

Appendix B: Test Results of Bluetooth Low Energy

APPENDIX B.1: TEST RESULTS OF FREQUENCY TOLERANCE	2
<i>Test Result.....</i>	<i>2</i>
<i>Test Graphs.....</i>	<i>3</i>
APPENDIX B.2: TEST RESULTS OF ANTENNA POWER	10
<i>Test Result.....</i>	<i>10</i>
APPENDIX B.3: TEST RESULTS OF OCCUPIED CHANNEL BANDWIDTH (99%).....	12
<i>Test Result.....</i>	<i>12</i>
<i>Test Graphs.....</i>	<i>13</i>
APPENDIX B.4: TEST RESULTS OF SPREAD BANDWIDTH (90%).....	20
<i>Test Result.....</i>	<i>20</i>
<i>Test Graphs.....</i>	<i>21</i>
APPENDIX B.5: TEST RESULTS OF SPURIOUS EMISSIONS FOR TRANSMITTER.....	28
<i>Test Result.....</i>	<i>28</i>
<i>Test Result_Step2</i>	<i>30</i>
<i>Test Graphs.....</i>	<i>31</i>
<i>Test Graphs_Step2.....</i>	<i>68</i>
APPENDIX B.6: TEST RESULTS OF SPURIOUS EMISSIONS FOR RECEIVER	71
<i>Test Result.....</i>	<i>71</i>
<i>Test Graphs.....</i>	<i>72</i>

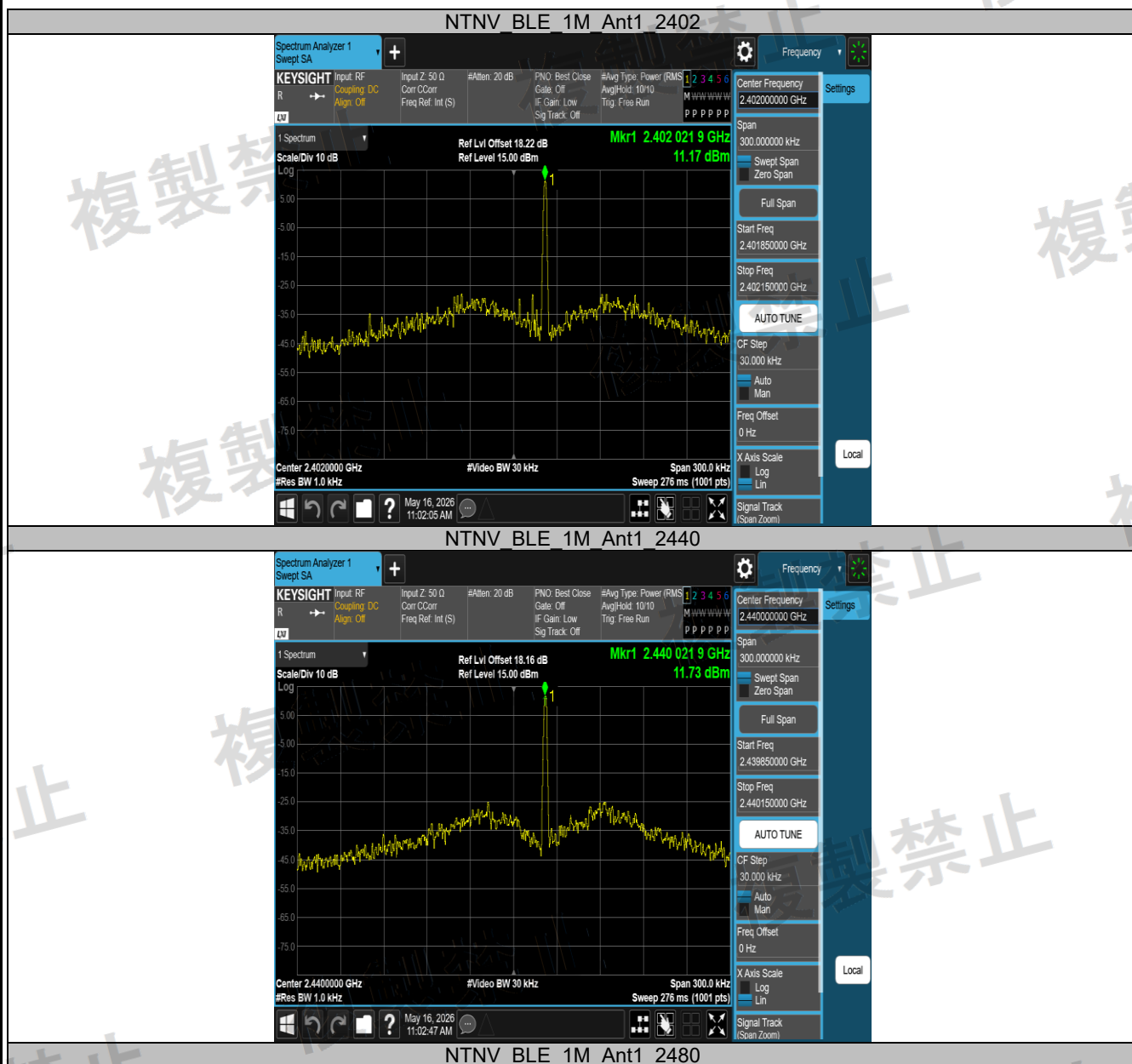
Appendix B.1: Test Results of Frequency Tolerance

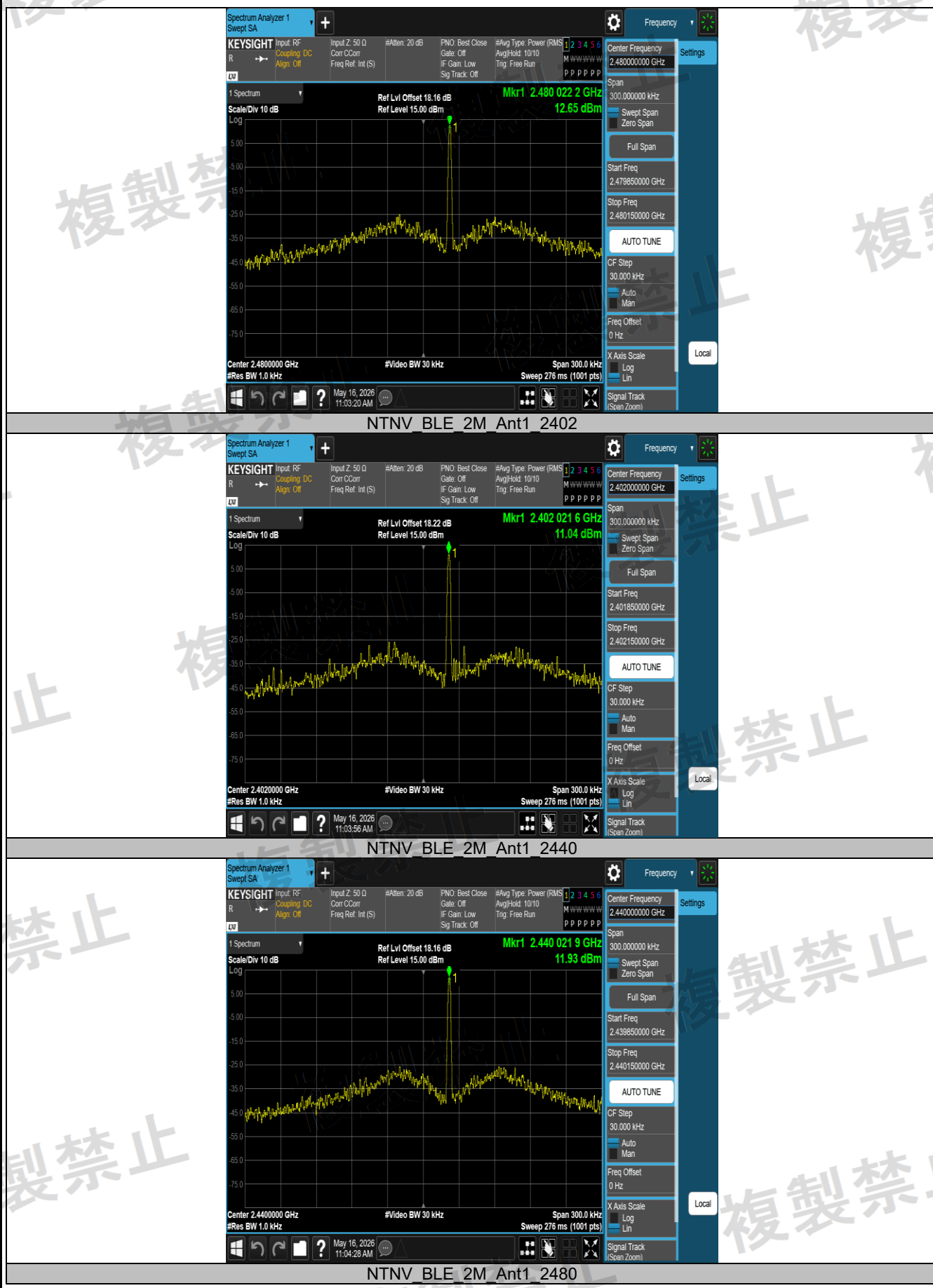
Test Result

TestCondition	TestMode	Antenna	Freq(MHz)	Result[ppm]	Limit[ppm]	Verdict
NTNV	BLE_1M	Ant1	2402	9.11740	±50	PASS
			2440	8.97541	±50	PASS
			2480	8.95161	±50	PASS
	BLE_2M	Ant1	2402	8.99251	±50	PASS
			2440	8.97541	±50	PASS
			2480	8.95161	±50	PASS
NTLV	BLE_1M	Ant1	2402	9.11740	±50	PASS
			2440	8.97541	±50	PASS
			2480	8.95161	±50	PASS
	BLE_2M	Ant1	2402	8.99251	±50	PASS
			2440	8.97541	±50	PASS
			2480	8.95161	±50	PASS
NTHV	BLE_1M	Ant1	2402	9.11740	±50	PASS
			2440	8.97541	±50	PASS
			2480	8.95161	±50	PASS
	BLE_2M	Ant1	2402	8.99251	±50	PASS
			2440	8.97541	±50	PASS
			2480	8.95161	±50	PASS



