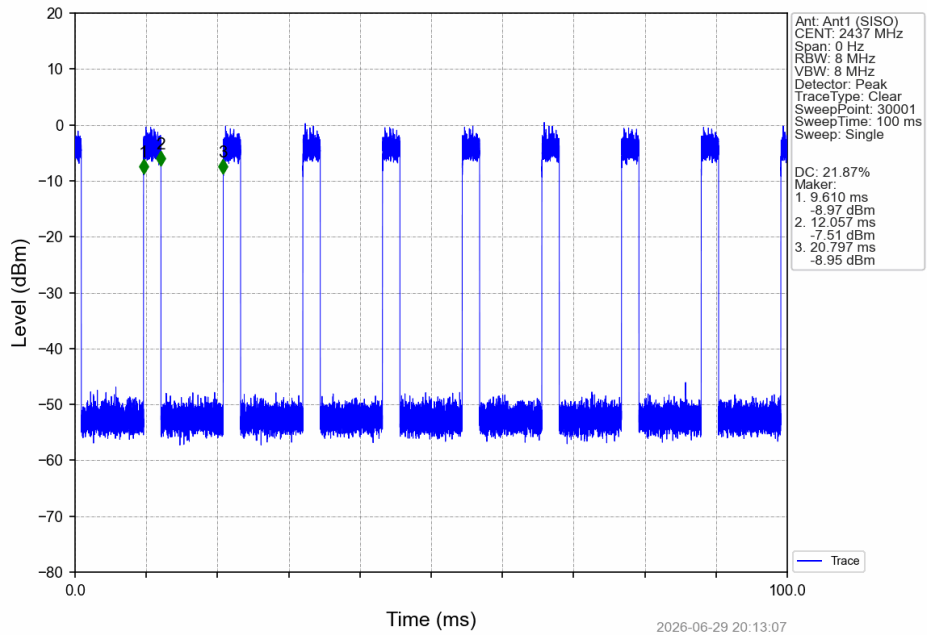
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



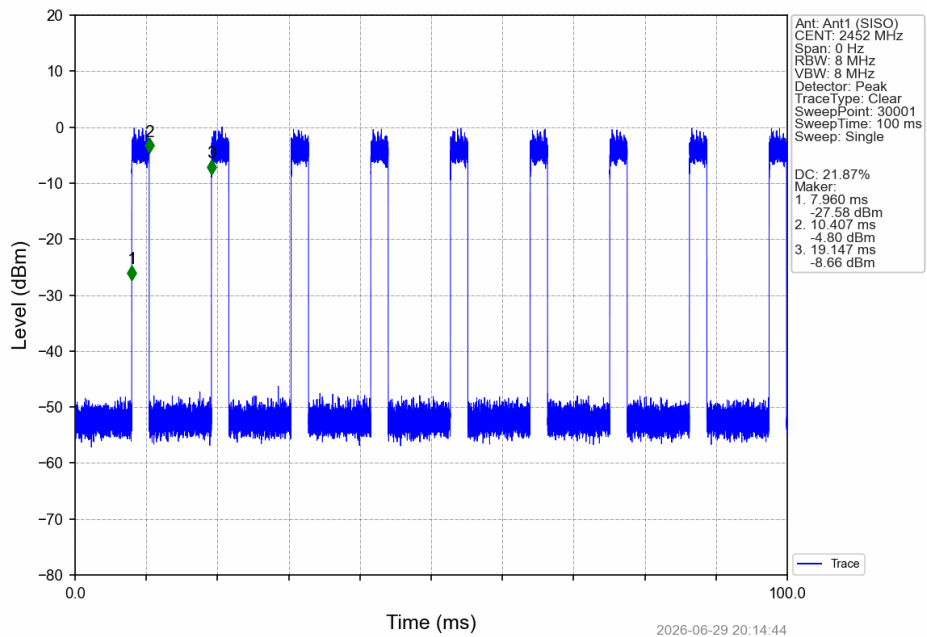
802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



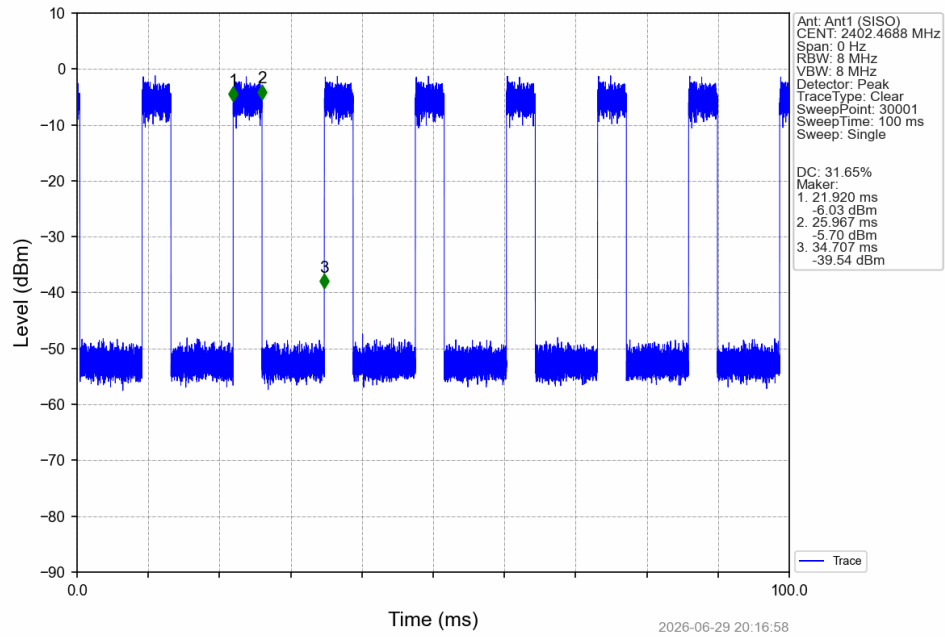
802.11n(HT40)_MCH_2437MHz_Ant1 (SISO)_NTNV



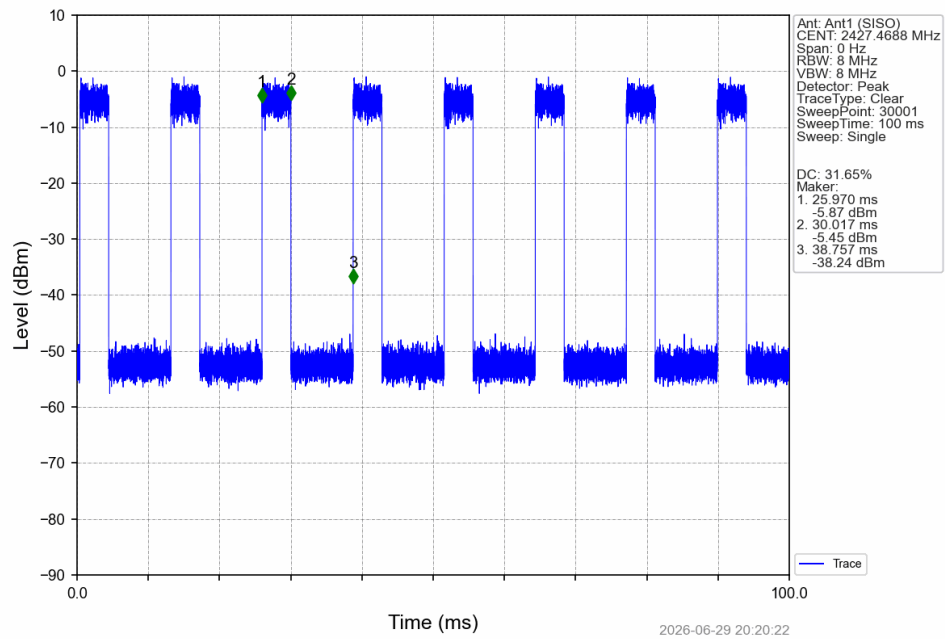
802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



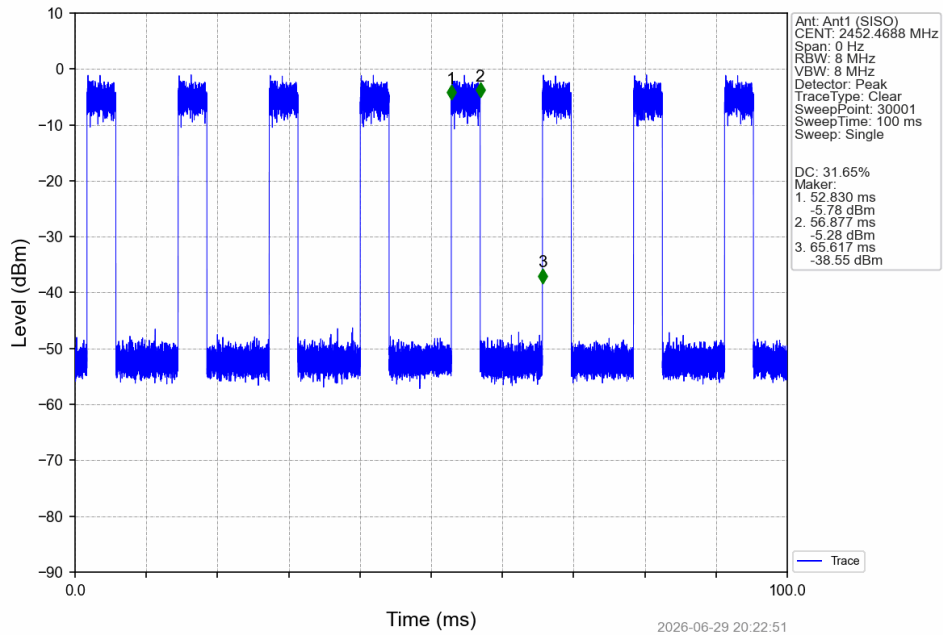
802.11ax(HEW20)_LCH_2412MHz_SU_/_Ant1 (SISO)_NTNV



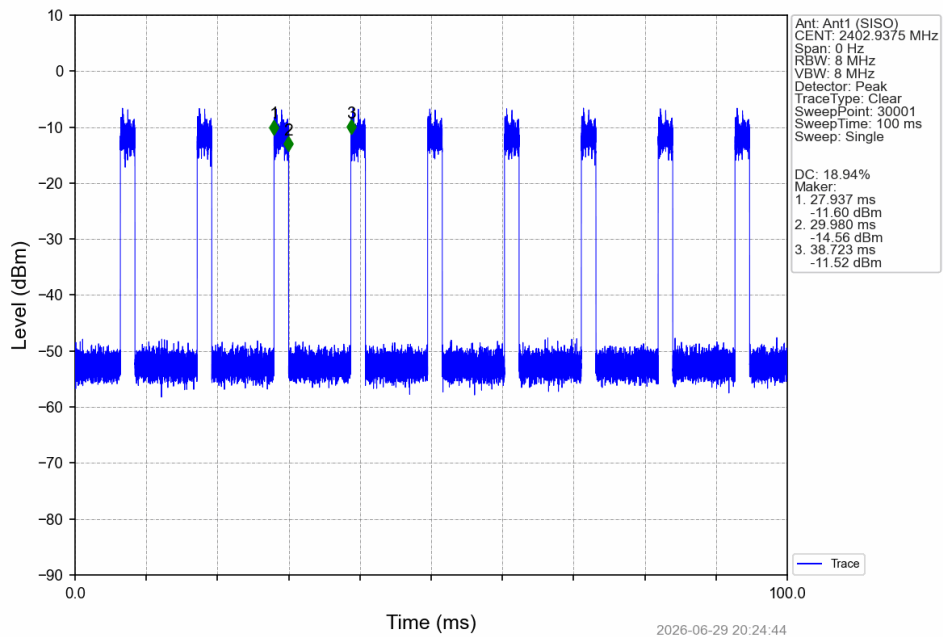
802.11ax(HEW20)_MCH_2437MHz_SU_/_Ant1 (SISO)_NTNV



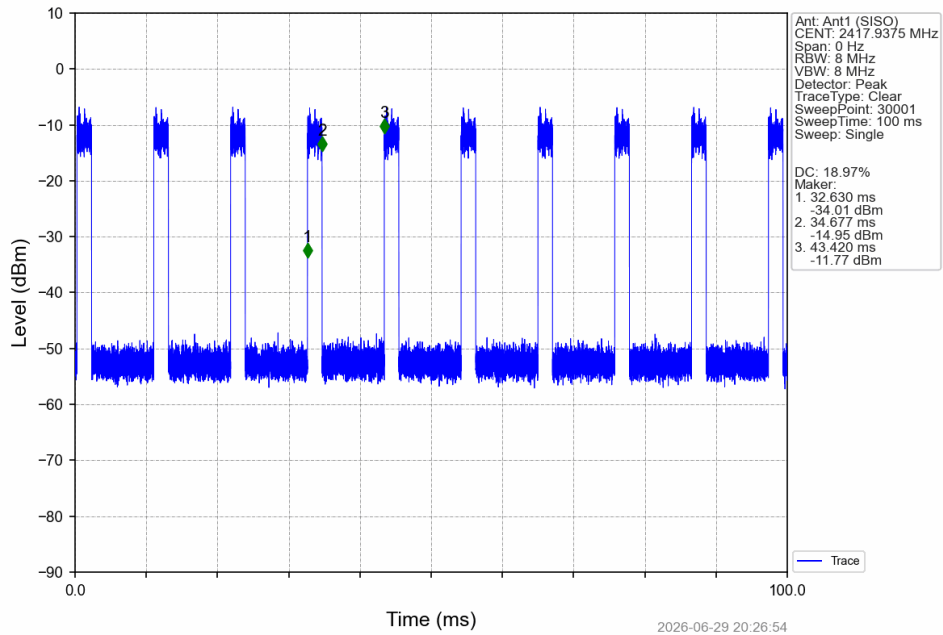
802.11ax(HEW20)_HCH_2462MHz_SU_/_Ant1 (SISO)_NTNV



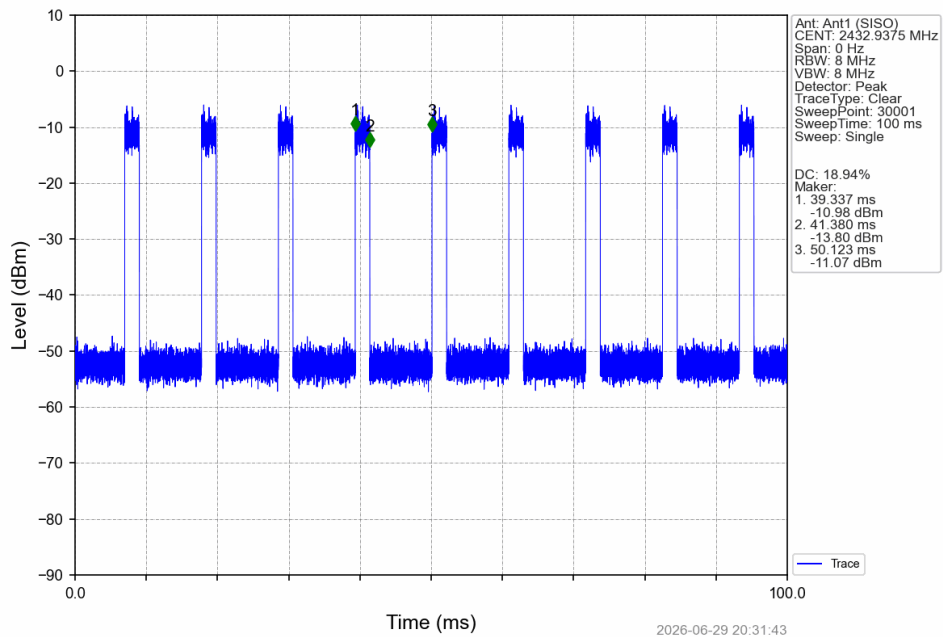
802.11ax(HEW40)_LCH_2422MHz_SU_/_Ant1 (SISO)_NTNV



802.11ax(HEW40)_MCH_2437MHz_SU_/_Ant1 (SISO)_NTNV



802.11ax(HEW40)_HCH_2452MHz_SU_/_Ant1 (SISO)_NTNV



2. Bandwidth

2.1 Test Result

2.1.1 OBW

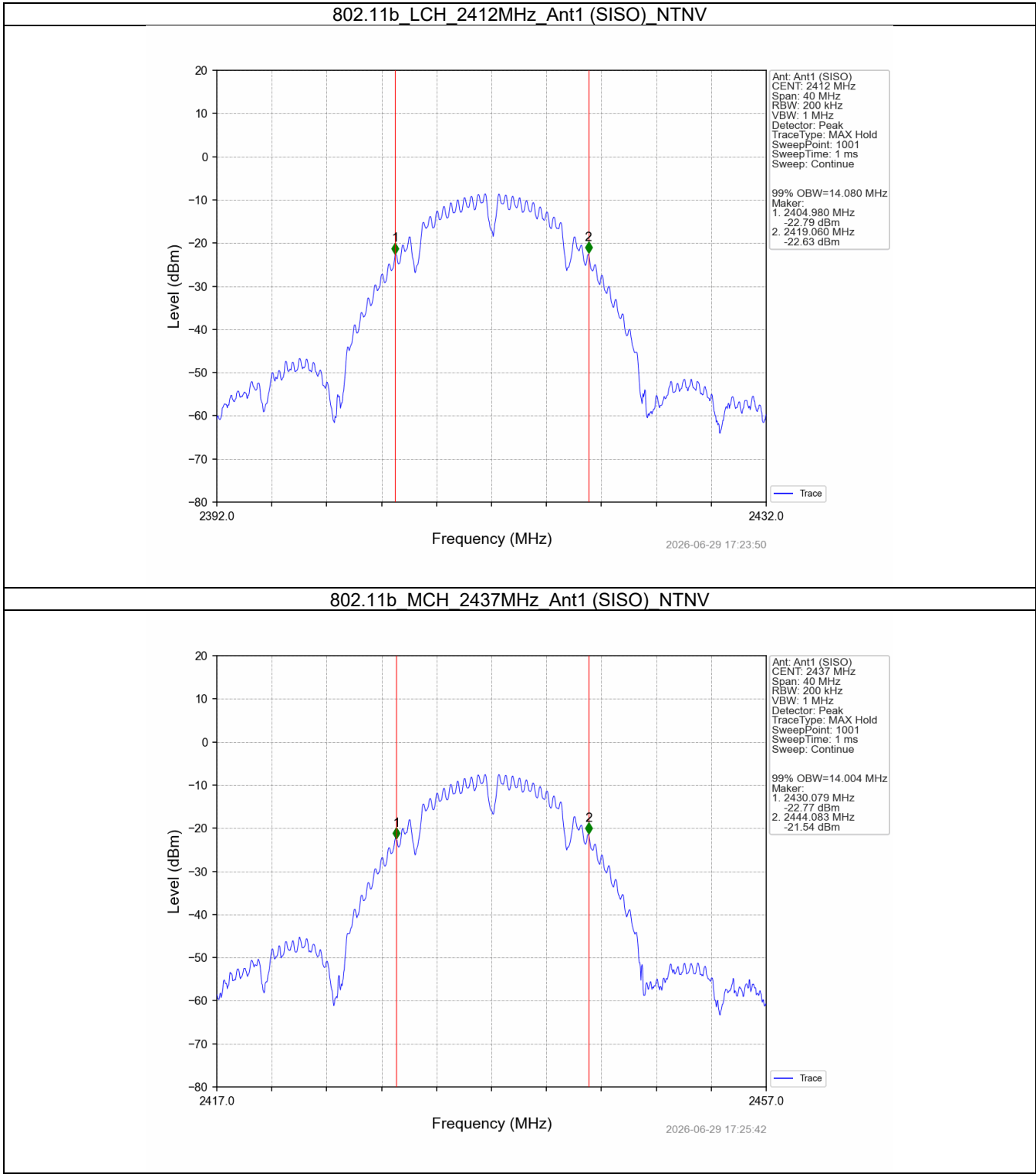
Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)		Verdict
				Result	Limit	
802.11b	SISO	2412	1	14.080	/	Pass
		2437	1	14.004	/	Pass
		2462	1	14.088	/	Pass
802.11g	SISO	2412	1	18.092	/	Pass
		2437	1	17.490	/	Pass
		2462	1	17.901	/	Pass
802.11n (HT20)	SISO	2412	1	18.240	/	Pass
		2437	1	18.125	/	Pass
		2462	1	18.174	/	Pass
802.11n (HT40)	SISO	2422	1	36.344	/	Pass
		2437	1	36.292	/	Pass
		2452	1	36.263	/	Pass
802.11ax (HEW20)	SISO	2412	1	18.909	/	Pass
		2437	1	18.903	/	Pass
		2462	1	18.973	/	Pass
802.11ax (HEW40)	SISO	2422	1	37.576	/	Pass
		2437	1	37.376	/	Pass
		2452	1	37.545	/	Pass

