



Appendix A for BT Test Data

Product Name: Integrated Amplifier

Test Model: 9000A

Environmental Conditions

Temperature:	23.4°C
Relative Humidity:	52.6%
ATM Pressure:	100.0 kPa
Test Engineer:	Jerry Chu
Supervised by:	Can Kun



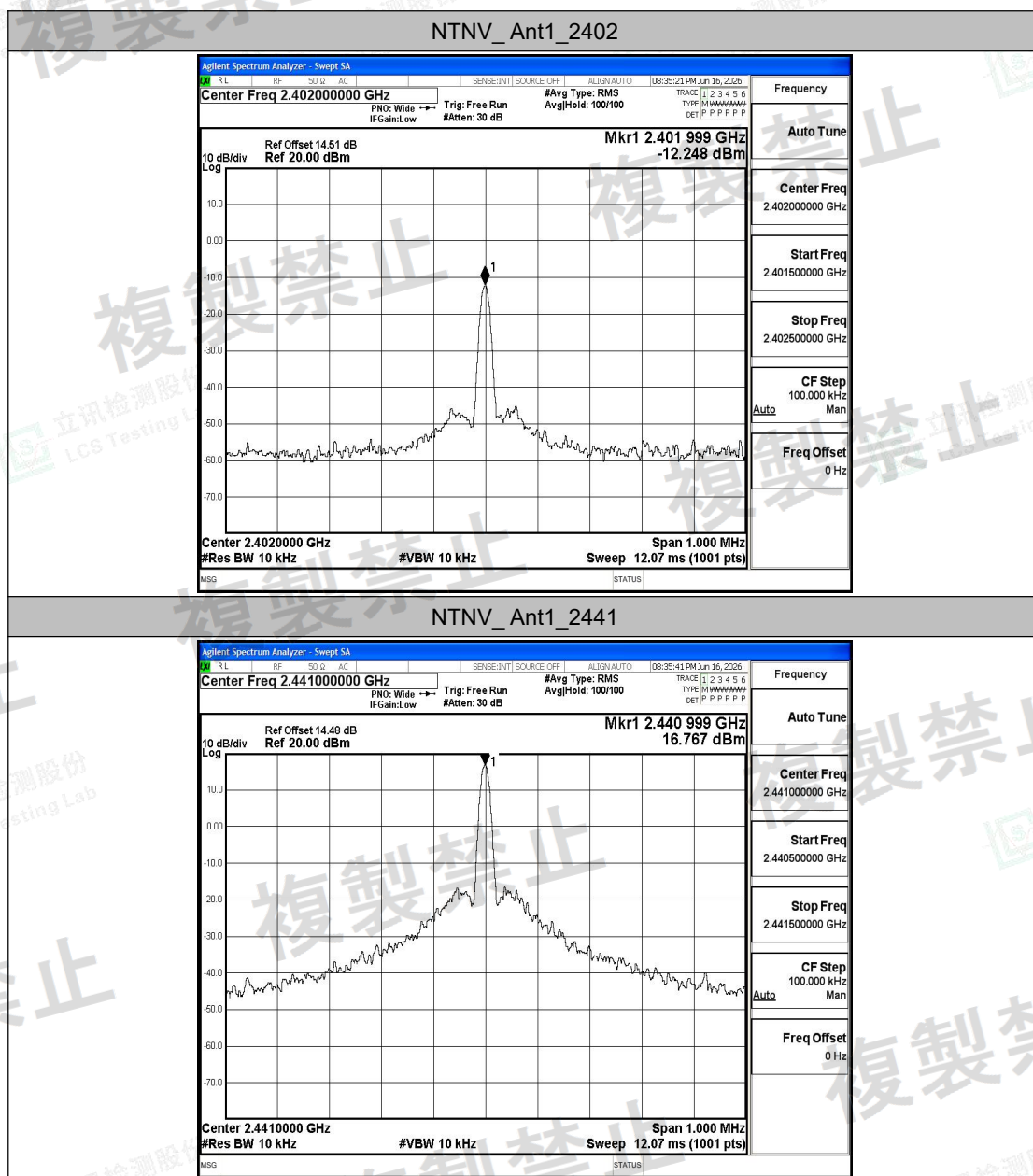
A.1 Frequency_Error

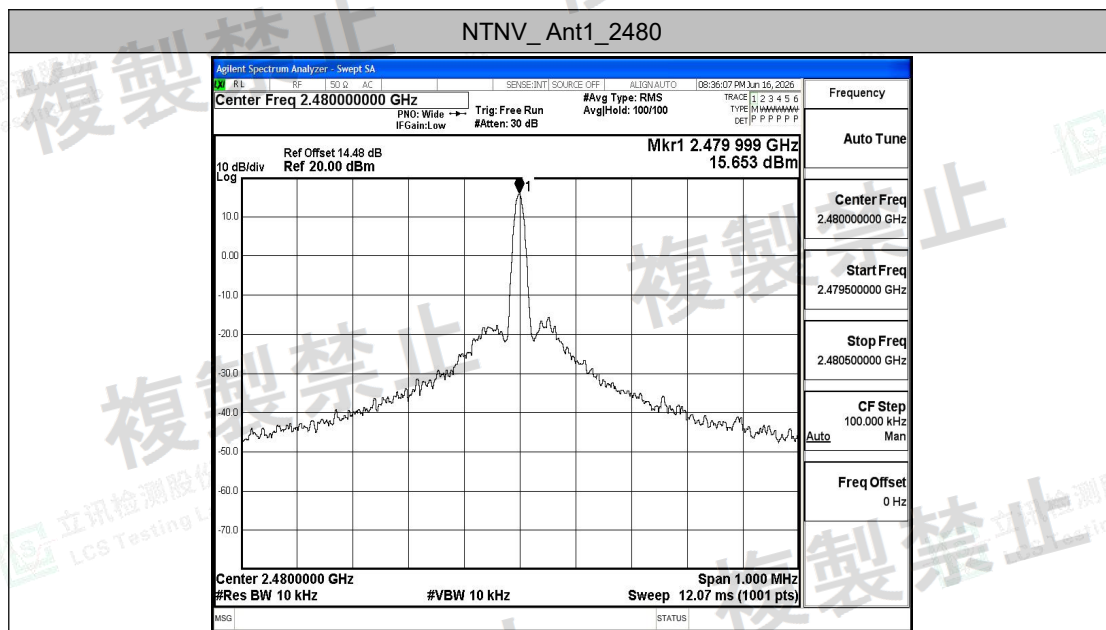
Test Result

Test Condition	Test Mode	Antenna	Frequency[MHz]	Result[ppm]	Limit[ppm]	Verdict
NTNV	Frequency Error	Ant1	2402	-0.41632	±50	PASS
			2441	-0.40967	±50	PASS
			2480	-0.40323	±50	PASS



Test Graphs







A.2 Antenna Power & EIRP

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)	/	/
Hopping-Tx (1Mbps)	0.03	2.42	1.746	0.033	3	10.00%	+20%
Hopping-Tx (2Mbps)	0.03	1.23	1.327	0.025	3	-16.67%	+20%
Hopping-Tx (3Mbps)	0.03	2.08	1.614	0.030	3	0.00%	+20%
Conclusion: PASS							

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

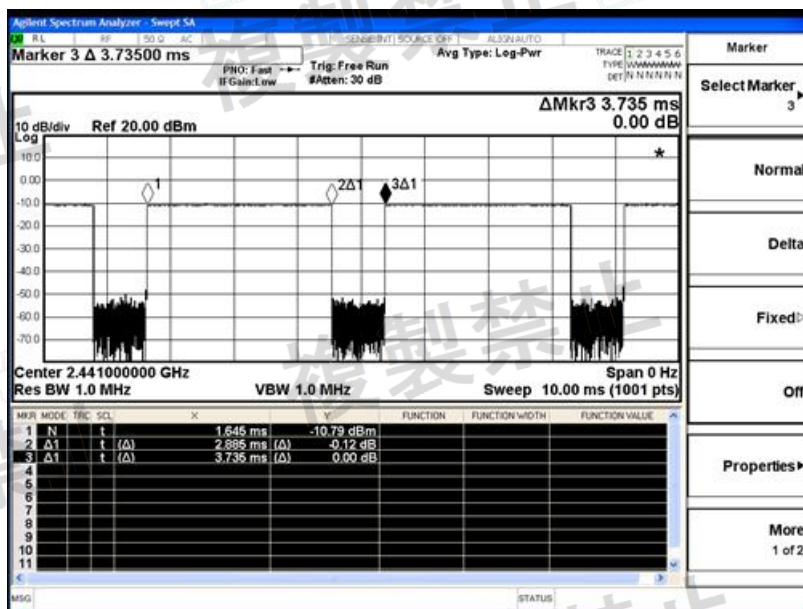
Antenna power Result = Measured Power / Spreading bandwidth

Spread Bandwidth (DH5) = 69.351MHz, Spread Bandwidth (2DH5) = 69.573MHz,

Spread Bandwidth (3DH5) = 69.353MHz

Duty cycle=77.2%

Duty cycle= [Ton/ (Ton+Toff)]*100%=2.885/3.735*100%=77.2%





EIRP								
Test Condition	TestMode	Antenna	Result (mW/MHz)	Result (dBm/MHz)	Antenna Gain(dBi)	EIRP (dBm/MHz)	Limit (dBm/MHz)	Verdict
NTNV	Hopping-Tx (1Mbps)	Ant1	0.033	-14.81	3.6	-11.21	≤6.91	PASS
NTNV	Hopping-Tx (2Mbps)	Ant1	0.025	-16.02	3.6	-12.42	≤6.91	PASS
NTNV	Hopping-Tx (3Mbps)	Ant1	0.030	-15.23	3.6	-11.63	≤6.91	PASS



A.3 Occupied Bandwidth

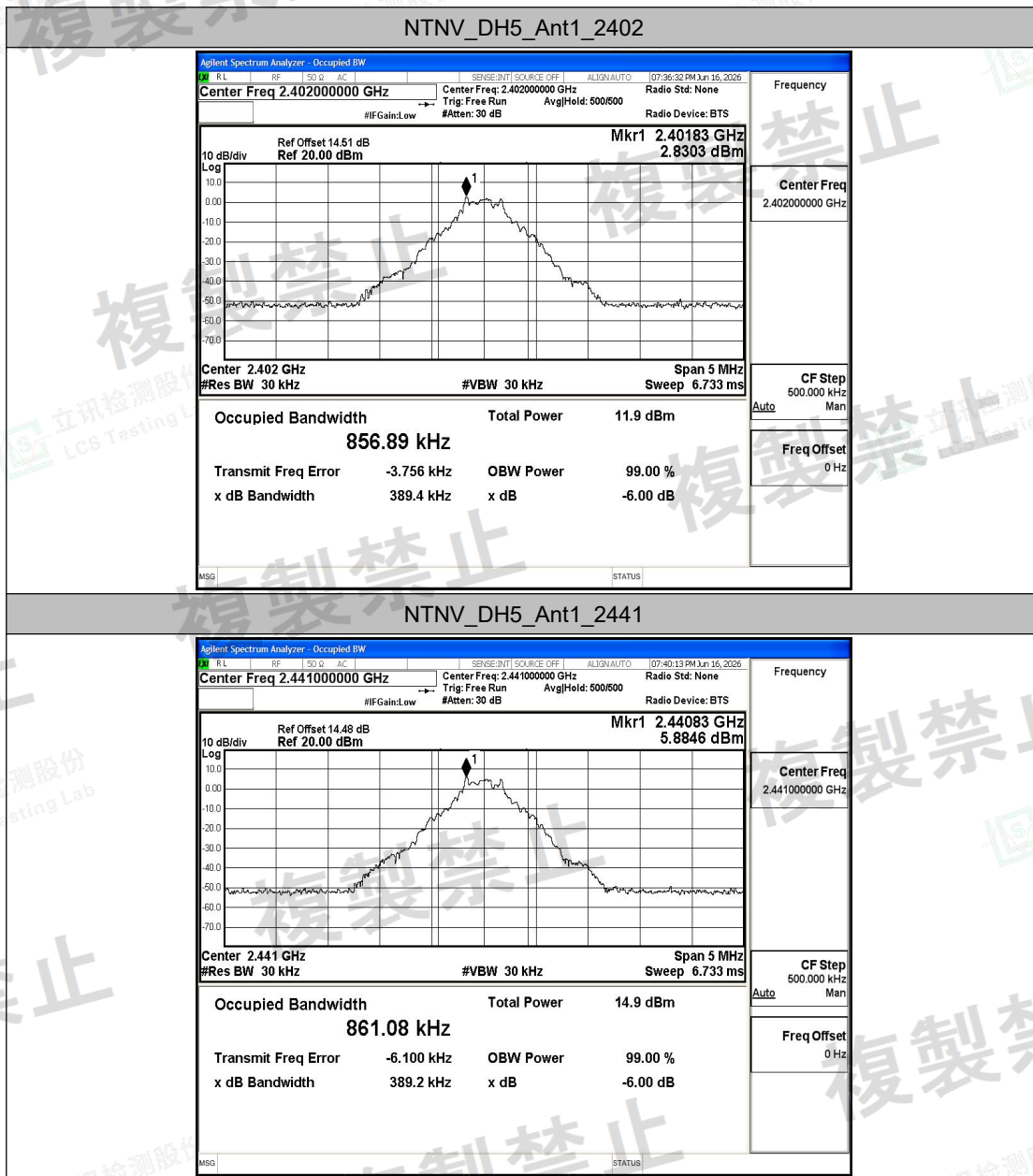
Test Result

Test Condition	Test Mode	Antenna	Frequency [MHz]	Result [MHz]	Limit [MHz]	Verdict
NTNV	DH5	Ant1	2402	0.857	≤83.5	PASS
			2441	0.861	≤83.5	PASS
			2480	0.864	≤83.5	PASS
	2DH5	Ant1	2402	1.187	≤83.5	PASS
			2441	1.183	≤83.5	PASS
			2480	1.187	≤83.5	PASS
	3DH5	Ant1	2402	1.184	≤83.5	PASS
			2441	1.185	≤83.5	PASS
			2480	1.185	≤83.5	PASS

Test Condition	Test Mode	Antenna	Frequency [MHz]	Result [MHz]	Limit [MHz]	Verdict
NTNV	DH5	Ant1	Hop	78.486	≤83.5	PASS
	2DH5	Ant1	Hop	78.560	≤83.5	PASS
	3DH5	Ant1	Hop	78.565	≤83.5	PASS

