Appendix RF test data for BT

複製禁止

1. Frequency Error

1.1 Test Result

1.1.1 Ant1

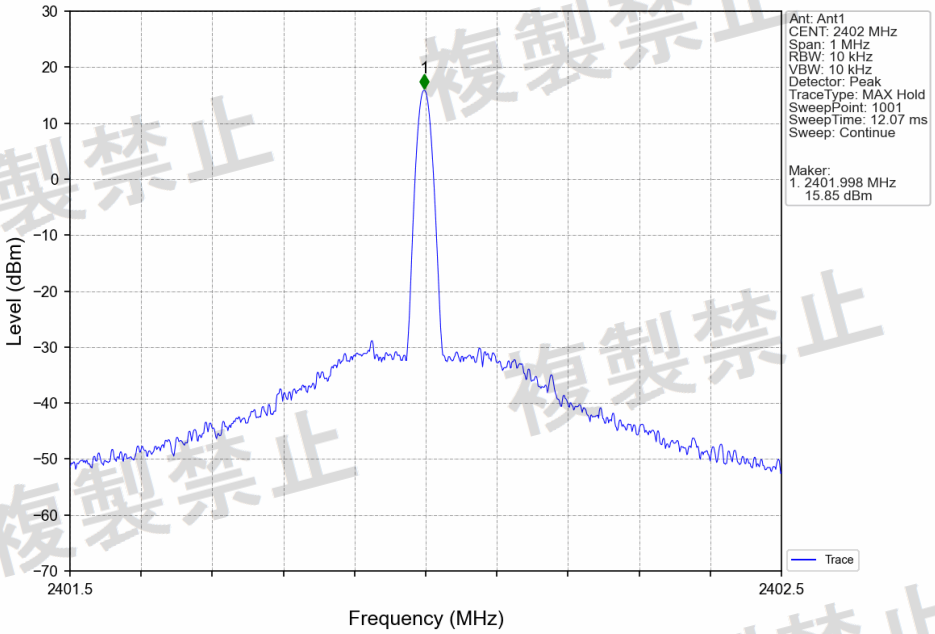
Ant1								
ENV	Mode	TX Type	Frequency (MHz)	Packet Type	Measured Frequency (MHz)	Tolerance (ppm)		Verdict
						Result	Limit	
NTNV	Carrier Wave	SISO	2402	DH5	2401.998	-0.83	-50 to 50	Pass
			2480	DH5	2479.998	-0.81	-50 to 50	Pass

複製禁止

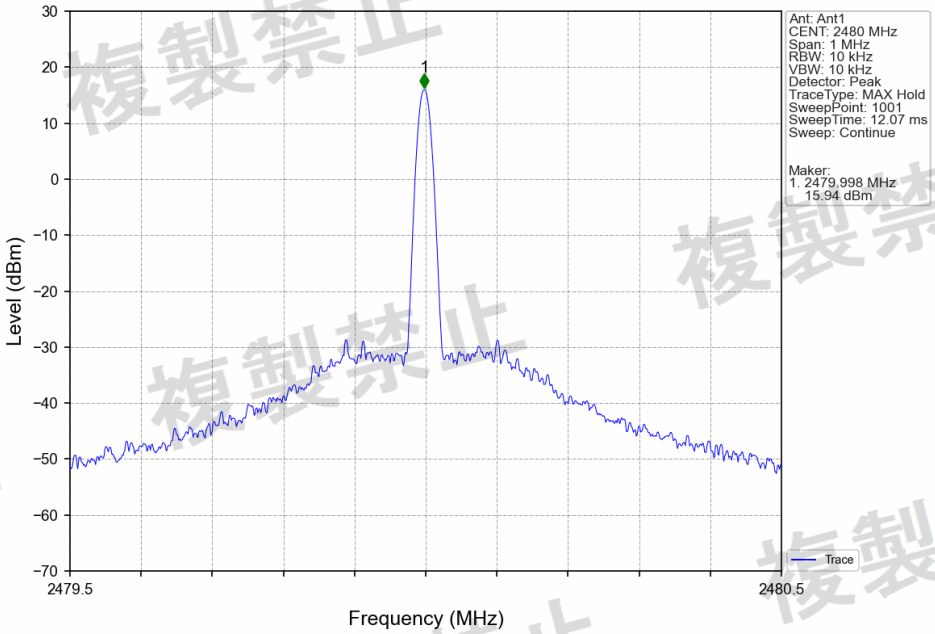
1.2 Test Graph

1.2.1 Ant1

Frequency Error_NTNV_Carrier Wave_2402MHz_Ant1_NTNV



Frequency Error_NTNV_Carrier Wave_2480MHz_Ant1_NTNV



2. Occupied Bandwidth

2.1 Test Result

2.1.1 OBW

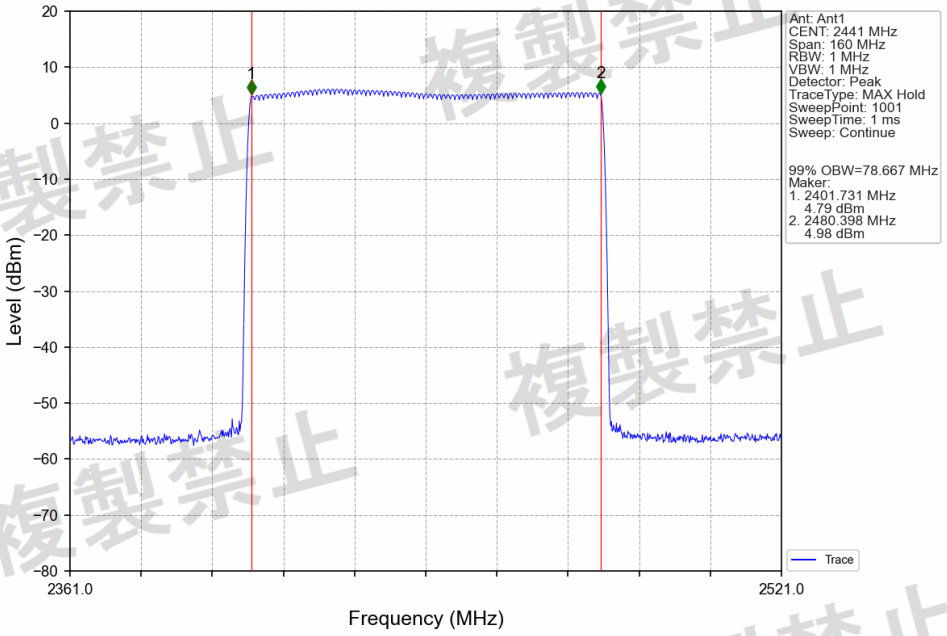
ENV	Mode	TX Type	Frequency (MHz)	Packet Type	99% Occupied Bandwidth (MHz)		Verdict
					ANT1	Limit	
NTNV	GFSK	SISO	HOPP	DH5	78.667	<=83.5	Pass
	Pi/4DQPSK	SISO	HOPP	2DH5	78.745	<=83.5	Pass
	8DPSK	SISO	HOPP	3DH5	78.723	<=83.5	Pass

複製禁止

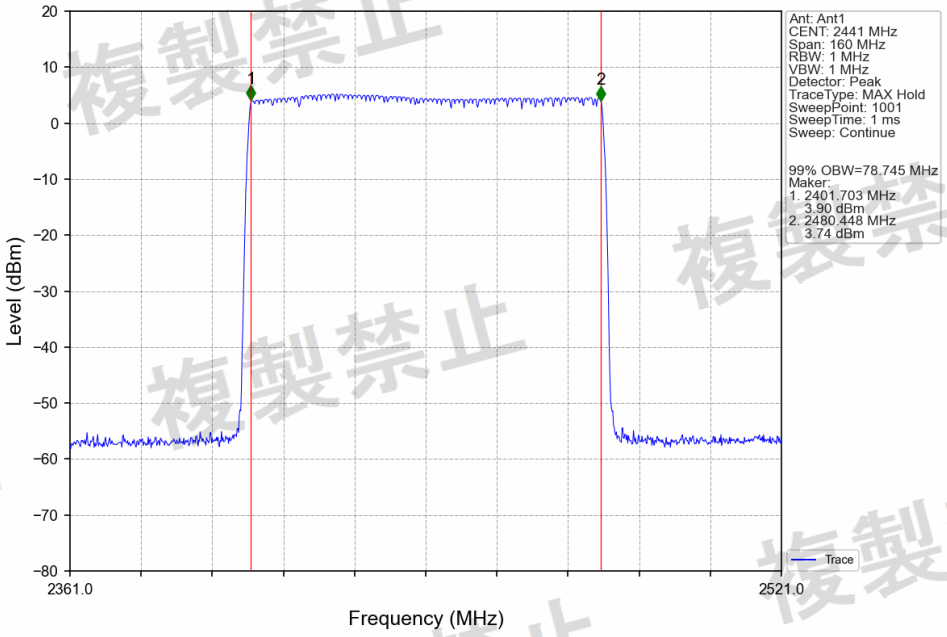
2.2 Test Graph

2.2.1 OBW

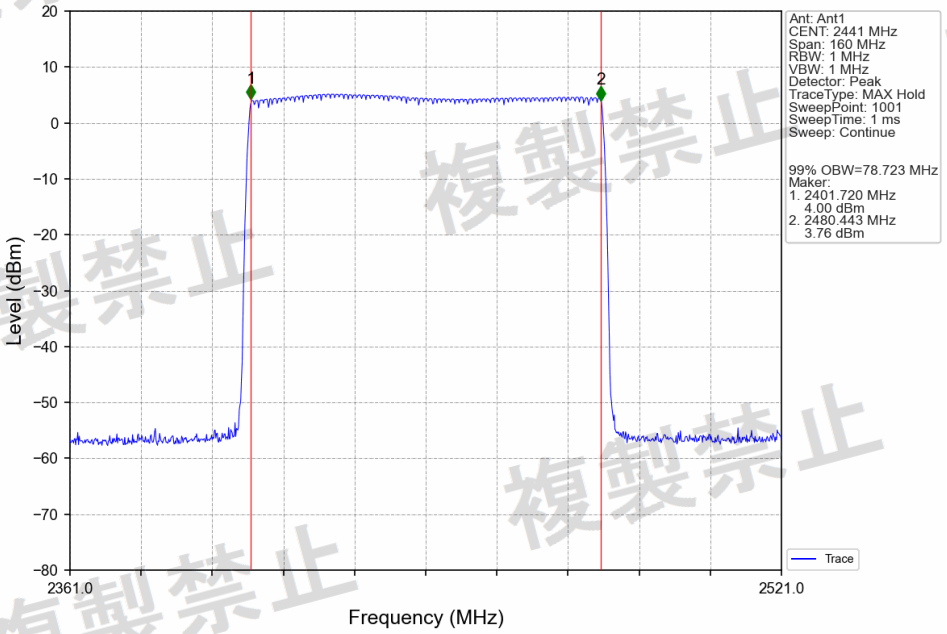
GFSK_DH5_HOPP_Ant1_NTNV



Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



3. Spread Bandwidth

3.1 Test Result

3.1.1 SPBW

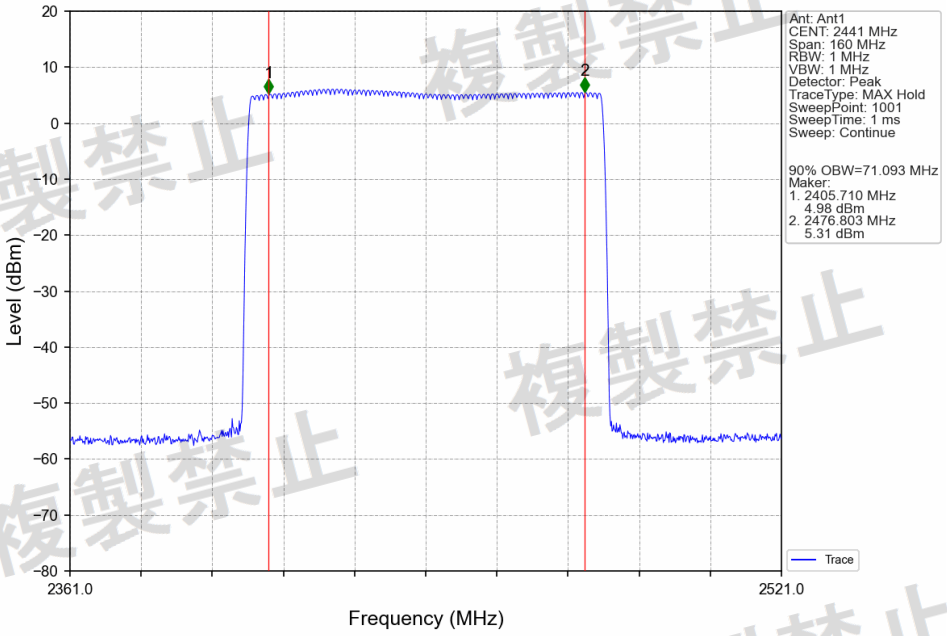
ENV	Mode	TX Type	Frequency (MHz)	Packet Type	Spread Bandwidth (MHz)		Verdict
					ANT1	Limit	
NTNV	GFSK	SISO	HOPP	DH5	71.093	/	Only For Report
	Pi/4DQPSK	SISO	HOPP	2DH5	71.192	/	Only For Report
	8DPSK	SISO	HOPP	3DH5	70.963	/	Only For Report

