

Appendix: Bluetooth Classic

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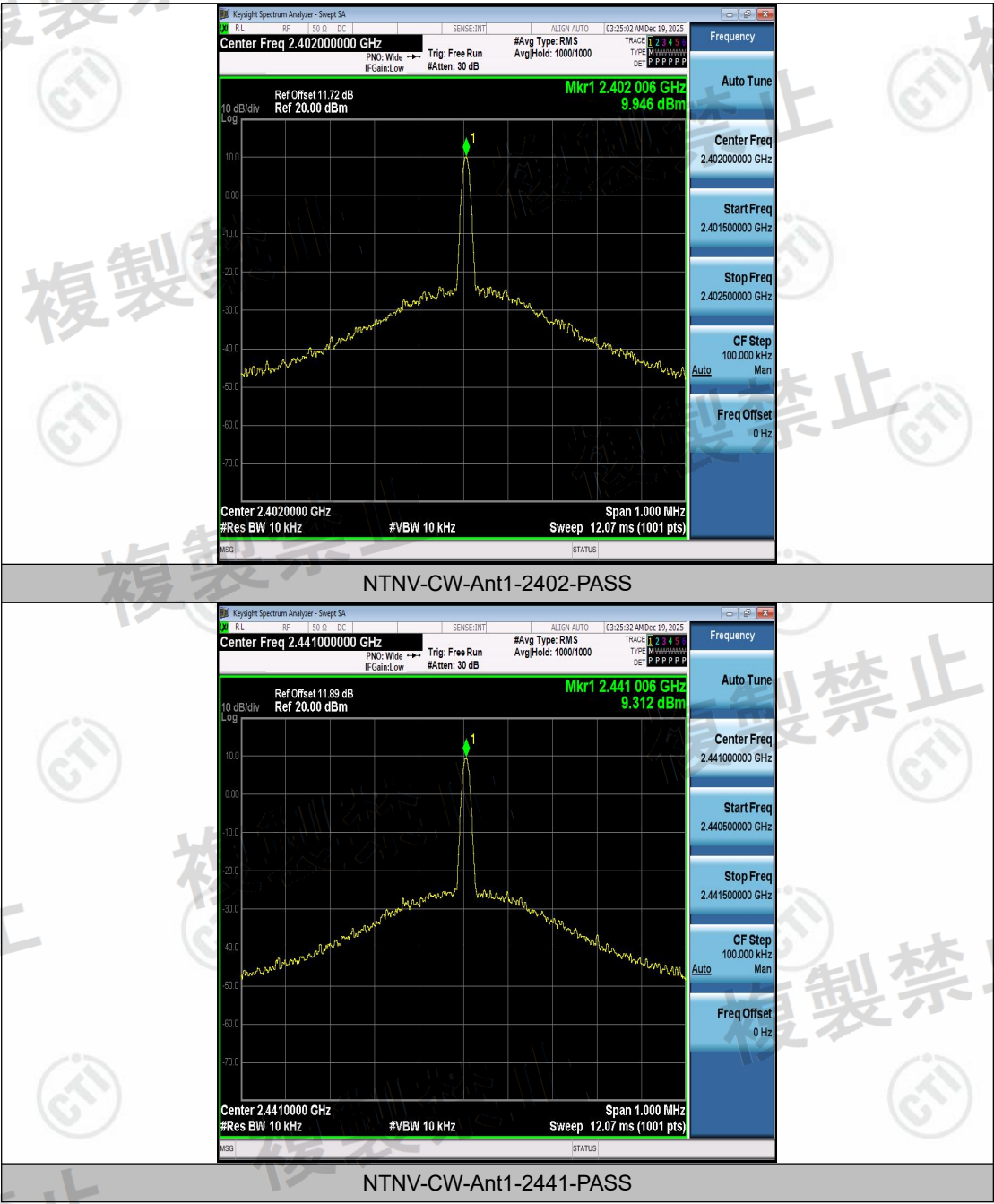
Appendix A: Frequency_Error

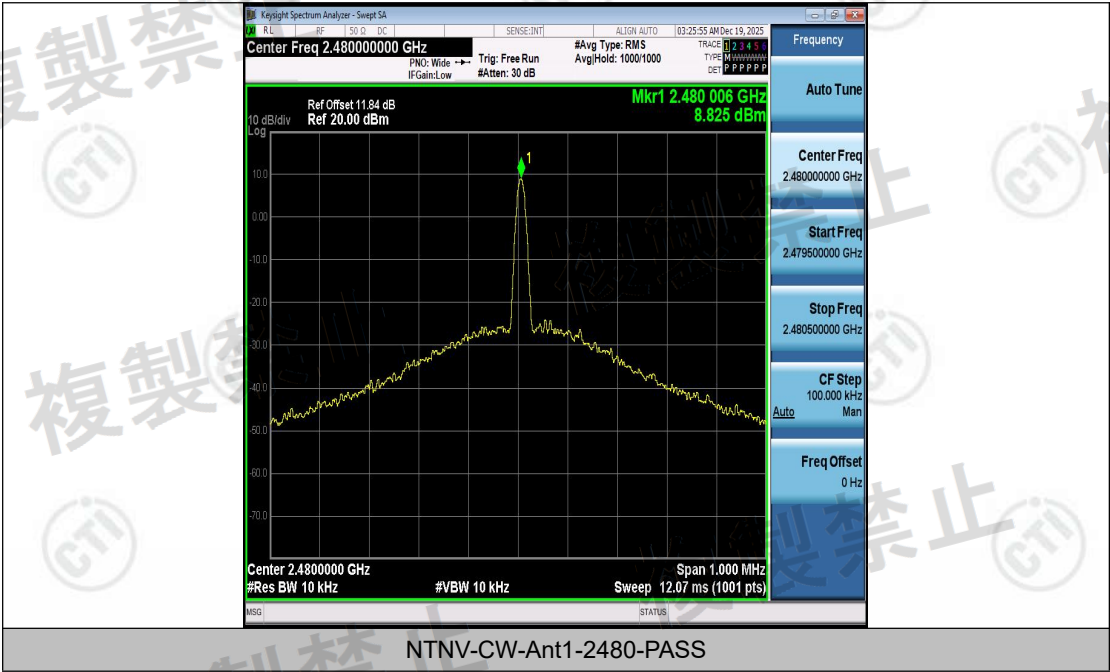
Test Result

Test Condition	Test Mode	Antenna	Frequency[MHz]	CenterFreq [MHz]	Result[ppm]	Limit[ppm]	Verdict
NTNV	CW	Ant1	2402	2402.006	2.49792	±50	PASS
NTNV	CW	Ant1	2441	2441.006	2.45801	±50	PASS
NTNV	CW	Ant1	2480	2480.006	2.41936	±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]	Duty Cycle	Result [mW/MHz]	Limit [mW/MHz]	Verdict
NTNV	DH5	Ant1	Hop	16.33	70.678	77.6	0.7835	≤3	PASS
NTNV	2DH5	Ant1	Hop	16.08	70.452	77.87	0.739	≤3	PASS
NTNV	3DH5	Ant1	Hop	14.95	70.661	77.87	0.568	≤3	PASS

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

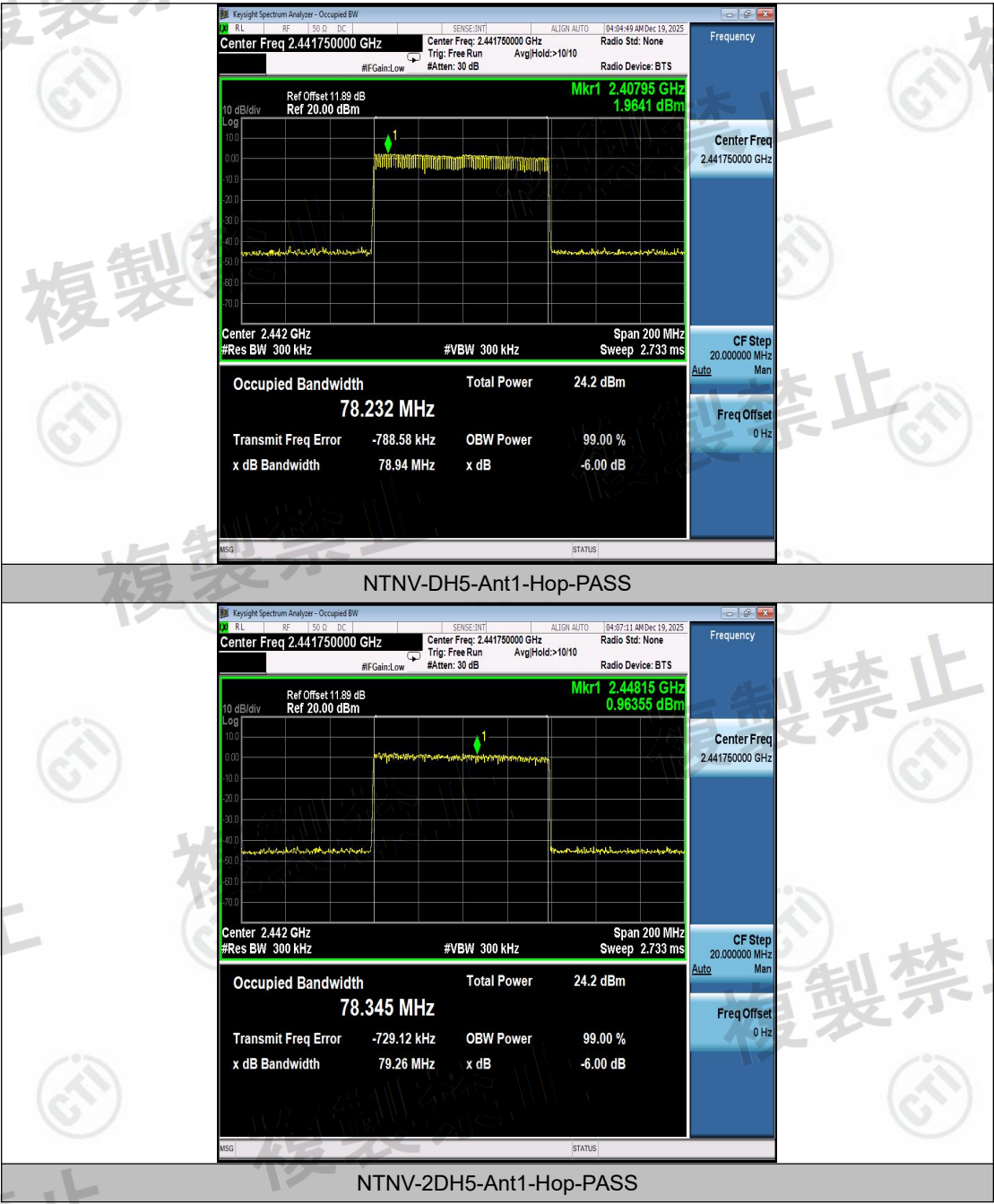
Test Condition	Test Mode	Antenna	Freq(MHz)	Power [mW/MHz]	RatedPower [mW/MHz]	Result (%)	Limit (%)	Verdict
NTNV	DH5	Ant1	Hop	0.783	1	-21.683	NA, +20	PASS
NTNV	2DH5	Ant1	Hop	0.739	1	-26.084	NA, +20	PASS
NTNV	3DH5	Ant1	Hop	0.568	1	-43.187	NA, +20	PASS

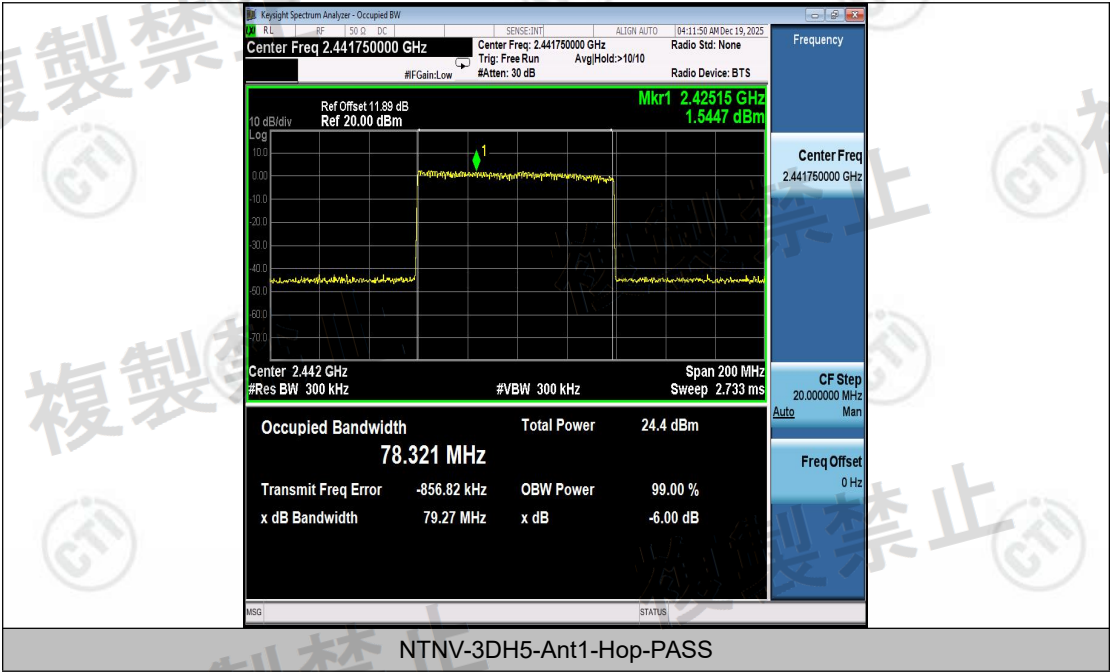
Test Condition	Test Mode	Antenna	Freq (MHz)	Result(dBm/MHz)	Gain	EIRP(dBm/MHz)	Limit(dBm/MHz)	Verdict
NTNV	DH5	Ant1	Hop	-1.061	1.7	0.639	≤6.91	PASS
NTNV	2DH5	Ant1	Hop	-1.313	1.7	0.387	≤6.91	PASS
NTNV	3DH5	Ant1	Hop	-2.455	1.7	-0.755	≤6.91	PASS

Appendix C: Occupied Bandwidth**Test Result**

Test Condition	Test Mode	Antenna	Frequency[MHz]	Result [MHz]	Limit [MHz]	Verdict
NTNV	DH5	Ant1	Hop	78.232	≤83.5	PASS
NTNV	2DH5	Ant1	Hop	78.345	≤83.5	PASS
NTNV	3DH5	Ant1	Hop	78.321	≤83.5	PASS

Test Graphs

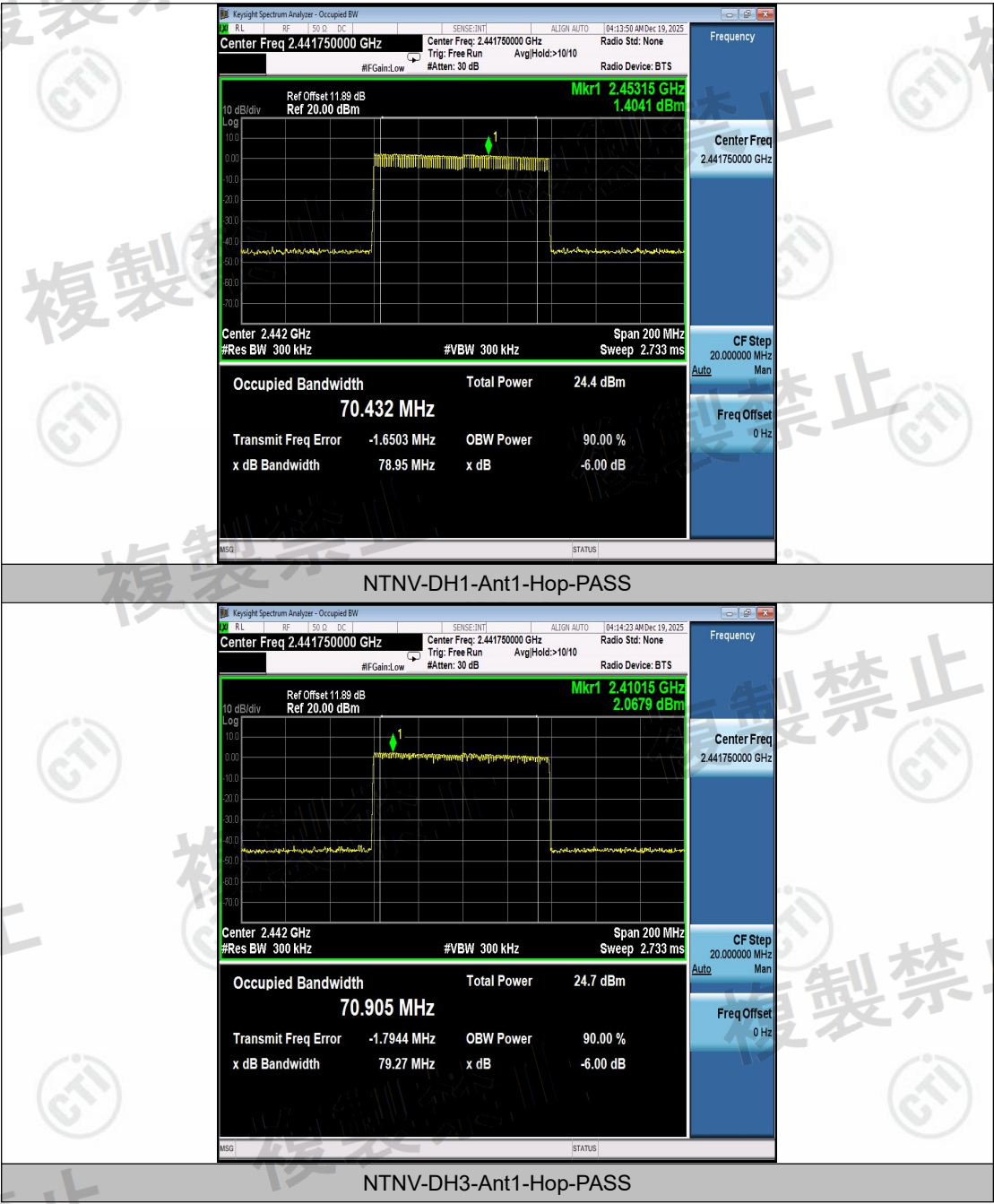


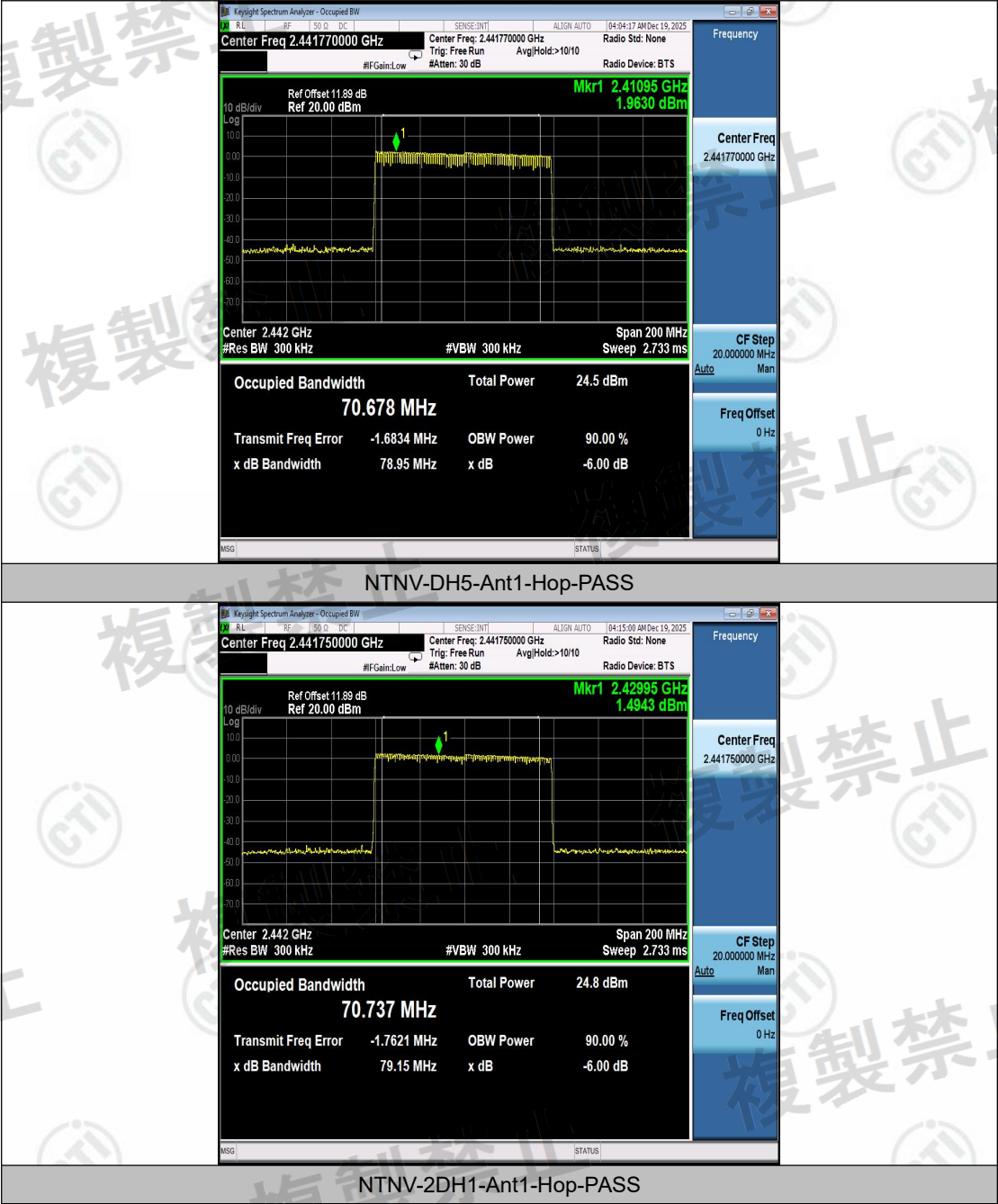


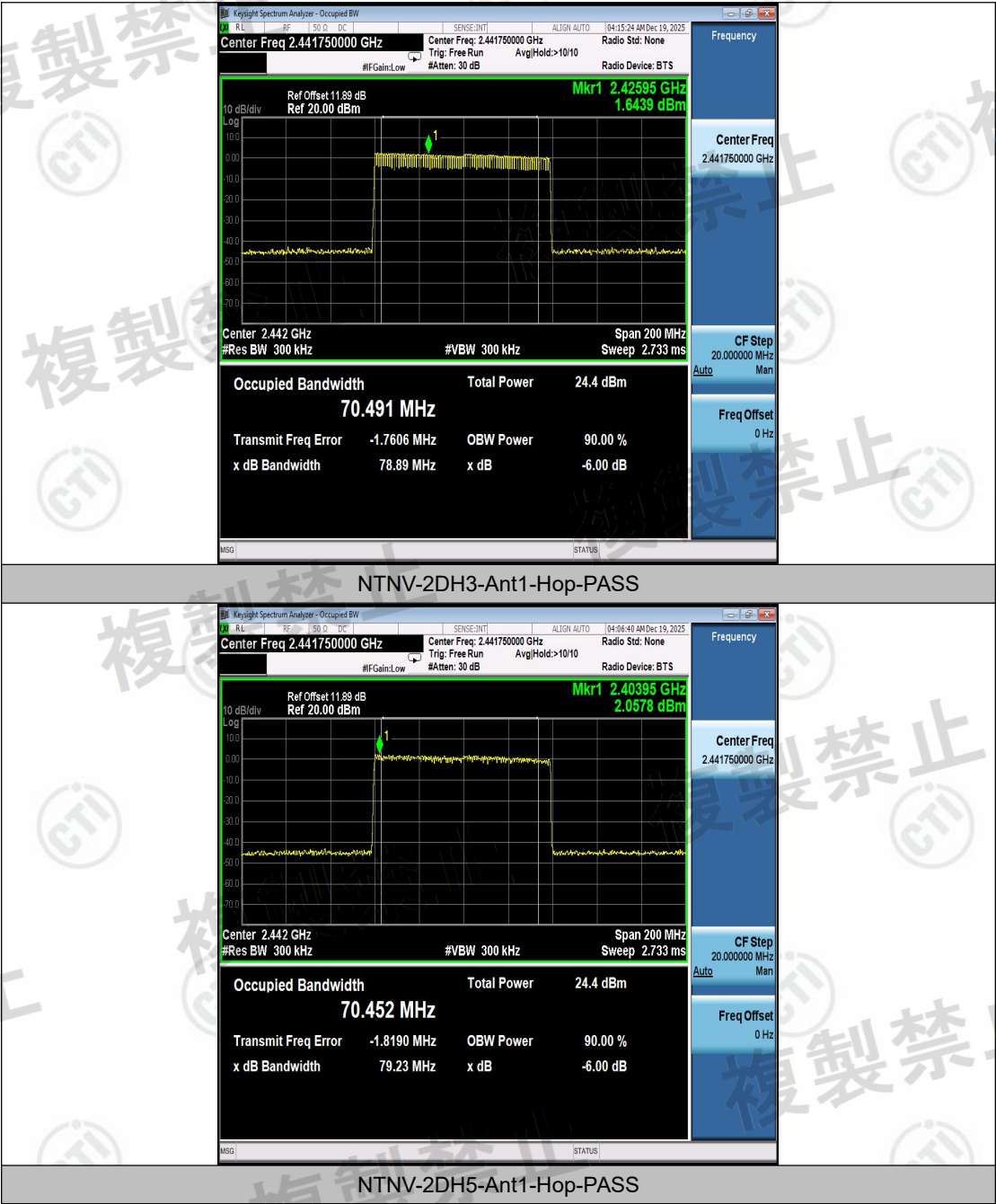
Appendix D: Spread Bandwidth**Test Result**

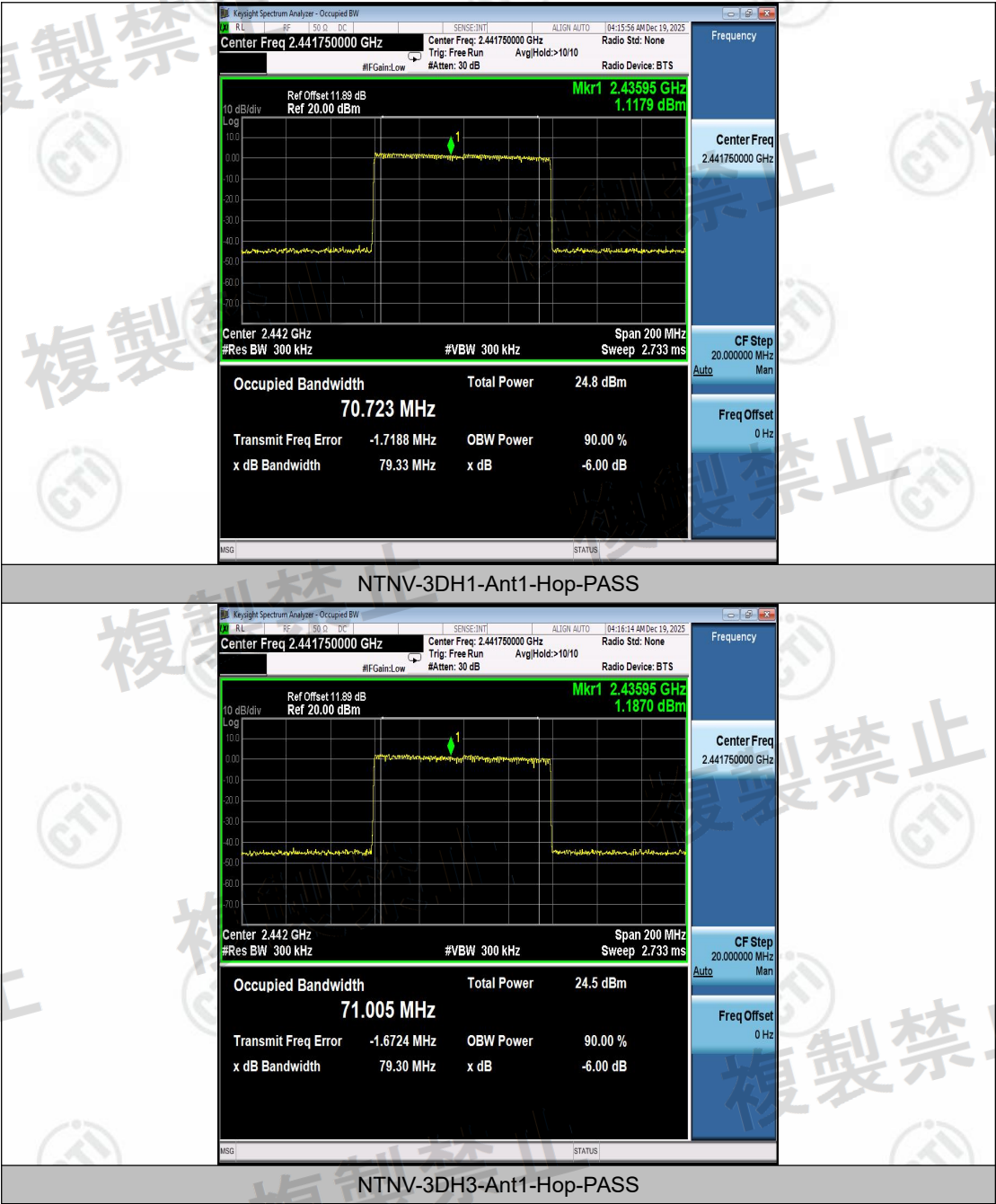
Test Condition	Test Mode	Antenna	Frequency[MHz]	Result [MHz]
NTNV	DH1	Ant1	Hop	70.432
NTNV	DH3	Ant1	Hop	70.905
NTNV	DH5	Ant1	Hop	70.678
NTNV	2DH1	Ant1	Hop	70.737
NTNV	2DH3	Ant1	Hop	70.491
NTNV	2DH5	Ant1	Hop	70.452
NTNV	3DH1	Ant1	Hop	70.723
NTNV	3DH3	Ant1	Hop	71.005
NTNV	3DH5	Ant1	Hop	70.661