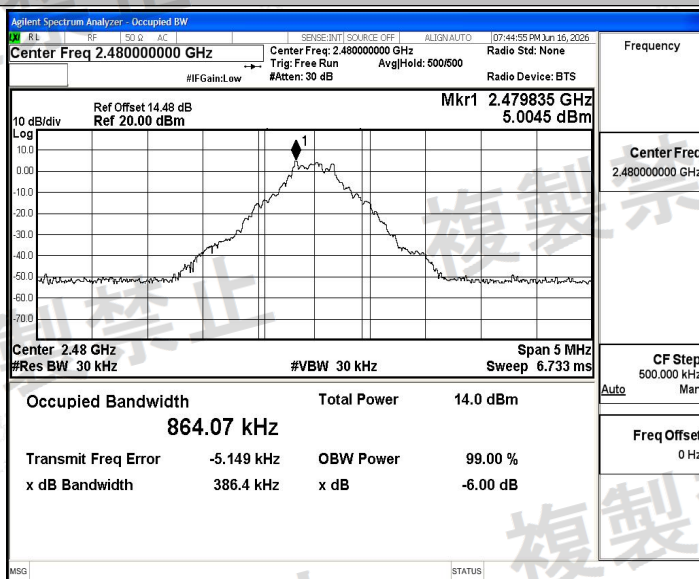


Test Graphs

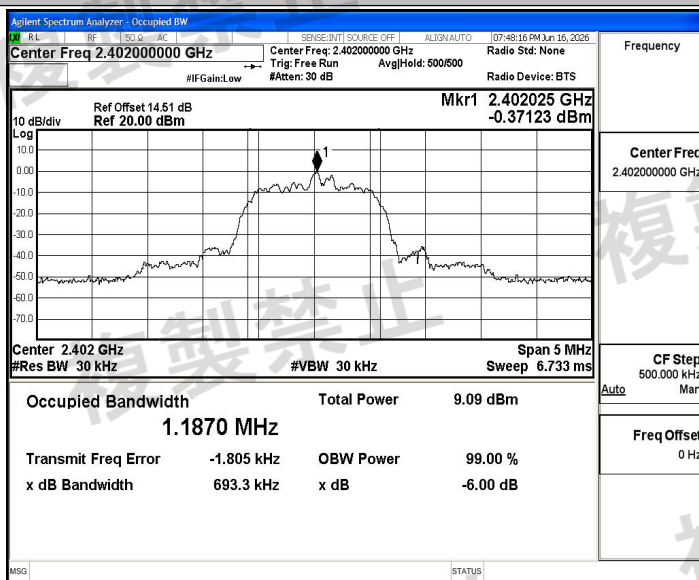




NTNV_DH5_Ant1_2480

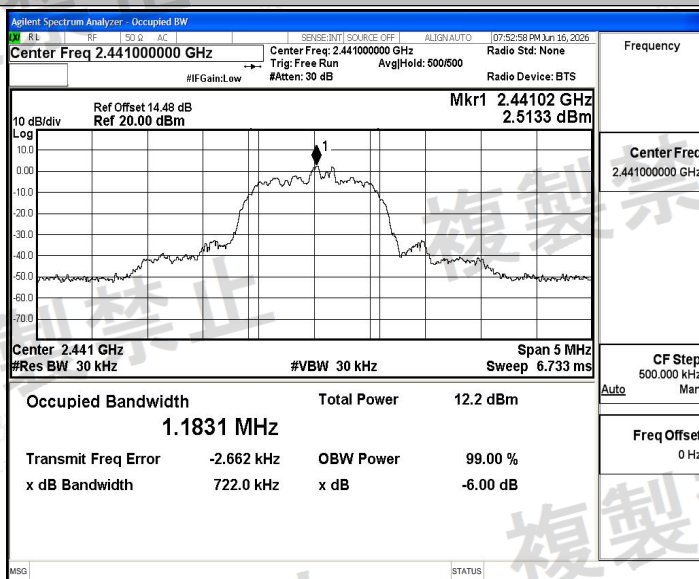


NTNV_2DH5_Ant1_2402

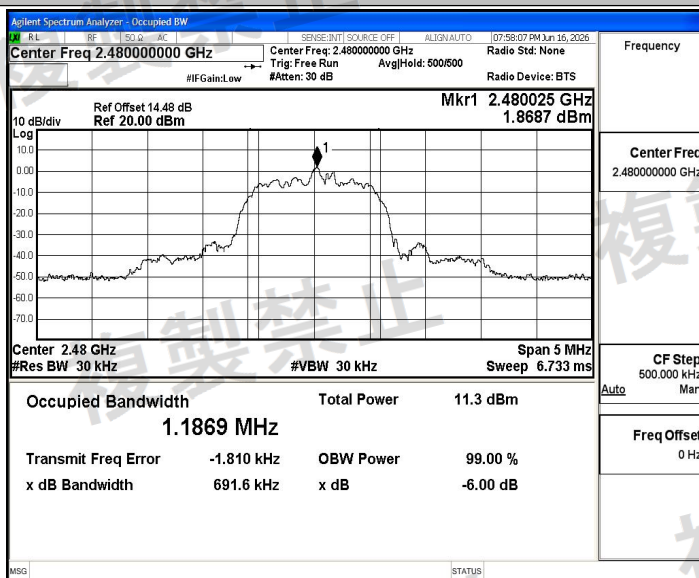




NTNV_2DH5_Ant1_2441

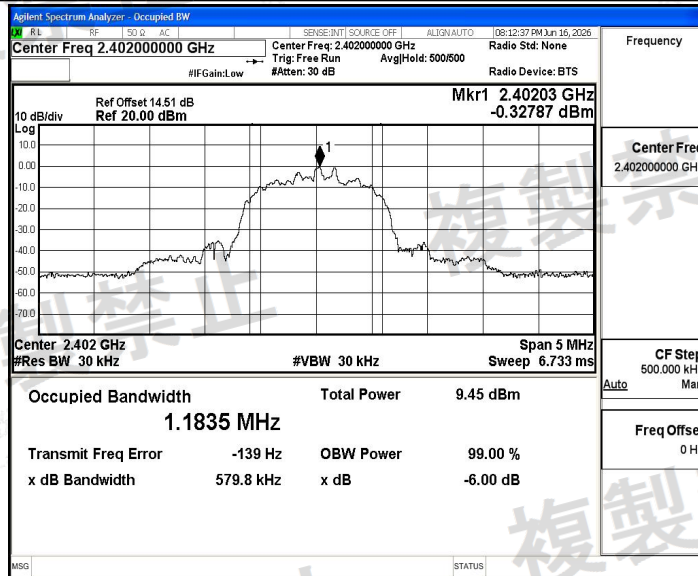


NTNV_2DH5_Ant1_2480

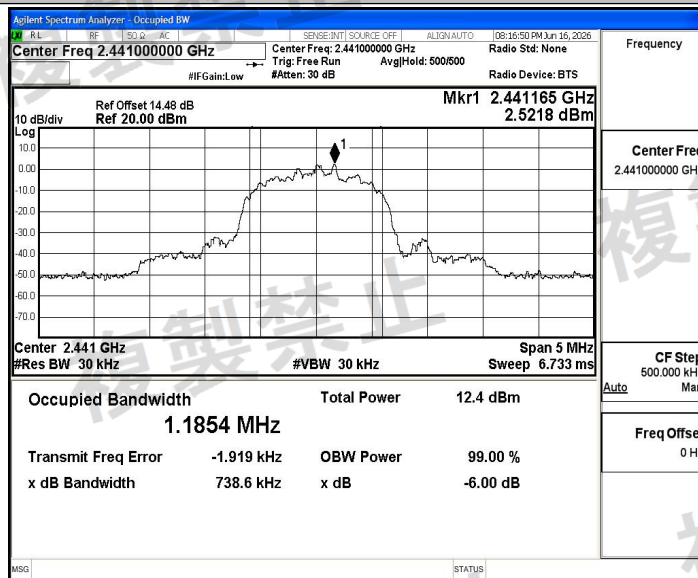


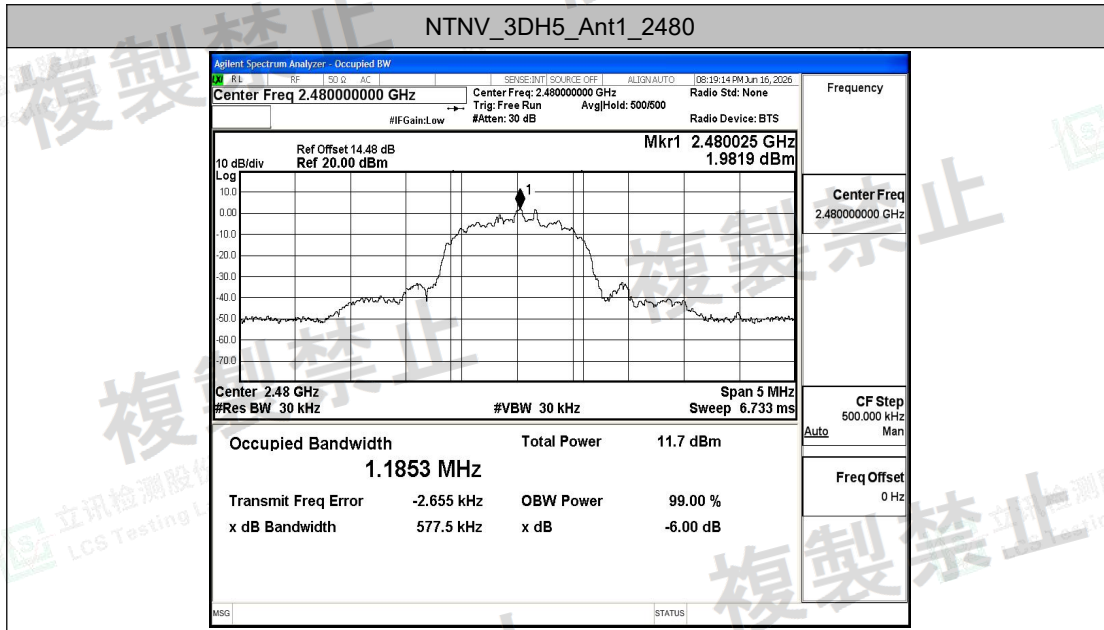


NTNV_3DH5_Ant1_2402



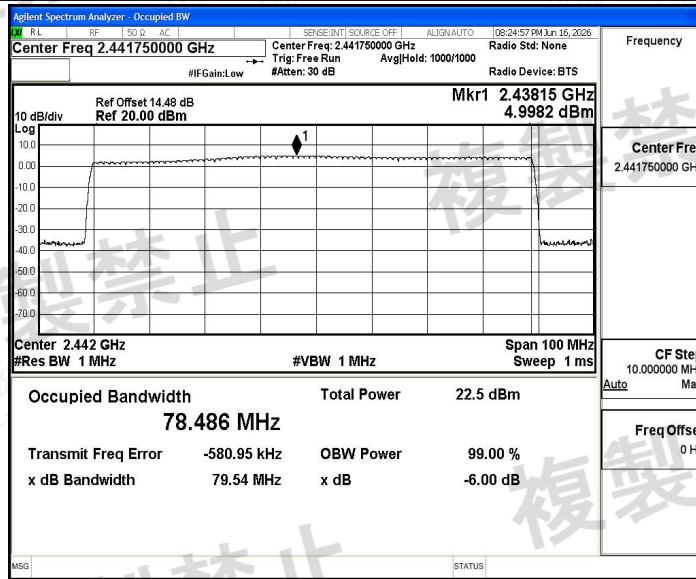
NTNV_3DH5_Ant1_2441



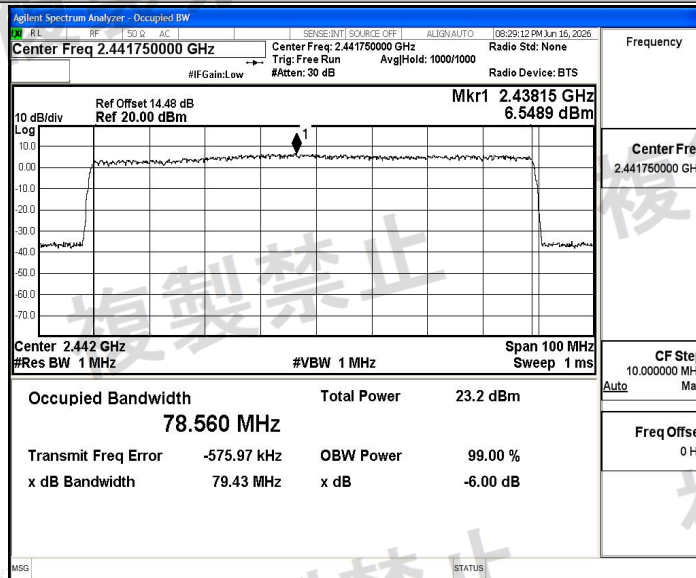


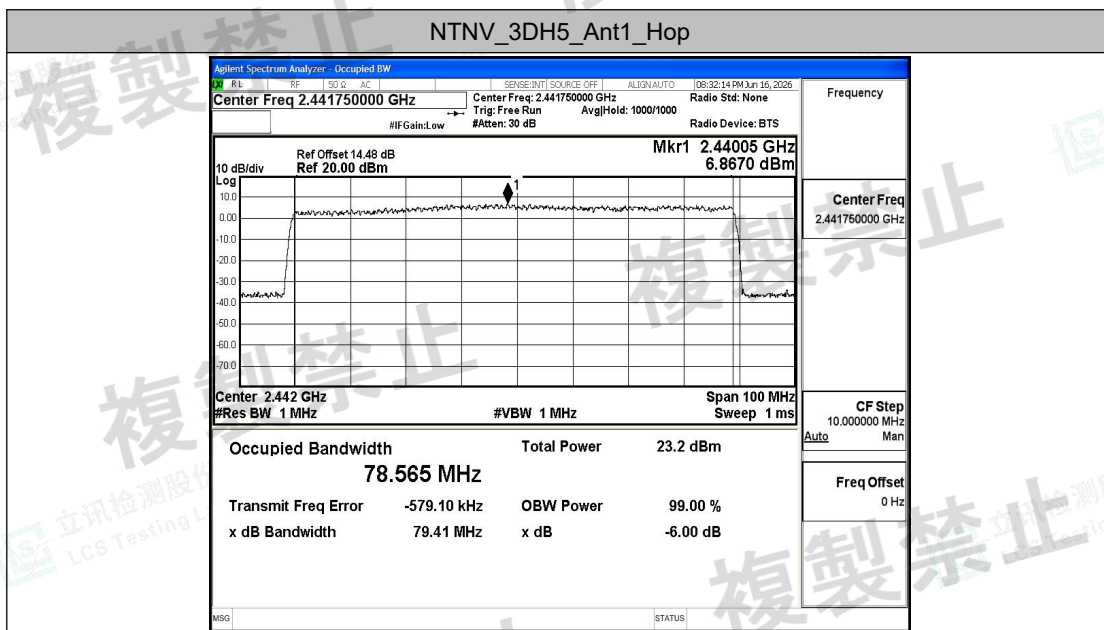


NTNV_DH5_Ant1_Hop



NTNV_2DH5_Ant1_Hop







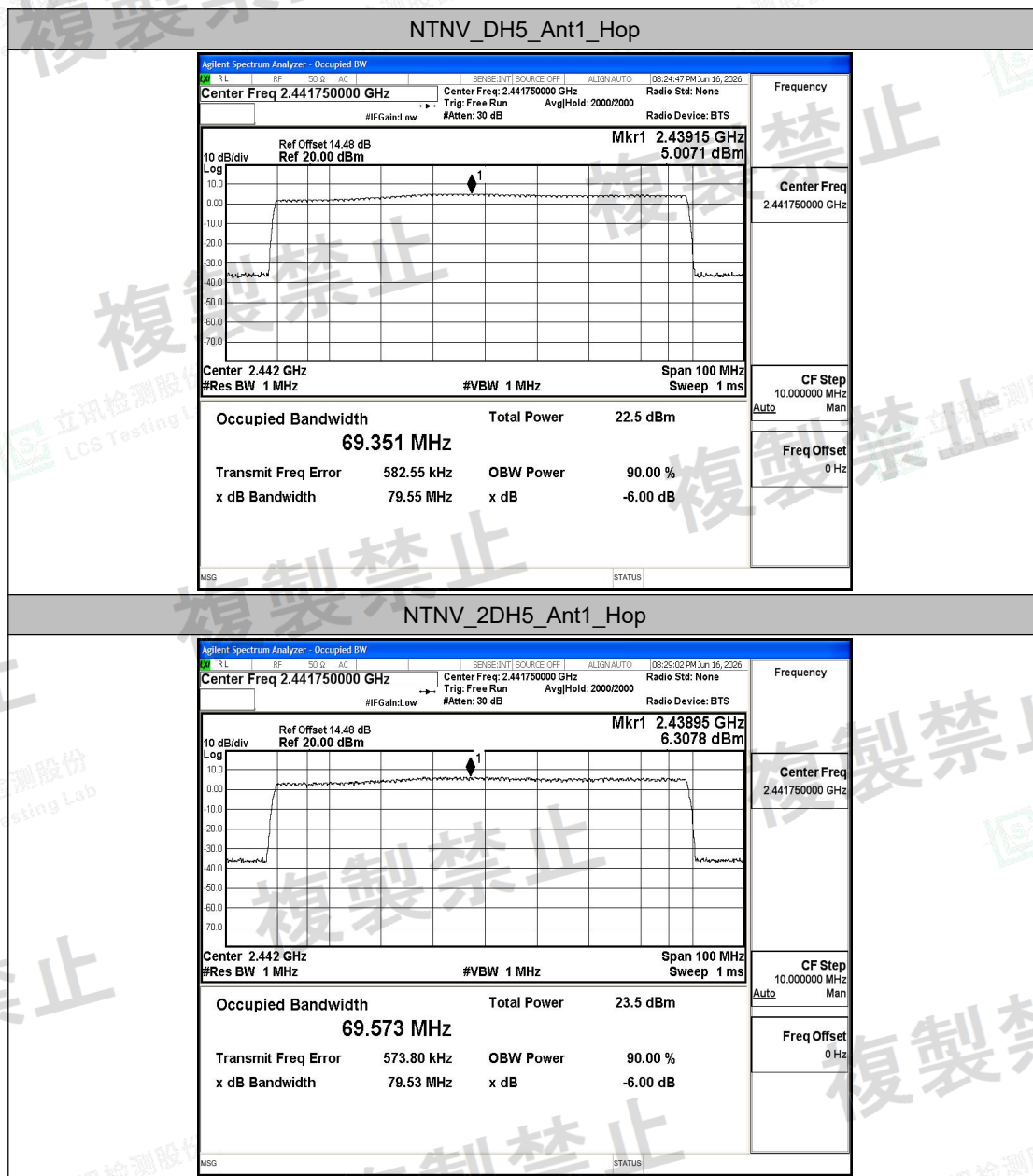
A.4 Spread Bandwidth

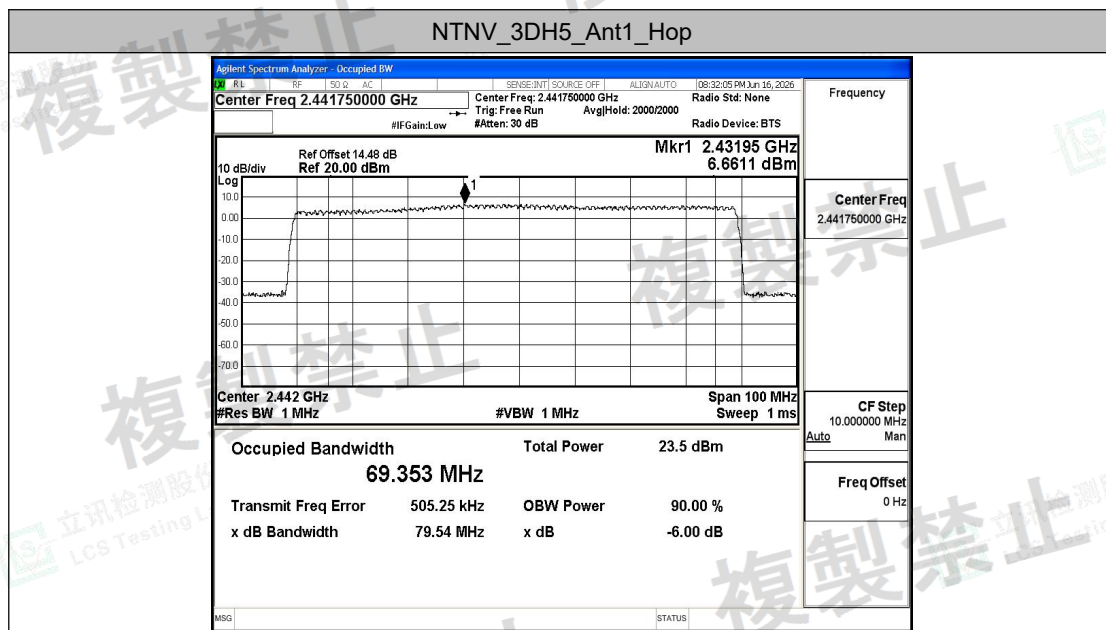
Test Result

Test Condition	Test Mode	Antenna	Frequency[MHz]	Result [MHz]	Limit	Verdict
NTNV	DH5	Ant1	Hop	69.351	---	PASS
	2DH5	Ant1	Hop	69.573	---	PASS
	3DH5	Ant1	Hop	69.353	---	PASS



Test Graphs







A.5 Spurious Emission of TX

Test Result

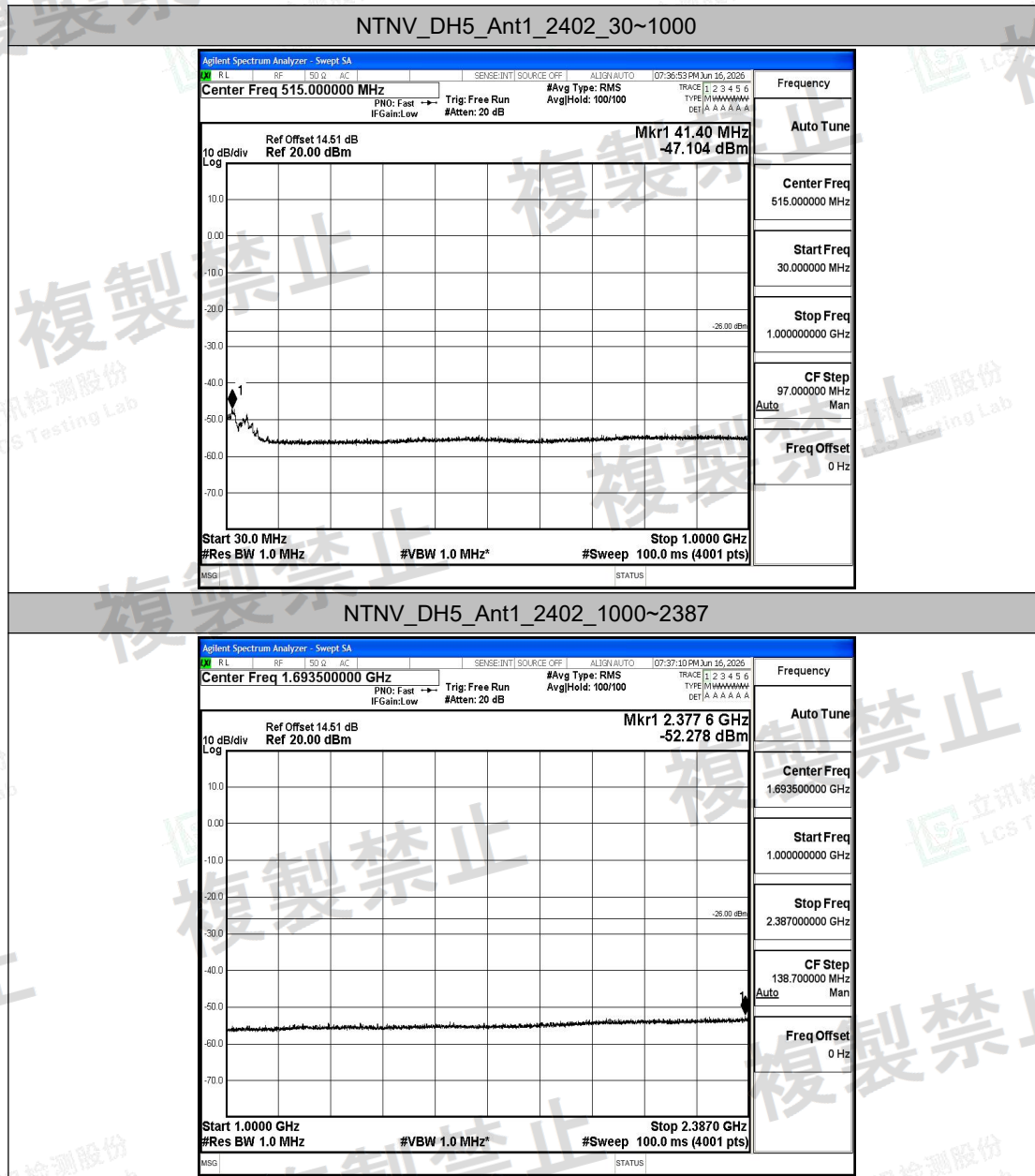
Test Condition	Test Mode	Antenna	Frequency [MHz]	Freq. Range [MHz]	Result [dBm]	Limit [dBm]	Result [μW]	Limit [μW]	Verdict
NTNV	DH5	Ant1	2402	30~1000	-47.10	≤-26	0.01950	≤2.5	PASS
				1000~2387	-52.28	≤-26	0.00592	≤2.5	PASS
				2387~2400	-40.71	≤-16	0.08492	≤25	PASS
				2483.5~2496.5	-42.97	≤-16	0.05047	≤25	PASS
				2496.5~13000	-28.39	≤-26	1.44877	≤2.5	PASS
			2441	30~1000	-45.59	≤-26	0.02761	≤2.5	PASS
				1000~2387	-52.39	≤-26	0.00577	≤2.5	PASS
				2387~2400	-43.37	≤-16	0.04603	≤25	PASS
				2483.5~2496.5	-43.16	≤-16	0.04831	≤25	PASS
				2496.5~13000	-34.51	≤-26	0.35400	≤2.5	PASS
