



Shenzhen CTL Testing Technology Co., Ltd.

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Annex for Bluetooth low Energy

Test Report No.: CTL2410233011-MIC

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1. Frequency Error

1.1 Test Result

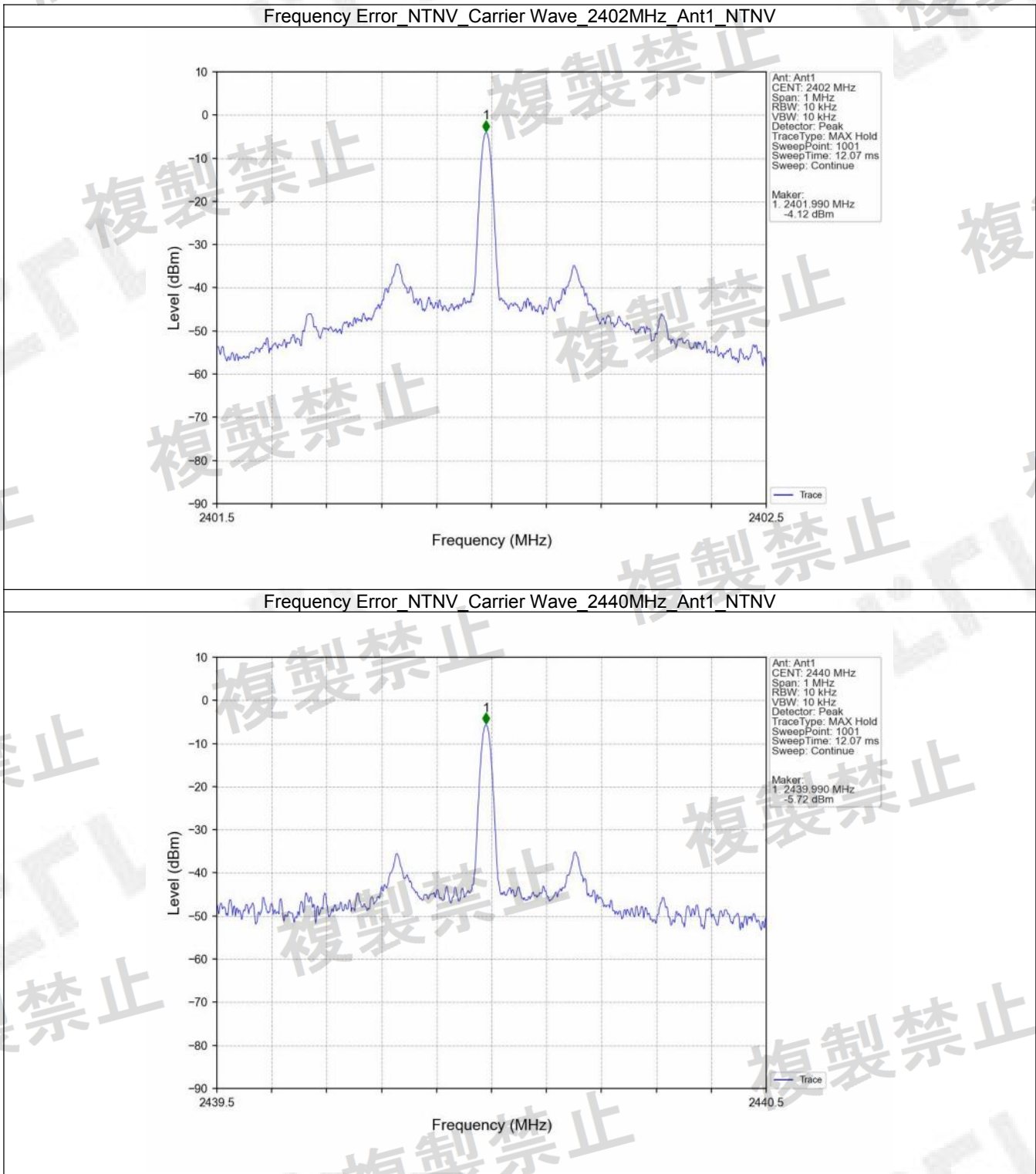
1.1.1 Ant1

Ant1							
ENV	Mode	TX Type	Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)		Verdict
					Result	Limit	
NTNV	Carrier Wave	SISO	2402	2401.990	-4.16	-50 to 50	Pass
			2440	2439.990	-4.10	-50 to 50	Pass
			2480	2479.990	-4.03	-50 to 50	Pass
NTLV	Carrier Wave	SISO	2402	2401.990	-4.16	-50 to 50	Pass
			2440	2439.990	-4.10	-50 to 50	Pass
			2480	2479.990	-4.03	-50 to 50	Pass
NTHV	Carrier Wave	SISO	2402	2401.990	-4.16	-50 to 50	Pass
			2440	2439.990	-4.10	-50 to 50	Pass
			2480	2479.990	-4.03	-50 to 50	Pass

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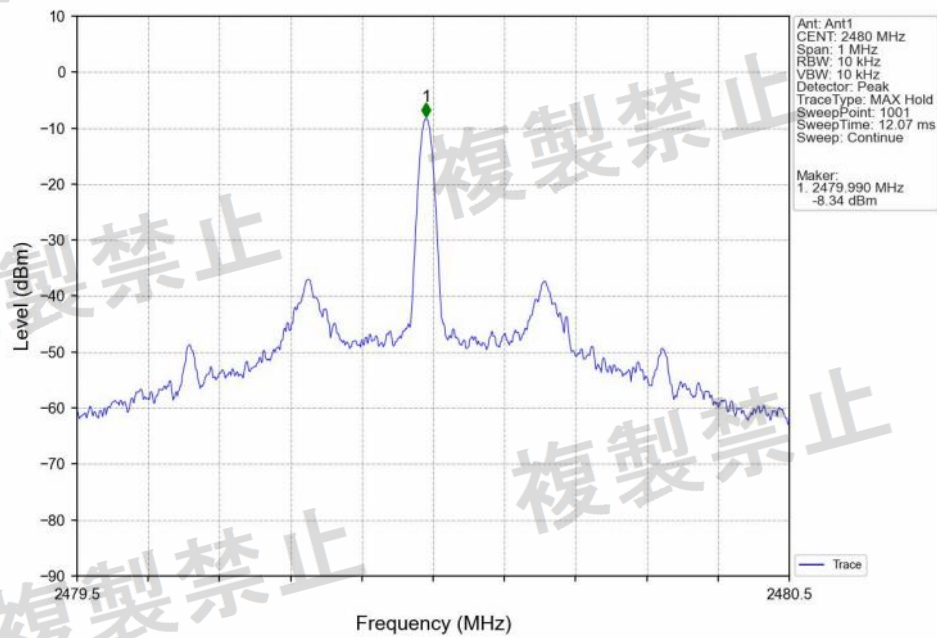
1.2 Test Graph

1.2.1 Ant1

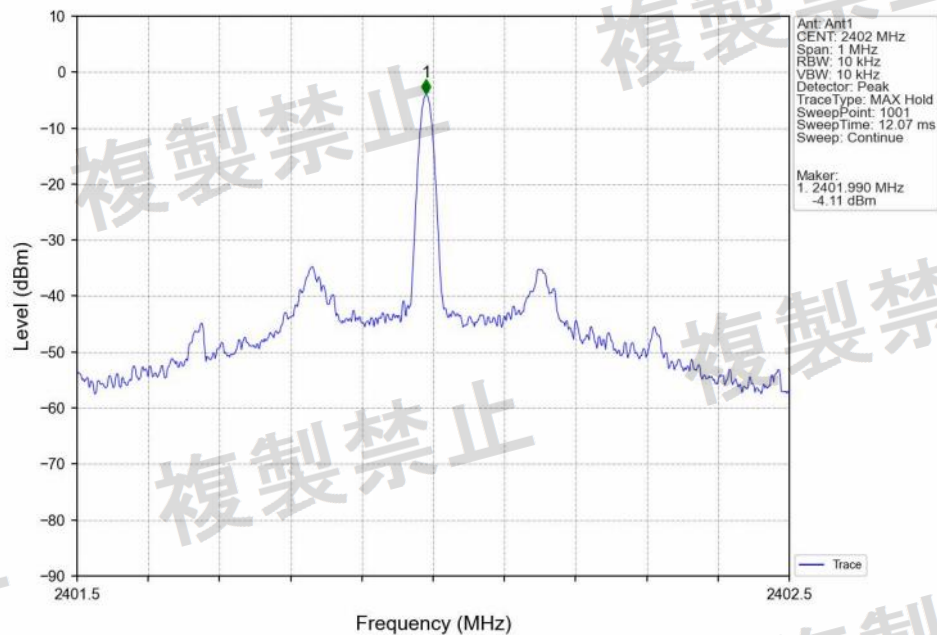


MIC:219-269236

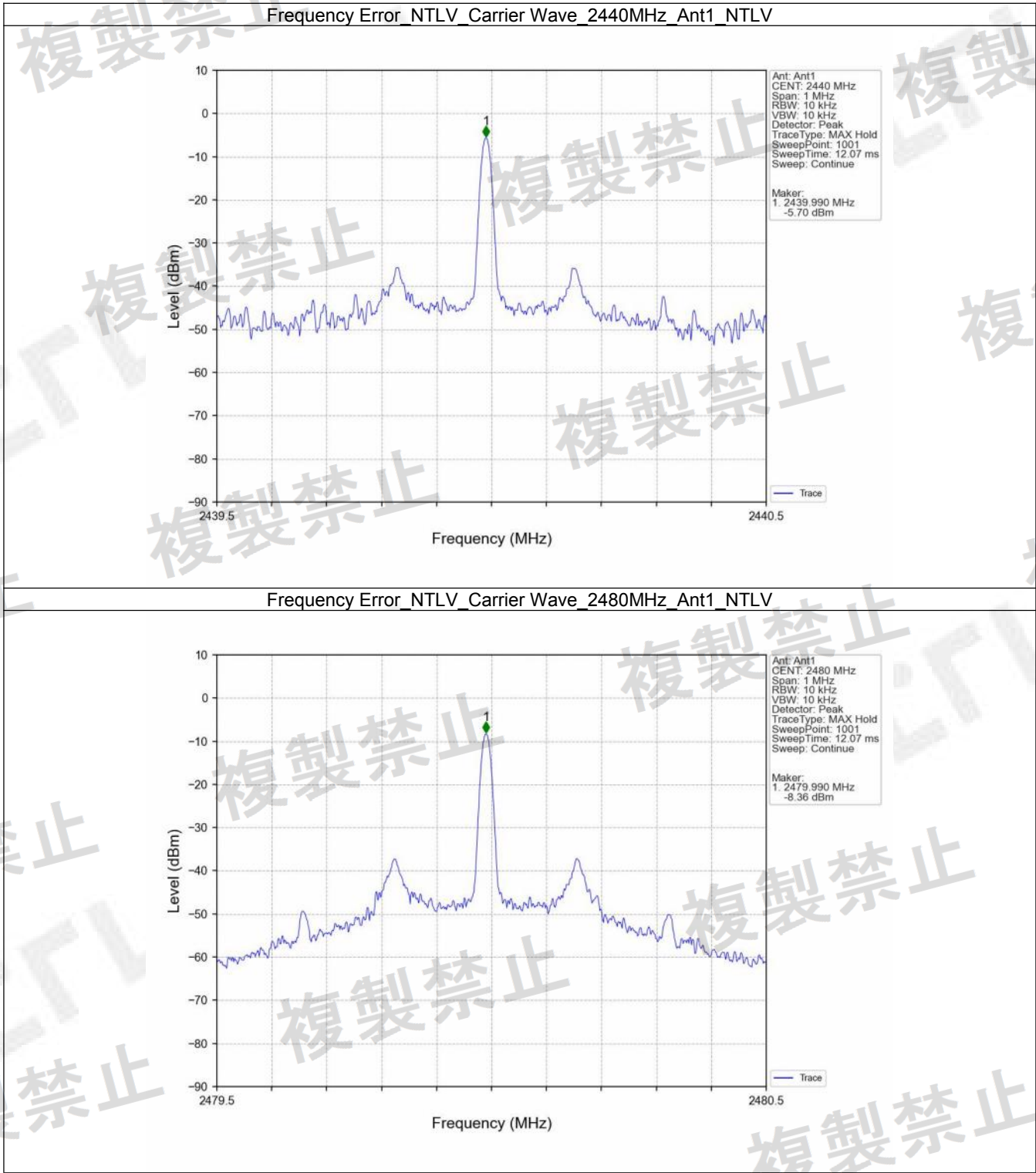
Frequency Error_NTNV_Carrier Wave_2480MHz_Ant1_NTNV



Frequency Error_NTLV_Carrier Wave_2402MHz_Ant1_NTLV

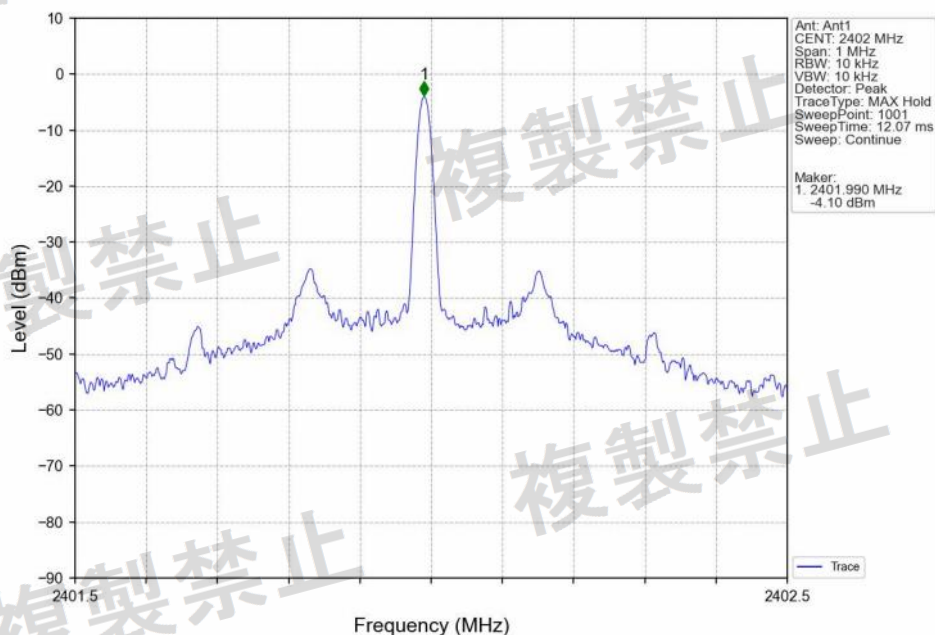


MIC:219-269236

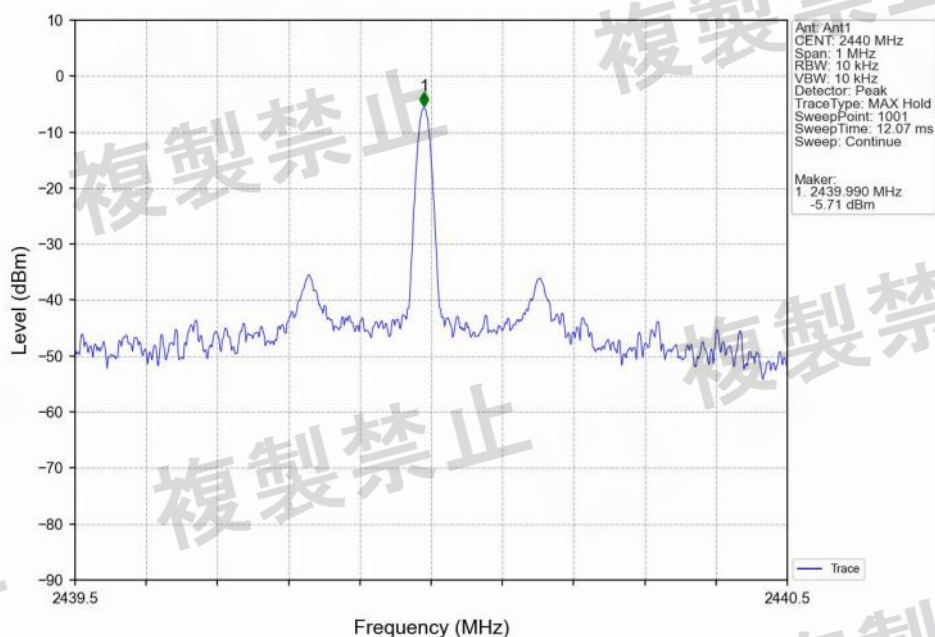


MIC:219-269236

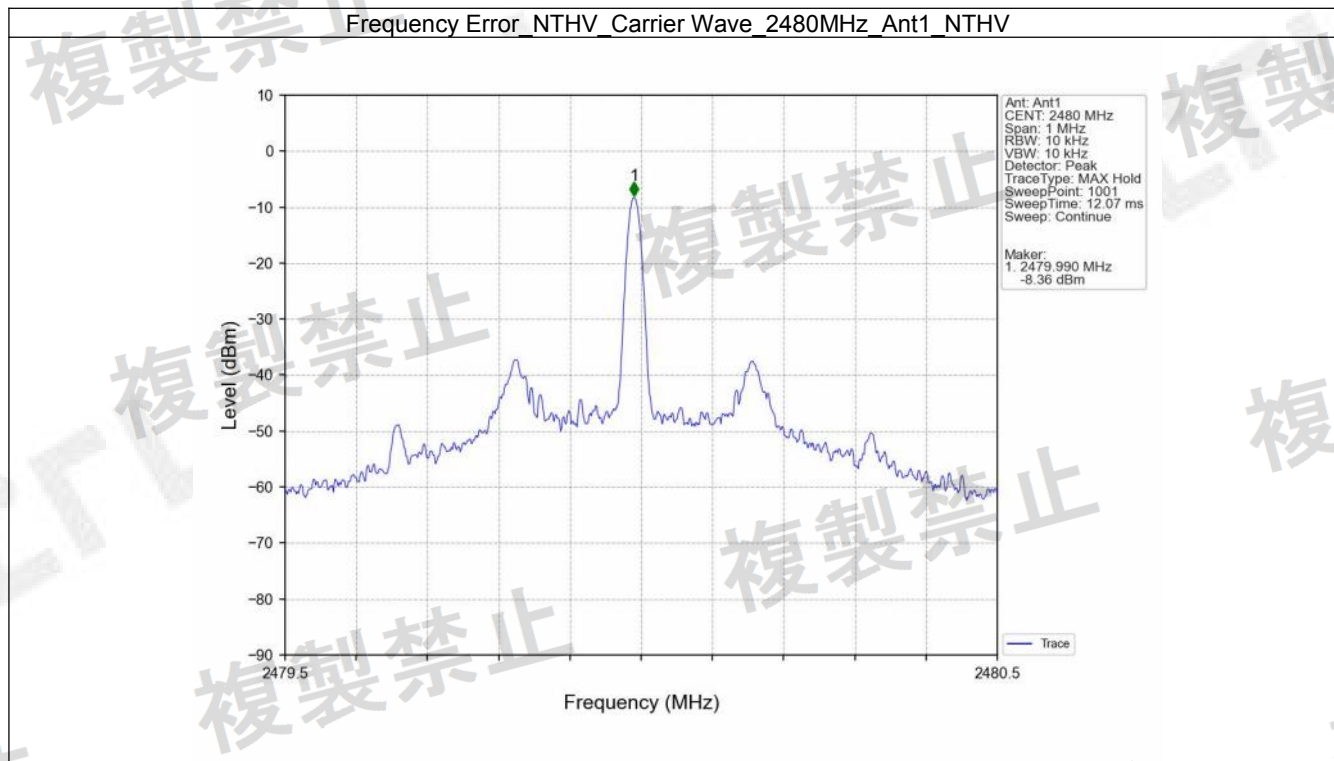
Frequency Error_NTHV_Carrier Wave_2402MHz_Ant1_NTHV



