

Appendix: Bluetooth Classic

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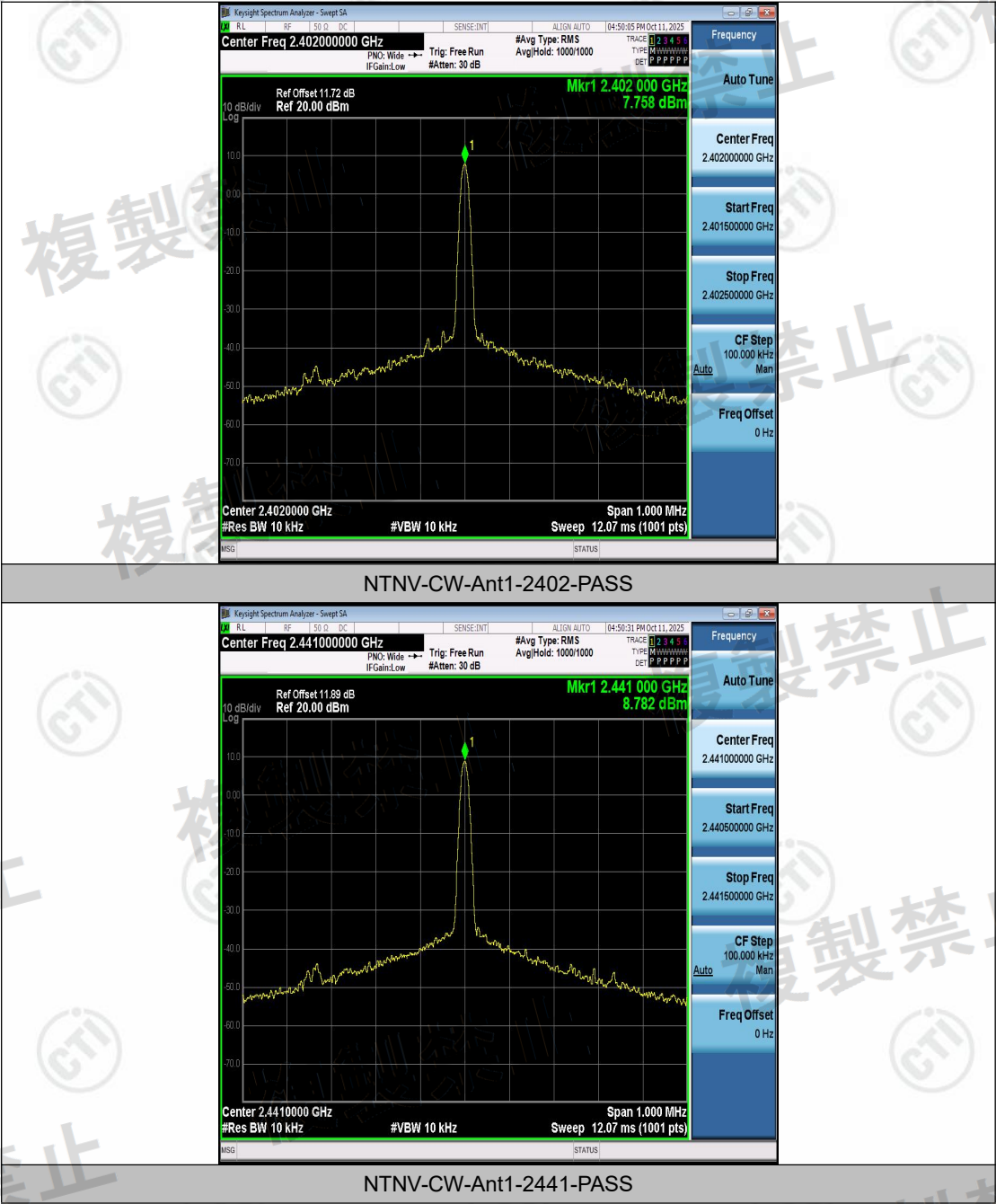
Appendix A: Frequency_Error

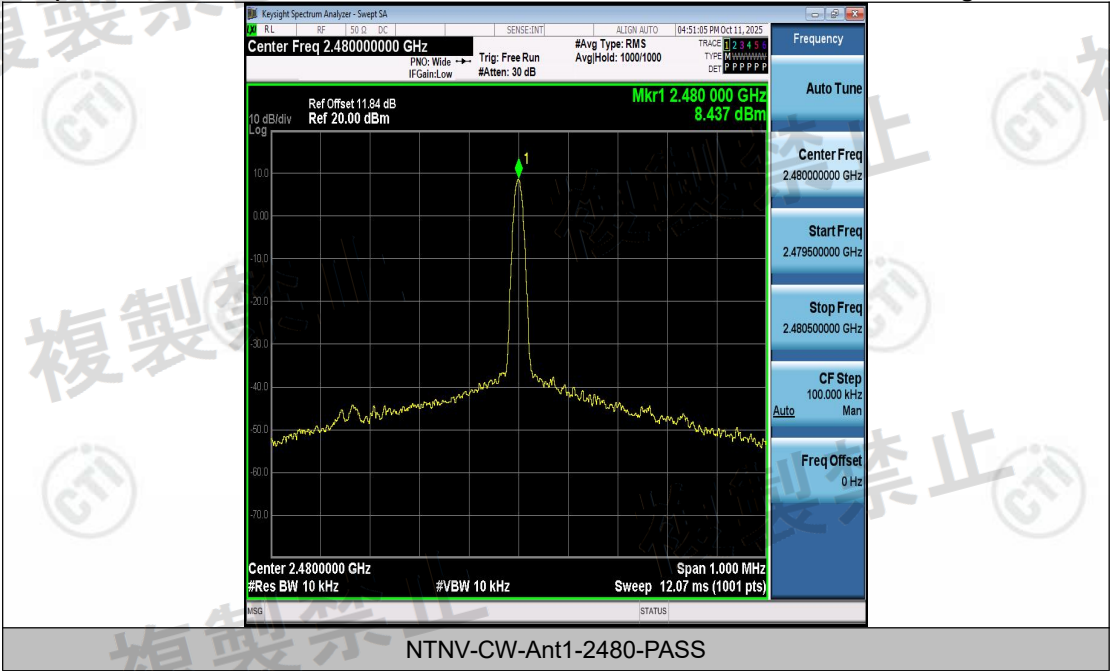
Test Result

Test Condition	Test Mode	Antenna	Frequency[MHz]	CenterFreq [MHz]	Result[ppm]	Limit[ppm]	Verdict
NTNV	CW	Ant1	2402	2402	0.00000	±50	PASS
NTNV	CW	Ant1	2441	2441	0.00000	±50	PASS
NTNV	CW	Ant1	2480	2480	0.00000	±50	PASS

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

Test Graphs





Appendix B: Antenna Power

Test Result

Test Mode	Antenna	Frequency [MHz]	Conducted Sensor power[dBm]	SpreadBW [MHz]	Duty Cycle	Result [mW/MHz]	Limit [mW/MHz]	Verdict
DH5	Ant1	Hop	18.58	70.069	76.80	1.340	≤3	PASS
2DH5	Ant1	Hop	19.32	70.287	77.07	1.578	≤3	PASS
3DH5	Ant1	Hop	19.68	70.156	77.07	1.718	≤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	1.340	1.8	-25.56	NA, +20	PASS
NTNV	2DH5	Ant1	Hop	1.578	1.8	-12.33	NA, +20	PASS
NTNV	3DH5	Ant1	Hop	1.718	1.8	-4.56	NA, +20	PASS

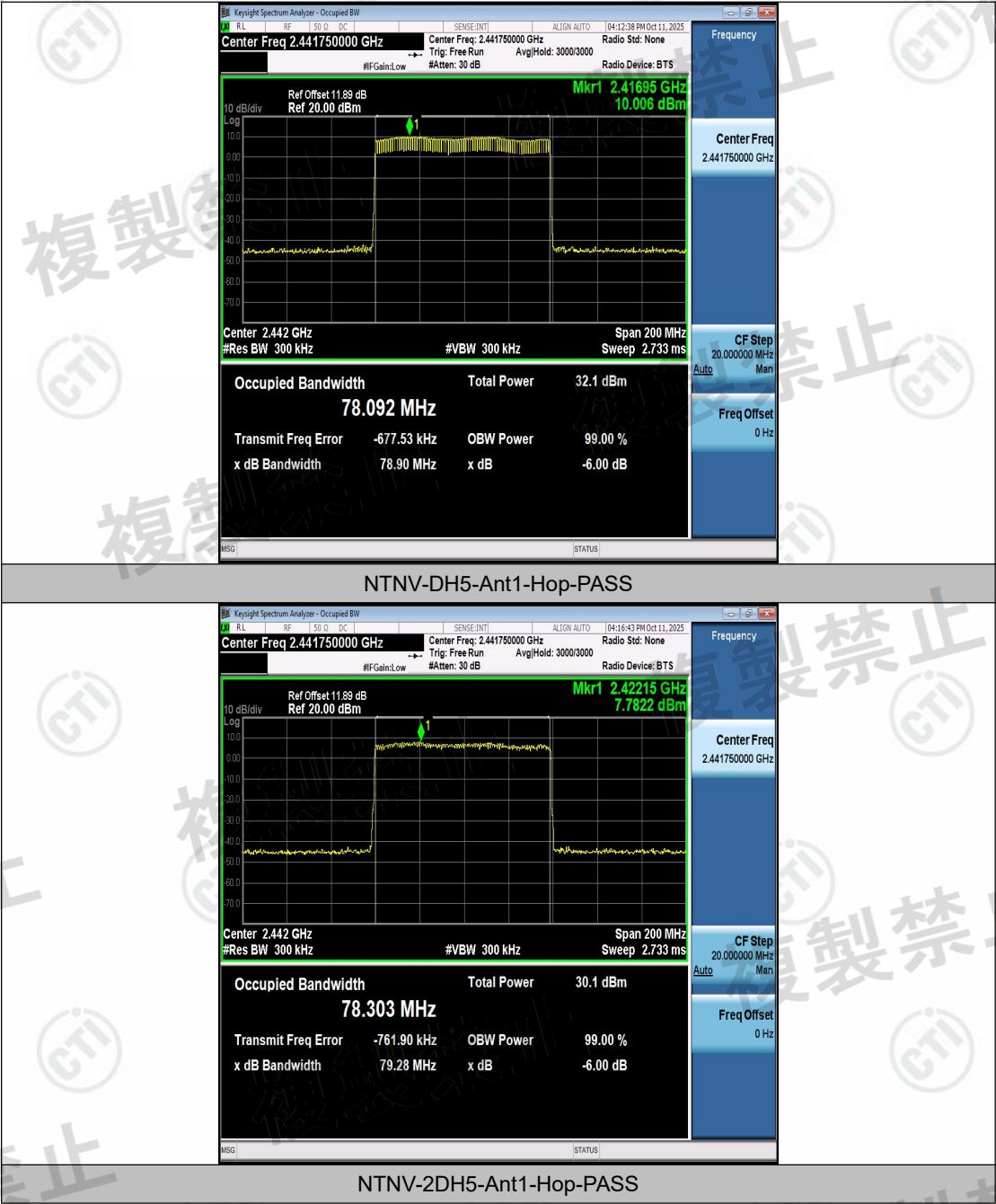
TestCondition	TestMode	Antenna	Freq(M Hz)	Result(dBm/ MHz)	EIRP(dBm/ MHz)	Limit(dBm/MHz)	Verdict
NTNV	DH5	Ant1	Hop	1.271	4.621	≤6.91	PASS
NTNV	2DH5	Ant1	Hop	1.982	5.332	≤6.91	PASS
NTNV	3DH5	Ant1	Hop	2.350	5.700	≤6.91	PASS

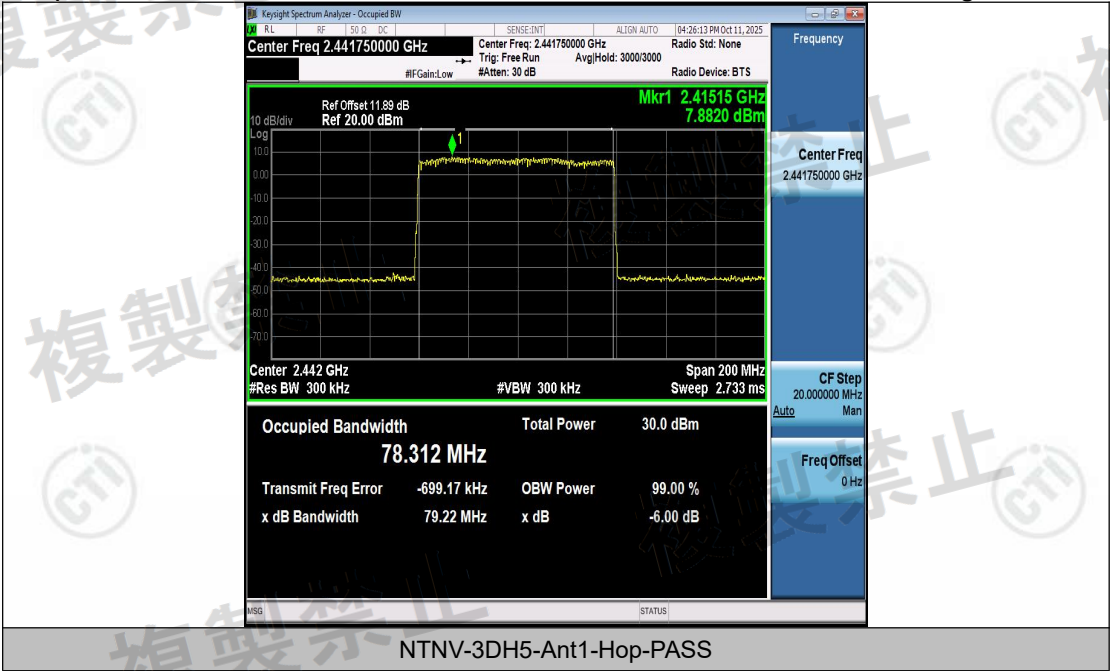
Appendix C: Occupied Bandwidth

Test Result

Test Condition	Test Mode	Antenna	Frequency[MHz]	Result [MHz]	Limit [MHz]	Verdict
NTNV	DH5	Ant1	Hop	78.092	≤83.5	PASS
NTNV	2DH5	Ant1	Hop	78.303	≤83.5	PASS
NTNV	3DH5	Ant1	Hop	78.312	≤83.5	PASS

Test Graphs



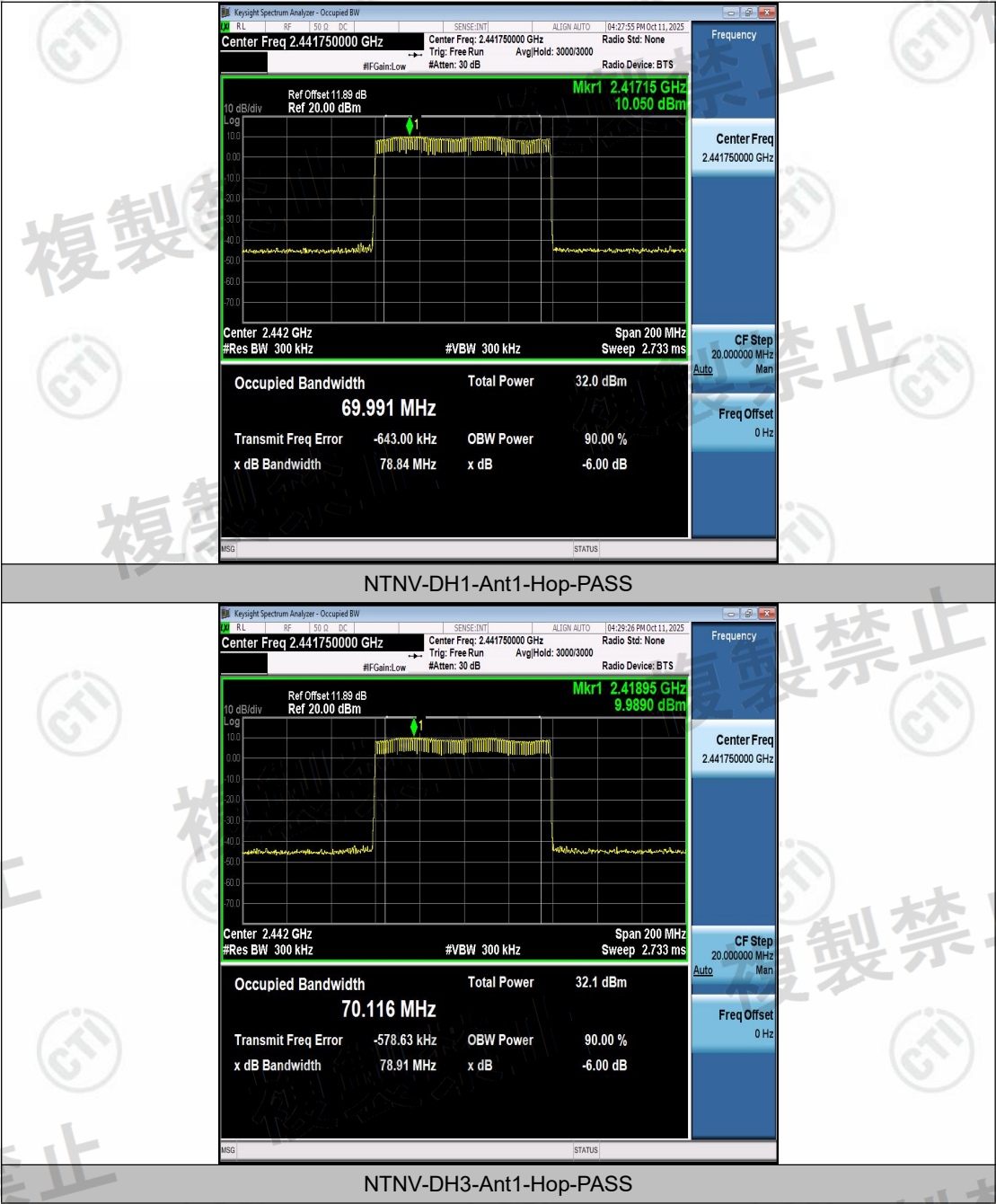


Appendix D: Spread Bandwidth

Test Result

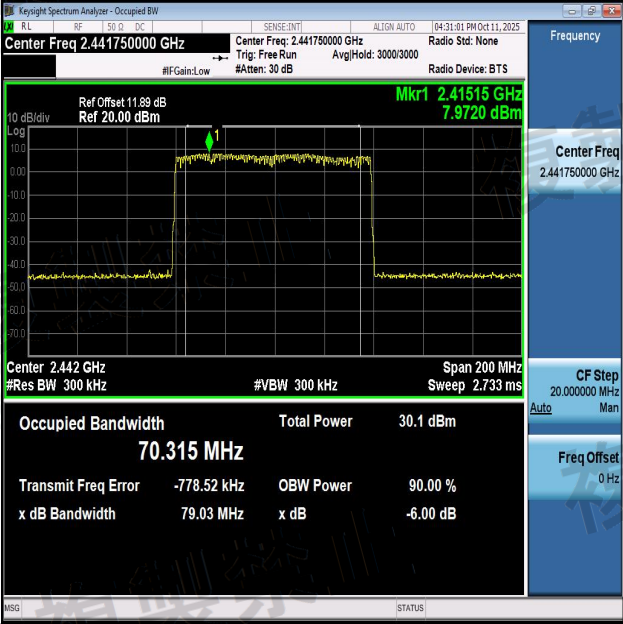
Test Condition	Test Mode	Antenna	Frequency [MHz]	Result [MHz]
NTNV	DH1	Ant1	Hop	69.991
NTNV	DH3	Ant1	Hop	70.116
NTNV	DH5	Ant1	Hop	70.069
NTNV	2DH1	Ant1	Hop	70.315
NTNV	2DH3	Ant1	Hop	70.164
NTNV	2DH5	Ant1	Hop	70.287
NTNV	3DH1	Ant1	Hop	70.115
NTNV	3DH3	Ant1	Hop	70.280
NTNV	3DH5	Ant1	Hop	70.156

