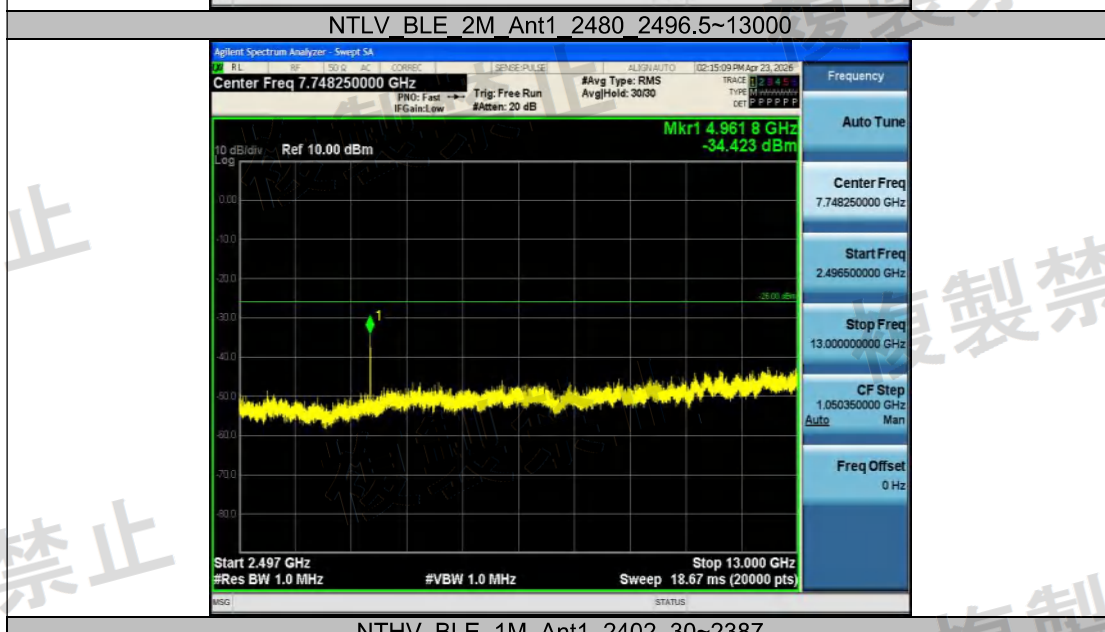
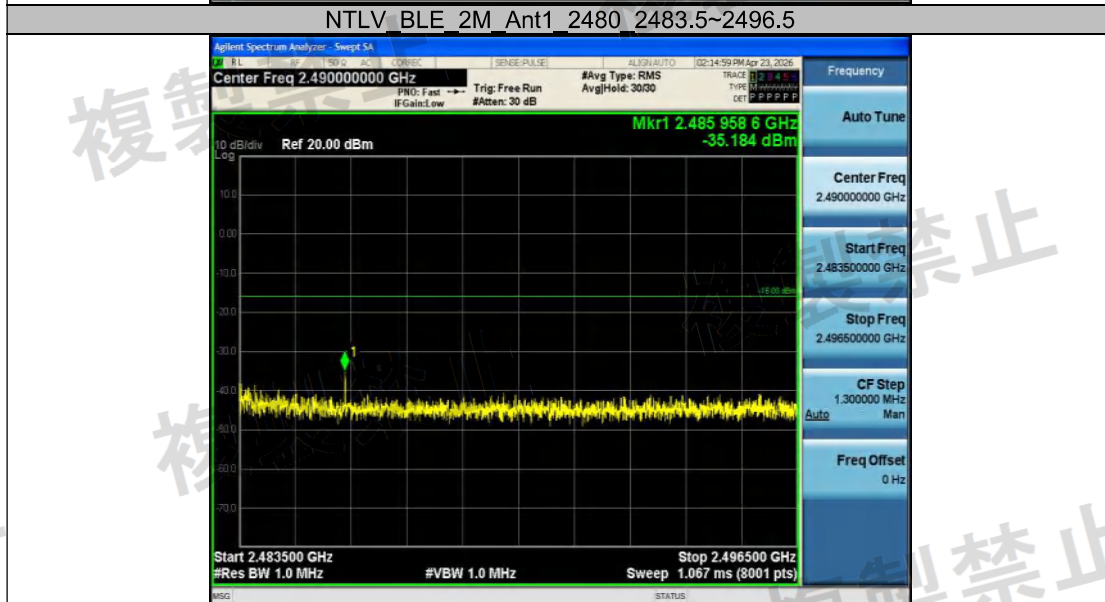
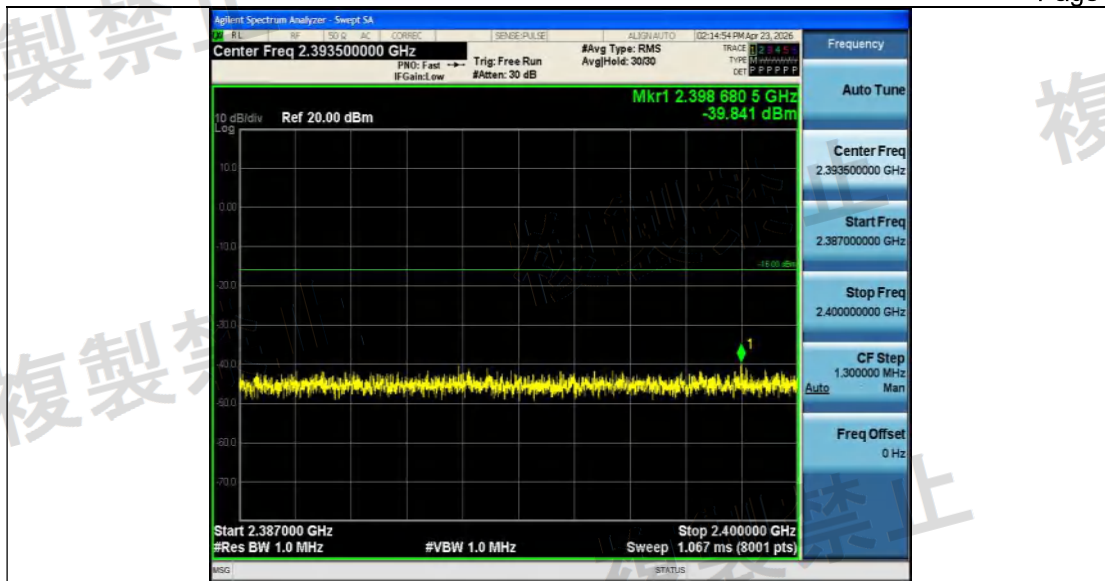
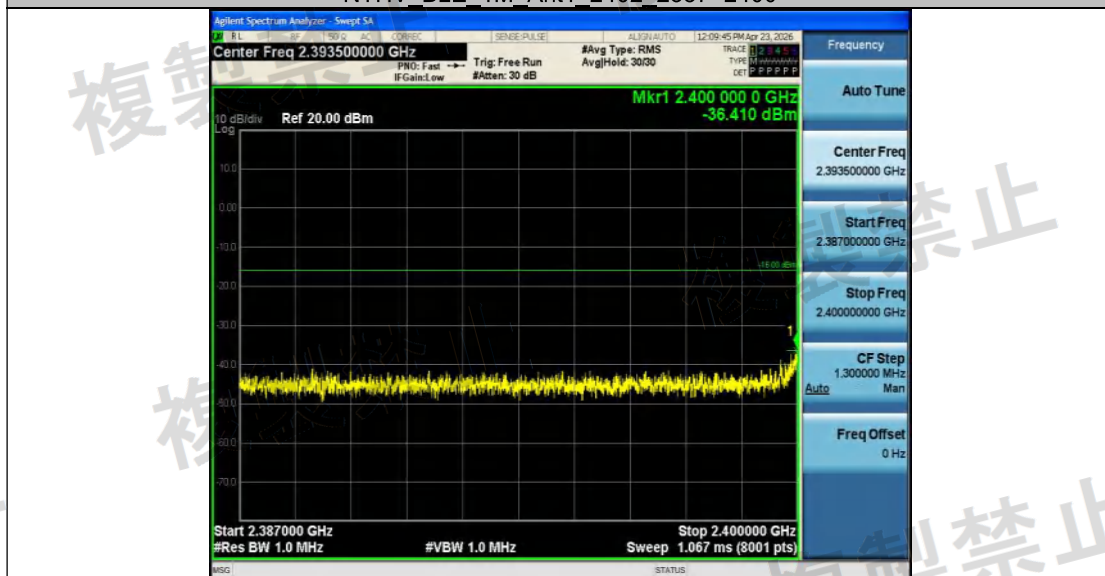


