

Japan - TEST REPORT

Report Number : 4842023226300A Date of Issue: 2023.3.27

Model : WBR1-IPEX

Product Type : WiFi-Bluetooth module

Applicant : Hangzhou Tuya Information Technology Co., Ltd.

Address : Room701, Building3, More Center, No.87 GuDun Road, 310000, Hangzhou, Zhejiang, PEOPLE'S REPUBLIC OF CHINA

Production Facility : Hangzhou Tuya Information Technology Co., Ltd.

Address : Room701, Building3, More Center, No.87 GuDun Road, 310000, Hangzhou, Zhejiang, PEOPLE'S REPUBLIC OF CHINA

Test Result : ☒ Positive ☐ Negative

Total pages including Appendices

: 66



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1 General Information

1.1 Notes

TÜV SÜD Certification and Testing (China) Co., Ltd. – EMC-Lab is a subcontractor to TÜV SÜD Product Service GmbH according to the principles outlined in ISO 17025.

TÜV SÜD Certification and Testing (China) Co., Ltd. – EMC-Lab reports apply only to the specific samples tested under stated test conditions. Construction of the actual test samples has been documented. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. The manufacturer/importer is responsible to the Competent Authorities in Europe for any modifications made to the production units which result in non-compliance to the relevant regulations. TÜV SÜD Certification and Testing (China) Co., Ltd. – EMC-Lab shall have no liability for any deductions, inferences or generalizations drawn by the client or others from Jiangsu TÜV Product Service Ltd. – EMC-Lab issued reports.

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Prepared by
Project Engineer

2023.3.27

Date

Bo Dai

Name

Signature

Approved by
Project Manager

2023.3.27

Date

Jun Bao

Name

Signature

1.2 Testing Laboratory

Address of Test Laboratory:

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. – EMC-Lab

Company Address: 10# Huaxia Road (M), Dongting, Wuxi, 214100 P. R. China

Telephone: +86 510 8820 3737

Fax: +86 510 8820 3636

1.3 Details of Applicant

Applicant: Hangzhou Tuya Information Technology Co., Ltd.

Address: Room701, Building3, More Center, No.87 GuDun Road, 310000, Hangzhou, Zhejiang, PEOPLE'S REPUBLIC OF CHINA

Product Description: WiFi-Bluetooth module

Manufacturers Model No.: WBR1-IPEX

1.4 Application Details

Date of receipt of order: 2023.3.6

Date of receipt of test item: 2023.3.6

Date of test: 2023.3.6-2023.3.17

1.5 Test Item

Refer to table 1

1.6 Applied Standard

APPLIED PRODUCT STANDARD

Article 2 Paragraph 1 item(19): Ministry of Internal Affairs and Communications Notification Article 88 Appendix 43

1.7 Test Summary

Table 1. Summary of results

Essential parameter	Corresponding technical requirements: Article 88 Appendix 43	Result
Transmitter requirements	RF Output Power	PASS
	RF Output Power Tolerance	PASS
	Frequency Tolerance	PASS
	Occupied Bandwidth	PASS
	Spread Bandwidth	PASS
	Spreading Factor	PASS
	Carrier sense	N/A
	Interference prevention function	PASS
	Unwanted (Spurious) Emission Strength	PASS
Receiver requirements	Secondary Emittted Radio Wave Strength	PASS

NOTE 1: Measurement taken is within the measurement uncertainty of measurement system.

Remark: It is compliance to the appropriate section of the Ordinance Article 2 paragraph 1 Item (19).

2 Equipment Specification

2.1 General Description

The EUT is a WiFi-Bluetooth module.

2.2 Technical Data

Description	WiFi-Bluetooth module
Model	WBR1-IPEX
Operation frequency	2400MHz-2483.5MHz
BT Antenna type	external antenna
Antenna gain	3.52 dBi
Rated Input	DC 3.3V
Modulation	DSSS_802.11b; OFDM_802.11g; OFDM_802.11n_HT20;

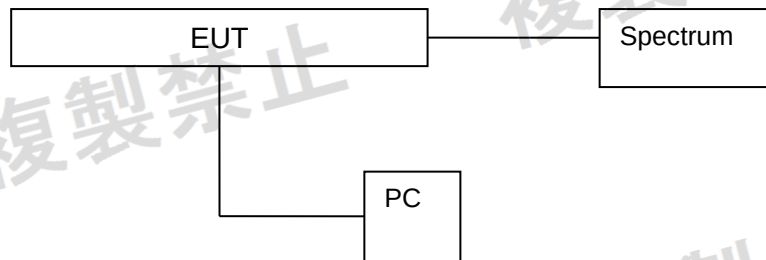
2.3 Test conditions and test Connections

2.3.1 Test Conditions

The EUT will be connected to test system in order to simulate normal operating conditions (with reference to the guidance given in the standard for this type of equipment).

The EUT is supplied by an internal battery, the fluctuation of the input voltage to the radio circuit section is 1% or less when the input power supply to the EUT at $\pm 10\%$. All test items were performed at normal voltage.

2.3.2 Test Connections



Test Configuration

2.4 Auxiliary Equipment Used during Test

Table 3. Auxiliary Equipment Used during Test

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
PC	Huawei	MagicBook	---	---

2.5 Lists of Test Instruments

Table 4. Lists of Test Instruments

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Spectrum Analyzer	R&S	FSV40	487/641405	2023.5.5
RF test system	R&S	TS8997	487/391835	2023.11.23

2.6 Measurement Uncertainty (95% confidence levels, k=2)

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Conducted RF test	Power level test involved: 2.04dB Frequency test involved: 1.1×10^{-7}

3 Measurements Result

3.1 RF Output Power

3.1.1 Test condition

Date of testing:	2023.3.9
Channel:	Low: 2412MHz; Middle: 2442MHz; High: 2472MHz (for 802.11b; 802.11g; 802.11n_HT20)
Test position:	Transmitting
Ambient temperature:	25.5 °C
Relative humidity:	55.6 %
Atmosphere Pressure:	105.5 KPa

3.1.2 Limit

- The antenna power of a transmitting equipment (with a frequency band of 2,427 – 2,470.75 MHz, for spread spectrum systems using FH systems, hybrid systems of DS and FH, or hybrid systems of FH and OFDM) shall be such that the mean power within a bandwidth of 1 MHz is 3 mW or less in the case of modulation using a standard coding test signal with the same transmission rate as that of the modulation signal.
- The antenna power of a transmitting equipment using a spread spectrum system other than any of those in “a” and the OFDM system shall be such that the mean power within a bandwidth of 1 MHz is 10 mW or less in the case of modulation using a standard coding test signal with the same transmission rate as that of the modulation signal.

3.1.3 Test result

802.11b

Frequency (MHz)	Voltage (VDC)	Result (mW/MHz)	Limit (mW/MHz)
2412	3.3VDC	5.61	10
2442	3.3VDC	5.60	10
2472	3.3VDC	5.58	10

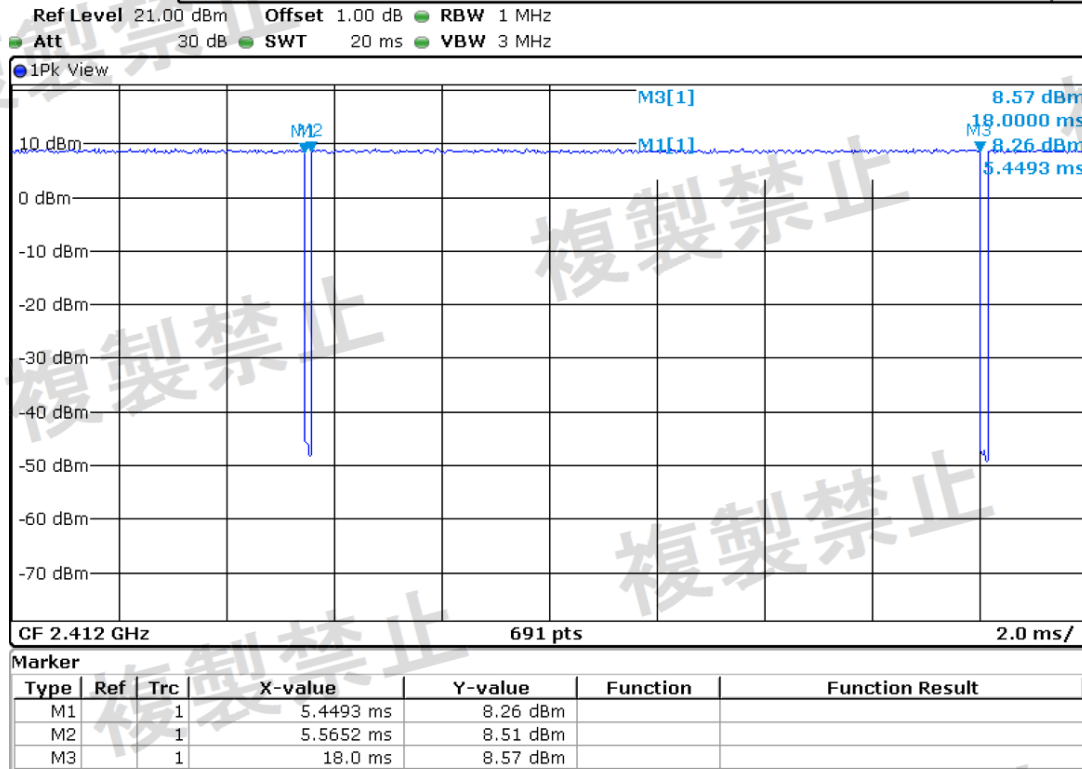
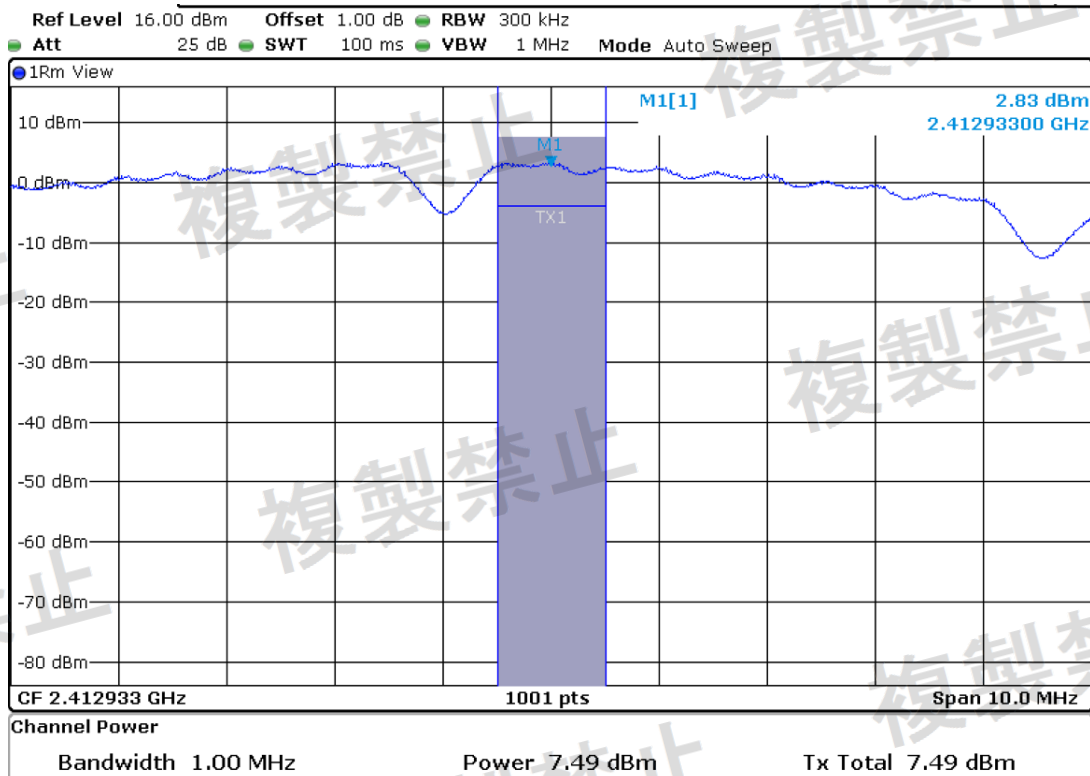
802.11g

Frequency (MHz)	Voltage (VDC)	Result (mW/MHz)	Limit (mW/MHz)
2412	3.3VDC	1.74	10
2442	3.3VDC	1.76	10
2472	3.3VDC	1.76	10

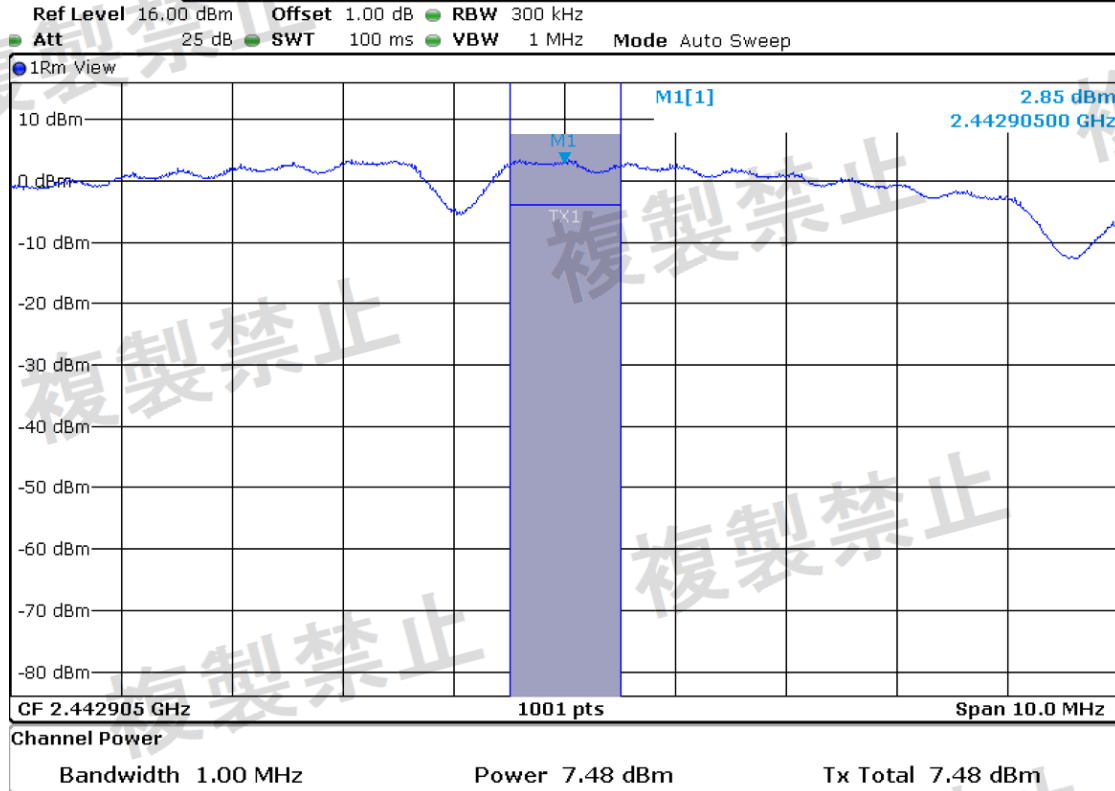
802.11n_HT20

Frequency (MHz)	Voltage (VDC)	Result (mW/MHz)	Limit (mW/MHz)
2412	3.3VDC	1.64	10
2442	3.3VDC	1.66	10
2472	3.3VDC	1.65	10

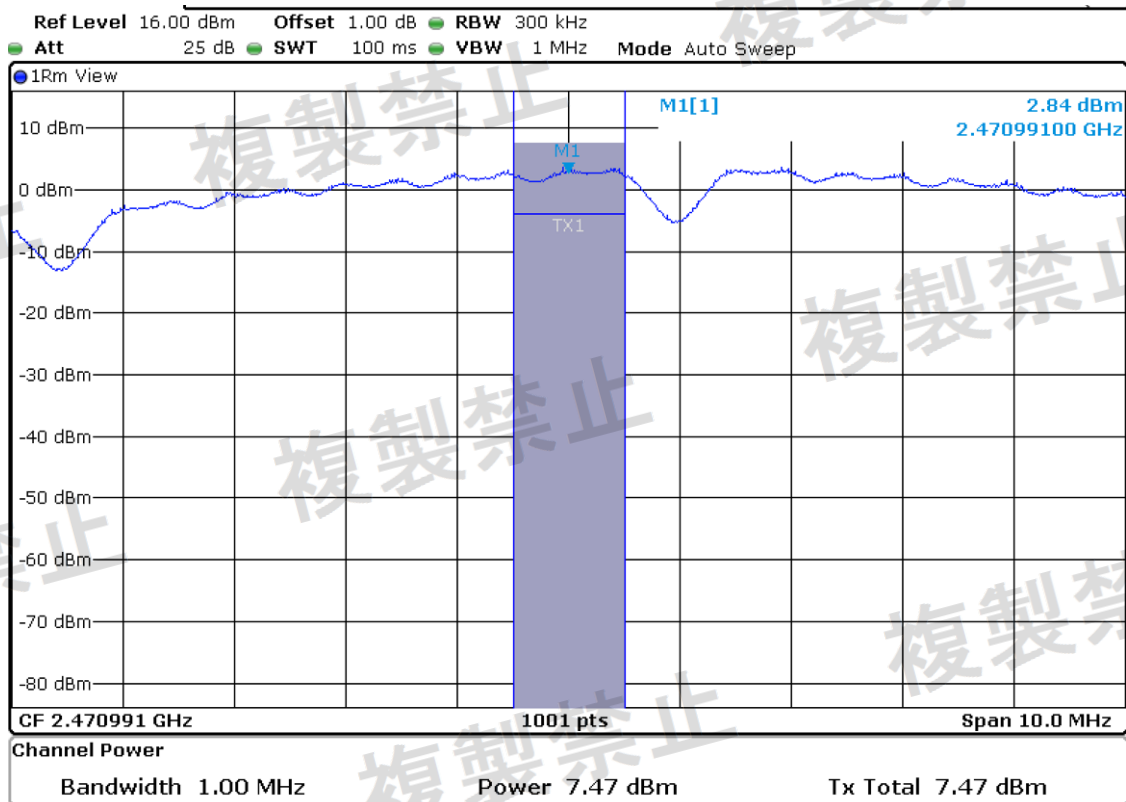
802.11b 2412MHz



802.11b 2442MHz



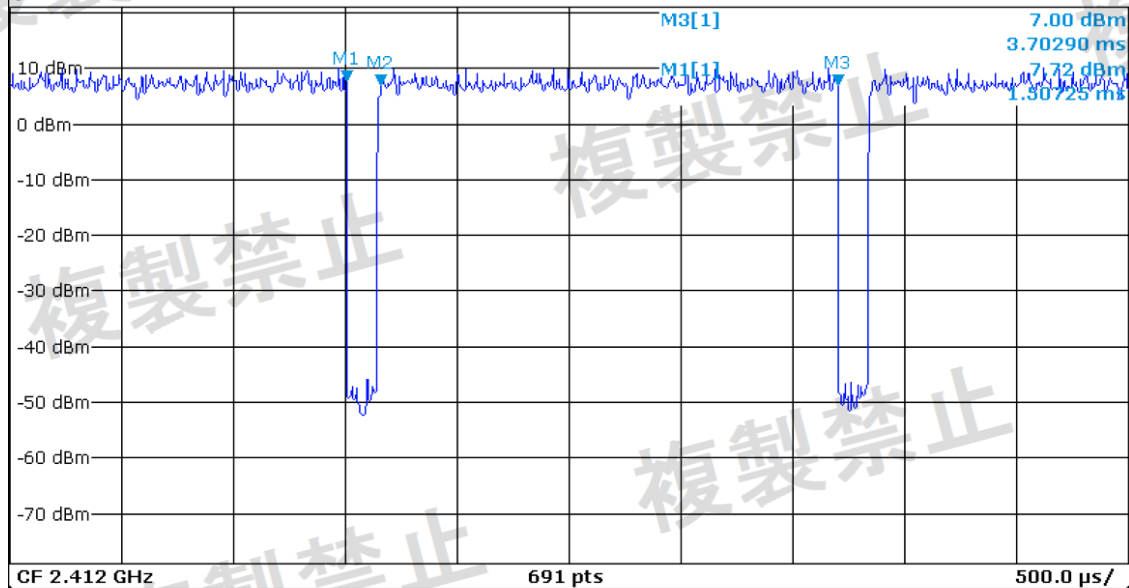
802.11b 2472MHz



802.11g 2412MHz

Ref Level 21.00 dBm Offset 1.00 dB RBW 1 MHz
Att 30 dB SWT 5 ms VBW 3 MHz

1Pk View

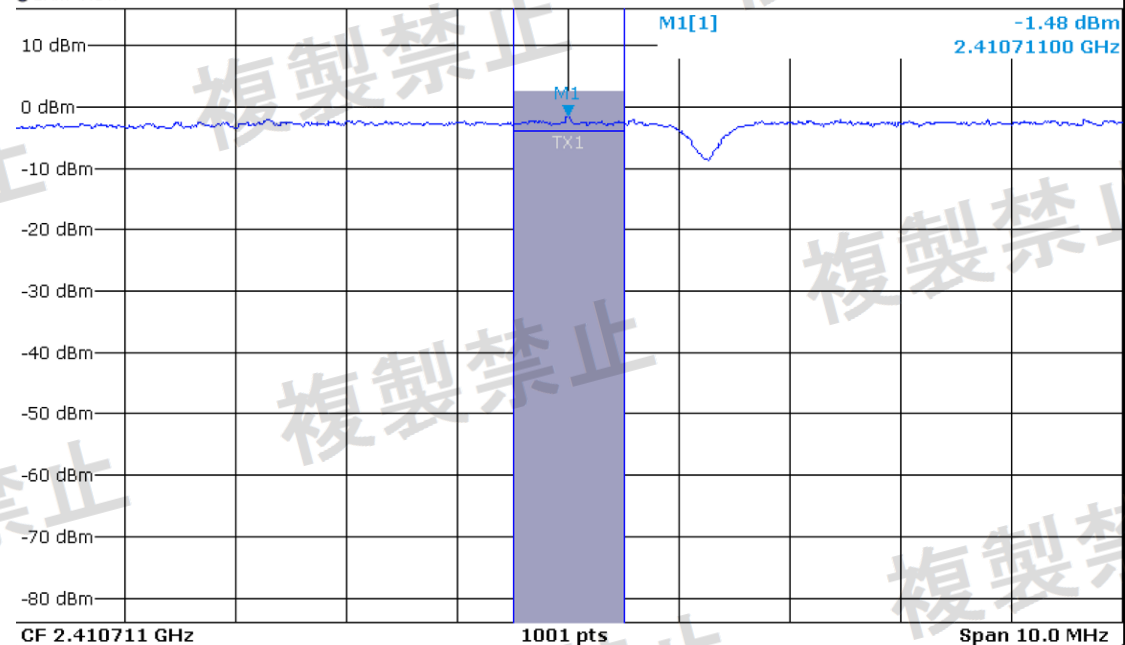


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.50725 ms	7.72 dBm		
M2		1	1.65942 ms	7.10 dBm		
M3		1	3.7029 ms	7.00 dBm		

Ref Level 16.00 dBm Offset 1.00 dB RBW 300 kHz
Att 25 dB SWT 100 ms VBW 1 MHz Mode Auto Sweep

