Appendix A for SHEM210700841901

1. Duty Cycle

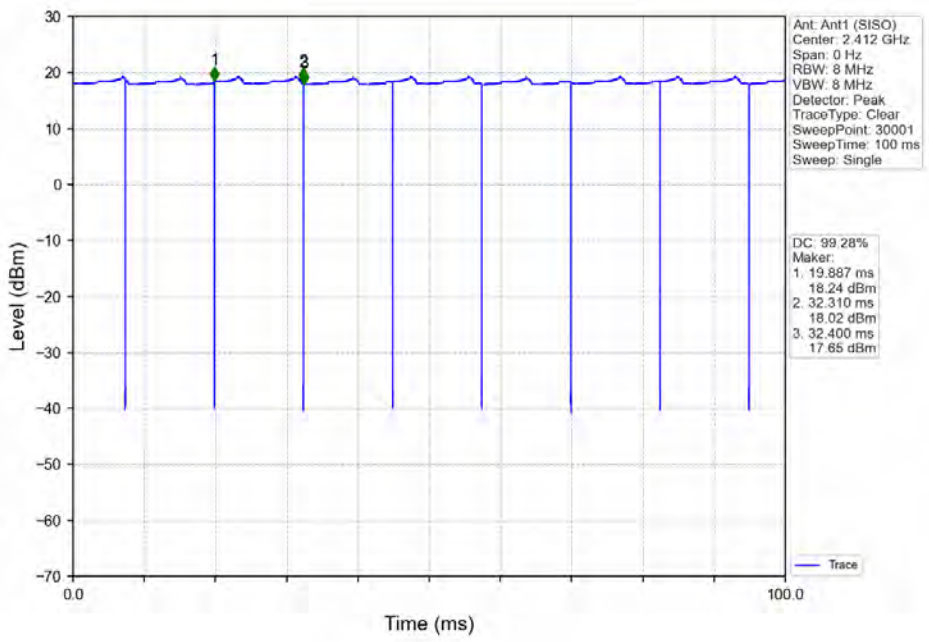
1.1 Ant1

1.1.1 Test Result

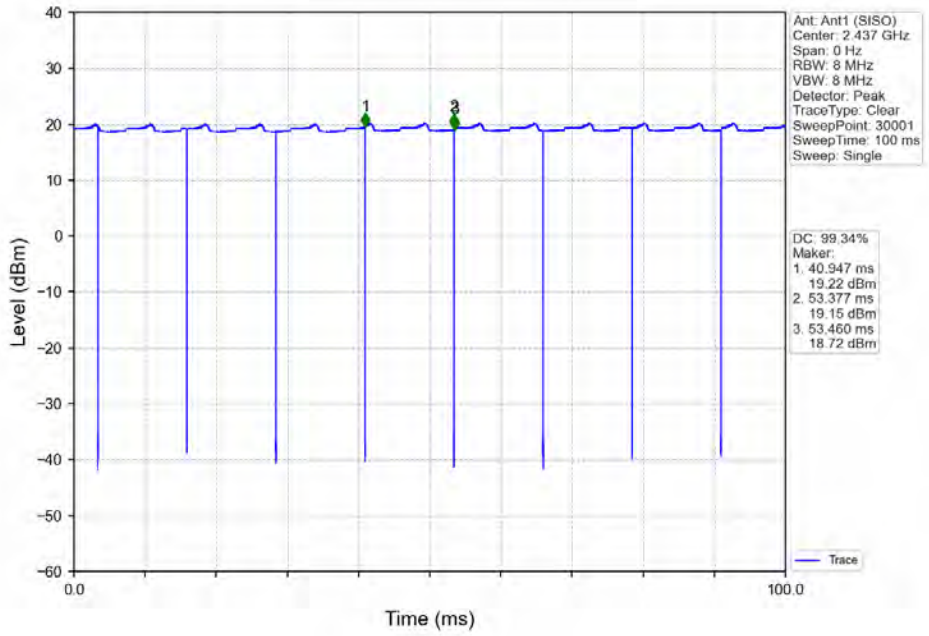
Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
802.11b	SISO	2412	12.423	12.513	99.28	0.03	0.03
		2437	12.430	12.513	99.34	0.03	0.03
		2462	12.424	12.514	99.28	0.03	0.03
802.11g	SISO	2412	2.064	2.153	95.87	0.18	0.29
		2437	2.063	2.153	95.82	0.19	0.30
		2462	2.063	2.153	95.82	0.19	0.33
802.11n (HT20)	MIMO	2412	5.000	5.090	98.23	0.08	0.03
		2437	4.998	5.088	98.23	0.08	0.07
		2462	4.999	5.089	98.23	0.08	0.07
802.11n (HT40)	MIMO	2422	2.428	2.512	96.66	0.15	0.00
		2437	2.428	2.514	96.58	0.15	0.07
		2452	2.422	2.512	96.42	0.16	0.07

1.1.2 Test Graph

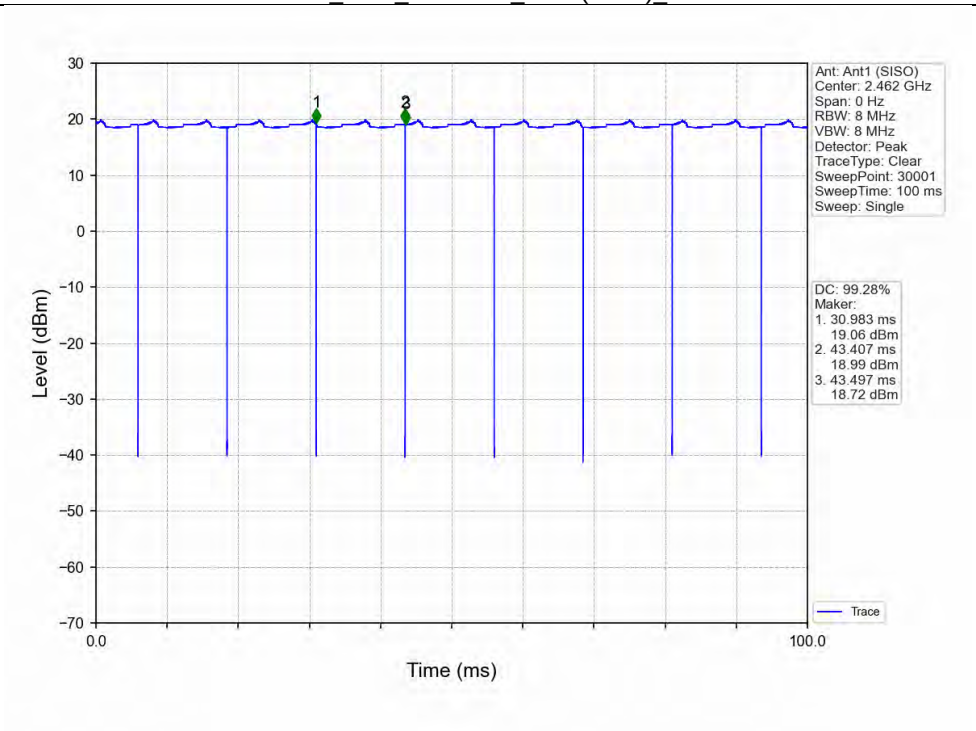
802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



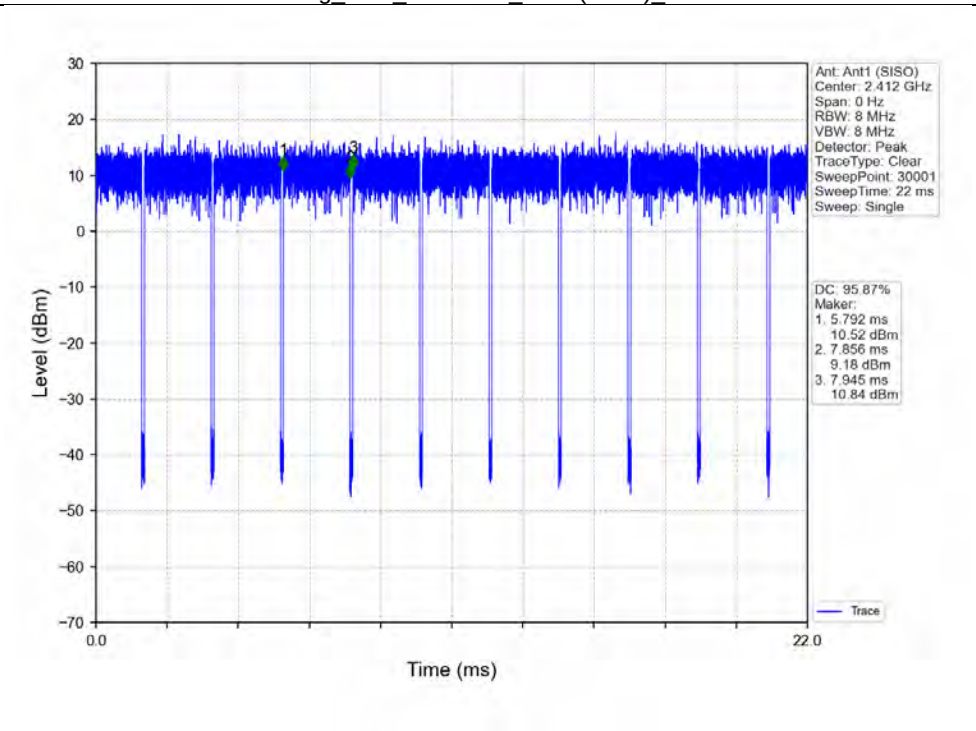
802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV



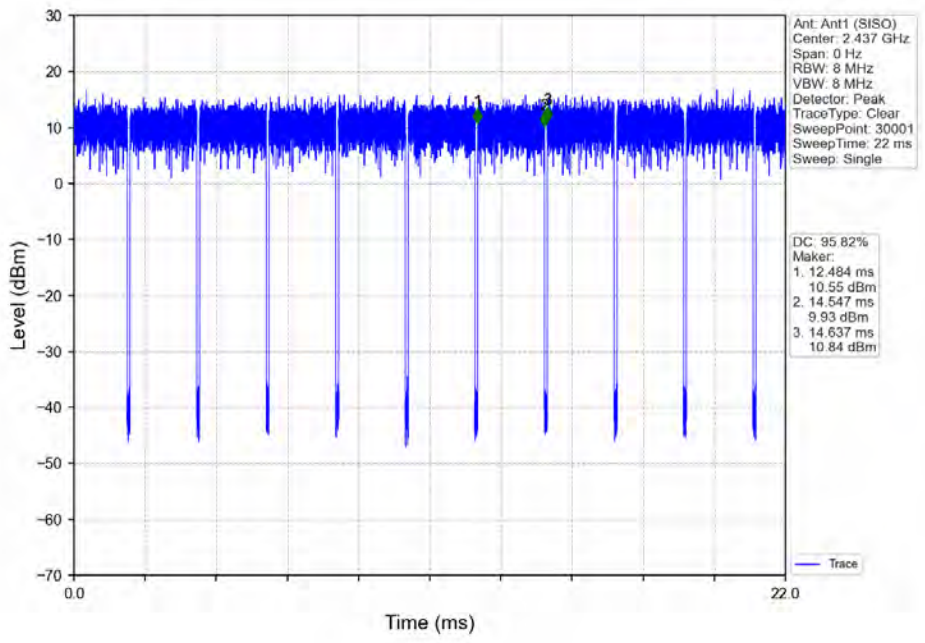
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



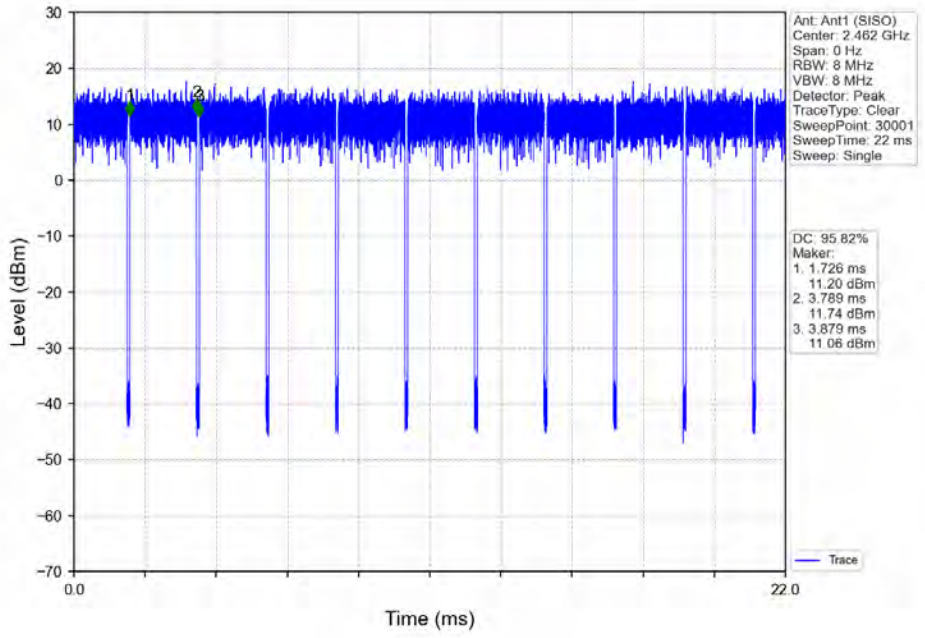
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



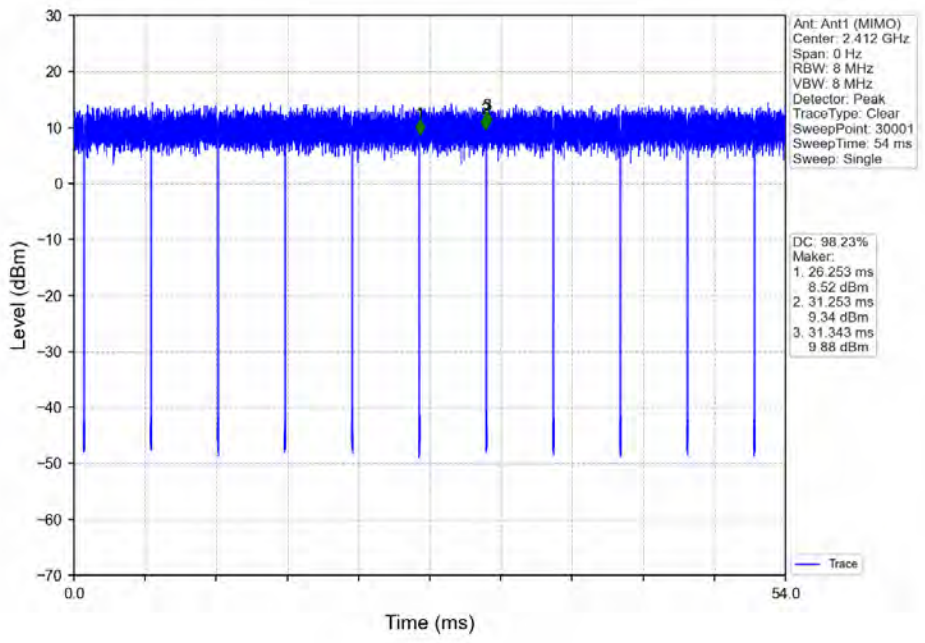
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



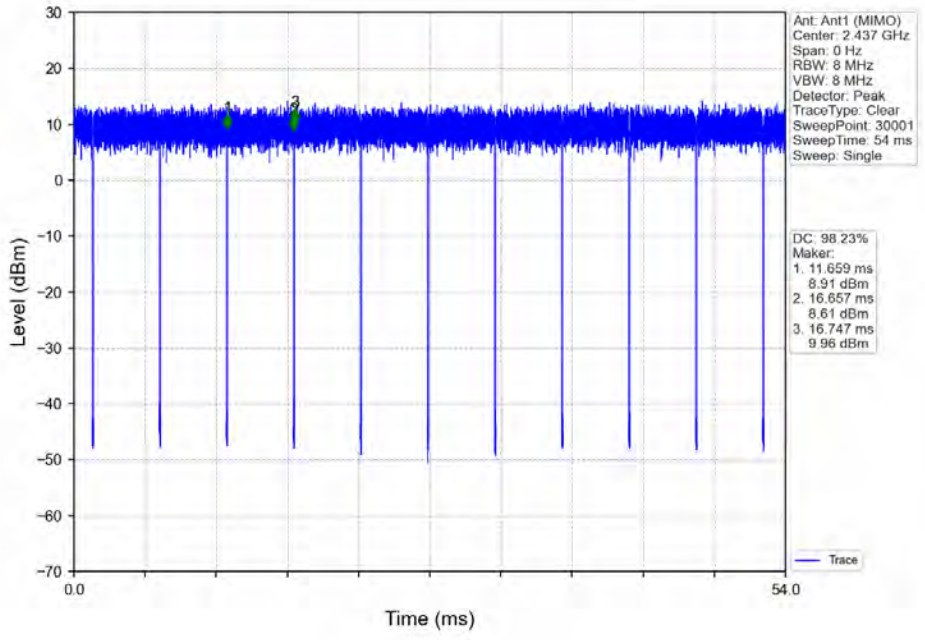
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



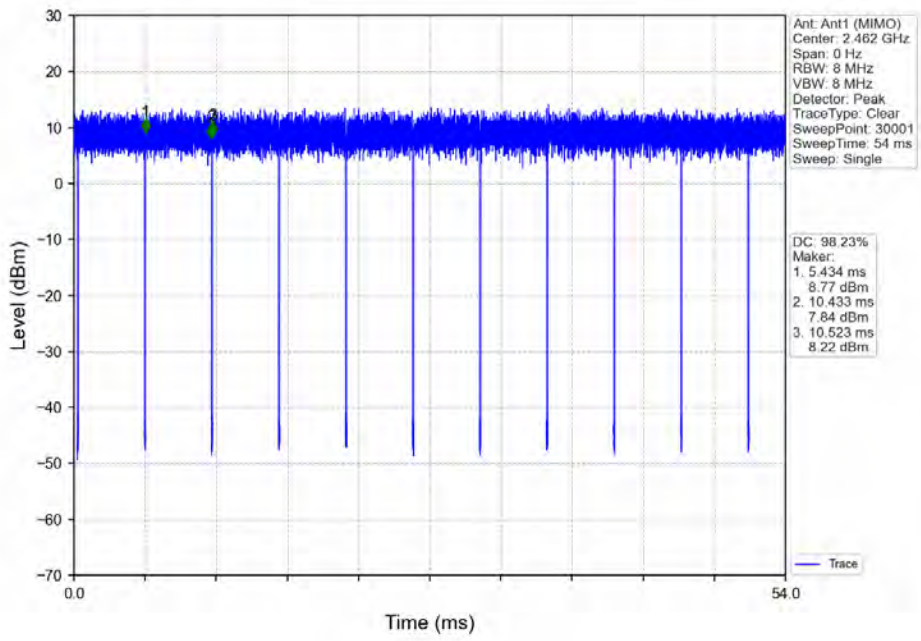
802.11n(HT20)_LCH_2412MHz_Ant1 (MIMO)_NTNV



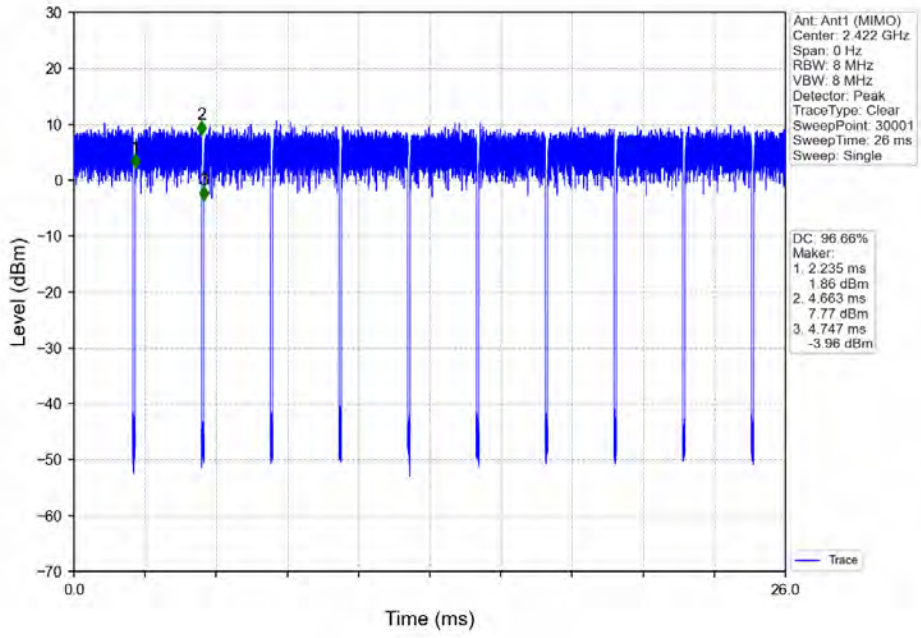
802.11n(HT20)_MCH_2437MHz_Ant1 (MIMO)_NTNV



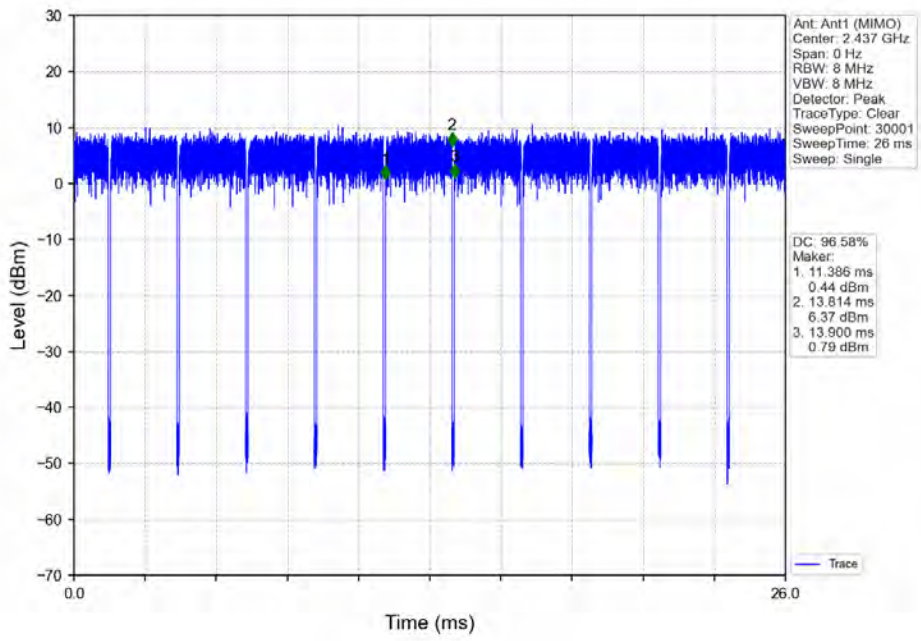
802.11n(HT20)_HCH_2462MHz_Ant1 (MIMO)_NTNV



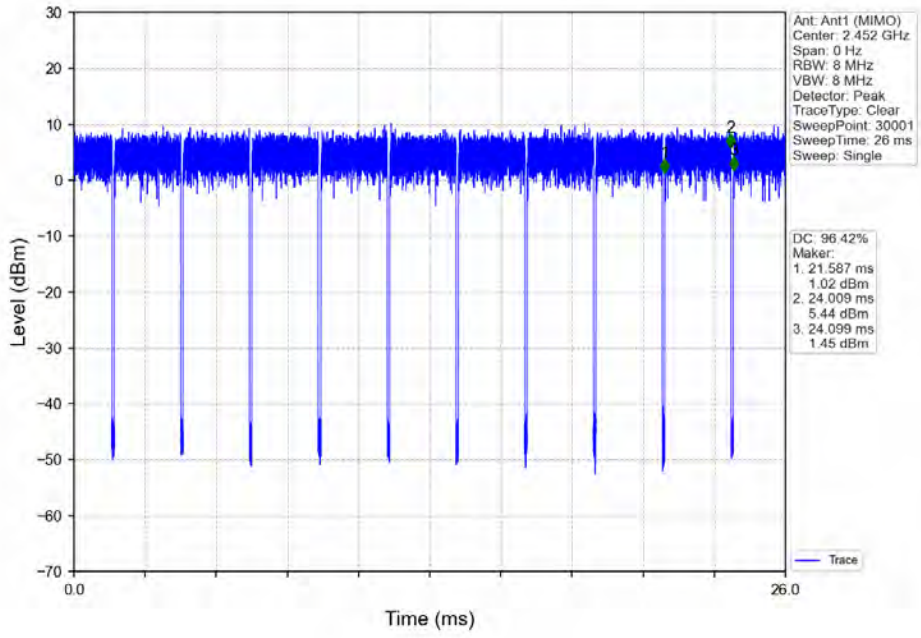
802.11n(HT40)_LCH_2422MHz_Ant1 (MIMO)_NTNV



802.11n(HT40)_MCH_2437MHz_Ant1 (MIMO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (MIMO)_NTNV



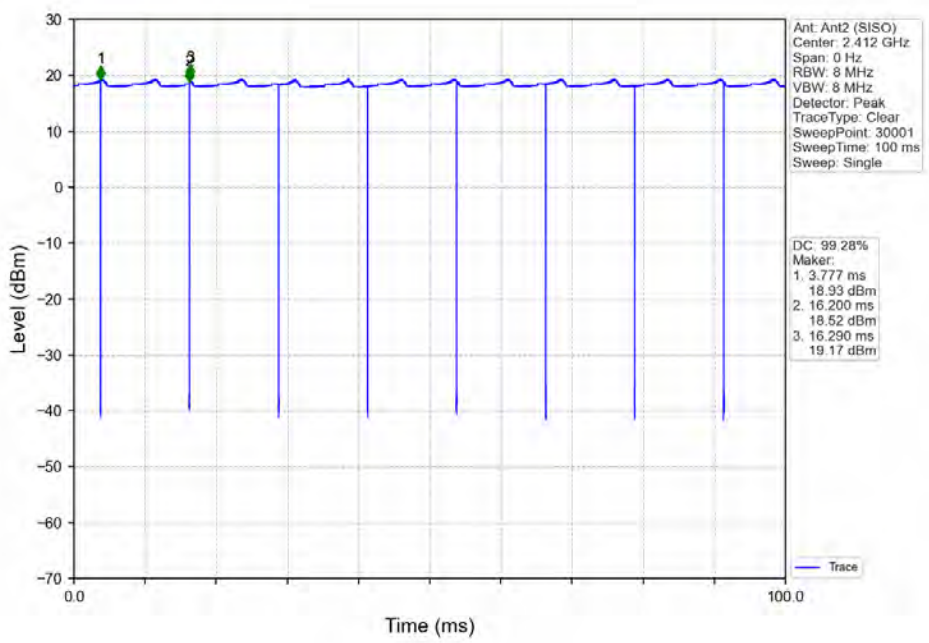
1.2 Ant2

1.2.1 Test Result

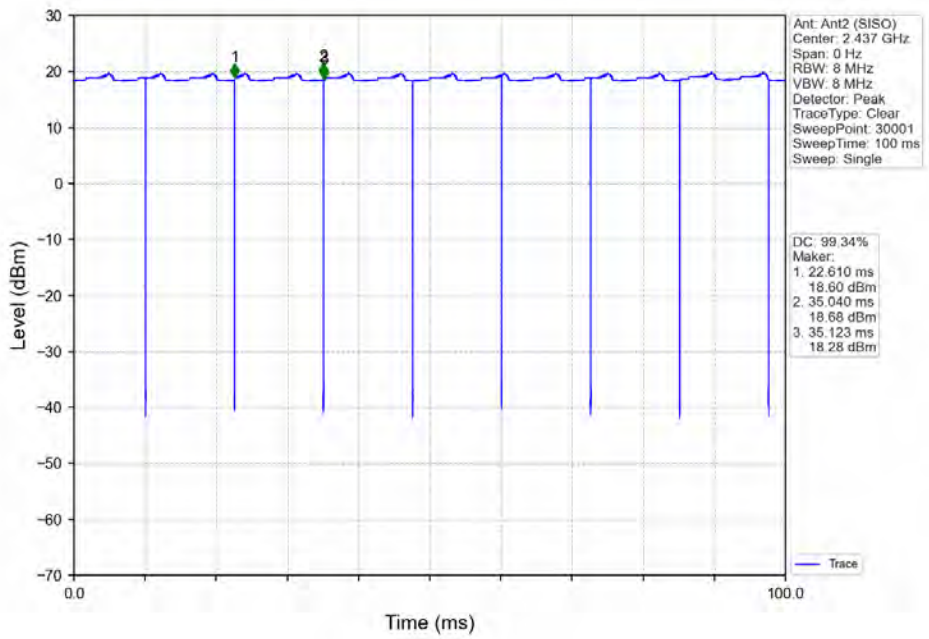
Ant2							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
802.11b	SISO	2412	12.423	12.513	99.28	0.03	0.03
		2437	12.430	12.513	99.34	0.03	0.03
		2462	12.430	12.513	99.34	0.03	0.03
802.11g	SISO	2412	2.064	2.153	95.87	0.18	0.33
		2437	2.065	2.162	95.51	0.20	0.65
		2462	2.064	2.153	95.87	0.18	0.33
802.11n (HT20)	MIMO	2412	5.001	5.091	98.23	0.08	0.07
		2437	5.001	5.091	98.23	0.08	0.14
		2462	4.995	5.088	98.17	0.08	0.04
802.11n (HT40)	MIMO	2422	2.424	2.513	96.46	0.16	0.03
		2437	2.423	2.512	96.46	0.16	0.03
		2452	2.427	2.511	96.65	0.15	0.00

1.2.2 Test Graph

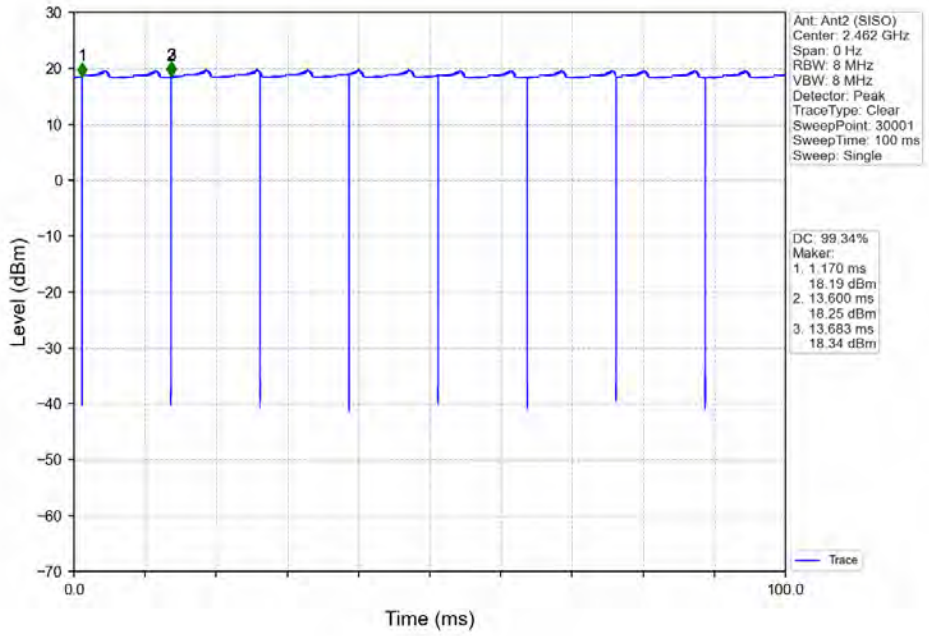
802.11b_LCH_2412MHz_Ant2 (SISO)_NTNV



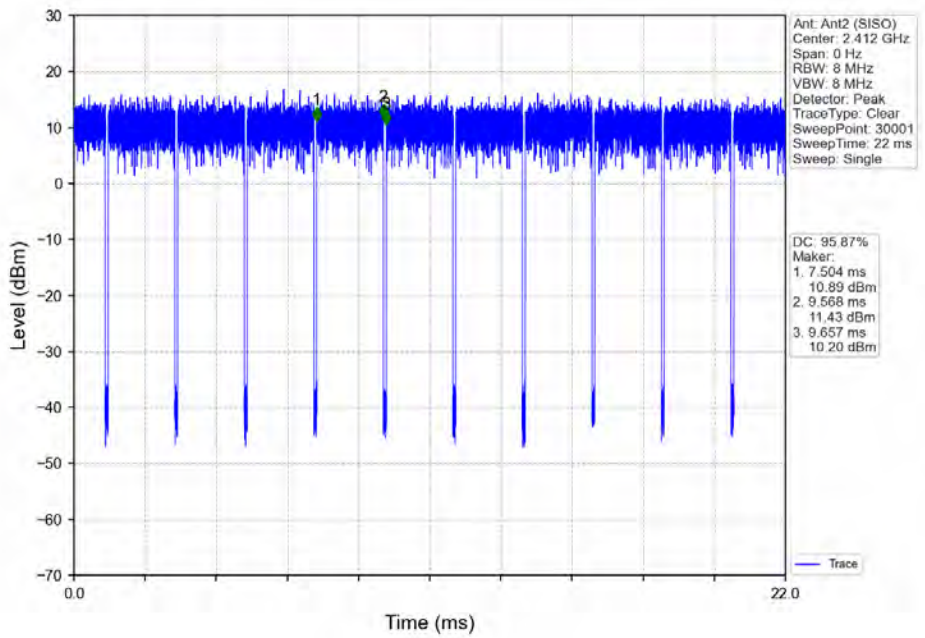
802.11b_MCH_2437MHz_Ant2 (SISO)_NTNV



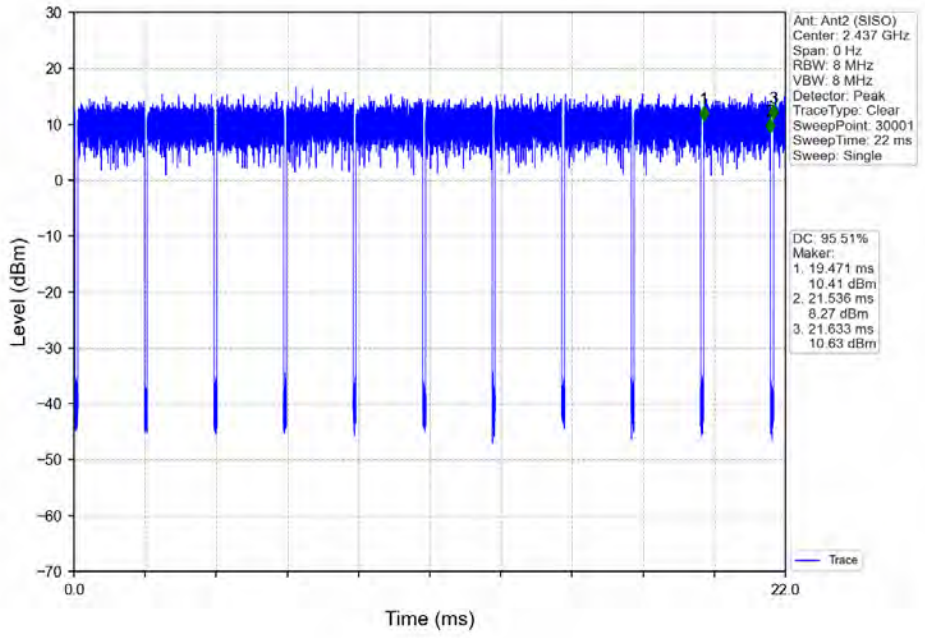
802.11b_HCH_2462MHz_Ant2 (SISO)_NTNV



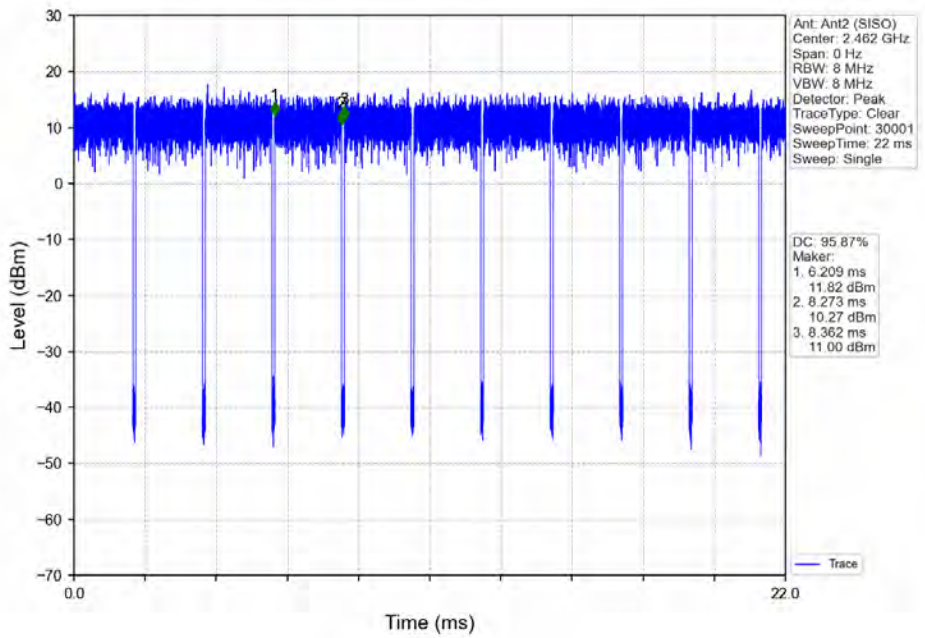
802.11g_LCH_2412MHz_Ant2 (SISO)_NTNV



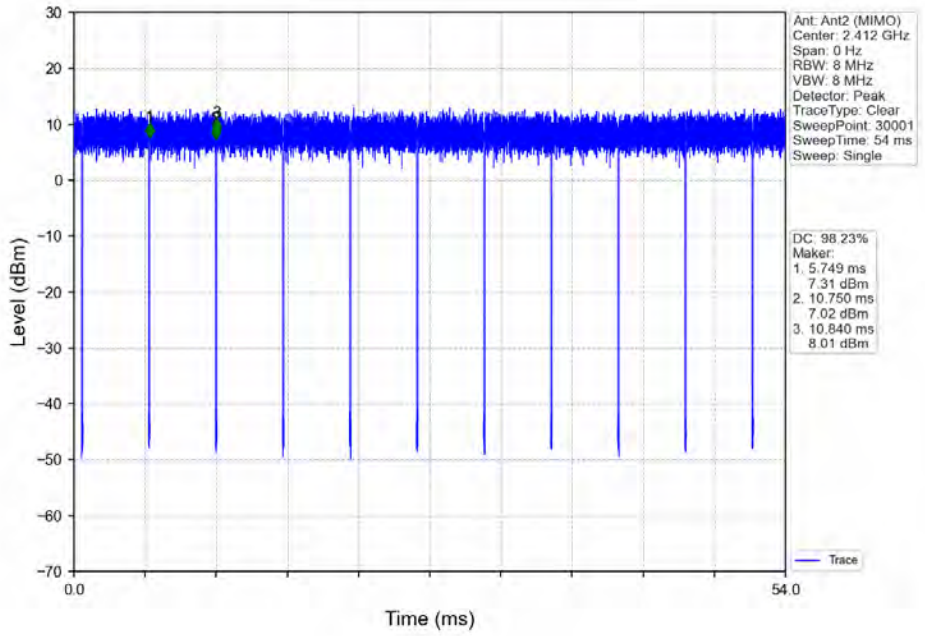
802.11g_MCH_2437MHz_Ant2 (SISO)_NTNV



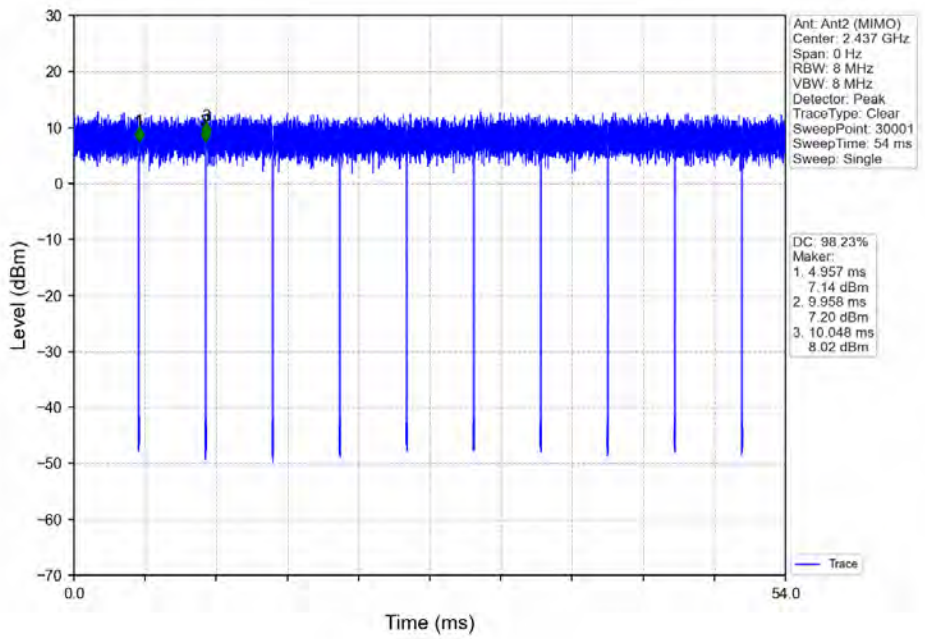
802.11g_HCH_2462MHz_Ant2 (SISO)_NTNV



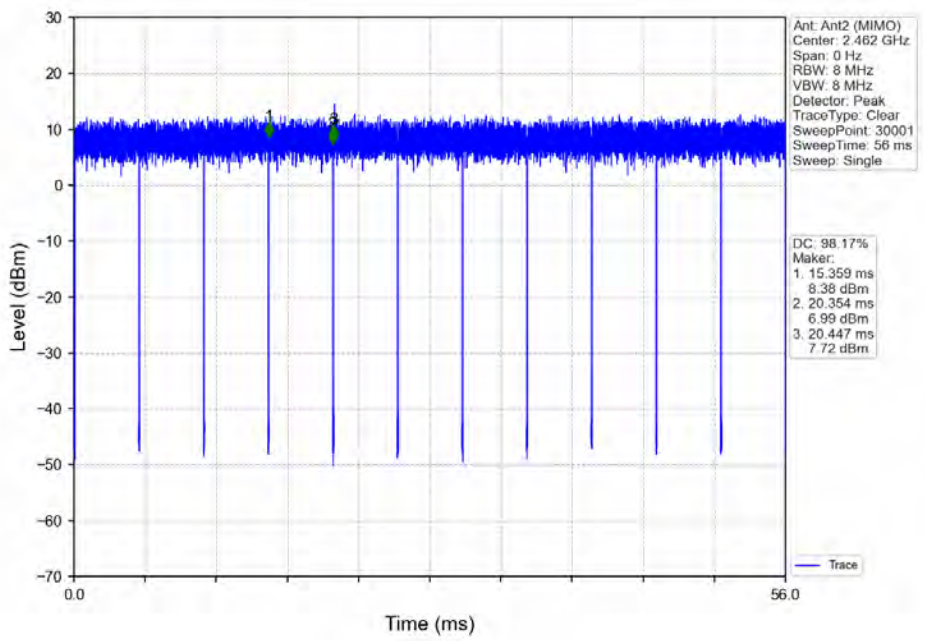
802.11n(HT20)_LCH_2412MHz_Ant2 (MIMO)_NTNV



