



Shenzhen CTL Testing Technology Co., Ltd.

Unit 01A&B&C&D-1, Building A3, Guangming Sci-Tech Park, Guan Guang Road,
Fenghuang Subdistrict, Guangming District, Shenzhen, Guangdong, China
Tel: +86-755-89486194 E-mail: ctl@ctl-lab.com

Annex for Bluetooth low Energy

Test Report No.: CTL2601202044-MIC

TABLE OF CONTENTS

1. Frequency Error.....	2
2. Occupied Bandwidth.....	6
3. Antenna Power.....	10
4. Spurious Emission Intensity.....	17
5. Secondary Radiated Emission.....	24

MIC: 219-269106

1. Frequency Error

1.1 Test Result

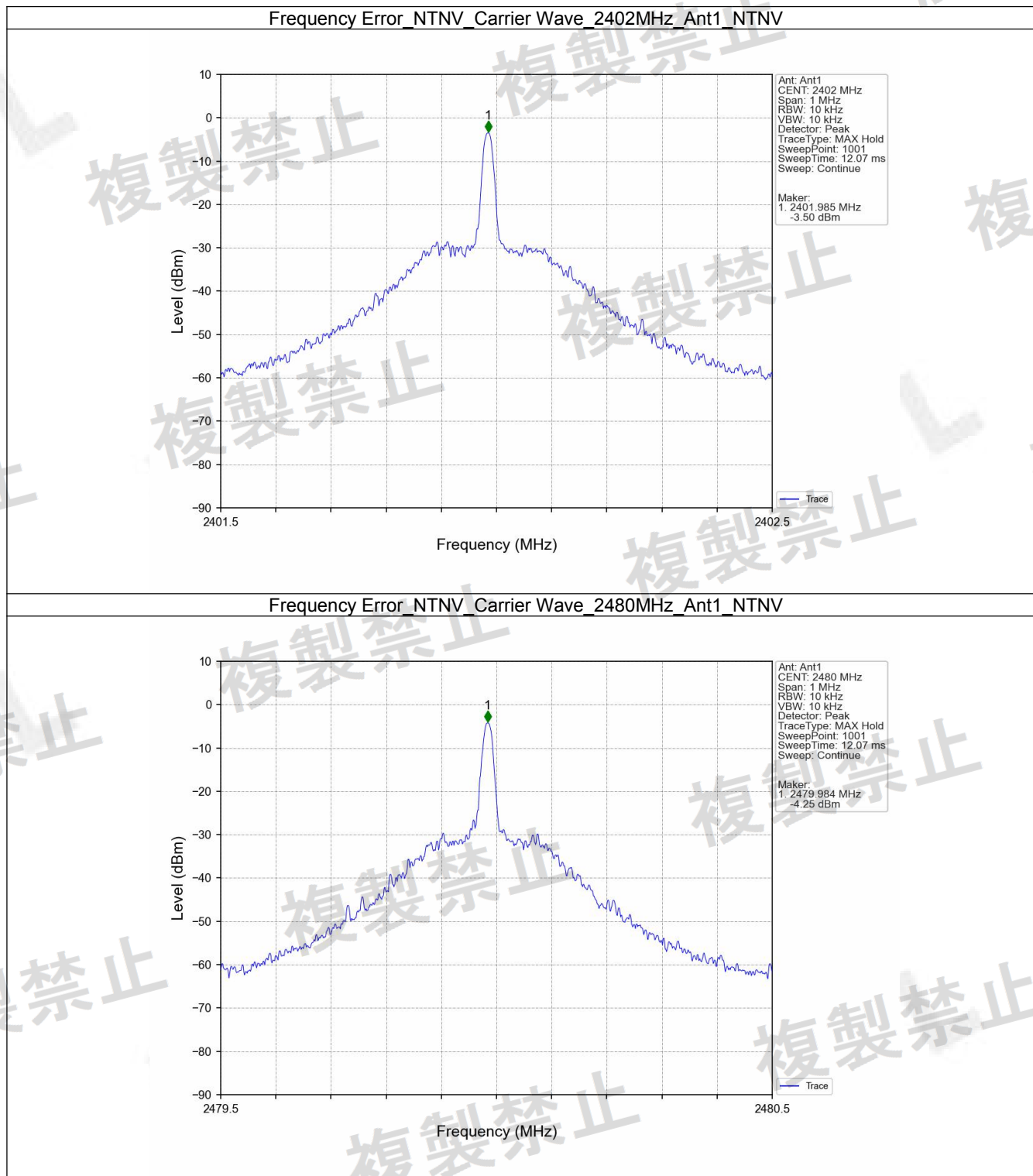
1.1.1 Ant1

Ant1							
ENV	Mode	TX Type	Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)		Verdict
					Result	Limit	
NTNV	Carrier Wave	SISO	2402	2401.985	-6.24	-50 to 50	Pass
			2480	2479.984	-6.45	-50 to 50	Pass
NTLV	Carrier Wave	SISO	2402	2401.985	-6.24	-50 to 50	Pass
			2480	2479.984	-6.45	-50 to 50	Pass
NTHV	Carrier Wave	SISO	2402	2401.985	-6.24	-50 to 50	Pass
			2480	2479.984	-6.45	-50 to 50	Pass

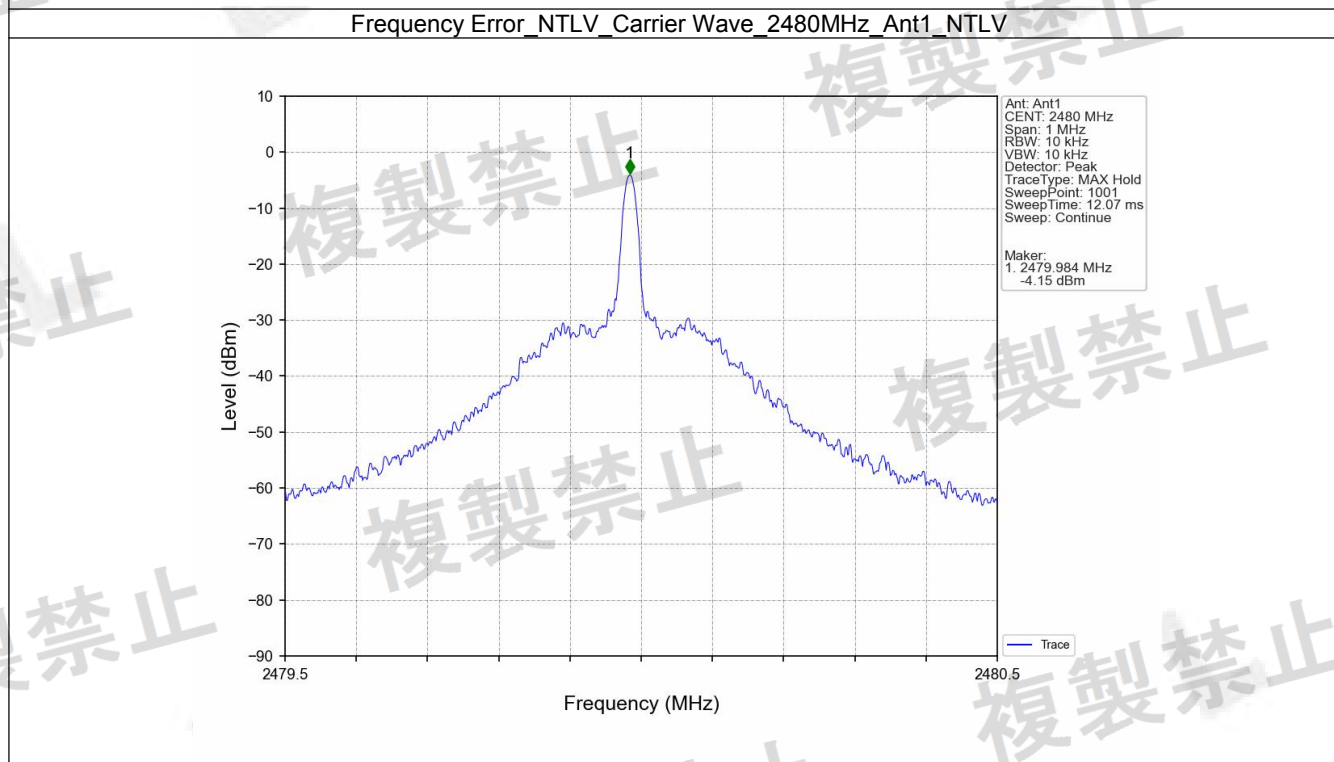
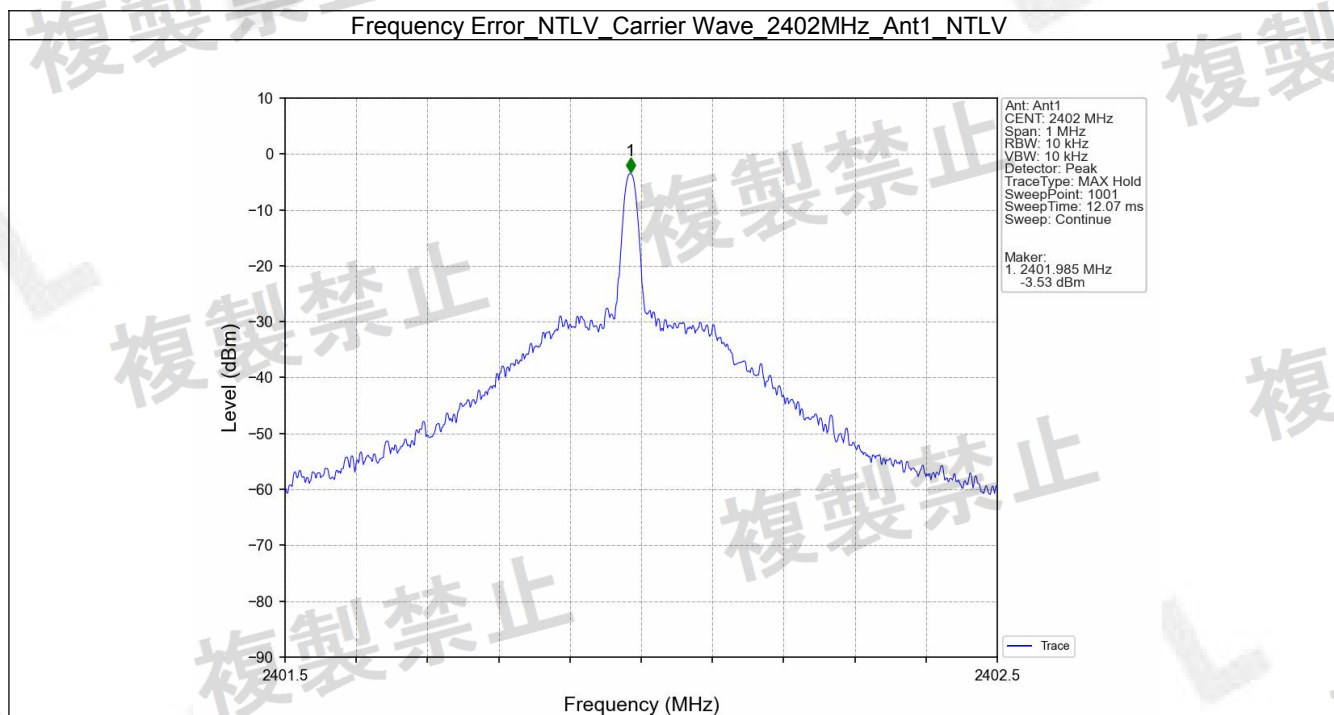
MIC: 219-269106

