



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

Product Name: Vehicle monitoring display

Trade Mark: /

Test Model: HD-M729W -MONITOR

FCC ID: 2BWCS-MONITOR

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	10.080	2406.960	2417.040	0.5	PASS
11B	Ant2	2412	10.120	2406.920	2417.040	0.5	PASS
11B	Ant1	2437	10.120	2431.920	2442.040	0.5	PASS
11B	Ant2	2437	10.080	2431.960	2442.040	0.5	PASS
11B	Ant1	2462	10.080	2456.960	2467.040	0.5	PASS
11B	Ant2	2462	10.120	2456.920	2467.040	0.5	PASS
11G	Ant1	2412	15.960	2404.160	2420.120	0.5	PASS
11G	Ant2	2412	16.280	2403.840	2420.120	0.5	PASS
11G	Ant1	2437	15.880	2428.880	2444.760	0.5	PASS
11G	Ant2	2437	16.280	2428.840	2445.120	0.5	PASS
11G	Ant1	2462	15.440	2454.480	2469.920	0.5	PASS
11G	Ant2	2462	16.080	2454.080	2470.160	0.5	PASS
11N20MIMO	Ant1	2412	16.880	2403.480	2420.360	0.5	PASS
11N20MIMO	Ant2	2412	16.920	2403.480	2420.400	0.5	PASS
11N20MIMO	Ant1	2437	15.920	2428.600	2444.520	0.5	PASS
11N20MIMO	Ant2	2437	15.560	2428.840	2444.400	0.5	PASS
11N20MIMO	Ant1	2462	16.920	2453.480	2470.400	0.5	PASS
11N20MIMO	Ant2	2462	16.880	2453.480	2470.360	0.5	PASS
11N40MIMO	Ant1	2422	35.040	2404.400	2439.440	0.5	PASS
11N40MIMO	Ant2	2422	35.120	2404.400	2439.520	0.5	PASS
11N40MIMO	Ant1	2437	35.120	2419.400	2454.520	0.5	PASS
11N40MIMO	Ant2	2437	35.040	2419.400	2454.440	0.5	PASS





