

Appendix RF Test Data for 2.4G

Product Name: Wireless Receiver
Test Model: SANWA RC35

Environmental Conditions

Temperature:	23.2° C
Relative Humidity:	52.6%
ATM Pressure:	100.0 kPa
Test Engineer:	Zoey Cao
Supervised by:	Eric Wang

A.1 Frequency_Error

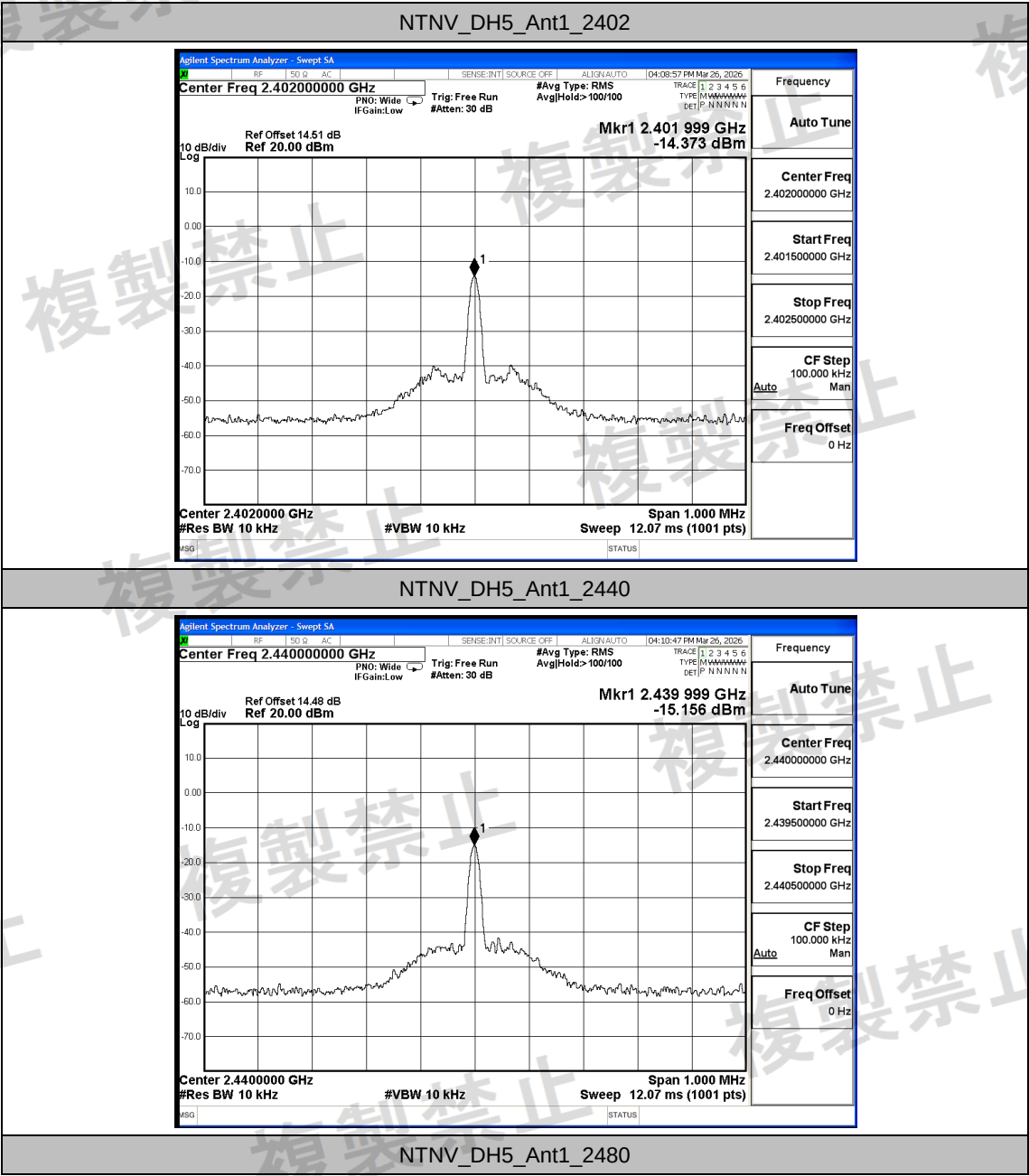
Test Result

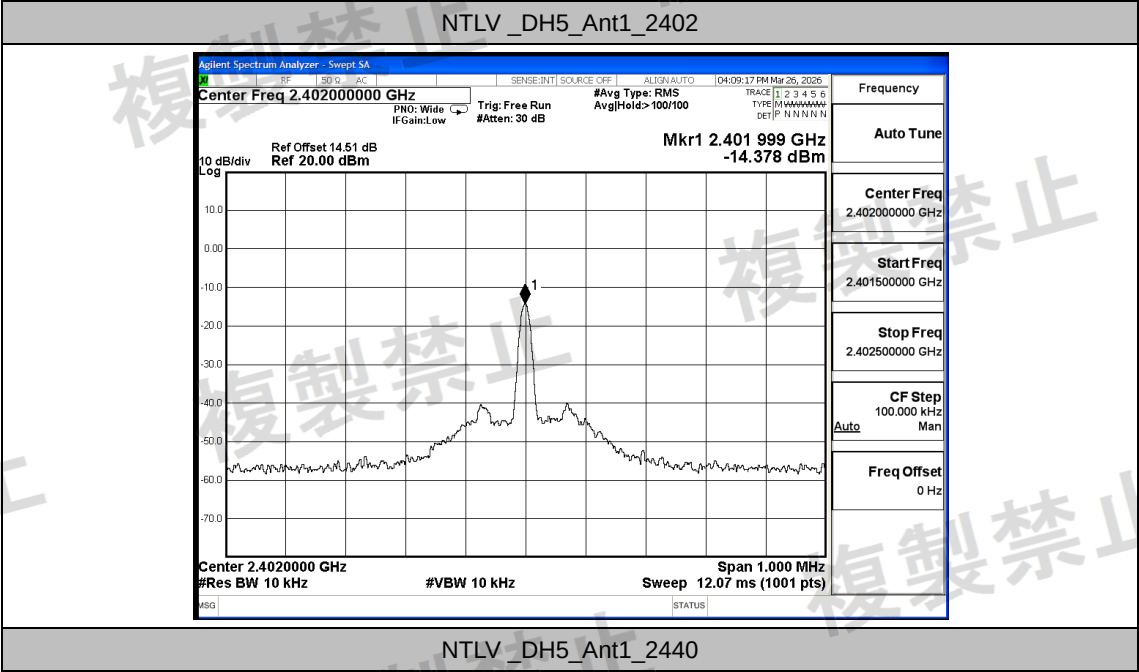
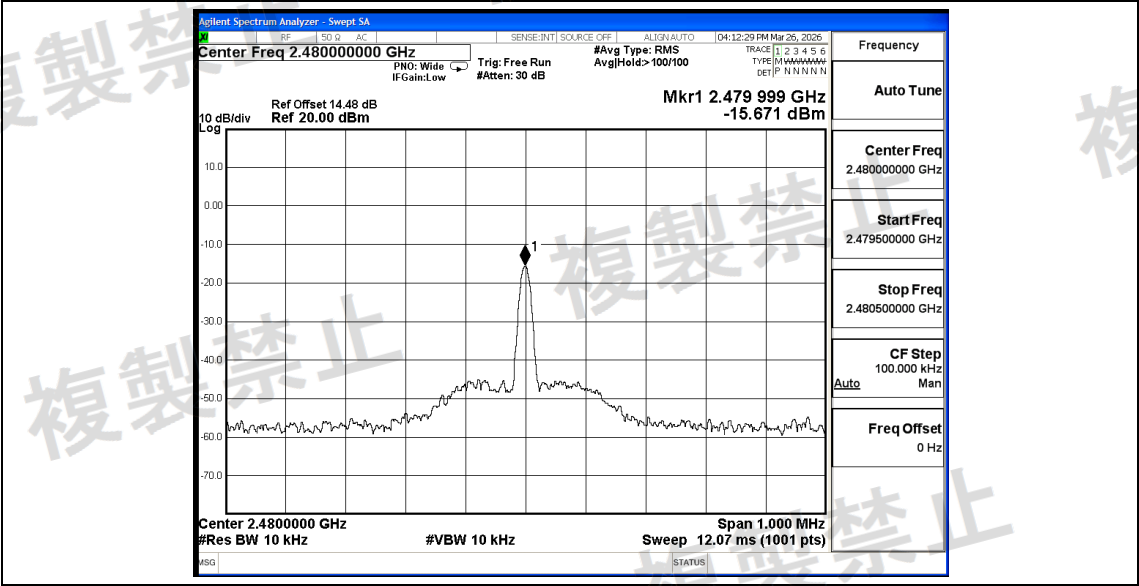
TestCondition	TestMode	Antenna	Channel	Result[ppm]	Limit[ppm]	Verdict
NTNV	2.4G	Ant1	2402	-0.42	±50	PASS
			2440	-0.41	±50	PASS
			2480	-0.40	±50	PASS

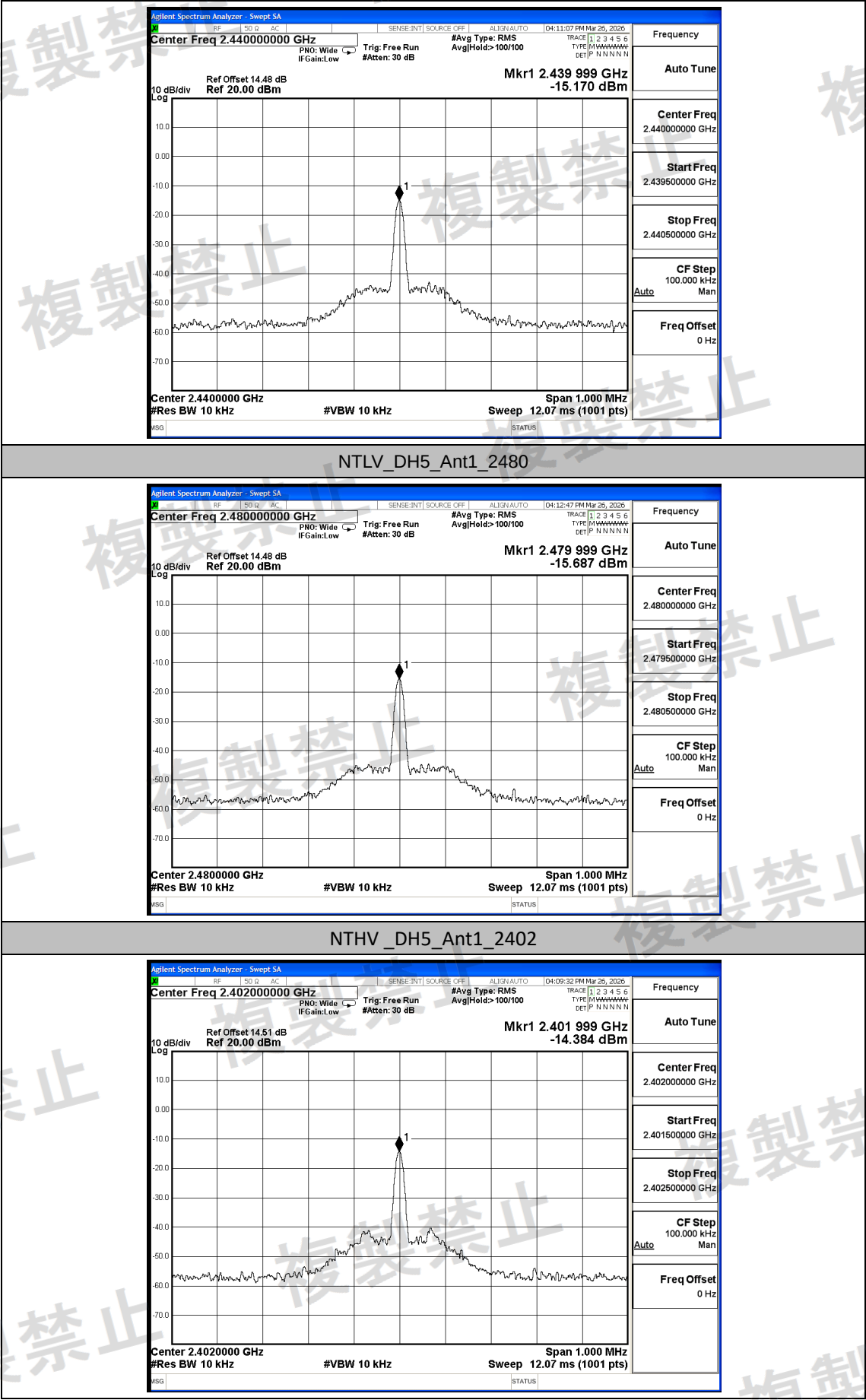
TestCondition	TestMode	Antenna	Channel	Result[ppm]	Limit[ppm]	Verdict
NTLV	2.4G	Ant1	2402	-0.42	±50	PASS
			2440	-0.41	±50	PASS
			2480	-0.40	±50	PASS

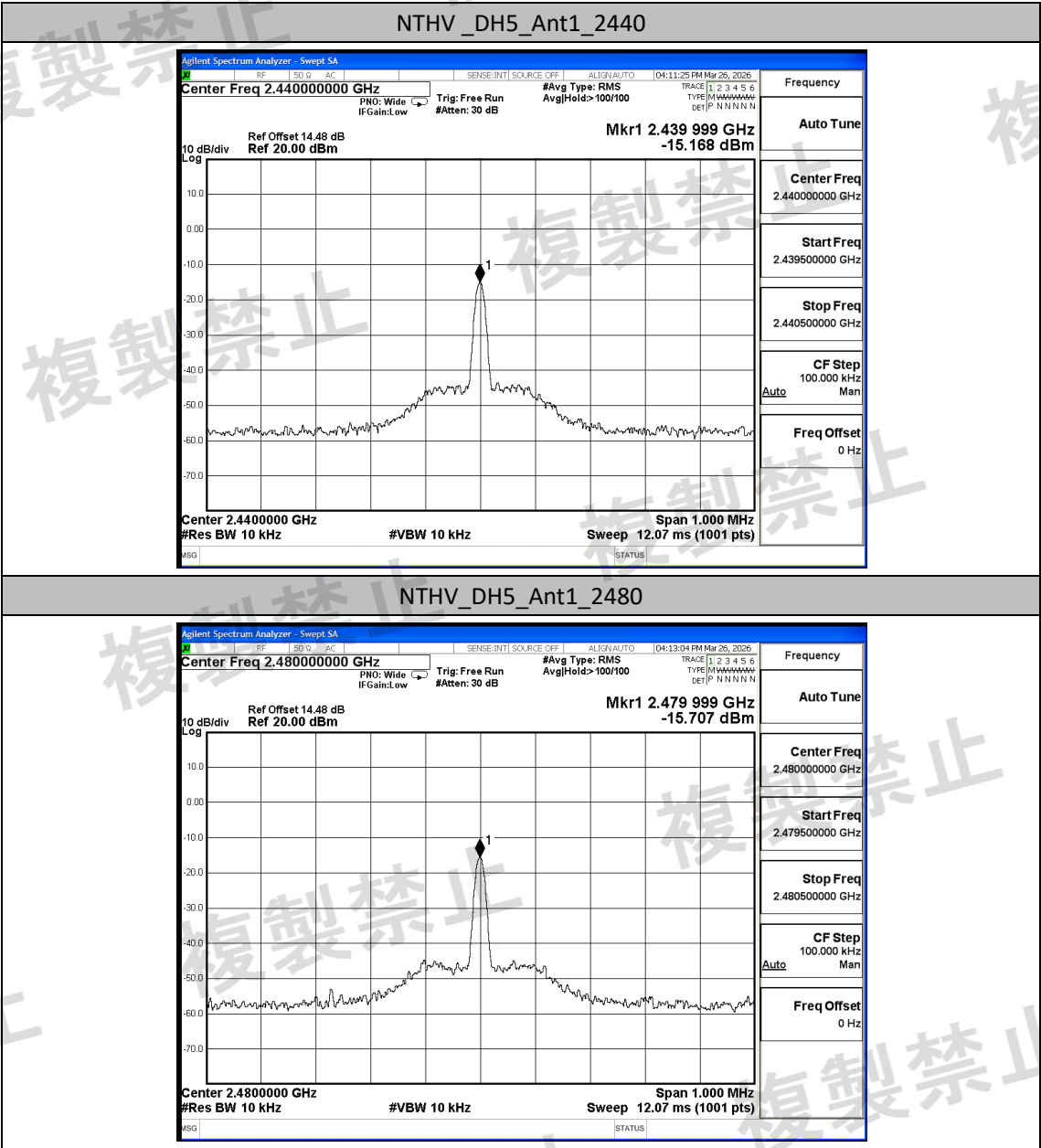
TestCondition	TestMode	Antenna	Channel	Result[ppm]	Limit[ppm]	Verdict
NTHV	2.4G	Ant1	2402	-0.42	±50	PASS
			2440	-0.41	±50	PASS
			2480	-0.40	±50	PASS

Test Graphs









A.2 Antenna Power

Test Result

Test Voltage				Normal Voltage			
Mode	Declared power	Average Result	Average Result	Result	Limit	Tolerance	Limit
	(mW/MHz)	(dBm)	(mW)	(mW/MHz)	(mW/MHz)	/	/
Hoping-Tx	0.02	-2.06	0.62	0.018	3	-10.00	+20%
Conclusion: PASS							

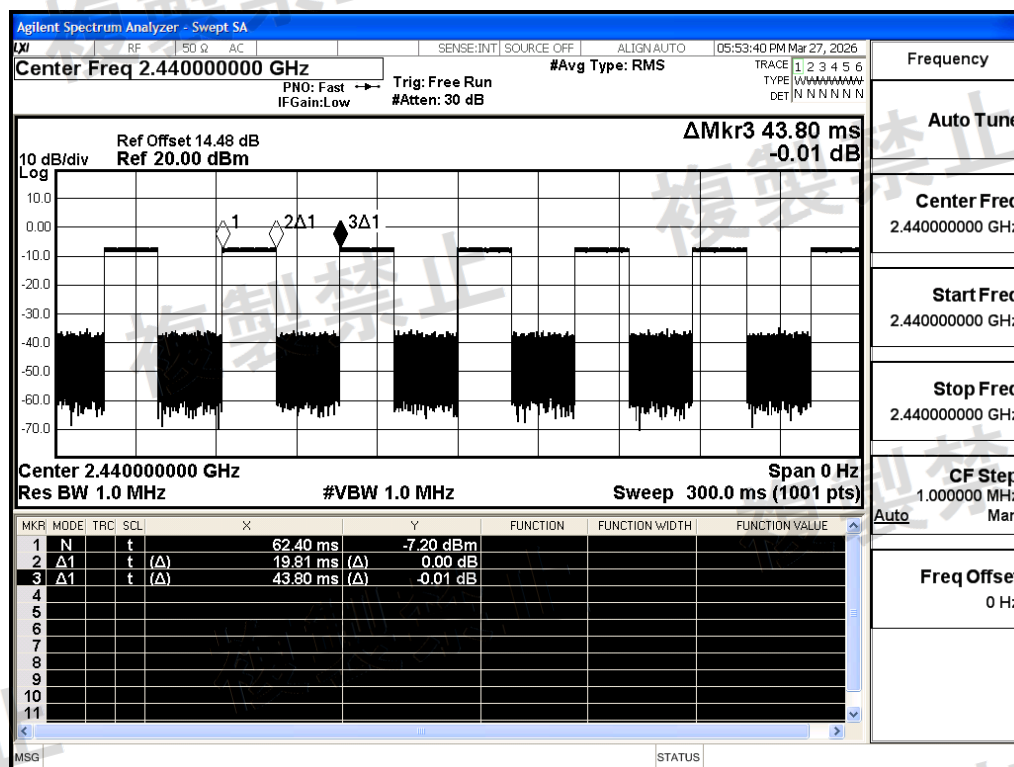
Result power= Average value / (Duty Cycle * Spreading bandwidth)

2.4G ANTenna power Result = Measured Power / Spreading bandwidth

Spread Bandwidth= 76.932MHz

Duty cycle=45.23%

Duty cycle= [Ton/ (Ton+Toff)]*100%=(19.81/43.80)*100%=45.23%



Test Voltage				Low Voltage			
Mode	Declared power	Average Result	Average Result	Result	Limit	Tolerance	Limit
	(mW/MHz)	(dBm)	(mW)	(mW/MHz)	(mW/MHz)	/	/
Hoping-Tx	0.02	-2.15	0.61	0.018	3	-10.00	+20%
Conclusion: PASS							

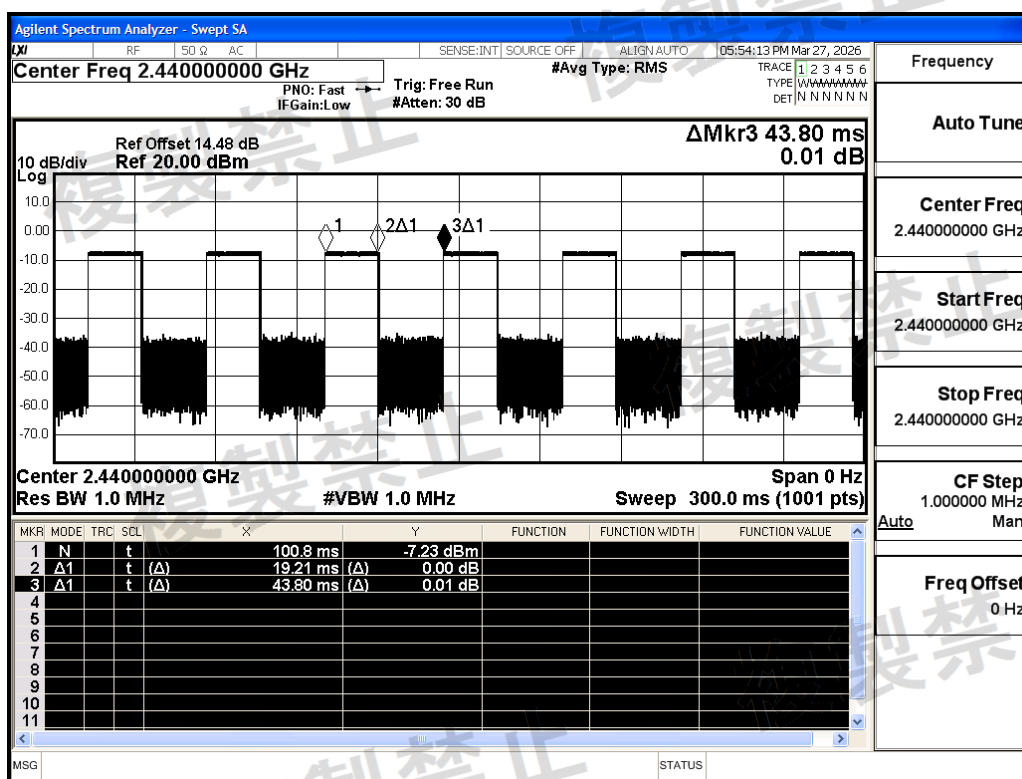
Result power= Average value / (Duty Cycle * Spreading bandwidth)

