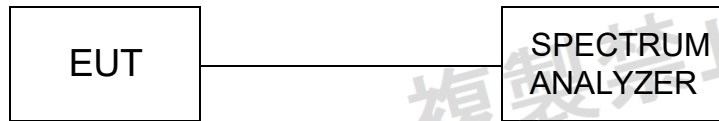




4.6. Limit of secondary radiated emissions

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	707.67	-71.80	≤-54	0.06607	≤4	PASS
				1000~13000	12366.37	-62.56	≤-47	0.55463	≤20	PASS
			2440	30~1000	946.04	-72.16	≤-54	0.06081	≤4	PASS
				1000~13000	12985.60	-63.12	≤-47	0.48753	≤20	PASS
			2480	30~1000	754.11	-72.74	≤-54	0.05321	≤4	PASS
				1000~13000	12282.36	-63.57	≤-47	0.43954	≤20	PASS
	BLE_2M	Ant1	2402	30~1000	869.78	-72.81	≤-54	0.05236	≤4	PASS
				1000~13000	12891.99	-62.95	≤-47	0.50699	≤20	PASS
			2440	30~1000	957.20	-72.64	≤-54	0.05445	≤4	PASS
				1000~13000	12840.39	-62.93	≤-47	0.50933	≤20	PASS
			2480	30~1000	940.10	-72.57	≤-54	0.05534	≤4	PASS
				1000~13000	11836.54	-62.97	≤-47	0.50466	≤20	PASS
NTLV	BLE_1M	Ant1	2402	30~1000	699.30	-69.89	≤-54	0.10257	≤4	PASS
				1000~13000	12991.60	-62.90	≤-47	0.51286	≤20	PASS
			2440	30~1000	700.51	-71.77	≤-54	0.06653	≤4	PASS
				1000~13000	12944.20	-62.58	≤-47	0.55208	≤20	PASS
			2480	30~1000	963.50	-72.56	≤-54	0.05546	≤4	PASS
				1000~13000	11307.32	-62.94	≤-47	0.50816	≤20	PASS
	BLE_2M	Ant1	2402	30~1000	939.62	-72.57	≤-54	0.05534	≤4	PASS
				1000~13000	12390.37	-63.21	≤-47	0.47753	≤20	PASS
			2440	30~1000	913.55	-72.16	≤-54	0.06081	≤4	PASS
				1000~13000	2453.87	-62.53	≤-47	0.55847	≤20	PASS
			2480	30~1000	926.52	-72.85	≤-54	0.05188	≤4	PASS
				1000~13000	12348.37	-62.58	≤-47	0.55208	≤20	PASS
NTHV	BLE_1M	Ant1	2402	30~1000	714.94	-71.51	≤-54	0.07063	≤4	PASS
				1000~13000	12703.59	-63.35	≤-47	0.46238	≤20	PASS
			2440	30~1000	960.72	-72.38	≤-54	0.05781	≤4	PASS
				1000~13000	12350.17	-63.64	≤-47	0.43251	≤20	PASS
			2480	30~1000	853.41	-72.45	≤-54	0.05689	≤4	PASS
				30~1000						





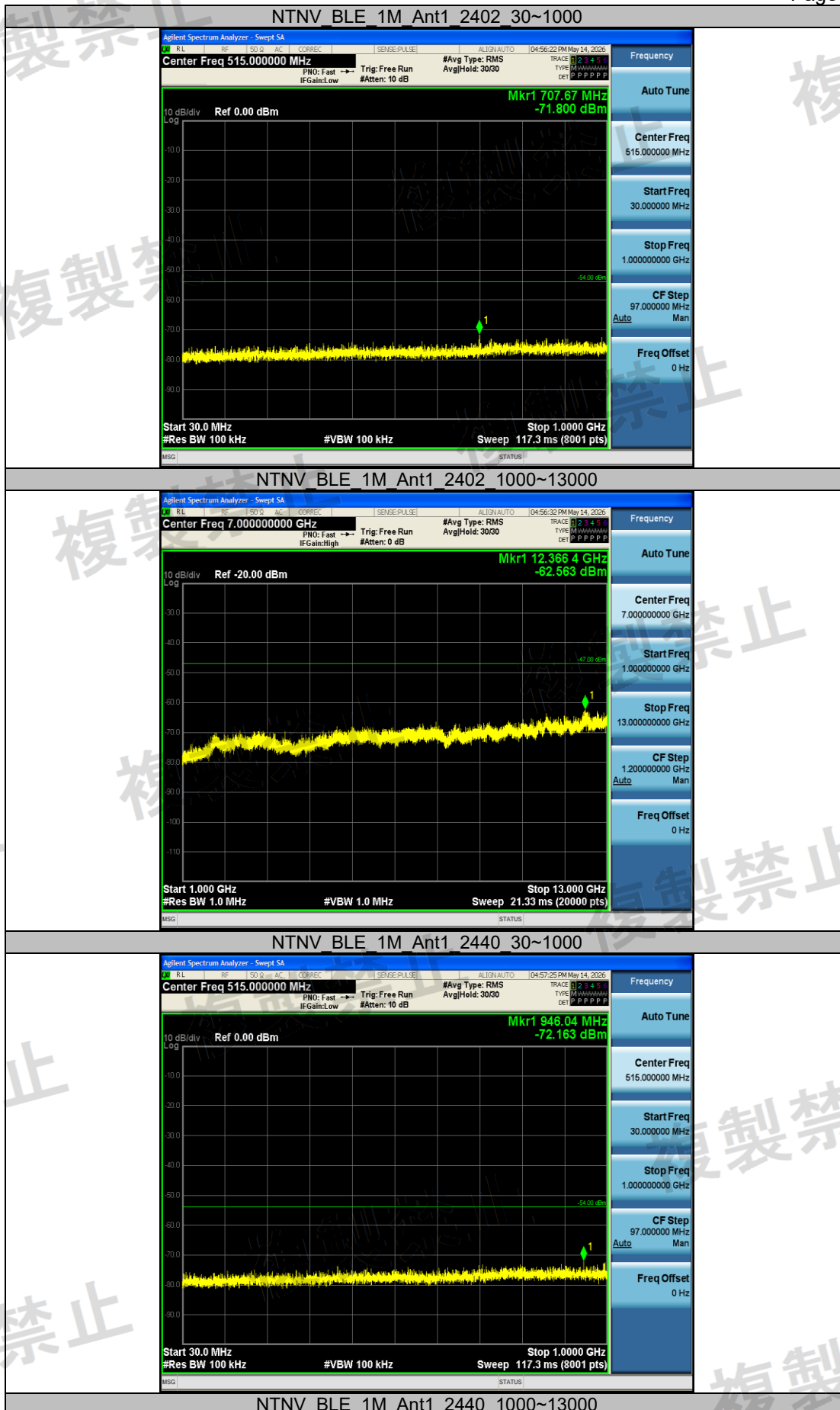
	BLE_2M	Ant1	2402	1000~13000	12354.37	-62.25	≤-47	0.59566	≤20	PASS
				30~1000	938.65	-71.62	≤-54	0.06887	≤4	PASS
				1000~13000	12718.59	-62.81	≤-47	0.52360	≤20	PASS
			2440	30~1000	792.42	-72.15	≤-54	0.06095	≤4	PASS
				1000~13000	12352.57	-62.91	≤-47	0.51168	≤20	PASS
			2480	30~1000	920.10	-72.96	≤-54	0.05058	≤4	PASS
				1000~13000	12360.97	-62.93	≤-47	0.50933	≤20	PASS