11N40MIMO	Ant1	2452	35.440	2434.080	2469.520	0.5	PASS
11N40MIMO	Ant2	2452	35.440	2434.080	2469.520	0.5	PASS

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





Test Graphs





11B-Ant1-2437-PASS

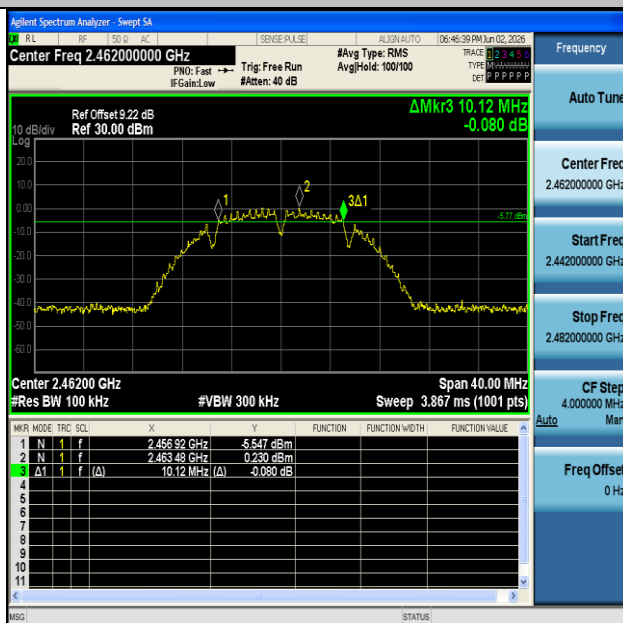


11B-Ant2-2437-PASS



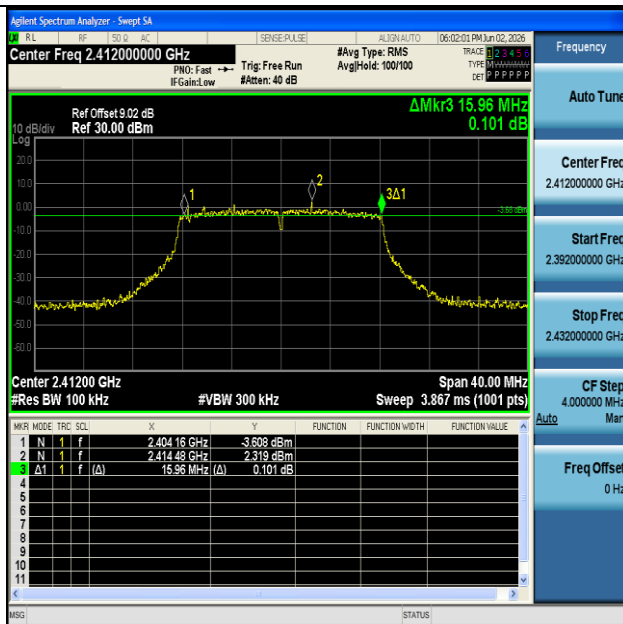


11B-Ant1-2462-PASS

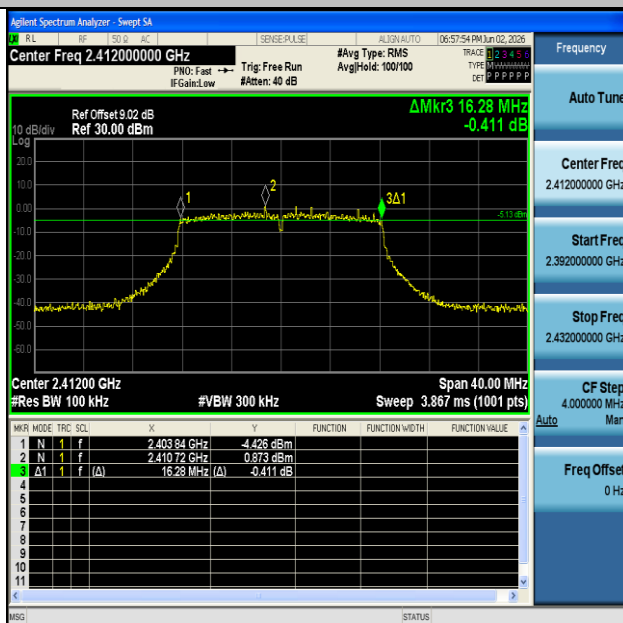


11B-Ant2-2462-PASS





11G-Ant1-2412-PASS



11G-Ant2-2412-PASS





11G-Ant1-2437-PASS

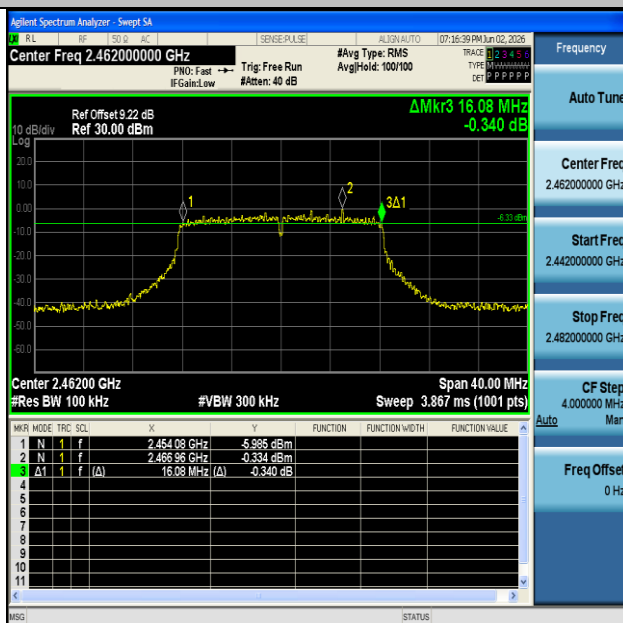


11G-Ant2-2437-PASS





11G-Ant1-2462-PASS



11G-Ant2-2462-PASS





11N20MIMO-Ant1-2412-PASS



11N20MIMO-Ant2-2412-PASS





11N20MIMO-Ant1-2437-PASS

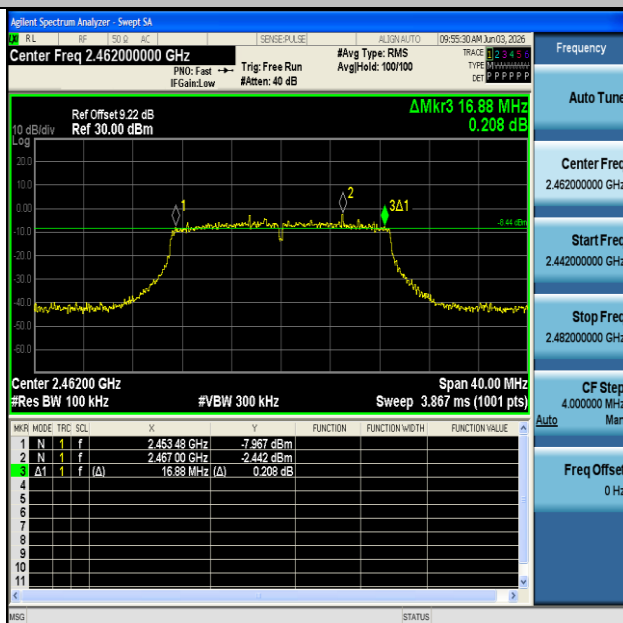


11N20MIMO-Ant2-2437-PASS





11N20MIMO-Ant1-2462-PASS

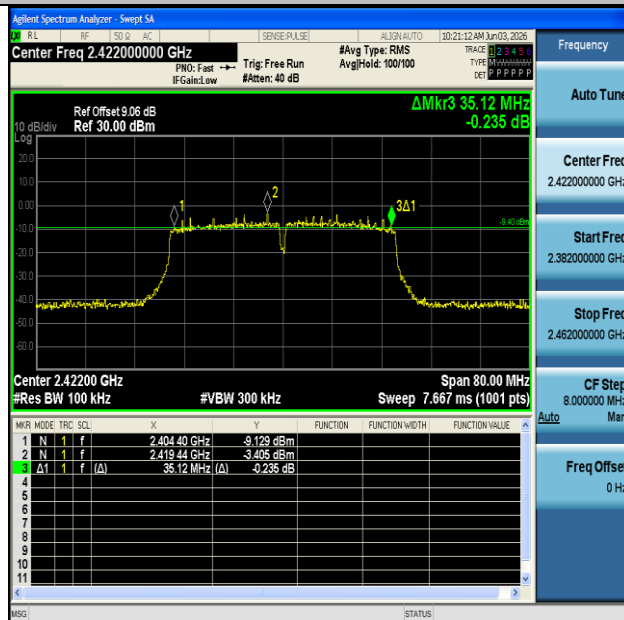


11N20MIMO-Ant2-2462-PASS



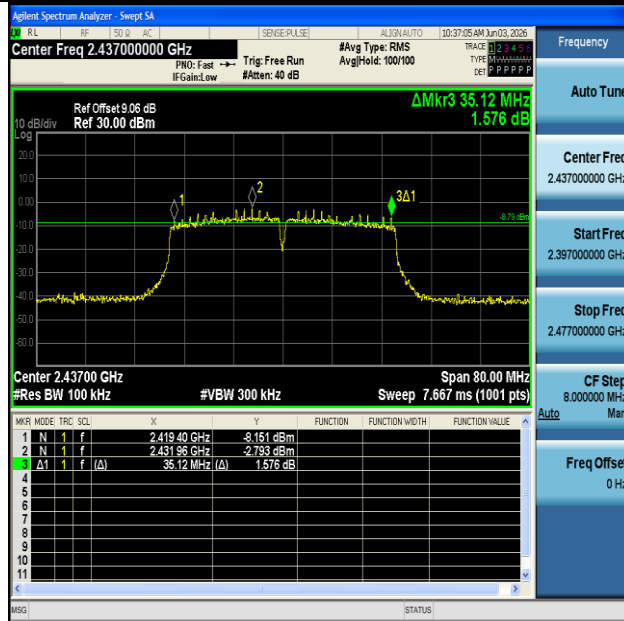


11N40MIMO-Ant1-2422-PASS

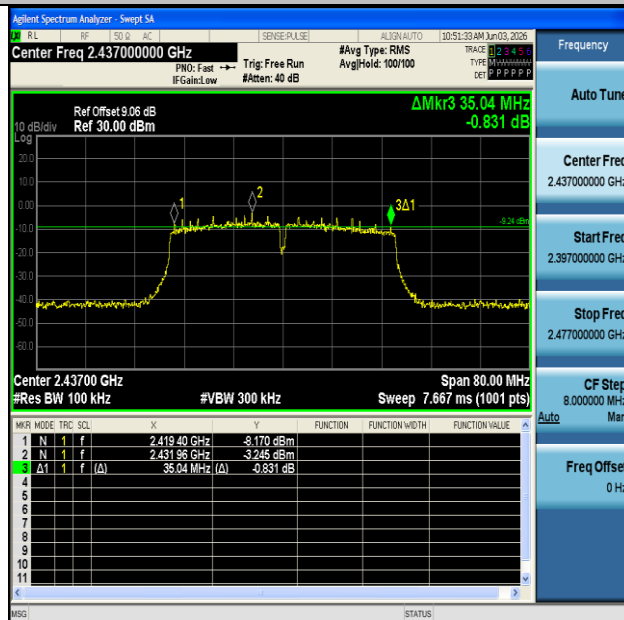


11N40MIMO-Ant2-2422-PASS





11N40MIMO-Ant1-2437-PASS

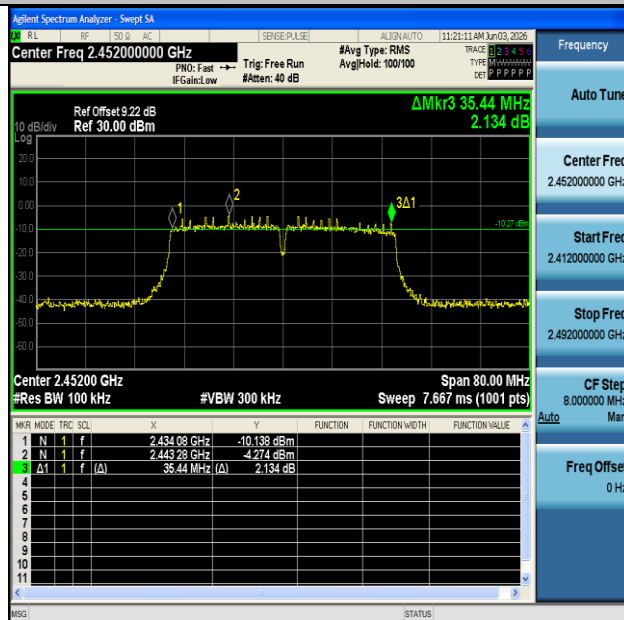


11N40MIMO-Ant2-2437-PASS





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	14.877	2404.5676	2419.4446	---	---
11B	Ant2	2412	14.782	2404.6042	2419.3862	---	---
11B	Ant1	2437	14.672	2429.5784	2444.2504	---	---
11B	Ant2	2437	14.610	2429.6019	2444.2119	---	---
11B	Ant1	2462	14.820	2454.6316	2469.4516	---	---
11B	Ant2	2462	14.822	2454.6293	2469.4513	---	---
11G	Ant1	2412	16.735	2403.6258	2420.3608	---	---
11G	Ant2	2412	16.634	2403.6847	2420.3187	---	---
11G	Ant1	2437	16.729	2428.6095	2445.3385	---	---
11G	Ant2	2437	16.576	2428.6949	2445.2709	---	---
11G	Ant1	2462	16.769	2453.6687	2470.4377	---	---
11G	Ant2	2462	16.624	2453.7131	2470.3371	---	---
11N20MIMO	Ant1	2412	17.894	2403.0454	2420.9394	---	---
11N20MIMO	Ant2	2412	17.881	2403.0309	2420.9119	---	---
11N20MIMO	Ant1	2437	17.841	2428.0661	2445.9071	---	---
11N20MIMO	Ant2	2437	17.781	2428.0931	2445.8741	---	---
11N20MIMO	Ant1	2462	17.827	2453.1412	2470.9682	---	---
11N20MIMO	Ant2	2462	17.899	2453.0927	2470.9917	---	---
11N40MIMO	Ant1	2422	36.215	2403.9561	2440.1711	---	---
11N40MIMO	Ant2	2422	36.270	2403.9236	2440.1936	---	---
11N40MIMO	Ant1	2437	36.112	2419.0176	2455.1296	---	---
11N40MIMO	Ant2	2437	36.127	2418.9334	2455.0604	---	---
11N40MIMO	Ant1	2452	36.463	2433.7870	2470.2500	---	---
11N40MIMO	Ant2	2452	36.411	2433.8415	2470.2525	---	---