2.4G Antenna power Result = Measured Power / Spreading bandwidth

Spread Bandwidth= 76.996MHz

Duty cycle=43.86%

Duty cycle= [Ton/ (Ton+Toff)]*100%=(19.21/43.80)*100%=43.86%



Test Voltage				High Voltage			
Mode	Declared power	Average Result	Average Result	Result	Limit	Tolerance	Limit
	(mW/MHz)	(dBm)	(mW)	(mW/MHz)	(mW/MHz)	/	/
Hoping-Tx	0.02	-2.56	0.55	0.016	3	-20.00	+20%
Conclusion: PASS							

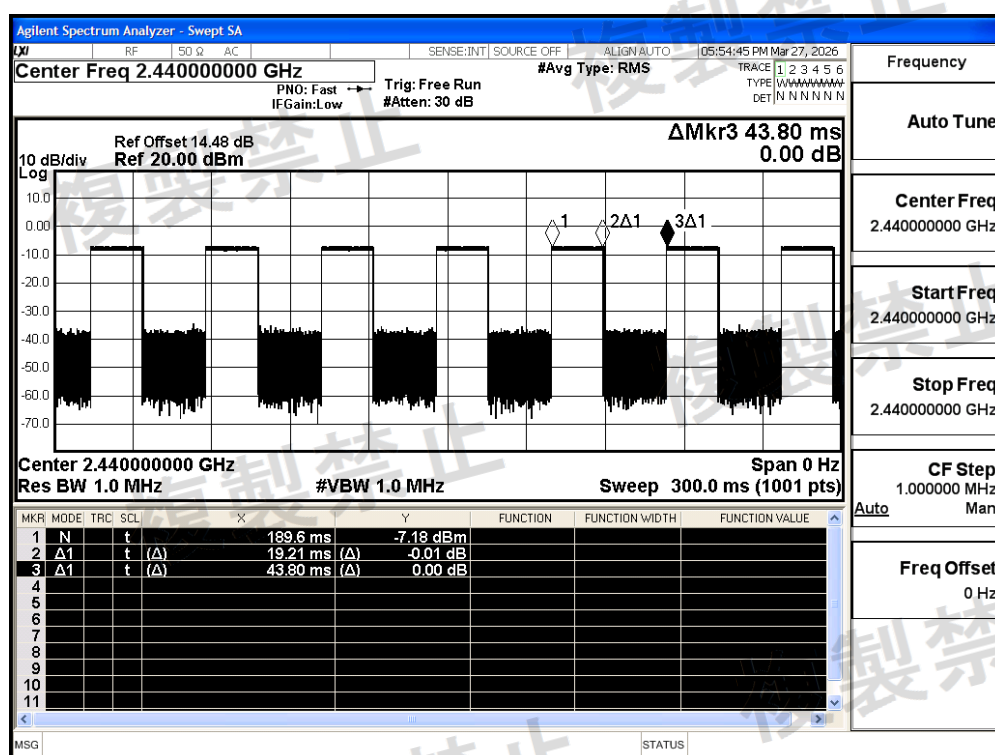
Result power= Average value / (Duty Cycle * Spreading bandwidth)

2.4G Antenna power Result = Measured Power / Spreading bandwidth

Spread Bandwidth= 77.057MHz

Duty cycle=43.86%

Duty cycle= [Ton/ (Ton+Toff)]*100%=(19.21/43.80)*100%=43.86%



A.3 Occupied Bandwidth

Test Result

TestCondition	TestMode	Antenna	Freq(MHz)	Result [MHz]	Limit [MHz]	Verdict
NTNV	2.4G	Ant1	2402	2.467	≤83.5	PASS
			2440	2.500	≤83.5	PASS
			2480	2.644	≤83.5	PASS

TestCondition	TestMode	Antenna	Freq(MHz)	Result [MHz]	Limit [MHz]	Verdict
NTNV	2.4G	Ant1	Hop	79.617	≤83.5	PASS

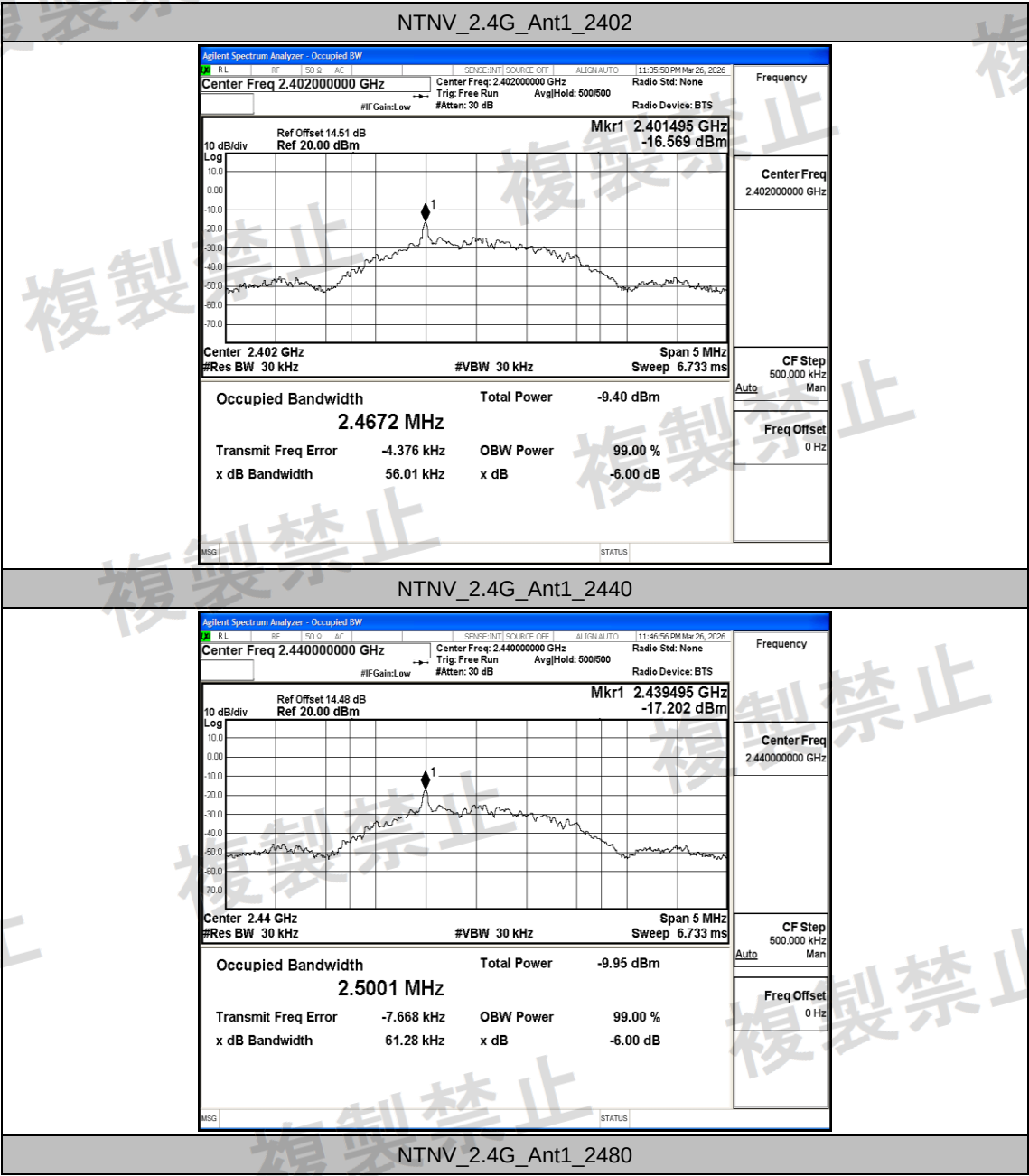
TestCondition	TestMode	Antenna	Freq(MHz)	Result [MHz]	Limit [MHz]	Verdict
NTLV	2.4G	Ant1	2402	2.691	≤83.5	PASS
			2440	2.681	≤83.5	PASS
			2480	3.062	≤83.5	PASS

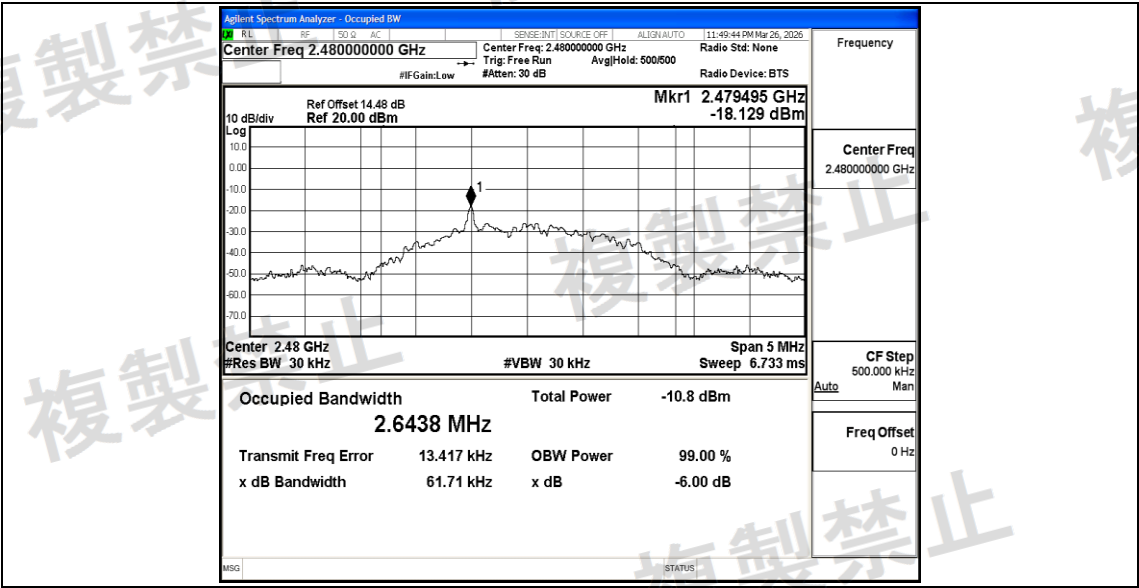
TestCondition	TestMode	Antenna	Freq(MHz)	Result [MHz]	Limit [MHz]	Verdict
NTLV	2.4G	Ant1	Hop	79.619	≤83.5	PASS

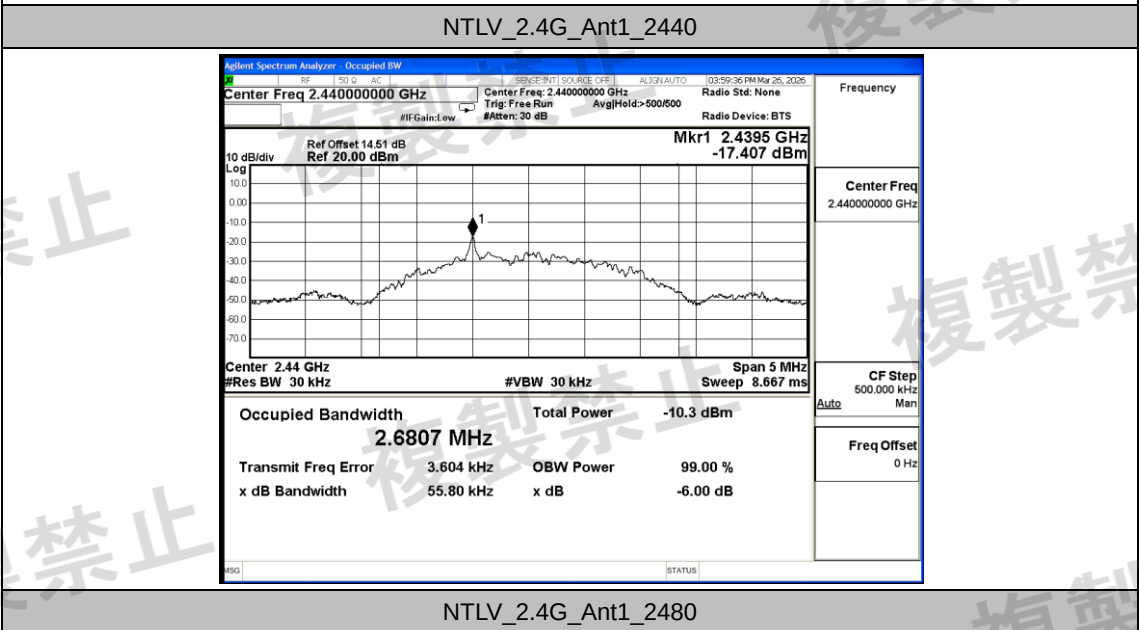
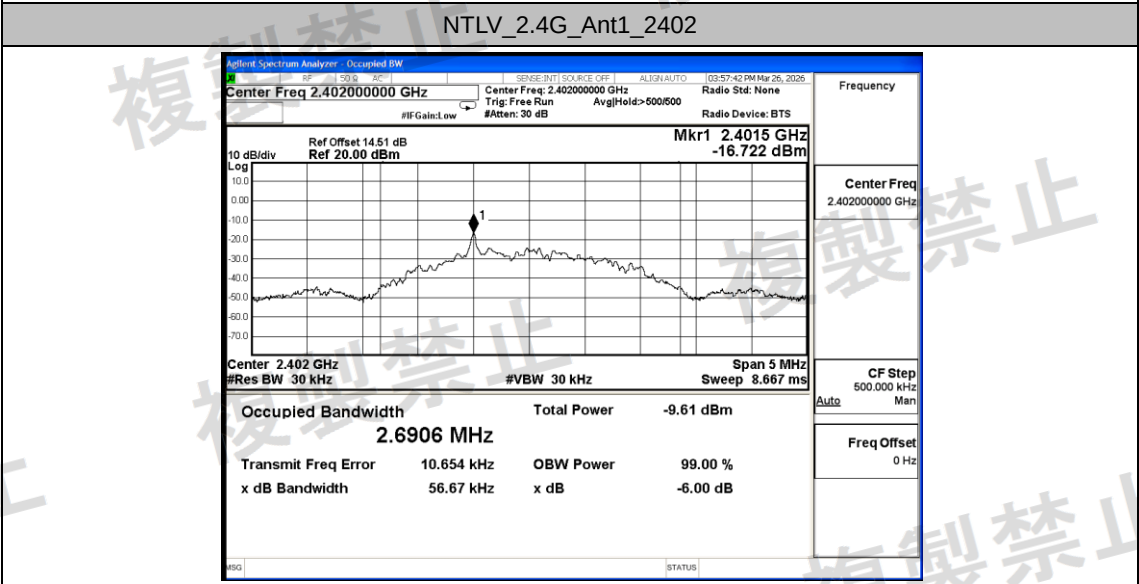
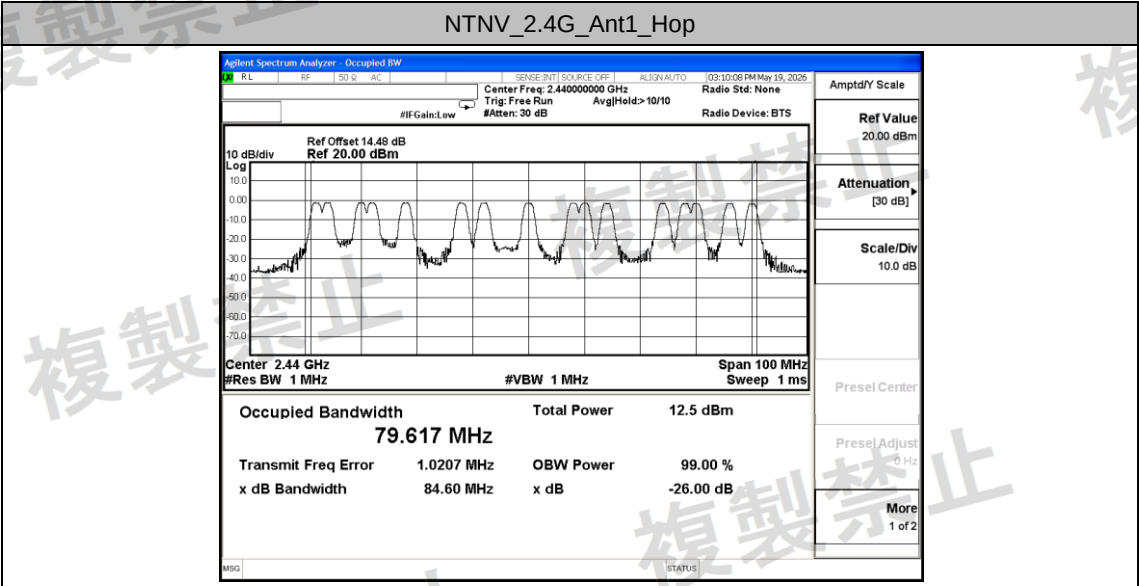
TestCondition	TestMode	Antenna	Freq(MHz)	Result [MHz]	Limit [MHz]	Verdict
NTHV	2.4G	Ant1	2402	2.506	≤83.5	PASS
			2440	2.502	≤83.5	PASS
			2480	2.581	≤83.5	PASS

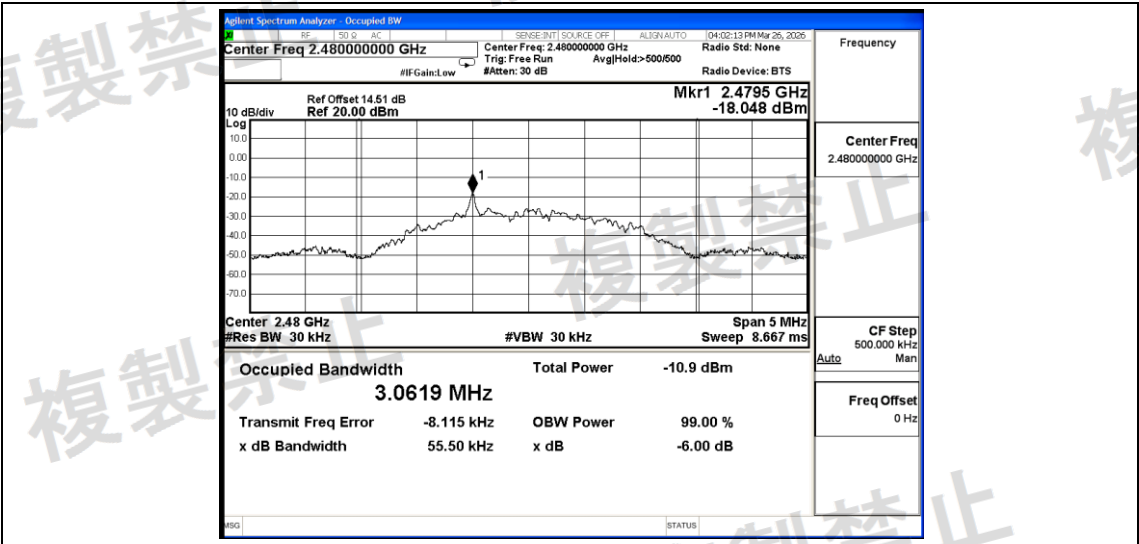
TestCondition	TestMode	Antenna	Freq(MHz)	Result [MHz]	Limit [MHz]	Verdict
NTHV	2.4G	Ant1	Hop	79.640	≤83.5	PASS