2.1.2 6dB BW

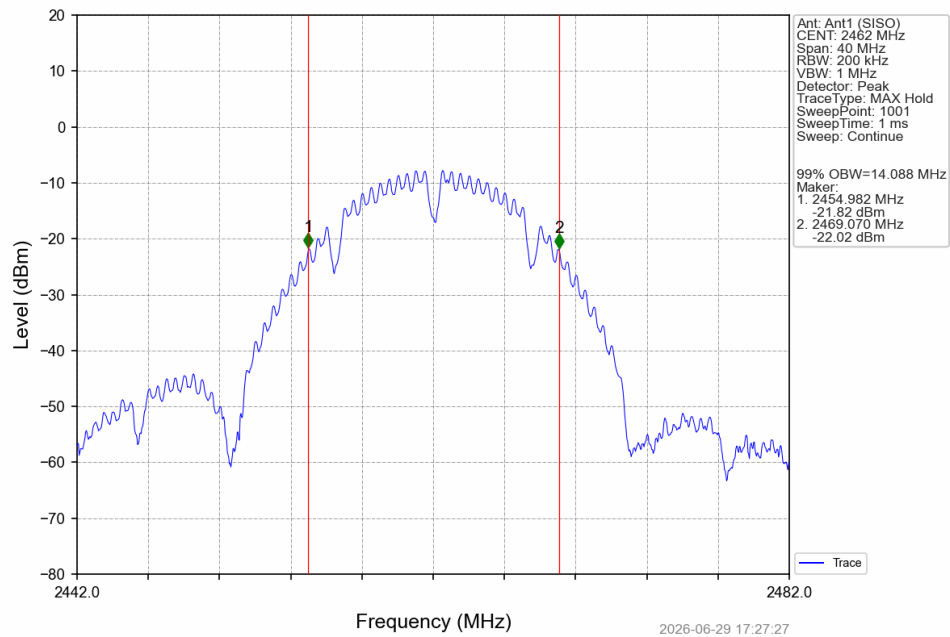
Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
802.11b	SISO	2412	1	9.165	≥ 0.5	Pass
		2437	1	9.164	≥ 0.5	Pass
		2462	1	9.167	≥ 0.5	Pass
802.11g	SISO	2412	1	16.522	≥ 0.5	Pass
		2437	1	16.429	≥ 0.5	Pass
		2462	1	16.617	≥ 0.5	Pass
802.11n (HT20)	SISO	2412	1	18.027	≥ 0.5	Pass
		2437	1	14.307	≥ 0.5	Pass
		2462	1	17.847	≥ 0.5	Pass
802.11n (HT40)	SISO	2422	1	35.559	≥ 0.5	Pass
		2437	1	35.016	≥ 0.5	Pass
		2452	1	34.636	≥ 0.5	Pass
802.11ax (HEW20)	SISO	2412	1	18.883	≥ 0.5	Pass
		2437	1	18.636	≥ 0.5	Pass
		2462	1	18.900	≥ 0.5	Pass
802.11ax (HEW40)	SISO	2422	1	34.408	≥ 0.5	Pass
		2437	1	33.327	≥ 0.5	Pass
		2452	1	35.751	≥ 0.5	Pass

2.2 Test Graph

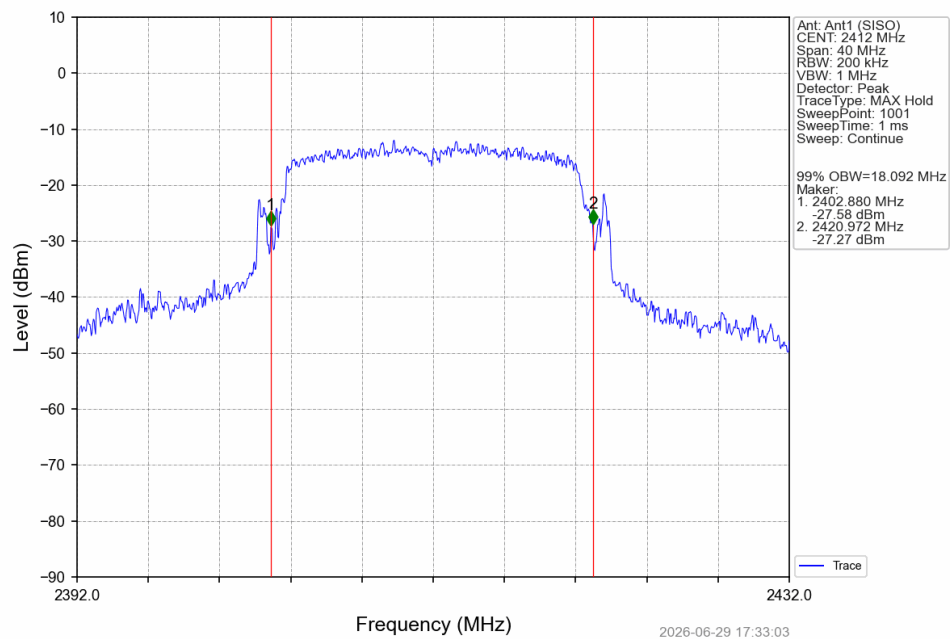
2.2.1 OBW



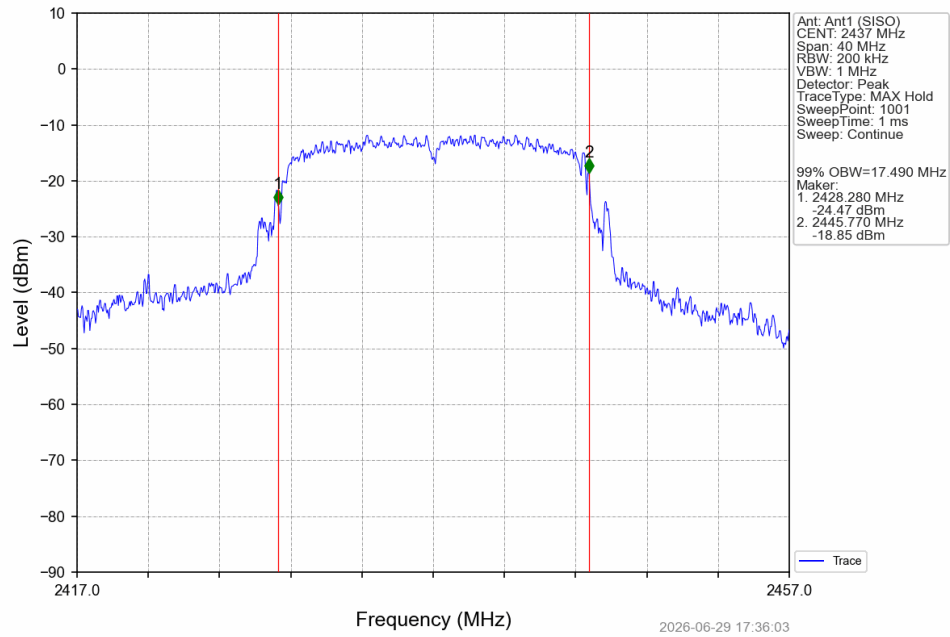
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



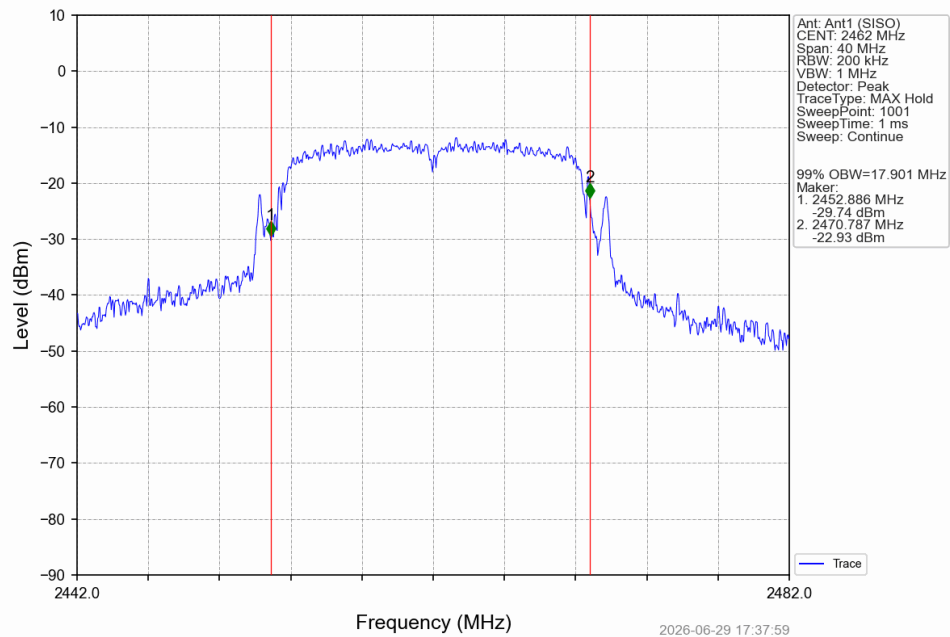
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



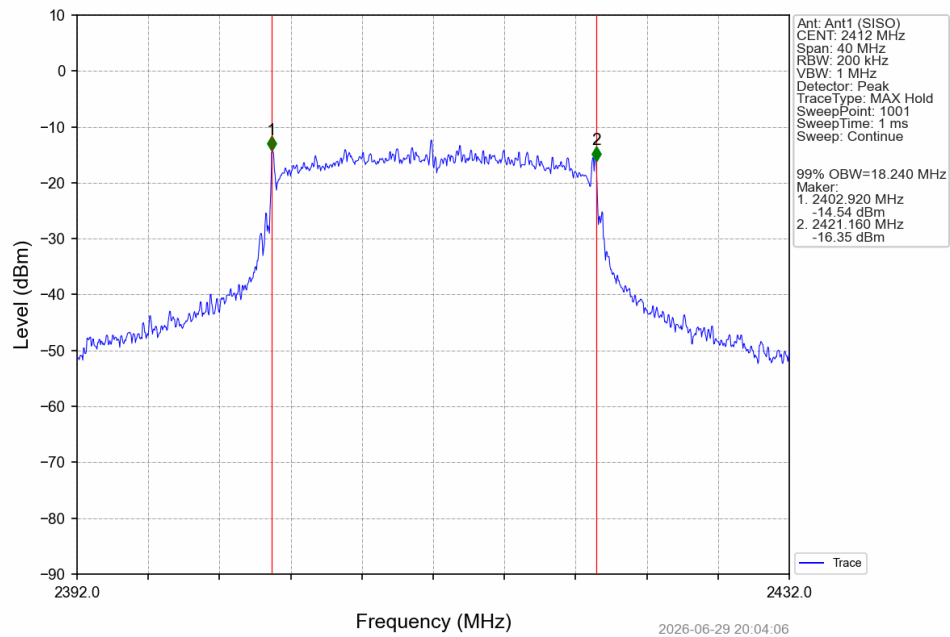
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



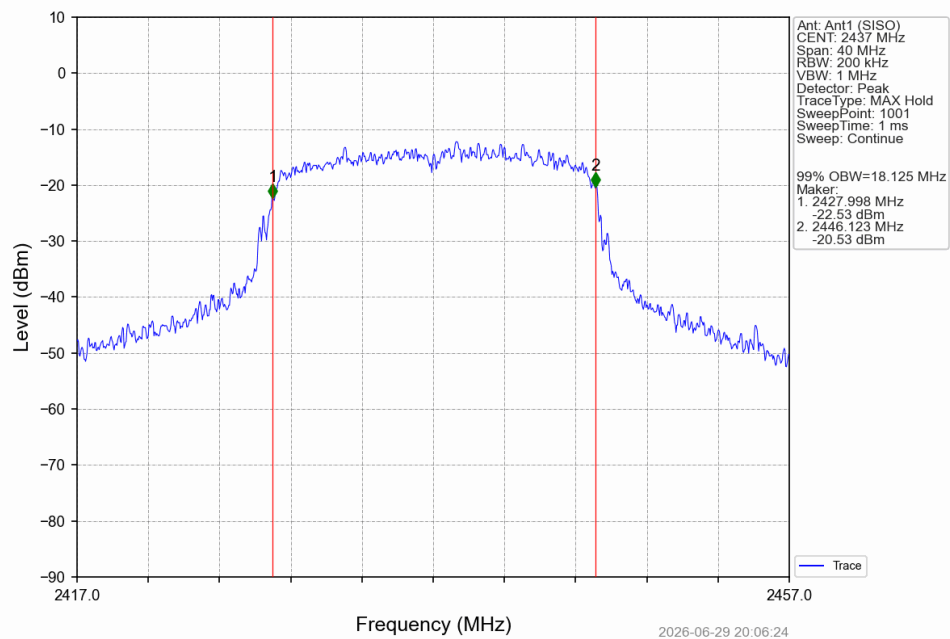
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



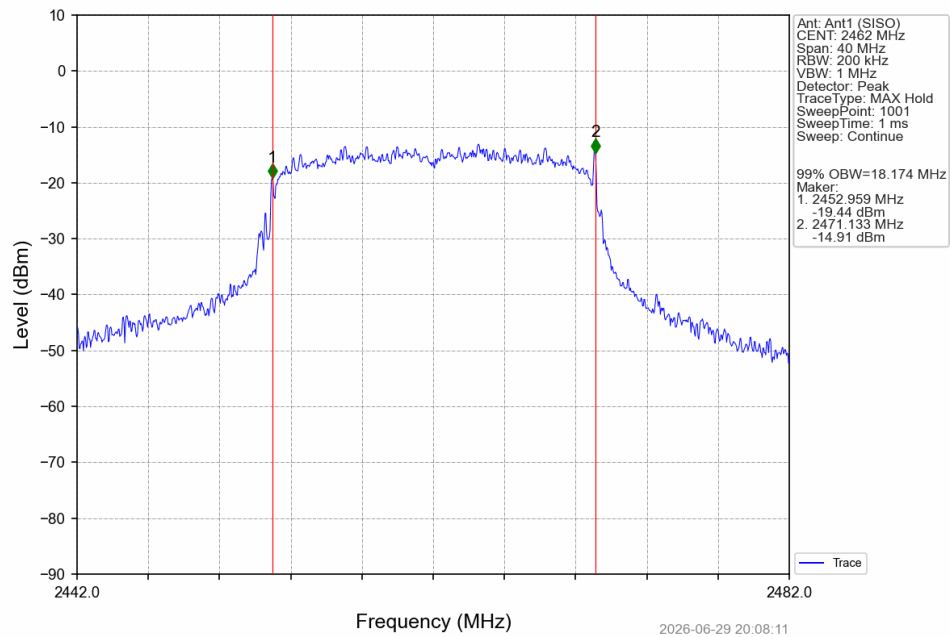
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



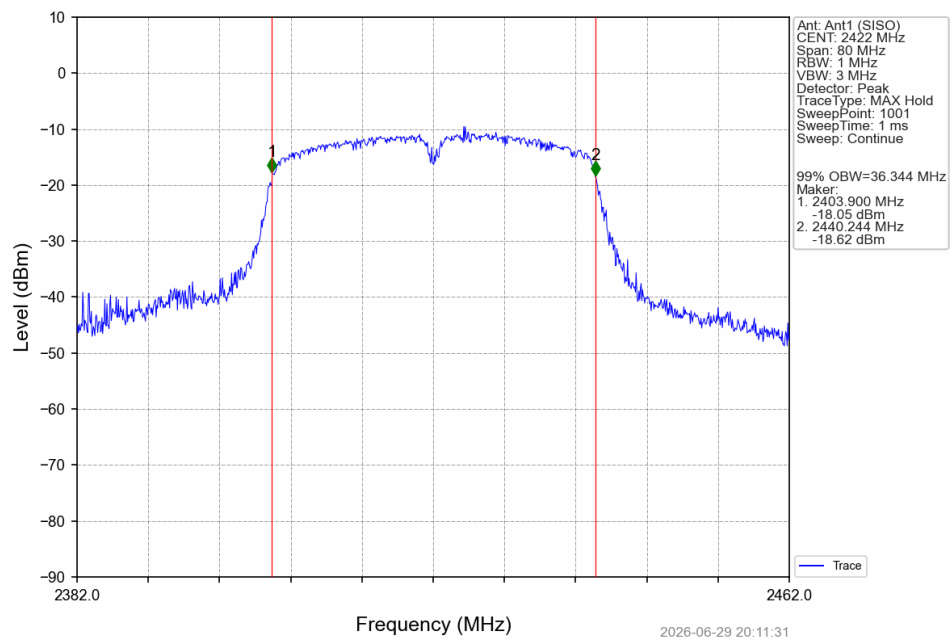
802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



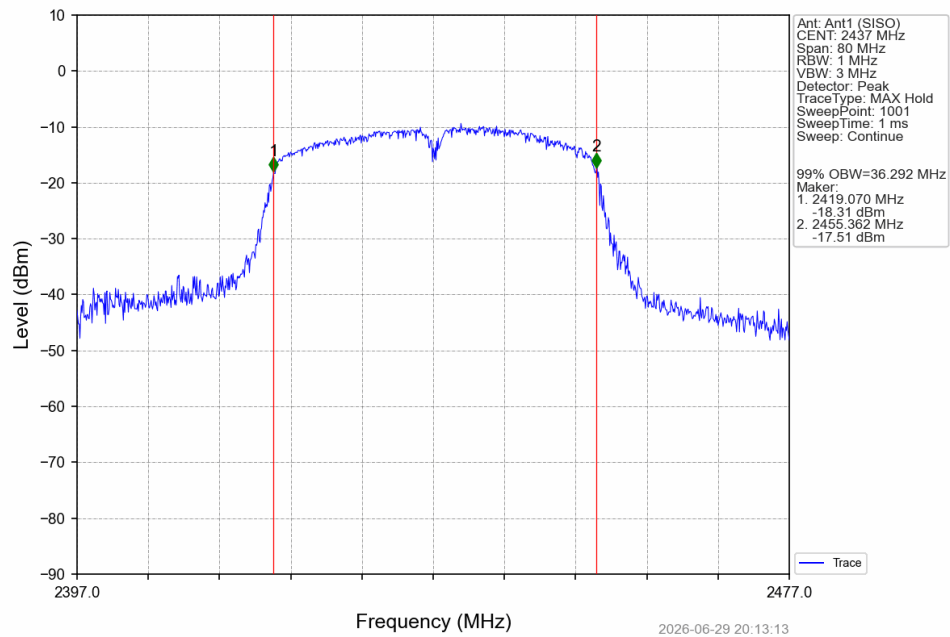
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



