

RF Test Report

For

Applicant name: Campagne Co.,Ltd.
Address: 2-25-1,Kichijojiminami-cho,Musashino-shi,Tokyo 180-0003 JAPAN
EUT name: True Wireless Earphones
Brand name: musashino LABEL
Model number: CP-TWS02A
Series model number: N/A

Issued By

Company name: BTF Testing Lab (Shenzhen) Co., Ltd.
Address: Plant 101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, Guangdong, China

Report number: BTF260420R01101
Test standards: Article 2-1, Item 19
MIC Notice No.88 Appendix No. 43
Test conclusion: Pass

Date of sample receipt: 2026-04-10
Test date: 2026-04-10 to 2026-04-30
Date of issue: 2026-07-25

Test by:

Vivi Yan

Vivi. Yan / Tester

Prepared by:

Vivi Yan

Vivi. Yan / Project engineer

Approved by:


Ryan CJ / EMC Manager

Note: All the test results in this report only related to the testing samples. Which can be duplicated completely for the legal use with approval of applicant; it shall not be reproduced except in full without the written approval of BTF Testing Lab (Shenzhen) Co., Ltd., All the objections should be raised within thirty days from the date of issue. To validate the report, you can contact us.

Revision History

Version	Issue Date	Revisions Content
R_V0	2026-07-25	Original

Note:
Once the revision has been made, then previous versions reports are invalid.

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1 Introduction

1.1 Laboratory Location

Test location:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	Plant 101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, Guangdong, China
Phone number:	+86-0755-23146130
Fax number:	+86-0755-23146130

1.2 Identification of the Responsible Testing Location

Test Location:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	Plant 101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, Guangdong, China
Description:	All measurement facilities used to collect the measurement data are located at F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

1.3 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Designation No.: CN1409**
BTF Testing Lab (Shenzhen) Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The test firm Registration No. is 695374.
- **CNAS - Registration No.: CNAS L17568**
BTF Testing Lab (Shenzhen) Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L17568.
- **A2LA - Registration No.: 6660.01**
BTF Testing Lab (Shenzhen) Co., Ltd. is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories.
- **ISED – CAB identifier.: CN0135**
The 3m Semi-anechoic chamber of BTF Testing Lab (Shenzhen) Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 27844.
- **VCCI - Registration No.: C-20122, G-20157, R-20166**
EMC LAB: Certificated by VCCI, Japan
Registration No.: C-20122, G-20157, R-20166
Date of Registration: June 20, 2025
This Certificate is valid until June 19, 2028

1.4 Announcement

- (1) The test report reference to the report template version v0.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) This document may not be altered or revised in any way unless done so by BTF and all revisions are duly noted in the revisions section.
- (5) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
- (6) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.
- (7) All entrusted information in this report is provided by the client and has been confirmed through consultation with the client; The testing items for this report have been discussed and confirmed with the client, and our company is only responsible for the content reflected in the report.

2 Product Information

2.1 Application Information

Company name:	Campagne Co.,Ltd.
Address:	2-25-1,Kichijojiminami-cho,Musashino-shi,Tokyo 180-0003 JAPAN

2.2 Manufacturer Information

Company name:	SHENZHEN SHI KISB ELECTRONIC CO., LTD.
Address:	Room 301A, 4/F, Building A, Shanghe Industrial Park, Nanchang Road, Sanwei Community, Hangcheng Subdistrict, Bao'an District, Shenzhen, Guangdong Province, China

2.3 Factory Information

Company name:	SHENZHEN SHI KISB ELECTRONIC CO., LTD.
Address:	Room 301A, 4/F, Building A, Shanghe Industrial Park, Nanchang Road, Sanwei Community, Hangcheng Subdistrict, Bao'an District, Shenzhen, Guangdong Province, China

2.4 General Description of Equipment under Test (EUT)

EUT name:	True Wireless Earphones
Under test model name:	CP-TWS02A
Series model name:	N/A
Description of model name differentiation:	N/A
Ratings:	Input: DC 5V 330mA Rechargeable Li-ion polymer Battery DC 3.7V 350mAh 1.295Wh

2.5 Technical Information

Operation Frequency:	2402-2480MHz
Channel numbers:	79
Channel separation:	1MHz
Modulation technology:	GFSK, Pi/4-DQPSK,8DPSK
The Max RF conducted output power (mW/MHz)	R: 0.21 mW/MHz L: 0.40 mW/MHz
Antenna type:	FPC ANT
Antenna gain:	L: -2.09dBi(declare by Applicant) R: -0.21dBi(declare by Applicant)

Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461	/	/

3 Summary of Test Results

3.1 Test Standards

The tests were performed according to following standards:

Article 2-1, Item 19 : 2.4GHz for SRD/BT/WIFI

MIC Notice No.88 Appendix No.43: 2.4GHz band advanced low-power data communication system

3.2 Uncertainty of Test

Measurement	Value
Radio Frequency	$\pm 1.2 \times 10^{-9}$
Occupied Channel Bandwidth	$\pm 173.1\text{Hz}$
RF output power, conducted	$\pm 0.66\text{ dB}$
Unwanted Emissions, Conducted	$\pm 2.32\text{dB}$
Time	$\pm 5\%$
The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

3.3 Summary of Test Result

Item	Standard	Requirement	Result
Tolerance of Frequency	Article 2-1, Item 19	Article 2-1, Item 19	Pass
Occupied Bandwidth (99%)	Article 2-1, Item 19	Article 2-1, Item 19	Pass
Spread Bandwidth (90%)	Article 2-1, Item 19	Article 2-1, Item 19	Pass
Antenna Power and Tolerance	Article 2-1, Item 19	Article 2-1, Item 19	Pass
Spurious Emission Intensity	Article 2-1, Item 19	Article 2-1, Item 19	Pass
Secondary Radiated Emissions	Article 2-1, Item 19	Article 2-1, Item 19	Pass
Dwell Time	Article 2-1, Item 19	Article 2-1, Item 19	Pass
Interference Prevention Function	Article 2-1, Item 19	Article 2-1, Item 19	Pass
RF Accessibility	Article 2-1, Item 19	Article 49-20, paragraph 1(a)	Pass
Remark: 1. Pass: Meet the requirements. 2. N/A: not applicable.			

3.4 Additions to, deviations, or exclusions from the method

None

4 Test Configuration

4.1 Test Equipment List

Test Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Cal. By	Remark
Test Software	TST Pass	/	Version: 2.0	/	/	Guangzhou LiSai Metrology & Test Co., Ltd.	3
Cell Site Test Set	HP	8921A	US35010158	2025-10-17	2026-10-16	Guangzhou LiSai Metrology & Test Co., Ltd.	3
Spectrum Analyzer	Keysight	N9020A	MY50410020	2025-10-17	2026-10-16	Guangzhou LiSai Metrology & Test Co., Ltd.	3
ESG Vector Signal Generator	Agilent	E4438C	MY45094854	2025-10-17	2026-10-16	Guangzhou LiSai Metrology & Test Co., Ltd.	3
MXG Vector Signal Generator	Agilent	N5182A	MY46240163	2025-10-17	2026-10-16	Guangzhou LiSai Metrology & Test Co., Ltd.	3
Wideband Radio Communication Tester	Rohde&Schwarz	CMW500	161997	2025-10-17	2026-10-16	Guangzhou LiSai Metrology & Test Co., Ltd.	3
Programmable Constant Temperature And Humidity Test Chamber	ZZCKONG	ZZ-K02A	20210928007	2025-10-17	2026-10-16	Guangzhou LiSai Metrology & Test Co., Ltd.	3
DC Power Supply	Tongmen	etm-6050c	20211026123	2025-10-17	2026-10-16	Guangzhou LiSai Metrology & Test Co., Ltd.	3
RF Control Unit	Techy	TR1029-1	10291	2025-10-17	2026-10-16	Guangzhou LiSai Metrology & Test Co., Ltd.	3
RF Sensor Unit	Techy	TR1029-2	10292	2025-10-17	2026-10-16	Guangzhou LiSai Metrology & Test Co., Ltd.	3
RF shielding box	Yinuoxin Electronics	50*50*50 cm	050505M	2025-10-21	2026-10-20	Guangzhou LiSai Metrology & Test Co., Ltd.	3

Remark:

1. Calibration conducted by the National Institute of Information and Communications Technology (NICT) in Japan (hereinafter referred to as *NICT*) or a designated calibration agency under Article 102-18 paragraph (1) in JRL.
2. Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Act (Act. No.51 of 1992)
3. Calibration conducted in countries except Japan, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).
4. Calibration, etc. conducted by using measuring instruments and other equipment listed in the right column of appended table No. 3, which shall have been given any type of calibration, etc. listed above from (2) to (4).

From JRL Article 24-2, paragraph 4, Item 2

All calibration information is from Guangzhou LiSai Metrology & Test Co., Ltd.

4.2 Test Auxiliary Equipment

The EUT has been tested as an independent unit.

4.3 Environment Condition

ENV	Temperature (°C)	Voltage (V)
NTHV	25	4.07
NTLV	25	3.33
NTNV	25	3.7

Voltage fluctuation test:

The RF unit is supplied DC 3.7 The fluctuation of input voltage to the circuit of RF unit of test equipment is under $\pm 1\%$, when input voltage DC 3.7 fluctuated $\pm 10\%$, so all measurement has been conducted by only rated voltage.

DC Input	RF_IC Input	Rate of fluctuation(%)
3.33V	3.3V	0.0
3.70V	3.3V	0.0
4.07V	3.3V	0.0

4.4 Test Modes

No.	Test Modes
TM1	TX mode
TM2	RX mode

4.5 Test software

Test software:	Version:	Power Class:
BlueSuite 3.3.11	V 3.3.11	L: 5; R:11

4.6 Test Channel of EUT

Operation Band: 1

Bandwidth (MHz)	Lowest Channel (LCH) (MHz)	Middle Channel (MCH) (MHz)	Highest Channel (HCH) (MHz)
1	2402	2441	2480

5 Evaluation Results (Evaluation)

5.1 Interference Prevention Function

Test Requirement:	The EUT shall support one of the following functions: - Automatic identification transmission - Automatic identification reception
Test Method:	Notification No.88 of MIC, 2004
Procedure:	(1) For EUTs capable of automatically transmitting identification data a. Transmit identification data from EUT to Demodulator b. Confirm identification data is correctly received by Demodulator (2) For EUTs capable of automatically receiving identification data a. Transmit identification data from Link Partner to EUT b. Confirm communication link is established c. Link Partner shall respond by transmitting different identification data back to the EUT d. Confirm EUT stops transmitting, or confirm EUT recognizes that the two identification data are different
Operating Environment:	
Temperature:	22.7 °C
Humidity:	47.4 %
Atmospheric Pressure:	1010 mbar
Test voltage:	DC3.7V From battery

5.1.1 Conclusion

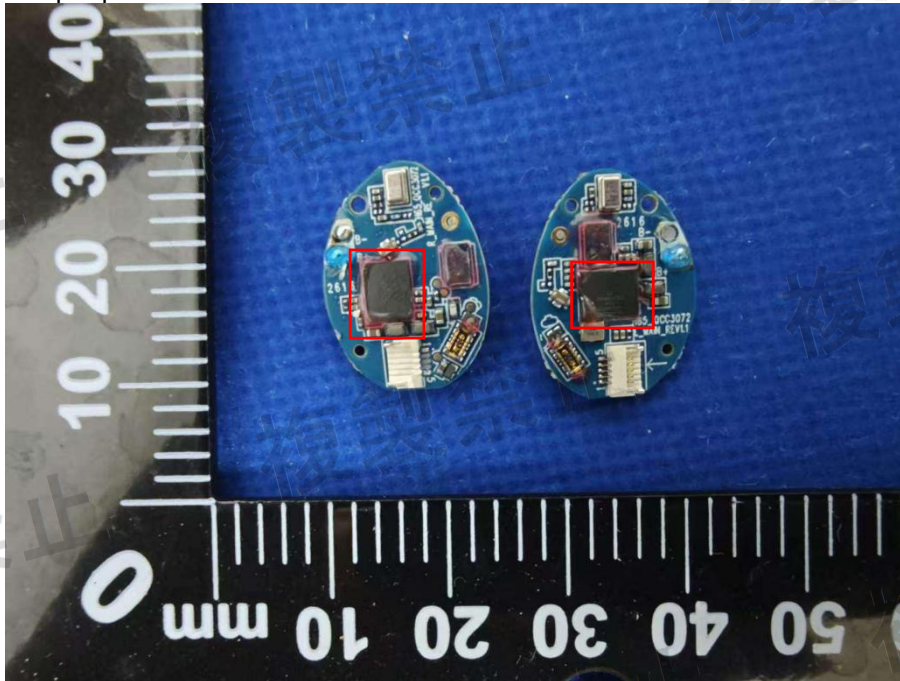
The detected ID of the device is below: 9B:AE:F2:E1:F7:B0
Test result: The device meet the requirements PASS

5.2 RF Accessibility

Test Requirement:	The EUT shall be constructed in such a way that sensitive RF parts, (like modulation and oscillator parts) cannot be reached easily by the user. These parts shall be covered by soldered metal caps or glue or by other mechanical covers. If the covers are fixed with screws, these shall be not the common type(s) like a Phillips, but special versions like Torx, so that the user cannot open the device with common tools.
Operating Environment:	
Temperature:	22.3 °C
Humidity:	53.5 %
Atmospheric Pressure:	1010 mbar
Test voltage:	DC3.7V From battery

5.2.1 Conclusion

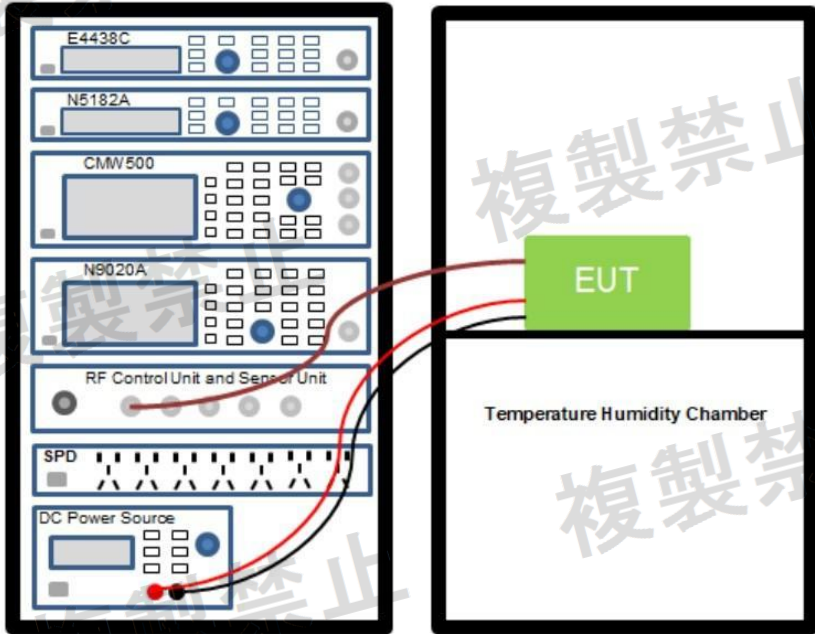
Tamper proof declaration:



We apply the product for Japan RF certification, The RF module is protected by fixing adhesive, If the fixing adhesive will be open by force, it's will be damaged. See below the structure:

6 Radio Spectrum Matter Test Results (RF)

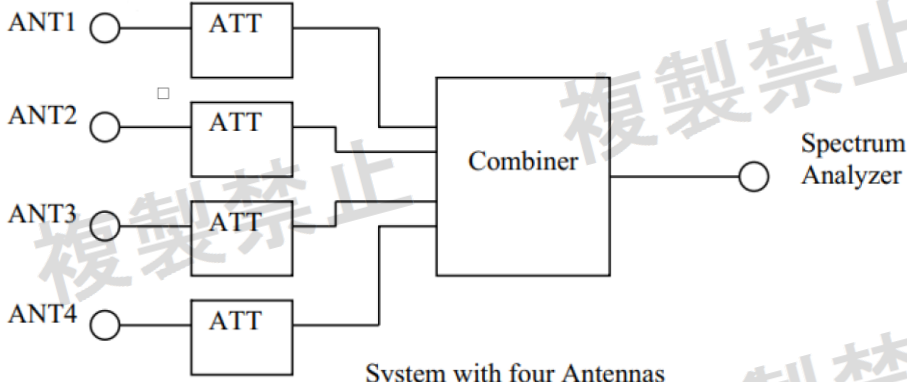
6.1 Tolerance of Frequency

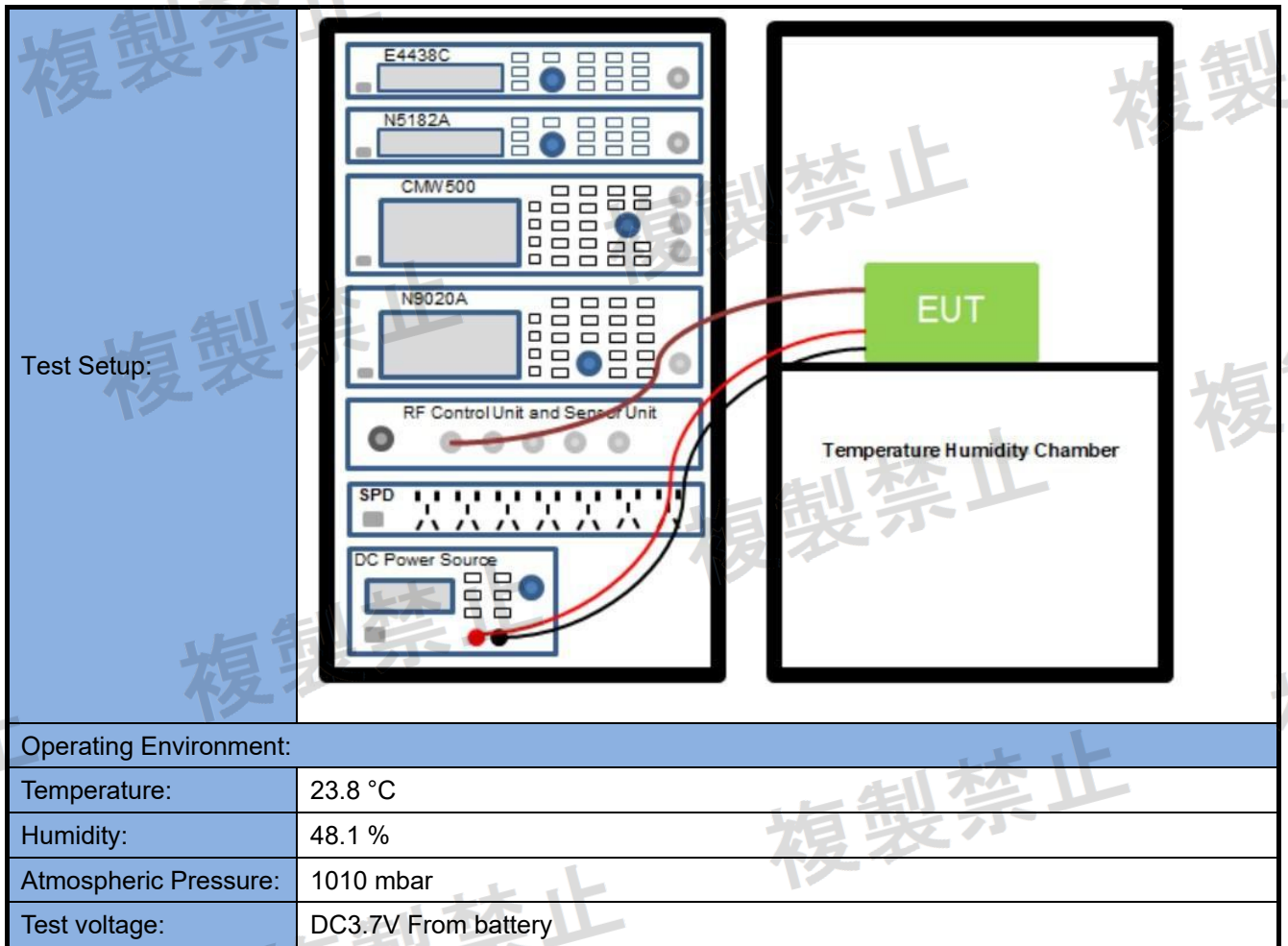
Test Requirement:	Article 2-1, Item 19	
Test Method:	Notification No.88 of MIC, 2004	
Test Limit:	±50ppm or less.	
Procedure:	Center frequency:	Test frequency
	Span:	2 times channel bandwidth
	RBW:	10 kHz
	VBW:	10 kHz
	Sweep data points:	1001 or greater
	Sweep time:	Auto
	Detector mode:	Positive peak
	Indication mode:	Max hold
	If the EUT cannot transmit in un-modulated mode then modulated mode measurements can be made, as follows: If the spectrum observed using the spectrum analyzer has a characteristic dip at the center, then the center frequency of the dip shall be regarded as the center frequency of the carrier.	
	Test Setup:	
Operating Environment:		
Temperature:	25 °C	
Humidity:	46.1 %	
Atmospheric Pressure:	1010 mbar	
Test voltage:	DC3.7V From battery	

6.1.1 Test Data

Please Refer to Appendix for Details.

6.2 Occupied Bandwidth (99%)

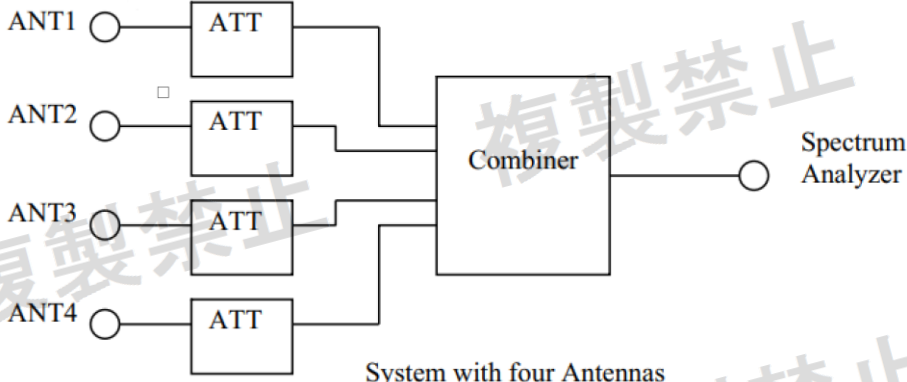
Test Requirement:	Article 2-1, Item 19																		
Test Method:	Notification No.88 of MIC, 2004																		
Test Limit:	For FHSS or FHSS and other modulation Hybrid: 83.5 MHz or less: The measured bandwidth at the low and high channels shall meet the following requirements: - The lowest frequency of the measured bandwidth shall not be less than 2400 MHz - The highest frequency of the measured bandwidth shall not be greater than 2483.5 MHz [Occupied Bandwidth] 83.5 MHz or less																		
Procedure:	<table border="1"> <tr> <td>Center Frequency:</td><td>Test frequency</td></tr> <tr> <td>Span:</td><td>2 - 3.5 times the technical standard</td></tr> <tr> <td>RBW:</td><td>Within 3% of the technical standard</td></tr> <tr> <td>VBW:</td><td>Same as RBW</td></tr> <tr> <td>Sweep time:</td><td>Auto</td></tr> <tr> <td>Sweep data points:</td><td>1001 or greater</td></tr> <tr> <td>Detector mode:</td><td>Positive peak</td></tr> <tr> <td>Indication mode:</td><td>Max hold</td></tr> <tr> <td>BW setting:</td><td>99%</td></tr> </table> (1) Measure the signal bandwidth using a spectrum analyzer (2) For multiple antenna systems: a) Each antenna shall be individually measured b) If the measured occupied bandwidth for any antenna exceeds [(Occupied Bandwidth Limit) – 100kHz] then, in addition, the occupied bandwidth shall be measured with all antennas combined – see diagram below:  System with four Antennas	Center Frequency:	Test frequency	Span:	2 - 3.5 times the technical standard	RBW:	Within 3% of the technical standard	VBW:	Same as RBW	Sweep time:	Auto	Sweep data points:	1001 or greater	Detector mode:	Positive peak	Indication mode:	Max hold	BW setting:	99%
Center Frequency:	Test frequency																		
Span:	2 - 3.5 times the technical standard																		
RBW:	Within 3% of the technical standard																		
VBW:	Same as RBW																		
Sweep time:	Auto																		
Sweep data points:	1001 or greater																		
Detector mode:	Positive peak																		
Indication mode:	Max hold																		
BW setting:	99%																		

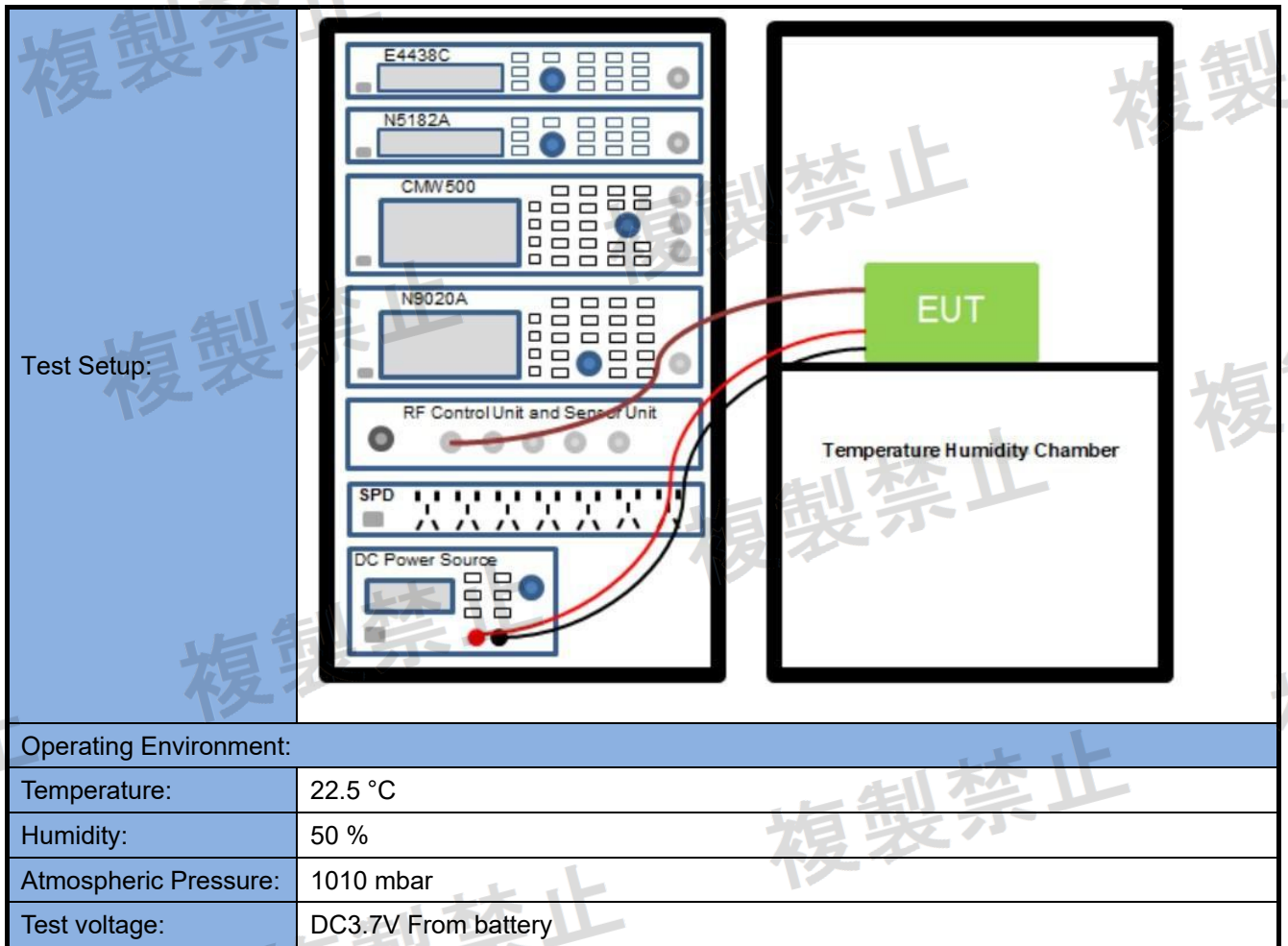


6.2.1 Test Data

Please Refer to Appendix for Details.

6.3 Spread Bandwidth (90%)

Test Requirement:	Article 2-1, Item 19																		
Test Method:	Notification No.88 of MIC, 2004																		
Test Limit:	Only for report use.																		
Procedure:	<table border="1"> <tr> <td>Center Frequency:</td><td>Test frequency</td></tr> <tr> <td>Span:</td><td>2 - 3.5 times the technical standard</td></tr> <tr> <td>RBW:</td><td>Within 3% of the technical standard</td></tr> <tr> <td>VBW:</td><td>Same as RBW</td></tr> <tr> <td>Sweep time:</td><td>Auto</td></tr> <tr> <td>Sweep data points:</td><td>1001 or greater</td></tr> <tr> <td>Detector mode:</td><td>Positive peak</td></tr> <tr> <td>Indication mode:</td><td>Max hold</td></tr> <tr> <td>BW setting:</td><td>90%</td></tr> </table> (1) Measure the signal bandwidth using a spectrum analyzer (2) For multiple antenna systems: a) Each antenna shall be individually measured b) If the measured occupied bandwidth for any antenna exceeds [(Occupied Bandwidth Limit) – 100kHz] then, in addition, the occupied bandwidth shall be measured with all antennas combined – see diagram below:  System with four Antennas	Center Frequency:	Test frequency	Span:	2 - 3.5 times the technical standard	RBW:	Within 3% of the technical standard	VBW:	Same as RBW	Sweep time:	Auto	Sweep data points:	1001 or greater	Detector mode:	Positive peak	Indication mode:	Max hold	BW setting:	90%
Center Frequency:	Test frequency																		
Span:	2 - 3.5 times the technical standard																		
RBW:	Within 3% of the technical standard																		
VBW:	Same as RBW																		
Sweep time:	Auto																		
Sweep data points:	1001 or greater																		
Detector mode:	Positive peak																		
Indication mode:	Max hold																		
BW setting:	90%																		

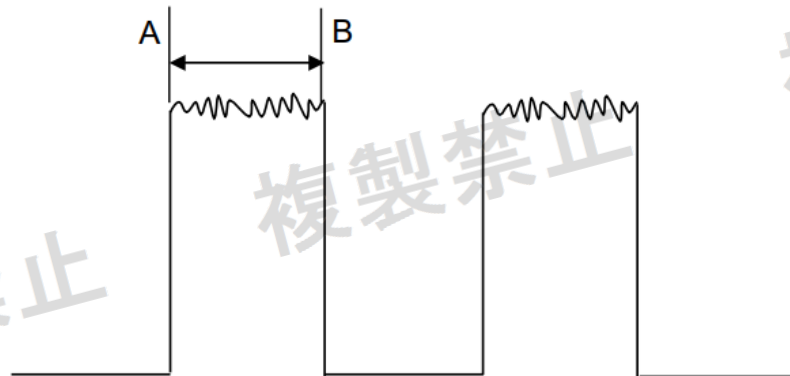


6.3.1 Test Data

Please Refer to Appendix for Details.

6.4 Antenna Power and Tolerance

Test Requirement:	Article 2-1, Item 19	
Test Method:	Notification No.88 of MIC, 2004	
Test Limit:	Antenna Power: 3 mW/MHz or less Tolerance: +20% or less EIRP: 6.91dBm/MHz	
Procedure:	[Setting 1] – Search for peak power frequency	
	Center Frequency:	Test frequency
	Span:	Approximately twice the occupied bandwidth
	RBW:	1MHz
	VBW:	Approximately three times the RBW
	Sweep time:	Auto
	Sweep data points:	1001 or greater
	Detector mode:	Positive peak
	Indication mode:	Max hold
	[Setting 2] – Measurement of average antenna power for FHSS, DSSS, OFDM	
	Frequency:	Frequency of peak power found using [Setting 1]
	Span:	0 Hz
	RBW:	3 MHz (FHSS-Channel Spacing ≤ 1MHz) 1MHz (DSSS, OFDM, FHSS-Channel Spacing > 1MHz)
	Detector mode:	Sample
	Sweep:	Minimum time required to make an accurate measurement.
		For burst type (intermittent) transmission sweep time shall be greater than one burst interval
	Sweep data points:	1001 or greater
	[Setting 3] – Measurement of average antenna power other than for FHSS, DSSS, OFDM	
	Frequency:	Frequency of peak power found using [Setting 1]
	Span:	0 Hz
	RBW:	Bandwidth sufficient to cover that occupied by the carrier
	VBW:	Bandwidth sufficient to cover that occupied by the carrier
	Detector mode:	Sample
	Sweep:	Minimum time required to make an accurate measurement.
		For burst type (intermittent) transmission sweep time shall be greater than one burst interval
	Sweep data points:	1001 or greater
	- A hopping transmission separation of 1MHz or less with a constant transmission interval - The transmission probability is equal for all hopping frequencies Procedure: (1) After configuring the spectrum analyzer to [Setting 1], find the frequency of maximum transmitted power (2) After configuring the spectrum analyzer to [Setting 2], measure the Average Burst Power of the frequency found in (1) Note: Measure the period A-B in the figure below:	



Measurement of Average Burst Power (A to B)

(3) Calculate Antenna Power using the following formula:

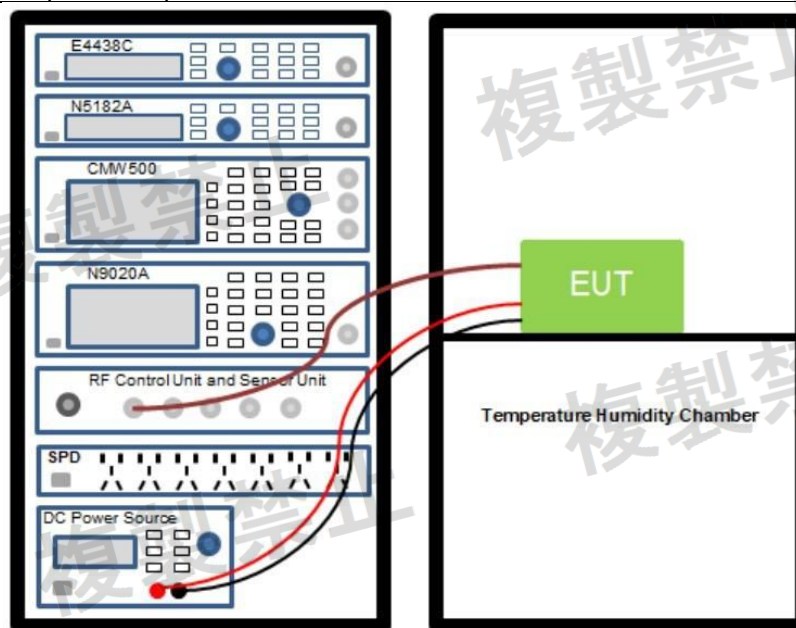
Antenna Power (W/MHz) = Average Burst Power (W) / Spread Bandwidth (MHz)

[Note]

Spread Bandwidth in the formula above is derived from the data collected in section 5 (Occupied Bandwidth (99%) and Spread Bandwidth (90%))

(4) If the EUT has multiple antennas then each antenna power output shall be measured individually – the sum of these individual measurements shall represent the power output value

Test Setup:



Operating Environment:

Temperature:	24.1 °C
Humidity:	51.6 %
Atmospheric Pressure:	1010 mbar
Test voltage:	DC3.7V From battery

6.4.1 Test Data

Please Refer to Appendix for Details.

