

ARIB STD-T66 TEST REPORT

FOR

Applicant	:	Guangzhou FiiO Electronics Technology Co., Ltd.
Address	:	No.21, Longliang Road, Xialiang Village, Longgui Street, Baiyun District, Guangzhou
Equipment under Test	:	Desktop DAC and Headphone Amplifier
Model No.	:	K9
Trade Mark	:	FiiO
Manufacturer	:	Guangzhou FiiO Electronics Technology Co., Ltd.
Address	:	No.21, Longliang Road, Xialiang Village, Longgui Street, Baiyun District, Guangzhou

Issued By: Dongguan Dongdian Testing Service Co., Ltd.

Add.: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park,
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REPORT

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Test Report Declare

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Test Standard Used: ARIB STD-T66 Version 3.7/2014-10, Second-Generation Low-Power Data Communication System/wireless LAN System, Article 2 Paragraph 1 Item (19).

We Declare:

The equipment described above is tested by Dongguan Dongdian Testing Service Co., Ltd. and in the configuration tested the equipment complied with the standard specified above. The test results are contained in this test report and Dongguan Dongdian Testing Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above ARIB standard.

Report No.:	DDT-R22111011-2E02		
Date of Receipt:	Dec. 06, 2022	Date of Test:	Dec. 06, 2022 ~ Dec. 22, 2022

Prepared By:

Johnny Wang

Johnny Wang/Engineer

Approved By:



Damon Hu/EMC Manager

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan Dongdian Testing Service Co., Ltd.

Revision History

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	Dec. 22, 2022	

1. Summary of Test Results

CLAUSE (ARIB STD-T66)	TEST PARAMETER	RESULTS
3.2 (2)	Antenna Power	Pass
3.2 (3)	Tolerances for Antenna Power	Pass
3.2 (4)	Frequency Tolerance	Pass
3.2 (5)	Transmission Rate	N/A
3.2 (7)	Occupied Frequency Bandwidth	Pass
3.2 (8)	Spread Bandwidth	N/A
3.2 (9)	Spreading Factor	N/A
3.2 (10)	Number of Carriers	N/A
3.2 (11)	Dwell Time	N/A
3.2 (6)	Spurious Emissions	Pass
---	Carrier Sense	N/A
3.6	Process Gain	N/A
3.3 (1)	Secondary Radiated Emissions	Pass
N/A is an abbreviation for Not Applicable.		

2. General Test Information

2.1. Description of EUT

EUT* Name	: Desktop DAC and Headphone Amplifier
Model Number	: K9
EUT function description	: Please reference user manual of this device
Power supply	: AC 110V
Radio Specification	: Bluetooth V5.0
Operation frequency	: 2402 MHz - 2480 MHz
Modulation	: GFSK
Data rate	: 1 Mbps, 2 Mbps
Antenna Gain	: 2 dBi
Sample Number	: S22111011-02

Note: EUT is the abbreviation of equipment under test.

2.2. Accessories of EUT

Description of Accessories	Manufacturer	Model number	Serial No.	Other
N/A	N/A	N/A	N/A	N/A

2.3. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	EMC Compliance	SN
Notebook	Lenovo Beijing Co. Ltd.	ThinkPad	FCC/CE	TP00015A

2.4. Block diagram of EUT configuration for test

EUT

The test software was used to control EUT work in Continuous Tx mode, and select test channel, wireless mode as below table.

Test software: BlueSuite 3.3.9.exe

The pathloss of external cable: 0.5dB (According to the manufacturer's claims)

Test mode, channel, information			
Mode	Channel	Frequency (MHz)	Power Level
BLE_1M	LCH:CH0	2402	Default
	MCH:CH19	2440	Default
	HCH:CH39	2480	Default
BLE_2M	LCH:CH0	2402	Default
	MCH:CH19	2440	Default
	HCH:CH39	2480	Default
Rx mode	/	/	/

2.5. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

	Normal Conditions
Temperature range	21.0 °C
Humidity range	51.5%
Pressure range	101.325 kPa
Power supply	AC 110V (When the input voltage to equipment fluctuated by Manufacturer, the RF unit circuit voltage fluctuation under 1%, therefore all test performed on the rated voltage for equipment.)

The measurement result of the voltage fluctuation at RF circuit when AC 110V +/- 10%.

Input voltage	RF module voltage
AC 121V	DC 4.0V
AC 110V	DC 4.0V
AC 99V	DC 4.0V

2.6. Deviations of test standard

No deviation.

2.7. Test laboratory

Dongguan Dongdian Testing Service Co., Ltd.

Add.: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808.

Tel.: +86-0769-38826678, <http://www.dgddt.com>, Email: ddt@dgddt.com.

CNAS Accreditation No. L6451; A2LA Accreditation Number: 3870.01

FCC Designation Number: CN1182, Test Firm Registration Number: 540522

Innovation, Science and Economic Development Canada Site Registration Number: 10288A

Conformity Assessment Body identifier: CN0048

VCCI facility registration number: C-20087, T-20088, R-20123, R-20155, G-20118

2.8. Measurement uncertainty

Test Item	Uncertainty
Occupied Channel Bandwidth	±1%
Uncertainty for radio frequency	1×10^{-9}
RF Output power, conducted	±0.6dB
Power Spectral Density, Conducted	±1.2dB
Unwanted Emissions, Conducted	±0.6dB
Temperature	±0.2°C
Humidity	±1%
DC and Low frequency voltage	±0.5%
Time	±1%
Duty Cycle	±1%

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

3. Equipment Used During Test

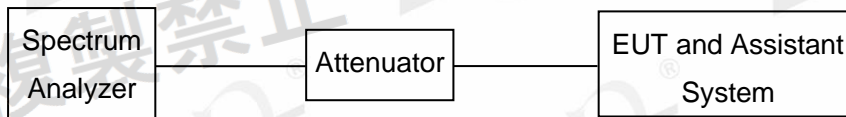
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date	Cal Method	Calibration body
RF Connected Test (Tonscend RF Measurement System)							
Spectrum analyzer	R&S	FSU26	200071	Apr. 26, 2022	Apr. 25, 2023	(C)	CCIC
Power Sensor	R&S	NRP-Z22	101254	Apr. 27, 2022	Apr. 26, 2023	(C)	CCIC
MULTIMETER	FLUKE	15B PRO	55060010WS	Apr. 26, 2022	Apr. 25, 2023	(C)	CCIC
Test Software	JS Tonscend	JS1120-3	Ver.3.2.22	N/A	N/A	N/A	N/A
Remarks: (a) 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) 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 form (a) to (c). Form JRL Article 24-2, paragraph 4, item 2.							

4. Antenna Power

4.1. Limit

Limit	10 mW (10 dBm)
Tolerance	+20%, -80%

4.2. Block diagram of test setup



4.3. Test procedure

- (1) Connected the EUT's antenna port to the Spectrum Analyzer by suitable attenuator, set the Spectrum Analyzer as below:

Centre Frequency: The centre frequency of the channel under test.

Resolution BW: 2 MHz/ 3 MHz..

Video BW: 2 MHz/ 3 MHz.

Span: 10 MHz.

Detector: Peak.

Trace Mode: Max Hold.

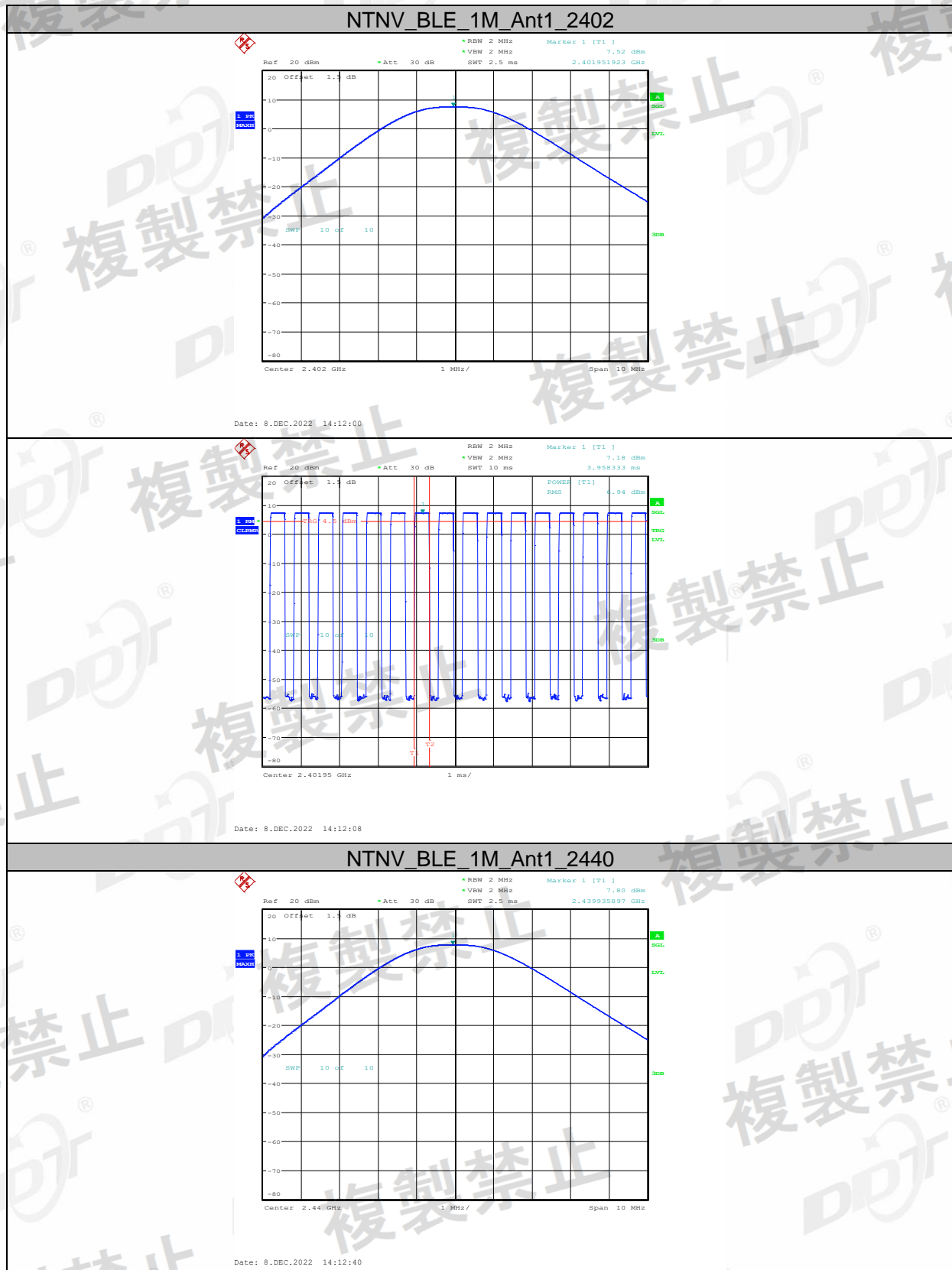
- (2) When the trace is complete, search the frequency of peak power

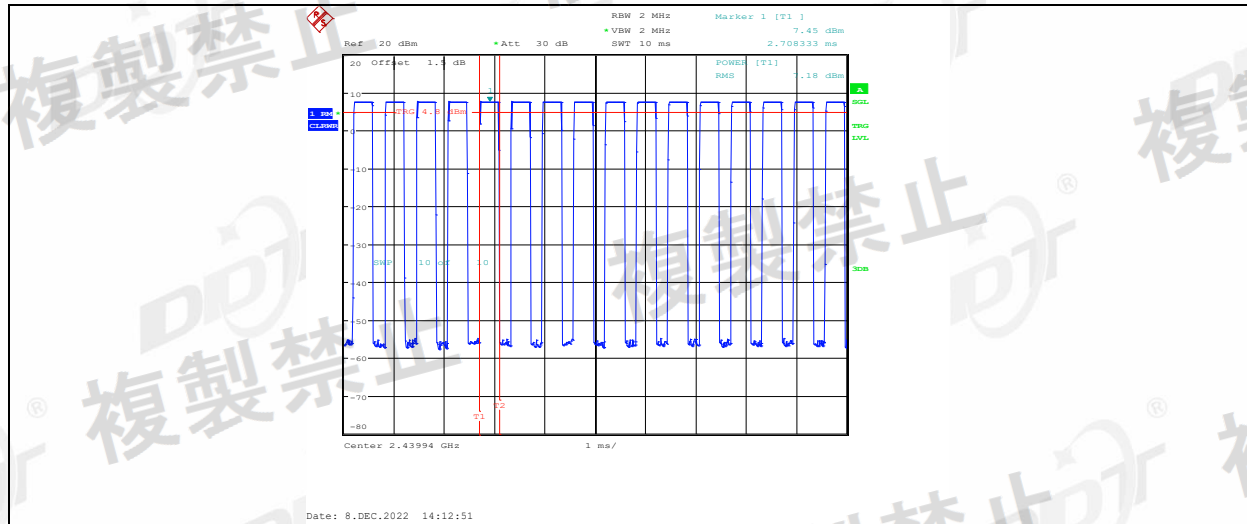
Note: The cable loss and attenuator loss have been put into spectrum analyzer as amplitude offset.