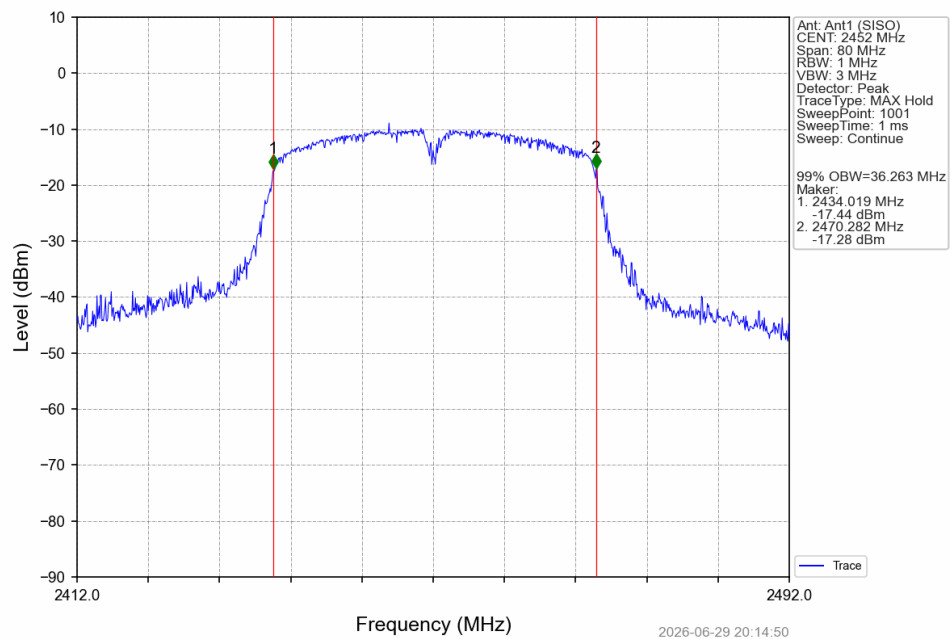
802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



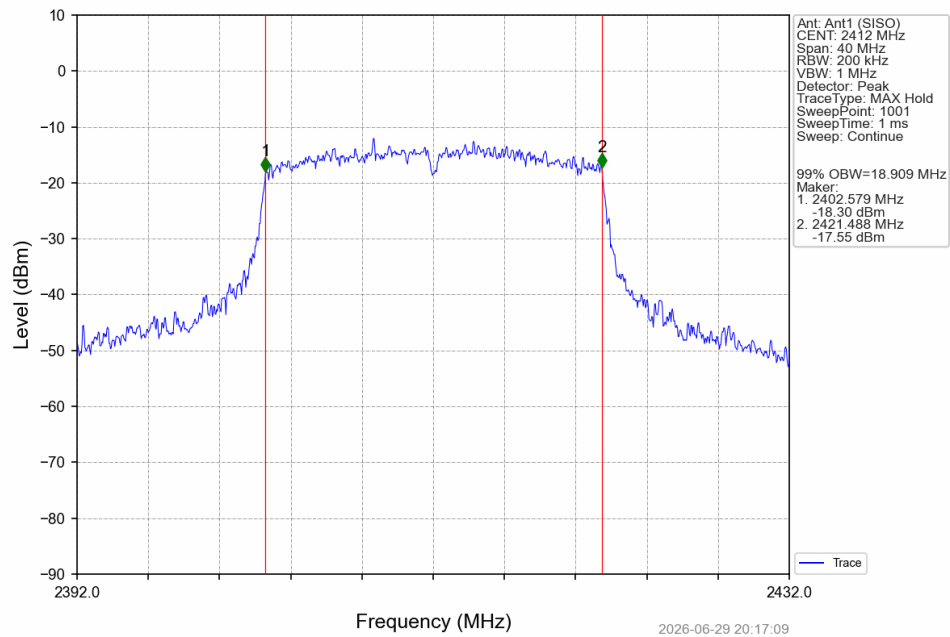
802.11n(HT40)_MCH_2437MHz_Ant1 (SISO)_NTNV



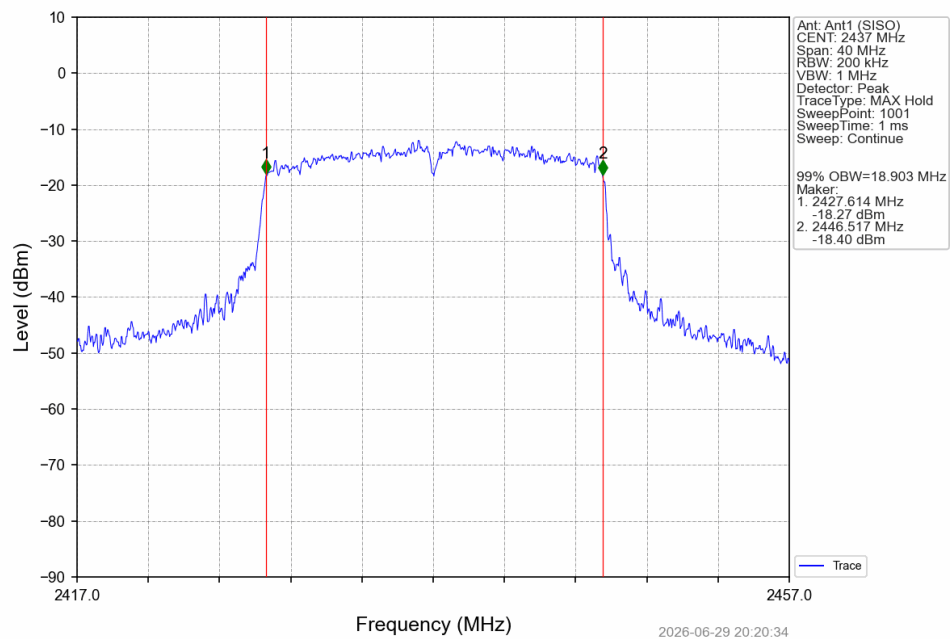
802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



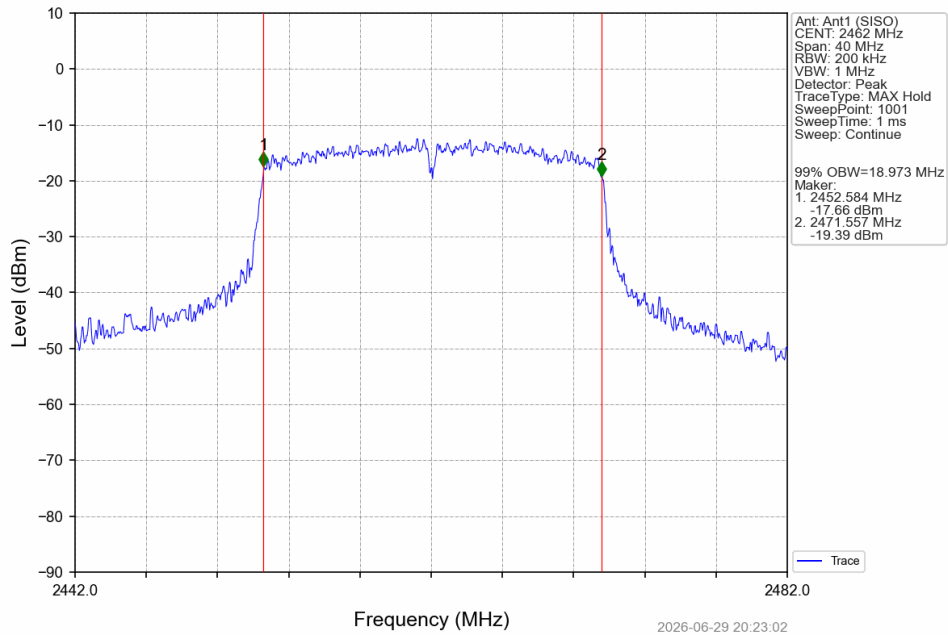
802.11ax(HEW20)_LCH_2412MHz_SU_/_Ant1 (SISO)_NTNV



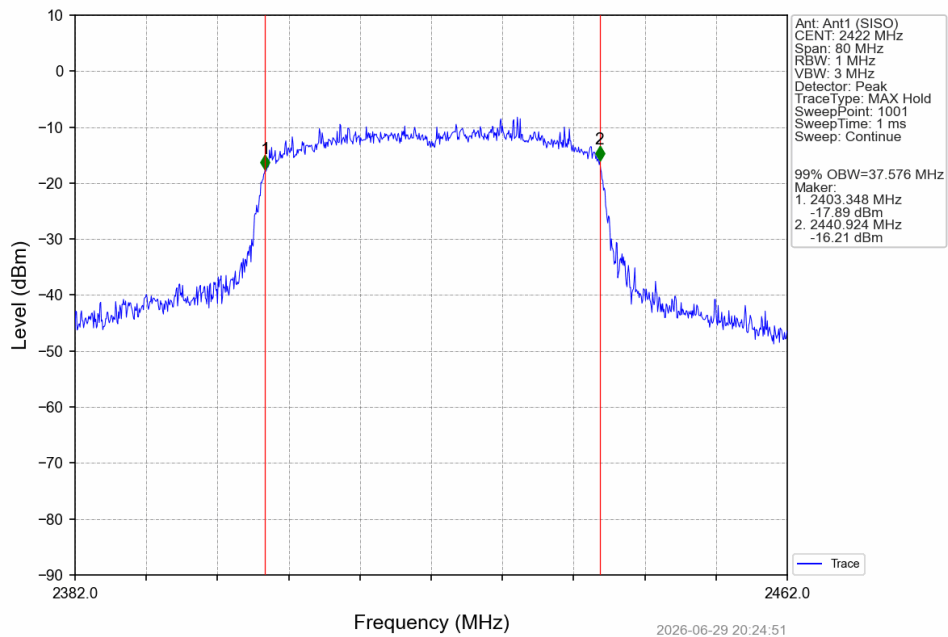
802.11ax(HEW20)_MCH_2437MHz_SU_/_Ant1 (SISO)_NTNV



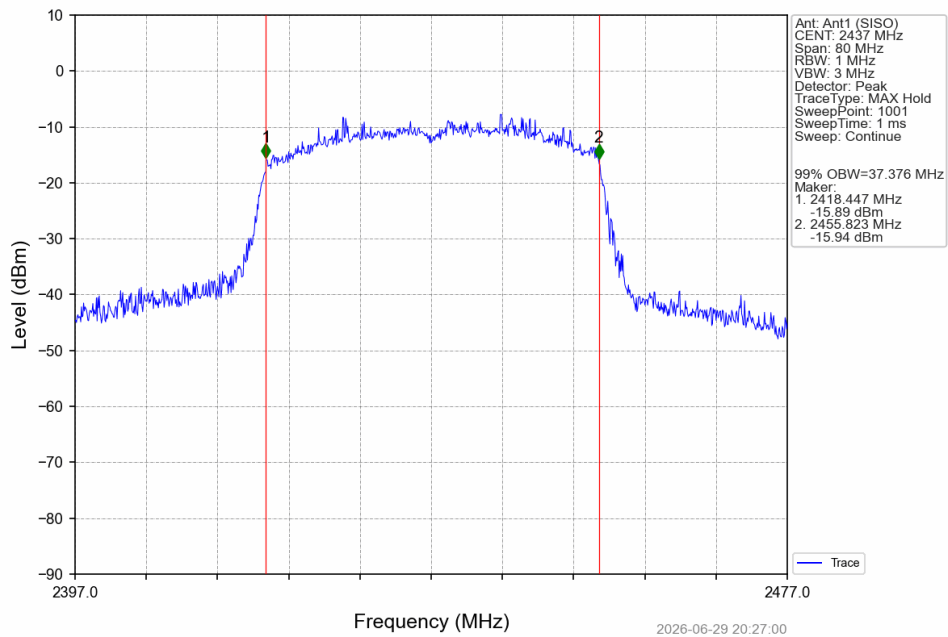
802.11ax(HEW20)_HCH_2462MHz_SU_/_Ant1 (SISO)_NTNV



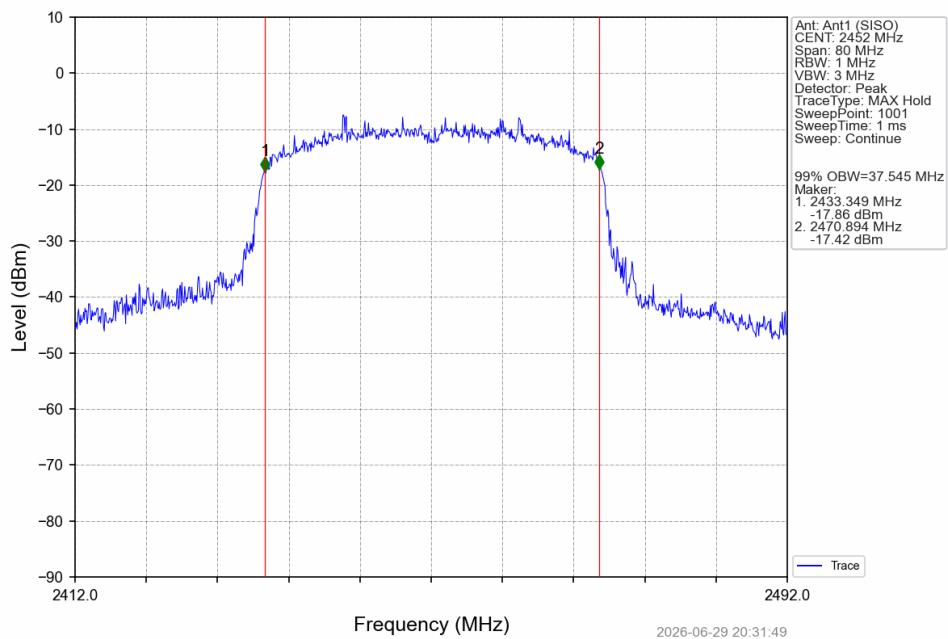
802.11ax(HEW40)_LCH_2422MHz_SU_/_Ant1 (SISO)_NTNV



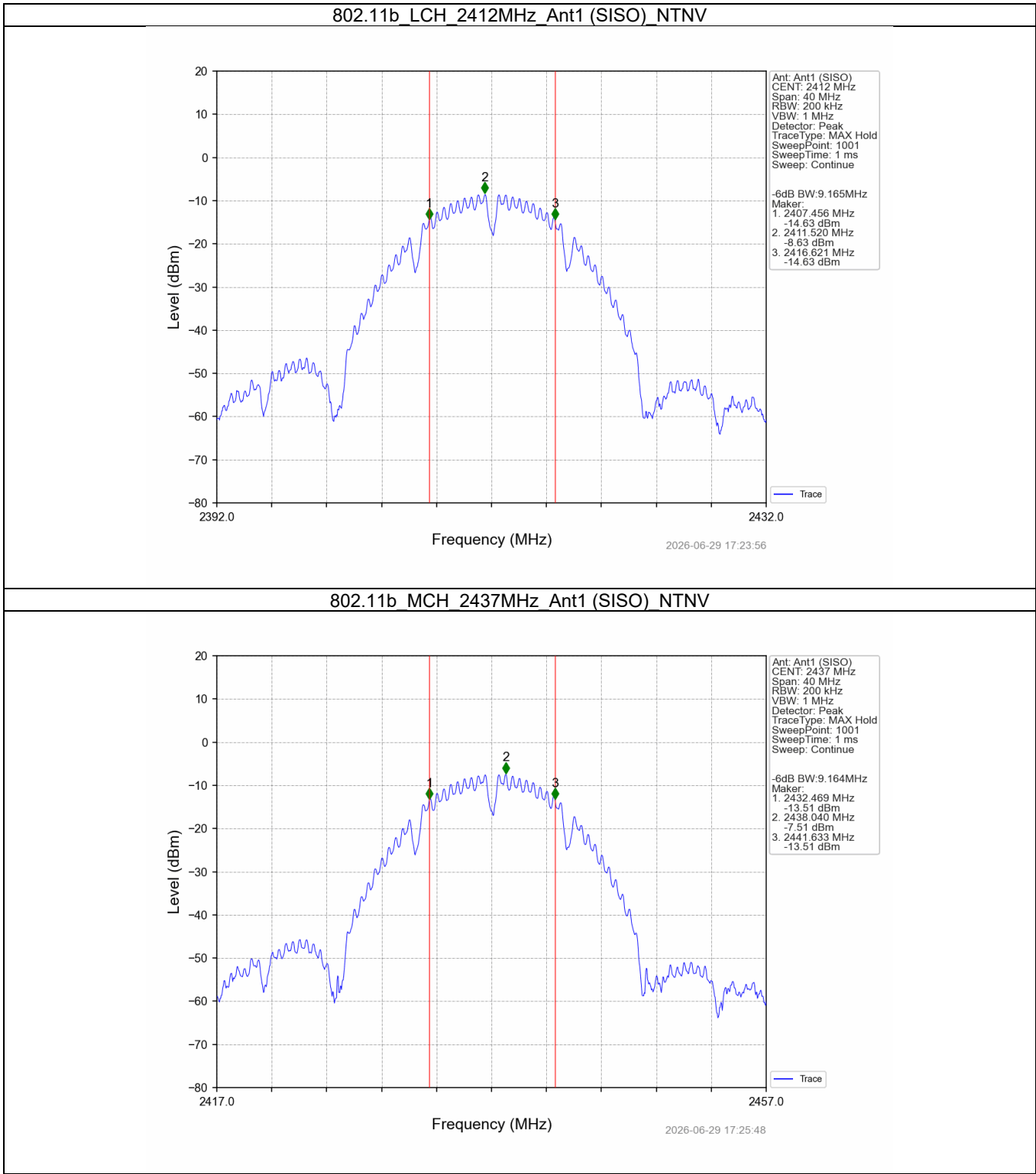
802.11ax(HEW40)_MCH_2437MHz_SU_/_Ant1 (SISO)_NTNV



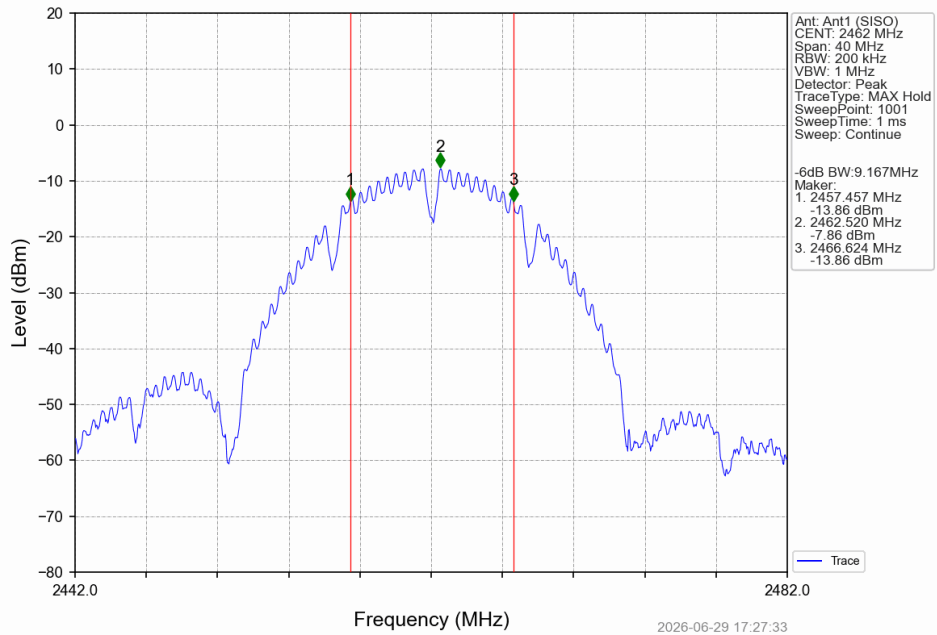
802.11ax(HEW40)_HCH_2452MHz_SU_/_Ant1 (SISO)_NTNV