1.2 Test Graph

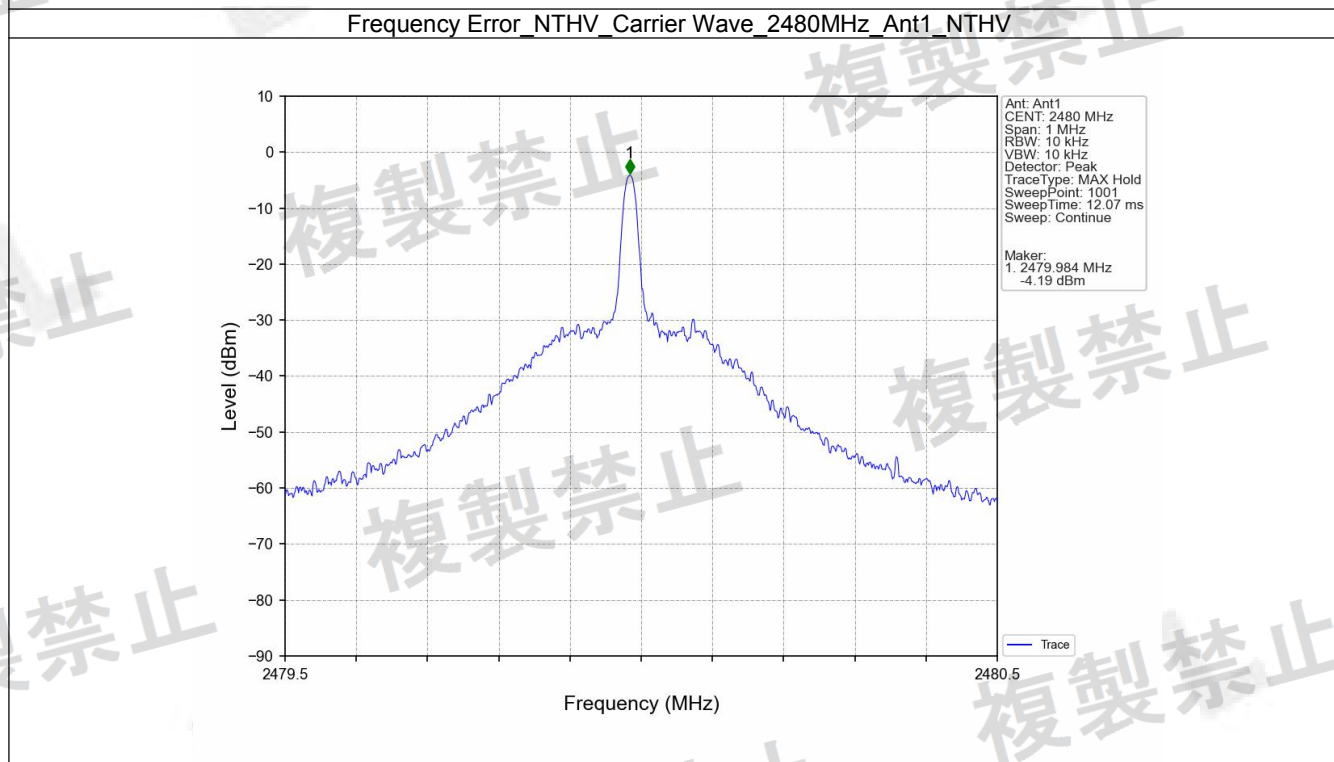
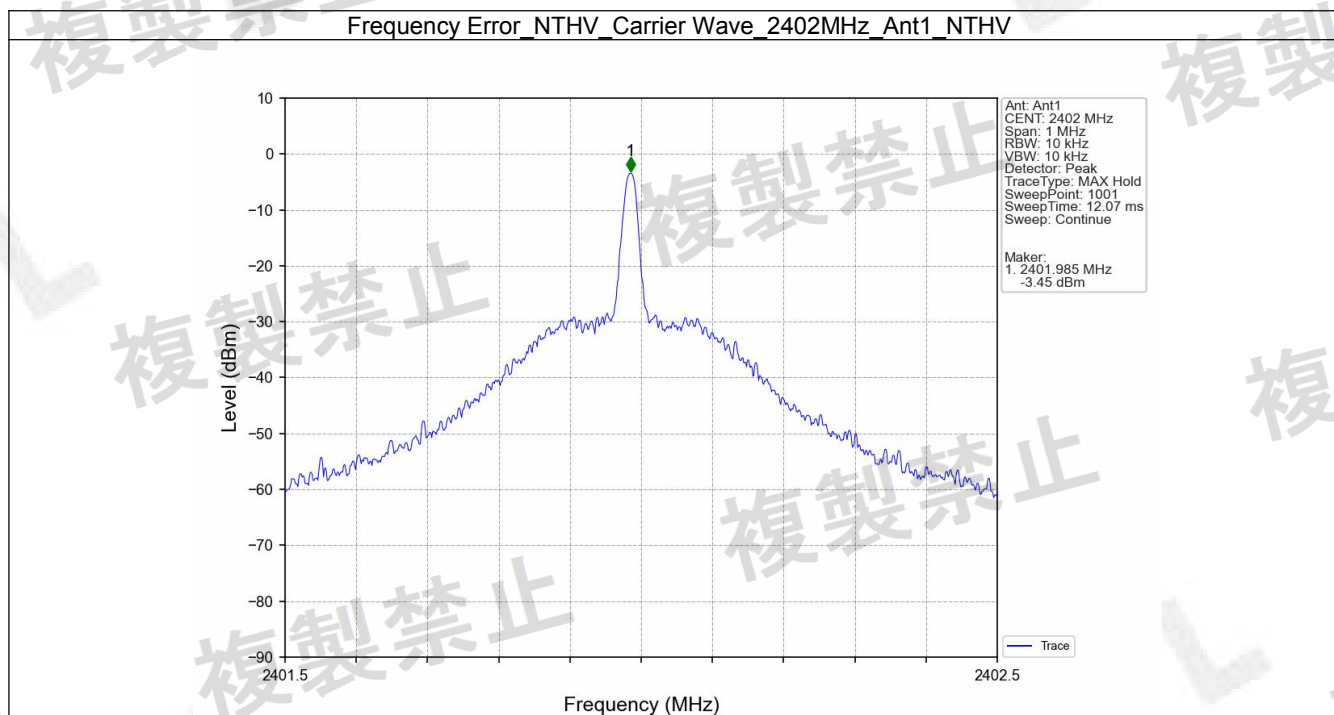
1.2.1 Ant1



MIC: 219-269106



MIC: 219-269106



MIC: 219-269106

2. Occupied Bandwidth

2.1 Test Result

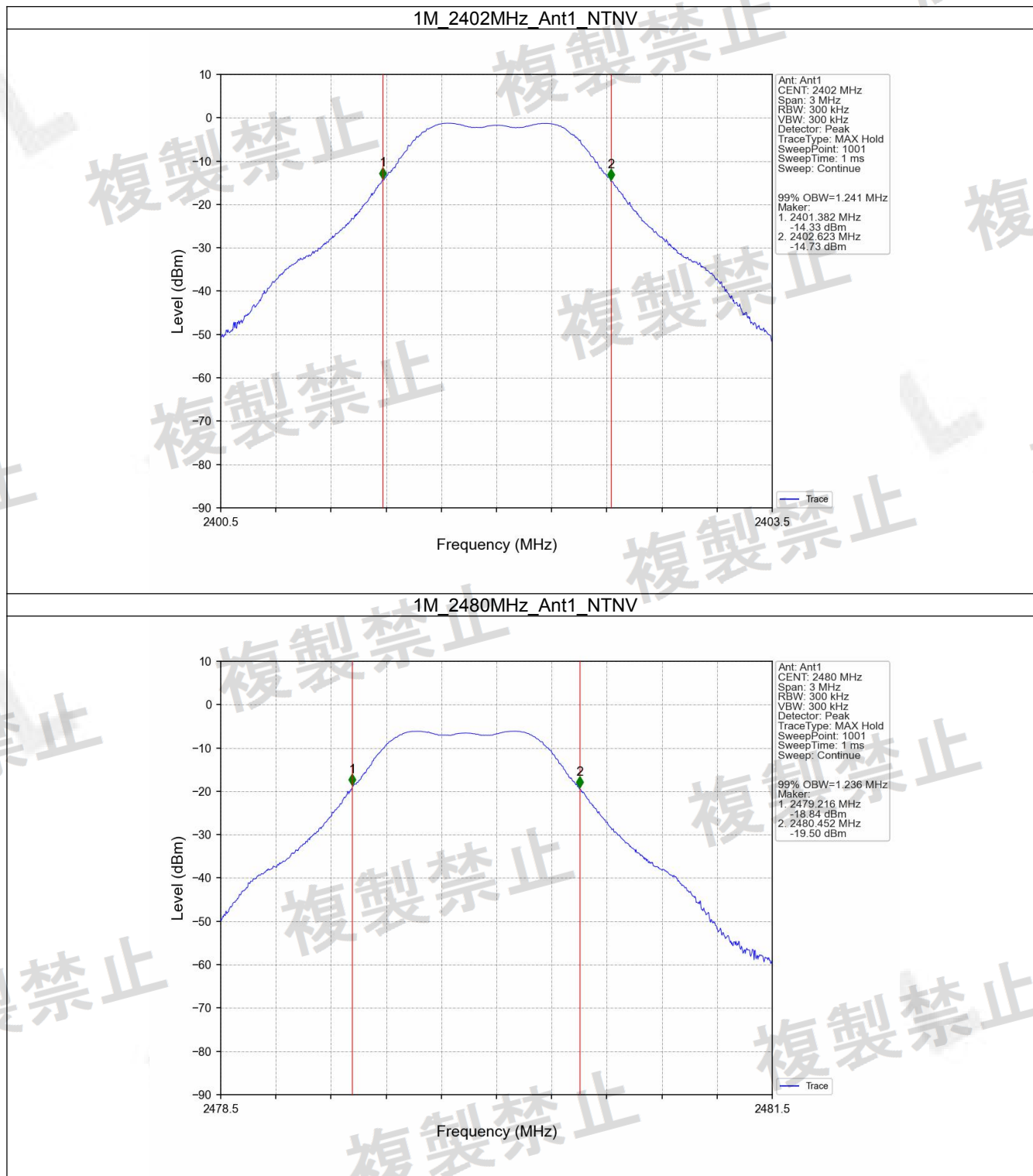
2.1.1 OBW

ENV	Mode	TX Type	Frequency (MHz)	99% Occupied Bandwidth (MHz)		Verdict
				ANT1	Limit	
NTNV	1M	SISO	2402	1.241	≤ 26	Pass
			2480	1.236	≤ 26	Pass
NTLV	1M	SISO	2402	1.242	≤ 26	Pass
			2480	1.235	≤ 26	Pass
NTHV	1M	SISO	2402	1.240	≤ 26	Pass
			2480	1.235	≤ 26	Pass