4.4. Test result

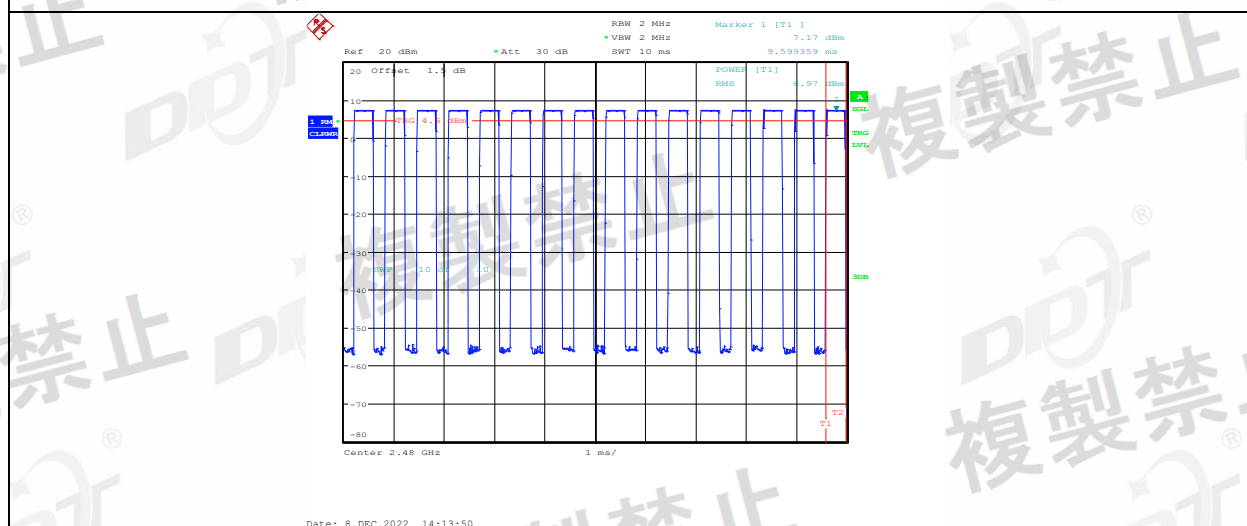
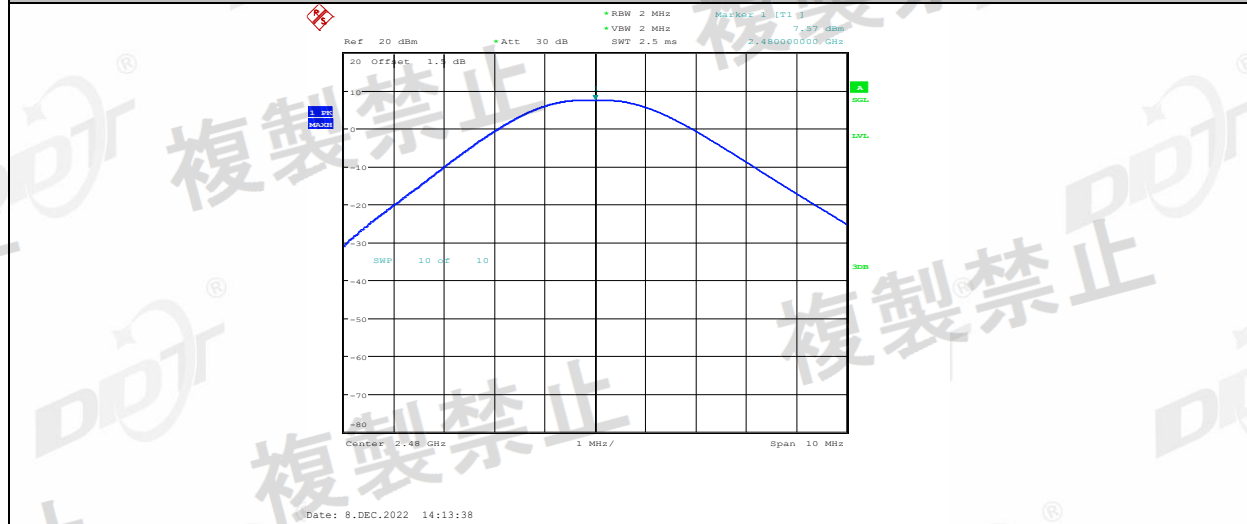
Mode	Antenna	Frequency MHz	Measured		EIRP		Tolerances	Stated power (mW)	Limit
			dBm	mW	dBm	mW			
BLE_1M	Ant1	2402	6.94	4.94	8.94	7.83	-17.61	6	10
	Ant1	2440	7.18	5.22	9.18	8.28	-12.93	6	10
	Ant1	2480	6.97	4.98	8.97	7.89	-17.04	6	10
BLE_2M	Ant1	2402	6.78	4.76	8.78	7.55	-20.59	6	10
	Ant1	2440	7.00	5.01	9.00	7.94	-16.47	6	10
	Ant1	2480	6.78	4.76	8.78	7.55	-20.59	6	10
Tolerances for Antenna Power Limit: +20%, -80%									
Conclusion: Pass									

4.5. Original test data

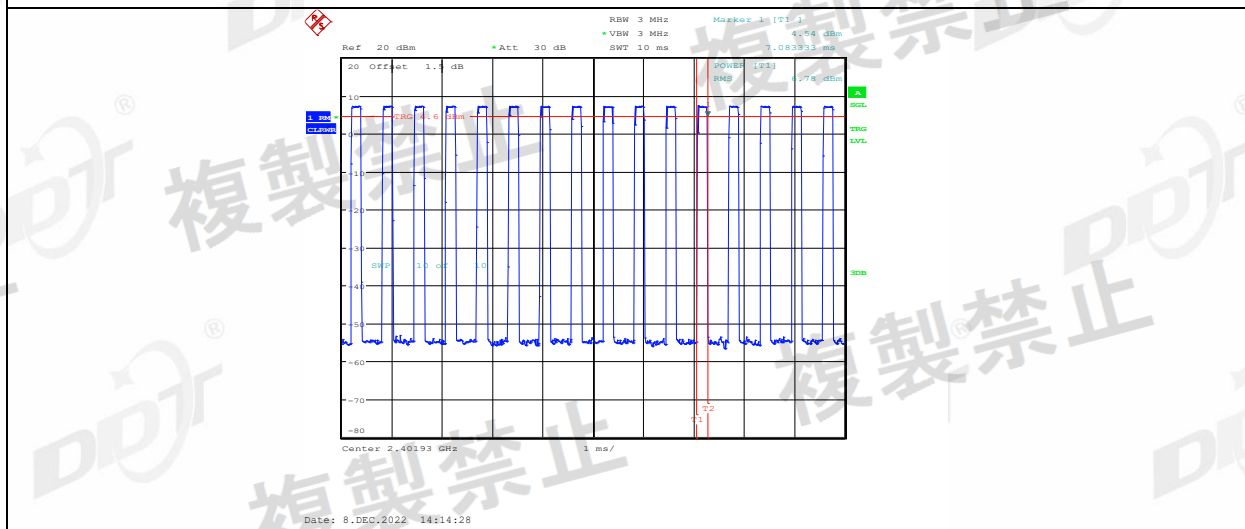
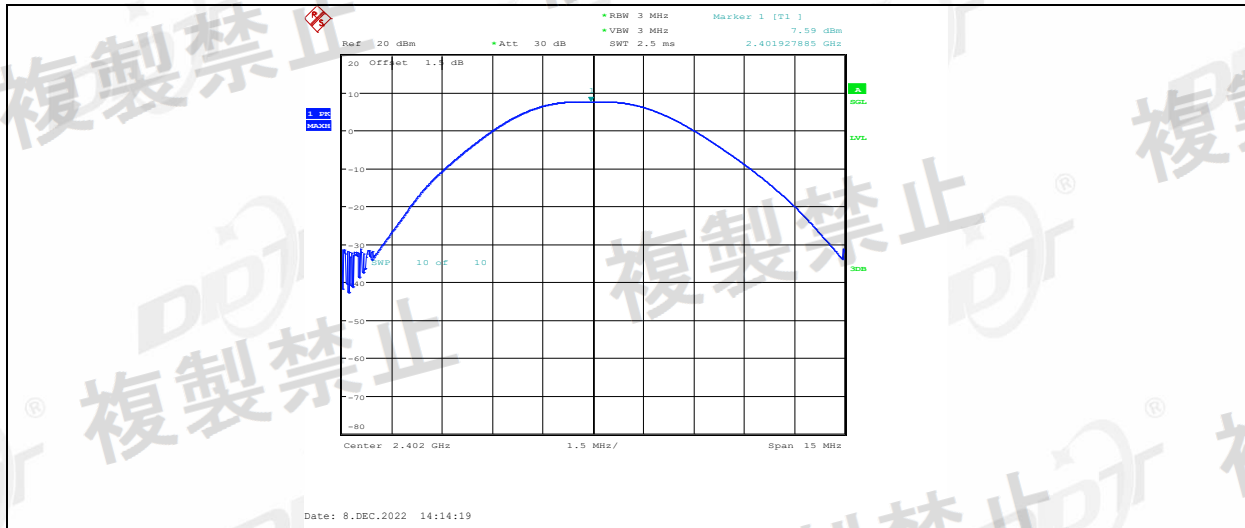




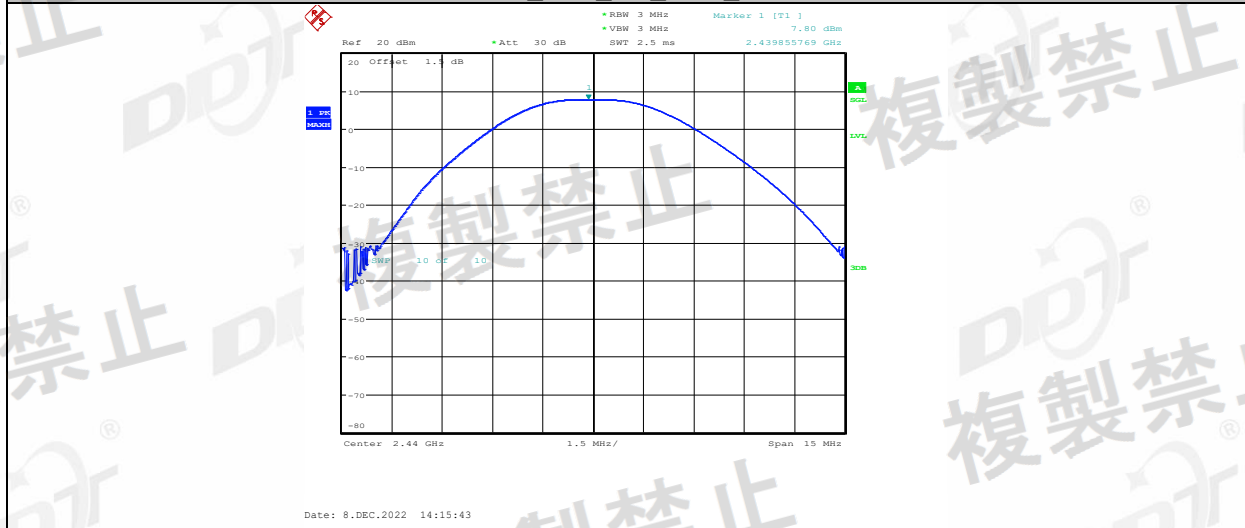
NTNV_BLE_1M_Ant1_2480

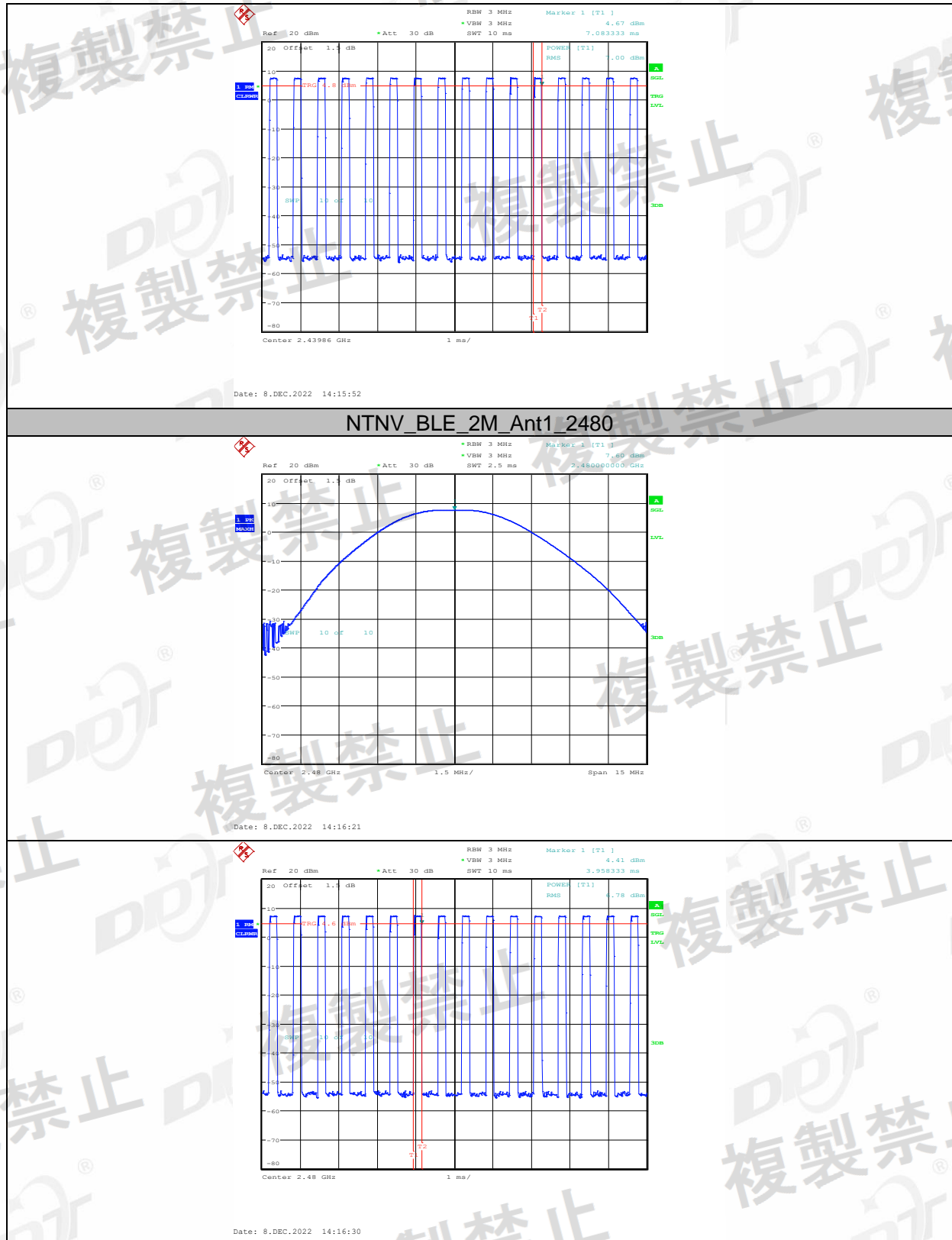


NTNV_BLE_2M_Ant1_2402



NTNV_BLE_2M_Ant1_2440



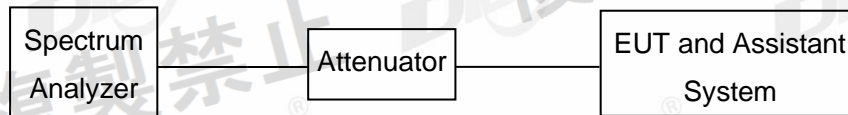


5. Frequency Tolerance

5.1. Limit

+/- 50 x 10⁻⁶ or less (50 ppm)

5.2. Block diagram of test setup



5.3. Test procedure

- (1) Connected the EUT's antenna port to the Spectrum Analyzer by suitable attenuator, set the Spectrum Analyzer as below:

Centre Frequency: The centre frequency of the channel under test.

Resolution BW: 10 kHz.

Video BW: 10 kHz.

Span: 1 MHz.

Detector: Peak.