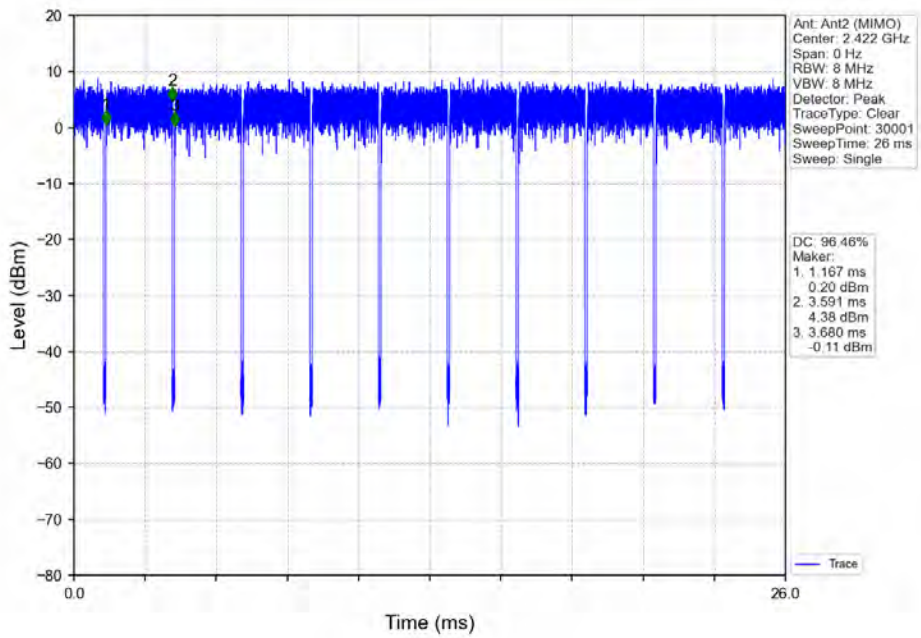
802.11n(HT20)_MCH_2437MHz_Ant2 (MIMO)_NTNV



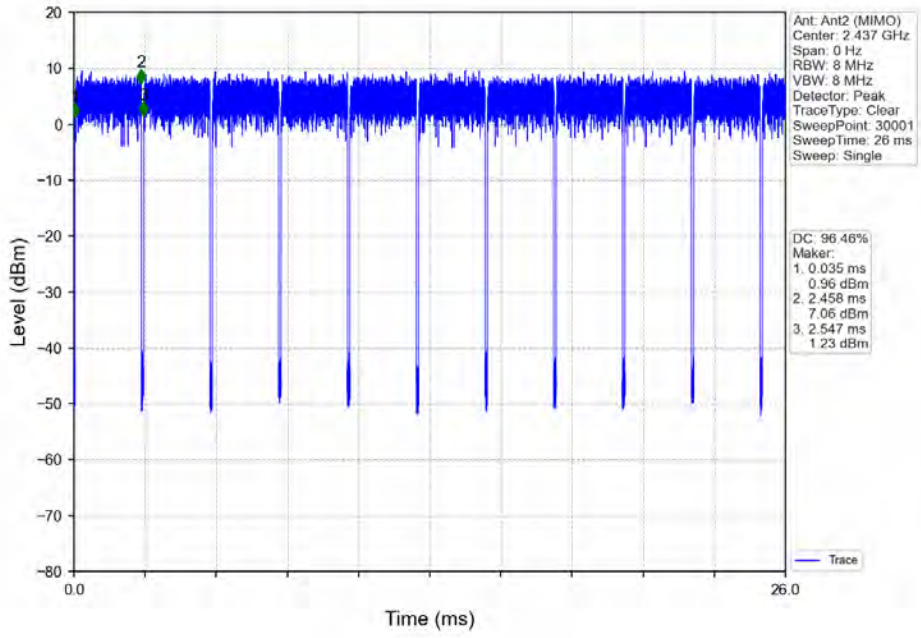
802.11n(HT20)_HCH_2462MHz_Ant2 (MIMO)_NTNV



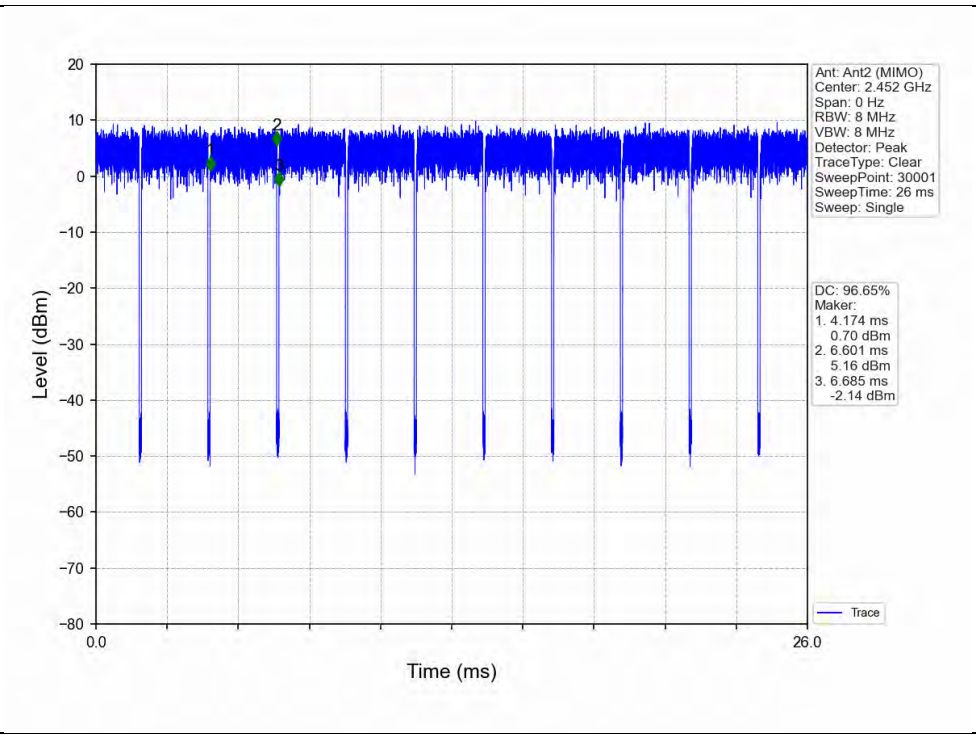
802.11n(HT40)_LCH_2422MHz_Ant2 (MIMO)_NTNV



802.11n(HT40)_MCH_2437MHz_Ant2 (MIMO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant2 (MIMO)_NTNV



2. Bandwidth

2.1 OBW

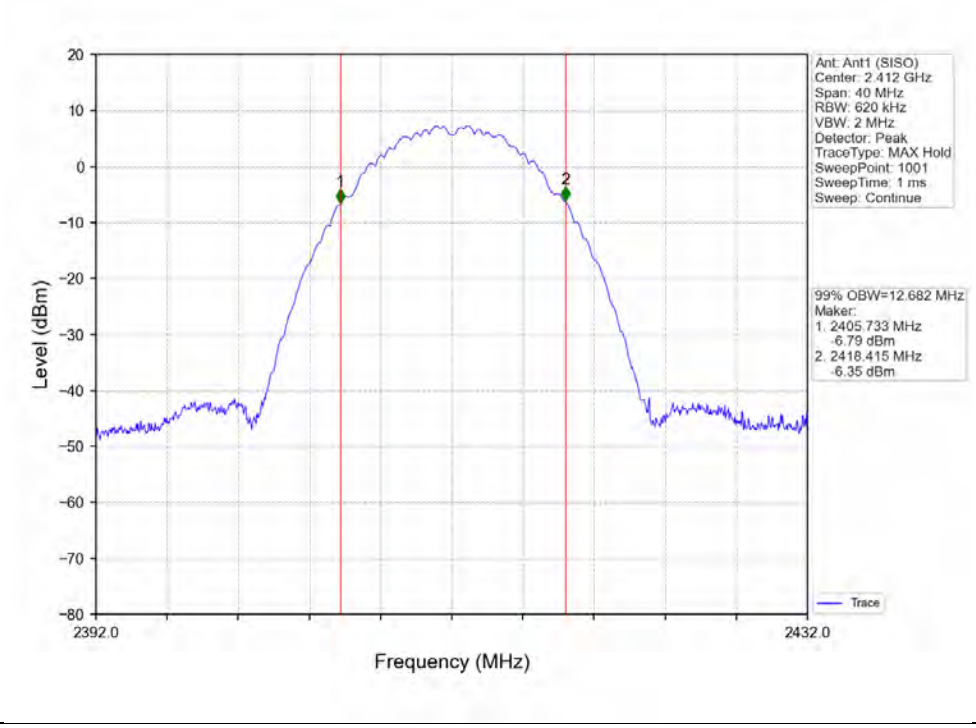
2.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Ant	99% Occupied Bandwidth (MHz)	Limit (MHz)	Verdict
802.11b	SISO	2412	1	12.682	/	Pass
			2	12.729	/	Pass
		2437	1	12.704	/	Pass
			2	12.740	/	Pass
		2462	1	12.694	/	Pass
			2	12.758	/	Pass
802.11g	SISO	2412	1	16.796	/	Pass
			2	16.822	/	Pass
		2437	1	16.806	/	Pass
			2	16.799	/	Pass
		2462	1	16.791	/	Pass
			2	16.830	/	Pass
802.11n (HT20)	MIMO	2412	1	17.865	/	Pass
			2	17.873	/	Pass
		2437	1	17.875	/	Pass
			2	17.866	/	Pass
		2462	1	17.867	/	Pass
			2	17.871	/	Pass
802.11n (HT40)	MIMO	2422	1	36.018	/	Pass
			2	36.010	/	Pass

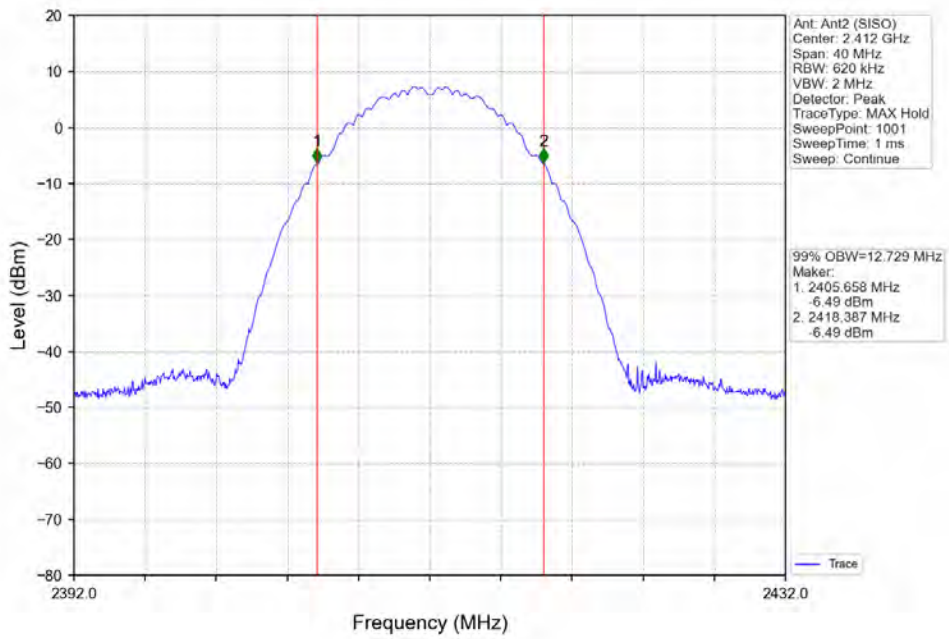
		2437	1	36.046	/	Pass
			2	36.004	/	Pass
		2452	1	36.034	/	Pass
			2	36.028	/	Pass

2.1.2 Test Graph

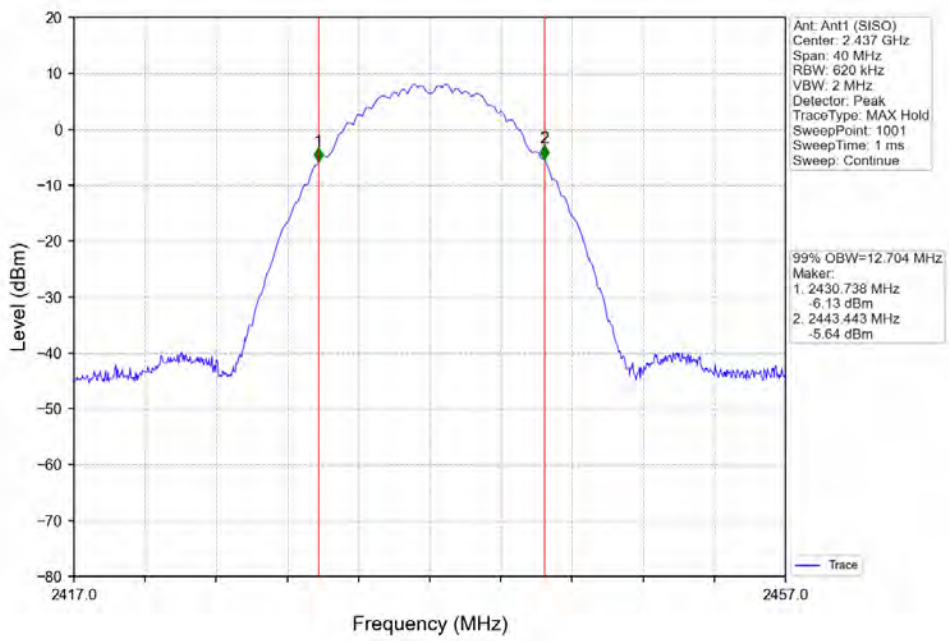
802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



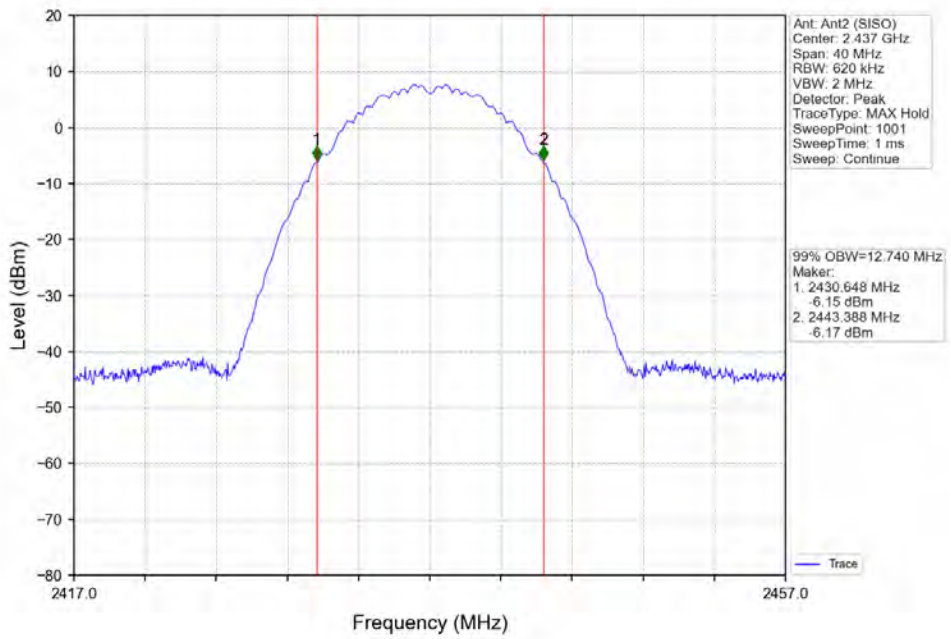
802.11b_LCH_2412MHz_Ant2 (SISO)_NTNV



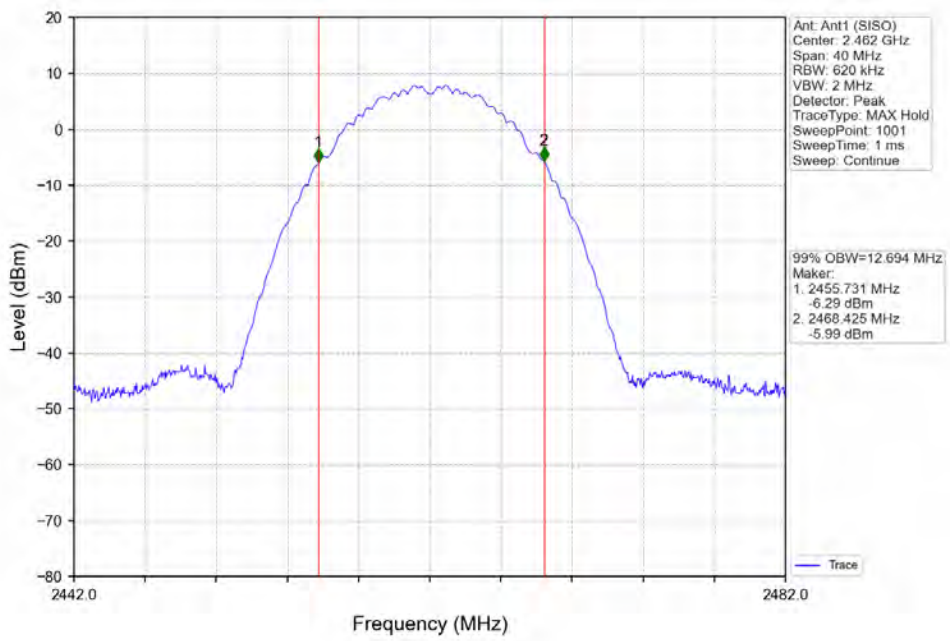
802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV



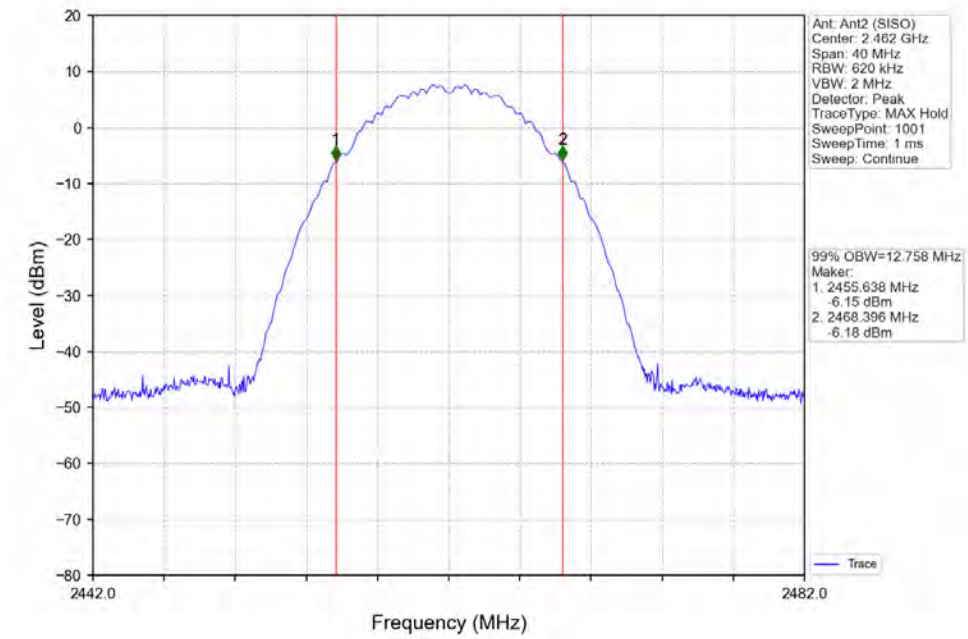
802.11b_MCH_2437MHz_Ant2 (SISO)_NTNV



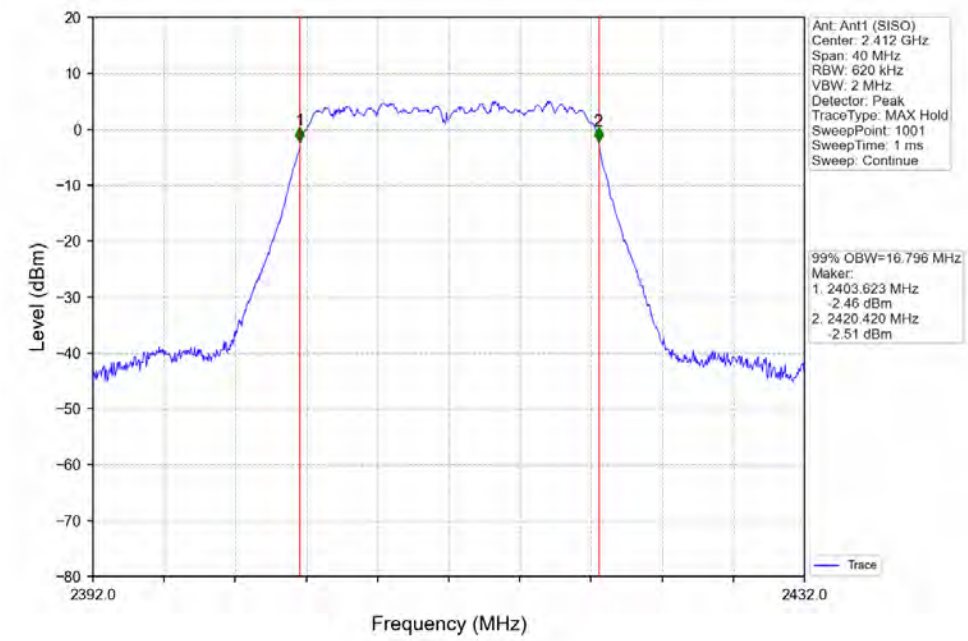
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



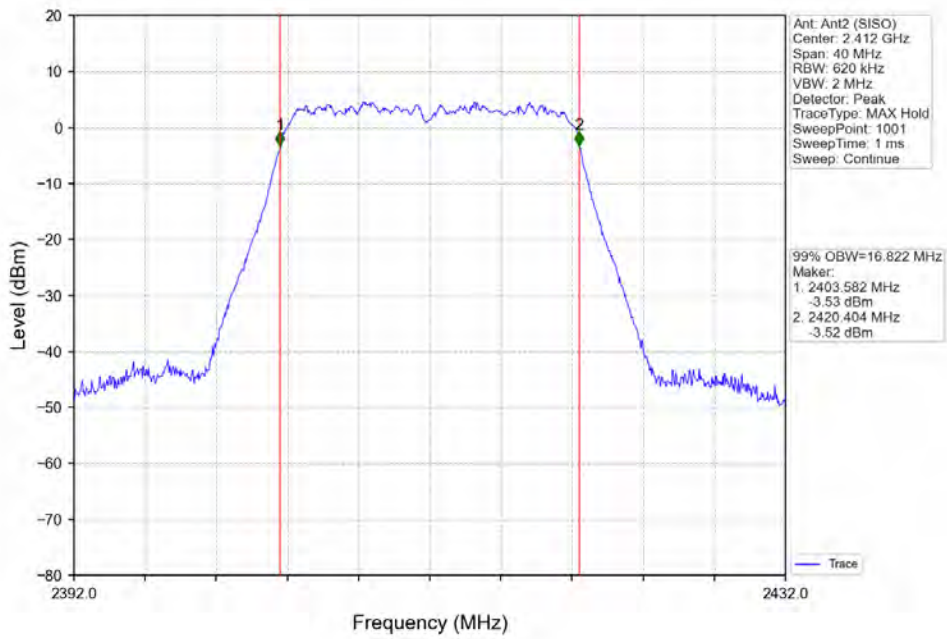
802.11b_HCH_2462MHz_Ant2 (SISO)_NTNV



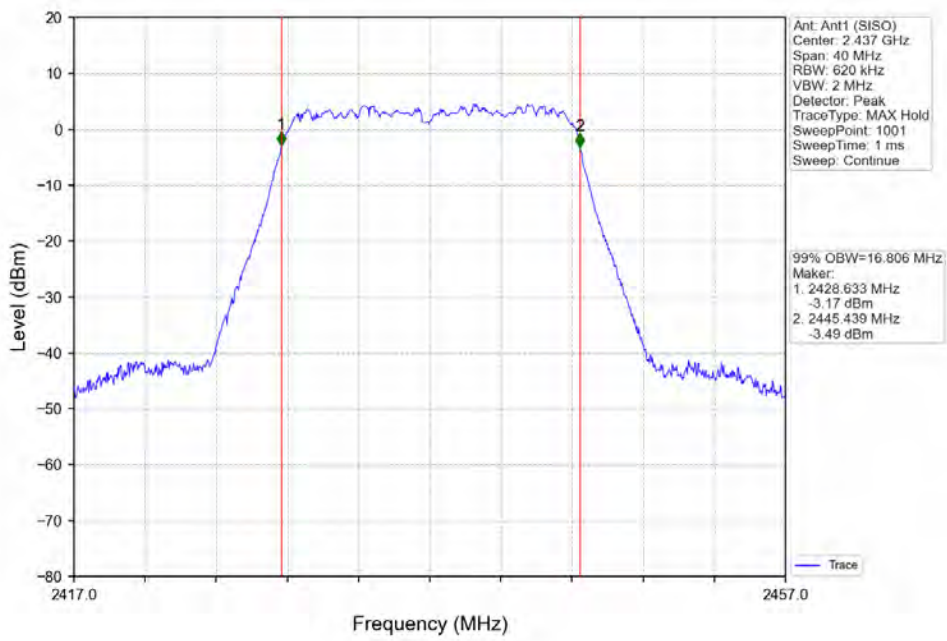
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



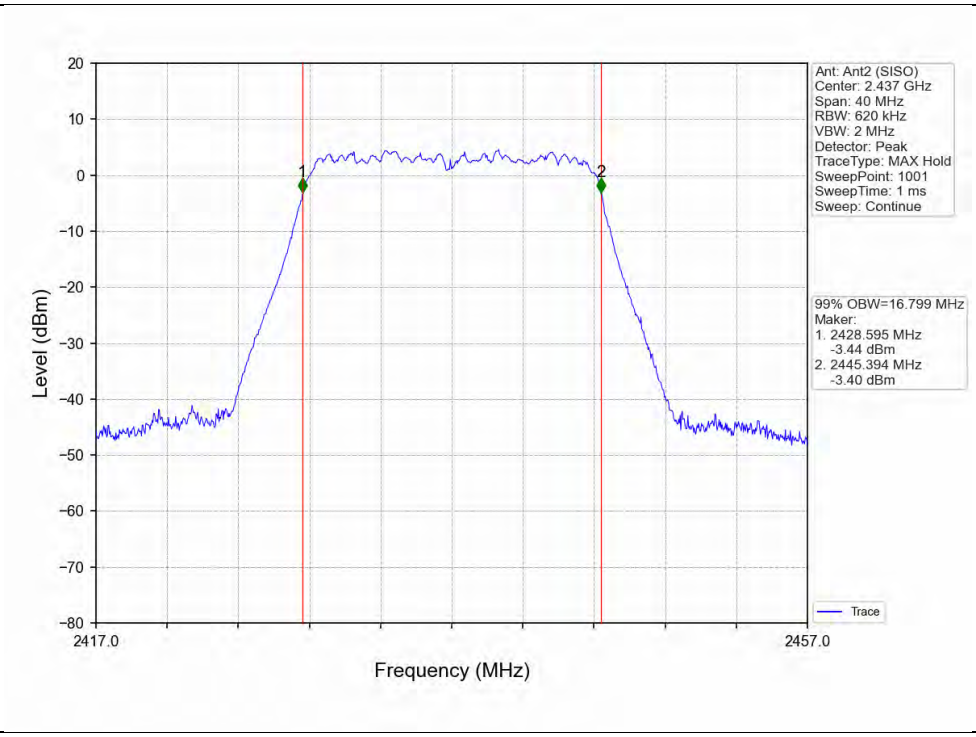
802.11g_LCH_2412MHz_Ant2 (SISO)_NTNV



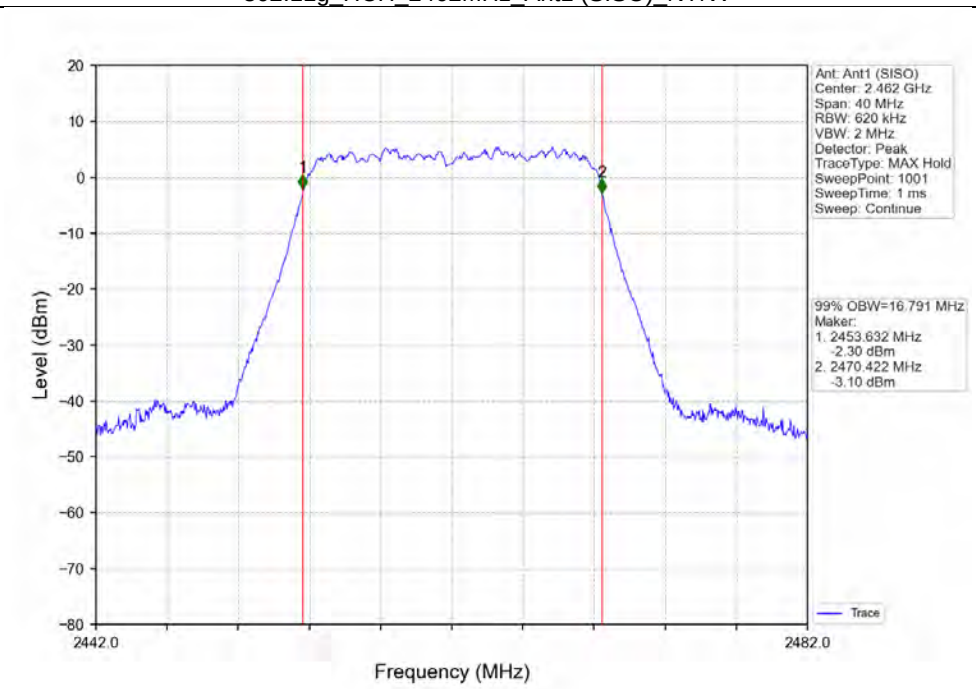
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



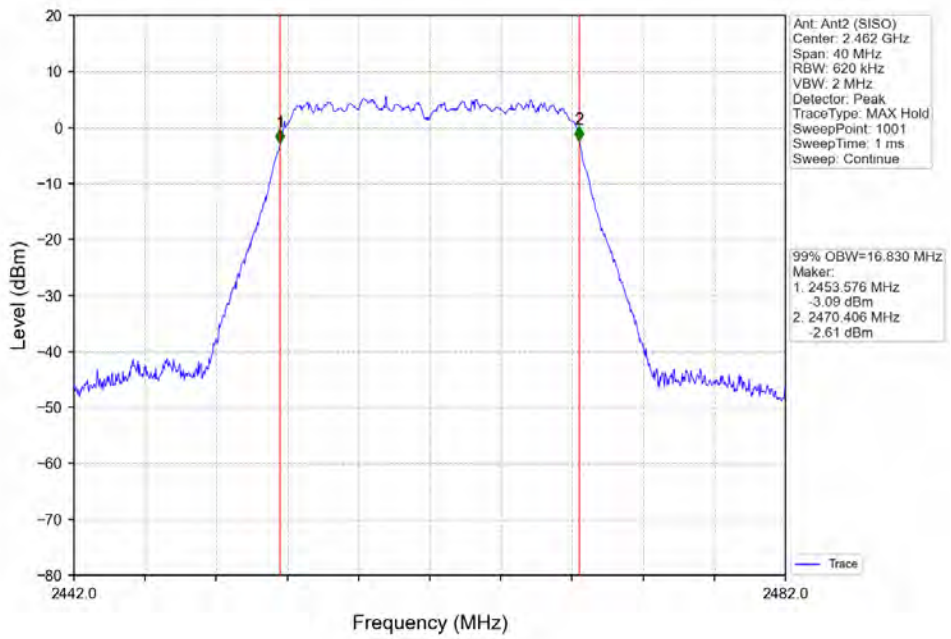
802.11g_MCH_2437MHz_Ant2 (SISO)_NTNV



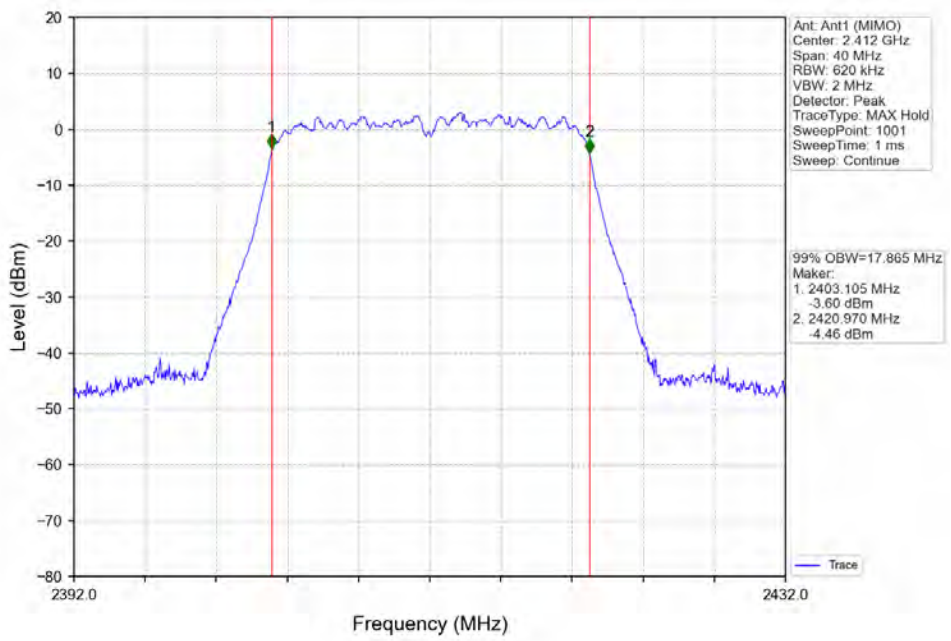
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



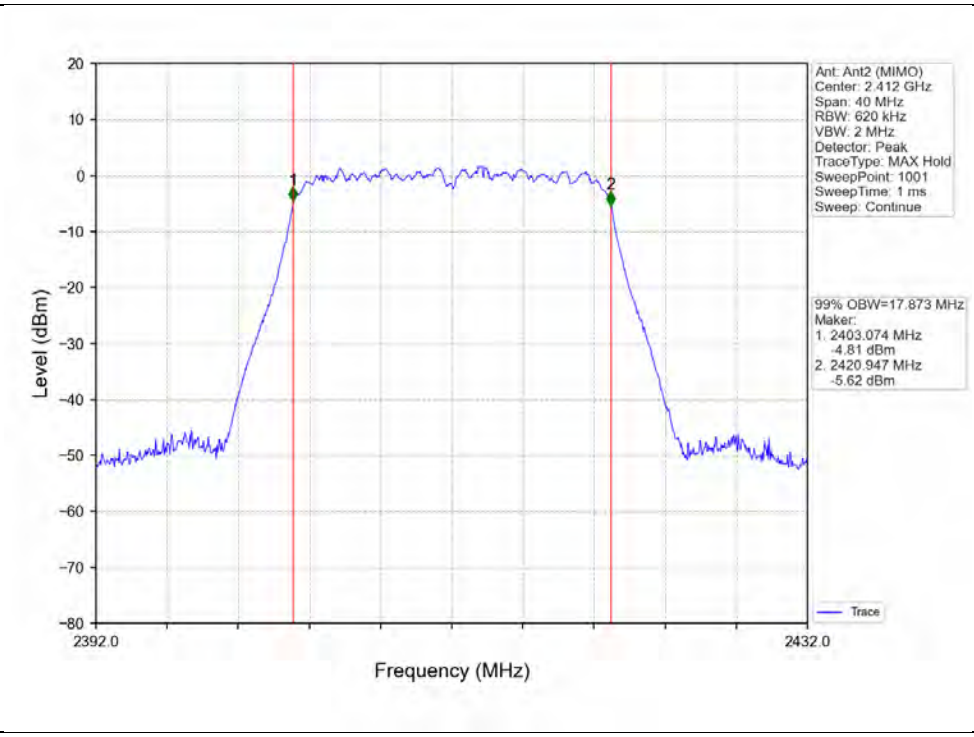
802.11g_HCH_2462MHz_Ant2 (SISO)_NTNV



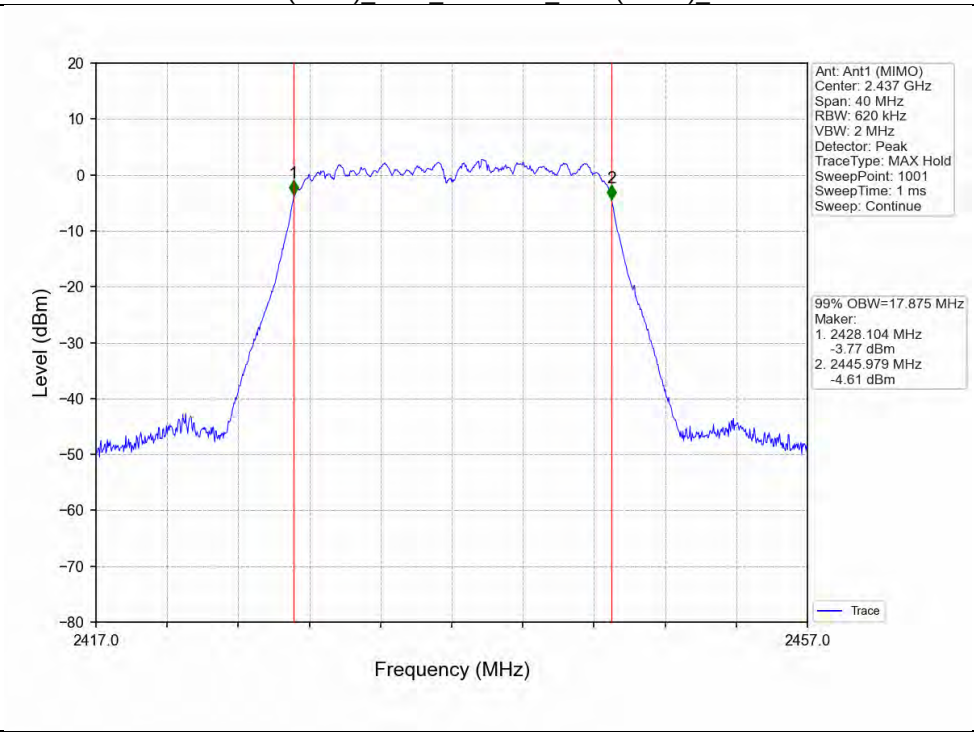
802.11n(HT20)_LCH_2412MHz_Ant1 (MIMO)_NTNV



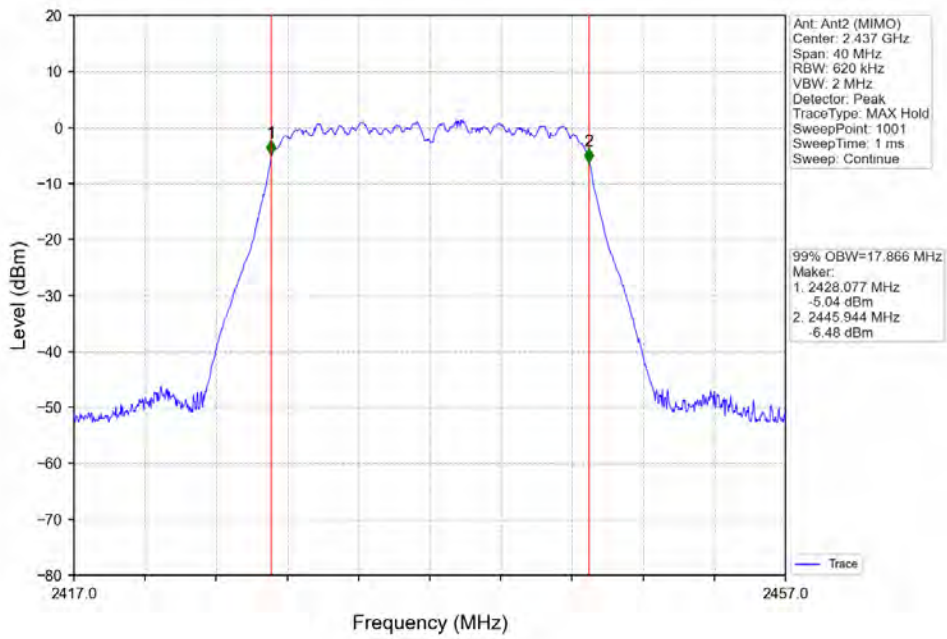
802.11n(HT20)_LCH_2412MHz_Ant2 (MIMO)_NTNV



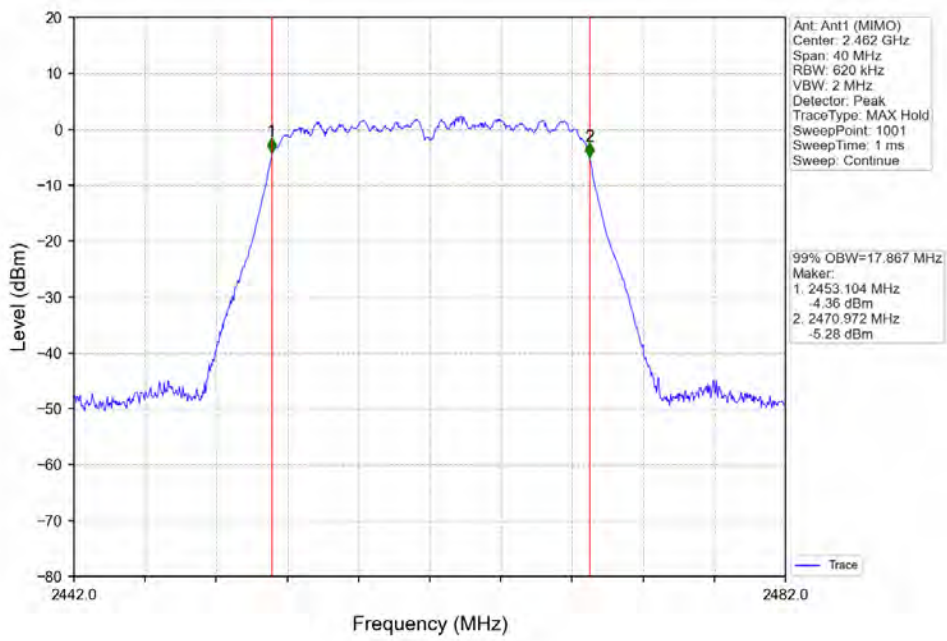
802.11n(HT20)_MCH_2437MHz_Ant1 (MIMO)_NTNV



