

ANNEX D TEST DATA

For

Project No.:	8328EU012507W
Client:	Shenzhen Rango Innovation Technology co., Ltd.
Product Name:	Storm A2 Wireless Gaming Headset
Model No.:	StormA2
Technology:	Bluetooth (BDR&EDR)
Test Engineer:	<i>Mikoy zhu</i>
Test Date:	2025-04-21

Test Summary

Item	Result
Frequency Error	Pass
Occupied Bandwidth	Pass
Antenna Power	Pass
Dwell Time	Pass
Spurious Emission Intensity	Pass
Secondary Radiated Emission	Pass

1. Frequency Error

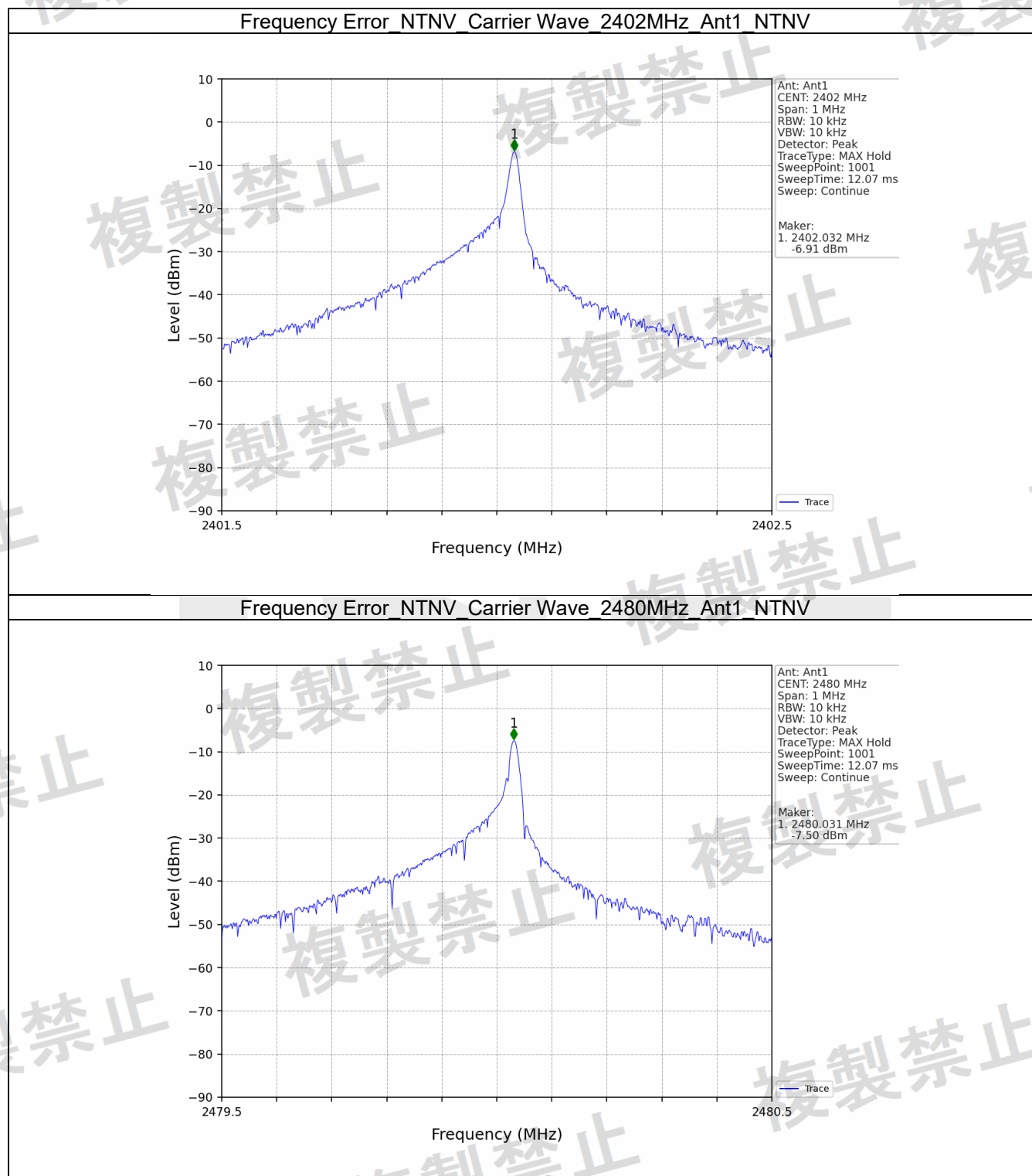
1.1 Test Result

1.1.1 Ant1

Ant1								
ENV	Mode	TX Type	Frequency (MHz)	Packet Type	Measured Frequency (MHz)	Tolerance (ppm)		Verdict
						Result	Limit	
NTNV	Carrier Wave	SISO	2402	DH5	2402.032	13.32	-50 to 50	Pass
			2480	DH5	2480.031	12.50	-50 to 50	Pass

1.2 Test Graph

1.2.1 Ant1



2. Occupied Bandwidth

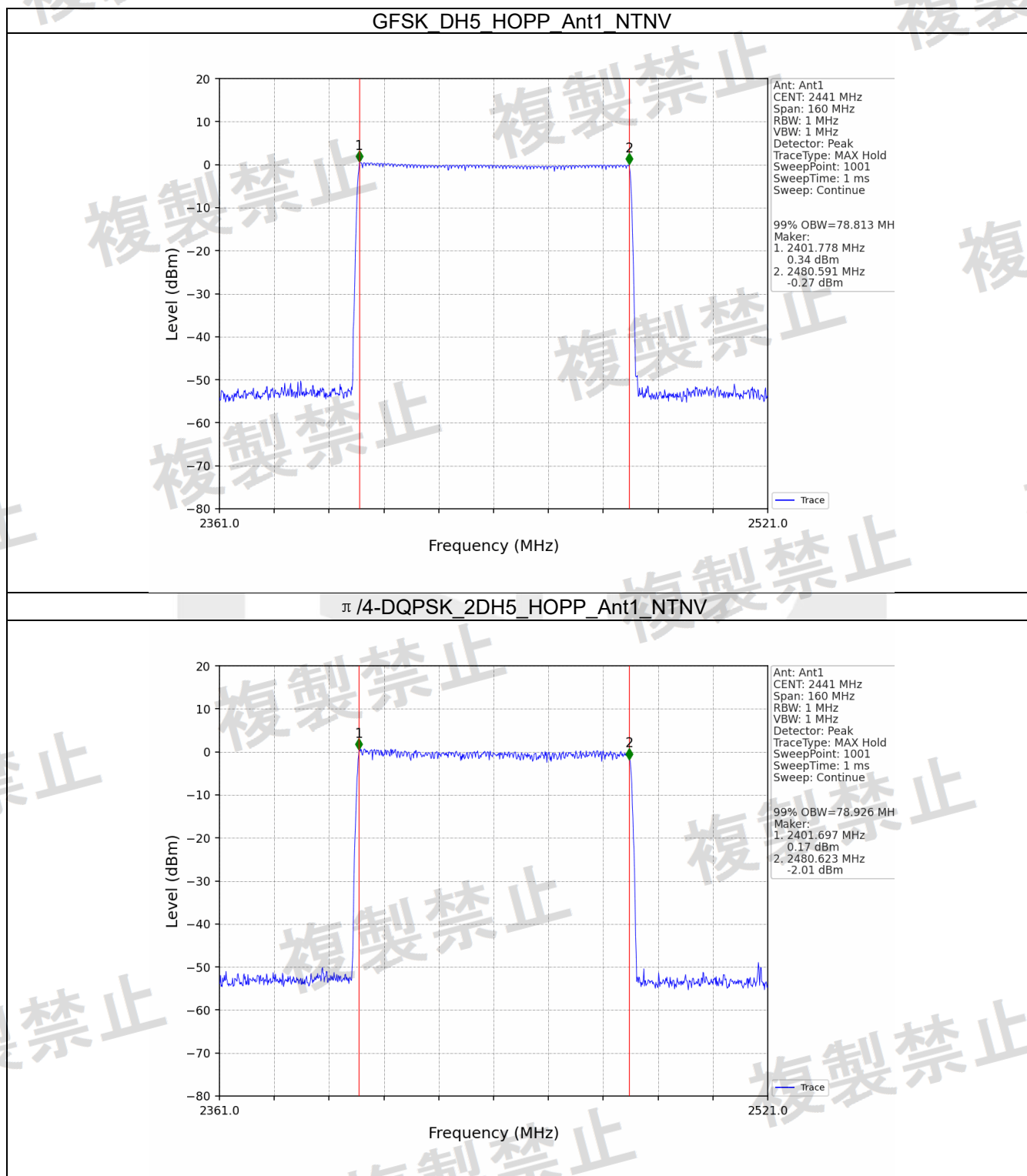
2.1 Test Result

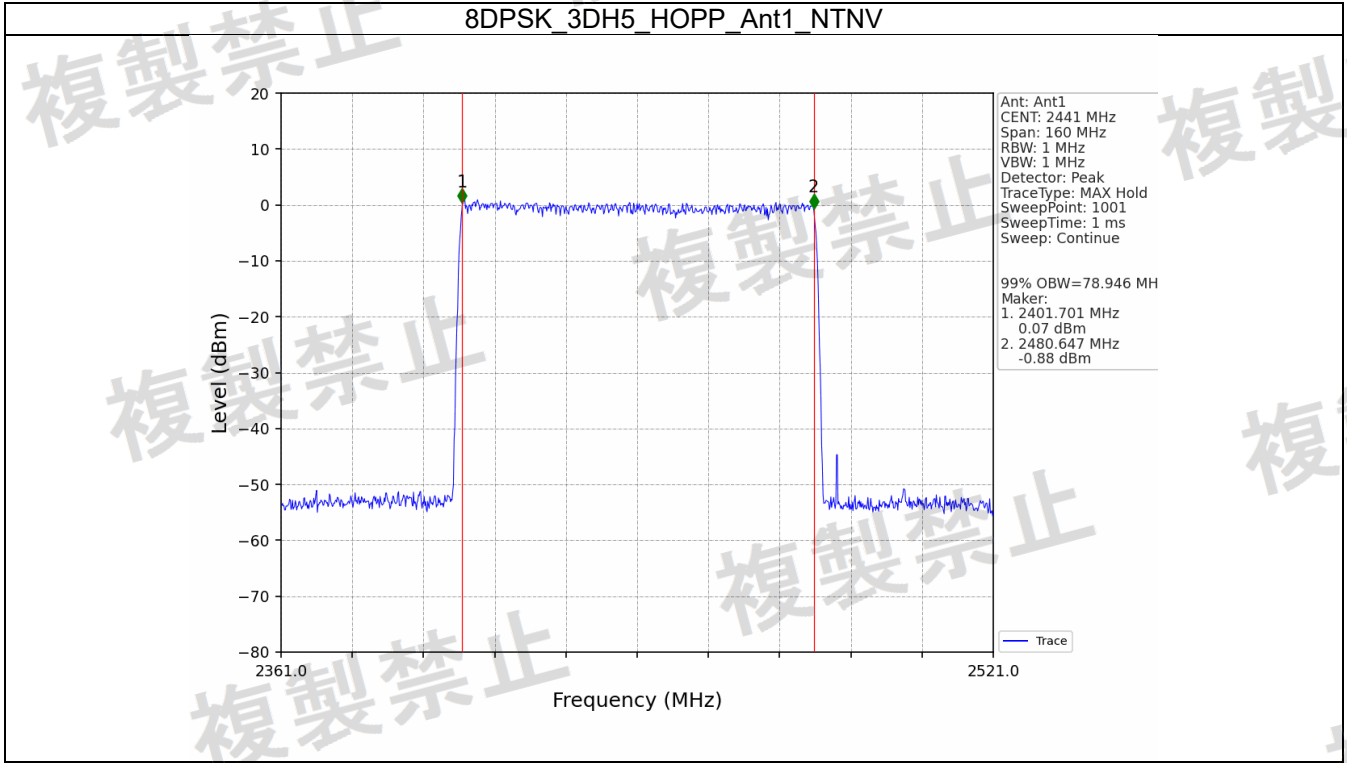
2.1.1 OBW

ENV	Mode	TX Type	Frequency (MHz)	Packet Type	99% Occupied Bandwidth (MHz)		Verdict
					ANT1	Limit	
NTNV	GFSK	SISO	HOPP	DH5	78.813	≤ 83.5	Pass
	$\pi/4$ -DQPSK	SISO	HOPP	2DH5	78.926	≤ 83.5	Pass
	8DPSK	SISO	HOPP	3DH5	78.946	≤ 83.5	Pass

2.2 Test Graph

2.2.1 OBW





3. Spread Bandwidth

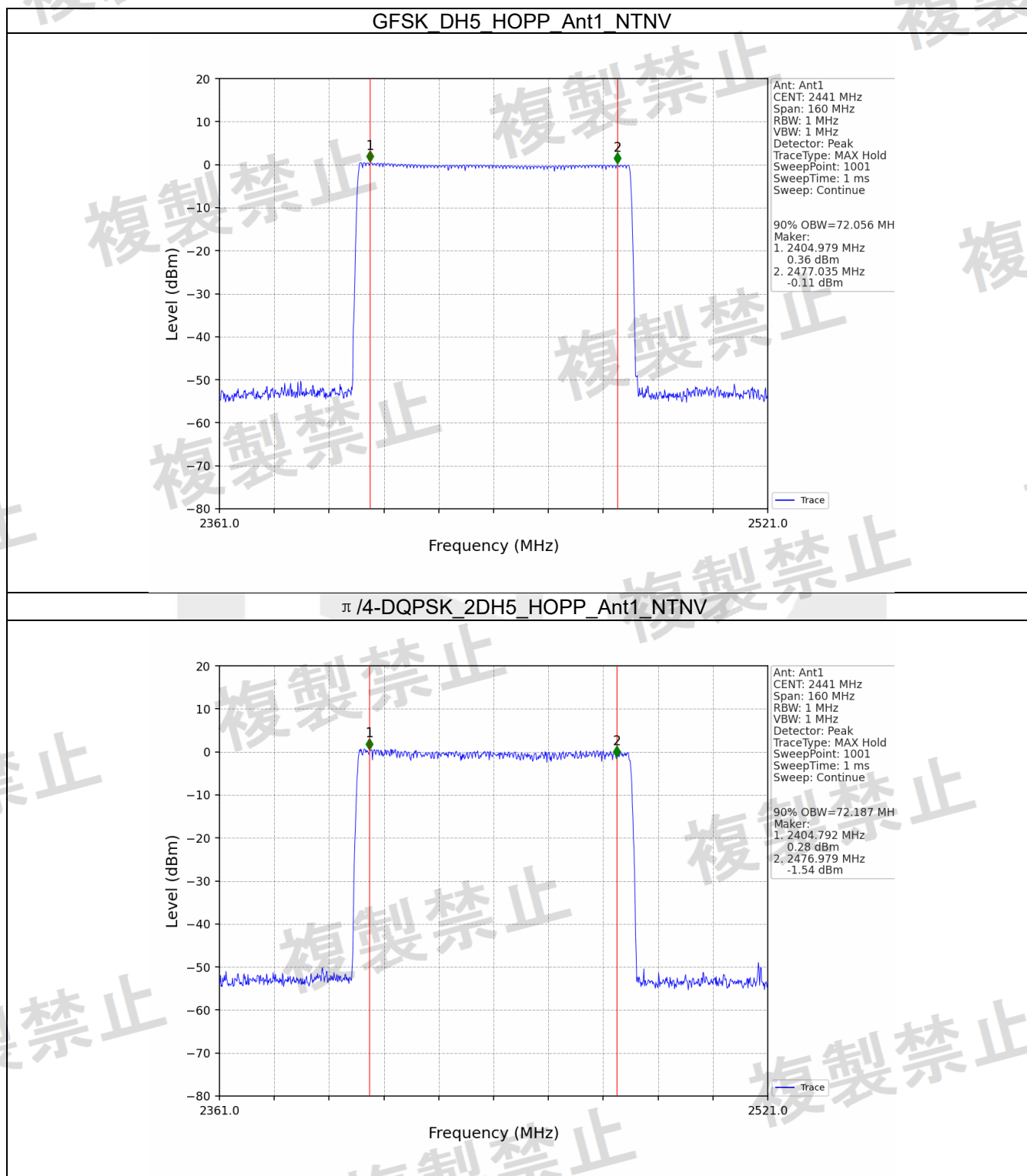
3.1 Test Result

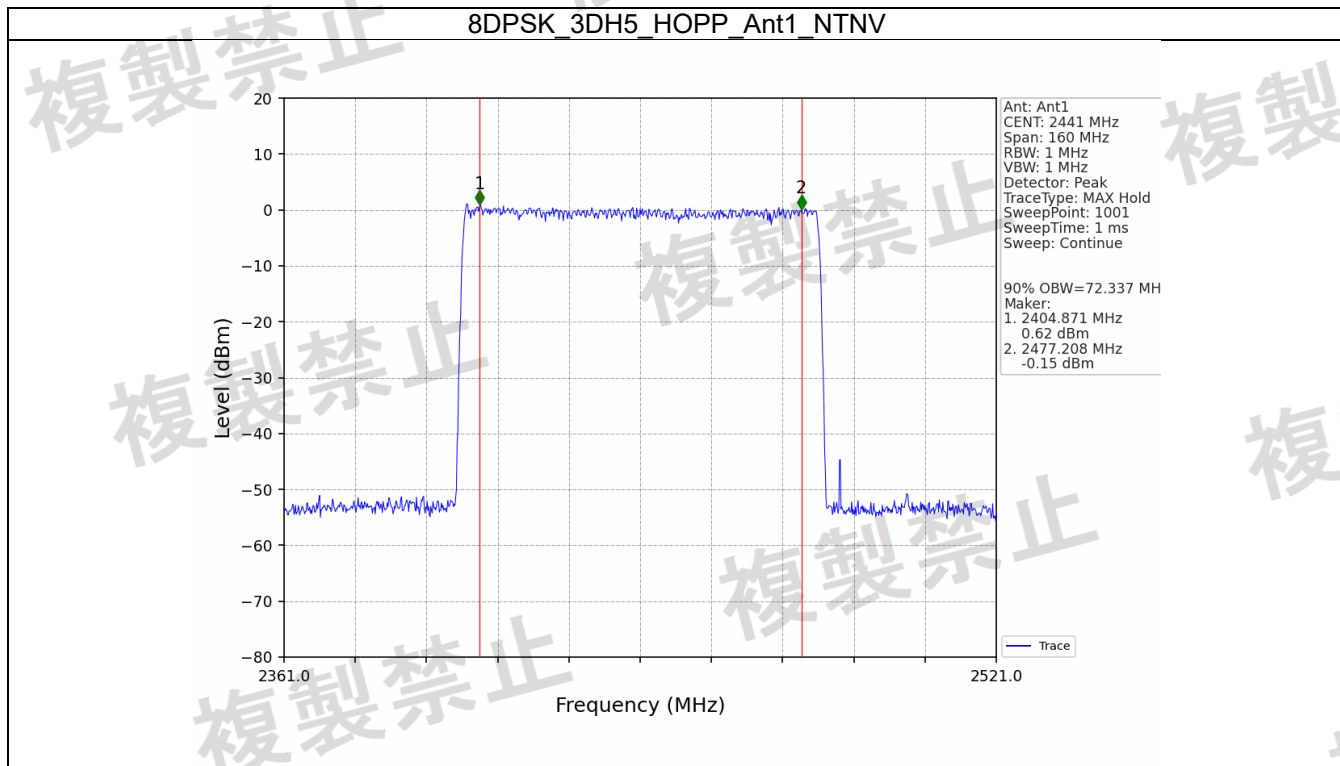
3.1.1 SPBW

ENV	Mode	TX Type	Frequency (MHz)	Packet Type	Spread Bandwidth (MHz)		Verdict
					ANT1	Limit	
NTNV	GFSK	SISO	HOPP	DH5	72.056	/	Only For Report
	π /4-DQPSK	SISO	HOPP	2DH5	72.187	/	Only For Report
	8DPSK	SISO	HOPP	3DH5	72.337	/	Only For Report

3.2 Test Graph

3.2.1 SPBW





4. Antenna Power

4.1 Test Result

4.1.1 Power

ENV	Mode	TX Type	Frequency (MHz)	Packet Type	Total power (mW)			Antenna Power Density PD (mW / MHz)	Nominal Power (mW/MHz)	Tolerance (%)		Verdict
					dBm	mW	Spread Bandwidth (MHz)			Measured	Limit	
NTNV	GFSK	SISO	HOPP	DH5	0.40	1.096	72.056	0.015	0.02	-25.00	20	Pass
	$\pi/4$ DQPSK	SISO	HOPP	2DH5	-2.18	0.606	72.187	0.008	0.02	-60.00	20	Pass
	8DPSK	SISO	HOPP	3DH5	-1.11	0.774	72.337	0.011	0.02	-45.00	20	Pass
Note: 1. Antenna Power Density PD = Total power (mW) / Spread Spectrum Bandwidth MHz												

4.2.1 EIRP

ENV	Mode	TX Type	Frequency (MHz)	ANT	Gain (dBi)	Measured Power (dBm/MHz)	EIRP (dBm/MHz)		Verdict
							Result	Limit	
NTNV	GFSK	SISO	HOPP	1	2.39	-18.861	-16.471	6.91	Pass
	$\pi/4$ DQPSK		HOPP	1	2.39	-20.969	-18.579	6.91	Pass
	8DPSK		HOPP	1	2.39	-20.458	-18.068	6.91	Pass
Note: E.I.R.P = Measured Power + Antenna Gain									

