

TEST REPORT

Product Name : Electronic Shelf Label
Polaris-160Q-N,Polaris-160Q,Polaris
Model Number : Lite-160Q-N,Polaris Lite-160Q,Polaris
Pro-160Q-N,Polaris Pro-160Q

Prepared for : HANSHOW TECHNOLOGY CO., LTD.
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Report Number : ENS2510140199W00501R
Date(s) of Tests : October 27, 2025 to November 7, 2025
Date of issue : November 8, 2025

TEST RESULT CERTIFICATION

Applicant : HANSHOW TECHNOLOGY CO., LTD.
Address : The 1st Floor Podium and Floor 4 of Building 1, Floor 7 of Building 5, Jiaxing Photovoltaic Technology Innovation Park, No.1288, Kanghe Road, Xiuzhou District, Jiaxing City, Zhejiang Prov,P.R.China
Manufacturer : HANSHOW TECHNOLOGY CO., LTD.
Address : The 1st Floor Podium and Floor 4 of Building 1, Floor 7 of Building 5, Jiaxing Photovoltaic Technology Innovation Park, No.1288, Kanghe Road, Xiuzhou District, Jiaxing City, Zhejiang Prov,P.R.China
EUT : Electronic Shelf Label
Model Name : Polaris-160Q-N,Polaris-160Q,Polaris Lite-160Q-N,Polaris Lite-160Q,Polaris Pro-160Q-N,Polaris Pro-160Q
Trademark : N/A

Measurement Procedure Used:

APPLICABLE STANDARDS		
STANDARD	Test Procedure	TEST RESULT
ARIB STD T-66 V3.7 RE-740 49.20 MIC Requirements for Certification	MIC public notice 88:2004, annex 43 MIC public notice 88:2004, annex 1	PASS

The device described above is tested by EMTEK (SHENZHEN) CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and EMTEK (SHENZHEN) CO., LTD. is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) was measured according to the test methods of Ordinance Concerning Technical Regulations Conformity Certification etc. of Specified Radio Equipment in Annex 1, the Ministry of Internal Affairs and Communication notification in Annex "43" of Article 88, Paragraph 1 or the test method more than equivalent and the result is technically compliant with the ARIB STD T-66 requirements.
The test results of this report relate only to the tested sample identified in this report

Date of Test : October 27, 2025 to November 7, 2025

Prepared by : Una Yu
Una Yu/Editor

Reviewer : Joe Xia
Joe Xia/Supervisor

Approved & Authorized Signer : Lisa Wang
Lisa Wang/Manager

Modified Information

Version	Report No.	Revision Date	Summary
Ver.1.0	ENS2510140199W00501R	/	Original Report

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1 EUT TECHNICAL DESCRIPTION

Product:	Electronic Shelf Label
Model Number:	Polaris-160Q-N,Polaris-160Q,Polaris Lite-160Q-N,Polaris Lite-160Q,Polaris Pro-160Q-N,Polaris Pro-160Q
Sample:	2#
Modulation:	GFSK
Data Rate :	500Kbps
Frequency Range:	2402 MHz to 2480 MHz
Number of Channels:	157 Channels
Max Transmit Power:	2mW
Antenna:	PCB Antenna
Antenna Gain:	-1.6 dBi
Power supply:	DC 3V
HW version:	HSEL3_01_60F_38
Temperature Range:	0°C ~ +40°C

Note: for more details, please refer to the User's manual of the EUT.

2 SUMMARY OF TEST RESULT

ARIB STD-T66 Clause	Test Parameter	Verdict	Remark
Clause 3.2(2).(4)	Frequency Error	PASS	
Clause 3.2(2).(7)	Occupied Bandwidth	PASS	
Clause 3.2(2).(8)	Spreading Bandwidth	PASS	
Clause 3.2 (2)	Power to Antenna (conducted)	PASS	
Clause 3.2 (2)	Power Density to Antenna (conducted)	PASS	
Clause 3.2 (6)	Spurious emission Intensity	PASS	
Clause 3.3 (1)	Collateral Emissions of Receiver	PASS	
Clause 3.4 (1)	Interference prevention function	PASS	
NOTE1: N/A (Not Applicable)			

3 TEST METHODOLOGY

3.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards:
Item 19 of Article 2 Paragraph 1 of the TELEC rules for 2.4GHz band wide-band low-power data communication system. All measurements contained in this report were conducted with test method for radio equipment specified in MIC public notice 88:2004, annex 43 for certification. And measuring method for electric field intensity of radio station with remarkably weak radiowave transmitted.