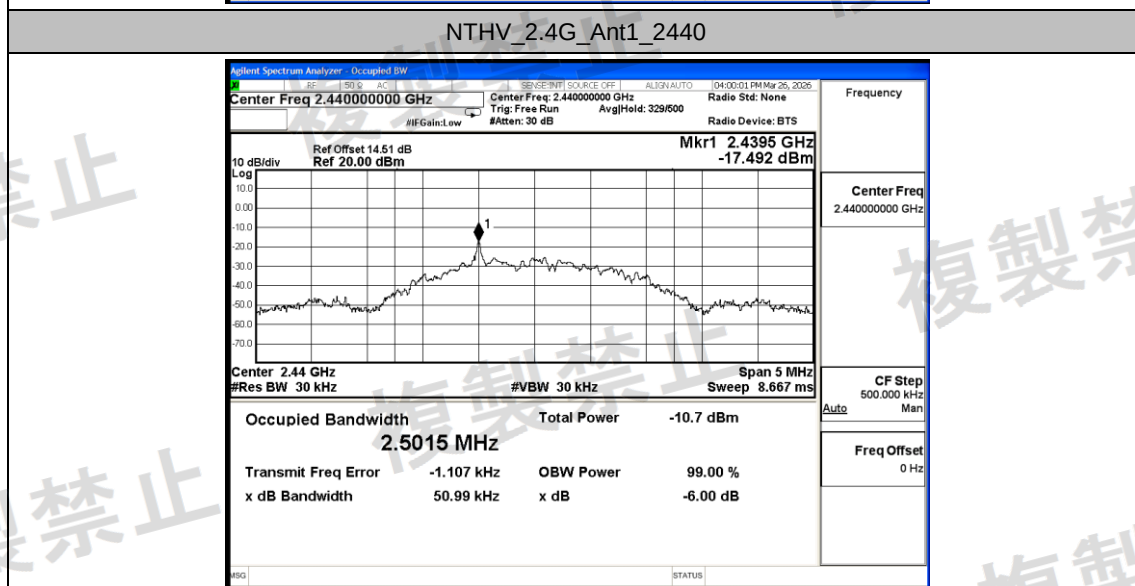
Test Graphs

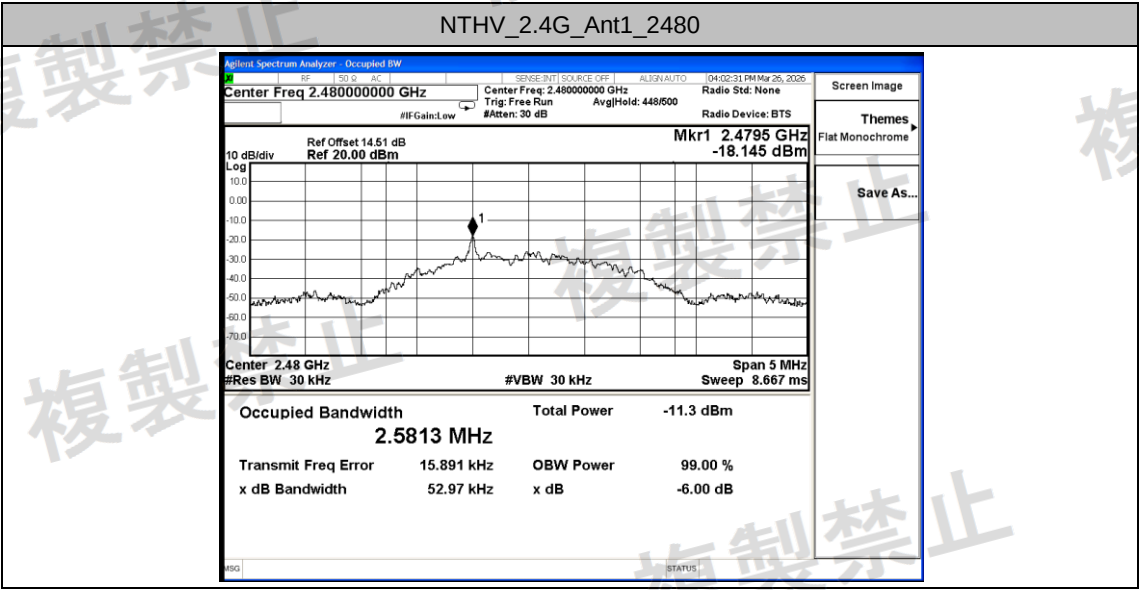


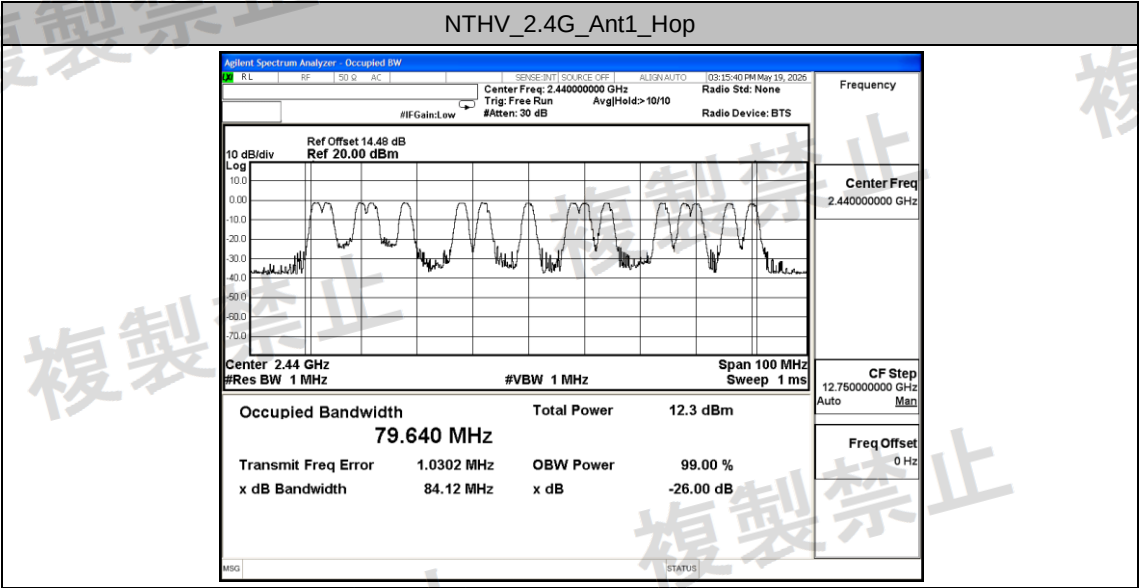












A.4 Spread Bandwidth

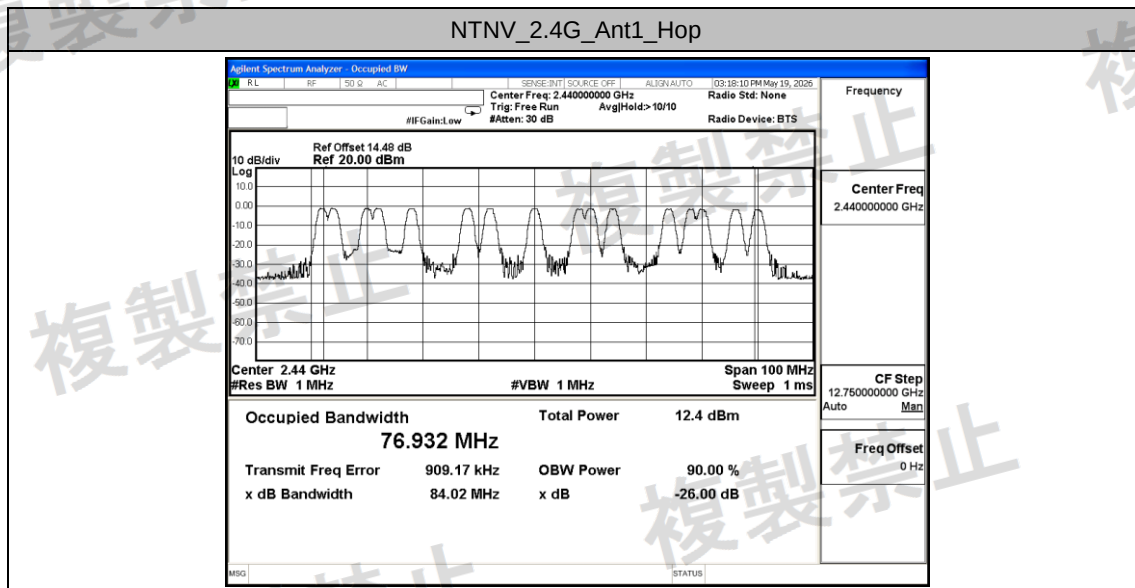
Test Result

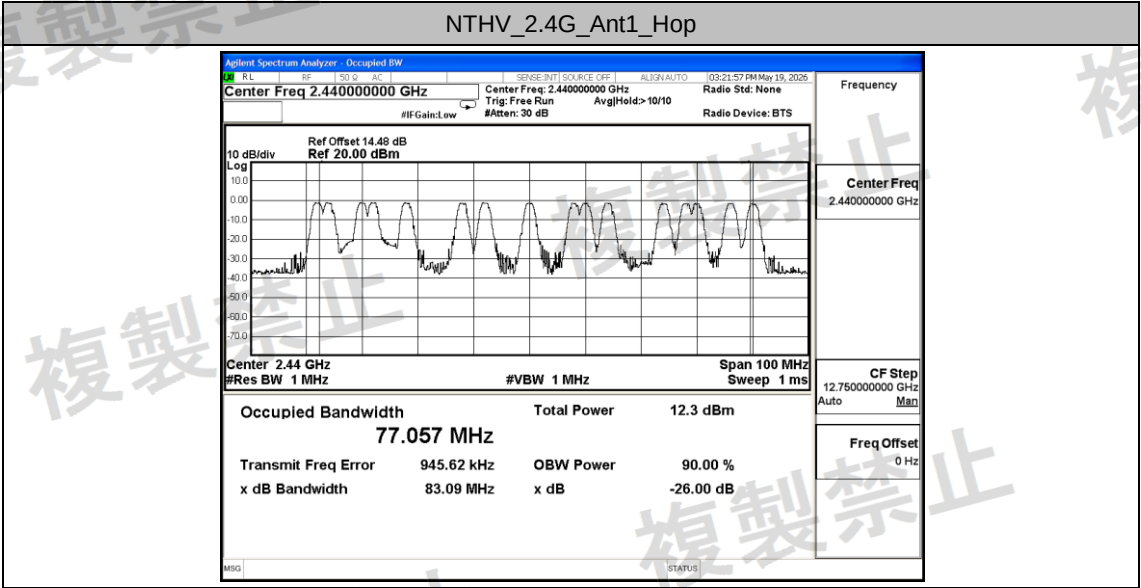
TestCondition	TestMode	Antenna	Freq(MHz)	Result [MHz]	Limit [MHz]	Verdict
NTNV	2.4G	Ant1	Hop	76.932	/	PASS

TestCondition	TestMode	Antenna	Freq(MHz)	Result [MHz]	Limit [MHz]	Verdict
NTLV	2.4G	Ant1	Hop	76.996	/	PASS

TestCondition	TestMode	Antenna	Freq(MHz)	Result [MHz]	Limit [MHz]	Verdict
NTHV	2.4G	Ant1	Hop	77.057	/	PASS

Test Graphs





A.5 Spurious Emission of TX

Test Result

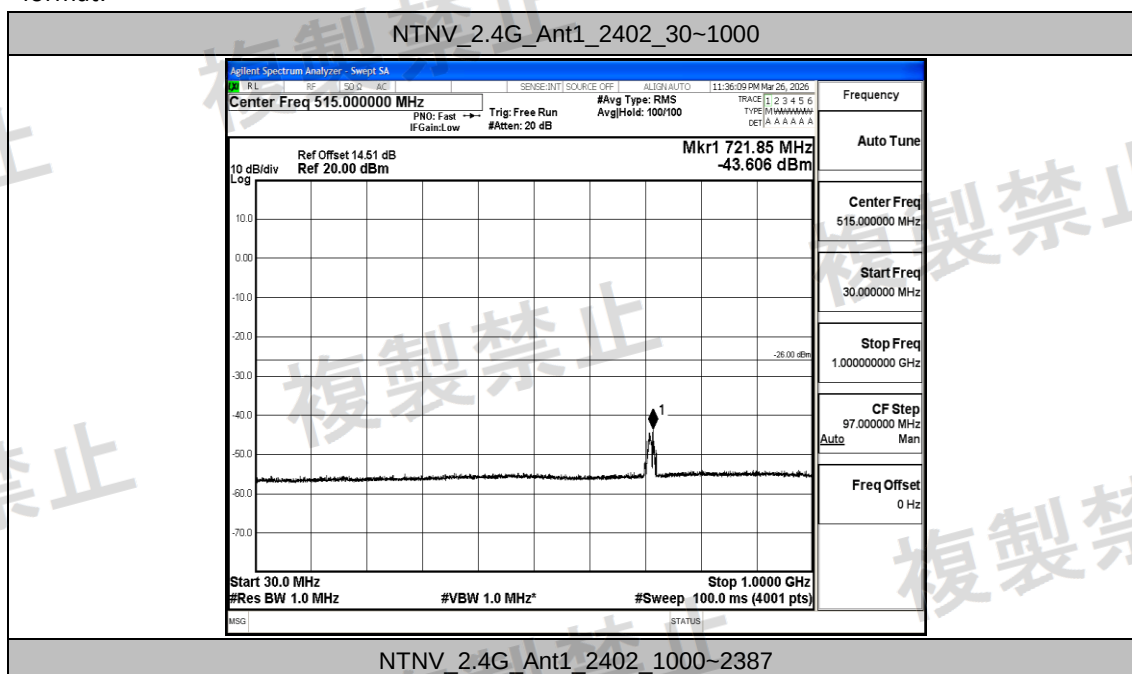
TestCondition	TestMode	Antenna	Freq(MHz)	Freq.Range [MHz]	Result [dBm]	Limit [dBm]	Result [μW]	Limit [μW]	Verdict
NTNV	2.4G	Ant1	2402	30~1000	-43.61	≤-26	0.04355	≤2.5	PASS
				1000~2387	-52.75	≤-26	0.00531	≤2.5	PASS
				2387~2400	-38.13	≤-16	0.15382	≤25	PASS
				2483.5~2496.5	-43.34	≤-16	0.04634	≤25	PASS
				2496.5~13000	-30.57	≤-26	0.87700	≤2.5	PASS
			2440	30~1000	-53.92	≤-26	0.00406	≤2.5	PASS
				1000~2387	-31.82	≤-26	0.65766	≤2.5	PASS
				2387~2400	-43.47	≤-16	0.04498	≤25	PASS
				2483.5~2496.5	-43.37	≤-16	0.04603	≤25	PASS
				2496.5~13000	-45.19	≤-26	0.03027	≤2.5	PASS
			2480	30~1000	-53.96	≤-26	0.00402	≤2.5	PASS
				1000~2387	-52.83	≤-26	0.00521	≤2.5	PASS
				2387~2400	-43.46	≤-16	0.04508	≤25	PASS
				2483.5~2496.5	-43.09	≤-16	0.04909	≤25	PASS
				2496.5~13000	-45.03	≤-26	0.03141	≤2.5	PASS

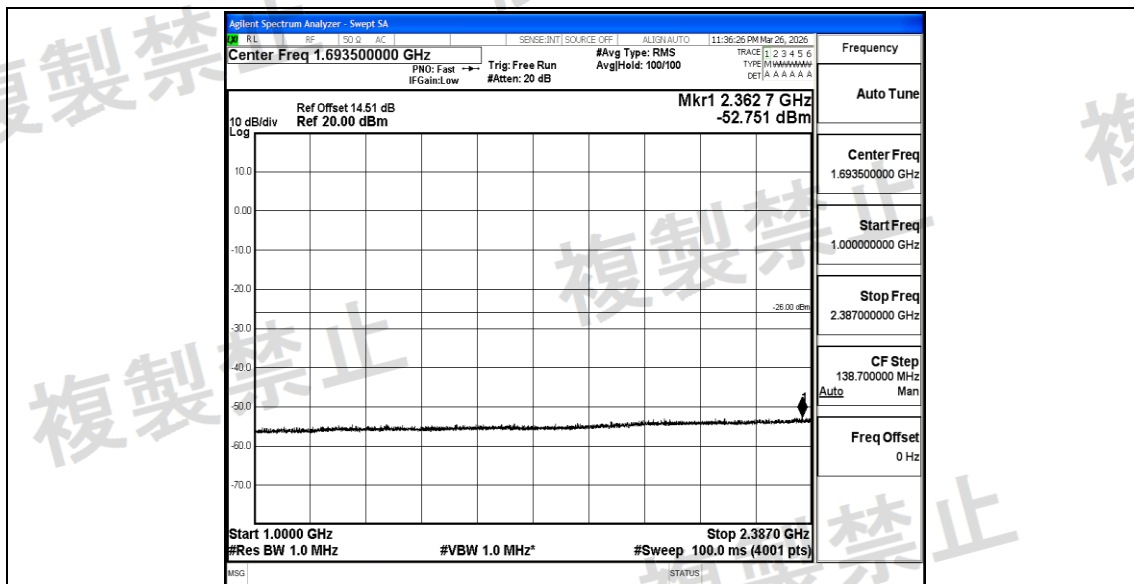
TestCondition	TestMode	Antenna	Freq(MHz)	Freq.Range [MHz]	Result [dBm]	Limit [dBm]	Result [μW]	Limit [μW]	Verdict
NTLV	2.4G	Ant1	2402	30~1000	-44.83	≤-26	0.0329	≤2.5	PASS
				1000~2387	-43.47	≤-26	0.0450	≤2.5	PASS
				2387~2400	-33.49	≤-16	0.4477	≤25	PASS
				2483.5~2496.5	-43.43	≤-16	0.0454	≤25	PASS
				2496.5~13000	-33.50	≤-26	0.4467	≤2.5	PASS
			2440	30~1000	-45.22	≤-26	0.0301	≤2.5	PASS
				1000~2387	-43.96	≤-26	0.0402	≤2.5	PASS
				2387~2400	-43.06	≤-16	0.0494	≤25	PASS
				2483.5~2496.5	-43.42	≤-16	0.0455	≤25	PASS
				2496.5~13000	-39.85	≤-26	0.1035	≤2.5	PASS
			2480	30~1000	-44.42	≤-26	0.0361	≤2.5	PASS
				1000~2387	-44.18	≤-26	0.0382	≤2.5	PASS
				2387~2400	-43.69	≤-16	0.0428	≤25	PASS
				2483.5~2496.5	-40.38	≤-16	0.0916	≤25	PASS
				2496.5~13000	-34.32	≤-26	0.3698	≤2.5	PASS

TestCondition	TestMode	Antenna	Freq(MHz)	Freq.Range [MHz]	Result [dBm]	Limit [dBm]	Result [μW]	Limit [μW]	Verdict
NTHV	2.4G	Ant1	2402	30~1000	-44.67	≤-26	0.0341	≤2.5	PASS
				1000~2387	-44.03	≤-26	0.0395	≤2.5	PASS
				2387~2400	-33.13	≤-16	0.4864	≤25	PASS
				2483.5~2496.5	-43.42	≤-16	0.0455	≤25	PASS
				2496.5~13000	-27.04	≤-26	1.9770	≤2.5	PASS
			2440	30~1000	-44.96	≤-26	0.0319	≤2.5	PASS
				1000~2387	-44.25	≤-26	0.0376	≤2.5	PASS
				2387~2400	-43.49	≤-16	0.0448	≤25	PASS
				2483.5~2496.5	-43.41	≤-16	0.0456	≤25	PASS
				2496.5~13000	-39.78	≤-26	0.1052	≤2.5	PASS
			2480	30~1000	-44.79	≤-26	0.0332	≤2.5	PASS
				1000~2387	-43.79	≤-26	0.0418	≤2.5	PASS
				2387~2400	-43.62	≤-16	0.0435	≤25	PASS
				2483.5~2496.5	-39.97	≤-16	0.1007	≤25	PASS
				2496.5~13000	-40.30	≤-26	0.0933	≤2.5	PASS

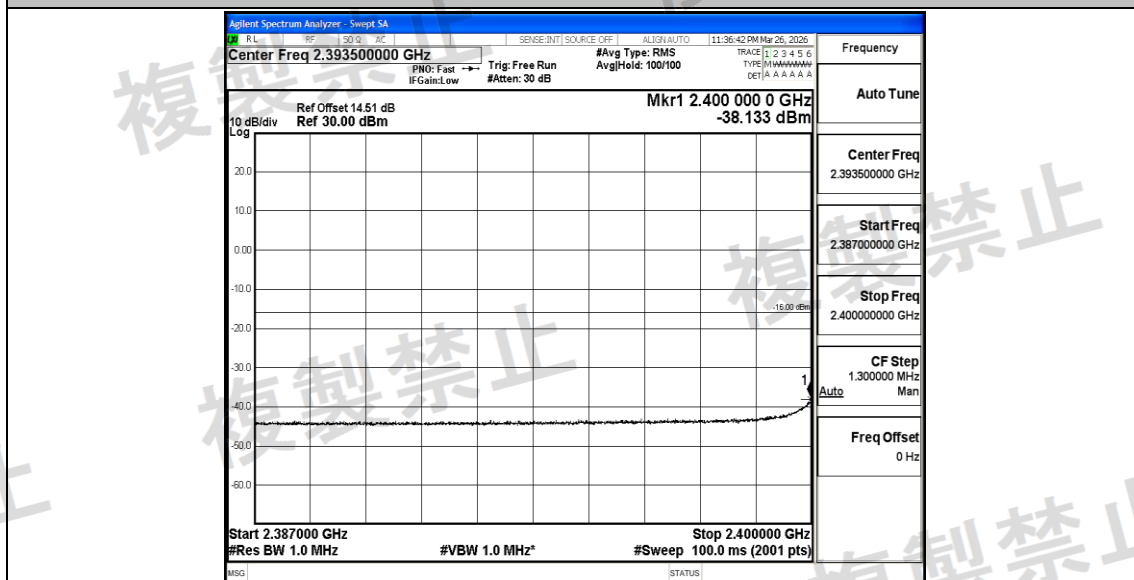
Test Graphs

-Note:SA set to from 2.4965GHz to 13GHz, plot shows from 2.497GHz to 13GHz as of SA's default format.