5. Dwell Time

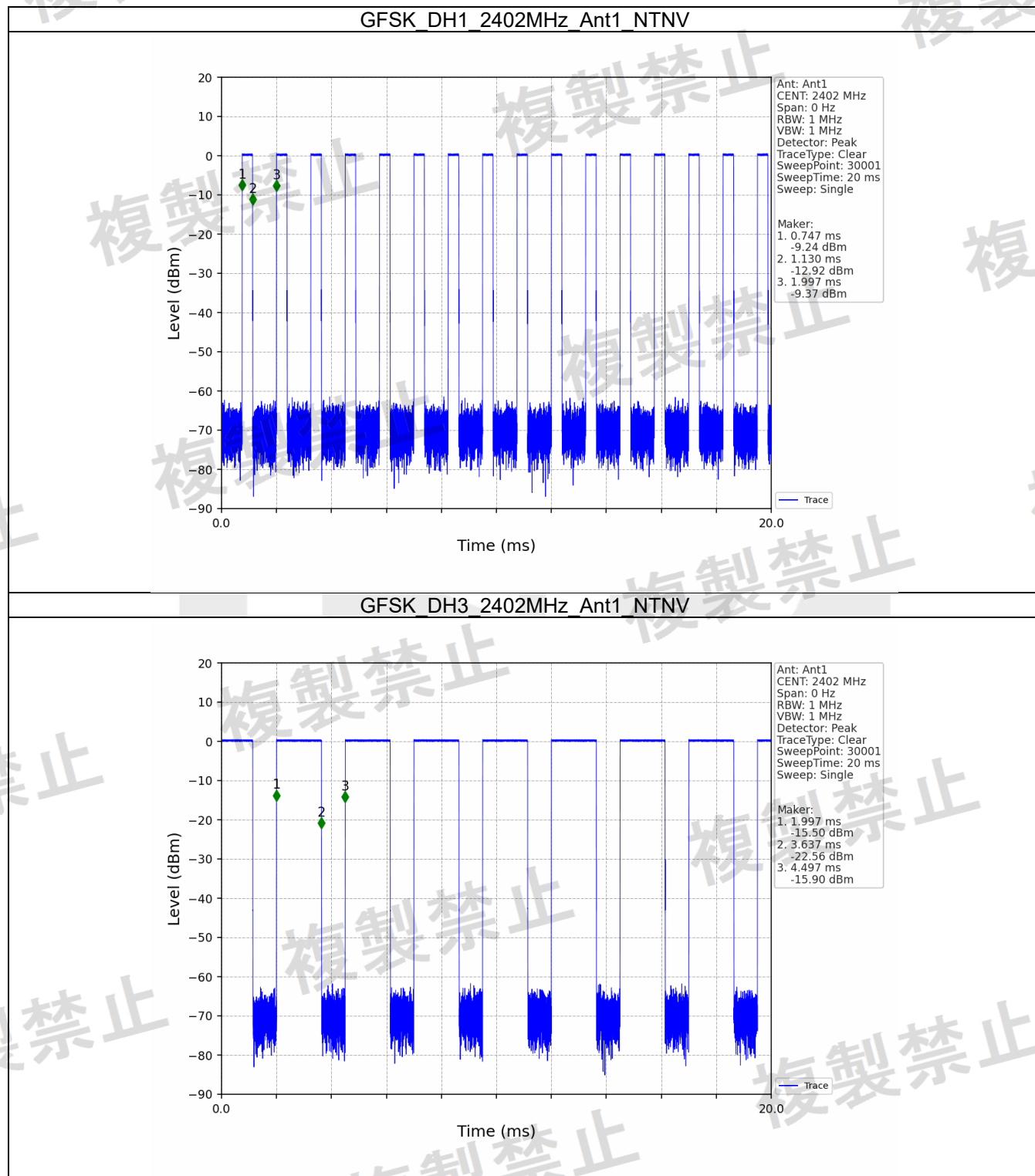
5.1 Test Result

5.1.1 Ant1

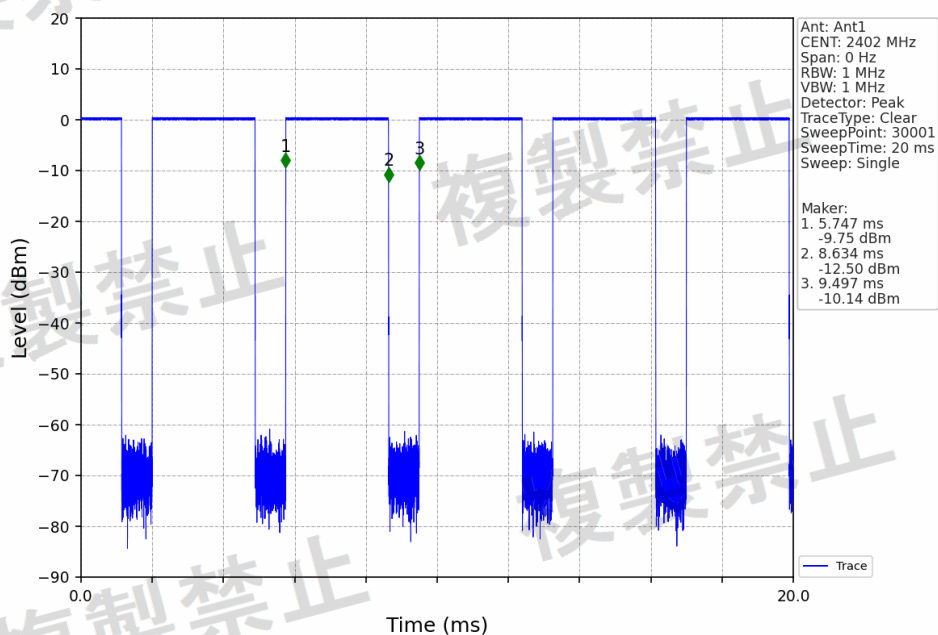
Ant1											
ENV	Mode	TX Type	Frequency (MHz)	Packet Type	Spreading Rate	T_on (ms)	Period (ms)	Hopp Number	Dwell Time (ms)		Verdict
NTNV	GFSK	SISO	2402	DH1	72.056	0.383	1.250	79	111.787	<=400	Pass
				DH3	72.056	1.640	2.500	79	239.335	<=400	Pass
				DH5	72.056	2.887	3.750	79	280.879	<=400	Pass
			2480	DH1	72.056	0.383	1.250	79	111.787	<=400	Pass
				DH3	72.056	1.639	2.500	79	239.189	<=400	Pass
				DH5	72.056	2.887	3.750	79	280.879	<=400	Pass
	$\pi/4$ -DQPSK	SISO	2402	2DH1	72.187	0.393	1.250	79	114.914	<=400	Pass
				2DH3	72.187	1.646	2.500	79	240.648	<=400	Pass
				2DH5	72.187	2.893	3.750	79	281.974	<=400	Pass
			2480	2DH1	72.187	0.394	1.250	79	115.207	<=400	Pass
				2DH3	72.187	1.644	2.500	79	240.355	<=400	Pass
				2DH5	72.187	2.893	3.750	79	281.974	<=400	Pass
	8DPSK	SISO	2402	3DH1	72.337	0.393	1.250	79	115.153	<=400	Pass
				3DH3	72.337	1.644	2.500	79	240.855	<=400	Pass
				3DH5	72.337	2.895	3.750	79	282.755	<=400	Pass
			2480	3DH1	72.337	0.394	1.250	79	115.446	<=400	Pass
				3DH3	72.337	1.644	2.500	79	240.855	<=400	Pass
				3DH5	72.337	2.895	3.750	79	282.755	<=400	Pass

5.2 Test Graph

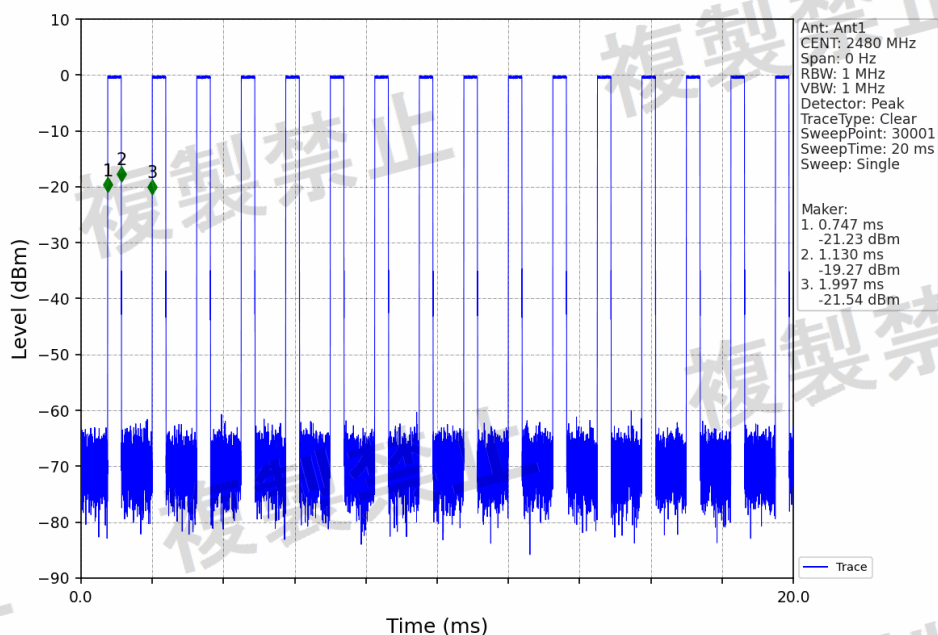
5.2.1 Ant1

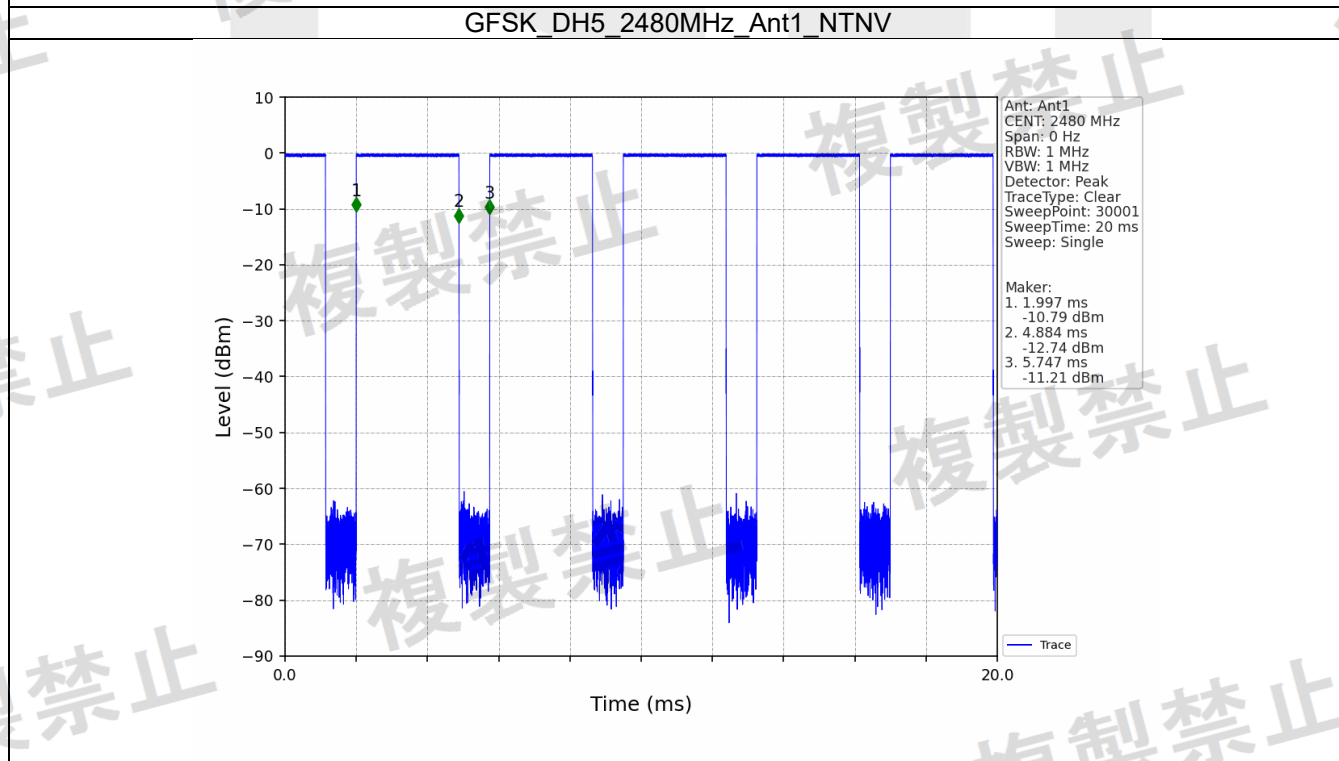
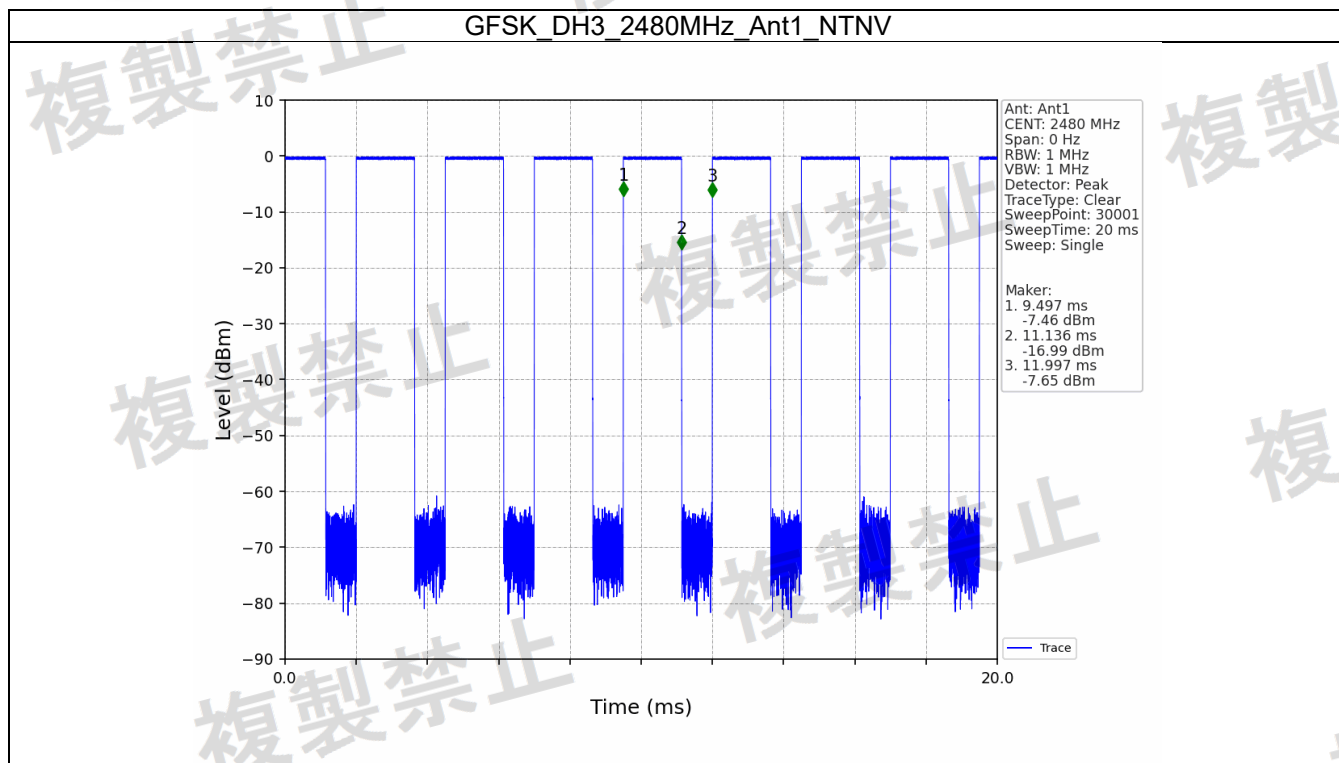


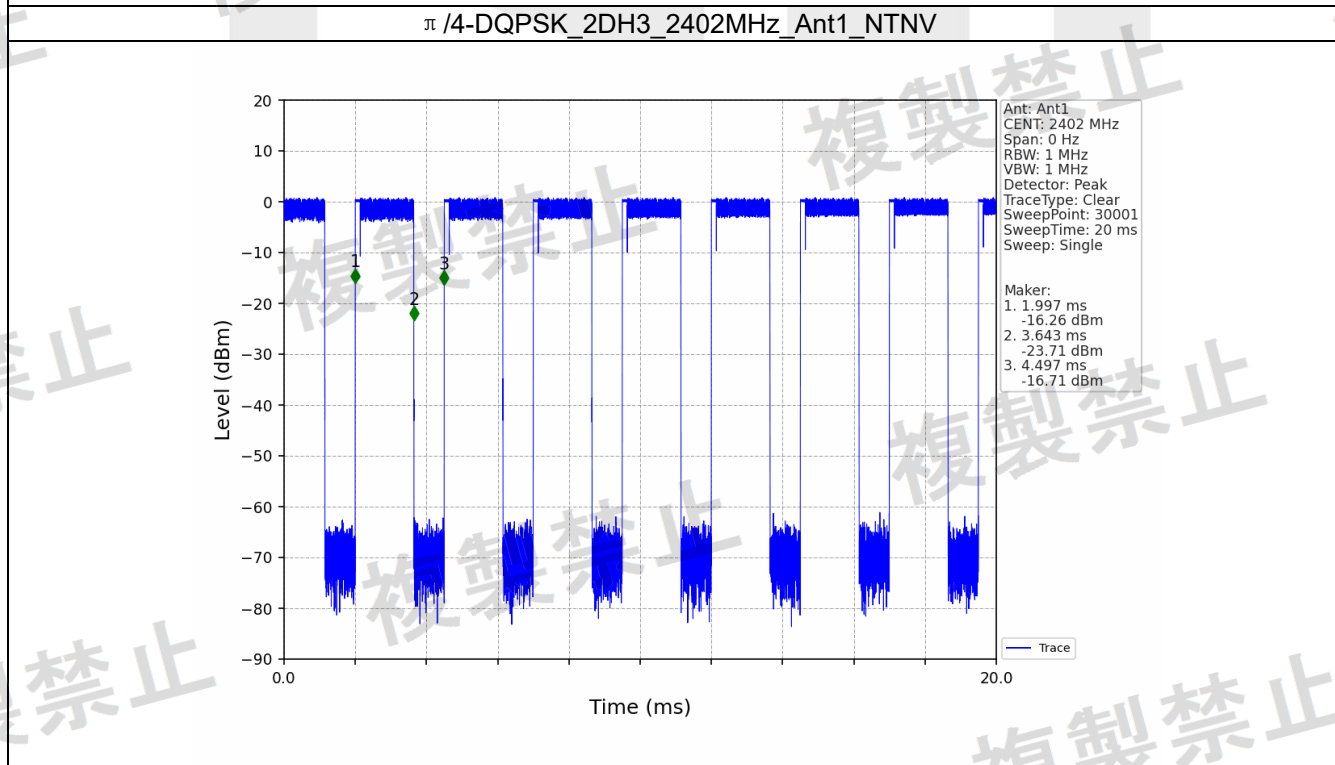
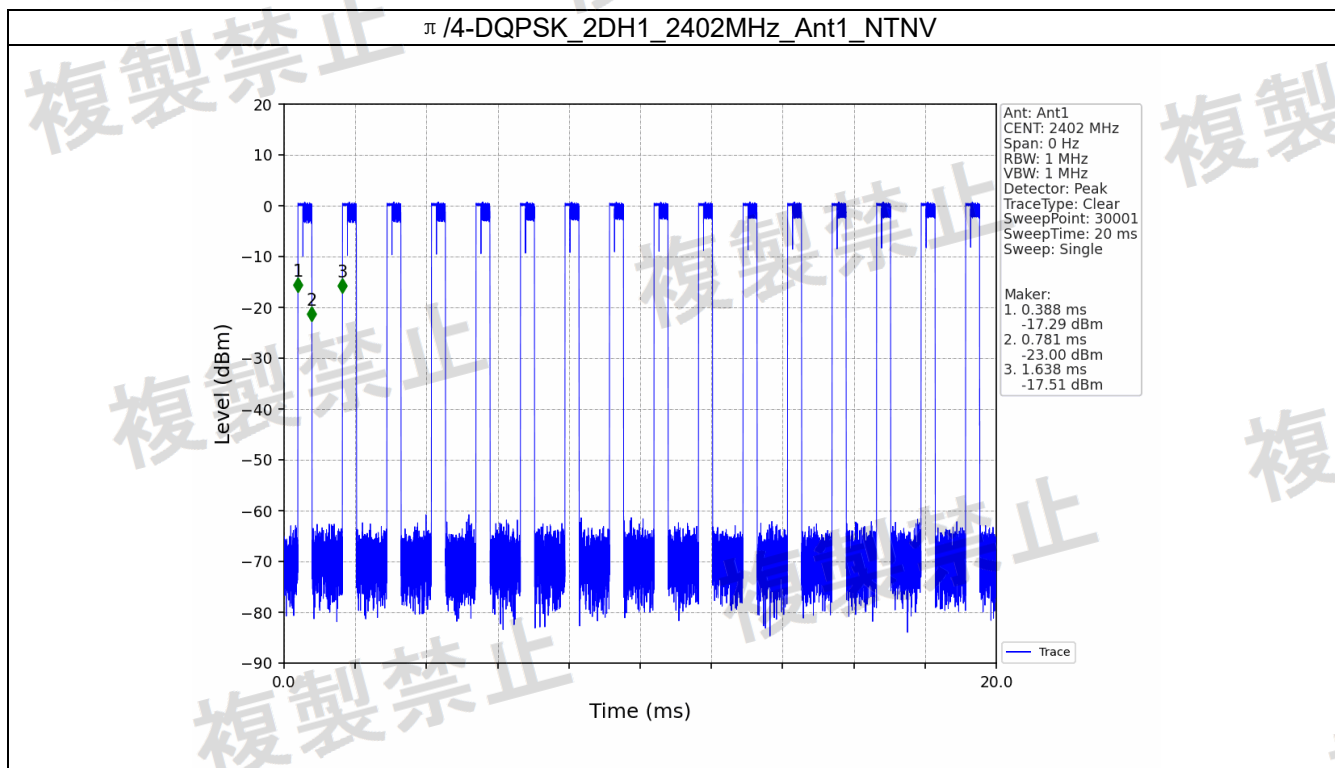
GFSK_DH5_2402MHz_Ant1_NTNV