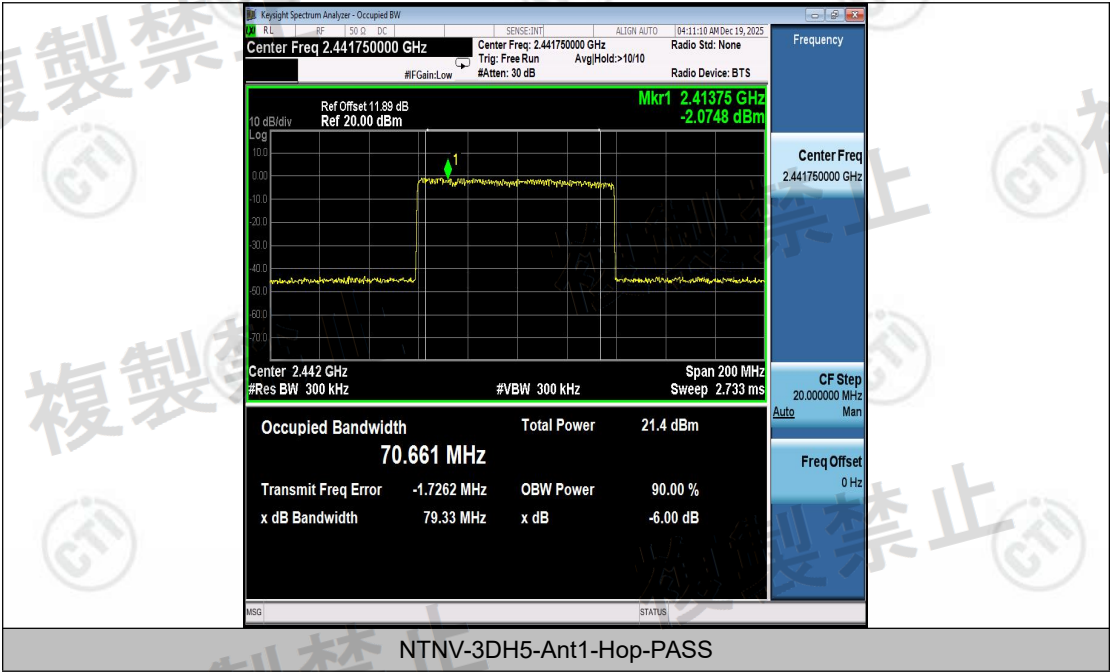
Test Graphs











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	719.91	-51.18	0.00762	≤ 2.5	PASS
NTNV	DH5	Ant1	2402	1000~2387	2353.71	-42.54	0.05572	≤ 2.5	PASS
NTNV	DH5	Ant1	2402	2387~2400	2399.94	-32.27	0.59293	≤ 25	PASS
NTNV	DH5	Ant1	2402	2483.5~2496.5	2491.88	-37.70	0.16982	≤ 25	PASS
NTNV	DH5	Ant1	2402	2496.5~13000	4804.12	-43.23	0.04753	≤ 2.5	PASS
NTNV	DH5	Ant1	2441	30~1000	767.93	-50.93	0.00807	≤ 2.5	PASS
NTNV	DH5	Ant1	2441	1000~2387	2380.76	-45.70	0.02692	≤ 2.5	PASS
NTNV	DH5	Ant1	2441	2387~2400	2393.09	-35.57	0.27733	≤ 25	PASS
NTNV	DH5	Ant1	2441	2483.5~2496.5	2489.74	-36.73	0.21232	≤ 25	PASS
NTNV	DH5	Ant1	2441	2496.5~13000	3848.30	-44.27	0.03741	≤ 2.5	PASS
NTNV	DH5	Ant1	2480	30~1000	767.93	-49.77	0.01054	≤ 2.5	PASS
NTNV	DH5	Ant1	2480	1000~2387	2384.23	-45.00	0.03162	≤ 2.5	PASS
NTNV	DH5	Ant1	2480	2387~2400	2393.82	-37.43	0.18072	≤ 25	PASS
NTNV	DH5	Ant1	2480	2483.5~2496.5	2483.99	-37.23	0.18923	≤ 25	PASS
NTNV	DH5	Ant1	2480	2496.5~13000	3761.65	-44.27	0.03741	≤ 2.5	PASS
NTNV	DH5	Ant1	Hop	30~1000	719.91	-63.14	0.00049	≤ 2.5	PASS
NTNV	DH5	Ant1	Hop	1000~2387	2358.91	-55.15	0.00305	≤ 2.5	PASS
NTNV	DH5	Ant1	Hop	2387~2400	2399.92	-45.41	0.02877	≤ 25	PASS
NTNV	DH5	Ant1	Hop	2483.5~2496.5	2494.92	-49.18	0.01208	≤ 25	PASS
NTNV	DH5	Ant1	Hop	2496.5~13000	4812.00	-55.81	0.00262	≤ 2.5	PASS
NTNV	2DH5	Ant1	2402	30~1000	719.91	-50.99	0.00796	≤ 2.5	PASS
NTNV	2DH5	Ant1	2402	1000~2387	2354.41	-42.83	0.05212	≤ 2.5	PASS
NTNV	2DH5	Ant1	2402	2387~2400	2399.99	-29.02	1.25314	≤ 25	PASS
NTNV	2DH5	Ant1	2402	2483.5~2496.5	2495.51	-37.16	0.19231	≤ 25	PASS
NTNV	2DH5	Ant1	2402	2496.5~13000	4804.64	-43.88	0.04093	≤ 2.5	PASS
NTNV	2DH5	Ant1	2441	30~1000	767.93	-51.63	0.00687	≤ 2.5	PASS
NTNV	2DH5	Ant1	2441	1000~2387	2345.04	-45.06	0.03119	≤ 2.5	PASS
NTNV	2DH5	Ant1	2441	2387~2400	2392.82	-36.71	0.21330	≤ 25	PASS
NTNV	2DH5	Ant1	2441	2483.5~2496.5	2488.86	-37.29	0.18664	≤ 25	PASS
NTNV	2DH5	Ant1	2441	2496.5~13000	3738.01	-44.47	0.03573	≤ 2.5	PASS
NTNV	2DH5	Ant1	2480	30~1000	767.93	-50.76	0.00839	≤ 2.5	PASS
NTNV	2DH5	Ant1	2480	1000~2387	2383.88	-45.96	0.02535	≤ 2.5	PASS
NTNV	2DH5	Ant1	2480	2387~2400	2399.85	-37.57	0.17498	≤ 25	PASS
NTNV	2DH5	Ant1	2480	2483.5~2496.5	2496.14	-37.24	0.18880	≤ 25	PASS
NTNV	2DH5	Ant1	2480	2496.5~13000	3860.38	-44.33	0.03690	≤ 2.5	PASS
NTNV	2DH5	Ant1	Hop	30~1000	767.93	-63.05	0.00050	≤ 2.5	PASS

NTNV	2DH5	Ant1	Hop	1000~2387	2367.93	-54.10	0.00389	≤2.5	PASS
NTNV	2DH5	Ant1	Hop	2387~2400	2399.71	-48.68	0.01355	≤25	PASS
NTNV	2DH5	Ant1	Hop	2483.5~2496.5	2492.29	-49.32	0.01169	≤25	PASS
NTNV	2DH5	Ant1	Hop	2496.5~13000	3872.46	-56.54	0.00222	≤2.5	PASS
NTNV	3DH5	Ant1	2402	30~1000	719.91	-51.53	0.00703	≤2.5	PASS
NTNV	3DH5	Ant1	2402	1000~2387	2354.41	-44.47	0.03573	≤2.5	PASS
NTNV	3DH5	Ant1	2402	2387~2400	2400.00	-29.47	1.12980	≤25	PASS
NTNV	3DH5	Ant1	2402	2483.5~2496.5	2487.94	-37.81	0.16558	≤25	PASS
NTNV	3DH5	Ant1	2402	2496.5~13000	3850.93	-44.27	0.03741	≤2.5	PASS
NTNV	3DH5	Ant1	2441	30~1000	719.91	-52.48	0.00565	≤2.5	PASS
NTNV	3DH5	Ant1	2441	1000~2387	2345.04	-46.43	0.02275	≤2.5	PASS
NTNV	3DH5	Ant1	2441	2387~2400	2392.93	-36.60	0.21878	≤25	PASS
NTNV	3DH5	Ant1	2441	2483.5~2496.5	2492.94	-37.21	0.19011	≤25	PASS
NTNV	3DH5	Ant1	2441	2496.5~13000	8116.92	-44.43	0.03606	≤2.5	PASS
NTNV	3DH5	Ant1	2480	30~1000	767.93	-50.79	0.00834	≤2.5	PASS
NTNV	3DH5	Ant1	2480	1000~2387	2384.92	-46.89	0.02046	≤2.5	PASS
NTNV	3DH5	Ant1	2480	2387~2400	2399.73	-36.96	0.20137	≤25	PASS
NTNV	3DH5	Ant1	2480	2483.5~2496.5	2487.35	-37.59	0.17418	≤25	PASS
NTNV	3DH5	Ant1	2480	2496.5~13000	3738.01	-44.44	0.03597	≤2.5	PASS
NTNV	3DH5	Ant1	Hop	30~1000	767.93	-62.98	0.00050	≤2.5	PASS
NTNV	3DH5	Ant1	Hop	1000~2387	2366.20	-54.16	0.00384	≤2.5	PASS
NTNV	3DH5	Ant1	Hop	2387~2400	2399.99	-41.44	0.07178	≤25	PASS
NTNV	3DH5	Ant1	Hop	2483.5~2496.5	2491.59	-48.66	0.01361	≤25	PASS
NTNV	3DH5	Ant1	Hop	2496.5~13000	3752.19	-56.52	0.00223	≤2.5	PASS

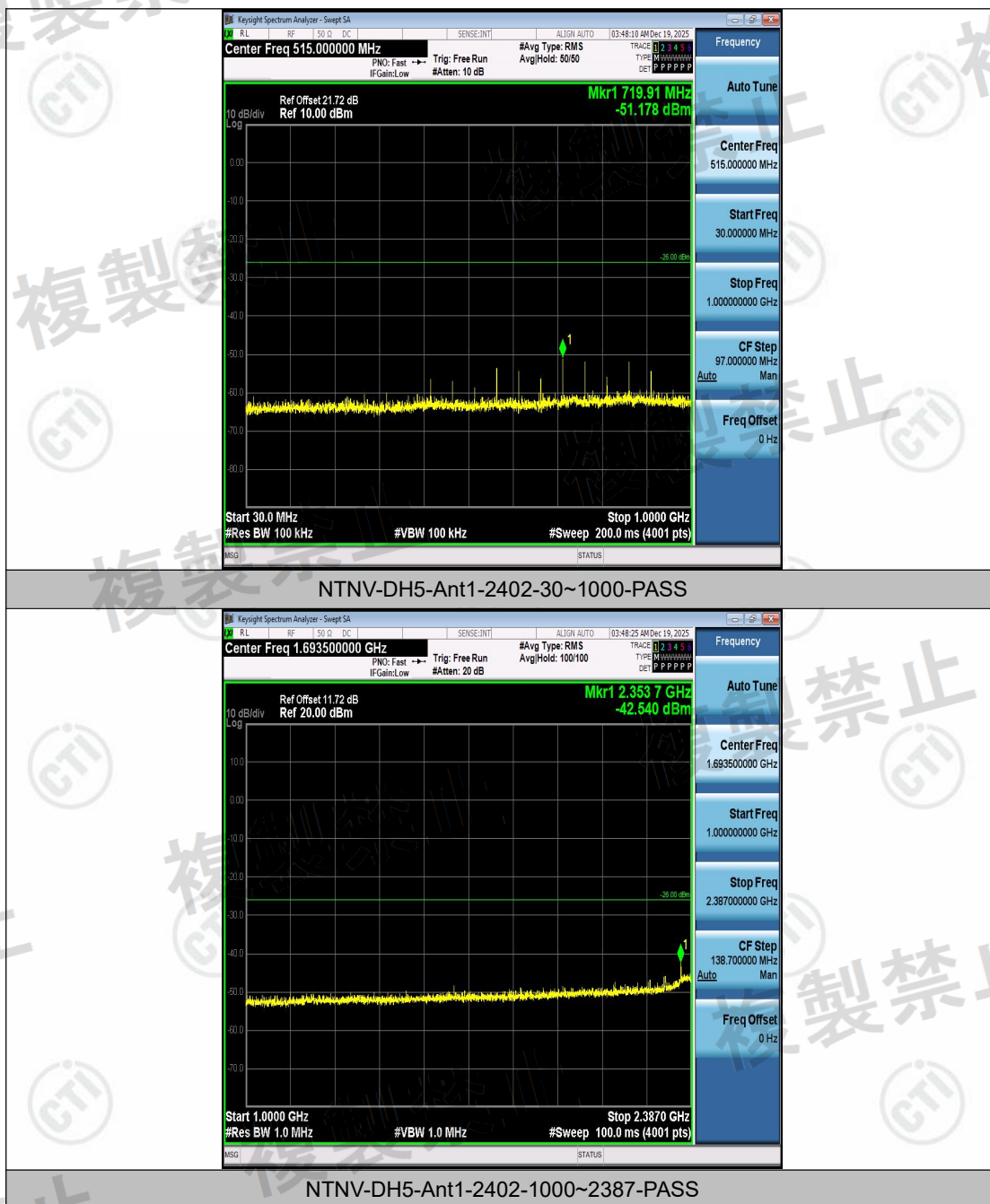
Note:

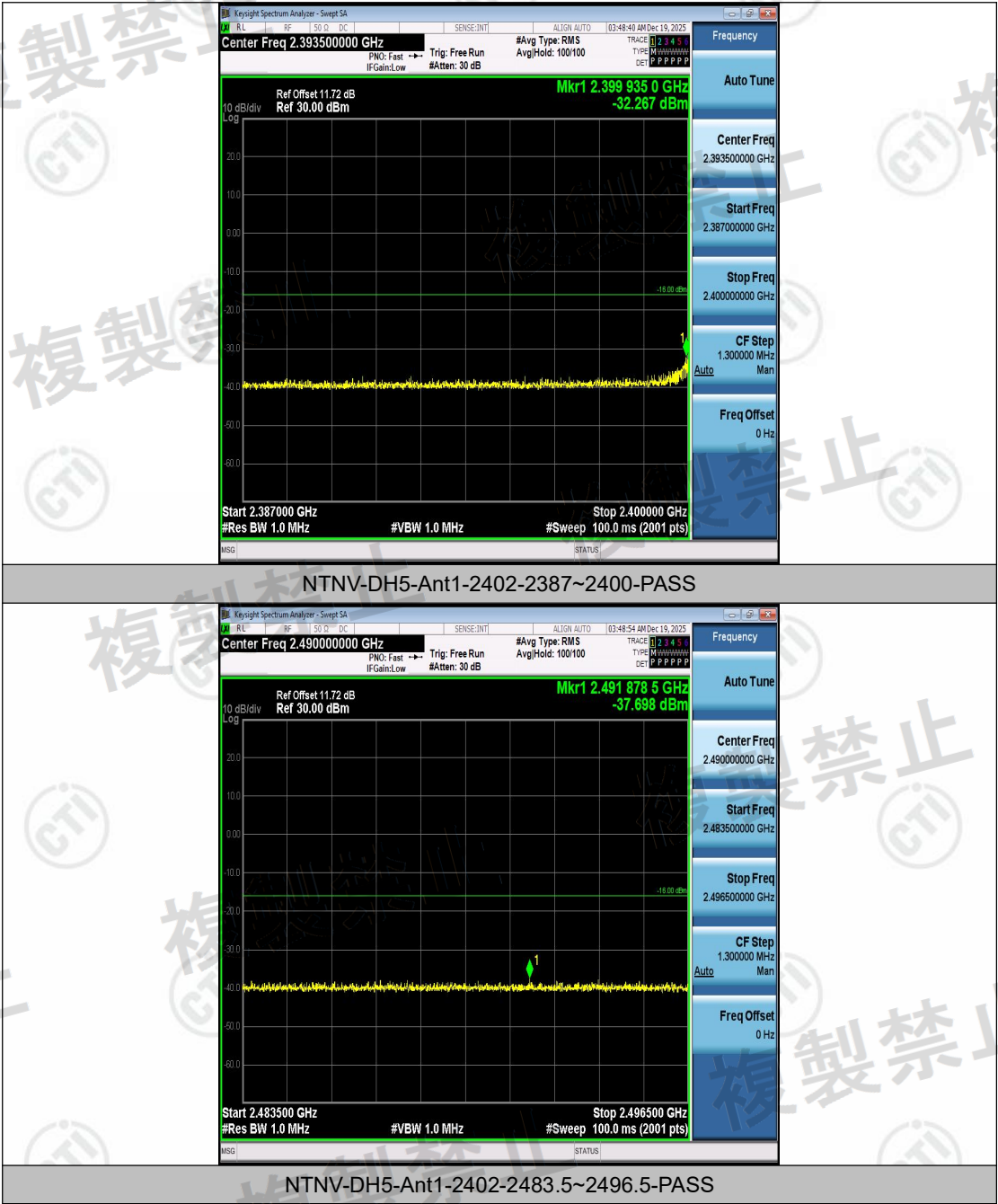
$\text{dBm}/1\text{MHz} = \text{dBm}/100\text{kHz} + 10 \times \log_{10} (1\text{MHz}/100\text{kHz})$

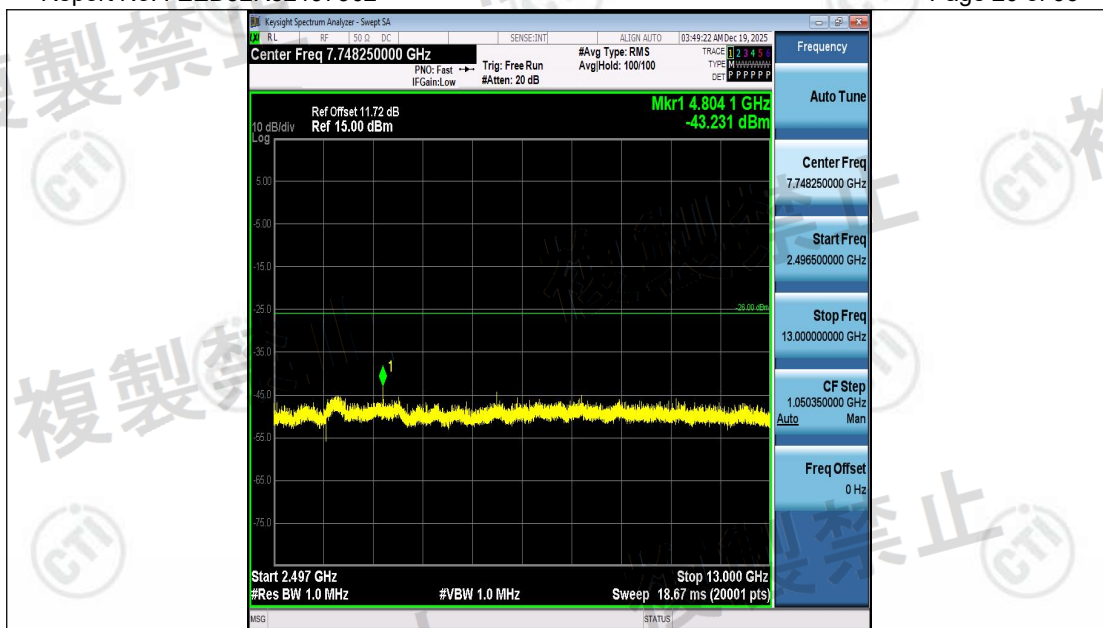
$\text{dBm}/1\text{MHz} = \text{dBm}/100\text{kHz} + 10$

During the 30M-1000M testing process, a 10 dB factor was added for the test.

