



Appendix Test Data for WLAN (2.4G) (Conducted Measurement)

Product Name: Wanbo Projector

Trade Mark: wanbo

Test Model: Cube 2S

FCC ID: 2A7PI-CUBE2

Environmental Conditions

Temperature:	23.5℃
Relative Humidity:	58%
ATM Pressure:	100.0 kPa
Test Engineer:	Allen Lai
Supervised by:	Max Zhang
NOTE	N/A

Appendix A: DTS Bandwidth

Test Result

Test Mode	Antenna	Frequency [MHz]	DTS BW [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
11B	Ant1	2412	9.000	2407.520	2416.520	0.5	PASS
11B	Ant2	2412	9.040	2407.520	2416.560	0.5	PASS
11B	Ant1	2437	9.000	2432.520	2441.520	0.5	PASS
11B	Ant2	2437	8.560	2432.520	2441.080	0.5	PASS
11B	Ant1	2462	9.040	2457.520	2466.560	0.5	PASS
11B	Ant2	2462	9.080	2457.480	2466.560	0.5	PASS
11G	Ant1	2412	14.960	2404.560	2419.520	0.5	PASS
11G	Ant2	2412	15.400	2404.520	2419.920	0.5	PASS
11G	Ant1	2437	15.120	2429.480	2444.600	0.5	PASS
11G	Ant2	2437	15.720	2428.880	2444.600	0.5	PASS
11G	Ant1	2462	15.880	2454.280	2470.160	0.5	PASS
11G	Ant2	2462	15.400	2454.520	2469.920	0.5	PASS
11N20MIMO	Ant1	2412	16.200	2404.480	2420.680	0.5	PASS
11N20MIMO	Ant2	2412	16.520	2404.240	2420.760	0.5	PASS
11N20MIMO	Ant1	2437	15.080	2429.480	2444.560	0.5	PASS
11N20MIMO	Ant2	2437	15.680	2428.880	2444.560	0.5	PASS
11N20MIMO	Ant1	2462	15.080	2454.480	2469.560	0.5	PASS
11N20MIMO	Ant2	2462	16.000	2454.440	2470.440	0.5	PASS
11N40MIMO	Ant1	2422	35.120	2404.480	2439.600	0.5	PASS
11N40MIMO	Ant2	2422	35.120	2404.480	2439.600	0.5	PASS
11N40MIMO	Ant1	2437	35.040	2419.480	2454.520	0.5	PASS
11N40MIMO	Ant2	2437	35.040	2419.480	2454.520	0.5	PASS
11N40MIMO	Ant1	2452	35.120	2434.480	2469.600	0.5	PASS





11N40MIMO	Ant2	2452	35.440	2434.080	2469.520	0.5	PASS
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Note: offset(dB) = cable loss(dB) + attenuator factor(dB)