6.5 Spurious Emission Intensity

Test Requirement:	Article 2-1, Item 19	
Test Method:	Notification No.88 of MIC, 2004	
Test Limit:	(1) Below 2387 MHz: 2.5 μ W (-26 dBm)/MHz or less (2) 2387 to 2400 MHz: 25.0 μ W (-16 dBm)/MHz or less (3) 2483.5 to 2496.5 MHz: 25.0 μ W (-16 dBm)/MHz or less (4) Over 2496.5 MHz: 2.5 μ W (-26 dBm)/MHz or less	
Procedure:	[Setting 1]	
	Frequency range:	(see Note 1)
	RBW:	1 MHz
	VBW:	1 MHz
	Sweep time:	Minimum time required to make an accurate measurement
	Sweep Data Points:	1001 or greater
	Detector mode:	Positive peak
	Indication mode:	Max hold (see Note 2)
	Note 1:	Measurement range shall be 30 MHz to 12.5 GHz, except for the following cases: -FHSS, FHSS+DSSS, FHSS+OFDM:2374 MHz to 2509.5 MHz -Other than FHSS, FHSS+DSSS, FHSS+OFDM: 2400 MHz to 2483.5 MHz
	Note 2:	Sweep shall be repeated until the max hold waveform is stable.
	[Setting 2]	
	Center frequency:	Frequency of spurious emission found using [Setting 1]
	Span:	0 Hz
	RBW:	1 MHz
	VBW:	1 MHz
	Sweep time:	Minimum time required to make an accurate measurement. For burst type (intermittent) spurious emissions, sweep time shall be greater than one burst interval
	Sweep Data Points:	1001 or greater
	Detector mode:	Sample
	[Setting 3]	
	Frequency range:	2374 MHz to 2400 MHz 2483.5 MHz to 2509.5 MHz
	RBW:	30 kHz
	VBW:	30 kHz
	Sweep time:	Minimum time required to make an accurate measurement.
	Sweep data points:	1001 or greater
	Detector mode:	Positive peak
	Indication mode:	Max hold
	(1) After configuring the spectrum analyzer to [Setting 1], search for spurious emissions from 30 MHz to 12.5 GHz. If the sweep range does not cover the required measurement frequency range then the measurement range will need to	

be divided into sufficient sections of size [RBW x Sweep Data Points]. If spurious emissions greater than [Limit - 3dB] are found, then more detailed measurements are required, go to step (2)

(2) Configure the spectrum analyzer using [Setting 2] and measure the average signal amplitude.

If the spurious emission is burst type (intermittent), then the average value shall not include signal OFF time.

If spurious emissions ranging from 30 MHz to 2374 MHz and from 2509.5MHz to 12.5GHz are over the limit, then the test result is Fail.

If spurious emissions ranging from 2374 MHz to 2400 MHz and from 2483.5 MHz to 2509.5 MHz are over the limit, then further detailed measurements are required, go to step (3)

(3) In the following cases, measure the spurious emissions using [Setting 3]

- Case1: FHSS, FHSS+DSSS, FHSS+OFDM
- Case2: Other than FHSS, FHSS+DSSS, FHSS+OFDM, and the spurious emissions in step (2) are over the limit

(4) Calculate the spurious emission value (Calculated Value) using following the formula below:

$$\text{Calculated Value} = (\text{Measured Value using (3)} + 15.2\text{dB})$$

Note: 15.2dB adjustment is derived from the Conversion Factor of RBW

$$\text{Conversion Factor of RBW} = 10 \times \log (\text{Reference Bandwidth} / \text{RBW of measurement}) = 15.2 \text{ [dB]}$$

Where: Reference Bandwidth = 1 MHz
RBW of measurement = 30 kHz

(5) If the calculated value using (4) is over the Limit (section 6.7), go to (6)

(6) Configure the spectrum analyzer to [Setting 3] then make the following changes:

Frequency: Frequency of spurious emission
Span: 1 MHz

(7) After sweep, send the span data set to the PC

(8) Convert measured data from dBm to Watts

(9) Sum all the data using the formula below. If the sum is within the limit, the test result is Pass, otherwise, Fail

$$P_s = \left(\sum_{i=1}^n E_i \right) \times \frac{S_w}{RBW \times k \times n}$$

Ps: Sum (Watts)

Ei: Measured value at each point in the Span (Watts) Sw: Span (1MHz)

n: Number of measurement points in the Span

k: Correction factor for Equivalent Noise Bandwidth, specific to each spectrum analyzer, check the instrument user guide

RBW: Resolution Bandwidth (MHz).

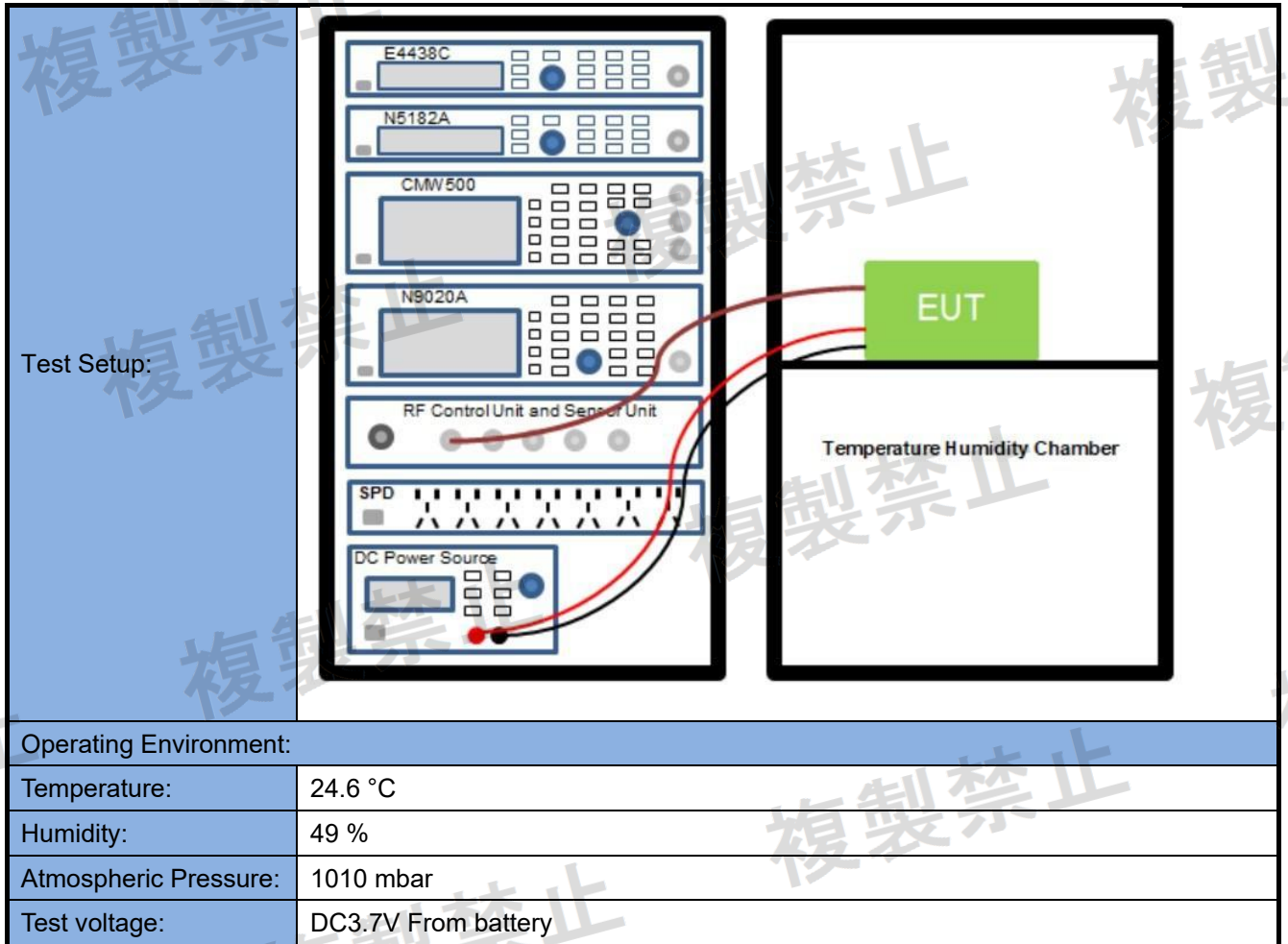
(10) If the EUT has multiple antennas, measure the spurious emission from each individual antenna using steps (1) through (9)

(11) Convert the individual antenna spurious level measurements (step (10)) from dB to absolute values

(12) Combine (sum) the absolute values of the spurious measurements at each frequency for each antenna (to create a single composite spectrum of spurious emissions)

(13) Ensure that the composite spectrum does not exceed the Limit defined in 6.7 (Technical Standard)

(14) Configuring the spectrum analyzer using [Setting 3] and measure the spurious emissions with all the antennas electrically combined

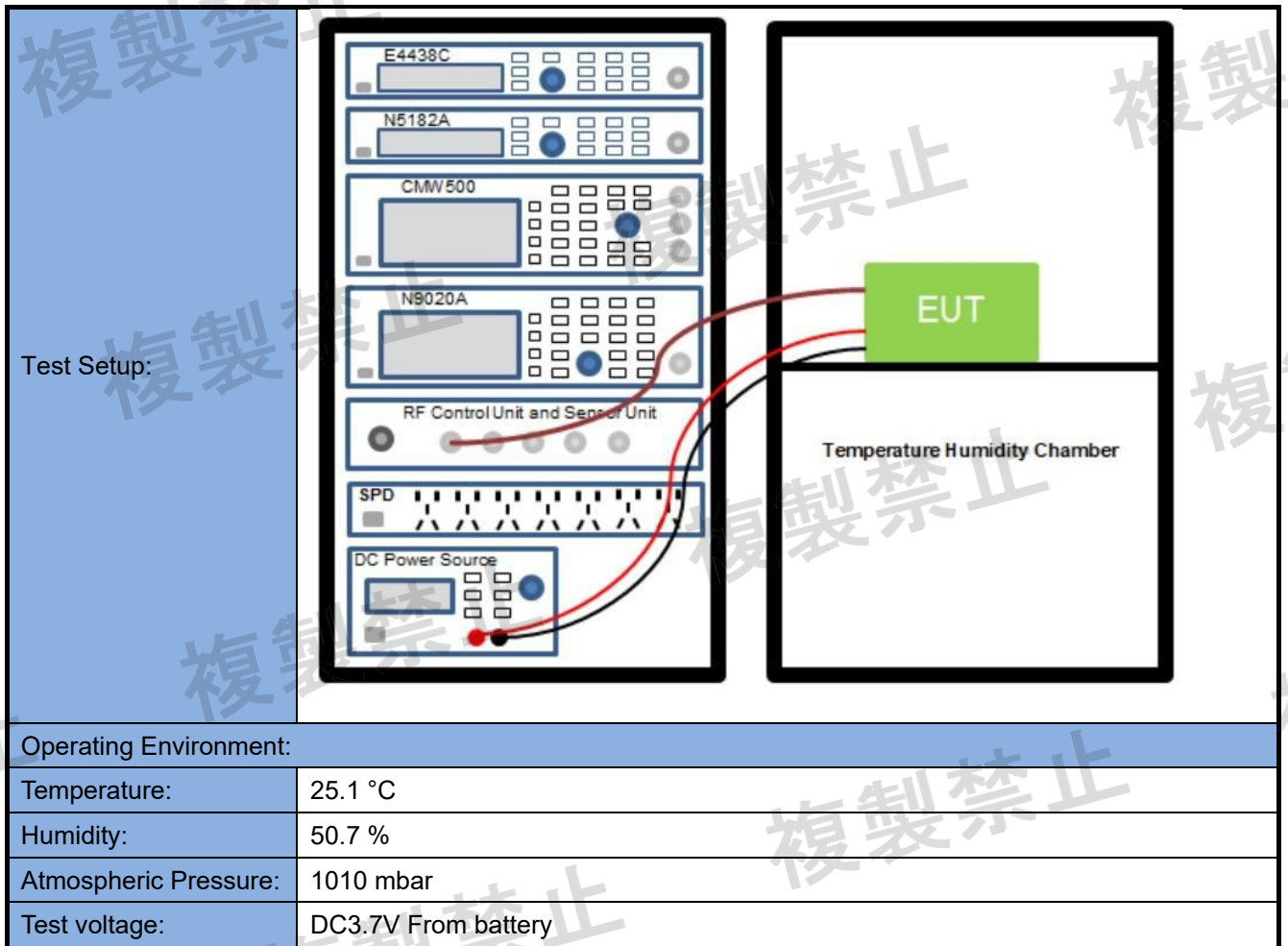


6.5.1 Test Data

Please Refer to Appendix for Details.

6.6 Secondary Radiated Emissions

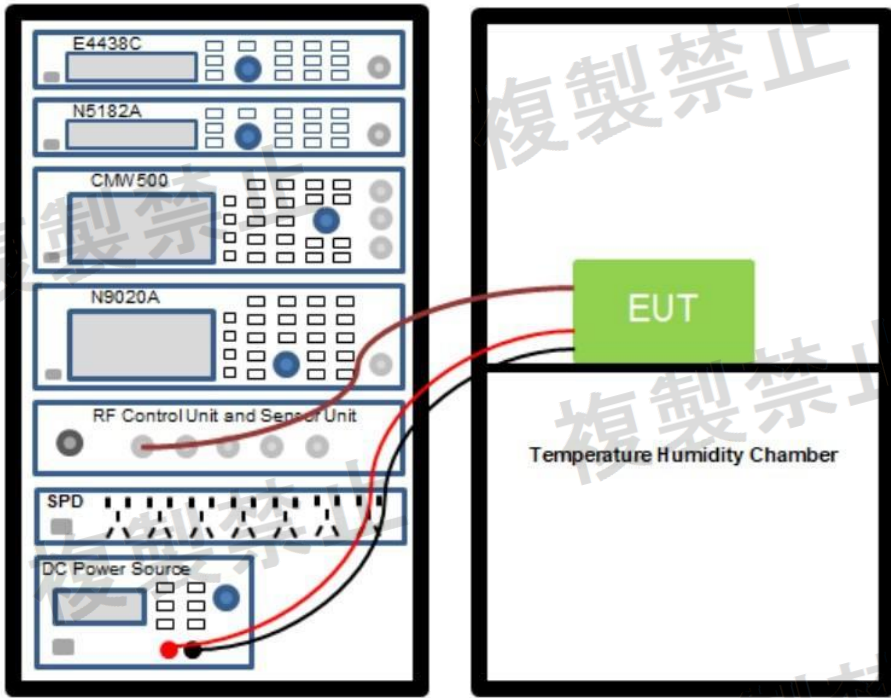
Test Requirement:	Article 2-1, Item 19	
Test Method:	Notification No.88 of MIC, 2004	
Test Limit:	(1) Below 1 GHz: 4 nW (-54dBm) or less (2) Above 1 GHz: 20 nW (-47dBm) or less	
Procedure:	[Setting 1]	
	Frequency range:	30 MHz ~ 12.5 GHz
	RBW:	Below 1 GHz:100 kHz Above 1 GHz:1 MHz
	VBW:	Below 1 GHz:100 kHz Above 1 GHz:1 MHz
	Sweep time:	Auto
	Sweep data points:	1001 or greater
	Detector mode:	Positive peak
	Indication mode:	Max hold
	[Setting 2]	
	Center Frequency:	Frequency of spurious emission found using [Setting 1]
	Span:	0 Hz
	RBW:	Below 1 GHz:100 kHz Above 1 GHz:1 MHz
	VBW:	Below 1 GHz:100 kHz Above 1 GHz:1 MHz
	Sweep time:	Auto
	Sweep data points:	1001 or greater
	Detector mode:	Sample
	(1) Configure the spectrum analyzer to [Setting 1] and then search for spurious emissions in the range 30 MHz to 12.5GHz. If the sweep range does not cover the required measurement frequency range then the measurement range will need to be divided into sufficient sections of size [RBW x Sweep Data Points].	
	(2) If spurious emissions are found with an amplitude greater than [Limit - 10dB] then perform further detailed measurements as described in (3)	
	(3) Configure the spectrum analyzer using [Setting 2] and measure the average signal amplitude.	
	If the spurious emission is burst type (intermittent), then the average value shall not include signal OFF time Multiple Antenna Systems	
	If the EUT has multiple antennas then emissions from each antenna shall be measured individually, as described below	
	(4) For each antenna repeat steps (1) through (3). Convert all spurious level measurements from dB to absolute value	
(5) Combine (sum) the absolute values of the spurious measurements at each frequency for each antenna (to create a single composite spectrum of spurious emissions)		
(6) Ensure that the composite spectrum does not exceed the Limit		



6.6.1 Test Data

Please Refer to Appendix for Details.

6.7 Dwell Time

Test Requirement:	Article 2-1, Item 19														
Test Method:	Notification No.88 of MIC, 2004														
Test Limit:	Transmit ON Time shall be less than 0.4 seconds Total Dwell Time shall be less than 0.4 seconds														
Procedure:	[Setting 1] <table> <tr> <td>Frequency:</td><td>Test frequency</td></tr> <tr> <td>Span:</td><td>0 Hz</td></tr> <tr> <td>RBW:</td><td>1 MHz</td></tr> <tr> <td>VBW:</td><td>1 MHz</td></tr> <tr> <td>Sweep data points:</td><td>1001 or greater</td></tr> <tr> <td>Trigger:</td><td>Video trigger</td></tr> <tr> <td>Detection mode:</td><td>Positive peak</td></tr> </table> (1) Configure the spectrum analyzer to [Setting 1] (2) Measure the Burst Cycle and Transmit ON Time (3) Total Dwell Time shall be calculated by the following formula: Total Dwell Time = (0.4 x Spreading Rate x Transmit ON Time) / (Burst Cycle x Number of Hopping Channels) [Notes] a. Spreading Rate = Spread Bandwidth (measured value) / Transmission Rate b. Transmit ON Time and Burst Cycle are both measured in Seconds c. Numerical Coefficient (0.4) is a dimensionless number defined in the technical standard	Frequency:	Test frequency	Span:	0 Hz	RBW:	1 MHz	VBW:	1 MHz	Sweep data points:	1001 or greater	Trigger:	Video trigger	Detection mode:	Positive peak
Frequency:	Test frequency														
Span:	0 Hz														
RBW:	1 MHz														
VBW:	1 MHz														
Sweep data points:	1001 or greater														
Trigger:	Video trigger														
Detection mode:	Positive peak														
Test Setup:															
Operating Environment:															
Temperature:	22.3 °C														
Humidity:	48.9 %														
Atmospheric Pressure:	1010 mbar														
Test voltage:	DC3.7V From battery														

6.7.1 Test Data

Please Refer to Appendix for Details.

7 Test Setup Photos

Refer to Appendix - Test Setup Photos

8 EUT Constructional Details (EUT Photos)

Refer to Appendix - EUT External Photo and Appendix - EUT Internal Photo

9 Appendix-L

1. Frequency Error

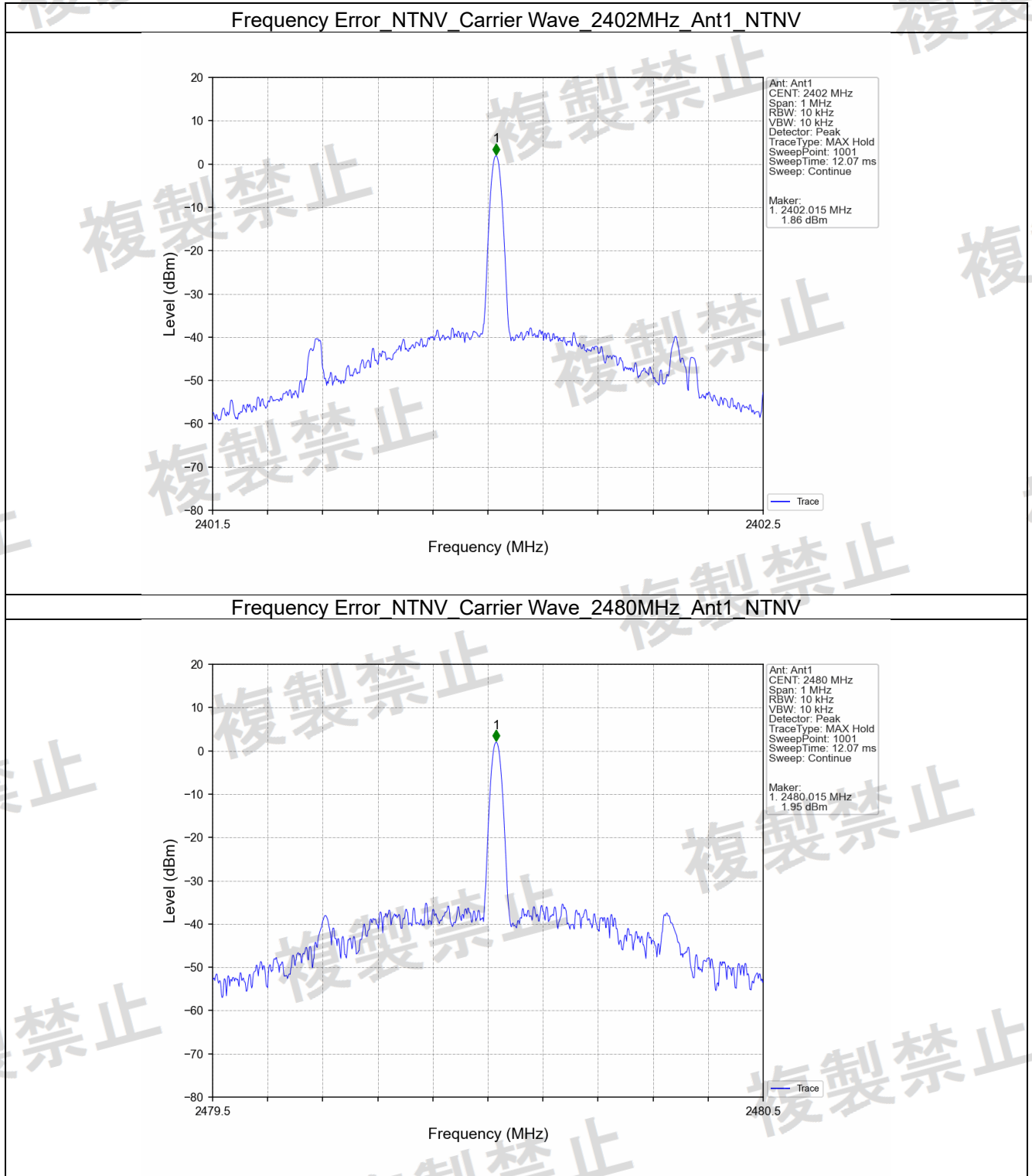
1.1 Test Result

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	2402.015	6.24	-50 to 50	Pass
			2480	DH5	2480.015	6.05	-50 to 50	Pass

1.2 Test Graph

1.2.1 Ant1



2. Occupied Bandwidth

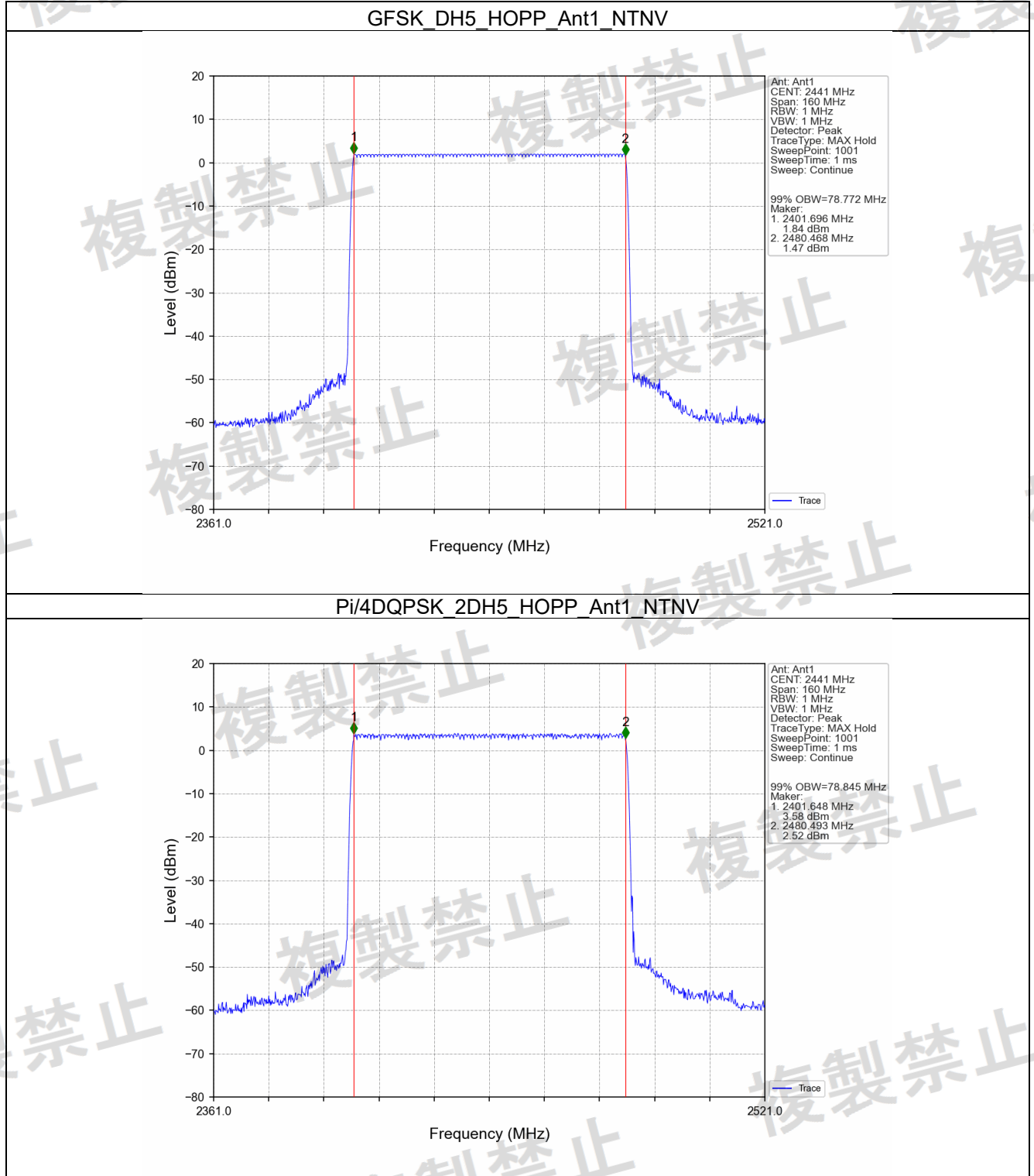
2.1 Test Result

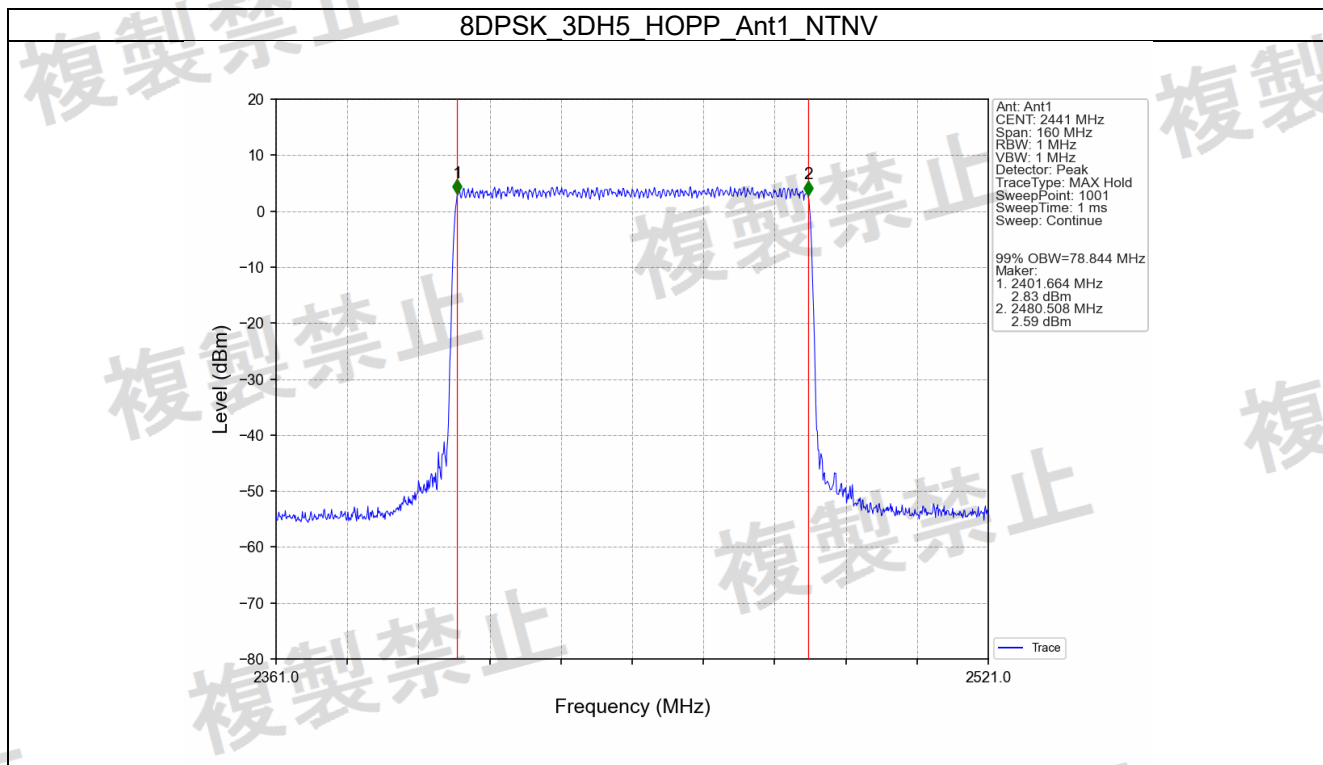
2.1.1 OBW

ENV	Mode	TX Type	Frequency (MHz)	Packet Type	99% Occupied Bandwidth (MHz)		Verdict
					ANT1	Limit	
NTNV	GFSK	SISO	HOPP	DH5	78.772	≤ 83.5	Pass
	Pi/4DQPSK	SISO	HOPP	2DH5	78.845	≤ 83.5	Pass
	8DPSK	SISO	HOPP	3DH5	78.844	≤ 83.5	Pass