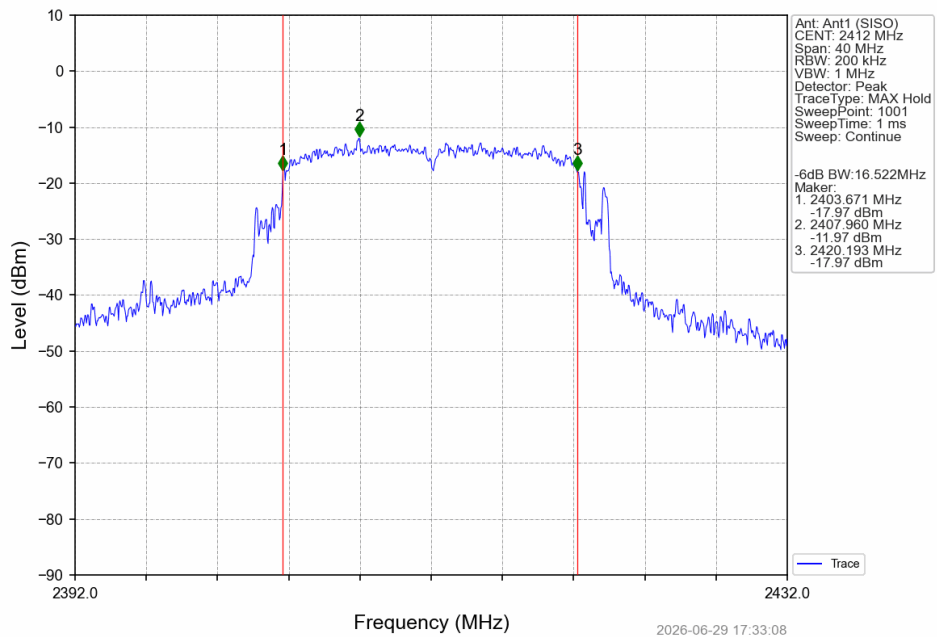
2.2.2 6dB BW



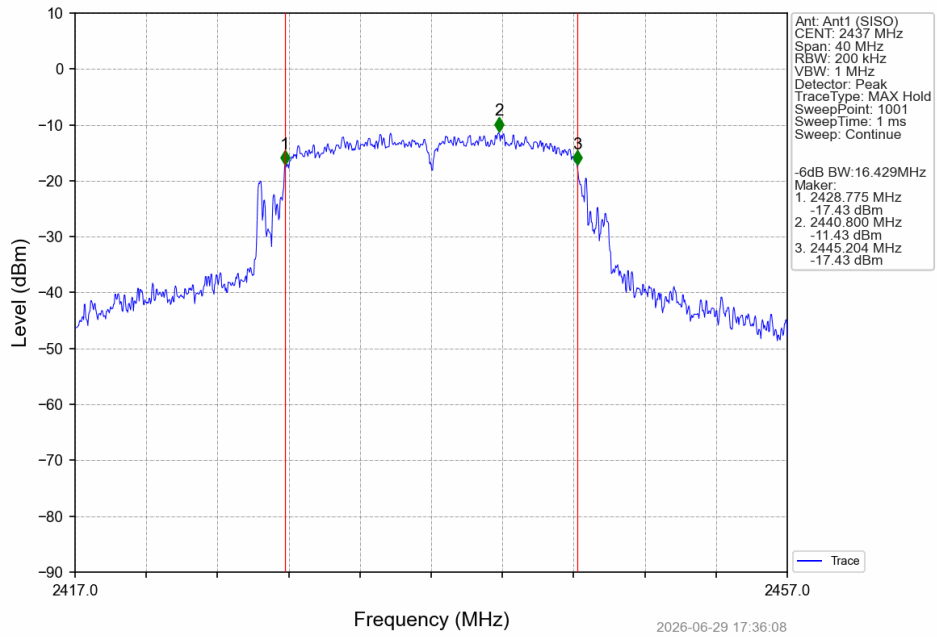
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



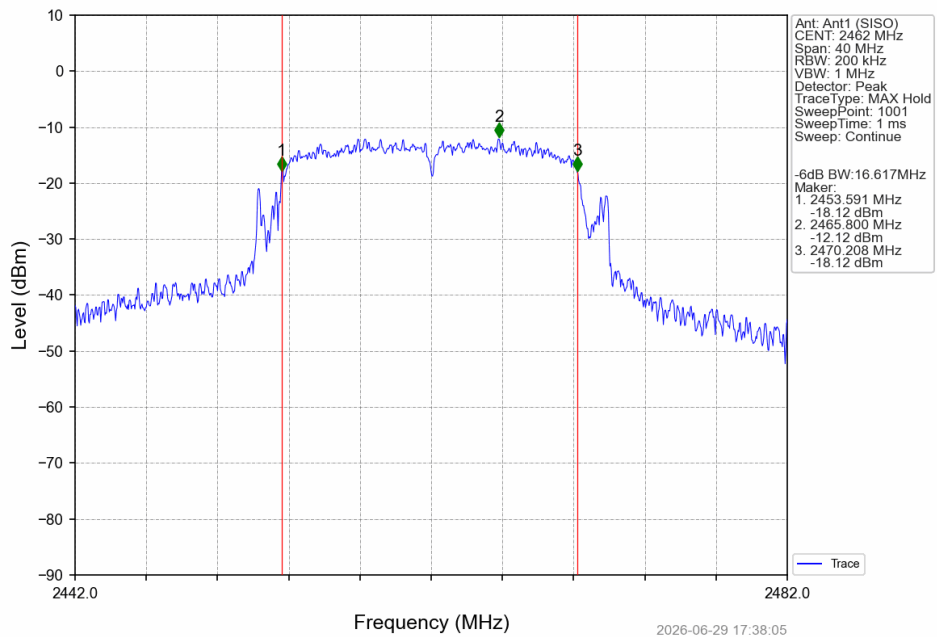
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



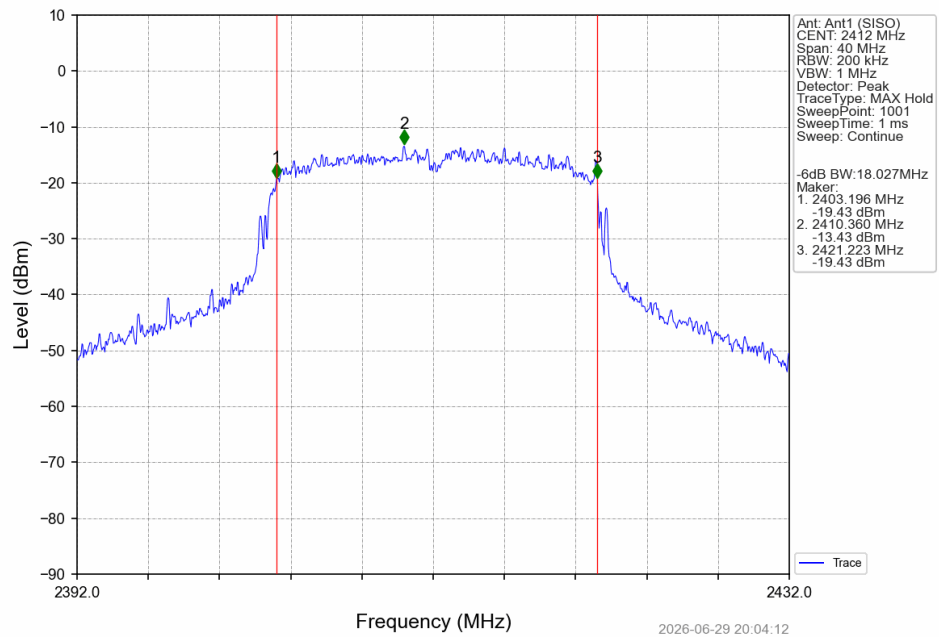
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



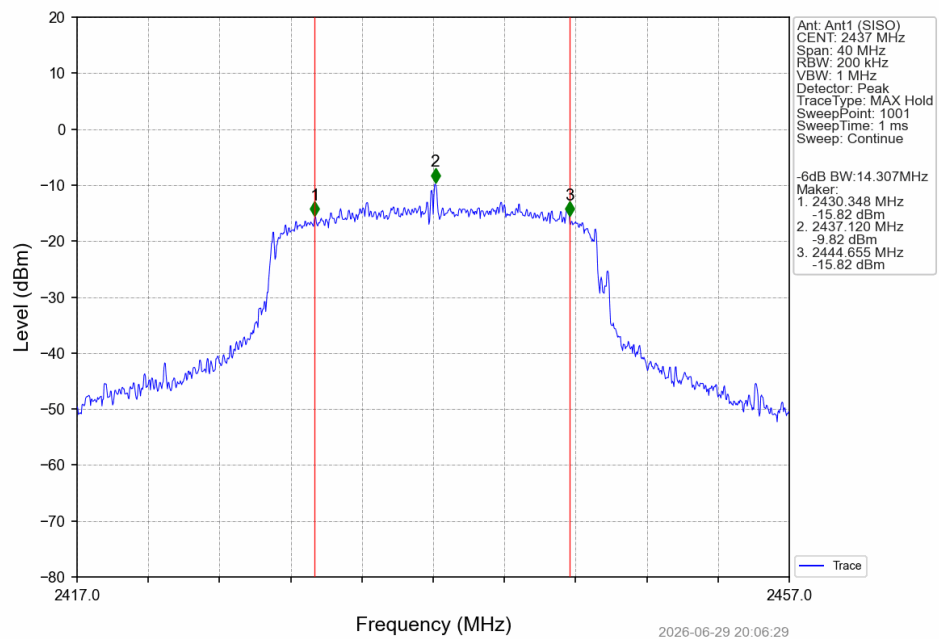
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



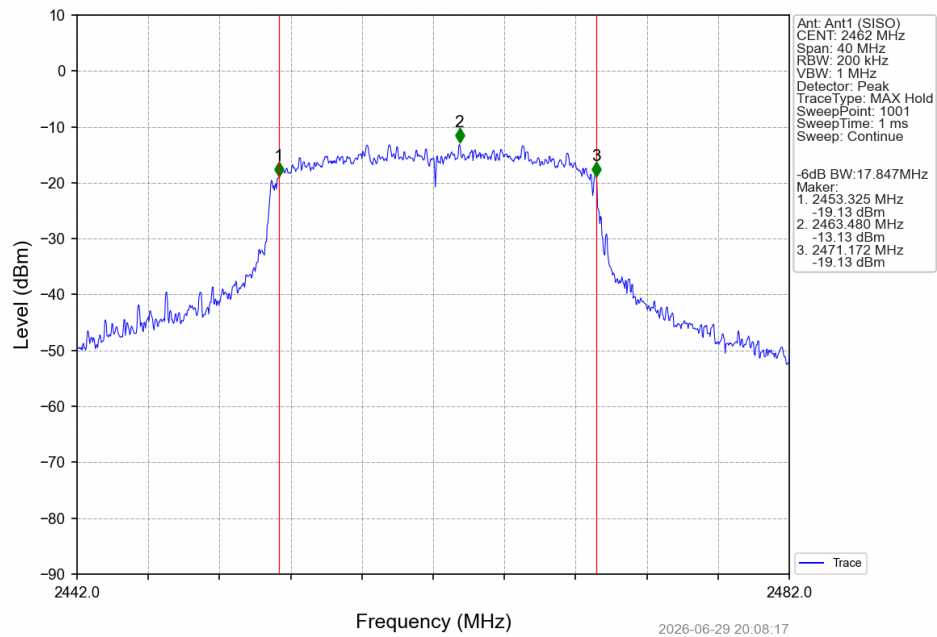
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



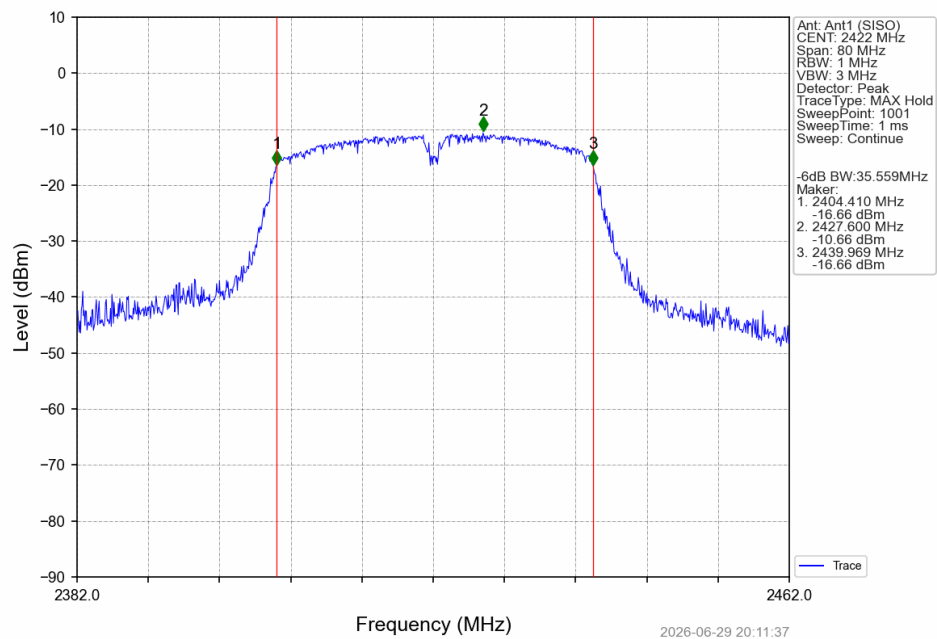
802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



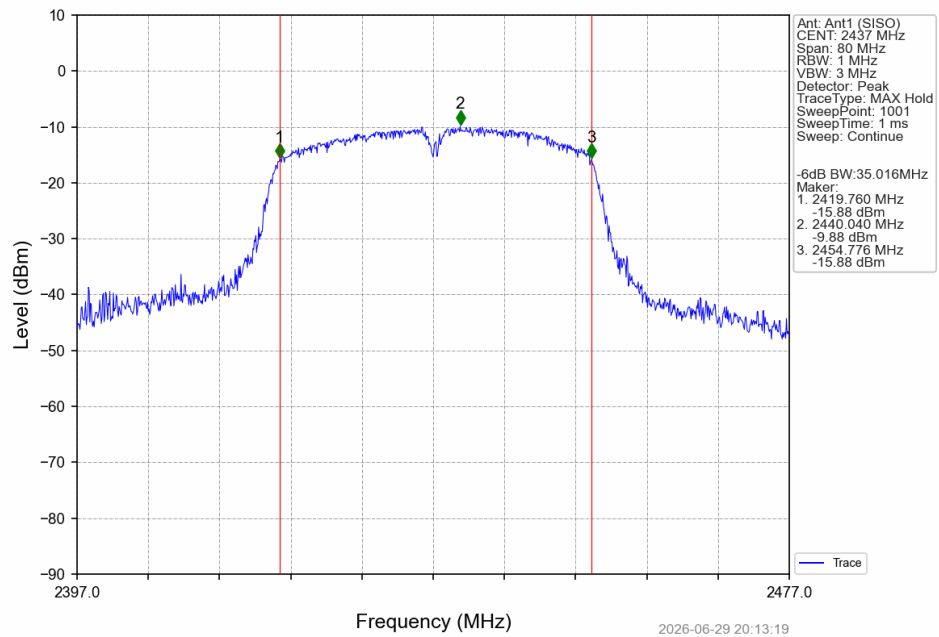
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



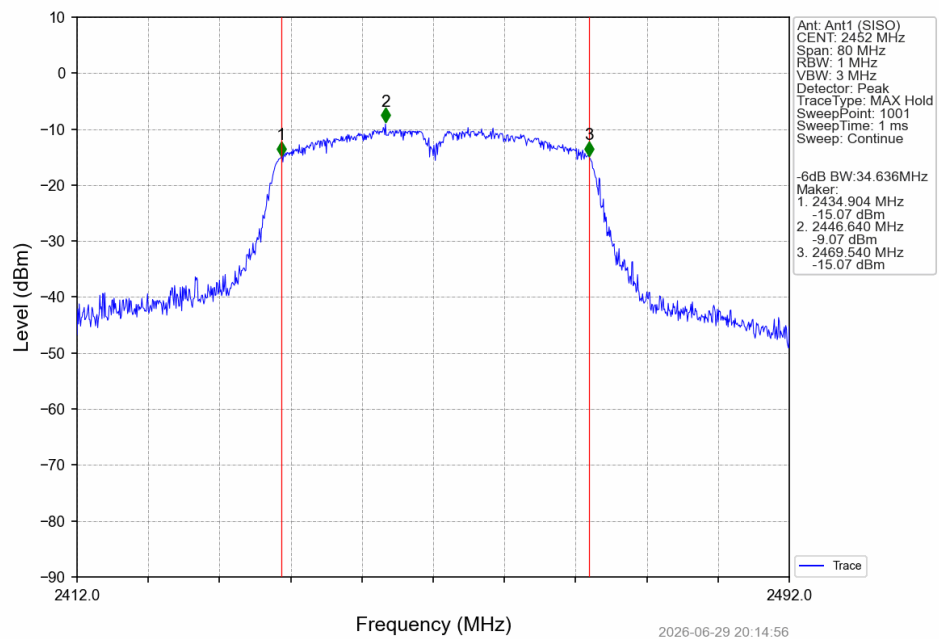
802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



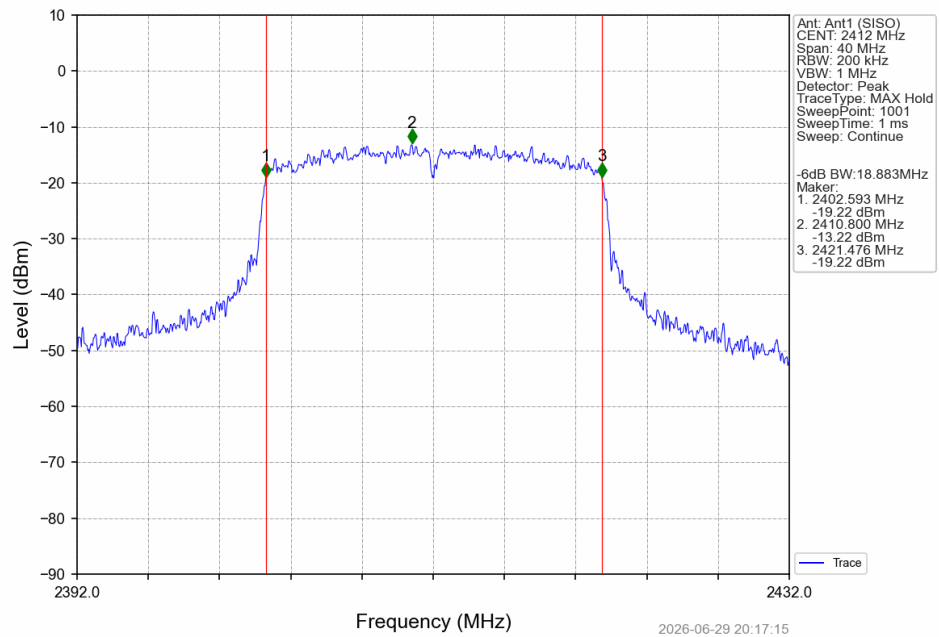
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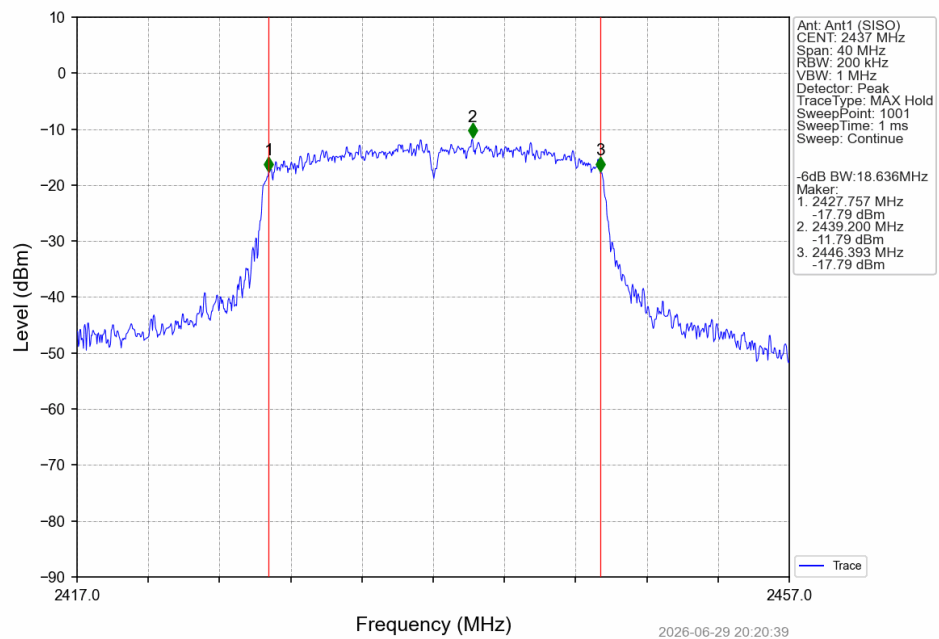
802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