			2480	30~1000	-44.90	≤-26	0.03236	≤2.5	PASS
				1000~2387	-52.48	≤-26	0.00565	≤2.5	PASS
				2387~2400	-43.45	≤-16	0.04519	≤25	PASS
				2483.5~2496.5	-43.10	≤-16	0.04898	≤25	PASS
				2496.5~13000	-45.61	≤-26	0.02748	≤2.5	PASS
	2DH5	Ant1	2402	30~1000	-44.64	≤-26	0.03436	≤2.5	PASS
				1000~2387	-52.59	≤-26	0.00551	≤2.5	PASS
				2387~2400	-34.87	≤-16	0.32584	≤25	PASS
				2483.5~2496.5	-43.07	≤-16	0.04932	≤25	PASS
				2496.5~13000	-45.33	≤-26	0.02931	≤2.5	PASS
			2441	30~1000	-43.74	≤-26	0.04227	≤2.5	PASS
				1000~2387	-52.77	≤-26	0.00528	≤2.5	PASS
				2387~2400	-43.43	≤-16	0.04539	≤25	PASS
				2483.5~2496.5	-43.11	≤-16	0.04887	≤25	PASS
				2496.5~13000	-45.03	≤-26	0.03141	≤2.5	PASS
			2480	30~1000	-44.03	≤-26	0.03954	≤2.5	PASS
				1000~2387	-52.65	≤-26	0.00543	≤2.5	PASS
				2387~2400	-43.25	≤-16	0.04732	≤25	PASS
				2483.5~2496.5	-43.25	≤-16	0.04732	≤25	PASS
				2496.5~13000	-36.75	≤-26	0.21135	≤2.5	PASS
	3DH5	Ant1	2402	30~1000	-44.51	≤-26	0.03540	≤2.5	PASS
				1000~2387	-52.62	≤-26	0.00547	≤2.5	PASS
				2387~2400	-34.98	≤-16	0.31769	≤25	PASS
				2483.5~2496.5	-43.34	≤-16	0.04634	≤25	PASS
				2496.5~13000	-37.43	≤-26	0.18072	≤2.5	PASS
			2441	30~1000	-43.95	≤-26	0.04027	≤2.5	PASS
				1000~2387	-52.71	≤-26	0.00536	≤2.5	PASS



		2480	2387~2400	-43.48	≤-16	0.04487	≤25	PASS
			2483.5~2496.5	-43.24	≤-16	0.04742	≤25	PASS
			2496.5~13000	-33.97	≤-26	0.40087	≤2.5	PASS
			30~1000	-27.05	≤-26	1.97242	≤2.5	PASS
			1000~2387	-49.08	≤-26	0.01236	≤2.5	PASS
			2387~2400	-43.26	≤-16	0.04721	≤25	PASS
			2483.5~2496.5	-43.22	≤-16	0.04764	≤25	PASS
			2496.5~13000	-31.02	≤-26	0.79068	≤2.5	PASS

