

Appendix: Bluetooth Classic

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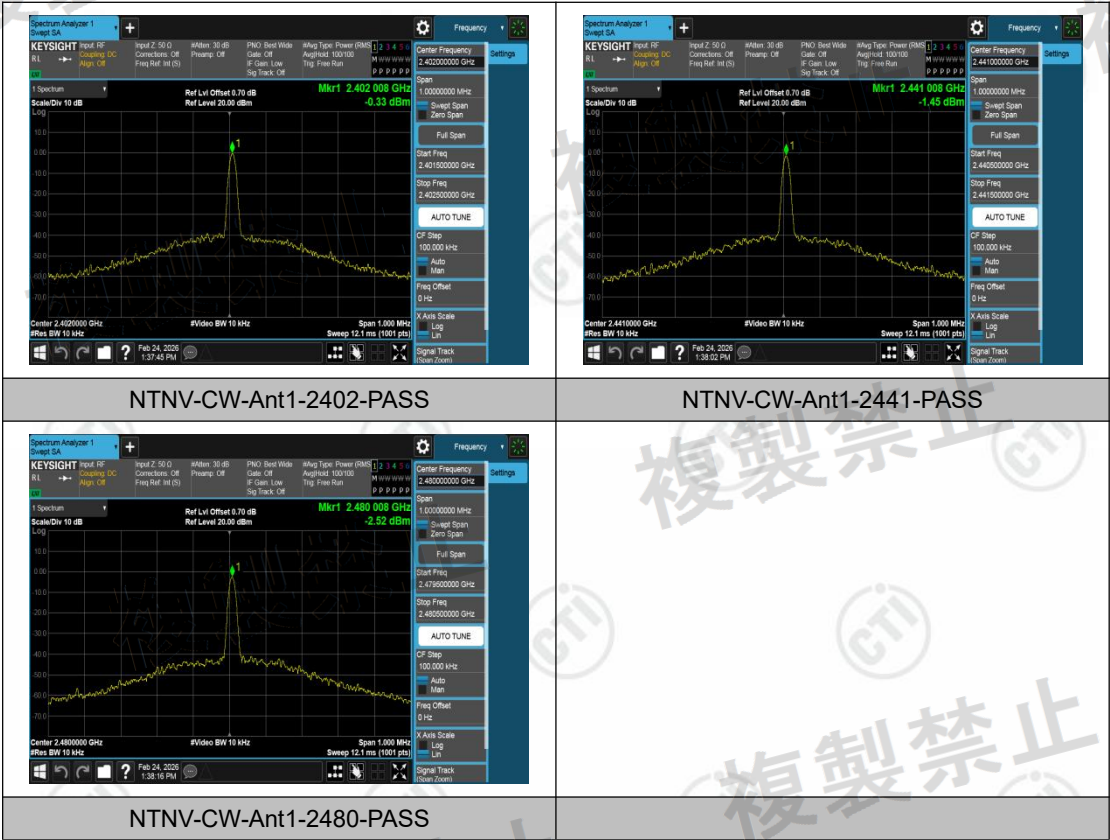
Appendix A: Frequency_Error

Test Result

Test Condition	Test Mode	Antenna	Frequency[MHz]	CenterFreq [MHz]	Result[ppm]	Limit[ppm]	Verdict
NTNV	CW	Ant1	2402	2402.008	3.33056	±50	PASS
NTNV	CW	Ant1	2441	2441.008	3.27735	±50	PASS
NTNV	CW	Ant1	2480	2480.008	3.22581	±50	PASS

Note: Result[ppm]= (CenterFreq - Channel)/Channel*1000000

Test Graphs



Appendix B: Antenna Power

Test Result

Test Condition	Test Mode	Antenna	Frequency [MHz]	Conducted Sensor power[dBm]	SpreadBW [MHz]	Result [mW/MHz]	Limit [mW/MHz]	Verdict
NTNV	DH5	Ant1	Hop	13.25	70.617	0.387	≤3	PASS
NTNV	2DH5	Ant1	Hop	13.25	70.797	0.385	≤3	PASS
NTNV	3DH5	Ant1	Hop	13.27	71.043	0.385	≤3	PASS

Note: Antenna Power(mW/MHz)=Power(mW)/Spread Bandwidth(MHz)/Duty Cycle(%)*100;

Test Condition	Test Mode	Antenna	Freq (MHz)	Power (mW/MHz)	Rated Power (mW/MHz)	Result (%)	Limit (%)	Verdict
NTNV	DH5	Ant1	Hop	0.387	0.4	-3.250	+20	PASS
NTNV	2DH5	Ant1	Hop	0.385	0.4	-3.750	+20	PASS
NTNV	3DH5	Ant1	Hop	0.385	0.4	-3.750	+20	PASS

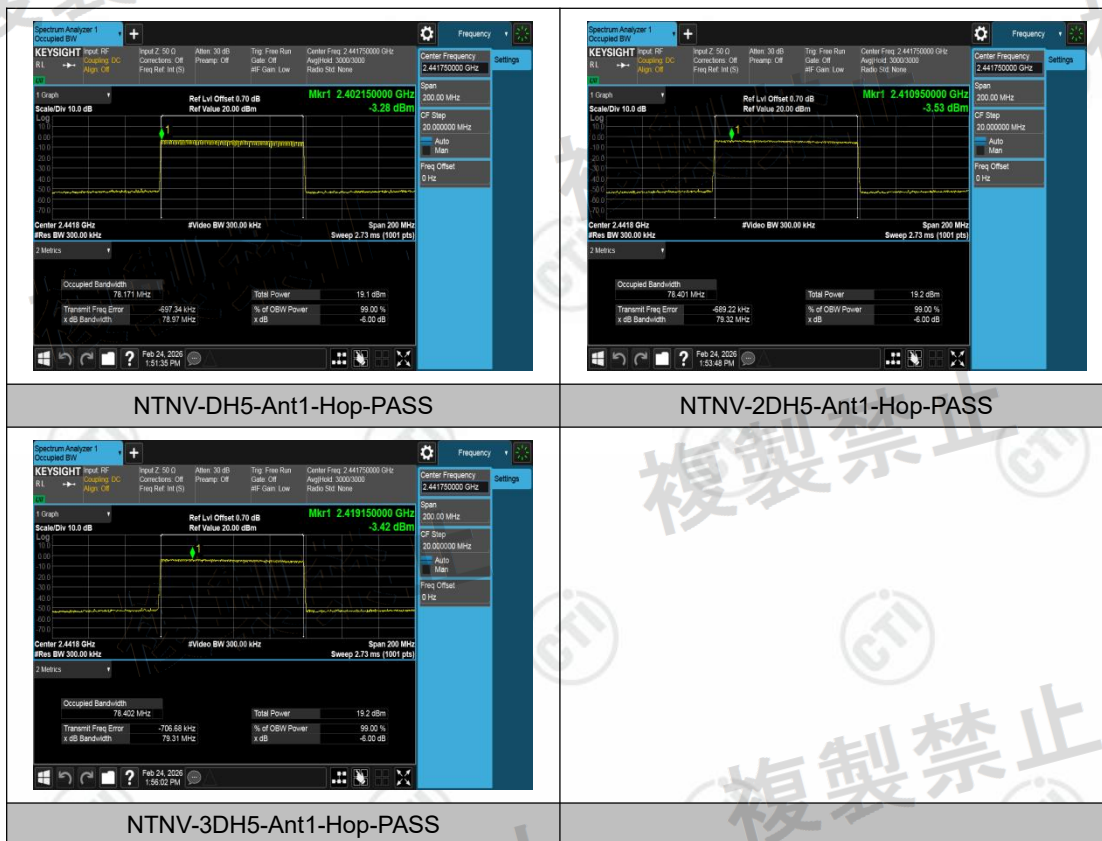
TestCondition	TestMode	Antenna	Freq (MHz)	Result (dBm/MHz)	EIRP (dBm/MHz)	Limit (dBm/MHz)	Verdict
NTNV	DH5	Ant1	Hop	-4.123	-5.54745	≤6.91	PASS
NTNV	2DH5	Ant1	Hop	-4.145	-5.56945	≤6.91	PASS
NTNV	3DH5	Ant1	Hop	-4.145	-5.56945	≤6.91	PASS