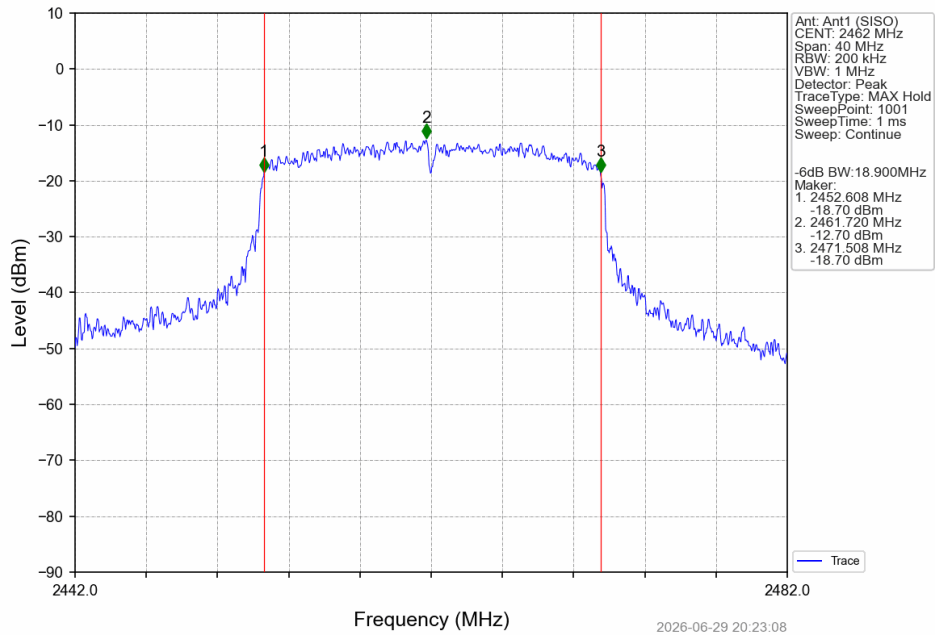
802.11ax(HEW20)_LCH_2412MHz_SU_/_Ant1 (SISO)_NTNV



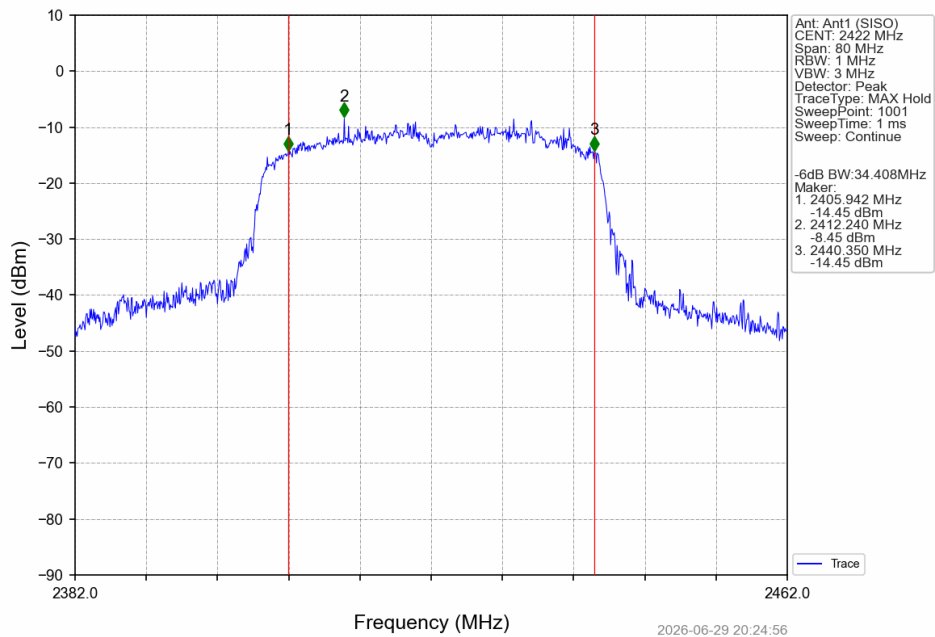
802.11ax(HEW20)_MCH_2437MHz_SU_/_Ant1 (SISO)_NTNV



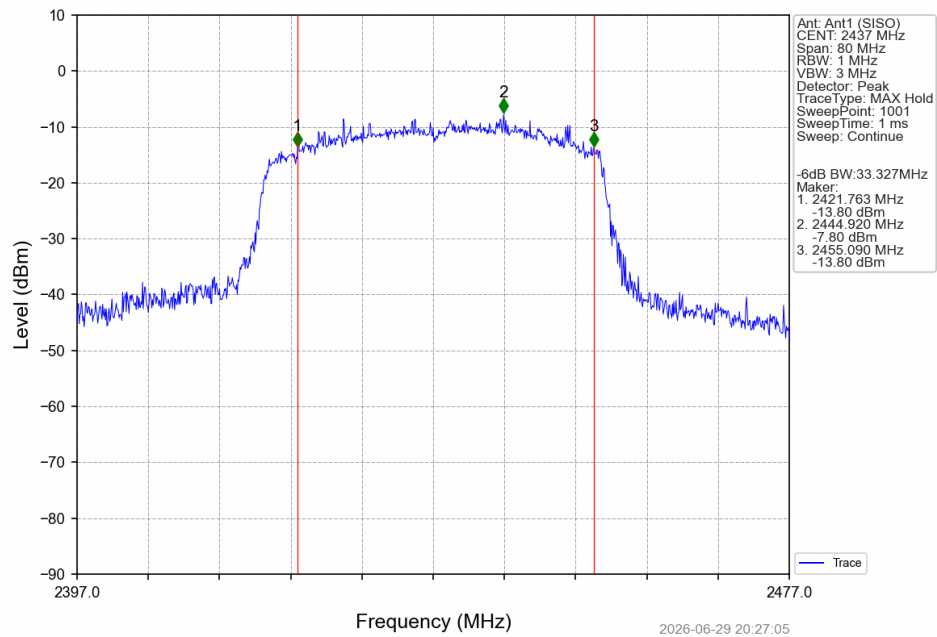
802.11ax(HEW20)_HCH_2462MHz_SU_/_Ant1 (SISO)_NTNV



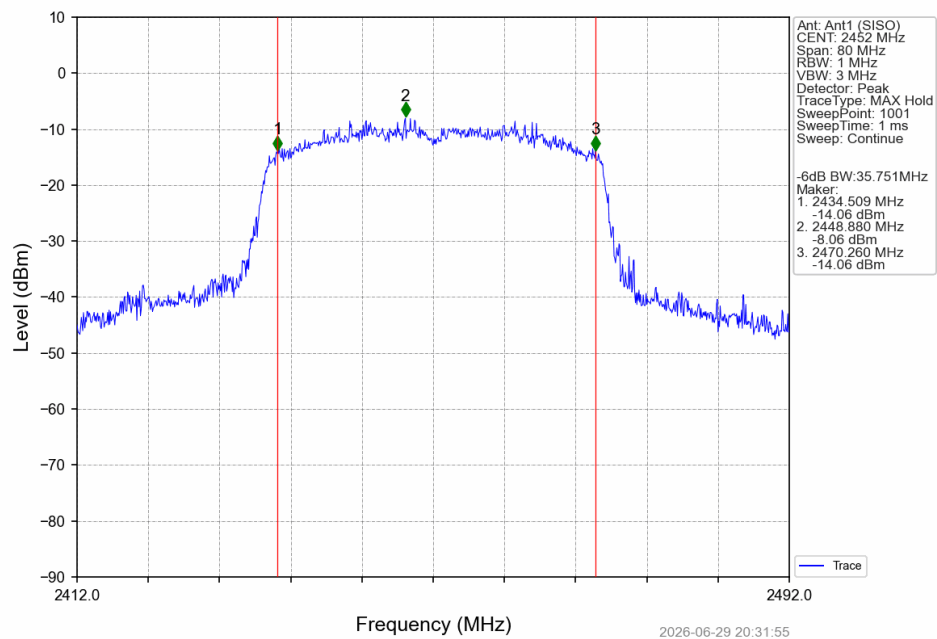
802.11ax(HEW40)_LCH_2422MHz_SU_/_Ant1 (SISO)_NTNV



802.11ax(HEW40)_MCH_2437MHz_SU_/_Ant1 (SISO)_NTNV



802.11ax(HEW40)_HCH_2452MHz_SU_/_Ant1 (SISO)_NTNV



3. Maximum Conducted Output Power

3.1 Test Result

3.1.1 Power

Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
802.11b	SISO	2412	2.22	<=30	Pass
		2437	3.26	<=30	Pass
		2462	2.98	<=30	Pass
802.11g	SISO	2412	5.50	<=30	Pass
		2437	6.31	<=30	Pass
		2462	5.83	<=30	Pass
802.11n (HT20)	SISO	2412	4.00	<=30	Pass
		2437	4.17	<=30	Pass
		2462	4.38	<=30	Pass
802.11n (HT40)	SISO	2422	2.65	<=30	Pass
		2437	3.14	<=30	Pass
		2452	3.23	<=30	Pass
802.11ax (HEW20)	SISO	2412	4.71	<=30	Pass
		2437	5.49	<=30	Pass
		2462	5.00	<=30	Pass
802.11ax (HEW40)	SISO	2422	3.10	<=30	Pass
		2437	3.54	<=30	Pass
		2452	3.87	<=30	Pass

4. Maximum Power Spectral Density

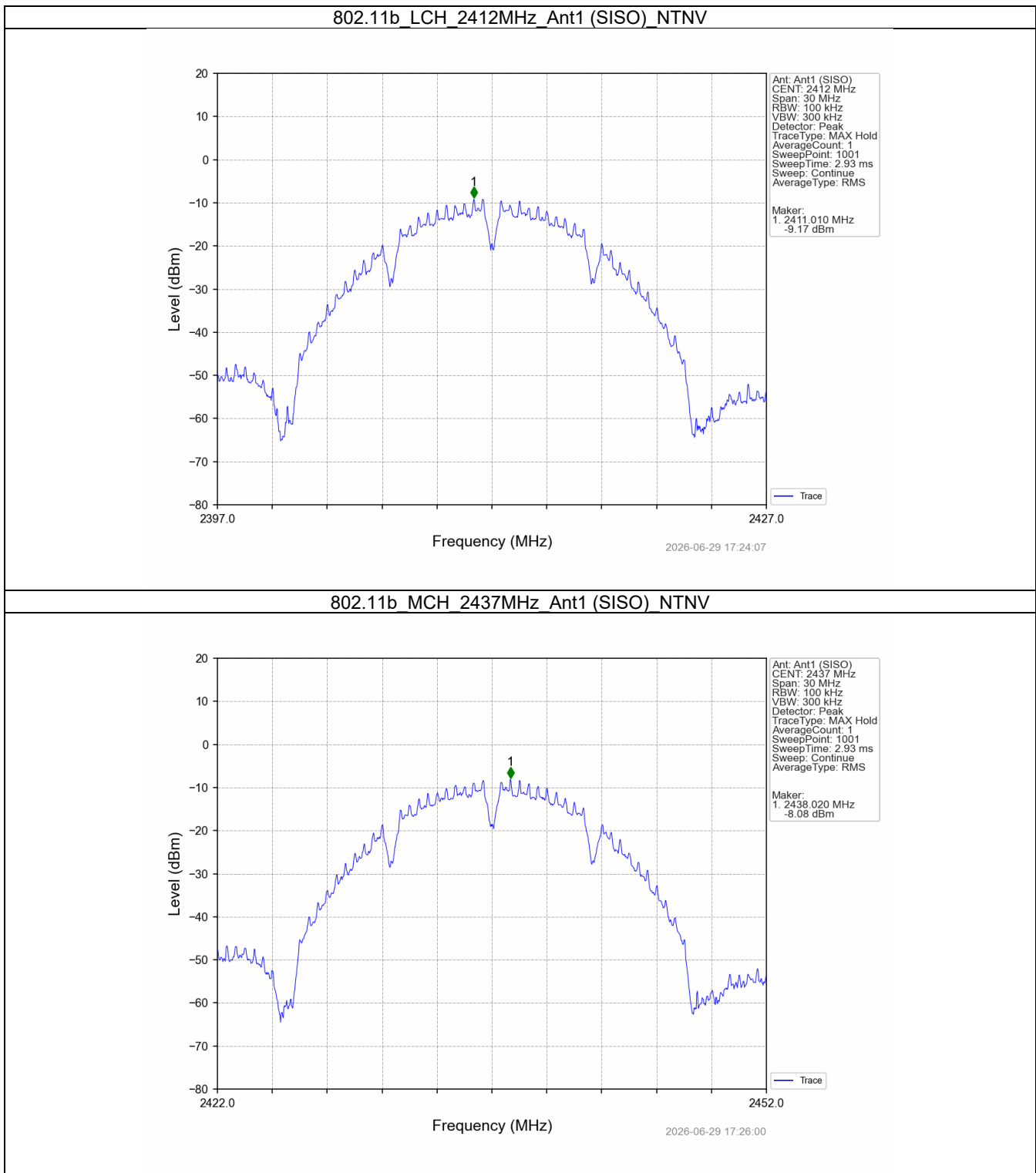
4.1 Test Result

4.1.1 PSD

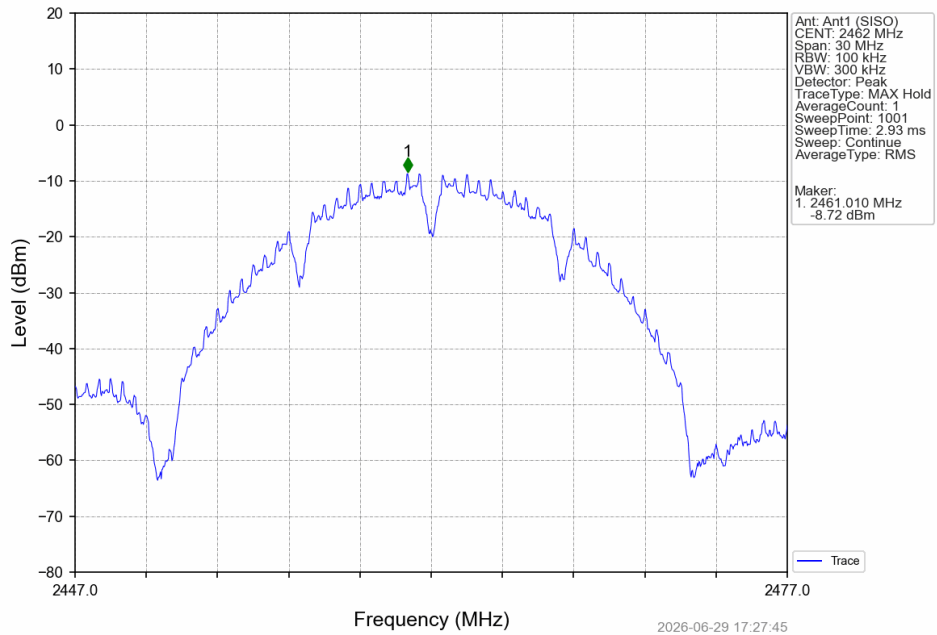
Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm)		Verdict
			ANT1	Limit(dBm/3kHz)	
802.11b	SISO	2412	-9.17dBm/100kHz	<=8	Pass
		2437	-8.08dBm/100kHz	<=8	Pass
		2462	-8.72dBm/100kHz	<=8	Pass
802.11g	SISO	2412	-15.43dBm/100kHz	<=8	Pass
		2437	-11.96dBm/100kHz	<=8	Pass
		2462	-13.59dBm/100kHz	<=8	Pass
802.11n (HT20)	SISO	2412	-14.99dBm/100kHz	<=8	Pass
		2437	-12.70dBm/100kHz	<=8	Pass
		2462	-13.58dBm/100kHz	<=8	Pass
802.11n (HT40)	SISO	2422	-18.31dBm/100kHz	<=8	Pass
		2437	-18.15dBm/100kHz	<=8	Pass
		2452	-18.15dBm/100kHz	<=8	Pass
802.11ax (HEW20)	SISO	2412	-14.39dBm/100kHz	<=8	Pass
		2437	-14.00dBm/100kHz	<=8	Pass
		2462	-14.77dBm/100kHz	<=8	Pass
802.11ax (HEW40)	SISO	2422	-17.88dBm/100kHz	<=8	Pass
		2437	-18.01dBm/100kHz	<=8	Pass
		2452	-17.53dBm/100kHz	<=8	Pass