1Rm View



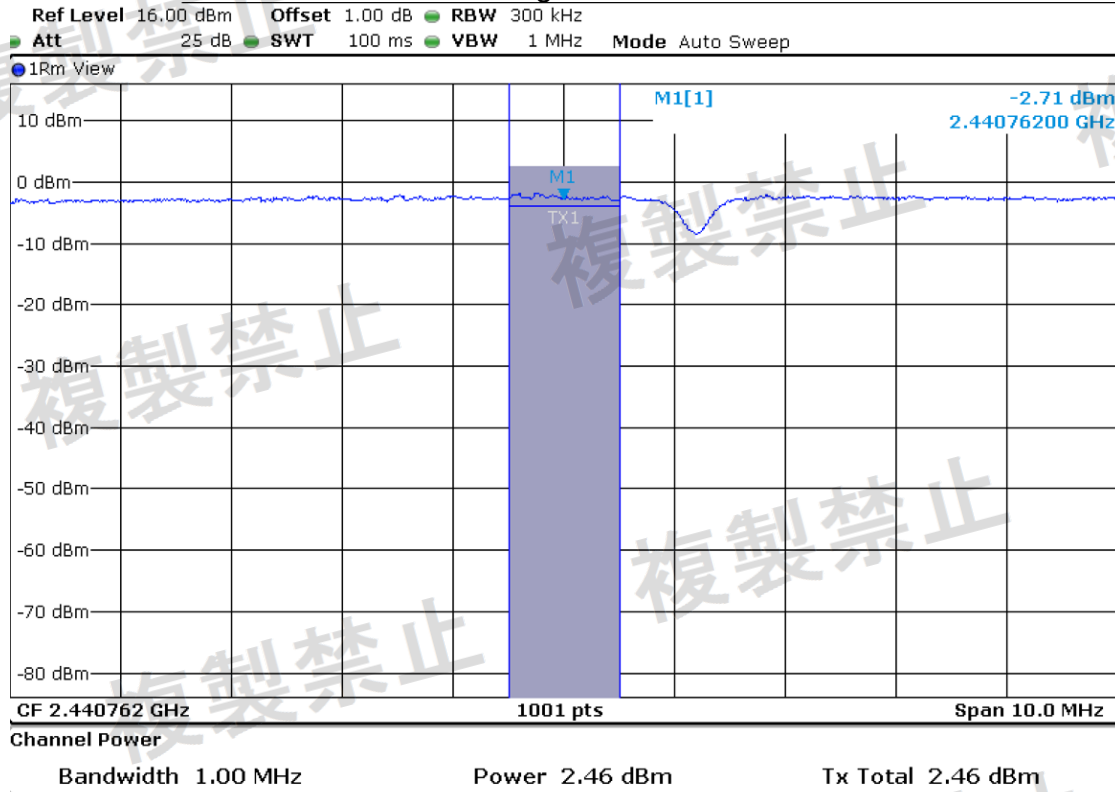
Channel Power

Bandwidth 1.00 MHz

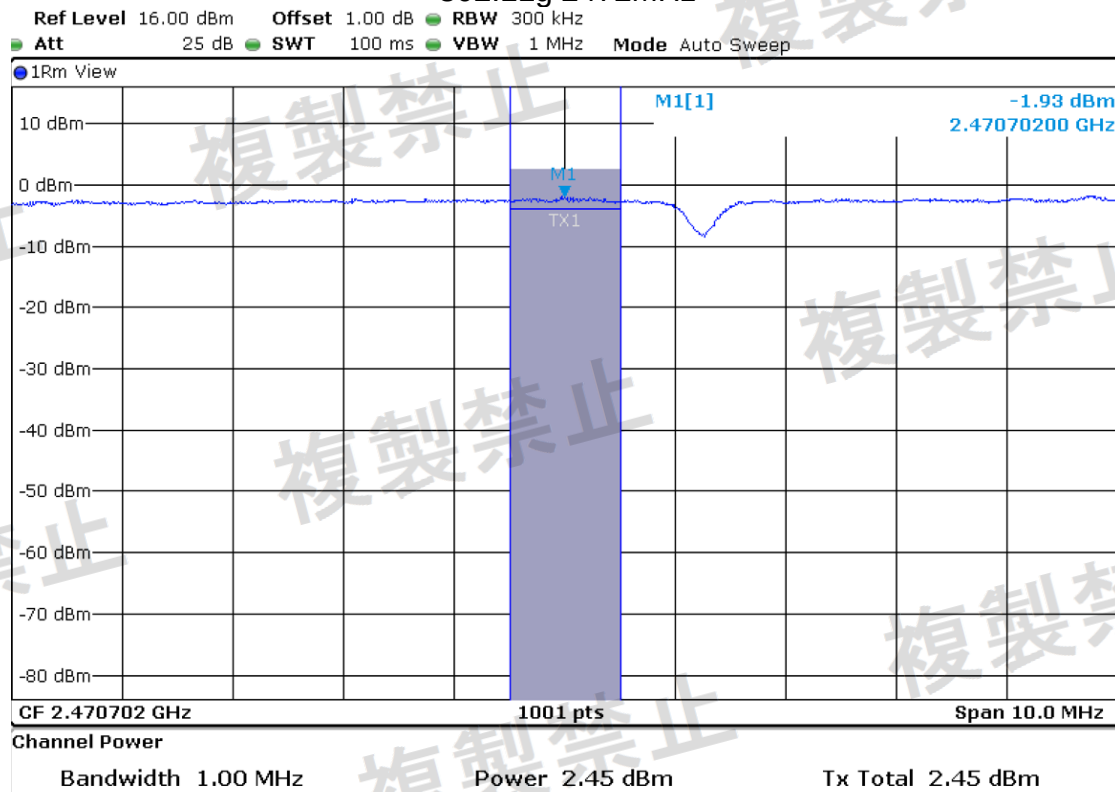
Power 2.40 dBm

Tx Total 2.40 dBm

802.11g 2442MHz



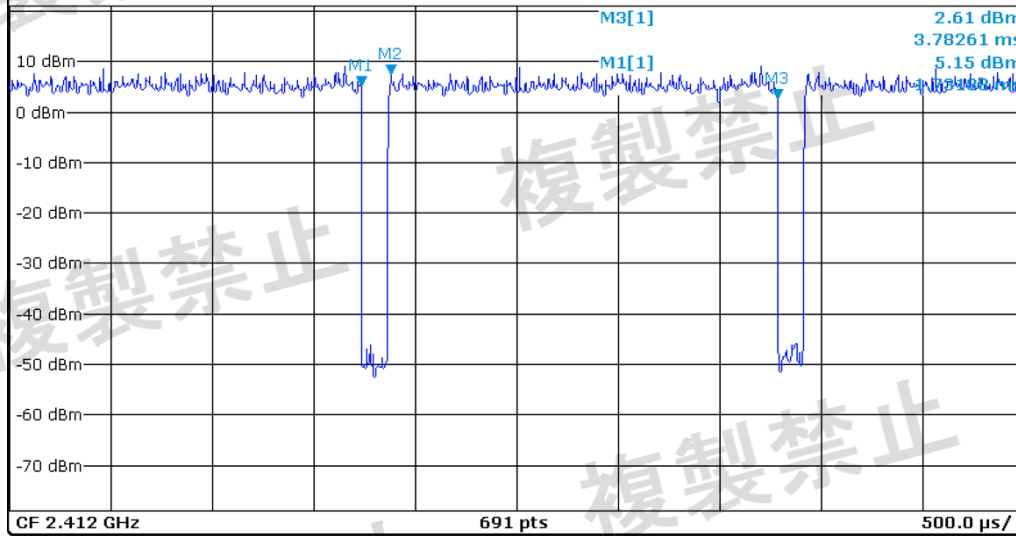
802.11g 2472MHz



802.11n HT20 2412MHz

Ref Level 21.00 dBm Offset 1.00 dB RBW 1 MHz
Att 30 dB SWT 5 ms VBW 3 MHz

1Pk View

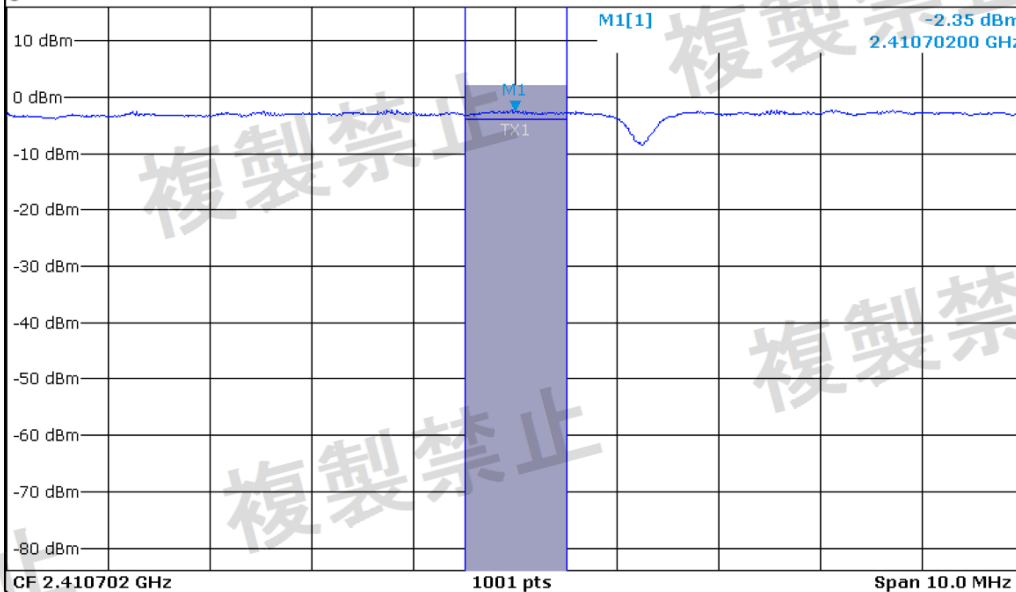


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1	1		1.73188 ms	5.15 dBm		
M2	1		1.87681 ms	7.63 dBm		
M3	1		3.78261 ms	2.61 dBm		

Ref Level 16.00 dBm Offset 1.00 dB RBW 300 kHz
Att 25 dB SWT 100 ms VBW 1 MHz Mode Auto Sweep

IRm View



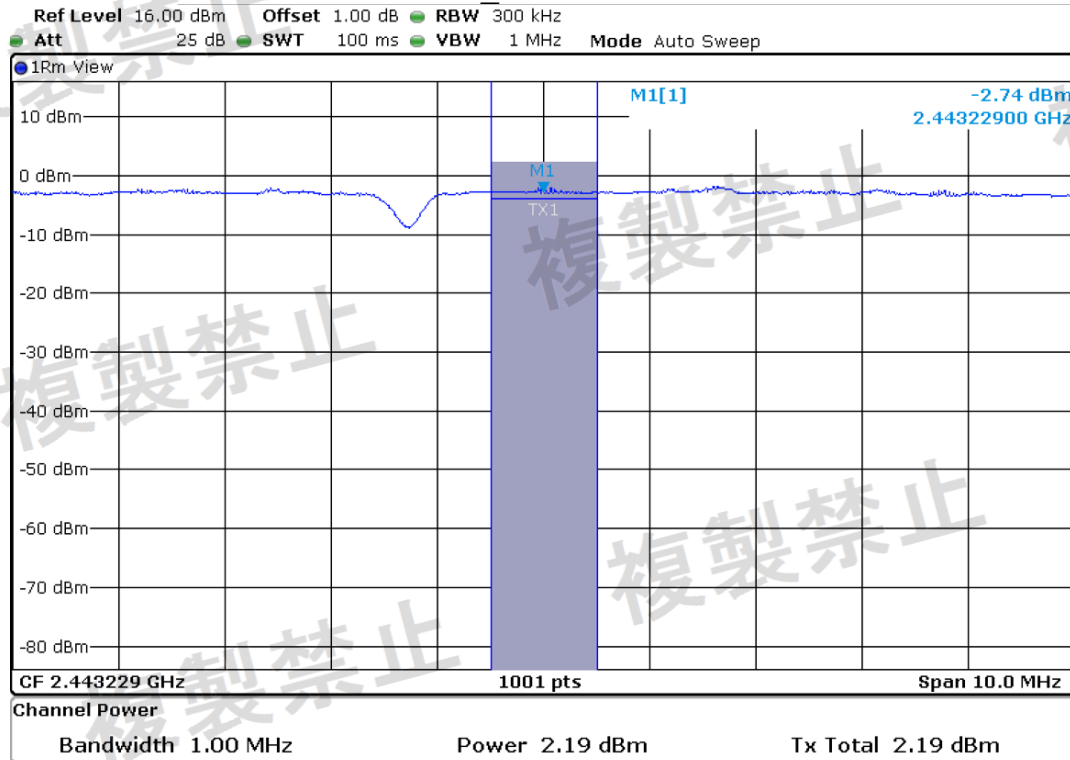
Channel Power

Bandwidth 1.00 MHz

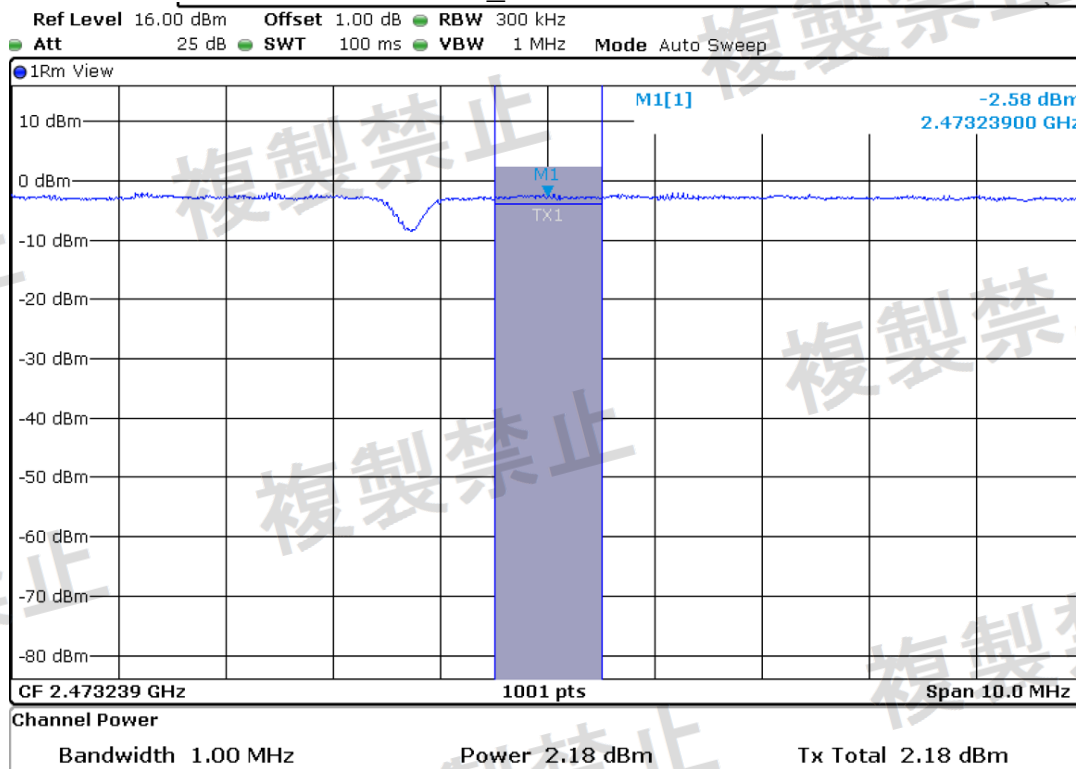
Power 2.16 dBm

Tx Total 2.16 dBm

802.11n HT20 2442MHz



802.11n HT20 2472MHz



3.1.4 Result

The equipment met the requirement of this clause.

Title: MIC-WIFI Test Report
Revision: 00
Effective: 2020-09-20

ID-Number: EMC_WUX_F_25.56E
Author: Zhilan Xue
Developed: 2020-09-20

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3.2 RF Output Power Tolerance

3.2.1 Test condition

Date of testing:	2023.3.9
Channel:	Low: 2412MHz; Middle: 2442MHz; High: 2472MHz (for 802.11b; 802.11g; 802.11n_HT20)
Test position:	Transmitting
Ambient temperature:	25.5 °C
Relative humidity:	55.6 %
Atmosphere Pressure:	105.5 KPa

3.2.2 Limit

Upper and lower limits of the tolerance for antenna power shall be 20% and 80%, respectively. Note that they represent the tolerance for the maximum rated antenna power and that no upper and lower limits of the tolerance are regulated in the case of antenna power reduction for communications reasons.

3.2.3 Test result

802.11b

Frequency (MHz)	Voltage (VDC)	Declared Output Power (mW/MHz)	Result (mW/MHz)	Tolerances	Limit
2412	3.3VDC	8.00	5.61	-29.87%	+20%~-80%
2442	3.3VDC	8.00	5.60	-30.03%	+20%~-80%
2472	3.3VDC	8.00	5.58	-30.19%	+20%~-80%
Conclusion: PASS					

802.11g

Frequency (MHz)	Voltage (VDC)	Declared Output Power (mW/MHz)	Result (mW/MHz)	Tolerances	Limit
2412	3.3VDC	2.50	1.74	-30.49%	+20%~-80%
2442	3.3VDC	2.50	1.76	-29.52%	+20%~-80%
2472	3.3VDC	2.50	1.76	-29.68%	+20%~-80%
Conclusion: PASS					

802.11n_HT20

Frequency (MHz)	Voltage (VDC)	Declared Output Power (mW/MHz)	Result (mW/MHz)	Tolerances	Limit
2412	3.3VDC	2.30	1.64	-28.51%	+20%~-80%
2442	3.3VDC	2.30	1.66	-28.01%	+20%~-80%
2472	3.3VDC	2.30	1.65	-28.18%	+20%~-80%
Conclusion: PASS					

3.2.4 Result

The equipment met the requirement of this clause.

3.3 Frequency Tolerance

3.3.1 Test condition

Date of testing:	2023.3.9
Channel:	Low: 2412MHz; Middle: 2442MHz; High: 2472MHz
Test position:	Transmitting
Ambient temperature:	25.5 °C
Relative humidity:	55.6 %
Atmosphere Pressure:	105.5 KPa

3.3.2 Limit

Tolerance of frequency: $\pm 50 \times 10^{-6}$.

3.3.3 Test Result

802.11b

Test Frequency (MHz)	Voltage (VDC)	Result (kHz)	Tolerance (kHz)	Tolerance (ppm)	Limit (ppm)
2412	3.3VDC	2411951.82	48.18	19.98	± 50
2442	3.3VDC	2441951.81	48.19	19.73	± 50
2472	3.3VDC	2471951.37	48.63	19.67	± 50
Conclusion: PASS					

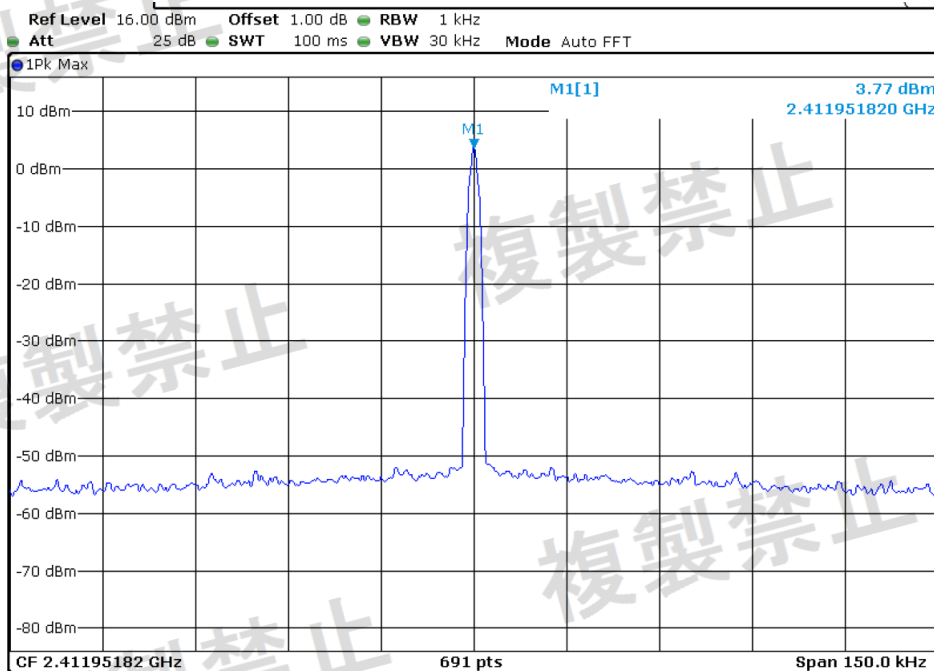
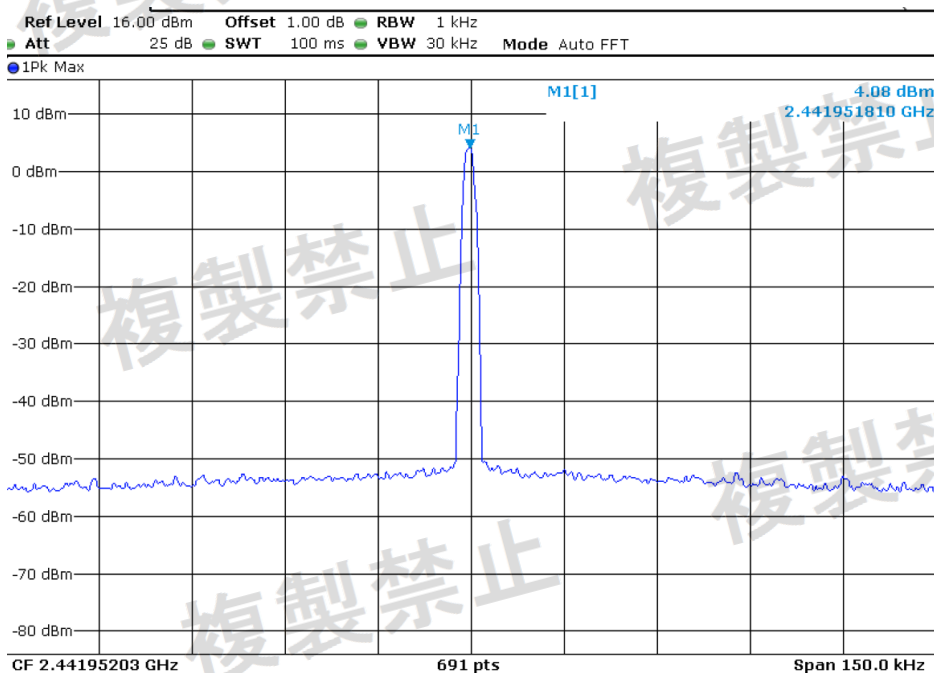
802.11g

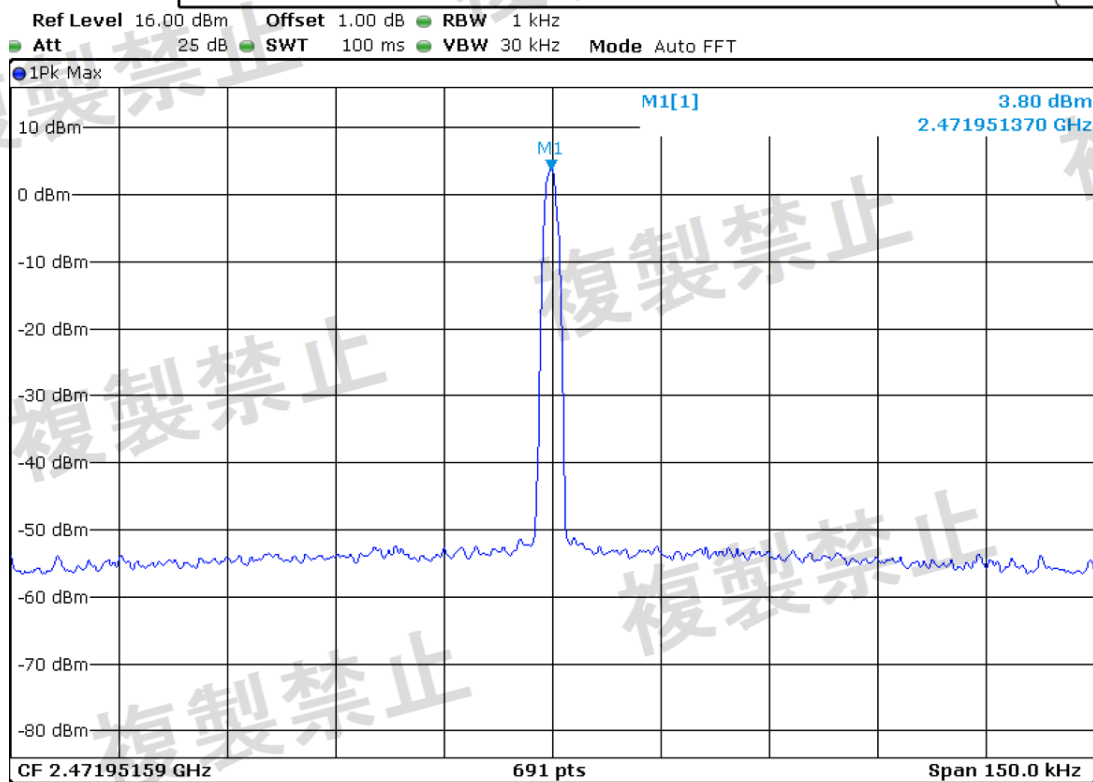
Test Frequency (MHz)	Voltage (VDC)	Result (kHz)	Tolerance (kHz)	Tolerance (ppm)	Limit (ppm)
2412	3.3VDC	2411951.82	48.18	19.98	± 50
2442	3.3VDC	2441952.03	47.97	19.64	± 50
2472	3.3VDC	2471951.81	48.19	19.49	± 50
Conclusion: PASS					

802.11n_HT20

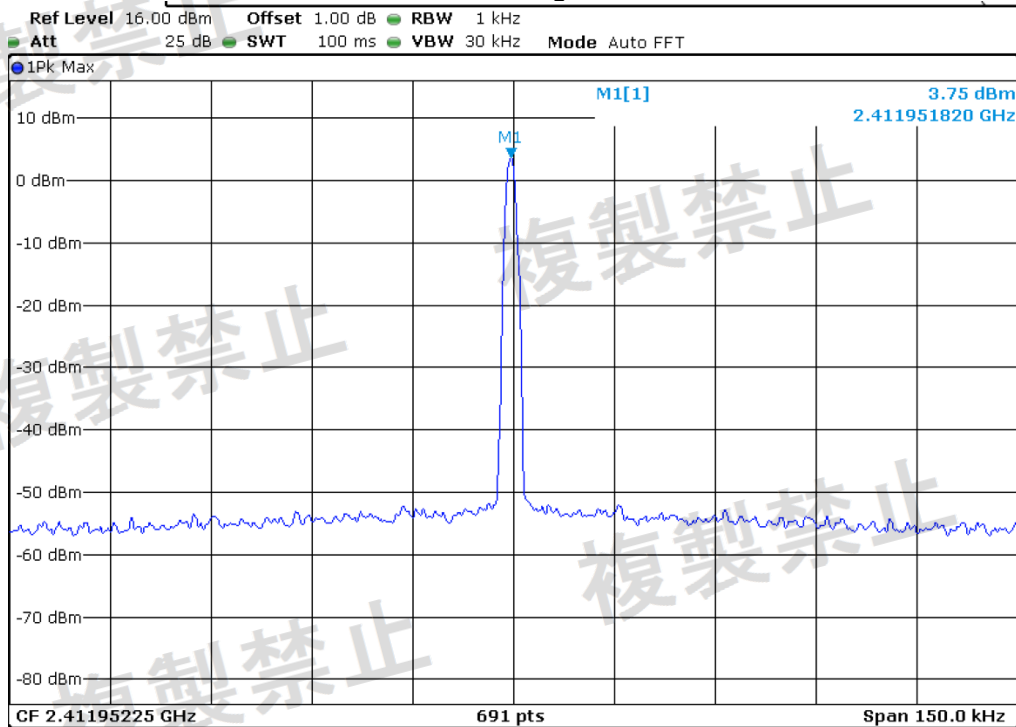
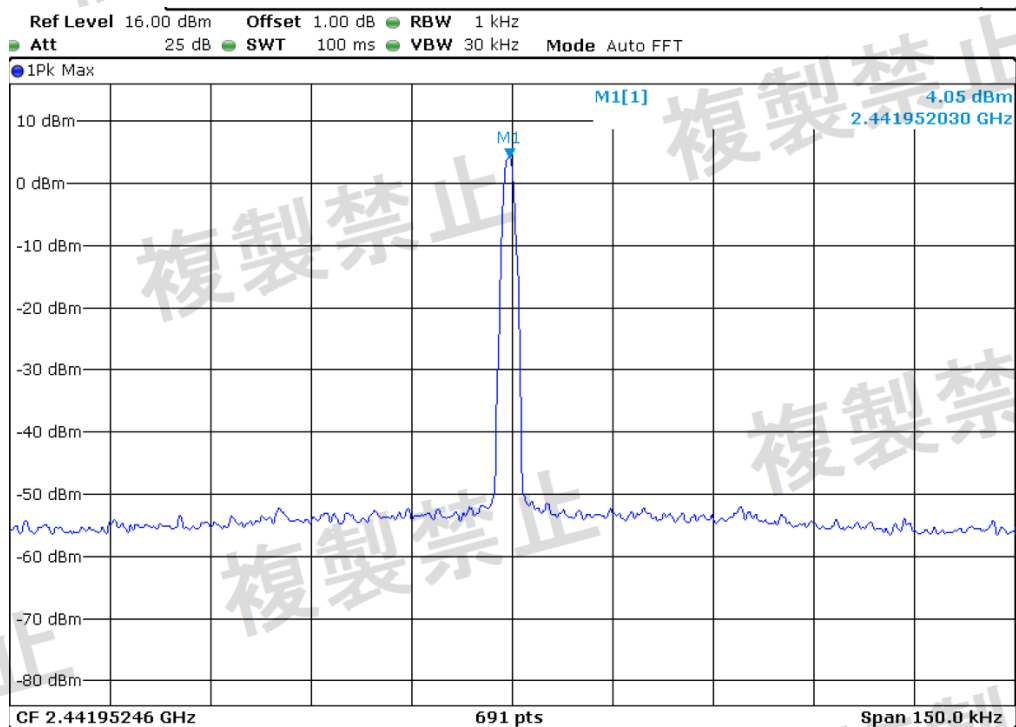
Test Frequency (MHz)	Voltage (VDC)	Result (kHz)	Tolerance (kHz)	Tolerance (ppm)	Limit (ppm)
2412	3.3VDC	2411953.55	46.45	19.26	± 50
2442	3.3VDC	2441953.11	46.89	19.20	± 50
2472	3.3VDC	2471952.46	47.54	19.23	± 50
Conclusion: PASS					