Frequency Error_NTHV_Carrier Wave_2440MHz_Ant1_NTHV



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2. Occupied Bandwidth

2.1 Test Result

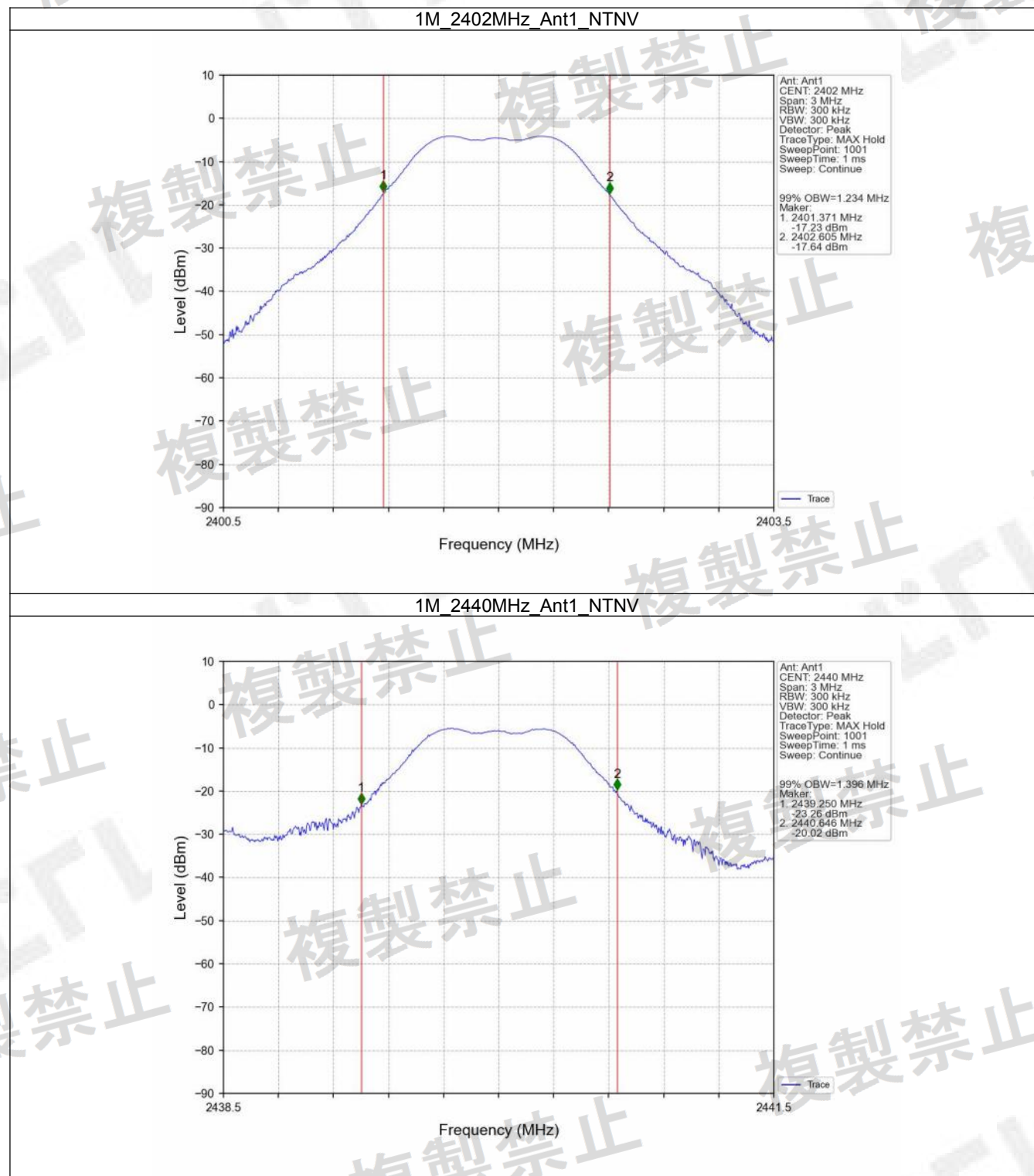
2.1.1 OBW

ENV	Mode	TX Type	Frequency (MHz)	99% Occupied Bandwidth (MHz)		Verdict
				ANT1	Limit	
NTNV	1M	SISO	2402	1.234	<=26	Pass
			2440	1.396	<=26	Pass
			2480	1.285	<=26	Pass
NTLV	1M	SISO	2402	1.234	<=26	Pass
			2440	1.376	<=26	Pass
			2480	1.287	<=26	Pass
NTHV	1M	SISO	2402	1.235	<=26	Pass
			2440	1.375	<=26	Pass
			2480	1.287	<=26	Pass

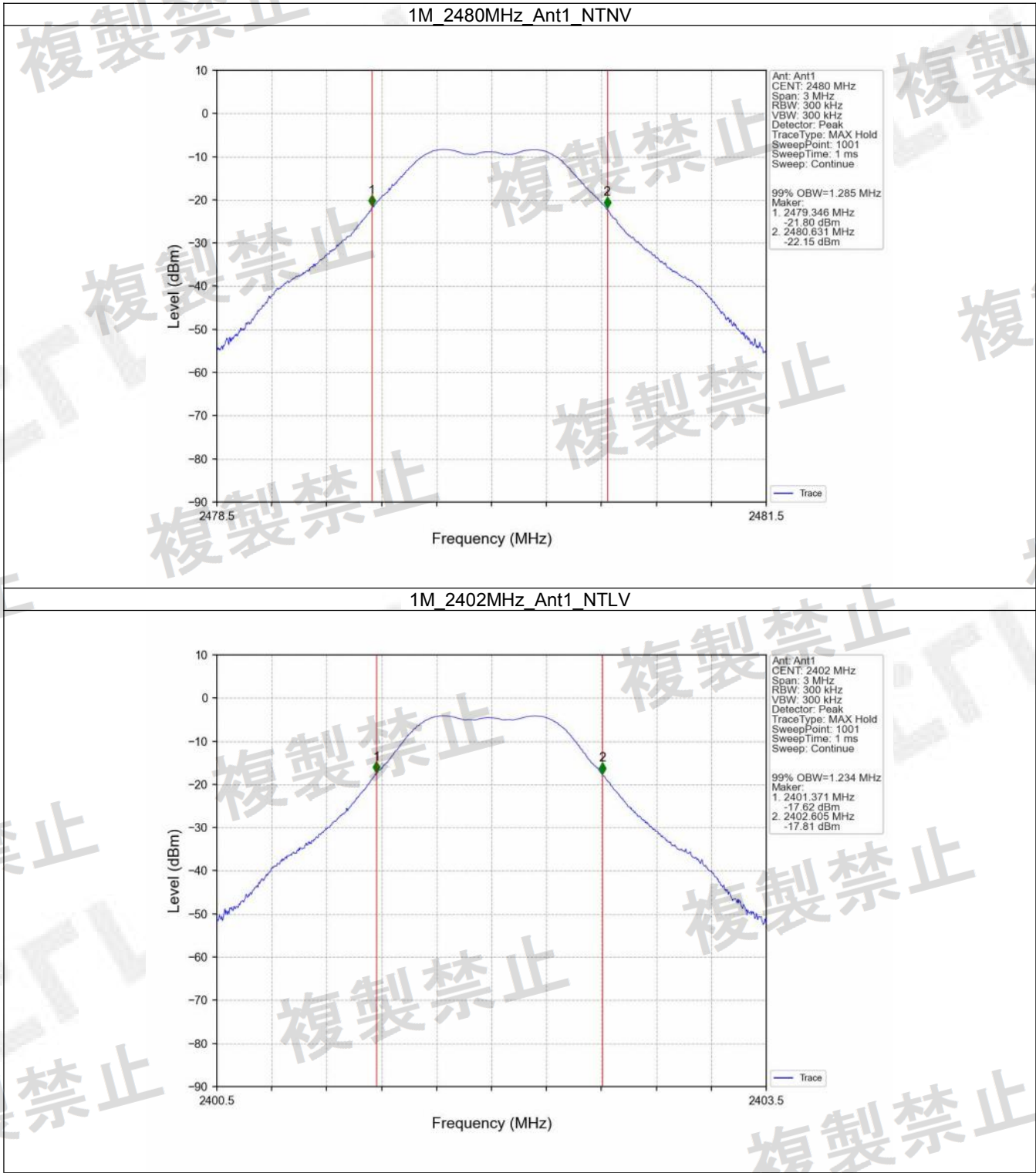
MIC:219-269236

2.2 Test Graph

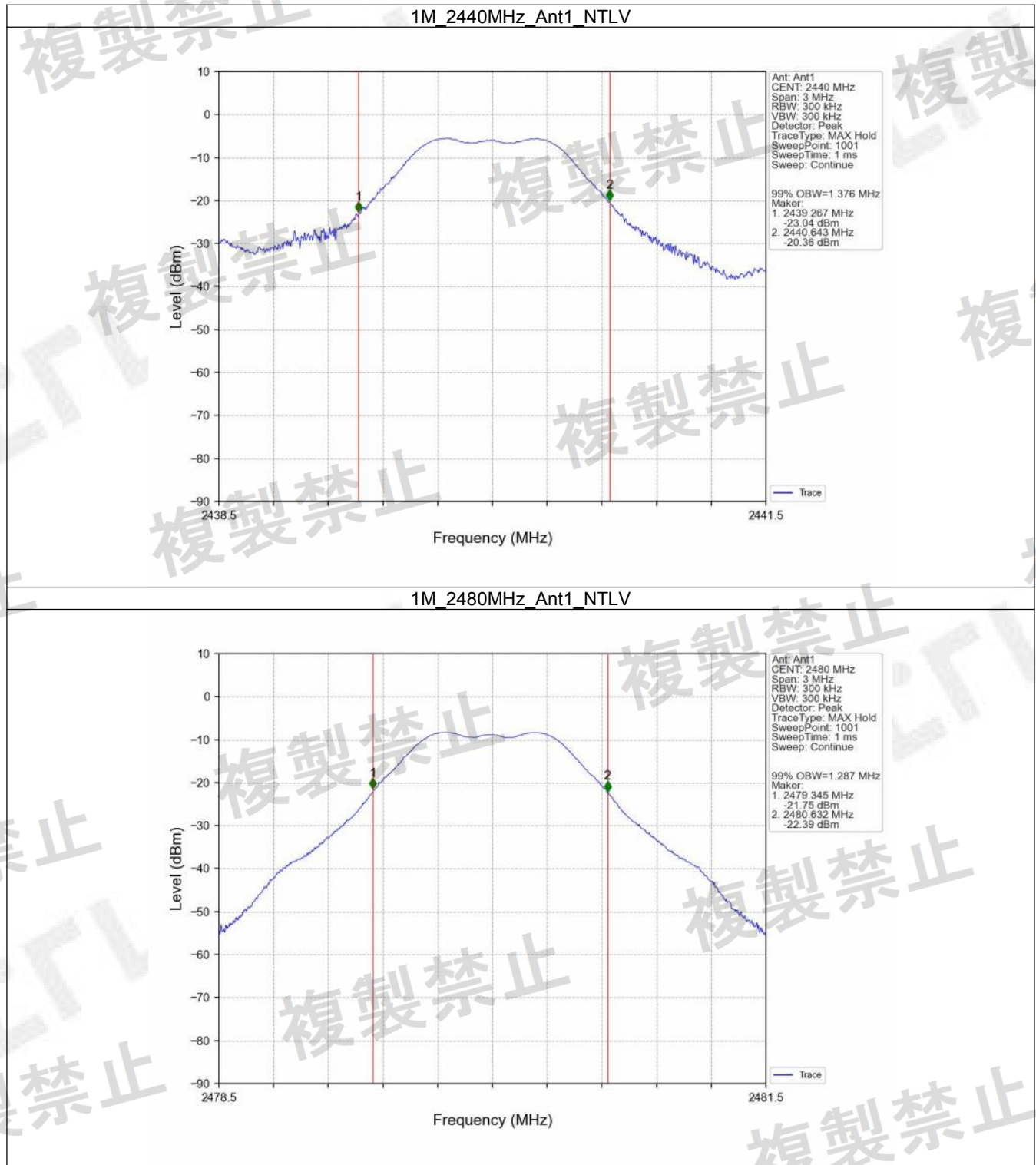
2.2.1 OBW



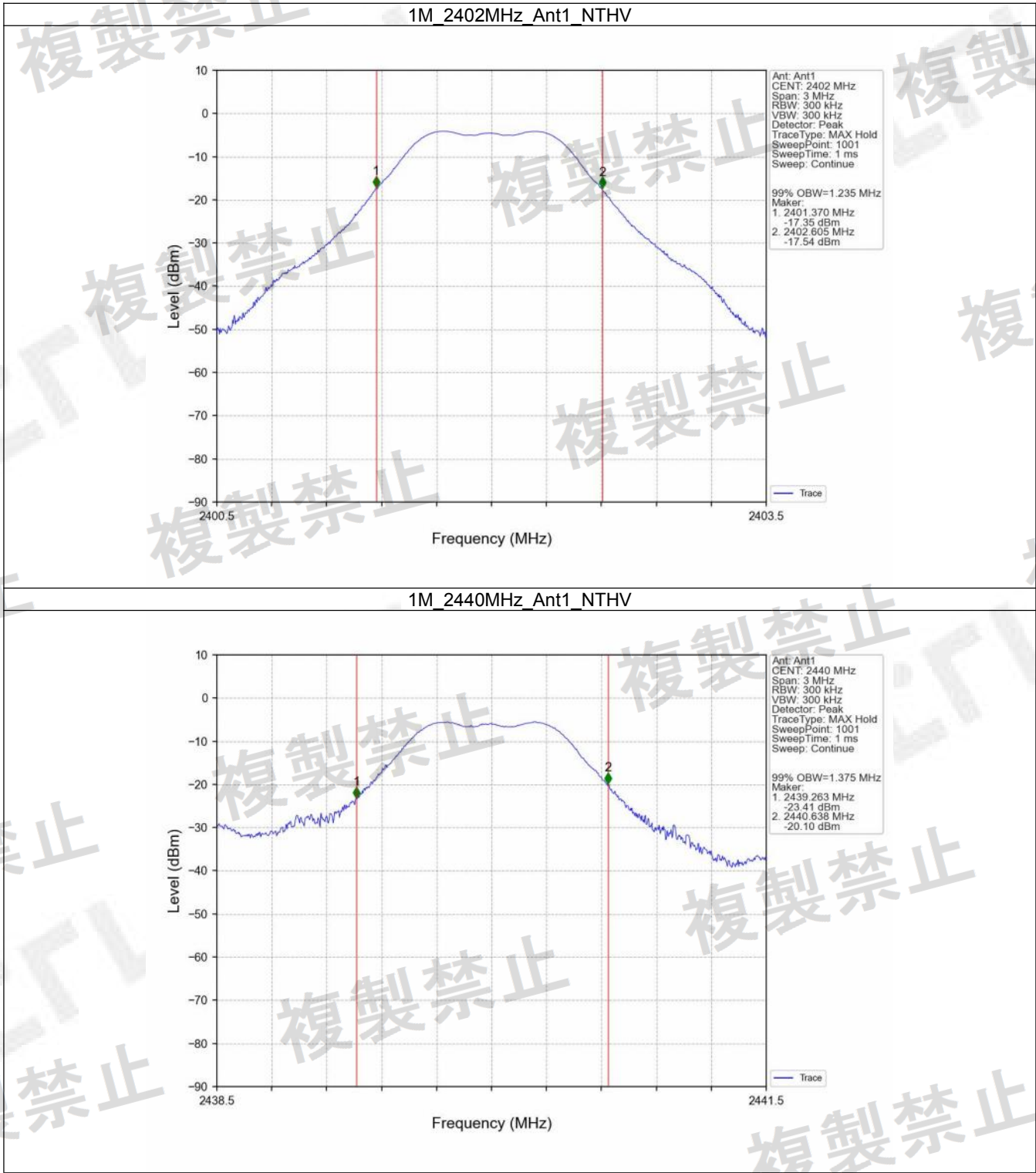
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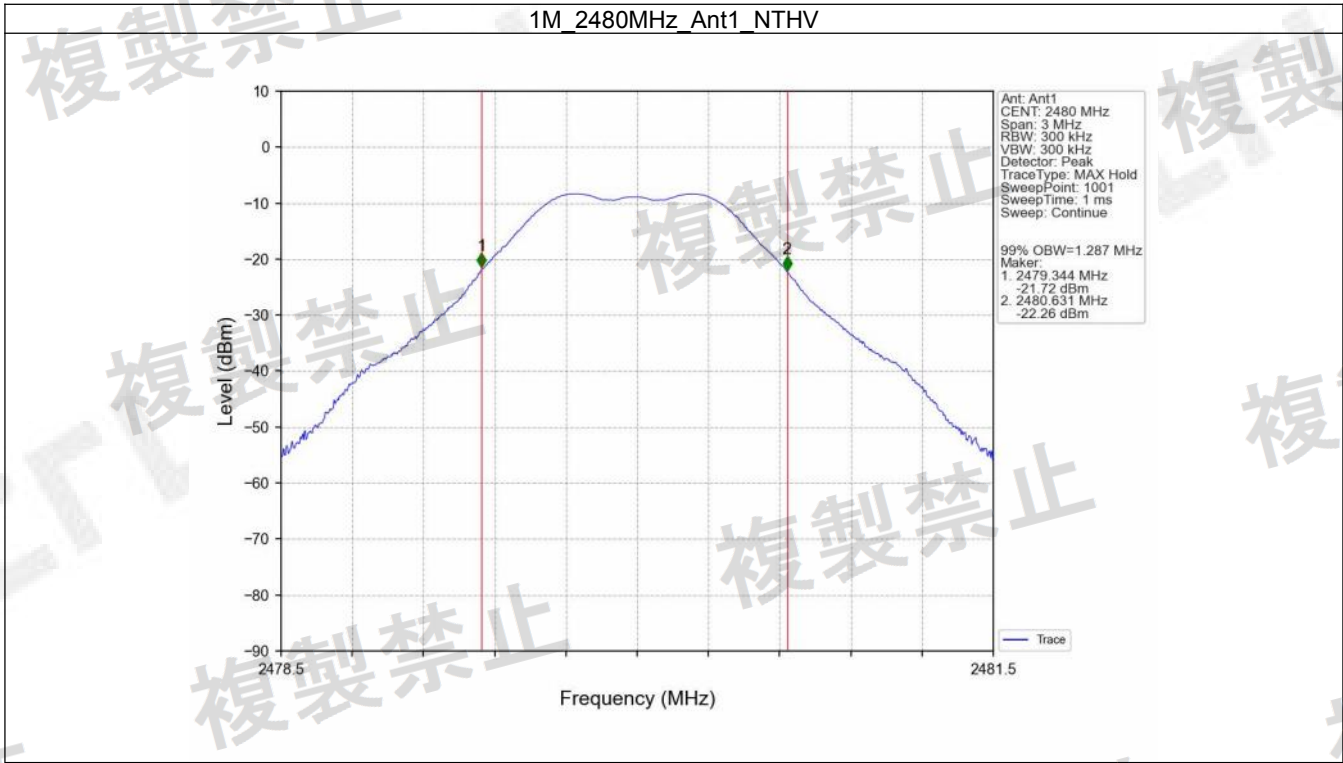
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3. Antenna Power

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	0.362	<=10.00	0.360	0.56	20%	Pass
			2440	1	0.248	<=10.00	0.360	-31.11	20%	Pass
			2480	1	0.134	<=10.00	0.360	-62.78	20%	Pass
NTLV	1M	SISO	2402	1	0.359	<=10.00	0.360	-0.28	20%	Pass
			2440	1	0.244	<=10.00	0.360	-32.22	20%	Pass
			2480	1	0.137	<=10.00	0.360	-61.94	20%	Pass
NTHV	1M	SISO	2402	1	0.357	<=10.00	0.360	-0.83	20%	Pass
			2440	1	0.248	<=10.00	0.360	-31.11	20%	Pass
			2480	1	0.135	<=10.00	0.360	-62.50	20%	Pass

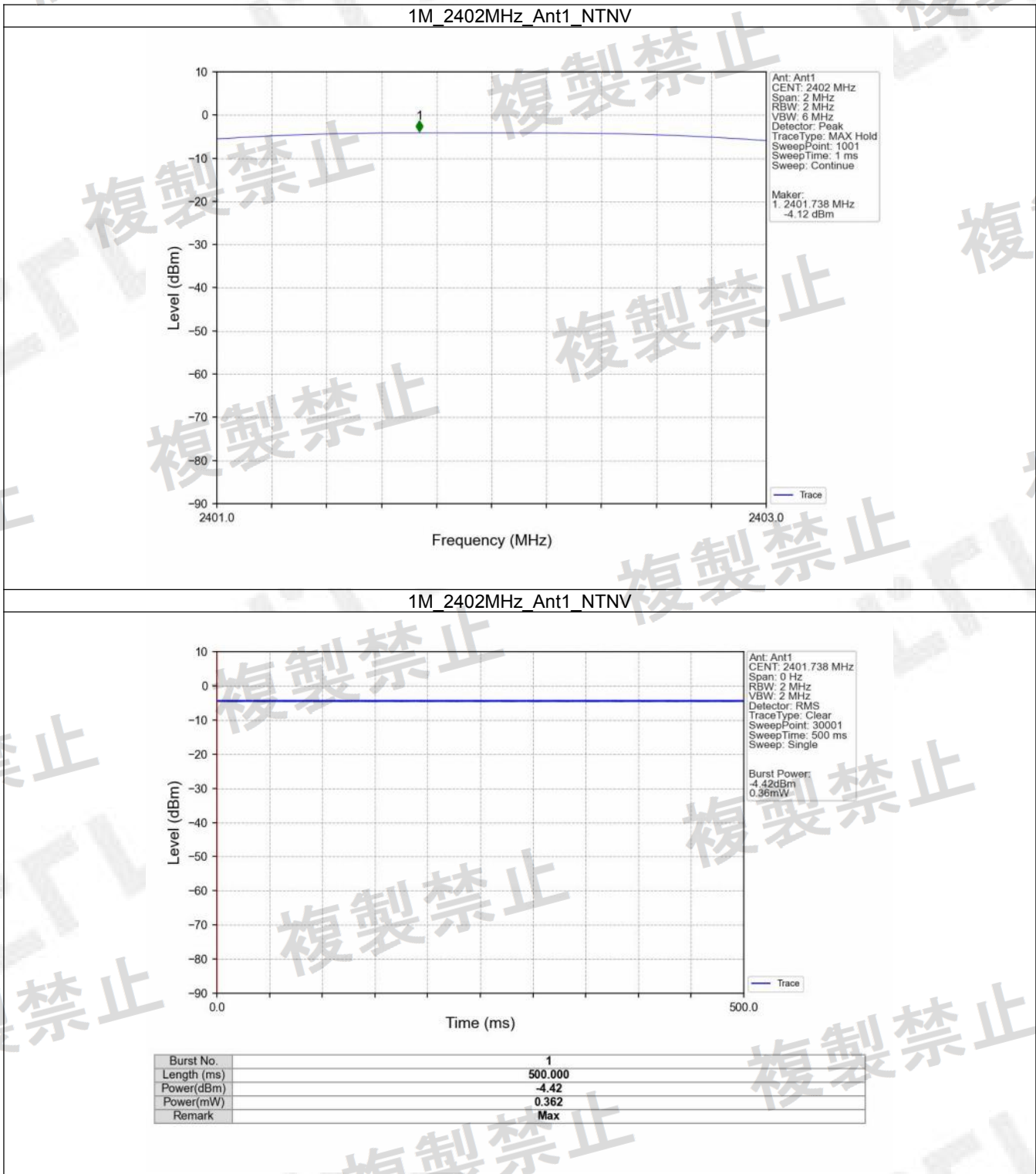
3.1.2 EIRP

ENV	Mode	TX Type	Frequency (MHz)	ANT	Gain (dBi)	EIRP (dBm)		Verdict
						Result	Limit	
NTNV	1M	SISO	2402	1	1.72	-2.70	12.14	Pass
			2440	1	1.72	-4.34	12.14	Pass
			2480	1	1.72	-7.01	12.14	Pass
NTLV	1M	SISO	2402	1	1.72	-2.73	12.14	Pass
			2440	1	1.72	-4.41	12.14	Pass
			2480	1	1.72	-6.91	12.14	Pass
NTHV	1M	SISO	2402	1	1.72	-2.76	12.14	Pass
			2440	1	1.72	-4.34	12.14	Pass
			2480	1	1.72	-6.97	12.14	Pass