Test Graphs





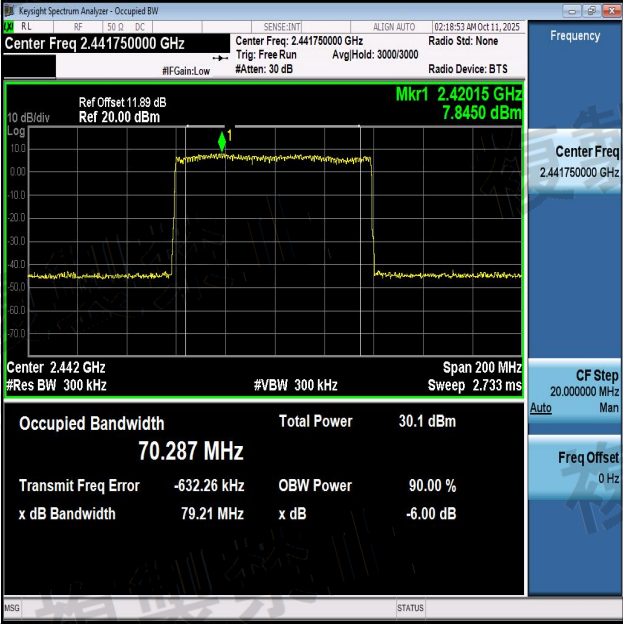
NTNV-DH5-Ant1-Hop-PASS



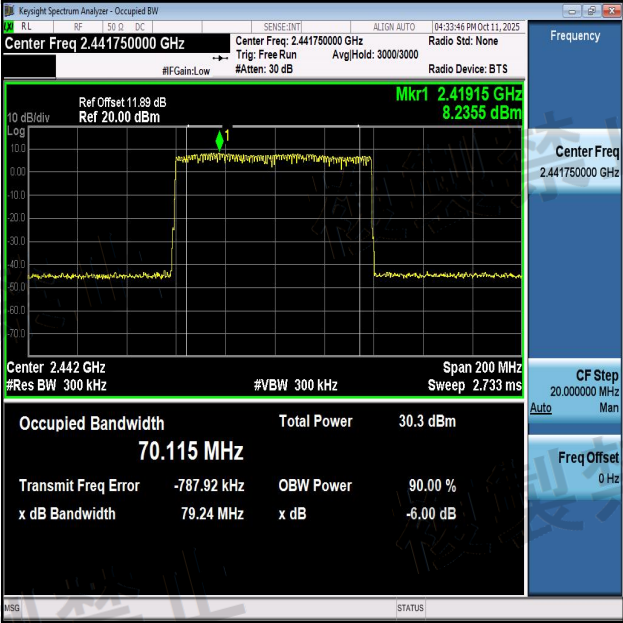
NTNV-2DH1-Ant1-Hop-PASS



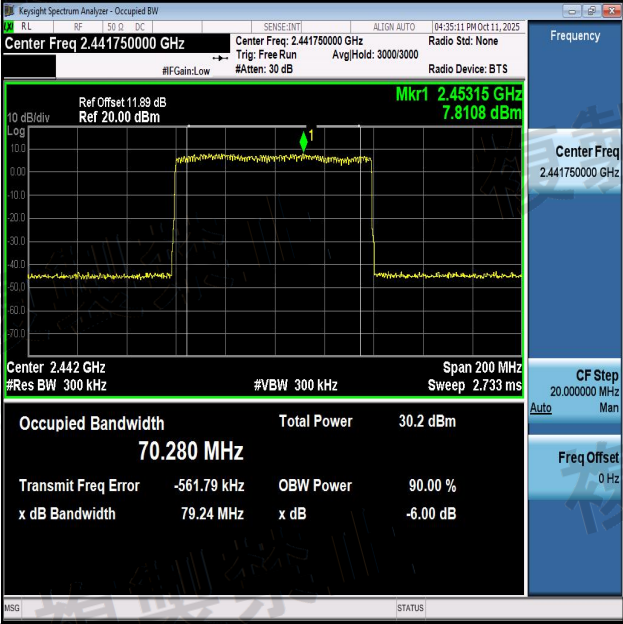
NTNV-2DH3-Ant1-Hop-PASS



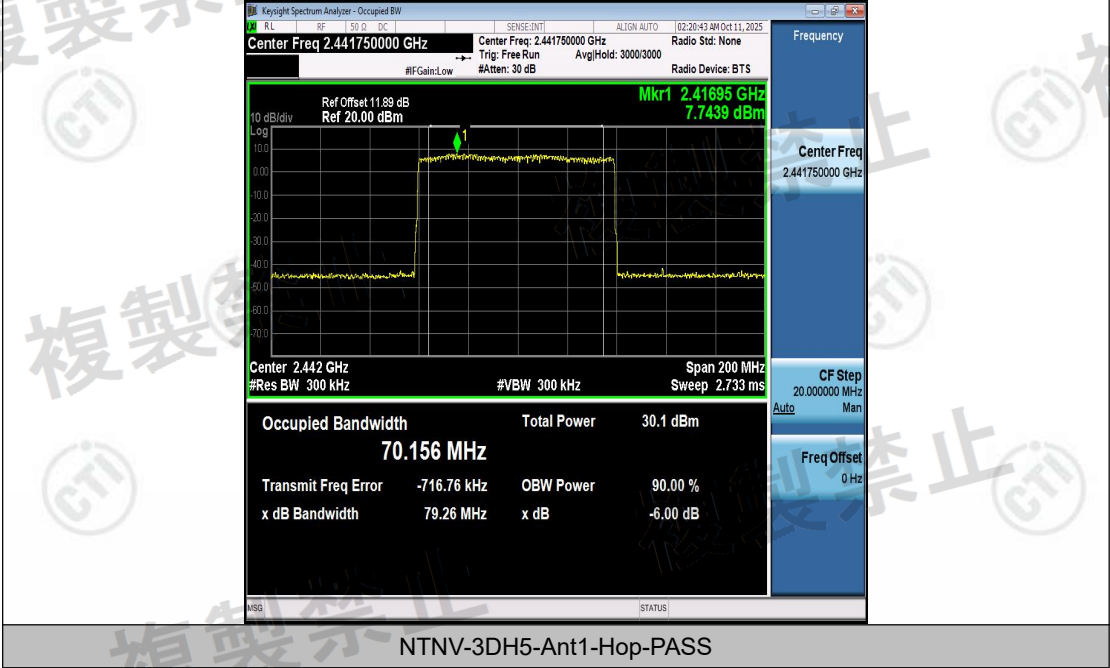
NTNV-2DH5-Ant1-Hop-PASS



NTNV-3DH1-Ant1-Hop-PASS



NTNV-3DH3-Ant1-Hop-PASS



Appendix E: Unwanted Emission Strength

Test Result

Test Condition	Test Mode	Antenna	Freq [MHz]	Freq.Range [MHz]	Freq [MHz]	Result [dBm/MHz]	Result [μ W/MHz]	Limit [μ W/MHz]	Verdict
NTNV	DH5	Ant1	2402	30~1000	994.18	-59.50	0.00112	≤ 2.5	PASS
NTNV	DH5	Ant1	2402	1000~2387	2362.38	-47.36	0.01837	≤ 2.5	PASS
NTNV	DH5	Ant1	2402	2387~2400	2399.96	-29.84	1.03753	≤ 25	PASS
NTNV	DH5	Ant1	2402	2483.5~2496.5	2488.71	-37.61	0.17338	≤ 25	PASS
NTNV	DH5	Ant1	2402	2496.5~13000	3769.52	-44.74	0.03357	≤ 2.5	PASS
NTNV	DH5	Ant1	2441	30~1000	854.74	-59.51	0.00112	≤ 2.5	PASS
NTNV	DH5	Ant1	2441	1000~2387	2344.00	-47.64	0.01722	≤ 2.5	PASS
NTNV	DH5	Ant1	2441	2387~2400	2390.84	-37.76	0.16749	≤ 25	PASS
NTNV	DH5	Ant1	2441	2483.5~2496.5	2488.06	-37.39	0.18239	≤ 25	PASS
NTNV	DH5	Ant1	2441	2496.5~13000	3858.28	-44.66	0.03420	≤ 2.5	PASS
NTNV	DH5	Ant1	2480	30~1000	980.12	-59.19	0.00121	≤ 2.5	PASS
NTNV	DH5	Ant1	2480	1000~2387	2347.82	-47.15	0.01928	≤ 2.5	PASS
NTNV	DH5	Ant1	2480	2387~2400	2397.80	-37.91	0.16181	≤ 25	PASS
NTNV	DH5	Ant1	2480	2483.5~2496.5	2490.18	-37.56	0.17539	≤ 25	PASS
NTNV	DH5	Ant1	2480	2496.5~13000	3889.79	-44.03	0.03954	≤ 2.5	PASS
NTNV	DH5	Ant1	Hop	30~1000	738.34	-71.36	0.00007	≤ 2.5	PASS
NTNV	DH5	Ant1	Hop	1000~2387	2310.02	-59.29	0.00118	≤ 2.5	PASS
NTNV	DH5	Ant1	Hop	2387~2400	2399.84	-43.58	0.04385	≤ 25	PASS
NTNV	DH5	Ant1	Hop	2483.5~2496.5	2487.38	-48.53	0.01403	≤ 25	PASS
NTNV	DH5	Ant1	Hop	2496.5~13000	3884.01	-57.06	0.00197	≤ 2.5	PASS
NTNV	2DH5	Ant1	2402	30~1000	882.87	-59.72	0.00107	≤ 2.5	PASS
NTNV	2DH5	Ant1	2402	1000~2387	2332.91	-47.58	0.01746	≤ 2.5	PASS
NTNV	2DH5	Ant1	2402	2387~2400	2400	-21.04	7.87046	≤ 25	See table below
NTNV	2DH5	Ant1	2402	2483.5~2496.5	2495.60	-37.67	0.17100	≤ 25	PASS
NTNV	2DH5	Ant1	2402	2496.5~13000	7283.47	-45.37	0.02904	≤ 2.5	PASS
NTNV	2DH5	Ant1	2441	30~1000	938.16	-58.76	0.00133	≤ 2.5	PASS
NTNV	2DH5	Ant1	2441	1000~2387	2349.20	-47.70	0.01698	≤ 2.5	PASS
NTNV	2DH5	Ant1	2441	2387~2400	2398.02	-37.81	0.16558	≤ 25	PASS
NTNV	2DH5	Ant1	2441	2483.5~2496.5	2486.61	-37.36	0.18365	≤ 25	PASS
NTNV	2DH5	Ant1	2441	2496.5~13000	3736.44	-44.75	0.03350	≤ 2.5	PASS
NTNV	2DH5	Ant1	2480	30~1000	875.11	-59.54	0.00111	≤ 2.5	PASS

NTNV	2DH5	Ant1	2480	1000~2387	2325.28	-47.90	0.01622	≤2.5	PASS
NTNV	2DH5	Ant1	2480	2387~2400	2387.26	-37.26	0.18793	≤25	PASS
NTNV	2DH5	Ant1	2480	2483.5~2496.5	2487.65	-37.02	0.19861	≤25	PASS
NTNV	2DH5	Ant1	2480	2496.5~13000	3854.08	-45.08	0.03105	≤2.5	PASS
NTNV	2DH5	Ant1	Hop	30~1000	919.49	-71.41	0.00007	≤2.5	PASS
NTNV	2DH5	Ant1	Hop	1000~2387	2387.00	-57.22	0.00190	≤2.5	PASS
NTNV	2DH5	Ant1	Hop	2387~2400	2400.00	-32.85	0.51880	≤25	PASS
NTNV	2DH5	Ant1	Hop	2483.5~2496.5	2487.80	-49.07	0.01239	≤25	PASS
NTNV	2DH5	Ant1	Hop	2496.5~13000	3796.31	-56.42	0.00228	≤2.5	PASS
NTNV	3DH5	Ant1	2402	30~1000	795.57	-59.13	0.00122	≤2.5	PASS
NTNV	3DH5	Ant1	2402	1000~2387	2180.34	-47.56	0.01754	≤2.5	PASS
NTNV	3DH5	Ant1	2402	2387~2400	2400	-20.53	8.85116	≤25	See table below
NTNV	3DH5	Ant1	2402	2483.5~2496.5	2487.80	-36.98	0.20045	≤25	PASS
NTNV	3DH5	Ant1	2402	2496.5~13000	3809.96	-45.05	0.03126	≤2.5	PASS
NTNV	3DH5	Ant1	2441	30~1000	450.25	-59.72	0.00107	≤2.5	PASS
NTNV	3DH5	Ant1	2441	1000~2387	2340.19	-46.74	0.02118	≤2.5	PASS
NTNV	3DH5	Ant1	2441	2387~2400	2399.38	-37.27	0.18750	≤25	PASS
NTNV	3DH5	Ant1	2441	2483.5~2496.5	2483.77	-37.69	0.17022	≤25	PASS
NTNV	3DH5	Ant1	2441	2496.5~13000	3864.58	-45.14	0.03062	≤2.5	PASS
NTNV	3DH5	Ant1	2480	30~1000	857.90	-59.82	0.00104	≤2.5	PASS
NTNV	3DH5	Ant1	2480	1000~2387	2375.56	-47.70	0.01698	≤2.5	PASS
NTNV	3DH5	Ant1	2480	2387~2400	2387.11	-37.46	0.17947	≤25	PASS
NTNV	3DH5	Ant1	2480	2483.5~2496.5	2488.51	-37.42	0.18113	≤25	PASS
NTNV	3DH5	Ant1	2480	2496.5~13000	3715.96	-44.31	0.03707	≤2.5	PASS
NTNV	3DH5	Ant1	Hop	30~1000	877.54	-70.18	0.00010	≤2.5	PASS
NTNV	3DH5	Ant1	Hop	1000~2387	2386.65	-59.10	0.00123	≤2.5	PASS
NTNV	3DH5	Ant1	Hop	2387~2400	2399.99	-32.94	0.50816	≤25	PASS
NTNV	3DH5	Ant1	Hop	2483.5~2496.5	2492.16	-48.99	0.01262	≤25	PASS
NTNV	3DH5	Ant1	Hop	2496.5~13000	3774.25	-57.08	0.00196	≤2.5	PASS

Test Result_Step2

Test Condition	Test Mode	Antenna	Frequency [MHz]	Freq. [MHz]	Result [dBm/MHz]	Limit [dBm/MHz]	Result [μW/MHz]	Limit [μW/MHz]	Verdict
NTNV	2DH5	Ant1	2402	2400.00	-31.33	≤-16	0.73621	≤25	PASS
NTNV	3DH5	Ant1	2402	2400.00	-31.29	≤-16	0.74302	≤25	PASS

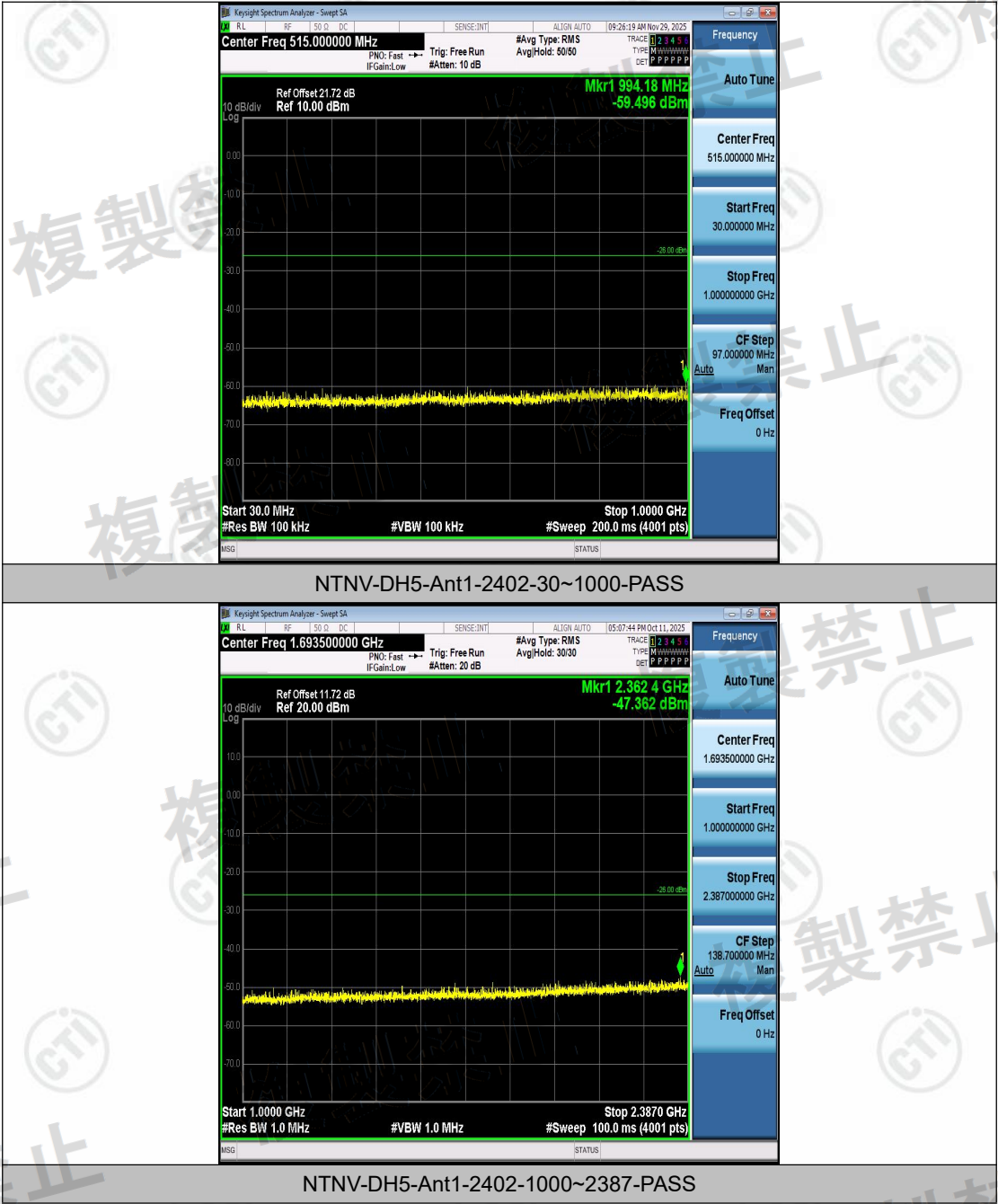
Note:

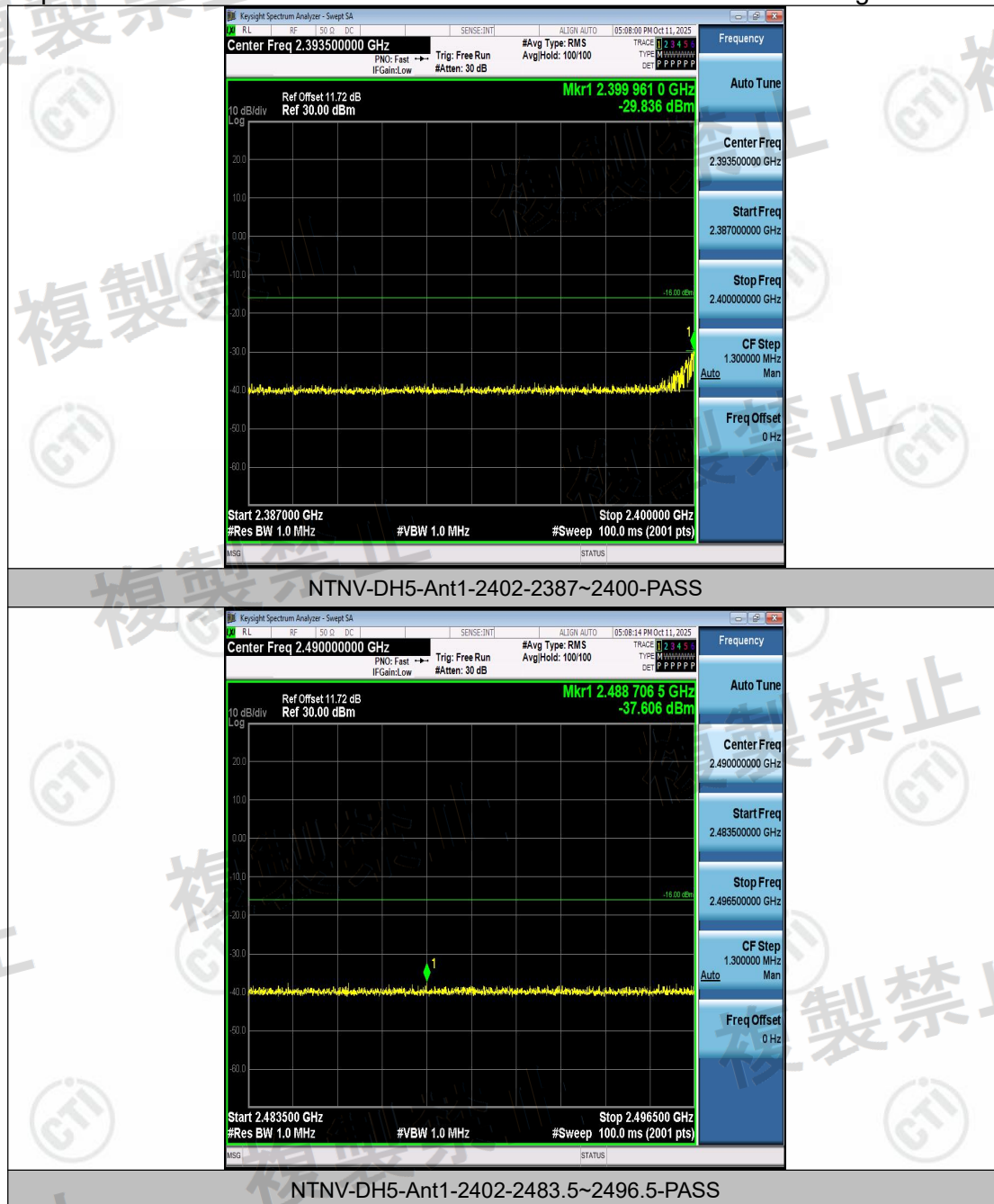
$\text{dBm/1MHz} = \text{dBm/100kHz} + 10 \times \log_{10} (1\text{MHz}/100\text{kHz})$

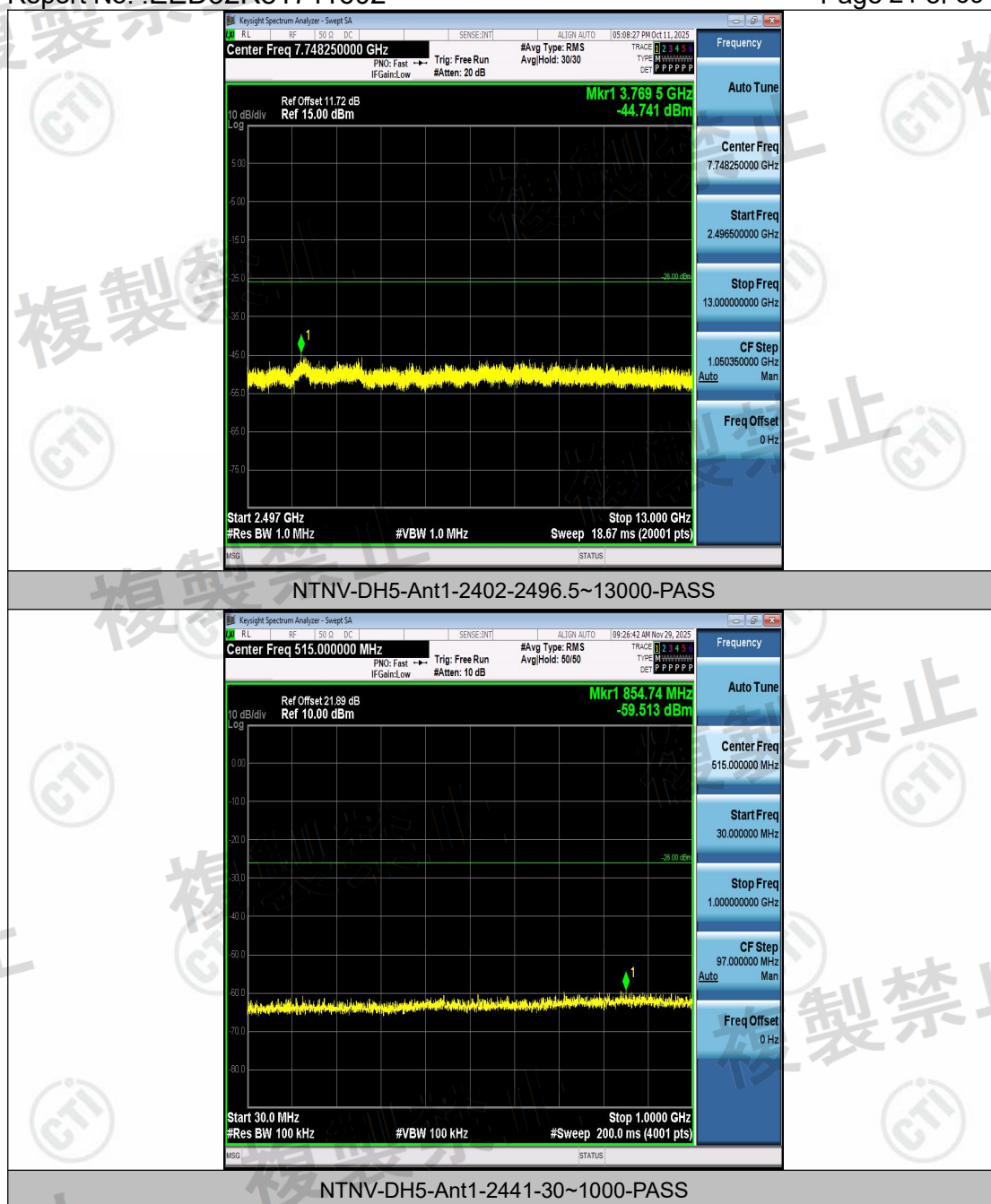
$\text{dBm/1MHz} = \text{dBm/100kHz} + 10$

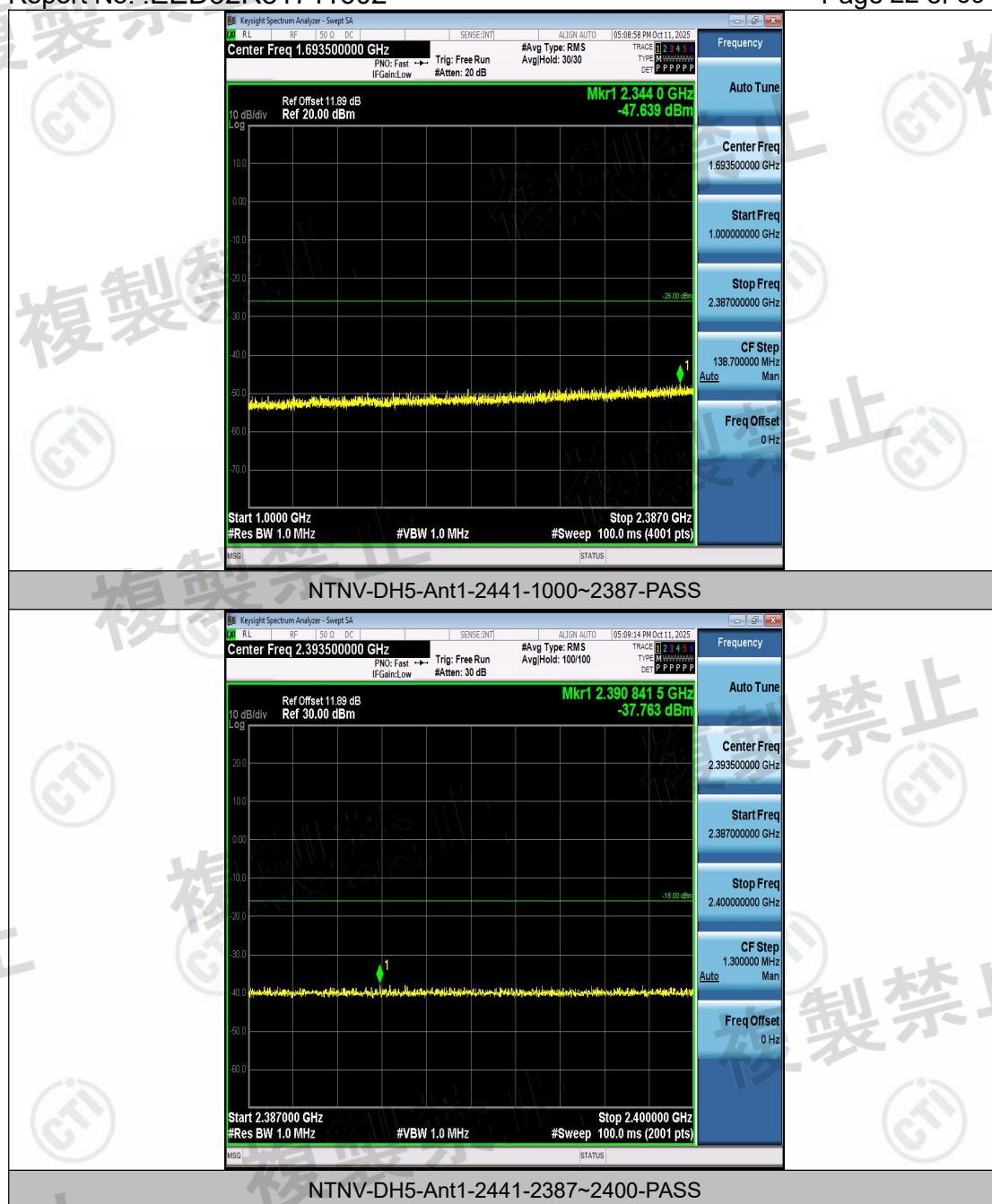
During the 30M-1000M testing process, a 10 dB factor was added for the test.

