



JAPAN Radio Test Report

Low Energy

APPLICANT : Telink Semiconductor (Shanghai) Co., Ltd.

PRODUNCT NAME : ML3228A-GAIA-M3-PE11

BRAND NAME : TELINK SEMICONDUCTOR (SHANG HAI) CO., LTD.

MODEL NAME : ML3228A-GAIA-M3-PE11

TYPE EMISSIONS : 1M02F1D(LE 1Mbps) ;
2M05F1D(LE 2Mbps) ;
1M05F1D(LE 125Kbps) ;
1M02F1D(LE 500Kbps)

DECLARATION : 4.950 mW (LE 1Mbps);

OUTPUT POWER : 4.950 mW (LE 2Mbps);
4.950 mW (LE 125Kbps);
4.950 mW (LE 500Kbps);

STANDARD : Article 49-20 and the relevant articles of the
Ordinance Regulating Radio Equipment

TEST : MIC Notice No.88 Appendix No.43

PROCEDURE

TEST DATE(S) : Mar. 14, 2026



We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the procedures given in MIC Notice No.88 Appendix No.43 and shown to be compliant with the applicable technical standards. Article 2 Paragraph 1 Item 19 of the Certificate Ordinance of the Radio Law indicates the classification of the specified radio equipment.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia



Sporton International Inc. (Kunshan)

**No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China**

TABLE OF CONTENTS

REVISION HISTORY	4
SUMMARY OF TEST RESULT	5
1 GENERAL DESCRIPTION	6
1.1 Applicant	6
1.2 Manufacturer	6
1.3 Feature of Equipment Under Test	7
1.4 Modification of EUT	8
1.5 Testing Site	8
1.6 Test Software	9
1.7 Measurement Uncertainty	9
1.8 Applied Standards	9
1.9 Ancillary Equipment List	9
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	10
2.1 Carrier Frequency Channel	10
2.2 EUT Operation Test Setup	10
3 TEST RESULT	11
3.1 Frequency Tolerance Measurement	11
3.2 Occupied Bandwidth	12
3.3 Unwanted Emission Intensity Measurement	13
3.4 RF Output Power / Tolerance	14
3.5 Limitation of Collateral Emission of Receiver Measurement	16
3.6 Transmission Antenna Gain (EIRP Antenna Power) Measurement	17
3.7 Transmission Radiation Angle Width (3dB Beamwidth) Measurement	19
3.8 Radio Interference Prevention Capability Measurement	21
3.9 Hopping Frequency Dwell Time Measurement	22
3.10 Transmission frequency switching function	23
3.11 Construction Protection Confirmation Method	24
4 LIST OF MEASURING EQUIPMENT	25
APPENDIX A. SETUP PHOTOGRAPHS	
APPENDIX B. TEST RESULTS	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
JR620206A	Rev. 01	Initial issue of report	Apr. 01, 2026

SUMMARY OF TEST RESULT

Report Section	Description	Result
3.1	Frequency Tolerance	Pass
3.2	Occupied Bandwidth	Pass
3.3	Unwanted Emission Intensity	Pass
3.4	RF Output Power / Tolerance	Pass
3.5	Limitation of Collateral Emission of Receiver	Pass
3.6	Transmission Antenna Gain (EIRP Antenna Power)	NA
3.7	Transmission Radiation Angle Width (3dB Beam width)	NA
3.8	Radio Interference Prevention Capability	Pass
3.9	Hopping Frequency Dwell Time	N/A
3.10	Transmission frequency switching function	N/A
3.11	Construction Protection Confirmation	Pass

Conformity Assessment Condition:

- The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
- The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty"

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.



1 General Description

1.1 Applicant

Telink Semiconductor (Shanghai) Co., Ltd.

11F, Building 1, 61 Shengxia Road, Pudong District, Shanghai, China

1.2 Manufacturer

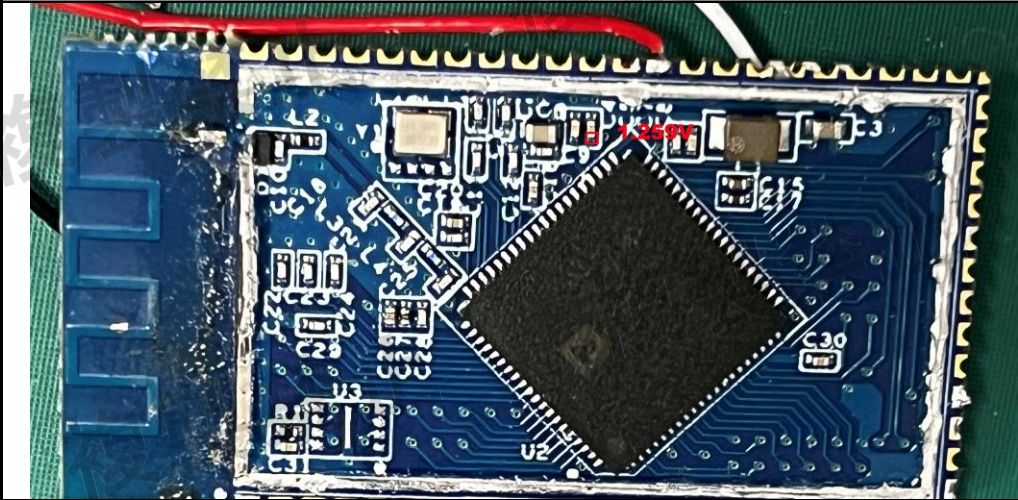
Shenzhen Xinghongju Technology Co., LTD

Building 201, No. 48, Pingzi Road, Nienfeng Community, Pingdi Street, Longgang District, Shenzhen

1.3 Feature of Equipment Under Test

Product Feature & Specification		
Product Name	ML3228A-GAIA-M3-PE11	
Brand Name	TELINK SEMICONDUCTOR (SHANG HAI) CO., LTD.	
Model Name	ML3228A-GAIA-M3-PE11	
Support Category / Frequency Range	Article 2-1-19 / 2400MHz ~ 2483.5MHz	
Type of Modulation	☐ Direct Spreading (DS) ☐ Orthogonal frequency-division multiplexing (OFDM) ☐ Frequency Hopping (FH) ☒ Other :GFSK	
Number of Channels	LE 1Mbps/2Mbps/125Kbps/500Kbps	40
Channel Spacing	LE 1Mbps/2Mbps/125Kbps/500Kbps	2MHz
Declaration RF Output Power	4.950 mW(LE 1Mbps) 4.950 mW (LE 2Mbps) 4.950 mW (LE 125Kbps) 4.950 mW (LE 500Kbps)	
Antenna Power (E.I.R.P)	8.346 dBm (LE 1Mbps) 8.346 dBm (LE 2Mbps) 8.346 dBm (LE 125Kbps) 8.346 dBm (LE 500Kbps)	
Modulation	☒ GFSK ☐ $\pi/4$ -DQPSK ☐ 8-DPSK ☐ Other : FSK	
Power Source ^{NOTE}	☐ Commercial power	AC 100 ~ 240V
	☒ External Power Source	DC 3.3V
	☐ Lithium battery	DC 3.7V, mAh
	☐ UM battery	DC 1.2V

NOTE: When EUT be operated at $\pm 10\%$ from the normal supply voltage, the supply voltage of RF part was varied within $\pm 1\%$. All test cases were done under the normal supply voltage.

Power Supply voltage 3.3Vdc (Nominal)	Power Supply voltage 3.63 Vdc (+10%)	Power Supply voltage 2.97 Vdc (-10%)
1.259	1.259	1.259
Measurement point		
		

Antenna Information			
Brand Name :	N/A	Model Name :	N/A
Antenna Type :	PCB	Antenna Gain :	1.4 dBi

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Modification of EUT

No modifications are made to the EUT during all test items.

1.5 Testing Site

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Site	Sporton International Inc. (Kunshan)
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158
Test Site No.	Sporton Site No.: TH01-KS

1.6 Test Software

Item	Site	Manufacturer	Name	Version
1.	TH01-KS	Tonscend	JS1120-3 test system China_210602	3.3.10

1.7 Measurement Uncertainty

Test Items	Uncertainty	Remark
Occupied Channel Bandwidth	$\pm 0.384\%$	Confidence 95%
RF output power, conducted	± 0.90 dB	Confidence 95%
Frequency Tolerance	0.38ppm	Confidence 95%
Power density, conducted	± 0.90 dB	Confidence 95%
Unwanted Emission	± 2.00 dB	Confidence 95%
Temperature	± 0.86 °C	Confidence 95%
Humidity	± 2.2 %	Confidence 95%
Time	± 0.44 %	Confidence 95%

1.8 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- Article 49-20 and the relevant articles of the Ordinance Regulating Radio Equipment

Remark:

- All test items were verified and recorded according to the standards and without any deviation during the test.
- The measurement was implemented in accordance with MIC Notice No. 88 Appendix No. 43.

1.9 Ancillary Equipment List

None.

2 Test Configuration of Equipment Under Test

2.1 Carrier Frequency Channel

Channel (LE Channel)	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	14	2430	27	2456
1	2404	15	2432	28	2458
2	2406	16	2434	29	2460
3	2408	17	2436	30	2462
4	2410	18	2438	31	2464
5	2412	19	2440	32	2466
6	2414	20	2442	33	2468
7	2416	21	2444	34	2470
8	2418	22	2446	35	2472
9	2420	23	2448	36	2474
10	2422	24	2450	37	2476
11	2424	25	2452	38	2478
12	2426	26	2454	39	2480
13	2428				

2.2 EUT Operation Test Setup

The equipment under test (EUT) was operated by commands in order to make the EUT into the engineering modes for transmitting, receiving signals continuously.

3 Test Result

3.1 Frequency Tolerance Measurement

3.1.1 Limit

Item	Limits
Frequency Tolerance	$\leq \pm 50\text{ppm}$

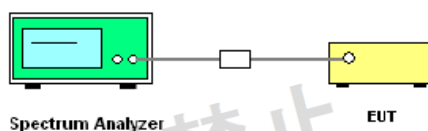
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedure

1. Frequency accuracy of instrument shall be less than 10% of limits tolerance (5ppm).
2. Three testing methods
 - a. Measure frequency tolerance by the system simulator.
 - b. CW Tone method
 - i. Setting of SA is following as: RBW:1kHz / VBW:30kHz.
 - ii. Maker Max. level to get measuring frequency f.
 - c. 10dB down method
 - i. Setting of SA is following as: RBW:30kHz / VBW: 30kHz / Trace: MaxHold
 - ii. Display line Level = Max. level – 10dB to place two markers, highest(fH) and lowest(fL) frequency
 - iii. Determine measuring frequency $f = (fH - fL)/2$
3. The frequency tolerance test case is directly measured using the frequency accuracy function of Bluetooth tester or spectrum analyzer. Then the frequency error formula is $(f - f_c)/f_c \times 10^6 \text{ ppm}$ and the limit is less than $\pm 50\text{ppm}$.

3.1.4 Test Setup



3.1.5 Test Result of Frequency Tolerance

Please refer to Appendix B.

3.2 Occupied Bandwidth

3.2.1 Limit

Item	Limits
Occupied Band Width	$\leq 83.5\text{MHz}$ (FH) $\leq 26\text{MHz}$ (OFDM, DS and Others)

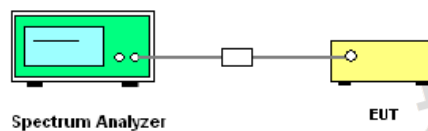
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

- Setting of SA is following as: RBW $\leq 3\%$ of bandwidth / VBW = RBW / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold.
- EUT have transmitted each modulation signal and fixed channelize (For DSSS or OFDM Device) or continuous maximum power of hopping mode (For FHSS Device). SA set to 99% of occupied bandwidth to measure occupied bandwidth. The limit is less than 26MHz (For DSSS or OFDM Device) or 83.5MHz (For FHSS Device).

3.2.4 Test Setup



3.2.5 Test Result of Occupied Bandwidth Measurement

Please refer to Appendix B.

3.3 Unwanted Emission Intensity Measurement

3.3.1 Limit

Item	Limits
Tx Spurious Emission	$\leq 2.5 \mu\text{W}/\text{MHz}$ ($2387\text{MHz} > f ; 2496.5\text{MHz} < f$)
	$\leq 25 \mu\text{W}/\text{MHz}$ ($2387\text{MHz} \leq f < 2400\text{MHz}$) and ($2483.5\text{MHz} < f \leq 2496.5\text{MHz}$)

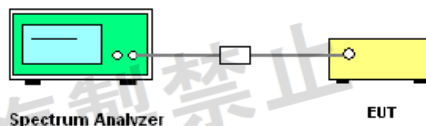
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. EUT have transmitted the maximum power and fixed channelize.
2. Setting of SA is following as: RBW:1MHz / VBW:1MHz above 1GHz, Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold.
3. Setting of SA is following as: RBW:100KHz / VBW:100KHz under 1GHz, Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold.
4. Setting of SA is following as 30MHz and stop frequency 2387MHz Then to mark peak reading value + cable loss shall be less than $2.5\mu\text{W}$.
5. SA adjusted to start frequency 2387MHz and stop frequency 2400MHz. Then to mark peak reading value + cable loss shall be less than $25\mu\text{W}$.
6. SA adjusted to start frequency 2483.5MHz and stop frequency 2496.5MHz Then to mark peak reading value + cable loss shall be less than $25\mu\text{W}$.
7. SA adjusted to start frequency 2496.5MHz and stop frequency 12500MHz Then to mark peak reading value + cable loss shall be less than $2.5\mu\text{W}$.
8. If the Result_Value is over the requirement, take total sum of 1MHz band centered at the spur frequency like ACLP measurement as Result_Value.

3.3.4 Test Setup



3.3.5 Test Result of Unwanted Emission Intensity

Please refer to Appendix B.

3.4 RF Output Power / Tolerance

3.4.1 Limit

Item	Limits
Antenna Power Density	$\leq 3\text{mW/MHz}$ (FH form 2400~2483.5MHz)
	$\leq 10\text{mW/MHz}$ (OFDM,DS from 2400~2483.5MHz)
	$\leq 10\text{mW}$ (Other from 2400~2483.5MHz)
Antenna Power Error	+20% (Base on manufacturer declare antenna power density)

Note: When an E.I.R.P. is less than 2.14dBi + antenna power limit, the shortage can be compensated for by the antenna power (GFSK).

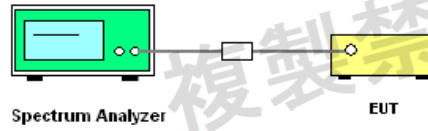
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedures

1. EUT have transmitted continuous maximum power on hopping mode (For FHSS Device).
2. Frequency hopping system or combined systems of direct spread and frequency hopping:
 - i. Connect the high frequency power meter to the output of the attenuator and measure the total power (without bandwidth limitation)
 - ii. Divide the total power by the spread bandwidth to find the “average” power per MHz.
The average power per MHz is equal to the power meter value dBm + cable loss dB + $10 \log_{10} (1/\text{Duty Cycle})$ dB + $10 \log_{10} (1/\text{Spread Bandwidth})$ dB.
 - iii. Confirm that frequency distribution of the hopping frequencies is homogeneous according to the supporting data.
If frequency distribution of the frequencies is not homogeneous, consider other measurement or correction methods based on the supporting data.
 - iv. Set the antenna power as follows:
 - Continuous waves: value in ii.
3. Antenna RF Output Power Tolerance is definition that actual measure antenna power tolerance + 20% power range that manufacturer declare the conducted power density.

3.4.4 Test Setup



3.4.5 Test Result of RF Output Power / Tolerance

Please refer to Appendix B.

3.5 Limitation of Collateral Emission of Receiver Measurement

3.5.1 Limit

Item	Limits
Rx Spurious Emission	$\leq 4\text{nW}$ ($f < 1\text{GHz}$)
	$\leq 20\text{nW}$ ($1\text{GHz} \leq f$)

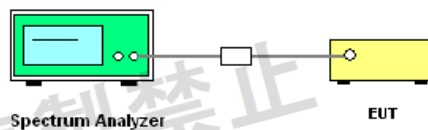
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. EUT have the continuous reception mode and fixed only one channelize.
2. SA set RBW: 100KHz and VBW: 100KHz. Then adjust to start frequency 30MHz and stop frequency 1GHz. Search to mark peak reading value + cable loss shall be less than 4nW.
3. SA set RBW: 1MHz and VBW: 1MHz. Then adjust to start frequency 1000MHz and stop frequency 12.5GHz. Search to mark peak reading value + cable loss shall be less than 20nW.
4. If power level of lower emissions are more than 1/10 of limit (.0.4nW for $f < 1\text{GHz}$, 2nW for $f \geq 1\text{GHz}$), all those are to be indicated in the 2nd and 3rd lines. If others are 1/10 or less more of the limit, no necessary to be indicated.

3.5.4 Test Setup



3.5.5 Test Result of Limitation of Collateral Emission of Receiver

Please refer to Appendix B.

3.6 Transmission Antenna Gain (EIRP Antenna Power) Measurement

3.6.1 Limit

Item	Limits
EIRP Power Density	$\leq 6.91\text{dBm/MHz}$ (FH form 2400~2483.5MHz)
	$\leq 12.14\text{dBm/MHz}$ (OFDM,DS from 2400~2483.5MHz)
	$\leq 12.14\text{dBm}$ (Other from 2400~2483.5MHz)
Remark: This test item will not be applied to EIRP power of EUT is lower than 12.14dBm/MHz.	

3.6.2 Measuring Instruments

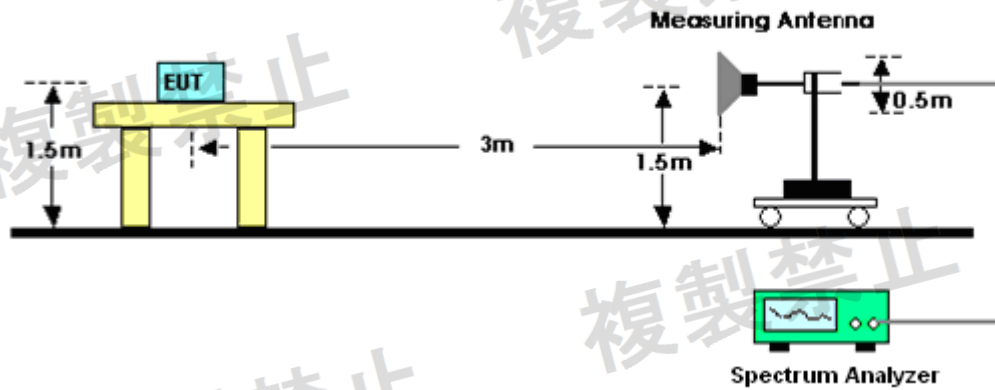
See list of measuring instruments of this test report.

