

Japan - TEST REPORT

Report Number : **68.950.22.0595.01** Date of Issue: **2020-06-06**Model : **MWB-S-WB01-1A**

Product Type : 2.4GHz Wi-Fi + BLE Communication Module

Applicant : GD Midea Air-Conditioning Equipment Co., Ltd.

Address : Linggang Road, Beijiao, Shunde 528311 Foshan, Guangdong

: PEOPLE'S REPUBLIC OF CHINA

Manufacturer : GD Midea Air-Conditioning Equipment Co., Ltd.

Address : Linggang Road, Beijiao, Shunde 528311 Foshan, Guangdong

: PEOPLE'S REPUBLIC OF CHINA

Test Result : **n Positive** **o Negative**Total pages including
Appendices : **32**

Any use for advertising purposes must be granted in writing. This technical report may only be quoted in full. This report is the result of a single examination of the object in question and is not generally applicable evaluation of the quality of other products in regular production. For further details, please see testing and certification regulation, chapter A-3.4.

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1 General Information

1.1 Notes

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Prepared by
Project Engineer

2022-06-06
Date

Mark Chen
Name

Signature



Approved by
Project Manager

2022-06-06
Date

John Zhi
Name

Signature



1.2 Testing Laboratory

Address of Test Laboratory:

TÜV SÜD Certification and Testing (China) Co., Ltd. – Shenzhen Branch
Address: Building 12&13, Zhiheng Wisdomland Business Park,
Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052,
P. R. China

Phone: +86-755-8828 6998
Fax: +86-755-8828 5299

1.3 Details of Applicant

Applicant: GD Midea Air-Conditioning Equipment Co., Ltd.
Address: Linggang Road, Beijiao, Shunde 528311 Foshan, Guangdong
PEOPLE'S REPUBLIC OF CHINA
Product Description: 2.4GHz Wi-Fi + BLE Communication Module
Manufacturers Model No.: MWB-S-WB01-1A

1.4 Application Details

Date of receipt of order:	May 19, 2022
Date of receipt of test item:	May 19, 2022
Date of test:	May 19, 2022 – May 30, 2022

1.5 Test Item

Refer to table 1

1.6 Applied Standard

APPLIED PRODUCT STANDARD

ARIB STD-T66 Version 3.7/2014-10

1.7 Test Summary

Table 1. Summary of results

Conformance requirement according to ARIB STD-T66 Version 3.7/2014-10, No.88 Annex 43		No.88 Annex 43 Article	Result	Test site
Essential parameter	Corresponding technical requirements			
Transmitter requirements	3.2 (2) Antenna Power	Article 14	PASS	Site 1
	3.2 (3) Tolerances for Antenna Power	Article 14	PASS	Site 1
	3.2 (4) Frequency Tolerance	Article 5, Table 1	PASS	Site 1
	3.2 (5) Transmission Rate	Article 6, Table 2 & Article 49-20, Item1-h & 1-i	N/A*	N/A
	3.2 (7) Occupied Frequency Bandwidth	Article 6, Table 2 & Article 49-20, Item1-h & 1-i	PASS	Site 1
	3.2 (8) Spread Bandwidth	Article 6, Table 2 & Article 49-20, Item1-h & 1-i	PASS	Site 1
	3.2 (9) Process Gain	Article 49-20(1);f(1)	N/A*	N/A
	3.2 (10) Number of Carriers	Article 49-20(1);g	N/A*	N/A
	3.2 (11) Dwell Time	Article 49-20(1);j	N/A*	N/A
	3.2 (6) Spurious Emissions	Article 24 PASS Site	PASS	Site 1
Receiver requirements	3.5 (1) Secondary Radiated Emissions	Article 24, Paragraph 2	PASS	Site 1
	3.4 (1) Interference prevention function	Article 9-4, Item 9-C Article 6-2, Item 3 of the Regulation for Enforcement of the Radio Law	PASS	Site 1

Method of measurement:	MIC Notice No.88 Appendix No.43
Test condition:	Conductive, RF test program provided by the customer was used to control the operating channel as well as the output power level.

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

NOTE 2: "*" N/A is an abbreviation for Not Applicable.

2 Equipment Specification

2.1 General Description

The EUT is 2.4GHz Wi-Fi + BLE Communication Module with 2.4GHz Wi-Fi and BLE function. The TX and RX range of 2.4GHz Wi-Fi is 2412MHz-2484MHz, BLE range is 2402MHz-2480MHz.

This report is for BLE only.

2.2 Technical Data

Description	2.4GHz Wi-Fi + BLE Communication Module
Model	MWB-S-WB01-1A
Brand name	Midea
Ratings	5.0VDC, 500mA, 2.5W
Modulation	GFSK(BLE)
Antenna gain	1.88dBi
Antenna type	PCB antenna

Table 2. Work Frequency

Mode	Work Frequency	
	Transmit Frequency	Receive Frequency
BLE	2402MHz-2480MHz	2402MHz-2480MHz

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).

2.3.2 Test Connections

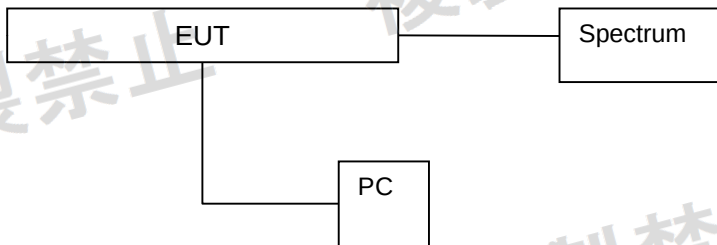


Figure 2. Test Configuration

2.4 Auxiliary Equipment Used during Test

Table 3. Auxiliary Equipment Used during Test

Name	Model	Manufacturer	S/N	Cal Date	Cal Interval (month)
Notebook	X220	Thinkpad	---	---	---

2.5 Lists of Test Instruments

Table 4. Lists of Test Instruments

Description	Manufacturer	Model no.	Equipment ID	Serial no.	cal interval (year)	cal. due date
Signal Analyzer	Rohde & Schwarz	FSV40	68-4-74-14-004	101030	1	2022-6-3

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

Test Item	Uncertainty
Uncertainty for Conducted RF test	RF Power Conducted: 1.31dB Frequency test involved: 0.6×10^{-7} or 1%
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

3 Measurements Result

3.1 Antenna Power

3.1.1 Test condition

Channel:	Low: 2402MHz; Middle: 2440MHz; High: 2480MHz
Test position:	Transmitting
Ambient temperature:	23.1°C
Relative humidity:	49.6%
Atmosphere Pressure:	101.0KPa

3.1.2 Limit (ARIB STD-T66, Clause 3.2 (2)-a)

- 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

Frequency (MHz)	Voltage (VDC)	Reading (dBm)	Result (mW)	Limit (mW)
2402	5.5	3.91	2.459	10
	5.0	3.92	2.465	10
	4.5	3.94	2.476	10
2440	5.5	4.13	2.589	10
	5.0	4.16	2.606	10
	4.5	4.19	2.624	10
2480	5.5	4.03	2.527	10
	5.0	4.04	2.533	10
	4.5	4.03	2.532	10

3.1.4 Result

The equipment met the requirement of this clause.