Test Graphs



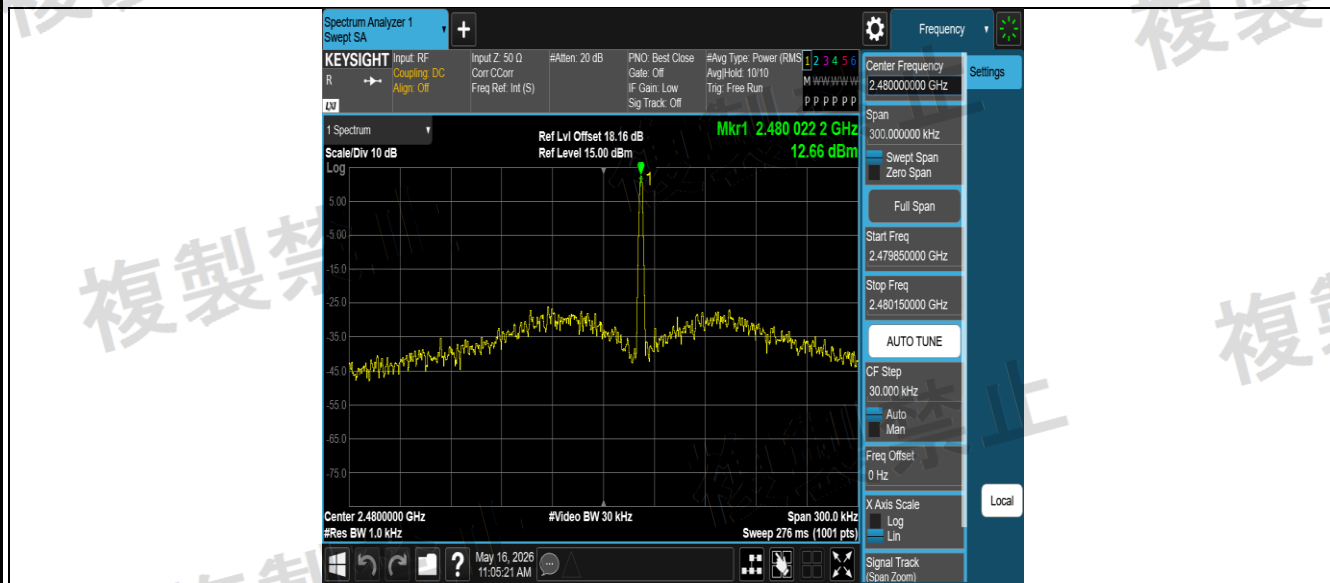












Appendix B.2: Test Results of Antenna Power

Test Result

Antenna Power							
TestCondition	TestMode	Antenna	Freq(MHz)	Result(dBm)	Result(mW)	Limit(mW)	Verdict
NTNV	BLE_1M	Ant1	2402	5.95	3.9355	≤10	PASS
			2440	5.58	3.6141	≤10	PASS
			2480	5.02	3.1769	≤10	PASS
	BLE_2M	Ant1	2402	5.81	3.8107	≤10	PASS
			2440	5.48	3.5318	≤10	PASS
			2480	4.89	3.0832	≤10	PASS
NTLV	BLE_1M	Ant1	2402	5.94	3.9264	≤10	PASS
			2440	5.59	3.6224	≤10	PASS
			2480	5.01	3.1696	≤10	PASS
	BLE_2M	Ant1	2402	5.82	3.8194	≤10	PASS
			2440	5.48	3.5318	≤10	PASS
			2480	4.91	3.0974	≤10	PASS
NTHV	BLE_1M	Ant1	2402	5.94	3.9264	≤10	PASS
			2440	5.60	3.6308	≤10	PASS
			2480	5.00	3.1623	≤10	PASS
	BLE_2M	Ant1	2402	5.81	3.8107	≤10	PASS
			2440	5.48	3.5318	≤10	PASS
			2480	4.90	3.0903	≤10	PASS

Tolerance								
Test Condition	Test Mode	Antenna	Freq(MHz)	Power (mW)	RatedPower (mW)	Result (%)	Limit (%)	Verdict
NTNV	BLE_1M	Ant1	2402	3.9355	10	-60.64	-80 to +20	PASS
			2440	3.6141	10	-63.86	-80 to +20	PASS
			2480	3.1769	10	-68.23	-80 to +20	PASS
	BLE_2M	Ant1	2402	3.8107	10	-61.89	-80 to +20	PASS
			2440	3.5318	10	-64.68	-80 to +20	PASS
			2480	3.0832	10	-69.17	-80 to +20	PASS
NTLV	BLE_1M	Ant1	2402	3.9264	10	-60.74	-80 to +20	PASS
			2440	3.6224	10	-63.78	-80 to +20	PASS
			2480	3.1696	10	-68.30	-80 to +20	PASS
	BLE_2M	Ant1	2402	3.8194	10	-61.81	-80 to +20	PASS
			2440	3.5318	10	-64.68	-80 to +20	PASS
			2480	3.0974	10	-69.03	-80 to +20	PASS
NTHV	BLE_1M	Ant1	2402	3.9264	10	-60.74	-80 to +20	PASS
			2440	3.6308	10	-63.69	-80 to +20	PASS
			2480	3.1623	10	-68.38	-80 to +20	PASS
	BLE_2M	Ant1	2402	3.8107	10	-61.89	-80 to +20	PASS
			2440	3.5318	10	-64.68	-80 to +20	PASS
			2480	3.0903	10	-69.10	-80 to +20	PASS



EIRP							
TestCondition	TestMode	Antenna	Freq(MHz)	Power (dBm)	EIRP(dBm)	Limit(dBm)	Verdict
NTNV	BLE_1M	Ant1	2402	5.95	8.83	≤12.14	PASS
			2440	5.58	8.46	≤12.14	PASS
			2480	5.02	7.90	≤12.14	PASS
	BLE_2M	Ant1	2402	5.81	8.69	≤12.14	PASS
			2440	5.48	8.36	≤12.14	PASS
			2480	4.89	7.77	≤12.14	PASS
NTLV	BLE_1M	Ant1	2402	5.94	8.82	≤12.14	PASS
			2440	5.59	8.47	≤12.14	PASS
			2480	5.01	7.89	≤12.14	PASS
	BLE_2M	Ant1	2402	5.82	8.70	≤12.14	PASS
			2440	5.48	8.36	≤12.14	PASS
			2480	4.91	7.79	≤12.14	PASS
NTHV	BLE_1M	Ant1	2402	5.94	8.82	≤12.14	PASS
			2440	5.60	8.48	≤12.14	PASS
			2480	5.00	7.88	≤12.14	PASS
	BLE_2M	Ant1	2402	5.81	8.69	≤12.14	PASS
			2440	5.48	8.36	≤12.14	PASS
			2480	4.90	7.78	≤12.14	PASS



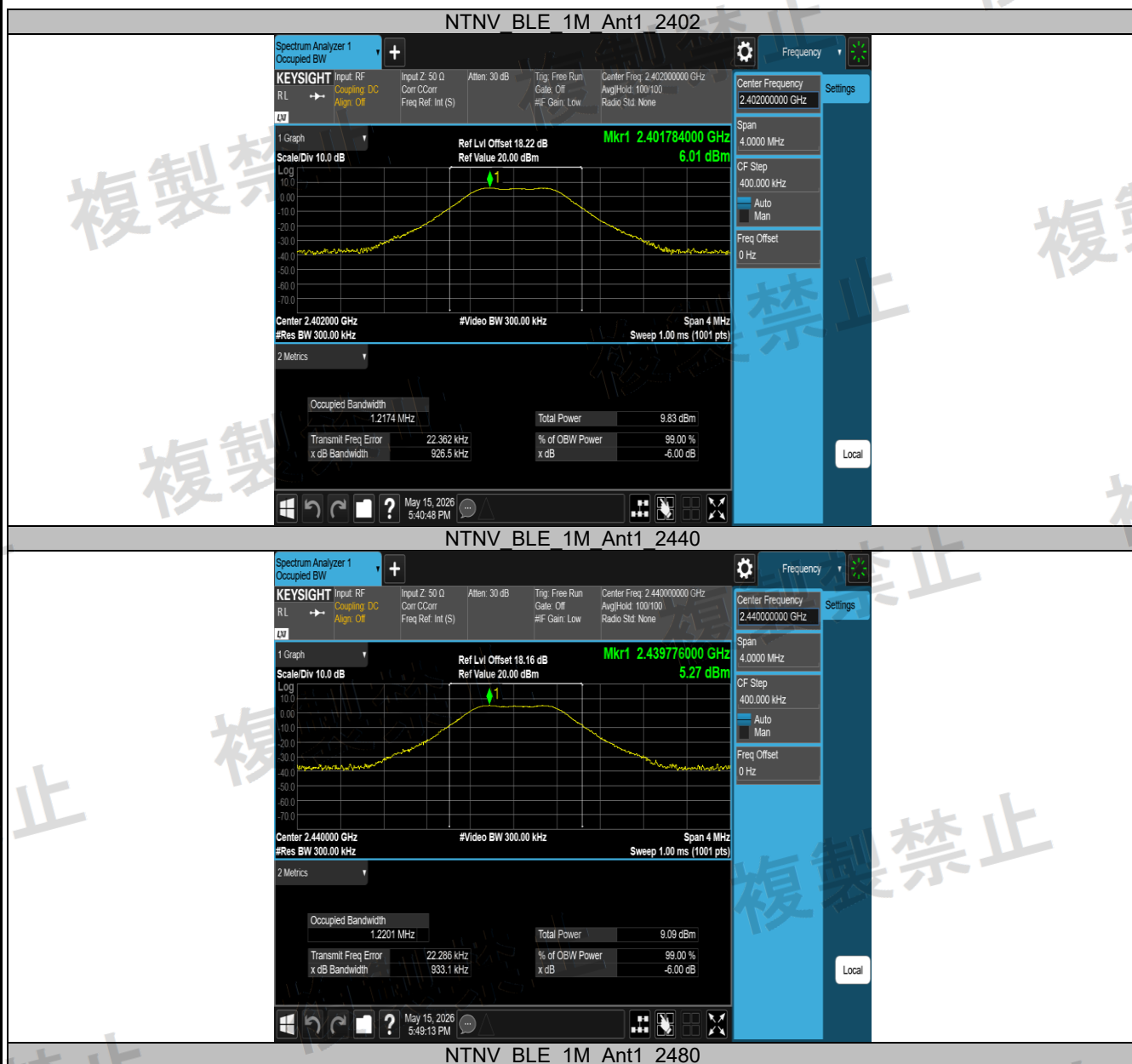
Appendix B.3: Test Results of Occupied Channel Bandwidth (99%)