3.2 MEASUREMENT EQUIPMENT USED

3.2.1 Radio Frequency Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Calibration Body	Calibration Method
Wideband Radio Communication Tester	R&S	CMW500	171168	2025/9/9	LISAI	(c)
Frequency Extender	R&S	CMW-Z800A	100430	2025/9/9	LISAI	(c)
Spectrum Analyzer	R&S	FSV3044	101289	2024/12/17	LISAI	(c)
Analog Signal Generator	R&S	SMB100A	183237	2025/9/9	LISAI	(c)
Vector Signal Generator	R&S	SMM100A	101808	2025/9/9	LISAI	(c)
RF Control Unit	Tonscend	JS0806-2	22C8060567	2025/9/9	N/A	N/A
Temperature&Humidity Chamber	ESPEC	EL-02KA	12107166	2025/5/10	LISAI	(c)

Remark:

- (a) Calibration conducted by the National Institute of Information and Communications Technology (NICT) in Japan (hereinafter referred to as "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 from (a) to (c).

From JRL Article 24-2, paragraph 4, Item 2

Calibration Body:Guangzhou LiSai Metrology & Test Co.,Ltd.

Address:No.8.South Street Shi Ji Institute Guangzhou.Guangdong.China

Notice: Calibration duration for above equipments is 1 year.

3.3 DESCRIPTION OF TEST MODES

The EUT has been tested under its typical operating condition.

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Those data rates (GFSK :1Mbps, 2Mbps) were used for all test.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Frequency and Channel list:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
4	2402	82	2441	...	...
5	2402.5	83	2441.5	158	2479
6	2403	84	2442	159	2479.5
...	...	...	...	160	2480

Note: $f_c = 2402\text{MHz} + (k-1) \times 0.5\text{MHz}$ $k=1$ to 157

Test Frequency and channel list:

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
4	2402	82	2441	160	2480

4 FACILITIES AND ACCREDITATIONS

4.1 FACILITIES

All measurement facilities used to collect the measurement data are located at Building 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22."

4.2 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

Name of Firm : EMTEK (SHENZHEN) CO., LTD.

Site Location : Building 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China

5 TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

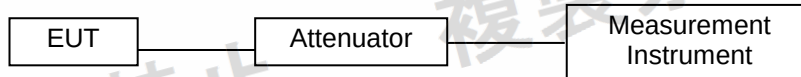
Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-5}$
Uncertainty for Output power test	$\pm 0.83\text{dB}$
Conducted Emissions Test	$\pm 2.0\text{dB}$
Radiated Emission Test	$\pm 2.0\text{dB}$
Occupied Bandwidth Test	$\pm 1.0\text{dB}$
Power density test	$\pm 1.85\text{dB}$
All emission, radiated	$\pm 3\text{dB}$
Antenna Port Emission	$\pm 3\text{dB}$
Temperature	$\pm 0.5^\circ\text{C}$
Humidity	$\pm 3\%$

Measurement Uncertainty for a level of Confidence of 95%

6 SETUP OF EQUIPMENT UNDER TEST

6.1 RADIO FREQUENCY TEST SETUP 1

The General 2.4G component's antenna port(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



6.2 SUPPORT EQUIPMENT

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Notebook	Lenovo	ThinkPad S2 Yoga 3rd Gen	R9-OR98VZ

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

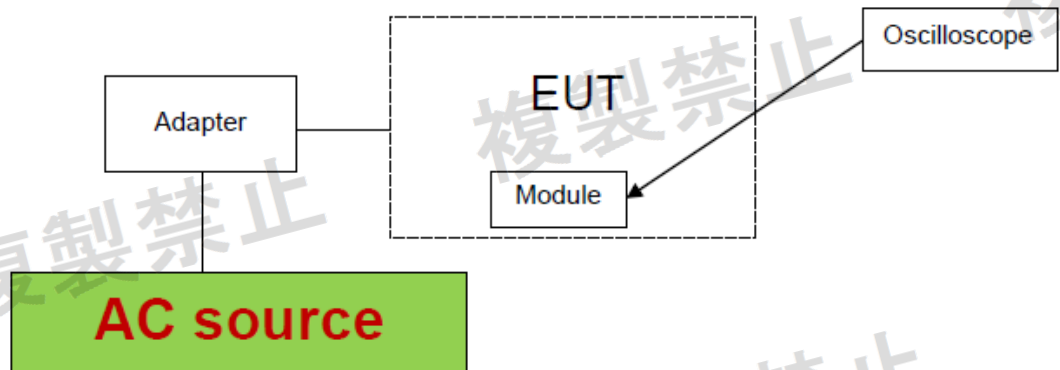
7 WIRELESS MODULE VOLTAGE TEST IN EXTREME CONDITIONS