3.2 Tolerances for Antenna Power

3.2.1 Test condition

Channel:	Low: 2402MHz; Middle: 2440MHz; High: 2480MHz
Test position:	Transmitting
Ambient temperature:	23.1°C
Relative humidity:	49.6%
Atmosphere Pressure:	101.0KPa

3.2.2 Limit (ARIB STD-T66, Clause 3.2 (3))

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

Frequency (MHz)	Voltage (VDC)	Declared Output Power (mW)	Result (mW)	Tolerances	Limit (mW)
2402	5.5	2.6	2.459	-5.42	+20%~-80%
	5.0	2.6	2.465	-5.19	+20%~-80%
	4.5	2.6	2.476	-4.77	+20%~-80%
2440	5.5	2.6	2.589	-0.42	+20%~-80%
	5.0	2.6	2.606	0.23	+20%~-80%
	4.5	2.6	2.624	0.92	+20%~-80%
2480	5.5	2.6	2.527	-2.81	+20%~-80%
	5.0	2.6	2.533	-2.58	+20%~-80%
	4.5	2.6	2.532	-2.62	+20%~-80%
Conclusion: PASS					

Note: Deviation = (Output power – Declared Output Power) / Declared Output Power * 100%

3.2.4 Result

The equipment met the requirement of this clause.

3.3 Frequency Tolerance

3.3.1 Test condition

Channel:	Low: 2402MHz; Middle: 2440MHz; High: 2480MHz
Test position:	Transmitting
Ambient temperature:	23.1°C
Relative humidity:	49.6%
Atmosphere Pressure:	101.0KPa

3.3.2 Limit (ARIB STD-T66, Clause 3.2 (4))

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

3.3.3 Test Result

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

3.3.4 Test Result

Test Frequency (MHz)	Voltage (DC)	Result (MHz)	Tolerance (kHz)	Tolerance (ppm)	Limit (ppm)
2402	5.5	2401.996	4	-1.67	± 50
	5.0	2401.997	3	-1.25	± 50
	4.5	2401.998	2	-0.83	± 50
2440	5.5	2439.995	5	-2.05	± 50
	5.0	2439.997	3	-1.23	± 50
	4.5	2439.996	4	-1.64	± 50
2480	5.5	2479.998	2	-0.81	± 50
	5.0	2479.997	3	-1.21	± 50
	4.5	2479.996	4	-1.61	± 50
Conclusion: PASS					

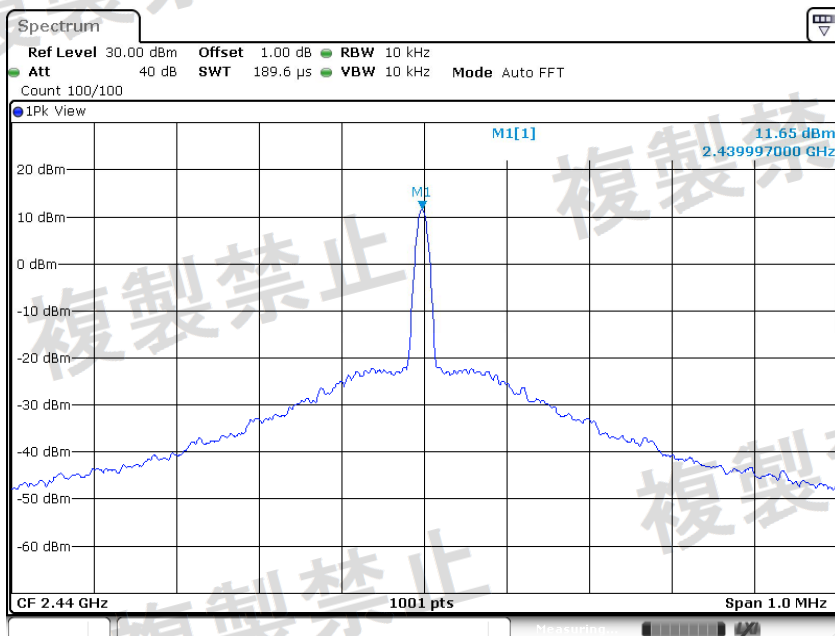
Spectrum

Ref Level 30.00 dBm Offset 1.00 dB RBW 10 kHz
Att 40 dB SWT 189.6 μ s VBW 10 kHz Mode Auto FFT
Count 100/100

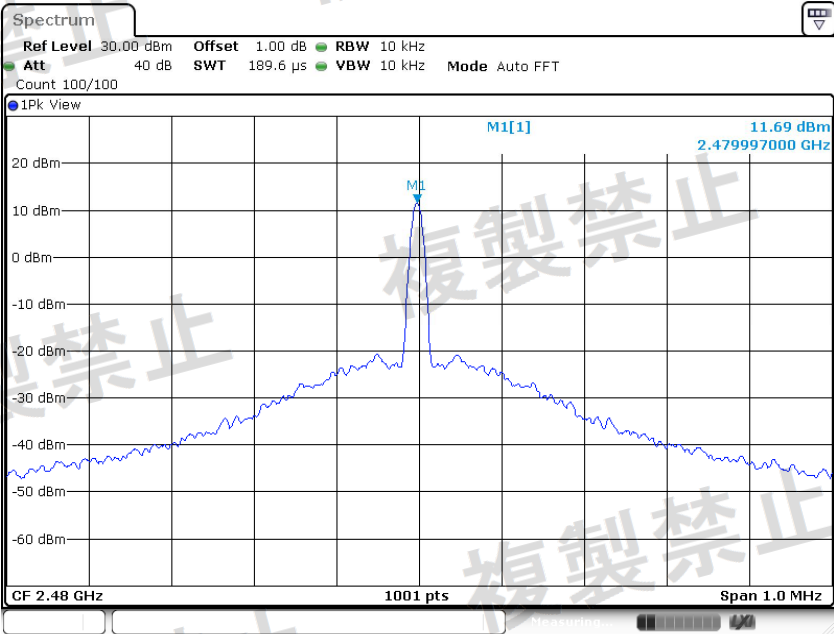
1Pk View

M1[1] 11.75 dBm
2.401997000 GHz

CF 2.402 GHz 1001 pts Span 1.0 MHz



Page 12 of 32



2480MHz

3.3.5 Result

The equipment met the requirement of this clause.