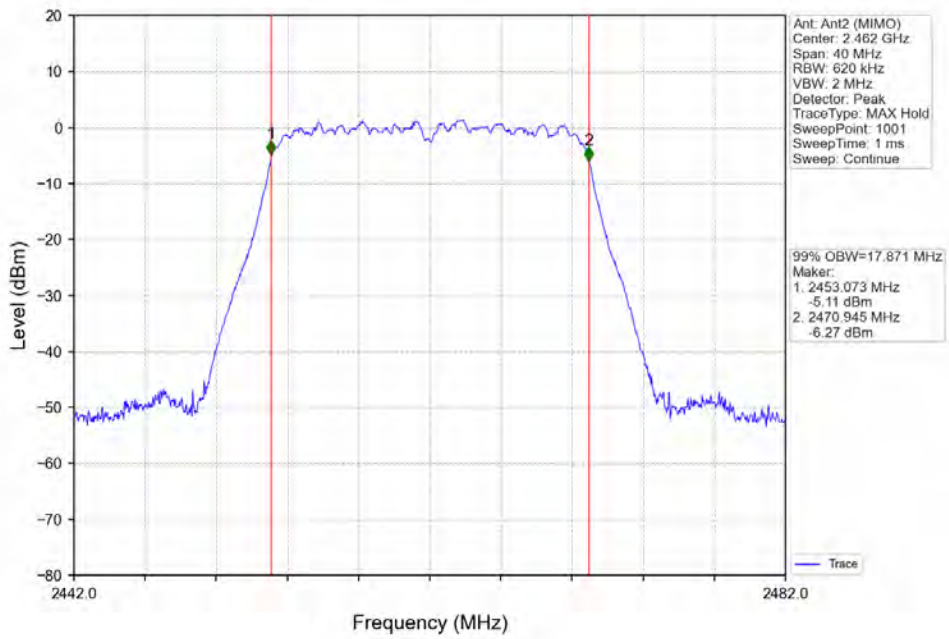
802.11n(HT20)_MCH_2437MHz_Ant2 (MIMO)_NTNV



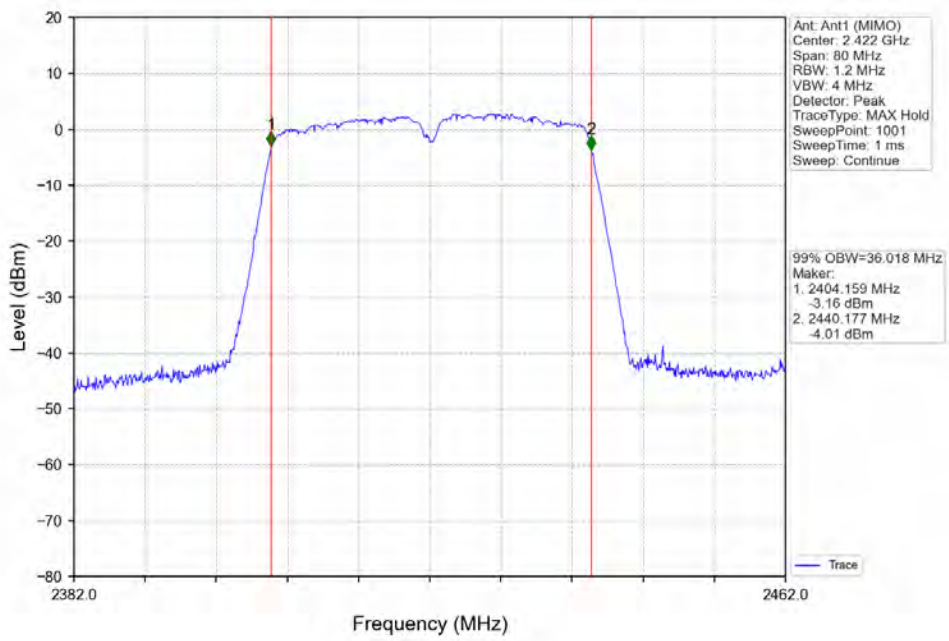
802.11n(HT20)_HCH_2462MHz_Ant1 (MIMO)_NTNV



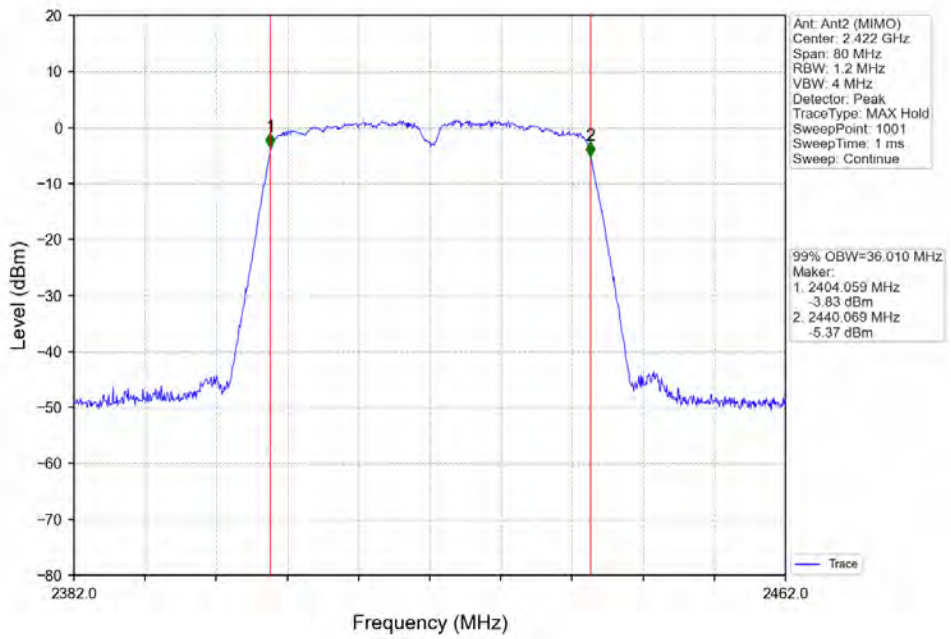
802.11n(HT20)_HCH_2462MHz_Ant2 (MIMO)_NTNV



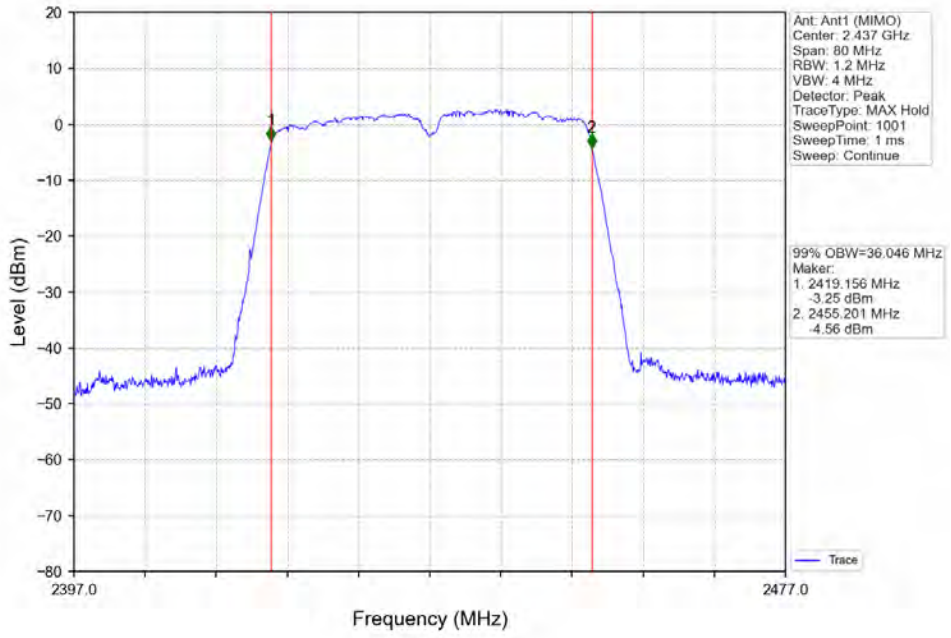
802.11n(HT40)_LCH_2422MHz_Ant1 (MIMO)_NTNV



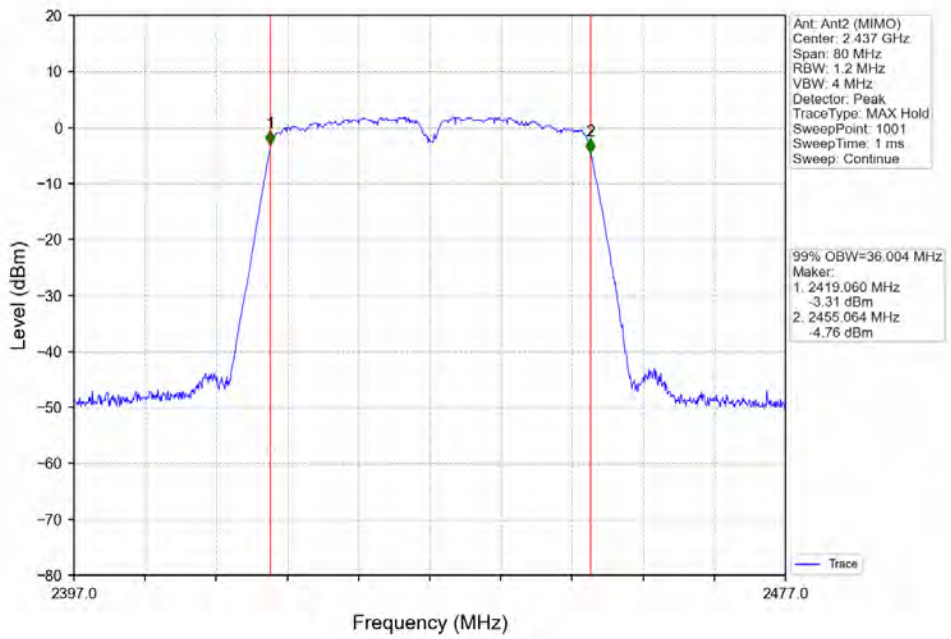
802.11n(HT40)_LCH_2422MHz_Ant2 (MIMO)_NTNV



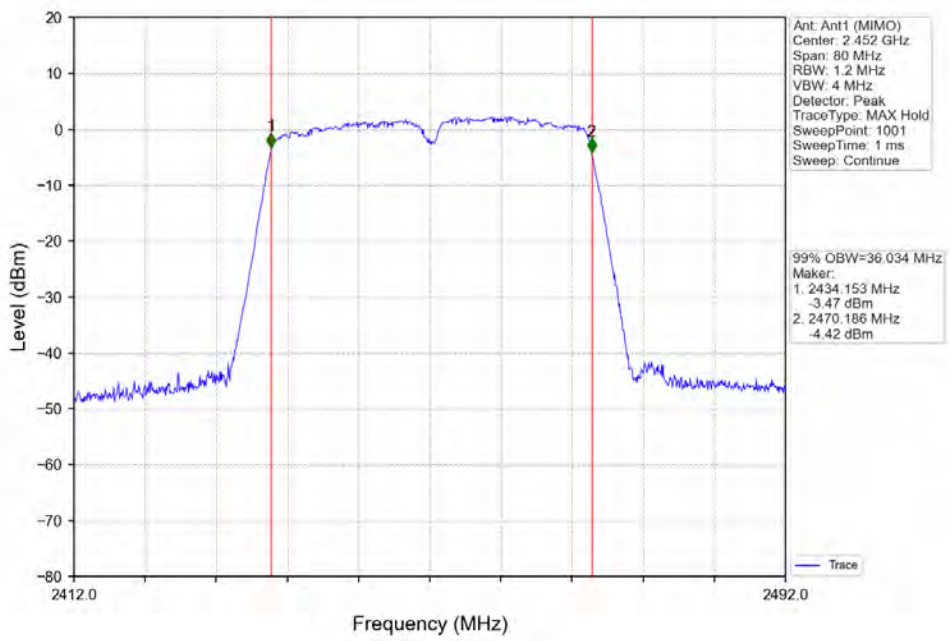
802.11n(HT40)_MCH_2437MHz_Ant1 (MIMO)_NTNV



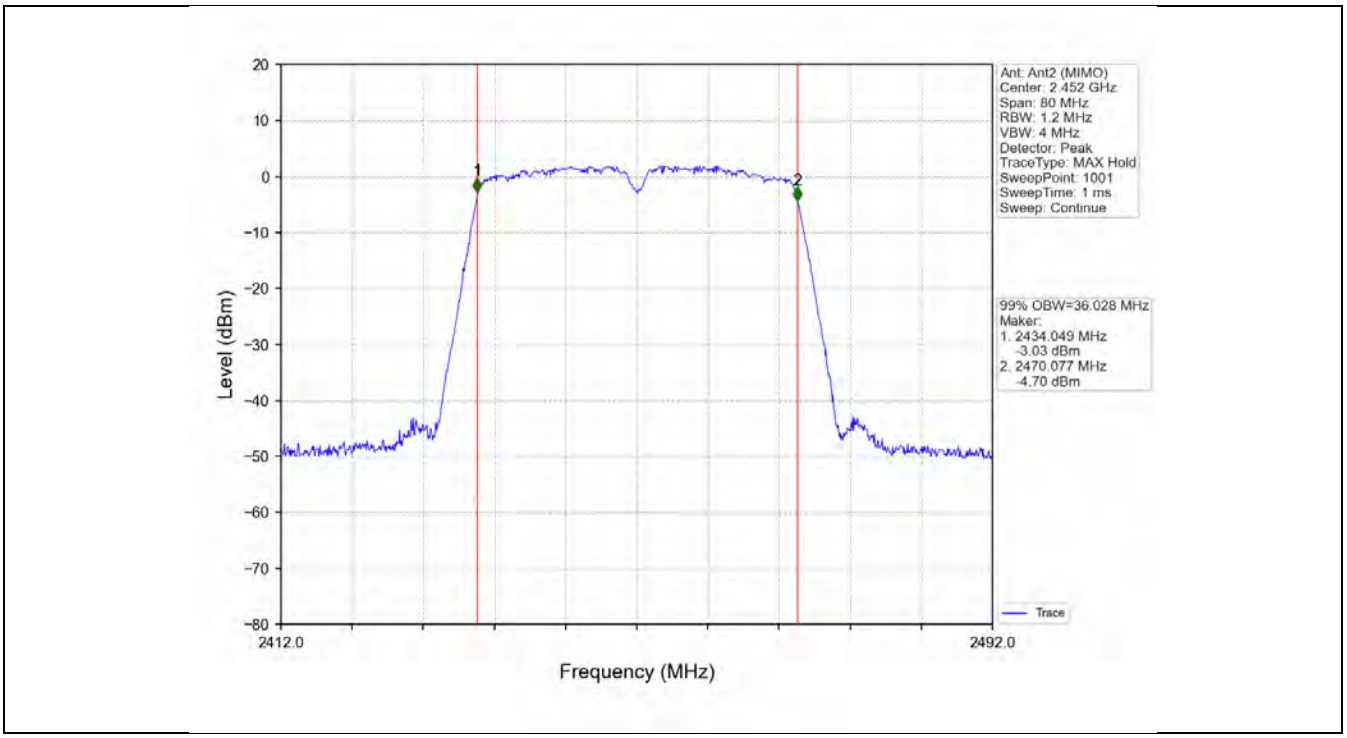
802.11n(HT40)_MCH_2437MHz_Ant2 (MIMO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (MIMO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant2 (MIMO)_NTNV



2.2 6dB BW

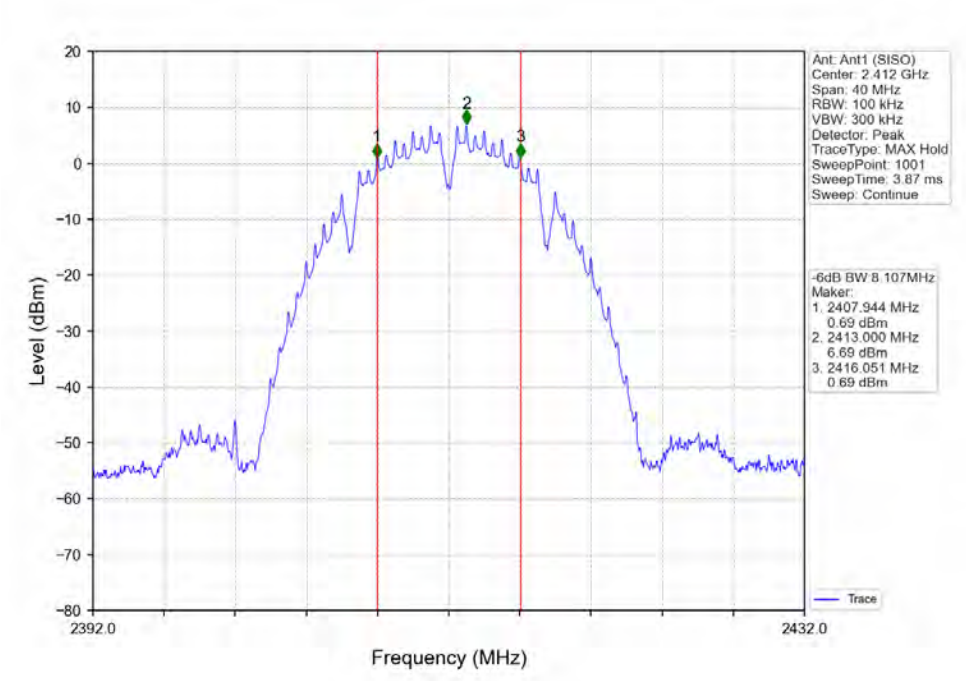
2.2.1 Test Result

Mode	TX Type	Frequency (MHz)	Ant	6dB Bandwidth (MHz)	Limit (MHz)	Verdict
802.11b	SISO	2412	1	8.107	>=0.5	Pass
			2	8.109	>=0.5	Pass
		2437	1	8.107	>=0.5	Pass
			2	8.108	>=0.5	Pass
		2462	1	8.107	>=0.5	Pass
			2	8.110	>=0.5	Pass
802.11g	SISO	2412	1	16.398	>=0.5	Pass
			2	16.402	>=0.5	Pass
		2437	1	16.406	>=0.5	Pass
			2	16.400	>=0.5	Pass
		2462	1	16.396	>=0.5	Pass
			2	16.403	>=0.5	Pass
802.11n (HT20)	MIMO	2412	1	17.616	>=0.5	Pass
			2	17.626	>=0.5	Pass
		2437	1	17.617	>=0.5	Pass
			2	17.628	>=0.5	Pass
		2462	1	17.621	>=0.5	Pass
			2	17.619	>=0.5	Pass
802.11n (HT40)	MIMO	2422	1	35.180	>=0.5	Pass
			2	35.172	>=0.5	Pass
		2437	1	35.343	>=0.5	Pass
			2	35.208	>=0.5	Pass
		2452	1	35.497	>=0.5	Pass

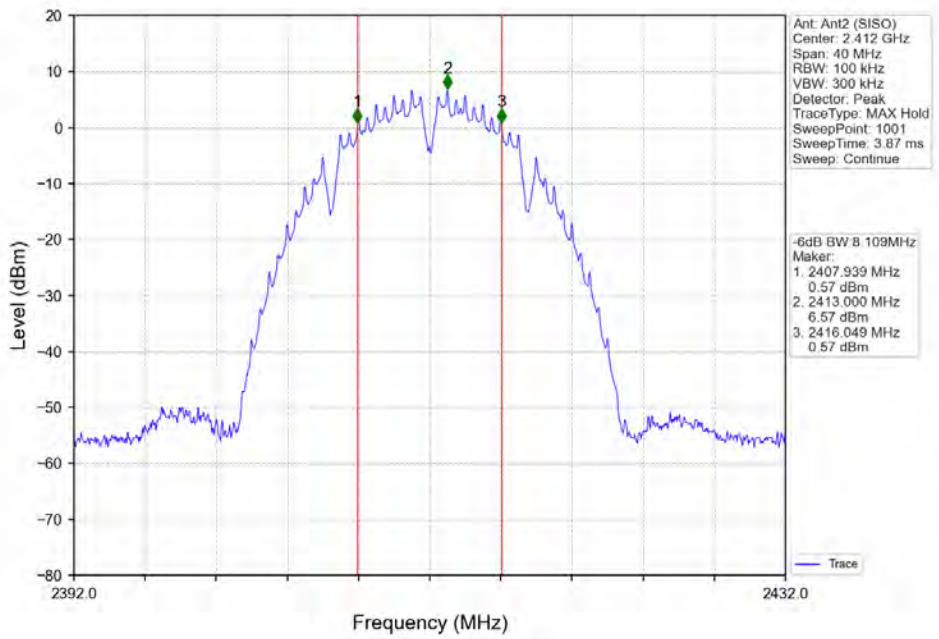
			2	35.177	>=0.5	Pass

2.2.2 Test Graph

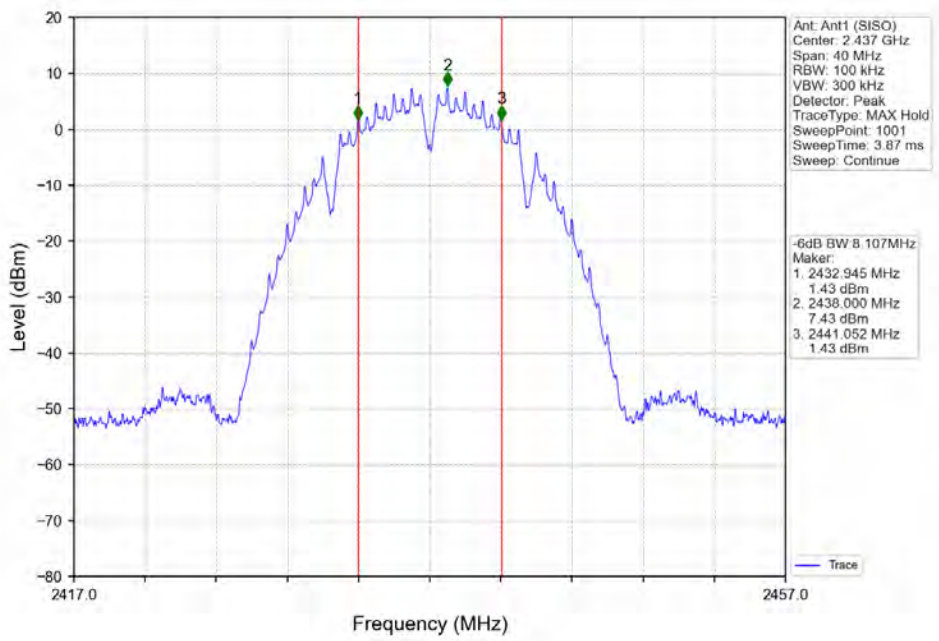
802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



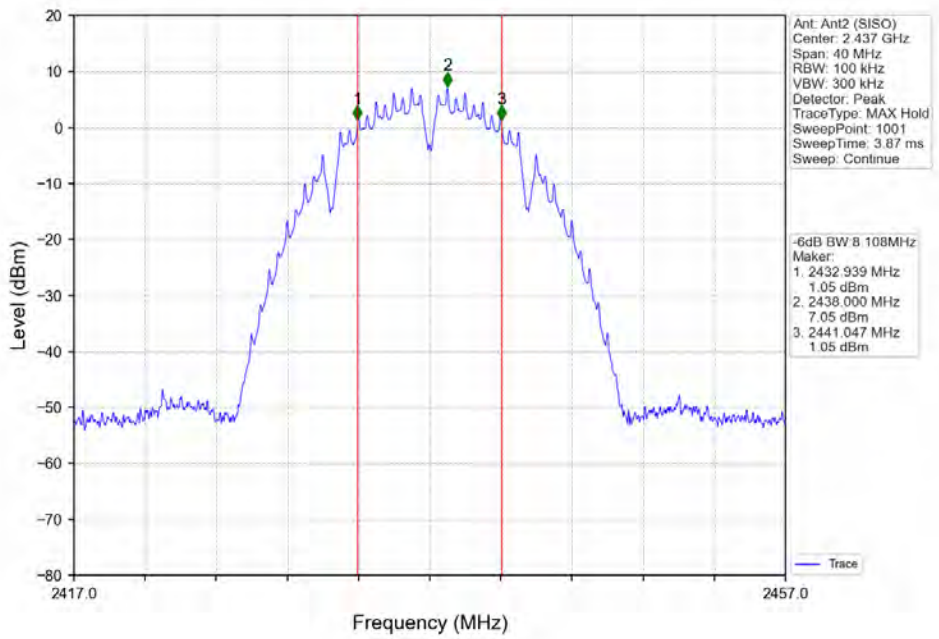
802.11b_LCH_2412MHz_Ant2 (SISO)_NTNV



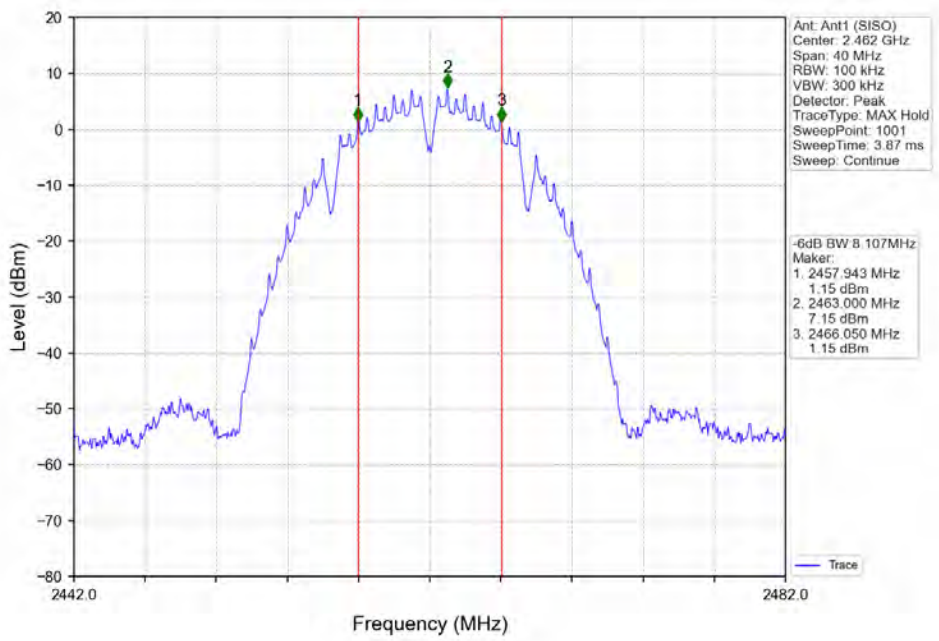
802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV



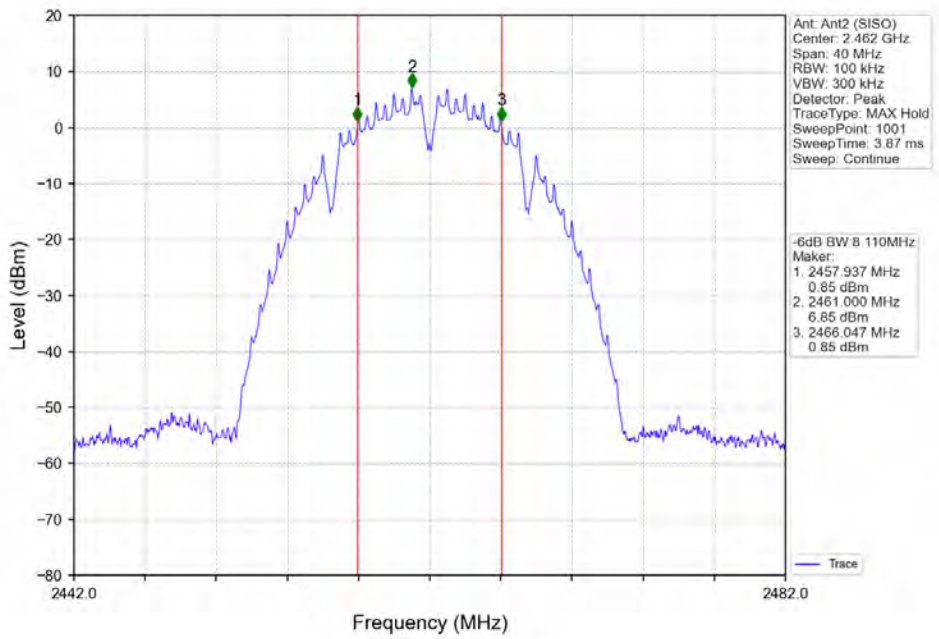
802.11b_MCH_2437MHz_Ant2 (SISO)_NTNV



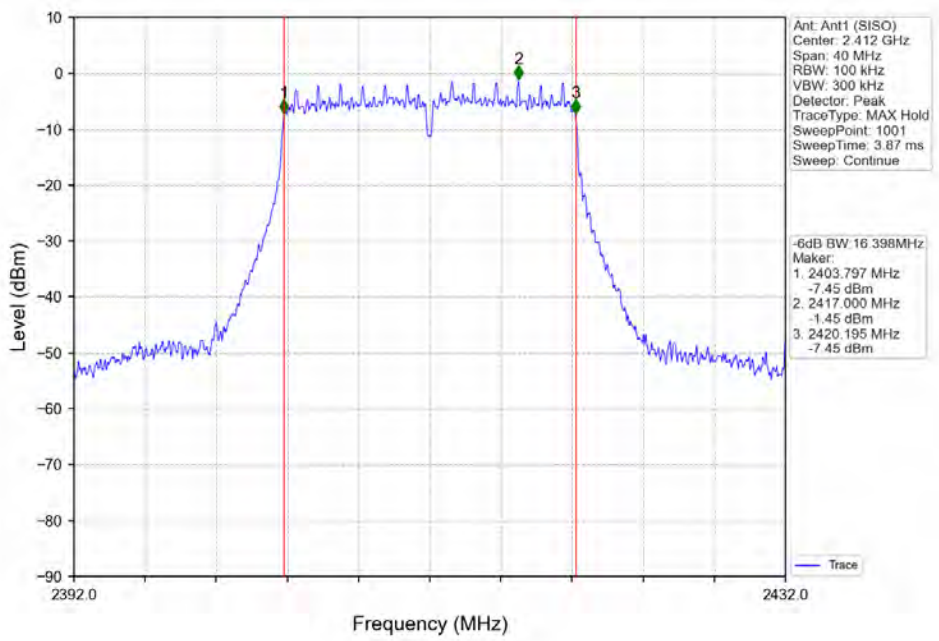
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



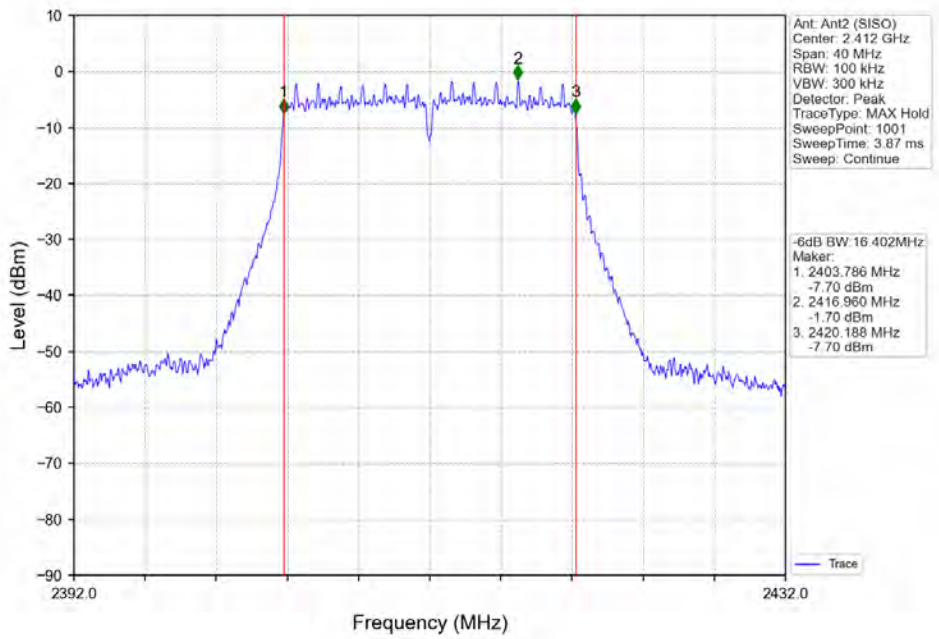
802.11b_HCH_2462MHz_Ant2 (SISO)_NTNV



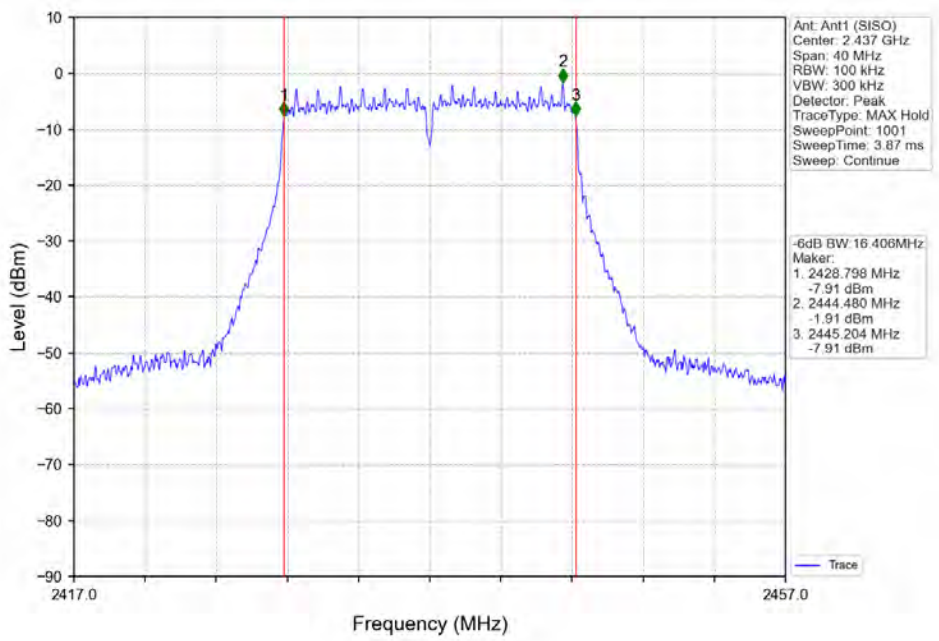
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



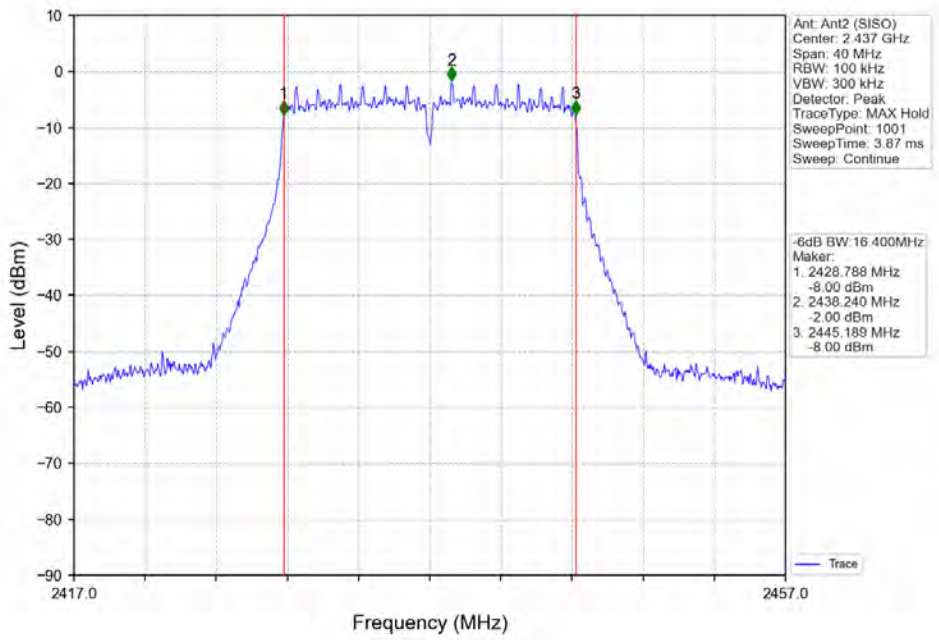
802.11g_LCH_2412MHz_Ant2 (SISO)_NTNV



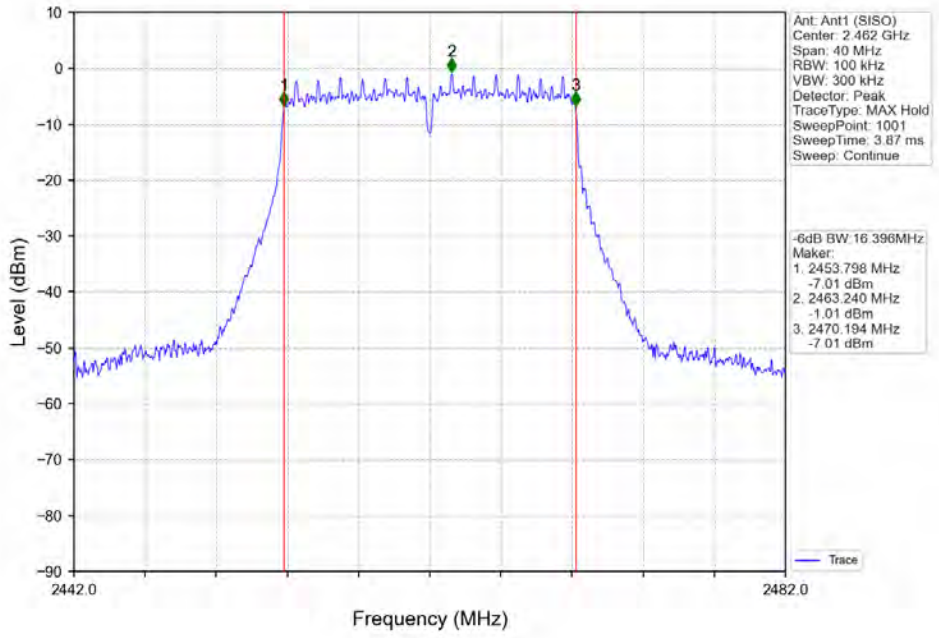
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



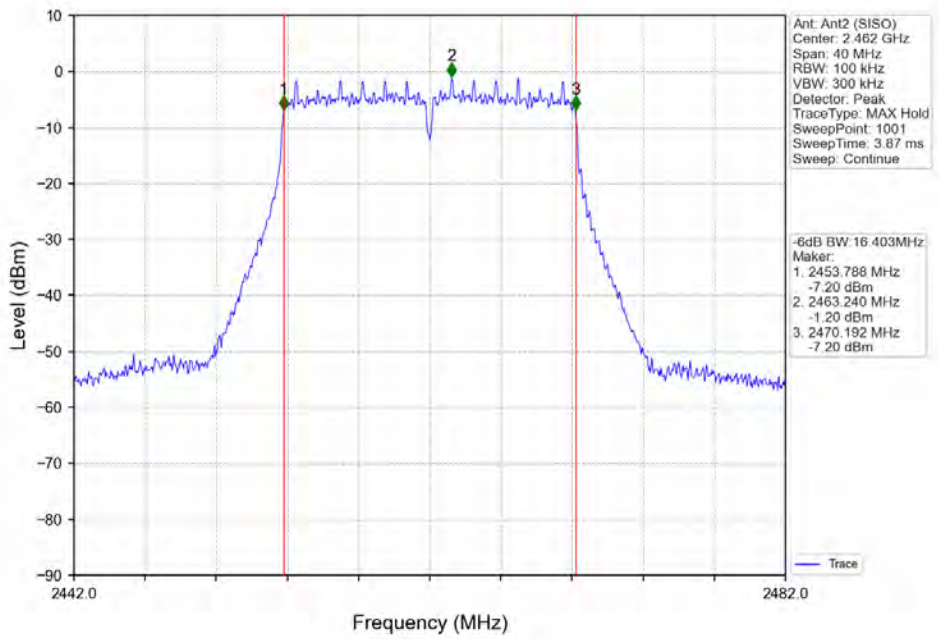
802.11g_MCH_2437MHz_Ant2 (SISO)_NTNV



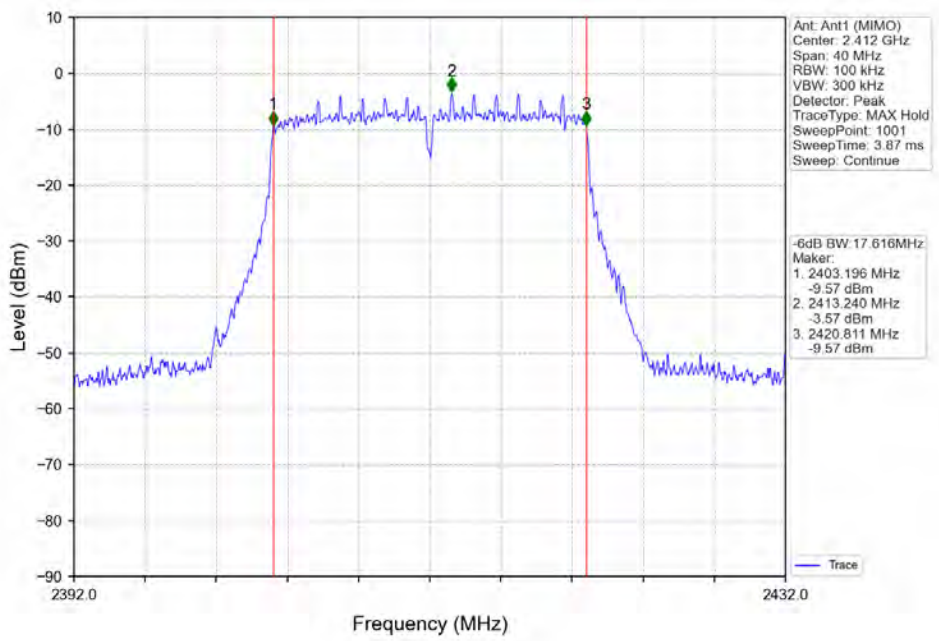
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