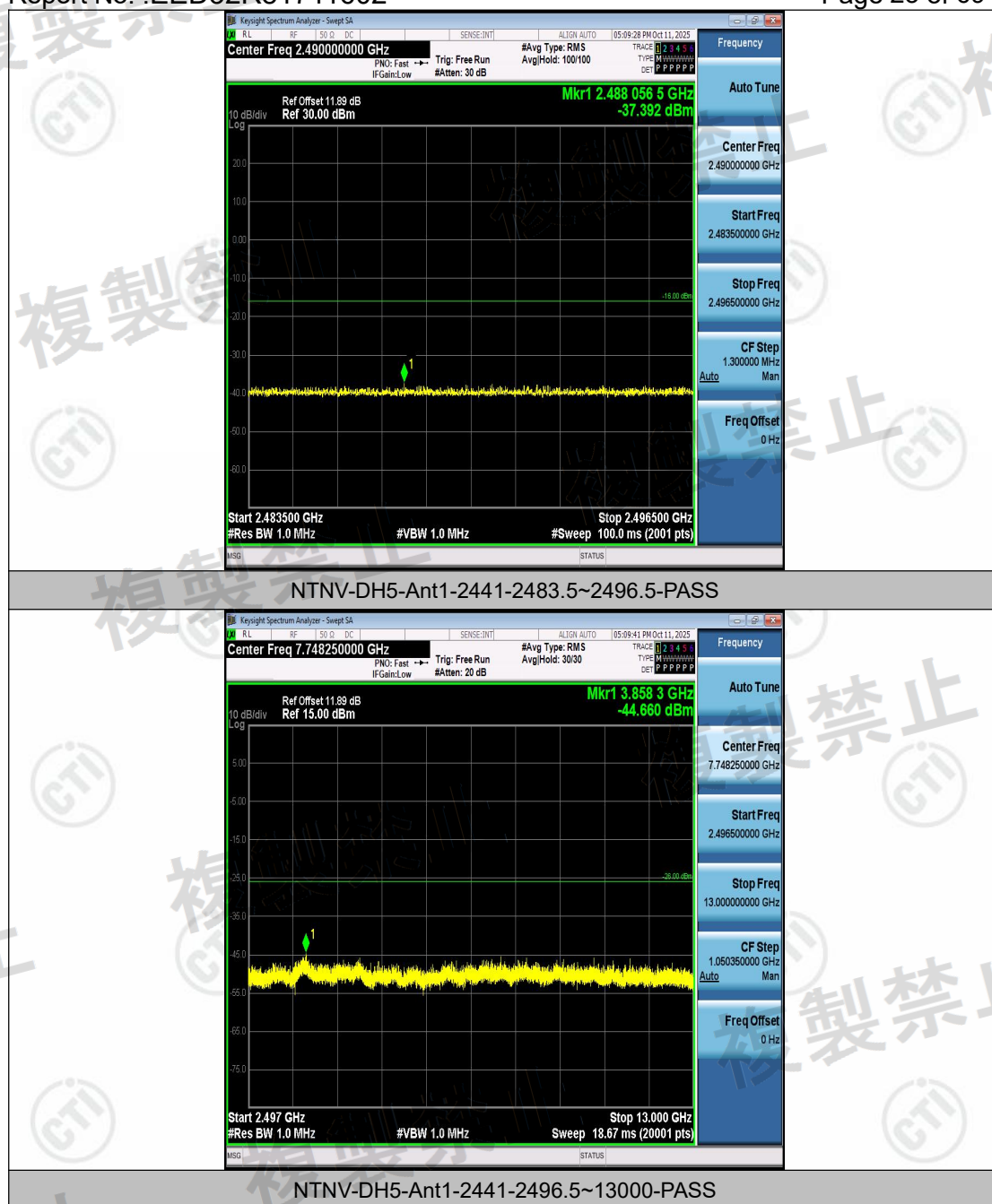
Test Graphs

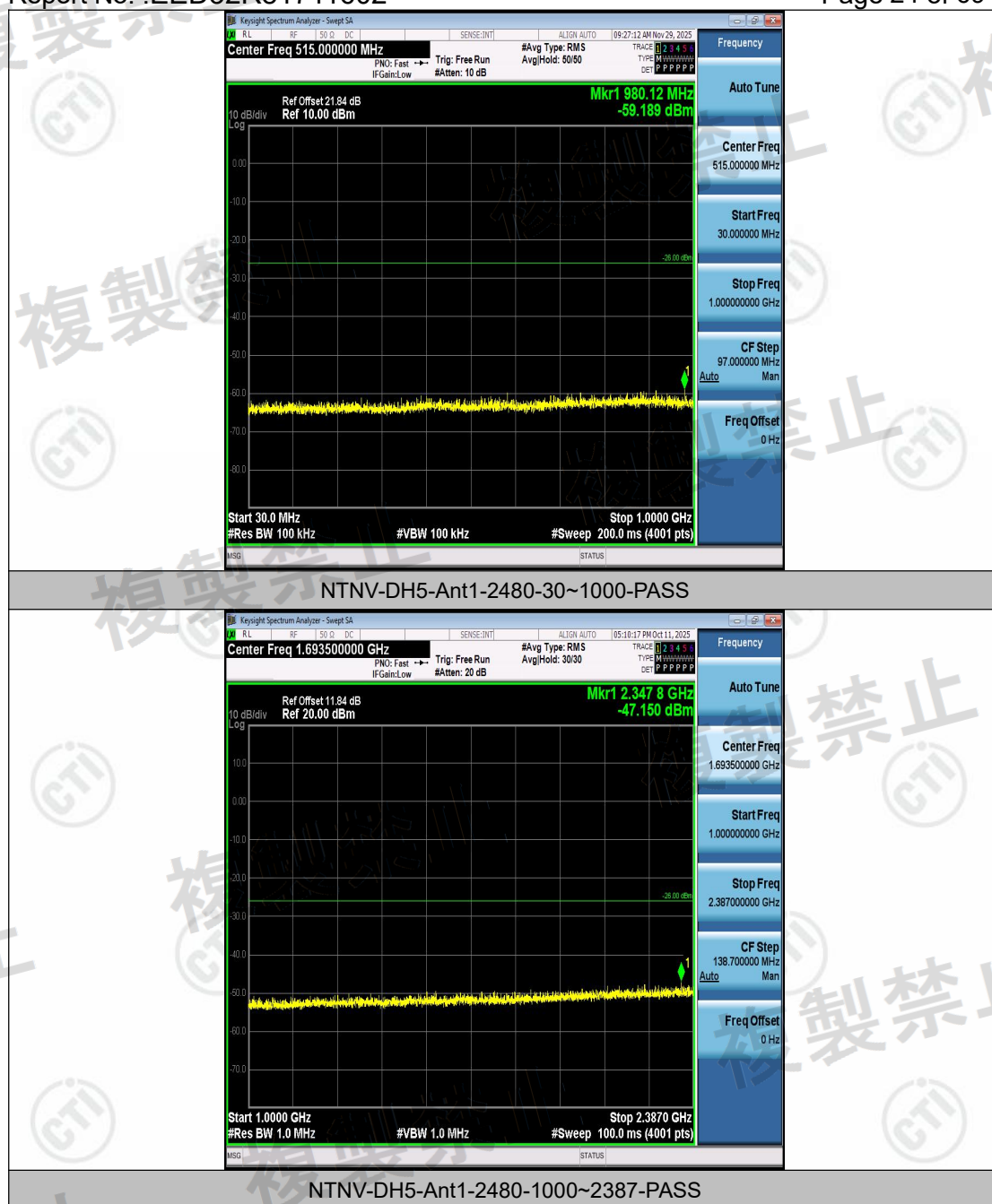


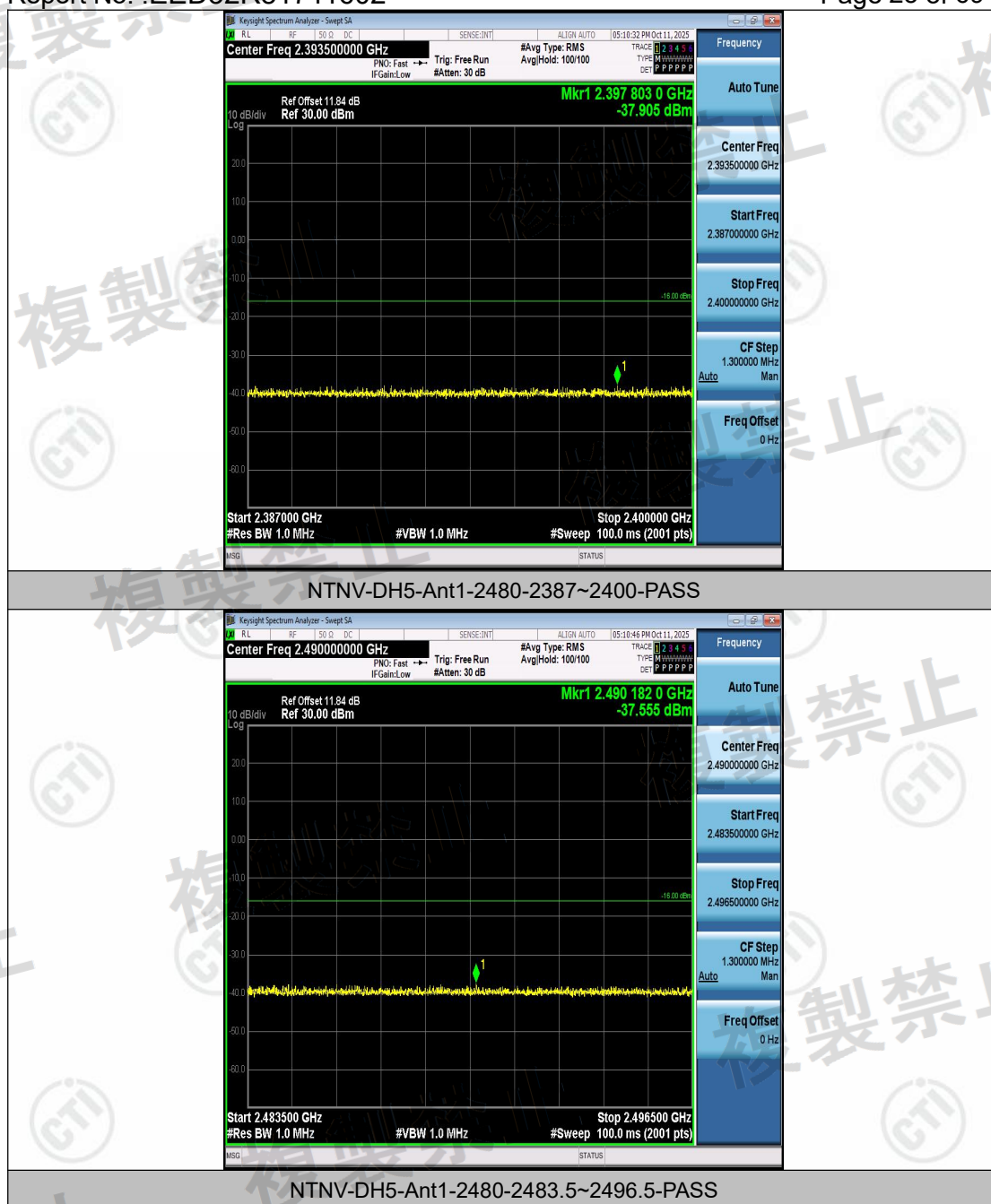


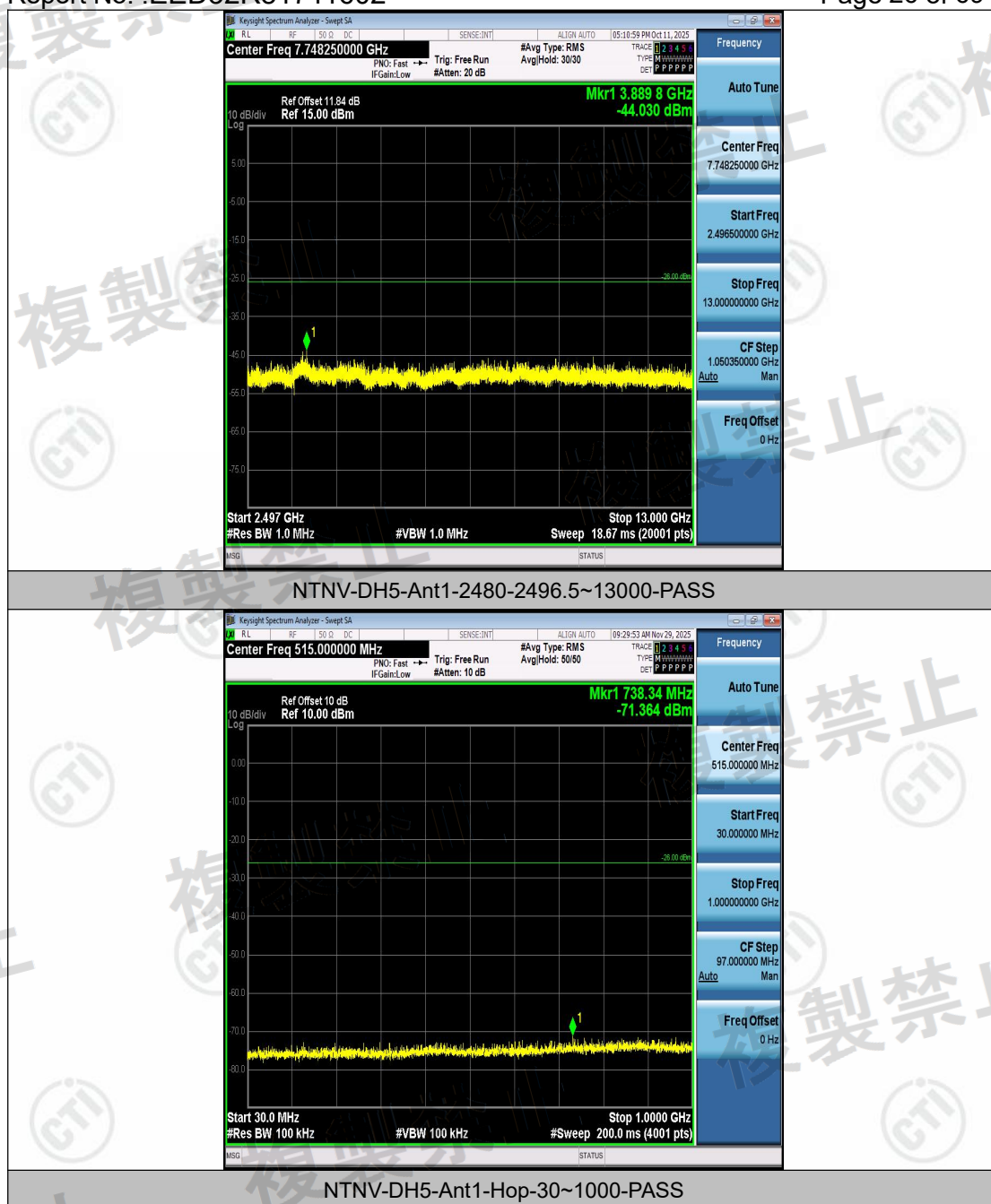


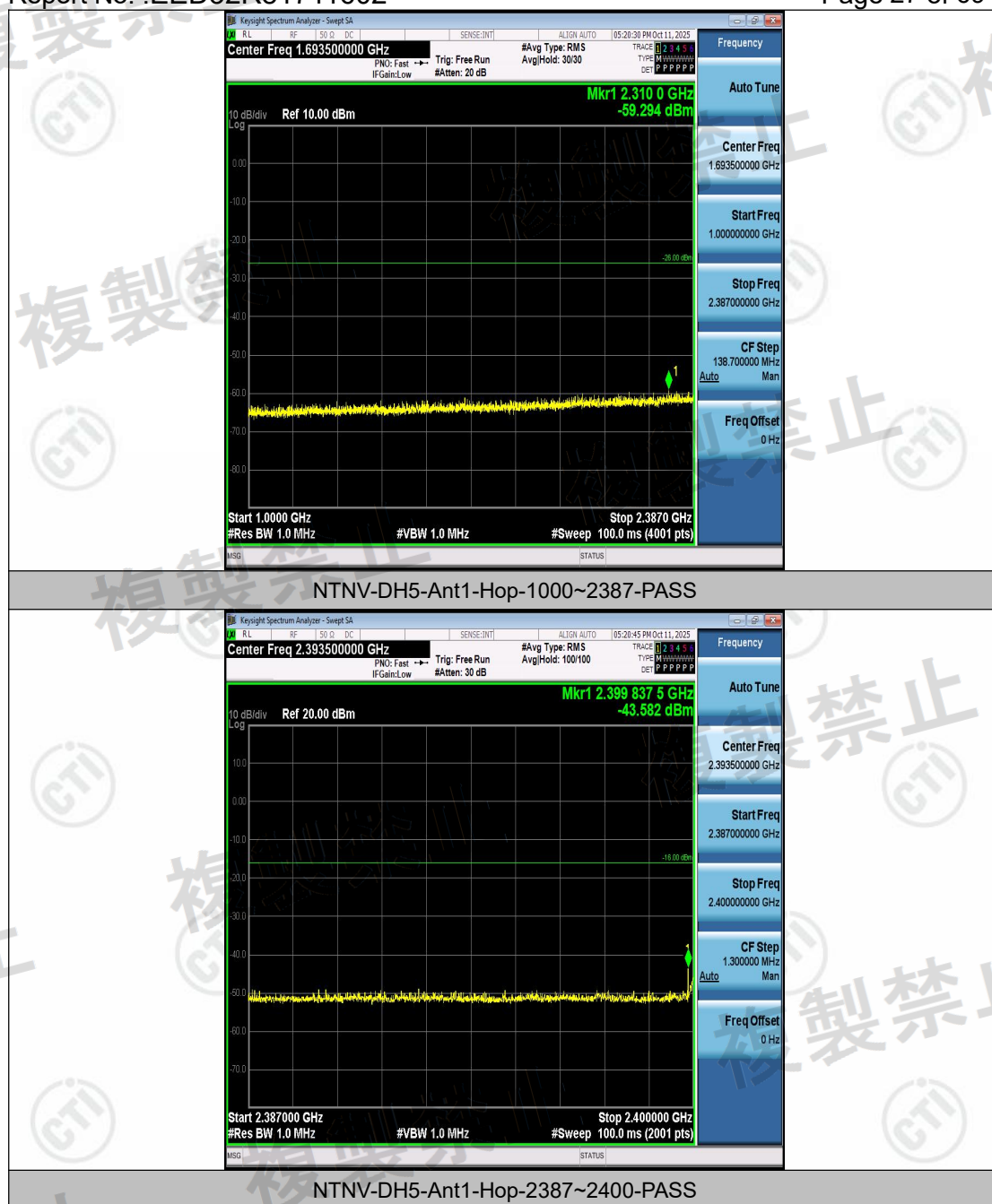


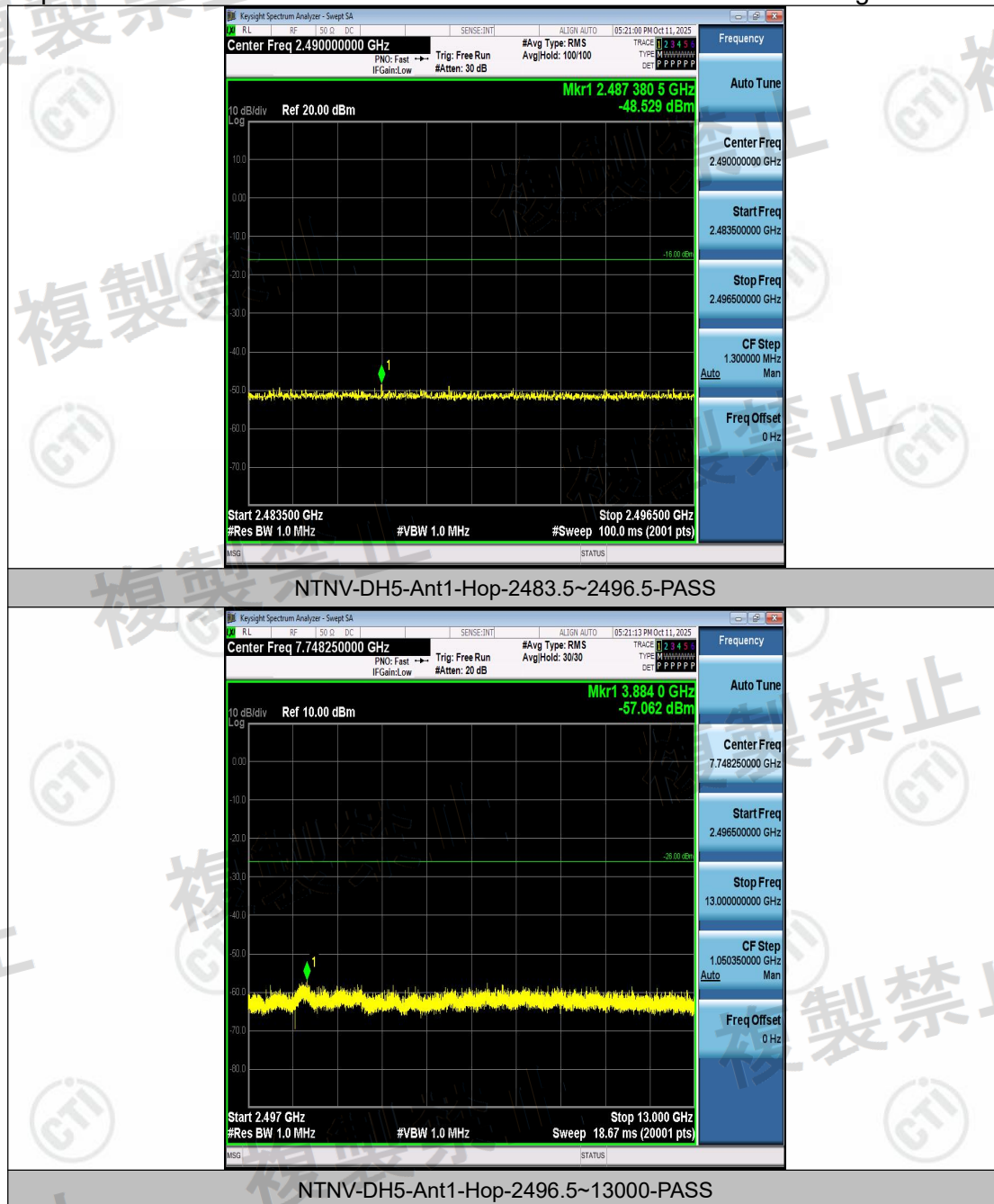


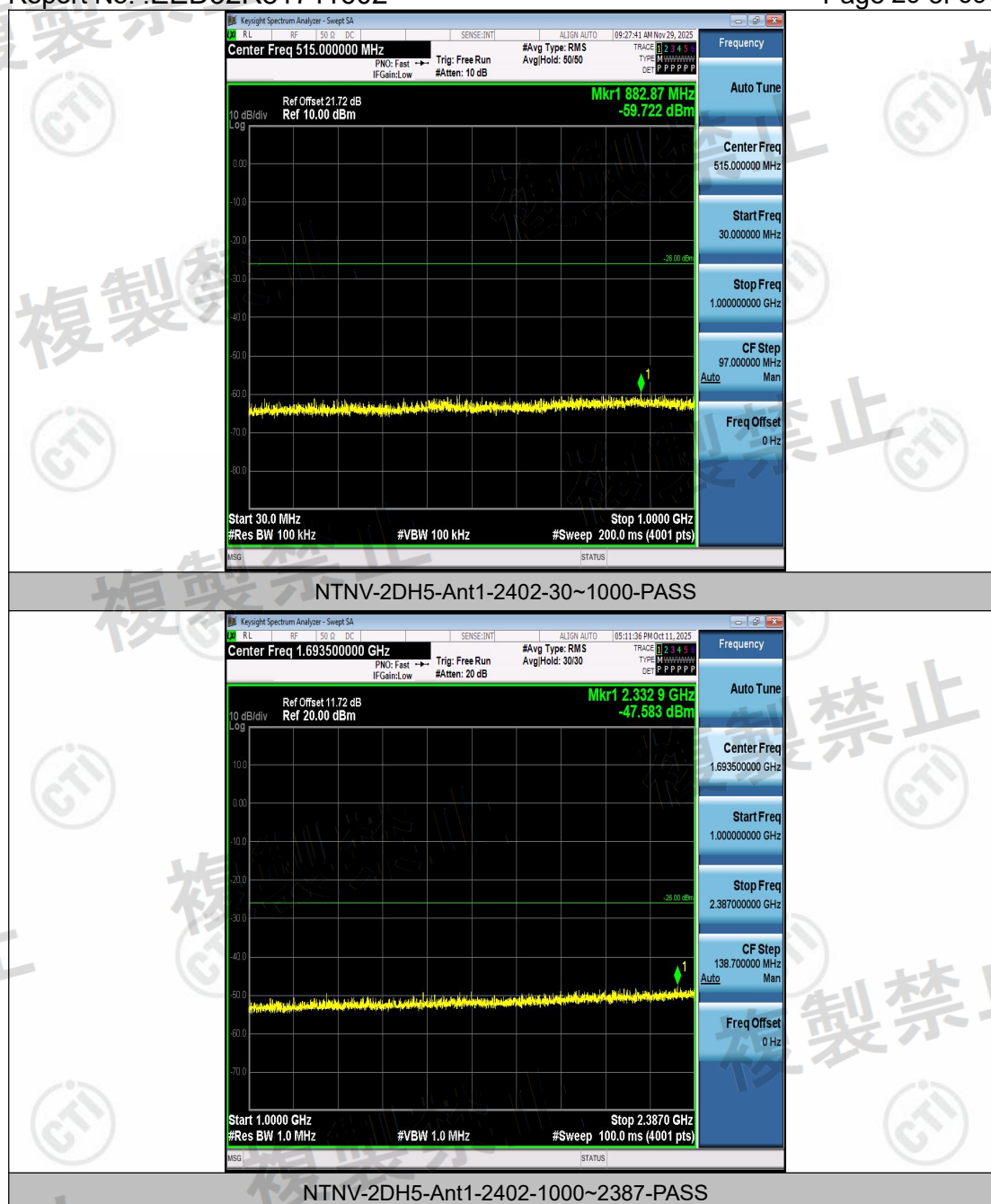


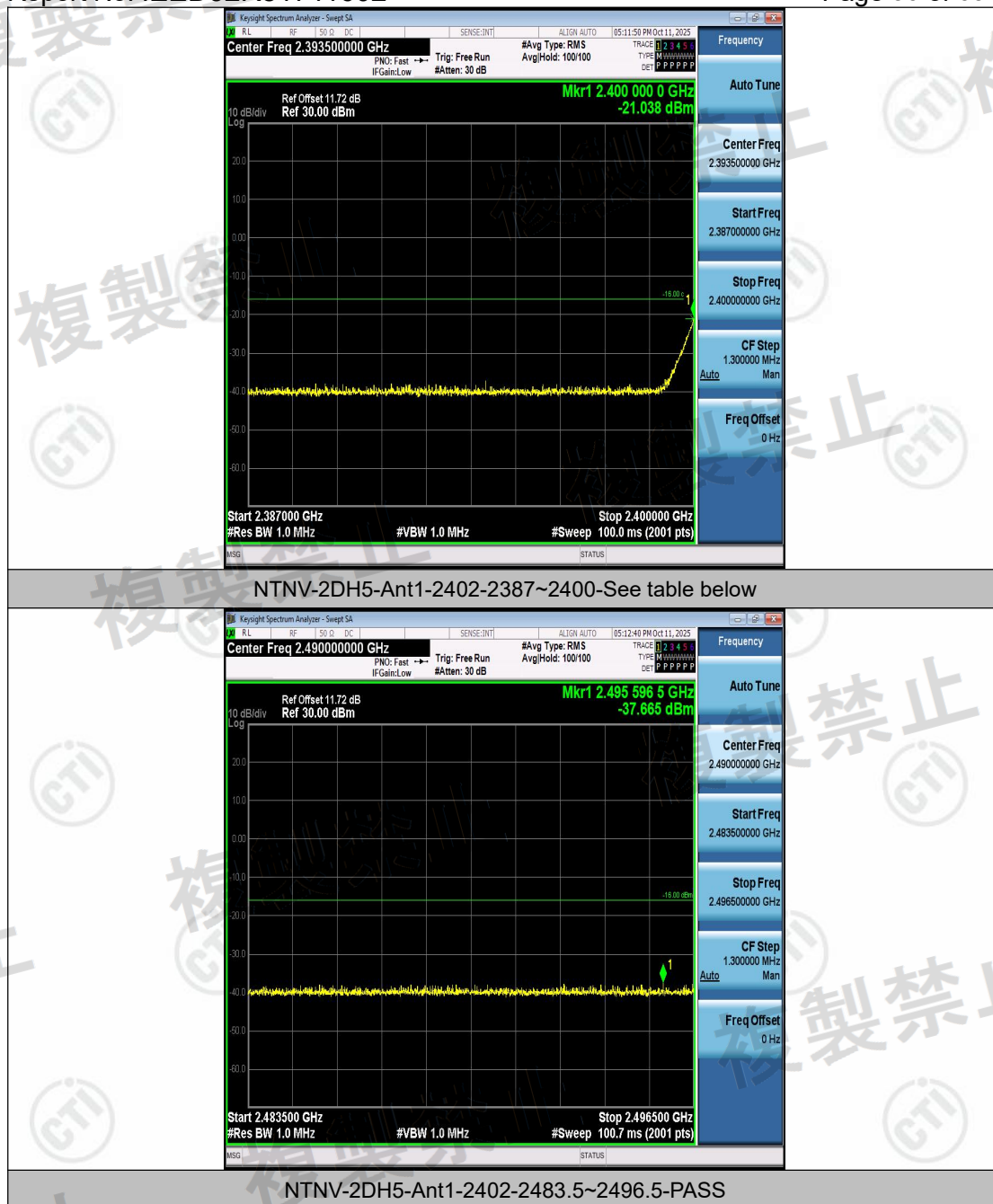


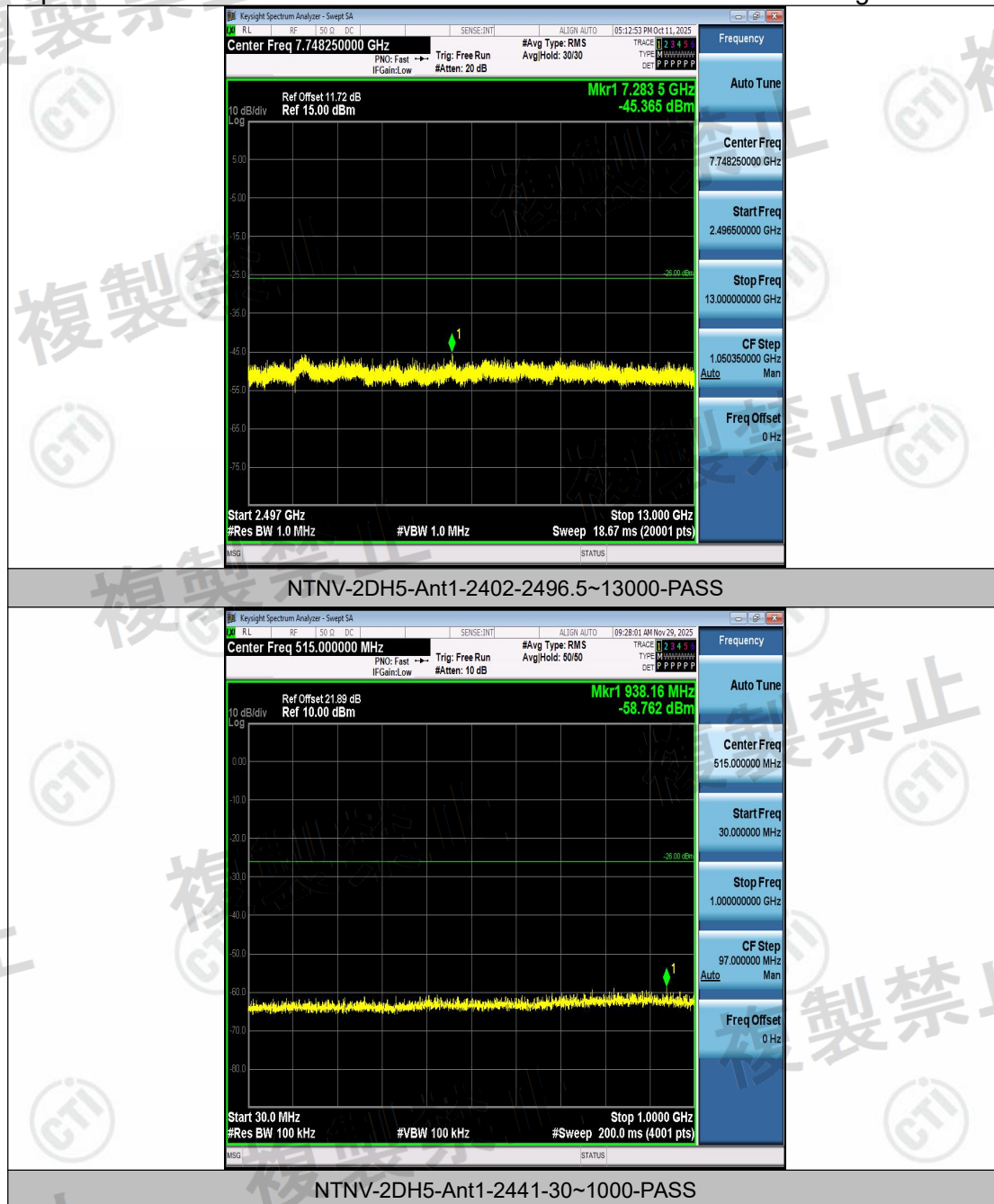


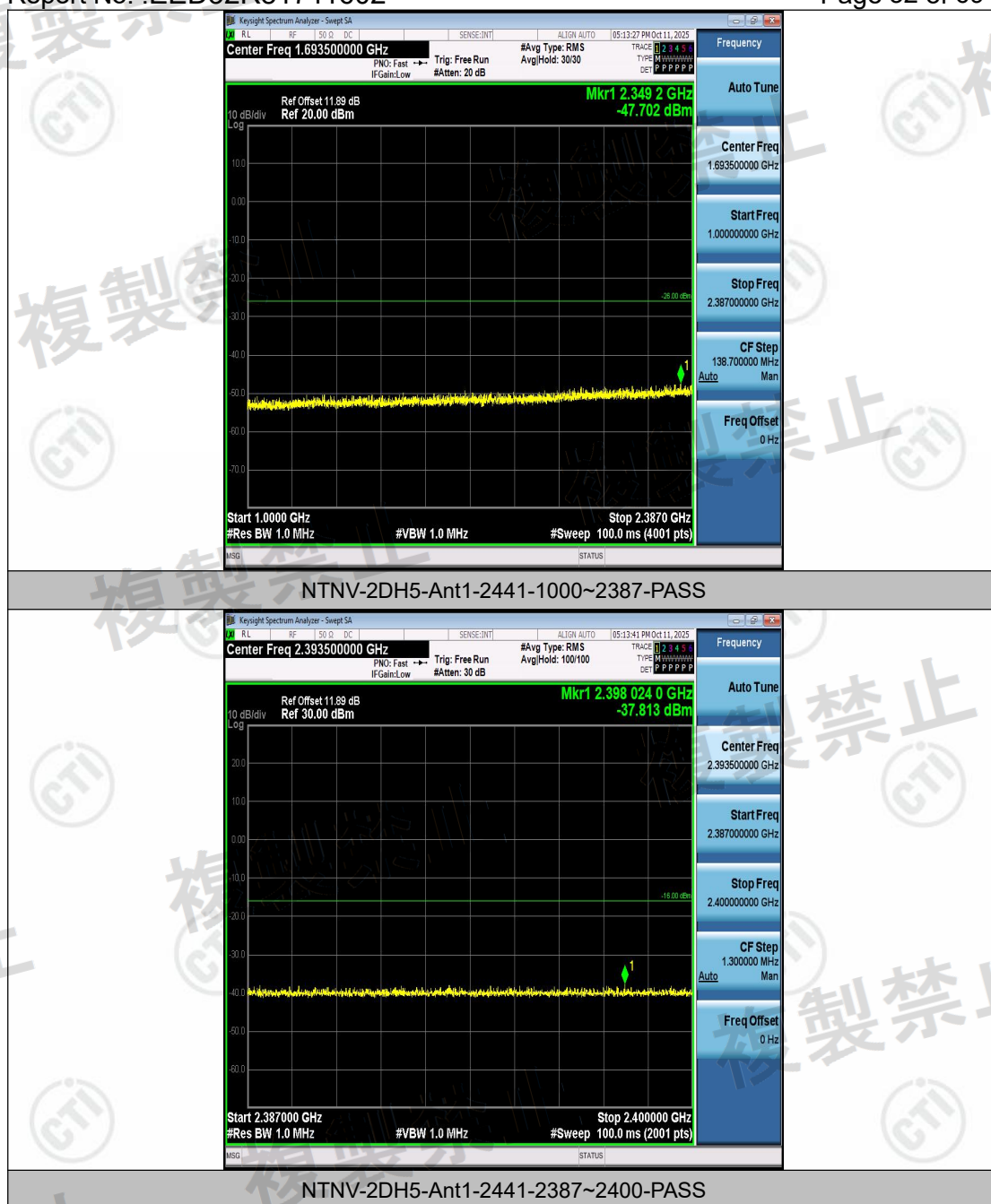


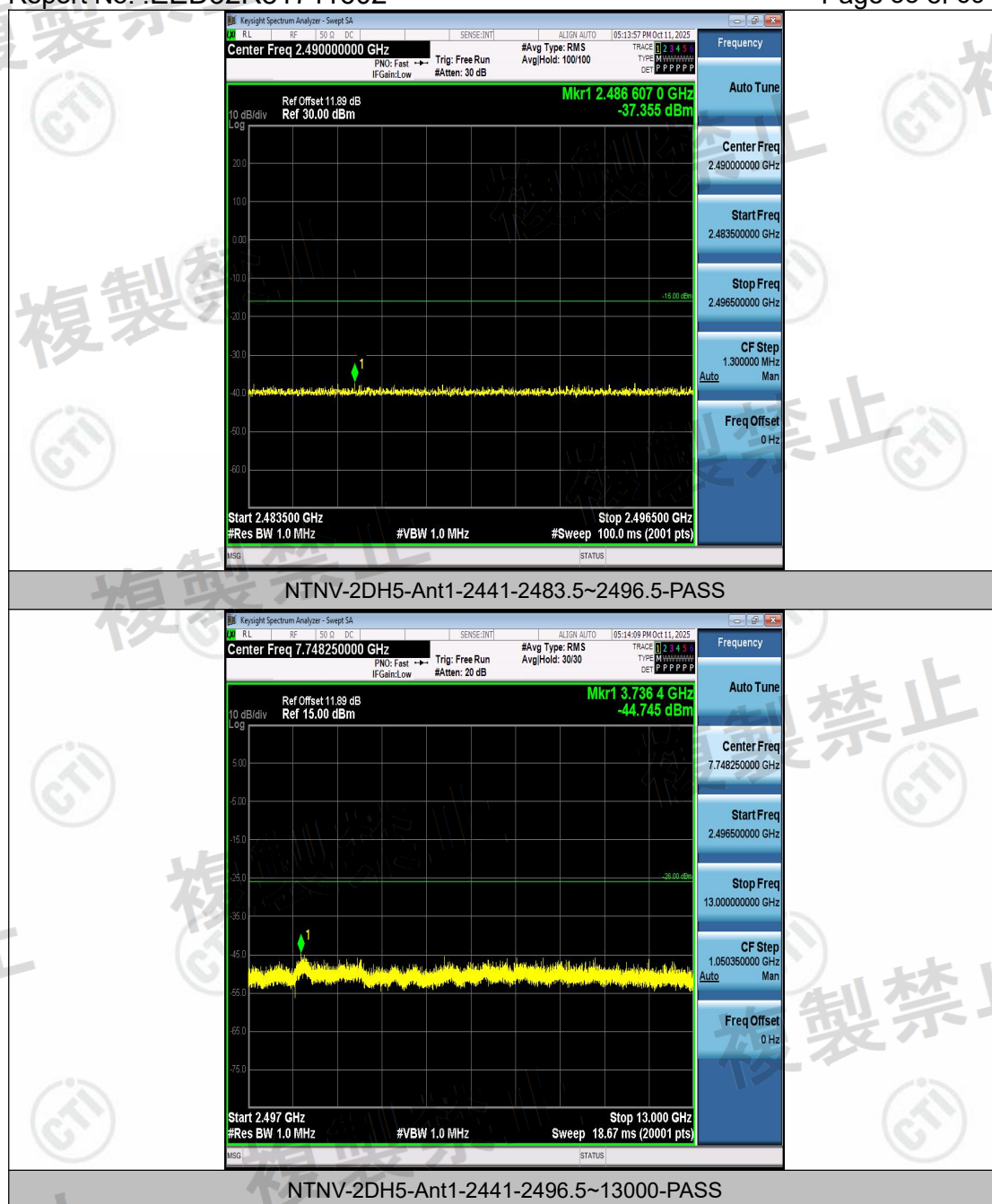


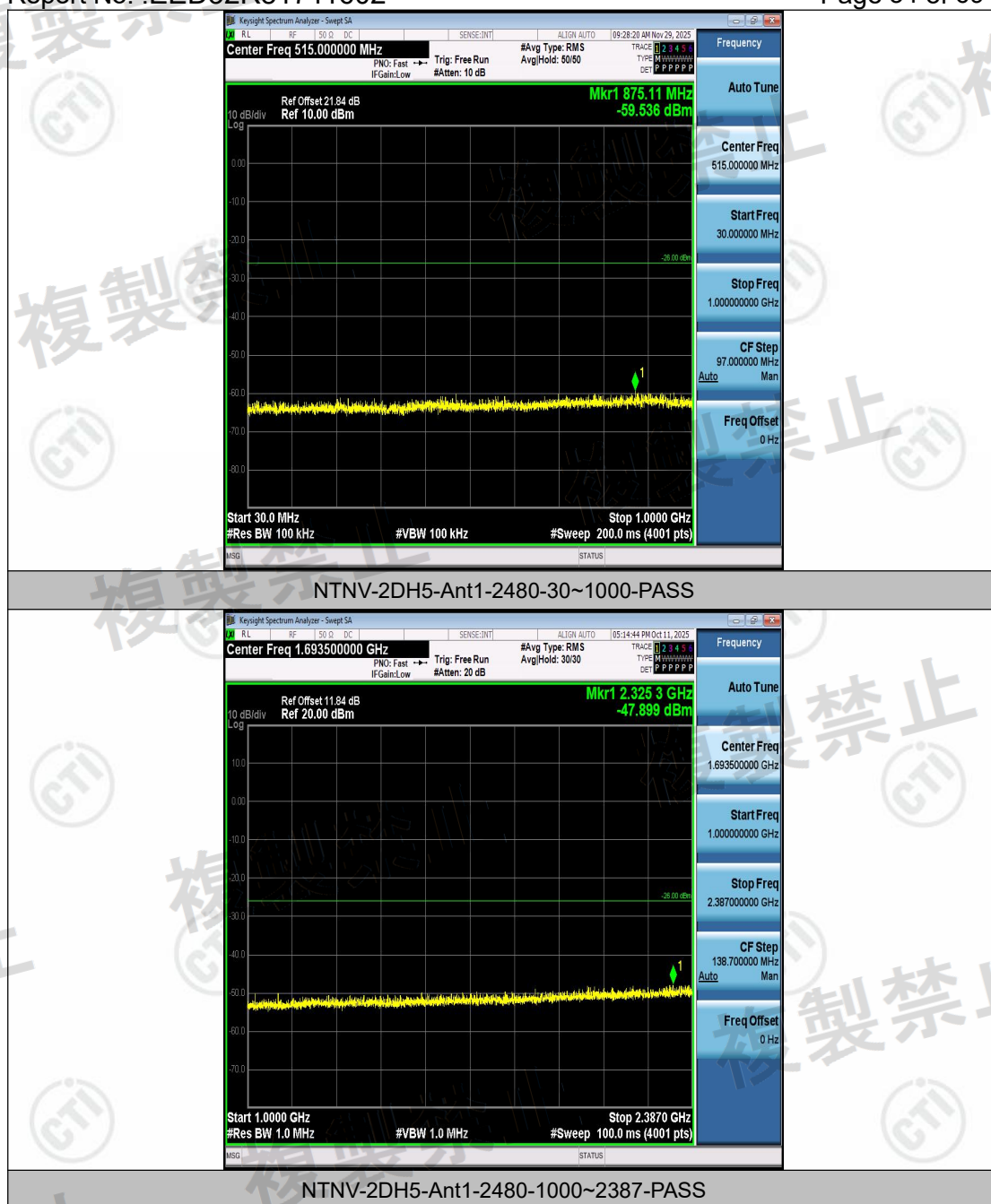


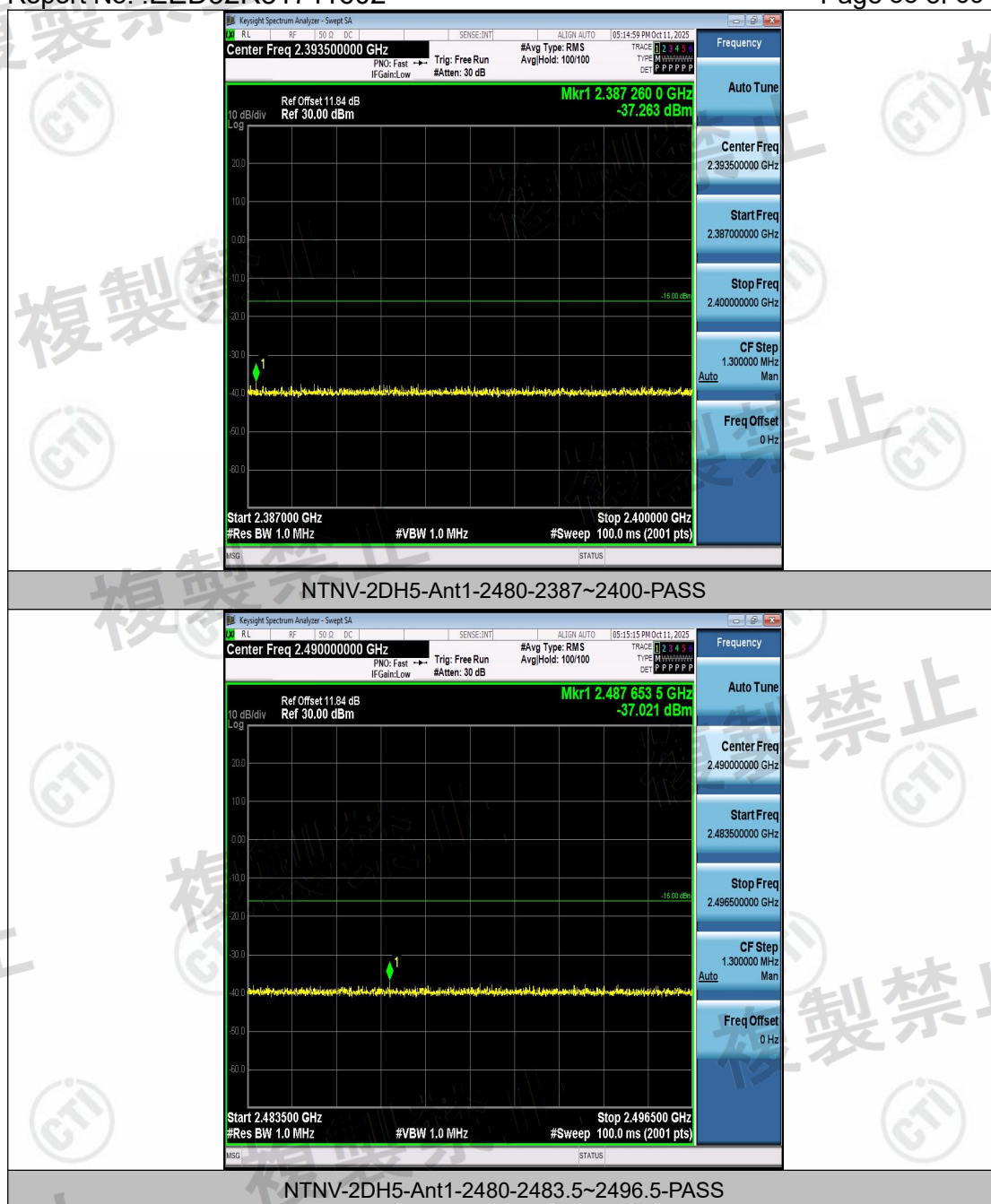


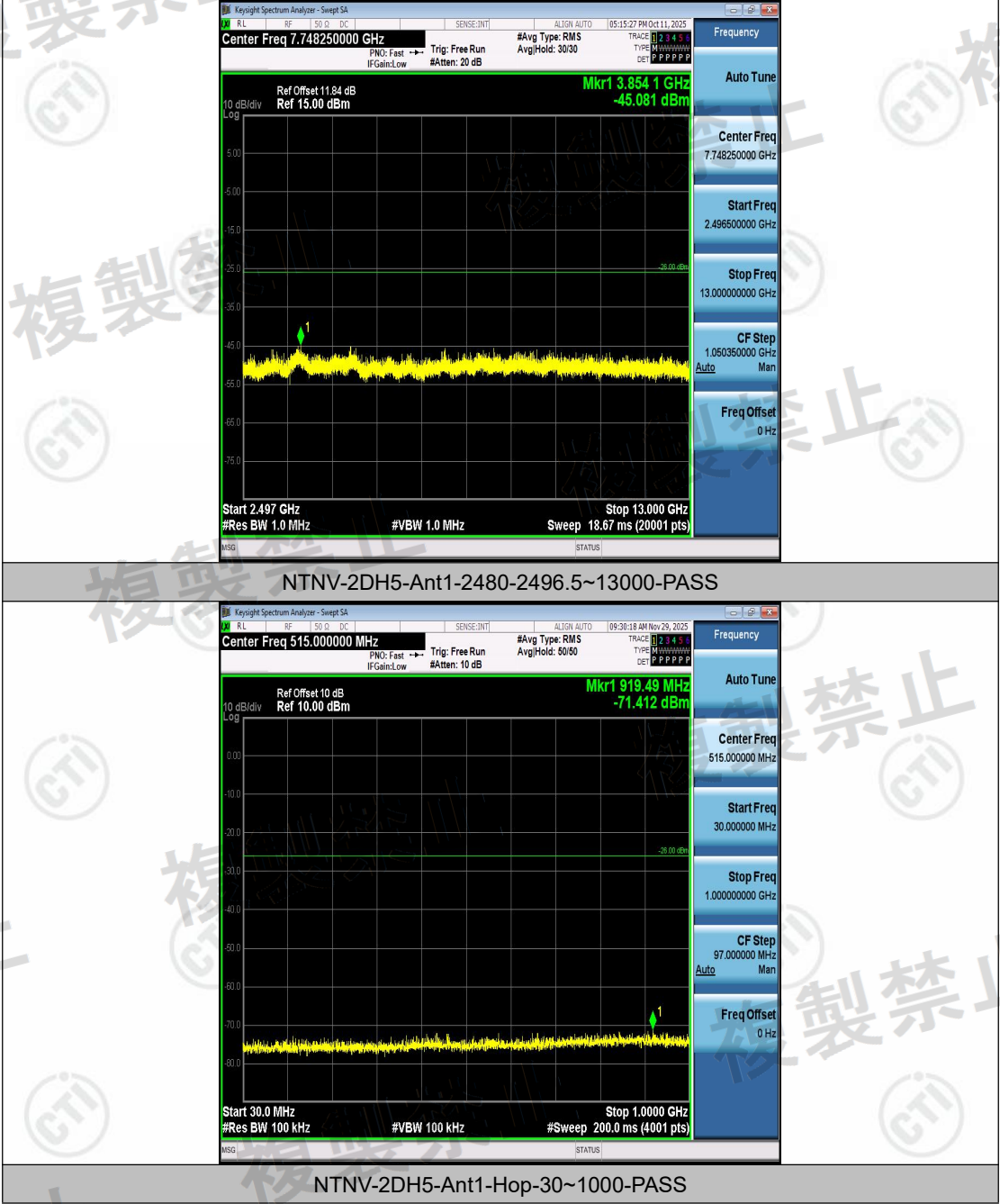