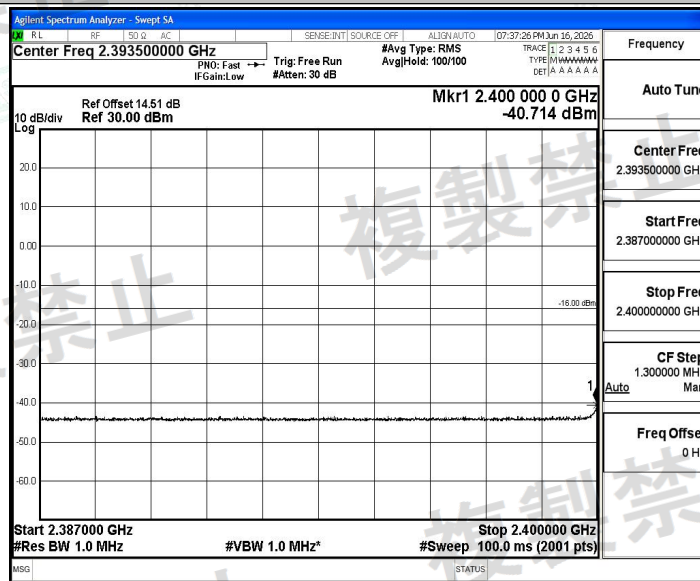


Test Graphs

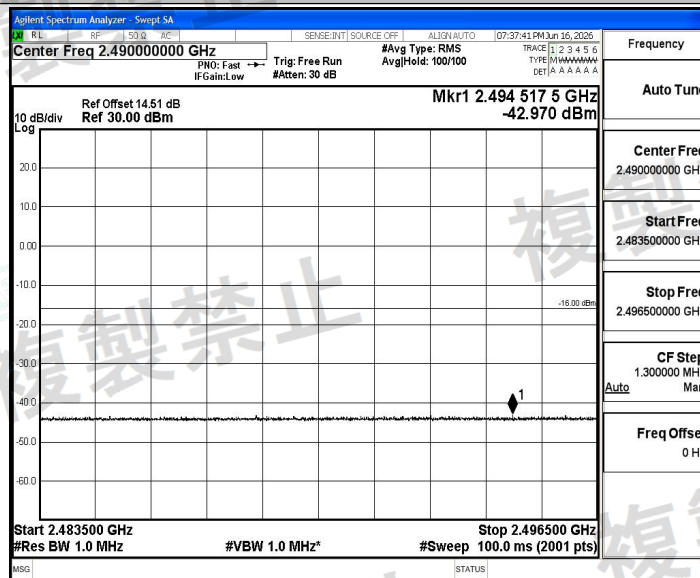




NTNV_DH5_Ant1_2402_2387~2400

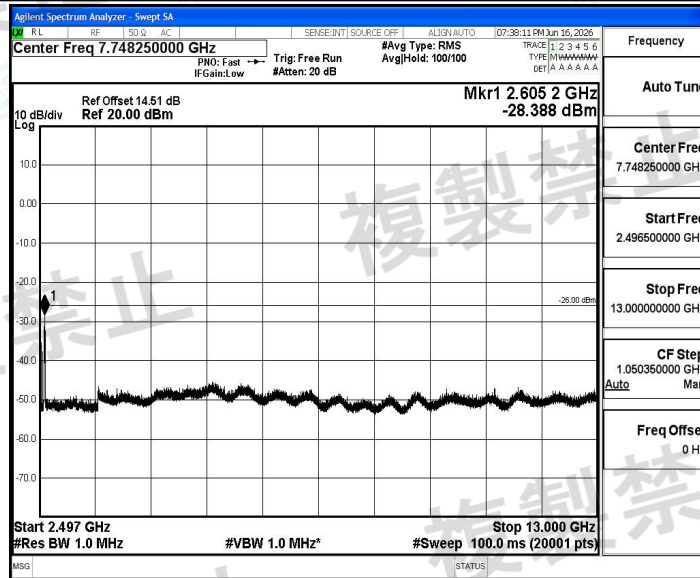


NTNV_DH5_Ant1_2402_2483.5~2496.5

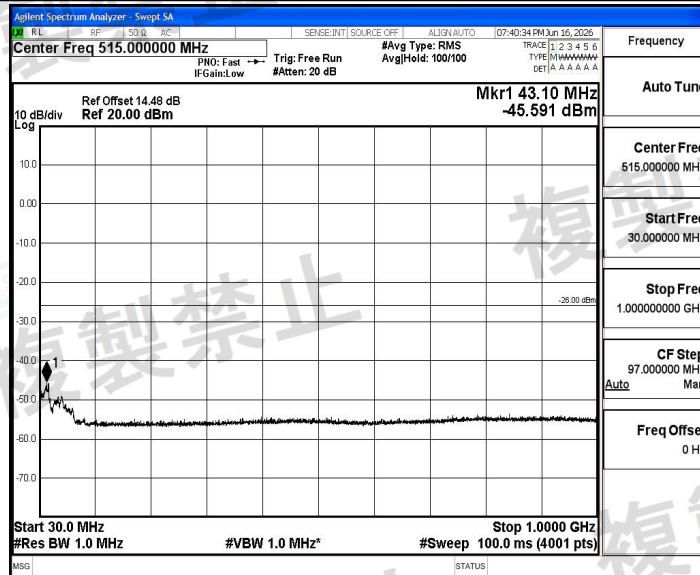




NTNV_DH5_Ant1_2402_2496.5~13000

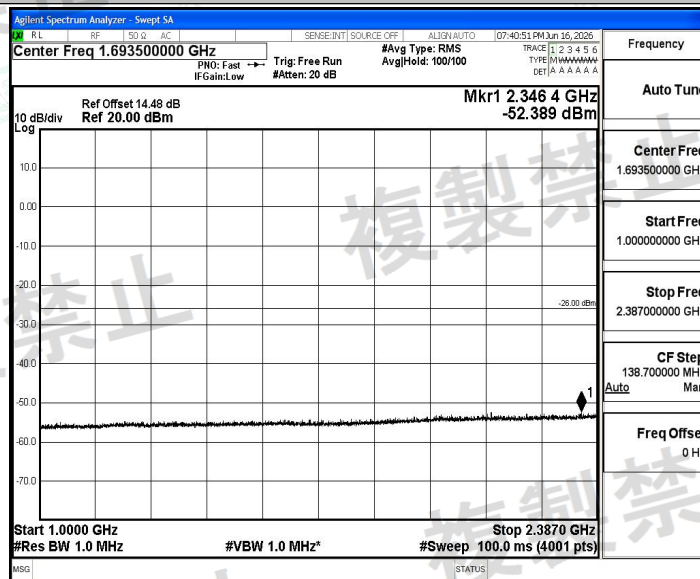


NTNV_DH5_Ant1_2441_30~1000

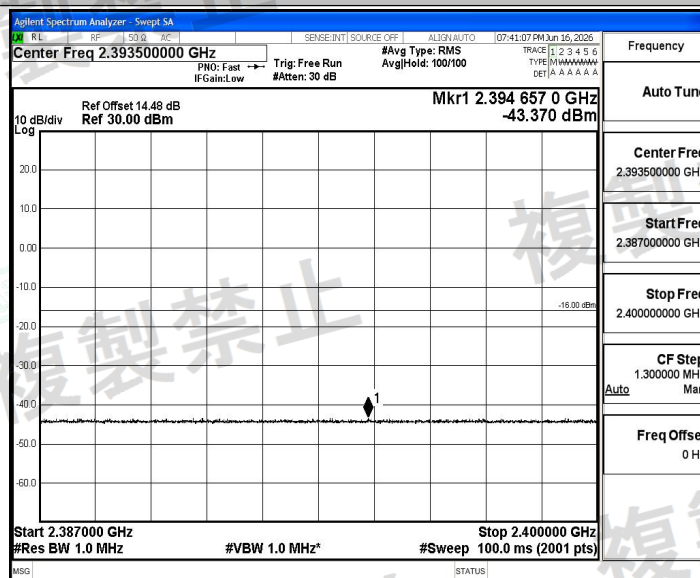




NTNV_DH5_Ant1_2441_1000~2387

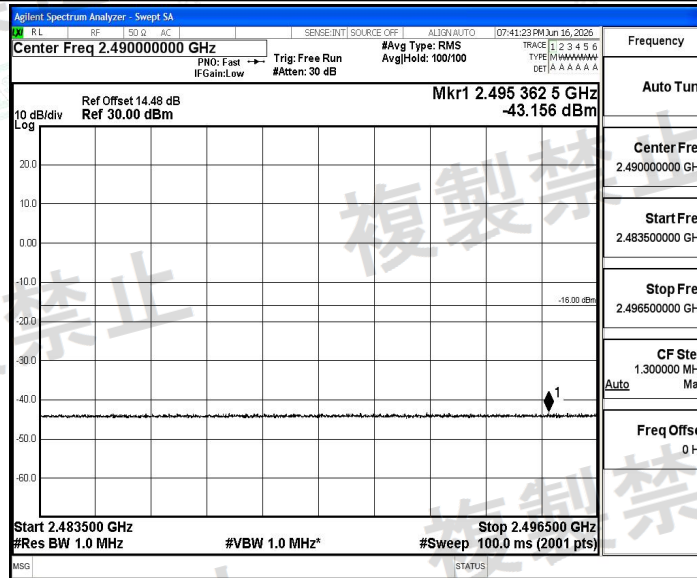


NTNV_DH5_Ant1_2441_2387~2400

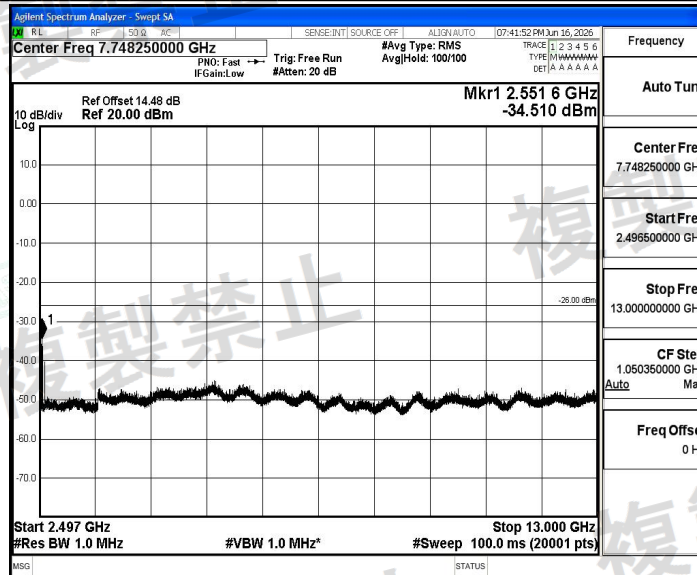




NTNV_DH5_Ant1_2441_2483.5~2496.5

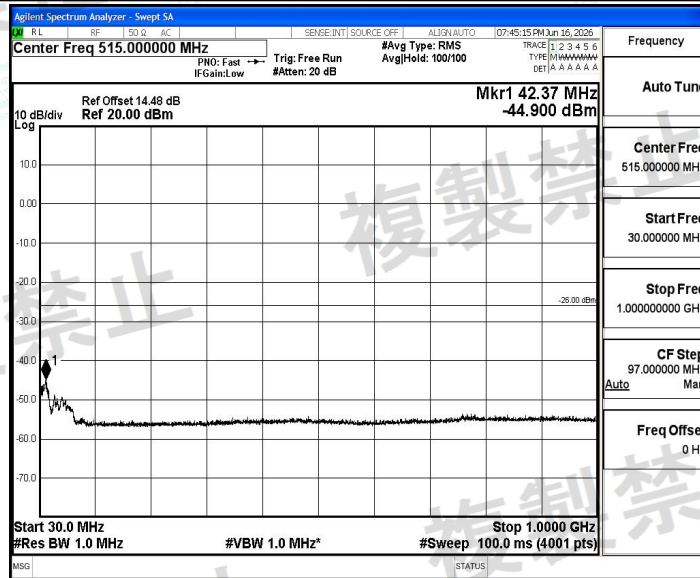


NTNV_DH5_Ant1_2441_2496.5~13000

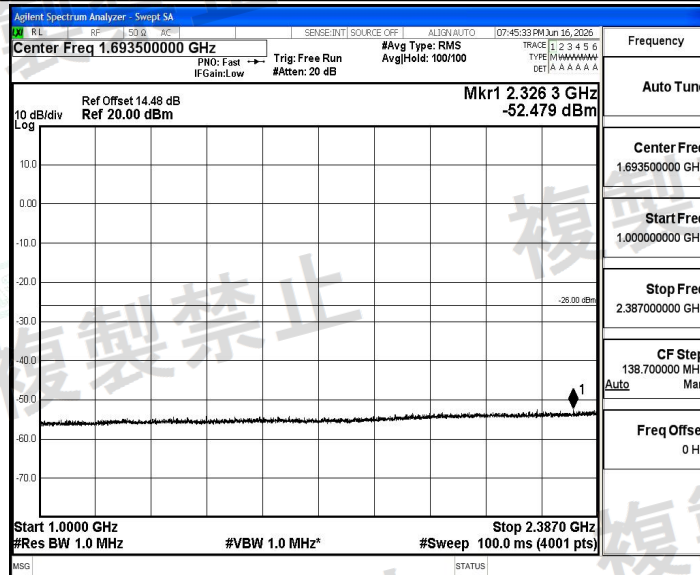