3.4 Occupied Frequency Bandwidth

3.4.1 Test condition

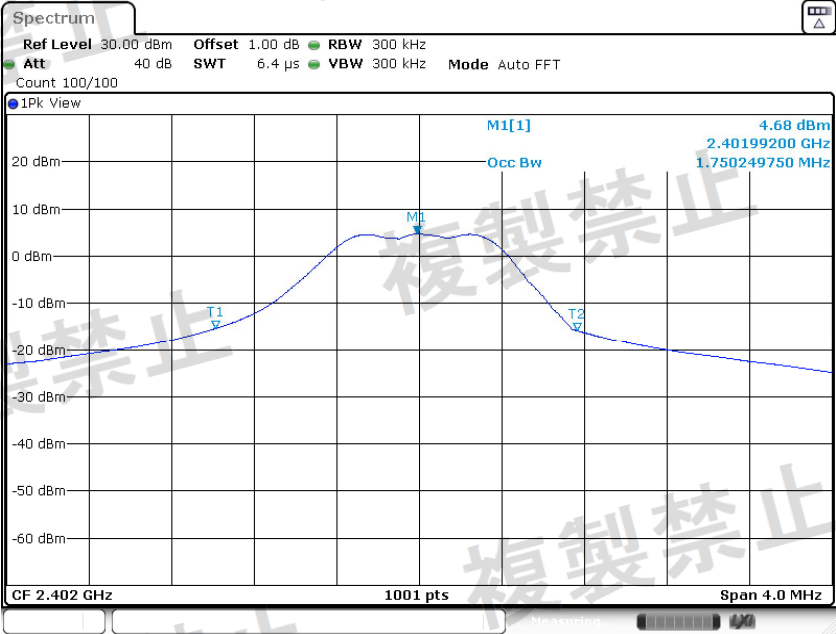
Channel:	Low: 2402MHz; Middle: 2440MHz; High: 2480MHz
Test position:	Transmitting
Ambient temperature:	23.1°C
Relative humidity:	49.6%
Atmosphere Pressure:	101.0KPa

3.4.2 Limit (ARIB STD-T66, Clause 3.2 (7))

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 system other than any of the above shall be 26 MHz or less.

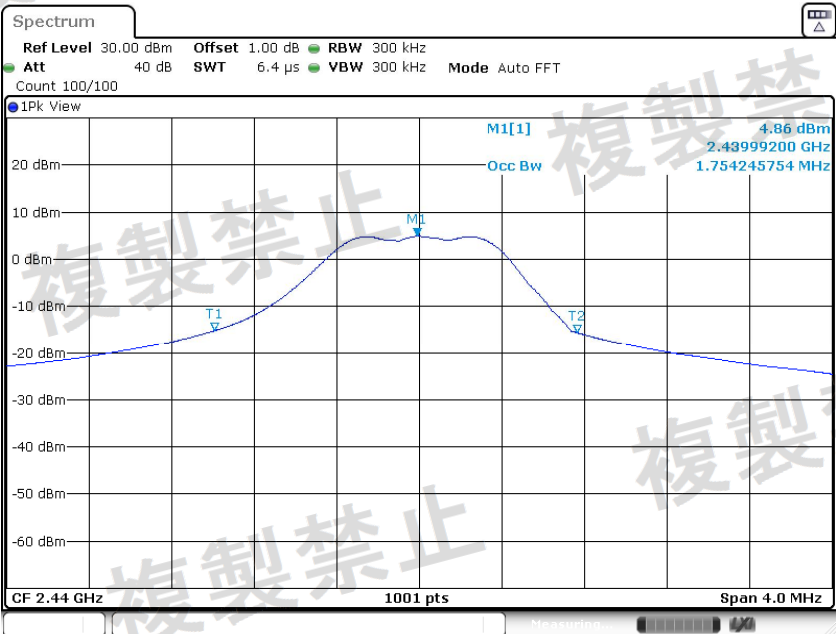
3.4.3 Test Result

Test Frequency (MHz)	Voltage (DC)	Result (KHz)	Limit (MHz)
2402	5.5	1742	<26MHz
	5.0	1750	<26MHz
	4.5	1758	<26MHz
2440	5.5	1766	<26MHz
	5.0	1754	<26MHz
	4.5	1742	<26MHz
2480	5.5	1754	<26MHz
	5.0	1758	<26MHz
	4.5	1750	<26MHz



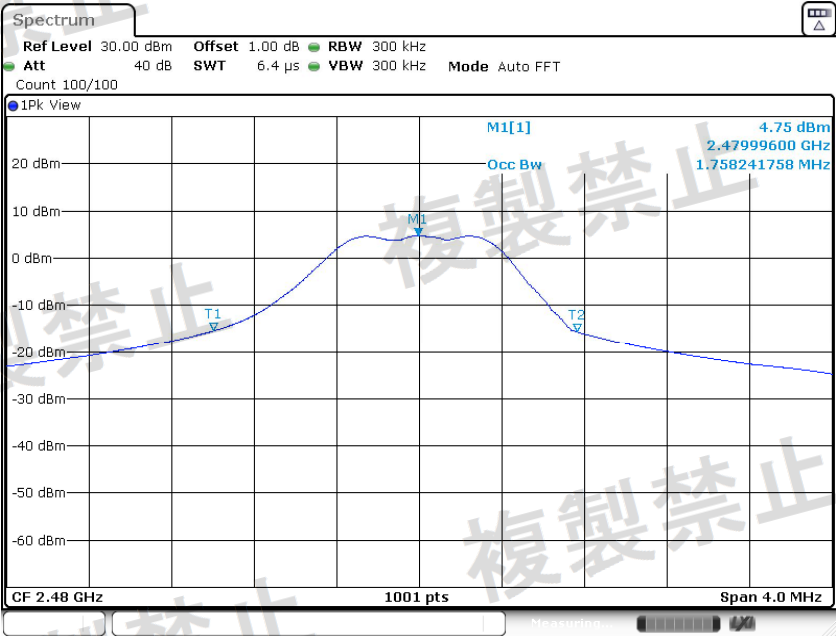
Date: 27.MAY.2022 11:03:22

2402MHz



Date: 27.MAY.2022 11:11:20

2440MHz



Date: 27 MAY 2022 11:15:42

2480MHz

3.4.4 Result

The equipment met the requirement of this clause.

3.5 Spread Bandwidth

3.5.1 Test condition

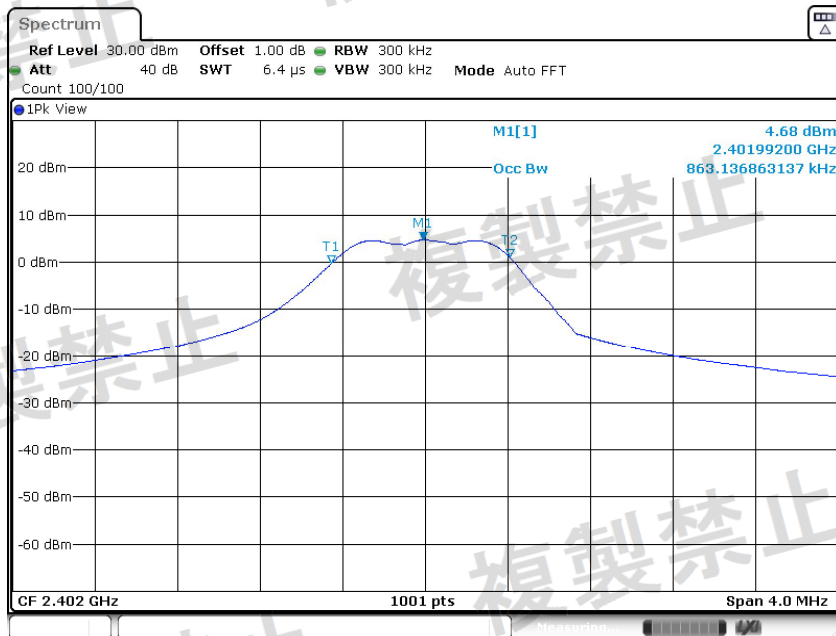
Channel:	Low: 2402MHz; Middle: 2440MHz; High: 2480MHz
Test position:	Transmitting
Ambient temperature:	23.1°C
Relative humidity:	49.6%
Atmosphere Pressure:	101.0KPa