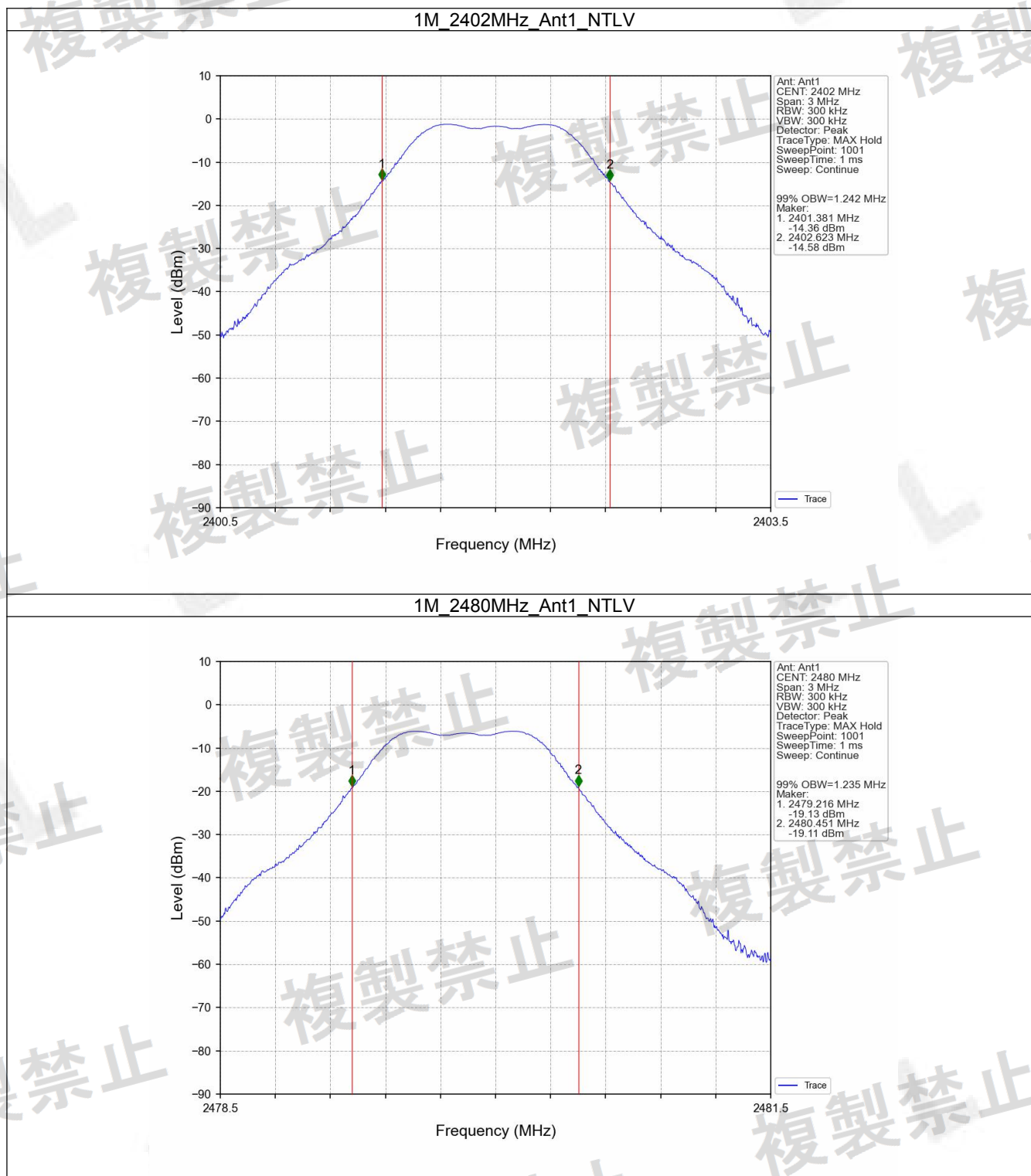
MIC: 219-269106

2.2 Test Graph

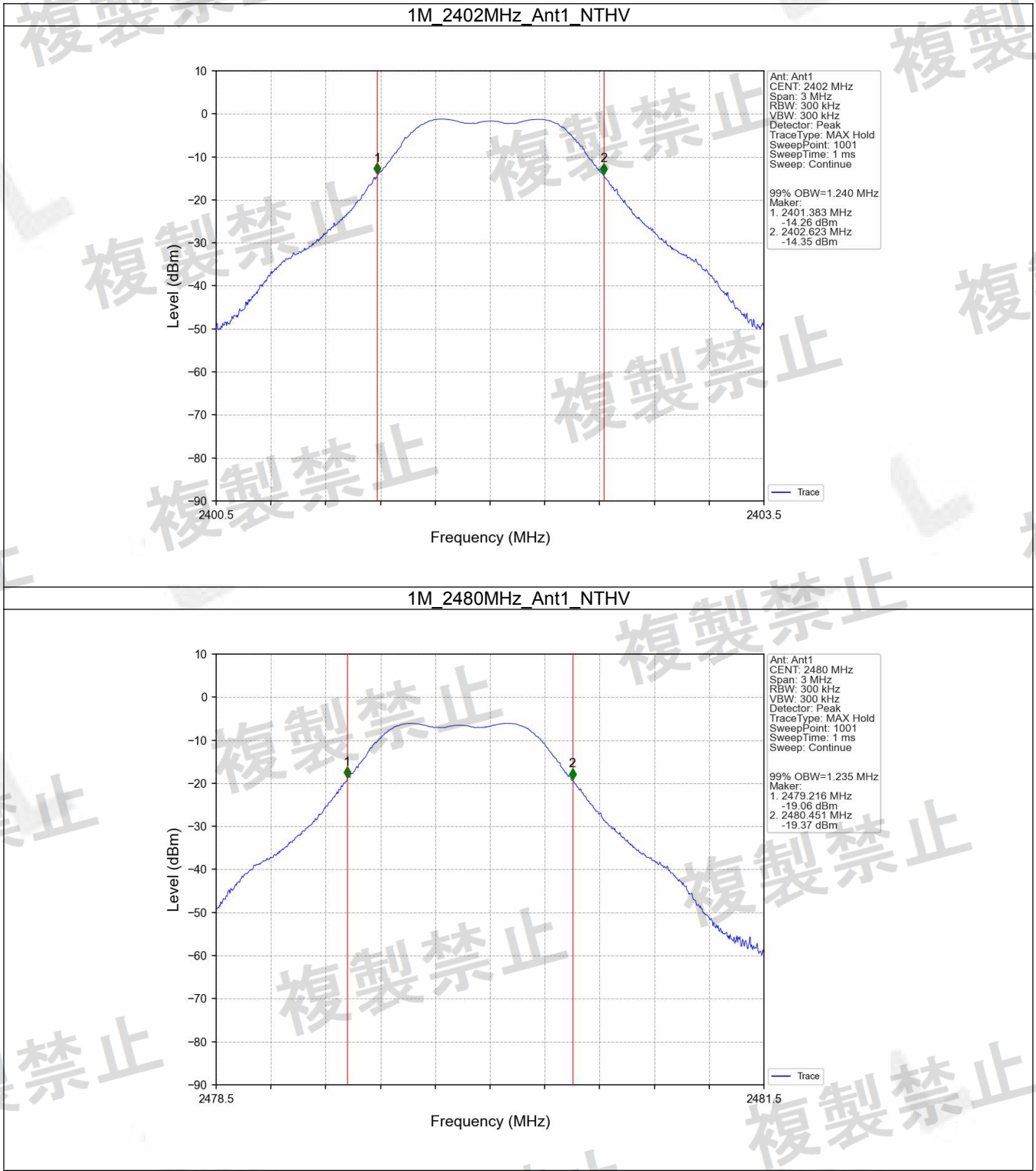
2.2.1 OBW



MIC: 219-269106



MIC: 219-269106



MIC: 219-269106

3. Antenna Power

3.1 Test Result

3.1.1 Power

ENV	Mode	TX Type	Frequency (MHz)	ANT	Antenna Power (mW)		Nominal Power (mW)	Tolerance (%)		Verdict
					Measured	Limit		Measured	Limit	
NTNV	1M	SISO	2402	1	0.721	≤ 10.00	0.720	0.14	≤ 20	Pass
			2480	1	0.235	≤ 10.00	0.720	-67.36	≤ 20	Pass
NTLV	1M	SISO	2402	1	0.704	≤ 10.00	0.720	-2.22	≤ 20	Pass
			2480	1	0.226	≤ 10.00	0.720	-68.61	≤ 20	Pass
NTHV	1M	SISO	2402	1	0.700	≤ 10.00	0.720	-2.78	≤ 20	Pass
			2480	1	0.238	≤ 10.00	0.720	-66.94	≤ 20	Pass

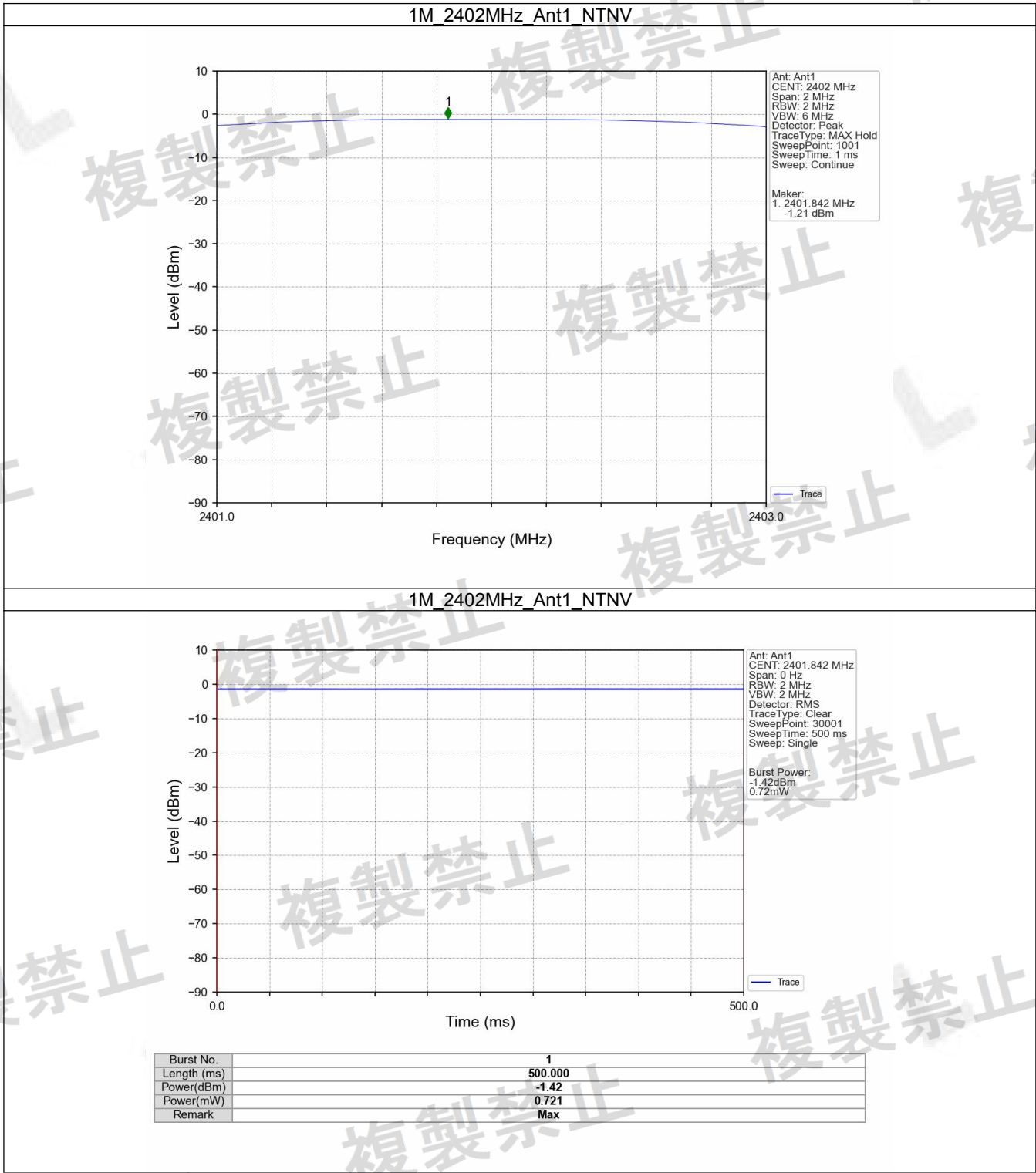
3.1.2 EIRP

ENV	Mode	TX Type	Frequency (MHz)	ANT	Gain (dBi)	EIRP (dBm)		Verdict
						Result	Limit	
NTNV	1M	SISO	2402	1	-5.09	-6.51	≤ 12.14	Pass
			2480	1	-5.09	-11.37	≤ 12.14	Pass
NTLV	1M	SISO	2402	1	-5.09	-6.61	≤ 12.14	Pass
			2480	1	-5.09	-11.55	≤ 12.14	Pass
NTHV	1M	SISO	2402	1	-5.09	-6.64	≤ 12.14	Pass
			2480	1	-5.09	-11.33	≤ 12.14	Pass