NTNV_DH5_Ant1_2480_30~1000



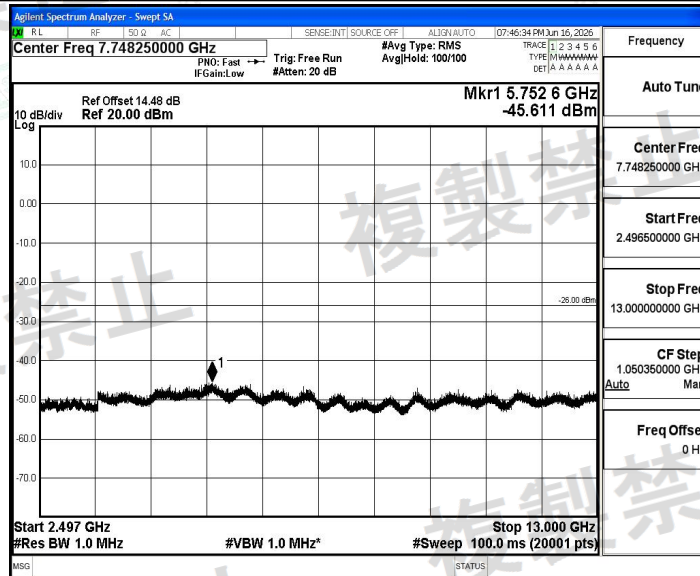
NTNV_DH5_Ant1_2480_1000~2387



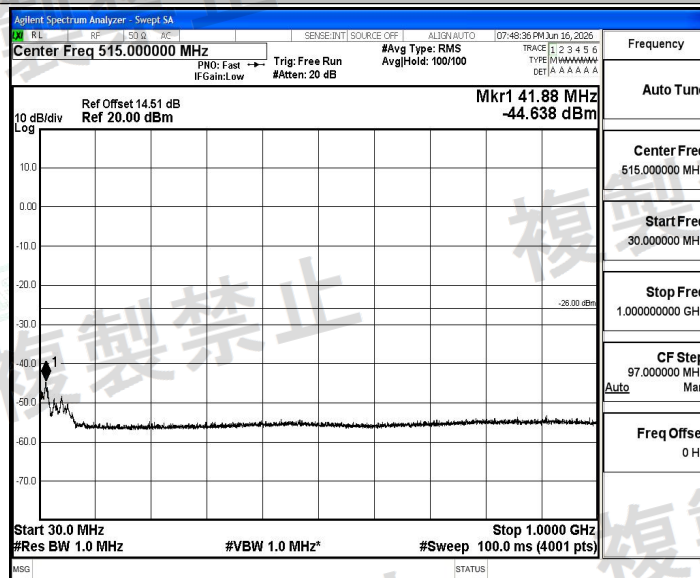




NTNV_DH5_Ant1_2480_2496.5~13000

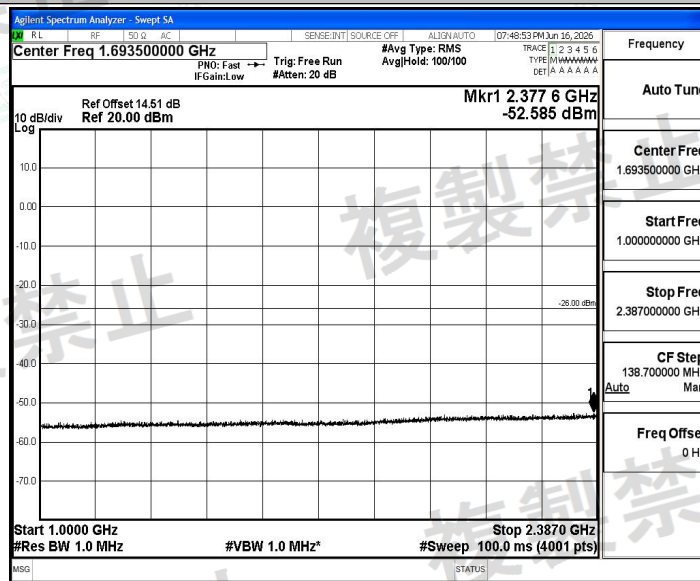


NTNV_2DH5_Ant1_2402_30~1000

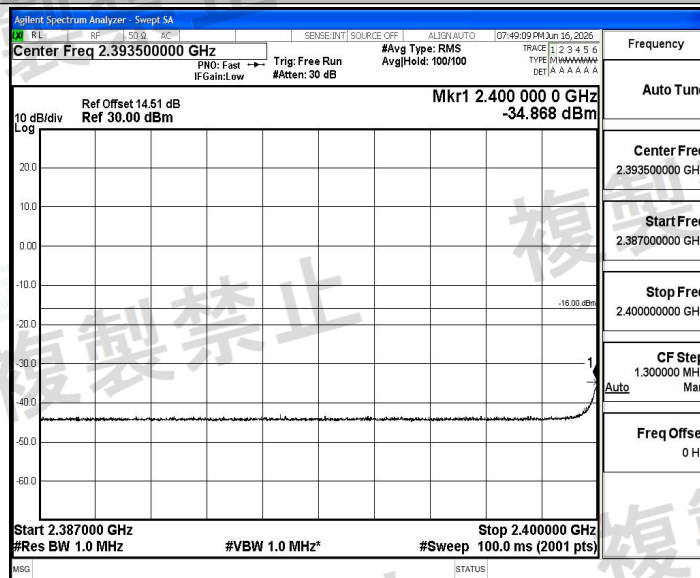




NTNV_2DH5_Ant1_2402_1000~2387

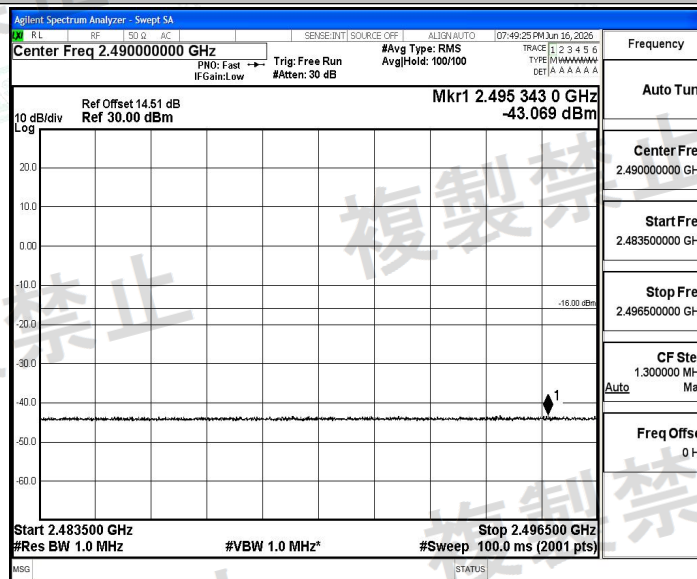


NTNV_2DH5_Ant1_2402_2387~2400

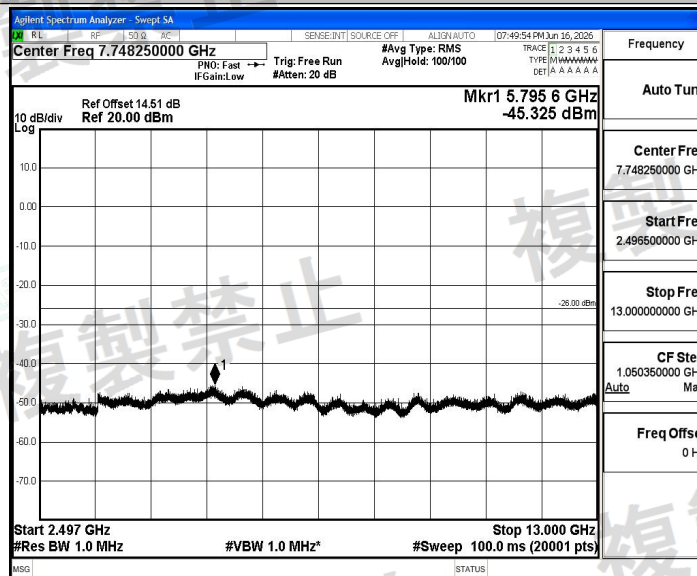




NTNV_2DH5_Ant1_2402_2483.5~2496.5

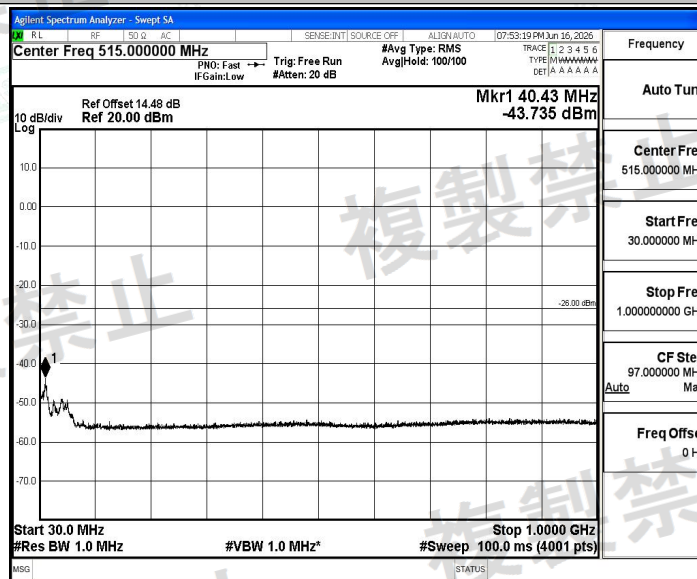


NTNV_2DH5_Ant1_2402_2496.5~13000

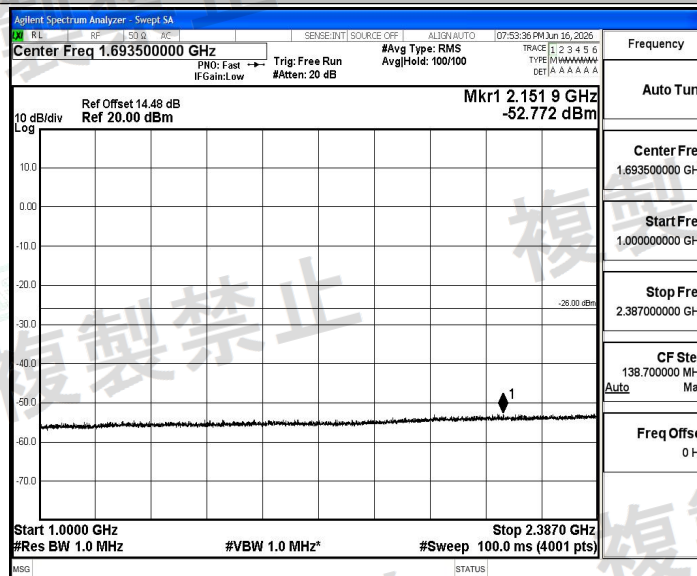




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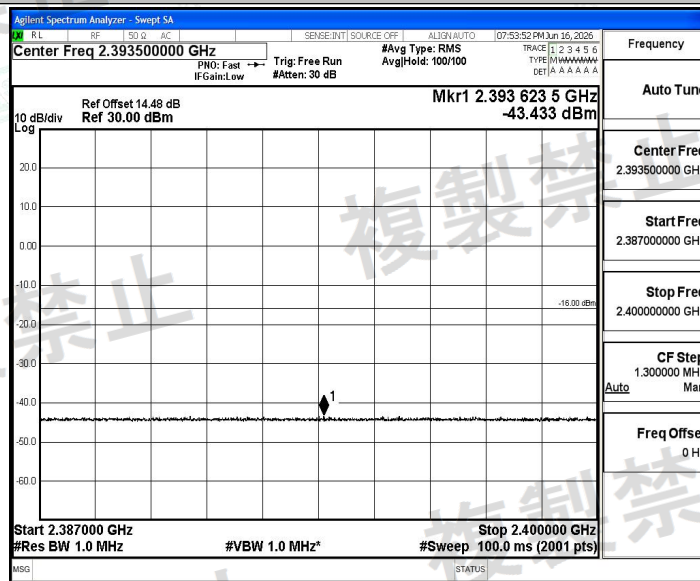