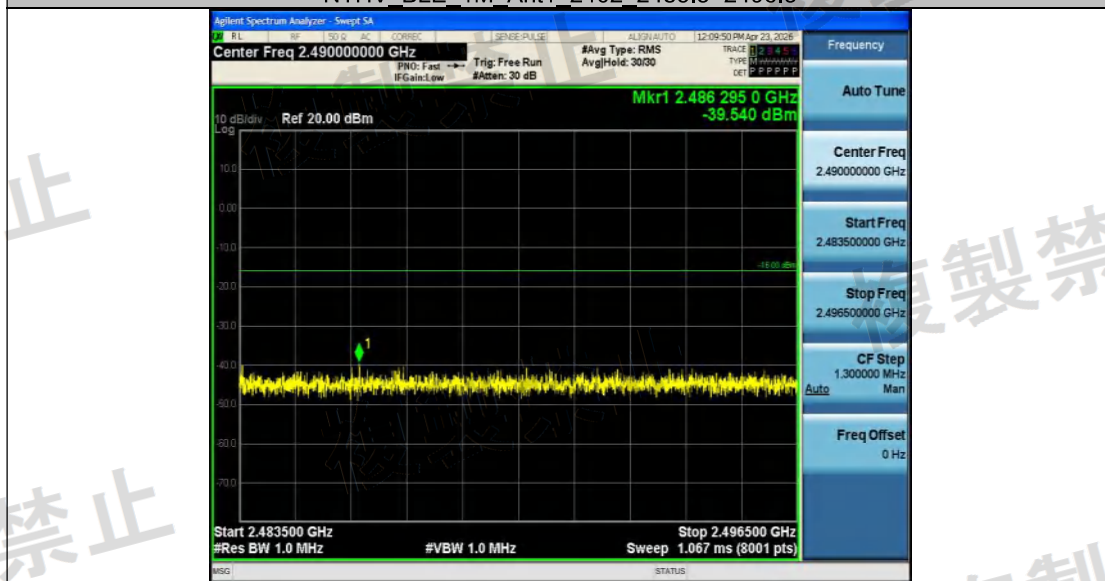




NTHV_BLE_1M_Ant1_2402_2387~2400

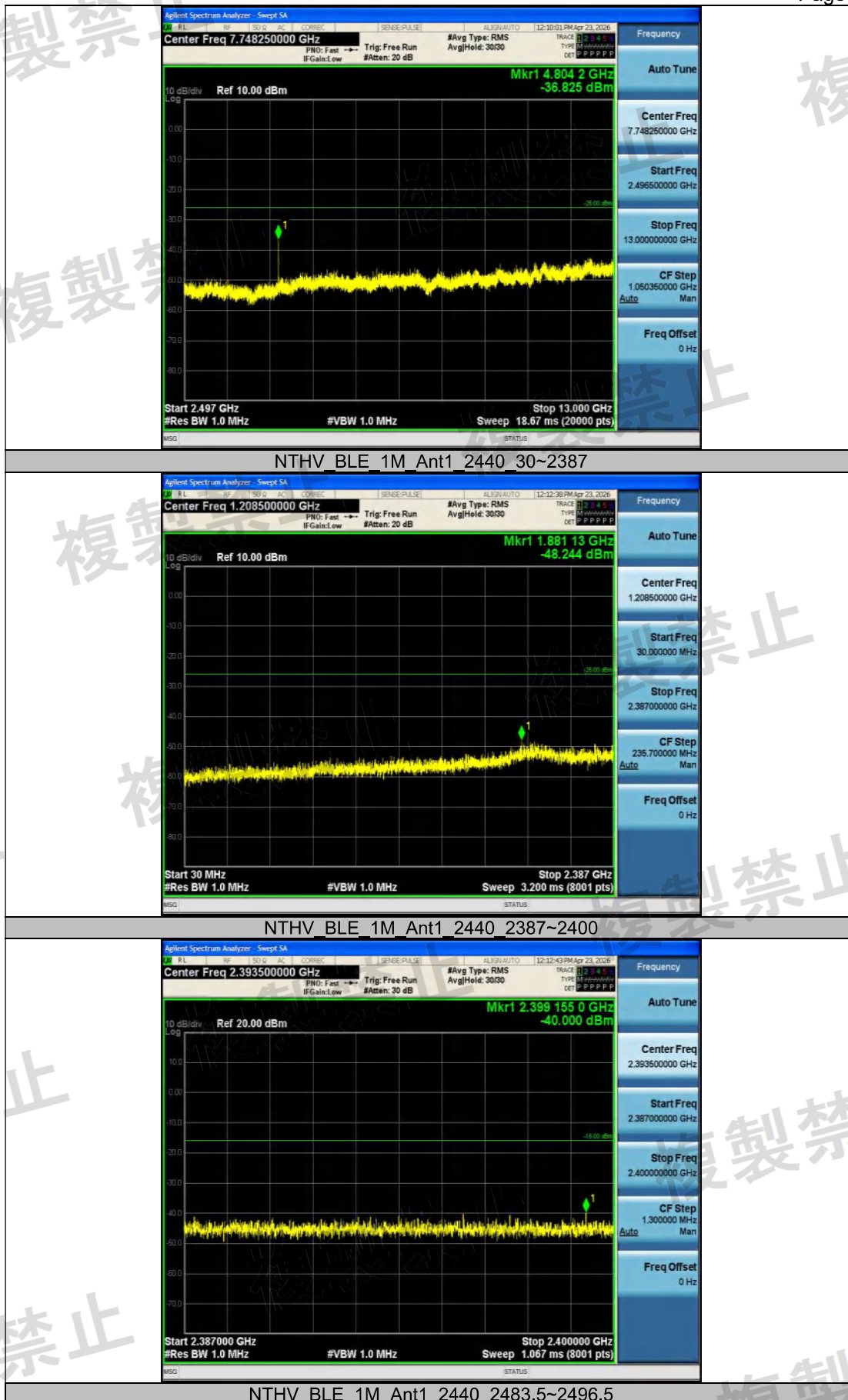


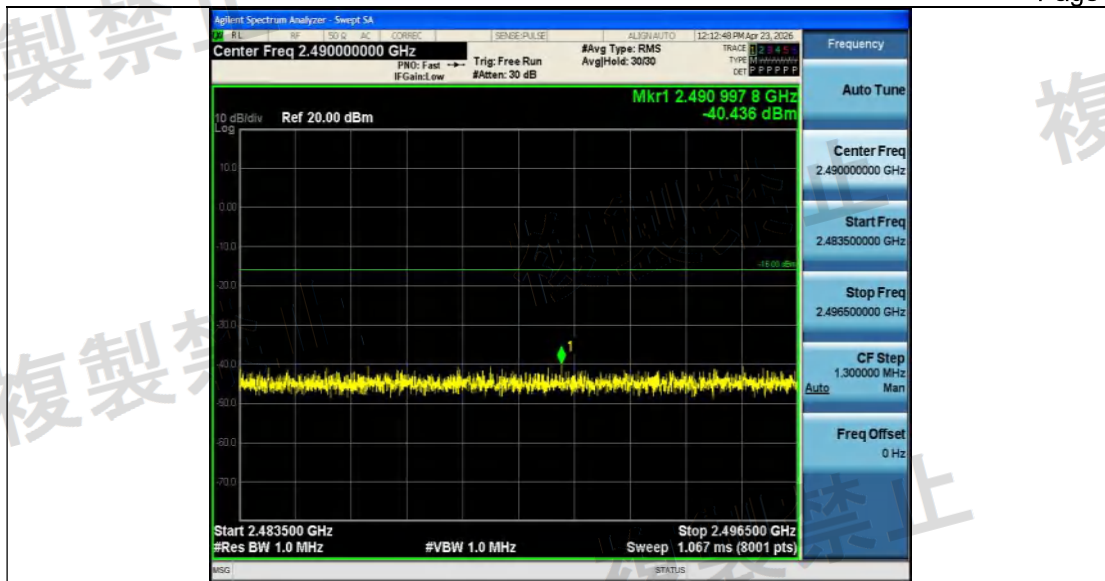
NTHV_BLE_1M_Ant1_2402_2483.5~2496.5



NTHV_BLE_1M_Ant1_2402_2496.5~13000



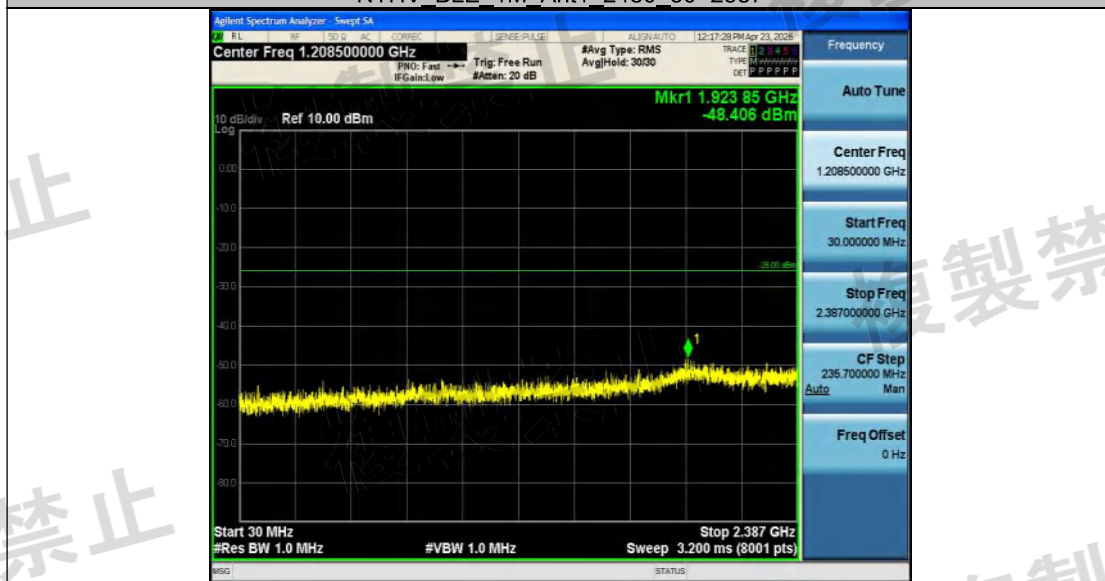




NTHV BLE 1M Ant1 2440 2496.5~13000

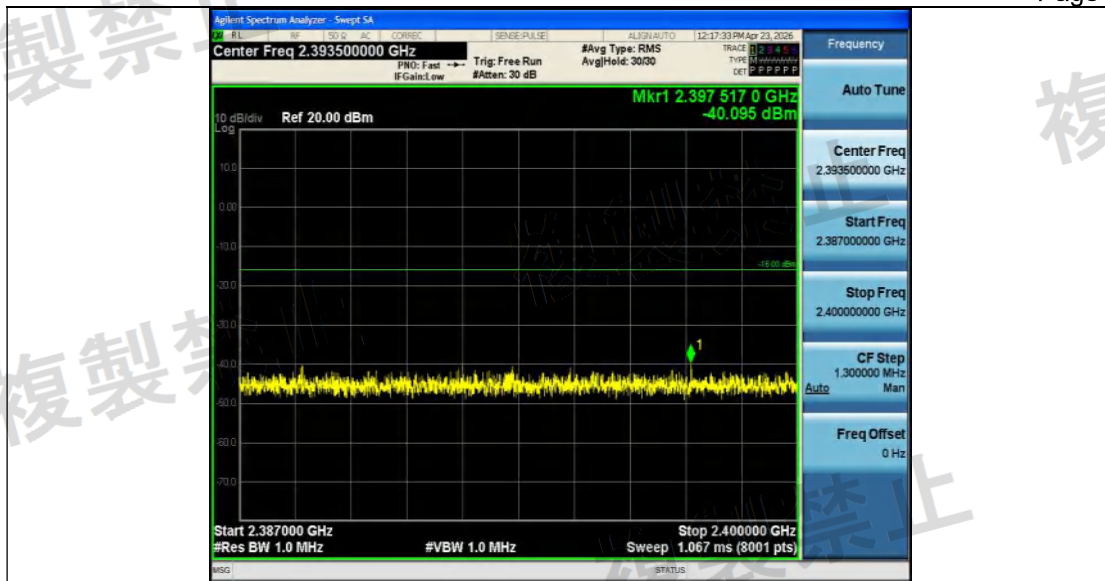


NTHV BLE 1M Ant1 2480 30~2387

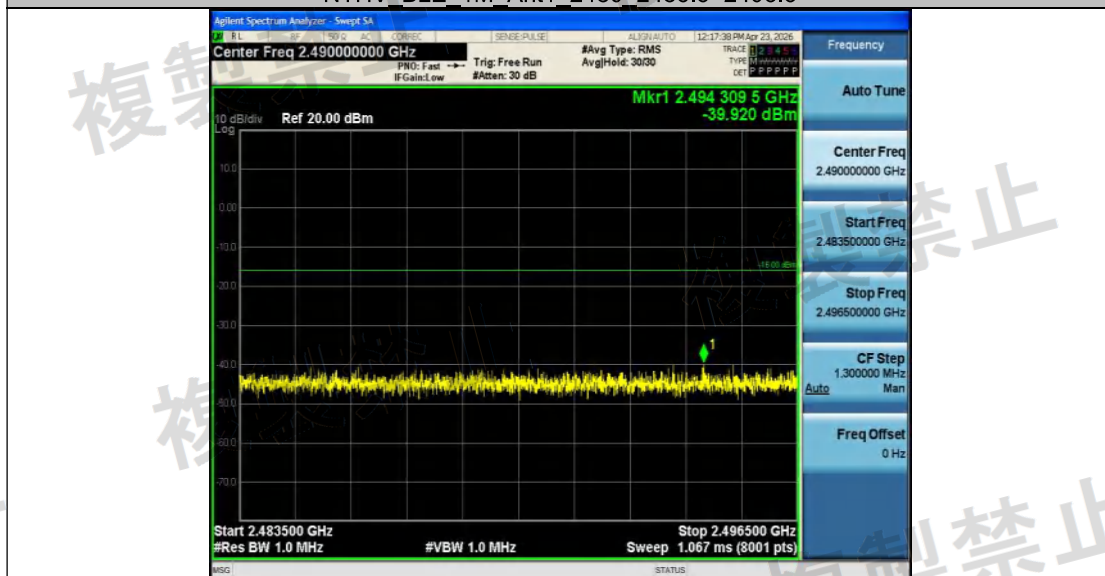


NTHV BLE 1M Ant1 2480 2387~2400

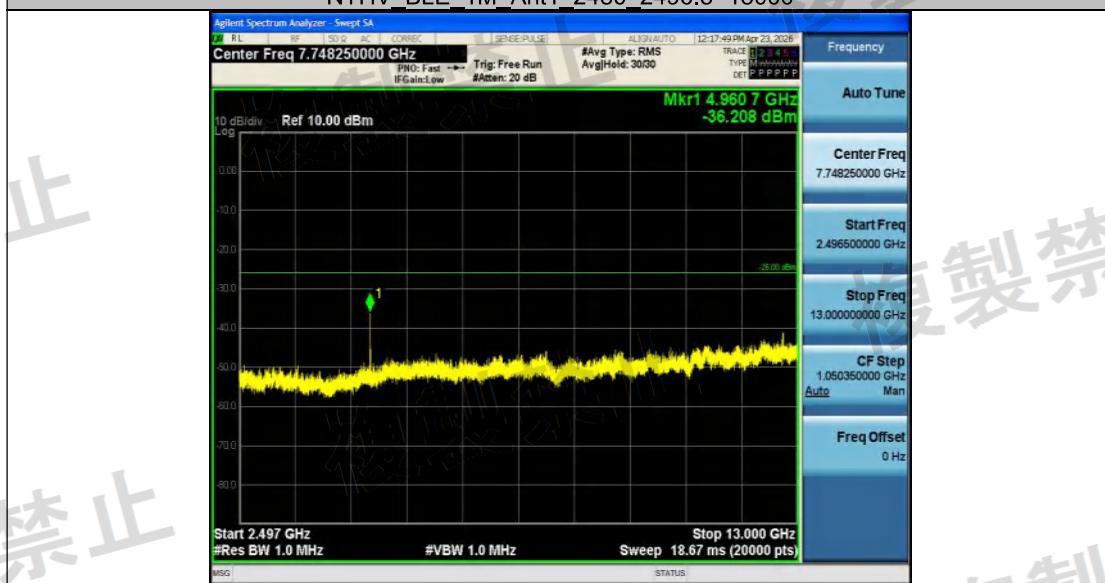




NTHV BLE 1M Ant1 2480 2483.5~2496.5

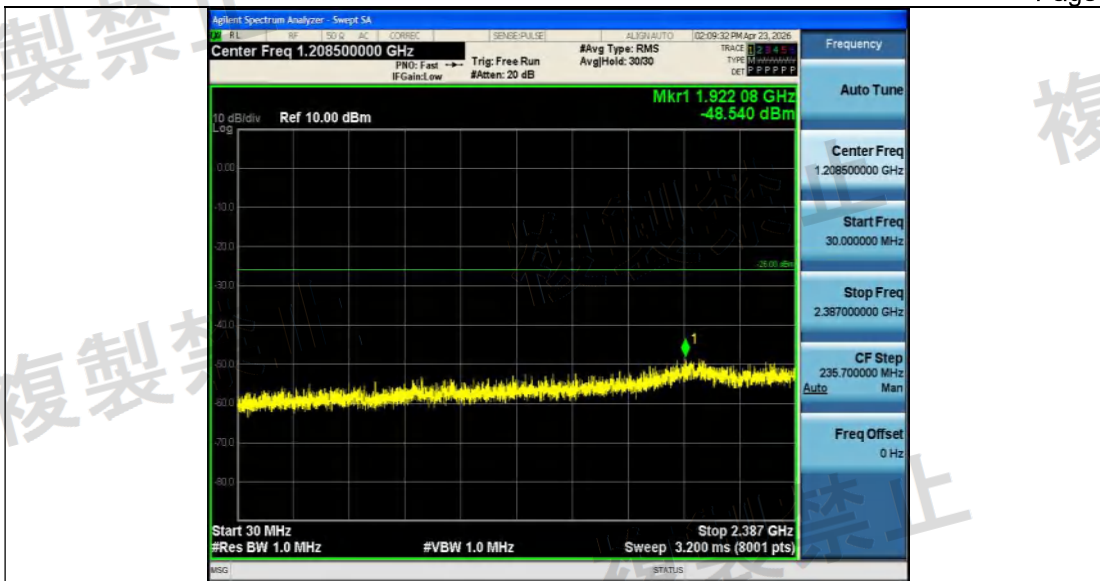


NTHV BLE 1M Ant1 2480 2496.5~13000

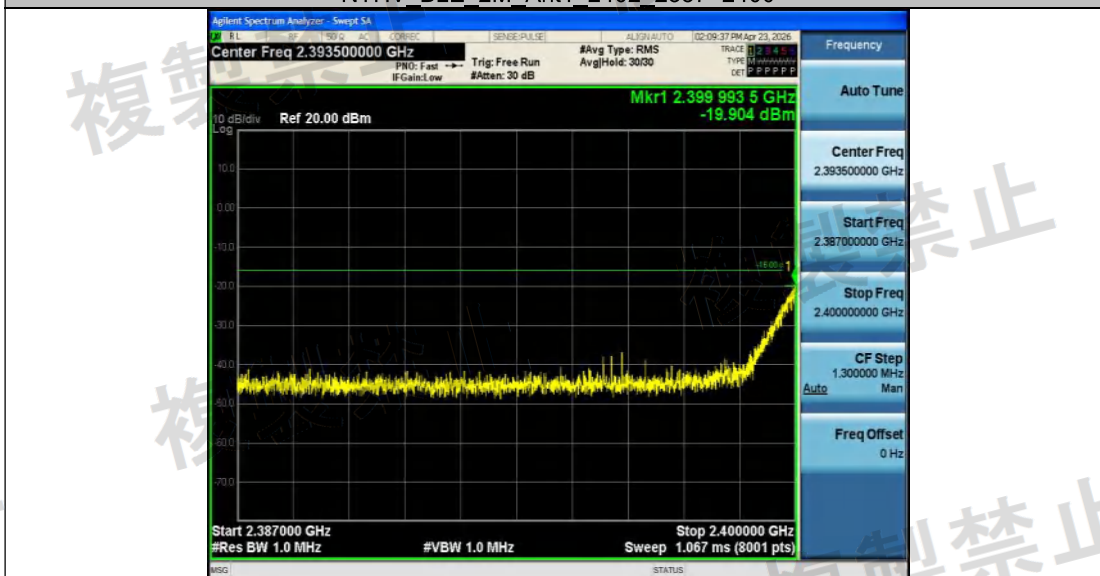


NTHV BLE 2M Ant1 2402 30~2387

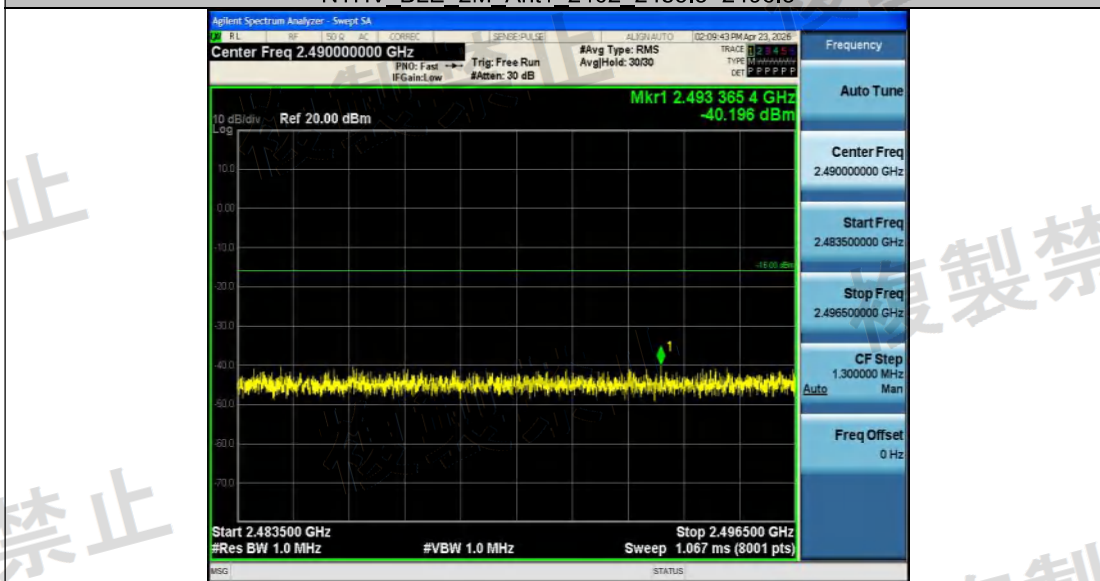




NTHV_BLE_2M_Ant1_2402_2387~2400

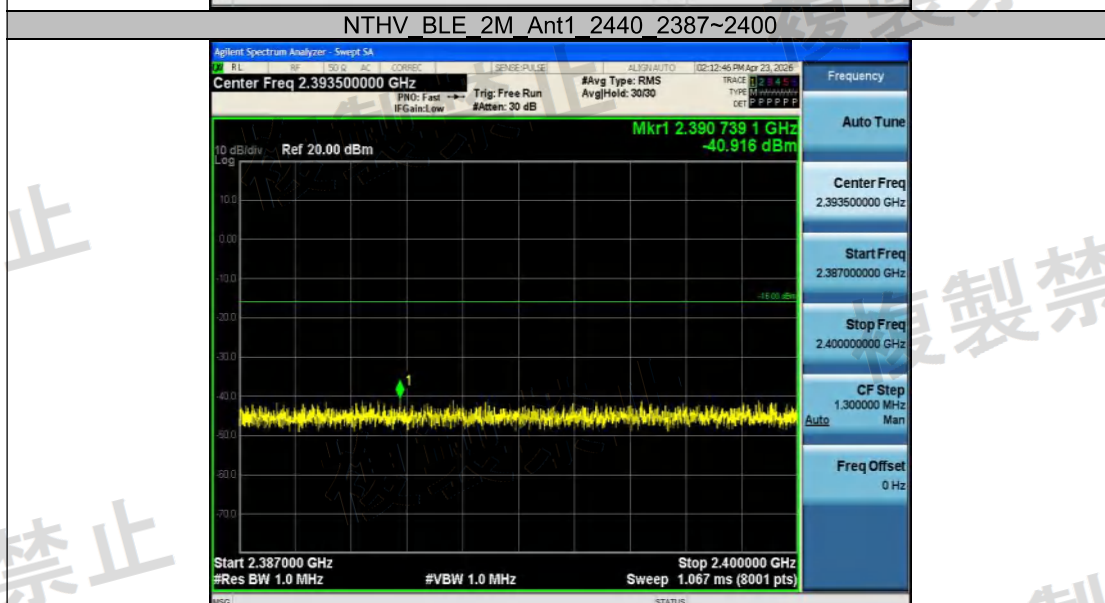
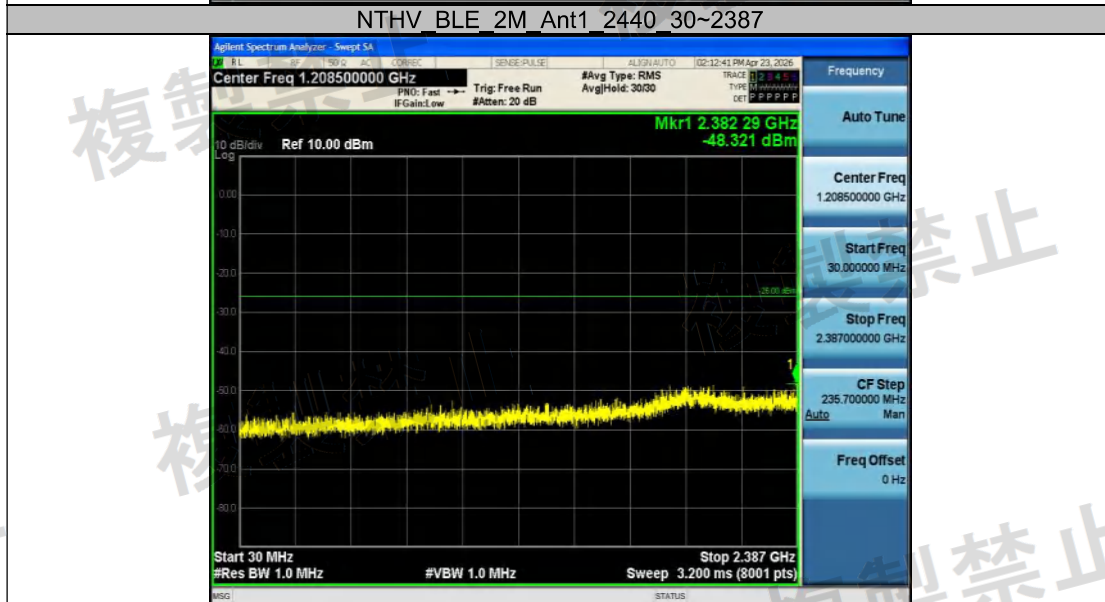