Appendix C: Occupied Bandwidth

Test Result

Test Condition	Test Mode	Antenna	Frequency[MHz]	Result [MHz]	Limit [MHz]	Verdict
NTNV	DH5	Ant1	Hop	78.171	≤83.5	PASS
NTNV	2DH5	Ant1	Hop	78.401	≤83.5	PASS
NTNV	3DH5	Ant1	Hop	78.402	≤83.5	PASS

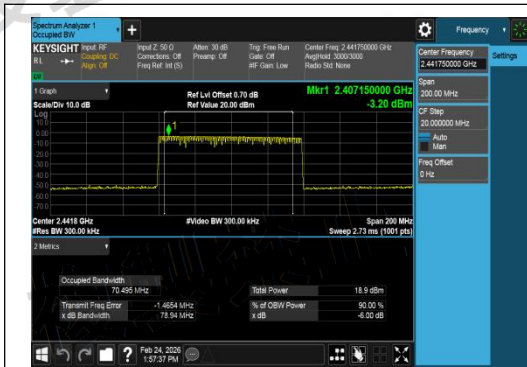
Test Graphs



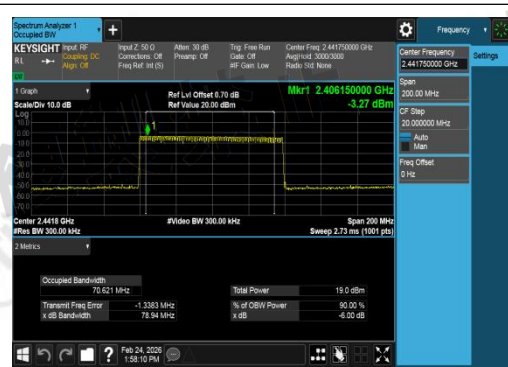
Appendix D: Spread Bandwidth**Test Result**

Test Condition	Test Mode	Antenna	Frequency[MHz]	Result [MHz]
NTNV	DH1	Ant1	Hop	70.495
NTNV	DH3	Ant1	Hop	70.621
NTNV	DH5	Ant1	Hop	70.617
NTNV	2DH1	Ant1	Hop	70.794
NTNV	2DH3	Ant1	Hop	70.828
NTNV	2DH5	Ant1	Hop	70.797
NTNV	3DH1	Ant1	Hop	70.372
NTNV	3DH3	Ant1	Hop	71.021
NTNV	3DH5	Ant1	Hop	71.043

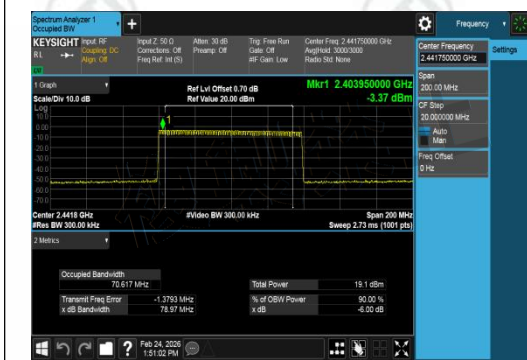
Test Graphs



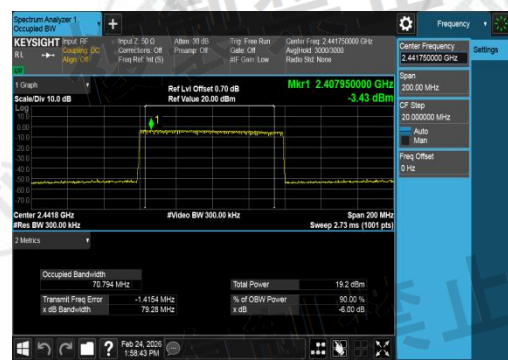
NTNV-DH1-Ant1-Hop-PASS



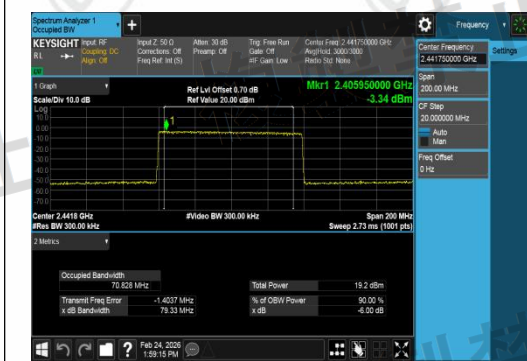
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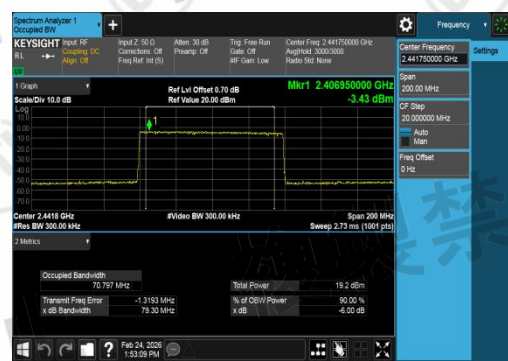
NTNV-DH5-Ant1-Hop-PASS