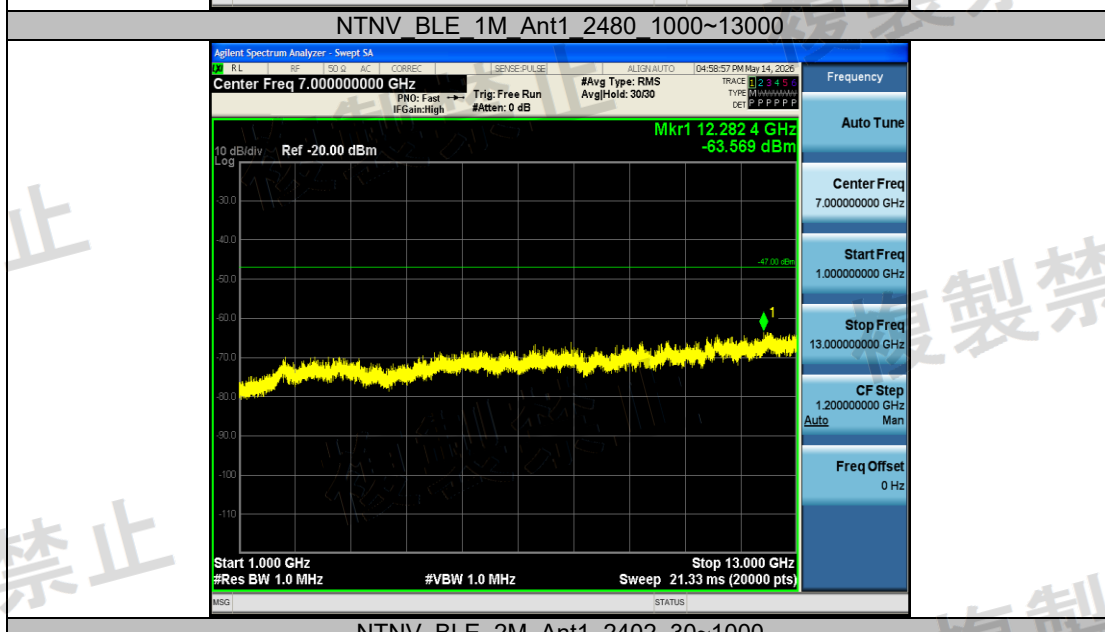
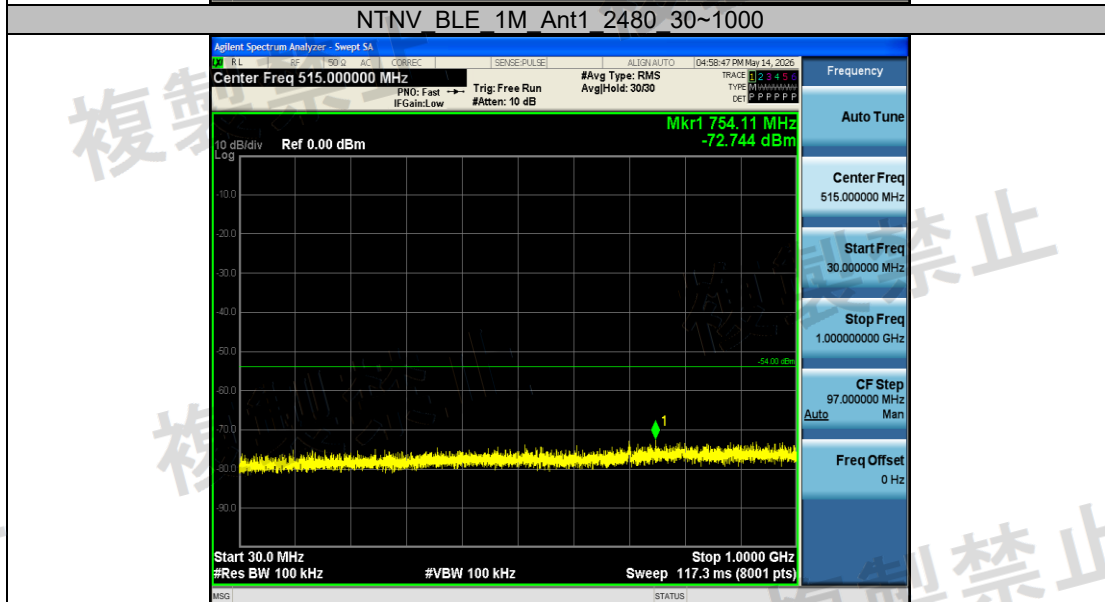
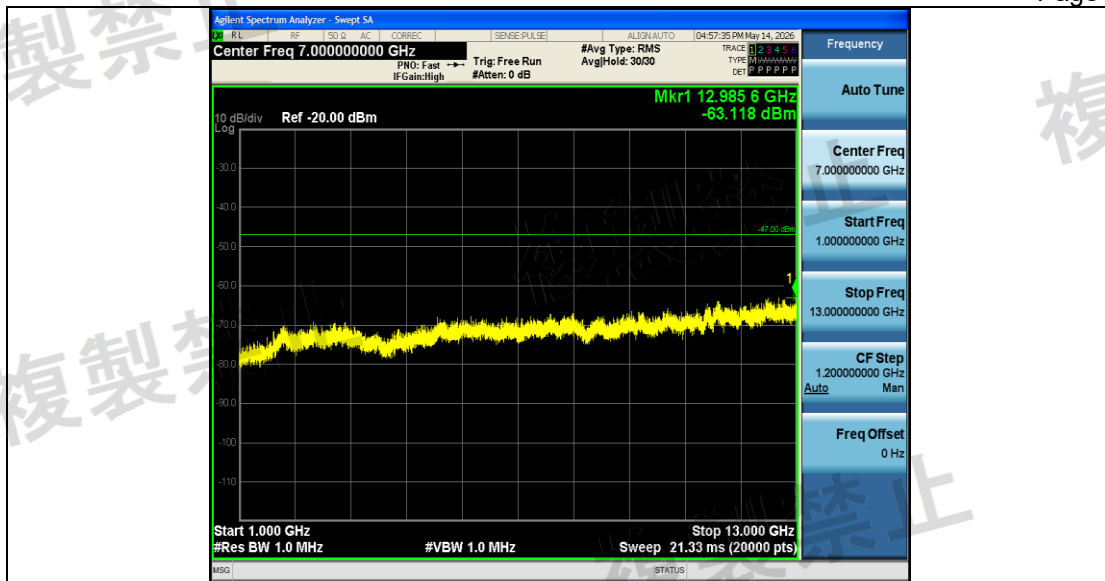
Note: 1. The product was tested at 25 °C and 55% humidity condition;

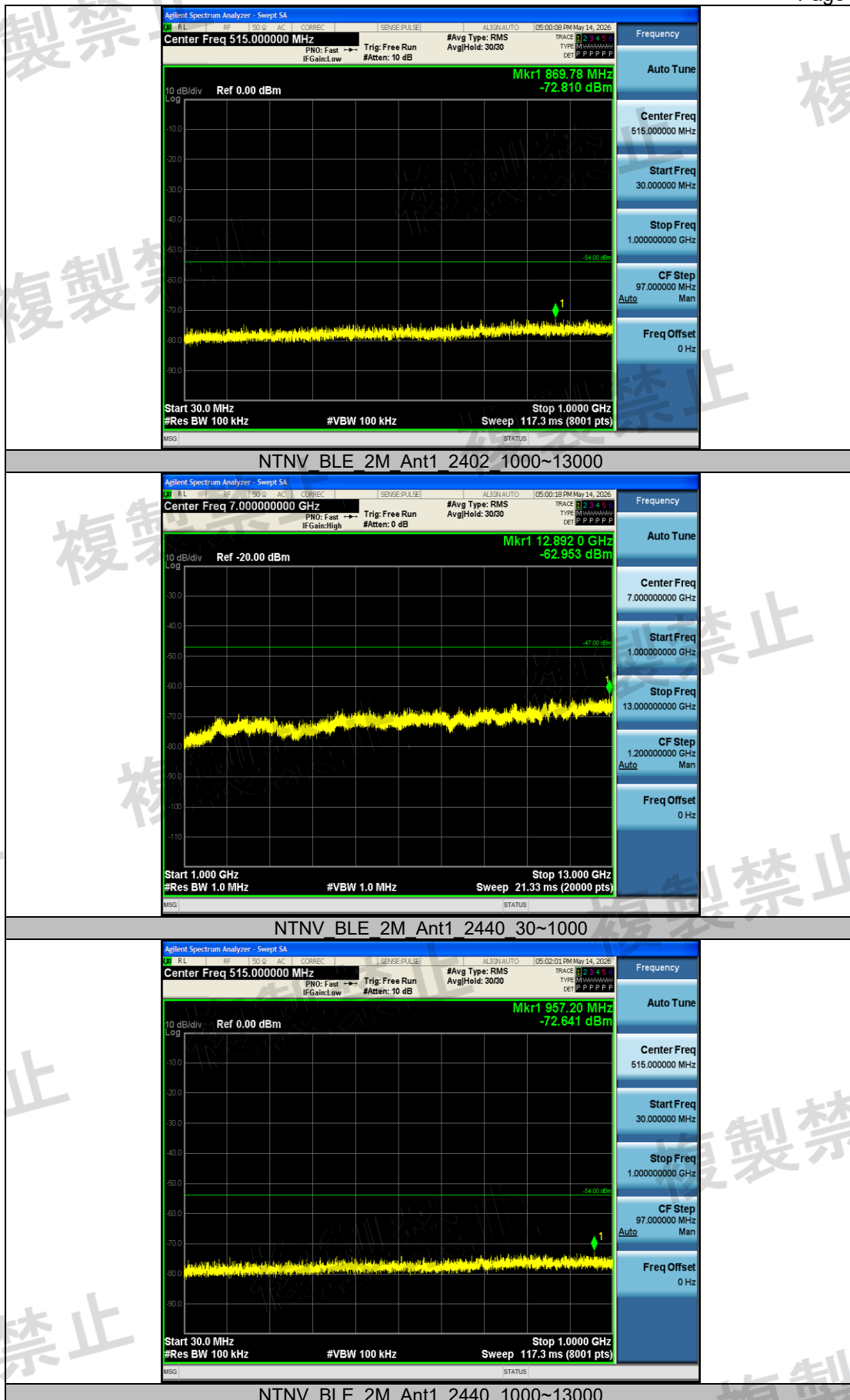
2. All condition has been tested, list the worst case in this item

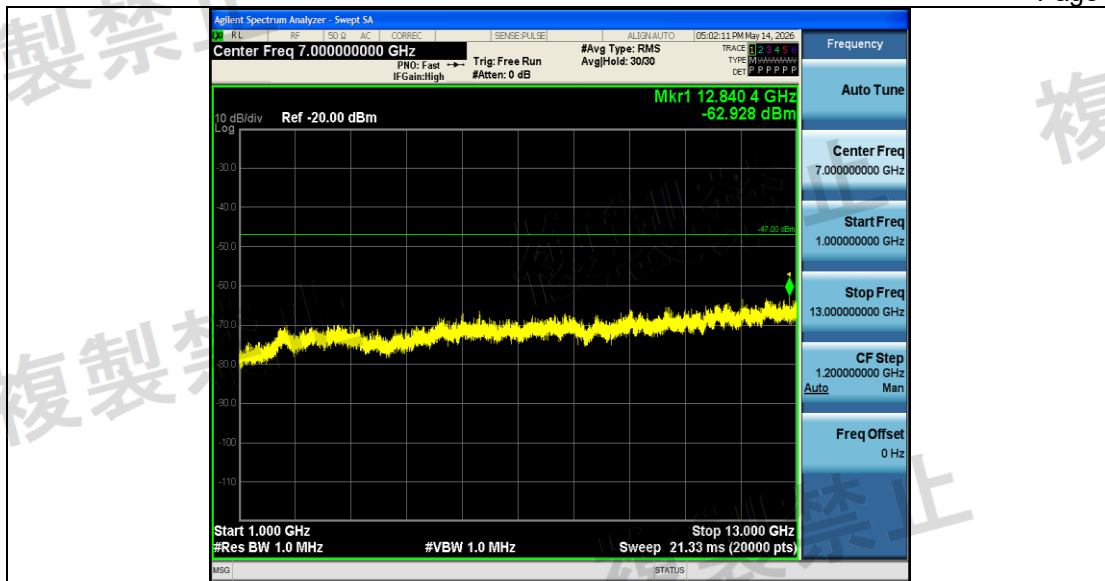
Test plot as follows:



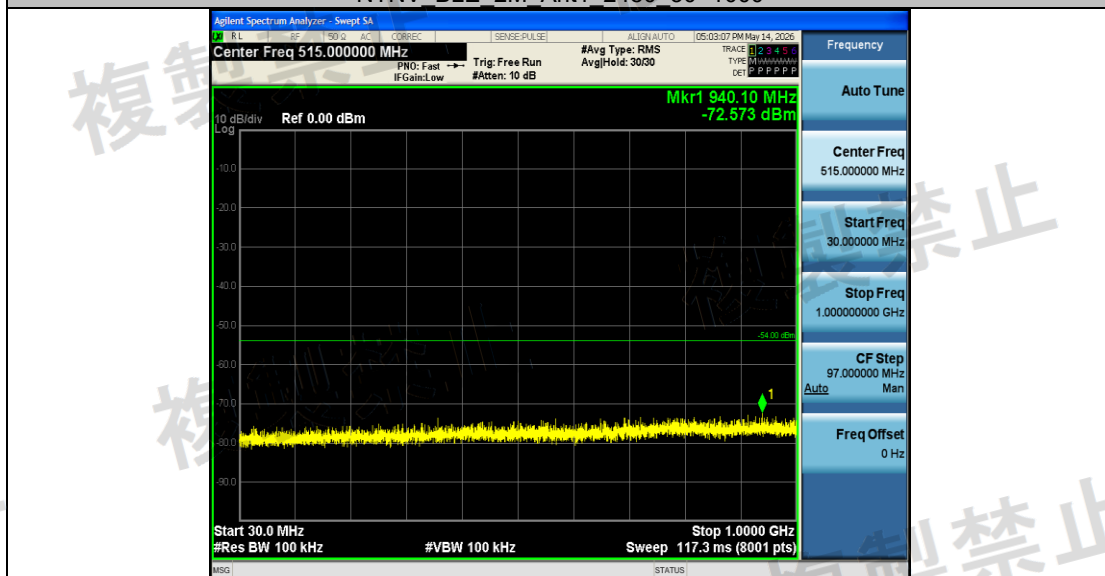




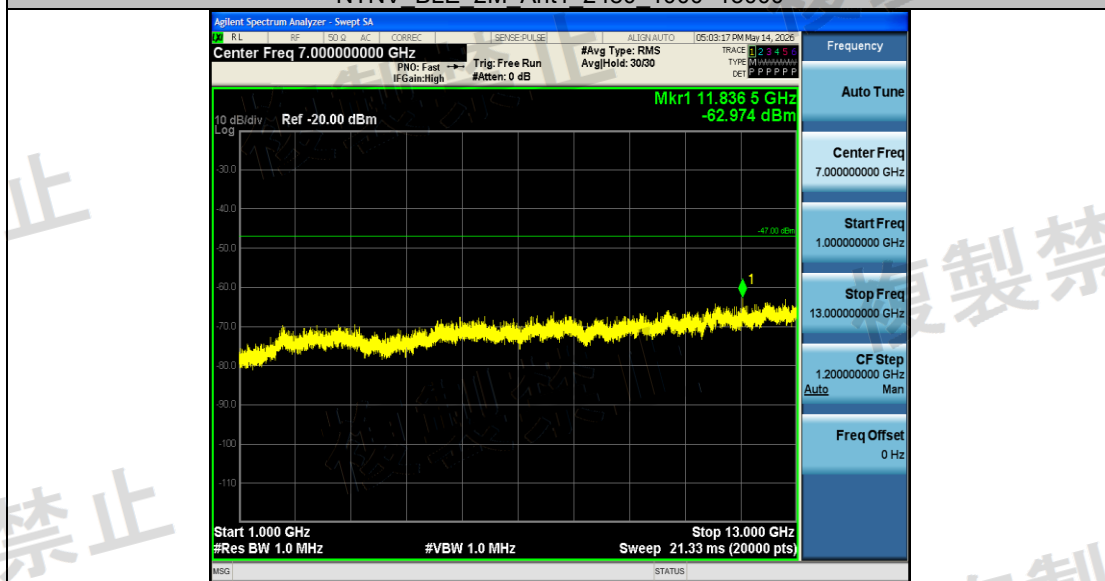




NTNV BLE 2M Ant1 2480 30~1000

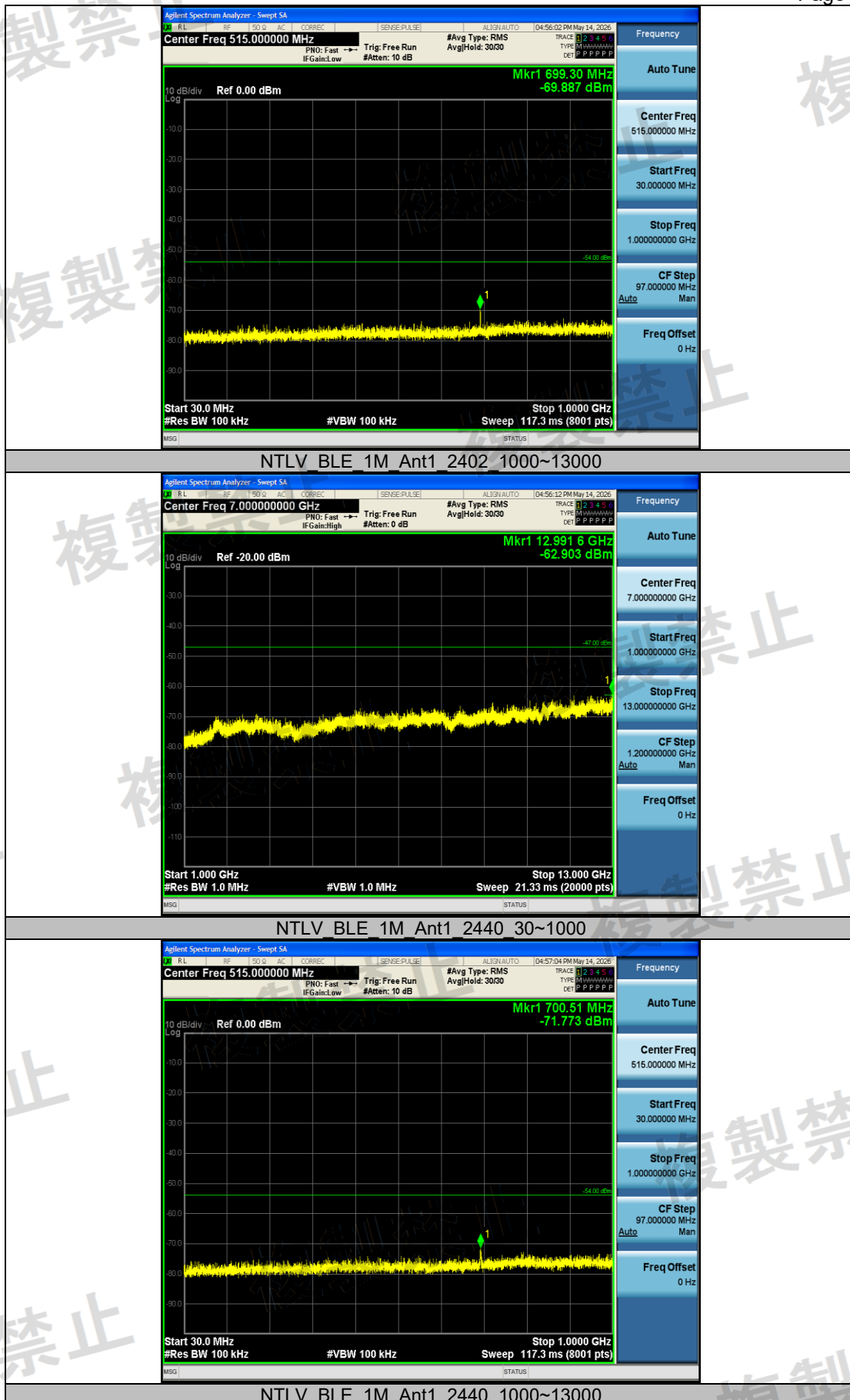


