

TEST REPORT

Application No.: SHEM1910017947CR
Japan MIC No.:
Applicant: NextVPU (Shanghai) Co., Ltd.
Address of Applicant: Rm 607, Section A, Bldg. 1, #3000 Longdong Rd, Pudong New District, Shanghai, P.R. China 201203
Manufacturer: NextVPU (Shanghai) Co., Ltd.
Address of Manufacturer: Rm 607, Section A, Bldg. 1, #3000 Longdong Rd, Pudong New District, Shanghai, P.R. China 201203
Factory: Shenzhen 9hstars technology Co., Ltd.
Address of Factory: 3/F EAST, Building 11, Triple industrial Area, Songbai Road, Tangtuo community, Shiyan street, Baoan District, Shenzhen City, Guangdong Province, China

Equipment Under Test (EUT):

EUT Name: AngelEye Smart Reader

Model No.: SR-W1 · SR-W2 · SR-W3 · SR-W4 · SR-WX

("X" represent 0-9 · A-Z · a-z or blank); □

□

Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.

Standard(s) : MIC Item 19 of Article 2 Paragraph 1

Date of Receipt: 2019-10-15

Date of Test: 2019-10-25 to 2019-11-11

Date of Issue: 2019-12-04

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Parlam Zhan

Parlam Zhan
E&E Section Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.



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Revision Record			
Version	Description	Date	Remark
00	Original	2019-12-04	/

Authorized for issue by:			
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		Parlam Zhan / Reviewer	

2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	MIC Item 19 of Article 2 Paragraph 1	N/A	MIC Item 19 of Article 2 Paragraph 1	Pass
Interference prevention capability	MIC Item 19 of Article 2 Paragraph 1	MIC Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass
RF accessibility	MIC Item 19 of Article 2 Paragraph 1	N/A	MIC Item 19 of Article 2 Paragraph 1	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Frequency Error	MIC Item 19 of Article 2 Paragraph 1	MIC Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass
Occupied Bandwidth(99%)	MIC Item 19 of Article 2 Paragraph 1	MIC Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass
Spread spectrum Bandwidth(90%)	MIC Item 19 of Article 2 Paragraph 1	MIC Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass
Antenna Power	MIC Item 19 of Article 2 Paragraph 1	MIC Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass
Dwell time	MIC Item 19 of Article 2 Paragraph 1	MIC Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass
Spurious emission Intensity	MIC Item 19 of Article 2 Paragraph 1	MIC Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass
Limit of secondary radiated emissions	MIC Item 19 of Article 2 Paragraph 1	MIC Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass

Note: Declaration of EUT Family Grouping:

There are series models mentioned in this report and they are the similar in electrical and electronic characters. Only the model SR-W1 was tested since their differences are model number, for market segmentation purposes



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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 3.7V 500mAh rechargeable battery
Cable:	Type C cable:1m
Channel Spacing	1MHz
Modulation Type	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channels	79
Operation Frequency	2402MHz to 2480MHz
Spectrum Spread Technology	Frequency Hopping Spread Spectrum(FHSS)
Antenna Gain	3.51Bi
Antenna Type	Monopole Antenna

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	ThinkPad X100e	/

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 8.4 \times 10^{-8}$
2	Timeout	$\pm 2s$
3	Duty cycle	$\pm 0.37\%$
4	Occupied Bandwidth	$\pm 3\%$
5	RF conducted power	$\pm 0.6dB$
6	RF power density	$\pm 2.84dB$
7	Conducted Spurious emissions	$\pm 0.75dB$
8	RF Radiated power	$\pm 4.6dB$ (Below 1GHz) $\pm 4.1dB$ (Above 1GHz)
9	Radiated Spurious emission test	$\pm 4.2dB$ (Below 30MHz) $\pm 4.4dB$ (30MHz-1GHz) $\pm 4.8dB$ (1GHz-18GHz) $\pm 5.2dB$ (Above 18GHz)
10	Temperature test	$\pm 1^{\circ}C$
11	Humidity test	$\pm 3\%$
12	Supply voltages	$\pm 1.5\%$
13	Time	$\pm 3\%$

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

No tests were sub-contracted.

4.5 Test Facility

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

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **NVLAP (Certificate No. 201034-0)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the National Voluntary Laboratory Accreditation Program(NVLAP). Certificate No. 201034-0.

- **FCC –Designation Number: CN5033**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

Designation Number: CN5033. Test Firm Registration Number: 479755.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

IC Registration No.: 8617A-1. CAB Identifier: CN0020.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

5 Equipment List

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	Cal body	Certifier
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2018-12-20	2019-12-19	JEPSI*	(C)
Spectrum Analyzer	Agilent	N9020A	SHEM181-1	2019-08-13	2020-08-12	JEPSI*	(C)
Signal Generator	R&S	SMR20	SHEM006-1	2019-08-13	2020-08-12	JEPSI*	(C)
Signal Generator	Agilent	N5182A	SHEM182-1	2019-08-13	2020-08-12	JEPSI*	(C)
Communication Tester	R&S	CMW270	SHEM183-1	2019-08-13	2020-08-12	JEPSI*	(C)
Switcher+ Power Sensor	Tonscend / Keysight	JS0806 U2021XA*4	SHEM184-1	2019-08-13	2020-08-12	JEPSI*	(C)
Splitter	Anritsu	MA1612A	SHEM185-1	/	/	JEPSI*	(C)
Coupler	e-meca	803-S-1	SHEM186-1	/	/	JEPSI*	(C)
EMI Test Receiver	R&S	ESU40	SHEM051-1	2018-12-20	2019-12-19	JEPSI*	(C)
High-low Temp Cabinet	Suzhou Zhihe	TL-40	SHEM087-1	2017-09-25	2020-09-24	SGS SHCAL	(C)
AC Power Stabilizer	WOCEN	6100	SHEM045-1	2018-12-26	2019-12-25	JEPSI*	(C)
DC Power Supply	MCN	MCH-303A	SHEM210-1	2018-12-26	2019-12-25	JEPSI*	(C)
Conducted test Cable	/	RF01~RF04	/	2018-12-26	2019-12-25	JEPSI*	(C)

Remark:

- 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.
- Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Act (Act No. 51 of 1992).
- 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).
- 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 (a) to (c).

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

Notice:

- (C) is applicable for equipment calibration above.
- Calibration duration for above equipments is 1 year.

6 Radio Spectrum Technical Requirement

6.1 Radio Technical Requirements Specification

Table 1: Radio Technical Requirements Specification for 2.4 GHz band wide-band low-power data communication system (Item 19 of Article 2-1)

Items	Technical standard
Assigned frequency or designated frequency	2400-2483.5MHz
Communication method	One-way communication, simplex, semi-duplex, or duplex operation of digital signal transmission including spread spectrum
Tolerance of frequency	$\pm 50 \times 10^{-6}$
Tolerance of occupied bandwidth	FH: 83.5MHz or less FH + DS: 83.5MHz or less FH + OFDM: 83.5MHz or less OFDM: 38MHz or less Others: 26MHz or less
Antenna power	Designated value (1) FH, FH+DS, FH+OFDM: 3mW/MHz (used in the range of 2427 - 2470.75 MHz) (2) OFDM, DS other than (1) 10mW/MHz (3) Other than (1) & (2) 10mW (4) OFDM OBW 26 - 38MHz: 5mW/MHz Tolerance: +20%, -80%
Antenna gain	1) 12.14 dBi or less in principle 2) In case of directional antenna (1) FH, FH+DS or FH+OFDM using 2427-2470.75 MHz EIRP \leq 16.91 dBm/MHz (2) OFDM or DS other than (1) EIRP \leq 22.14 dBm/MHz (3) Other than (1) and (2): 22.14 dBm or less (4) OFDM OBW 26 - 38MHz: 19.14dBm/MHz (5) Half-power angle of directional antenna (e) in case of the item 2): $e \leq 360/A$ (The A is 10 in maximum.)
Tolerance of spurious emission intensity	(1) Below 2387 MHz: 2.5 μ W (2) 2387 to 2400 MHz: 25 μ W (3) 2483.5 through 2496.5 MHz: 25 μ W (4) Over 2496.5 MHz: 2.5 μ W
Spreading bandwidth	DS, FH, FH+DS, FH+OFDM: 500kHz or more
Spreading rate of spectrum	For DS system; (Spreading bandwidth) / (Frequency corresponding to transmission rate) \geq 5
Limit of secondary radiated emissions	(1) Below 1 GHz: 4nW (2) 1 GHz or higher: 20nW
Interference prevention function	Shall have the function of automatic transmission and reception of identification sign.
Structure	Shall be of the structure that the RF and modulator sections excluding antenna cannot easily be opened.
Note	DS: Direct spread FH: Frequency hopping OFDM: Orthogonal frequency division multiplexing

6.2 E.U.T. test conditions

Environment:	Temperature:	5.0 -35.0 °C
	Humidity:	45-85 % RH
	Atmospheric Pressure:	99.2 -102.0 kPa

Power supply:

Test Voltage: rated voltage and $\pm 10\%$ of the rated voltage.

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

Test Mode Classify	Power Supply	Measured Value
TM 1	DC 3.7V	DC 3.30V
TM 2	DC 4.07V	DC 3.31V
TM 3	DC 3.33V	DC 3.29V

Test frequencies: If the EUT can be set to 3 of more different (carrier) frequencies in 1 allocated band, testing shall be performed using the Lowest, Middle and the Highest frequency (L, M and H). If there are 2 or fewer frequencies, testing shall be performed with the available frequencies.

Test frequencies are the lowest channel: 0 channel (2402 MHz), middle channel: 39 channel (2441 MHz), and highest channel: 78 channel (2480 MHz)

EUT channels and frequencies list:

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

6.3 Antenna Requirement

6.3.1 Test Requirement:

MIC Item 19 of Article 2 Paragraph 1

6.3.2 Conclusion

Standard requirement:

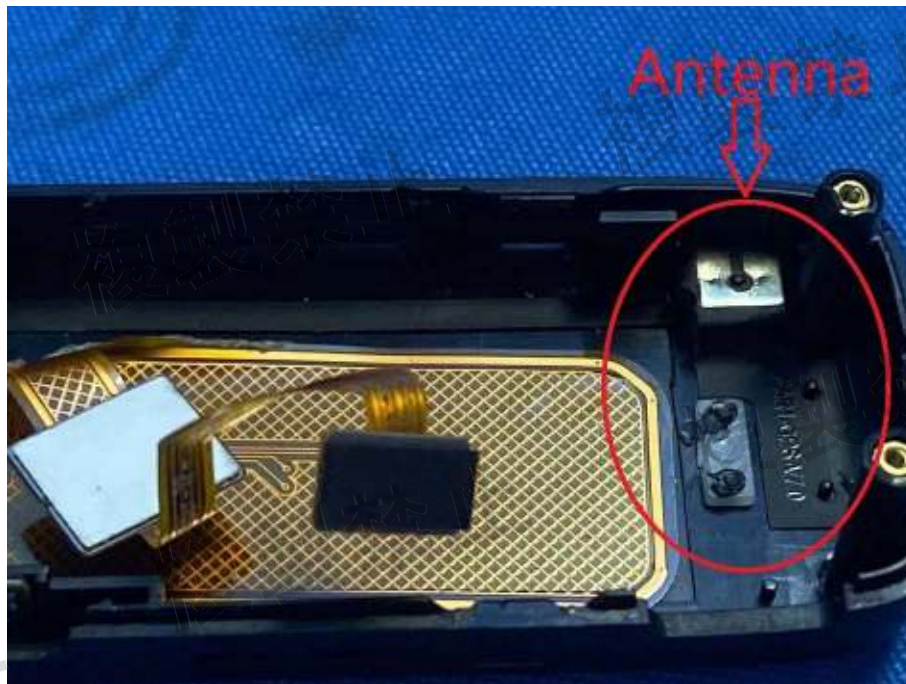
Applicable for equipment with an antenna terminal, including testing terminals. If an antenna connector is available, all relevant tests will be carried out conducted. If not, tests will be carried out in an anechoic room or with a suitable test-fixture.

EUT Details:

The antenna is Integral Antenna and no consideration of replacement. The best case gain of the antenna is 3.51dBi.

Result:

An antenna connector is available, all relevant tests will be carried out conducted.



6.4 Interference prevention capability

6.4.1 Test Requirement:

MIC Item 19 of Article 2 Paragraph 1

Limit:

Article 2, Item (19) Notice 88 Appendix 43, 44, 45

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.

6.4.2 Test Setup Diagram



6.4.3 Conclusion

Standard Requirement:

- 1) Measurement system diagram as shown above and test equipment keep transmitting identification code.
- 2) Condition of measuring instrument
 - (1) Demodulator must be able to demodulate the transmitting signal emitted by test equipment and to indicate the identification code.
- 3) Condition of test equipment The mode of normal use.
- 4) Measuring operation procedure
 - (1) When test equipment has the function to transmit identification code automatically:
 - A) Transmit the predetermined identification code from test equipment.
 - B) Confirm the transmitted identification code by demodulator.

EUT Details:

The unit does meet the requirements (Good).

Bluetooth address:00:00:46:81:63:01

6.5 RF accessibility

6.5.1 Test Requirement:

MIC Item 19 of Article 2 Paragraph 1

6.5.2 Conclusion

Standard 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.

EUT Details:

RF and Modulation components are covered with shielding case and this shielding case is soldered.



7 Radio Spectrum Matter Test Results

7.1 Frequency Error

Test Requirement MIC Item 19 of Article 2 Paragraph 1
Test Method: MIC Notice No.88 Appendix No.43
Limit: Tolerance of frequency: $\pm 50\text{E-6}$

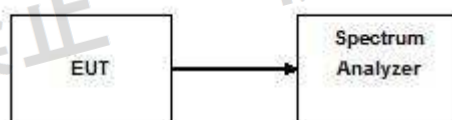
7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode.