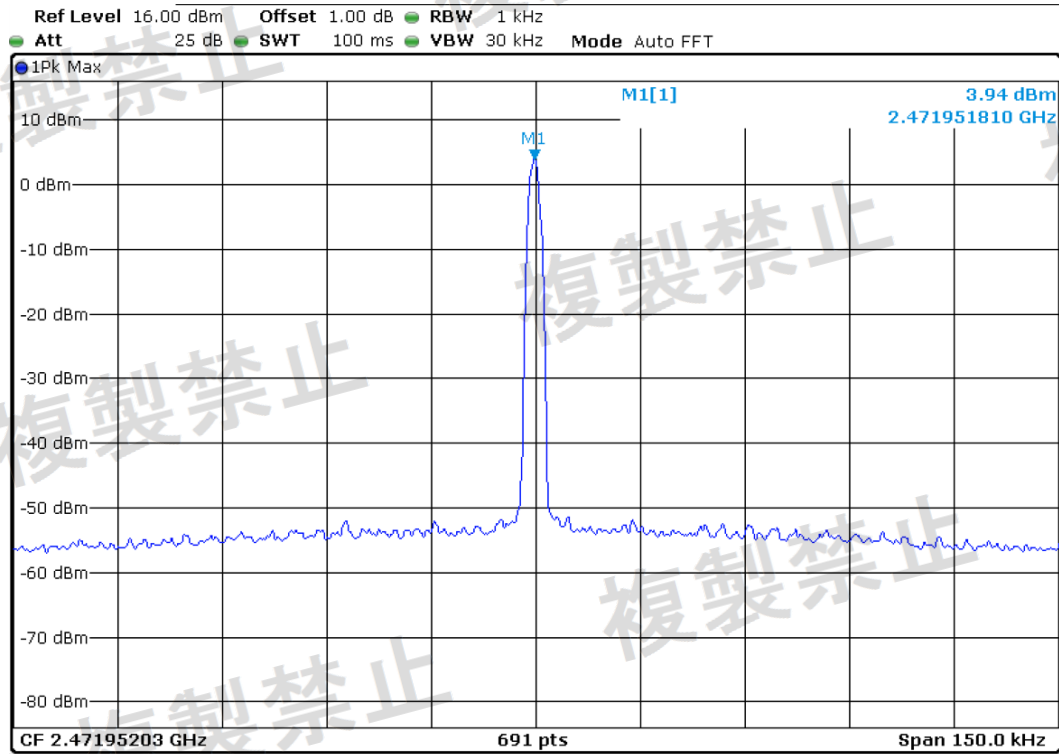
802.11b



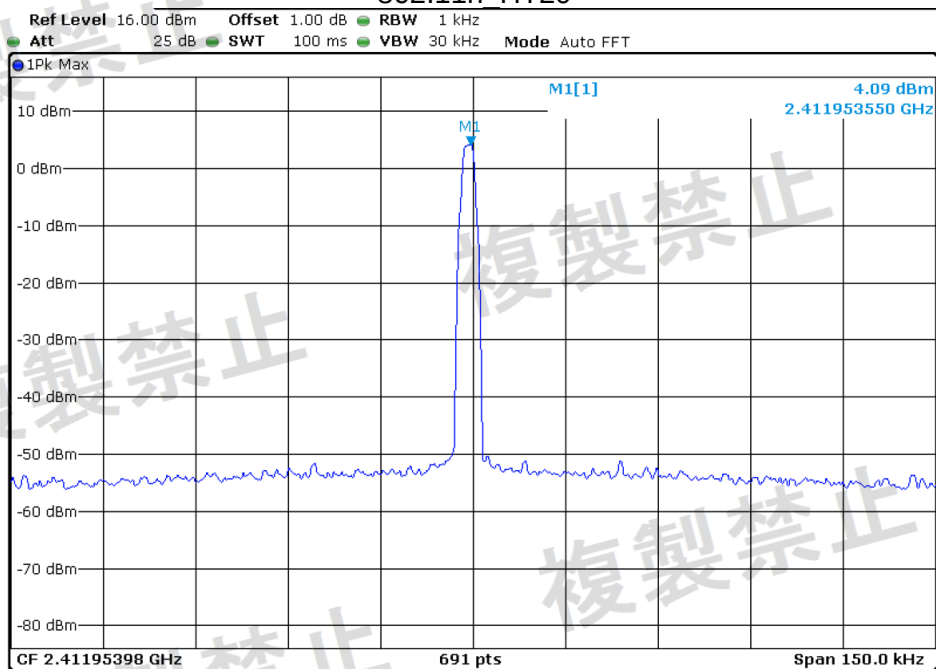
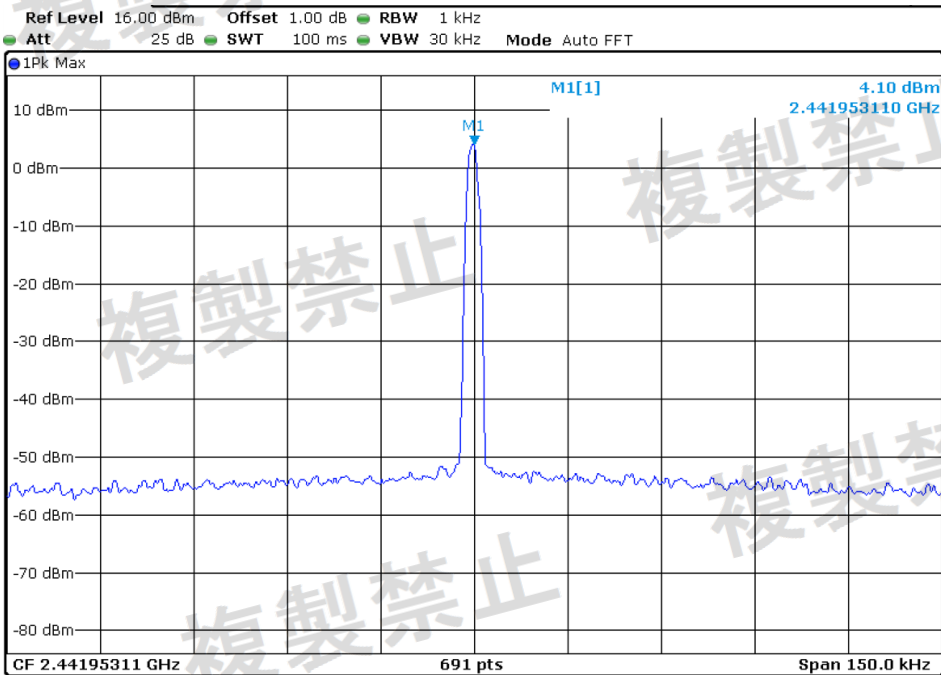


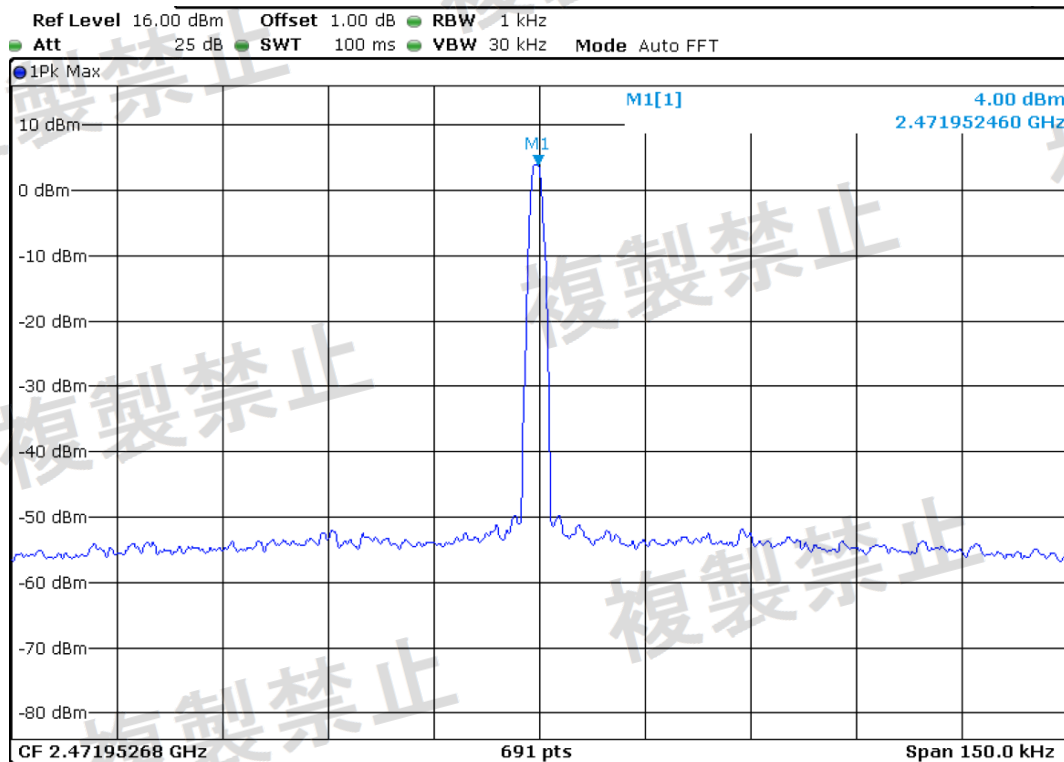
802.11g





802.11n HT20





3.3.4 Result

The equipment met the requirement of this clause.

3.4 Occupied Bandwidth

3.4.1 Test condition

Date of testing:	2023.3.9
Channel:	Low: 2412MHz; Middle: 2442MHz; High: 2472MHz (for 802.11b; 802.11g; 802.11n_HT20)
Test position:	Transmitting
Ambient temperature:	25.5 °C
Relative humidity:	55.6 %
Atmosphere Pressure:	105.5 KPa

3.4.2 Limit

Permissible value for occupied bandwidth using the FH system, a hybrid system combining DS and FH systems, or a hybrid system combining FH and OFDM systems shall be 83.5 MHz or less, while necessary bandwidth (minimum occupied bandwidth sufficient to ensure information transmission of required quality at a required transmission rate for the system used under specified conditions for a given emission type) using a OFDM system is at most 40MHz; and for transmission devices using any other necessary frequency bandwidth is at most 26 MHz or less.

3.4.3 Test Result

802.11b

Test Frequency (MHz)	Voltage (VDC)	Result (MHz)	Limit (MHz)
2412	3.3VDC	14.11	<26MHz
2442	3.3VDC	14.04	<26MHz
2472	3.3VDC	14.04	<26MHz

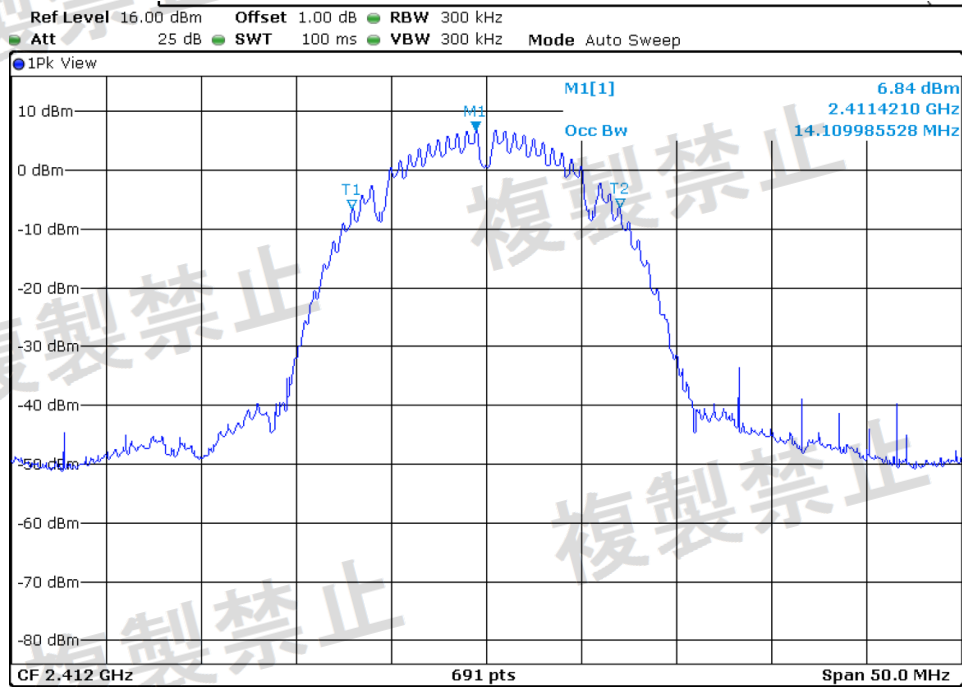
802.11g

Test Frequency (MHz)	Voltage (VDC)	Result (MHz)	Limit (MHz)
2412	3.3VDC	16.86	<26MHz
2442	3.3VDC	16.79	<26MHz
2472	3.3VDC	16.93	<26MHz

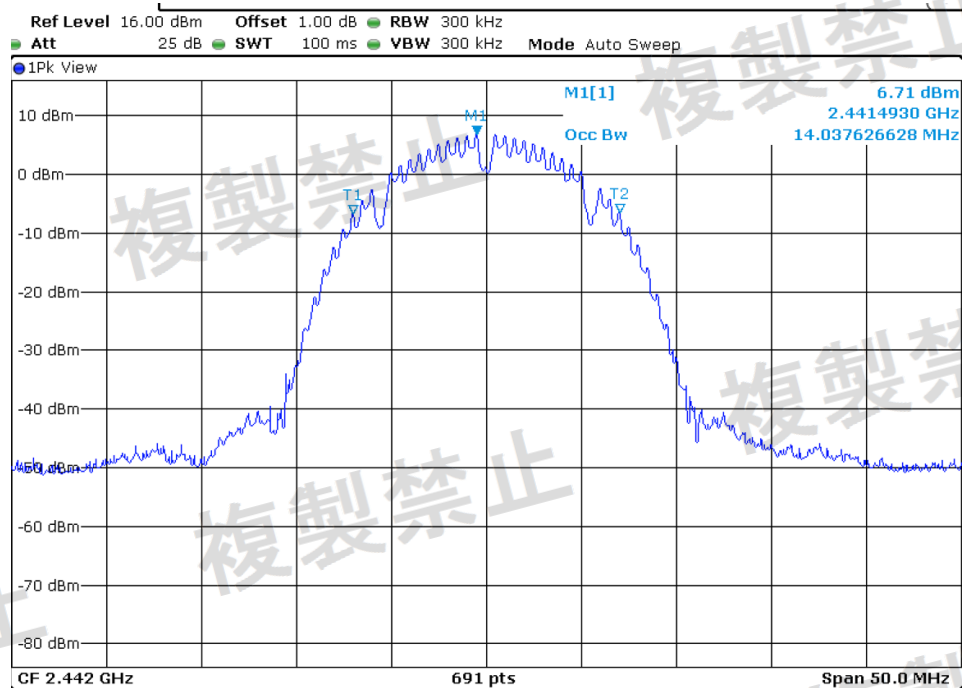
802.11n_HT20

Test Frequency (MHz)	Voltage (VDC)	Result (MHz)	Limit (MHz)
2412	3.3VDC	18.09	<26MHz
2442	3.3VDC	17.95	<26MHz
2472	3.3VDC	18.02	<26MHz

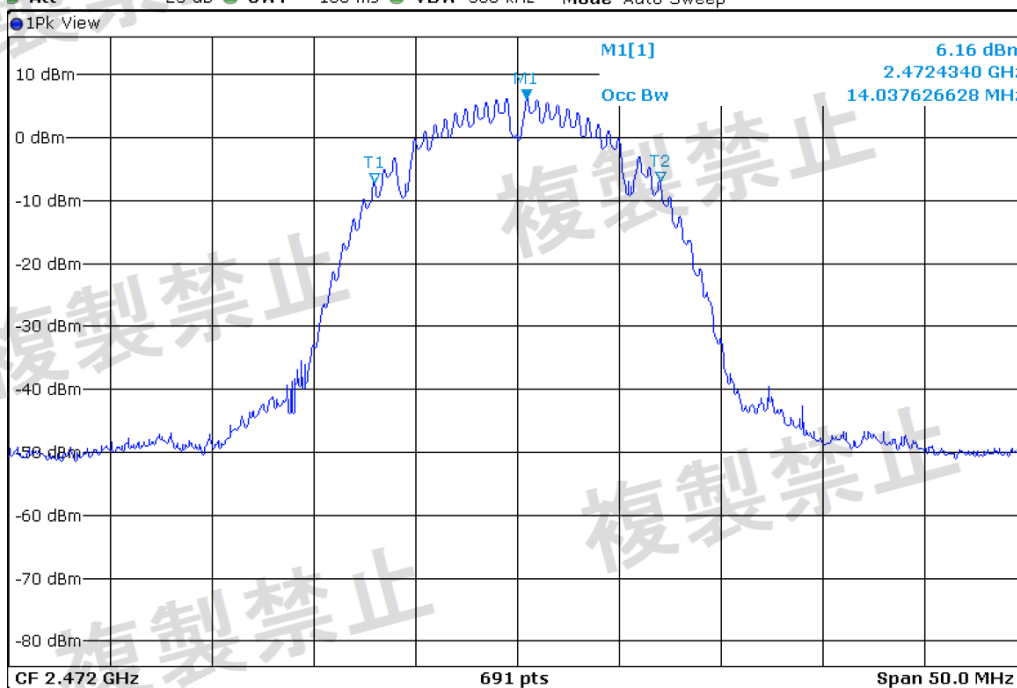
802.11b 2412MHz



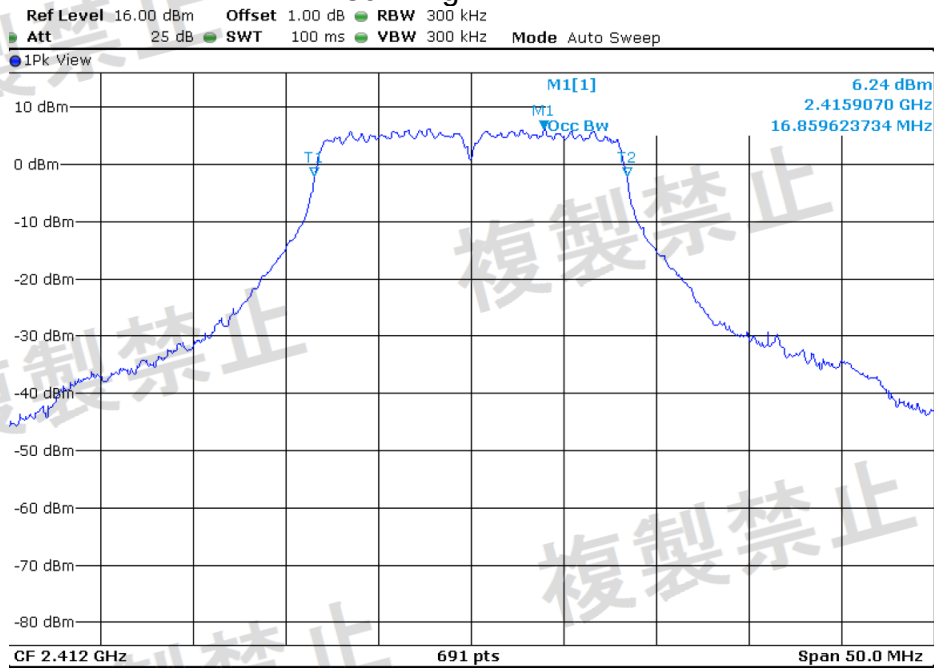
802.11b 2442MHz



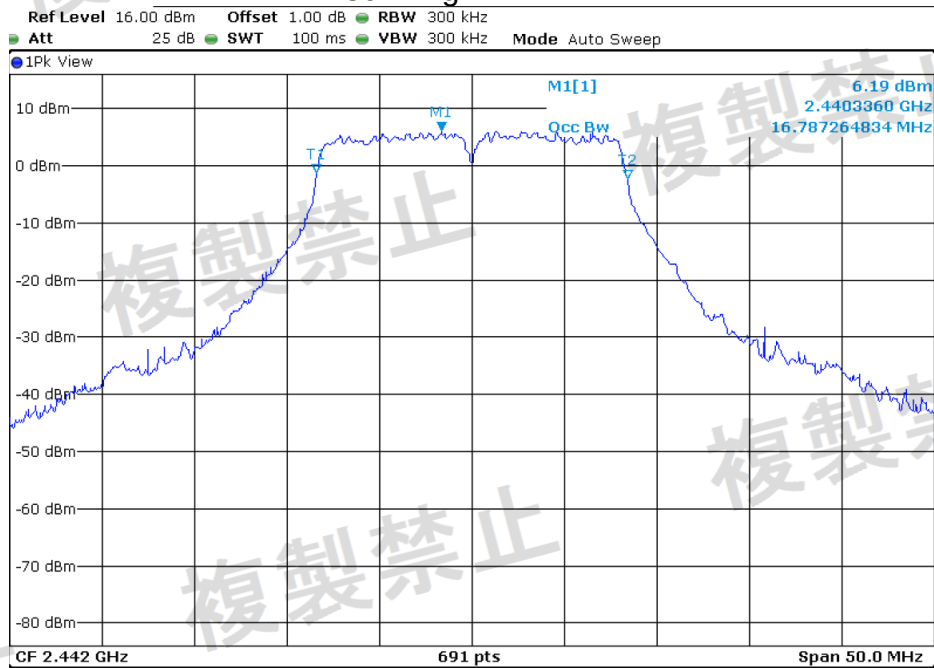
Ref Level 16.00 dBm Offset 1.00 dB RBW 300 kHz
Att 25 dB SWT 100 ms VBW 300 kHz Mode Auto Sweep