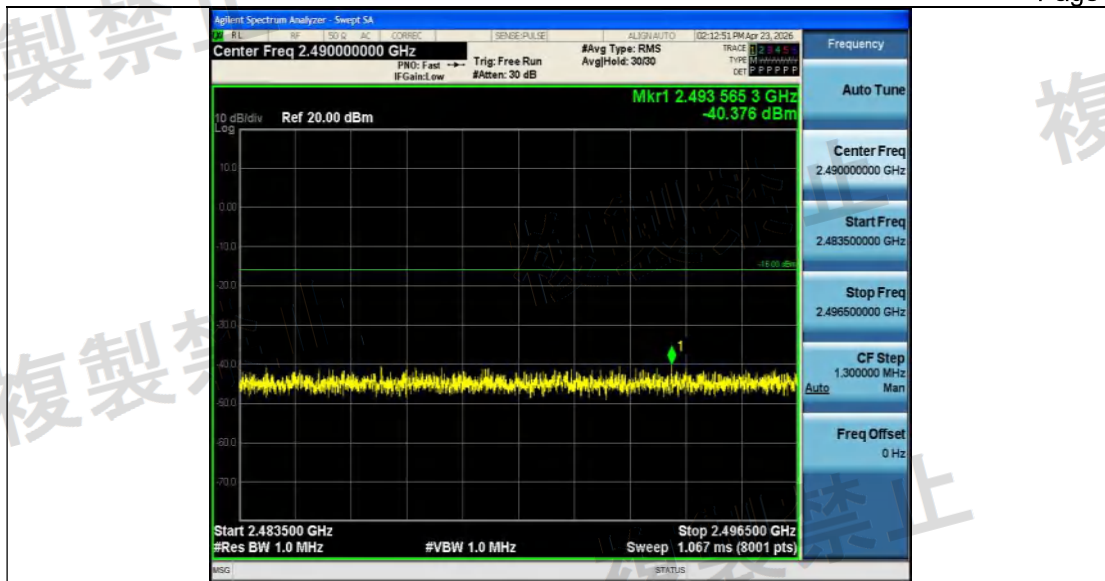
NTHV_BLE_2M_Ant1_2402_2483.5~2496.5



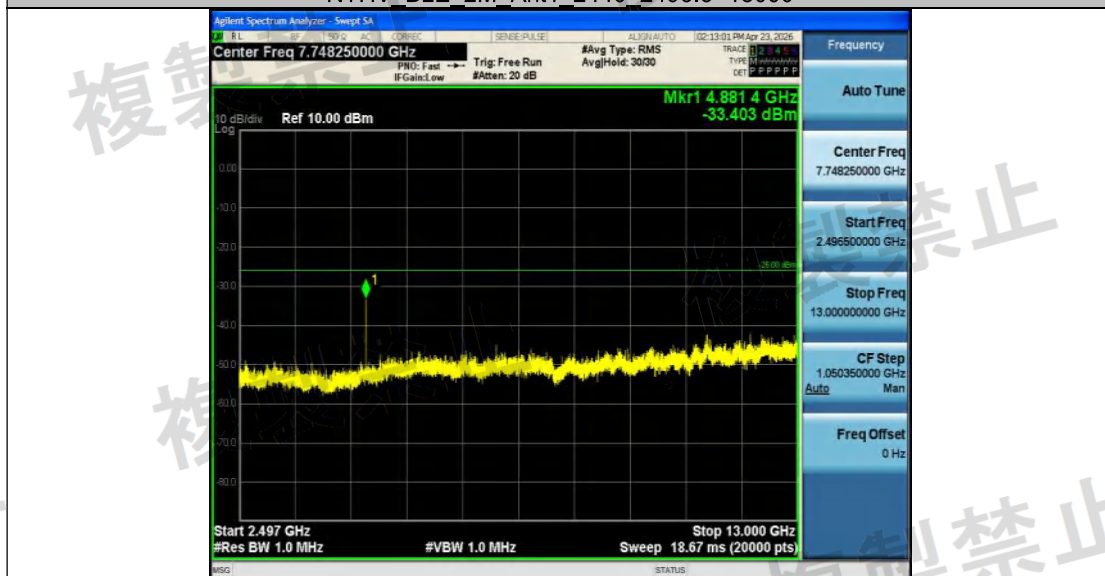
NTHV_BLE_2M_Ant1_2402_2496.5~13000



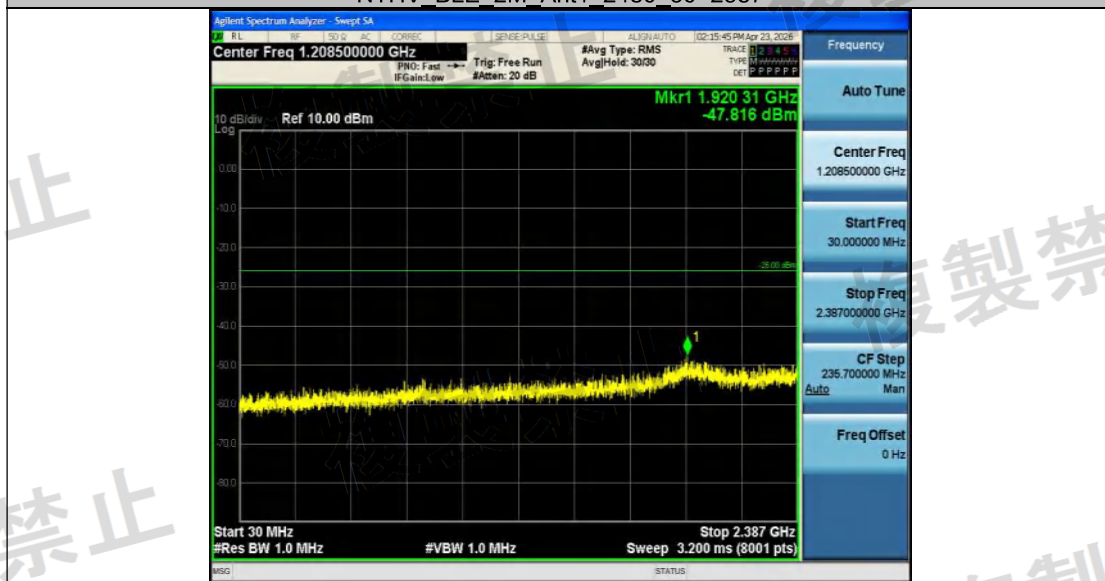




NTHV BLE 2M Ant1 2440 2496.5~13000

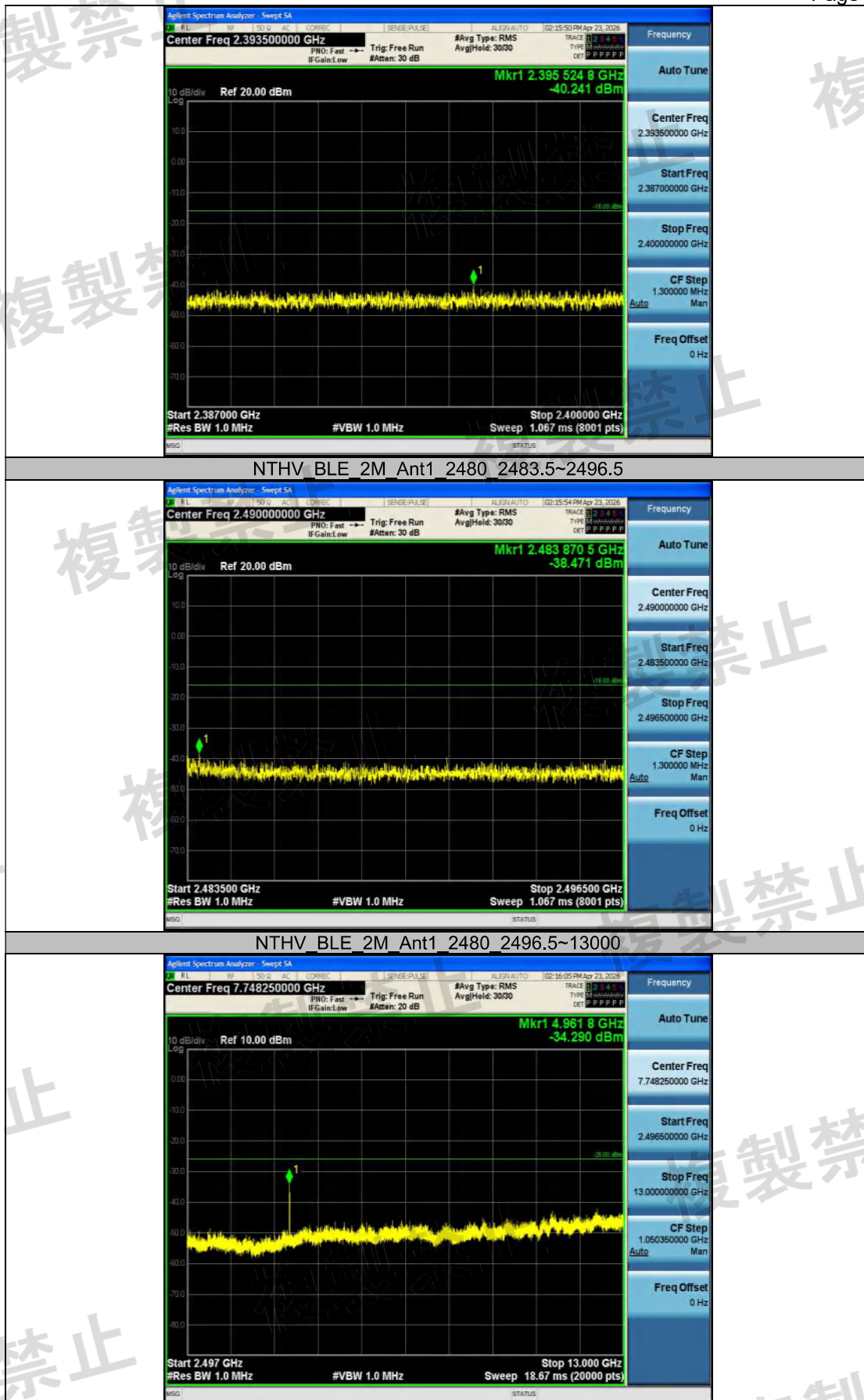


NTHV BLE 2M Ant1 2480 30~2387



NTHV BLE 2M Ant1 2480 2387~2400

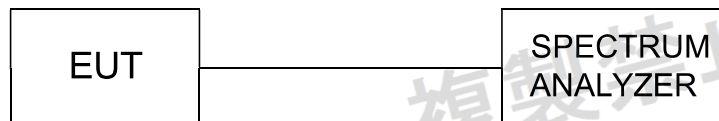






4.6. Limit of secondary radiated emissions

TEST CONFIGURATION



TEST PROCEDURE

The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.

EUT Condition: modulation

Spectrum Condition:

Frequency: 30MHz-13GHz

RBW:100KHz(30MHz-1GHz), 1MHz(1GHz-13GHz)

VBW:100KHz(30MHz-1GHz), 1MHz(1GHz-13GHz)

Sweep time:Auto

Dectector mode: Positive peak

Indication mode: max hold

LIMIT

The limit on secondary emissions radiated from the receiving equipment within which the function of other radio equipment will not be impaired shall be, in terms of the power of a dummy antenna circuit that has the same electrical constant as the receiving antenna, 4 nW or less at a frequency below 1 GHz and 20 nW or less at a frequency of 1 GHz or higher as measured using the circuit

TEST RESULTS

Test Condition	Test Mode	Antenna	Freq (MHz)	Freq.Range [MHz]	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [nW]	Limit [nW]	Verdict
NTNV	BLE_1M	Ant1	2402	30~1000	845.29	-72.54	≤-54	0.05572	≤4	PASS
				1000~13000	9914.65	-52.26	≤-47	5.94292	≤20	See table below
			2440	30~1000	955.50	-71.65	≤-54	0.06839	≤4	PASS
				1000~13000	9754.44	-51.89	≤-47	6.47143	≤20	See table below
			2480	30~1000	907.12	-72.63	≤-54	0.05458	≤4	PASS
				1000~13000	9914.65	-52.15	≤-47	6.09537	≤20	See table below
	BLE_2M	Ant1	2402	30~1000	821.40	-72.75	≤-54	0.05309	≤4	PASS
				1000~13000	9602.63	-51.31	≤-47	7.39605	≤20	See table below
			2440	30~1000	971.99	-72.71	≤-54	0.05358	≤4	PASS
				1000~13000	9755.04	-51.82	≤-47	6.57658	≤20	See table below
			2480	30~1000	836.31	-72.60	≤-54	0.05495	≤4	PASS
				1000~13000	9914.65	-51.97	≤-47	6.35331	≤20	See table below





NTLV	BLE_1M	Ant1	2402	30~1000	839.10	-72.26	≤-54	0.0594 3	≤4	PASS
				1000~1300 0	9914.6 5	-52.39	≤-47	5.7676 6	≤20	See table below
			2440	30~1000	942.41	-72.58	≤-54	0.0552 1	≤4	PASS
				1000~1300 0	9755.0 4	-51.50	≤-47	7.0794 6	≤20	See table below
			2480	30~1000	927.86	-71.86	≤-54	0.0651 6	≤4	PASS
				1000~1300 0	9914.6 5	-52.30	≤-47	5.8884 4	≤20	See table below
	BLE_2M	Ant1	2402	30~1000	948.23	-71.95	≤-54	0.0638 3	≤4	PASS
				1000~1300 0	9602.6 3	-51.47	≤-47	7.1285 3	≤20	See table below
			2440	30~1000	789.51	-72.54	≤-54	0.0557 2	≤4	PASS
				1000~1300 0	9754.4 4	-51.92	≤-47	6.4268 8	≤20	See table below
			2480	30~1000	916.10	-72.91	≤-54	0.0511 7	≤4	PASS
				1000~1300 0	9914.6 5	-52.65	≤-47	5.4325 0	≤20	See table below
NTHV	BLE_1M	Ant1	2402	30~1000	797.15	-72.70	≤-54	0.0537 0	≤4	PASS
				1000~1300 0	9914.6 5	-52.63	≤-47	5.4575 8	≤20	See table below
			2440	30~1000	970.78	-72.26	≤-54	0.0594 3	≤4	PASS
				1000~1300 0	9755.0 4	-51.80	≤-47	6.6069 3	≤20	See table below
			2480	30~1000	807.94	-72.01	≤-54	0.0629 5	≤4	PASS
				1000~1300 0	9914.6 5	-52.62	≤-47	5.4701 6	≤20	See table below
	BLE_2M	Ant1	2402	30~1000	990.42	-72.17	≤-54	0.0606 7	≤4	PASS
				1000~1300 0	9602.6 3	-51.23	≤-47	7.5335 6	≤20	See table below
			2440	30~1000	954.77	-72.75	≤-54	0.0530 9	≤4	PASS
				1000~1300 0	9754.4 4	-51.73	≤-47	6.7142 9	≤20	See table below
			2480	30~1000	834.49	-72.64	≤-54	0.0544 5	≤4	PASS
				1000~1300 0	9914.6 5	-52.48	≤-47	5.6493 7	≤20	See table below





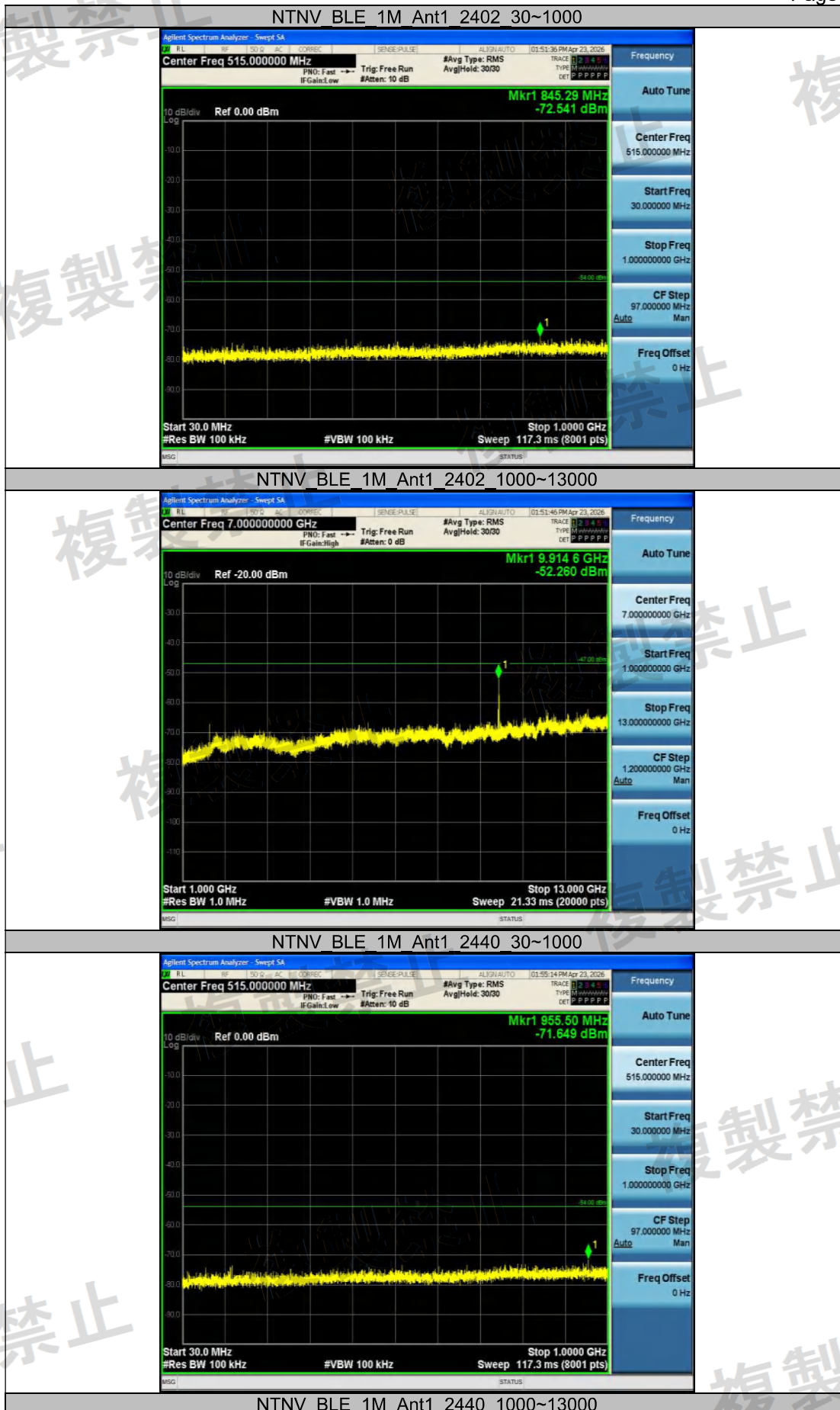
Test Condition	Test Mode	Antenna	Freq (MHz)	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [nW]	Limit [nW]	Verdict
NTNV	BLE_1M	Ant1	2402	9914.20	-53.63	≤-47	4.33511	≤20	PASS
			2440	9754.11	-53.08	≤-47	4.92040	≤20	PASS
			2480	9914.18	-53.52	≤-47	4.44631	≤20	PASS
	BLE_2M	Ant1	2402	9602.42	-53.63	≤-47	4.33511	≤20	PASS
			2440	9754.23	-53.31	≤-47	4.66659	≤20	PASS
			2480	9914.24	-53.74	≤-47	4.22669	≤20	PASS
NTLV	BLE_1M	Ant1	2402	9914.06	-53.60	≤-47	4.36516	≤20	PASS
			2440	9754.24	-53.34	≤-47	4.63447	≤20	PASS
			2480	9914.18	-53.53	≤-47	4.43609	≤20	PASS
	BLE_2M	Ant1	2402	9602.24	-52.63	≤-47	5.45758	≤20	PASS
			2440	9754.13	-53.09	≤-47	4.90908	≤20	PASS
			2480	9914.20	-53.86	≤-47	4.11150	≤20	PASS
NTHV	BLE_1M	Ant1	2402	9914.23	-53.97	≤-47	4.00867	≤20	PASS
			2440	9754.23	-53.30	≤-47	4.67735	≤20	PASS
			2480	9914.24	-53.74	≤-47	4.22669	≤20	PASS
	BLE_2M	Ant1	2402	9602.17	-52.45	≤-47	5.68853	≤20	PASS
			2440	9754.15	-53.10	≤-47	4.89779	≤20	PASS
			2480	9914.21	-53.61	≤-47	4.35512	≤20	PASS