7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data

1. Test Conditions:

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping OFF, CW Tx

3. Spectrum Analyzer conditions:

Frequency: Test Frequency

Span 1MHz

RBW 10 kHz (Modulation OFF),

VBW 10 kHz (Modulation OFF),

Sweep Time Auto

Detector mode Positive peak

Indication mode Max hold

Alternative method:

Frequency: Test Frequency

Span 2 times channel bandwidth

RBW 100 kHz (Modulation ON),

VBW 100 kHz (Modulation ON),

Sweep Time Auto

Detector mode Positive peak

Indication mode Max hold

The detailed test data see: Appendix A for SHEM191001794701

7.2 Occupied Bandwidth(99%)

Test Requirement	MIC Item 19 of Article 2 Paragraph 1
Test Method:	MIC Notice No.88 Appendix No.43
Limit:	FH: 83.5MHz or less
	FH + DS: 83.5MHz or less
	FH + OFDM: 83.5MHz or less
	OFDM: 38MHz or less
	Others: 26MHz or less

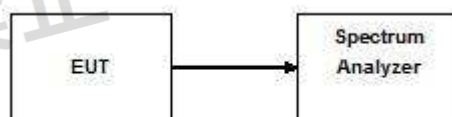
7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode.

7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

1. Test Conditions:

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping ON, Modulation Tx

For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.

3. Spectrum Analyzer conditions:

Frequency: Test Frequency

Span 83.5 MHz (FHSS);

RBW 1 MHz (FHSS); 3% OBW (Others)

VBW 1 MHz (FHSS); 3 times RBW (Others)

Sweep Time Auto

detector mode Positive peak

Indication mode Max hold

OBW 99%

The detailed test data see: Appendix A for SHEM191001794701

7.3 Spread spectrum Bandwidth(90%)

Test Requirement	MIC Item 19 of Article 2 Paragraph 1
Test Method:	MIC Notice No.88 Appendix No.43
Limit:	DS,FH,FH+DS,FH+OFDM: 500kHz or more

7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode.

7.3.2 Test Setup Diagram



7.3.3 Measurement Procedure and Data

1. Test Conditions:

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping ON, Modulation Tx

For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.

3. Spectrum Analyzer conditions:

Frequency: Test Frequency

Span 83.5 MHz (FHSS);

RBW 1 MHz (FHSS);

VBW 1 MHz (FHSS);

Sweep Time Auto

detector mode Positive peak

Indication mode Max hold

OBW 90%

The detailed test data see: Appendix A for SHEM191001794701

7.4 Antenna Power

Test Requirement	MIC Item 19 of Article 2 Paragraph 1
Test Method:	MIC Notice No.88 Appendix No.43
Limit:	Designated value
	(1) FH, FH+DS, FH+OFDM: 3mW/MHz (used in the range of 2427 - 2470.75 MHz)
	(2) OFDM, DS other than (1) 10mW/MHz
	(3) Other than (1) & (2) 10mW
	(4) OFDM OBW 26 - 38MHz: 5mW/MHz
	Tolerance:+20%,-80%

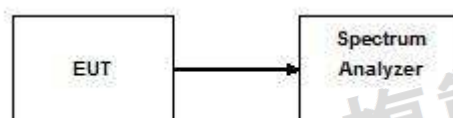
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode.

7.4.2 Test Setup Diagram



7.4.3 Measurement Procedure and Data

1. Test Conditions:

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping ON, Modulation Tx

For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.

3. Spectrum Analyzer conditions:

Frequency: Test Frequency

Span 10 MHz(FHSS); Enough to capture the emission (Others)

RBW 1 MHz (FHSS; OFDM; DSSS); More than OBW (Others)

VBW 1 MHz (FHSS; OFDM; DSSS); More than RBW (Others)

Sweep Time Auto

detector mode Positive peak

Indication mode Max hold

The detailed test data see: Appendix A for SHEM191001794701

7.5 Dwell time

Test Requirement MIC Item 19 of Article 2 Paragraph 1
Test Method: MIC Notice No.88 Appendix No.43
Limit: less than 0.4sec

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode.

7.5.2 Test Setup Diagram



7.5.3 Measurement Procedure and Data

1. Test Conditions:

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping ON, Hopping frequency is fixed, Bluetooth equipment is setting DH5 mode

For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.

3. Spectrum Analyzer conditions:

Frequency: Test Frequency (fixed hopping frequency)

Span 0 Hz

RBW 1 MHz

VBW 1 MHz

Sweep Time EUT condition

Trigger Video Trigger

Measures the Transmission time of 1 burst (sec)

Measures the Burst cycle (sec)

4. Calculation procedure:

Dwell time = (0.4(s) x [spreading rate] x [Transmission time of 1 burst(s)]) / ([burst cycle(s)] x [No. of hopping channel])

Note:

* Spreading rate = [Spread bandwidth (actual measurement value)] / [Transmission rate]

The detailed test data see: Appendix A for SHEM191001794701

7.6 Spurious emission Intensity

Test Requirement	MIC Item 19 of Article 2 Paragraph 1
Test Method:	MIC Notice No.88 Appendix No.43
Limit:	(1) Below 2387 MHz: 2.5 μ W/MHz (2) 2387 to 2400 MHz: 25 μ W/MHz (3) 2483.5 through 2496.5 MHz: 25 μ W/MHz (4) Over 2496.5 MHz: 2.5 μ W/MHz

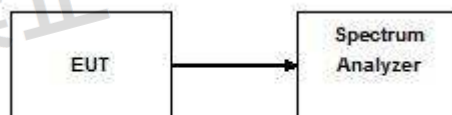
7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode.

7.6.2 Test Setup Diagram



7.6.3 Measurement Procedure and Data

1. Test Conditions:

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping ON, , Modulation Tx

For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.

3. Spectrum Analyzer conditions:

Step 1

All spurious are measured from 30 MHz to 13 GHz by peak mode.

Step 2

IF the value measured by Step1 is 2 dB or less, measure in average mode.

Test setup for Step 1:

Frequency: 30 MHz – 2400 MHz , 2483.5 MHz –13 GHz

RBW 100 kHz (30 – 1GHz) , 1 MHz (over 1GHz)

VBW 100 kHz (30 – 1GHz) , 1 MHz (over 1GHz)

Sweep Time Auto

detector mode Positive peak

Indication mode Max hold

Test setup for Step 2:

Frequency: Spurious Frequency

Span 0 Hz

RBW 100 kHz (30 – 1GHz) , 1 MHz (over 1GHz)

VBW 100 kHz (30 – 1GHz) , 1 MHz (over 1GHz)

Sweep Time Auto

detector mode Sample

Indication mode Max hold

The detailed test data see: Appendix A for SHEM191001794701

7.7 Limit of secondary radiated emissions

Test Requirement	MIC Item 19 of Article 2 Paragraph 1
Test Method:	MIC Notice No.88 Appendix No.43
Limit:	(1) Below 1 GHz : 4 nW or less (2) 1 GHz and over : 20 nW or less

7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode b: RX mode_Keep the EUT in receiving mode.

7.7.2 Test Setup Diagram



7.7.3 Measurement Procedure and Data

1. Test Conditions:

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping ON

For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.

3. Spectrum Analyzer conditions:

Step 1

All spurious are measured from 30 MHz to 13 GHz by peak mode.

Step 2

IF the value measured by Step1 is 2 dB or less, measure in average mode.

Test setup for Step 1:

Frequency: 30 MHz – 2400 MHz , 2483.5 MHz –13 GHz

RBW 100 kHz (30 – 1GHz) , 1 MHz (over 1GHz)

VBW 100 kHz (30 – 1GHz) , 1 MHz (over 1GHz)

Sweep Time: Auto

detector mode: Positive peak

Indication mode: Max hold

Test setup for Step 2:

Frequency: Spurious Frequency

Span 0 Hz

RBW 100 kHz (30 – 1GHz) , 1 MHz (over 1GHz)

VBW 100 kHz (30 – 1GHz) , 1 MHz (over 1GHz)

Sweep Time: Auto

detector mode: Sample

Indication mode: Max hold

The detailed test data see: Appendix A for SHEM191001794701

8 Photographs

Refer to the < Photographs >

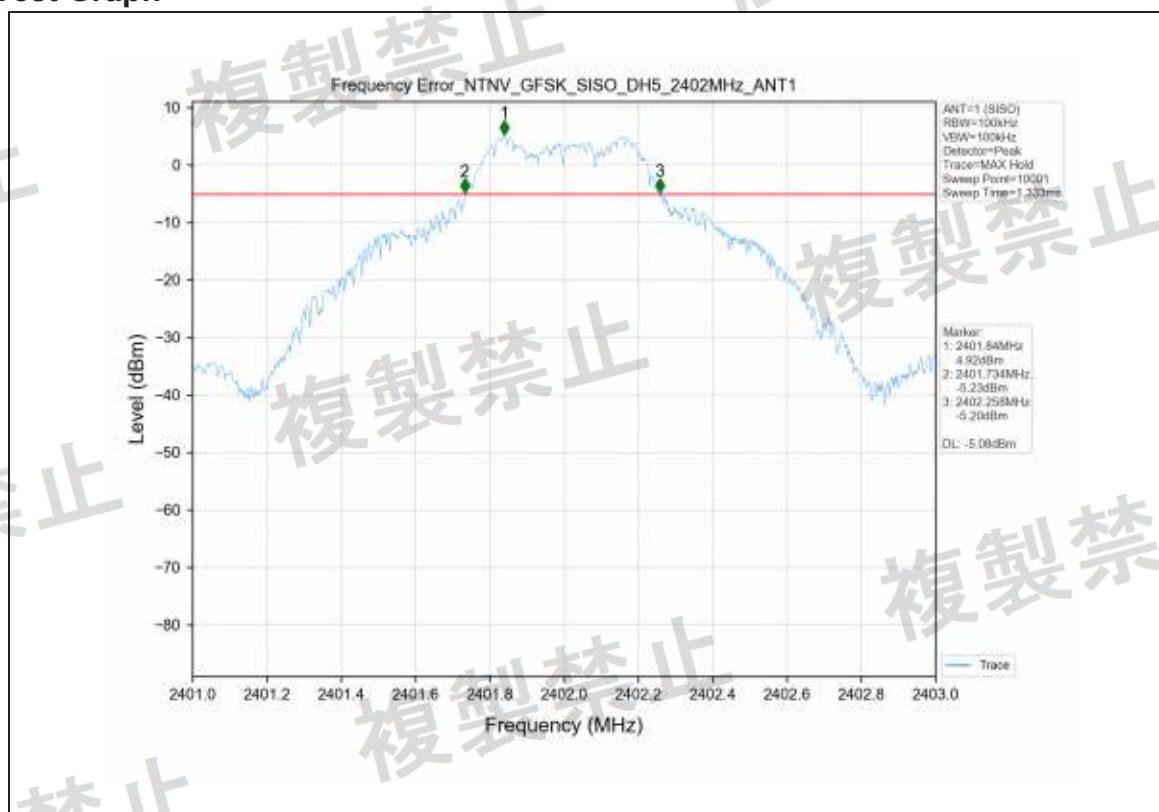
Appendix A for SHEM191001794701

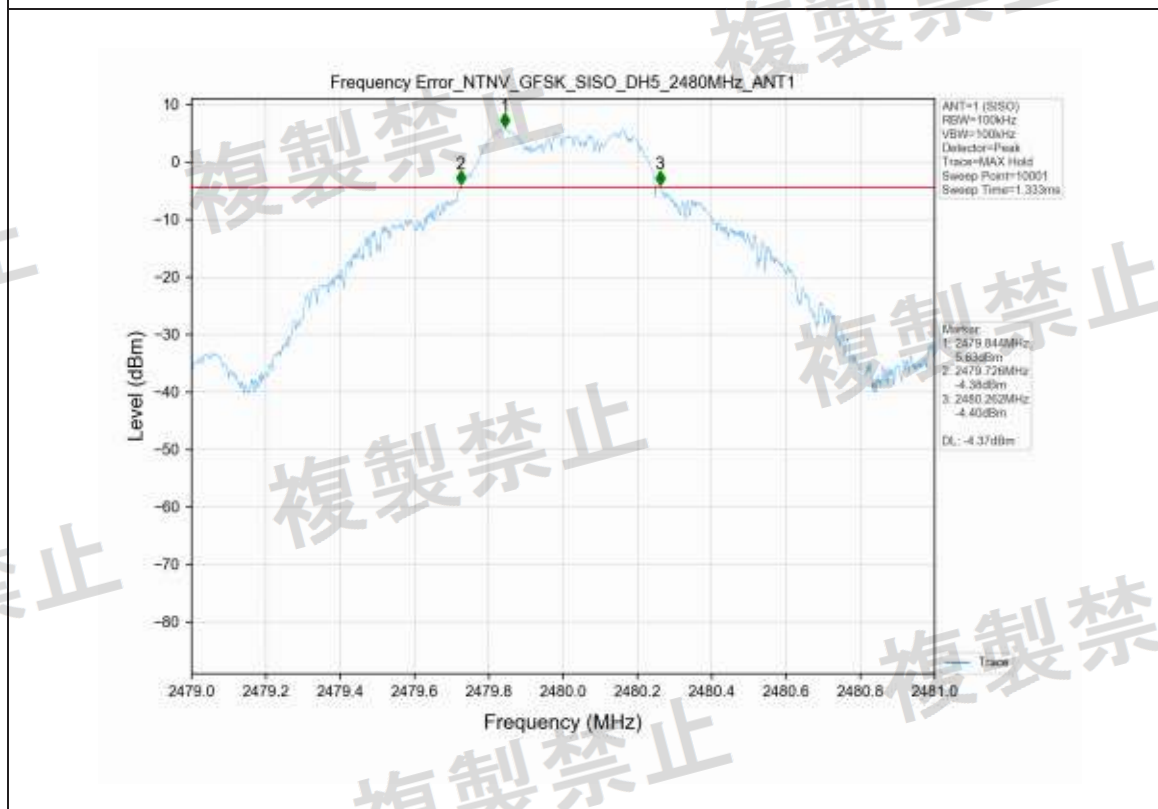
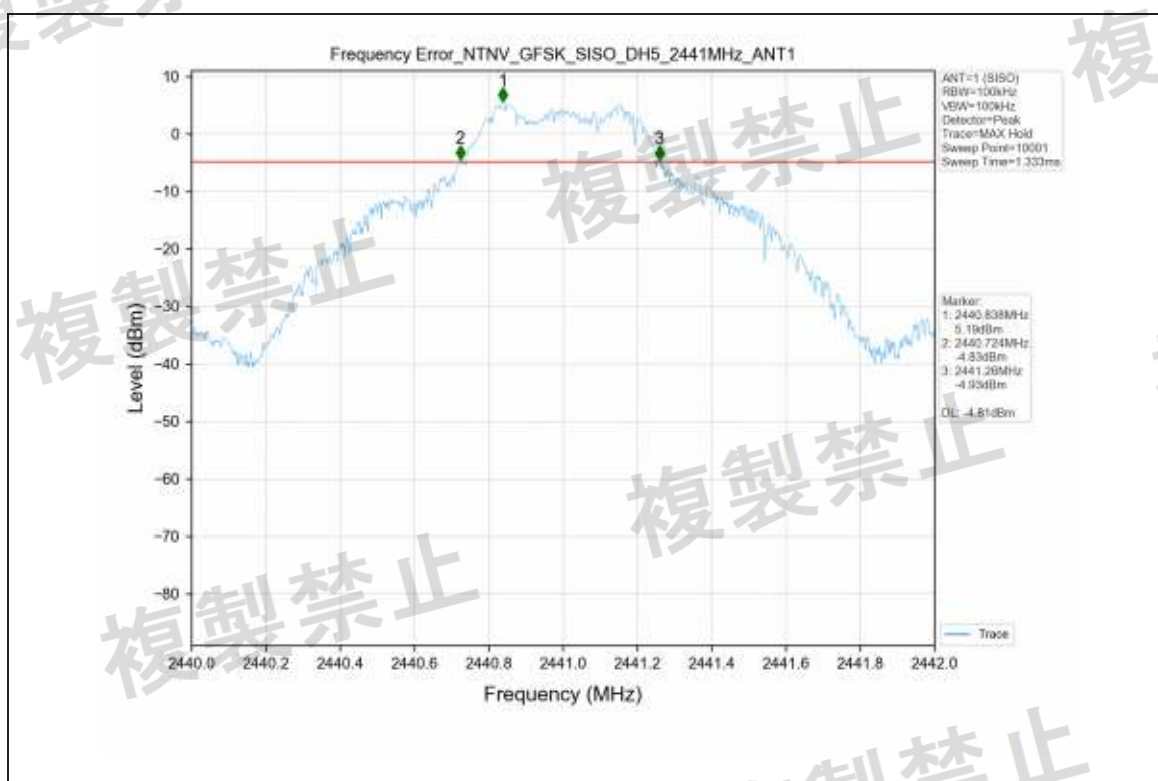
1. Frequency Error

