

Appendix

Report No.:	CISRR241106034
FCC ID:	2BL5R-HZ07
Product Name:	WiFi signal amplification repeater
Model No.:	ws-010
Test Engineer:	Mark Fu
Supervised by:	Rory Huang

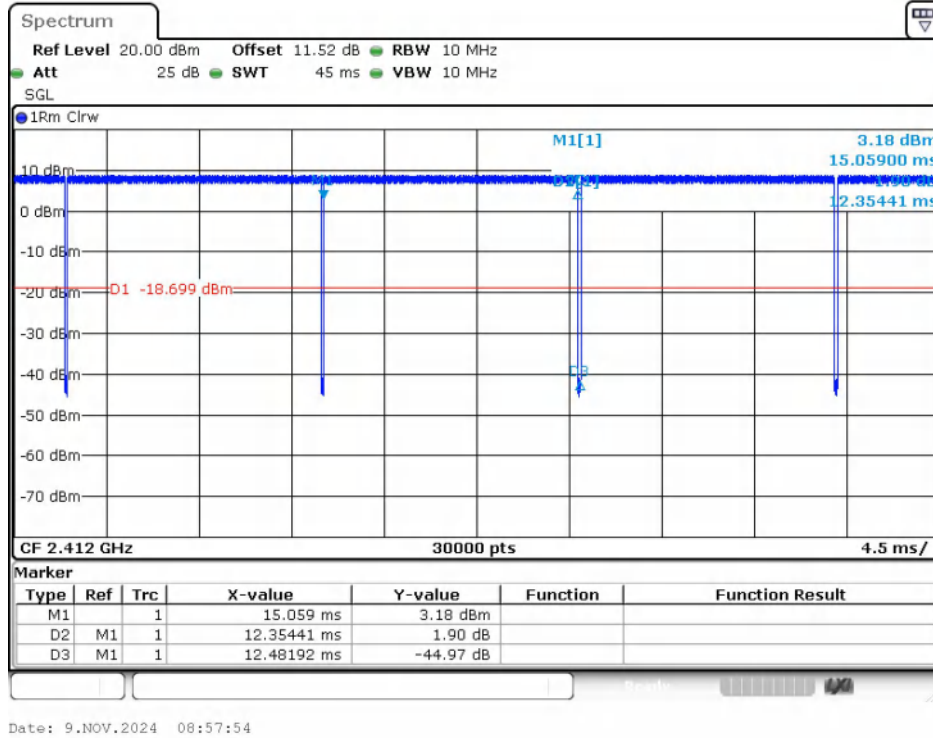
Duty Cycle

Test Result

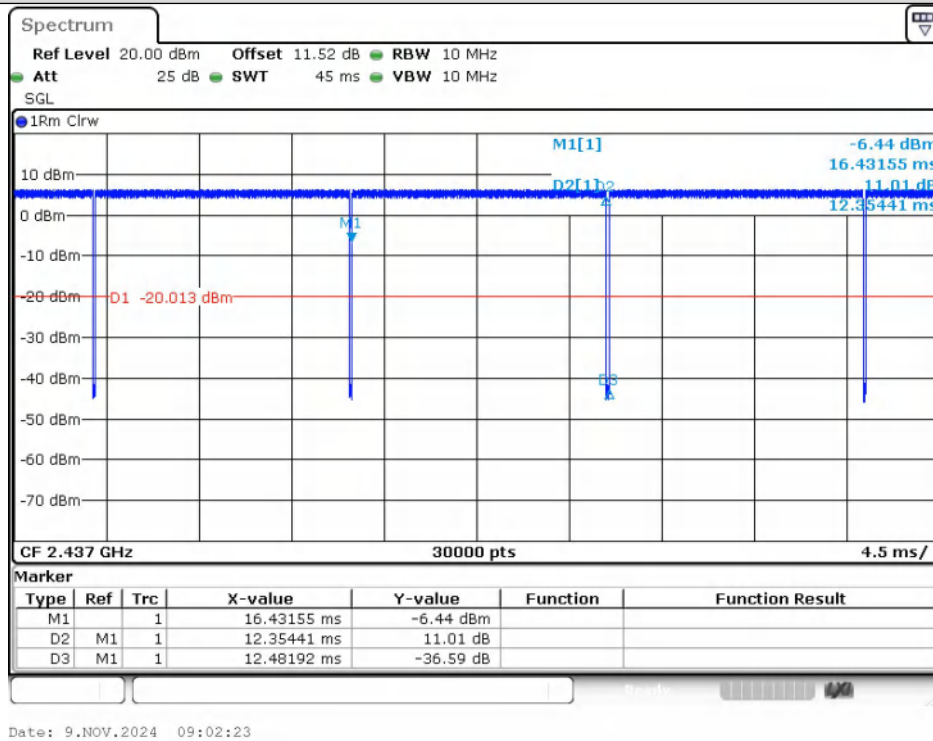
Ant1

Mode	Data rates	Channel	Antenna	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
IEEE 802.11b	1	1	1	12.354	12.482	98.98	0.9898	0.0445	0.0809
		6		12.354	12.482	98.98	0.9898	0.0445	0.0809
		11		12.375	12.501	98.99	0.9899	0.0441	0.0808
1		2.068		2.195	94.21	0.9421	0.259	0.4836	
6		2.068		2.195	94.21	0.9421	0.259	0.4836	
11		2.068		2.195	94.21	0.9421	0.259	0.4836	
IEEE 802.11g	MCS 0	1		1.924	2.051	93.81	0.9381	0.2775	0.5198
		6		1.924	2.051	93.81	0.9381	0.2775	0.5198
		11		1.924	2.051	93.81	0.9381	0.2775	0.5198