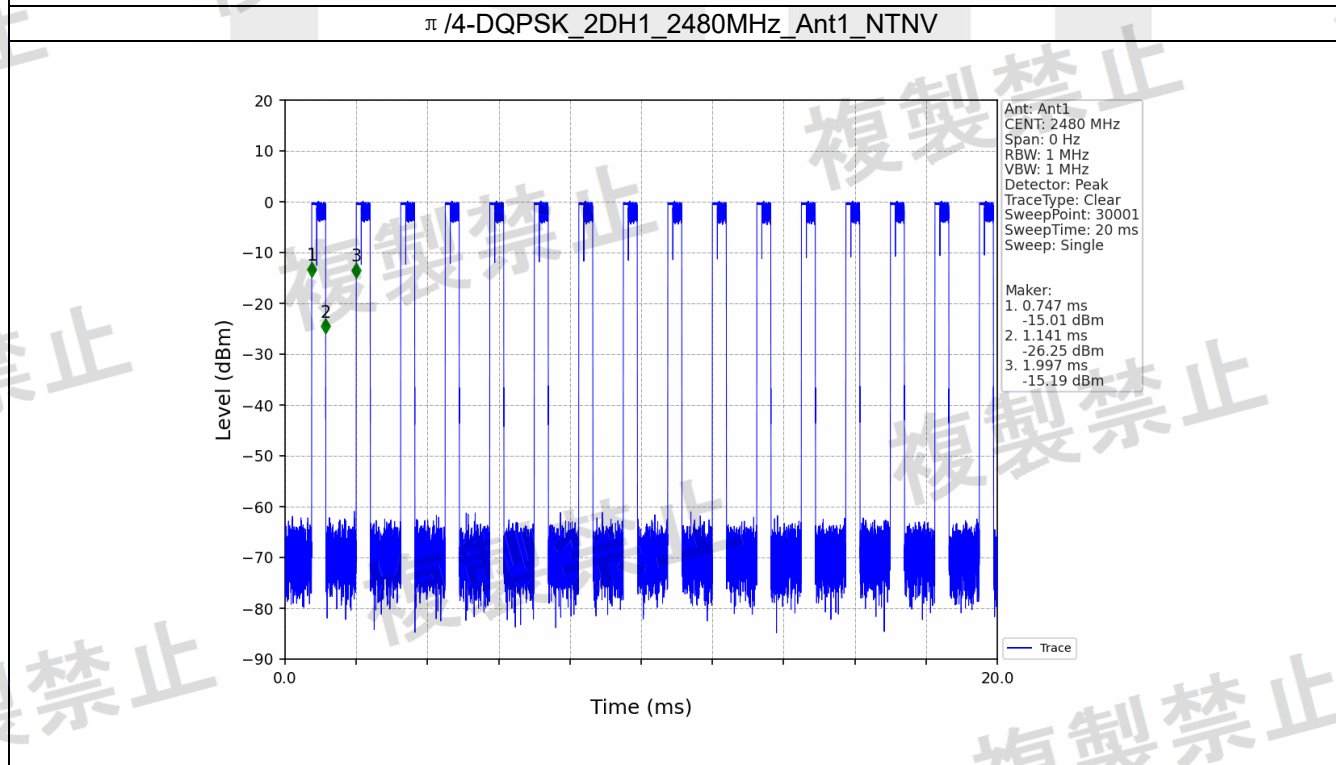
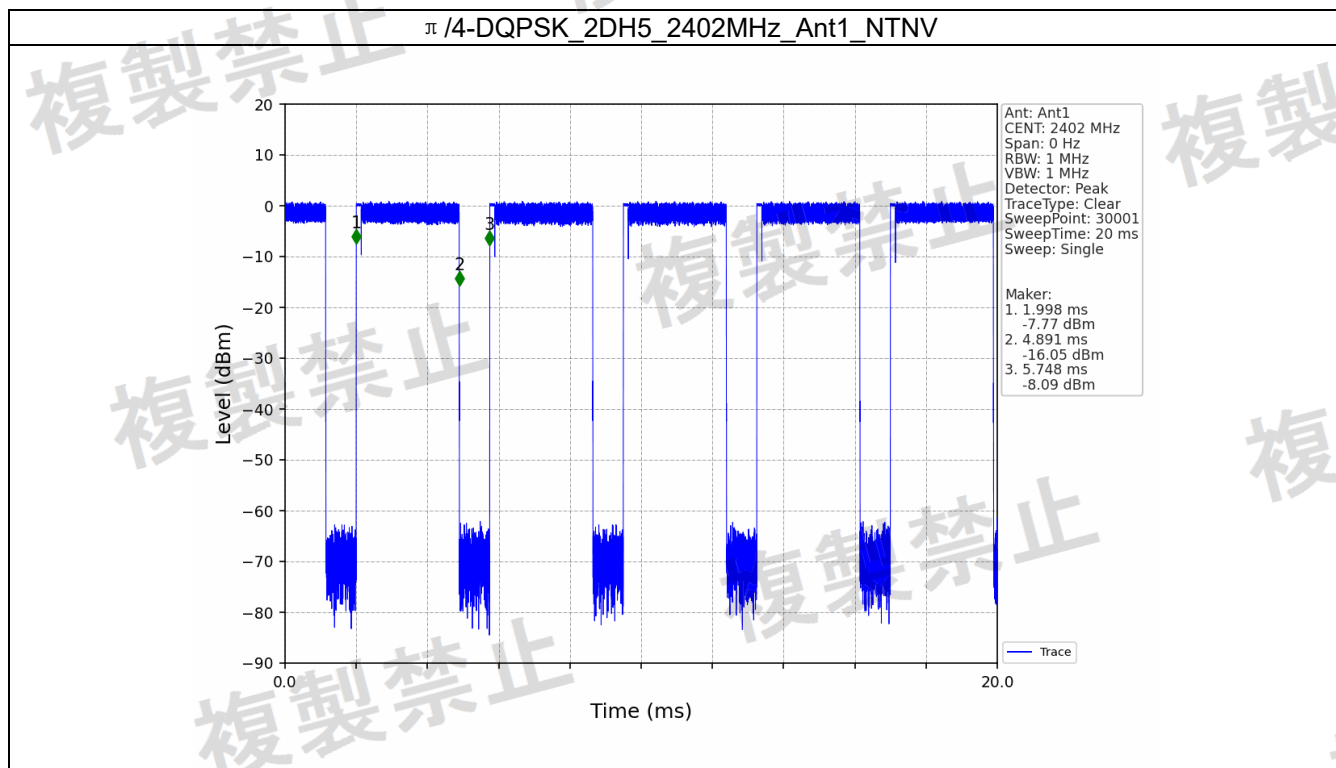


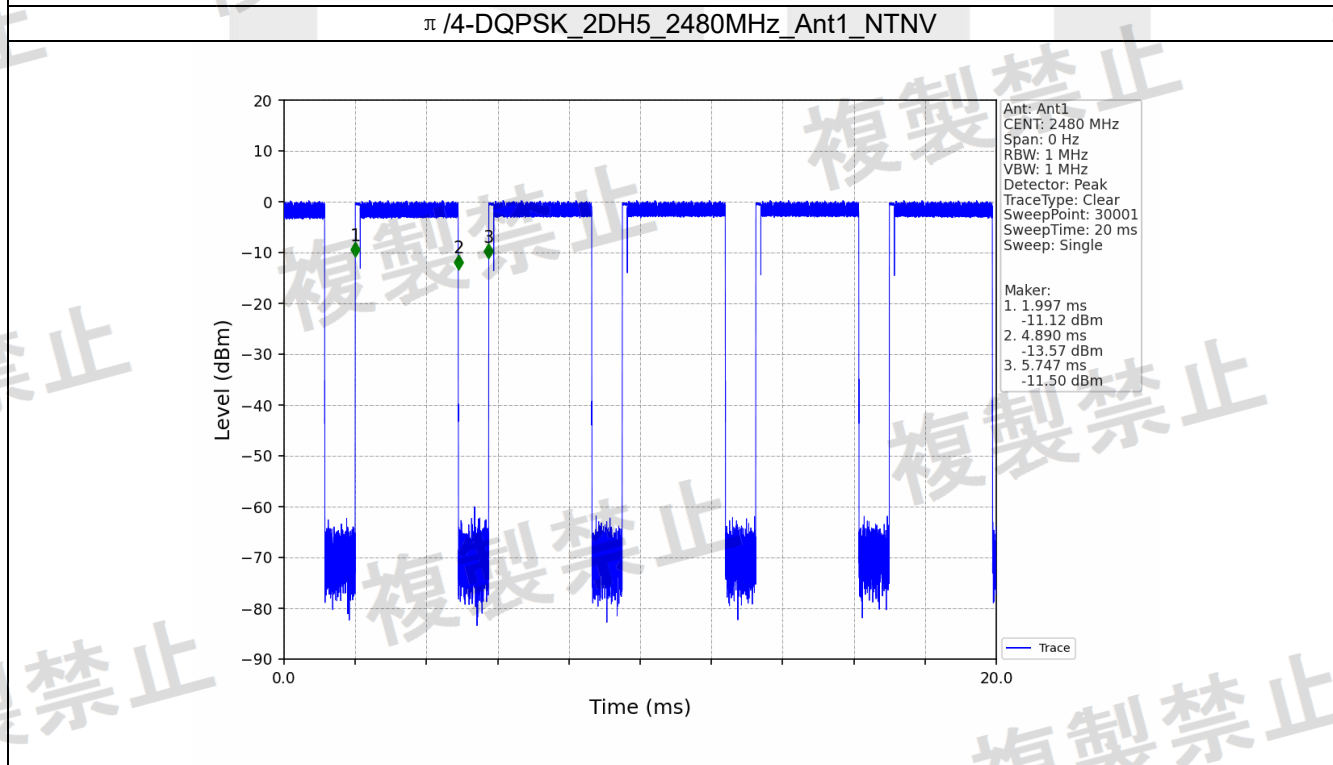
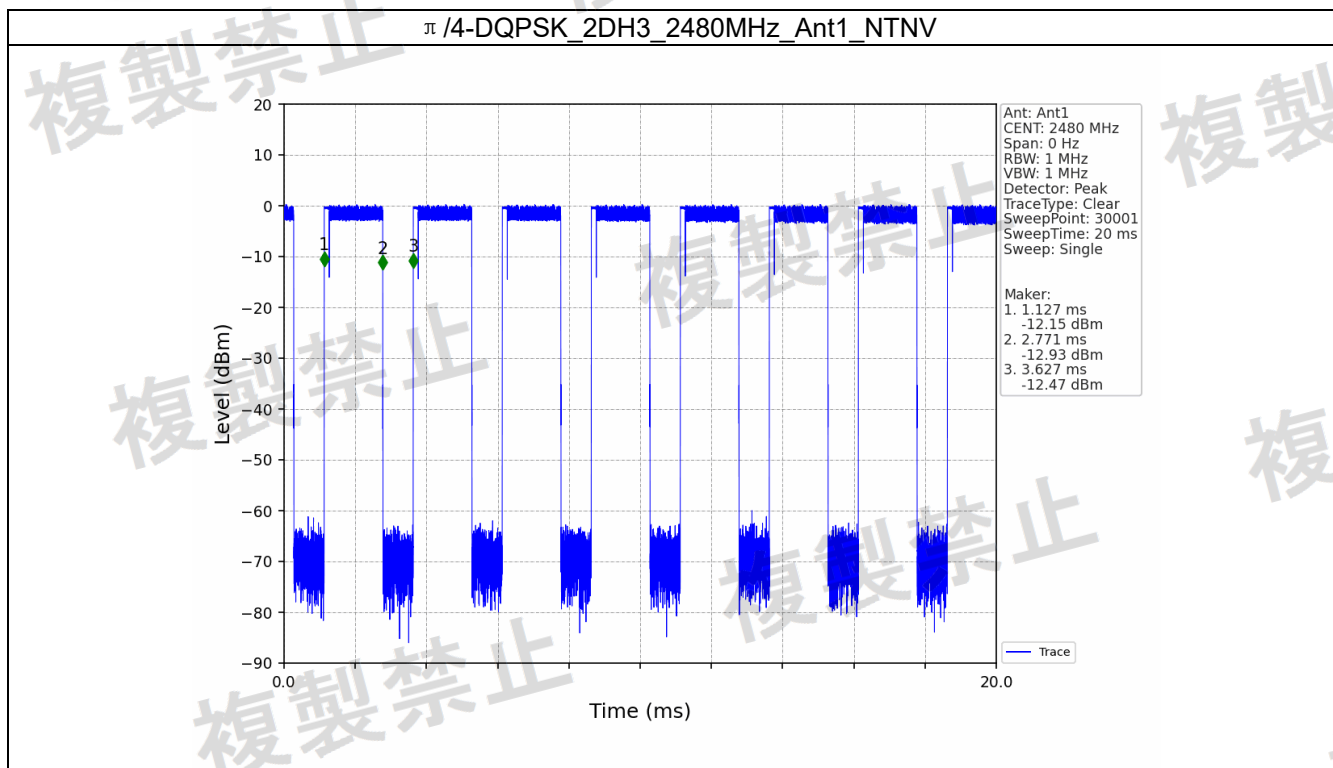
GFSK_DH1_2480MHz_Ant1_NTNV

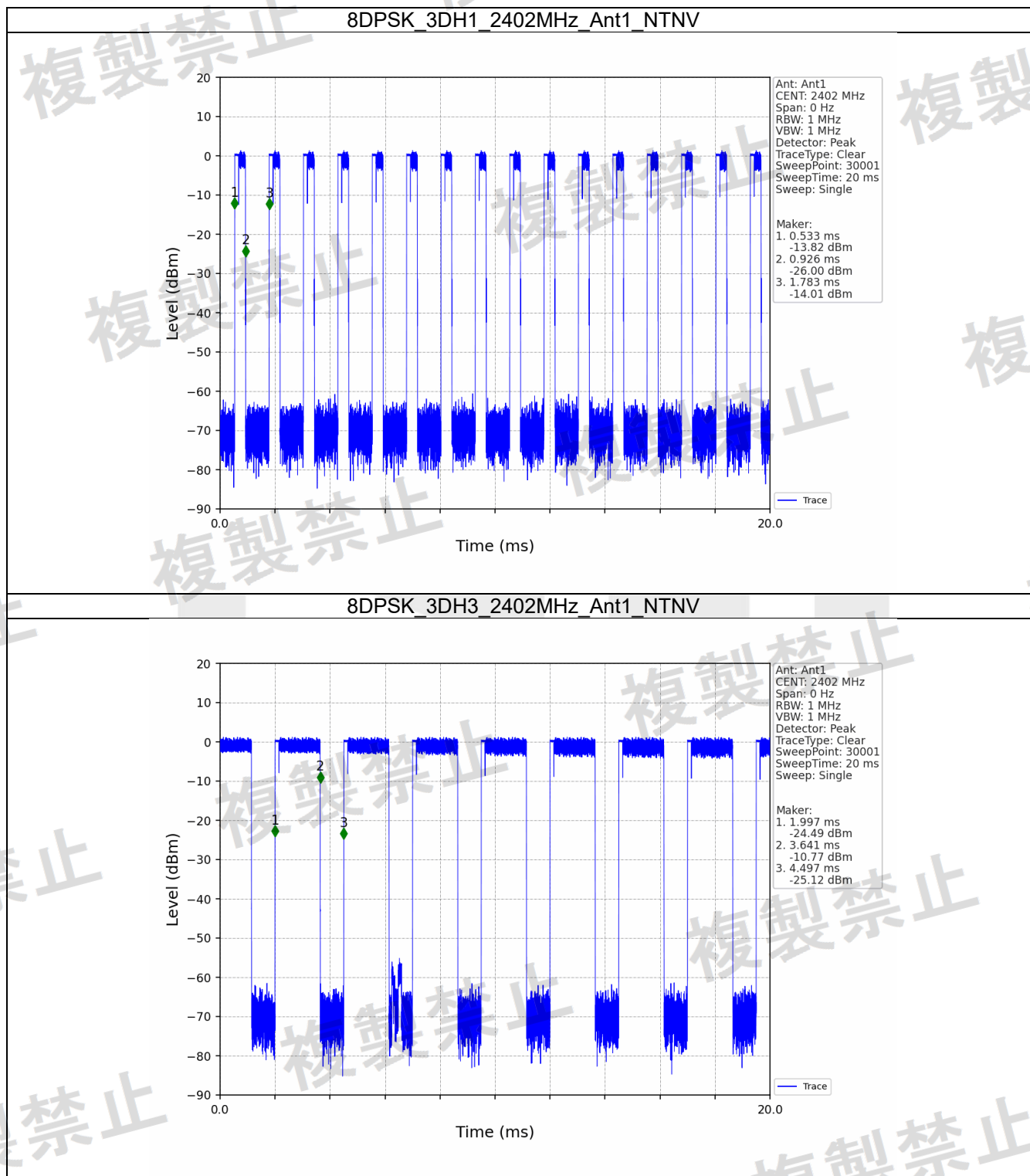


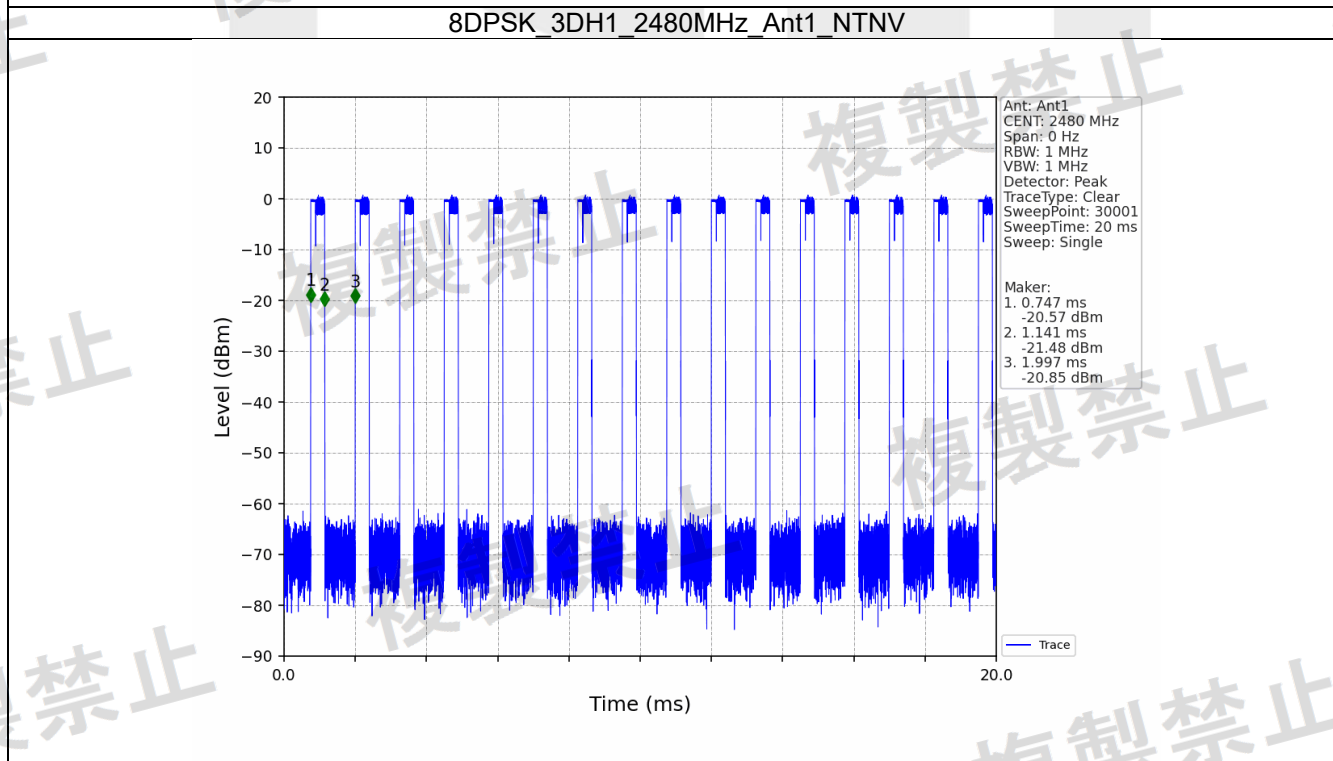
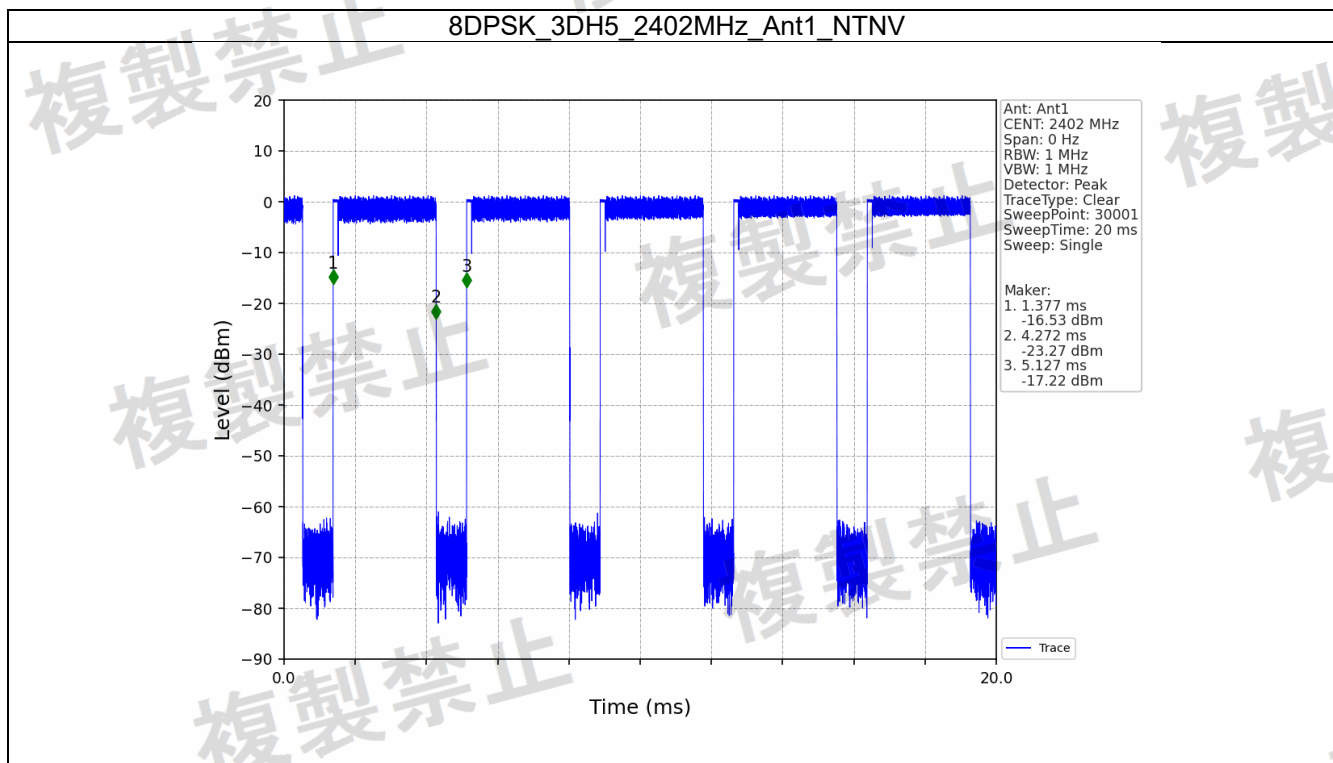


