

Japan - TEST REPORT

Report Number : **68.950.19.0128.01** Date of Issue: **May 05, 2019**

Model : **AP7060DN**

Product Type : **Wireless LAN Access Point**

Applicant : **Huawei Technologies Co., Ltd.**

Address : **Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District**
518129 Shenzhen, PEOPLE'S REPUBLIC OF CHINA

Production Facility : **Huawei Technologies Co., Ltd.**

Address : **Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District**
518129 Shenzhen, PEOPLE'S REPUBLIC OF CHINA

Test Result : ☒ **Positive** ☐ **Negative**

Total pages including Appendices : **29**

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1 General Information

1.1 Notes

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

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Prepared by
Project Engineer



2019-05-05

Date

Vincent zheng

Name

Signature

Approved by
Project Manager

2019-05-05

Date

Cookies Bu

Name

Signature

1.2 Testing Laboratory

Address of Test Laboratory:

Site 1 :

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

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1.3 Details of Applicant

Applicant: Huawei Technologies Co., Ltd.

Address: Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian,
Longgang District, 518129 Shenzhen, PEOPLE'S REPUBLIC OF CHINA

Product Description: Wireless LAN Access Point

Manufacturers Model No.: AP7060DN

1.4 Application Details

Date of receipt of order:	March 25,2019
Date of receipt of test item:	March 25,2019
Date of test:	April 25,2019

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 Article	Result
Essential parameter	Corresponding technical requirements		
Transmitter requirements	3.2 (2) Antenna Power	Article 14	PASS
	3.2 (3) Tolerances for Antenna Power	Article 14	PASS
	3.2 (4) Frequency Tolerance	Article 5, Table 1	PASS
	3.2 (5) Transmission Rate	Article 6, Table 2 & Article 49-20, Item1-h & 1-i	N/A*
	3.2 (7) Occupied Frequency Bandwidth	Article 6, Table 2 & Article 49-20, Item1-h & 1-i	PASS
	3.2 (8) Spread Bandwidth	Article 6, Table 2 & Article 49-20, Item1-h & 1-i	PASS
	3.2 (9) Process gain	Article 49-20(1);f(1)	N/A**
	3.2 (10) Number of Carriers	Article 49-20(1);g	N/A*
	3.2 (11) Dwell Time	Article 49-20(1);j	N/A*
	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
	3.2 (6) Spurious Emissions	Article 24	PASS
Receiver requirements	3.5 (1) Secondary Radiated Emissions	Article 24, Paragraph 2	PASS

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

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

NOTE 3: "**BLE is special and it is not DS, not HS, so it is others. "Transmission Rate" & "Process gain" is Not Applicable"

2 Equipment Specification

2.1 General Description

AP7060DN is a Wireless LAN Access Point with Bluetooth LE, 2.4 GHz Wi-Fi, 5G Wi-Fi

This report is for Bluetooth LE only.

2.2 Technical Data

Description	Wireless LAN Access Point
Model	AP7060DN
Operation frequency	802.11b: 2412MHz-2472MHz
	802.11g: 2412MHz-2472MHz
	802.11n HT20, HT40: 2412MHz-2472MHz
	802.11ax20, ax40: 2412MHz-2472MHz
	802.11a 20MHz, 802.11n 20MHz, 802.11ac/ax 20MHz
	W52: 5180MHz - 5240MHz, W53: 5260MHz - 5320MHz,
	W56: 5500MHz - 5700MHz
	802.11n 40MHz, 802.11ac/ax 40MHz
	W52: 5190MHz - 5230MHz, W53: 5270MHz - 5310MHz
	W56: 5510MHz - 5670MHz
	802.11ac/ax 80MHz
	W52: 5210MHz, W53: 5290MHz, W56: 5530MHz-5610MHz
WIFI Antenna type	802.11ac/ax 80MHz + 80MHz means two arbitrary (non-adjacent channel) channels of 80MHz bandwidth signal which combined to a signal of 160MHz bandwidth.
	802.11ac 160MHz means two arbitrary (adjacent channel) channels of 80MHz bandwidth signal which combined to a signal of 160MHz bandwidth.
	Built-in dual-band combined antenna
	Built-in dual-band combined antenna 2.4G/5G: 4 dBi/2 dBi
BT Antenna type	2.4G/5G: 4 dBi/2 dBi
Antenna gain	Beamforming gain: 9dBi
Smart Antenna System	MIMO, MIMO+Beamforming
Channel rate supported	802.11b: 1, 2, 5.5, and 11 Mbit/s
	802.11a/g: 6, 9, 12, 18, 24, 36, 48, and 54 Mbit/s
	802.11n: 6.5 to 800 Mbit/s
	802.11ac wave2: 6.5 to 1733.3 Mbit/s
Rated Input	802.11ax wave2: 6.5 to 1733.3 Mbit/s
	DC 48V from external AC Adapter
Modulation	DC 48V from PoE power supply
	DSSS, OFDM

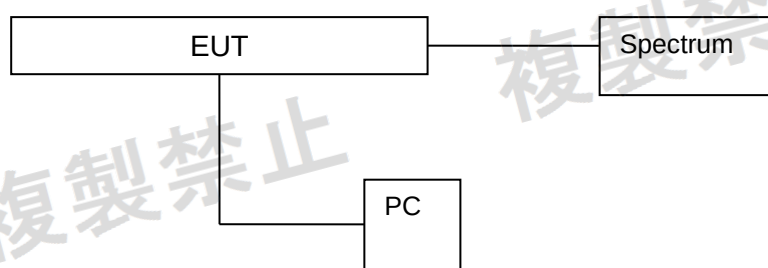
2.3 Test conditions and test Connections

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 external POE adapter, so $\pm 10\%$ of the rated voltage test is not required. 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	X240	LENOVO	---	---

2.5 Lists of Test Instruments

Table 4. Lists of Test Instruments

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Vector Signal Generator	Rohde & Schwarz	SMBV100A	262825	2019-7-6
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2019-7-6
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	101226/100851	2019-7-6
Power Splitter	Weinschel	1580	SC319	2019-7-5
10dB Attenuator	Weinschel	4M-10	43152	2019-7-6
10dB Attenuator	R&S	DNF	DNF-001	2019-7-6
10dB Attenuator	R&S	DNF	DNF-002	2019-7-6
10dB Attenuator	R&S	DNF	DNF-003	2019-7-6
10dB Attenuator	R&S	DNF	DNF-004	2019-7-6
Test software	Tonscend	System for BT/WIFI	Version 2.6	N/A

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

Test Item	Uncertainty
Uncertainty for Conducted RF test	RF Power Conducted: 1.16dB 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

Date of testing:	March 15, 2019
Channel:	Low: 2402MHz; Middle: 2440MHz; High: 2480MHz
Test position:	Transmitting
Ambient temperature:	22.4 °C
Relative humidity:	58.9 %
Atmosphere Pressure:	101.5 KPa

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

- 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.
- b. 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 (mW)	Result A (mW)	Limit (mW)
2402	48VDC	-1.94	0.64	10
2440	48VDC	0.04	1.01	10
2480	48VDC	-1.08	0.78	10

3.1.4 Result

The equipment met the requirement of this clause.