1.1 Test Result

Test Condition	Test Mode	TX Type	Test Channel	Ant	Result [MHz]	Result [ppm]	Limit [ppm]	Verdict
NTNV	GFSK	SISO	2402	1	2401.9962	-1.58	-50 to +50	PASS
			2441	1	2440.9924	-3.11	-50 to +50	PASS
			2480	1	2479.9939	-2.46	-50 to +50	PASS
	Pi/4DQPSK	SISO	2402	1	2401.9992	-0.33	-50 to +50	PASS
			2441	1	2441.0106	4.34	-50 to +50	PASS
			2480	1	2480.0004	0.16	-50 to +50	PASS
	8DPSK	SISO	2402	1	2402.003	1.25	-50 to +50	PASS
			2441	1	2441.0106	4.34	-50 to +50	PASS
			2480	1	2480.0027	1.09	-50 to +50	PASS

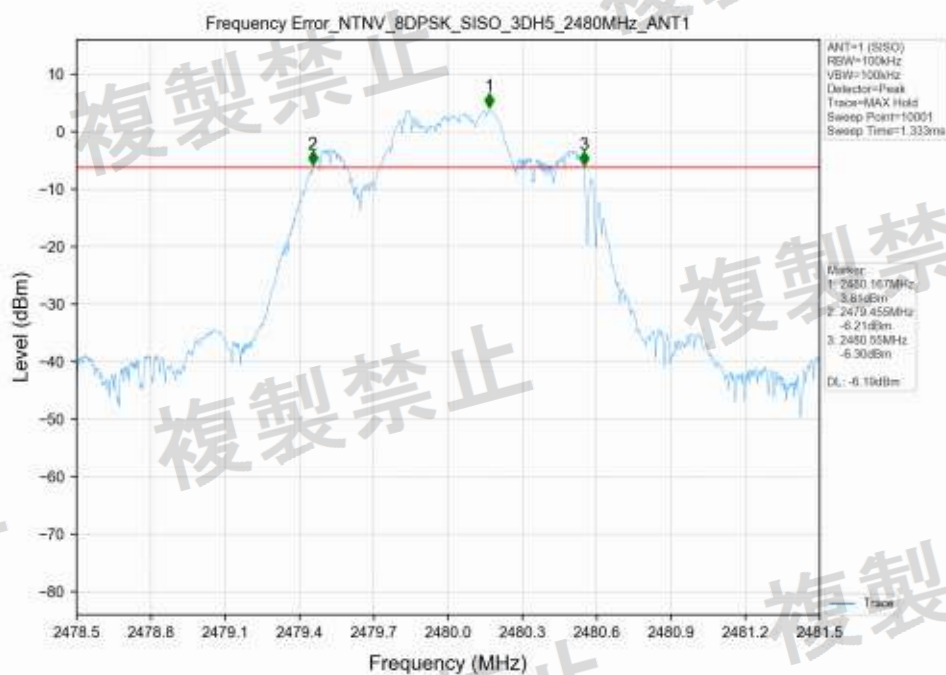
1.2 Test Graph









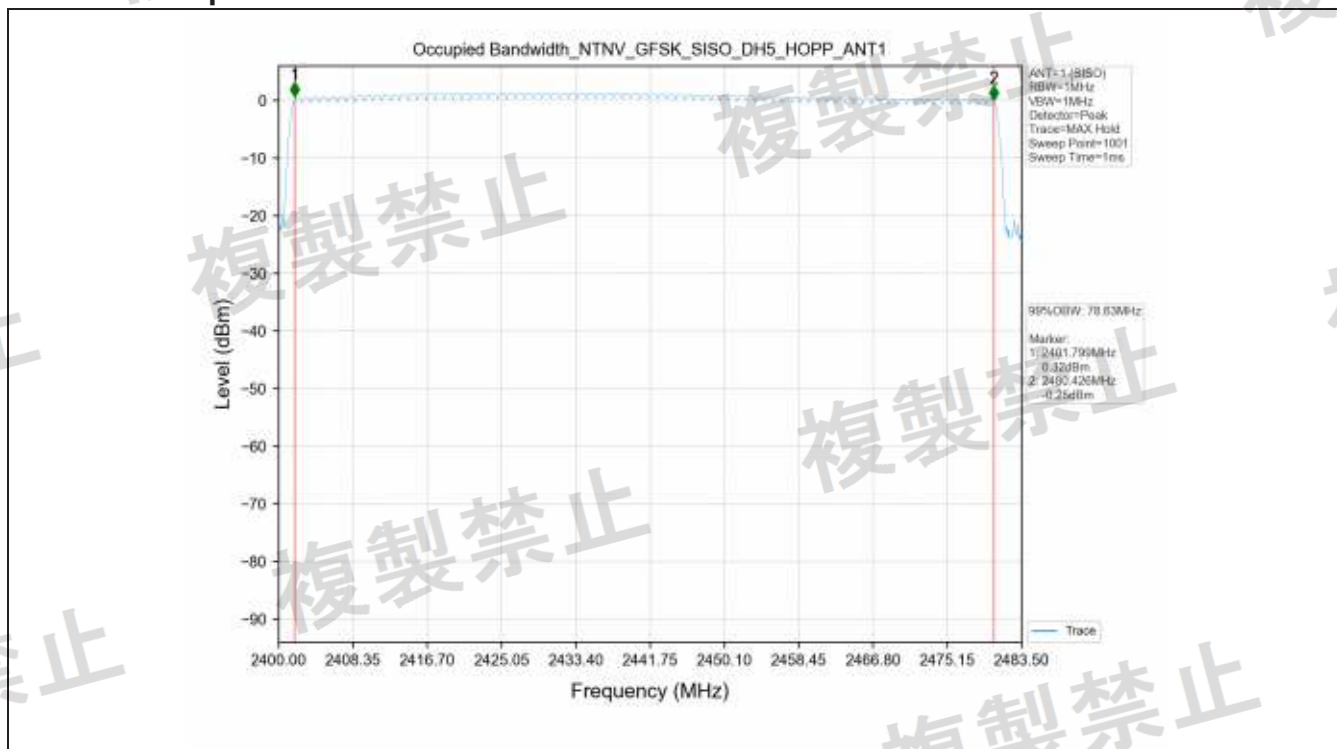


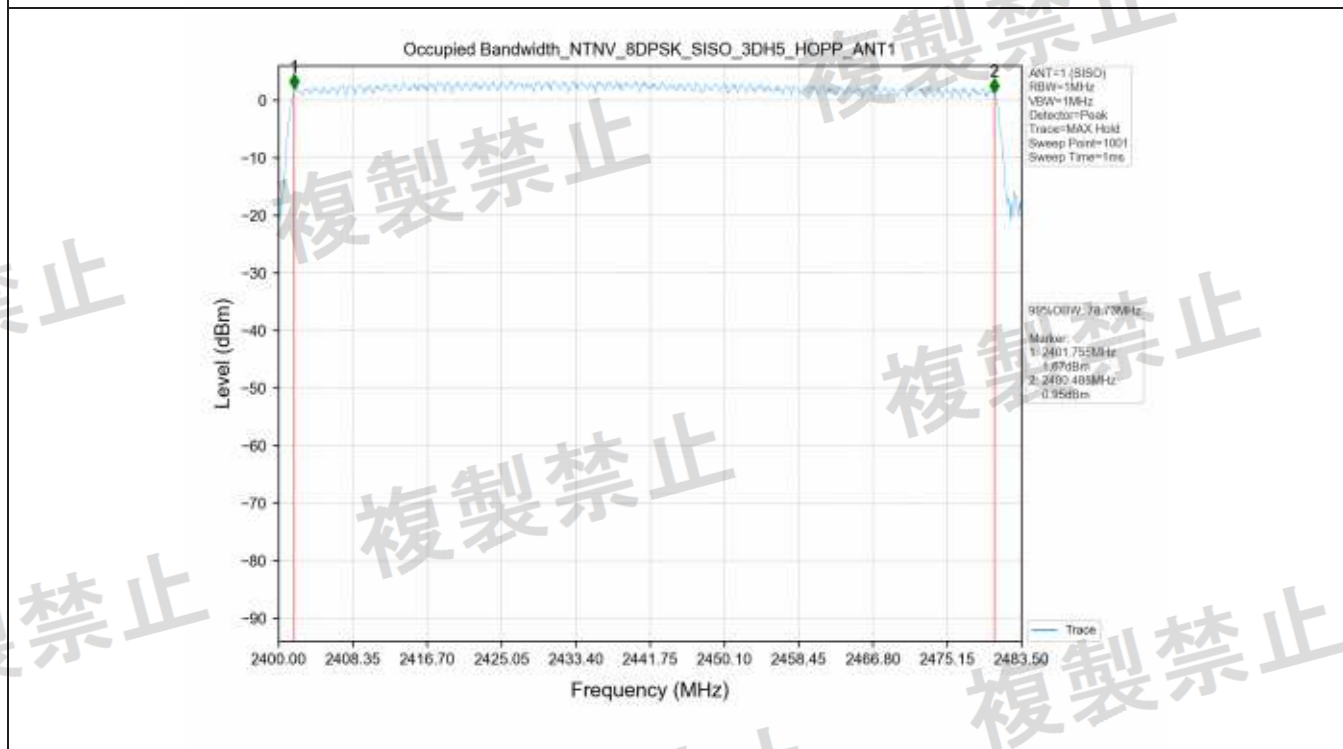
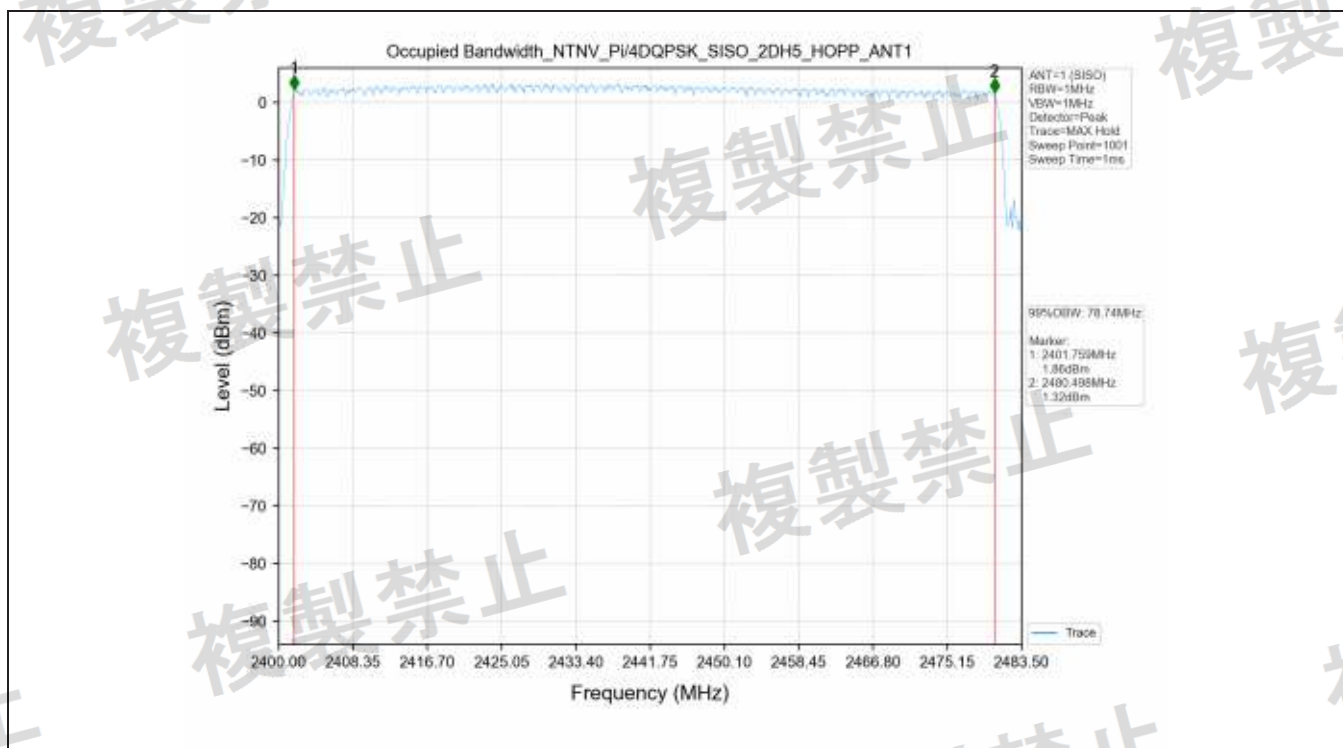
2. Occupied Bandwidth