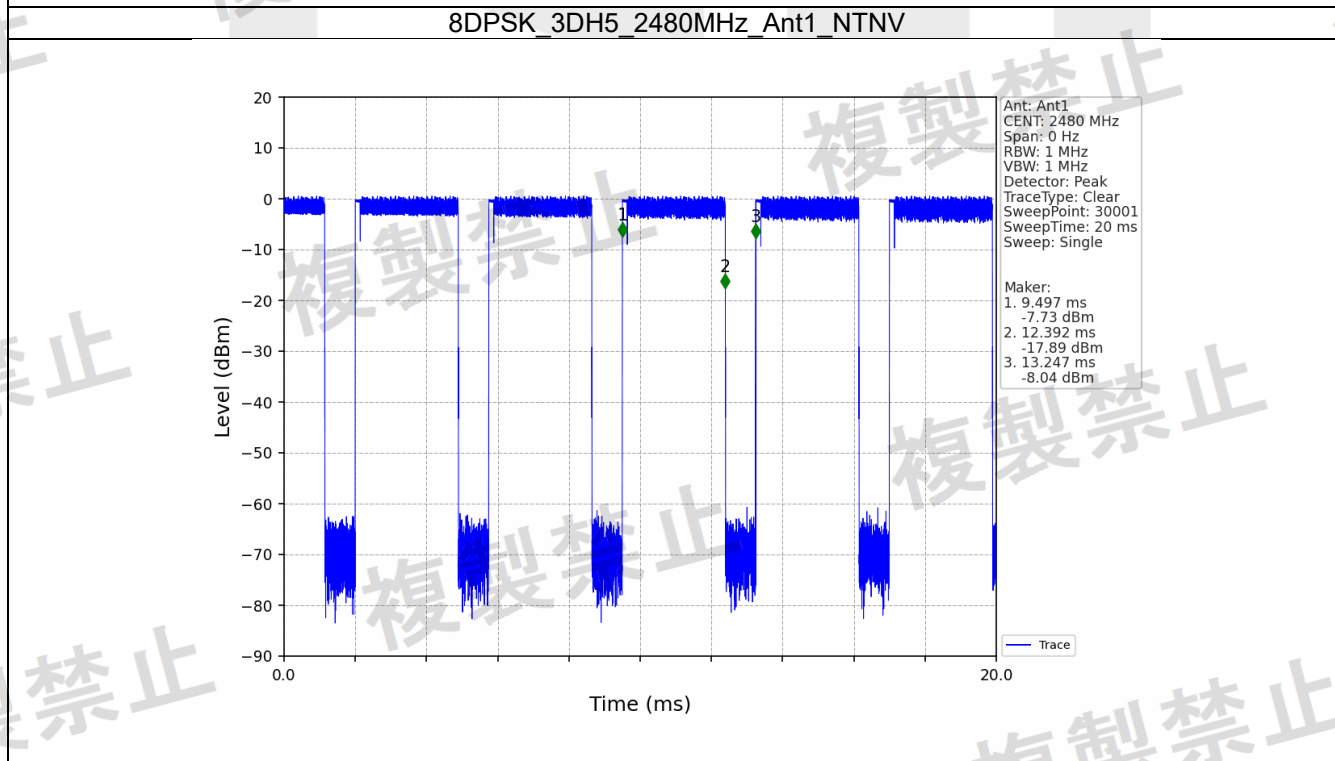
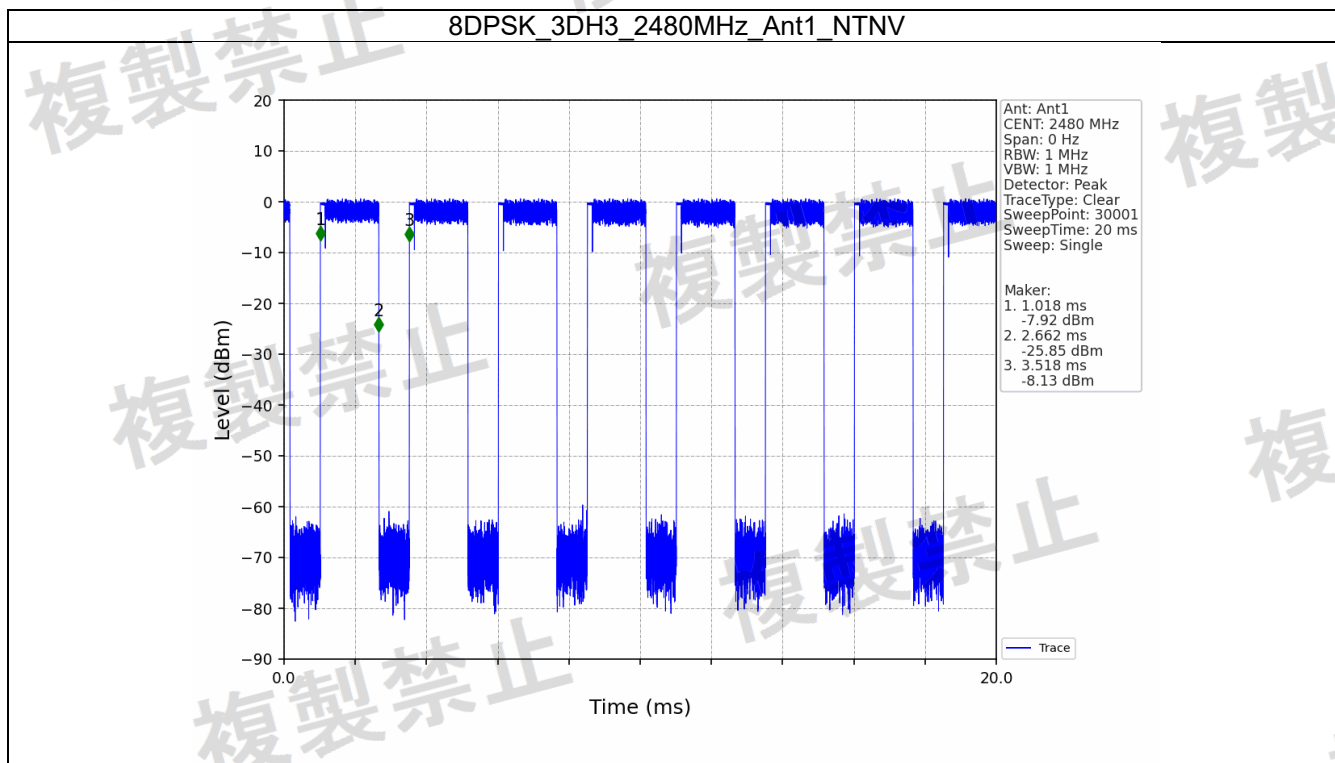












6. Spurious Emission Intensity

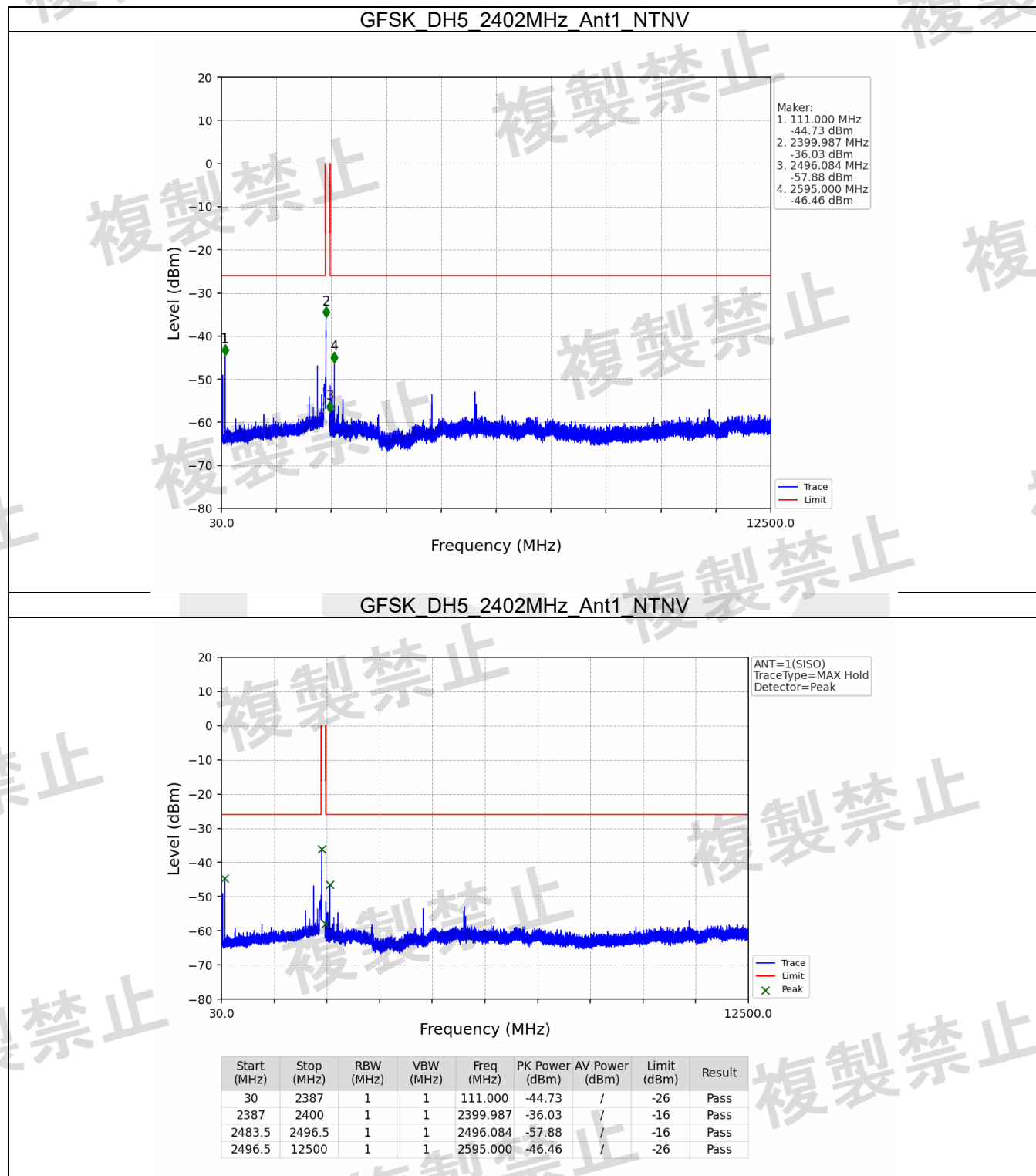
6.1 Test Result

6.1.1 TxSe_NTNV

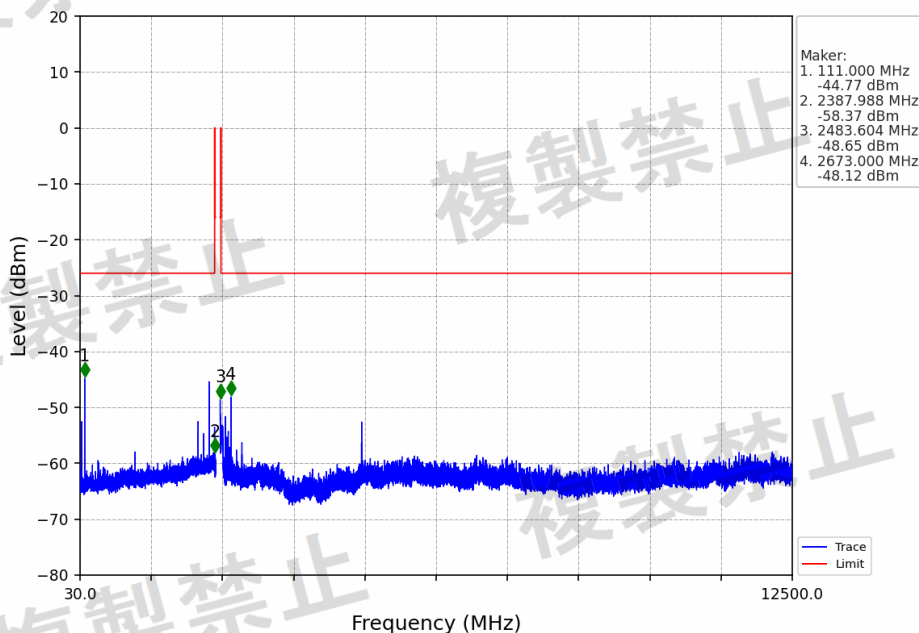
NTNV												
Mode	TX Type	Freq. (MHz)	ANT	Freq. Range		Marker					Limit (uW /MHz)	Verdict
				Start (MHz)	Stop (MHz)	Freq. (MHz)	PK Power (dBm /MHz)	PK Power (uW /MHz)	AV Power (dBm /MHz)	AV Power (uW /MHz)		
GFSK	SISO	2402	1	30	2387	111	-44.73	0.034	/	/	2.5	Pass
				2387	2400	2399.987	-36.03	0.249	/	/	25	Pass
				2483.5	2496.5	2496.084	-57.88	0.002	/	/	25	Pass
				2496.5	12500	2595	-46.46	0.023	/	/	2.5	Pass
		2480	1	30	2387	111	-44.77	0.033	/	/	2.5	Pass
				2387	2400	2387.988	-58.37	0.001	/	/	25	Pass
				2483.5	2496.5	2483.604	-48.65	0.014	/	/	25	Pass
				2496.5	12500	2673	-48.12	0.015	/	/	2.5	Pass
$\pi/4$ -DQPSK	SISO	2402	1	30	2387	111	-44.81	0.033	/	/	2.5	Pass
				2387	2400	2399.987	-33.69	0.428	/	/	25	Pass
				2483.5	2496.5	2495.044	-56.40	0.002	/	/	25	Pass
				2496.5	12500	2595	-47.26	0.019	/	/	2.5	Pass
		2480	1	30	2387	111	-44.76	0.033	/	/	2.5	Pass
				2387	2400	2399.701	-57.82	0.002	/	/	25	Pass
				2483.5	2496.5	2483.513	-44.89	0.032	/	/	25	Pass
				2496.5	12500	2673	-49.10	0.012	/	/	2.5	Pass
8DPSK	SISO	2402	1	30	2387	111	-44.75	0.033	/	/	2.5	Pass
				2387	2400	2399.961	-32.10	0.617	/	/	25	Pass
				2483.5	2496.5	2488.388	-58.51	0.001	/	/	25	Pass
				2496.5	12500	2594.5	-46.54	0.022	/	/	2.5	Pass
		2480	1	30	2387	111	-44.79	0.033	/	/	2.5	Pass
				2387	2400	2395.346	-58.61	0.001	/	/	25	Pass
				2483.5	2496.5	2483.513	-40.16	0.096	/	/	25	Pass
				2496.5	12500	2672.5	-48.03	0.016	/	/	2.5	Pass