複製禁止

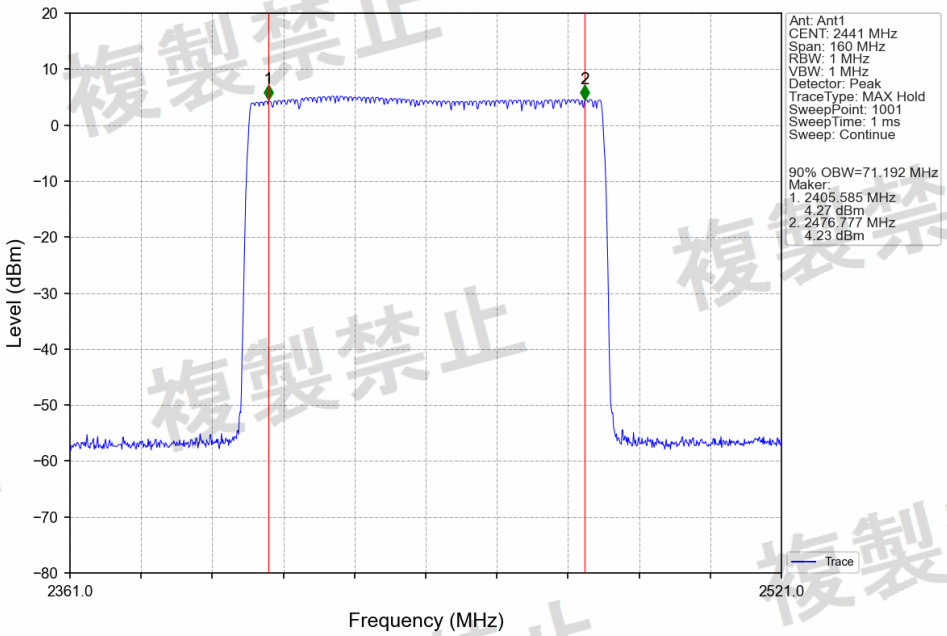
3.2 Test Graph

3.2.1 SPBW

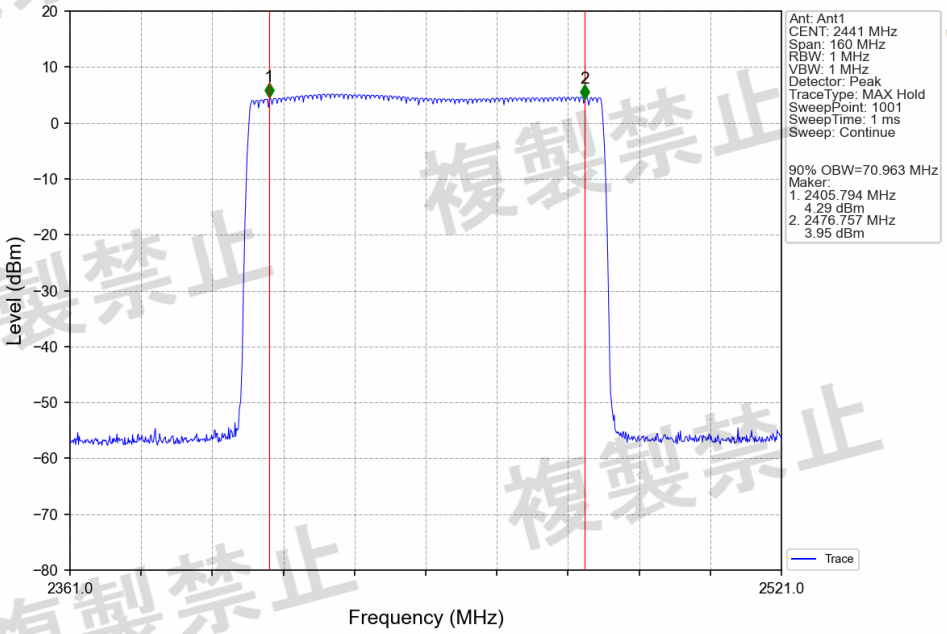
GFSK_DH5_HOPP_Ant1_NTNV



Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



4. Antenna Power

4.1 Test Result

4.1.1 Power

ENV	Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Burst Power (dBm)	Antenna Power (mW/MHz)		Nominal Power (mW/MHz)	Tolerance (%)		Verdict
							Measured	Limit		Measured	Limit	
NTNV	GFSK	SISO	HOPP	DH5	1	5.84	0.054	<=3.00	0.05	8.00%	<=20	Pass
	Pi/4DQPSK	SISO	HOPP	2DH5	1	1.31	0.019	<=3.00	0.05	-62.00%	<=20	Pass
	8DPSK	SISO	HOPP	3DH5	1	1.73	0.021	<=3.00	0.05	-58.00%	<=20	Pass

Note: Antenna Power=Burst Power to mW/ Spread Bandwidth

4.1.2 EIRP

ENV	Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Burst Power (dBm)	Gain (dBi)	EIRP (dBm/MHz)		Verdict
								Result	Limit	
NTNV	GFSK	SISO	HOPP	DH5	1	5.84	2.48	0.119	<=6.91	Pass
	Pi/4DQPSK	SISO	HOPP	2DH5	1	1.31	2.48	0.054	<=6.91	Pass
	8DPSK	SISO	HOPP	3DH5	1	1.73	2.48	0.060	<=6.91	Pass

Note: EIRP (dBm/MHz) = (Burst Power+ Gain)/ Spread Bandwidth

5. Dwell Time

5.1 Test Result

5.1.1 Ant1

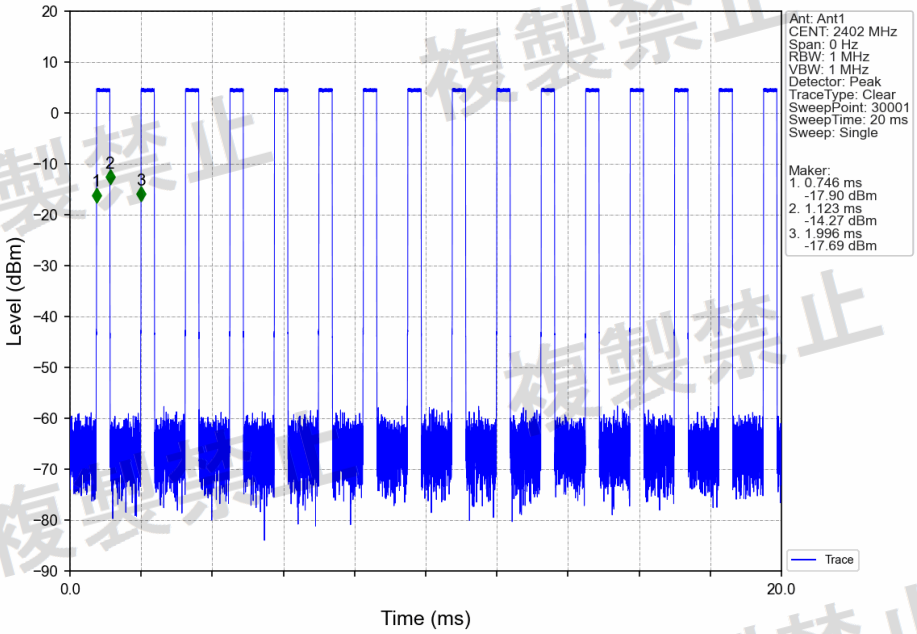
Ant1											
ENV	Mode	TX Type	Frequency (MHz)	Packet Type	Spreading Rate	T_on (ms)	Period (ms)	Hopp Number	Dwell Time (ms)		Verdict
									Result	Limit	
NTNV	GFSK	SISO	2402	DH1	71.093	0.377	1.250	79	108.565	<=400	Pass
				DH3	71.093	1.632	2.500	79	234.985	<=400	Pass
				DH5	71.093	2.880	3.750	79	276.453	<=400	Pass
			2480	DH1	71.093	0.376	1.250	79	108.277	<=400	Pass
				DH3	71.093	1.633	2.500	79	235.129	<=400	Pass
				DH5	71.093	2.881	3.750	79	276.549	<=400	Pass
	Pi/4DQPSK	SISO	2402	2DH1	71.192	0.385	1.250	79	111.023	<=400	Pass
				2DH3	71.192	1.637	2.500	79	236.033	<=400	Pass
				2DH5	71.192	2.885	3.750	79	277.318	<=400	Pass
			2480	2DH1	71.192	0.385	1.250	79	111.023	<=400	Pass
				2DH3	71.192	1.637	2.500	79	236.033	<=400	Pass
				2DH5	71.192	1.637	2.500	79	236.033	<=400	Pass
	8DPSK	SISO	2402	3DH1	70.963	0.384	1.250	79	110.379	<=400	Pass
				3DH3	70.963	1.635	2.500	79	234.986	<=400	Pass
				3DH5	70.963	2.887	3.750	79	276.618	<=400	Pass
			2480	3DH1	70.963	0.385	1.250	79	110.666	<=400	Pass
				3DH3	70.963	1.636	2.500	79	235.130	<=400	Pass
				3DH5	70.963	2.887	3.750	79	276.618	<=400	Pass

Note: Dwell Time = 90% spreading factor / total number of channels * duty cycle * 400ms