802.11g 2412MHz



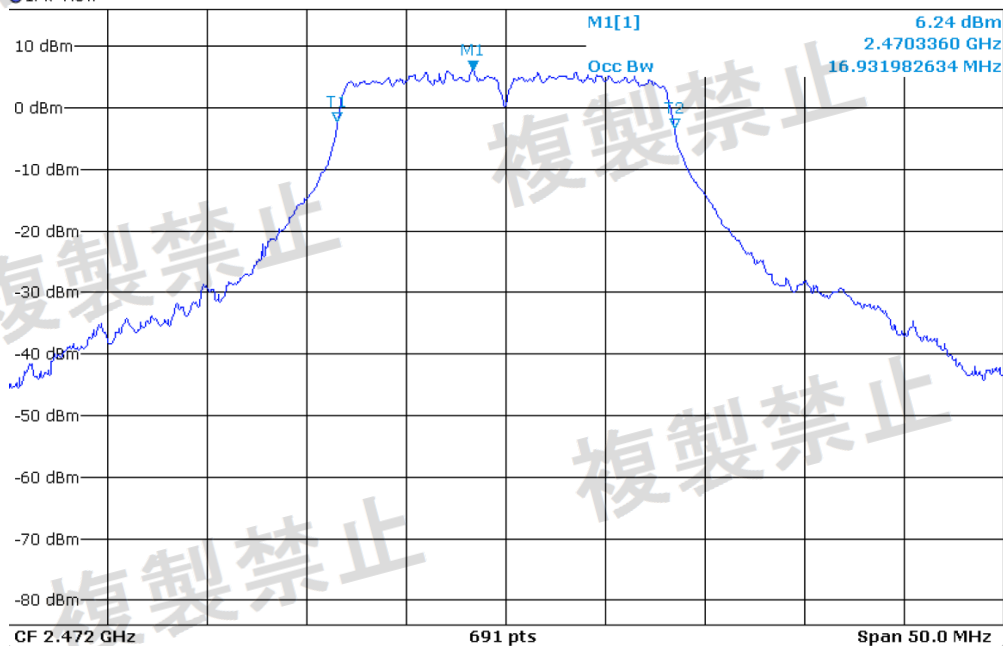
802.11g 2442MHz



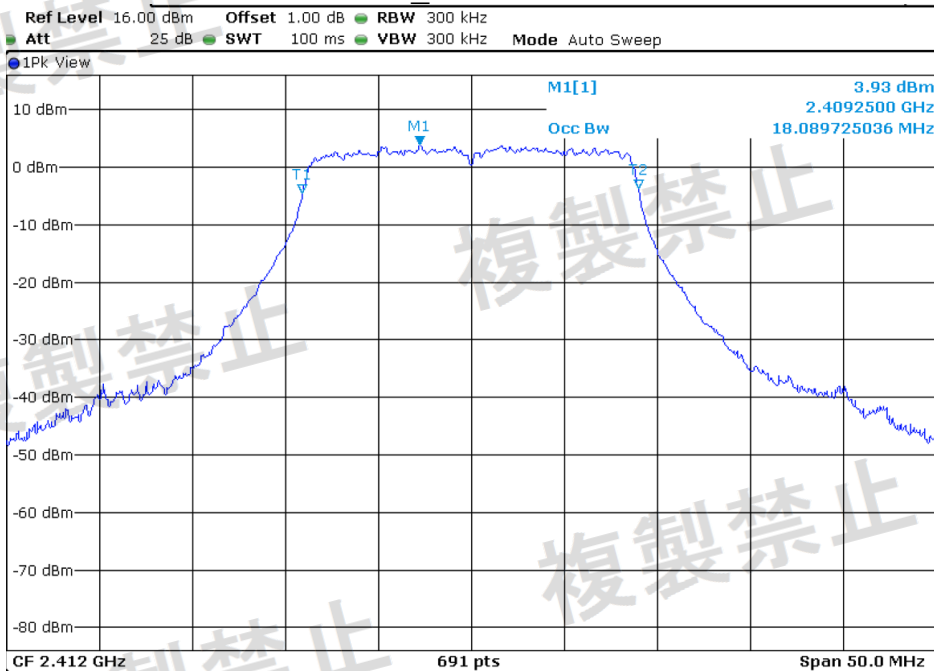
802.11g 2472MHz

Ref Level 16.00 dBm Offset 1.00 dB RBW 300 kHz
Att 25 dB SWT 100 ms VBW 300 kHz Mode Auto Sweep

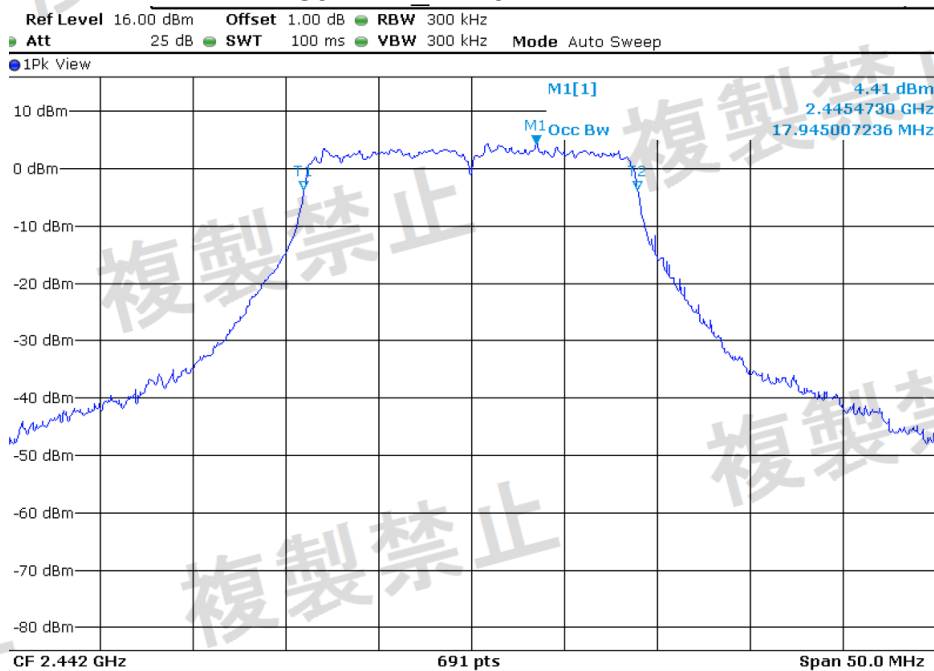
● 1Pk View



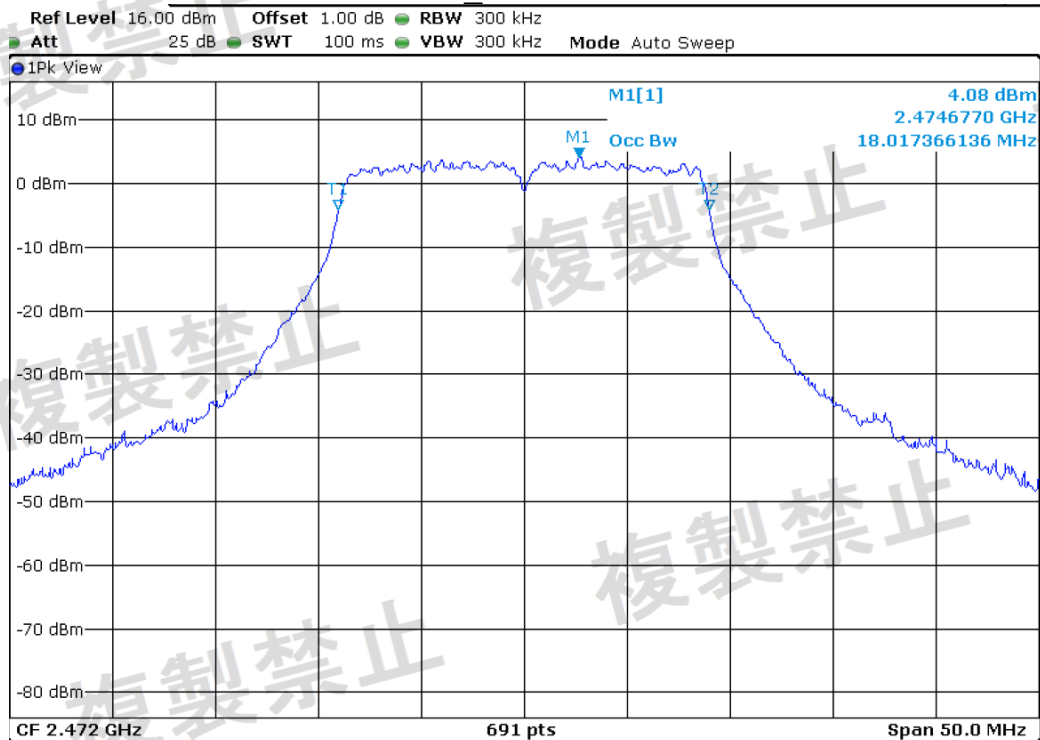
802.11n HT20 2412MHz



802.11n HT20 2442MHz



802.11n HT20 2472MHz



3.4.4 Result

The equipment met the requirement of this clause.

3.5 Spread Bandwidth

3.5.1 Test condition

Date of testing:	2023.3.9
Channel:	Low: 2412MHz; Middle: 2442MHz; High: 2472MHz
Test position:	Transmitting
Ambient temperature:	25.5 °C
Relative humidity:	55.6 %
Atmosphere Pressure:	105.5 KPa

3.5.2 Limit

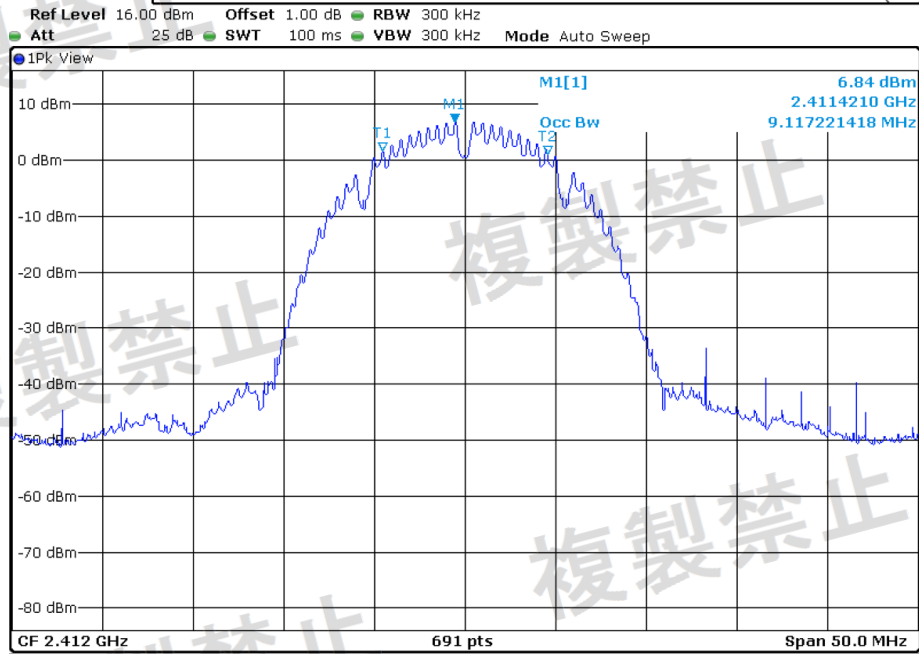
In spread spectrum systems, spread bandwidth (which refers to a frequency bandwidth with an upper limit and lower limit such that each of the mean powers radiated above the upper frequency limit and below the lower frequency limit is equal to 5 % of the total mean power radiated; this also applies hereafter) shall be 500 kHz or more.

3.5.3 Test Result

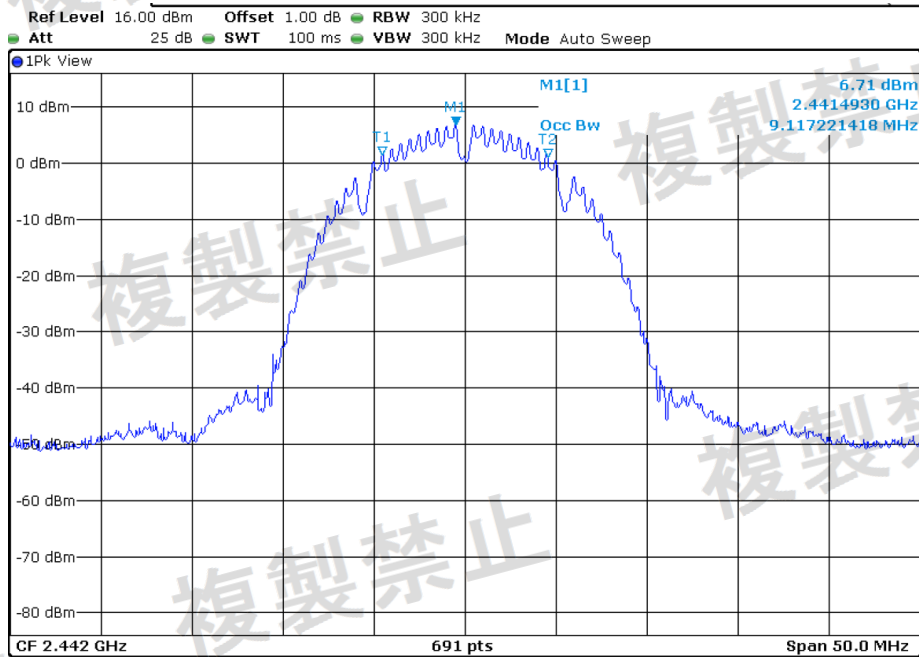
802.11b

Test Frequency (MHz)	Voltage (VDC)	Result (MHz)	Limit (kHz)
2412	3.3VDC	9.12	>500
2442	3.3VDC	9.12	>500
2472	3.3VDC	9.12	>500

802.11b 2412MHz



802.11b 2442MHz





The equipment met the requirement of this clause

3.6 Unwanted (Spurious) Emission Strength

3.6.1 Test condition

Date of testing:	2023.3.9
Channel:	Low: 2412MHz; Middle: 2442MHz; High: 2472MHz (for 802.11b; 802.11g; 802.11n_HT20)
Test position:	Transmitting
Ambient temperature:	25.5 °C
Relative humidity:	55.6 %
Atmosphere Pressure:	105.5 KPa

3.6.2 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

3.6.3 Test Result

Test Condition	Test Mode	Channel	Freq., Range	Result	Limit	Verdict
NTNV	802.11b	2412	30~2387	-46.11	-26	PASS
NTNV	802.11b	2412	2387~2400	-33.87	-16	PASS
NTNV	802.11b	2412	2483.5~2496.5	-46.82	-16	PASS
NTNV	802.11b	2412	2496.5~12500	-32.04	-26	PASS
NTNV	802.11b	2442	30~2387	-49.46	-26	PASS
NTNV	802.11b	2442	2387~2400	-43.07	-16	PASS
NTNV	802.11b	2442	2483.5~2496.5	-46.41	-16	PASS
NTNV	802.11b	2442	2496.5~12500	-31.28	-26	PASS
NTNV	802.11b	2472	30~2387	-50.34	-26	PASS
NTNV	802.11b	2472	2387~2400	-48.84	-16	PASS
NTNV	802.11b	2472	2483.5~2496.5	-30.04	-16	PASS
NTNV	802.11b	2472	2496.5~12500	-37.14	-26	PASS

Test Condition	Test Mode	Channel	Freq., Range	Result	Limit	Verdict
NTNV	802.11g	2412	30~2387	-36.19	-26	PASS
NTNV	802.11g	2412	2387~2400	-19.46*	-16	PASS
NTNV	802.11g	2412	2483.5~2496.5	-43.29	-16	PASS
NTNV	802.11g	2412	2496.5~12500	-35.10	-26	PASS
NTNV	802.11g	2442	30~2387	-48.07	-26	PASS
NTNV	802.11g	2442	2387~2400	-41.95	-16	PASS
NTNV	802.11g	2442	2483.5~2496.5	-43.08	-16	PASS
NTNV	802.11g	2442	2496.5~12500	-32.02	-26	PASS
NTNV	802.11g	2472	30~2387	-47.21	-26	PASS
NTNV	802.11g	2472	2387~2400	-47.25	-16	PASS
NTNV	802.11g	2472	2483.5~2496.5	-19.69*	-16	PASS
NTNV	802.11g	2472	2496.5~12500	-30.76	-26	PASS

Test Condition	Test Mode	Channel	Freq., Range	Result	Limit	Verdict
NTNV	802.11n HT20	2412	30~2387	-40.36	-26	PASS
NTNV	802.11n HT20	2412	2387~2400	-20.45*	-16	PASS
NTNV	802.11n HT20	2412	2483.5~2496.5	-44.46	-16	PASS
NTNV	802.11n HT20	2412	2496.5~12500	-38.26	-26	PASS
NTNV	802.11n HT20	2442	30~2387	-49.26	-26	PASS
NTNV	802.11n HT20	2442	2387~2400	-44.78	-16	PASS
NTNV	802.11n HT20	2442	2483.5~2496.5	-43.52	-16	PASS
NTNV	802.11n HT20	2442	2496.5~12500	-36.47	-26	PASS
NTNV	802.11n HT20	2472	30~2387	-49.37	-26	PASS
NTNV	802.11n HT20	2472	2387~2400	-46.90	-16	PASS
NTNV	802.11n HT20	2472	2483.5~2496.5	-20.41*	-16	PASS
NTNV	802.11n HT20	2472	2496.5~12500	-38.32	-26	PASS

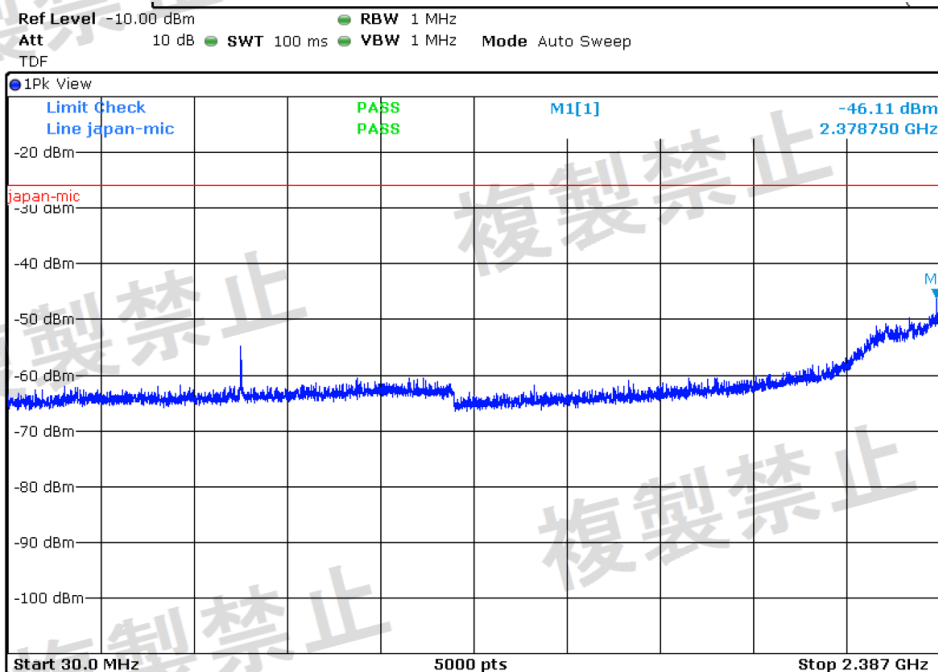
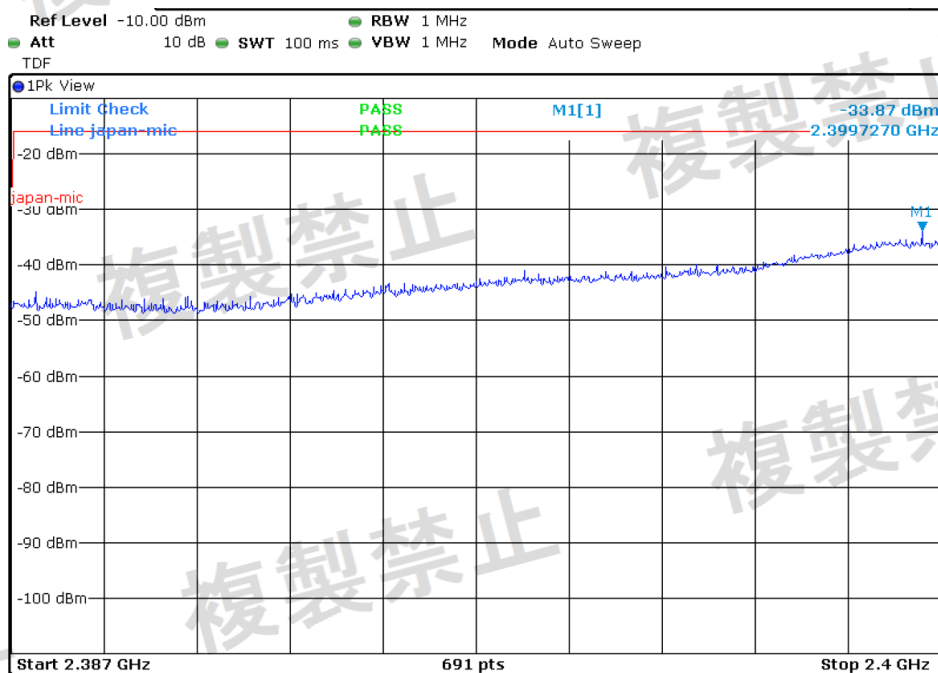
Note: “*” denotes for correction of RBW (+15.2dB for 30kHz)

3.6.4 Result

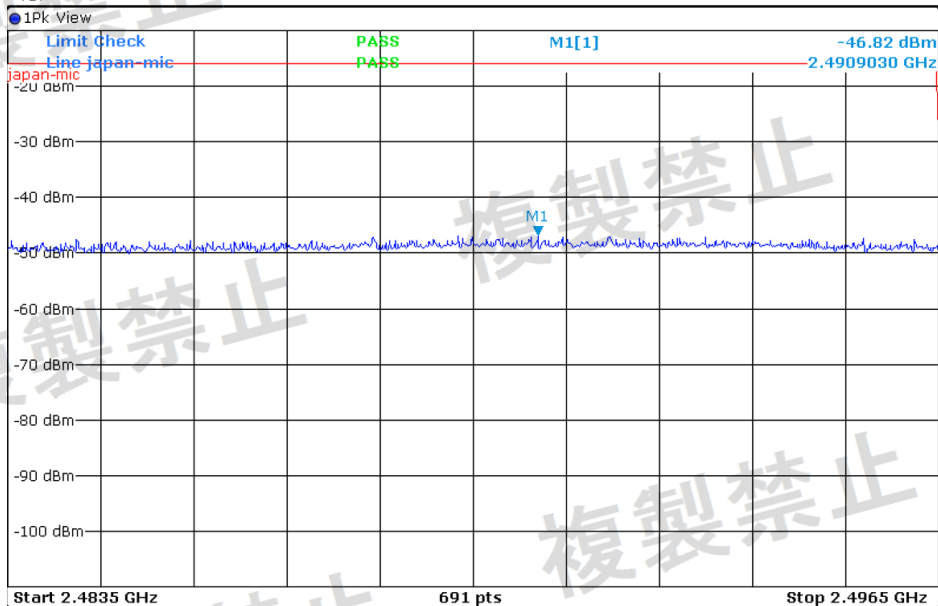
The equipment met the requirement of this clause.

3.6.5 Test Graphs

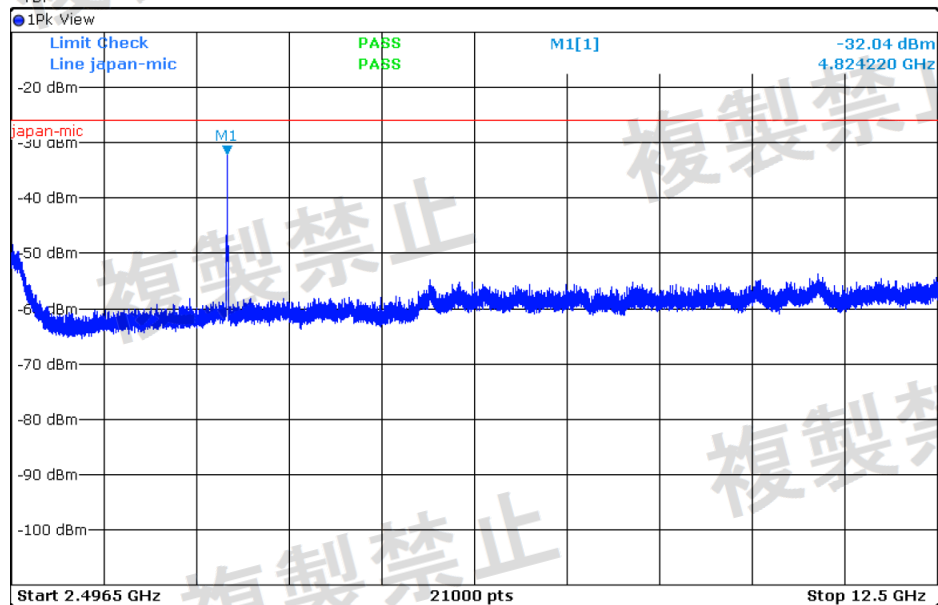
802.11b 2412



Ref Level -10.00 dBm RBW 1 MHz
Att 10 dB SWT 100 ms VBW 1 MHz Mode Auto Sweep
TDF

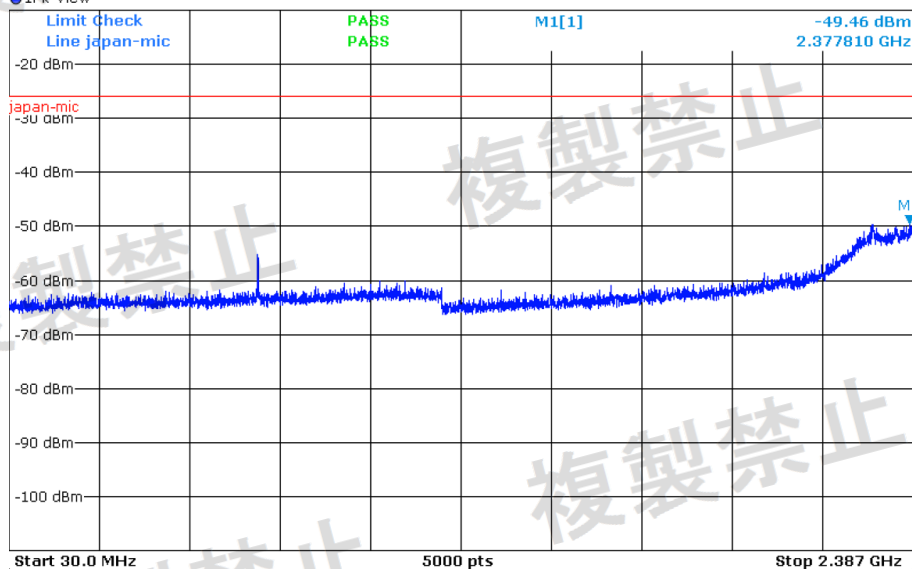


Ref Level -10.00 dBm RBW 1 MHz
Att 10 dB SWT 100 ms VBW 1 MHz Mode Auto Sweep
TDF