6.2 Test Graph

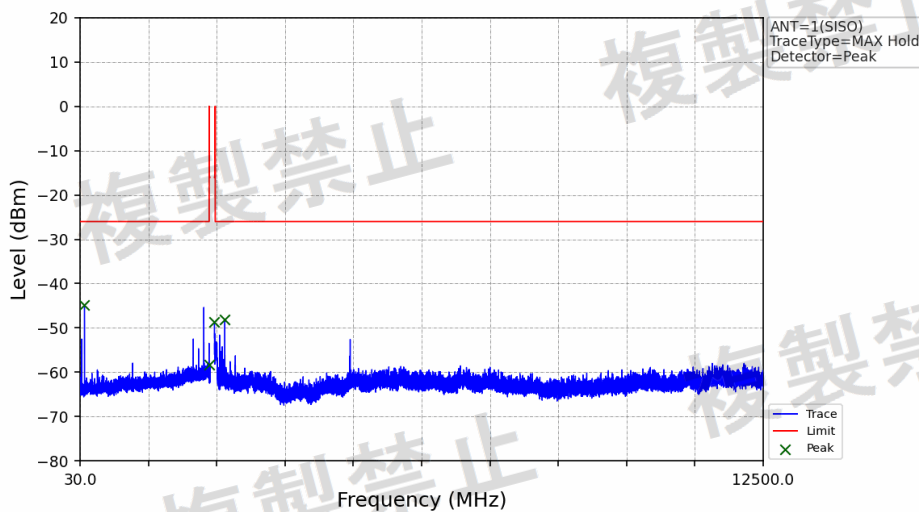
6.2.1 TxSe_NTNV



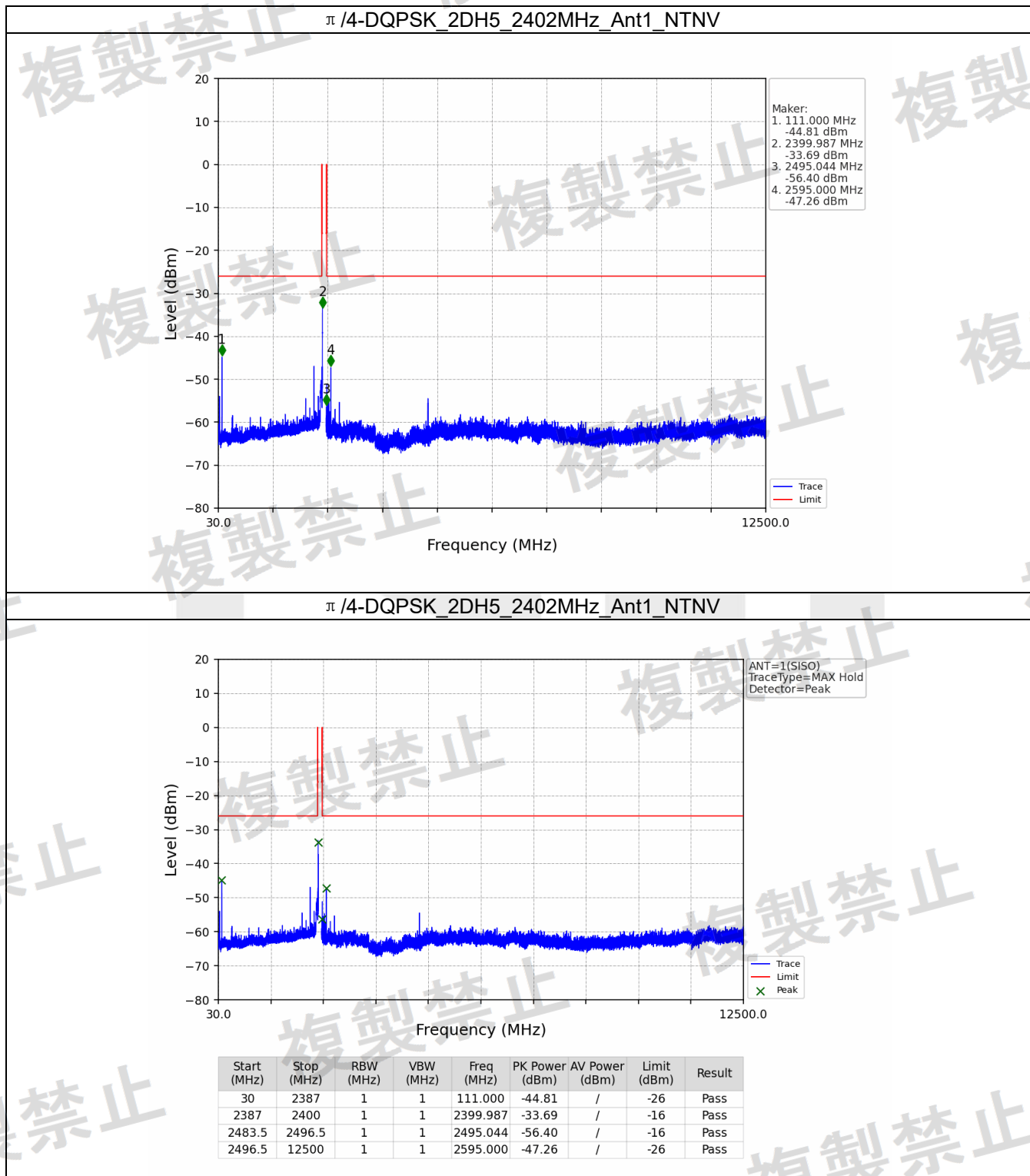
GFSK_DH5_2480MHz_Ant1_NTNV

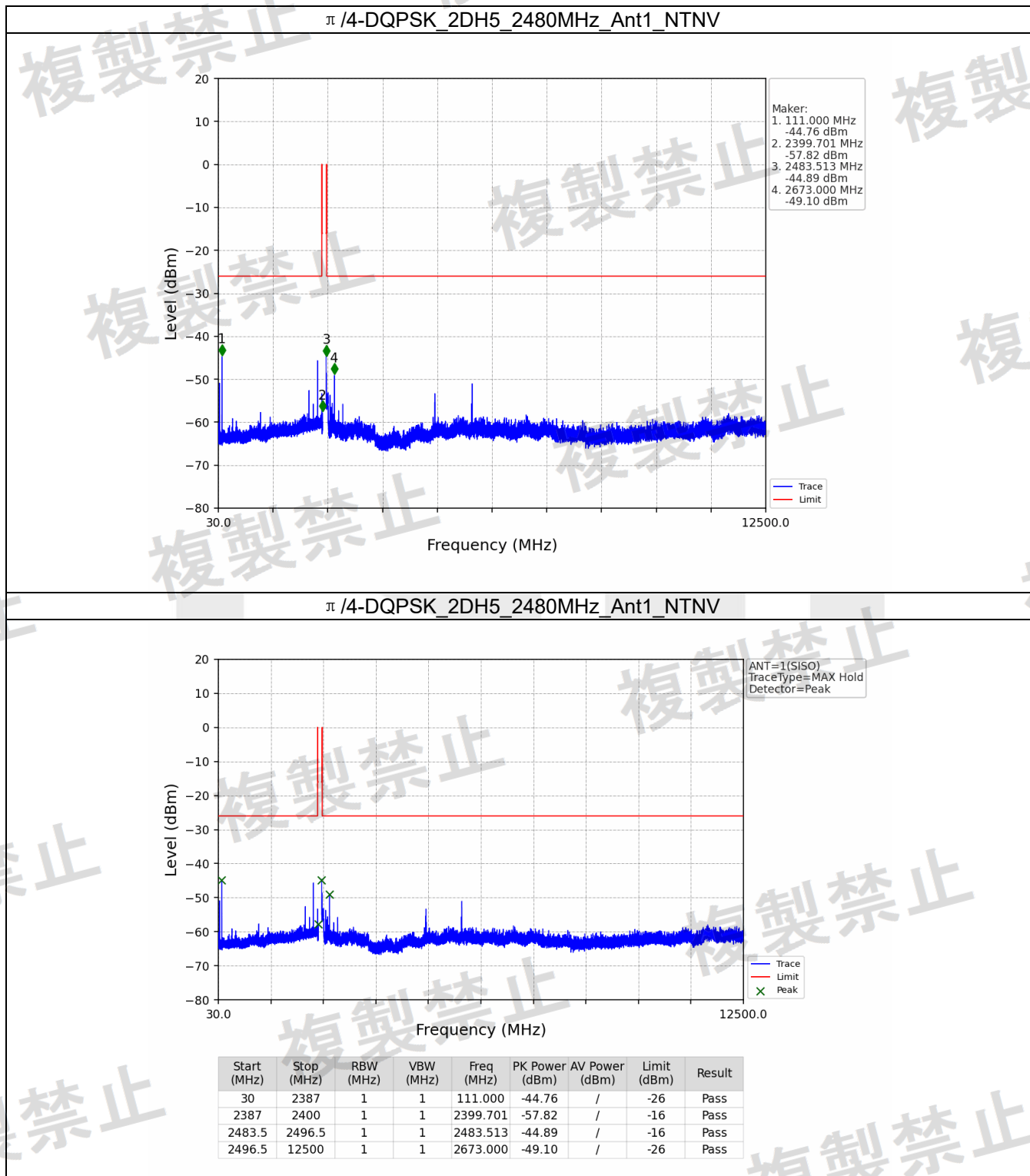


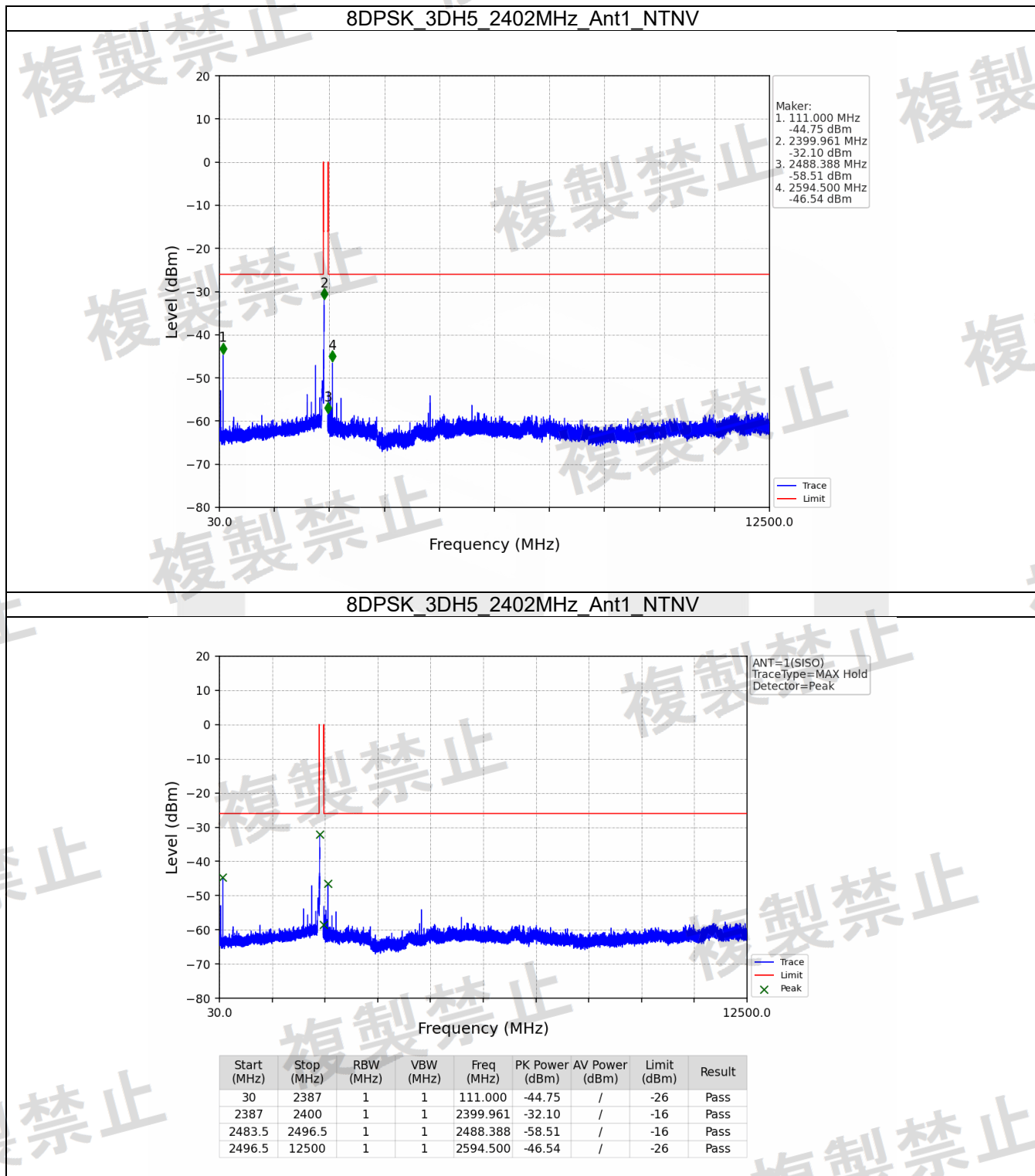
GFSK_DH5_2480MHz_Ant1_NTNV

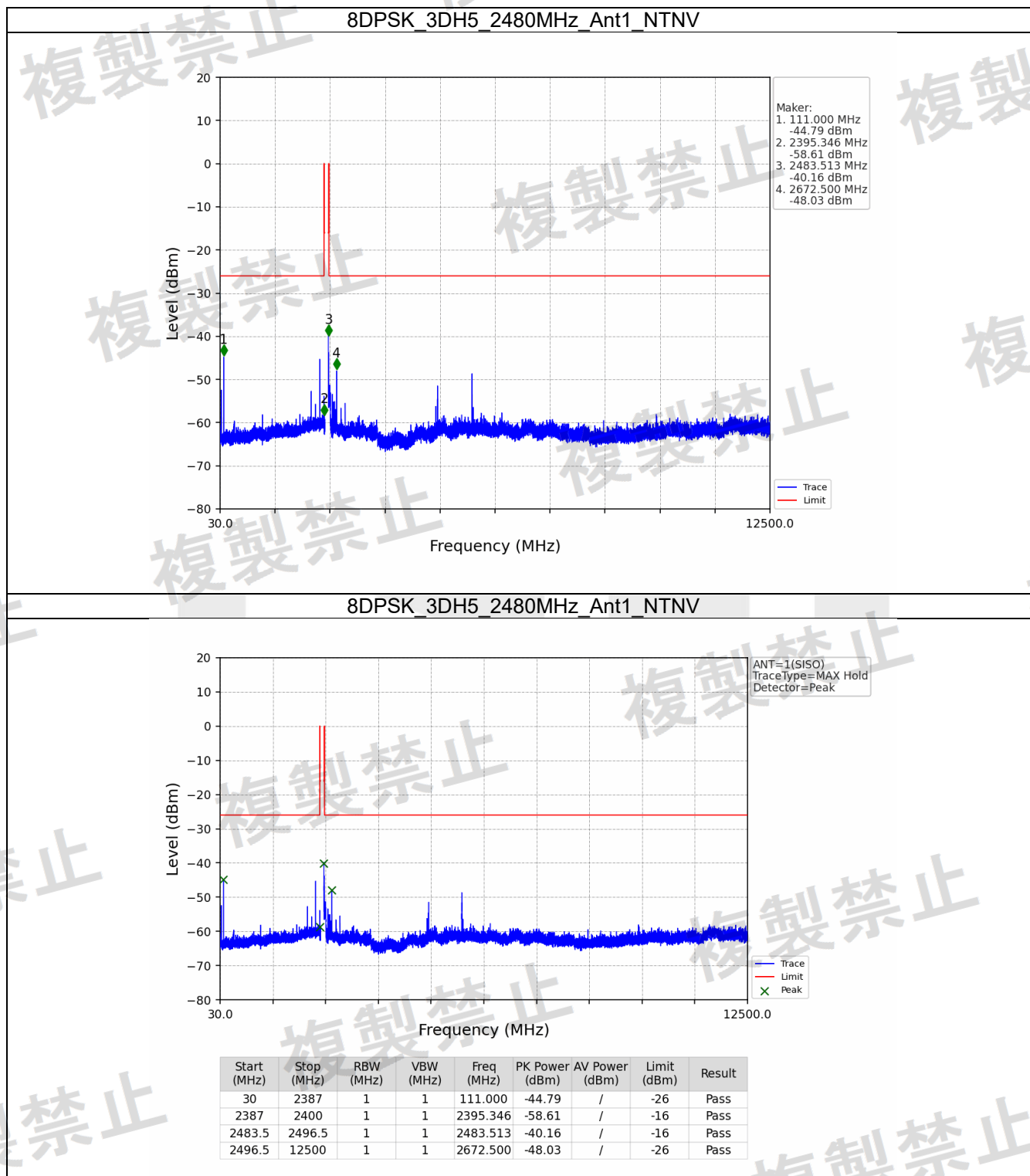


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	111.000	-44.77	/	-26	Pass
2387	2400	1	1	2387.988	-58.37	/	-16	Pass
2483.5	2496.5	1	1	2483.604	-48.65	/	-16	Pass
2496.5	12500	1	1	2673.000	-48.12	/	-26	Pass









7. Secondary Radiated Emission

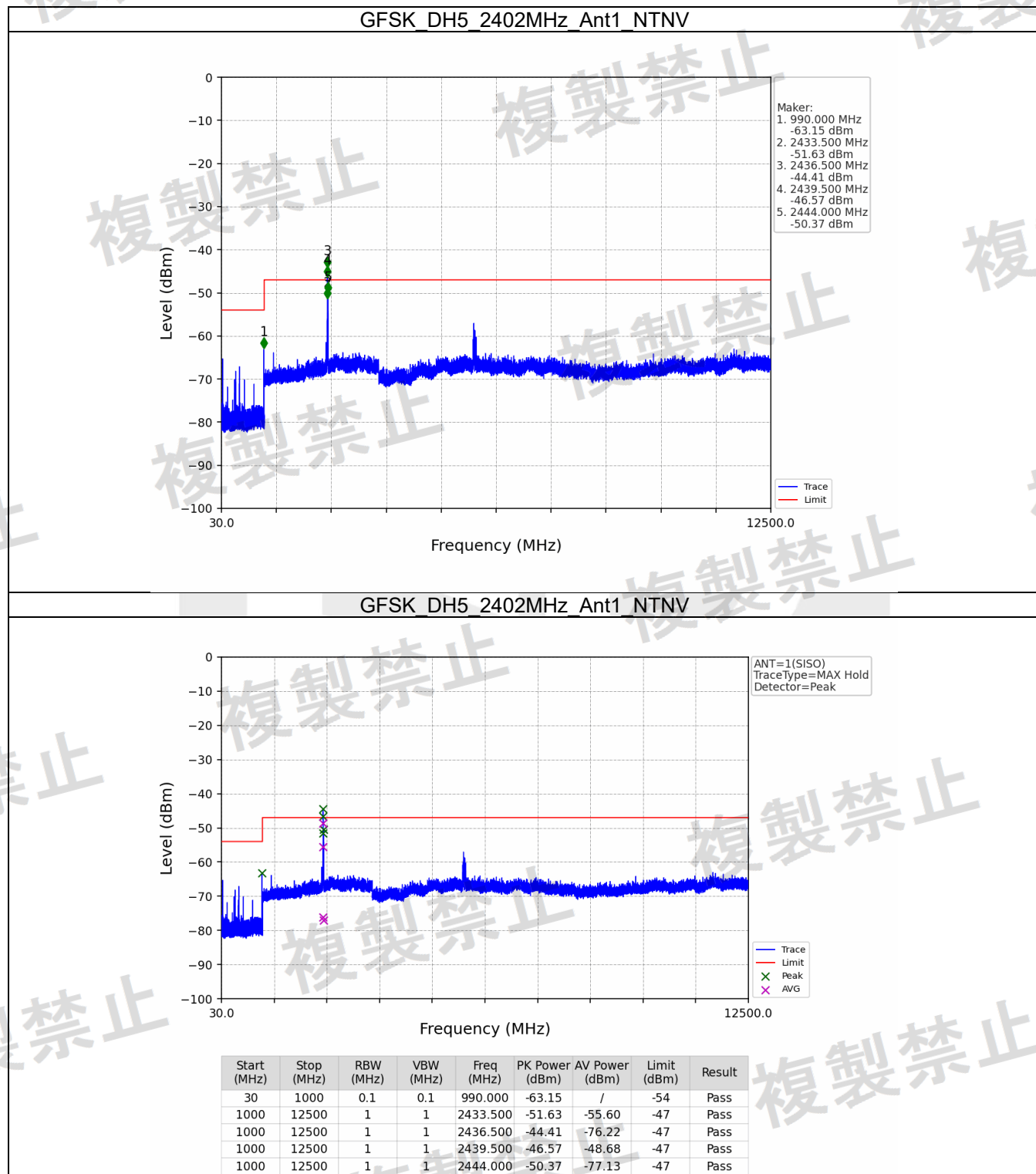
7.1 Test Result

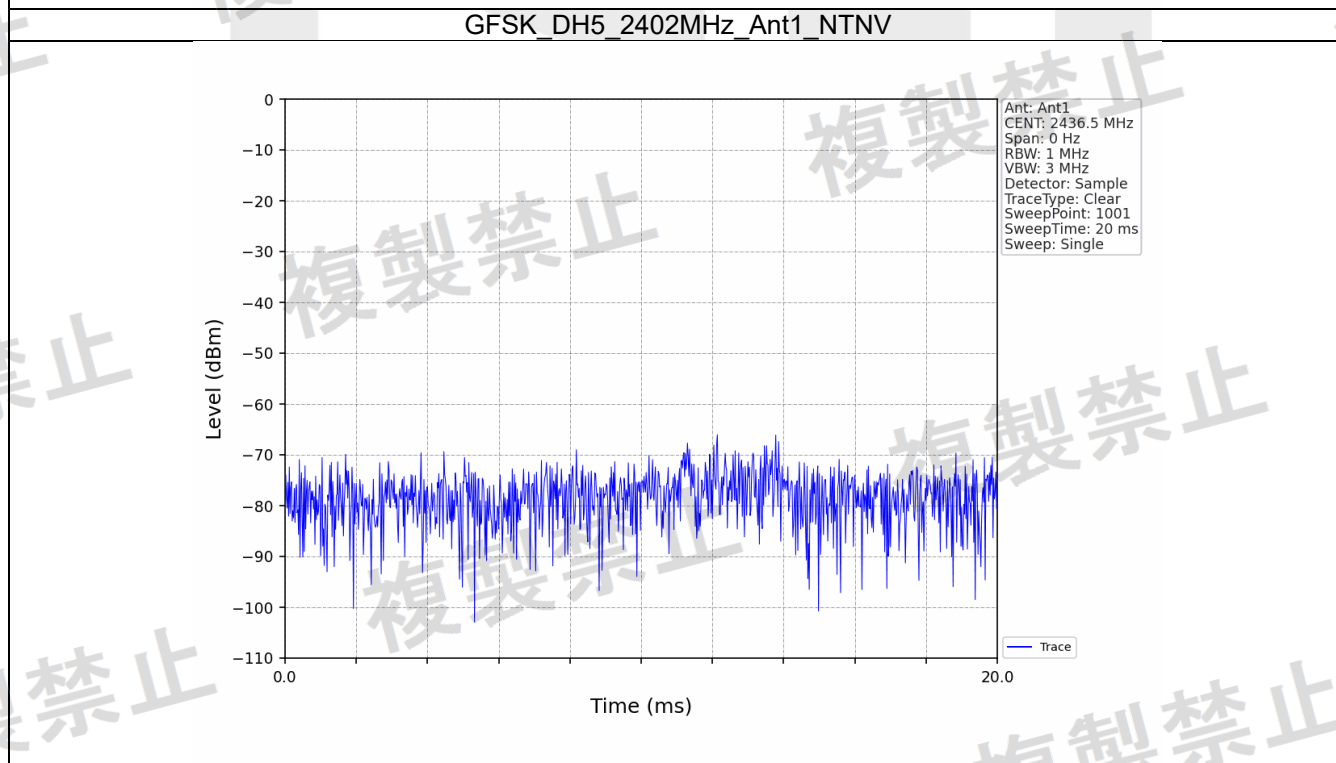
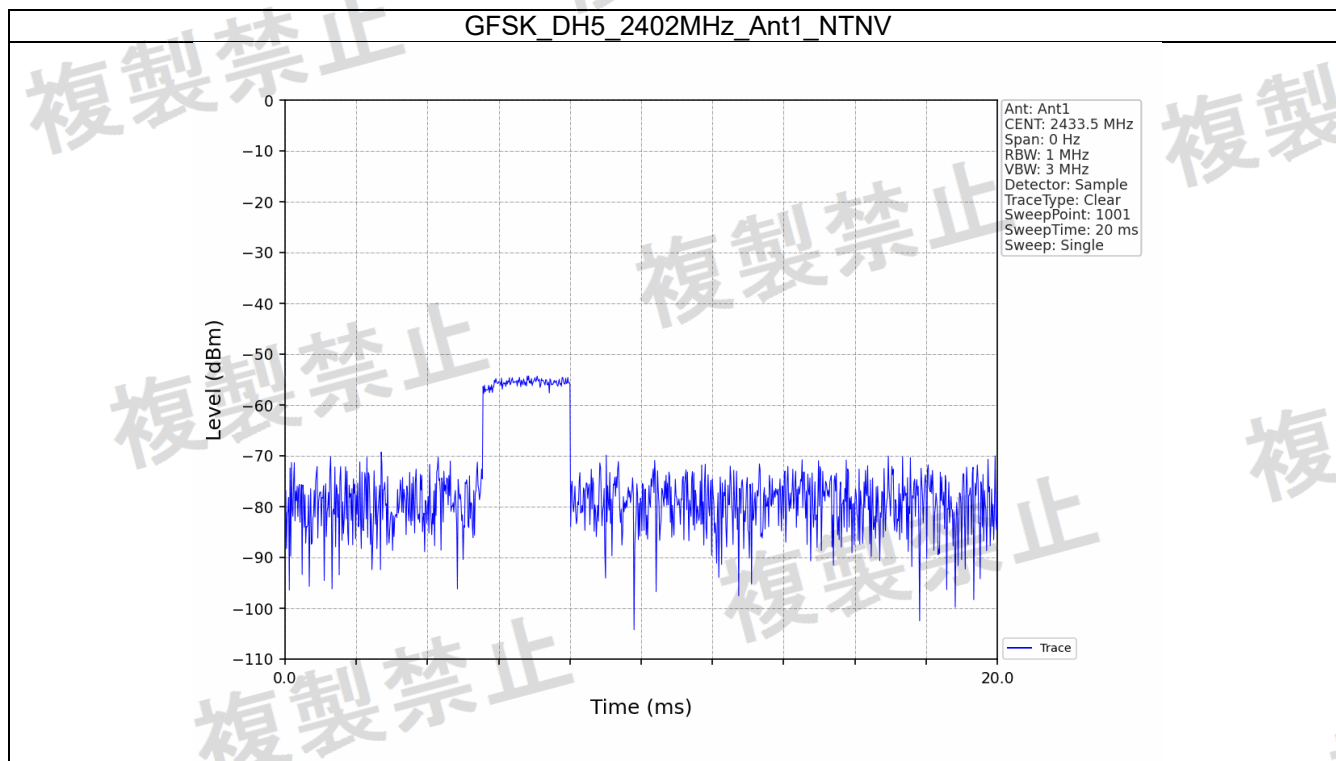
7.1.1 RxSe_NTNV