Test Graphs





11B-Ant1-2437-PASS



11B-Ant2-2437-PASS





11B-Ant1-2462-PASS

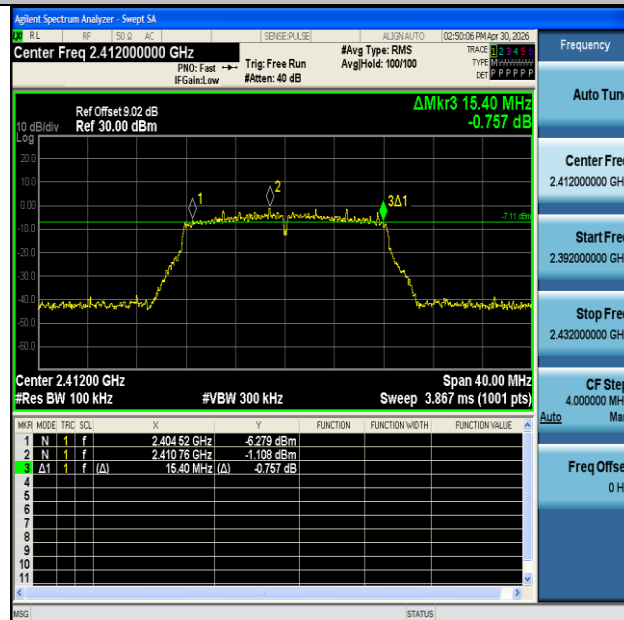


11B-Ant2-2462-PASS





11G-Ant1-2412-PASS



11G-Ant2-2412-PASS





11G-Ant1-2437-PASS

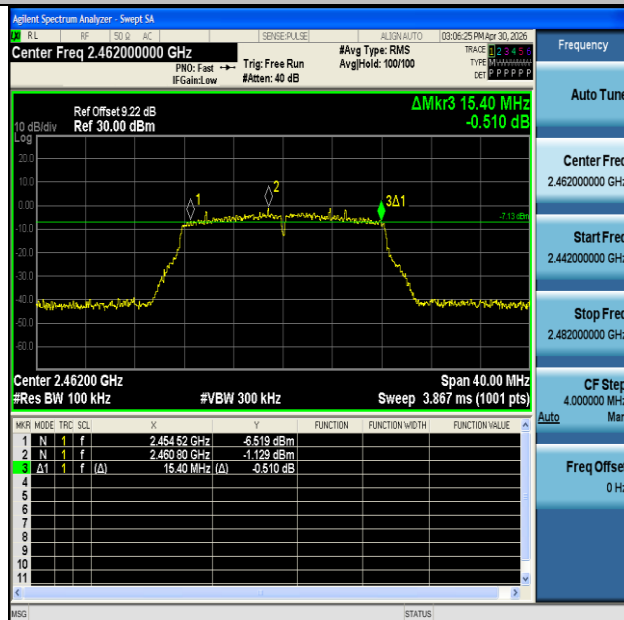


11G-Ant2-2437-PASS



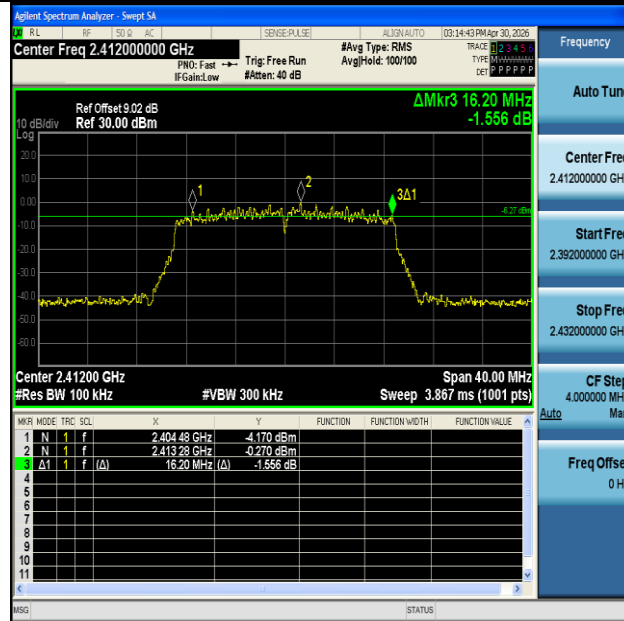


11G-Ant1-2462-PASS

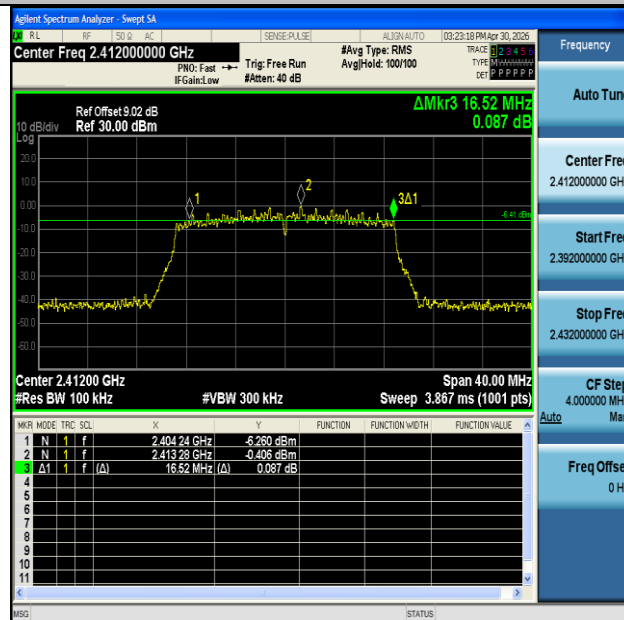


11G-Ant2-2462-PASS



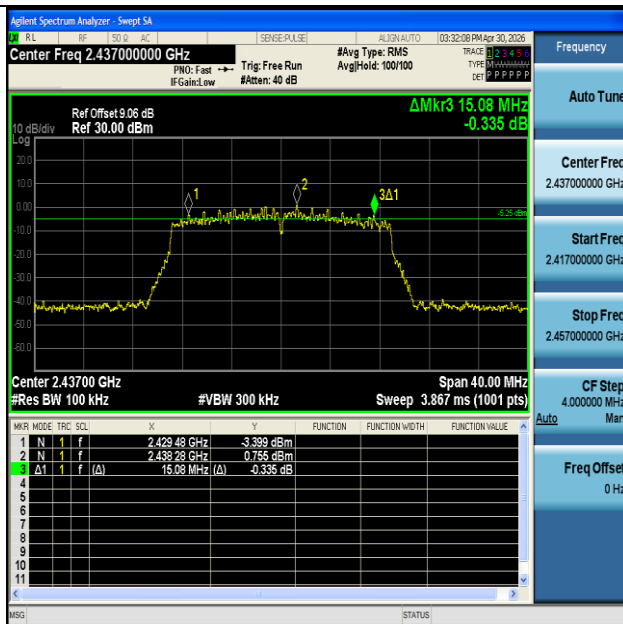


11N20MIMO-Ant1-2412-PASS

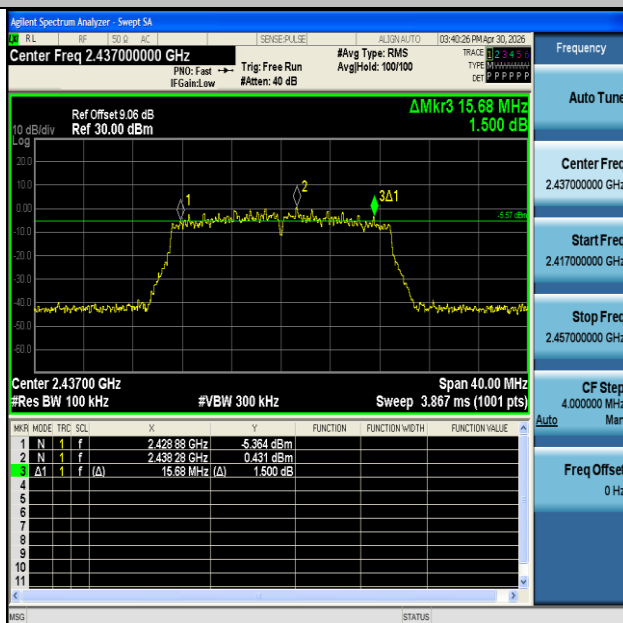


11N20MIMO-Ant2-2412-PASS



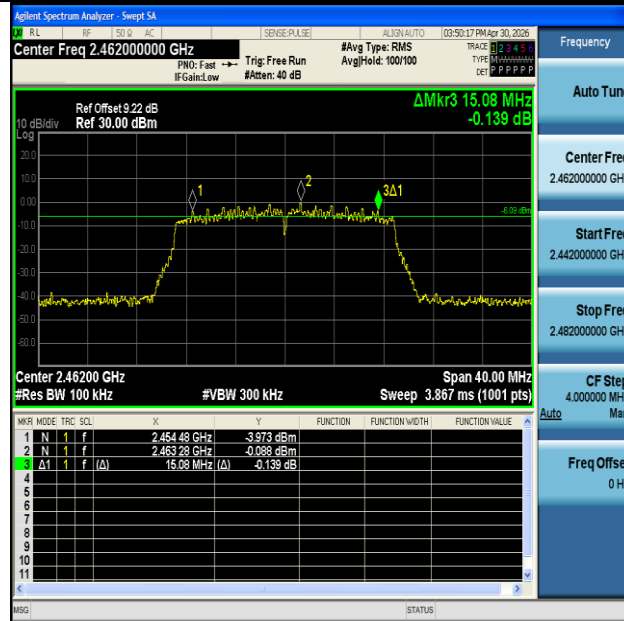


11N20MIMO-Ant1-2437-PASS

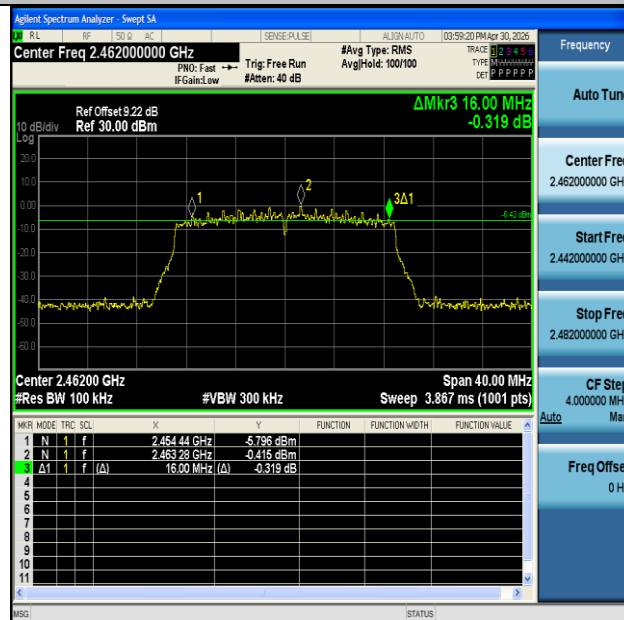


11N20MIMO-Ant2-2437-PASS



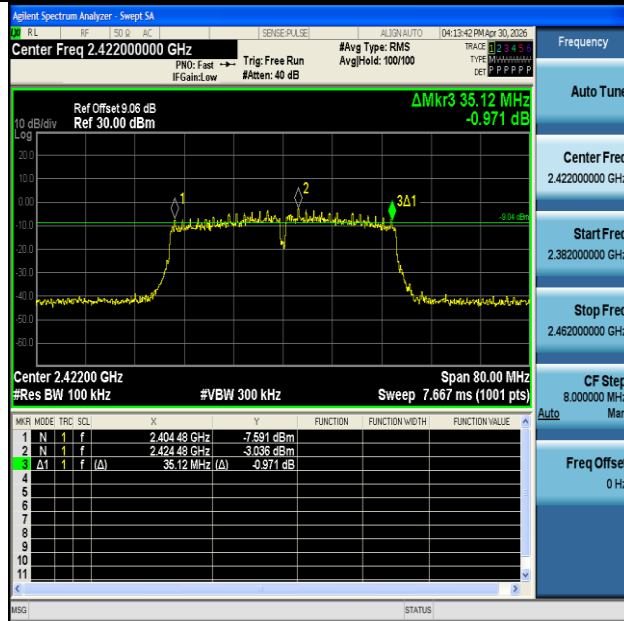


11N20MIMO-Ant1-2462-PASS

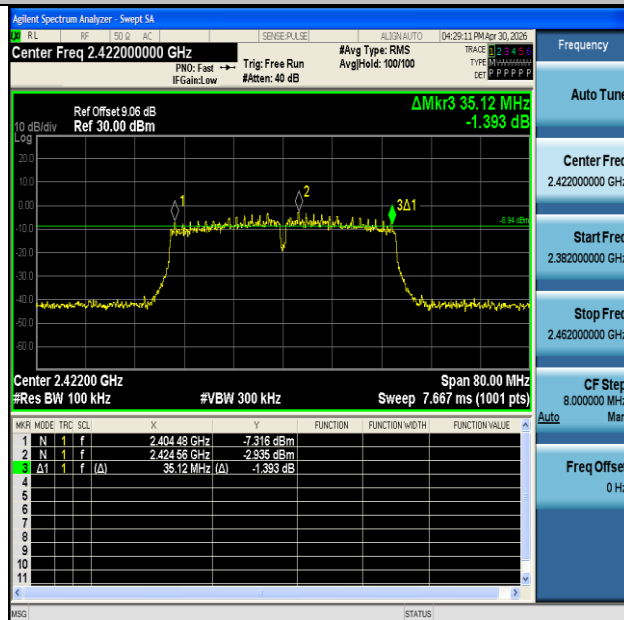


11N20MIMO-Ant2-2462-PASS



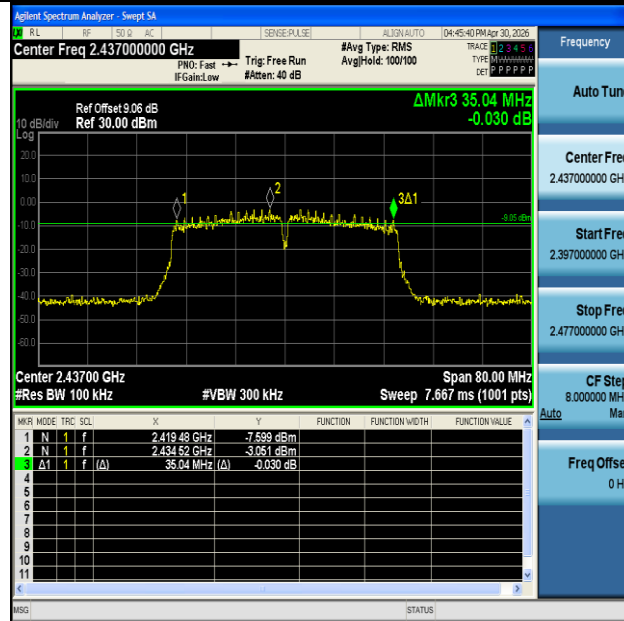


11N40MIMO-Ant1-2422-PASS

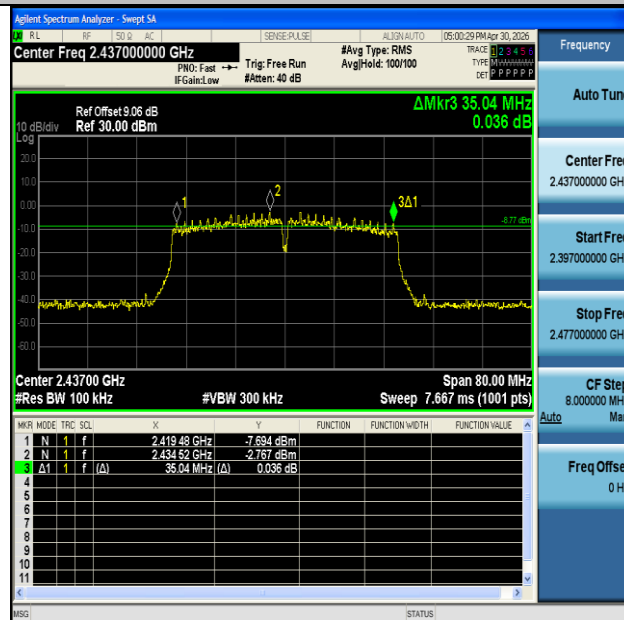


11N40MIMO-Ant2-2422-PASS



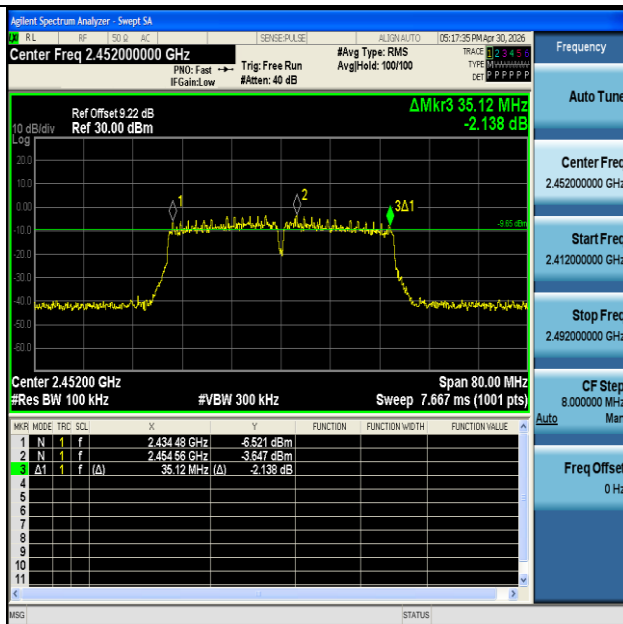


11N40MIMO-Ant1-2437-PASS

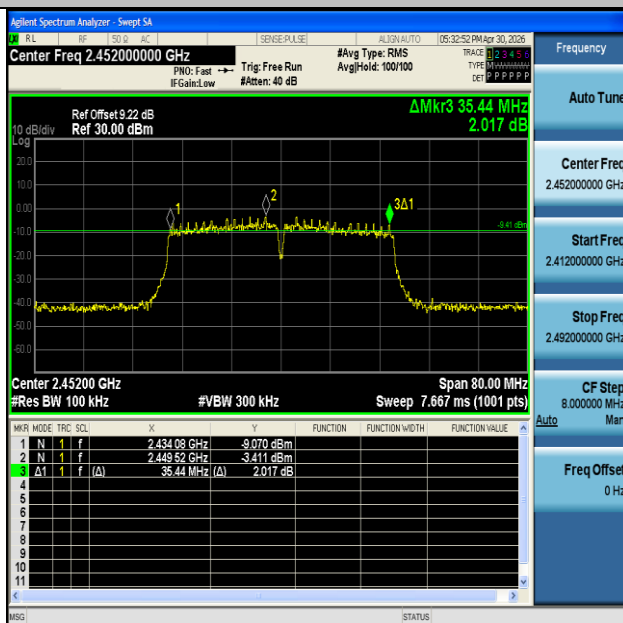


11N40MIMO-Ant2-2437-PASS





11N40MIMO-Ant1-2452-PASS



11N40MIMO-Ant2-2452-PASS





Appendix B: Occupied Channel Bandwidth

Test Result

Test Mode	Antenna	Channel Frequency [MHz]	OCB [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
11B	Ant1	2412	13.411	2405.3609	2418.7719	---	---
11B	Ant2	2412	13.419	2405.3556	2418.7746	---	---
11B	Ant1	2437	13.259	2430.3827	2443.6417	---	---
11B	Ant2	2437	13.283	2430.3575	2443.6405	---	---
11B	Ant1	2462	13.428	2455.3676	2468.7956	---	---
11B	Ant2	2462	13.417	2455.3541	2468.7711	---	---
11G	Ant1	2412	16.849	2403.6205	2420.4695	---	---
11G	Ant2	2412	16.586	2403.7804	2420.3664	---	---
11G	Ant1	2437	16.741	2428.6574	2445.3984	---	---
11G	Ant2	2437	16.568	2428.7465	2445.3145	---	---
11G	Ant1	2462	16.802	2453.6272	2470.4292	---	---
11G	Ant2	2462	16.563	2453.7927	2470.3557	---	---
11N20MIMO	Ant1	2412	17.769	2403.1961	2420.9651	---	---
11N20MIMO	Ant2	2412	17.671	2403.2477	2420.9187	---	---
11N20MIMO	Ant1	2437	17.639	2428.1875	2445.8265	---	---
11N20MIMO	Ant2	2437	17.672	2428.1861	2445.8581	---	---
11N20MIMO	Ant1	2462	17.761	2453.2108	2470.9718	---	---
11N20MIMO	Ant2	2462	17.718	2453.2043	2470.9223	---	---
11N40MIMO	Ant1	2422	36.103	2404.0695	2440.1725	---	---
11N40MIMO	Ant2	2422	36.233	2403.9900	2440.2230	---	---
11N40MIMO	Ant1	2437	36.098	2419.0075	2455.1055	---	---
11N40MIMO	Ant2	2437	36.022	2419.0356	2455.0576	---	---
11N40MIMO	Ant1	2452	36.260	2433.9137	2470.1737	---	---
11N40MIMO	Ant2	2452	36.261	2433.8781	2470.1391	---	---

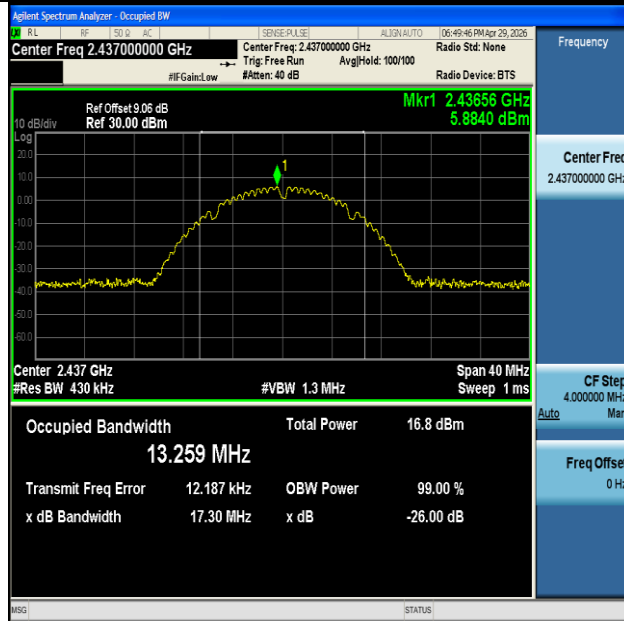
Note: offset(dB) = cable loss(dB) + attenuator factor(dB)