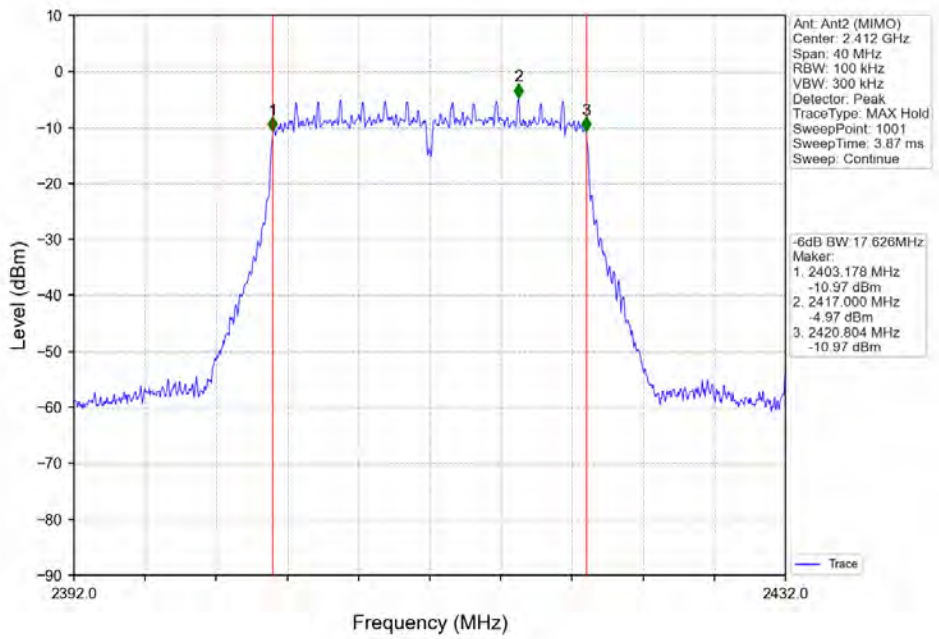
802.11g_HCH_2462MHz_Ant2 (SISO)_NTNV



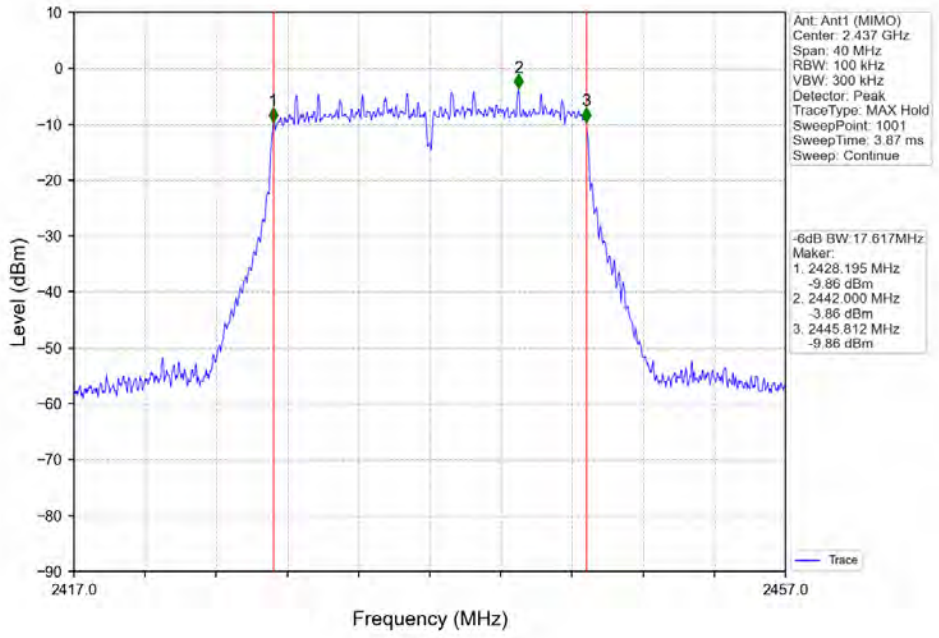
802.11n(HT20)_LCH_2412MHz_Ant1 (MIMO)_NTNV



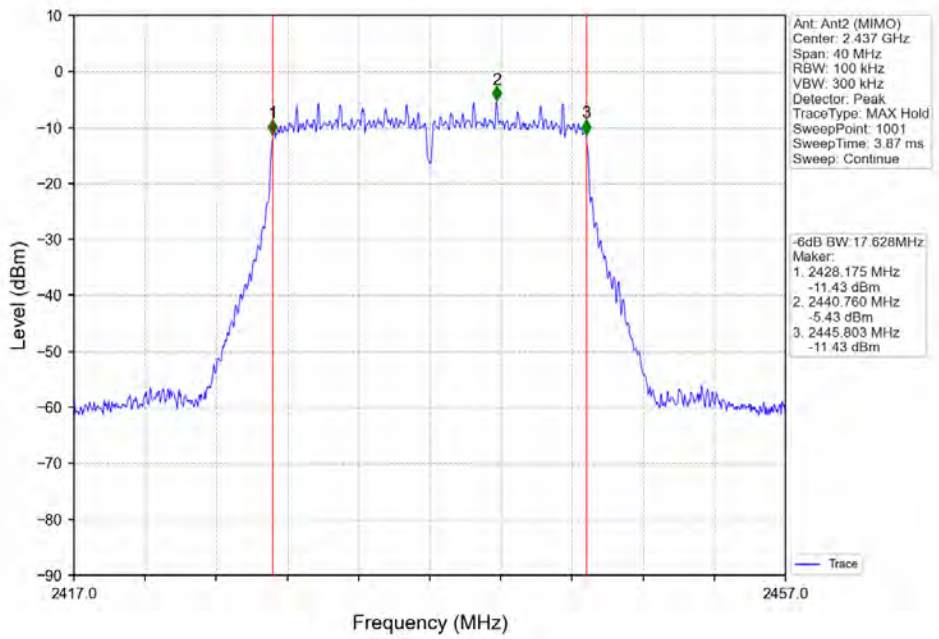
802.11n(HT20)_LCH_2412MHz_Ant2 (MIMO)_NTNV



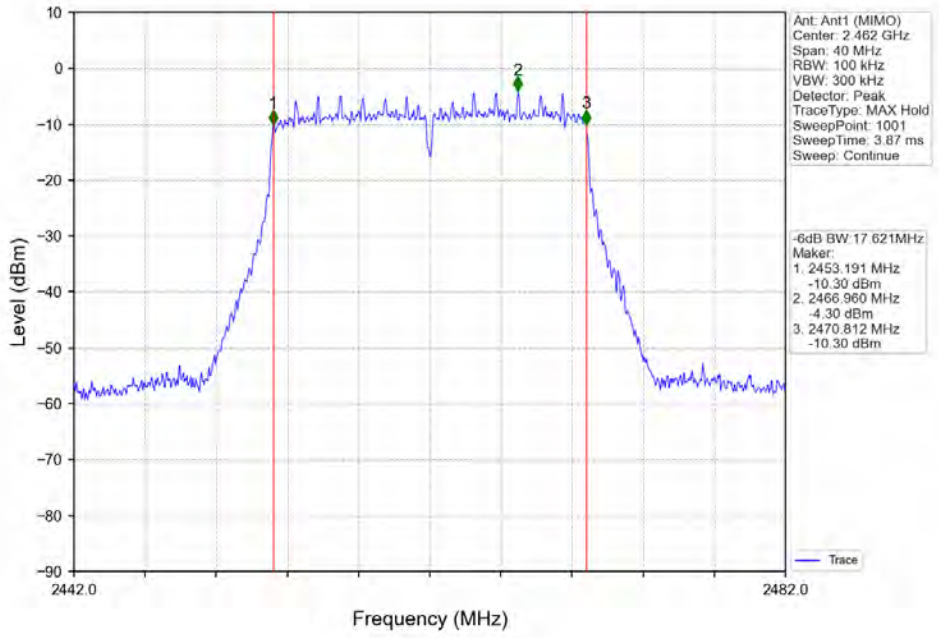
802.11n(HT20)_MCH_2437MHz_Ant1 (MIMO)_NTNV



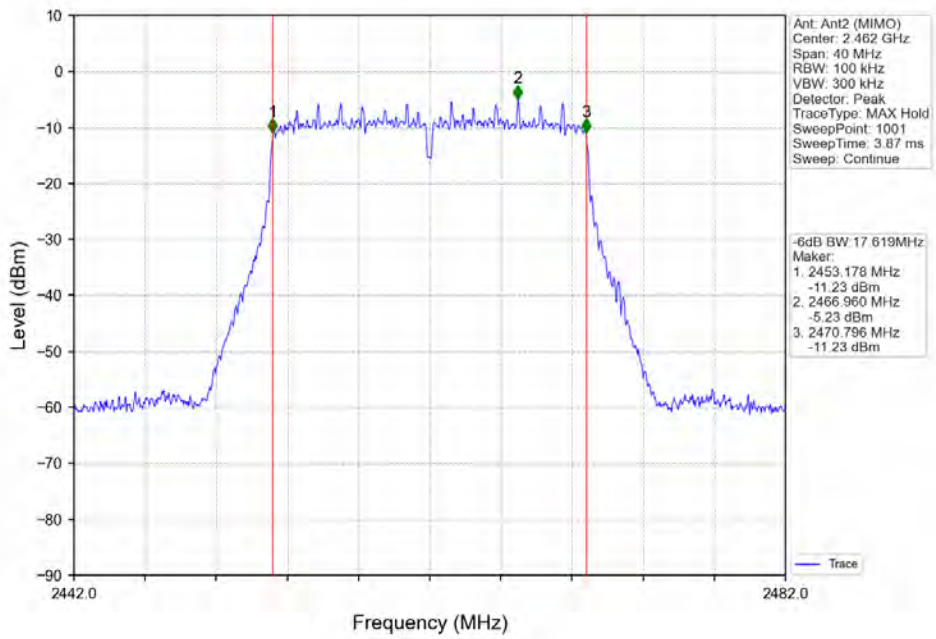
802.11n(HT20)_MCH_2437MHz_Ant2 (MIMO)_NTNV



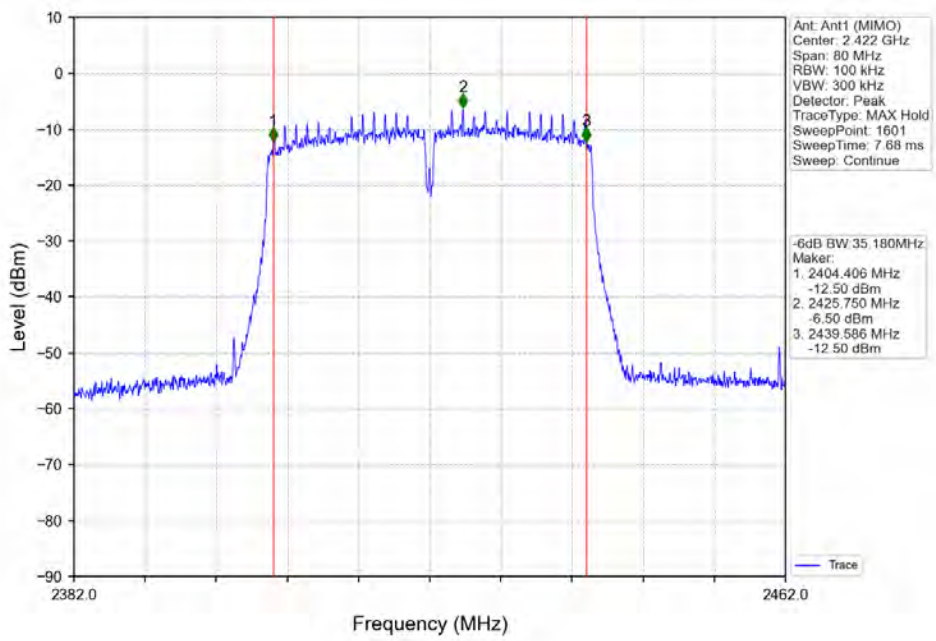
802.11n(HT20)_HCH_2462MHz_Ant1 (MIMO)_NTNV



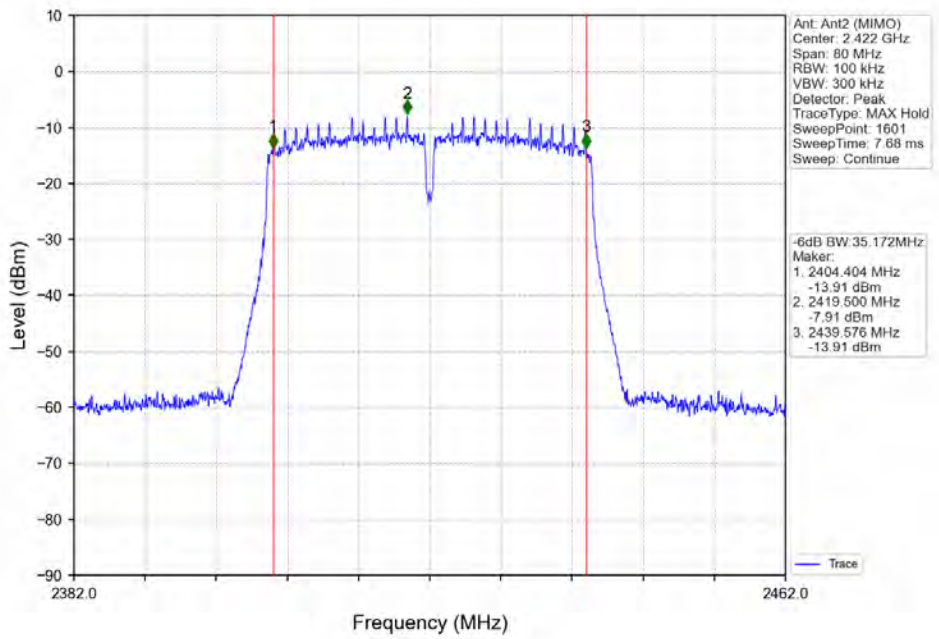
802.11n(HT20)_HCH_2462MHz_Ant2 (MIMO)_NTNV



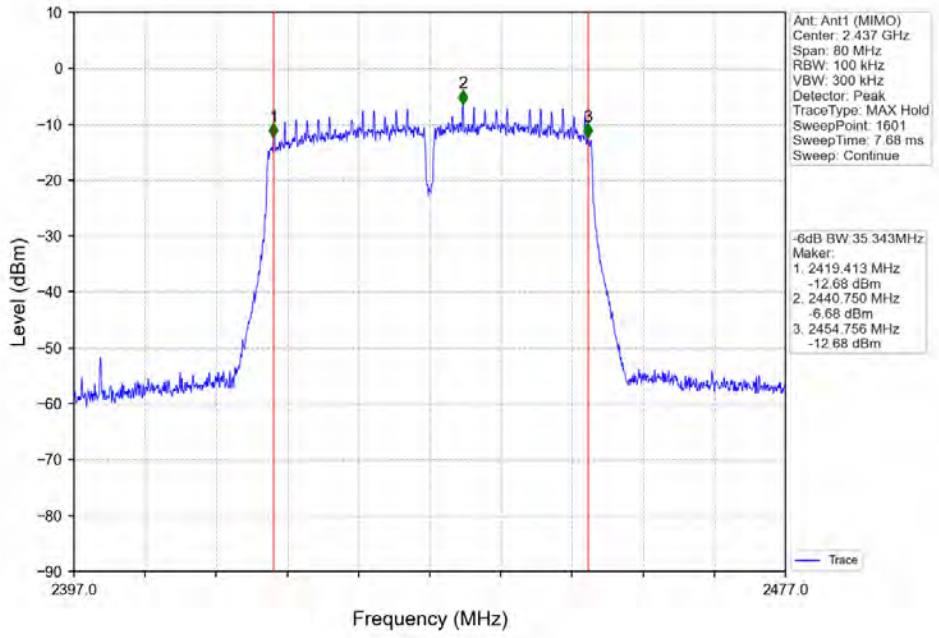
802.11n(HT40)_LCH_2422MHz_Ant1 (MIMO)_NTNV



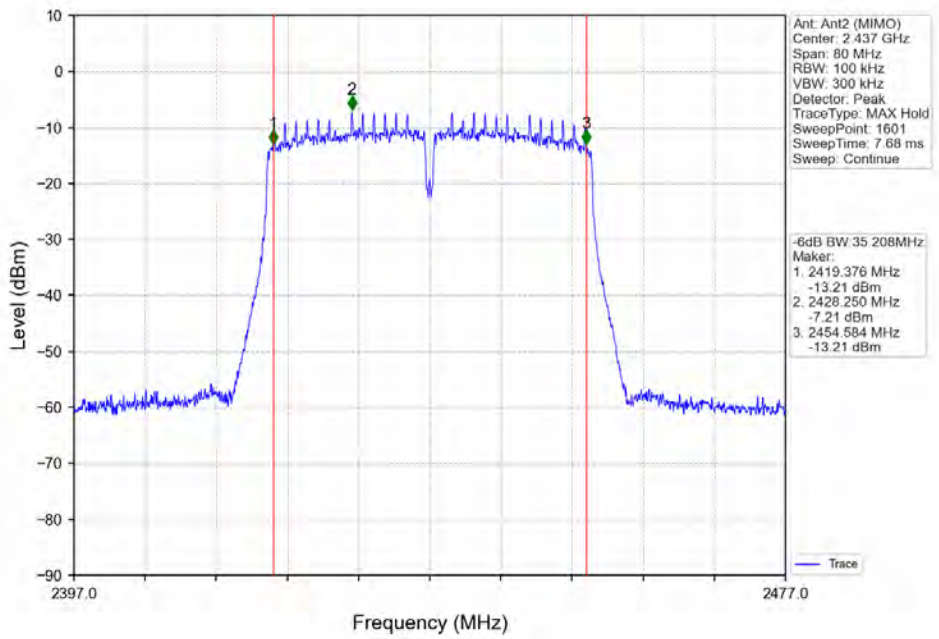
802.11n(HT40)_LCH_2422MHz_Ant2 (MIMO)_NTNV



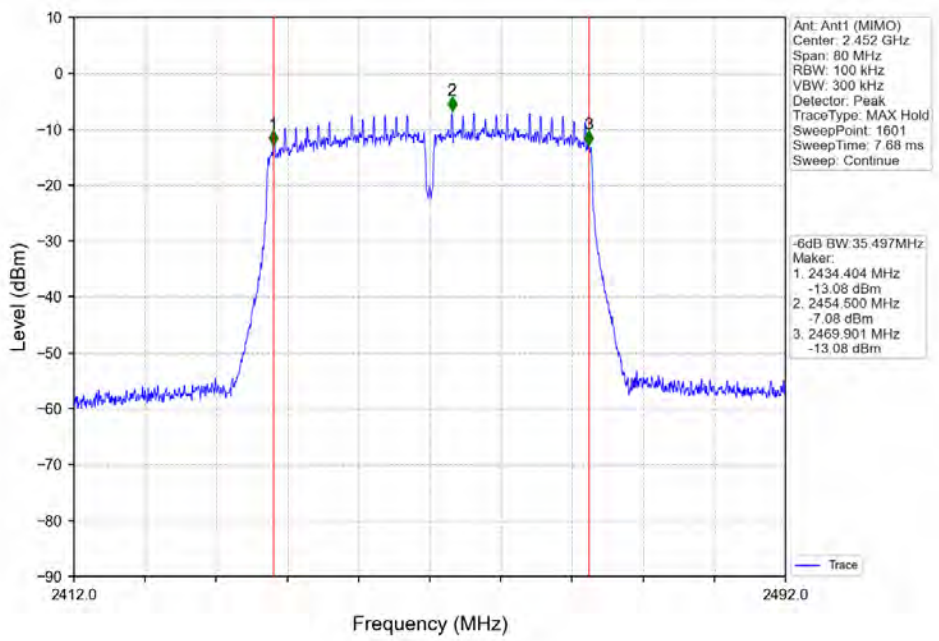
802.11n(HT40)_MCH_2437MHz_Ant1 (MIMO)_NTNV



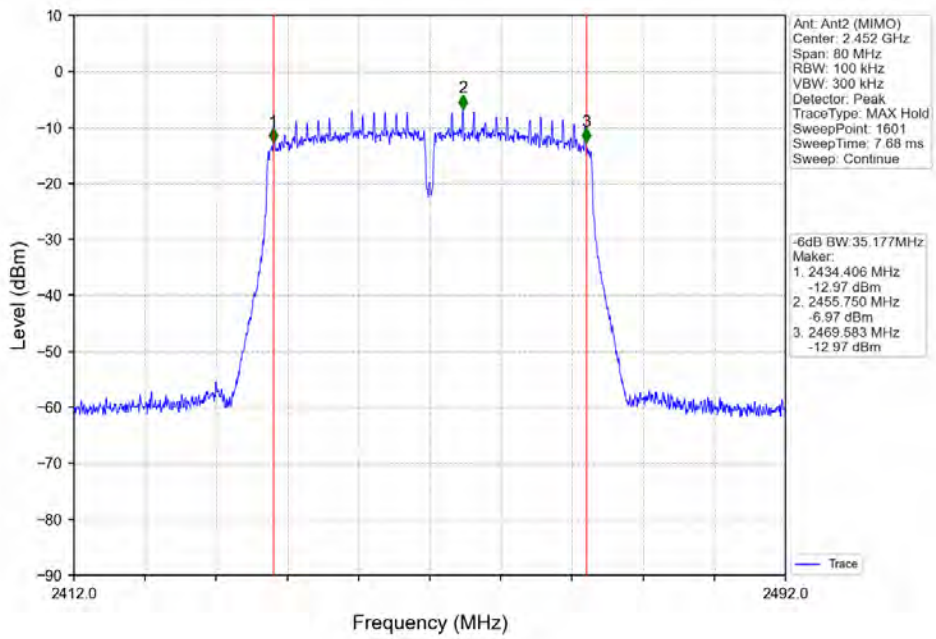
802.11n(HT40)_MCH_2437MHz_Ant2 (MIMO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (MIMO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant2 (MIMO)_NTNV



3. Maximum Conducted Output Power

3.1 Power

3.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Measured Peak Output Power (dBm)				Verdict
			Ant1	Ant2	Sum	Limit	
802.11b	SISO	2412	17.12	17.09	/	<=30	Pass
		2437	17.84	17.52	/	<=30	Pass
		2462	17.60	17.37	/	<=30	Pass
802.11g	SISO	2412	17.79	17.51	/	<=30	Pass
		2437	17.45	17.18	/	<=30	Pass
		2462	18.14	18.00	/	<=30	Pass
802.11n (HT20)	MIMO	2412	15.78	14.59	18.24	<=30	Pass
		2437	15.53	14.18	17.92	<=30	Pass
		2462	15.10	14.25	17.71	<=30	Pass
802.11n (HT40)	MIMO	2422	15.09	13.81	17.51	<=30	Pass
		2437	14.86	14.54	17.71	<=30	Pass
		2452	14.62	14.56	17.60	<=30	Pass
Note1: Antenna Gain: Ant1: 2.70dBi; Ant2: 2.70dBi;							

4. Maximum Power Spectral Density

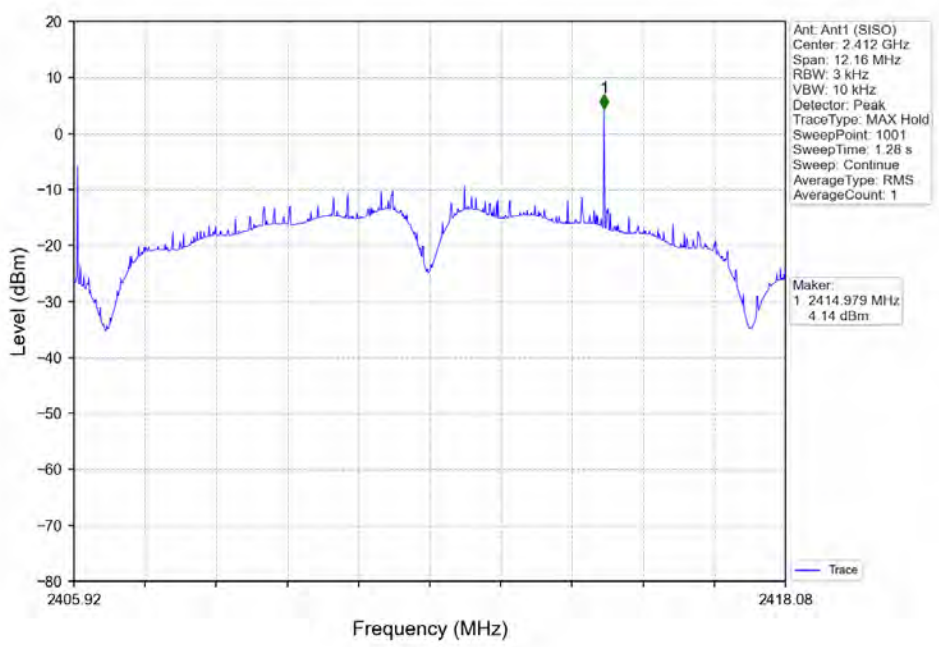
4.1 PSD

4.1.1 Test Result

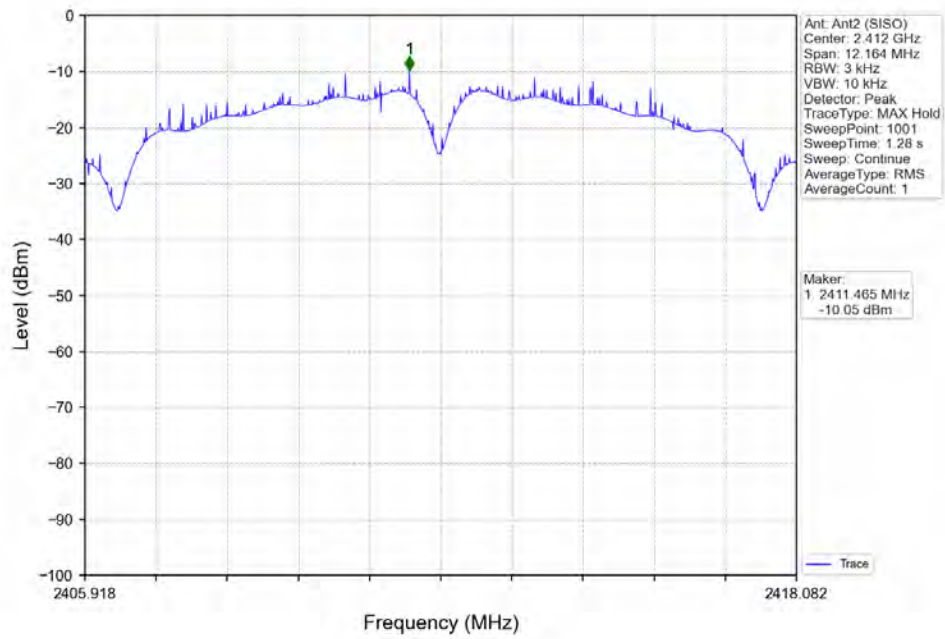
Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/3kHz)				Verdict
			Ant1	Ant2	Sum	Limit	
802.11b	SISO	2412	4.14	-10.05	/	<=8	Pass
		2437	-7.77	4.45	/	<=8	Pass
		2462	-9.26	-9.08	/	<=8	Pass
802.11g	SISO	2412	-17.91	-17.19	/	<=8	Pass
		2437	-16.72	-17.57	/	<=8	Pass
		2462	-16.24	-16.97	/	<=8	Pass
802.11n (HT20)	MIMO	2412	-19.68	-20.66	-17.61	<=8	Pass
		2437	-18.77	-21.19	-17.38	<=8	Pass
		2462	-20.28	-21.04	-18.05	<=8	Pass
802.11n (HT40)	MIMO	2422	-21.20	-22.32	-19.70	<=8	Pass
		2437	-22.06	-21.59	-19.51	<=8	Pass
		2452	-21.50	-21.93	-19.05	<=8	Pass
Note1: Antenna Gain: Ant1: 2.70dBi; Ant2: 2.70dBi;							

4.1.2 Test Graph

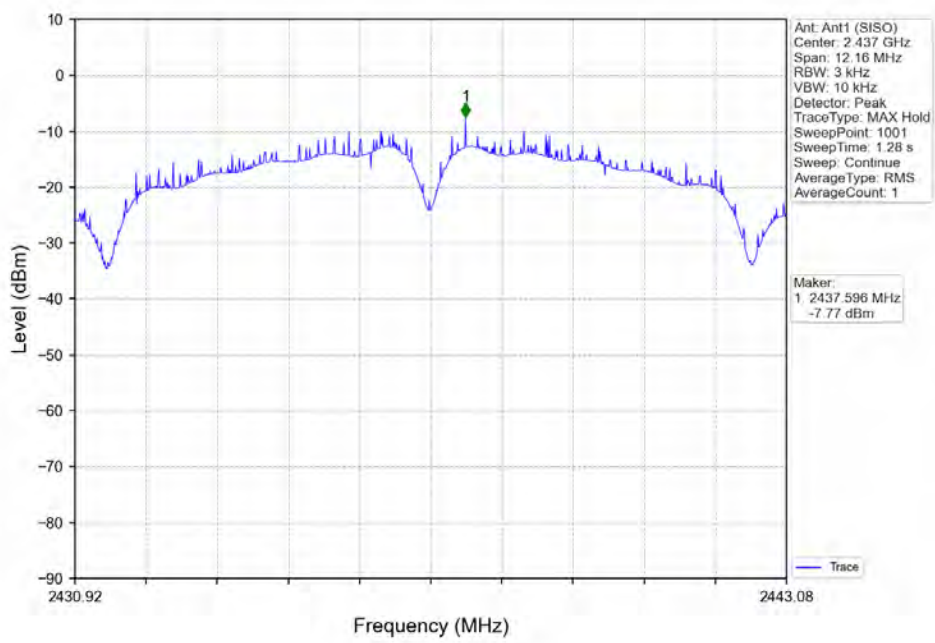
802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



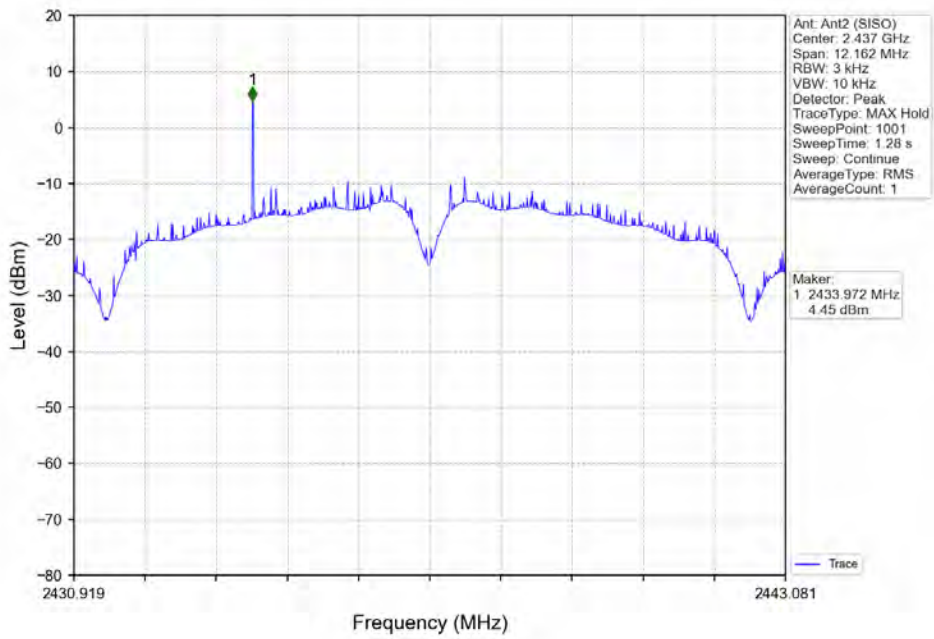
802.11b_LCH_2412MHz_Ant2 (SISO)_NTNV



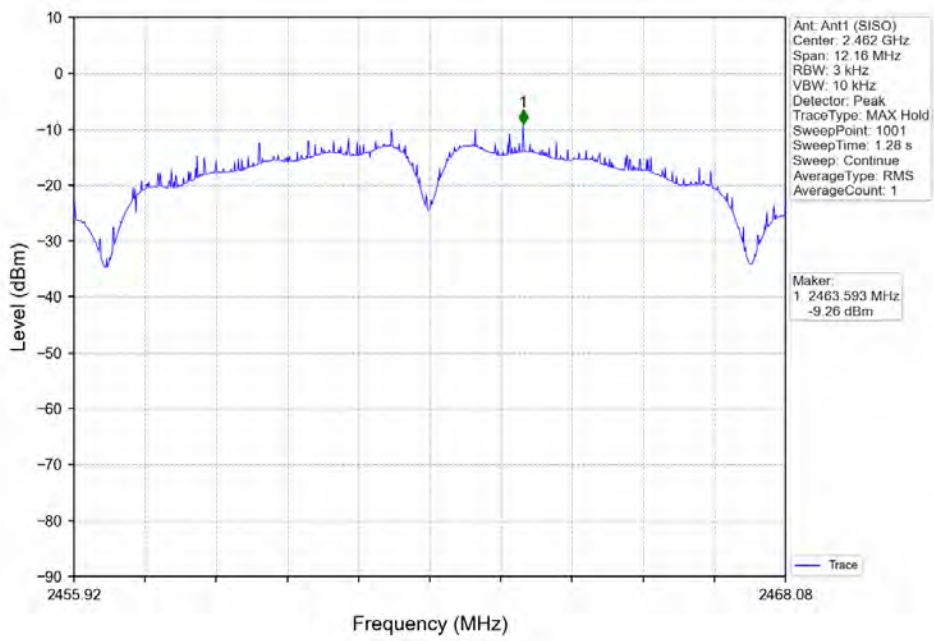
802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV



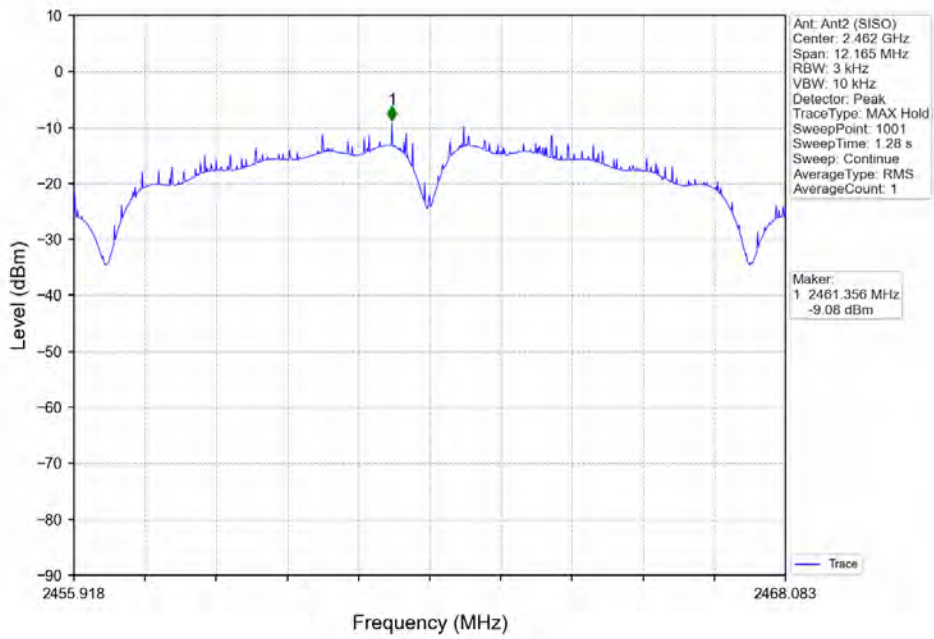
802.11b_MCH_2437MHz_Ant2 (SISO)_NTNV



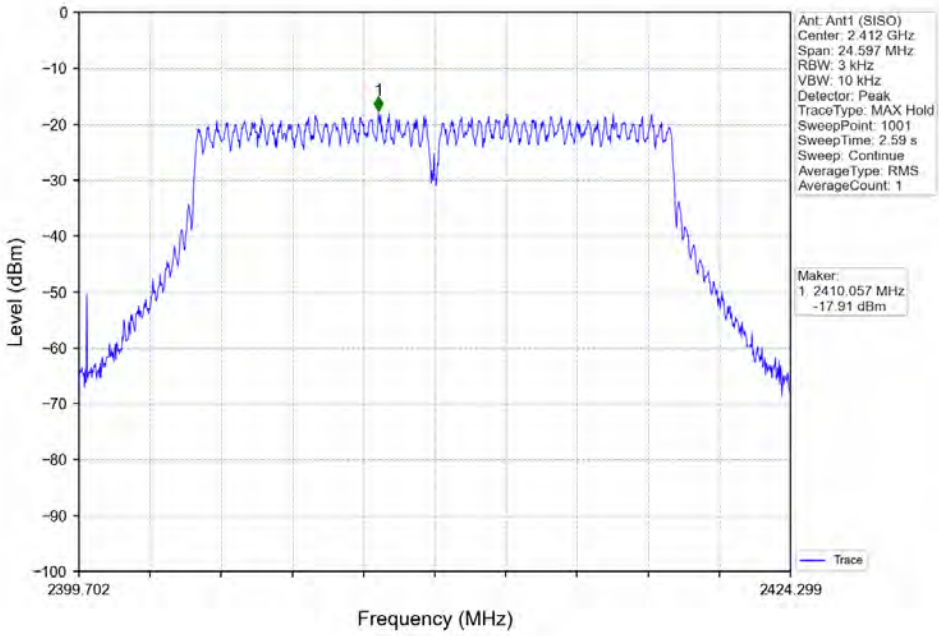
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



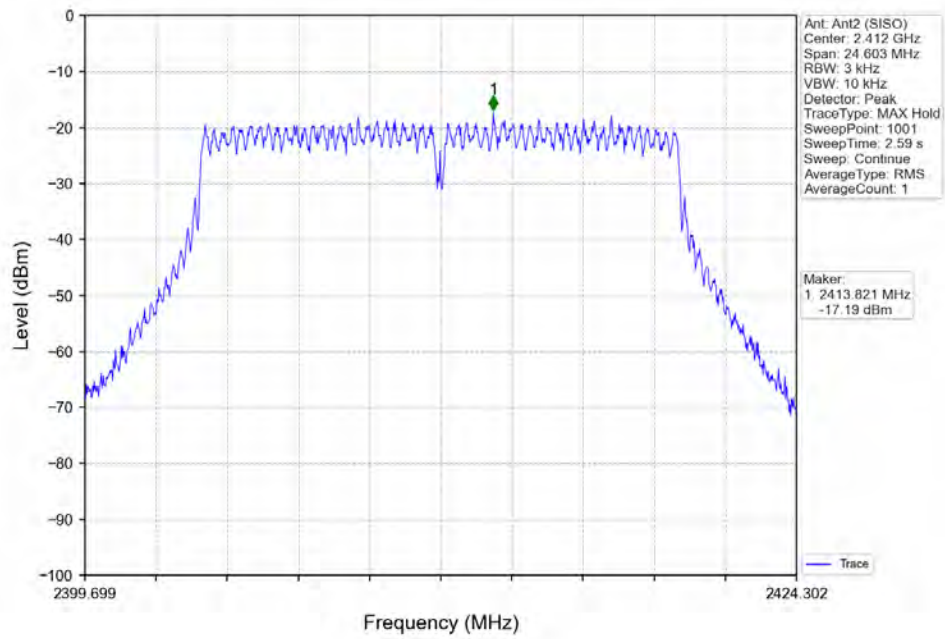
802.11b_HCH_2462MHz_Ant2 (SISO)_NTNV



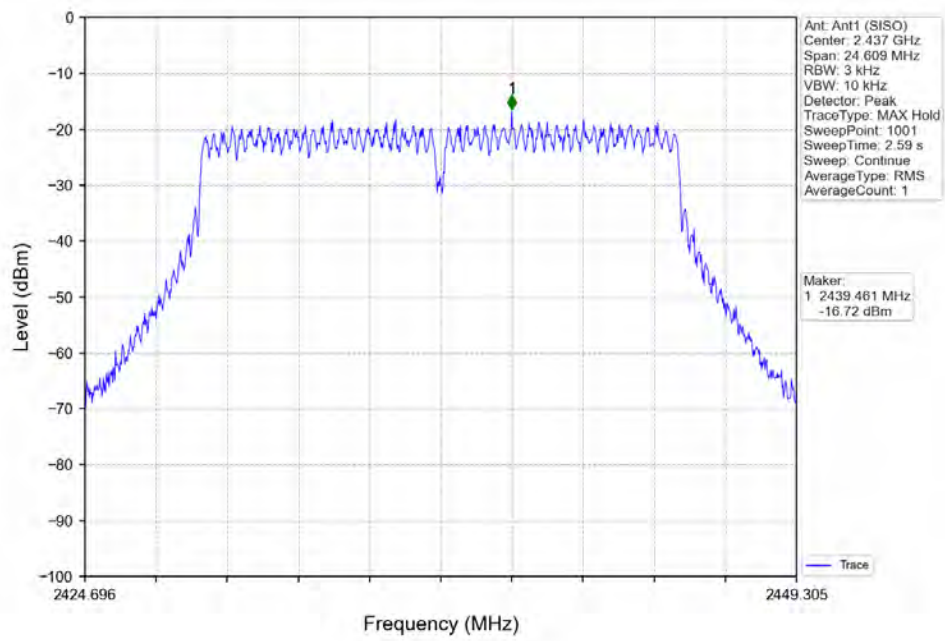
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



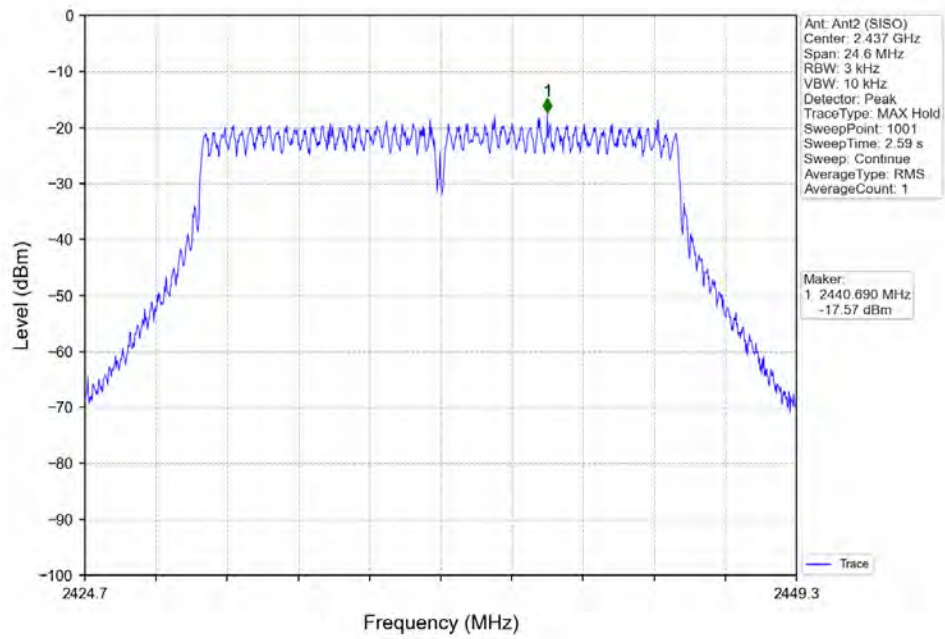
802.11g_LCH_2412MHz_Ant2 (SISO)_NTNV



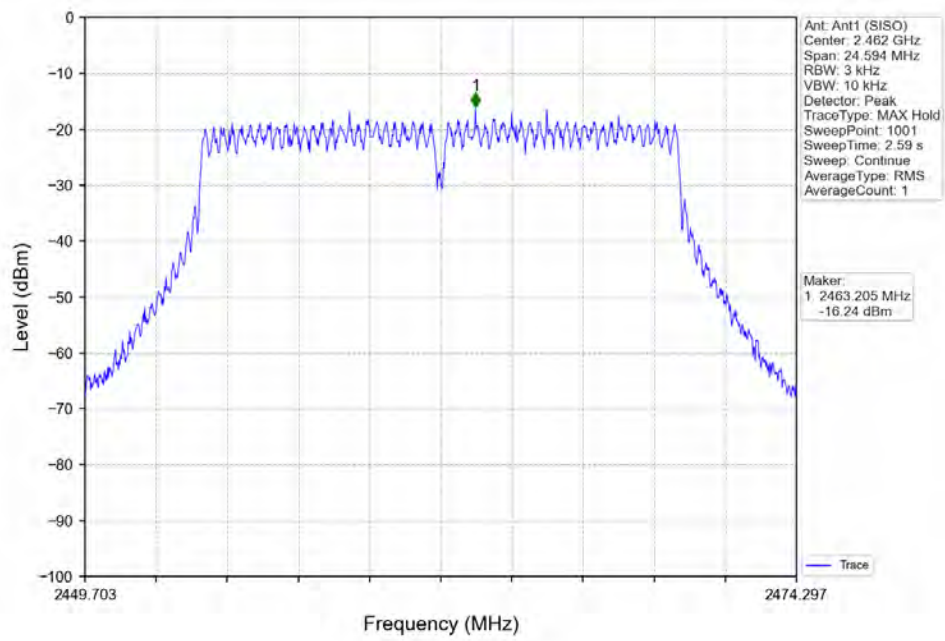
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