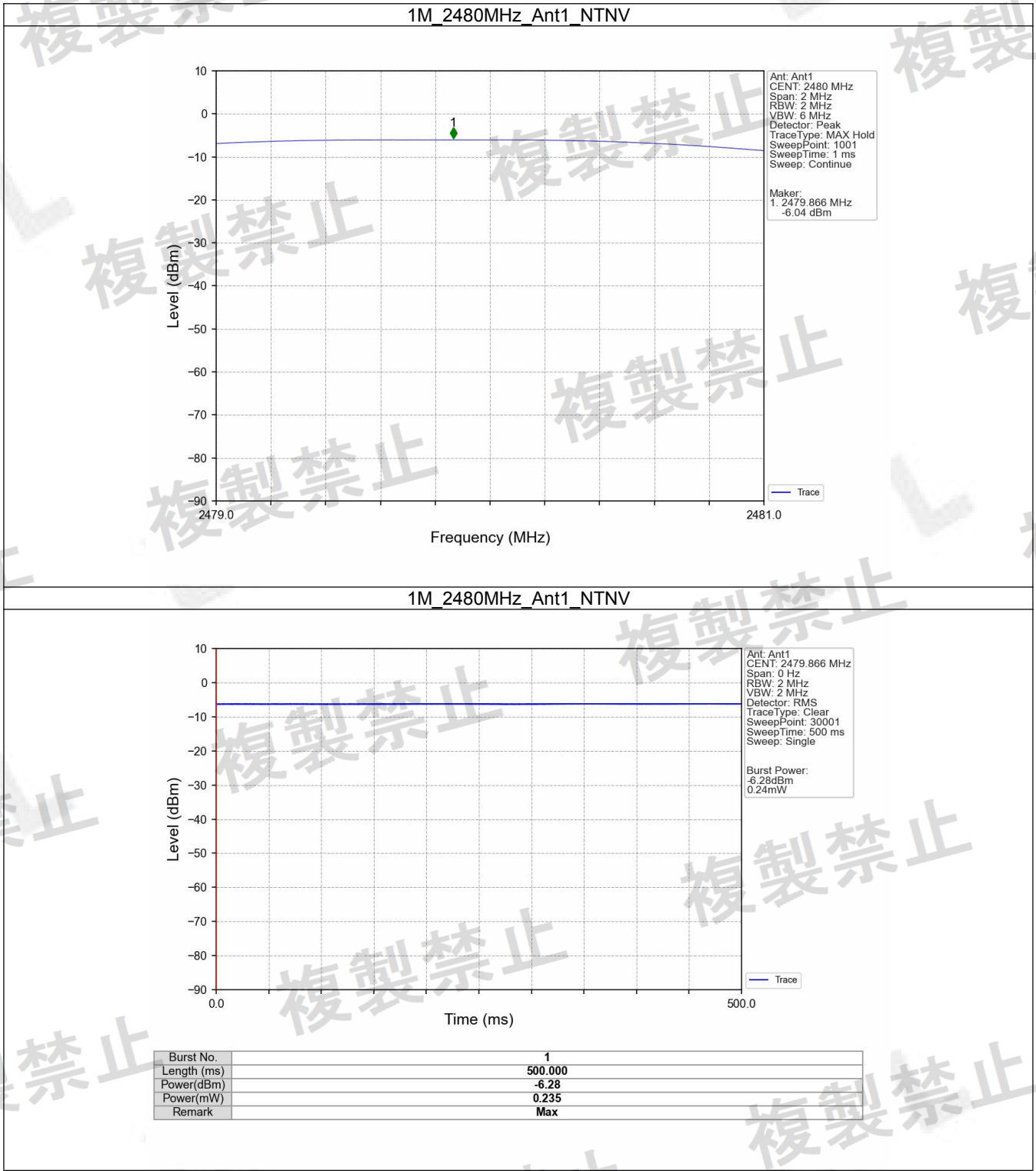
MIC: 219-269106

3.2 Test Graph

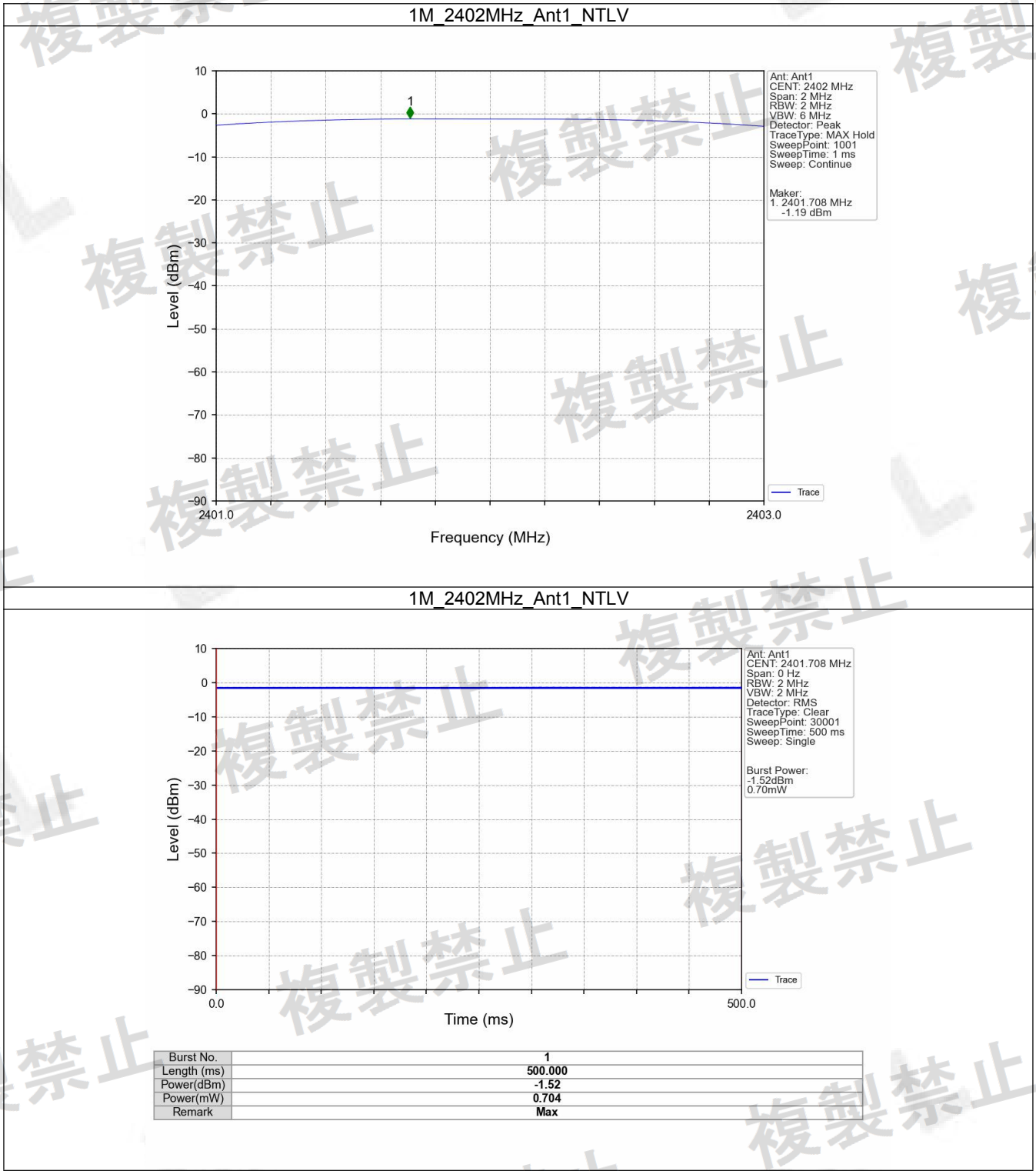
3.2.1 Power



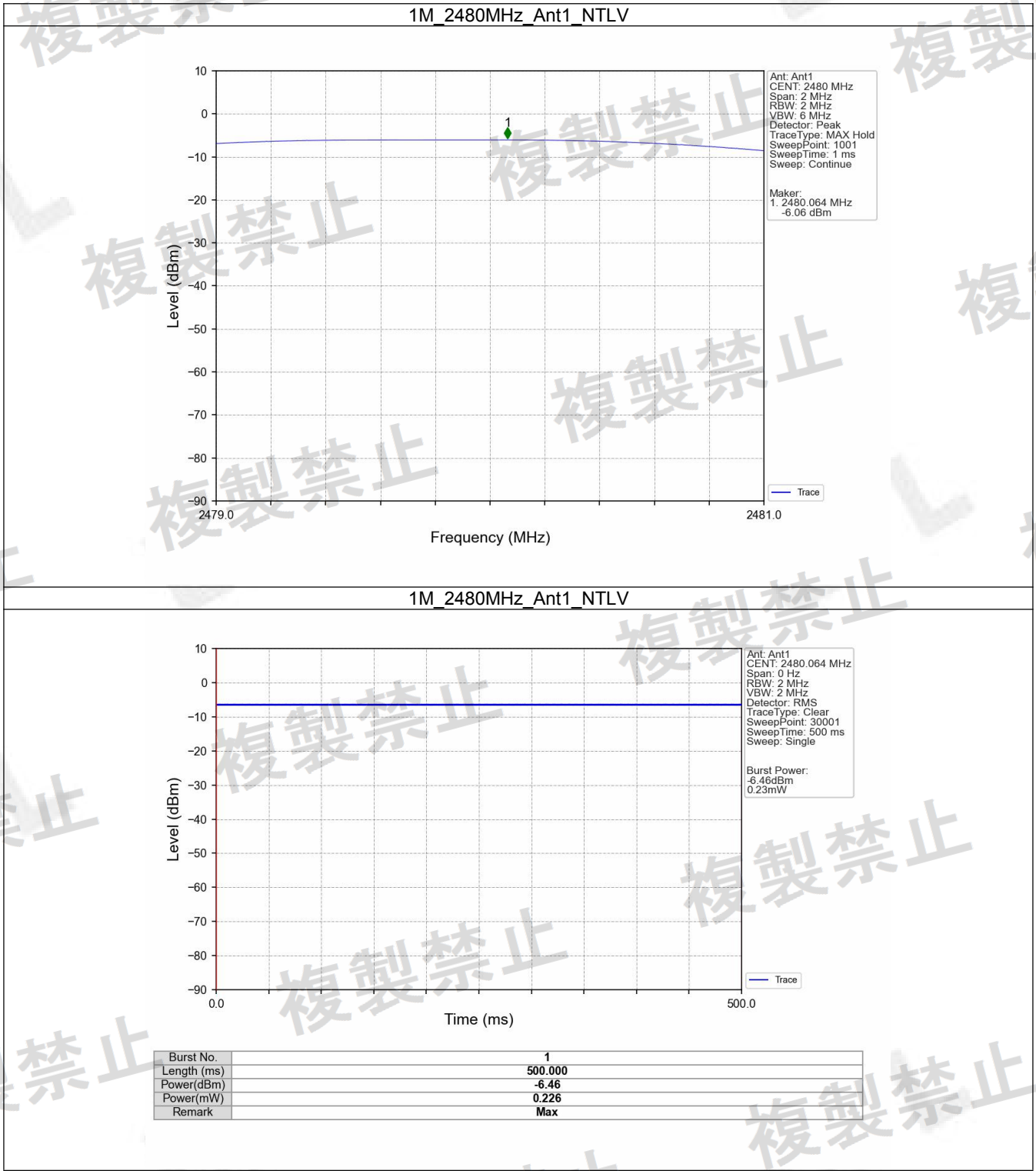
MIC: 219-269106



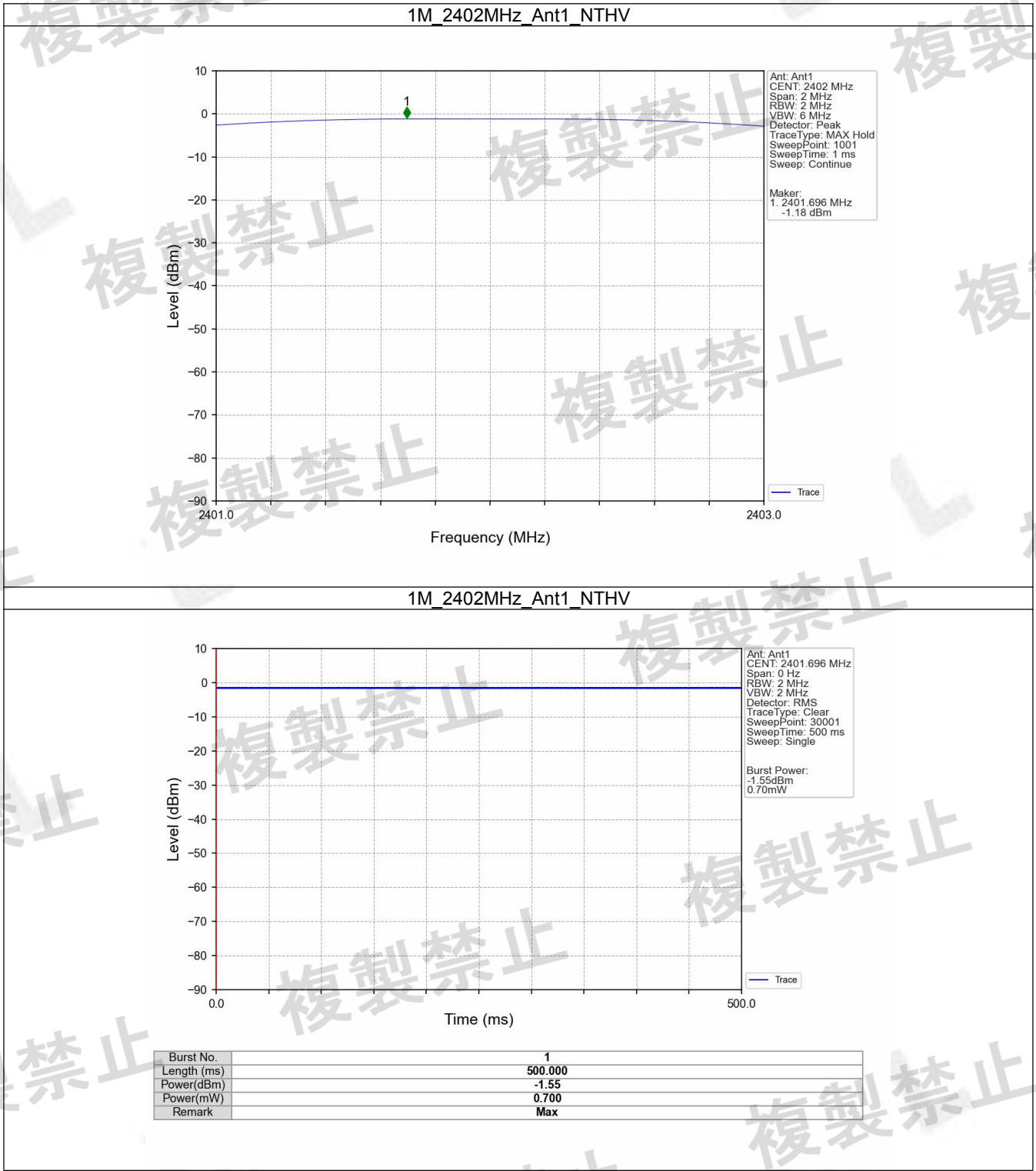
MIC: 219-269106



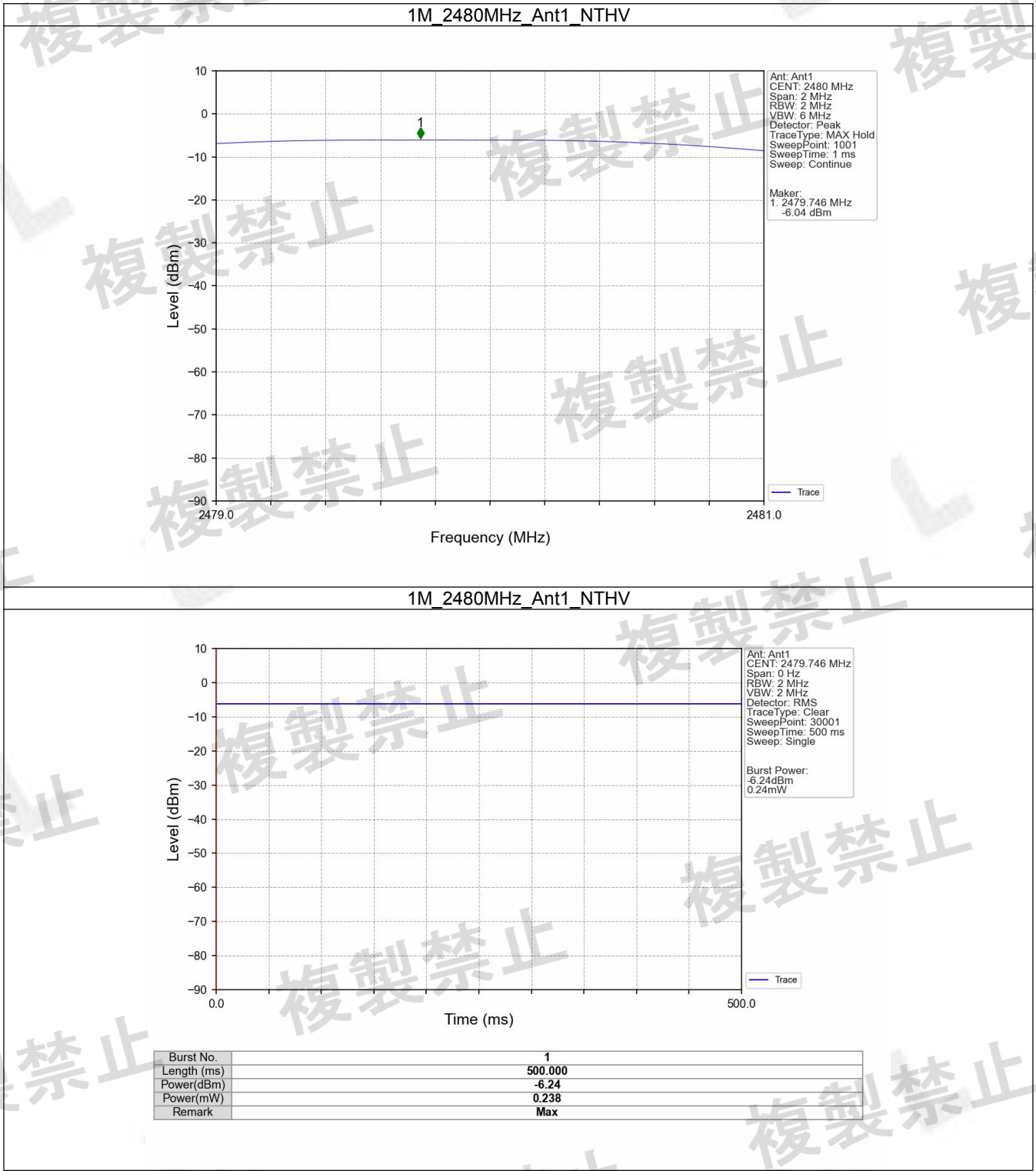
MIC: 219-269106



MIC: 219-269106



MIC: 219-269106



MIC: 219-269106

4. Spurious Emission Intensity

4.1 Test Result

4.1.1 TxSe_NTNV

NTNV												
Mode	TX Type	Freq. (MHz)	ANT	Freq. Range		Marker					Limit (uW /MHz)	Verdict
				Start (MHz)	Stop (MHz)	Freq. (MHz)	PK Power (dBm /MHz)	PK Power (uW /MHz)	AV Power (dBm /MHz)	AV Power (uW /MHz)		
1M	SISO	2402	1	30	2387	2339	-44.16	0.038	/	/	2.5	Pass
				2387	2400	2399.987	-38.26	0.149	/	/	25	Pass
				2483.5	2496.5	2484.488	-58.74	0.001	/	/	25	Pass
				2496.5	12500	7207.5	-36.17	0.242	/	/	2.5	Pass
		2480	1	30	2387	2352.5	-56.32	0.002	/	/	2.5	Pass
				2387	2400	2399.74	-59.30	0.001	/	/	25	Pass
				2483.5	2496.5	2495.902	-60.38	0.001	/	/	25	Pass
				2496.5	12500	5753.5	-39.86	0.103	/	/	2.5	Pass

4.1.2 TxSe_NTLV

NTLV												
Mode	TX Type	Freq. (MHz)	ANT	Freq. Range		Marker					Limit (uW /MHz)	Verdict