7.1 APPLICABLE STANDARD

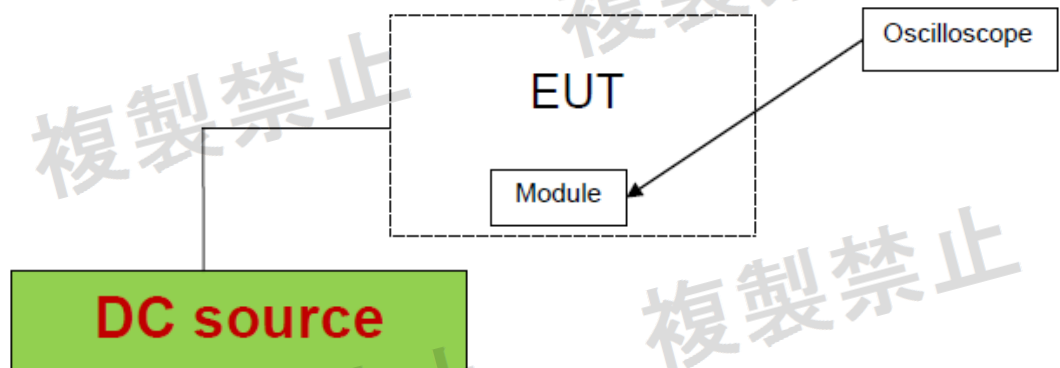
When there is a fluctuation of $\pm 10\%$ input voltage from external power to the test equipment. If the fluctuation of input voltage to the circuit of the radio part (excl. power) in the test equipment is confirmed below $\pm 1\%$, Measurement shall be tested with the rated voltage.

7.2 TEST CONFIGURATION

Config A



Config B



7.3 TEST RESULTS

Temperature :	22°C	Test Date :	November 6, 2025
Humidity :	52 %	Test By:	ZGJ

Test Voltage (V)	3.7	4.07	3.33
Module Test voltage (V)	3.3	3.3	3.3
Module Ratedvoltage (V)	3.3	3.3	3.3
The Range of Module Voltage (%)	0	0	0
Test result	PASS	PASS	PASS

Note: In extreme conditions, EUT module power is confirmed below $\pm 1\%$.

8 TEST REQUIREMENTS

8.1 FREQUENCY ERROR

8.1.1 Applicable Standard

According to ARIB STD-T66, Clause 3.2(2).(4)

8.1.2 Conformance Limit

For the 2.4 GHz bands it shall be better than 50 ppm under the operational conditions.

8.1.3 Test Configuration

Test according to clause 6.1 radio frequency test setup 1.

8.1.4 Test Procedure

If the fluctuation of input voltage to the circuit of the radio part (excl. power) in the test equipment is confirmed below $\pm 1\%$, Measurement shall be tested with the rated voltage.

When there is a fluctuation of $\pm 10\%$ input voltage from external power to the test equipment. In case the test equipment is designed to function only within the specified fluctuation range of $\pm 10\%$ for the voltage source tests shall be conducted applying the rated voltage and a respective specified maximum/minimum value of fluctuation range.

Set the EUT on the test frequency and transmit.

Stop the modulation (stop the spreading), set on "continuous transmission of no-modulated radiation" in principle. If impossible, on "continuous burst transmission of no-modulated radiation", or a modulation mode to generate a specific frequency spectrum so that the frequency can be measured using a spectrum analyzer (example: a wave of the sub-carrier).

In case of no-modulation (consecutive or continuous burst), direct measurement is conducted with the frequency meter.