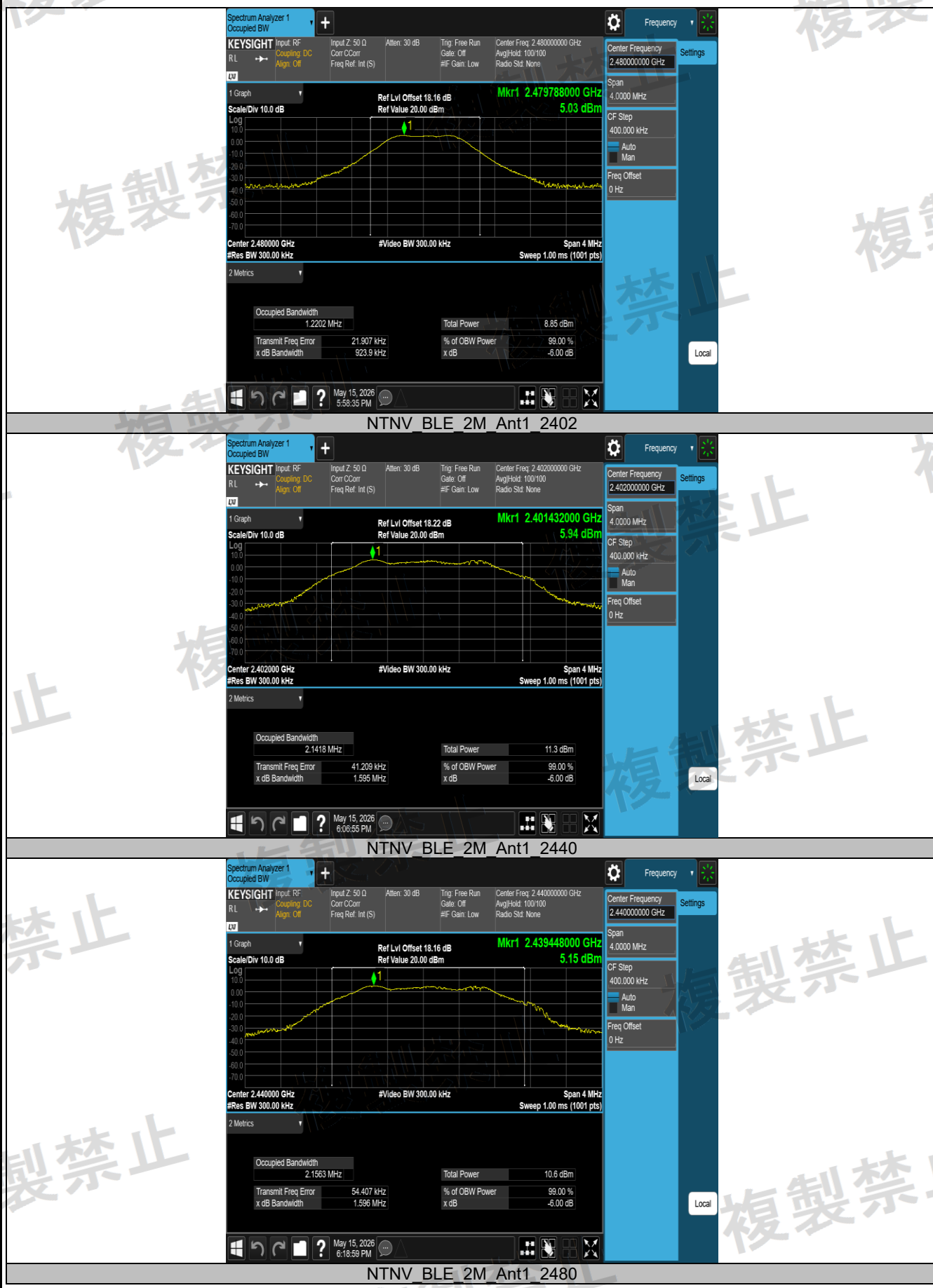
Test Result

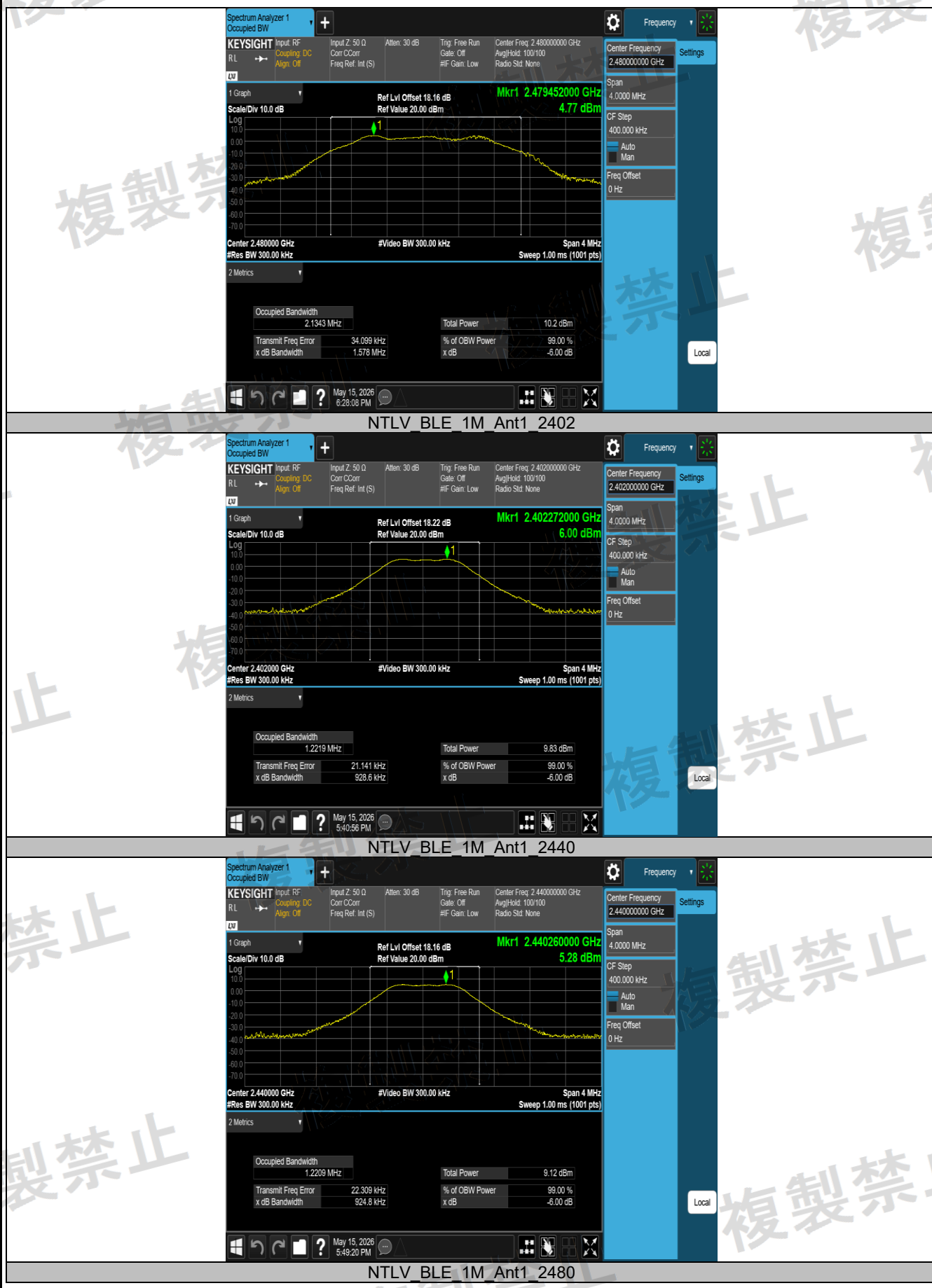
TestCondition	TestMode	Antenna	Freq(MHz)	Result [MHz]	Limit [MHz]	Verdict
NTNV	BLE_1M	Ant1	2402	1.217	≤26	PASS
			2440	1.220	≤26	PASS
			2480	1.220	≤26	PASS
	BLE_2M	Ant1	2402	2.142	≤26	PASS
			2440	2.156	≤26	PASS
			2480	2.134	≤26	PASS
NTLV	BLE_1M	Ant1	2402	1.222	≤26	PASS
			2440	1.221	≤26	PASS
			2480	1.219	≤26	PASS
	BLE_2M	Ant1	2402	2.149	≤26	PASS
			2440	2.167	≤26	PASS
			2480	2.151	≤26	PASS
NTHV	BLE_1M	Ant1	2402	1.215	≤26	PASS
			2440	1.219	≤26	PASS
			2480	1.217	≤26	PASS
	BLE_2M	Ant1	2402	2.138	≤26	PASS
			2440	2.143	≤26	PASS
			2480	2.145	≤26	PASS