				Start (MHz)	Stop (MHz)	Freq. (MHz)	PK Power (dBm /MHz)	PK Power (uW /MHz)	AV Power (dBm /MHz)	AV Power (uW /MHz)		
1M	SISO	2402	1	30	2387	2338.5	-44.20	0.038	/	/	2.5	Pass
				2387	2400	2399.987	-38.09	0.155	/	/	25	Pass
				2483.5	2496.5	2493.939	-58.27	0.001	/	/	25	Pass
				2496.5	12500	7206	-36.13	0.244	/	/	2.5	Pass
		2480	1	30	2387	2353	-55.90	0.003	/	/	2.5	Pass
				2387	2400	2399.467	-58.96	0.001	/	/	25	Pass
				2483.5	2496.5	2495.72	-60.31	0.001	/	/	25	Pass
				2496.5	12500	5758	-43.00	0.050	/	/	2.5	Pass

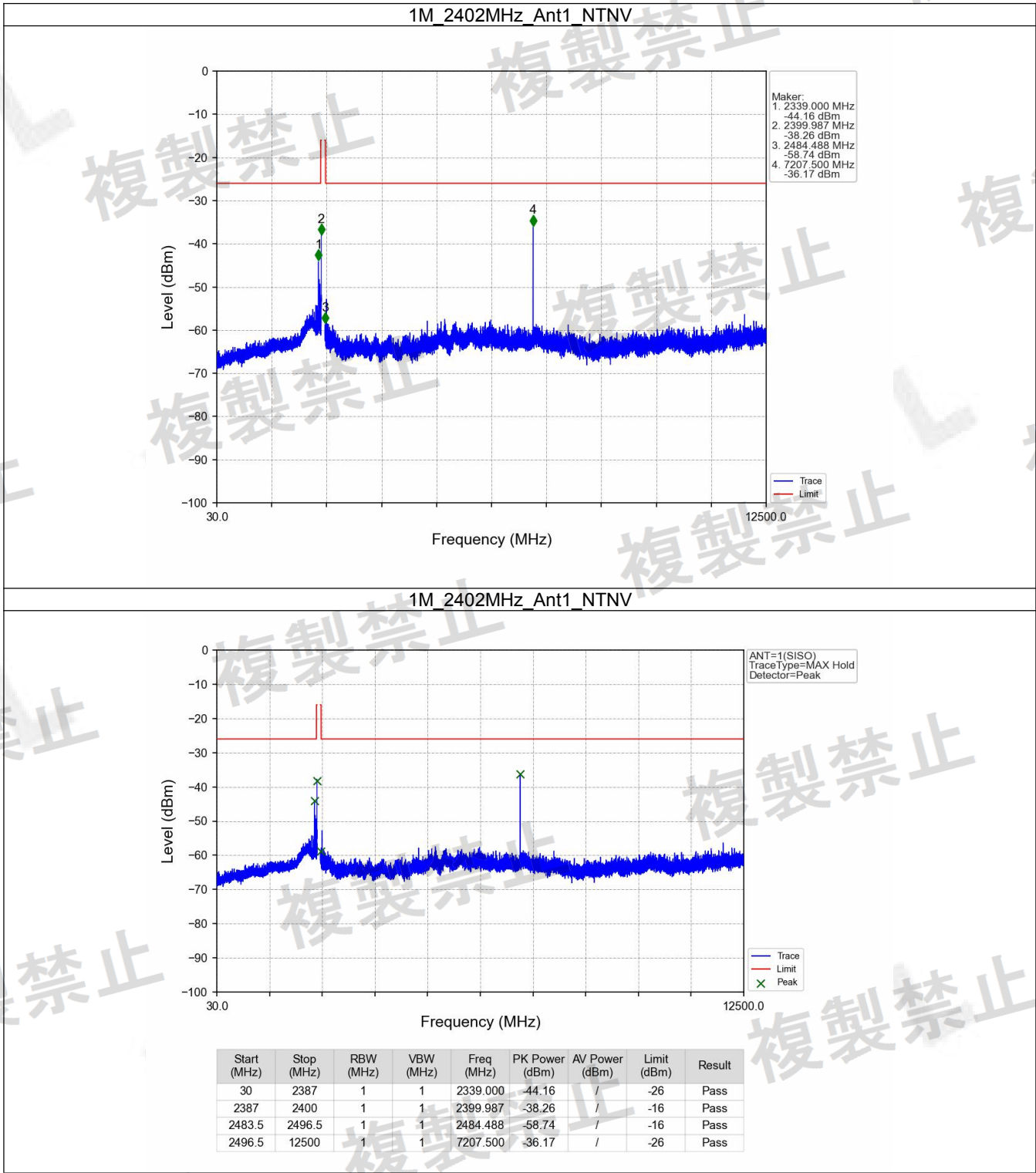
4.1.3 TxSe_NTHV

NTHV												
Mode	TX Type	Freq. (MHz)	ANT	Freq. Range		Marker					Limit (uW /MHz)	Verdict
				Start (MHz)	Stop (MHz)	Freq. (MHz)	PK Power (dBm /MHz)	PK Power (uW /MHz)	AV Power (dBm /MHz)	AV Power (uW /MHz)		
1M	SISO	2402	1	30	2387	2339	-43.91	0.041	/	/	2.5	Pass
				2387	2400	2399.987	-38.09	0.155	/	/	25	Pass
				2483.5	2496.5	2487.582	-58.59	0.001	/	/	25	Pass
				2496.5	12500	7206	-36.16	0.242	/	/	2.5	Pass
		2480	1	30	2387	1943.5	-33.26	0.472	/	/	2.5	Pass
				2387	2400	2399.558	-58.95	0.001	/	/	25	Pass
				2483.5	2496.5	2495.863	-60.06	0.001	/	/	25	Pass
				2496.5	12500	2544.5	-46.32	0.023	/	/	2.5	Pass