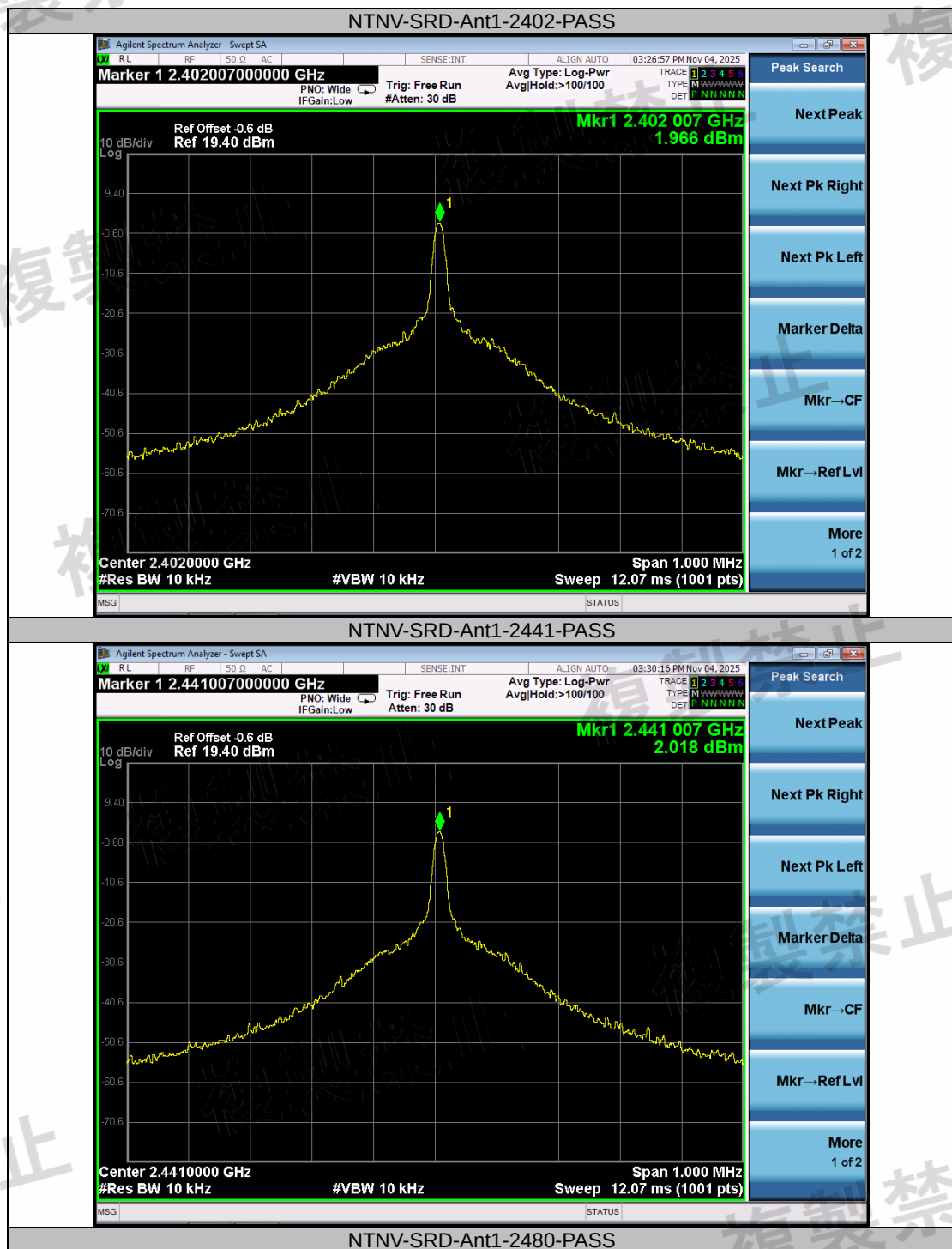
In case of burst wave, the measurement is conducted for a time period to achieve a sufficient accuracy. The mean value is employed as the measurement value.