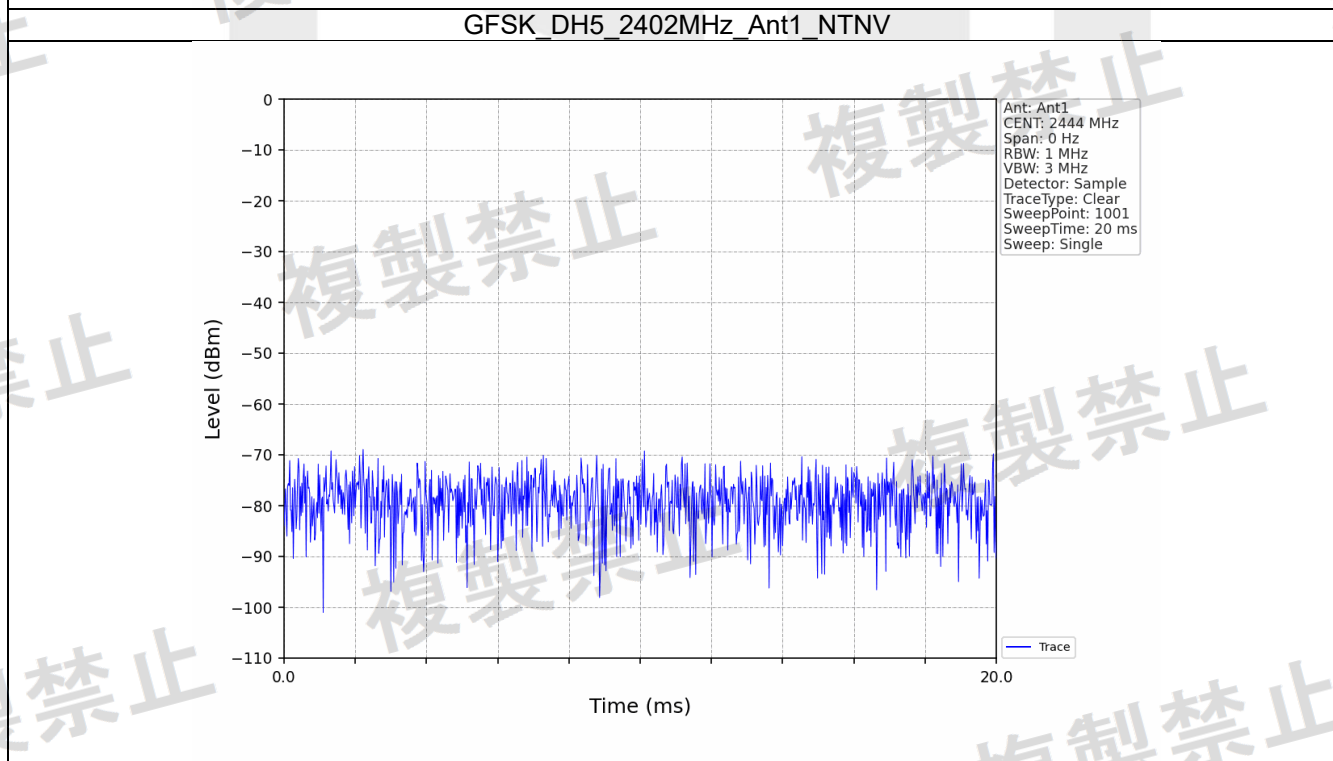
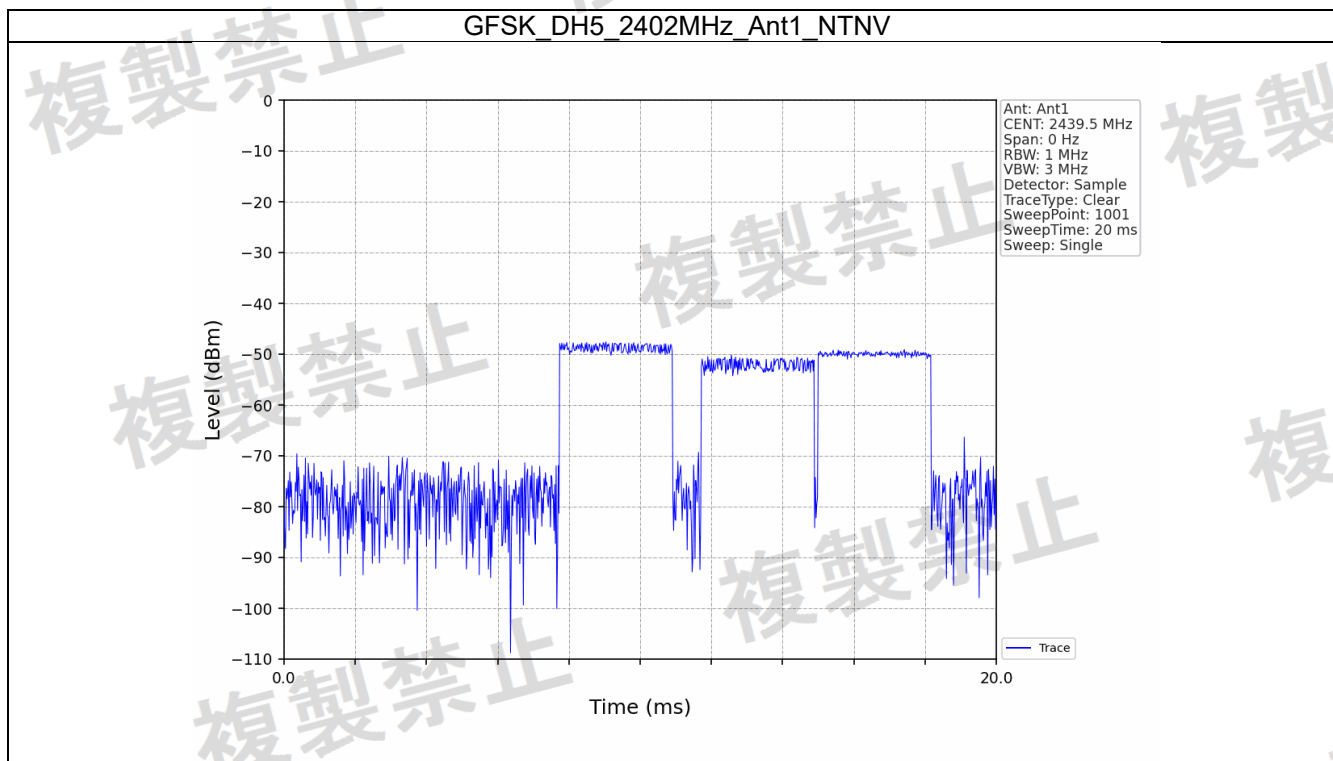
NTNV												
Mode	TX Type	Freq. (MHz)	ANT	Freq. Range		Marker					Limit (nW)	Verdict
				Start (MHz)	Stop (MHz)	Freq. (MHz)	PK Power (dBm)	PK Power (nW)	AV Power (dBm)	AV Power (nW)		
GFSK	SISO	2402	1	30	1000	990	-63.15	0.484	/	/	4	Pass
				1000	12500	2433.5	-51.63	6.871	-55.60	2.754	20	Pass
						2436.5	-44.41	36.224	-76.22	0.024	20	Pass
						2439.5	-46.57	22.029	-48.68	13.552	20	Pass
						2444	-50.37	9.183	-77.13	0.019	20	Pass
		2480	1	30	1000	990	-63.38	0.459	/	/	4	Pass
				1000	12500	2434.5	-50.92	8.091	-77.24	0.019	20	Pass
						2437.5	-46.19	24.044	-51.56	6.982	20	Pass
						2440.5	-49.58	11.015	-76.72	0.021	20	Pass
						5741	-50.31	9.311	-77.10	0.019	20	Pass
$\pi/4$ -DQPSK	SISO	2402	1	30	1000	990	-63.28	0.470	/	/	4	Pass
				1000	12500	2436.5	-48.26	14.928	-76.88	0.021	20	Pass
						2441.5	-49.44	11.376	-76.95	0.020	20	Pass
		2480	1	30	1000	990	-63.02	0.499	/	/	4	Pass
				1000	12500	2402.5	-52.45	5.689	-76.97	0.020	20	Pass
						2427	-47.53	17.660	-77.17	0.019	20	Pass
						2434.5	-45.97	25.293	-76.81	0.021	20	Pass
						2439	-42.64	54.450	-54.00	3.981	20	Pass
						2443	-51.54	7.015	-77.13	0.019	20	Pass
8DPSK	SISO	2402	1	30	1000	800.6	-76.62	0.022	/	/	4	Pass
				1000	12500	2433	-55.37	2.904	/	/	20	Pass
		2480	1	30	1000	990	-63.44	0.453	/	/	4	Pass
				1000	12500	2437	-42.75	53.088	-76.87	0.021	20	Pass
						2441	-45.99	25.177	-76.87	0.021	20	Pass

7.2 Test Graph

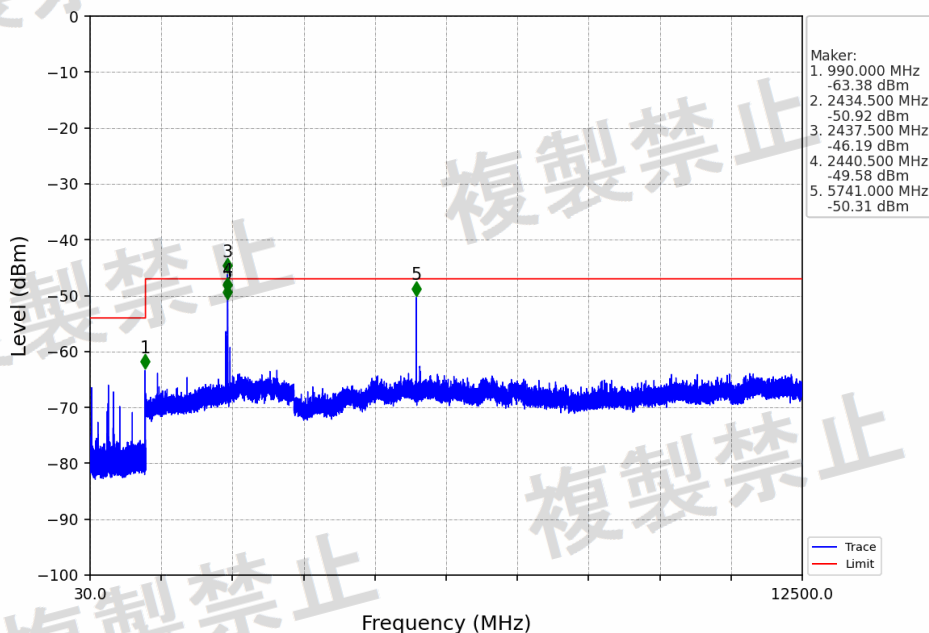
7.2.1 RxSe_NTNV



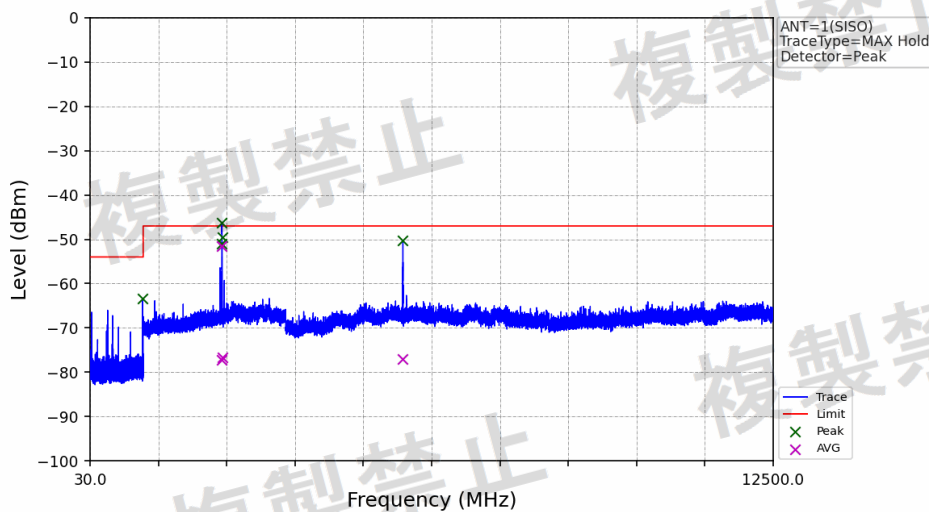




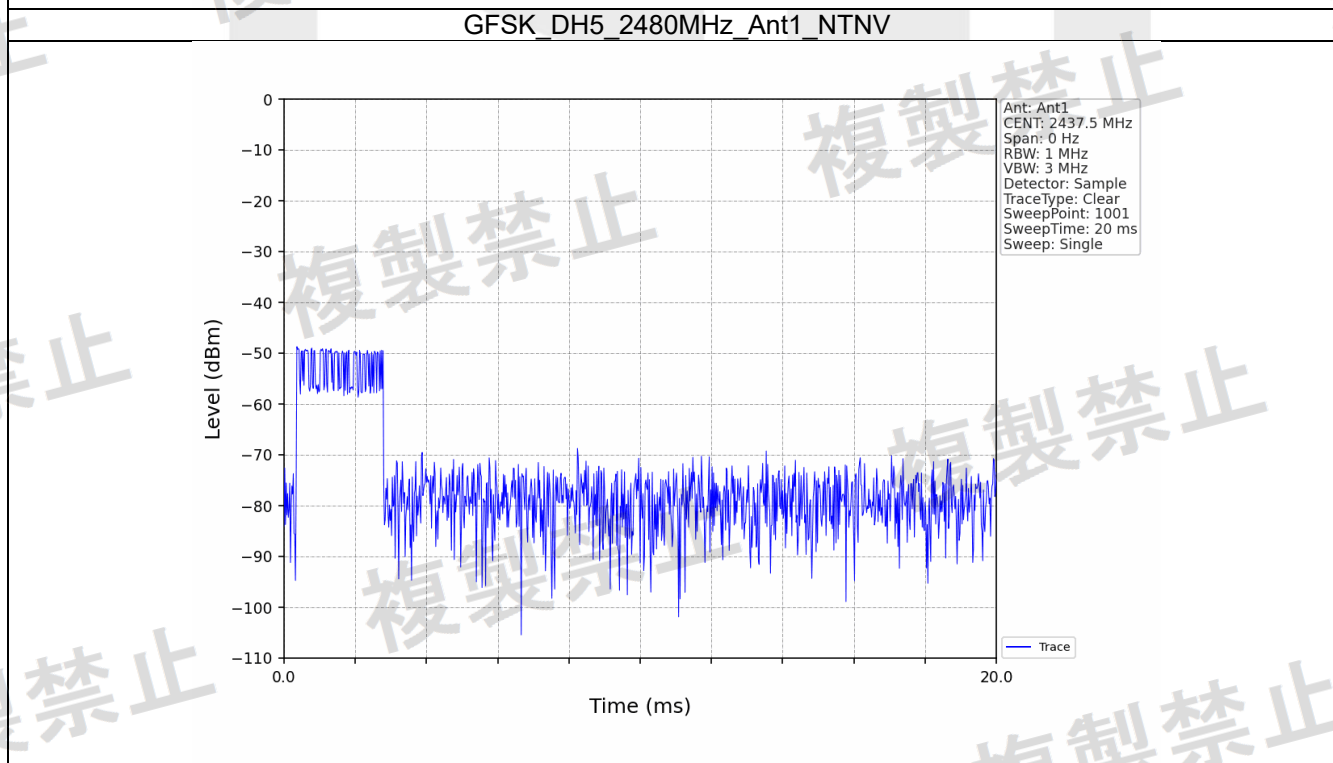
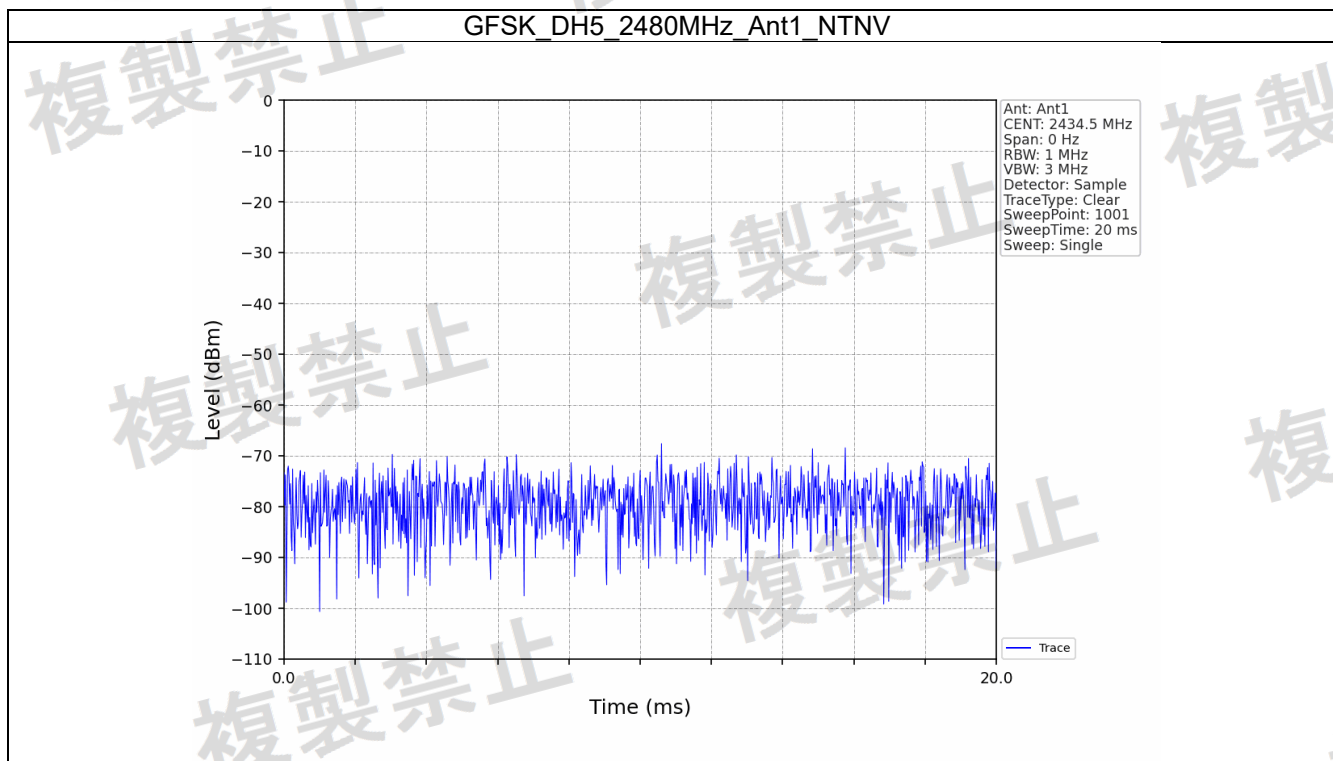
GFSK_DH5_2480MHz_Ant1_NTNV