2.1 Test Result

Test Condition	Test Mode	TX Type	Test Channel	Ant	Test Result [MHz]	Limit [MHz]	Verdict
NTNV	GFSK	SISO	HOPP	1	78.63	≤ 83.5	PASS
	Pi/4DQPSK	SISO	HOPP	1	78.74	≤ 83.5	PASS
	8DPSK	SISO	HOPP	1	78.73	≤ 83.5	PASS

2.2 Test Graph



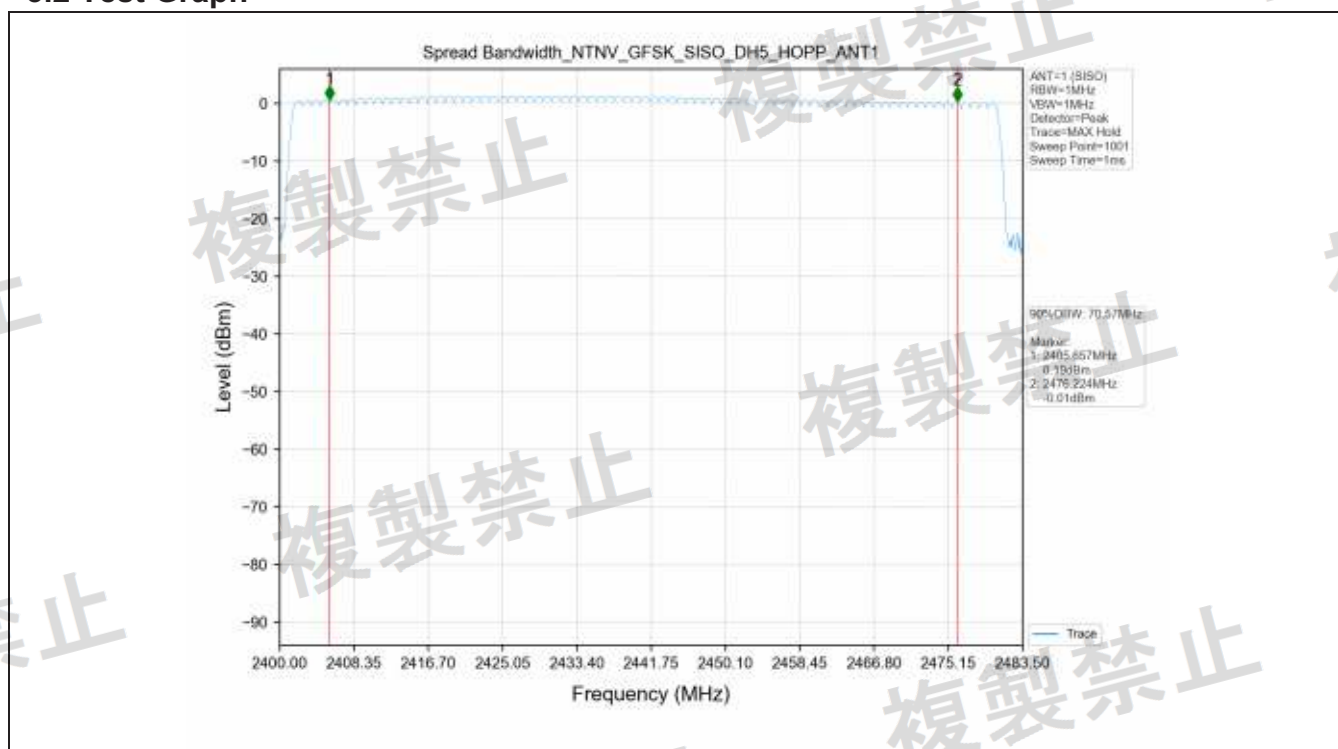


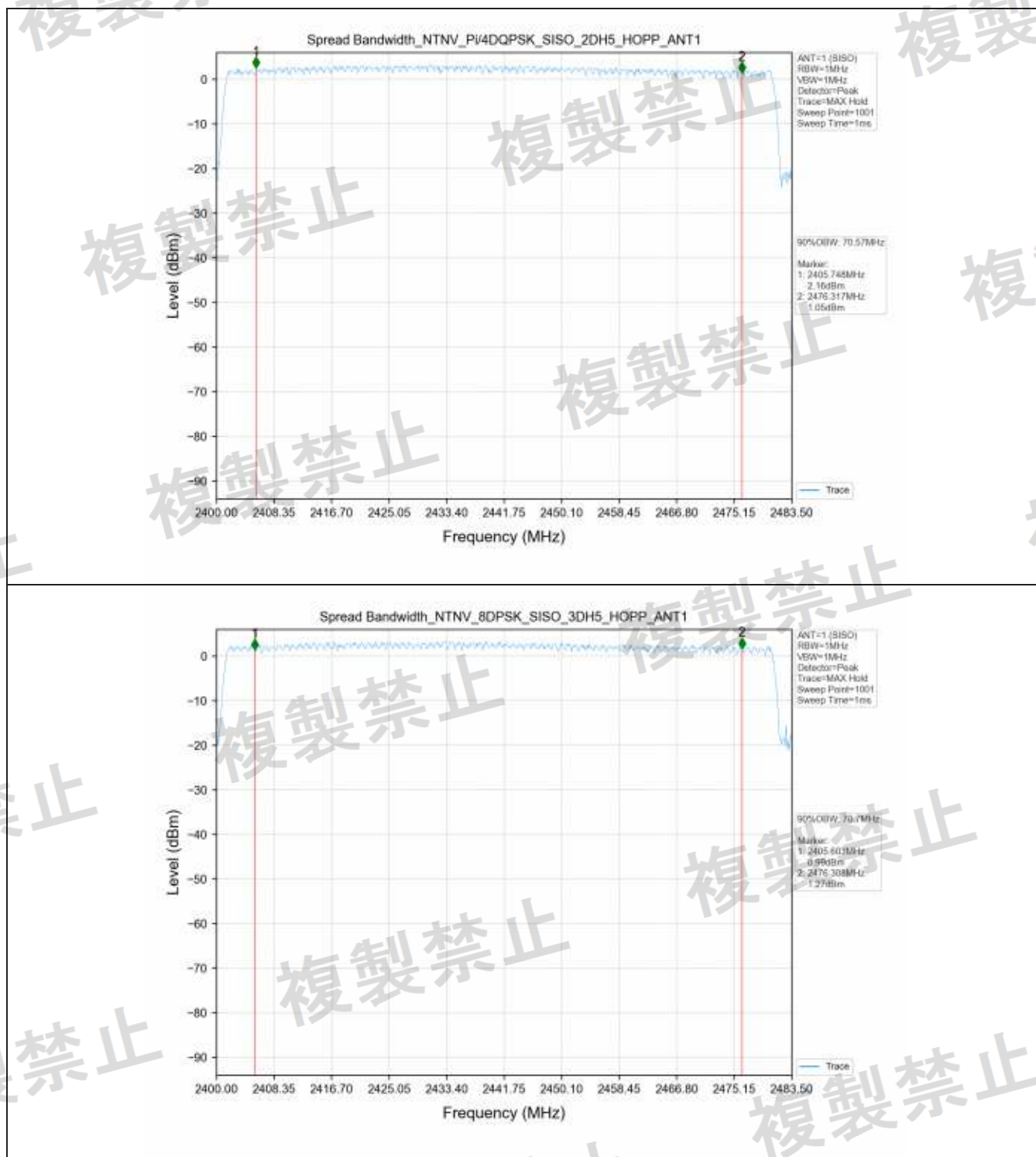
3. Spread Bandwidth

3.1 Test Result

Test Condition	Test Mode	Packet Type	Hopp Number	Test Channel	Ant	Test Result [MHz]	Limit [MHz]	Verdict
NTNV	GFSK	DH5	79	HOPP	1	70.57	≥ 0.5	PASS
	PI/4DQPSK	2DH5	79	HOPP	1	70.57	≥ 0.5	PASS
	8DPSK	3DH5	79	HOPP	1	70.7	≥ 0.5	PASS

3.2 Test Graph



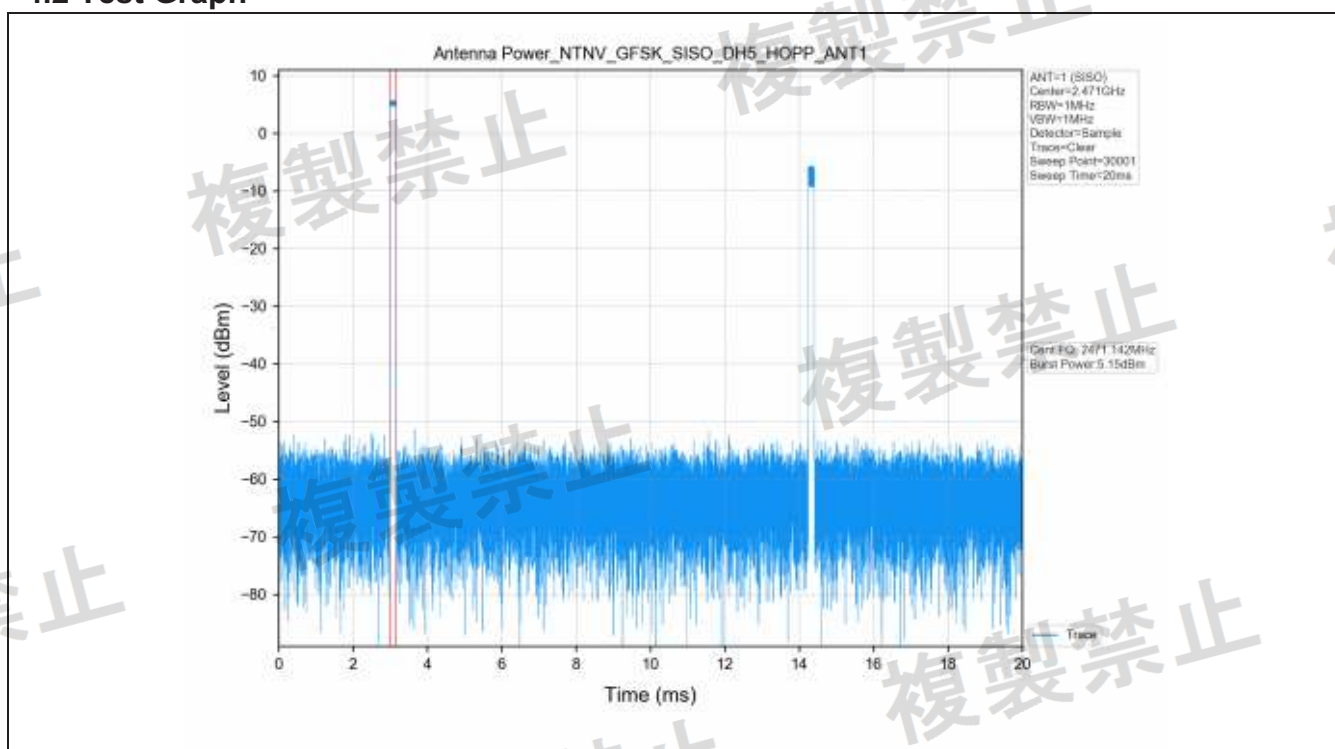


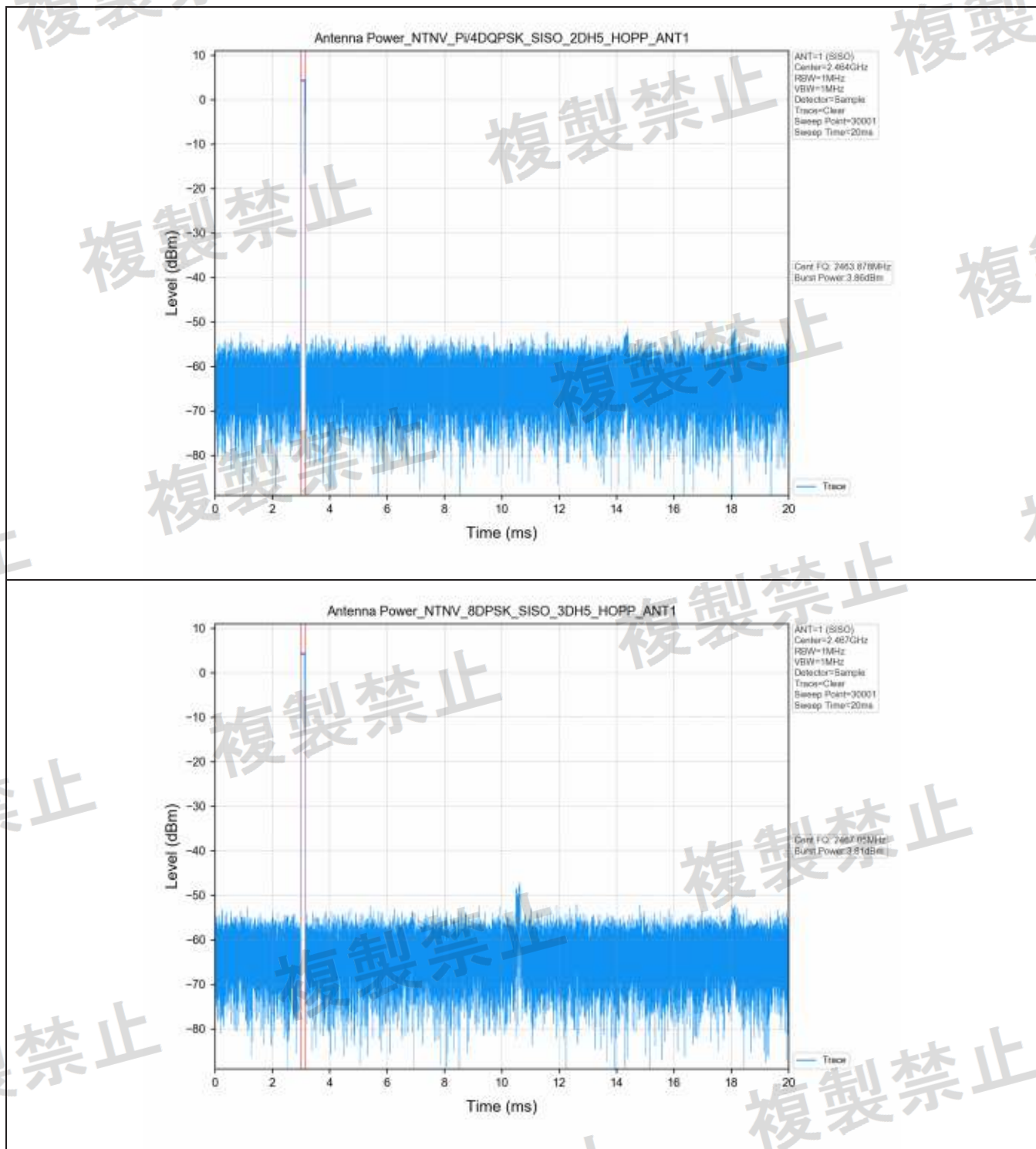
4. Antenna Power

4.1 Test Result

Test Condition	Test Mode	Hopp Number	TX Type	Test Channel	Ant	Antenna Power (mW/MHz)			Tolerance (%)	Limit (%)	Verdict
						Measured	Limit	Nominal Power			
NTNV	GFSK	79	SISO	Hopping	1	0.045	3	0.2	-77.000	-80 to 20	GFSK
	Pi/4DQ PSK	79	SISO	Hopping	1	0.034	3	0.1	-66.000	-80 to 20	Pi/4DQ PSK
	8DPSK	79	SISO	Hopping	1	0.033	3	0.1	-66.000	-80 to 20	8DPSK