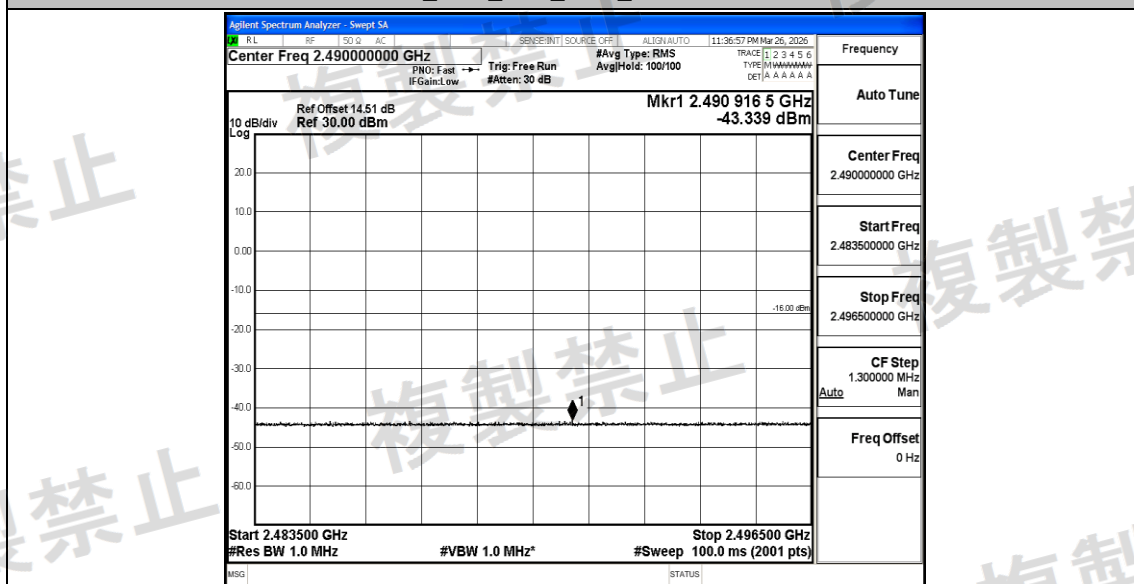


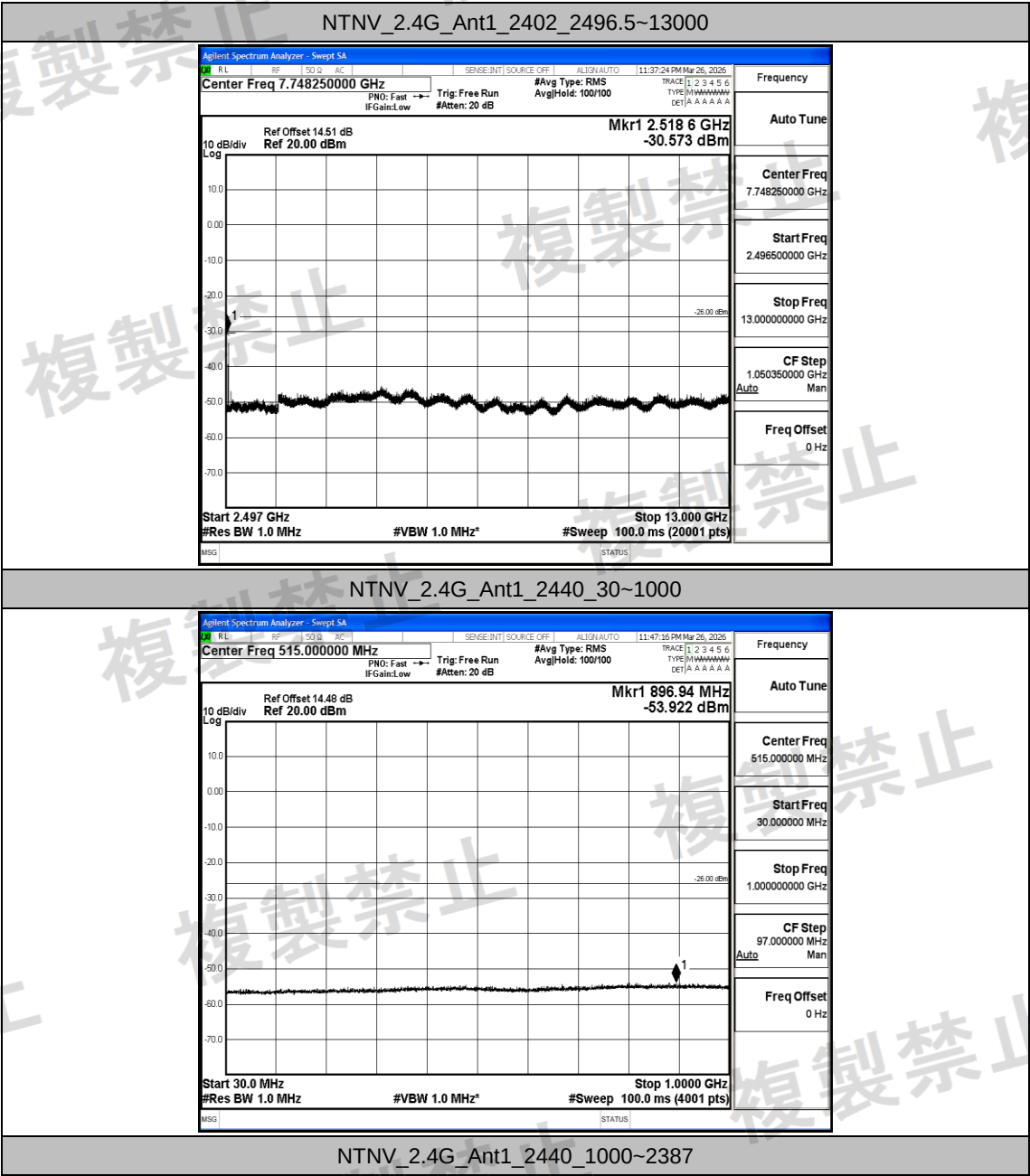


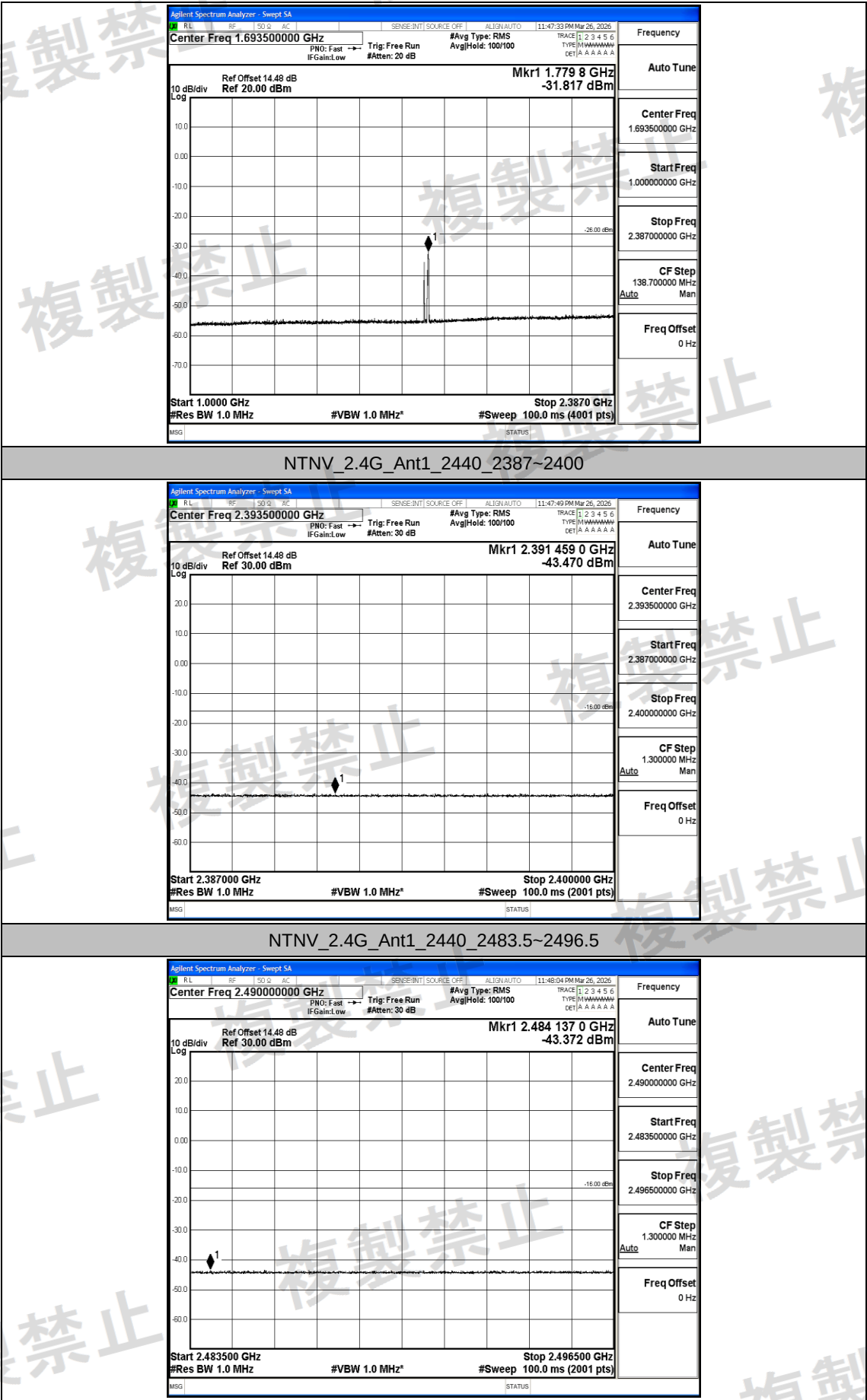
NTNV_2.4G_Ant1_2402_2387~2400

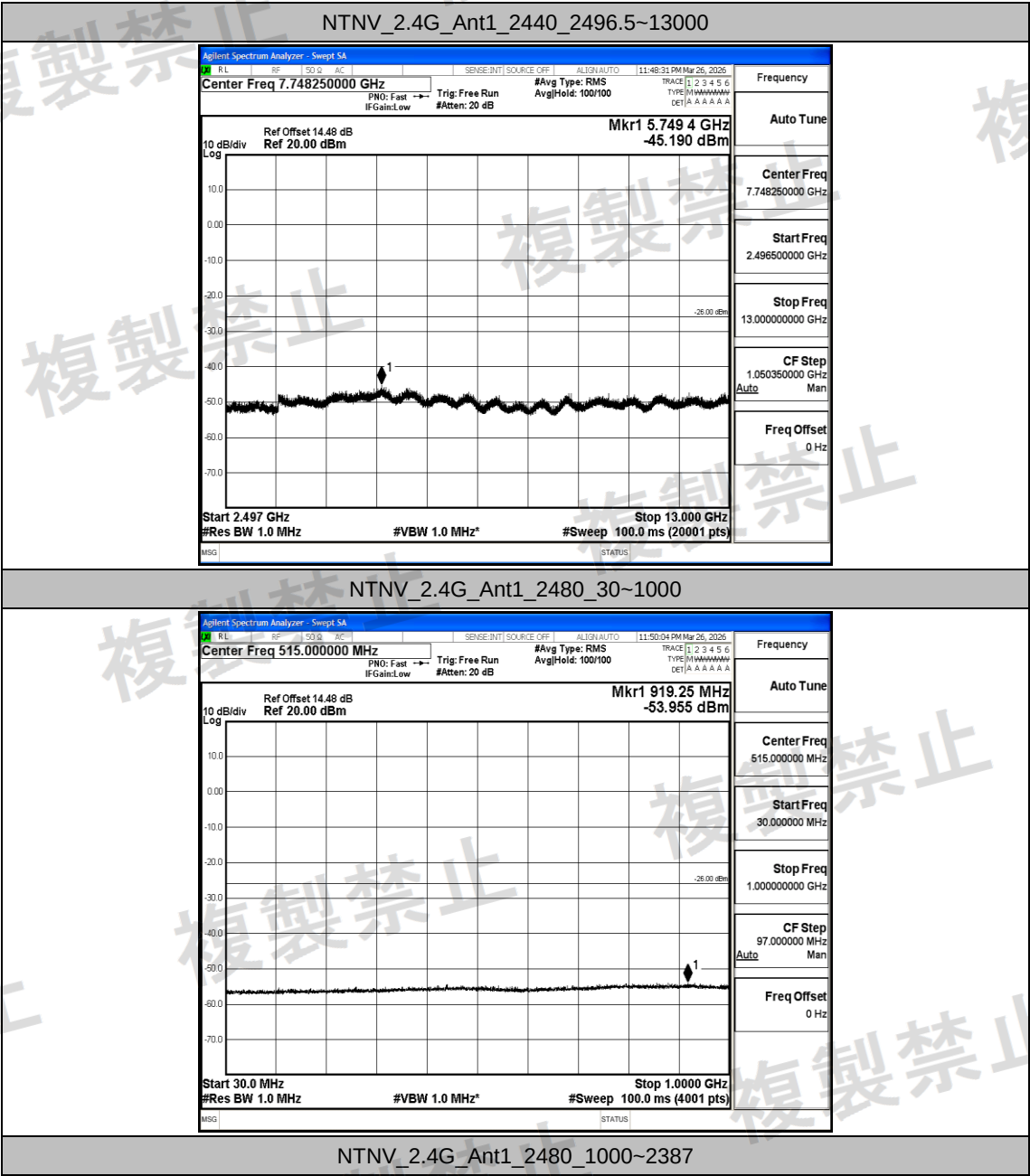


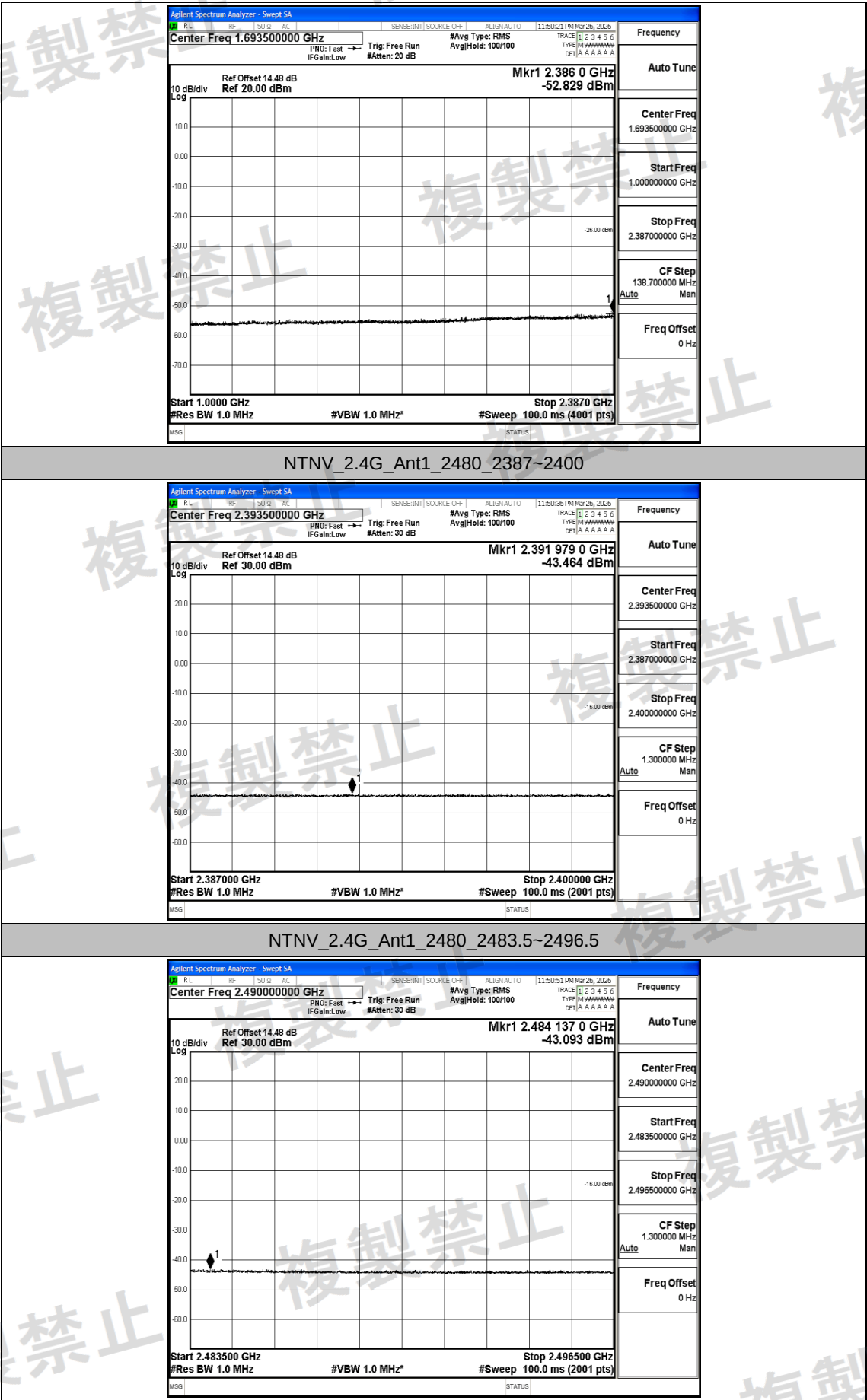
NTNV_2.4G_Ant1_2402_2483.5~2496.5

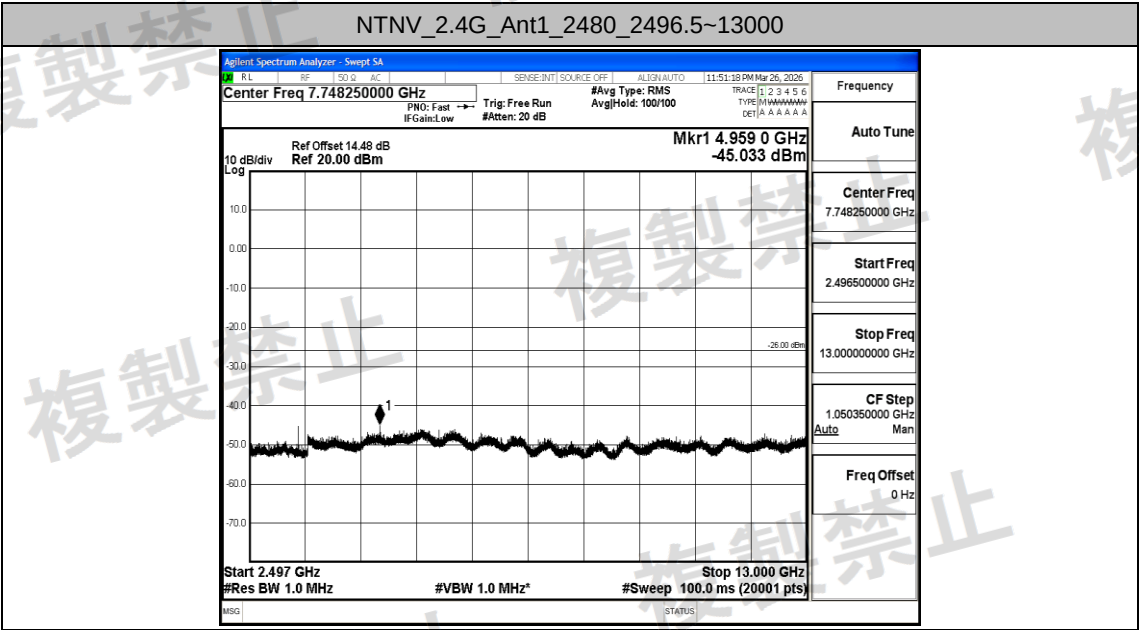




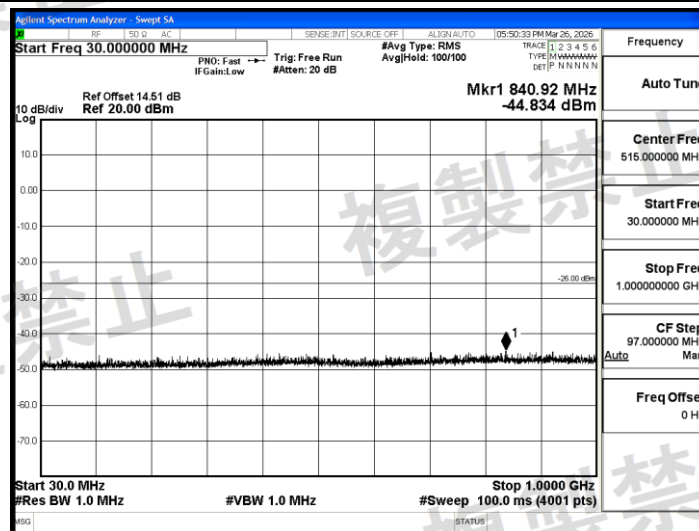




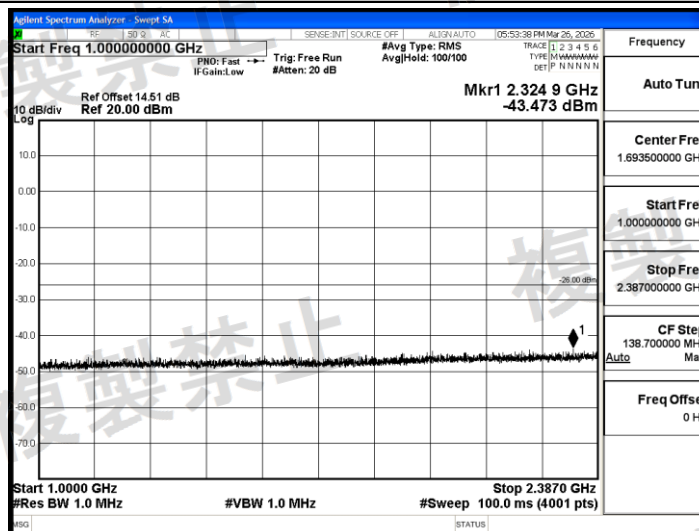




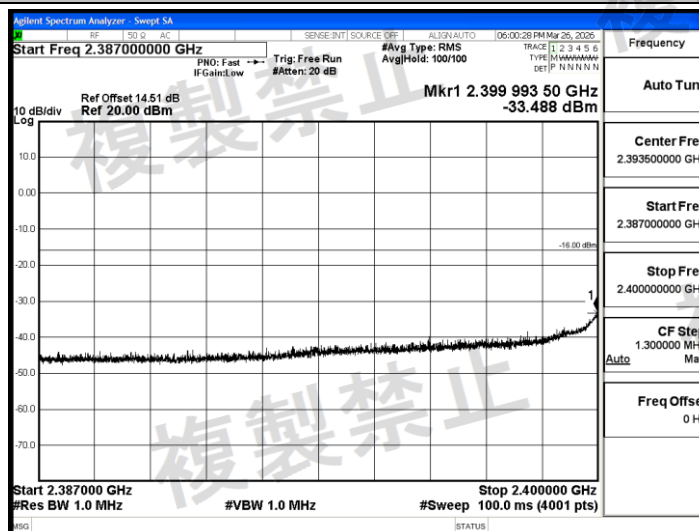
NTLV_2.4G_Ant1_2402_30~1000



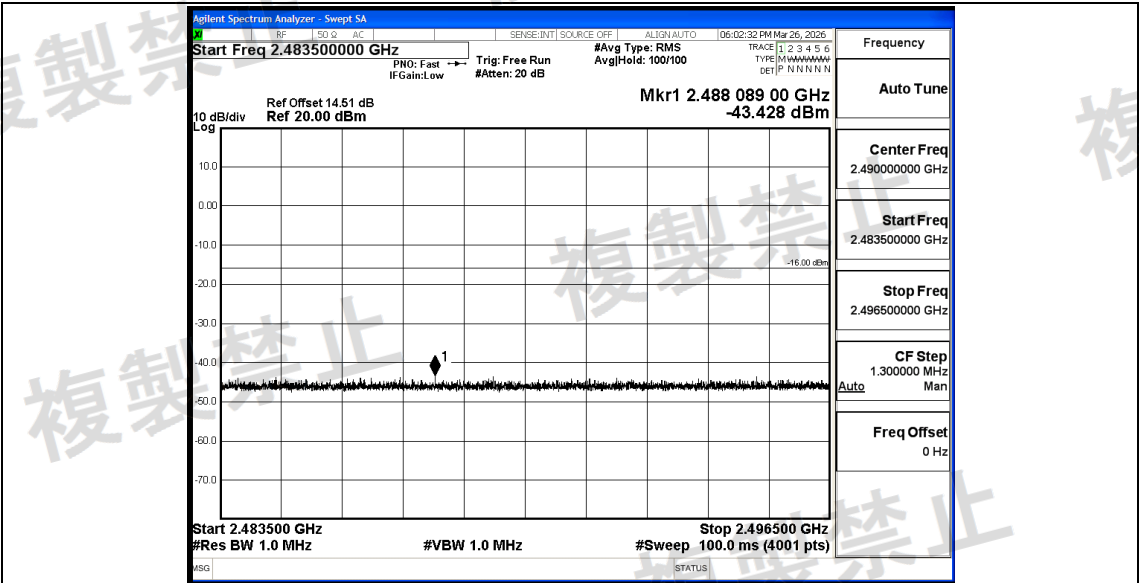
NTLV_2.4G_Ant1_2402_1000~2387



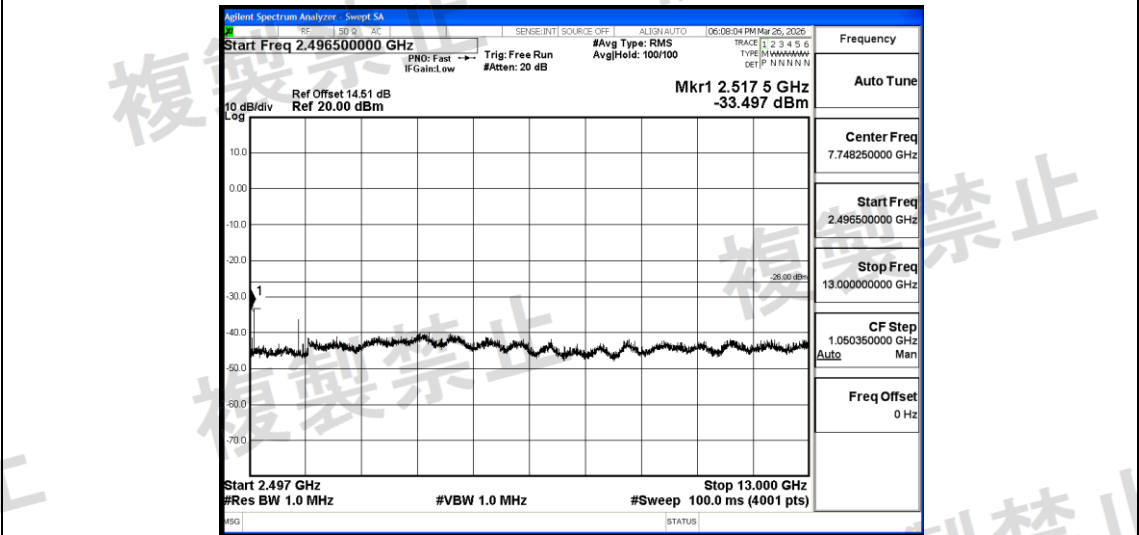
NTLV_2.4G_Ant1_2402_2387~2400



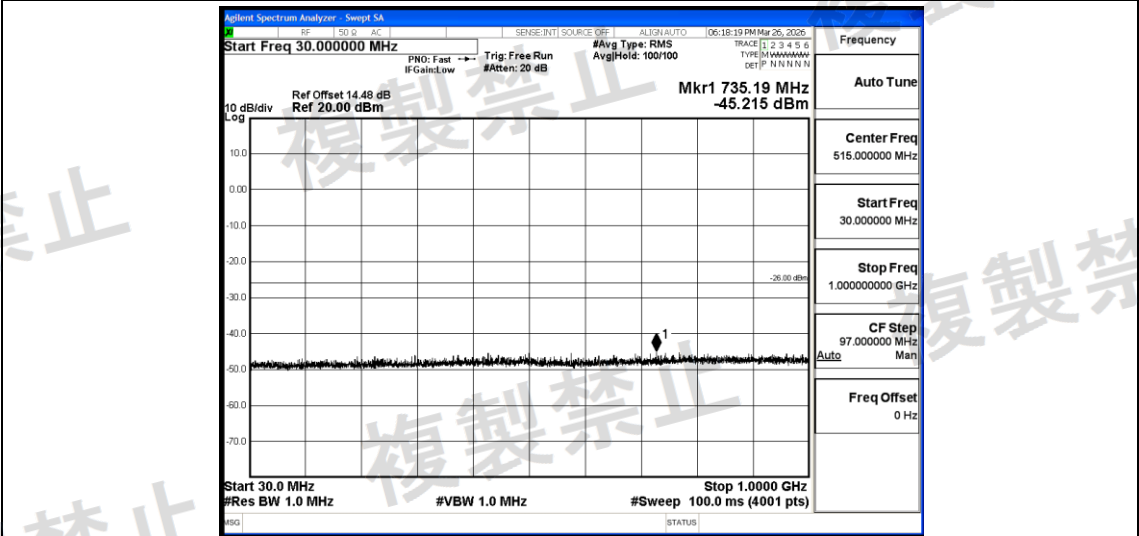
NTLV_2.4G_Ant1_2402_2483.5~2496.5



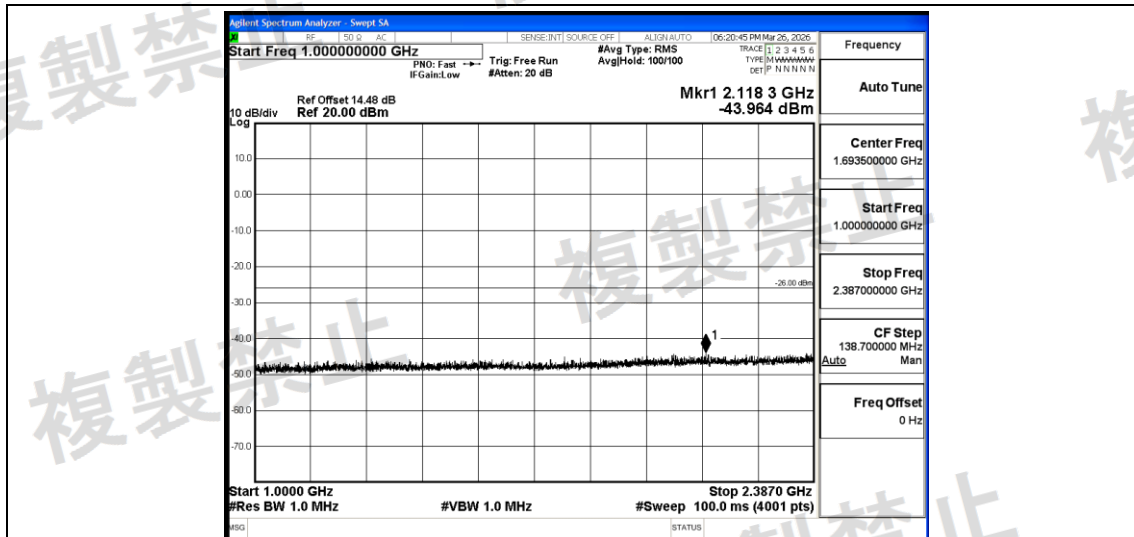
NTLV_2.4G_Ant1_2402_2496.5~13000



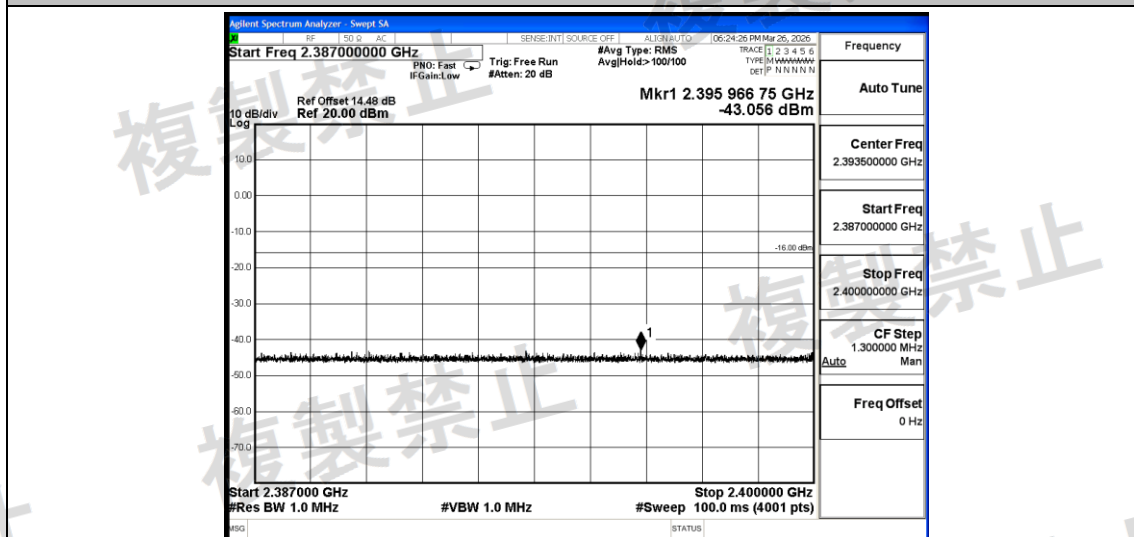