4.2 Test Graph

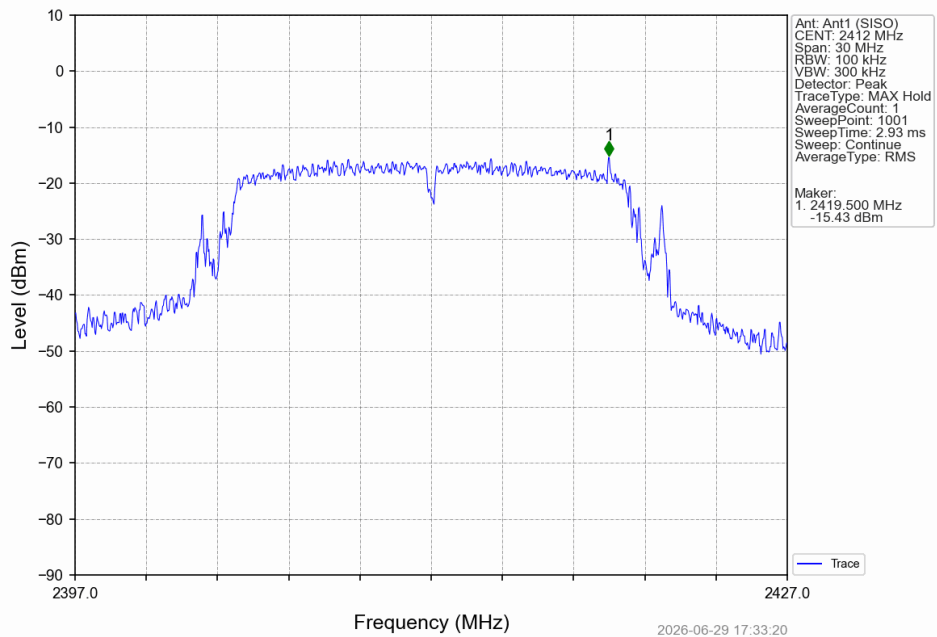
4.2.1 PSD



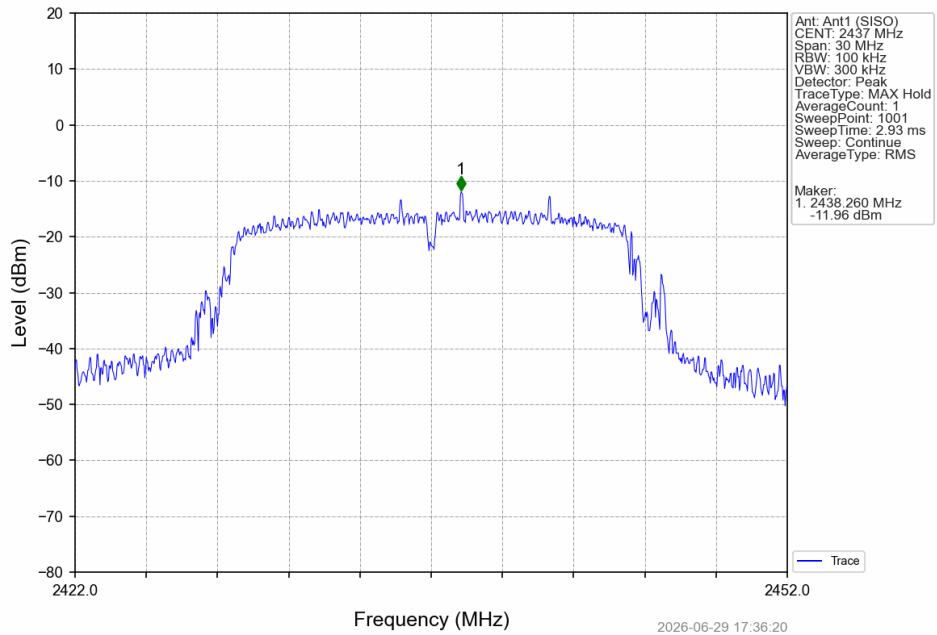
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



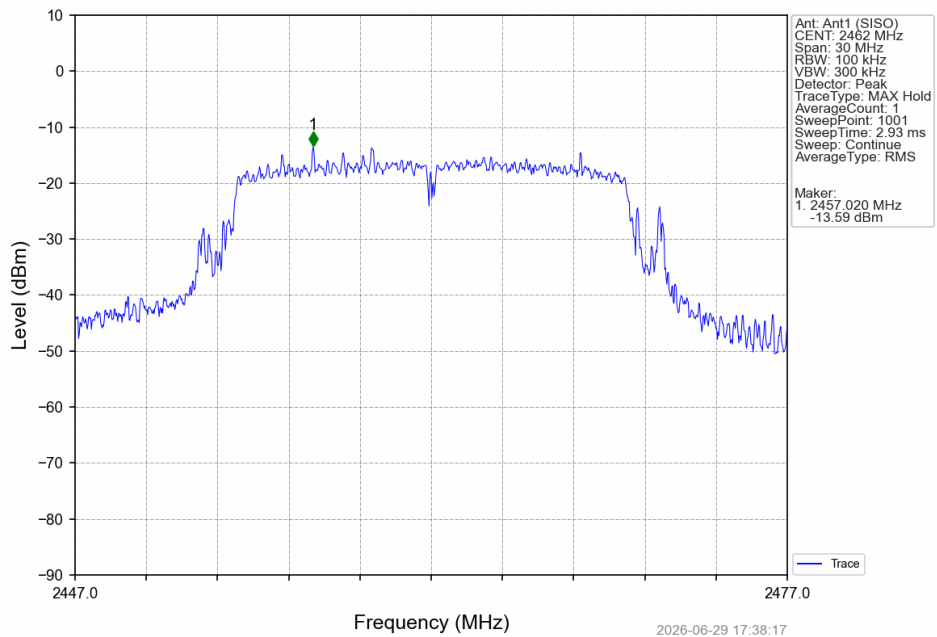
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



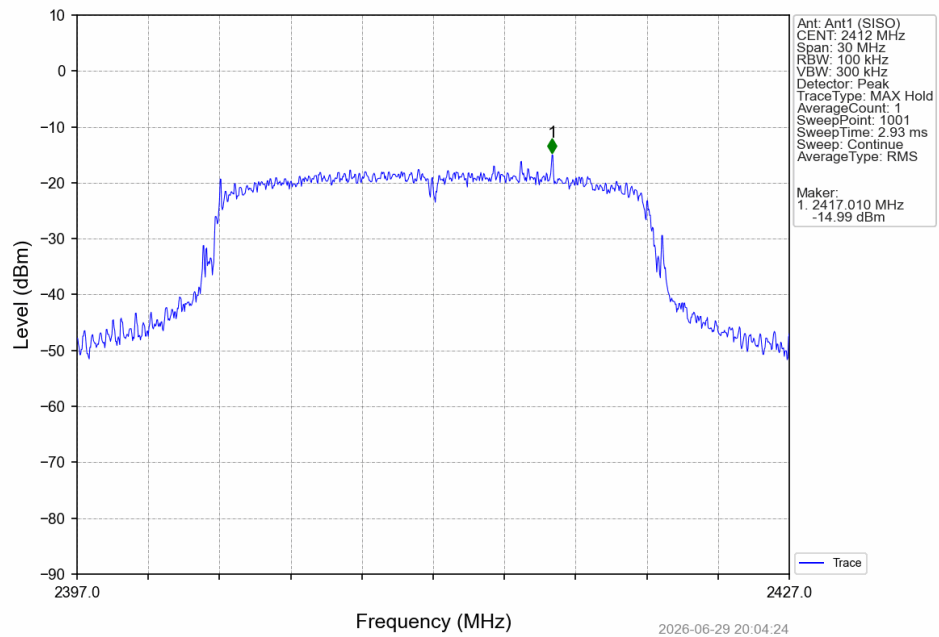
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



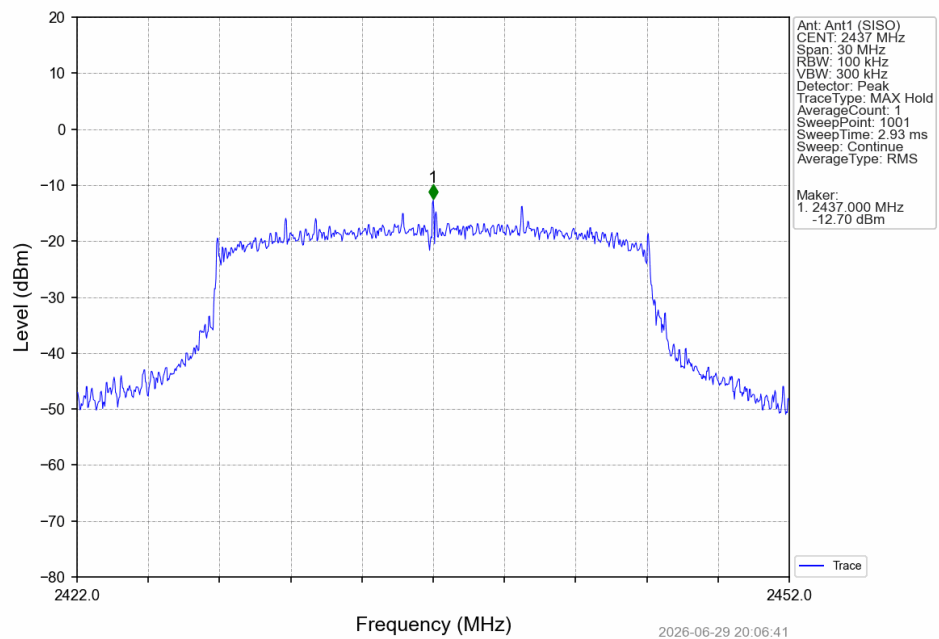
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



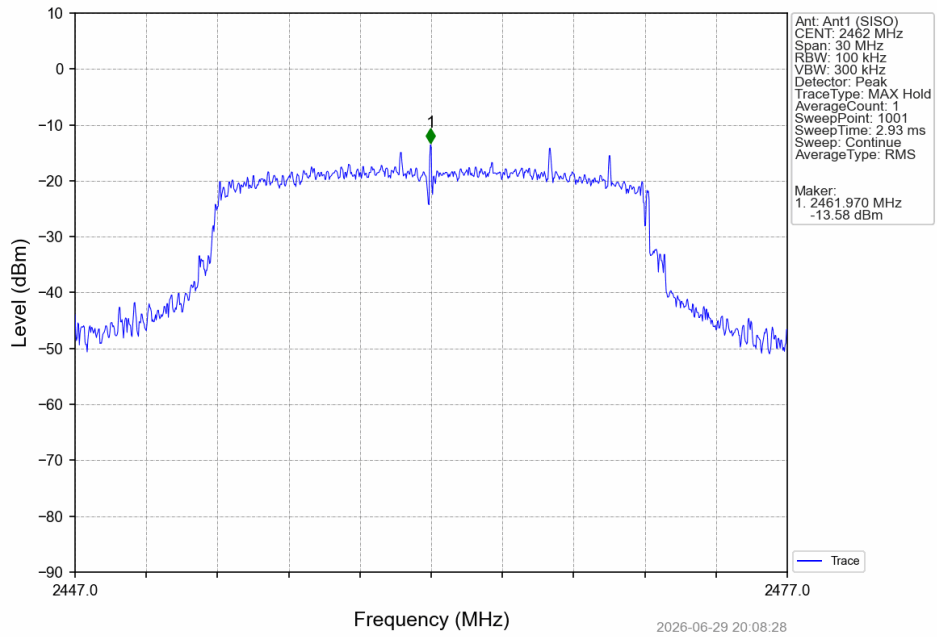
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



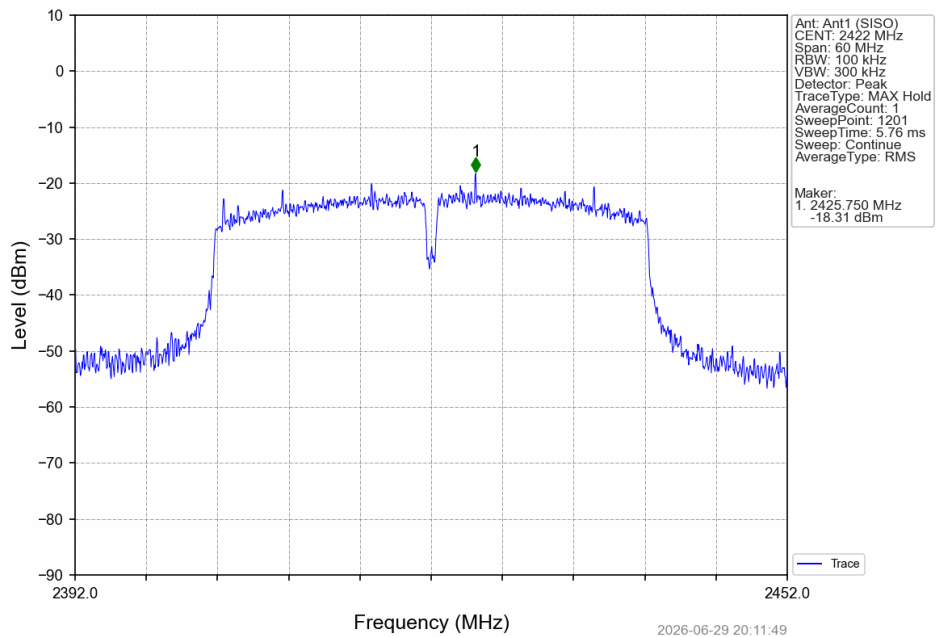
802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



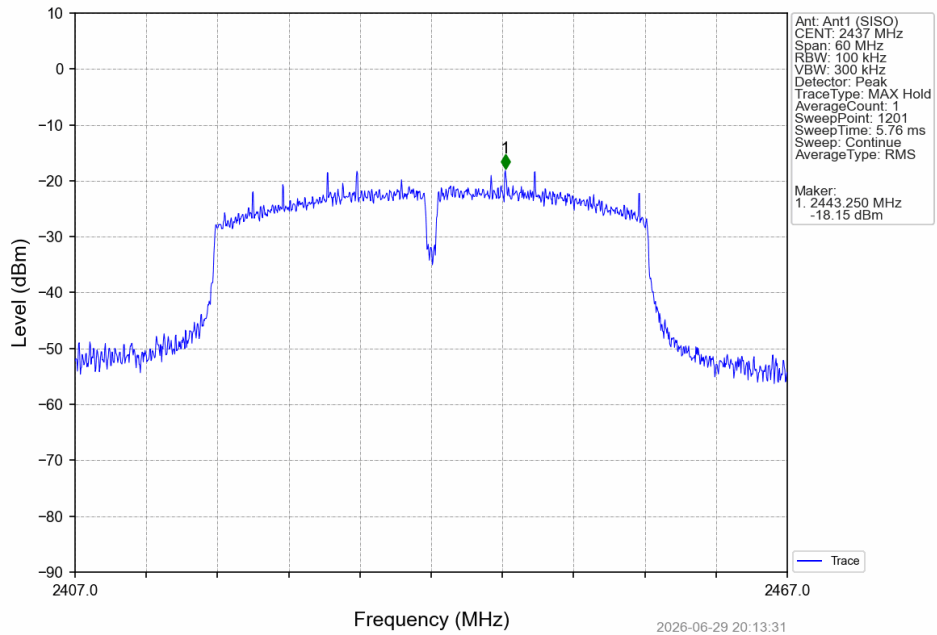
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



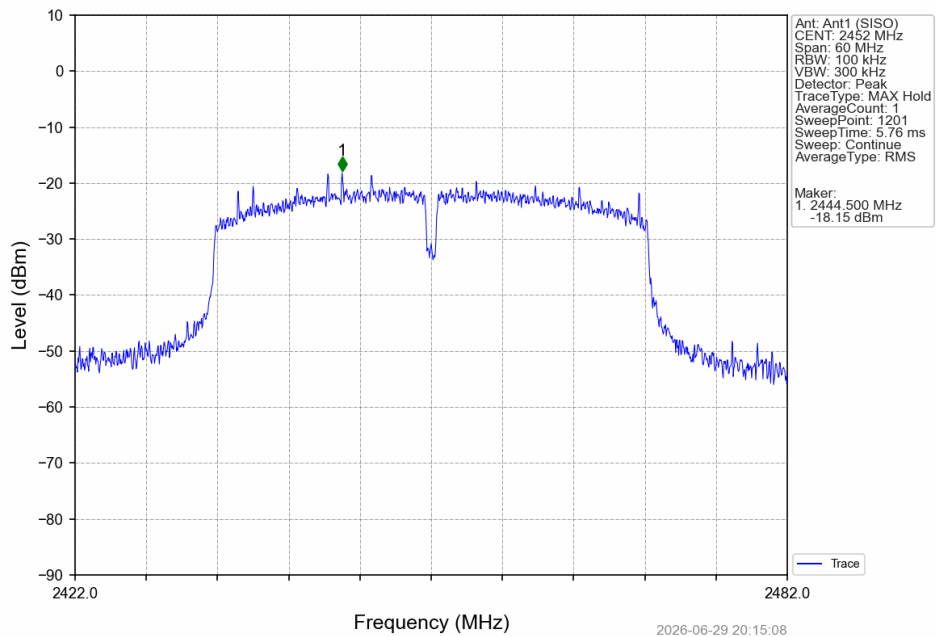
802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



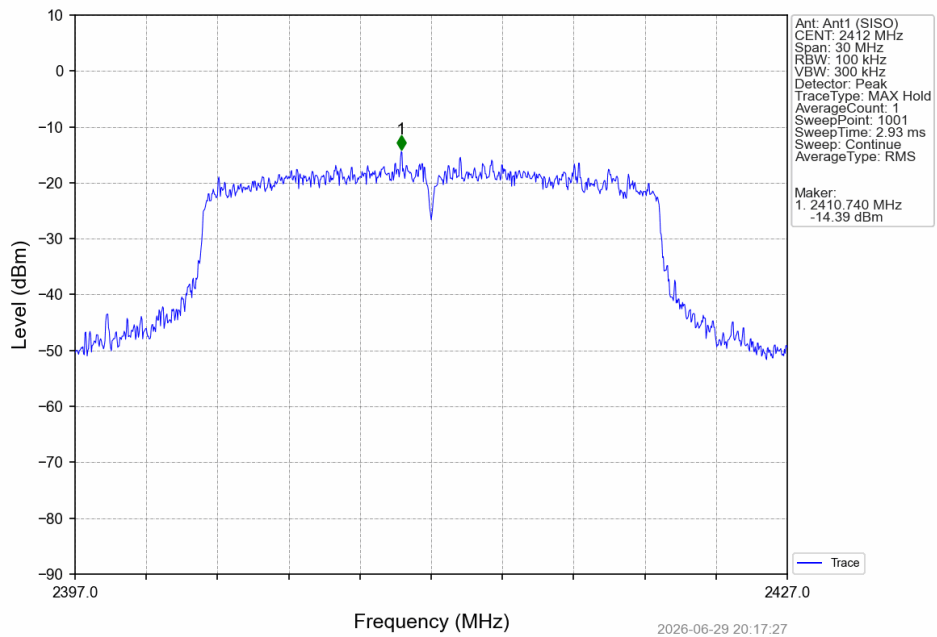
802.11n(HT40)_MCH_2437MHz_Ant1 (SISO)_NTNV



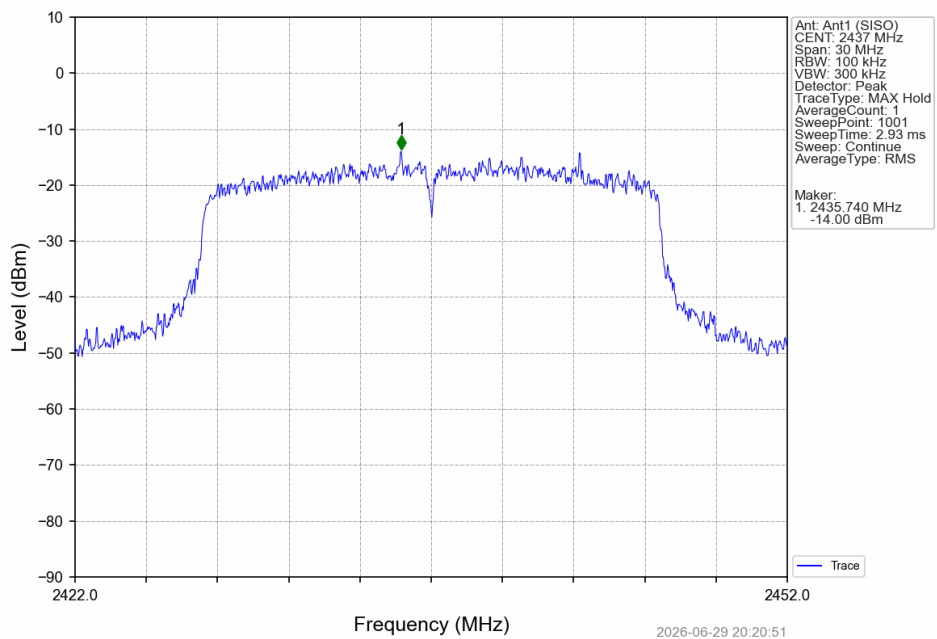
802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