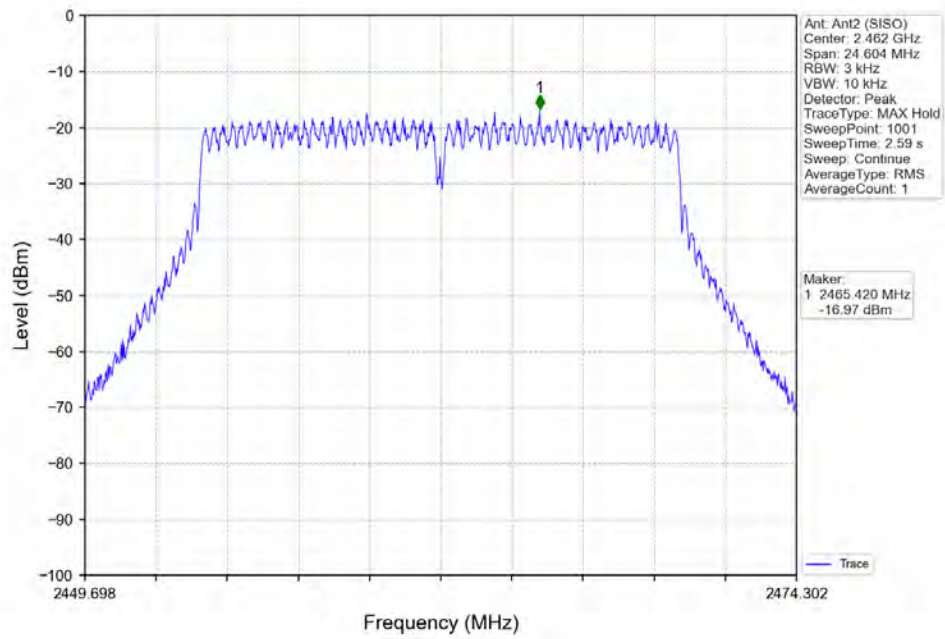
802.11g_MCH_2437MHz_Ant2 (SISO)_NTNV



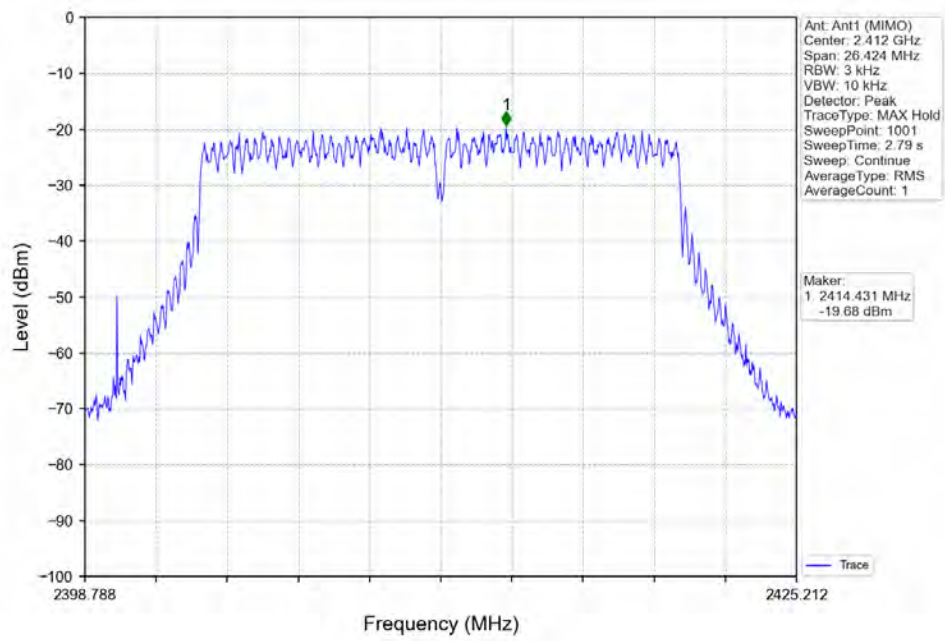
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



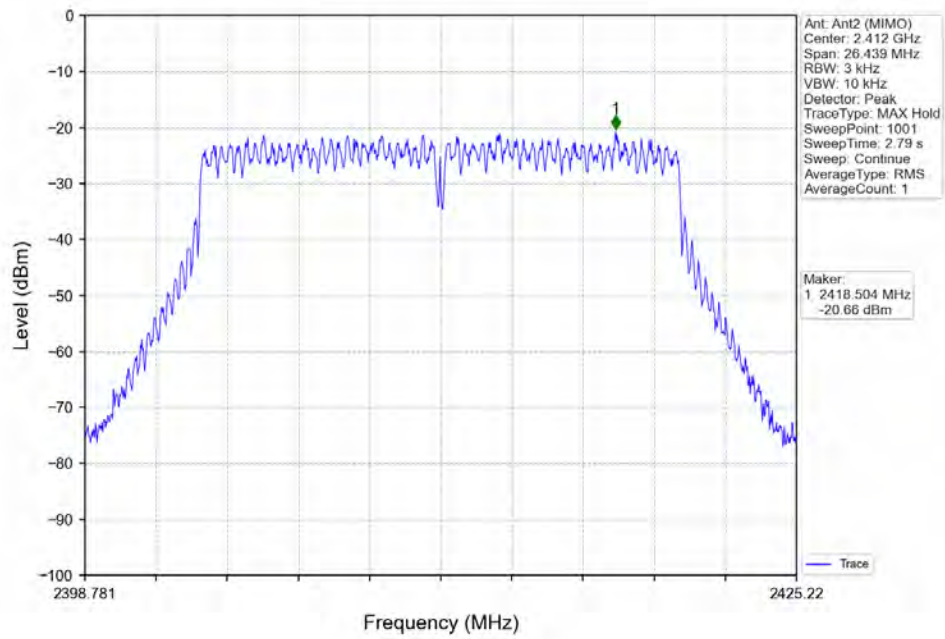
802.11g_HCH_2462MHz_Ant2 (SISO)_NTNV



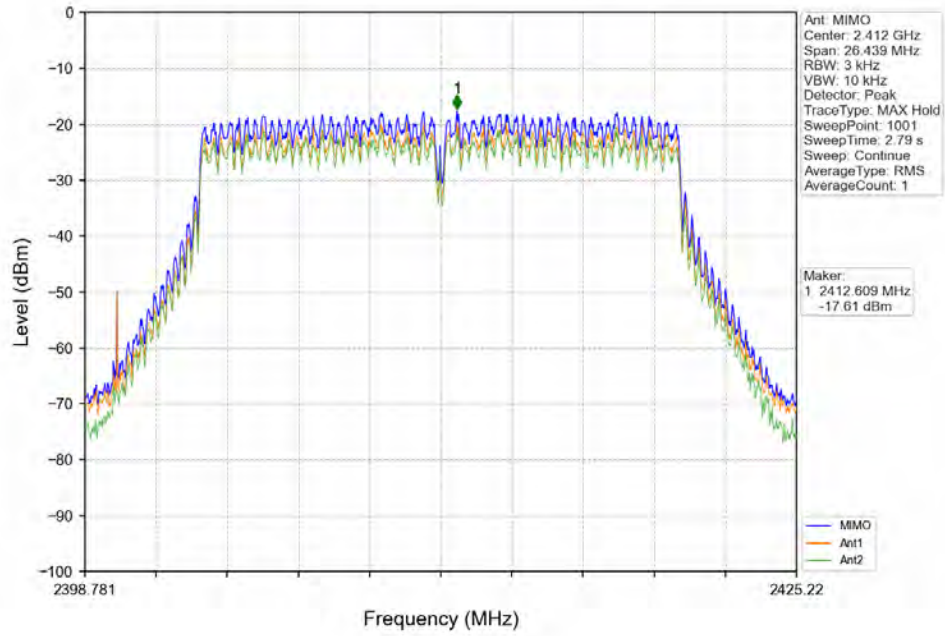
802.11n(HT20)_LCH_2412MHz_Ant1 (MIMO)_NTNV



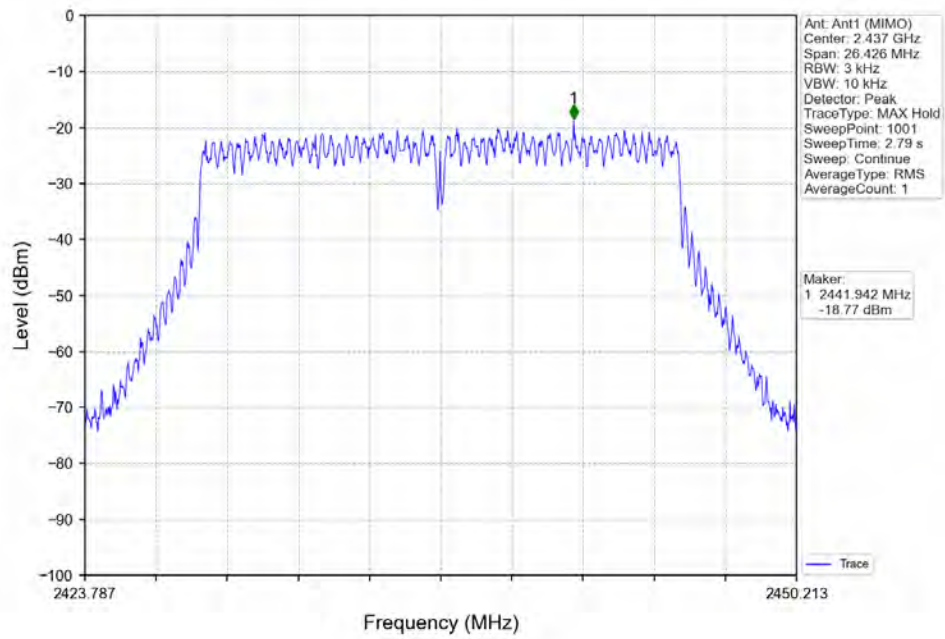
802.11n(HT20)_LCH_2412MHz_Ant2 (MIMO)_NTNV



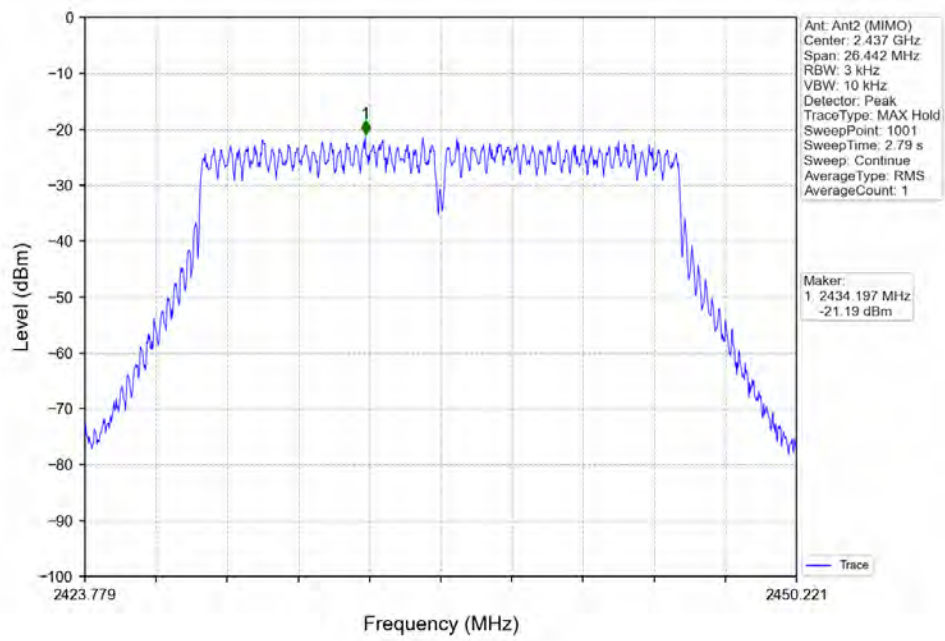
802.11n(HT20)_LCH_2412MHz_MIMO_NTNV



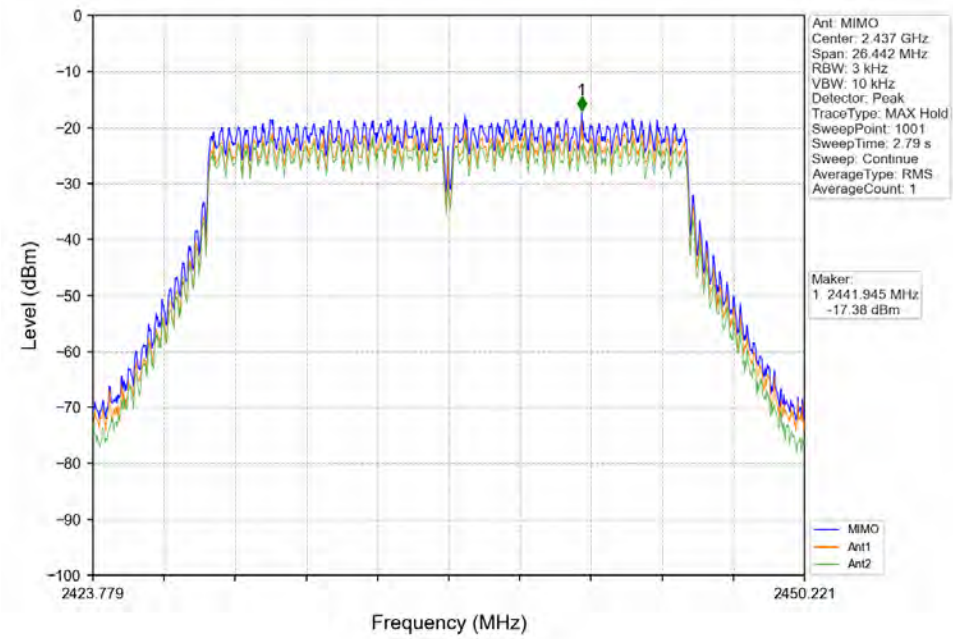
802.11n(HT20)_MCH_2437MHz_Ant1 (MIMO)_NTNV



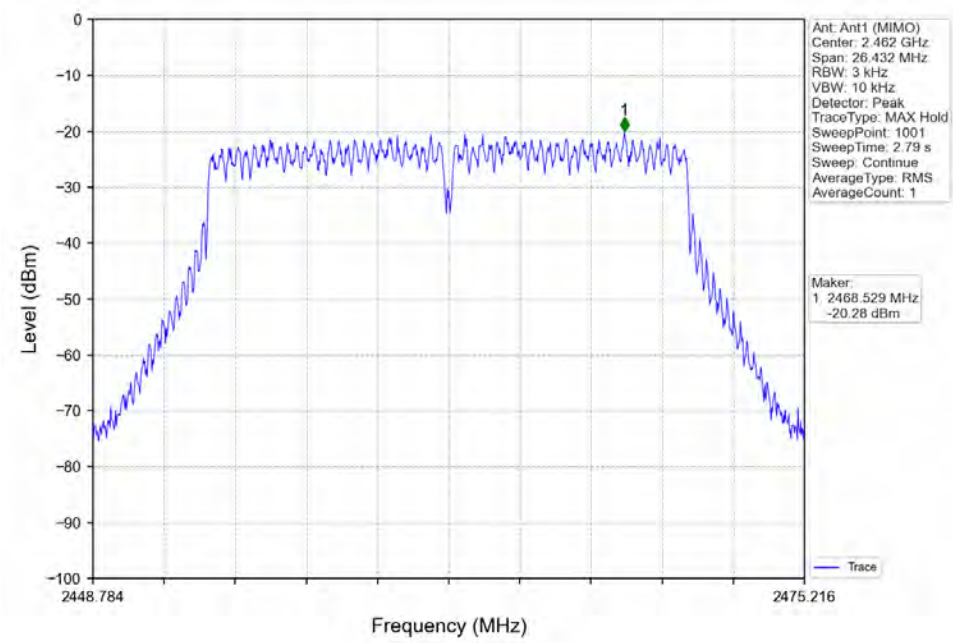
802.11n(HT20)_MCH_2437MHz_Ant2 (MIMO)_NTNV



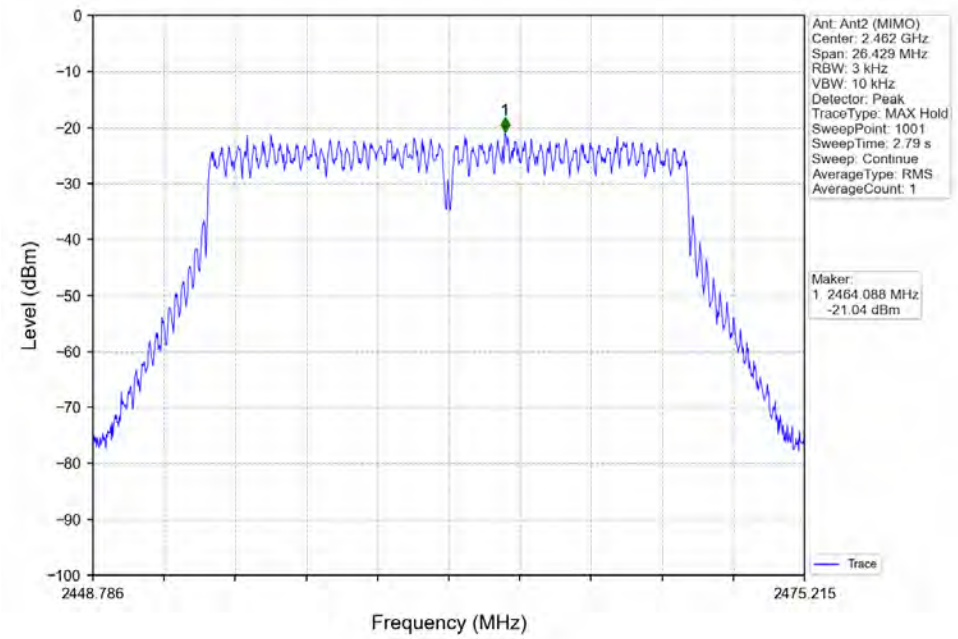
802.11n(HT20)_MCH_2437MHz_MIMO_NTNV



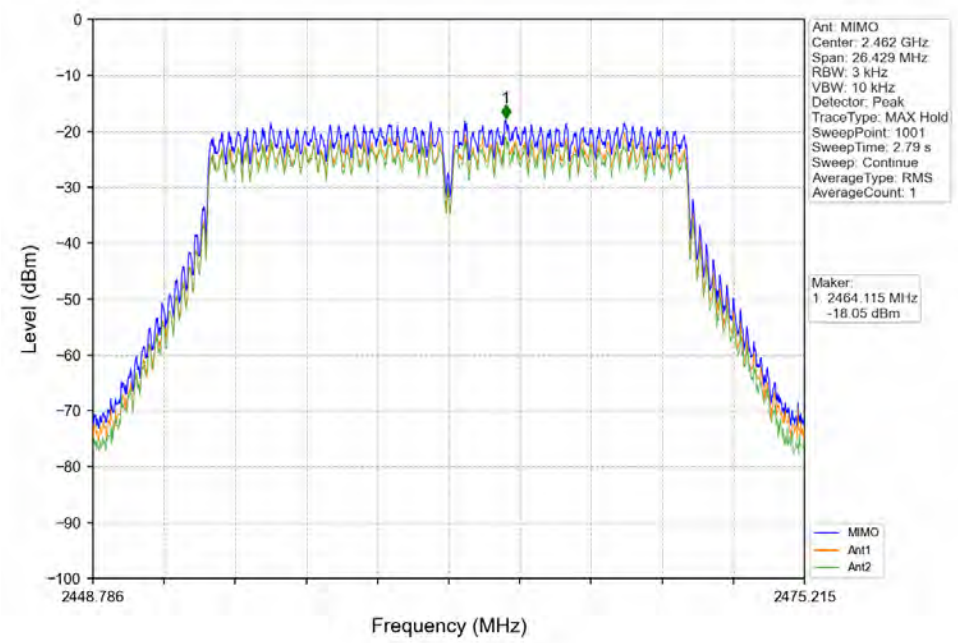
802.11n(HT20)_HCH_2462MHz_Ant1 (MIMO)_NTNV



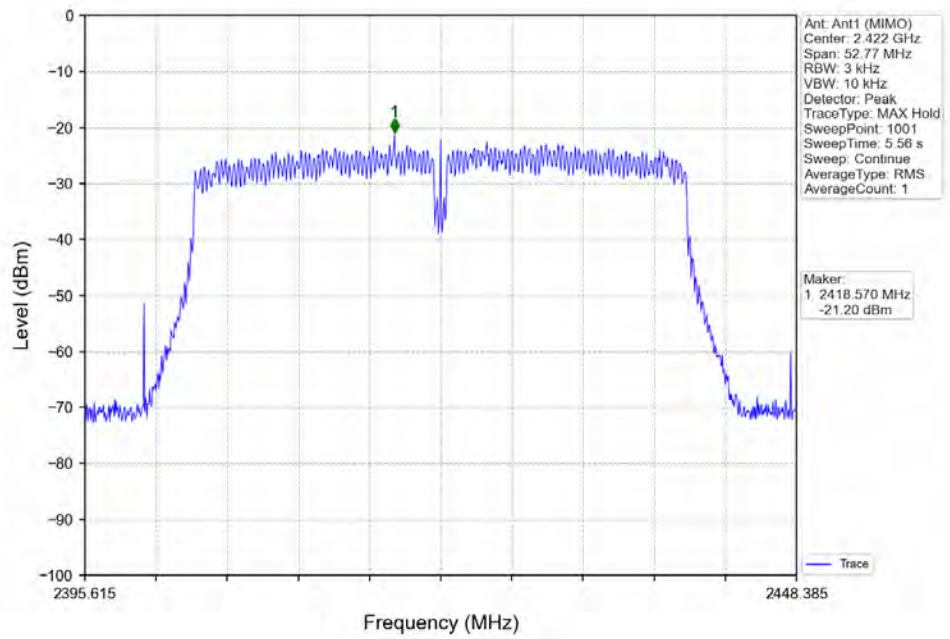
802.11n(HT20)_HCH_2462MHz_Ant2 (MIMO)_NTNV



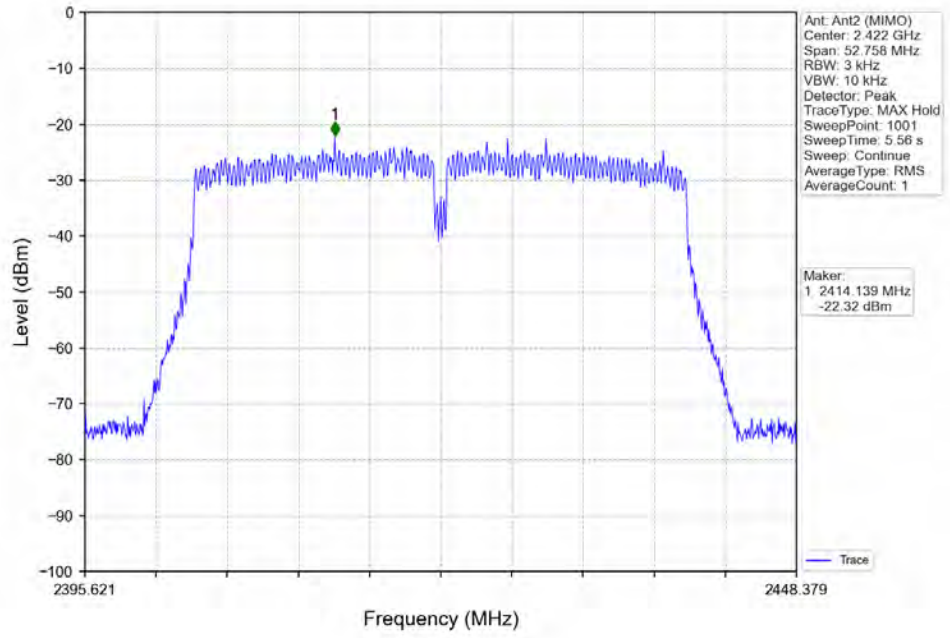
802.11n(HT20)_HCH_2462MHz_MIMO_NTNV



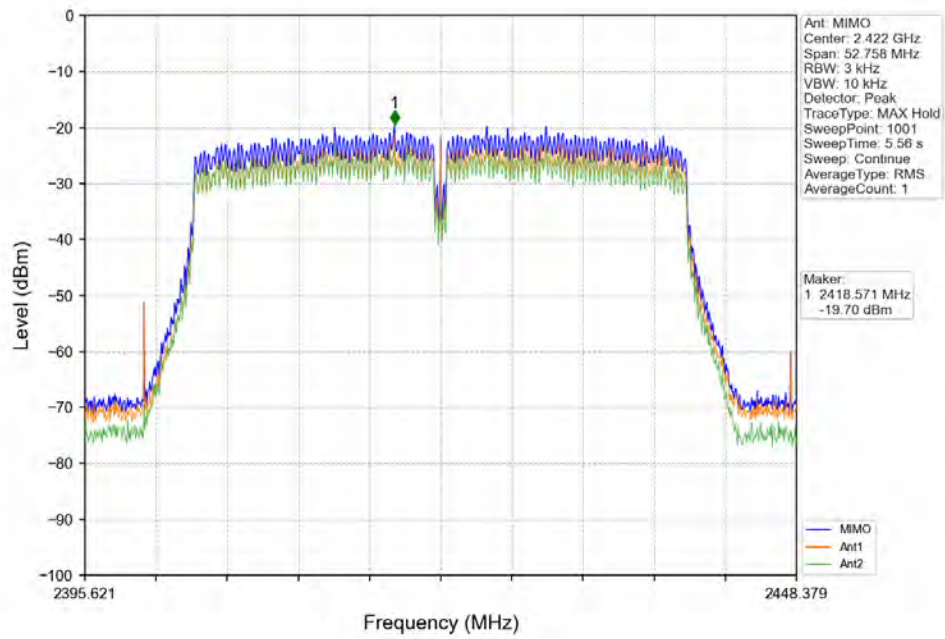
802.11n(HT40)_LCH_2422MHz_Ant1 (MIMO)_NTNV



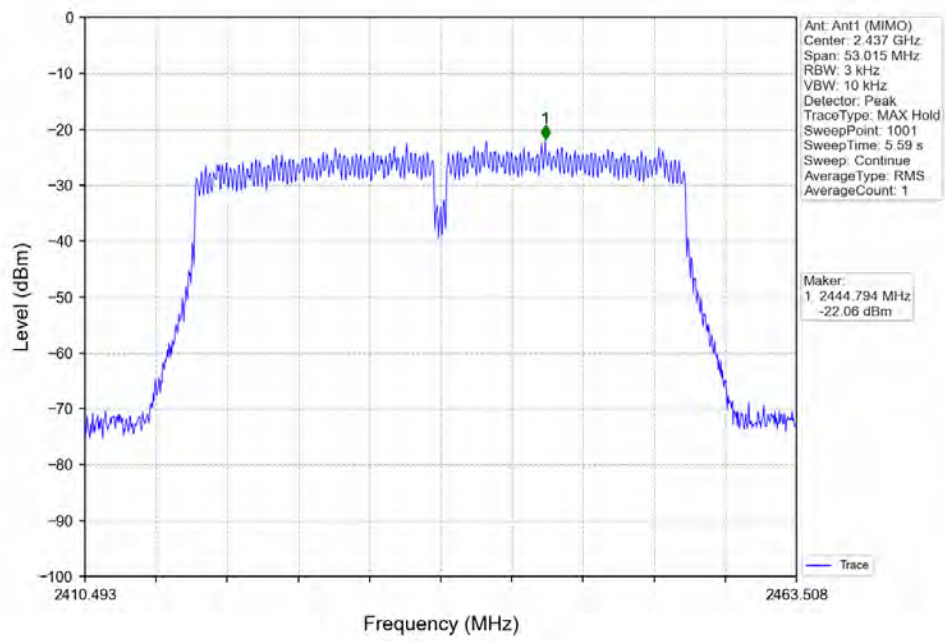
802.11n(HT40)_LCH_2422MHz_Ant2 (MIMO)_NTNV



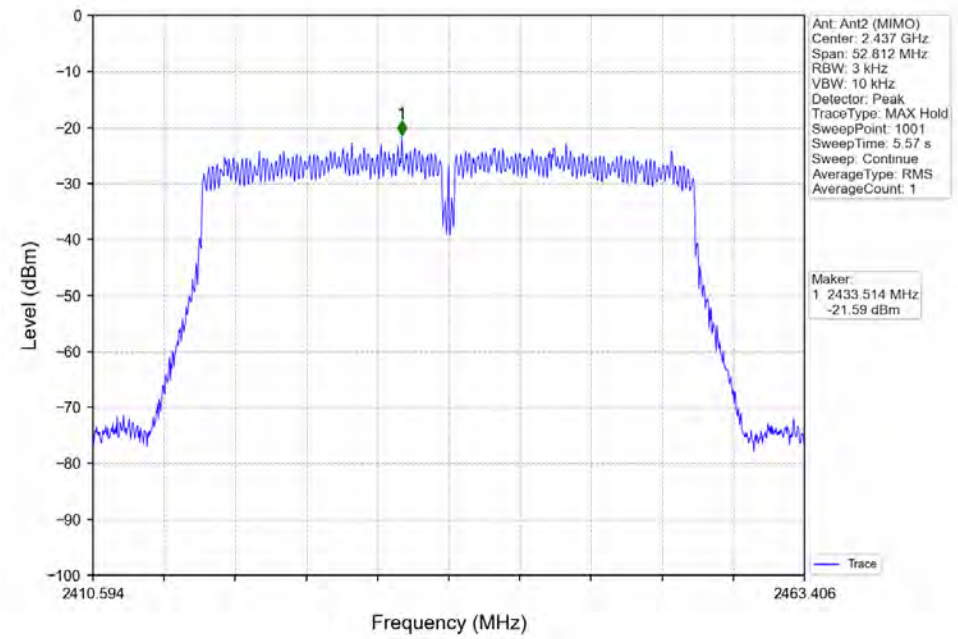
802.11n(HT40)_LCH_2422MHz_MIMO_NTNV



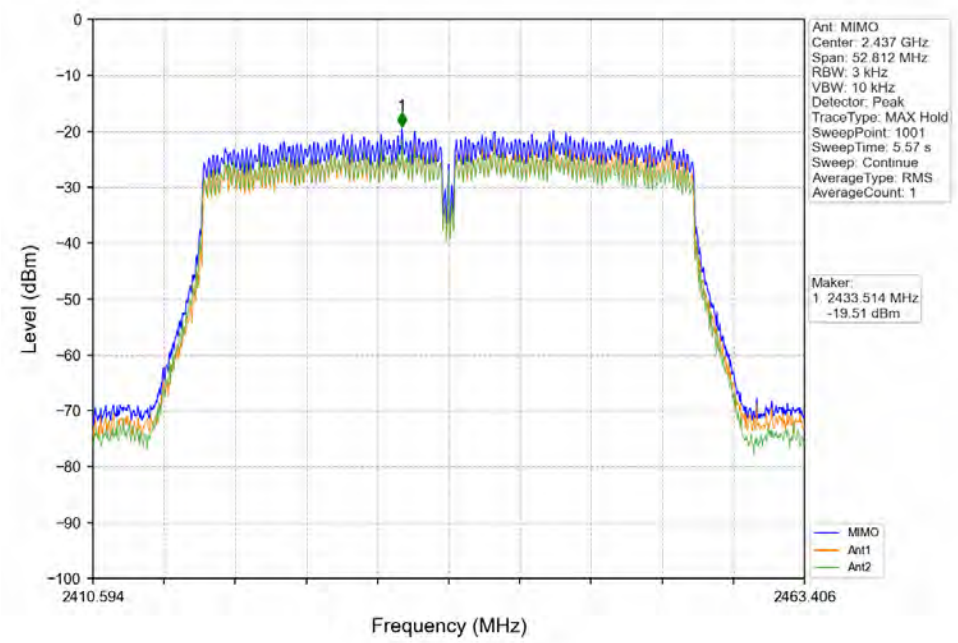
802.11n(HT40)_MCH_2437MHz_Ant1 (MIMO)_NTNV



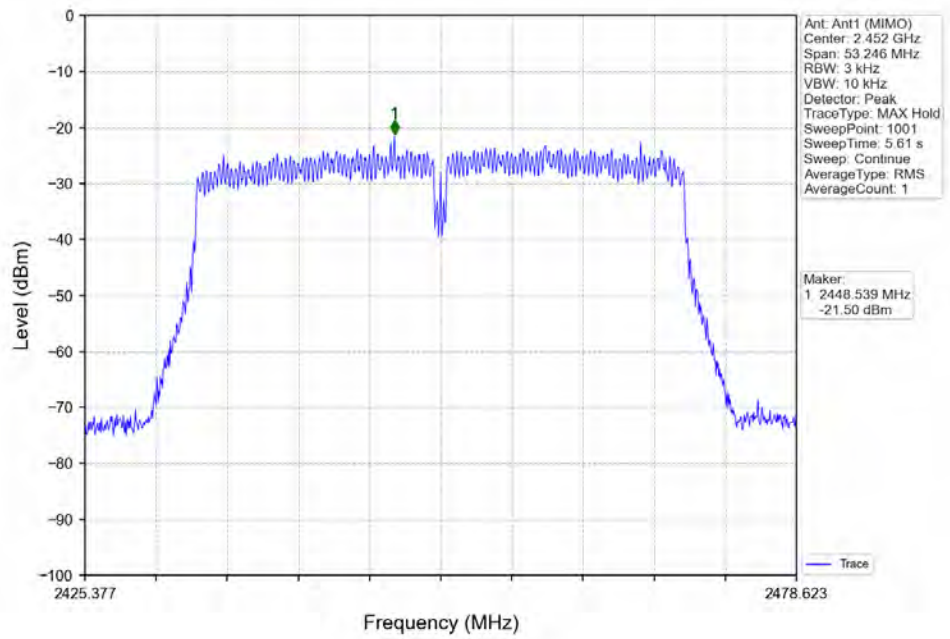
802.11n(HT40)_MCH_2437MHz_Ant2 (MIMO)_NTNV



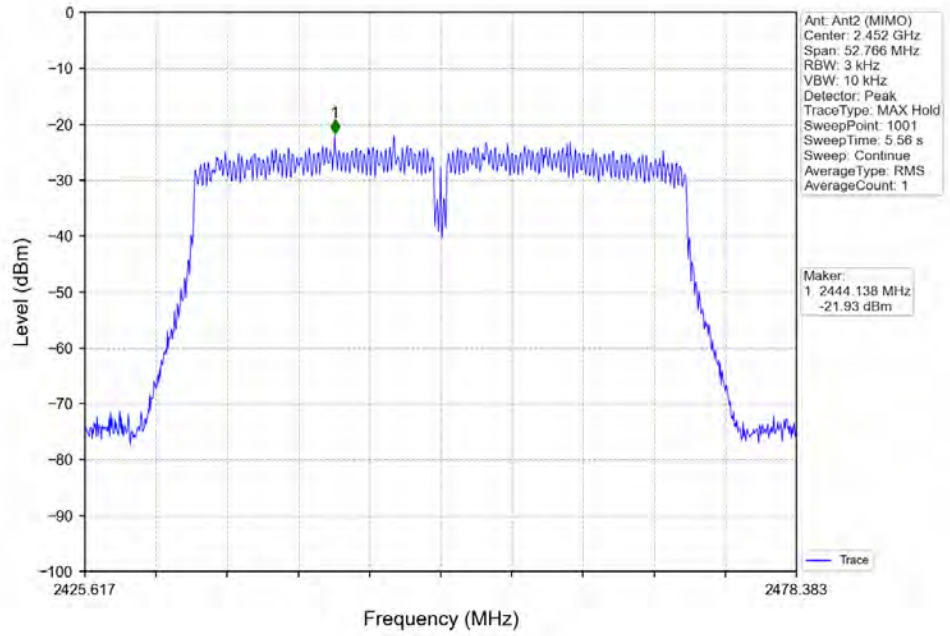
802.11n(HT40)_MCH_2437MHz_MIMO_NTNV



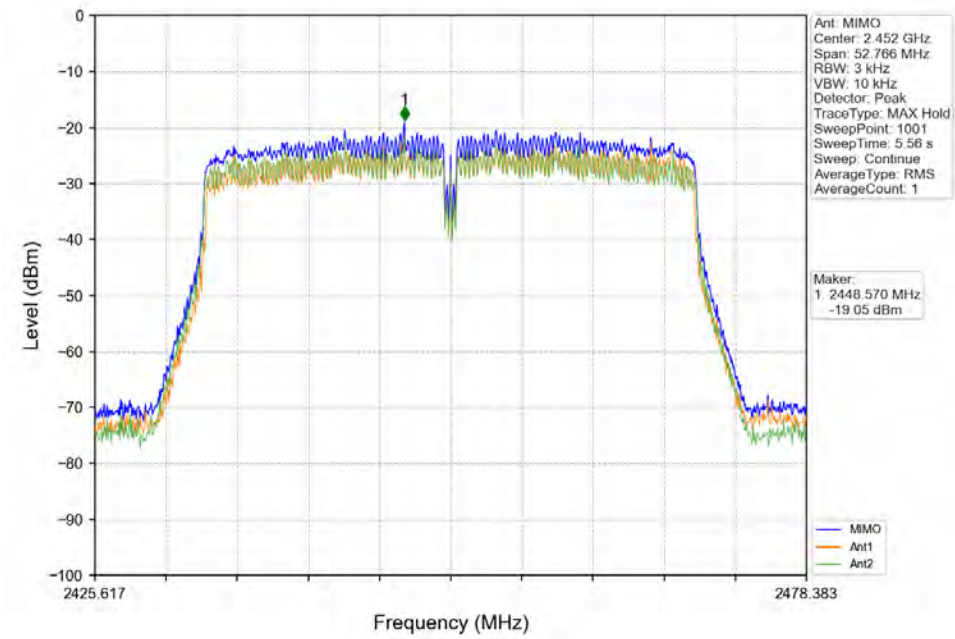
802.11n(HT40)_HCH_2452MHz_Ant1 (MIMO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant2 (MIMO)_NTNV



802.11n(HT40)_HCH_2452MHz_MIMO_NTNV



5. Unwanted Emissions In Non-restricted Frequency Bands

5.1 Ref

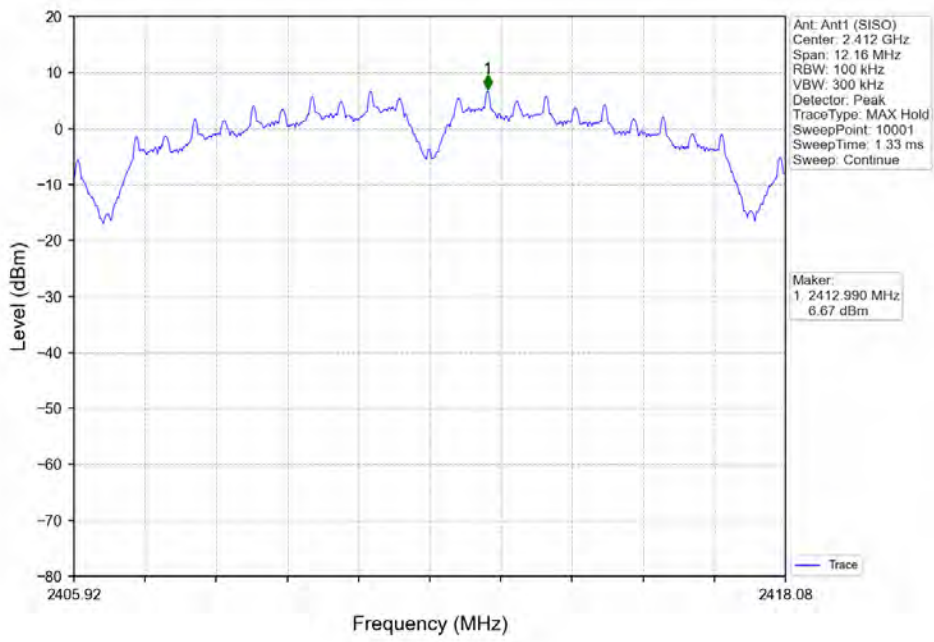
5.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Ant	Level of Reference (dBm)
802.11b	SISO	2412	1	6.67
			2	6.69
		2437	1	7.43
			2	7.03
		2462	1	7.15
			2	6.98
802.11g	SISO	2412	1	-1.74
			2	-1.68
		2437	1	-1.81
			2	-2.09
		2462	1	-1.06
			2	-1.29
802.11n (HT20)	MIMO	2412	1	-3.53
			2	-4.97
		2437	1	-3.85
			2	-5.42
		2462	1	-4.63
			2	-5.49
802.11n (HT40)	MIMO	2422	1	-6.82
			2	-7.82

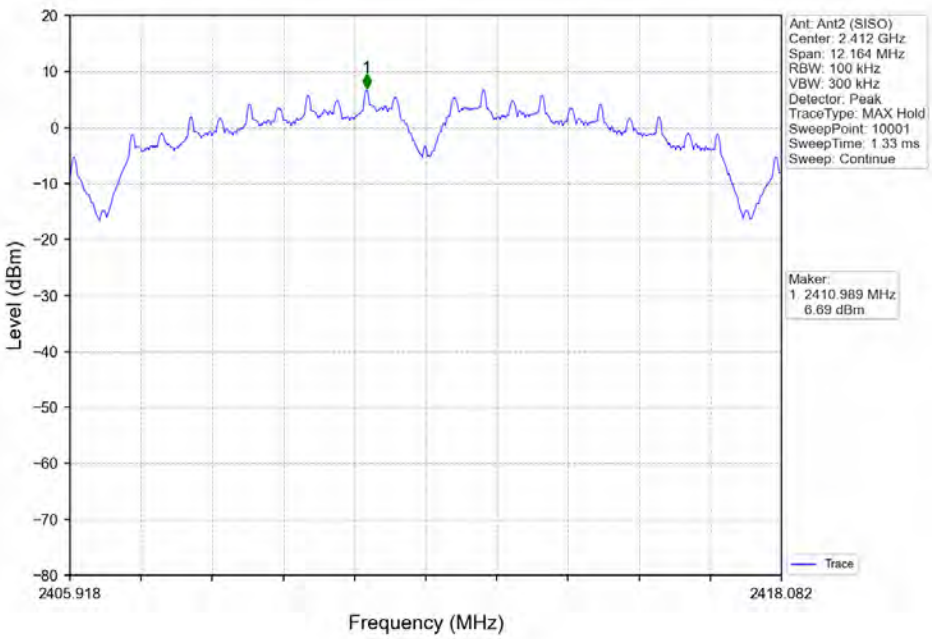
		2437	1	-6.89
			2	-7.40
		2452	1	-6.87
			2	-7.36
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.				