3.2 Tolerances for Antenna Power

3.2.1 Test condition

Date of testing:	March 15, 2019
Channel:	Low: 2402MHz; Middle: 2440MHz; High: 2480MHz
Test position:	Transmitting
Ambient temperature:	22.4 °C
Relative humidity:	58.9 %
Atmosphere Pressure:	101.5 KPa

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	48VDC	1	0.64	-35.51	+20%~-80%
2440	48VDC	1	1.01	1.00	+20%~-80%
2480	48VDC	1	0.78	-22.11	+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

Date of testing:	March 15, 2019
Channel:	Low: 2402MHz; Middle: 2440MHz; High: 2480MHz
Test position:	Transmitting
Ambient temperature:	22.4 °C
Relative humidity:	58.9 %
Atmosphere Pressure:	101.5 KPa

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

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

3.3.3 Test Result

Test Frequency (MHz)	Voltage (VDC)	Result (KHz)	Tolerance (KHz)	Tolerance (ppm)	Limit (ppm)
2402	48VDC	2402014	14	5.828	± 50
2440	48VDC	2440009	9	3.689	± 50
2480	48VDC	2480012	12	4.839	± 50
Conclusion: PASS					

3.3.4 Result

The equipment met the requirement of this clause.

3.4 Occupied Frequency Bandwidth

3.4.1 Test condition

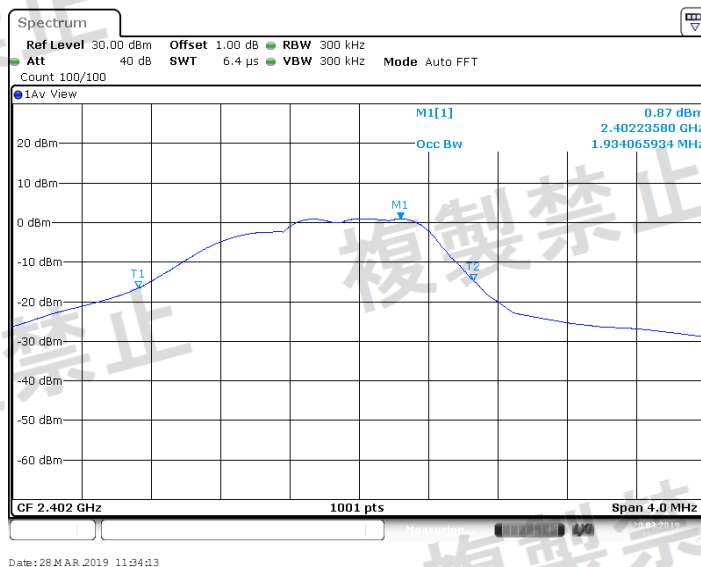
Date of testing:	March 15, 2019
Channel:	Low: 2402MHz; Middle: 2440MHz; High: 2480MHz
Test position:	Transmitting
Ambient temperature:	22.4 °C
Relative humidity:	58.9 %
Atmosphere Pressure:	101.5 KPa

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

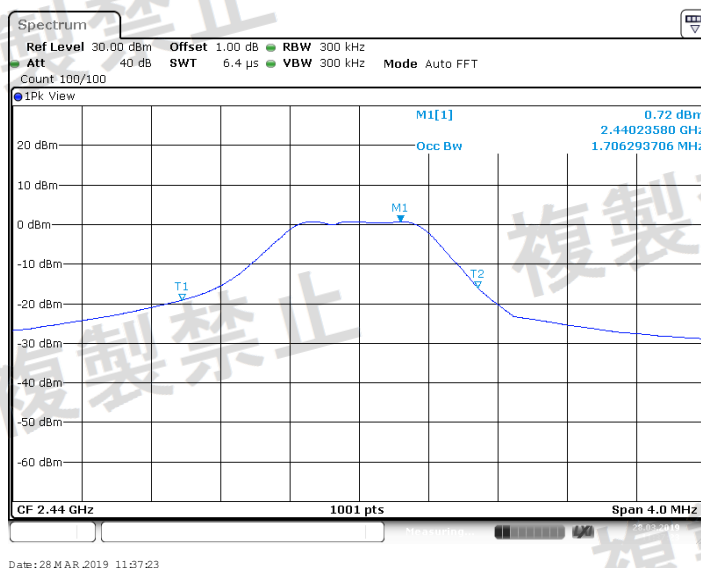
Permissible value for occupied bandwidth using the FH system, a hybrid system combining DS and FH systems, or a hybrid system combining FH and OFDM systems shall be 83.5 MHz or less, while necessary bandwidth (minimum occupied bandwidth sufficient to ensure information transmission of required quality 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

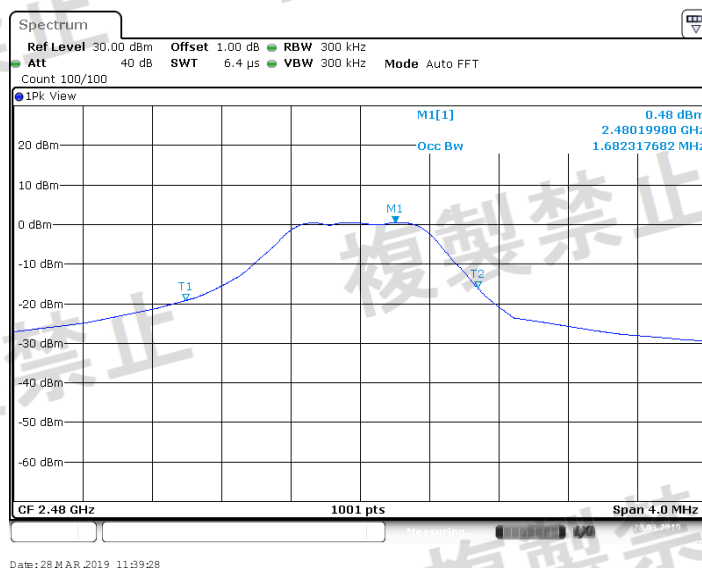
Test Frequency (MHz)	Voltage (VDC)	Result (MHz)	Limit (MHz)
2402	48VDC	1.934	<26MHz
2440	48VDC	1.706	<26MHz
2480	48VDC	1.682	<26MHz



2402MHz



2440MHz



2480MHz

3.4.4 Result

The equipment met the requirement of this clause.