4.2 Test Graph



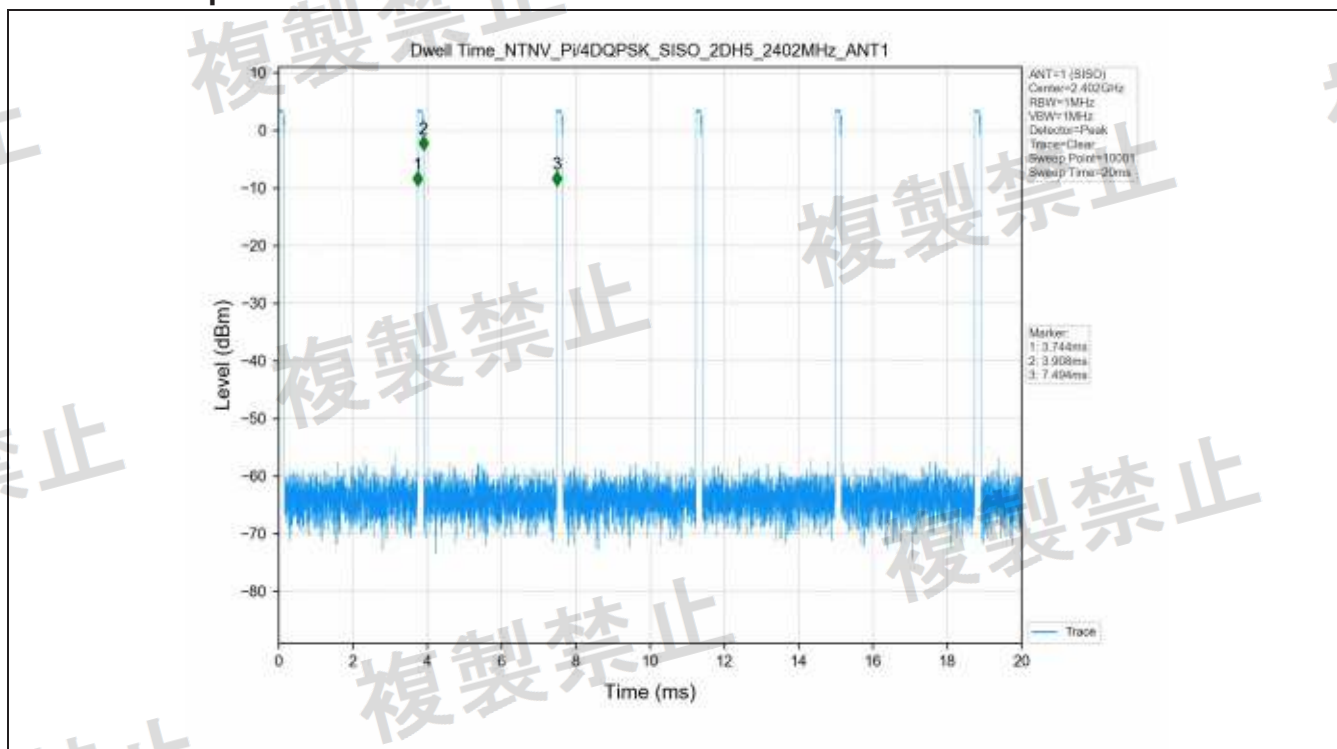


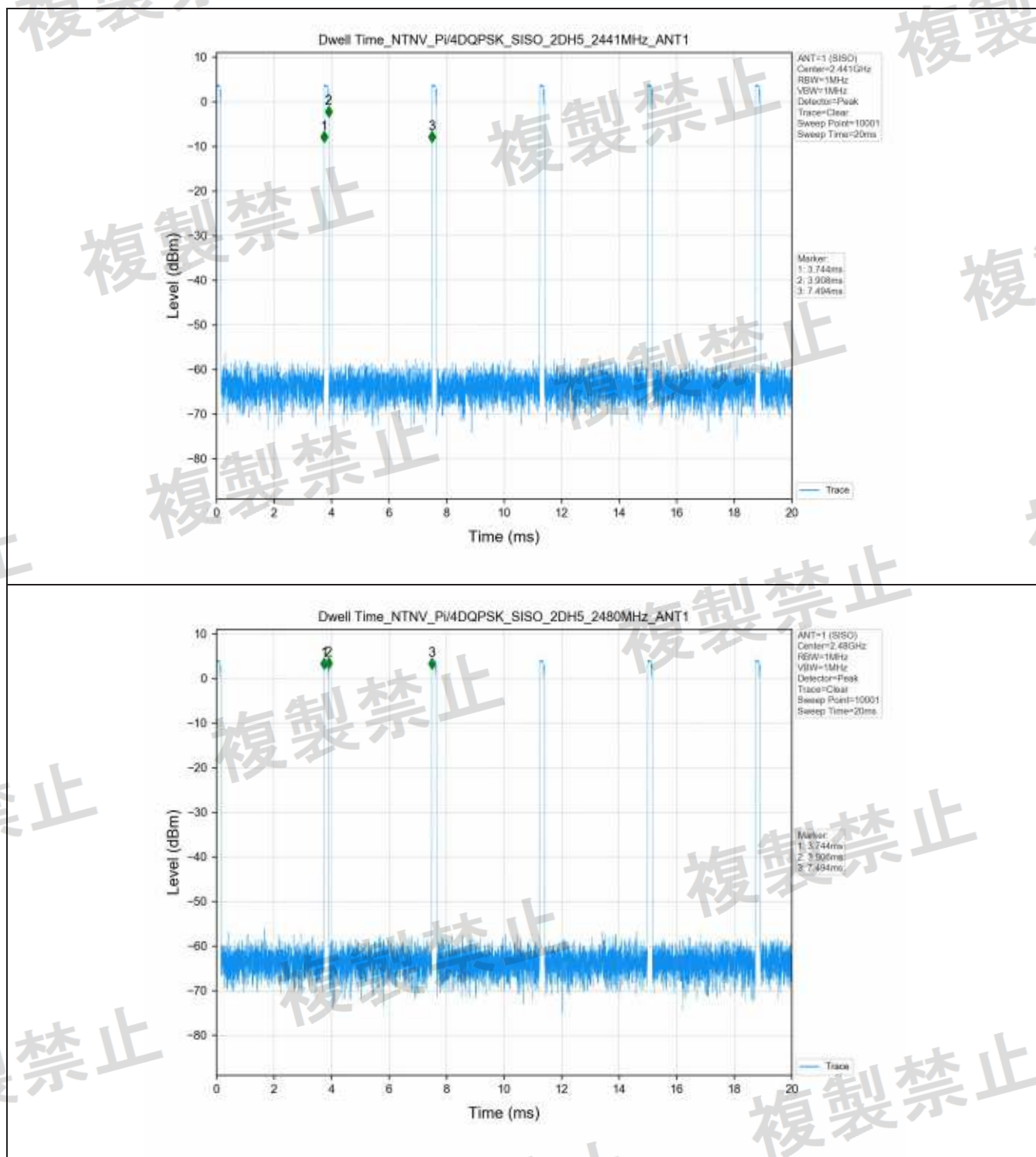
5. Dwell Time

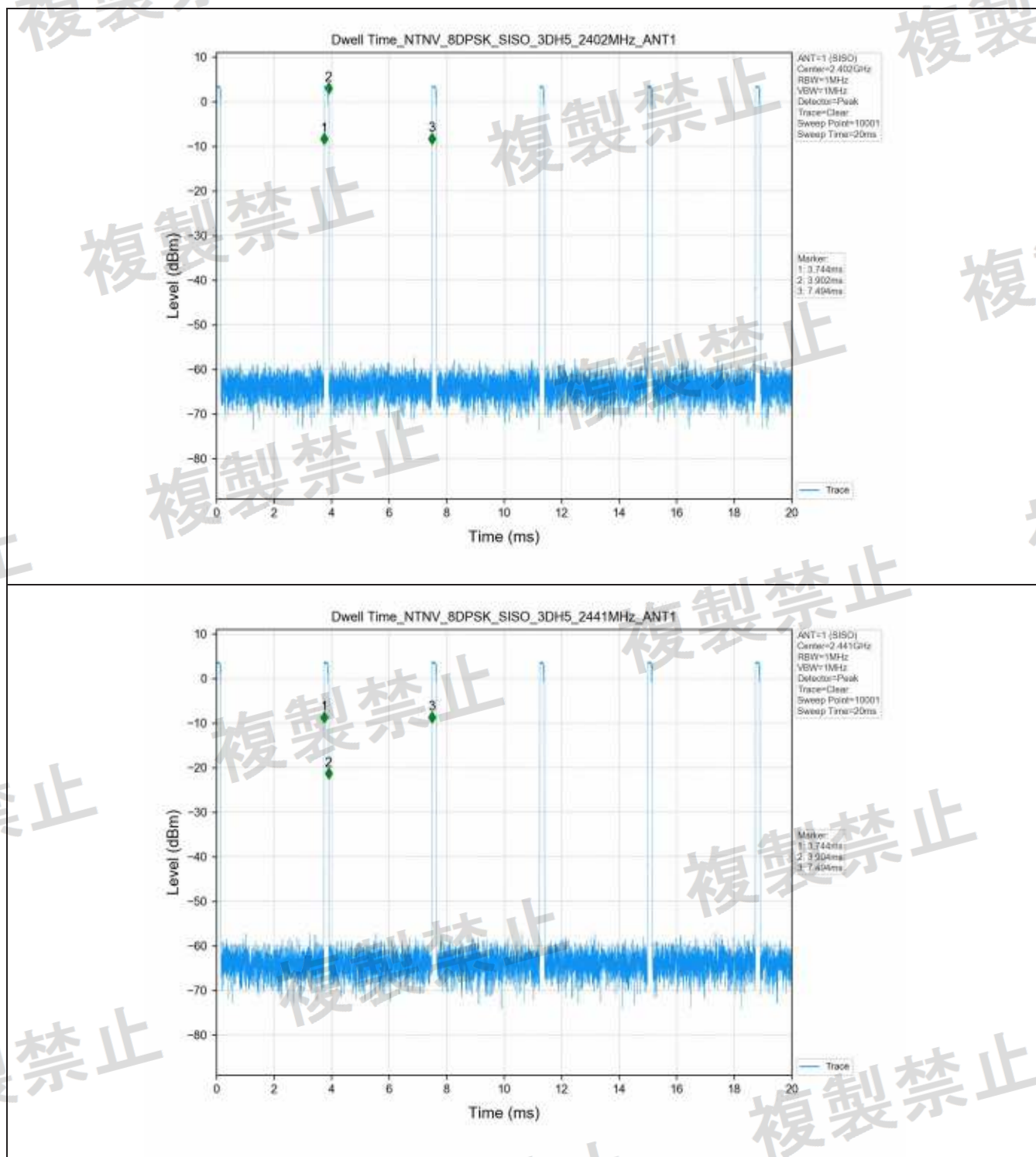
5.1 Test Result

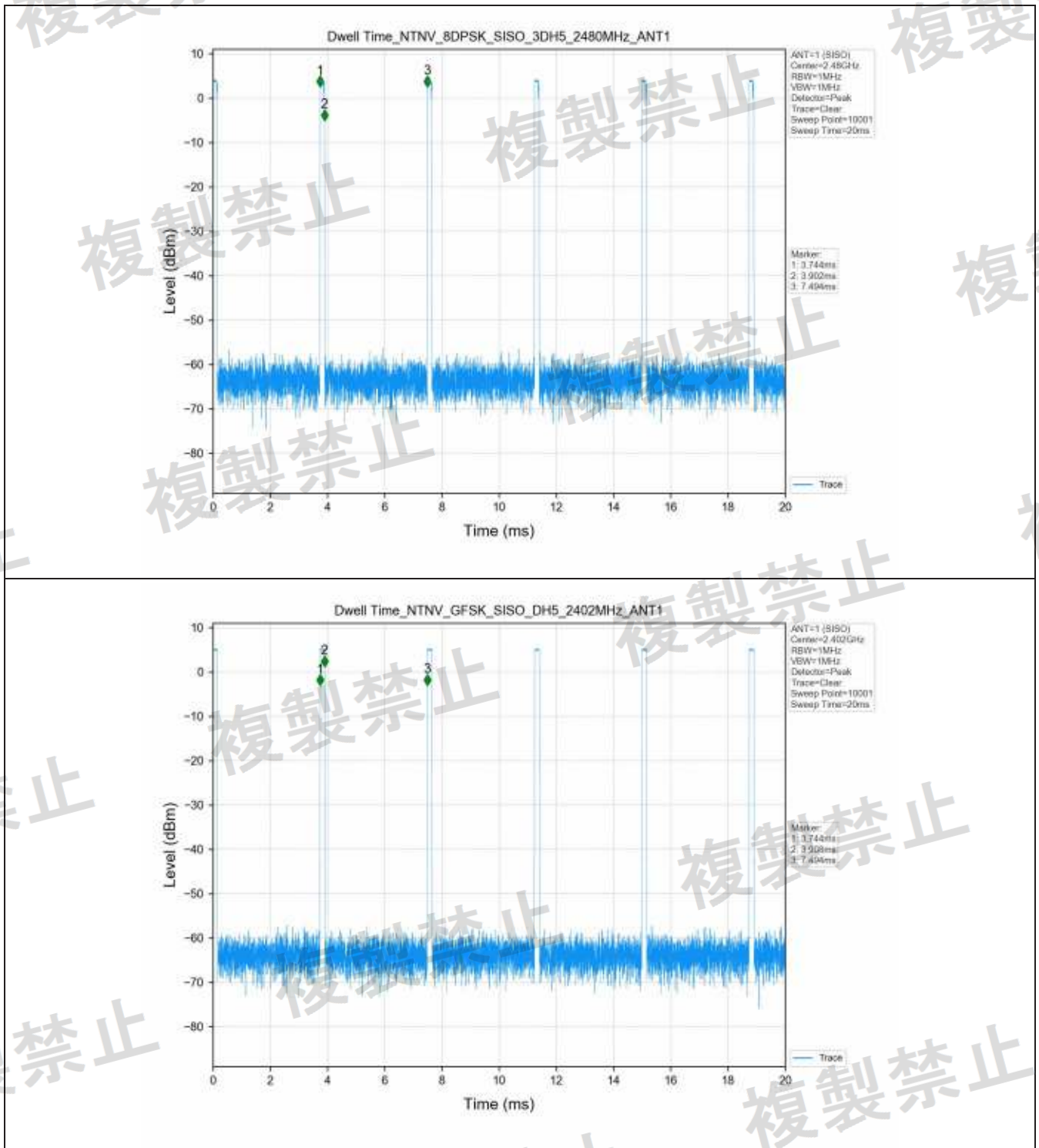
Test Condition	Packet Type	Test Channel	Ant	Spreading Rate	T _{on} [ms]	Period [ms]	Hopp Number	Dwell Time [s]	Limit [s]	Verdict
NTNV	2DH5	2402	1	35.2	0.164	3.750	79	0.01	<0.4	PASS
		2441	1	35.2	0.164	3.750	79	0.01	<0.4	PASS
		2480	1	35.2	0.162	3.750	79	0.01	<0.4	PASS
	3DH5	2402	1	23.75	0.158	3.750	79	0.01	<0.4	PASS
		2441	1	23.75	0.160	3.750	79	0.01	<0.4	PASS
		2480	1	23.75	0.158	3.750	79	0.01	<0.4	PASS
	DH5	2402	1	71.69	0.164	3.750	79	0.02	<0.4	PASS
		2441	1	71.69	0.164	3.750	79	0.02	<0.4	PASS
		2480	1	71.69	0.164	3.750	79	0.02	<0.4	PASS