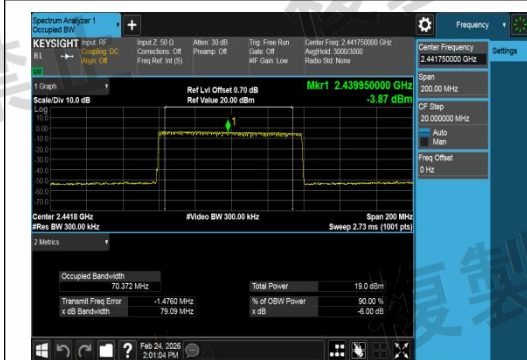
NTNV-2DH1-Ant1-Hop-PASS



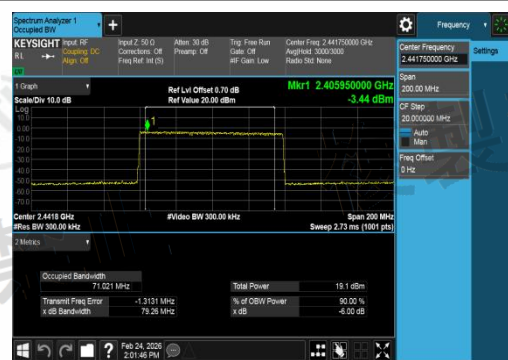
NTNV-2DH3-Ant1-Hop-PASS



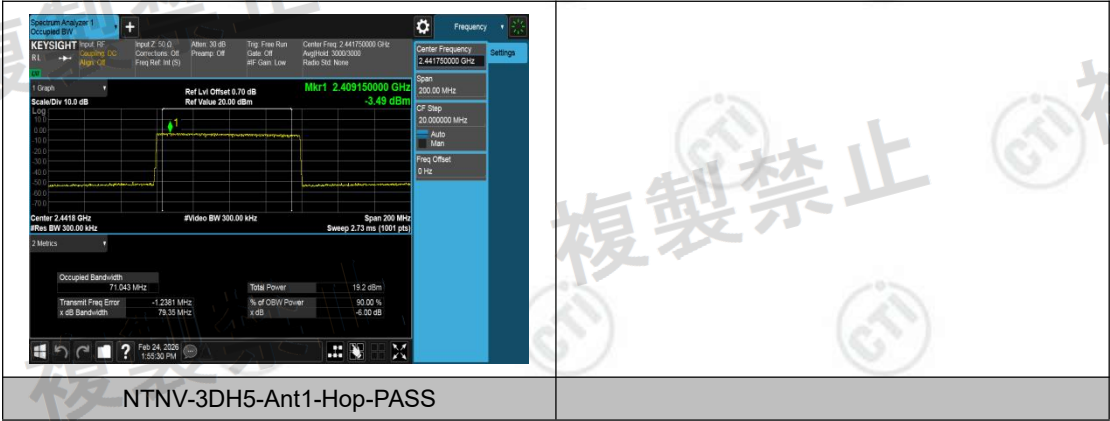
NTNV-2DH5-Ant1-Hop-PASS



NTNV-3DH1-Ant1-Hop-PASS



NTNV-3DH3-Ant1-Hop-PASS

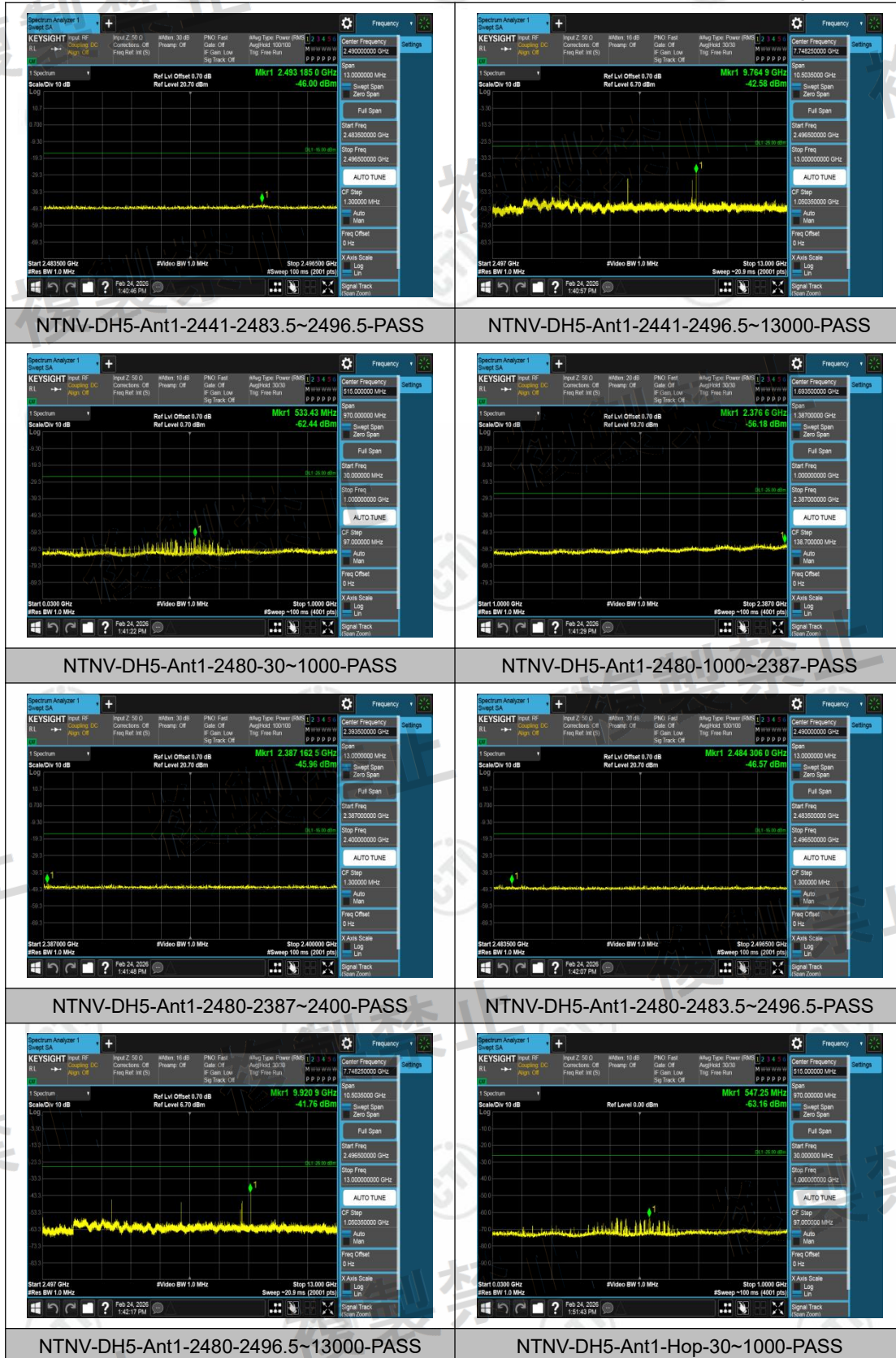


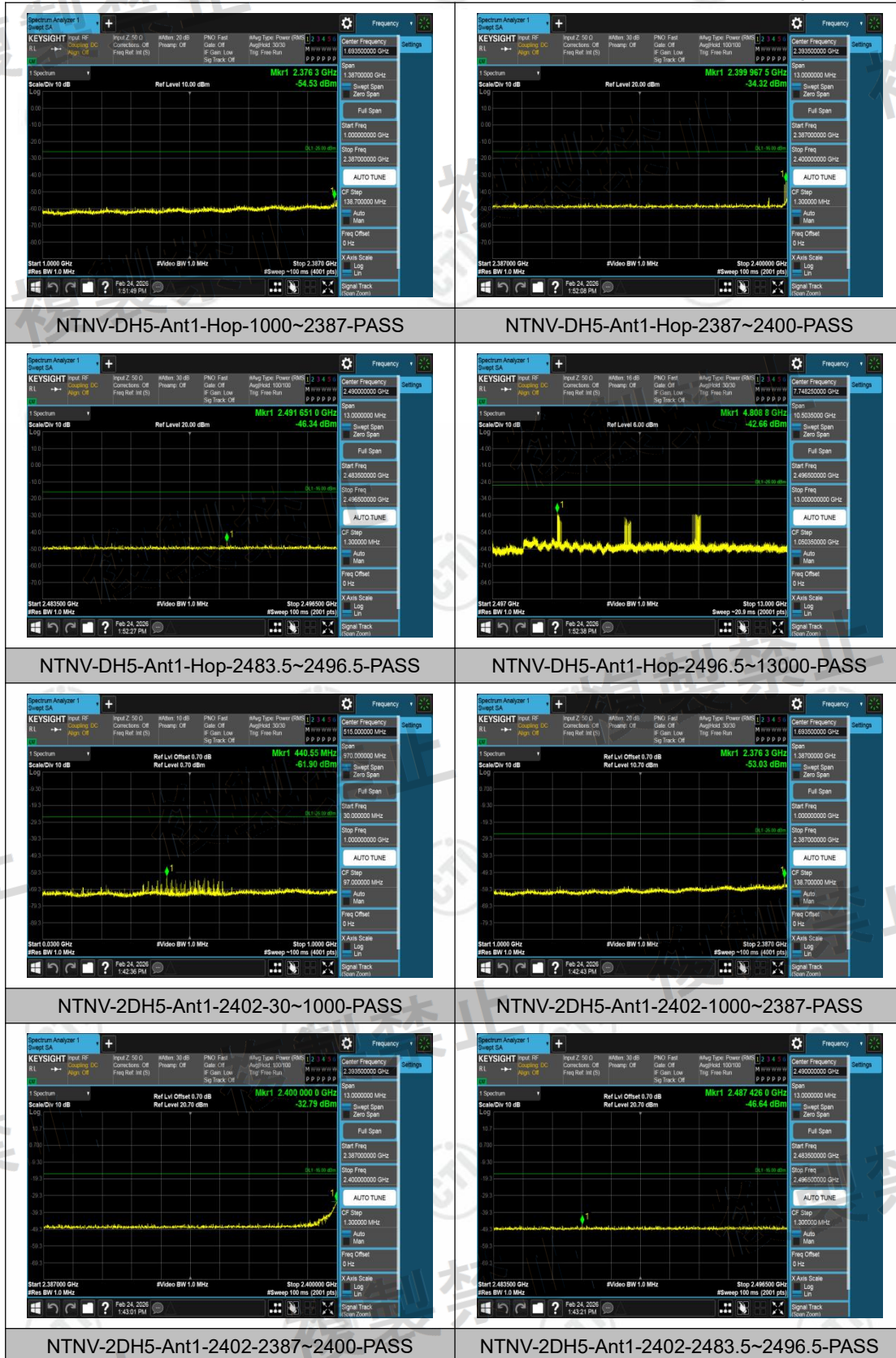
Appendix E: Unwanted Emission Strength

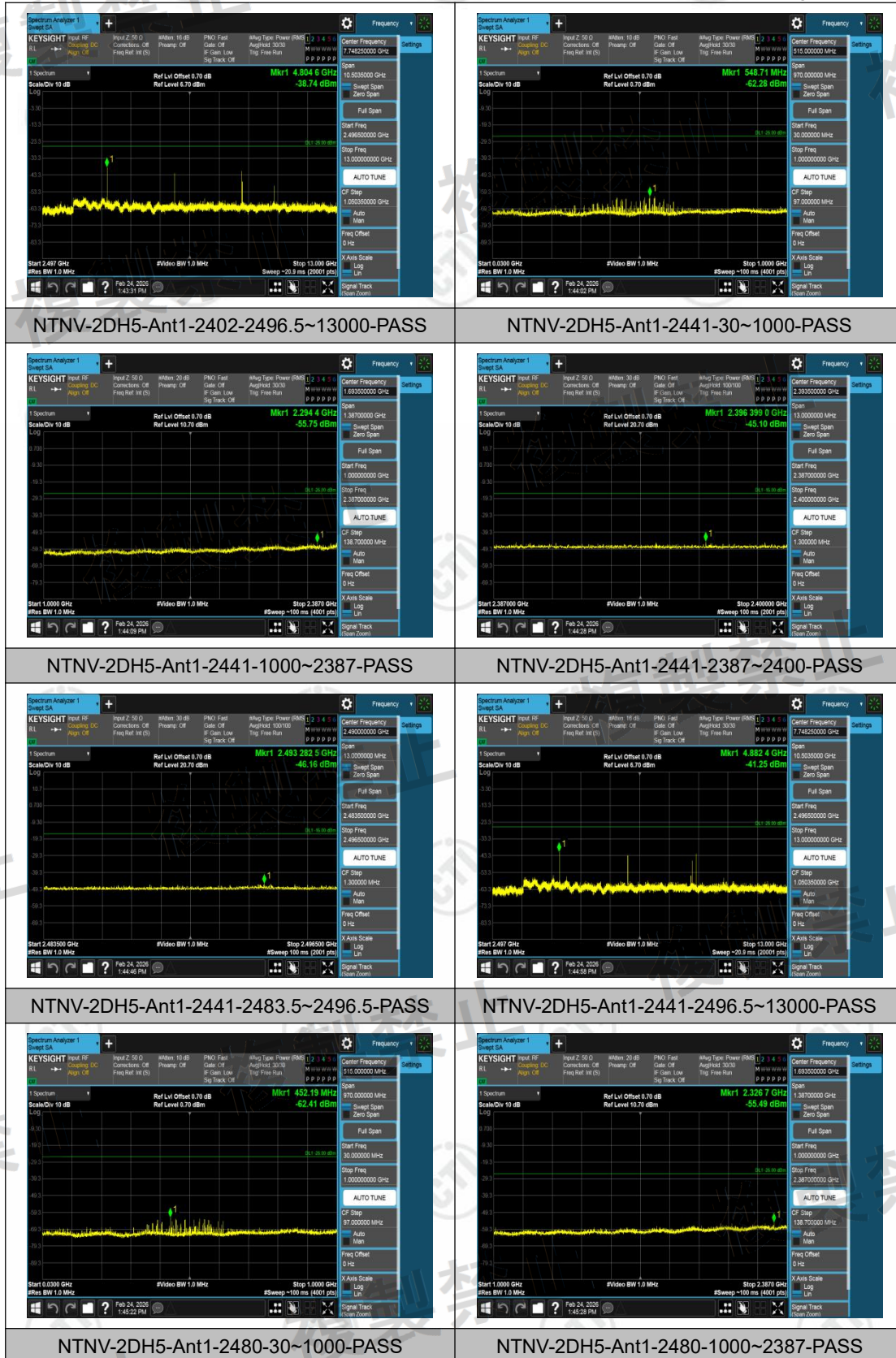
Test Result

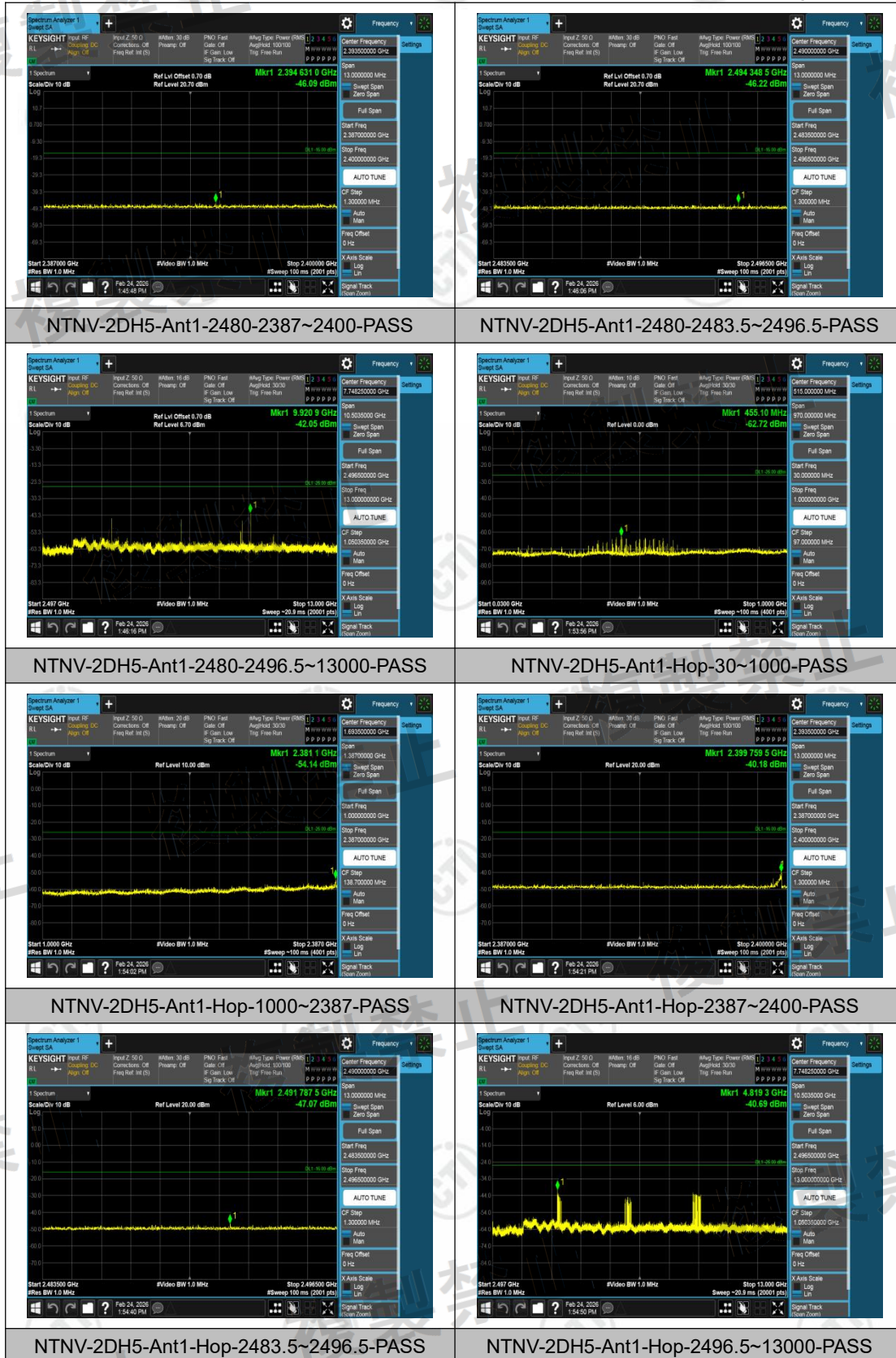
Test Condition	Test Mode	Antenna	Frequency [MHz]	Freq.Range [MHz]	Freq [MHz]	Result [dBm/MHz]	Result [μ W/MHz]	Limit [μ W/MHz]	Verdict
NTNV	DH5	Ant1	2402	30~1000	563.50	-63.04	0.00050	≤ 2.5	PASS
NTNV	DH5	Ant1	2402	1000~2387	2375.90	-53.18	0.00481	≤ 2.5	PASS
NTNV	DH5	Ant1	2402	2387~2400	2400.00	-32.78	0.52723	≤ 25	PASS
NTNV	DH5	Ant1	2402	2483.5~2496.5	2486.32	-46.51	0.02234	≤ 25	PASS
NTNV	DH5	Ant1	2402	2496.5~13000	9608.95	-41.18	0.07621	≤ 2.5	PASS
