

TEST REPORT

Application No.: SZCR2308002513AT
Applicant: Zhejiang Qiangnao Technology Co., Ltd.
Address of Applicant: 201-5, Building#1,1818-2 Wenyi West Road, Yuhang District, Hangzhou, Zhejiang
Manufacturer: Zhejiang Qiangnao Technology Co., Ltd.
Address of Manufacturer: 201-5, Building#1,1818-2 Wenyi West Road, Yuhang District, Hangzhou, Zhejiang
Factory: Huizhou BYD Electronic Co., Ltd.
Address of Factory: Xiangshui River, Economic Development Zone, Daya Bay, Huizhou, Guangdong Province, P.R. China
Equipment Under Test (EUT):
EUT Name: Portable EEG Feedback Device
Model No.: ZS-11
Trade Mark: BrainCo
Standard(s) : MIC Item 19 of Article 2 Paragraph 1
Test Method: MIC Notice No.88 Appendix No.43
Date of Receipt: 2023-08-04
Date of Test: 2023-08-10 to 2023-08-18
Date of Issue: 2023-08-21

Test Result:**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Kenx Xu

EMC Laboratory Manager



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch EMC Laboratory

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SZEMC-TRF-01 Rev. A/0 Aug01,2022

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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2023-08-21		Original

Authorized for issue by:			
		Vincent Chen	
		Vincent Chen/Project Engineer	
		Eric Fu	
		Eric Fu/Reviewer	



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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 Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass
RF accessibility		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 Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass
Antenna Power		MIC Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass
Spurious emission Intensity		MIC Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass
Limit of secondary radiated emissions		MIC Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass

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4 General Information

4.1 Details of E.U.T.

Power supply:	Powered by Li-Ion Polymer Battery DC3.7V (Charged by Type-C port DC 5V)
Cable(s):	Type-C cable shielded 52cm
Bluetooth Version:	V5.0 LE
Operation Frequency:	2402MHz to 2480MHz
Modulation Type:	GFSK
Channel Spacing:	2MHz
Data Rate:	1Mbps
Rated Power:	0.77mW
Number of Channels:	40
Antenna Type:	PCB Antenna
Antenna Gain:	2.2dBi

Remark: The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

4.2 Test Conditions

Power Supply

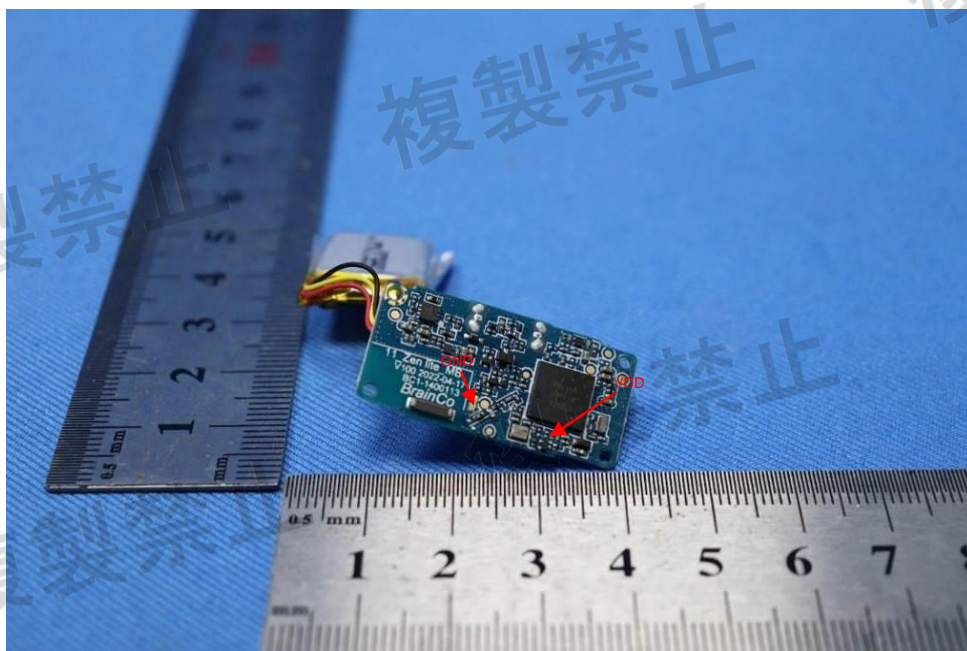
The RF unit is supplied DC3.3V. The fluctuation of input voltage to the circuit of RF unit of test equipment is under $\pm 1\%$, when input voltage from DC5V to the test equipment is fluctuated by $\pm 10\%$. So, all measurement has been conducted by only rated voltage.

The measurement result of the voltage fluctuation at RF circuit when DC5.00V $\pm 10\%$.

DC Input	DC5V00
3.3V	5.5V
3.3V	5.0V
3.3V	4.5V

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Temperature: 5 -35.0 °C
Humidity: 45-85 % RH
Atmospheric Pressure: 1000 -1010 mbar

Note:

VN: Normal Voltage
 TN: Normal Temperature
 TL: Low Extreme Test Temperature
 TH: High Extreme Test Temperature

Test

Frequencies:

If the EUT can be set to 3 or 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.

4.3 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
--	--	--	--
The EUT has been tested as an independent unit.			

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4.4 Measurement Uncertainty

Test Item	Measurement Uncertainty
Frequency Error	$\pm 7.25\text{E-}8$
Occupied Bandwidth(99%)	$\pm 3\%$
Antenna Power	$\pm 0.75\text{dB}$
Spurious emission Intensity	$\pm 0.75\text{dB}$
Limit of secondary radiated emissions	$\pm 0.75\text{dB}$

Remark:
The U_{lab} (lab Uncertainty) is less than $U_{\text{CISPR/ETSI}}$ (CISPR/ETSI Uncertainty), so the test results
– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
– non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

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4.5 Test Location

All tests were performed at:

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No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053

Fax: +86 755 2671 0594

No tests were sub-contracted.

4.6 Test Facility

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

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI (Member No. 1937)**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen EMC laboratory have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1336**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1336. Test Firm Registration Number: 787754.

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

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

CAB identifier: CN0006.

IC#: 4620C.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None



5 Equipment List

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	Calibration body	Classification
DC Power Supply	Rohde & Schwarz	NGSM 32/10	SEM011-04	2022-10-20	2023-10-19	SGS	(c)
MXA Signal Analyzer (10Hz-26.5GHz)	KEYSIGHT	N9020A	SEM004-17	2023-03-21	2024-03-20	GRGTEST	(c)
Signal Generator (9kHz-40GHz)	KEYSIGHT	N5173B	SEM006-05	2022-09-29	2023-09-28	CEPREI	(c)
Multimeter	FLUKE	Fluke 73III	SEM022-01	2023-03-21	2024-03-20	SGS	(c)
Universal Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-03	2023-03-20	2024-03-19	CEPREI	(c)
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2022-09-04	2023-09-03	SGS	(c)
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2023-03-23	2024-03-22	CEPREI	(c)

Remark:

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

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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

MIC Item 19 of Article 2 Paragraph 1

6.1.2 Conclusion

Standard requirement:

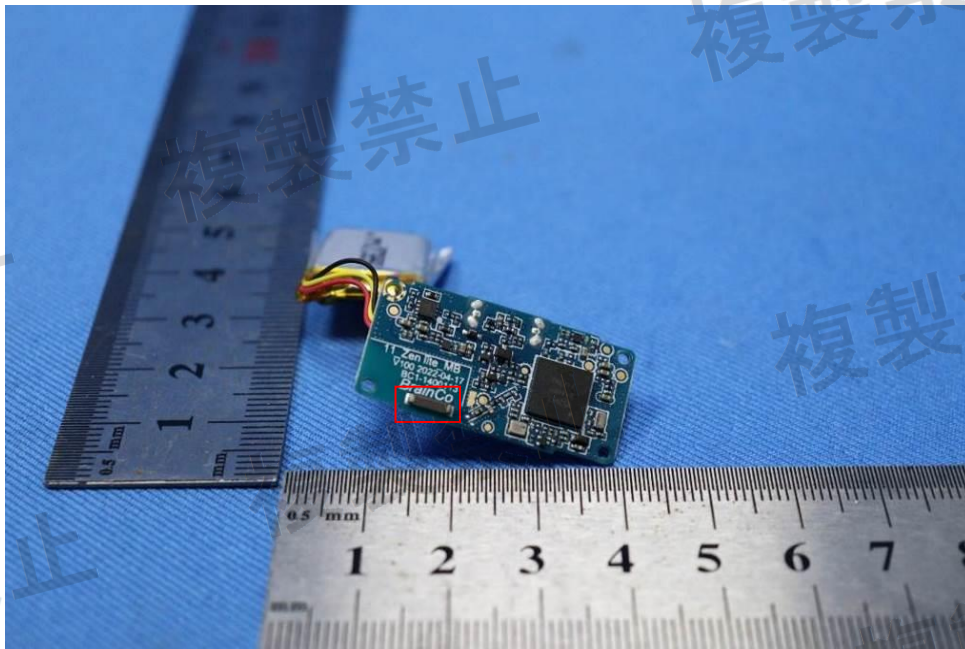
Applicable for equipment with an antenna terminal, including testing terminals. If an antenna connector is available, all relevant tests will be carried out conducted. If not, tests will be carried out in an anechoic room or with a suitable test-fixture.