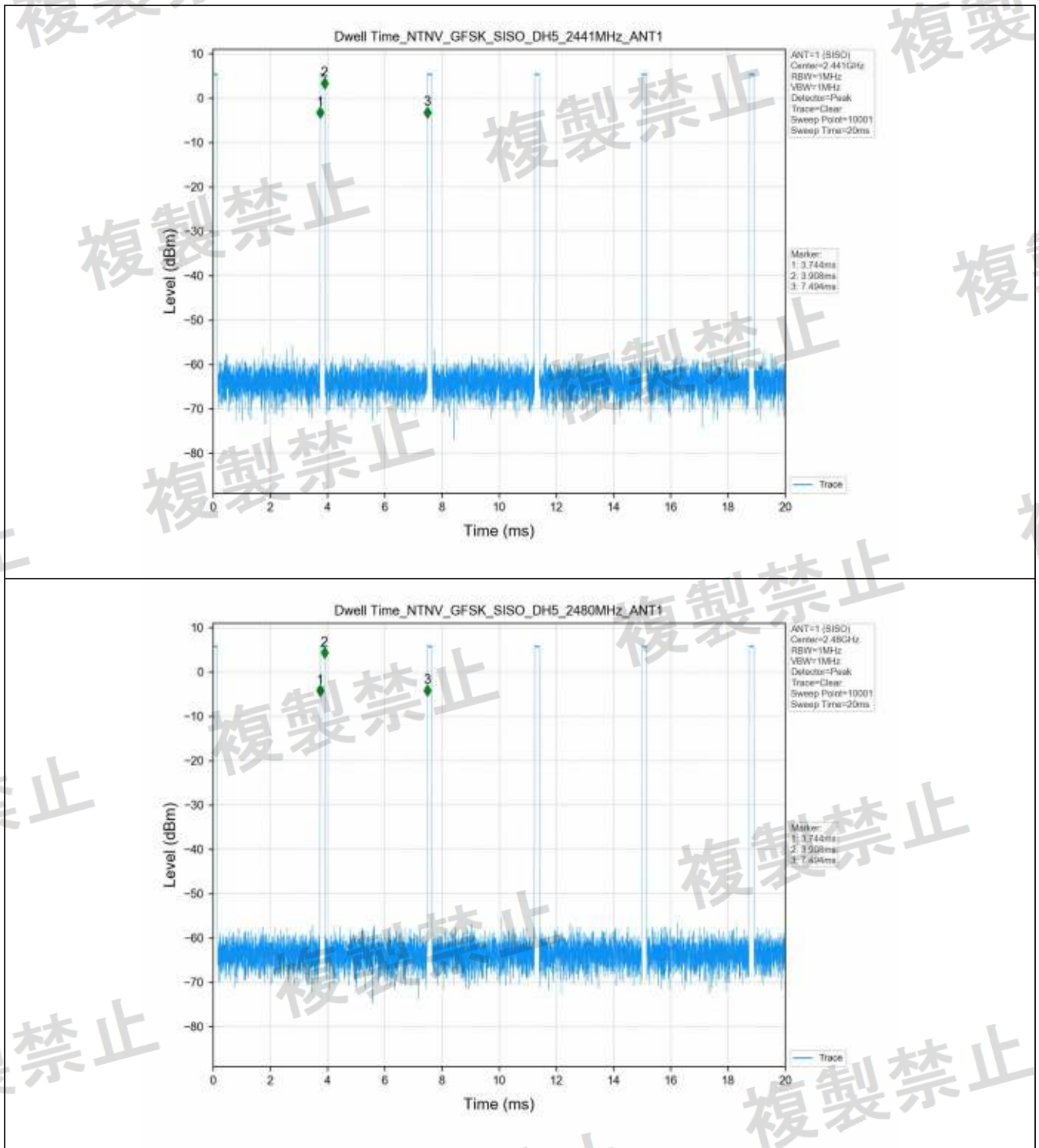
5.2 Test Graph









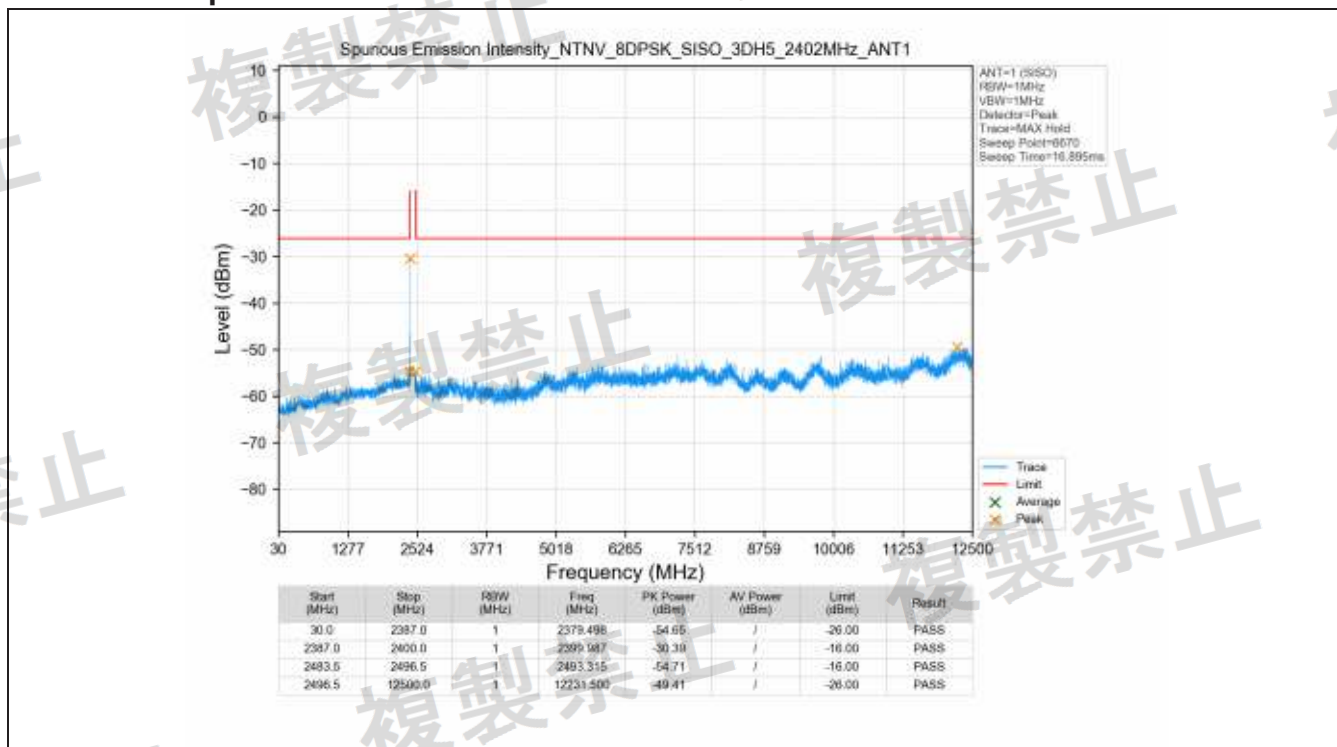


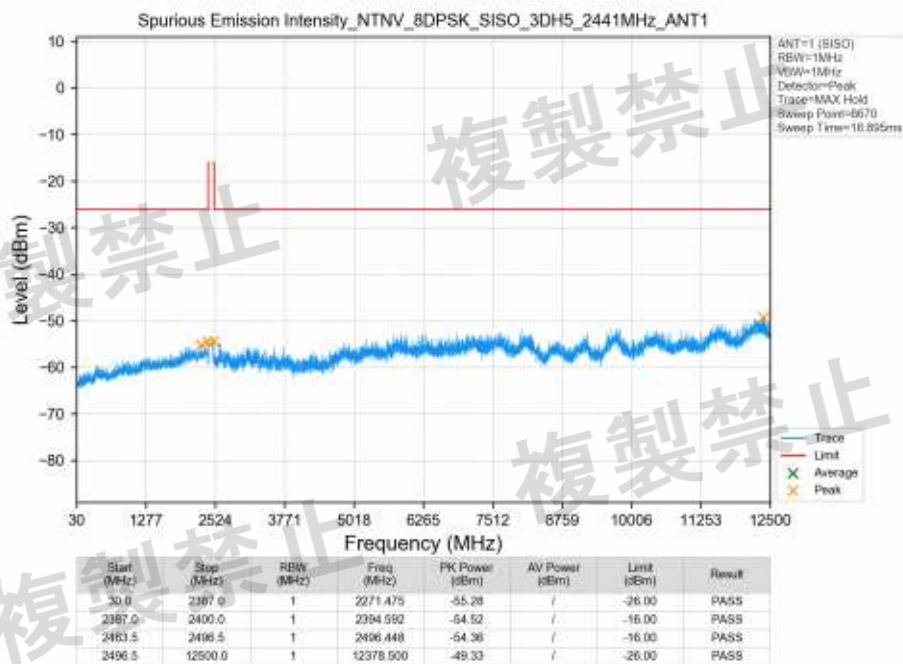
6. Spurious Emission Intensity

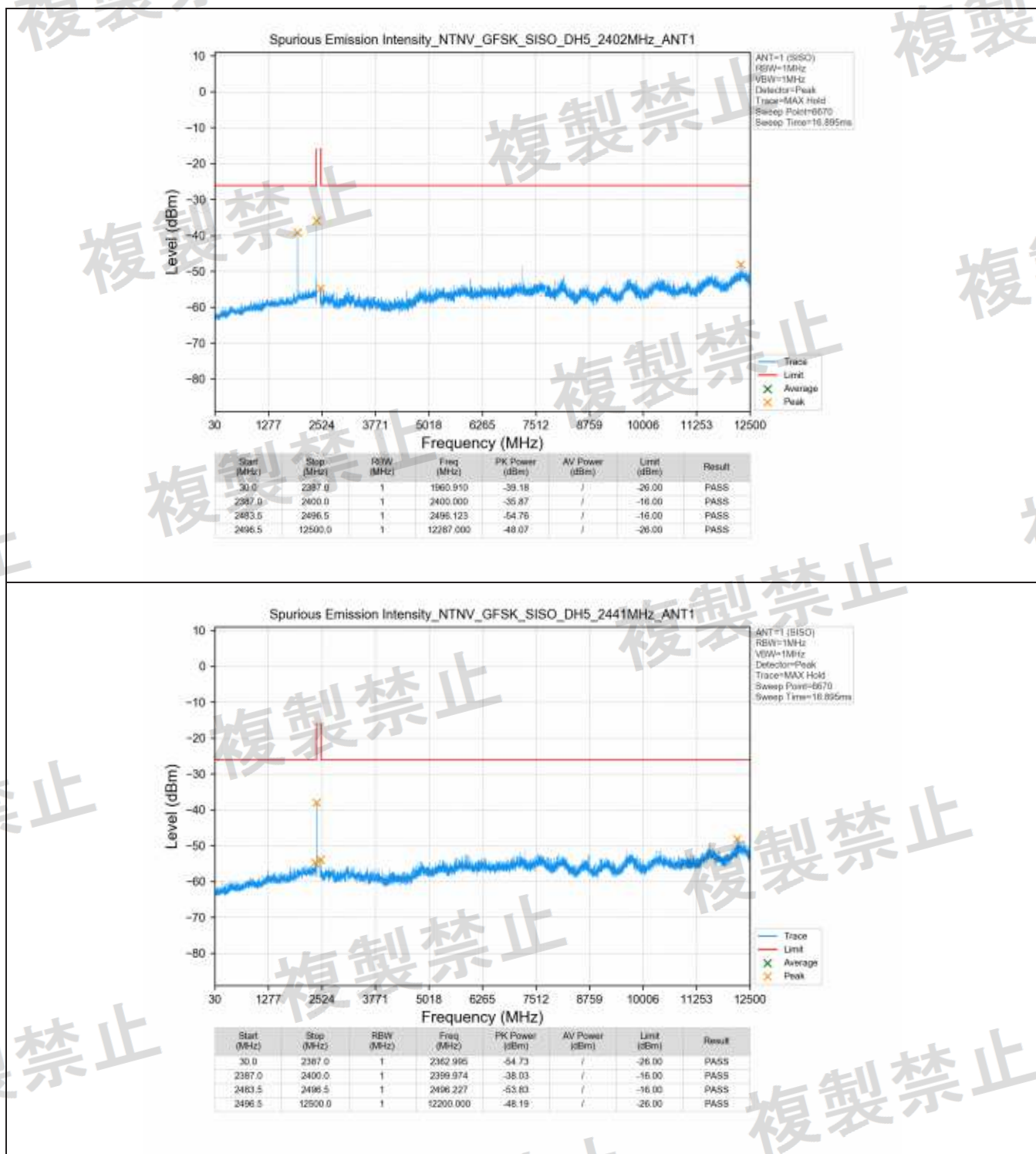
6.1 Test Result

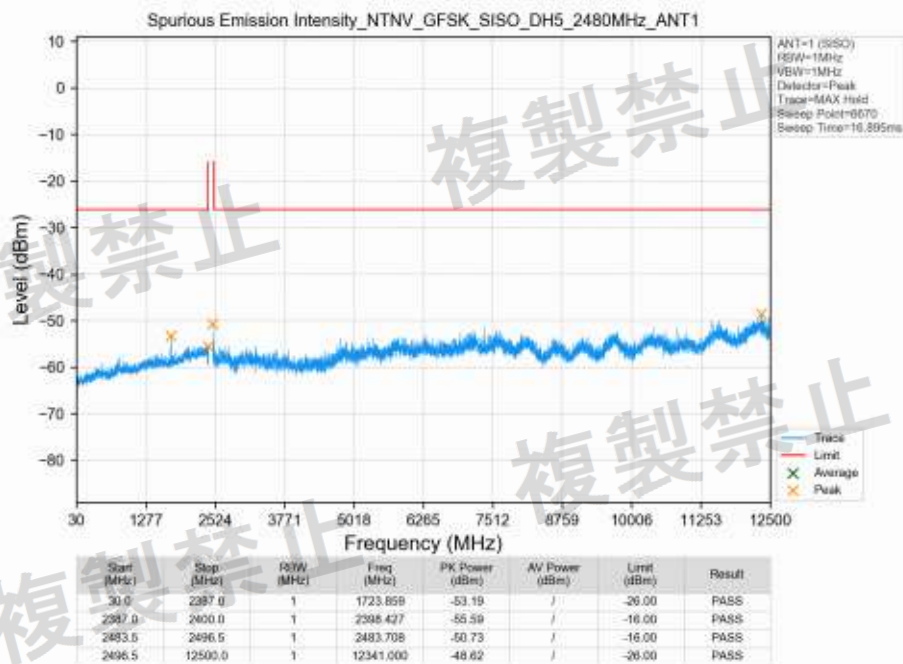
Test Condition	Test Mode	Test Channel	Ant	Test Result [MHz]	Limit [MHz]	Verdict
NTNV	8DPSK	2402	1	See test plot	See test plot	PASS
		2441	1	See test plot	See test plot	PASS
		2480	1	See test plot	See test plot	PASS