NTNV	DH5	Ant1	2441	30~1000	550.41	-62.50	0.00056	≤ 2.5	PASS
NTNV	DH5	Ant1	2441	1000~2387	2247.26	-55.10	0.00309	≤ 2.5	PASS
NTNV	DH5	Ant1	2441	2387~2400	2397.06	-45.39	0.02891	≤ 25	PASS
NTNV	DH5	Ant1	2441	2483.5~2496.5	2493.19	-46.00	0.02512	≤ 25	PASS
NTNV	DH5	Ant1	2441	2496.5~13000	9764.92	-42.58	0.05521	≤ 2.5	PASS
NTNV	DH5	Ant1	2480	30~1000	533.43	-62.44	0.00057	≤ 2.5	PASS
NTNV	DH5	Ant1	2480	1000~2387	2376.60	-56.18	0.00241	≤ 2.5	PASS
NTNV	DH5	Ant1	2480	2387~2400	2387.16	-45.96	0.02535	≤ 25	PASS
NTNV	DH5	Ant1	2480	2483.5~2496.5	2484.31	-46.57	0.02203	≤ 25	PASS
NTNV	DH5	Ant1	2480	2496.5~13000	9920.90	-41.76	0.06668	≤ 2.5	PASS
NTNV	DH5	Ant1	Hop	30~1000	547.25	-63.16	0.00048	≤ 2.5	PASS
NTNV	DH5	Ant1	Hop	1000~2387	2376.25	-54.53	0.00352	≤ 2.5	PASS
NTNV	DH5	Ant1	Hop	2387~2400	2399.97	-34.32	0.36983	≤ 25	PASS
NTNV	DH5	Ant1	Hop	2483.5~2496.5	2491.65	-46.34	0.02323	≤ 25	PASS
NTNV	DH5	Ant1	Hop	2496.5~13000	4808.85	-42.66	0.05420	≤ 2.5	PASS