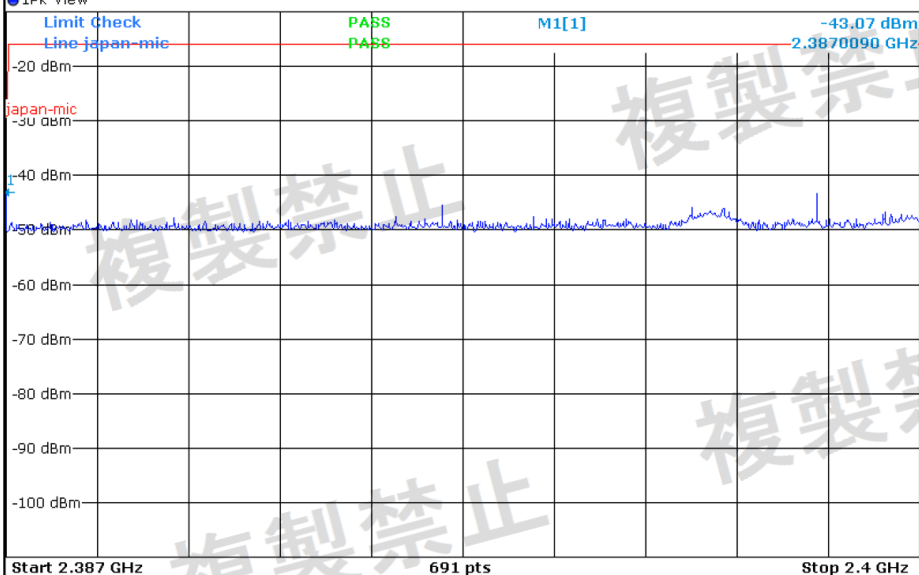


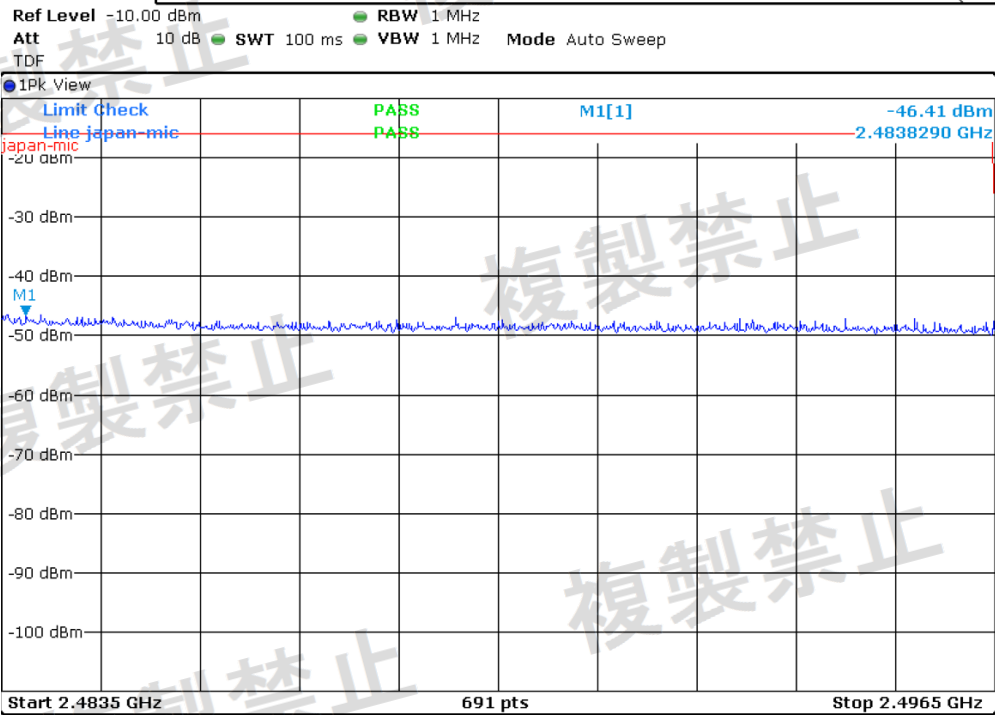
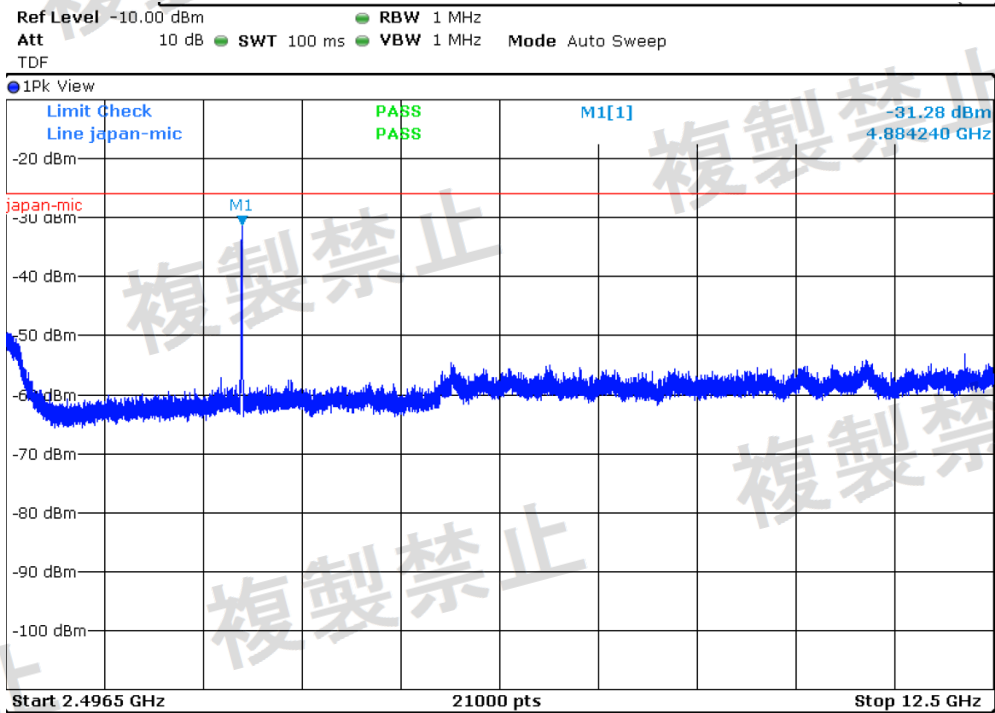
802.11b 2442

Ref Level -10.00 dBm RBW 1 MHz
Att 10 dB SWT 100 ms VBW 1 MHz Mode Auto Sweep

TDF
● 1Pk View

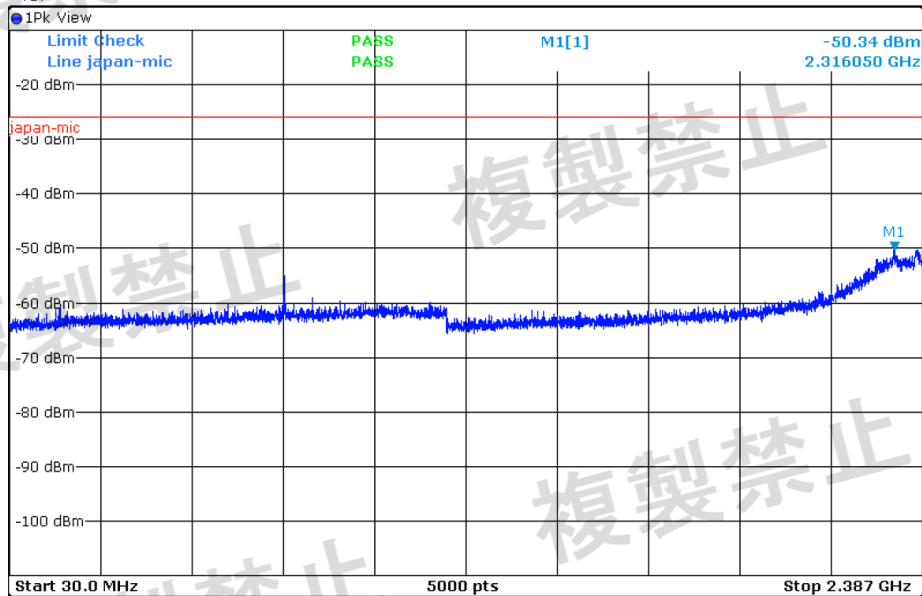
Ref Level -10.00 dBm RBW 1 MHz
Att 10 dB SWT 100 ms VBW 1 MHz Mode Auto Sweep

TDF
● 1Pk View

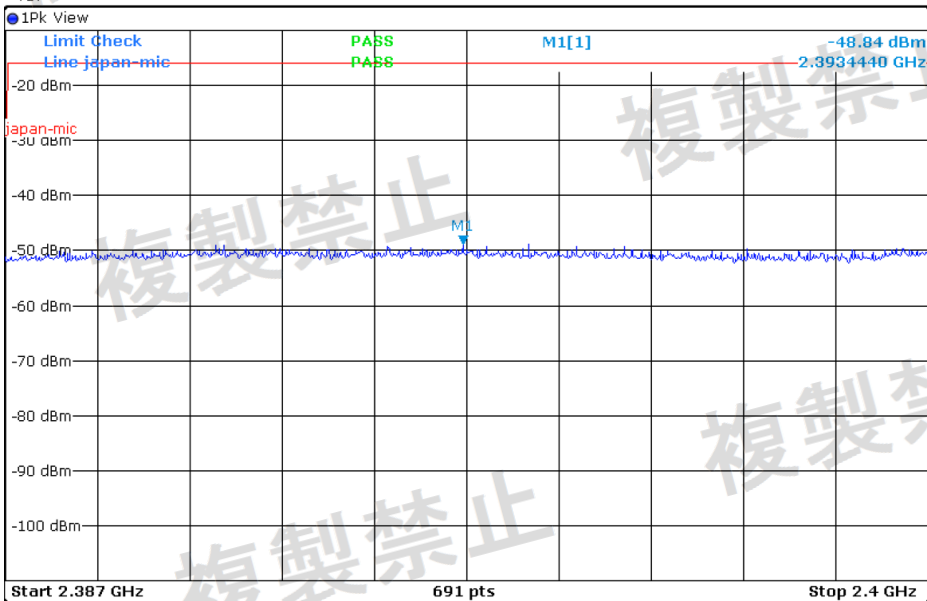


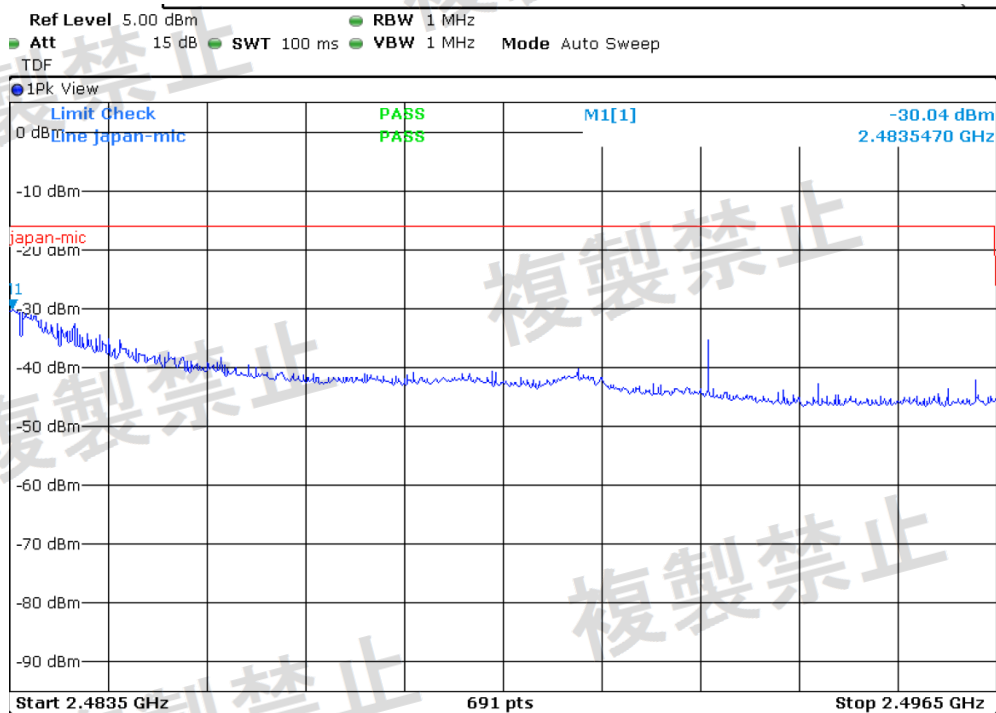
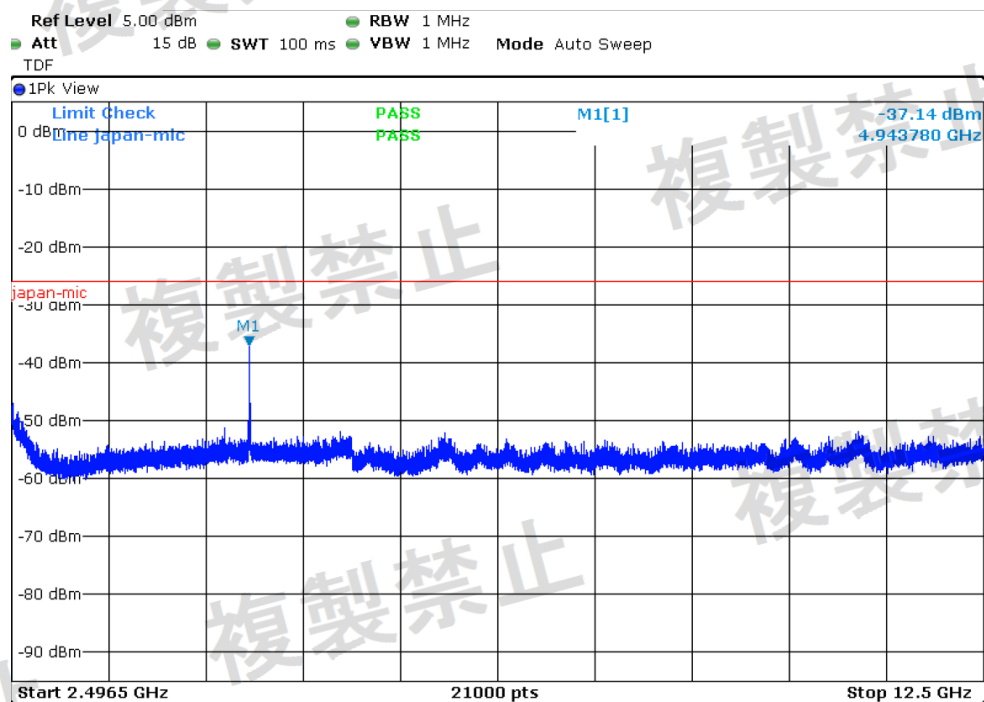
802.11b 2472

Ref Level -10.00 dBm RBW 1 MHz
Att 10 dB SWT 100 ms VBW 1 MHz Mode Auto Sweep
TDF

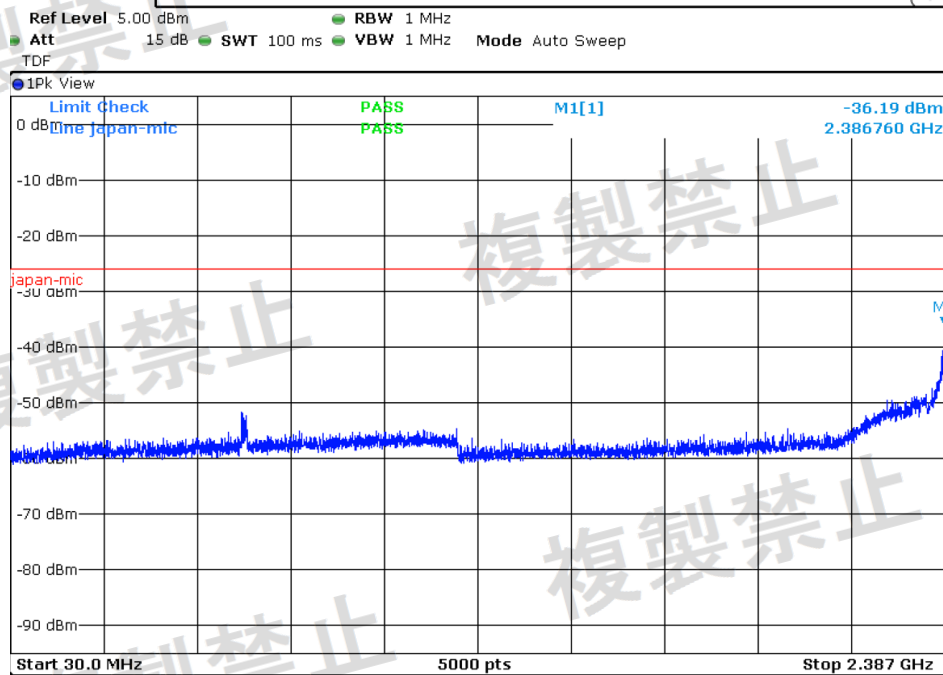
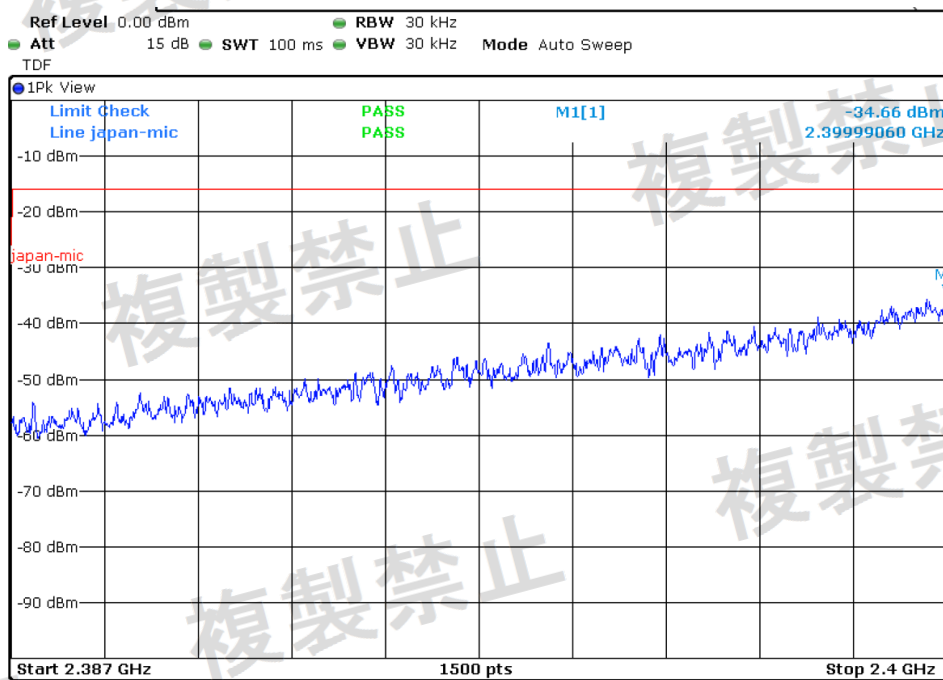


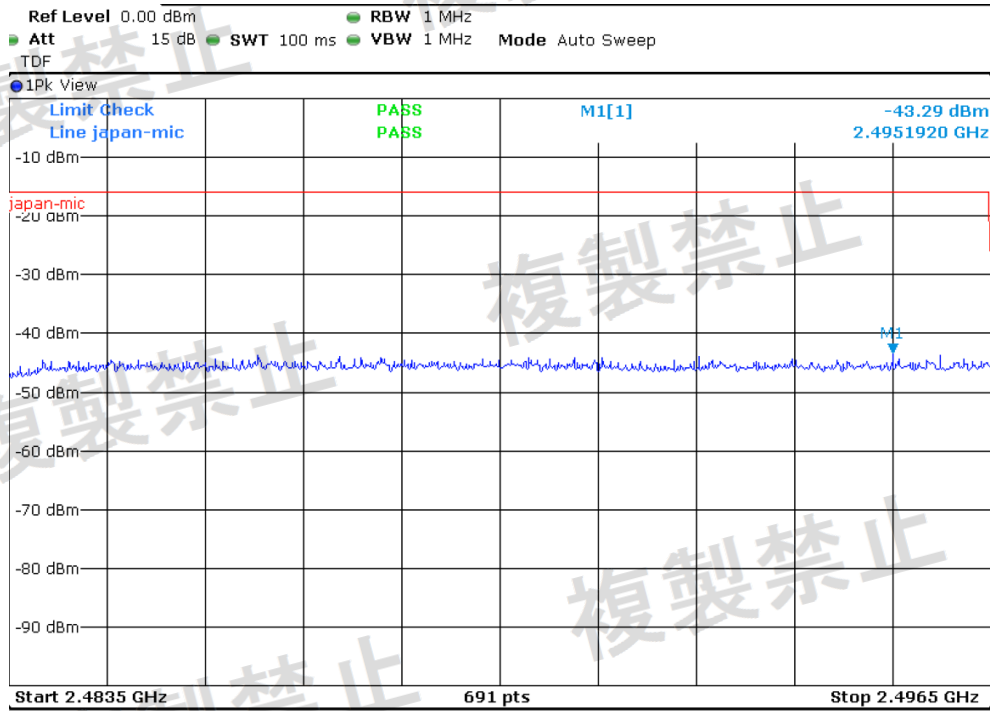
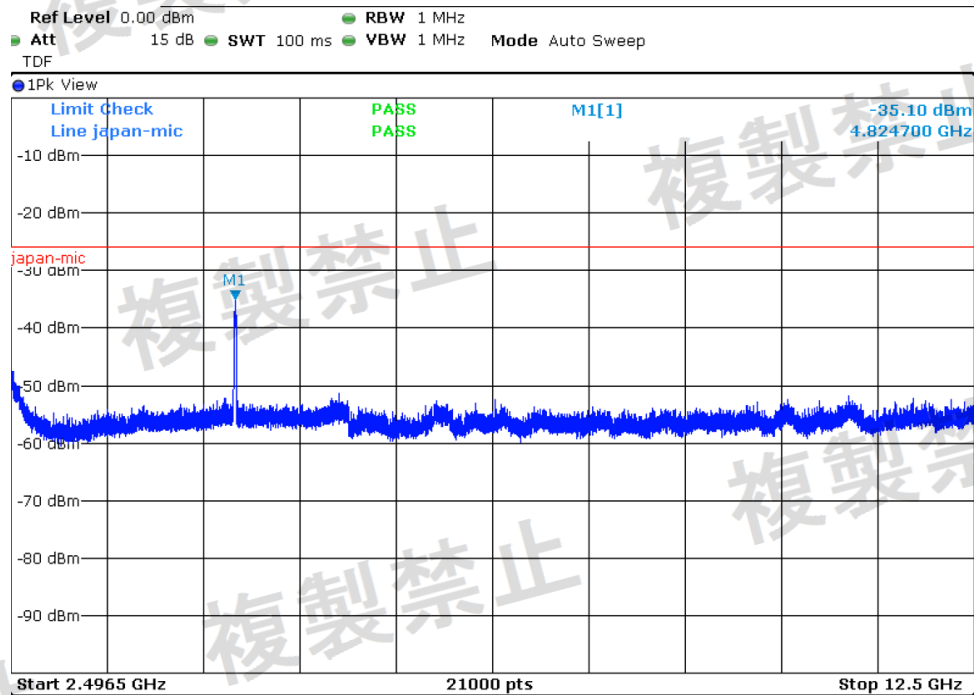
Ref Level -10.00 dBm RBW 1 MHz
Att 10 dB SWT 100 ms VBW 1 MHz Mode Auto Sweep
TDF





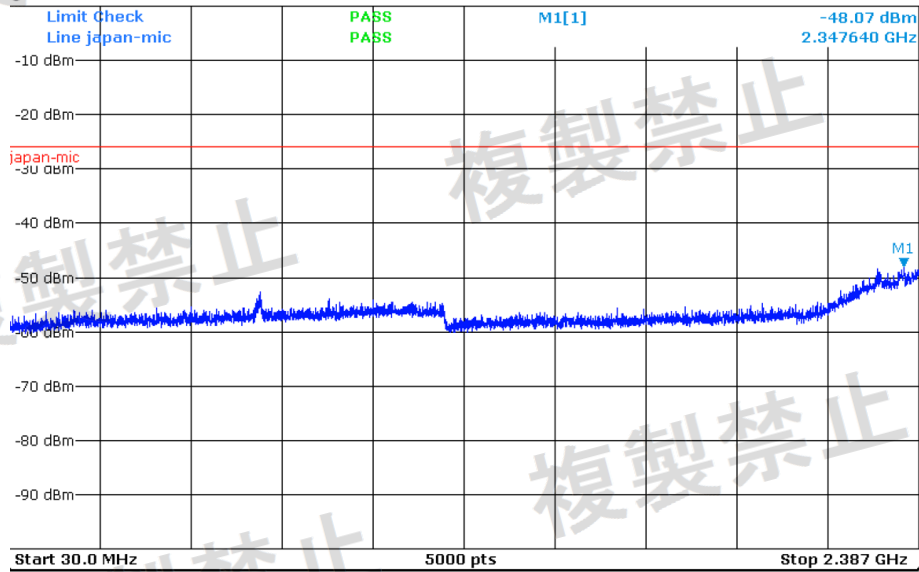
802.11g 2412



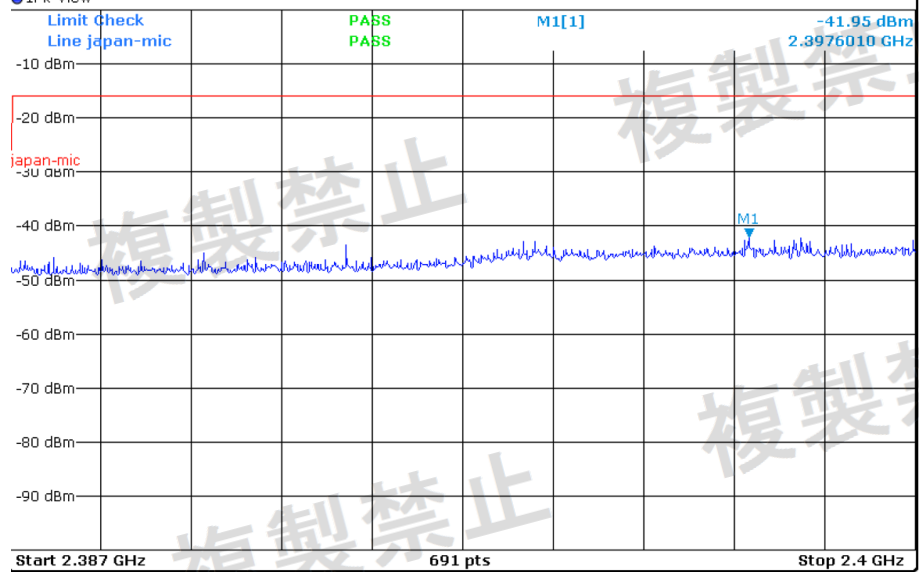


802.11g 2442

Ref Level 0.00 dBm RBW 1 MHz
Att 15 dB SWT 100 ms VBW 1 MHz Mode Auto Sweep
TDF
1Pk View