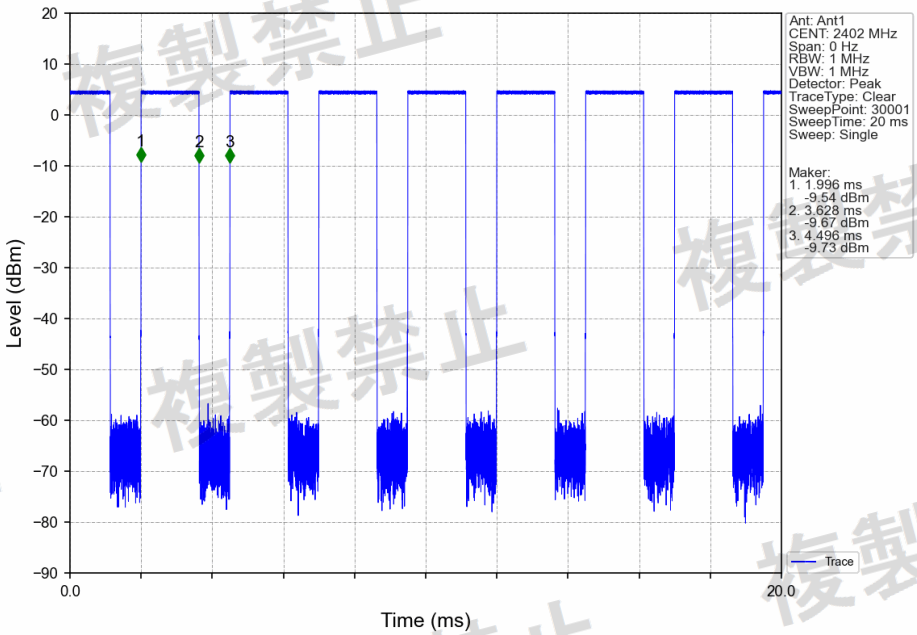
5.2 Test Graph

5.2.1 Ant1

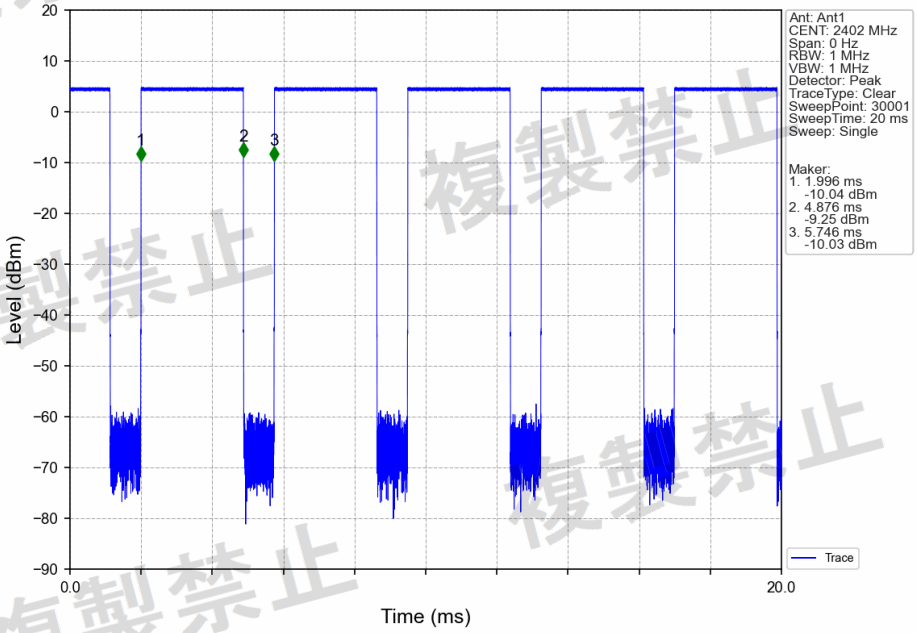
GFSK_DH1_2402MHz_Ant1_NTNV



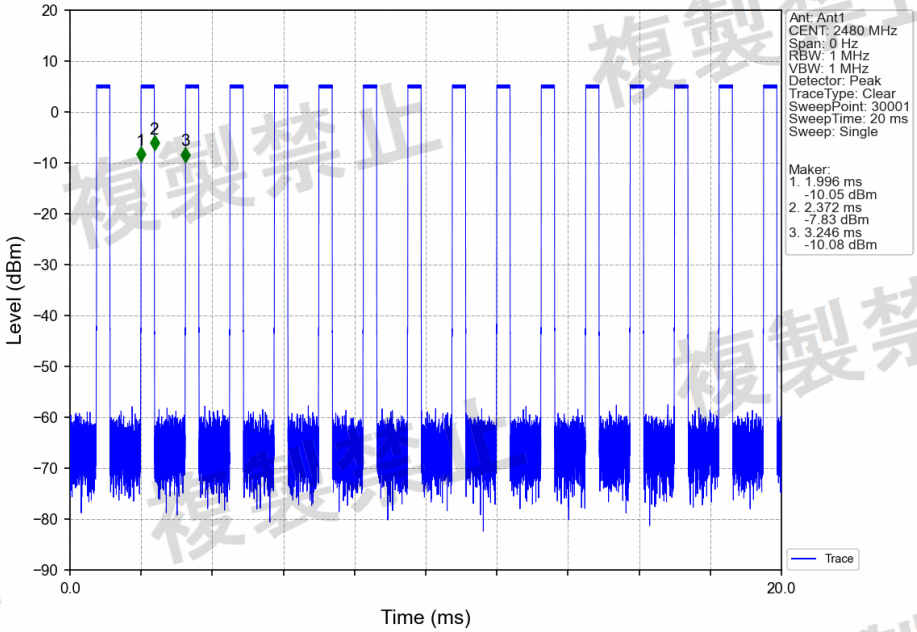
GFSK_DH3_2402MHz_Ant1_NTNV



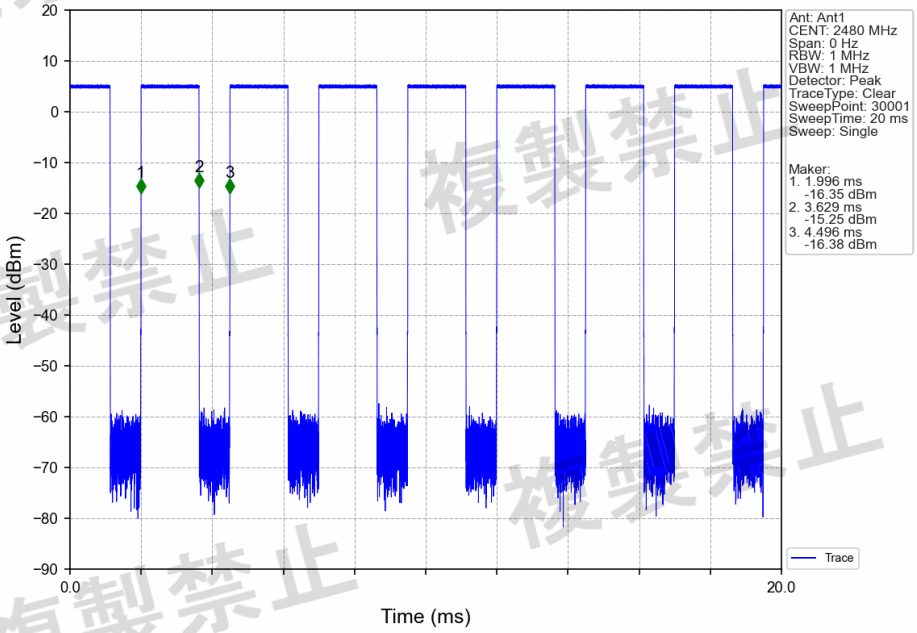
GFSK_DH5_2402MHz_Ant1_NTNV



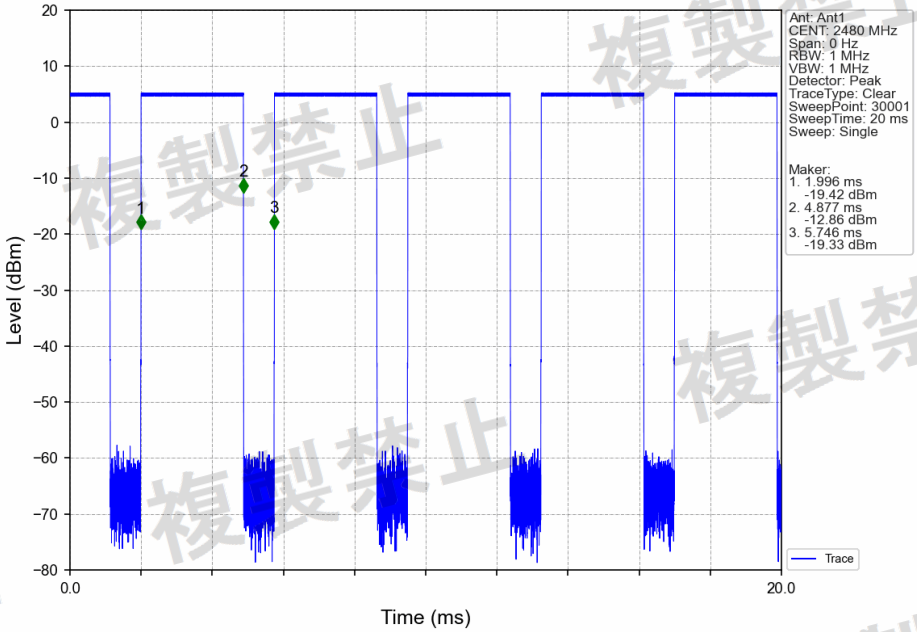
GFSK_DH1_2480MHz_Ant1_NTNV



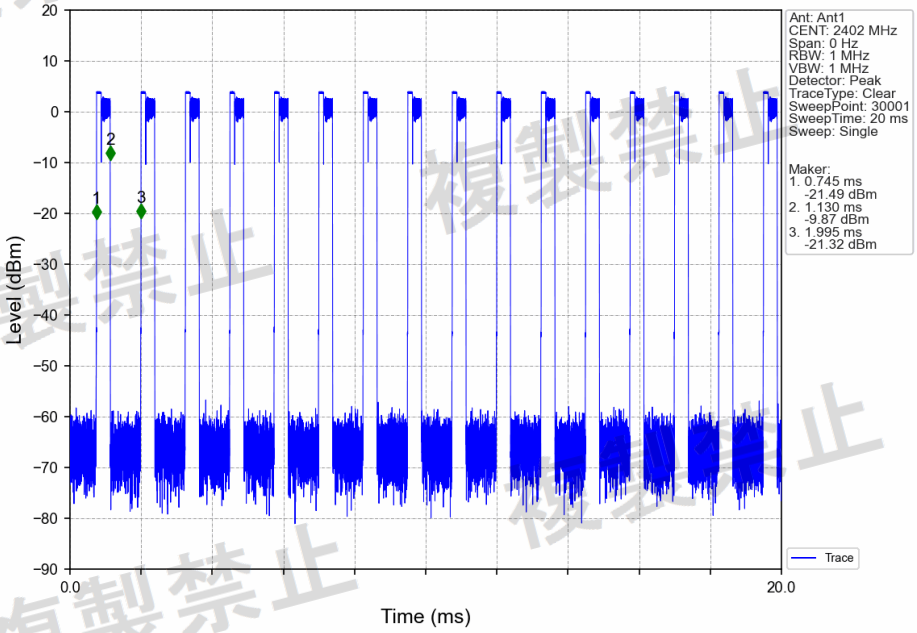
GFSK_DH3_2480MHz_Ant1_NTNV



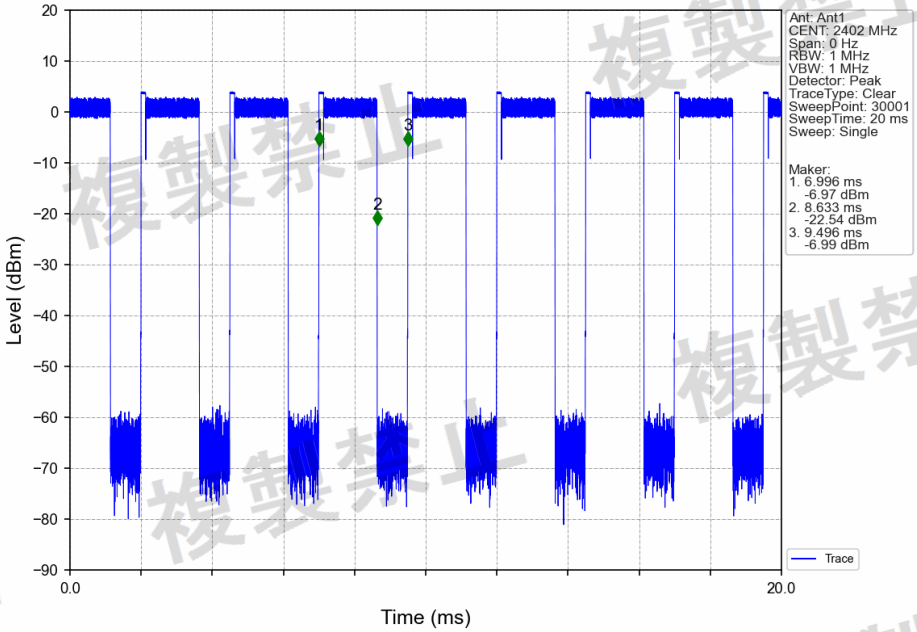
GFSK_DH5_2480MHz_Ant1_NTNV



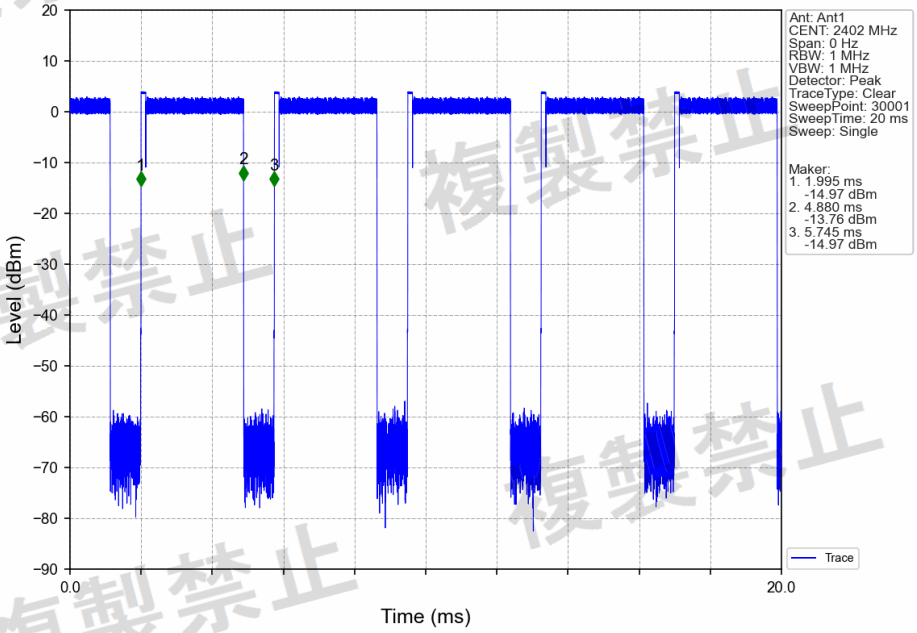
Pi/4DQPSK_2DH1_2402MHz_Ant1_NTNV



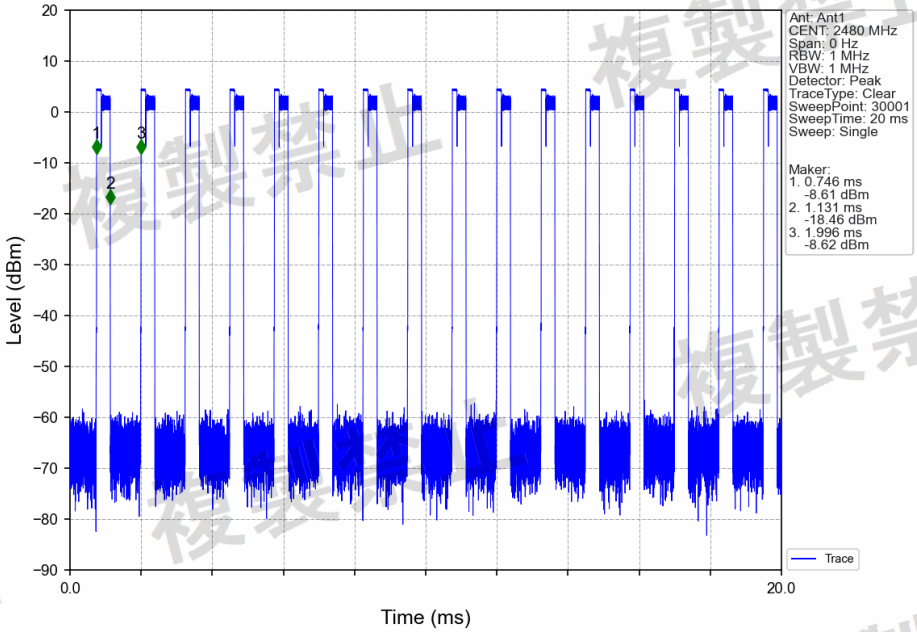
Pi/4DQPSK_2DH3_2402MHz_Ant1_NTNV



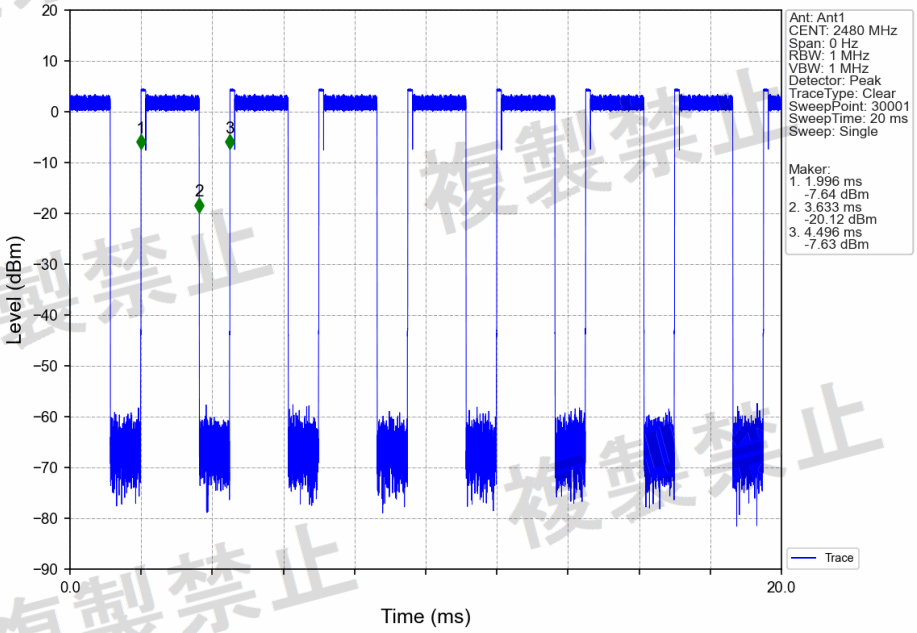
Pi/4DQPSK_2DH5_2402MHz_Ant1_NTNV



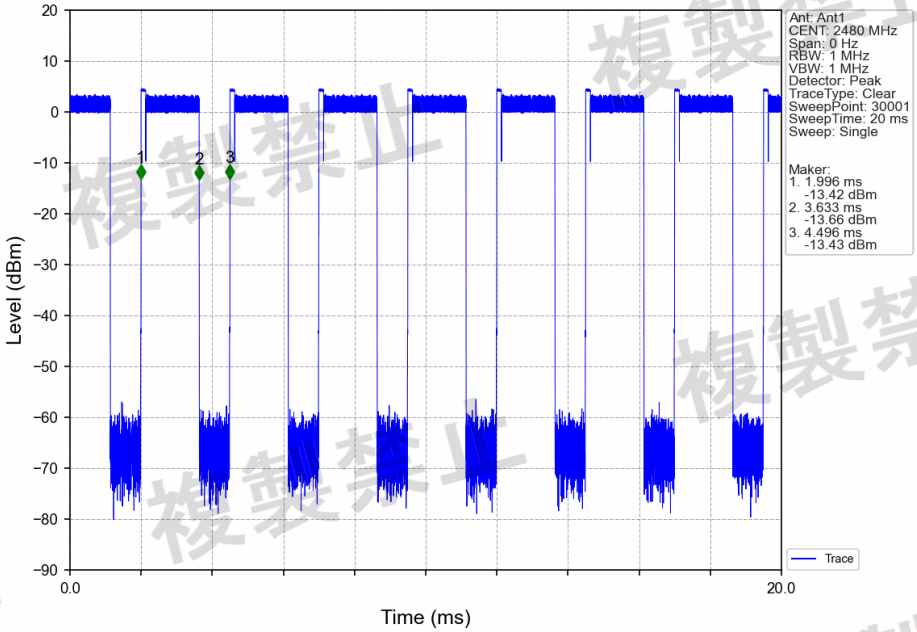
Pi/4DQPSK_2DH1_2480MHz_Ant1_NTNV



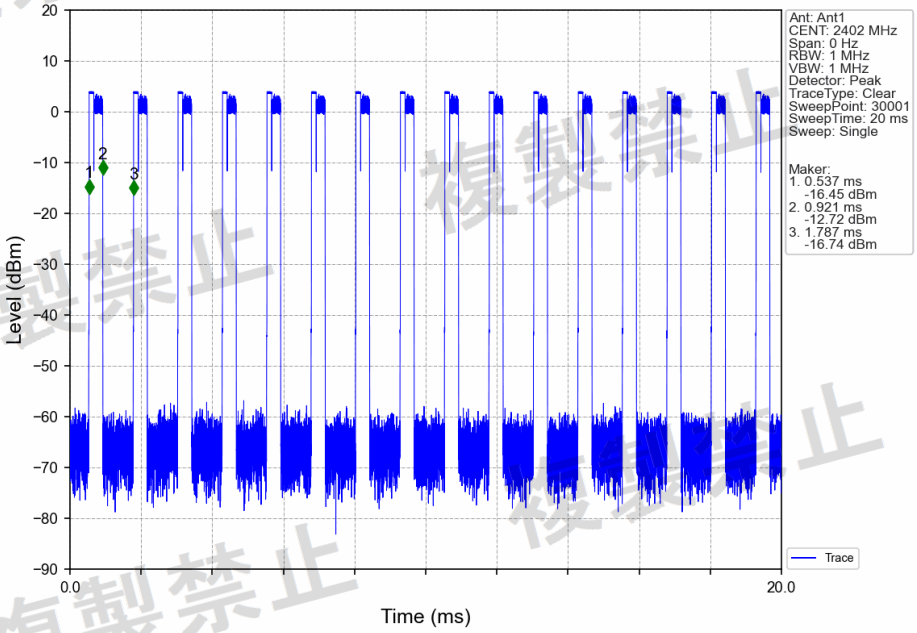
Pi/4DQPSK_2DH3_2480MHz_Ant1_NTNV



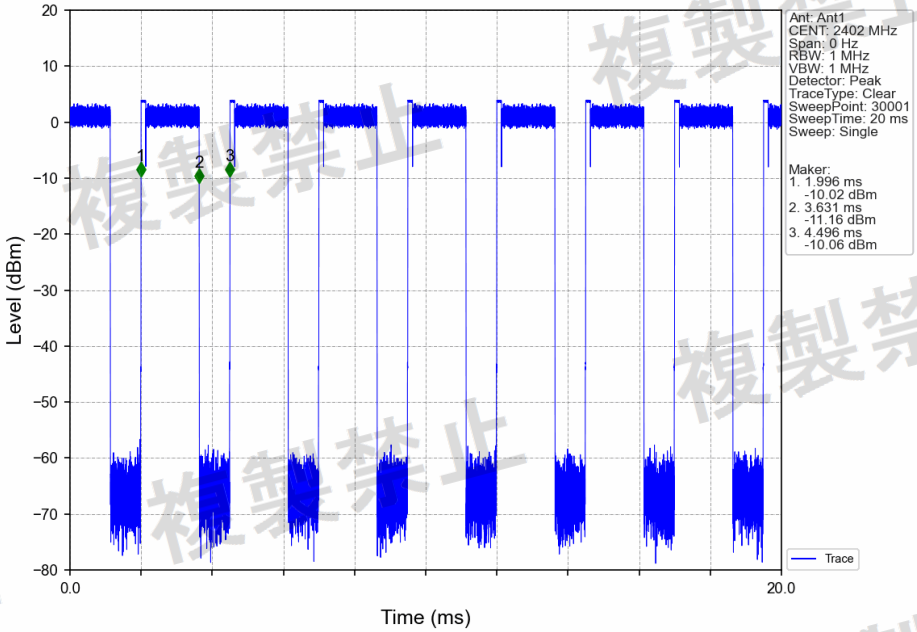
Pi/4DQPSK_2DH5_2480MHz_Ant1_NTNV



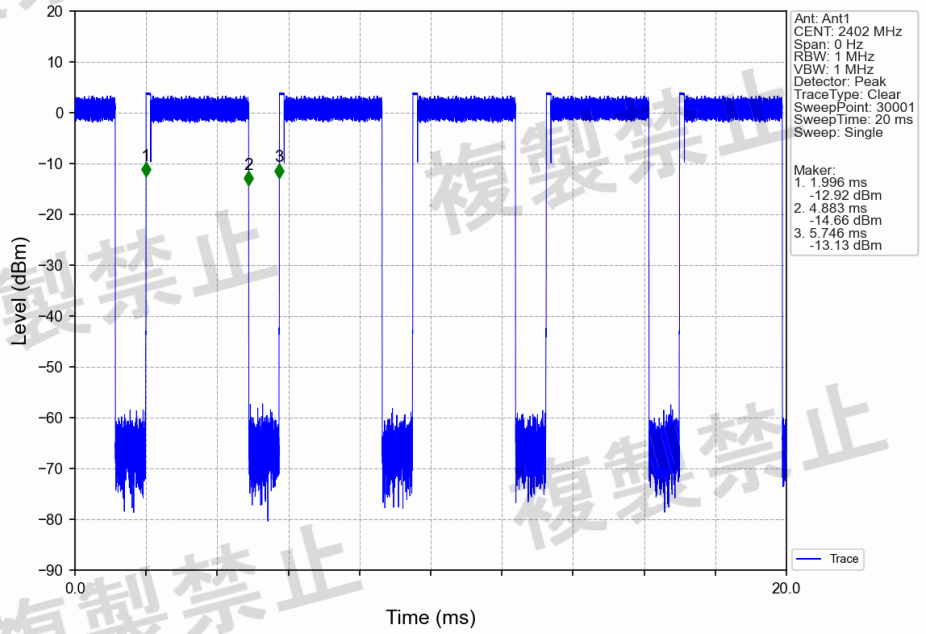
8DPSK_3DH1_2402MHz_Ant1_NTNV



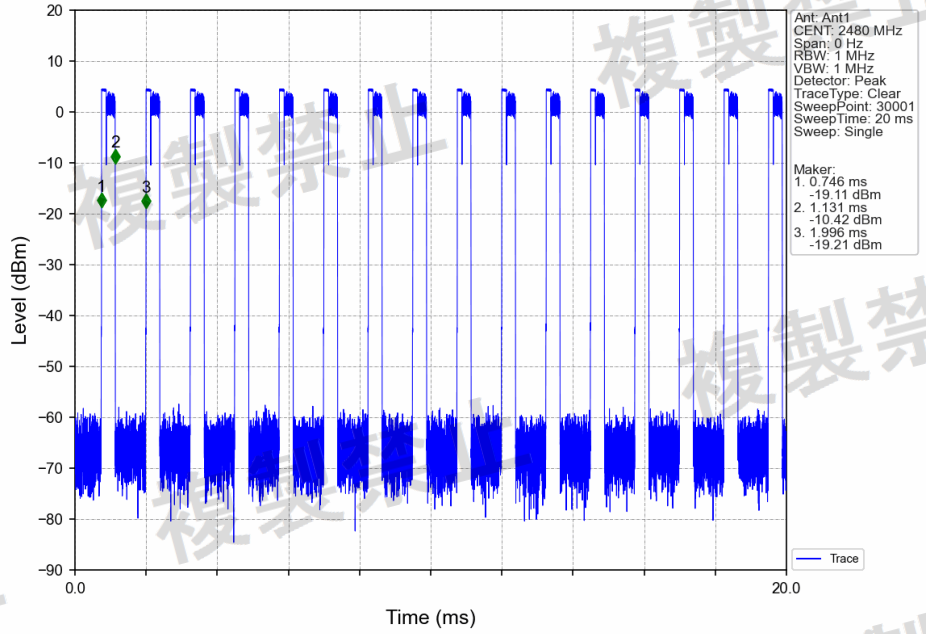
8DPSK_3DH3_2402MHz_Ant1_NTNV



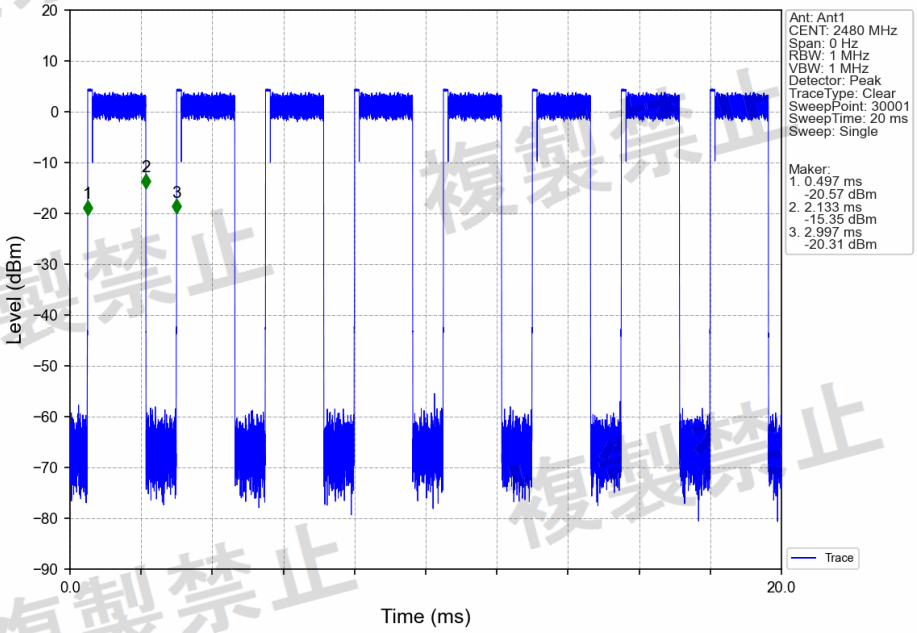
8DPSK_3DH5_2402MHz_Ant1_NTNV



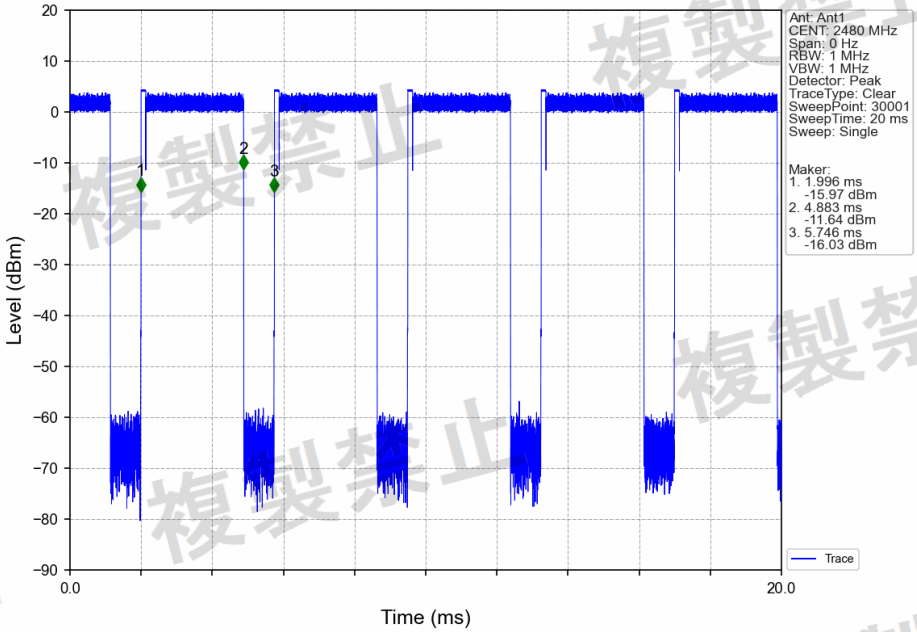
8DPSK_3DH1_2480MHz_Ant1_NTNV



8DPSK_3DH3_2480MHz_Ant1_NTNV