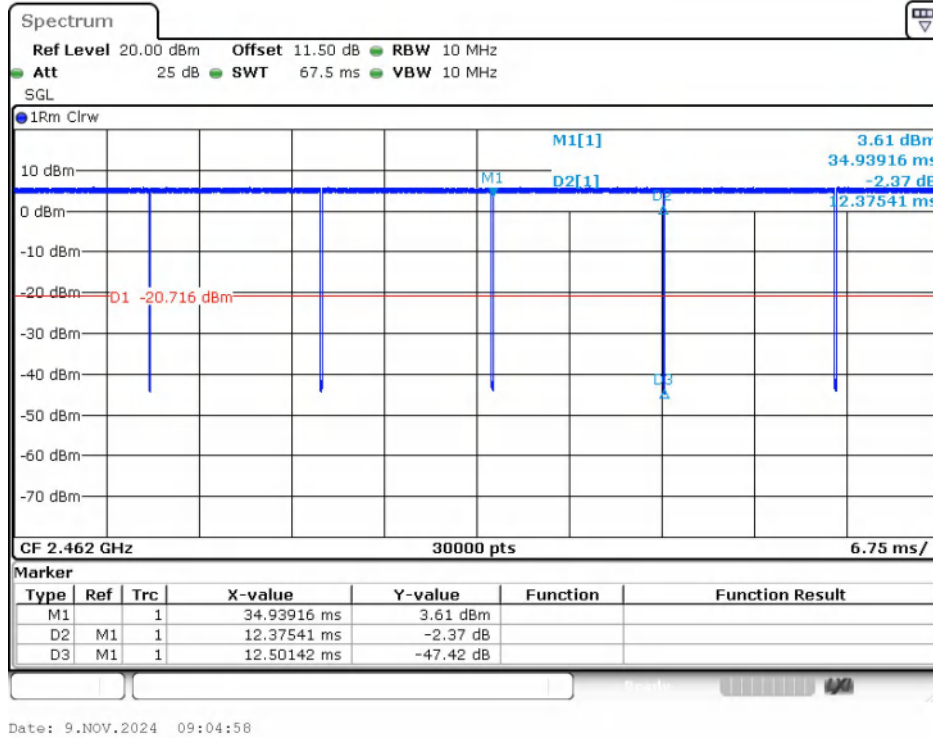
Test Graphs



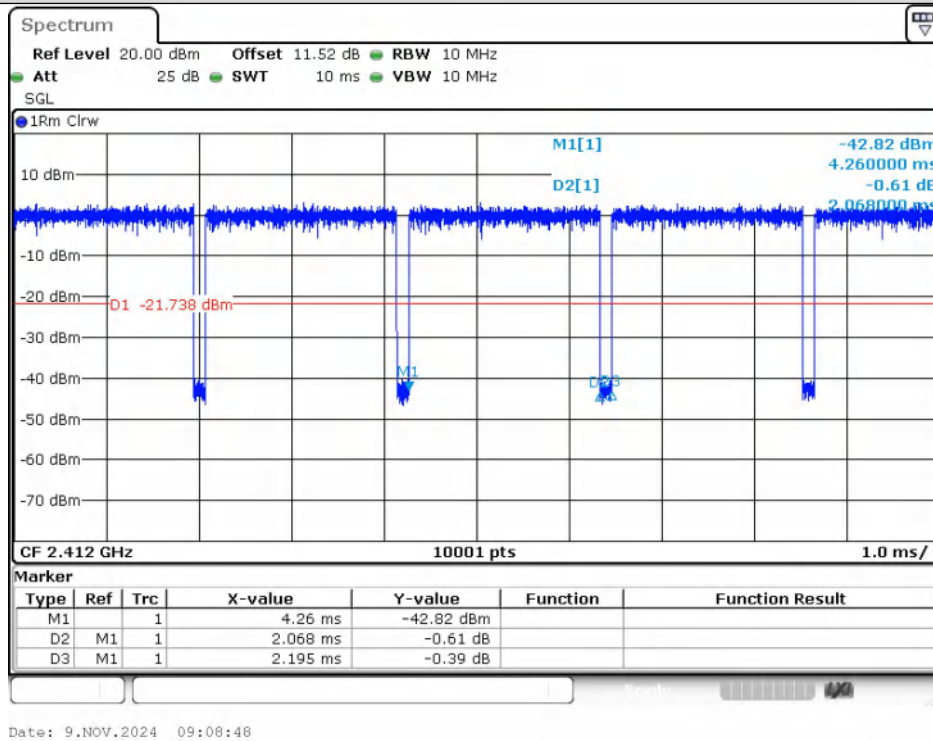
IEEE 802.11b_20MHz_Channel 1



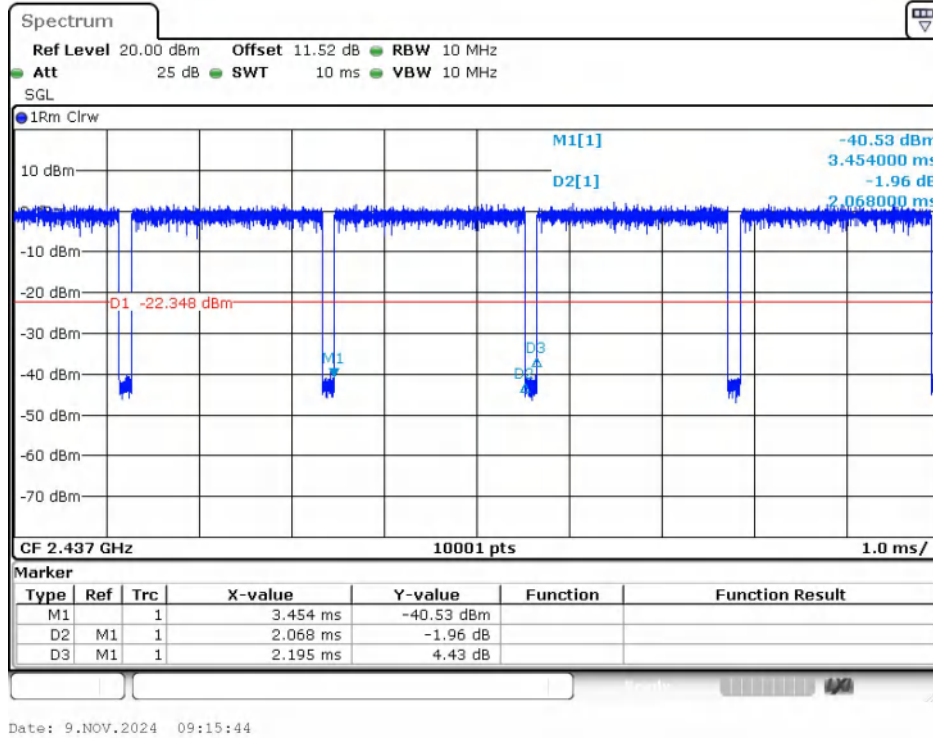
IEEE 802.11b_20MHz_Channel 6



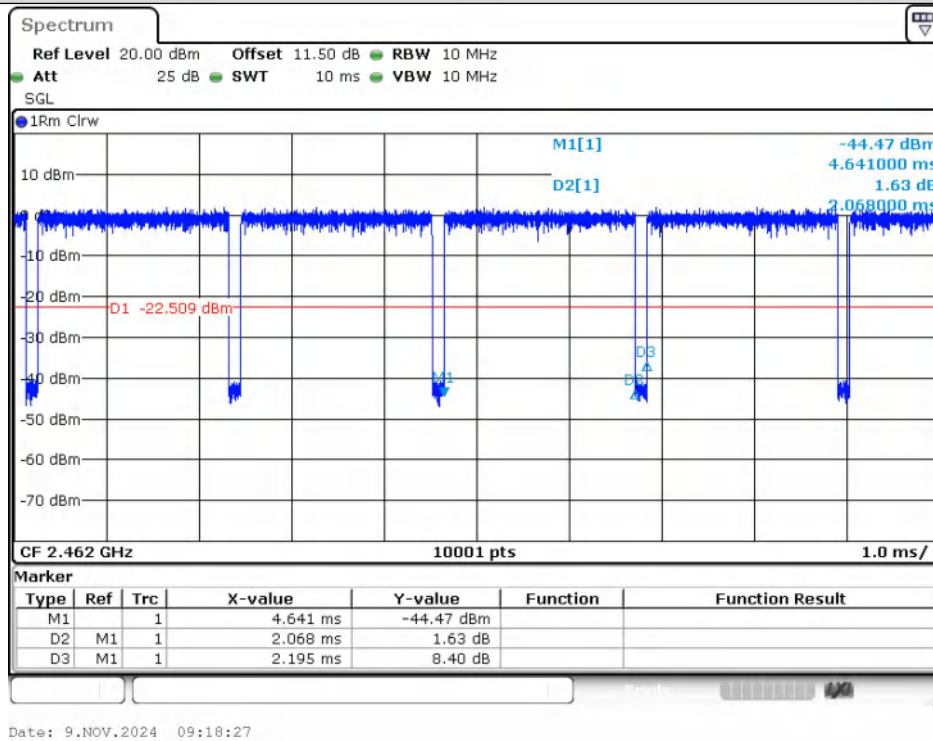
IEEE 802.11b_20MHz_Channel 11



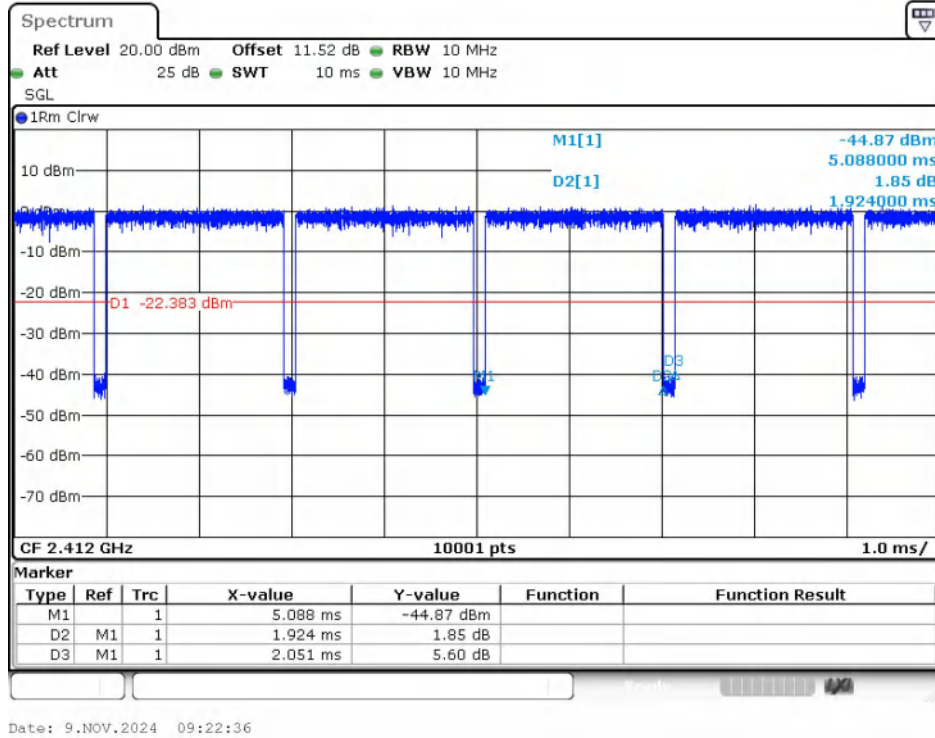
IEEE 802.11g_20MHz_Channel 1



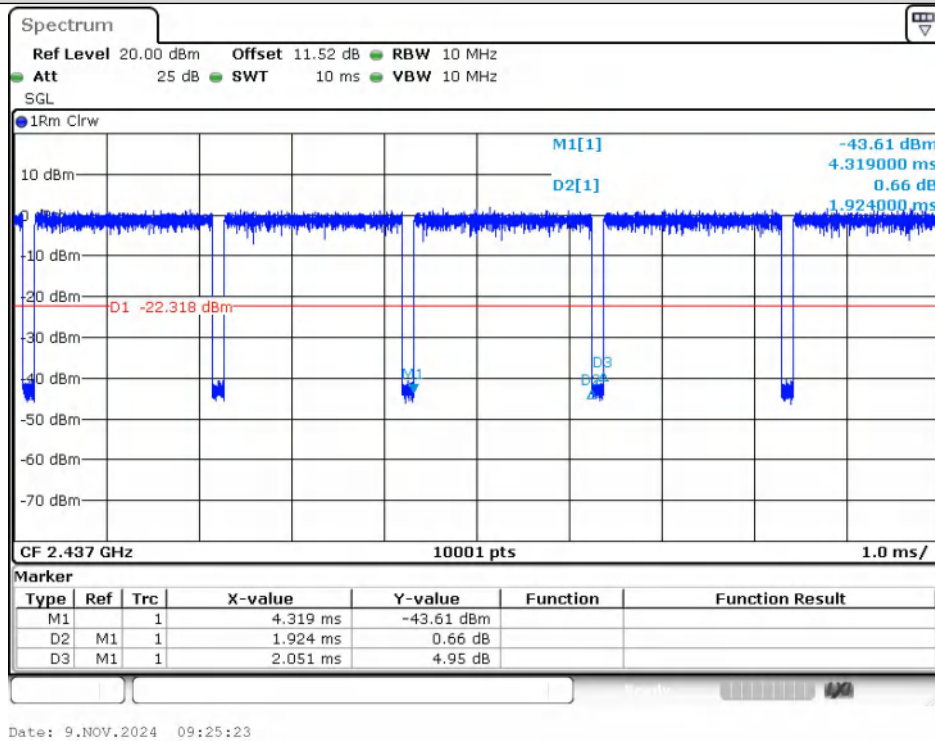
IEEE 802.11g_20MHz_Channel 6



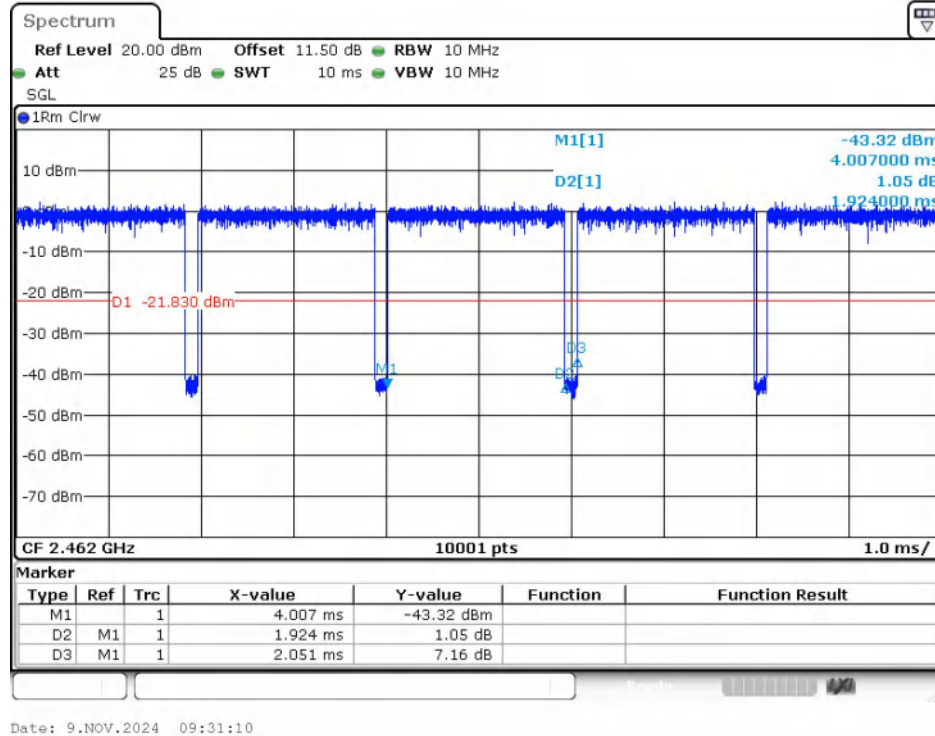
IEEE 802.11g_20MHz_Channel 11



IEEE 802.11n_20MHz_Channel 1



IEEE 802.11n_20MHz_Channel 6

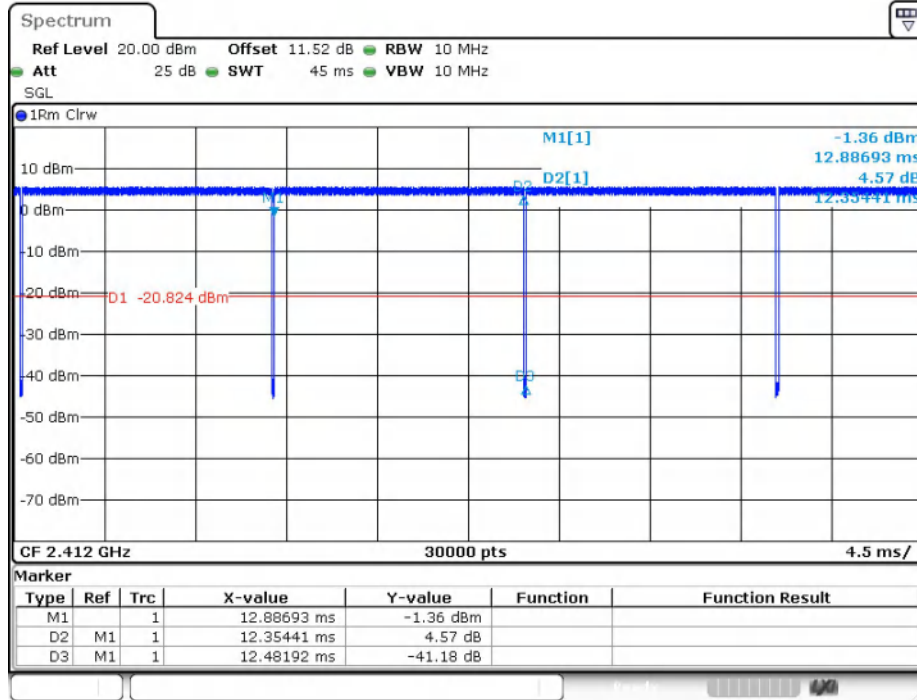


IEEE 802.11n_20MHz_Channel 11

Ant2

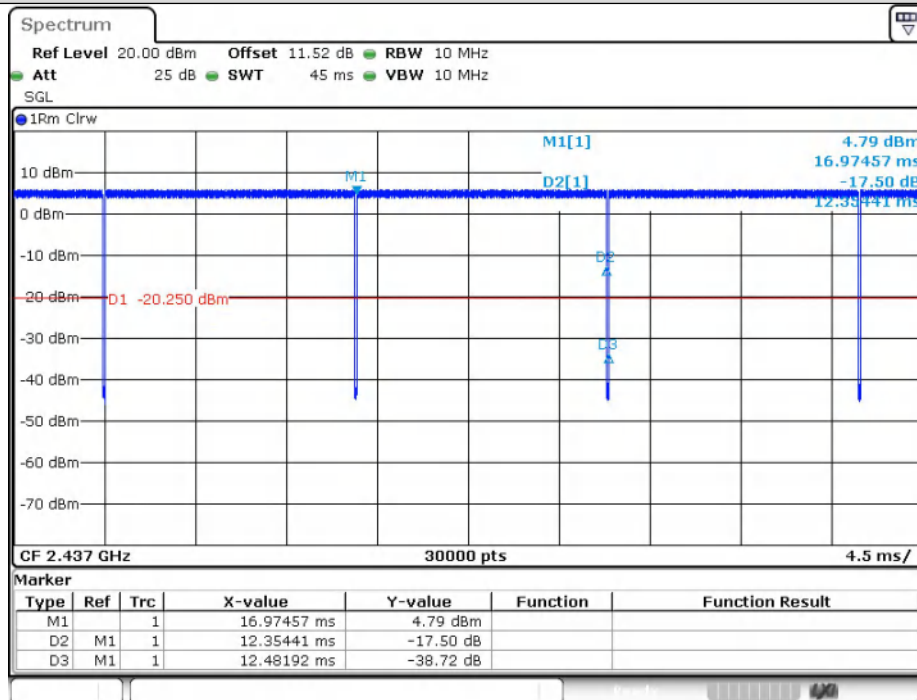
Mode	Data rates	Channel	Antenna	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
IEEE 802.11b	1	1	1	12.354	12.482	98.98	0.9898	0.0445	0.0809
		6		12.354	12.482	98.98	0.9898	0.0445	0.0809
		11		12.353	12.480	98.98	0.9898	0.0445	0.0810
1		2.068		2.195	94.21	0.9421	0.259	0.4836	
6		2.068		2.195	94.21	0.9421	0.259	0.4836	
11		2.068		2.195	94.21	0.9421	0.259	0.4836	
IEEE 802.11g	MCS 0	1		1.924	2.051	93.81	0.9381	0.2775	0.5198
		6		1.924	2.051	93.81	0.9381	0.2775	0.5198
		11		1.924	2.051	93.81	0.9381	0.2775	0.5198

Test Graphs



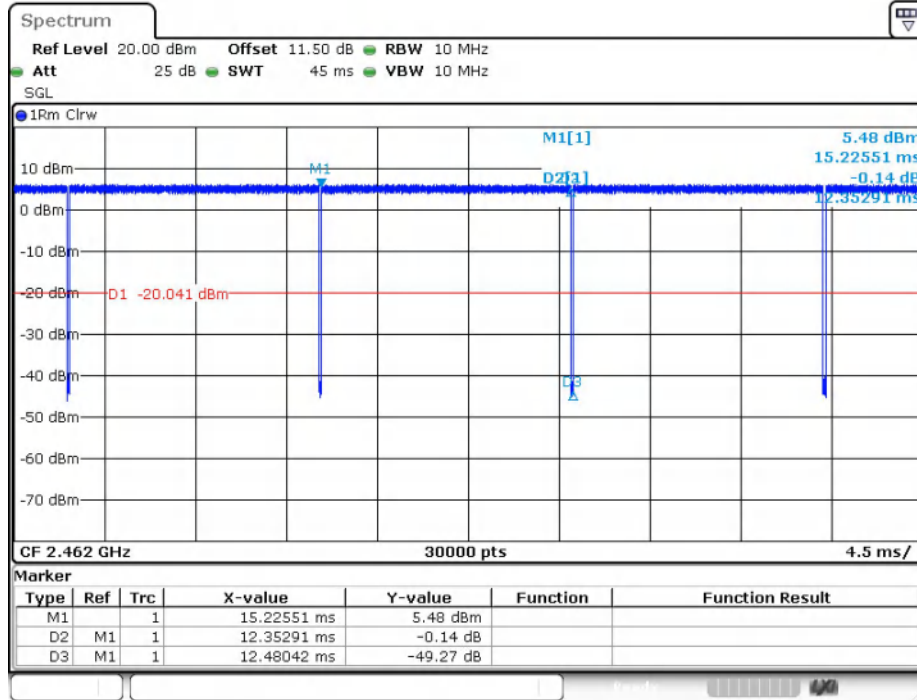
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IEEE 802.11b_20MHz_Channel 1



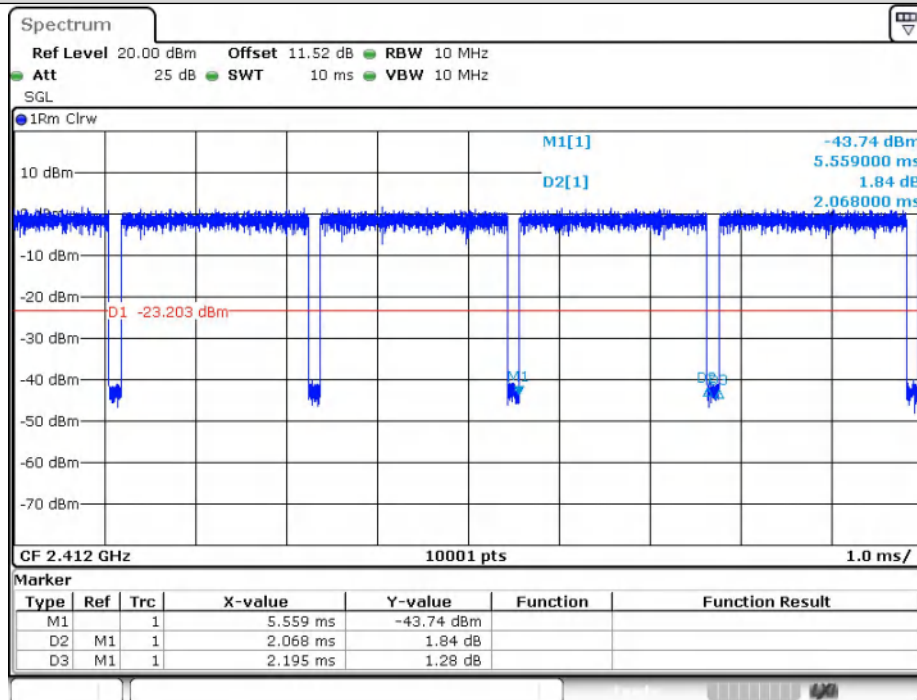
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IEEE 802.11b_20MHz_Channel 6



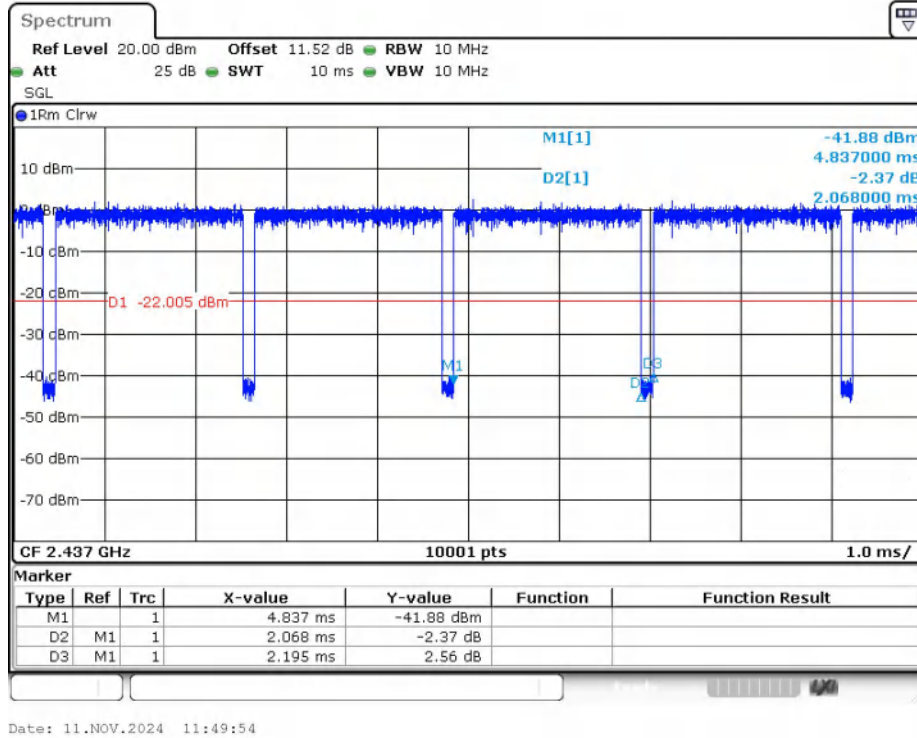
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IEEE 802.11b_20MHz_Channel 11