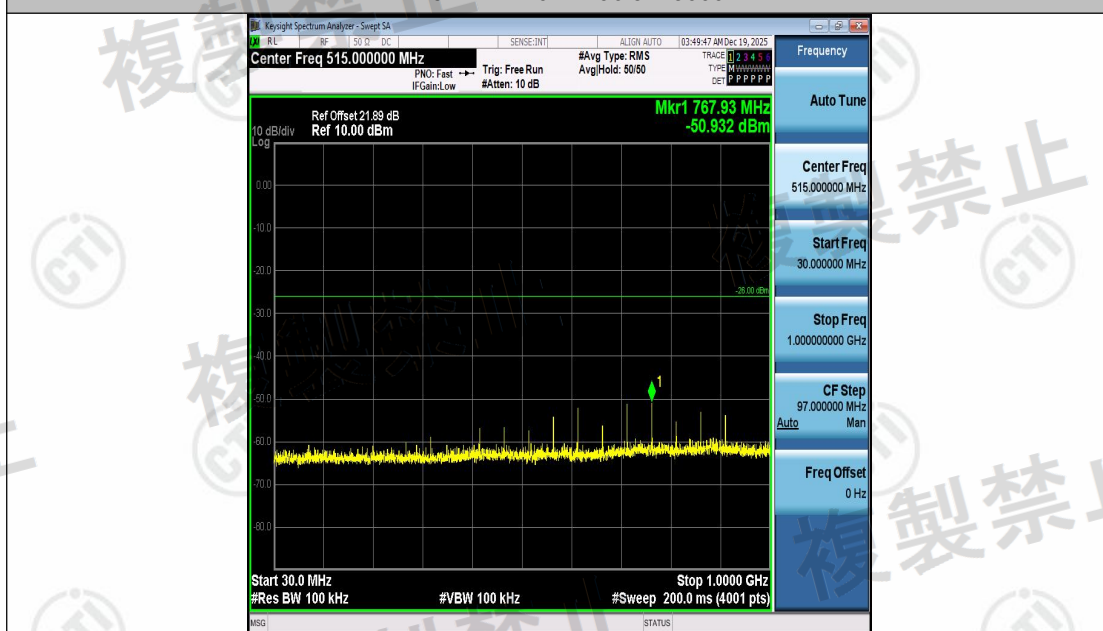
Test Graphs



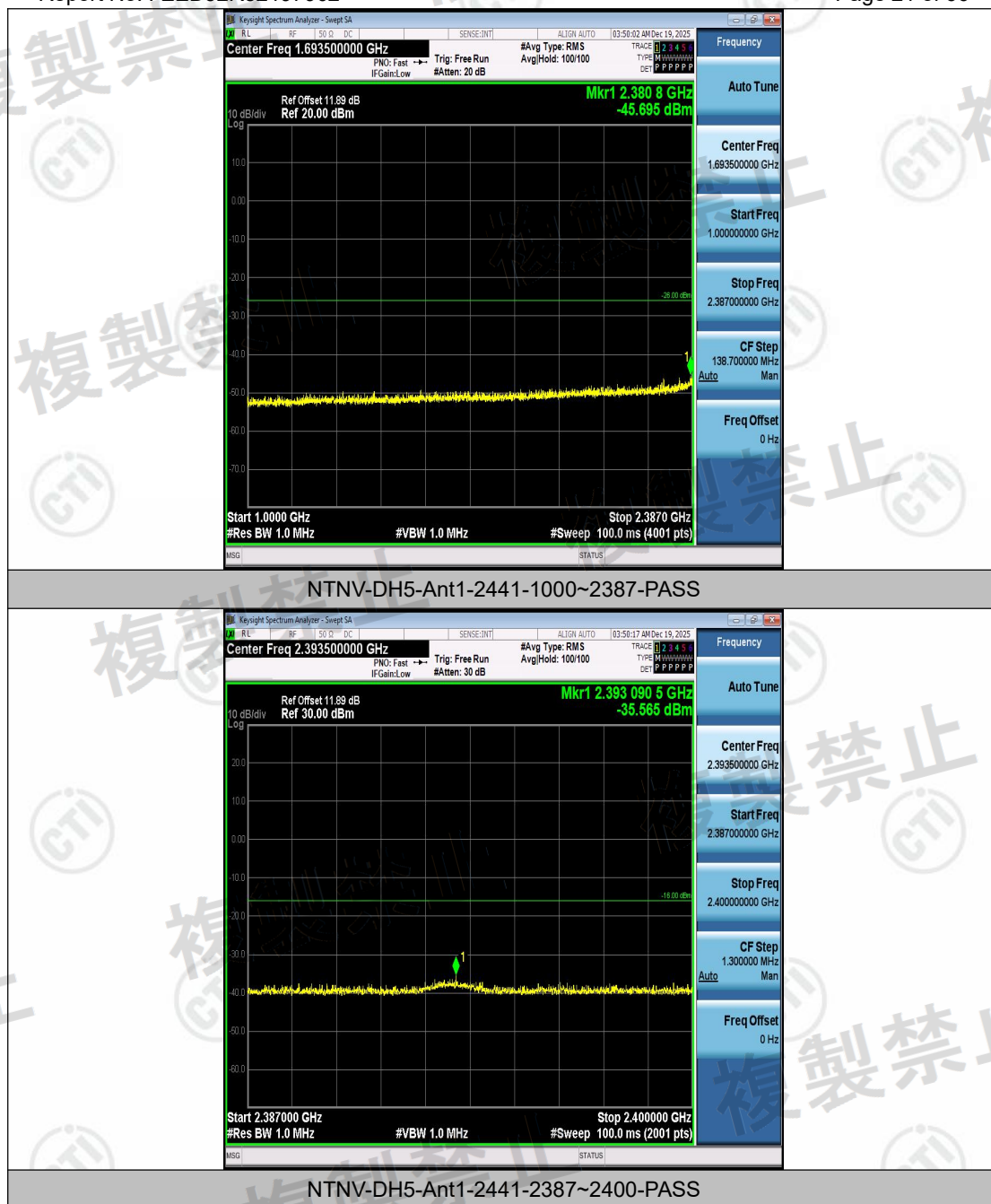


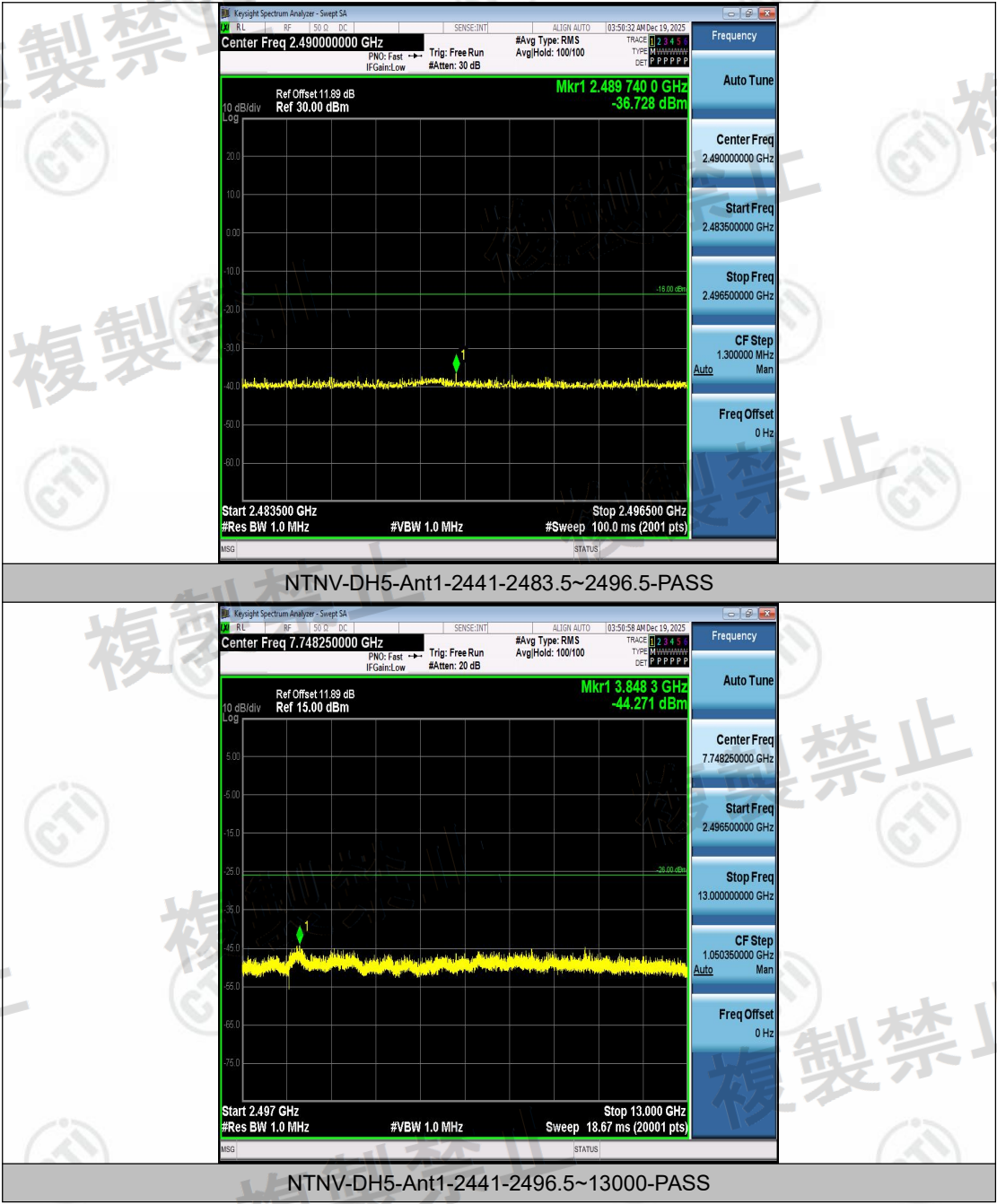


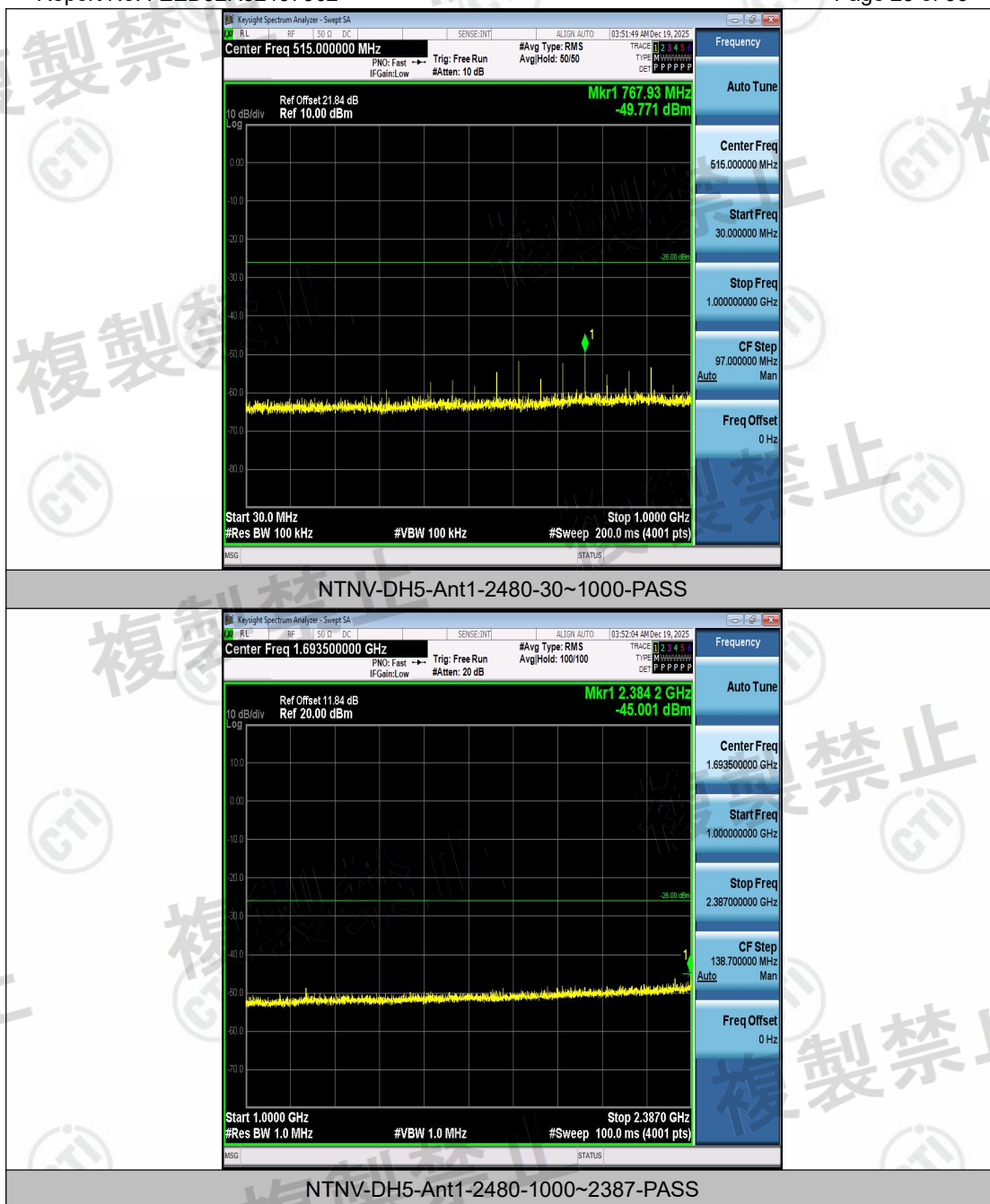
NTNV-DH5-Ant1-2402-2496.5~13000-PASS

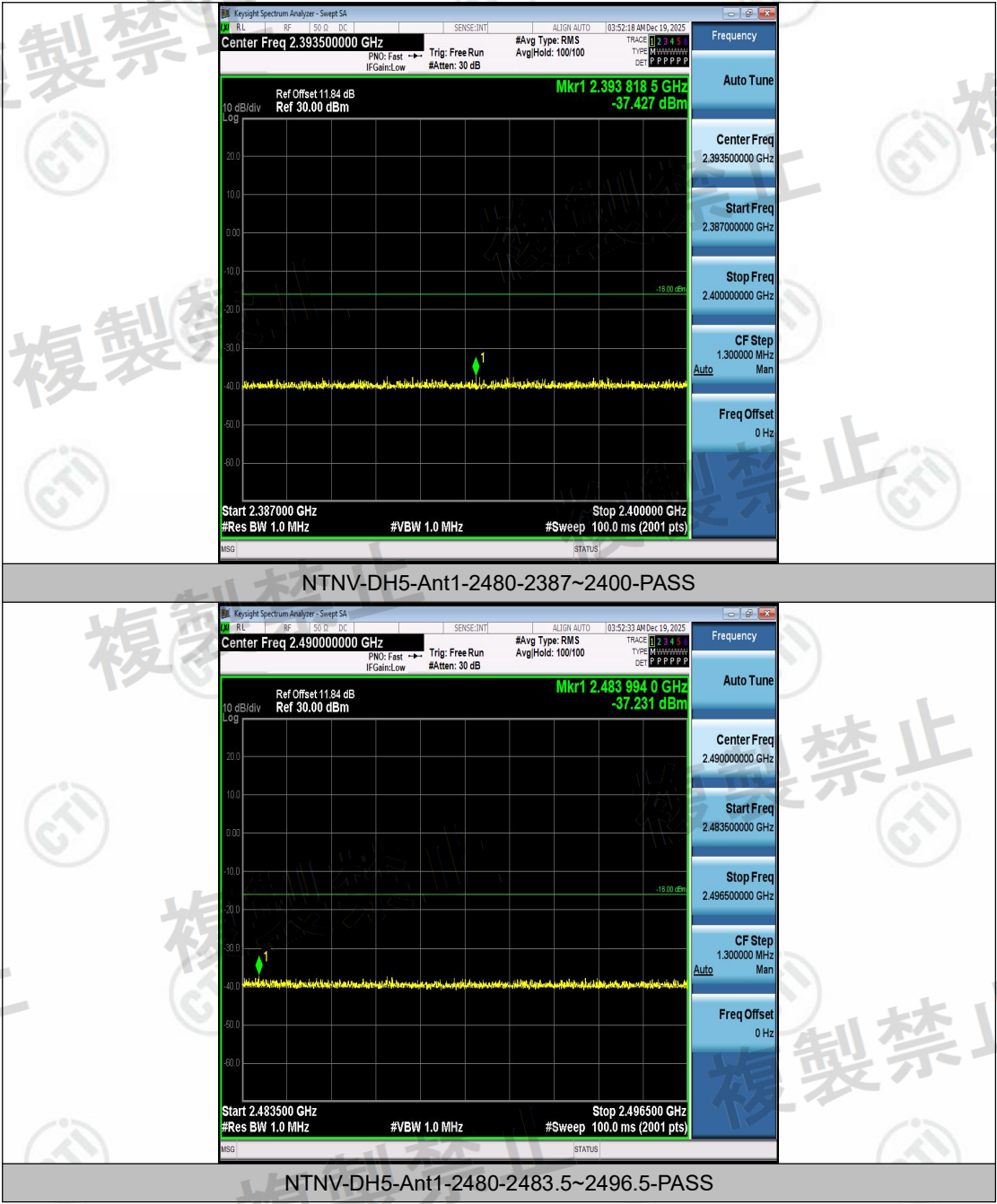


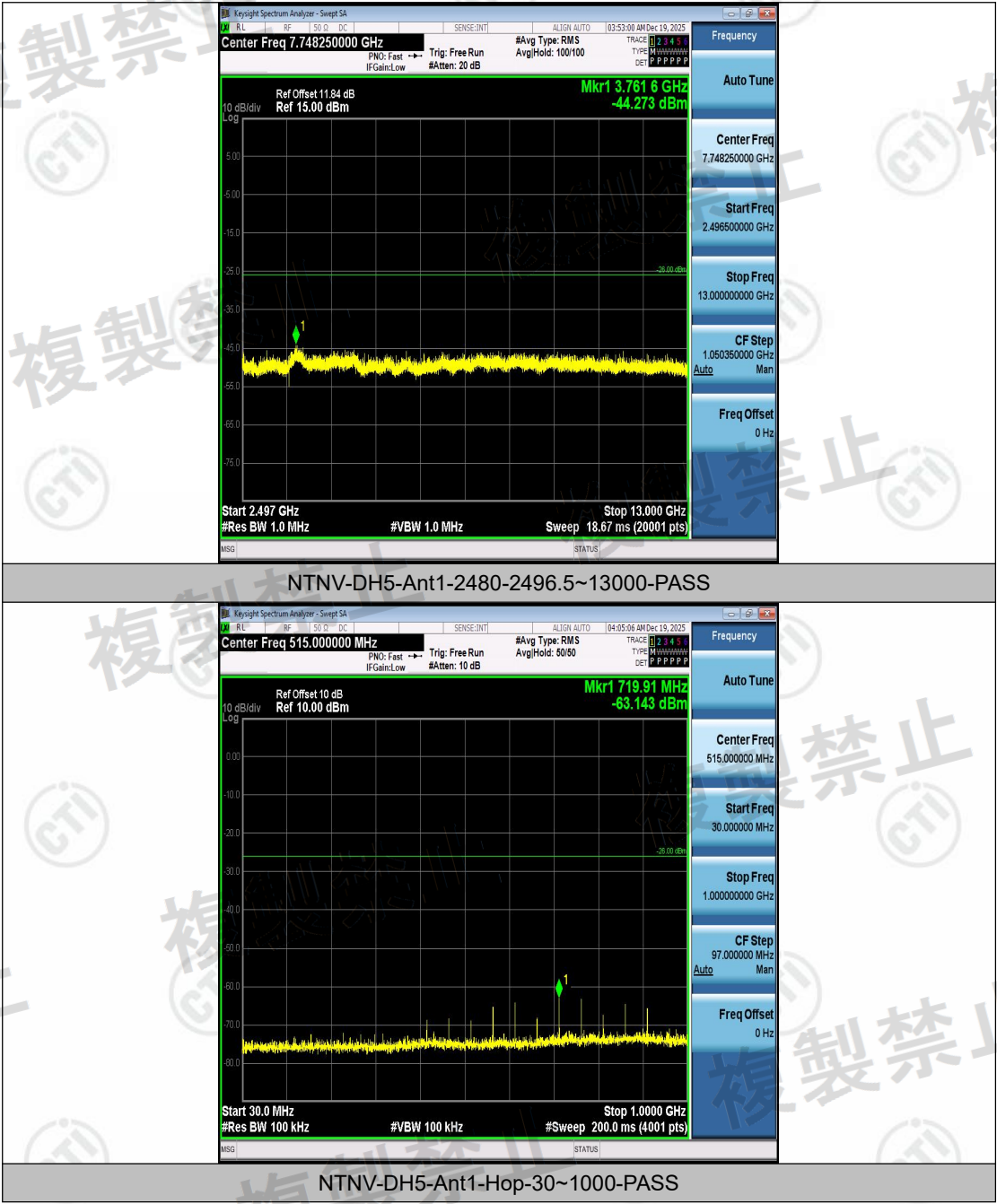
NTNV-DH5-Ant1-2441-30~1000-PASS

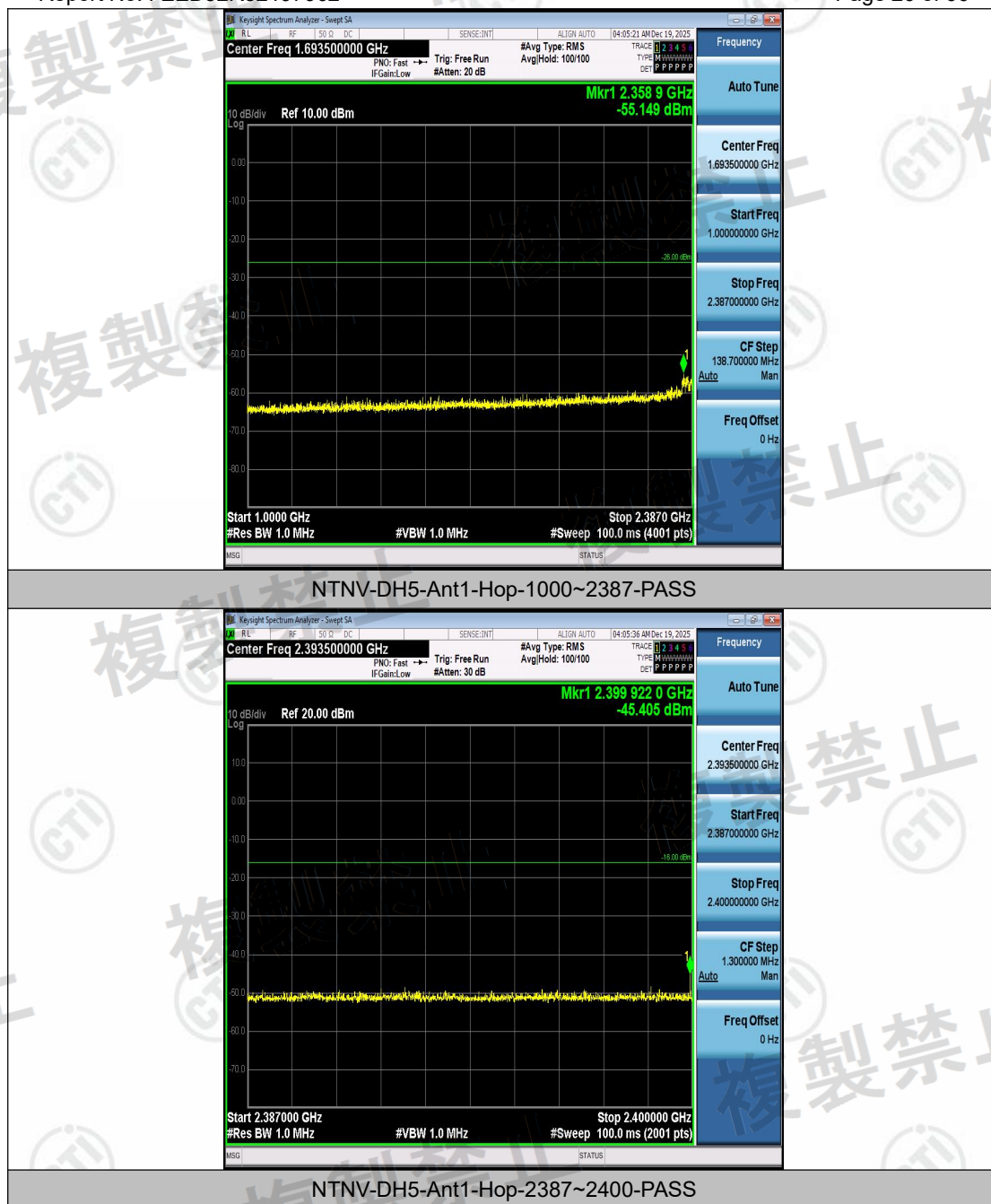


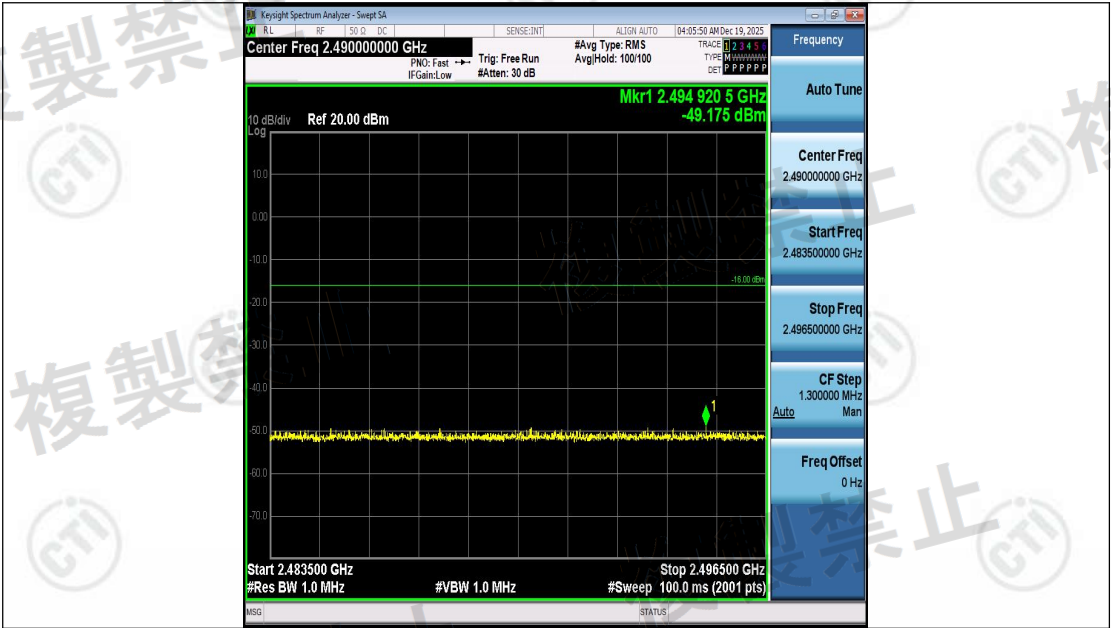




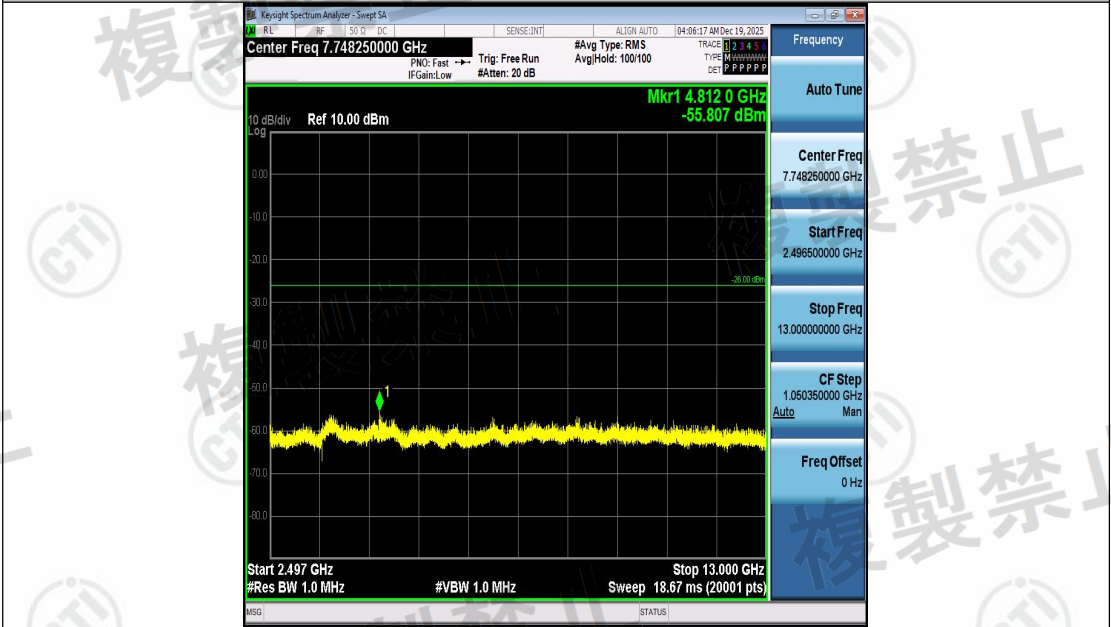