3.6.3 Test Procedures

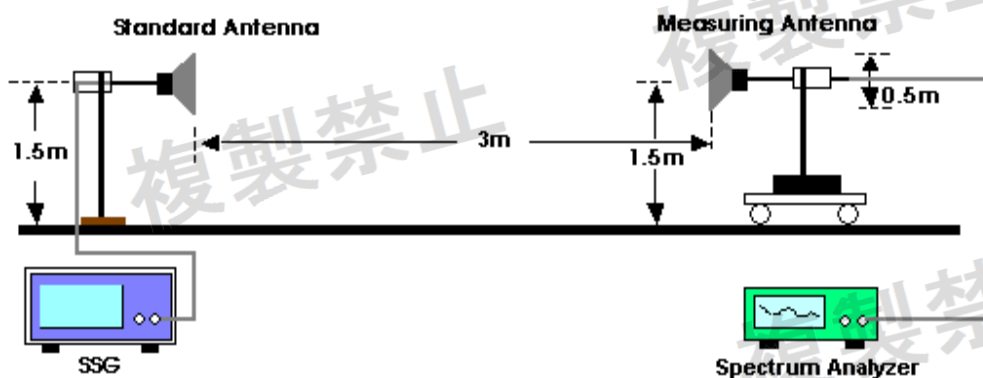
1. Set EUT and measuring antenna at the same height and roughly facing each other.
2. Move the measuring antenna height up and down within $\pm 50\text{cm}$ of EUT height and swing it to find the maximum output of the measuring antenna. The output level at the spectrum analyzer is read as "E".
3. Remove the EUT from the turn table and put the replacing antenna facing to measuring antenna at same height. Set the standard signal generator (SSG) at same frequency and transmit on then receive the signal.
4. Swing the replacing antenna give a maximum receiving level.
5. Move the measuring antenna height up and down within $\pm 50\text{cm}$ of replacing antenna height and swing it to find the maximum receiving level.
6. Set SSG output power at P_t to give the equivalent output level of "E" or calculate P_t with SSG output which gives the nearest of "E" and difference ($\pm 1\text{dB}$). Record the P_t .
7. Calculate EIRP by the formula below $\text{EIRP} = G_t - L + P_t$.
 G_t : gain of replacing antenna (dBi)
 L : feeder loss between SSG and replacing antenna
 P_t : Output power of the SSG
8. If the antenna for the EUT has circular polarization, sum of V-field and H-field will be result if measuring antenna is linear polarization.

3.6.4 Test Setup

<For EUT radiation measurement>



<For standard antenna measurement>



3.6.5 Test Result of Transmission Antenna Gain (EIRP Antenna Power)

Please refer to Appendix B. For the antenna gain, please refer to antenna test report.

Remark: This test item will not be applied to EIRP power of EUT is lower than 12.14dBm/MHz.

3.7 Transmission Radiation Angle Width (3dB Beamwidth) Measurement

3.7.1 Limit

Item	Limits
3dB antenna beamwidth	$360/A$ (If $A < 1$; then $A = 1$) $A = \{\text{EIRP Power [mW]} / 16.36 \text{ for DS, OFDM}\}$ or $A = \{\text{EIRP Power [mW]} / 4.9 \text{ for FH}\}$
Remark: This test item will not be applied to EIRP power of EUT is lower than 12.14dBm/MHz.	

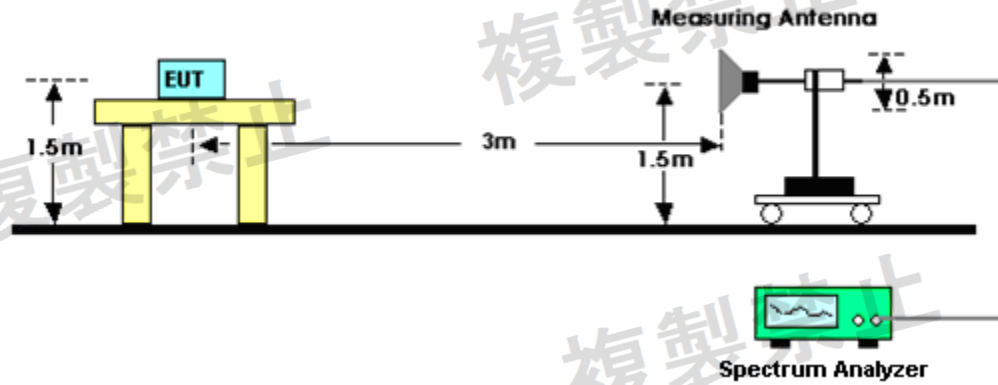
3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

3.7.3 Test Procedures

1. Set EUT and measuring antenna at the same height and roughly facing each other.
2. Set spectrum analyzer with condition in section 3.7.2 and tune reference level to observe receiving signal position.
3. Rotate directions of the EUT horizontally and vertically to find the maximum receiving power.
4. Move the measuring antenna height up and down within $\pm 50\text{cm}$ of EUT height and swing it to find the maximum output of measuring antenna. The output level at the spectrum analyzer is read as "E".
5. Calculate permitted radiation angle in horizontal and vertical using EIRP measured in another test method.
6. Calculate 3dB antenna beam width by the formula below $360/A$ (If $A < 1$; then $A = 1$).
 $A = \{\text{EIRP Power [mW]} / 16.36 \text{ for DS, OFDM}\}$ or
 $A = \{\text{EIRP Power [mW]} / 4.9 \text{ for FH}\}$

3.7.4 Test Setup



3.7.5 Test Result of Transmission Radiation Angle Width (3dB Beamwidth)

Please refer to Appendix B.

For the antenna gain, please refer to antenna test report.

Remark: This test item will not be applied to EIRP power of EUT is lower than 12.14dBm/MHz.

3.8 Radio Interference Prevention Capability Measurement

3.8.1 Limit

Item	Limits
Identification code	≥ 48 bits

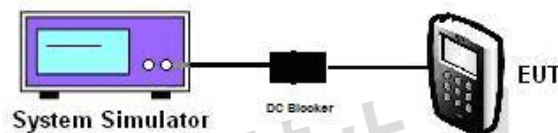
3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

3.8.3 Test Procedures

1. In the case that the EUT has the function of automatically transmitting the identification code: a. Transmit the predetermined identification codes from EUT. b. Check the transmitted identification codes with the demodulator.
2. In the case of receiving the identification code: a. Transmit the predetermined identification codes from the counterpart. b. Check if communication is normal. c. Transmit the signals other than predetermined ID codes from the counterpart. d. Check if the EUT stops the transmission, or if it displays that identification codes are different from the predetermined ones.

3.8.4 Test Setup



3.8.5 Test Result of Radio Interference Prevention Capability

Please refer to Appendix B.

3.9 Hopping Frequency Dwell Time Measurement

3.9.1 Limit

Item	Limits
Hopping Freq. Dwell Time	≤ 0.4 seconds

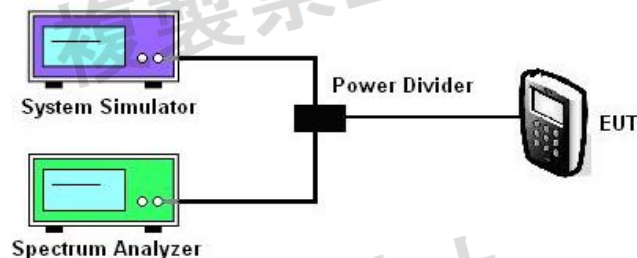
3.9.2 Measuring Instruments

See list of measuring instruments of this test report.

3.9.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
3. Use a video trigger with the trigger level set to enable triggering only on full pulses.
4. Sweep Time is more than once pulse time.
5. Set the center frequency on any frequency would be measured and set the frequency span to zero span.
6. Measure the maximum time duration of one single pulse.
7. Set the EUT in continuous transmitting for each supported maximum packet format.
8. Measure the maximum time duration of one single pulse.
9. Use the marker-delta function to calculate the dwell time.
10. Dwell Time = Total Number of channels x 0.4(s) x Average Hopping Channel x package transfer time
11. Average Hopping Channel = Total Number of hopping / sweep time

3.9.4 Test Setup



3.9.5 Test Result of Hopping Frequency Dwell Time

Not Applicable.

3.10 Transmission frequency switching function

3.10.1 Limit

1. Set the test equipment to transmit mode and use a spectrum analyzer to confirm that radio waves at the frequency to be switched are being transmitted.
2. Set the test equipment to transmit operation and use a spectrum analyzer to confirm that the transmission time of the frequency to be switched is within 4 seconds.
(Only transmitters that use Gaussian frequency shift keying and compensate for the drop in equivalent isotropic radiated power with antenna power.)

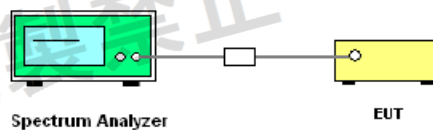
3.10.2 Measuring Instruments

See list of measuring instruments of this test report.

3.10.3 Test Procedures

1. Set the test equipment to transmit operation.
2. SA set RBW: 100KHz and VBW: 100KHz. Bandwidth from the lower limit frequency to the upper limit frequency that the test equipment can switch to.
3. SA set RBW: 100KHz and VBW: 100KHz. Any frequency between the lower limit frequency and the upper limit frequency that the test equipment can switch to.
4. Monitor the EUT, while confirm that the transmission time of the frequency to be switched is within 4 seconds, then record it Good, otherwise, the result is fail.

3.10.4 Test Setup



3.10.5 Test Result

Not Applicable.

3.11 Construction Protection Confirmation Method

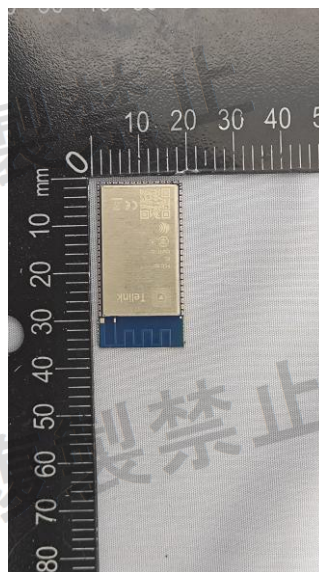
3.11.1 Limit

The high-frequency section and modulation section of the radio equipment except for the antenna system shall not be capable of being opened easily.

3.11.2 Confirmation Method

☐	Sealed with special screws.
☐	Plastic chassis is being welded using ultrasonic waves.
☐	Chassis is glued using a special adhesive.
☐	Metal covers are spot-fused.
☐	Cover is specially interlocked.
☒	RF and Modulation components are covered with shielding case and this shielding case is soldered.
☐	Shield case is welded at RF and modulation parts, and ID-ROM is welded using the BGA Method.
☐	Shield case is welded at RF and modulation parts, and ID-ROM is glued at its lead with a special adhesive.
☐	Shield case is welded at RF and modulation parts, and ID-ROM is glued with a non-transparent laminating agent.
☐	Other :

3.11.3 The Photos of Construction Protection



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Periods of Test	Due Date	Calibration Body	Calibration Method
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Jul. 07, 2025	Mar. 14, 2026	Jul. 06, 2026	Guangzhou Lisai metrology&Test Co., Ltd.	C
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Dec. 25, 2025	Mar. 14, 2026	Dec. 24, 2026	Guangzhou Lisai metrology&Test Co., Ltd.	C
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Dec. 25, 2025	Mar. 14, 2026	Dec. 24, 2026	Guangzhou Lisai metrology&Test Co., Ltd.	C
DC Power Supply	GW INSTEK	GPD-2303S	GEO861339	Max 31	Oct. 09, 2025	Mar. 14, 2026	Oct. 08, 2026	Guangzhou Lisai metrology&Test Co., Ltd.	C
Multi-meter	ELECALL	MF-47	VN-MF47-181013	-	Apr. 15, 2025	Mar. 14, 2026	Apr. 14, 2026	Guangzhou Lisai metrology&Test Co., Ltd.	C

Note: Above test equipment was used and kept valid calibration period during test.

Calibration Method :

a) : Calibration conducted by the National Institute of Information and Communications Technology~ NICT~ or a designated calibration agency under Article 102-18 paragraph

(1) TELEC Engineering Center, Intertek Japan K.K., Keysight Technologies, Inc~.

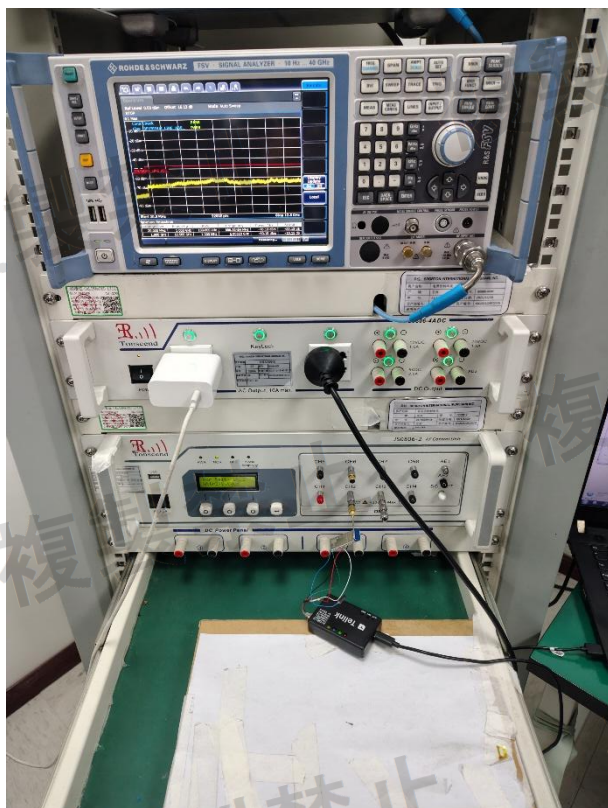
b) : Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992)~Japan Calibration Service System~

c) : Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph

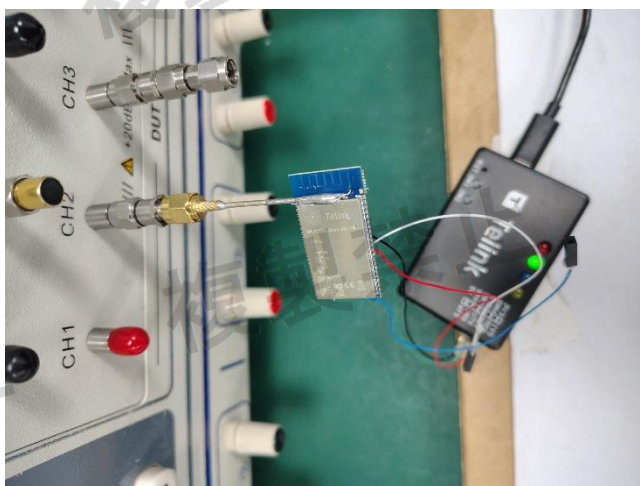
(1)~ TELEC Engineering Center, Intertek Japan K.K., Keysight Technologies, Inc~.

Appendix A. Setup Photographs

Front View



Near View





Appendix B. Test Results

Please refer to the following pages for test results.

TEST RESULTS DATA
BLUETOOTH(Normal Voltage)

Environment of Test Room		Temperature	23~25 °C	
		Humidity	50~55 %	
Test Engineer		Jiang Jun		
Use the DC Power Supply to adjust Voltage.				
Input Power Voltage:		3.3		VDC
Antenna	No.	Type	Gain	
	1	PCB	1.4	
	2			

Type Emissions		
		Ant 1
BLE 1M	Modulatoin Type:	GFSK
	Type Emissions:	1M02F1D
BLE 2M	Modulatoin Type:	GFSK
	Type Emissions:	2M05F1D
BLE 125K	Modulatoin Type:	GFSK
	Type Emissions:	1M05F1D
BLE 500K	Modulatoin Type:	GFSK
	Type Emissions:	1M02F1D

Radio Interference Prevention Capability	-----	good	PASS
--	-------	------	------

E.I.R.P		Port 1	
		Ant 1	
BLE 1M	Peak Antenna Gain	1.40	dBi
	Declaration Output Power	4.950	mW
	Declaration Output Power	6.946	dBm
	E.I.R.P	8.346	dBm
BLE 2M	Peak Antenna Gain	1.40	dBi
	Declaration Output Power	4.950	mW
	Declaration Output Power	6.946	dBm
	E.I.R.P	8.346	dBm
BLE-125K	Peak Antenna Gain	1.40	dBi
	Declaration Output Power	4.950	mW
	Declaration Output Power	6.946	dBm
	E.I.R.P	8.346	dBm
BLE-500K	Peak Antenna Gain	1.40	dBi
	Declaration Output Power	4.950	mW
	Declaration Output Power	6.946	dBm
	E.I.R.P	8.346	dBm

Power Tolerance							
Antenna			Ant 1				
BLE 1M	Measurement Frequency	MHz	2402	2440	2480	Limit	Result
	Channel Number	Ch	0	19	39	/	-
	RF Output Power	mW	4.920	4.875	4.943	/	-
	RF Output Power Tolerance	%	-0.60	-1.51	-0.14	+20	PASS
	Output Power (With burst radio)	dBm	6.92	6.88	6.94	/	-
BLE 2M	Measurement Frequency	MHz	2402	2440	2480	Limit	Result
	Channel Number	Ch	0	19	39	/	-
	RF Output Power	mW	4.842	4.909	4.887	/	-
	RF Output Power Tolerance	%	-2.19	-0.83	-1.28	+20	PASS
	Output Power (With burst radio)	dBm	6.85	6.91	6.89	/	-
BLE-125K	Measurement Frequency	MHz	2402	2440	2480	Limit	Result
	Channel Number	Ch	0	19	39	/	-
	RF Output Power	mW	4.887	4.831	4.864	/	-
	RF Output Power Tolerance	%	-1.28	-2.41	-1.74	+20	PASS
	Output Power (With burst radio)	dBm	6.89	6.84	6.87	/	-
BLE-500K	Measurement Frequency	MHz	2402	2440	2480	Limit	Result
	Channel Number	Ch	0	19	39	/	-
	RF Output Power	mW	4.842	4.831	4.887	/	-
	RF Output Power Tolerance	%	-2.19	-2.41	-1.28	+20	PASS
	Output Power (With burst radio)	dBm	6.85	6.84	6.89	/	-

Burst	
Antenna	Ant 1
BLE 1M	ON TIME(msec)
	OFF TIME(msec)
	Ratio(%)
	Packet Type (Mode)
BLE 2M	ON TIME(msec)
	OFF TIME(msec)
	Ratio(%)
	Packet Type (Mode)
BLE-125K	ON TIME(msec)
	OFF TIME(msec)
	Ratio(%)
	Packet Type (Mode)
BLE-500K	ON TIME(msec)
	OFF TIME(msec)
	Ratio(%)
	Packet Type (Mode)
Cable loss	