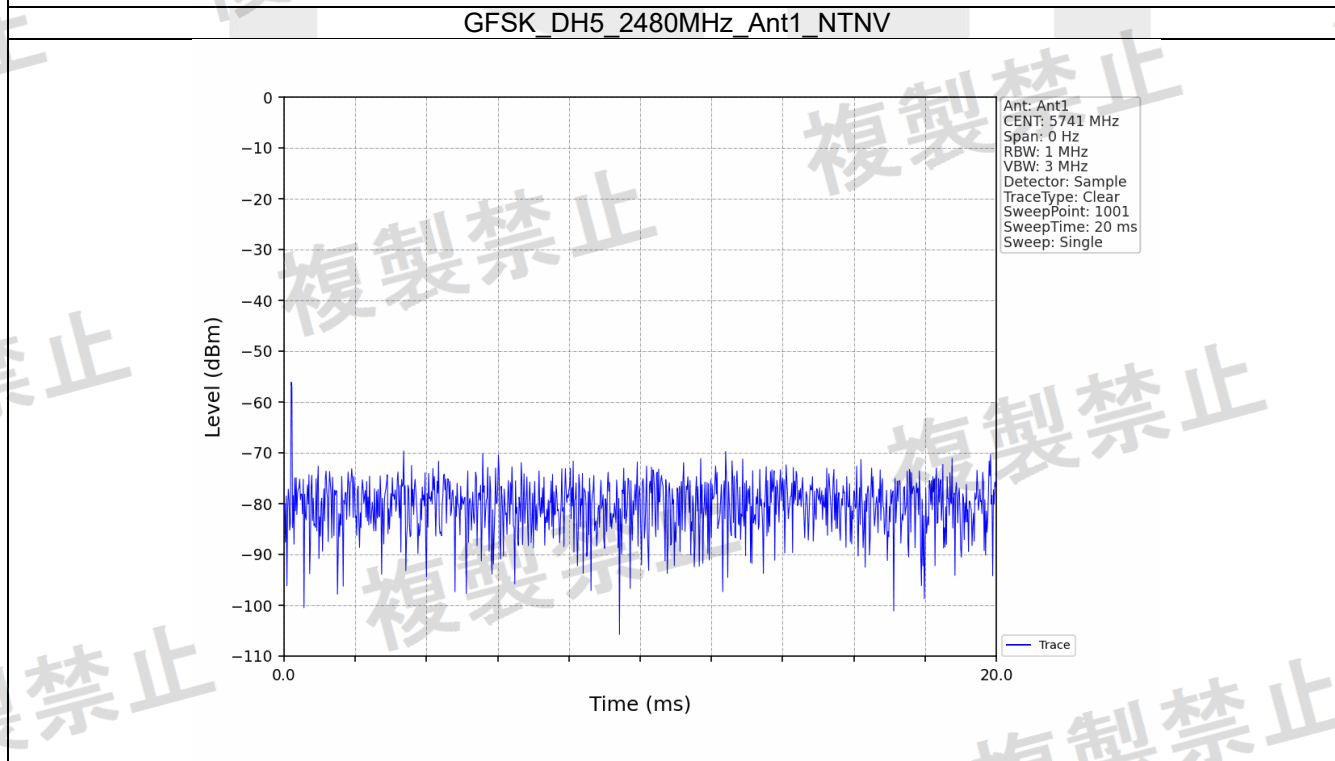
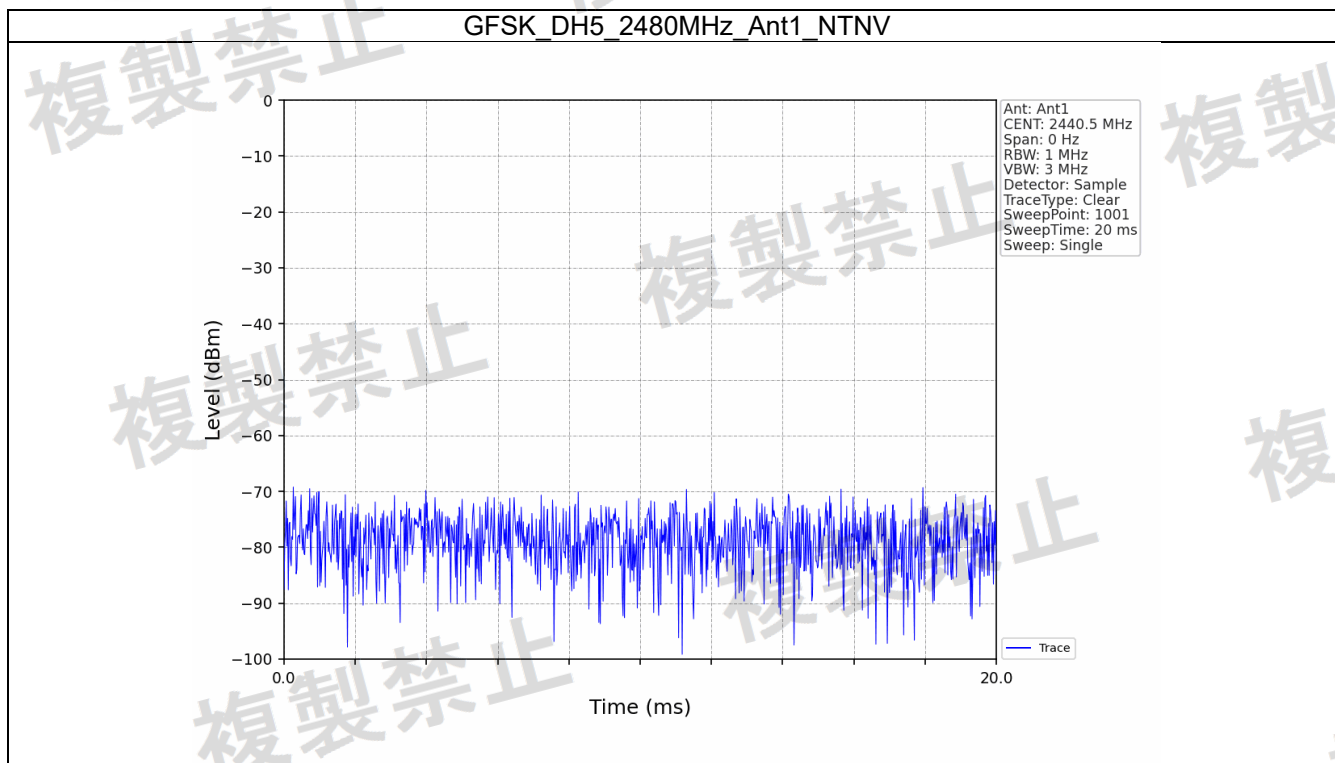


GFSK_DH5_2480MHz_Ant1_NTNV

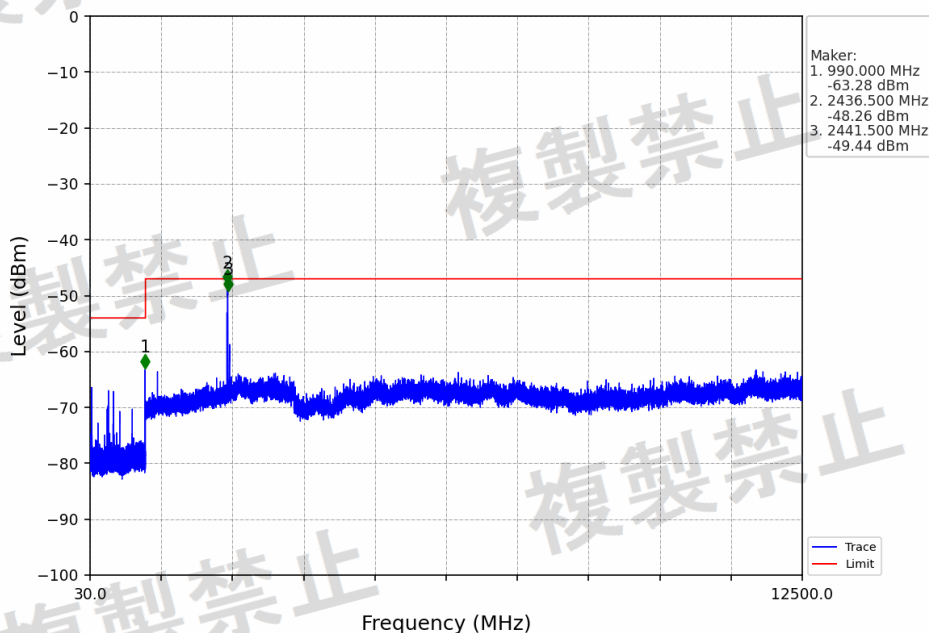


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	990.000	-63.38	/	-54	Pass
1000	12500	1	1	2434.500	-50.92	-77.24	-47	Pass
1000	12500	1	1	2437.500	-46.19	-51.56	-47	Pass
1000	12500	1	1	2440.500	-49.58	-76.72	-47	Pass
1000	12500	1	1	5741.000	-50.31	-77.10	-47	Pass

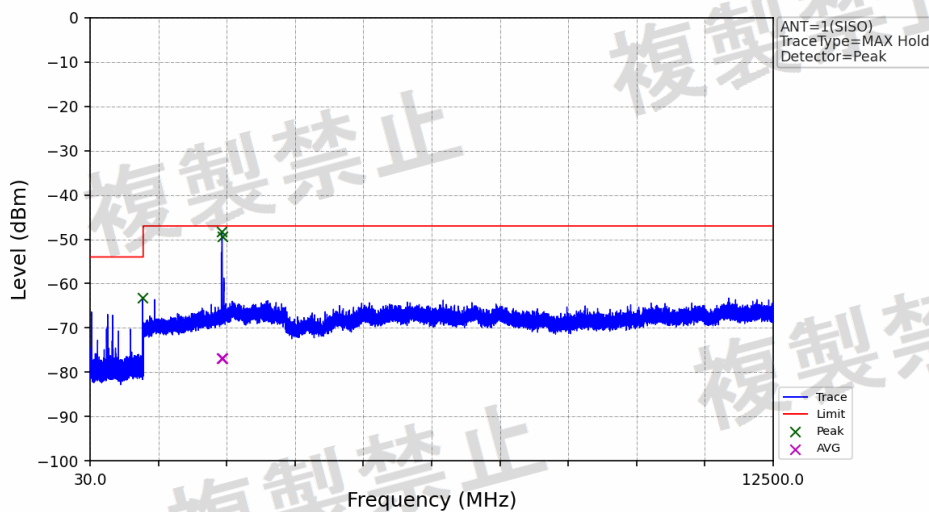




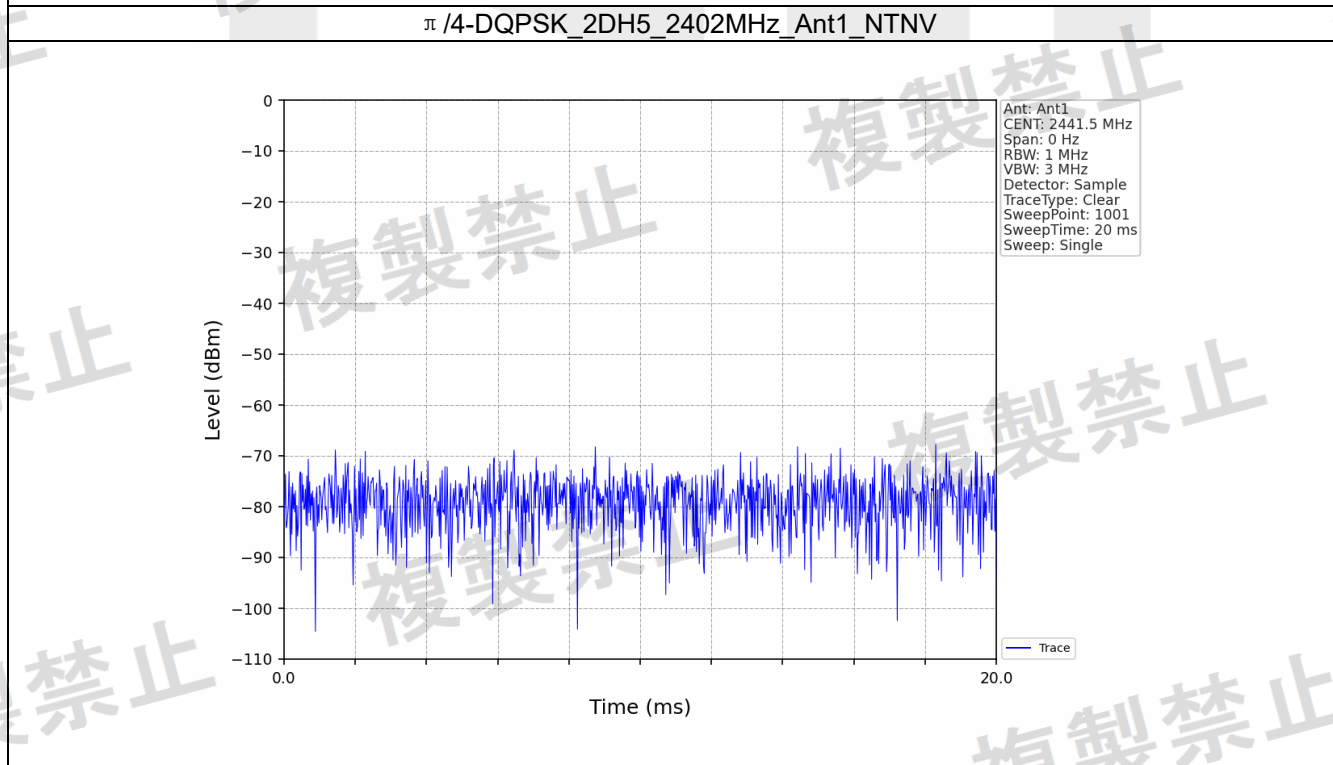
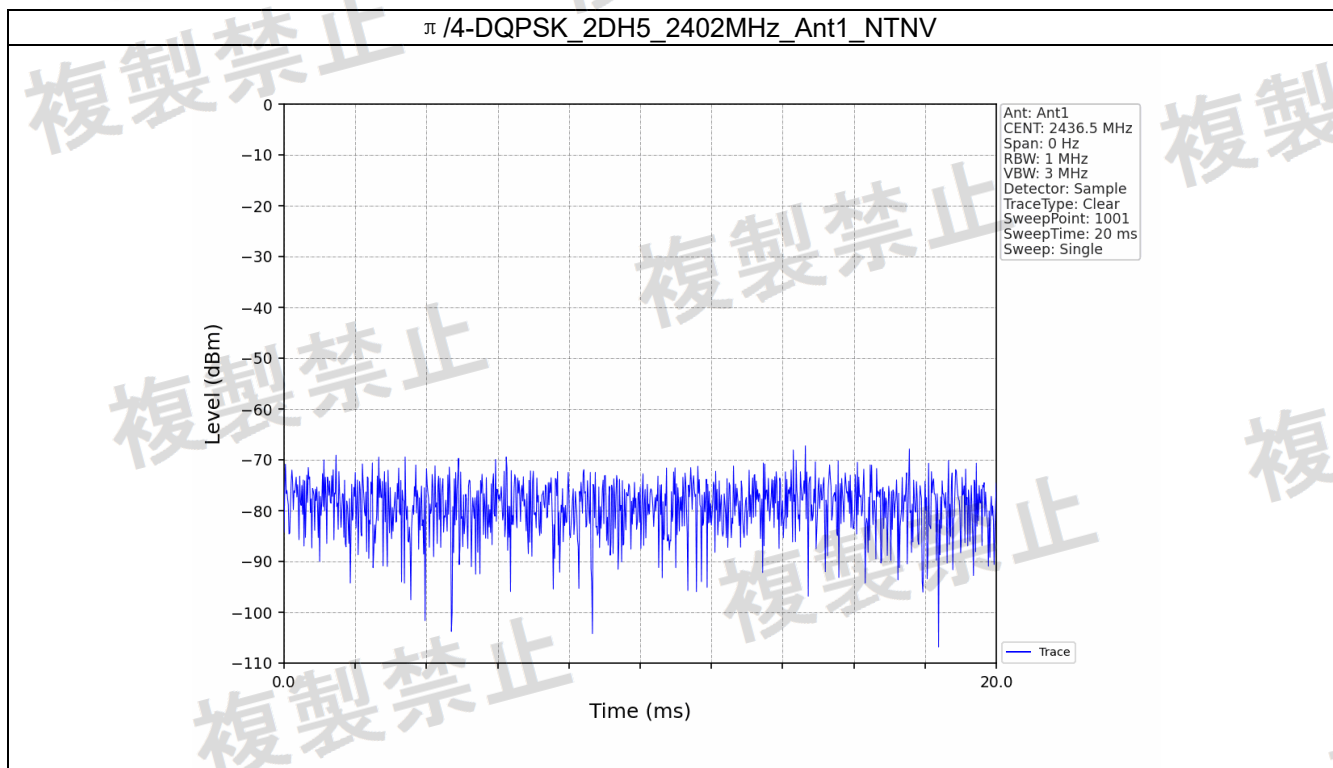
$\pi/4$ -DQPSK_2DH5_2402MHz_Ant1_NTNV

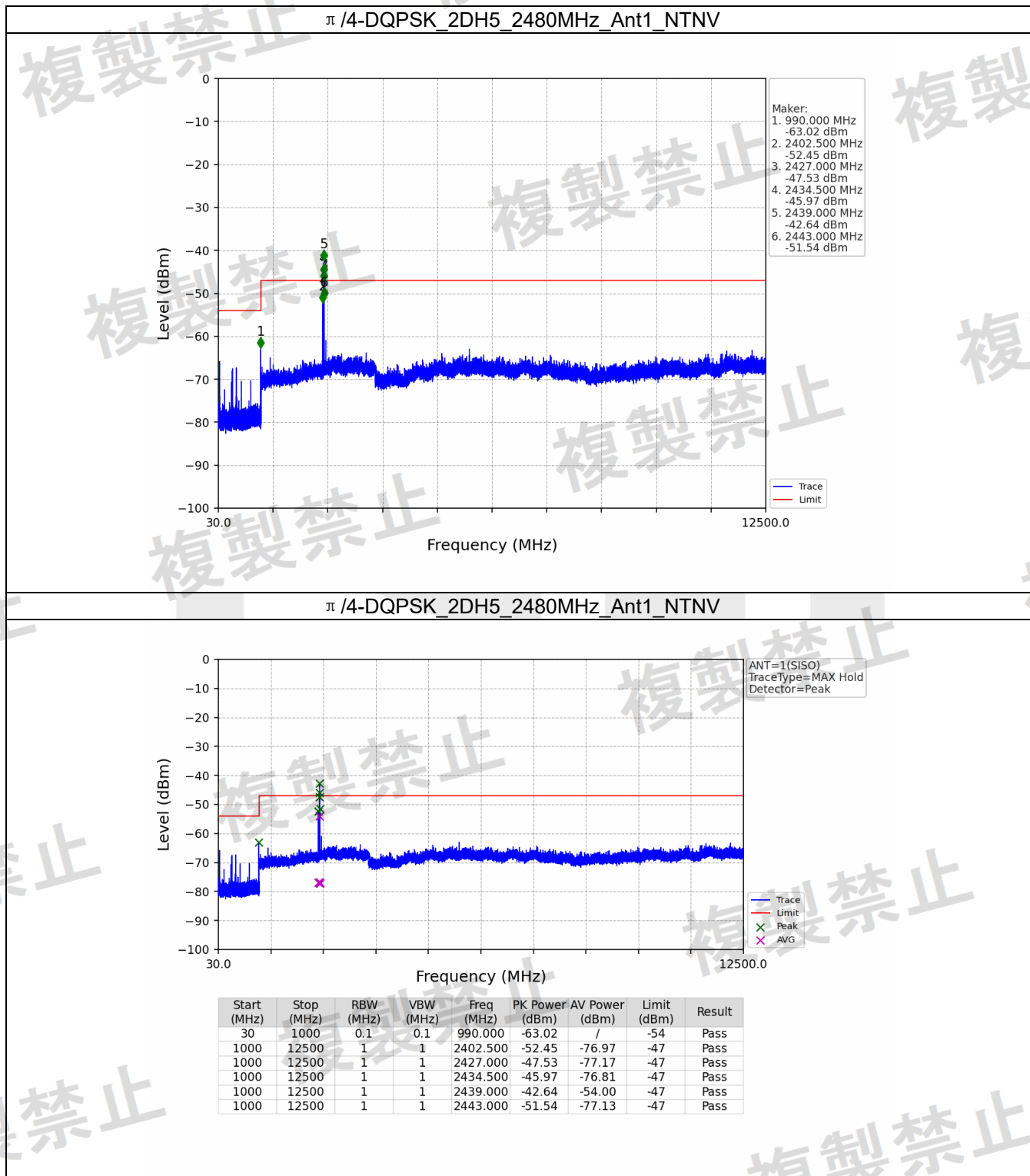


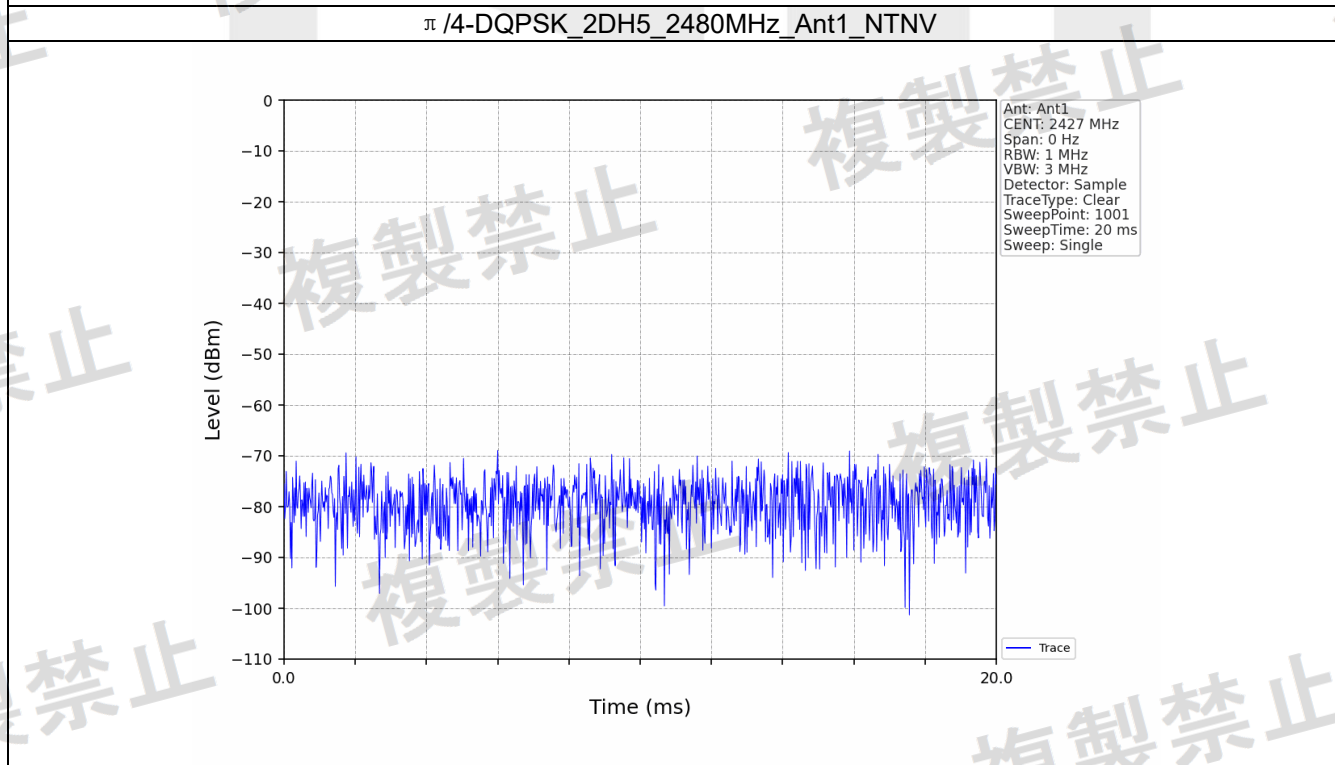
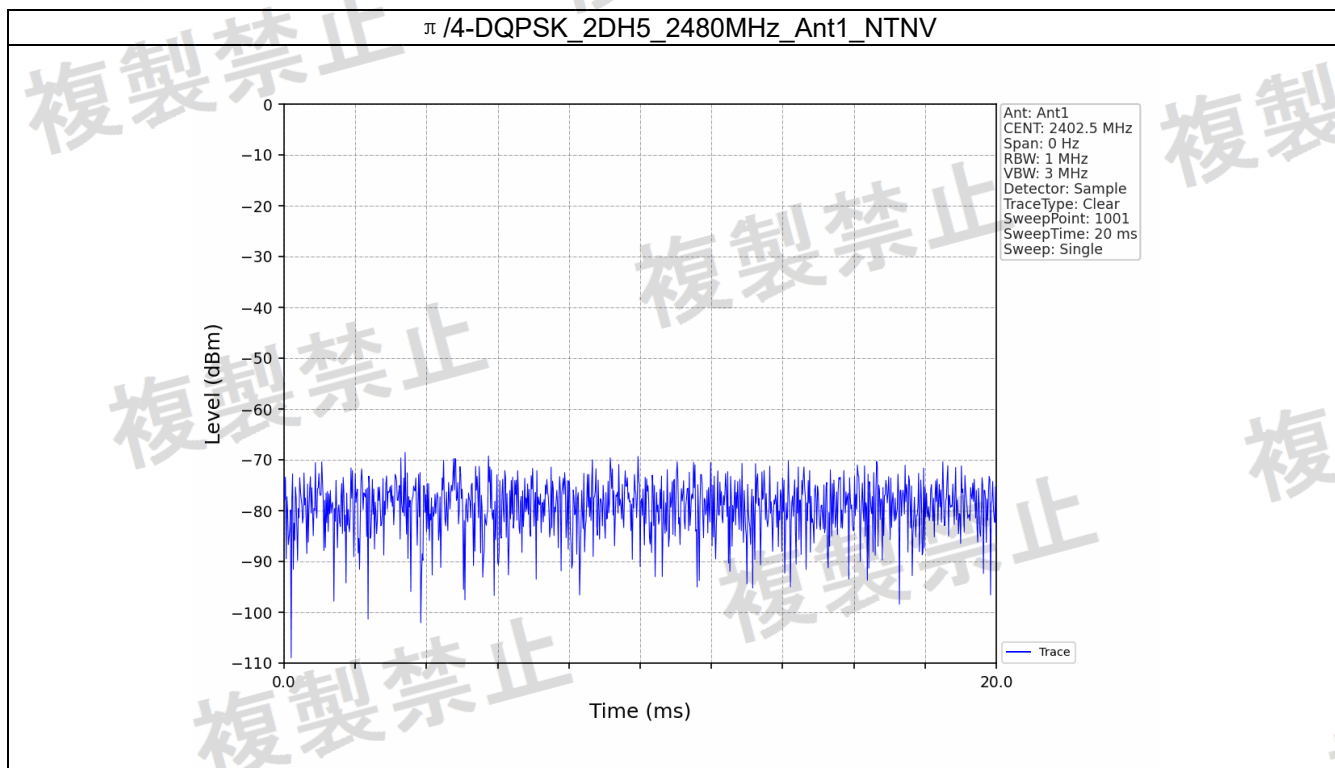
$\pi/4$ -DQPSK_2DH5_2402MHz_Ant1_NTNV