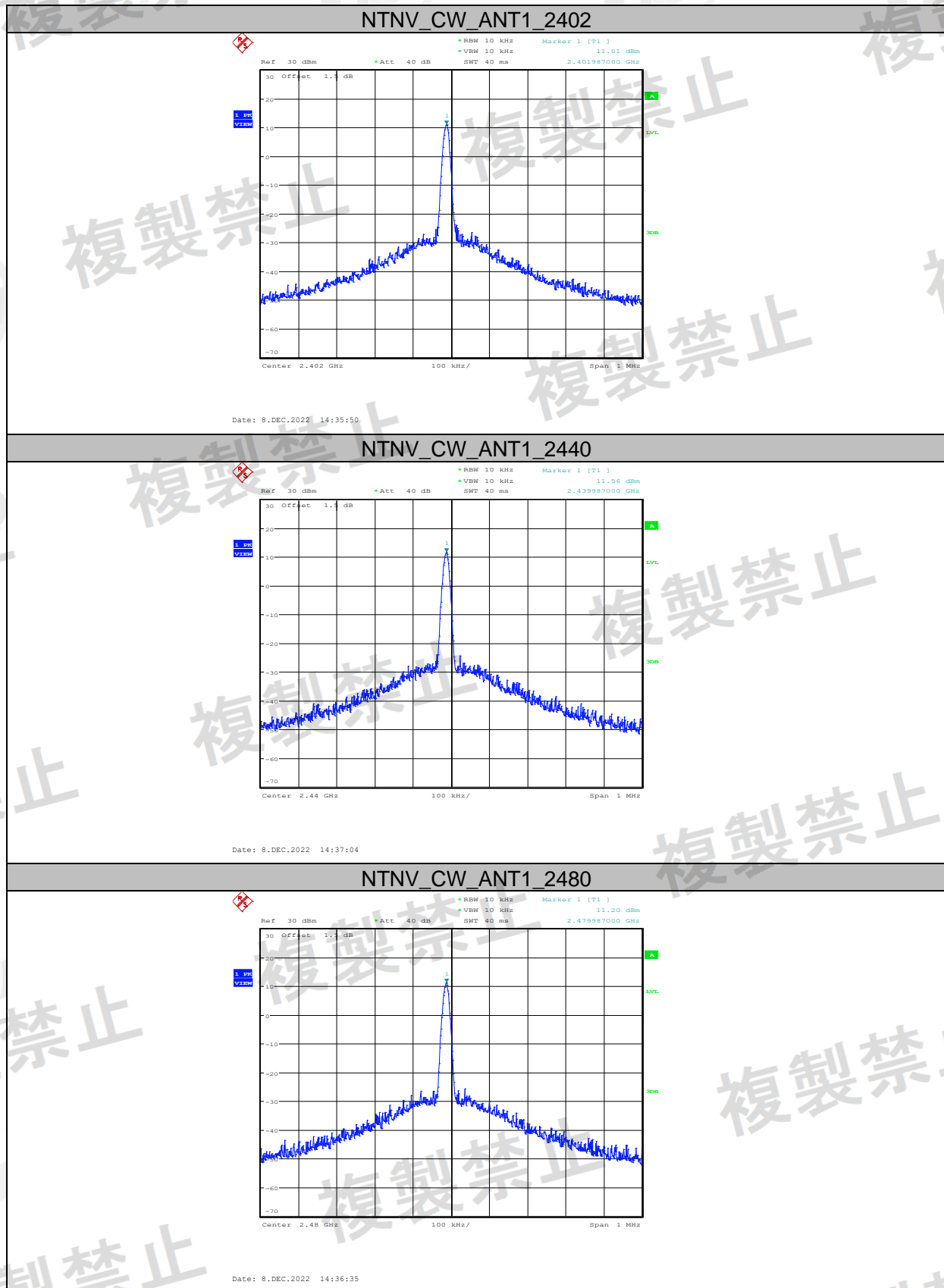
Trace Mode: Max Hold.

- (2) When the trace is complete, find the peak value of the power envelope and record the frequency.

5.4. Test result

Mode	Frequency MHz	Result			Limit ppm
		Measured (MHz)	Tolerance (kHz)	Tolerance (ppm)	
Carrier Tx mode	2402	2401.987	-13	-5.412	+/-50
	2440	2439.987	-13	-5.328	+/-50
	2480	2479.987	-13	-5.242	+/-50
Conclusion: Pass					

5.5. Original test data

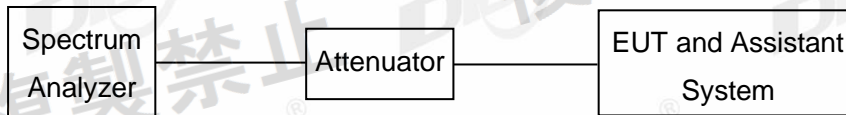


6. Occupied Frequency Bandwidth

6.1. Limit

26 MHz or less

6.2. Block diagram of test setup



6.3. Test procedure

- (1) Connected the EUT's antenna port to the Spectrum Analyzer by suitable attenuator, set the Spectrum Analyzer as below:

Centre Frequency: The centre frequency of the channel under test.

Resolution BW: 300 kHz

Video BW: 300 kHz

Span: 4 MHz

Detector: Peak.

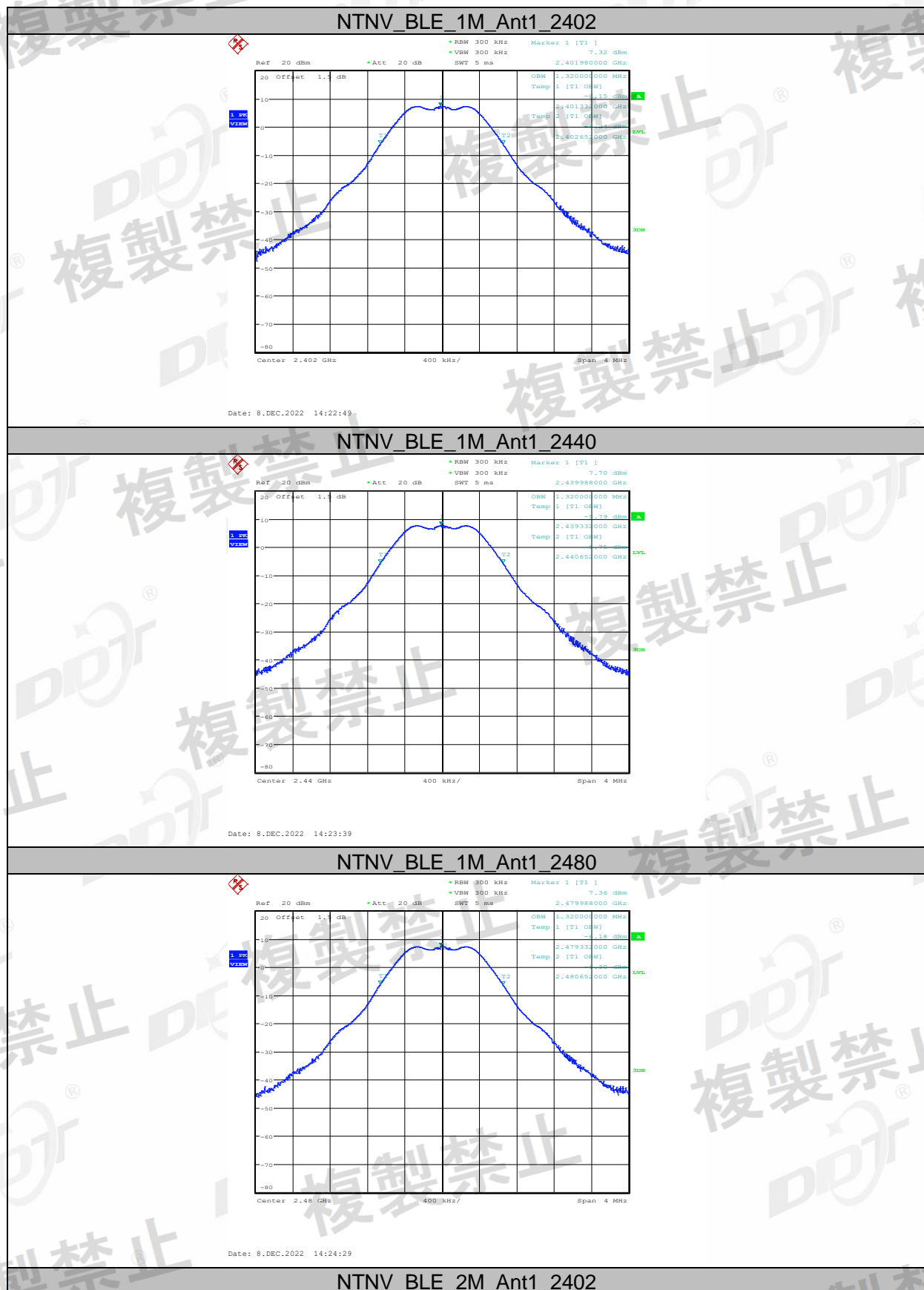
Trace Mode: Max Hold.

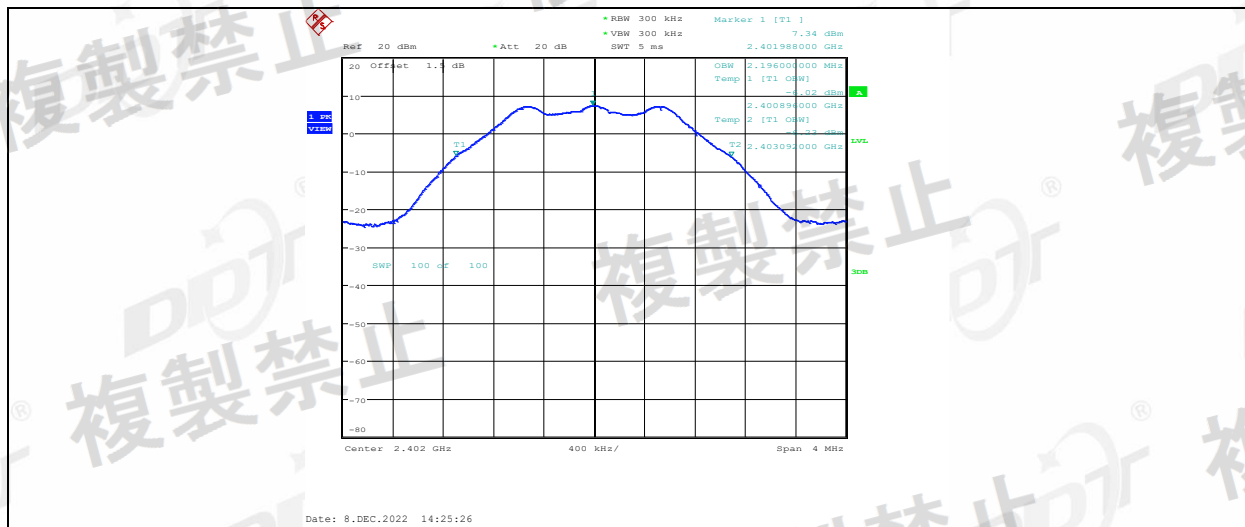
- (2) When the trace is complete, measure the occupied bandwidth (99% bandwidth) with spectrum analyzer's bandwidth measure function.

6.4. Test result

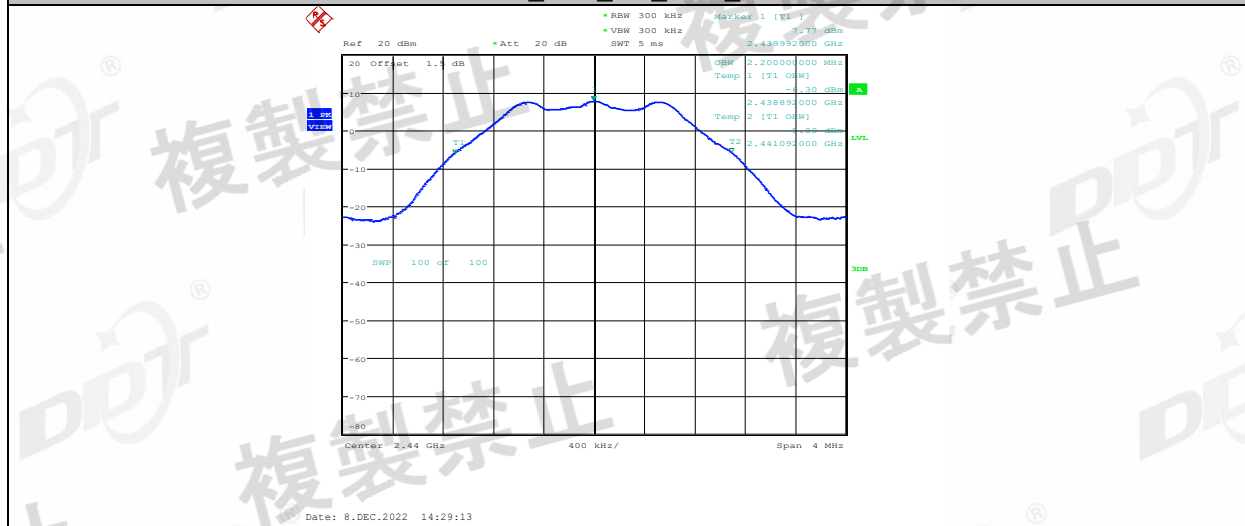
Mode	Frequency MHz	Antenna	Measured	Limit
			MHz	MHz
BLE_1M	2402	Ant1	1.320	<26
	2440	Ant1	1.320	<26
	2480	Ant1	1.320	<26
BLE_2M	2402	Ant1	2.196	<26
	2440	Ant1	2.200	<26
	2480	Ant1	2.196	<26
Conclusion: Pass				

6.5. Original test data

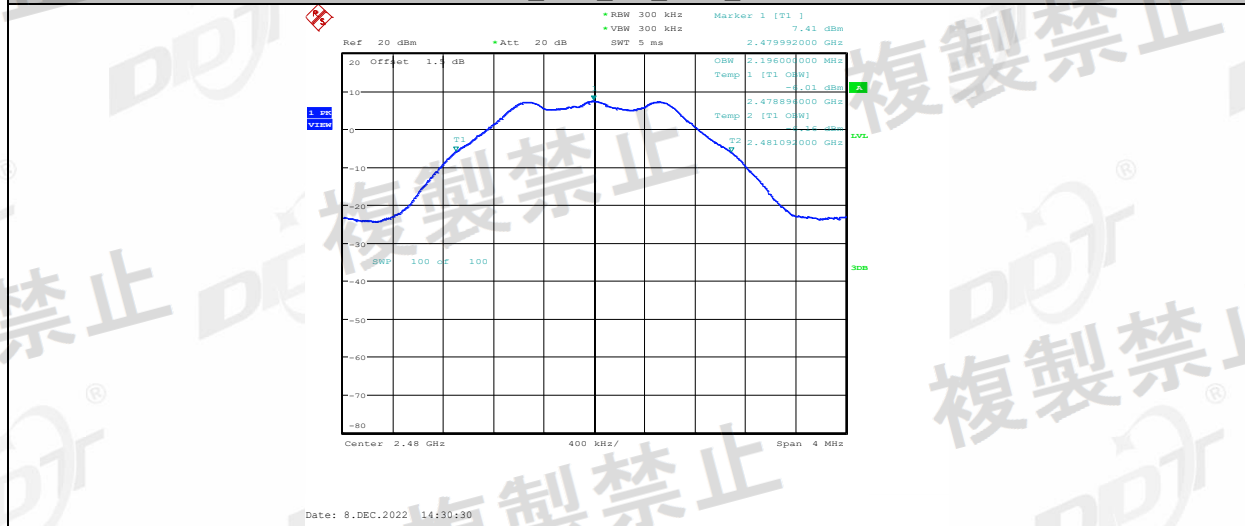




NTNV_BLE_2M_Ant1_2440



NTNV_BLE_2M_Ant1_2480



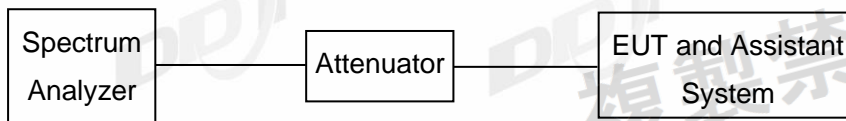
7. Transmitter Spurious Emissions (Conducted)

7.1. Limit

Permissible mean power of spurious emission of each frequency supplied to a feeder, that is, mean power of spurious emission in the 1 MHz bandwidth at frequency f other than frequency band used shall be as follows:

- a. $2,387\text{MHz} \leq f \leq 2,400\text{MHz}$ and $2,483.5\text{MHz} < f \leq 2,496.5\text{MHz}$ 25 μW or less
- b. $2,387\text{MHz} > f$ and $2,496.5\text{MHz} < f$ 2.5 μW or less

7.2. Block diagram of test setup



7.3. Test procedure

- (1) Connected the EUT's antenna port to the Spectrum Analyzer by suitable attenuator, set the Spectrum Analyzer as below:

Resolution BW: 1 MHz. Video BW: 1 MHz.

Detector: Peak. Trace Mode: Max Hold.