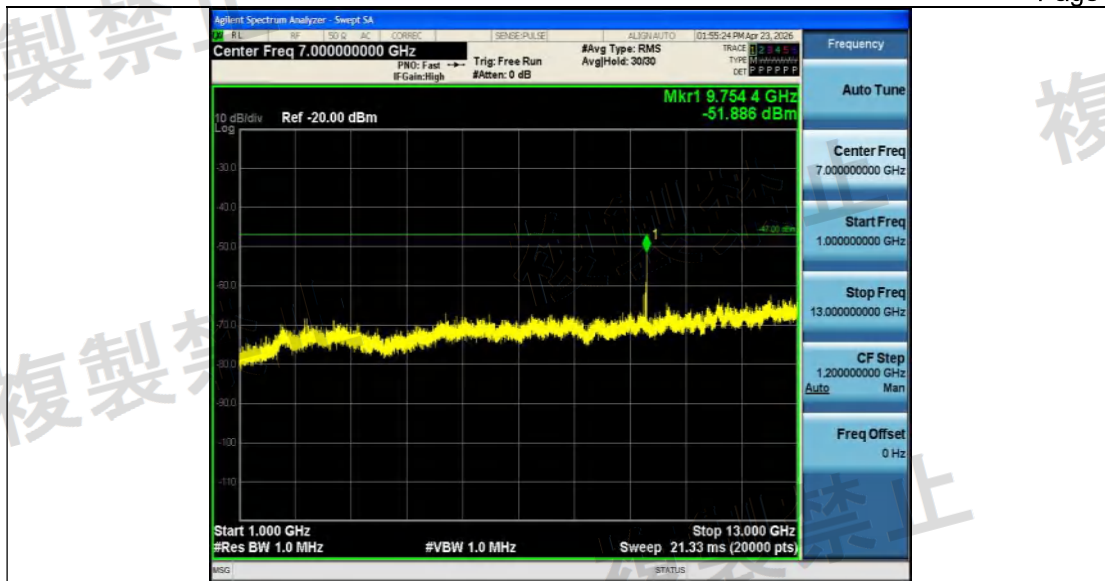
Note: 1. The product was tested at 25℃ and 55% humidity condition;

2. All condition has been tested, list the worst case in this item

Test plot as follows:



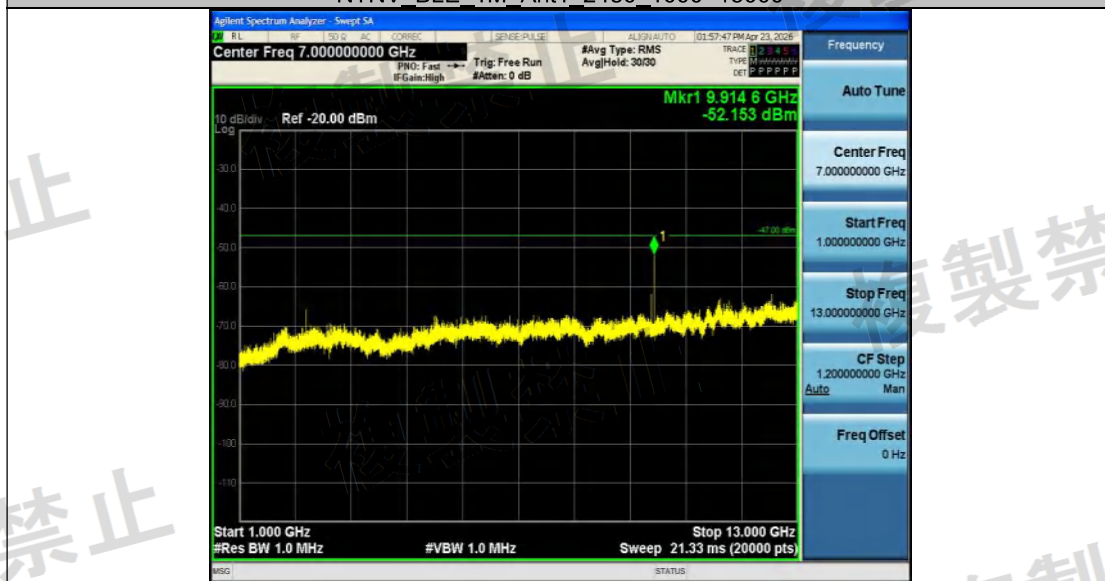




NTNV BLE 1M Ant1 2480 30~1000



NTNV BLE 1M Ant1 2480 1000~13000



NTNV BLE 2M Ant1 2402 30~1000

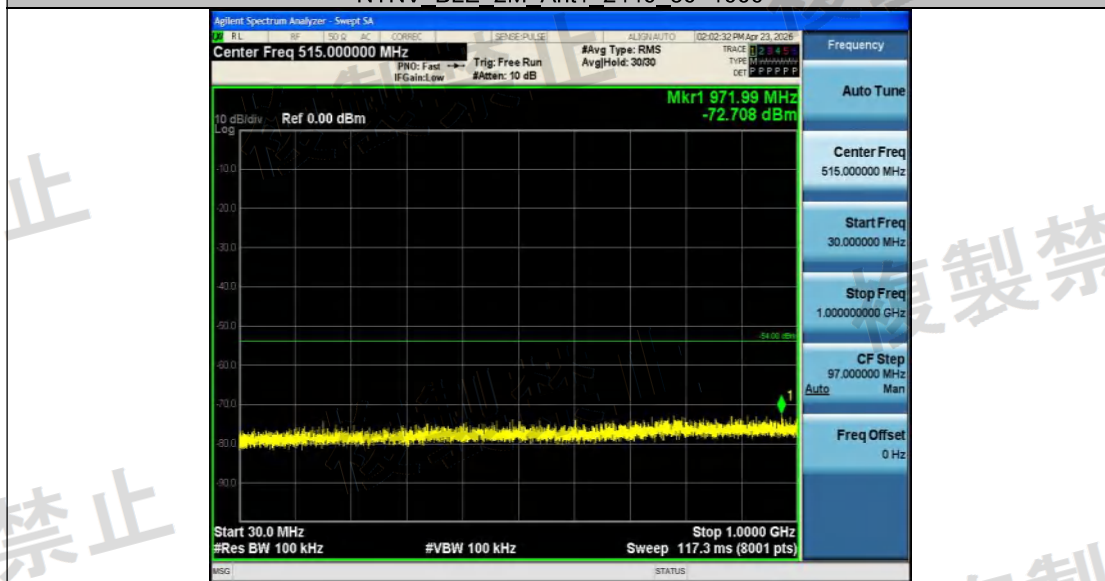




NTNV_BLE_2M_Ant1_2402_1000~13000

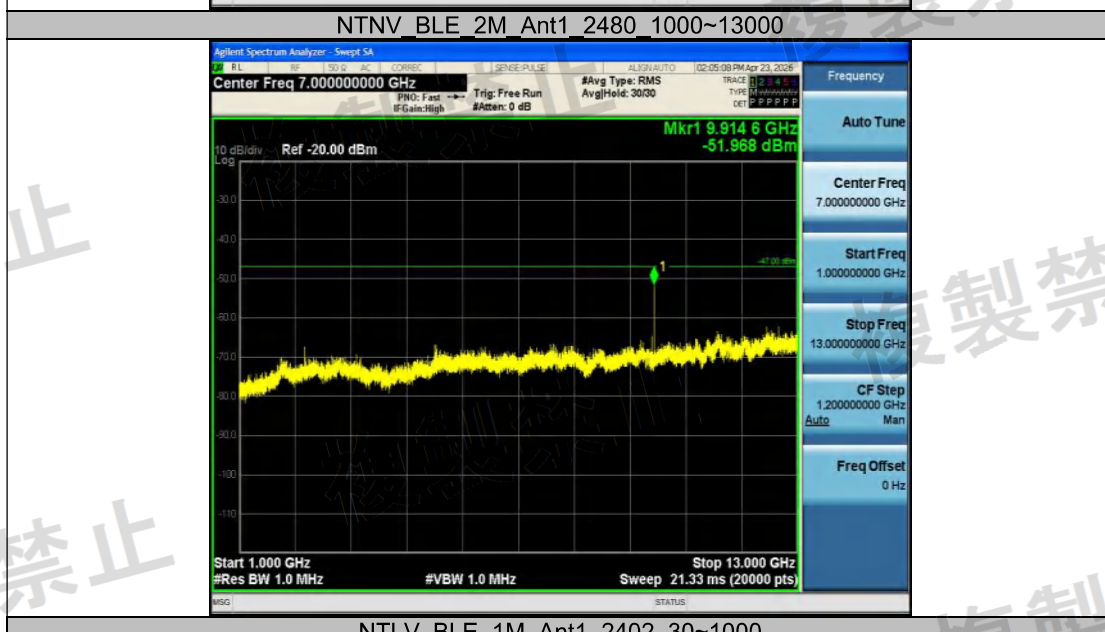
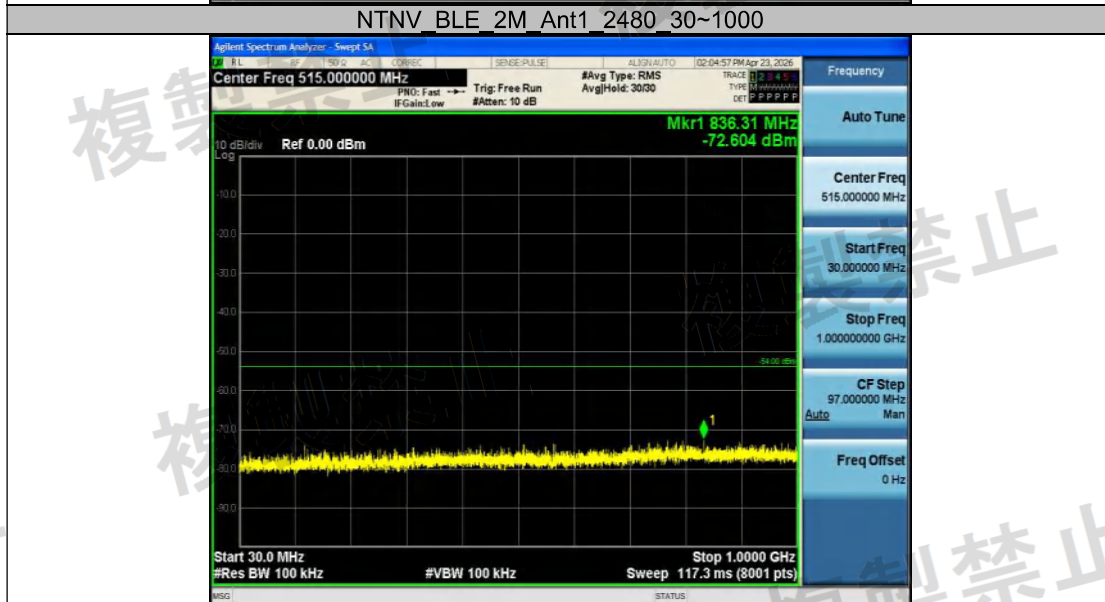