NTNV	2DH5	Ant1	2402	30~1000	440.55	-61.90	0.00065	≤ 2.5	PASS
NTNV	2DH5	Ant1	2402	1000~2387	2376.25	-53.03	0.00498	≤ 2.5	PASS
NTNV	2DH5	Ant1	2402	2387~2400	2400.00	-32.79	0.52602	≤ 25	PASS
NTNV	2DH5	Ant1	2402	2483.5~2496.5	2487.43	-46.64	0.02168	≤ 25	PASS
NTNV	2DH5	Ant1	2402	2496.5~13000	4804.64	-38.74	0.13366	≤ 2.5	PASS
NTNV	2DH5	Ant1	2441	30~1000	548.71	-62.28	0.00059	≤ 2.5	PASS
NTNV	2DH5	Ant1	2441	1000~2387	2294.42	-55.76	0.00265	≤ 2.5	PASS
NTNV	2DH5	Ant1	2441	2387~2400	2396.40	-45.10	0.03090	≤ 25	PASS
NTNV	2DH5	Ant1	2441	2483.5~2496.5	2493.28	-46.16	0.02421	≤ 25	PASS
NTNV	2DH5	Ant1	2441	2496.5~13000	4882.37	-41.25	0.07499	≤ 2.5	PASS
NTNV	2DH5	Ant1	2480	30~1000	452.19	-62.41	0.00057	≤ 2.5	PASS
NTNV	2DH5	Ant1	2480	1000~2387	2326.67	-55.49	0.00282	≤ 2.5	PASS
NTNV	2DH5	Ant1	2480	2387~2400	2394.63	-46.10	0.02455	≤ 25	PASS
NTNV	2DH5	Ant1	2480	2483.5~2496.5	2494.35	-46.22	0.02388	≤ 25	PASS
NTNV	2DH5	Ant1	2480	2496.5~13000	9920.90	-42.05	0.06237	≤ 2.5	PASS