5.1.2 Test Graph

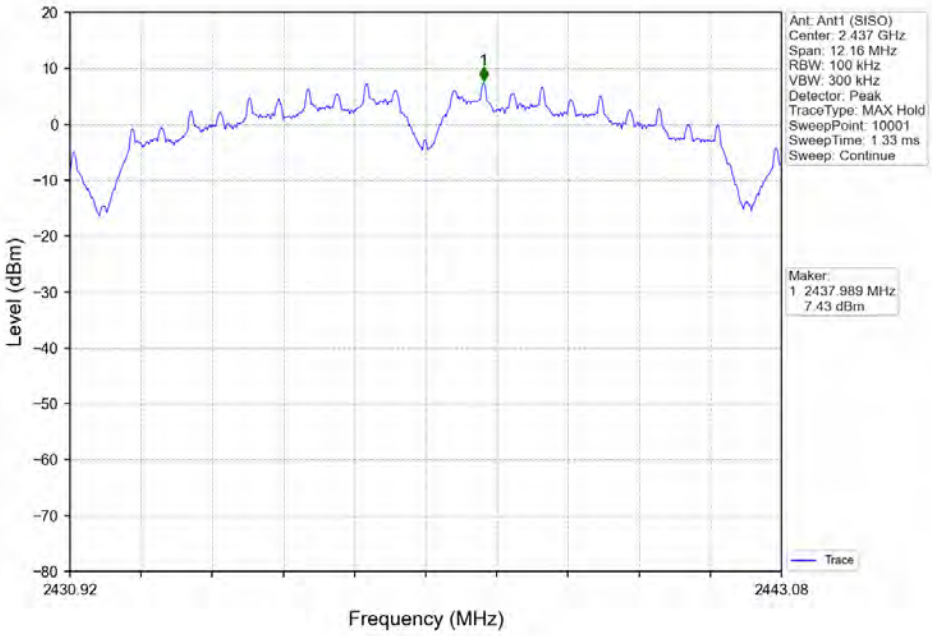
802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



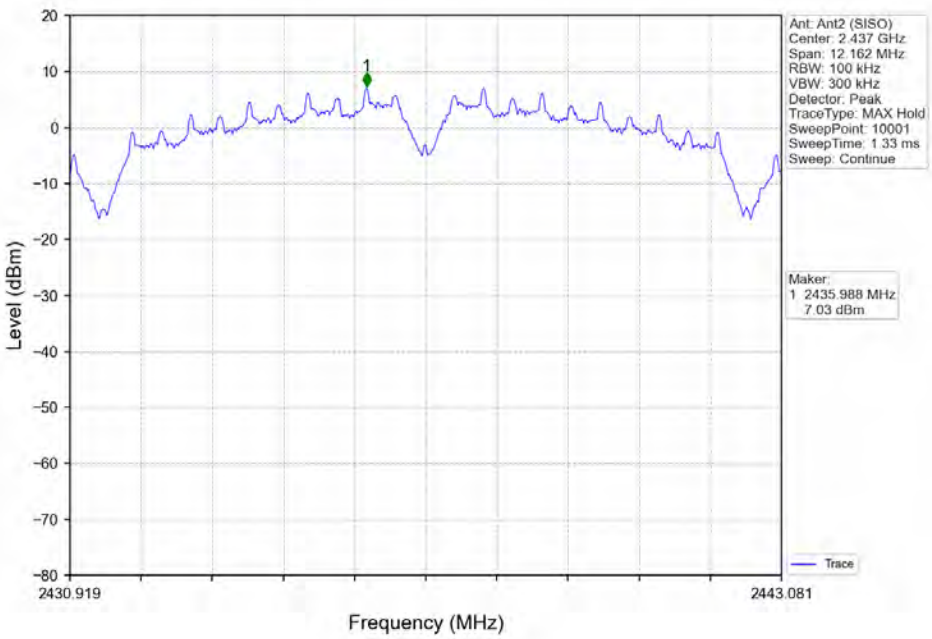
802.11b_LCH_2412MHz_Ant2 (SISO)_NTNV



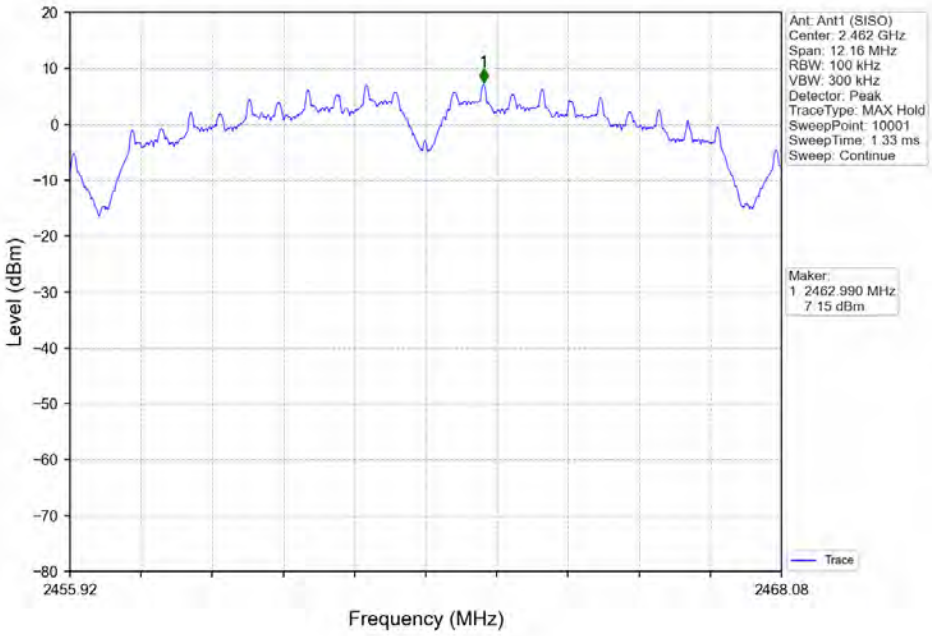
802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV



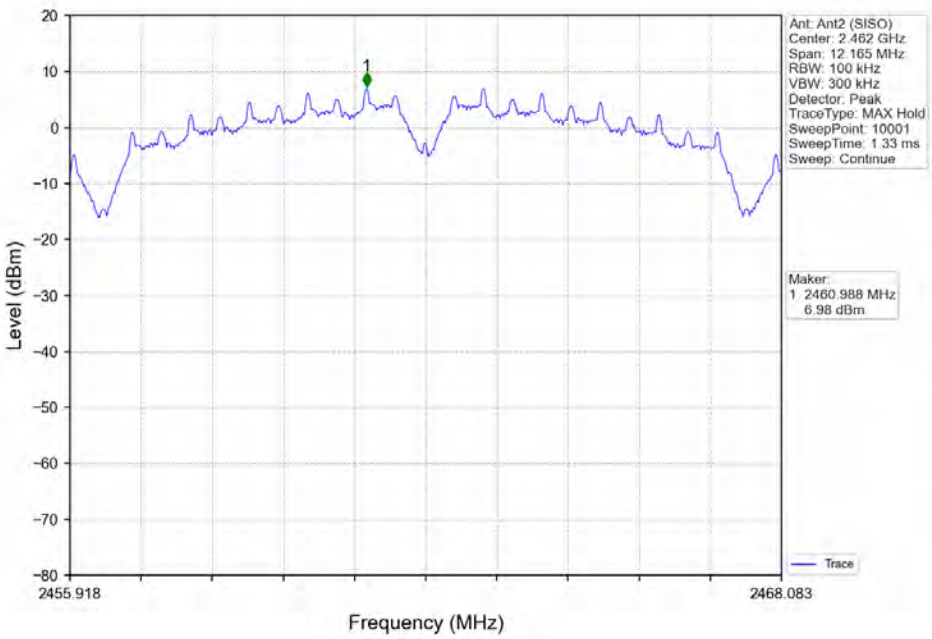
802.11b_MCH_2437MHz_Ant2 (SISO)_NTNV



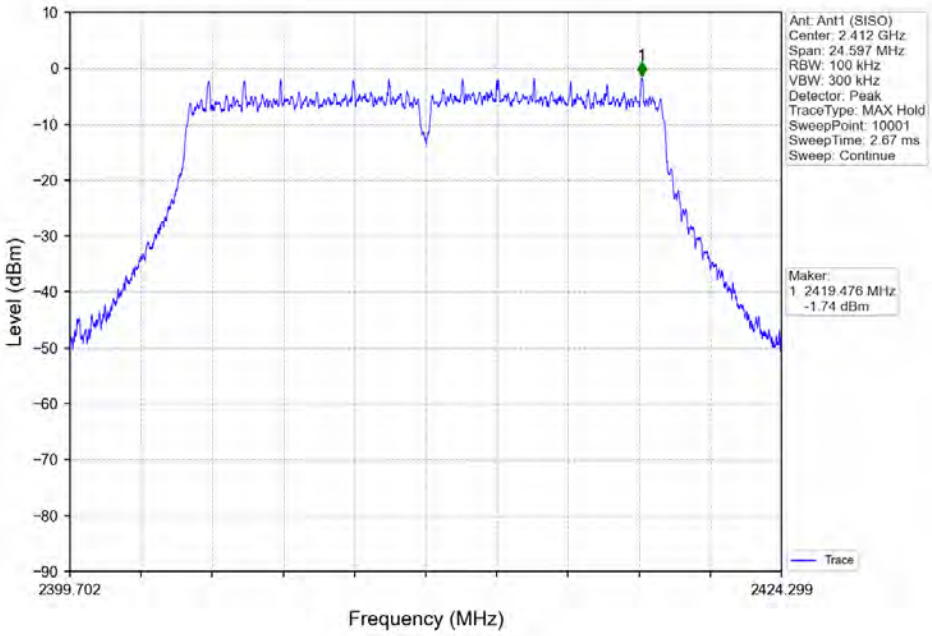
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



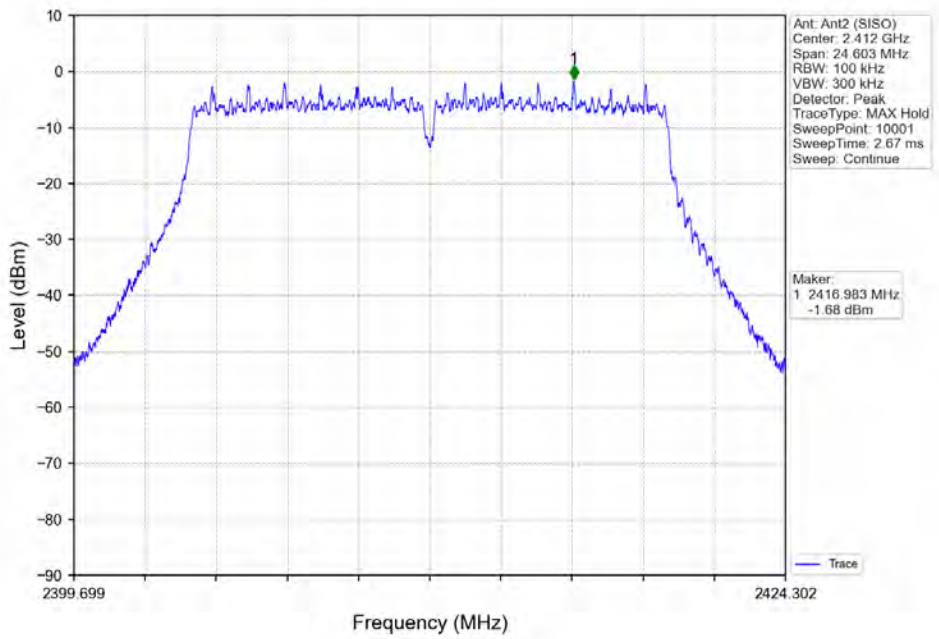
802.11b_HCH_2462MHz_Ant2 (SISO)_NTNV



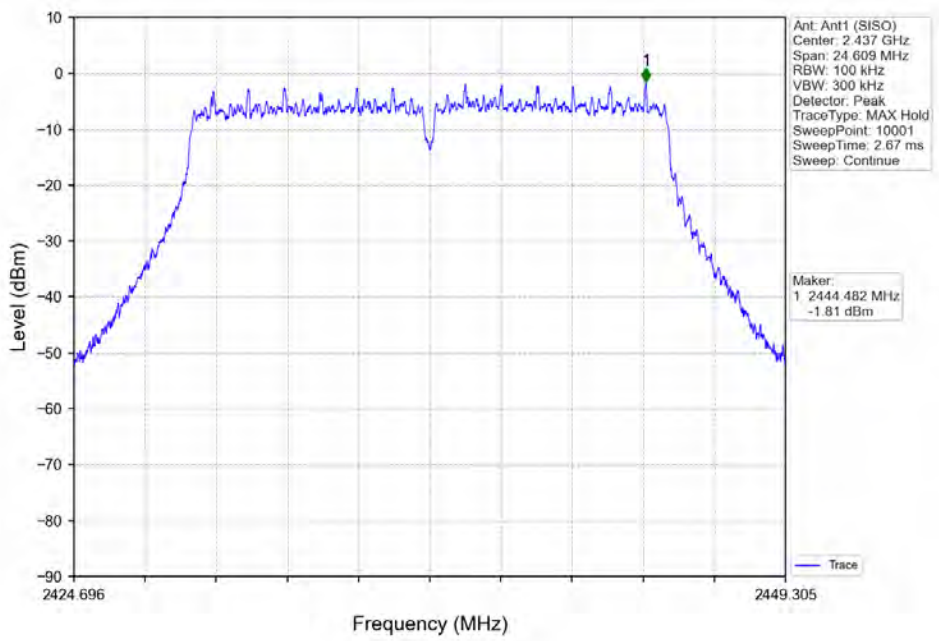
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



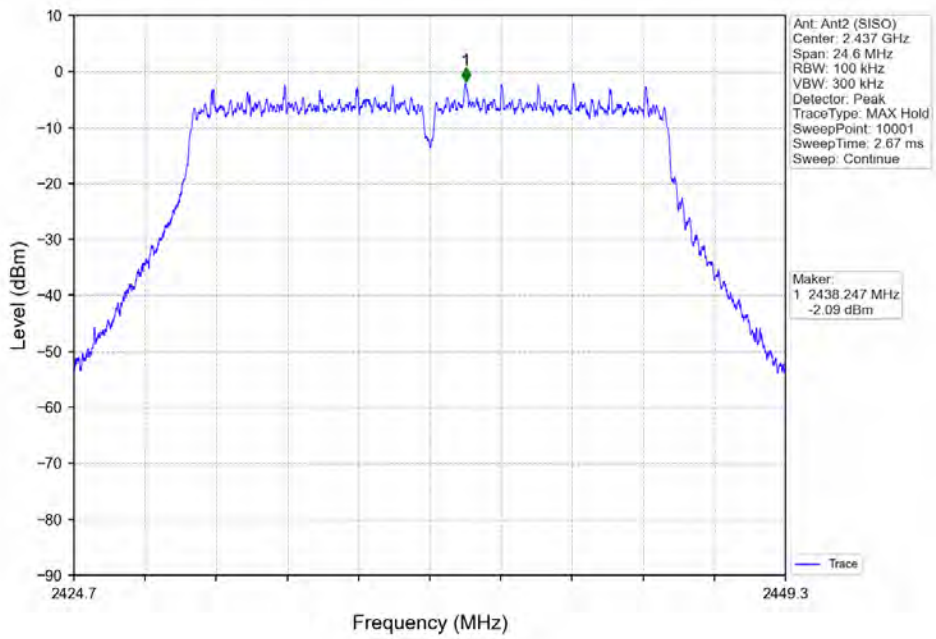
802.11g_LCH_2412MHz_Ant2 (SISO)_NTNV



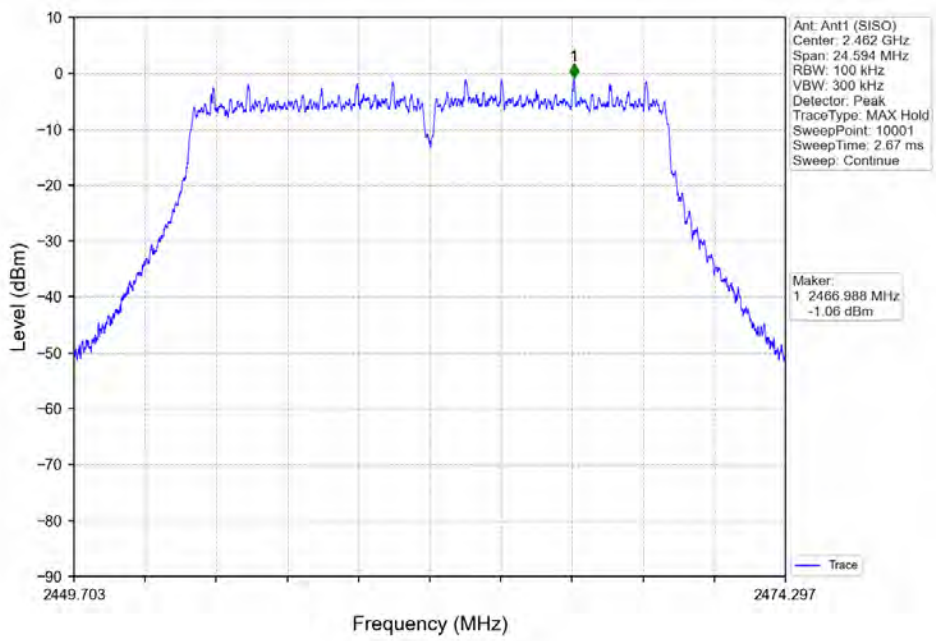
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



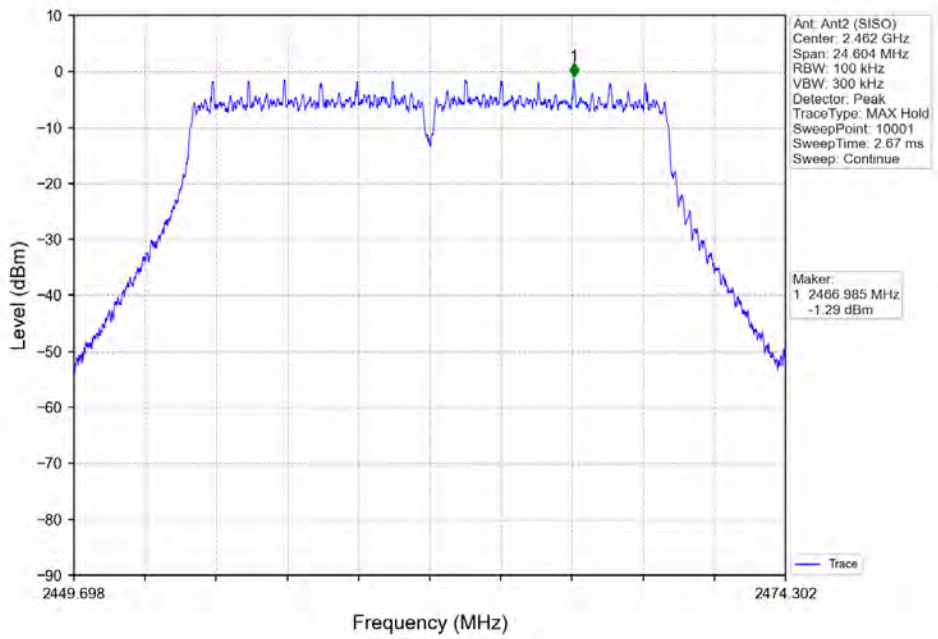
802.11g_MCH_2437MHz_Ant2 (SISO)_NTNV



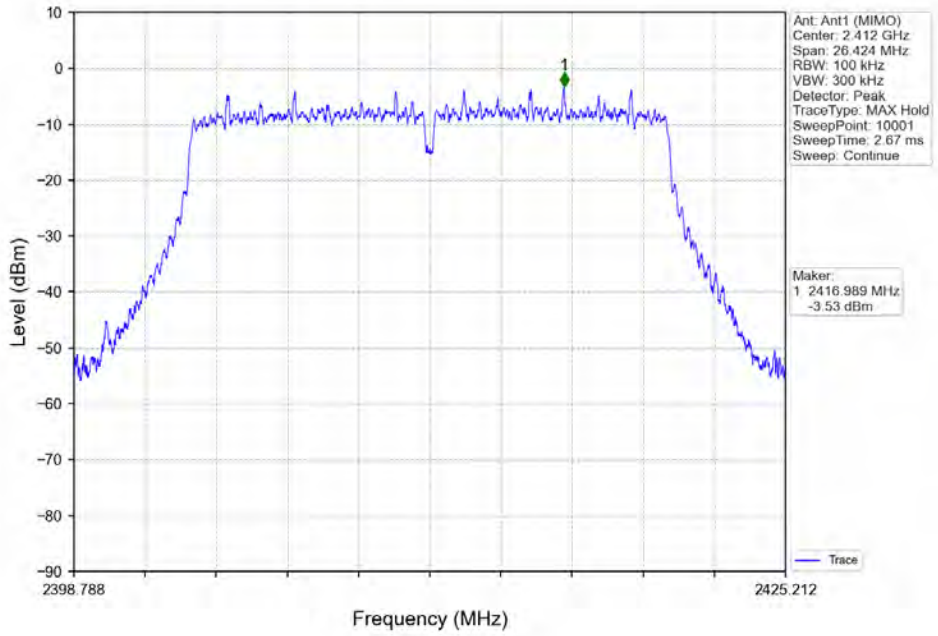
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



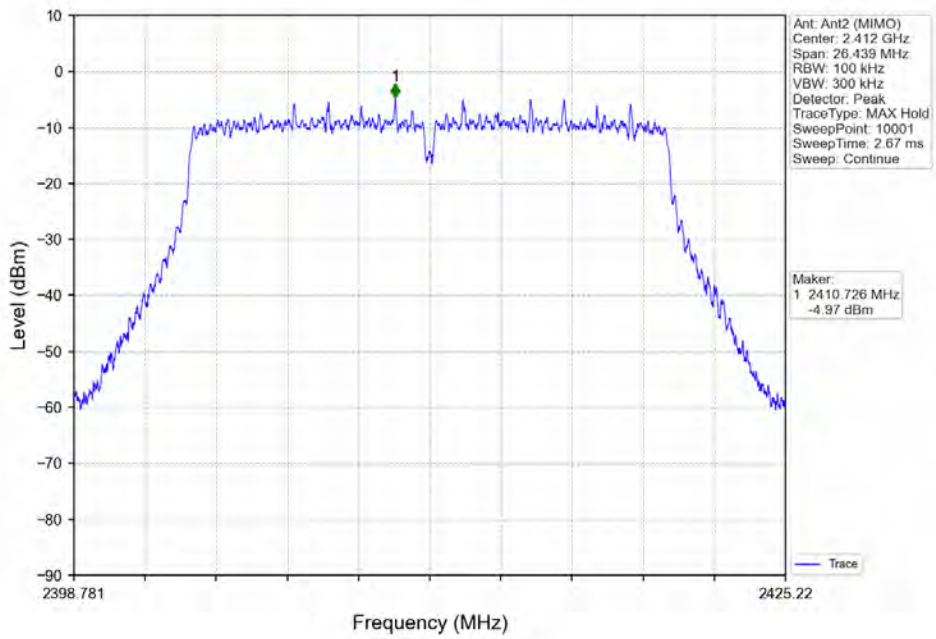
802.11g_HCH_2462MHz_Ant2 (SISO)_NTNV



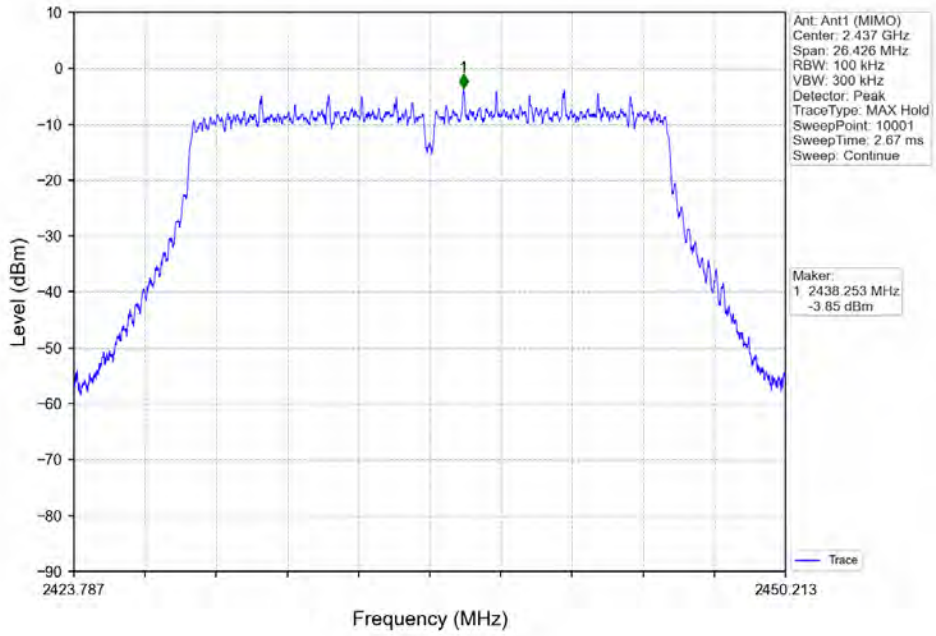
802.11n(HT20)_LCH_2412MHz_Ant1 (MIMO)_NTNV



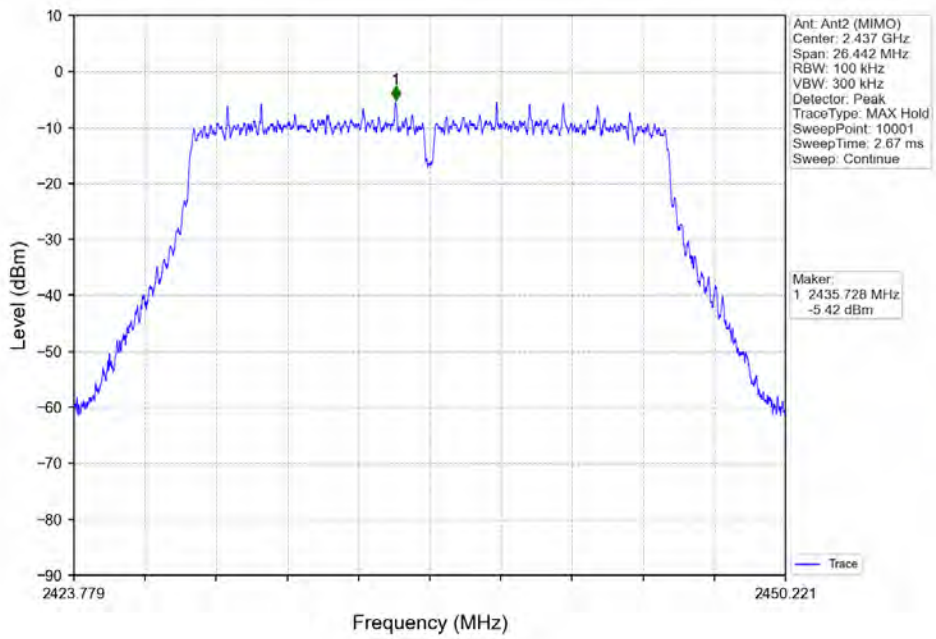
802.11n(HT20)_LCH_2412MHz_Ant2 (MIMO)_NTNV



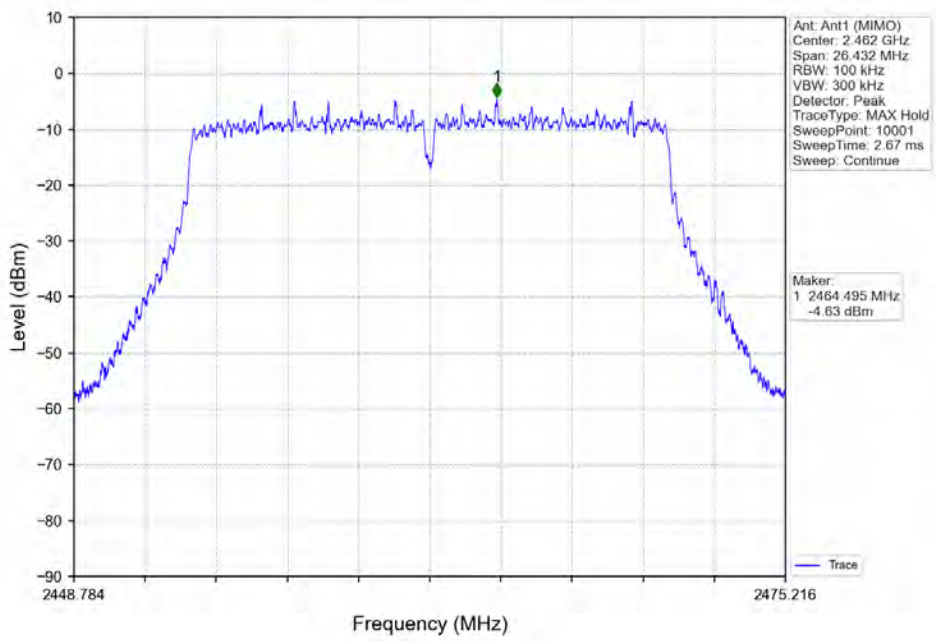
802.11n(HT20)_MCH_2437MHz_Ant1 (MIMO)_NTNV



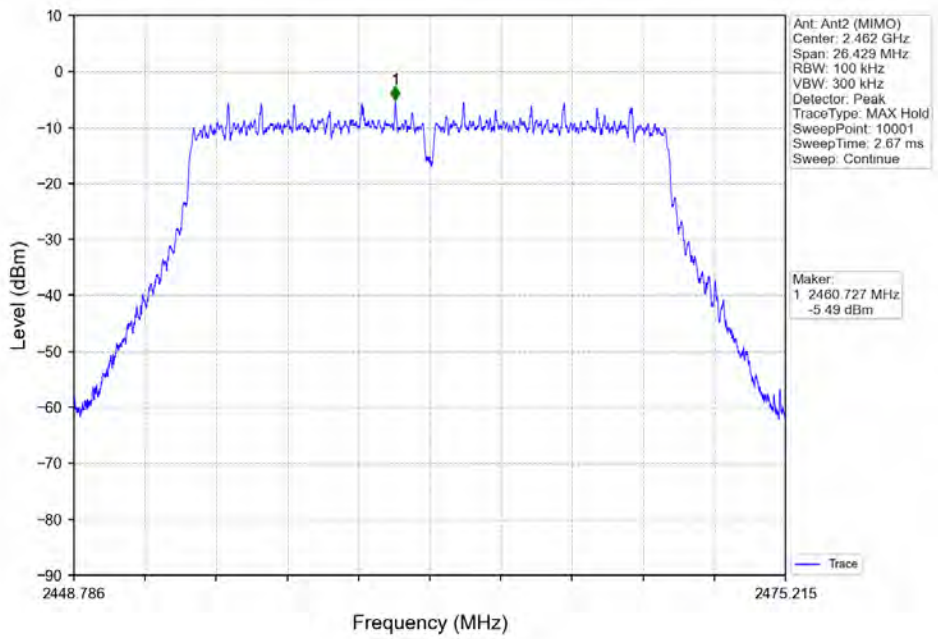
802.11n(HT20)_MCH_2437MHz_Ant2 (MIMO)_NTNV



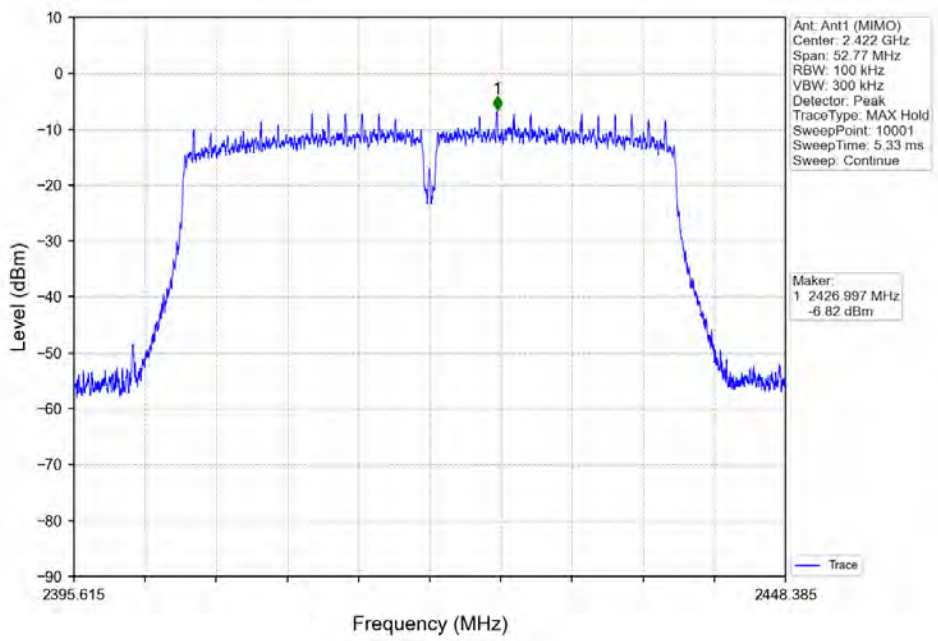
802.11n(HT20)_HCH_2462MHz_Ant1 (MIMO)_NTNV



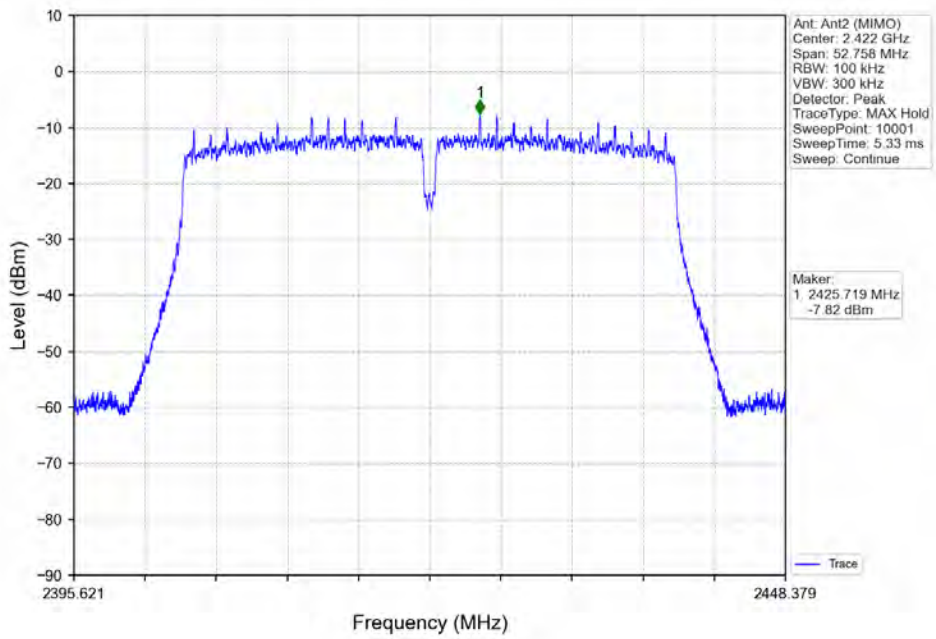
802.11n(HT20)_HCH_2462MHz_Ant2 (MIMO)_NTNV



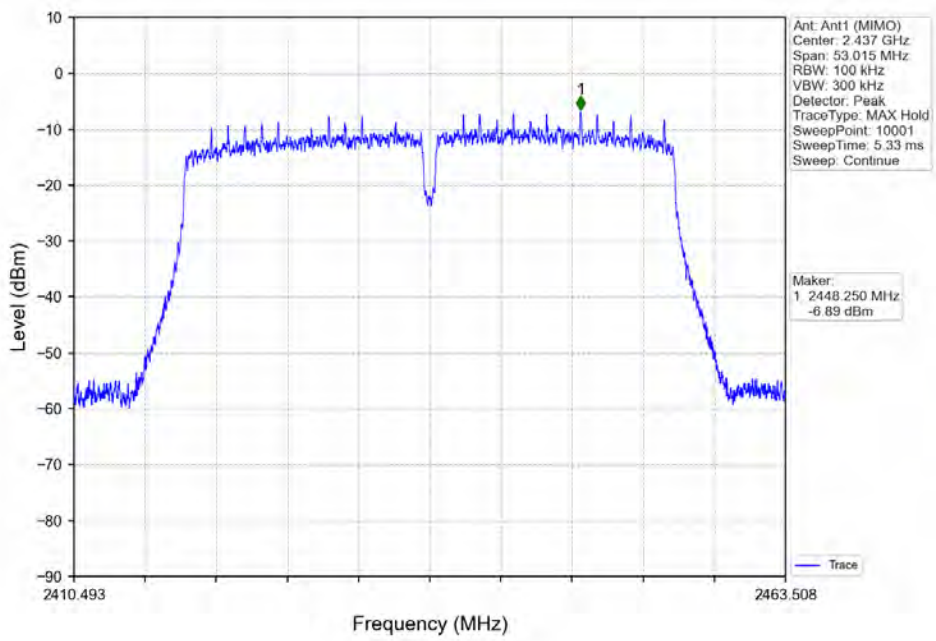
802.11n(HT40)_LCH_2422MHz_Ant1 (MIMO)_NTNV



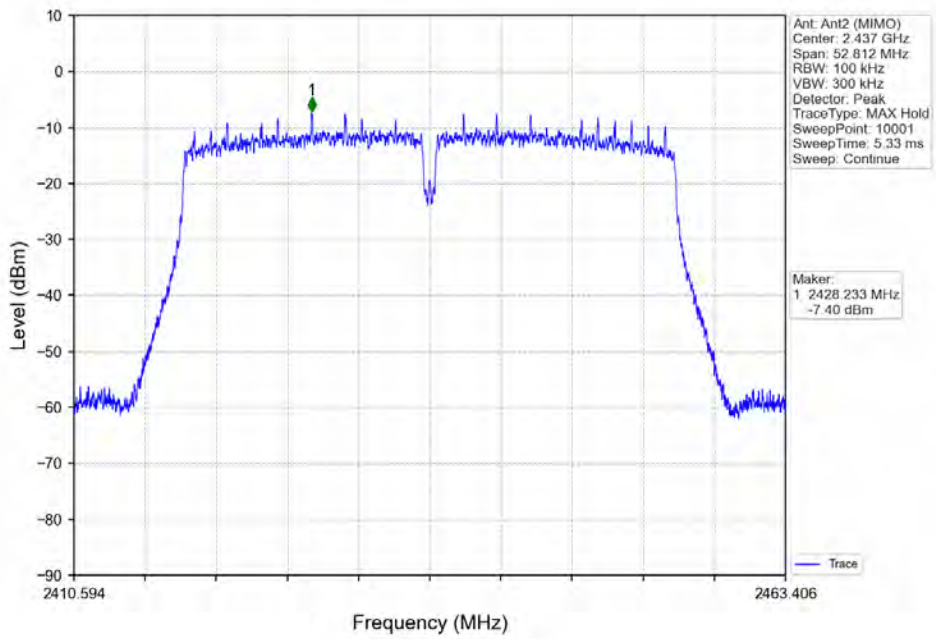
802.11n(HT40)_LCH_2422MHz_Ant2 (MIMO)_NTNV



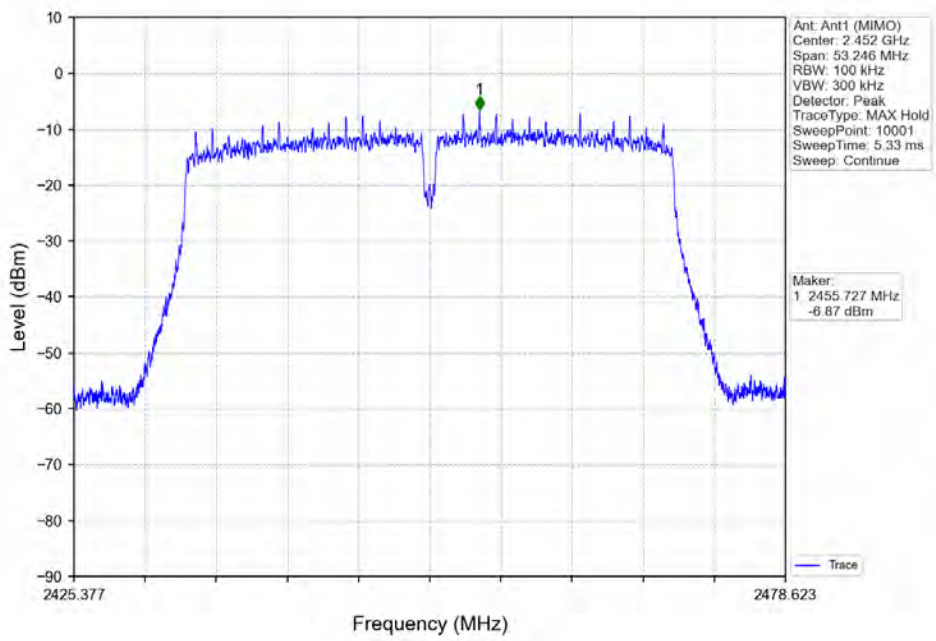
802.11n(HT40)_MCH_2437MHz_Ant1 (MIMO)_NTNV