8DPSK_3DH5_2480MHz_Ant1_NTNV



6. Spurious Emission Intensity

6.1 Test Result

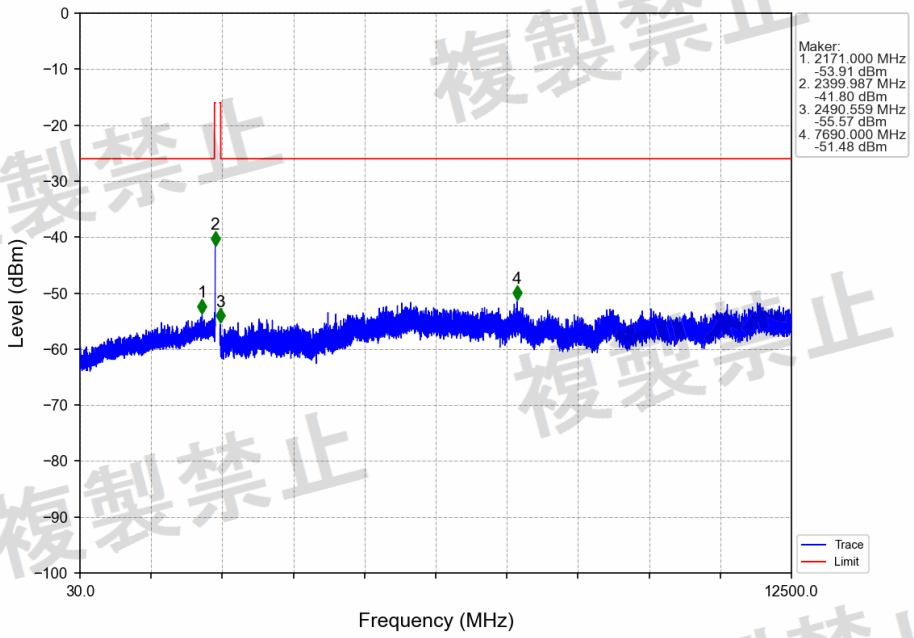
6.1.1 TxSe_NTNV

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	2171	-53.91	0.004	/	/	2.5	Pass
				2387	2400	2399.987	-41.80	0.066	/	/	25	Pass
				2483.5	2496.5	2490.559	-55.57	0.003	/	/	25	Pass
				2496.5	12500	7690	-51.48	0.007	/	/	2.5	Pass
		2480	1	30	2387	2326	-53.49	0.004	/	/	2.5	Pass
				2387	2400	2392.2	-55.14	0.003	/	/	25	Pass
				2483.5	2496.5	2483.799	-52.65	0.005	/	/	25	Pass
				2496.5	12500	7663	-50.97	0.008	/	/	2.5	Pass
Pi/4DQPSK	SISO	2402	1	30	2387	2366	-53.59	0.004	/	/	2.5	Pass
				2387	2400	2399.987	-31.23	0.753	/	/	25	Pass
				2483.5	2496.5	2485.19	-54.31	0.004	/	/	25	Pass
				2496.5	12500	5463.5	-50.89	0.008	/	/	2.5	Pass
		2480	1	30	2387	2380.5	-54.01	0.004	/	/	2.5	Pass
				2387	2400	2387.715	-55.34	0.003	/	/	25	Pass
				2483.5	2496.5	2483.578	-52.86	0.005	/	/	25	Pass
				2496.5	12500	12305.5	-51.06	0.008	/	/	2.5	Pass
8DPSK	SISO	2402	1	30	2387	2308.5	-54.13	0.004	/	/	2.5	Pass
				2387	2400	2399.974	-34.55	0.351	/	/	25	Pass
				2483.5	2496.5	2483.656	-54.34	0.004	/	/	25	Pass
				2496.5	12500	7299.5	-51.26	0.007	/	/	2.5	Pass
		2480	1	30	2387	2157	-53.95	0.004	/	/	2.5	Pass
				2387	2400	2395.008	-55.41	0.003	/	/	25	Pass