NTNV_2DH5_Ant1_2441_1000~2387

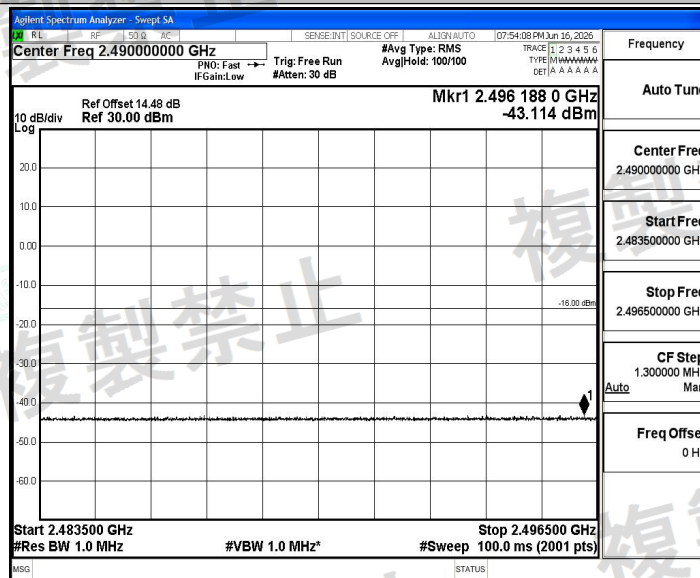




NTNV_2DH5_Ant1_2441_2387~2400

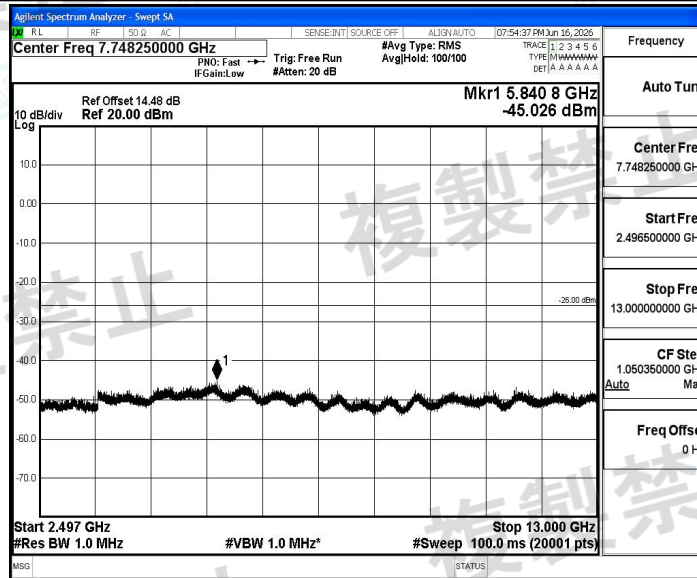


NTNV_2DH5_Ant1_2441_2483.5~2496.5

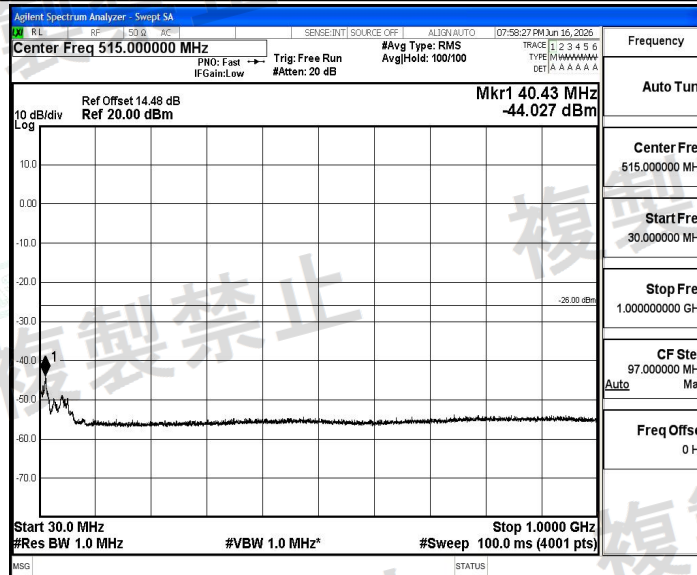




NTNV_2DH5_Ant1_2441_2496.5~13000

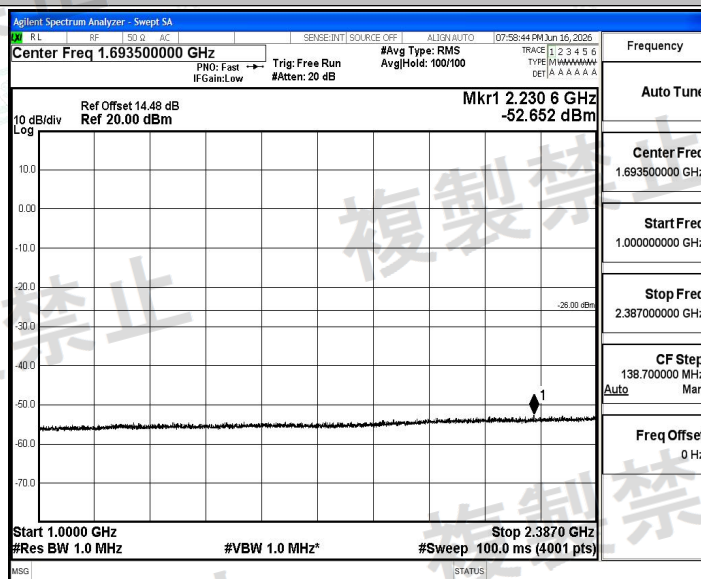


NTNV_2DH5_Ant1_2480_30~1000

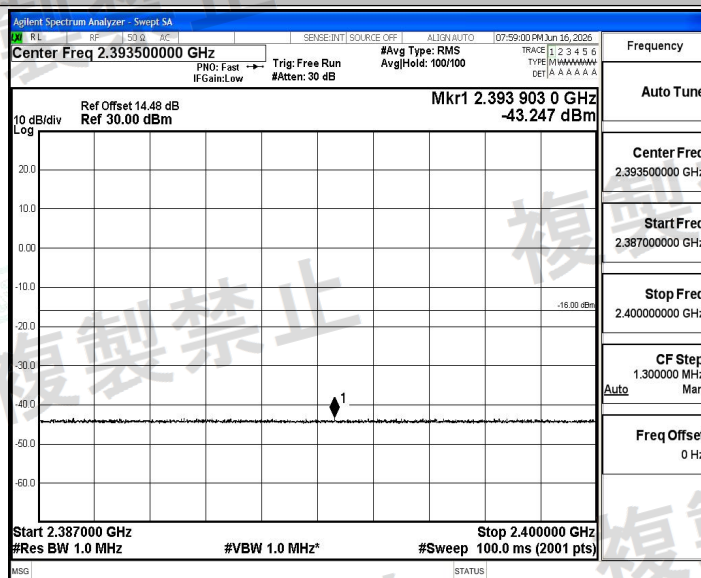




NTNV_2DH5_Ant1_2480_1000~2387

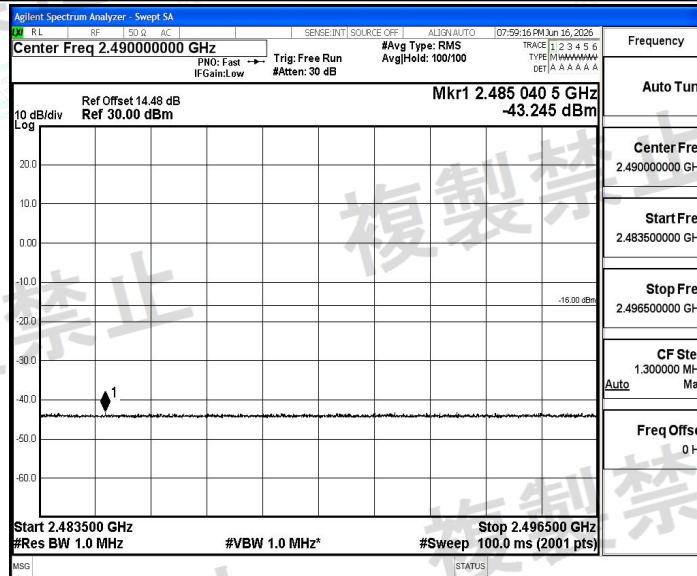


NTNV_2DH5_Ant1_2480_2387~2400

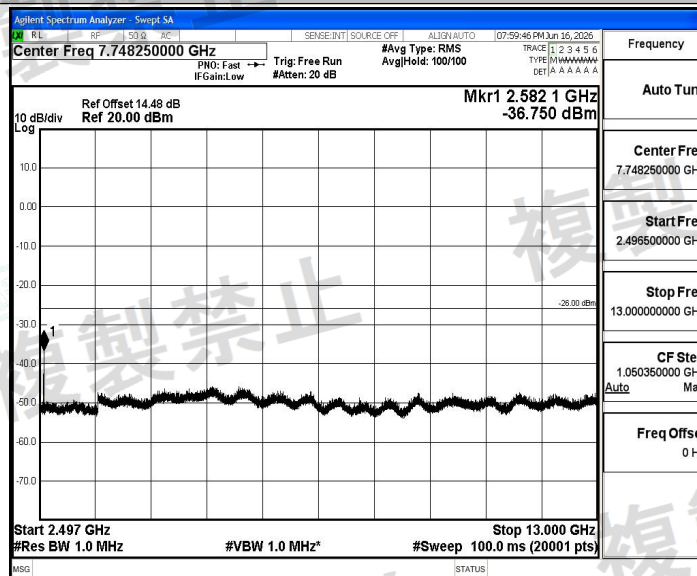




NTNV_2DH5_Ant1_2480_2483.5~2496.5

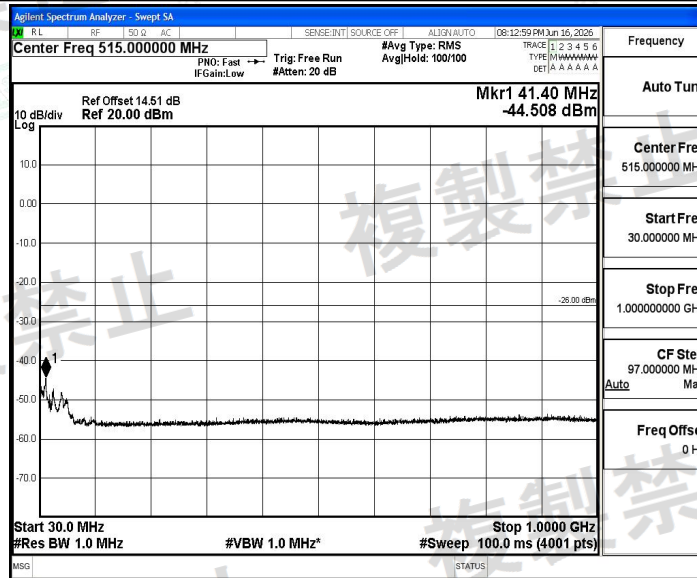


NTNV_2DH5_Ant1_2480_2496.5~13000

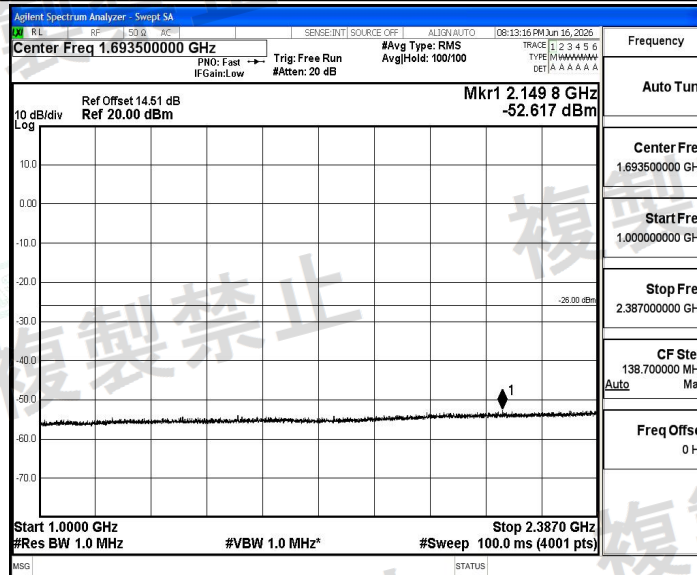




NTNV_3DH5_Ant1_2402_30~1000

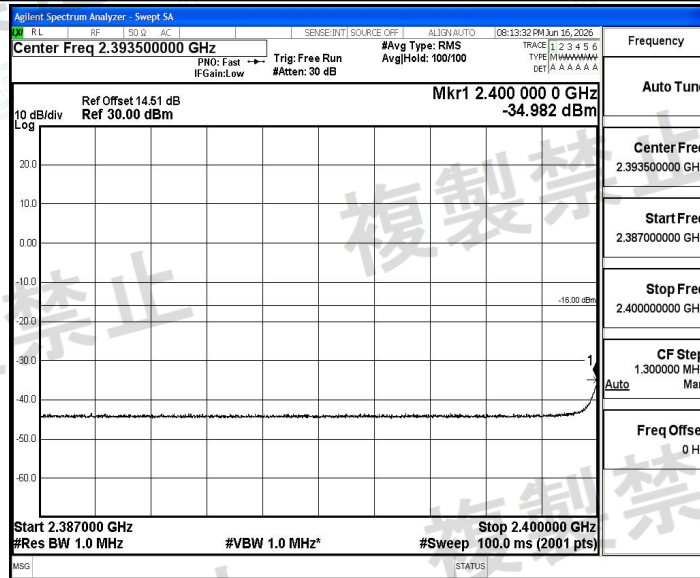


NTNV_3DH5_Ant1_2402_1000~2387

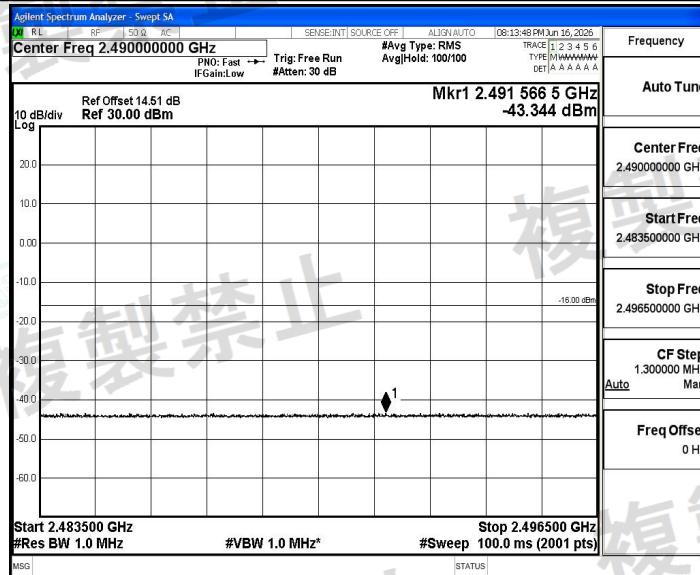




NTNV_3DH5_Ant1_2402_2387~2400

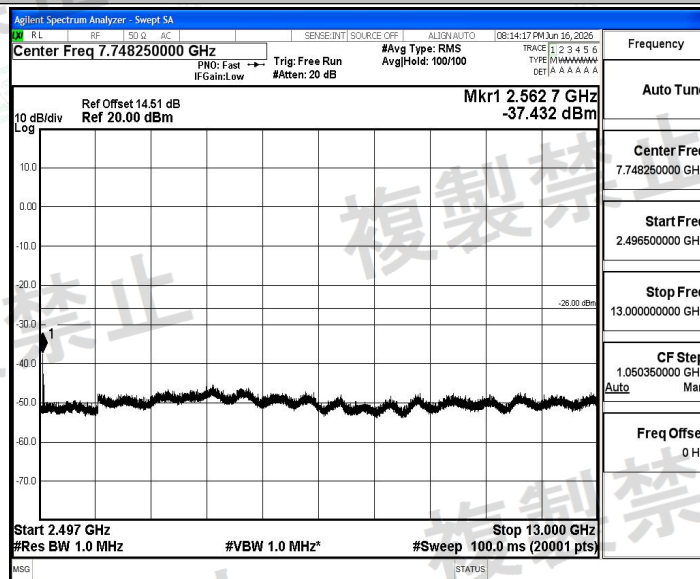


NTNV_3DH5_Ant1_2402_2483.5~2496.5

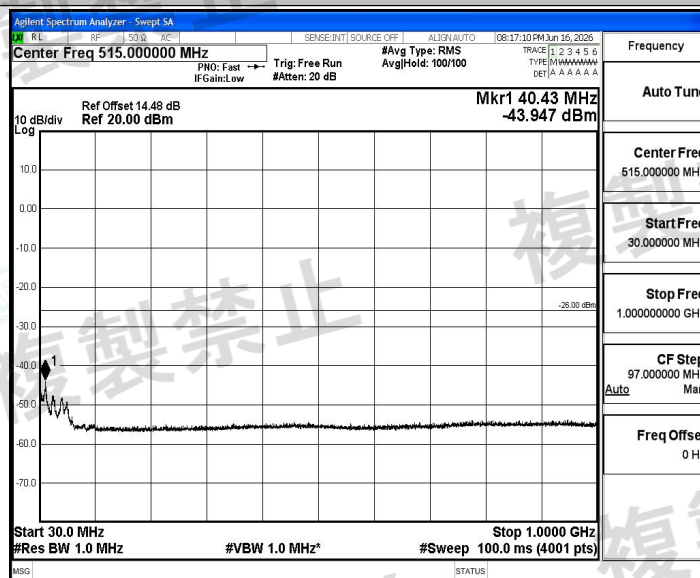




NTNV_3DH5_Ant1_2402_2496.5~13000

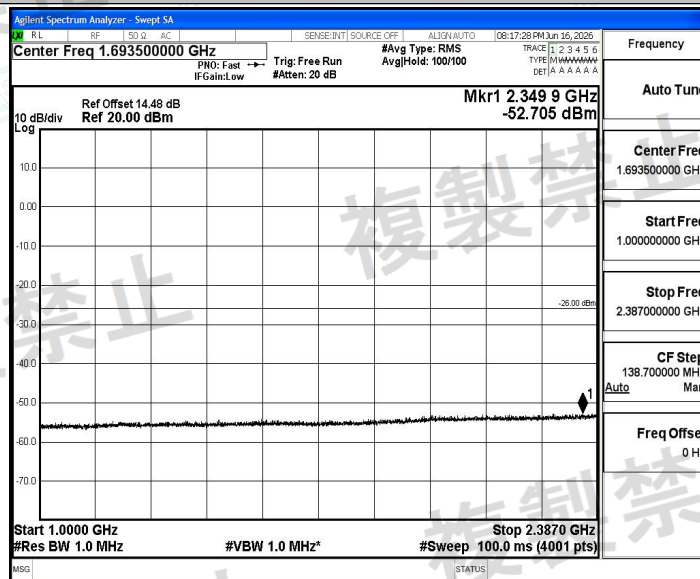


NTNV_3DH5_Ant1_2441_30~1000

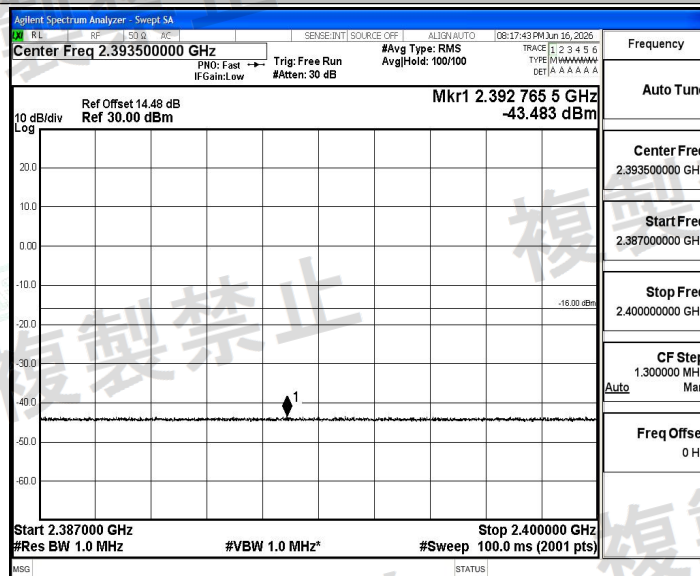




NTNV_3DH5_Ant1_2441_1000~2387

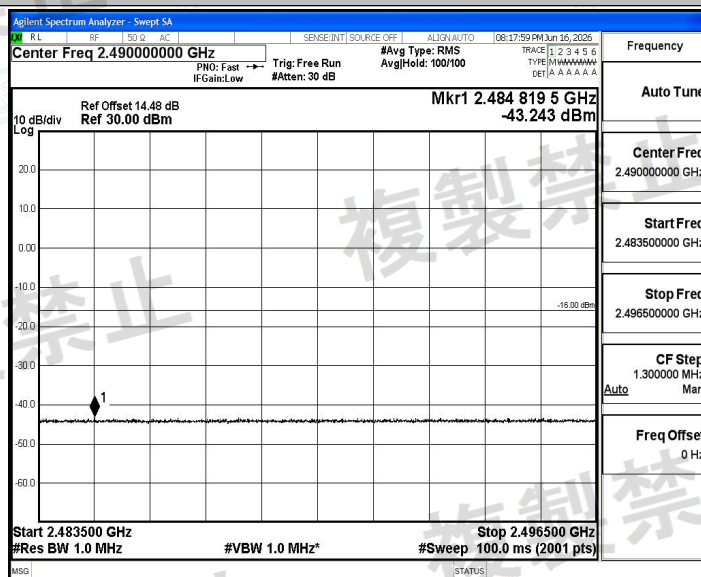


NTNV_3DH5_Ant1_2441_2387~2400

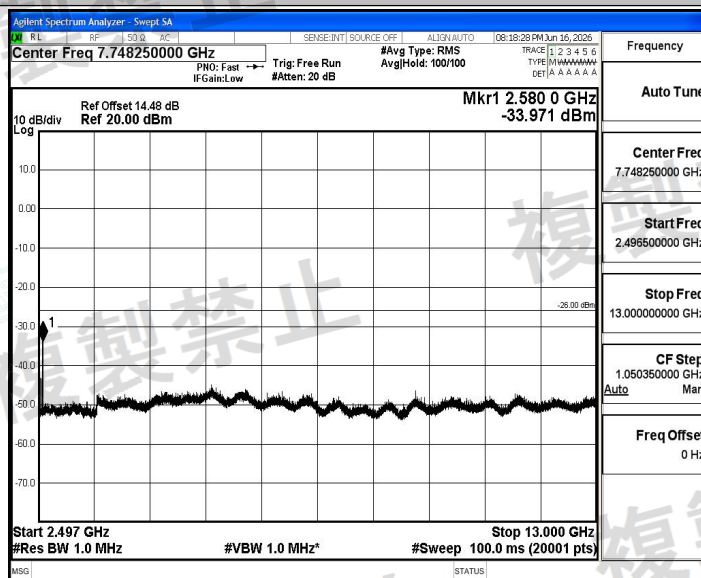




NTNV_3DH5_Ant1_2441_2483.5~2496.5

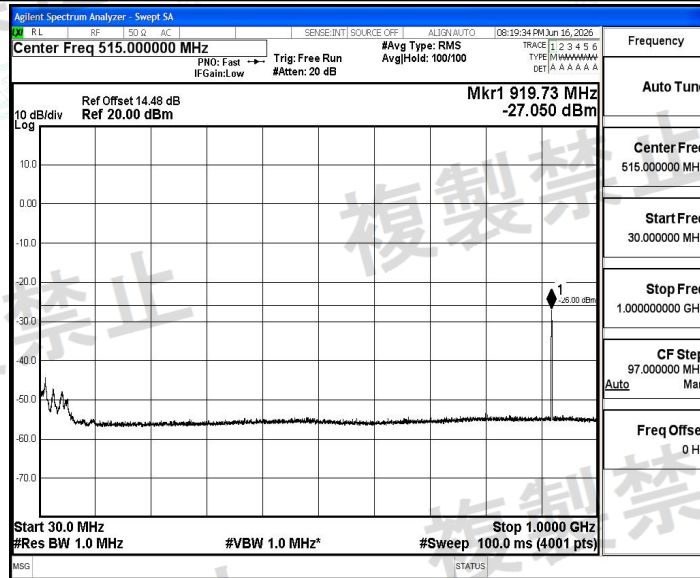