3.5.2 Limit (ARIB STD-T66, Clause 3.2 (8))

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

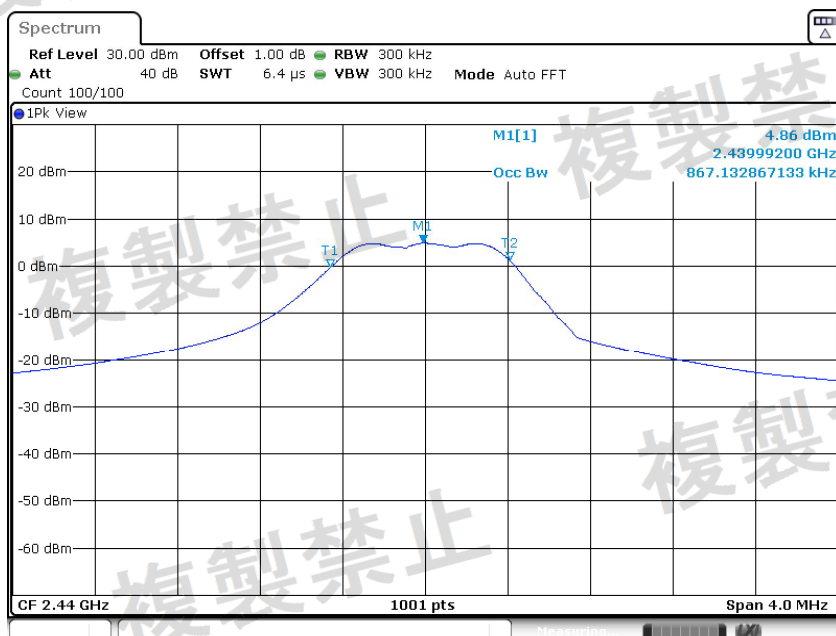
3.5.3 Test Result

Test Frequency (MHz)	Voltage (DC)	Result (kHz)	Limit (kHz)
2402	5.5	862	>500
	5.0	863	>500
	4.5	863	>500
2440	5.5	866	>500
	5.0	867	>500
	4.5	864	>500
2480	5.5	865	>500
	5.0	867	>500
	4.5	866	>500



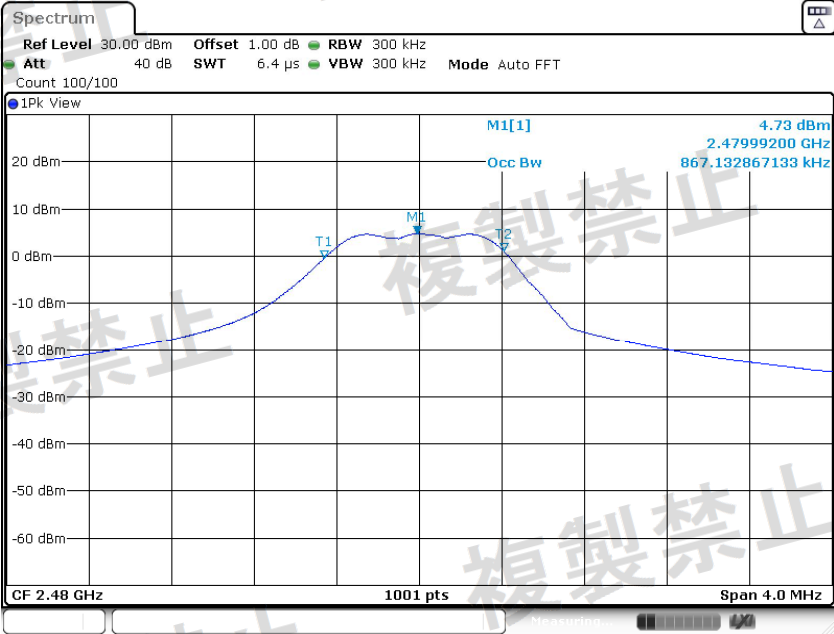
Date: 27.MAY.2022 11:03:56

2402MHz



Date: 27.MAY.2022 11:11:54

2440MHz



Date: 27.MAY.2022 11:16:16

2480MHz

3.5.4 Result

The equipment met the requirement of this clause.

3.6 Transmitter Spurious Emissions (Conducted) (For transmitter)

3.6.1 Test condition

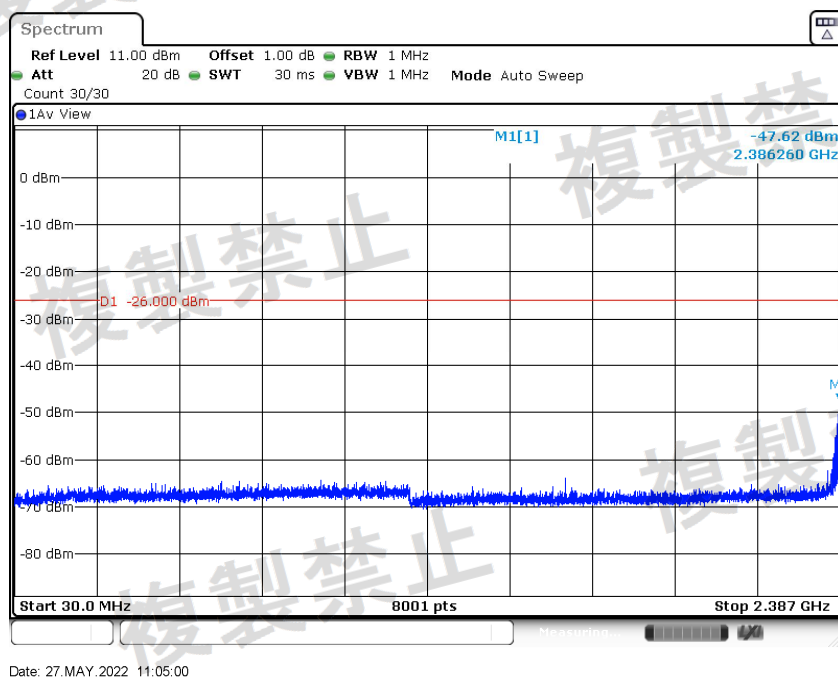
Channel:	Low: 2402MHz; Middle: 2440MHz; High: 2480MHz
Test position:	Transmitting
Ambient temperature:	23.1°C
Relative humidity:	49.6%
Atmosphere Pressure:	101.0KPa