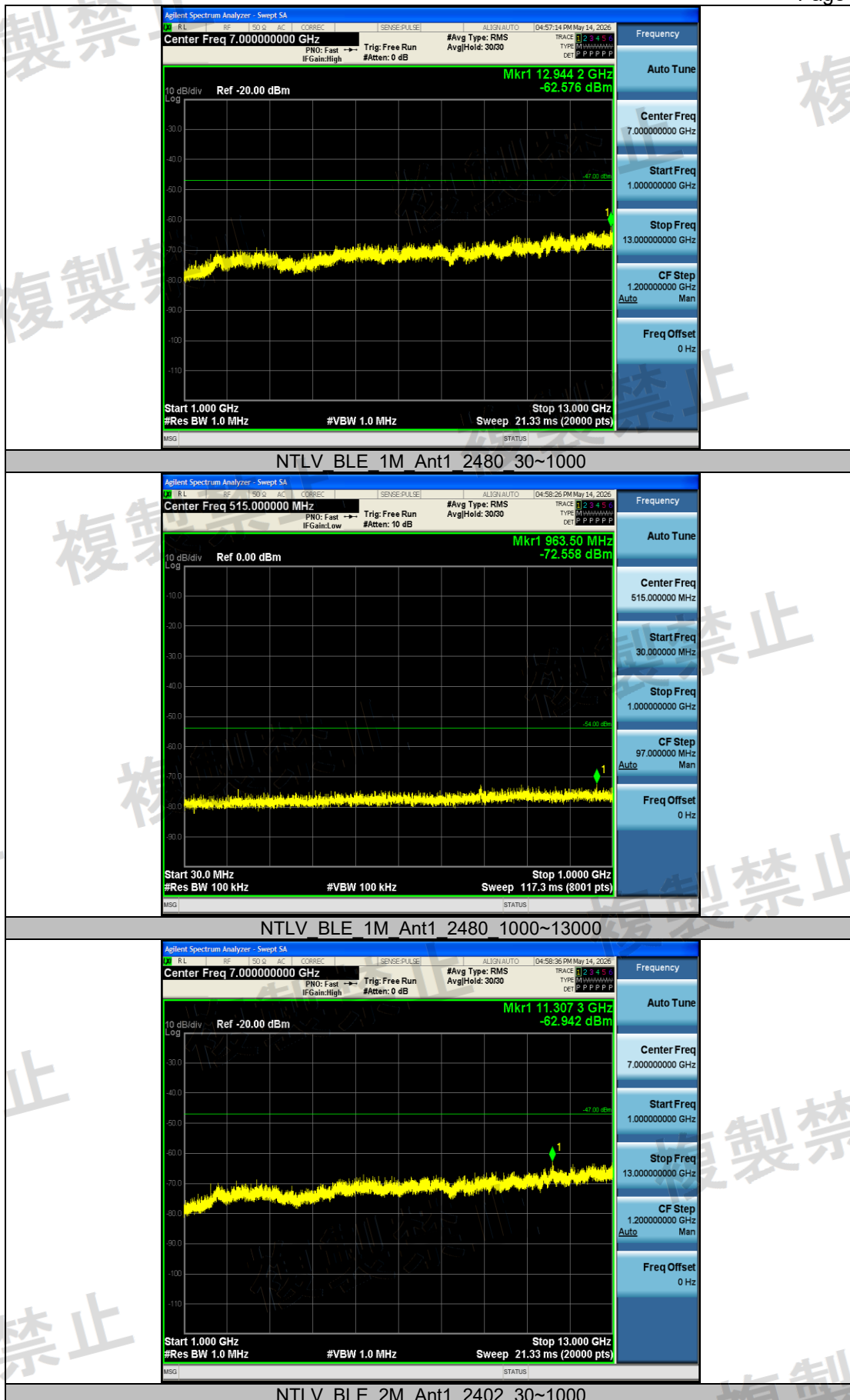
NTNV BLE 2M Ant1 2480 1000~13000

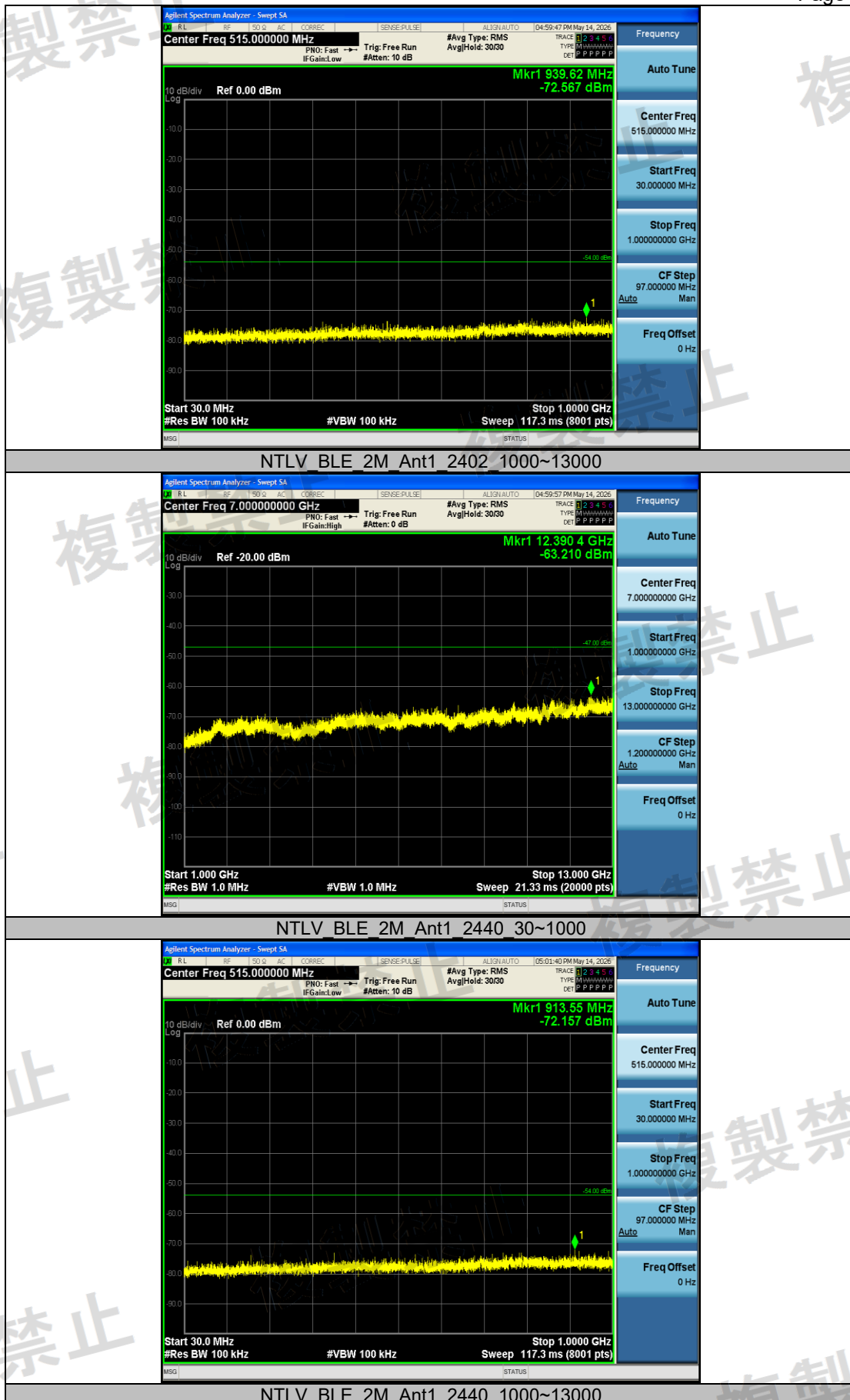


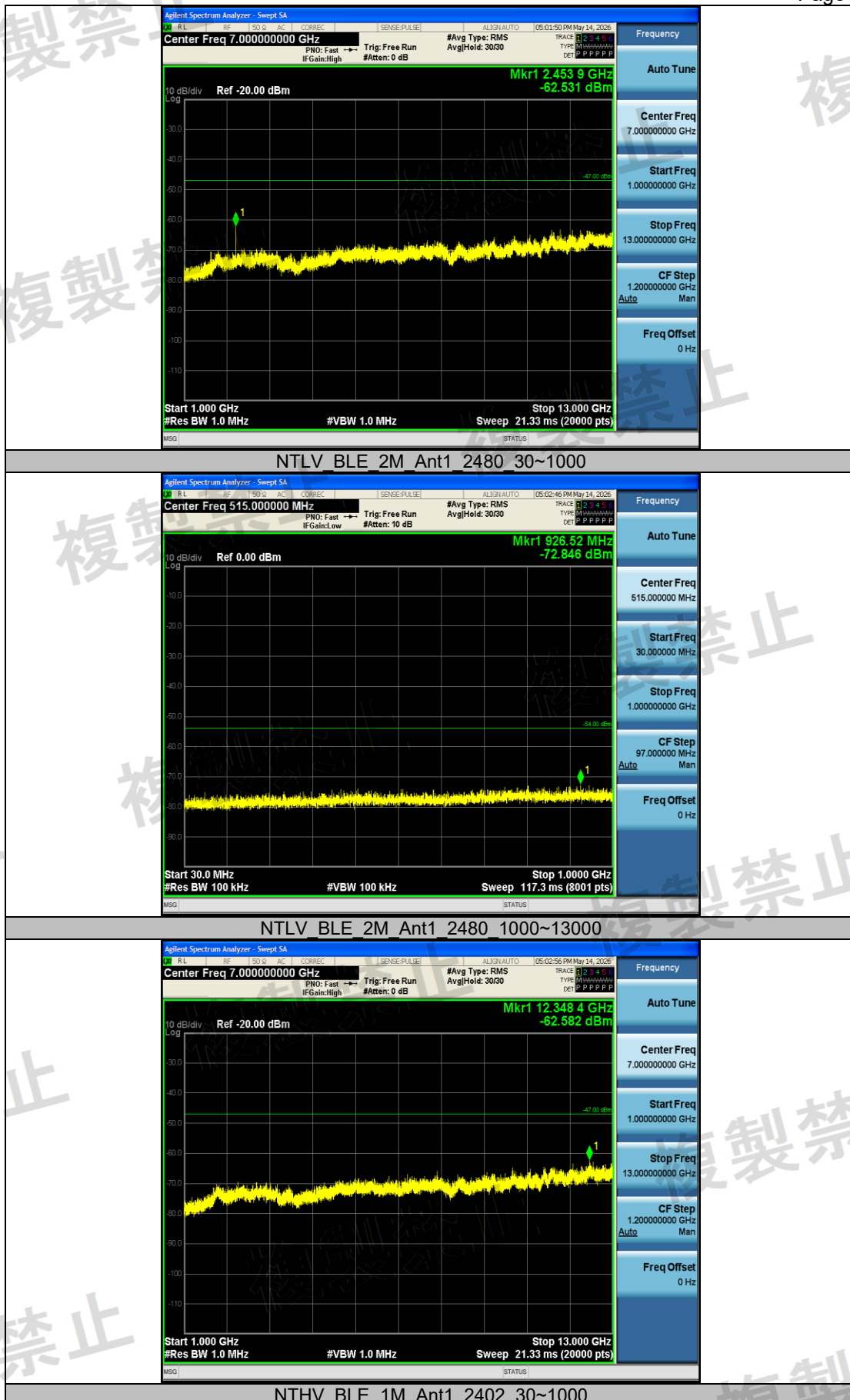
NTLV BLE 1M Ant1 2402 30~1000