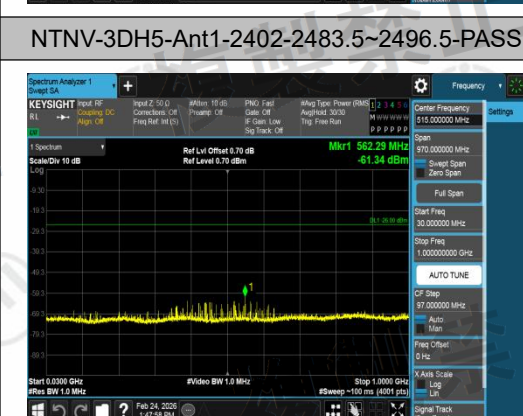
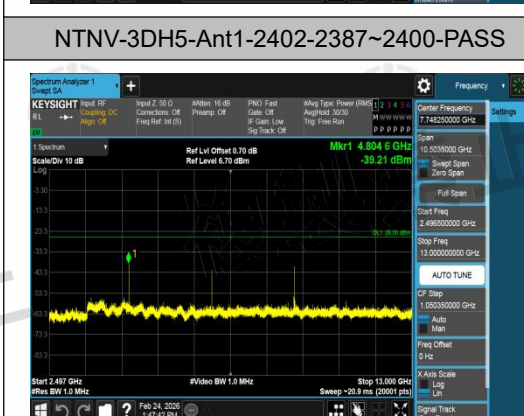
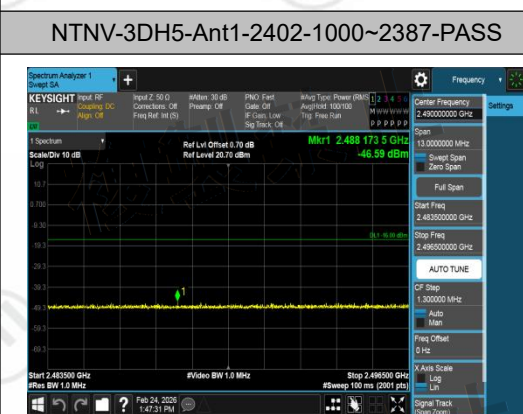
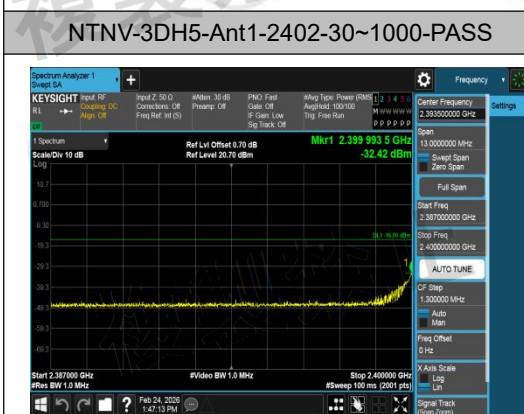
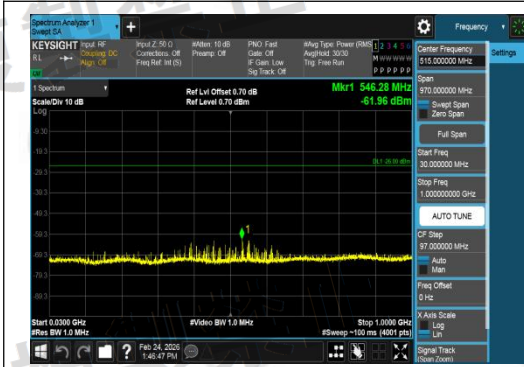
NTNV	2DH5	Ant1	Hop	30~1000	455.10	-62.72	0.00053	≤2.5	PASS
NTNV	2DH5	Ant1	Hop	1000~2387	2381.11	-54.14	0.00385	≤2.5	PASS
NTNV	2DH5	Ant1	Hop	2387~2400	2399.76	-40.18	0.09594	≤25	PASS
NTNV	2DH5	Ant1	Hop	2483.5~2496.5	2491.79	-47.07	0.01963	≤25	PASS
NTNV	2DH5	Ant1	Hop	2496.5~13000	4819.35	-40.69	0.08531	≤2.5	PASS
NTNV	3DH5	Ant1	2402	30~1000	546.28	-61.96	0.00064	≤2.5	PASS
NTNV	3DH5	Ant1	2402	1000~2387	2376.25	-52.70	0.00537	≤2.5	PASS
NTNV	3DH5	Ant1	2402	2387~2400	2399.99	-32.42	0.57280	≤25	PASS
NTNV	3DH5	Ant1	2402	2483.5~2496.5	2488.17	-46.59	0.02193	≤25	PASS
NTNV	3DH5	Ant1	2402	2496.5~13000	4804.64	-39.21	0.11995	≤2.5	PASS
NTNV	3DH5	Ant1	2441	30~1000	562.29	-61.34	0.00073	≤2.5	PASS
NTNV	3DH5	Ant1	2441	1000~2387	2261.48	-55.64	0.00273	≤2.5	PASS
NTNV	3DH5	Ant1	2441	2387~2400	2388.04	-45.42	0.02871	≤25	PASS
NTNV	3DH5	Ant1	2441	2483.5~2496.5	2490.03	-46.04	0.02489	≤25	PASS
NTNV	3DH5	Ant1	2441	2496.5~13000	4882.90	-41.69	0.06776	≤2.5	PASS
NTNV	3DH5	Ant1	2480	30~1000	532.22	-61.82	0.00066	≤2.5	PASS
NTNV	3DH5	Ant1	2480	1000~2387	2084.98	-55.75	0.00266	≤2.5	PASS
NTNV	3DH5	Ant1	2480	2387~2400	2392.02	-45.98	0.02523	≤25	PASS
NTNV	3DH5	Ant1	2480	2483.5~2496.5	2491.88	-46.51	0.02234	≤25	PASS
NTNV	3DH5	Ant1	2480	2496.5~13000	9920.90	-41.90	0.06457	≤2.5	PASS
NTNV	3DH5	Ant1	Hop	30~1000	563.26	-62.95	0.00051	≤2.5	PASS
NTNV	3DH5	Ant1	Hop	1000~2387	2385.96	-53.71	0.00426	≤2.5	PASS
NTNV	3DH5	Ant1	Hop	2387~2400	2399.99	-33.84	0.41305	≤25	PASS
NTNV	3DH5	Ant1	Hop	2483.5~2496.5	2491.40	-46.96	0.02014	≤25	PASS
NTNV	3DH5	Ant1	Hop	2496.5~13000	4810.95	-41.00	0.07943	≤2.5	PASS