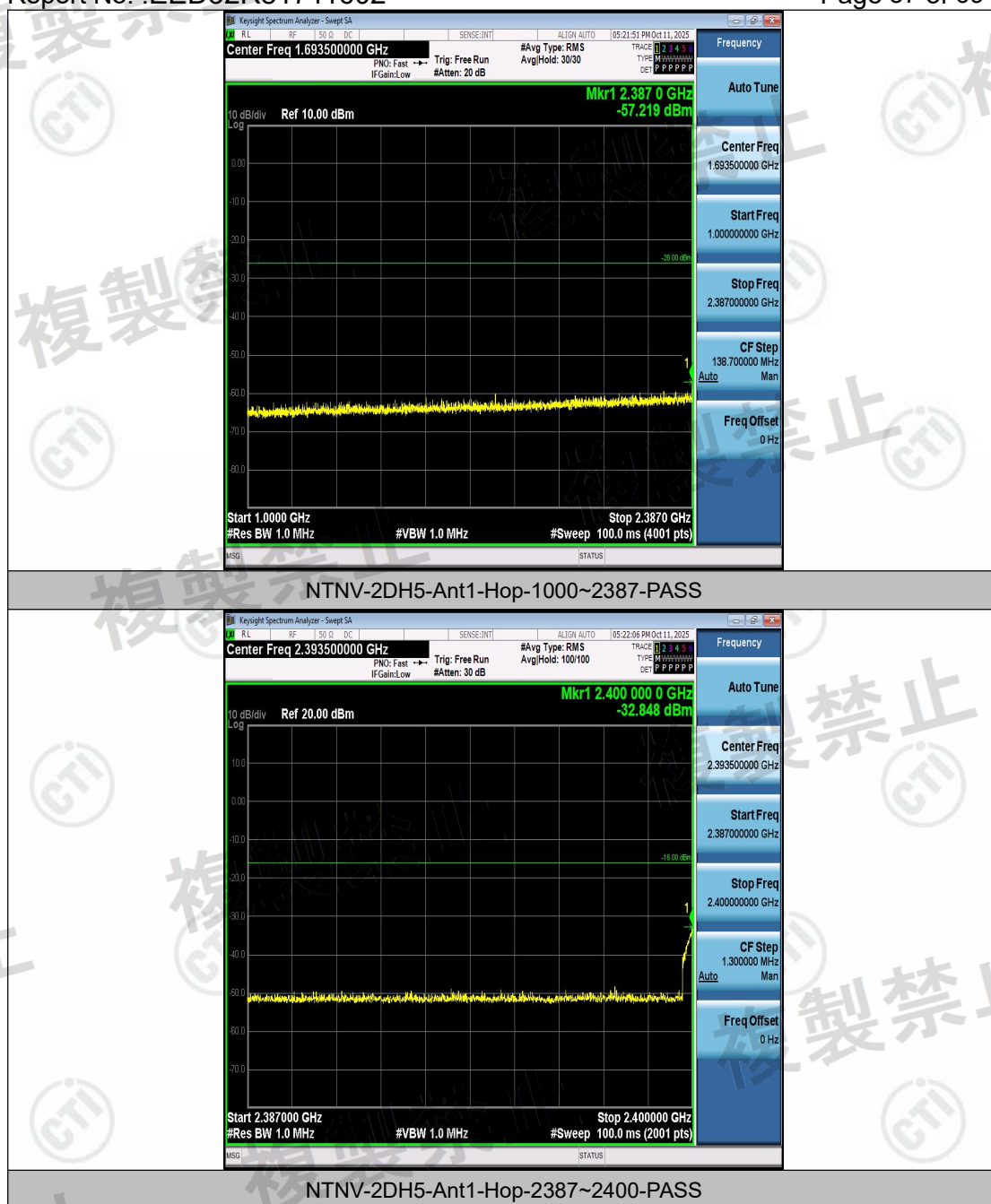


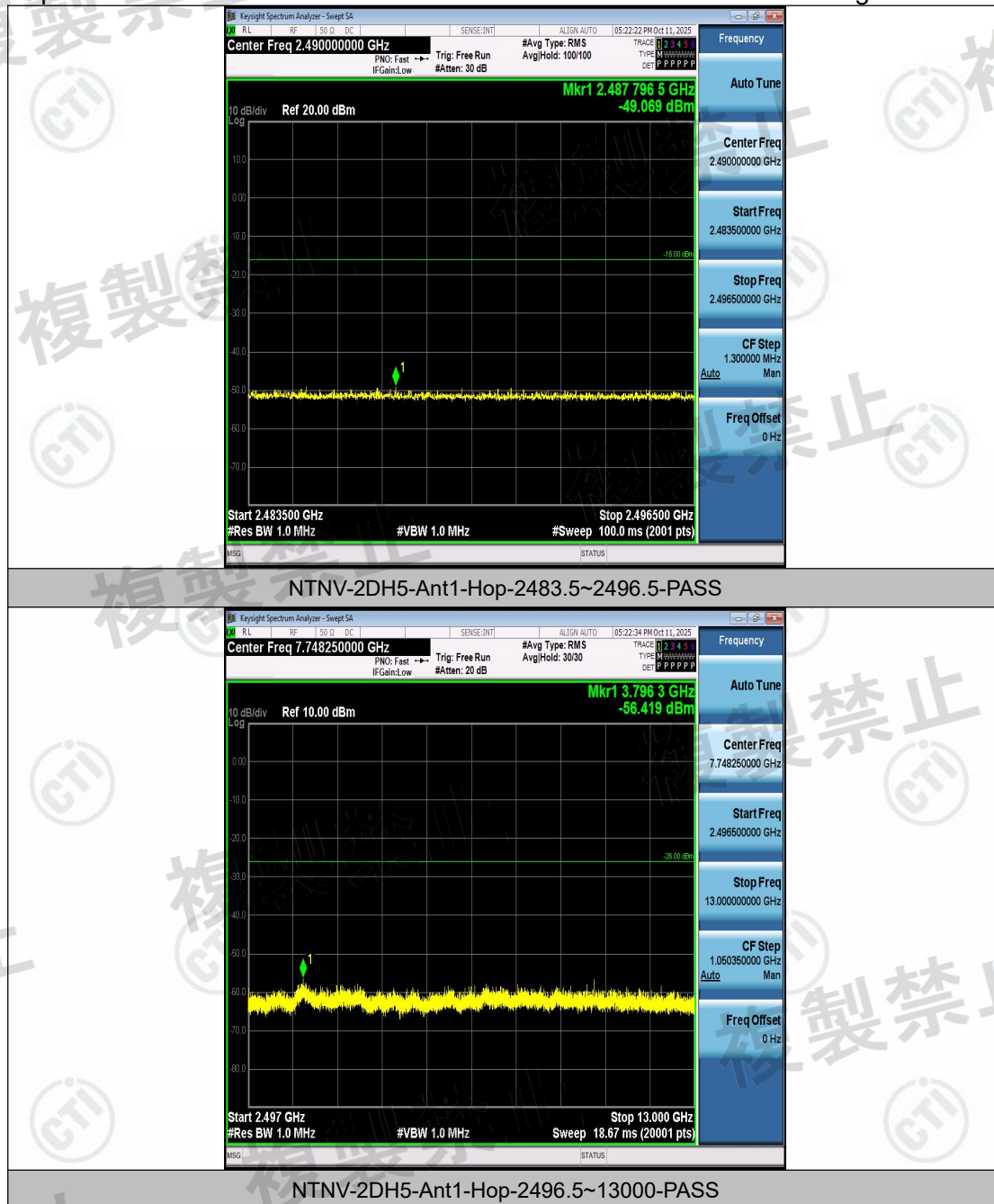


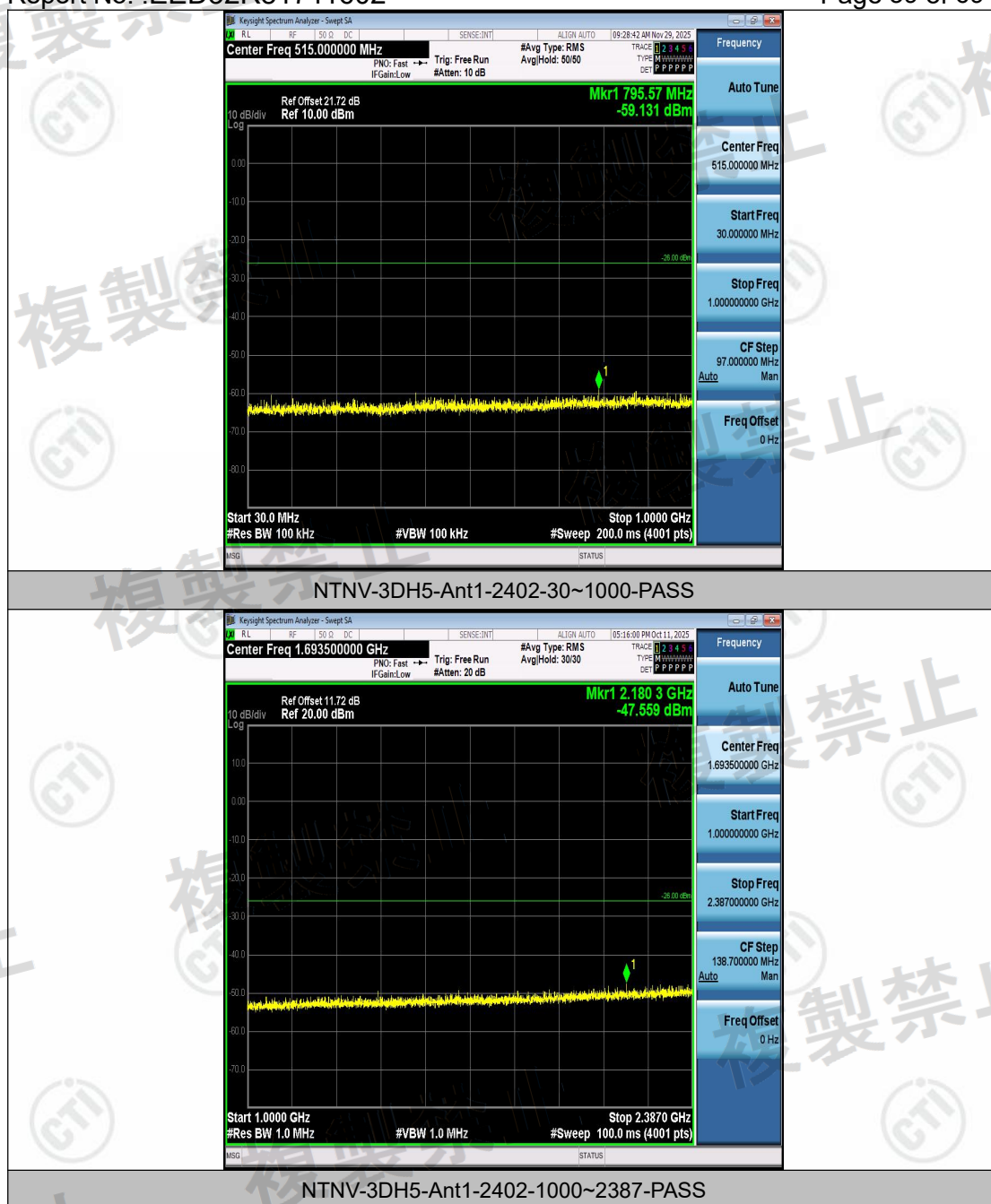


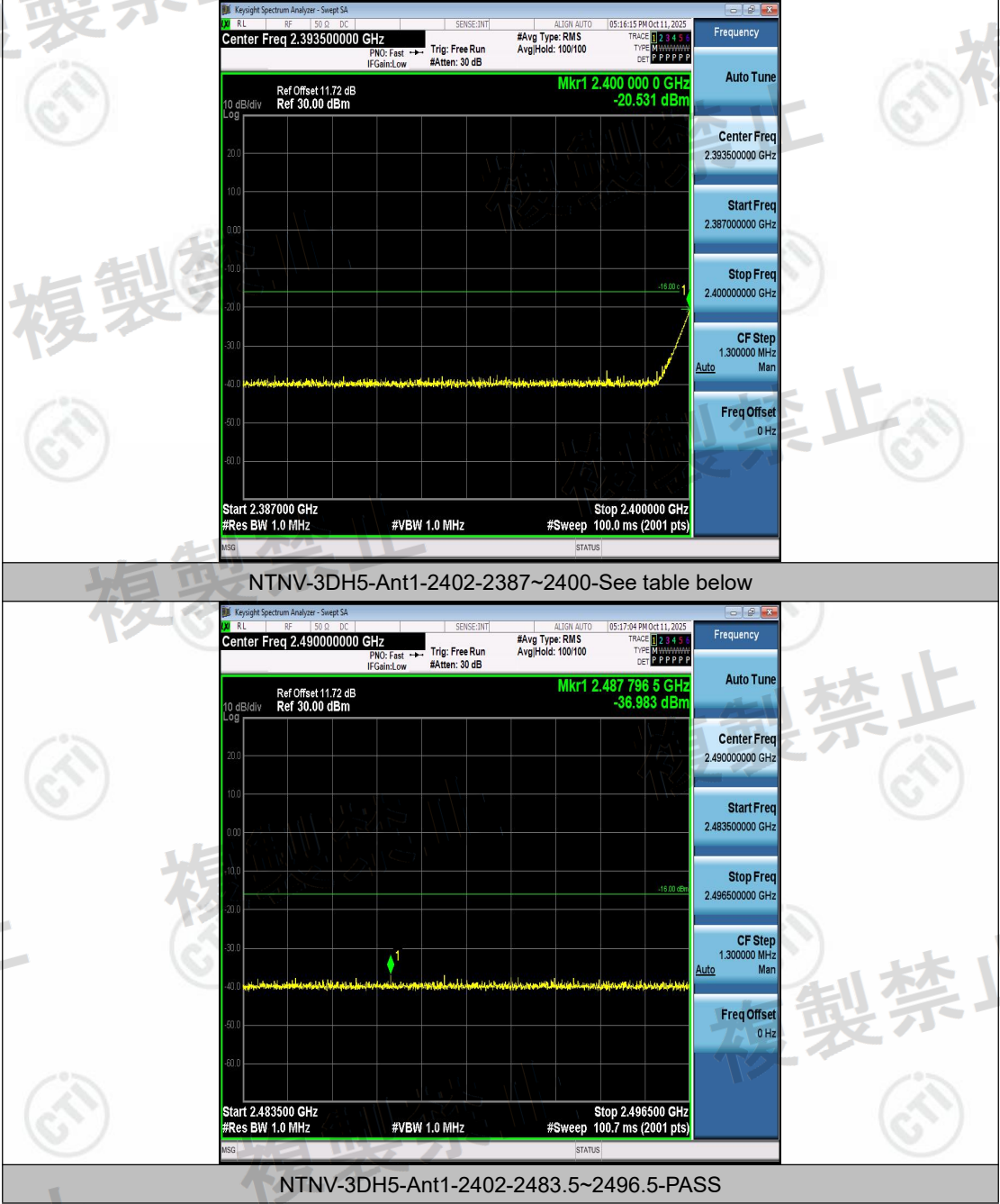


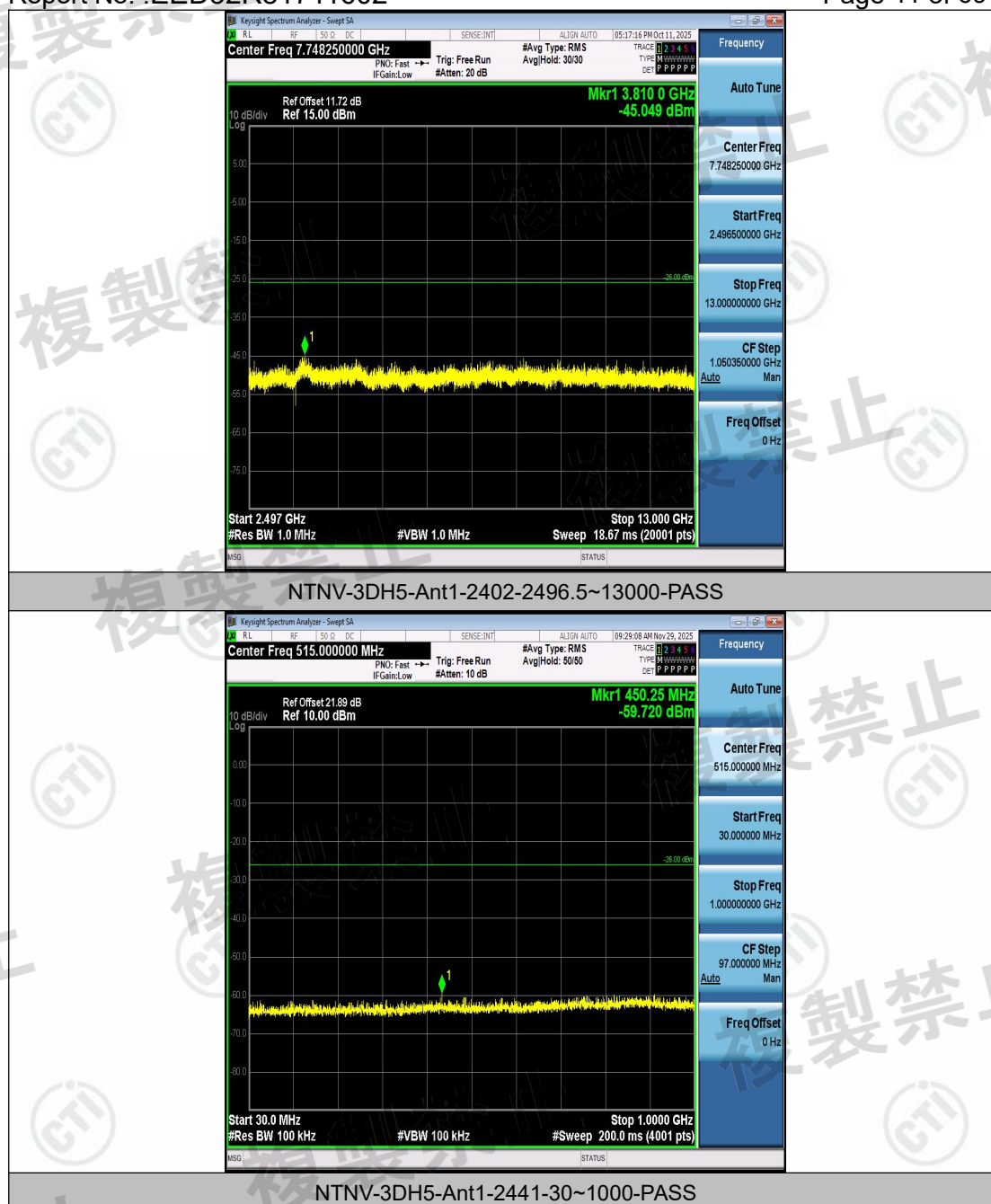


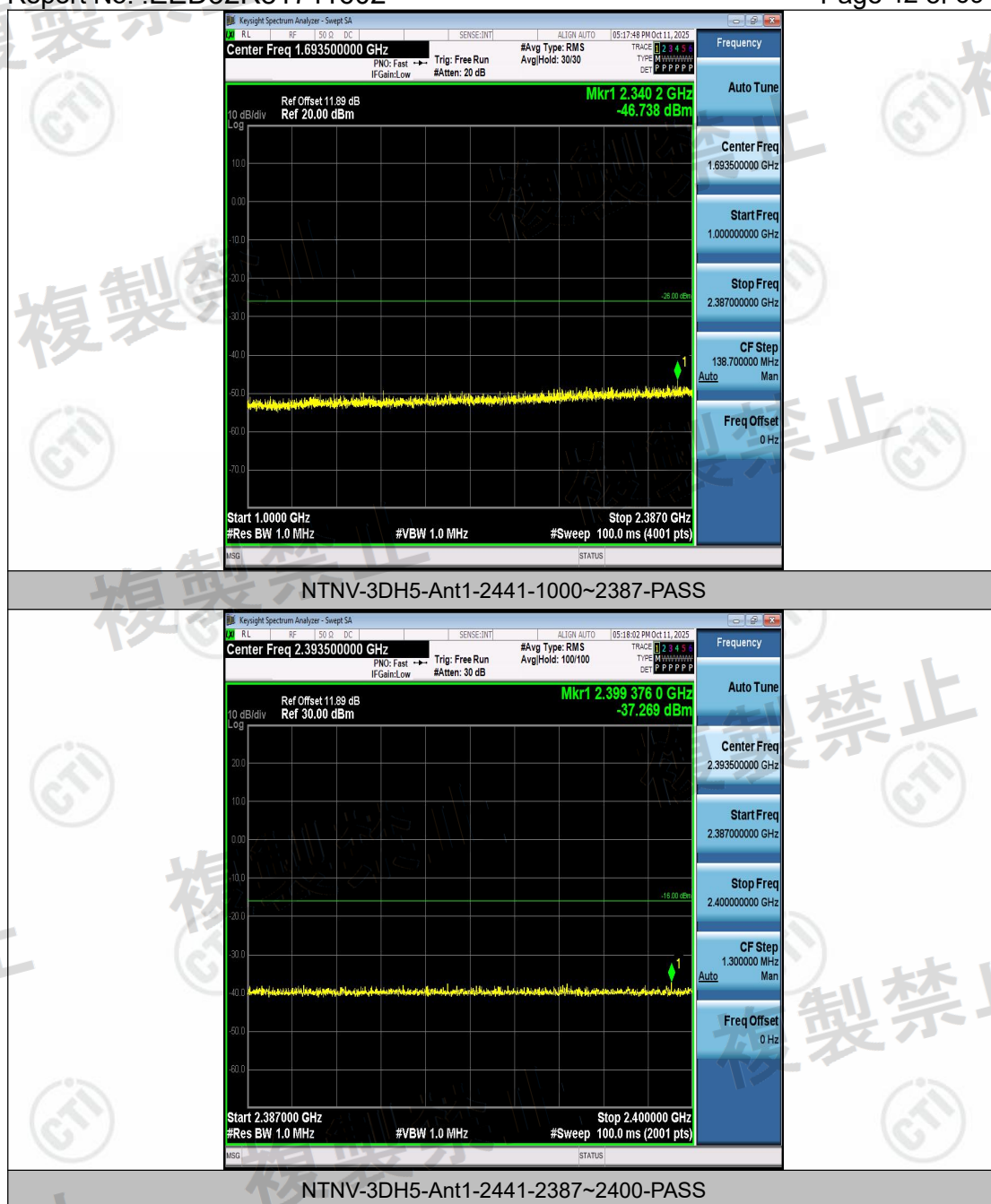


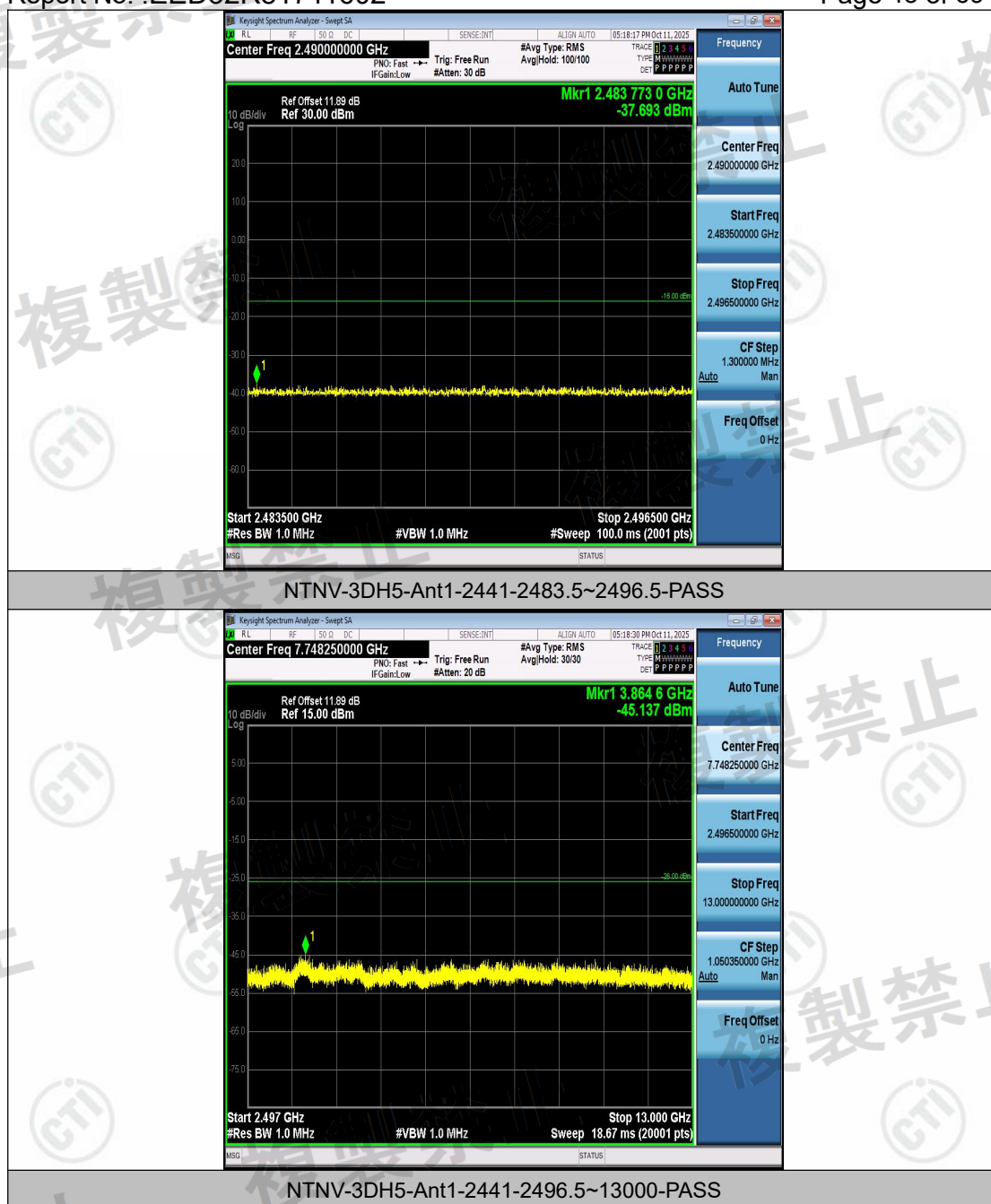


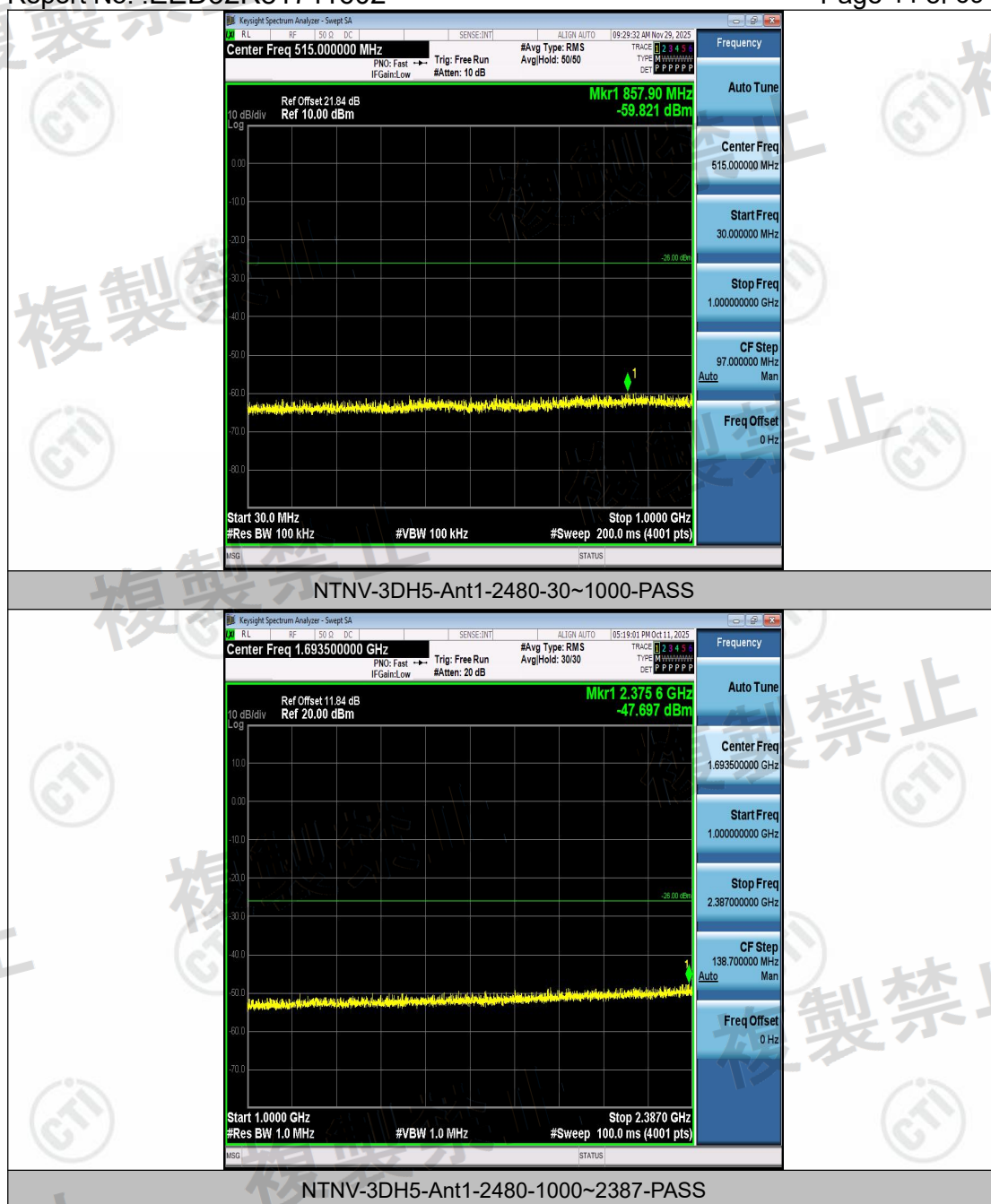


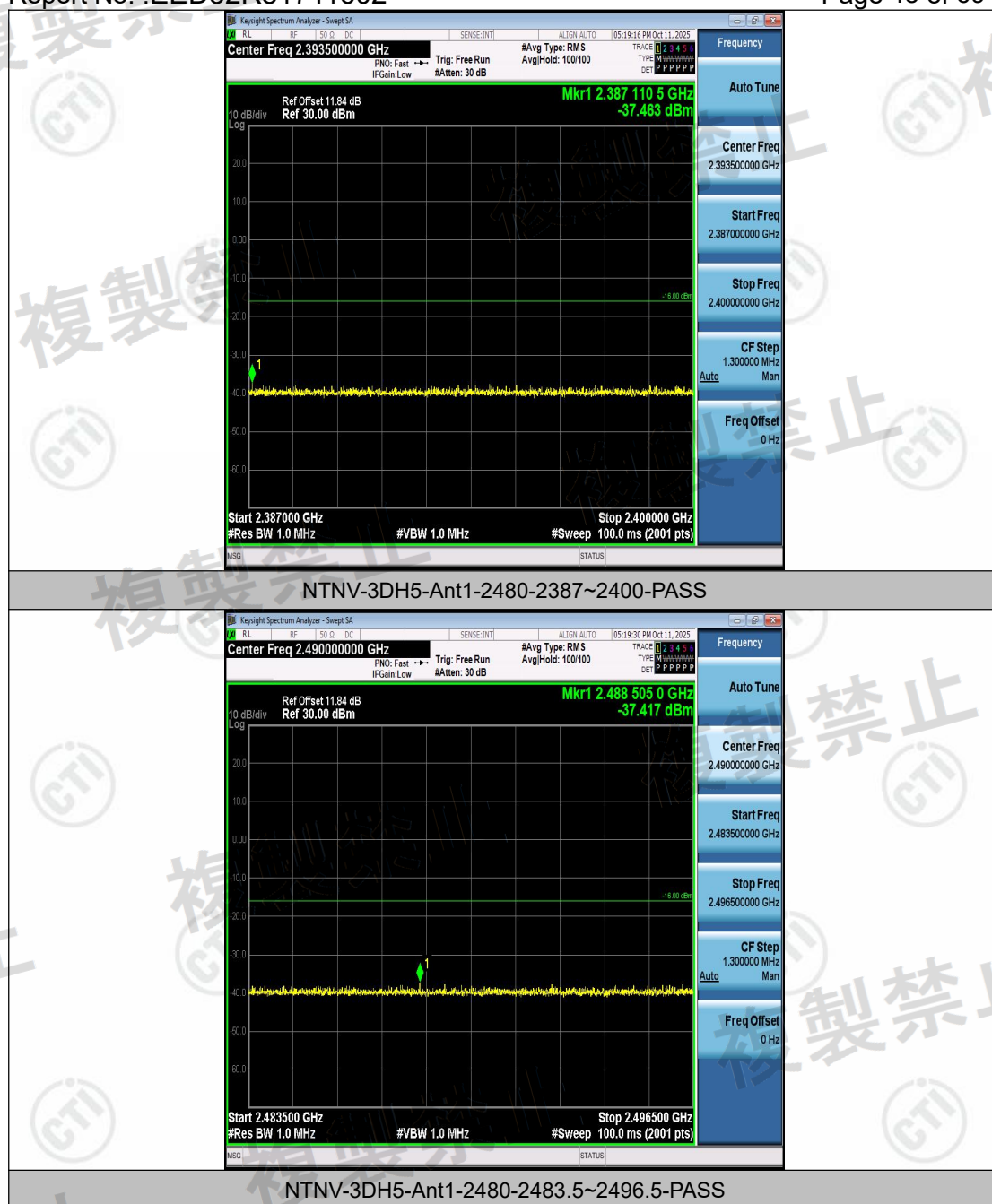


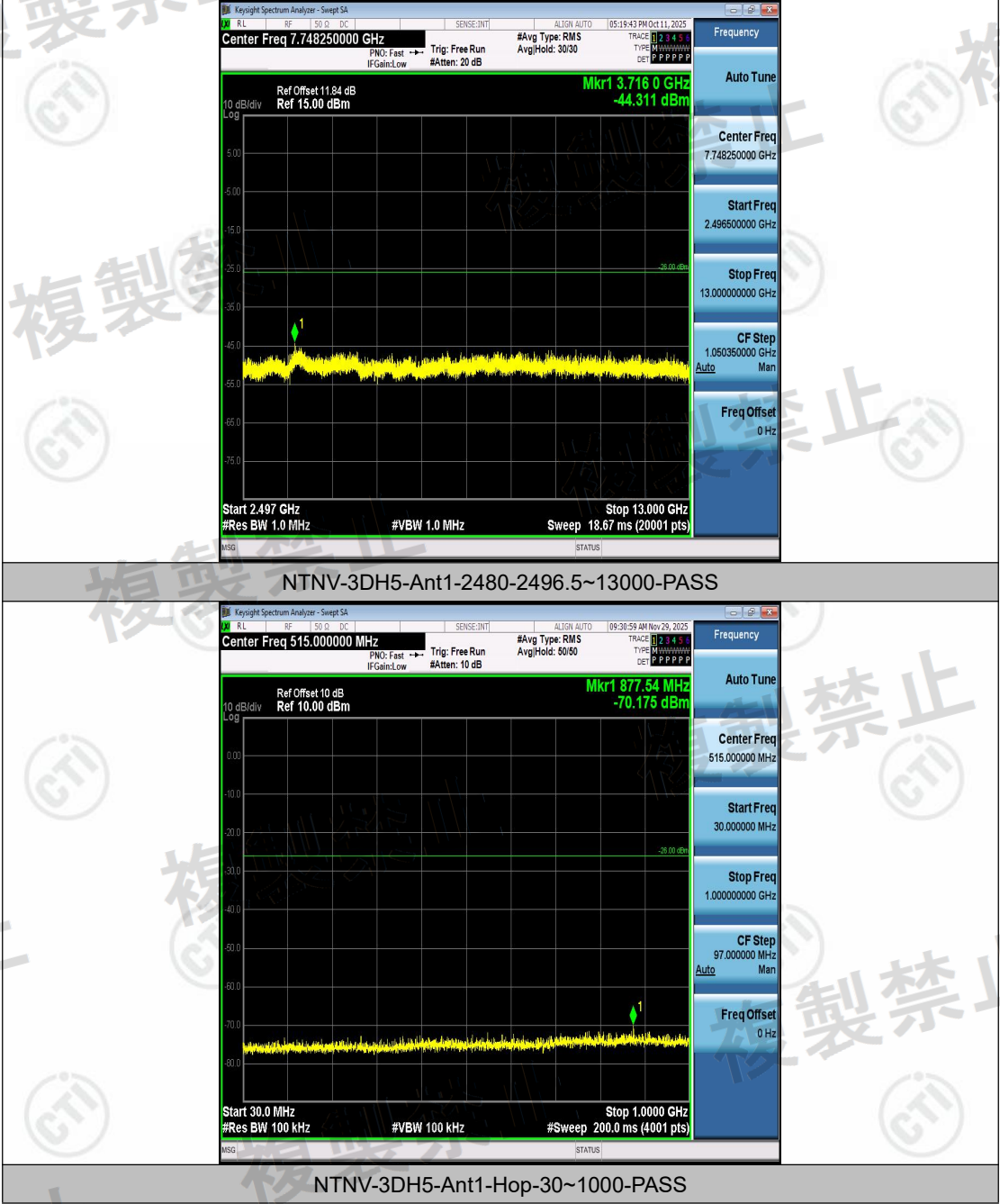


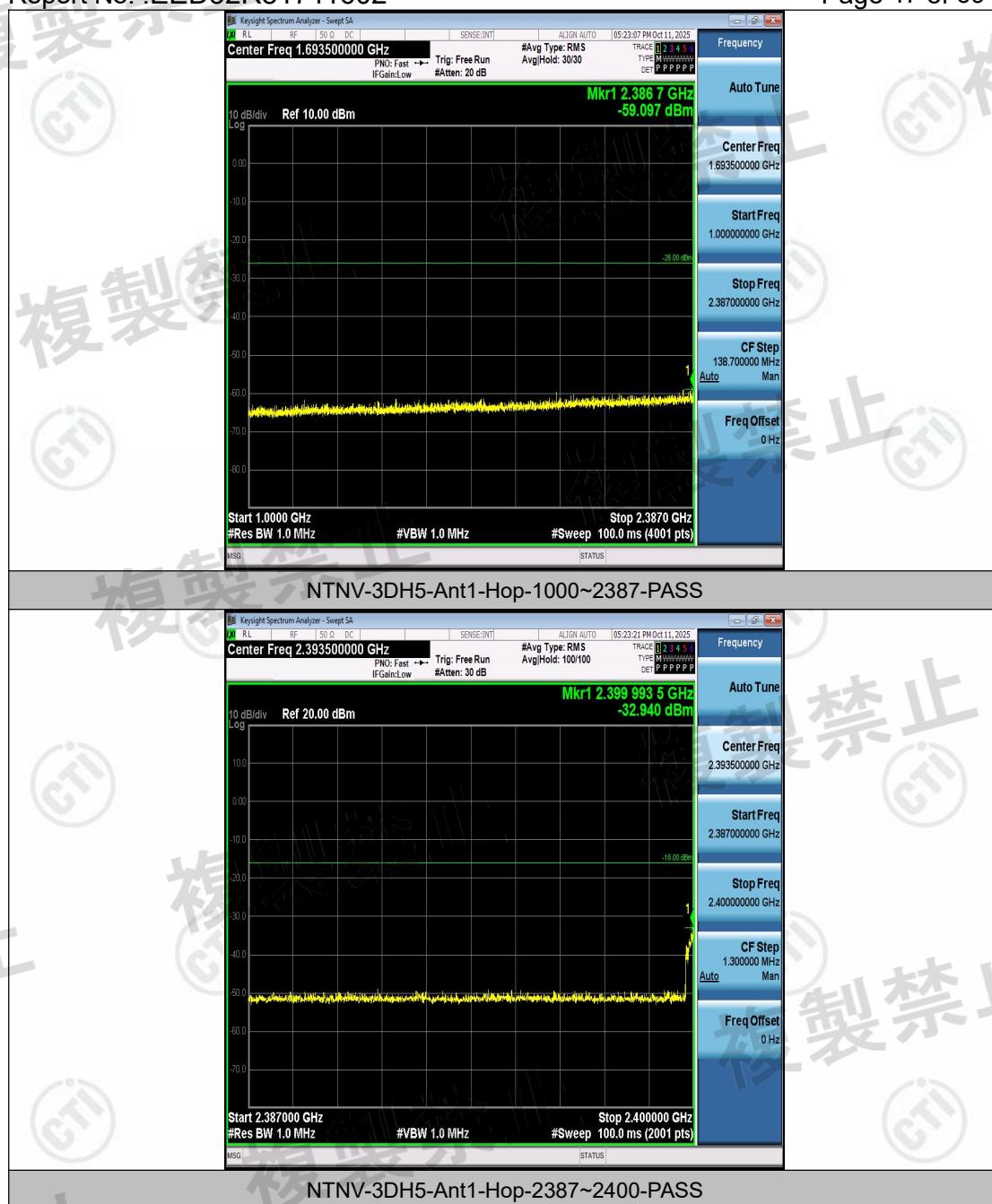


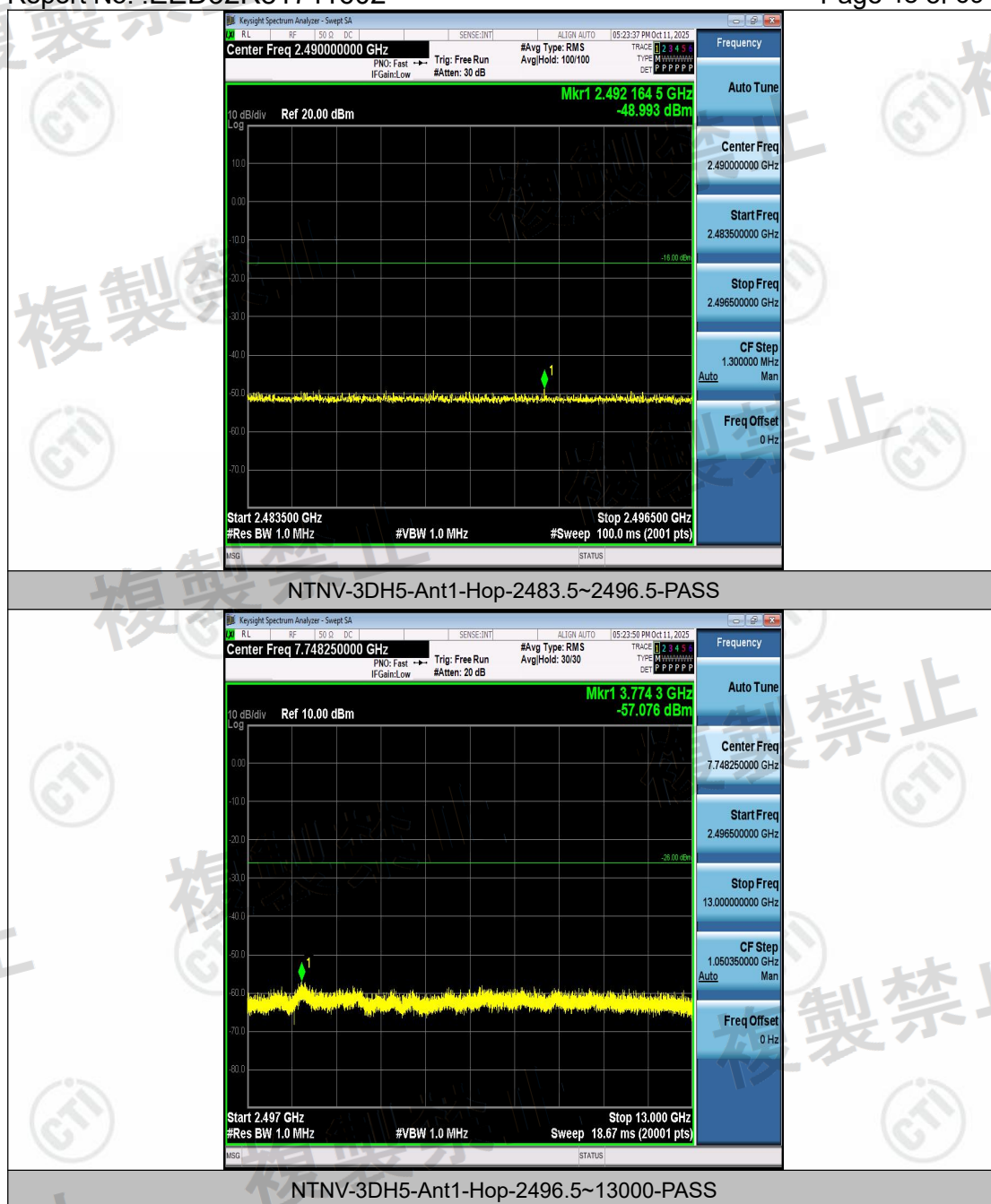




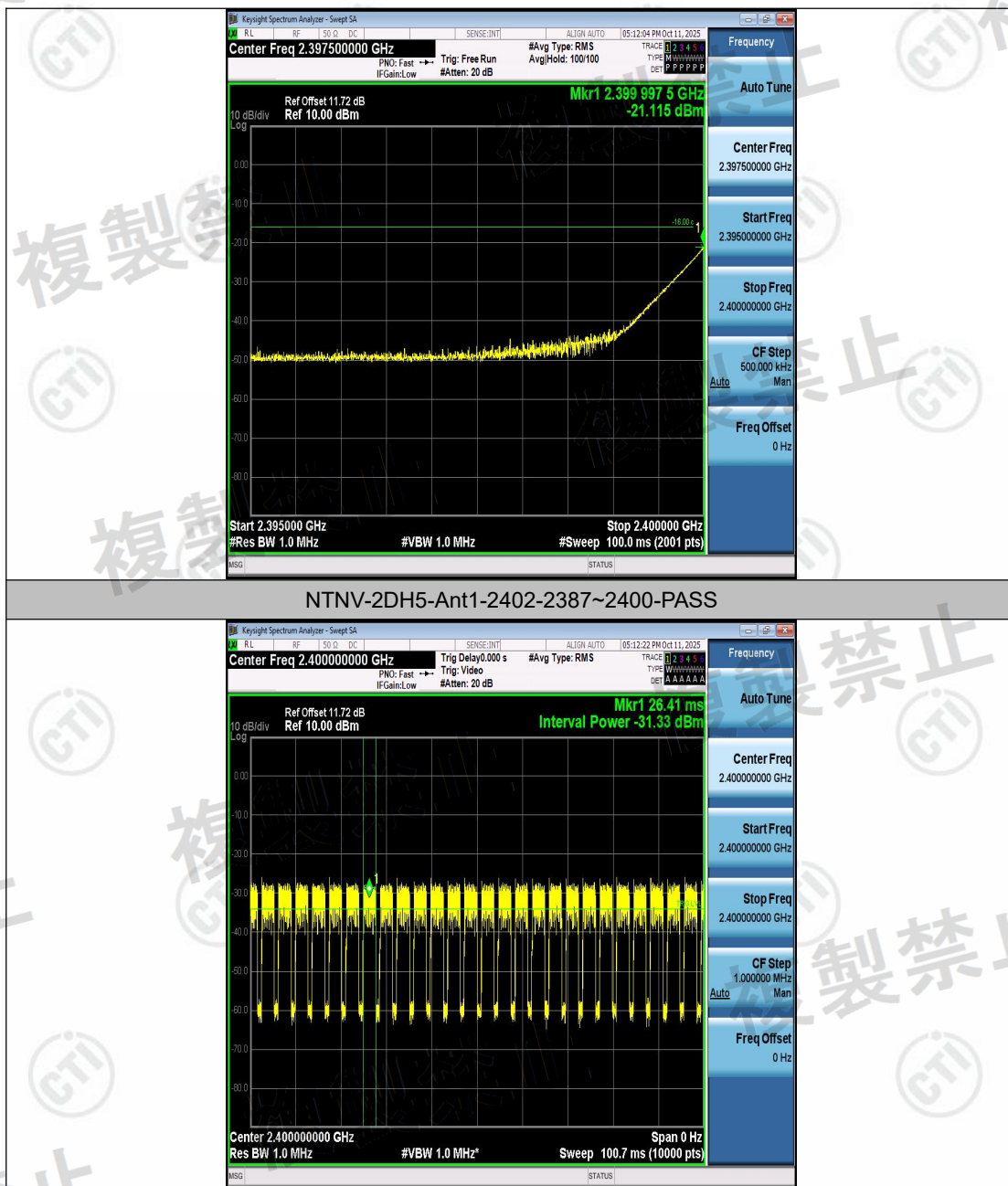


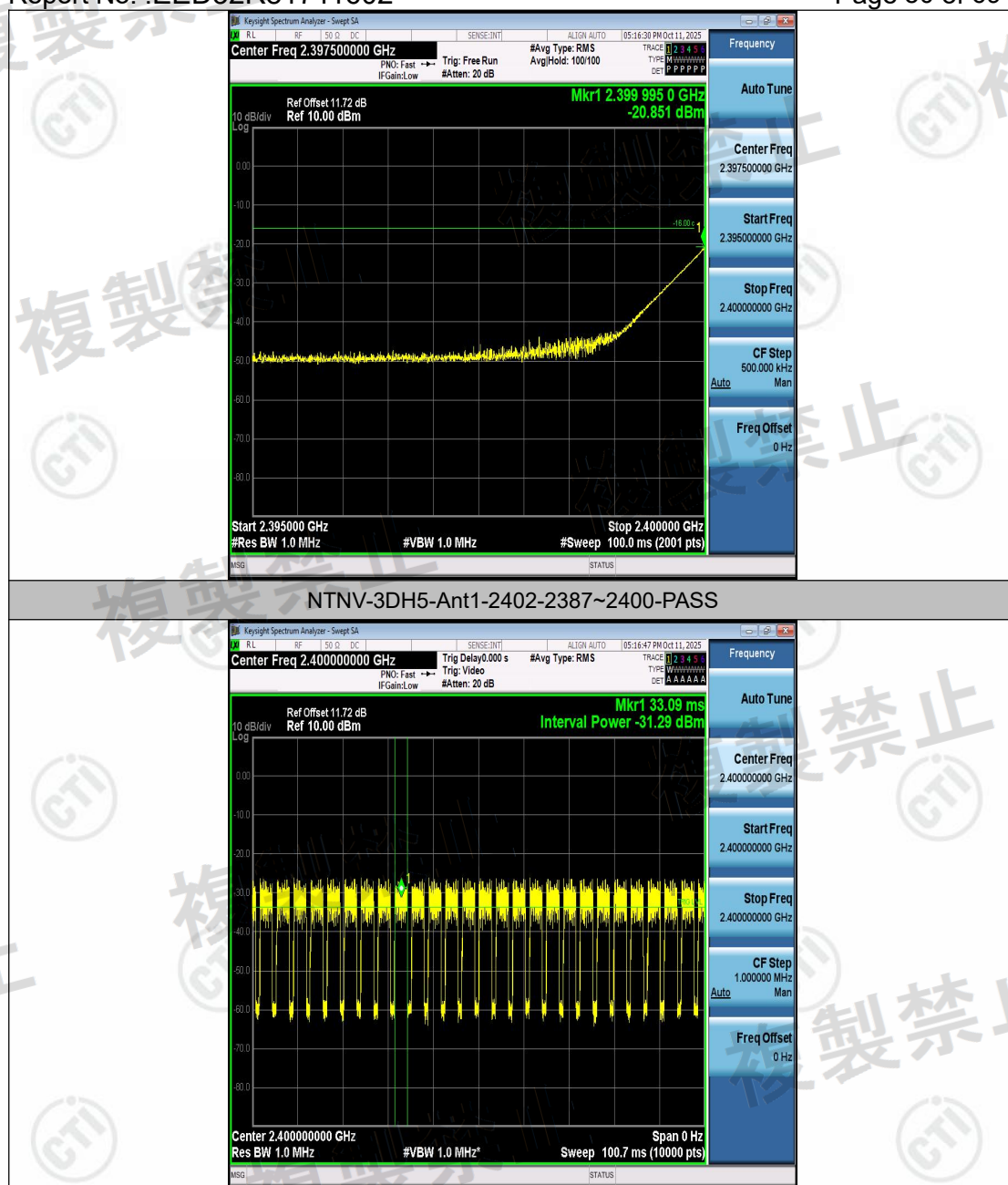