EUT Details:

The antenna is integrated on the main PCB and no consideration of replacement.

The best case gain of the antenna is 2.2dBi.

Result:



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



6.2 Interference prevention capability

6.2.1 Test Requirement:

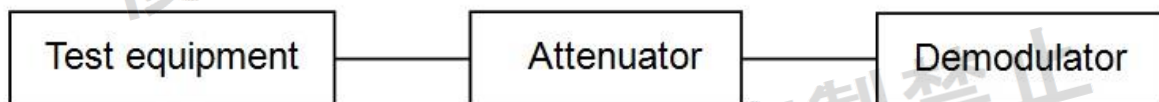
MIC Item 19 of Article 2 Paragraph 1

Limit:

Article 2, Item (19) Notice 88 Appendix 43

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.

6.2.2 Test Setup Diagram



6.2.3 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:

58:94:B2:04:08:3E

The unit does meet the requirements (Good).



6.3 RF accessibility

6.3.1 Test Requirement:

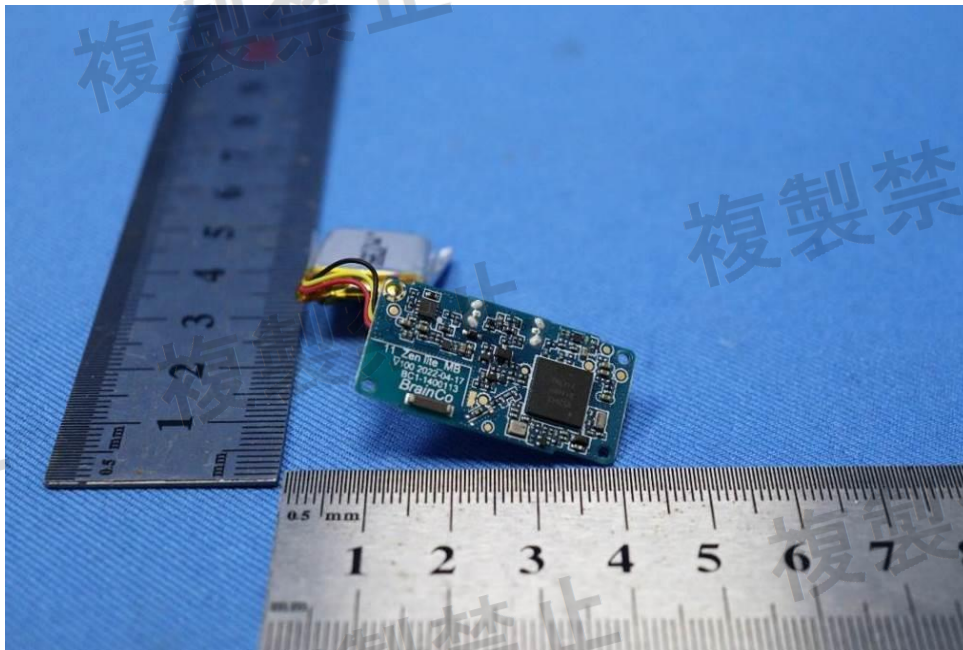
MIC Item 19 of Article 2 Paragraph 1

6.3.2 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 parts are mounted on PCB with surface mount technology, and there is no any adjustable parts on PCB or adjustable parts are not exposed.



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: 25.7 °C

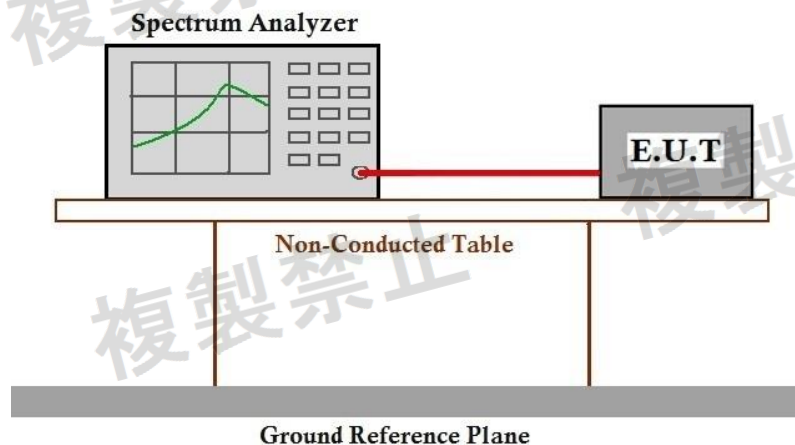
Humidity: 48.0 % RH

Atmospheric Pressure: 1005 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.1.3 Test Setup Diagram



7.1.4 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

Please Refer to Appendix for Details



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

OFDM: 40MHz or less

Others: 26MHz or less

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 25.7 °C

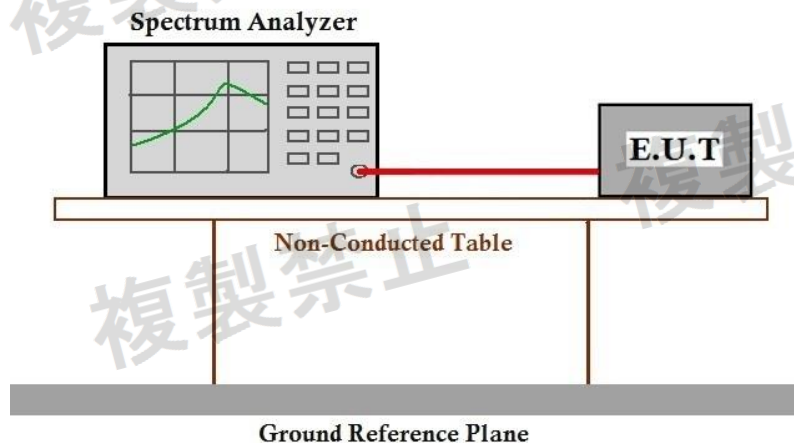
Humidity: 48.0 % RH

Atmospheric Pressure: 1005 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.2.3 Test Setup Diagram



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7.2.4 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); 40/60 MHz (OFDM; DSSS); 2-5 times OBW (Others)

RBW 1 MHz (FHSS); 300kHz (OFDM; DSSS); 3% OBW (Others)

VBW 1 MHz (FHSS); 300kHz (OFDM; DSSS); 3 times RBW (Others)

Sweep Time Auto

detector mode Positive peak

Indication mode Max hold

OBW 99%

Please Refer to Appendix for Details



7.3 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%

7.3.1 E.U.T. Operation

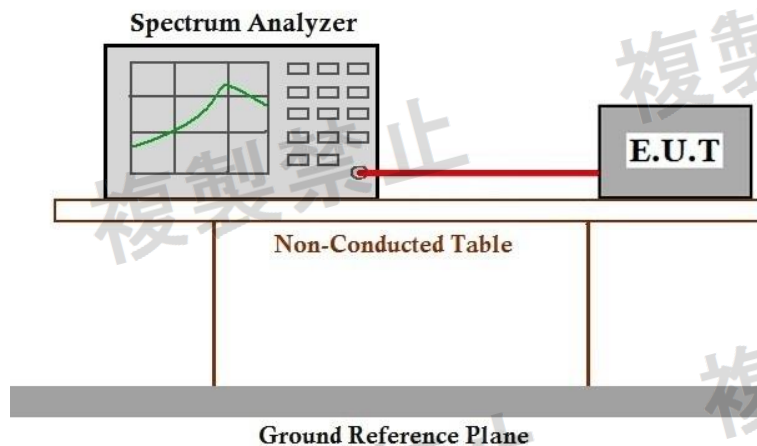
Operating Environment:

Temperature: 25.7 °C Humidity: 48.0 % RH Atmospheric Pressure: 1005 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode Keep the EUT in continuously transmitting mode with GFSK modulation

7.3.3 Test Setup Diagram



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7.3.4 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 25 MHz(FHSS); 40/60 MHz (OFDM; DSSS); 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 RMS

Indication mode Max hold

Please Refer to Appendix for Details



7.4 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

7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 25.7 °C

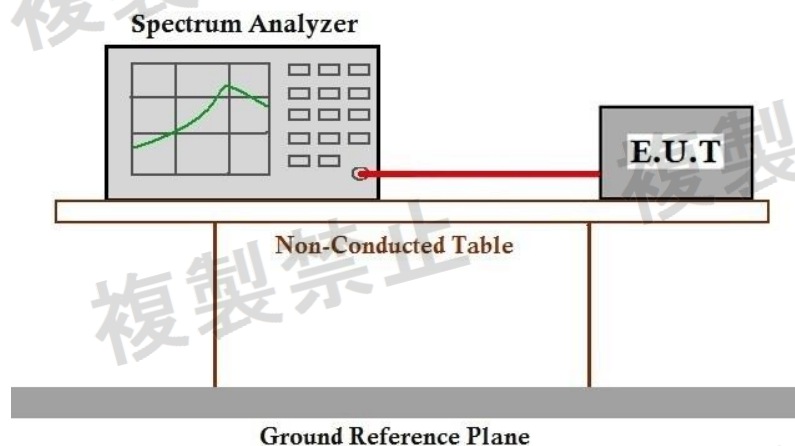
Humidity: 48.0 % RH

Atmospheric Pressure: 1005 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.4.3 Test Setup Diagram



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7.4.4 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 1 MHz

VBW 1 MHz

Sweep Time Auto

detector mode Positive peak

Indication mode Max hold

Test setup for Step 2:

Frequency: Spurious Frequency

RBW 1 MHz

VBW 1 MHz

Sweep Time Auto

detector mode Sample

Indication mode Max hold

Please Refer to Appendix for Details



7.5 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

7.5.1 E.U.T. Operation

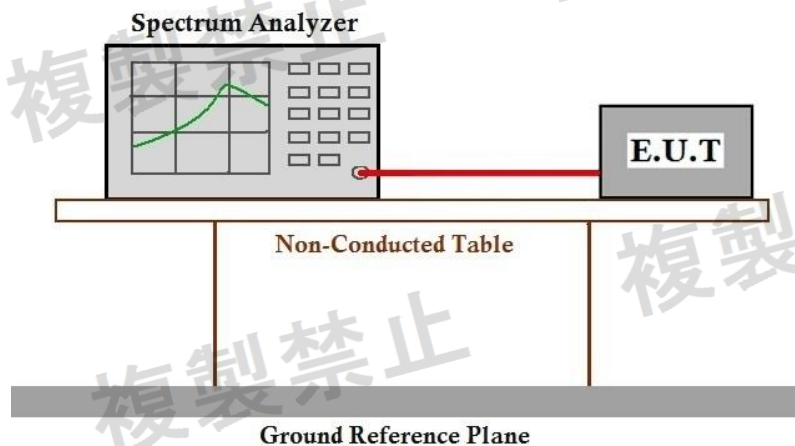
Operating Environment:

Temperature: 25.7 °C Humidity: 48.0 % RH Atmospheric Pressure: 1005 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	RX_Keep the EUT in receiving mode

7.5.3 Test Setup Diagram



7.5.4 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

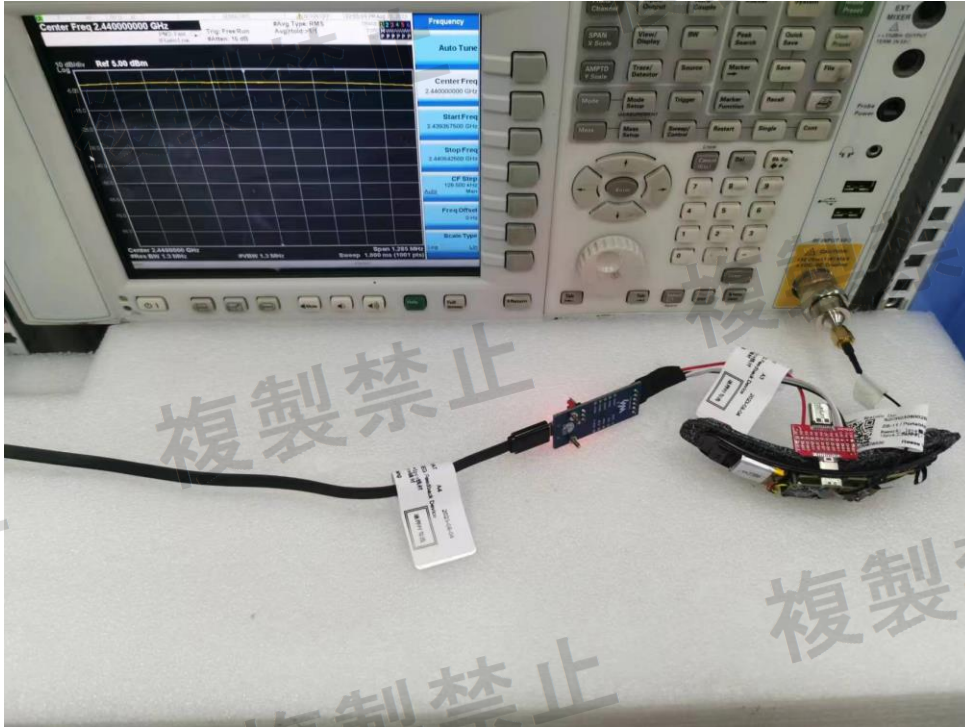
detector mode Sample

Indication mode Max hold

Please Refer to Appendix for Details



8 Test Setup Photo



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9 EUT Constructional Details (EUT Photos)

Refer to Appendix - Photographs of EUT Constructional Details for SZCR2308002513AT