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



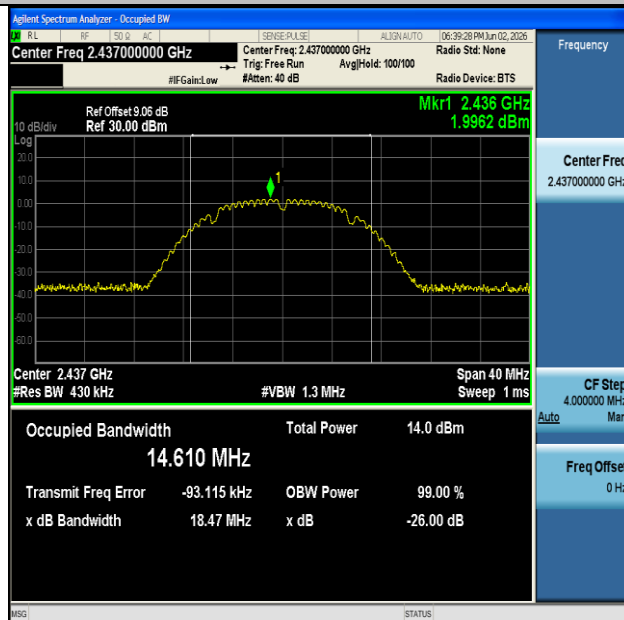


Test Graphs



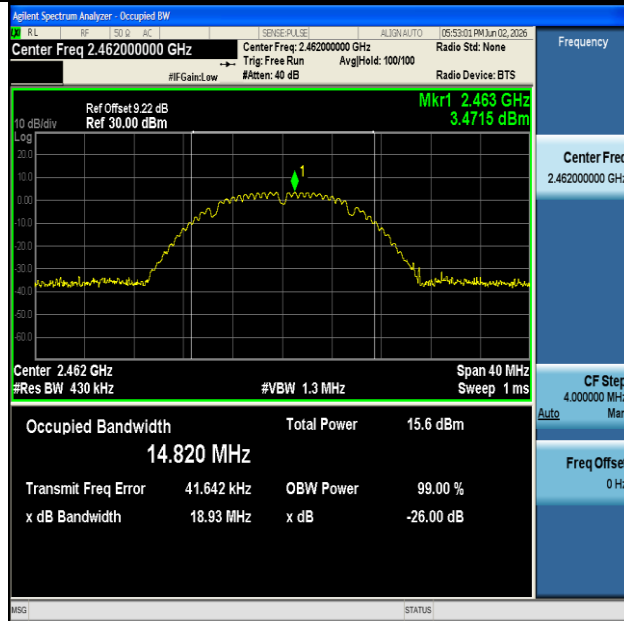


11B-Ant1-2437



11B-Ant2-2437



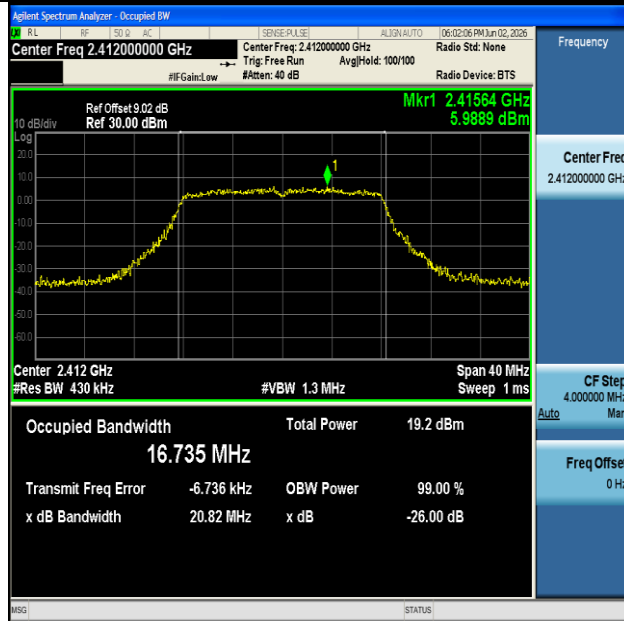


11B-Ant1-2462

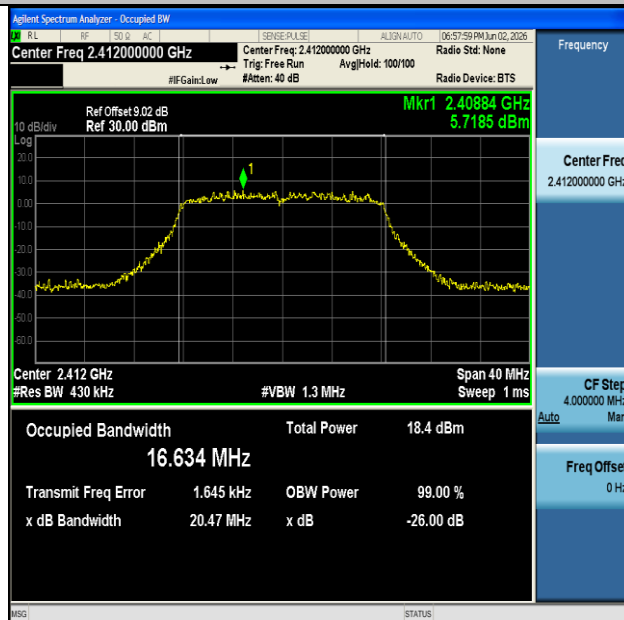


11B-Ant2-2462



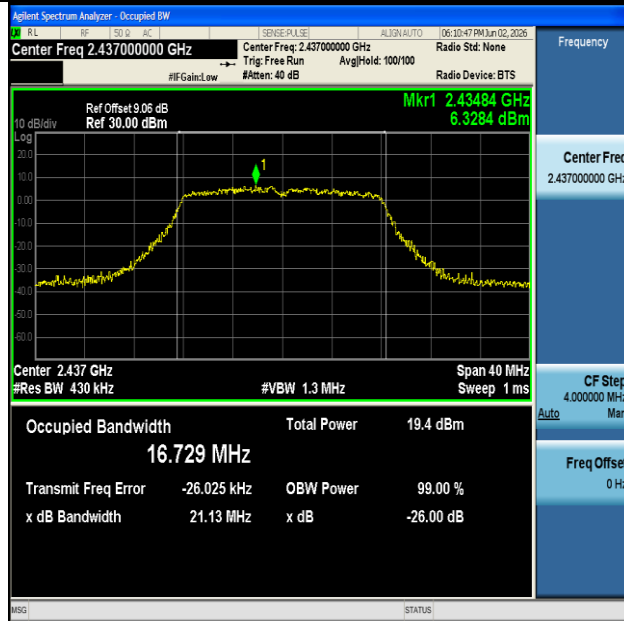


11G-Ant1-2412

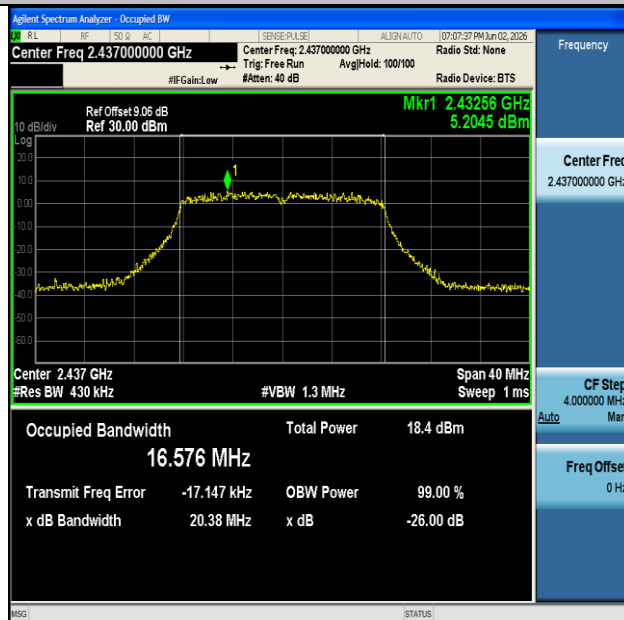


11G-Ant2-2412



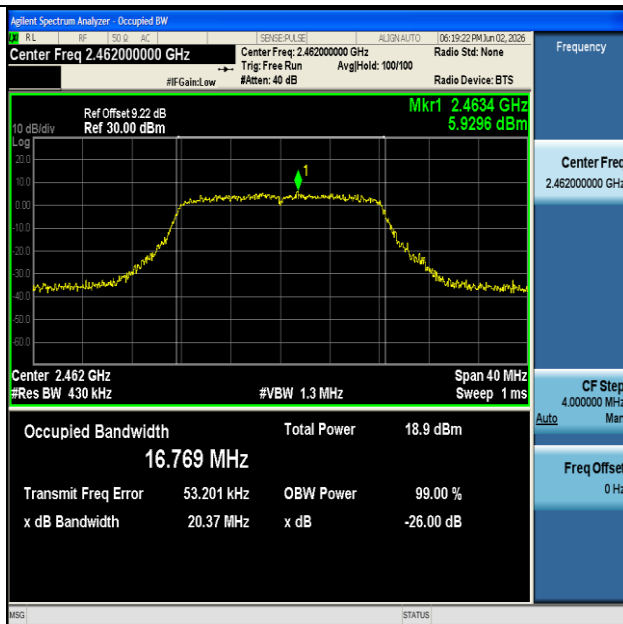


11G-Ant1-2437

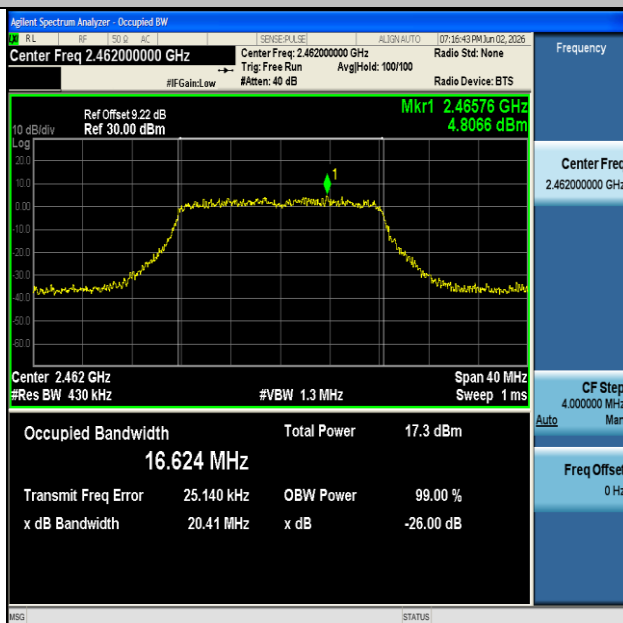


11G-Ant2-2437



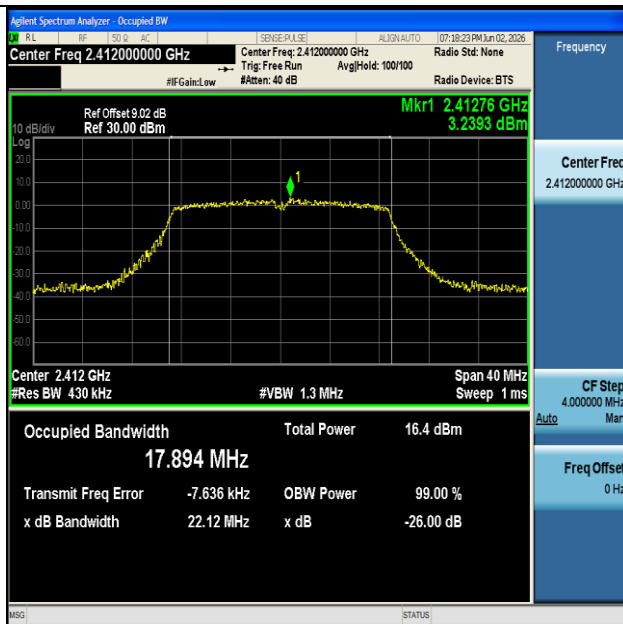


11G-Ant1-2462

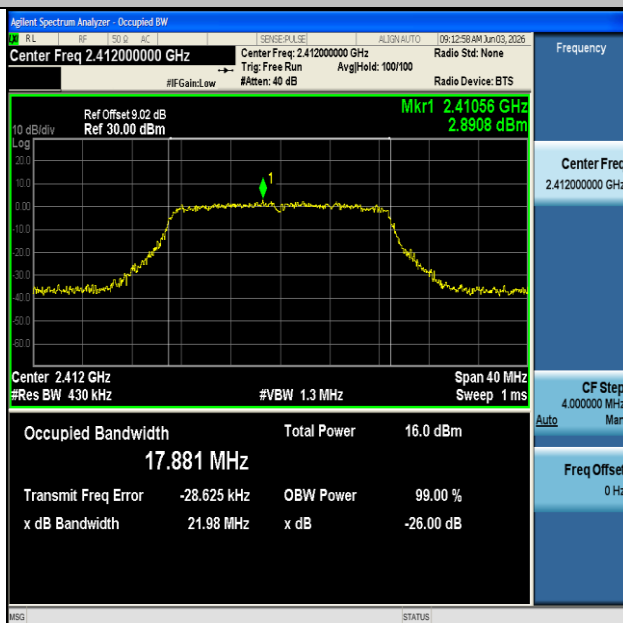


11G-Ant2-2462





11N20MIMO-Ant1-2412

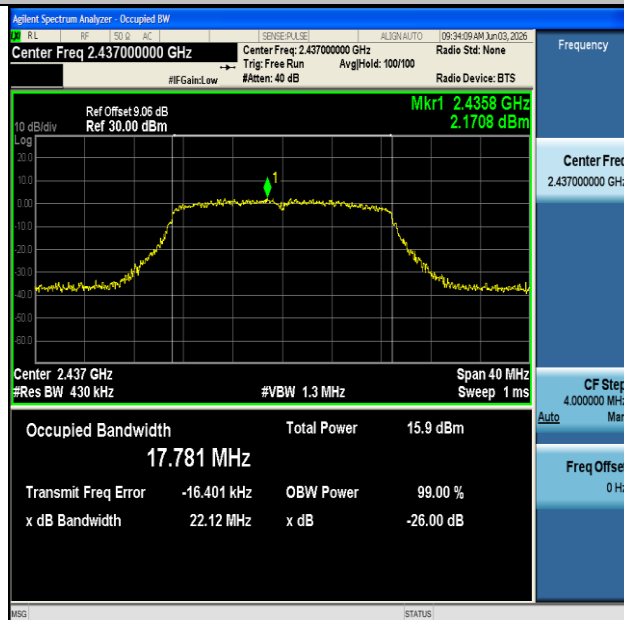


11N20MIMO-Ant2-2412



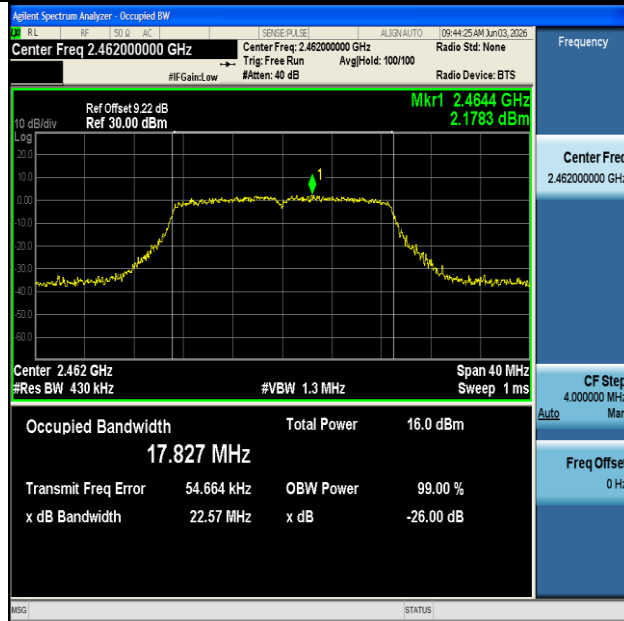


11N20MIMO-Ant1-2437

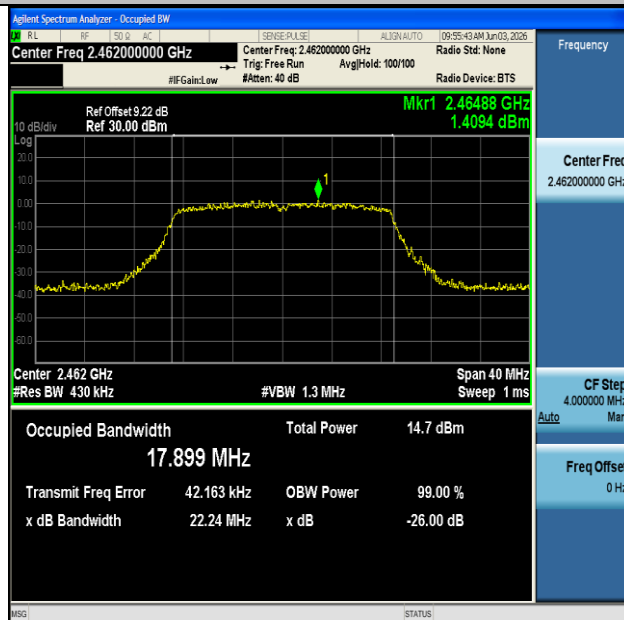


11N20MIMO-Ant2-2437



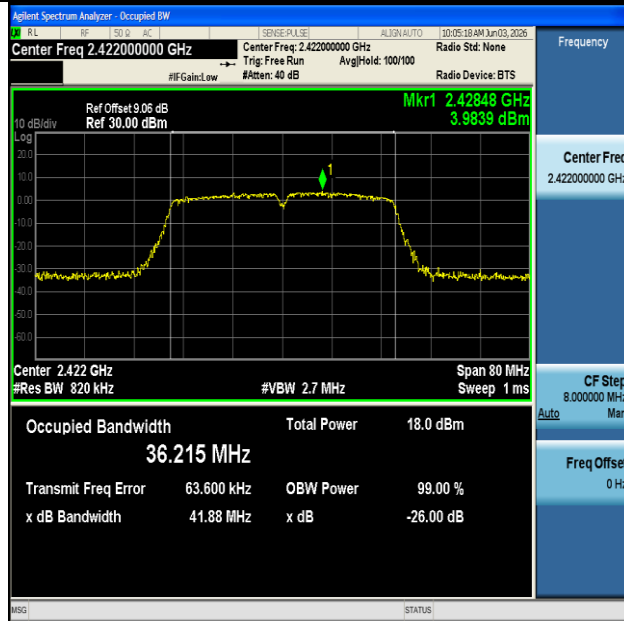


11N20MIMO-Ant1-2462



11N20MIMO-Ant2-2462



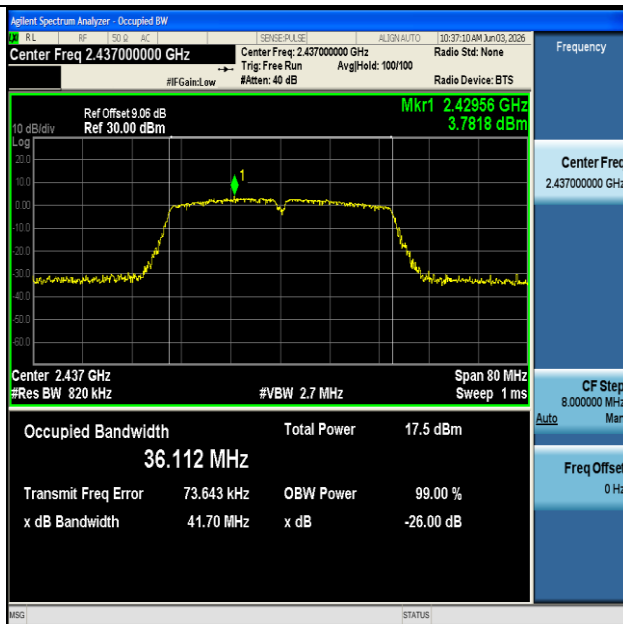


11N40MIMO-Ant1-2422

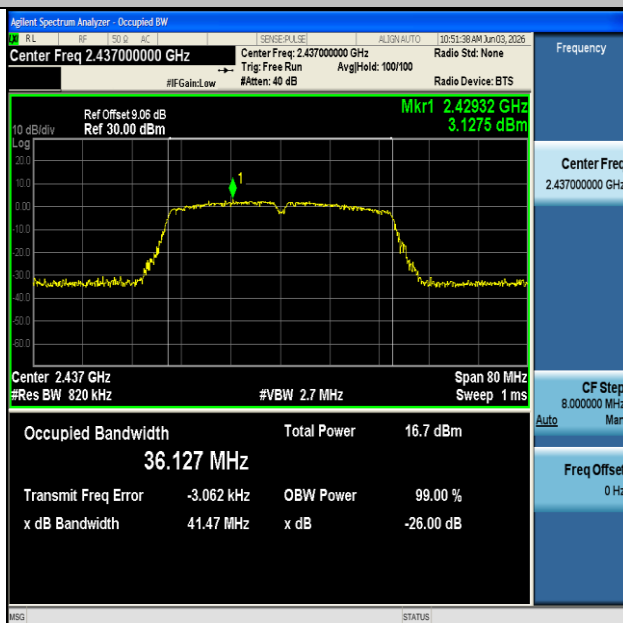


11N40MIMO-Ant2-2422



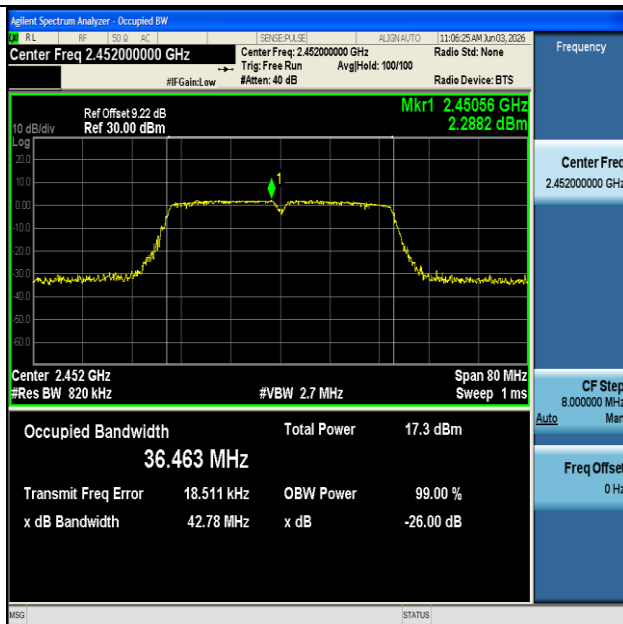


11N40MIMO-Ant1-2437

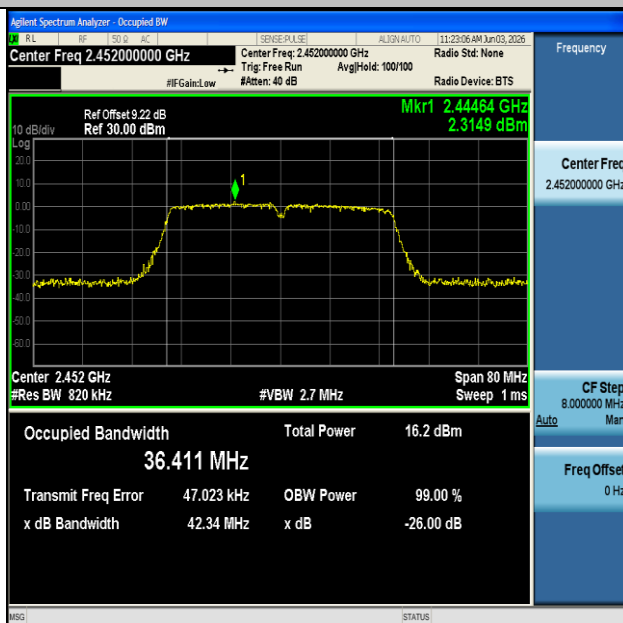


11N40MIMO-Ant2-2437





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	12.70	≤30.00	PASS
11B	Ant2	2412	10.77	≤30.00	PASS
11B	Ant1	2437	12.86	≤30.00	PASS
11B	Ant2	2437	11.14	≤30.00	PASS
11B	Ant1	2462	12.67	≤30.00	PASS
11B	Ant2	2462	9.84	≤30.00	PASS
11G	Ant1	2412	13.53	≤30.00	PASS
11G	Ant2	2412	12.47	≤30.00	PASS
11G	Ant1	2437	13.56	≤30.00	PASS
11G	Ant2	2437	12.38	≤30.00	PASS
11G	Ant1	2462	12.96	≤30.00	PASS
11G	Ant2	2462	11.18	≤30.00	PASS
11N20MIMO	Ant1	2412	10.73	≤30.00	PASS
11N20MIMO	Ant2	2412	10.12	≤30.00	PASS
11N20MIMO	total	2412	13.45	≤30.00	PASS
11N20MIMO	Ant1	2437	10.83	≤30.00	PASS
11N20MIMO	Ant2	2437	10.08	≤30.00	PASS
11N20MIMO	total	2437	13.48	≤30.00	PASS
11N20MIMO	Ant1	2462	10.19	≤30.00	PASS
11N20MIMO	Ant2	2462	8.73	≤30.00	PASS
11N20MIMO	total	2462	12.53	≤30.00	PASS
11N40MIMO	Ant1	2422	11.41	≤30.00	PASS