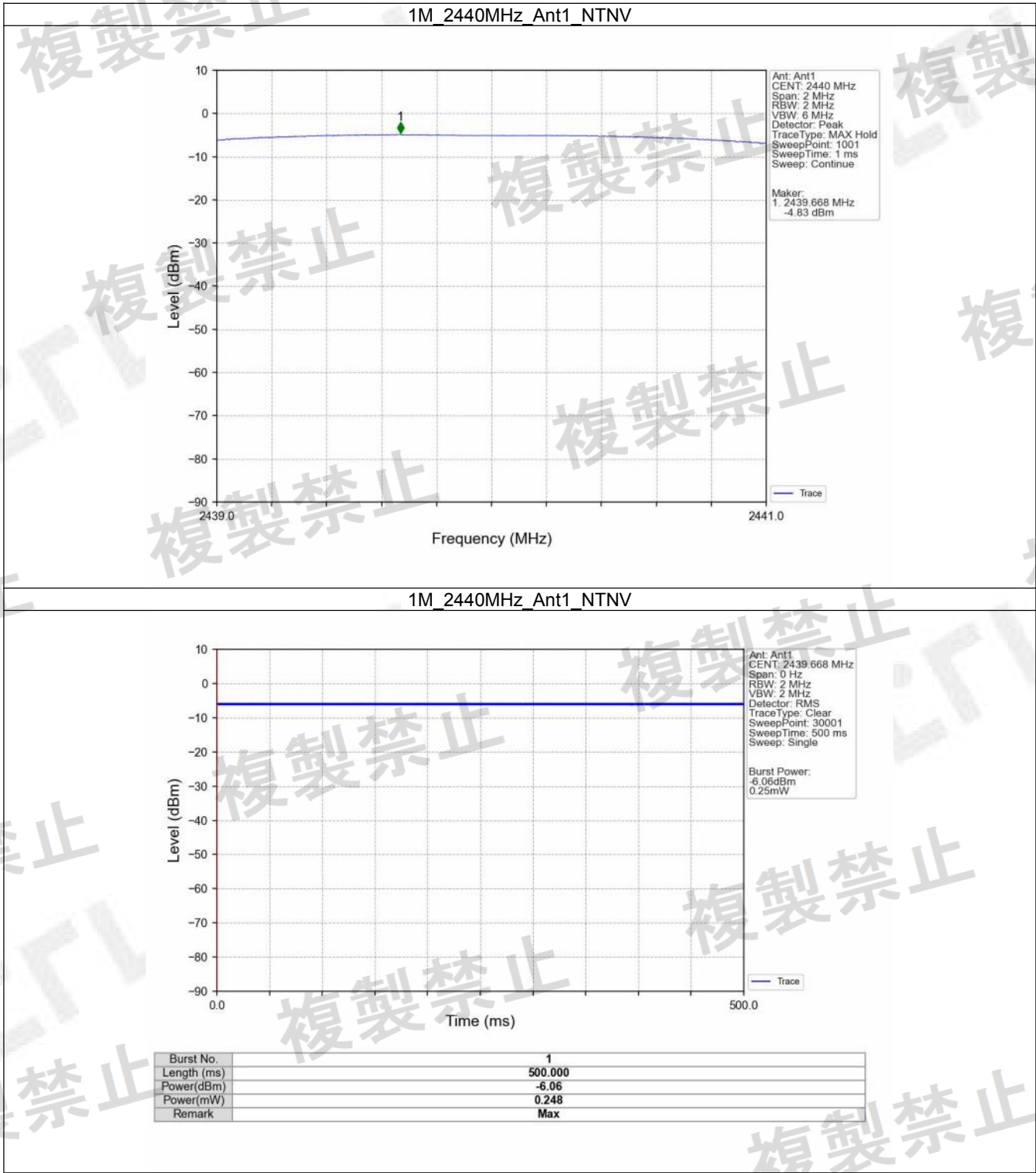
MIC:219-269236

3.2 Test Graph

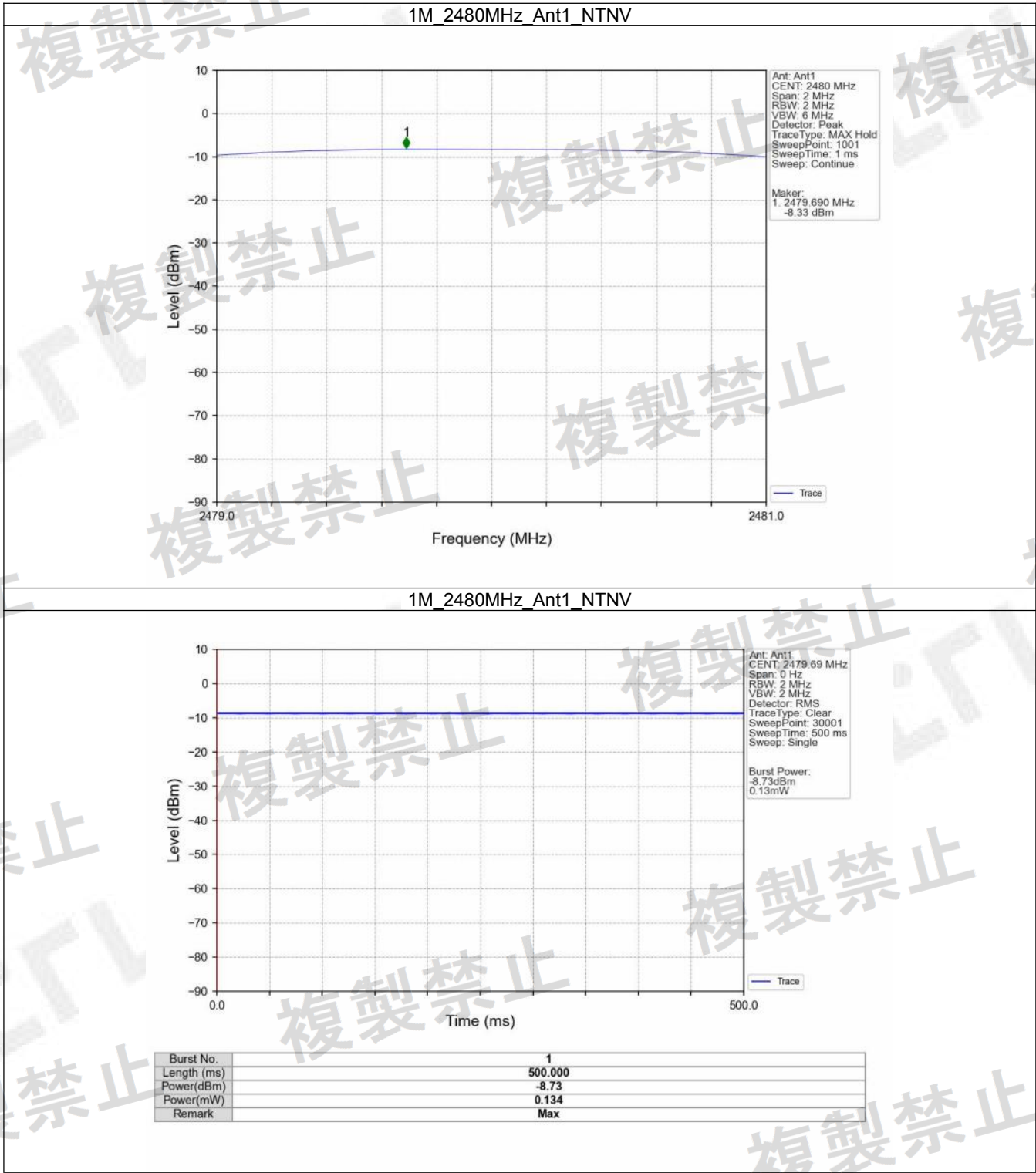
3.2.1 Power



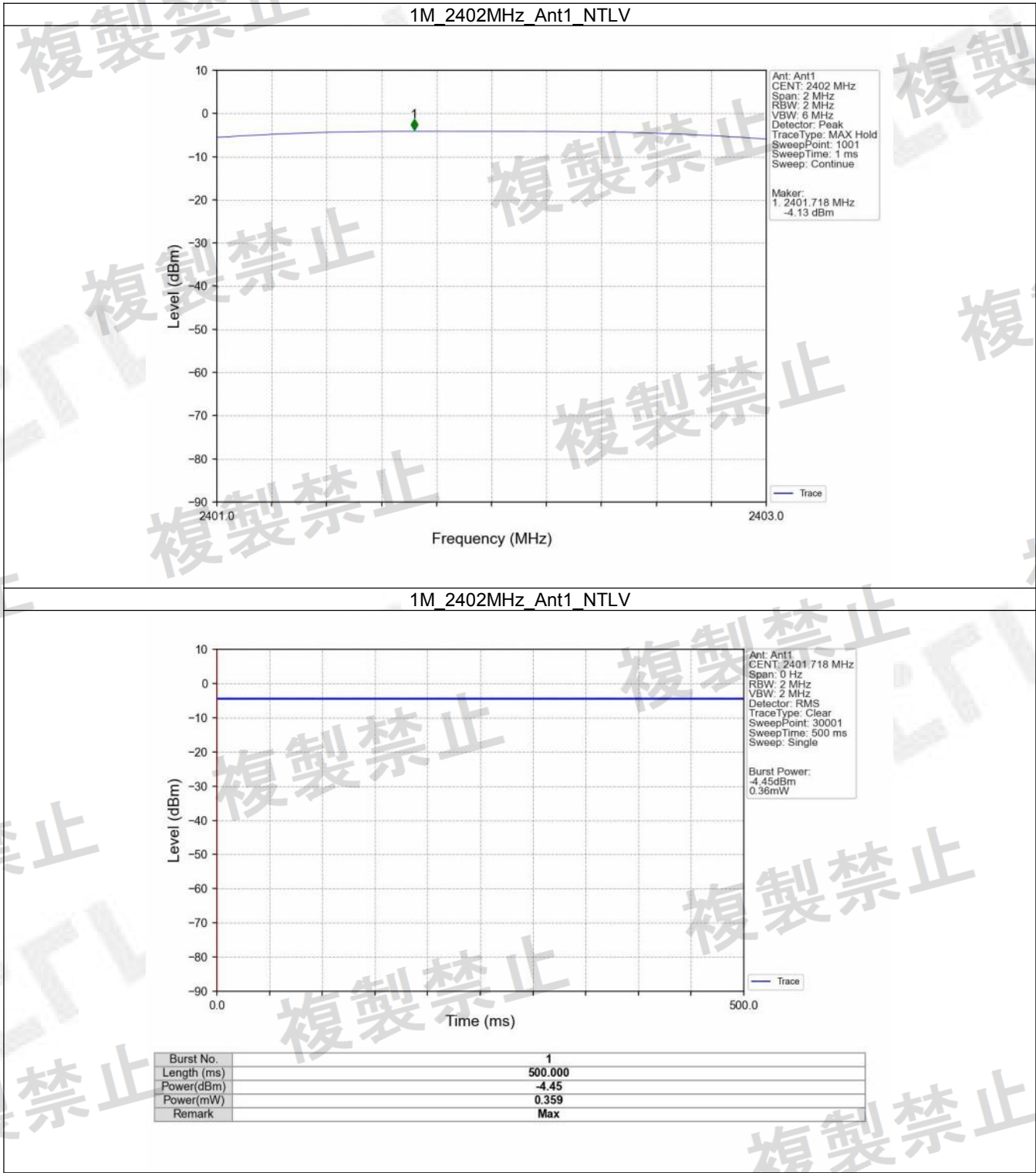
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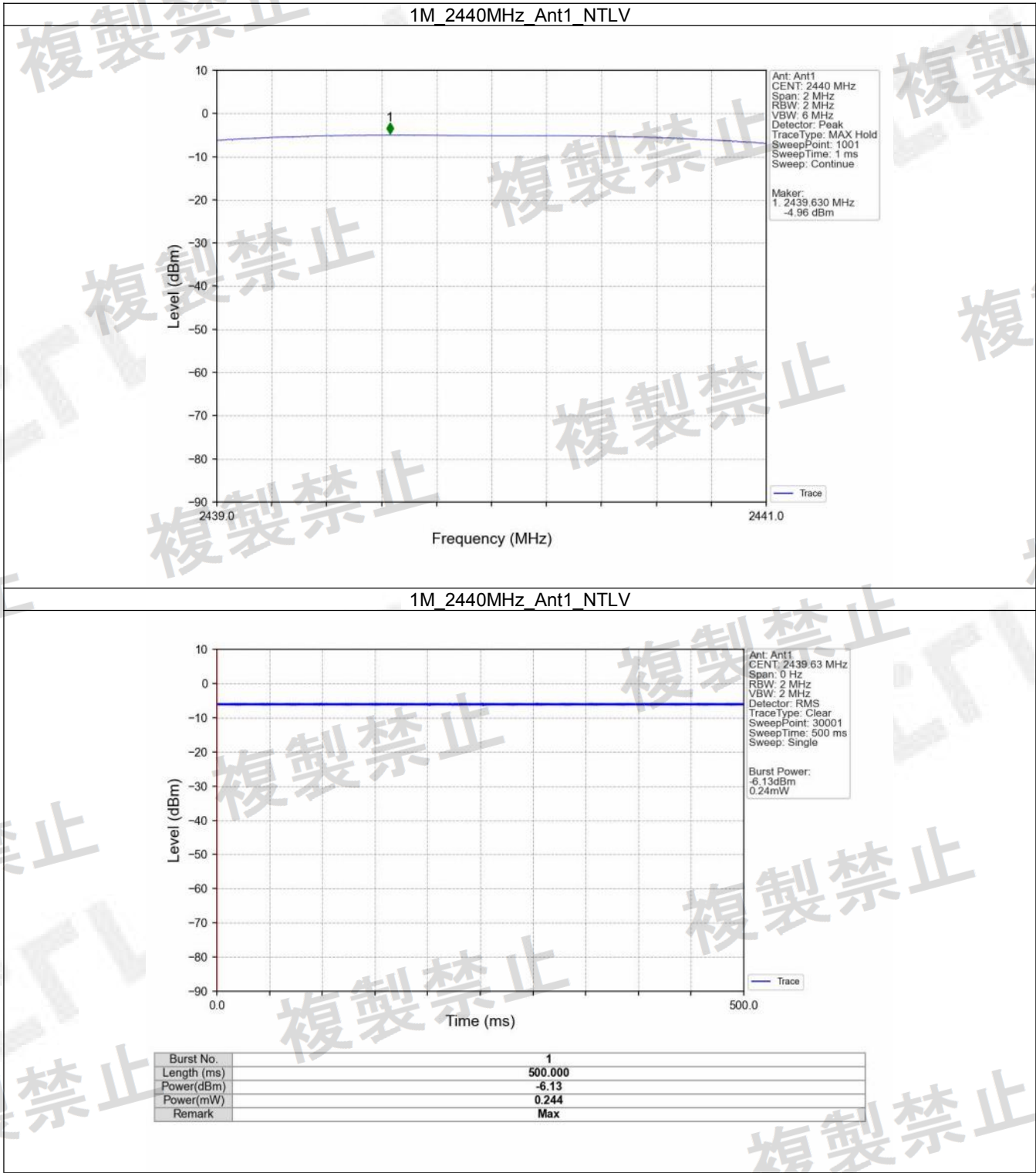
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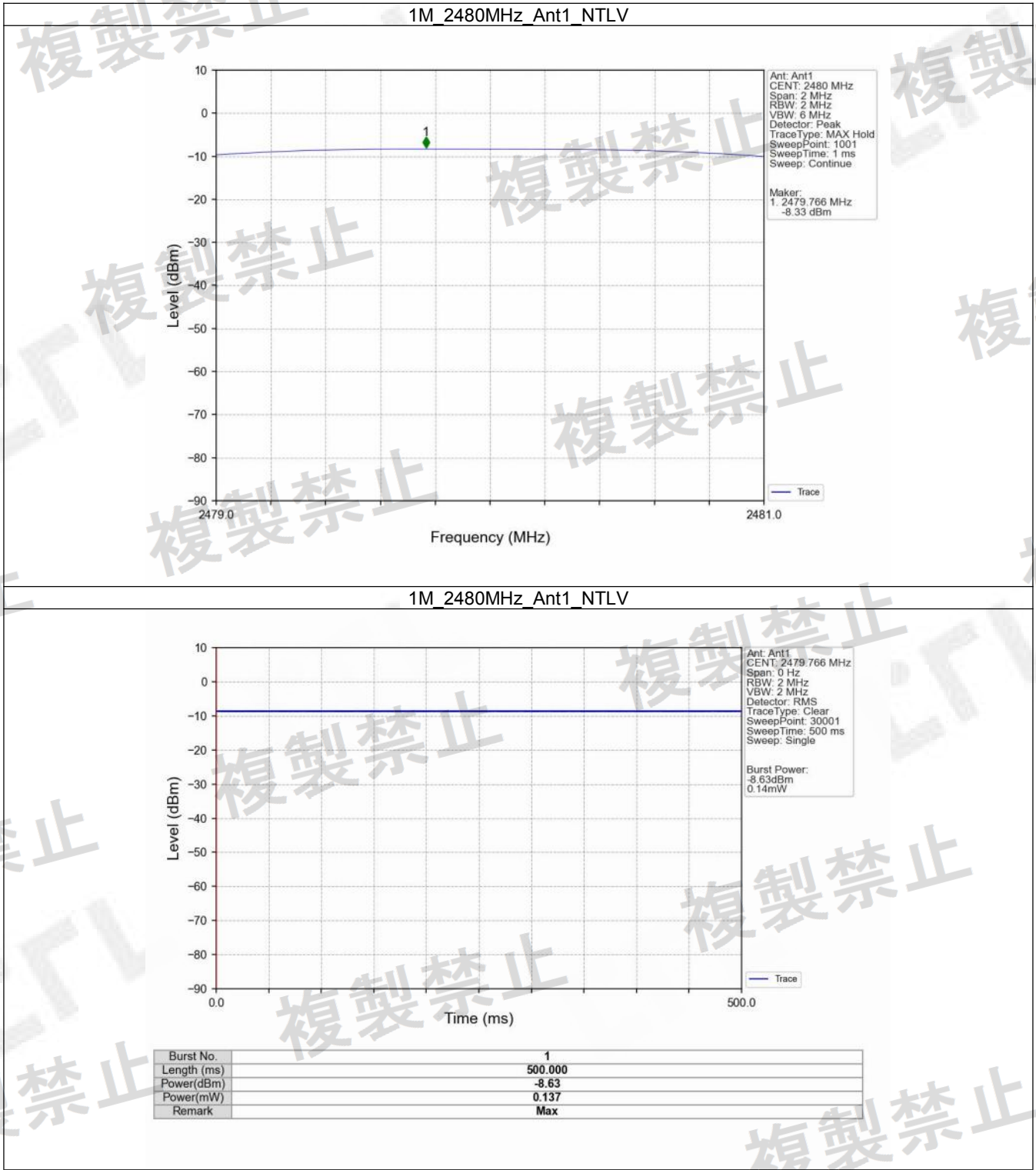
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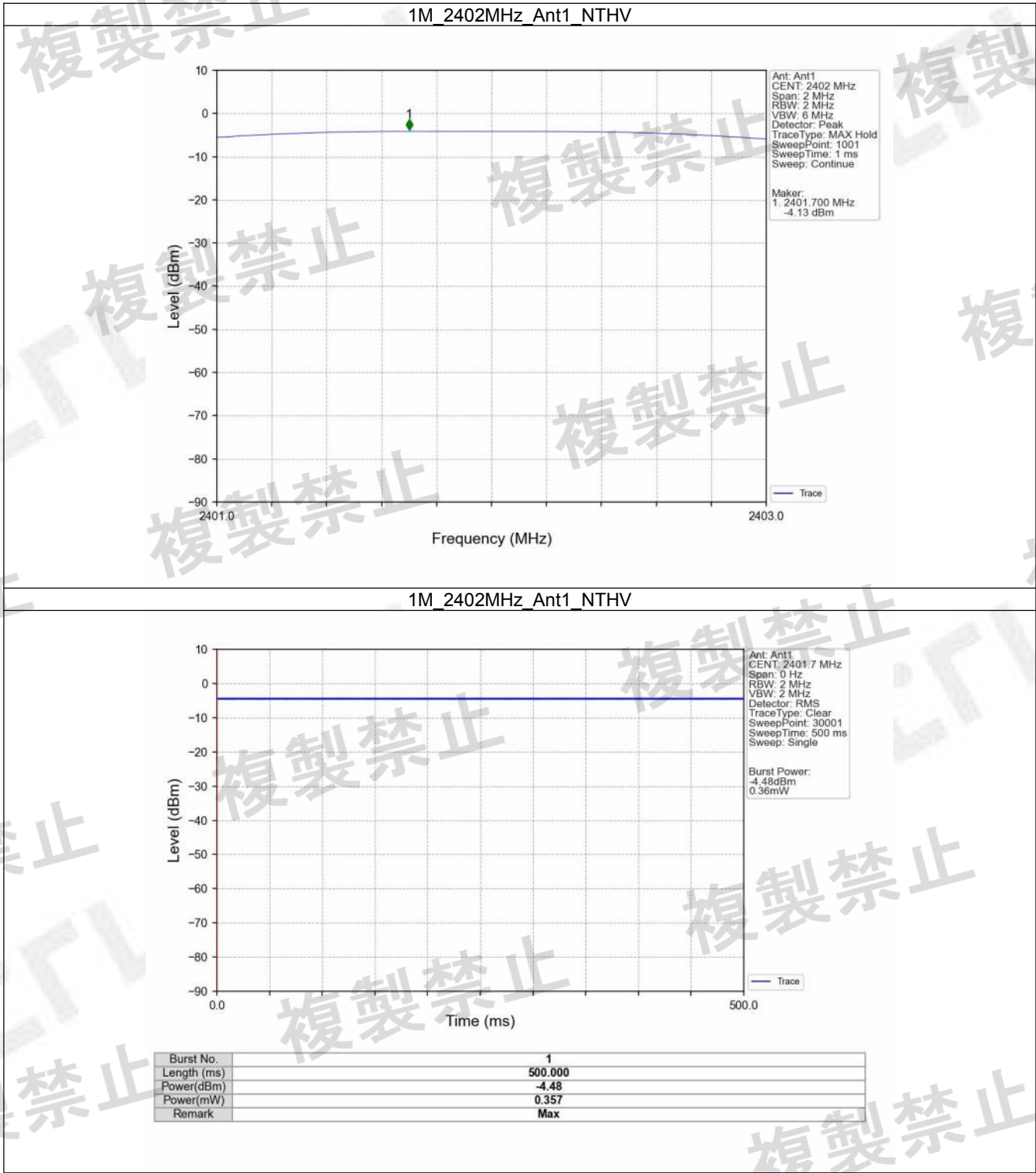
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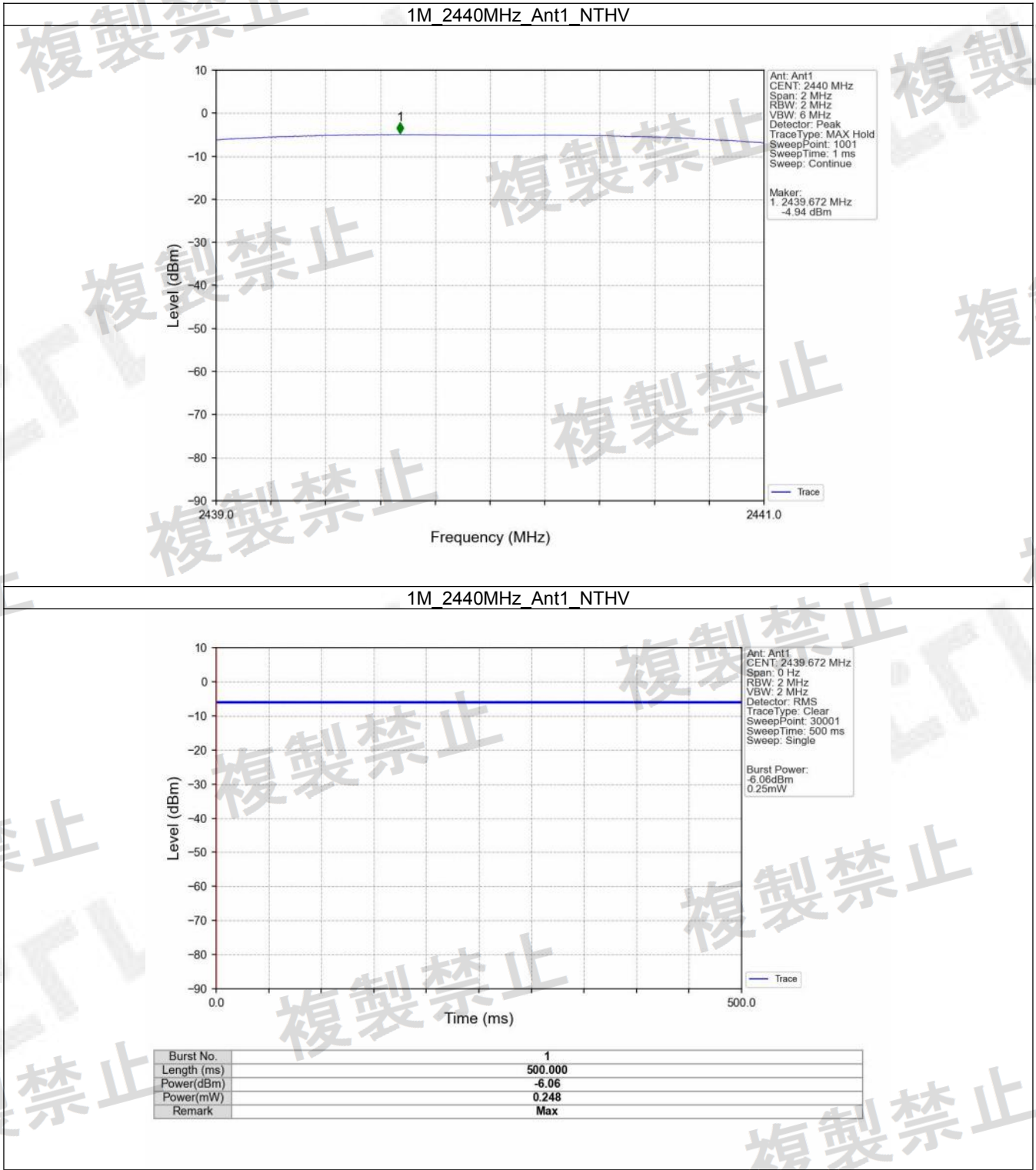
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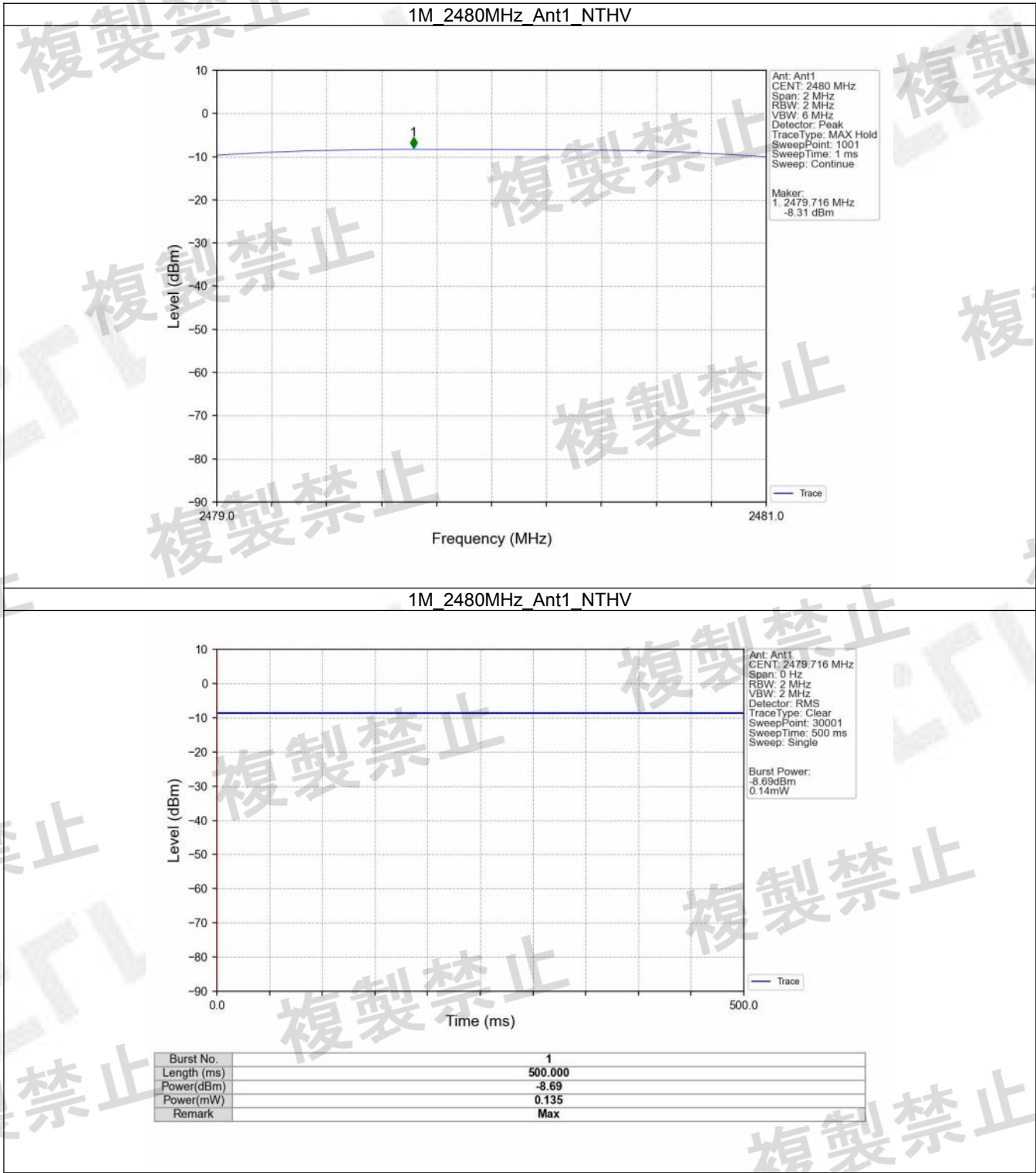
MIC:219-269236