				2483.5	2496.5	2483.565	-52.54	0.006	/	/	25	Pass
				2496.5	12500	6537	-51.19	0.008	/	/	2.5	Pass

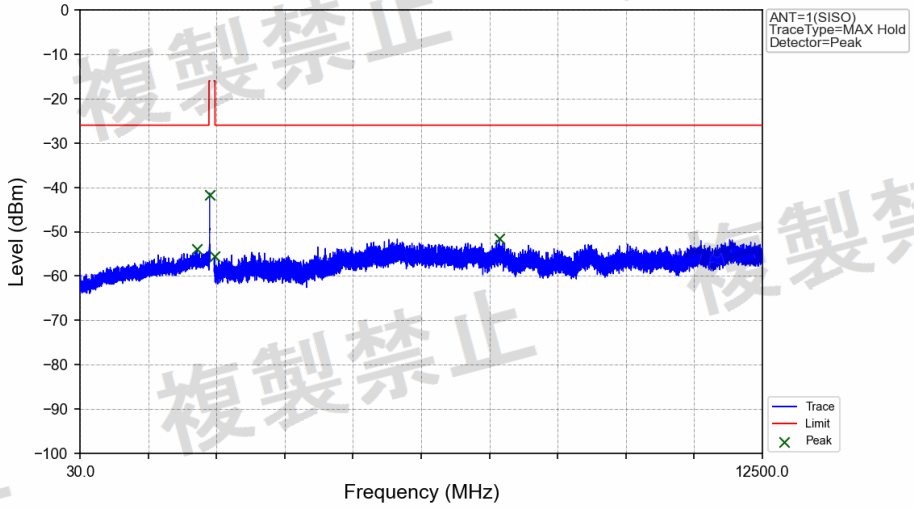
6.2 Test Graph

6.2.1 TxSe_NTNV

GFSK_DH5_2402MHz_Ant1_NTNV

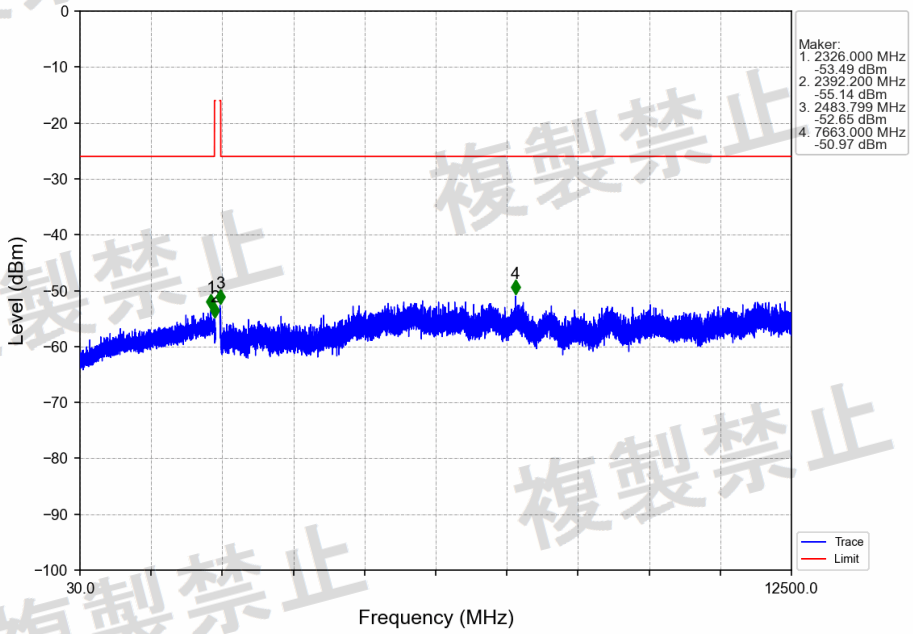


GFSK_DH5_2402MHz_Ant1_NTNV

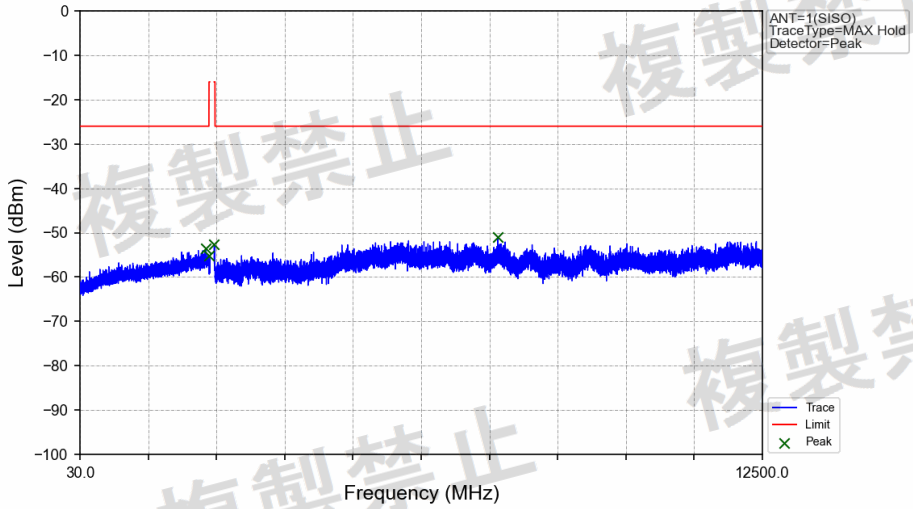


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	2171.000	-53.91	/	-26	Pass
2387	2400	1	1	2399.987	-41.80	/	-16	Pass
2483.5	2496.5	1	1	2490.559	-55.57	/	-16	Pass
2496.5	12500	1	1	7690.000	-51.48	/	-26	Pass

GFSK_DH5_2480MHz_Ant1_NTNV

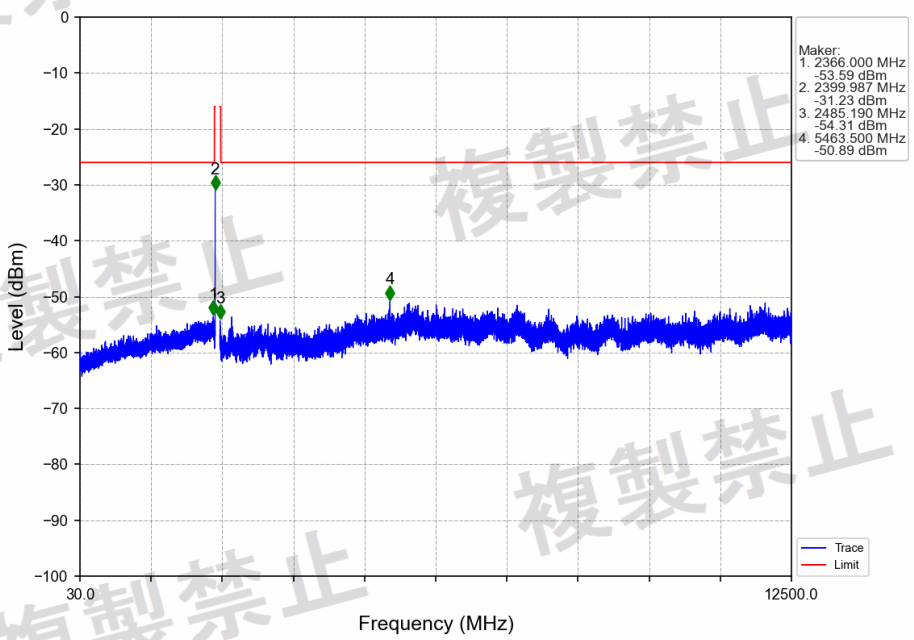


GFSK_DH5_2480MHz_Ant1_NTNV

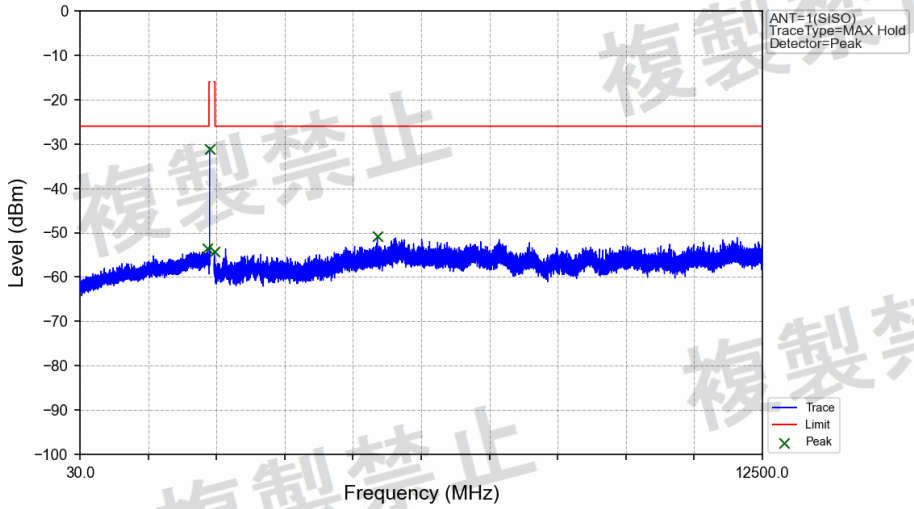


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	2326.000	-53.49	/	-26	Pass
2387	2400	1	1	2392.200	-55.14	/	-16	Pass
2483.5	2496.5	1	1	2483.799	-52.65	/	-16	Pass
2496.5	12500	1	1	7663.000	-50.97	/	-26	Pass

Pi/4DQPSK_2DH5_2402MHz_Ant1_NTNV

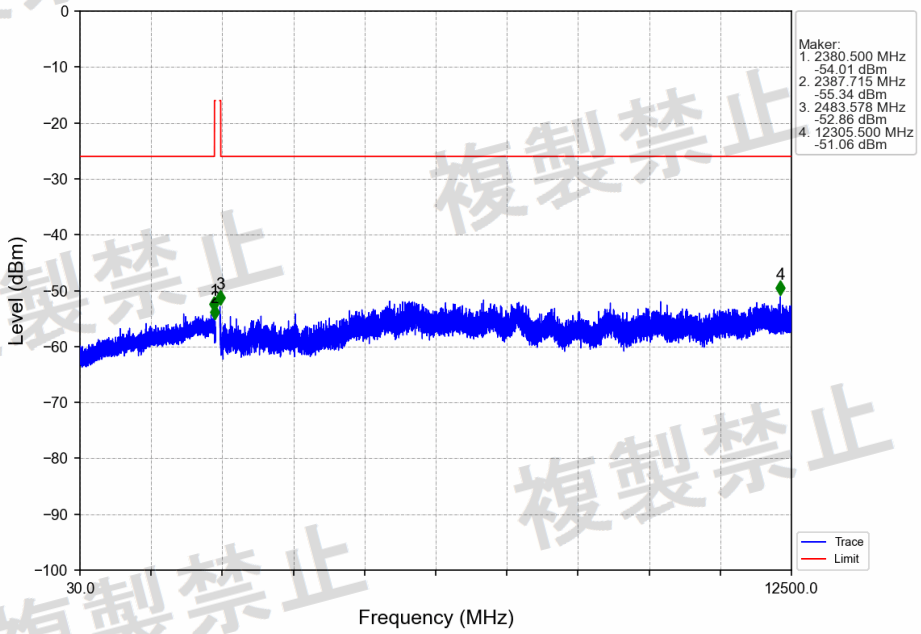


Pi/4DQPSK_2DH5_2402MHz_Ant1_NTNV

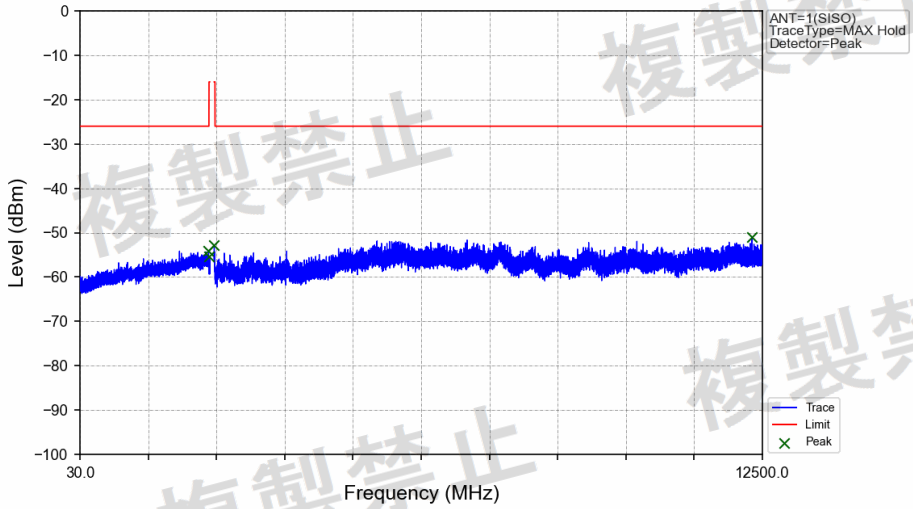


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	2366.000	-53.59	/	-26	Pass
2387	2400	1	1	2399.987	-31.23	/	-16	Pass
2483.5	2496.5	1	1	2485.190	-54.31	/	-16	Pass
2496.5	12500	1	1	5463.500	-50.89	/	-26	Pass