- (2) All the emissions from 30 MHz to 13 GHz were measured and record.

7.4. Test result

Test Condition	Test Mode	Antenna	Channel	Freq. Range	Result (dBm)	Limit	Verdict
NTNV	BLE_1M	ANT1	2402	30~1000	-47.15	-26	Pass
NTNV	BLE_1M	ANT1	2402	1000~2387	-42.39	-26	Pass
NTNV	BLE_1M	ANT1	2402	2387~2400	-39.39	-16	Pass
NTNV	BLE_1M	ANT1	2402	2483.5~2496.5	-53.68	-16	Pass
NTNV	BLE_1M	ANT1	2402	2496.5~13000	-35.23	-26	Pass
NTNV	BLE_1M	ANT1	2440	30~1000	-46.35	-26	Pass
NTNV	BLE_1M	ANT1	2440	1000~2387	-55.11	-26	Pass
NTNV	BLE_1M	ANT1	2440	2387~2400	-52.94	-16	Pass
NTNV	BLE_1M	ANT1	2440	2483.5~2496.5	-53.17	-16	Pass
NTNV	BLE_1M	ANT1	2440	2496.5~13000	-33.21	-26	Pass
NTNV	BLE_1M	ANT1	2480	30~1000	-45.98	-26	Pass
NTNV	BLE_1M	ANT1	2480	1000~2387	-61.43	-26	Pass
NTNV	BLE_1M	ANT1	2480	2387~2400	-53.20	-16	Pass
NTNV	BLE_1M	ANT1	2480	2483.5~2496.5	-39.09	-16	Pass
NTNV	BLE_1M	ANT1	2480	2496.5~13000	-36.70	-26	Pass

Test Condition	Test Mode	Antenna	Channel	Freq. Range	Result (dBm)	Limit	Verdict
NTNV	BLE_2M	ANT1	2402	30~1000	-47.72	-26	Pass
NTNV	BLE_2M	ANT1	2402	1000~2387	-42.46	-26	Pass
NTNV	BLE_2M	ANT1	2402	2387~2400	-17.28	-16	Pass
NTNV	BLE_2M	ANT1	2402	2483.5~2496.5	-52.77	-16	Pass
NTNV	BLE_2M	ANT1	2402	2496.5~13000	-35.47	-26	Pass
NTNV	BLE_2M	ANT1	2440	30~1000	-46.35	-26	Pass
NTNV	BLE_2M	ANT1	2440	1000~2387	-46.36	-26	Pass
NTNV	BLE_2M	ANT1	2440	2387~2400	-53.98	-16	Pass
NTNV	BLE_2M	ANT1	2440	2483.5~2496.5	-51.94	-16	Pass
NTNV	BLE_2M	ANT1	2440	2496.5~13000	-33.12	-26	Pass
NTNV	BLE_2M	ANT1	2480	30~1000	-46.07	-26	Pass
NTNV	BLE_2M	ANT1	2480	1000~2387	-47.04	-26	Pass
NTNV	BLE_2M	ANT1	2480	2387~2400	-53.39	-16	Pass
NTNV	BLE_2M	ANT1	2480	2483.5~2496.5	-39.44	-16	Pass
NTNV	BLE_2M	ANT1	2480	2496.5~13000	-36.65	-26	Pass

Note: If spurious emissions are greater than [limit -3 dB] in 1MHz RBW, then more detailed measurements are required. Repeat the test in 30 kHz RBW, the spurious emission value using following the formula below:

Calculated Value = (Measured Value + 15.2 dB)

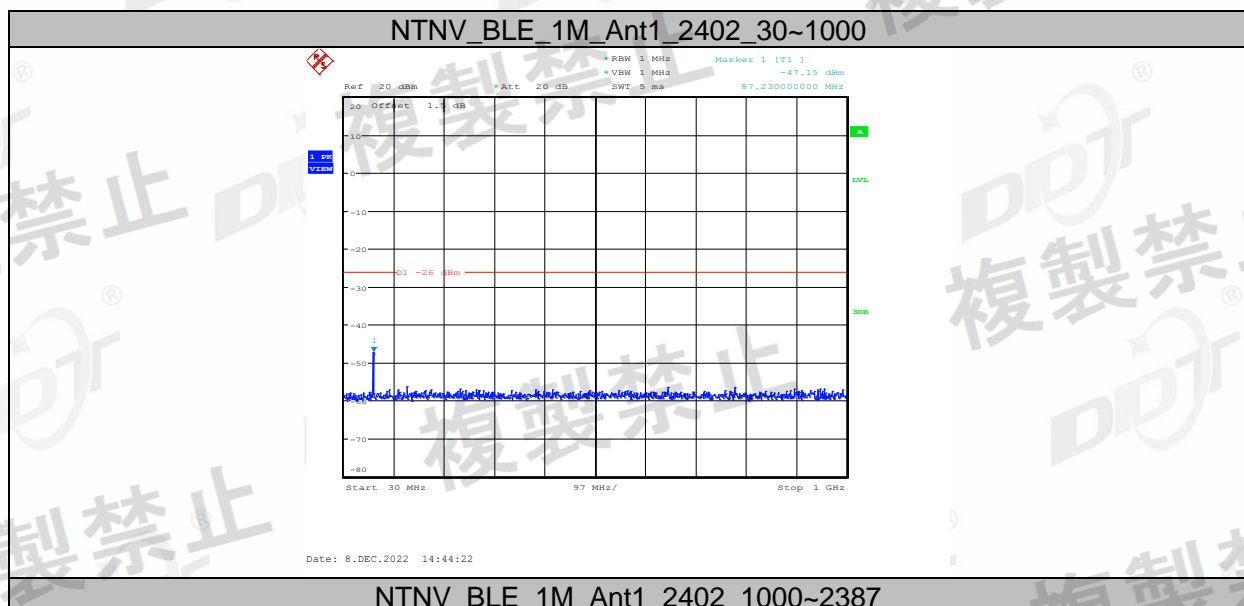
15.2 dB adjustment is derived from the Conversion Factor of RBW

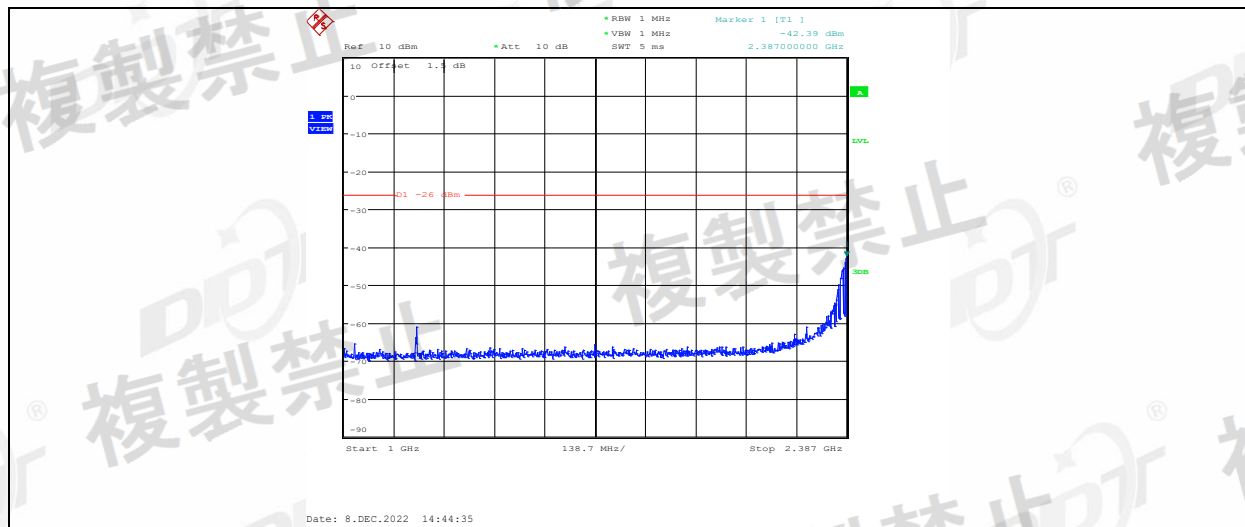
Conversion Factor of RBW = $10 \times \log(\text{Reference Bandwidth} / \text{RBW of measurement}) = 15.2[\text{dB}]$