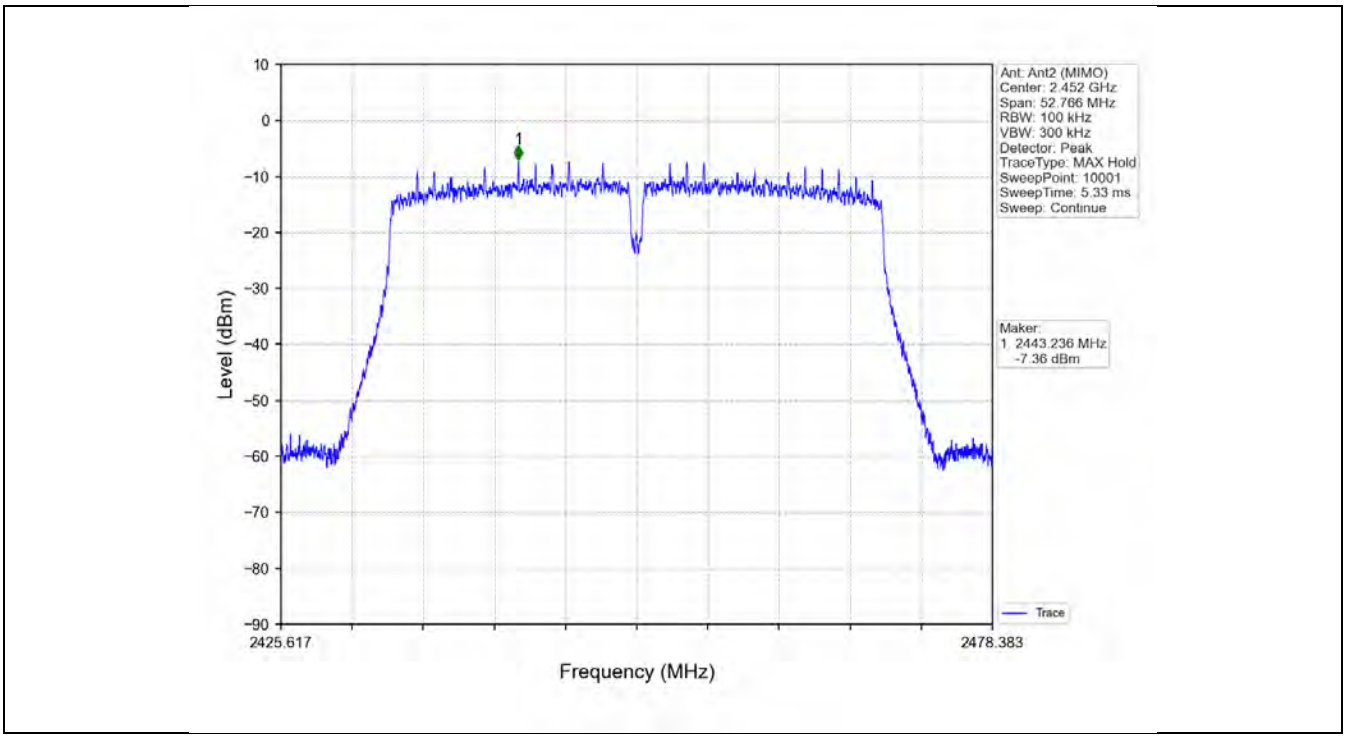
802.11n(HT40)_MCH_2437MHz_Ant2 (MIMO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant1 (MIMO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant2 (MIMO)_NTNV



5.2 CSE

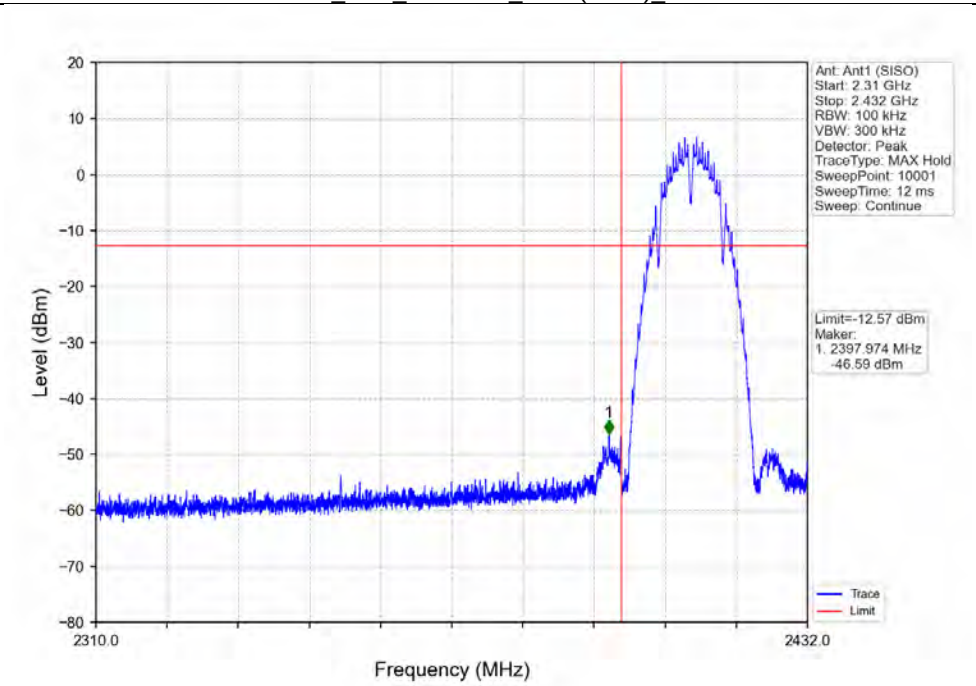
5.2.1 Test Result

Mode	TX Type	Frequency (MHz)	Ant	Level of Reference (dBm)	Limit (dBm)	Verdict
802.11b	SISO	2412	1	7.43	-12.57	Pass
			2	7.03	-12.97	Pass
		2437	1	7.43	-12.57	Pass
			2	7.03	-12.97	Pass
		2462	1	7.43	-12.57	Pass
			2	7.03	-12.97	Pass
802.11g	SISO	2412	1	-1.06	-21.06	Pass
			2	-1.29	-21.29	Pass
		2437	1	-1.06	-21.06	Pass
			2	-1.29	-21.29	Pass
		2462	1	-1.06	-21.06	Pass
			2	-1.29	-21.29	Pass
802.11n (HT20)	MIMO	2412	1	-3.53	-23.53	Pass
			2	-4.97	-24.97	Pass
		2437	1	-3.53	-23.53	Pass
			2	-4.97	-24.97	Pass
		2462	1	-3.53	-23.53	Pass
			2	-4.97	-24.97	Pass
802.11n (HT40)	MIMO	2422	1	-6.82	-26.82	Pass
			2	-7.36	-27.36	Pass
		2437	1	-6.82	-26.82	Pass
			2	-7.36	-27.36	Pass
		2452	1	-6.82	-26.82	Pass

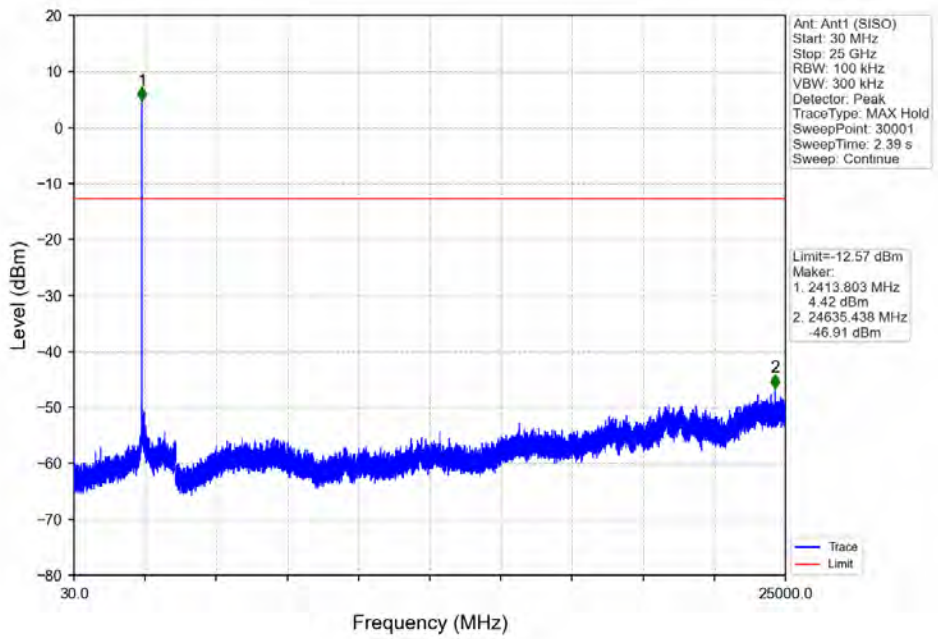
			2	-7.36	-27.36	Pass
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.						

5.2.2 Test Graph

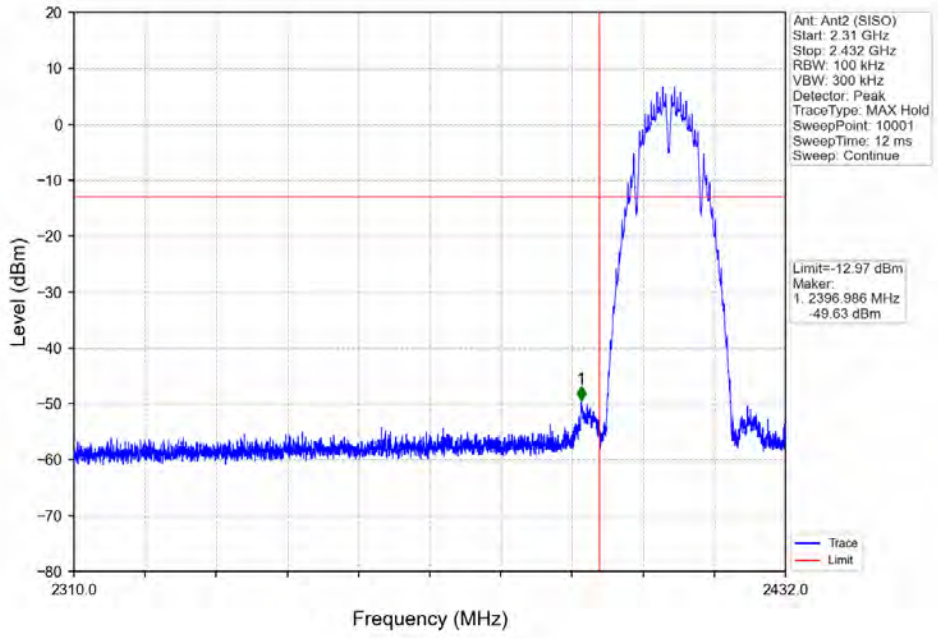
802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



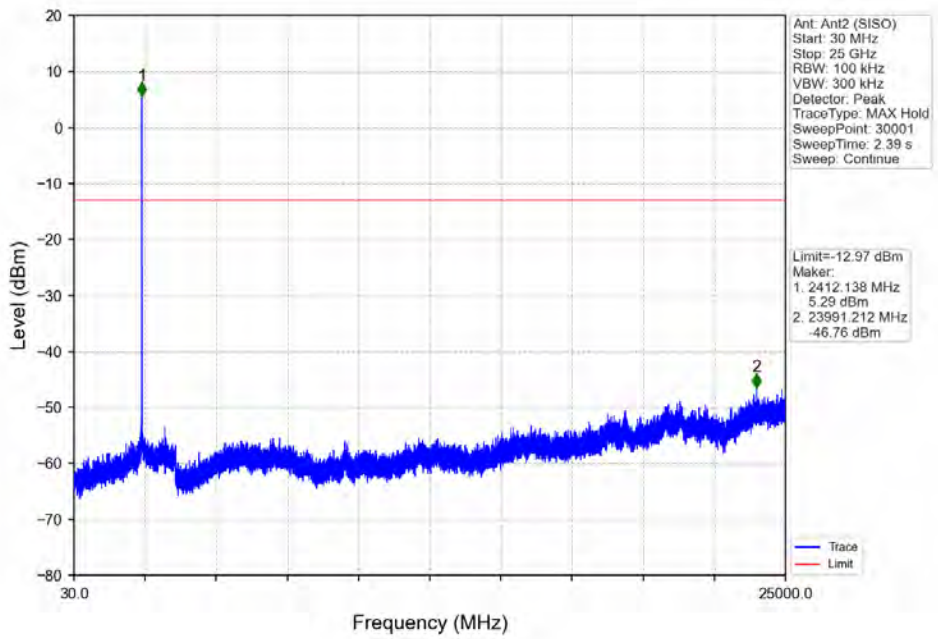
802.11b_LCH_2412MHz_Ant1 (SISO)_NTNV



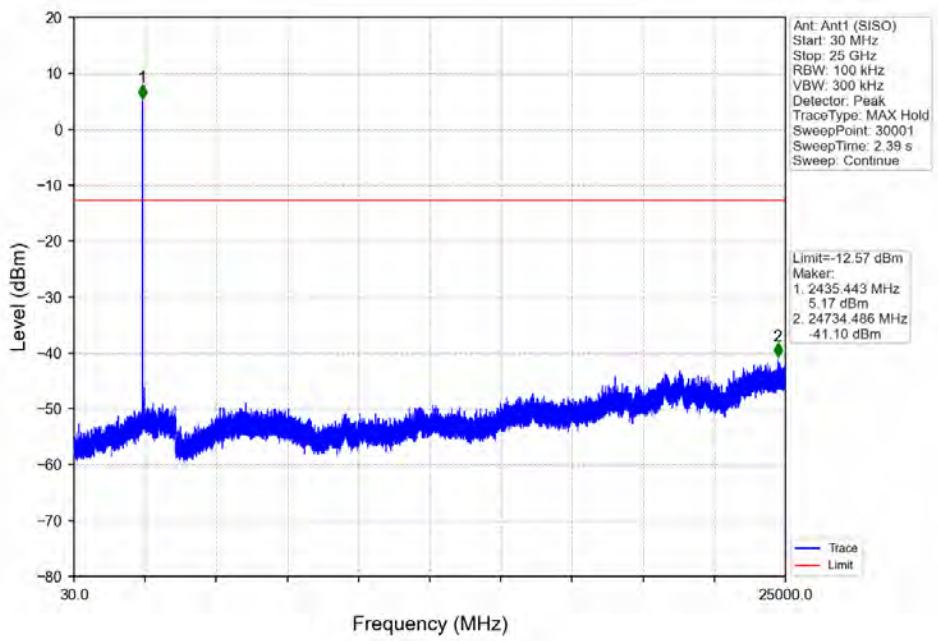
802.11b_LCH_2412MHz_Ant2 (SISO)_NTNV



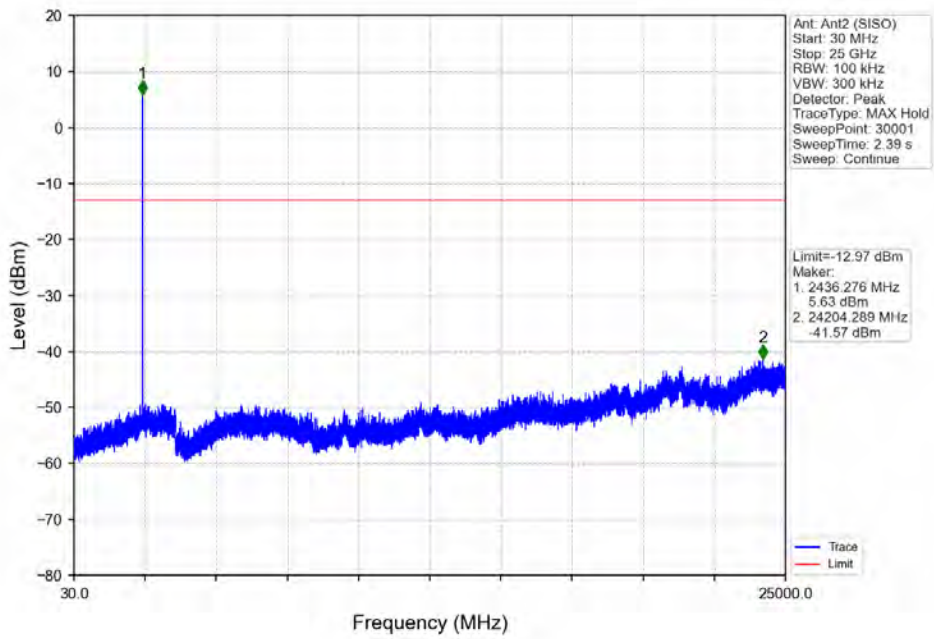
802.11b_LCH_2412MHz_Ant2 (SISO)_NTNV



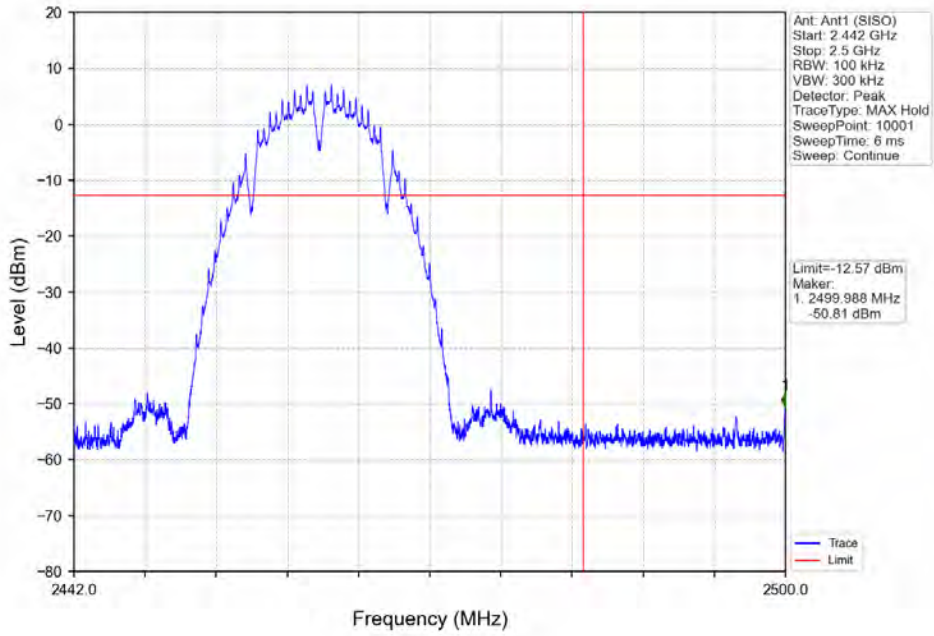
802.11b_MCH_2437MHz_Ant1 (SISO)_NTNV



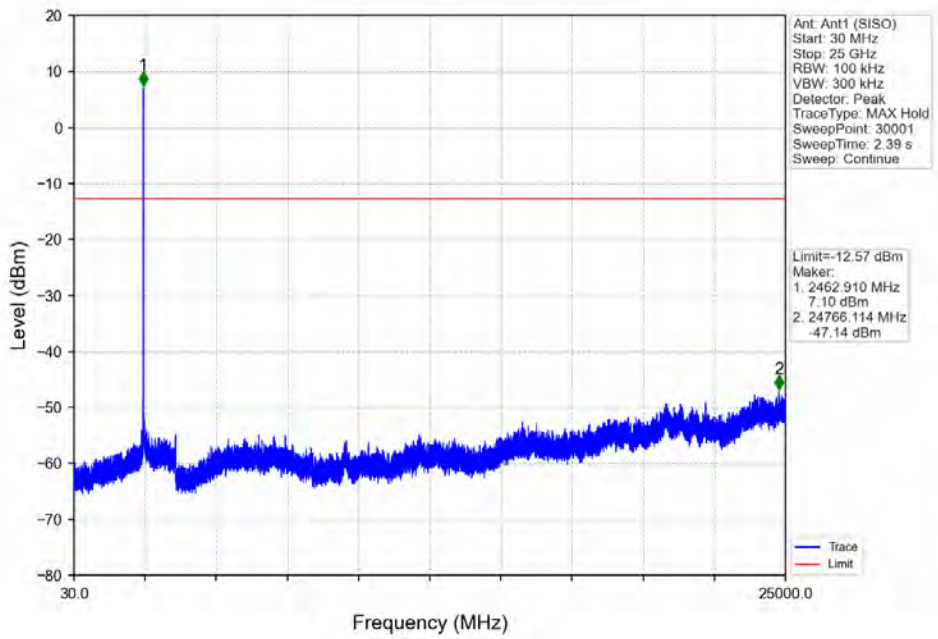
802.11b_MCH_2437MHz_Ant2 (SISO)_NTNV



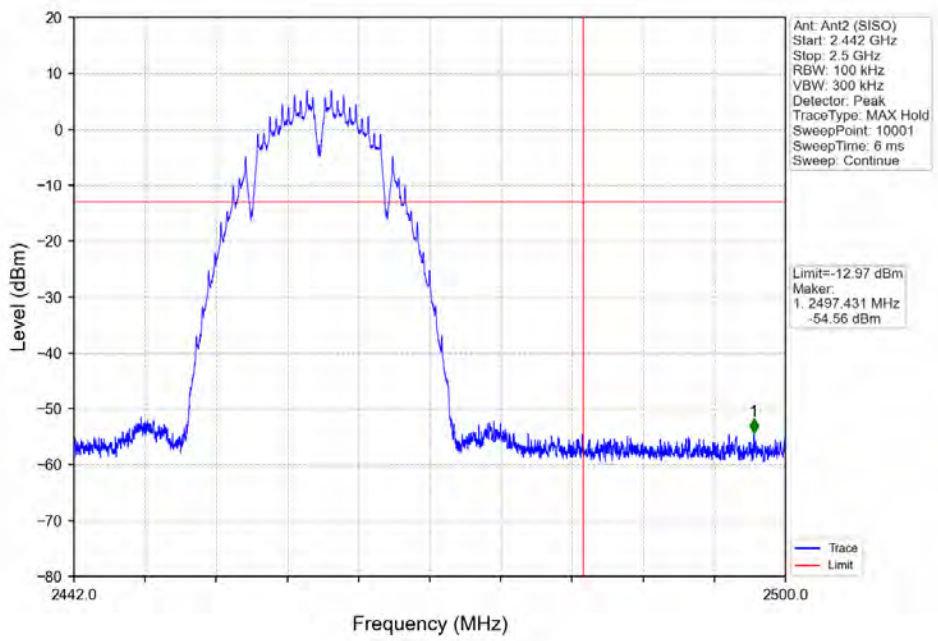
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



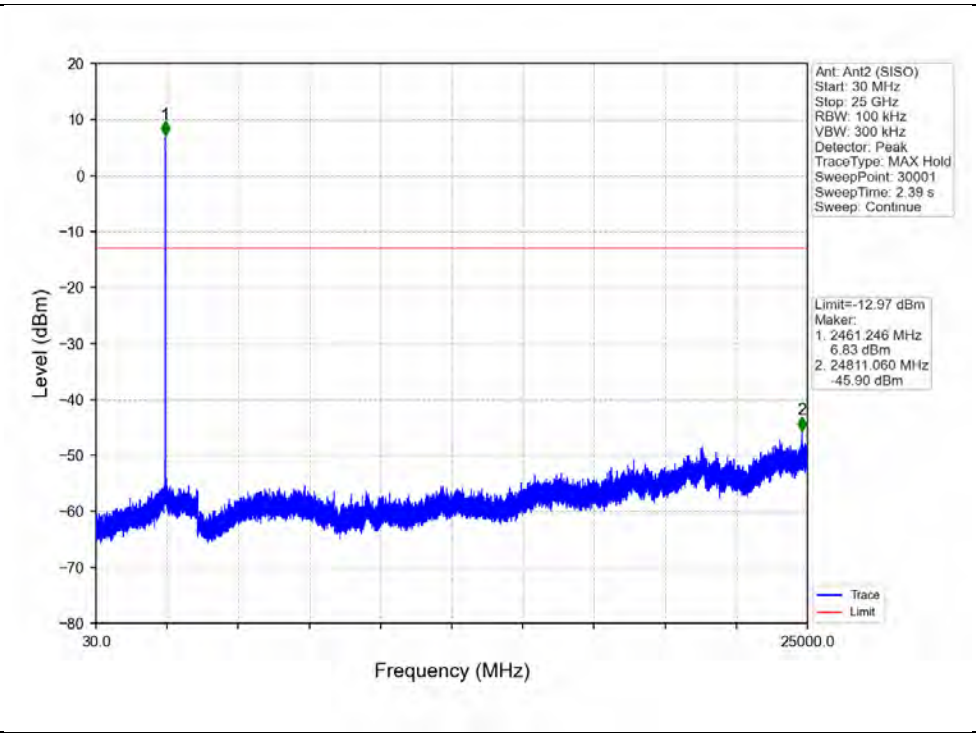
802.11b_HCH_2462MHz_Ant1 (SISO)_NTNV



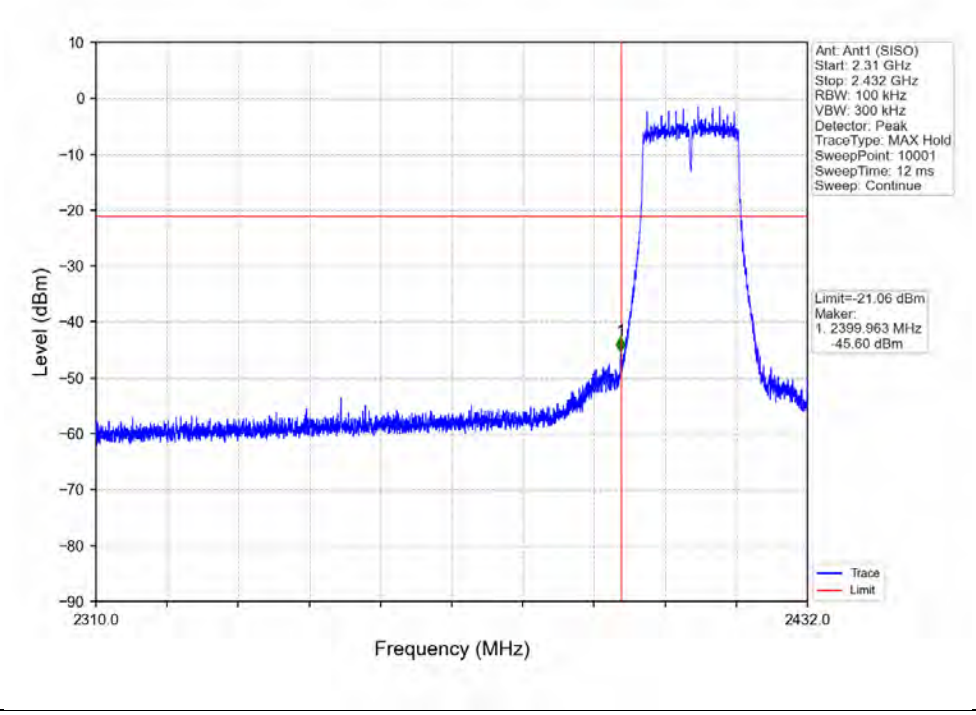
802.11b_HCH_2462MHz_Ant2 (SISO)_NTNV



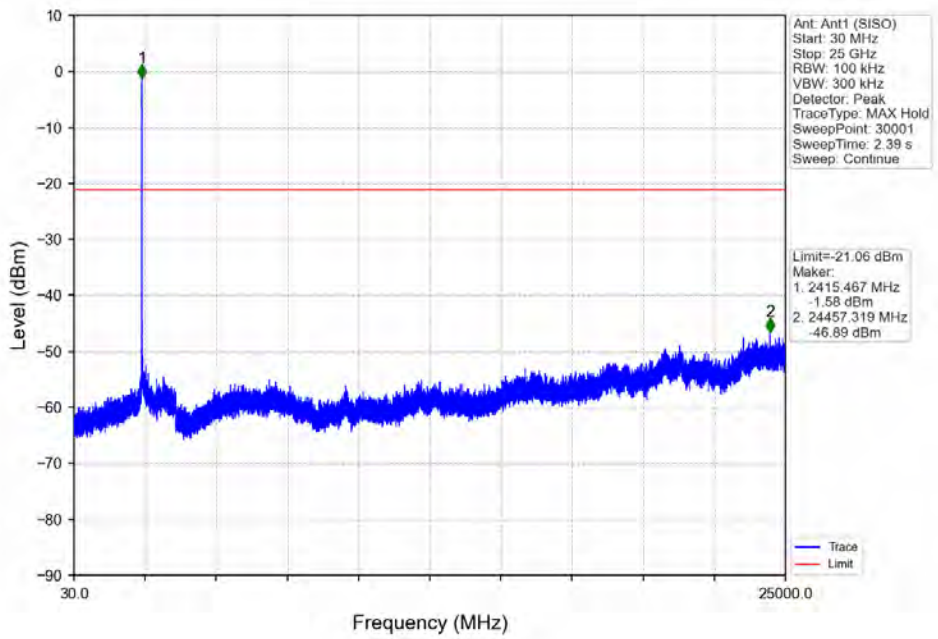
802.11b_HCH_2462MHz_Ant2 (SISO)_NTNV



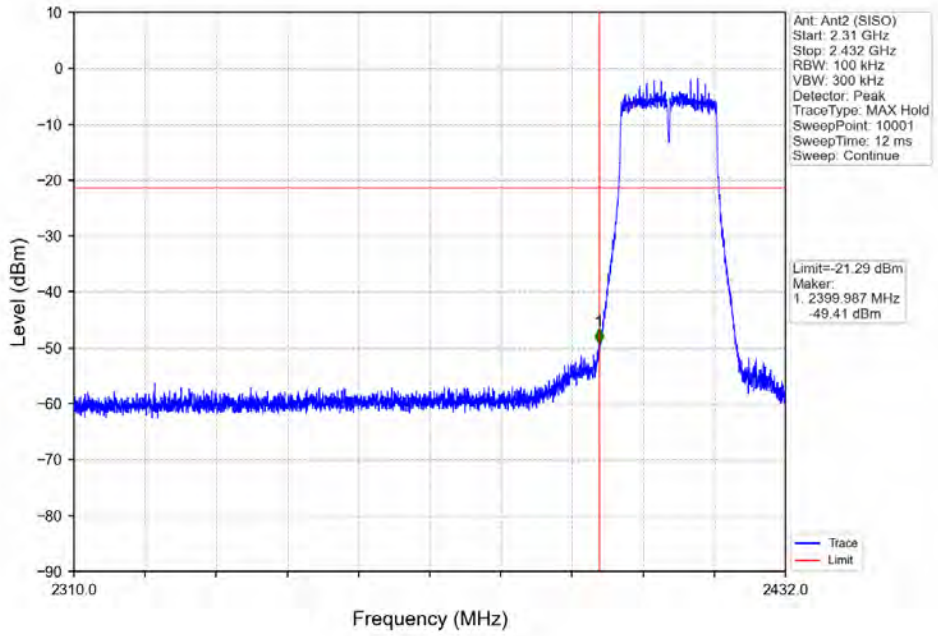
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



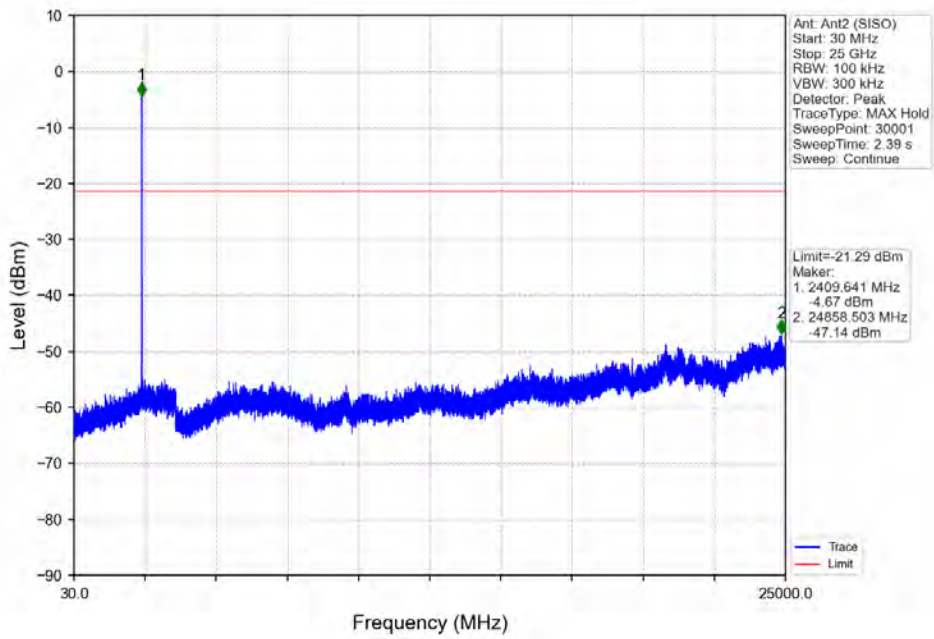
802.11g_LCH_2412MHz_Ant1 (SISO)_NTNV



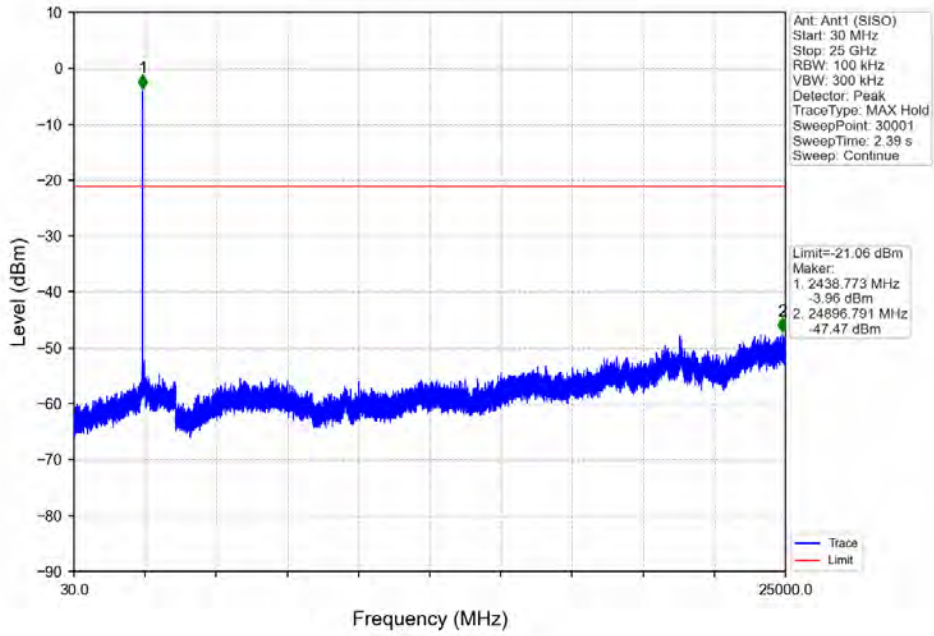
802.11g_LCH_2412MHz_Ant2 (SISO)_NTNV



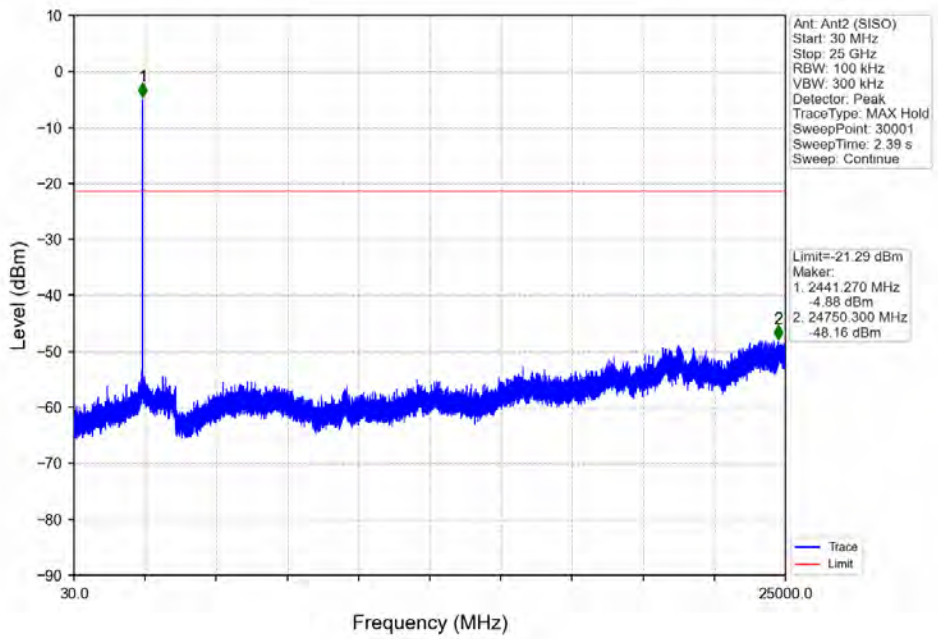
802.11g_LCH_2412MHz_Ant2 (SISO)_NTNV



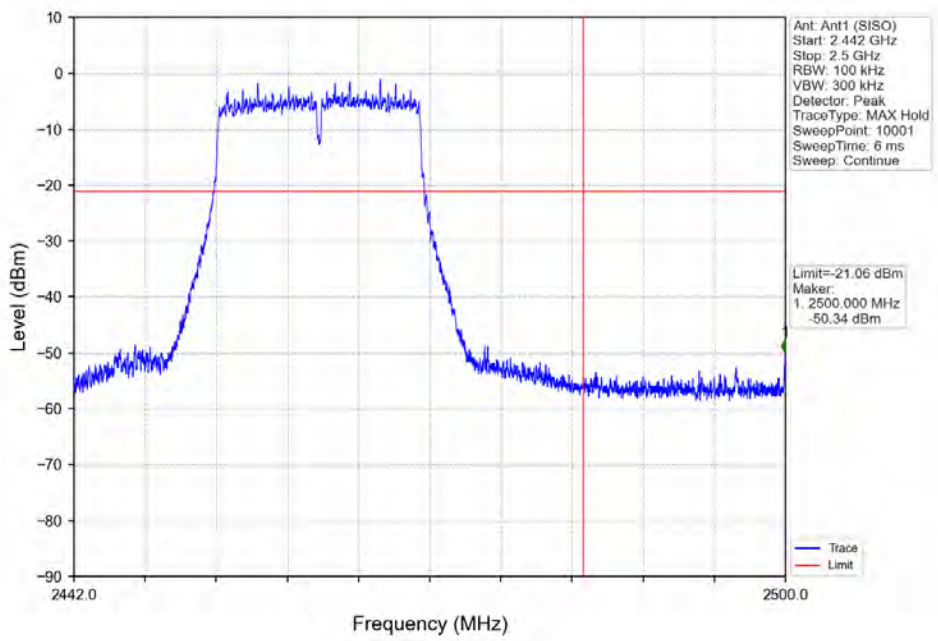
802.11g_MCH_2437MHz_Ant1 (SISO)_NTNV



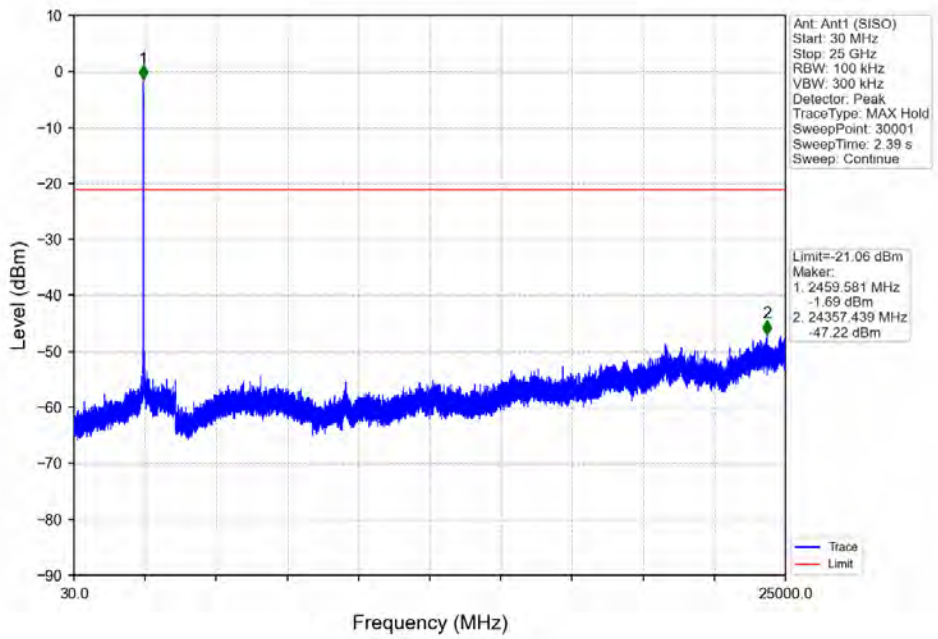
802.11g_MCH_2437MHz_Ant2 (SISO)_NTNV



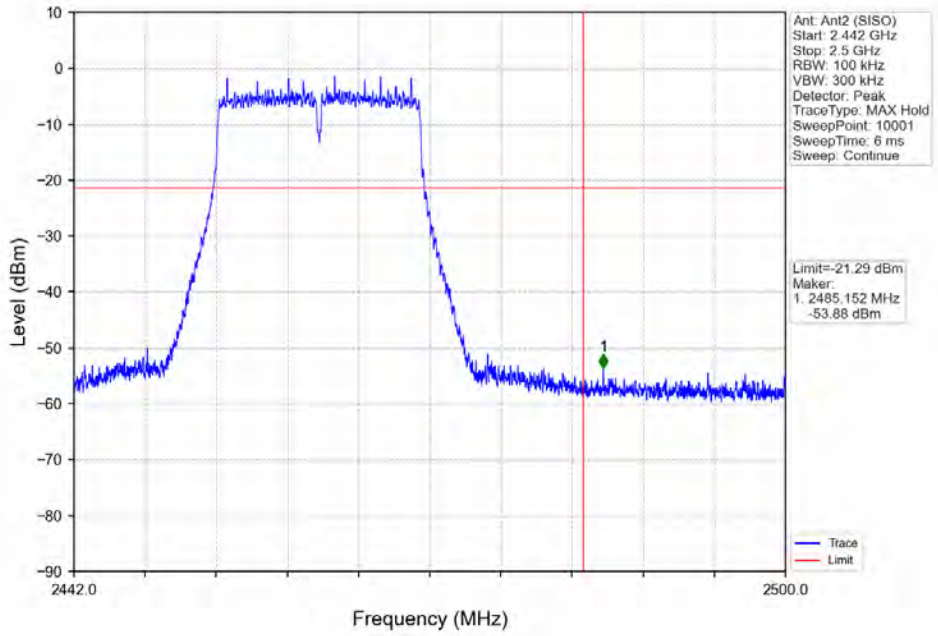
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