11N40MIMO	Ant2	2422	10.75	≤30.00	PASS
11N40MIMO	total	2422	14.10	≤30.00	PASS
11N40MIMO	Ant1	2437	10.98	≤30.00	PASS
11N40MIMO	Ant2	2437	10.19	≤30.00	PASS
11N40MIMO	total	2437	13.61	≤30.00	PASS
11N40MIMO	Ant1	2452	10.65	≤30.00	PASS
11N40MIMO	Ant2	2452	9.72	≤30.00	PASS
11N40MIMO	total	2452	13.22	≤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

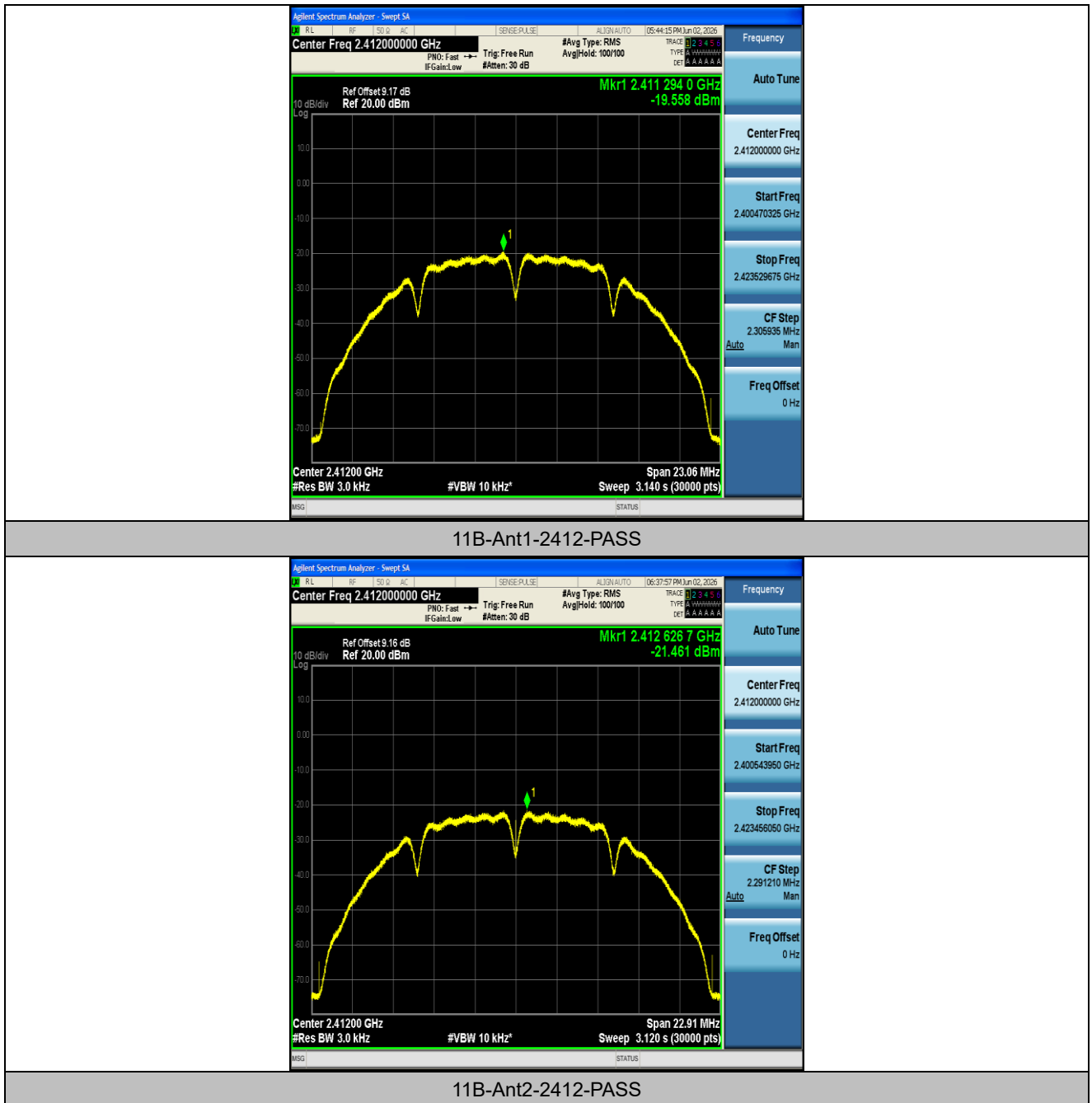
Test Mode	Antenna	Frequency [MHz]	Raw. Data [dBm/3-100kHz]	Dc. Factor	Result [dBm/3-100kHz]	Limit [dBm/3kHz]	Verdict
11B	Ant1	2412	-19.71	0.15	-19.56	≤8.00	PASS
11B	Ant2	2412	-21.60	0.14	-21.46	≤8.00	PASS
11B	Ant1	2437	-19.54	0.15	-19.39	≤8.00	PASS
11B	Ant2	2437	-21.44	0.17	-21.27	≤8.00	PASS
11B	Ant1	2462	-19.91	0.17	-19.74	≤8.00	PASS
11B	Ant2	2462	-22.74	0.15	-22.59	≤8.00	PASS
11G	Ant1	2412	-17.94	0.47	-17.47	≤8.00	PASS
11G	Ant2	2412	-18.99	0.48	-18.51	≤8.00	PASS
11G	Ant1	2437	-18.49	0.48	-18.01	≤8.00	PASS
11G	Ant2	2437	-19.25	0.48	-18.77	≤8.00	PASS
11G	Ant1	2462	-18.90	0.48	-18.42	≤8.00	PASS
11G	Ant2	2462	-20.05	0.48	-19.57	≤8.00	PASS
11N20MIMO	Ant1	2412	-21.07	0.51	-20.56	≤8.00	PASS
11N20MIMO	Ant2	2412	-21.46	0.51	-20.95	≤8.00	PASS
11N20MIMO	total	2412	---	---	-17.74	≤7.50	PASS
11N20MIMO	Ant1	2437	-20.49	0.51	-19.98	≤8.00	PASS
11N20MIMO	Ant2	2437	-21.38	0.51	-20.87	≤8.00	PASS
11N20MIMO	total	2437	---	---	-17.39	≤7.50	PASS
11N20MIMO	Ant1	2462	-20.81	0.51	-20.30	≤8.00	PASS
11N20MIMO	Ant2	2462	-20.83	0.43	-20.40	≤8.00	PASS
11N20MIMO	total	2462	---	---	-17.34	≤7.50	PASS
11N40MIMO	Ant1	2422	-21.95	1.01	-20.94	≤8.00	PASS
11N40MIMO	Ant2	2422	-23.57	1.01	-22.56	≤8.00	PASS
11N40MIMO	total	2422	---	---	-18.66	≤7.50	PASS
11N40MIMO	Ant1	2437	-22.70	1.01	-21.69	≤8.00	PASS
11N40MIMO	Ant2	2437	-23.87	1.01	-22.86	≤8.00	PASS
11N40MIMO	total	2437	---	---	-19.23	≤7.50	PASS
11N40MIMO	Ant1	2452	-23.08	1.01	-22.07	≤8.00	PASS
11N40MIMO	Ant2	2452	-23.89	1.01	-22.88	≤8.00	PASS
11N40MIMO	total	2452	---	---	-19.45	≤7.50	PASS

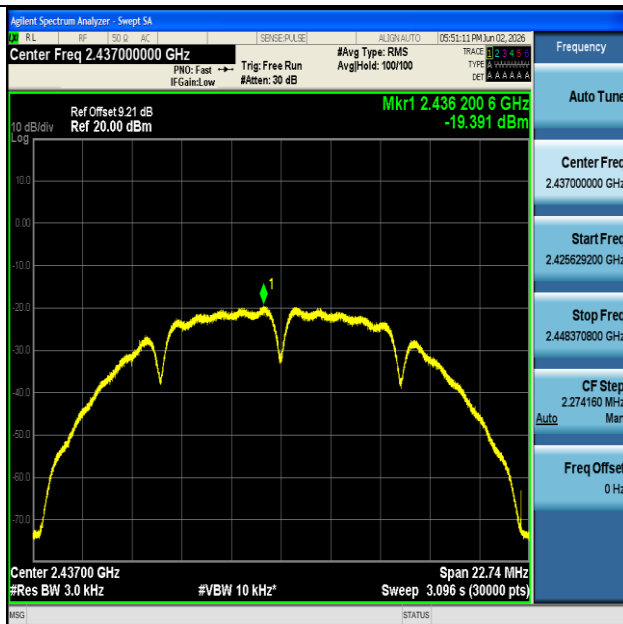
Note: offset(dB) = cable loss(dB) + attenuator factor(dB) + Duty Cycle Factor(dB)