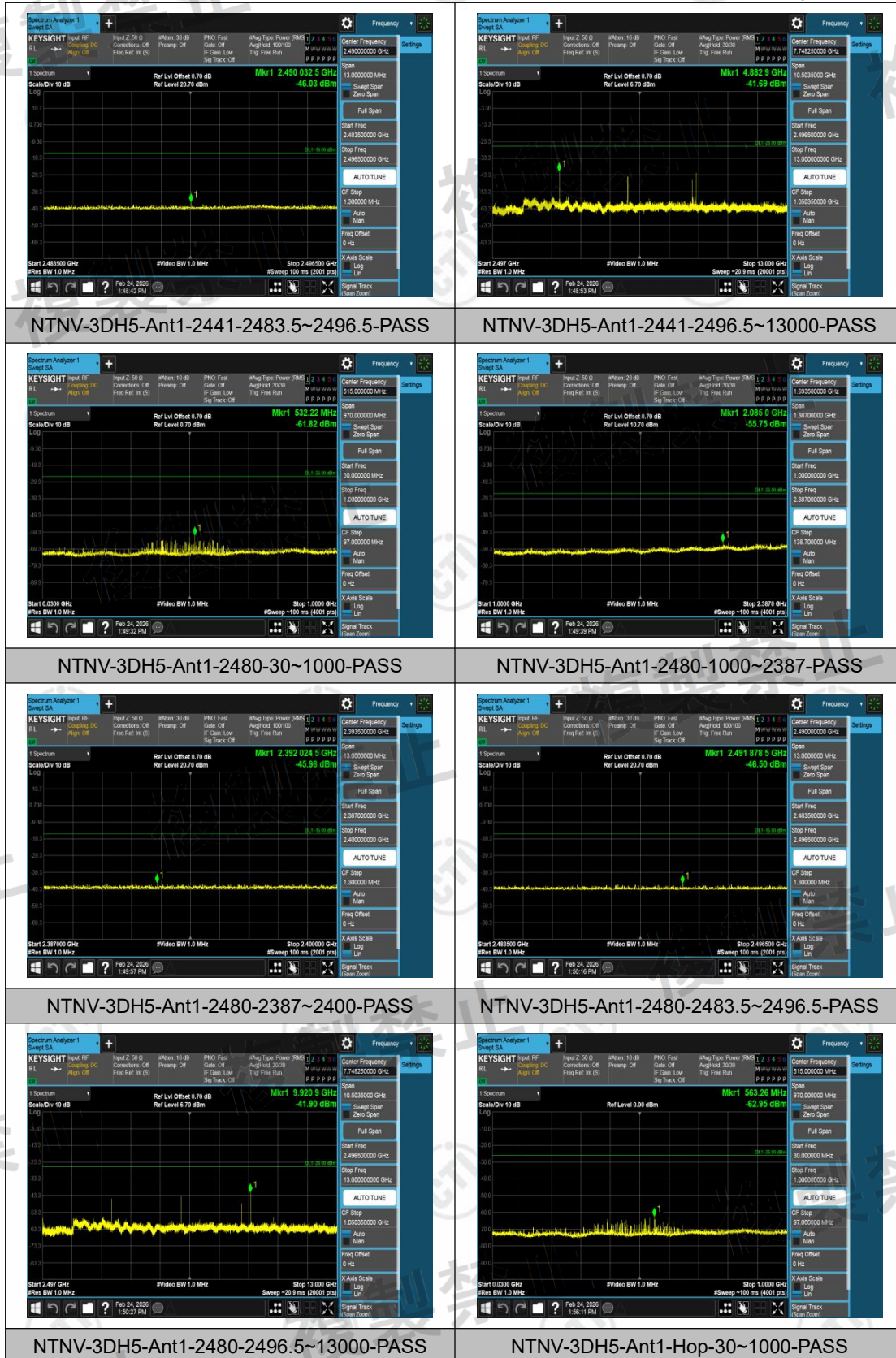


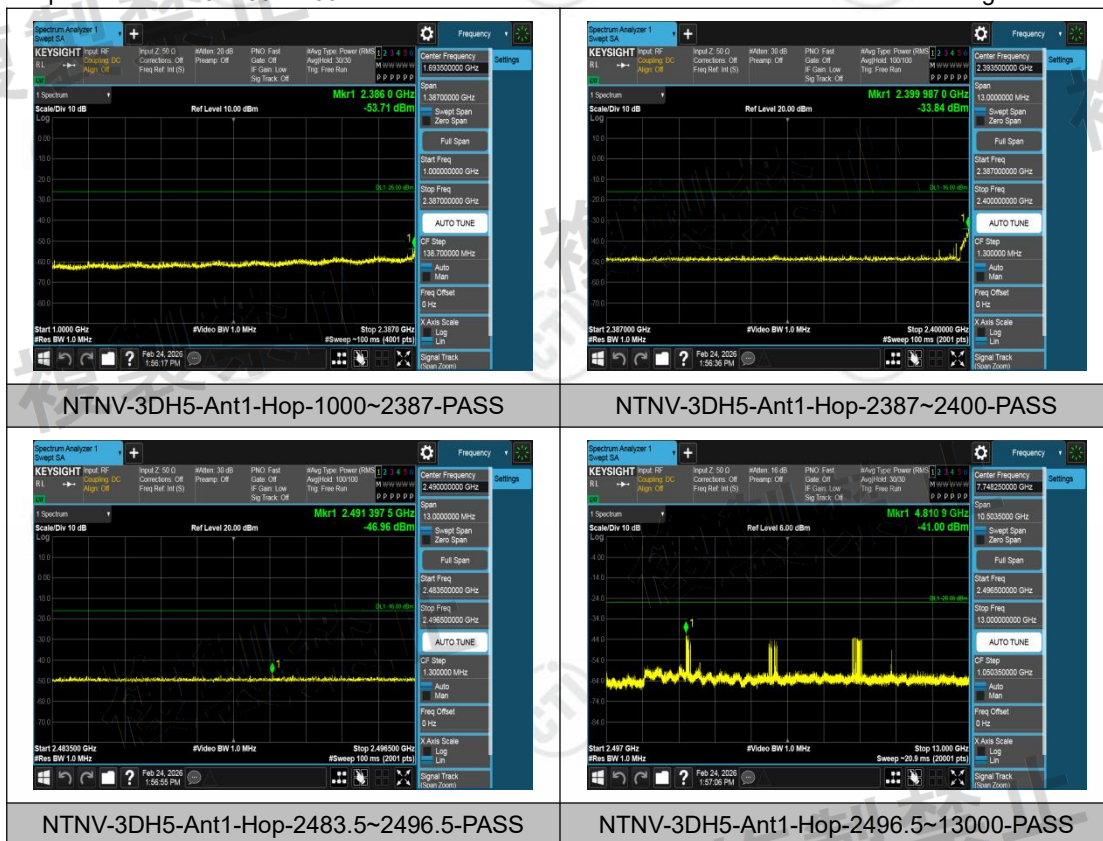










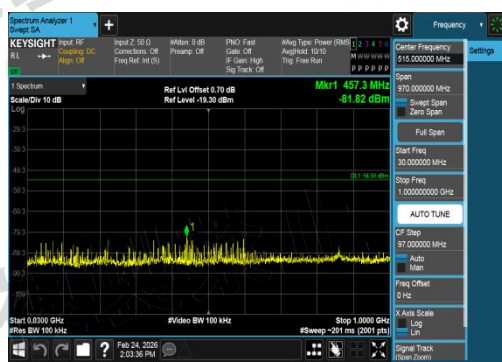


Appendix F: Secondary Radiated Emission Strength

Test Result

Test Condition	Test Mode	Antenna	Frequency [MHz]	Freq. Range [MHz]	Freq [MHz]	Result [dBm]	Result [nW]	Limit [nW]	Verdict
NTNV	DH5	Ant1	2402	30~1000	457.29	-81.82	0.00658	≤4	PASS
NTNV	DH5	Ant1	2402	1000~12500	2415.08	-71.47	0.07129	≤20	PASS
NTNV	DH5	Ant1	2441	30~1000	453.89	-80.49	0.00893	≤4	PASS
NTNV	DH5	Ant1	2441	1000~12500	2413.93	-69.62	0.10914	≤20	PASS
NTNV	DH5	Ant1	2480	30~1000	454.38	-81.07	0.00782	≤4	PASS
NTNV	DH5	Ant1	2480	1000~12500	2414.50	-71.17	0.07638	≤20	PASS
NTNV	DH5	Ant1	Hop	30~1000	452.92	-81.73	0.00671	≤4	PASS
NTNV	DH5	Ant1	Hop	1000~12500	2414.50	-69.50	0.11220	≤20	PASS
NTNV	2DH5	Ant1	2402	30~1000	245.83	-81.63	0.00687	≤4	PASS
NTNV	2DH5	Ant1	2402	1000~12500	2414.50	-69.21	0.11995	≤20	PASS
NTNV	2DH5	Ant1	2441	30~1000	453.41	-81.54	0.00701	≤4	PASS
NTNV	2DH5	Ant1	2441	1000~12500	2414.50	-71.42	0.07211	≤20	PASS
NTNV	2DH5	Ant1	2480	30~1000	467.96	-82.69	0.00538	≤4	PASS
NTNV	2DH5	Ant1	2480	1000~12500	2413.93	-72.76	0.05297	≤20	PASS
NTNV	2DH5	Ant1	Hop	30~1000	455.83	-81.83	0.00656	≤4	PASS
NTNV	2DH5	Ant1	Hop	1000~12500	2413.93	-70.64	0.08630	≤20	PASS
NTNV	3DH5	Ant1	2402	30~1000	245.83	-81.77	0.00665	≤4	PASS
NTNV	3DH5	Ant1	2402	1000~12500	2414.50	-68.59	0.13836	≤20	PASS
NTNV	3DH5	Ant1	2441	30~1000	454.86	-81.21	0.00757	≤4	PASS
NTNV	3DH5	Ant1	2441	1000~12500	2414.50	-69.72	0.10666	≤20	PASS
NTNV	3DH5	Ant1	2480	30~1000	516.46	-82.21	0.00601	≤4	PASS
NTNV	3DH5	Ant1	2480	1000~12500	5246.95	-64.93	0.32137	≤20	PASS
NTNV	3DH5	Ant1	Hop	30~1000	454.86	-81.46	0.00714	≤4	PASS
NTNV	3DH5	Ant1	Hop	1000~12500	2413.93	-70.70	0.08511	≤20	PASS