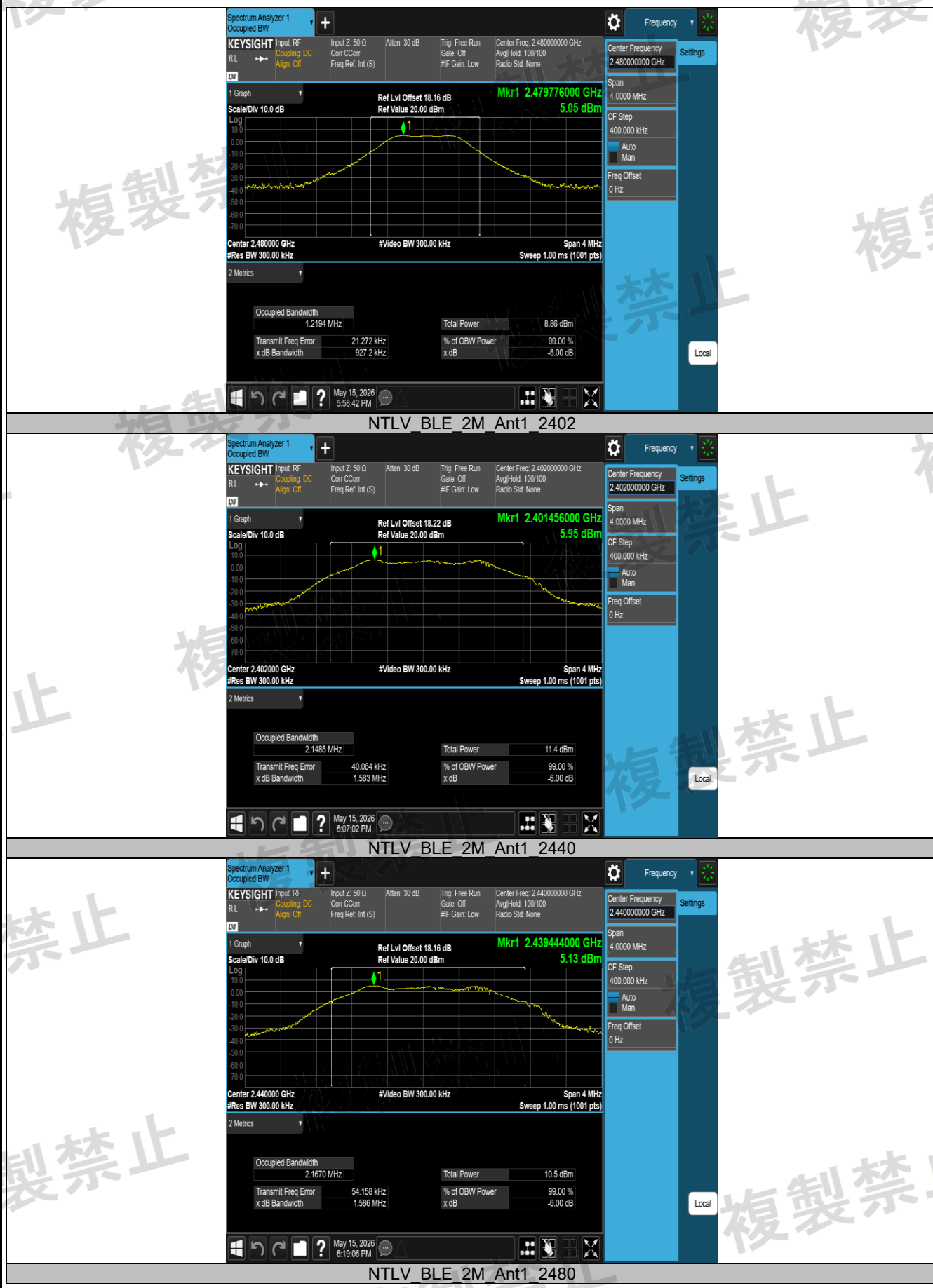


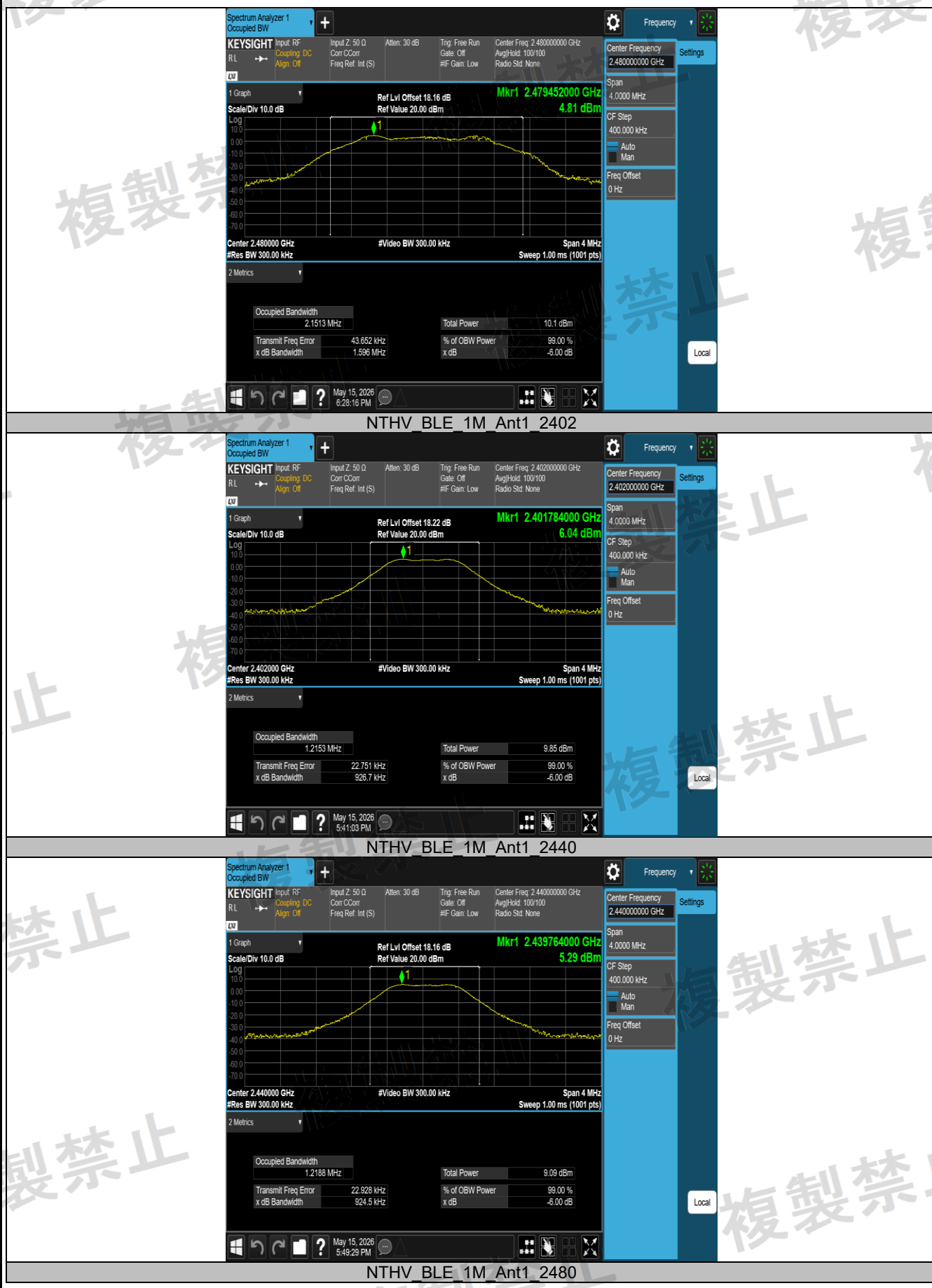
Test Graphs

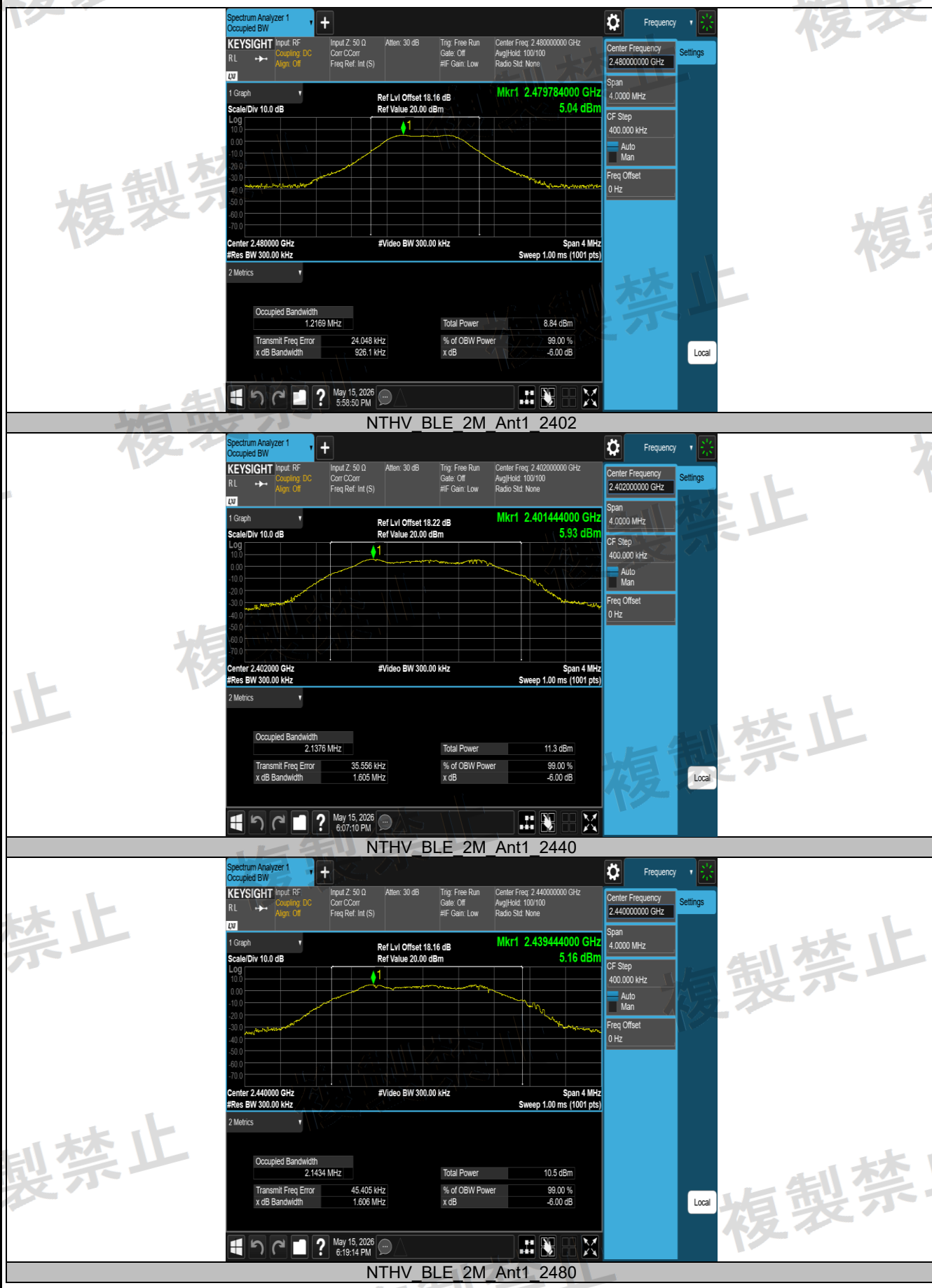


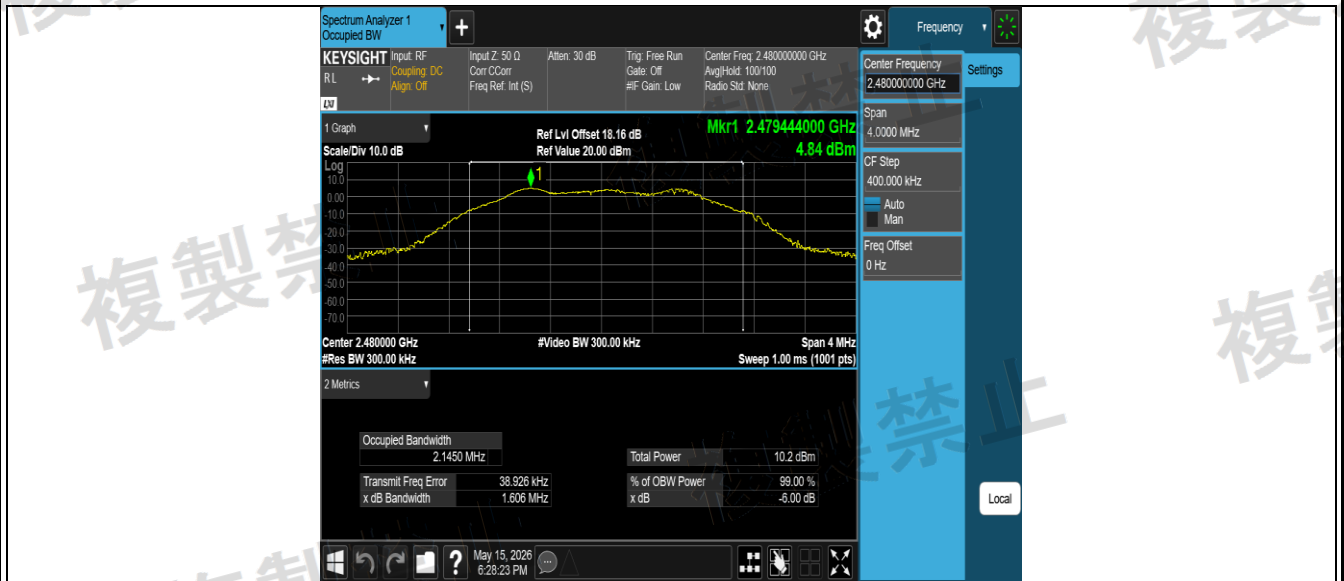












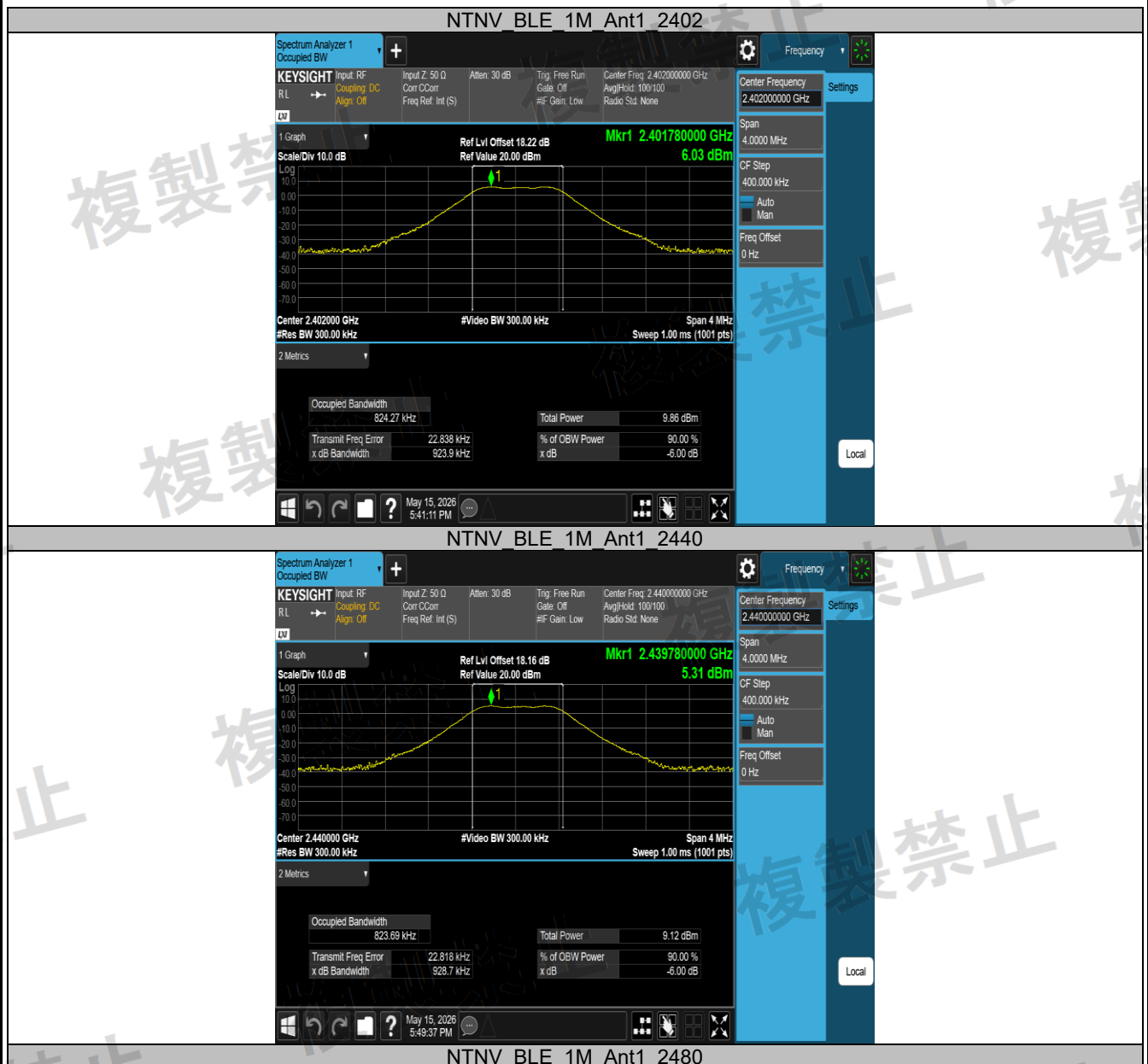


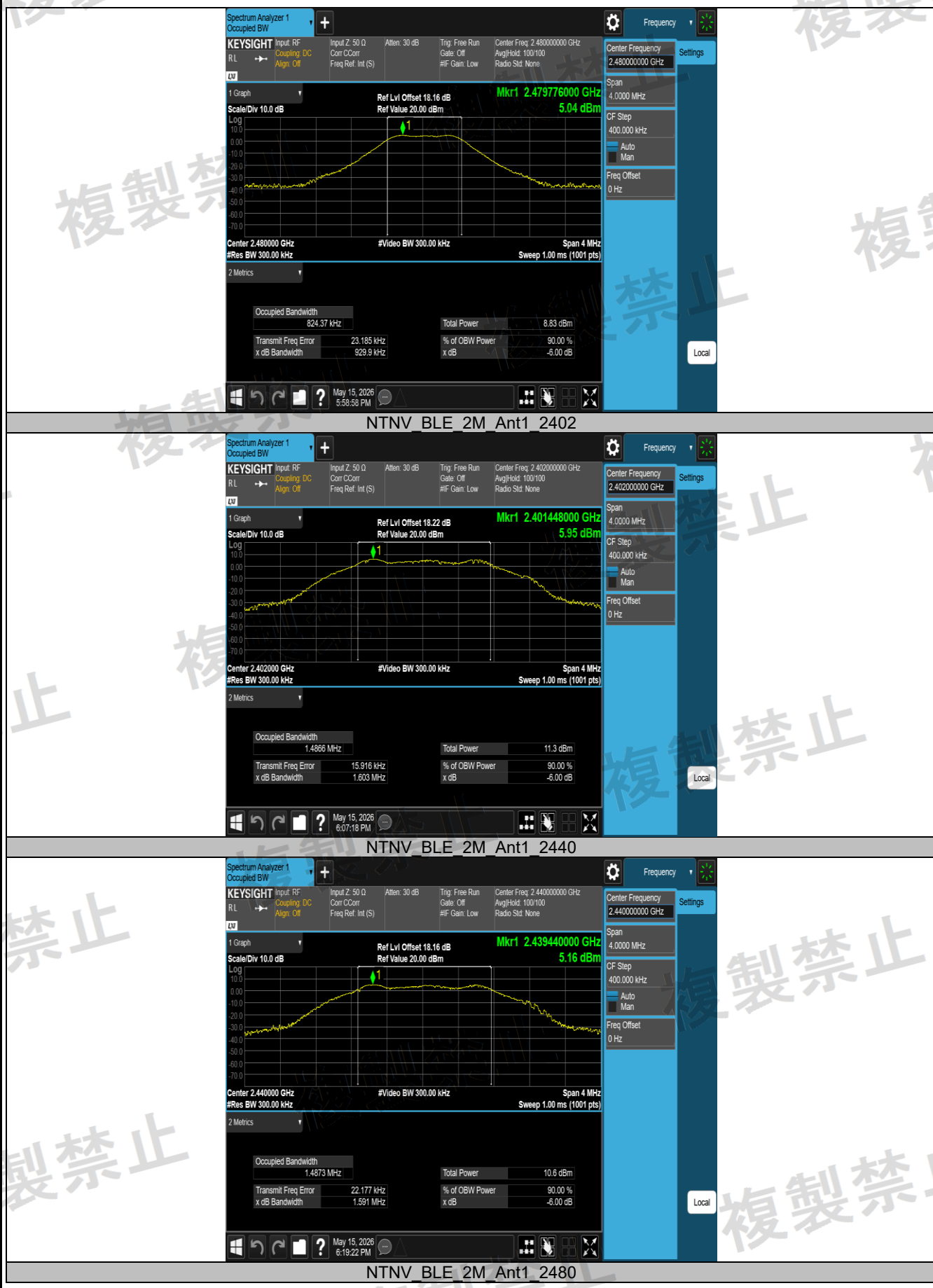
Appendix B.4: Test Results of Spread Bandwidth (90%)