MIC:219-269236



MIC:219-269236



MIC:219-269236

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	2367	-53.83	0.004	/	/	2.5	Pass
				2387	2400	2399.987	-39.95	0.101	/	/	25	Pass
				2483.5	2496.5	2486.633	-64.78	0.000	/	/	25	Pass
				2496.5	12500	7207.5	-45.69	0.027	/	/	2.5	Pass
		2440	1	30	2387	1924	-27.00	1.995	-33.85	0.412	2.5	Pass
				2387	2400	2388.768	-64.46	0.000	/	/	25	Pass
				2483.5	2496.5	2484.423	-64.65	0.000	/	/	25	Pass
				2496.5	12500	5749.5	-44.45	0.036	/	/	2.5	Pass
		2480	1	30	2387	2035	-15.03	31.405	-29.47	1.130	2.5	Pass
				2387	2400	2398.635	-58.60	0.001	/	/	25	Pass
				2483.5	2496.5	2483.643	-39.93	0.102	/	/	25	Pass
				2496.5	12500	2927	-25.46	2.844	-35.18	0.303	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	2367	-53.26	0.005	/	/	2.5	Pass
				2387	2400	2399.987	-40.42	0.091	/	/	25	Pass
				2483.5	2496.5	2489.857	-64.73	0.000	/	/	25	Pass
				2496.5	12500	7207	-45.78	0.026	/	/	2.5	Pass
		2440	1	30	2387	1939.5	-51.69	0.007	/	/	2.5	Pass
				2387	2400	2396.75	-64.06	0.000	/	/	25	Pass
				2483.5	2496.5	2483.747	-64.89	0.000	/	/	25	Pass
				2496.5	12500	7321.5	-45.46	0.028	/	/	2.5	Pass
		2480	1	30	2387	2035	-15.01	31.550	-29.39	1.151	2.5	Pass
				2387	2400	2393.032	-58.76	0.001	/	/	25	Pass
				2483.5	2496.5	2484.098	-40.29	0.094	/	/	25	Pass
				2496.5	12500	2926	-25.78	2.642	-29.27	1.183	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	2368	-52.49	0.006	/	/	2.5	Pass
				2387	2400	2399.987	-40.15	0.097	/	/	25	Pass
				2483.5	2496.5	2494.004	-65.20	0.000	/	/	25	Pass
				2496.5	12500	7207	-45.88	0.026	/	/	2.5	Pass
		2440	1	30	2387	1939.5	-45.63	0.027	/	/	2.5	Pass

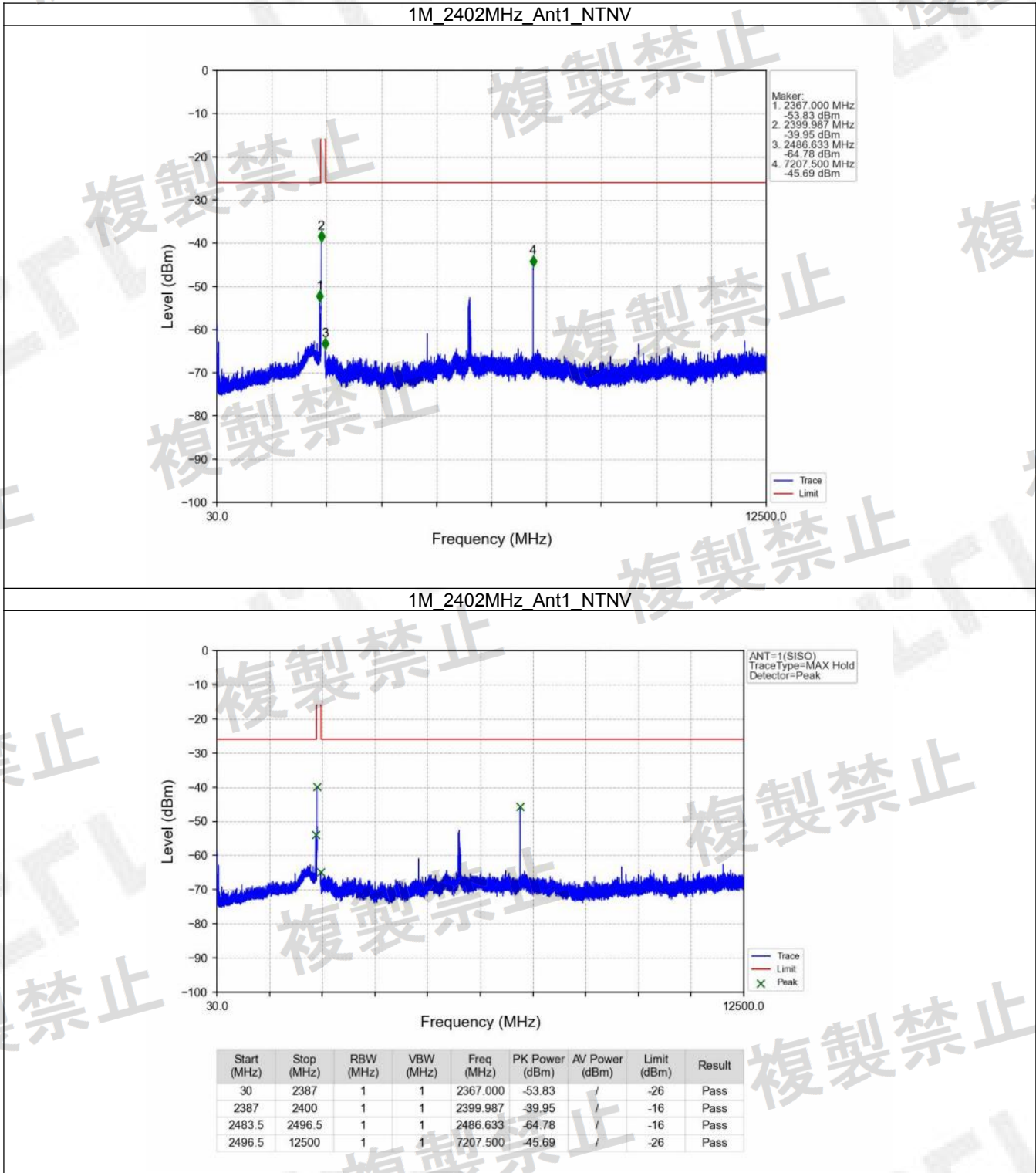
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		2480	1	2387	2400	2399.909	-64.22	0.000	/	/	25	Pass
				2483.5	2496.5	2484.384	-64.78	0.000	/	/	25	Pass
				2496.5	12500	5749	-44.30	0.037	/	/	2.5	Pass
				30	2387	2035	-15.01	31.550	-29.31	1.172	2.5	Pass
				2387	2400	2397.179	-58.02	0.002	/	/	25	Pass
				2483.5	2496.5	2483.617	-39.85	0.104	/	/	25	Pass
				2496.5	12500	2927	-25.56	2.780	-36.15	0.243	2.5	Pass

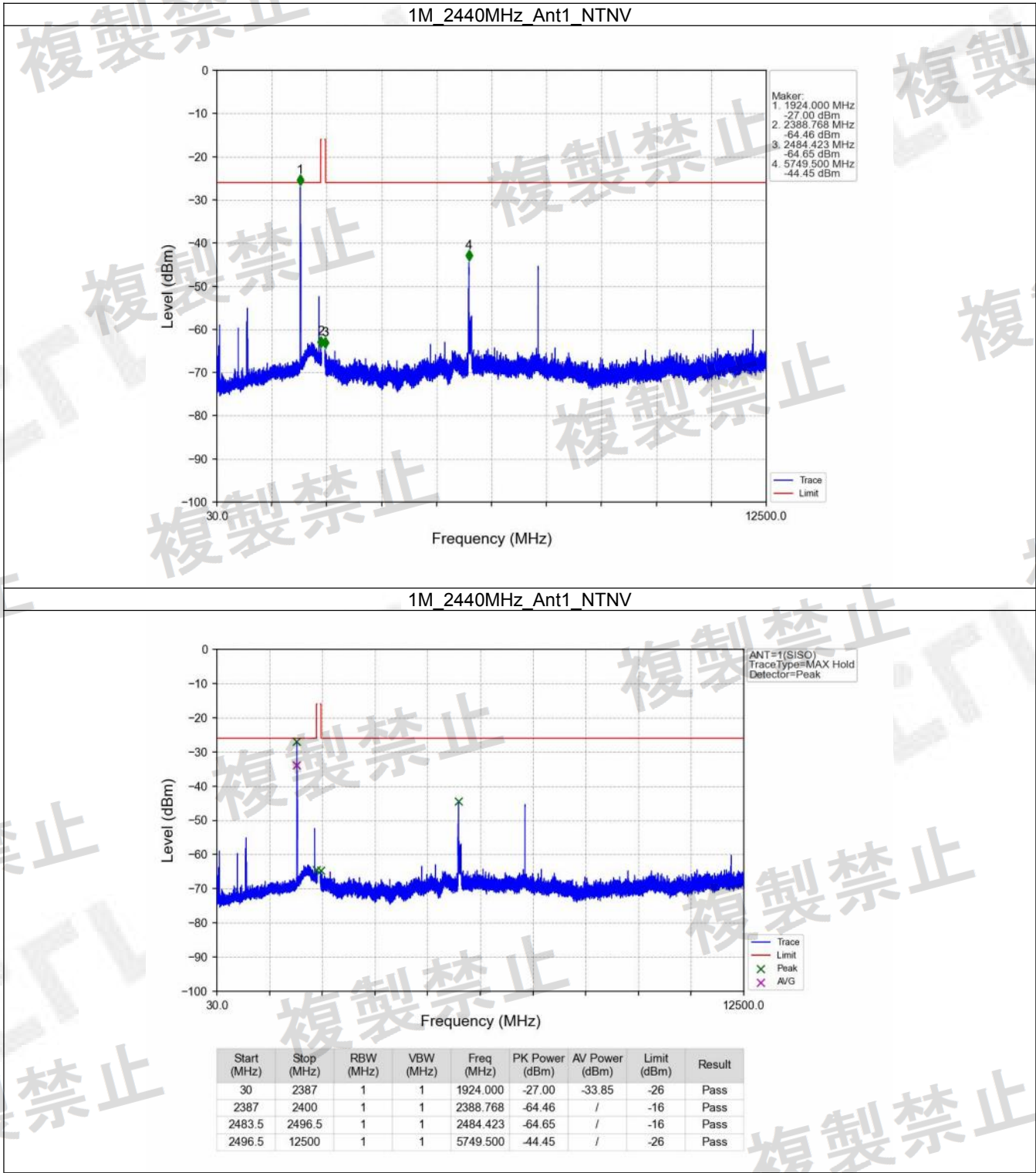
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4.2 Test Graph