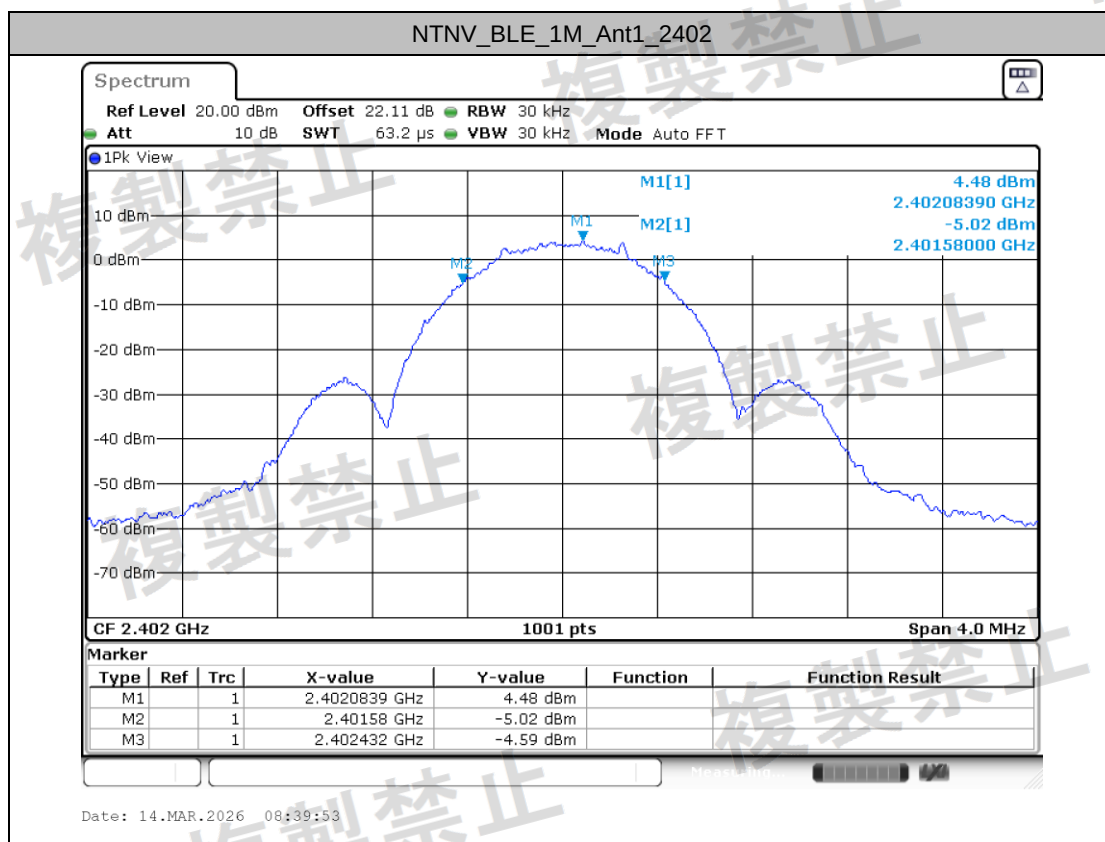


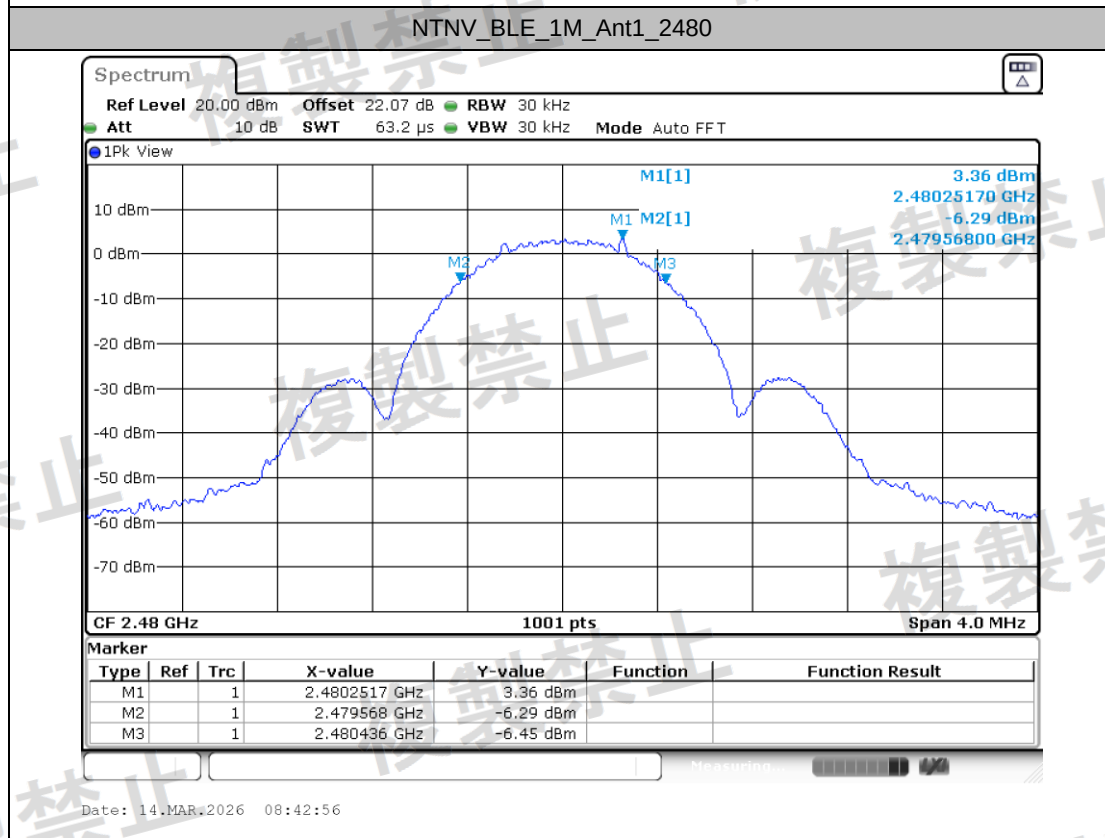
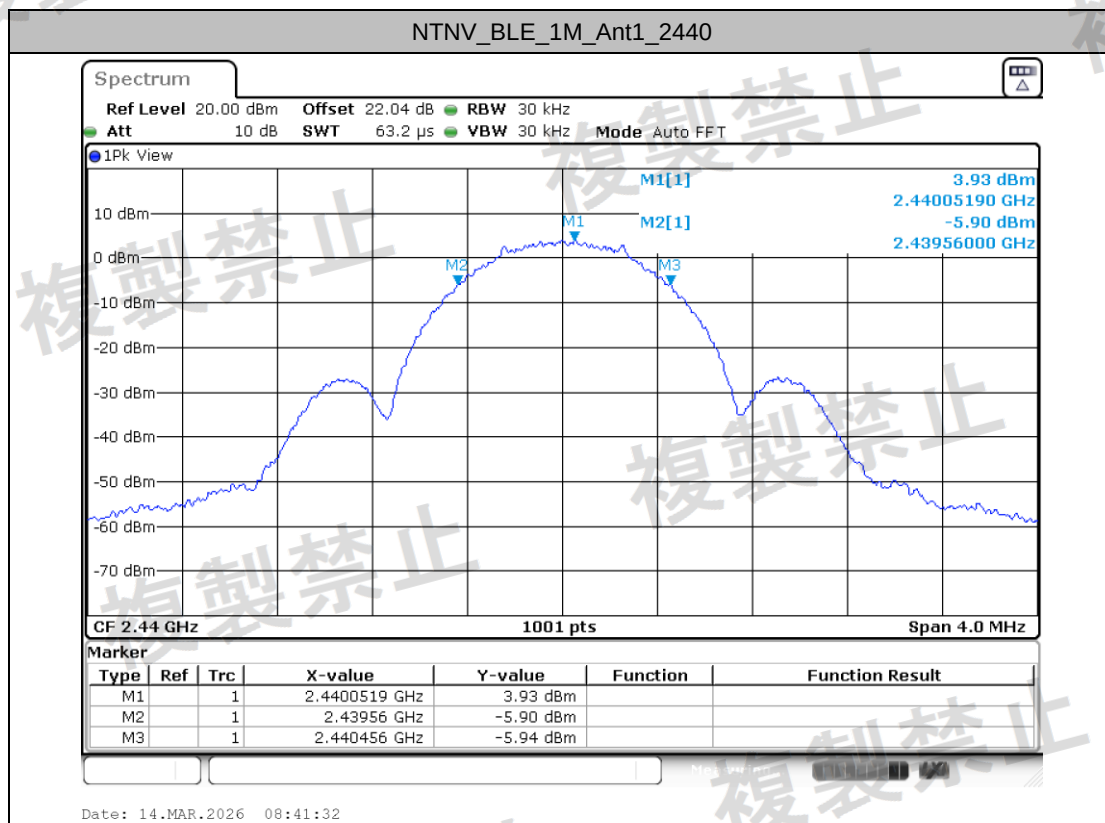
Frequency Error

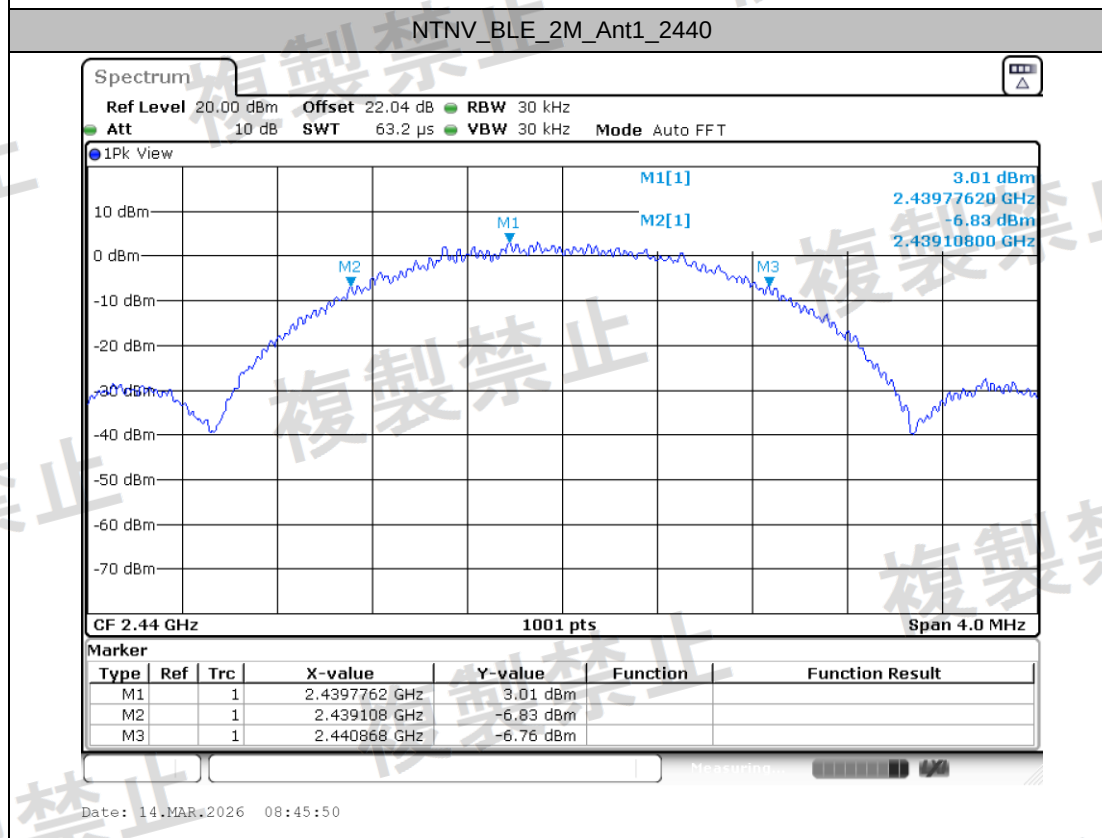
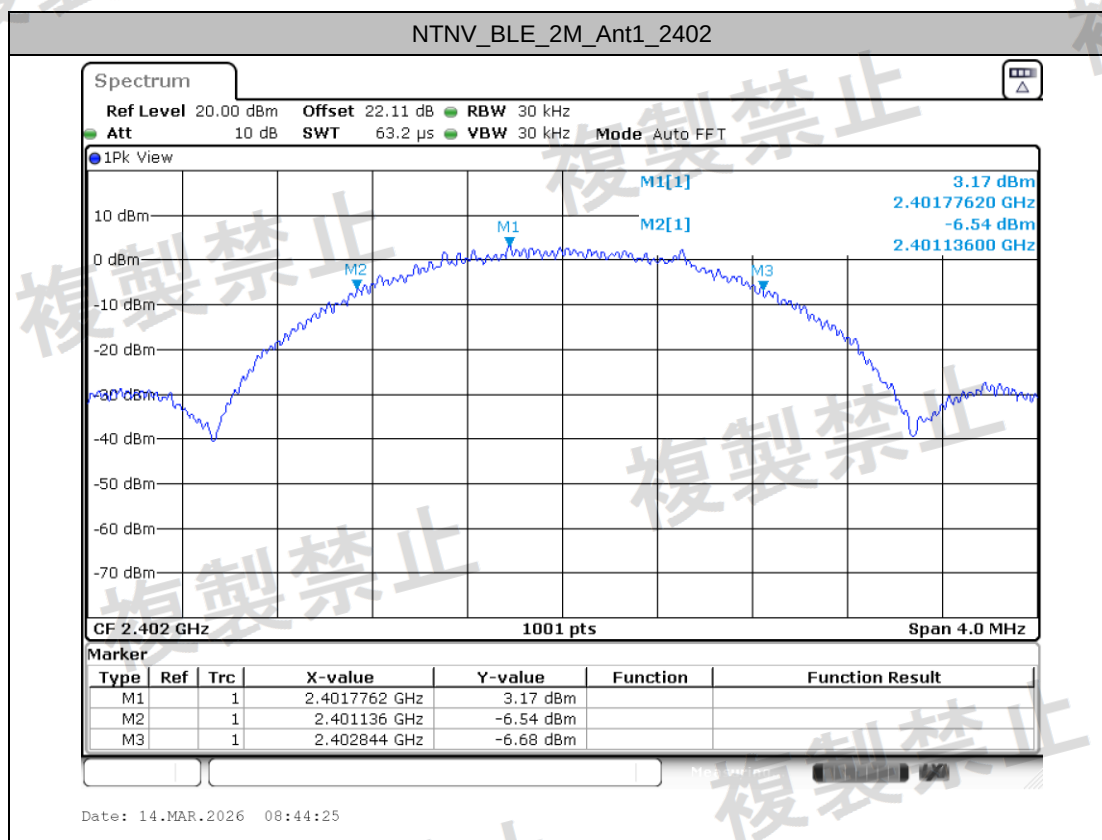
Test Result

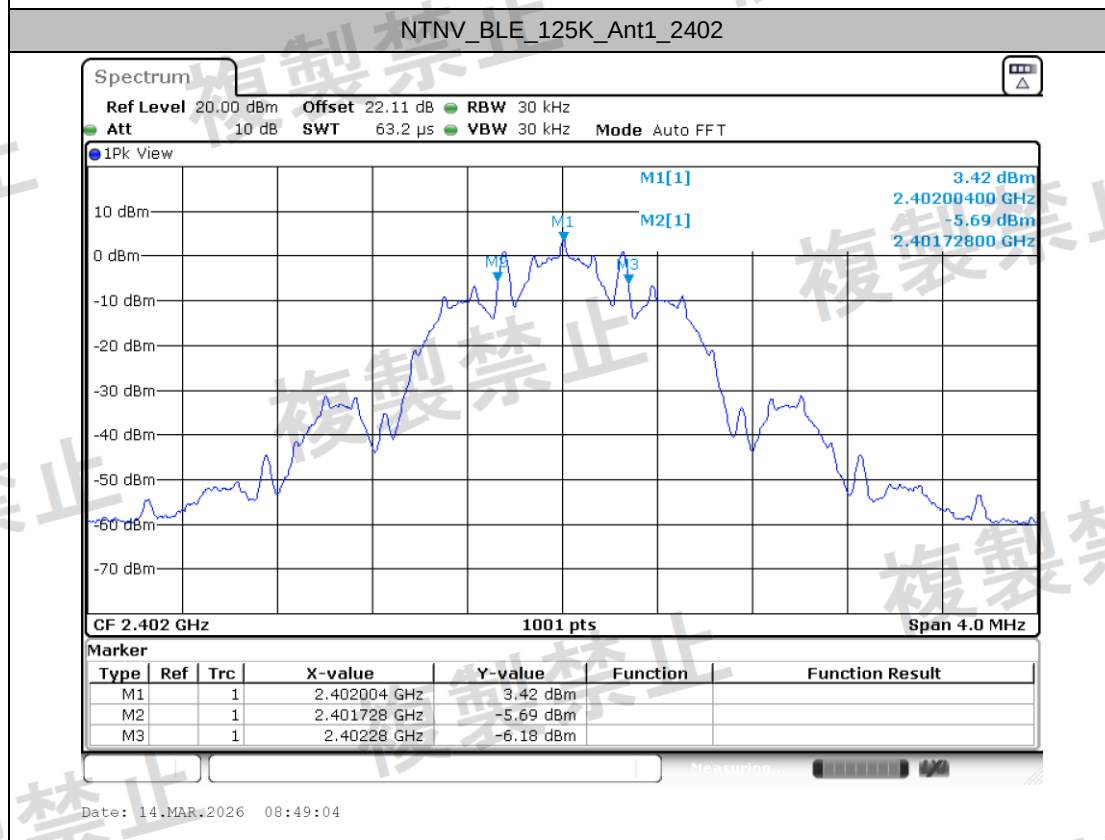
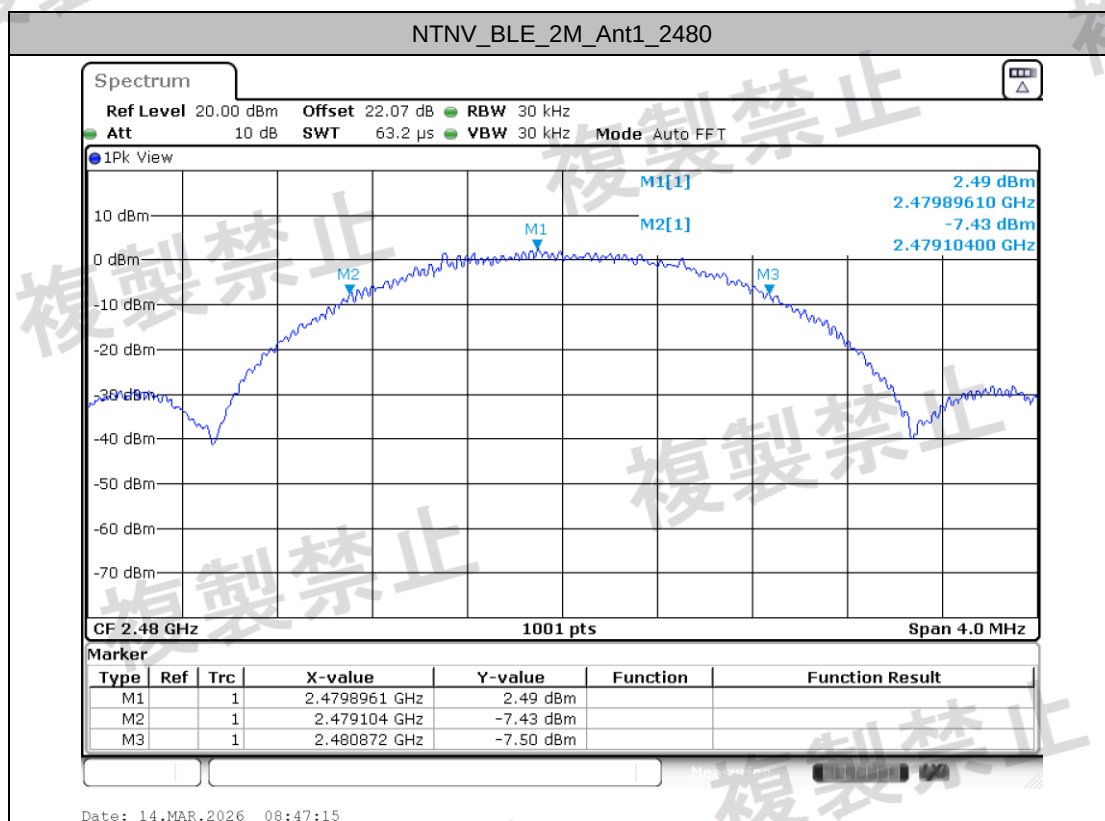
TestCondition	TestMode	Antenna	Freq (MHz)	CenterFreq [MHz]	Result[ppm]	Limit[ppm]	Verdict
NTNV	BLE_1M	Ant1	2402	2402.006	2.49792	±50	PASS
			2440	2440.008	3.27869	±50	PASS
			2480	2480.002	0.80645	±50	PASS
	BLE_2M	Ant1	2402	2401.99	-4.16320	±50	PASS
			2440	2439.988	-4.91803	±50	PASS
			2480	2479.988	-4.83871	±50	PASS
	BLE_125K	Ant1	2402	2402.004	1.66528	±50	PASS
			2440	2440.004	1.63934	±50	PASS
			2480	2480.004	1.61290	±50	PASS
	BLE_500K	Ant1	2402	2401.996	-1.66528	±50	PASS
			2440	2439.994	-2.45902	±50	PASS
			2480	2479.994	-2.41936	±50	PASS