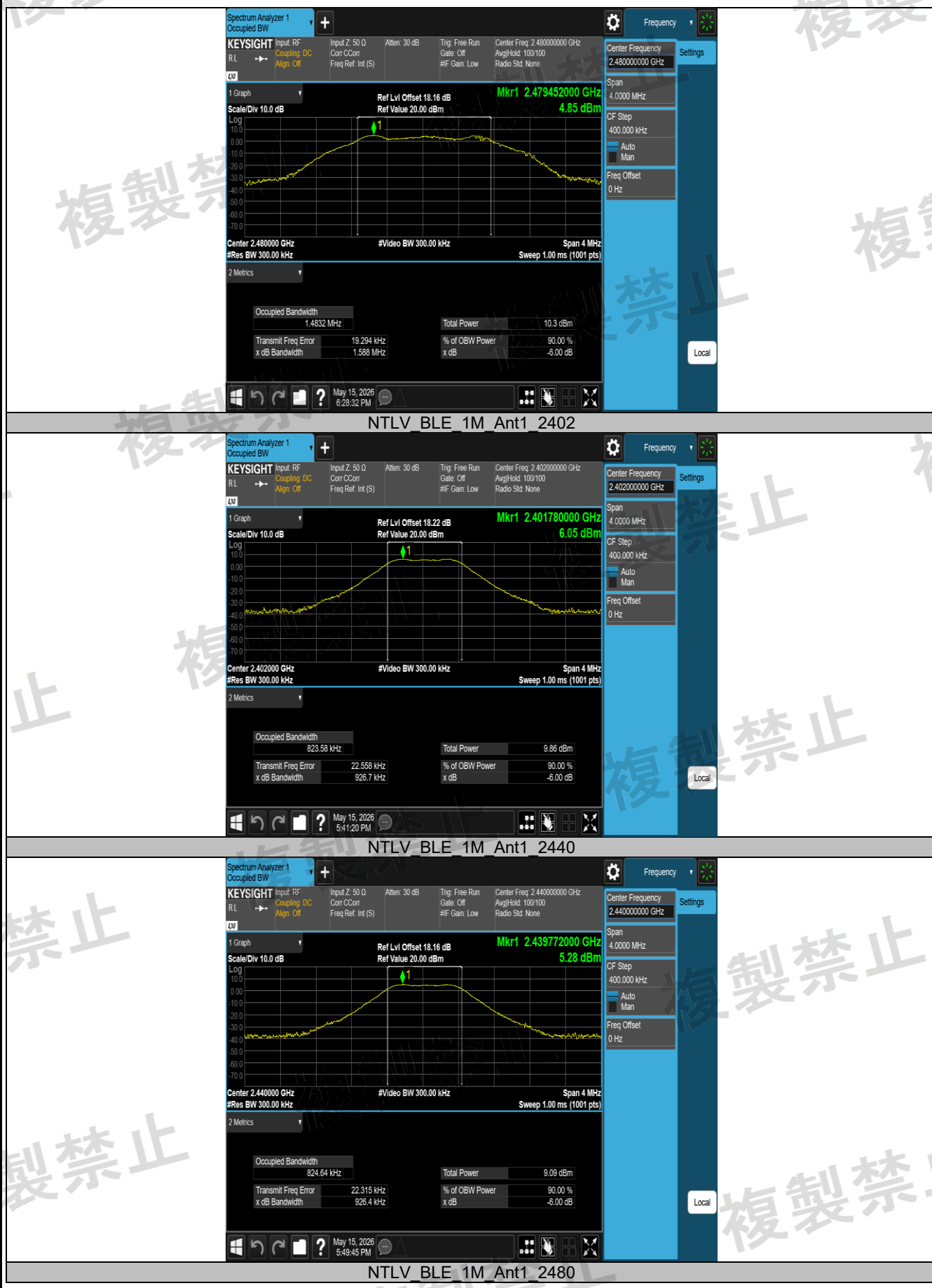
Test Result

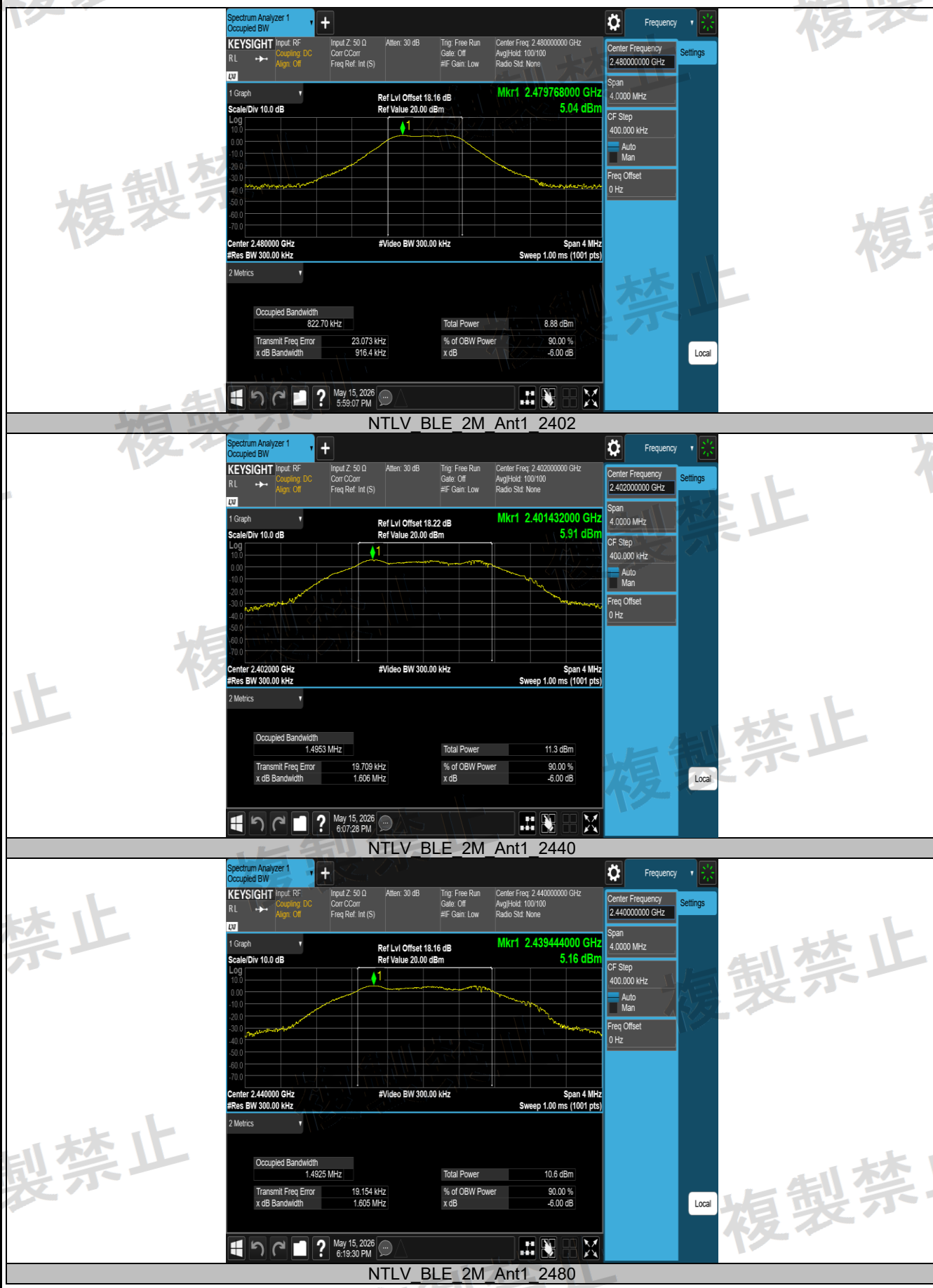
TestCondition	TestMode	Antenna	Freq(MHz)	Result [MHz]	Limit [MHz]	Verdict
NTNV	BLE_1M	Ant1	2402	0.824	≥0.5	PASS
			2440	0.824	≥0.5	PASS
			2480	0.824	≥0.5	PASS
	BLE_2M	Ant1	2402	1.487	≥0.5	PASS
			2440	1.487	≥0.5	PASS
			2480	1.483	≥0.5	PASS
NTLV	BLE_1M	Ant1	2402	0.824	≥0.5	PASS
			2440	0.825	≥0.5	PASS
			2480	0.823	≥0.5	PASS
	BLE_2M	Ant1	2402	1.495	≥0.5	PASS
			2440	1.493	≥0.5	PASS
			2480	1.490	≥0.5	PASS
NTHV	BLE_1M	Ant1	2402	0.824	≥0.5	PASS
			2440	0.825	≥0.5	PASS
			2480	0.824	≥0.5	PASS
	BLE_2M	Ant1	2402	1.490	≥0.5	PASS
			2440	1.488	≥0.5	PASS
			2480	1.484	≥0.5	PASS