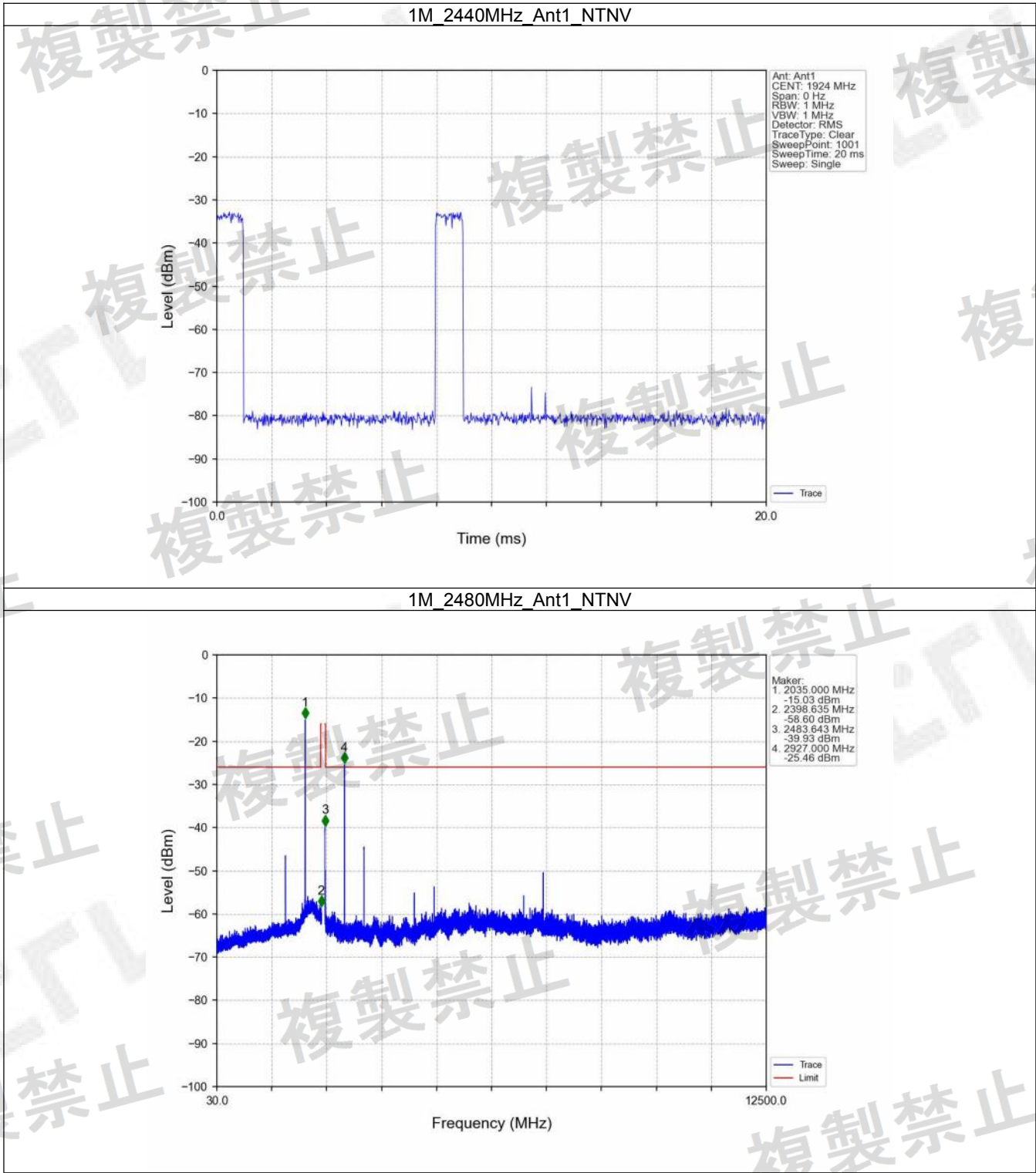
4.2.1 TxSe_NTNV



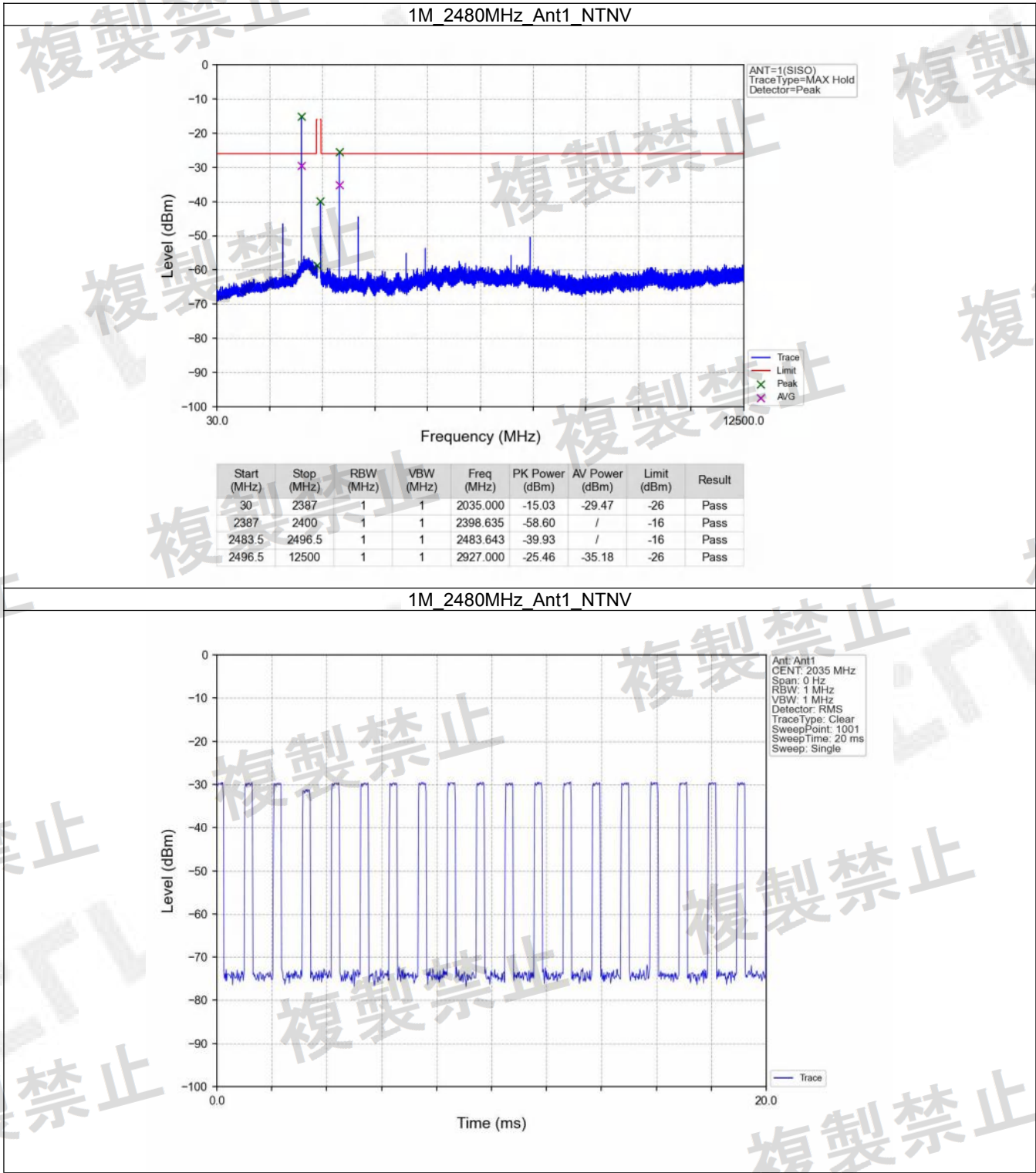
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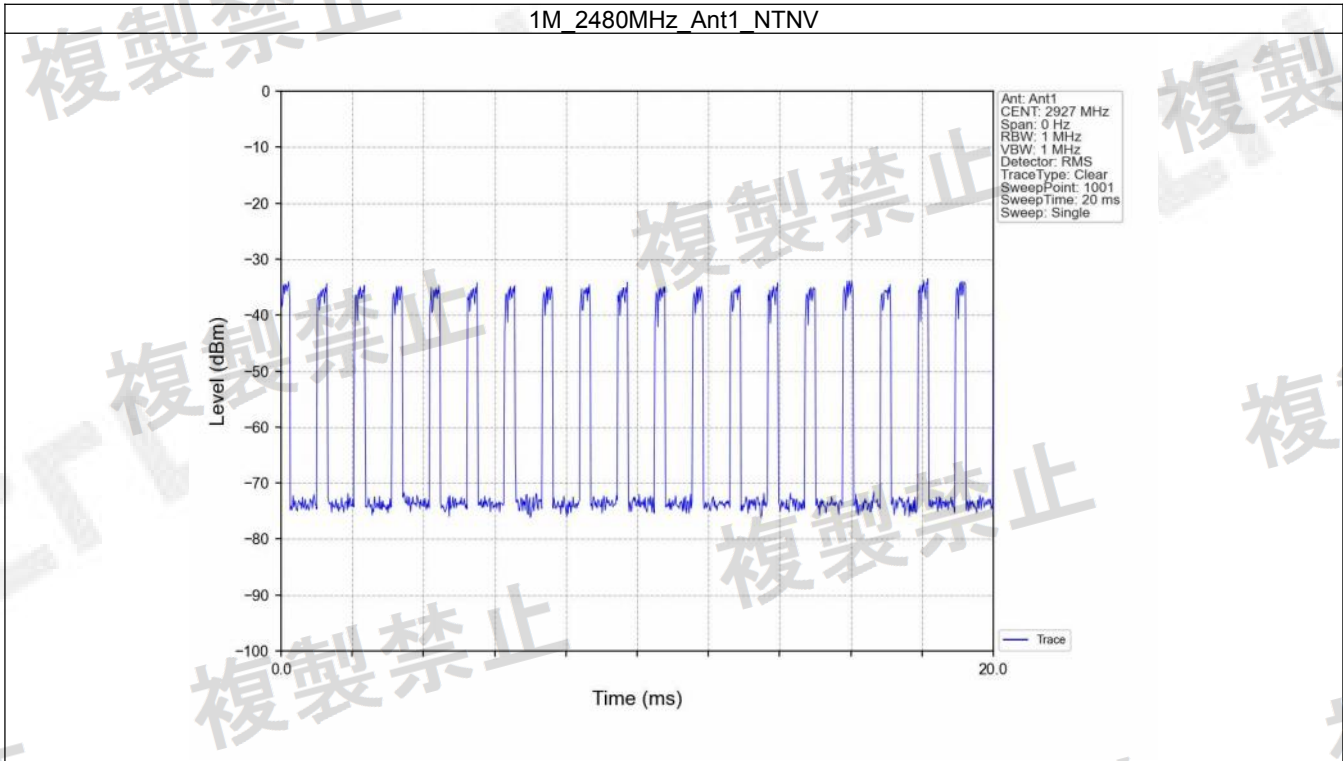
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MIC:219-269236

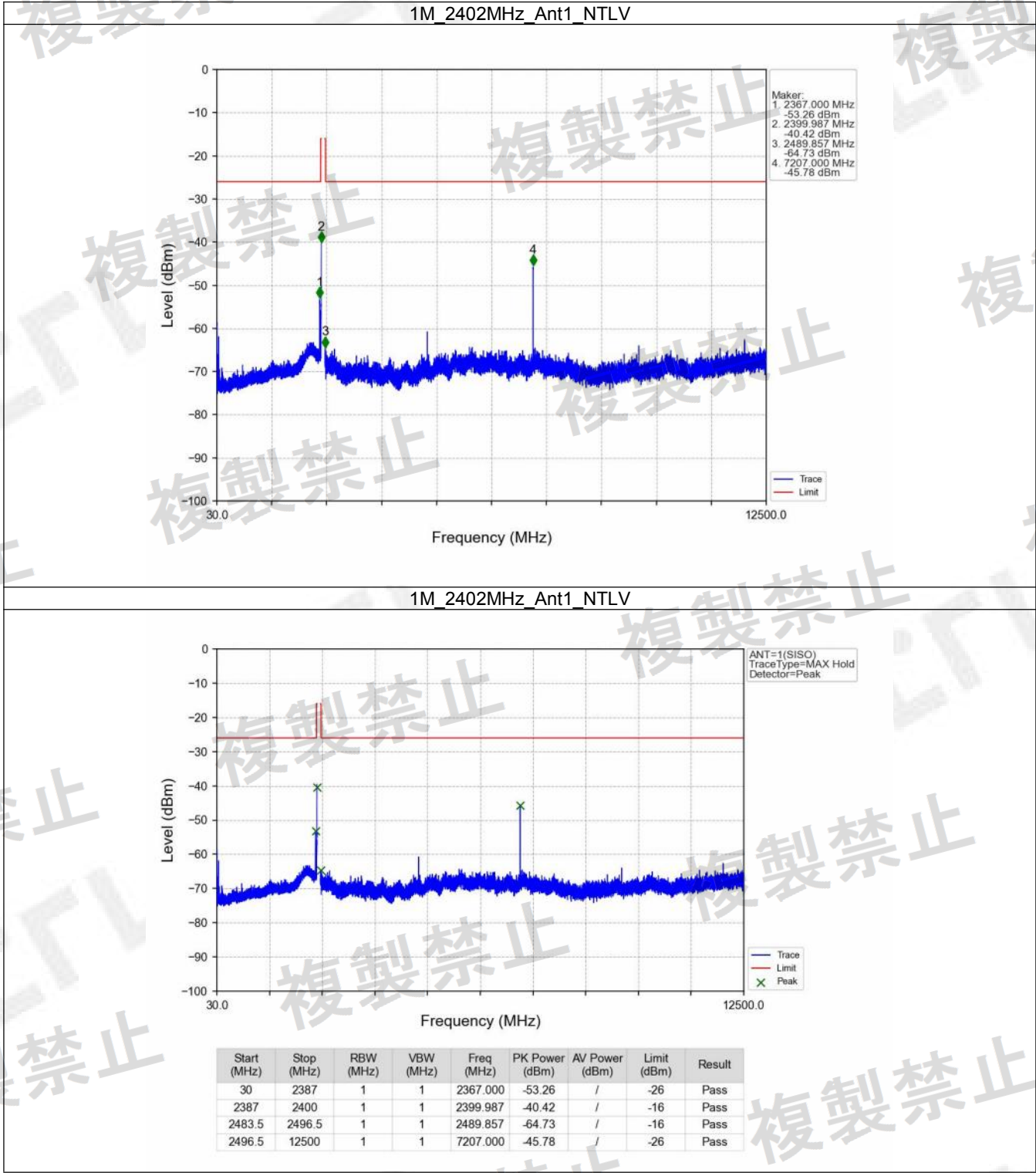


MIC:219-269236

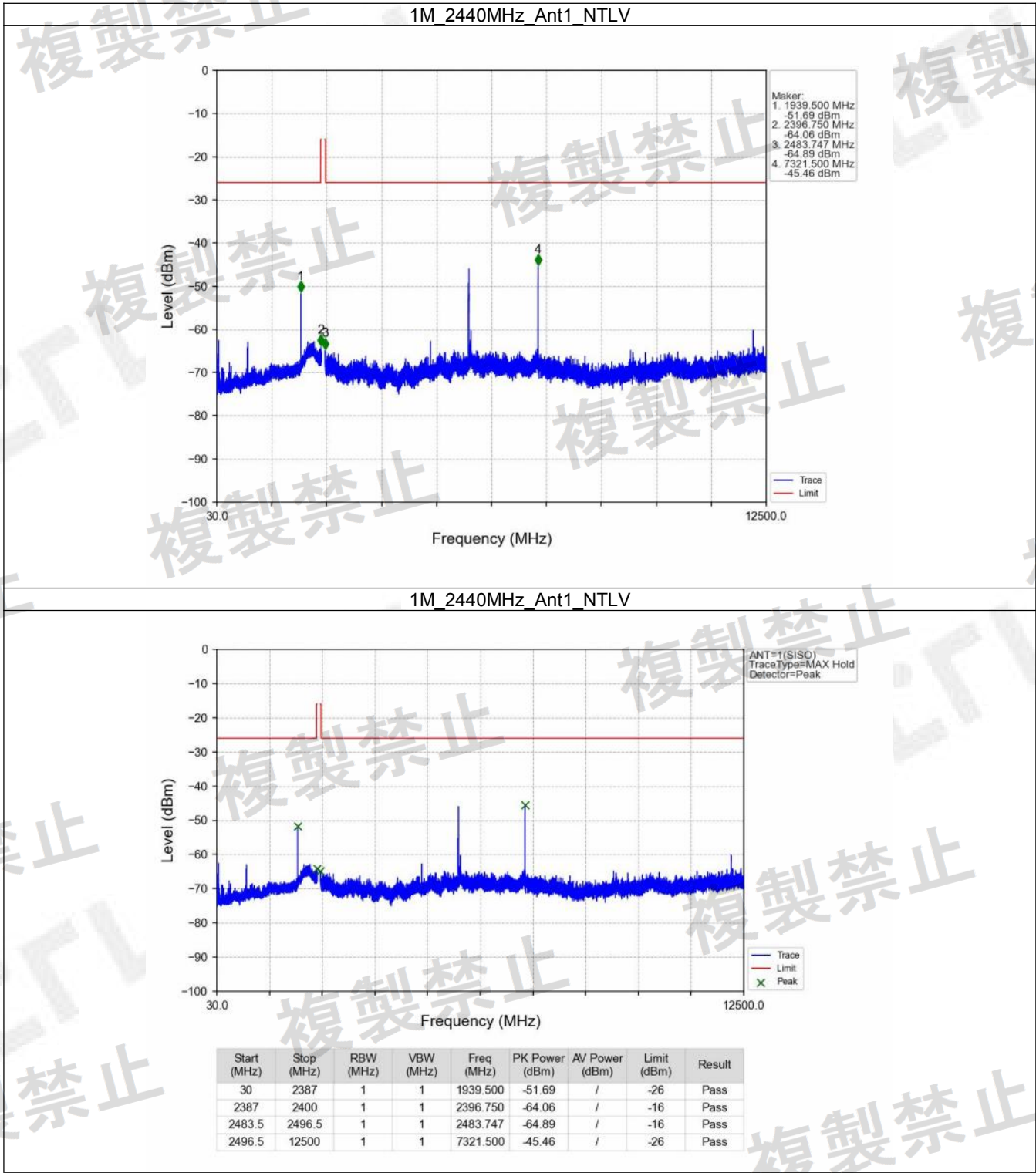


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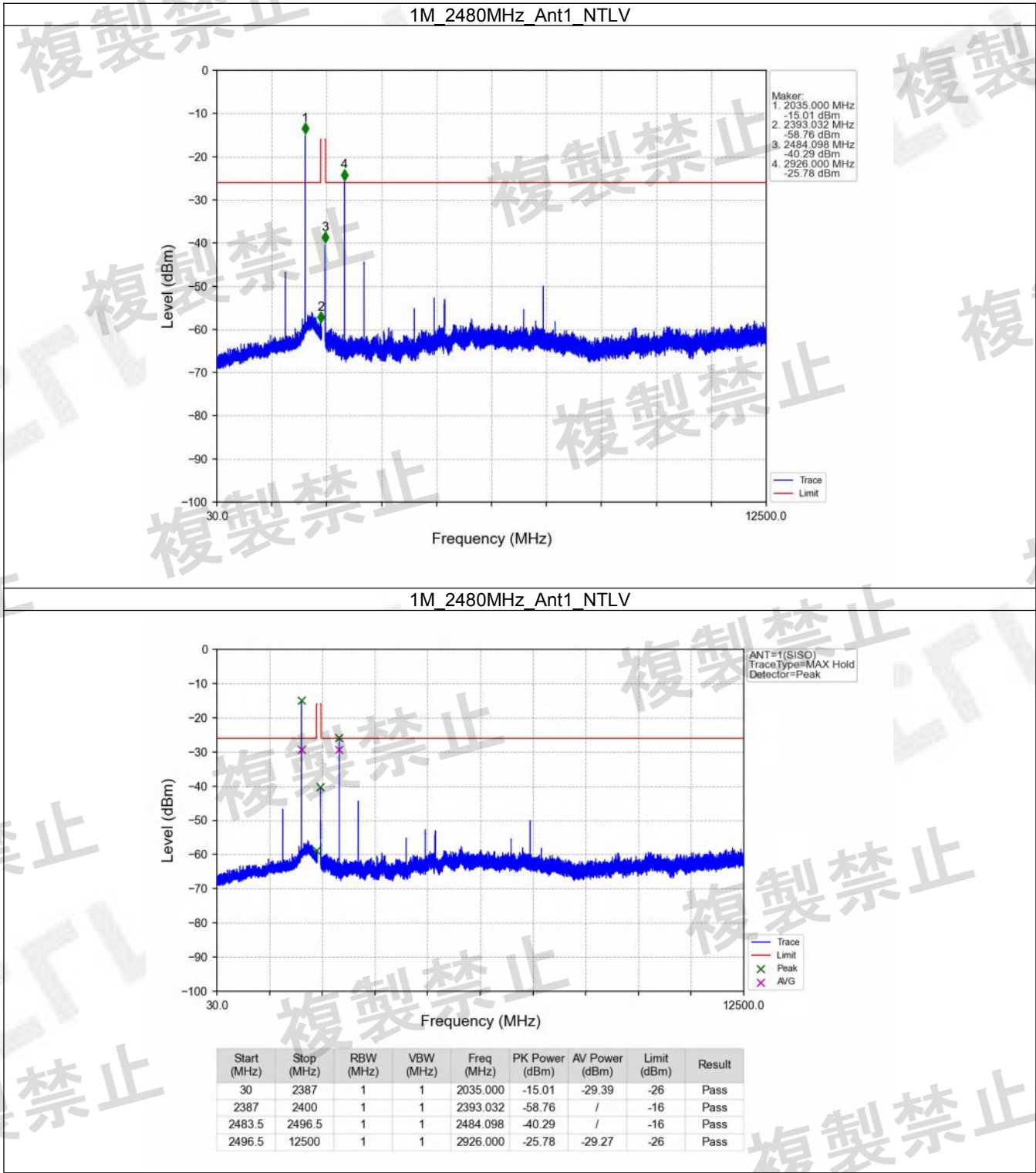
4.2.2 TxSe_NTLV