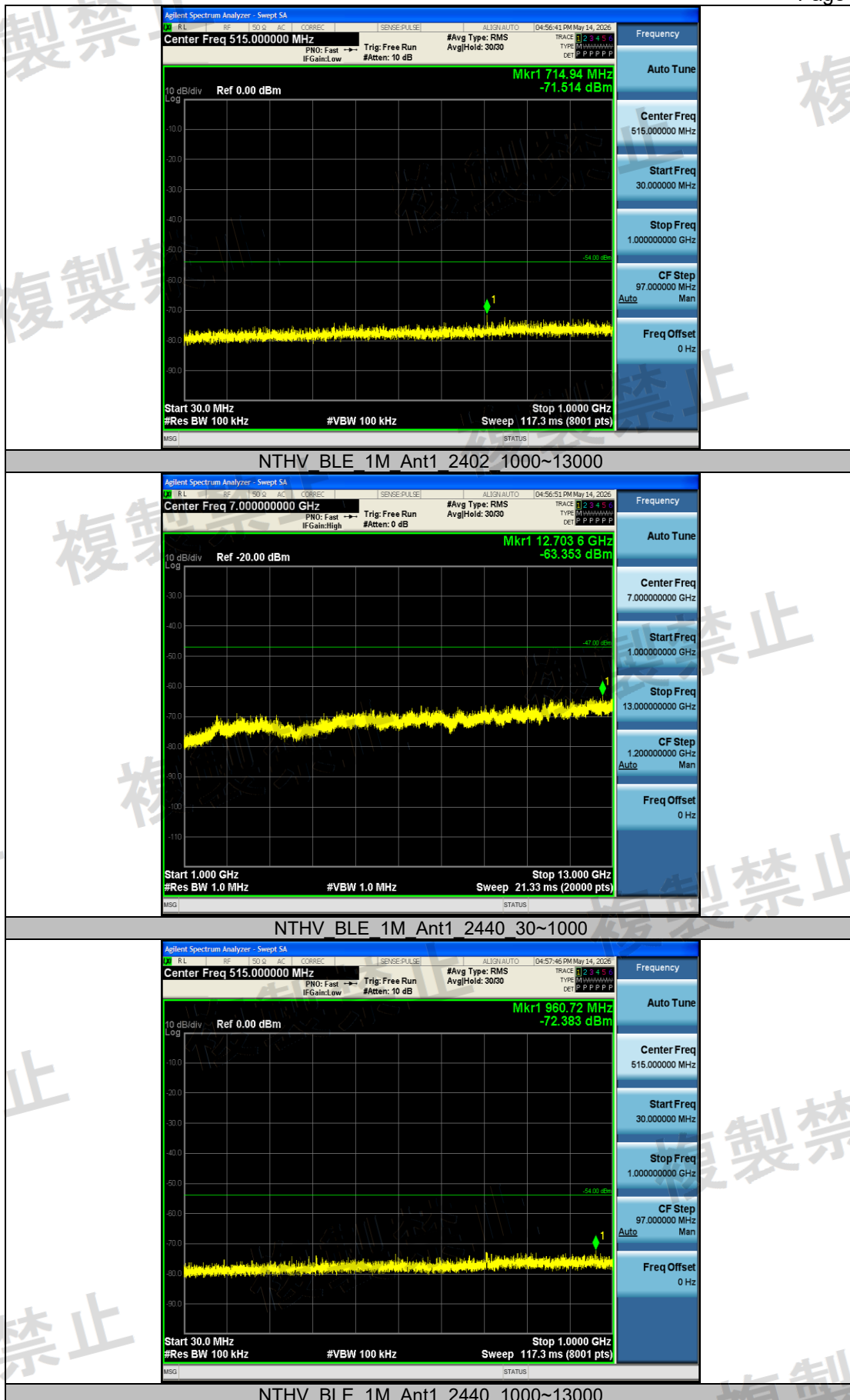


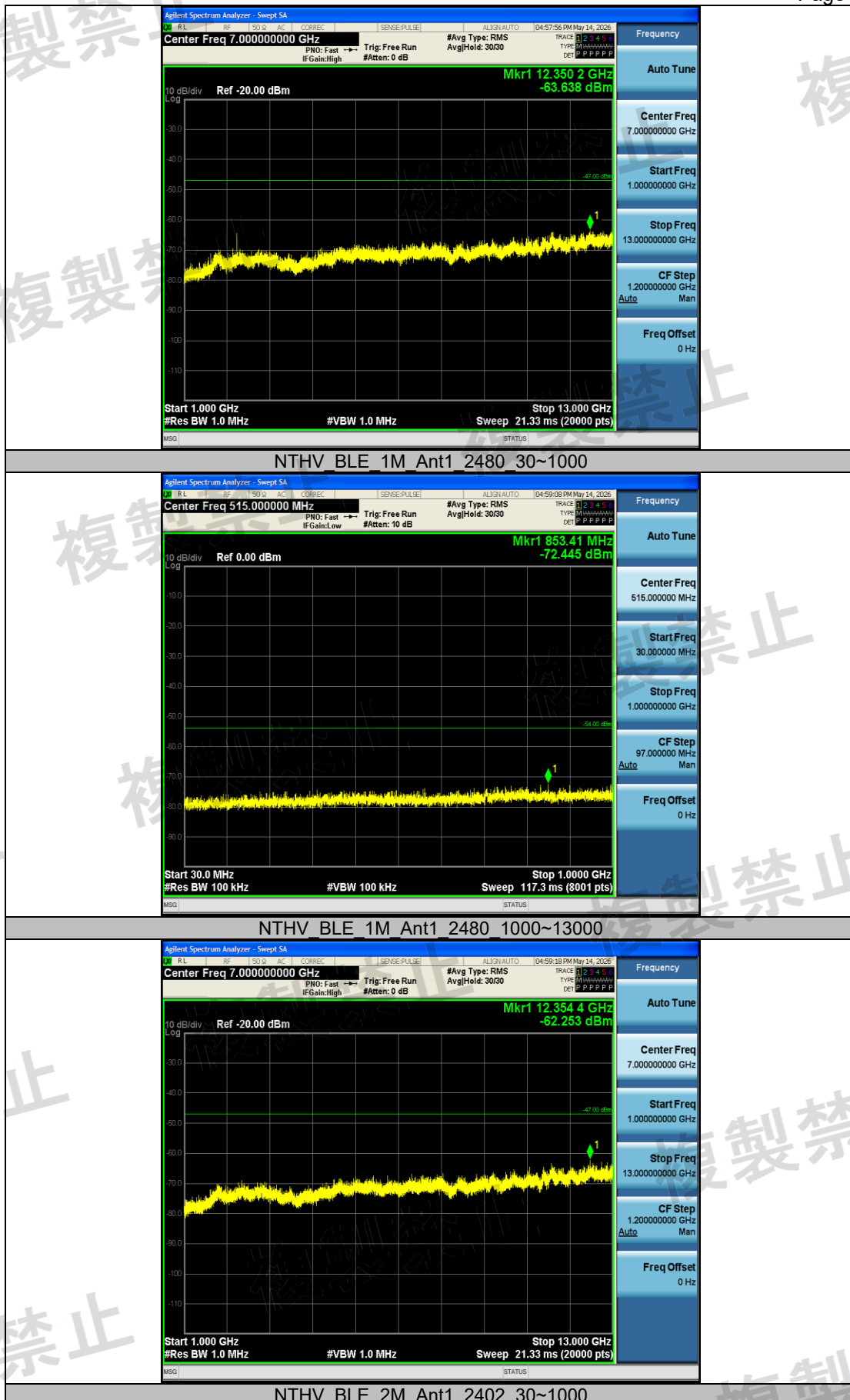


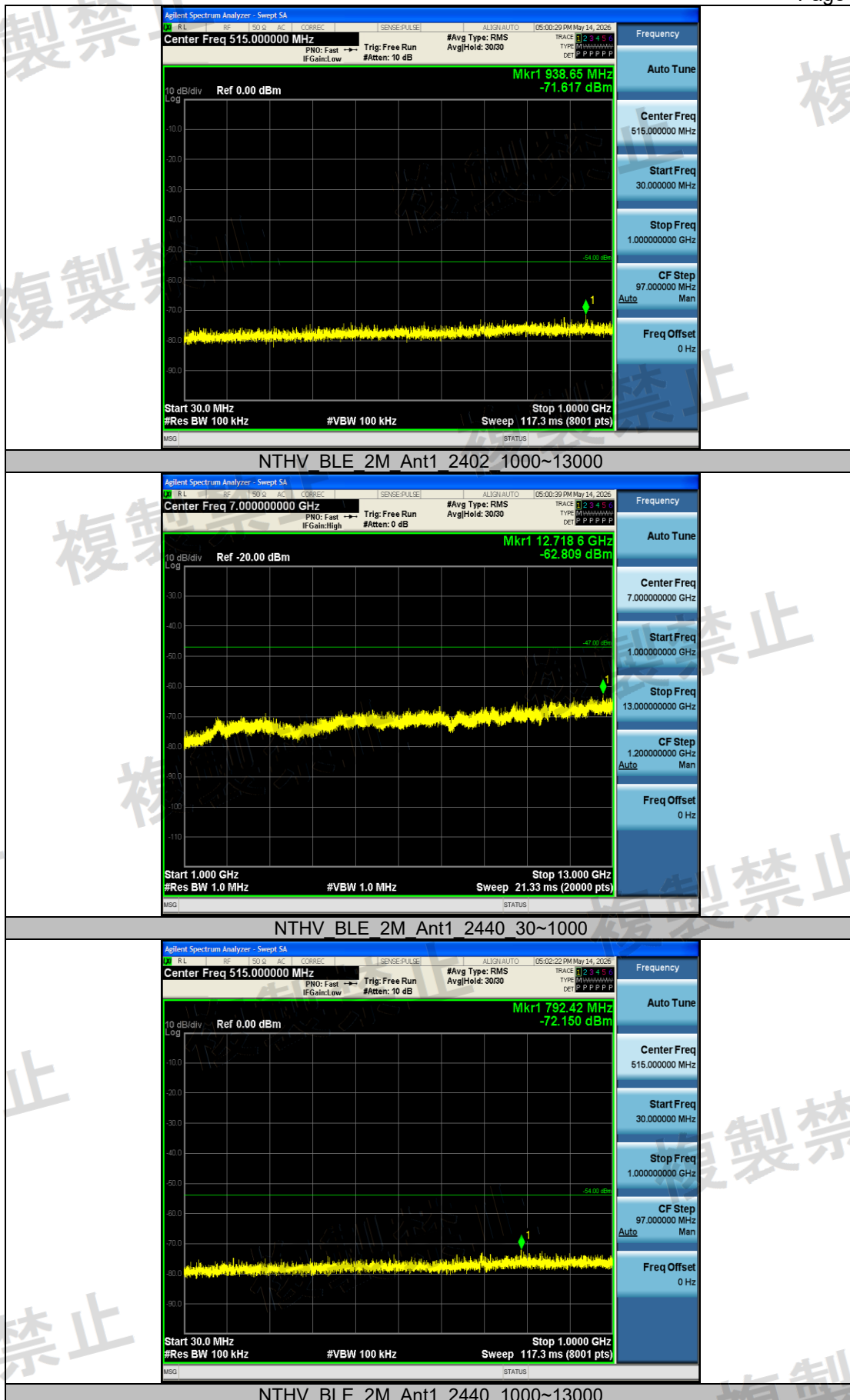


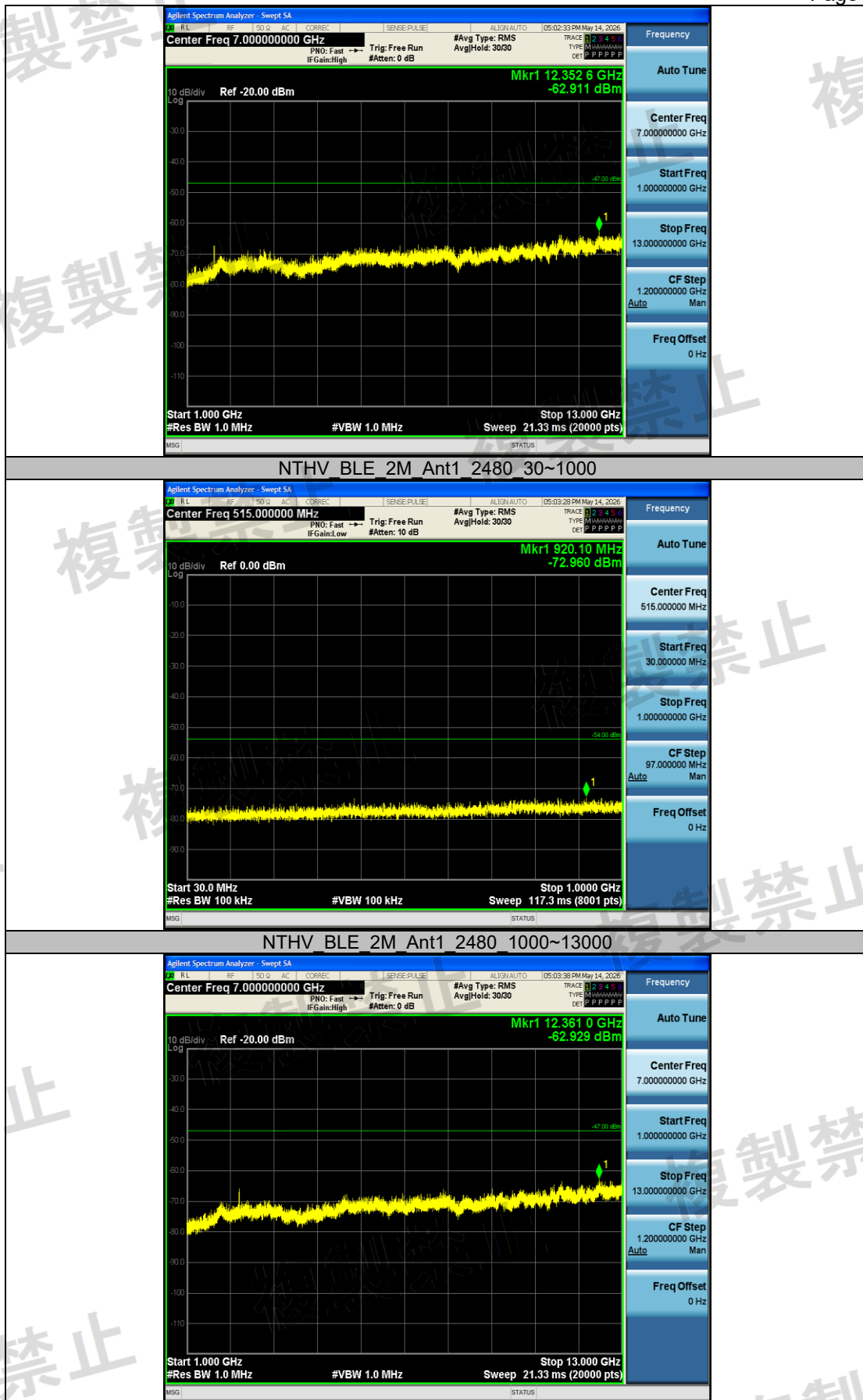