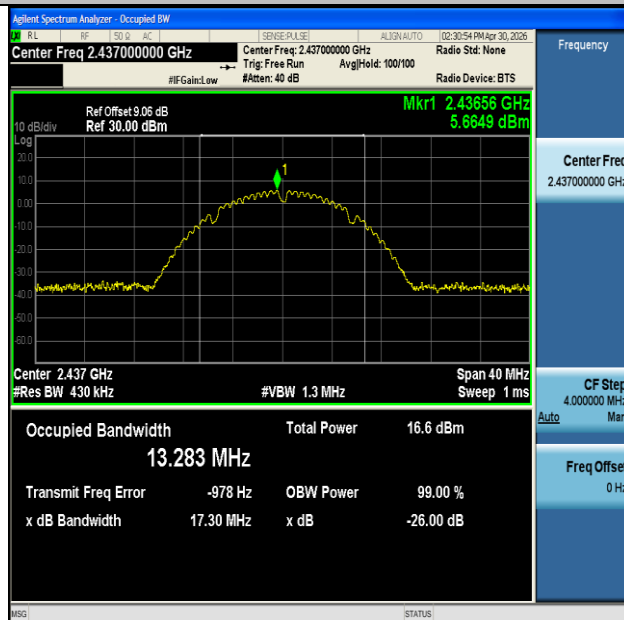


Test Graphs



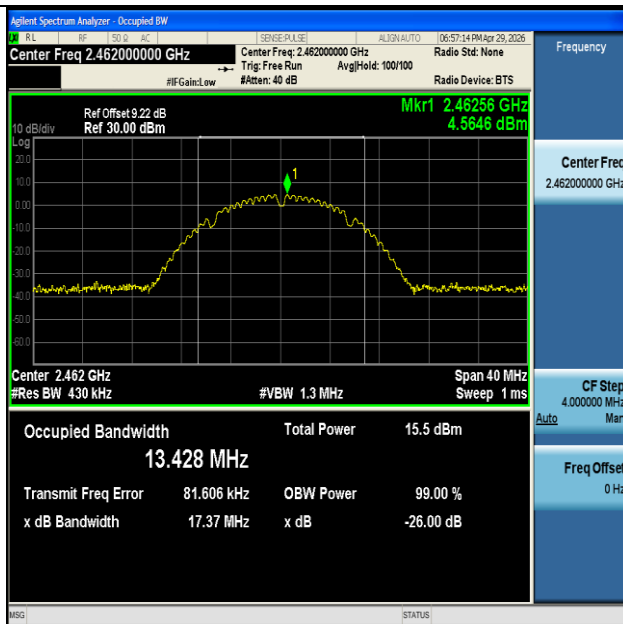


11B-Ant1-2437

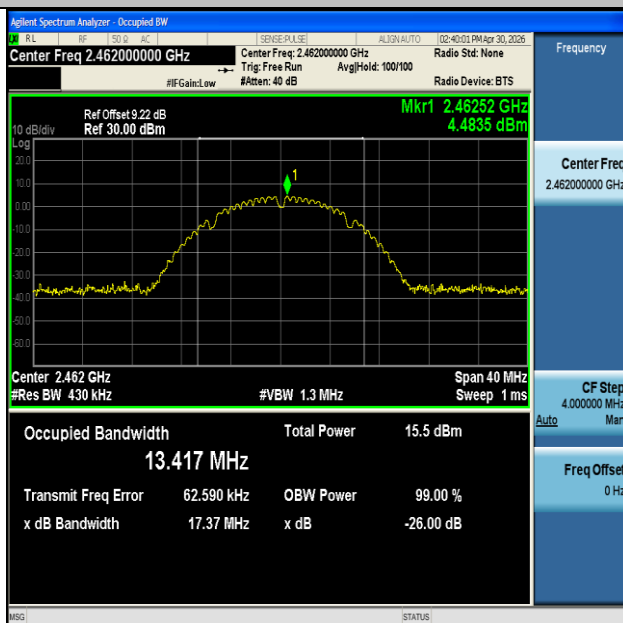


11B-Ant2-2437



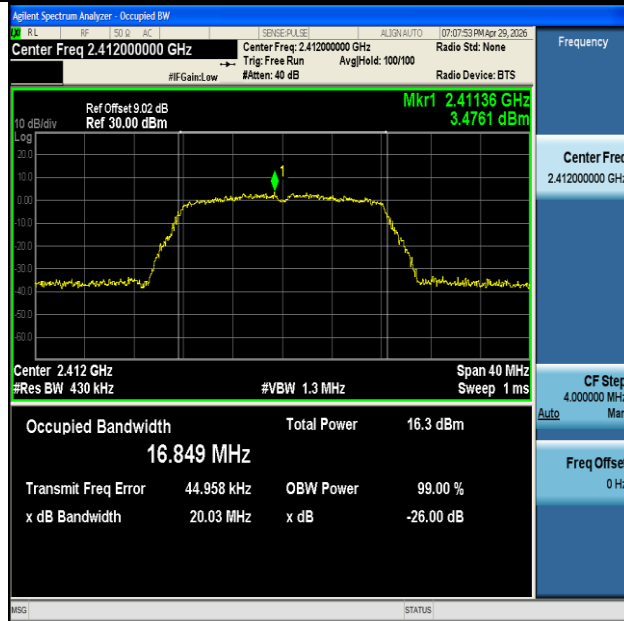


11B-Ant1-2462



11B-Ant2-2462



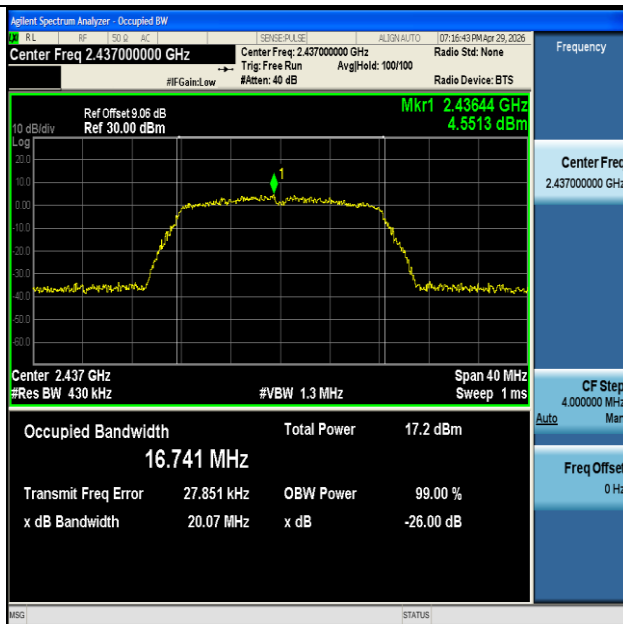


11G-Ant1-2412

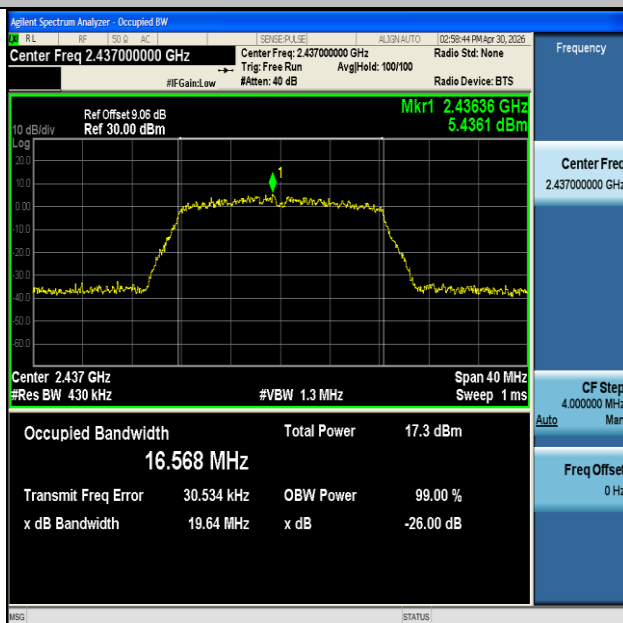


11G-Ant2-2412



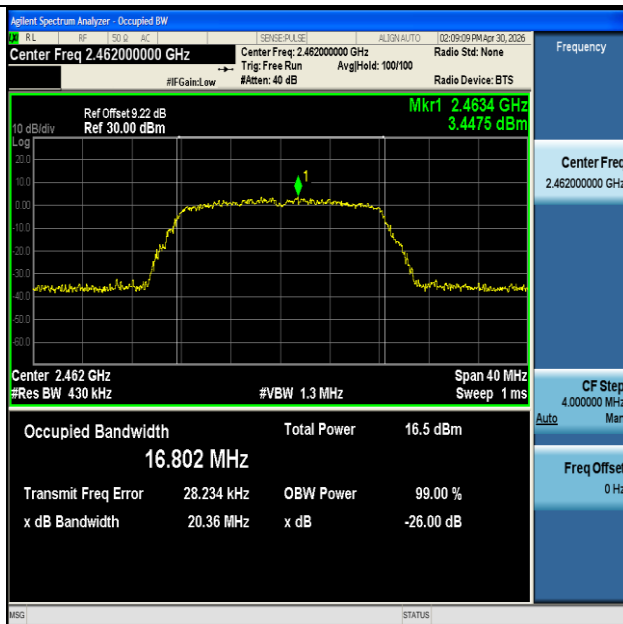


11G-Ant1-2437

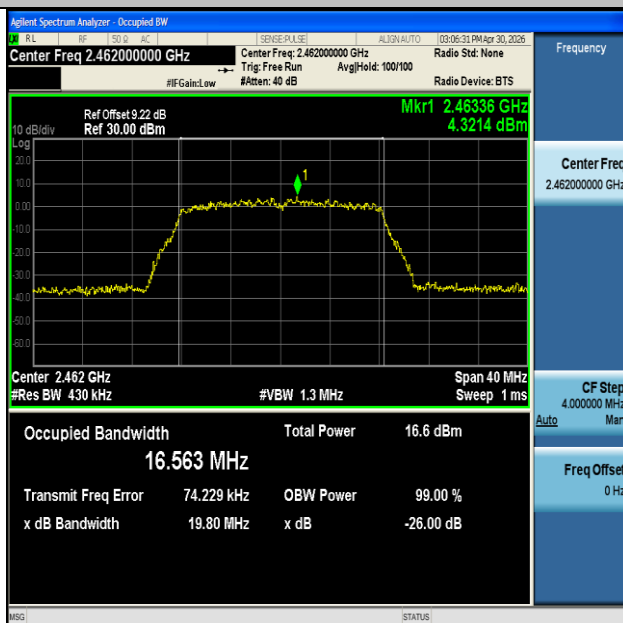


11G-Ant2-2437



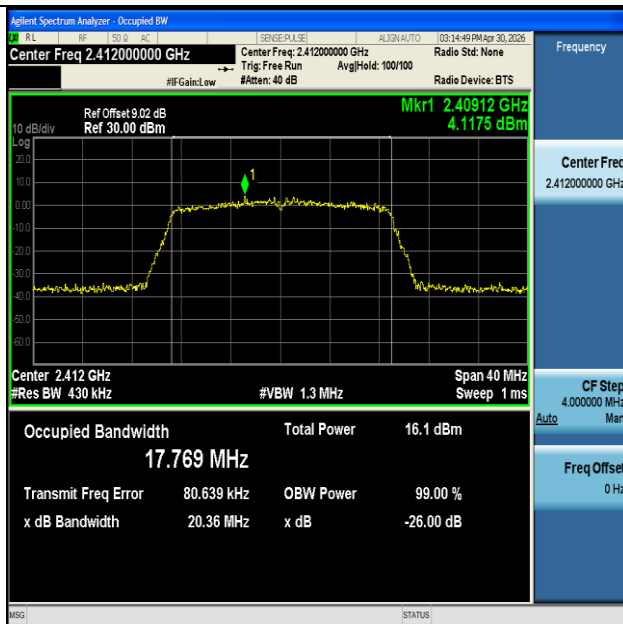


11G-Ant1-2462

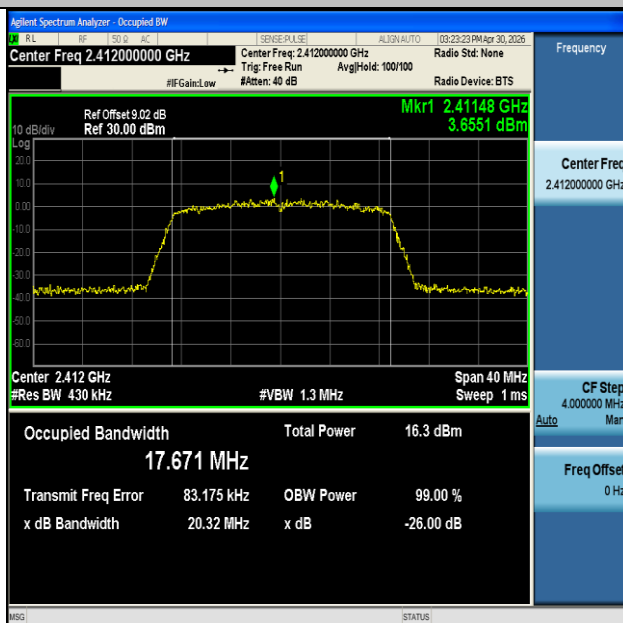


11G-Ant2-2462



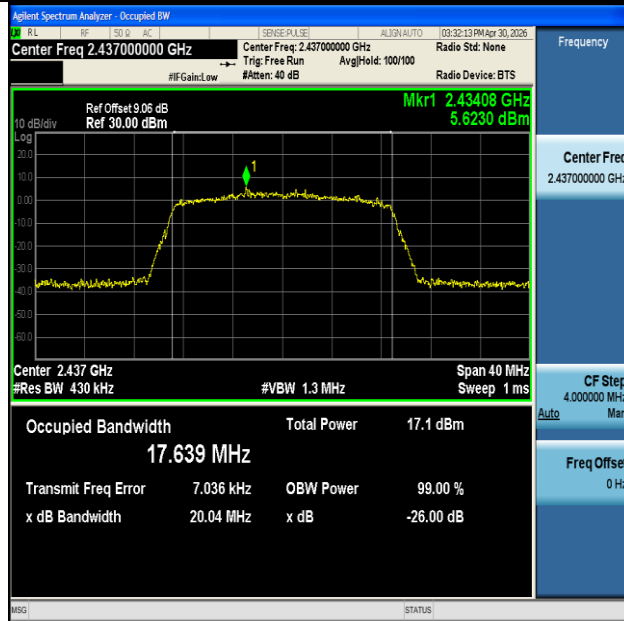


11N20MIMO-Ant1-2412

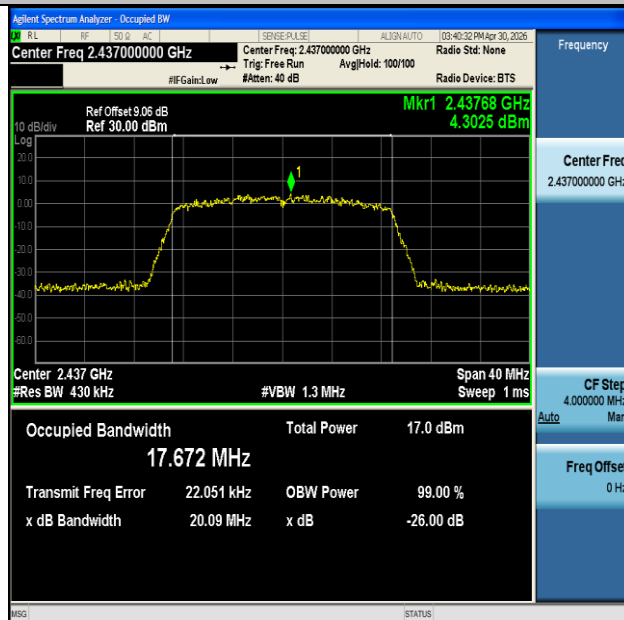


11N20MIMO-Ant2-2412



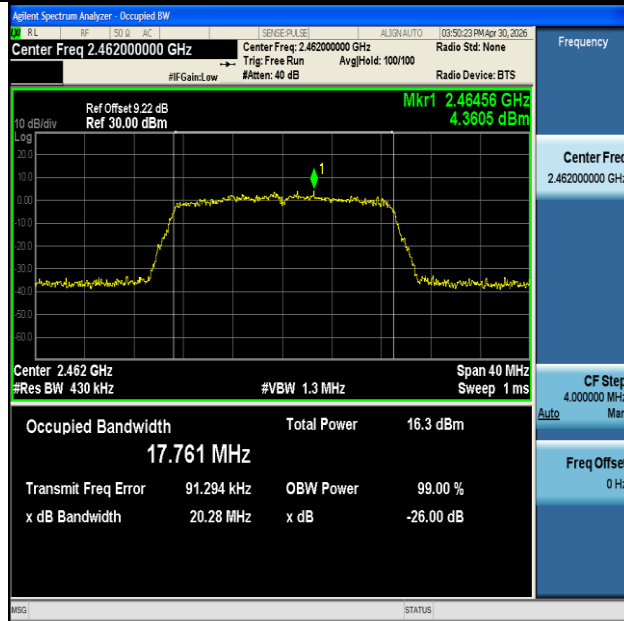


11N20MIMO-Ant1-2437

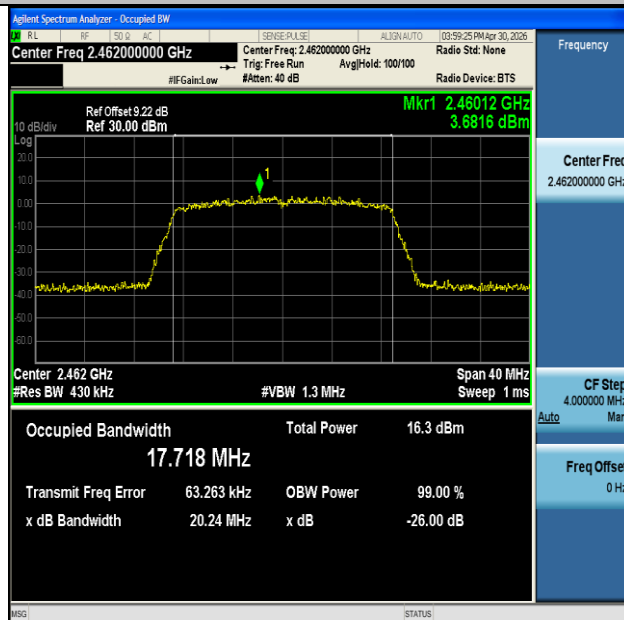


11N20MIMO-Ant2-2437



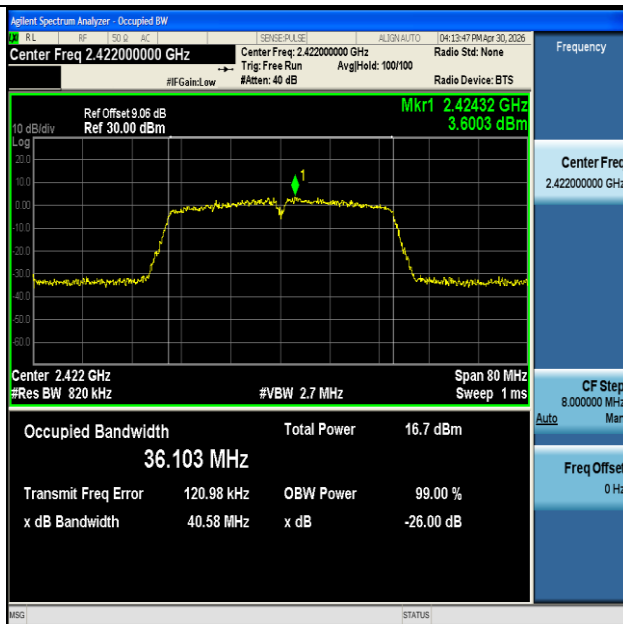


11N20MIMO-Ant1-2462

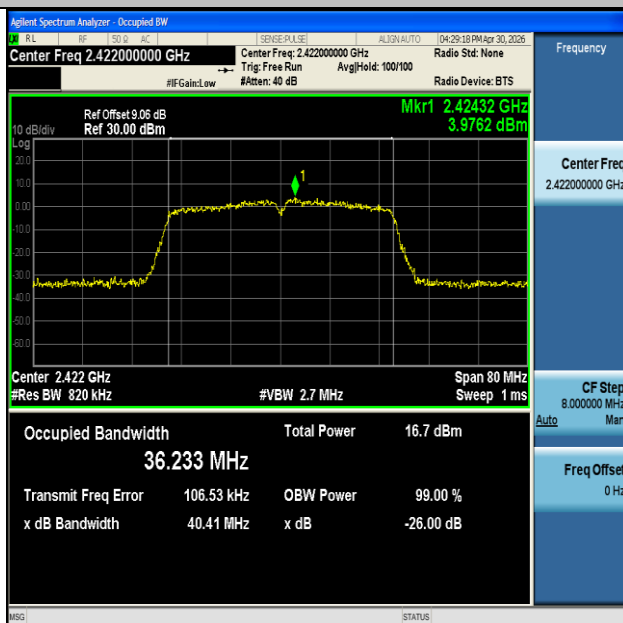


11N20MIMO-Ant2-2462



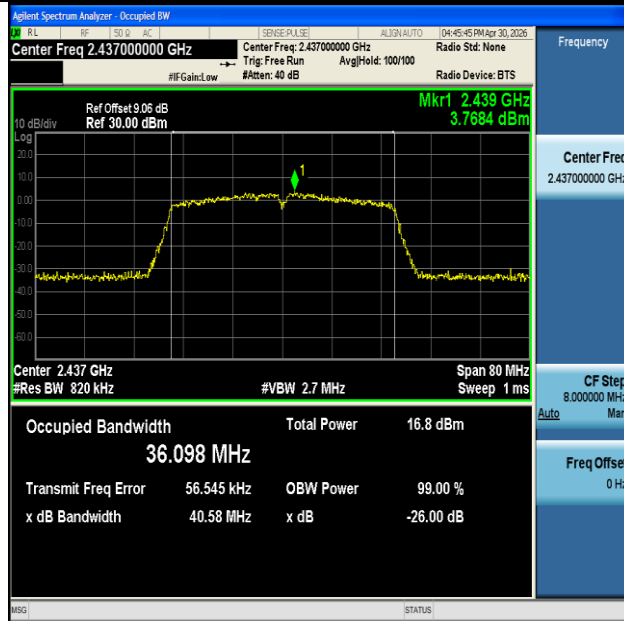


11N40MIMO-Ant1-2422

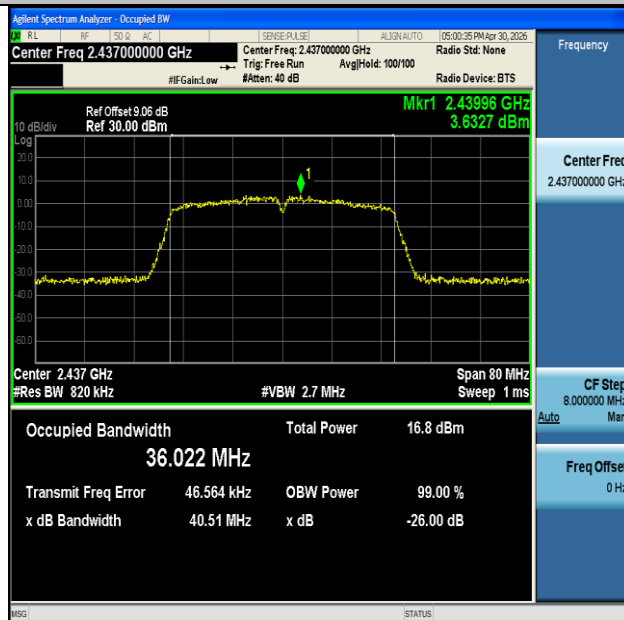


11N40MIMO-Ant2-2422



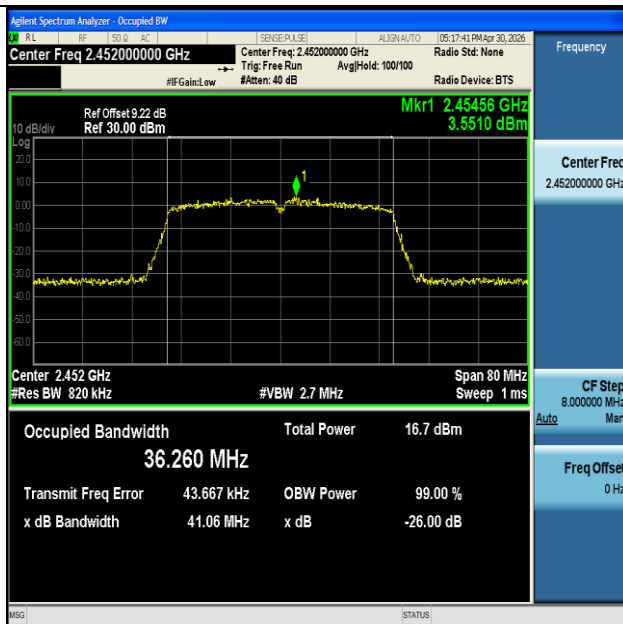


11N40MIMO-Ant1-2437

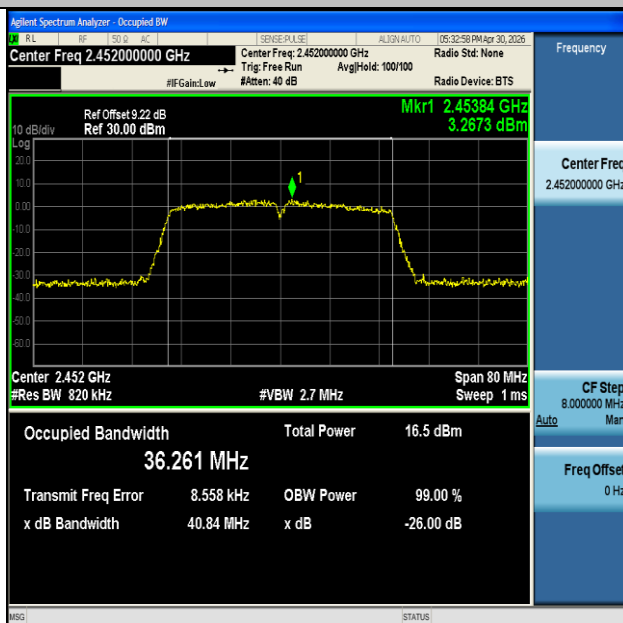


11N40MIMO-Ant2-2437





11N40MIMO-Ant1-2452



11N40MIMO-Ant2-2452





Appendix C: Maximum Average conducted output power

Test Result

Test Mode	Antenna	Frequency [MHz]	Conducted Power [dBm]	Conducted Limit [dBm]	Verdict
11B	Ant1	2412	12.55	≤30.00	PASS
11B	Ant2	2412	12.53	≤30.00	PASS
11B	Ant1	2437	13.86	≤30.00	PASS
11B	Ant2	2437	13.62	≤30.00	PASS
11B	Ant1	2462	12.60	≤30.00	PASS
11B	Ant2	2462	12.55	≤30.00	PASS
11G	Ant1	2412	10.44	≤30.00	PASS
11G	Ant2	2412	10.24	≤30.00	PASS
11G	Ant1	2437	11.14	≤30.00	PASS
11G	Ant2	2437	11.09	≤30.00	PASS
11G	Ant1	2462	10.45	≤30.00	PASS
11G	Ant2	2462	10.35	≤30.00	PASS
11N20MIMO	Ant1	2412	9.62	≤30.00	PASS
11N20MIMO	Ant2	2412	9.61	≤30.00	PASS
11N20MIMO	total	2412	12.63	≤30.00	PASS