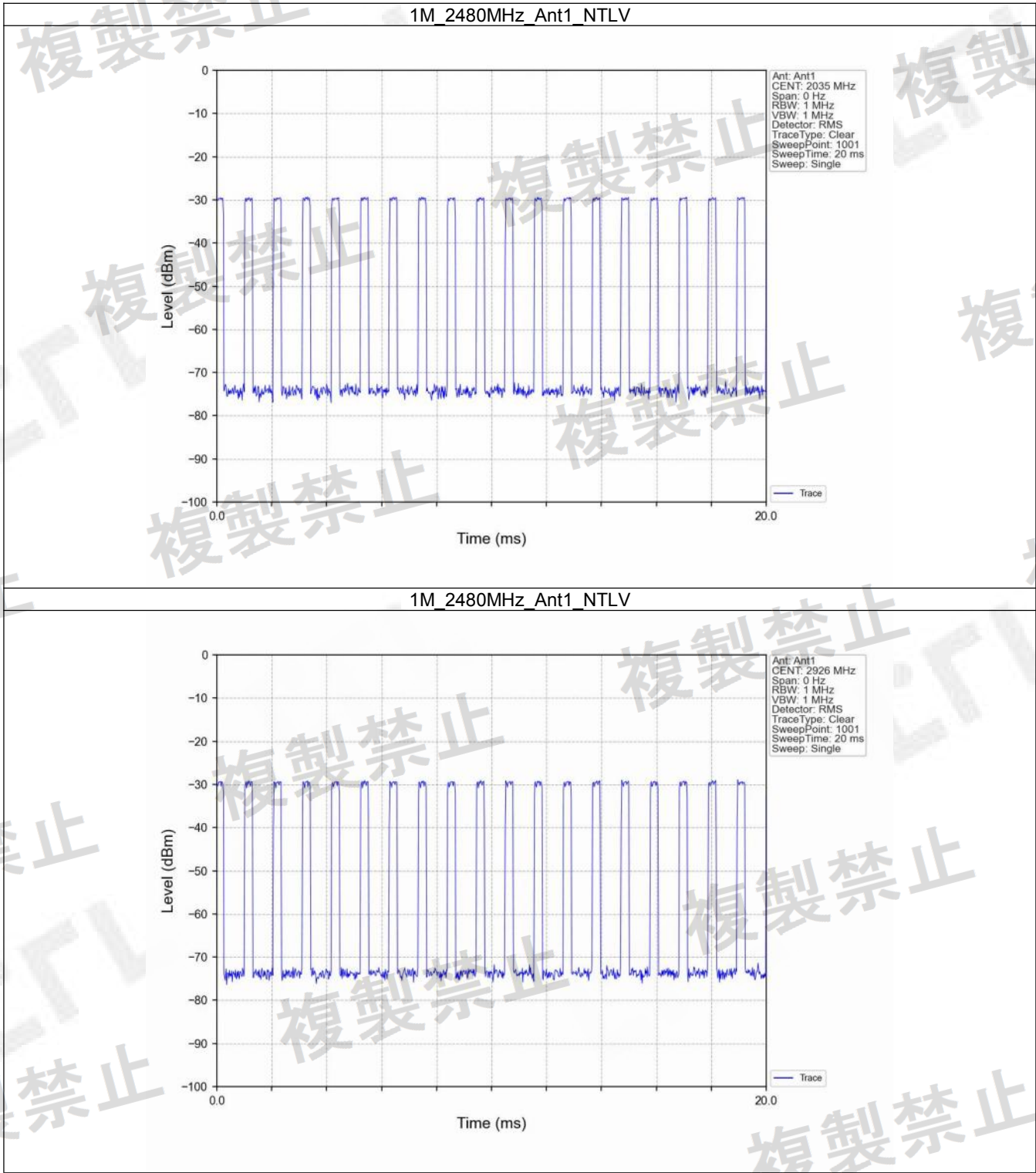
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MIC:219-269236

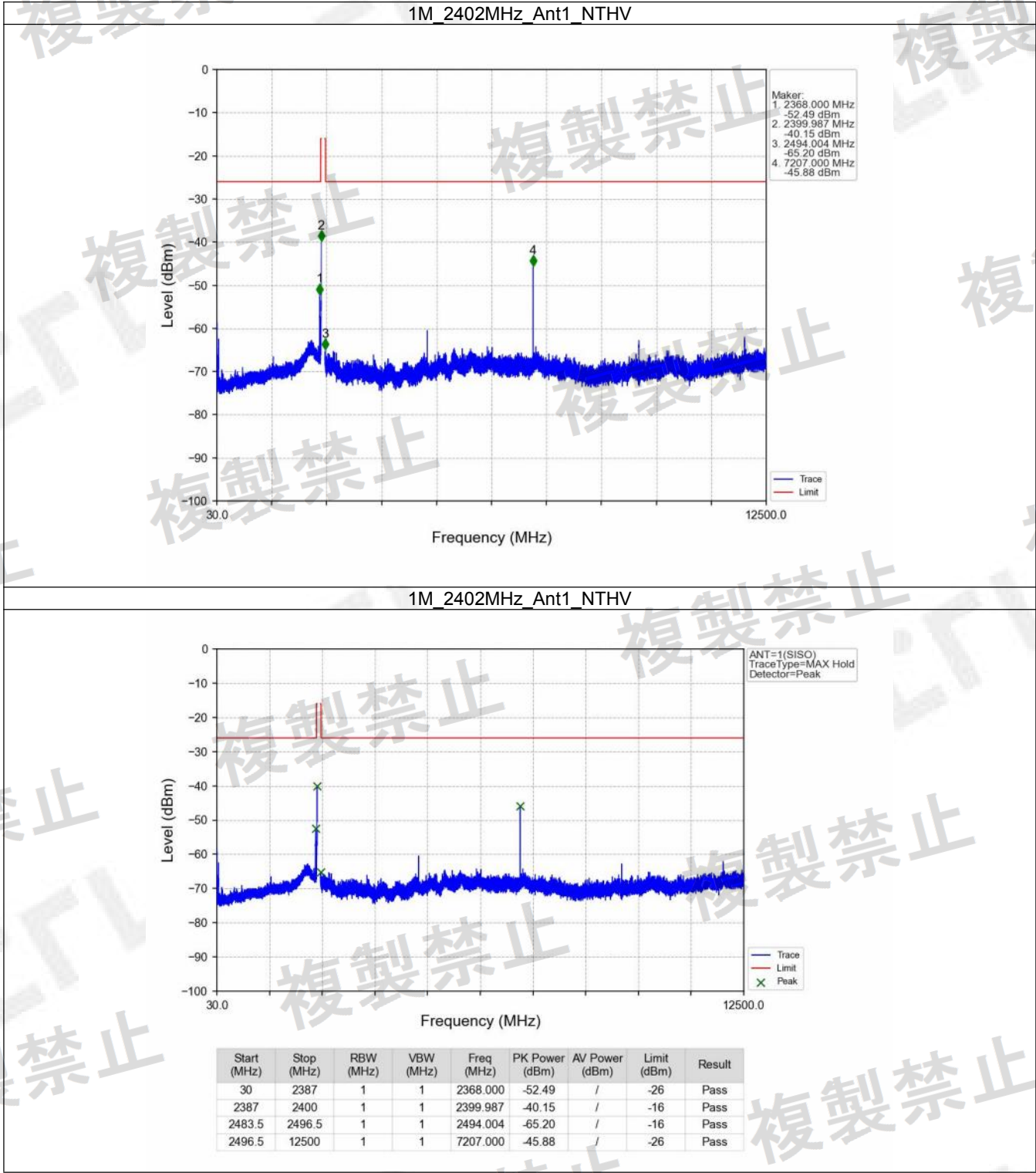


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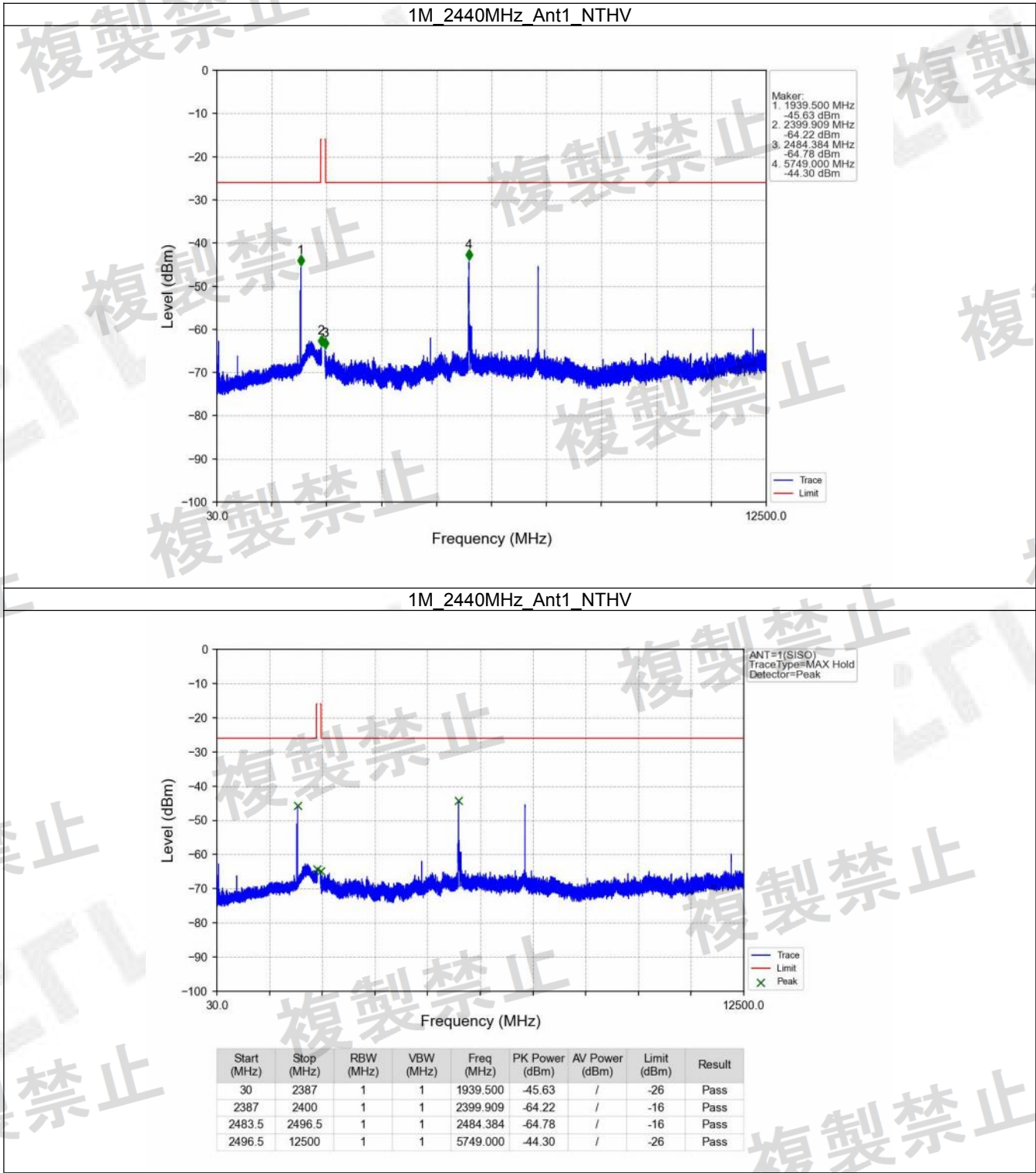


MIC:219-269236

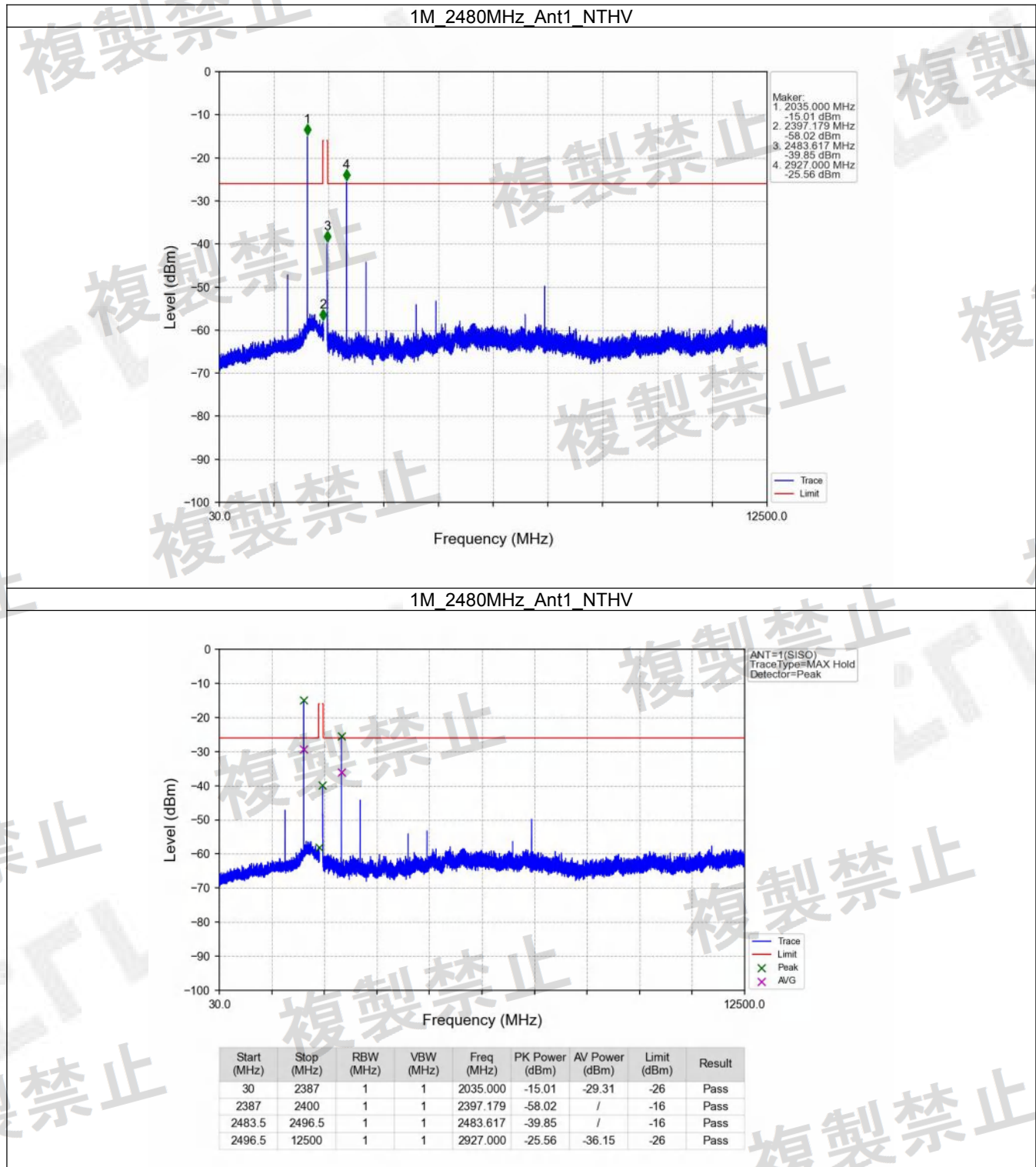
4.2.3 TxSe_NTHV



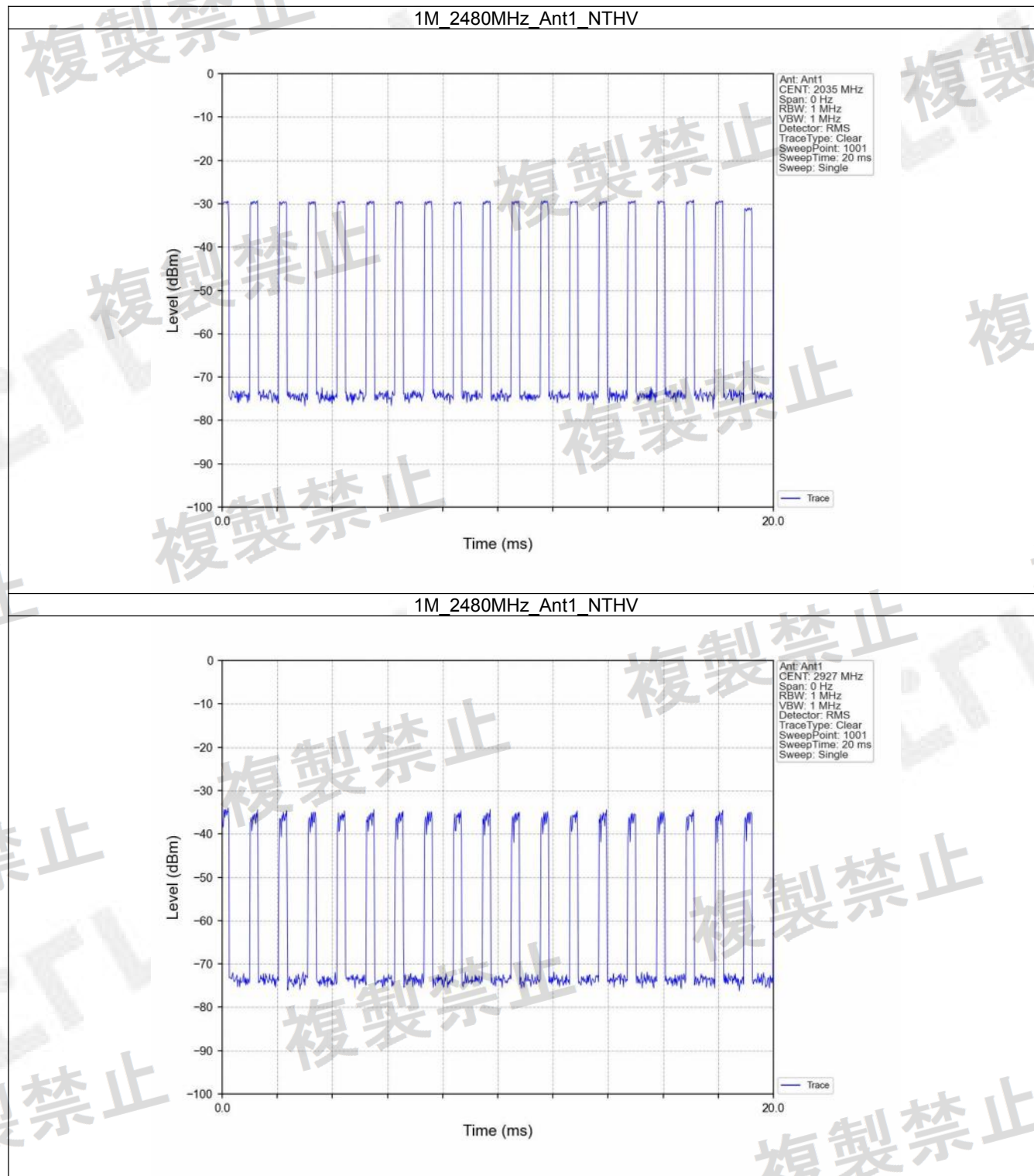
MIC:219-269236



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MIC:219-269236



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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	67.65	-76.71	0.021	/	/	4	Pass
				1000	12500	2435.5	-56.93	2.028	-79.17	0.012	20	Pass
		2440	1	30	1000	67.5	-75.51	0.028	/	/	4	Pass
				1000	12500	2442	-60.30	0.933	/	/	20	Pass
		2480	1	30	1000	67.6	-75.55	0.028	/	/	4	Pass
				1000	12500	2189.5	-63.40	0.457	/	/	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	68.55	-76.07	0.025	/	/	4	Pass
				1000	12500	1921	-50.28	9.376	-80.80	0.008	20	Pass
						1924	-43.91	40.644	-80.76	0.008	20	Pass
						1927	-46.83	20.749	-80.71	0.008	20	Pass
		2440	1	30	1000	68.4	-76.03	0.025	/	/	4	Pass
				1000	12500	2442.5	-61.39	0.726	/	/	20	Pass
		2480	1	30	1000	67.45	-76.82	0.021	/	/	4	Pass
				1000	12500	2440	-61.23	0.753	/	/	20	Pass