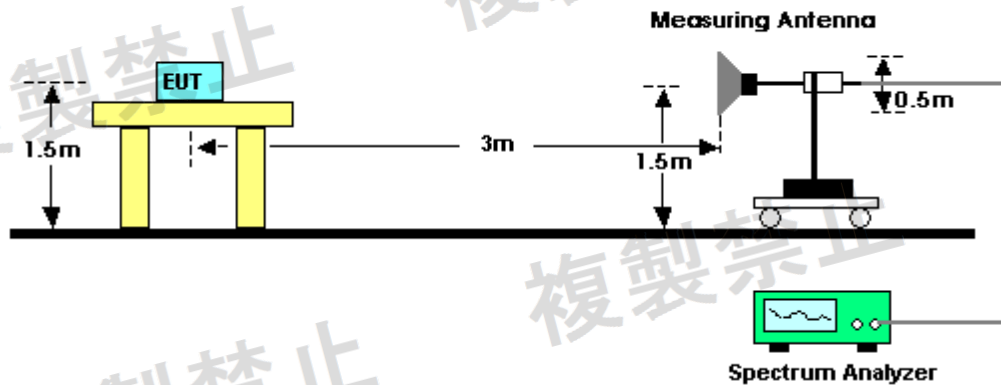




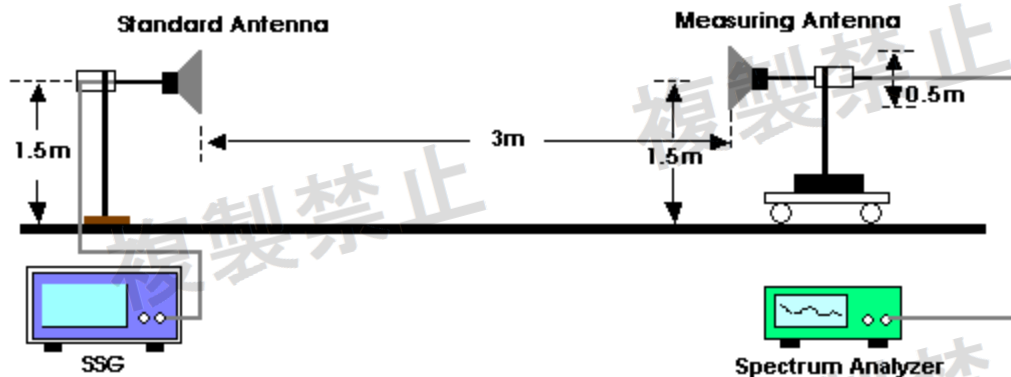
4.7. Transmission Antenna Gain (EIRP antenna power) Measurement