10 Appendix

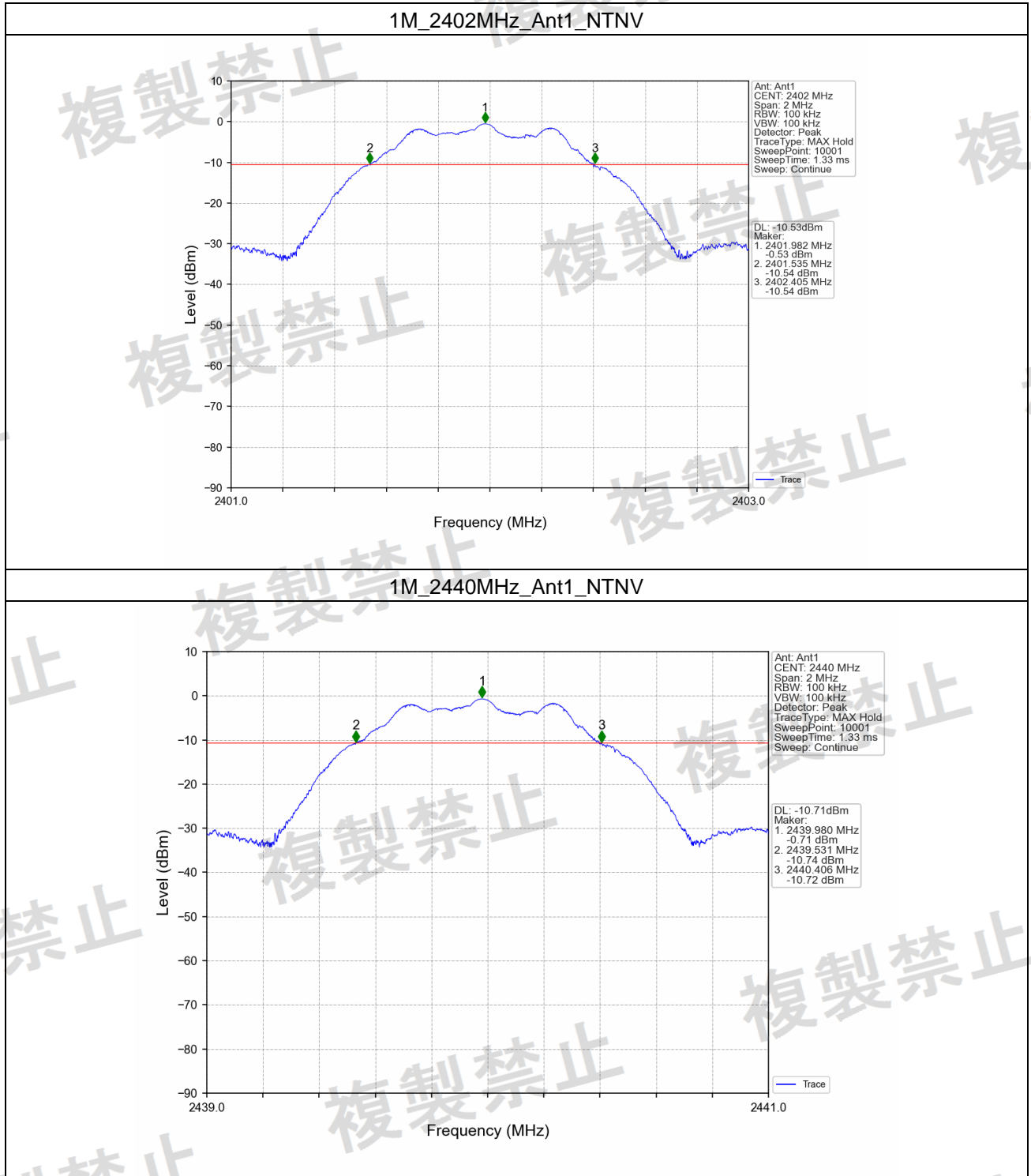
1. Frequency Error

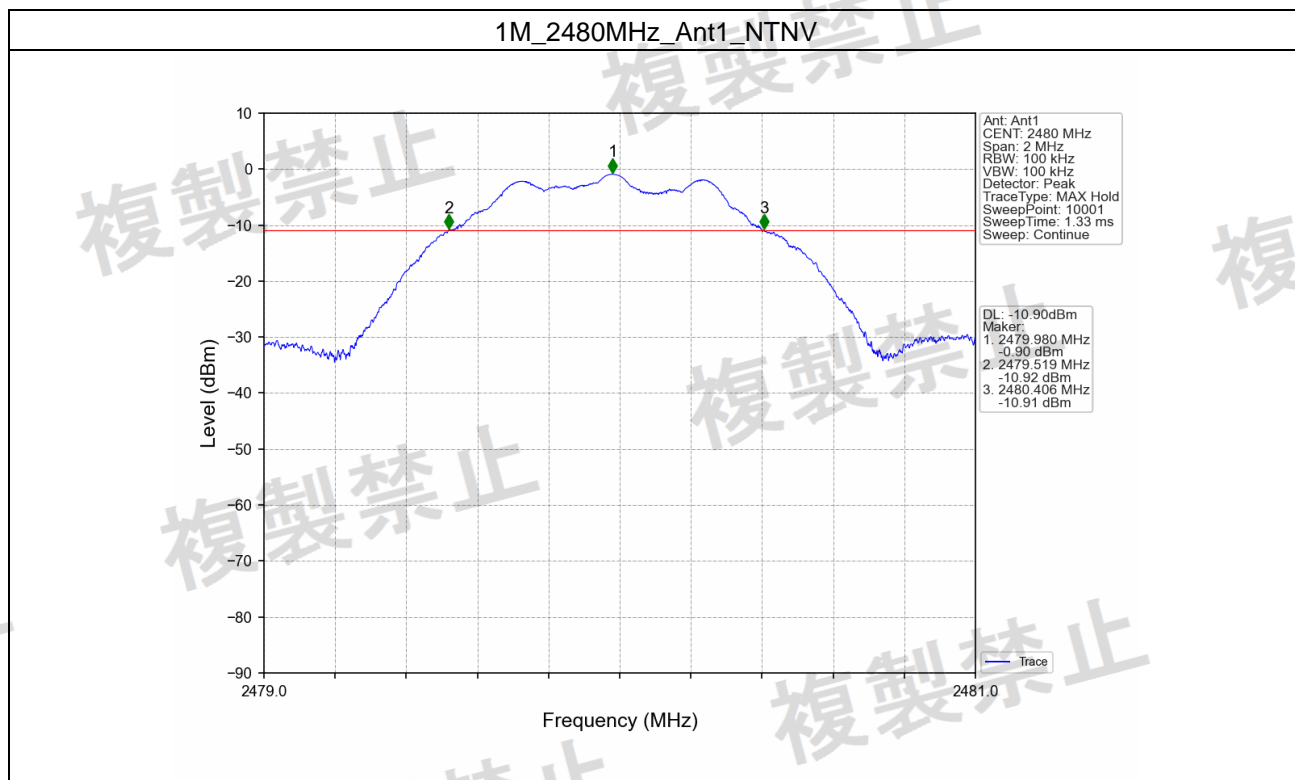
1.1 Ant1

1.1.1 Test Result

Ant1							
ENV	Mode	TX Type	Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)		Verdict
					Result	Limit	
NTNV	1M	SISO	2402	2401.970	-12.49	-50 to 50	Pass
			2440	2439.969	-12.70	-50 to 50	Pass
			2480	2479.962	-15.32	-50 to 50	Pass