Test Graphs_Step2



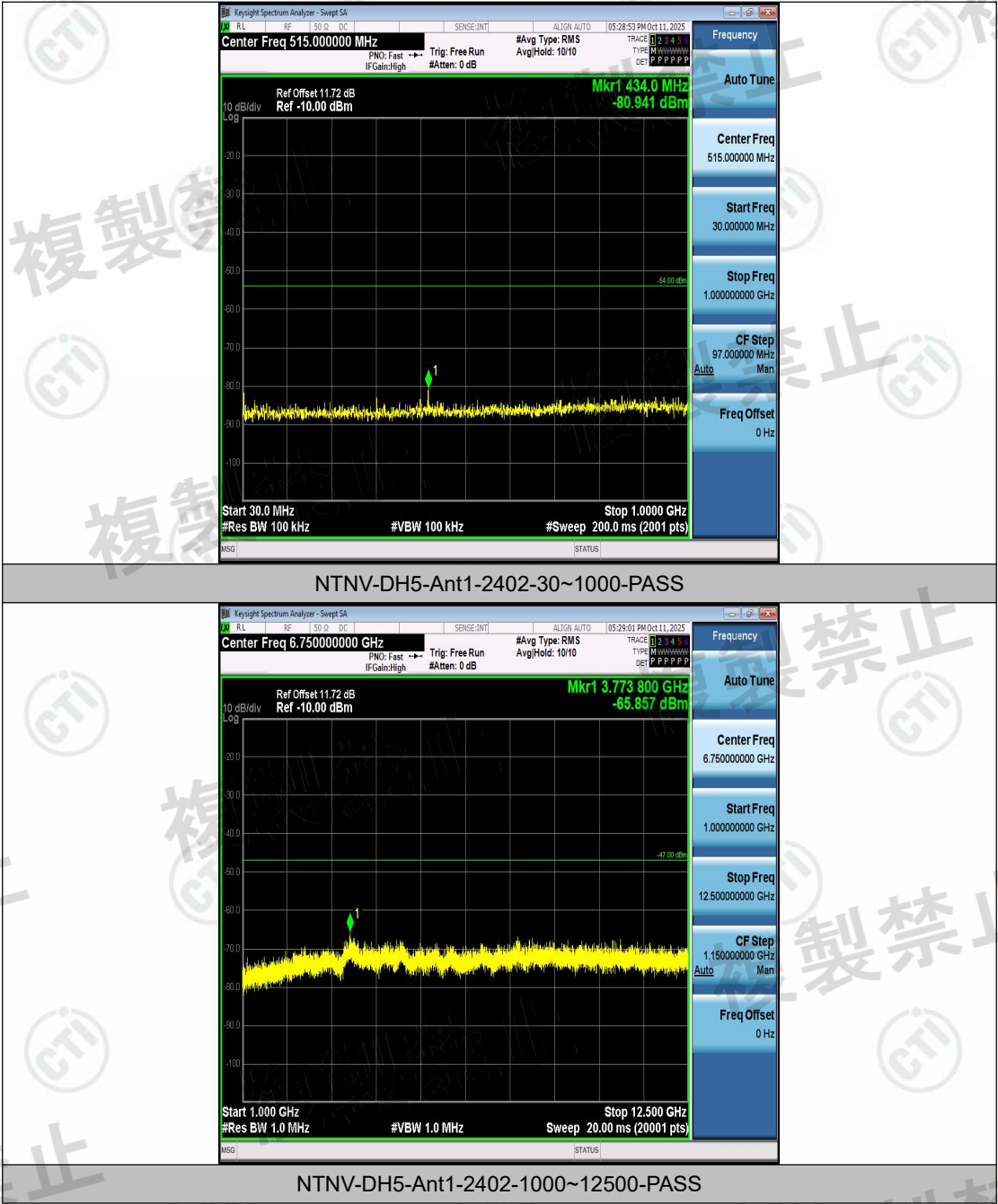


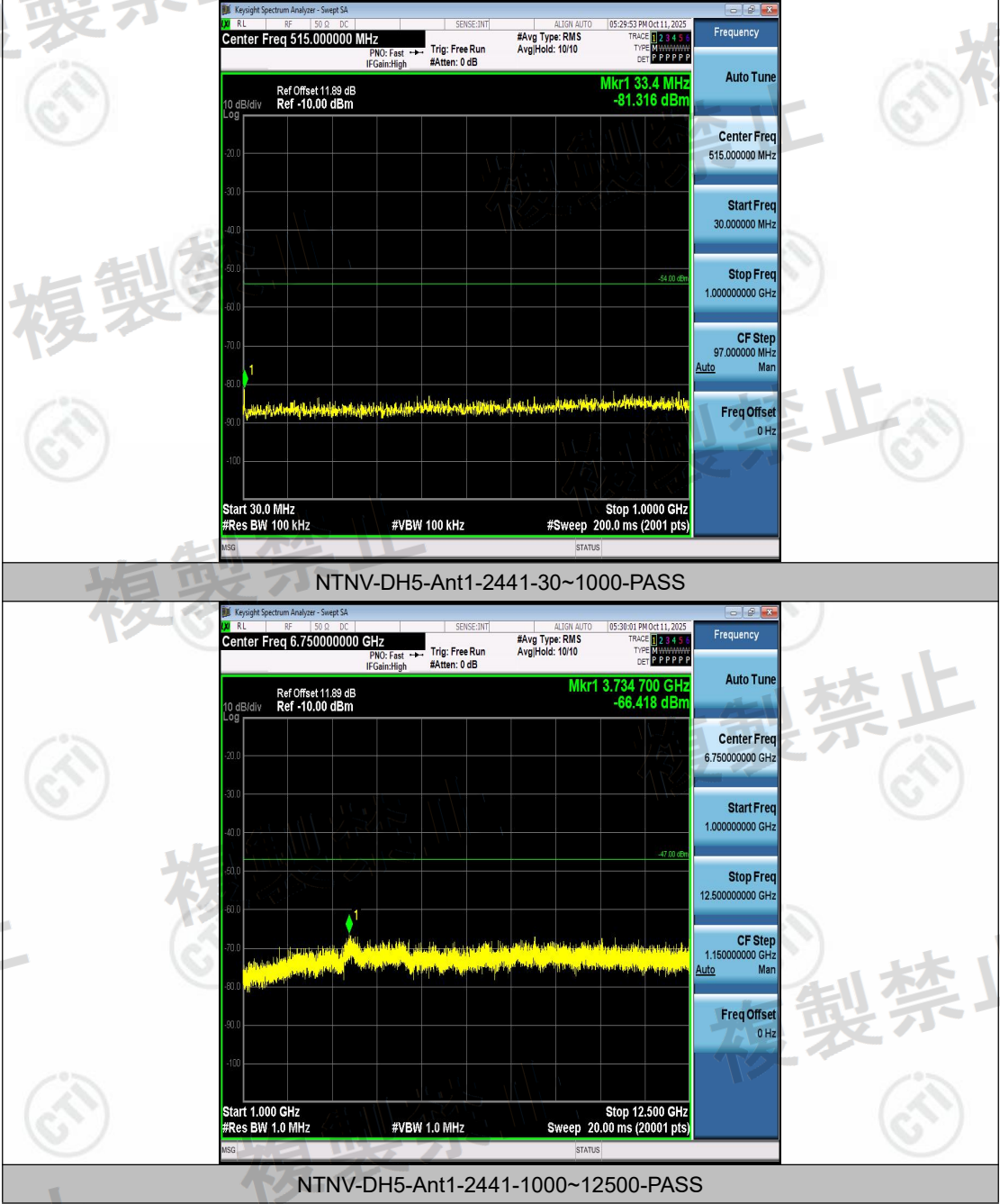
Appendix F: Secondary Radiated Emission Strength

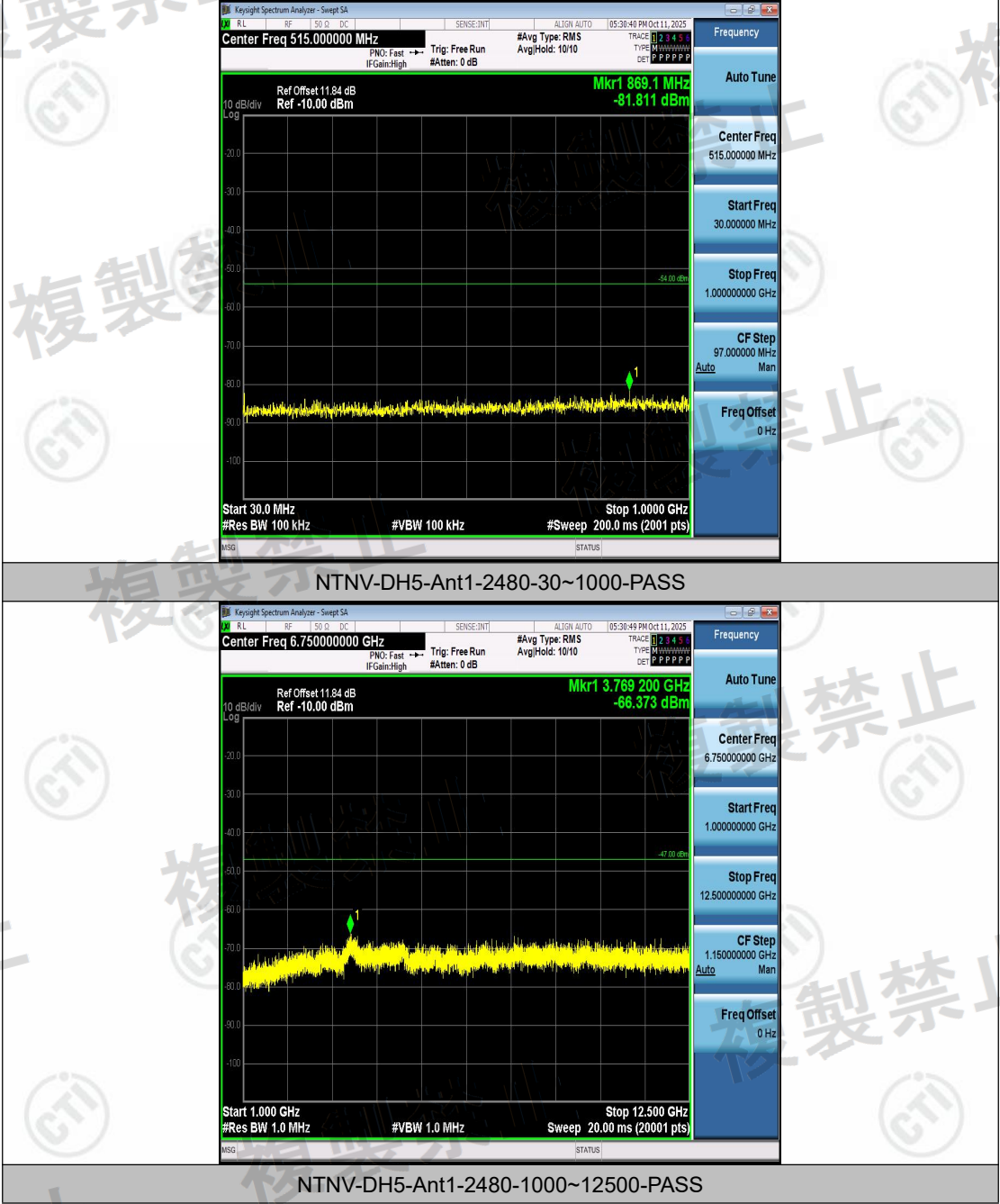
Test Result

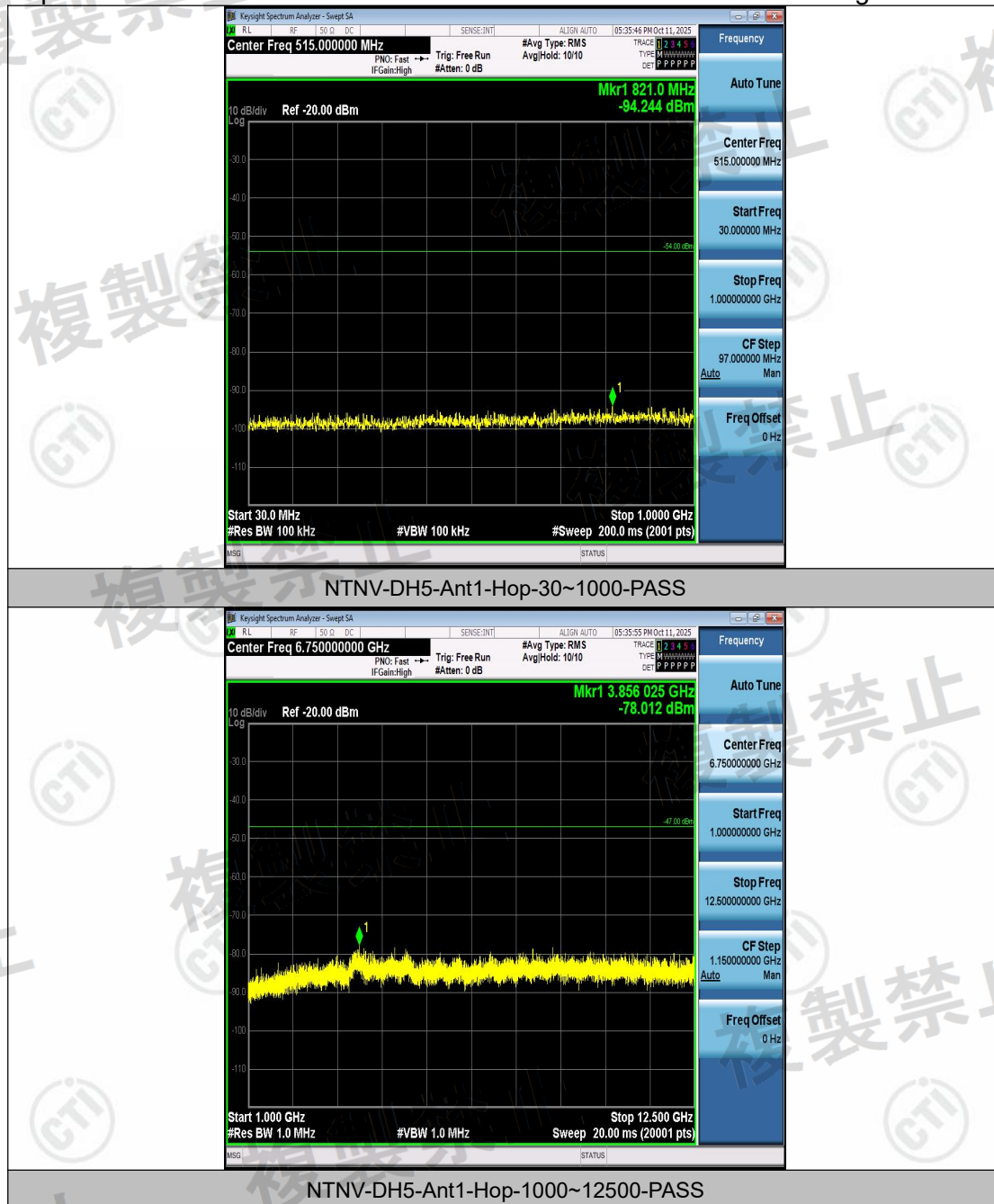
Test Condition	Test Mode	Antenna	Freq [MHz]	Freq.Range [MHz]	Freq [MHz]	Result [dBm]	Result [μW]	Limit [μW]	Verdict
NTNV	DH5	Ant1	2402	30~1000	434.01	-80.94	0.00805	≤4	PASS
NTNV	DH5	Ant1	2402	1000~12500	3773.80	-65.86	0.25942	≤20	PASS
NTNV	DH5	Ant1	2441	30~1000	33.40	-81.32	0.00738	≤4	PASS
NTNV	DH5	Ant1	2441	1000~12500	3734.70	-66.42	0.22803	≤20	PASS