	GFSK	2402	1	See test plot	See test plot	PASS
		2441	1	See test plot	See test plot	PASS
		2480	1	See test plot	See test plot	PASS
	Pi/4DQPSK	2402	1	See test plot	See test plot	PASS
		2441	1	See test plot	See test plot	PASS
		2480	1	See test plot	See test plot	PASS

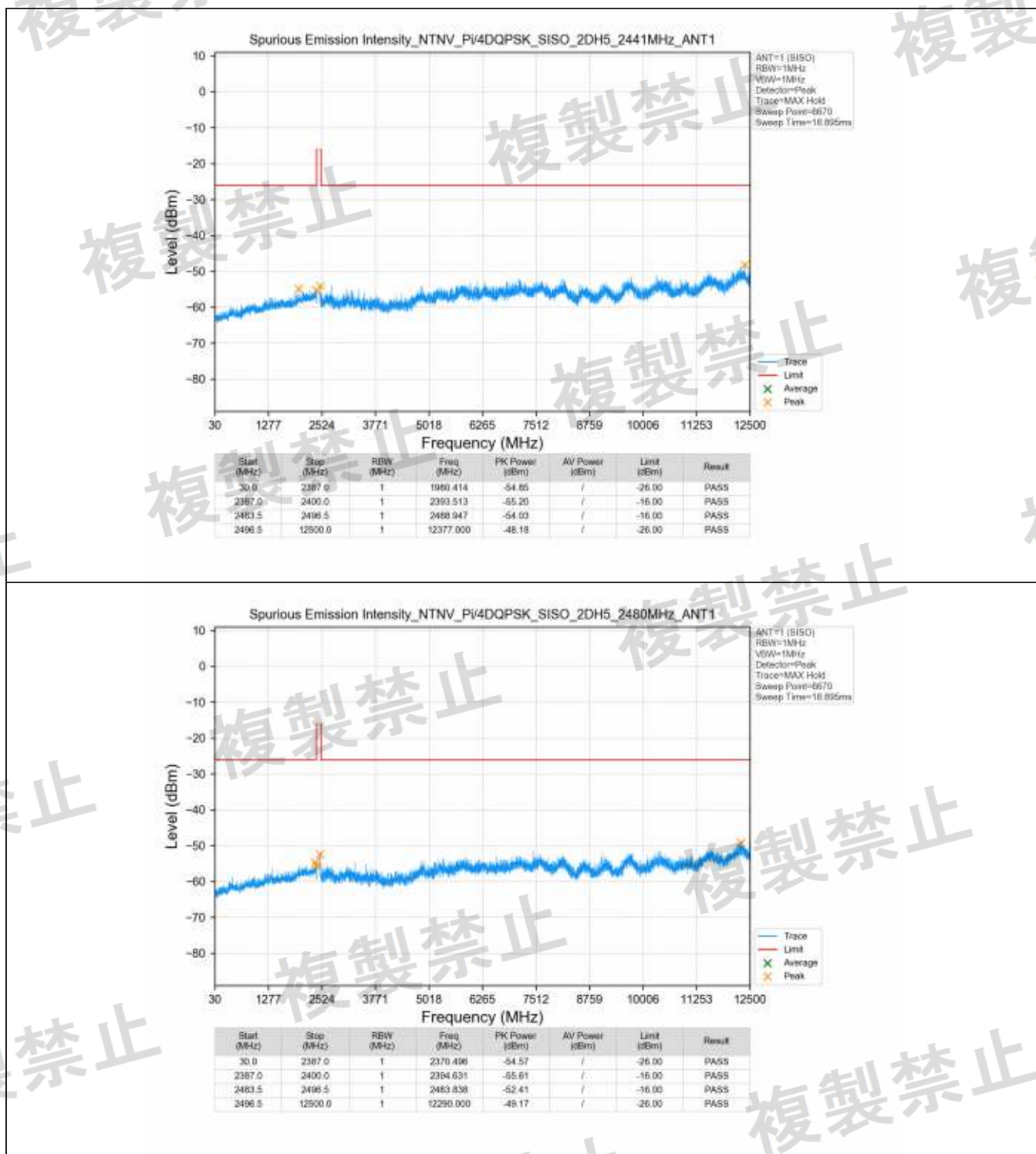
6.2 Test Graph









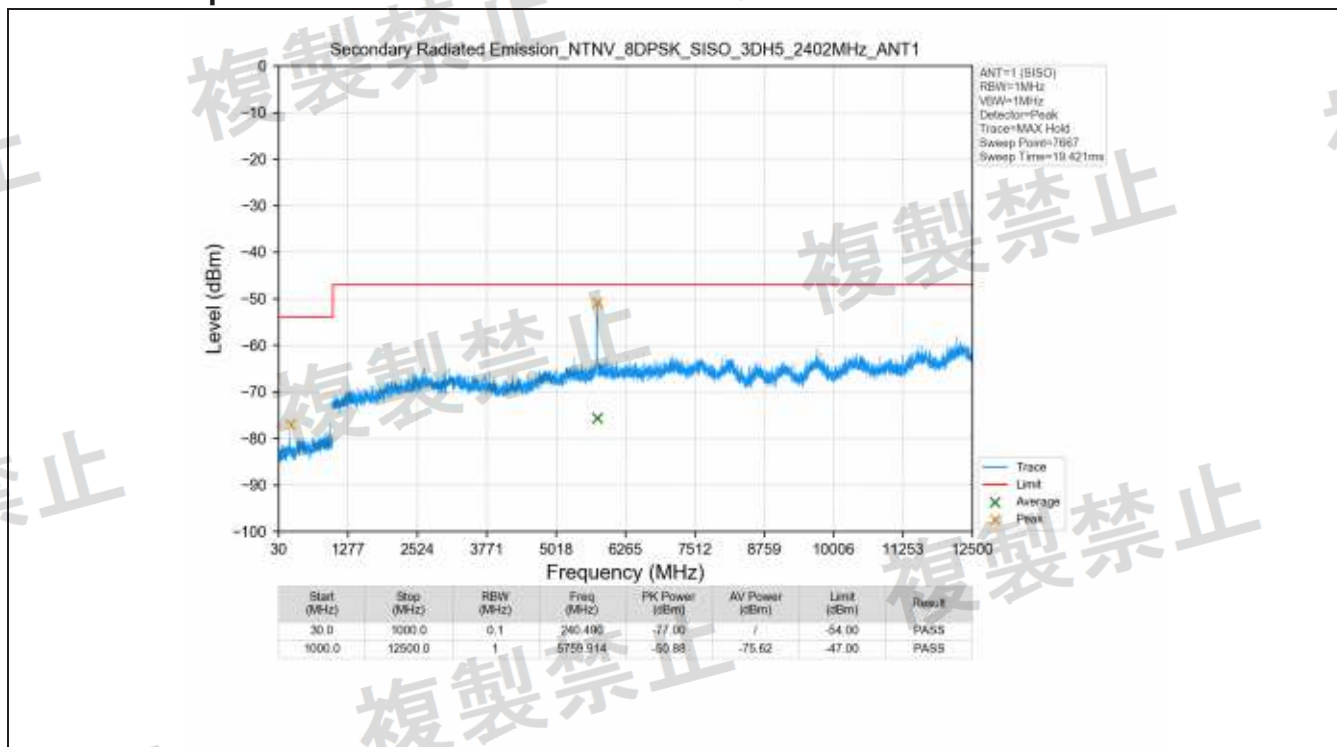


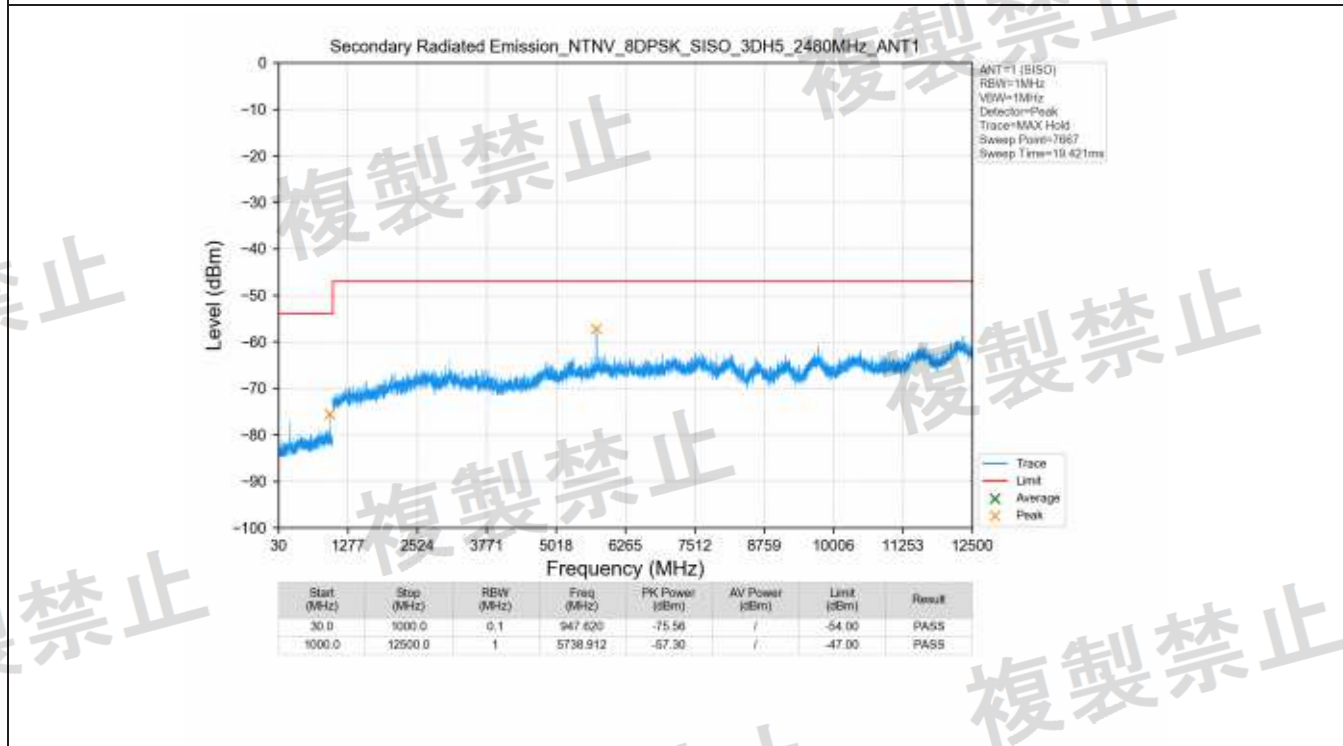
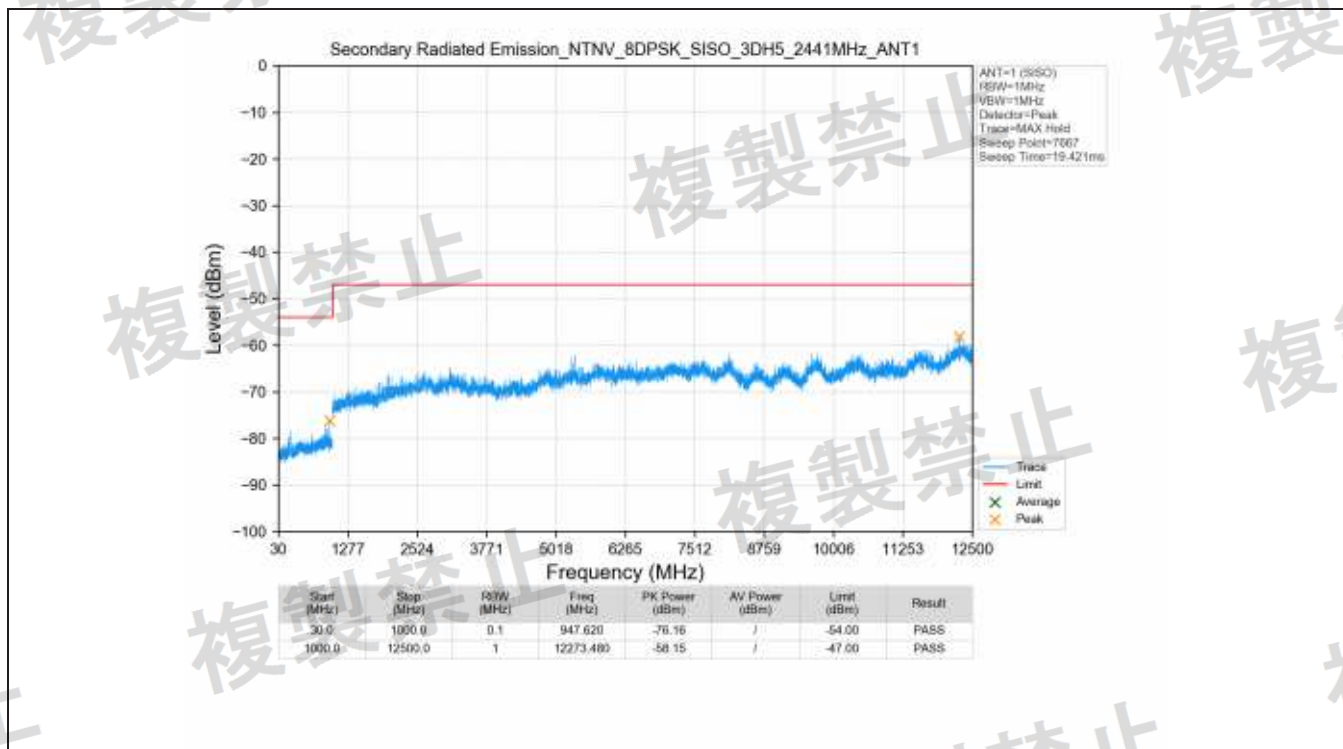
7. Secondary Radiated Emission