3.6.2 Limit (ARIB STD-T66, Clause 3.2 (6))

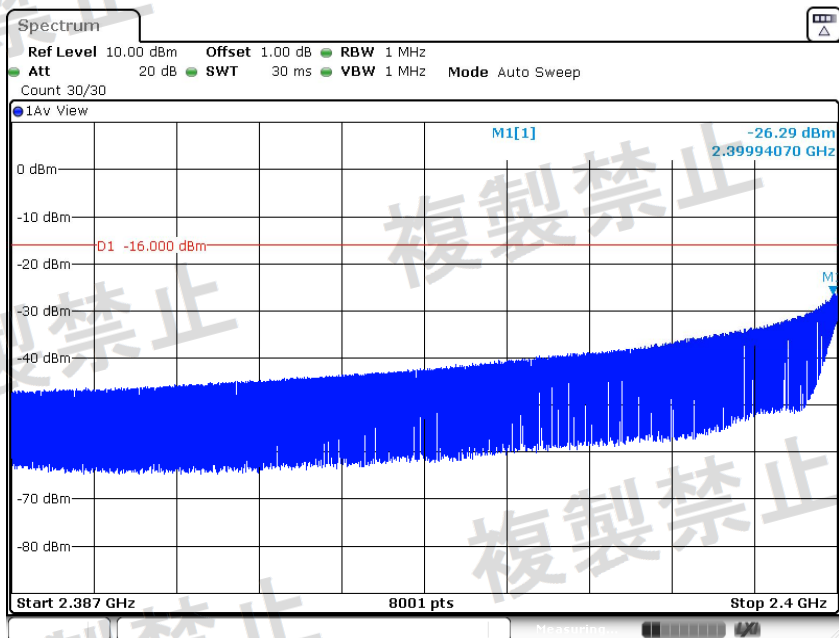
Permissible mean power of spurious emission of each frequency supplied to a feeder, that is, mean power of spurious emission in the 1 MHz bandwidth at frequency f other than frequency band used shall be as follows: a. $2,387\text{MHz} \leq f \leq 2,400\text{MHz}$ and $2,483.5\text{MHz} < f \leq 2,496.5\text{MHz}$ 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

2402MHz:

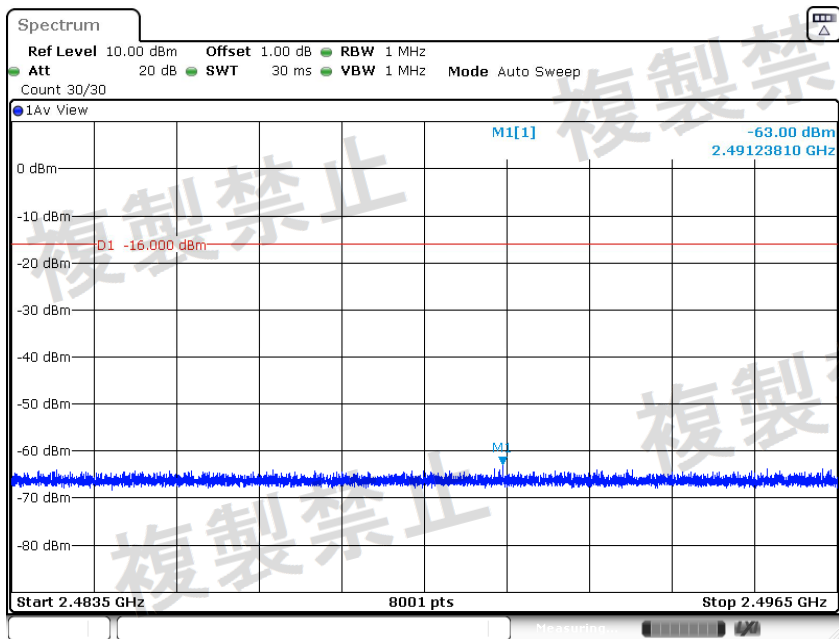


30MHz – 2.387GHz



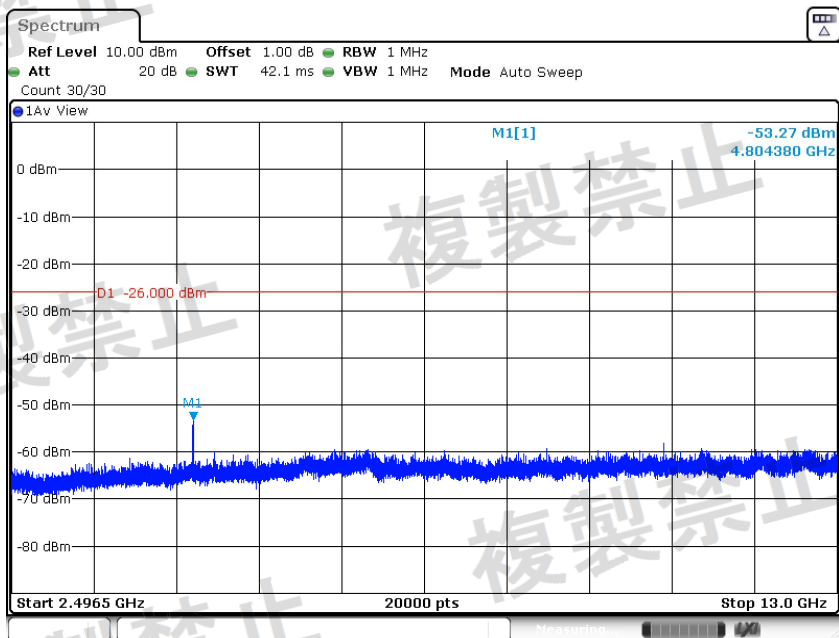
Date: 27 MAY 2022 11:05:10

2.387GHz – 2.4GHz



Date: 27 MAY 2022 11:05:21

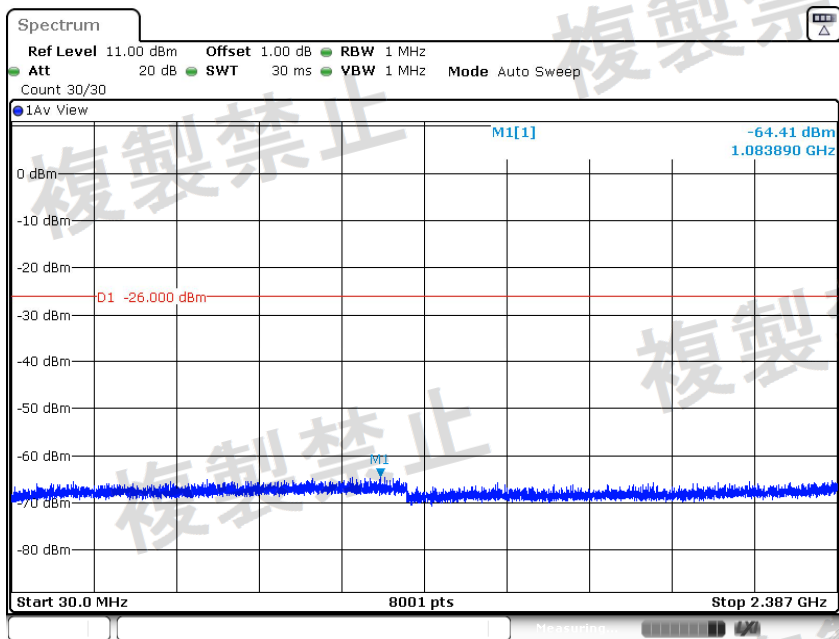
2.4835GHz – 2.4965GHz



Date: 27 MAY 2022 11:05:31

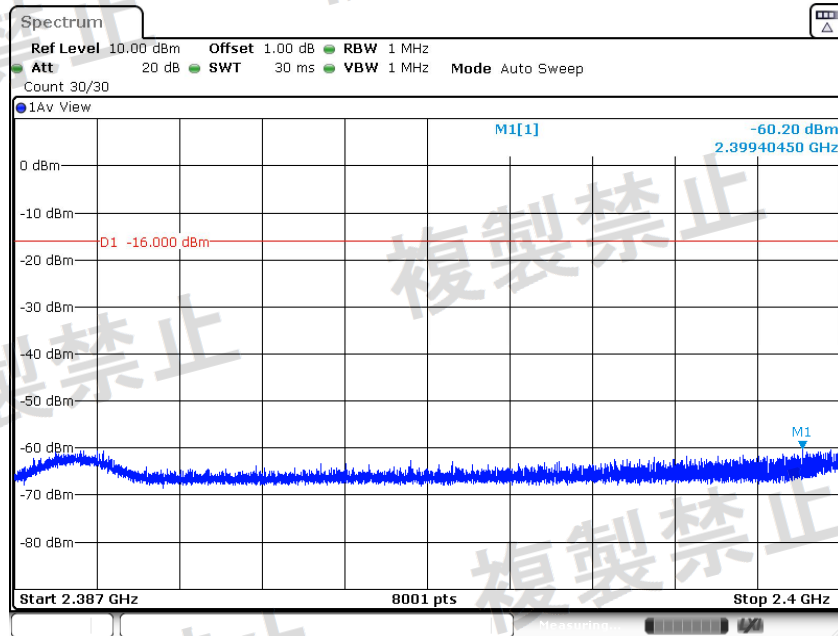
2.4965GHz – 13GHz

2440MHz:



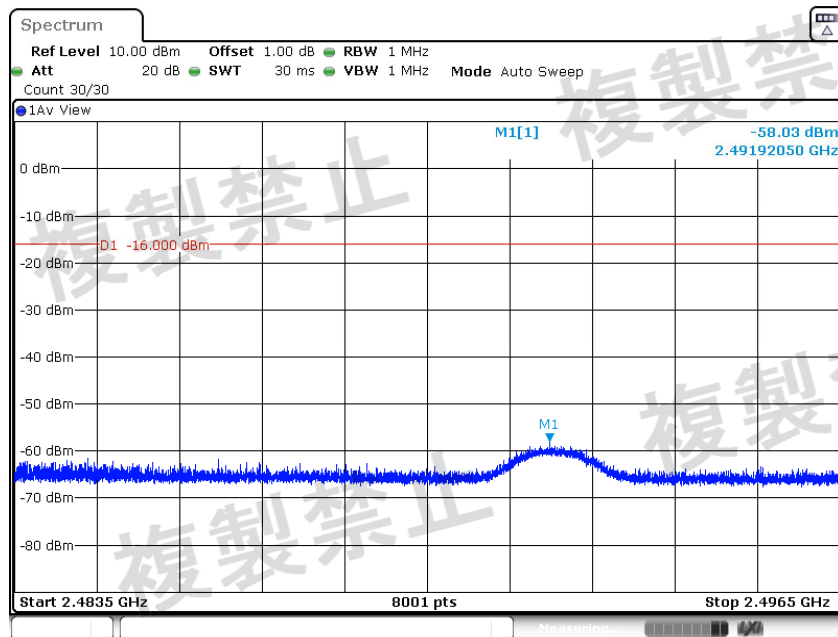
Date: 27 MAY 2022 11:12:59

30MHz – 2.387GHz



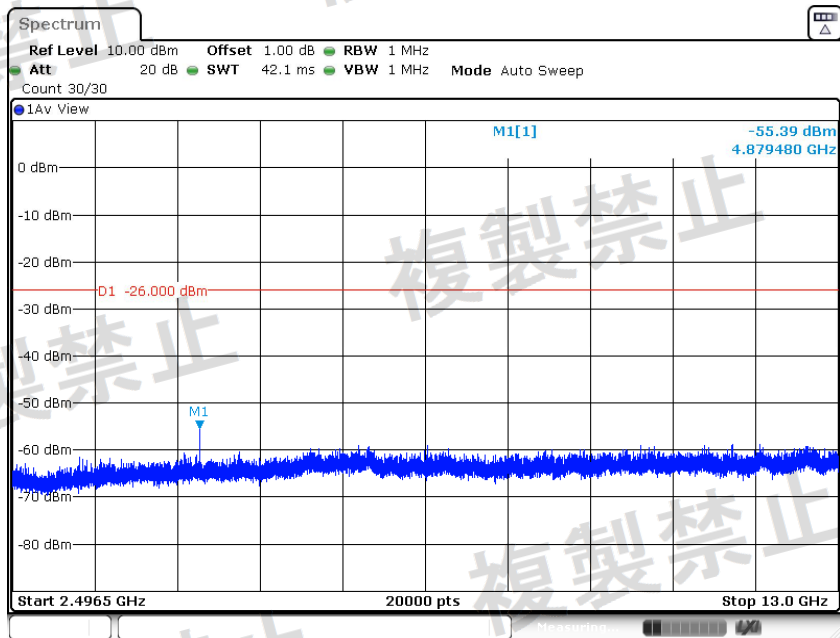
Date: 27.MAY.2022 11:13:08

2.387GHz – 2.4GHz



Date: 27.MAY.2022 11:13:19

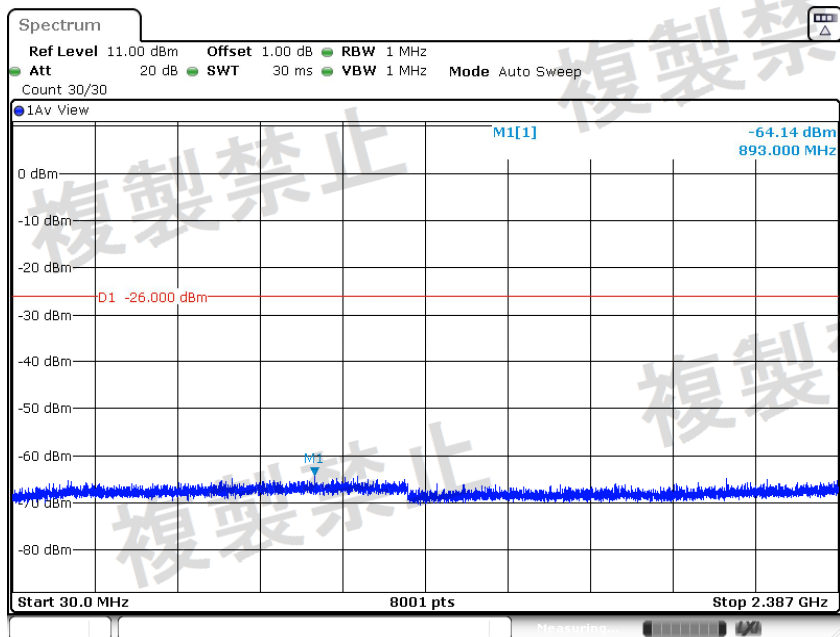
2.4835GHz – 2.4965GHz



Date: 27.MAY.2022 11:13:30

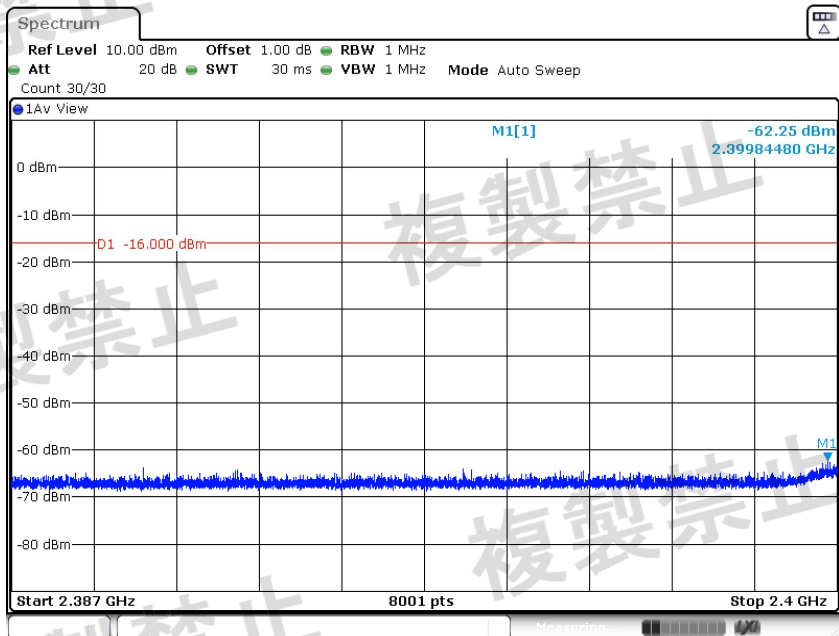
2.4965GHz – 13GHz

2480MHz:



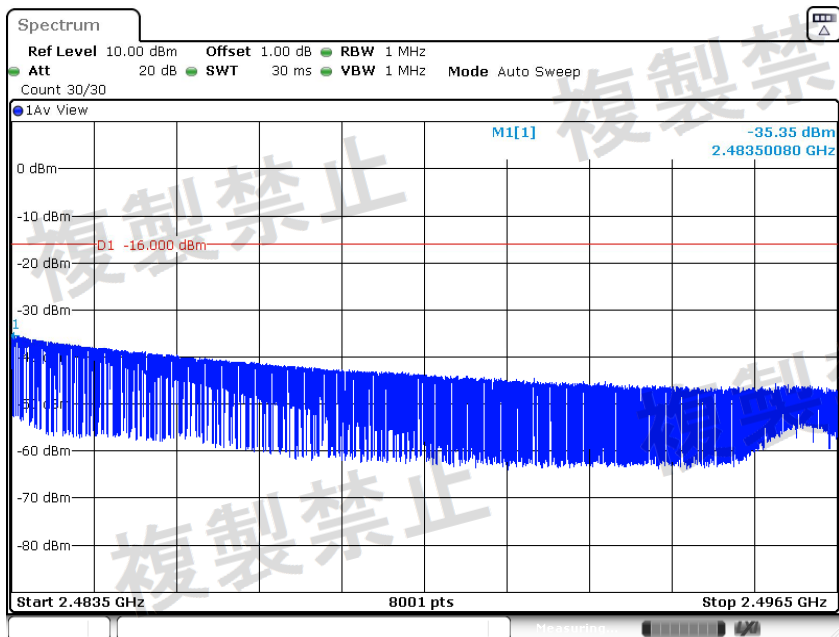
Date: 27.MAY.2022 11:17:21

30MHz – 2.387GHz



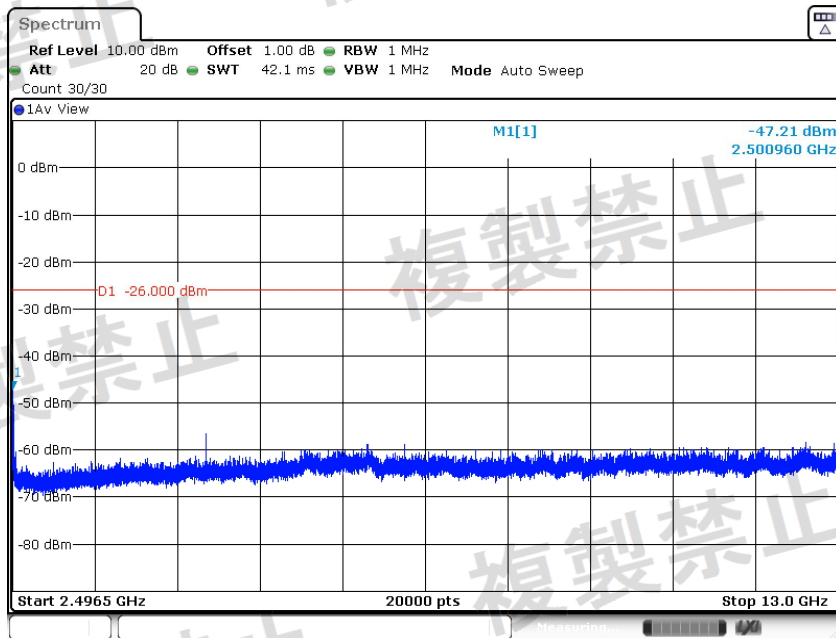
Date: 27 MAY 2022 11:17:30

2.387GHz – 2.4GHz



Date: 27 MAY 2022 11:17:41

2.4835GHz – 2.4965GHz



Date: 27.MAY.2022 11:17:52

2.4965GHz – 13GHz

3.6.4 Result

The equipment met the requirement of this clause.

3.7 Secondary Radiated Emissions (Conducted) (For receiver)

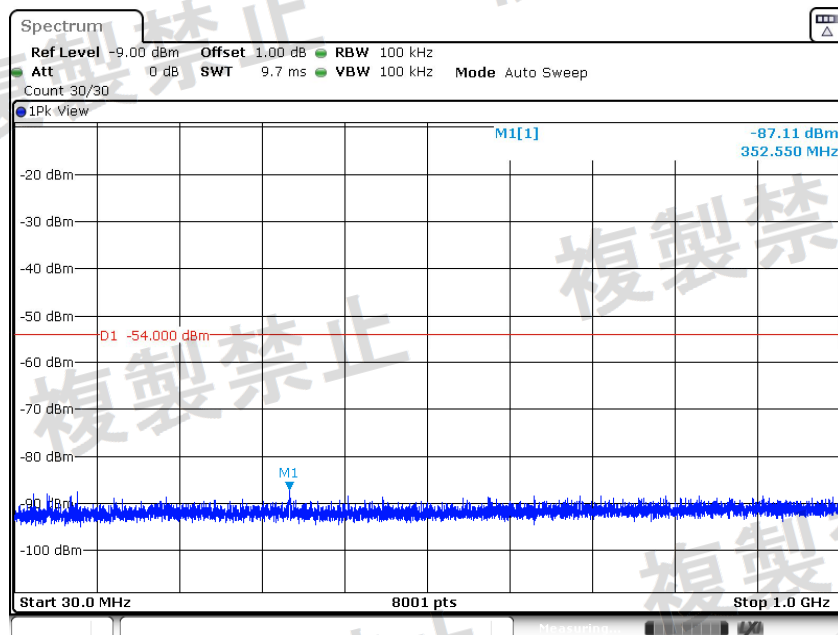
3.7.1 Test condition

Test position:	RX
Ambient temperature:	23.1°C
Relative humidity:	49.6%
Atmosphere Pressure:	101.0KPa