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

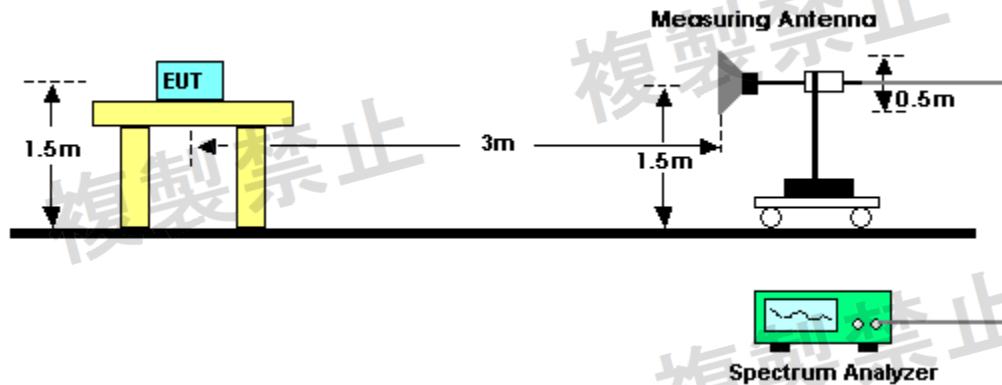
EIRP							
Test Condition	Test Mode	Antenna	Freq (MHz)	Result (dBm)	EIRP (dBm)	Limit (dBm)	Verdict
NTNV	BLE_1M	Ant1	2402	-0.66	1.84	≤12.14	PASS
			2440	0.14	2.64	≤12.14	PASS
			2480	-0.14	2.36	≤12.14	PASS
	BLE_2M	Ant1	2402	-1.07	1.43	≤12.14	PASS
			2440	-0.74	1.76	≤12.14	PASS
			2480	-0.69	1.81	≤12.14	PASS
NTLV	BLE_1M	Ant1	2402	-0.40	2.10	≤12.14	PASS
			2440	0.13	2.63	≤12.14	PASS
			2480	0.05	2.55	≤12.14	PASS
	BLE_2M	Ant1	2402	-1.12	1.38	≤12.14	PASS
			2440	-0.56	1.94	≤12.14	PASS
			2480	-0.69	1.81	≤12.14	PASS
NTHV	BLE_1M	Ant1	2402	-0.55	1.95	≤12.14	PASS
			2440	0.09	2.59	≤12.14	PASS
			2480	0.09	2.59	≤12.14	PASS
	BLE_2M	Ant1	2402	-1.12	1.38	≤12.14	PASS
			2440	-0.59	1.91	≤12.14	PASS
			2480	-0.85	1.65	≤12.14	PASS