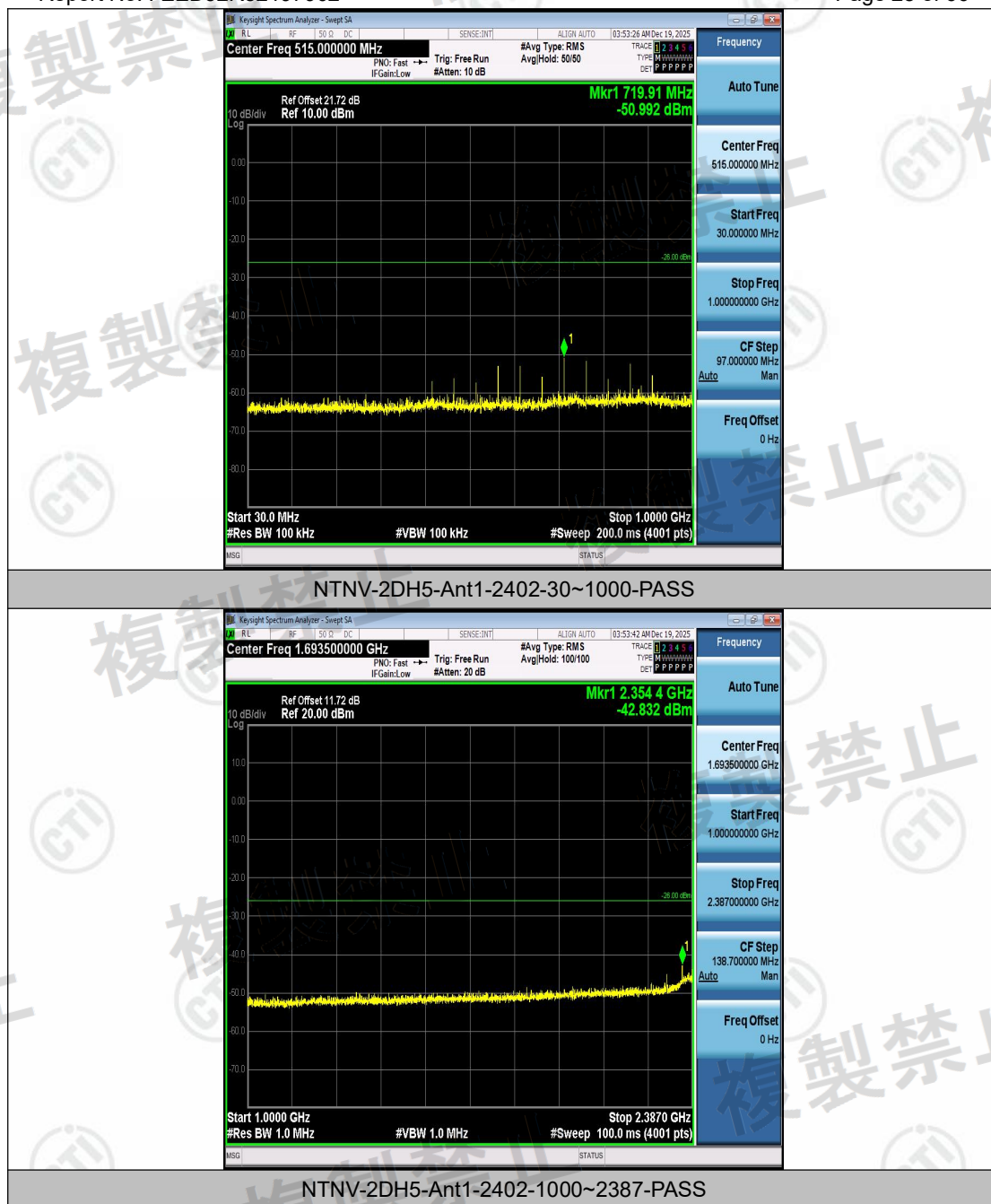


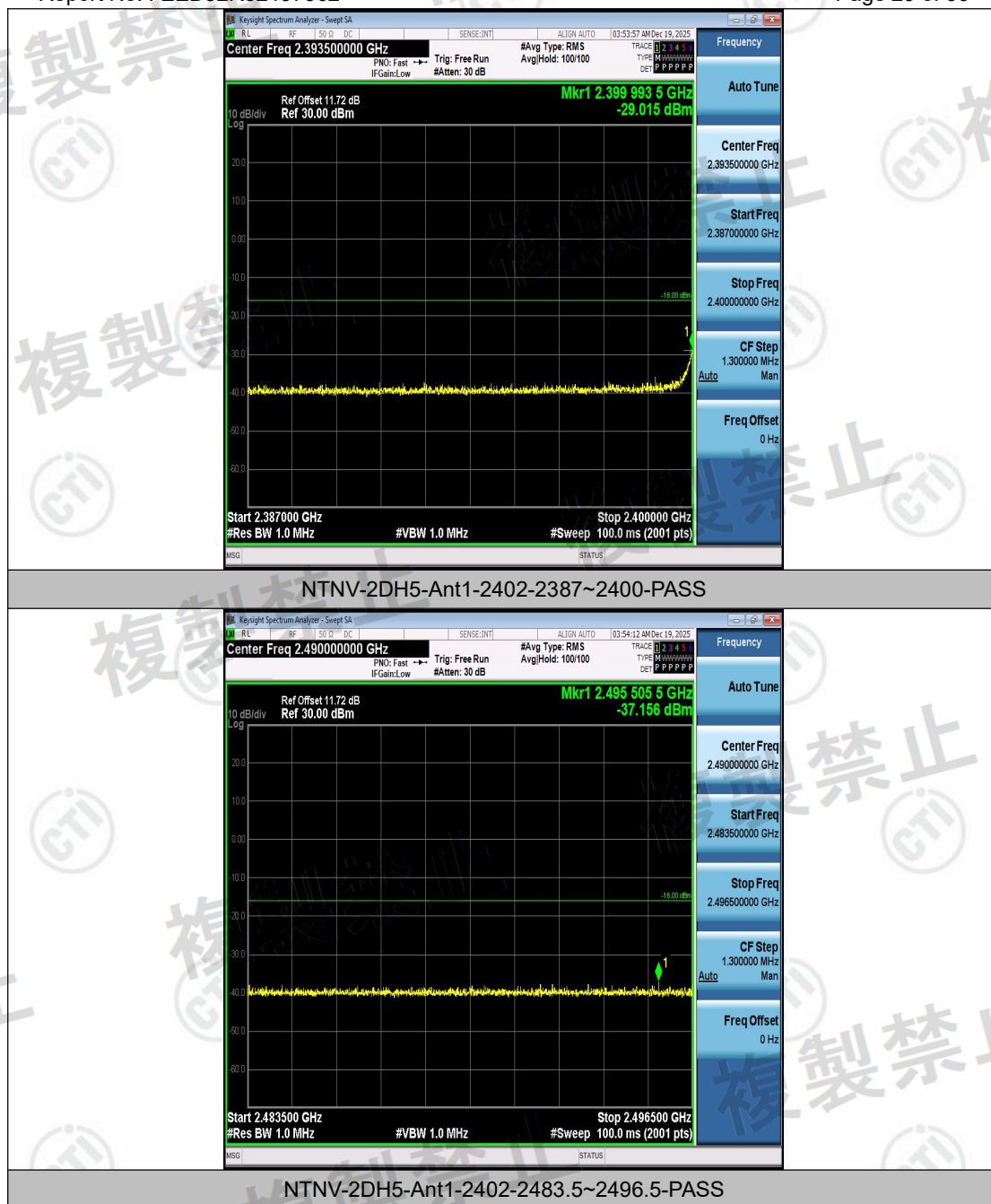


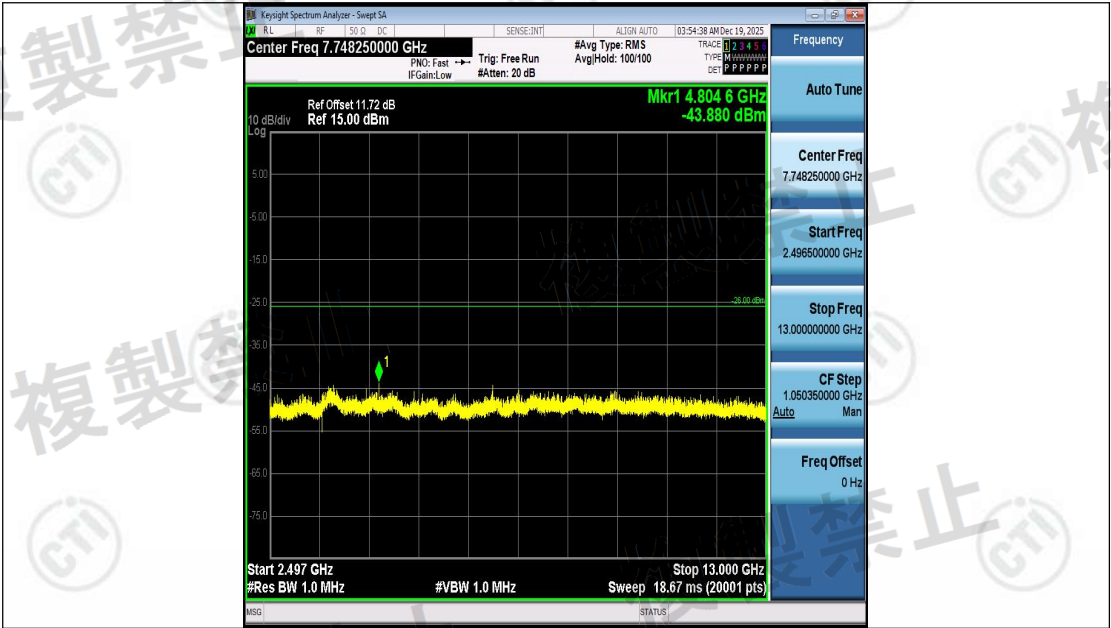
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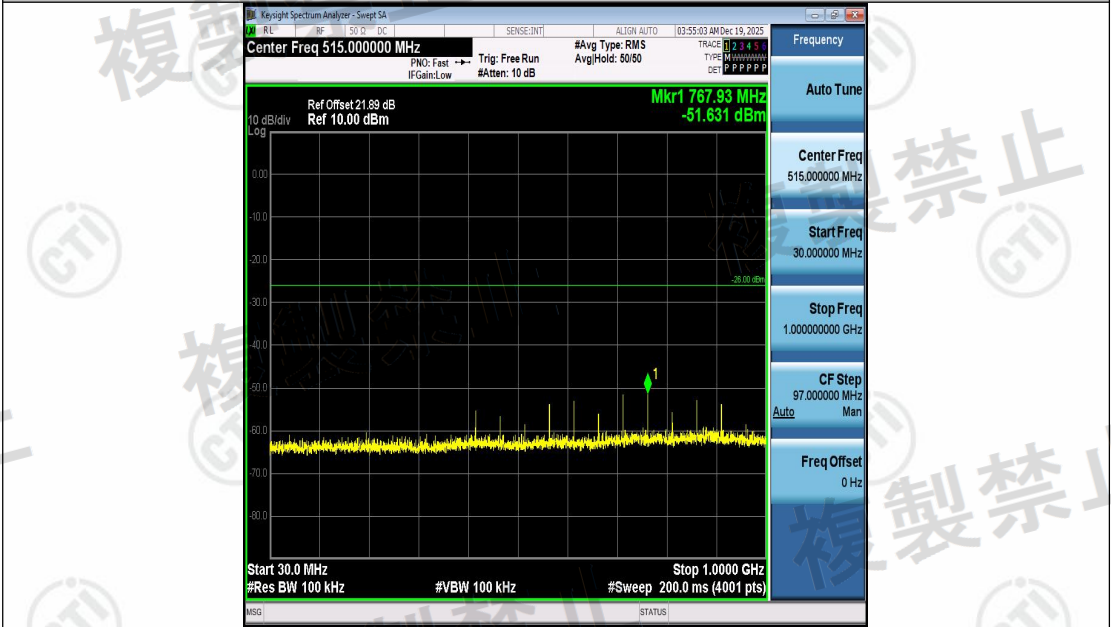
NTNV-DH5-Ant1-Hop-2496.5~13000-PASS



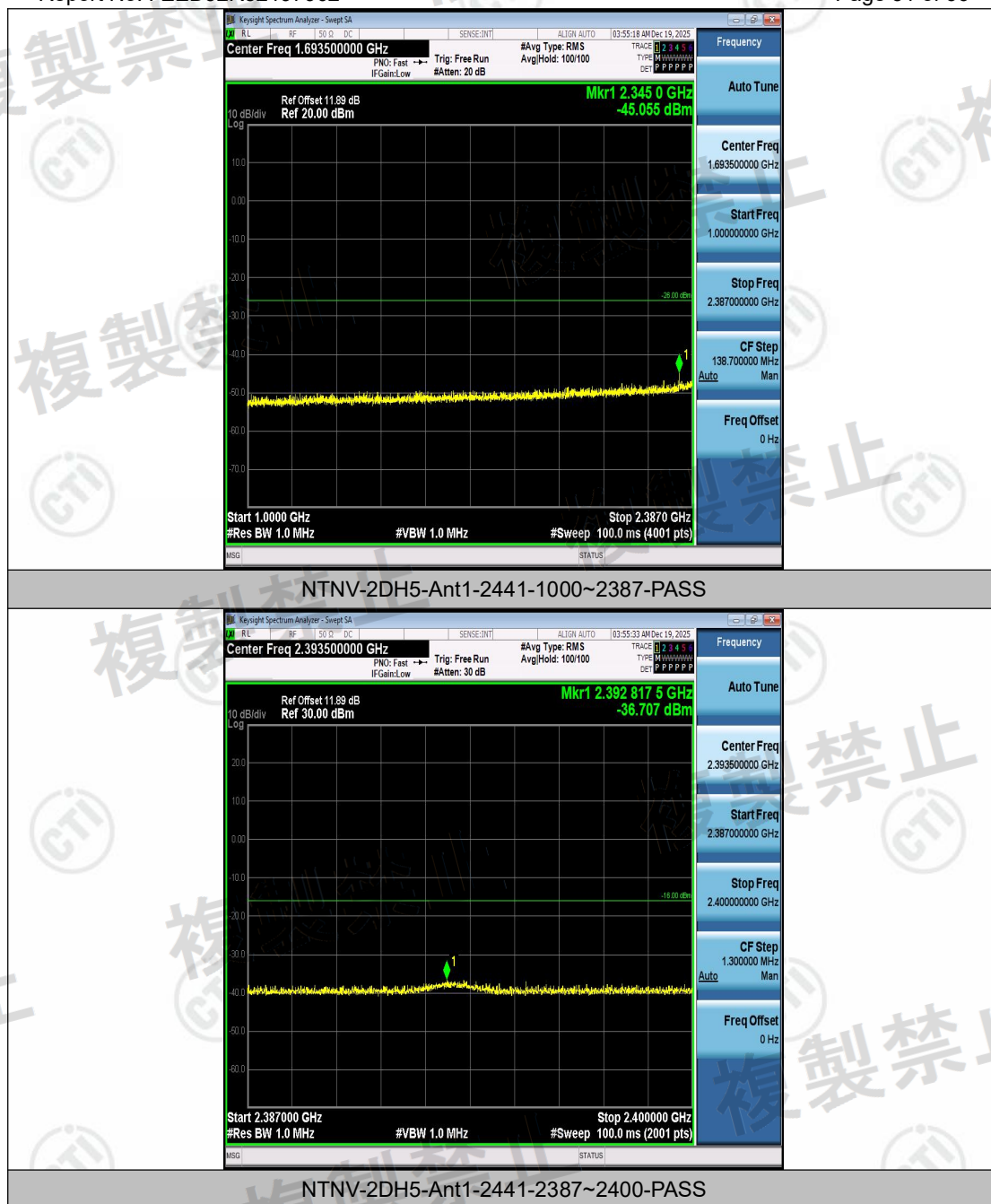


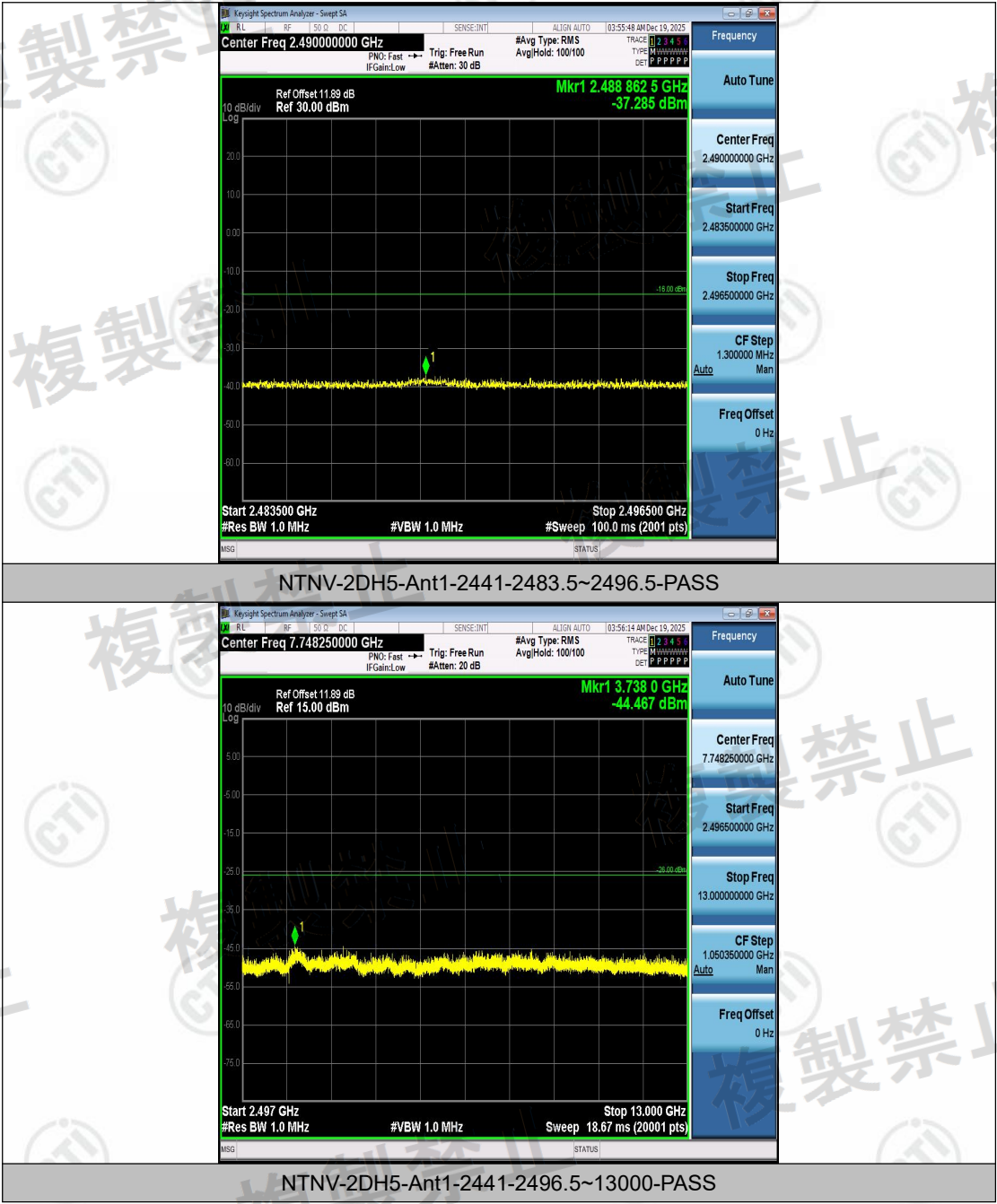


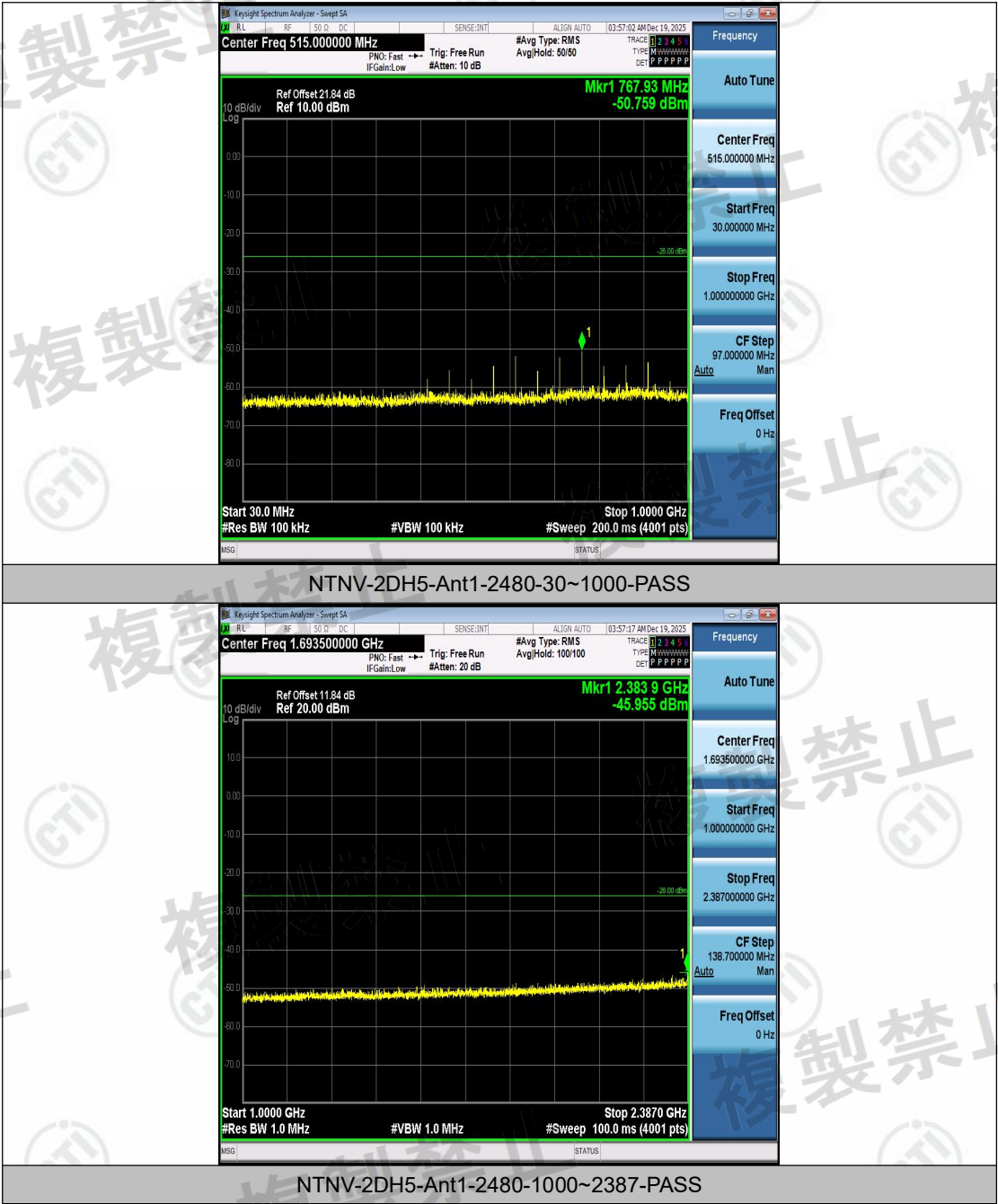
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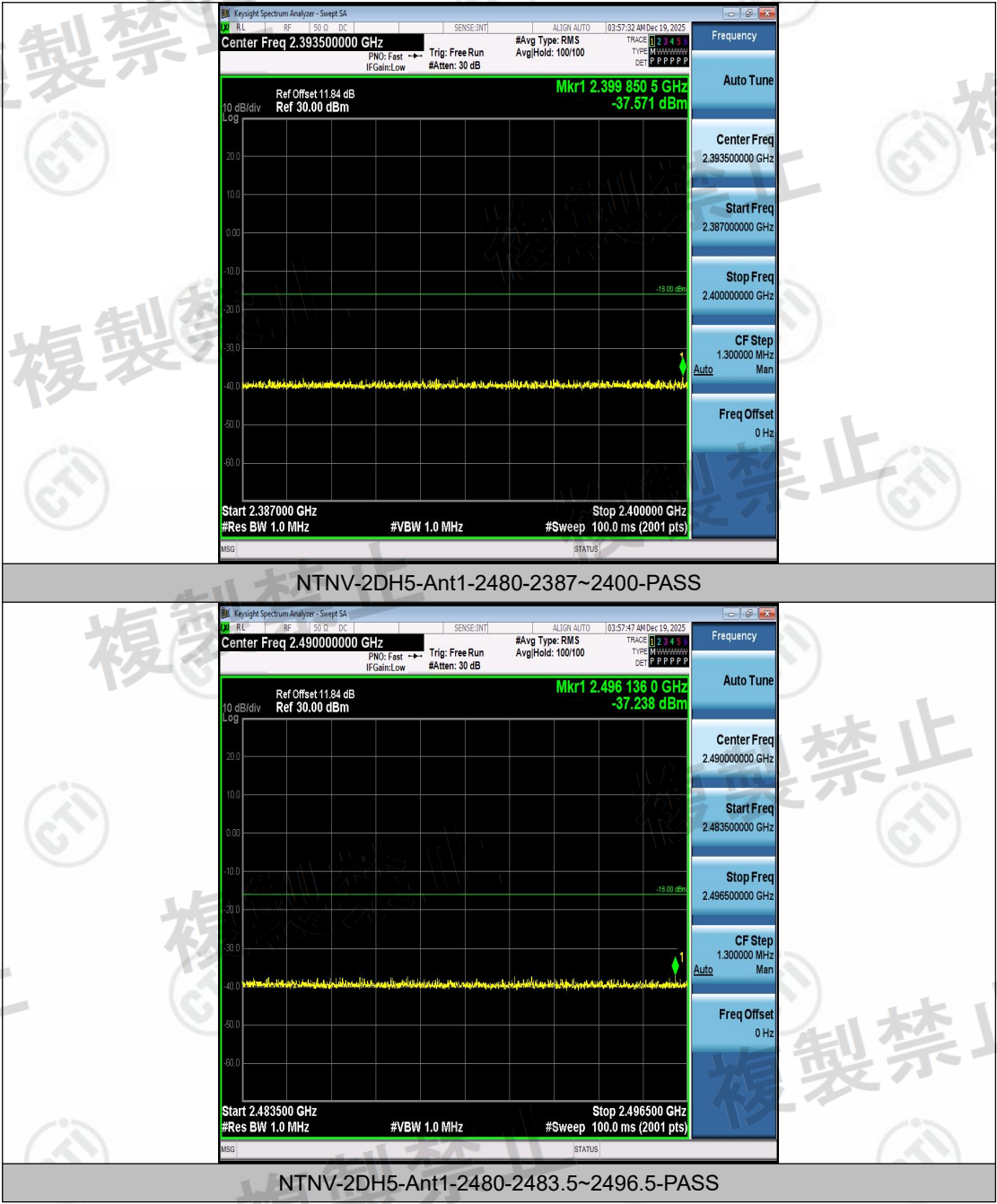