3.7.2 Limit (ARIB STD-T66, Clause 3.5 (1))

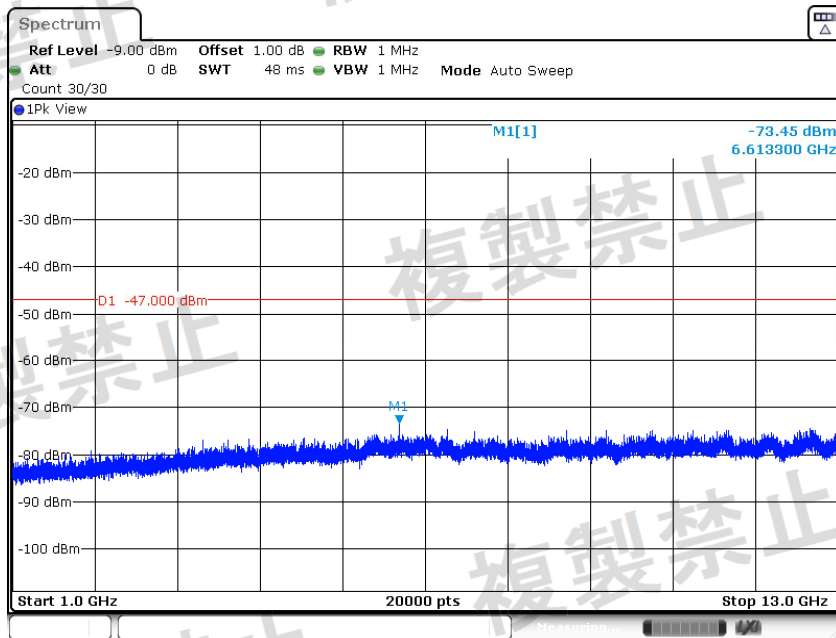
The limit on secondary emissions radiated from the receiving equipment within which the function of other radio equipment will not be impaired shall be, in terms of the power of a dummy antenna circuit that has the same electrical constant as the receiving antenna, 4 nW or less at a frequency below 1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

3.7.3 Test Result



Date: 27 MAY 2022 11:19:52

30MHz – 1GHz



Date: 27.MAY.2022 11:20:03

1GHZ – 13GHz

3.7.4 Result

The equipment met the requirement of this clause.

3.8 Interference prevention function

3.8.1 Test condition

Test position:	Transmitting
Ambient temperature:	23.1°C
Relative humidity:	49.6%
Atmosphere Pressure:	101.0KPa

3.8.2 Limit

Item	Limits
Identification Code	≥48 bits

Measured Result:

Test Conditions	Operation Frequency		
	2402 MHz	2440 MHz	2480 MHz
Normal Voltage (5.0V)	48	48	48
Extreme Voltage (4.5V)	48	48	48
Extreme Voltage (5.5V)	48	48	48

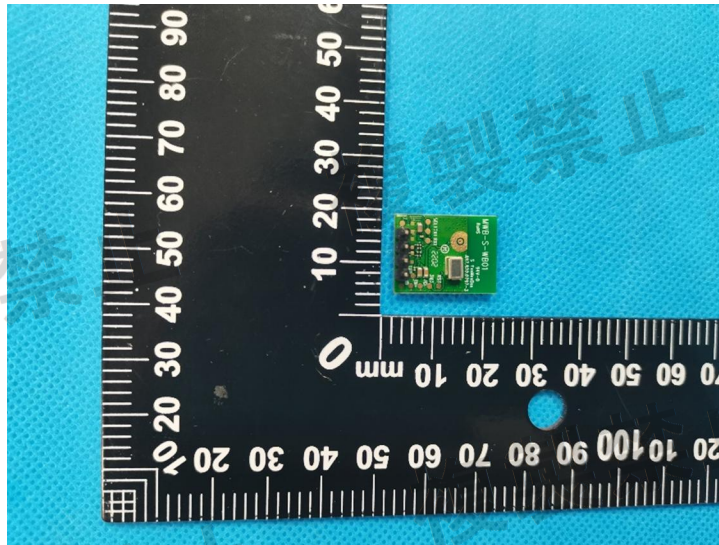
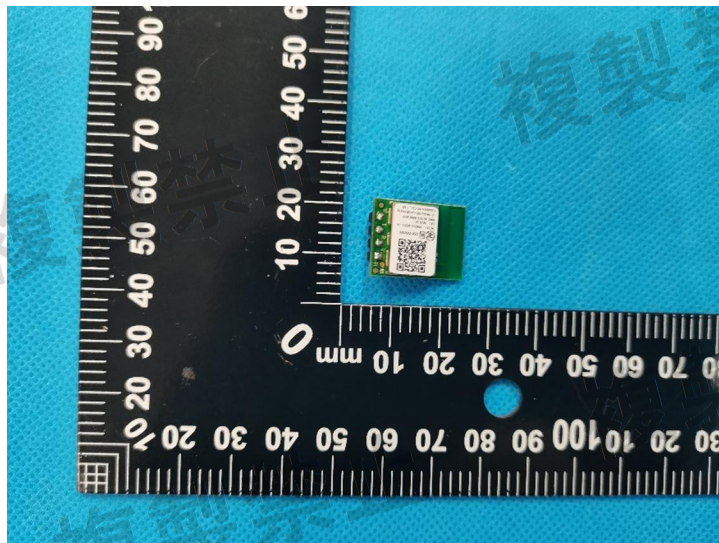
3.8.3 Result

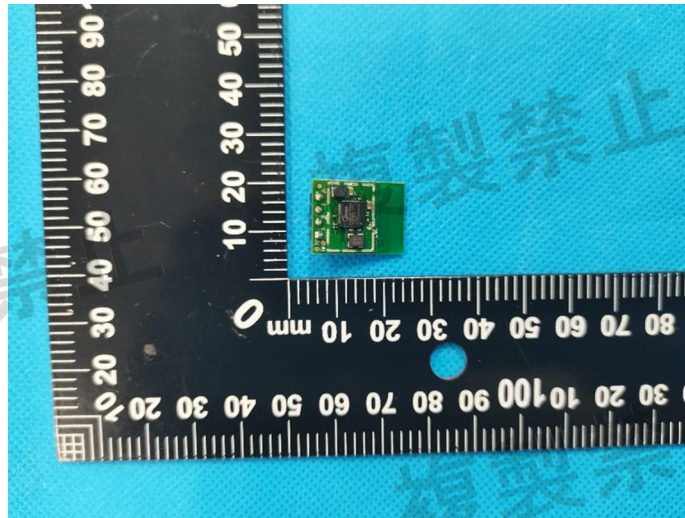
The equipment met the requirement of this clause.

4 Photographs of Test Set-ups



5 Photographs of EUT





---THE END OF REPORT---