Pi/4DQPSK_2DH5_2480MHz_Ant1_NTNV

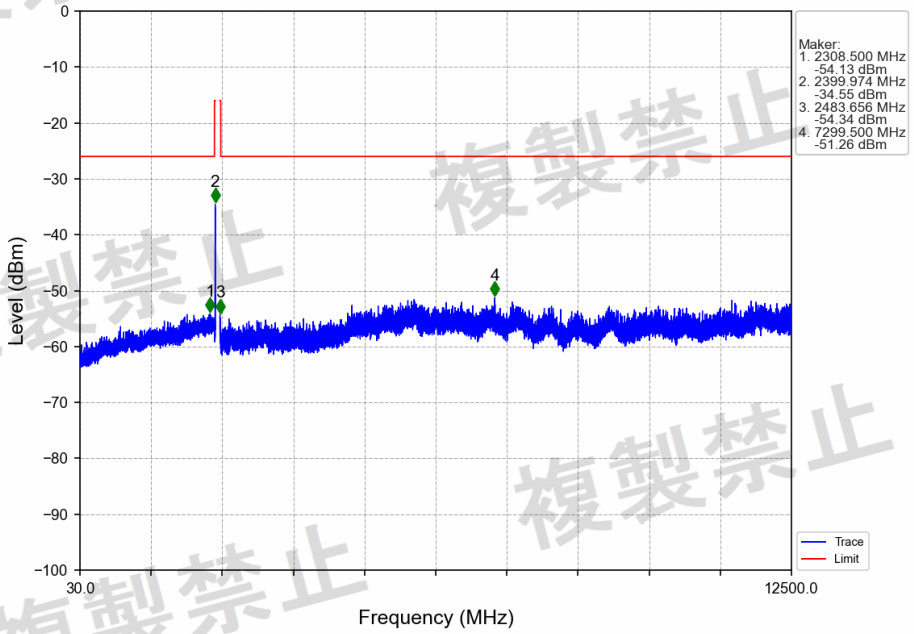


Pi/4DQPSK_2DH5_2480MHz_Ant1_NTNV

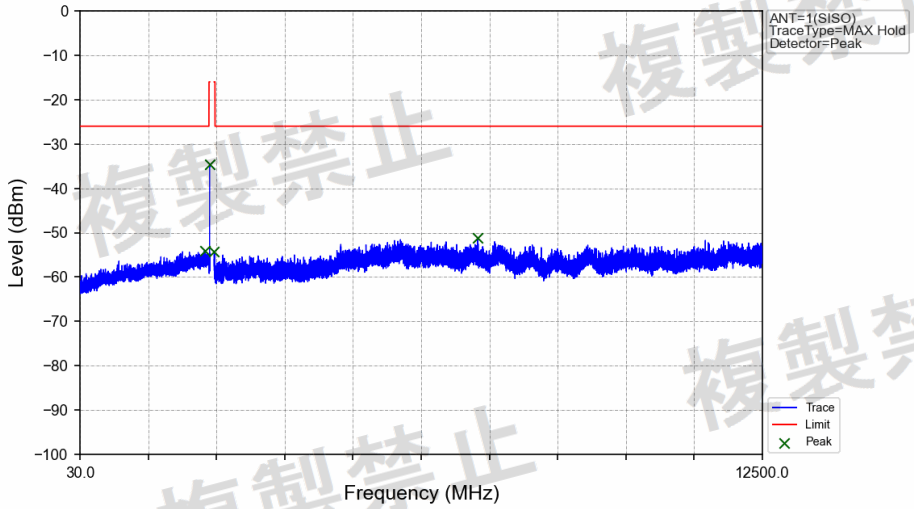


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	2380.500	-54.01	/	-26	Pass
2387	2400	1	1	2387.715	-55.34	/	-16	Pass
2483.5	2496.5	1	1	2483.578	-52.86	/	-16	Pass
2496.5	12500	1	1	12305.500	-51.06	/	-26	Pass

8DPSK_3DH5_2402MHz_Ant1_NTNV

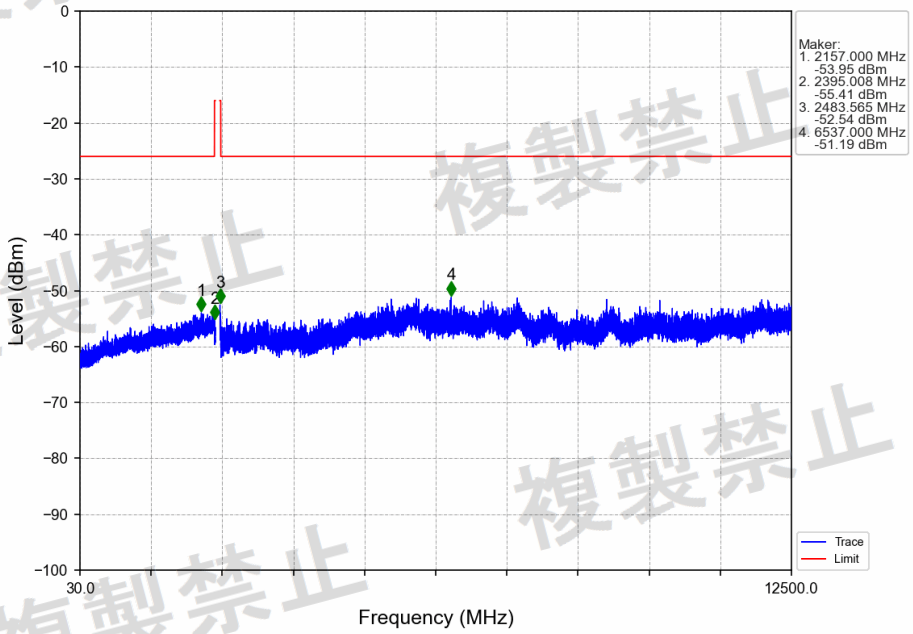


8DPSK_3DH5_2402MHz_Ant1_NTNV

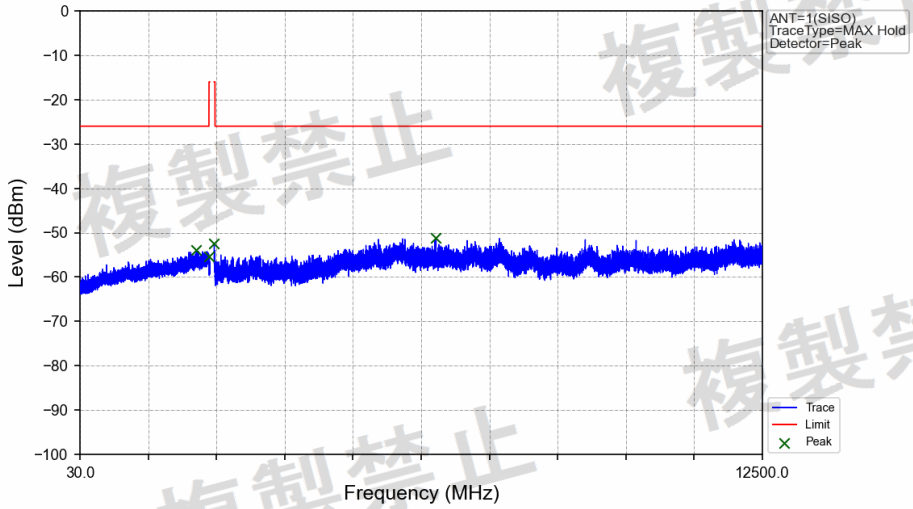


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	2308.500	-54.13	/	-26	Pass
2387	2400	1	1	2399.974	-34.55	/	-16	Pass
2483.5	2496.5	1	1	2483.656	-54.34	/	-16	Pass
2496.5	12500	1	1	7299.500	-51.26	/	-26	Pass

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	2387	1	1	2157.000	-53.95	/	-26	Pass
2387	2400	1	1	2395.008	-55.41	/	-16	Pass
2483.5	2496.5	1	1	2483.565	-52.54	/	-16	Pass
2496.5	12500	1	1	6537.000	-51.19	/	-26	Pass

7. Secondary Radiated Emission

7.1 Test Result

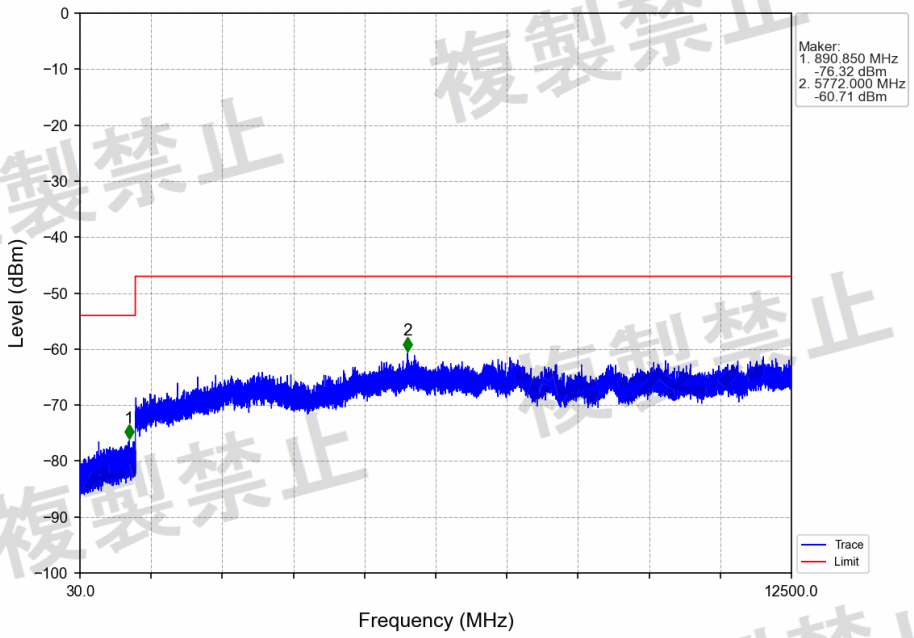
7.1.1 RxSe_NTNV

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	890.85	-76.32	0.023	/	/	4	Pass
				1000	12500	5772	-60.71	0.849	/	/	20	Pass
		2480	1	30	1000	784.15	-76.48	0.022	/	/	4	Pass
				1000	12500	6452	-61.01	0.793	/	/	20	Pass
Pi/4DQPSK	SISO	2402	1	30	1000	644.85	-76.01	0.025	/	/	4	Pass
				1000	12500	9878	-60.25	0.944	/	/	20	Pass
		2480	1	30	1000	931.3	-75.68	0.027	/	/	4	Pass
				1000	12500	5934.5	-60.77	0.838	/	/	20	Pass
8DPSK	SISO	2402	1	30	1000	811.85	-76.58	0.022	/	/	4	Pass
				1000	12500	1921	-56.50	2.239	-76.72	0.021	20	Pass
						3414	-49.78	10.520	-78.55	0.014	20	Pass
						3419	-48.65	13.646	-53.93	4.046	20	Pass
						3423	-51.96	6.368	-78.55	0.014	20	Pass
						3428	-55.04	3.133	-78.58	0.014	20	Pass
		2480	1	30	1000	783.4	-75.87	0.026	/	/	4	Pass
				1000	12500	12297	-60.85	0.822	/	/	20	Pass