11N20MIMO	Ant1	2437	10.79	≤30.00	PASS
11N20MIMO	Ant2	2437	10.56	≤30.00	PASS
11N20MIMO	total	2437	13.69	≤30.00	PASS
11N20MIMO	Ant1	2462	9.81	≤30.00	PASS
11N20MIMO	Ant2	2462	9.71	≤30.00	PASS
11N20MIMO	total	2462	12.77	≤30.00	PASS
11N40MIMO	Ant1	2422	9.88	≤30.00	PASS
11N40MIMO	Ant2	2422	9.64	≤30.00	PASS
11N40MIMO	total	2422	12.77	≤30.00	PASS
11N40MIMO	Ant1	2437	9.76	≤30.00	PASS
11N40MIMO	Ant2	2437	9.73	≤30.00	PASS
11N40MIMO	total	2437	12.76	≤30.00	PASS
11N40MIMO	Ant1	2452	9.60	≤30.00	PASS
11N40MIMO	Ant2	2452	9.39	≤30.00	PASS
11N40MIMO	total	2452	12.51	≤30.00	PASS

Note: offset(dB) = cable loss(dB) + attenuator factor(dB) + Duty Cycle Factor(dB)





Appendix D: Maximum Average power spectral density

Test Result

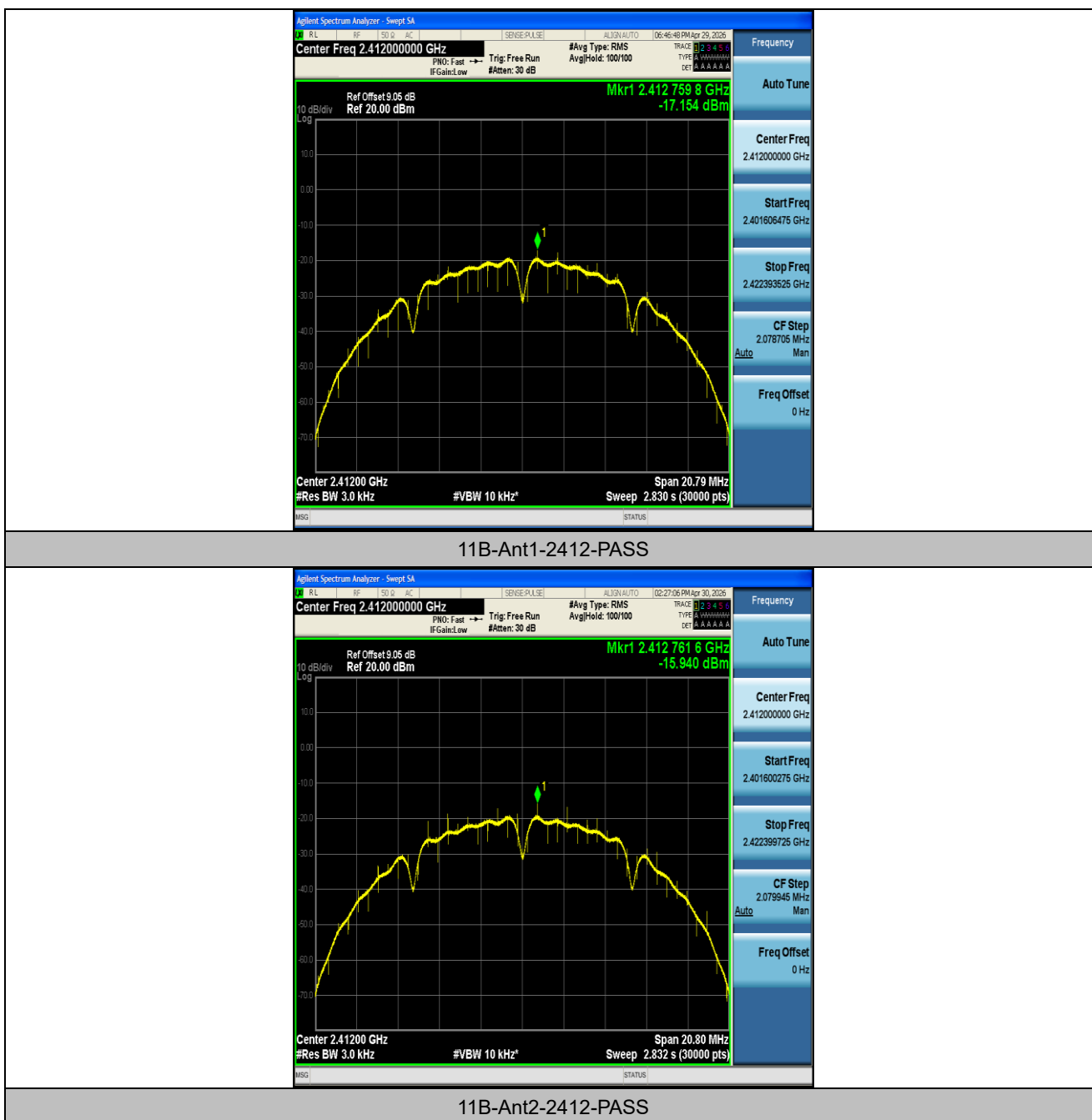
Test Mode	Antenna	Frequency [MHz]	Result [dBm/3-100kHz]	Limit [dBm/3kHz]	Verdict
11B	Ant1	2412	-17.15	≤8.00	PASS
11B	Ant2	2412	-15.94	≤8.00	PASS
11B	Ant1	2437	-15.57	≤8.00	PASS
11B	Ant2	2437	-14.76	≤8.00	PASS
11B	Ant1	2462	-16.60	≤8.00	PASS
11B	Ant2	2462	-14.41	≤8.00	PASS
11G	Ant1	2412	-21.50	≤8.00	PASS
11G	Ant2	2412	-22.32	≤8.00	PASS
11G	Ant1	2437	-21.40	≤8.00	PASS
11G	Ant2	2437	-20.28	≤8.00	PASS
11G	Ant1	2462	-21.40	≤8.00	PASS
11G	Ant2	2462	-21.36	≤8.00	PASS
11N20MIMO	Ant1	2412	-19.75	≤8.00	PASS
11N20MIMO	Ant2	2412	-18.83	≤8.00	PASS
11N20MIMO	total	2412	-16.26	≤6.69	PASS
11N20MIMO	Ant1	2437	-18.36	≤8.00	PASS
11N20MIMO	Ant2	2437	-17.79	≤8.00	PASS
11N20MIMO	total	2437	-15.06	≤6.69	PASS
11N20MIMO	Ant1	2462	-19.31	≤8.00	PASS
11N20MIMO	Ant2	2462	-18.85	≤8.00	PASS
11N20MIMO	total	2462	-16.06	≤6.69	PASS
11N40MIMO	Ant1	2422	-21.06	≤8.00	PASS
11N40MIMO	Ant2	2422	-19.17	≤8.00	PASS
11N40MIMO	total	2422	-17.00	≤6.69	PASS
11N40MIMO	Ant1	2437	-19.64	≤8.00	PASS
11N40MIMO	Ant2	2437	-18.67	≤8.00	PASS
11N40MIMO	total	2437	-16.12	≤6.69	PASS
11N40MIMO	Ant1	2452	-20.17	≤8.00	PASS
11N40MIMO	Ant2	2452	-19.10	≤8.00	PASS
11N40MIMO	total	2452	-16.59	≤6.69	PASS