2.2 Test Graph

2.2.1 OBW





3. Spread Bandwidth

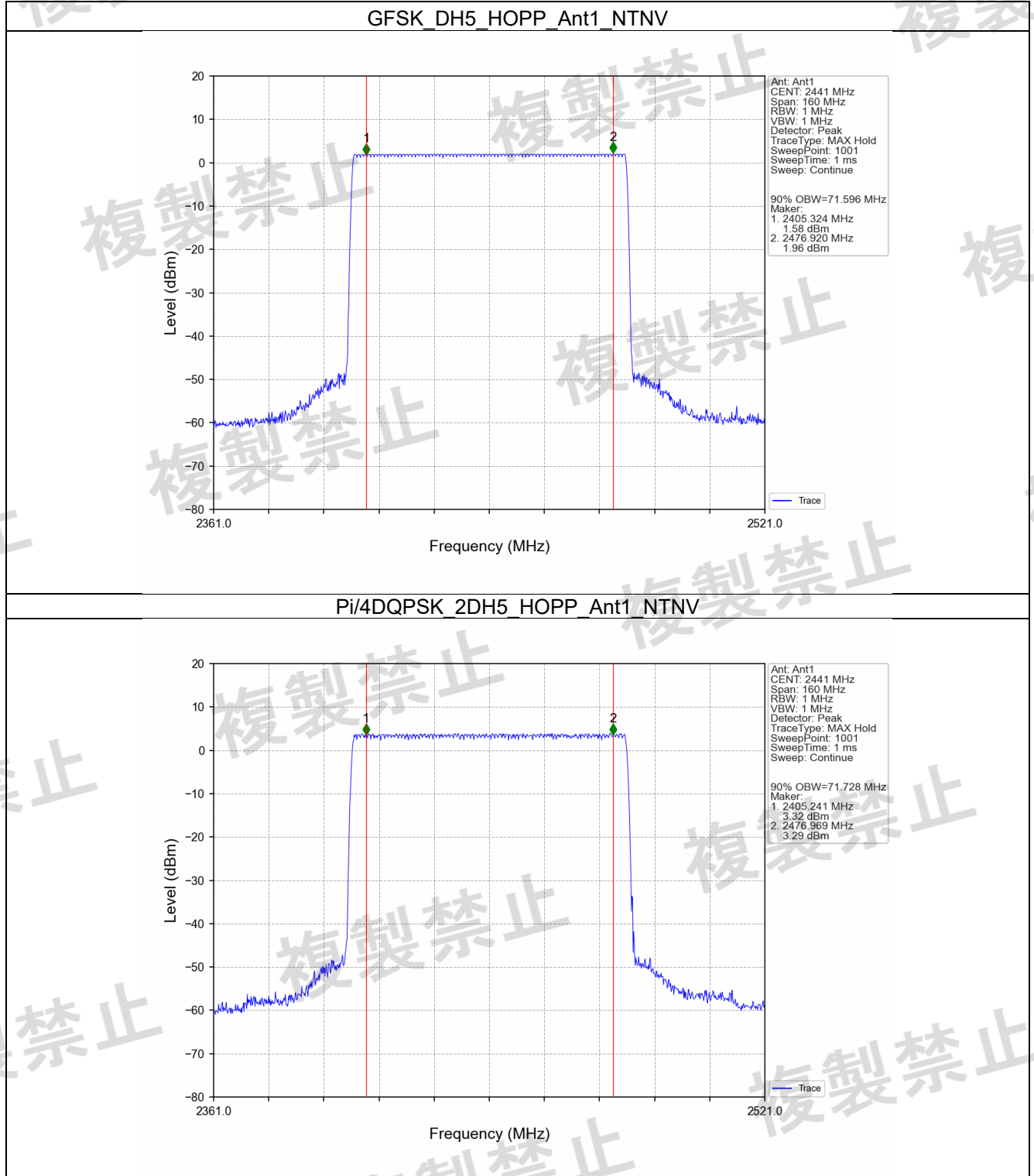
3.1 Test Result

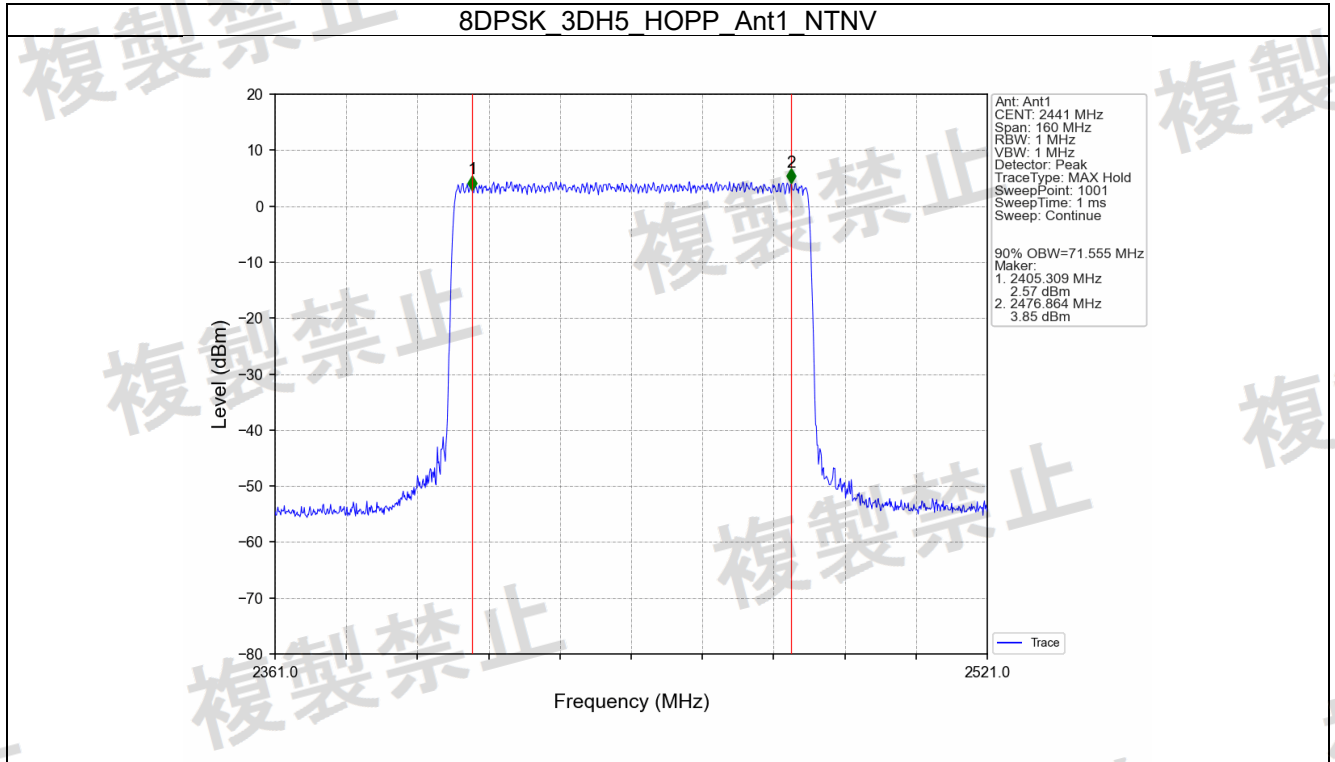
3.1.1 SPBW

ENV	Mode	TX Type	Frequency (MHz)	Packet Type	Spread Bandwidth (MHz)		Verdict
					ANT1	Limit	
NTNV	GFSK	SISO	HOPP	DH5	71.596	/	Only For Report
	Pi/4DQPSK	SISO	HOPP	2DH5	71.728	/	Only For Report
	8DPSK	SISO	HOPP	3DH5	71.555	/	Only For Report

3.2 Test Graph

3.2.1 SPBW





4. Antenna Power

4.1 Test Result

4.1.1 Power

ENV	Mode	Frequency (MHz)	Packet Type	Total Power (dBm)	Spread BW (MHz)	Antenna Power (mW/MHz)		Nominal Power (mW/MHz)	Tolerance (%)		Verdict
						result	Limit		Measured	Limit	
NTNV	GFSK	HOPP	DH5	12.36	71.596	0.24	<=3.00	0.4	-39.88%	<=20	Pass
	Pi/4DQPSK	HOPP	2DH5	11.05	71.728	0.18	<=3.00	0.4	-55.61%	<=20	Pass
	8DPSK	HOPP	3DH5	14.53	71.555	0.40	<=3.00	0.4	-0.85%	<=20	Pass

Note:

1. result= $[10^{(\text{Meas Power}/10)}]/\text{spread BW}$

4.1.2 EIRP

ENV	Mode	TX Type	Frequency (MHz)	Packet Type	Antenna power (dBm/MHz)	Gain (dBi)	EIRP (dBm/MHz)		Verdict
							Result	Limit	
NTNV	GFSK	SISO	HOPP	DH5	-6.19	-2.09	-8.28	<=6.91	Pass
	Pi/4DQPSK	SISO	HOPP	2DH5	-7.51	-2.09	-9.60	<=6.91	Pass
	8DPSK	SISO	HOPP	3DH5	-4.02	-2.09	-6.11	<=6.91	Pass

Note:

1. antenna power (dBm/MHz)=10LOG(result(mW/MHz))

5. Dwell Time

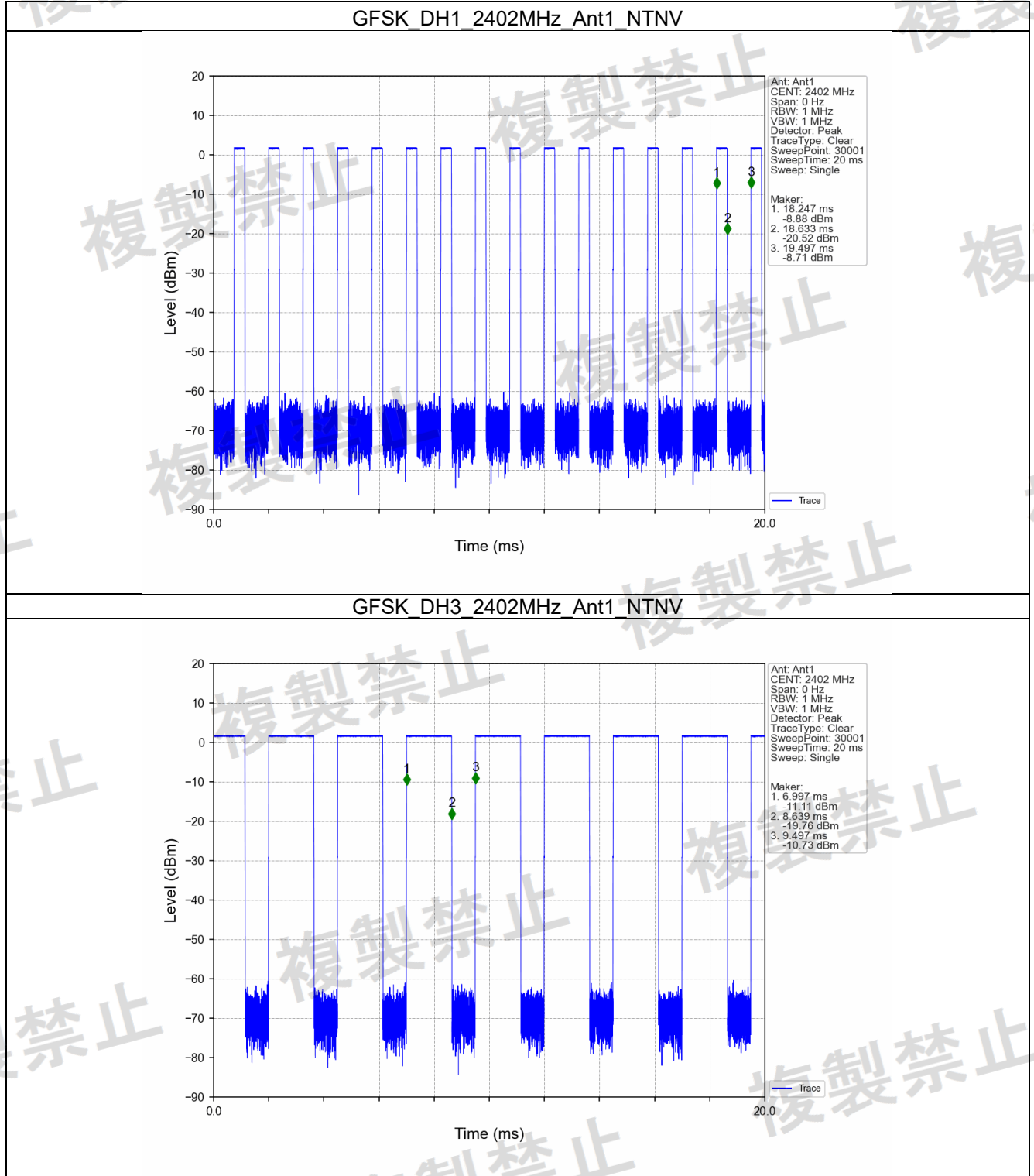
5.1 Test Result

5.1.1 Ant1

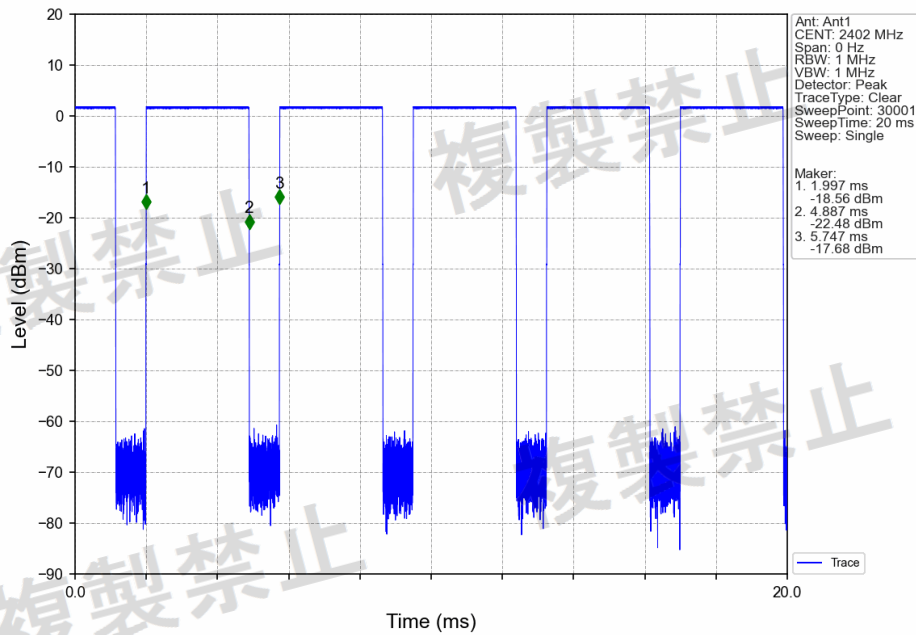
Ant1											
ENV	Mode	TX Type	Frequency (MHz)	Packet Type	Spreading Rate	T_on (ms)	Period (ms)	Hopp Number	Dwell Time (ms)		Verdict
									Result	Limit	
NTNV	GFSK	SISO	2402	DH1	71.596	0.386	1.250	79	111.944	<=400	Pass
				DH3	71.596	1.642	2.500	79	238.097	<=400	Pass
				DH5	71.596	2.890	3.750	79	279.375	<=400	Pass
			2480	DH1	71.596	0.386	1.250	79	111.944	<=400	Pass
				DH3	71.596	1.642	2.500	79	238.097	<=400	Pass
				DH5	71.596	2.890	3.750	79	279.375	<=400	Pass
	Pi/4DQPSK	SISO	2402	2DH1	71.728	0.389	1.250	79	113.022	<=400	Pass
				2DH3	71.728	1.641	2.500	79	238.391	<=400	Pass
				2DH5	71.728	2.889	3.750	79	279.794	<=400	Pass
			2480	2DH1	71.728	0.389	1.250	79	113.022	<=400	Pass
				2DH3	71.728	1.641	2.500	79	238.391	<=400	Pass
				2DH5	71.728	2.890	3.750	79	279.891	<=400	Pass
	8DPSK	SISO	2402	3DH1	71.555	0.389	1.250	79	112.749	<=400	Pass
				3DH3	71.555	1.640	2.500	79	237.671	<=400	Pass
				3DH5	71.555	2.891	3.750	79	279.312	<=400	Pass
			2480	3DH1	71.555	0.389	1.250	79	112.749	<=400	Pass
				3DH3	71.555	1.640	2.500	79	237.671	<=400	Pass
				3DH5	71.555	2.892	3.750	79	279.409	<=400	Pass