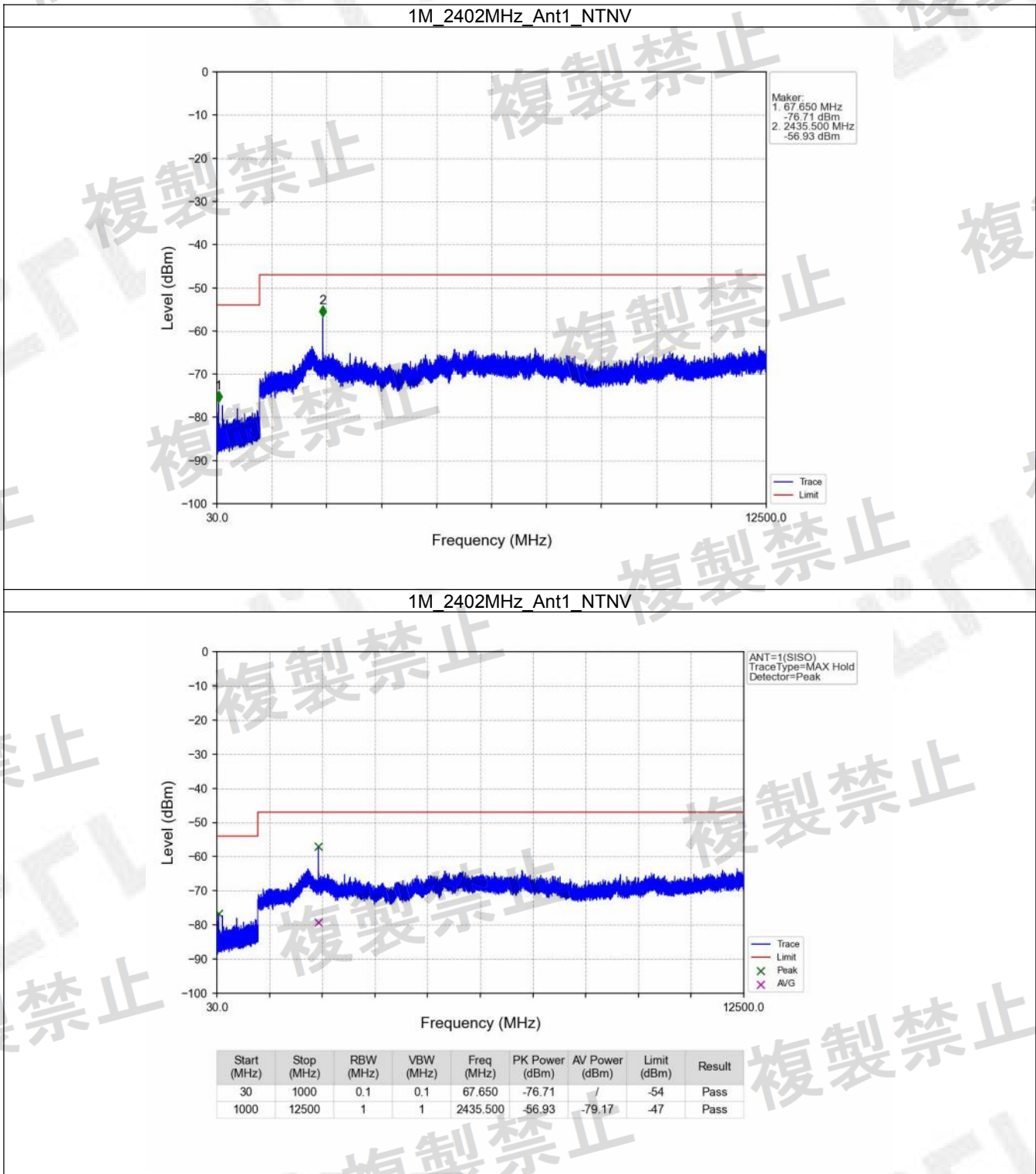
5.1.3 RxSe_NTHV

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	67.4	-75.80	0.026	/	/	4	Pass
				1000	12500	2438.5	-60.36	0.920	/	/	20	Pass
		2440	1	30	1000	68.25	-76.79	0.021	/	/	4	Pass
				1000	12500	2436.5	-59.49	1.125	/	/	20	Pass
		2480	1	30	1000	68.2	-76.12	0.024	/	/	4	Pass
				1000	12500	2173.5	-63.03	0.498	/	/	20	Pass

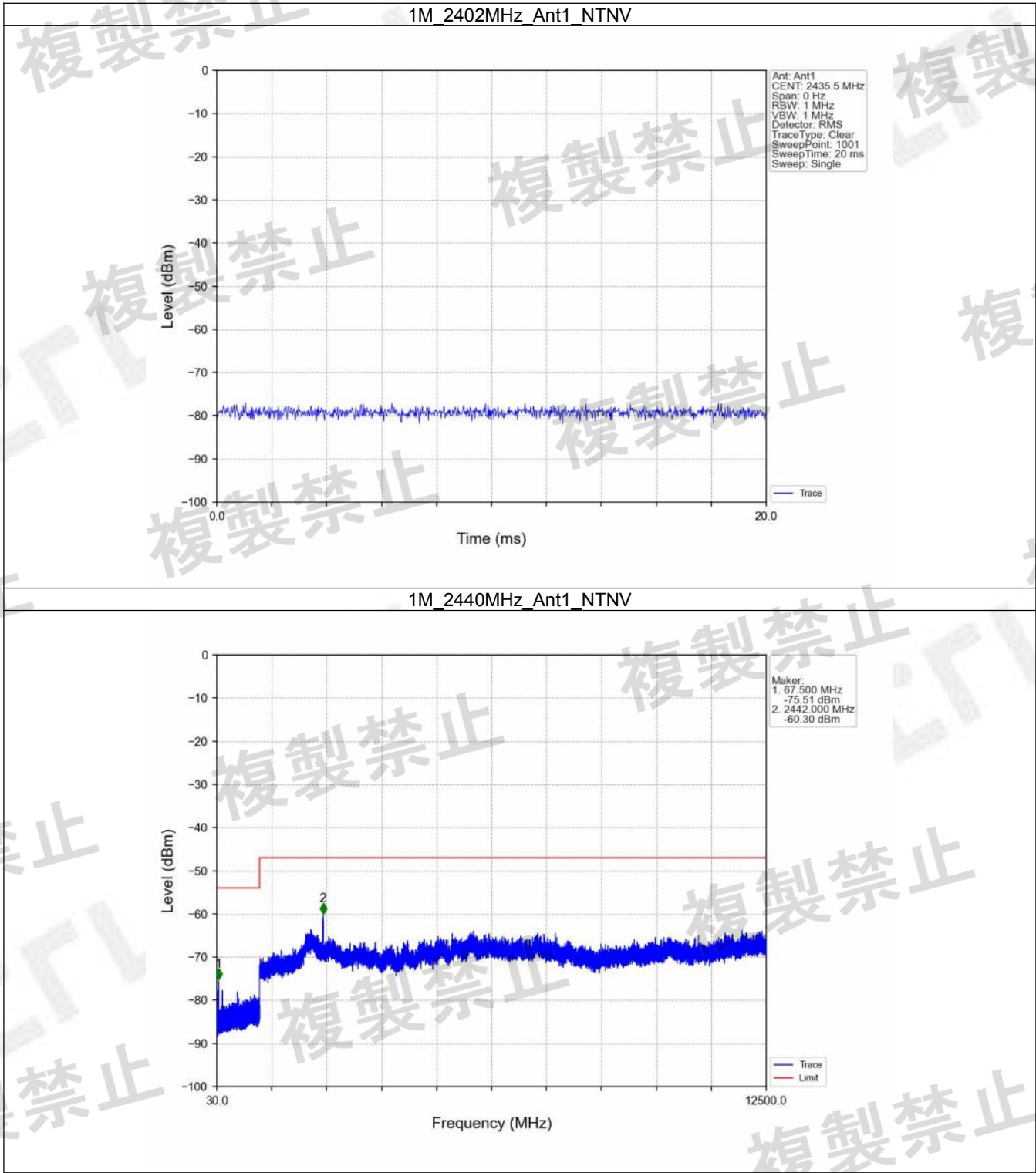
MIC:219-269236

5.2 Test Graph

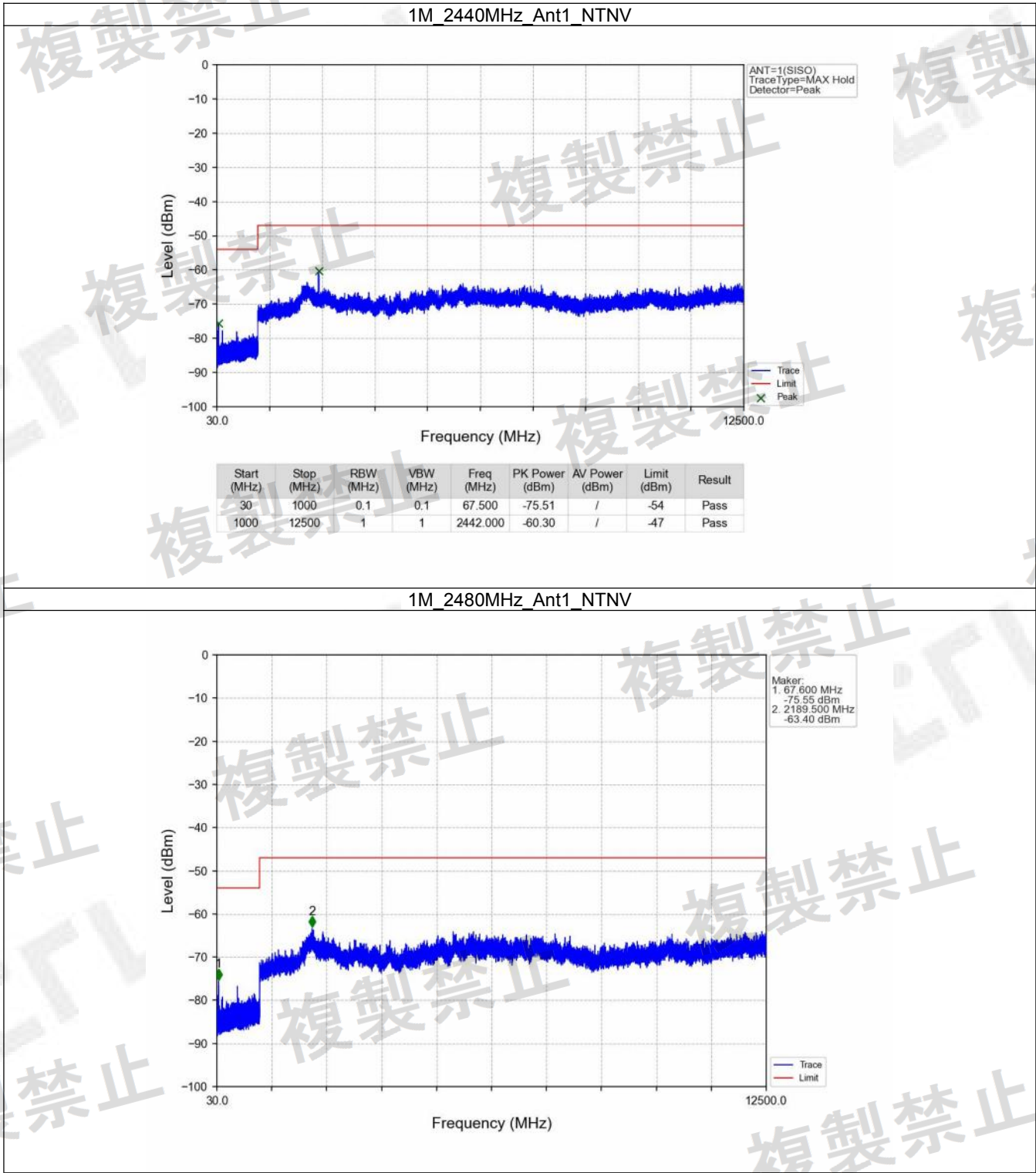
5.2.1 RxSe_NTNV



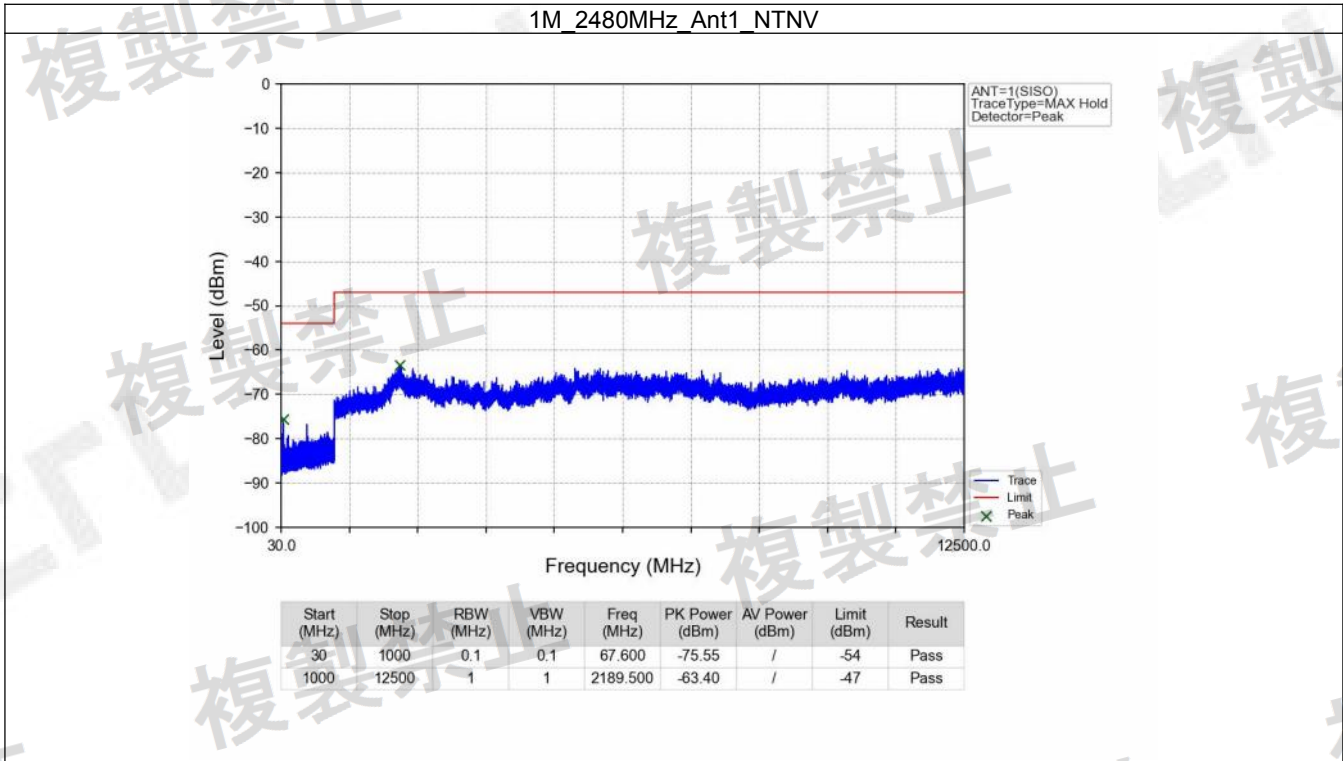
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MIC:219-269236

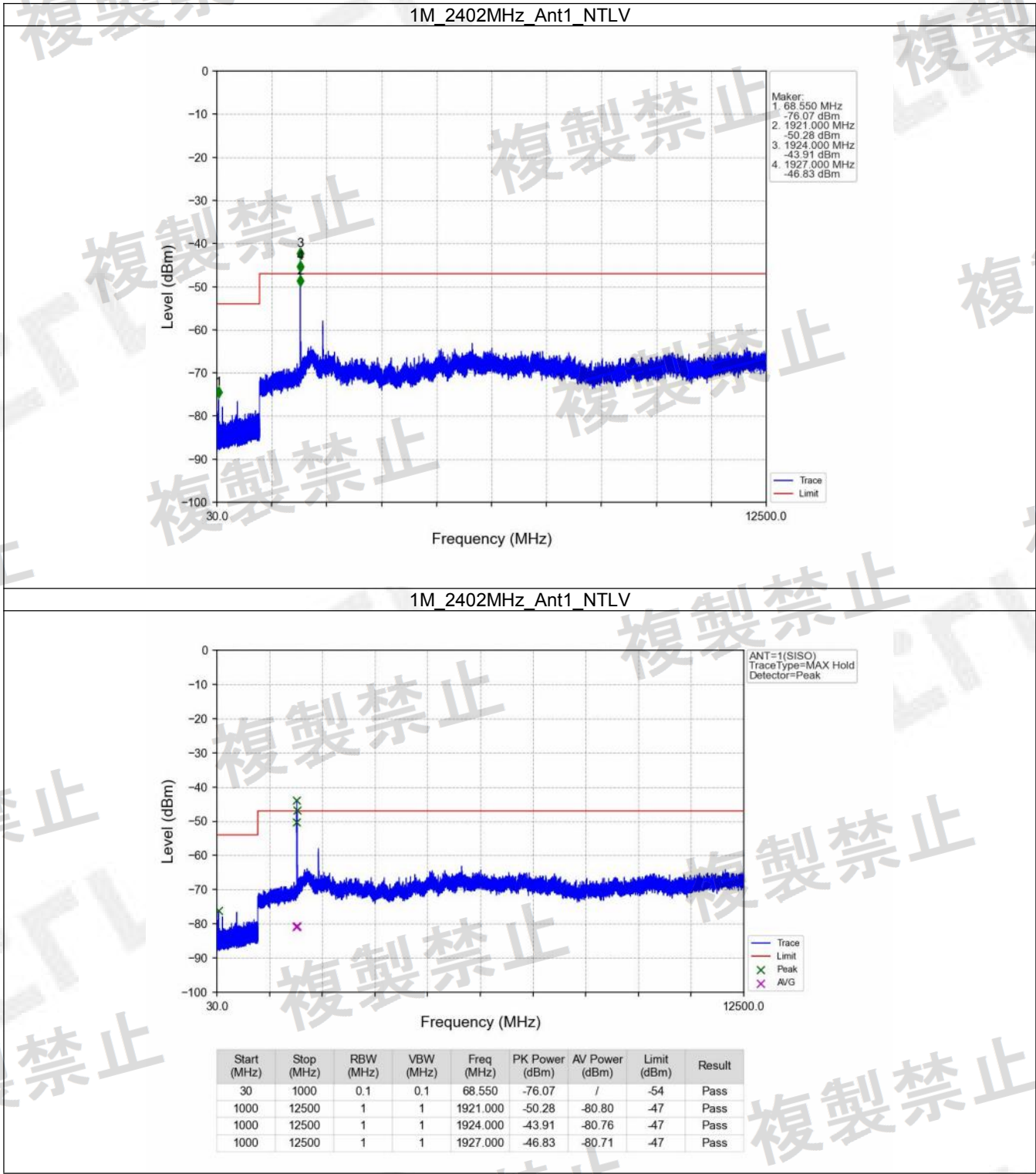


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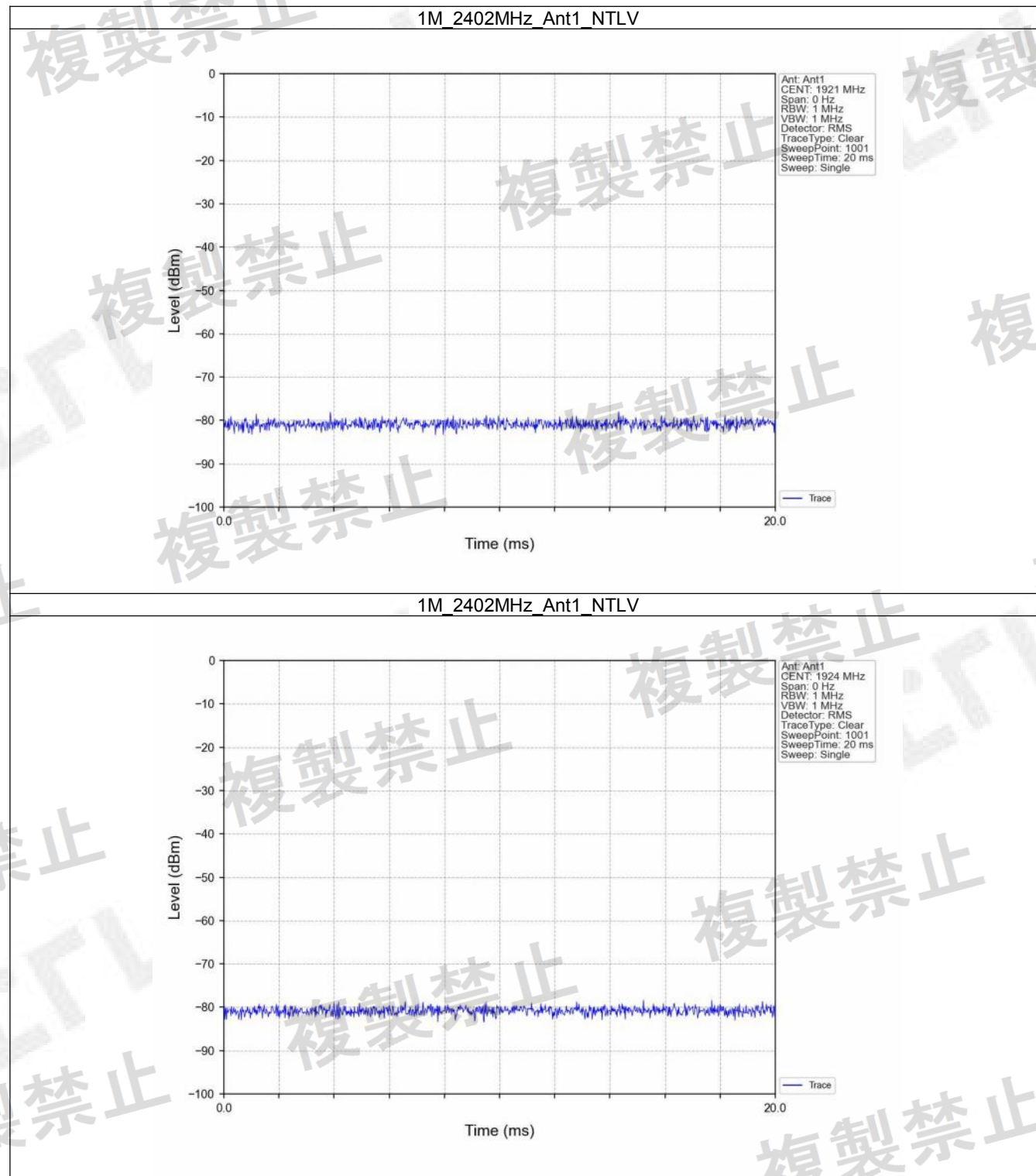