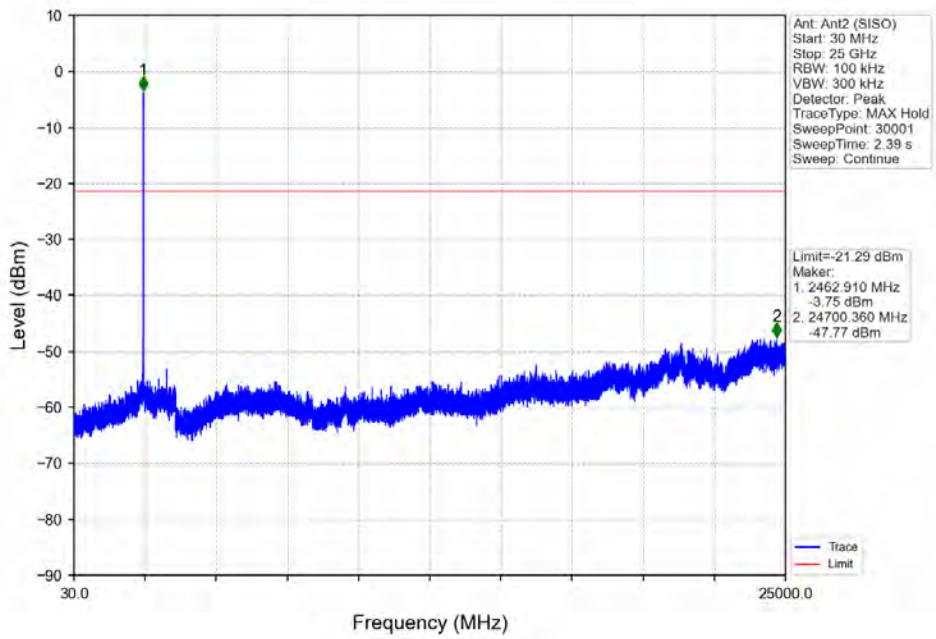
802.11g_HCH_2462MHz_Ant1 (SISO)_NTNV



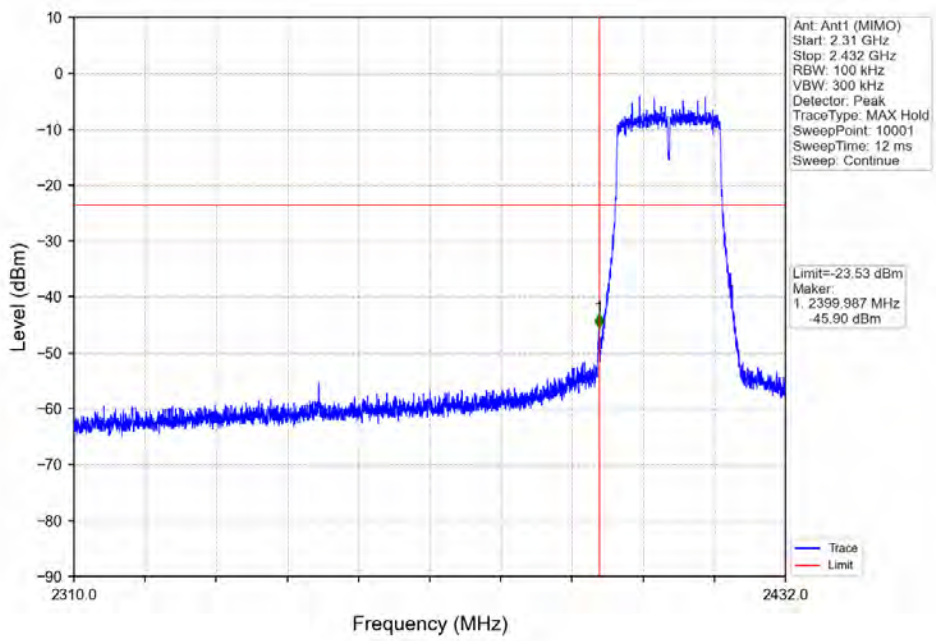
802.11g_HCH_2462MHz_Ant2 (SISO)_NTNV



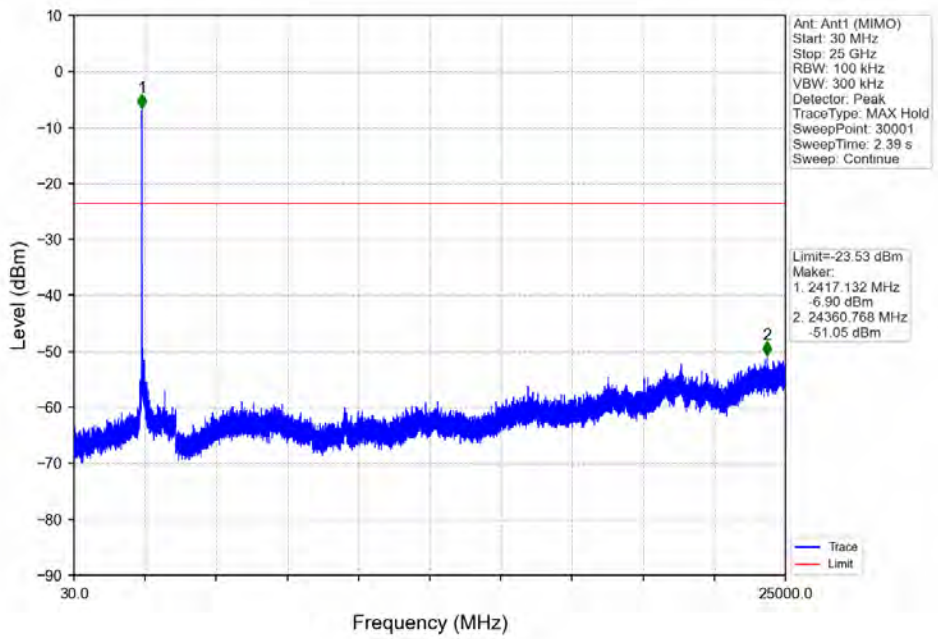
802.11g_HCH_2462MHz_Ant2 (SISO)_NTNV



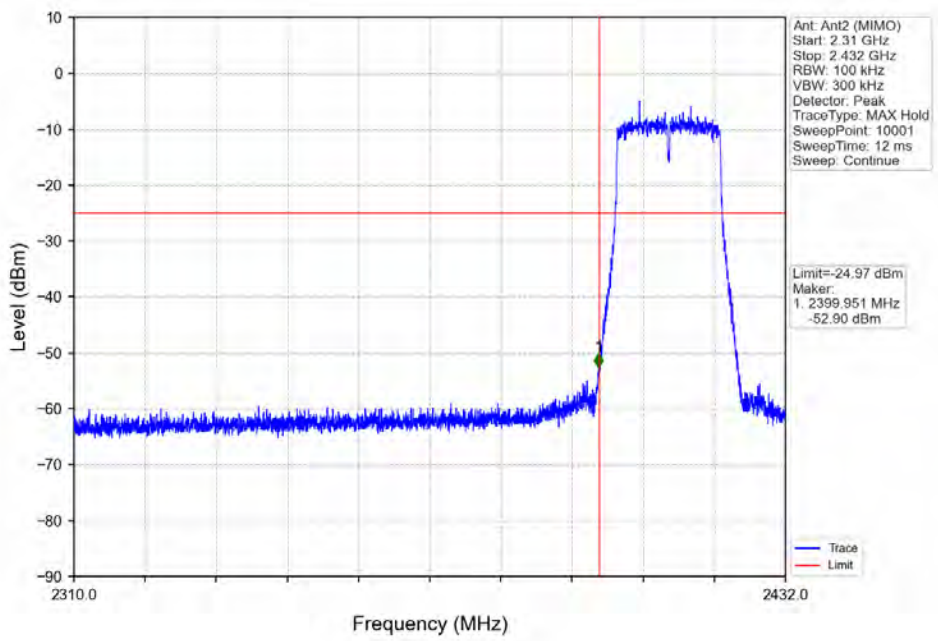
802.11n(HT20)_LCH_2412MHz_Ant1 (MIMO)_NTNV



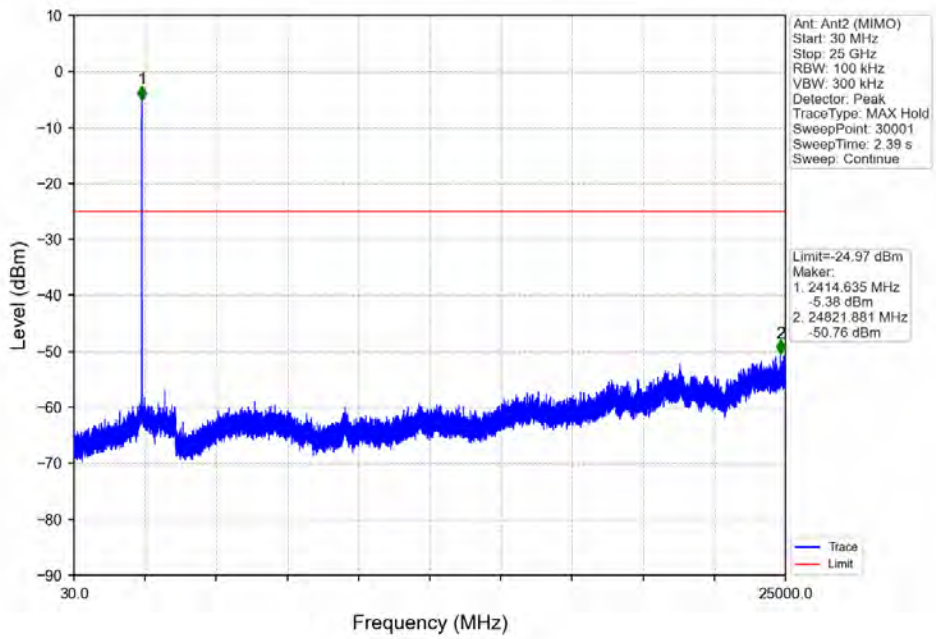
802.11n(HT20)_LCH_2412MHz_Ant1 (MIMO)_NTNV



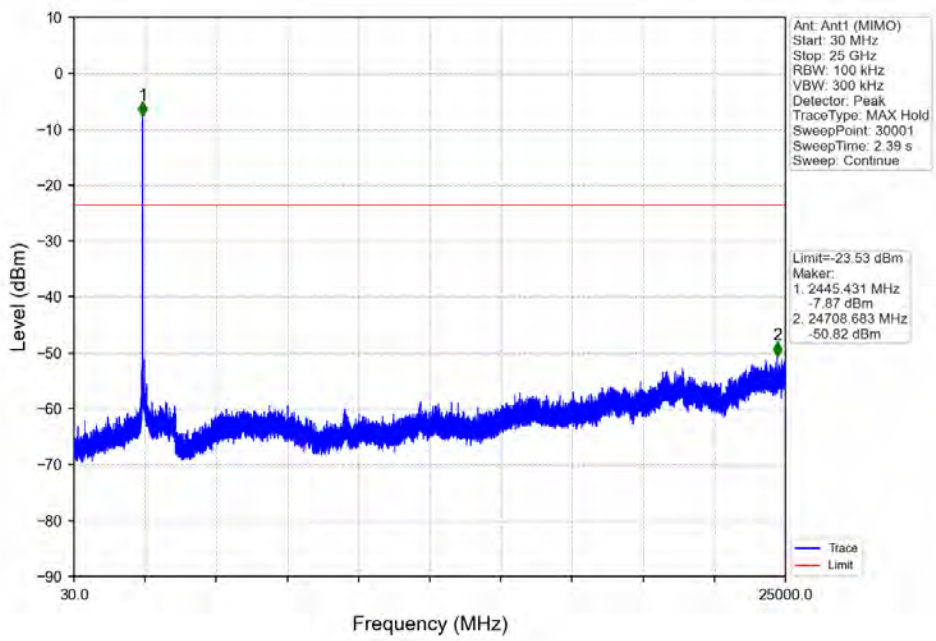
802.11n(HT20)_LCH_2412MHz_Ant2 (MIMO)_NTNV



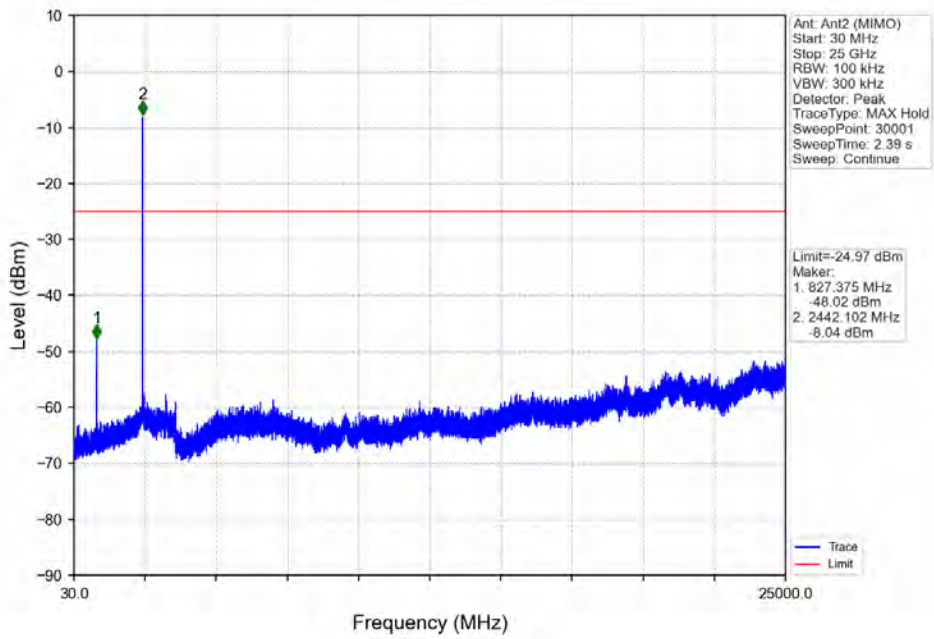
802.11n(HT20)_LCH_2412MHz_Ant2 (MIMO)_NTNV



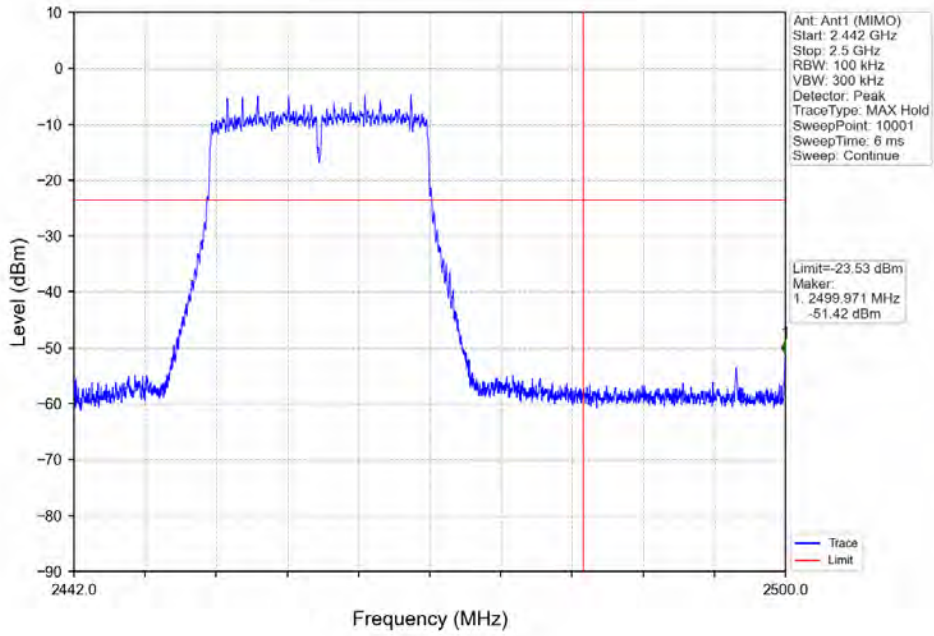
802.11n(HT20)_MCH_2437MHz_Ant1 (MIMO)_NTNV



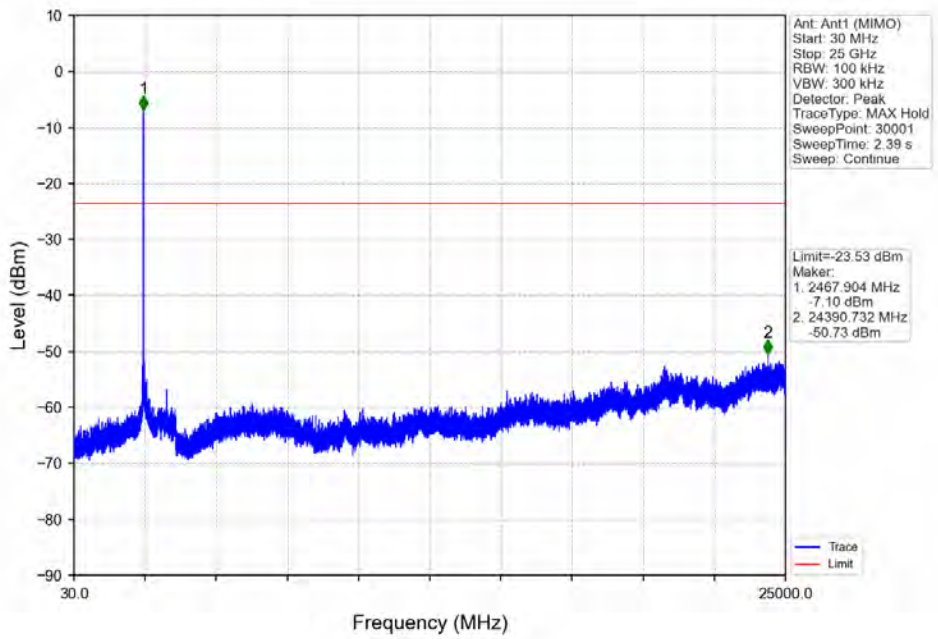
802.11n(HT20)_MCH_2437MHz_Ant2 (MIMO)_NTNV



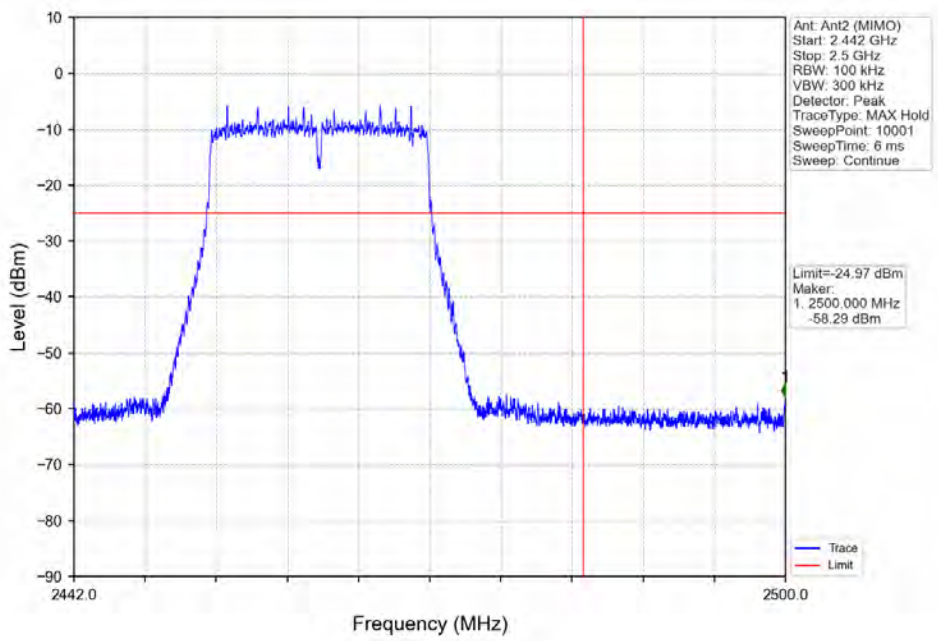
802.11n(HT20)_HCH_2462MHz_Ant1 (MIMO)_NTNV



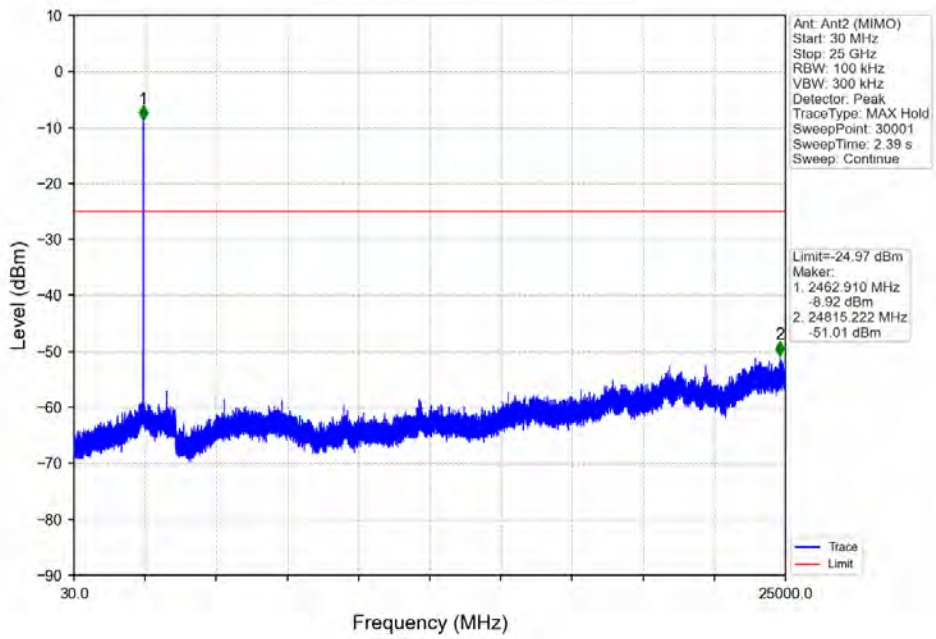
802.11n(HT20)_HCH_2462MHz_Ant1 (MIMO)_NTNV



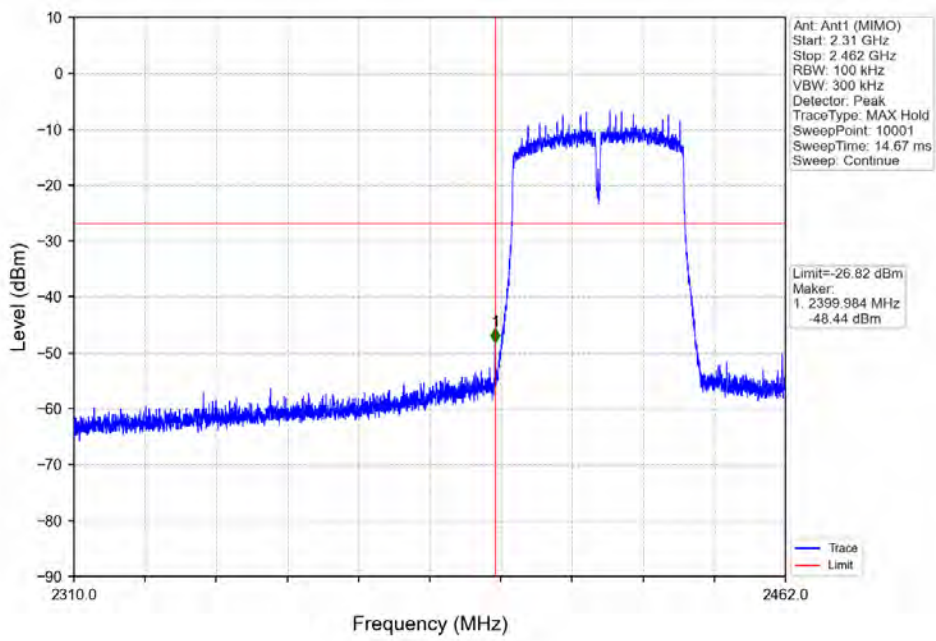
802.11n(HT20)_HCH_2462MHz_Ant2 (MIMO)_NTNV



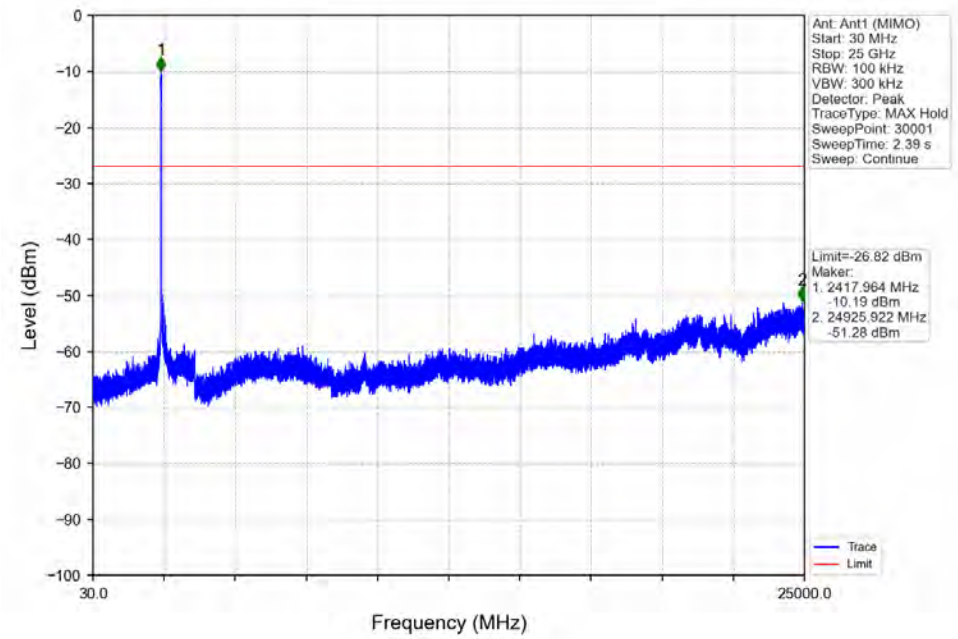
802.11n(HT20)_HCH_2462MHz_Ant2 (MIMO)_NTNV



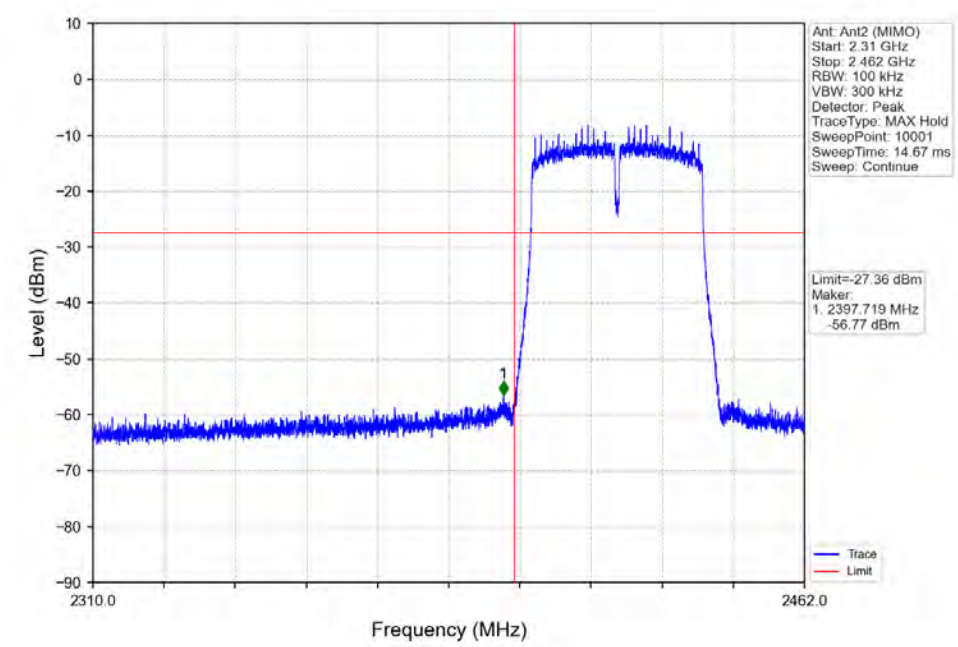
802.11n(HT40)_LCH_2422MHz_Ant1 (MIMO)_NTNV



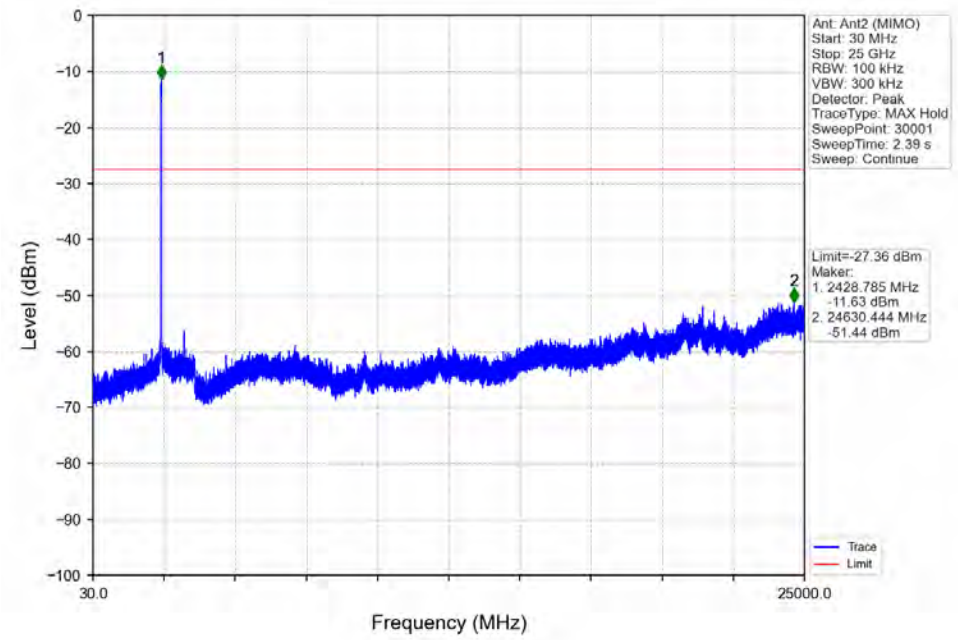
802.11n(HT40)_LCH_2422MHz_Ant1 (MIMO)_NTNV



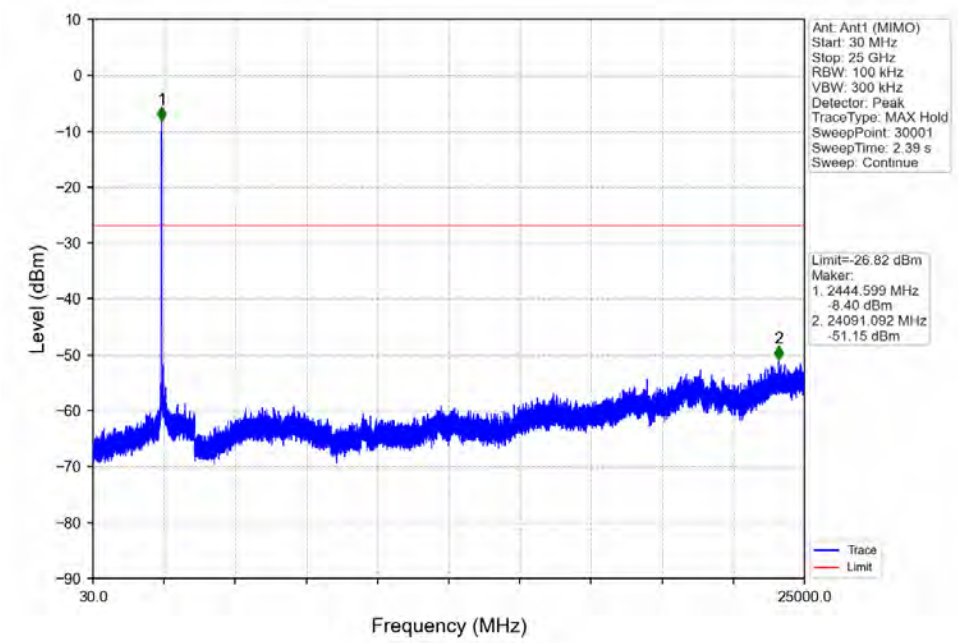
802.11n(HT40)_LCH_2422MHz_Ant2 (MIMO)_NTNV



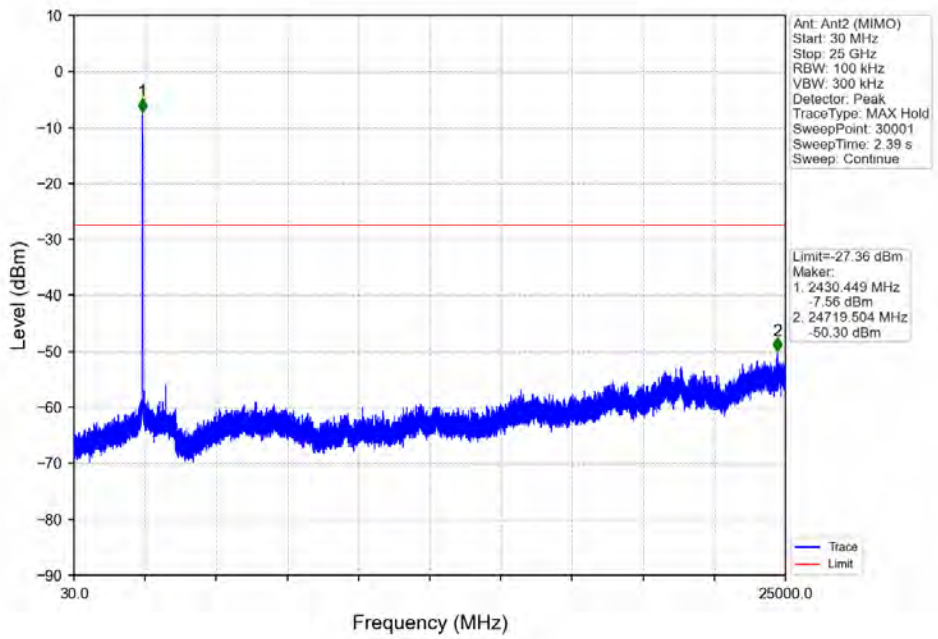
802.11n(HT40)_LCH_2422MHz_Ant2 (MIMO)_NTNV



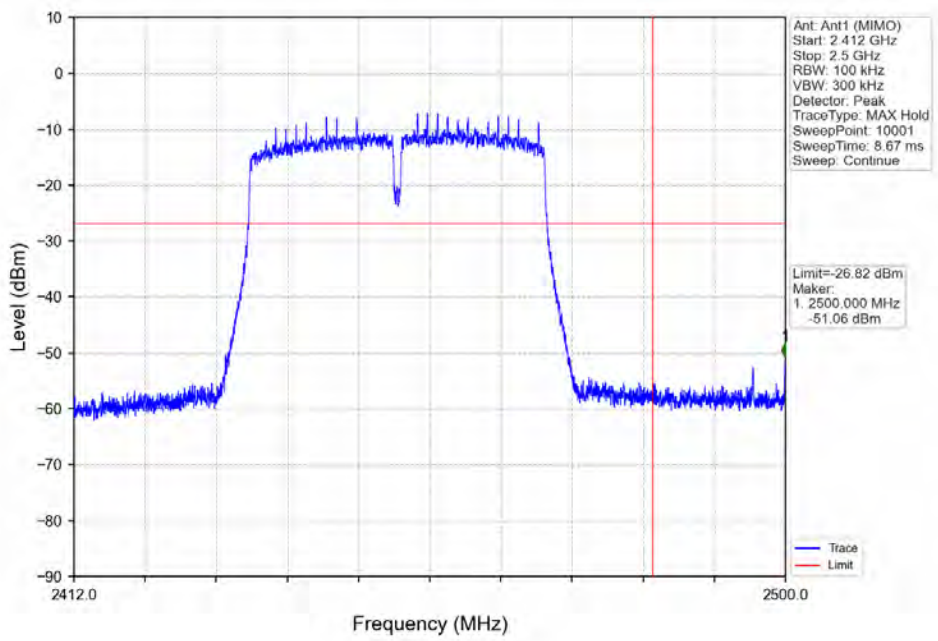
802.11n(HT40)_MCH_2437MHz_Ant1 (MIMO)_NTNV



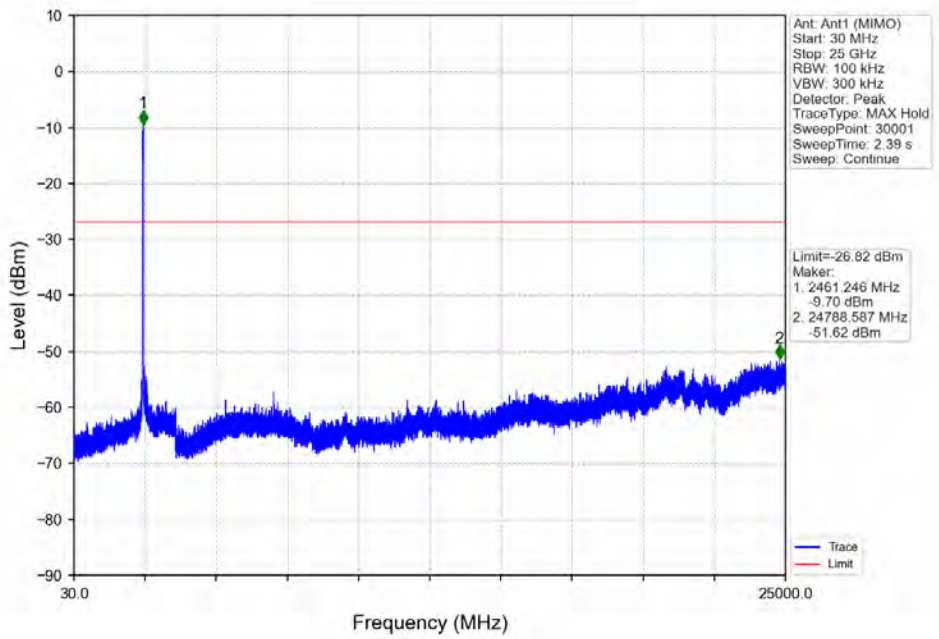
802.11n(HT40)_MCH_2437MHz_Ant2 (MIMO)_NTNV



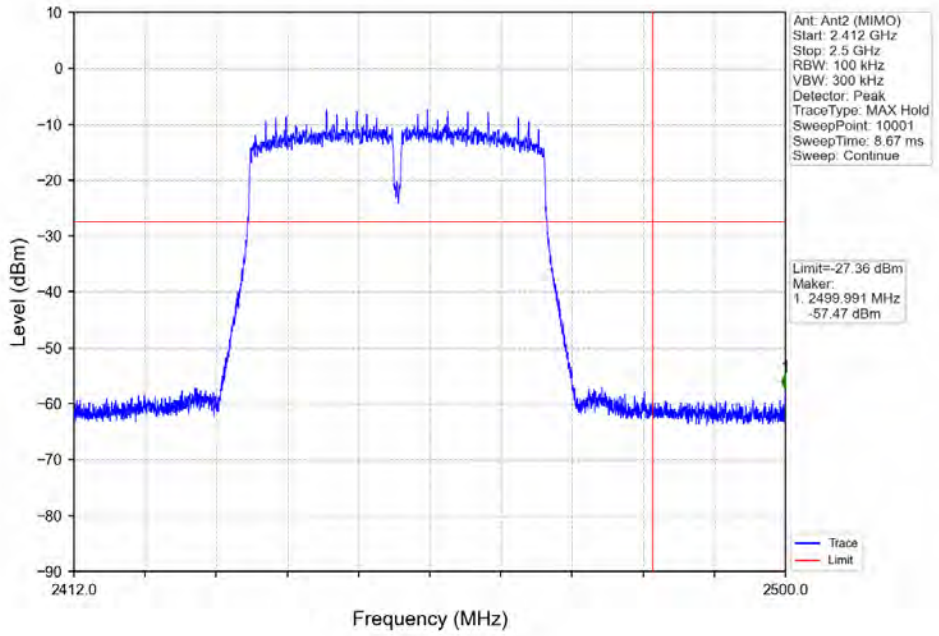
802.11n(HT40)_HCH_2452MHz_Ant1 (MIMO)_NTNV



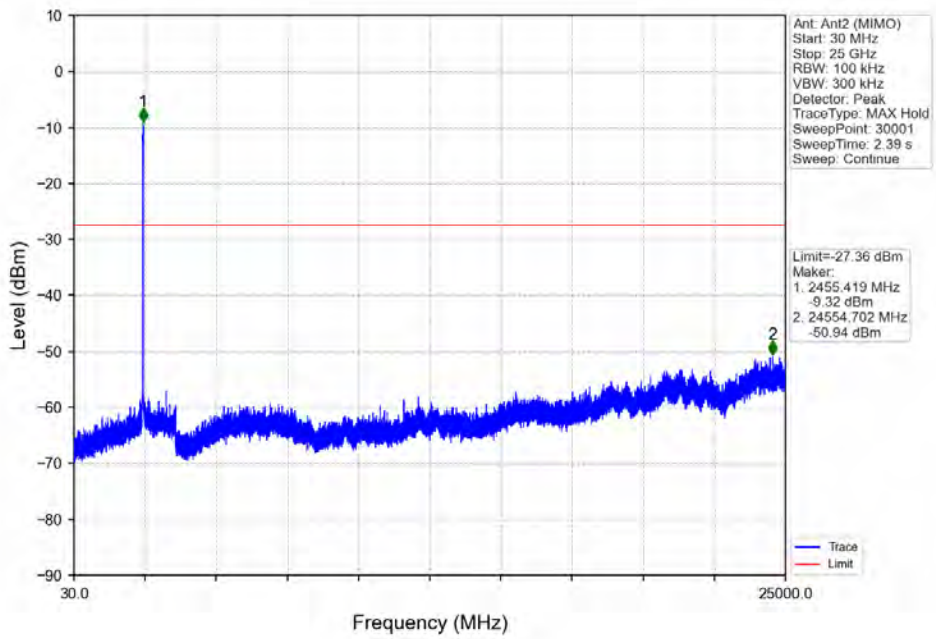
802.11n(HT40)_HCH_2452MHz_Ant1 (MIMO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant2 (MIMO)_NTNV



802.11n(HT40)_HCH_2452MHz_Ant2 (MIMO)_NTNV


Ant: Ant2 (MIMO)
Start: 30 MHz
Stop: 25 GHz
RBW: 100 kHz
VBW: 300 kHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 30001
SweepTime: 2.39 s
Sweep: Continue
Limit=-27.36 dBm
Maker:
1. 2455.419 MHz
-9.32 dBm
2. 24554.702 MHz
-50.94 dBm
Trace
Limit
Level (dBm)
Frequency (MHz)
30.0
25000.0
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1
2