1.1.2 Test Graph





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2. Occupied Bandwidth

2.1 OBW

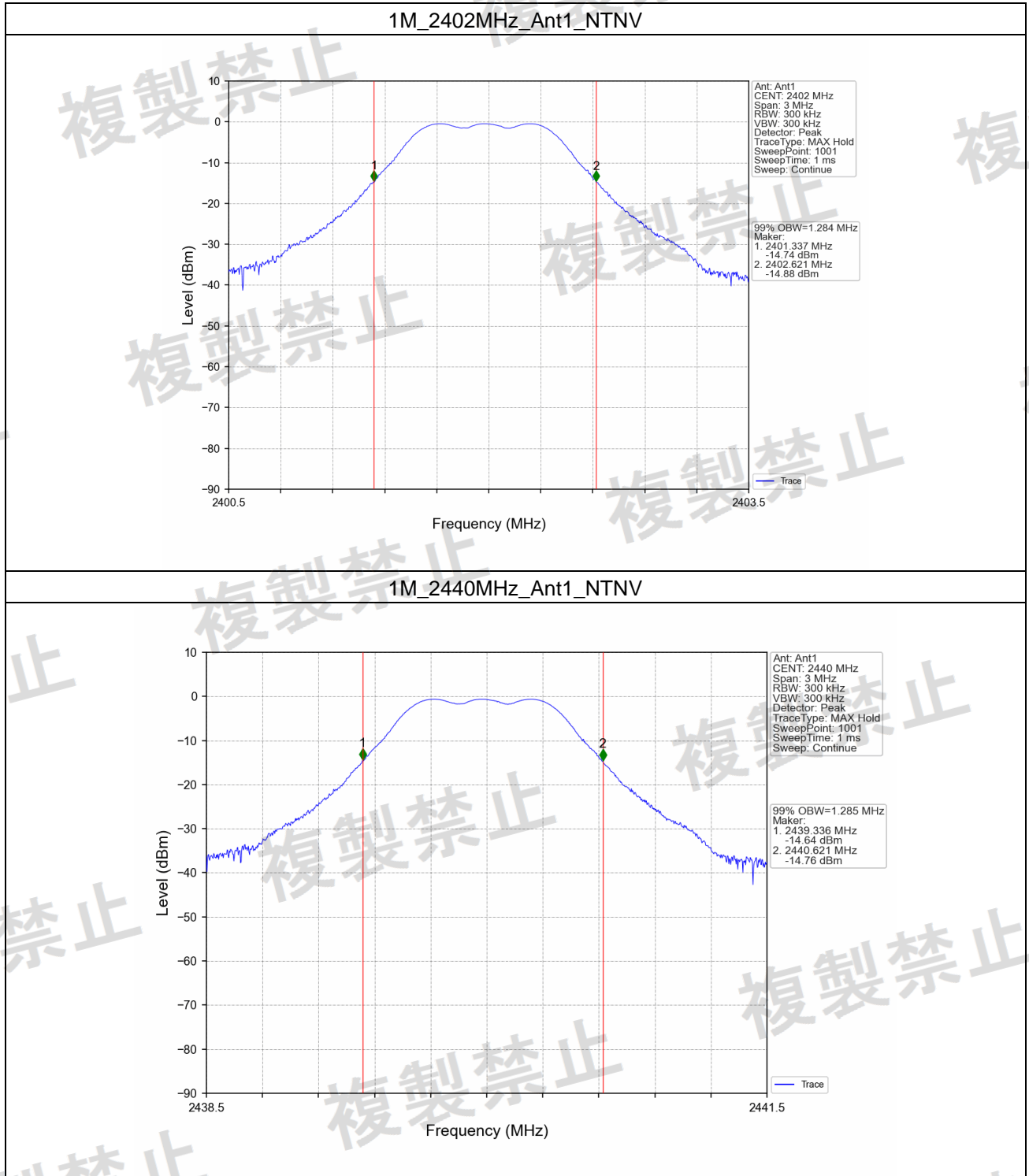
2.1.1 Test Result

ENV	Mode	TX Type	Frequency (MHz)	99% Occupied Bandwidth (MHz)		Verdict
				ANT1	Limit	
NTNV	1M	SISO	2402	1.284	<=26	Pass
			2440	1.285	<=26	Pass
			2480	1.291	<=26	Pass

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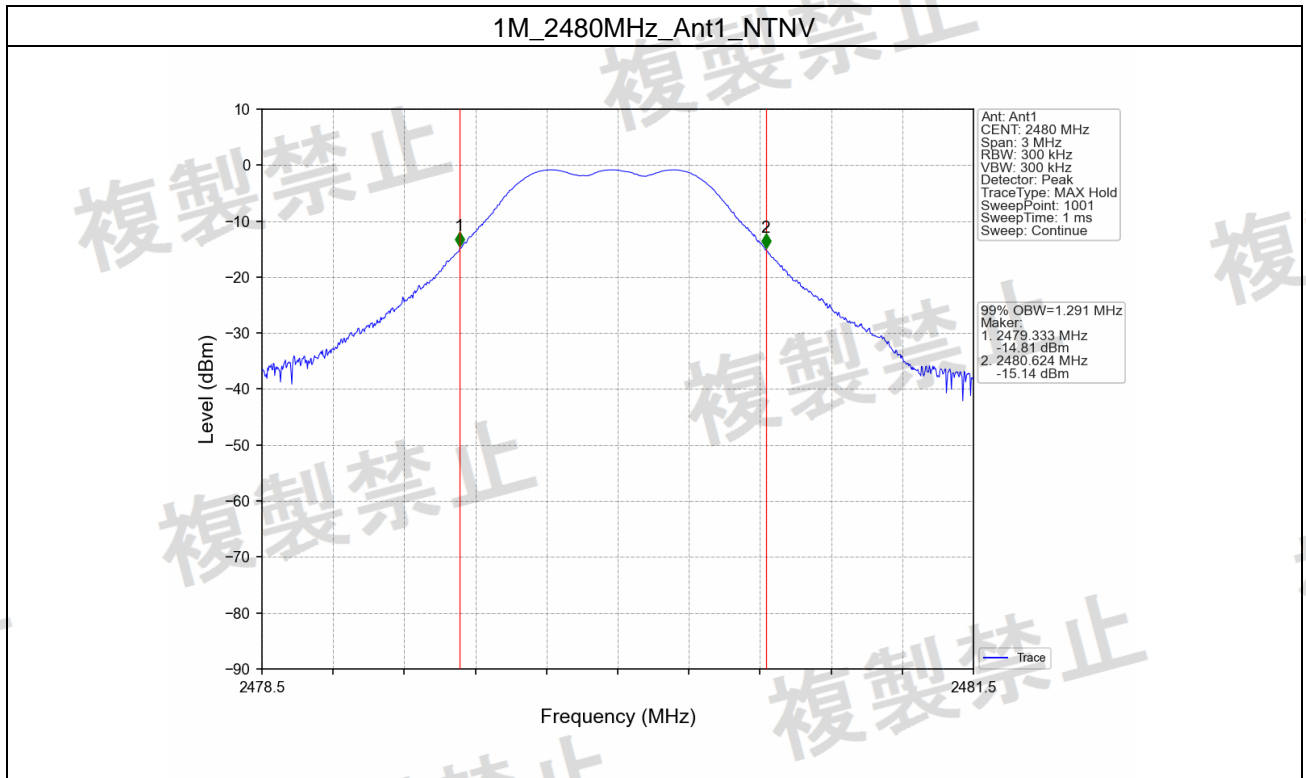
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2.1.2 Test Graph