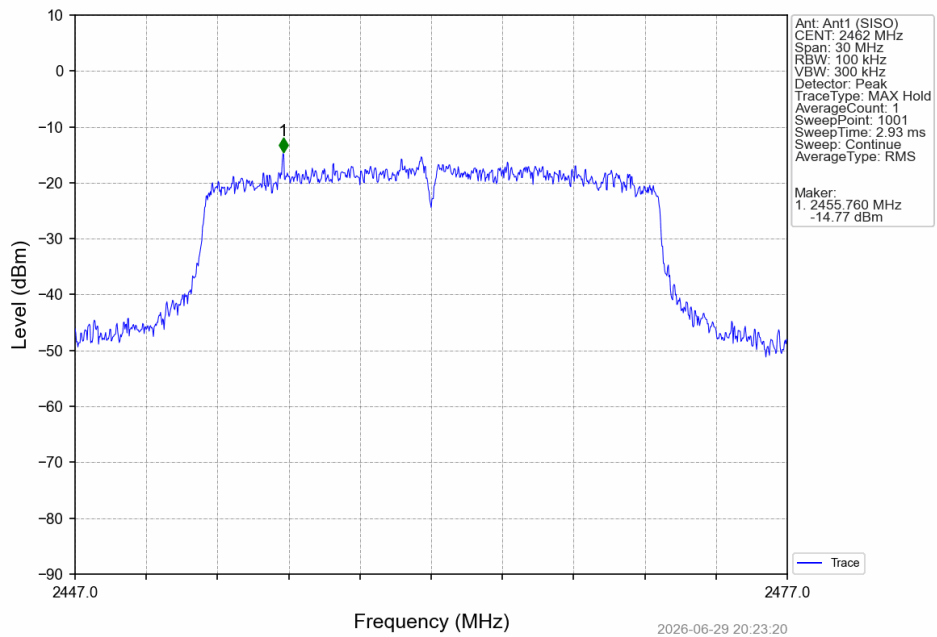
802.11ax(HEW20)_LCH_2412MHz_SU / _Ant1 (SISO)_NTNV



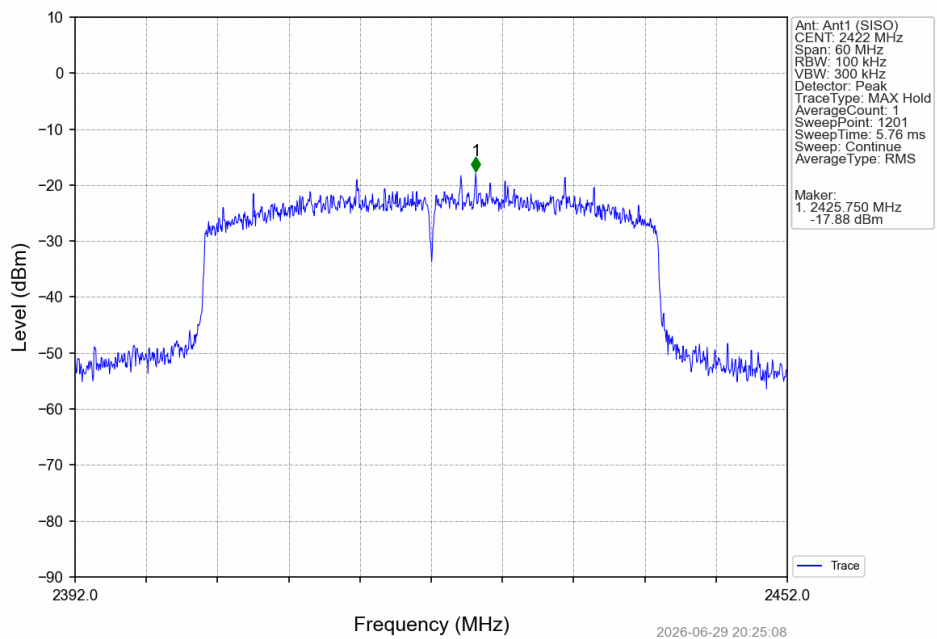
802.11ax(HEW20)_MCH_2437MHz_SU / _Ant1 (SISO)_NTNV



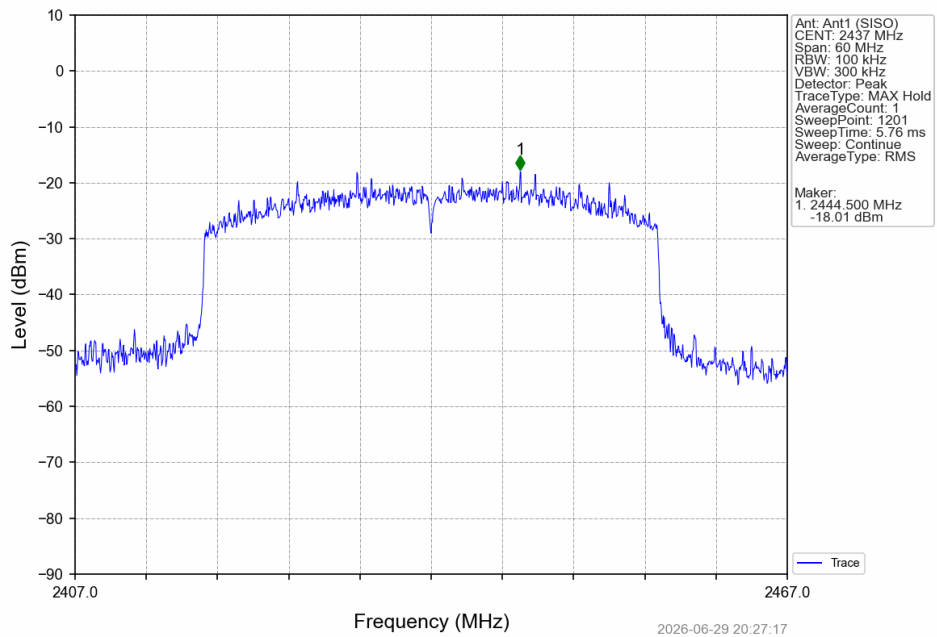
802.11ax(HEW20)_HCH_2462MHz_SU_/_Ant1 (SISO)_NTNV



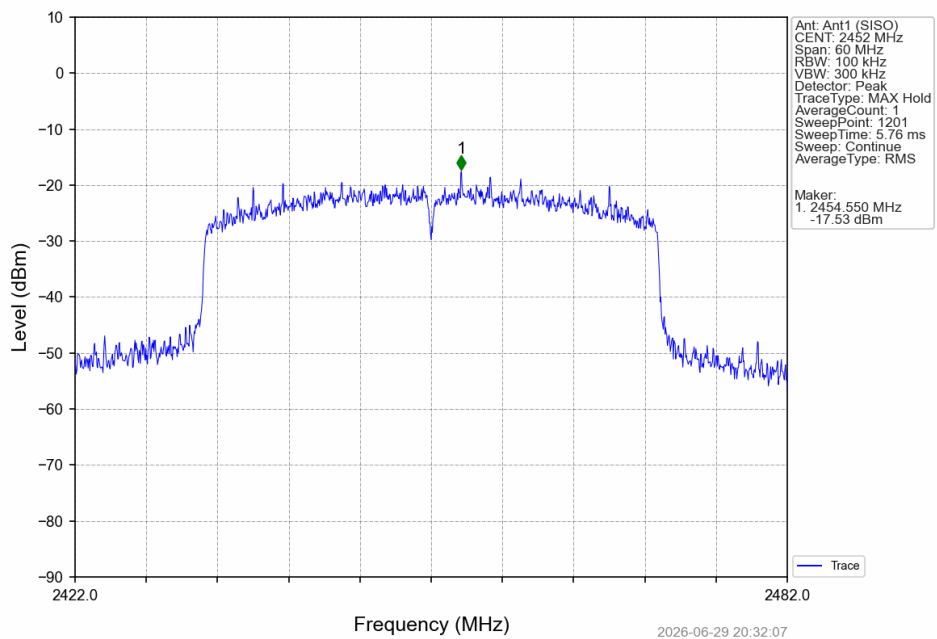
802.11ax(HEW40)_LCH_2422MHz_SU_/_Ant1 (SISO)_NTNV



802.11ax(HEW40)_MCH_2437MHz_SU_/_Ant1 (SISO)_NTNV



802.11ax(HEW40)_HCH_2452MHz_SU_/_Ant1 (SISO)_NTNV



5. Unwanted Emissions In Non-restricted Frequency Bands

5.1 Test Result

5.1.1 Ref

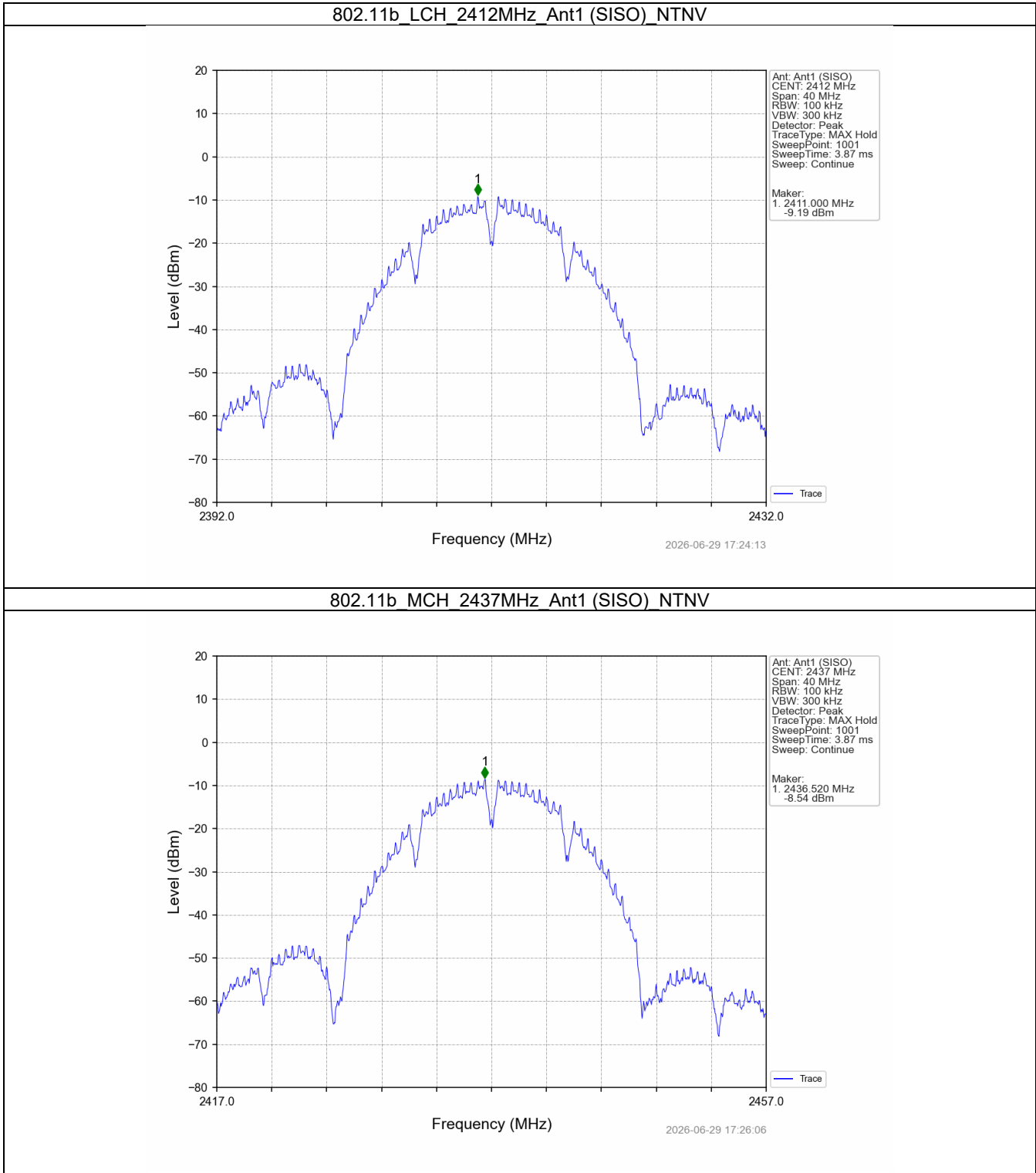
Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)
802.11b	SISO	2412	1	-9.19
		2437	1	-8.54
		2462	1	-8.82
802.11g	SISO	2412	1	-14.72
		2437	1	-12.39
		2462	1	-12.52
802.11n (HT20)	SISO	2412	1	-13.23
		2437	1	-12.28
		2462	1	-14.17
802.11n (HT40)	SISO	2422	1	-18.31
		2437	1	-17.22
		2452	1	-17.80
802.11ax (HEW20)	SISO	2412	1	-14.80
		2437	1	-13.52
		2462	1	-14.57
802.11ax (HEW40)	SISO	2422	1	-18.77
		2437	1	-17.25
		2452	1	-17.60

5.1.2 CSE

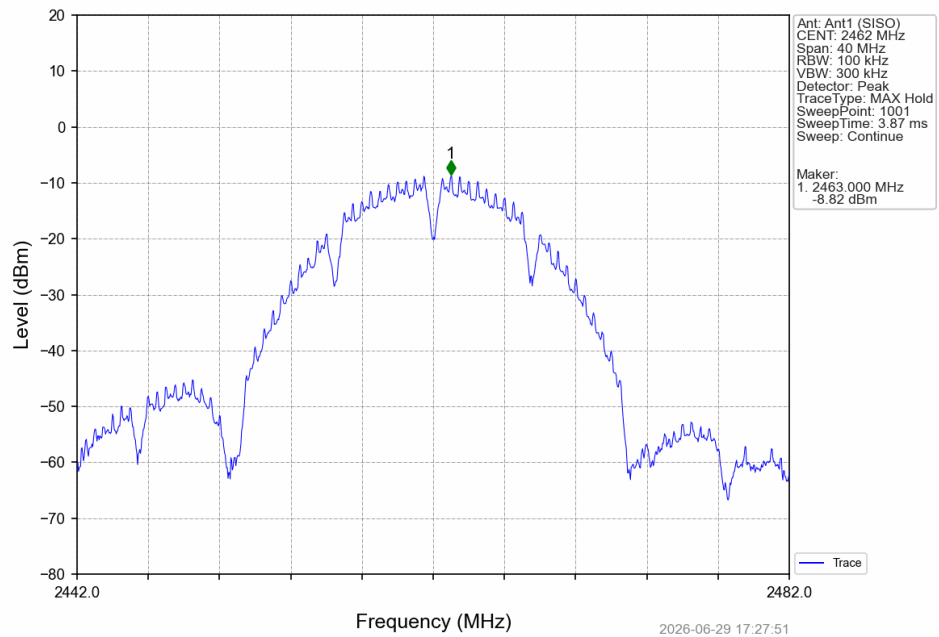
Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
802.11b	SISO	2412	1	-9.19	-29.19	Pass
		2437	1	-8.54	-28.54	Pass
		2462	1	-8.82	-28.82	Pass
802.11g	SISO	2412	1	-14.72	-34.72	Pass
		2437	1	-12.39	-32.39	Pass
		2462	1	-12.52	-32.52	Pass
802.11n (HT20)	SISO	2412	1	-13.23	-33.23	Pass
		2437	1	-12.28	-32.28	Pass
		2462	1	-14.17	-34.17	Pass
802.11n (HT40)	SISO	2422	1	-18.31	-38.31	Pass
		2437	1	-17.22	-37.22	Pass
		2452	1	-17.80	-37.80	Pass
802.11ax (HEW20)	SISO	2412	1	-14.80	-34.80	Pass
		2437	1	-13.52	-33.52	Pass
		2462	1	-14.57	-34.57	Pass
802.11ax (HEW40)	SISO	2422	1	-18.77	-38.77	Pass
		2437	1	-17.25	-37.25	Pass
		2452	1	-17.60	-37.60	Pass

5.2 Test Graph

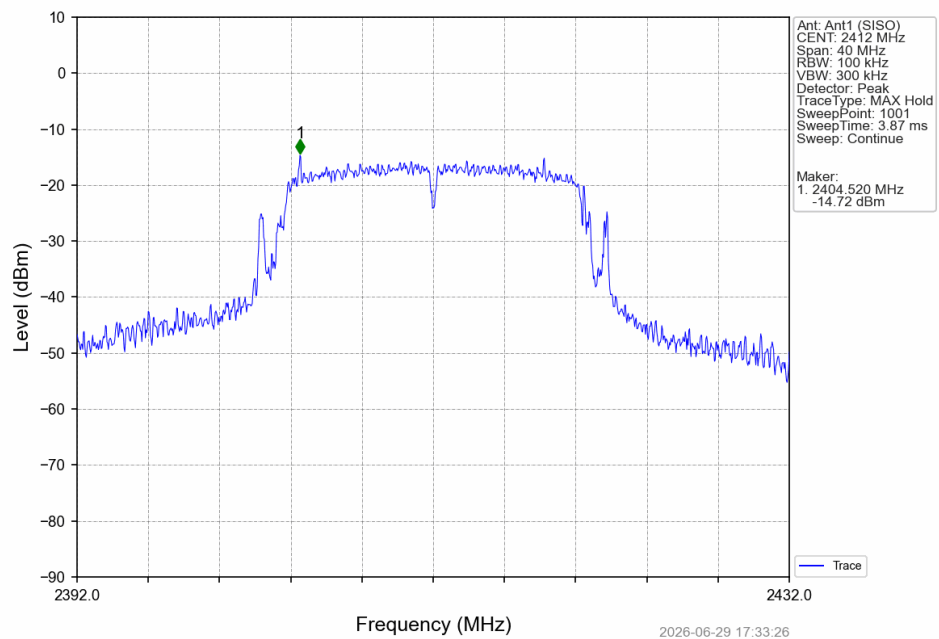
5.2.1 Ref



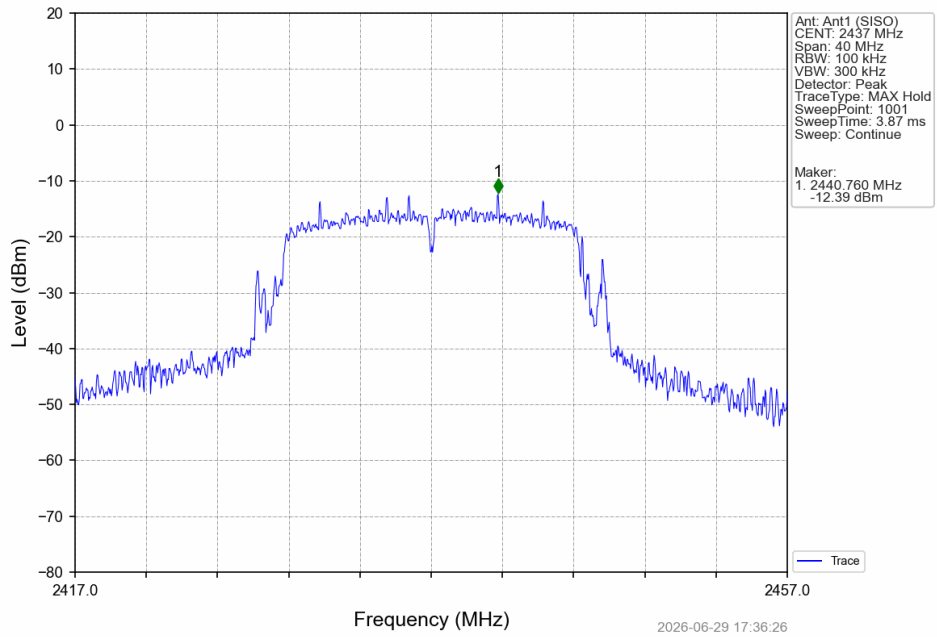
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