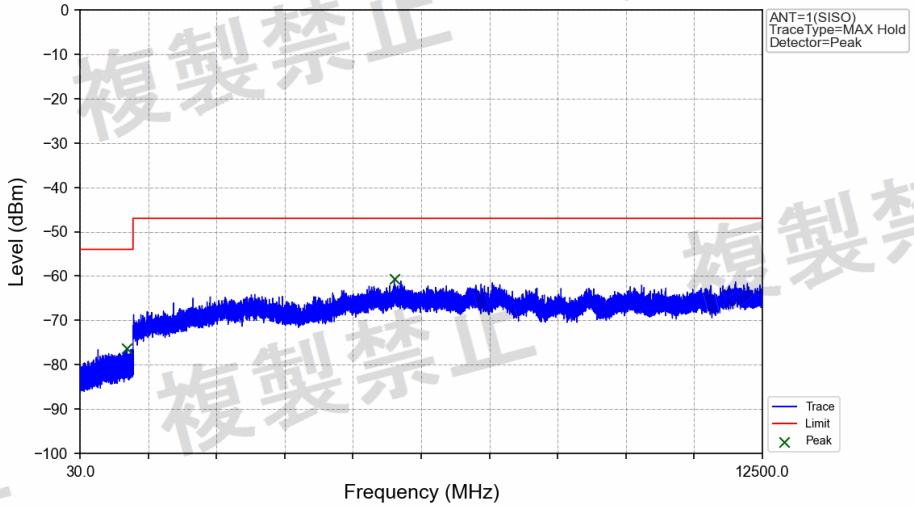
7.2 Test Graph

7.2.1 RxSe_NTNV

GFSK_DH5_2402MHz_Ant1_NTNV

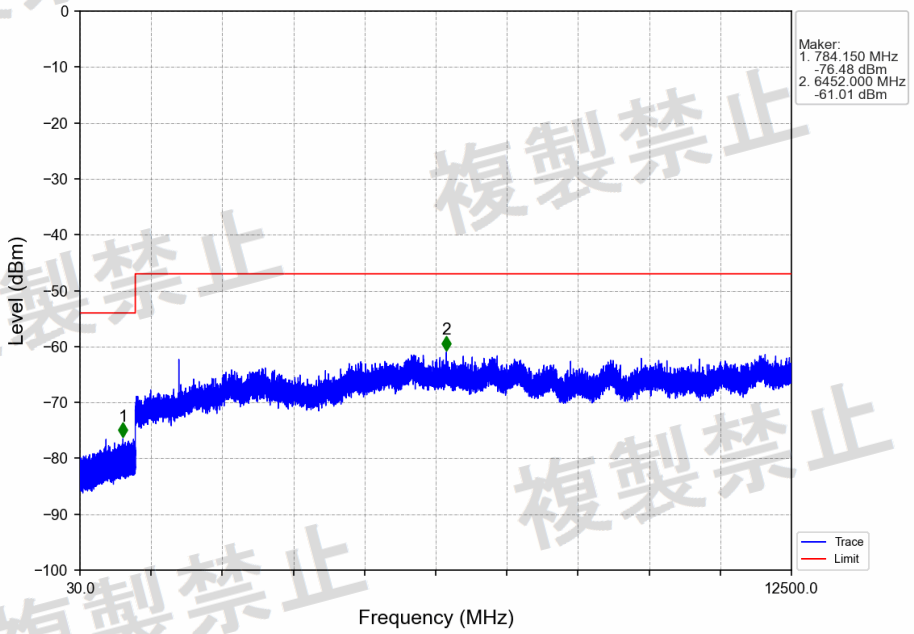


GFSK_DH5_2402MHz_Ant1_NTNV

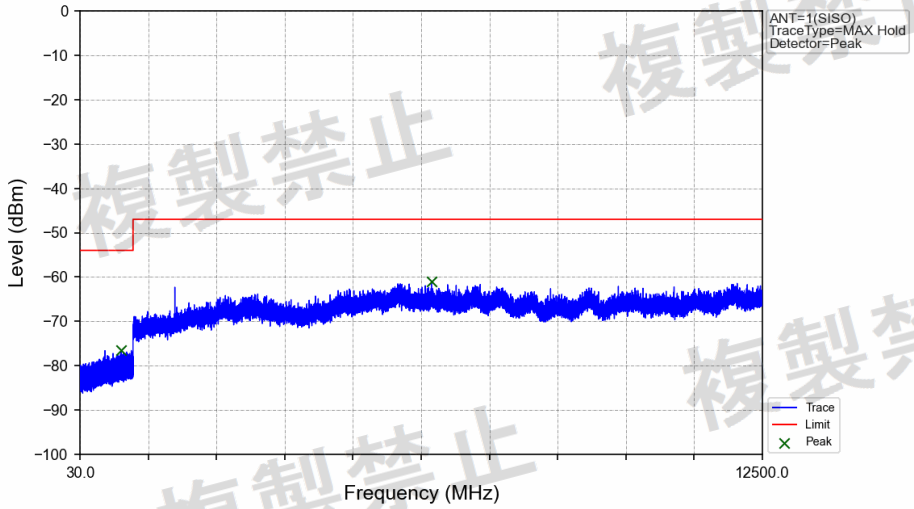


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	890.850	-76.32	/	-54	Pass
1000	12500	1	1	5772.000	-60.71	/	-47	Pass

GFSK_DH5_2480MHz_Ant1_NTNV

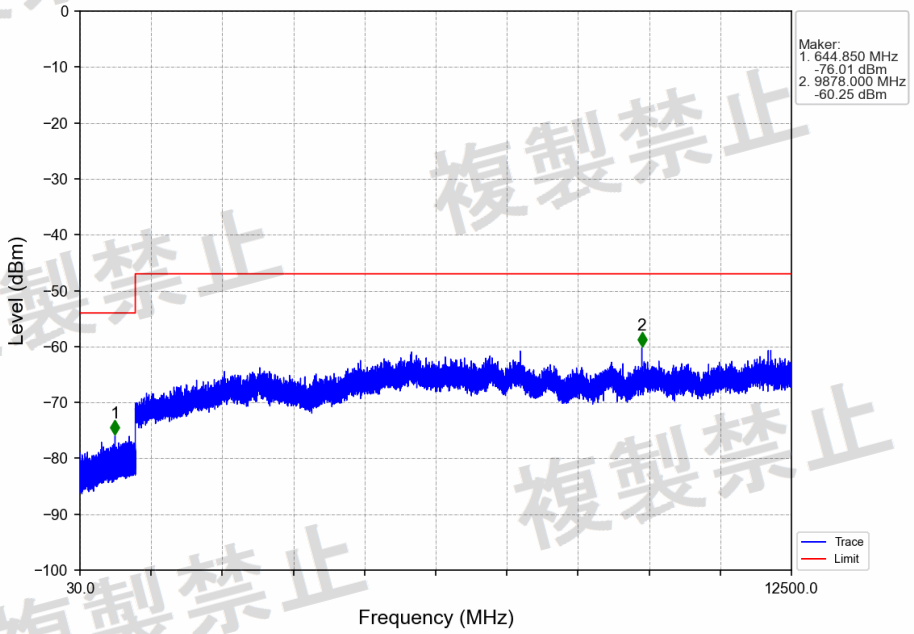


GFSK_DH5_2480MHz_Ant1_NTNV

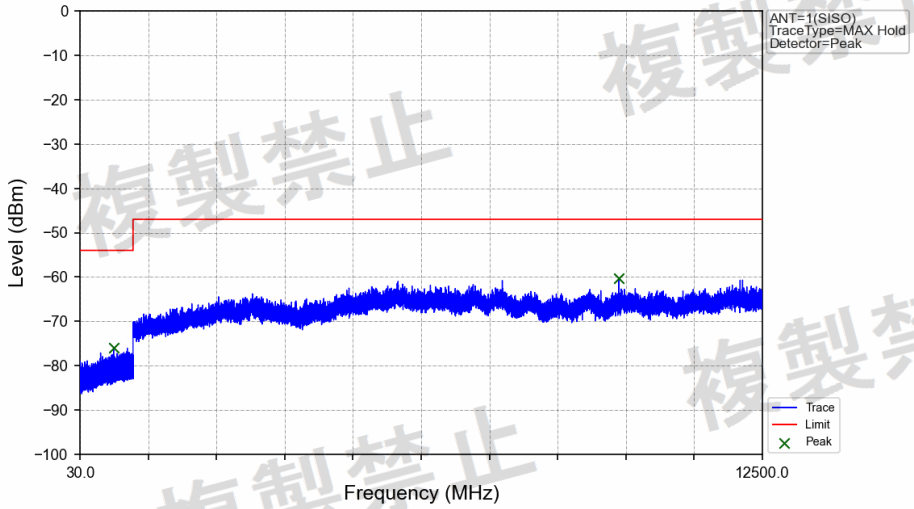


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	784.150	-76.48	/	-54	Pass
1000	12500	1	1	6452.000	-61.01	/	-47	Pass

Pi/4DQPSK_2DH5_2402MHz_Ant1_NTNV

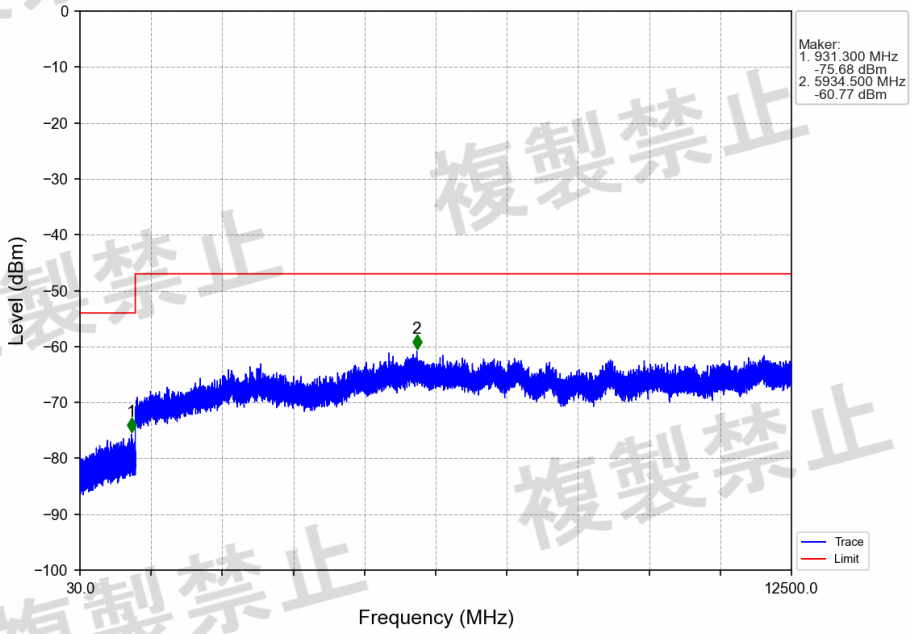


Pi/4DQPSK_2DH5_2402MHz_Ant1_NTNV

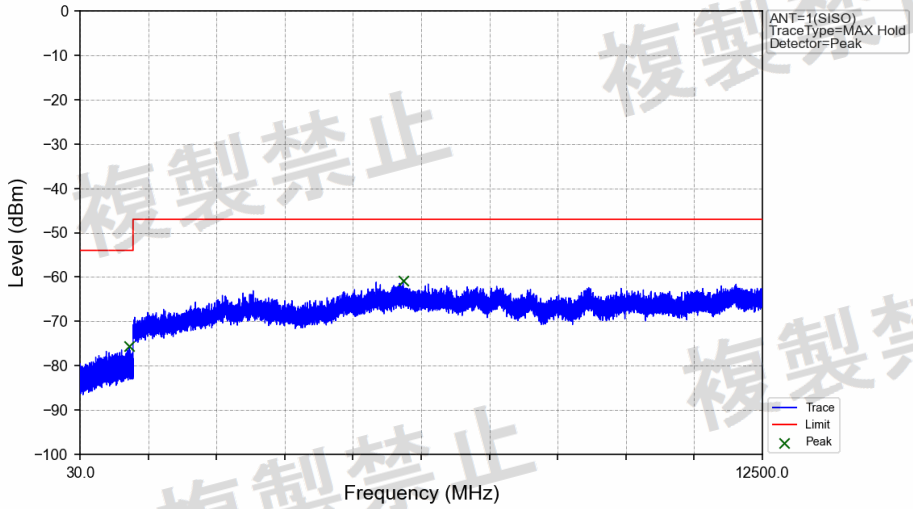


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	644.850	-76.01	/	-54	Pass
1000	12500	1	1	9878.000	-60.25	/	-47	Pass

Pi/4DQPSK_2DH5_2480MHz_Ant1_NTNV

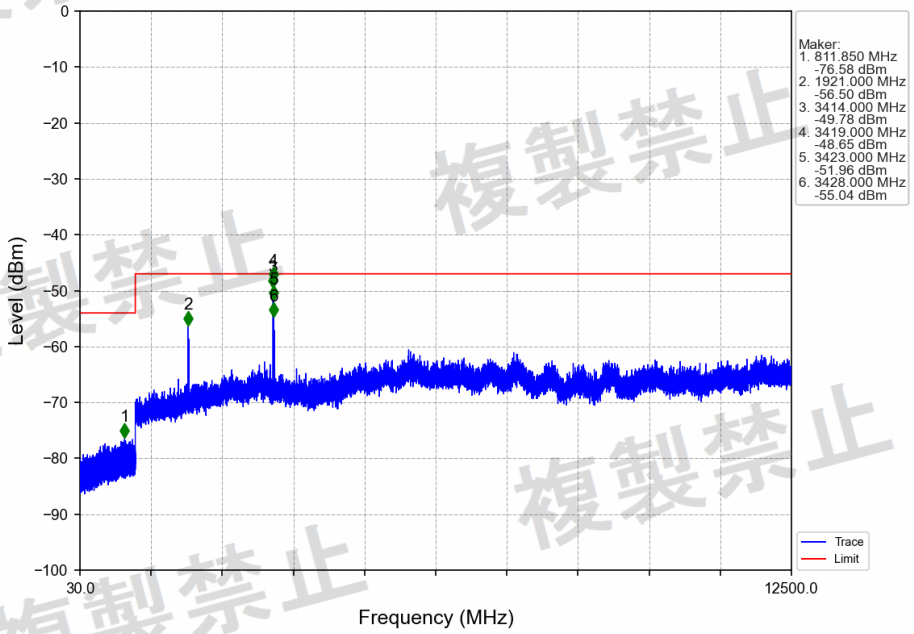


Pi/4DQPSK_2DH5_2480MHz_Ant1_NTNV

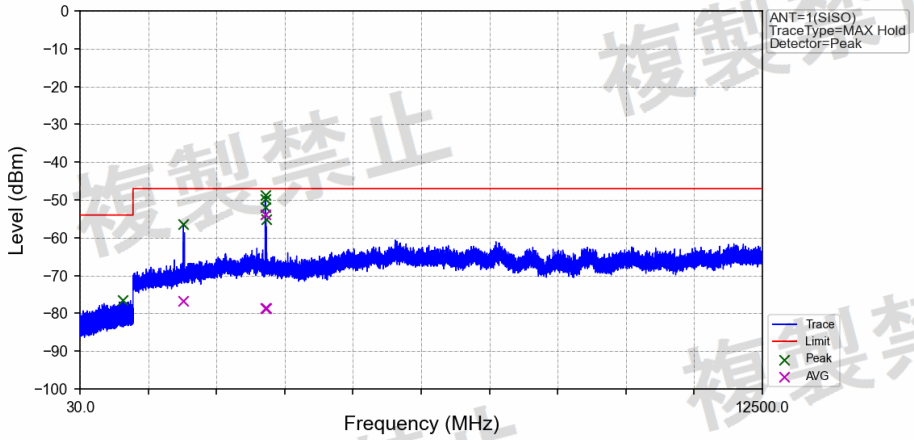


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	931.300	-75.68	/	-54	Pass
1000	12500	1	1	5934.500	-60.77	/	-47	Pass