NTLV_2.4G_Ant1_2440_30~1000



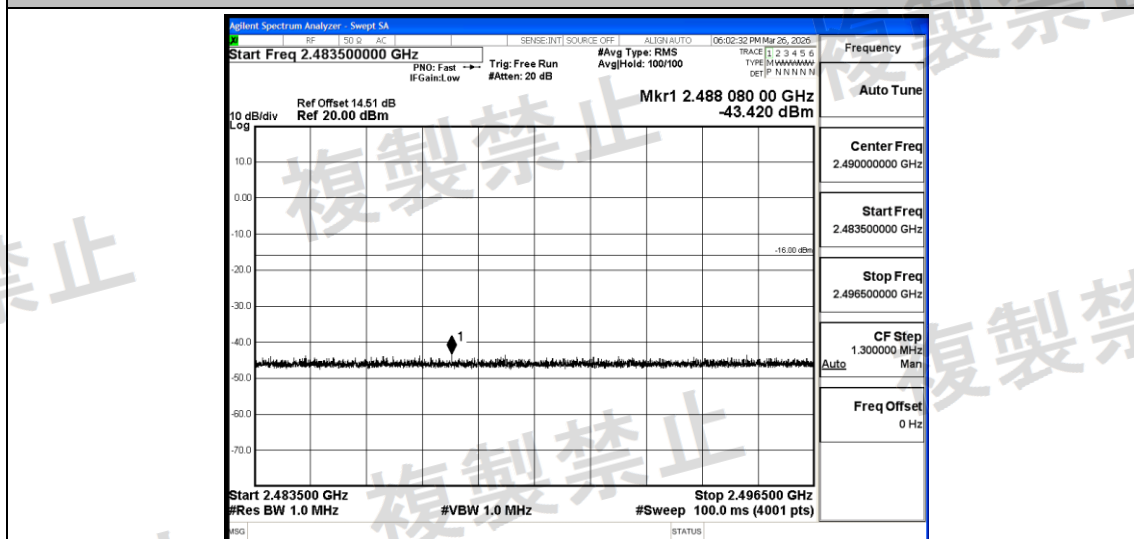
NTLV_2.4G_Ant1_2440_1000~2387



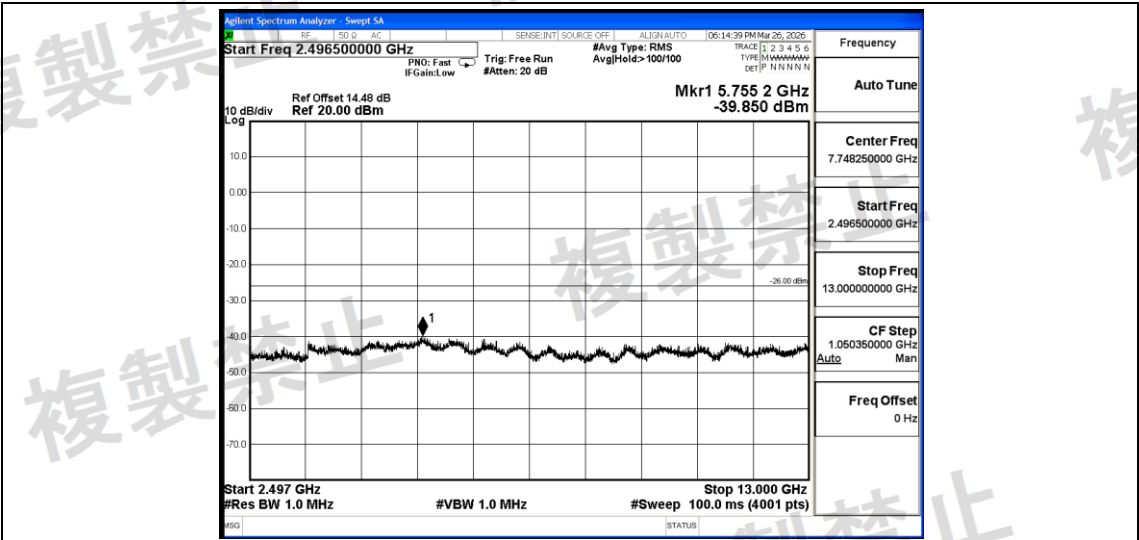
NTLV_2.4G_Ant1_2440_2387~2400



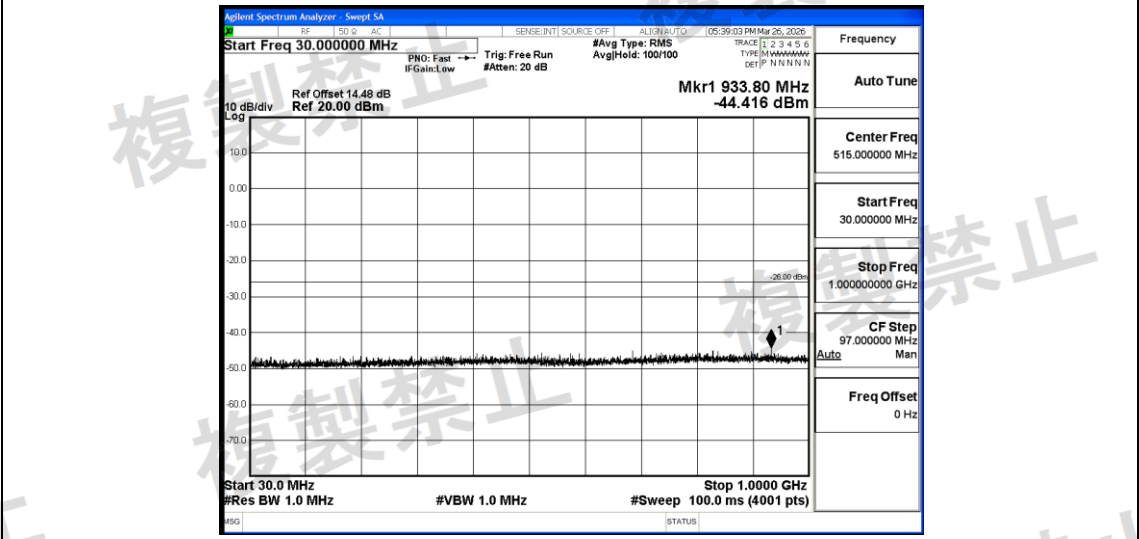
NTLV_2.4G_Ant1_2440_2483.5~2496.5



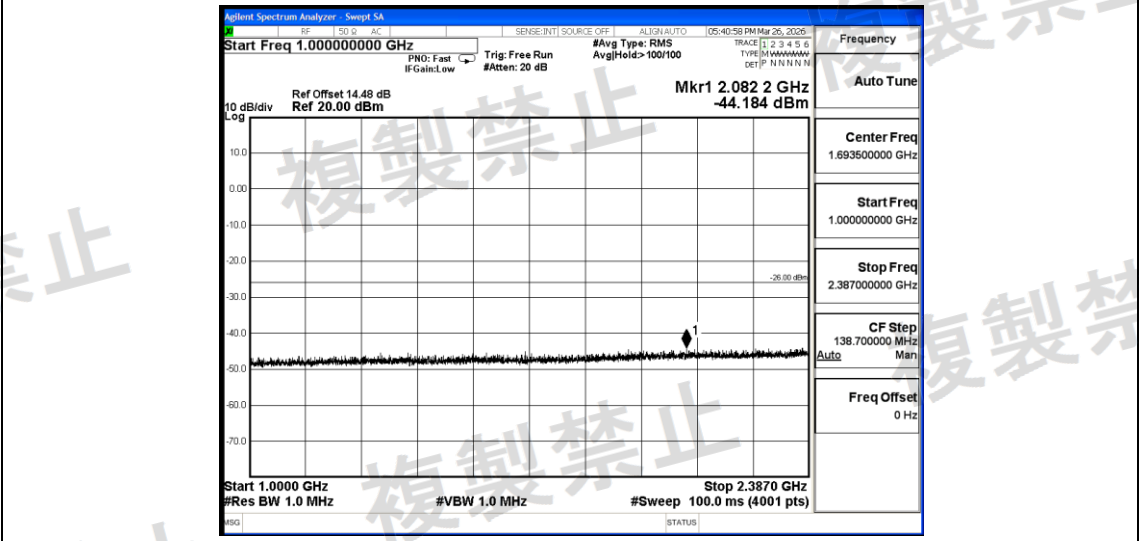
NTLV_2.4G_Ant1_2440_2496.5~13000



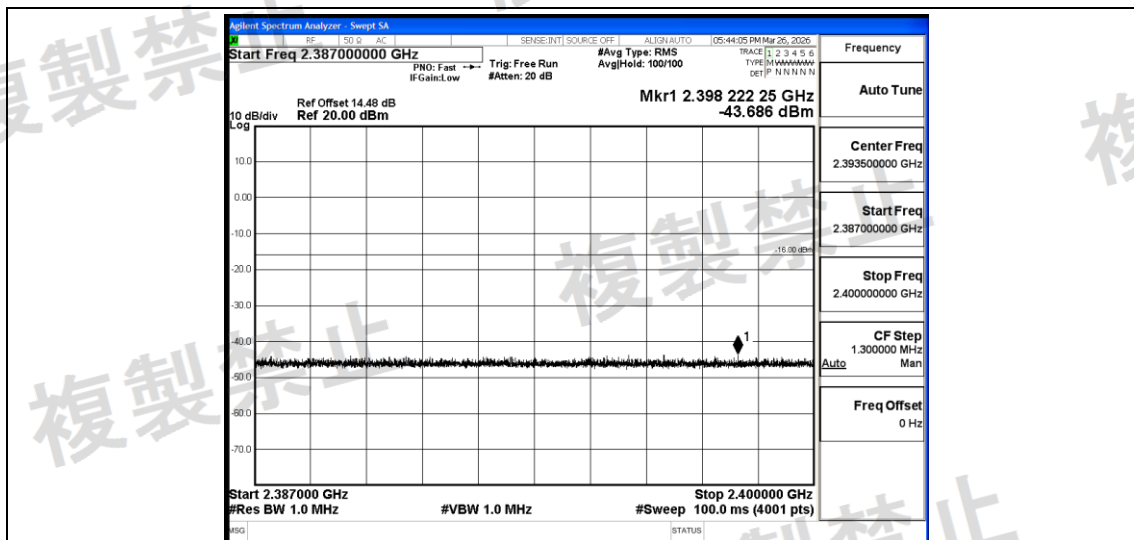
NTLV_2.4G_Ant1_2480_30~1000



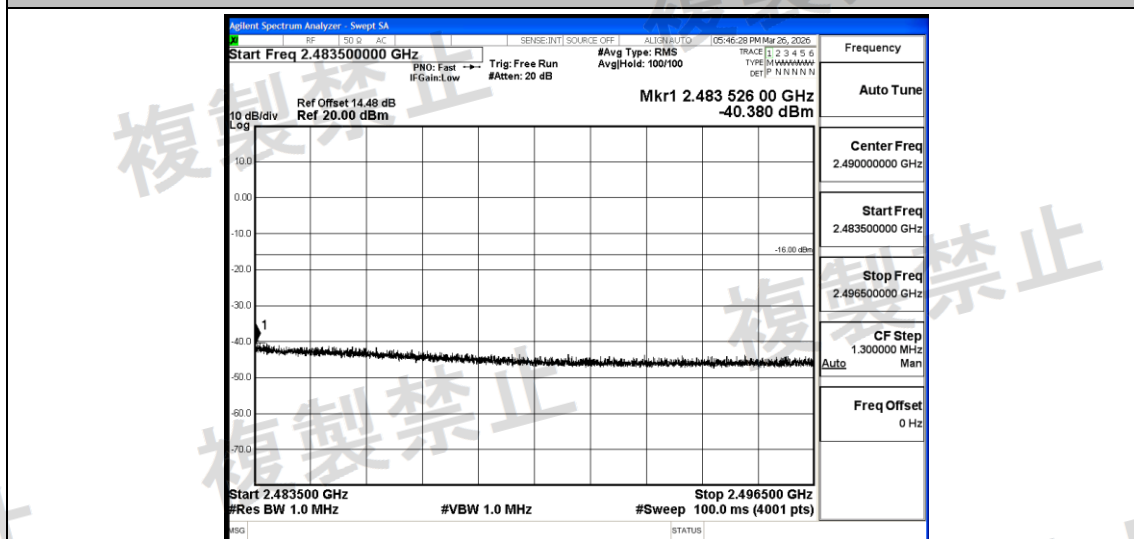
NTLV_2.4G_Ant1_2480_1000~2387



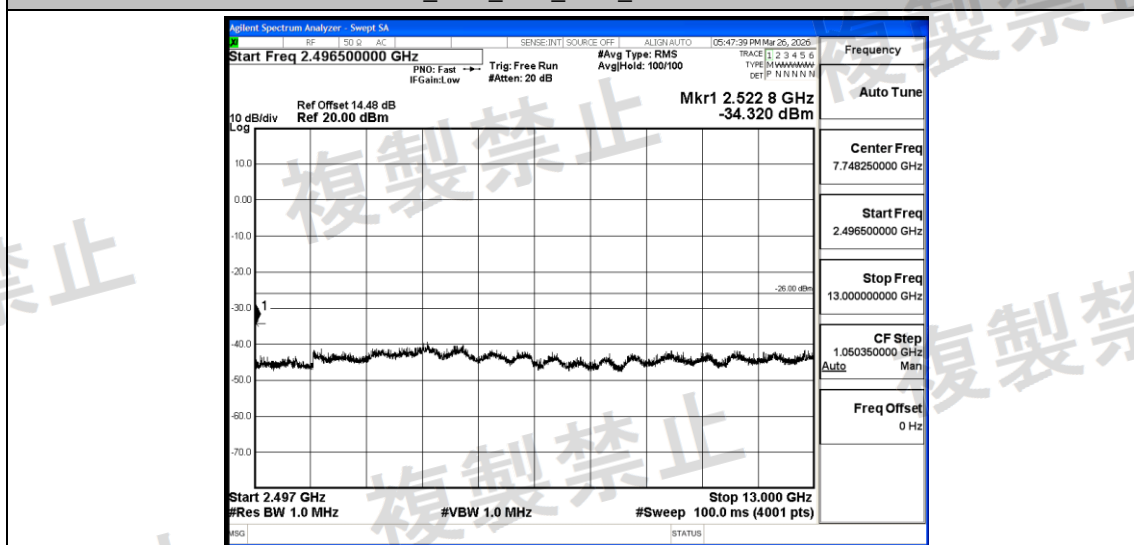
NTLV_2.4G_Ant1_2480_2387~2400



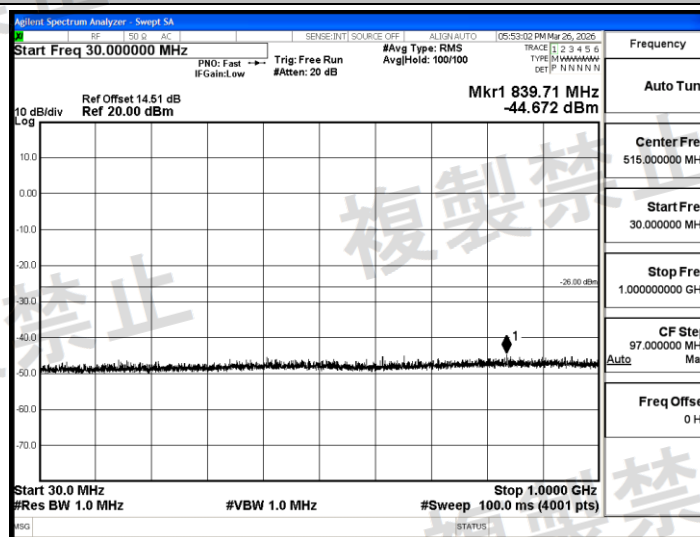
NTLV_2.4G_Ant1_2480_2483.5~2496.5



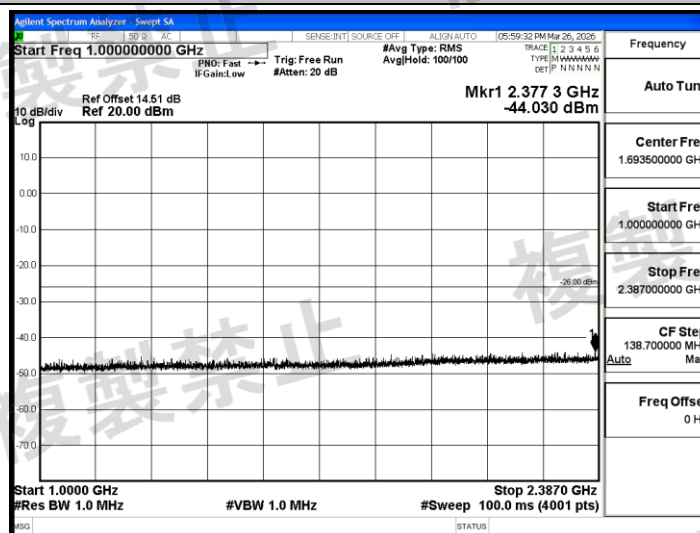
NTLV_2.4G_Ant1_2480_2496.5~13000



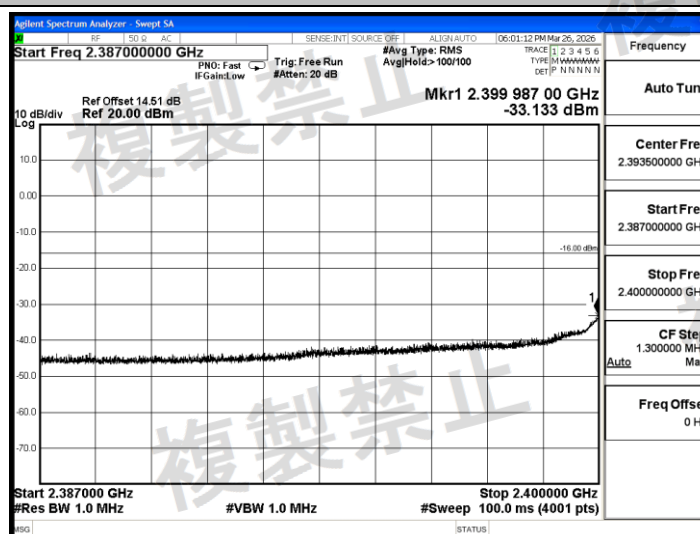
NTHV_2.4G_Ant1_2402_30~1000



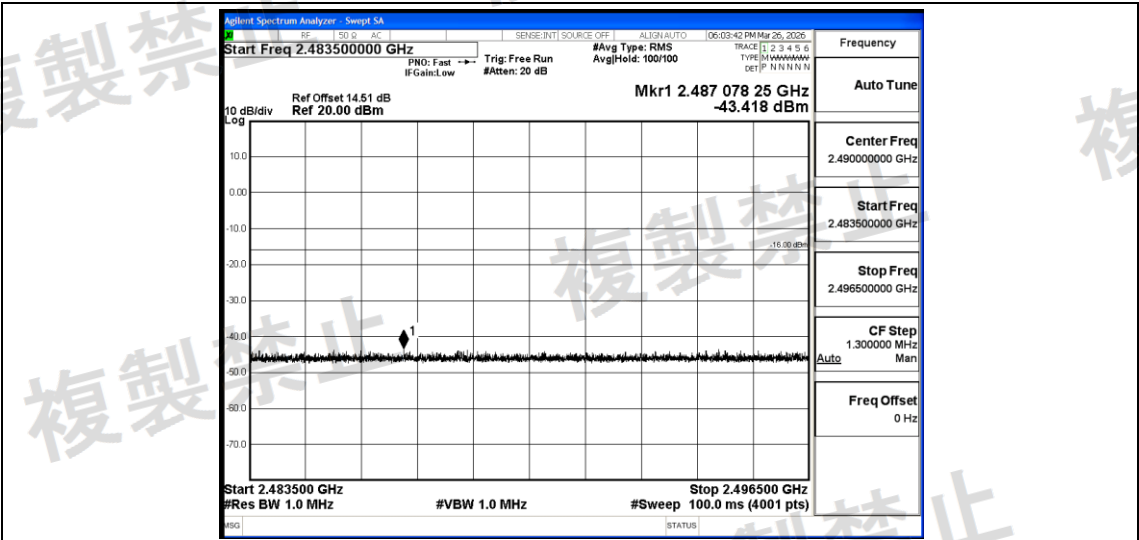
NTHV_2.4G_Ant1_2402_1000~2387