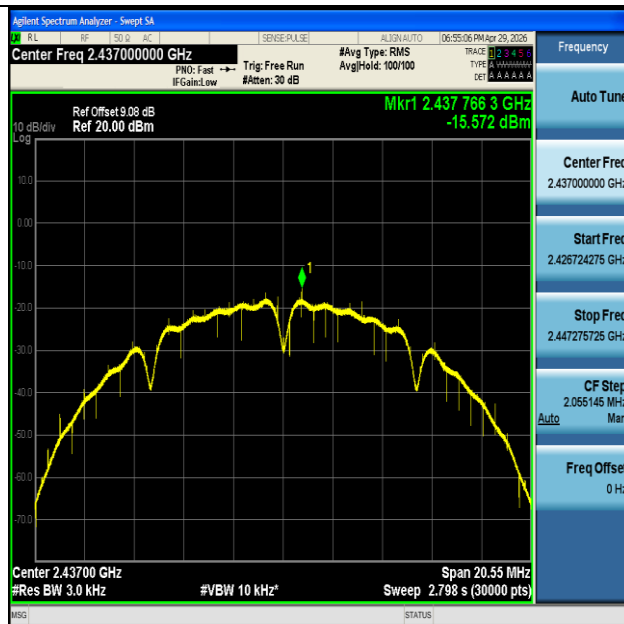
Note: offset(dB) = cable loss(dB) + attenuator factor(dB) + Duty Cycle Factor(dB)