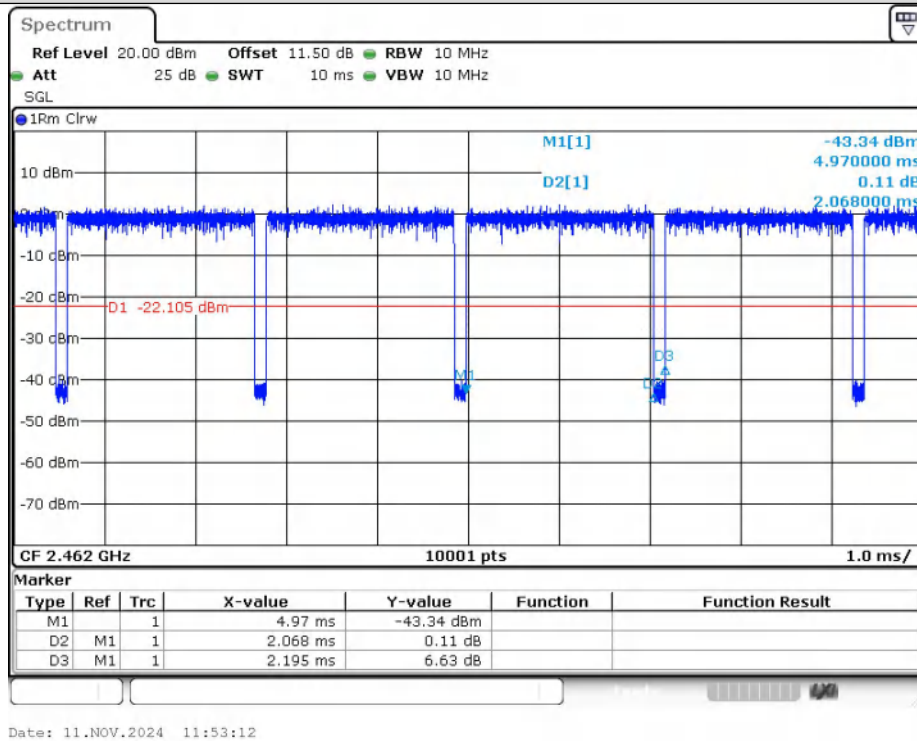


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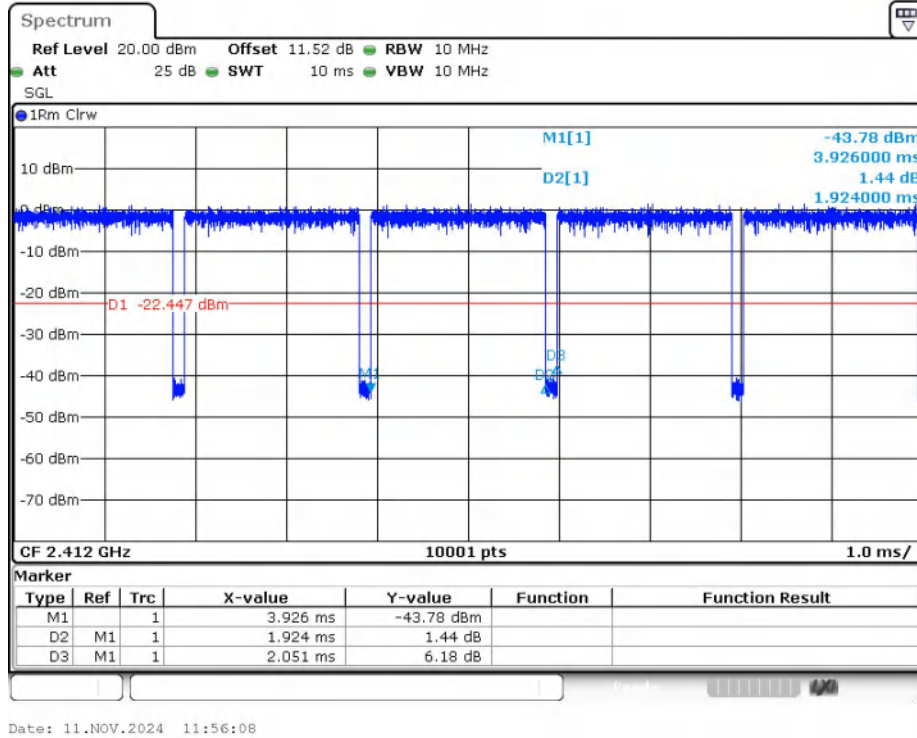
IEEE 802.11g_20MHz_Channel 1



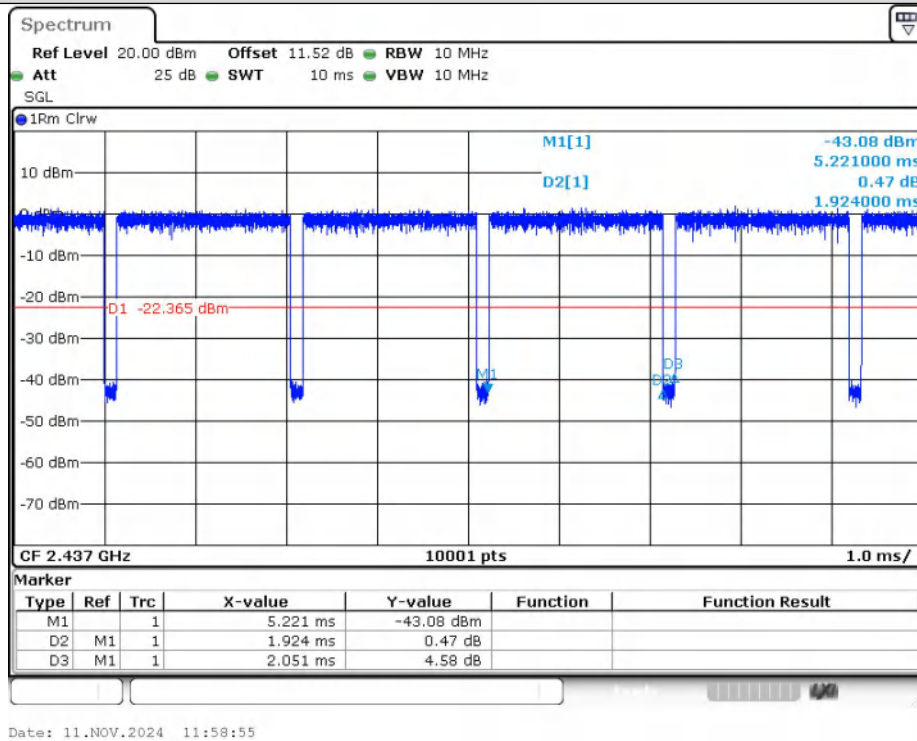
IEEE 802.11g_20MHz_Channel 6



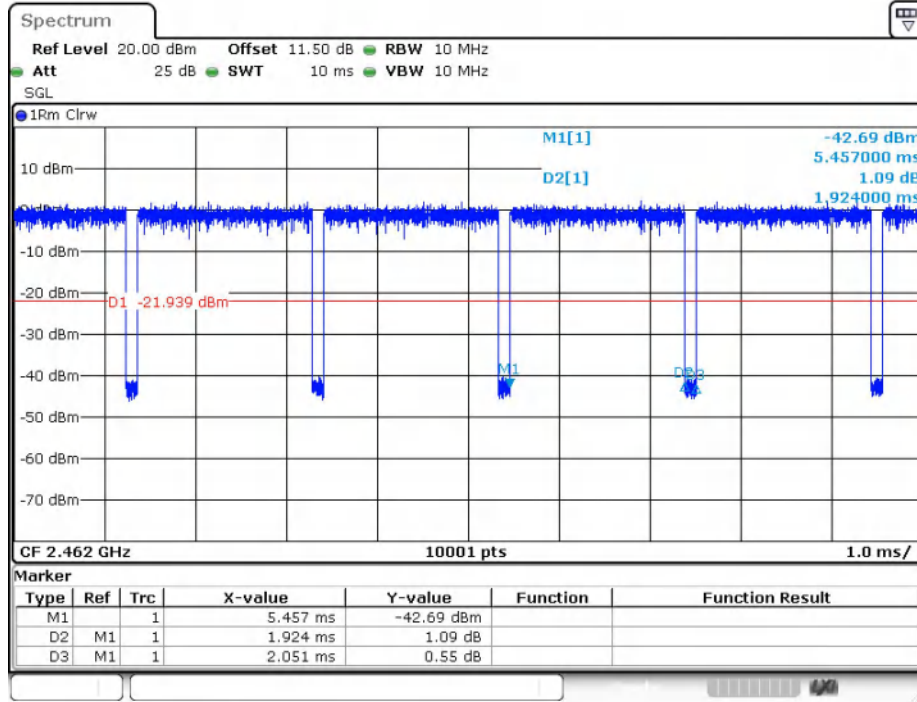
IEEE 802.11g_20MHz_Channel 11



IEEE 802.11n_20MHz_Channel 1



IEEE 802.11n_20MHz_Channel 6



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IEEE 802.11n_20MHz_Channel 11

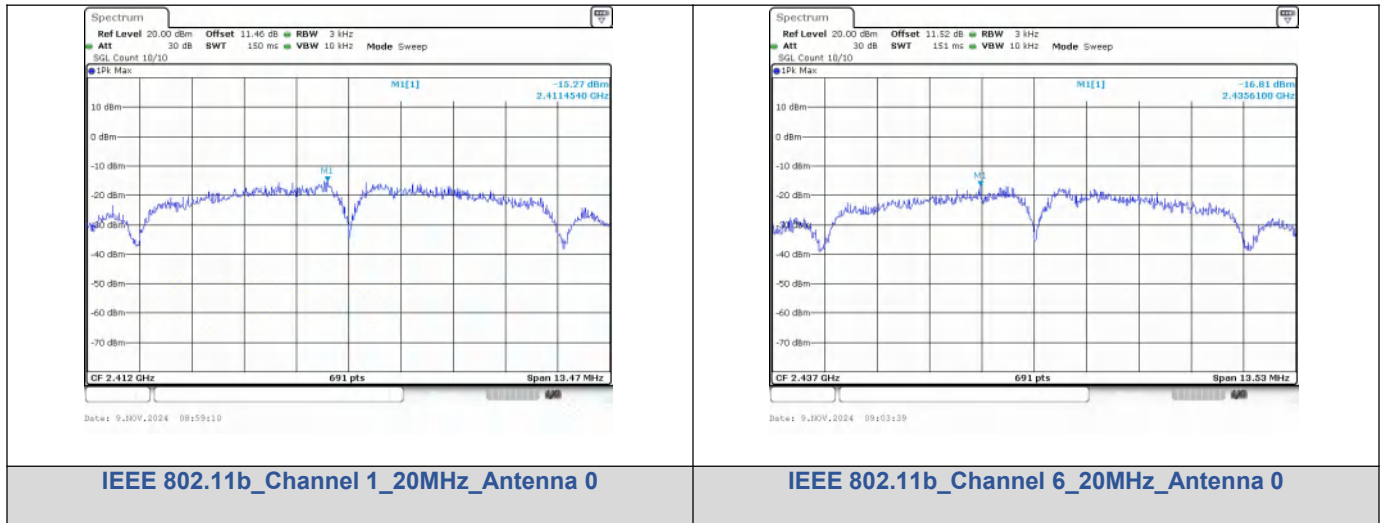
Power Spectral Density

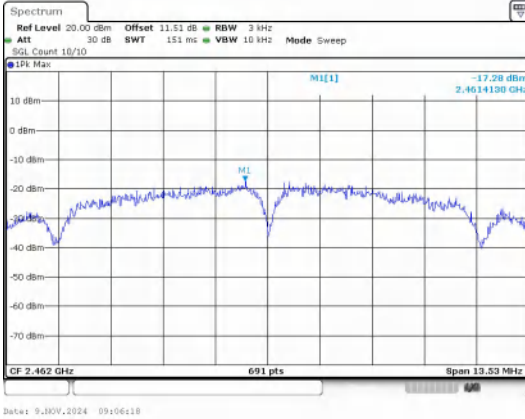
Test Result

Ant1

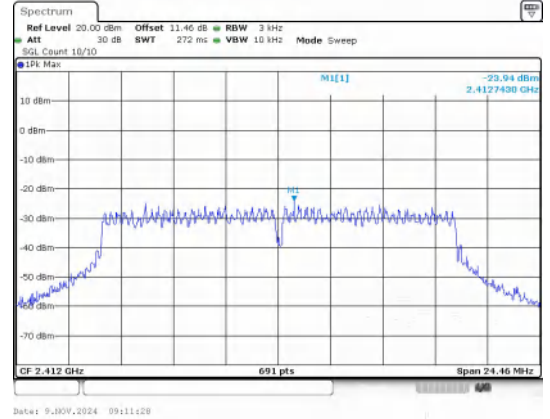
Mode	Channel	PSD (dBm/3kHz) Ant. 0	Limit (dBm/3kHz)	Result
IEEE 802.11b	1	-15.27	≤8	PASS
	6	-16.81		PASS
	11	-17.28		PASS
IEEE 802.11g	1	-23.94		PASS
	6	-24.54		PASS
	11	-24.79		PASS
IEEE 802.11n_20	1	-25.08		PASS
	6	-24.51		PASS
	11	-24.98		PASS

Test Graphs

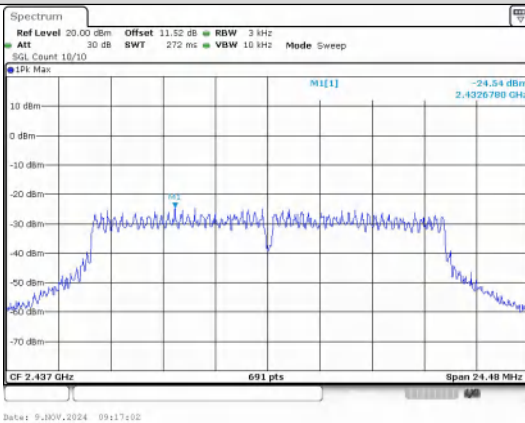




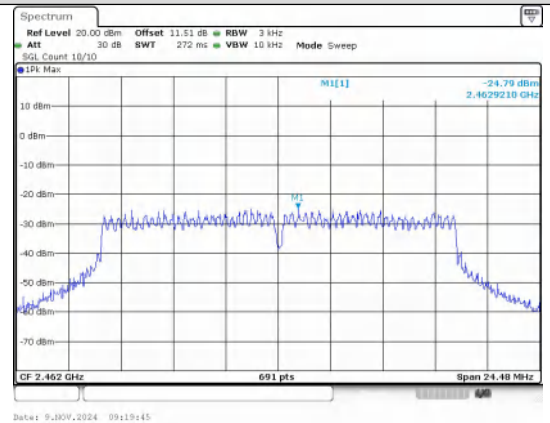
IEEE 802.11b_Channel 11_20MHz_Antenna 0



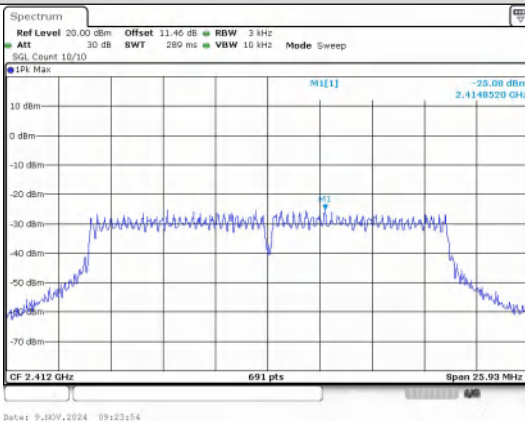
IEEE 802.11g_Channel 1_20MHz_Antenna 0



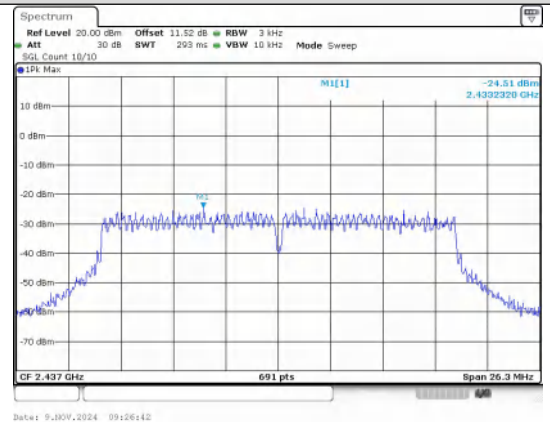
IEEE 802.11g_Channel 6_20MHz_Antenna 0



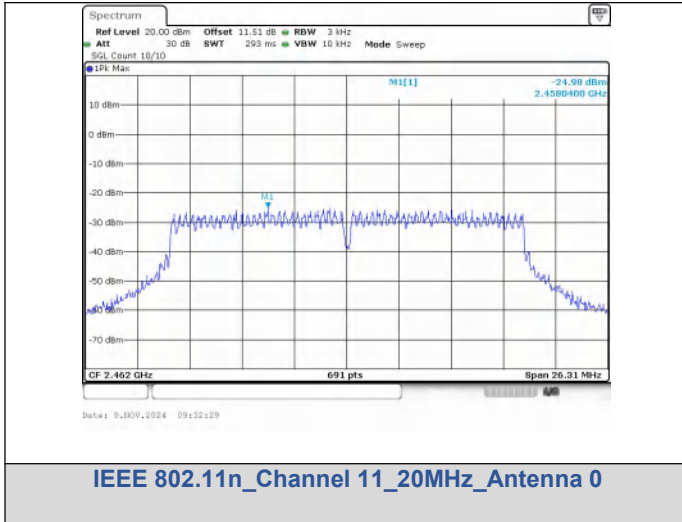
IEEE 802.11g_Channel 11_20MHz_Antenna 0



IEEE 802.11n_Channel 1_20MHz_Antenna 0



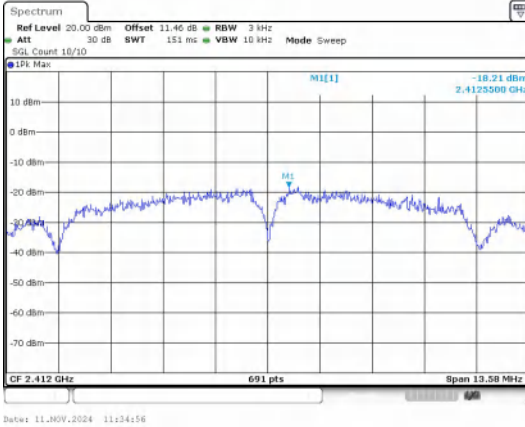
IEEE 802.11n_Channel 6_20MHz_Antenna 0



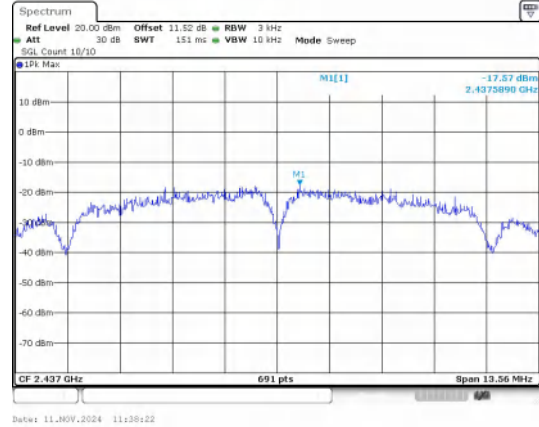
Ant2

Mode	Channel	PSD (dBm/3kHz) Ant. 0	Limit (dBm/3kHz)	Result
IEEE 802.11b	1	-18.21	≤8	PASS
	6	-17.57		PASS
	11	-17.37		PASS
IEEE 802.11g	1	-24.16		PASS
	6	-24.70		PASS
	11	-24.72		PASS
IEEE 802.11n_20	1	-25.16		PASS
	6	-24.87		PASS
	11	-24.85		PASS