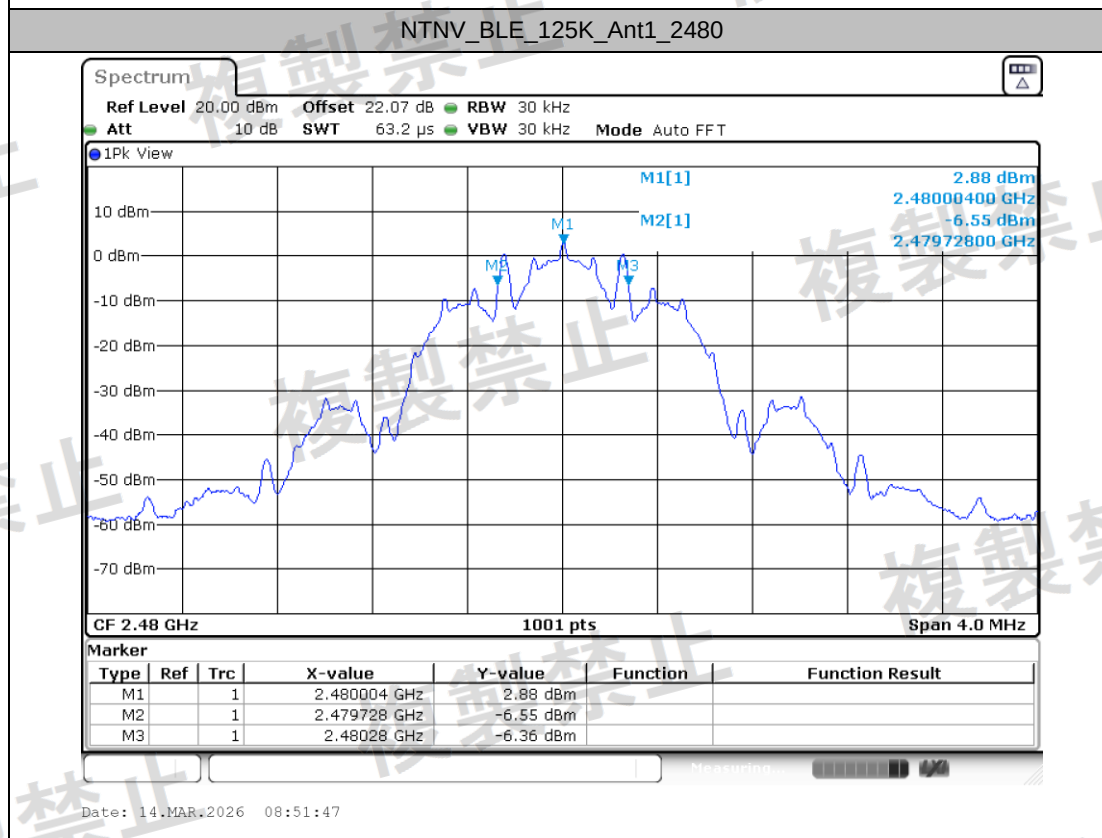
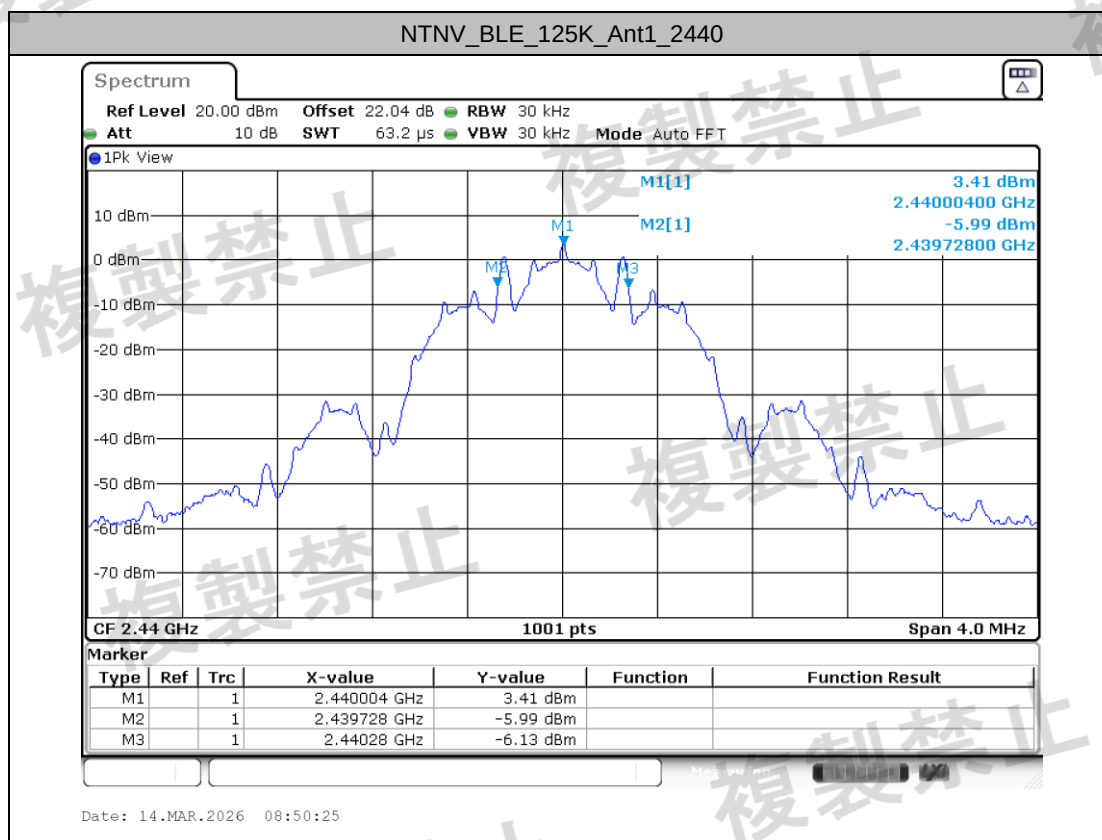
Test Graphs

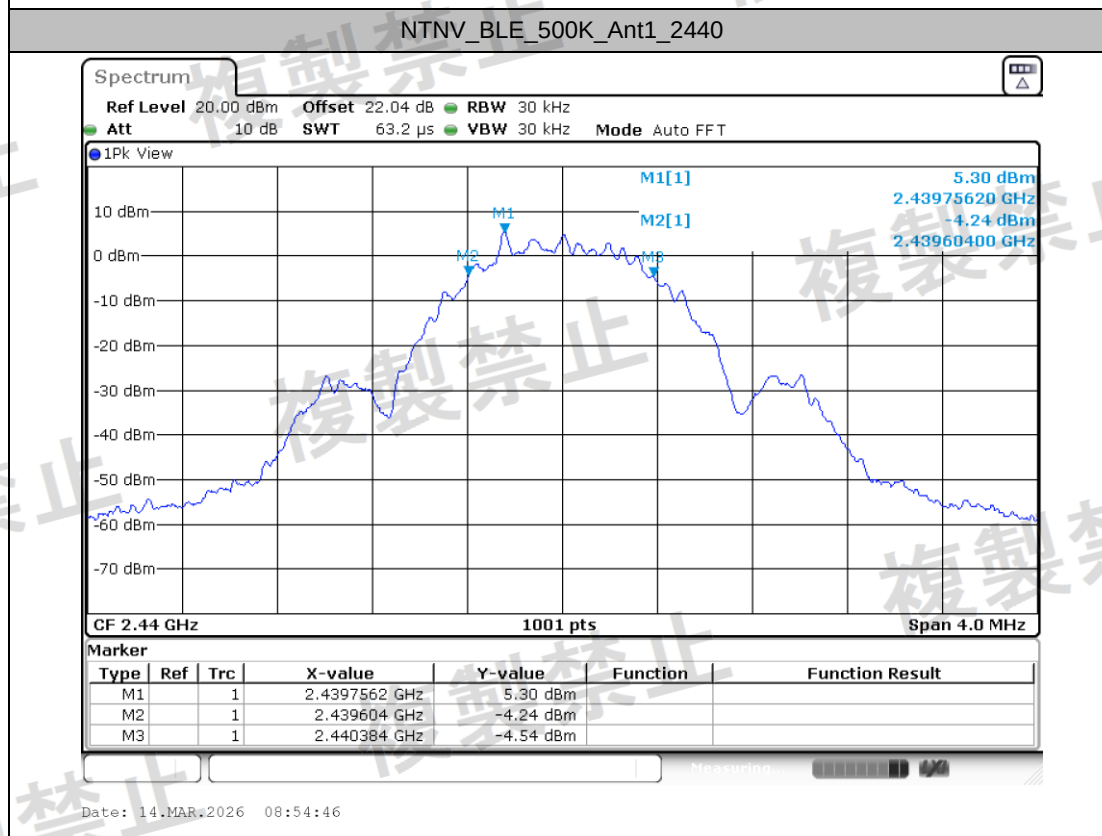
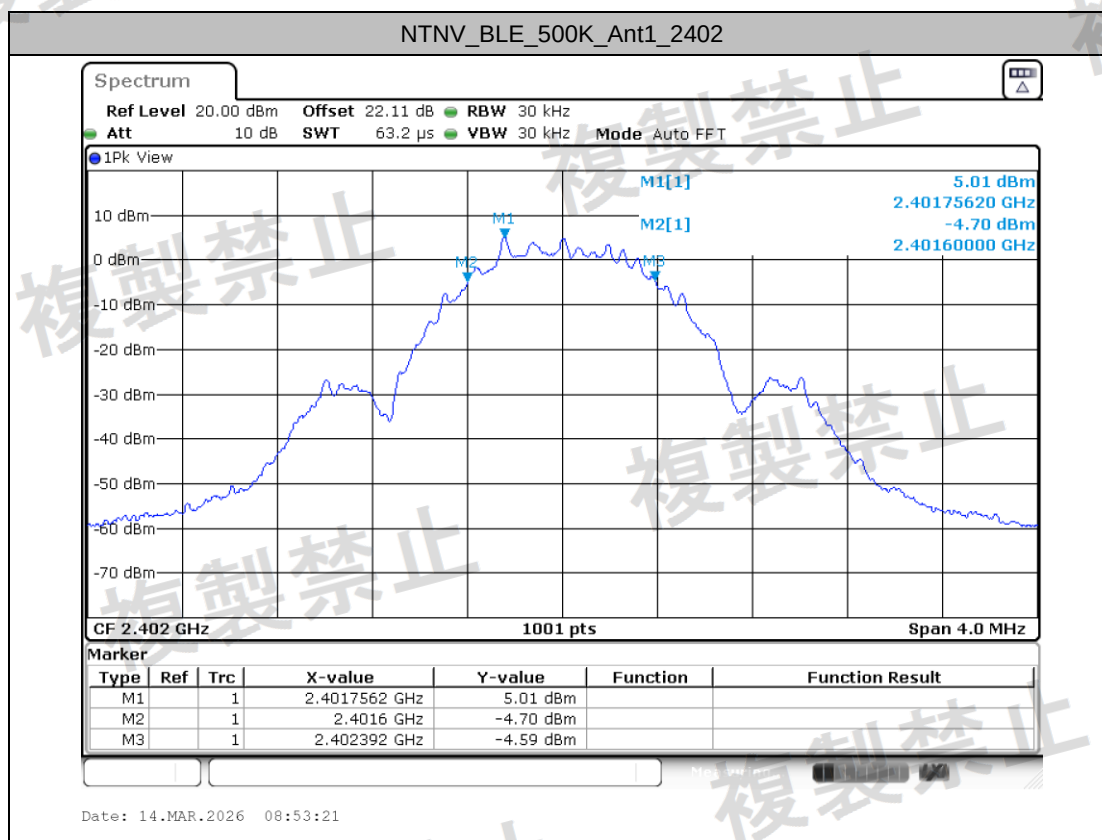