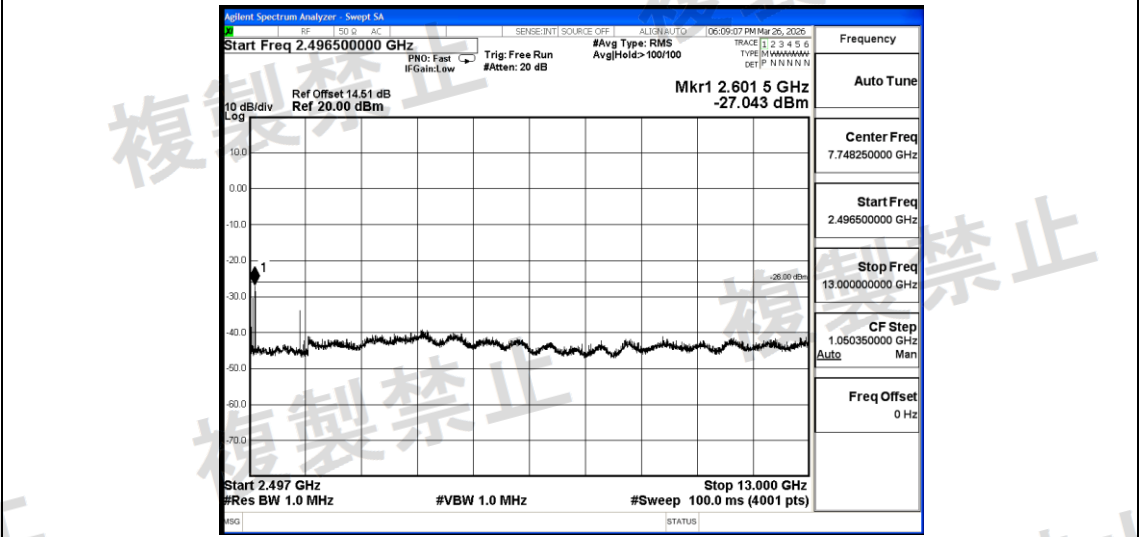
NTHV_2.4G_Ant1_2402_2387~2400



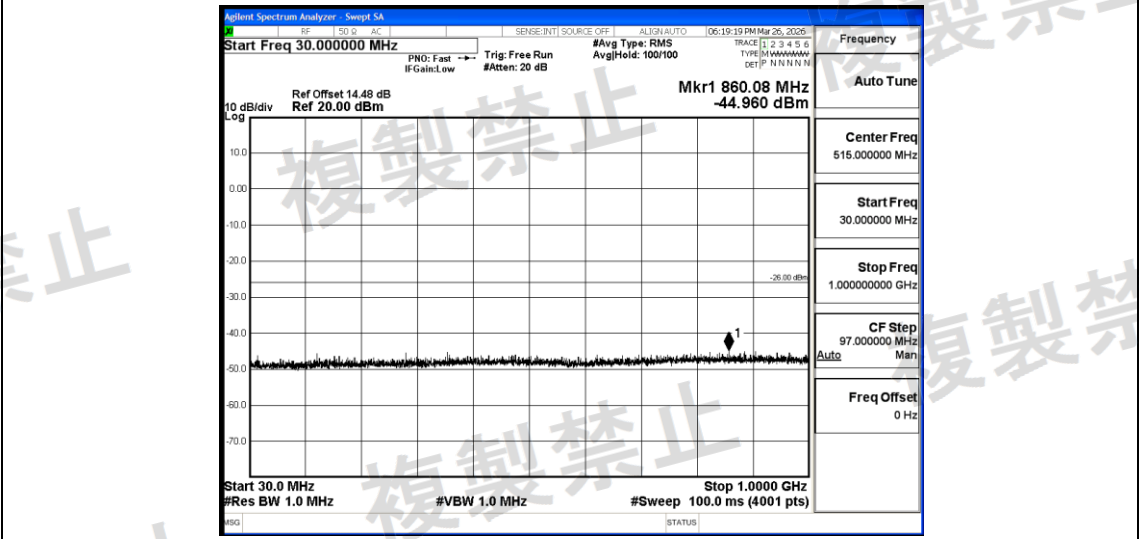
NTHV_2.4G_Ant1_2402_2483.5~2496.5



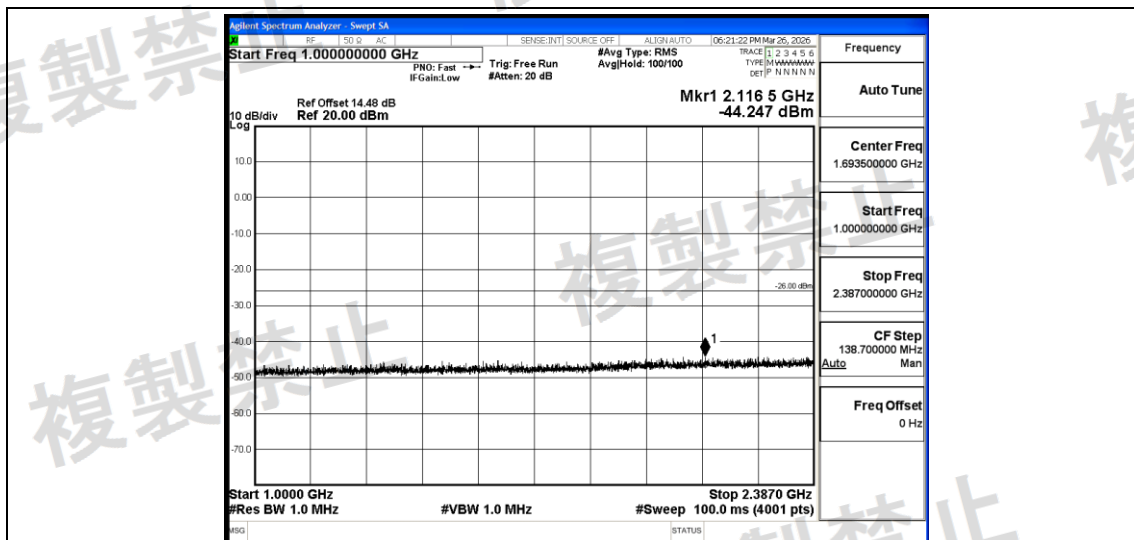
NTHV_2.4G_Ant1_2402_2496.5~13000



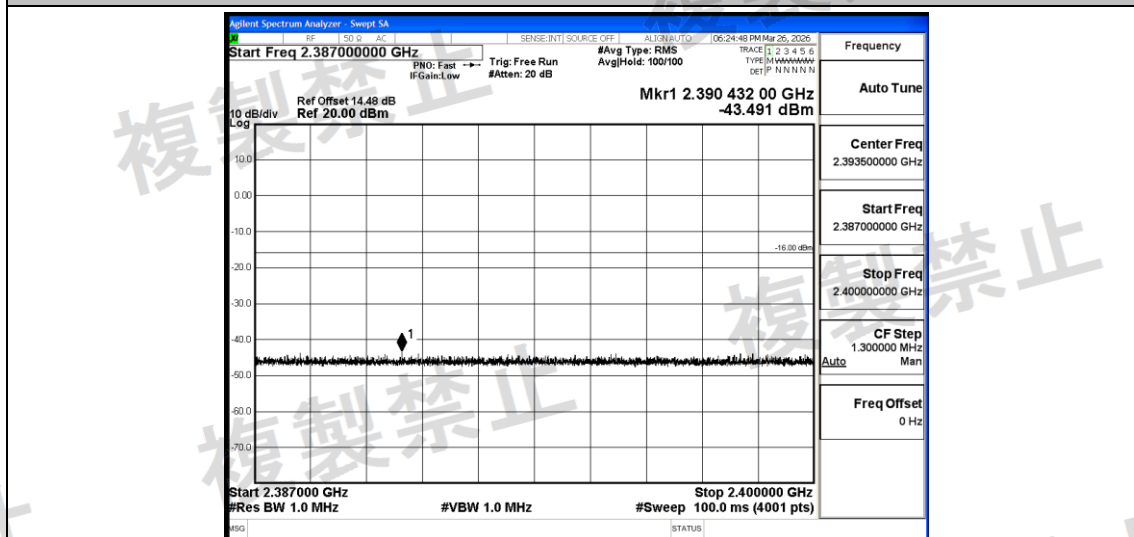
NTHV_2.4G_Ant1_2440_30~1000



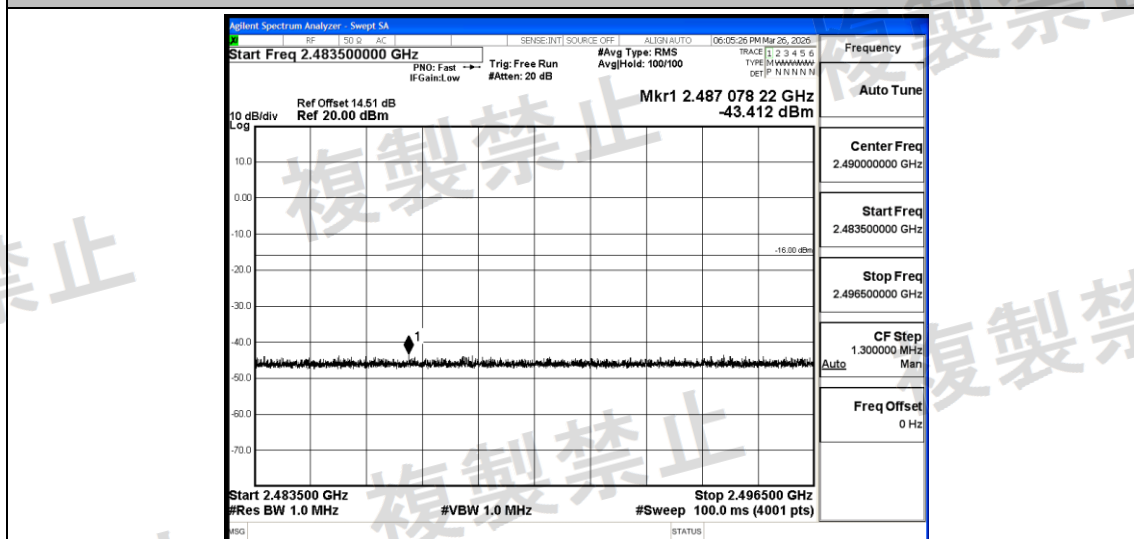
NTHV_2.4G_Ant1_2440_1000~2387



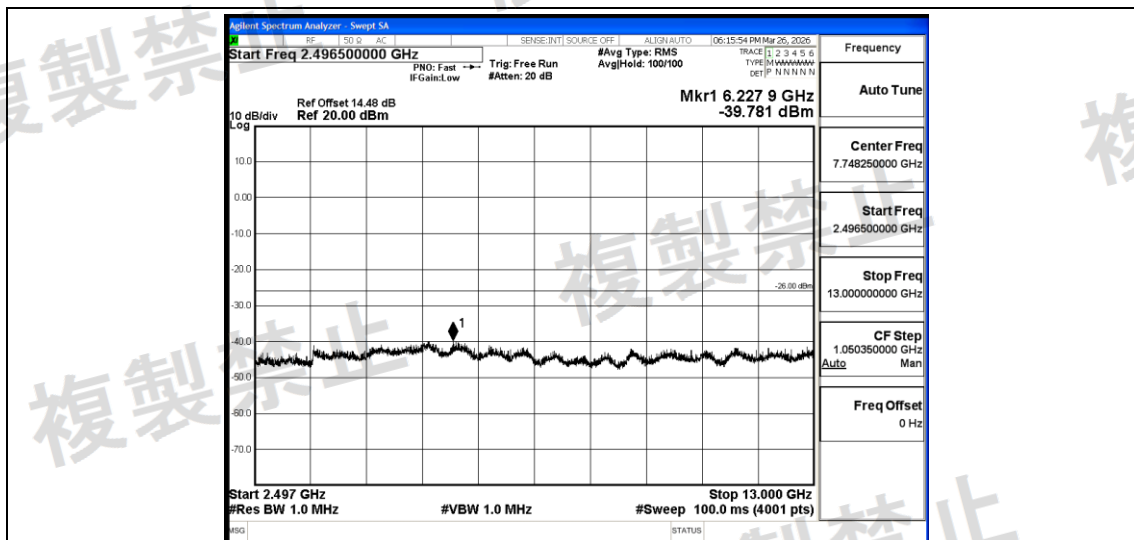
NTHV_2.4G_Ant1_2440_2387~2400



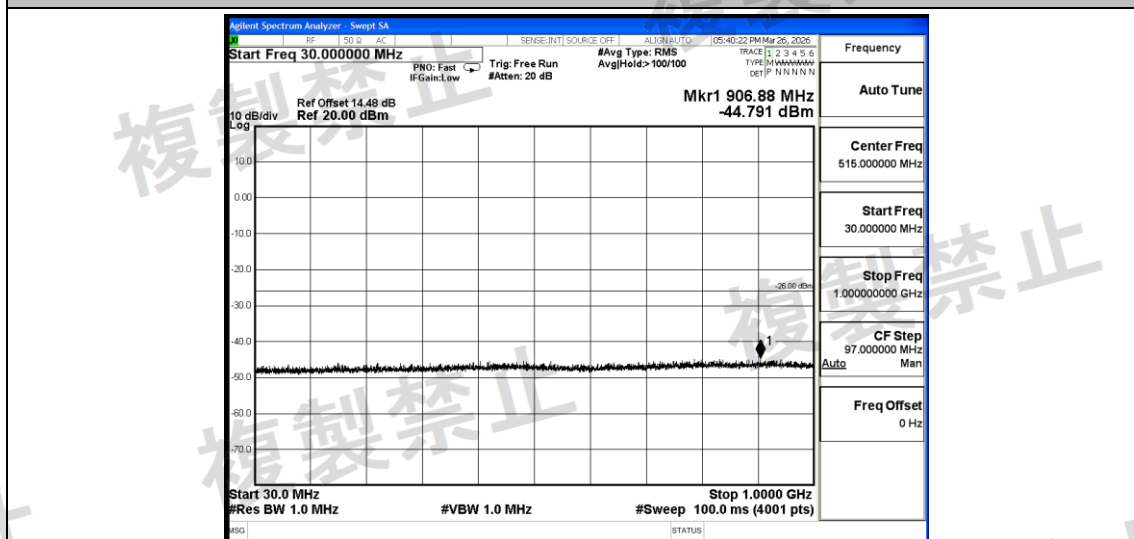
NTHV_2.4G_Ant1_2440_2483.5~2496.5



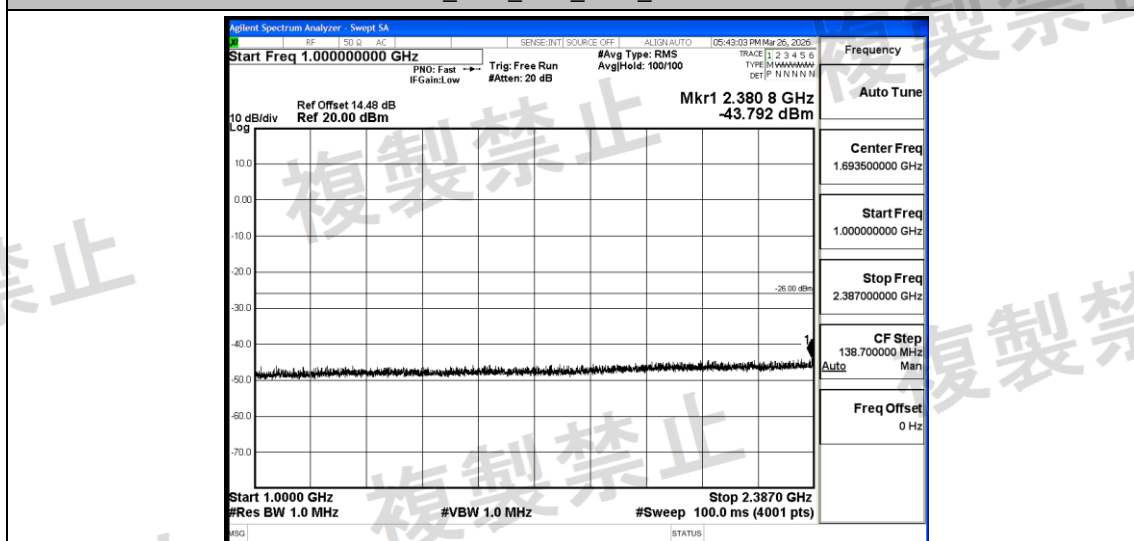
NTHV_2.4G_Ant1_2440_2496.5~13000



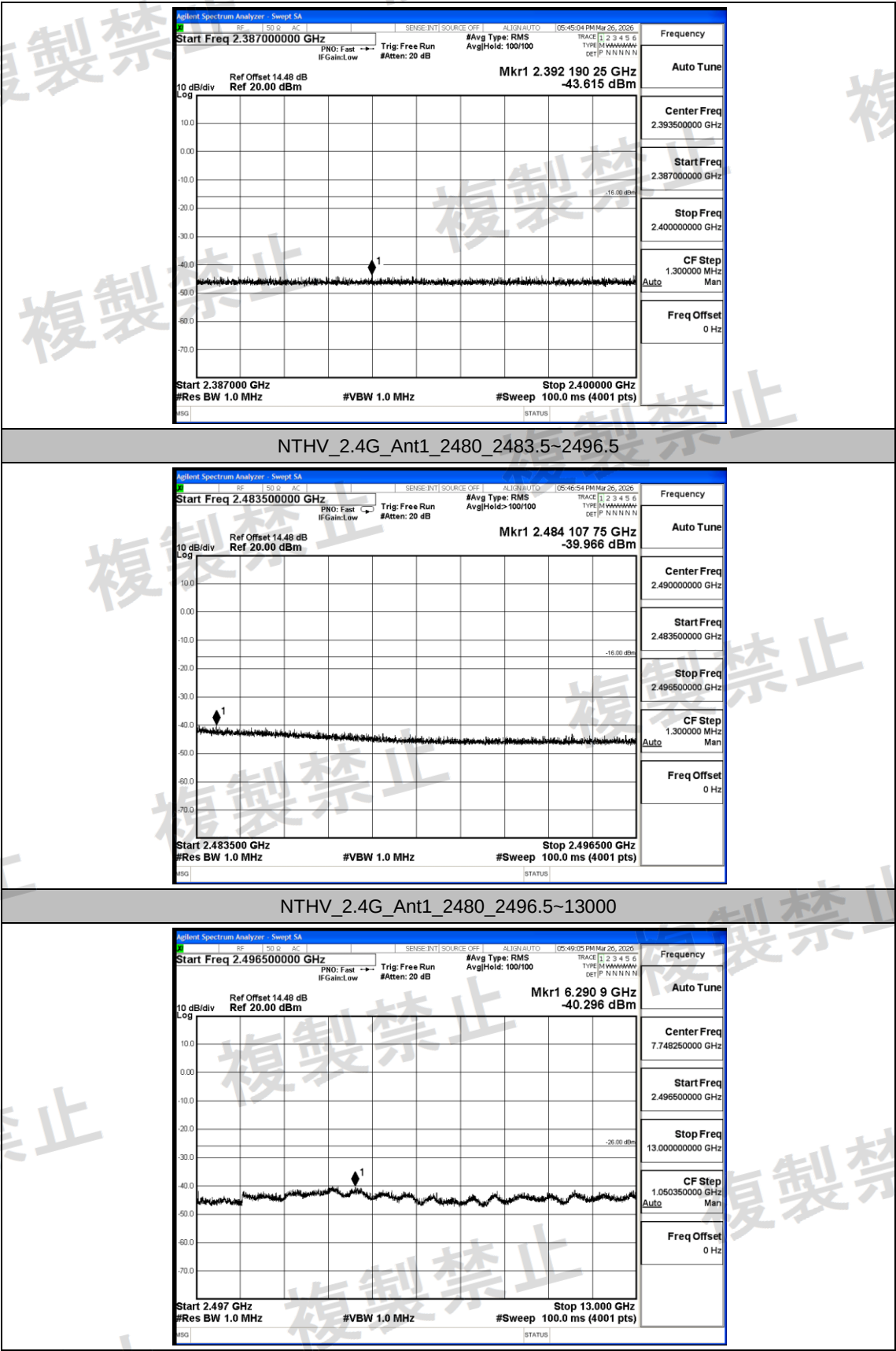
NTHV_2.4G_Ant1_2480_30~1000



NTHV_2.4G_Ant1_2480_1000~2387



NTHV_2.4G_Ant1_2480_2387~2400



A.6 Spurious Emission of RX

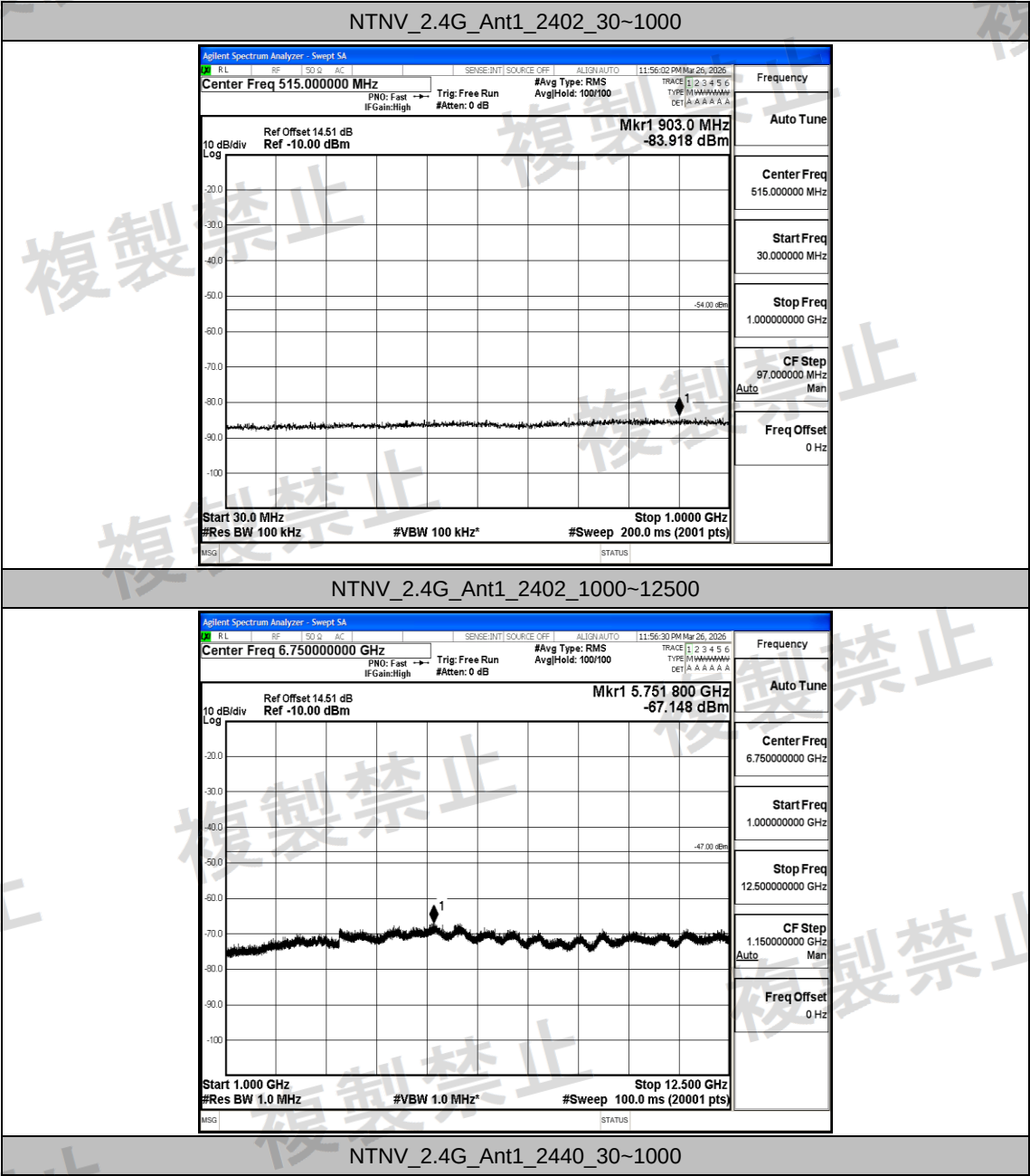
Test Result