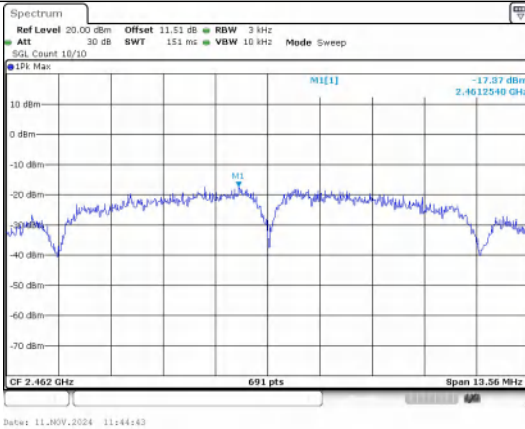
Test Graphs



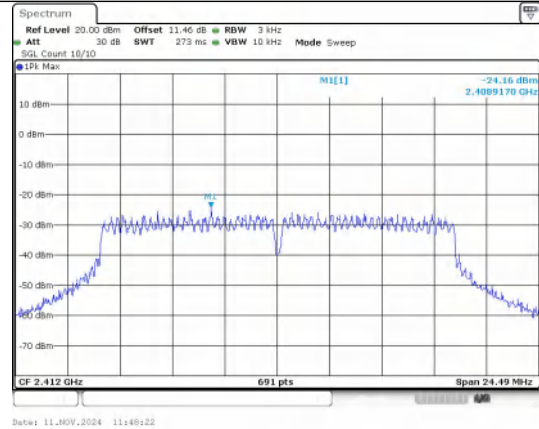
IEEE 802.11b_Channel 1_20MHz_Antenna 0



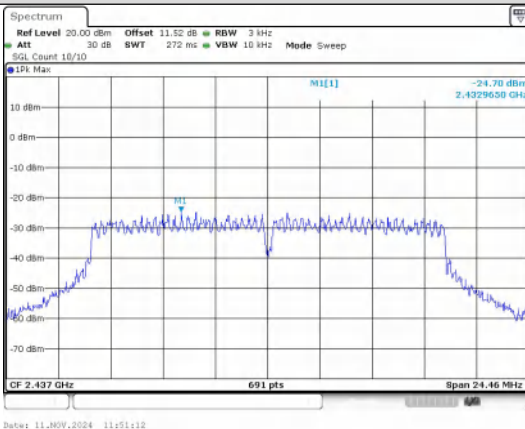
IEEE 802.11b_Channel 6_20MHz_Antenna 0



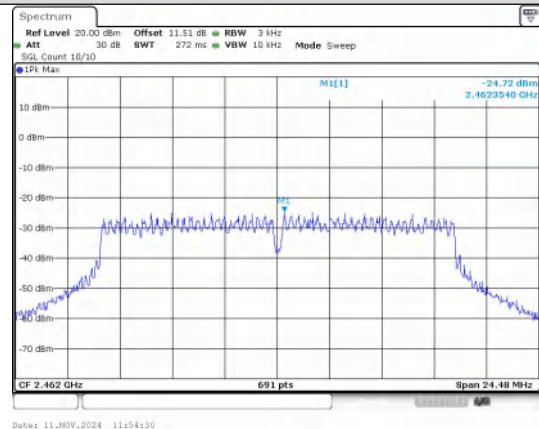
IEEE 802.11b_Channel 11_20MHz_Antenna 0



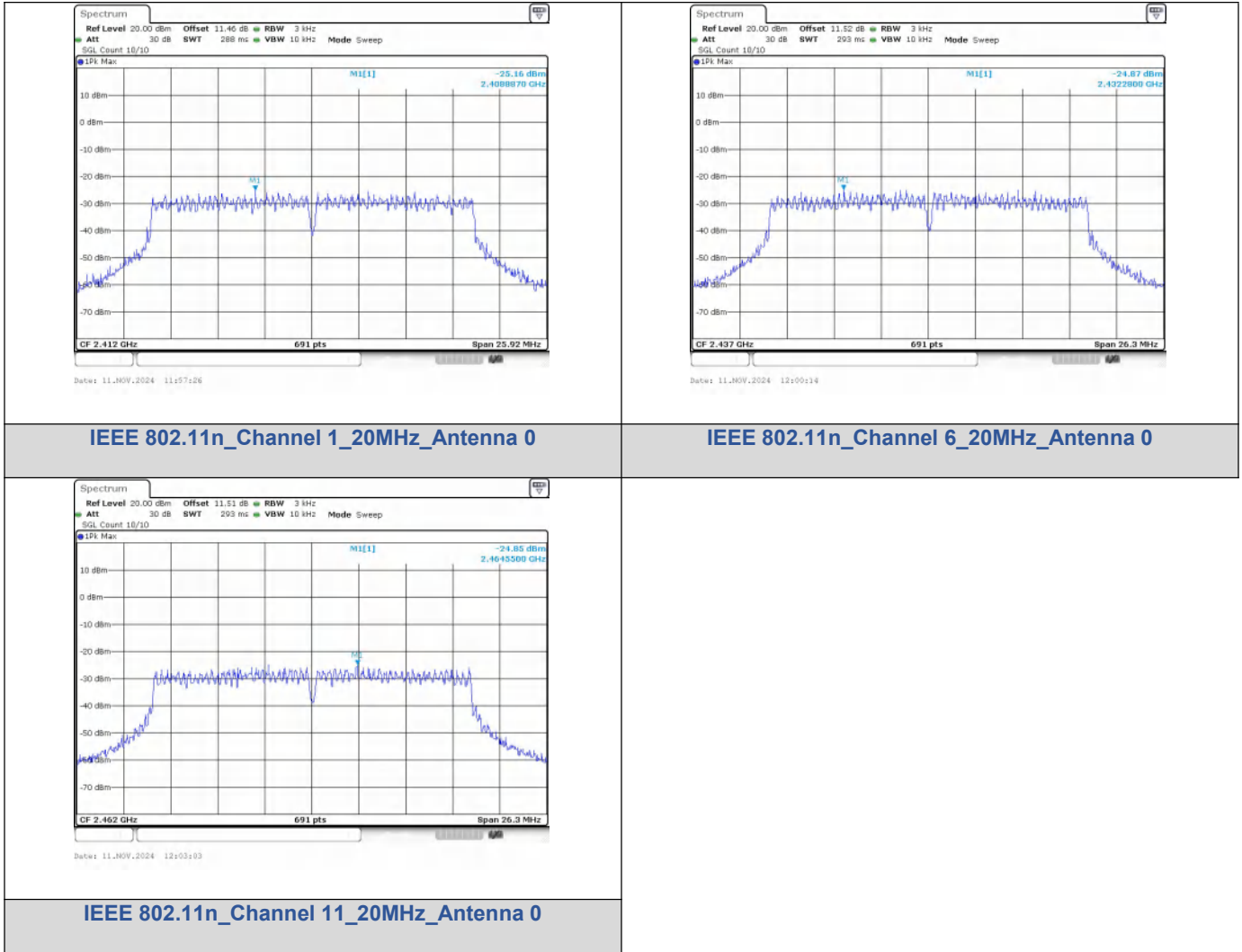
IEEE 802.11g_Channel 1_20MHz_Antenna 0



IEEE 802.11g_Channel 6_20MHz_Antenna 0



IEEE 802.11g_Channel 11_20MHz_Antenna 0



MIMO

Mode	Channel	PSD (dBm/3kHz) Ant. 1	PSD (dBm/3kHz) Ant. 2	PSD (dBm/3kHz) MIMO	Limit (dBm/3kHz)	Result
IEEE 802.11n_20	1	-25.08	-25.16	-22.11	≤8	PASS
	6	-24.51	-24.87	-21.68		PASS
	11	-24.98	-24.85	-21.90		PASS

Conducted Peak Output Power

Test Result

Conducted Output Power

Ant1

Mode	Channel	Ant. 0 (dBm)	Limit (dBm)	Result
IEEE 802.11b	1	15.56	≤30	PASS
	6	15.84	≤30	PASS
	11	15.62	≤30	PASS
IEEE 802.11g	1	15.51	≤30	PASS
	6	15.81	≤30	PASS
	11	15.01	≤30	PASS
IEEE 802.11n_20	1	15.52	≤30	PASS
	6	15.89	≤30	PASS
	11	15.80	≤30	PASS

Ant2

Mode	Channel	Ant. 0 (dBm)	Limit (dBm)	Result
IEEE 802.11b	1	15.07	≤30	PASS
	6	15.36	≤30	PASS
	11	15.62	≤30	PASS
IEEE 802.11g	1	15.42	≤30	PASS
	6	15.71	≤30	PASS
	11	15.88	≤30	PASS
IEEE 802.11n_20	1	15.41	≤30	PASS
	6	15.73	≤30	PASS
	11	15.92	≤30	PASS

MIMO

Mode	Channel	Ant. 1 (dBm)	Ant. 2 (dBm)	MOMO(dBm)	Limit (dBm)	Result
IEEE 802.11n_20	1	15.52	15.41	18.48	≤30	PASS
	6	15.89	15.73	18.82	≤30	PASS
	11	15.80	15.92	18.87	≤30	PASS

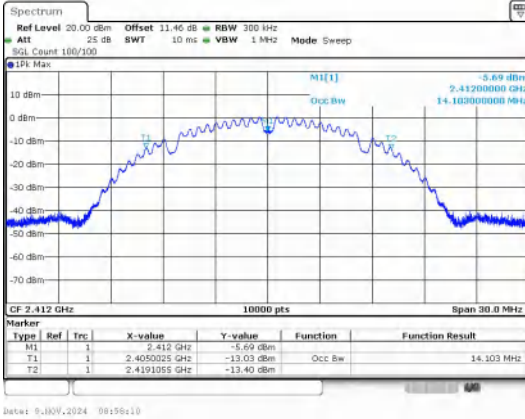
99% Bandwidth

Test Result

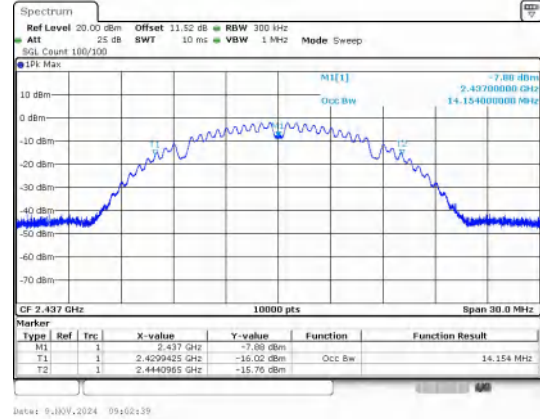
Ant1

Mode	Channel	Ant.	Center Frequency (MHz)	99% BW (MHz)
IEEE 802.11b	1	0	2412	14.103
	6		2437	14.154
	11		2462	14.100
IEEE 802.11g	1		2412	16.893
	6		2437	16.911
	11		2462	16.890
IEEE 802.11n_20	1		2412	17.988
	6		2437	17.988
	11		2462	17.976