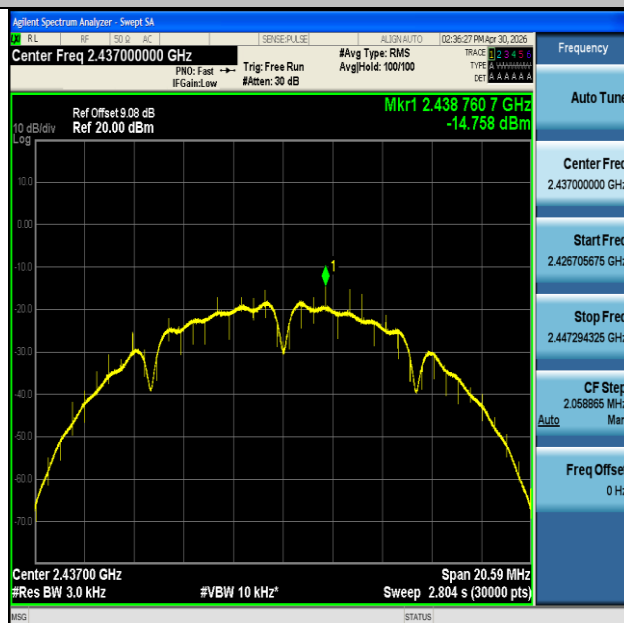


Test Graphs



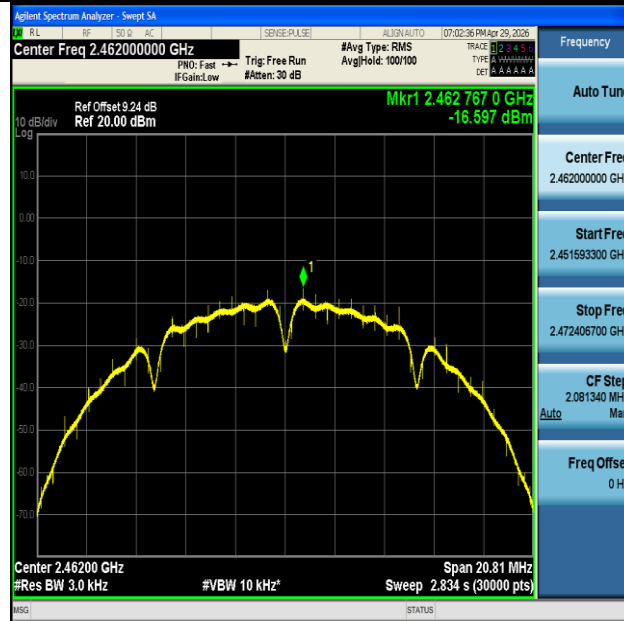


11B-Ant1-2437-PASS

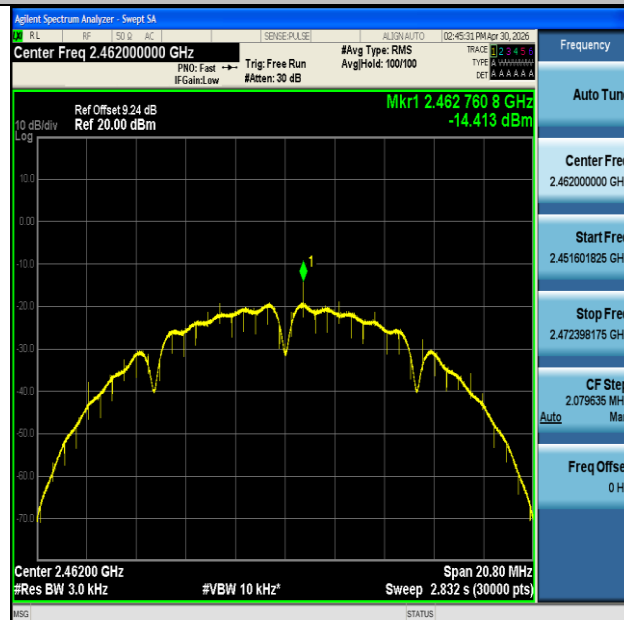


11B-Ant2-2437-PASS



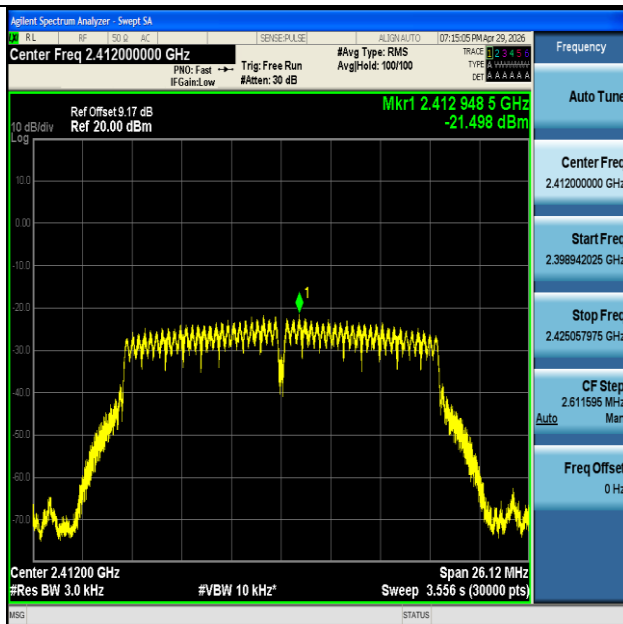


11B-Ant1-2462-PASS

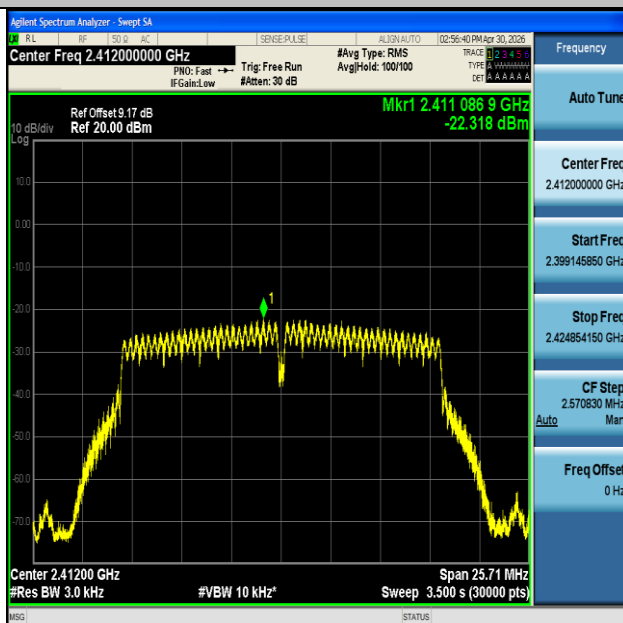


11B-Ant2-2462-PASS



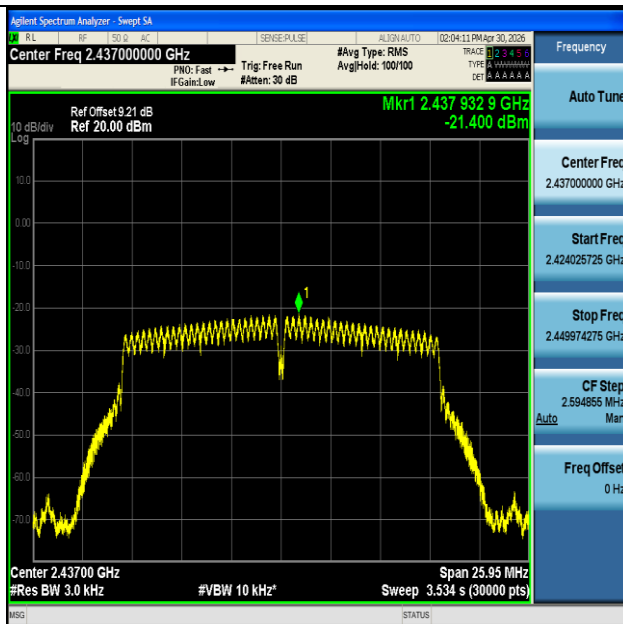


11G-Ant1-2412-PASS

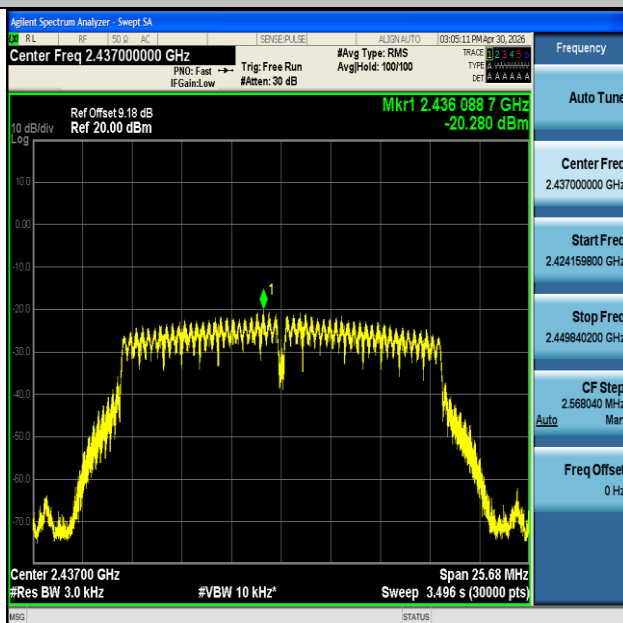


11G-Ant2-2412-PASS



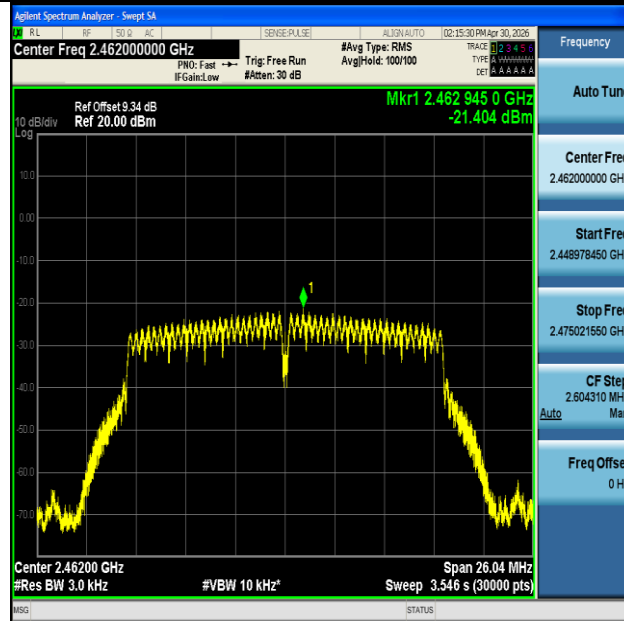


11G-Ant1-2437-PASS

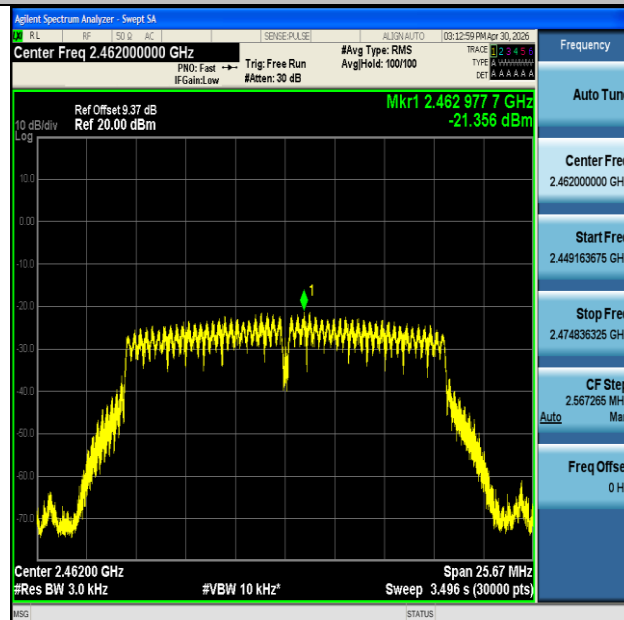


11G-Ant2-2437-PASS



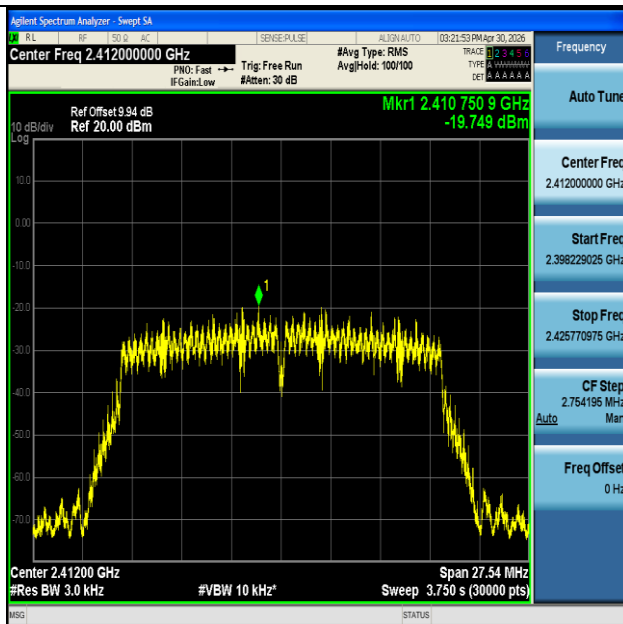


11G-Ant1-2462-PASS

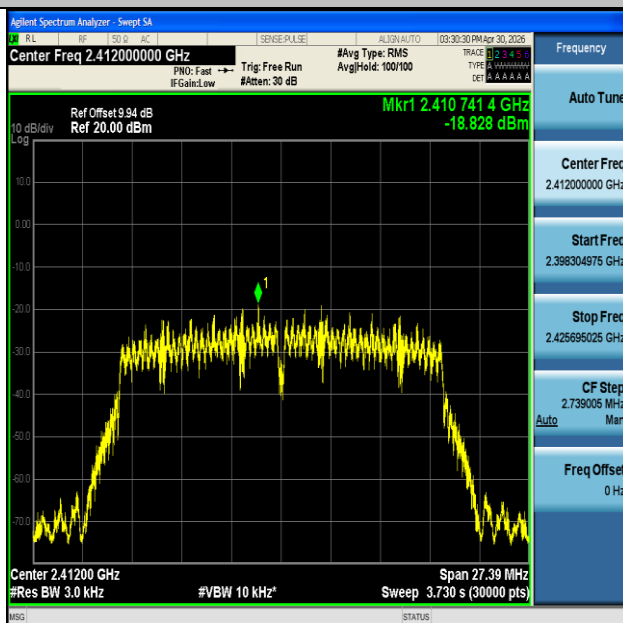


11G-Ant2-2462-PASS



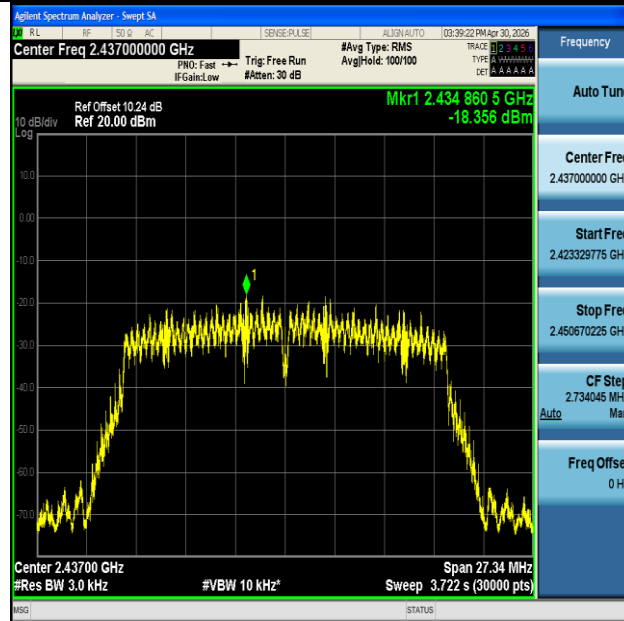


11N20MIMO-Ant1-2412-PASS

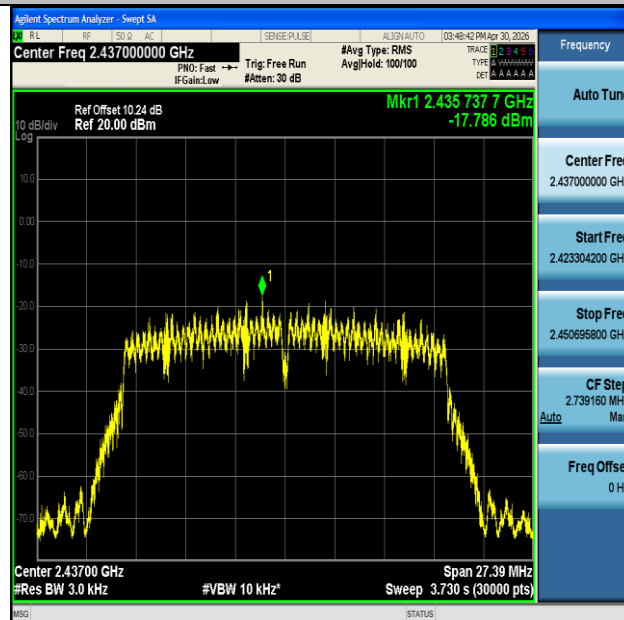


11N20MIMO-Ant2-2412-PASS



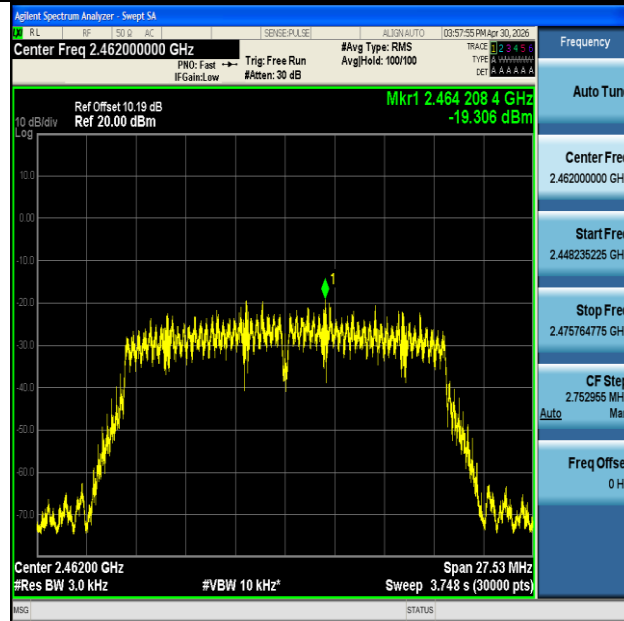


11N20MIMO-Ant1-2437-PASS

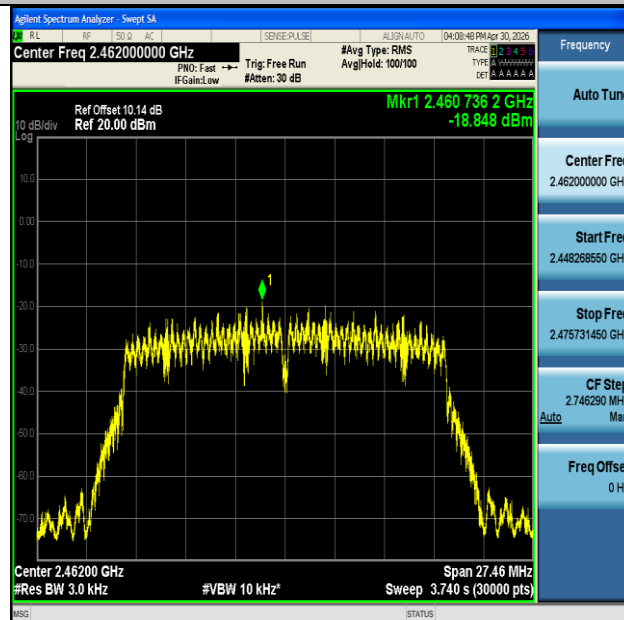


11N20MIMO-Ant2-2437-PASS



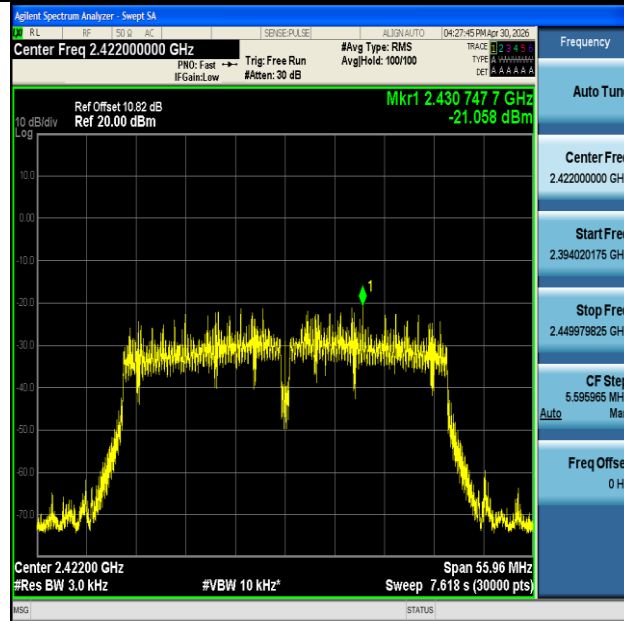


11N20MIMO-Ant1-2462-PASS

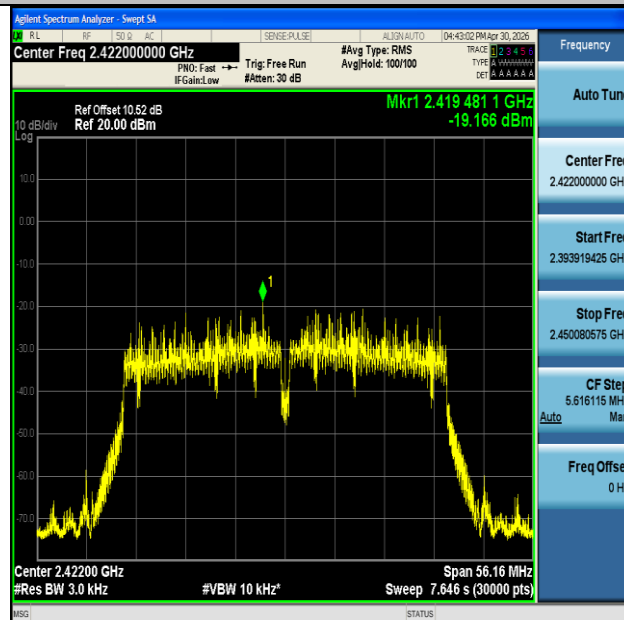


11N20MIMO-Ant2-2462-PASS



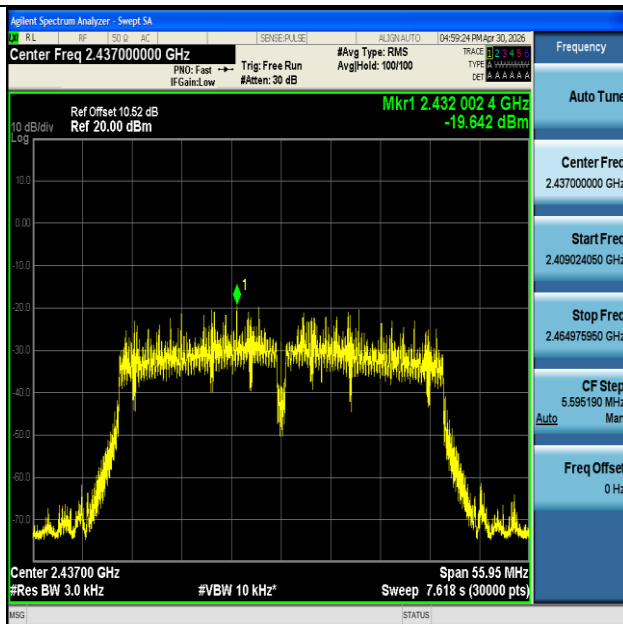


11N40MIMO-Ant1-2422-PASS

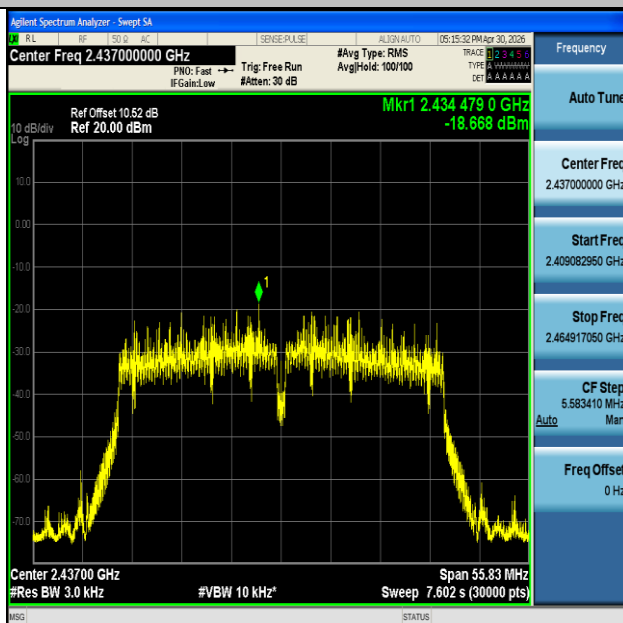