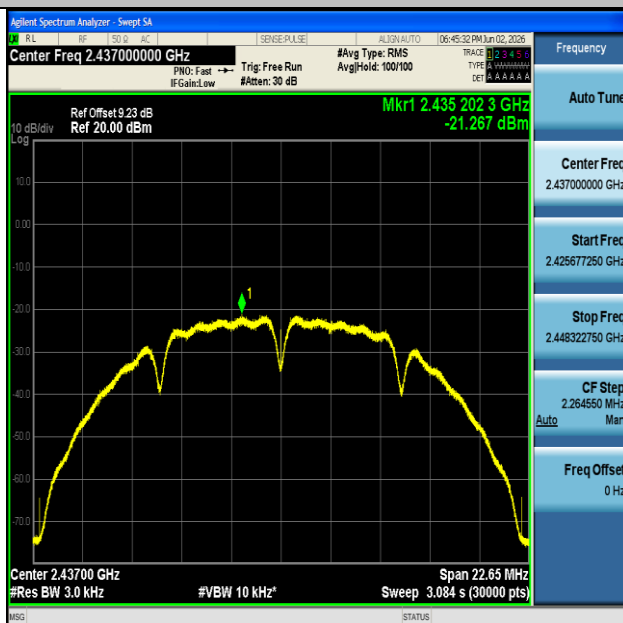


Test Graphs



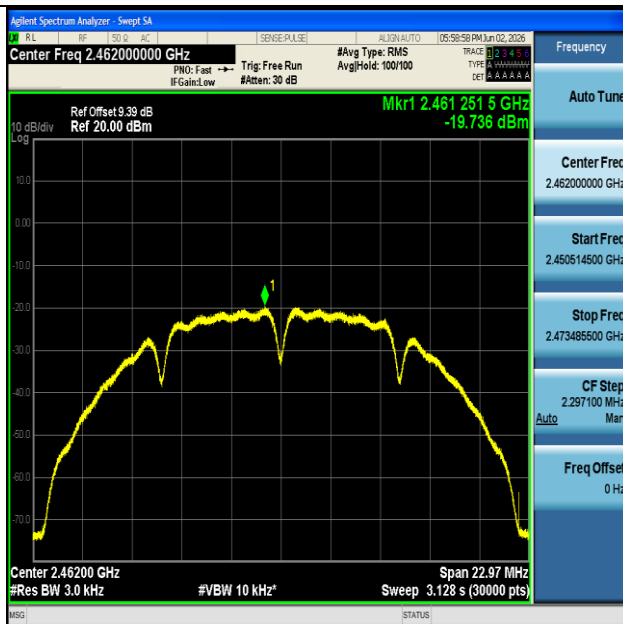


11B-Ant1-2437-PASS

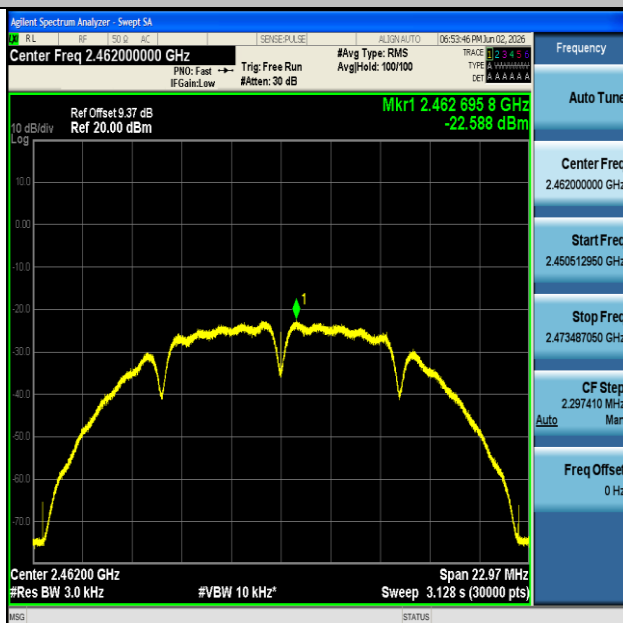


11B-Ant2-2437-PASS



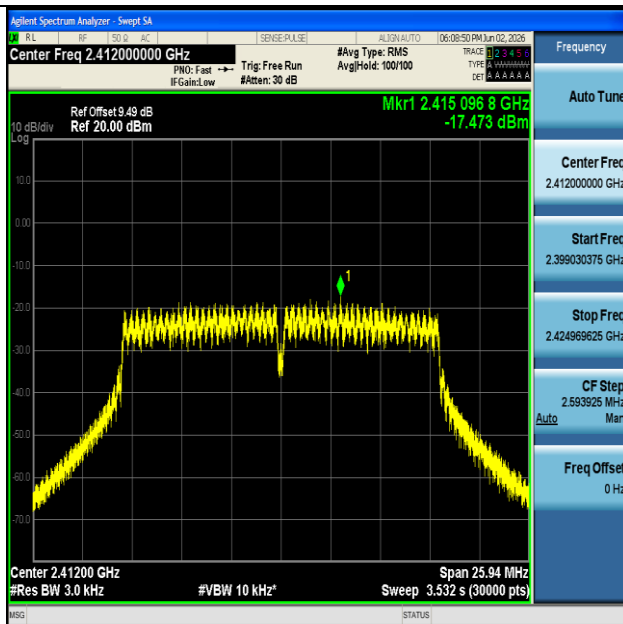


11B-Ant1-2462-PASS

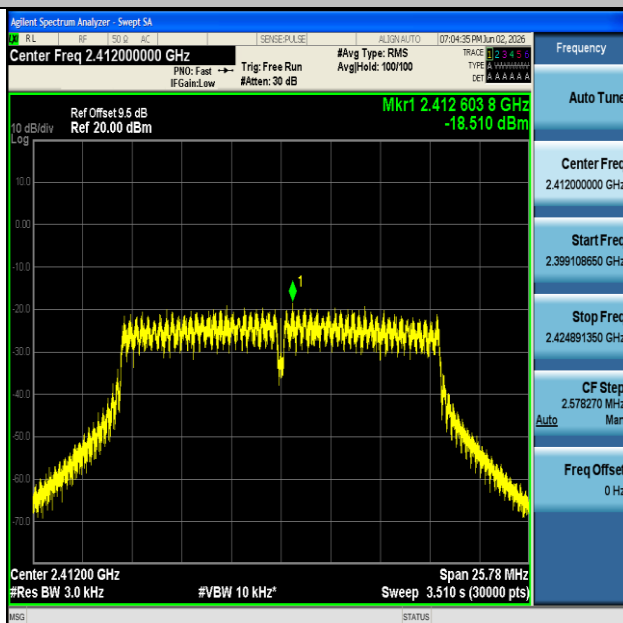


11B-Ant2-2462-PASS



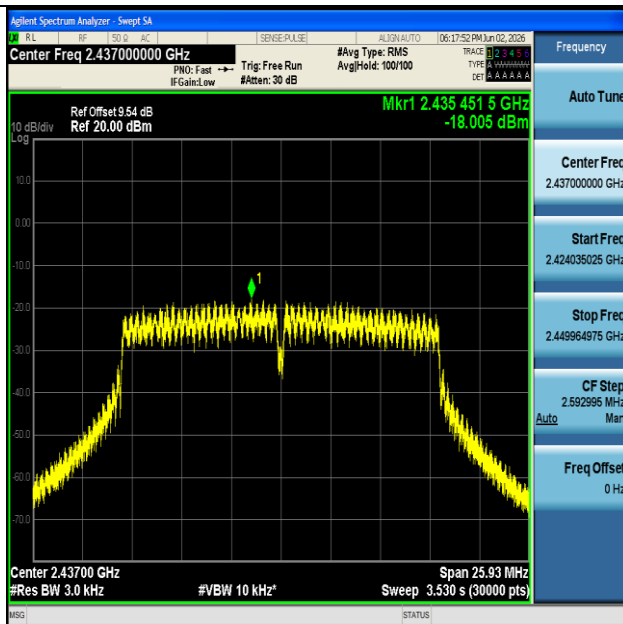


11G-Ant1-2412-PASS

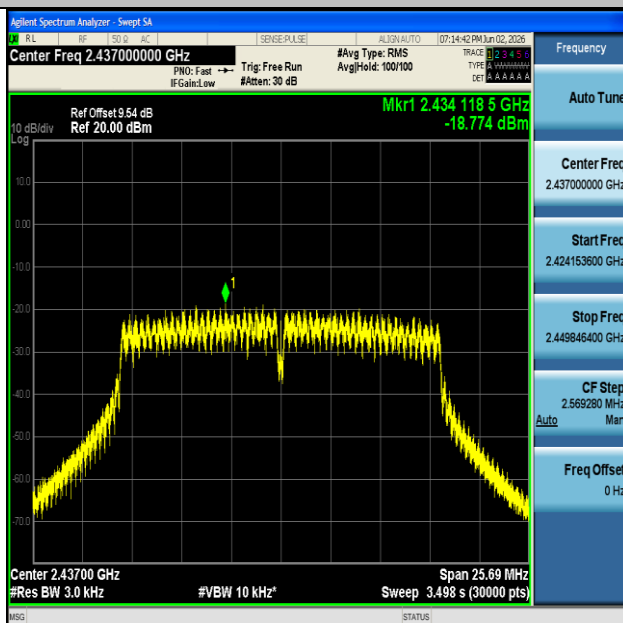


11G-Ant2-2412-PASS



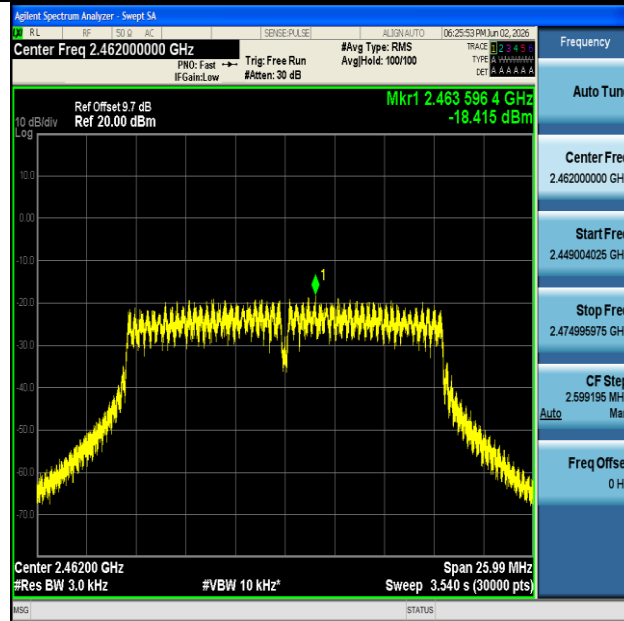


11G-Ant1-2437-PASS

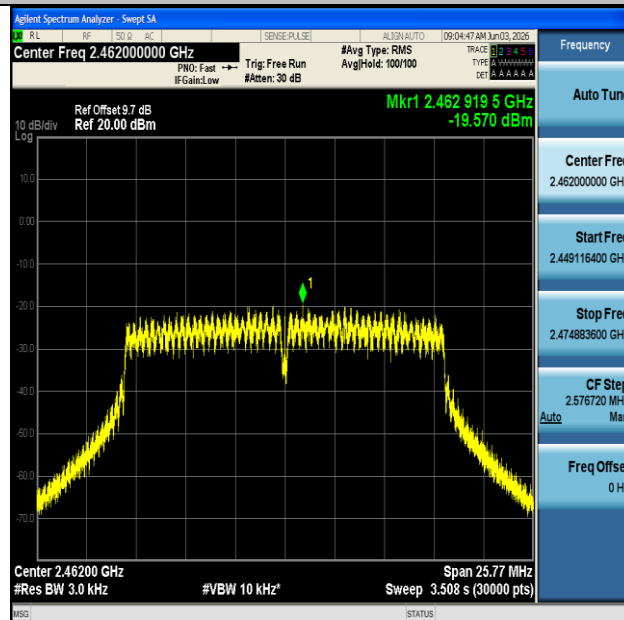


11G-Ant2-2437-PASS



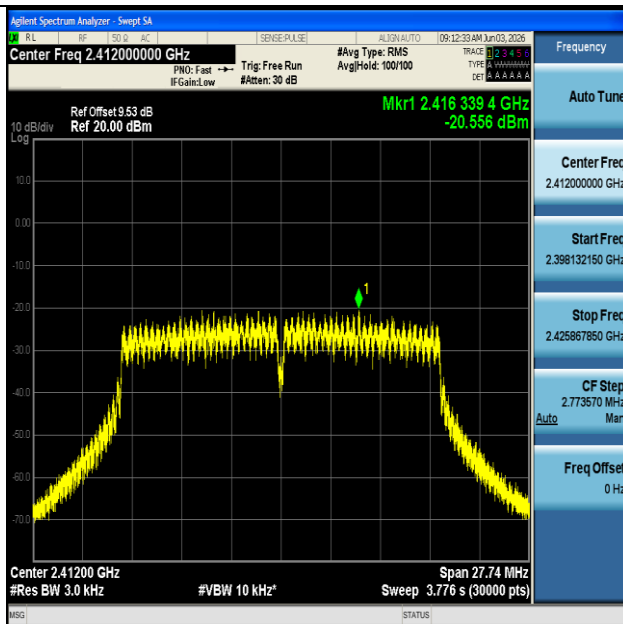


11G-Ant1-2462-PASS

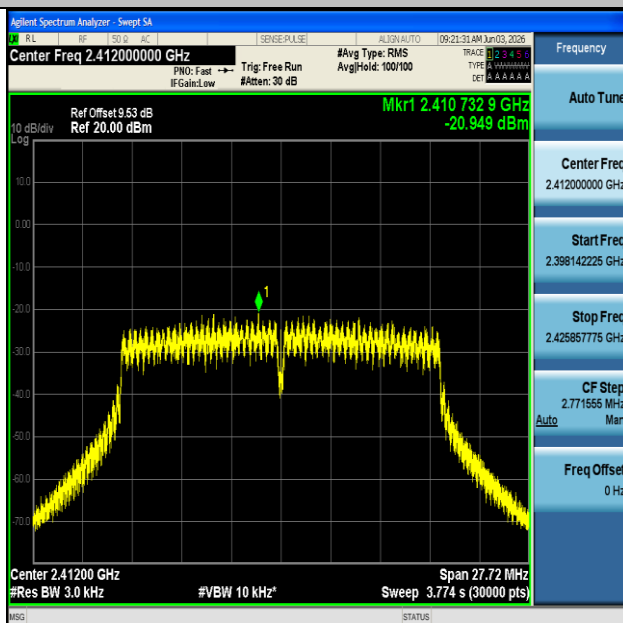


11G-Ant2-2462-PASS



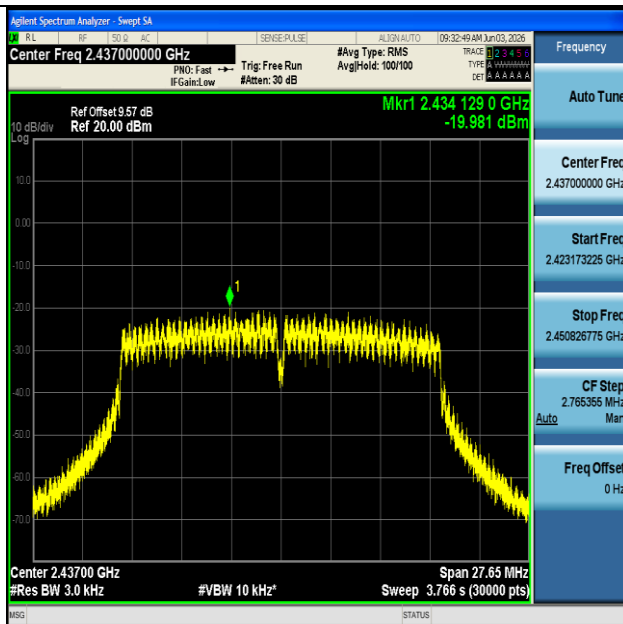


11N20MIMO-Ant1-2412-PASS

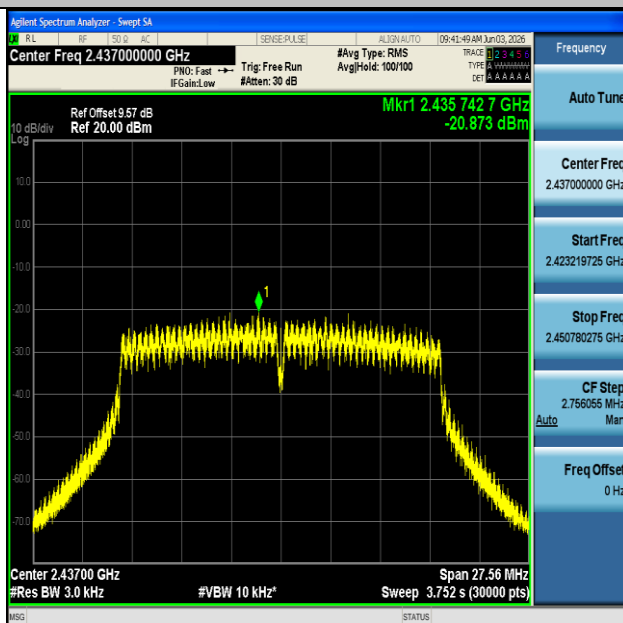


11N20MIMO-Ant2-2412-PASS