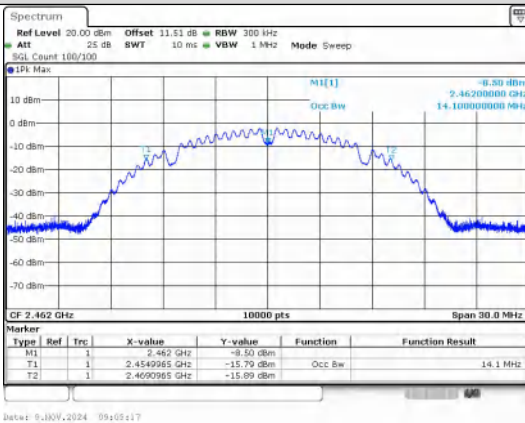
Test Graphs



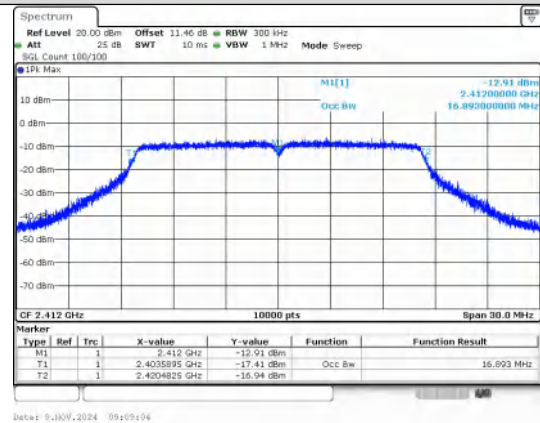
IEEE 802.11b_Channel 1_20MHz_Antenna 0



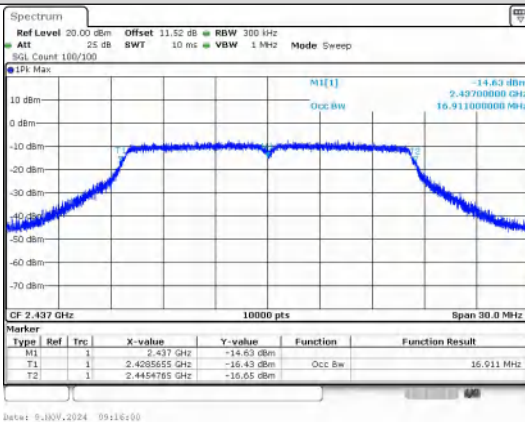
IEEE 802.11b_Channel 6_20MHz_Antenna 0



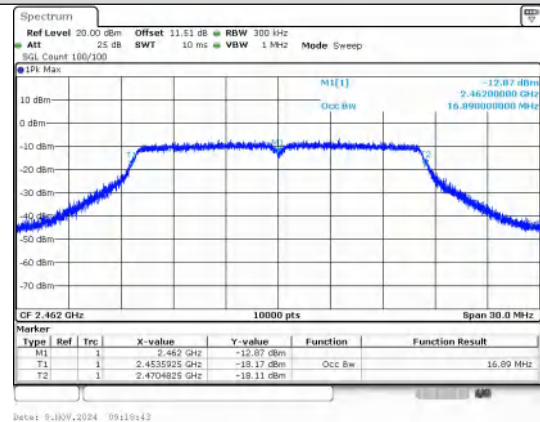
IEEE 802.11b_Channel 11_20MHz_Antenna 0



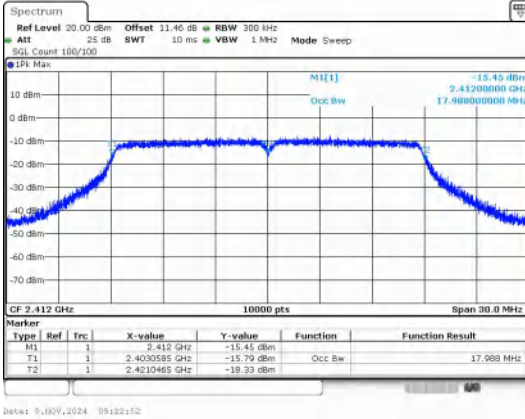
IEEE 802.11g_Channel 1_20MHz_Antenna 0



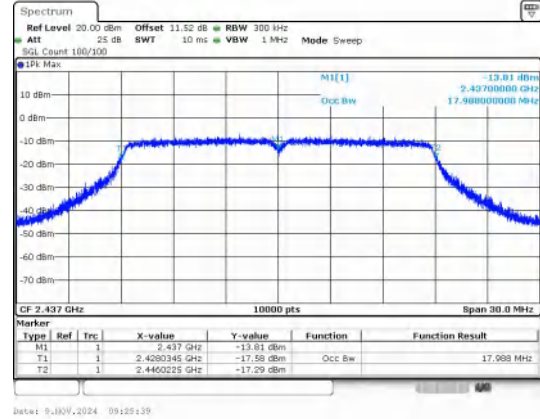
IEEE 802.11g_Channel 6_20MHz_Antenna 0



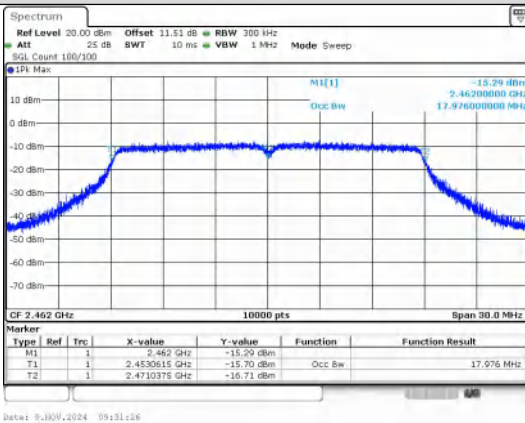
IEEE 802.11g_Channel 11_20MHz_Antenna 0



IEEE 802.11n_Channel 1_20MHz_Antenna 0



IEEE 802.11n_Channel 6_20MHz_Antenna 0



IEEE 802.11n_Channel 11_20MHz_Antenna 0

Ant2

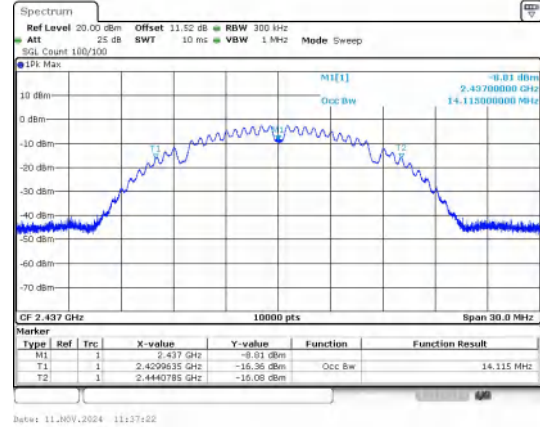
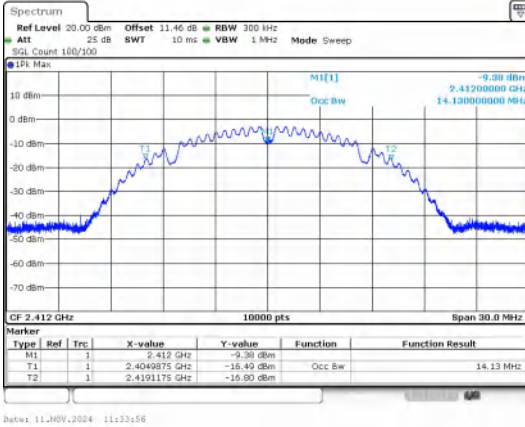
Mode	Channel	Ant.	Center Frequency (MHz)	99% BW (MHz)
IEEE 802.11b	1	0	2412	14.130
	6		2437	14.115
	11		2462	14.106
IEEE 802.11g	1		2412	16.914
	6		2437	16.902
	11		2462	16.887
IEEE 802.11n_20	1		2412	18.009
	6		2437	17.976

11

2462

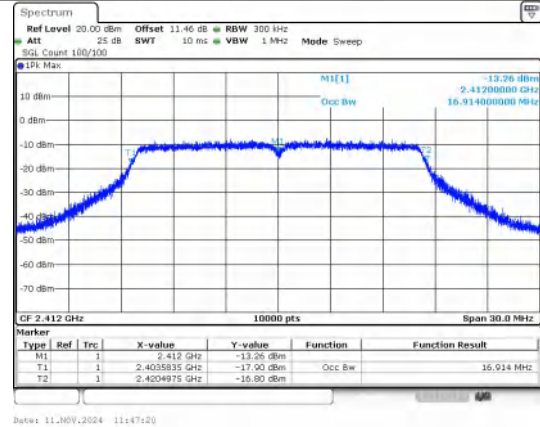
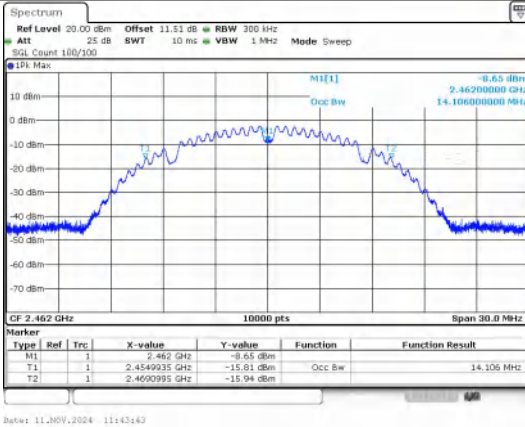
17.991

Test Graphs



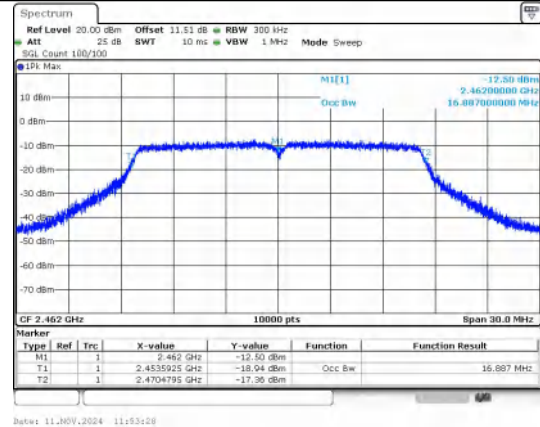
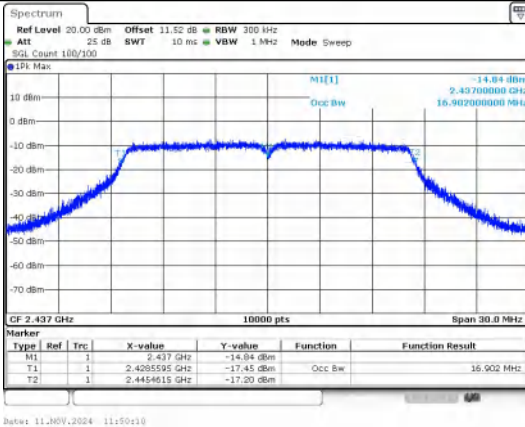
IEEE 802.11b_Channel 1_20MHz_Antenna 0

IEEE 802.11b_Channel 6_20MHz_Antenna 0

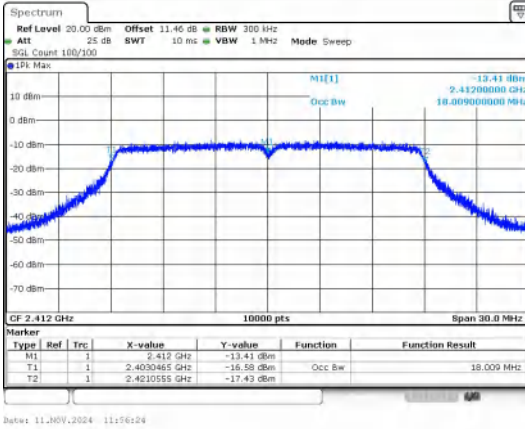


IEEE 802.11b_Channel 11_20MHz_Antenna 0

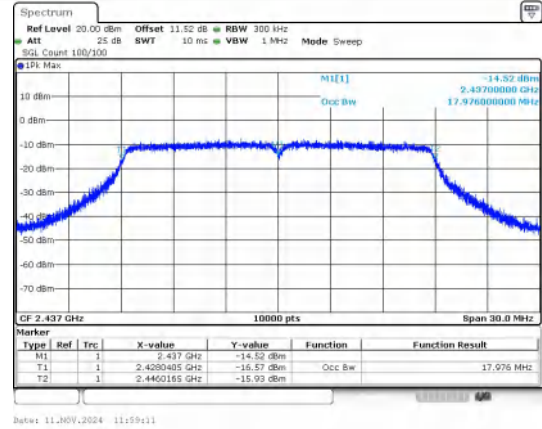
IEEE 802.11g_Channel 1_20MHz_Antenna 0



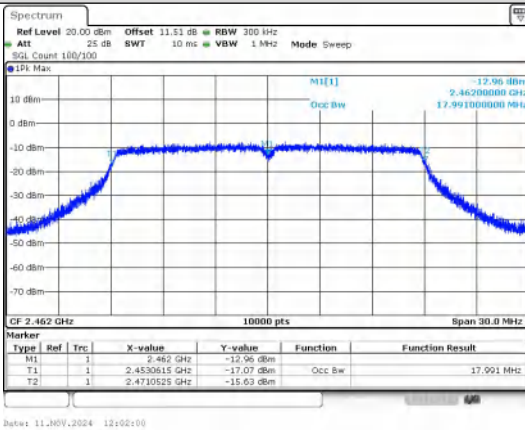
IEEE 802.11g_Channel 6_20MHz_Antenna 0



IEEE 802.11g_Channel 11_20MHz_Antenna 0



IEEE 802.11n_Channel 1_20MHz_Antenna 0



IEEE 802.11n_Channel 6_20MHz_Antenna 0

IEEE 802.11n_Channel 11_20MHz_Antenna 0

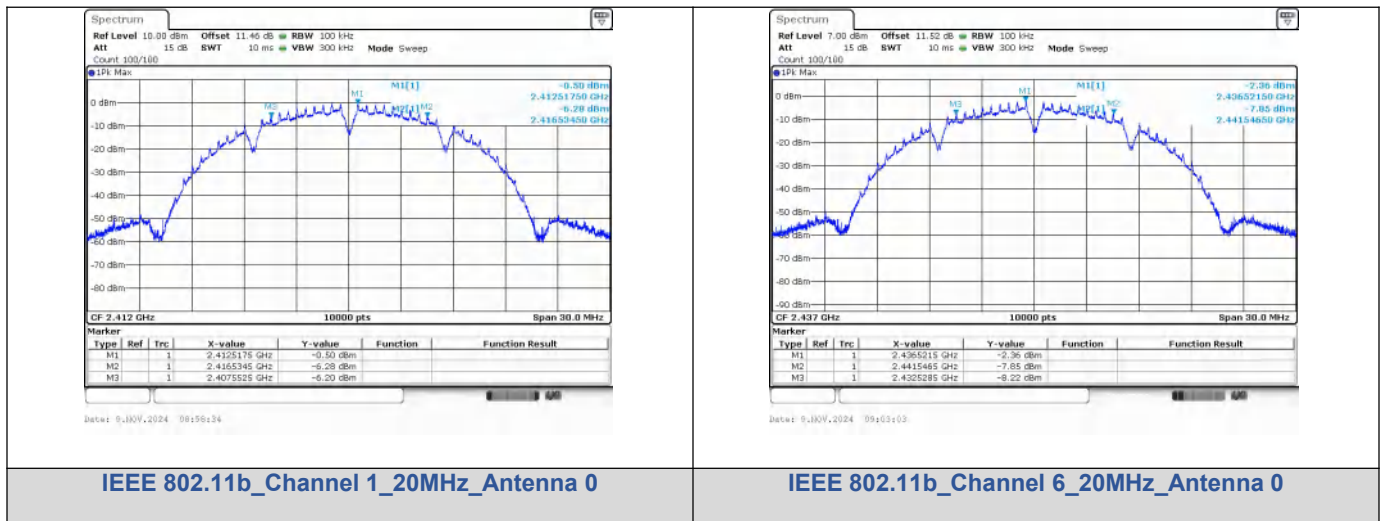
6dB Bandwidth

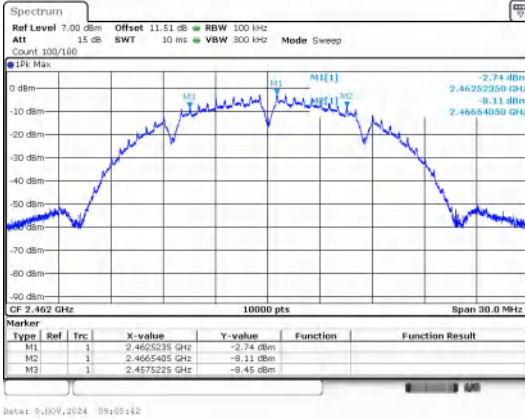
Test Result

Ant1

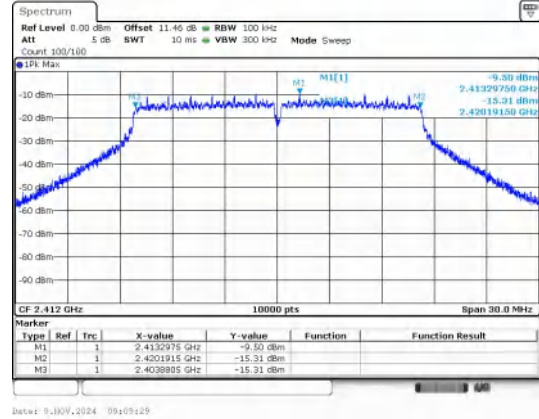
Mode	Channel	Ant.	Center Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)	Result
IEEE 802.11b	1	0	2412	8.980	≥0.5	PASS
	6		2437	9.020		PASS
	11		2462	9.020		PASS
IEEE 802.11g	1		2412	16.31		PASS
	6		2437	16.32		PASS
	11		2462	16.32		PASS
IEEE 802.11n_20	1		2412	17.29		PASS
	6		2437	17.53		PASS
	11		2462	17.54		PASS