5.2 Test Graph

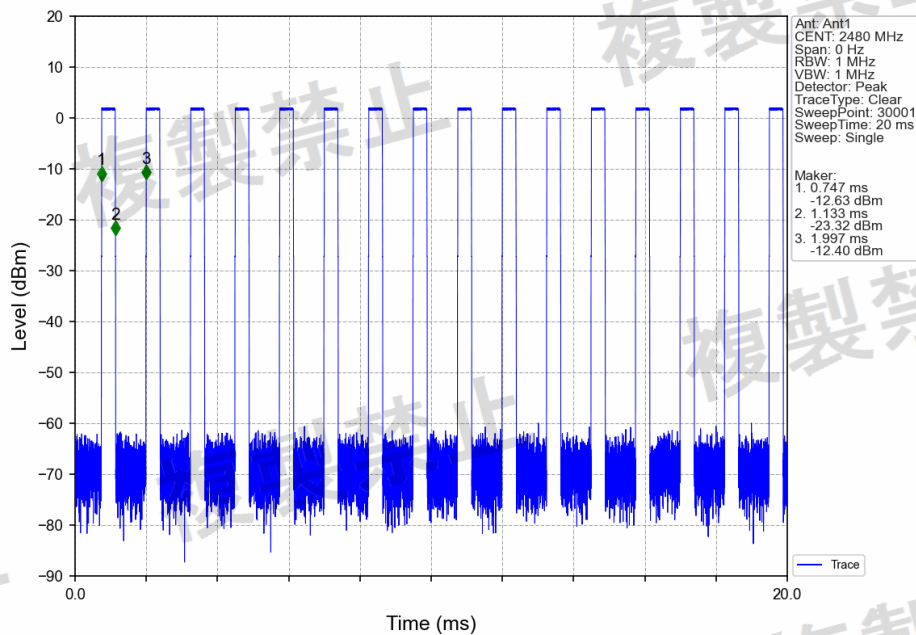
5.2.1 Ant1



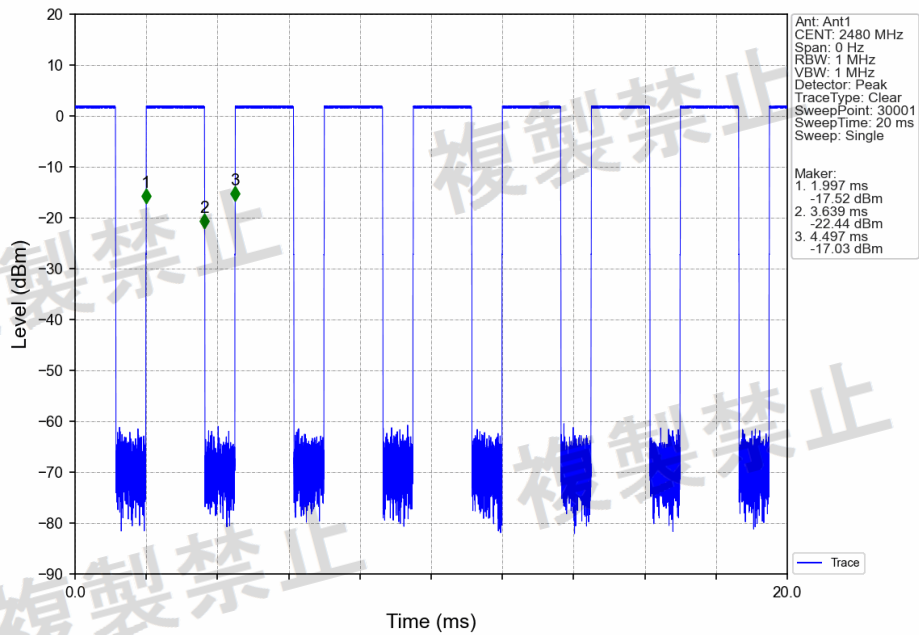
GFSK_DH5_2402MHz_Ant1_NTNV



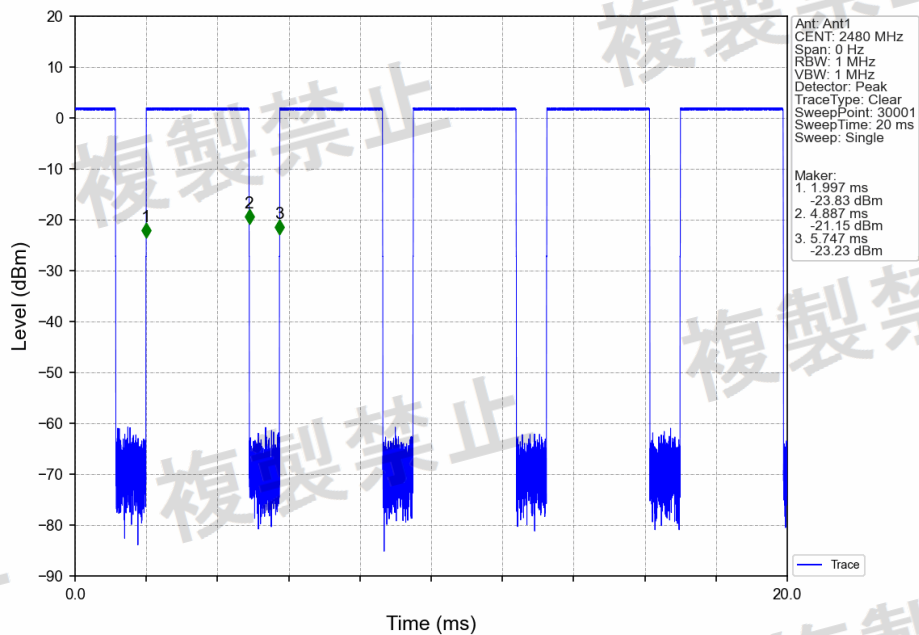
GFSK_DH1_2480MHz_Ant1_NTNV



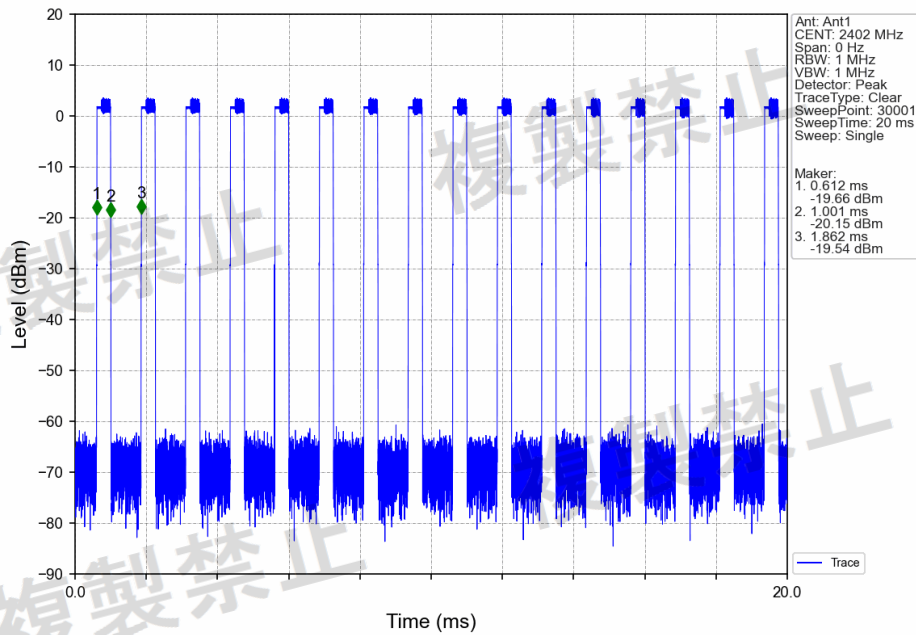
GFSK_DH3_2480MHz_Ant1_NTNV



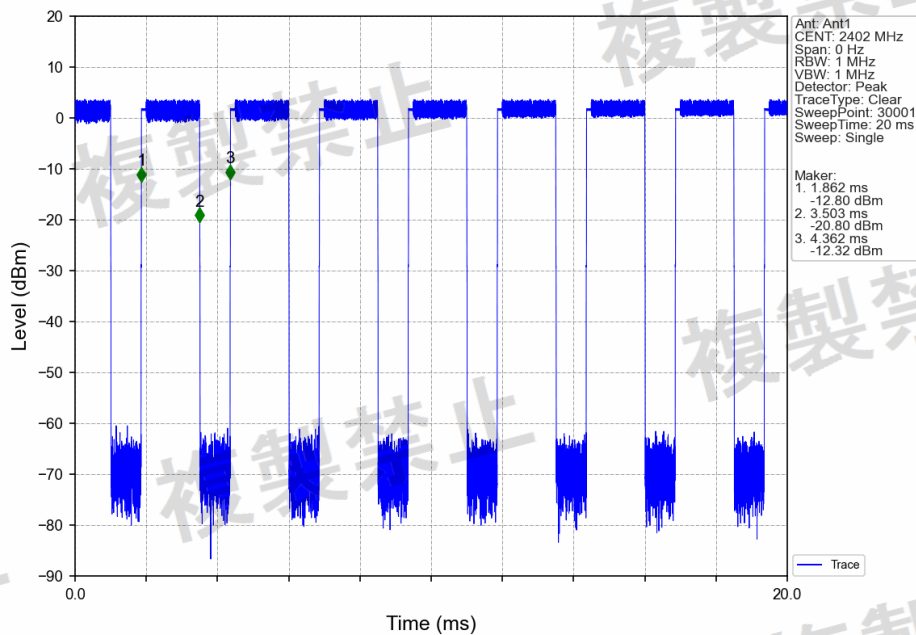
GFSK_DH5_2480MHz_Ant1_NTNV



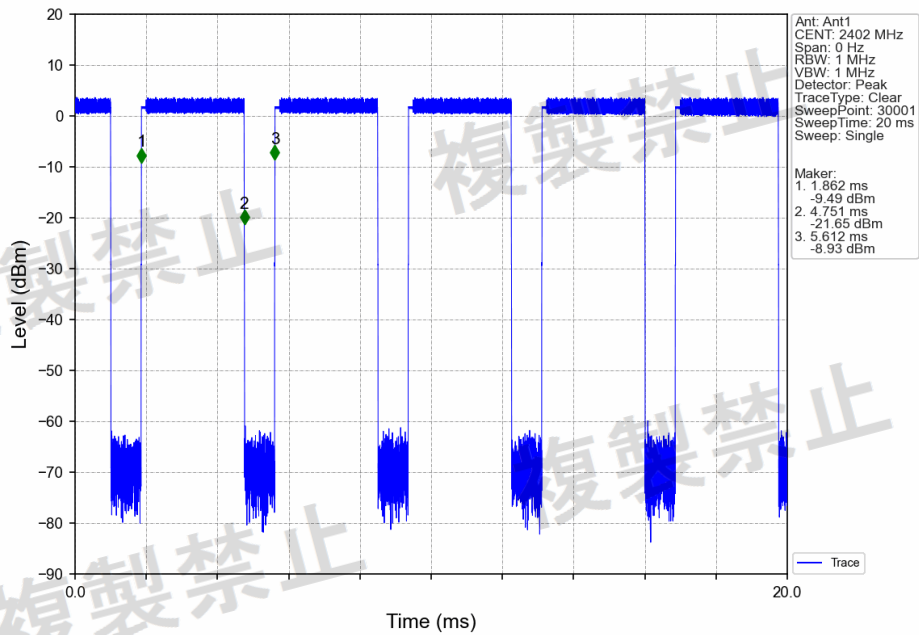
Pi/4DQPSK 2DH1 2402MHz Ant1 NTN



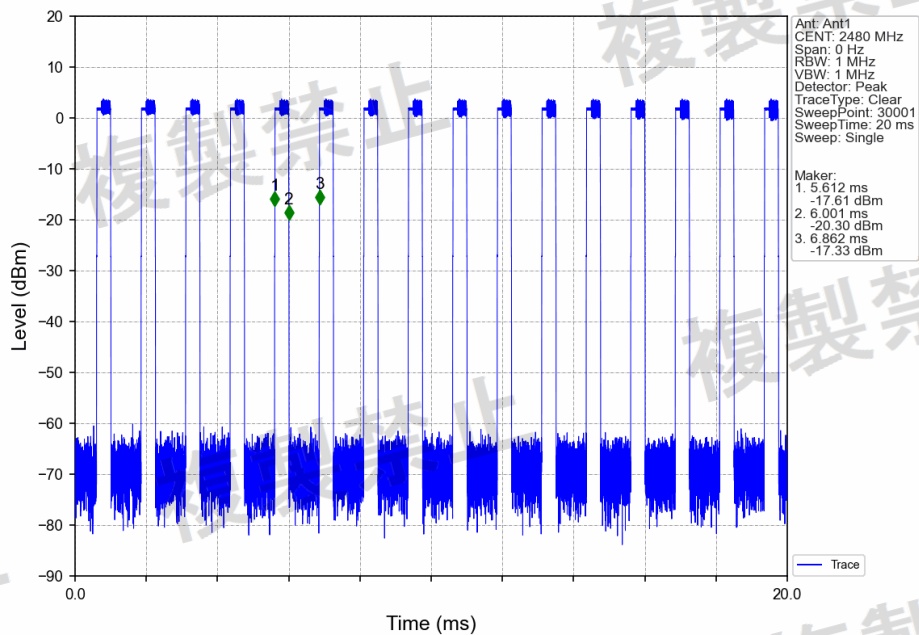
Pi/4DQPSK 2DH3 2402MHz Ant1 NTN



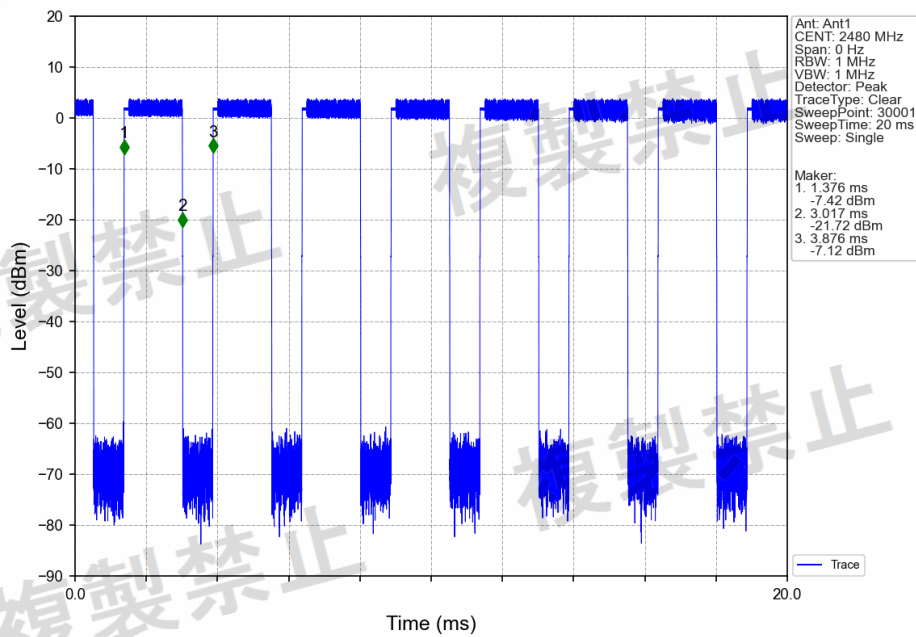
Pi/4DQPSK 2DH5 2402MHz Ant1 NTN



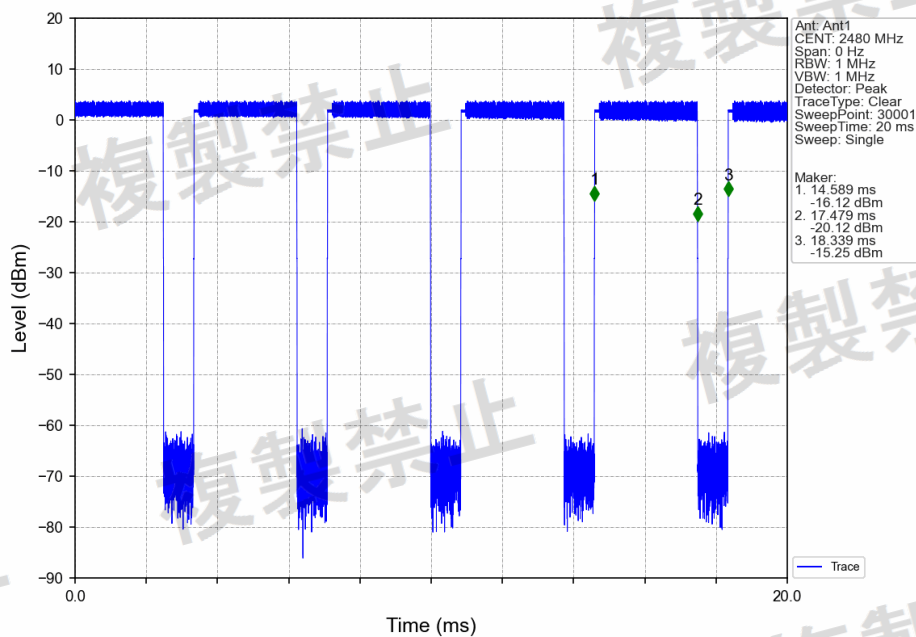
Pi/4DQPSK 2DH1 2480MHz Ant1 NTN



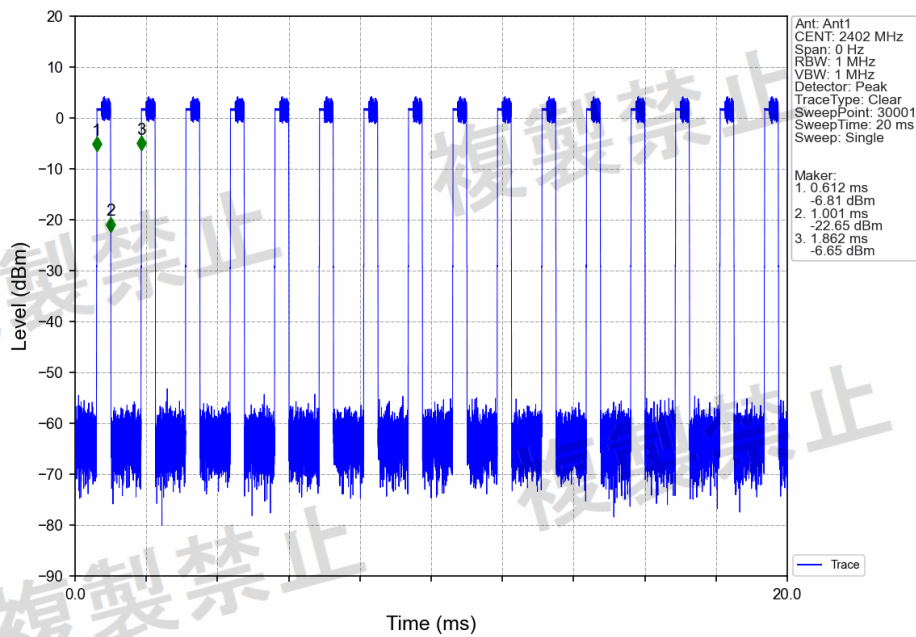
Pi/4DQPSK 2DH3 2480MHz Ant1 NTN



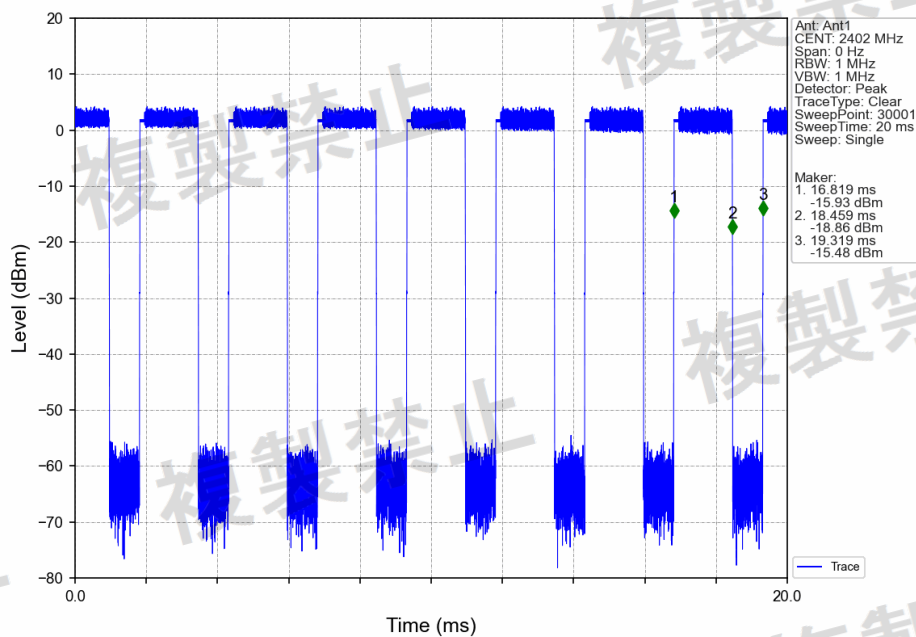
Pi/4DQPSK 2DH5 2480MHz Ant1 NTN



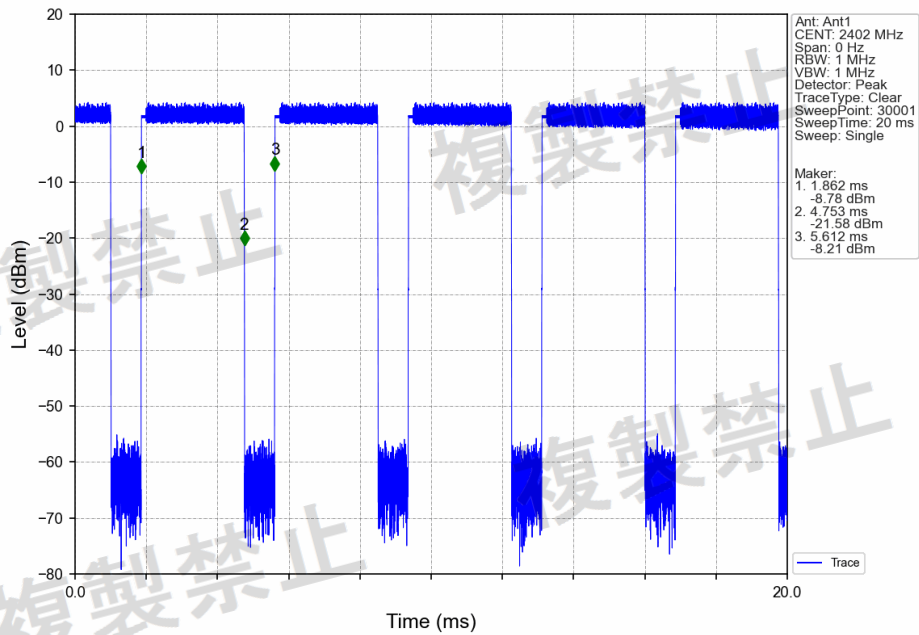
8DPSK_3DH1_2402MHz_Ant1_NTNV



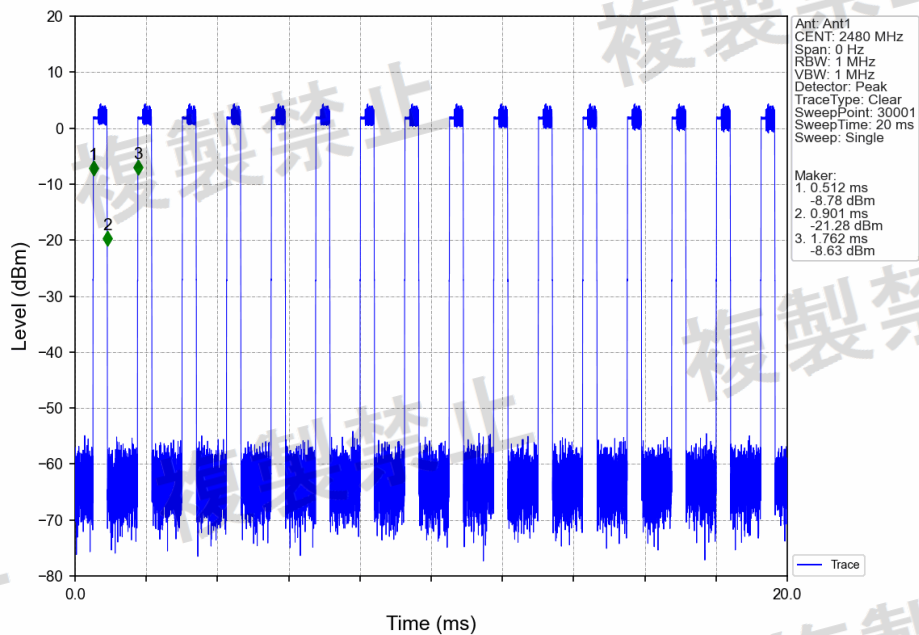
8DPSK_3DH3_2402MHz_Ant1_NTNV



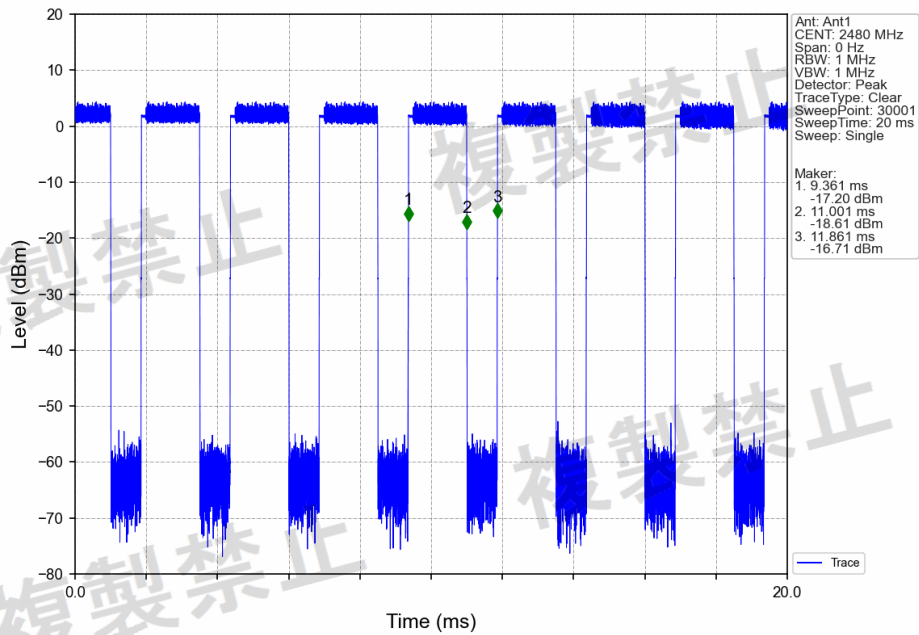
8DPSK_3DH5_2402MHz_Ant1_NTNV



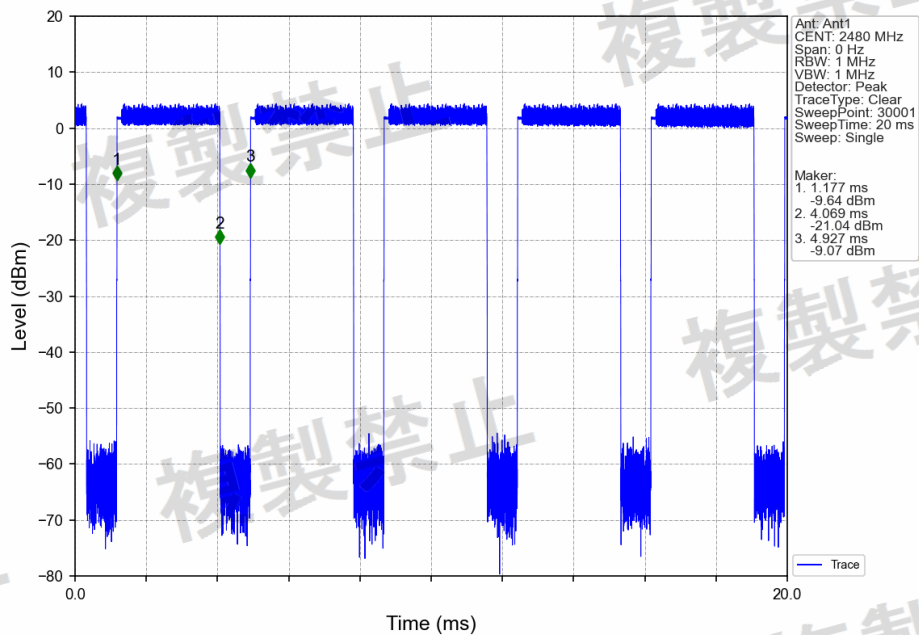
8DPSK_3DH1_2480MHz_Ant1_NTNV



8DPSK_3DH3_2480MHz_Ant1_NTNV



8DPSK_3DH5_2480MHz_Ant1_NTNV



6. Spurious Emission Intensity

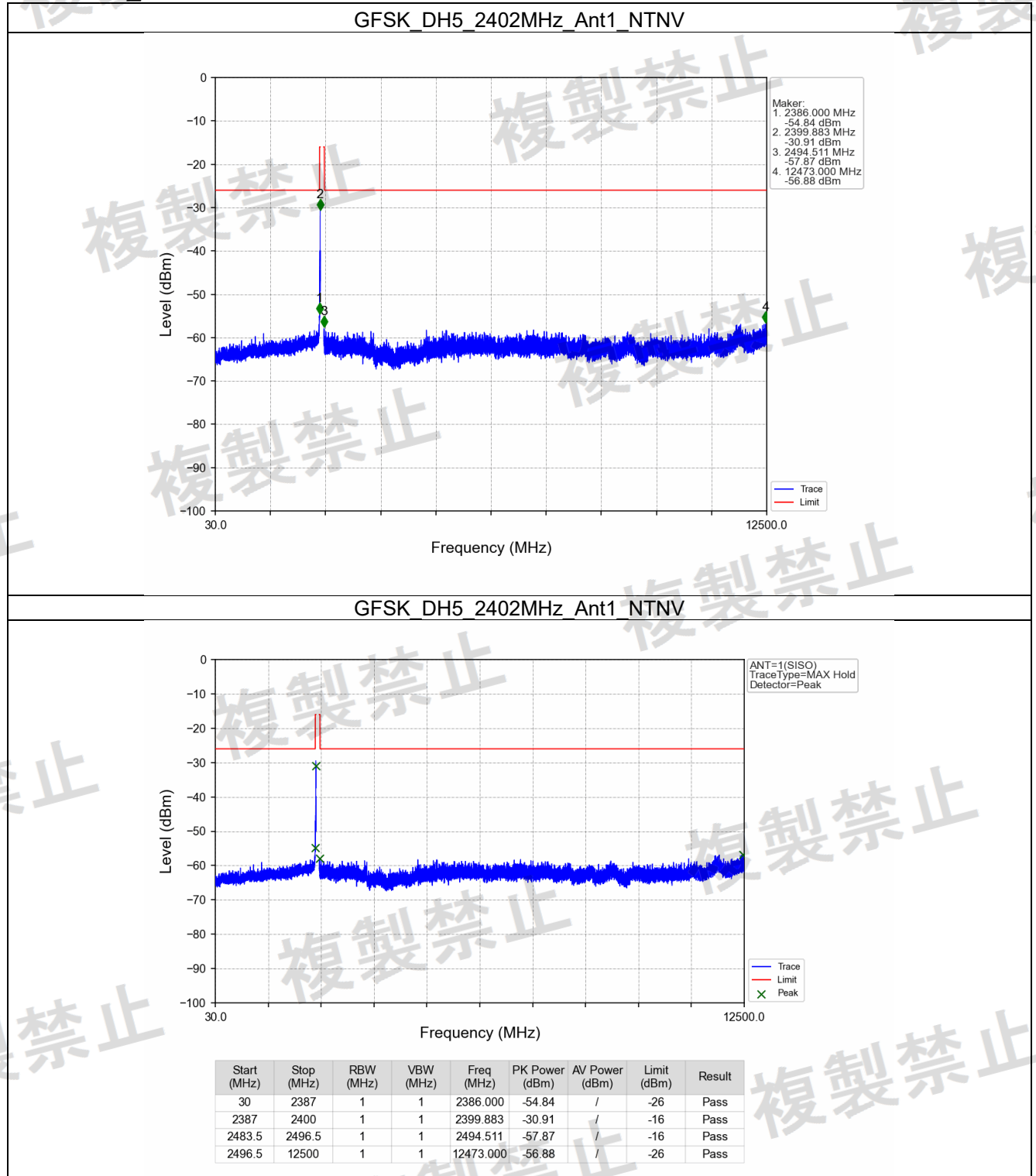
6.1 Test Result

6.1.1 TxSe_NTNV

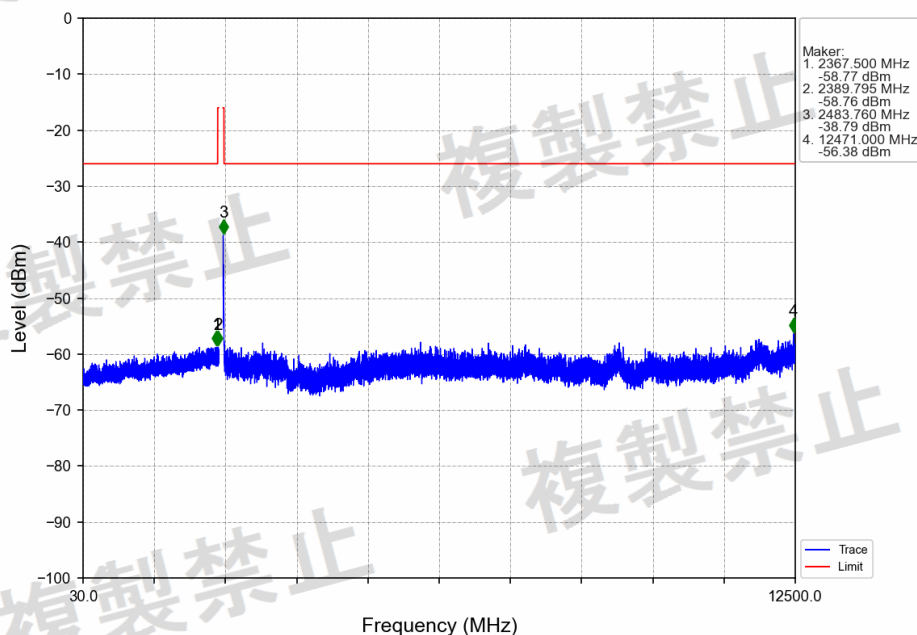
NTNV												
Mode	TX Type	Freq. (MHz)	ANT	Freq. Range		Marker					Limit (uW /MHz)	Verdict
				Start (MHz)	Stop (MHz)	Freq. (MHz)	PK Power (dBm /MHz)	PK Power (uW /MHz)	AV Power (dBm /MHz)	AV Power (uW /MHz)		
GFSK	SISO	2402	1	30	2387	2386	-54.84	0.003	/	/	2.5	Pass
				2387	2400	2399.883	-30.91	0.811	/	/	25	Pass
				2483.5	2496.5	2494.511	-57.87	0.002	/	/	25	Pass
				2496.5	12500	12473	-56.88	0.002	/	/	2.5	Pass
		2480	1	30	2387	2367.5	-58.77	0.001	/	/	2.5	Pass
				2387	2400	2389.795	-58.76	0.001	/	/	25	Pass
				2483.5	2496.5	2483.76	-38.79	0.132	/	/	25	Pass
				2496.5	12500	12471	-56.38	0.002	/	/	2.5	Pass
Pi/4DQPSK	SISO	2402	1	30	2387	2386.5	-53.22	0.005	/	/	2.5	Pass
				2387	2400	2399.974	-30.12	0.973	/	/	25	Pass
				2483.5	2496.5	2489.038	-56.64	0.002	/	/	25	Pass
				2496.5	12500	11816	-57.00	0.002	/	/	2.5	Pass
		2480	1	30	2387	704.5	-53.07	0.005	/	/	2.5	Pass
				2387	2400	2390.991	-58.01	0.002	/	/	25	Pass
				2483.5	2496.5	2483.656	-39.07	0.124	/	/	25	Pass
				2496.5	12500	2511.5	-55.56	0.003	/	/	2.5	Pass
8DPSK	SISO	2402	1	30	2387	2369	-51.25	0.007	/	/	2.5	Pass
				2387	2400	2399.987	-29.07	1.239	/	/	25	Pass
				2483.5	2496.5	2485.944	-52.00	0.006	/	/	25	Pass
				2496.5	12500	12434.5	-50.71	0.008	/	/	2.5	Pass
		2480	1	30	2387	2139	-52.08	0.006	/	/	2.5	Pass
				2387	2400	2395.996	-52.65	0.005	/	/	25	Pass
				2483.5	2496.5	2483.591	-38.38	0.145	/	/	25	Pass
				2496.5	12500	11899	-50.45	0.009	/	/	2.5	Pass

6.2 Test Graph

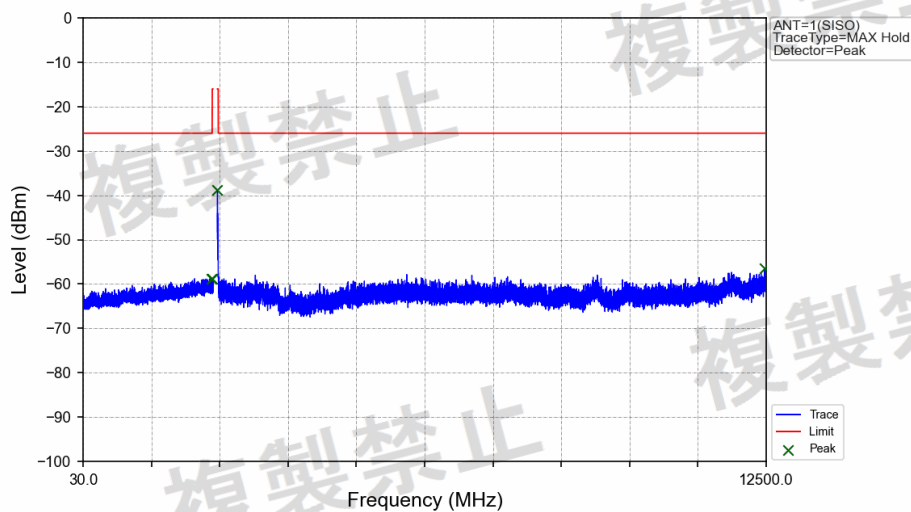
6.2.1 TxSe_NTNV



GFSK_DH5_2480MHz_Ant1_NTNV

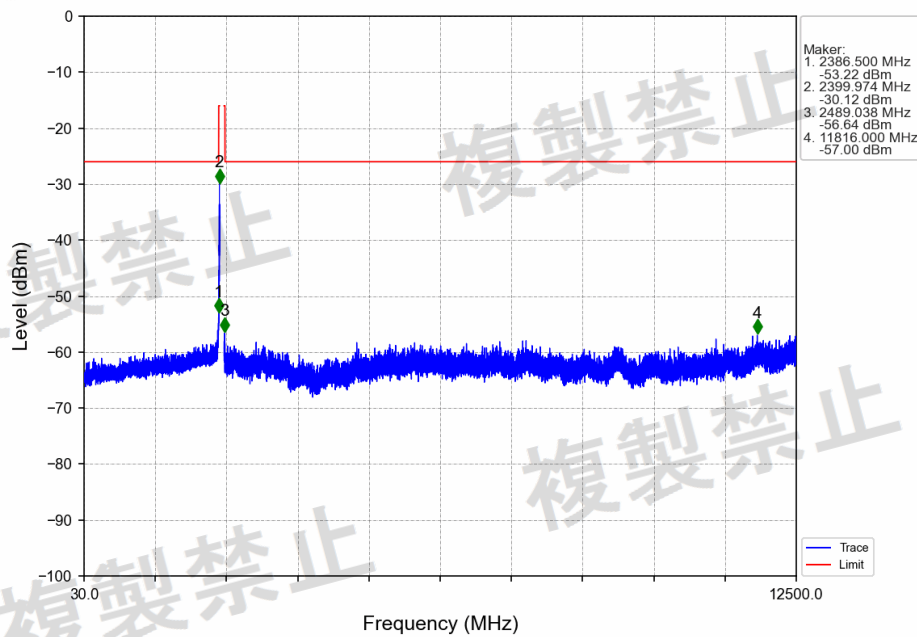


GFSK_DH5_2480MHz_Ant1_NTNV

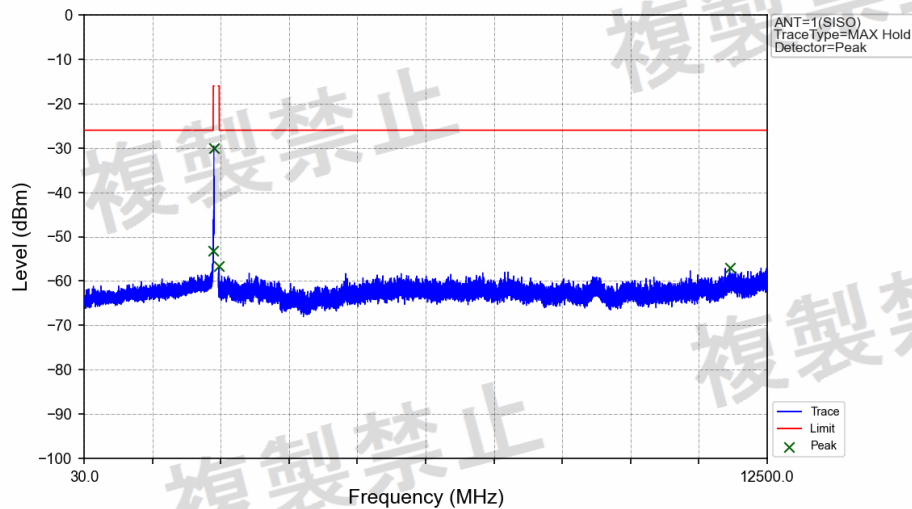


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	2367.500	-58.77	/	-26	Pass
2387	2400	1	1	2389.795	-58.76	/	-16	Pass
2483.5	2496.5	1	1	2483.760	-38.79	/	-16	Pass
2496.5	12500	1	1	12471.000	-56.38	/	-26	Pass

Pi/4DQPSK 2DH5 2402MHz_Ant1_NTNV

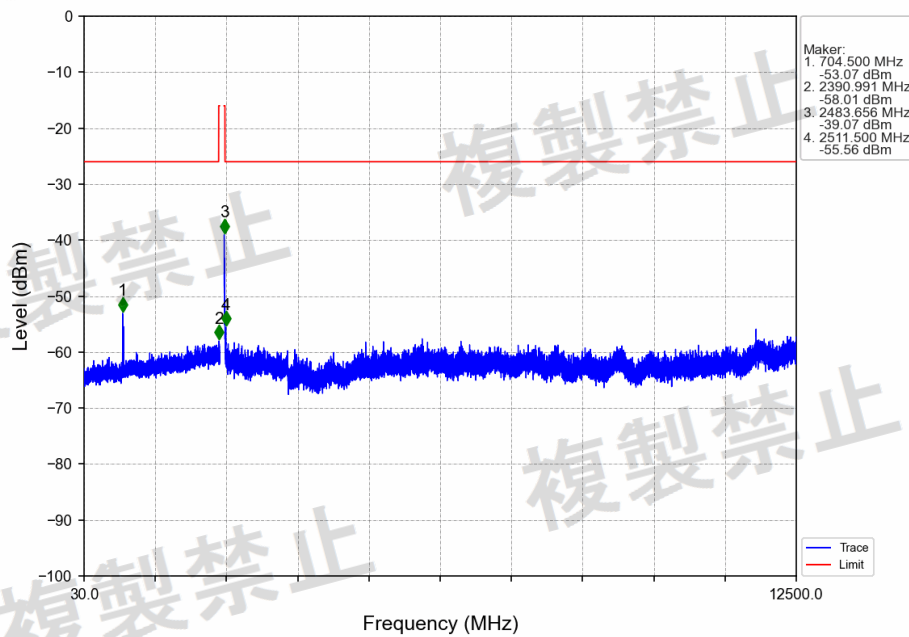


Pi/4DQPSK 2DH5 2402MHz_Ant1_NTNV

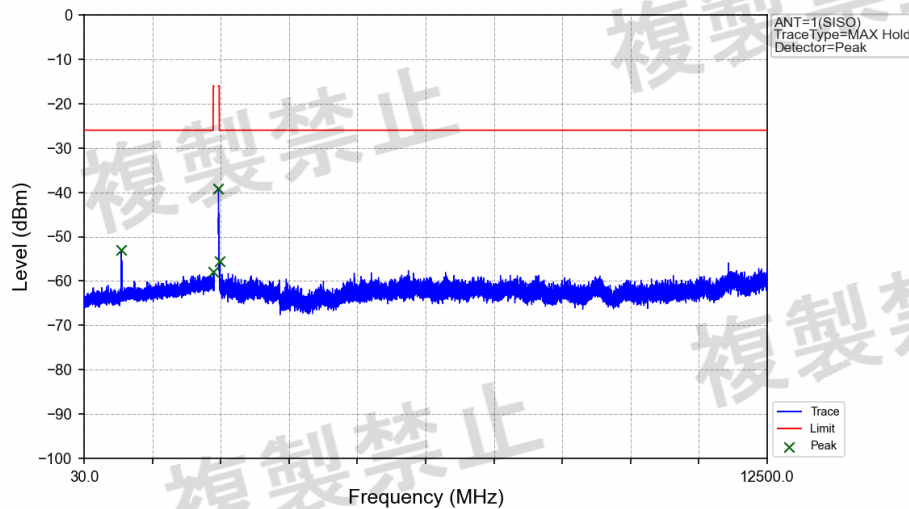


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	2386.500	-53.22	/	-26	Pass
2387	2400	1	1	2399.974	-30.12	/	-16	Pass
2483.5	2496.5	1	1	2489.038	-56.64	/	-16	Pass
2496.5	12500	1	1	11816.000	-57.00	/	-26	Pass

Pi/4DQPSK 2DH5 2480MHz Ant1_NTNV

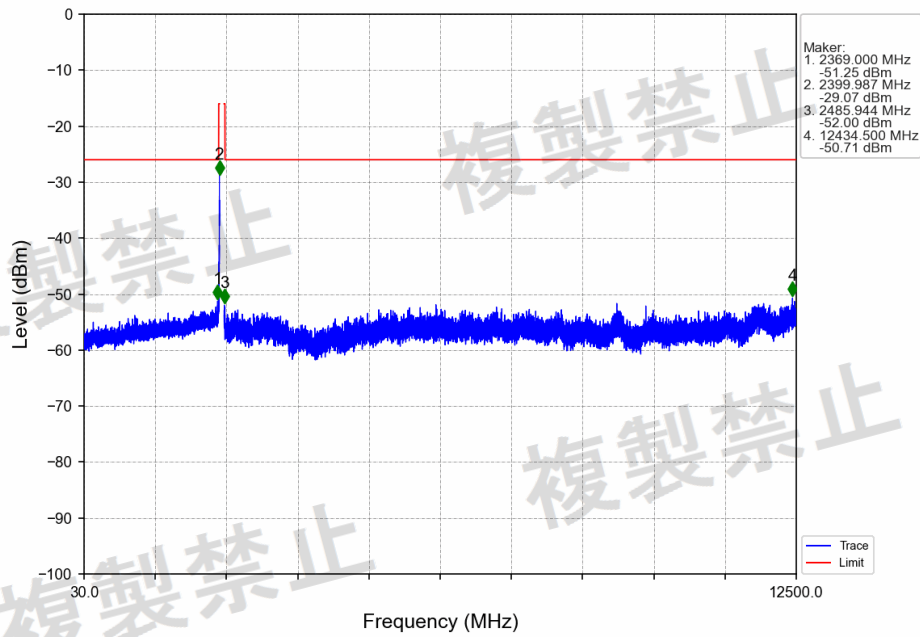


Pi/4DQPSK 2DH5 2480MHz Ant1_NTNV

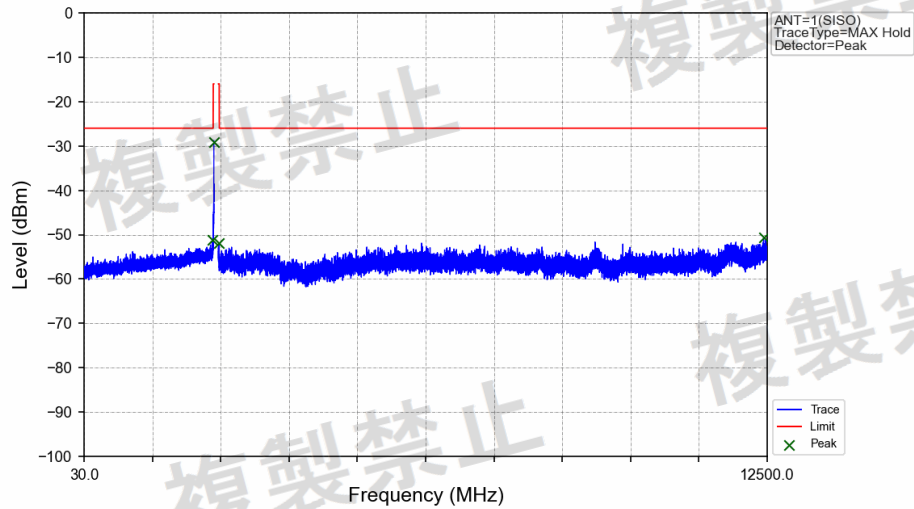


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	704.500	-53.07	/	-26	Pass
2387	2400	1	1	2390.991	-58.01	/	-16	Pass
2483.5	2496.5	1	1	2483.656	-39.07	/	-16	Pass
2496.5	12500	1	1	2511.500	-55.56	/	-26	Pass

8DPSK_3DH5_2402MHz_Ant1_NTNV

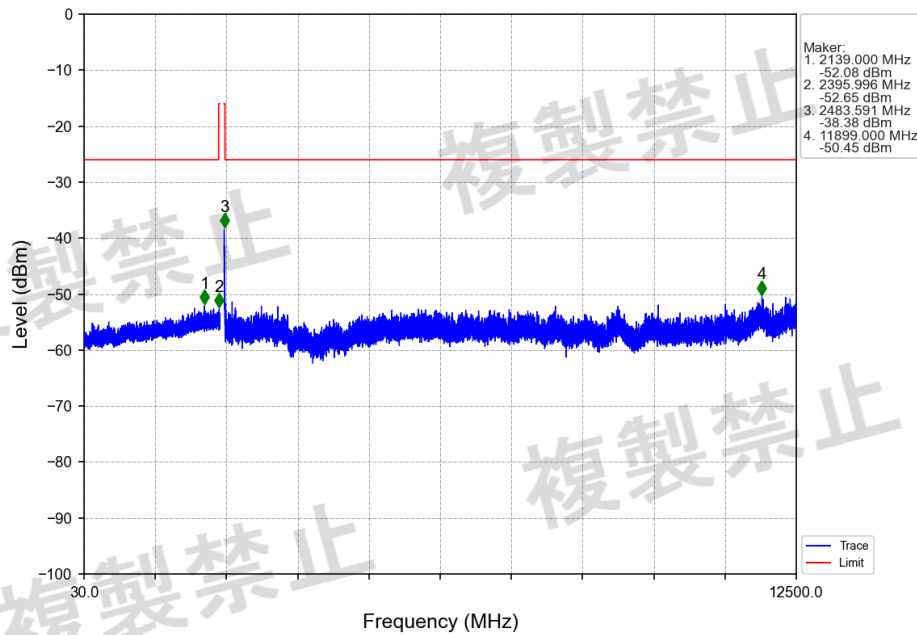


8DPSK_3DH5_2402MHz_Ant1_NTNV

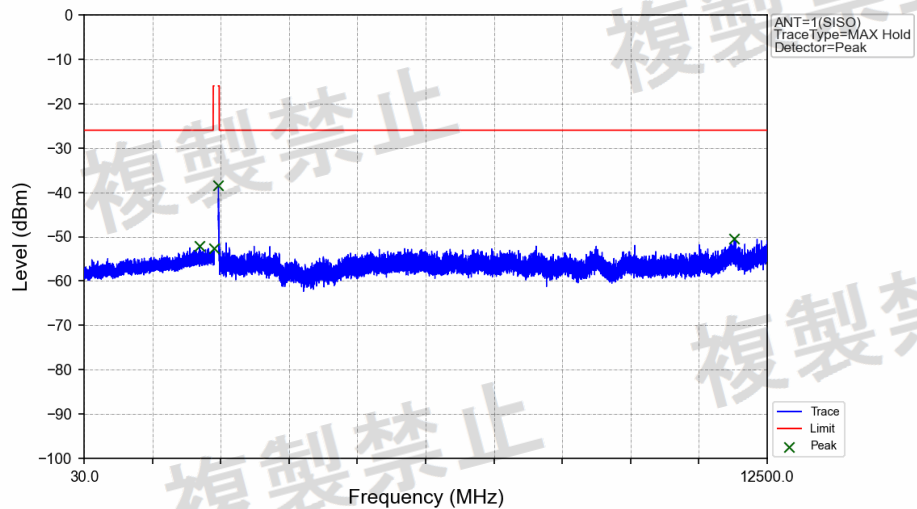


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	2369.000	-51.25	/	-26	Pass
2387	2400	1	1	2399.987	-29.07	/	-16	Pass
2483.5	2496.5	1	1	2485.944	-52.00	/	-16	Pass
2496.5	12500	1	1	12434.500	-50.71	/	-26	Pass