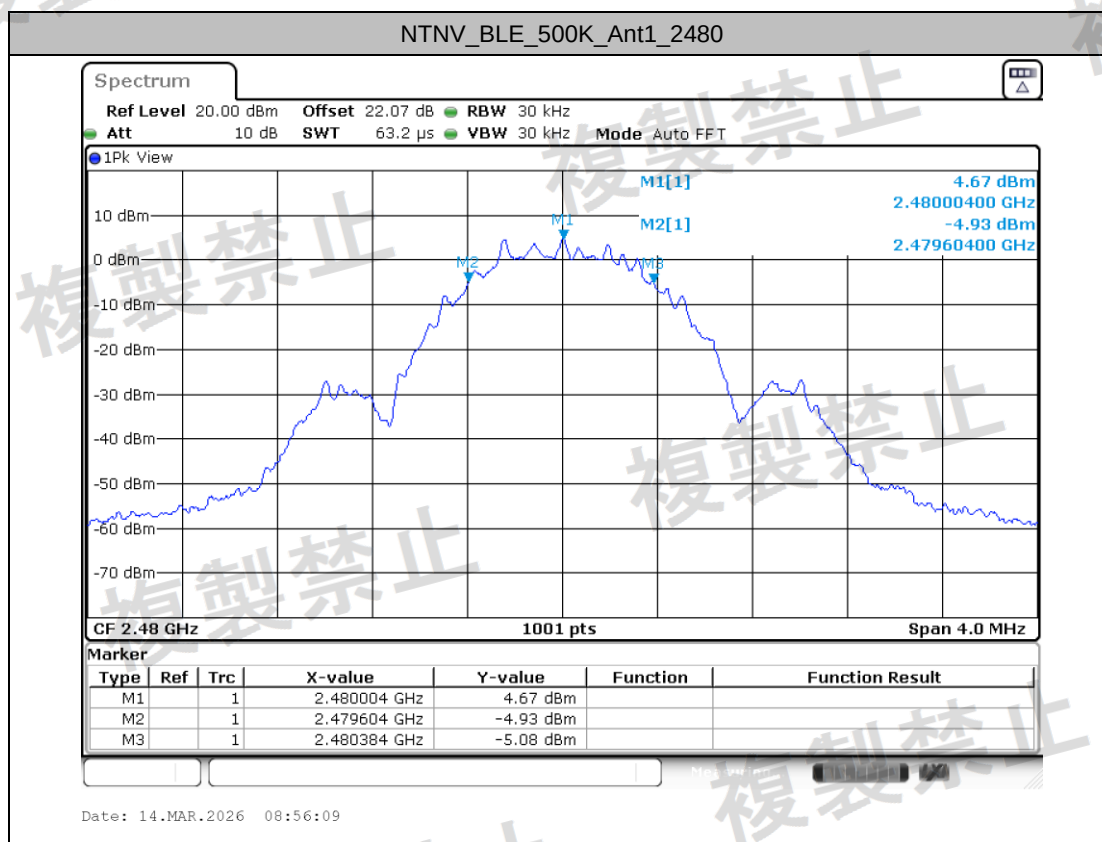












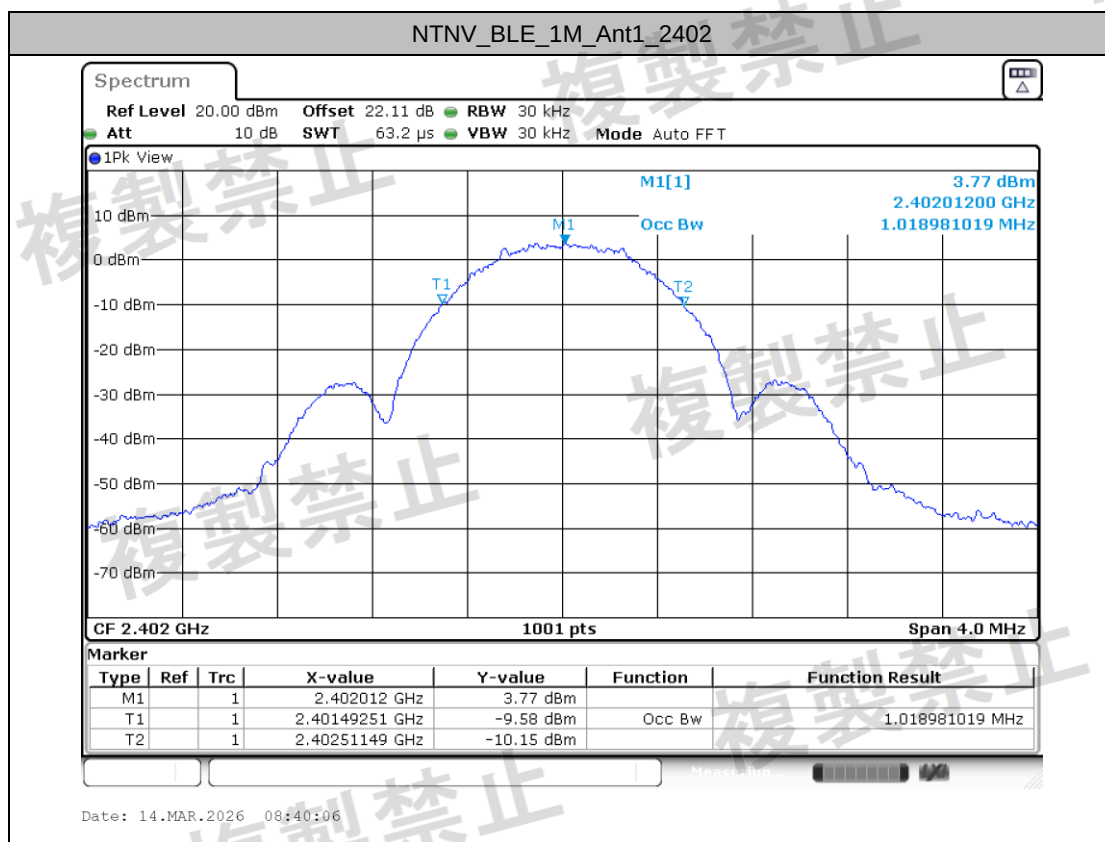


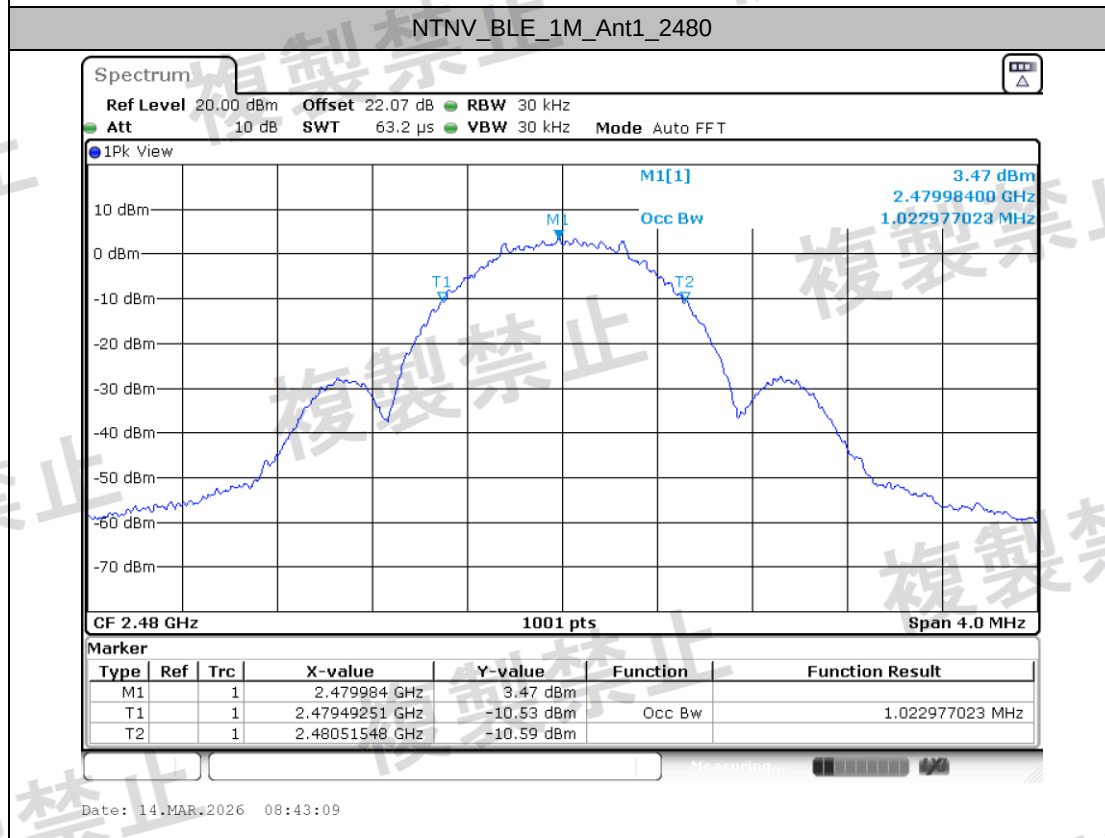
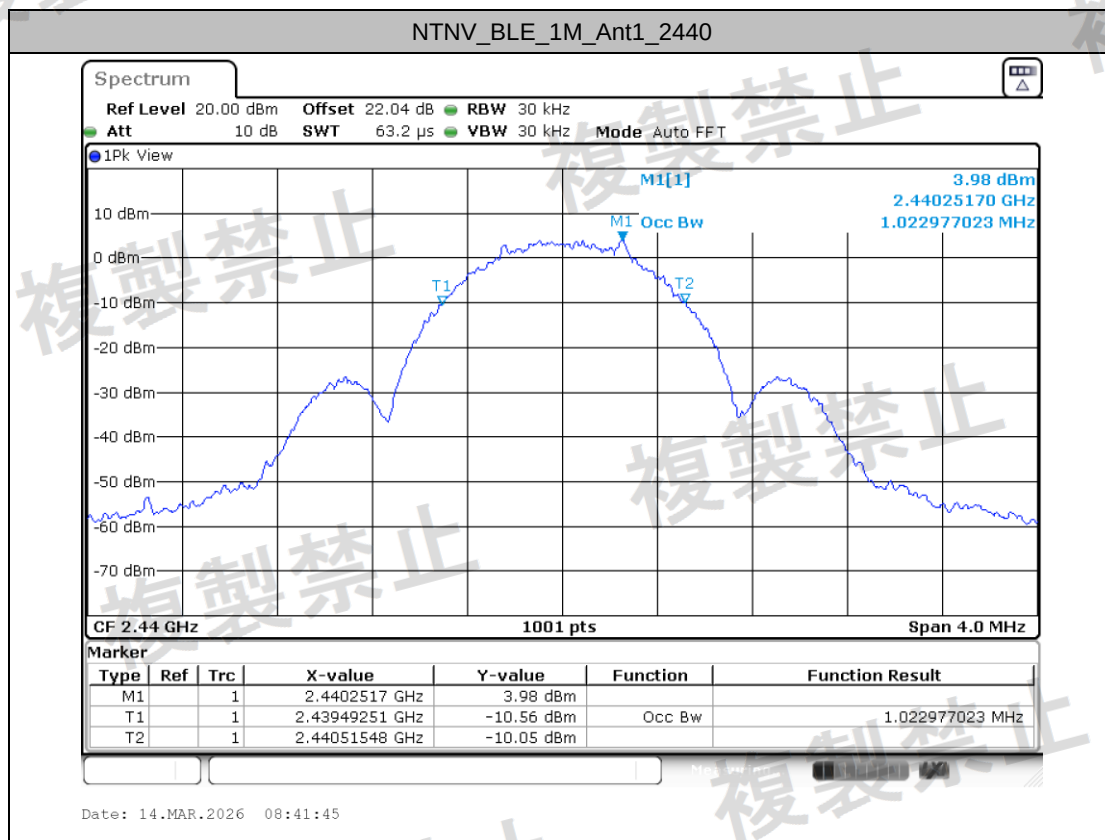
Occupied Bandwidth

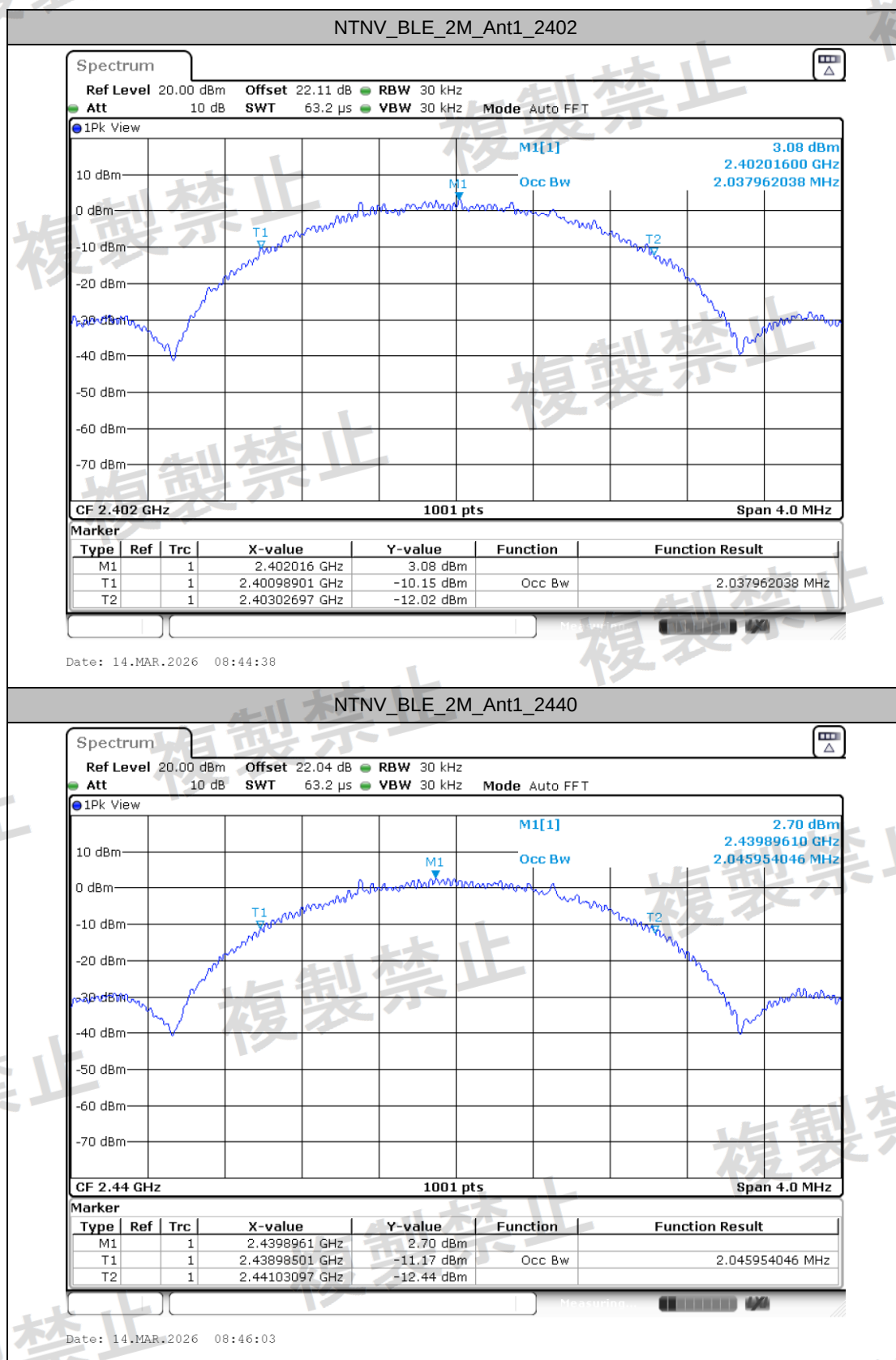
Test Result

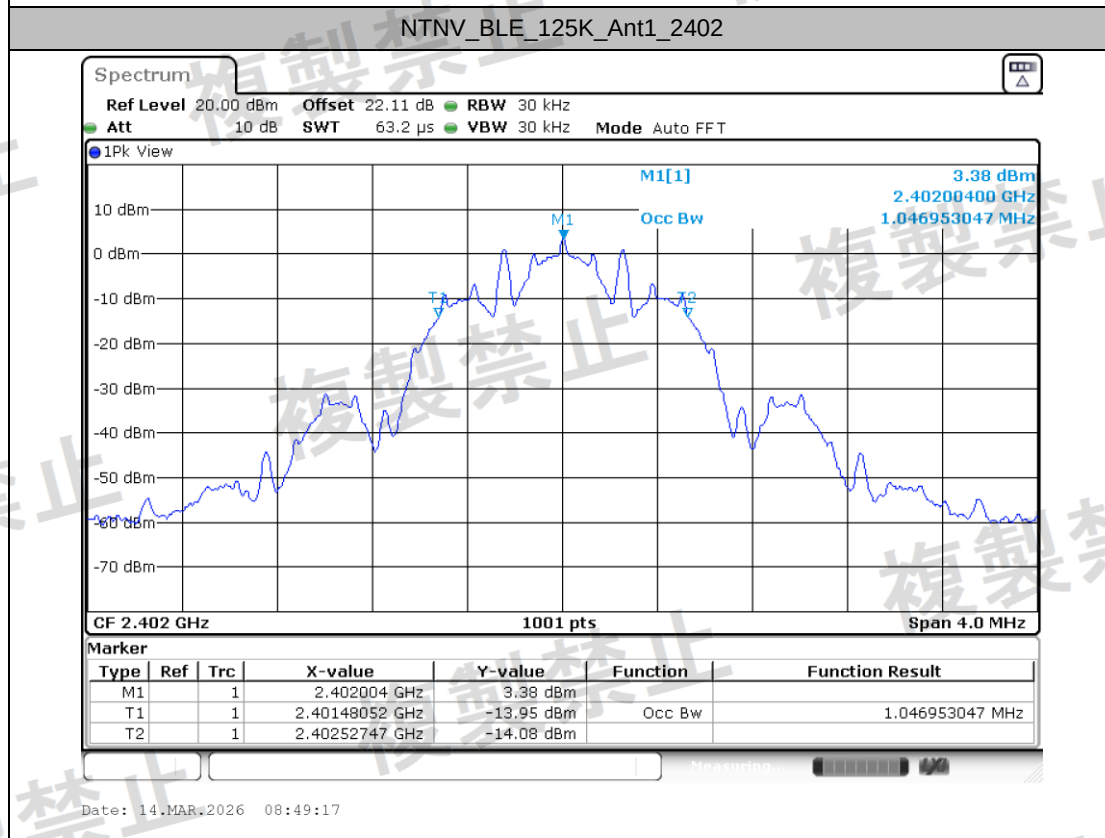
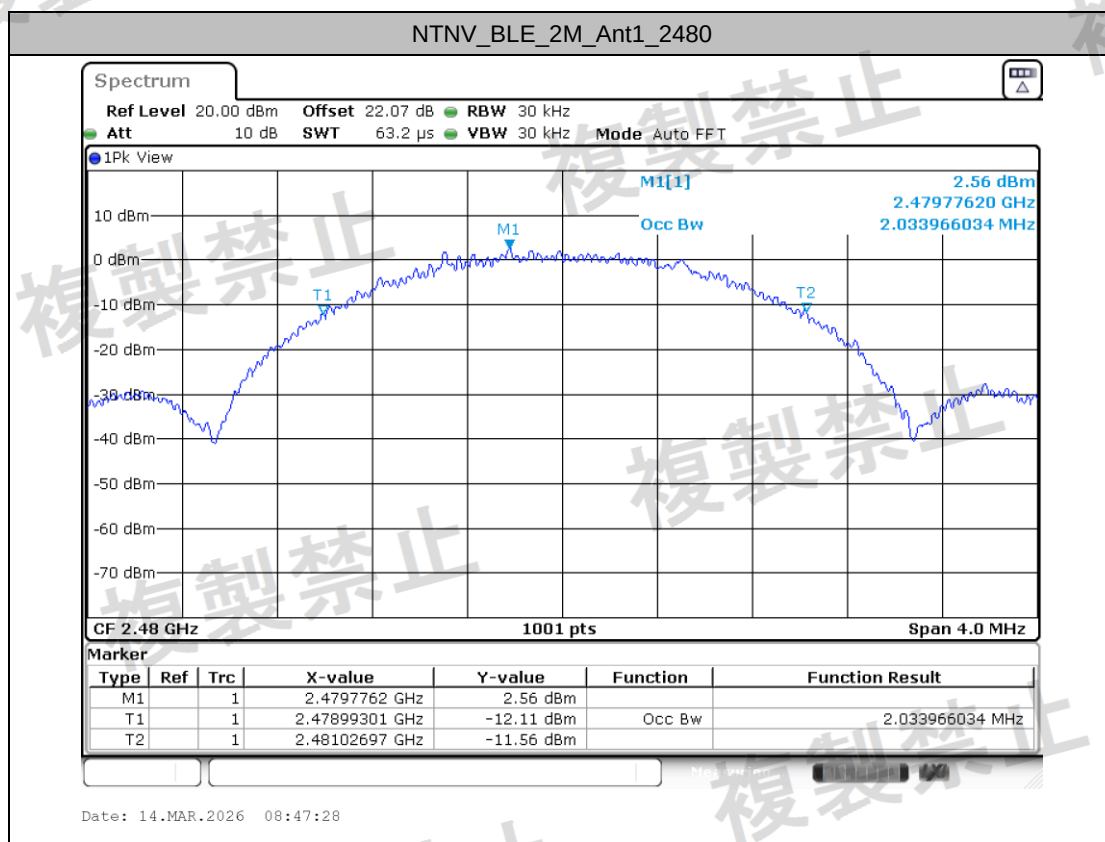
TestCondition	TestMode	Antenna	Freq(MHz)	Result [MHz]	Limit [MHz]	Verdict
NTNV	BLE_1M	Ant1	2402	1.019	≤26	PASS
			2440	1.023	≤26	PASS
			2480	1.023	≤26	PASS
	BLE_2M	Ant1	2402	2.038	≤26	PASS
			2440	2.046	≤26	PASS
			2480	2.034	≤26	PASS
	BLE_125K	Ant1	2402	1.047	≤26	PASS
			2440	1.039	≤26	PASS
			2480	1.047	≤26	PASS
	BLE_500K	Ant1	2402	1.019	≤26	PASS
			2440	1.015	≤26	PASS
			2480	1.015	≤26	PASS