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

External Photos

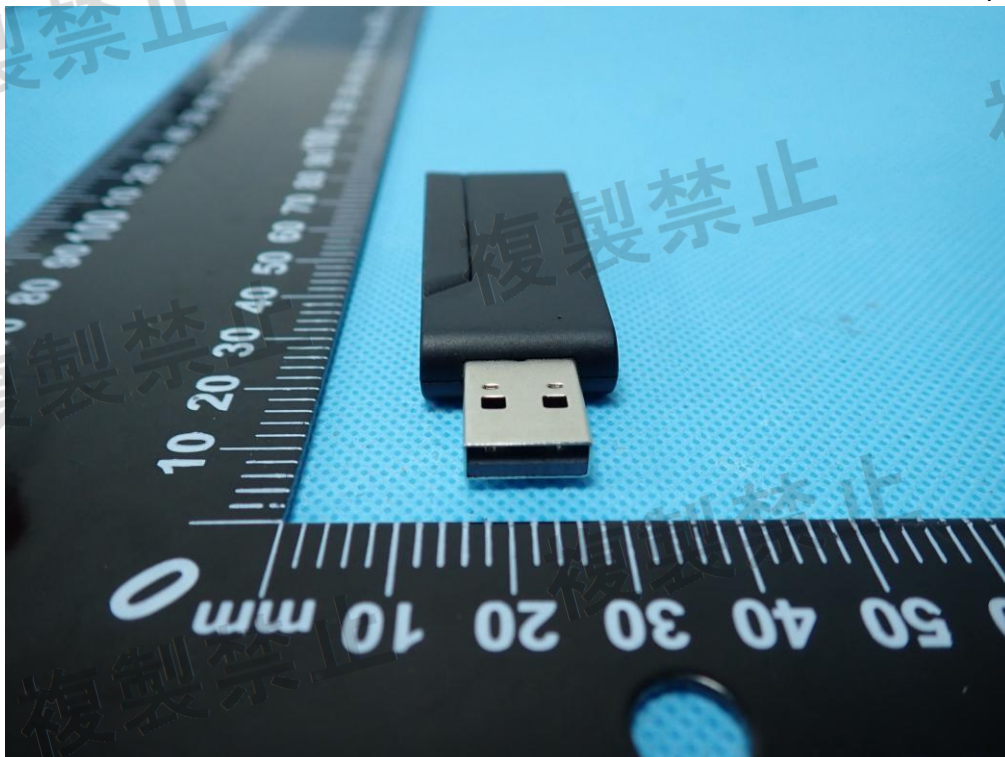


External Photo 1



External Photo 2





External Photo 3

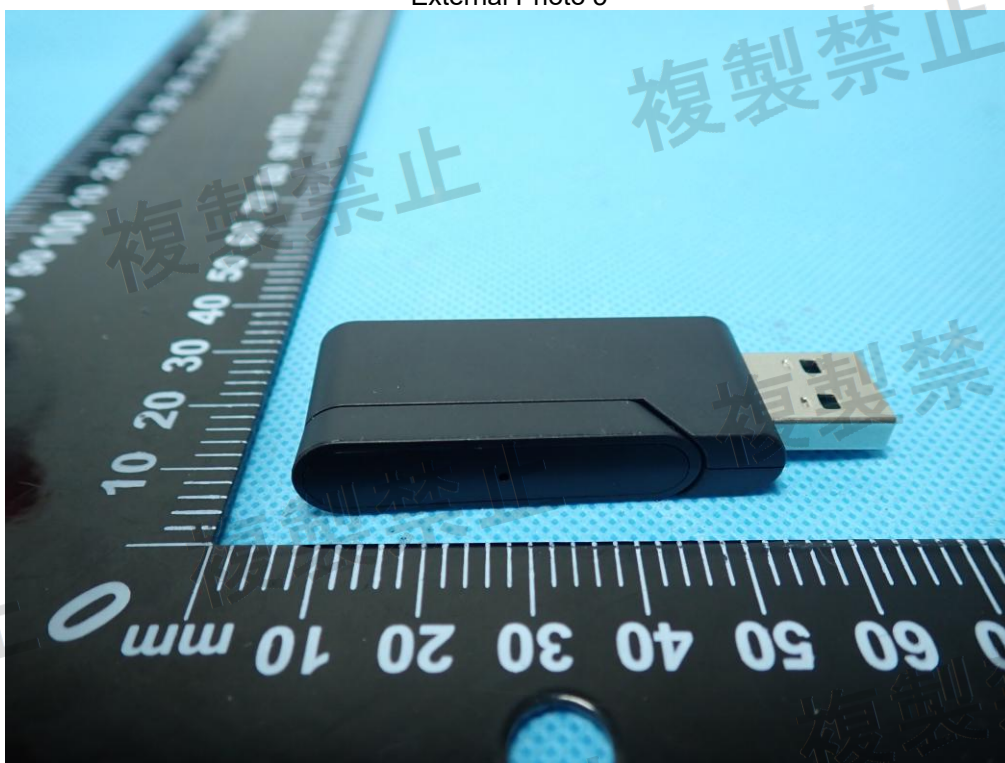


External Photo 4





External Photo 5



External Photo 6

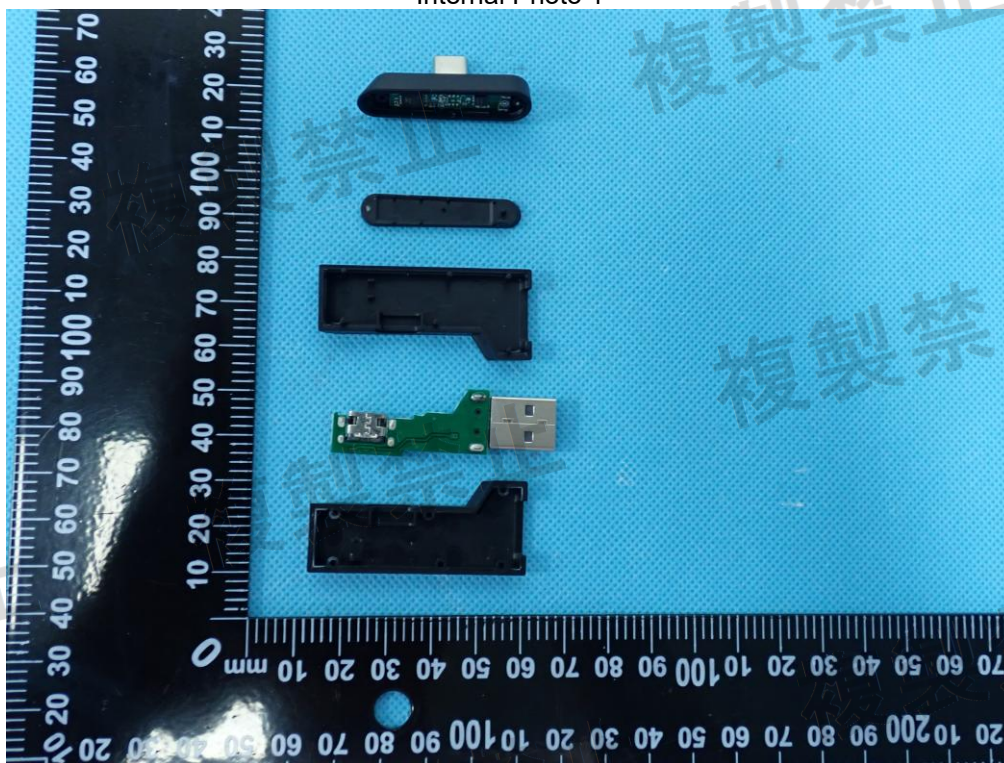




Internal Photos



Internal Photo 1

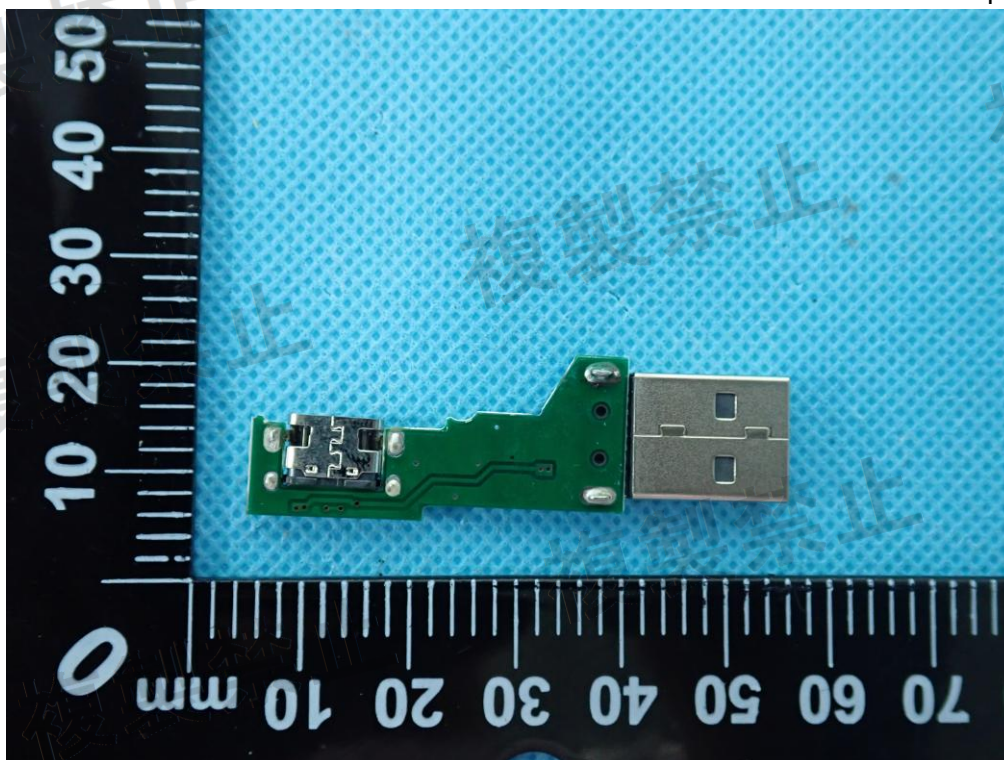


Internal Photo 2

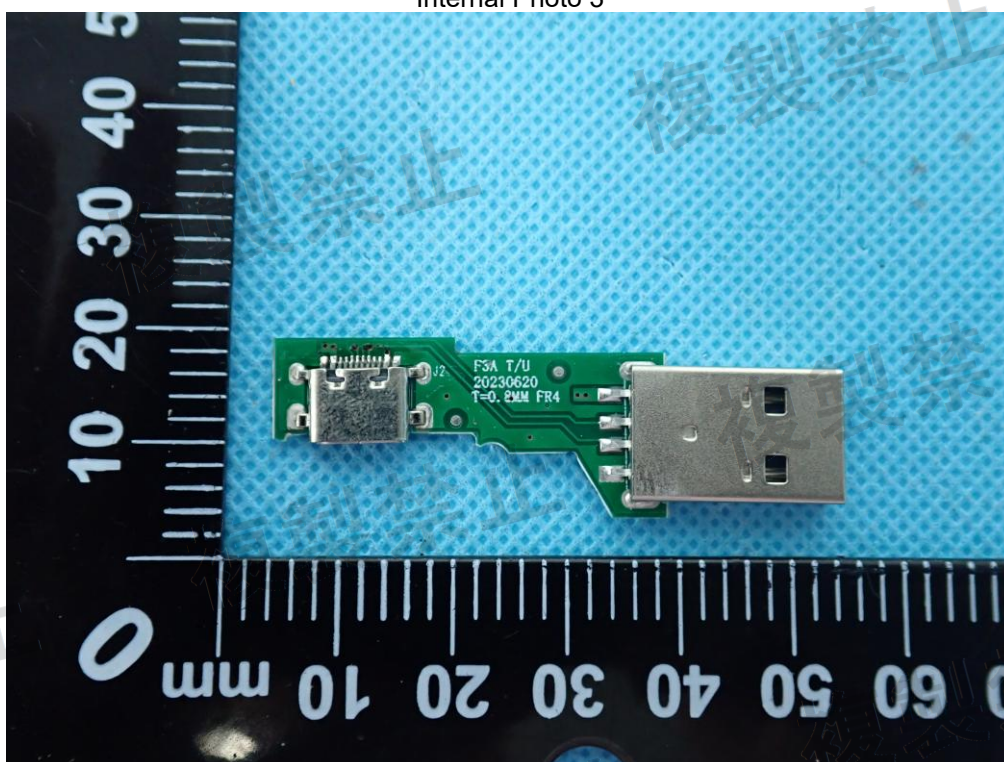




複製禁止



Internal Photo 3



Internal Photo 4

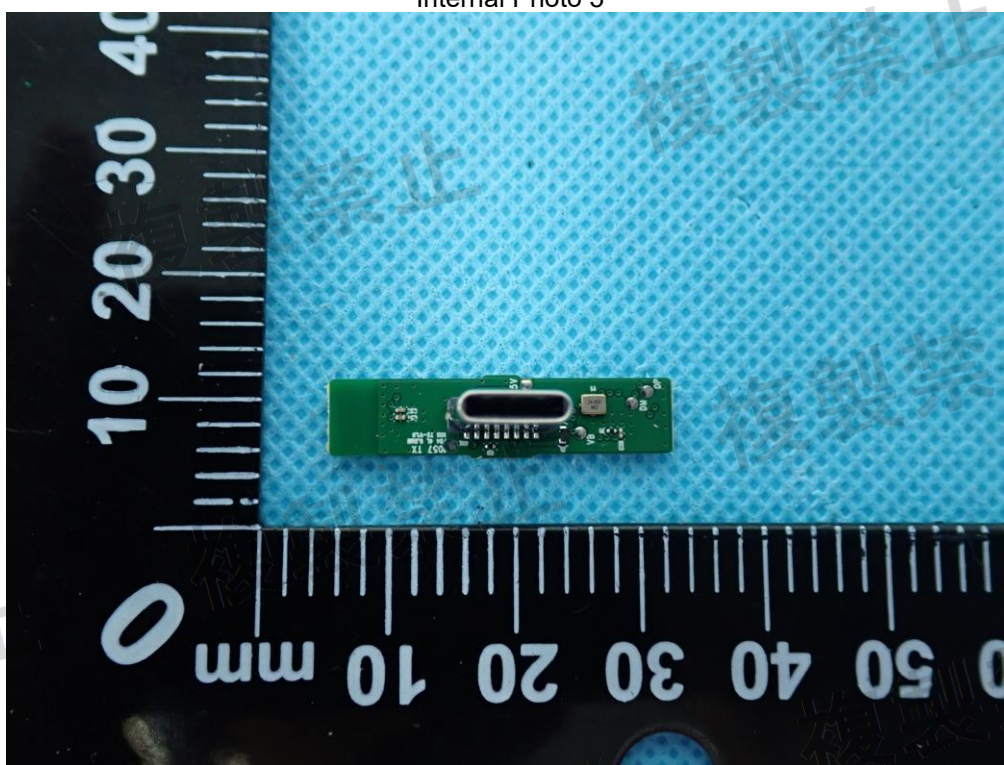




複製禁止



Internal Photo 5

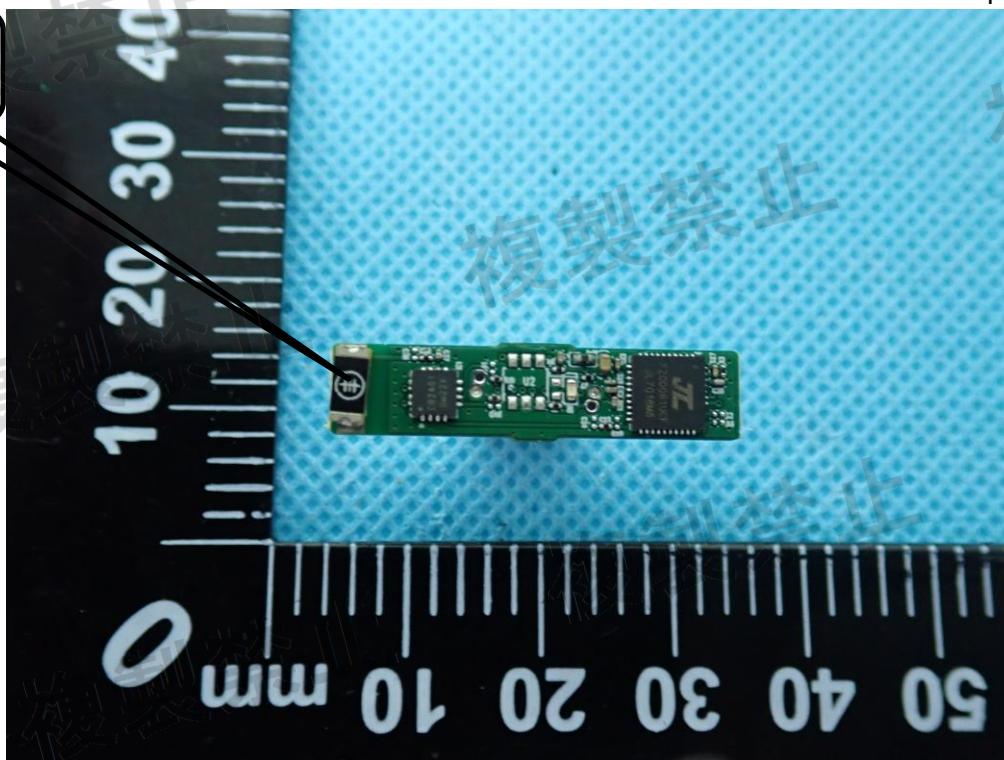


Internal Photo 6





BLE
antenna



Internal Photo 7

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