Where: Reference Bandwidth = 1 MHz

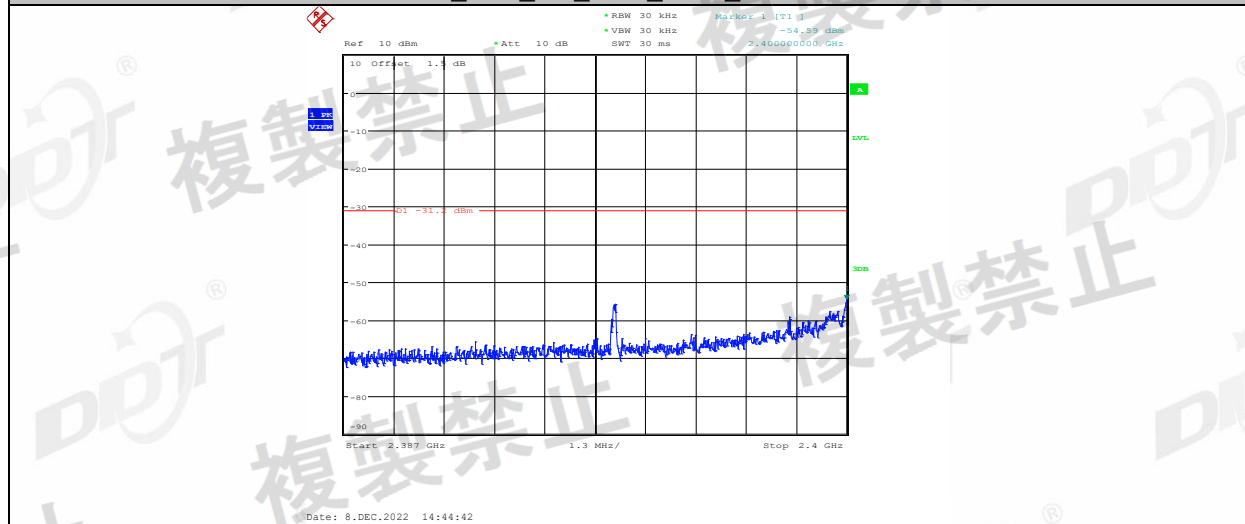
RBW of measurement = 30 kHz

7.5. Original test data

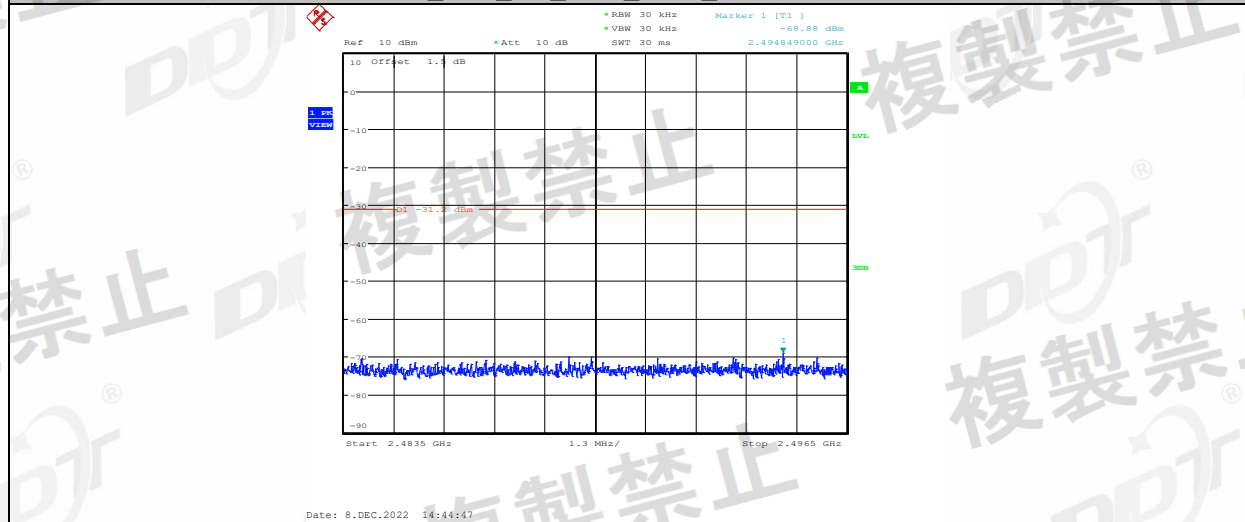




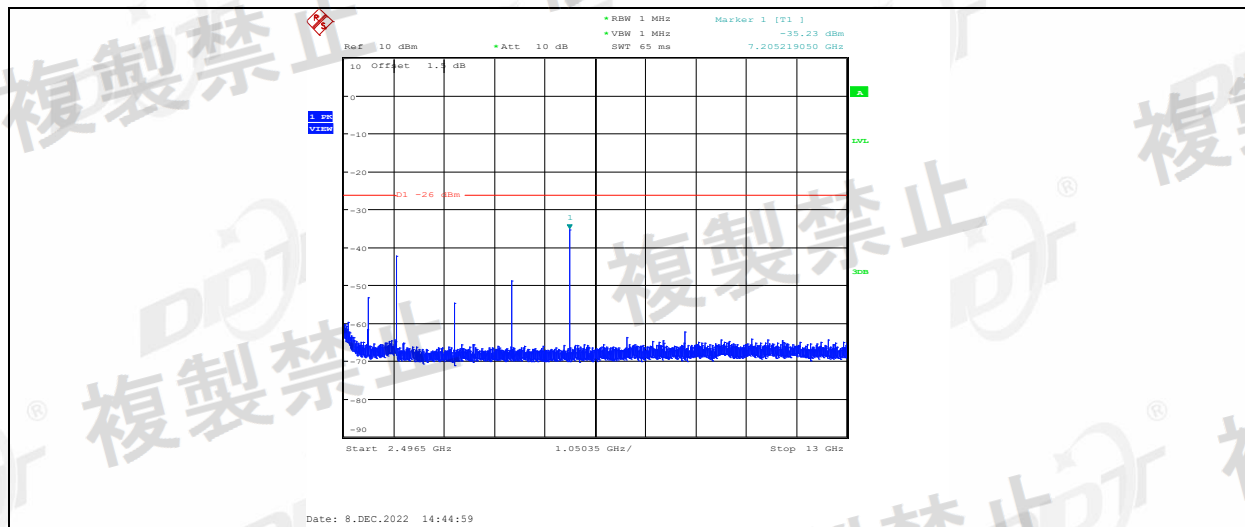
NTNV_BLE_1M_Ant1_2402_2387~2400



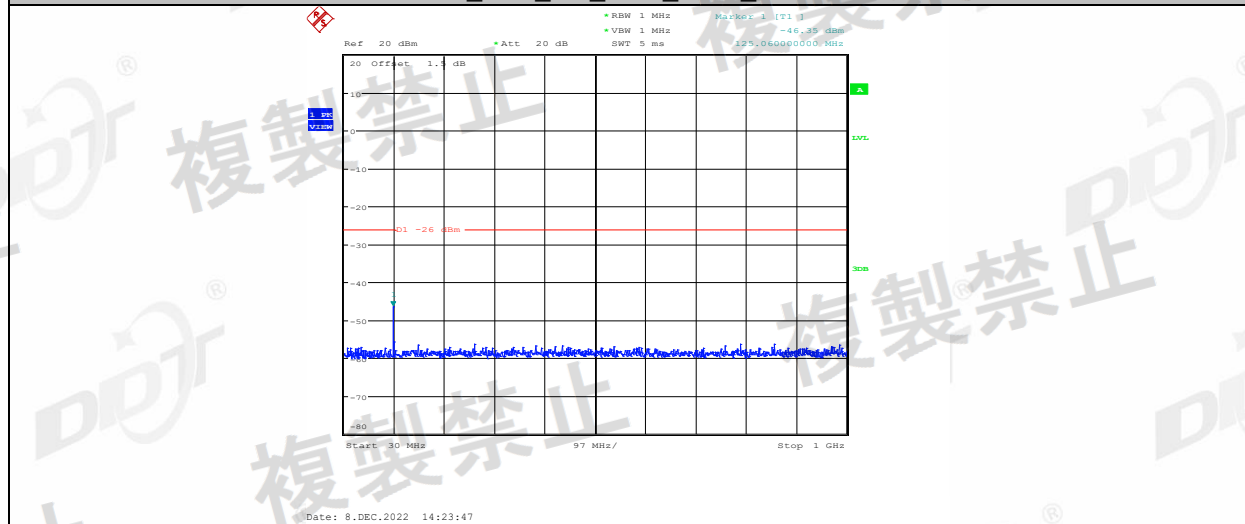
NTNV_BLE_1M_Ant1_2402_2483.5~2496.5



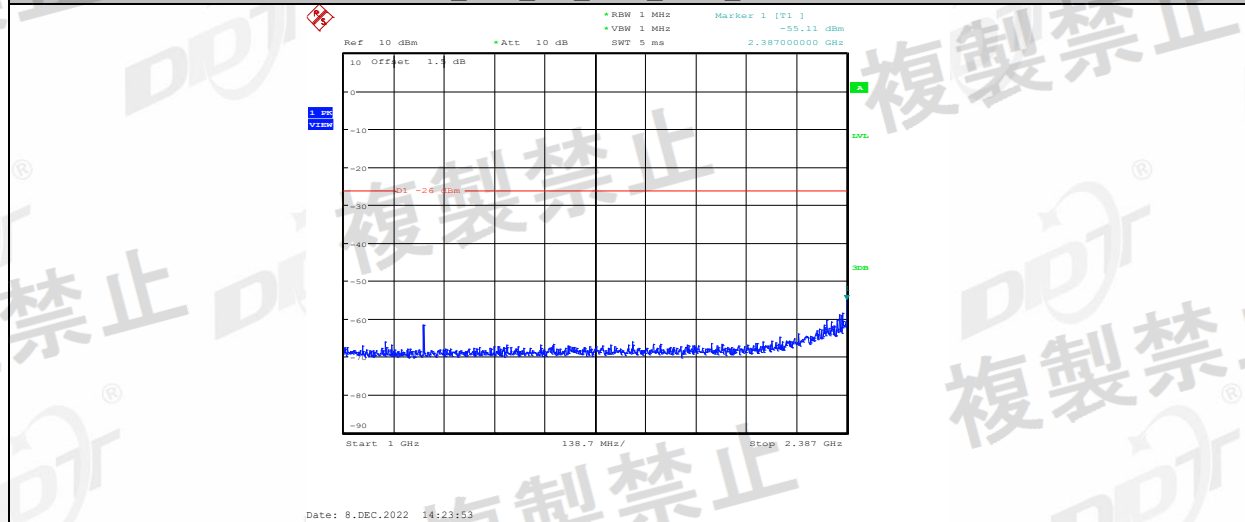
NTNV_BLE_1M_Ant1_2402_2496.5~13000



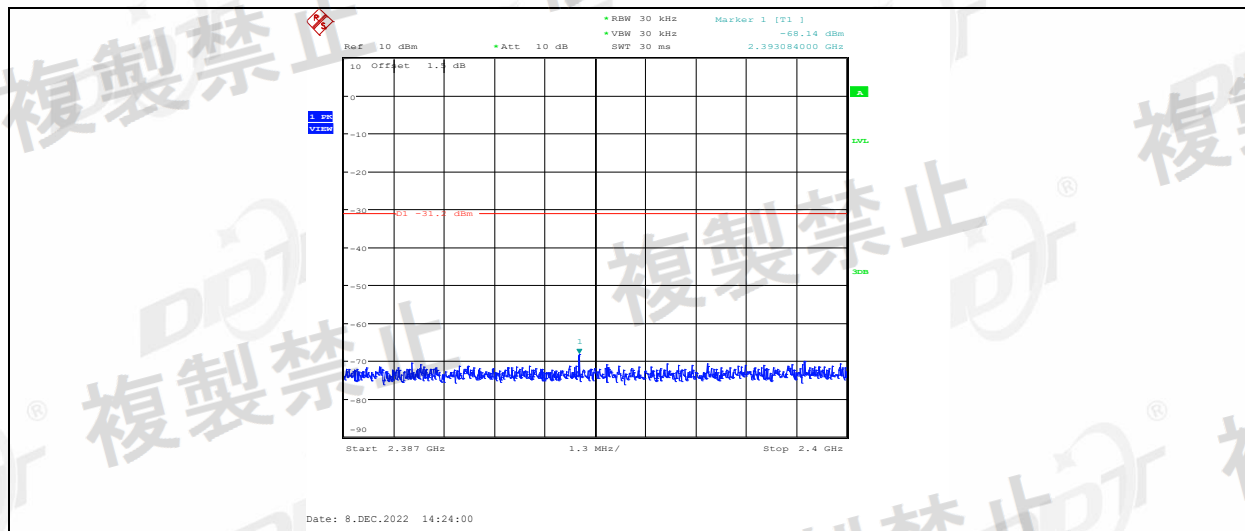
NTNV_BLE_1M_Ant1_2440_30~1000



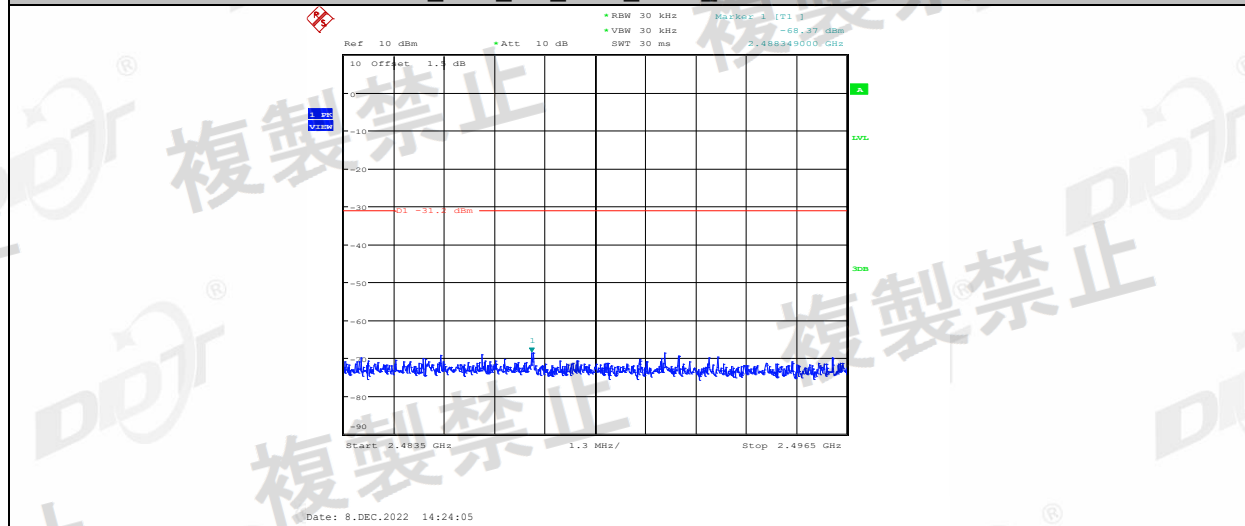
NTNV_BLE_1M_Ant1_2440_1000~2387



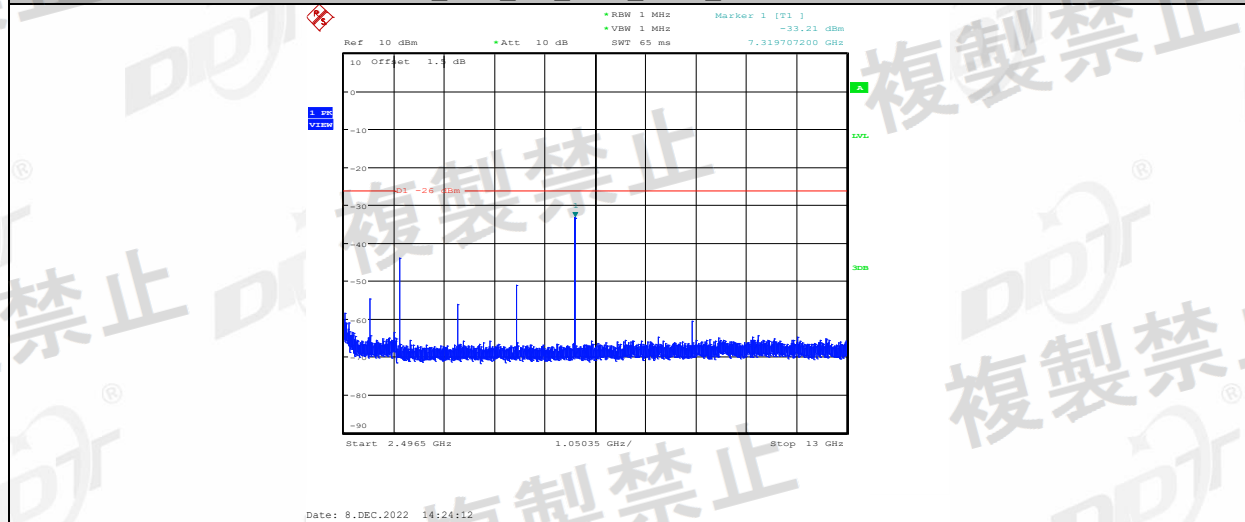
NTNV_BLE_1M_Ant1_2440_2387~2400



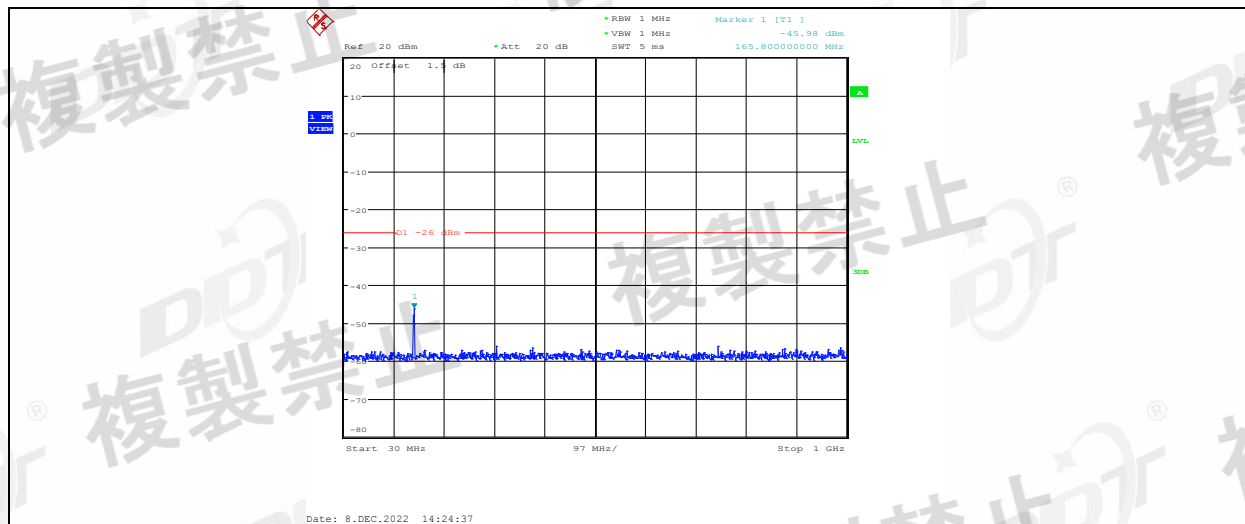
NTNV_BLE_1M_Ant1_2440_2483.5~2496.5



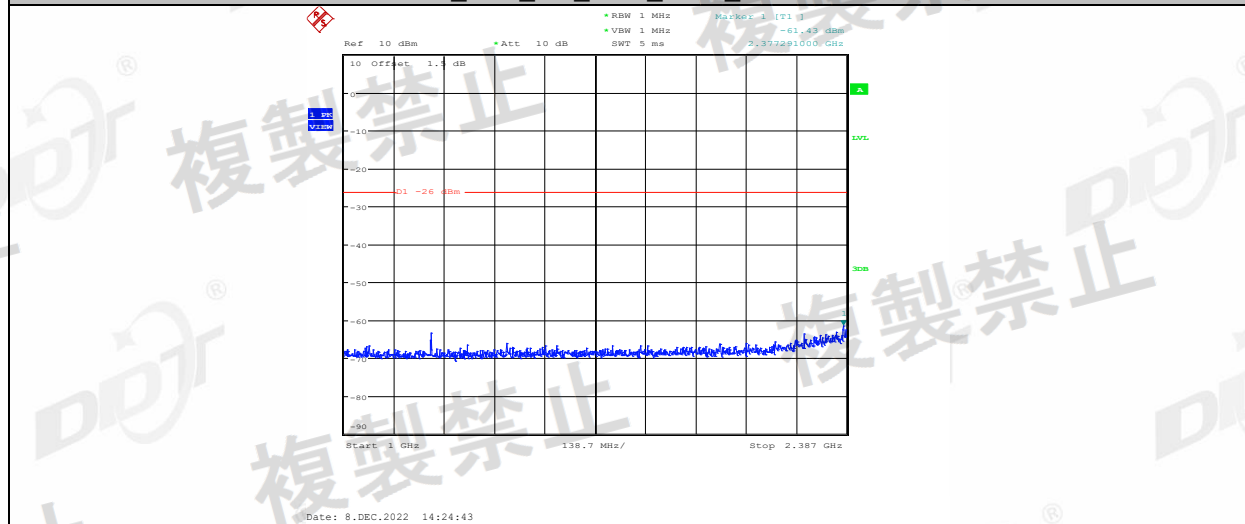
NTNV_BLE_1M_Ant1_2440_2496.5~13000



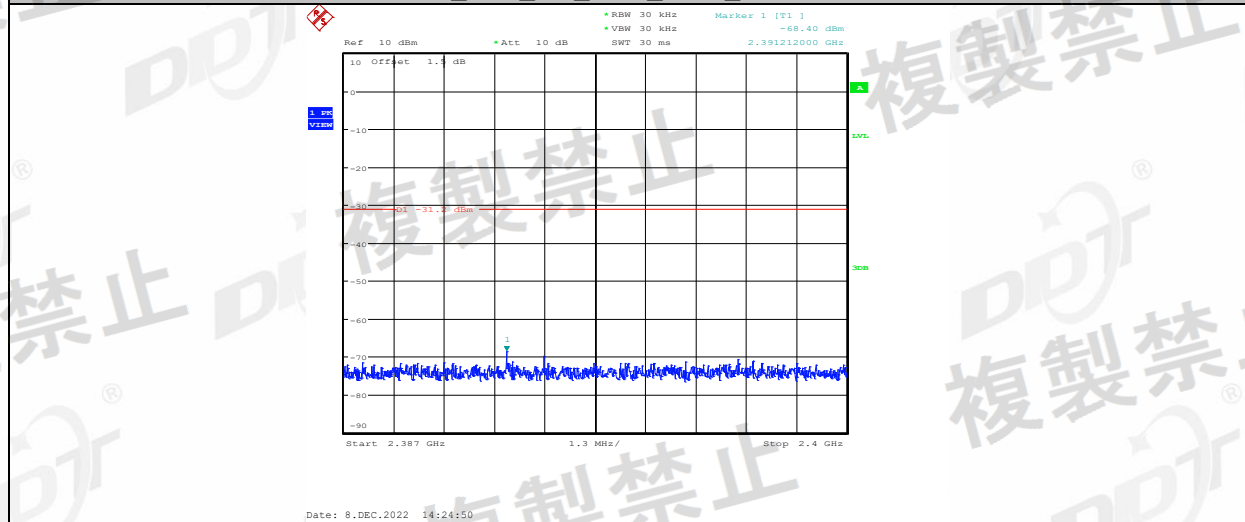
NTNV_BLE_1M_Ant1_2480_30~1000



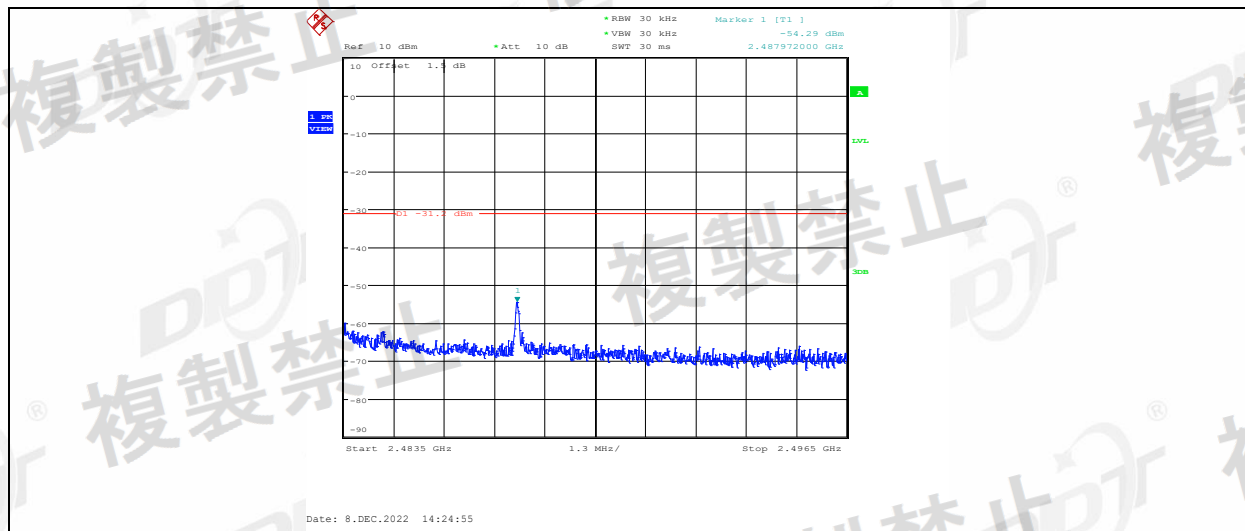
NTNV_BLE_1M_Ant1_2480_1000~2387



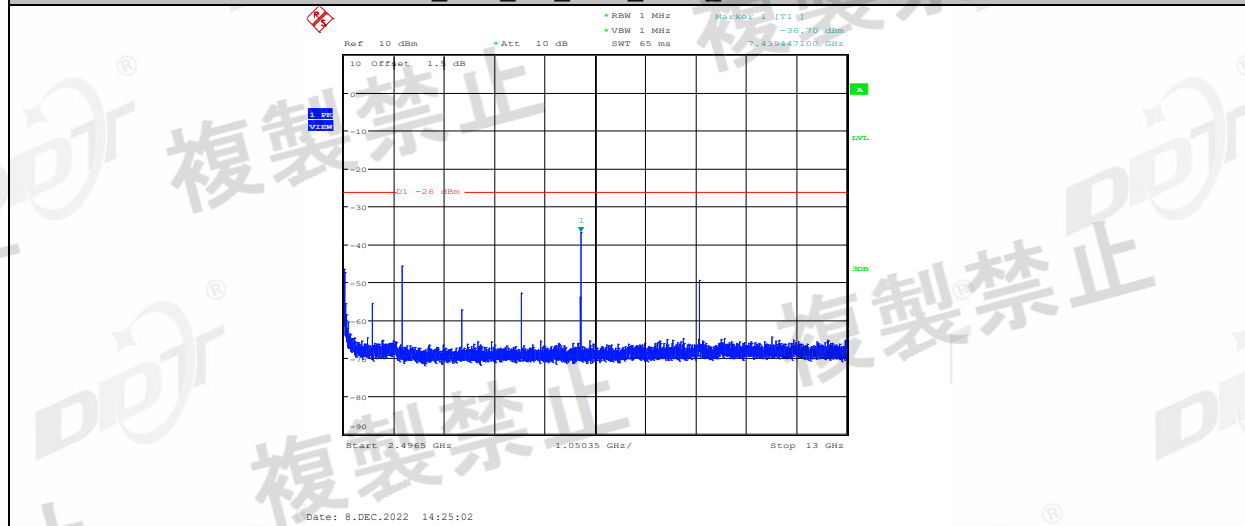
NTNV_BLE_1M_Ant1_2480_2387~2400



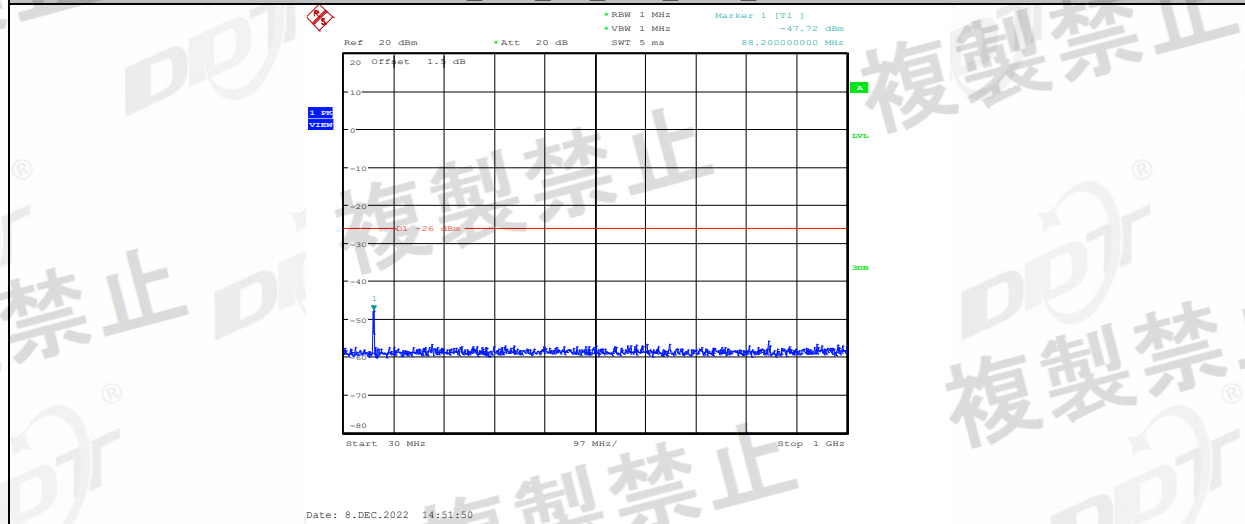