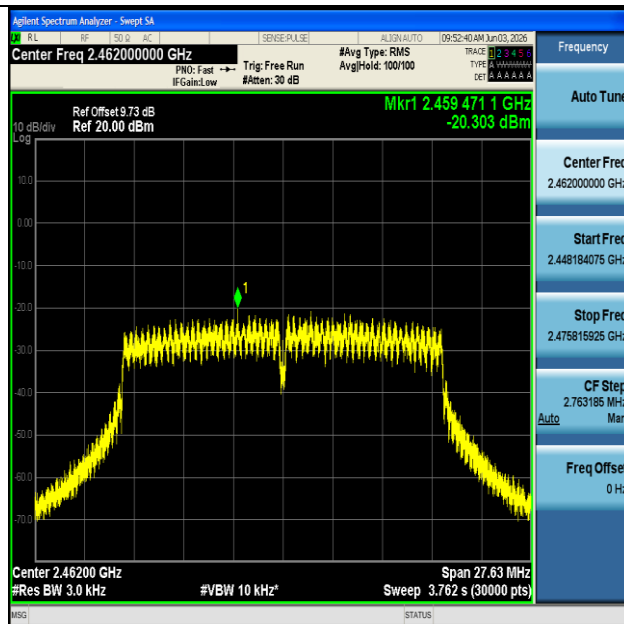


11N20MIMO-Ant1-2437-PASS

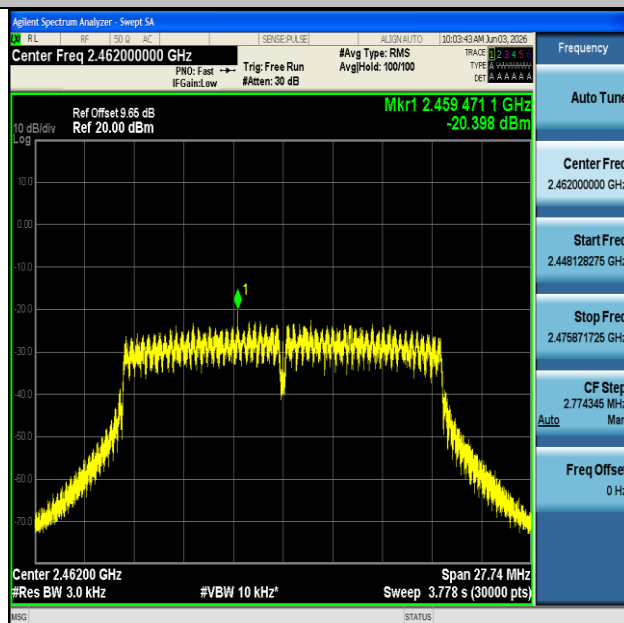


11N20MIMO-Ant2-2437-PASS



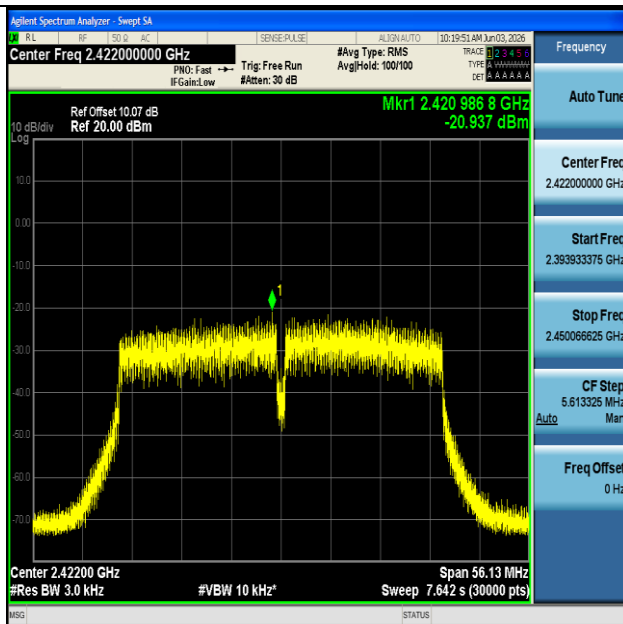


11N20MIMO-Ant1-2462-PASS

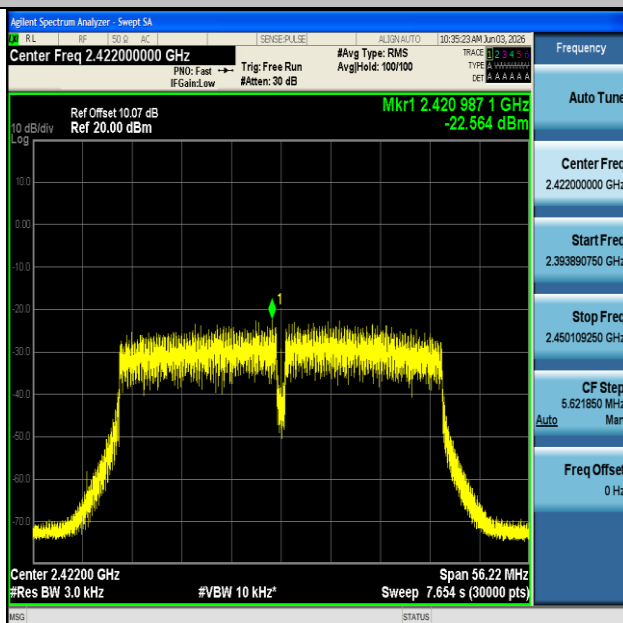


11N20MIMO-Ant2-2462-PASS



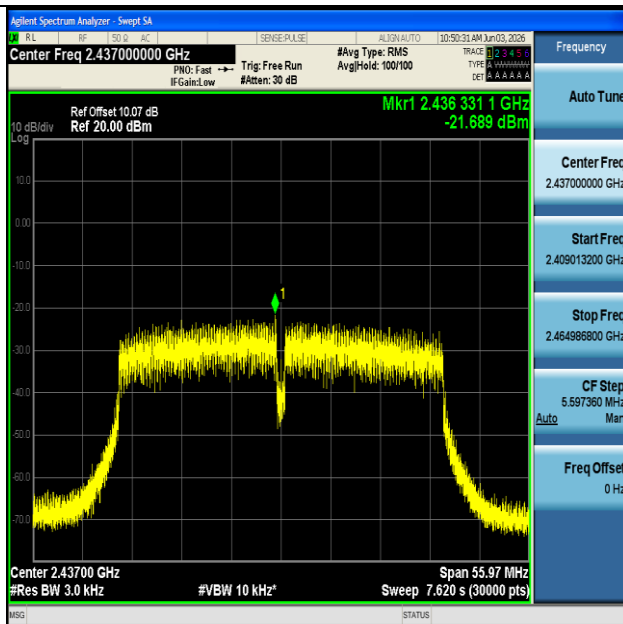


11N40MIMO-Ant1-2422-PASS

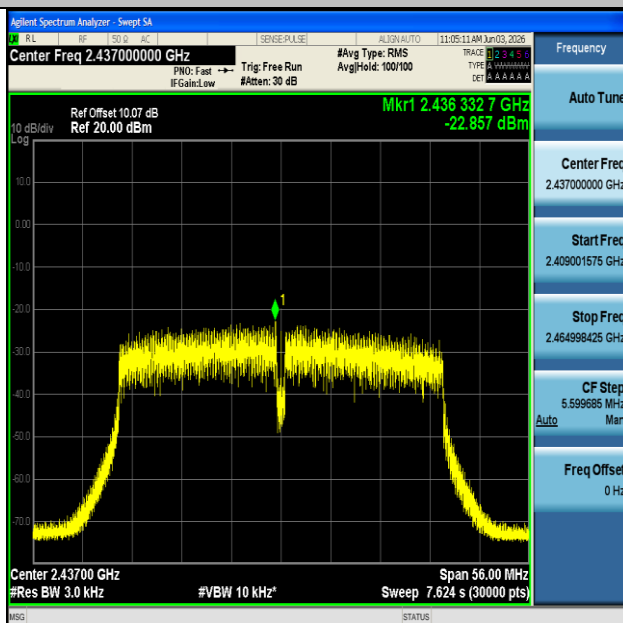


11N40MIMO-Ant2-2422-PASS



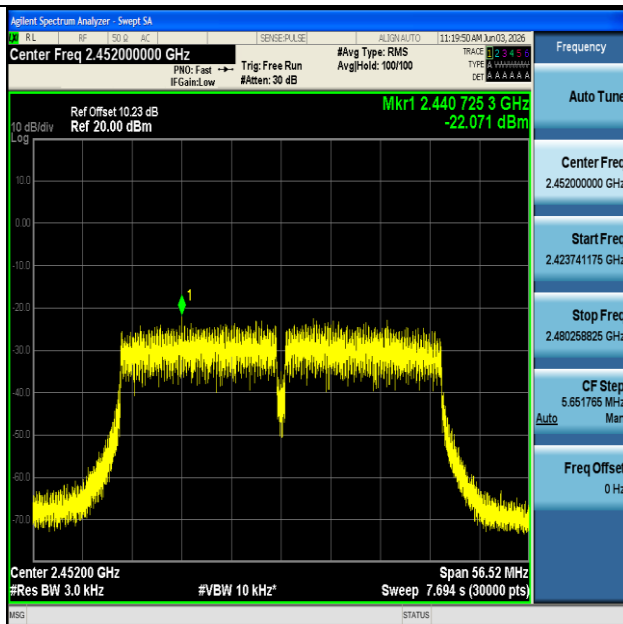


11N40MIMO-Ant1-2437-PASS

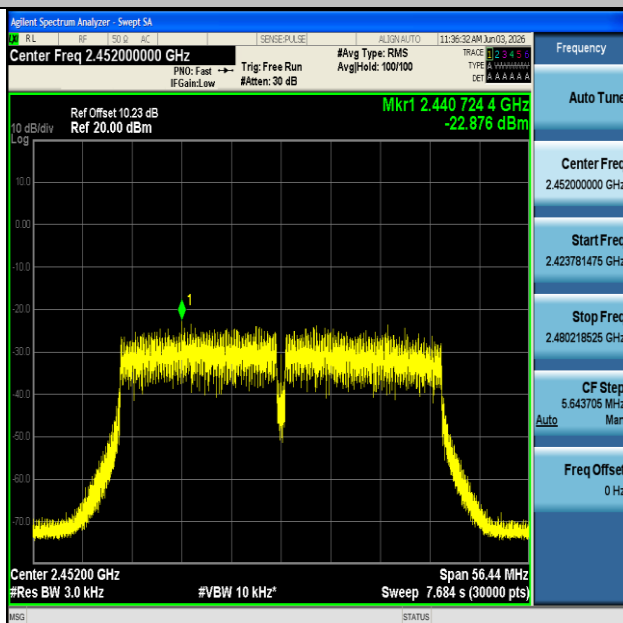


11N40MIMO-Ant2-2437-PASS





11N40MIMO-Ant1-2452-PASS



11N40MIMO-Ant2-2452-PASS





Appendix E: Band edge measurements

Test Result

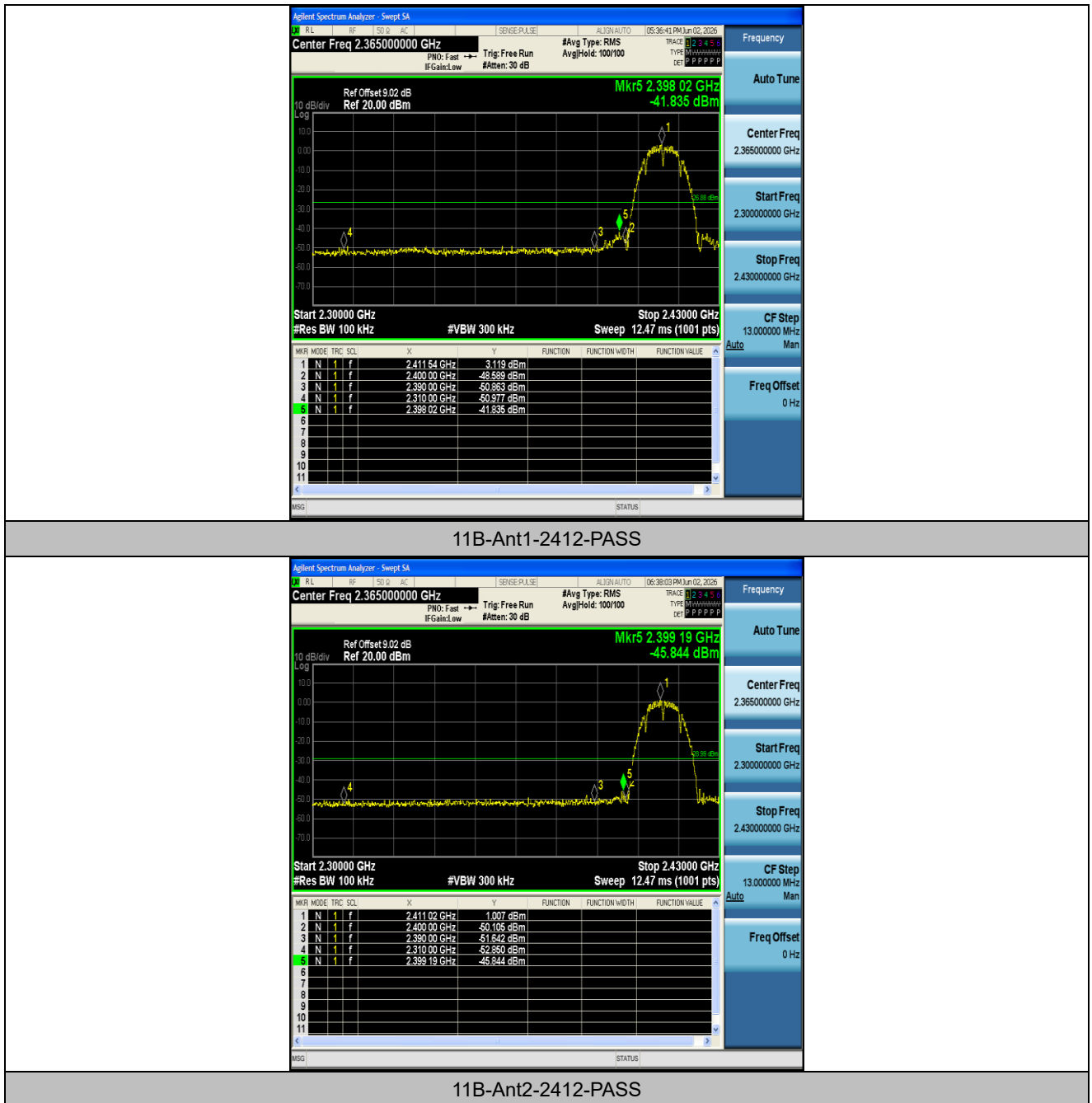
Test Mode	Antenna	Ch. Name	Frequency.[MHz]	Ref. Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	Low	2412	3.12	-41.84	≤-26.88	PASS