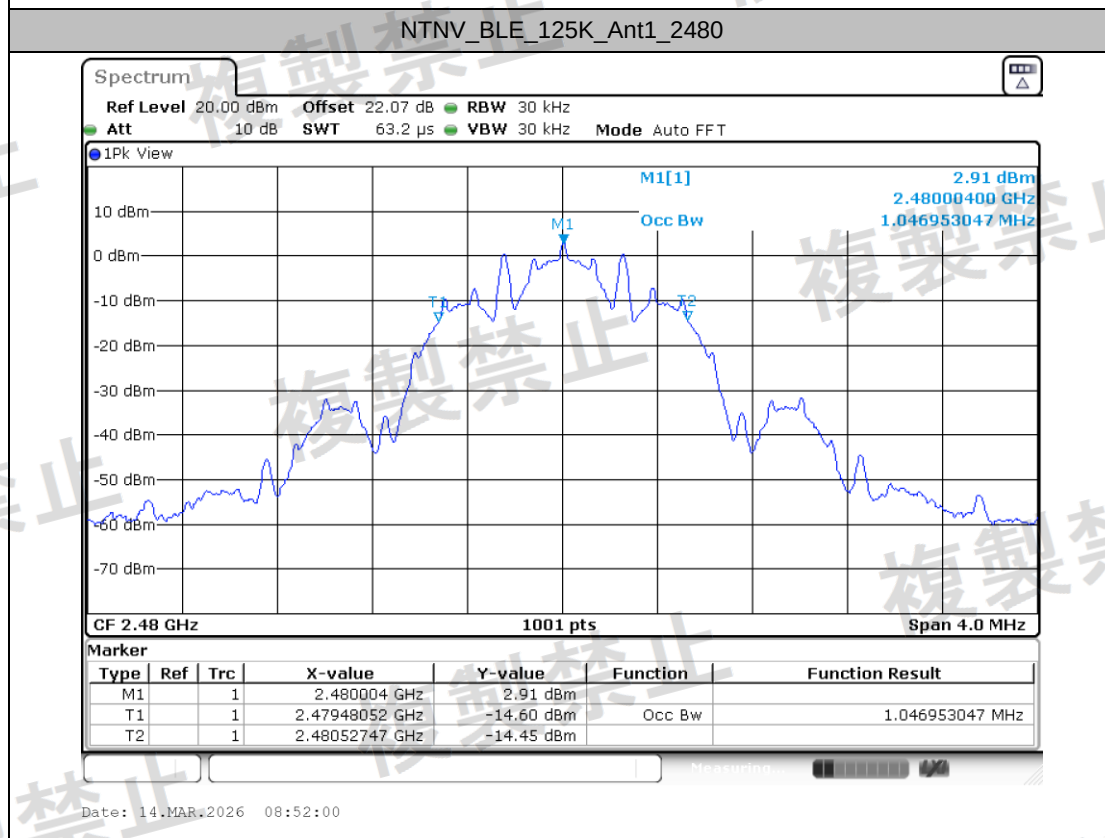
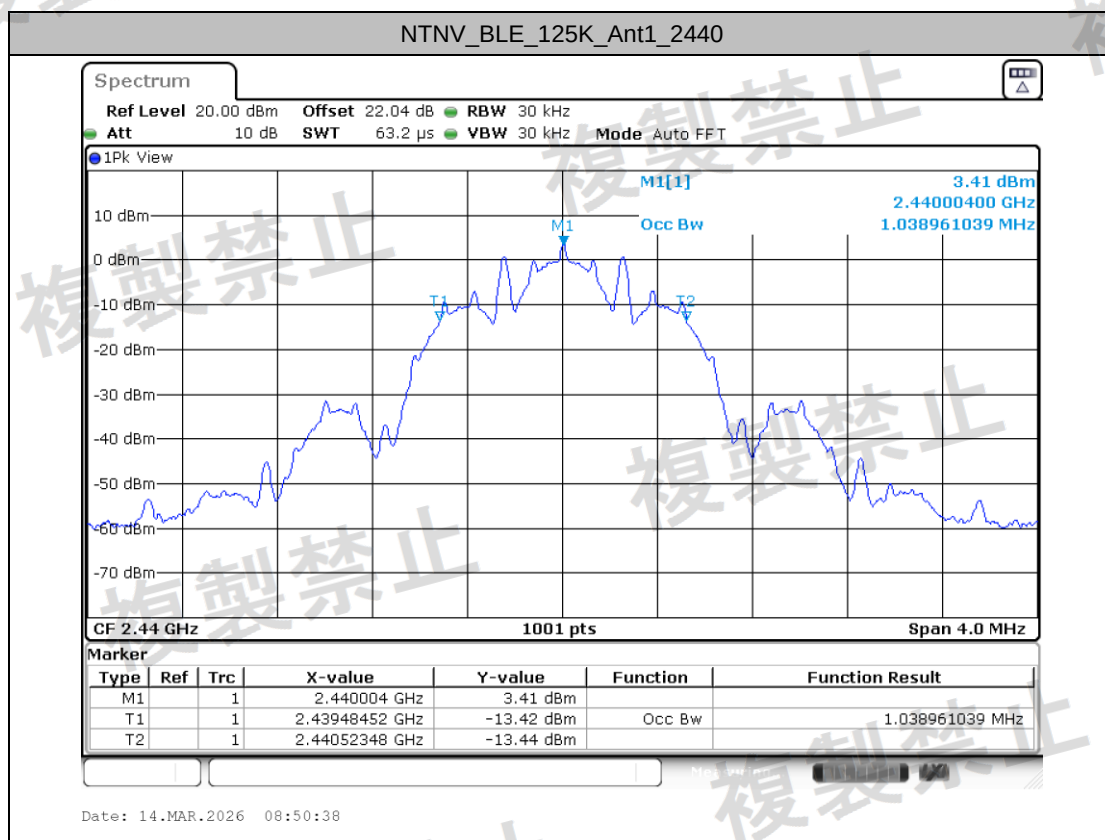
Test Graphs

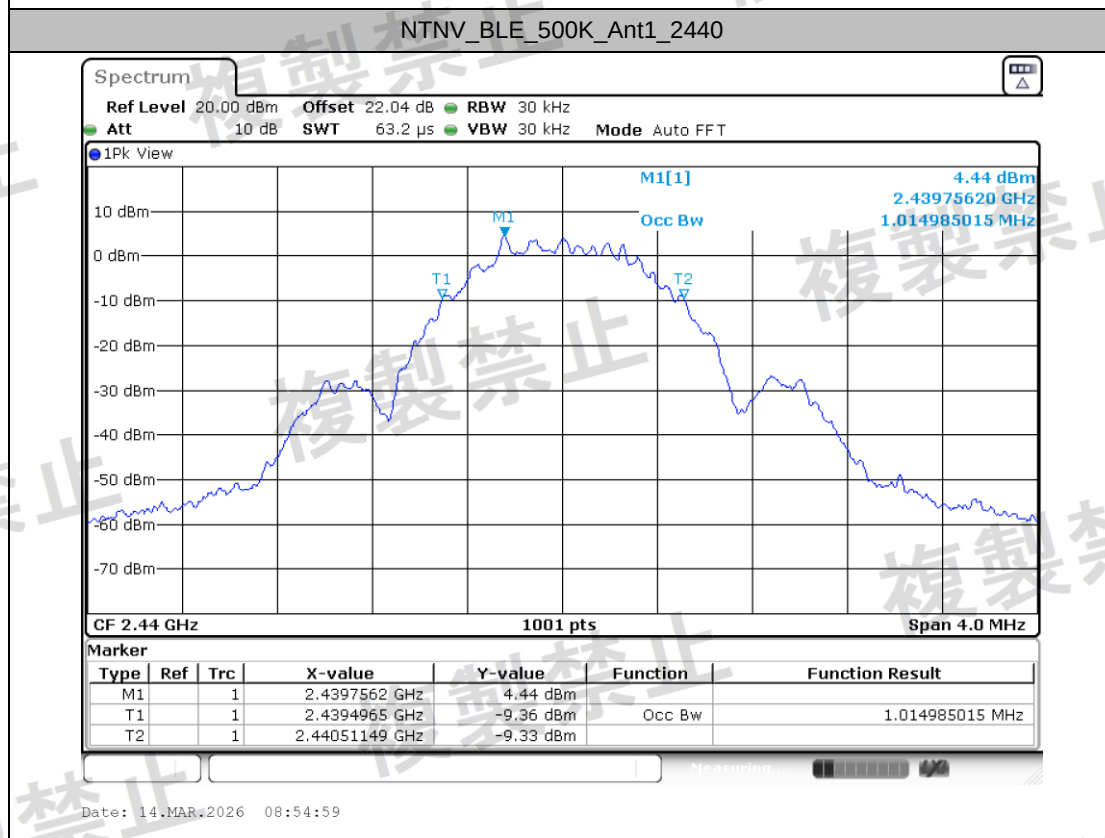
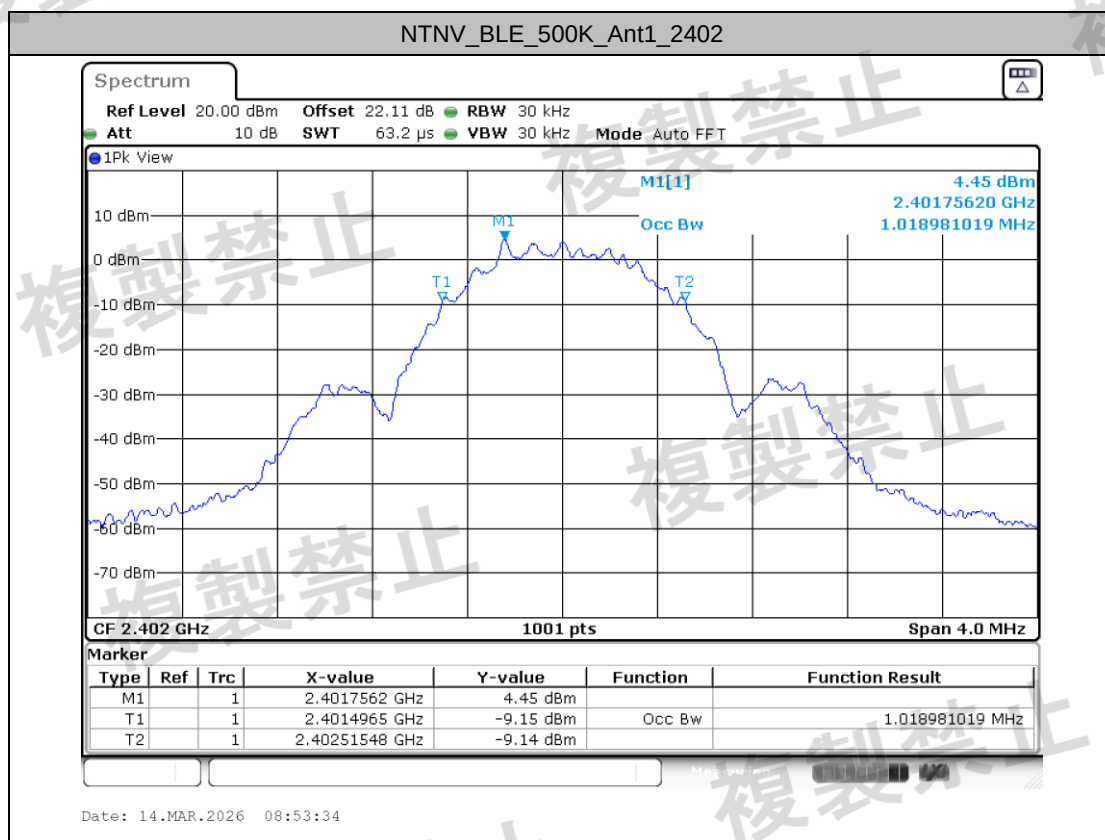