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	2139.000	-52.08	/	-26	Pass
2387	2400	1	1	2395.996	-52.65	/	-16	Pass
2483.5	2496.5	1	1	2483.591	-38.38	/	-16	Pass
2496.5	12500	1	1	11899.000	-50.45	/	-26	Pass

7. Secondary Radiated Emission

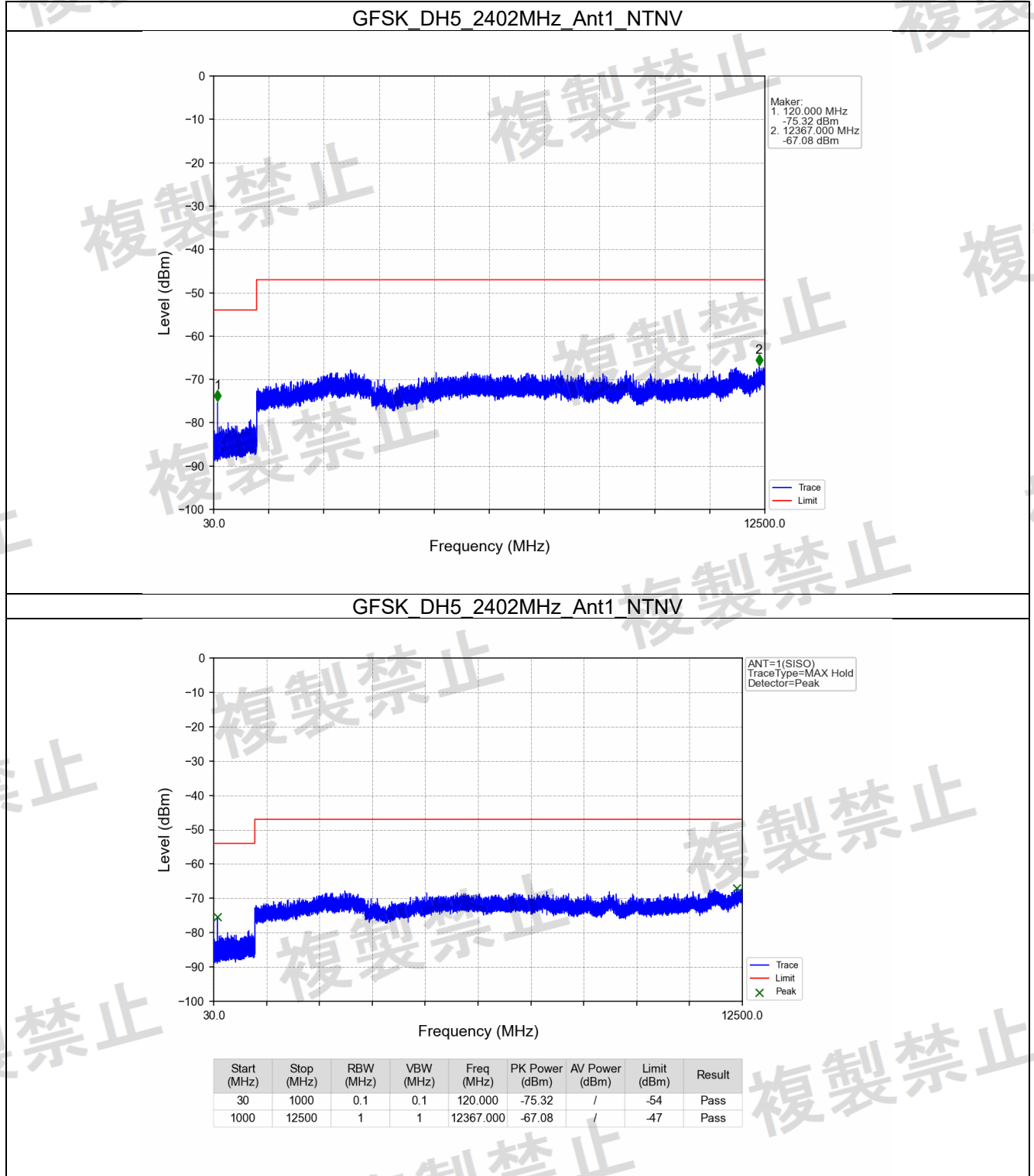
7.1 Test Result

7.1.1 RxSe_NTNV

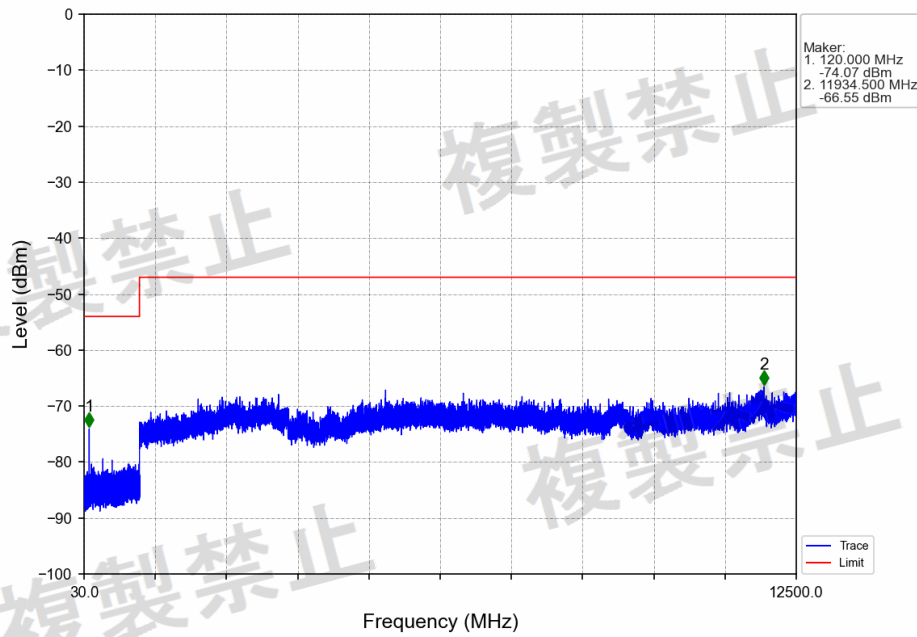
NTNV												
Mode	TX Type	Freq. (MHz)	ANT	Freq. Range		Marker					Limit (nW)	Verdict
				Start (MHz)	Stop (MHz)	Freq. (MHz)	PK Power (dBm)	PK Power (nW)	AV Power (dBm)	AV Power (nW)		
GFSK	SISO	2402	1	30	1000	120	-75.32	0.029	/	/	4	Pass
				1000	12500	12367	-67.08	0.196	/	/	20	Pass
		2480	1	30	1000	120	-74.07	0.039	/	/	4	Pass
				1000	12500	11934.5	-66.55	0.221	/	/	20	Pass
Pi/4DQPSK	SISO	2402	1	30	1000	120	-74.97	0.032	/	/	4	Pass
				1000	12500	12486	-66.35	0.232	/	/	20	Pass
		2480	1	30	1000	120	-75.45	0.029	/	/	4	Pass
				1000	12500	5788	-65.12	0.308	/	/	20	Pass
8DPSK	SISO	2402	1	30	1000	120	-74.68	0.034	/	/	4	Pass
				1000	12500	11984.5	-66.56	0.221	/	/	20	Pass
		2480	1	30	1000	120	-74.63	0.034	/	/	4	Pass
				1000	12500	3555	-65.15	0.305	/	/	20	Pass

7.2 Test Graph

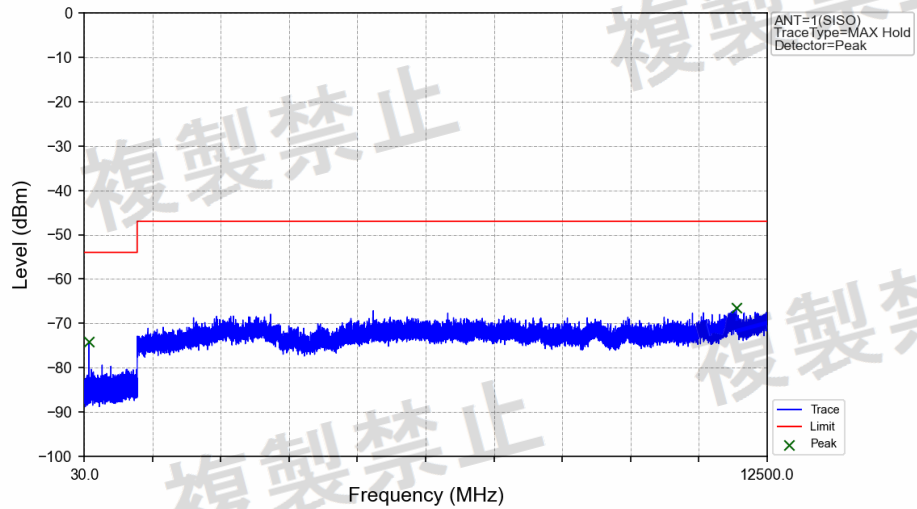
7.2.1 RxSe_NTNV



GFSK_DH5_2480MHz_Ant1_NTNV

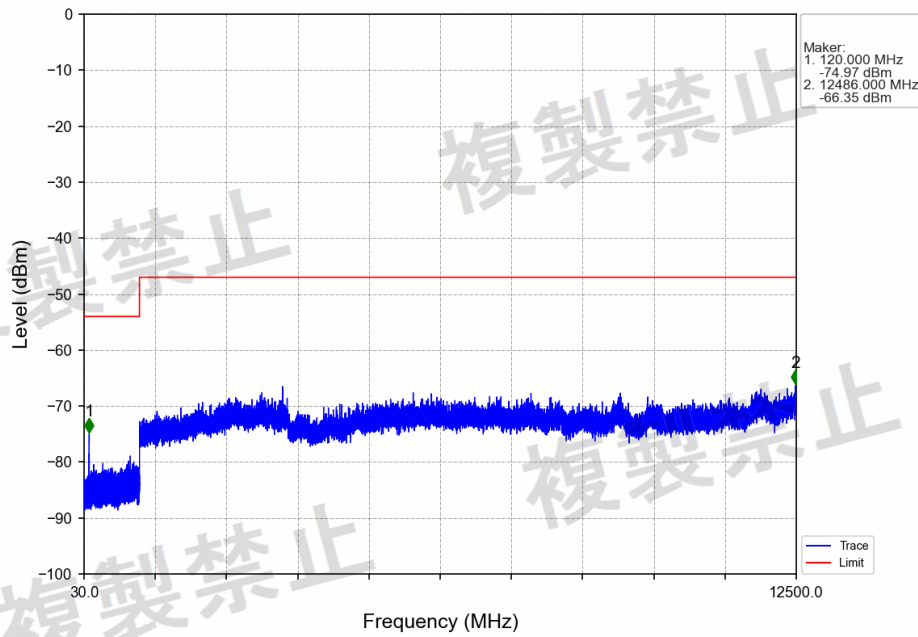


GFSK_DH5_2480MHz_Ant1_NTNV

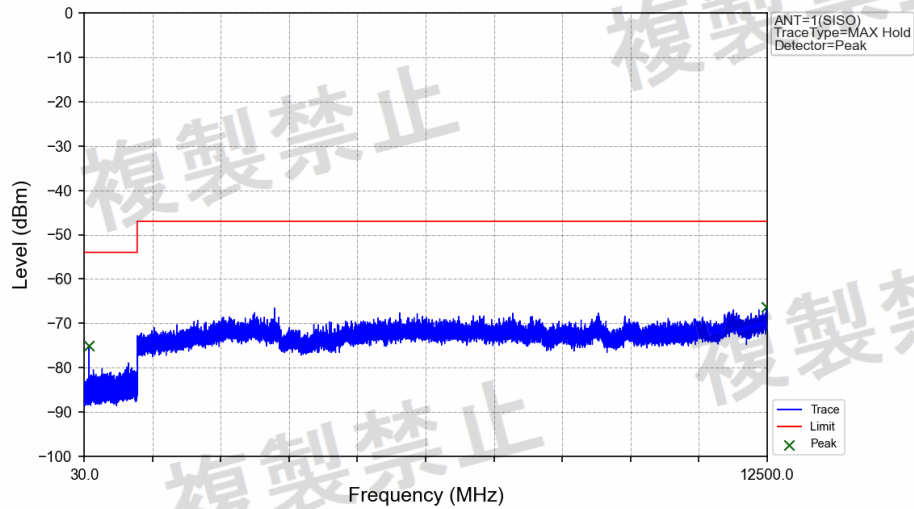


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	120.000	-74.07	/	-54	Pass
1000	12500	1	1	11934.500	-66.55	/	-47	Pass

Pi/4DQPSK 2DH5 2402MHz_Ant1_NTNV

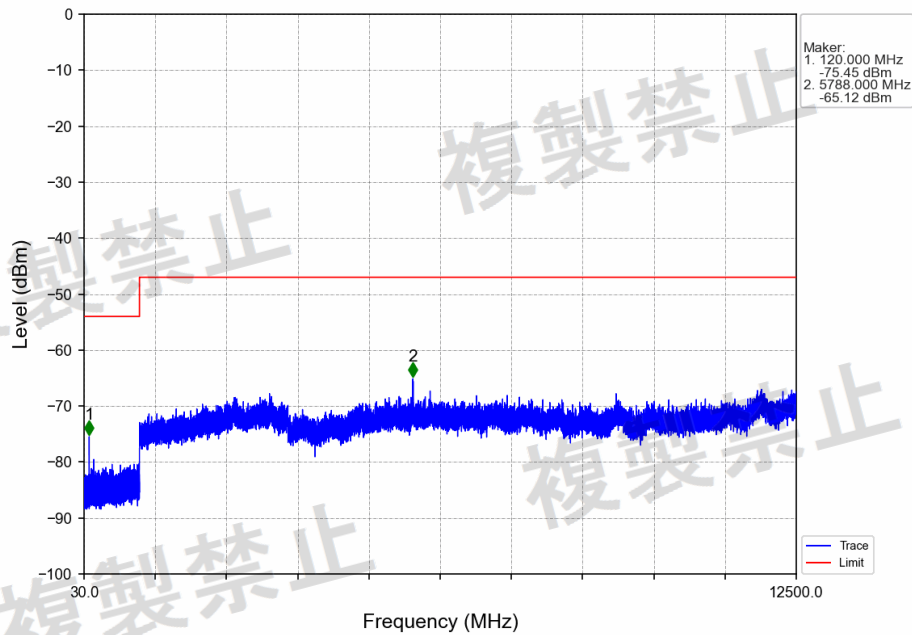


Pi/4DQPSK 2DH5 2402MHz_Ant1_NTNV

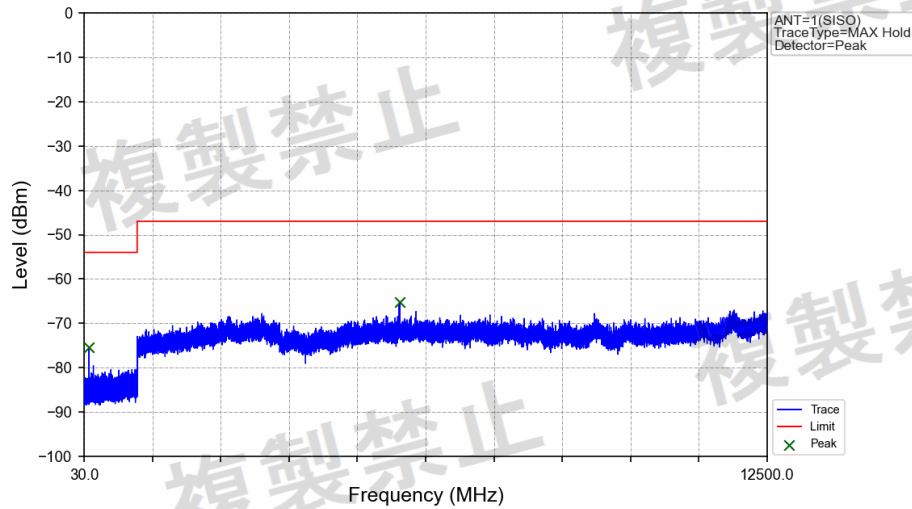


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	120.000	-74.97	/	-54	Pass
1000	12500	1	1	12486.000	-66.35	/	-47	Pass

Pi/4DQPSK 2DH5 2480MHz Ant1_NTNV

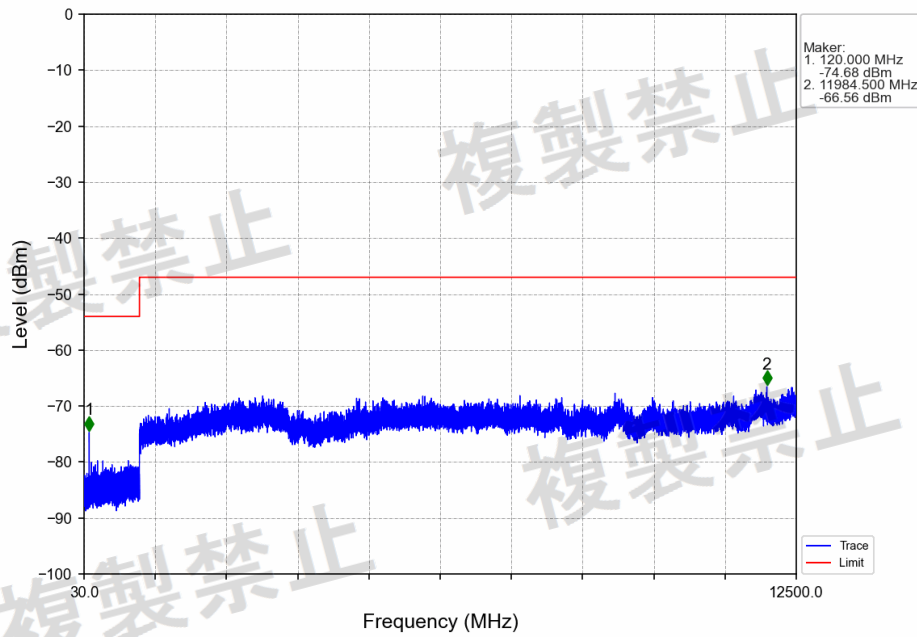


Pi/4DQPSK 2DH5 2480MHz Ant1_NTNV

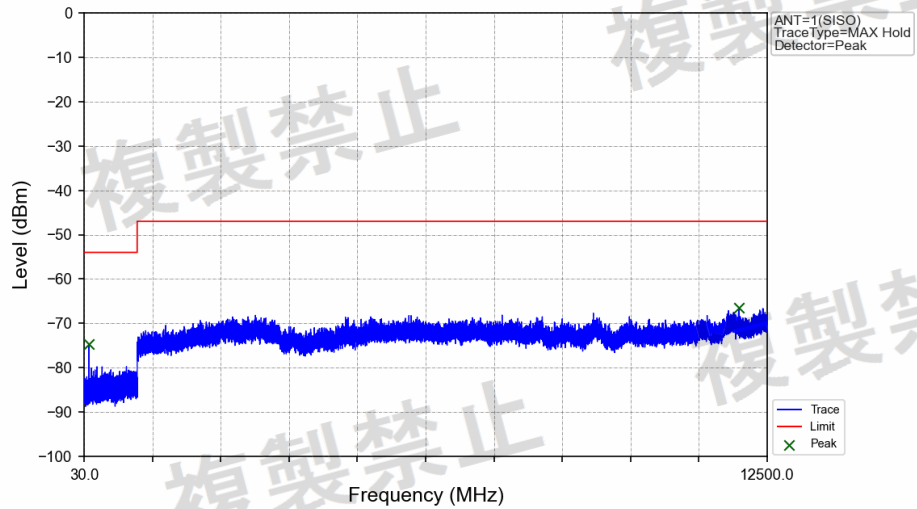


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	120.000	-75.45	/	-54	Pass
1000	12500	1	1	5788.000	-65.12	/	-47	Pass

8DPSK_3DH5_2402MHz_Ant1_NTNV

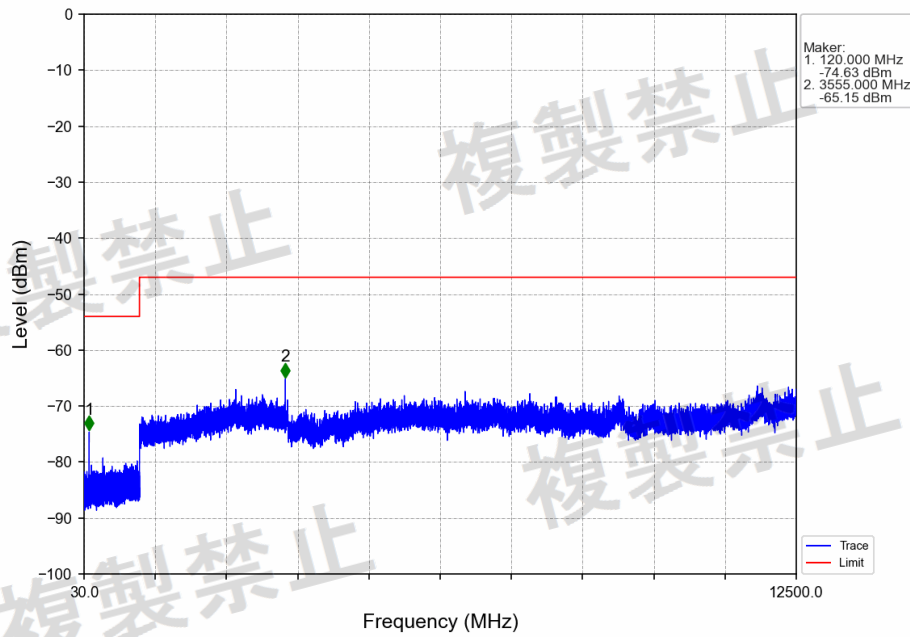


8DPSK_3DH5_2402MHz_Ant1_NTNV

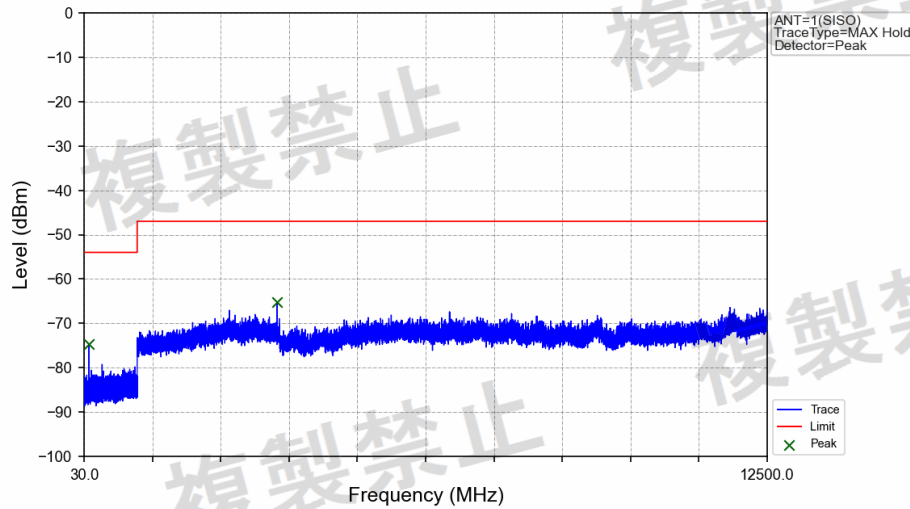


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	120.000	-74.68	/	-54	Pass
1000	12500	1	1	11984.500	-66.56	/	-47	Pass

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	120.000	-74.63	/	-54	Pass
1000	12500	1	1	3555.000	-65.15	/	-47	Pass

10 Appendix-R

1. Frequency Error

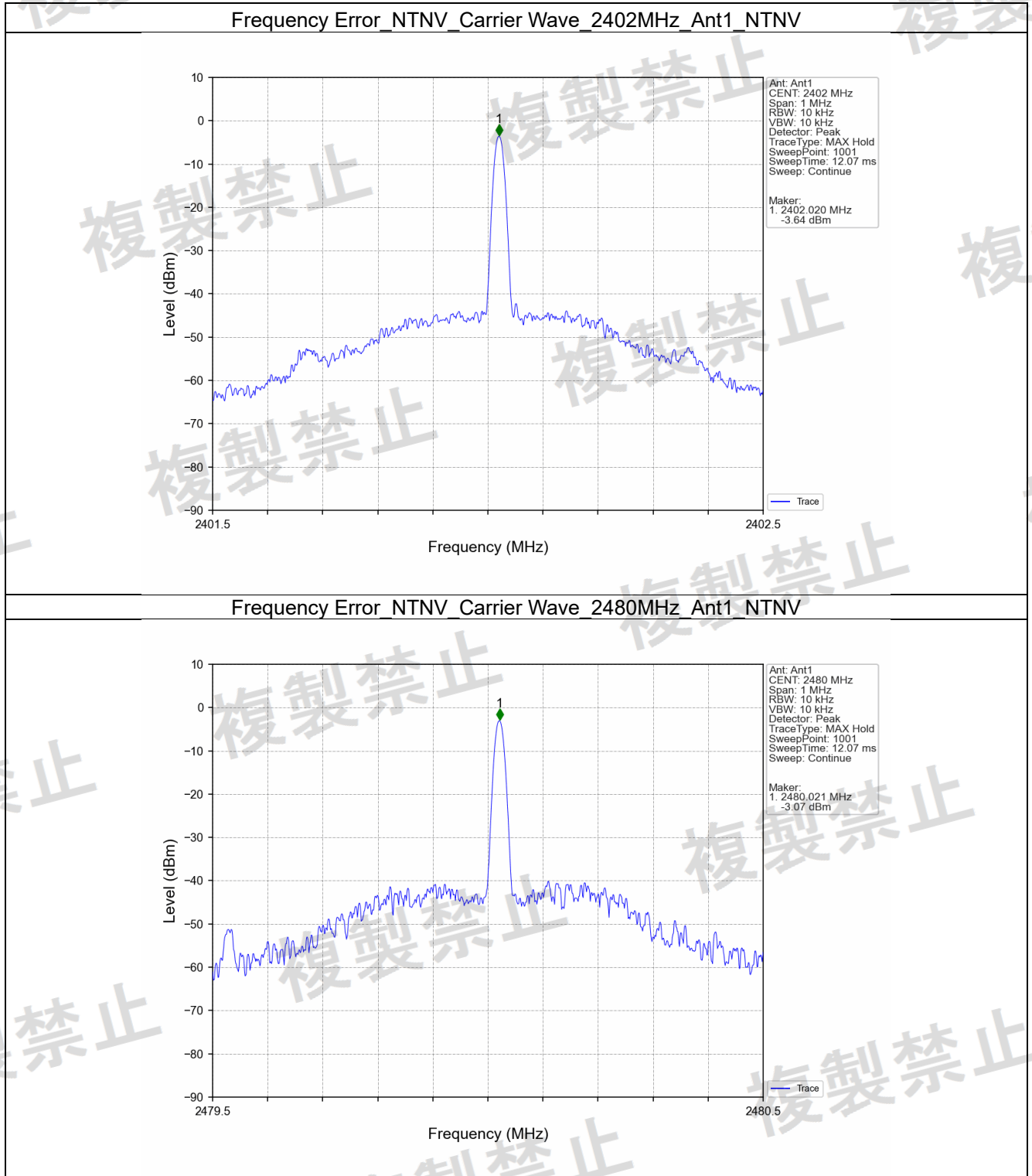
1.1 Test Result

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	2402.020	8.33	-50 to 50	Pass
			2480	DH5	2480.021	8.47	-50 to 50	Pass

1.2 Test Graph

1.2.1 Ant1



2. Occupied Bandwidth

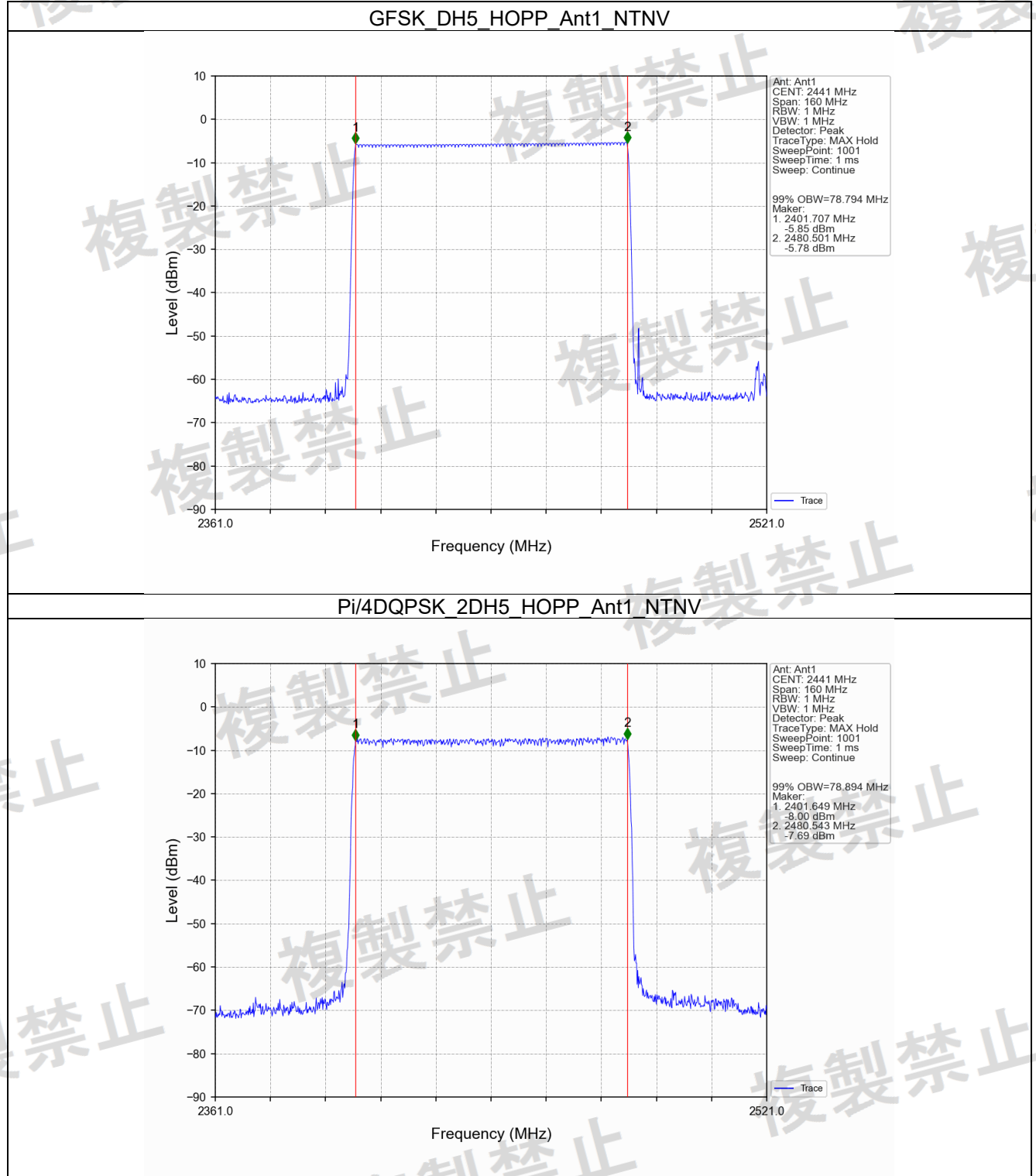
2.1 Test Result

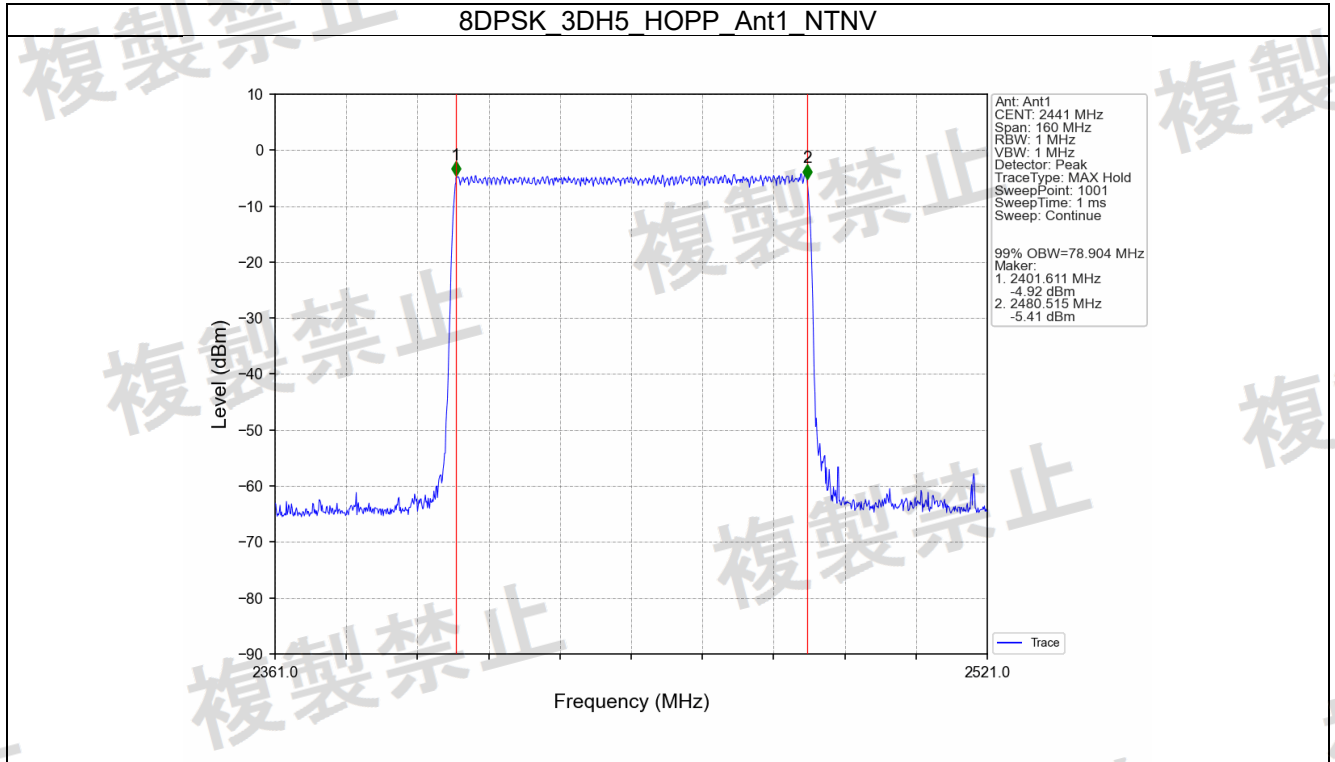
2.1.1 OBW

ENV	Mode	TX Type	Frequency (MHz)	Packet Type	99% Occupied Bandwidth (MHz)		Verdict
					ANT1	Limit	
NTNV	GFSK	SISO	HOPP	DH5	78.794	≤ 83.5	Pass
	Pi/4DQPSK	SISO	HOPP	2DH5	78.894	≤ 83.5	Pass
	8DPSK	SISO	HOPP	3DH5	78.904	≤ 83.5	Pass