3.5 Spread Bandwidth

3.5.1 Test condition

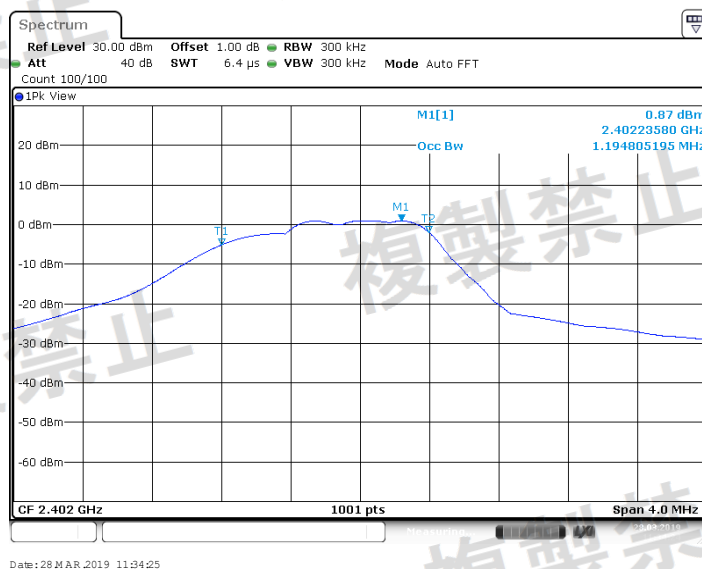
Date of testing:	March 15, 2019
Channel:	Low: 2402MHz; Middle: 2440MHz; High: 2480MHz
Test position:	Transmitting
Ambient temperature:	22.4 °C
Relative humidity:	58.9 %
Atmosphere Pressure:	101.5 KPa

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

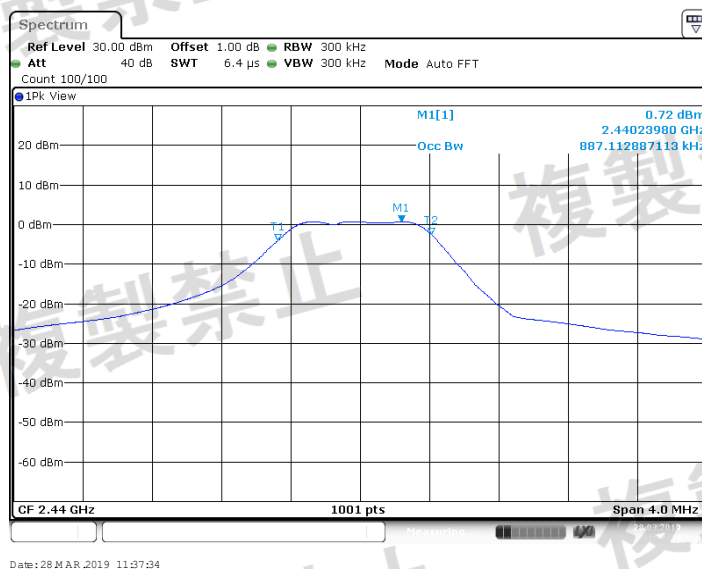
In spread spectrum systems, spread bandwidth (which refers to a frequency bandwidth with an upper limit and lower limit such that each of the mean powers radiated above the upper frequency limit and below the lower frequency limit is equal to 5 % of the total mean power radiated; this also applies hereafter)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

3.5.3 Test Result

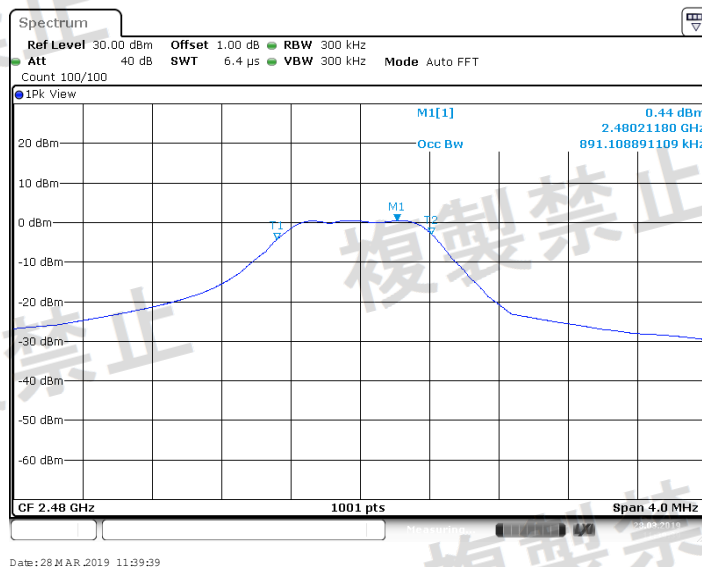
Test Frequency (MHz)	Voltage (VDC)	Result (kHz)	Limit (kHz)
2402	48VDC	1.195	>500
2440	48VDC	0.887	>500
2480	48VDC	0.891	>500



2402MHz



2440MHz



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

Date of testing:	March 15, 2019
Channel:	Low: 2402MHz; Middle: 2440MHz; High: 2480MHz
Test position:	Transmitting
Ambient temperature:	22.4 °C
Relative humidity:	58.9 %
Atmosphere Pressure:	101.5 KPa