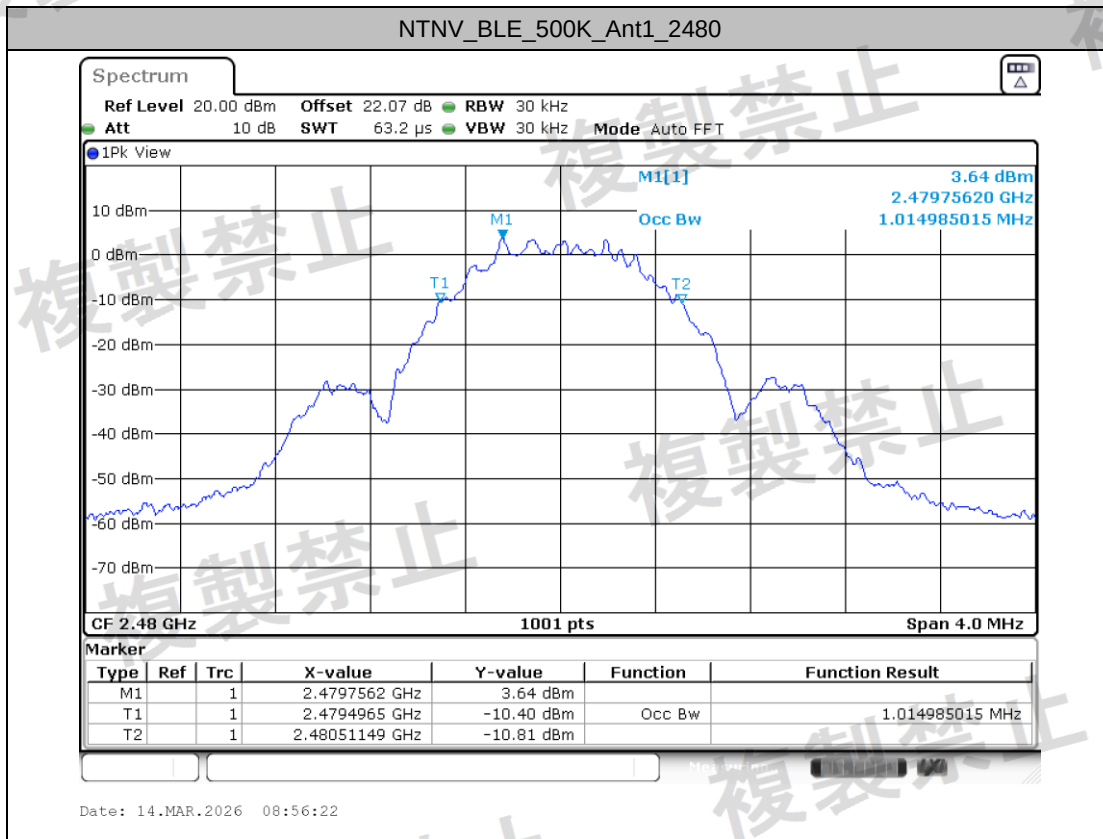












Unwanted Emission Intensity

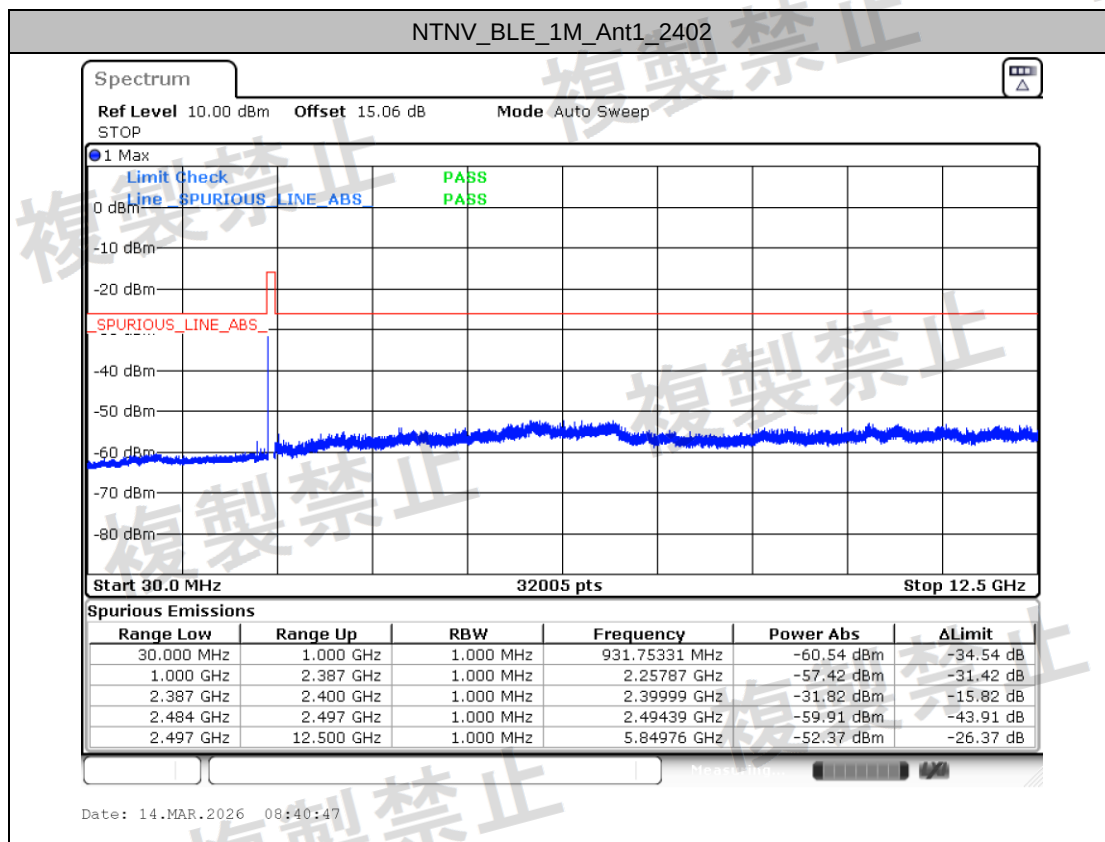
Test Result

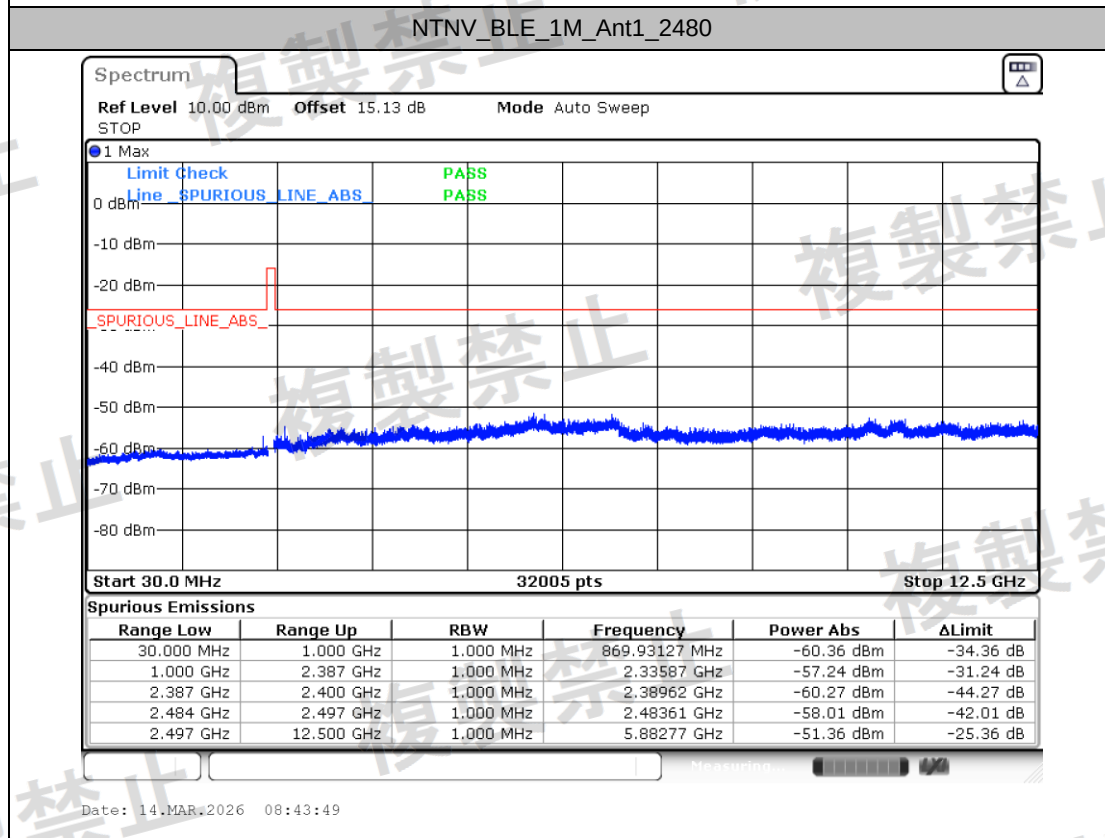
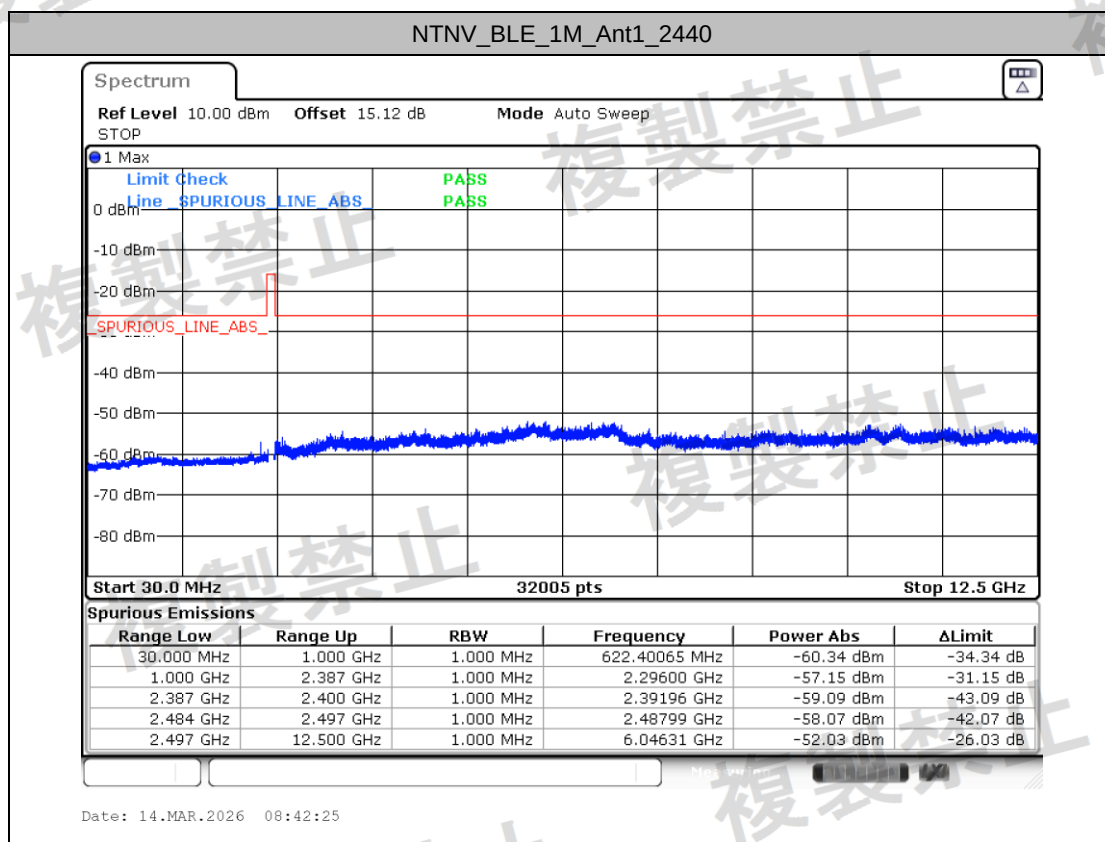
Test Condition	Test Mode	Antenna	Freq (MHz)	Freq.Range [MHz]	Freq. [MHz]	Result [dBm /MHz]	Limit [dBm /MHz]	Result [μW /MHz]	Limit [μW /MHz]	Verdict
NTNV	BLE_1M	Ant1	2402	30~1000	931.75	-60.54	-26.00	0.00088	2.5	PASS
				1000~2387	2257.87	-57.42	-26.00	0.00181	2.5	PASS
				2387~2400	2399.99	-31.82	-16.00	0.65766	25	PASS
				2483.5~2496.5	2494.39	-59.91	-16.00	0.00102	25	PASS
				2496.5~12500	5849.76	-52.37	-26.00	0.00579	2.5	PASS
			2440	30~1000	622.40	-60.34	-26.00	0.00092	2.5	PASS
				1000~2387	2296.00	-57.15	-26.00	0.00193	2.5	PASS
				2387~2400	2391.96	-59.09	-16.00	0.00123	25	PASS
				2483.5~2496.5	2487.99	-58.07	-16.00	0.00156	25	PASS
				2496.5~12500	6046.31	-52.03	-26.00	0.00627	2.5	PASS
	BLE_2M	Ant1	2480	30~1000	869.93	-60.36	-26.00	0.00092	2.5	PASS
				1000~2387	2335.87	-57.24	-26.00	0.00189	2.5	PASS
				2387~2400	2389.62	-60.27	-16.00	0.00094	25	PASS
				2483.5~2496.5	2483.61	-58.01	-16.00	0.00158	25	PASS
				2496.5~12500	5882.77	-51.36	-26.00	0.00731	2.5	PASS
			2402	30~1000	895.39	-60.33	-26.00	0.00093	2.5	PASS
				1000~2387	2257.87	-58.12	-26.00	0.00154	2.5	PASS
				2387~2400	2400.00	-19.35	-16.00	11.61449	25	PASS
				2483.5~2496.5	2490.18	-59.91	-16.00	0.00102	25	PASS
				2496.5~12500	5858.76	-51.32	-26.00	0.00738	2.5	PASS
	BLE_125K	Ant1	2440	30~1000	990.18	-60.38	-26.00	0.00092	2.5	PASS
				1000~2387	2296.00	-57.22	-26.00	0.00190	2.5	PASS
				2387~2400	2391.81	-59.54	-16.00	0.00111	25	PASS
				2483.5~2496.5	2488.11	-58.51	-16.00	0.00141	25	PASS
				2496.5~12500	5871.76	-51.85	-26.00	0.00653	2.5	PASS
			2480	30~1000	996.00	-60.16	-26.00	0.00096	2.5	PASS
				1000~2387	2335.87	-57.44	-26.00	0.00180	2.5	PASS
				2387~2400	2391.05	-60.50	-16.00	0.00089	25	PASS
				2483.5~2496.5	2483.50	-51.38	-16.00	0.00728	25	PASS
				2496.5~12500	5790.74	-52.30	-26.00	0.00589	2.5	PASS
		Ant1	2402	30~1000	962.06	-60.31	-26.00	0.00093	2.5	PASS
				1000~2387	2258.21	-57.09	-26.00	0.00195	2.5	PASS

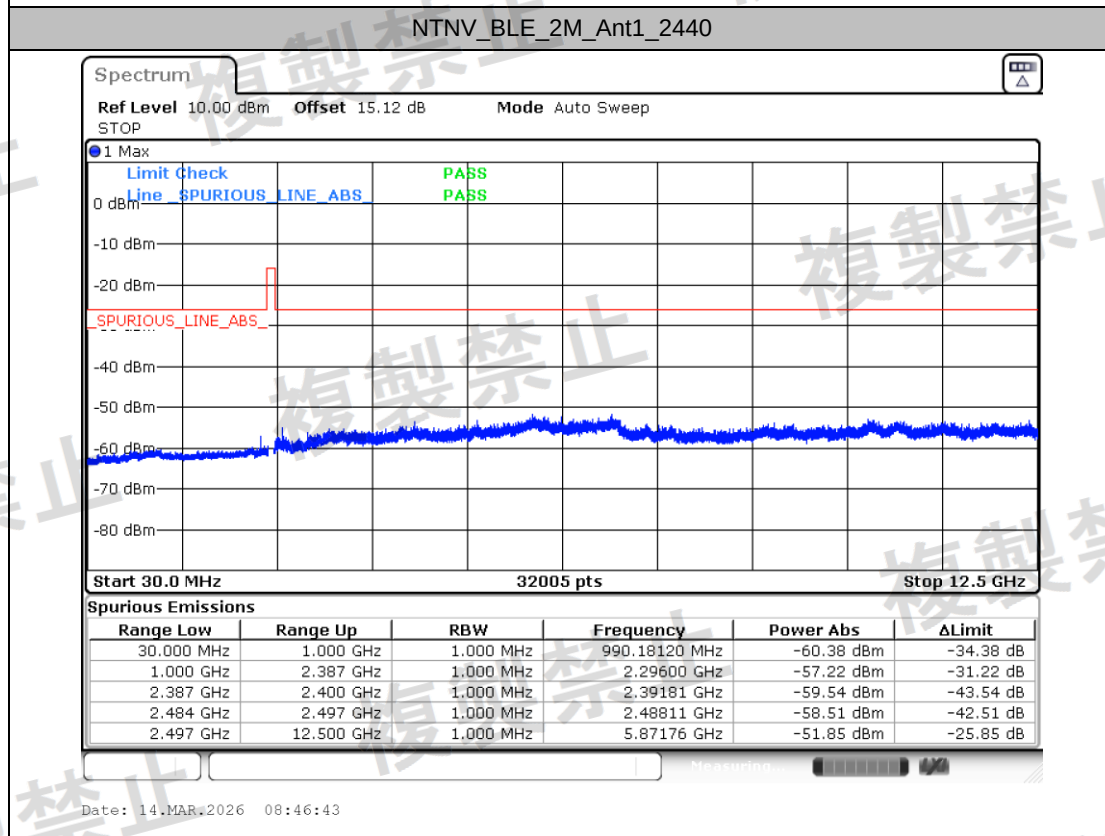
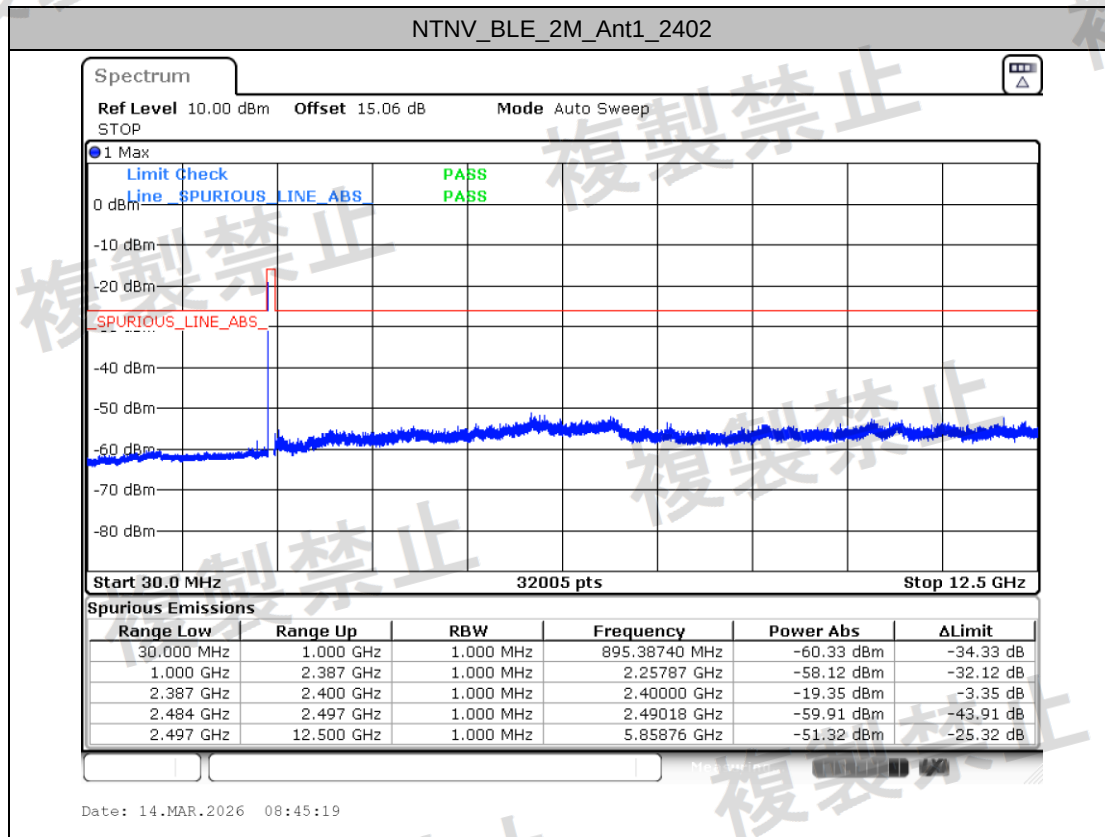
	BLE_500K	Ant1		2387~2400	2400.00	-33.07	-16.00	0.49317	25	PASS
				2483.5~2496.5	2494.83	-60.00	-16.00	0.00100	25	PASS
				2496.5~12500	6042.81	-51.39	-26.00	0.00726	2.5	PASS
			2440	30~1000	845.69	-60.17	-26.00	0.00096	2.5	PASS
				1000~2387	2296.00	-57.74	-26.00	0.00168	2.5	PASS
				2387~2400	2391.93	-59.22	-16.00	0.00120	25	PASS
			2480	2483.5~2496.5	2488.10	-57.85	-16.00	0.00164	25	PASS
				2496.5~12500	6044.31	-52.34	-26.00	0.00583	2.5	PASS
				30~1000	983.39	-60.23	-26.00	0.00095	2.5	PASS
			2402	1000~2387	2335.87	-56.92	-26.00	0.00203	2.5	PASS
				2387~2400	2393.13	-60.56	-16.00	0.00088	25	PASS
				2483.5~2496.5	2483.63	-58.37	-16.00	0.00146	25	PASS
			2440	2496.5~12500	5889.77	-51.85	-26.00	0.00653	2.5	PASS
				30~1000	995.03	-60.42	-26.00	0.00091	2.5	PASS
				1000~2387	2258.21	-57.85	-26.00	0.00164	2.5	PASS
			2480	2387~2400	2400.00	-31.82	-16.00	0.65766	25	PASS
				2483.5~2496.5	2488.23	-59.97	-16.00	0.00101	25	PASS
				2496.5~12500	5887.27	-51.69	-26.00	0.00678	2.5	PASS
			2440	30~1000	841.32	-60.39	-26.00	0.00091	2.5	PASS
				1000~2387	2296.00	-57.35	-26.00	0.00184	2.5	PASS
				2387~2400	2392.11	-59.25	-16.00	0.00119	25	PASS
			2480	2483.5~2496.5	2488.09	-57.74	-16.00	0.00168	25	PASS
				2496.5~12500	5875.76	-52.43	-26.00	0.00571	2.5	PASS
				30~1000	977.33	-60.56	-26.00	0.00088	2.5	PASS
			2402	1000~2387	2335.87	-57.01	-26.00	0.00199	2.5	PASS
				2387~2400	2399.24	-60.67	-16.00	0.00086	25	PASS
				2483.5~2496.5	2484.00	-58.18	-16.00	0.00152	25	PASS
			2440	2496.5~12500	5872.26	-52.00	-26.00	0.00631	2.5	PASS

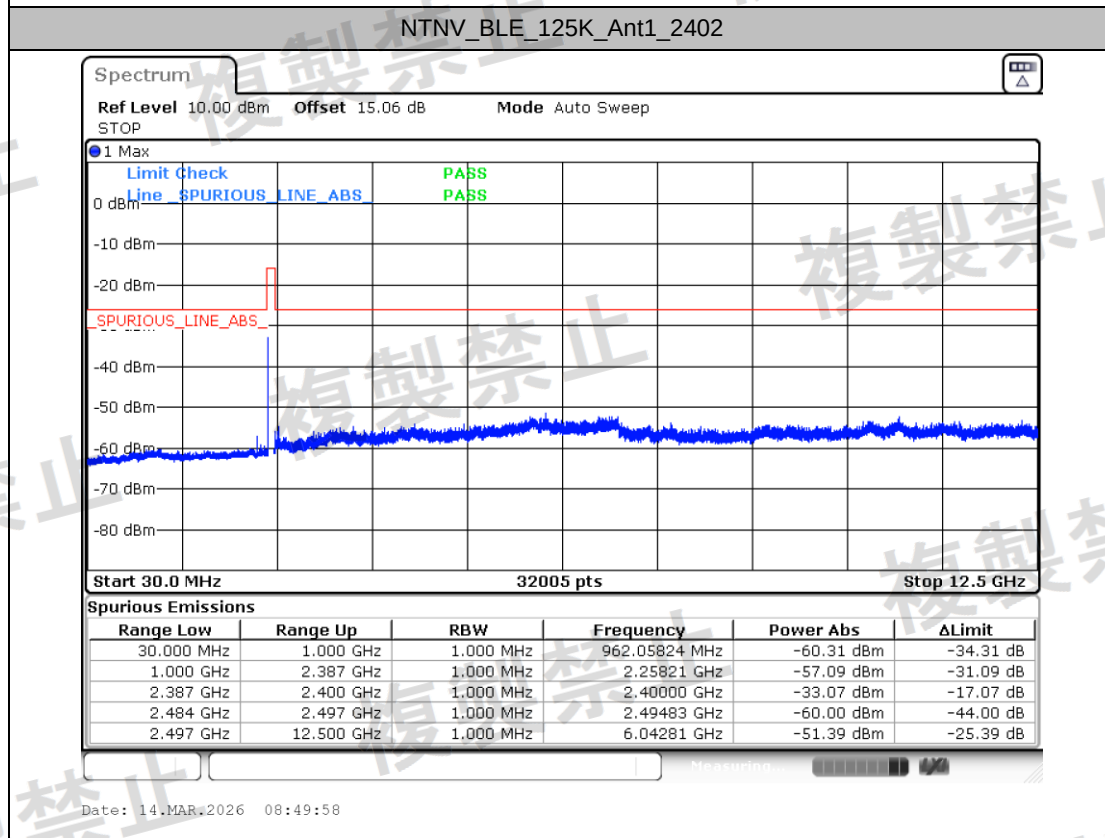
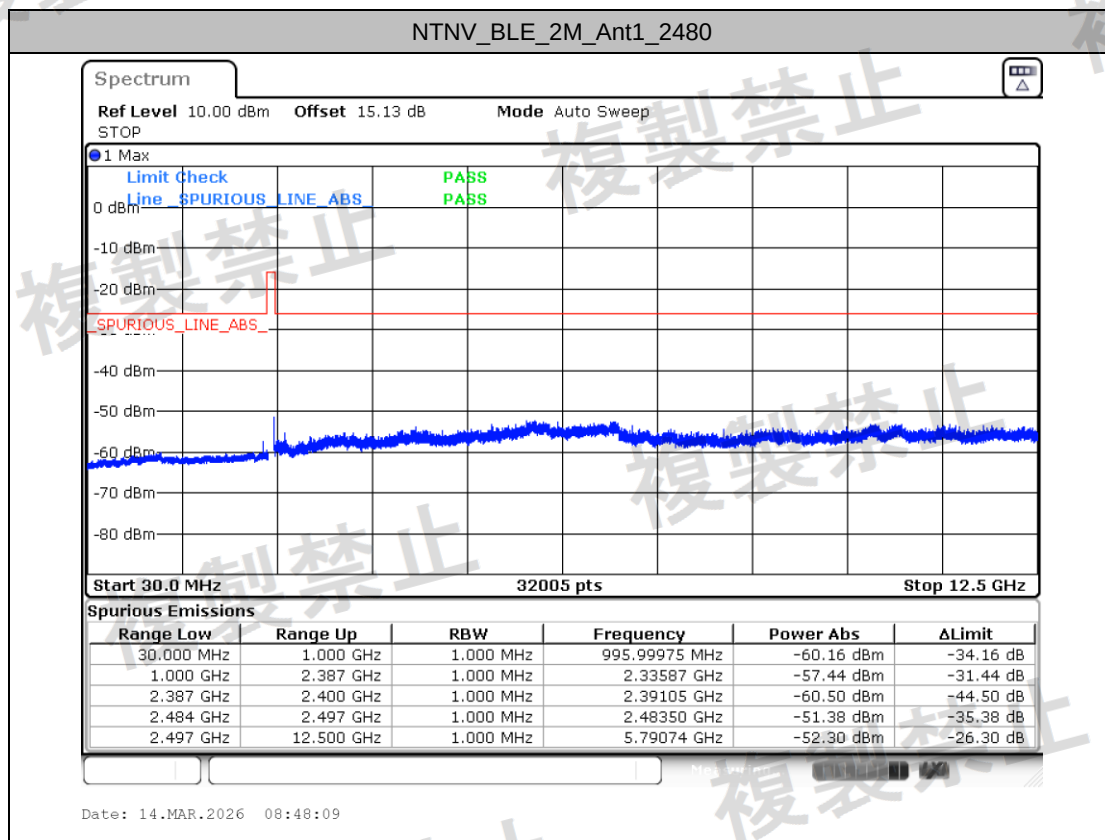