NTNV_3DH5_Ant1_2441_2496.5~13000

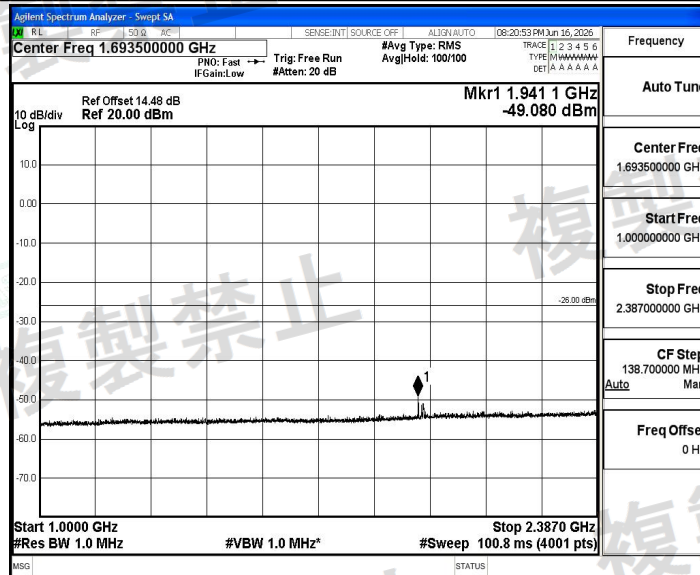




NTNV_3DH5_Ant1_2480_30~1000

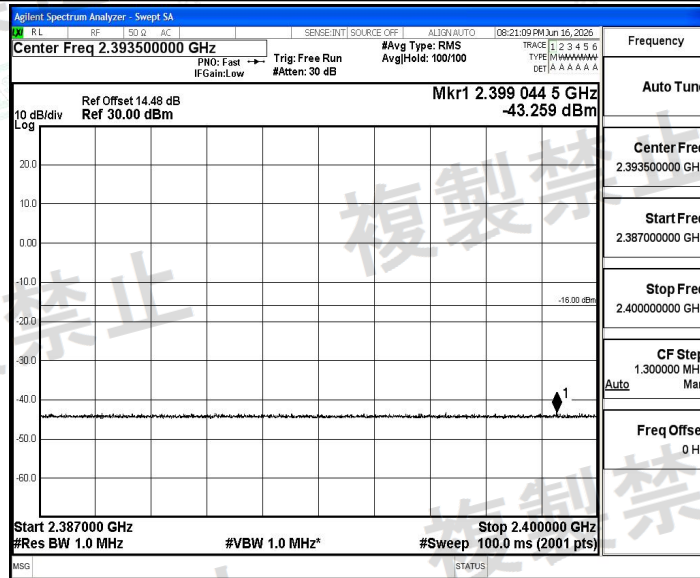


NTNV_3DH5_Ant1_2480_1000~2387

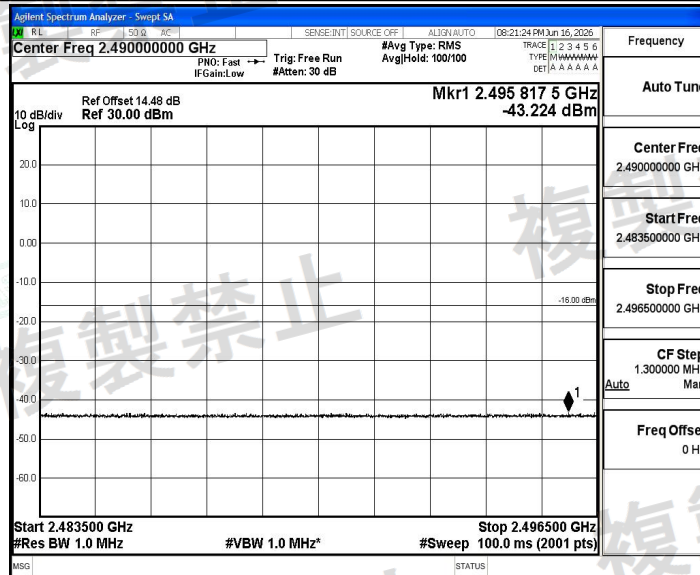


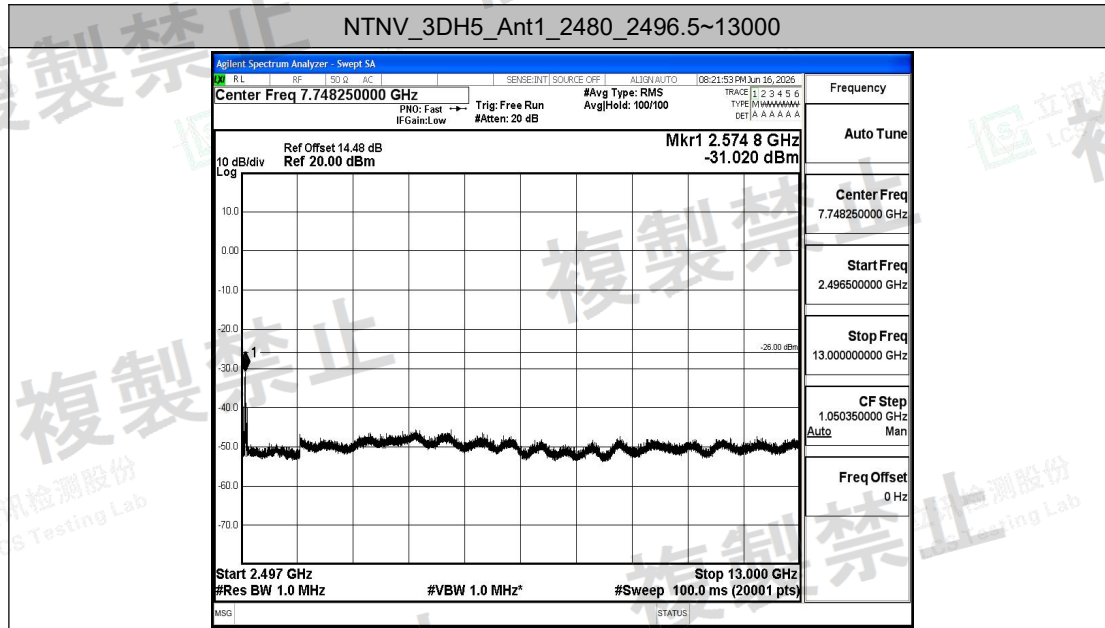


NTNV_3DH5_Ant1_2480_2387~2400



NTNV_3DH5_Ant1_2480_2483.5~2496.5







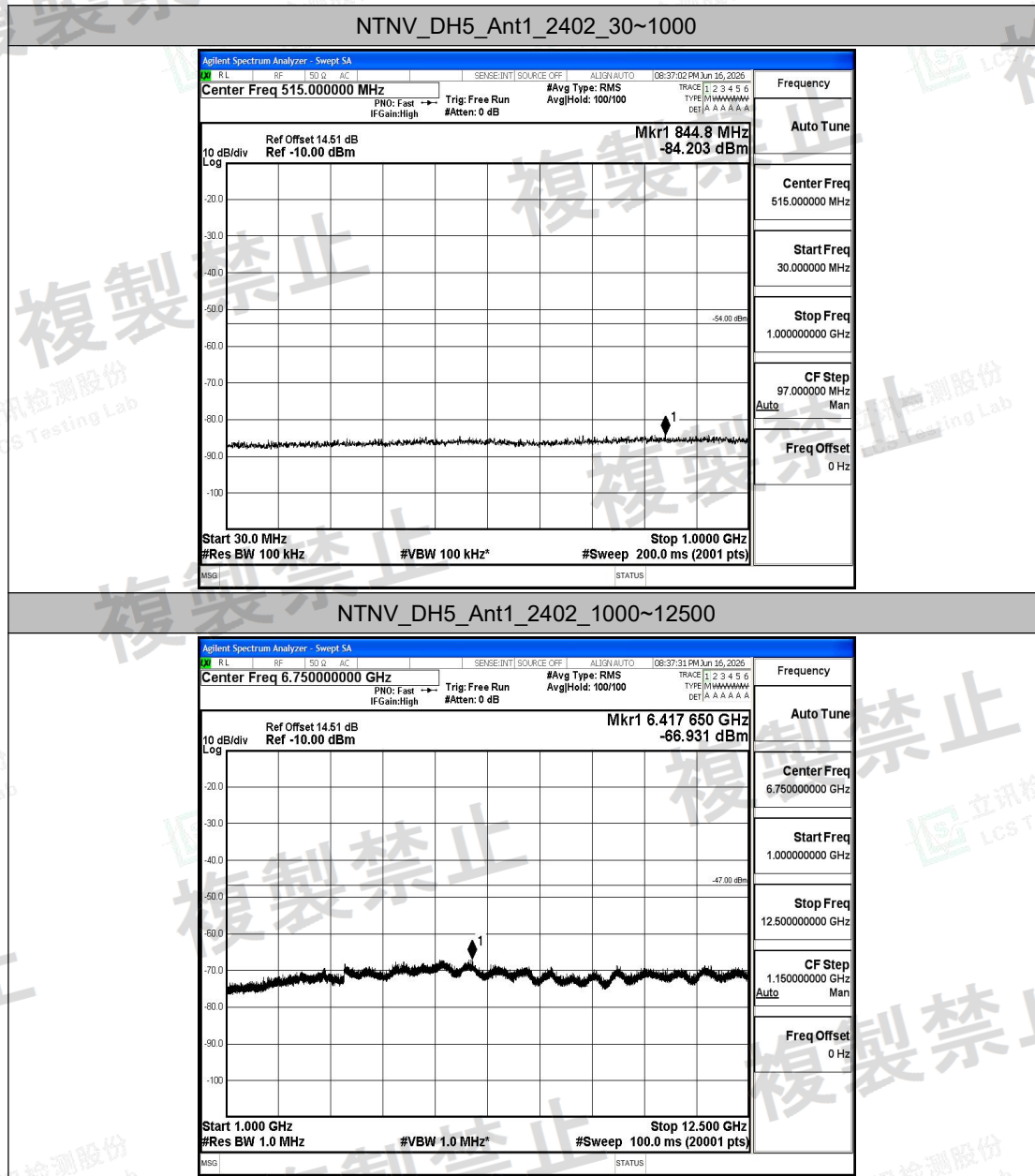
A.6 Spurious Emission of RX

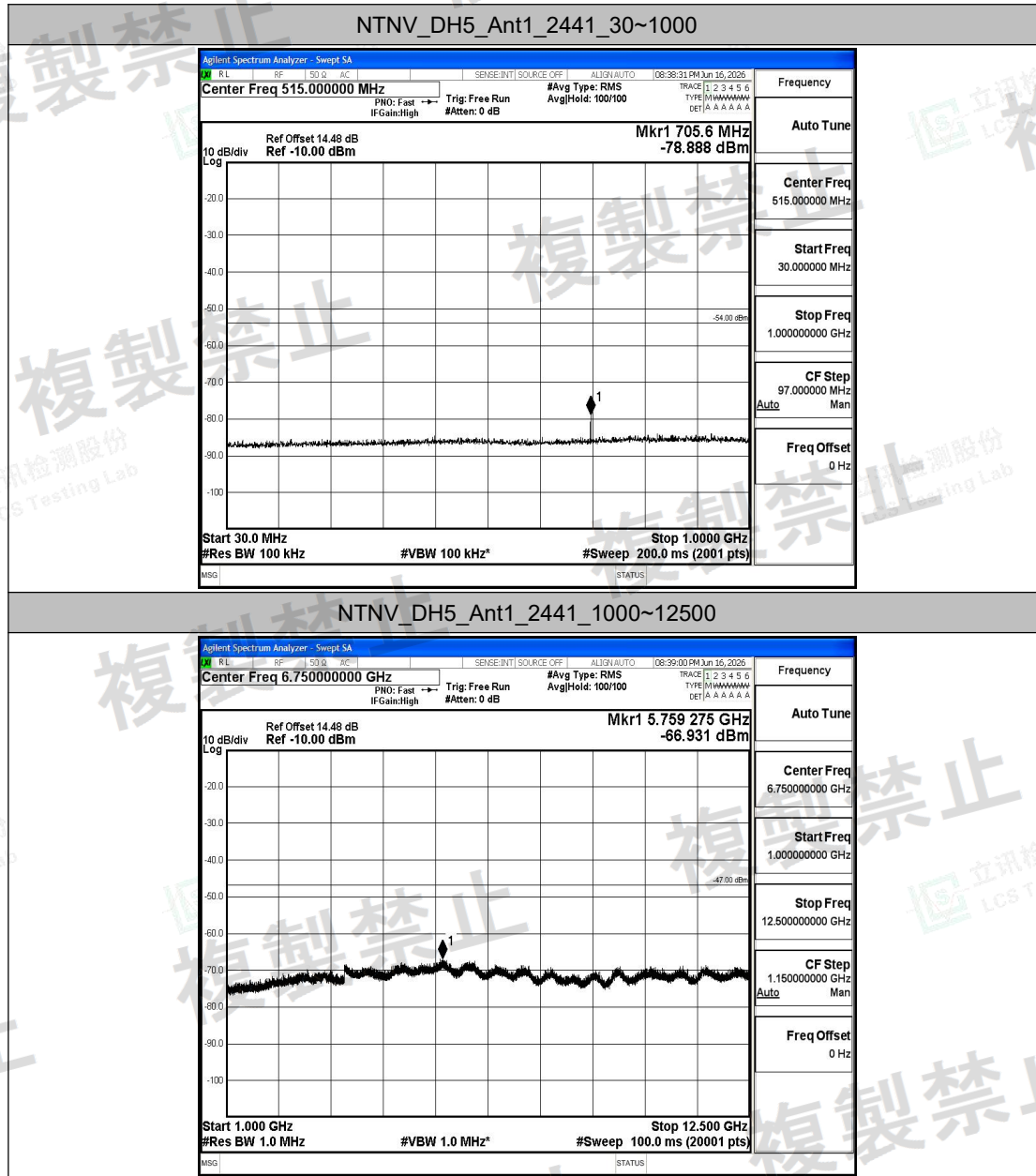
Test Result

Test Condition	Test Mode	Antenna	Frequency [MHz]	Freq. Range [MHz]	Result [dBm]	Limit [dBm]	Result [nW]	Limit [nW]	Verdict
NTNV	DH5	Ant1	2402	30~1000	-84.2	≤-54	0.00380	≤4	PASS
				1000~12500	-66.93	≤-47	0.20277	≤20	PASS
			2441	30~1000	-78.89	≤-54	0.01291	≤4	PASS
				1000~12500	-66.93	≤-47	0.20277	≤20	PASS
			2480	30~1000	-83.21	≤-54	0.00478	≤4	PASS
				1000~12500	-66.66	≤-47	0.21577	≤20	PASS
	2DH5	Ant1	2402	30~1000	-80.3	≤-54	0.00933	≤4	PASS
				1000~12500	-66.81	≤-47	0.20845	≤20	PASS
			2441	30~1000	-80.09	≤-54	0.00979	≤4	PASS
				1000~12500	-66.83	≤-47	0.20749	≤20	PASS
			2480	30~1000	-80.5	≤-54	0.00891	≤4	PASS
				1000~12500	-66.76	≤-47	0.21086	≤20	PASS
	3DH5	Ant1	2402	30~1000	-83.9	≤-54	0.00407	≤4	PASS
				1000~12500	-67.31	≤-47	0.18578	≤20	PASS
			2441	30~1000	-84.07	≤-54	0.00392	≤4	PASS
				1000~12500	-66	≤-47	0.25119	≤20	PASS
			2480	30~1000	-84.2	≤-54	0.00380	≤4	PASS
				1000~12500	-67.1	≤-47	0.19498	≤20	PASS