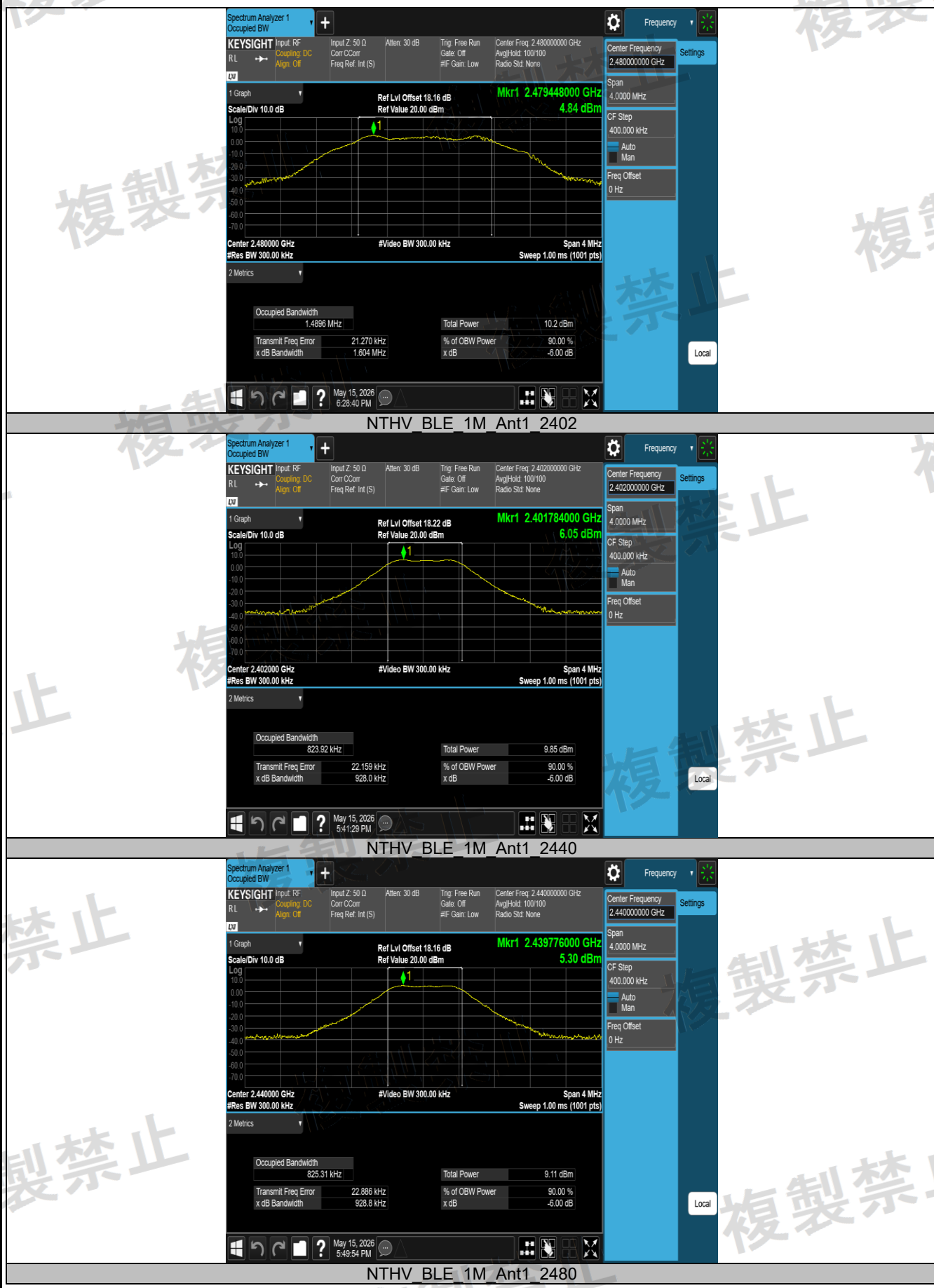
Test Graphs



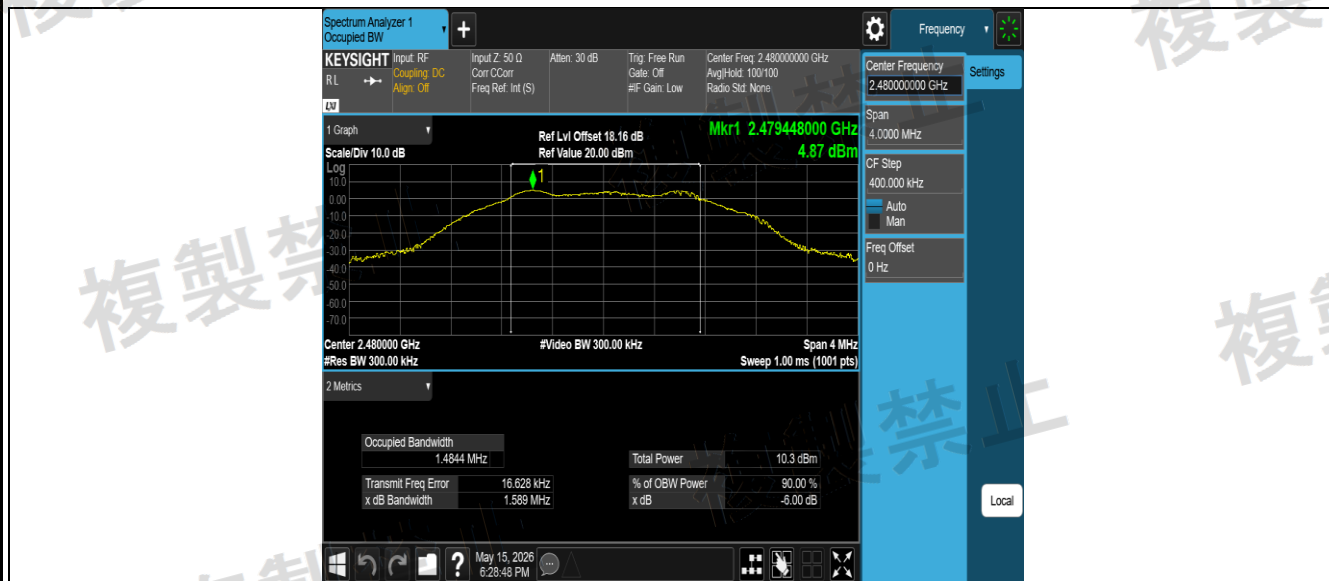












Appendix B.5: Test Results of Spurious Emissions for Transmitter
Test Result

Test Condition	Test Mode	Antenna	Freq (MHz)	Freq.Range [MHz]	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [μW]	Limit [μW]	Verdict
NTNV	BLE_1M	Ant1	2402	30~500	182.40	-48.22	≤-26	0.01507	≤2.5	PASS
				500~1000	546.13	-56.19	≤-26	0.00240	≤2.5	PASS
				1000~2387	2029.50	-43.21	≤-26	0.04775	≤2.5	PASS
				2387~2400	2399.99	-28.22	≤-16	1.50661	≤25	PASS
				2483.5~2496.5	2485.96	-43.79	≤-16	0.04178	≤25	PASS
				2496.5~13000	3500.63	-52.26	≤-26	0.00594	≤2.5	PASS
			2440	30~500	201.55	-47.94	≤-26	0.01607	≤2.5	PASS
				500~1000	979.25	-55.76	≤-26	0.00265	≤2.5	PASS
				1000~2387	2044.76	-43.39	≤-26	0.04581	≤2.5	PASS
				2387~2400	2392.96	-43.78	≤-16	0.04188	≤25	PASS
				2483.5~2496.5	2484.70	-43.16	≤-16	0.04831	≤25	PASS
				2496.5~13000	3795.26	-53.25	≤-26	0.00473	≤2.5	PASS
			2480	30~500	197.79	-48.48	≤-26	0.01419	≤2.5	PASS
				500~1000	569.75	-56.17	≤-26	0.00242	≤2.5	PASS
				1000~2387	2000.03	-42.95	≤-26	0.05070	≤2.5	PASS
				2387~2400	2390.69	-44.13	≤-16	0.03864	≤25	PASS
				2483.5~2496.5	2483.55	-42.17	≤-16	0.06067	≤25	PASS
				2496.5~13000	4960.62	-52.92	≤-26	0.00511	≤2.5	PASS
	BLE_2M	Ant1	2402	30~500	177.82	-47.75	≤-26	0.01679	≤2.5	PASS
				500~1000	893.13	-53.37	≤-26	0.00460	≤2.5	PASS
				1000~2387	2020.49	-43.50	≤-26	0.04467	≤2.5	PASS
				2387~2400	2400	-16.46	≤-16	22.5943 6	≤25	See table below
				2483.5~2496.5	2486.54	-42.61	≤-16	0.05483	≤25	PASS
				2496.5~13000	3754.82	-54.21	≤-26	0.00379	≤2.5	PASS
			2440	30~500	200.61	-46.89	≤-26	0.02046	≤2.5	PASS
				500~1000	941.38	-56.00	≤-26	0.00251	≤2.5	PASS
				1000~2387	2050.65	-42.36	≤-26	0.05808	≤2.5	PASS
				2387~2400	2393.15	-43.64	≤-16	0.04325	≤25	PASS
				2483.5~2496.5	2487.53	-43.67	≤-16	0.04295	≤25	PASS
				2496.5~13000	3774.78	-53.54	≤-26	0.00443	≤2.5	PASS
			2480	30~500	184.28	-48.69	≤-26	0.01352	≤2.5	PASS
				500~1000	933.88	-56.44	≤-26	0.00227	≤2.5	PASS
				1000~2387	2091.57	-42.94	≤-26	0.05082	≤2.5	PASS
				2387~2400	2387.22	-43.72	≤-16	0.04246	≤25	PASS
				2483.5~2496.5	2483.55	-40.73	≤-16	0.08453	≤25	PASS
NTLV	BLE_1M	Ant1	2402	30~500	188.39	-47.97	≤-26	0.01596	≤2.5	PASS
				500~1000	501.13	-55.63	≤-26	0.00274	≤2.5	PASS
				1000~2387	2028.81	-42.88	≤-26	0.05152	≤2.5	PASS
				2387~2400	2400.00	-27.86	≤-16	1.63682	≤25	PASS
				2483.5~2496.5	2490.00	-42.55	≤-16	0.05559	≤25	PASS
				2496.5~13000	3832.55	-53.90	≤-26	0.00407	≤2.5	PASS
			2440	30~500	197.91	-48.70	≤-26	0.01349	≤2.5	PASS
				500~1000	557.13	-56.23	≤-26	0.00238	≤2.5	PASS
				1000~2387	2031.23	-42.97	≤-26	0.05047	≤2.5	PASS
				2387~2400	2389.95	-43.79	≤-16	0.04178	≤25	PASS
				2483.5~2496.5	2494.22	-43.18	≤-16	0.04808	≤25	PASS
				2496.5~13000	3784.23	-53.33	≤-26	0.00465	≤2.5	PASS
			2480	30~500	193.09	-47.57	≤-26	0.01750	≤2.5	PASS
				500~1000	580.25	-56.09	≤-26	0.00246	≤2.5	PASS
				1000~2387	1939.69	-42.87	≤-26	0.05164	≤2.5	PASS
				2387~2400	2387.16	-43.66	≤-16	0.04305	≤25	PASS
				2483.5~2496.5	2483.64	-41.64	≤-16	0.06855	≤25	PASS
				2496.5~13000	4960.62	-53.12	≤-26	0.00488	≤2.5	PASS
	BLE_2M	Ant1	2402	30~500	187.80	-48.22	≤-26	0.01507	≤2.5	PASS

Appendix B

Prüfbericht - Produkte
Test Report - Products

CN26XNH9 001

Page 29 of 90

				500~1000	911.50	-55.96	≤-26	0.00254	≤2.5	PASS					
				1000~2387	1994.13	-42.66	≤-26	0.05420	≤2.5	PASS					
				2387~2400	2400	-16.58	≤-16	21.97860	≤25	See table below					
				2483.5~2496.5	2484.44	-43.74	≤-16	0.04227	≤25	PASS					
				2496.5~13000	3811.54	-54.12	≤-26	0.00387	≤2.5	PASS					
					2440	30~500	194.50	-48.49	≤-26	0.01416	≤2.5	PASS			
						500~1000	593.88	-56.53	≤-26	0.00222	≤2.5	PASS			
						1000~2387	2110.64	-43.30	≤-26	0.04677	≤2.5	PASS			
						2387~2400	2398.19	-43.50	≤-16	0.04467	≤25	PASS			
						2483.5~2496.5	2493.19	-43.57	≤-16	0.04395	≤25	PASS			