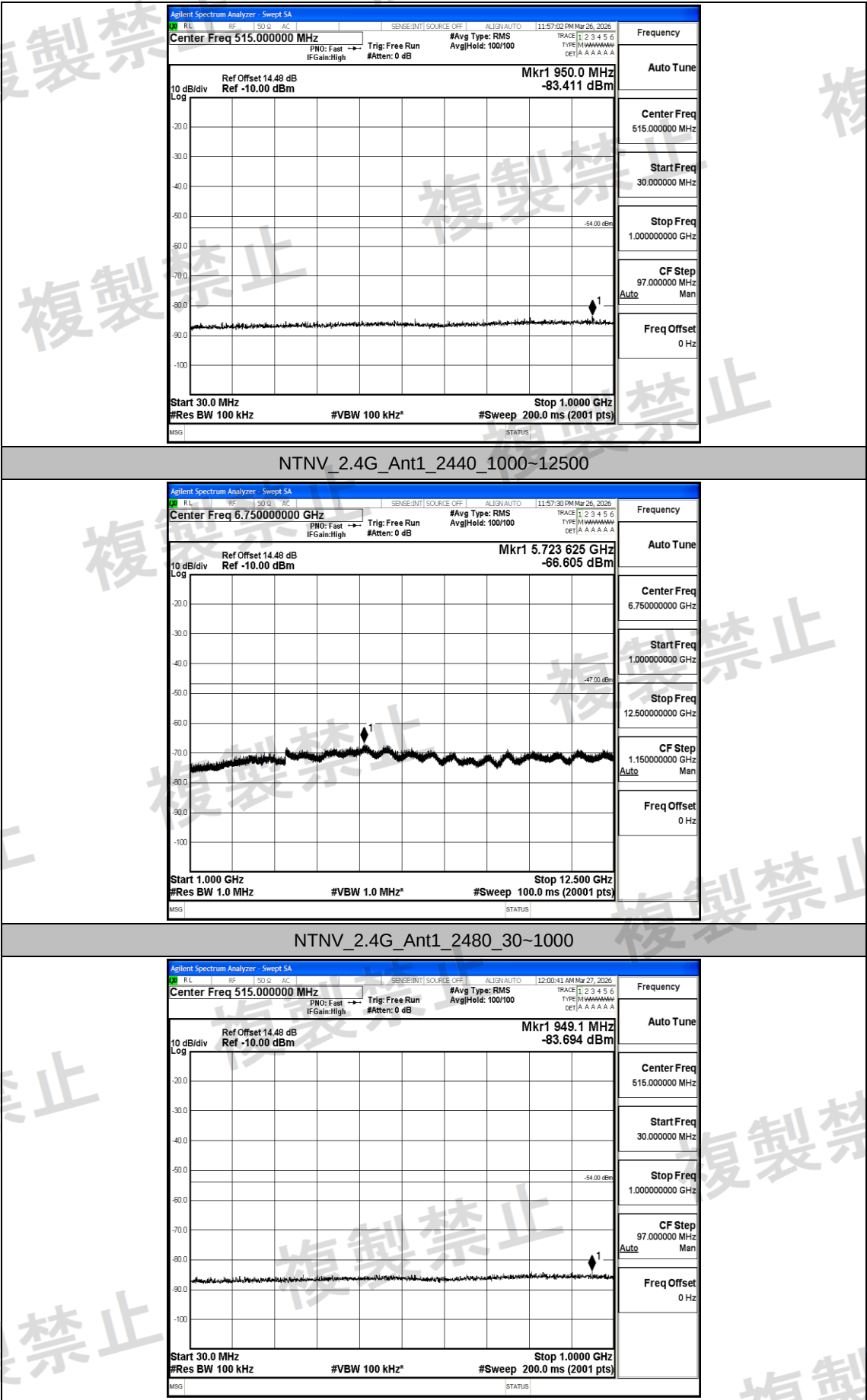
TestCondition	TestMode	Antenna	Freq(MHz)	Freq.Range [MHz]	Result [dBm]	Limit [dBm]	Result [nW]	Limit [nW]	Verdict
NTNV	2.4G	Ant1	2402	30~1000	-83.92	≤-54	0.00406	≤4	PASS
				1000~12500	-67.15	≤-47	0.19275	≤20	PASS
			2440	30~1000	-83.41	≤-54	0.00456	≤4	PASS
				1000~12500	-66.61	≤-47	0.21827	≤20	PASS
			2480	30~1000	-83.69	≤-54	0.00428	≤4	PASS
				1000~12500	-67.19	≤-47	0.19099	≤20	PASS

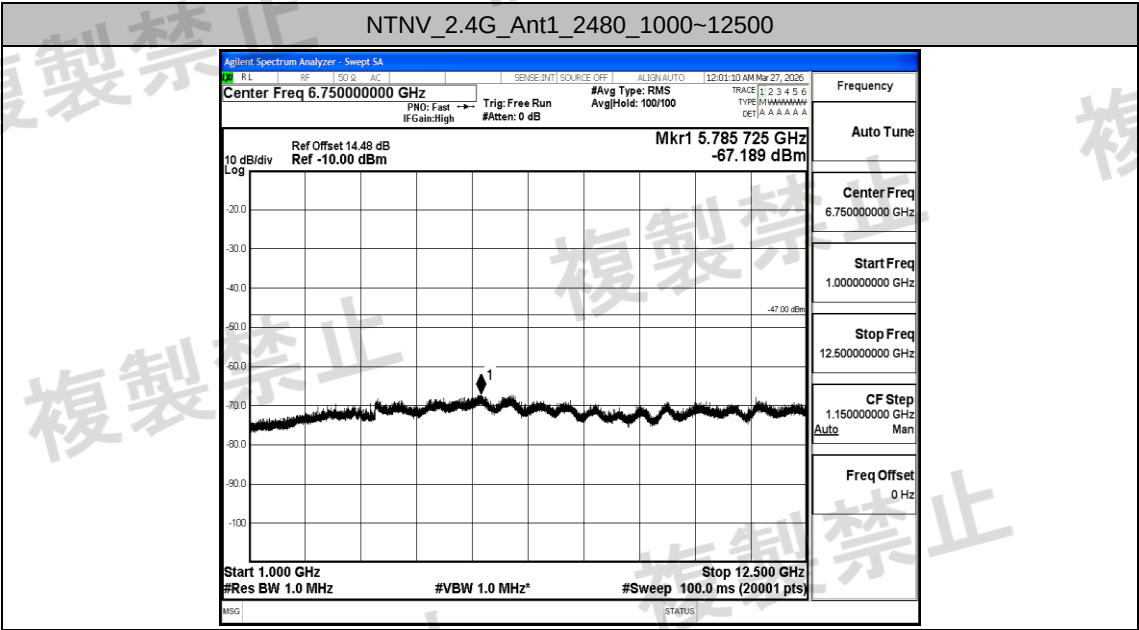
TestCondition	TestMode	Antenna	Freq(MHz)	Freq.Range [MHz]	Result [dBm]	Limit [dBm]	Result [nW]	Limit [nW]	Verdict
NTLV	2.4G	Ant1	2402	30~1000	-76.65	≤-54	0.0216	≤4	PASS
				1000~12500	-69.13	≤-47	0.1222	≤20	PASS
			2440	30~1000	-76.44	≤-54	0.0227	≤4	PASS
				1000~12500	-68.28	≤-47	0.1486	≤20	PASS
			2480	30~1000	-77.38	≤-54	0.0183	≤4	PASS
				1000~12500	-65.21	≤-47	0.3013	≤20	PASS