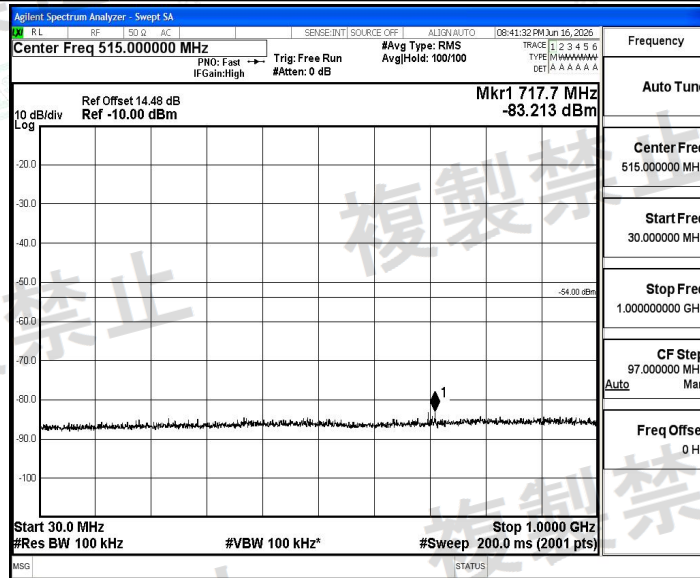
Test Graphs



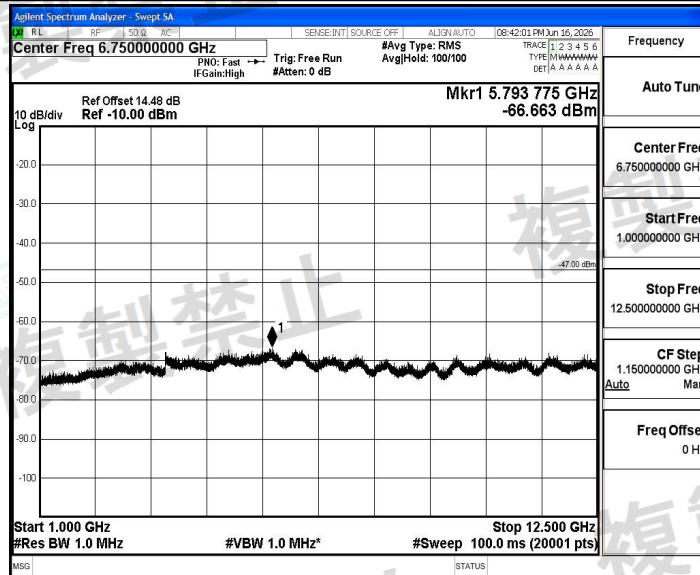




NTNV_DH5_Ant1_2480_30~1000

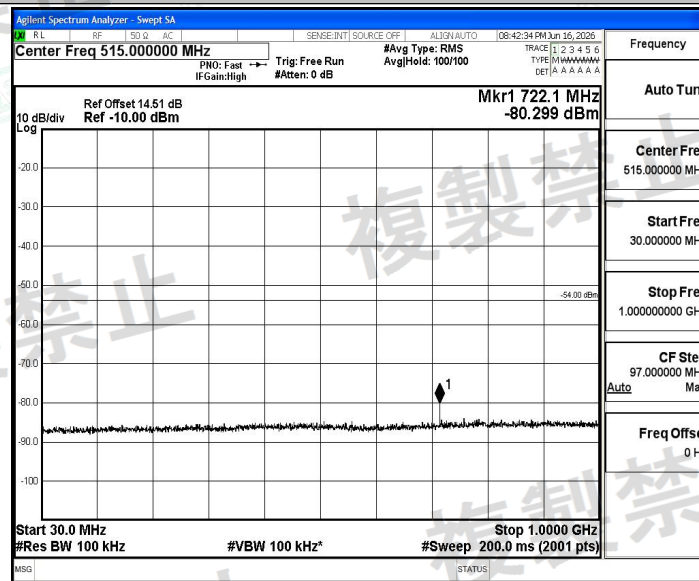


NTNV_DH5_Ant1_2480_1000~12500

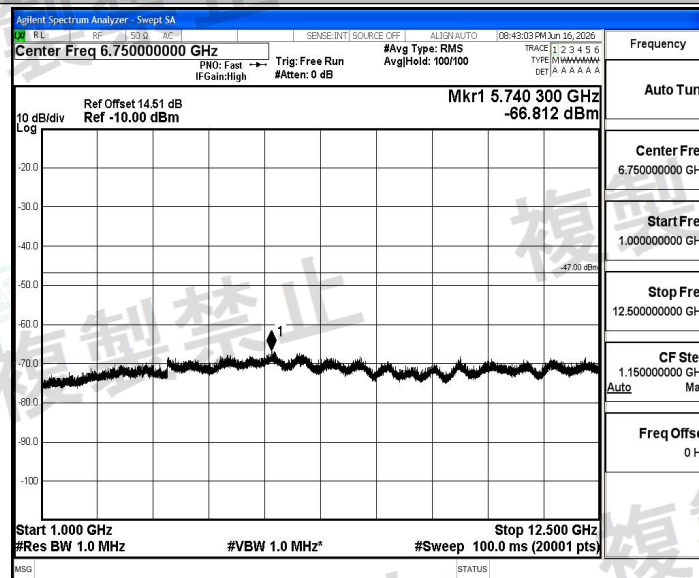




NTNV_2DH5_Ant1_2402_30~1000

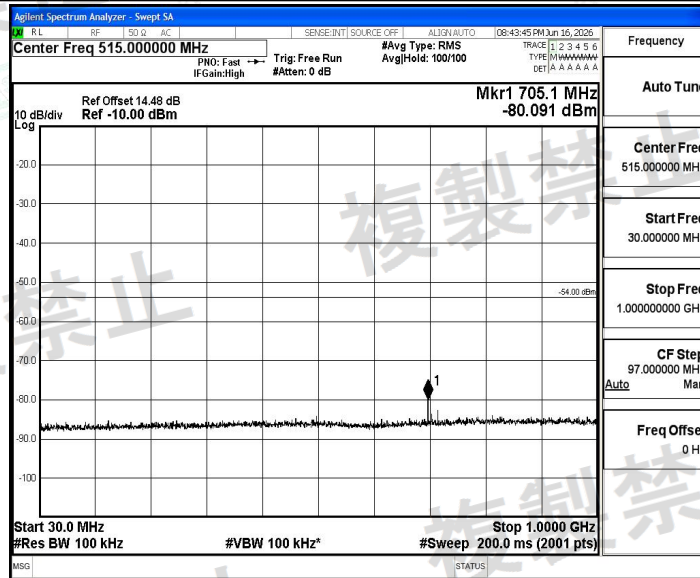


NTNV_2DH5_Ant1_2402_1000~12500

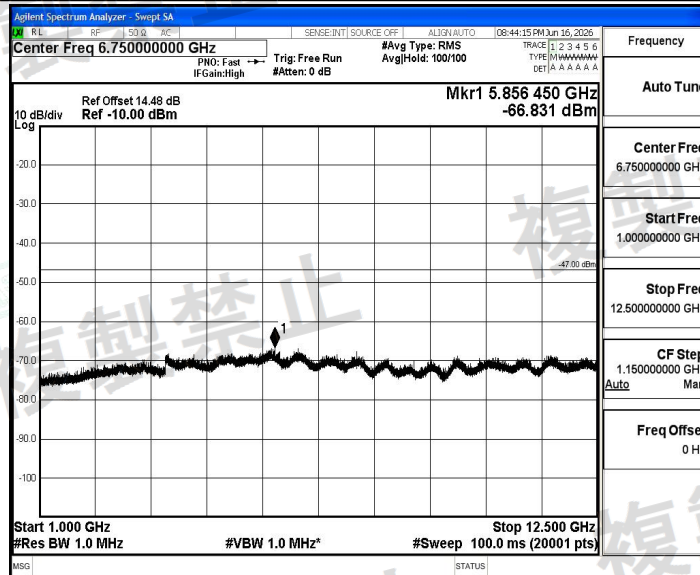




NTNV_2DH5_Ant1_2441_30~1000

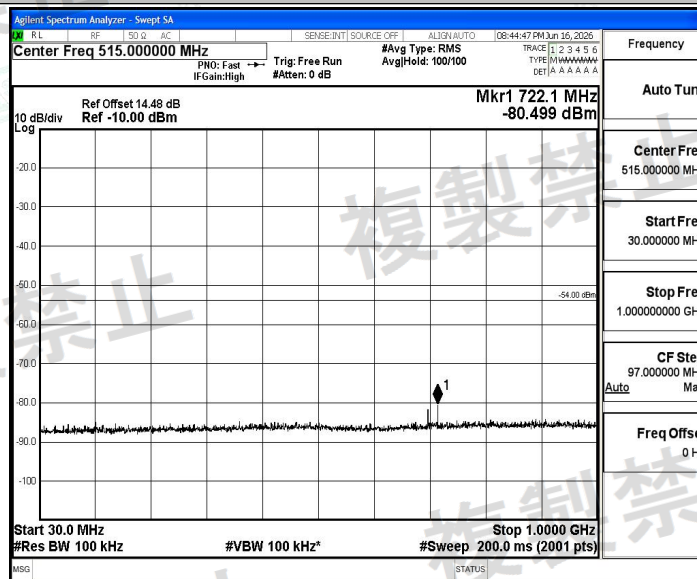


NTNV_2DH5_Ant1_2441_1000~12500

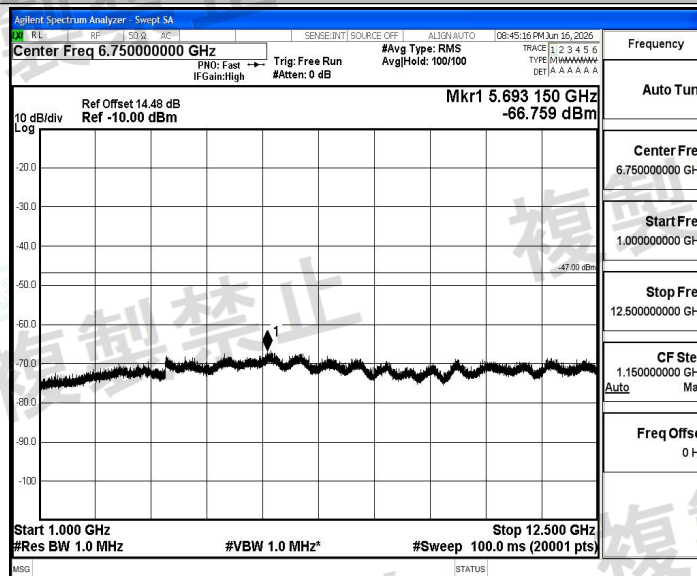




NTNV_2DH5_Ant1_2480_30~1000

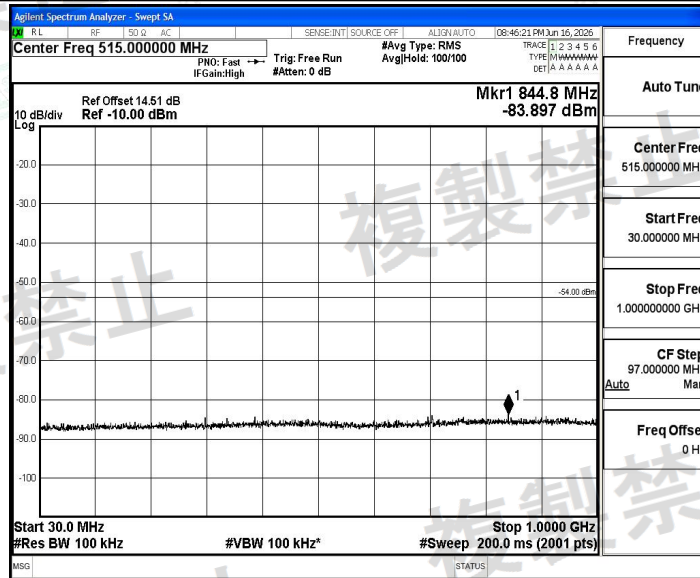


NTNV_2DH5_Ant1_2480_1000~12500

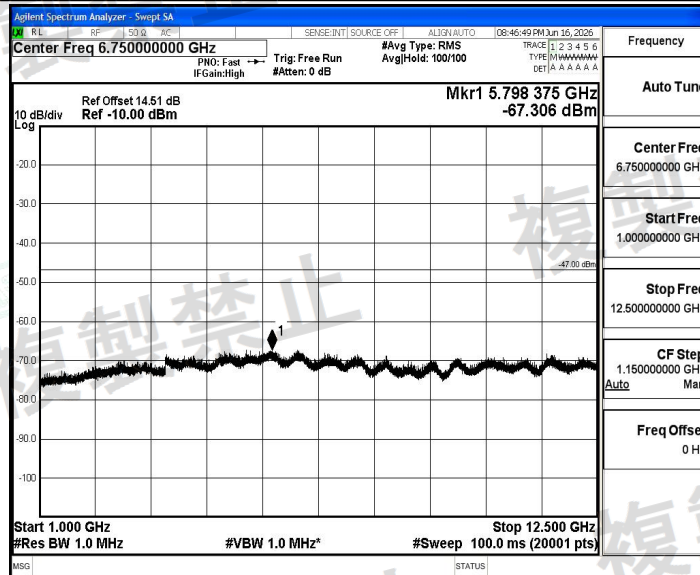




NTNV_3DH5_Ant1_2402_30~1000

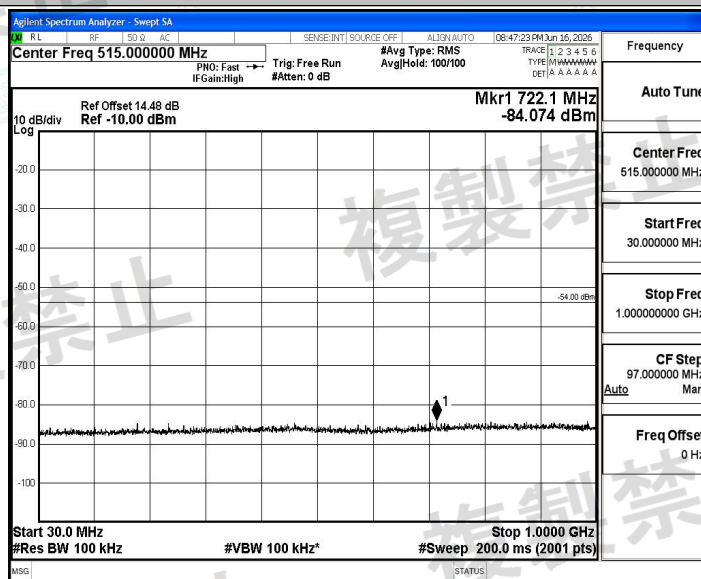


NTNV_3DH5_Ant1_2402_1000~12500

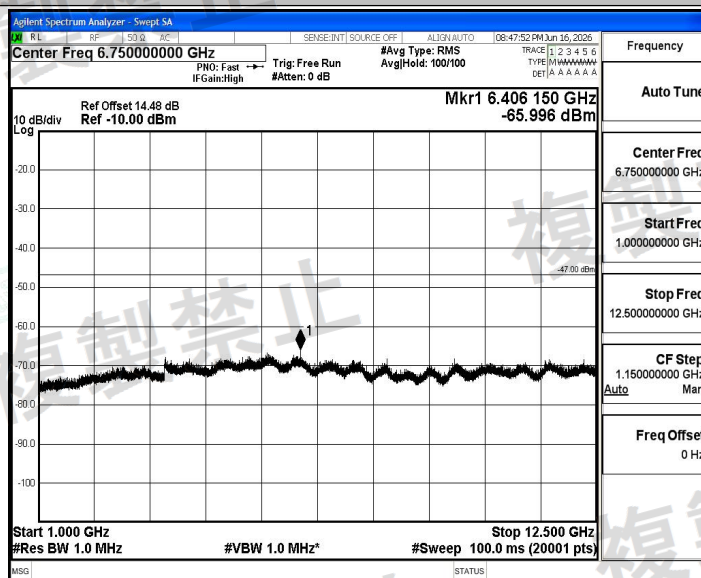




NTNV_3DH5_Ant1_2441_30~1000

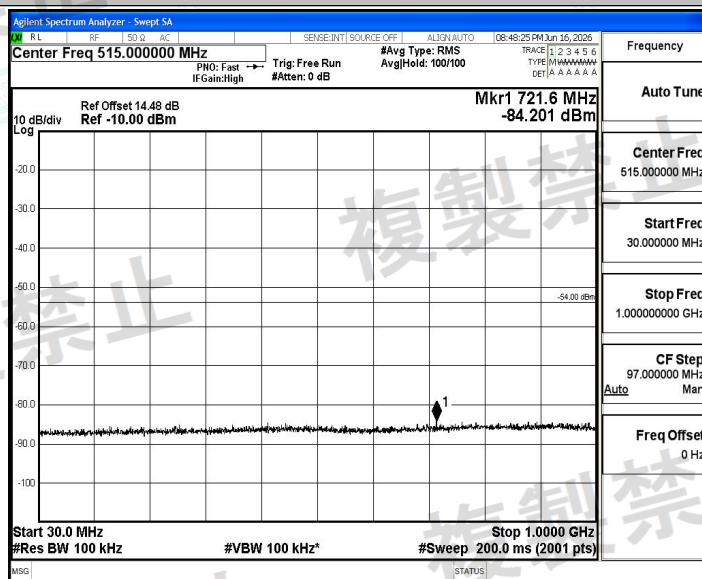


NTNV_3DH5_Ant1_2441_1000~12500

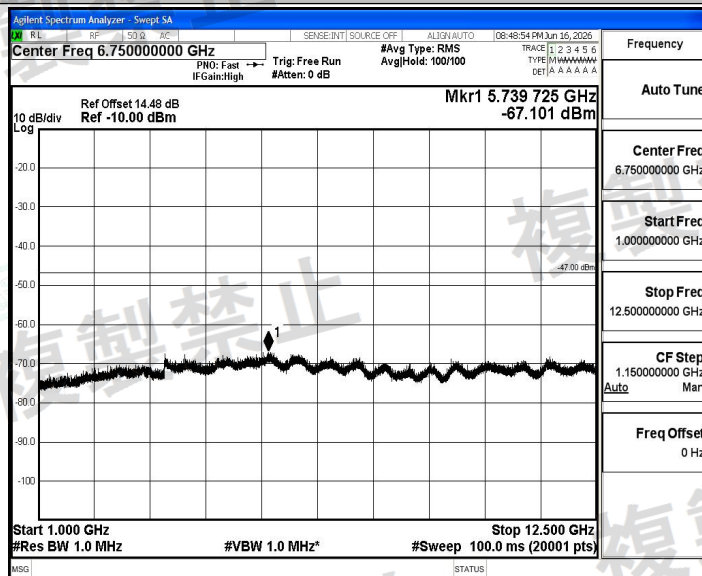




NTNV_3DH5_Ant1_2480_30~1000



NTNV_3DH5_Ant1_2480_1000~12500





A.7 Dwell Time

Test Result

Test Condition	Test Mode	Antenna	Frequency [MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit [s]	Verdict
NTNV	DH5	Ant1	Hop	2.91	70	0.204	≤0.4	PASS
	2DH5	Ant1	Hop	2.90	80	0.232	≤0.4	PASS
	3DH5	Ant1	Hop	2.90	120	0.348	≤0.4	PASS



Test Graphs