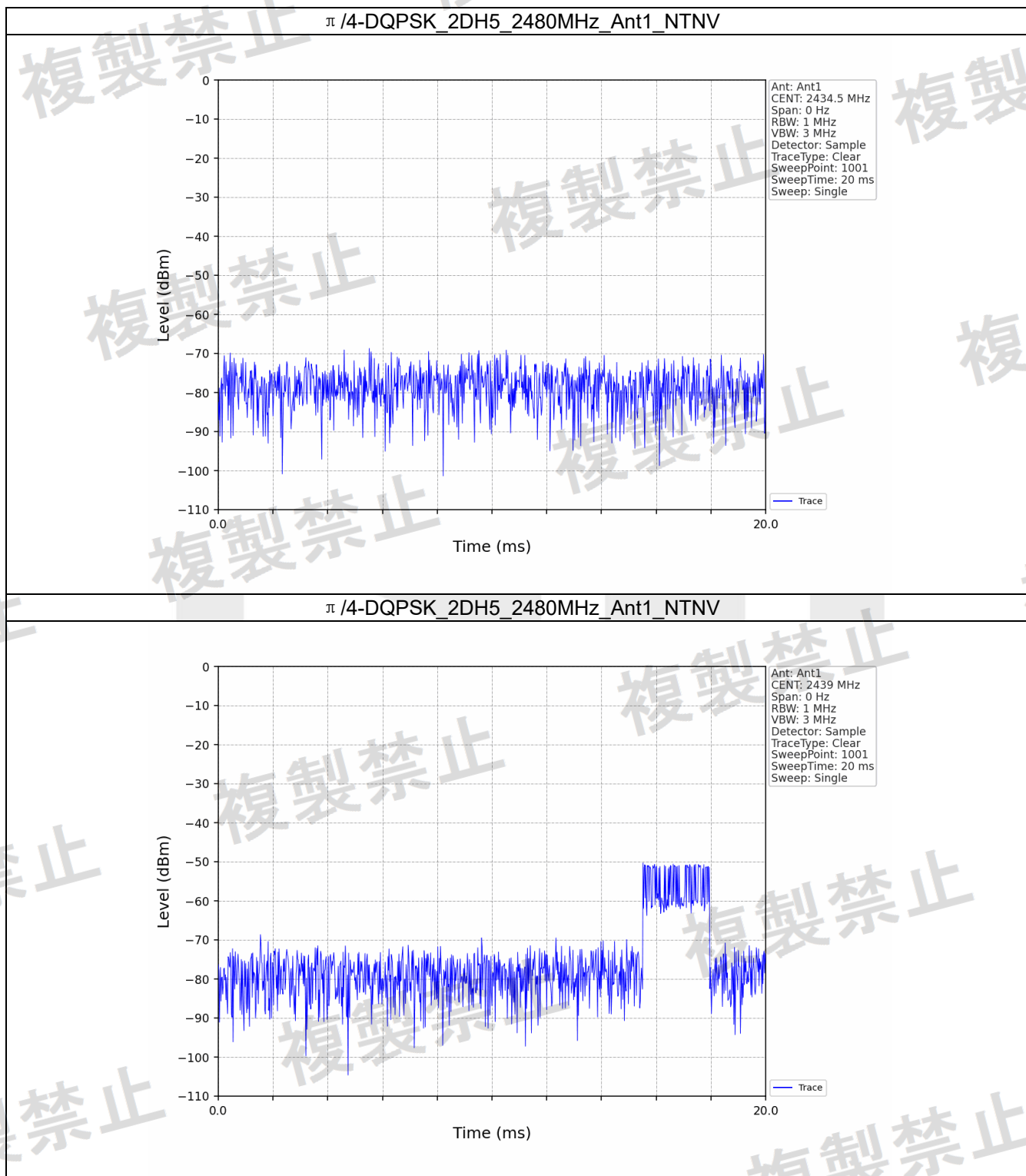


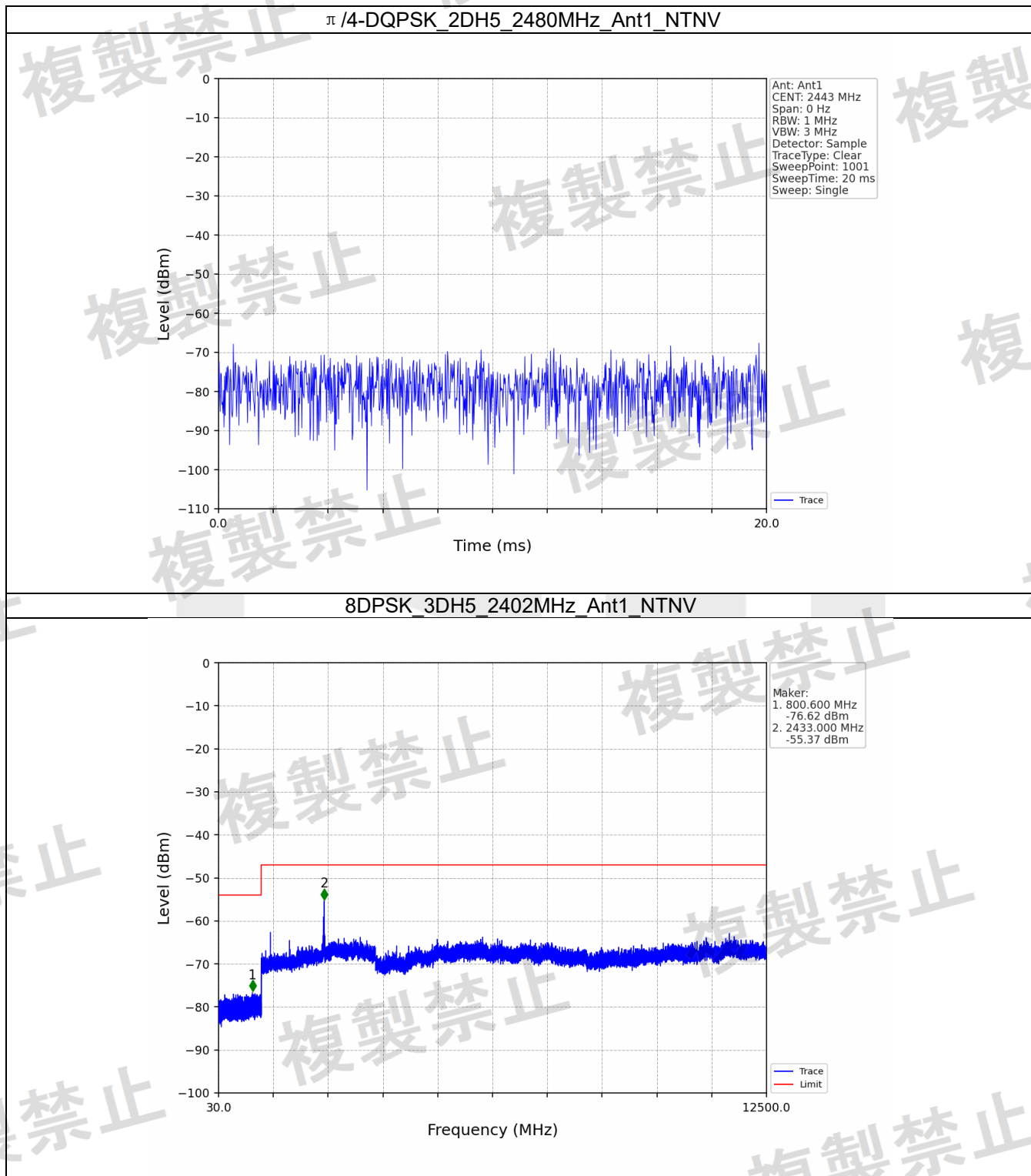
Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	990.000	-63.28	/	-54	Pass
1000	12500	1	1	2436.500	-48.26	-76.88	-47	Pass
1000	12500	1	1	2441.500	-49.44	-76.95	-47	Pass



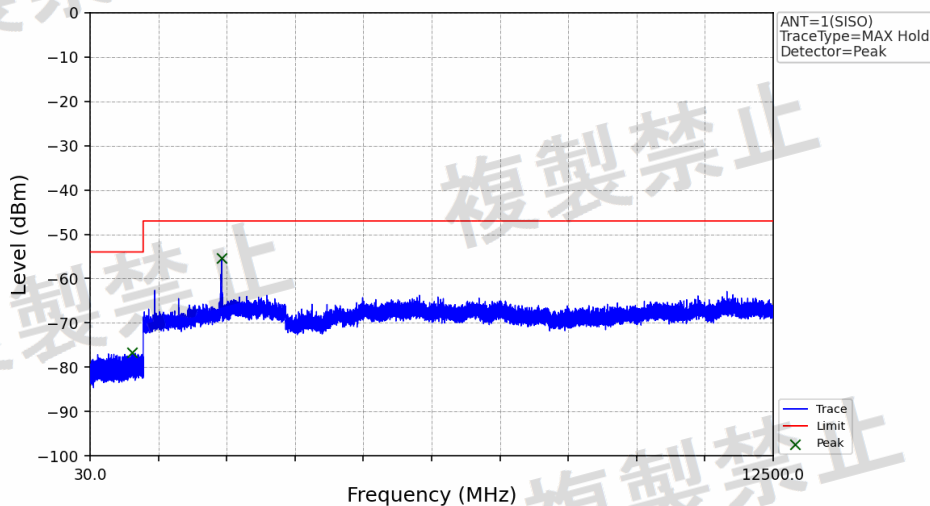






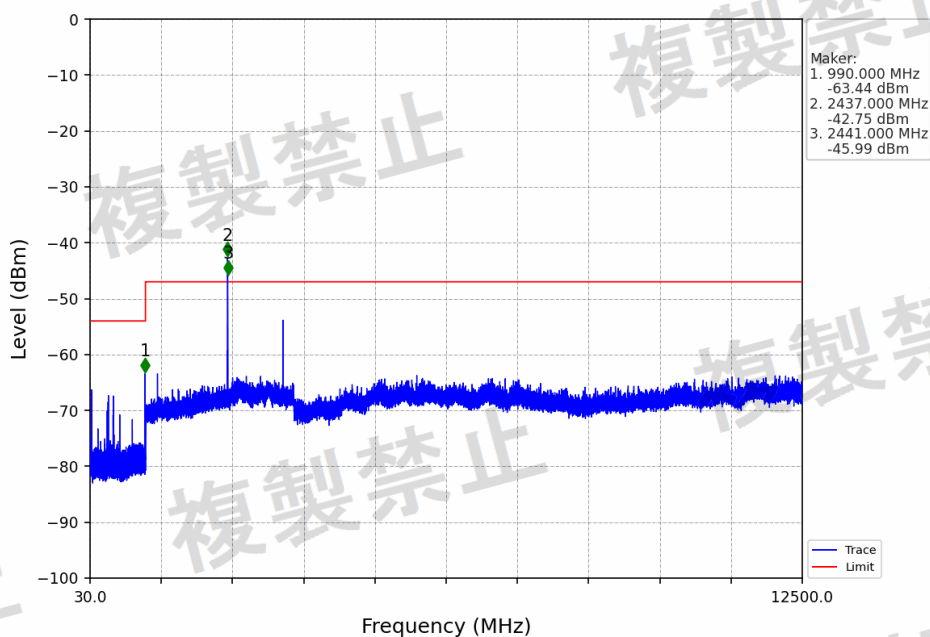


8DPSK_3DH5_2402MHz_Ant1_NTNV

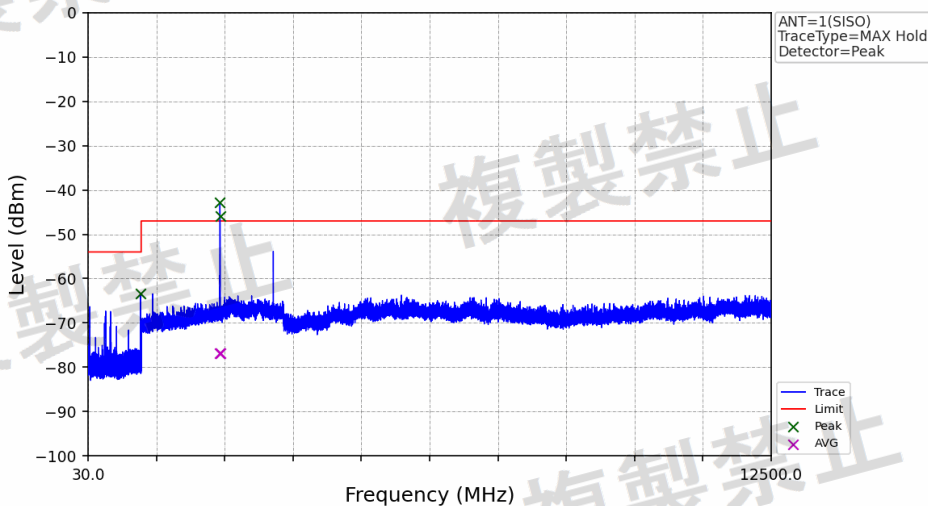


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	800.600	-76.62	/	-54	Pass
1000	12500	1	1	2433.000	-55.37	/	-47	Pass

8DPSK_3DH5_2480MHz_Ant1_NTNV

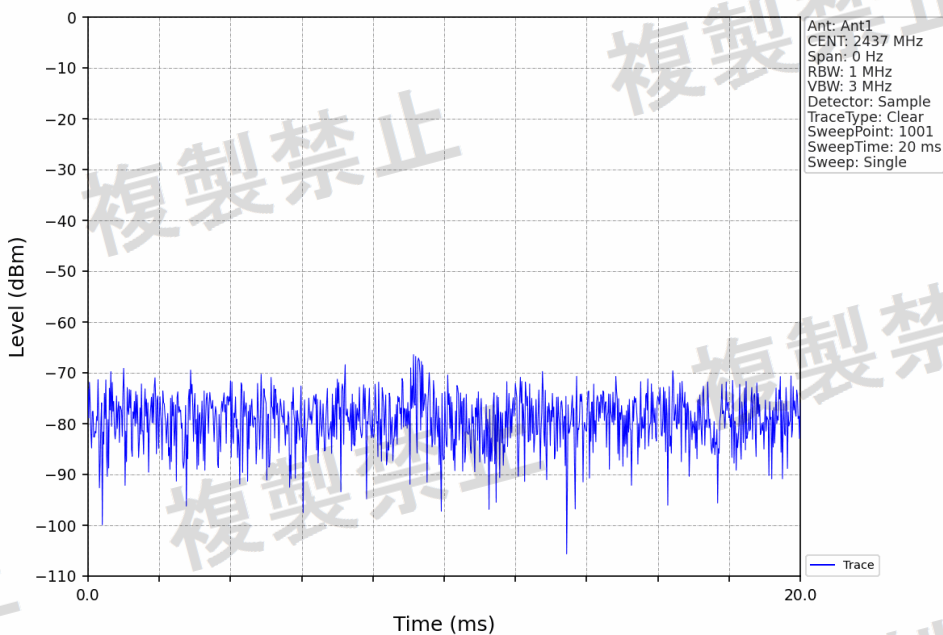


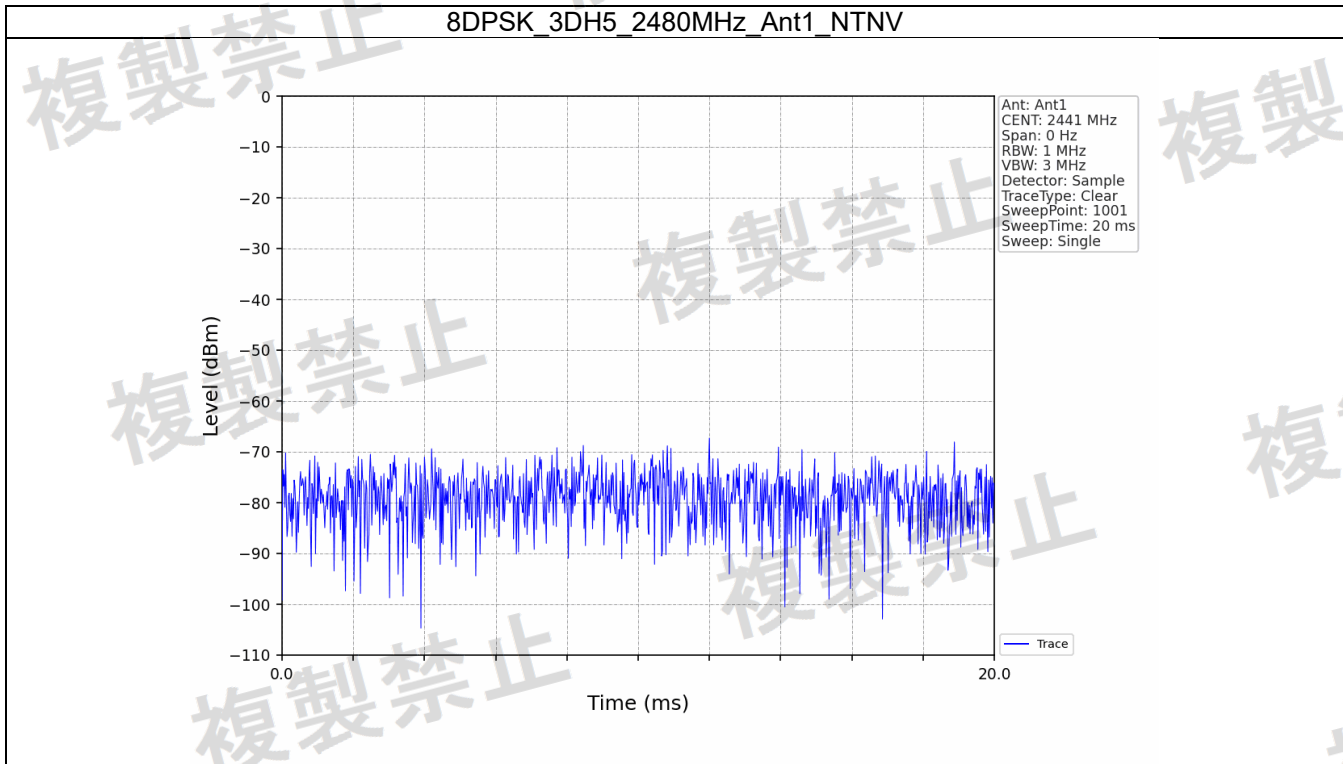
8DPSK_3DH5_2480MHz_Ant1_NTNV



Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	990.000	-63.44	/	-54	Pass
1000	12500	1	1	2437.000	-42.75	-76.87	-47	Pass
1000	12500	1	1	2441.000	-45.99	-76.87	-47	Pass

8DPSK_3DH5_2480MHz_Ant1_NTNV





----- End of Report -----