Test Graphs

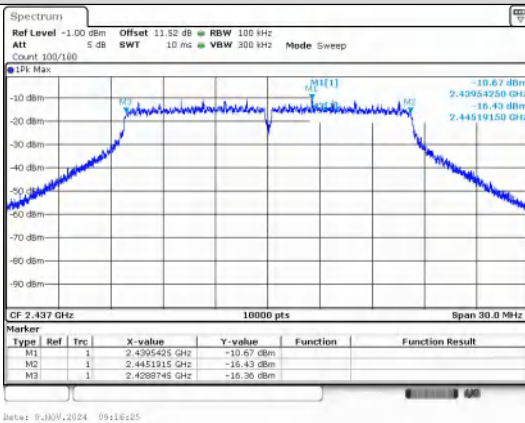




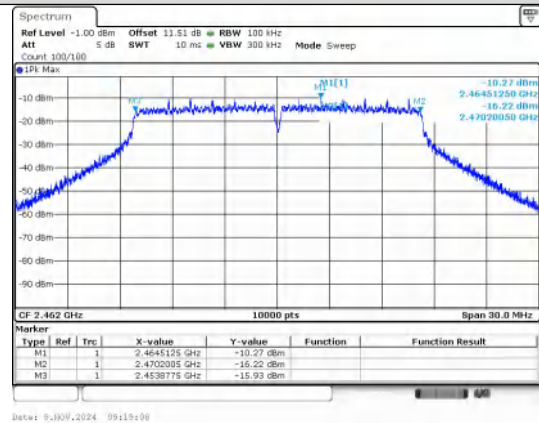
IEEE 802.11b_Channel 11_20MHz_Antenna 0



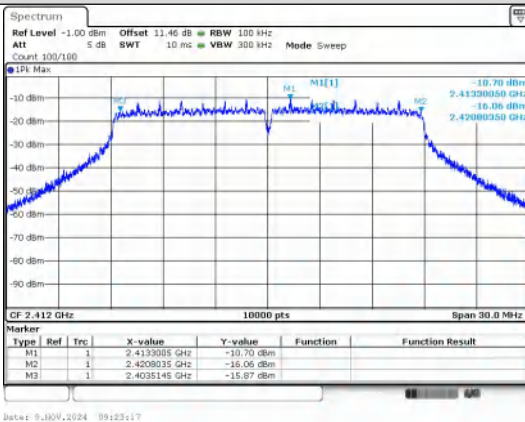
IEEE 802.11g_Channel 1_20MHz_Antenna 0



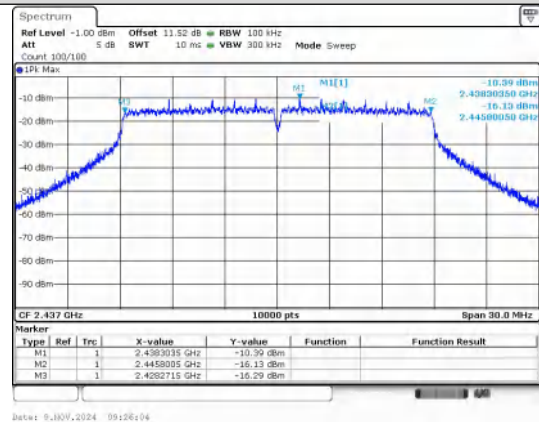
IEEE 802.11g_Channel 6_20MHz_Antenna 0



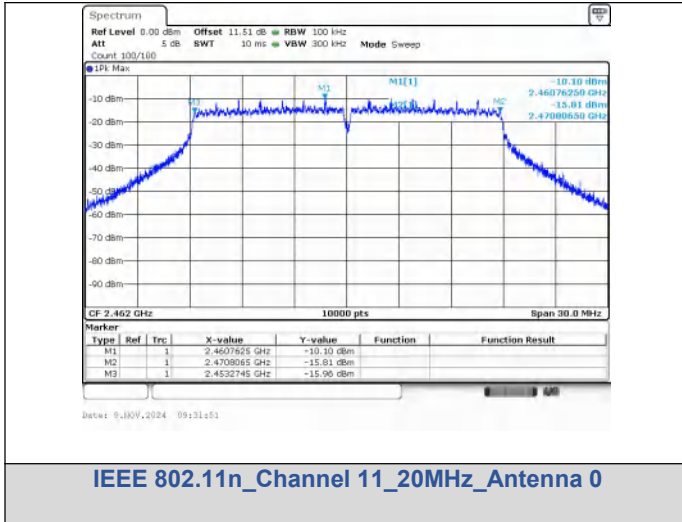
IEEE 802.11g_Channel 11_20MHz_Antenna 0



IEEE 802.11n_Channel 1_20MHz_Antenna 0



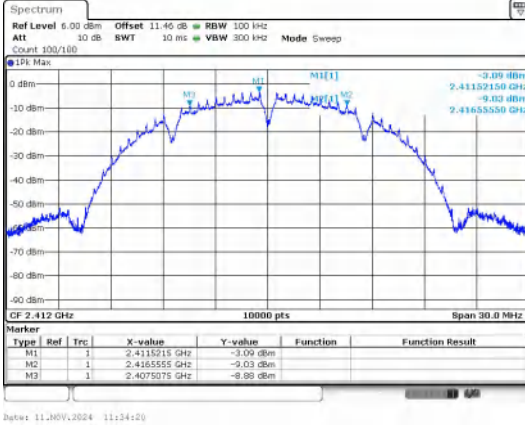
IEEE 802.11n_Channel 6_20MHz_Antenna 0



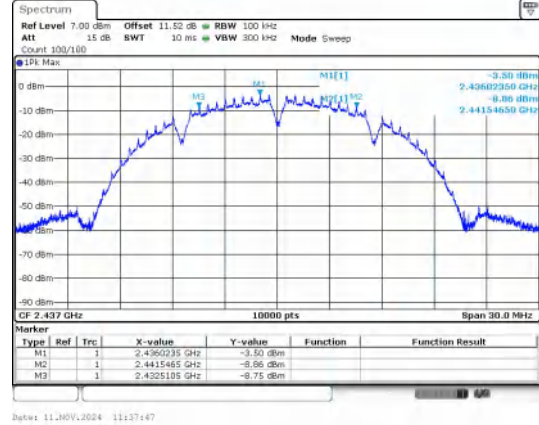
Ant2

Mode	Channel	Ant.	Center Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)	Result
IEEE 802.11b	1	0	2412	9.050	≥0.5	PASS
	6		2437	9.040		PASS
	11		2462	9.040		PASS
IEEE 802.11g	1		2412	16.33		PASS
	6		2437	16.31		PASS
	11		2462	16.32		PASS
IEEE 802.11n_20	1		2412	17.28		PASS
	6		2437	17.53		PASS
	11		2462	17.53		PASS

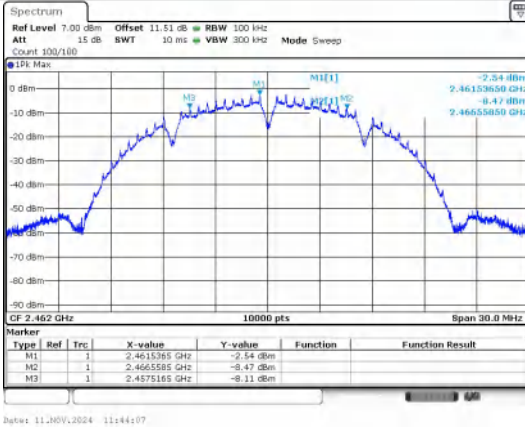
Test Graphs



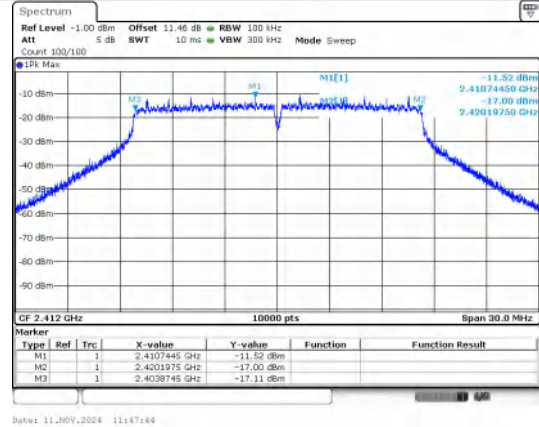
IEEE 802.11b_Channel 1_20MHz_Antenna 0



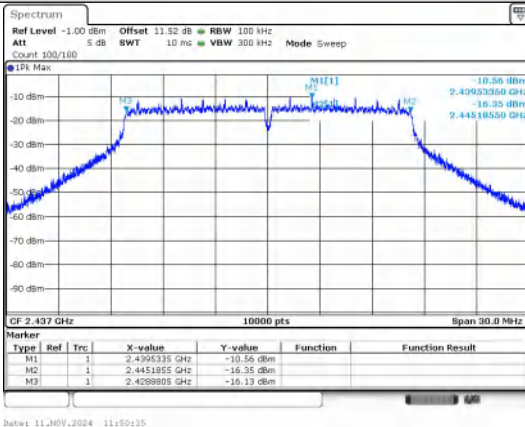
IEEE 802.11b_Channel 6_20MHz_Antenna 0



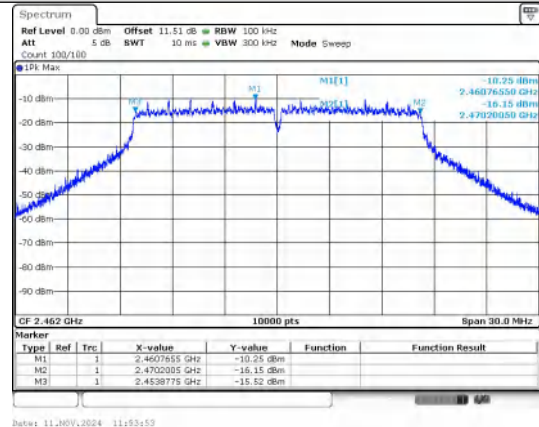
IEEE 802.11b_Channel 11_20MHz_Antenna 0



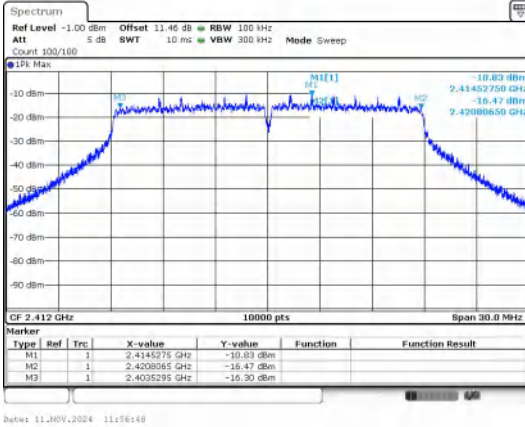
IEEE 802.11g_Channel 1_20MHz_Antenna 0



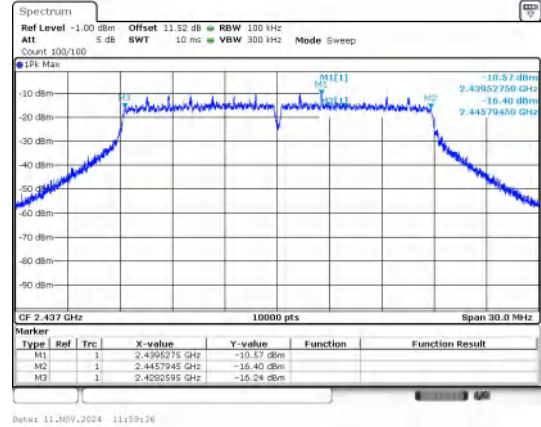
IEEE 802.11g_Channel 6_20MHz_Antenna 0



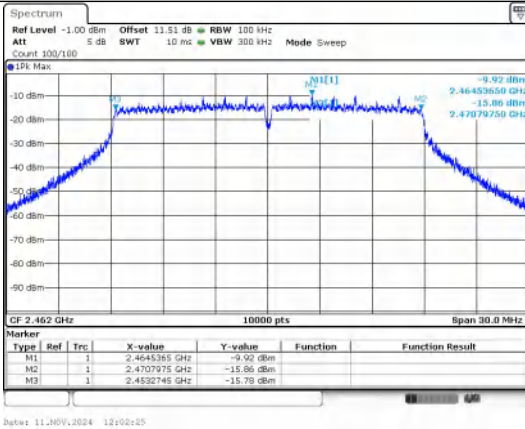
IEEE 802.11g_Channel 11_20MHz_Antenna 0



IEEE 802.11n_Channel 1_20MHz_Antenna 0



IEEE 802.11n_Channel 6_20MHz_Antenna 0



IEEE 802.11n_Channel 11_20MHz_Antenna 0

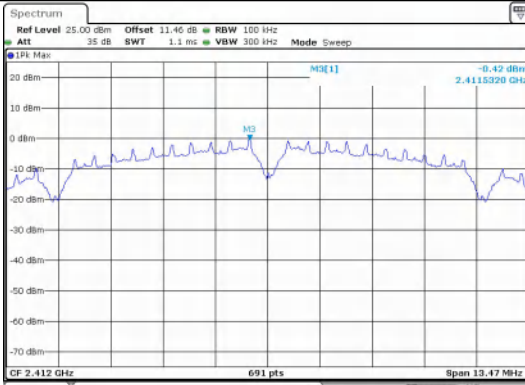
Conducted Out Of Band Emission

Test Result

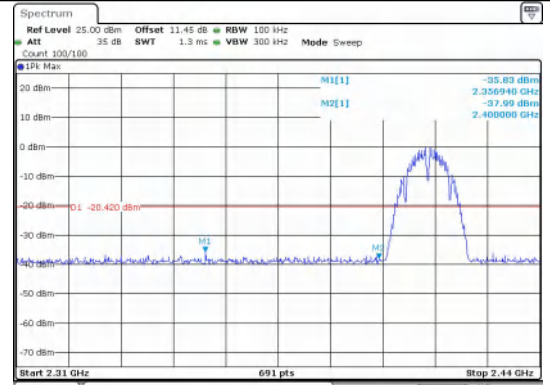
Ant1

Mode	Channel	Ant.	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
IEEE 802.11b	1	0	2356.94	-35.831	-20.42	-15.411	PASS
			2400.00	-37.990	-20.42	-17.570	PASS
			6925.50	-42.899	-20.42	-22.479	PASS
	6		17283.9	-43.268	-22.47	-20.798	PASS
	11		2483.50	-37.160	-22.55	-14.610	PASS
			6960.42	-42.606	-22.55	-20.056	PASS
IEEE 802.11g	1		2389.30	-36.605	-30.73	-5.875	PASS
			2400.00	-37.770	-30.73	-7.040	PASS
			6134.70	-43.184	-30.73	-12.454	PASS
	6		6938.78	-43.342	-30.53	-12.812	PASS
	11		2483.50	-37.680	-30.37	-7.310	PASS
			6927.13	-42.364	-30.37	-11.994	PASS
IEEE 802.11n_20	1		2368.04	-36.070	-30.79	-5.280	PASS
			2400.00	-37.220	-30.79	-6.430	PASS
			21503.0	-43.071	-30.79	-12.281	PASS
	6		6967.08	-42.963	-30.64	-12.323	PASS
	11		2483.50	-38.250	-30.27	-7.980	PASS
			6179.69	-42.836	-30.27	-12.566	PASS

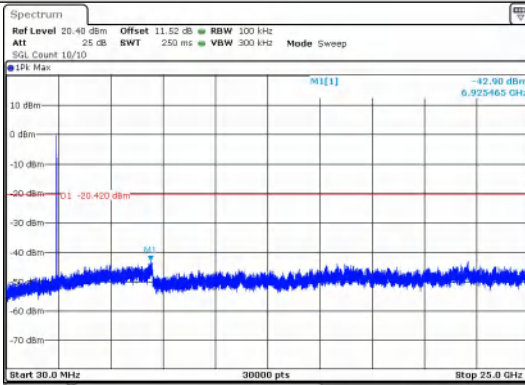
Test Graphs



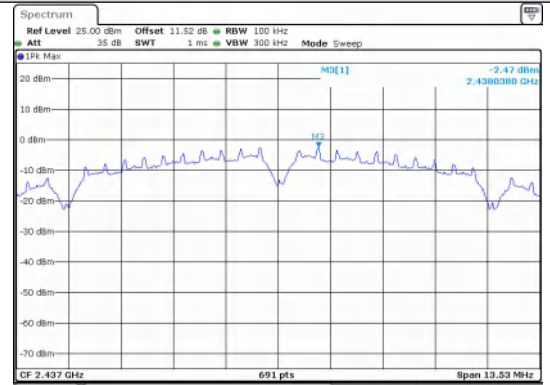
In-Band Reference Level
IEEE 802.11b_Channel 1_20MHz_Antenna 0



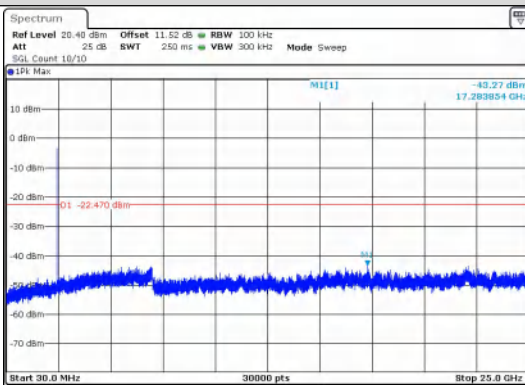
Out Of Band Emission
IEEE 802.11b_Channel 1_20MHz_Antenna 0



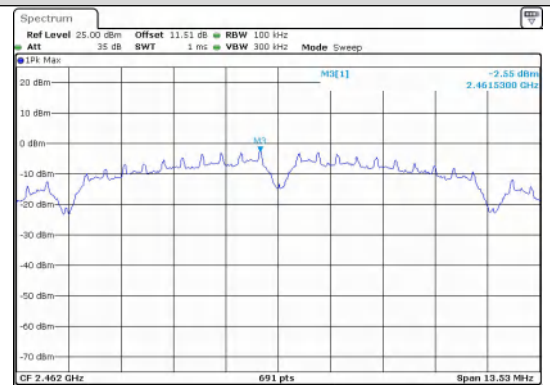
30.0 MHz - 25000.0 MHz
IEEE 802.11b_Channel 1_20MHz_Antenna 0



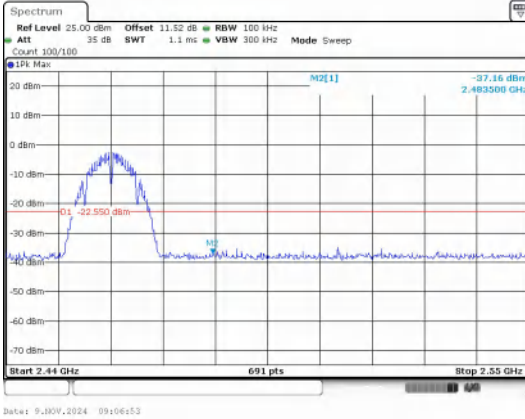
In-Band Reference Level
IEEE 802.11b_Channel 6_20MHz_Antenna 0



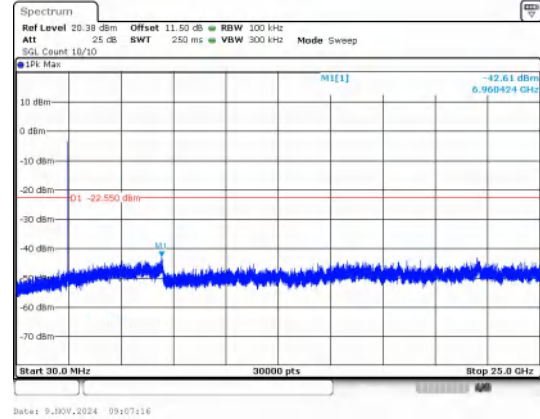
30.0 MHz - 25000.0 MHz
IEEE 802.11b_Channel 6_20MHz_Antenna 0