					2480	2496.5~13000	3823.62	-52.64	≤-26	0.00545	≤2.5	PASS			
						30~500	182.99	-48.83	≤-26	0.01309	≤2.5	PASS			
						500~1000	639.63	-55.91	≤-26	0.00256	≤2.5	PASS			
						1000~2387	2002.11	-43.31	≤-26	0.04667	≤2.5	PASS			
						2387~2400	2387.39	-43.86	≤-16	0.04111	≤25	PASS			
					Ant1	2402	2483.5~2496.5	2483.52	-40.52	≤-16	0.08872	≤25	PASS		
							2496.5~13000	4959.05	-52.93	≤-26	0.00509	≤2.5	PASS		
30~500	208.13	-48.50					≤-26	0.01413	≤2.5	PASS					
500~1000	777.75	-56.31					≤-26	0.00234	≤2.5	PASS					
1000~2387	2090.53	-42.94					≤-26	0.05082	≤2.5	PASS					
		2440				2387~2400	2400.00	-28.13	≤-16	1.53815	≤25	PASS			
						2483.5~2496.5	2494.82	-42.67	≤-16	0.05408	≤25	PASS			
						2496.5~13000	3811.01	-53.71	≤-26	0.00426	≤2.5	PASS			
						30~500	193.56	-48.68	≤-26	0.01355	≤2.5	PASS			
						500~1000	863.88	-55.41	≤-26	0.00288	≤2.5	PASS			
		2480				1000~2387	2064.87	-43.14	≤-26	0.04853	≤2.5	PASS			
						2387~2400	2394.84	-43.82	≤-16	0.04150	≤25	PASS			
						2483.5~2496.5	2495.38	-43.39	≤-16	0.04581	≤25	PASS			
						2496.5~13000	3696.52	-53.83	≤-26	0.00414	≤2.5	PASS			
						30~500	198.26	-48.55	≤-26	0.01396	≤2.5	PASS			
		Ant1				2402	500~1000	943.63	-55.66	≤-26	0.00272	≤2.5	PASS		
							1000~2387	2045.45	-42.91	≤-26	0.05117	≤2.5	PASS		
			2387~2400	2399.37	-42.83		≤-16	0.05212	≤25	PASS					
			2483.5~2496.5	2483.50	-41.51		≤-16	0.07063	≤25	PASS					
			2496.5~13000	4960.10	-52.09		≤-26	0.00618	≤2.5	PASS					
					2440	30~500	190.04	-48.41	≤-26	0.01442	≤2.5	PASS			
						500~1000	732.13	-56.30	≤-26	0.00234	≤2.5	PASS			
						1000~2387	2049.61	-43.41	≤-26	0.04560	≤2.5	PASS			
						2387~2400	2400	-16.24	≤-16	23.76840	≤25	See table below			
						2483.5~2496.5	2494.59	-43.50	≤-16	0.04467	≤25	PASS			
					2480	2496.5~13000	3858.28	-53.82	≤-26	0.00415	≤2.5	PASS			
						30~500	197.32	-48.38	≤-26	0.01452	≤2.5	PASS			
						500~1000	892.38	-55.48	≤-26	0.00283	≤2.5	PASS			
						1000~2387	2030.89	-43.13	≤-26	0.04864	≤2.5	PASS			
						2387~2400	2391.00	-43.61	≤-16	0.04355	≤25	PASS			
					Ant1	2440	2483.5~2496.5	2484.81	-43.54	≤-16	0.04426	≤25	PASS		
							2496.5~13000	3830.44	-53.82	≤-26	0.00415	≤2.5	PASS		
30~500	212.60	-47.90					≤-26	0.01622	≤2.5	PASS					
500~1000	705.25	-56.05					≤-26	0.00248	≤2.5	PASS					
1000~2387	2043.02	-42.71					≤-26	0.05358	≤2.5	PASS					
		2480				2387~2400	2395.02	-43.90	≤-16	0.04074	≤25	PASS			
						2483.5~2496.5	2483.55	-40.13	≤-16	0.09705	≤25	PASS			
						2496.5~13000	3751.67	-51.61	≤-26	0.00690	≤2.5	PASS			
						30~500	190.04	-48.41	≤-26	0.01442	≤2.5	PASS			
						500~1000	732.13	-56.30	≤-26	0.00234	≤2.5	PASS			
		Ant1				2402	1000~2387	2049.61	-43.41	≤-26	0.04560	≤2.5	PASS		
							2387~2400	2400	-16.24	≤-16	23.76840	≤25	See table below		
							2483.5~2496.5	2494.59	-43.50	≤-16	0.04467	≤25	PASS		
							2496.5~13000	3858.28	-53.82	≤-26	0.00415	≤2.5	PASS		
							30~500	197.32	-48.38	≤-26	0.01452	≤2.5	PASS		
								2440	500~1000	892.38	-55.48	≤-26	0.00283	≤2.5	PASS
									1000~2387	2030.89	-43.13	≤-26	0.04864	≤2.5	PASS
			2387~2400	2391.00	-43.61				≤-16	0.04355	≤25	PASS			
			2483.5~2496.5	2484.81	-43.54				≤-16	0.04426	≤25	PASS			
			2496.5~13000	3830.44	-53.82				≤-26	0.00415	≤2.5	PASS			
					2480	30~500	212.60	-47.90	≤-26	0.01622	≤2.5	PASS			
						500~1000	705.25	-56.05	≤-26	0.00248	≤2.5	PASS			
						1000~2387	2043.02	-42.71	≤-26	0.05358	≤2.5	PASS			
						2387~2400	2395.02	-43.90	≤-16	0.04074	≤25	PASS			
						2483.5~2496.5	2483.55	-40.13	≤-16	0.09705	≤25	PASS			



Test Result_Step2

Test Condition	Test Mode	Antenna	Freq (MHz)	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [μW]	Limit [μW]	Verdict
NTNV	BLE_2M	Ant1	2402	2400.00	-24.49	≤-16	3.55631	≤25	PASS
NTLV	BLE_2M	Ant1	2402	2400.00	-24.50	≤-16	3.54813	≤25	PASS
NTHV	BLE_2M	Ant1	2402	2400.00	-24.51	≤-16	3.53997	≤25	PASS



Test Graphs