NTNV_BLE_1M_Ant1_2480_2483.5~2496.5



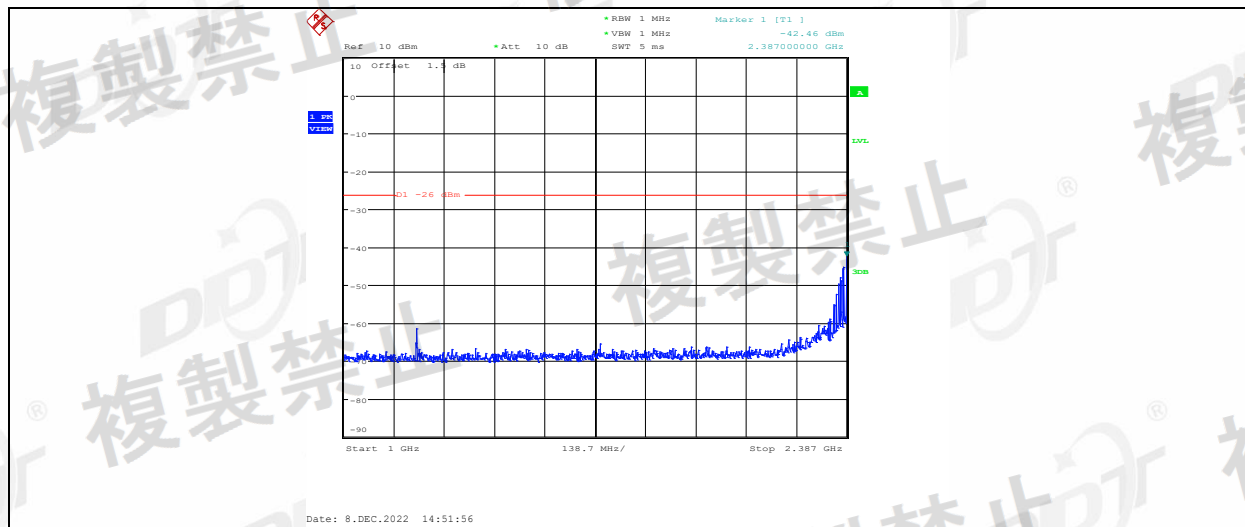
NTNV_BLE_1M_Ant1_2480_2496.5~13000



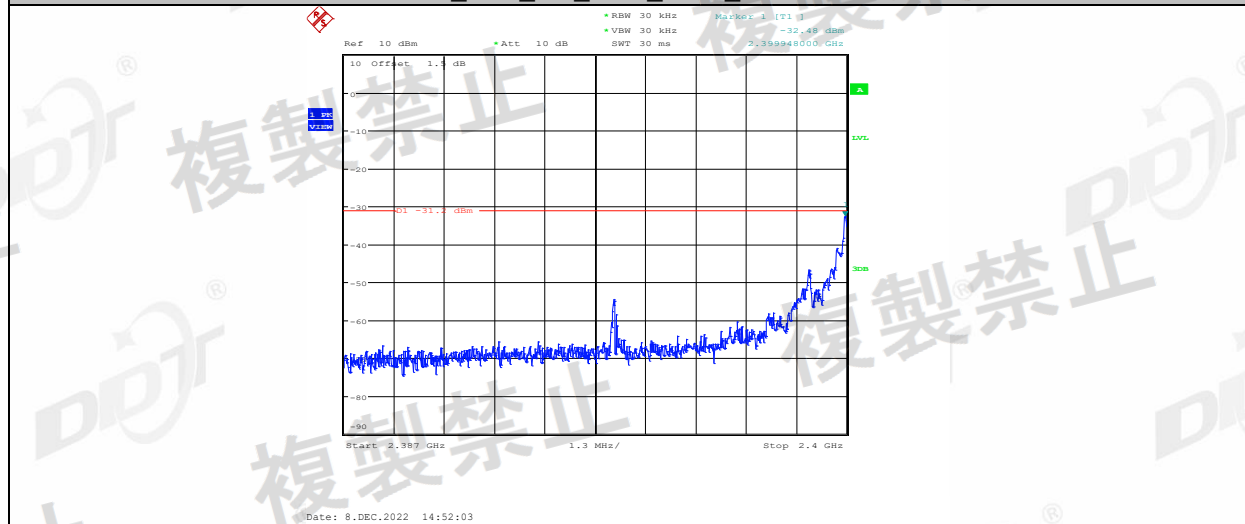
NTNV_BLE_2M_Ant1_2402_30~1000



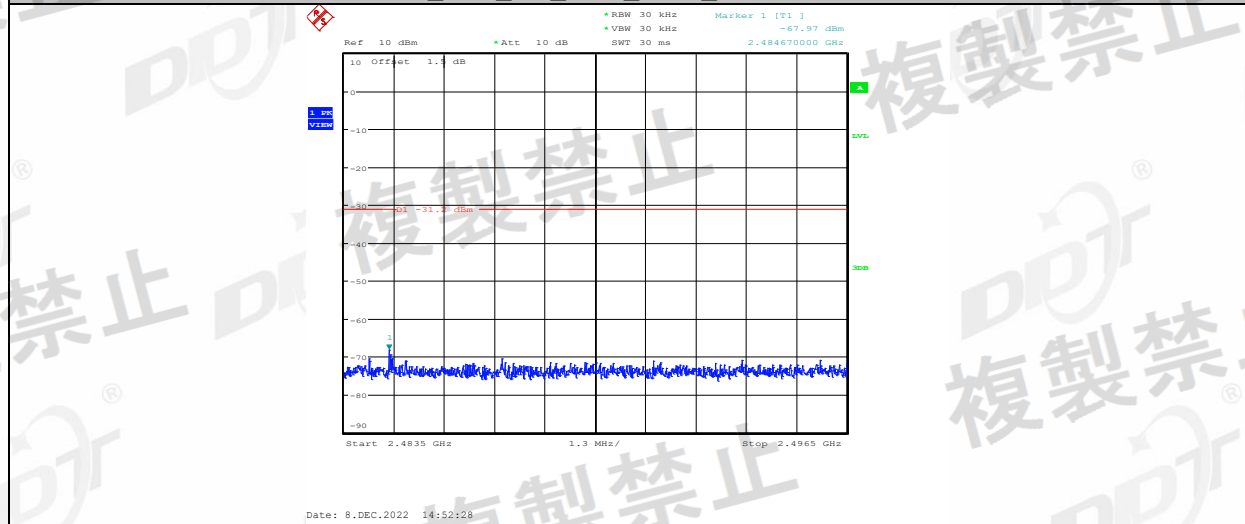
NTNV_BLE_2M_Ant1_2402_1000~2387



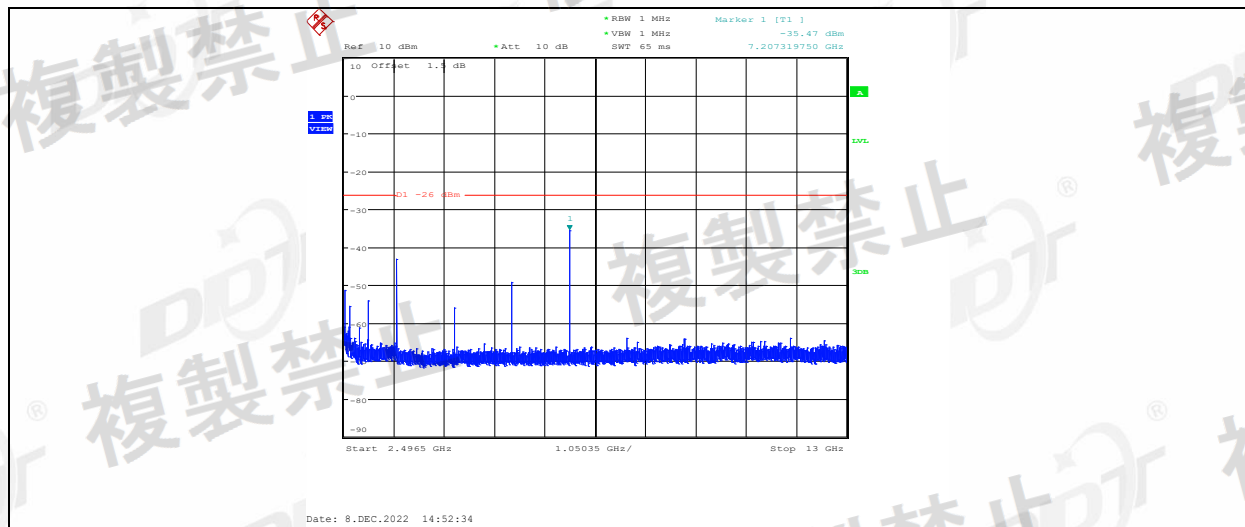
NTNV_BLE_2M_Ant1_2402_2387~2400



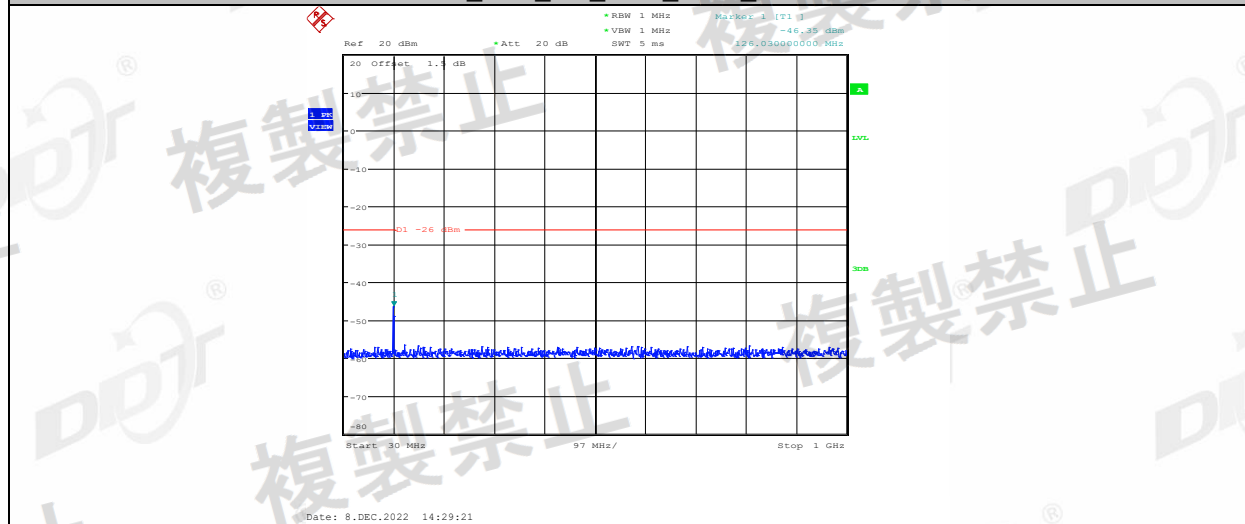
NTNV_BLE_2M_Ant1_2402_2483.5~2496.5



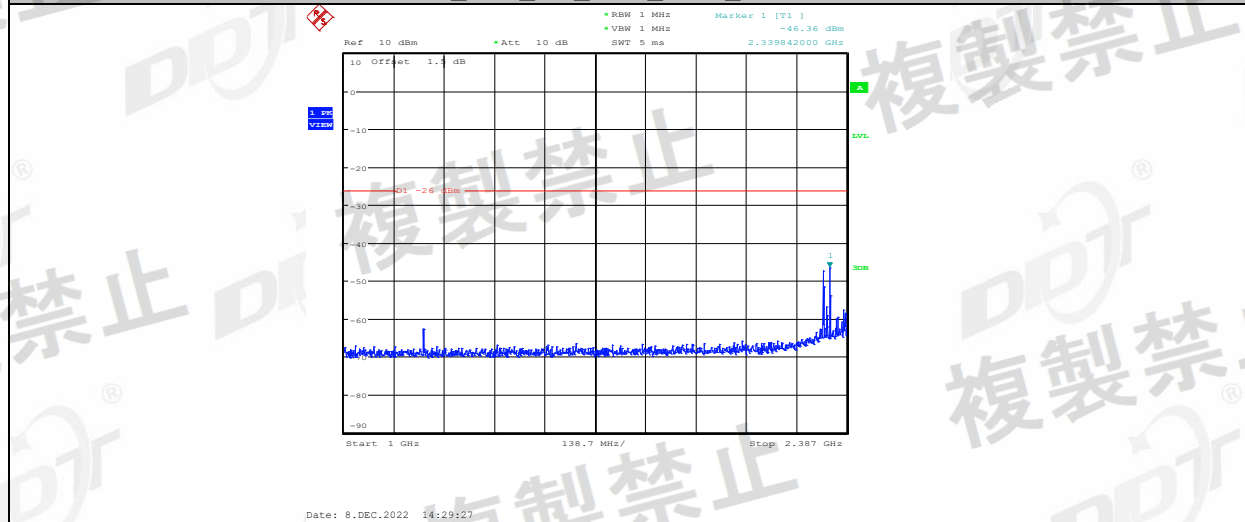
NTNV_BLE_2M_Ant1_2402_2496.5~13000



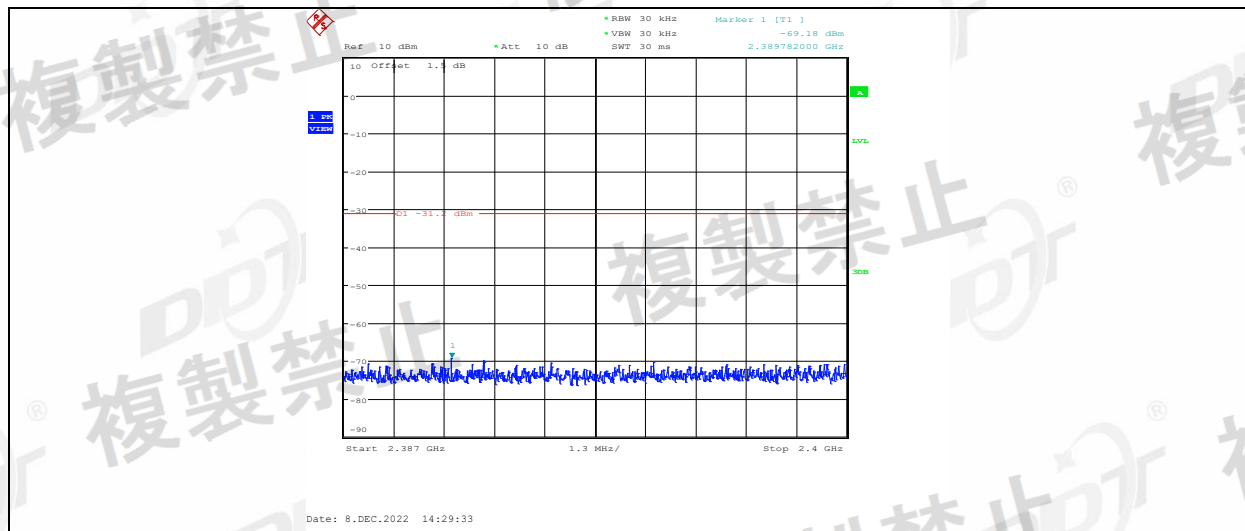
NTNV_BLE_2M_Ant1_2440_30~1000



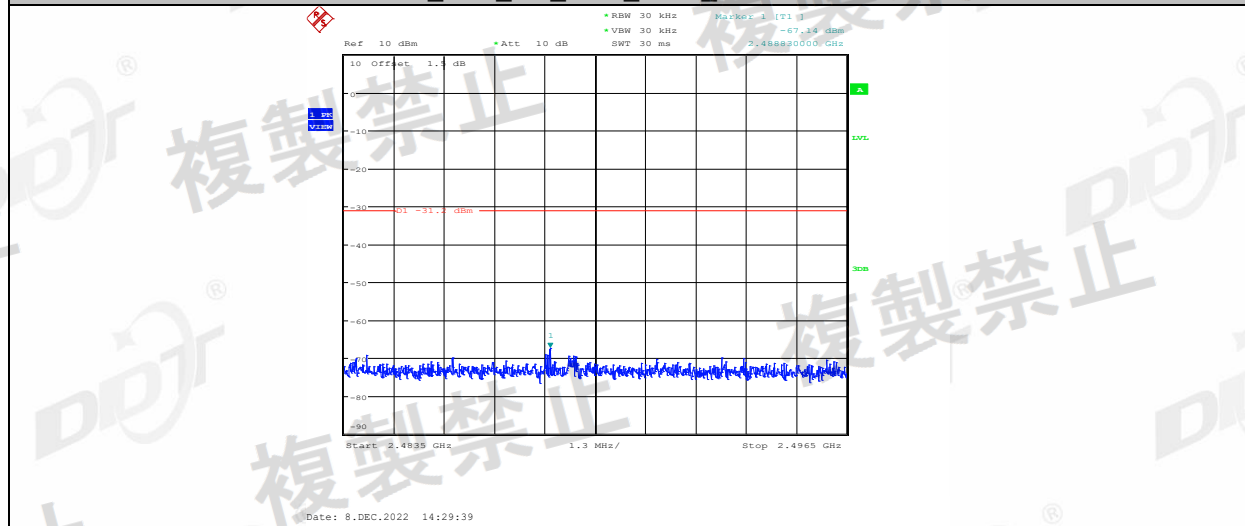
NTNV_BLE_2M_Ant1_2440_1000~2387



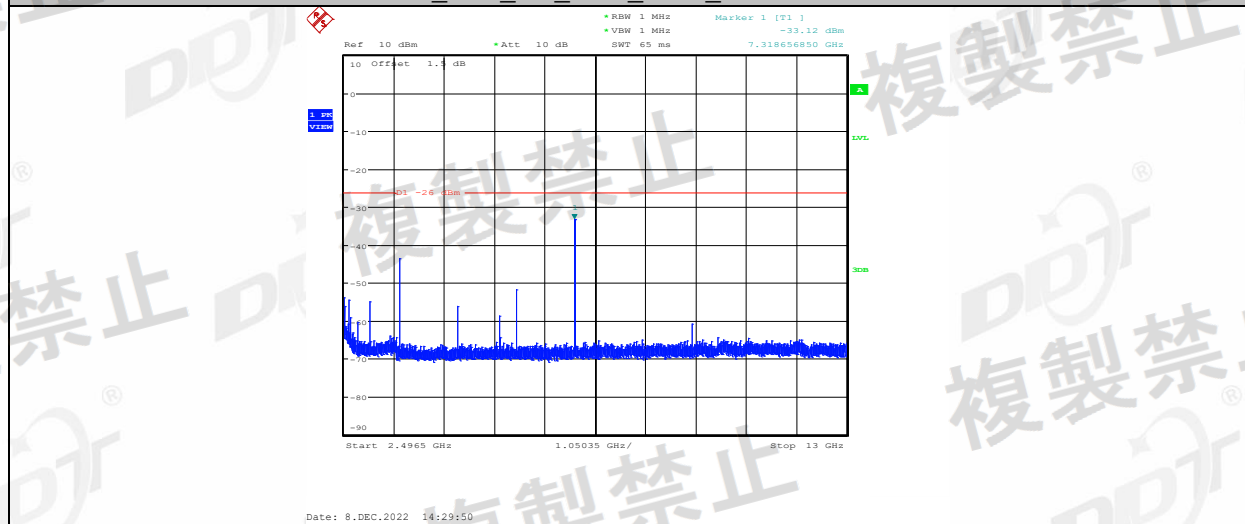
NTNV_BLE_2M_Ant1_2440_2387~2400



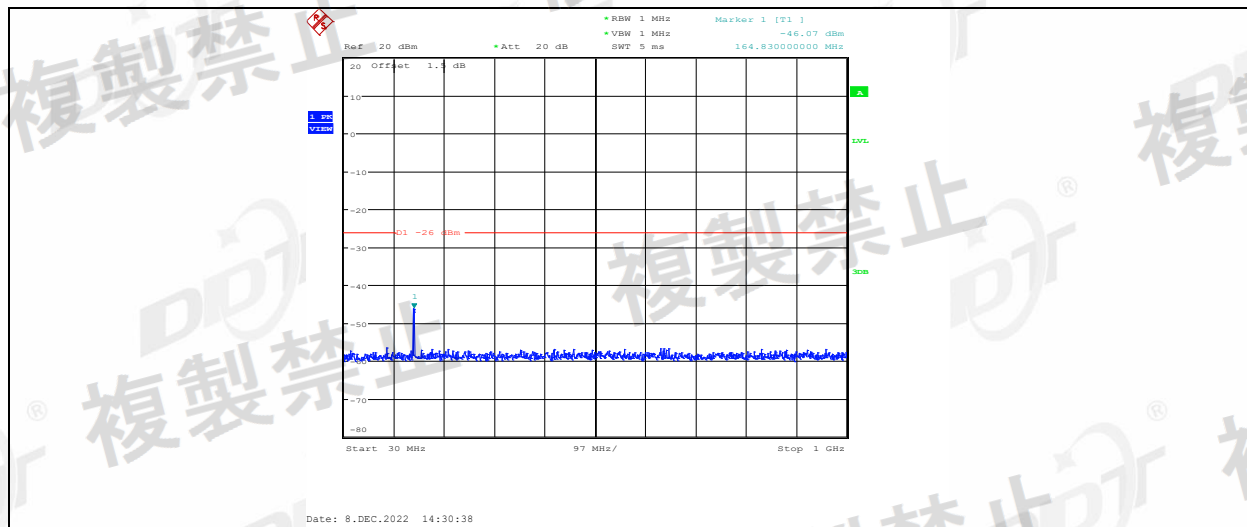
NTNV_BLE_2M_Ant1_2440_2483.5~2496.5



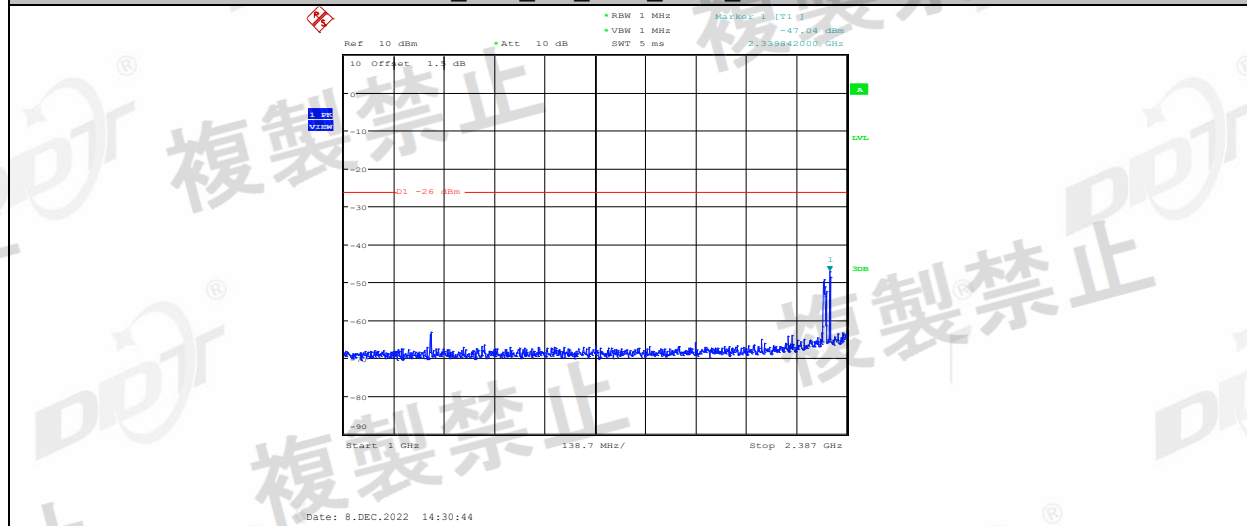
NTNV_BLE_2M_Ant1_2440_2496.5~13000



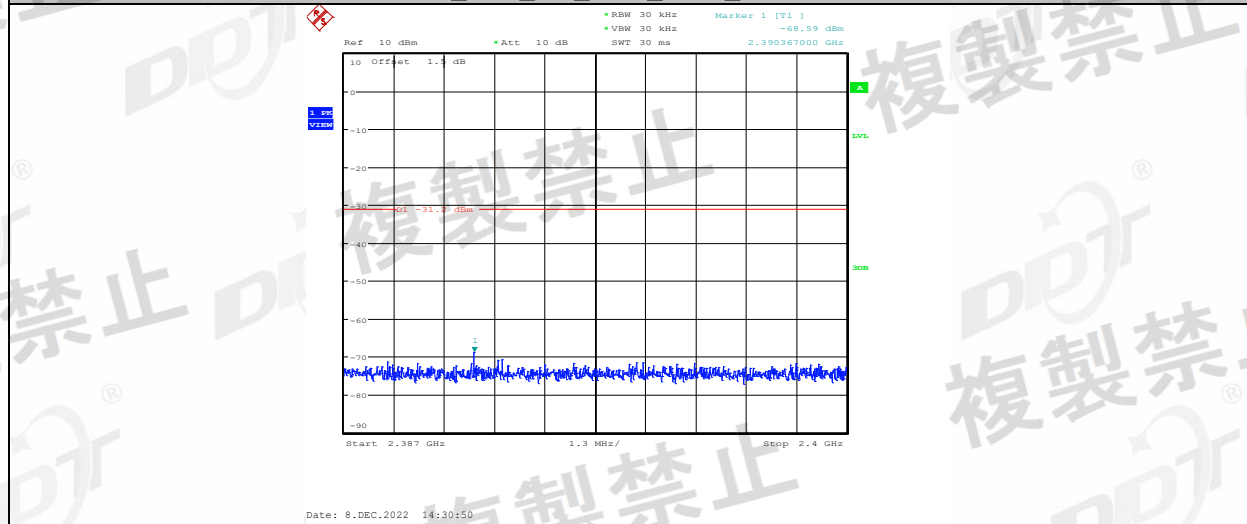
NTNV_BLE_2M_Ant1_2480_30~1000



NTNV_BLE_2M_Ant1_2480_1000~2387



NTNV_BLE_2M_Ant1_2480_2387~2400



NTNV_BLE_2M_Ant1_2480_2483.5~2496.5