NTNV	DH5	Ant1	2480	30~1000	869.05	-81.81	0.00659	≤4	PASS
NTNV	DH5	Ant1	2480	1000~12500	3769.20	-66.37	0.23067	≤20	PASS
NTNV	DH5	Ant1	Hop	30~1000	821.04	-94.24	0.00038	≤4	PASS
NTNV	DH5	Ant1	Hop	1000~12500	3856.03	-78.01	0.01581	≤20	PASS
NTNV	2DH5	Ant1	2402	30~1000	33.40	-81.85	0.00653	≤4	PASS
NTNV	2DH5	Ant1	2402	1000~12500	3799.68	-65.92	0.25586	≤20	PASS
NTNV	2DH5	Ant1	2441	30~1000	33.40	-82.22	0.00600	≤4	PASS
NTNV	2DH5	Ant1	2441	1000~12500	3734.70	-65.99	0.25177	≤20	PASS
NTNV	2DH5	Ant1	2480	30~1000	33.40	-81.04	0.00787	≤4	PASS
NTNV	2DH5	Ant1	2480	1000~12500	3833.60	-66.49	0.22439	≤20	PASS
NTNV	2DH5	Ant1	Hop	30~1000	919.49	-93.65	0.00043	≤4	PASS
NTNV	2DH5	Ant1	Hop	1000~12500	9047.13	-77.93	0.01611	≤20	PASS
NTNV	3DH5	Ant1	2402	30~1000	890.88	-82.83	0.00521	≤4	PASS
NTNV	3DH5	Ant1	2402	1000~12500	3824.40	-65.99	0.25177	≤20	PASS
NTNV	3DH5	Ant1	2441	30~1000	888.94	-82.19	0.00604	≤4	PASS
NTNV	3DH5	Ant1	2441	1000~12500	3705.95	-66.30	0.23442	≤20	PASS
NTNV	3DH5	Ant1	2480	30~1000	911.25	-82.53	0.00558	≤4	PASS
NTNV	3DH5	Ant1	2480	1000~12500	3799.68	-66.92	0.20324	≤20	PASS
NTNV	3DH5	Ant1	Hop	30~1000	795.82	-93.92	0.00041	≤4	PASS
NTNV	3DH5	Ant1	Hop	1000~12500	3811.75	-77.69	0.01702	≤20	PASS