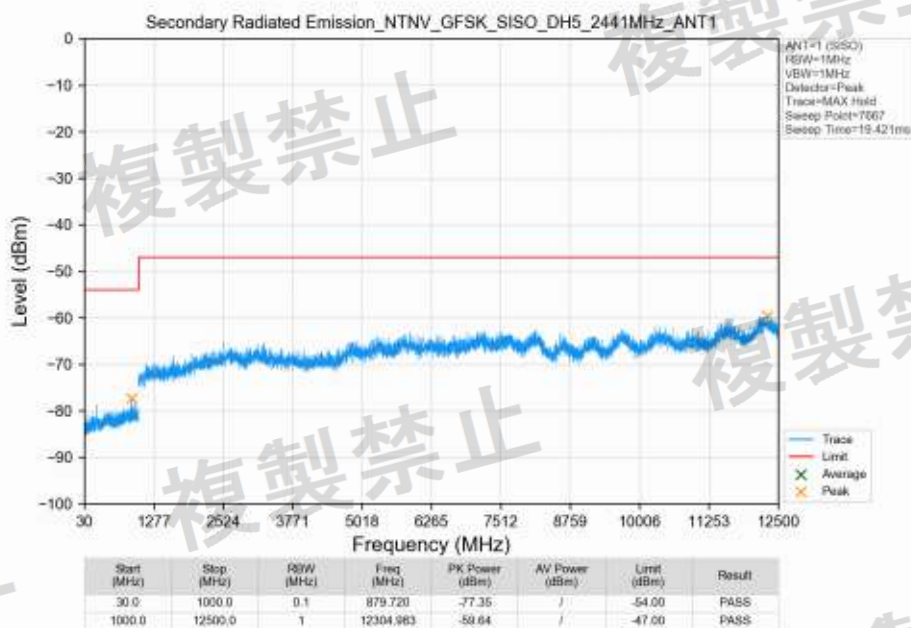
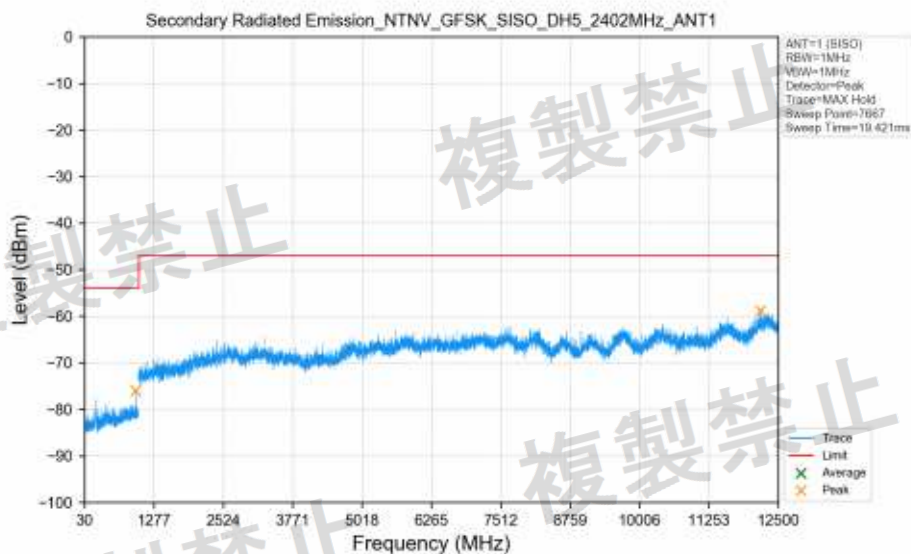
7.1 Test Result

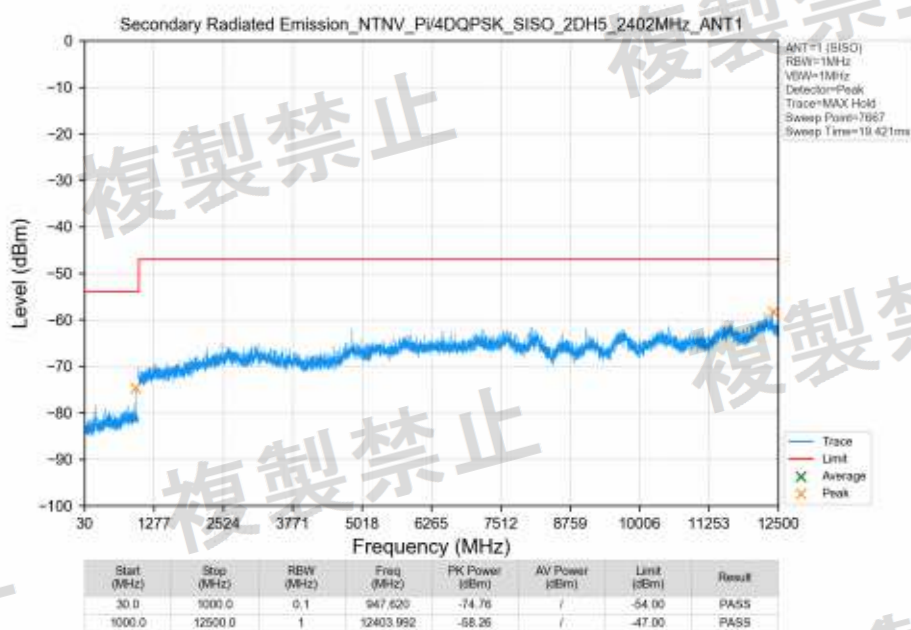
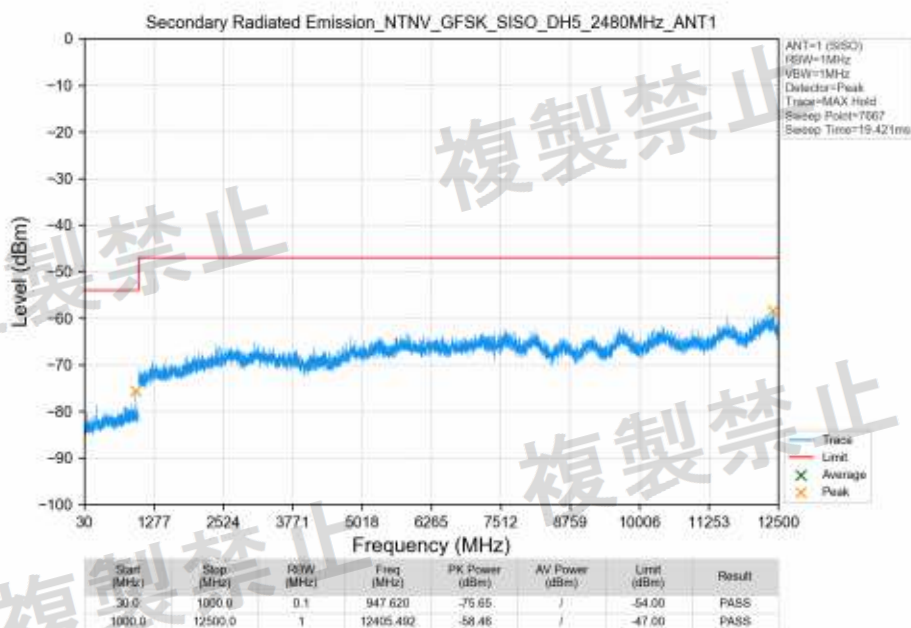
Test Condition	Test Mode	Test Channel	Ant	Test Result [MHz]	Limit [MHz]	Verdict
NTNV	8DPSK	2402	1	See test plot	See test plot	PASS
		2441	1	See test plot	See test plot	PASS
		2480	1	See test plot	See test plot	PASS
	GFSK	2402	1	See test plot	See test plot	PASS
		2441	1	See test plot	See test plot	PASS
		2480	1	See test plot	See test plot	PASS
	Pi/4DQPSK	2402	1	See test plot	See test plot	PASS
		2441	1	See test plot	See test plot	PASS
		2480	1	See test plot	See test plot	PASS

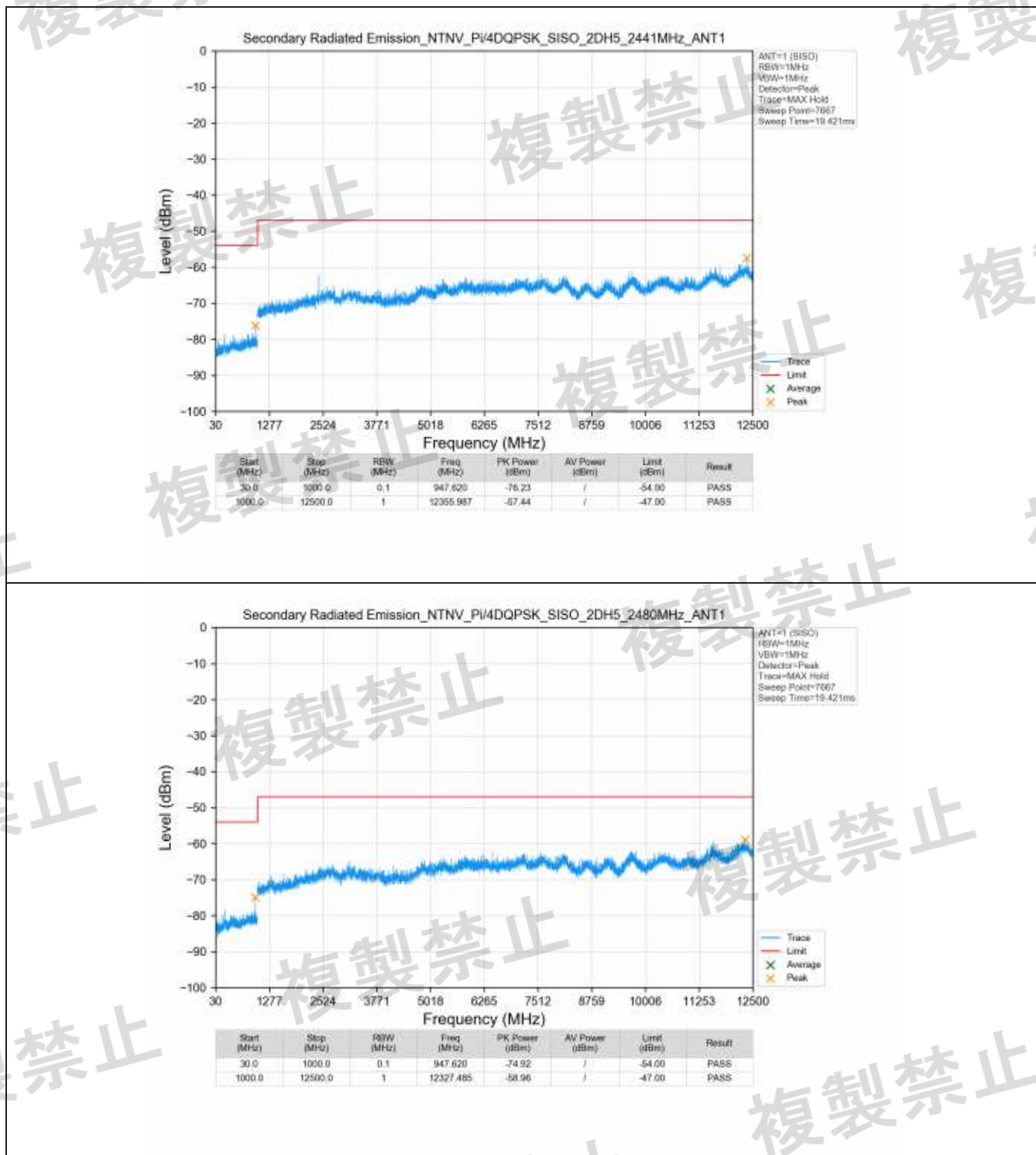
7.2 Test Graph











- End of the Report -