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

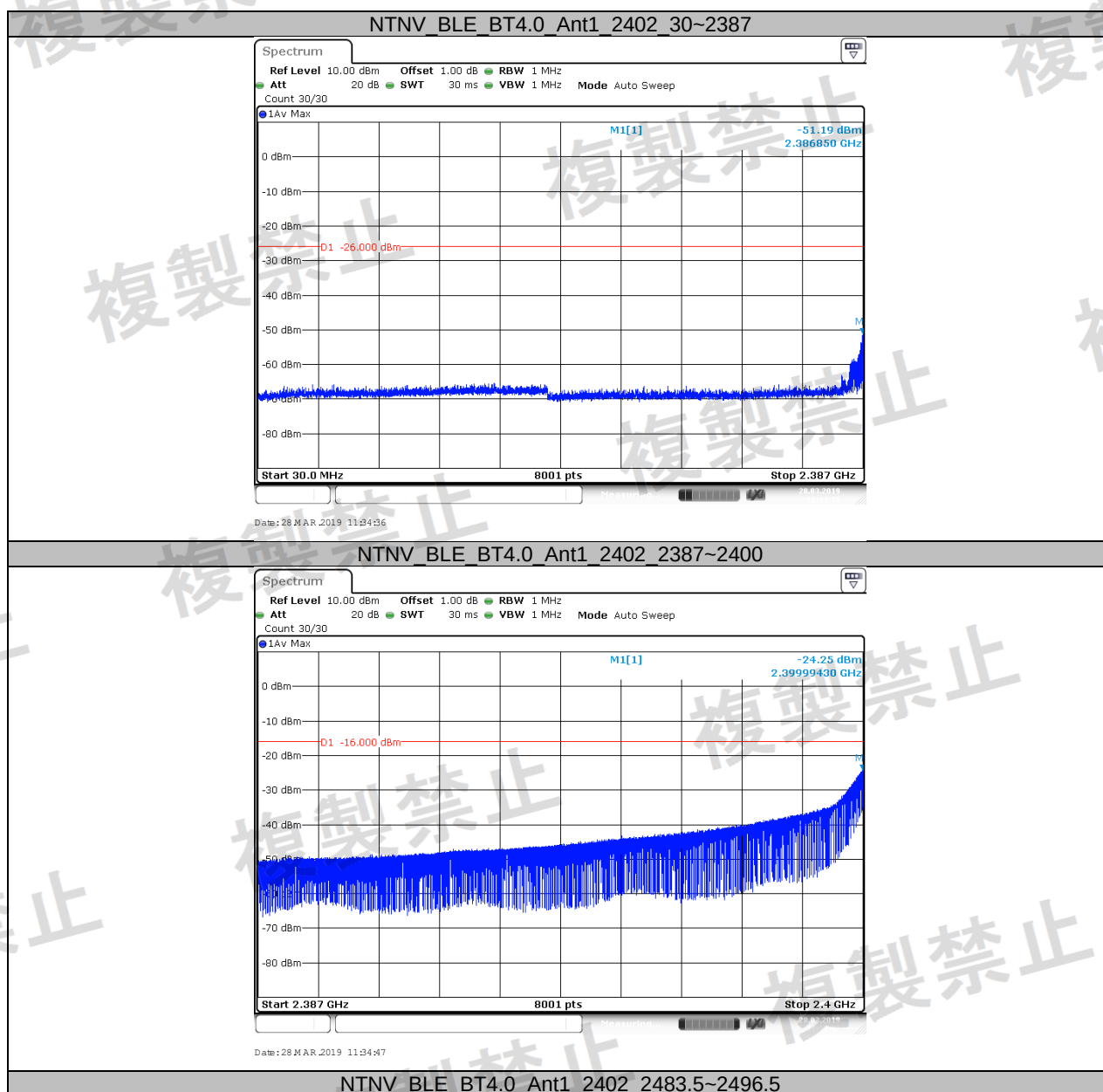
3.6.3 Test Result

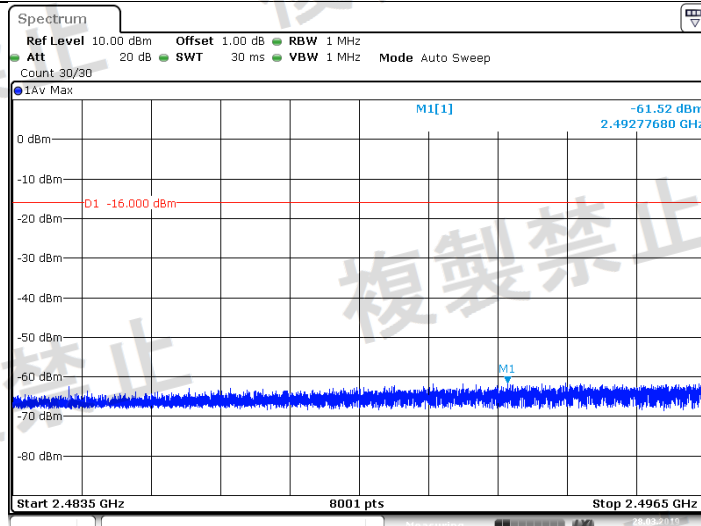
Test Condition	Test Mode	Channel	Freq., Range	Result	Limit	Verdict
NTNV	BLE	2402	30~2387	-51.19	-26	PASS
NTNV	BLE	2402	2387~2400	-24.25	-16	PASS
NTNV	BLE	2402	2483.5~2496.5	-61.52	-16	PASS
NTNV	BLE	2402	2496.5~13000	-59.18	-26	PASS
NTNV	BLE	2440	30~2387	-58.84	-26	PASS
NTNV	BLE	2440	2387~2400	-57.06	-16	PASS
NTNV	BLE	2440	2483.5~2496.5	-57	-16	PASS
NTNV	BLE	2440	2496.5~13000	-54.66	-26	PASS
NTNV	BLE	2480	30~2387	-62.34	-26	PASS
NTNV	BLE	2480	2387~2400	-61.15	-16	PASS
NTNV	BLE	2480	2483.5~2496.5	-39.94	-16	PASS
NTNV	BLE	2480	2496.5~13000	-50.42	-26	PASS
NTNV	BLE	2402	30~2387	-51.19	-26	PASS
NTNV	BLE	2402	2387~2400	-24.25	-16	PASS
NTNV	BLE	2402	2483.5~2496.5	-61.52	-16	PASS

3.6.4 Result

The equipment met the requirement of this clause.