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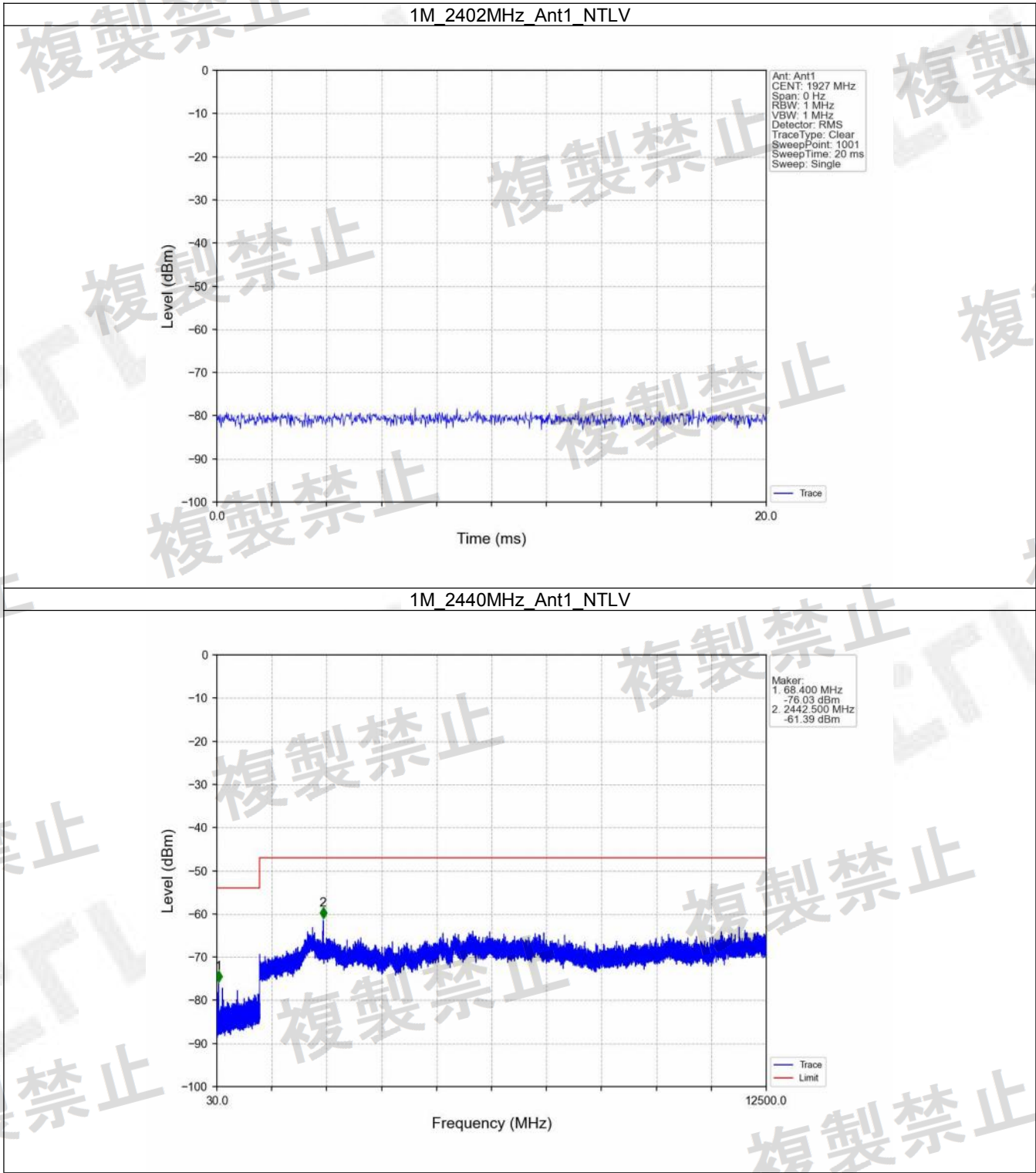
5.2.2 RxSe_NTLV



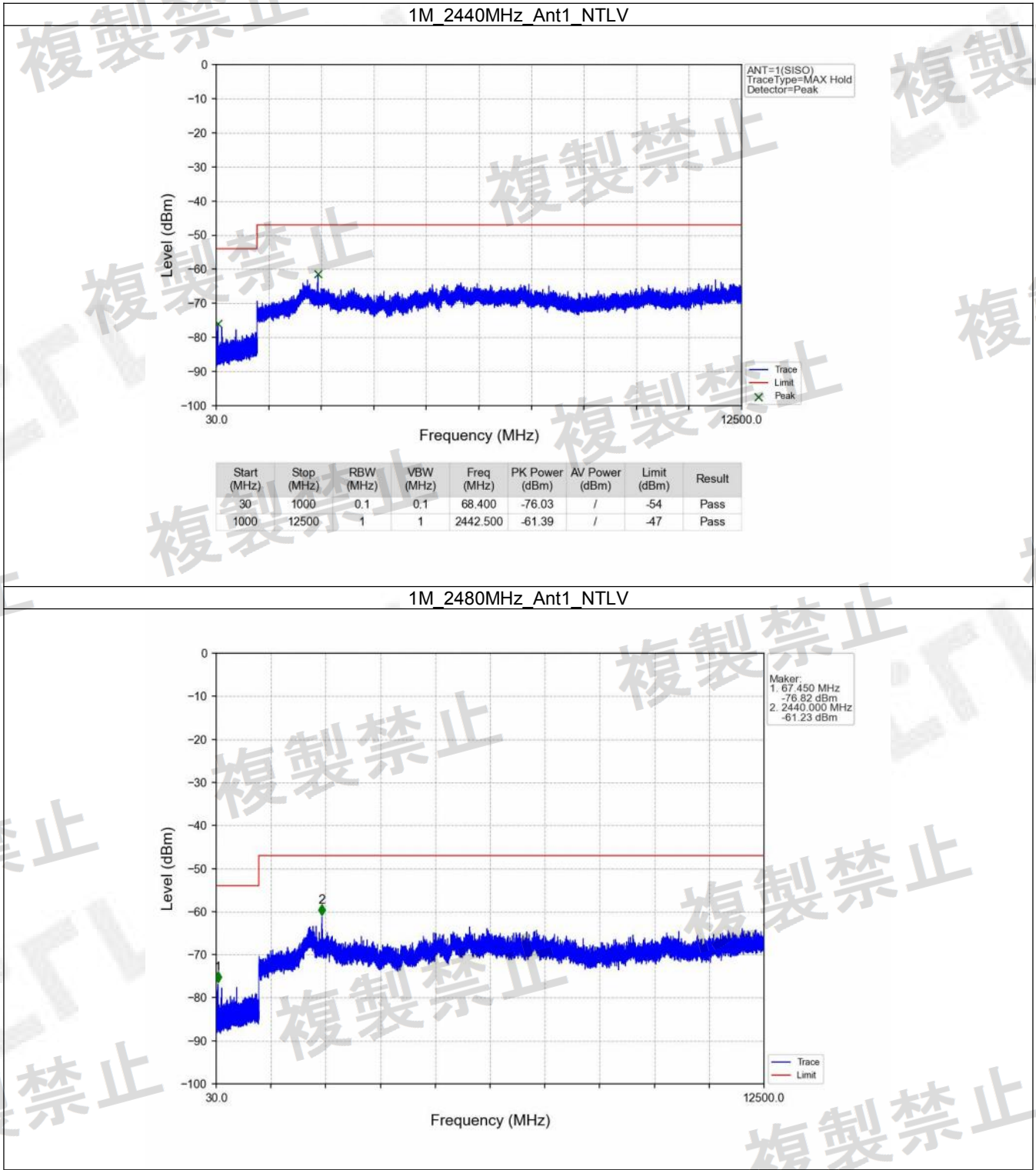
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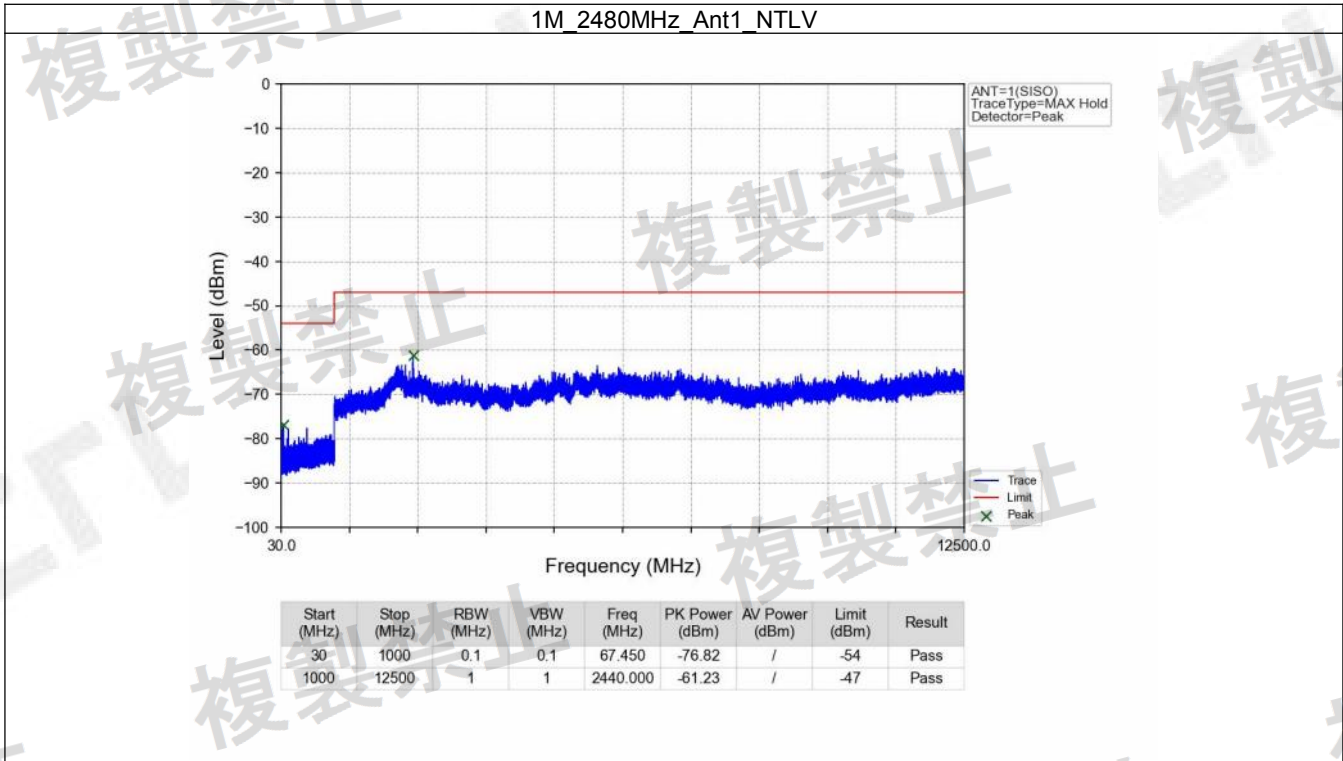
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MIC:219-269236

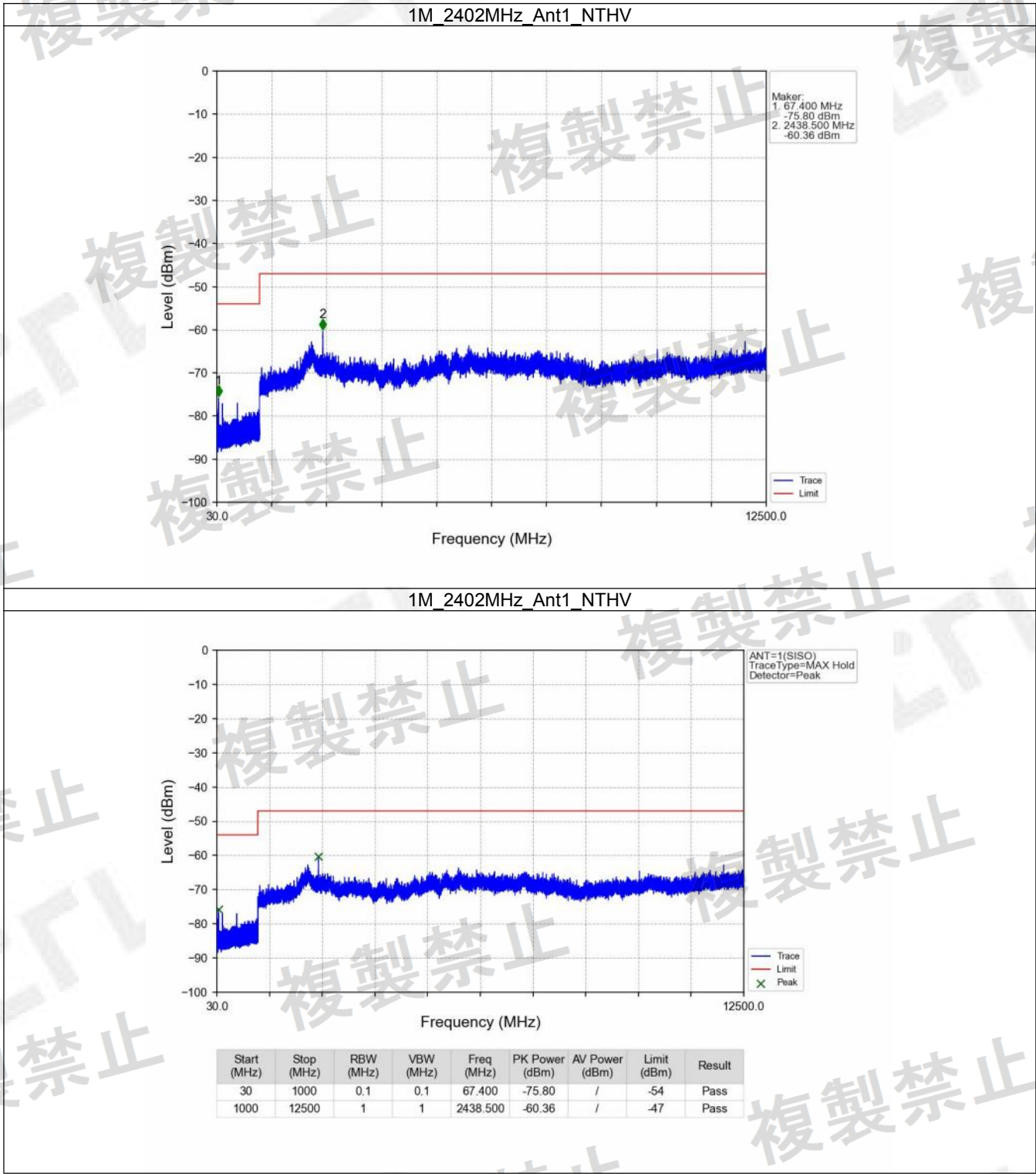


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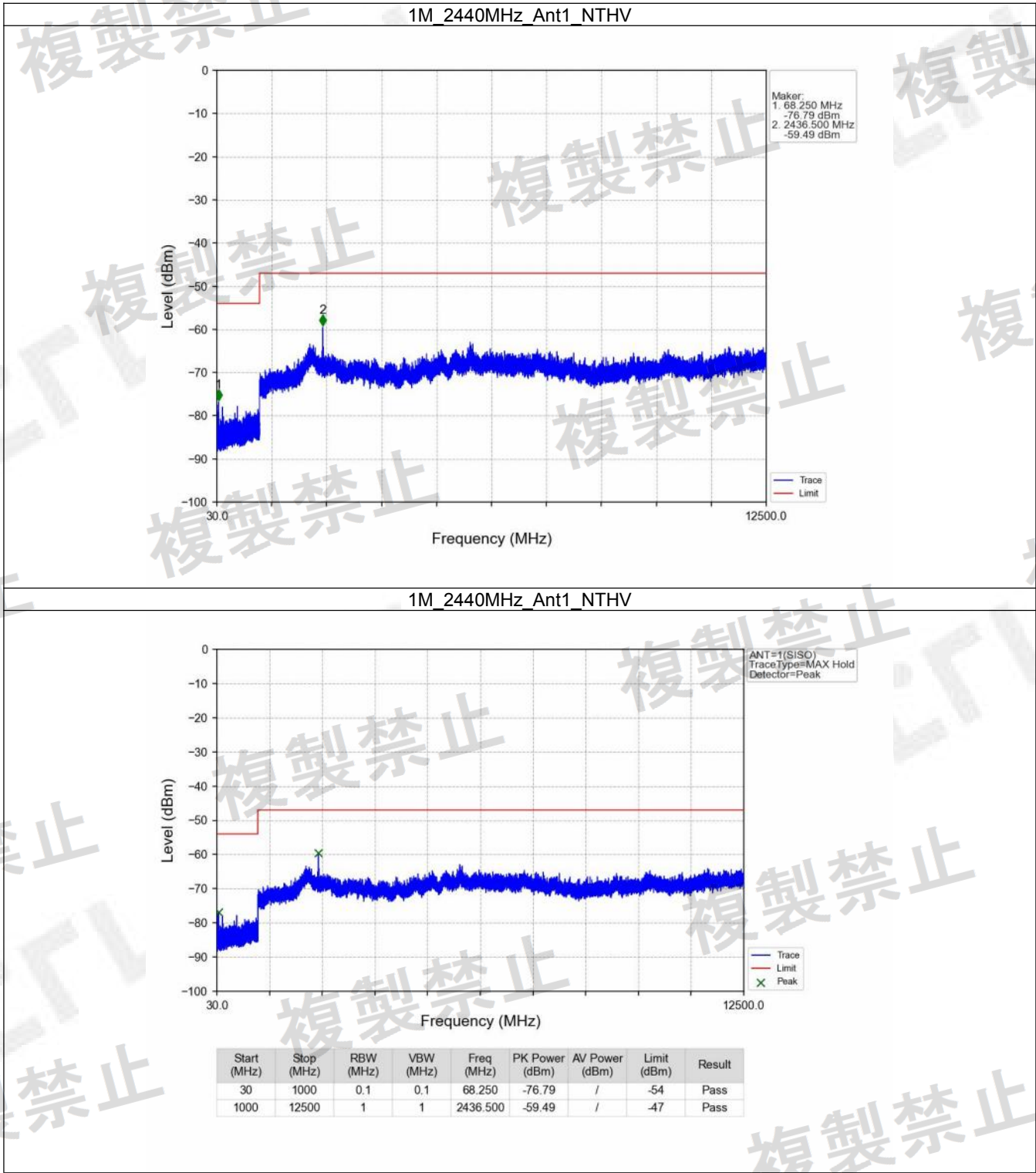


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5.2.3 RxSe_NTHV



MIC:219-269236



MIC:219-269236