11B	Ant2	Low	2412	1.01	-45.84	≤-28.99	PASS
11B	Ant1	High	2462	2.93	-48.59	≤-27.07	PASS
11B	Ant2	High	2462	0.34	-48.72	≤-29.66	PASS
11G	Ant1	Low	2412	1.63	-37.13	≤-28.37	PASS
11G	Ant2	Low	2412	0.93	-38.51	≤-29.08	PASS
11G	Ant1	High	2462	1.61	-47.85	≤-28.39	PASS
11G	Ant2	High	2462	0.27	-48.44	≤-29.73	PASS
11N20MIMO	Ant1	Low	2412	-0.72	-38.42	≤-30.72	PASS
11N20MIMO	Ant2	Low	2412	-1.22	-37.06	≤-31.22	PASS
11N20MIMO	Ant1	High	2462	-0.93	-47.92	≤-30.93	PASS
11N20MIMO	Ant2	High	2462	-2.56	-48.71	≤-32.56	PASS
11N40MIMO	Ant1	Low	2422	-2.33	-40.71	≤-32.33	PASS
11N40MIMO	Ant2	Low	2422	-3.42	-41.75	≤-33.42	PASS
11N40MIMO	Ant1	High	2452	-3.56	-46.62	≤-33.56	PASS
11N40MIMO	Ant2	High	2452	-4.24	-47.85	≤-34.24	PASS

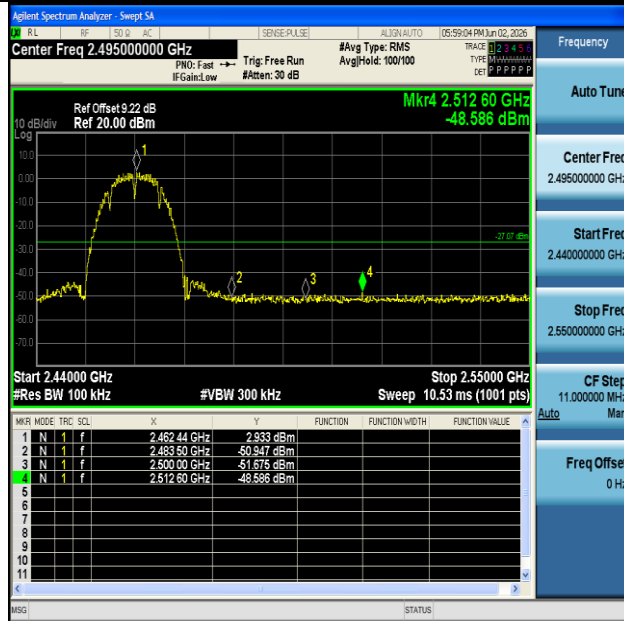
Note: offset(dB) = cable loss(dB) + attenuator factor(dB)