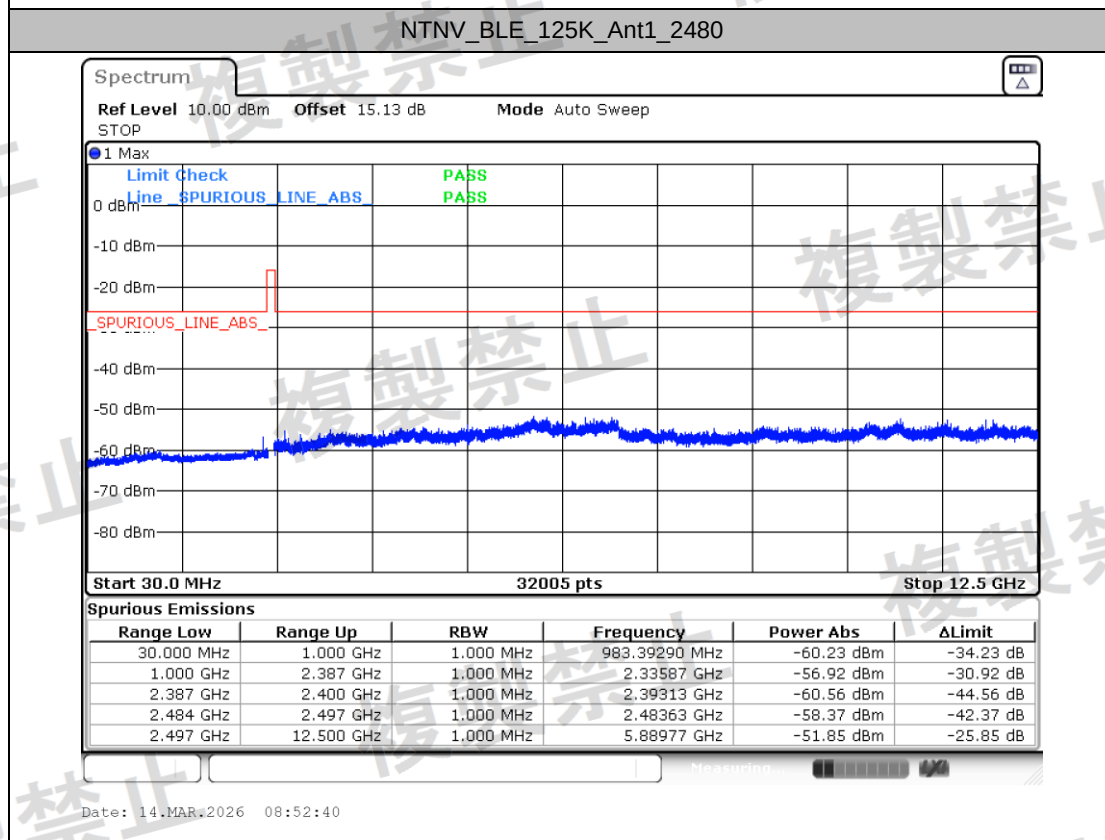
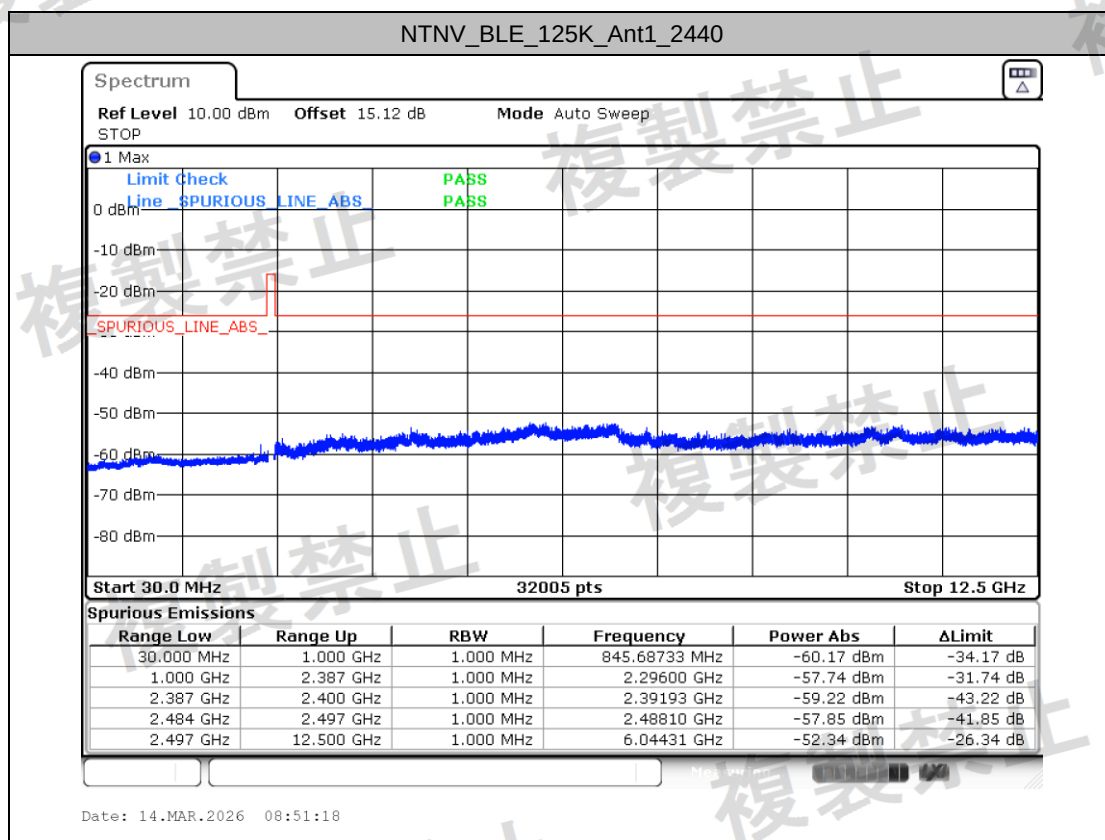
Test Graphs

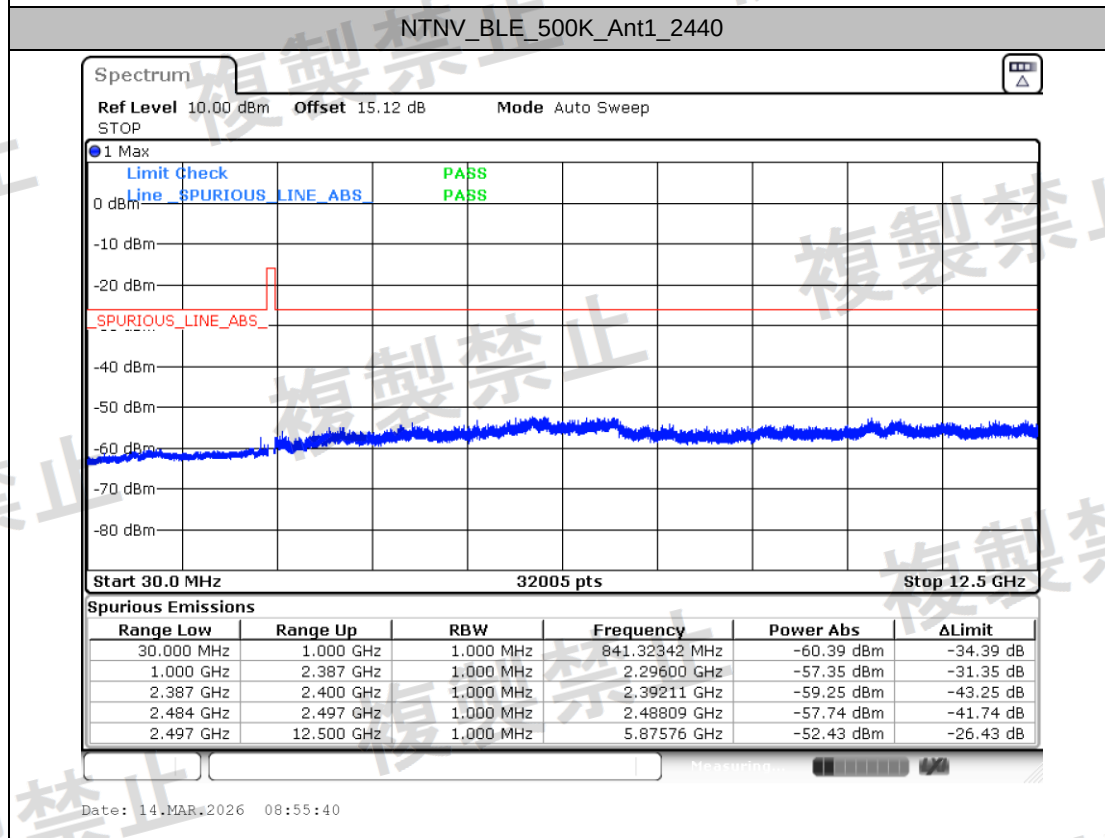
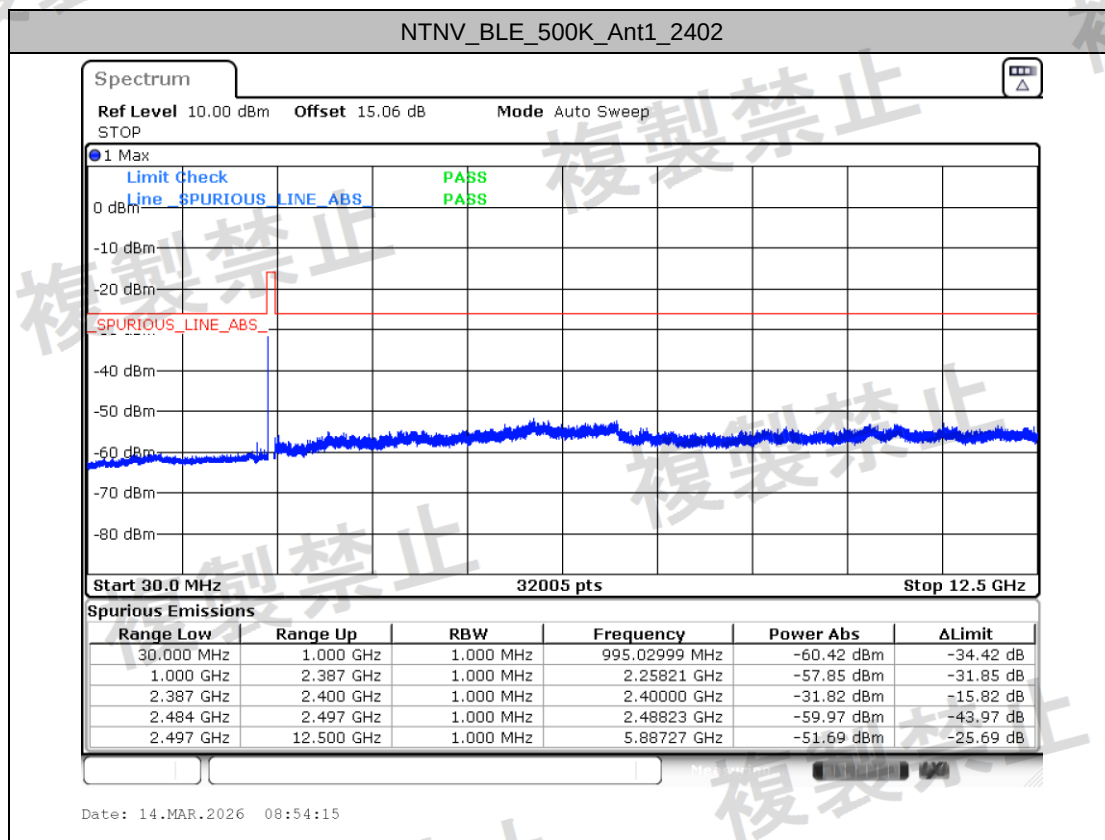


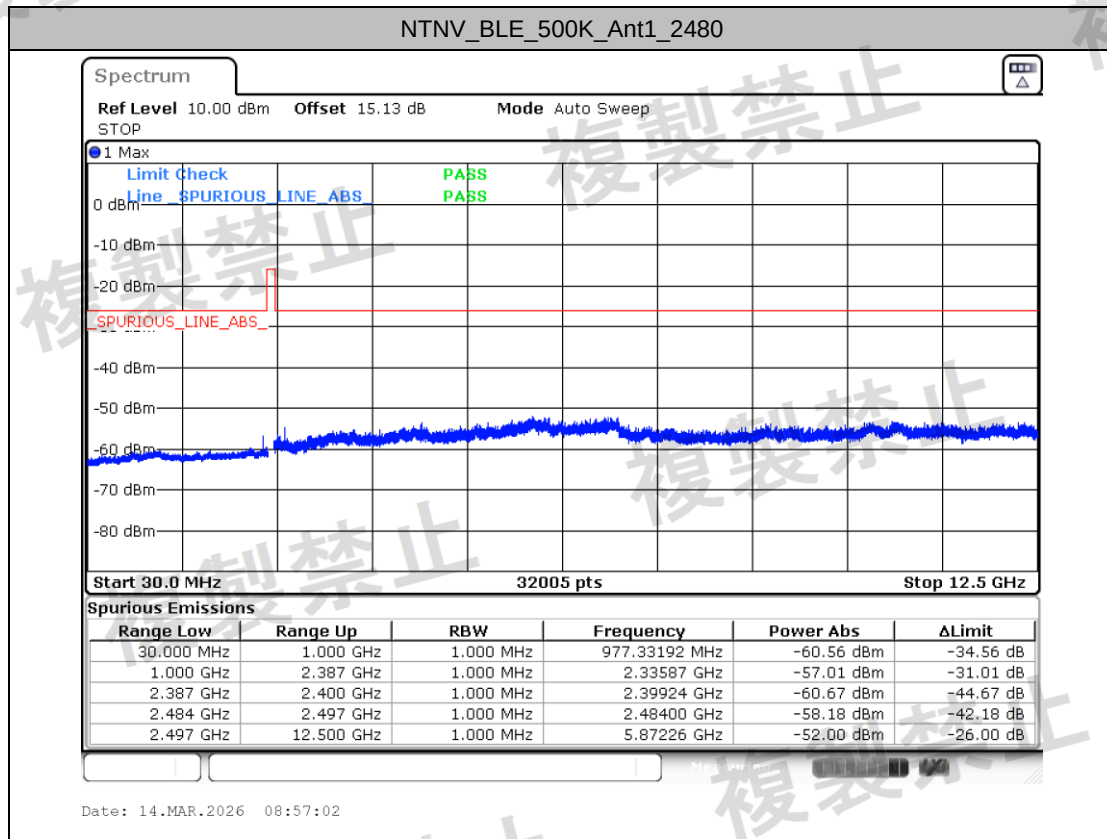












Limitation of Collateral Emission of Receiver

Test Result

Test Condition	Test Mode	Antenna	Freq (MHz)	Freq.Range [MHz]	Freq [MHz]	Result [dBm]	Limit [dBm]	Result [nW]	Limit [nW]	Verdict
NTNV	BLE_1M	Ant1	2402	30~1000	967.76	-76.46	-54.00	0.02259	4	PASS
				1000~12500	5880.07	-60.09	-47.00	0.97949	20	PASS
			2440	30~1000	873.72	-76.06	-54.00	0.02477	4	PASS
				1000~12500	5888.12	-59.34	-47.00	1.16413	20	PASS
			2480	30~1000	593.53	-75.63	-54.00	0.02735	4	PASS
				1000~12500	5867.99	-60.42	-47.00	0.90782	20	PASS
	BLE_2M	Ant1	2402	30~1000	977.94	-76.04	-54.00	0.02489	4	PASS
				1000~12500	6783.35	-60.06	-47.00	0.98628	20	PASS
			2440	30~1000	929.47	-76.20	-54.00	0.02399	4	PASS
				1000~12500	6035.89	-60.00	-47.00	1.00000	20	PASS
			2480	30~1000	834.94	-76.06	-54.00	0.02477	4	PASS
				1000~12500	5895.59	-59.68	-47.00	1.07647	20	PASS
	BLE_125K	Ant1	2402	30~1000	837.36	-75.32	-54.00	0.02938	4	PASS
				1000~12500	6960.44	-59.88	-47.00	1.02802	20	PASS
			2440	30~1000	885.84	-75.99	-54.00	0.02518	4	PASS
				1000~12500	5877.19	-59.85	-47.00	1.03514	20	PASS
			2480	30~1000	900.38	-76.07	-54.00	0.02472	4	PASS
				1000~12500	6036.46	-59.75	-47.00	1.05925	20	PASS
	BLE_500K	Ant1	2402	30~1000	993.46	-76.46	-54.00	0.02259	4	PASS
				1000~12500	5877.77	-59.72	-47.00	1.06660	20	PASS
			2440	30~1000	811.19	-75.93	-54.00	0.02553	4	PASS
				1000~12500	10283.20	-59.45	-47.00	1.13501	20	PASS
			2480	30~1000	920.74	-76.22	-54.00	0.02388	4	PASS
				1000~12500	6934.57	-59.81	-47.00	1.04472	20	PASS



Test Graphs