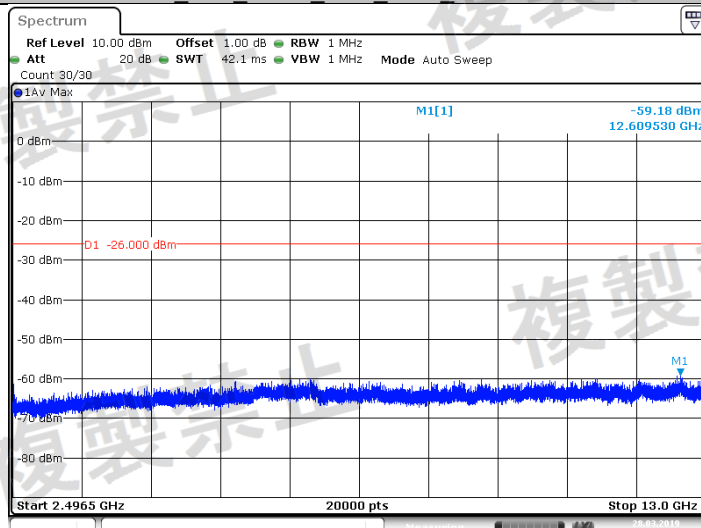
3.6.5 Test Graphs





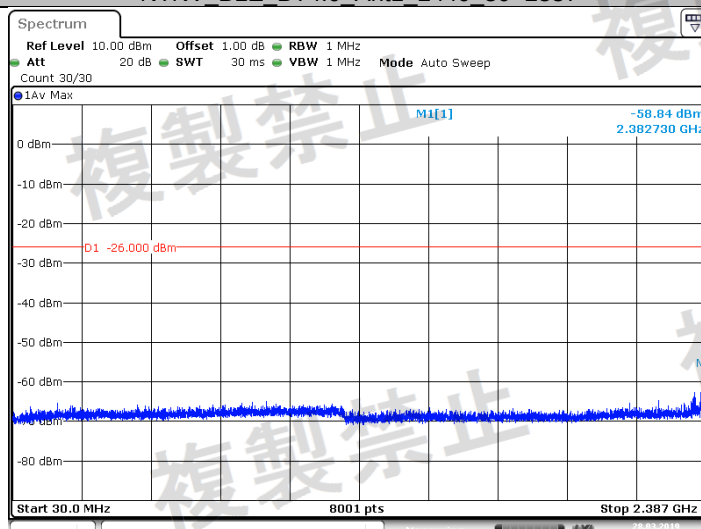
Date: 28 MAR 2019 11:35:02

NTNV_BLE_BT4.0_Ant1_2402_2496.5~13000



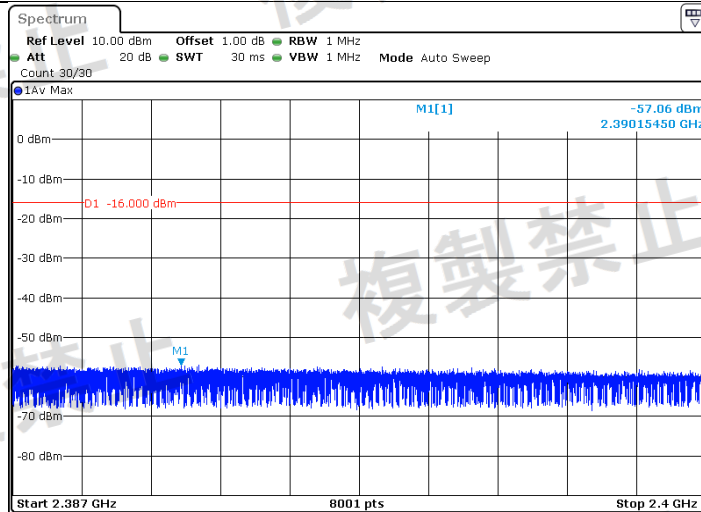
Date: 28 MAR 2019 11:35:13

NTNV_BLE_BT4.0_Ant1_2440_30~2387



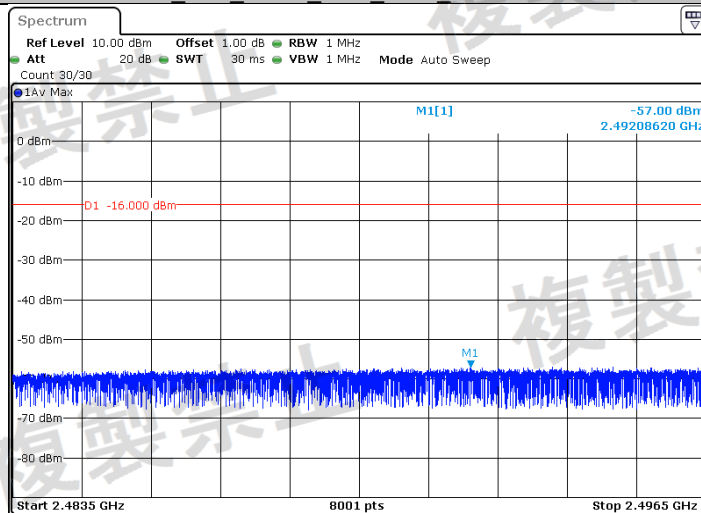
Date: 28 MAR 2019 11:37:45

NTNV_BLE_BT4.0_Ant1_2440_2387~2400



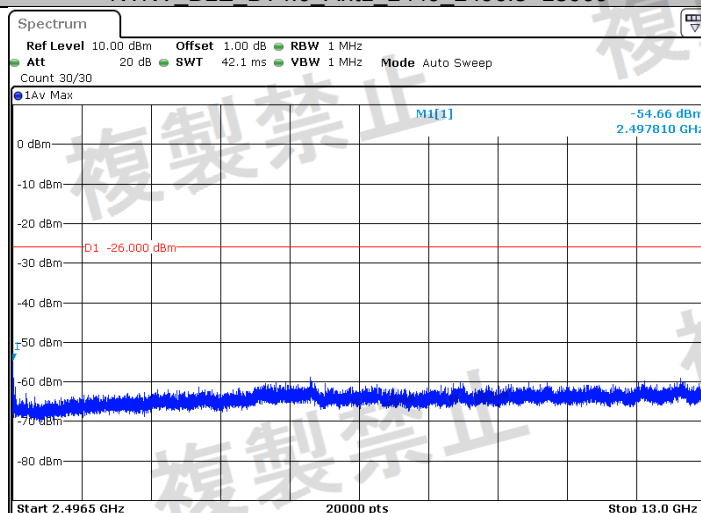
Date: 28 MAR 2019 11:37:56

NTNV_BLE_BT4.0_Ant1_2440_2483.5~2496.5



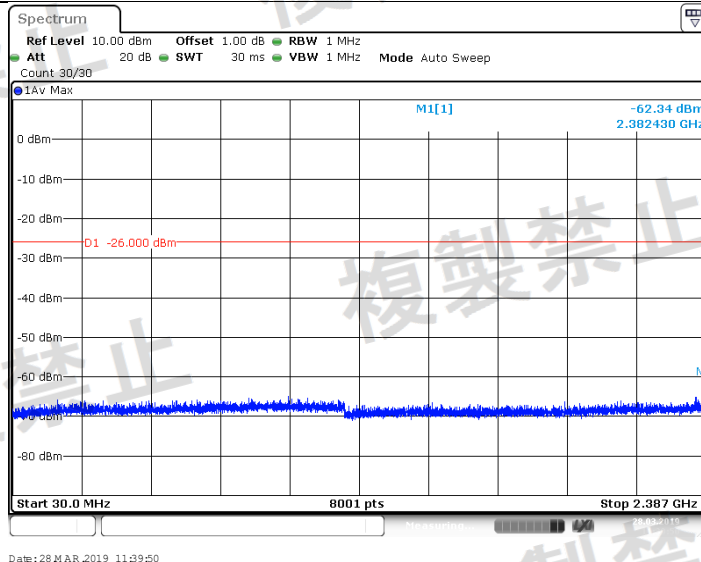
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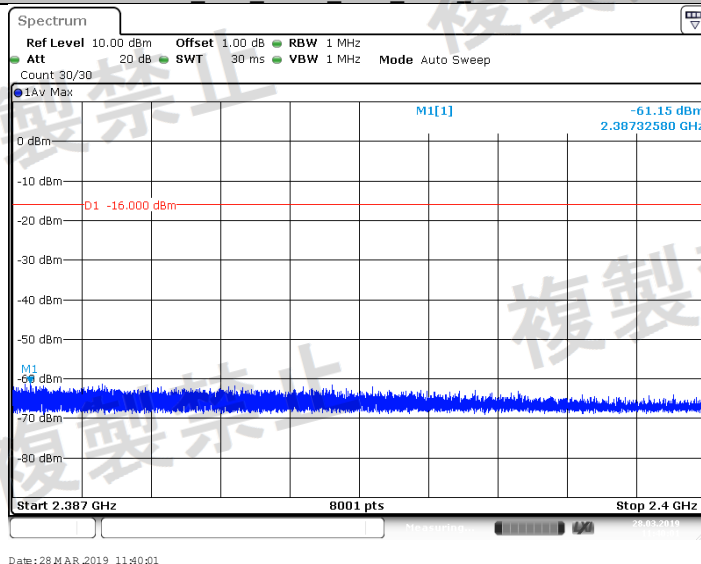