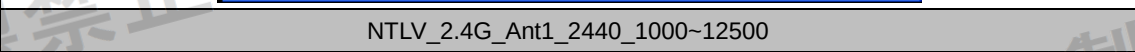
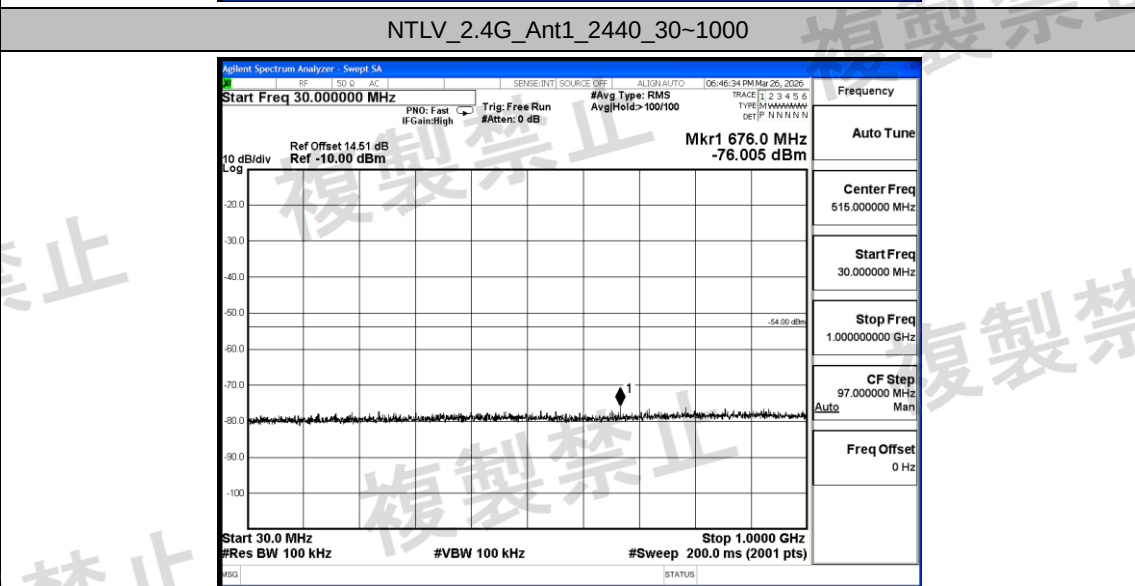
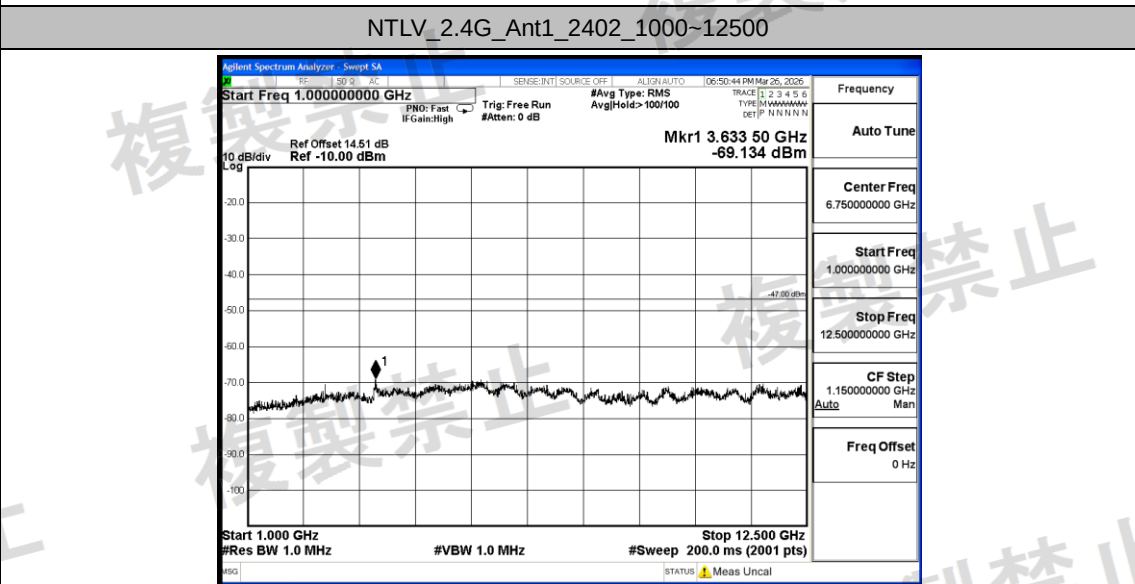
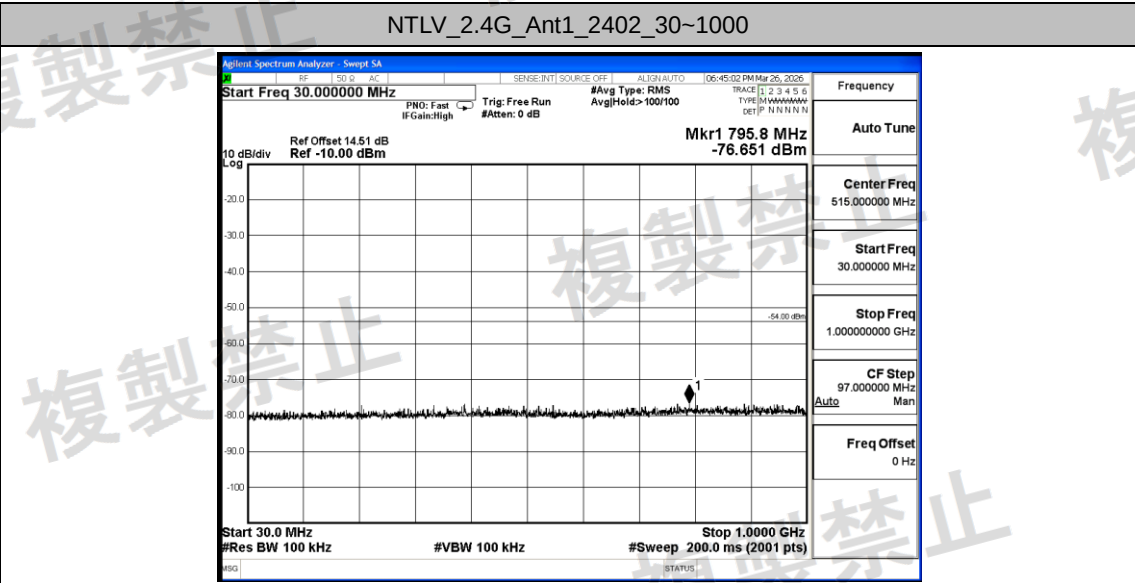
TestCondition	TestMode	Antenna	Freq(MHz)	Freq.Range [MHz]	Result [dBm]	Limit [dBm]	Result [nW]	Limit [nW]	Verdict
NTHV	2.4G	Ant1	2402	30~1000	-76.01	≤-54	0.0251	≤4	PASS
				1000~12500	-68.18	≤-47	0.1521	≤20	PASS
			2440	30~1000	-76.42	≤-54	0.0228	≤4	PASS
				1000~12500	-69.97	≤-47	0.1007	≤20	PASS
			2480	30~1000	-77.34	≤-54	0.0185	≤4	PASS
				1000~12500	-65.21	≤-47	0.3013	≤20	PASS

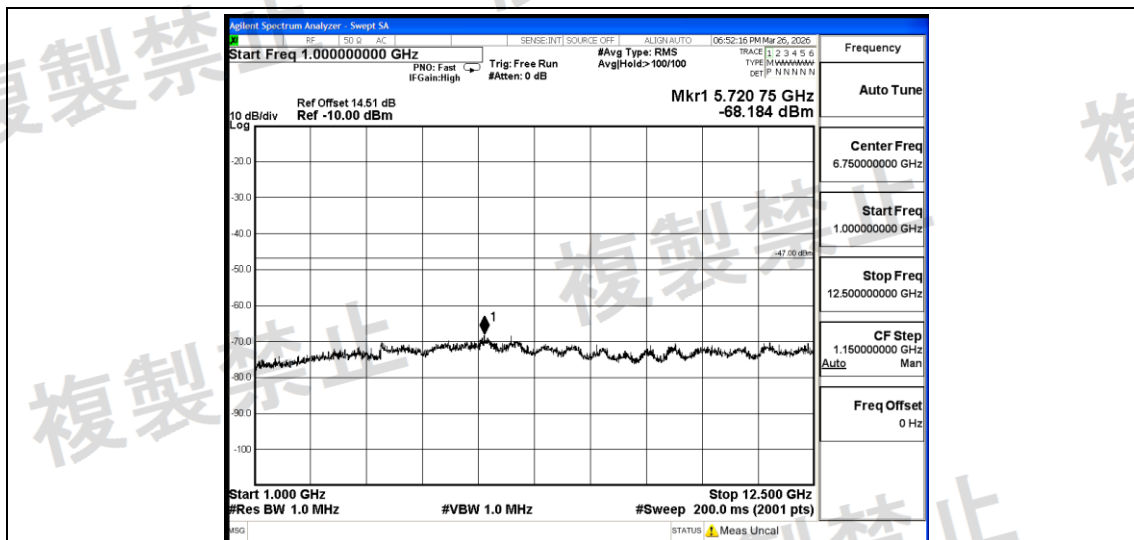
Test Graphs



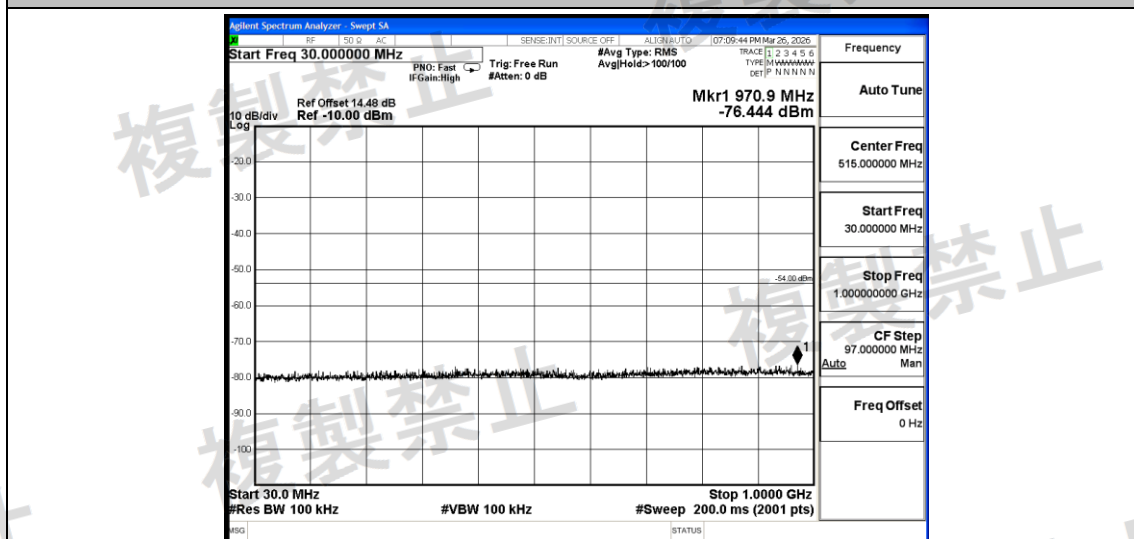




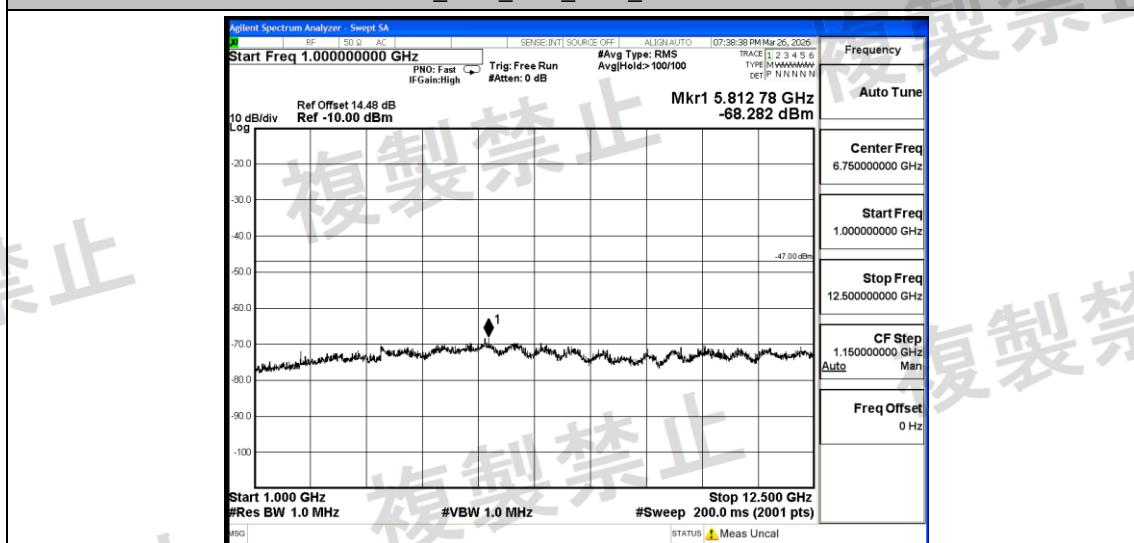




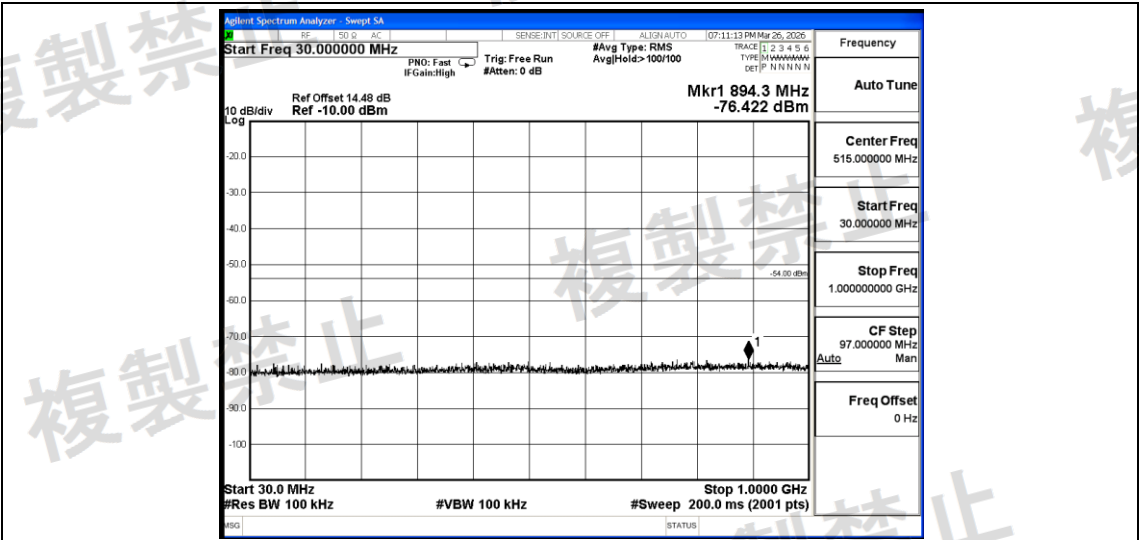
NTLV_2.4G_Ant1_2480_30~1000



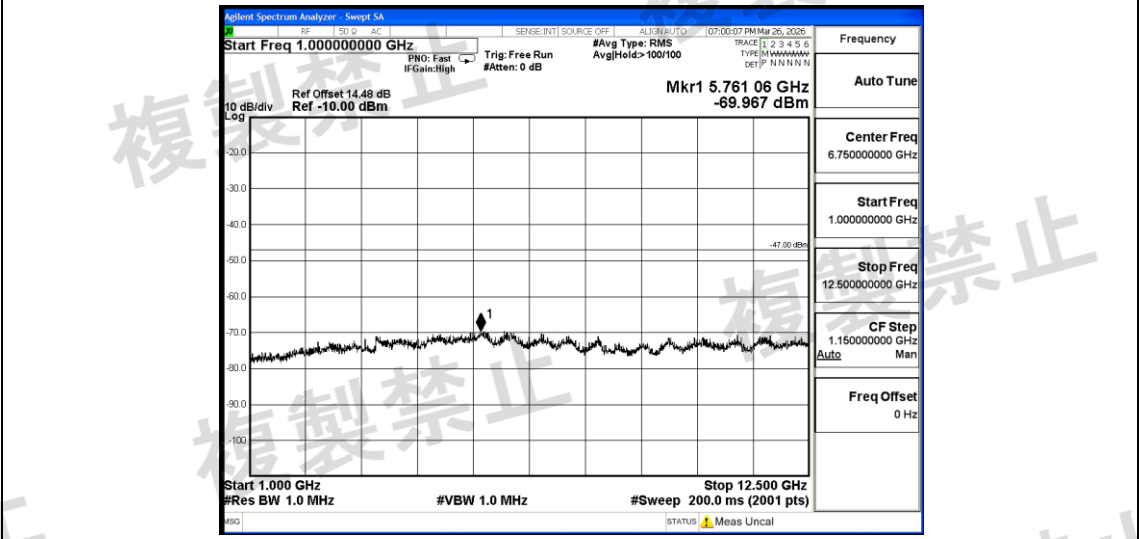
NTLV_2.4G_Ant1_2480_1000~12500



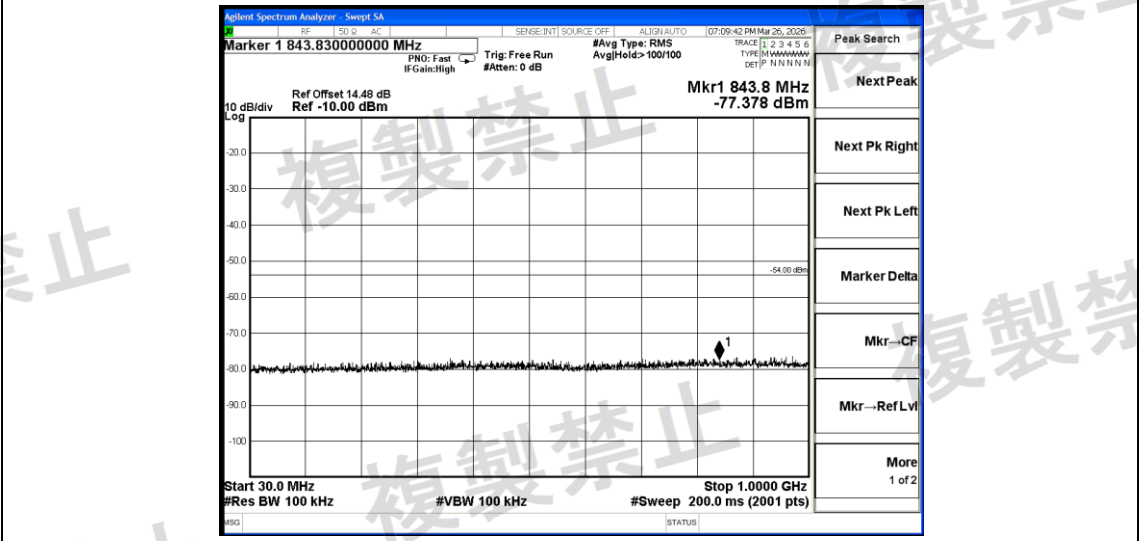
NTHV_2.4G_Ant1_2402_30~1000



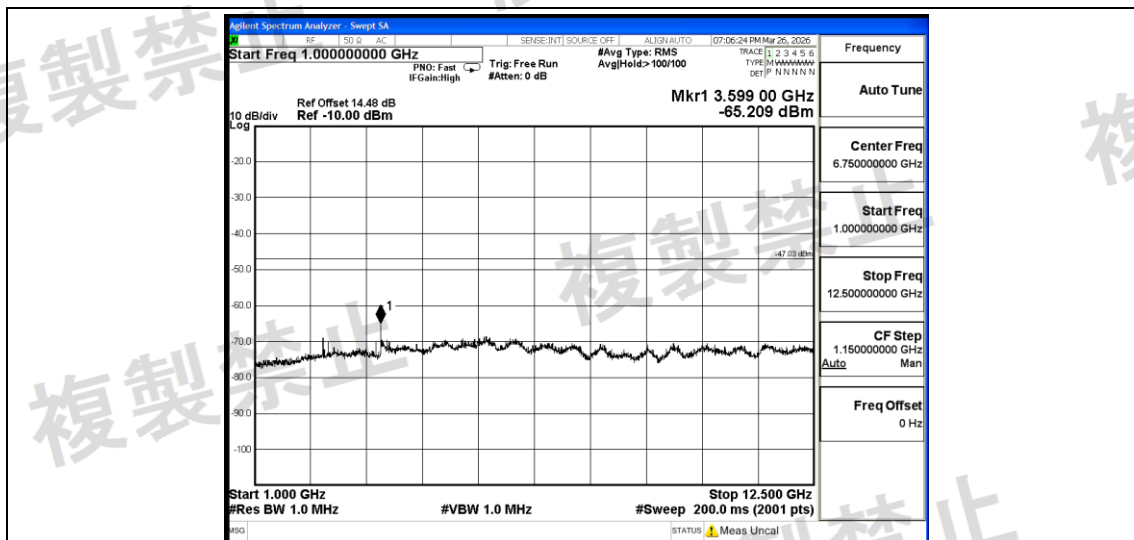
NTHV_2.4G_Ant1_2402_1000~12500



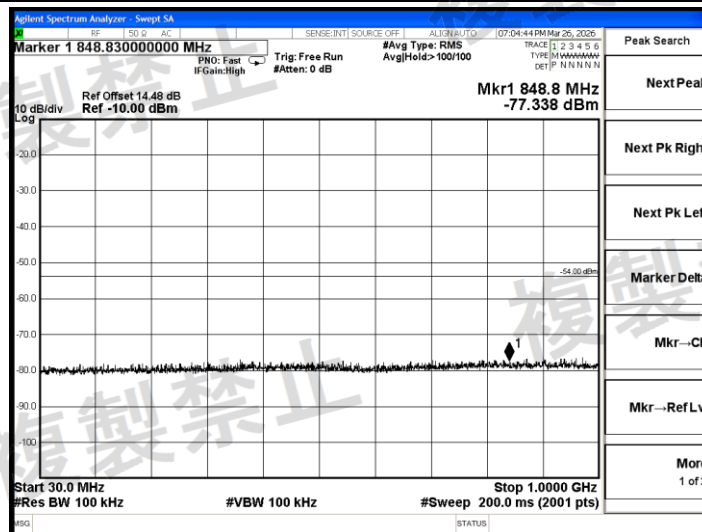
NTHV_2.4G_Ant1_2440_30~1000



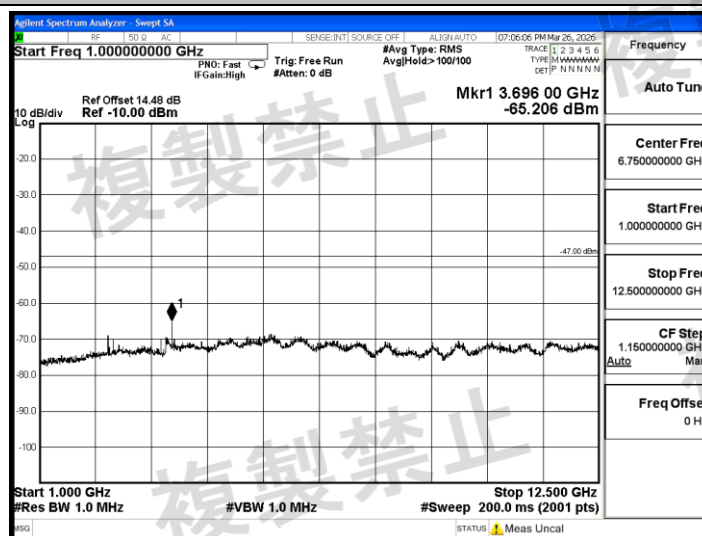
NTHV_2.4G_Ant1_2440_1000~12500



NTHV_2.4G_Ant1_2480_30~1000



NTHV_2.4G_Ant1_2480_1000~12500



A.7 Dwell Time

Test Result

TestCondition	TestMode	Antenna	Freq(MHz)	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit [s]	Verdict
NTNV	2.4G	Ant1	Hop	0.0575	49	0.003	≤0.4	PASS

TestCondition	TestMode	Antenna	Freq(MHz)	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit [s]	Verdict
NTLV	2.4G	Ant1	Hop	0.0550	49	0.003	≤0.4	PASS

TestCondition	TestMode	Antenna	Freq(MHz)	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit [s]	Verdict
NTHV	2.4G	Ant1	Hop	0.0545	49	0.003	≤0.4	PASS

Test Graphs