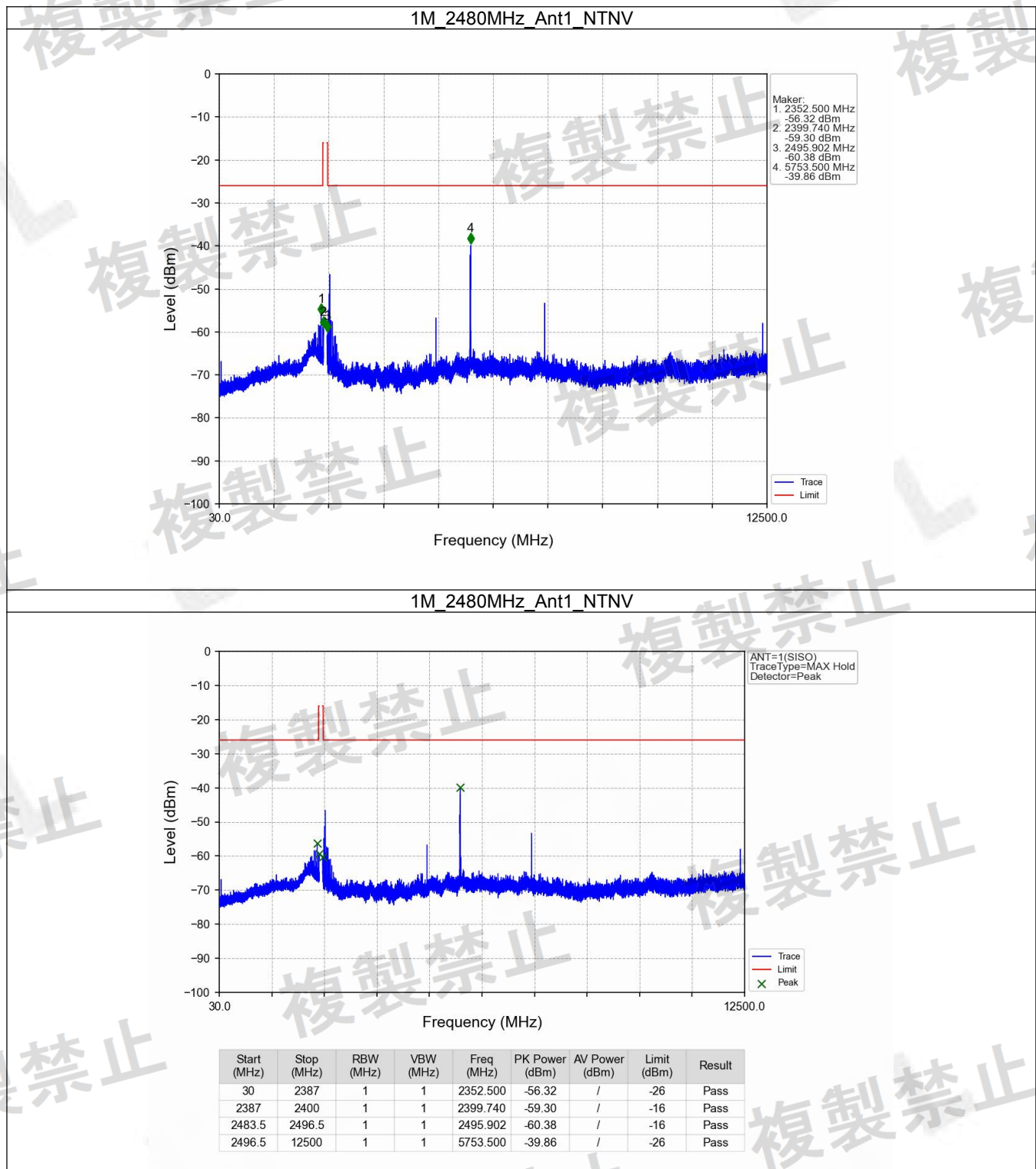
MIC: 219-269106

4.2 Test Graph

4.2.1 TxSe_NTNV

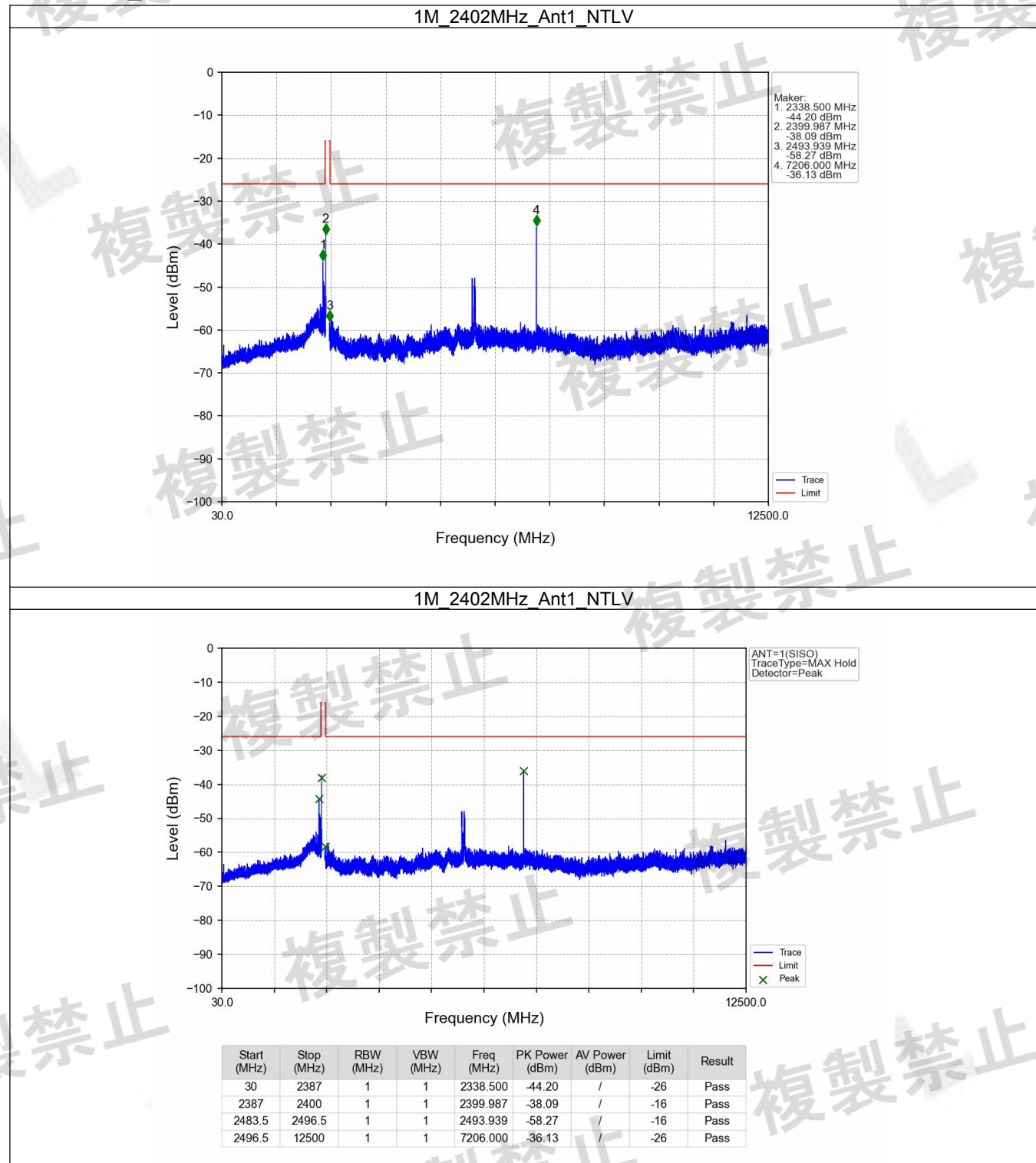


MIC: 219-269106

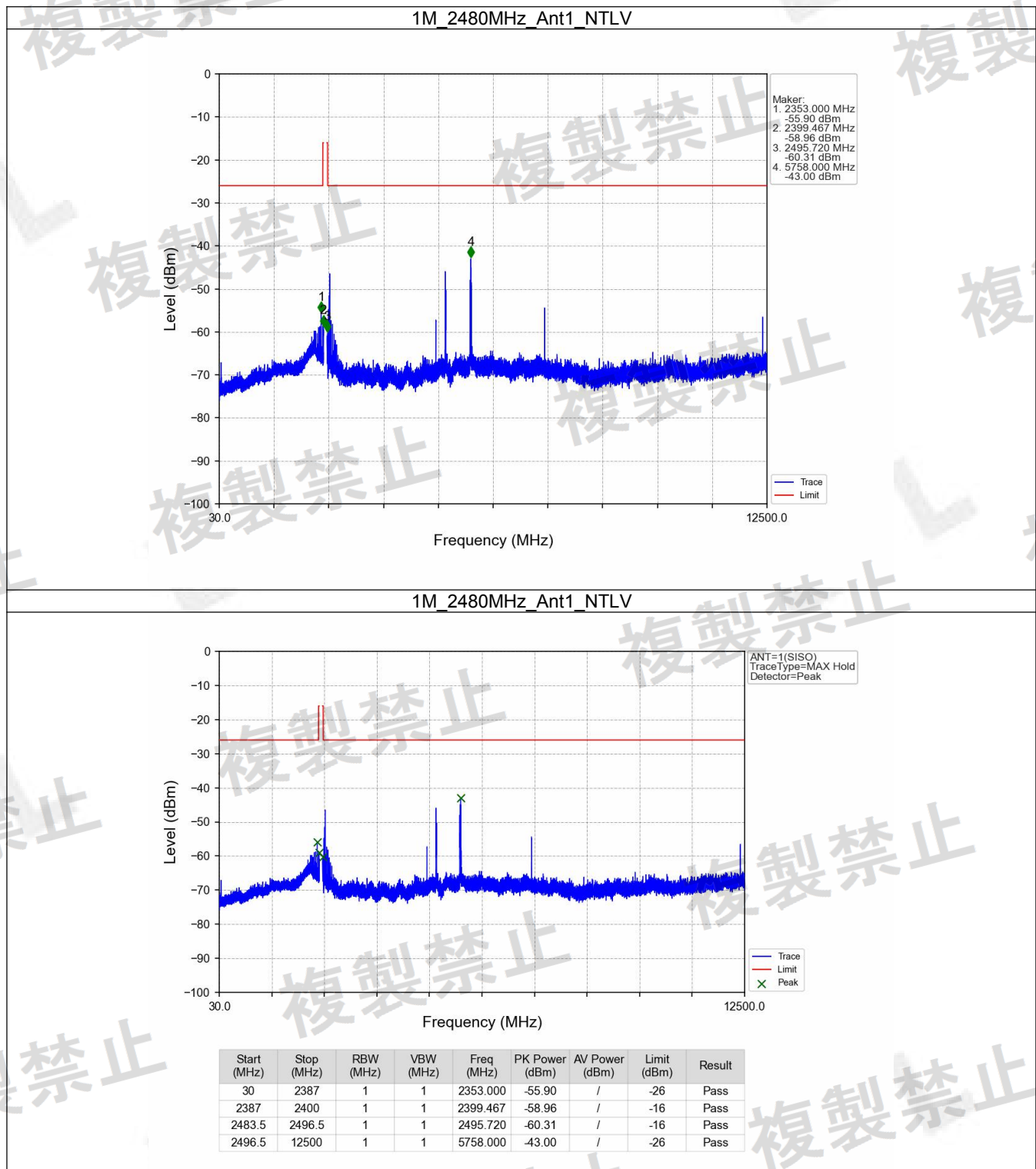


MIC: 219-269106

4.2.2 TxSe_NTLV

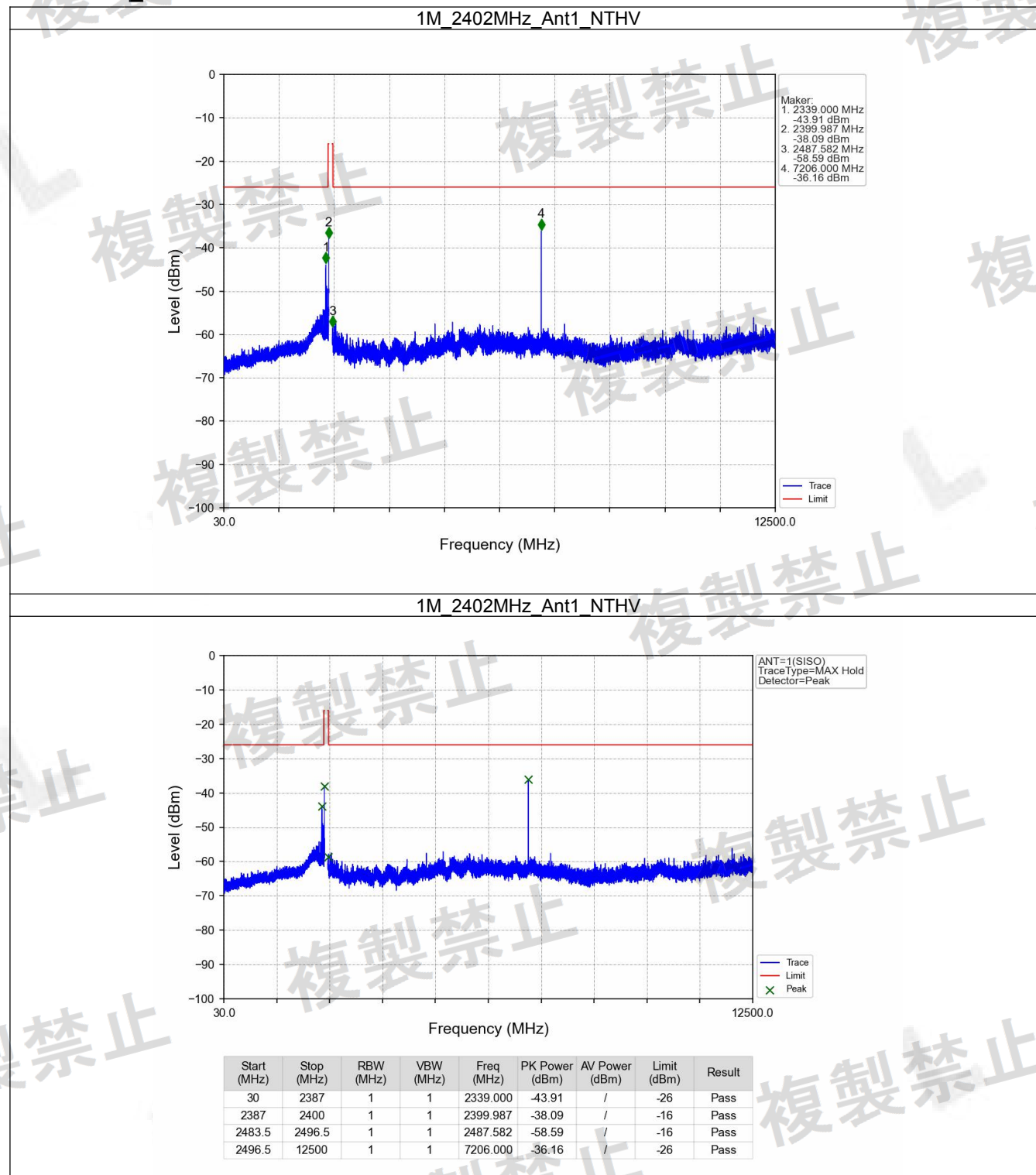


MIC: 219-269106

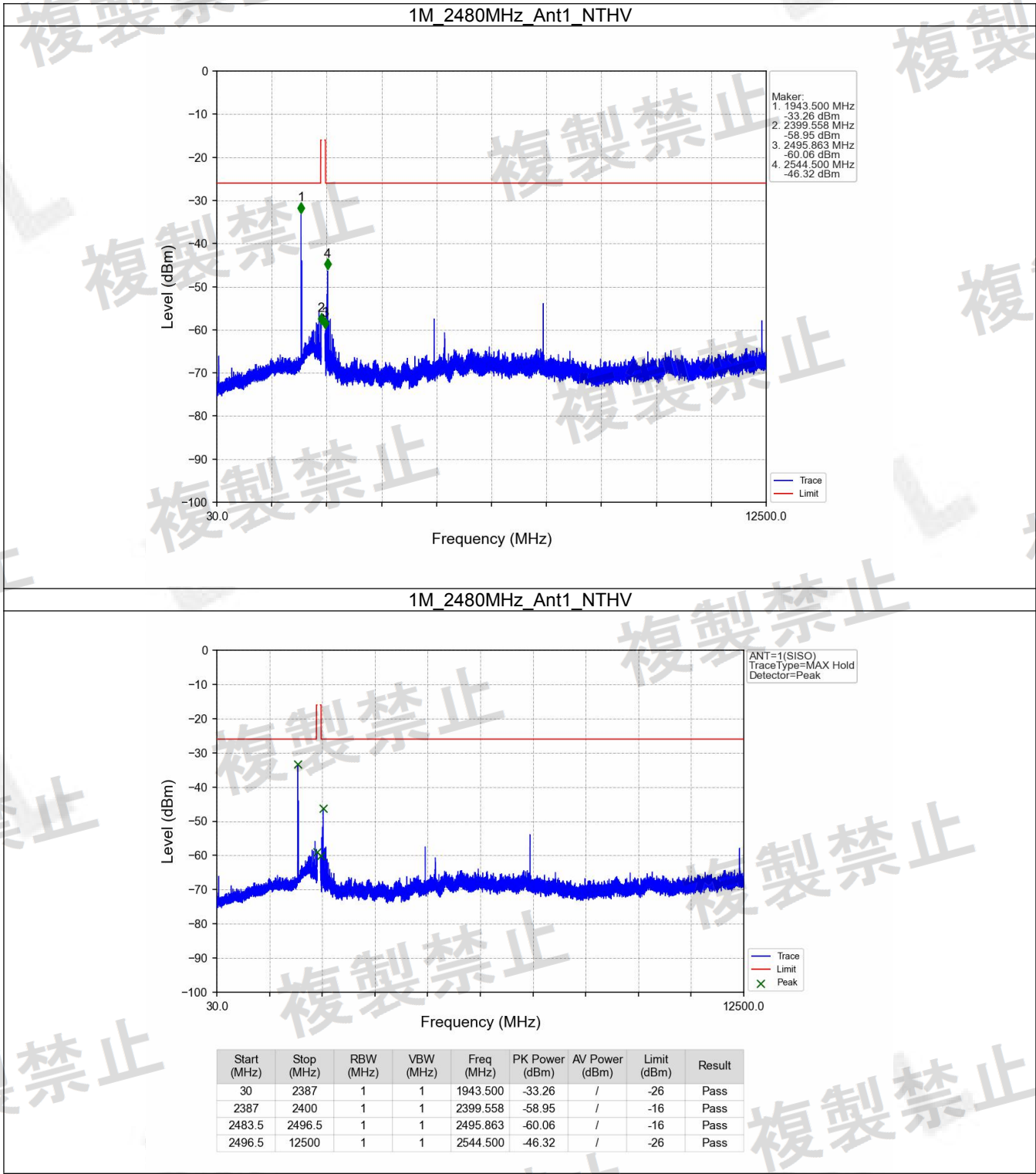


MIC: 219-269106

4.2.3 TxSe_NTHV



MIC: 219-269106



MIC: 219-269106

5. Secondary Radiated Emission

5.1 Test Result

5.1.1 RxSe_NTNV

NTNV												
Mode	TX Type	Freq. (MHz)	ANT	Freq. Range		Marker					Limit (nW)	Verdict
				Start (MHz)	Stop (MHz)	Freq. (MHz)	PK Power (dBm)	PK Power (nW)	AV Power (dBm)	AV Power (nW)		
1M	SISO	2402	1	30	1000	990	-77.90	0.016	/	/	4	Pass
				1000	12500	2183.5	-63.26	0.472	/	/	20	Pass
		2480	1	30	1000	835.15	-78.57	0.014	/	/	4	Pass
				1000	12500	5463	-63.24	0.474	/	/	20	Pass