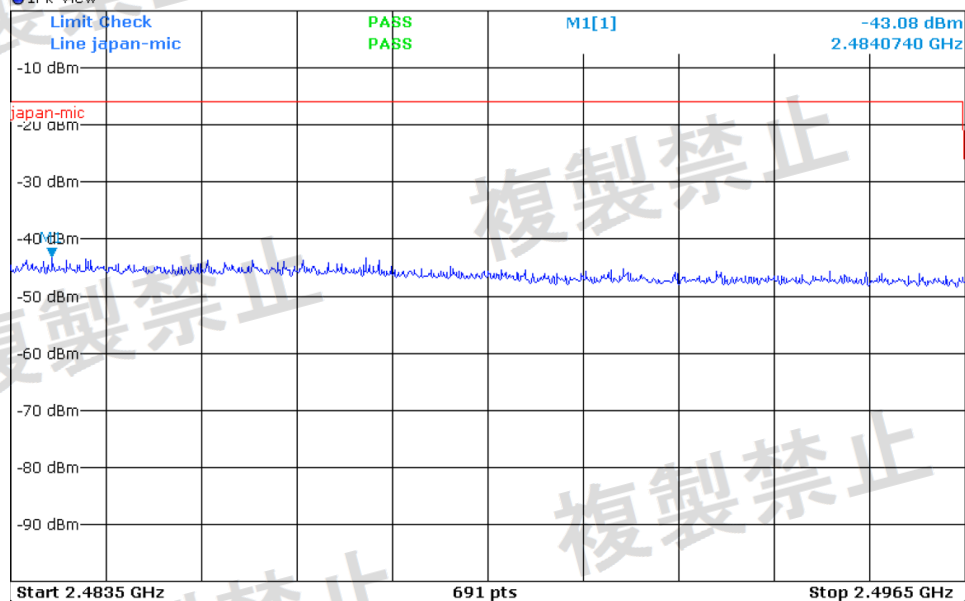
Ref Level 0.00 dBm RBW 1 MHz
Att 15 dB SWT 100 ms VBW 1 MHz Mode Auto Sweep
TDF
1Pk View



Ref Level 0.00 dBm RBW 1 MHz
Att 15 dB SWT 100 ms VBW 1 MHz Mode Auto Sweep

TDF

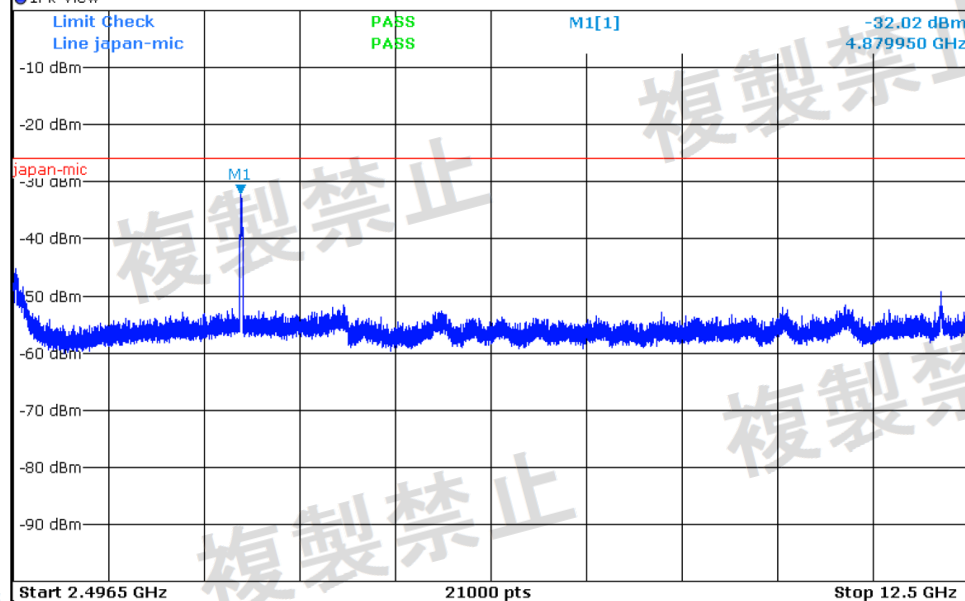
1Pk View



Ref Level 0.00 dBm RBW 1 MHz
Att 15 dB SWT 100 ms VBW 1 MHz Mode Auto Sweep

TDF

1Pk View

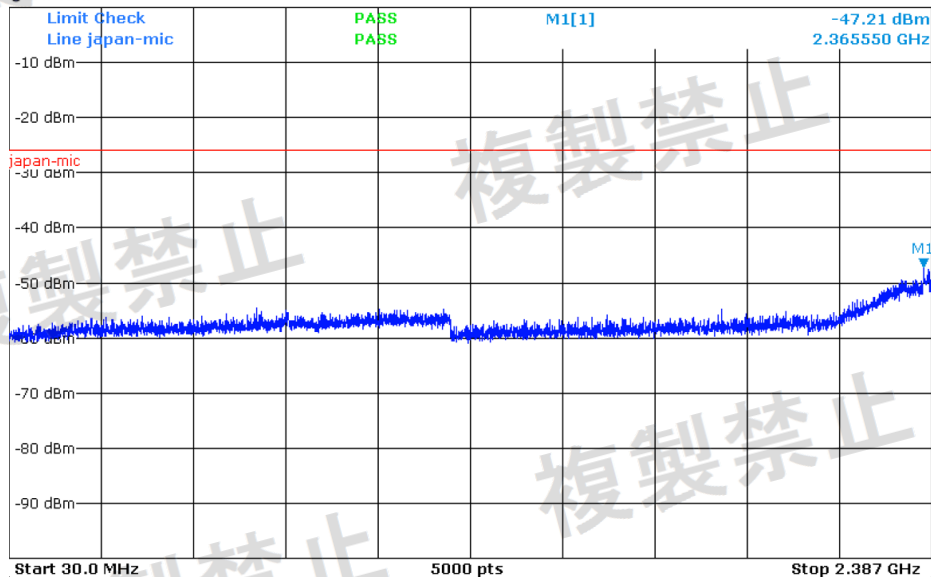


802.11g 2472

Ref Level 0.00 dBm RBW 1 MHz
Att 15 dB SWT 100 ms VBW 1 MHz Mode Auto Sweep

TDF

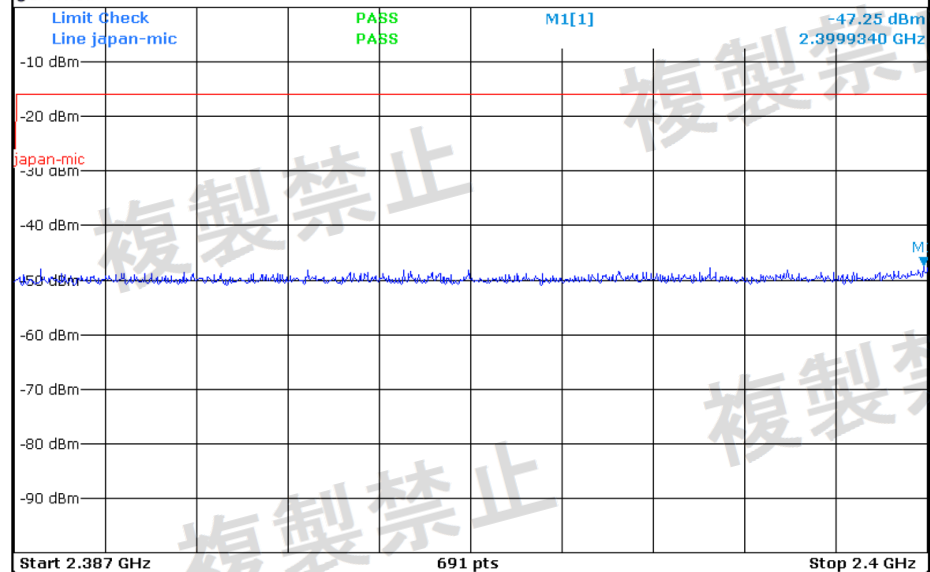
1Pk View



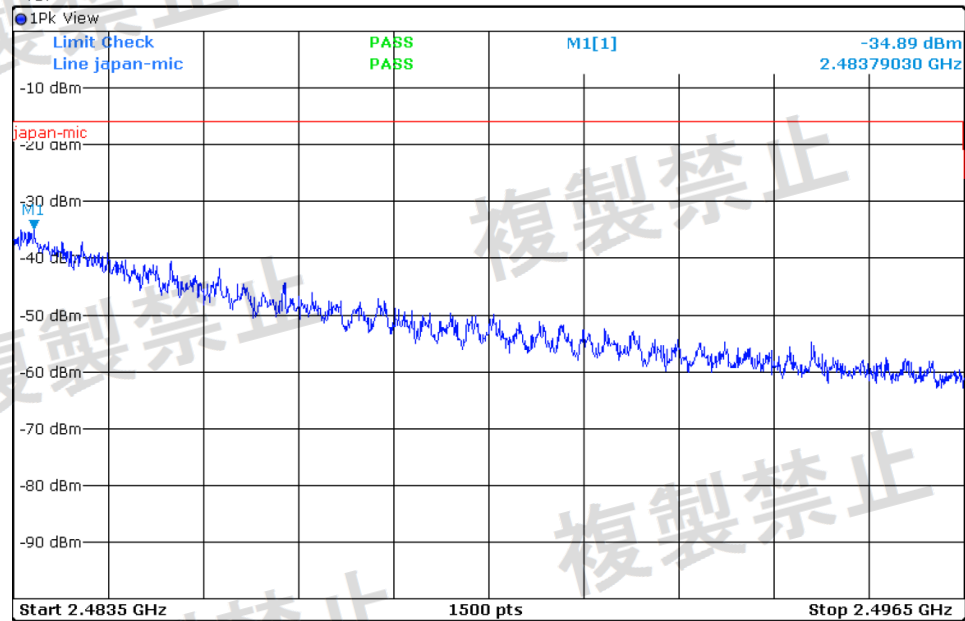
Ref Level 0.00 dBm RBW 1 MHz
Att 15 dB SWT 100 ms VBW 1 MHz Mode Auto Sweep

TDF

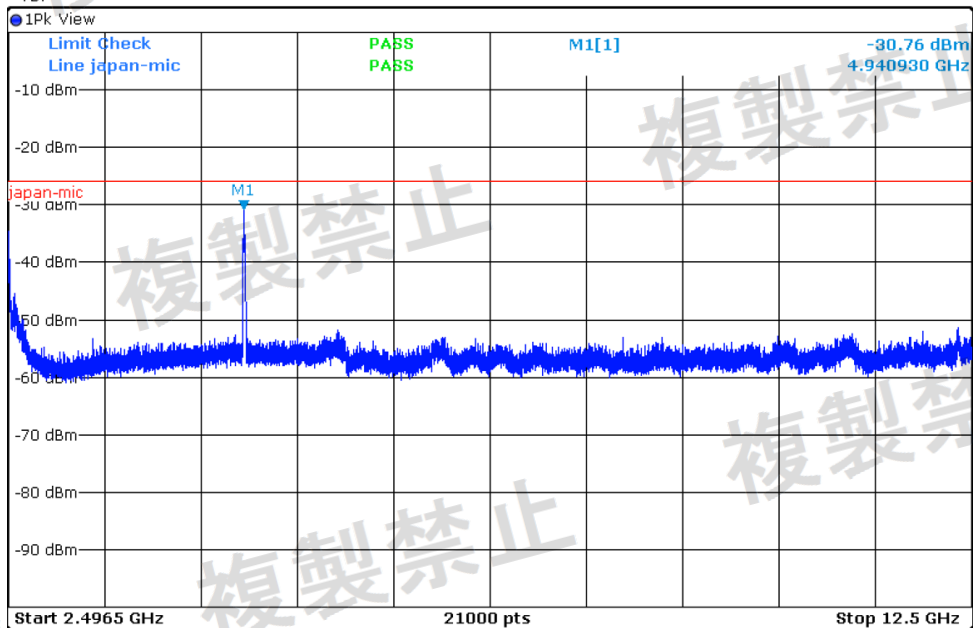
1Pk View



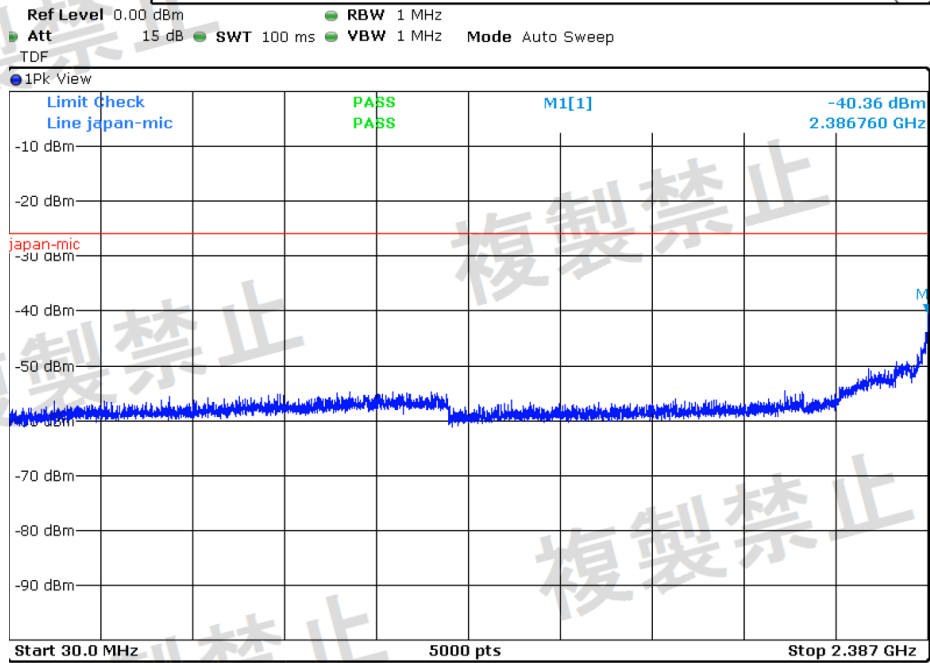
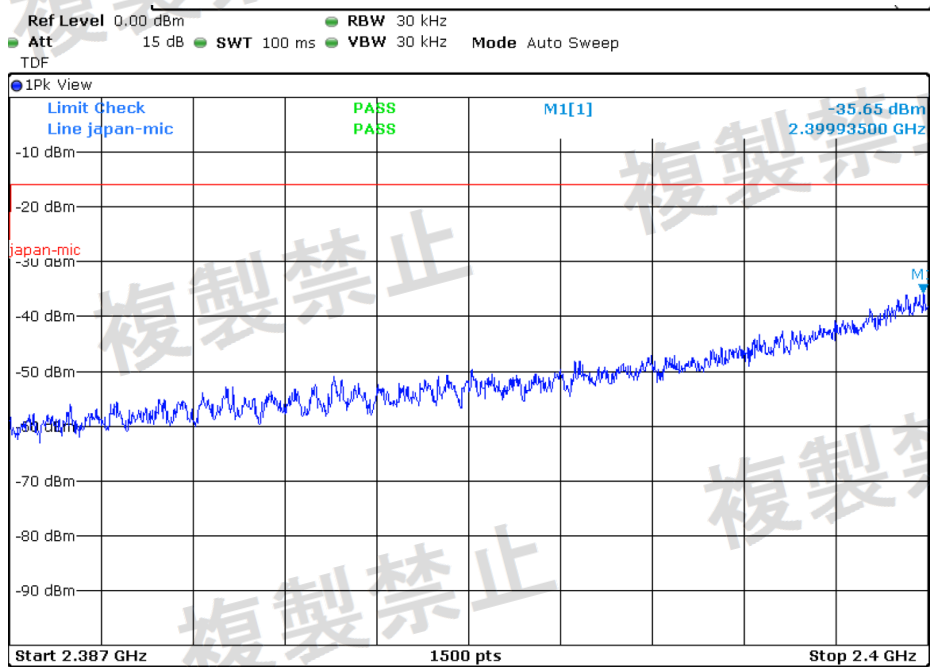
Ref Level 0.00 dBm RBW 30 kHz
Att 15 dB SWT 100 ms VBW 30 kHz Mode Auto Sweep

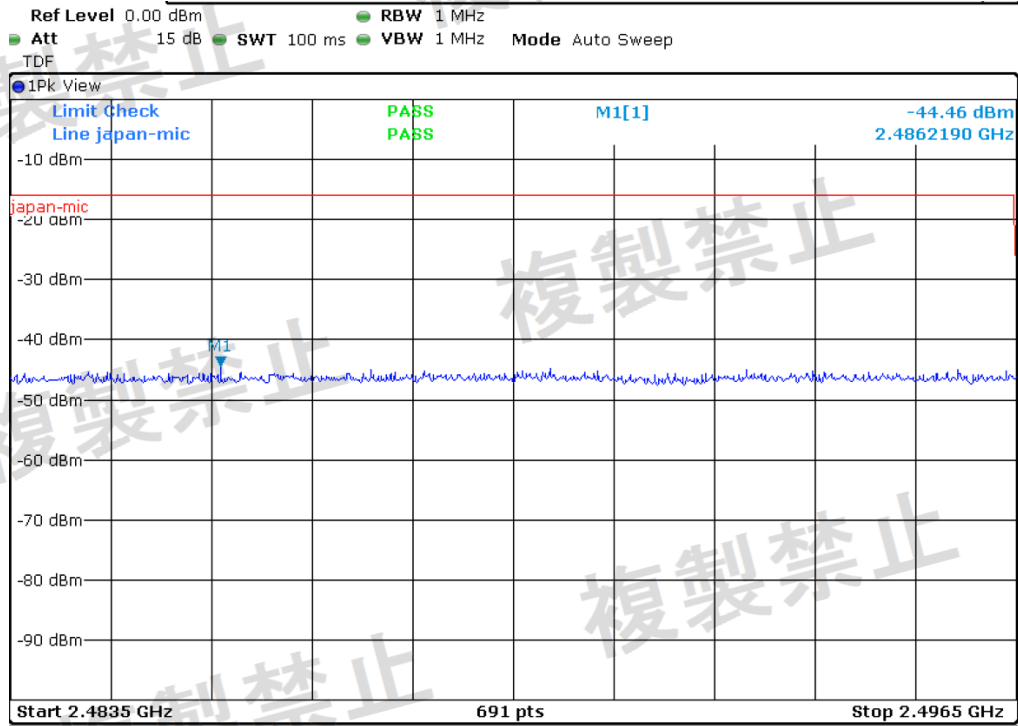
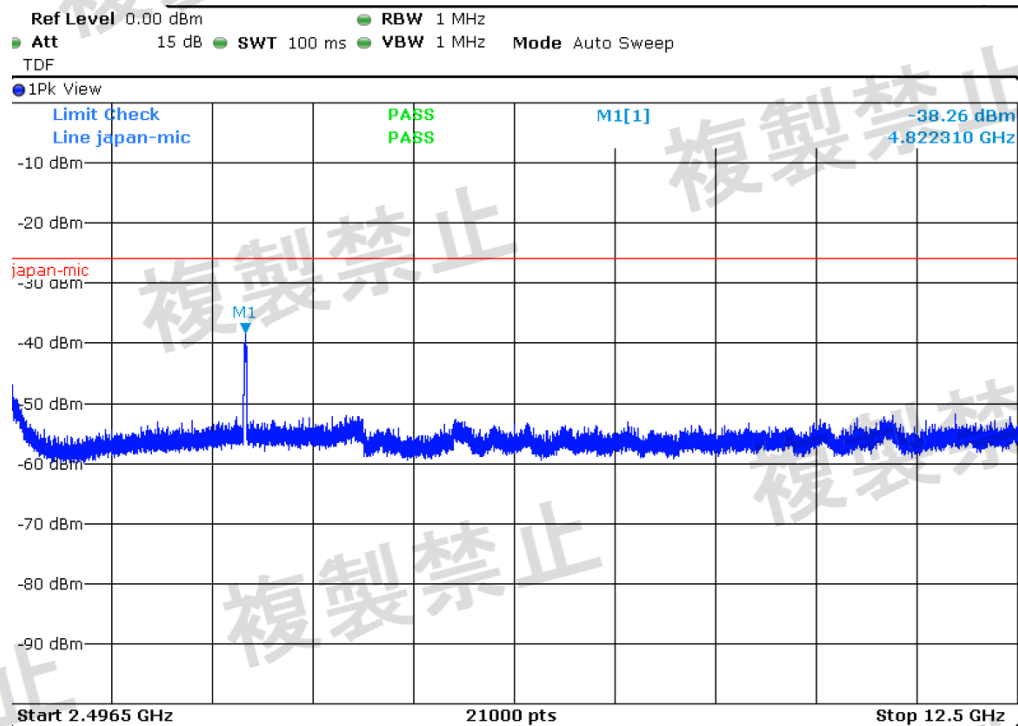


Ref Level 0.00 dBm RBW 1 MHz
Att 15 dB SWT 100 ms VBW 1 MHz Mode Auto Sweep

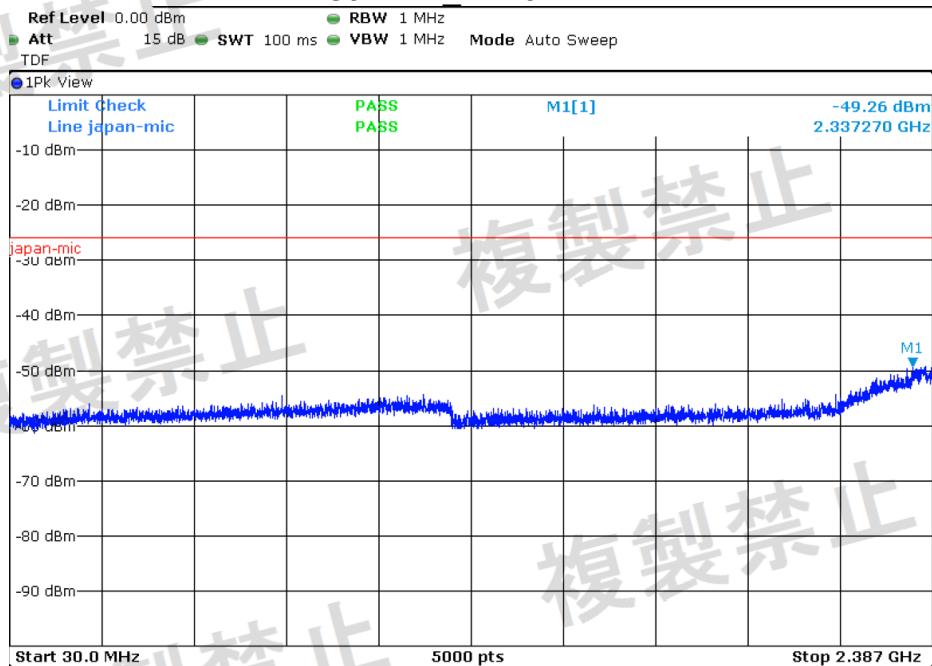
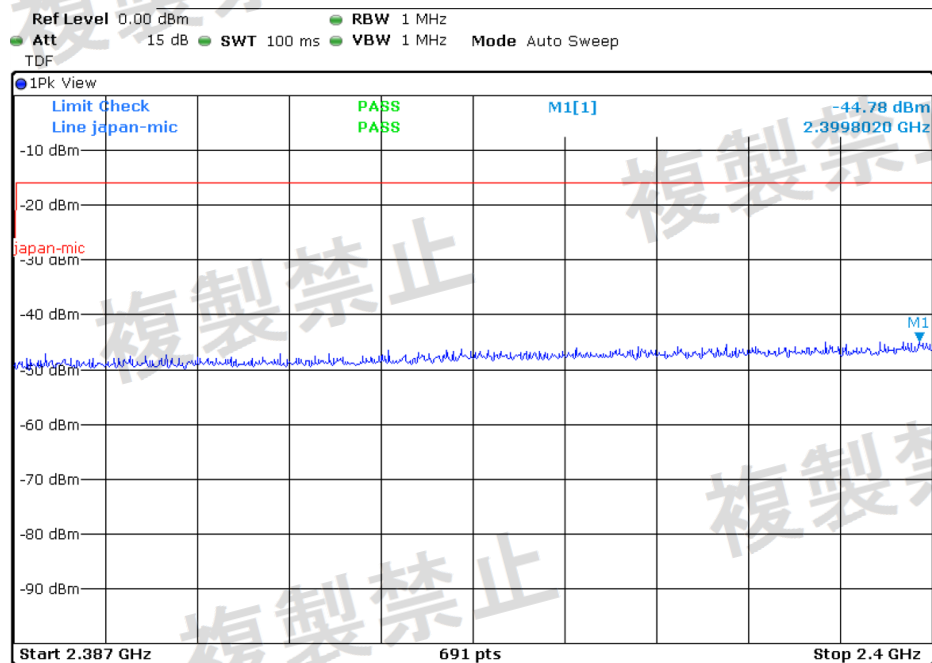