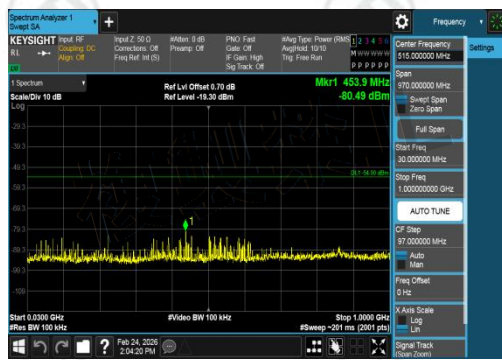
Test Graphs



NTNV-DH5-Ant1-2402-30~1000-PASS



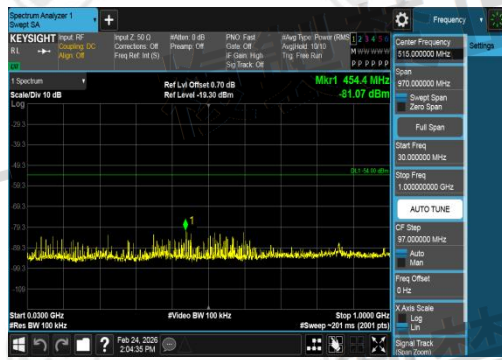
NTNV-DH5-Ant1-2402-1000~12500-PASS



NTNV-DH5-Ant1-2441-30~1000-PASS



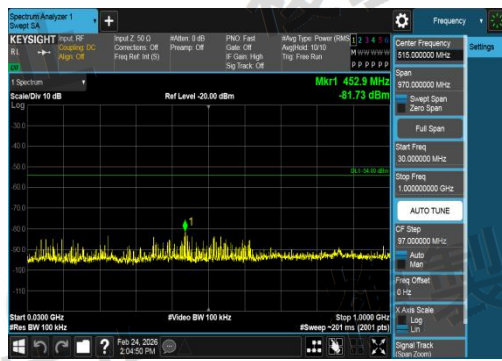
NTNV-DH5-Ant1-2441-1000~12500-PASS



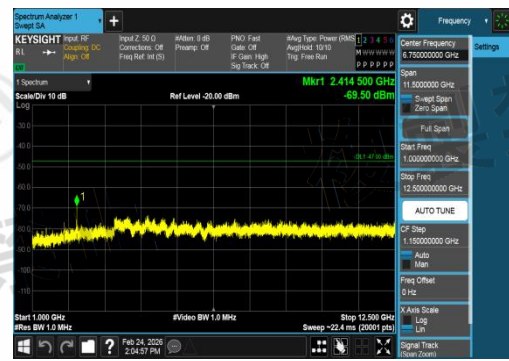
NTNV-DH5-Ant1-2480-30~1000-PASS



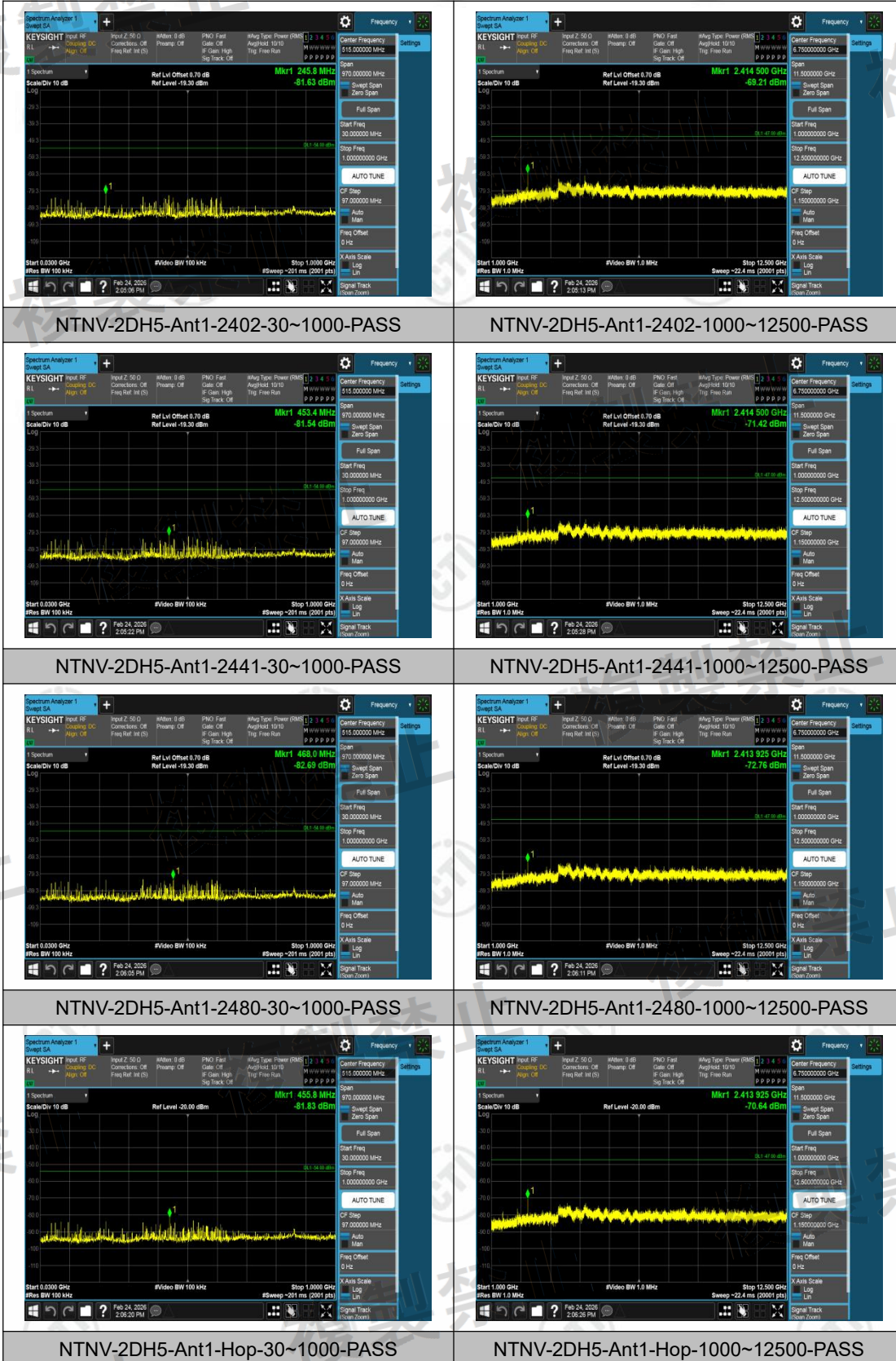
NTNV-DH5-Ant1-2480-1000~12500-PASS

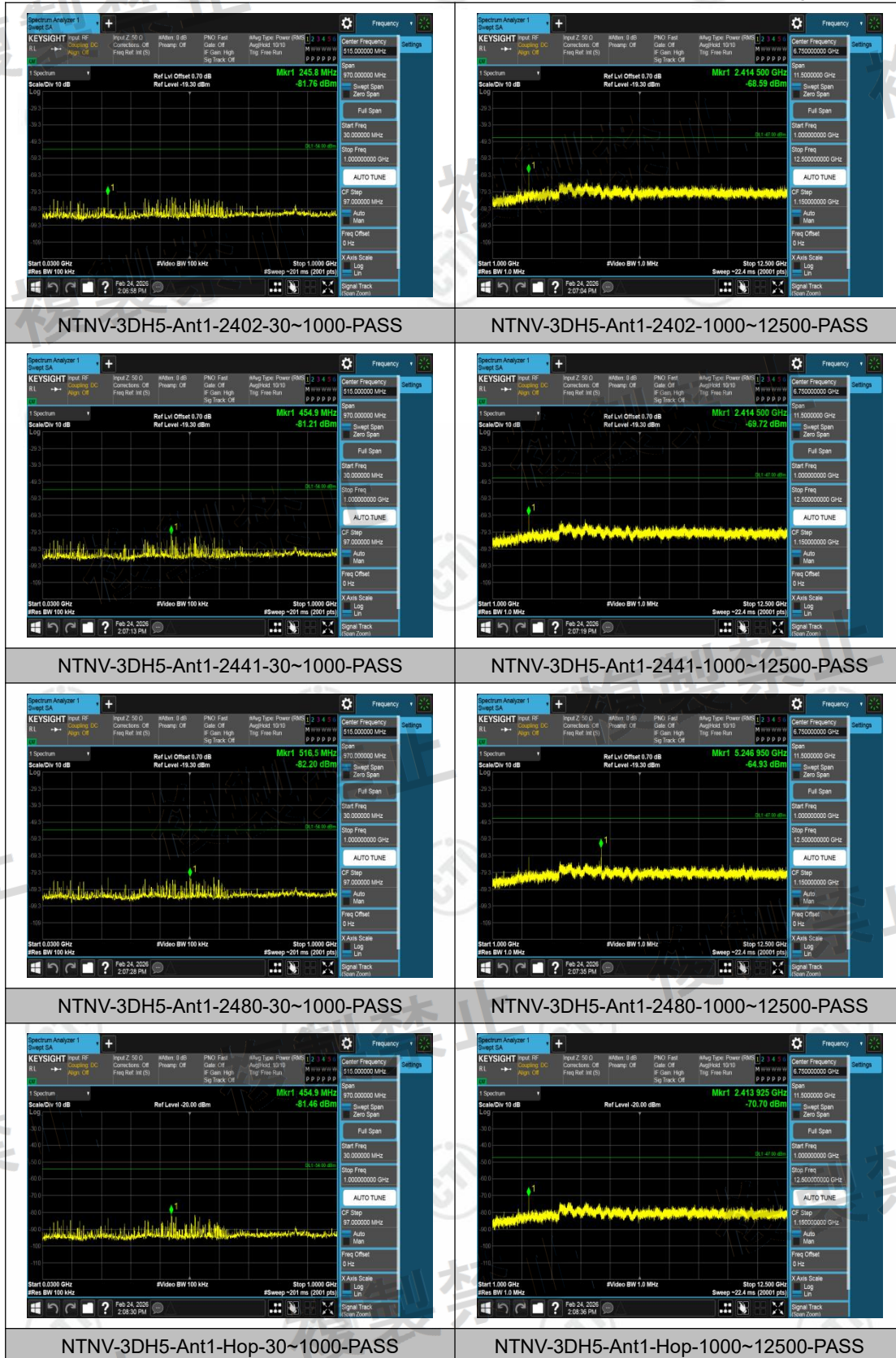


NTNV-DH5-Ant1-Hop-30~1000-PASS



NTNV-DH5-Ant1-Hop-1000~12500-PASS





Appendix G: Dwell Time

Test Result

Condition	Mode	Frequency (MHz)	Antenna	T_on(ms)	Period(ms)	Spreading Rate	Hop Number	Dwell Time (ms)	Limit (ms)	Verdict
NTNV	DH1	Ant1	2441	0.4	1.25	70.495	79	114.22	400	Pass
NTNV	DH3	Ant1	2441	1.65	2.5	70.621	79	236.00	400	Pass
NTNV	DH5	Ant1	2441	2.9	3.75	70.617	79	276.51	400	Pass
NTNV	2DH1	Ant1	2441	0.41	1.25	70.794	79	117.57	400	Pass
NTNV	2DH3	Ant1	2441	1.66	2.5	70.828	79	238.13	400	Pass
NTNV	2DH5	Ant1	2441	2.91	3.75	70.797	79	278.17	400	Pass
NTNV	3DH1	Ant1	2441	0.41	1.25	70.372	79	116.87	400	Pass
NTNV	3DH3	Ant1	2441	1.66	2.5	71.021	79	238.77	400	Pass
NTNV	3DH5	Ant1	2441	2.91	3.75	71.043	79	279.14	400	Pass

Dwell time=(0.4(s)*[Spreading rate]*[Transmission time of 1 burst(s)])/([Burst cycle(s)]*[No. of hopping channel]);

Note: Spreading rate=[Spread bandwidth(actual measurement value)]/[Transmission rate];

Test Graphs



NTNV-DH1-Ant1-2441



NTNV-DH3-Ant1-2441



NTNV-DH5-Ant1-2441



NTNV-2DH1-Ant1-2441



NTNV-2DH3-Ant1-2441



NTNV-2DH5-Ant1-2441



NTNV-3DH1-Ant1-2441



NTNV-3DH3-Ant1-2441



*** End of Report ***