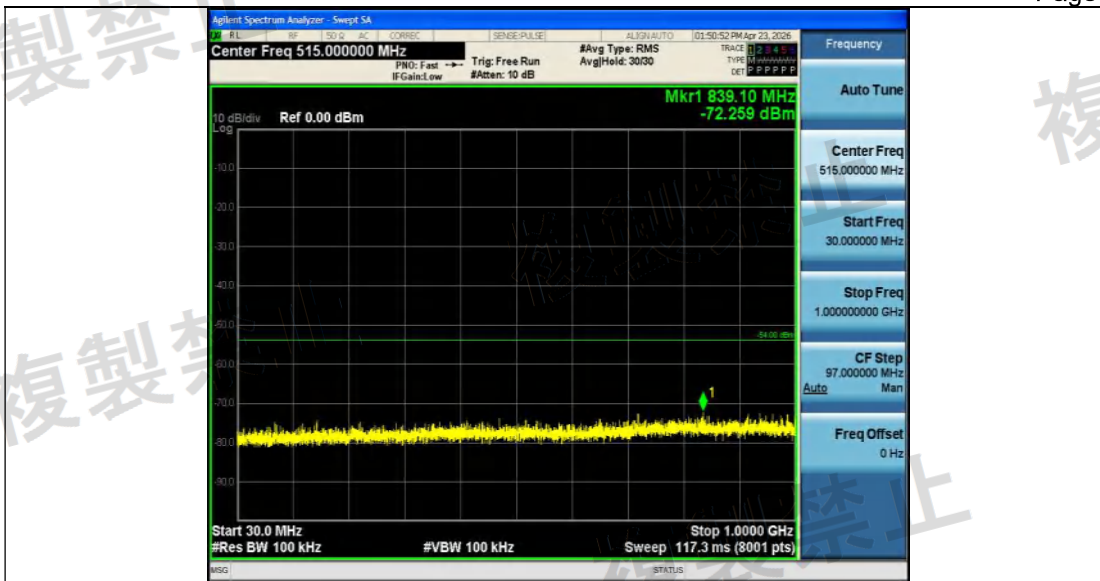
NTNV_BLE_2M_Ant1_2440_30~1000



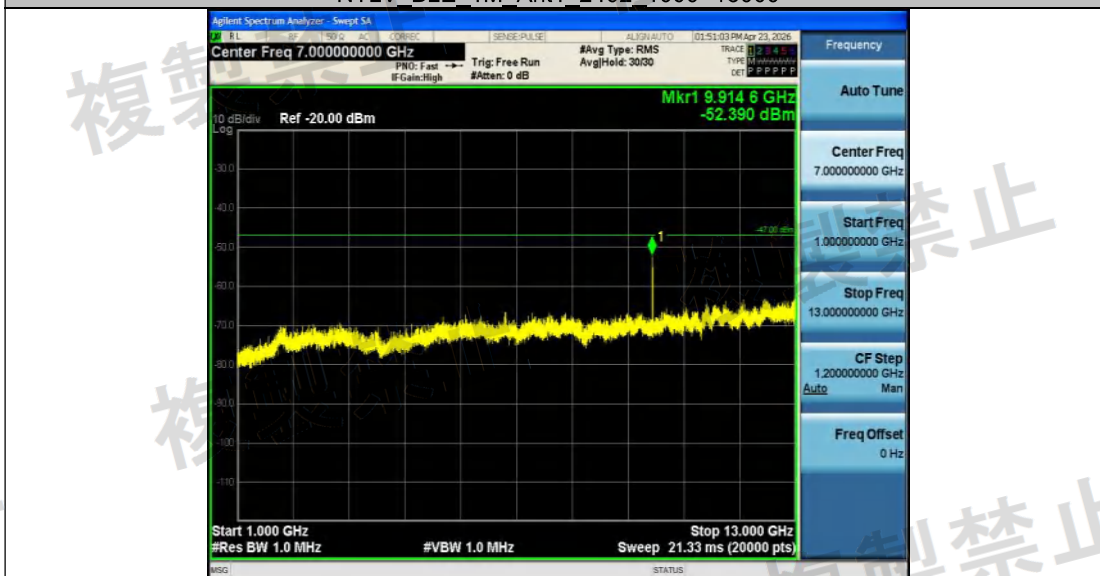
NTNV_BLE_2M_Ant1_2440_1000~13000



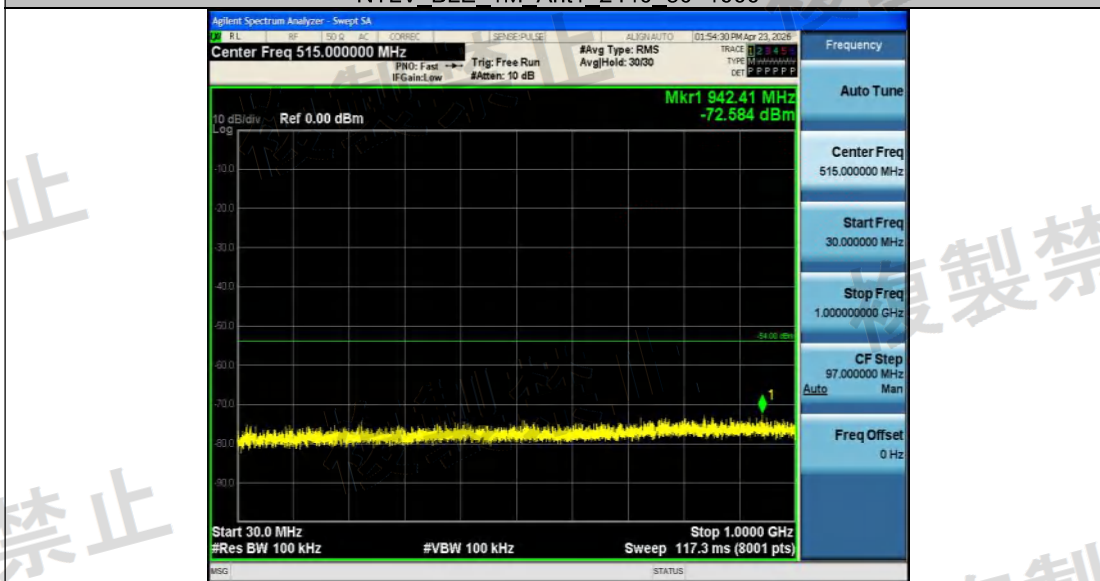




NTLV_BLE_1M_Ant1_2402_1000~13000



NTLV_BLE_1M_Ant1_2440_30~1000

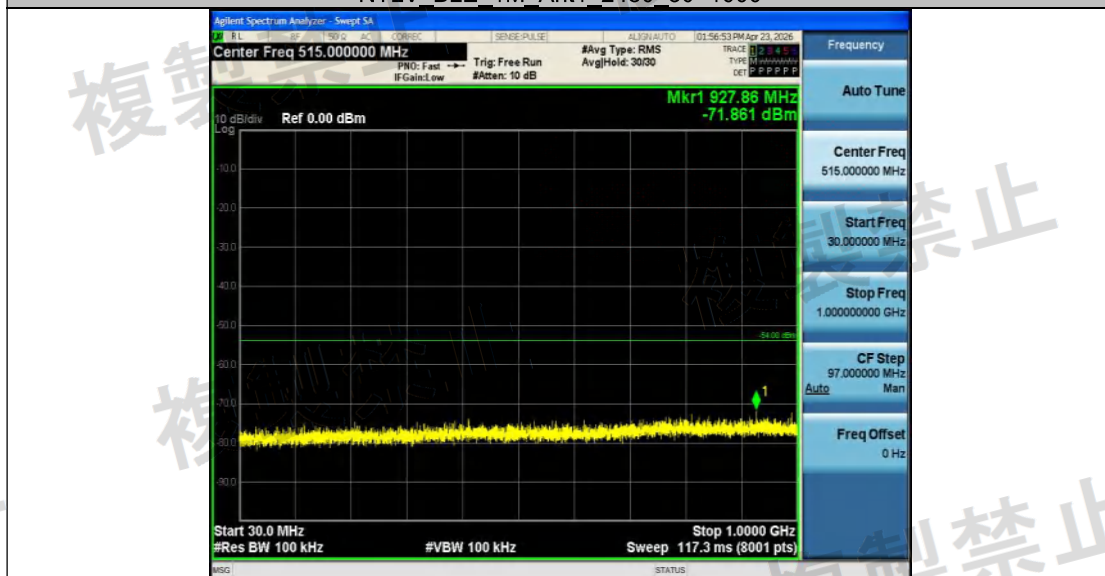


NTLV_BLE_1M_Ant1_2440_1000~13000

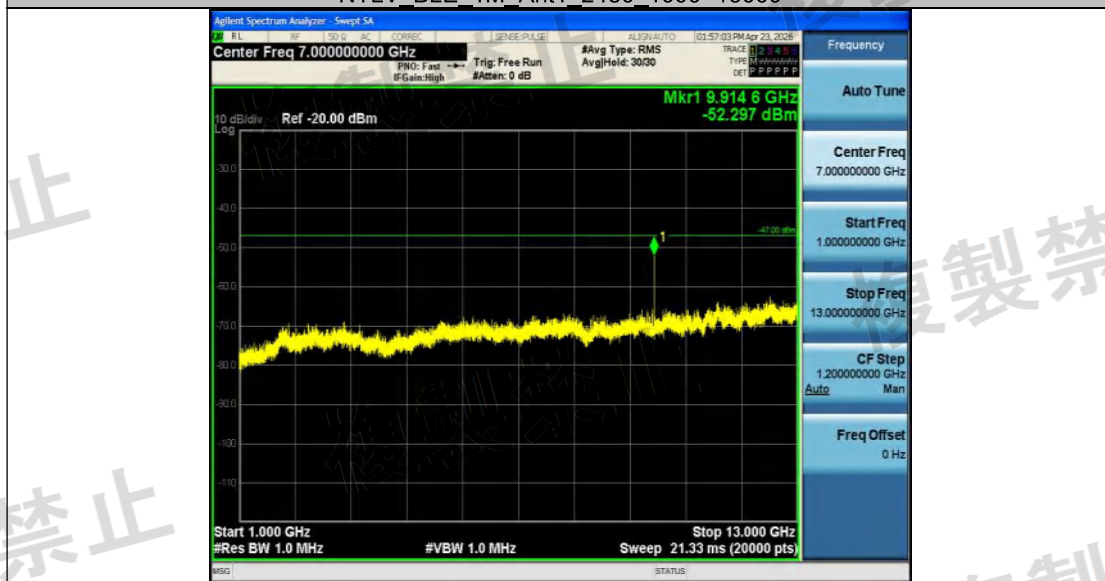




NTLV BLE 1M Ant1 2480 30~1000

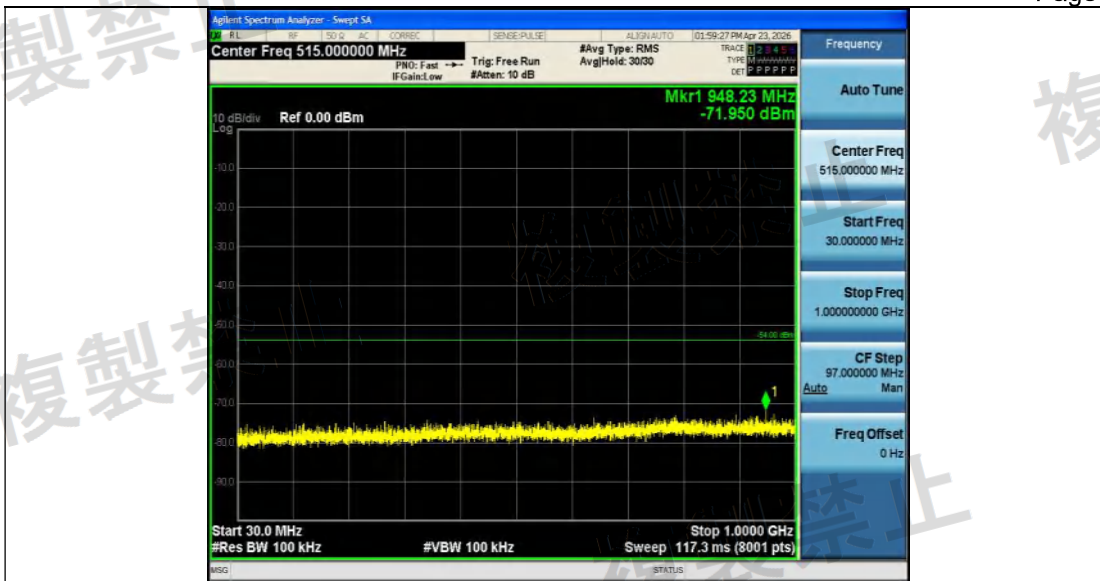


NTLV BLE 1M Ant1 2480 1000~13000



NTLV BLE 2M Ant1 2402 30~1000

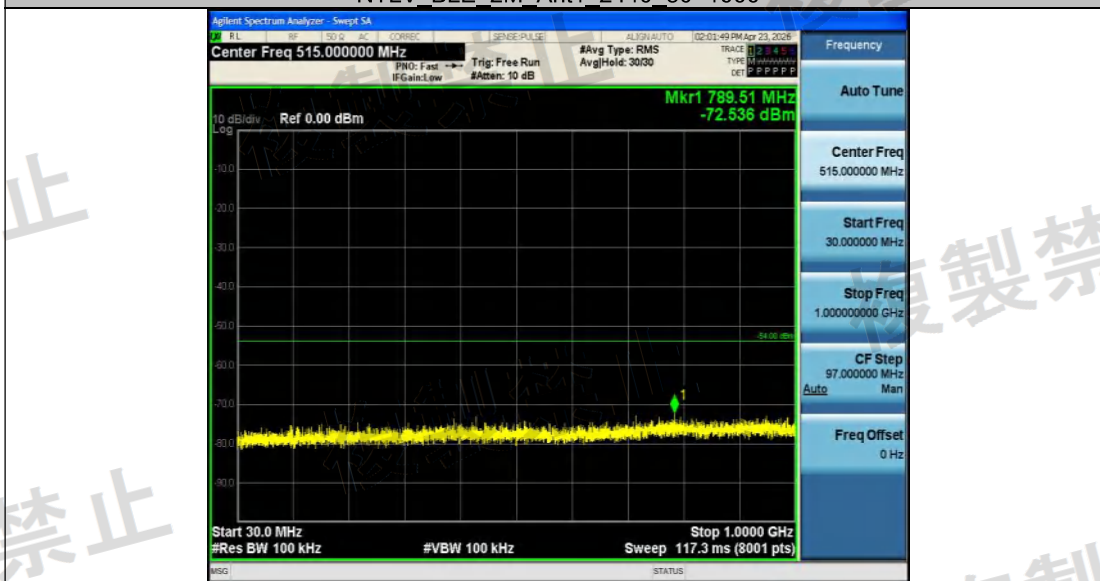




NTLV_BLE_2M_Ant1_2402_1000~13000

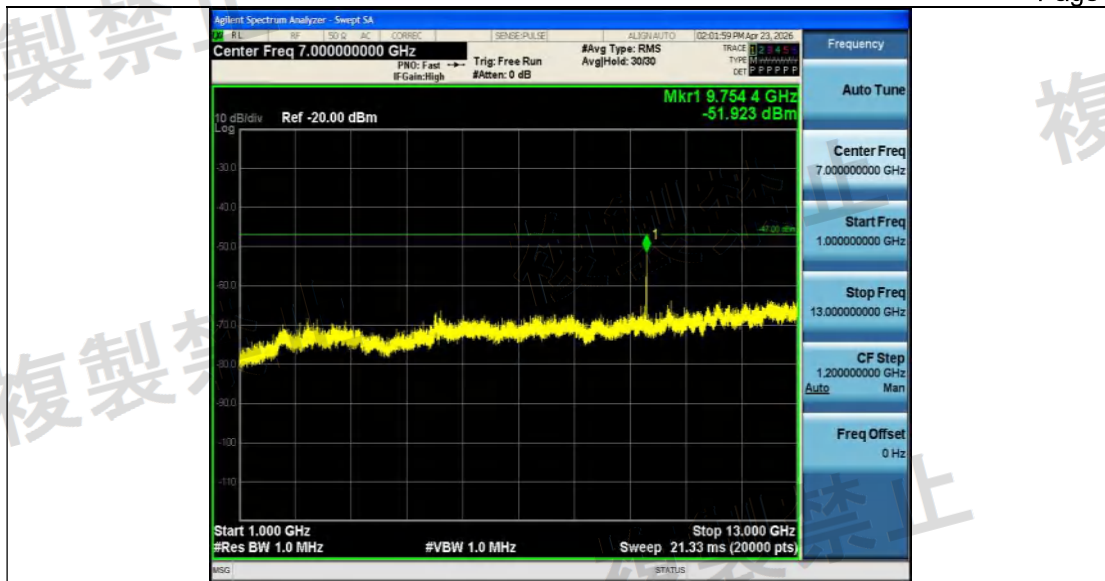


NTLV_BLE_2M_Ant1_2440_30~1000



NTLV_BLE_2M_Ant1_2440_1000~13000