Date: 28 MAR 2019 11:38:23

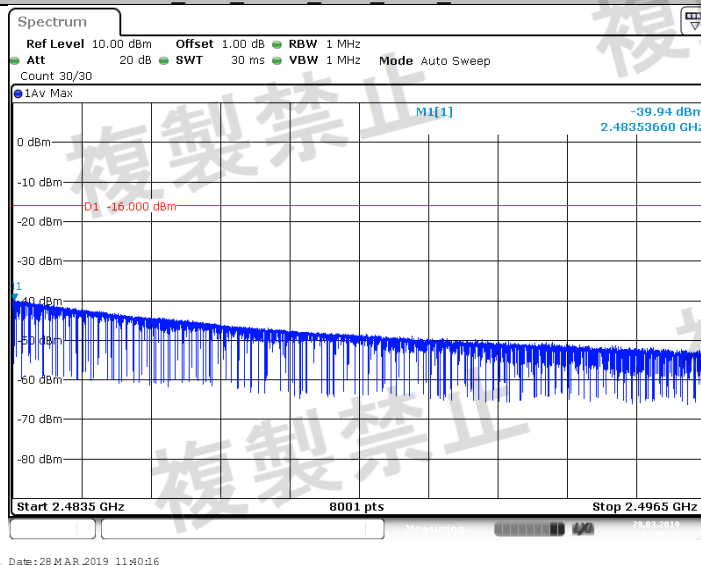
NTNV_BLE_BT4.0_Ant1_2480_30~2387



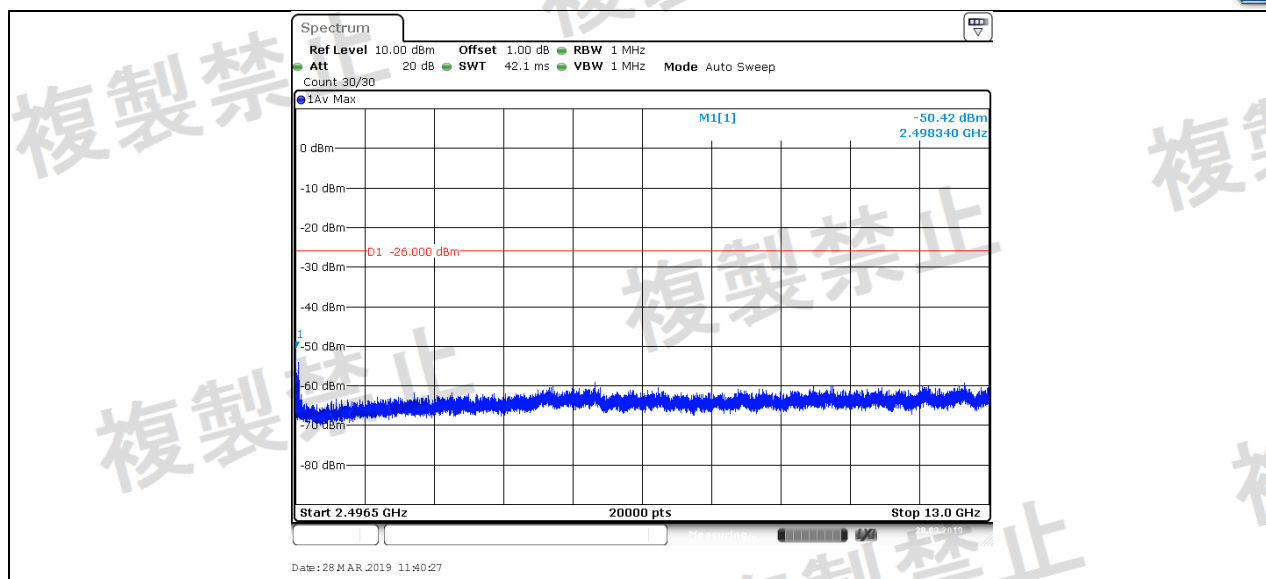
NTNV_BLE_BT4.0_Ant1_2480_2387~2400



NTNV_BLE_BT4.0_Ant1_2480_2483.5~2496.5



NTNV_BLE_BT4.0_Ant1_2480_2496.5~13000



3.7 Secondary Radiated Emissions (Conducted) (For receiver)

3.7.1 Test condition

Date of testing:	March 15, 2019
Channel:	Low: 2402MHz; Middle: 2440MHz; High: 2480MHz
Test position:	Transmitting
Ambient temperature:	22.4 °C
Relative humidity:	58.9 %
Atmosphere Pressure:	101.5 KPa

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.