2.2 Test Graph

2.2.1 OBW





3. Spread Bandwidth

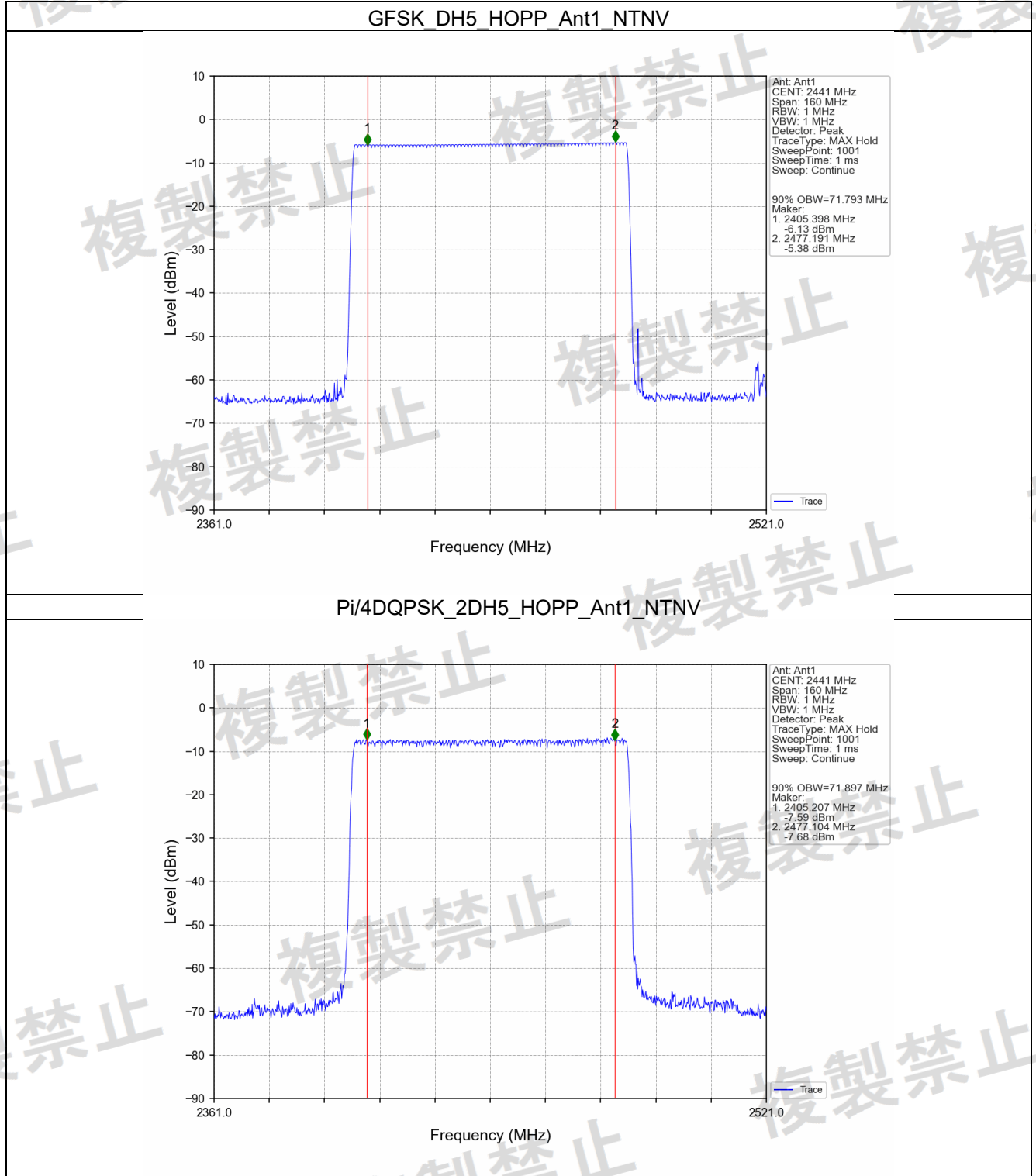
3.1 Test Result

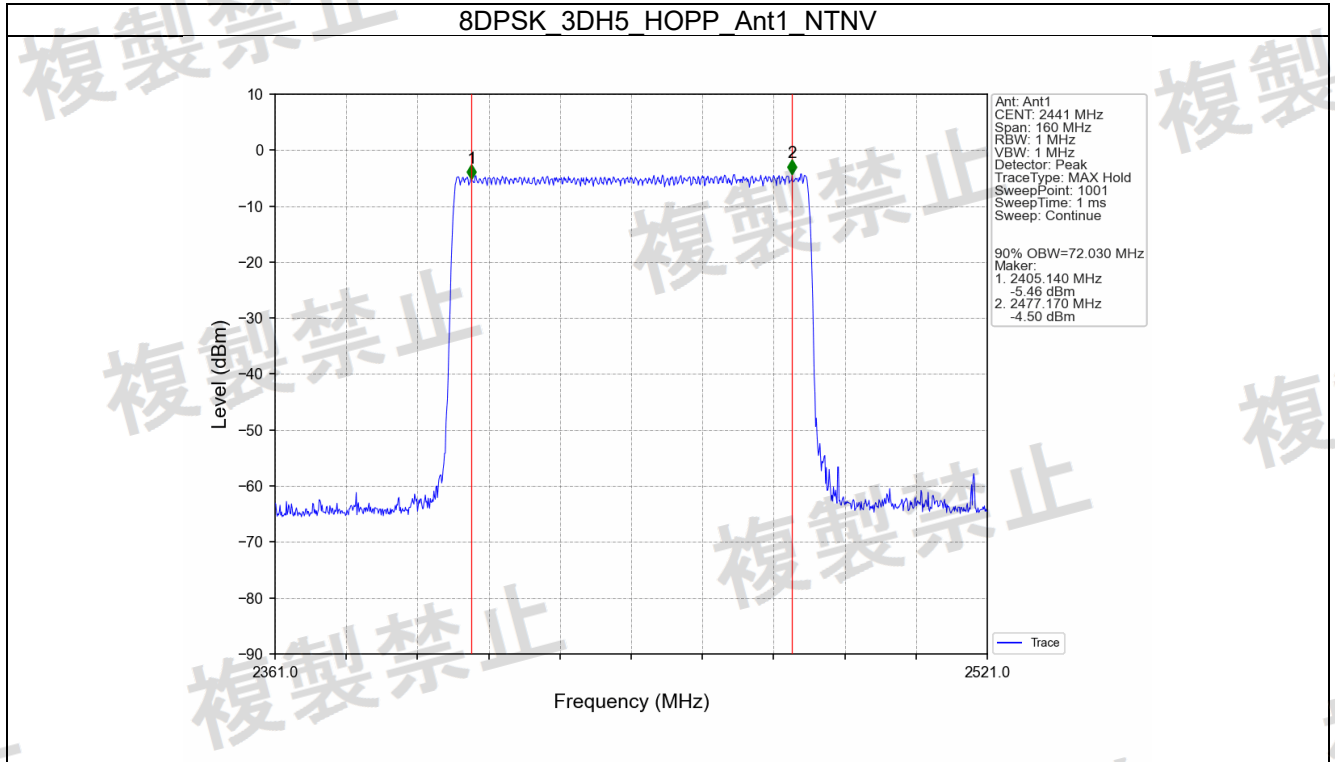
3.1.1 SPBW

ENV	Mode	TX Type	Frequency (MHz)	Packet Type	Spread Bandwidth (MHz)		Verdict
					ANT1	Limit	
NTNV	GFSK	SISO	HOPP	DH5	71.793	/	Only For Report
	Pi/4DQPSK	SISO	HOPP	2DH5	71.897	/	Only For Report
	8DPSK	SISO	HOPP	3DH5	72.030	/	Only For Report

3.2 Test Graph

3.2.1 SPBW





4. Antenna Power

4.1 Test Result

4.1.1 Power

ENV	Mode	Frequency (MHz)	Packet Type	Total Power (dBm)	Spread BW (MHz)	Antenna Power (mW/MHz)		Nominal Power (mW/MHz)	Tolerance (%)		Verdict
						result	Limit		Measured	Limit	
NTNV	GFSK	HOPP	DH5	11.41	71.793	0.19	<=3.00	0.3	-35.76%	<=20	Pass
	Pi/4DQPSK	HOPP	2DH5	10.46	71.897	0.15	<=3.00	0.3	-48.46%	<=20	Pass
	8DPSK	HOPP	3DH5	11.79	72.030	0.21	<=3.00	0.3	-30.12%	<=20	Pass

Note:

1. result= $[10^{(\text{Meas Power}/10)}]/\text{spread BW}$

4.1.2 EIRP

ENV	Mode	TX Type	Frequency (MHz)	Packet Type	Antenna power(dBm/MHz)	Gain (dBi)	EIRP (dBm/MHz)		Verdict
							Result	Limit	
NTNV	GFSK	SISO	HOPP	DH5	-7.15	-0.21	-7.36	<=6.91	Pass
	Pi/4DQPSK	SISO	HOPP	2DH5	-8.11	-0.21	-8.32	<=6.91	Pass
	8DPSK	SISO	HOPP	3DH5	-6.79	-0.21	-7.00	<=6.91	Pass

Note:

1. antenna power(dBm/MHz)=10LOG(result(mW/MHz))

5. Dwell Time

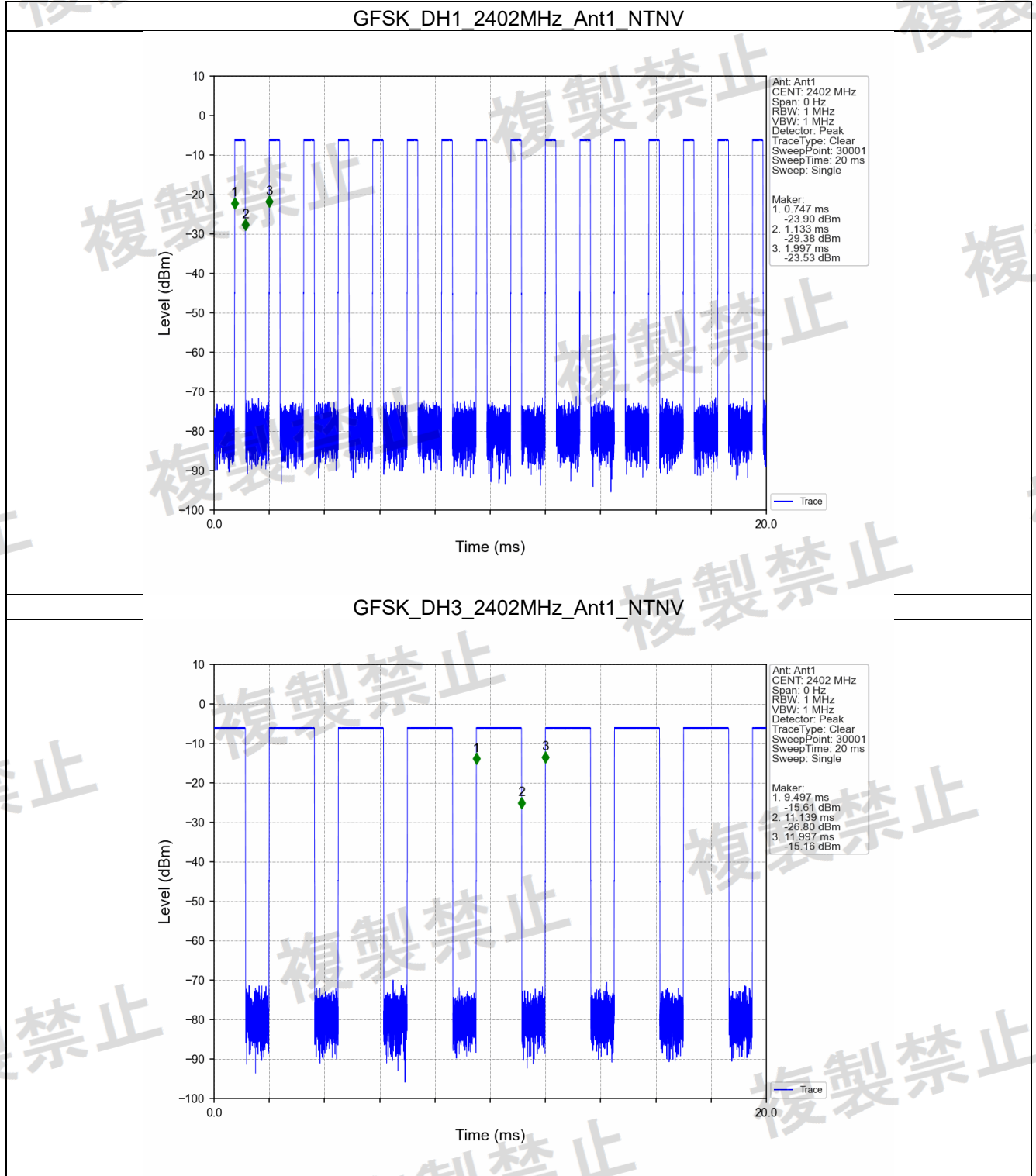
5.1 Test Result

5.1.1 Ant1

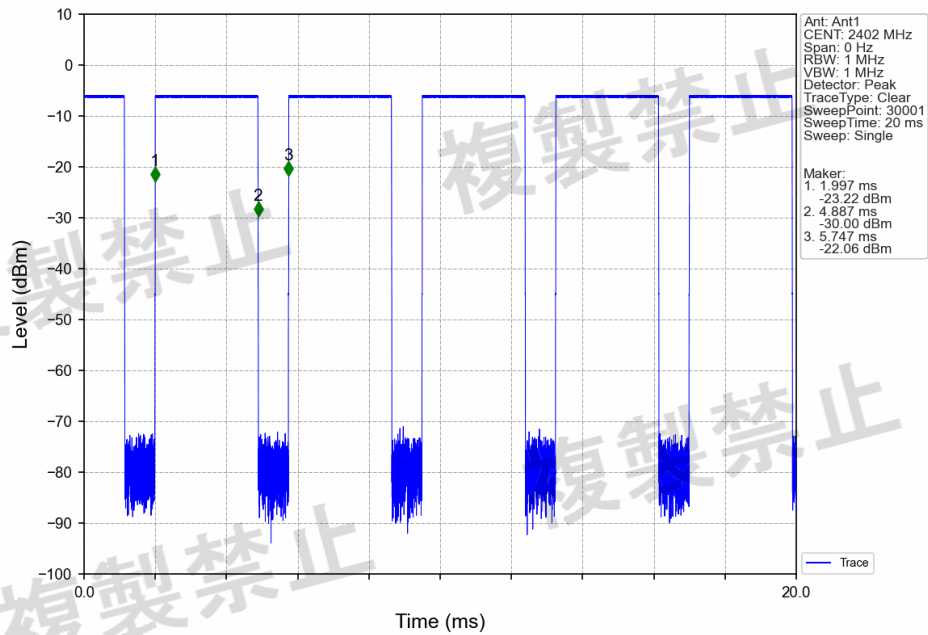
Ant1											
ENV	Mode	Tx Type	Frequency (MHz)	Packet Type	Spreading Rate	T _{on} (ms)	Period (ms)	Hopp Number	Dwell Time (ms)		Verdict
NTNV	GFSK	SISO	2402	DH1	71.793	0.386	1.250	79	112.252	<=400	Pass
				DH3	71.793	1.642	2.500	79	238.753	<=400	Pass
				DH5	71.793	2.890	3.750	79	280.144	<=400	Pass
			2480	DH1	71.793	0.386	1.250	79	112.252	<=400	Pass
				DH3	71.793	1.642	2.500	79	238.753	<=400	Pass
				DH5	71.793	2.890	3.750	79	280.144	<=400	Pass
	Pi/4DQPSK	SISO	2402	2DH1	71.897	0.389	1.250	79	113.288	<=400	Pass
				2DH3	71.897	1.641	2.500	79	238.953	<=400	Pass
				2DH5	71.897	2.888	3.750	79	280.356	<=400	Pass
			2480	2DH1	71.897	0.389	1.250	79	113.288	<=400	Pass
				2DH3	71.897	1.641	2.500	79	238.953	<=400	Pass
				2DH5	71.897	2.889	3.749	79	280.528	<=400	Pass
	8DPSK	SISO	2402	3DH1	72.030	0.390	1.250	79	113.789	<=400	Pass
				3DH3	72.030	1.640	2.500	79	239.249	<=400	Pass
				3DH5	72.030	2.891	3.750	79	281.166	<=400	Pass
			2480	3DH1	72.030	0.390	1.250	79	113.789	<=400	Pass
				3DH3	72.030	1.640	2.500	79	239.249	<=400	Pass
				3DH5	72.030	2.891	3.750	79	281.166	<=400	Pass