5.1.2 RxSe_NTLV

NTLV												
Mode	TX Type	Freq. (MHz)	ANT	Freq. Range		Marker					Limit (nW)	Verdict
				Start (MHz)	Stop (MHz)	Freq. (MHz)	PK Power (dBm)	PK Power (nW)	AV Power (dBm)	AV Power (nW)		
1M	SISO	2402	1	30	1000	926.15	-77.63	0.017	/	/	4	Pass
				1000	12500	12435.5	-63.60	0.437	/	/	20	Pass
		2480	1	30	1000	893	-77.36	0.018	/	/	4	Pass
				1000	12500	6288	-63.47	0.450	/	/	20	Pass

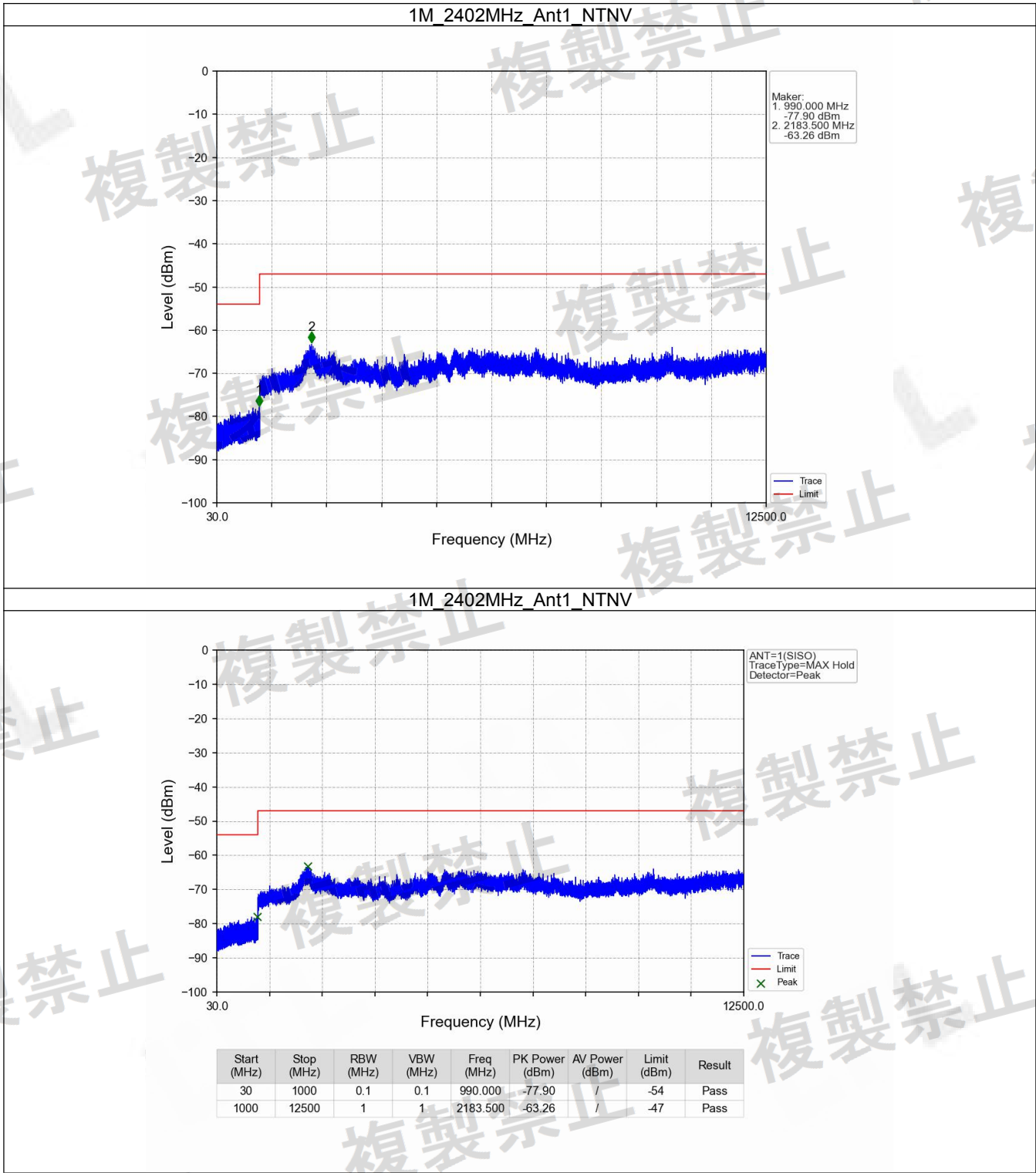
5.1.3 RxSe_NTHV

NTHV												
Mode	TX Type	Freq. (MHz)	ANT	Freq. Range		Marker					Limit (nW)	Verdict
				Start (MHz)	Stop (MHz)	Freq. (MHz)	PK Power (dBm)	PK Power (nW)	AV Power (dBm)	AV Power (nW)		
1M	SISO	2402	1	30	1000	997.8	-78.13	0.015	/	/	4	Pass
				1000	12500	7387.5	-63.63	0.434	/	/	20	Pass
		2480	1	30	1000	931.6	-78.13	0.015	/	/	4	Pass
				1000	12500	2081	-63.57	0.440	/	/	20	Pass