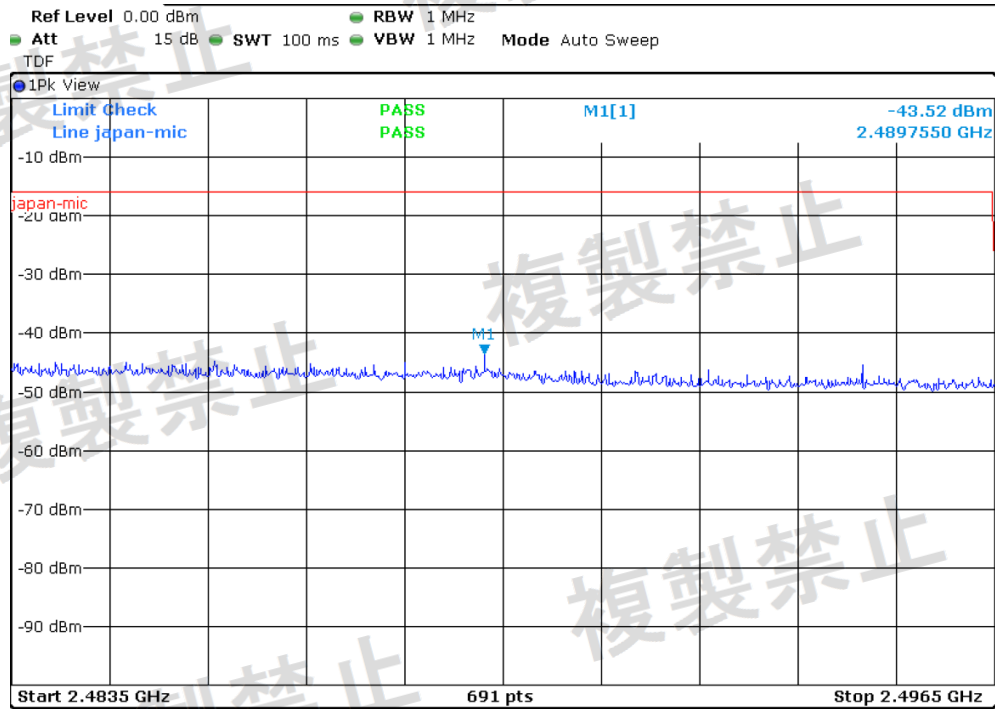
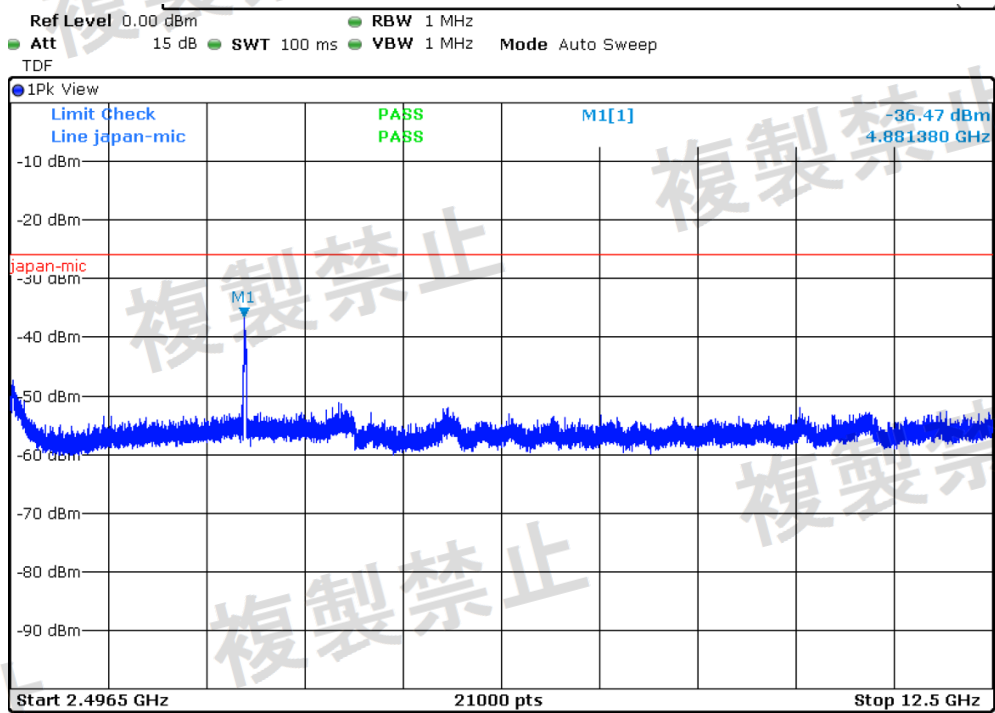
802.11n HT20 2412





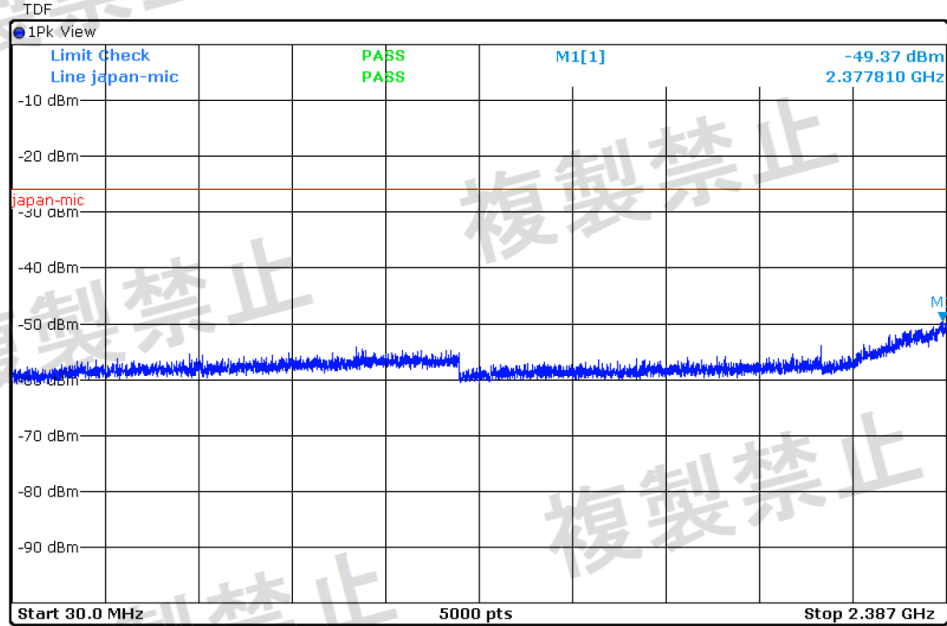
802.11n HT20 2442



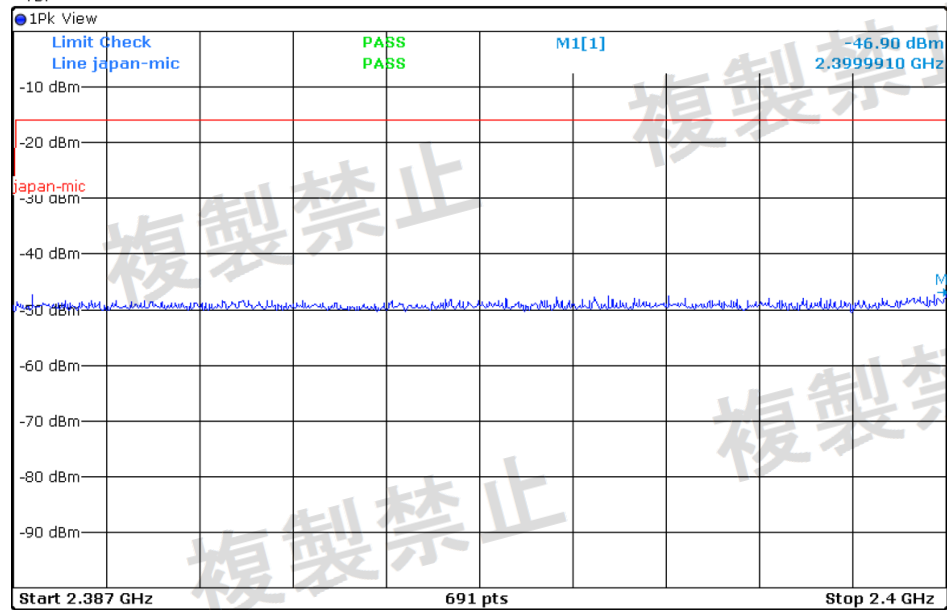


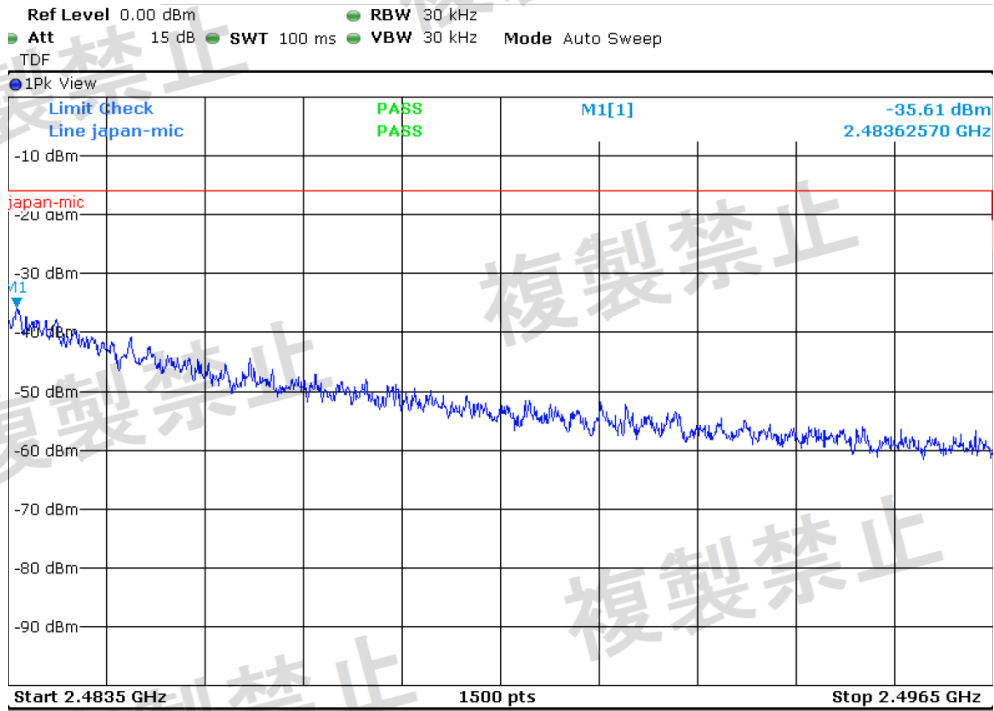
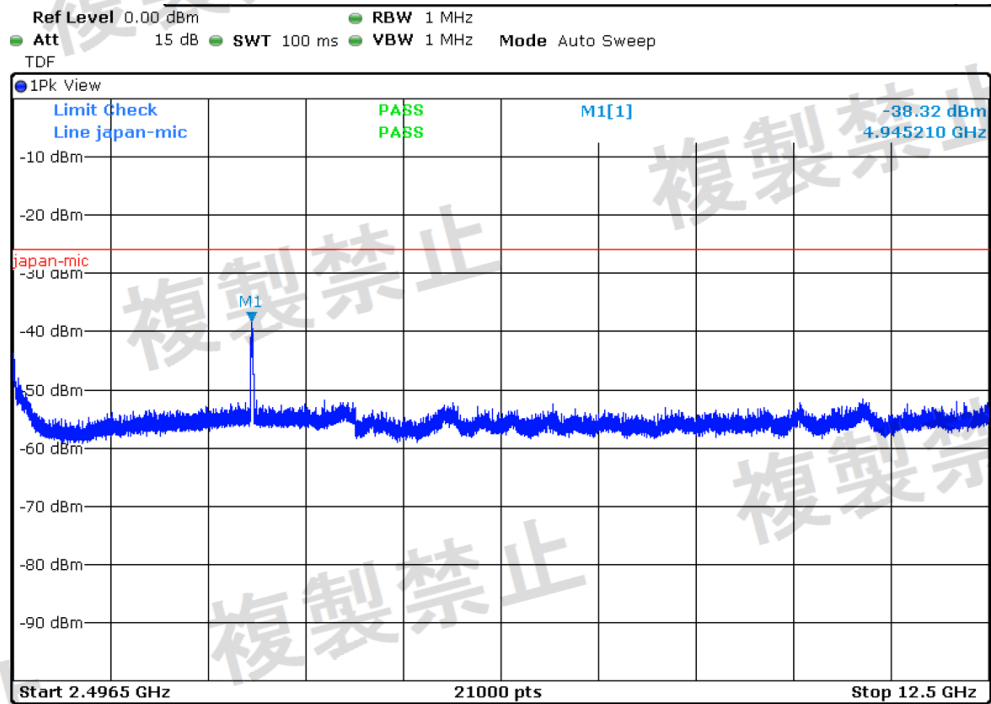
802.11n_HT20 2472

Ref Level 0.00 dBm
Att 15 dB RBW 1 MHz
SWT 100 ms VBW 1 MHz Mode Auto Sweep



Ref Level 0.00 dBm
Att 15 dB RBW 1 MHz
SWT 100 ms VBW 1 MHz Mode Auto Sweep





3.7 Secondary Emitted Radio Wave Strength

3.7.1 Test condition

Date of testing:	2023.3.9
Channel:	Low: 2412MHz; Middle: 2442MHz; High: 2472MHz (for 802.11b; 802.11g; 802.11n_HT20)
Test position:	Receiving
Ambient temperature:	25.5 °C
Relative humidity:	55.6 %
Atmosphere Pressure:	105.5 KPa

3.7.2 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.

3.7.3 Test Result

Test Condition	Test Mode	Channel	Freq., Range	Result	Limit	Verdict
NTNV	802.11b	2412	30~1000	-68.21	-54	PASS
NTNV	802.11b	2412	1000~12500	-63.61	-47	PASS
NTNV	802.11b	2442	30~1000	-68.30	-54	PASS
NTNV	802.11b	2442	1000~12500	-64.90	-47	PASS
NTNV	802.11b	2472	30~1000	-67.92	-54	PASS
NTNV	802.11b	2472	1000~12500	-64.73	-47	PASS

Test Condition	Test Mode	Channel	Freq., Range	Result	Limit	Verdict
NTNV	802.11g	2412	30~1000	-67.84	-54	PASS
NTNV	802.11g	2412	1000~12500	-63.76	-47	PASS
NTNV	802.11g	2442	30~1000	-68.31	-54	PASS
NTNV	802.11g	2442	1000~12500	-64.68	-47	PASS
NTNV	802.11g	2472	30~1000	-68.48	-54	PASS
NTNV	802.11g	2472	1000~12500	-64.81	-47	PASS

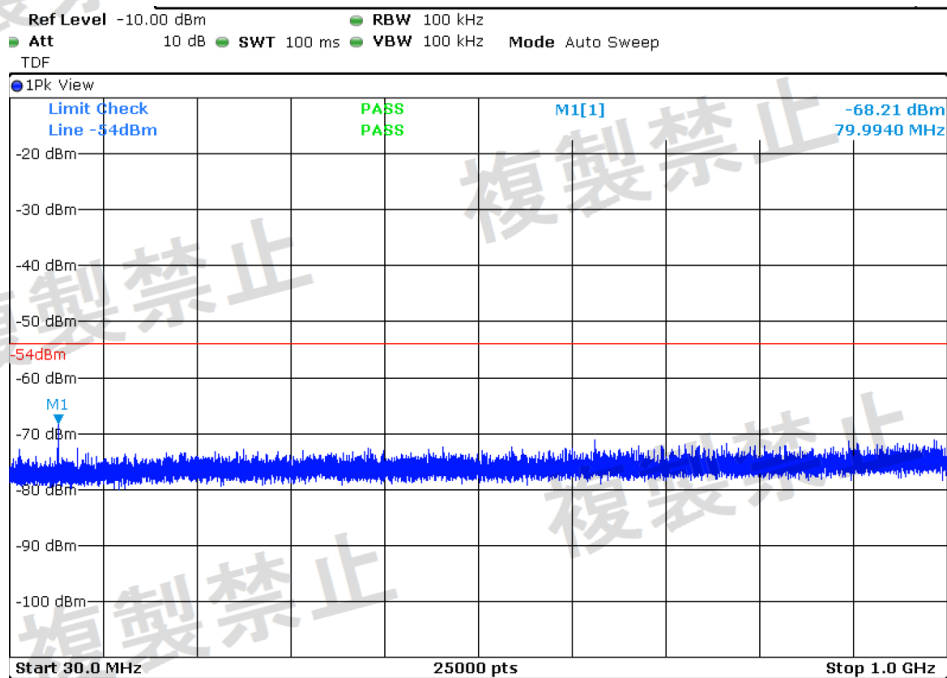
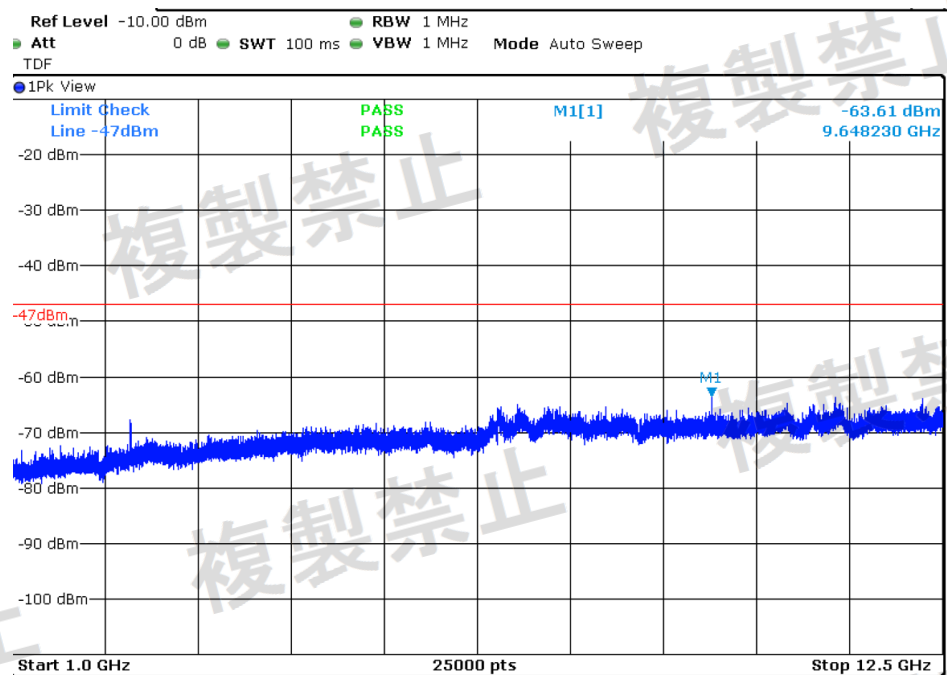
Test Condition	Test Mode	Channel	Freq., Range	Result	Limit	Verdict
NTNV	802.11n_HT20	2412	30~1000	-67.51	-54	PASS
NTNV	802.11n_HT20	2412	1000~12500	-64.32	-47	PASS
NTNV	802.11n_HT20	2442	30~1000	-68.19	-54	PASS
NTNV	802.11n_HT20	2442	1000~12500	-64.91	-47	PASS
NTNV	802.11n_HT20	2472	30~1000	-68.24	-54	PASS
NTNV	802.11n_HT20	2472	1000~12500	-64.20	-47	PASS

3.7.4 Result

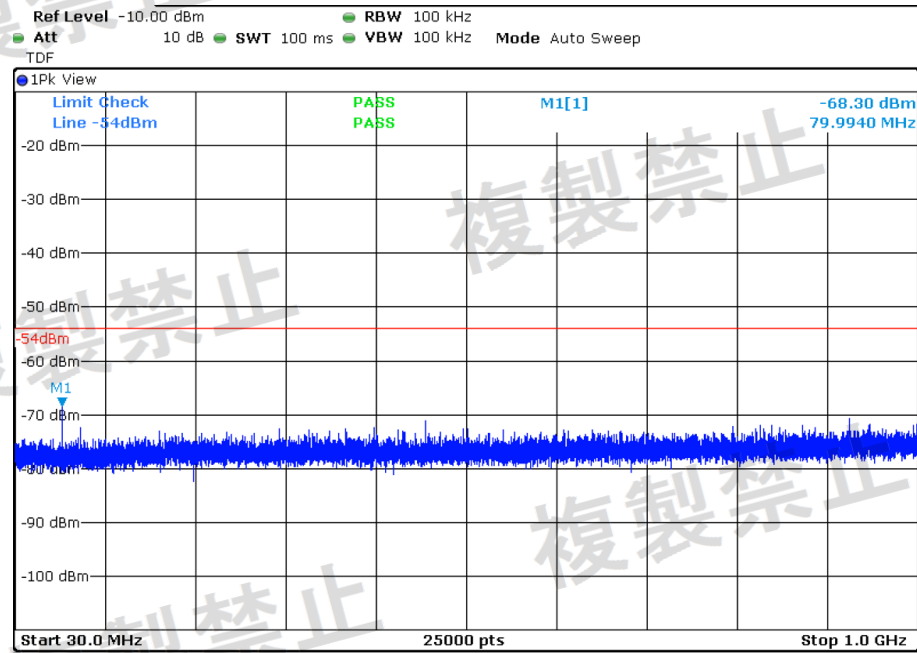
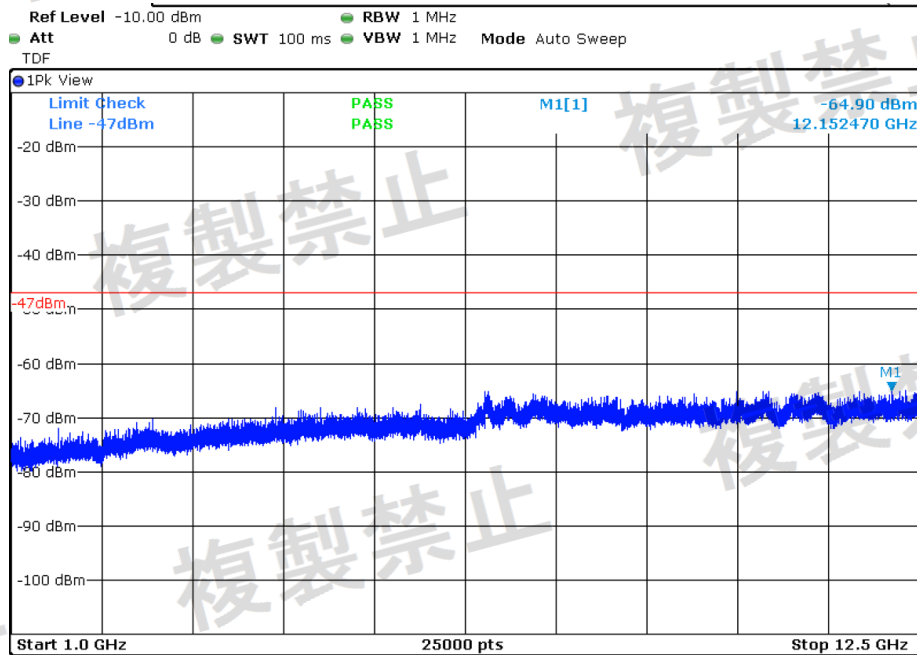
The equipment met the requirement of this clause.