5.2 Test Graph

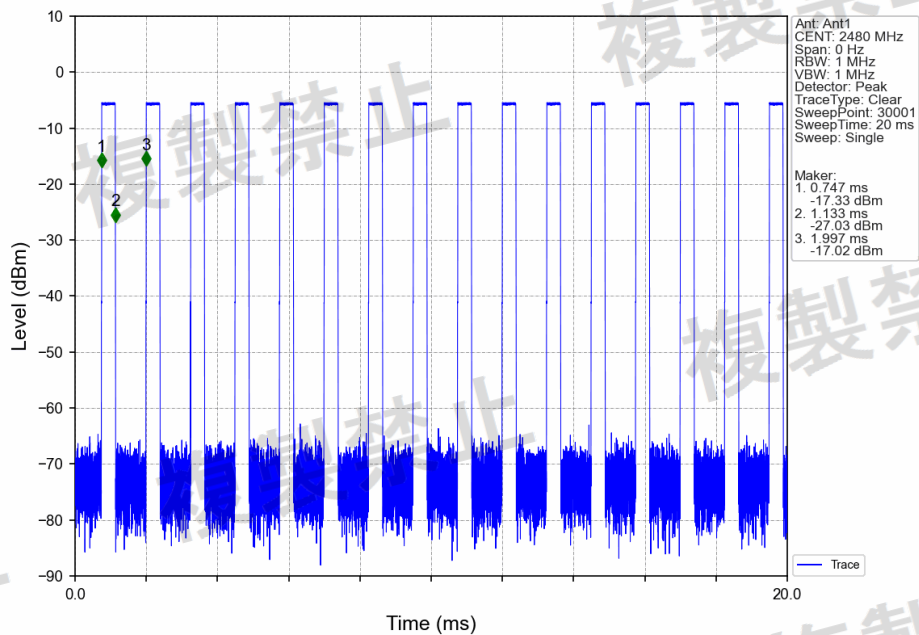
5.2.1 Ant1



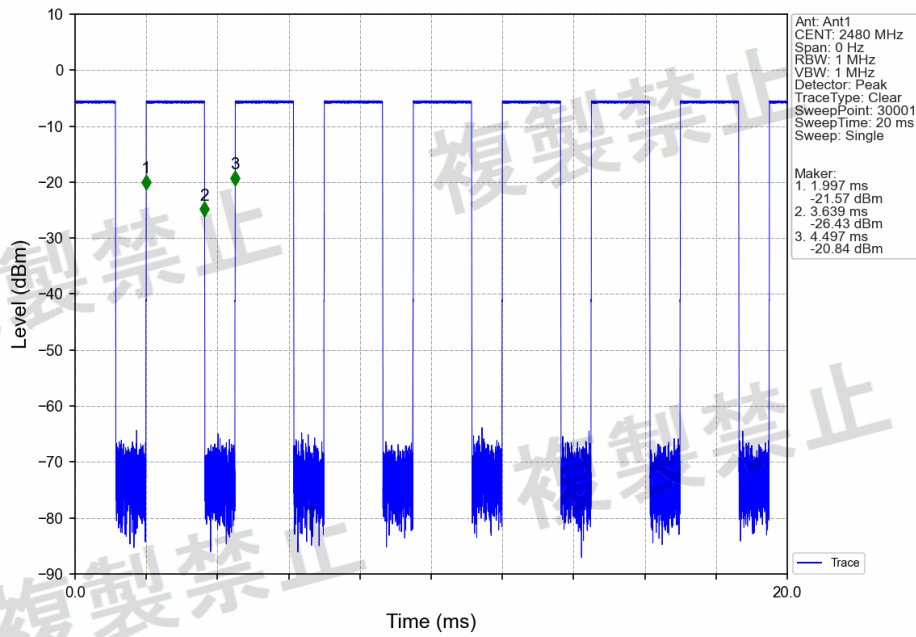
GFSK_DH5_2402MHz_Ant1_NTNV



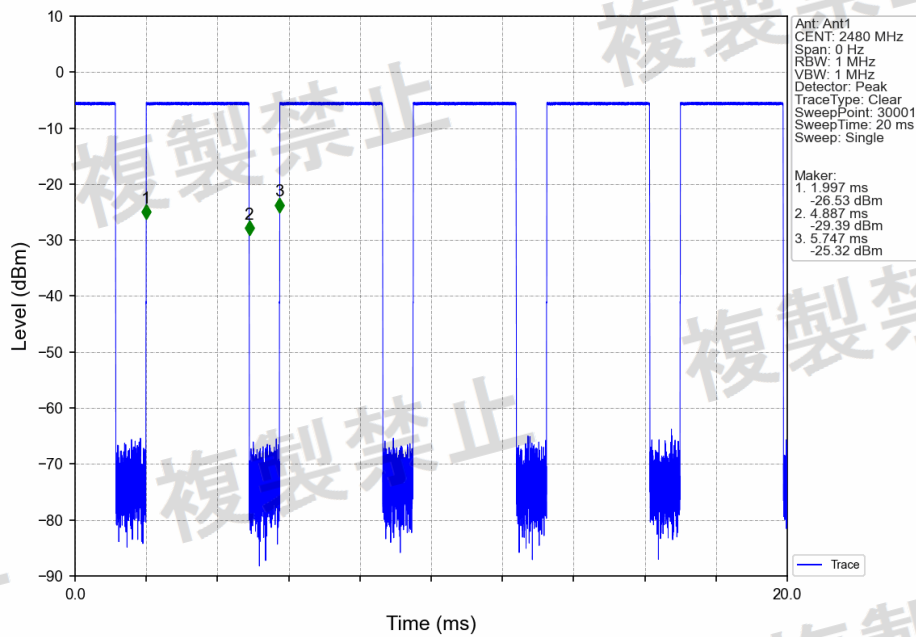
GFSK_DH1_2480MHz_Ant1_NTNV



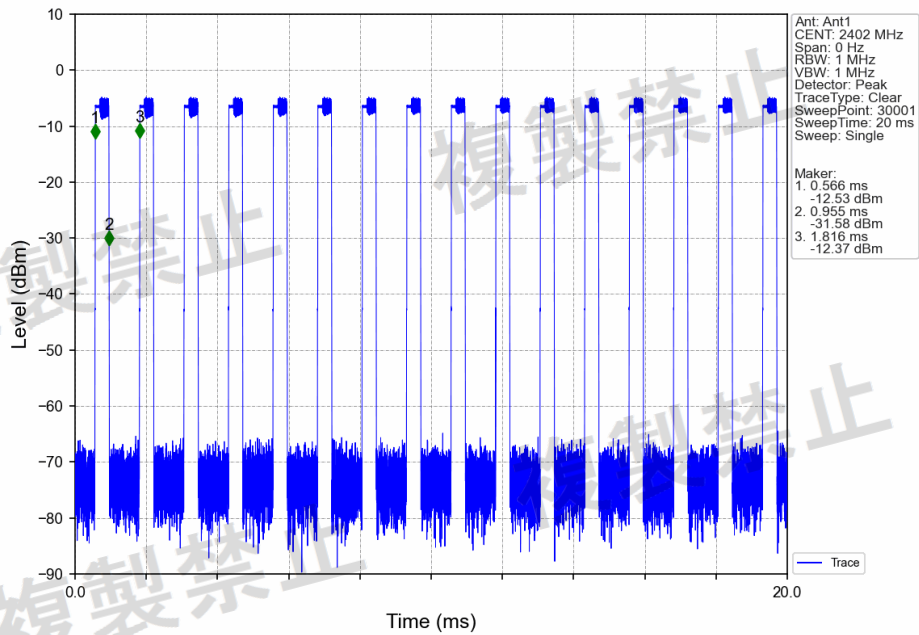
GFSK_DH3_2480MHz_Ant1_NTNV



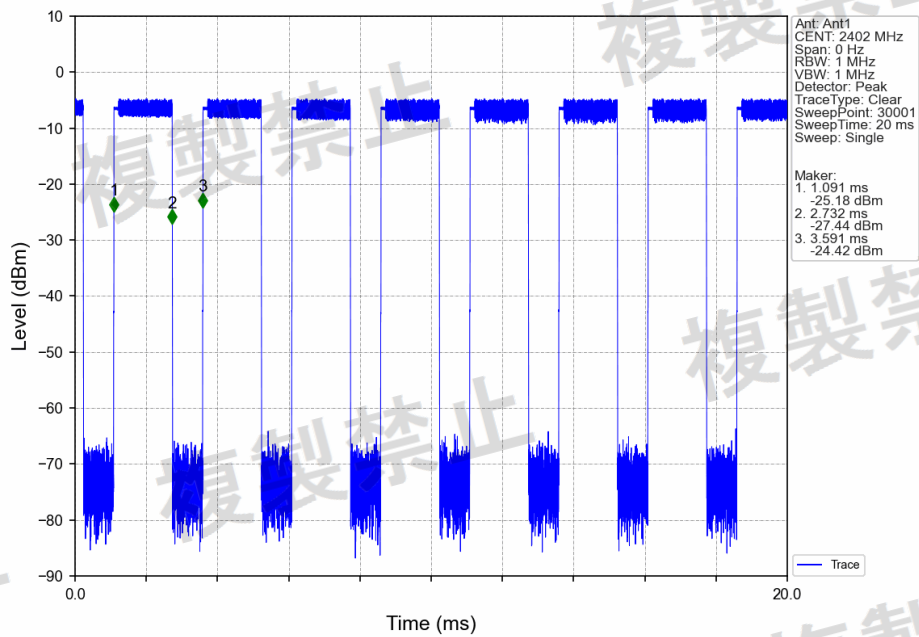
GFSK_DH5_2480MHz_Ant1_NTNV



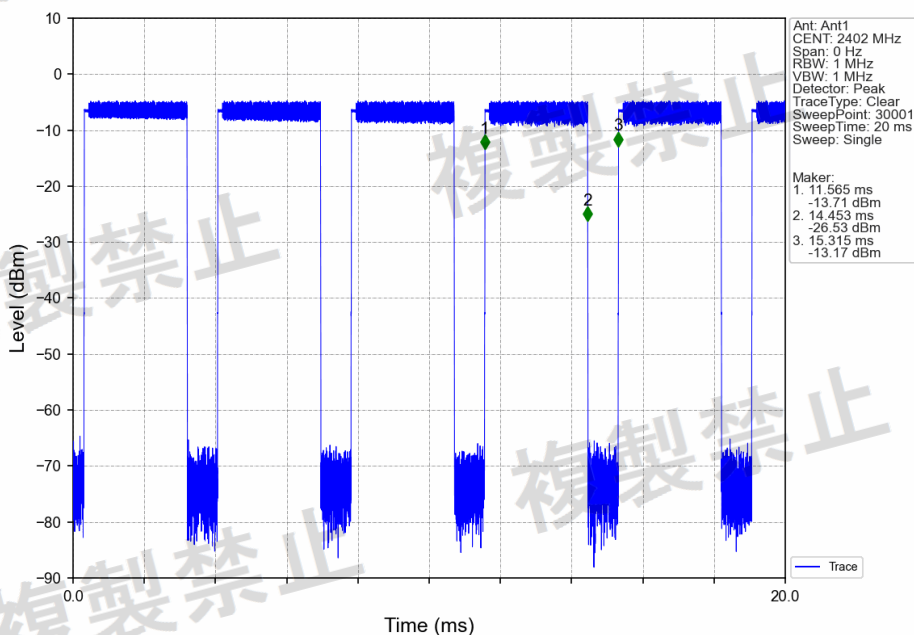
Pi/4DQPSK 2DH1 2402MHz Ant1 NTN



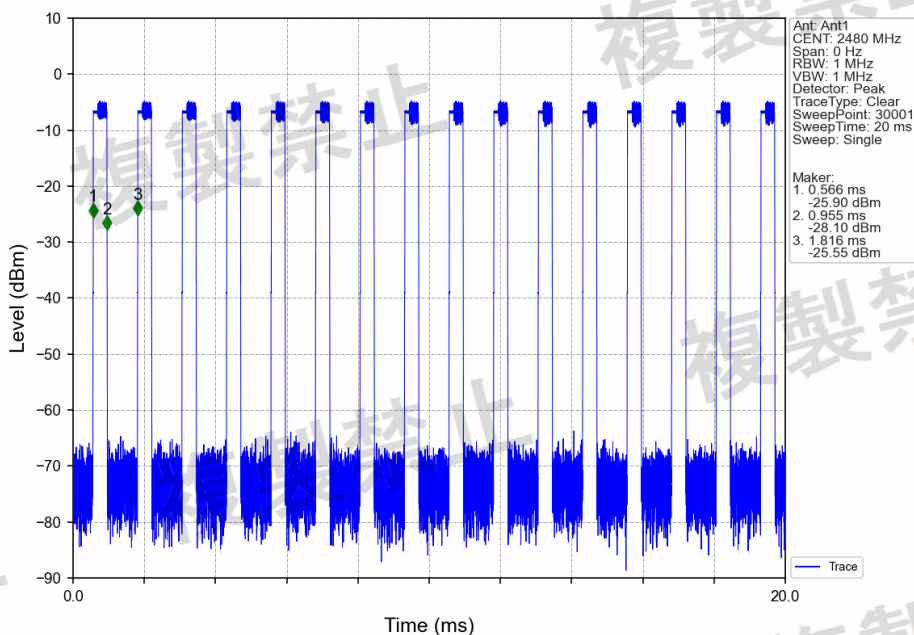
Pi/4DQPSK 2DH3 2402MHz Ant1 NTN



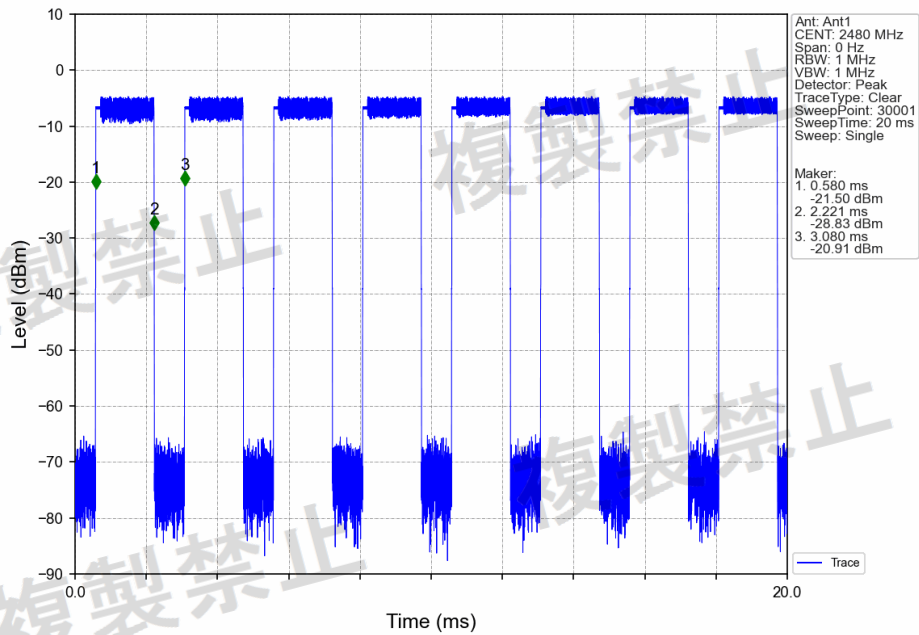
Pi/4DQPSK 2DH5 2402MHz Ant1 NTN



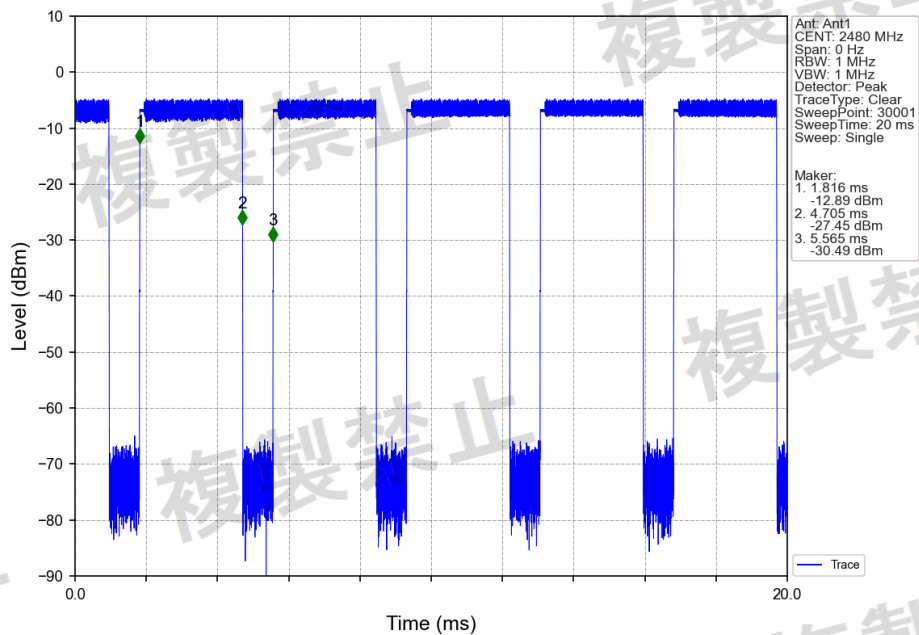
Pi/4DQPSK 2DH1 2480MHz Ant1 NTN



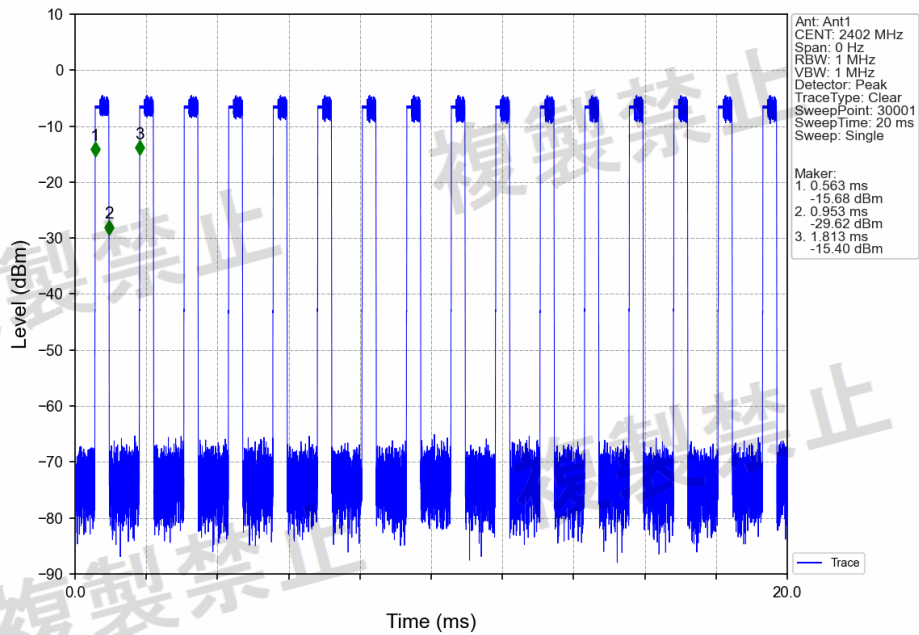
Pi/4DQPSK 2DH3 2480MHz_Ant1_NTNV



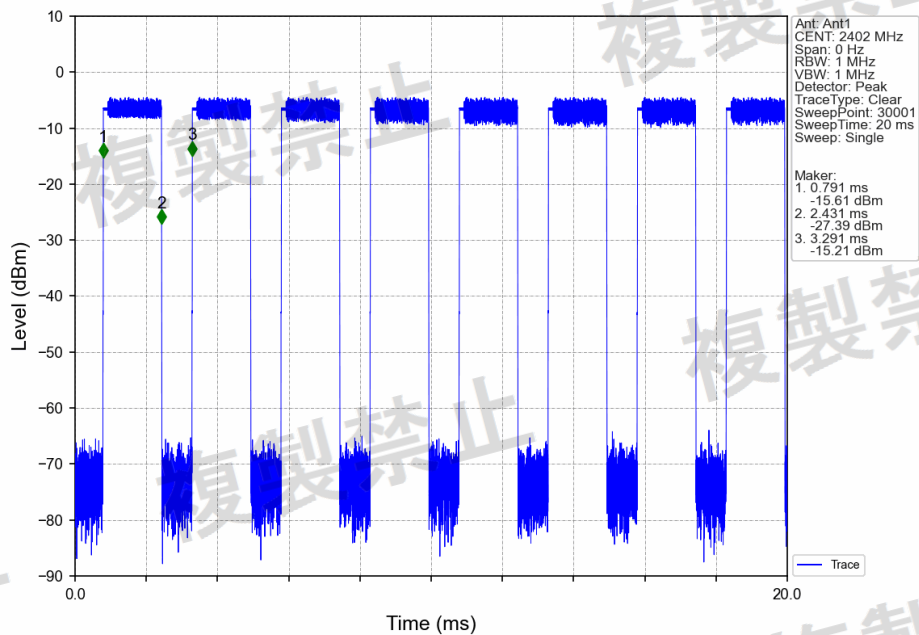
Pi/4DQPSK 2DH5 2480MHz_Ant1_NTNV



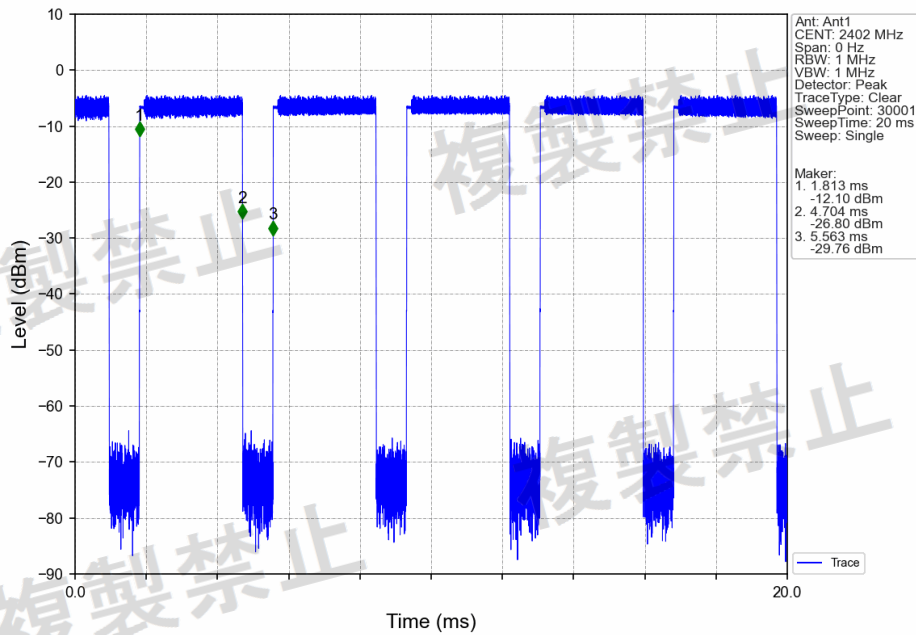
8DPSK_3DH1_2402MHz_Ant1_NTNV



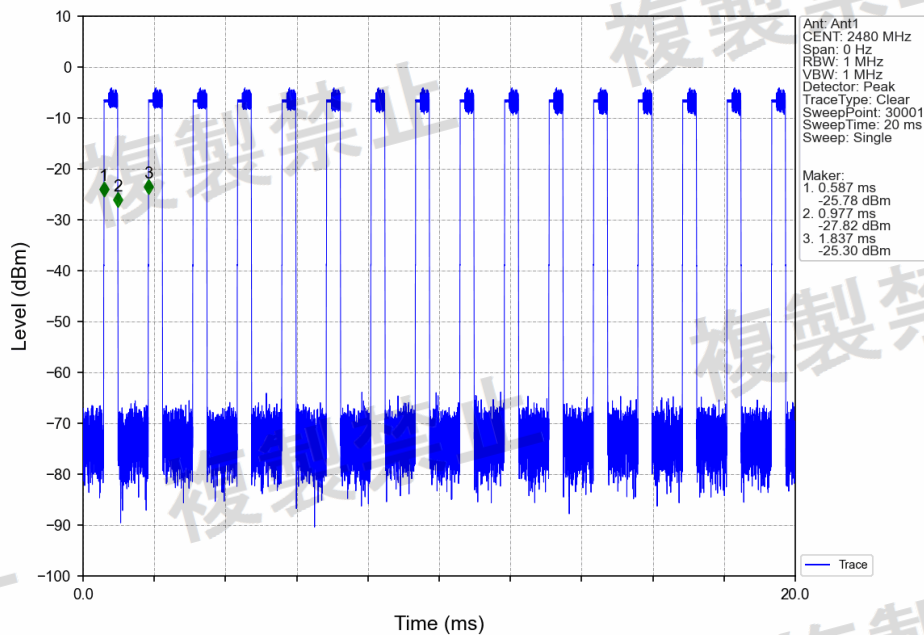
8DPSK_3DH3_2402MHz_Ant1_NTNV



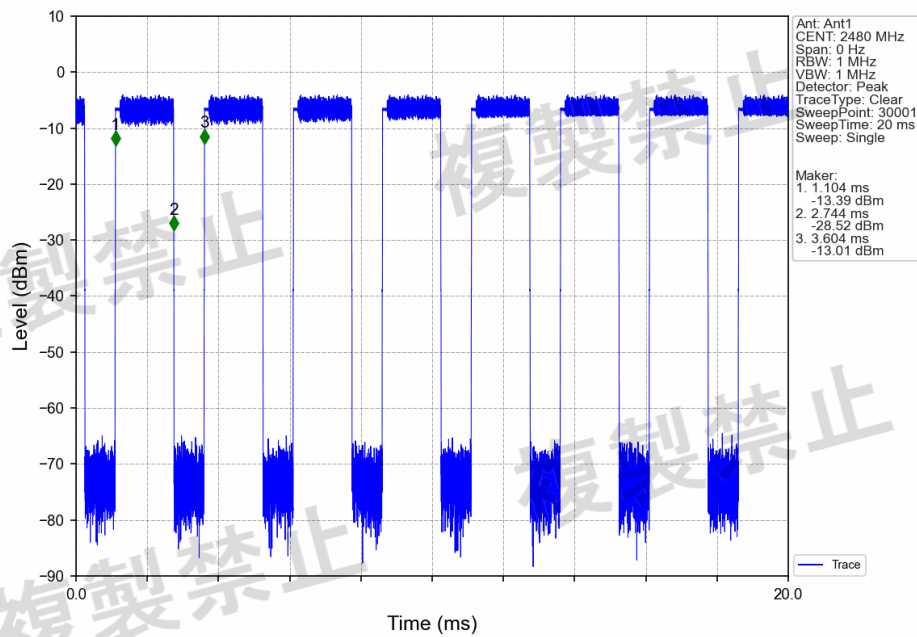
8DPSK_3DH5_2402MHz_Ant1_NTNV



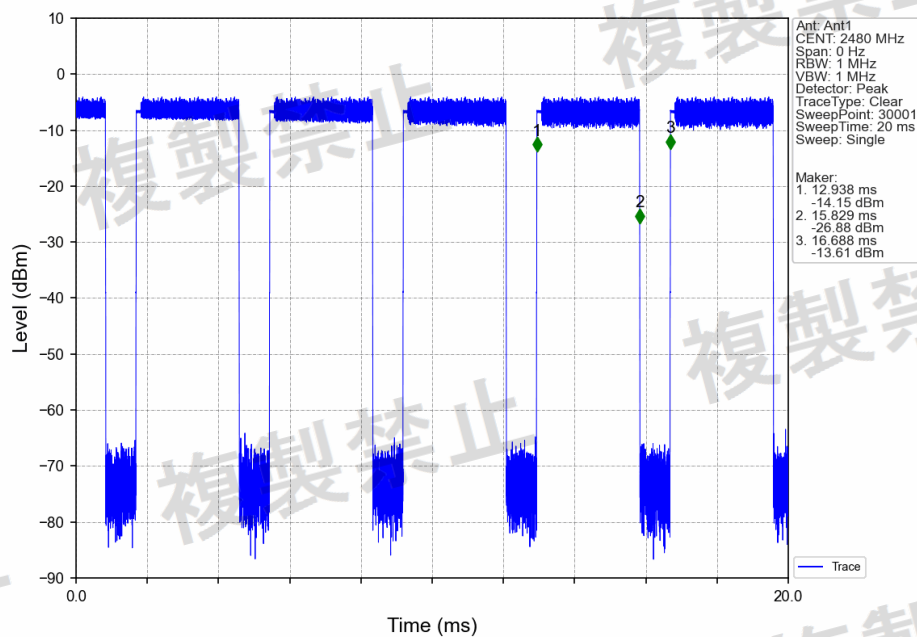
8DPSK_3DH1_2480MHz_Ant1_NTNV



8DPSK_3DH3_2480MHz_Ant1_NTNV



8DPSK_3DH5_2480MHz_Ant1_NTNV



6. Spurious Emission Intensity

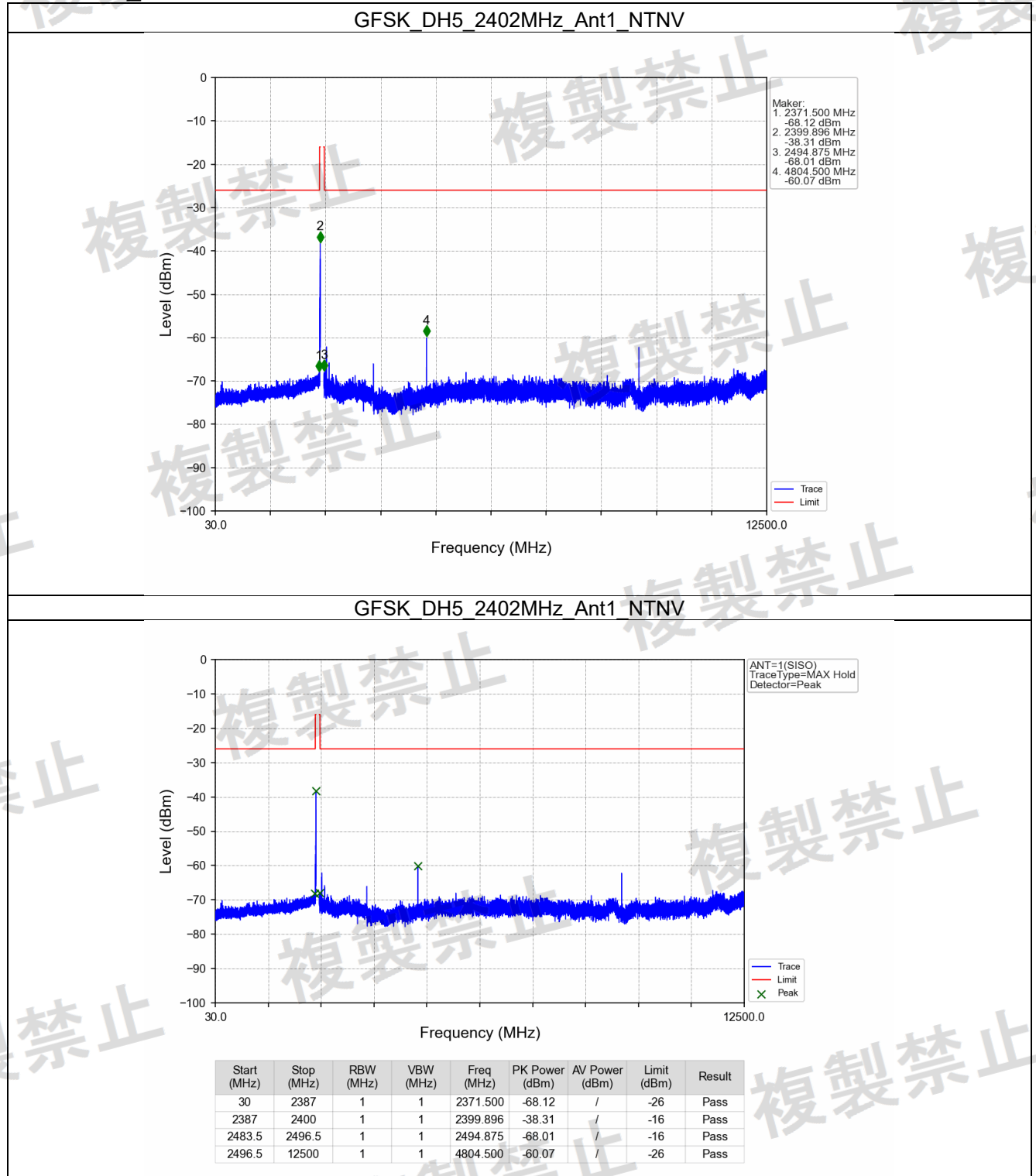
6.1 Test Result

6.1.1 TxSe_NTNV

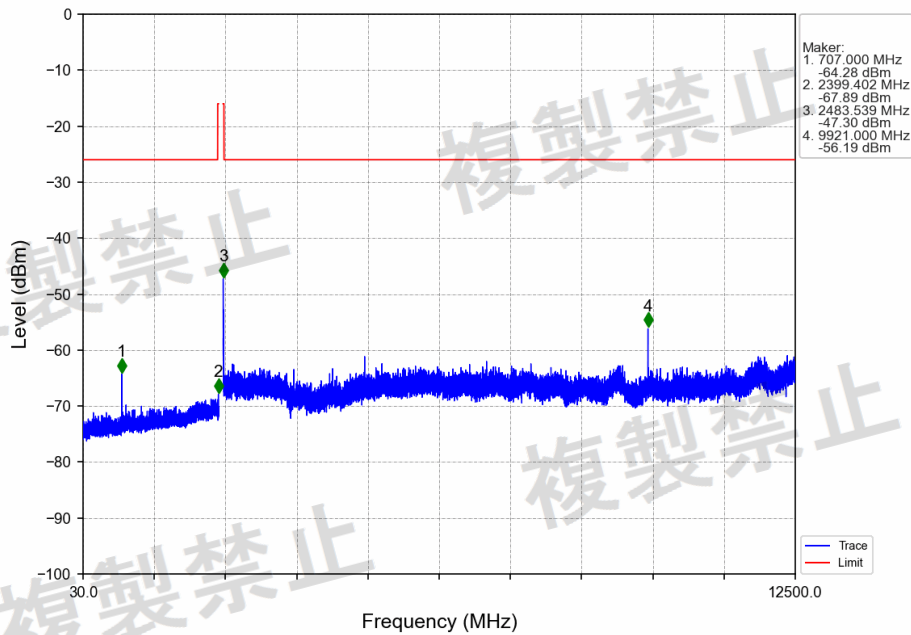
NTNV												
Mode	TX Type	Freq. (MHz)	ANT	Freq. Range		Marker					Limit (uW /MHz)	Verdict
				Start (MHz)	Stop (MHz)	Freq. (MHz)	PK Power (dBm /MHz)	PK Power (uW /MHz)	AV Power (dBm /MHz)	AV Power (uW /MHz)		
GFSK	SISO	2402	1	30	2387	2371.5	-68.12	0.000	/	/	2.5	Pass
				2387	2400	2399.896	-38.31	0.148	/	/	25	Pass
				2483.5	2496.5	2494.875	-68.01	0.000	/	/	25	Pass
				2496.5	12500	4804.5	-60.07	0.001	/	/	2.5	Pass
		2480	1	30	2387	707	-64.28	0.000	/	/	2.5	Pass
				2387	2400	2399.402	-67.89	0.000	/	/	25	Pass
				2483.5	2496.5	2483.539	-47.30	0.019	/	/	25	Pass
				2496.5	12500	9921	-56.19	0.002	/	/	2.5	Pass
Pi/4DQPSK	SISO	2402	1	30	2387	2258	-62.23	0.001	/	/	2.5	Pass
				2387	2400	2399.974	-44.92	0.032	/	/	25	Pass
				2483.5	2496.5	2483.604	-50.66	0.009	/	/	25	Pass
				2496.5	12500	2560.5	-59.71	0.001	/	/	2.5	Pass
		2480	1	30	2387	2368	-62.92	0.001	/	/	2.5	Pass
				2387	2400	2388.261	-62.74	0.001	/	/	25	Pass
				2483.5	2496.5	2483.565	-48.11	0.015	/	/	25	Pass
				2496.5	12500	9921	-56.51	0.002	/	/	2.5	Pass
8DPSK	SISO	2402	1	30	2387	2370.5	-62.02	0.001	/	/	2.5	Pass
				2387	2400	2399.987	-34.67	0.341	/	/	25	Pass
				2483.5	2496.5	2492.054	-62.16	0.001	/	/	25	Pass
				2496.5	12500	4804.5	-57.20	0.002	/	/	2.5	Pass
		2480	1	30	2387	2269.5	-61.46	0.001	/	/	2.5	Pass
				2387	2400	2396.672	-61.99	0.001	/	/	25	Pass
				2483.5	2496.5	2483.604	-48.56	0.014	/	/	25	Pass
				2496.5	12500	2519	-55.47	0.003	/	/	2.5	Pass

6.2 Test Graph

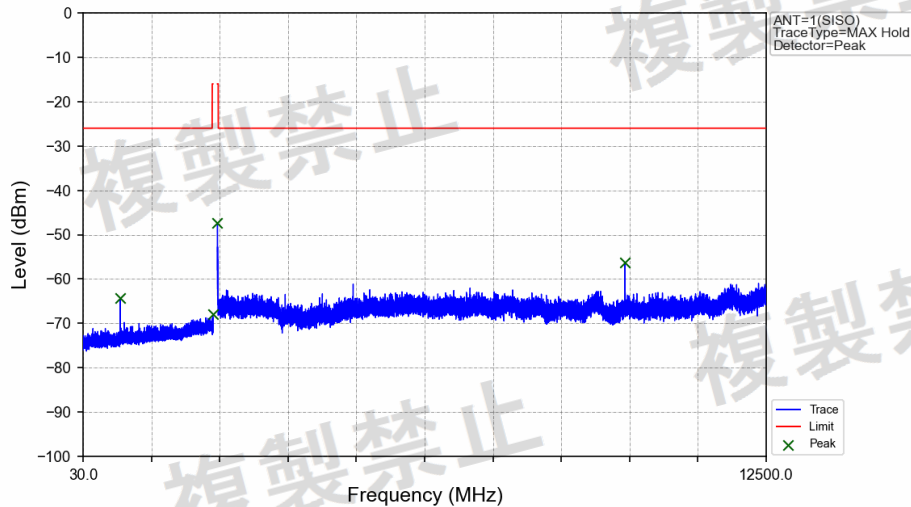
6.2.1 TxSe_NTNV



GFSK_DH5_2480MHz_Ant1_NTNV

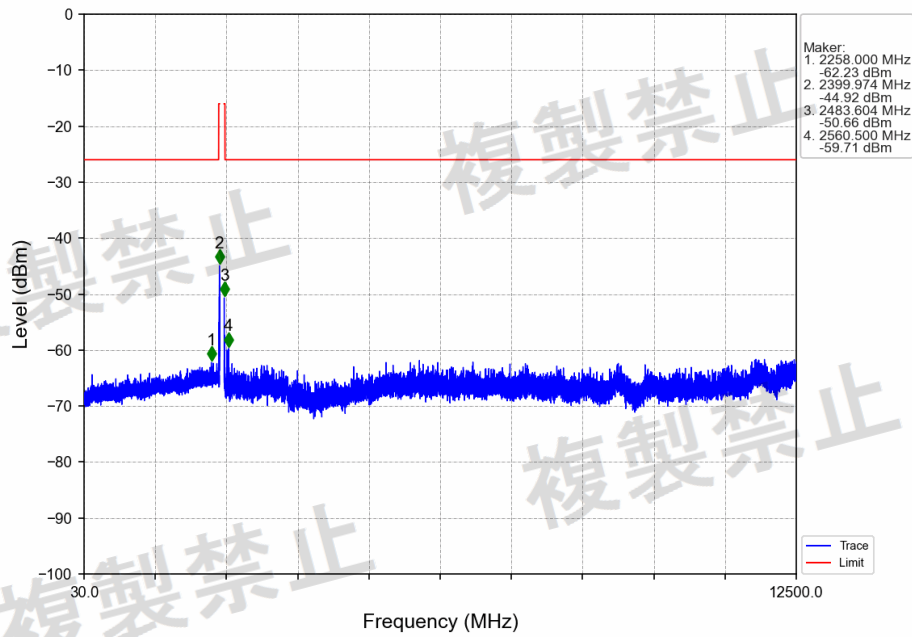


GFSK_DH5_2480MHz_Ant1_NTNV

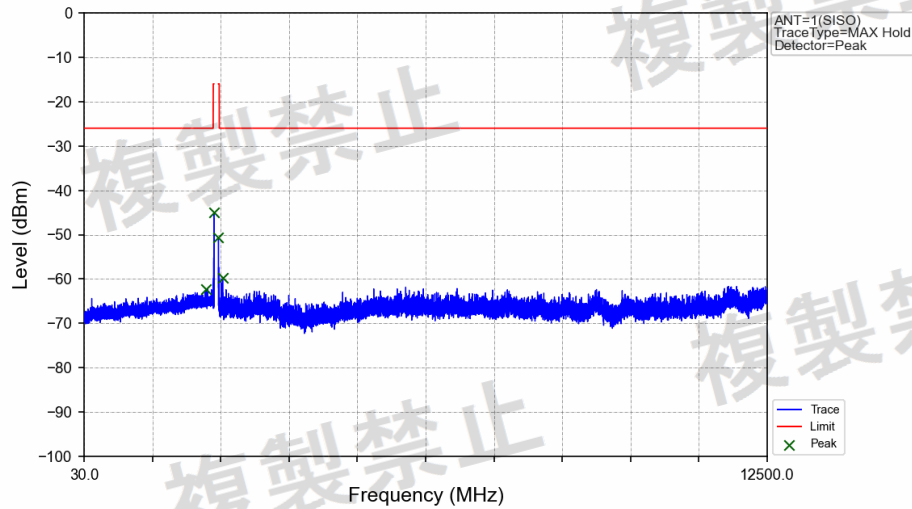


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	707.000	-64.28	/	-26	Pass
2387	2400	1	1	2399.402	-67.89	/	-16	Pass
2483.5	2496.5	1	1	2483.539	-47.30	/	-16	Pass
2496.5	12500	1	1	9921.000	-56.19	/	-26	Pass

Pi/4DQPSK 2DH5 2402MHz_Ant1_NTNV

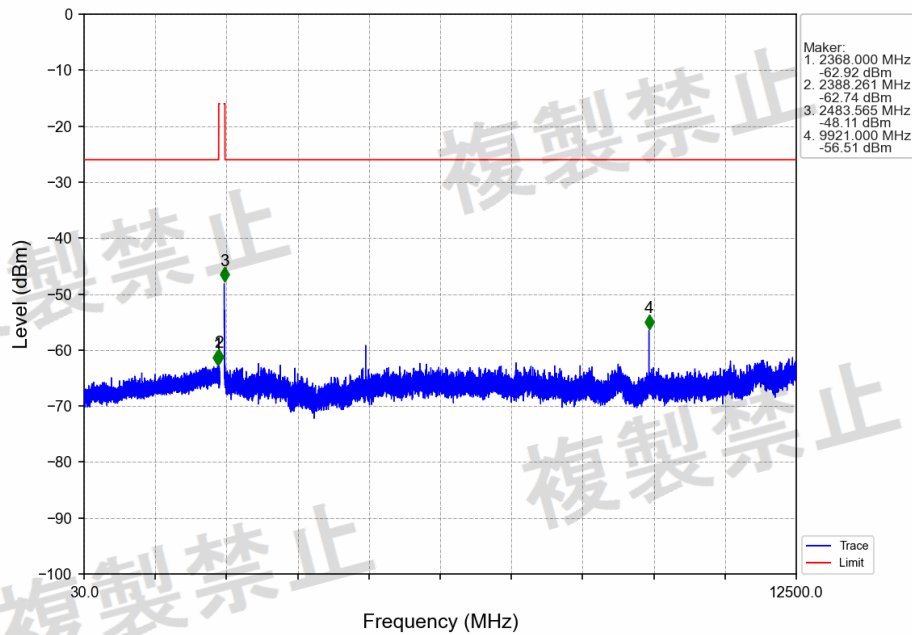


Pi/4DQPSK 2DH5 2402MHz_Ant1_NTNV

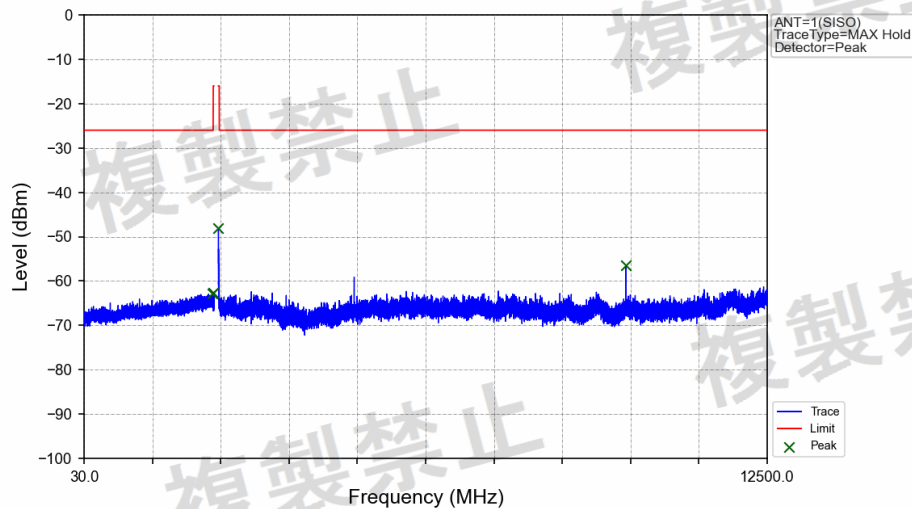


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	2258.000	-62.23	/	-26	Pass
2387	2400	1	1	2399.974	-44.92	/	-16	Pass
2483.5	2496.5	1	1	2483.604	-50.66	/	-16	Pass
2496.5	12500	1	1	2560.500	-59.71	/	-26	Pass