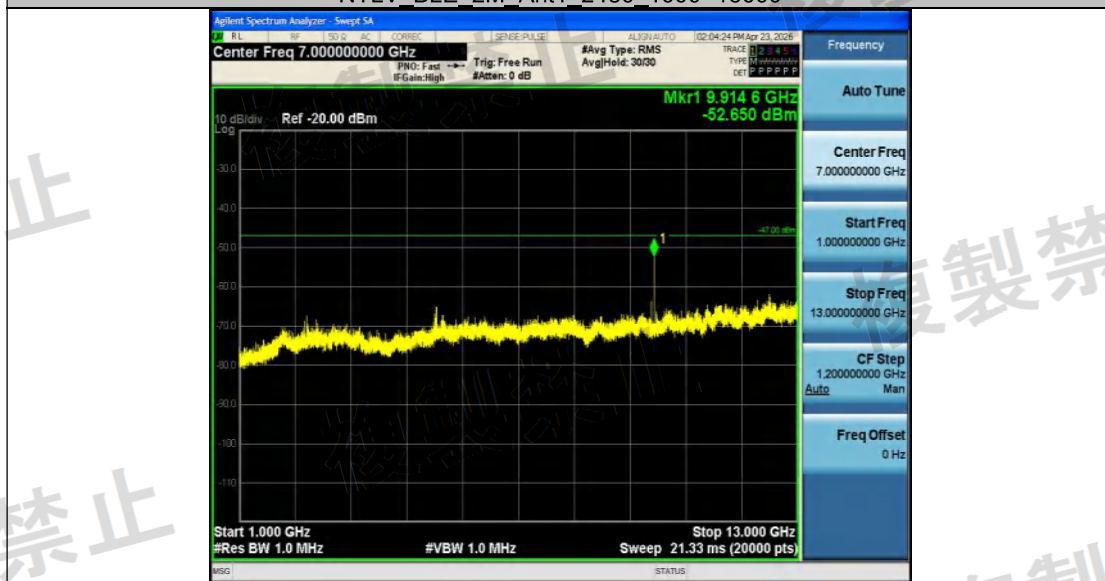




NTLV BLE 2M Ant1 2480 30~1000

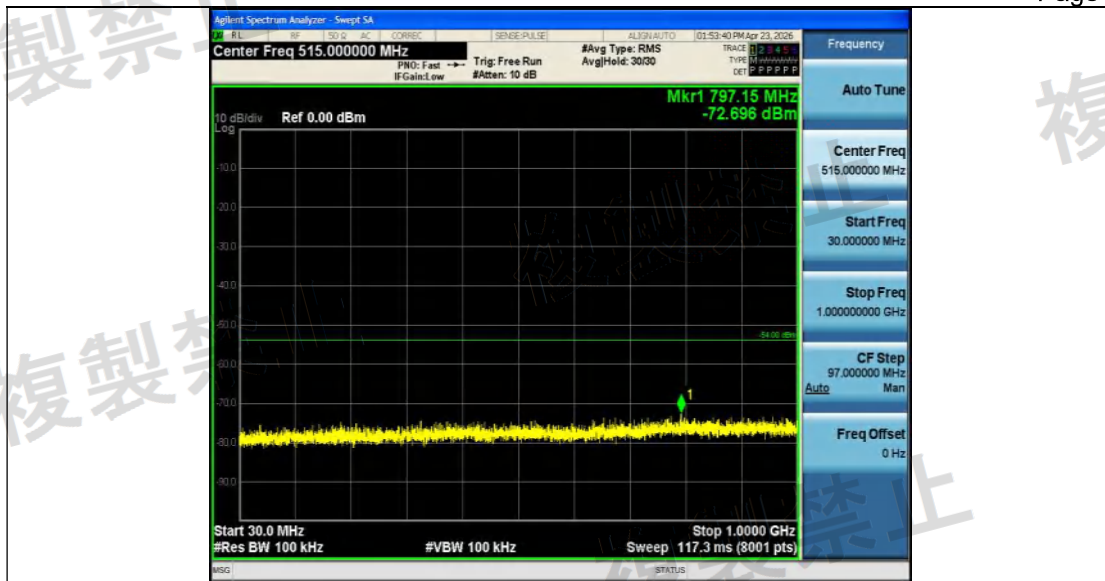


NTLV BLE 2M Ant1 2480 1000~13000



NTHV BLE 1M Ant1 2402 30~1000

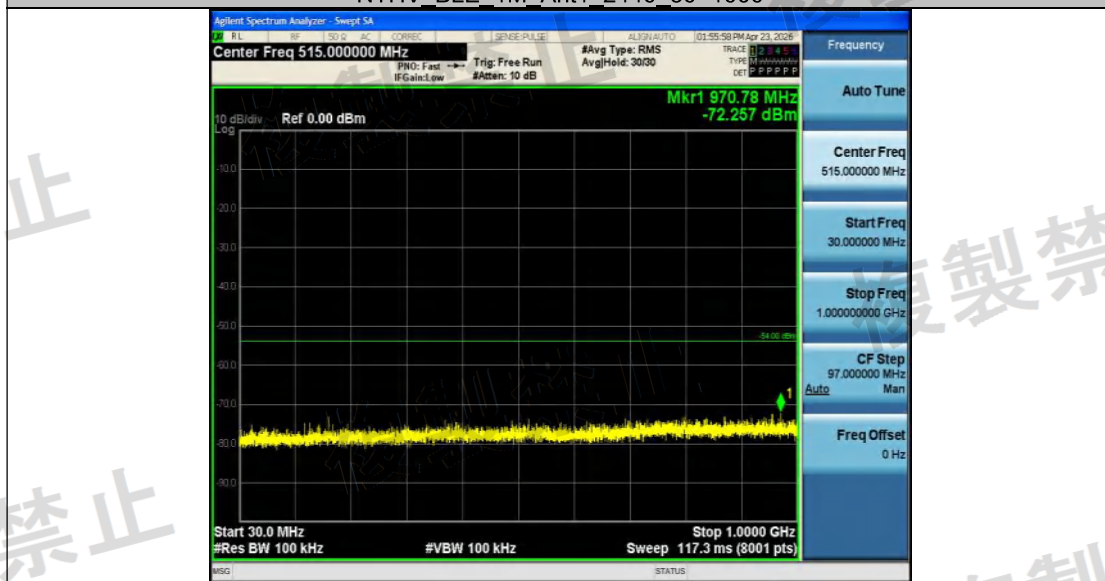




NTHV_BLE_1M_Ant1_2402_1000~13000

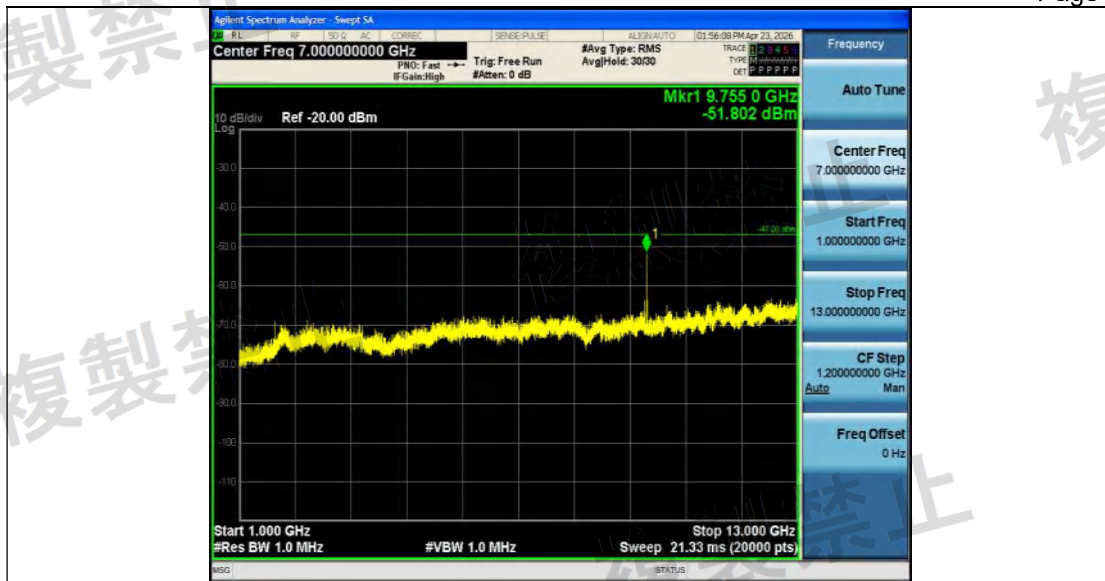


NTHV_BLE_1M_Ant1_2440_30~1000



NTHV_BLE_1M_Ant1_2440_1000~13000

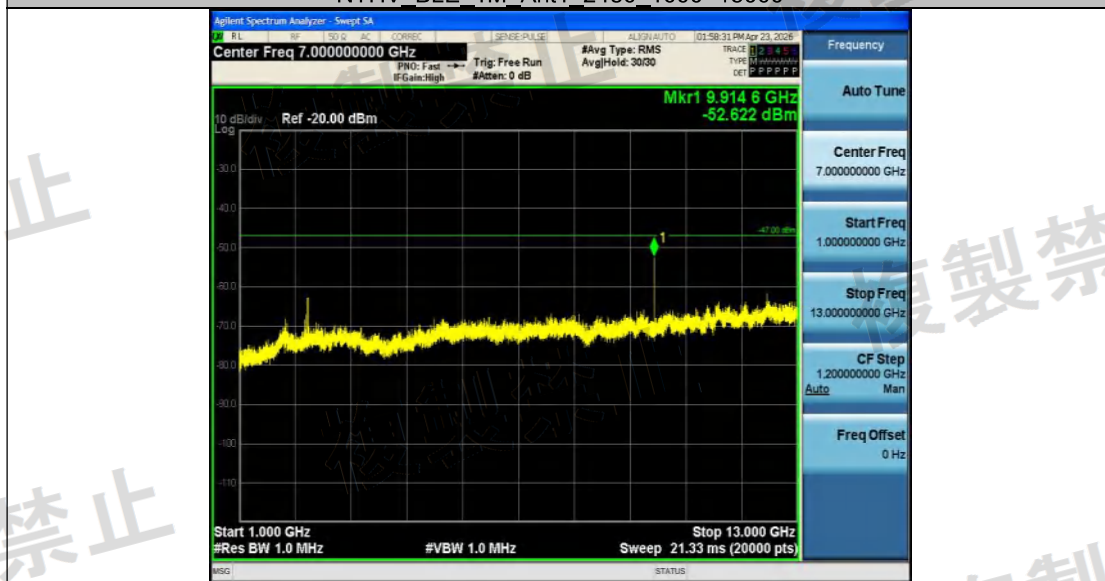




NTHV BLE 1M Ant1 2480 30~1000

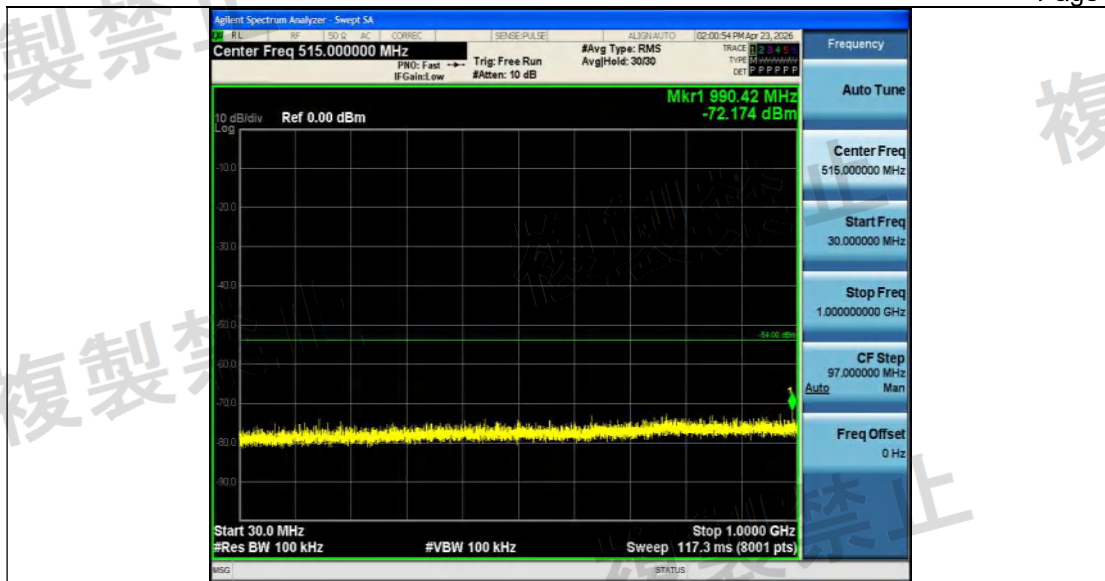


NTHV BLE 1M Ant1 2480 1000~13000

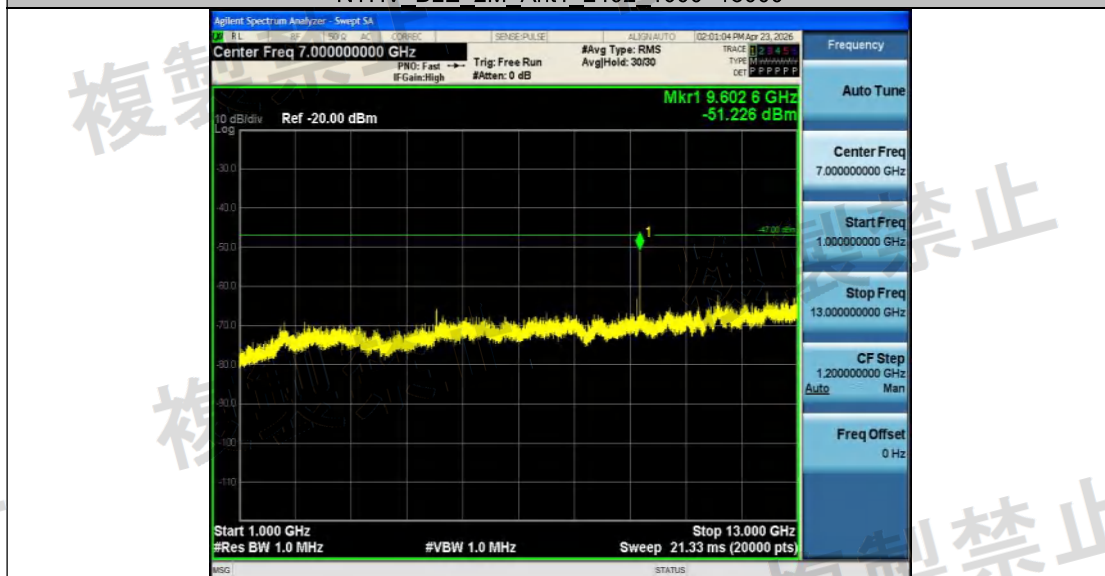


NTHV BLE 2M Ant1 2402 30~1000

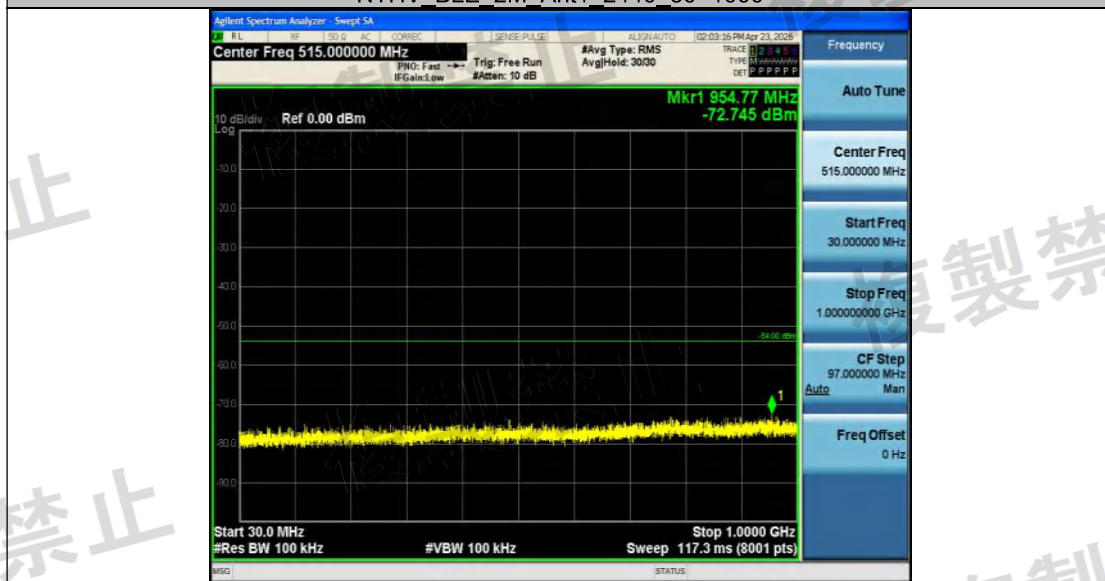




NTHV_BLE_2M_Ant1_2402_1000~13000



NTHV_BLE_2M_Ant1_2440_30~1000