* RBW 1 MHz Marker 1 [T1]

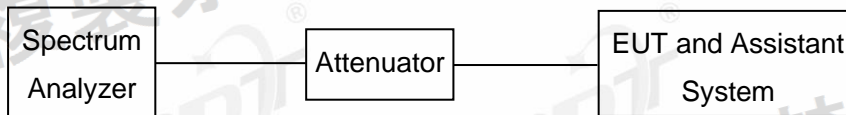


8. Secondary Radiated Emissions

8.1. Limit

The limit on secondary emissions radiated from the receiving equipment within which the function of other radio equipment will not be impaired shall be, in terms of the power of a dummy antenna circuit that has the same electrical constant as the receiving antenna, 4 nW or less at a frequency below 1 GHz and 20 nW or less at a frequency of 1 GHz or higher as measured using the circuit.

8.2. Block diagram of test setup



8.3. Test procedure

- (1) Connected the EUT's antenna port to the Spectrum Analyzer by suitable attenuator, set the Spectrum Analyzer as below:

Resolution BW: 100 kHz for frequency below 1 GHz and 1 MHz for frequency above 1 GHz

Video BW: 100 kHz for frequency below 1 GHz and 1 MHz for frequency above 1 GHz

Detector: Peak.

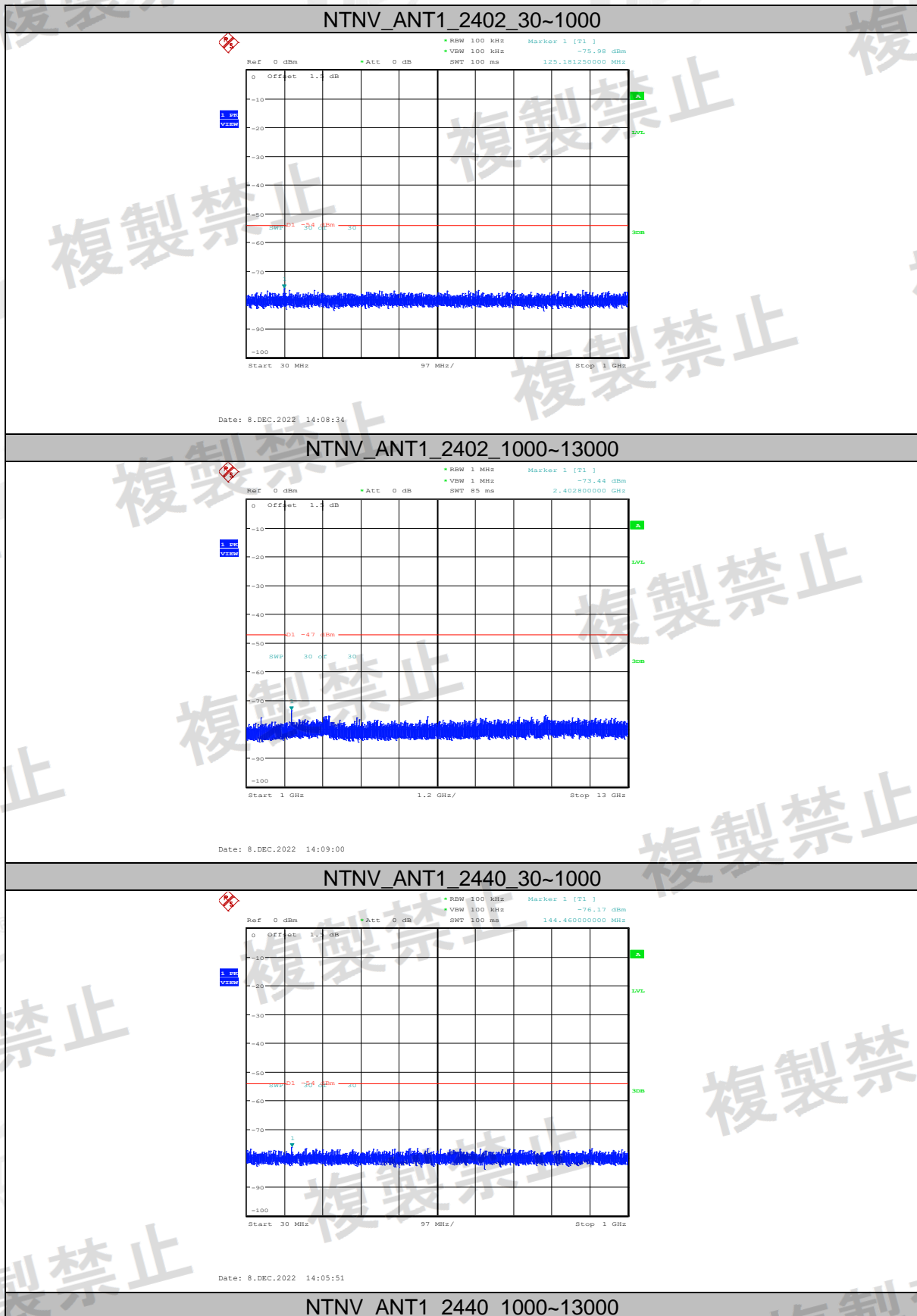
Trace Mode: Max Hold.

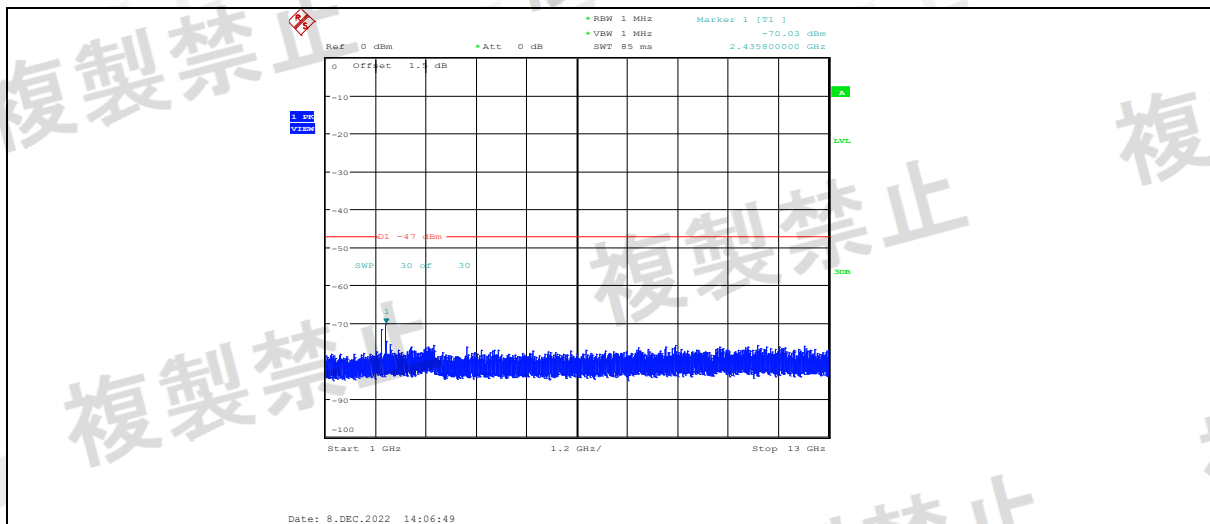
- (2) All the emissions from 30 MHz to 13 GHz were measured and record.

8.4. Test result