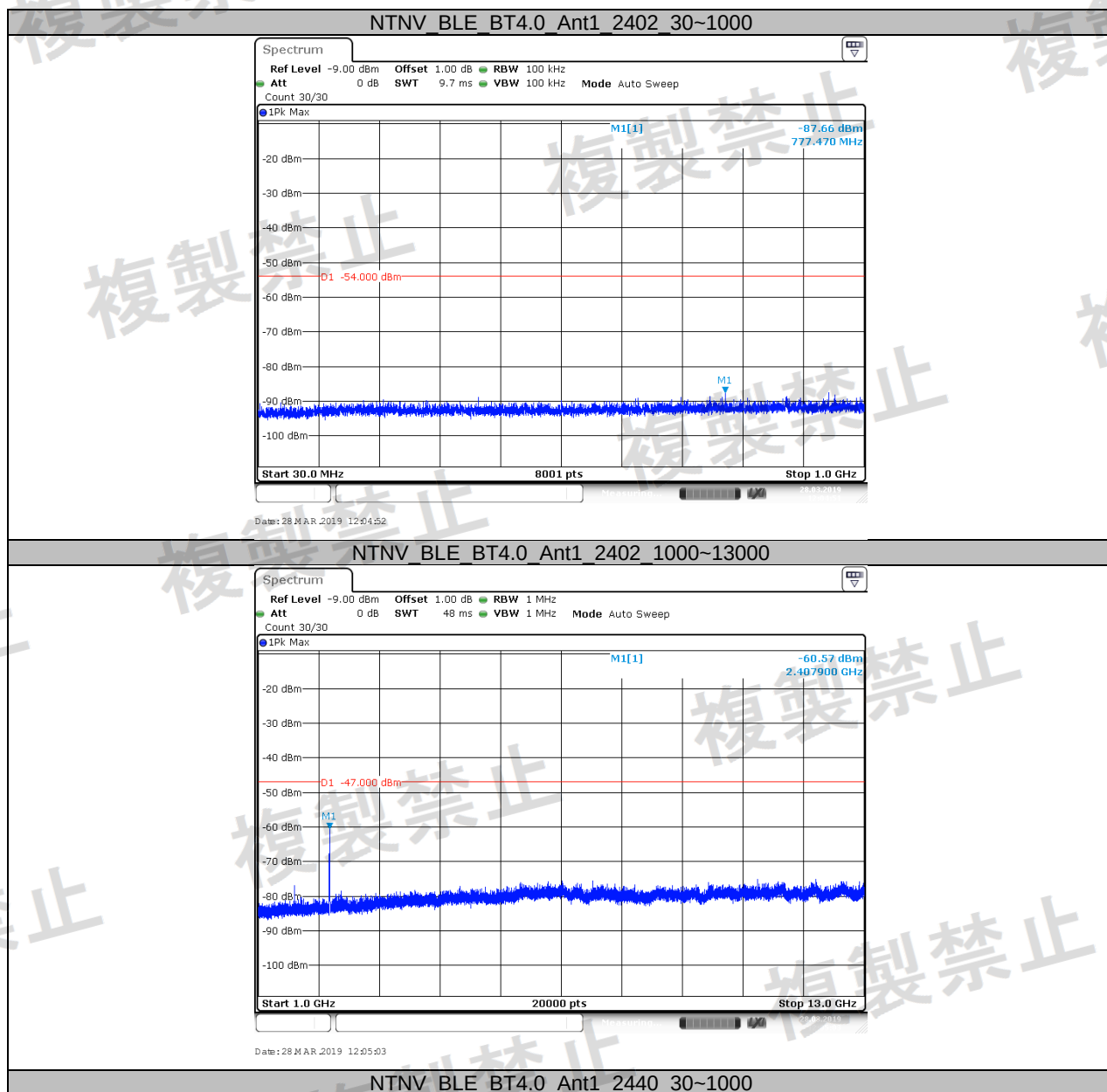
3.7.3 Test Result

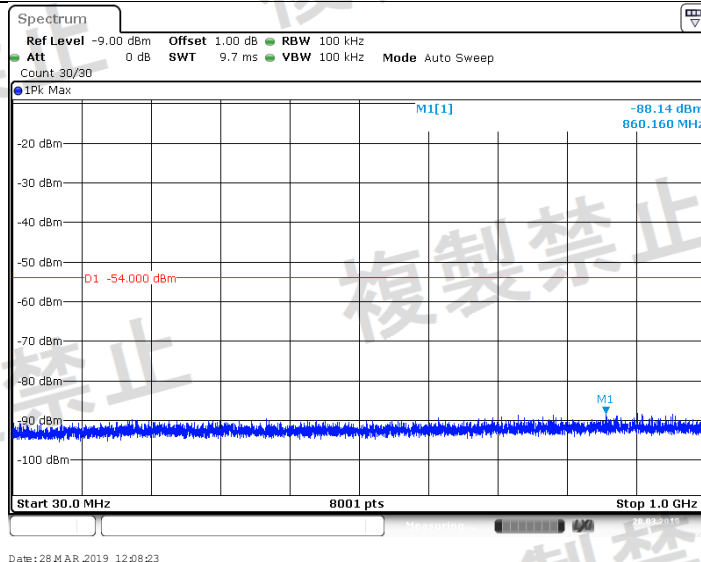
Test Condition	Test Mode	Channel	Freq., Range	Result	Limit	Verdict
NTNV	BLE	2402	2402	30~1000	-87.66	-54
NTNV	BLE	2402	2402	1000~13000	-60.57	-47
NTNV	BLE	2440	2440	30~1000	-88.14	-54
NTNV	BLE	2440	2440	1000~13000	-73.92	-47
NTNV	BLE	2480	2480	30~1000	-88.45	-54
NTNV	BLE	2480	2480	1000~13000	-74.94	-47