NTHV_BLE_2M_Ant1_2440_1000~13000



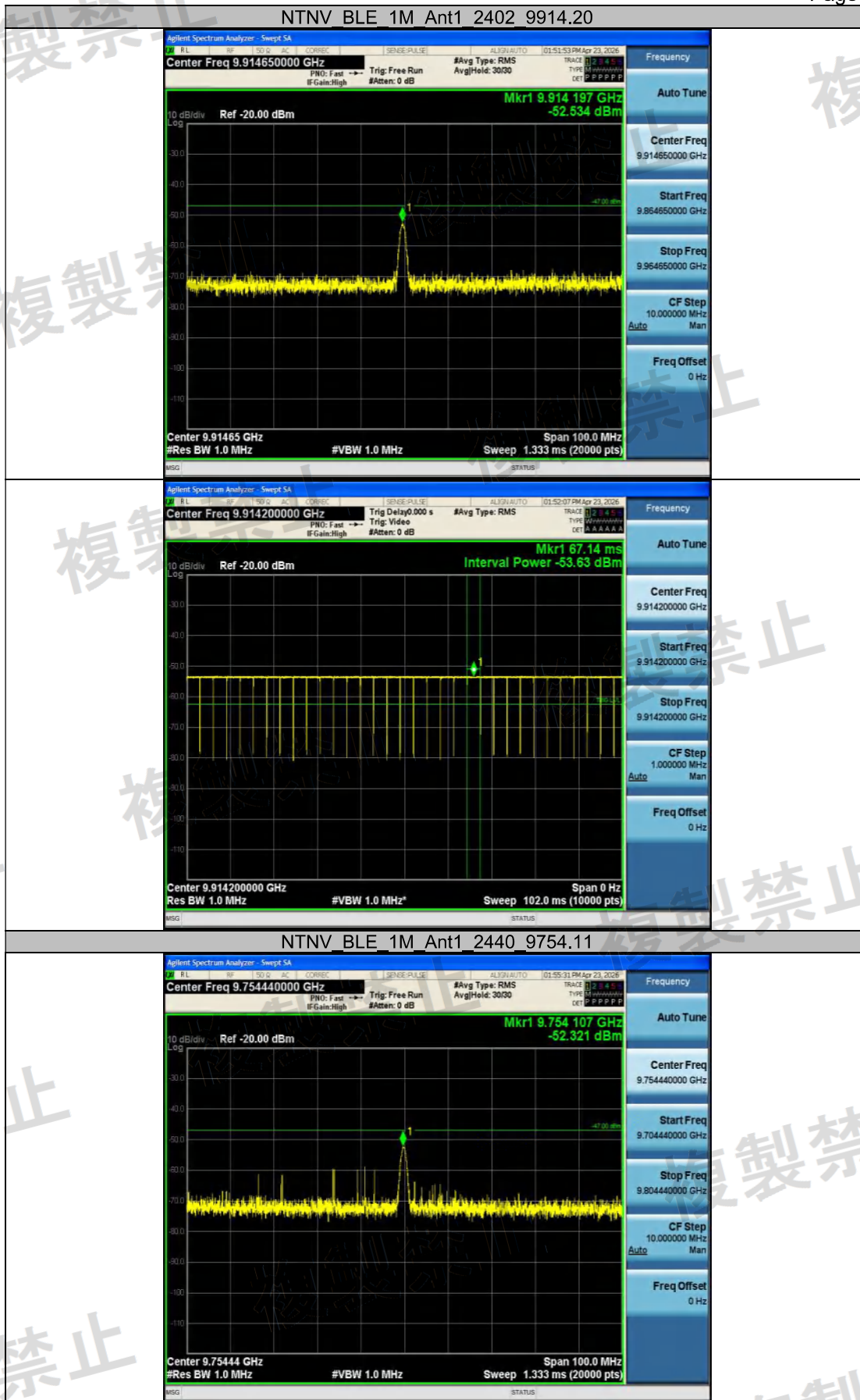


NTHV BLE 2M Ant1 2480 30~1000



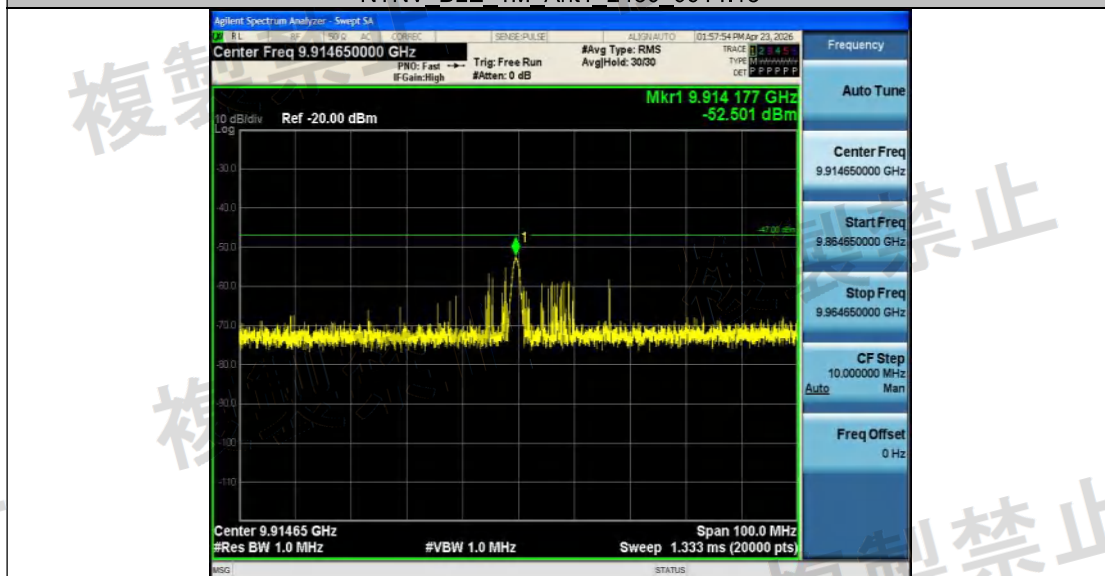
NTHV BLE 2M Ant1 2480 1000~13000





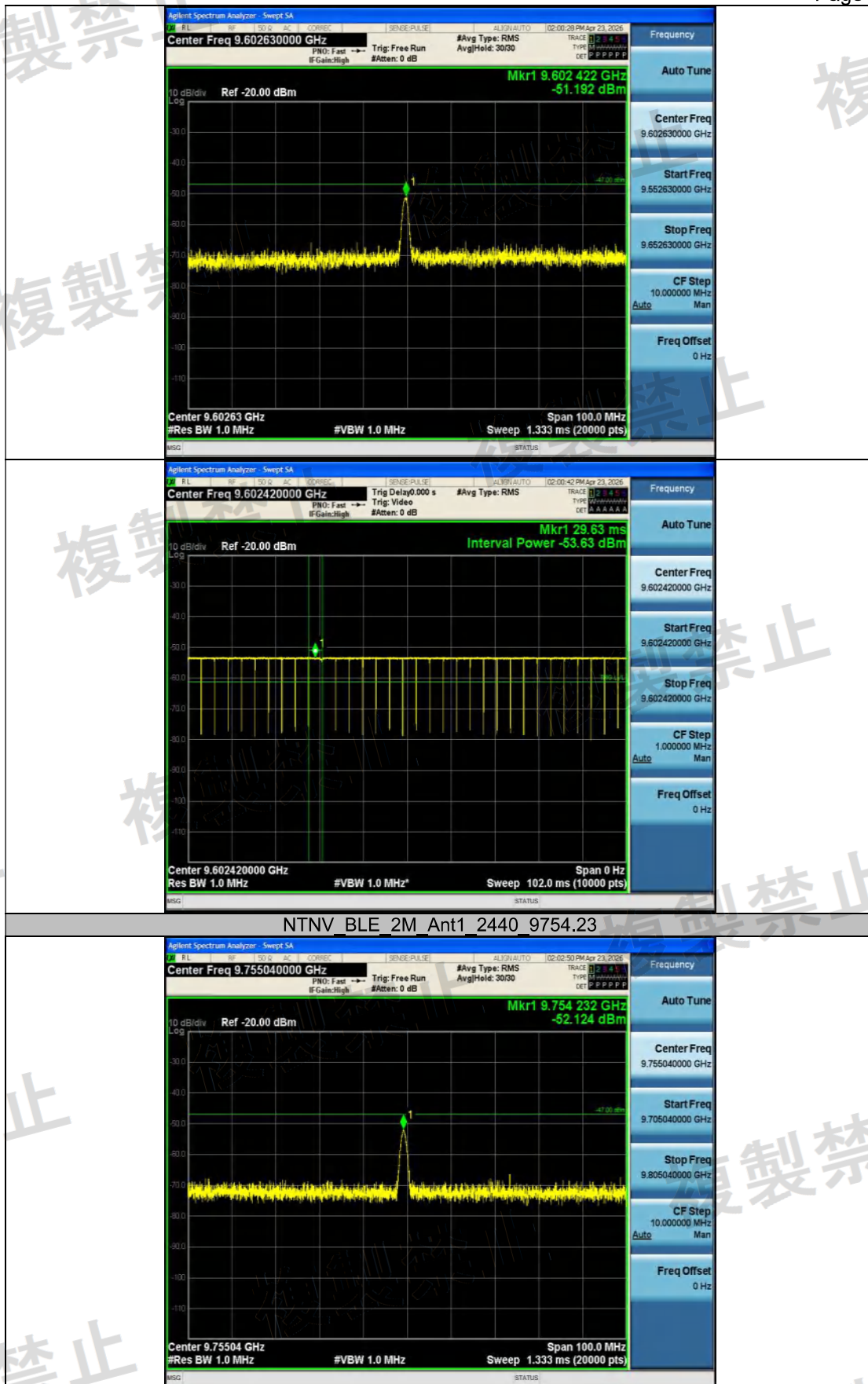


NTNV_BLE_1M_Ant1_2480_9914.18



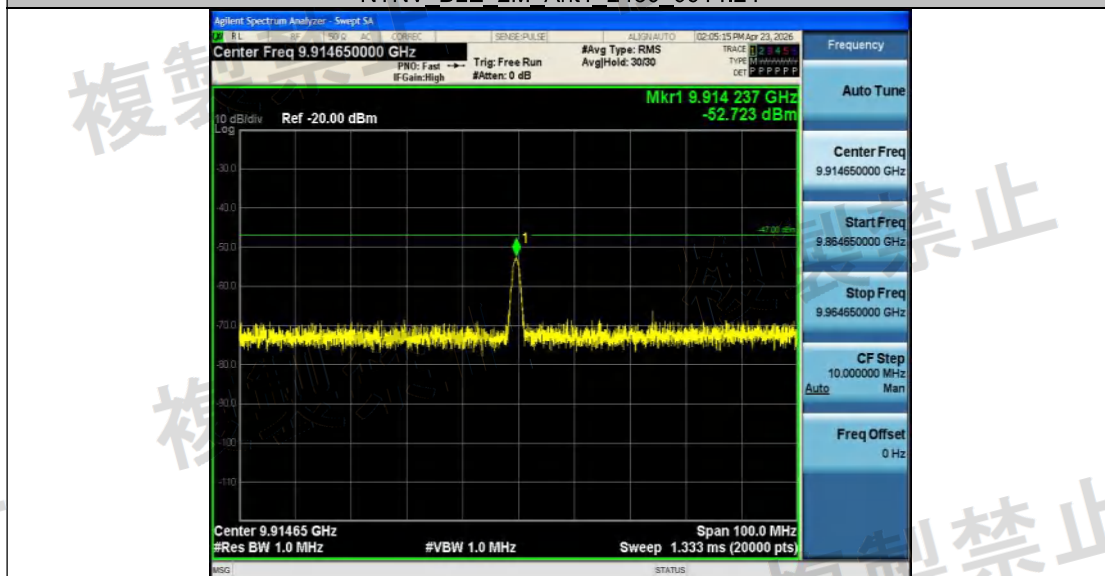
NTNV_BLE_2M_Ant1_2402_9602.42





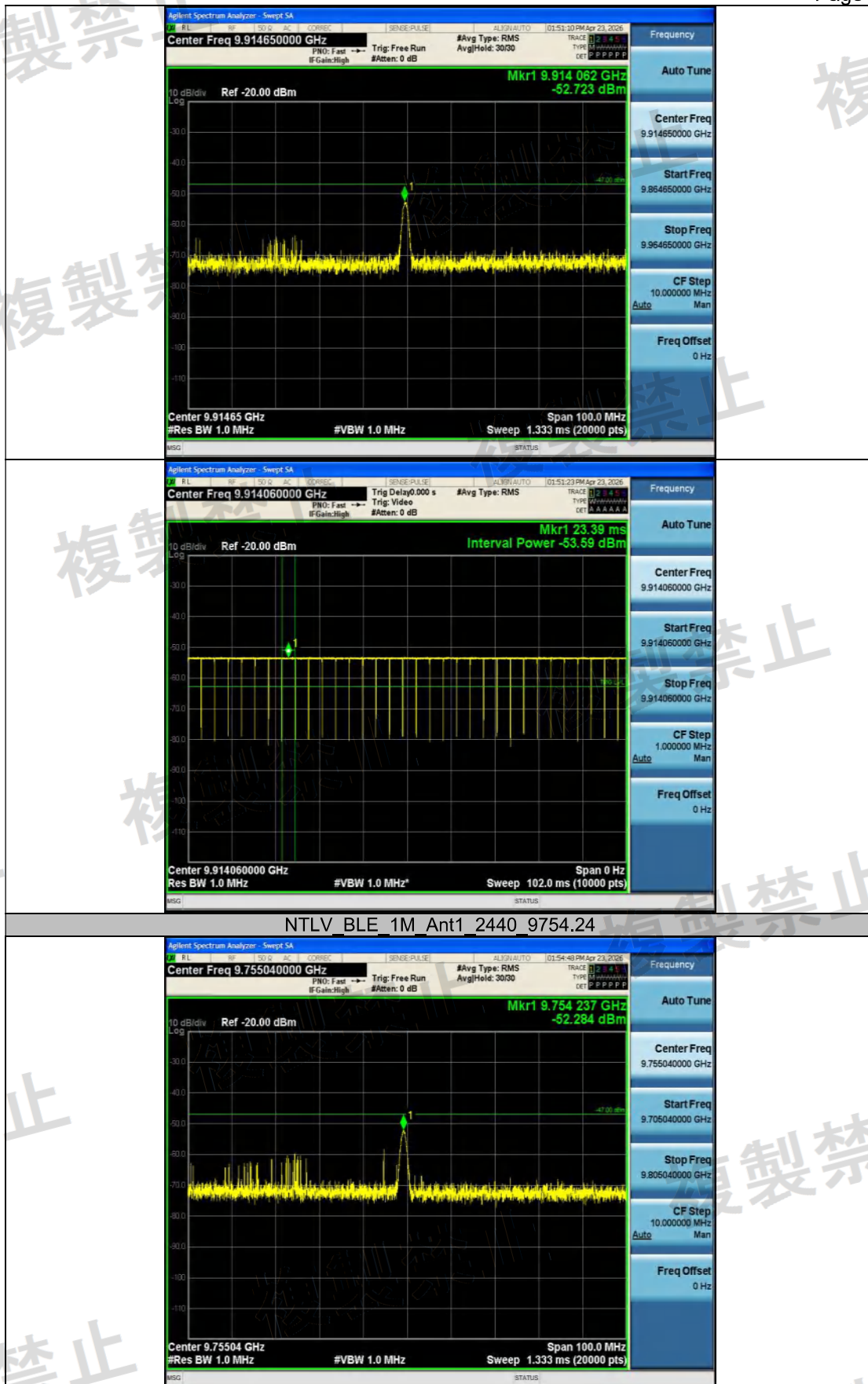


NTNV BLE 2M Ant1 2480 9914.24



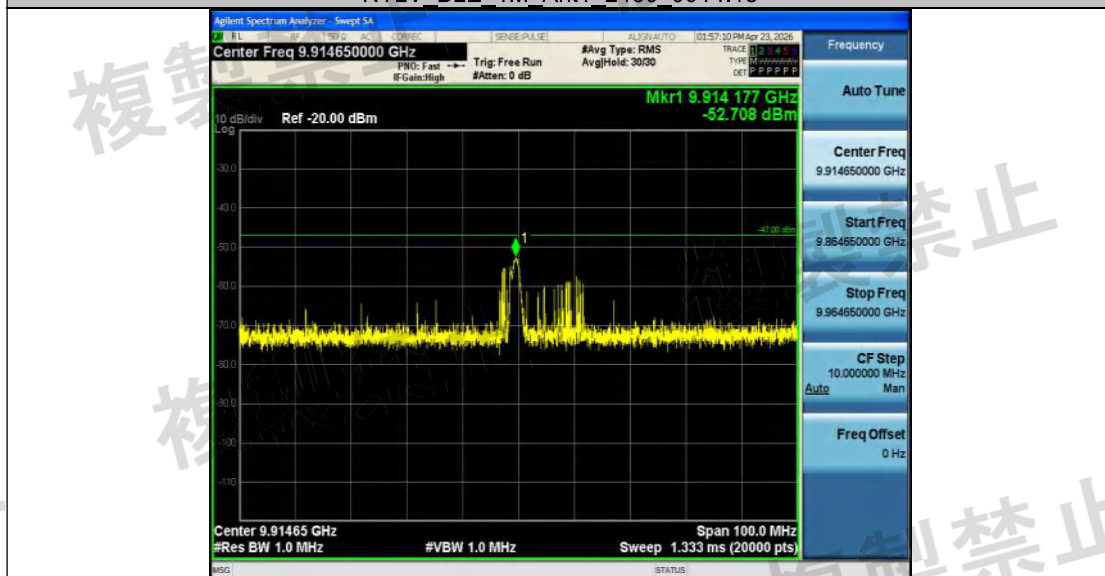
NTLV BLE 1M Ant1 2402 9914.06





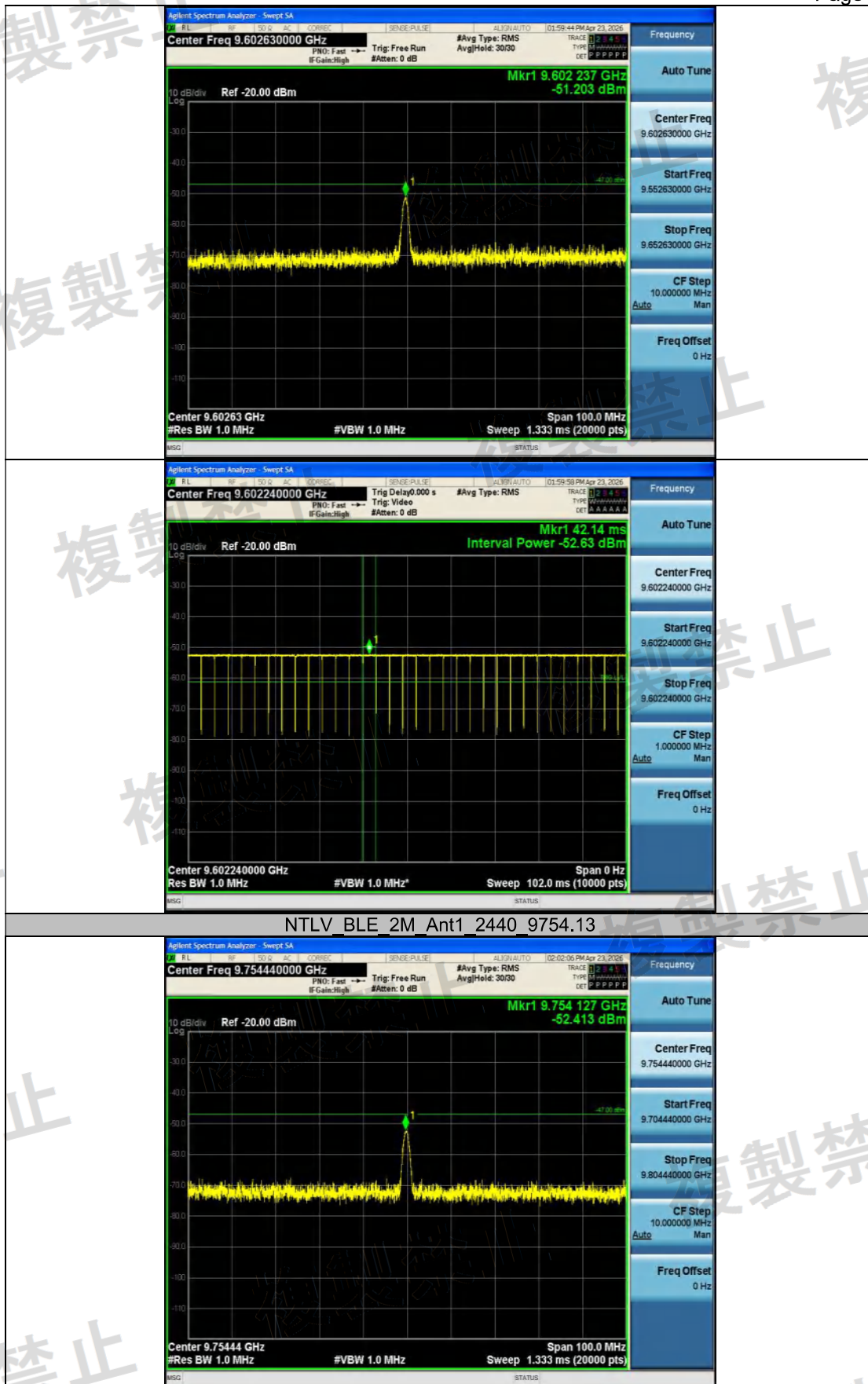


NTLV_BLE_1M_Ant1_2480_9914.18



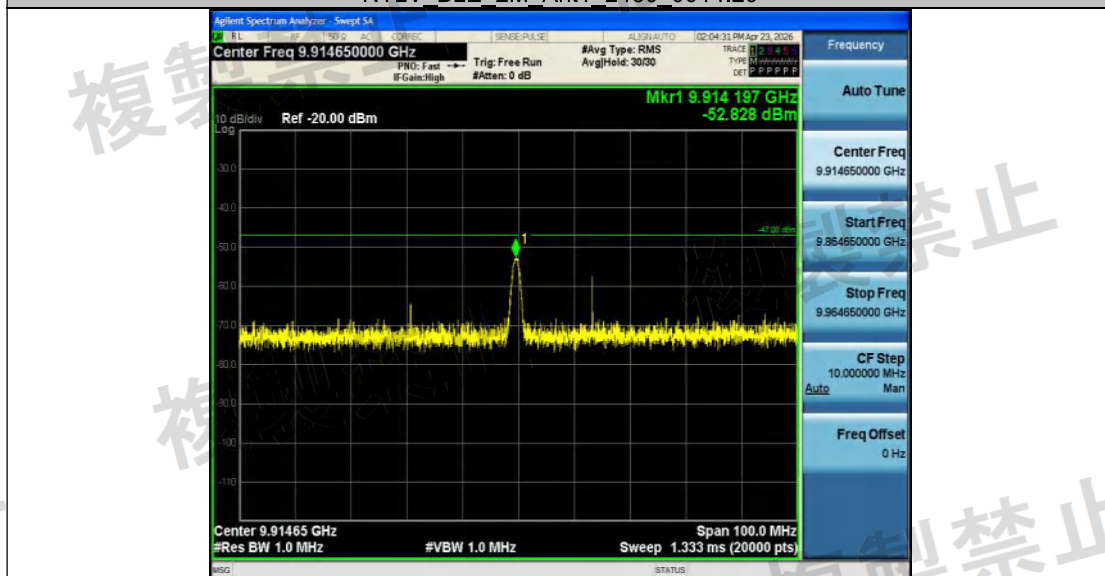
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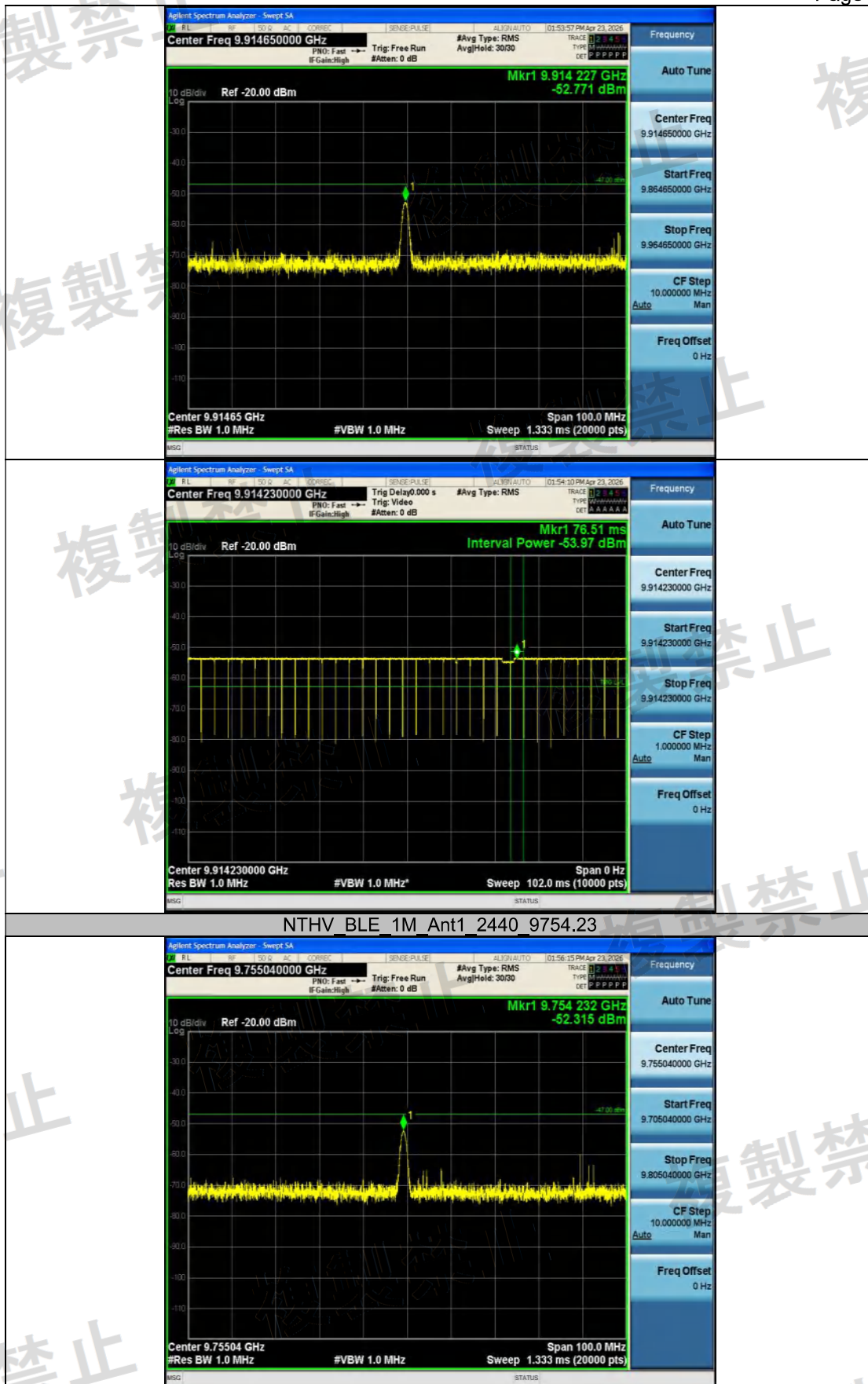