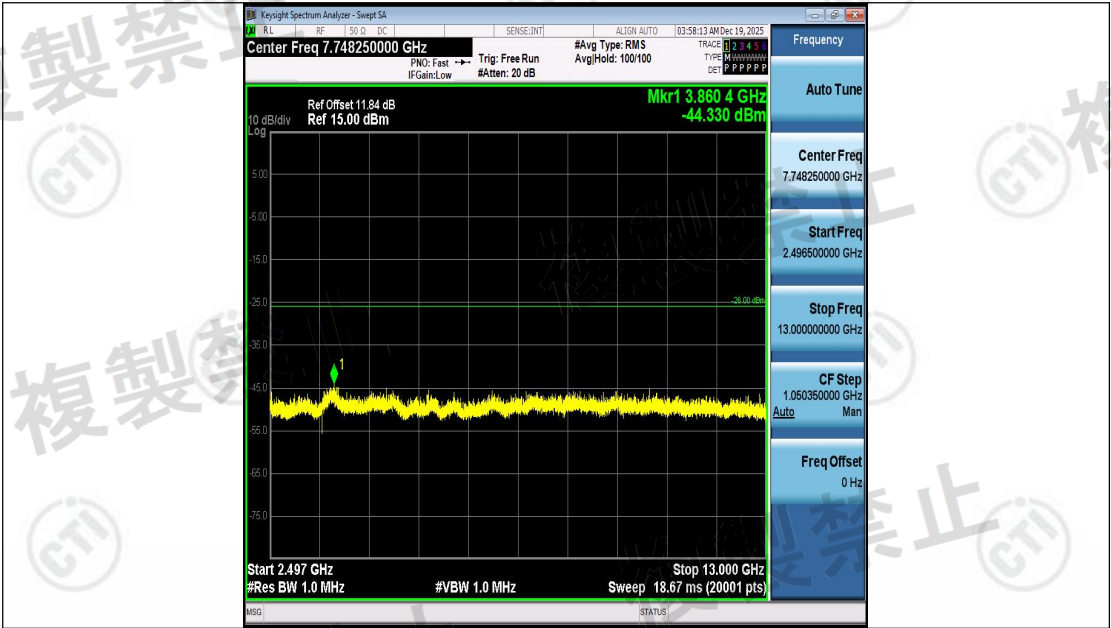
NTNV-2DH5-Ant1-2441-30~1000-PASS



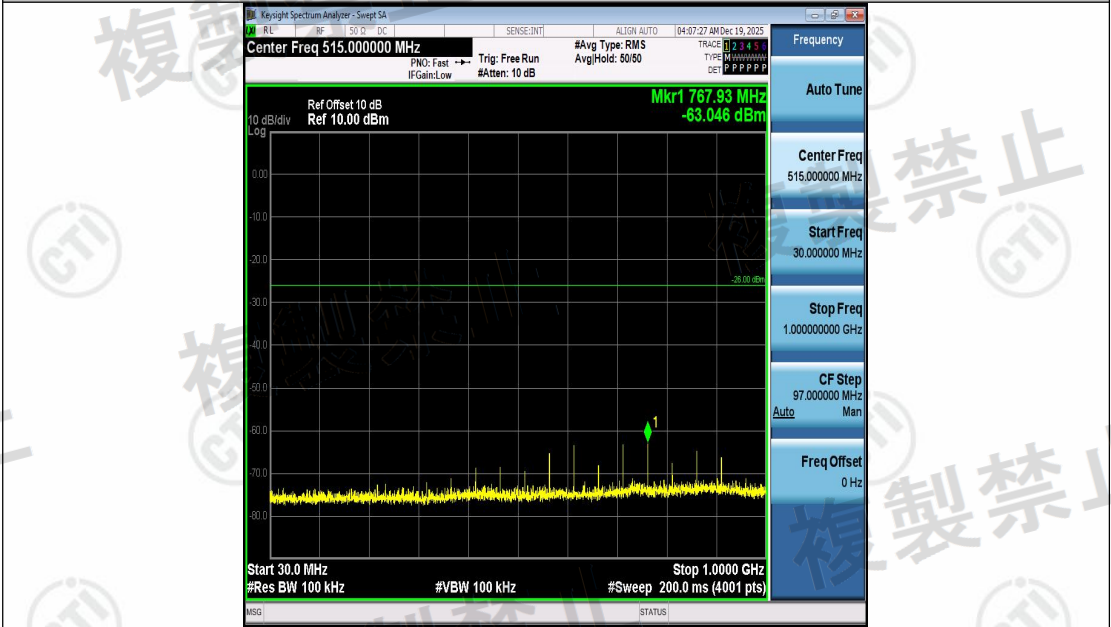




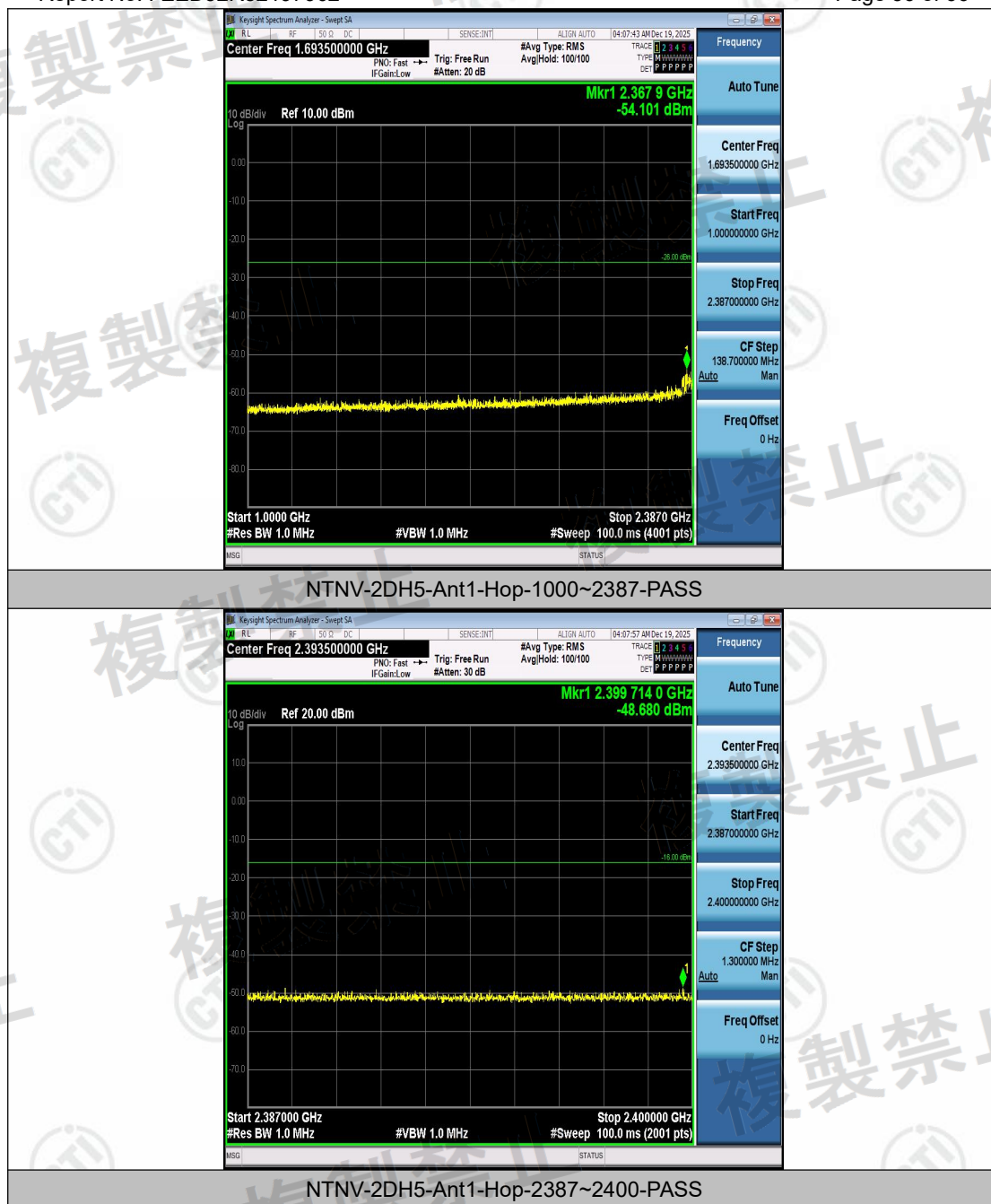


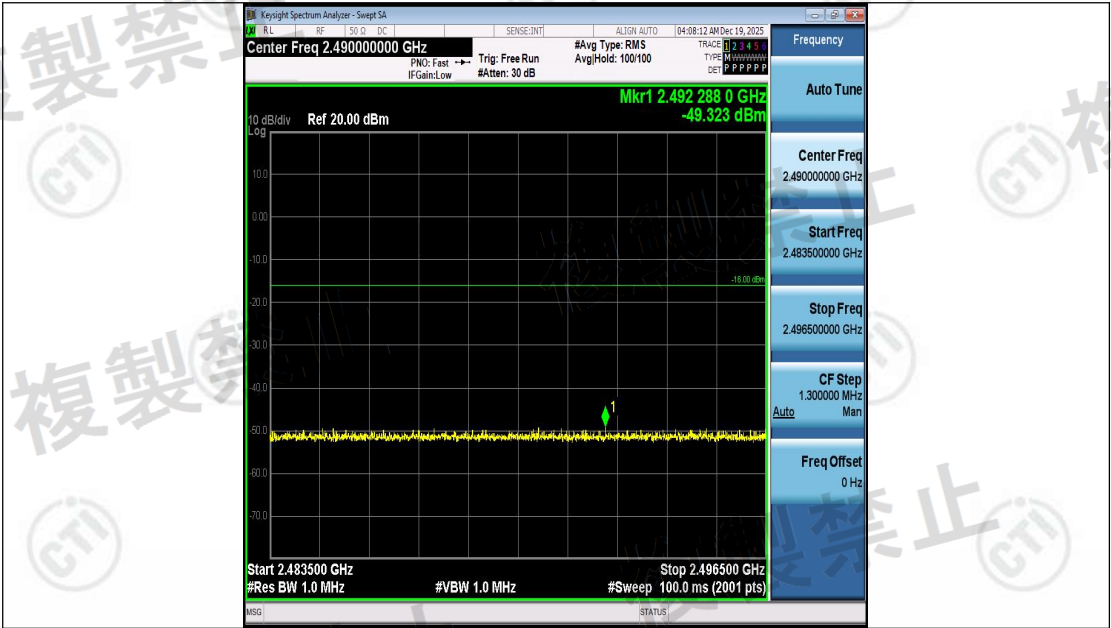


NTNV-2DH5-Ant1-2480-2496.5~13000-PASS

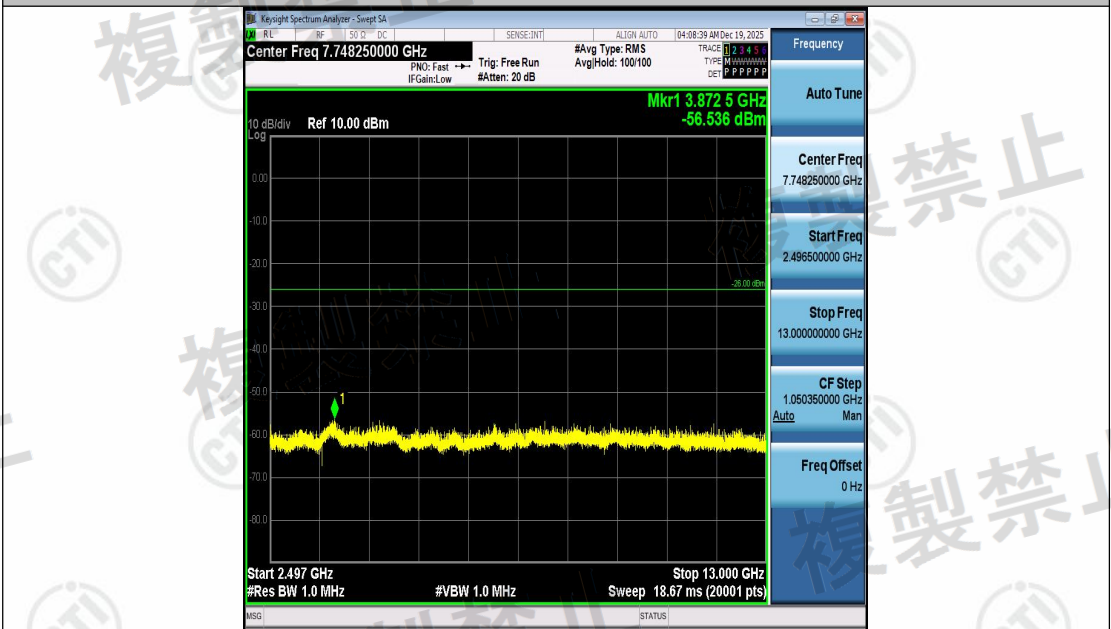


NTNV-2DH5-Ant1-Hop-30~1000-PASS

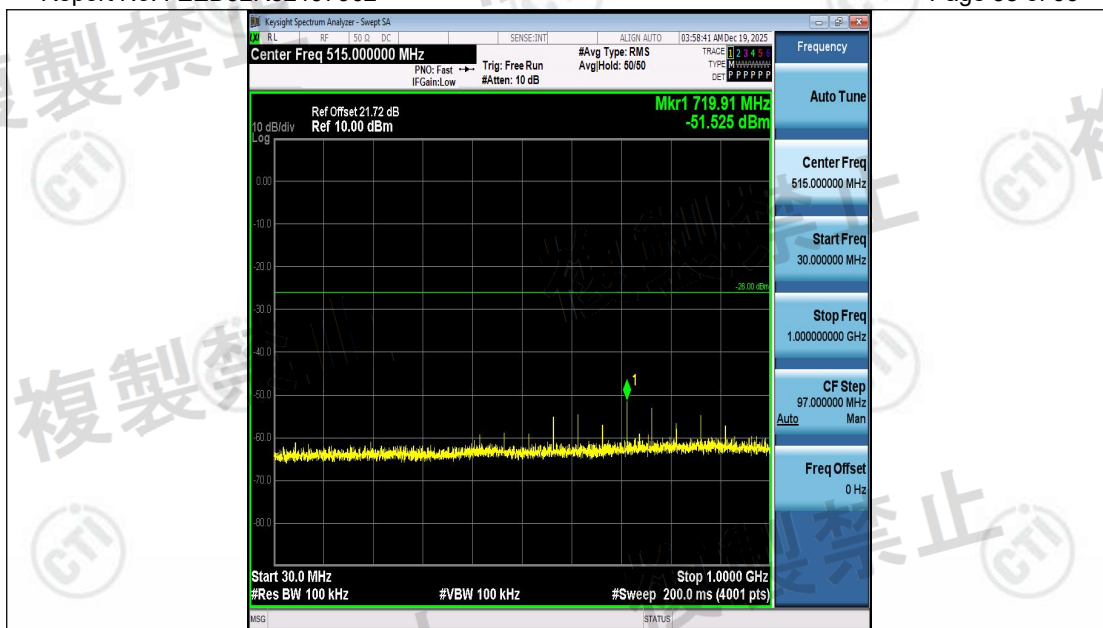




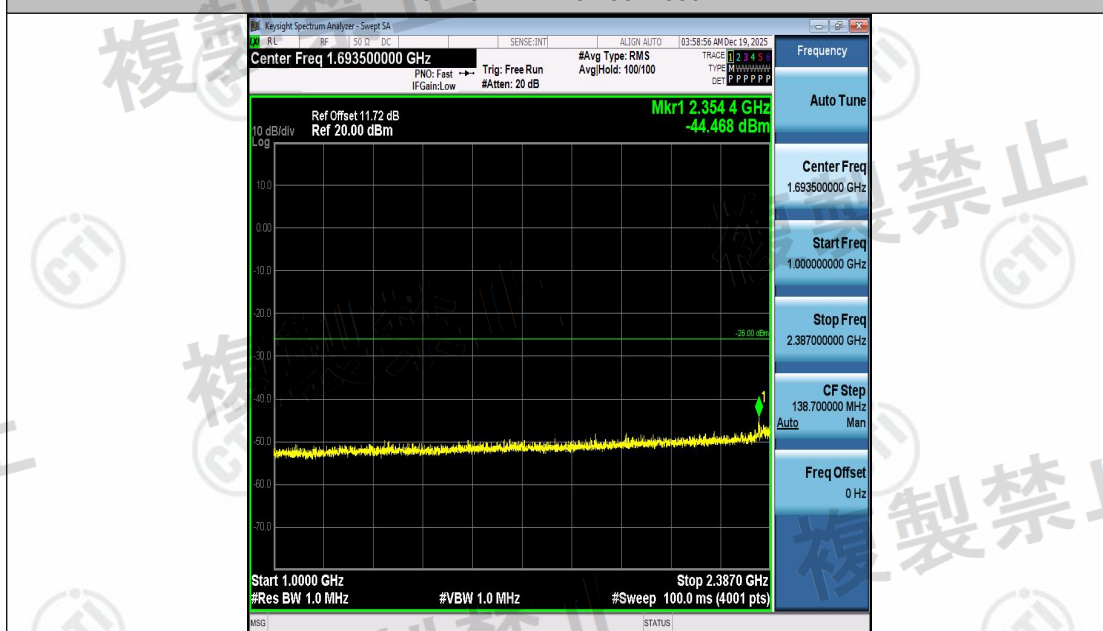
NTNV-2DH5-Ant1-Hop-2483.5~2496.5-PASS



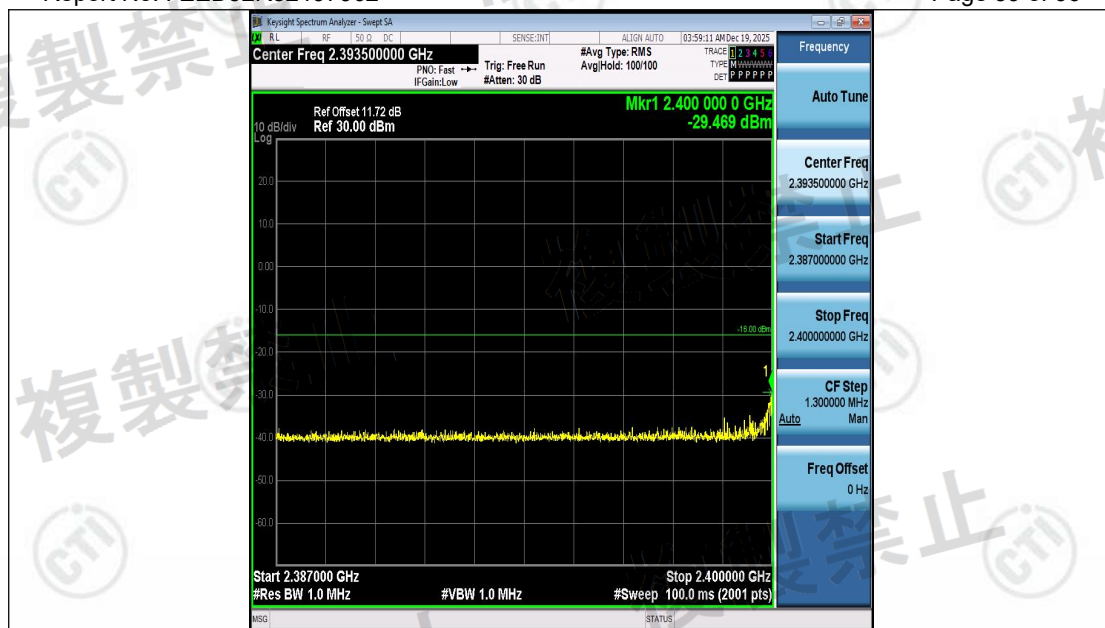
NTNV-2DH5-Ant1-Hop-2496.5~13000-PASS



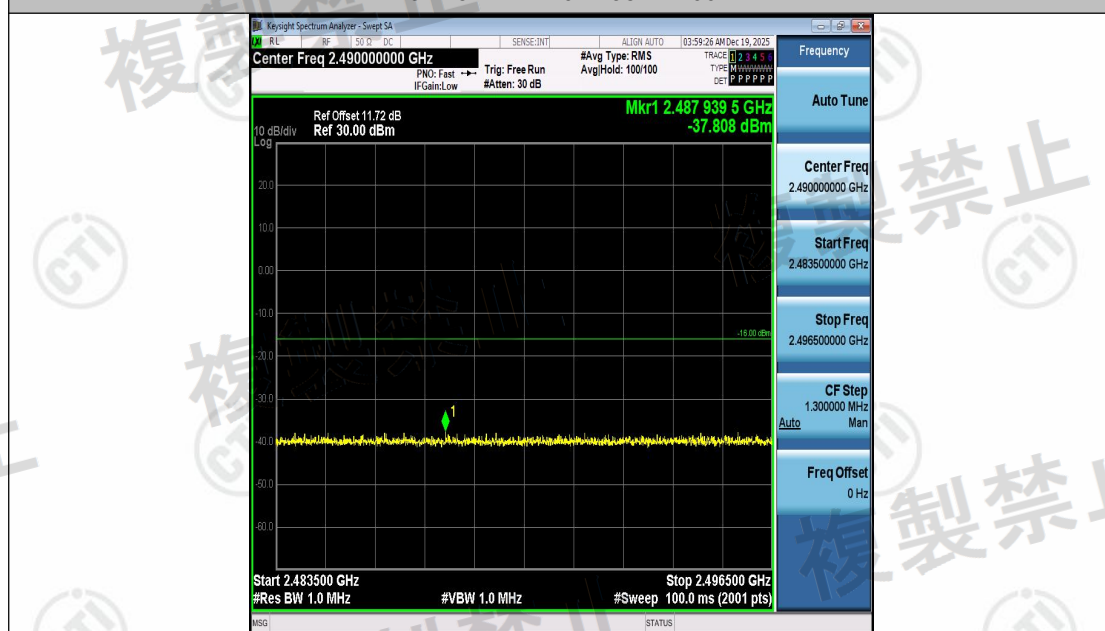
NTNV-3DH5-Ant1-2402-30~1000-PASS



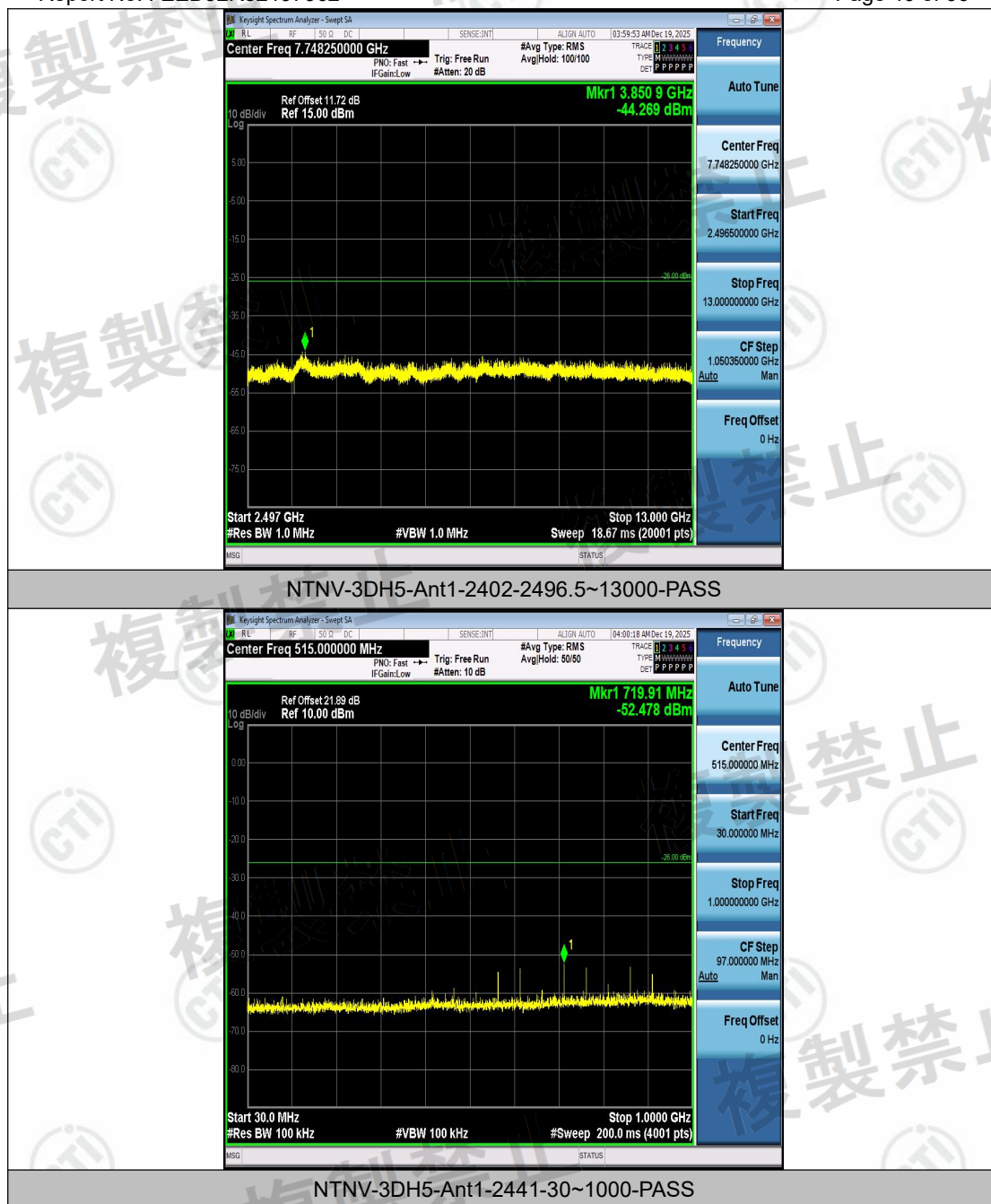
NTNV-3DH5-Ant1-2402-1000~2387-PASS

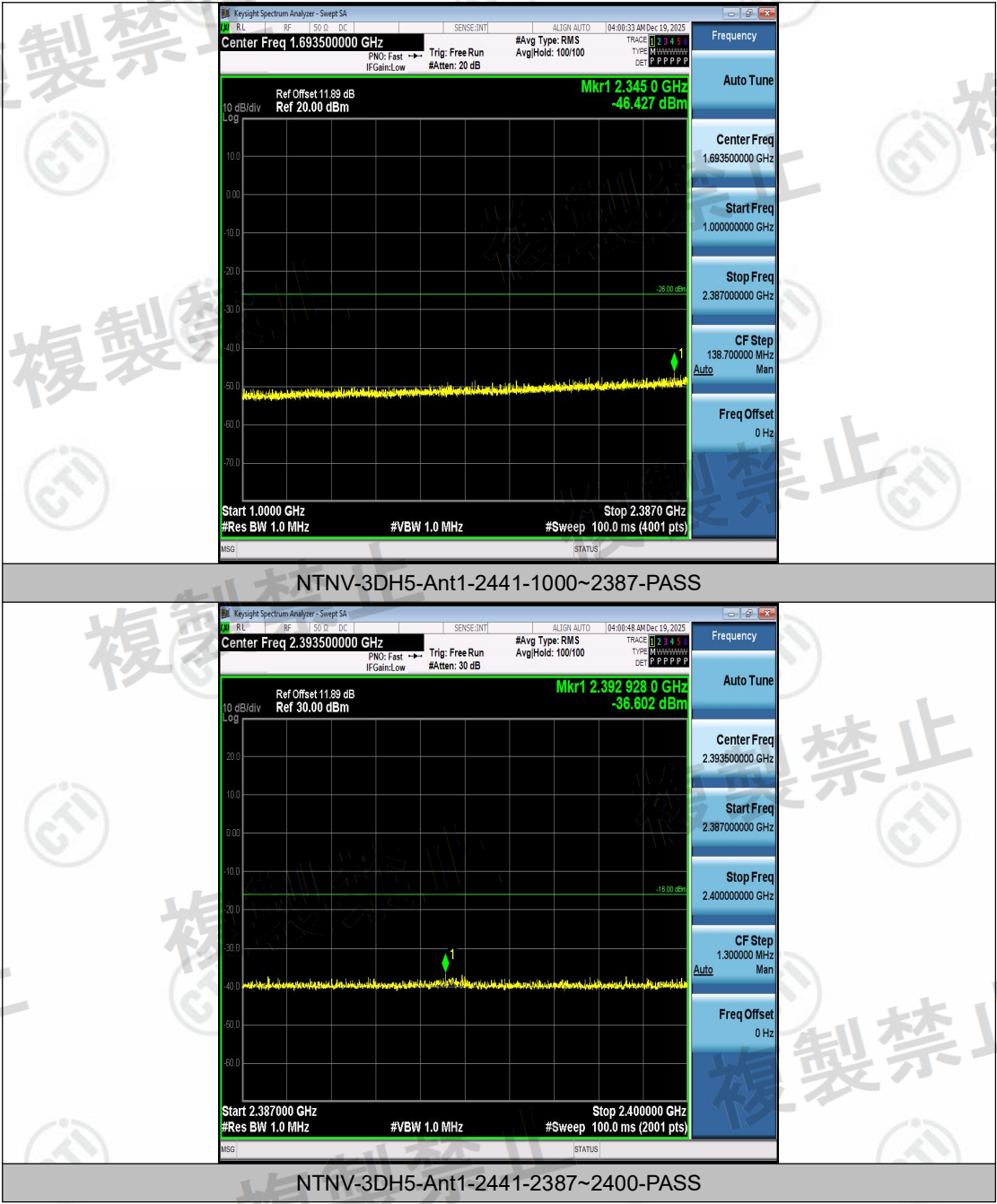