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3. Antenna Power

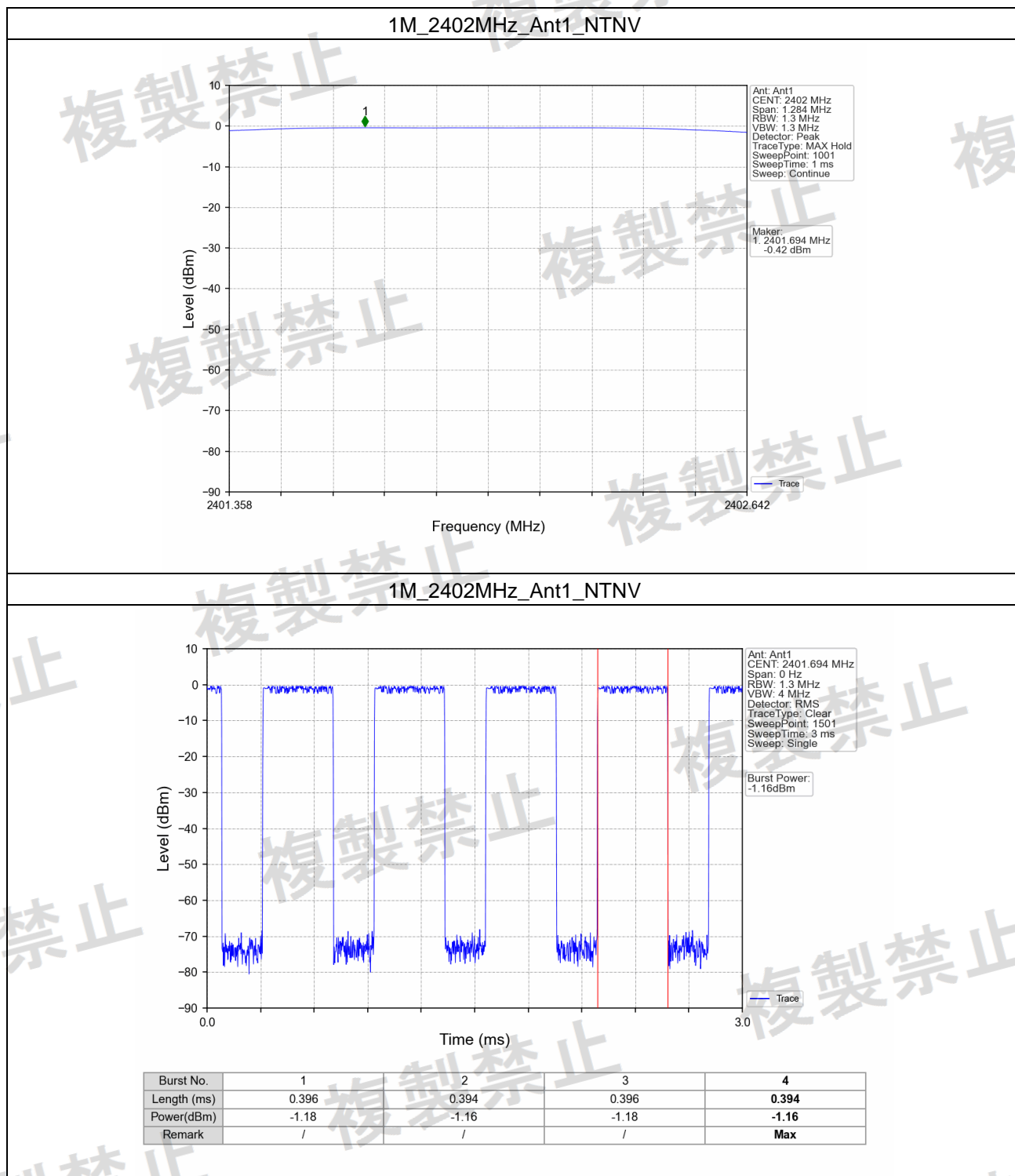
3.1 Power

3.1.1 Test Result

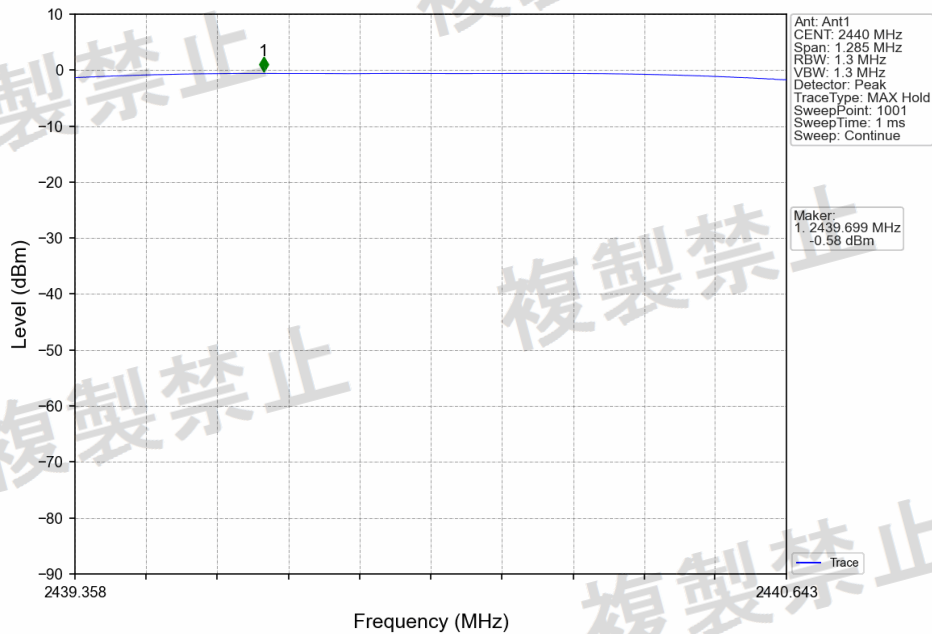
ENV	Mode	TX Type	Frequency (MHz)	ANT	Antenna Power (mW)		Nominal Power (mW)	Tolerance (%)		Verdict
					Measured	Limit		Measured	Limit	
NTNV	1M	SISO	2402	1	0.766	<=10.00	0.770	-0.52	-80 to 20	Pass
			2440	1	0.737	<=10.00	0.770	-4.29	-80 to 20	Pass
			2480	1	0.705	<=10.00	0.770	-8.44	-80 to 20	Pass



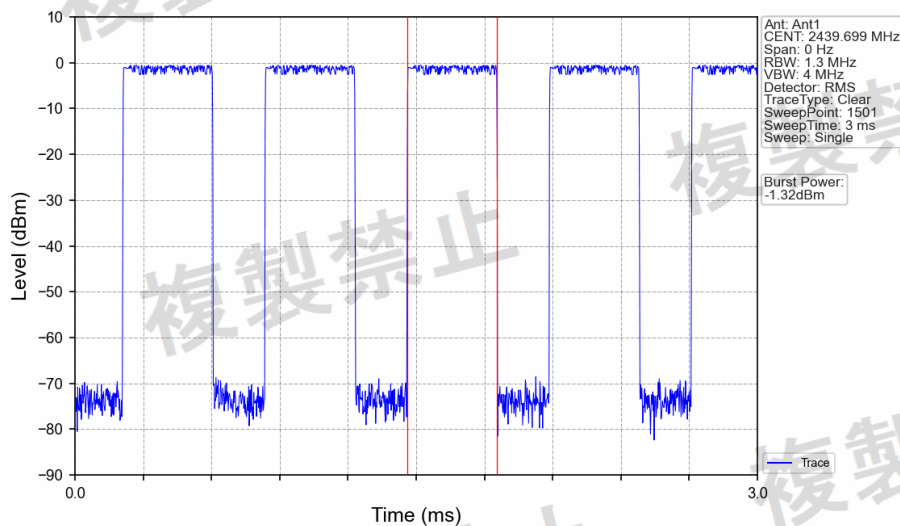
3.1.2 Test Graph



1M_2440MHz_Ant1_NTNV



1M_2440MHz_Ant1_NTNV

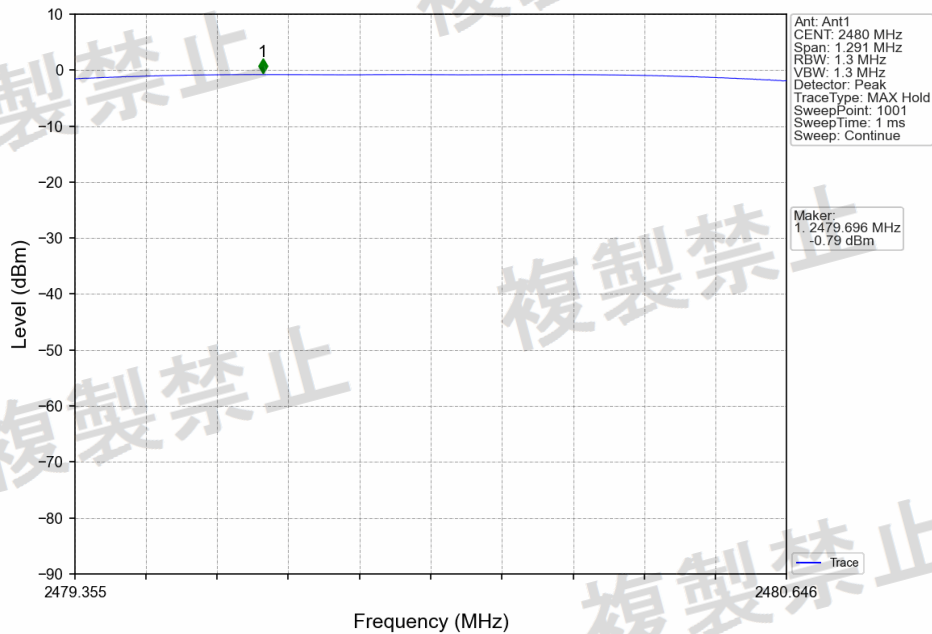


Burst No.	1	2	3	4
Length (ms)	0.396	0.396	0.396	0.396
Power(dBm)	-1.33	-1.32	-1.32	-1.33
Remark	/	/	Max	/