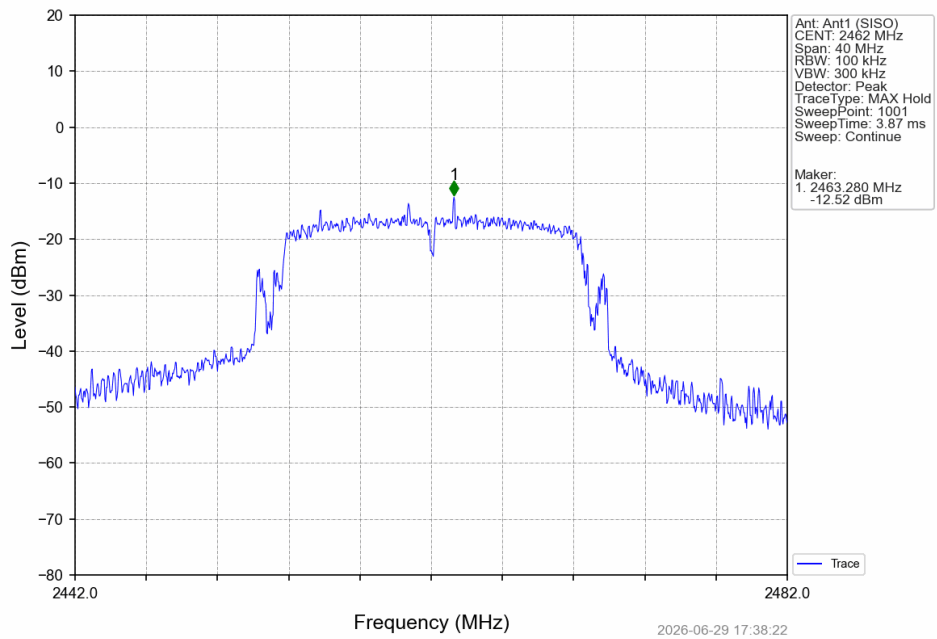
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



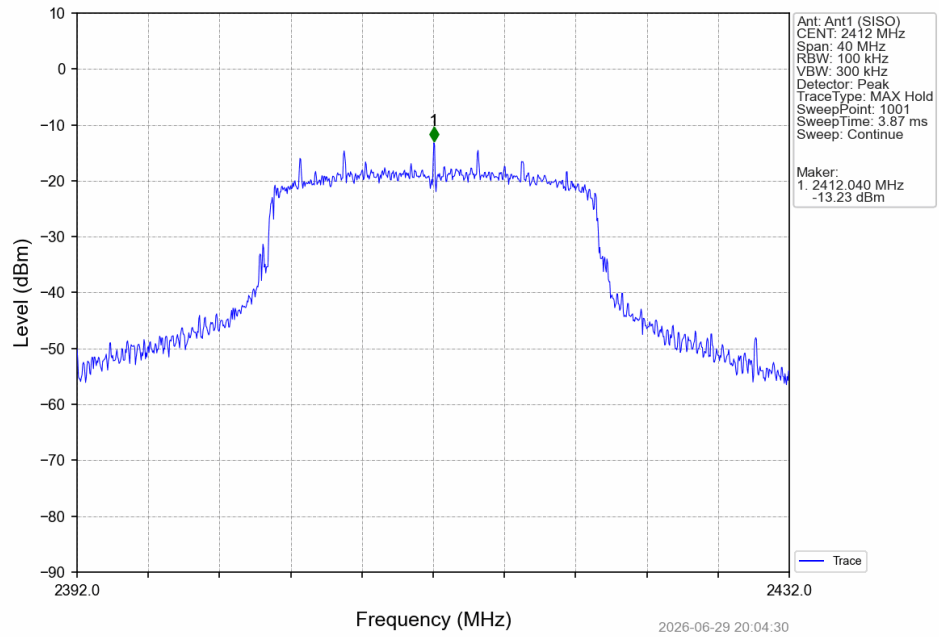
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



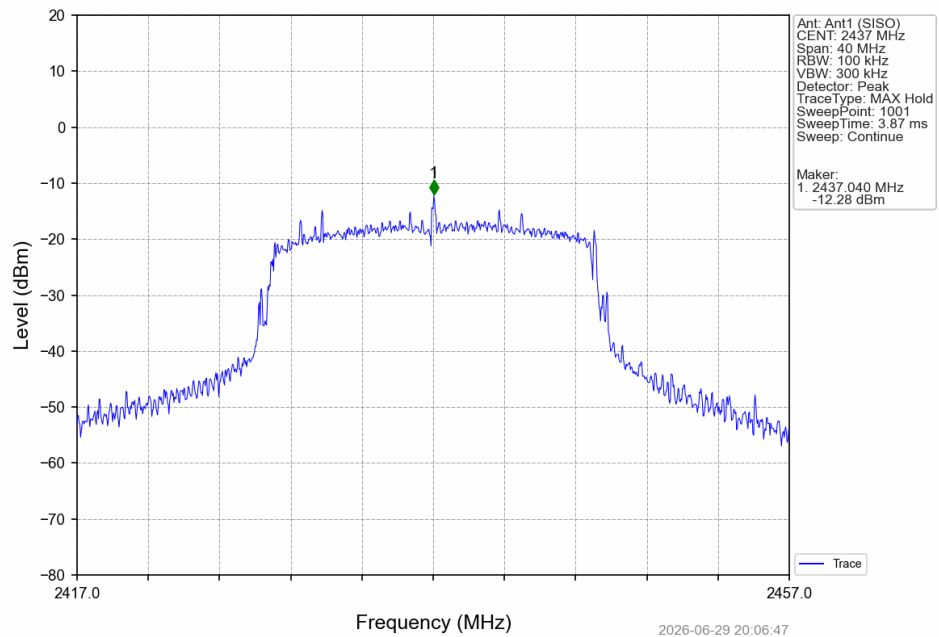
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



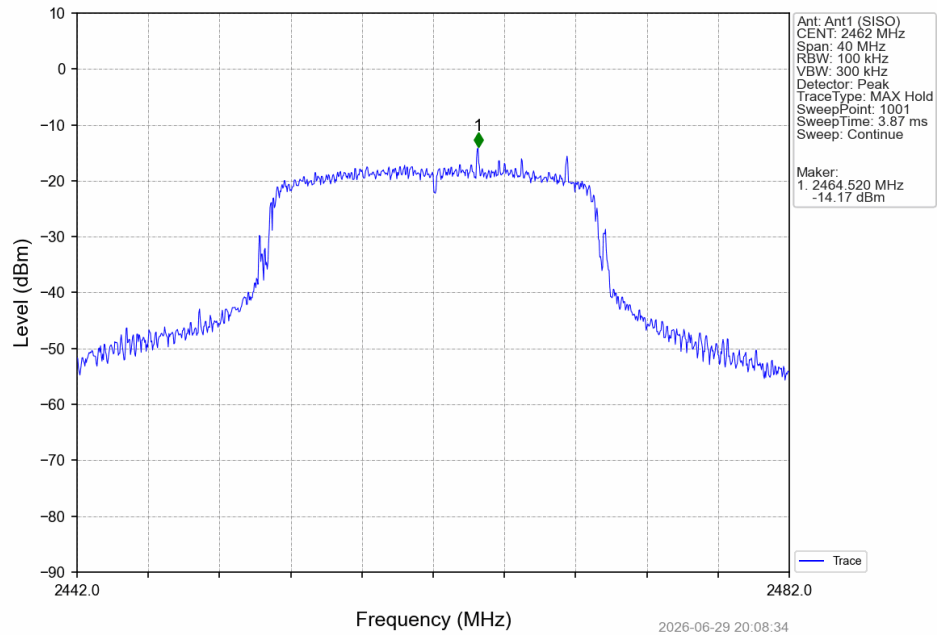
802.11n(HT20)_LCH_2412MHz_Ant1 (SISO)_NTNV



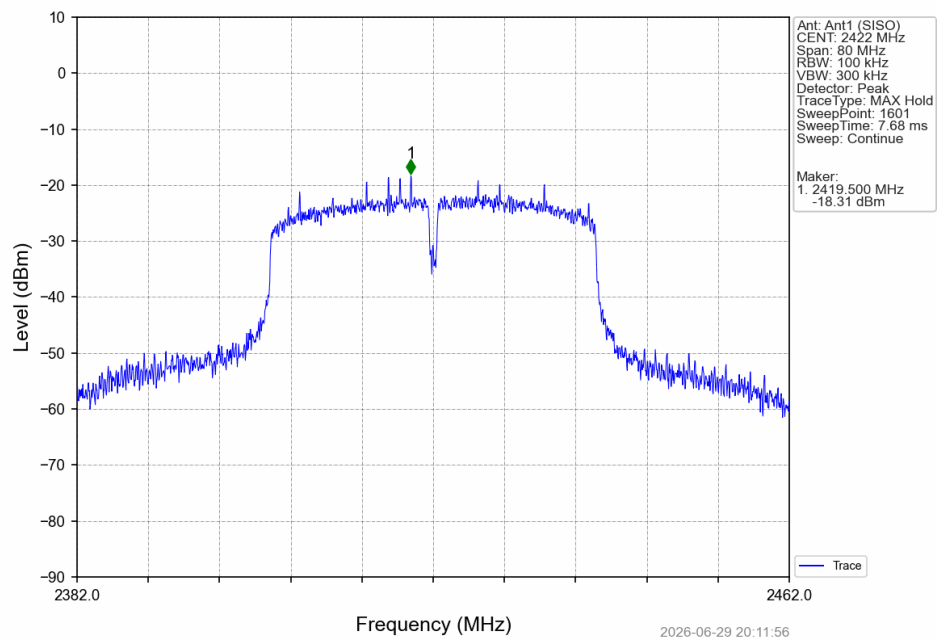
802.11n(HT20)_MCH_2437MHz_Ant1 (SISO)_NTNV



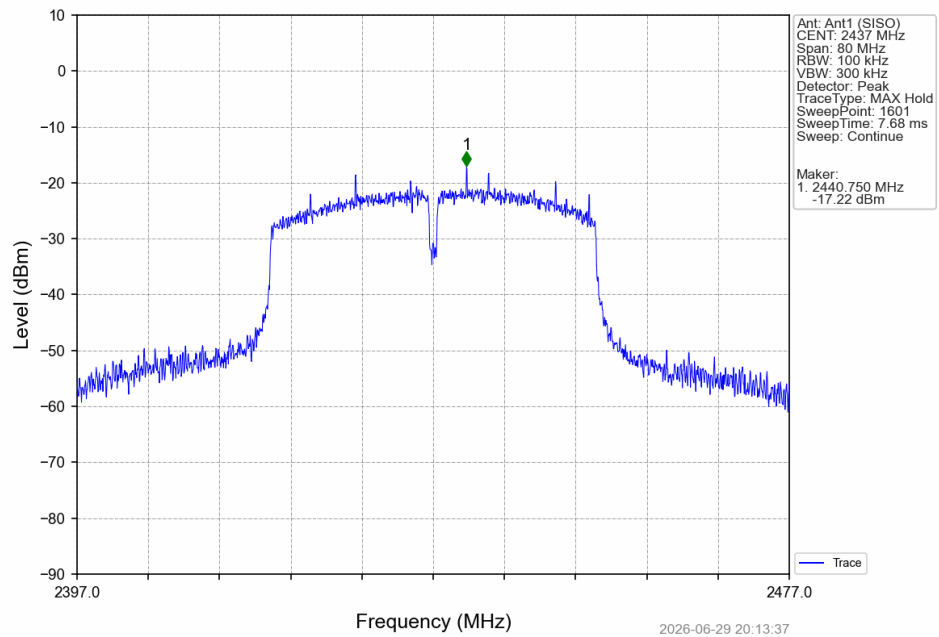
802.11n(HT20)_HCH_2462MHz_Ant1 (SISO)_NTNV



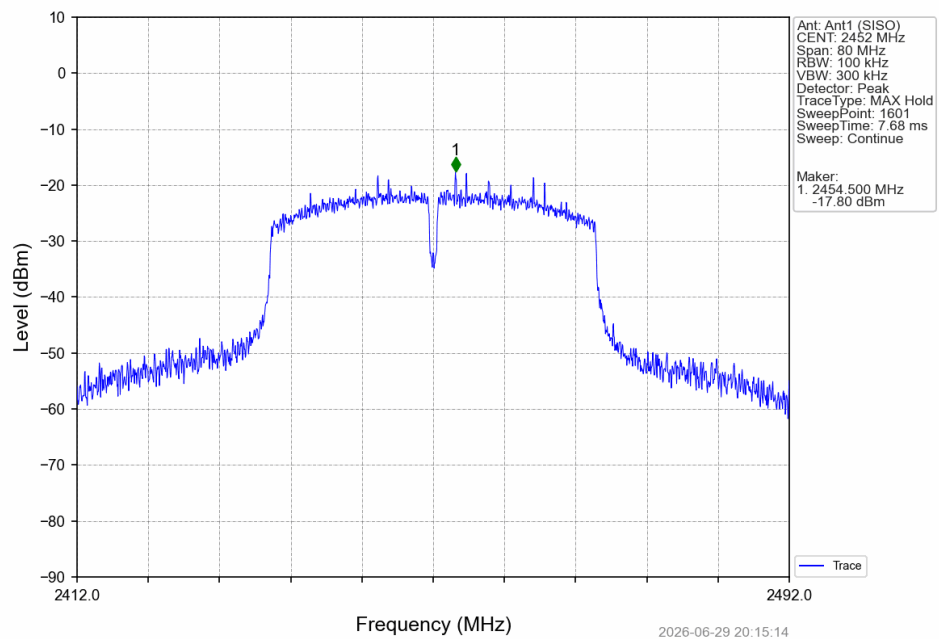
802.11n(HT40)_LCH_2422MHz_Ant1 (SISO)_NTNV



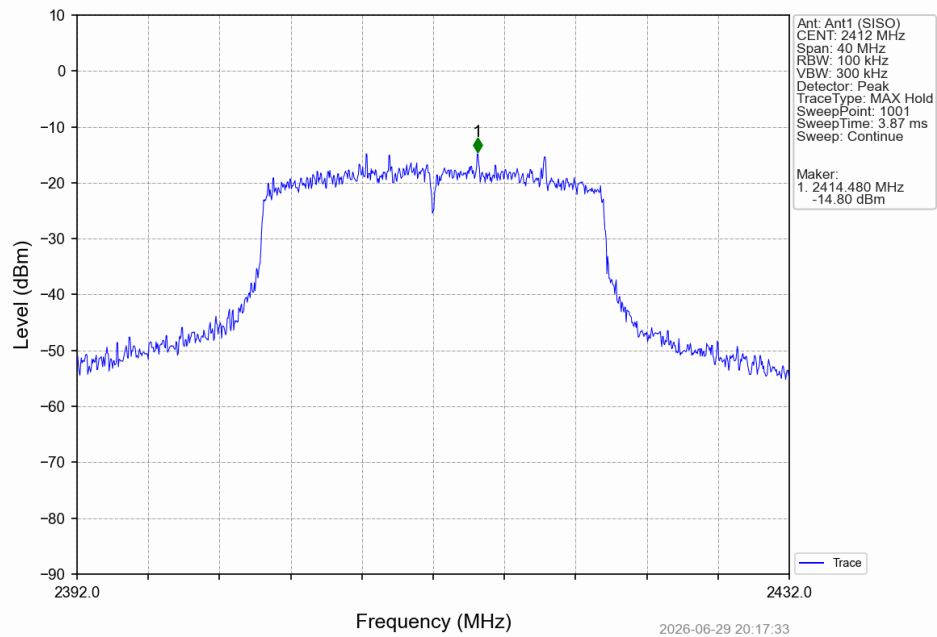
802.11n(HT40)_MCH_2437MHz_Ant1 (SISO)_NTNV



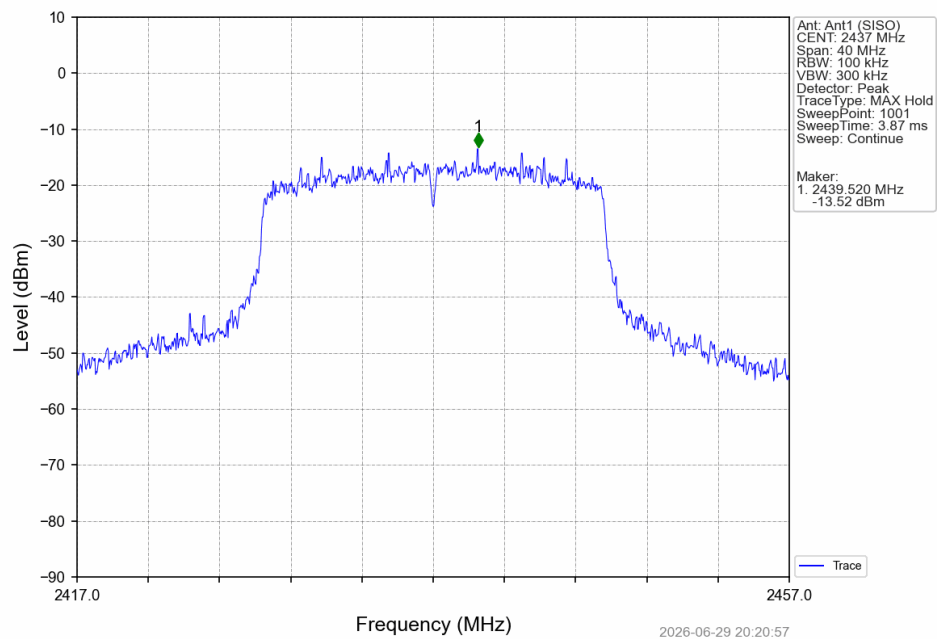
802.11n(HT40)_HCH_2452MHz_Ant1 (SISO)_NTNV



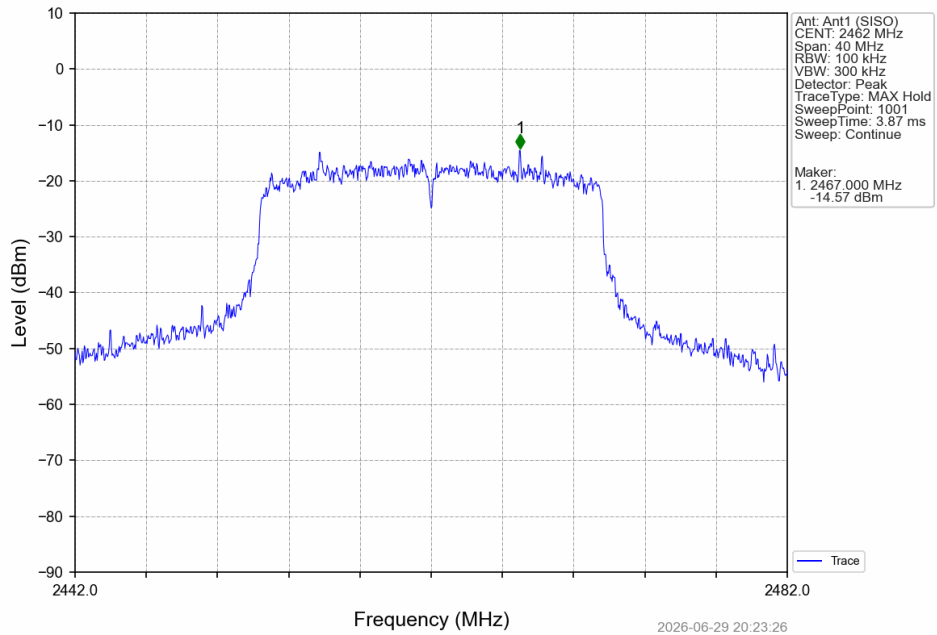
802.11ax(HEW20)_LCH_2412MHz_SU_/_Ant1 (SISO)_NTNV



802.11ax(HEW20)_MCH_2437MHz_SU_/_Ant1 (SISO)_NTNV



802.11ax(HEW20)_HCH_2462MHz_SU_/_Ant1 (SISO)_NTNV



802.11ax(HEW40)_LCH_2422MHz_SU_/_Ant1 (SISO)_NTNV