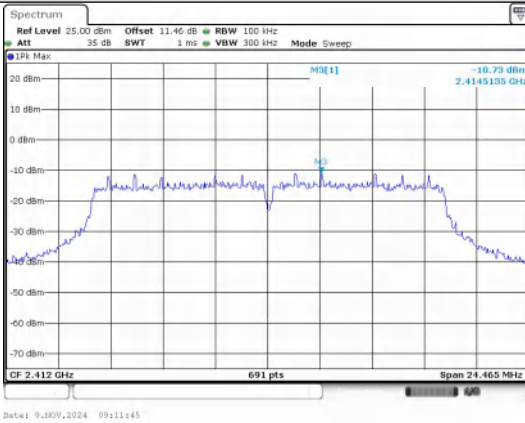
In-Band Reference Level
IEEE 802.11b_Channel 11_20MHz_Antenna 0



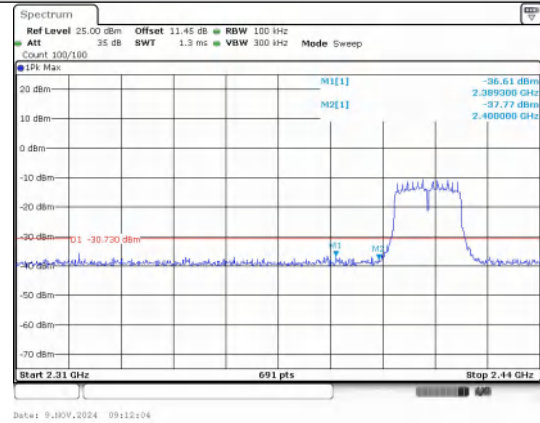
Out Of Band Emission
IEEE 802.11b_Channel 11_20MHz_Antenna 0



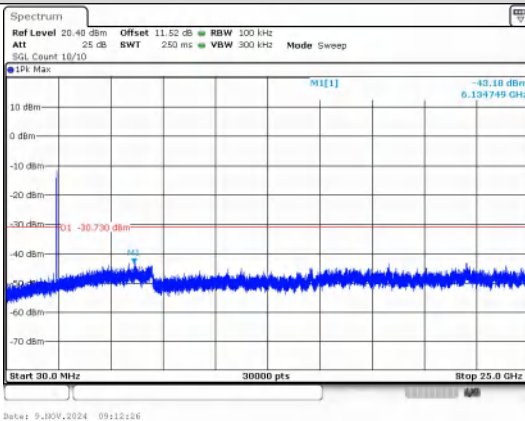
30.0 MHz - 25000.0 MHz
IEEE 802.11b_Channel 11_20MHz_Antenna 0



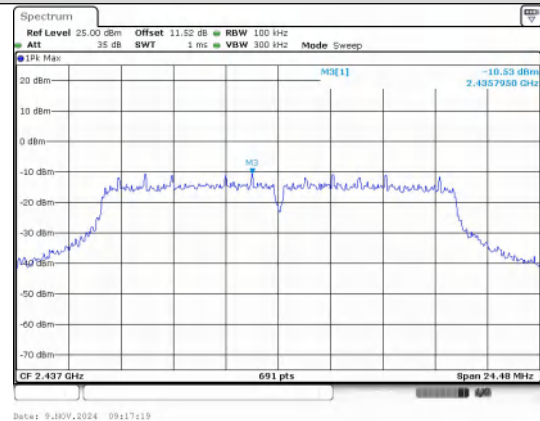
In-Band Reference Level
IEEE 802.11g_Channel 1_20MHz_Antenna 0



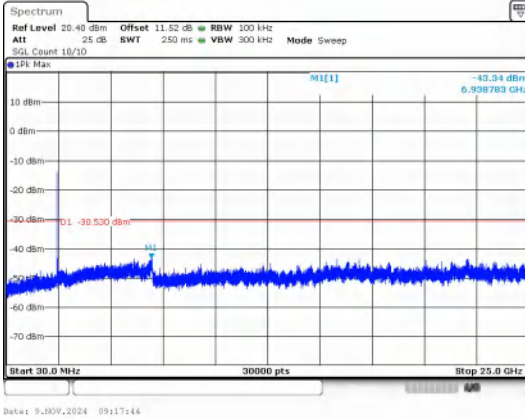
Out Of Band Emission
IEEE 802.11g_Channel 1_20MHz_Antenna 0



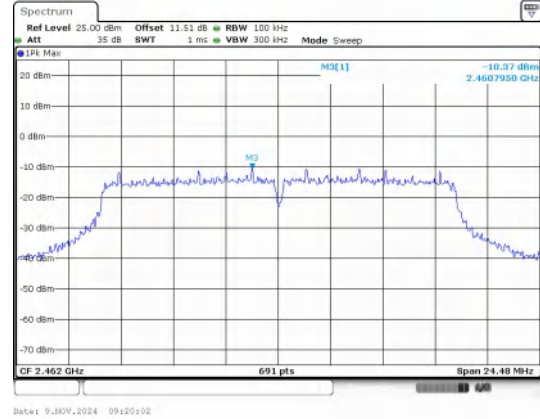
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IEEE 802.11g_Channel 1_20MHz_Antenna 0



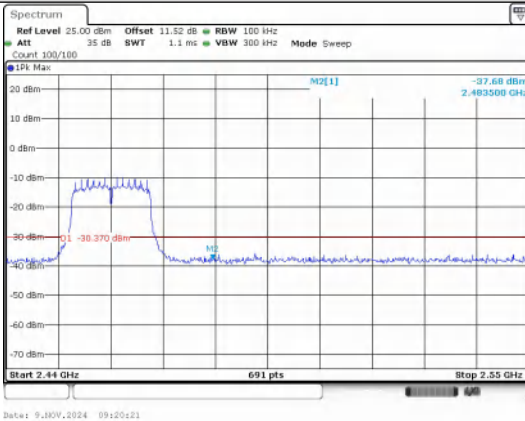
In-Band Reference Level
IEEE 802.11g_Channel 6_20MHz_Antenna 0



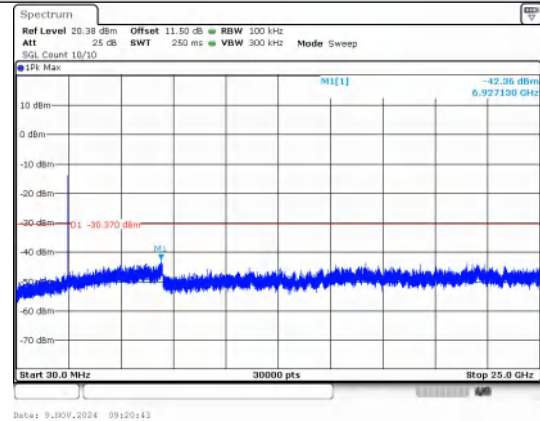
30.0 MHz - 25000.0 MHz
IEEE 802.11g_Channel 6_20MHz_Antenna 0



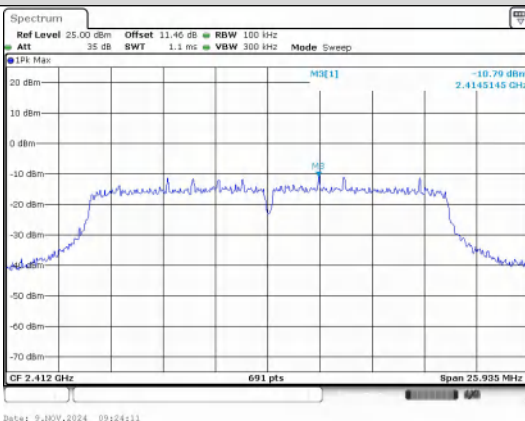
In-Band Reference Level
IEEE 802.11g_Channel 11_20MHz_Antenna 0



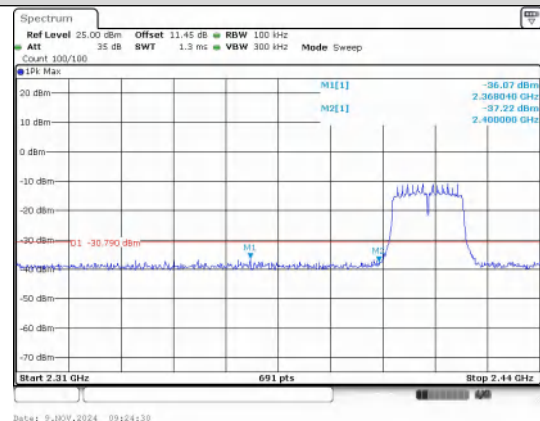
Out Of Band Emission
IEEE 802.11g_Channel 11_20MHz_Antenna 0



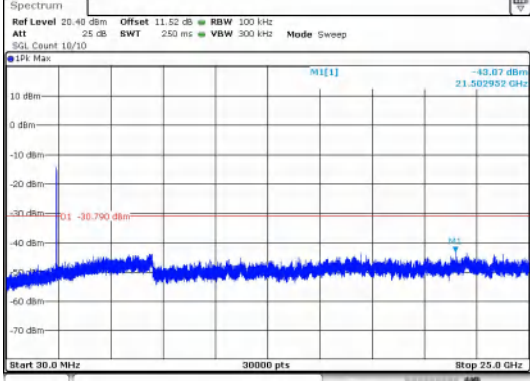
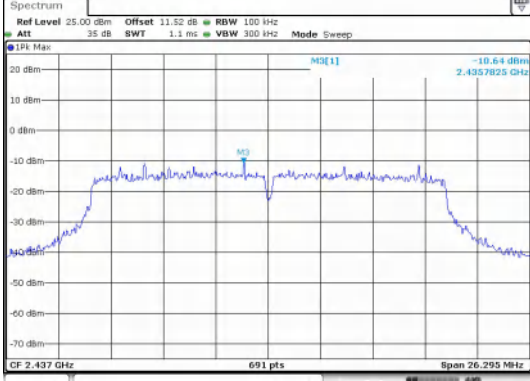
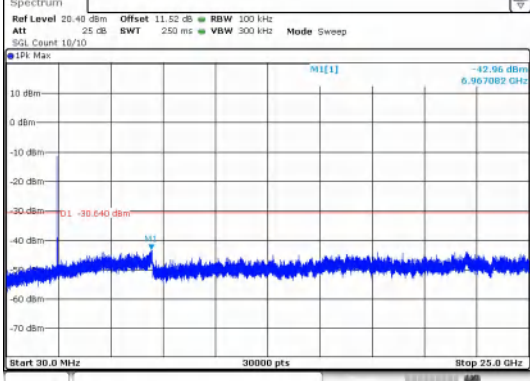
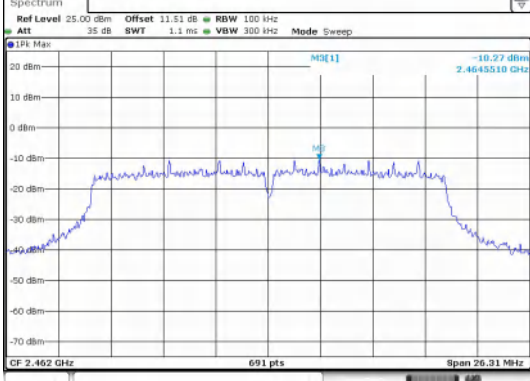
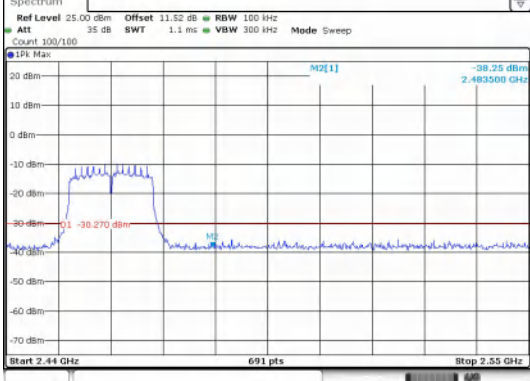
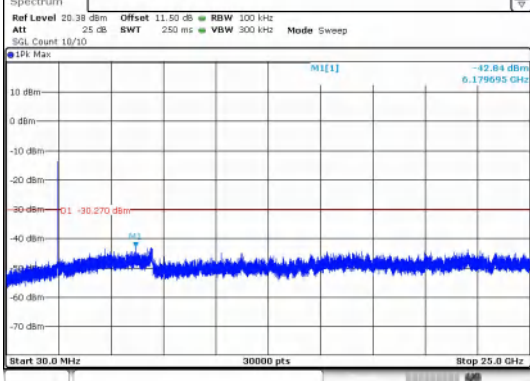
30.0 MHz - 25000.0 MHz
IEEE 802.11g_Channel 11_20MHz_Antenna 0



In-Band Reference Level
IEEE 802.11n_Channel 1_20MHz_Antenna 0



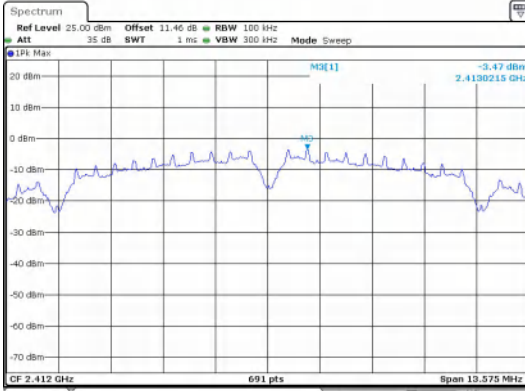
Out Of Band Emission
IEEE 802.11n_Channel 1_20MHz_Antenna 0

	
30.0 MHz - 25000.0 MHz IEEE 802.11n_Channel 1_20MHz_Antenna 0	In-Band Reference Level IEEE 802.11n_Channel 6_20MHz_Antenna 0
	
30.0 MHz - 25000.0 MHz IEEE 802.11n_Channel 6_20MHz_Antenna 0	In-Band Reference Level IEEE 802.11n_Channel 11_20MHz_Antenna 0
	
Out Of Band Emission IEEE 802.11n_Channel 11_20MHz_Antenna 0	30.0 MHz - 25000.0 MHz IEEE 802.11n_Channel 11_20MHz_Antenna 0

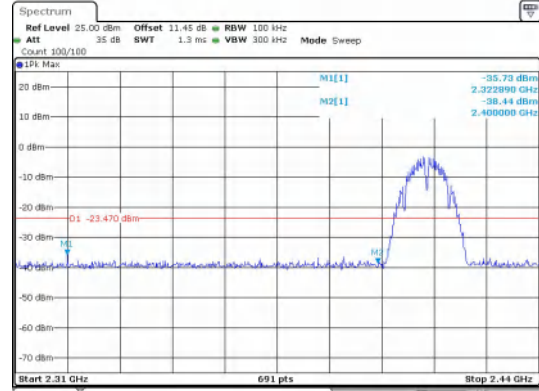
Ant2

Mode	Channel	Ant.	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
IEEE 802.11b	1	0	2322.89	-35.727	-23.47	-12.257	PASS
			2400.00	-38.440	-23.47	-14.970	PASS
			6936.30	-42.472	-23.47	-19.002	PASS
	6		6166.38	-42.961	-22.9	-20.061	PASS
	11		2483.50	-38.970	-22.76	-16.210	PASS
			4845.46	-42.933	-22.76	-20.173	PASS
IEEE 802.11g	1		2359.01	-36.738	-30.77	-5.968	PASS
			2400.00	-39.220	-30.77	-8.450	PASS
			6963.80	-42.223	-30.77	-11.453	PASS
	6		6156.39	-43.039	-30.81	-12.229	PASS
	11		2483.50	-38.370	-30.59	-7.780	PASS
			6906.32	-42.596	-30.59	-12.006	PASS
IEEE 802.11n_20	1		2329.66	-36.704	-31.3	-5.404	PASS
			2400.00	-37.350	-31.3	-6.050	PASS
			6903.00	-42.736	-31.3	-11.436	PASS
	6		5821.79	-42.618	-30.53	-12.088	PASS
	11		2483.50	-38.180	-30.22	-7.960	PASS
			6909.65	-43.010	-30.22	-12.790	PASS

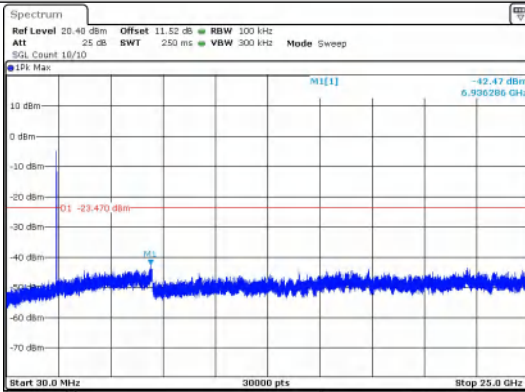
Test Graphs



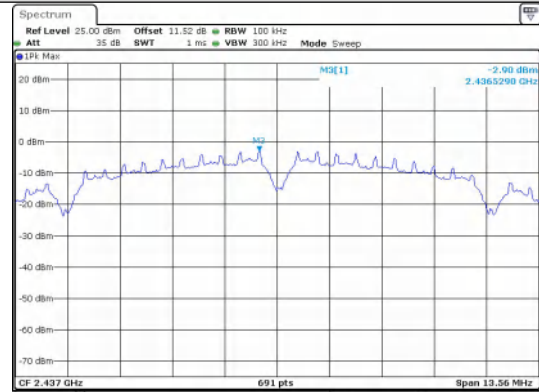
In-Band Reference Level
IEEE 802.11b_Channel 1_20MHz_Antenna 0