11N40MIMO-Ant2-2422-PASS



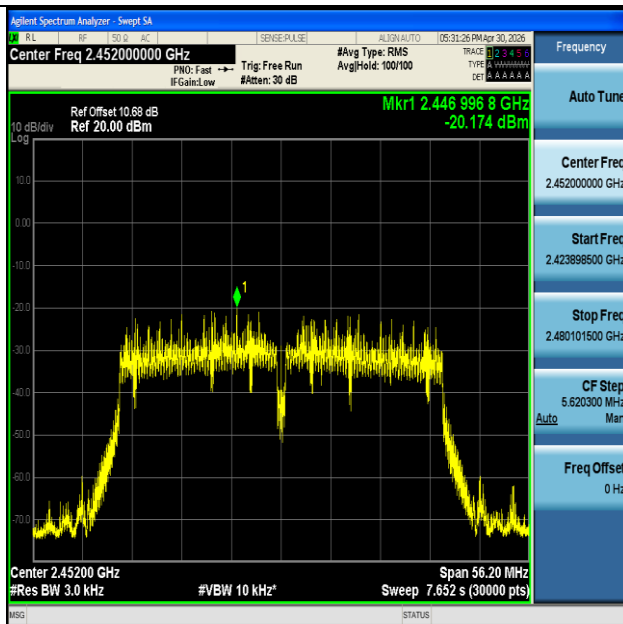


11N40MIMO-Ant1-2437-PASS

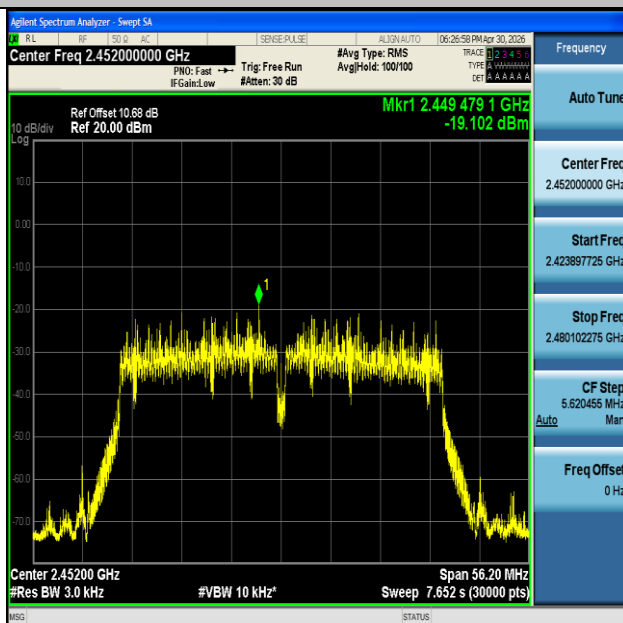


11N40MIMO-Ant2-2437-PASS





11N40MIMO-Ant1-2452-PASS



11N40MIMO-Ant2-2452-PASS





Appendix E: Band edge measurements

Test Result

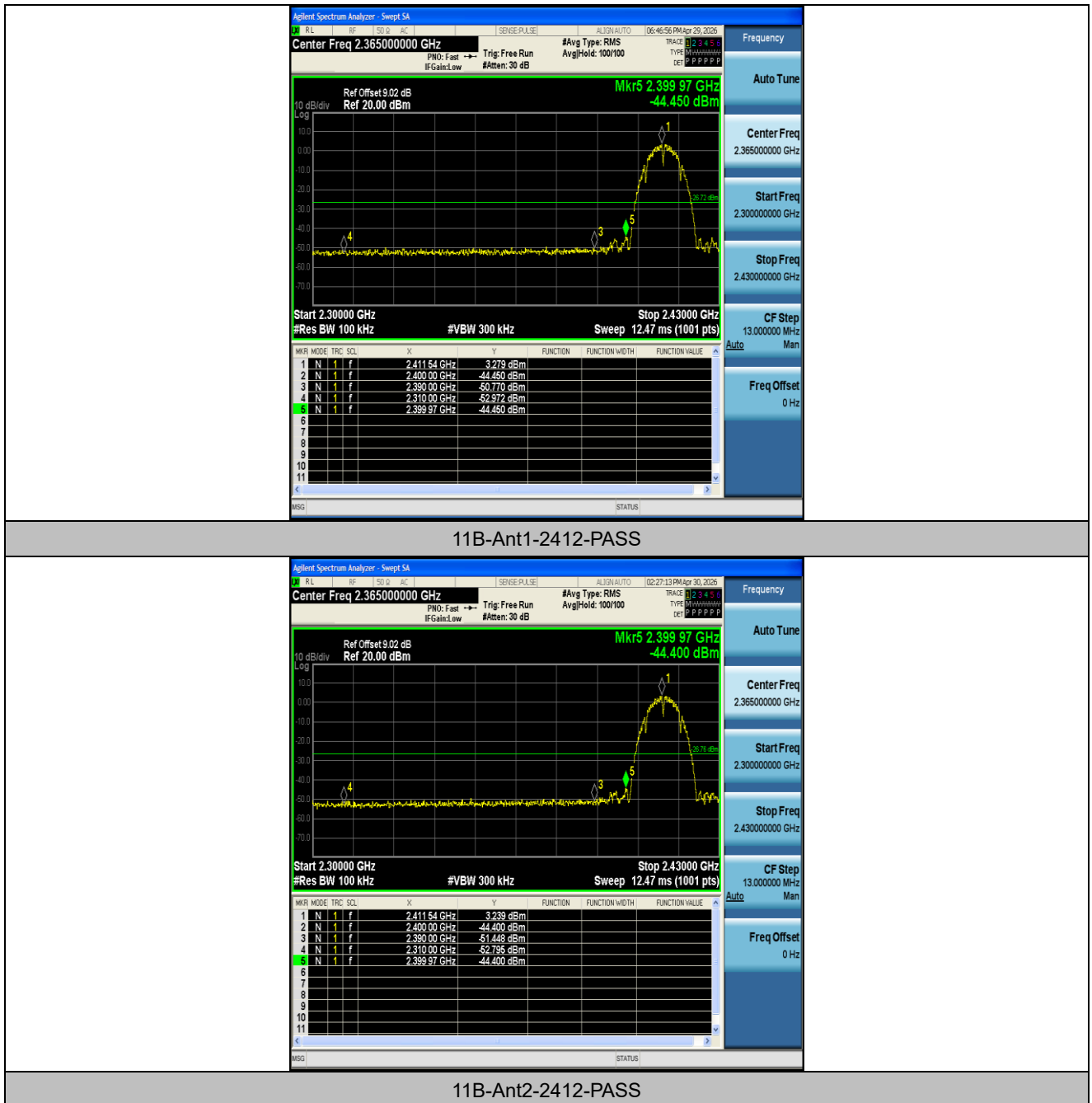
Test Mode	Antenna	Ch. Name	Frequency.[MHz]	Ref. Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	Low	2412	3.28	-44.45	≤-26.72	PASS
11B	Ant2	Low	2412	3.24	-44.4	≤-26.76	PASS
11B	Ant1	High	2462	3.40	-48.03	≤-26.6	PASS
11B	Ant2	High	2462	3.21	-49.35	≤-26.79	PASS
11G	Ant1	Low	2412	-1.45	-42.42	≤-31.45	PASS
11G	Ant2	Low	2412	-0.71	-44.68	≤-30.71	PASS
11G	Ant1	High	2462	-0.58	-47.75	≤-30.58	PASS
11G	Ant2	High	2462	-0.53	-49.1	≤-30.53	PASS
11N20MIMO	Ant1	Low	2412	-0.25	-43.56	≤-30.25	PASS
11N20MIMO	Ant2	Low	2412	-0.38	-43.44	≤-30.38	PASS
11N20MIMO	Ant1	High	2462	-0.04	-48.54	≤-30.04	PASS
11N20MIMO	Ant2	High	2462	-0.62	-48.25	≤-30.62	PASS
11N40MIMO	Ant1	Low	2422	-2.95	-44.32	≤-32.95	PASS
11N40MIMO	Ant2	Low	2422	-2.98	-41.81	≤-32.98	PASS
11N40MIMO	Ant1	High	2452	-3.59	-46.96	≤-33.59	PASS
11N40MIMO	Ant2	High	2452	-3.39	-47	≤-33.39	PASS

Note: offset(dB) = cable loss(dB) + attenuator factor(dB)