NTLV_BLE_2M_Ant1_2480_9914.20



NTHV_BLE_1M_Ant1_2402_9914.23





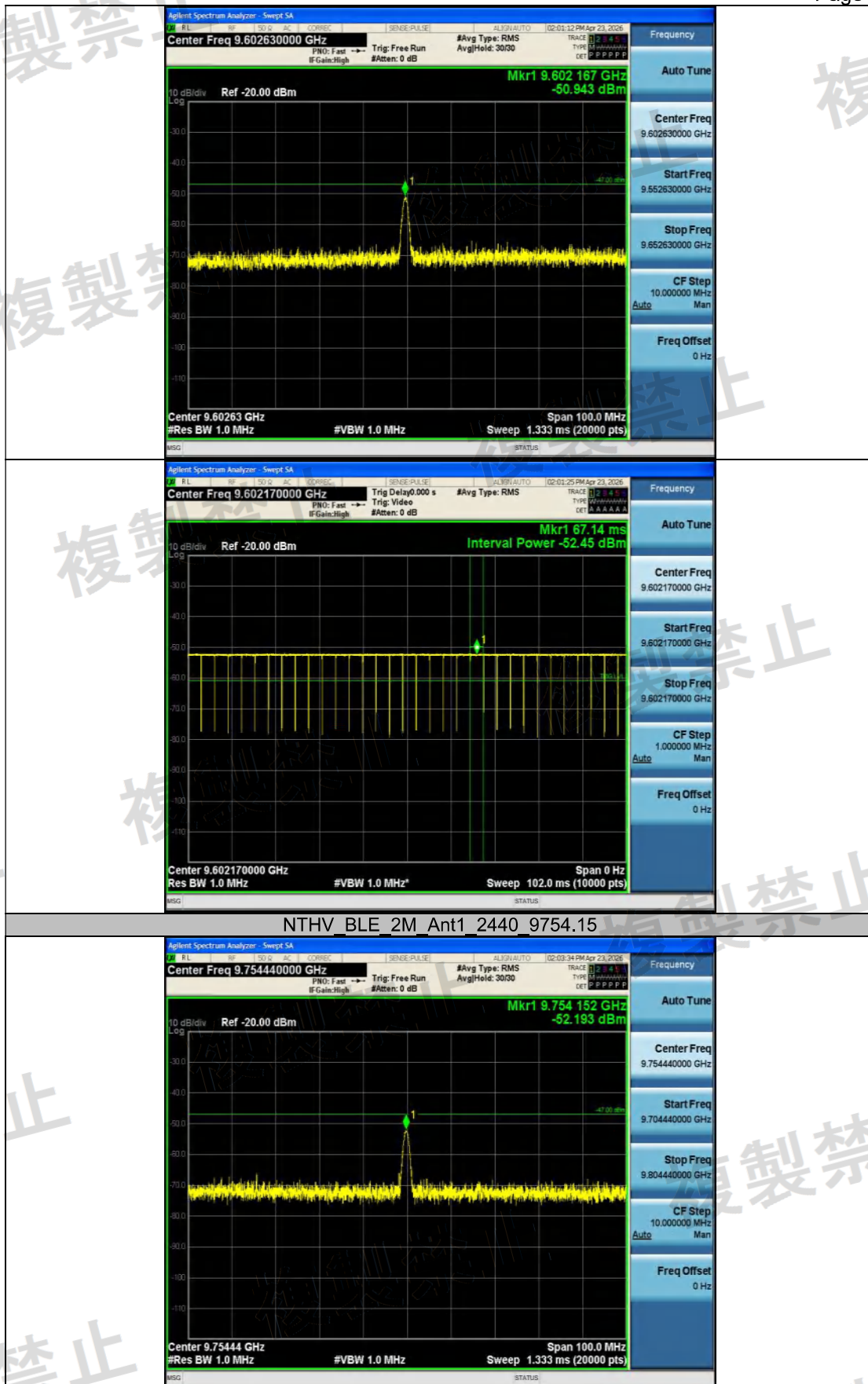


NTHV_BLE 1M Ant1 2480 9914.24



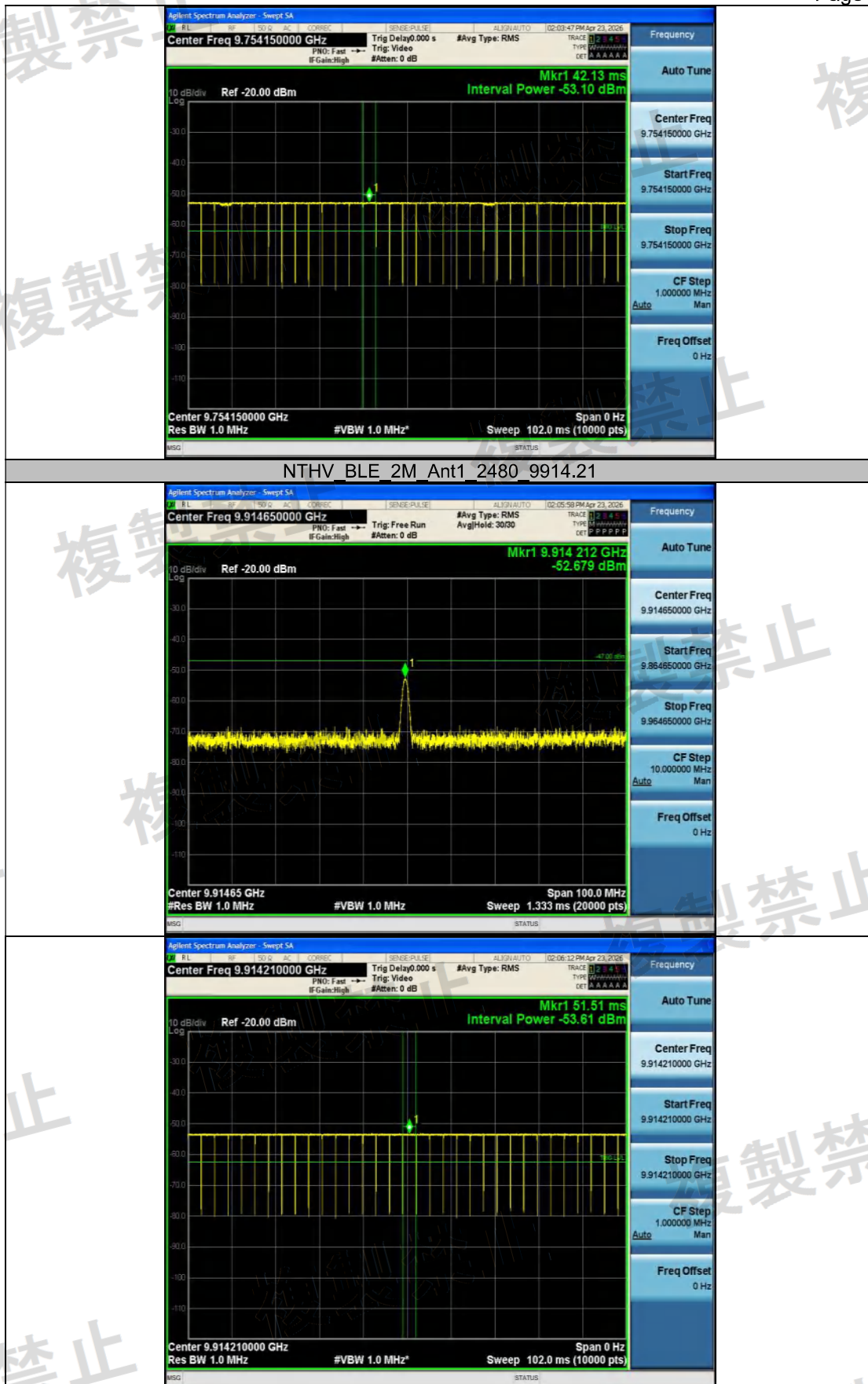
NTHV_BLE 2M Ant1 2402 9602.17





NTHV BLE 2M Ant1 2440 9754.15



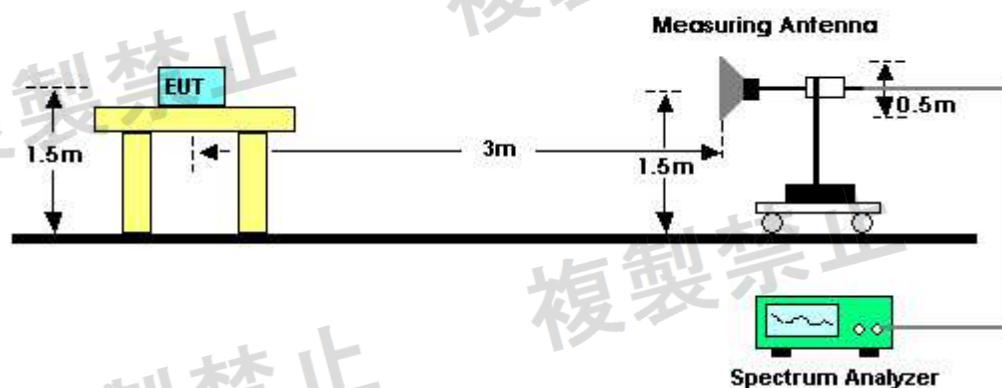




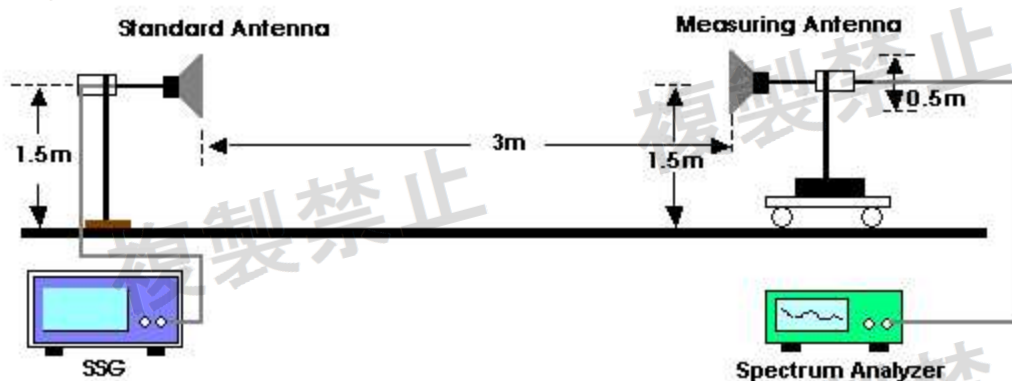
4.7. Transmission Antenna Gain (EIRP antenna power) Measurement

TEST CONFIGURATION

For EUT radiation measurement



For standard antenna measurement



TEST PROCEDURE

1. Set EUT and measuring antenna at the same height and roughly facing each other.
2. Move the measuring antenna height up and down within $\pm 50\text{cm}$ of EUT height and swing it to find the maximum output of the measuring antenna. The output level at the spectrum analyzer is read as "E".
3. Remove the EUT from the turn table and put the replacing antenna facing to measuring antenna at same height. Set the standard signal generator (SSG) at same frequency and transmit on then receive the signal
4. Swing the replacing antenna give a maximum receiving level.
5. Move the measuring antenna height up and down within $\pm 50\text{cm}$ of replacing antenna height and swing it to find the maximum receiving level.
6. Set SSG output power at P_t to give the equivalent output level of "E" or calculate P_t with SSG output which gives the nearest of "E" and difference ($\pm 1\text{dB}$). Record the P_t .
7. Calculate EIRP by the formula below $\text{EIRP} = G_t - L + P_t$.
Gt: gain of replacing antenna (dBi)





L: feeder loss between SSG and replacing antenna

Pt: Output power of the SSG

8. If the antenna for the EUT has circular polarization, sum of V-field and H-field will be result if measuring antenna is linear polarization.

LIMIT

Modulation system	Frequency band used	Antenna power (max.)	EIRP (max.)	
			Omnidirectional case	Directional case
DS, OFDM	2,400 - 2,483.5 MHz	10 mW/MHz	12.14 dBm/MHz	22.14 dBm/MHz
FH, DS-FH FH-OFDM	2,400 - 2,483.5 MHz	3 mW/MHz	6.91 dBm/MHz	16.91 dBm/MHz
	Excluding 2,427 - 2,470.75 MHz	10 mW/MHz	12.14 dBm/MHz	22.14 dBm/MHz
Other than the above	2,400 - 2,483.5 MHz	10 mW	12.14 dBm	22.14 dBm

Note: it is not applicable when Antenna gain do not exceed 2.14 dBi.

TEST RESULTS

N/A

AS:

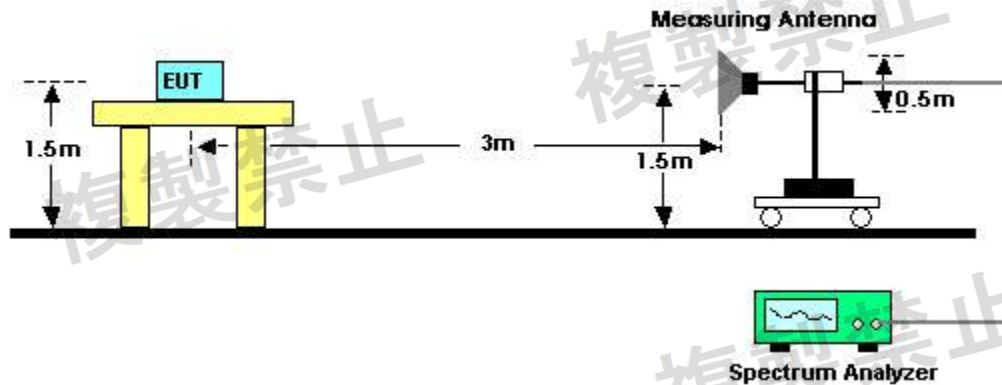
☒ Antenna gain do not exceed than 2.14 dBi





4.8. Transmission Radiation Angle Width (3db Beamwidth) Measurement

TEST CONFIGURATION



TEST PROCEDURE

1. Set EUT and measuring antenna at the same height and roughly facing each other.
2. Set spectrum analyzer with condition in section 4.8 and tune reference level to observe receiving signal position.
3. Rotate directions of the EUT horizontally and vertically to find the maximum receiving power.
4. Move the measuring antenna height up and down within $\pm 50\text{cm}$ of EUT height and swing it to find the maximum output of measuring antenna. The output level at the spectrum analyzer is read as "E".
5. Calculate permitted radiation angle in horizontal and vertical using EIRP measured in another test method.
6. Calculate 3dB antenna beam width by the formula below $360/A$ (If $A < 1$; then $A = 1$).
 $A = \{ \text{EIRP Power [mW]} / 16.36 \text{ for DS, OFDM} \} = \{ \text{EIRP Power [dBm]} / 12.14 \text{ for DS, OFDM} \}$ or
 $A = \{ \text{EIRP Power [mW]} / 4.9 \text{ for FH} \} = \{ \text{EIRP Power [dBm]} / 6.91 \text{ for FH} \}$

LIMIT

Item	Upper Limits
3dB antenna beam width	$360/A$ (If $A < 1$; then $A = 1$) $A = \{ \text{EIRP [mW]} / 16.36 \text{ for DS, OFDM} \}$ or $A = \{ \text{EIRP [mW]} / 4.9 \text{ for FH} \}$
Note: it is not applicable when Antenna gain do not exceed 2.14 dBi or EIRP do not exceed the omnidirectional EIRP upper limit..	

TEST RESULTS

N/A

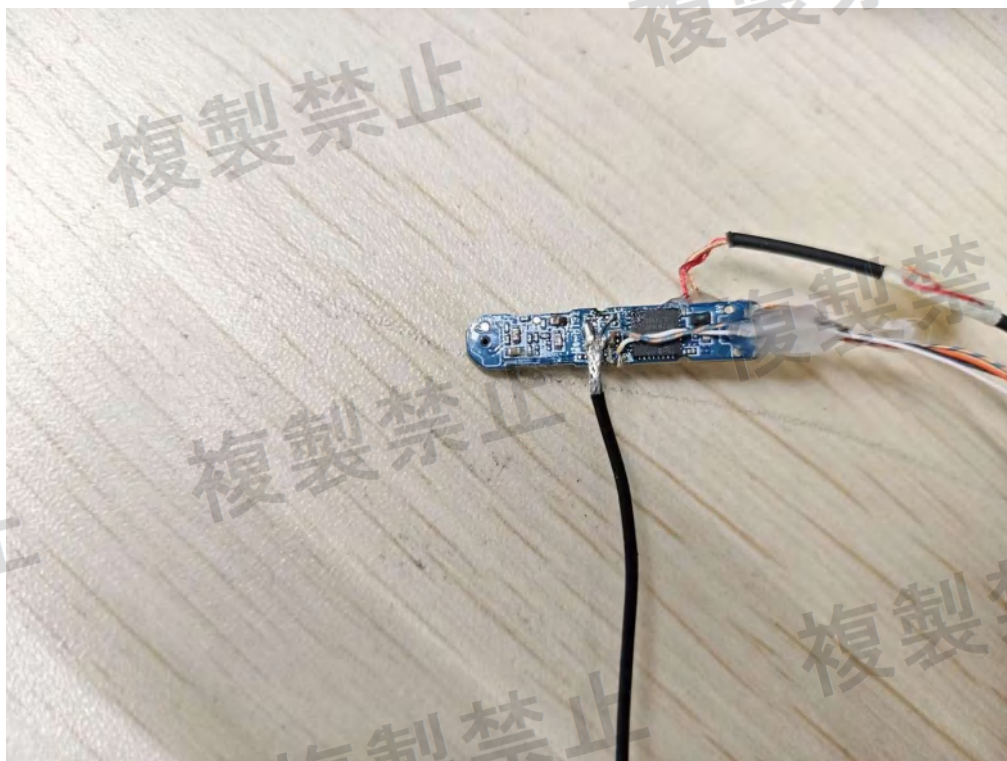
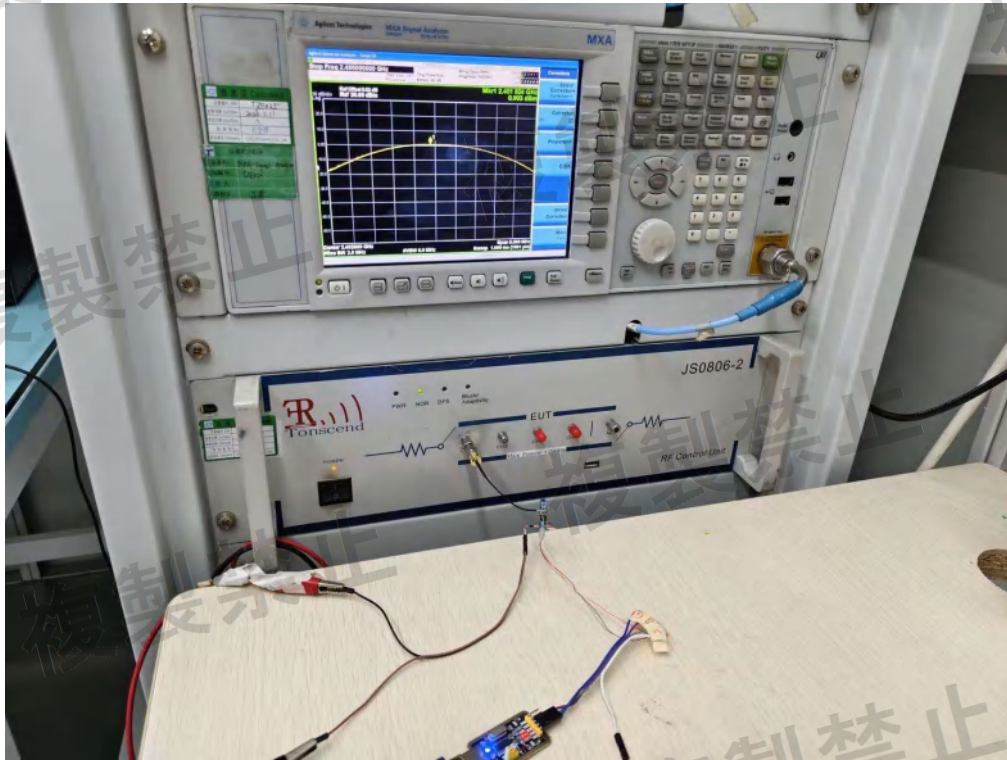
AS:

- ☒ Antenna gain do not exceed than 2.14 dBi
☐ EIRP do not exceed the omnidirectional EIRP upper limit





5. Test Setup Photos of the EUT





6. External and Internal Photos of the EUT

Reference to the test report No. TZ0070260403TRF01

.....End of Report.....