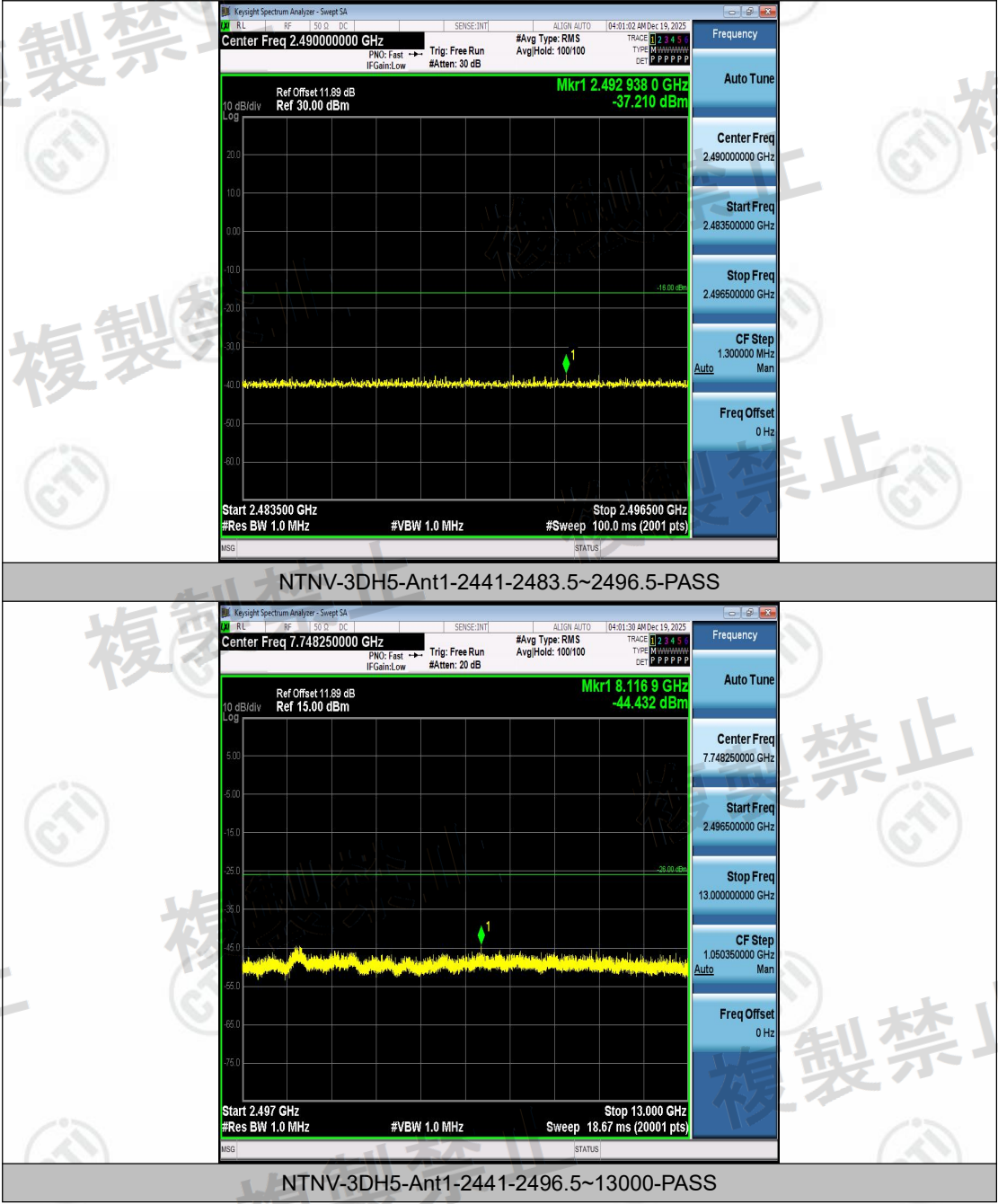
NTNV-3DH5-Ant1-2402-2387~2400-PASS

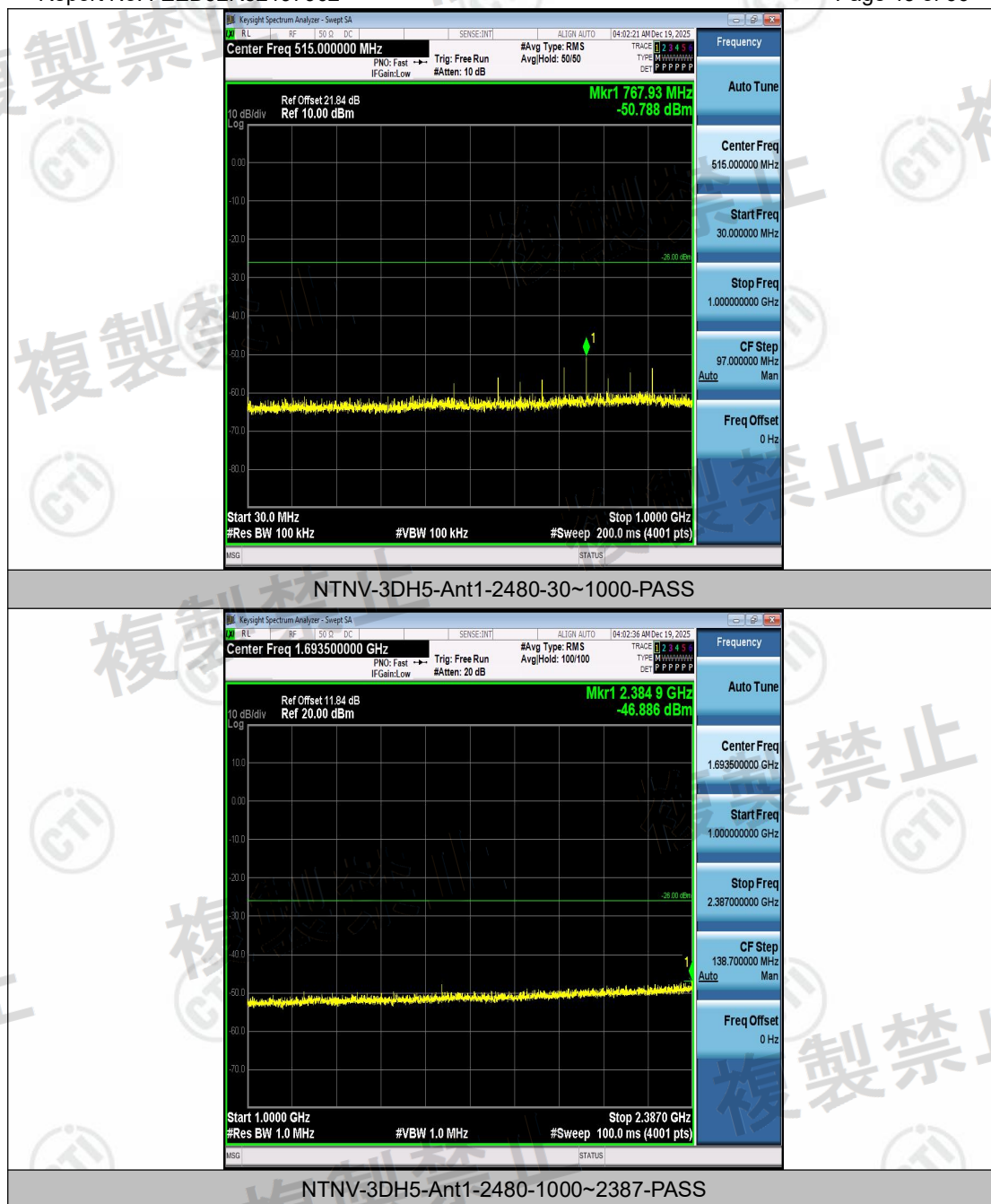


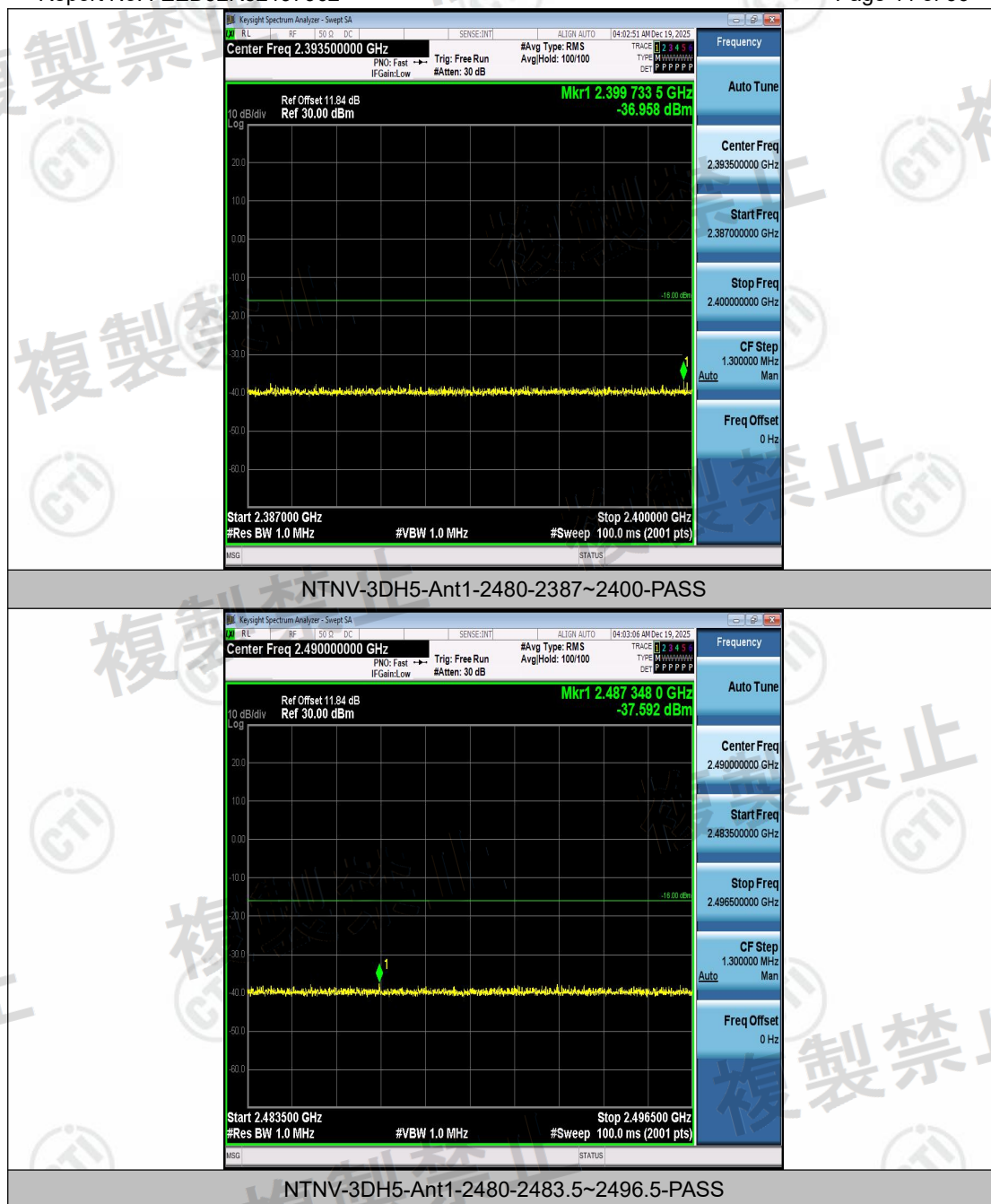
NTNV-3DH5-Ant1-2402-2483.5~2496.5-PASS

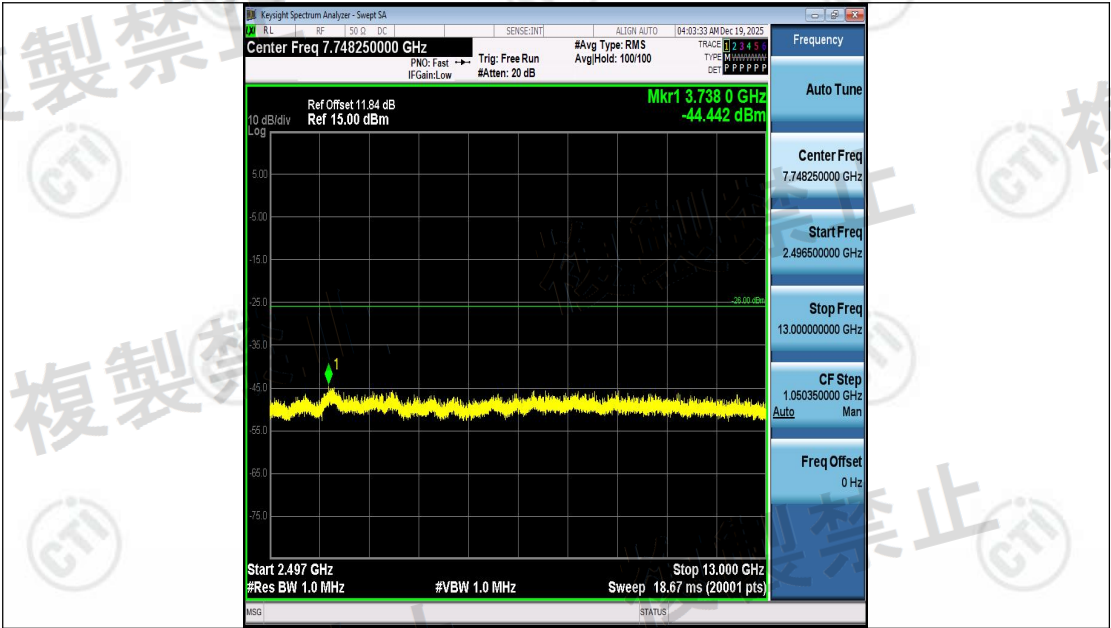




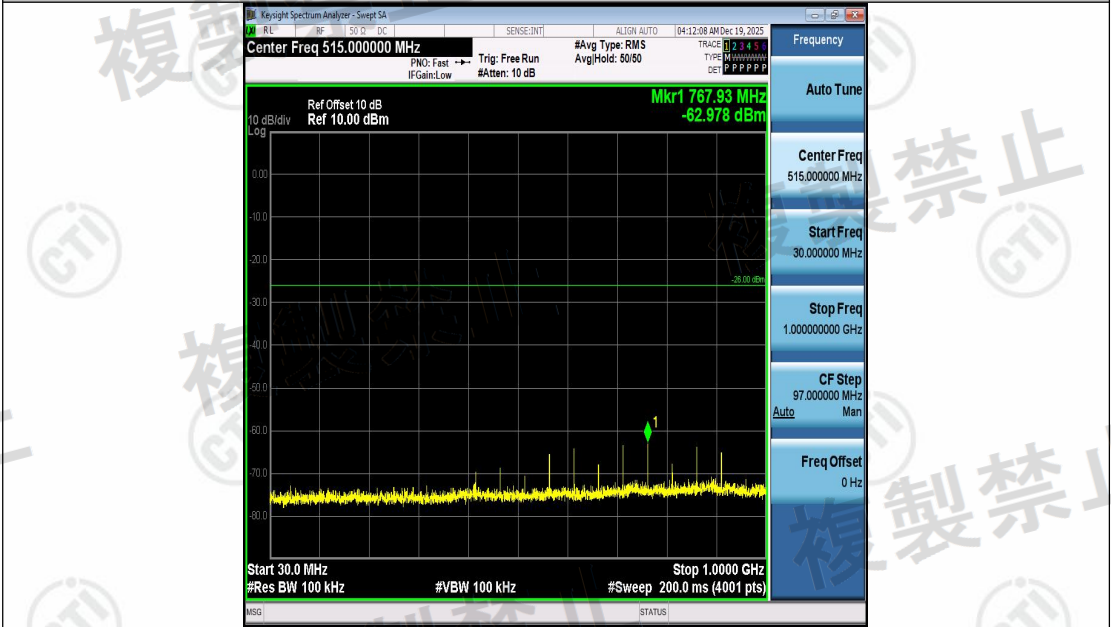




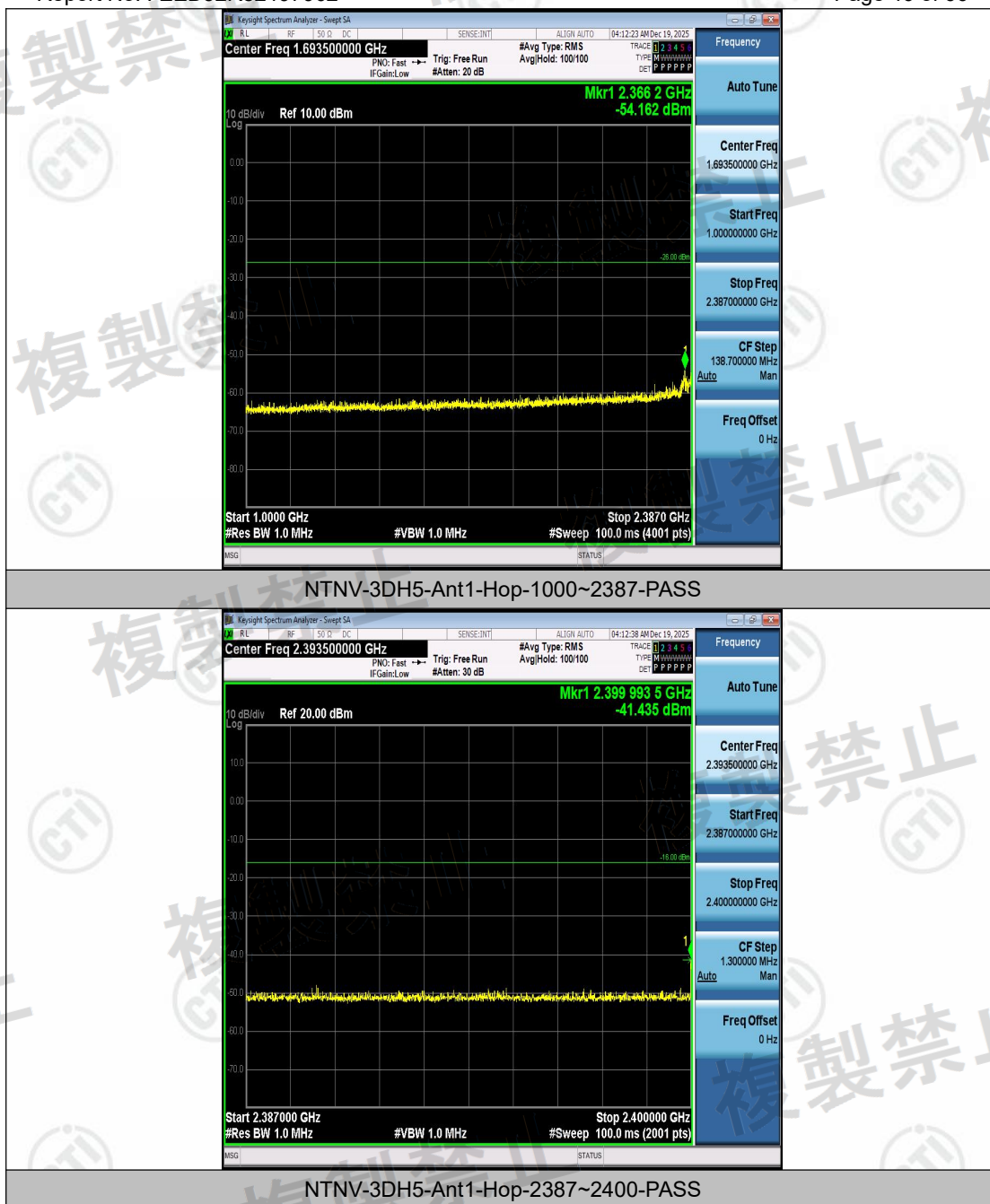


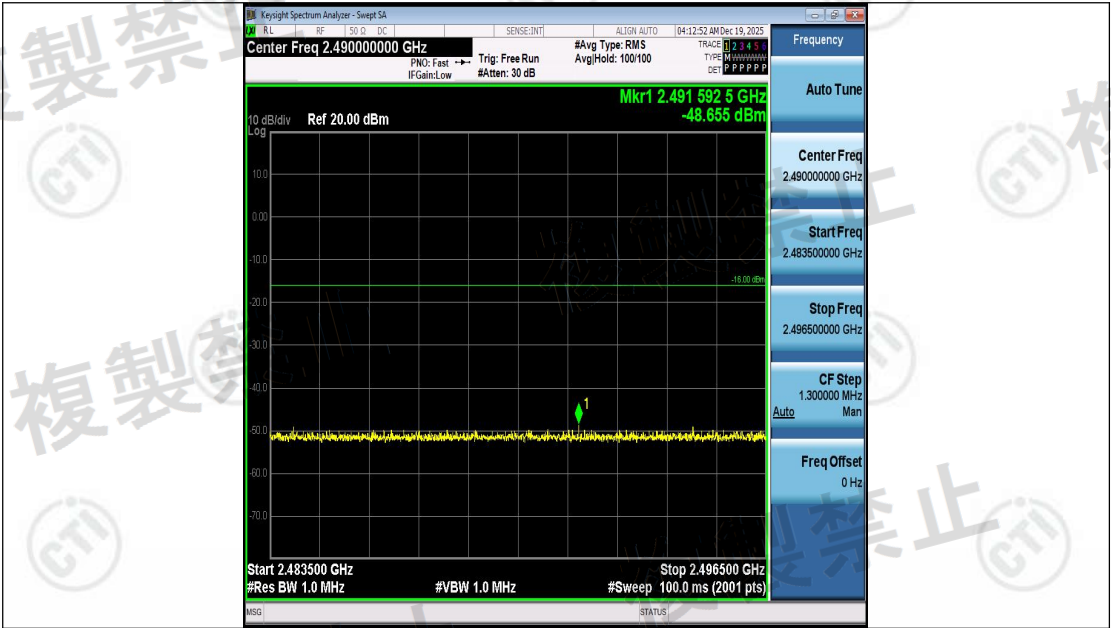


NTNV-3DH5-Ant1-2480-2496.5~13000-PASS

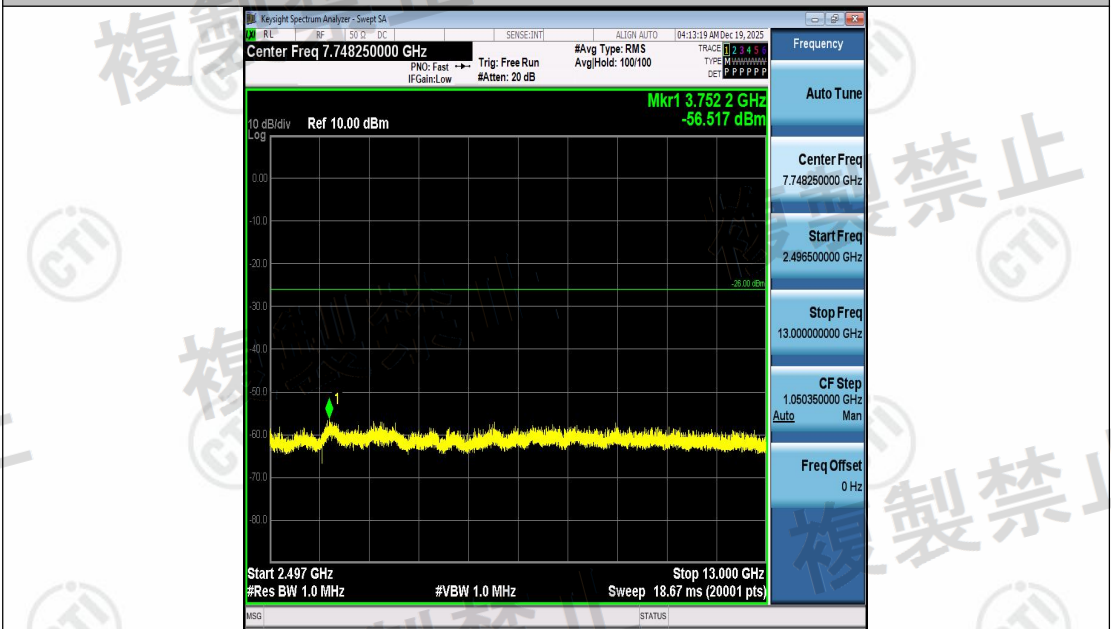


NTNV-3DH5-Ant1-Hop-30~1000-PASS





NTNV-3DH5-Ant1-Hop-2483.5~2496.5-PASS



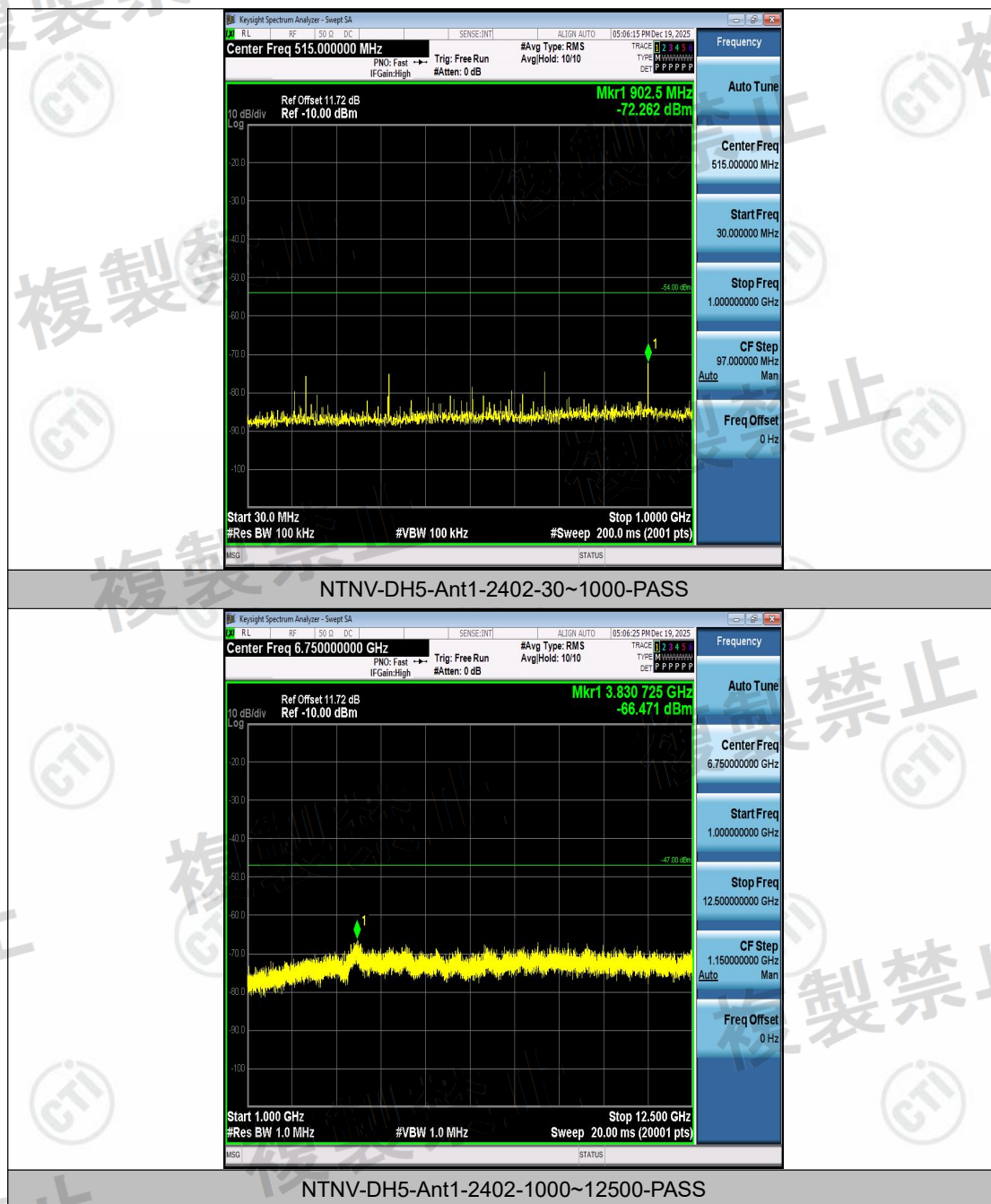
NTNV-3DH5-Ant1-Hop-2496.5~13000-PASS

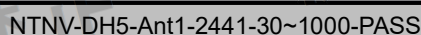
Appendix F: Secondary Radiated Emission Strength