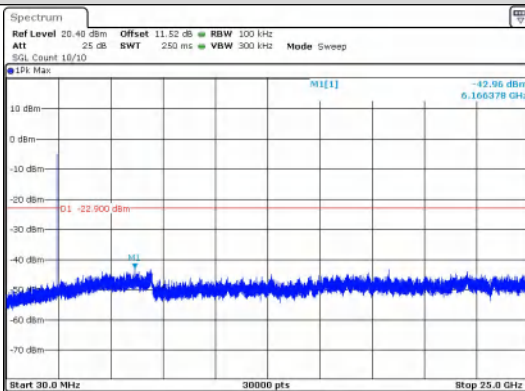
Out Of Band Emission
IEEE 802.11b_Channel 1_20MHz_Antenna 0



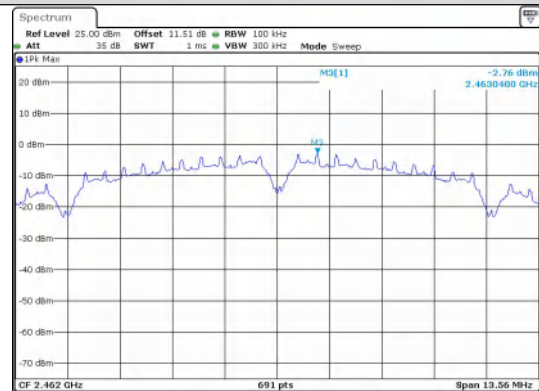
30.0 MHz - 25000.0 MHz
IEEE 802.11b_Channel 1_20MHz_Antenna 0



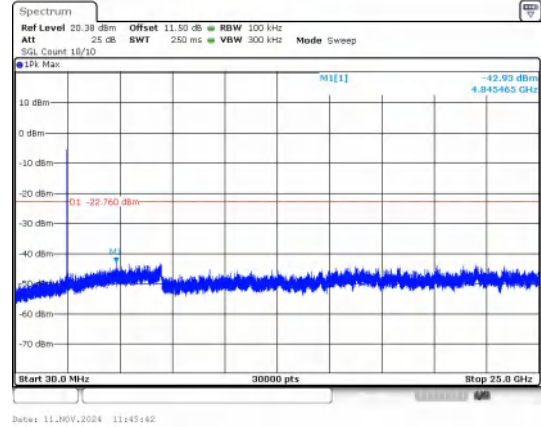
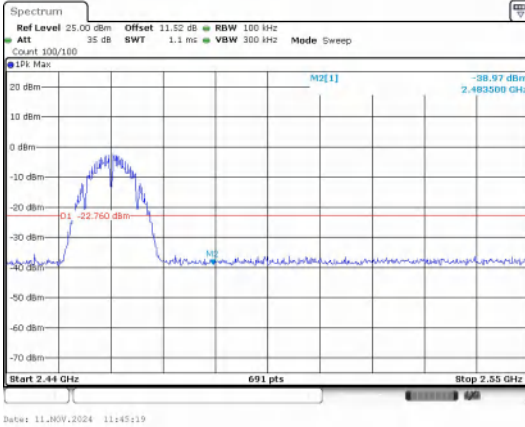
In-Band Reference Level
IEEE 802.11b_Channel 6_20MHz_Antenna 0



30.0 MHz - 25000.0 MHz
IEEE 802.11b_Channel 6_20MHz_Antenna 0

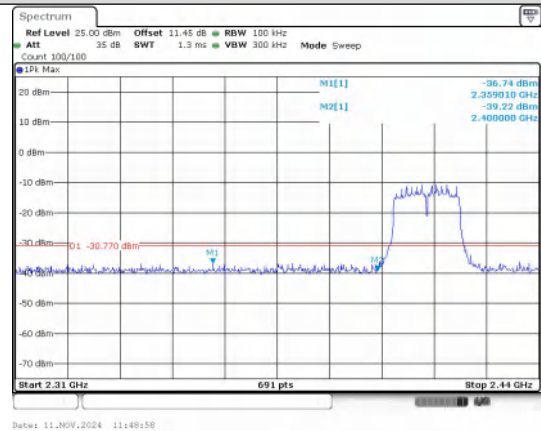
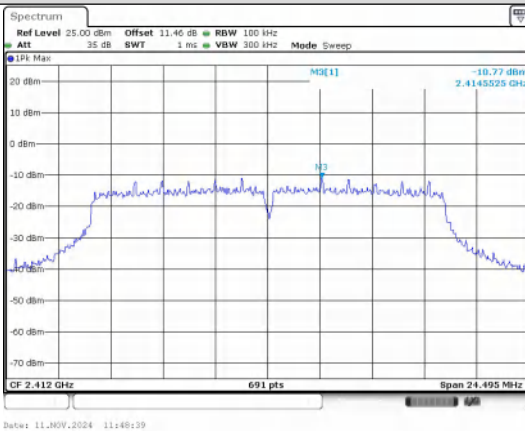


In-Band Reference Level
IEEE 802.11b_Channel 11_20MHz_Antenna 0



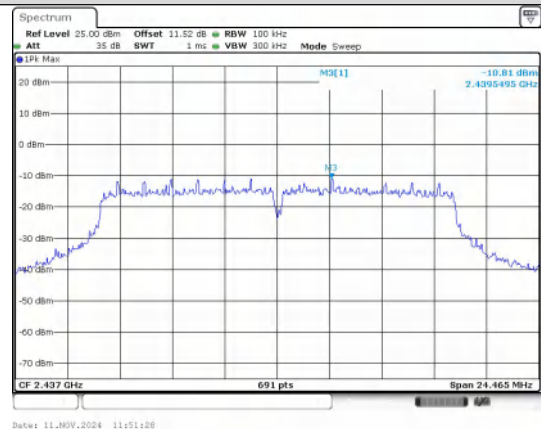
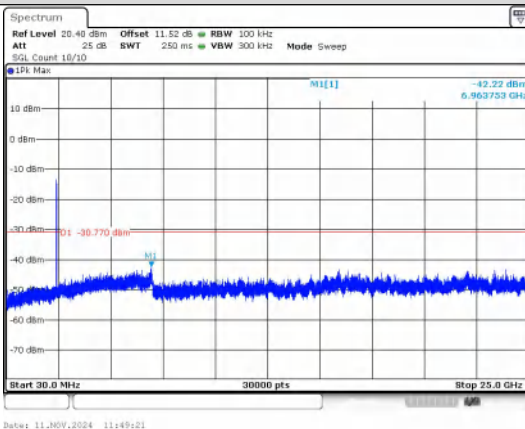
Out Of Band Emission
IEEE 802.11b_Channel 11_20MHz_Antenna 0

30.0 MHz - 25000.0 MHz
IEEE 802.11b_Channel 11_20MHz_Antenna 0



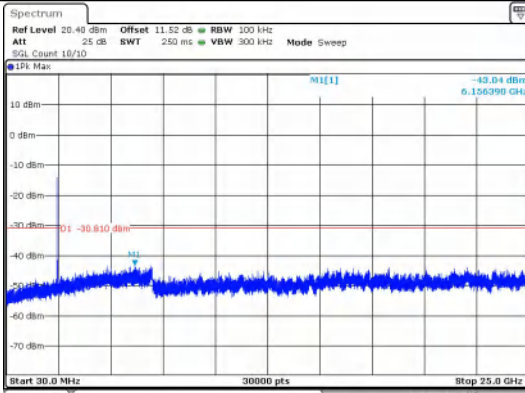
In-Band Reference Level
IEEE 802.11g_Channel 1_20MHz_Antenna 0

Out Of Band Emission
IEEE 802.11g_Channel 1_20MHz_Antenna 0

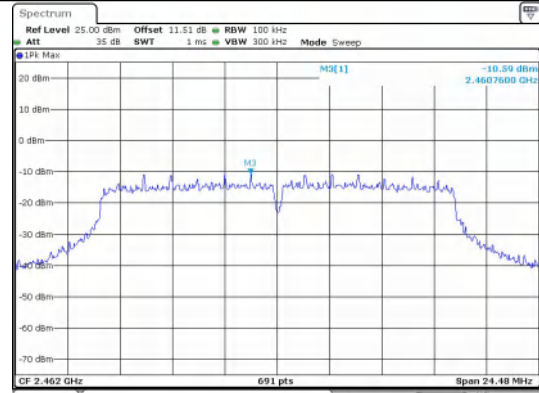


30.0 MHz - 25000.0 MHz
IEEE 802.11g_Channel 1_20MHz_Antenna 0

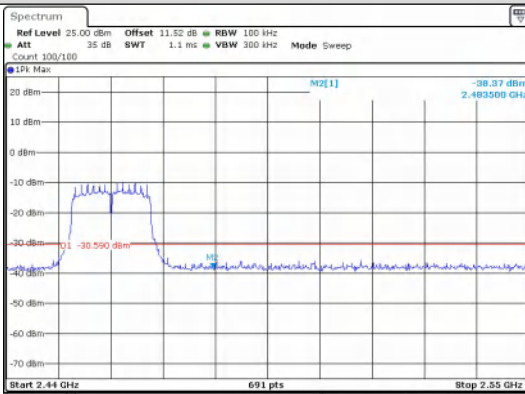
In-Band Reference Level
IEEE 802.11g_Channel 6_20MHz_Antenna 0



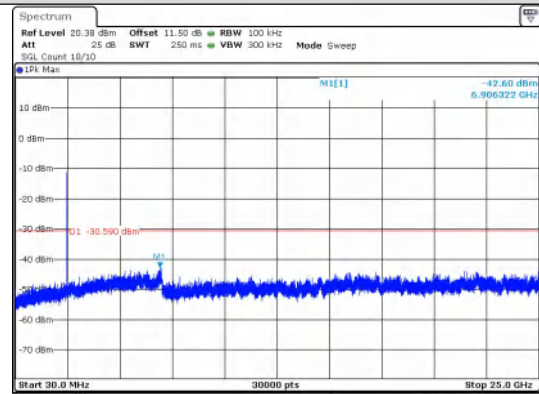
30.0 MHz - 25000.0 MHz
IEEE 802.11g_Channel 6_20MHz_Antenna 0



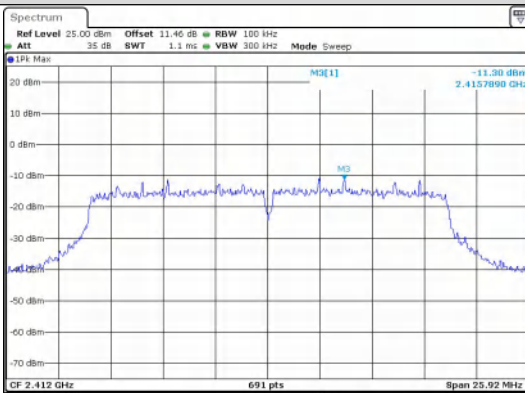
In-Band Reference Level
IEEE 802.11g_Channel 11_20MHz_Antenna 0



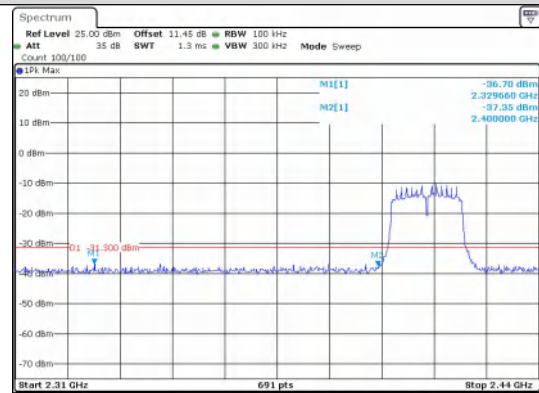
Out Of Band Emission
IEEE 802.11g_Channel 11_20MHz_Antenna 0



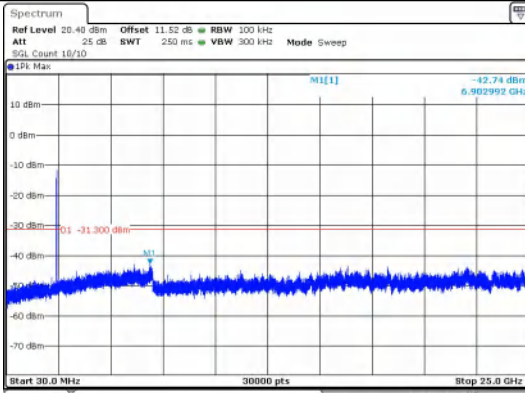
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IEEE 802.11g_Channel 11_20MHz_Antenna 0



In-Band Reference Level
IEEE 802.11n_Channel 1_20MHz_Antenna 0

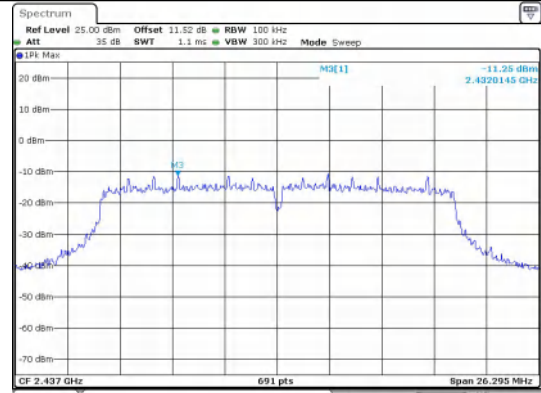


Out Of Band Emission
IEEE 802.11n_Channel 1_20MHz_Antenna 0



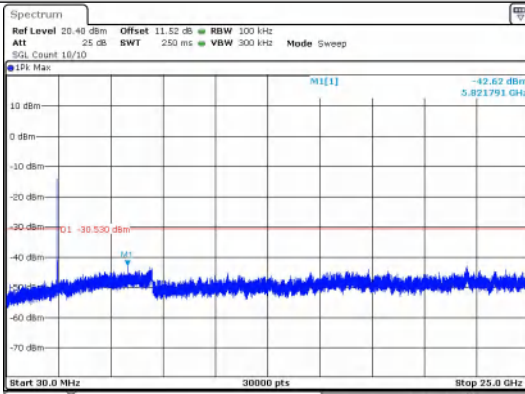
Date: 11.NOV.2024 11:58:25

30.0 MHz - 25000.0 MHz
IEEE 802.11n_Channel 1_20MHz_Antenna 0



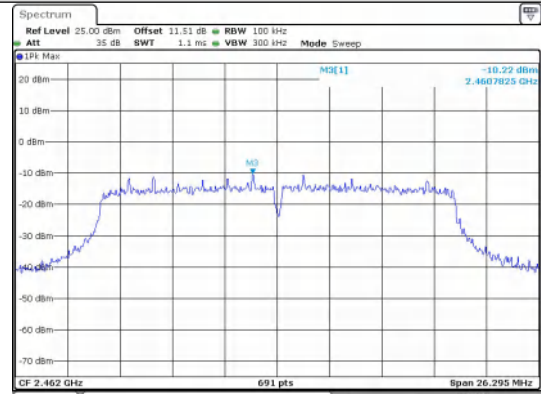
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In-Band Reference Level
IEEE 802.11n_Channel 6_20MHz_Antenna 0



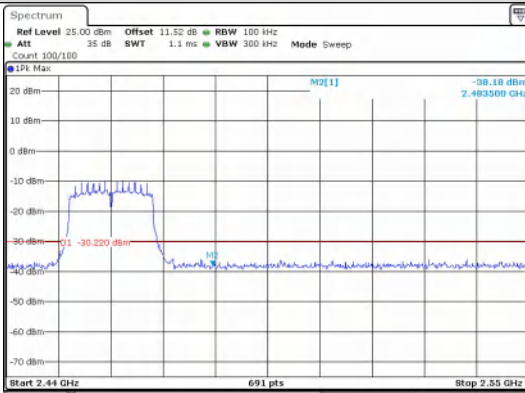
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IEEE 802.11n_Channel 6_20MHz_Antenna 0



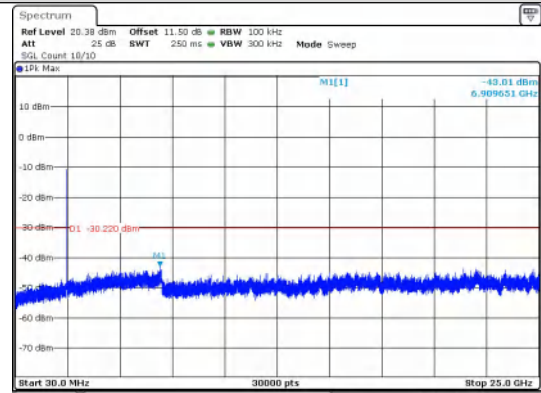
Date: 11.NOV.2024 12:03:19

In-Band Reference Level
IEEE 802.11n_Channel 11_20MHz_Antenna 0



Date: 11.NOV.2024 12:03:38

Out Of Band Emission
IEEE 802.11n_Channel 11_20MHz_Antenna 0



Date: 11.NOV.2024 12:04:01

30.0 MHz - 25000.0 MHz
IEEE 802.11n_Channel 11_20MHz_Antenna 0

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