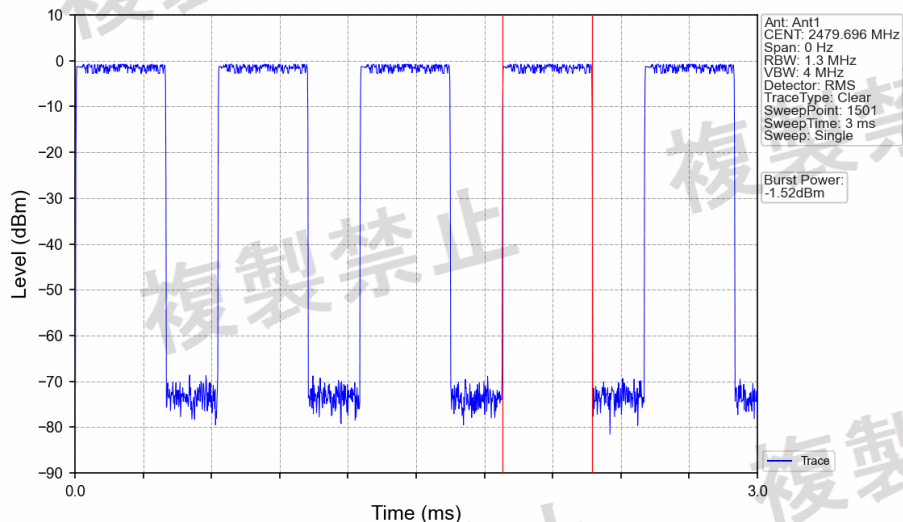
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1M_2480MHz_Ant1_NTNV



1M_2480MHz_Ant1_NTNV



Burst No.	1	2	3	4	5
Length (ms)	0.396	0.394	0.396	0.394	0.396
Power(dBm)	-1.54	-1.52	-1.54	-1.52	-1.54
Remark	/	/	/	Max	/

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4. Spurious Emission Intensity

4.1 TxSe

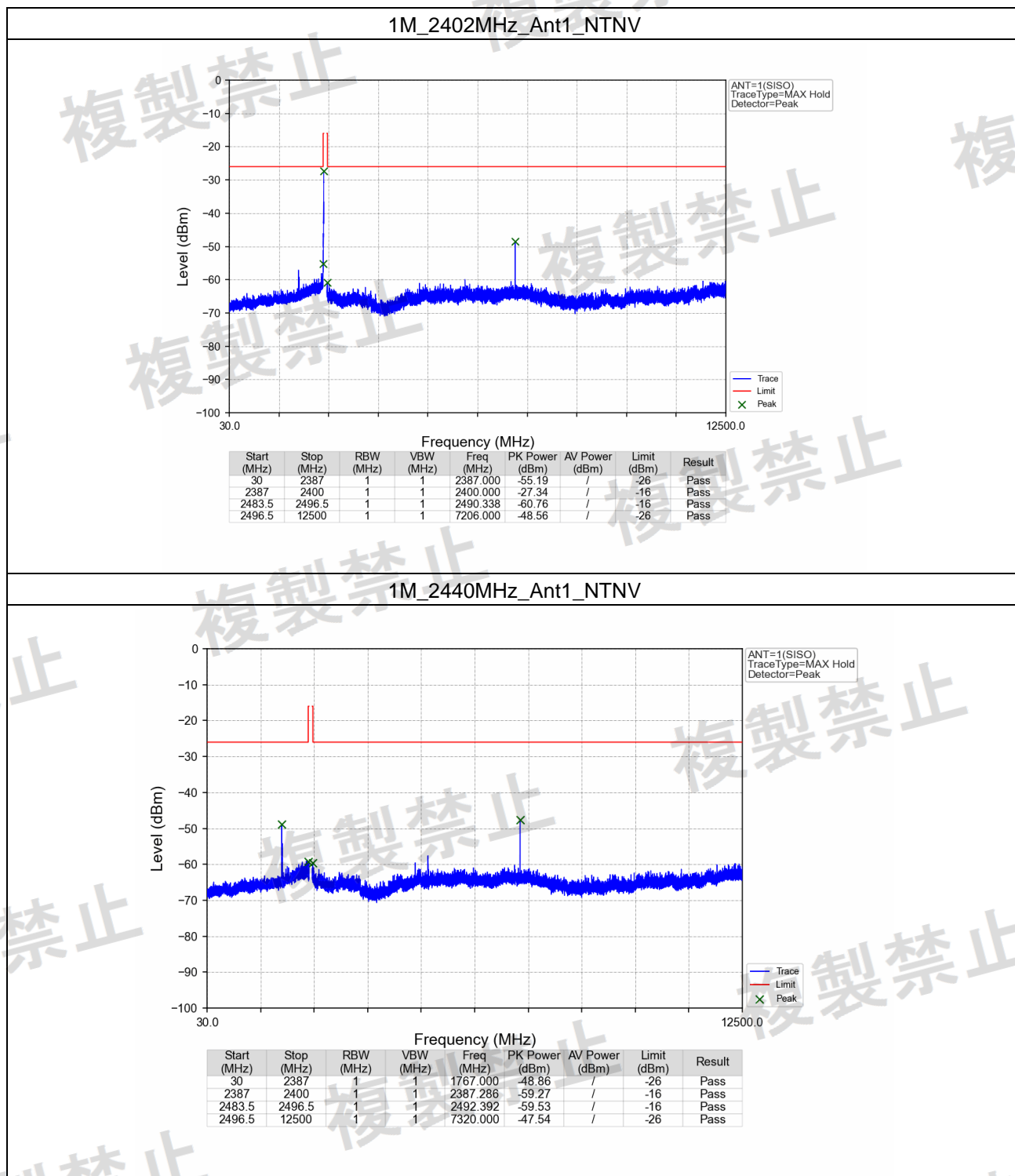
4.1.1 Test Result

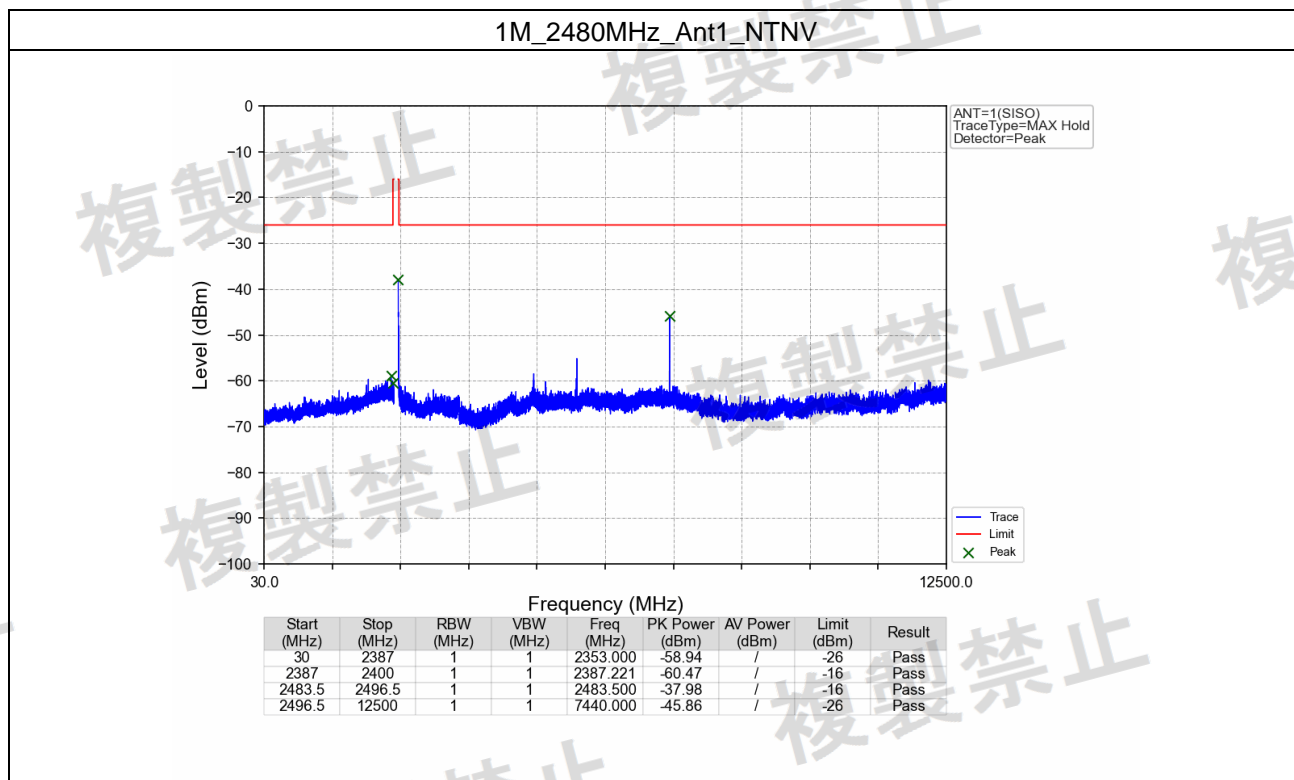
ENV	Mode	TX Type	Frequency (MHz)	ANT	Test Result	Limit	Verdict
NTNV	1M	SISO	2402	1	Refer To Test Graph		Pass
			2440	1	Refer To Test Graph		Pass
			2480	1	Refer To Test Graph		Pass

Note: The graphs just show the test results at 1MHz RBW, expressed in dBm units, which has the same meaning as dBm/MHz.