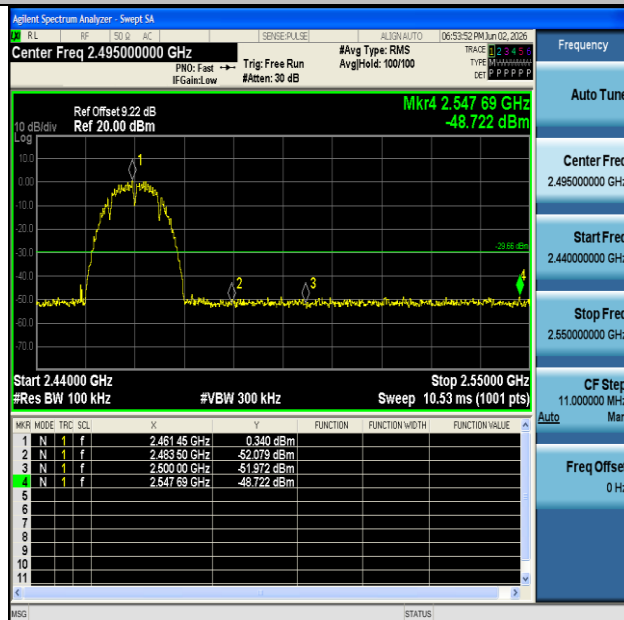


Test Graphs



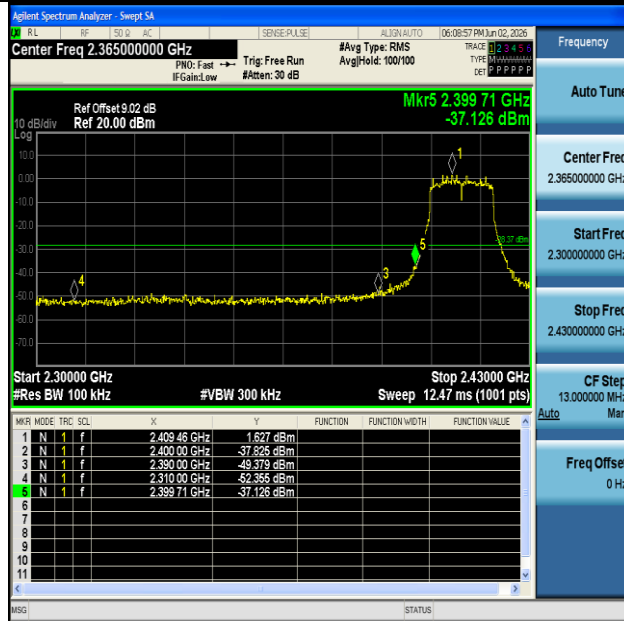


11B-Ant1-2462-PASS

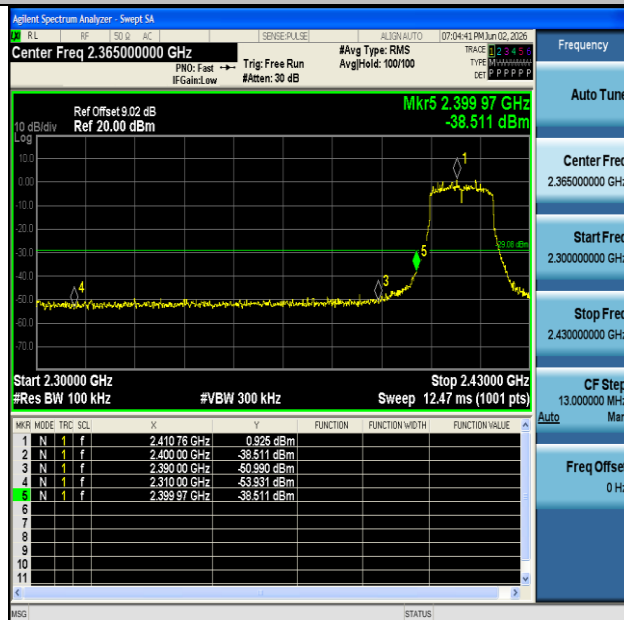


11B-Ant2-2462-PASS



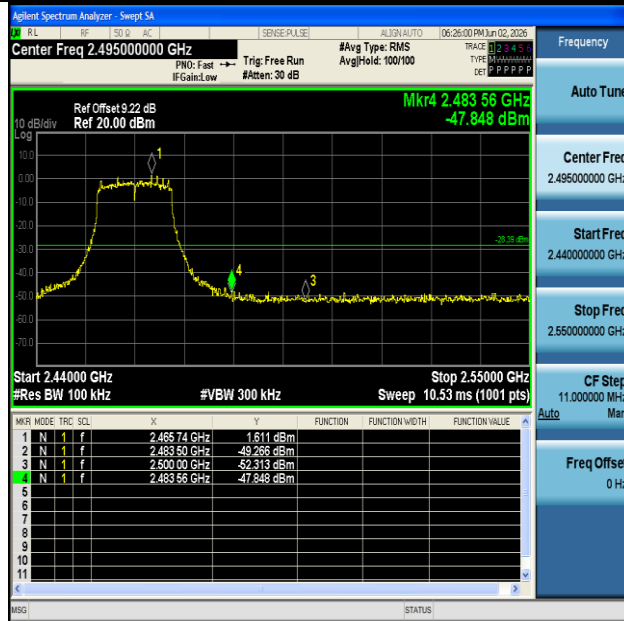


11G-Ant1-2412-PASS

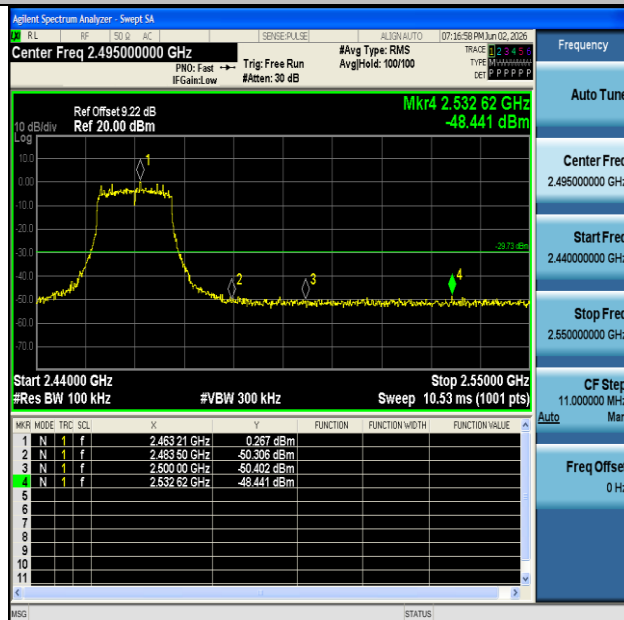


11G-Ant2-2412-PASS



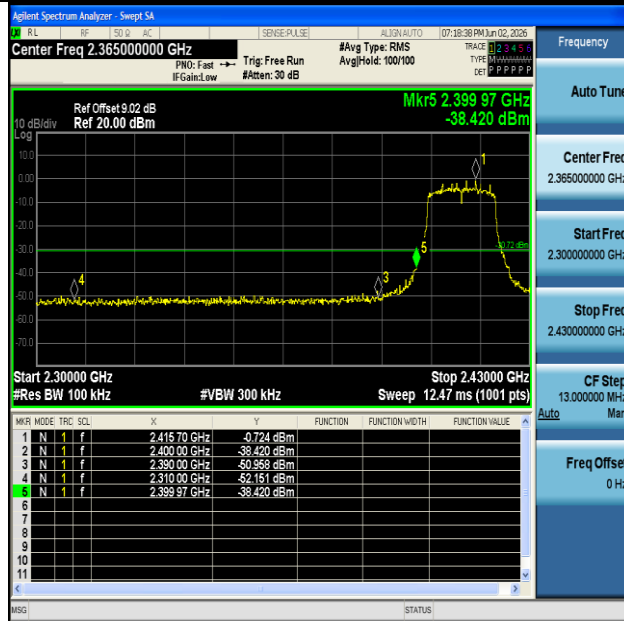


11G-Ant1-2462-PASS

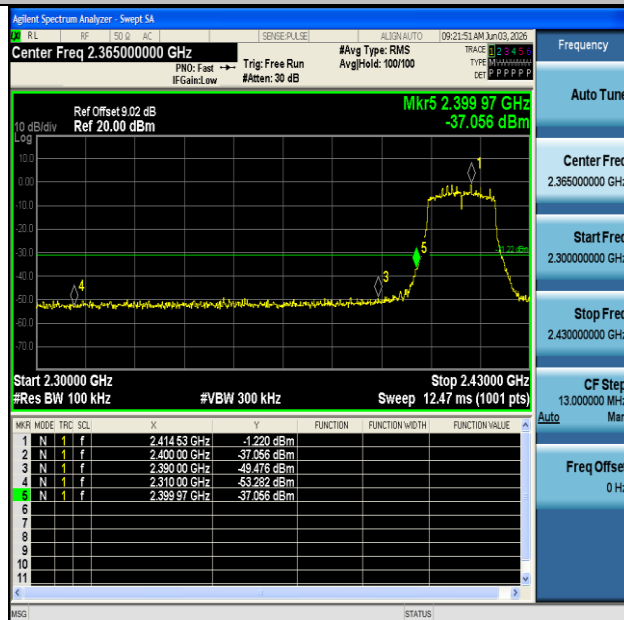


11G-Ant2-2462-PASS



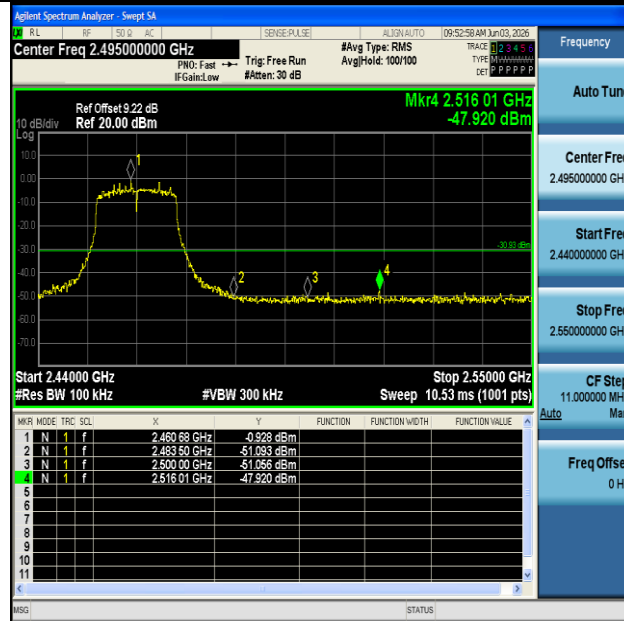


11N20MIMO-Ant1-2412-PASS

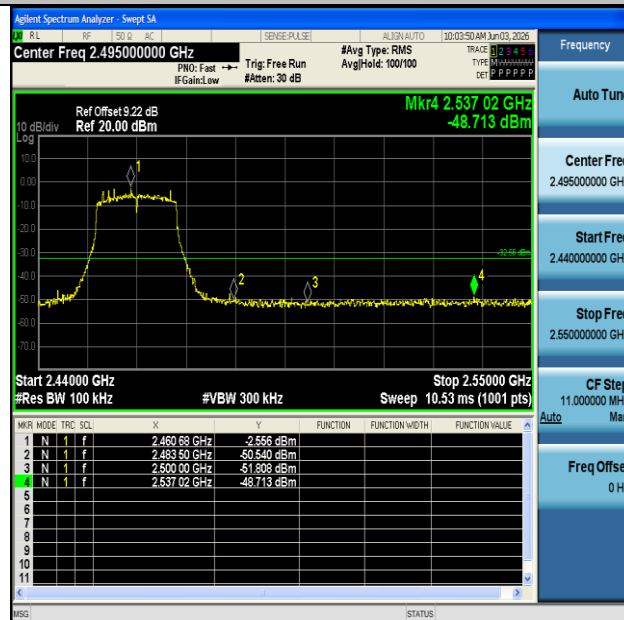


11N20MIMO-Ant2-2412-PASS



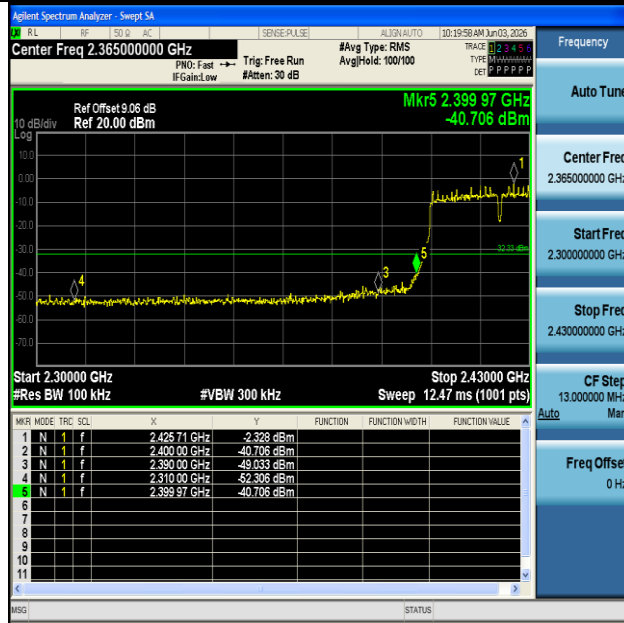


11N20MIMO-Ant1-2462-PASS

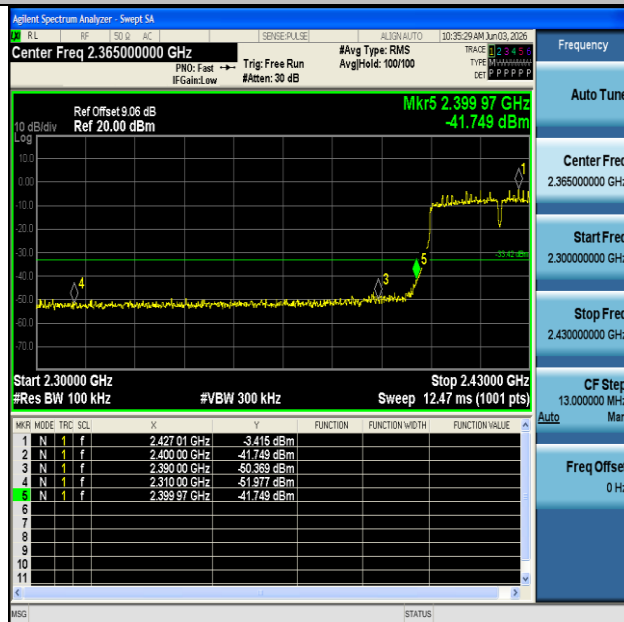


11N20MIMO-Ant2-2462-PASS



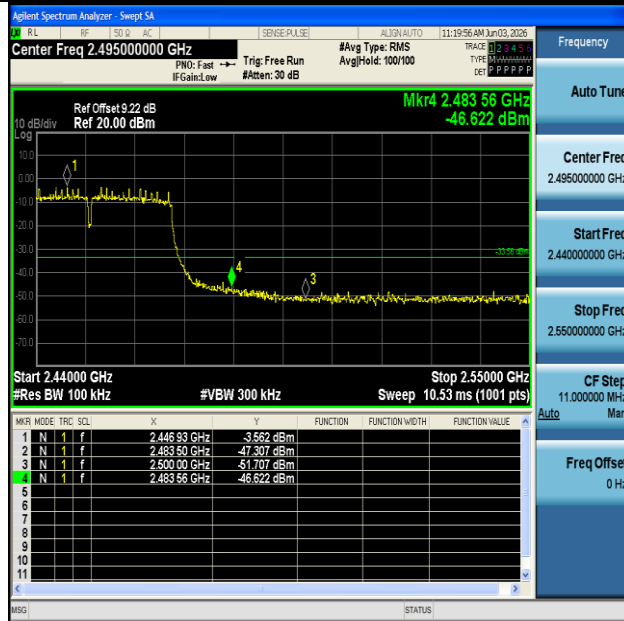


11N40MIMO-Ant1-2422-PASS

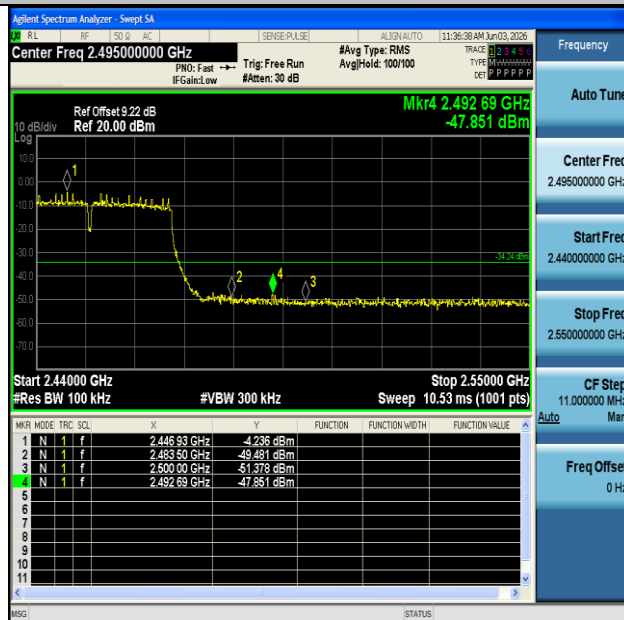


11N40MIMO-Ant2-2422-PASS





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	1.49	1.49	---	PASS
11B	Ant2	2412	0~Reference	0.41	0.41	---	PASS
11B	Ant1	2412	30~1000	1.49	-62.41	≤-28.51	PASS
11B	Ant2	2412	30~1000	0.41	-61.28	≤-29.59	PASS
11B	Ant1	2412	1000~26500	1.49	-37	≤-28.51	PASS
11B	Ant2	2412	1000~26500	0.41	-37.77	≤-29.59	PASS
11B	Ant1	2437	0~Reference	1.42	1.42	---	PASS
11B	Ant2	2437	0~Reference	1.57	1.57	---	PASS
11B	Ant1	2437	30~1000	1.42	-62.64	≤-28.58	PASS
11B	Ant2	2437	30~1000	1.57	-62.69	≤-28.43	PASS
11B	Ant1	2437	1000~26500	1.42	-37	≤-28.58	PASS
11B	Ant2	2437	1000~26500	1.57	-37.35	≤-28.43	PASS
11B	Ant1	2462	0~Reference	2.75	2.75	---	PASS
11B	Ant2	2462	0~Reference	0.19	0.19	---	PASS
11B	Ant1	2462	30~1000	2.75	-62.56	≤-27.25	PASS
11B	Ant2	2462	30~1000	0.19	-61.28	≤-29.81	PASS
11B	Ant1	2462	1000~26500	2.75	-37.82	≤-27.25	PASS
11B	Ant2	2462	1000~26500	0.19	-36.95	≤-29.81	PASS
11G	Ant1	2412	0~Reference	-1.30	-1.30	---	PASS
11G	Ant2	2412	0~Reference	-0.12	-0.12	---	PASS
11G	Ant1	2412	30~1000	-1.30	-62.48	≤-31.3	PASS
11G	Ant2	2412	30~1000	-0.12	-59.88	≤-30.12	PASS
11G	Ant1	2412	1000~26500	-1.30	-37.41	≤-31.3	PASS
11G	Ant2	2412	1000~26500	-0.12	-36.74	≤-30.12	PASS
11G	Ant1	2437	0~Reference	0.64	0.64	---	PASS
11G	Ant2	2437	0~Reference	-2.02	-2.02	---	PASS
11G	Ant1	2437	30~1000	0.64	-62.48	≤-29.36	PASS
11G	Ant2	2437	30~1000	-2.02	-62.09	≤-32.02	PASS
11G	Ant1	2437	1000~26500	0.64	-37.84	≤-29.36	PASS
11G	Ant2	2437	1000~26500	-2.02	-36.6	≤-32.02	PASS
11G	Ant1	2462	0~Reference	-1.06	-1.06	---	PASS
11G	Ant2	2462	0~Reference	-1.63	-1.63	---	PASS
11G	Ant1	2462	30~1000	-1.06	-61.83	≤-31.06	PASS
11G	Ant2	2462	30~1000	-1.63	-61.7	≤-31.63	PASS
11G	Ant1	2462	1000~26500	-1.06	-37.35	≤-31.06	PASS
11G	Ant2	2462	1000~26500	-1.63	-37.24	≤-31.63	PASS
11N20MIMO	Ant1	2412	0~Reference	-3.87	-3.87	---	PASS