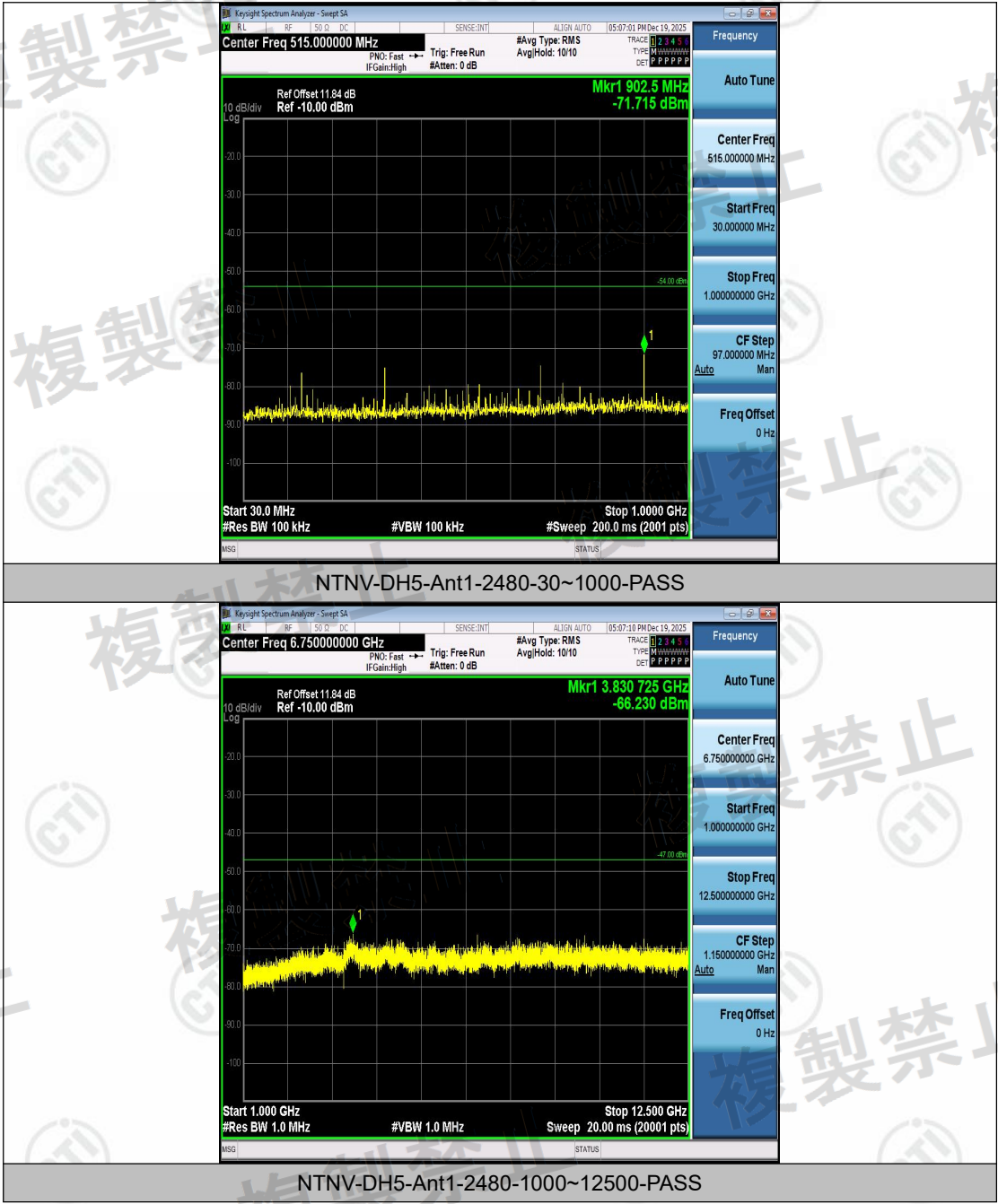
Test Result

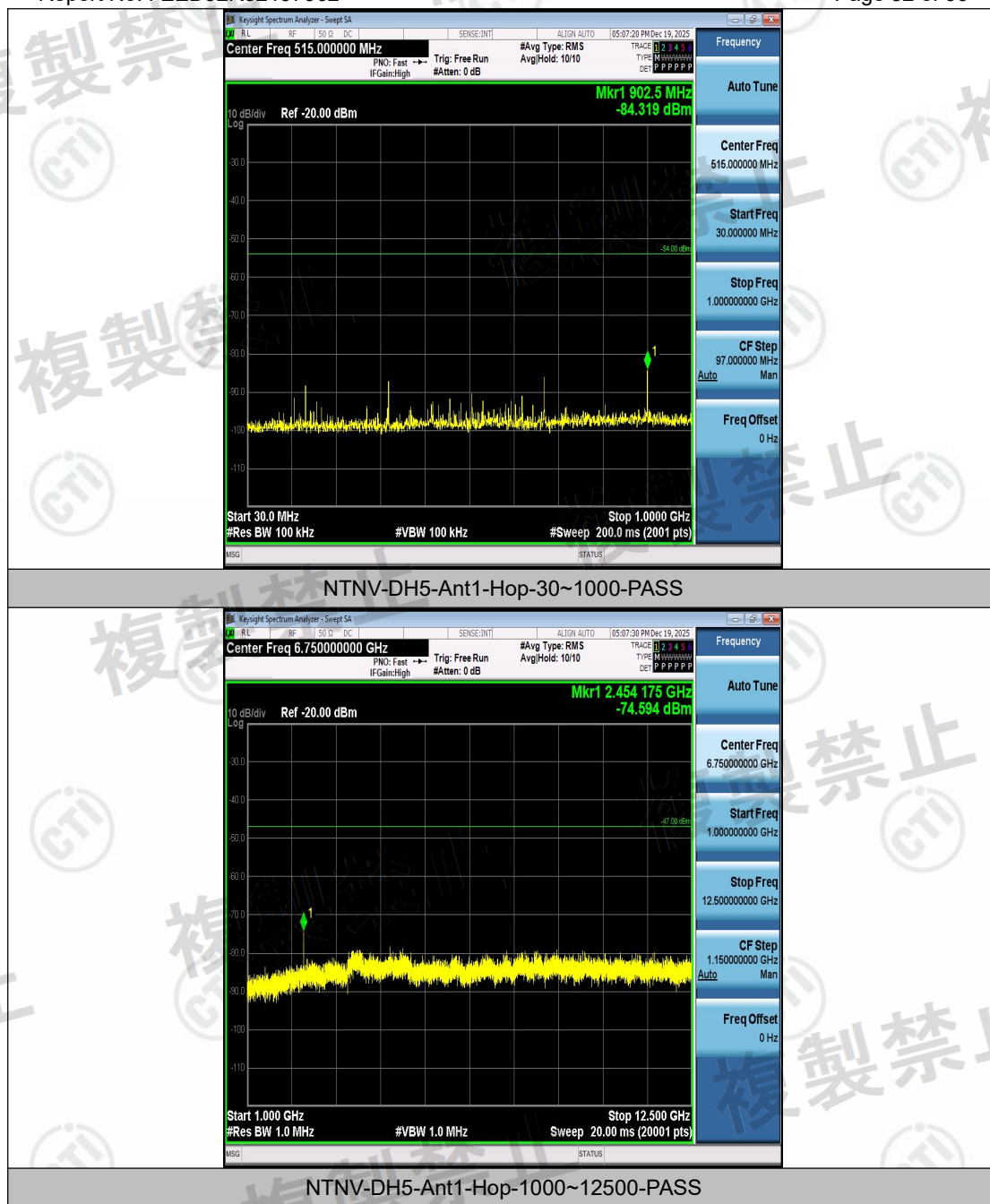
Test Condition	Test Mode	Antenna	Frequency [MHz]	Freq.Range [MHz]	Freq [MHz]	Result [dBm]	Result [μW]	Limit [μW]	Verdict
NTNV	DH5	Ant1	2402	30~1000	902.52	-72.26	0.05943	≤4	PASS
NTNV	DH5	Ant1	2402	1000~12500	3830.73	-66.47	0.22542	≤20	PASS
NTNV	DH5	Ant1	2441	30~1000	902.52	-70.07	0.09840	≤4	PASS
NTNV	DH5	Ant1	2441	1000~12500	8122.53	-65.48	0.28314	≤20	PASS
NTNV	DH5	Ant1	2480	30~1000	902.52	-71.72	0.06730	≤4	PASS
NTNV	DH5	Ant1	2480	1000~12500	3830.73	-66.23	0.23823	≤20	PASS
NTNV	DH5	Ant1	Hop	30~1000	902.52	-84.32	0.00370	≤4	PASS
NTNV	DH5	Ant1	Hop	1000~12500	2454.18	-74.59	0.03475	≤20	PASS
NTNV	2DH5	Ant1	2402	30~1000	902.52	-71.29	0.07430	≤4	PASS
NTNV	2DH5	Ant1	2402	1000~12500	2426.00	-66.75	0.21135	≤20	PASS
NTNV	2DH5	Ant1	2441	30~1000	902.52	-70.76	0.08395	≤4	PASS
NTNV	2DH5	Ant1	2441	1000~12500	8882.10	-66.44	0.22699	≤20	PASS
NTNV	2DH5	Ant1	2480	30~1000	902.52	-71.93	0.06412	≤4	PASS
NTNV	2DH5	Ant1	2480	1000~12500	3815.78	-64.91	0.32285	≤20	PASS
NTNV	2DH5	Ant1	Hop	30~1000	902.52	-82.59	0.00551	≤4	PASS
NTNV	2DH5	Ant1	Hop	1000~12500	3882.48	-77.99	0.01589	≤20	PASS
NTNV	3DH5	Ant1	2402	30~1000	338.46	-74.70	0.03388	≤4	PASS
NTNV	3DH5	Ant1	2441	30~1000	677.48	-75.55	0.02786	≤4	PASS
NTNV	3DH5	Ant1	2441	1000~12500	10691.6 3	-66.20	0.23988	≤20	PASS
NTNV	3DH5	Ant1	2480	30~1000	902.52	-71.78	0.06637	≤4	PASS
NTNV	3DH5	Ant1	2480	1000~12500	8375.53	-66.91	0.20370	≤20	PASS
NTNV	3DH5	Ant1	Hop	30~1000	902.52	-83.59	0.00438	≤4	PASS
NTNV	3DH5	Ant1	Hop	1000~12500	3848.55	-77.47	0.01791	≤20	PASS