Pi/4DQPSK 2DH5 2480MHz Ant1_NTNV

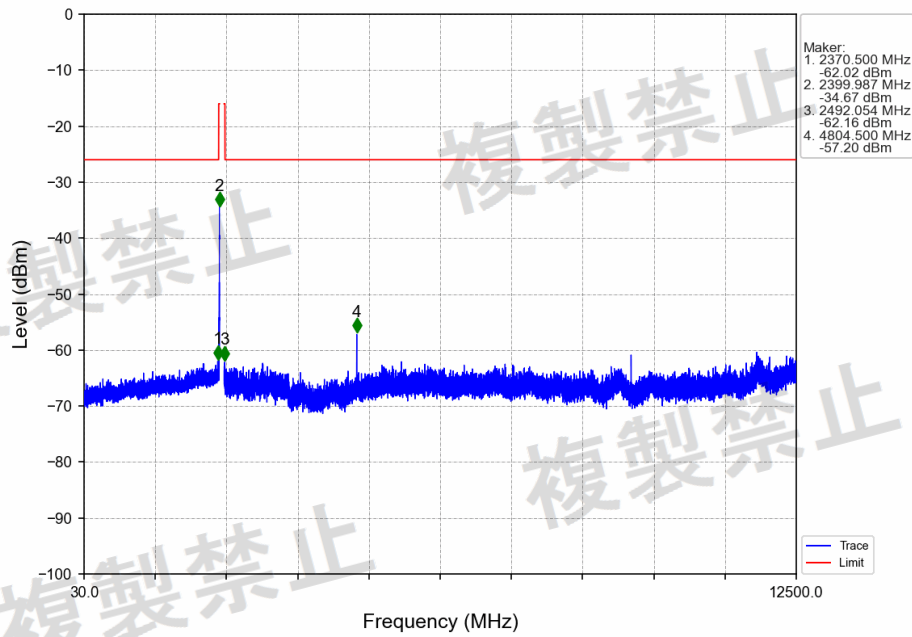


Pi/4DQPSK 2DH5 2480MHz Ant1_NTNV

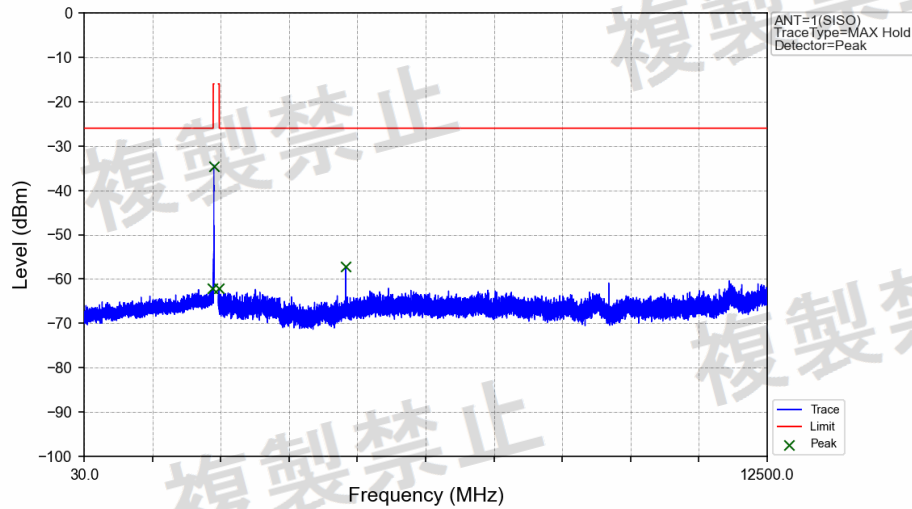


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	2368.000	-62.92	/	-26	Pass
2387	2400	1	1	2388.261	-62.74	/	-16	Pass
2483.5	2496.5	1	1	2483.565	-48.11	/	-16	Pass
2496.5	12500	1	1	9921.000	-56.51	/	-26	Pass

8DPSK_3DH5_2402MHz_Ant1_NTNV

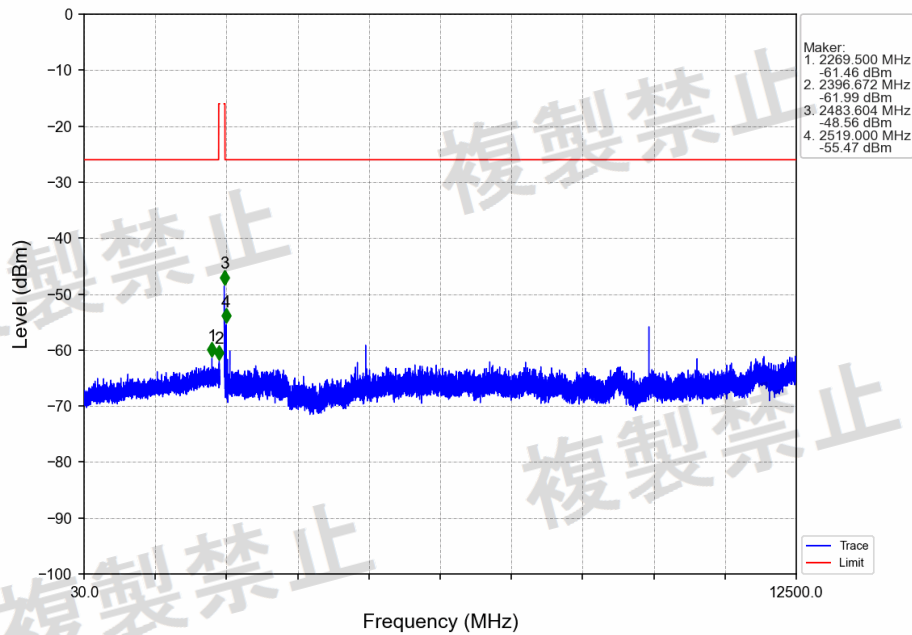


8DPSK_3DH5_2402MHz_Ant1_NTNV

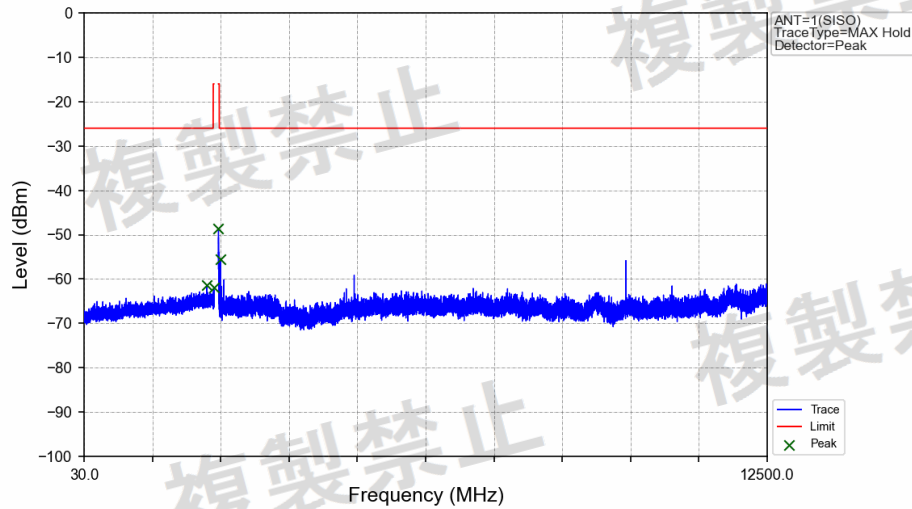


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	2387	1	1	2370.500	-62.02	/	-26	Pass
2387	2400	1	1	2399.987	-34.67	/	-16	Pass
2483.5	2496.5	1	1	2492.054	-62.16	/	-16	Pass
2496.5	12500	1	1	4804.500	-57.20	/	-26	Pass

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	2269.500	-61.46	/	-26	Pass
2387	2400	1	1	2396.672	-61.99	/	-16	Pass
2483.5	2496.5	1	1	2483.604	-48.56	/	-16	Pass
2496.5	12500	1	1	2519.000	-55.47	/	-26	Pass

7. Secondary Radiated Emission

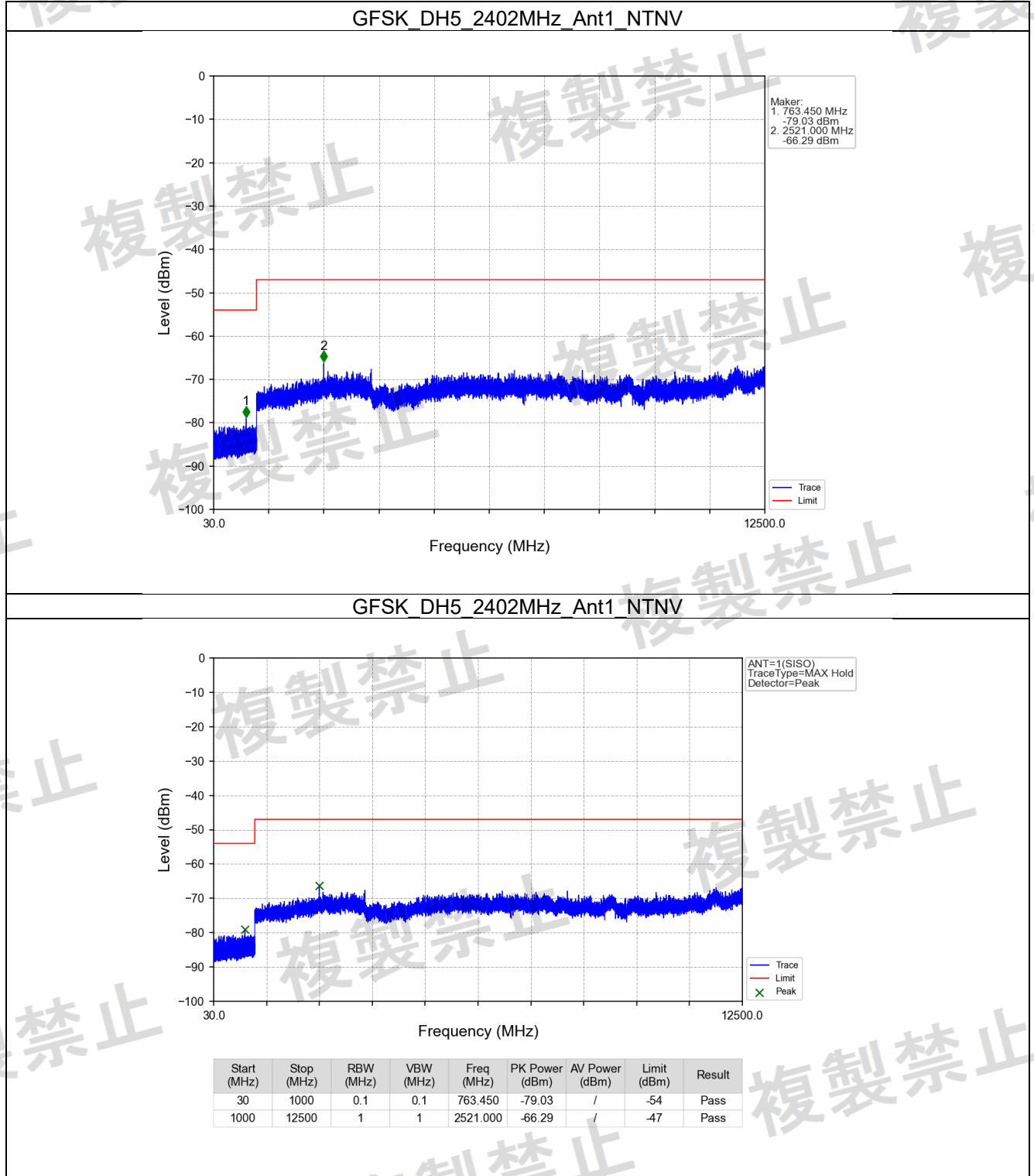
7.1 Test Result

7.1.1 RxSe_NTNV

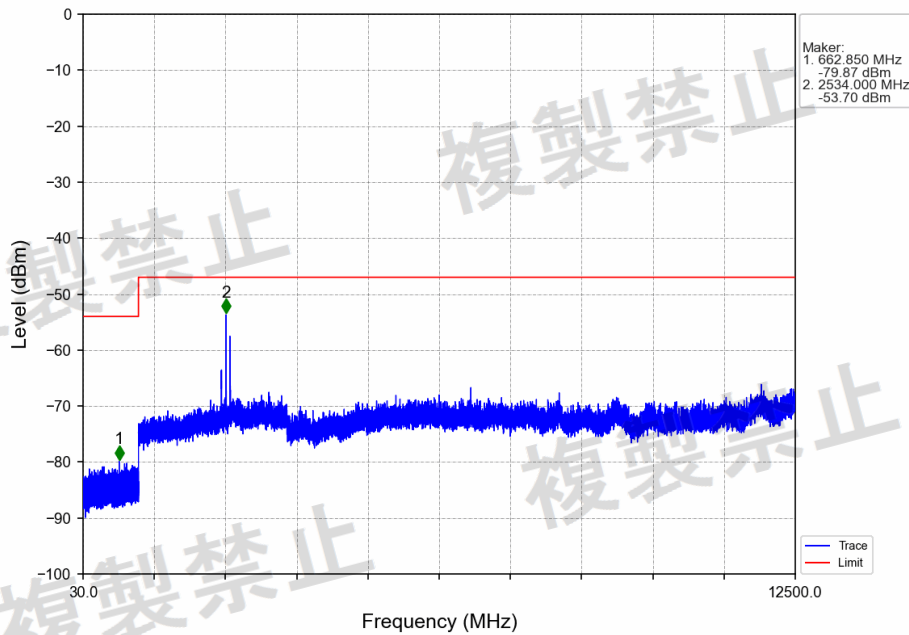
NTNV												
Mode	TX Type	Freq. (MHz)	ANT	Freq. Range		Marker					Limit (nW)	Verdict
				Start (MHz)	Stop (MHz)	Freq. (MHz)	PK Power (dBm)	PK Power (nW)	AV Power (dBm)	AV Power (nW)		
GFSK	SISO	2402	1	30	1000	763.45	-79.03	0.013	/	/	4	Pass
				1000	12500	2521	-66.29	0.235	/	/	20	Pass
		2480	1	30	1000	662.85	-79.87	0.010	/	/	4	Pass
				1000	12500	2534	-53.70	4.266	-79.78	0.011	20	Pass
Pi/4DQPSK	SISO	2402	1	30	1000	800.45	-80.01	0.010	/	/	4	Pass
				1000	12500	12391	-66.44	0.227	/	/	20	Pass
		2480	1	30	1000	824.35	-80.37	0.009	/	/	4	Pass
				1000	12500	2532.5	-57.51	1.774	/	/	20	Pass
8DPSK	SISO	2402	1	30	1000	935.05	-79.82	0.010	/	/	4	Pass
				1000	12500	11902.5	-66.43	0.228	/	/	20	Pass
		2480	1	30	1000	892.25	-76.78	0.021	/	/	4	Pass
				1000	12500	2613.5	-52.58	5.521	-79.56	0.011	20	Pass

7.2 Test Graph

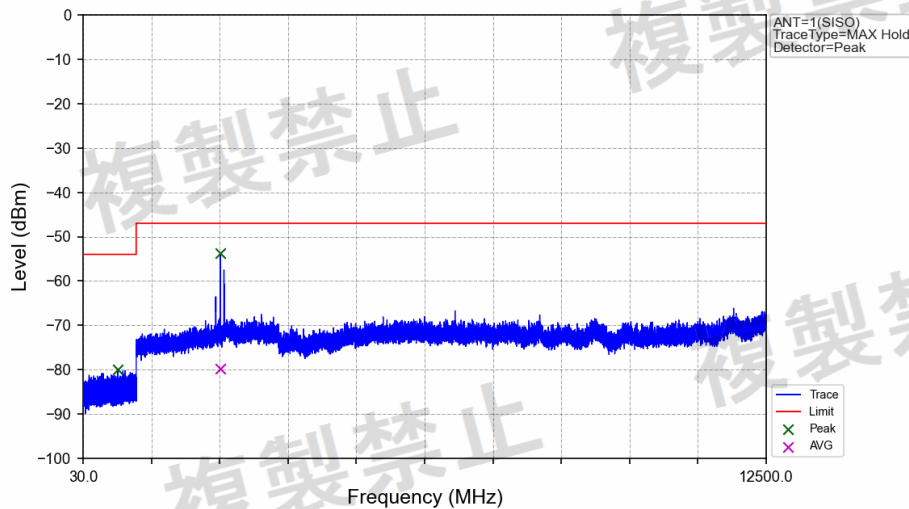
7.2.1 RxSe_NTNV



GFSK_DH5_2480MHz_Ant1_NTNV

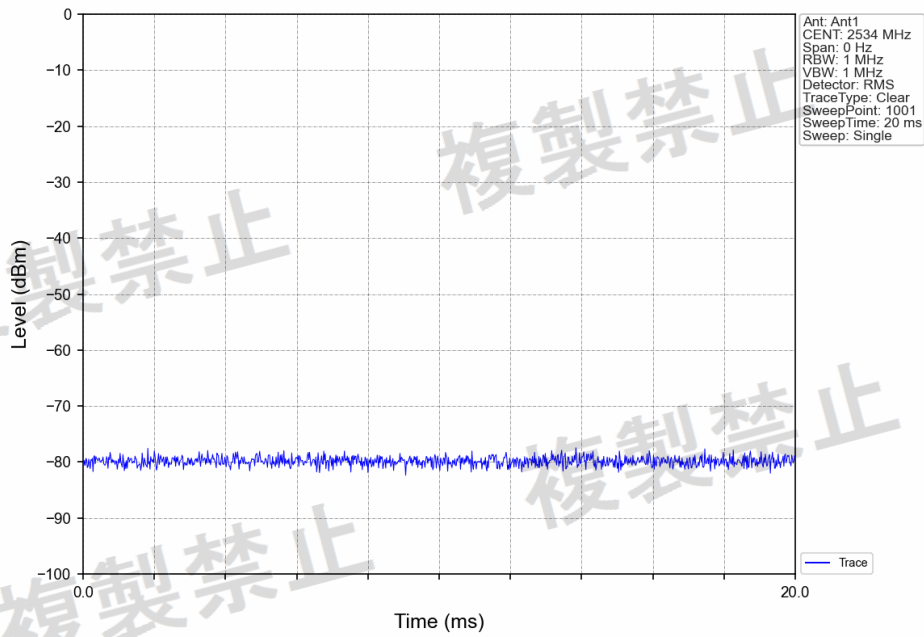


GFSK_DH5_2480MHz_Ant1_NTNV

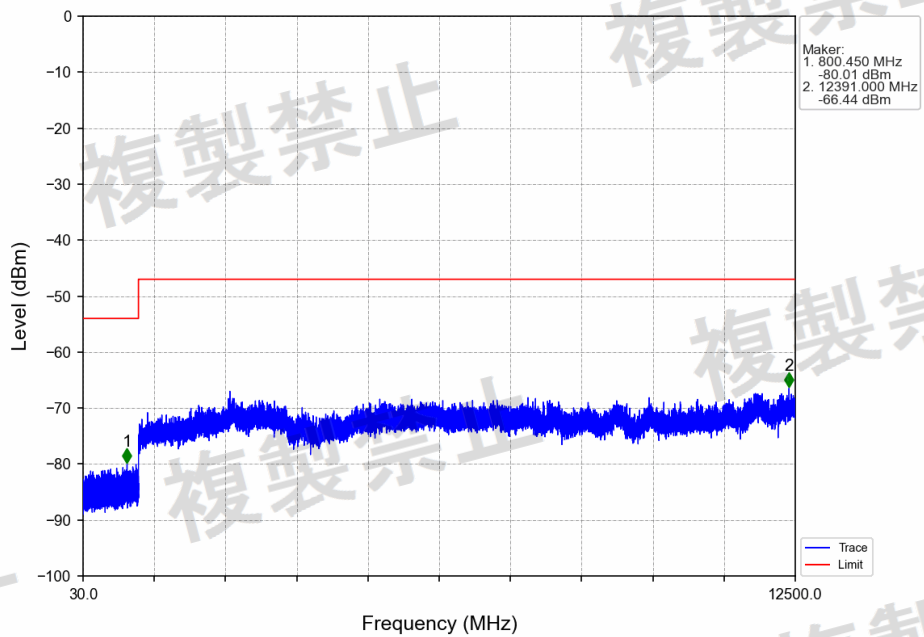


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	662.850	-79.87	/	-54	Pass
1000	12500	1	1	2534.000	-53.70	-79.78	-47	Pass

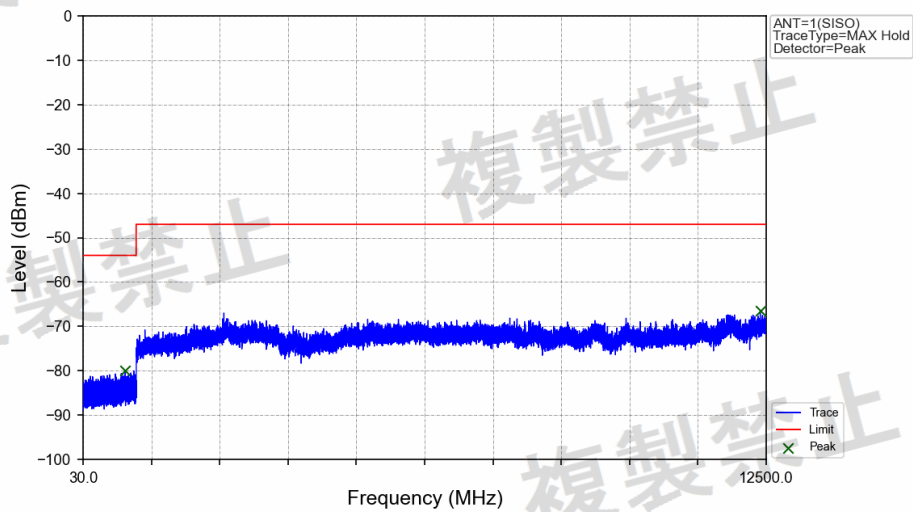
GFSK_DH5_2480MHz_Ant1_NTNV



Pi/4DQPSK_2DH5_2402MHz_Ant1_NTNV

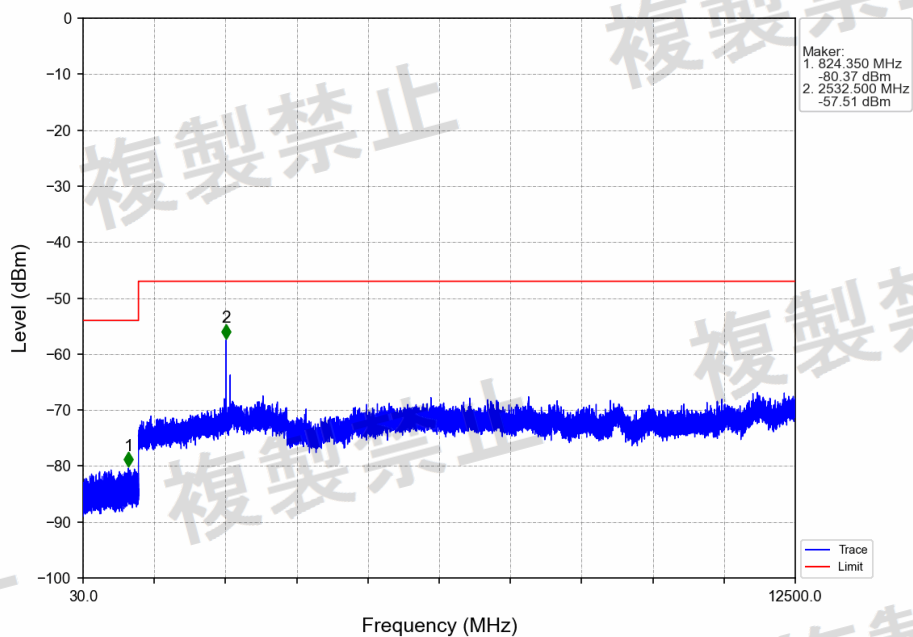


Pi/4DQPSK 2DH5 2402MHz_Ant1_NTNV

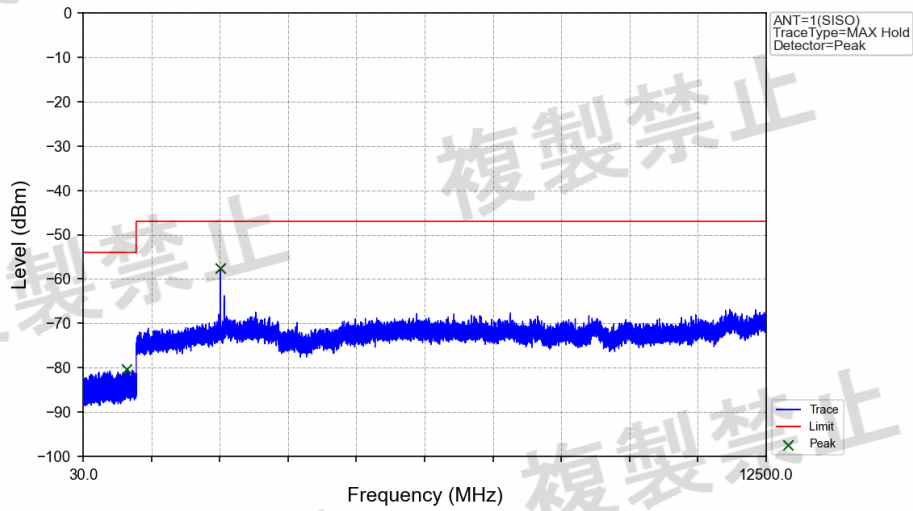


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	800.450	-80.01	/	-54	Pass
1000	12500	1	1	12391.000	-66.44	/	-47	Pass

Pi/4DQPSK 2DH5 2480MHz_Ant1_NTNV

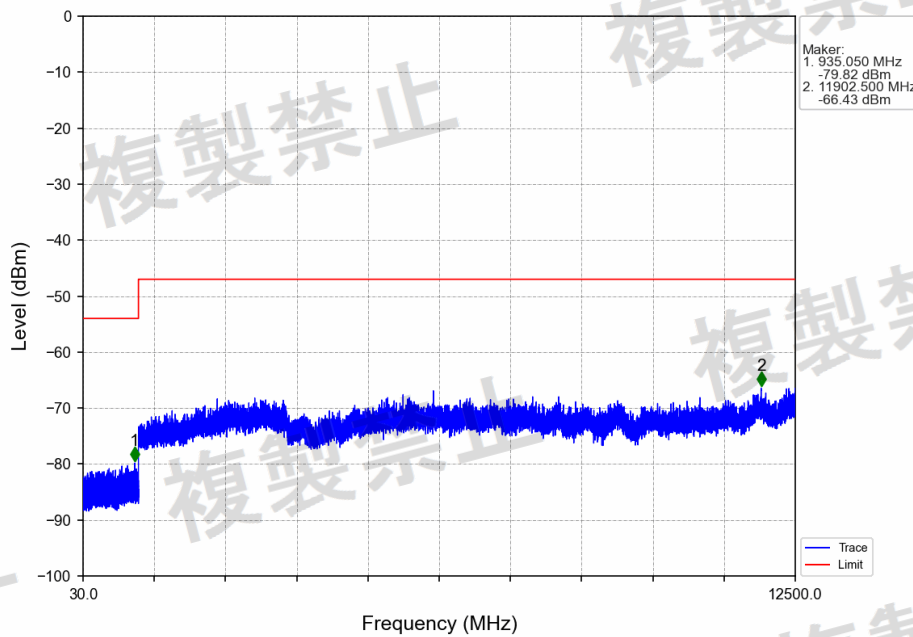


Pi/4DQPSK_2DH5_2480MHz_Ant1_NTNV

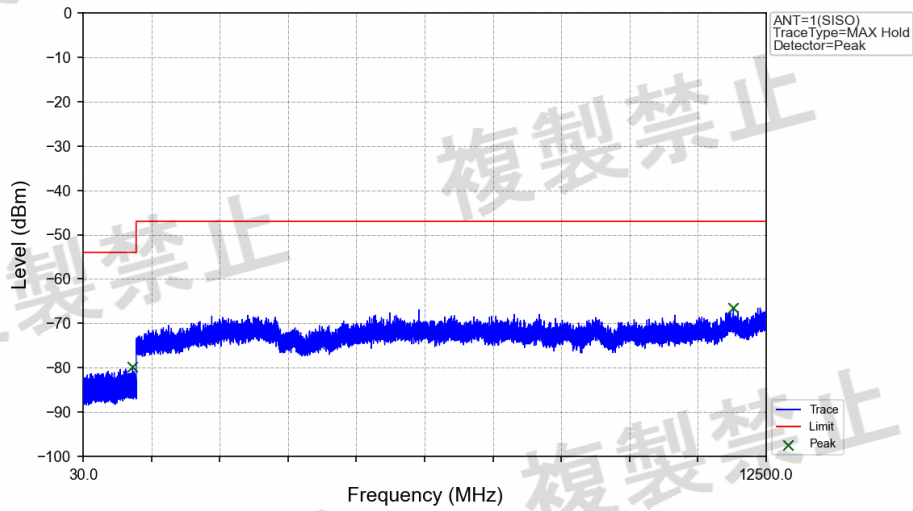


Start (MHz)	Stop (MHz)	RBW (MHz)	VBW (MHz)	Freq (MHz)	PK Power (dBm)	AV Power (dBm)	Limit (dBm)	Result
30	1000	0.1	0.1	824.350	-80.37	/	-54	Pass
1000	12500	1	1	2532.500	-57.51	/	-47	Pass

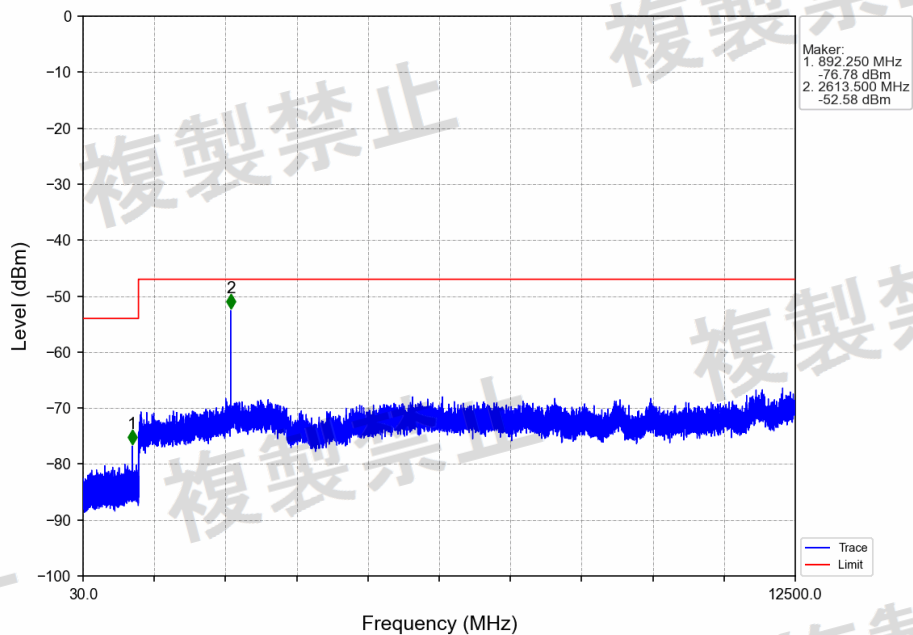
8DPSK_3DH5_2402MHz_Ant1_NTNV



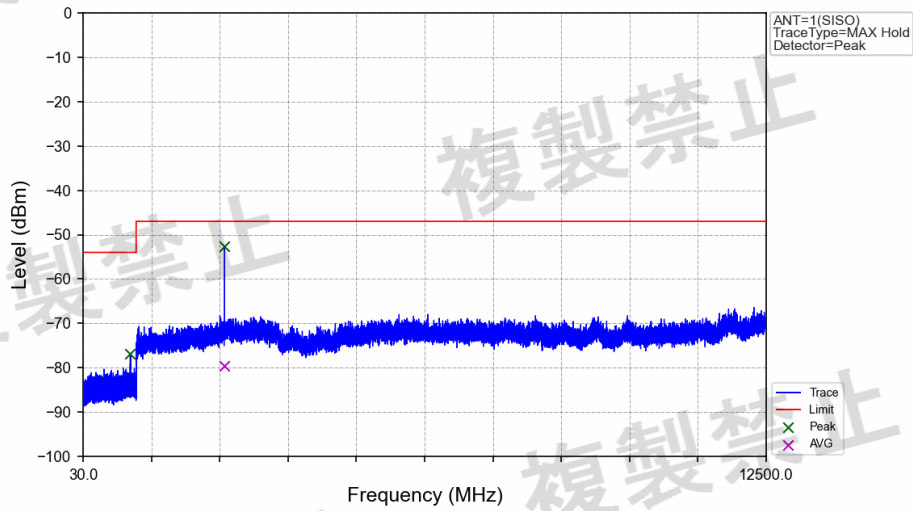
8DPSK_3DH5_2402MHz_Ant1_NTNV



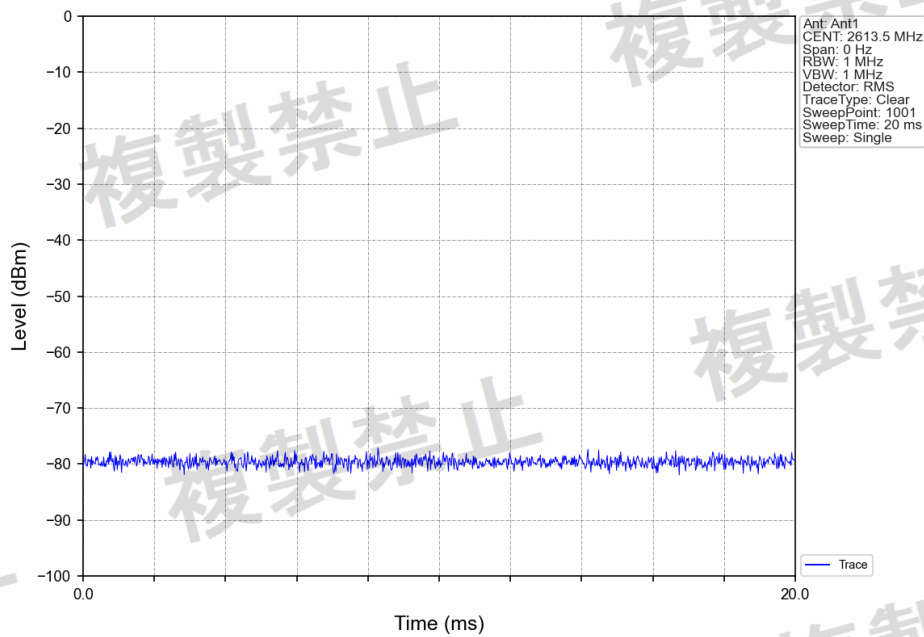
8DPSK_3DH5_2480MHz_Ant1_NTNV



8DPSK_3DH5_2480MHz_Ant1_NTNV



8DPSK_3DH5_2480MHz_Ant1_NTNV





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-- END OF REPORT --