3.7.5 Test Graphs

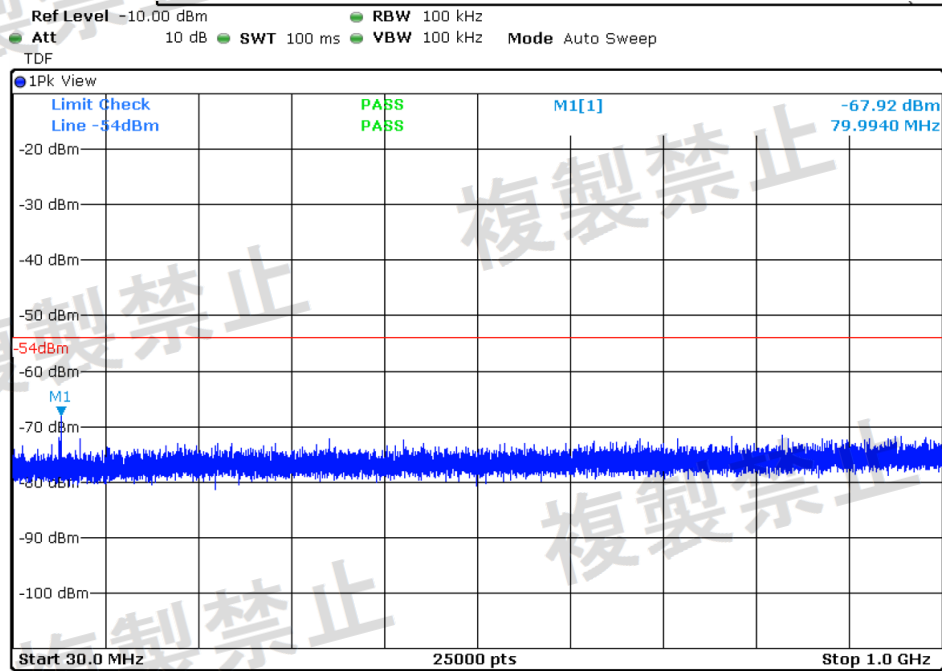
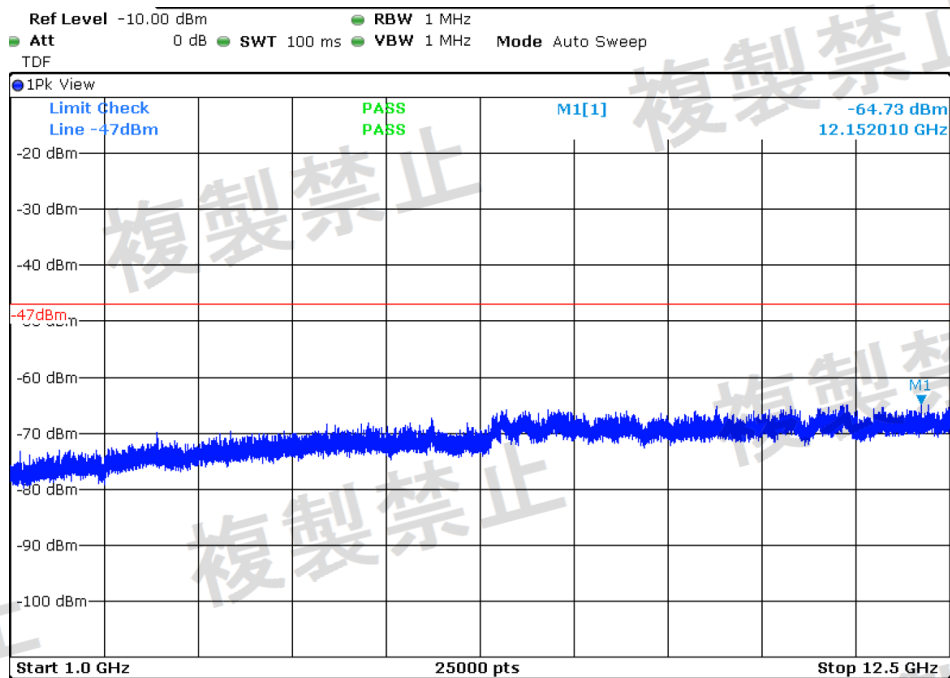
802.11b 2412



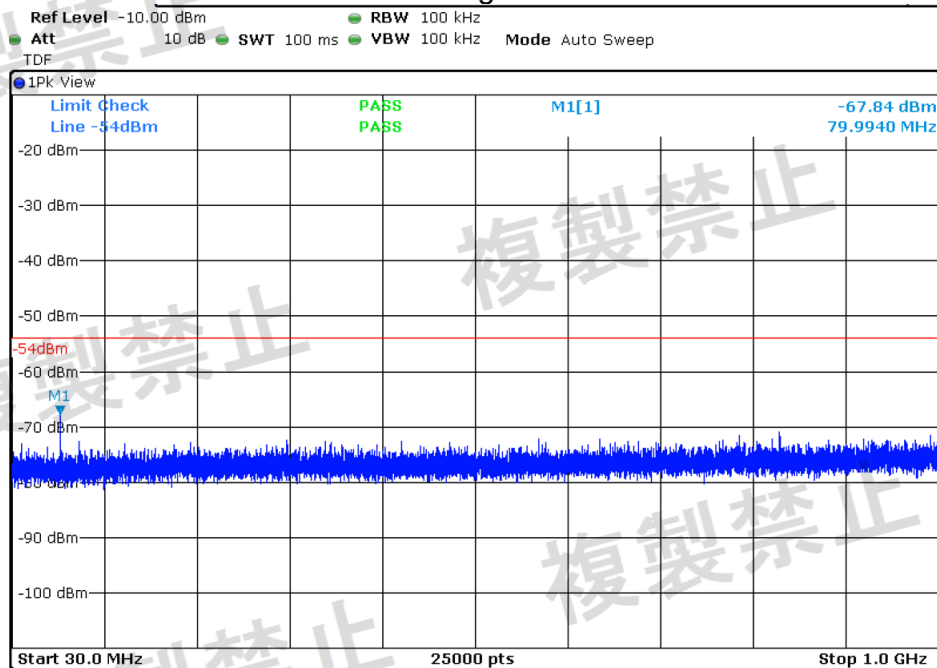
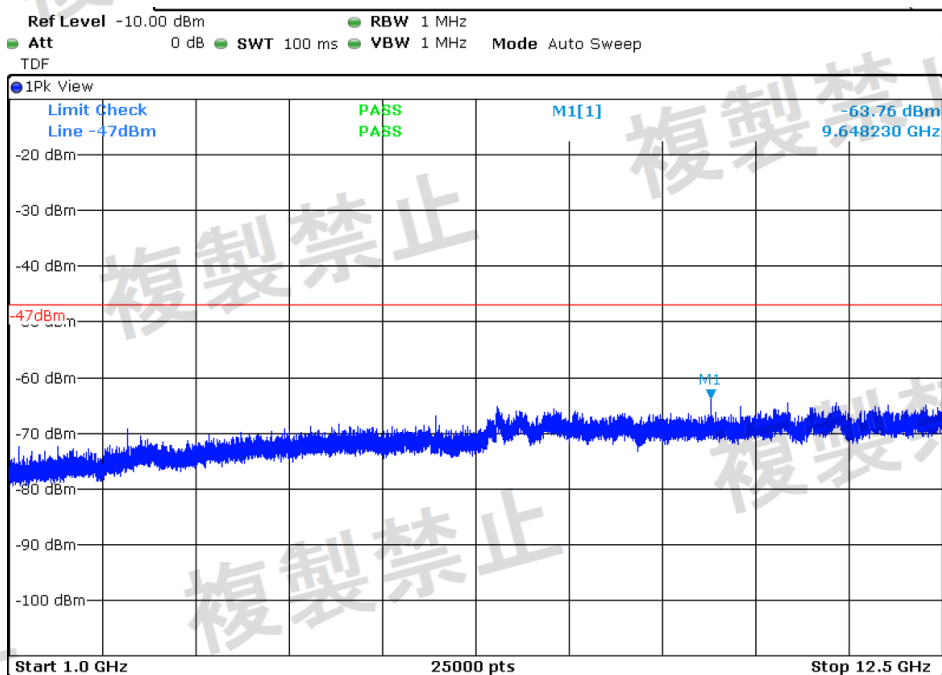
802.11b 2442



802.11b 2472

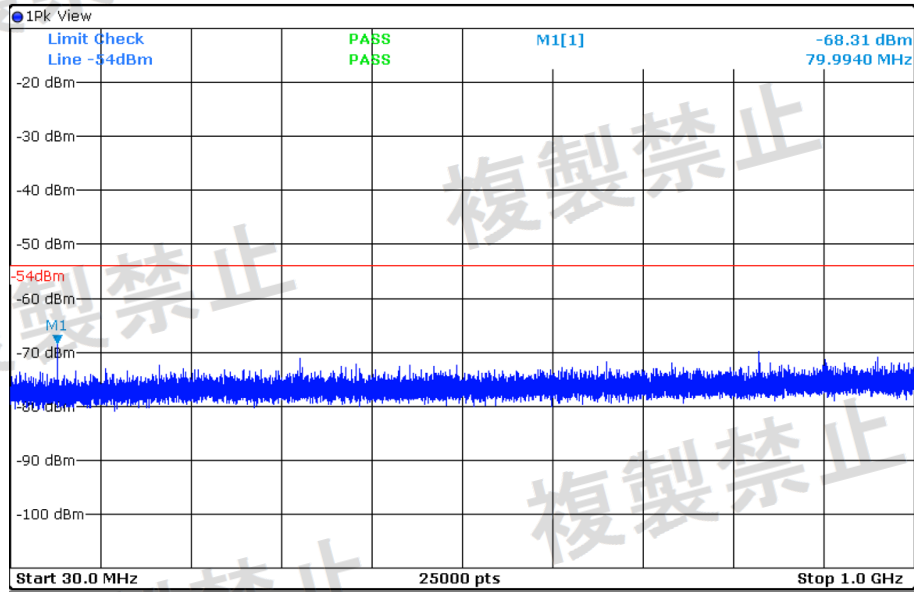


802.11g 2412

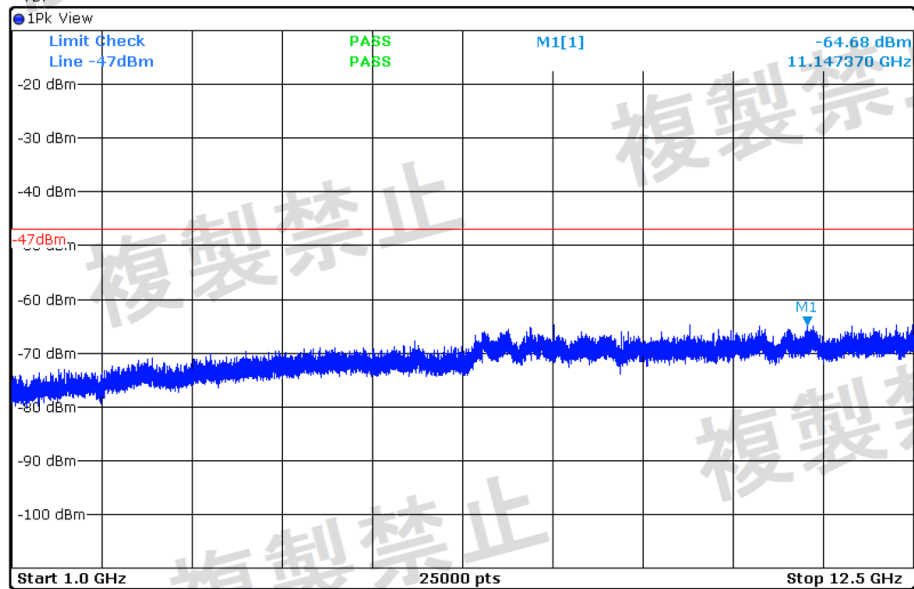


802.11g 2442

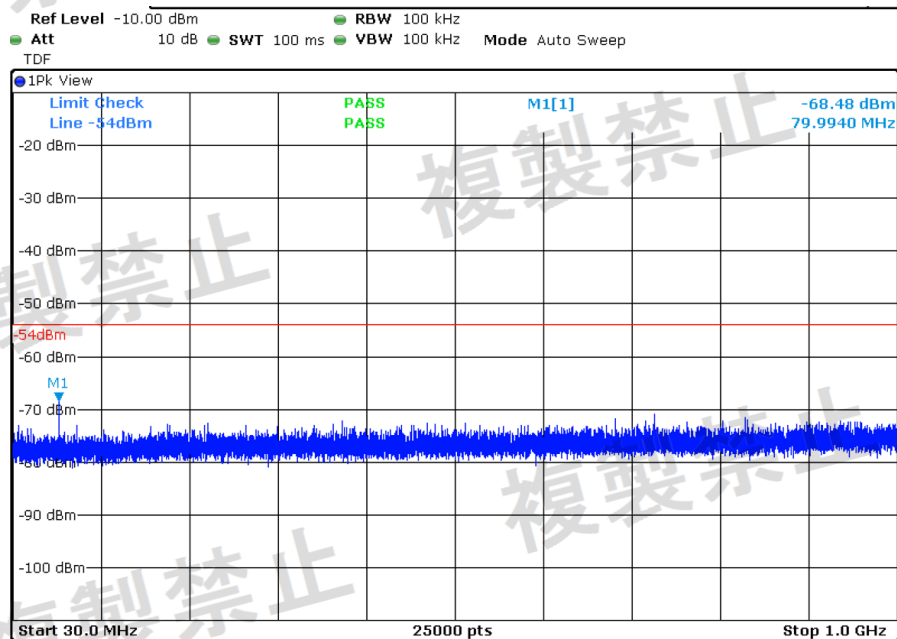
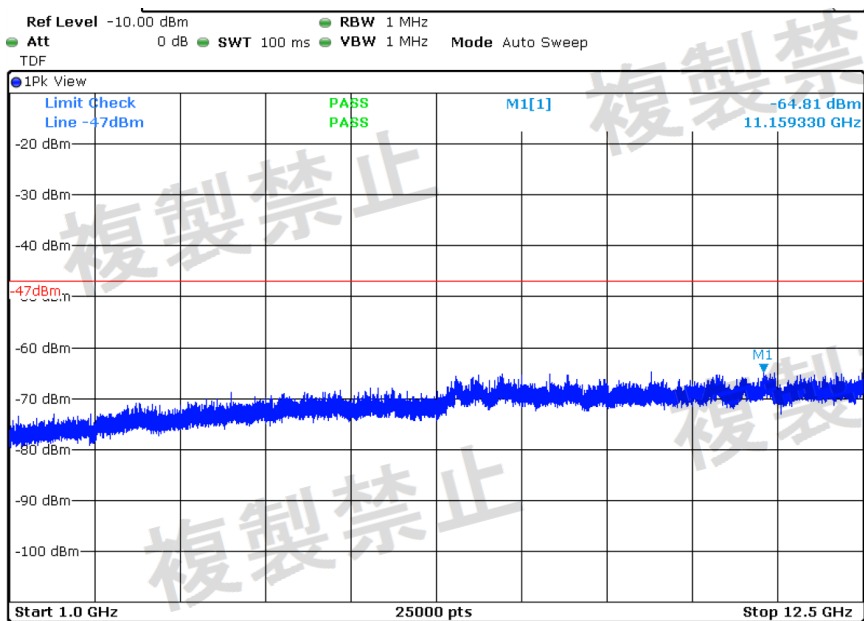
Ref Level -10.00 dBm RBW 100 kHz
Att 10 dB SWT 100 ms VBW 100 kHz Mode Auto Sweep
TDF



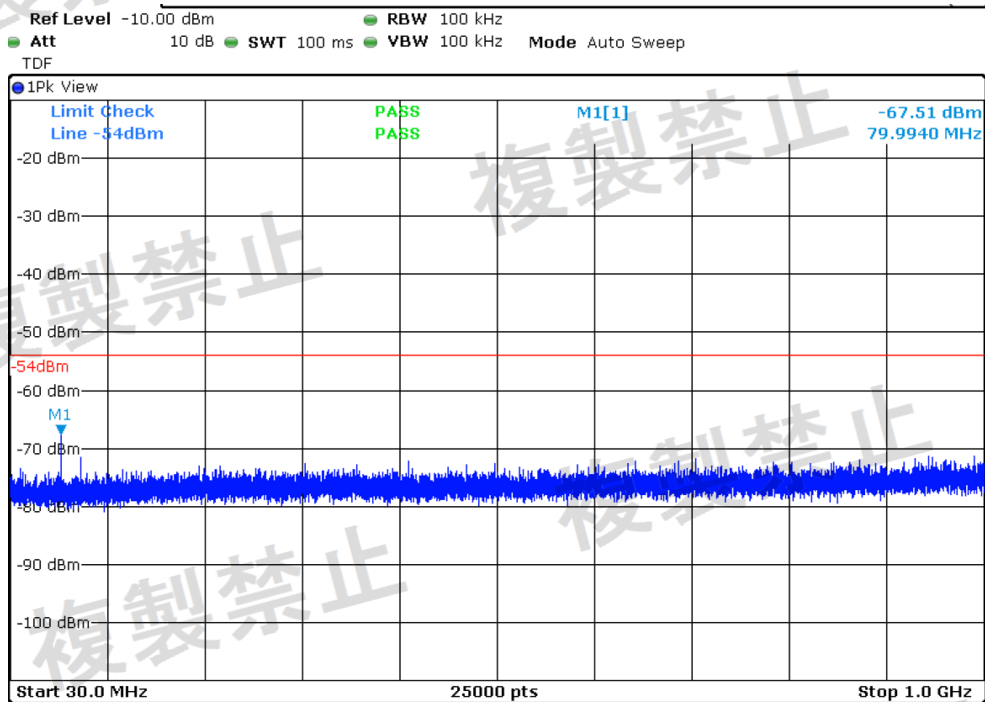
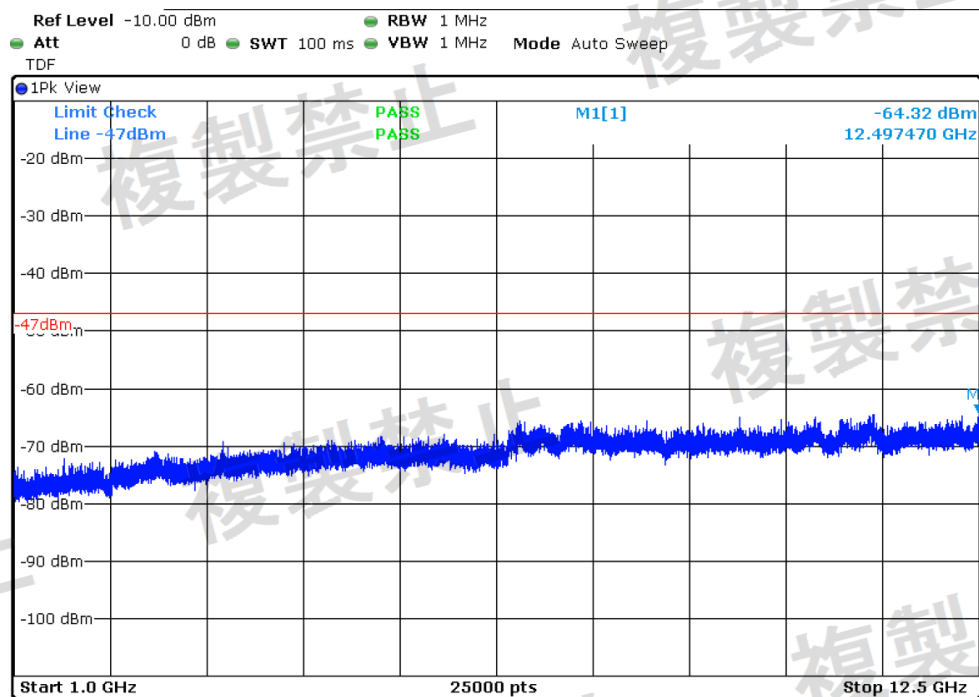
Ref Level -10.00 dBm RBW 1 MHz
Att 0 dB SWT 100 ms VBW 1 MHz Mode Auto Sweep
TDF



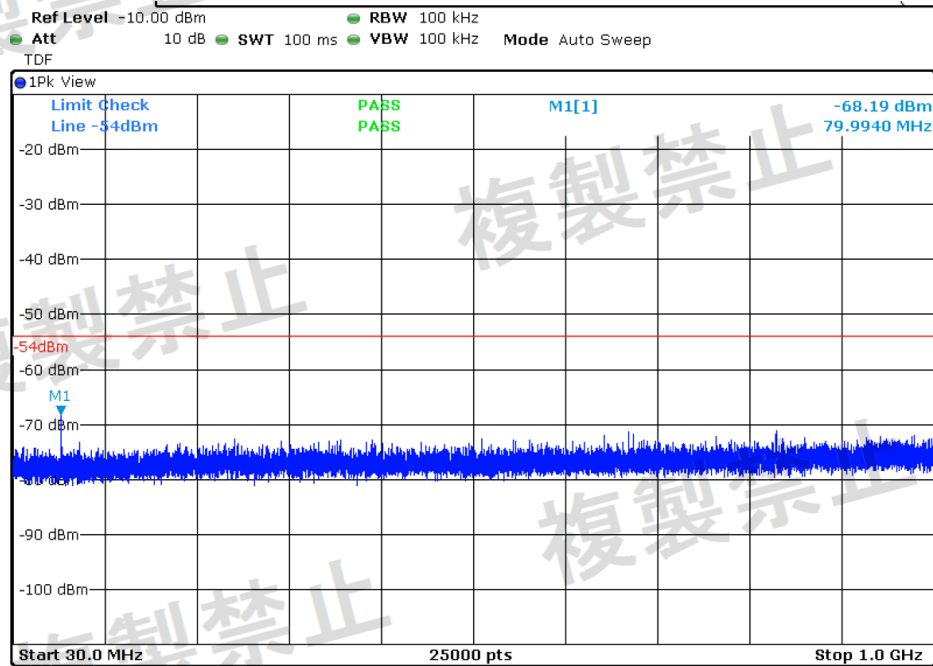
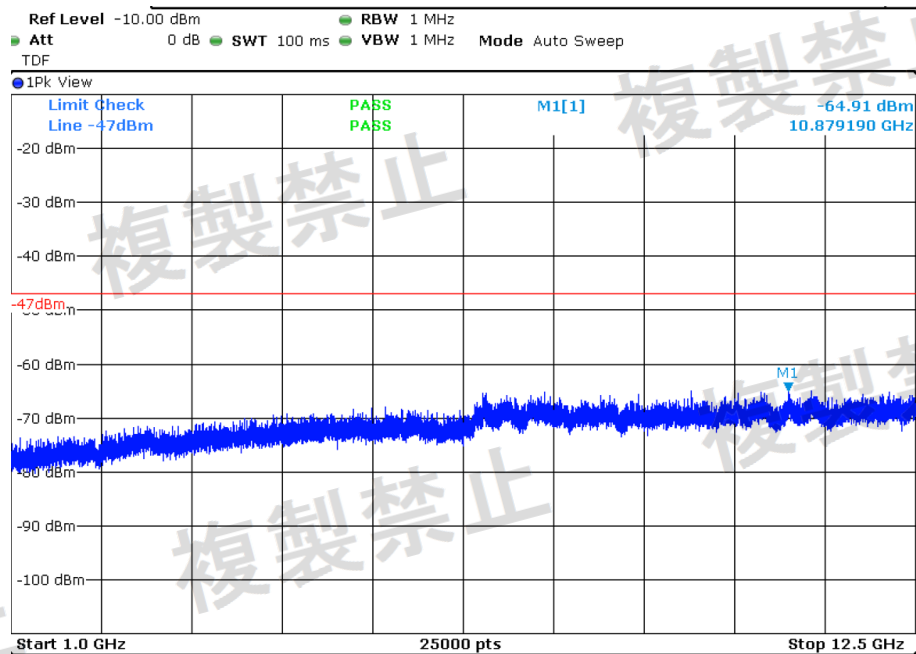
802.11g 2472



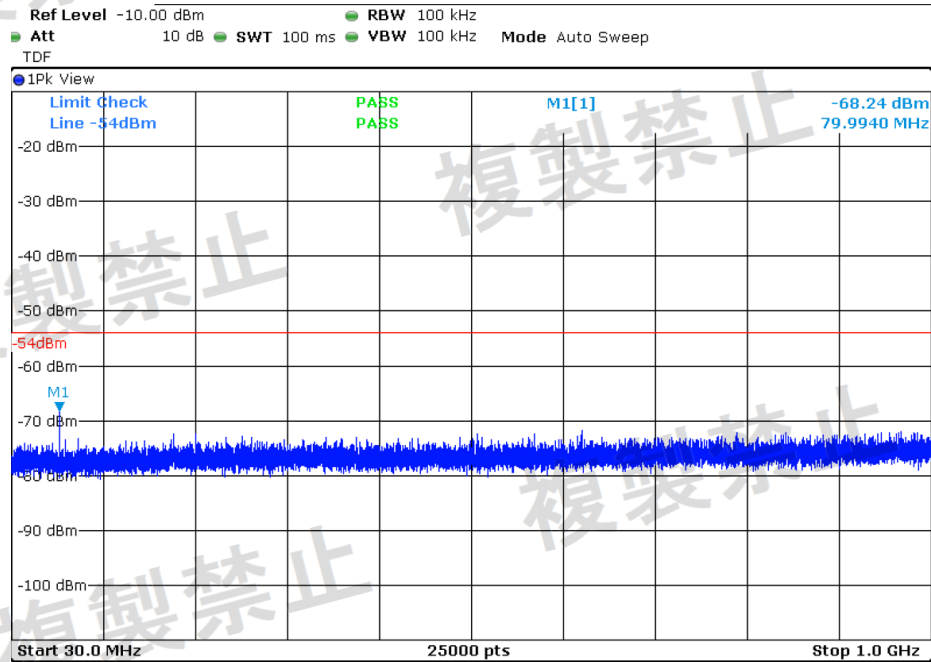
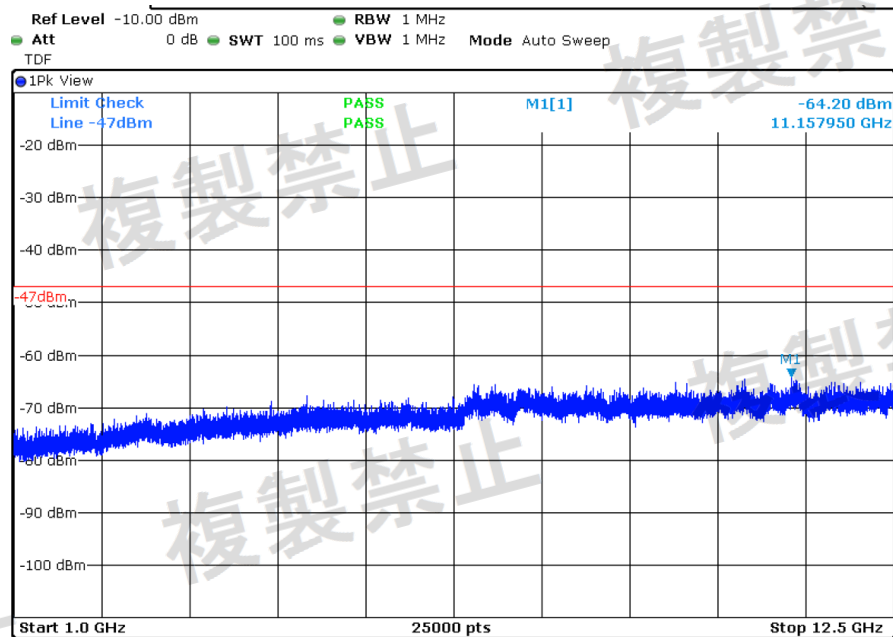
802.11n_HT20 2412



802.11n_HT20 2442



802.11n_HT20 2472



3.8 Spreading Factor

3.8.1 Test condition

Date of testing:	2023.3.9
Channel:	Low: 2412MHz; Middle: 2442MHz; High: 2472MHz (for 802.11b)
Test position:	Transmitting
Ambient temperature:	22.4 °C
Relative humidity:	58.9 %
Atmosphere Pressure:	101.5 KPa

3.8.2 Limit

Item	Limits
Spread Factor	≥5

Measured Result:

3.8.3 Test Result

Test Condition	Test Mode	Channel	Spread bandwidth/modulation rate	Result	Limit	Verdict
NTNV	b	2412	9.12/1.375	6.63	5	PASS
NTNV	b	2442	9.12/1.375	6.63	5	PASS
NTNV	b	2472	9.12/1.375	6.63	5	PASS

3.8.4 Result

The equipment met the requirement of this clause.

3.9 Interference prevention function

3.9.1 Test condition

Date of testing:	2023.3.9
Test position:	Connecting with host
Ambient temperature:	25.5 °C
Relative humidity:	55.6 %
Atmosphere Pressure:	105.5 KPa

3.9.2 Limit

Item	Limits
Identification Code	≥48 bits

Measured Result:

Complies. EUT displayed a valid identification. In real life applications, the EUT is programmed to connect with specific host only.

3.9.3 Result

The equipment met the requirement of this clause.

4 Photographs of Test Set-ups



-----The End-----