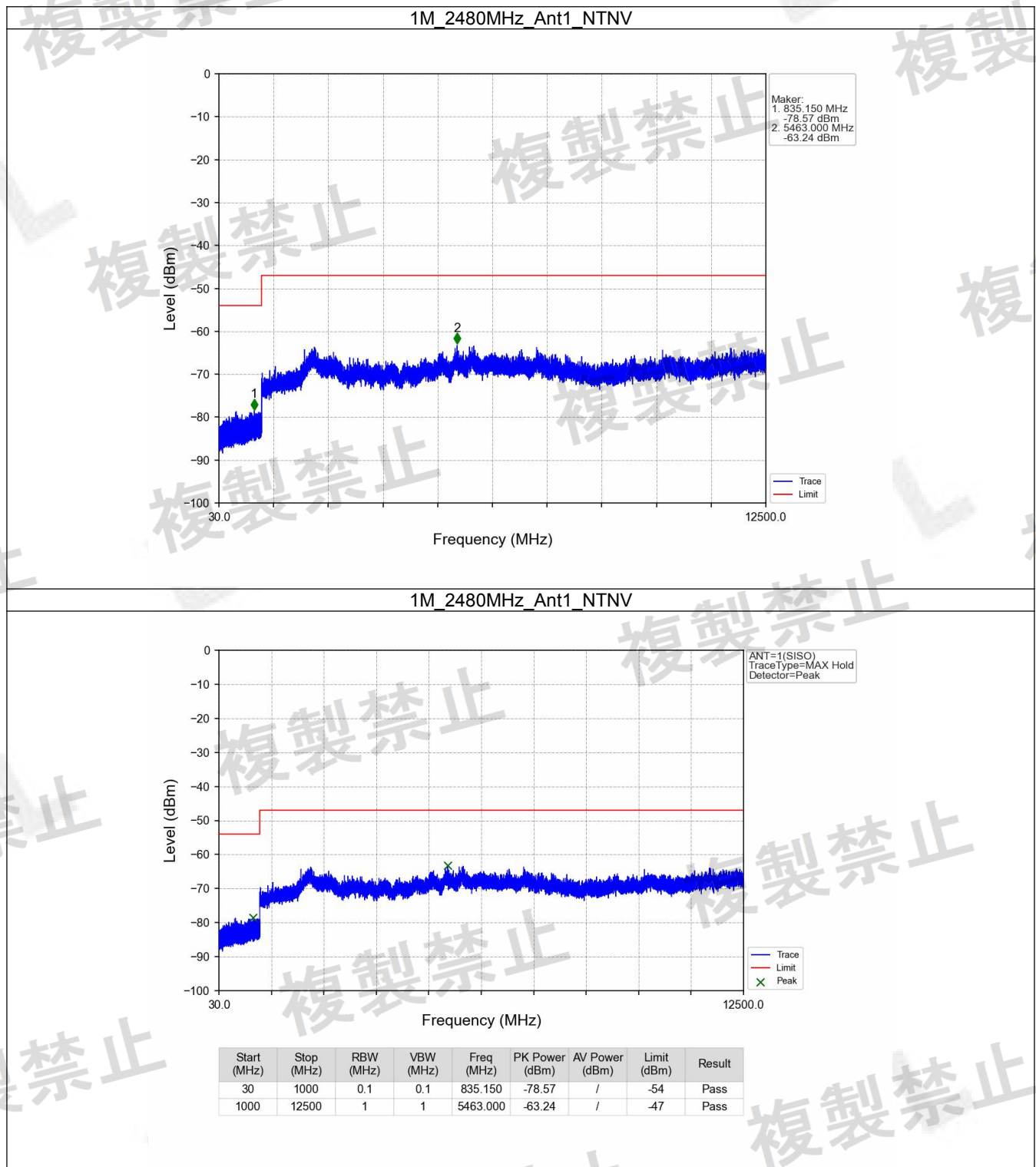
MIC: 219-269106

5.2 Test Graph

5.2.1 RxSe_NTNV

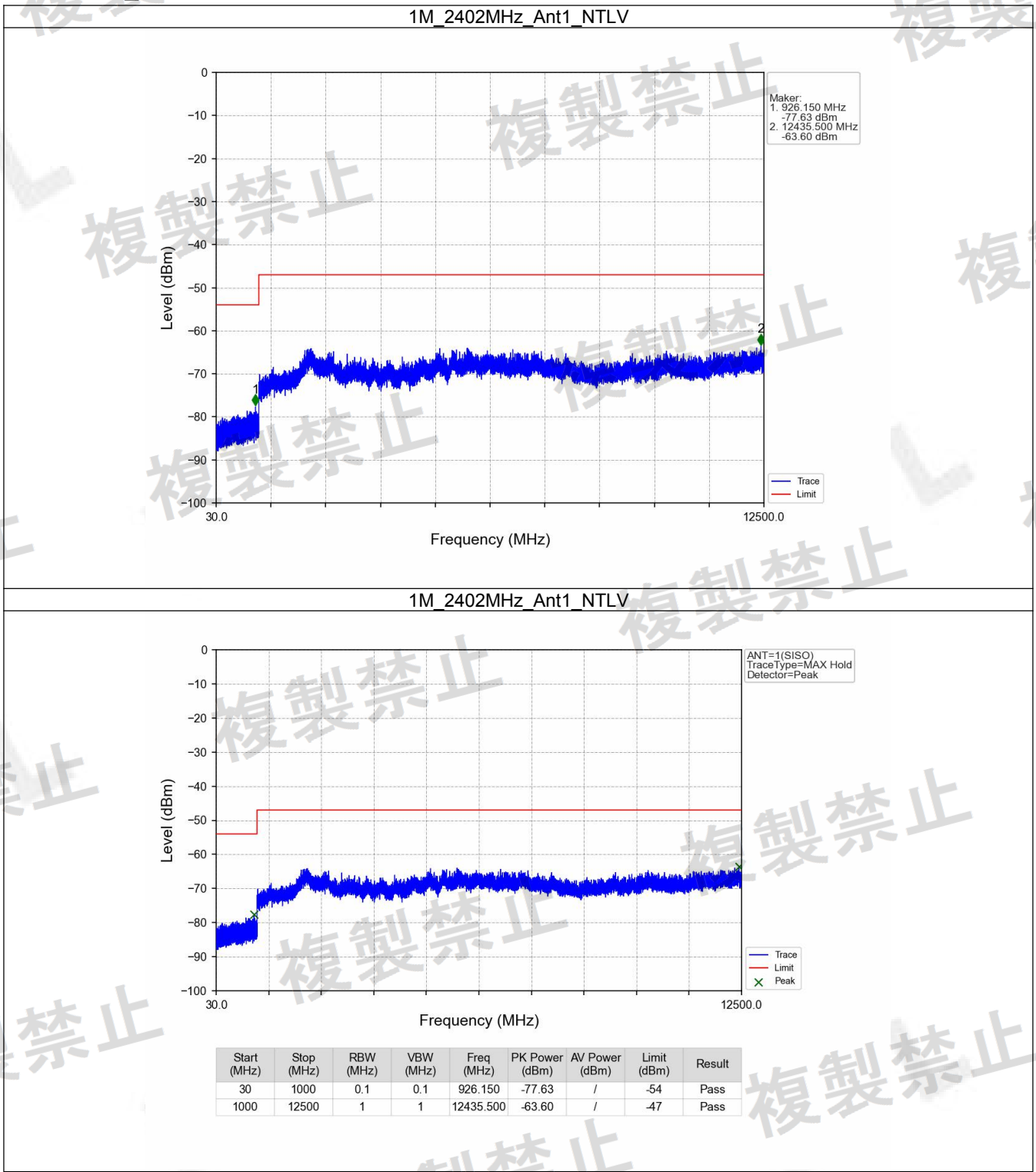


MIC: 219-269106

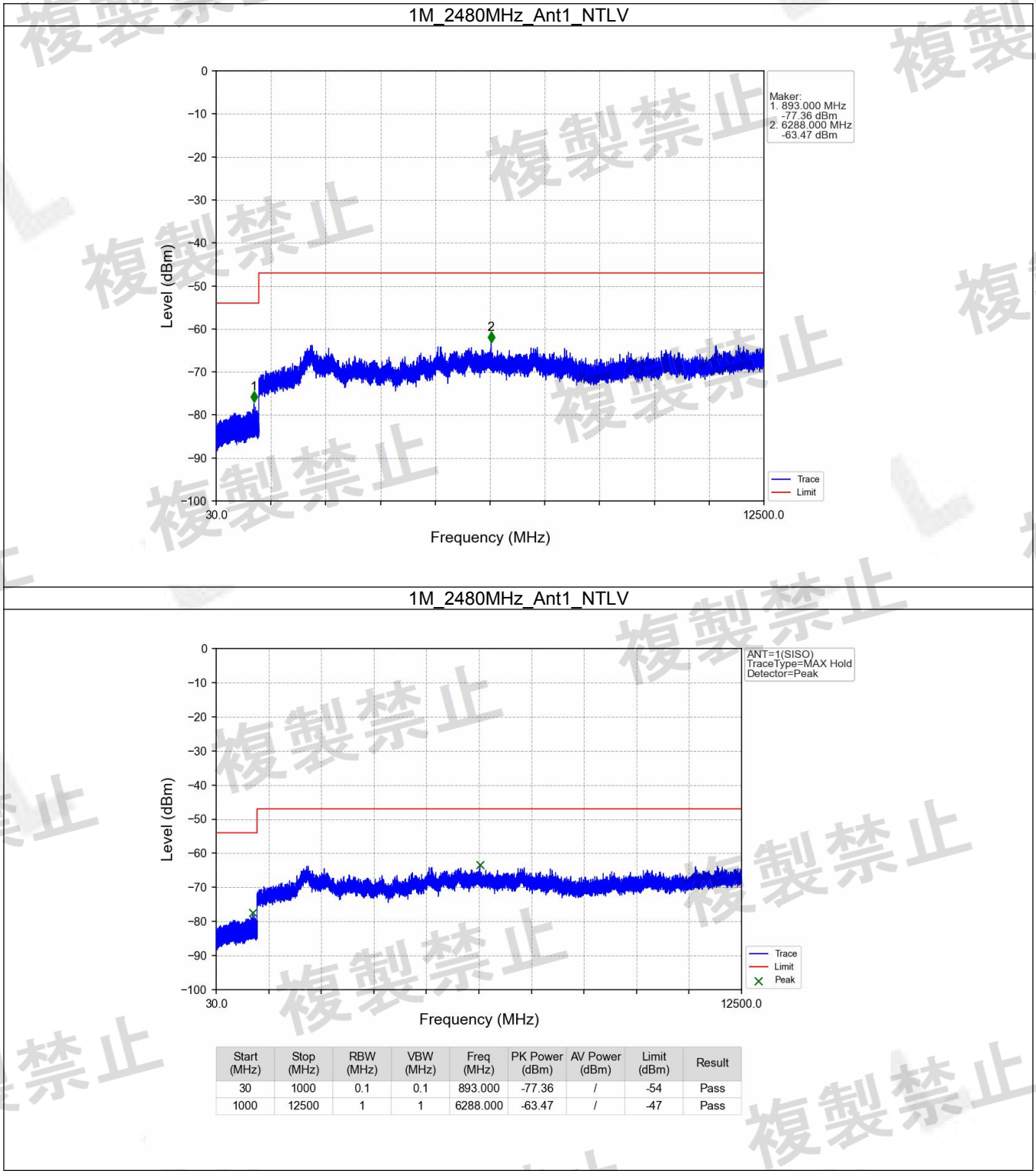


MIC: 219-269106

5.2.2 RxSe_NTLV

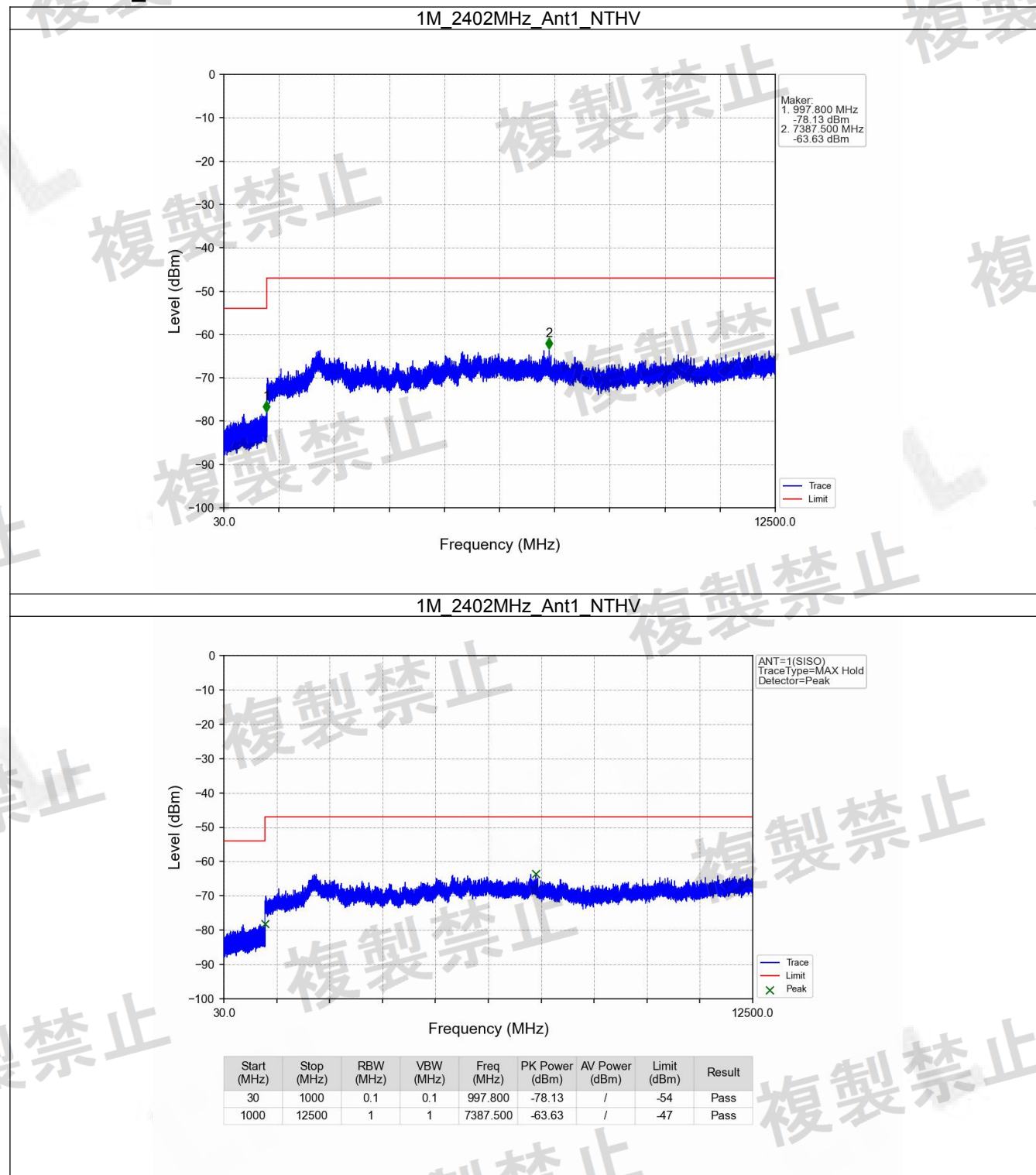


MIC: 219-269106



MIC: 219-269106

5.2.3 RxSe_NTHV



MIC: 219-269106