8DPSK_3DH5_2402MHz_Ant1_NTNV

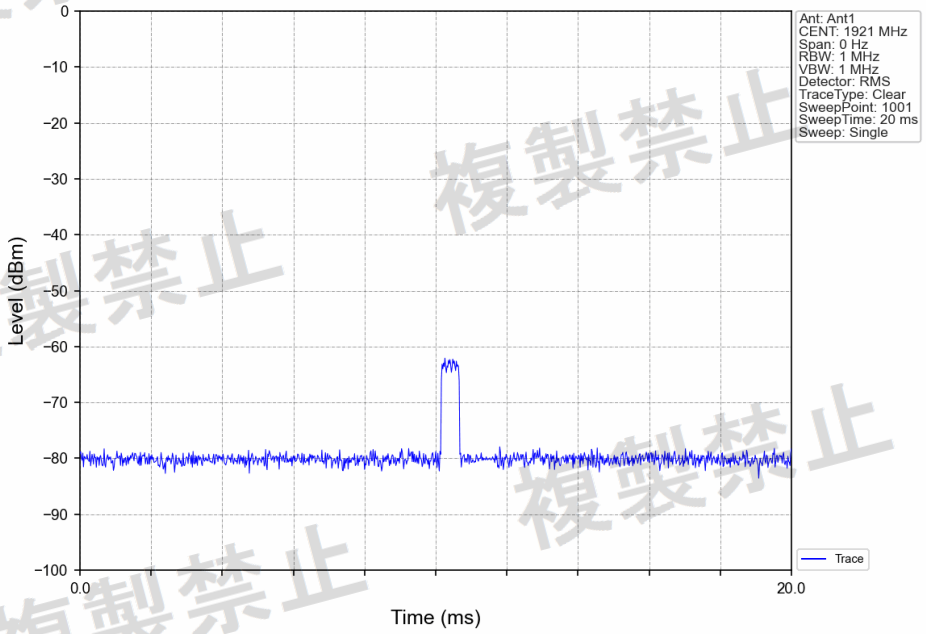


8DPSK_3DH5_2402MHz_Ant1_NTNV

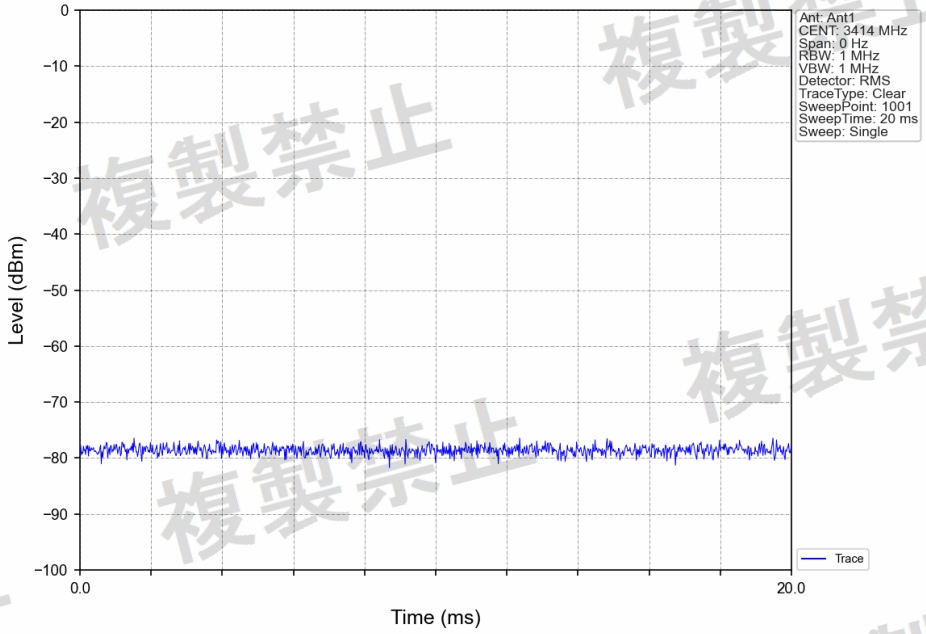


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	811.850	-76.58	/	-54	Pass
1000	12500	1	1	1921.000	-56.50	-76.72	-47	Pass
1000	12500	1	1	3414.000	-49.78	-78.55	-47	Pass
1000	12500	1	1	3419.000	-48.65	-53.93	-47	Pass
1000	12500	1	1	3423.000	-51.96	-78.55	-47	Pass
1000	12500	1	1	3428.000	-55.04	-78.58	-47	Pass

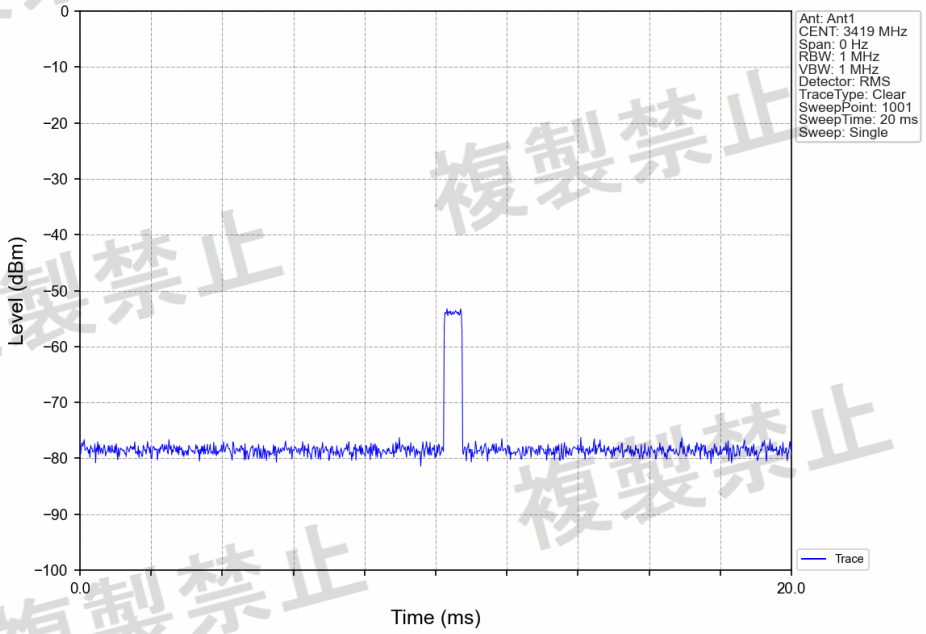
8DPSK_3DH5_2402MHz_Ant1_NTNV



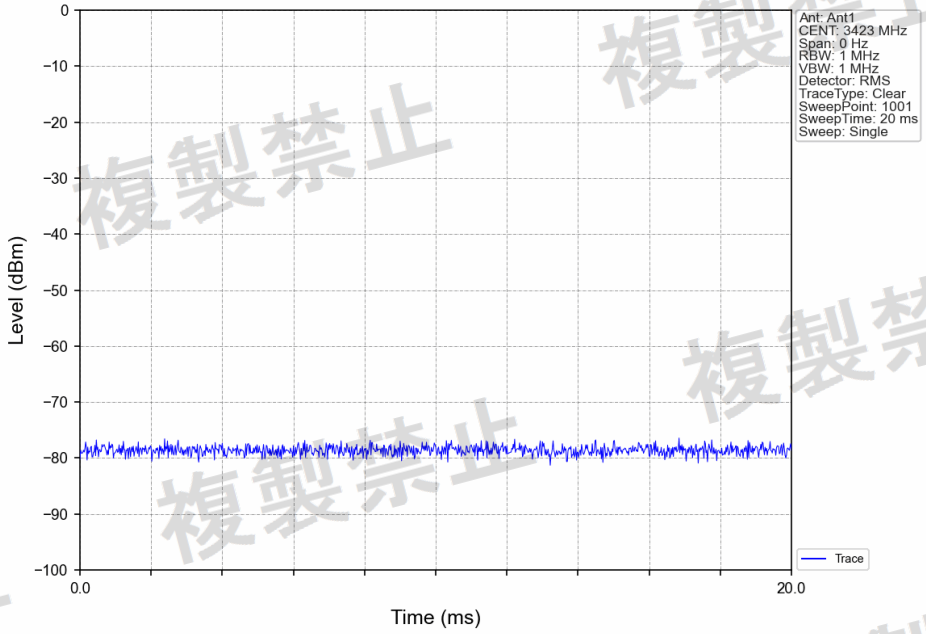
8DPSK_3DH5_2402MHz_Ant1_NTNV



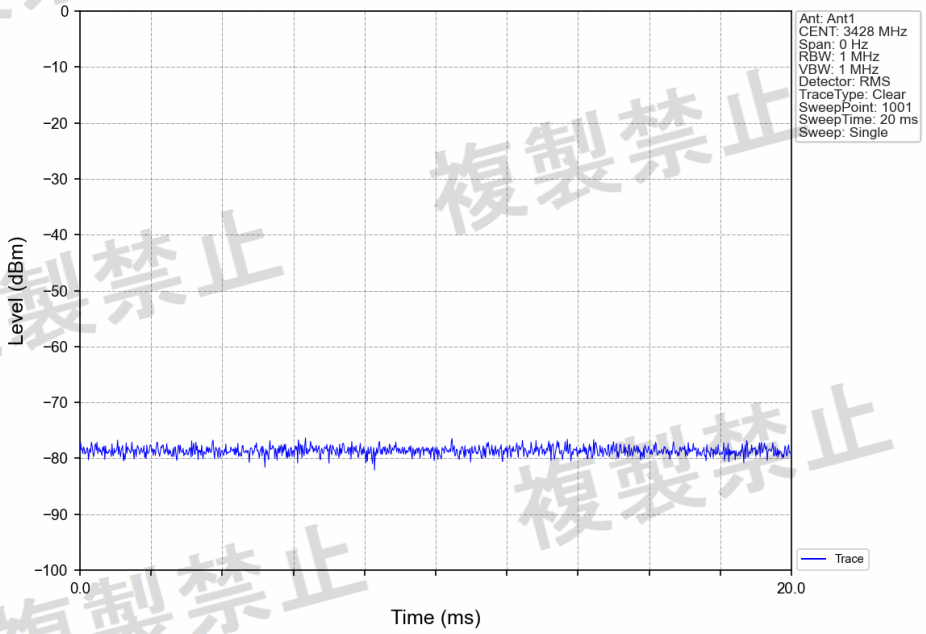
8DPSK_3DH5_2402MHz_Ant1_NTNV



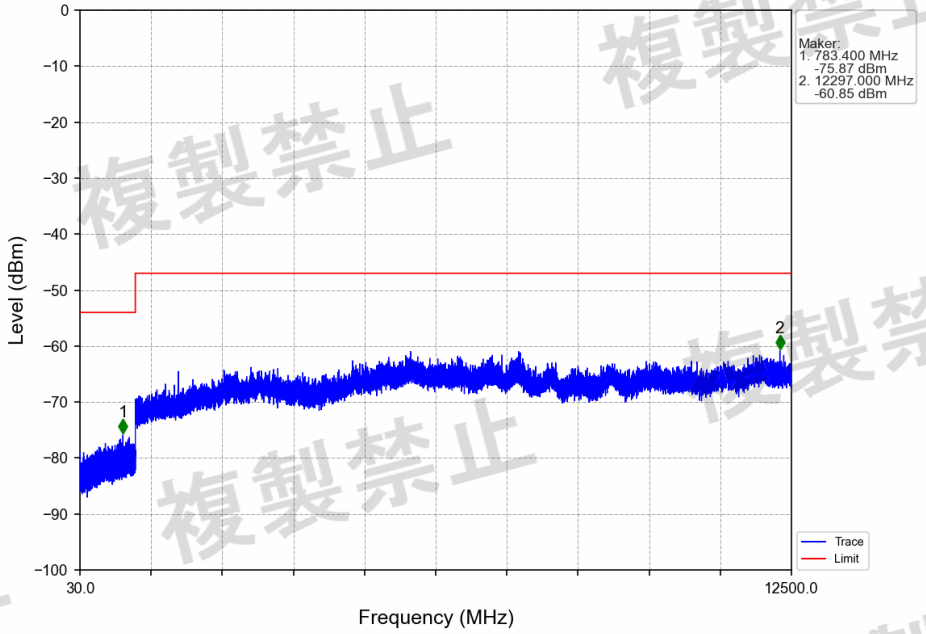
8DPSK_3DH5_2402MHz_Ant1_NTNV



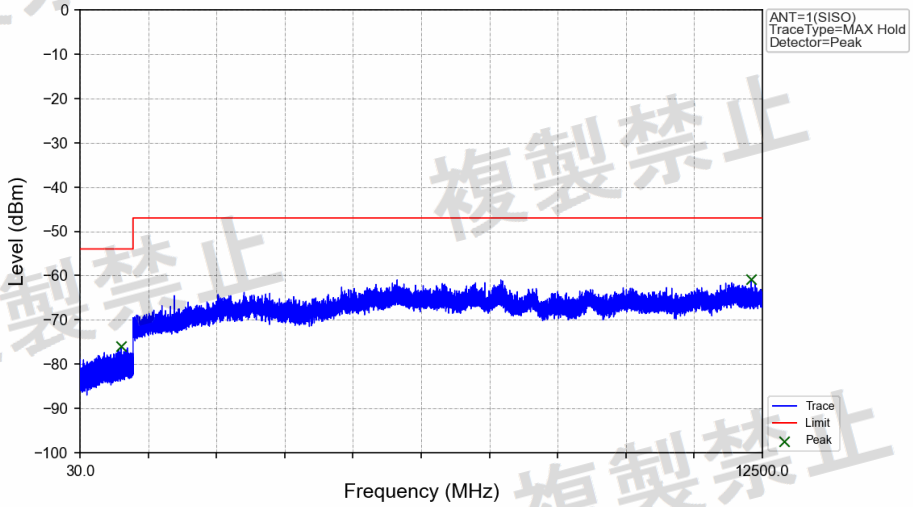
8DPSK_3DH5_2402MHz_Ant1_NTNV



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	783.400	-75.87	/	-54	Pass
1000	12500	1	1	12297.000	-60.85	/	-47	Pass

**********End of Report**********