3.7.4 Result

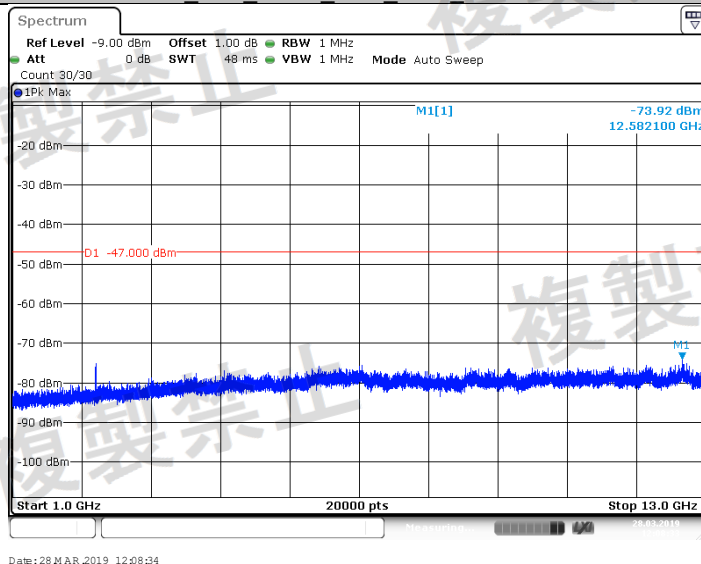
The equipment met the requirement of this clause.

3.7.5 Test Graphs

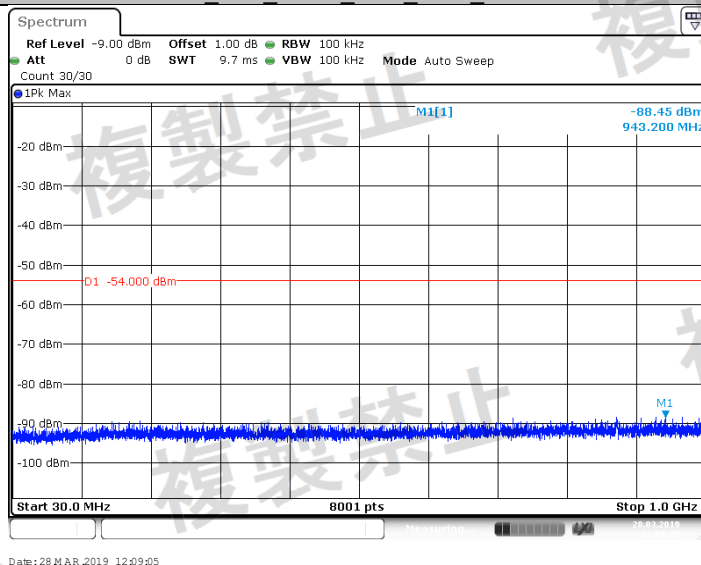




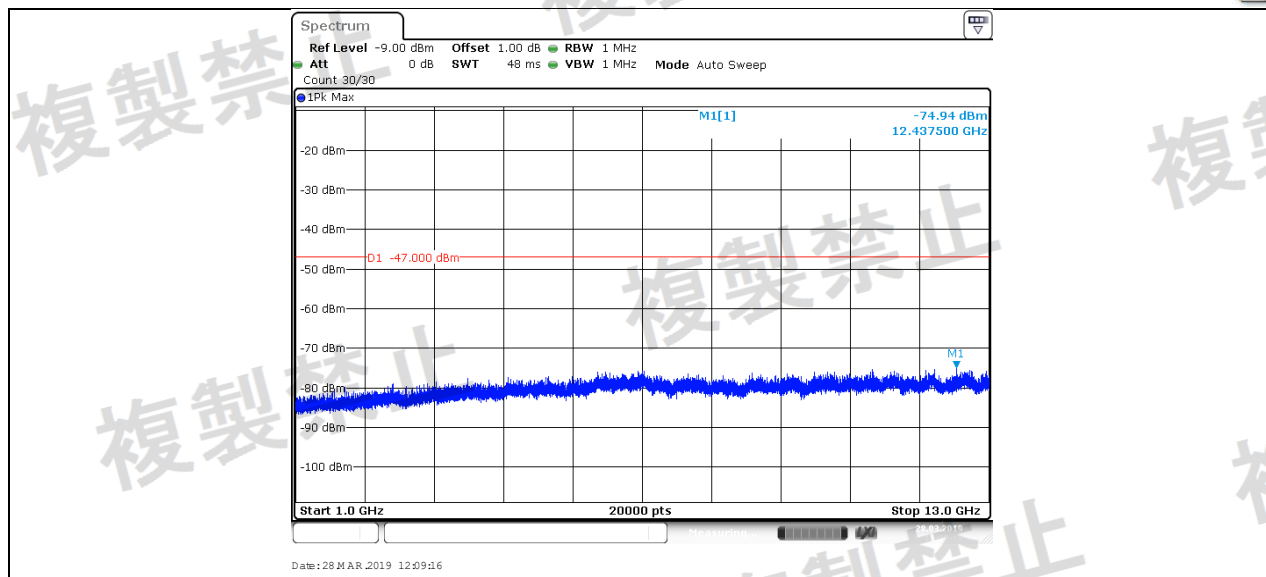
NTNV_BLE_BT4.0_Ant1_2440_1000~13000



NTNV_BLE_BT4.0_Ant1_2480_30~1000



NTNV_BLE_BT4.0_Ant1_2480_1000~13000



3.8 Interference prevention function

3.8.1 Test condition

Date of testing:	March 15, 2019
Channel:	Low: 2402MHz; Middle: 2440MHz; High: 2480MHz
Test position:	Transmitting
Ambient temperature:	22.4 °C
Relative humidity:	58.9 %
Atmosphere Pressure:	101.5 KPa

3.8.2 Limit

Item	Limits
Identification Code	≥48 bits

Measured Result:

Test Conditions	Operation Frequency		
	2402 MHz	2440 MHz	2480 MHz
Normal Voltage (48VDC)	48	48	48

3.8.3 Result

The equipment met the requirement of this clause.

4 Photographs of Test Set-ups