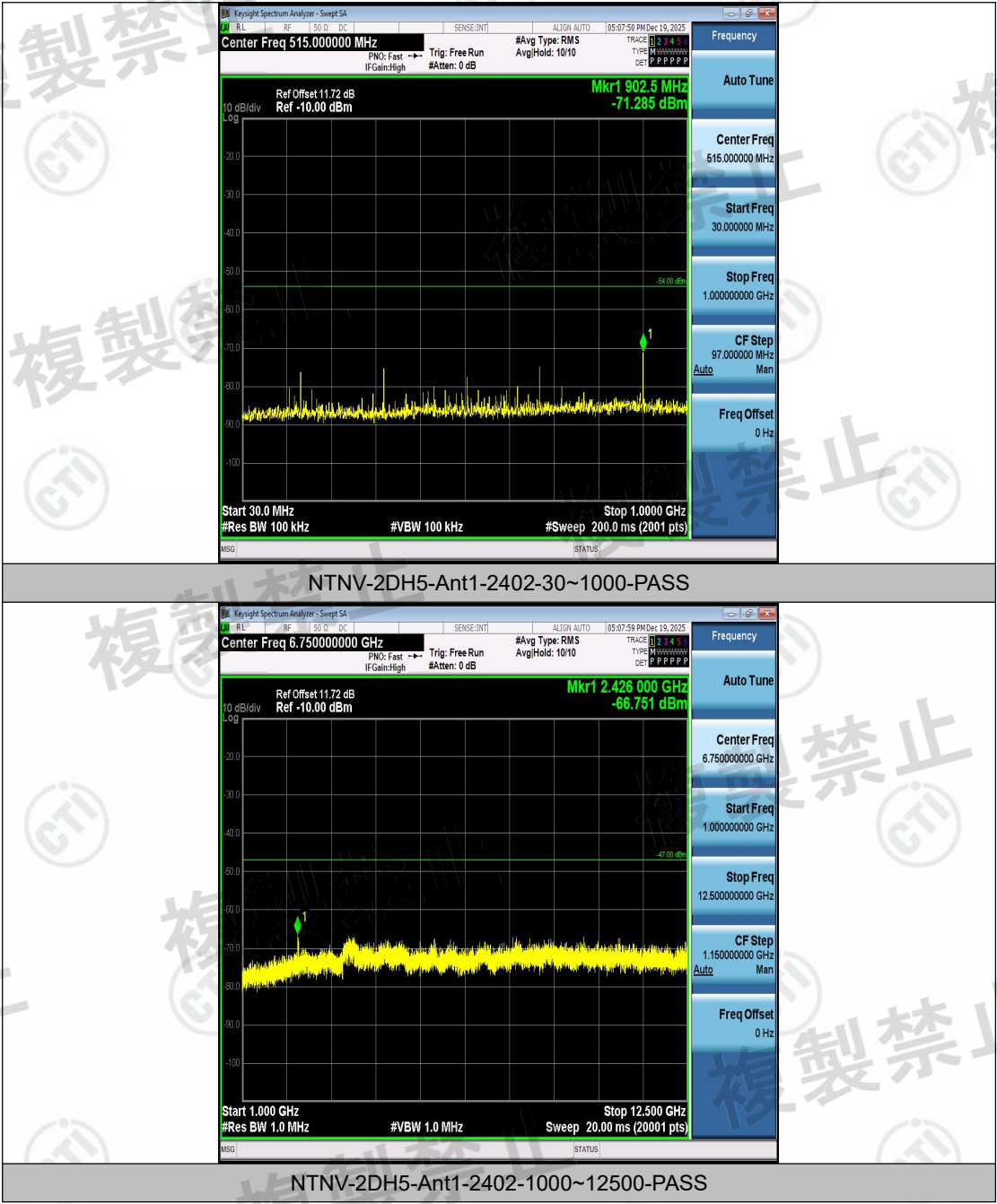
Test Graphs

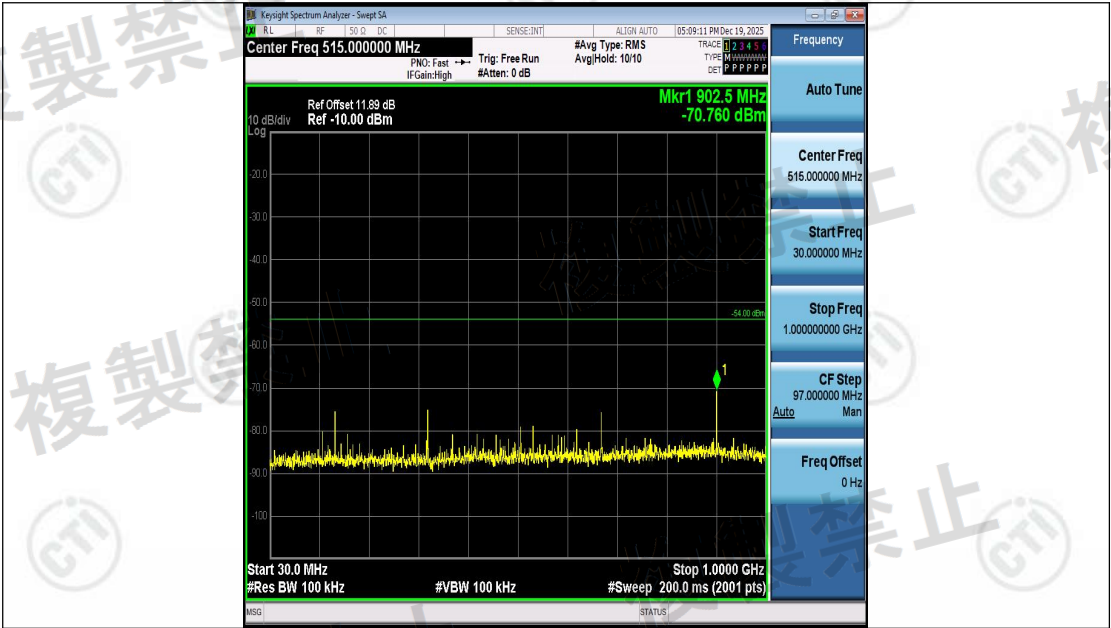




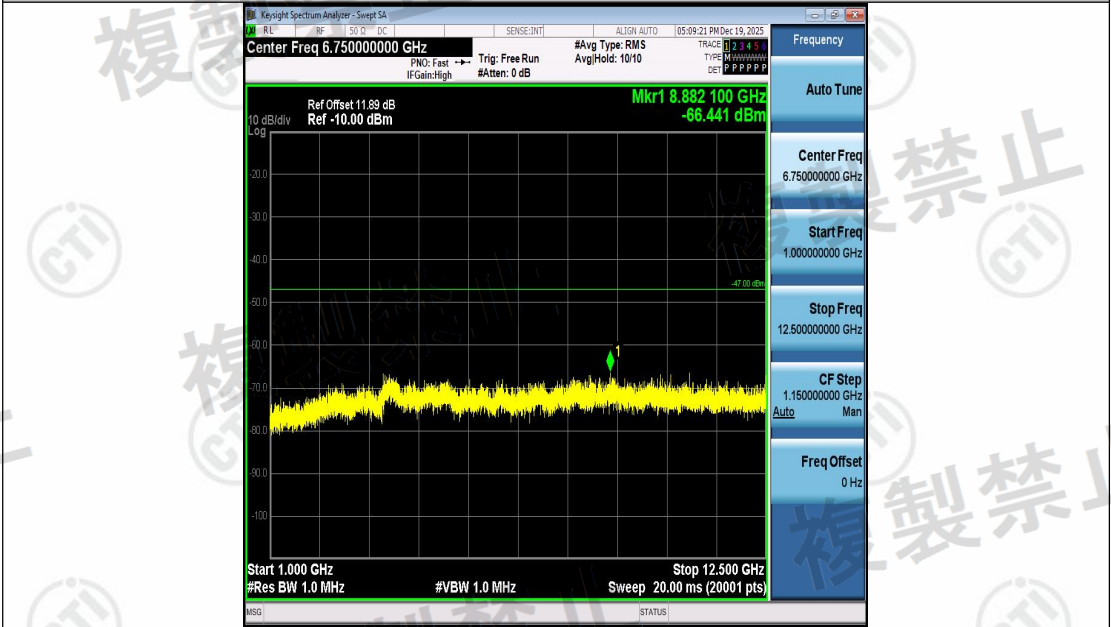




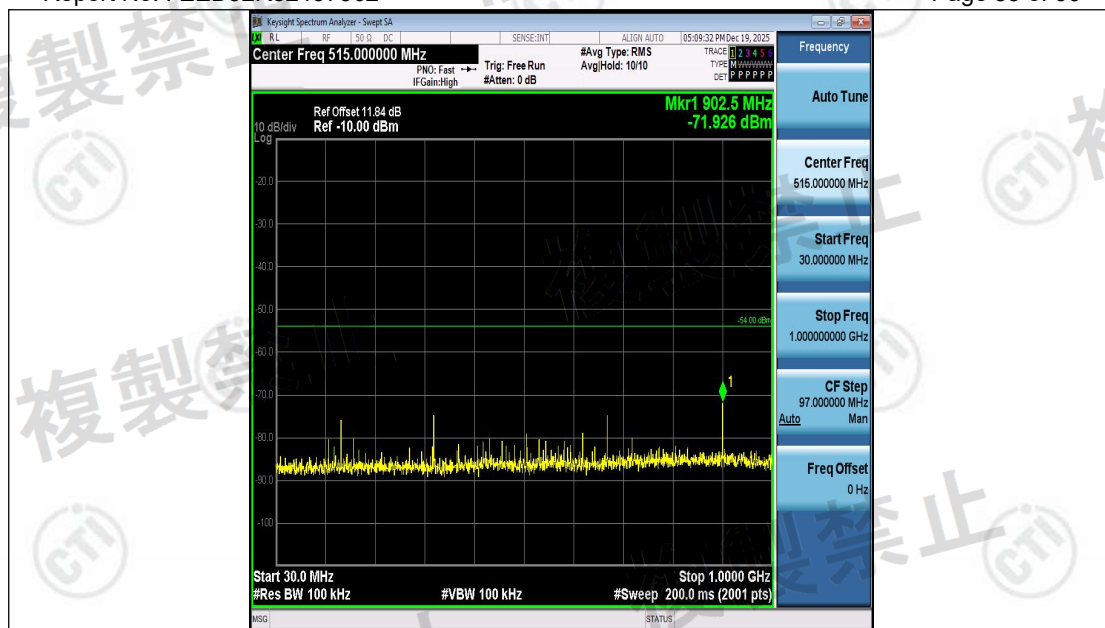




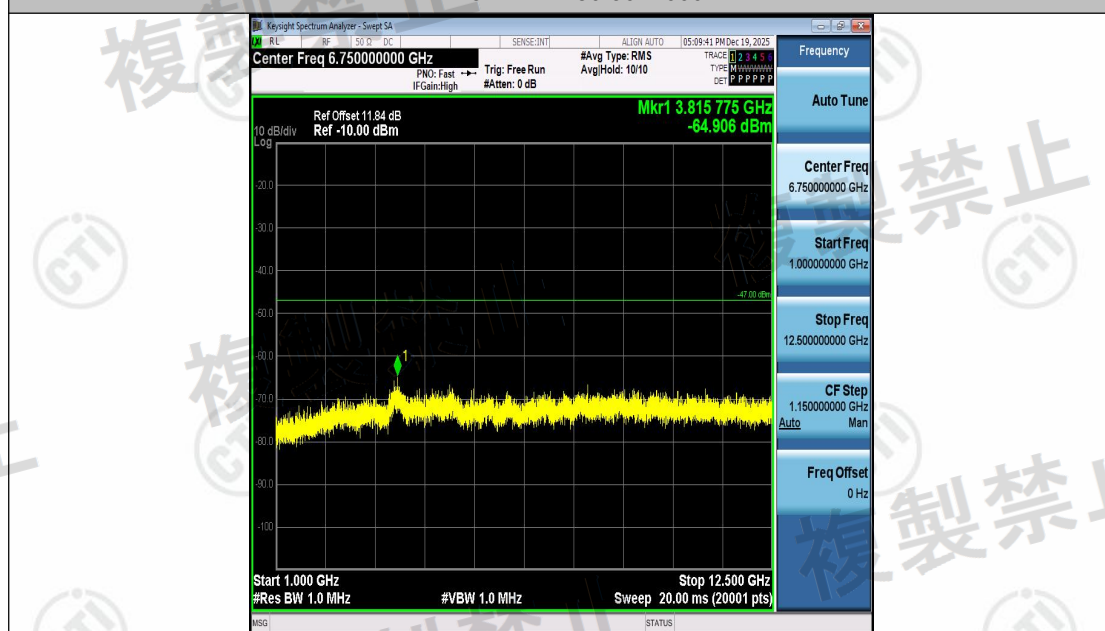
NTNV-2DH5-Ant1-2441-30~1000-PASS



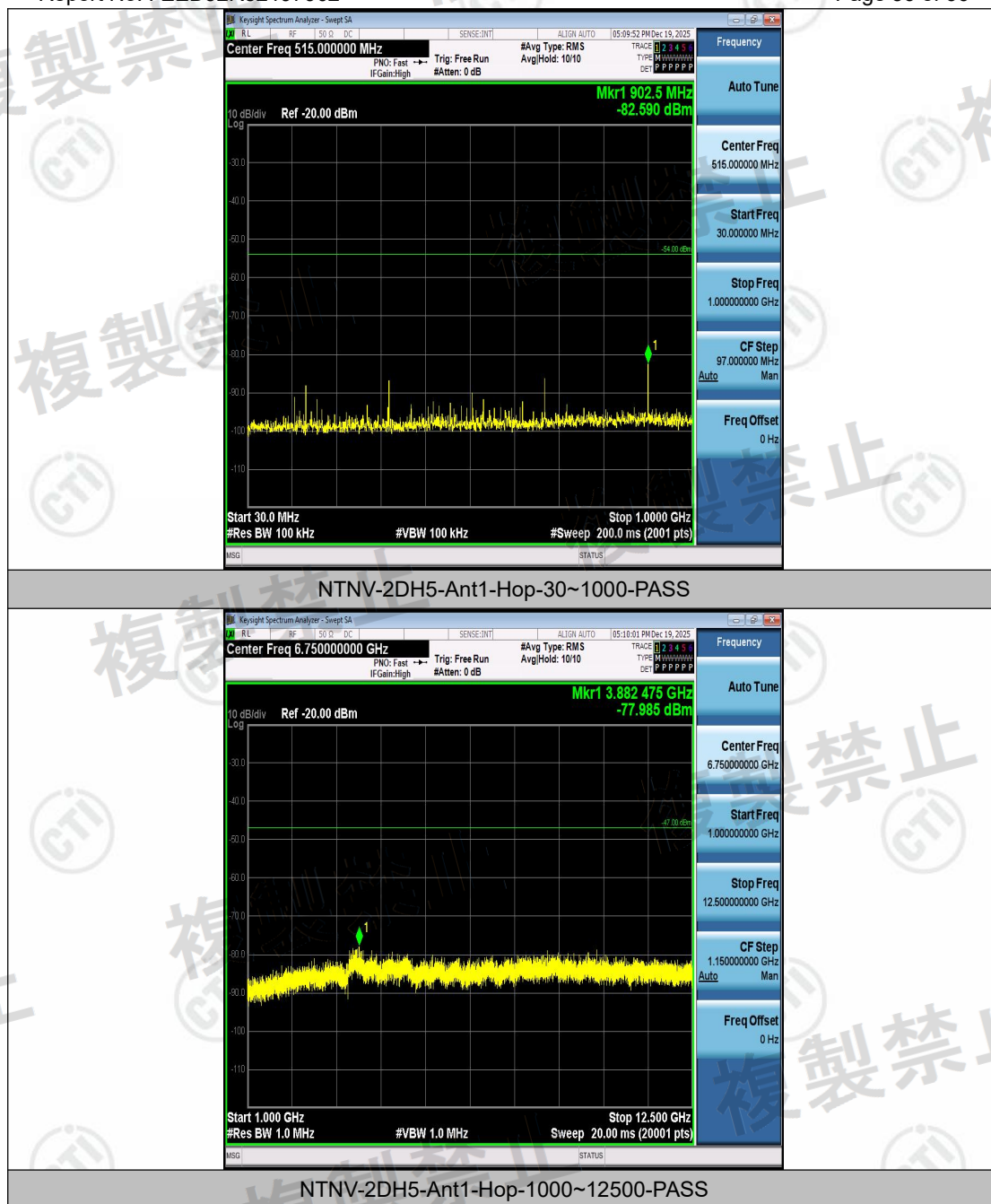
NTNV-2DH5-Ant1-2441-1000~12500-PASS

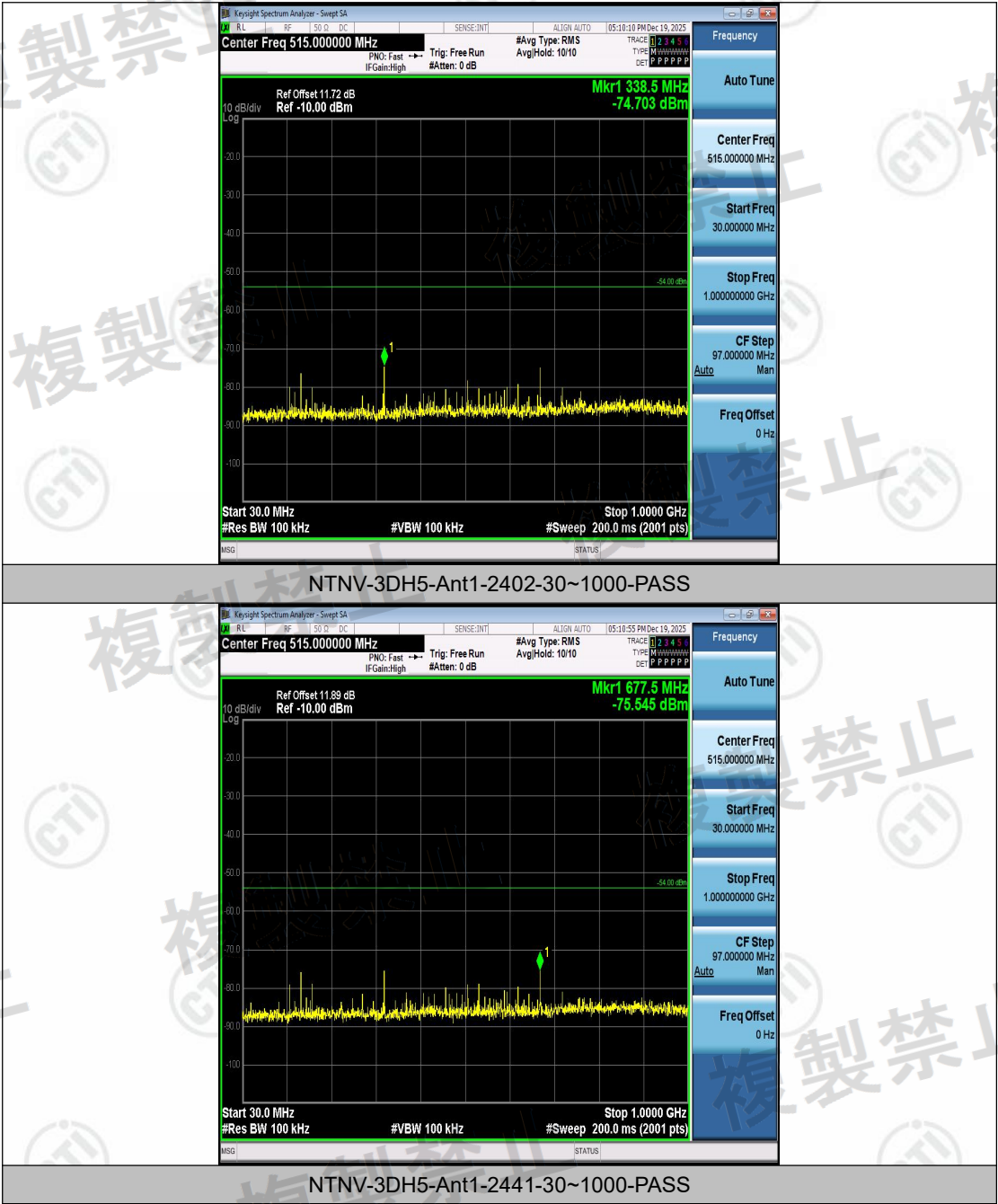


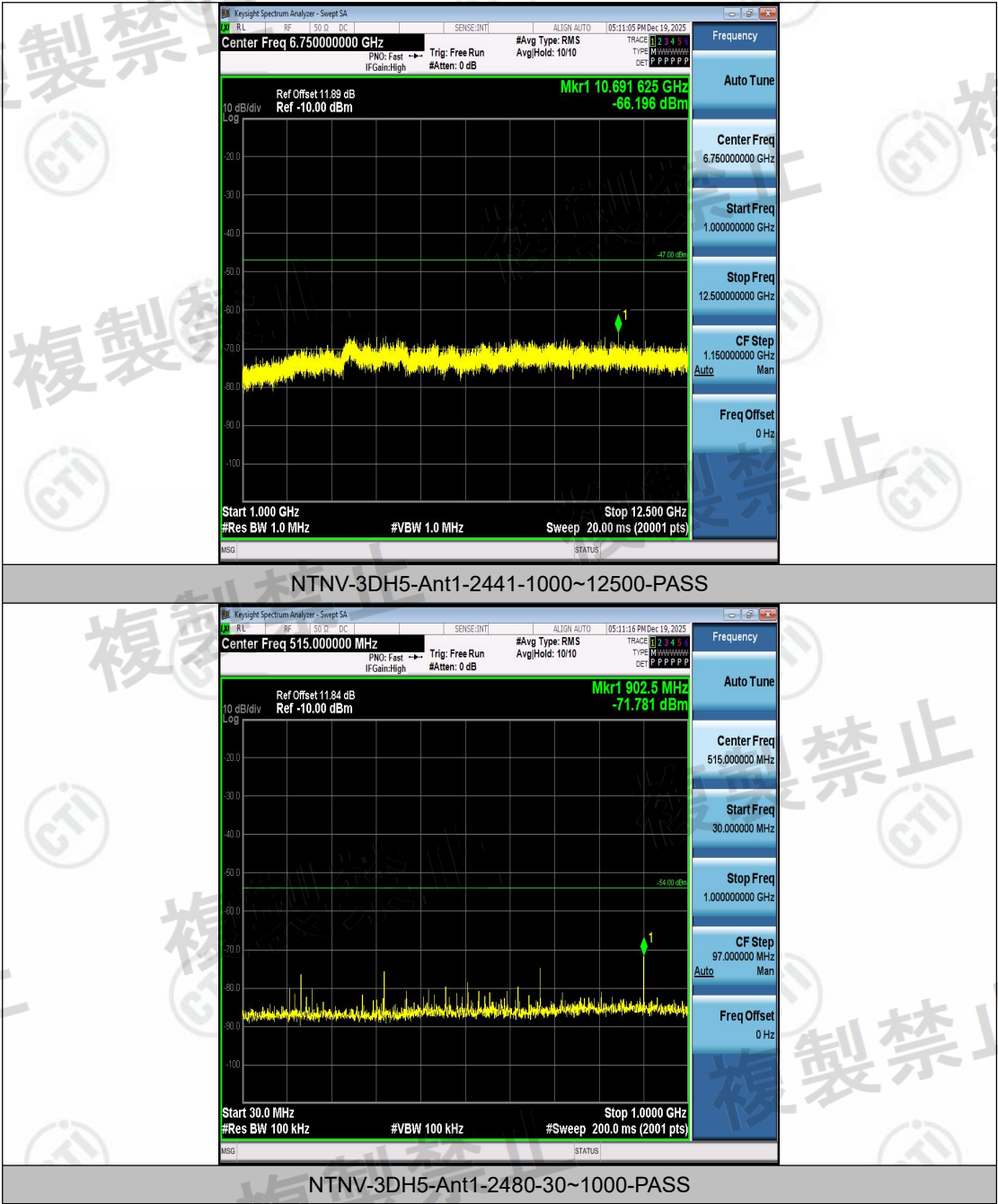
NTNV-2DH5-Ant1-2480-30~1000-PASS

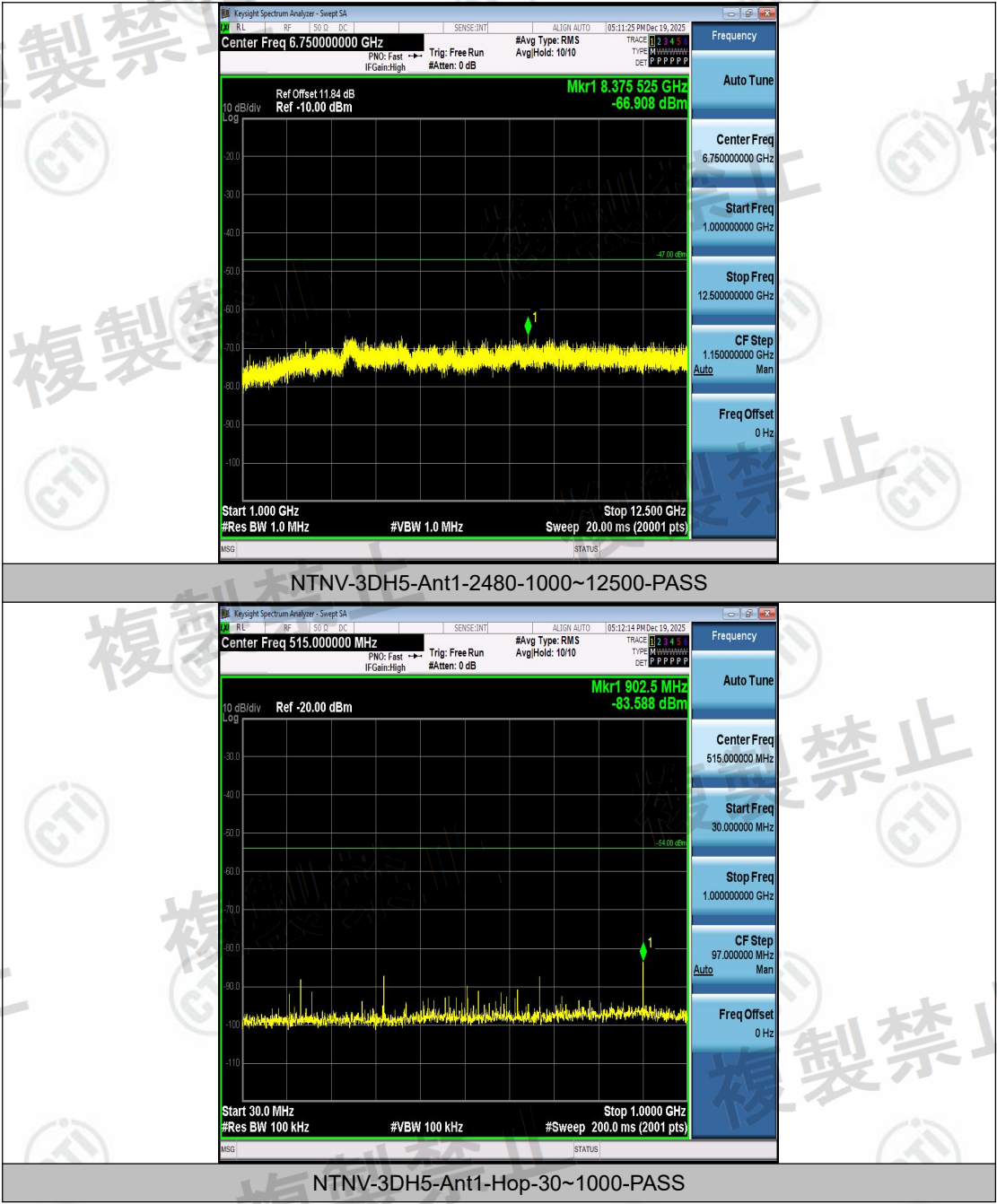


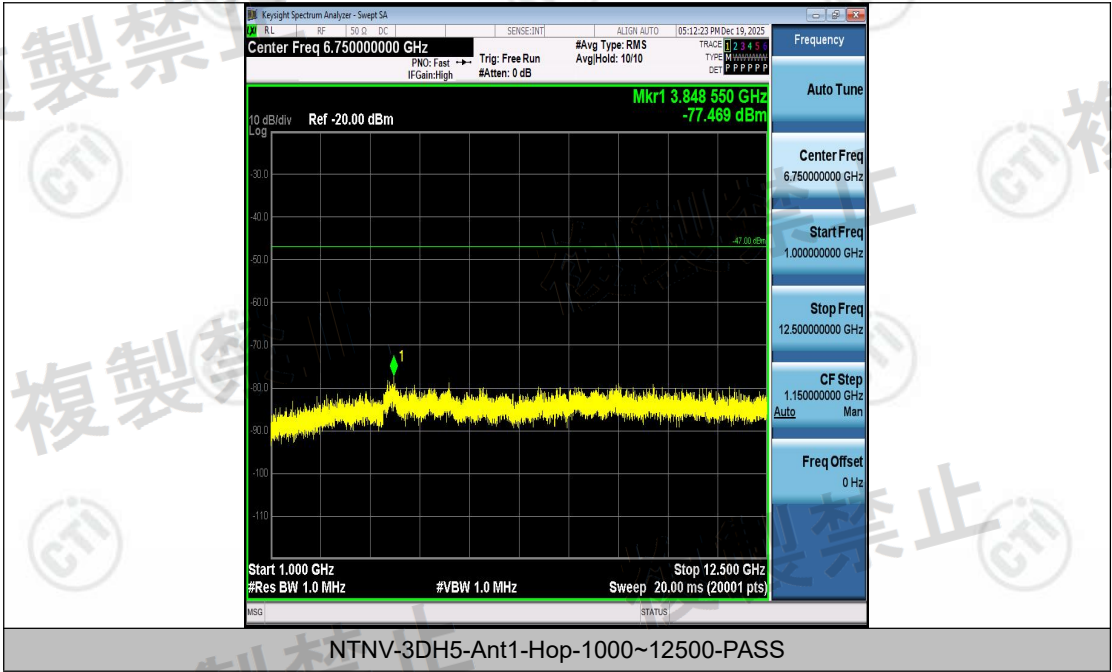
NTNV-2DH5-Ant1-2480-1000~12500-PASS











Appendix G: Dwell Time

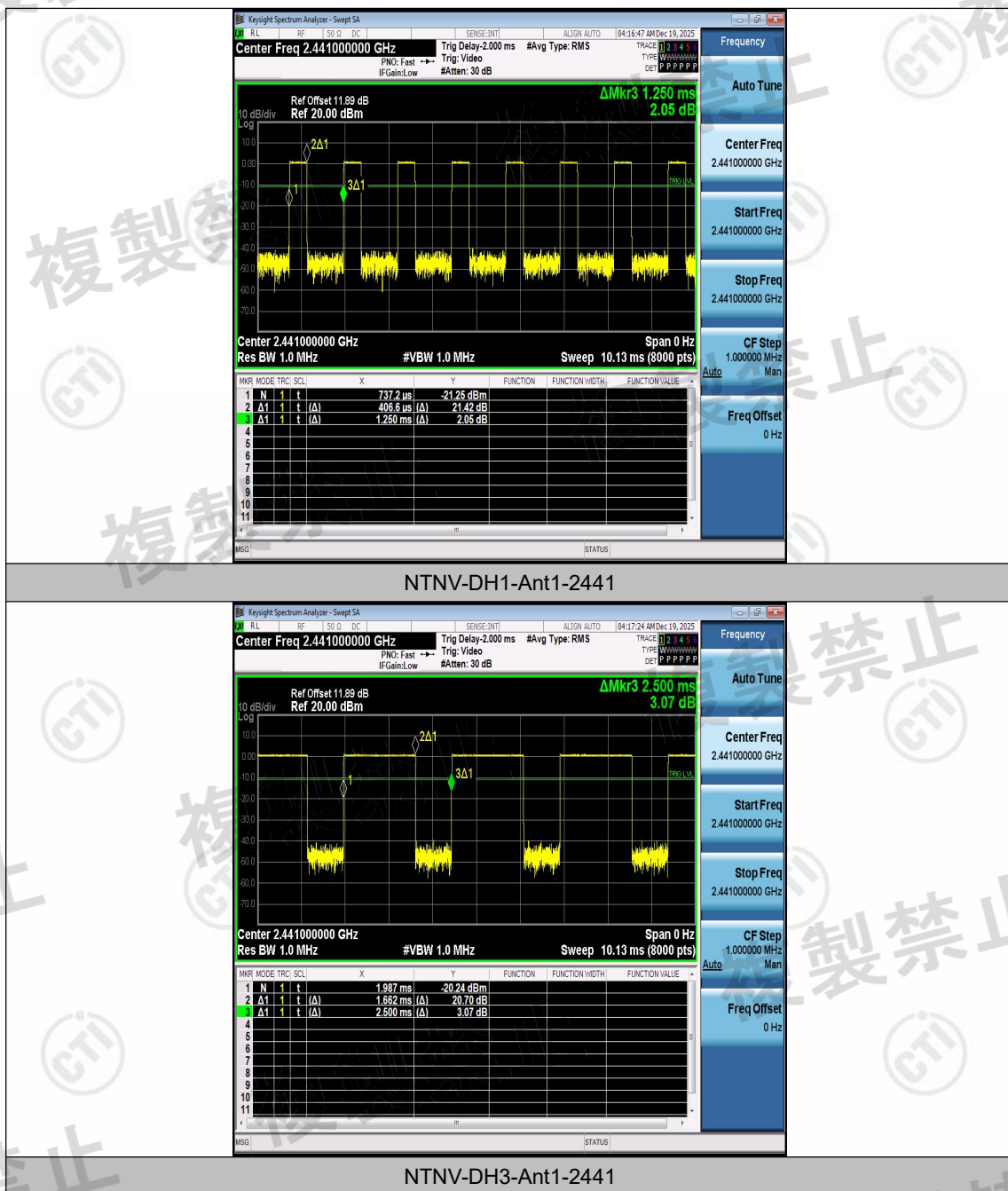
Test Result

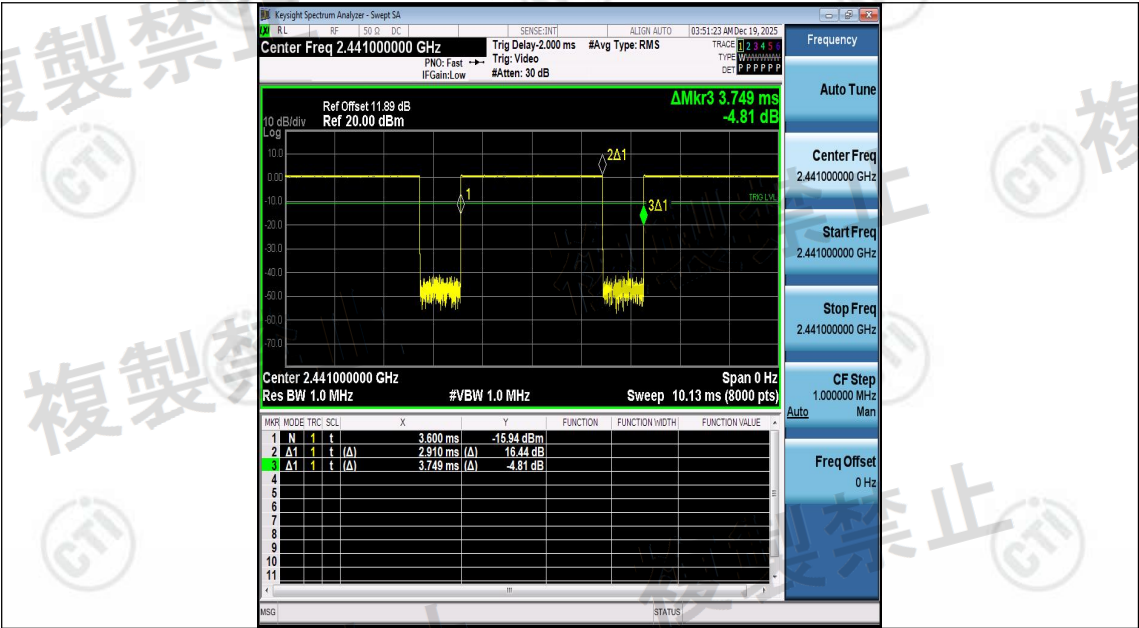
Condition	Mode	Frequency (MHz)	Antenna	T_on(ms)	Period(ms)	Spreading Rate	Hop Number	Dwell Time (ms)	Limit (ms)	Verdict
NTNV	DH1	Ant1	2441	0.41	1.25	70.432	79	116.97	400	Pass
NTNV	DH3	Ant1	2441	1.66	2.5	70.905	79	238.38	400	Pass
NTNV	DH5	Ant1	2441	2.91	3.75	70.678	79	277.70	400	Pass
NTNV	2DH1	Ant1	2441	0.42	1.25	70.737	79	120.34	400	Pass
NTNV	2DH3	Ant1	2441	1.67	2.5	70.491	79	238.42	400	Pass
NTNV	2DH5	Ant1	2441	2.92	3.75	70.452	79	277.77	400	Pass
NTNV	3DH1	Ant1	2441	0.42	1.25	70.723	79	120.32	400	Pass
NTNV	3DH3	Ant1	2441	1.67	2.5	71.005	79	240.16	400	Pass
NTNV	3DH5	Ant1	2441	2.92	3.75	70.661	79	278.59	400	Pass

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

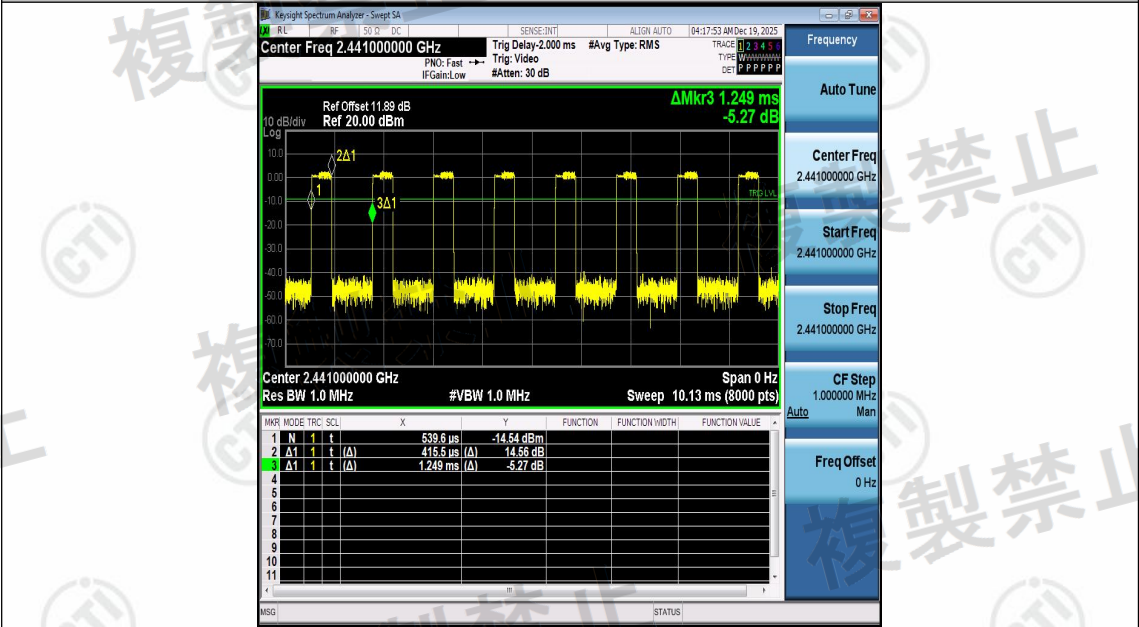
Note: Spreading rate=[Spread bandwidth(actual measurement value)]/[Transmission rate];

Test Graphs

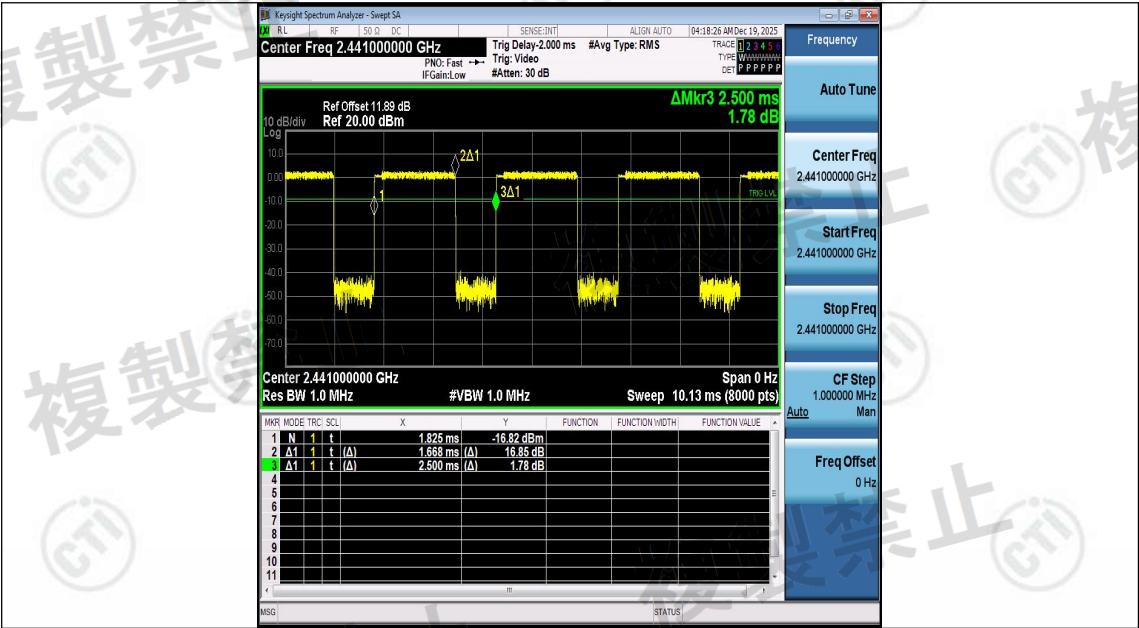




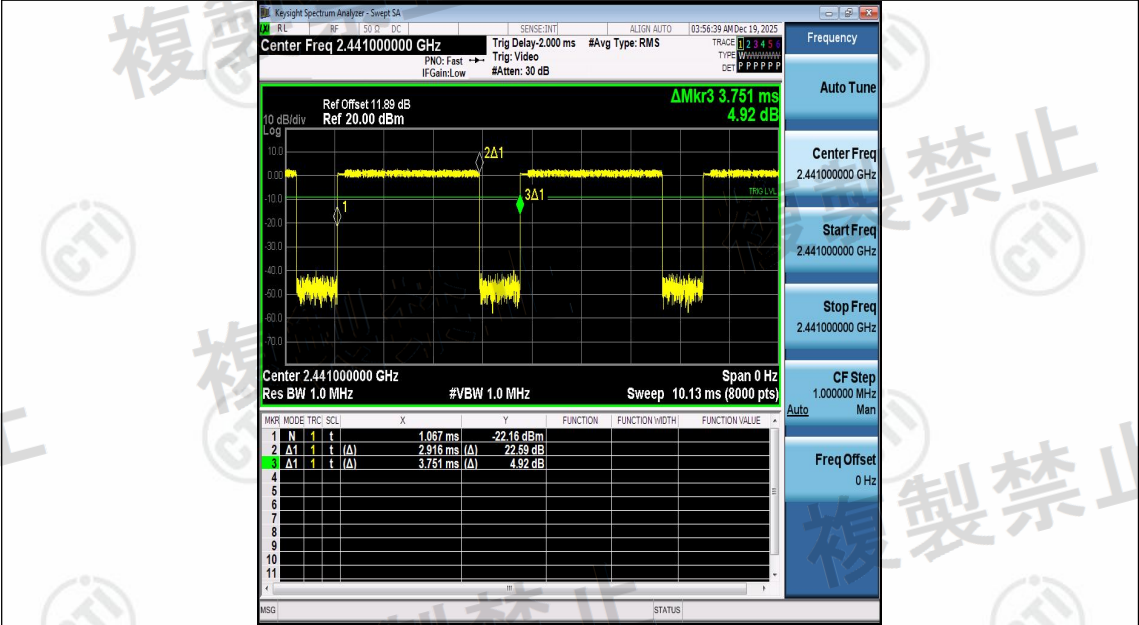
NTNV-DH5-Ant1-2441



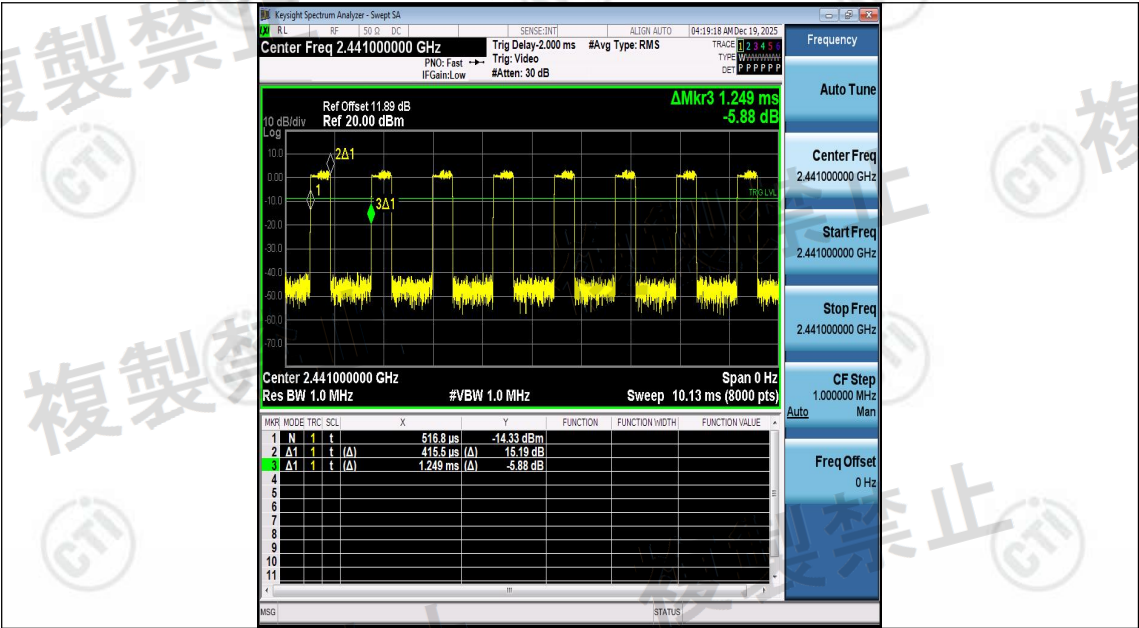
NTNV-2DH1-Ant1-2441



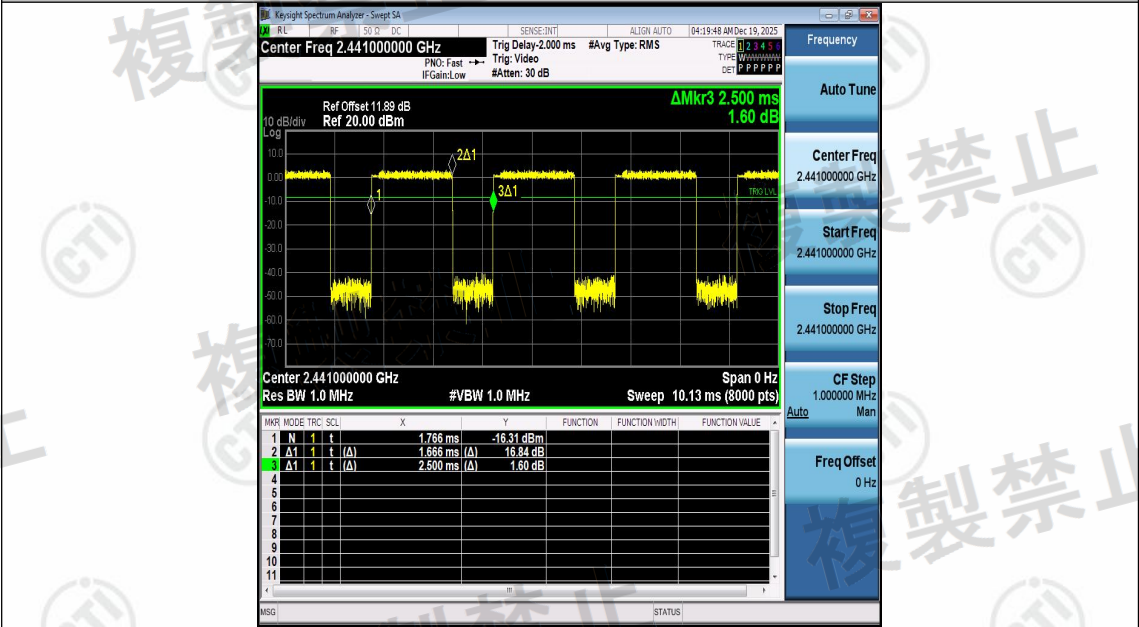
NTNV-2DH3-Ant1-2441



NTNV-2DH5-Ant1-2441



NTNV-3DH1-Ant1-2441



NTNV-3DH3-Ant1-2441