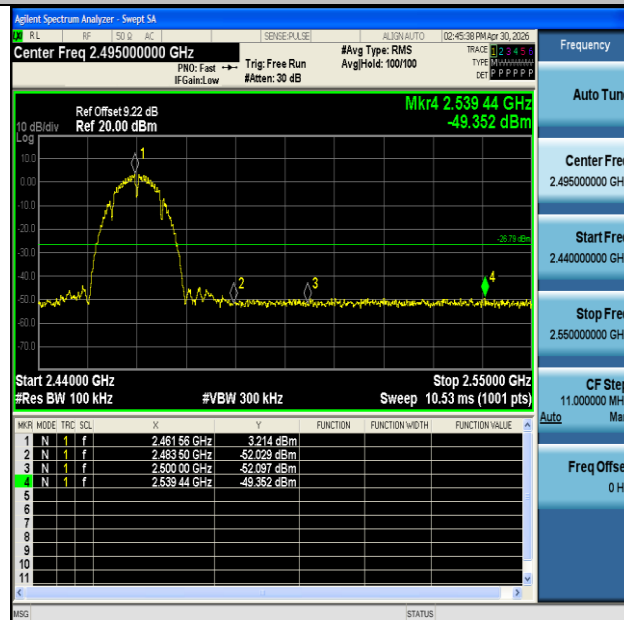


Test Graphs



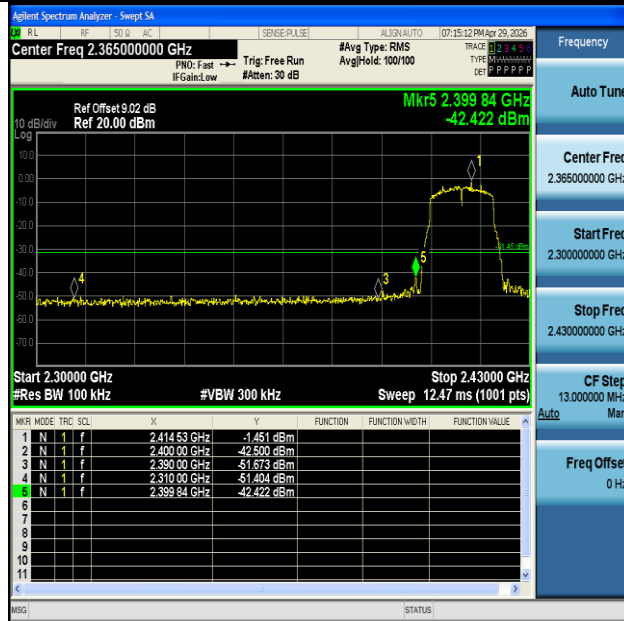


11B-Ant1-2462-PASS

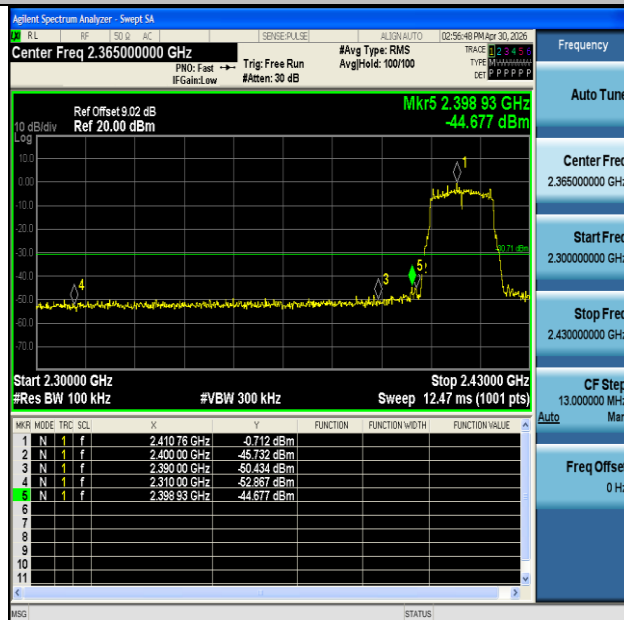


11B-Ant2-2462-PASS



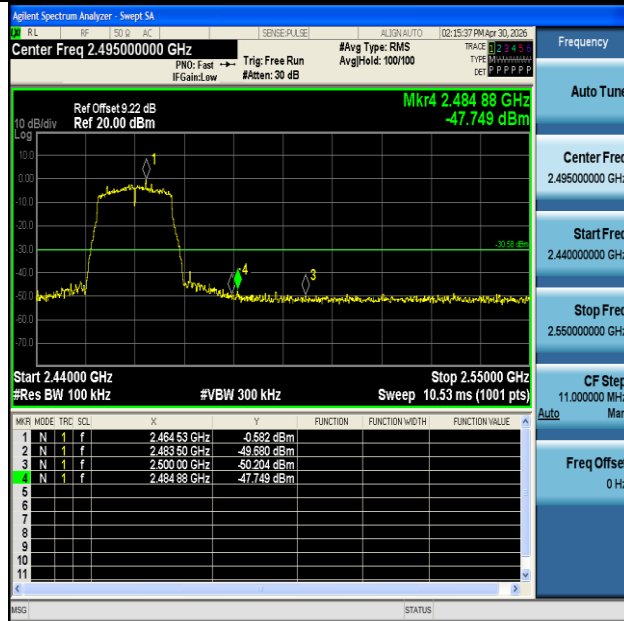


11G-Ant1-2412-PASS

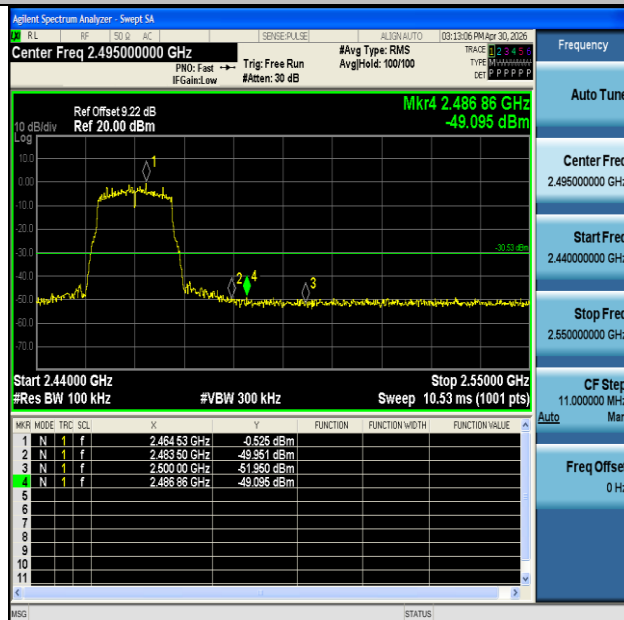


11G-Ant2-2412-PASS



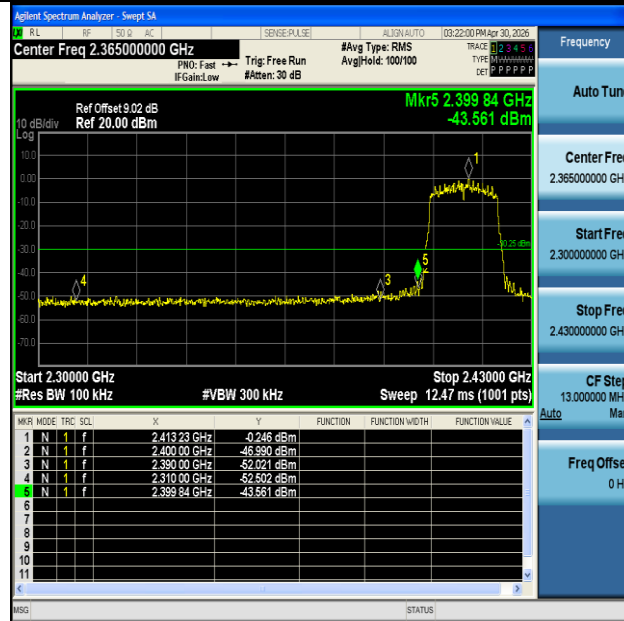


11G-Ant1-2462-PASS

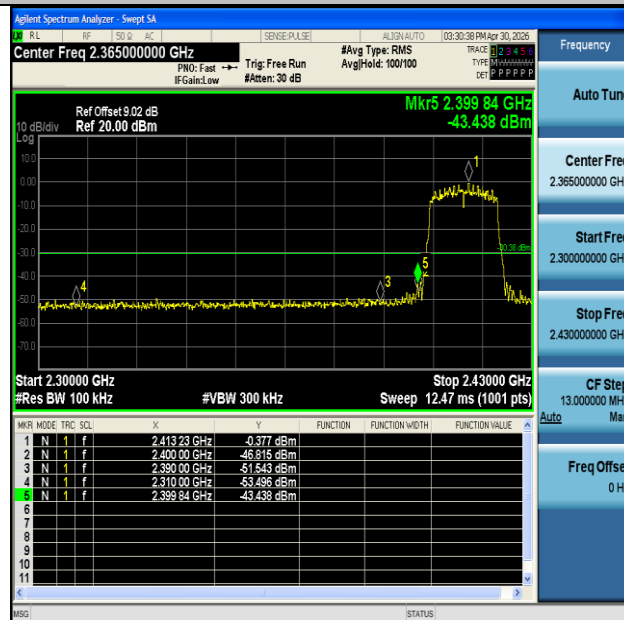


11G-Ant2-2462-PASS



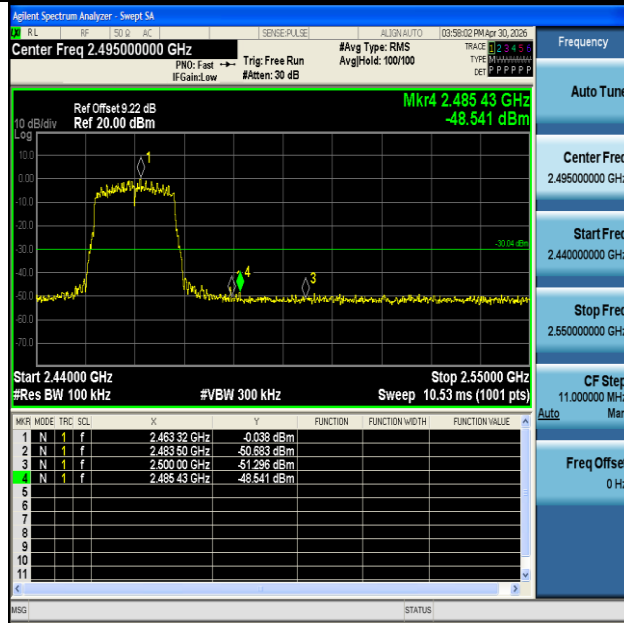


11N20MIMO-Ant1-2412-PASS

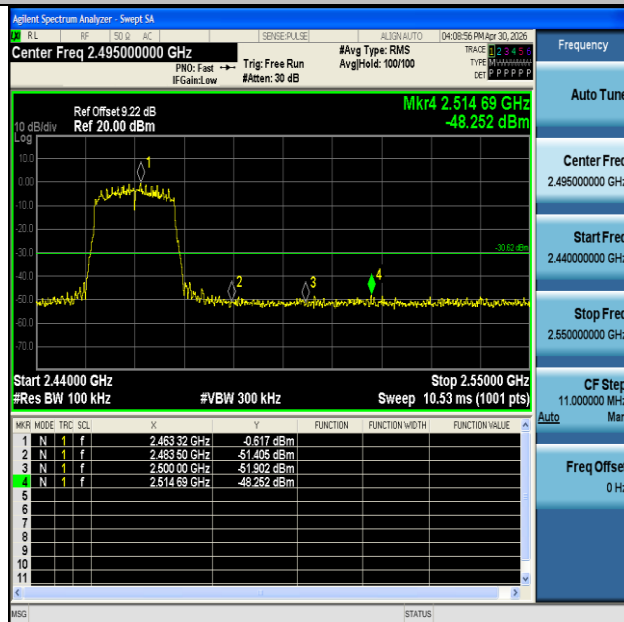


11N20MIMO-Ant2-2412-PASS



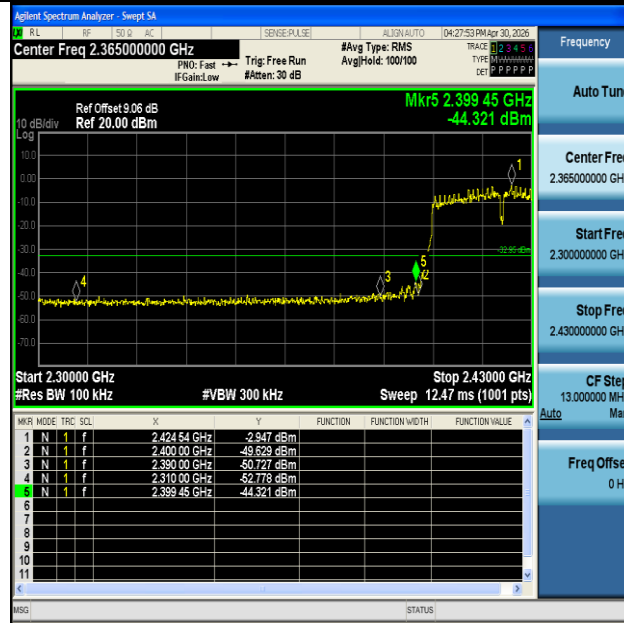


11N20MIMO-Ant1-2462-PASS



11N20MIMO-Ant2-2462-PASS



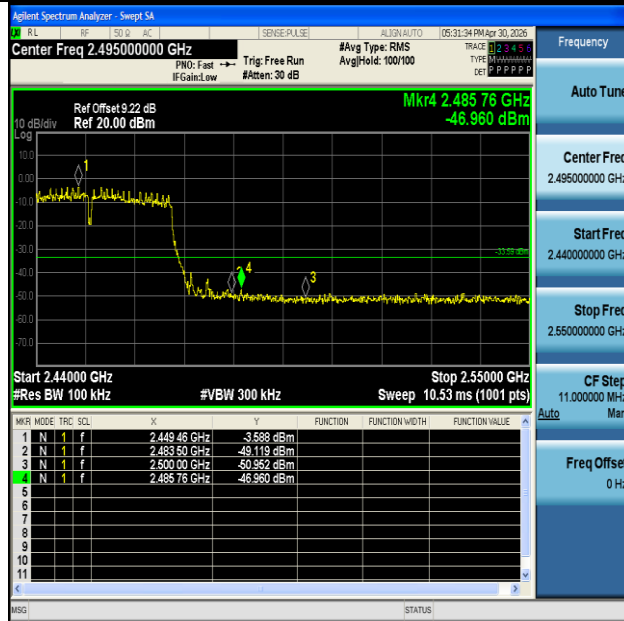


11N40MIMO-Ant1-2422-PASS

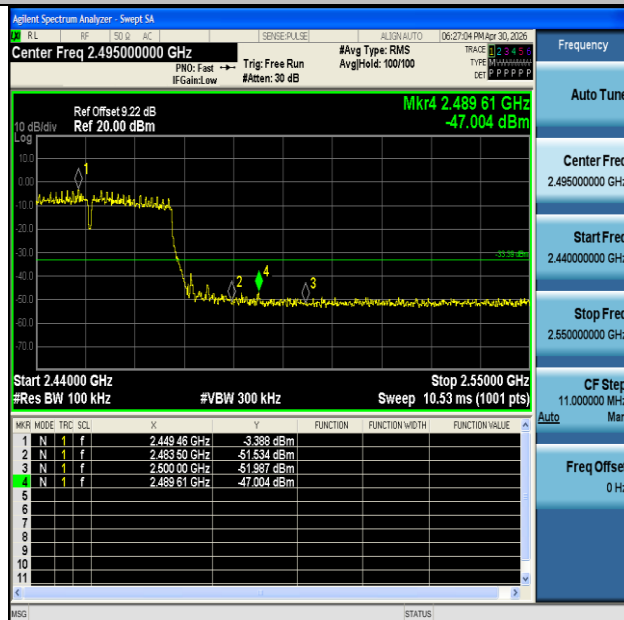


11N40MIMO-Ant2-2422-PASS





11N40MIMO-Ant1-2452-PASS



11N40MIMO-Ant2-2452-PASS





Appendix F: Conducted Spurious Emission

Test Result

Test Mode	Antenna	Frequency [MHz]	Freq. Range [Mhz]	Ref. Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	0~Reference	2.29	2.29	---	PASS
11B	Ant2	2412	0~Reference	3.02	3.02	---	PASS
11B	Ant1	2412	30~1000	2.29	-62.49	≤-27.71	PASS
11B	Ant2	2412	30~1000	3.02	-62.23	≤-26.98	PASS
11B	Ant1	2412	1000~26500	2.29	-37.51	≤-27.71	PASS
11B	Ant2	2412	1000~26500	3.02	-36.77	≤-26.98	PASS
11B	Ant1	2437	0~Reference	3.60	3.60	---	PASS
11B	Ant2	2437	0~Reference	3.78	3.78	---	PASS
11B	Ant1	2437	30~1000	3.60	-62.19	≤-26.4	PASS
11B	Ant2	2437	30~1000	3.78	-62.49	≤-26.22	PASS
11B	Ant1	2437	1000~26500	3.60	-36.84	≤-26.4	PASS
11B	Ant2	2437	1000~26500	3.78	-37.32	≤-26.22	PASS
11B	Ant1	2462	0~Reference	3.15	3.15	---	PASS
11B	Ant2	2462	0~Reference	1.93	1.93	---	PASS
11B	Ant1	2462	30~1000	3.15	-62.58	≤-26.85	PASS
11B	Ant2	2462	30~1000	1.93	-62.74	≤-28.07	PASS
11B	Ant1	2462	1000~26500	3.15	-37.27	≤-26.85	PASS
11B	Ant2	2462	1000~26500	1.93	-37.49	≤-28.07	PASS
11G	Ant1	2412	0~Reference	-3.47	-3.47	---	PASS
11G	Ant2	2412	0~Reference	-0.77	-0.77	---	PASS
11G	Ant1	2412	30~1000	-3.47	-61.1	≤-33.47	PASS
11G	Ant2	2412	30~1000	-0.77	-62.76	≤-30.77	PASS
11G	Ant1	2412	1000~26500	-3.47	-37.87	≤-33.47	PASS
11G	Ant2	2412	1000~26500	-0.77	-37.3	≤-30.77	PASS
11G	Ant1	2437	0~Reference	-0.35	-0.35	---	PASS
11G	Ant2	2437	0~Reference	-0.83	-0.83	---	PASS
11G	Ant1	2437	30~1000	-0.35	-62.22	≤-30.35	PASS
11G	Ant2	2437	30~1000	-0.83	-63.14	≤-30.83	PASS
11G	Ant1	2437	1000~26500	-0.35	-37.44	≤-30.35	PASS
11G	Ant2	2437	1000~26500	-0.83	-37.46	≤-30.83	PASS
11G	Ant1	2462	0~Reference	-2.79	-2.79	---	PASS
11G	Ant2	2462	0~Reference	-3.27	-3.27	---	PASS
11G	Ant1	2462	30~1000	-2.79	-62.93	≤-32.79	PASS
11G	Ant2	2462	30~1000	-3.27	-62.34	≤-33.27	PASS
11G	Ant1	2462	1000~26500	-2.79	-36.14	≤-32.79	PASS
11G	Ant2	2462	1000~26500	-3.27	-37.48	≤-33.27	PASS
11N20MIMO	Ant1	2412	0~Reference	-0.19	-0.19	---	PASS