4.1.2 Test Graph





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5. Secondary Radiated Emission

5.1 RxSe

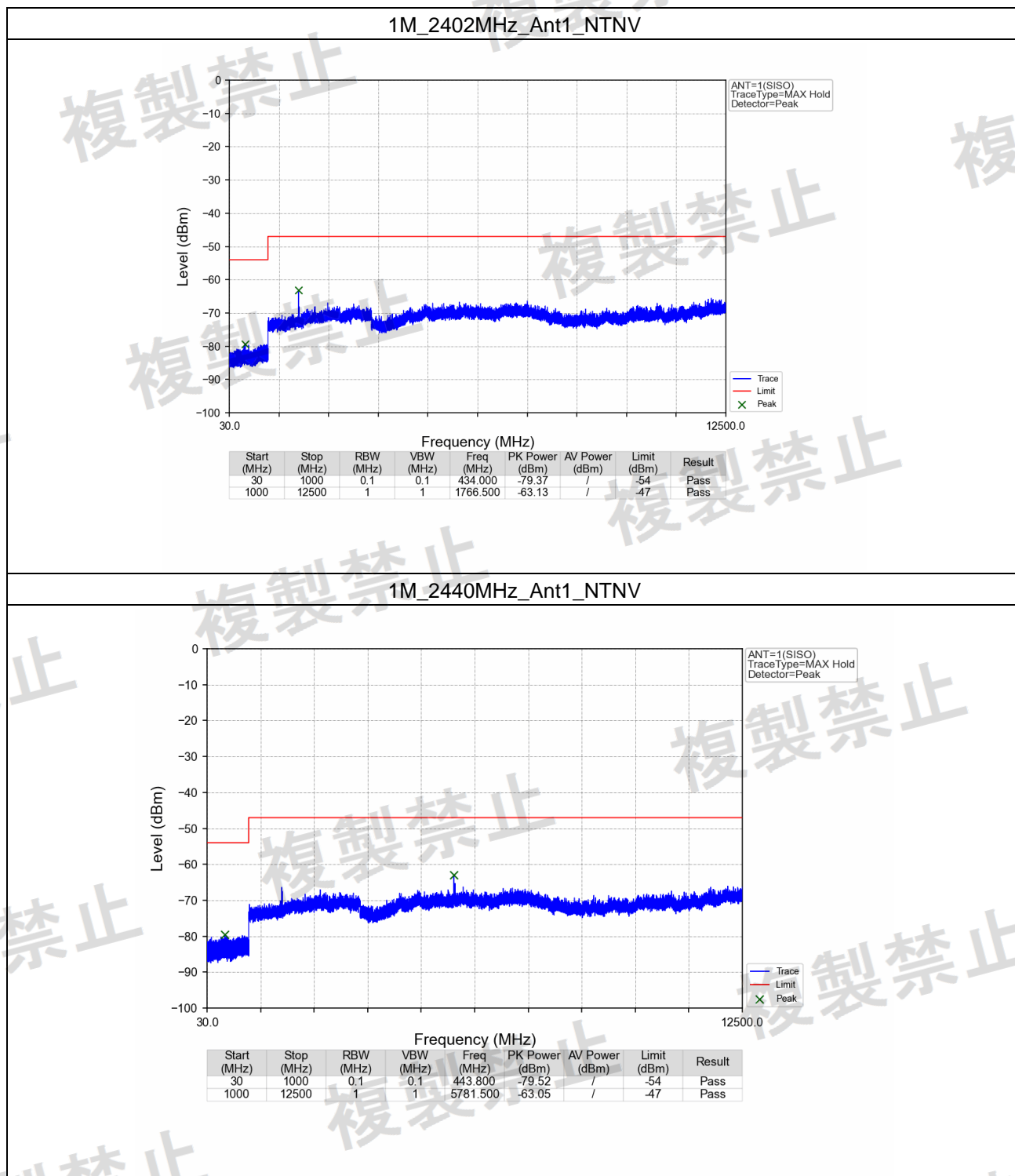
5.1.1 Test Result

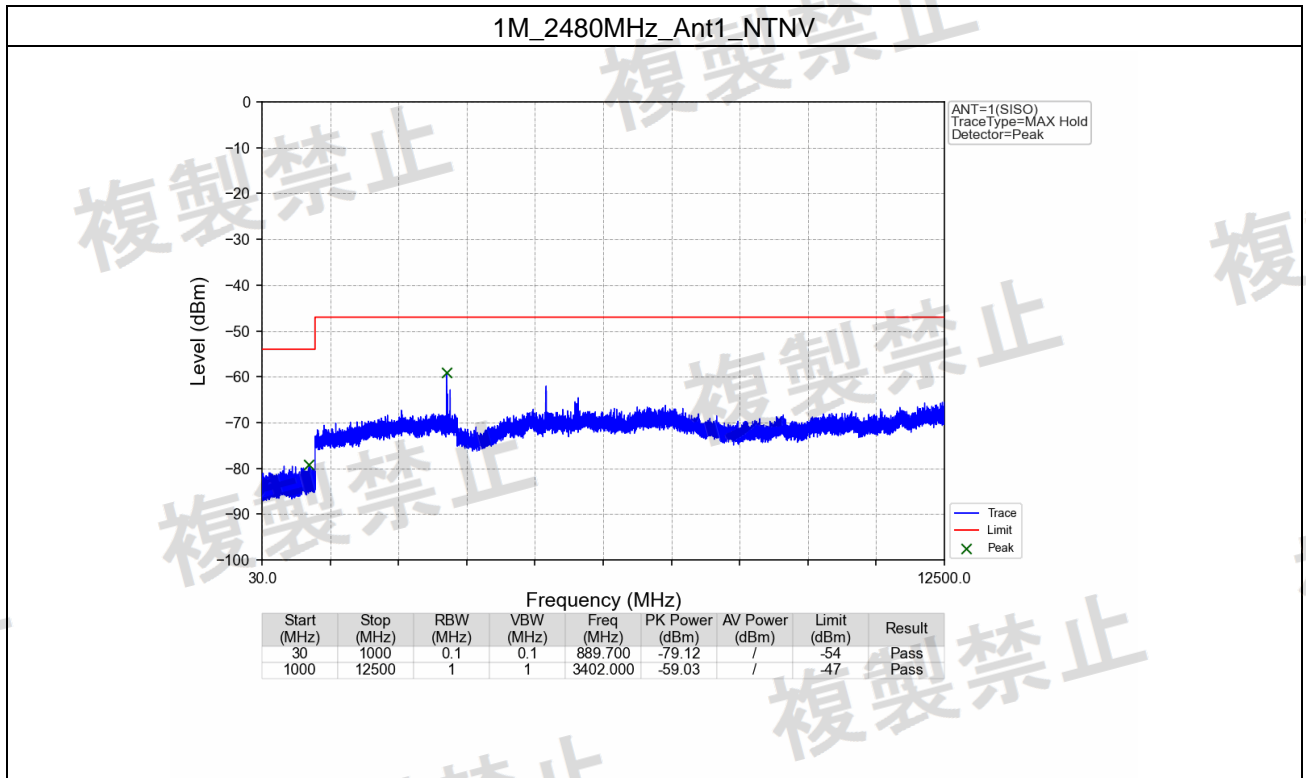
ENV	Mode	TX Type	Frequency (MHz)	ANT	Test Result	Limit	Verdict
NTNV	1M	SISO	2402	1	Refer To Test Graph		Pass
			2440	1	Refer To Test Graph		Pass
			2480	1	Refer To Test Graph		Pass

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5.1.2 Test Graph





- End of the Report -

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