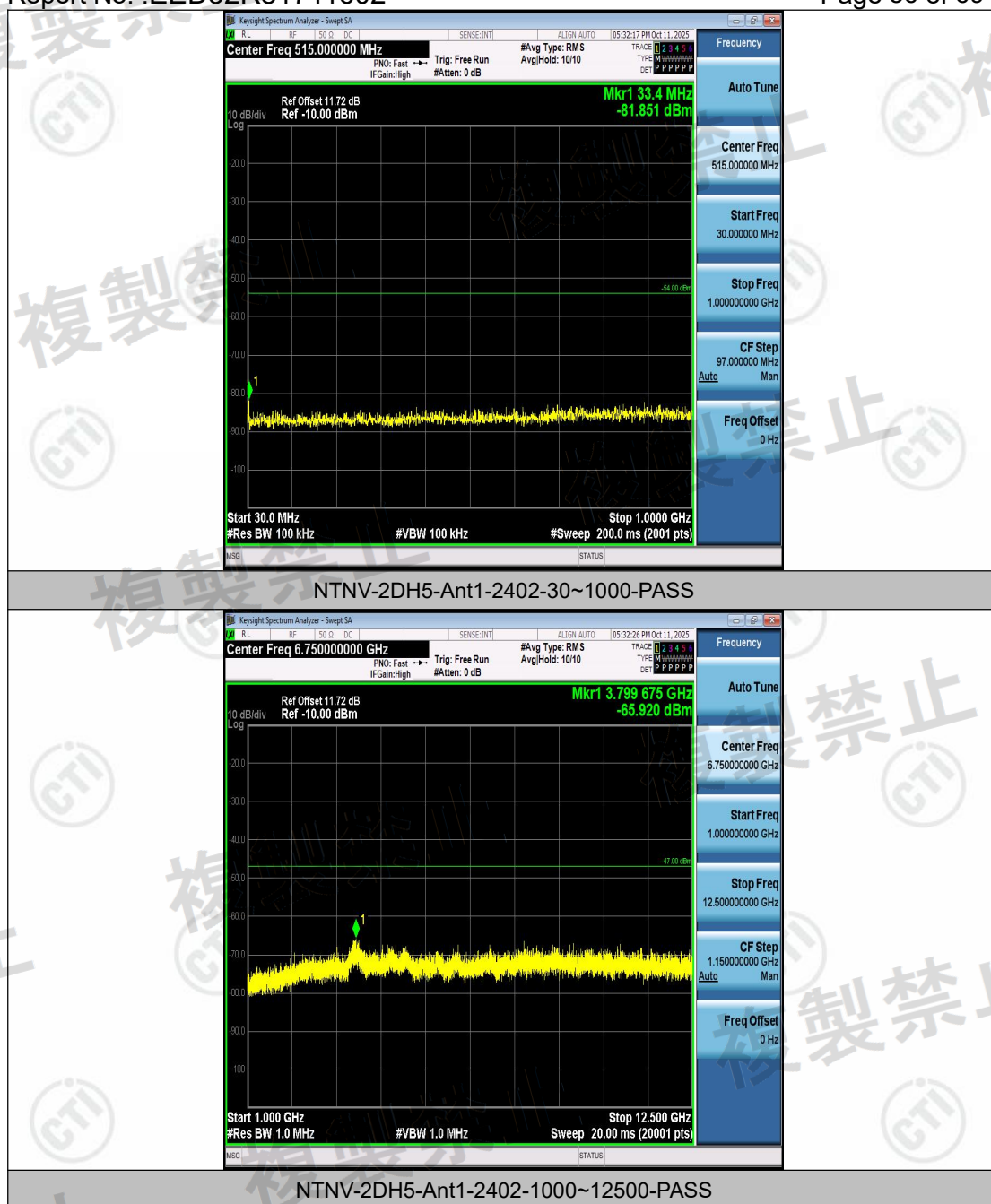
Test Graphs

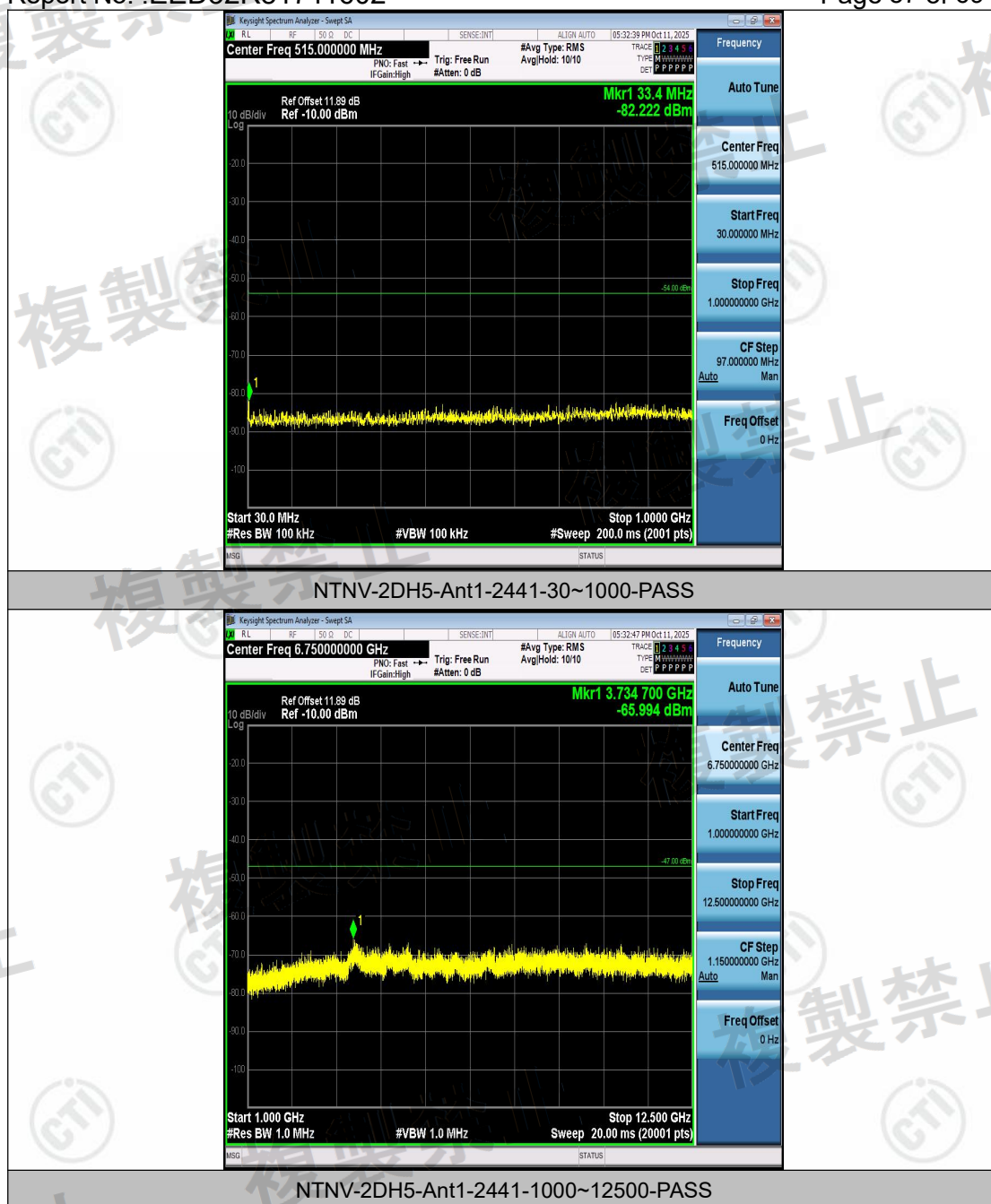


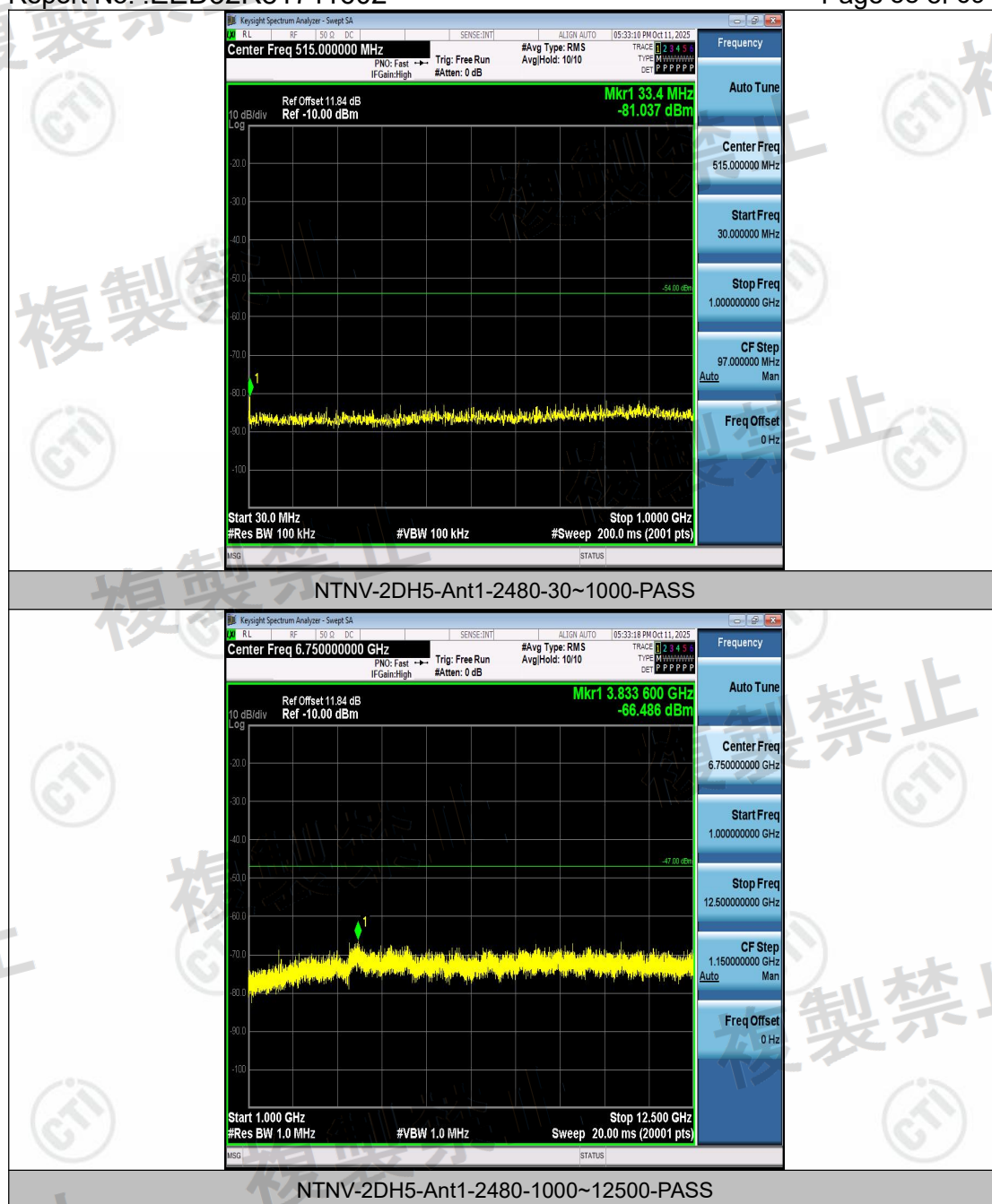


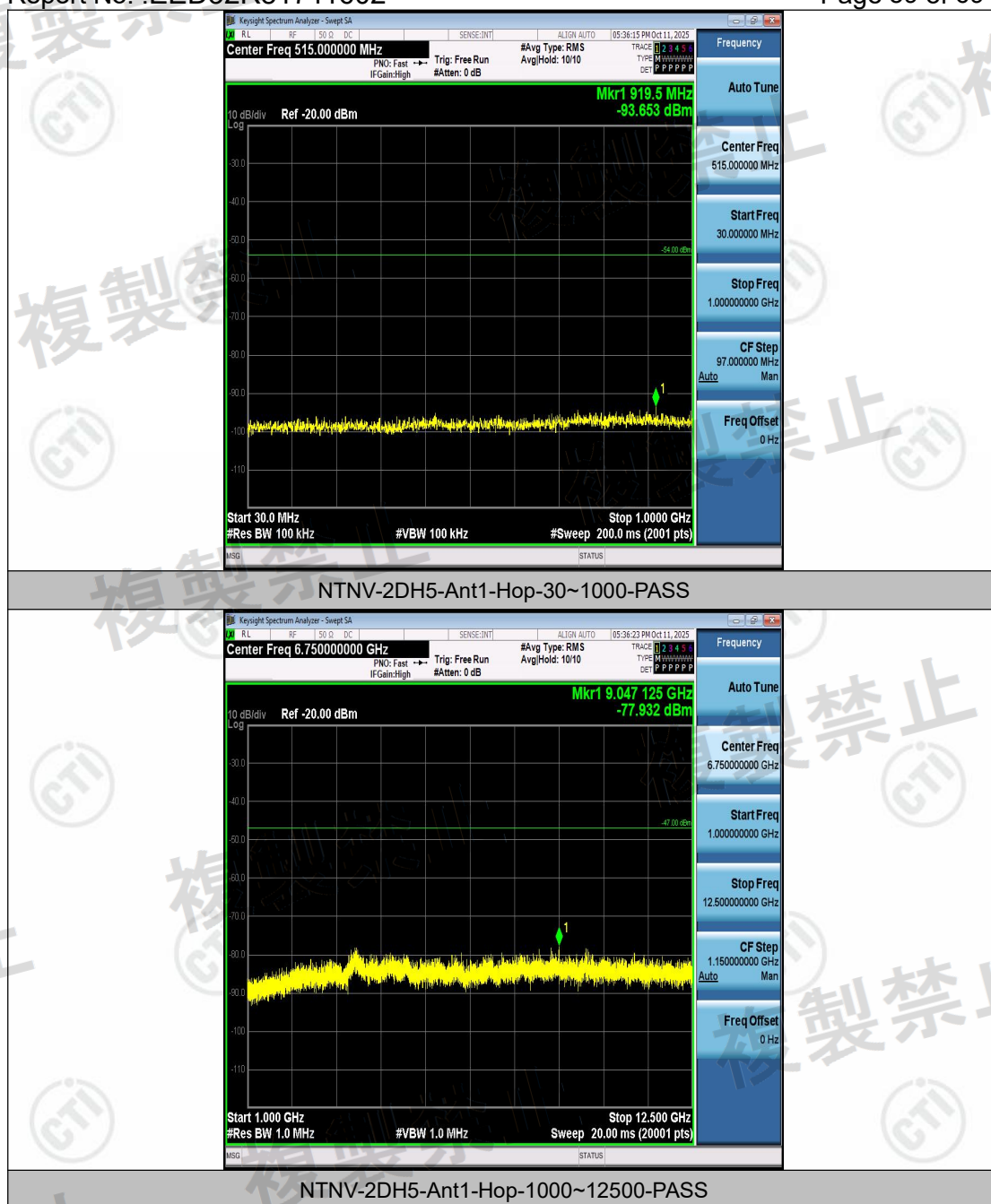


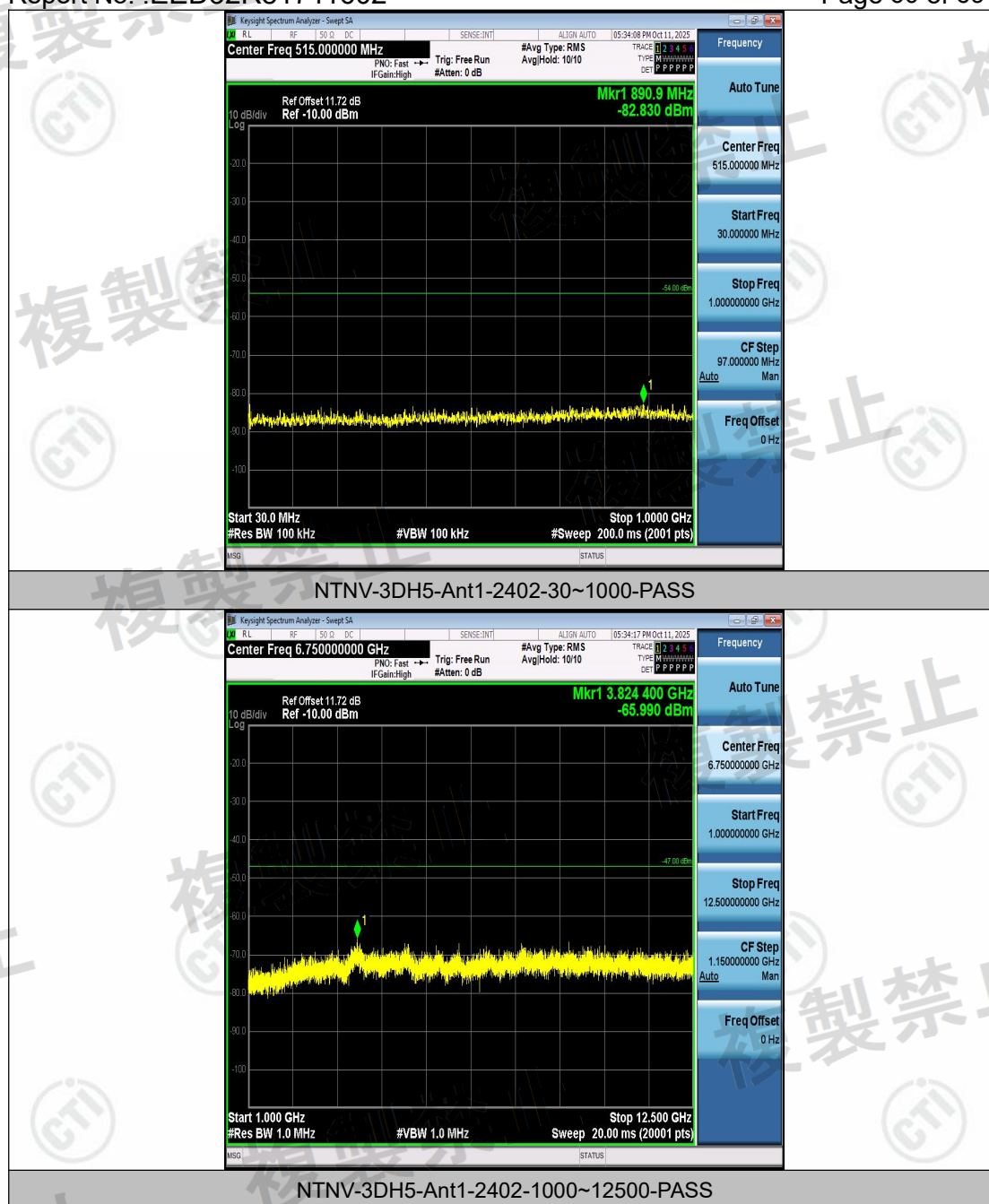


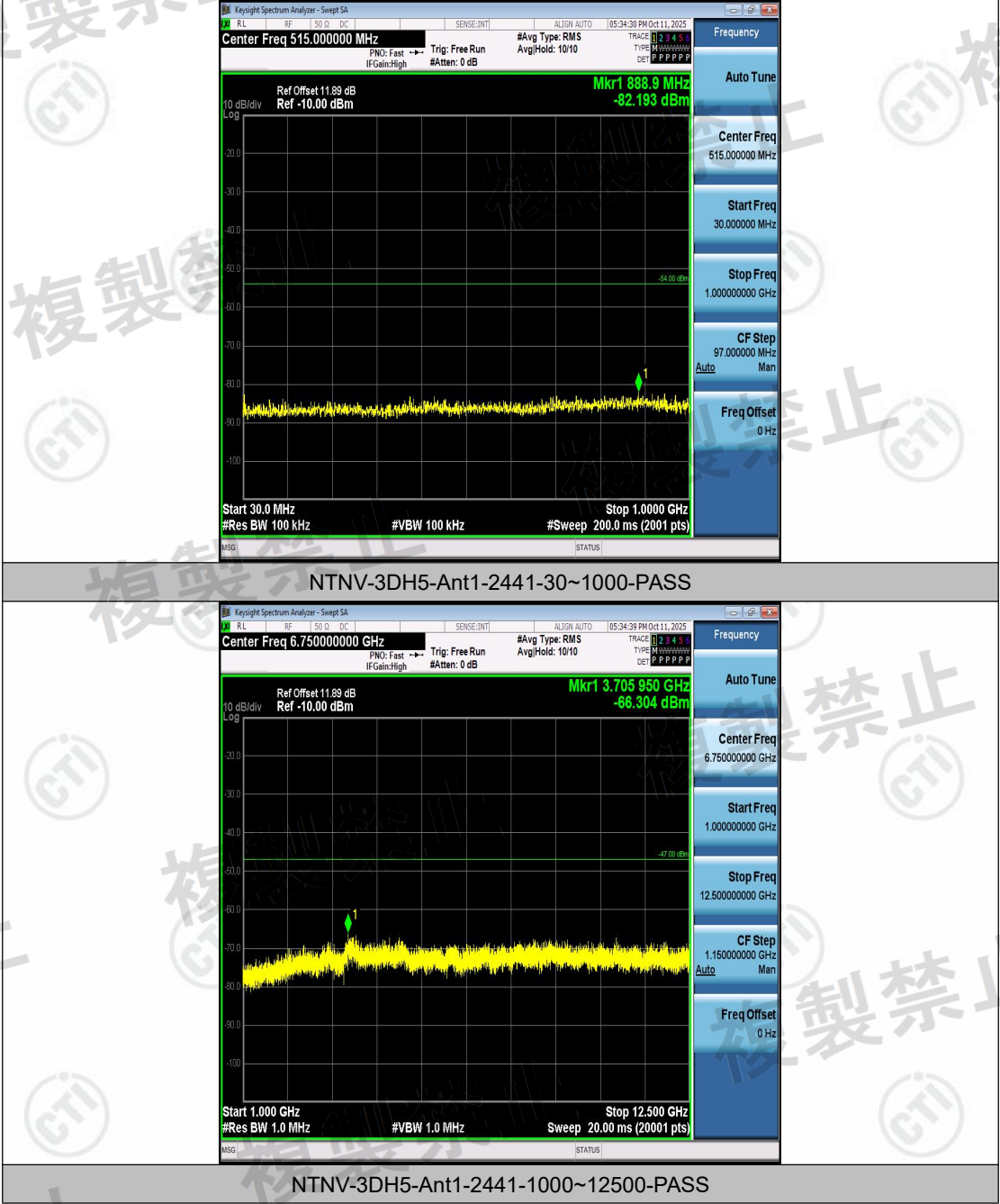


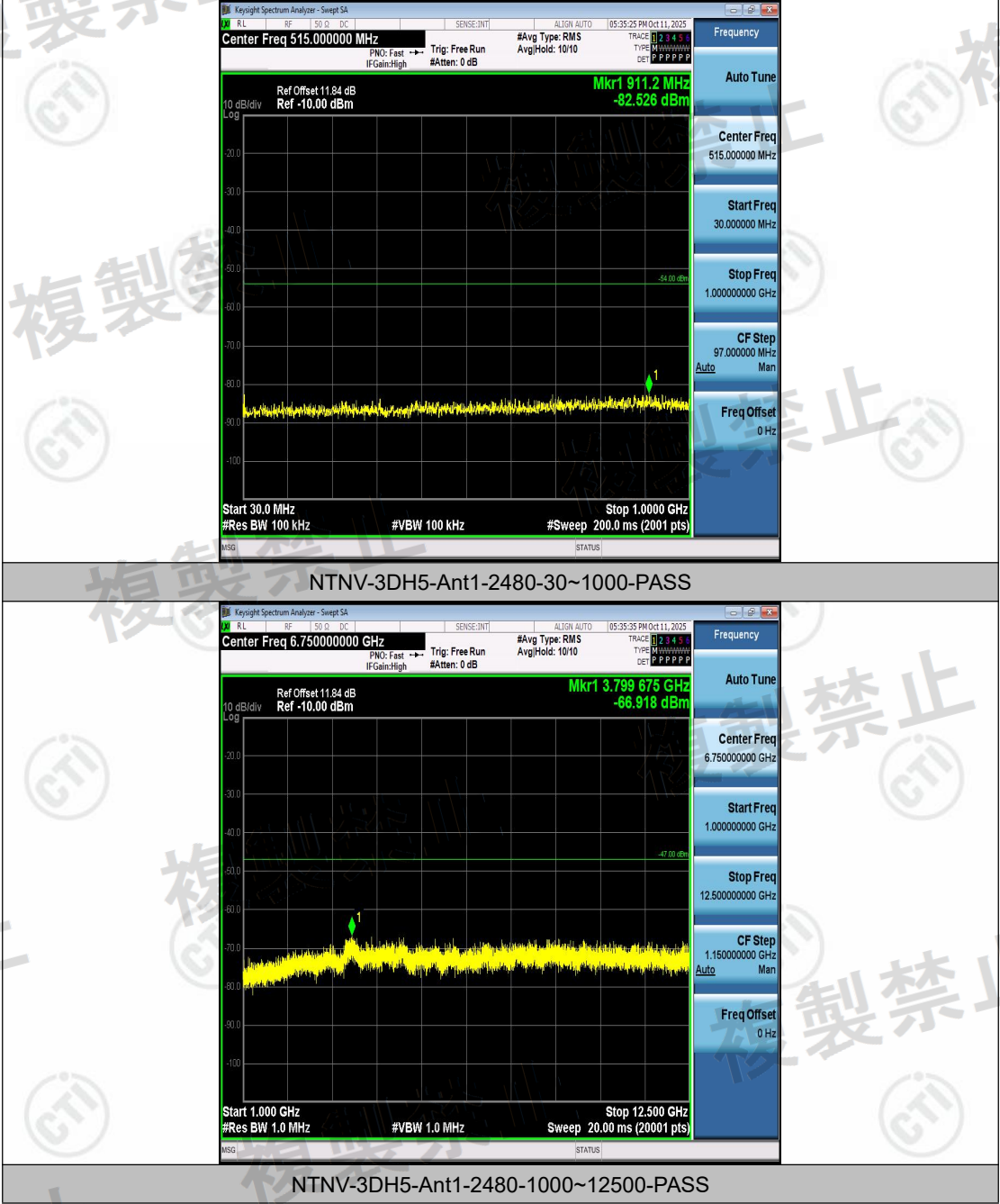


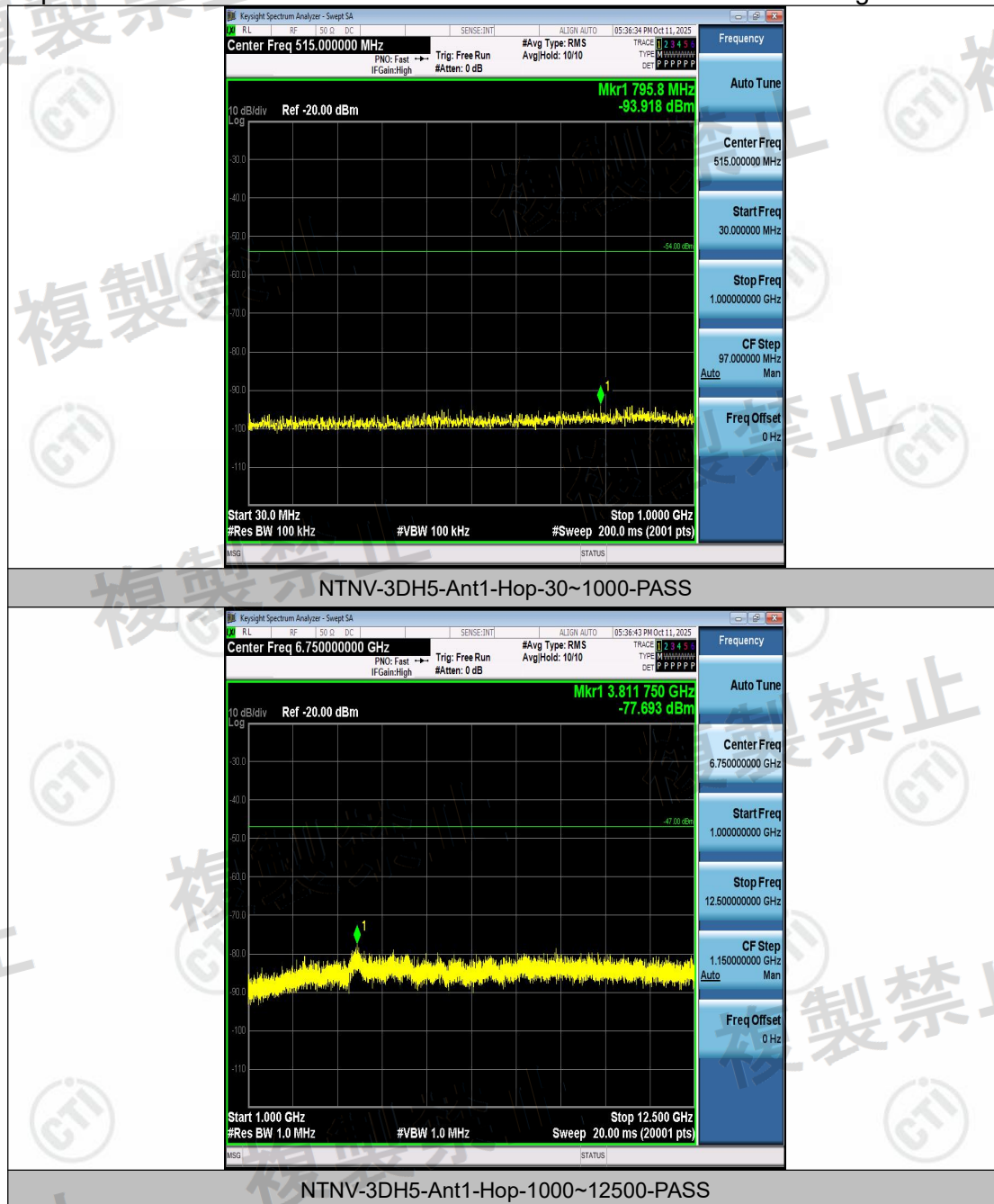










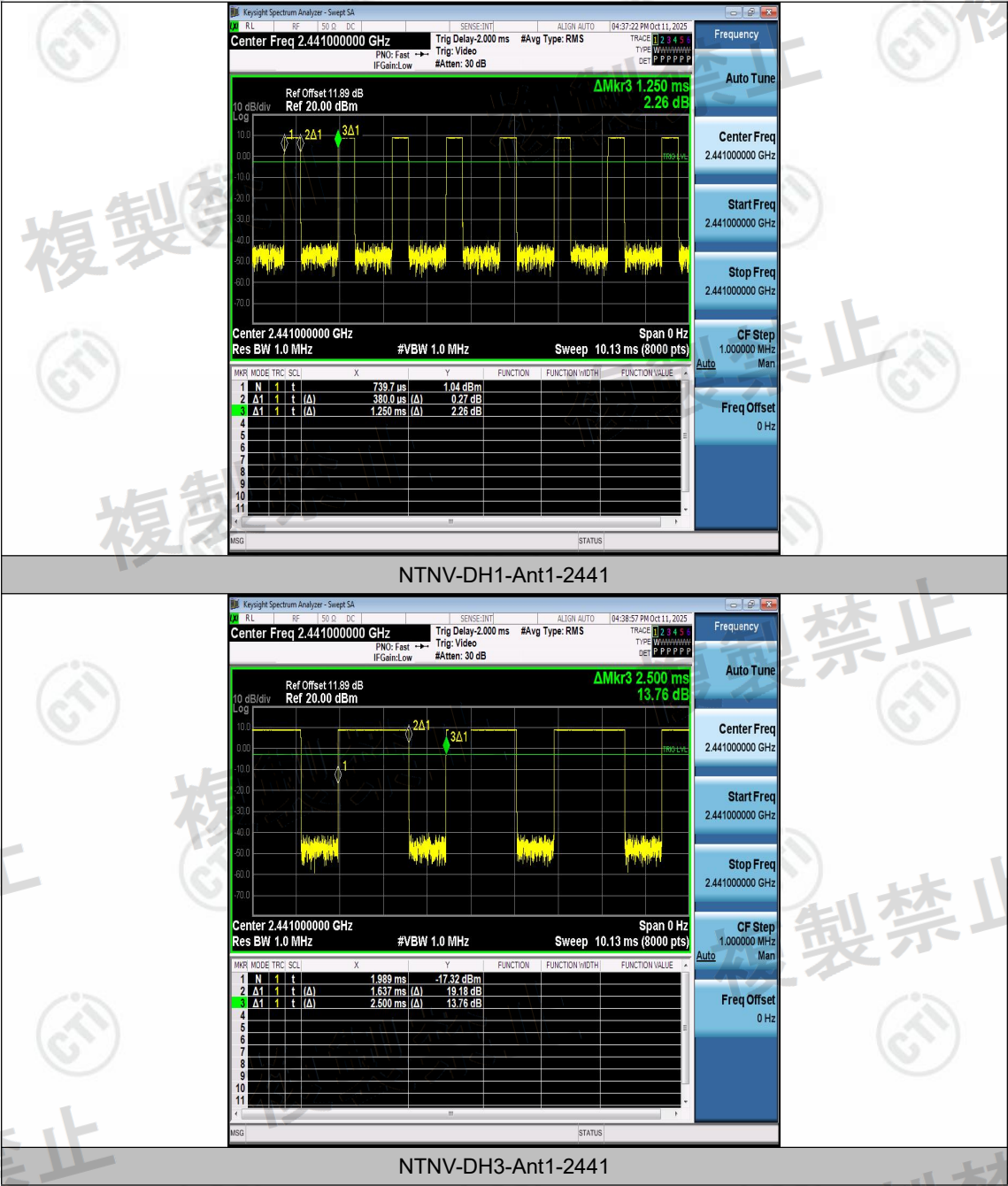


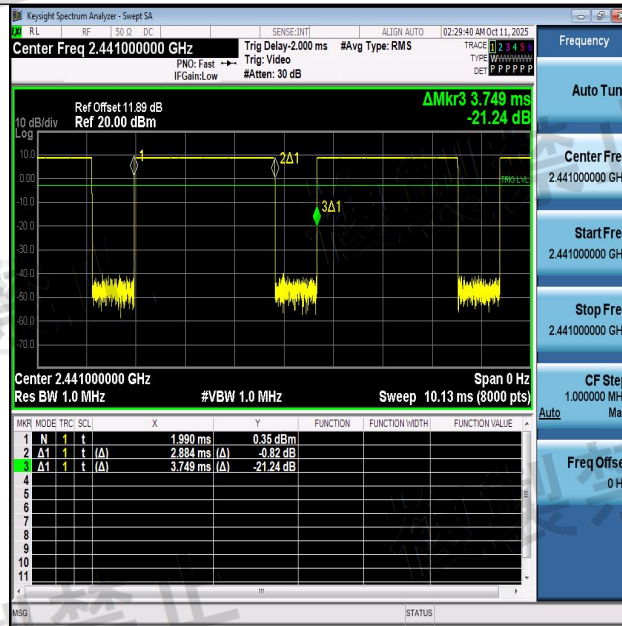
Appendix G: Dwell Time

Test Result

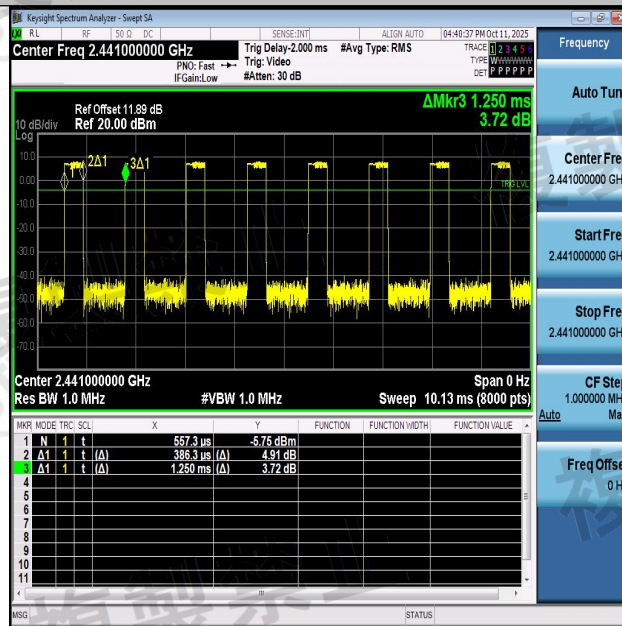
Condition	Mode	Frequency (MHz)	Antenna	T_on(ms)	Period(ms)	Spreading Rate	Hop Number	Dwell Time (ms)	Limit (ms)	Verdict
NTNV	DH1	Ant1	2441	0.38	1.25	69.991	79	107.73	400	Pass
NTNV	DH3	Ant1	2441	1.64	2.5	70.116	79	232.89	400	Pass
NTNV	DH5	Ant1	2441	2.88	3.75	70.069	79	272.47	400	Pass
NTNV	2DH1	Ant1	2441	0.39	1.25	70.315	79	111.08	400	Pass
NTNV	2DH3	Ant1	2441	1.64	2.5	70.164	79	233.05	400	Pass
NTNV	2DH5	Ant1	2441	2.89	3.75	70.287	79	274.27	400	Pass
NTNV	3DH1	Ant1	2441	0.39	1.25	70.115	79	110.76	400	Pass
NTNV	3DH3	Ant1	2441	1.64	2.5	70.28	79	233.44	400	Pass
NTNV	3DH5	Ant1	2441	2.89	3.75	70.156	79	273.76	400	Pass

Test Graphs





NTNV-DH5-Ant1-2441



NTNV-2DH1-Ant1-2441