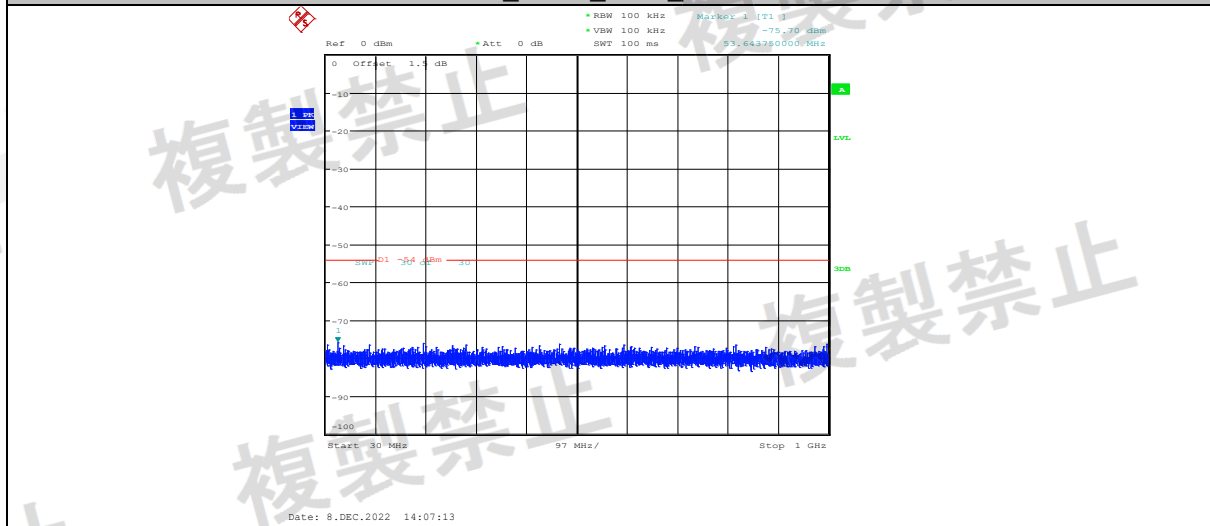
Test Condition	Test Mode	Antenna	Channel	Freq. Range	Result (dBm)	Limit	Verdict
NTNV	Rx mode	ANT1	2402	30~1000	-75.98	-54	Pass
NTNV	Rx mode	ANT1	2402	1000~13000	-73.44	-47	Pass
NTNV	Rx mode	ANT1	2440	30~1000	-76.17	-54	Pass
NTNV	Rx mode	ANT1	2440	1000~13000	-70.03	-47	Pass
NTNV	Rx mode	ANT1	2480	30~1000	-75.70	-54	Pass
NTNV	Rx mode	ANT1	2480	1000~13000	-67.38	-47	Pass

8.5. Original test data

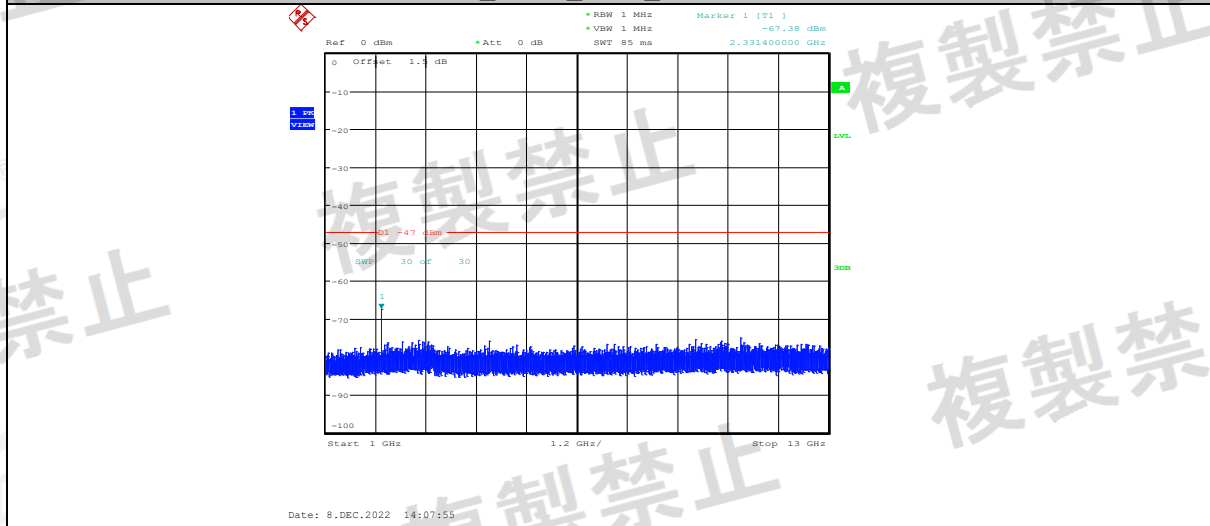




NTVN_ANT1_2480_30~1000



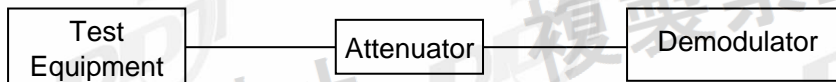
NTVN_ANT1_2480_1000~13000



9. Interference Prevention Function

9.1. Measurement system diagram

1) When transmitting identification code



2) Condition of measuring instrument

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.

9.2. 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.

9.3. Test result: The unit does meet the requirements (Good).

Test result: The unit does meet the requirements.

Pass

40ED981B331C

10. Test Setup Photograph



11. Photos of the EUT

Please refer to appendix I.

END OF REPORT