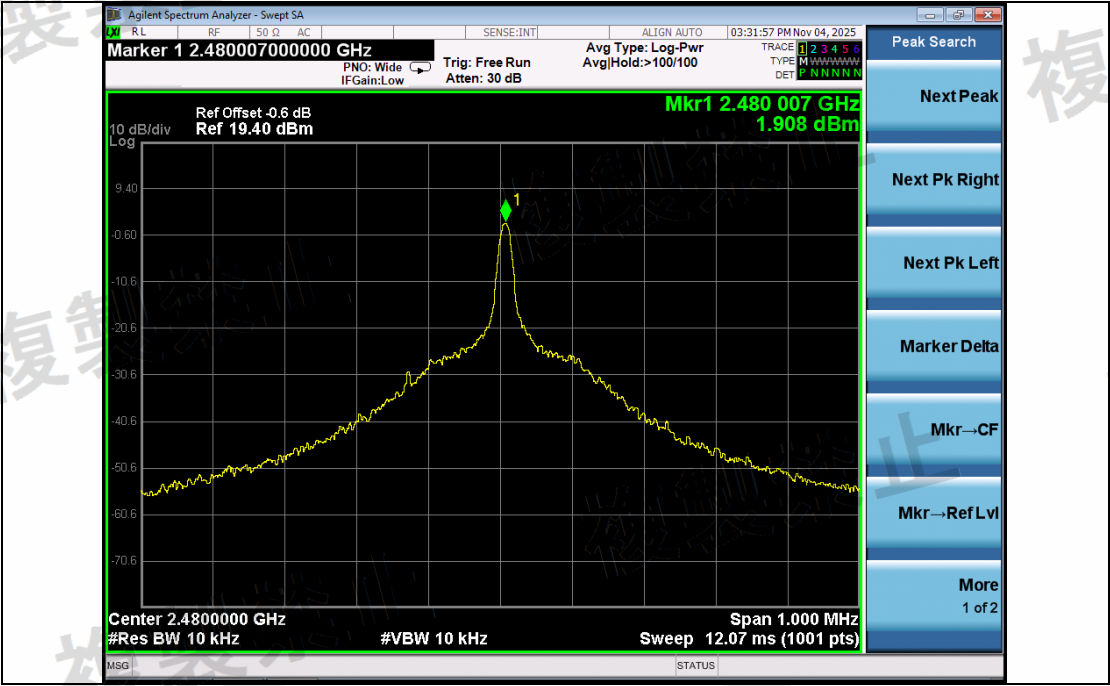
In case of a test mode generating specific frequency spectrum, the spectrum frequency is measured with the spectrum analyzer.

8.1.5 Test Results

Temperature :	25°C	Test Date :	November 6, 2025
Humidity :	60 %	Test By:	ZGJ
		Test voltage	Normal voltage

TestCondition	TestMode	Antenna	Freq(MHz)	Channel Freq(MHz)	Result[ppm]	Limit[ppm]	Verdict
NTNV	SRD	Ant1	2402	2402.007	2.91	±50	PASS
NTNV	SRD	Ant1	2441	2441.007	2.87	±50	PASS
NTNV	SRD	Ant1	2480	2480.007	2.82	±50	PASS





8.2 OCCUPIED BANDWIDTH

8.2.1 Applicable Standard

According to ARIB STD-T66 Clause 3.2(2).(7)

8.2.2 Conformance Limit

Permissible value for occupied bandwidth for DSSS & OFDM equipment (Carrier frequencies from 2,400MHz to 2,483.5MHz or from 2,471MHz to 2,497MHz, for all equipment except for 40 MHz channel separation) shall be 26MHz or less.

8.2.3 Test Configuration

Test according to clause 6.1 radio frequency test setup 1

8.2.4 Test Procedure

Spectrum analyzer is set as below

Central Frequency	Test frequency
Sweeping Bandwidth	2 to 3.5 times the allowable value (SPAN=4MHz)
Resolution Bandwidth	Lower than 3 % of allowable value (RBW=10kHz)
Video Bandwidth	Same level as Resolution Bandwidth
Y-Axis Scale	10 dB/Div
Input Level	Carrier level is sufficiently higher than spectrum analyzer noise
Sweep Time	Minimum time to assure the measurement accuracy (In case of burst wave, 1 burst per 1 sample)
Sampling points	More than 400 points
Sweep Mode	Consecutive sweep
Phase-Detection Mode	Positive peak
Trigger Condition	Max-hold

The measured value of the spectrum analyzer is processed by the computer internally or externally
Conditions of EUT

Set the test frequency and the modulation is performed with the standard coded test signal. In case of OFDM with burst wave, the modulation is conducted to minimize the rate of the time that the number of sub-carrier is less (short preamble).

After a repetition of sweep so that no variation is found, values of all the data points are loaded into the array variable on the computer.

For all the data, the dB values are converted to antilogarithm of power dimension.

Power summation of all the data is estimated and stored as "total power value".

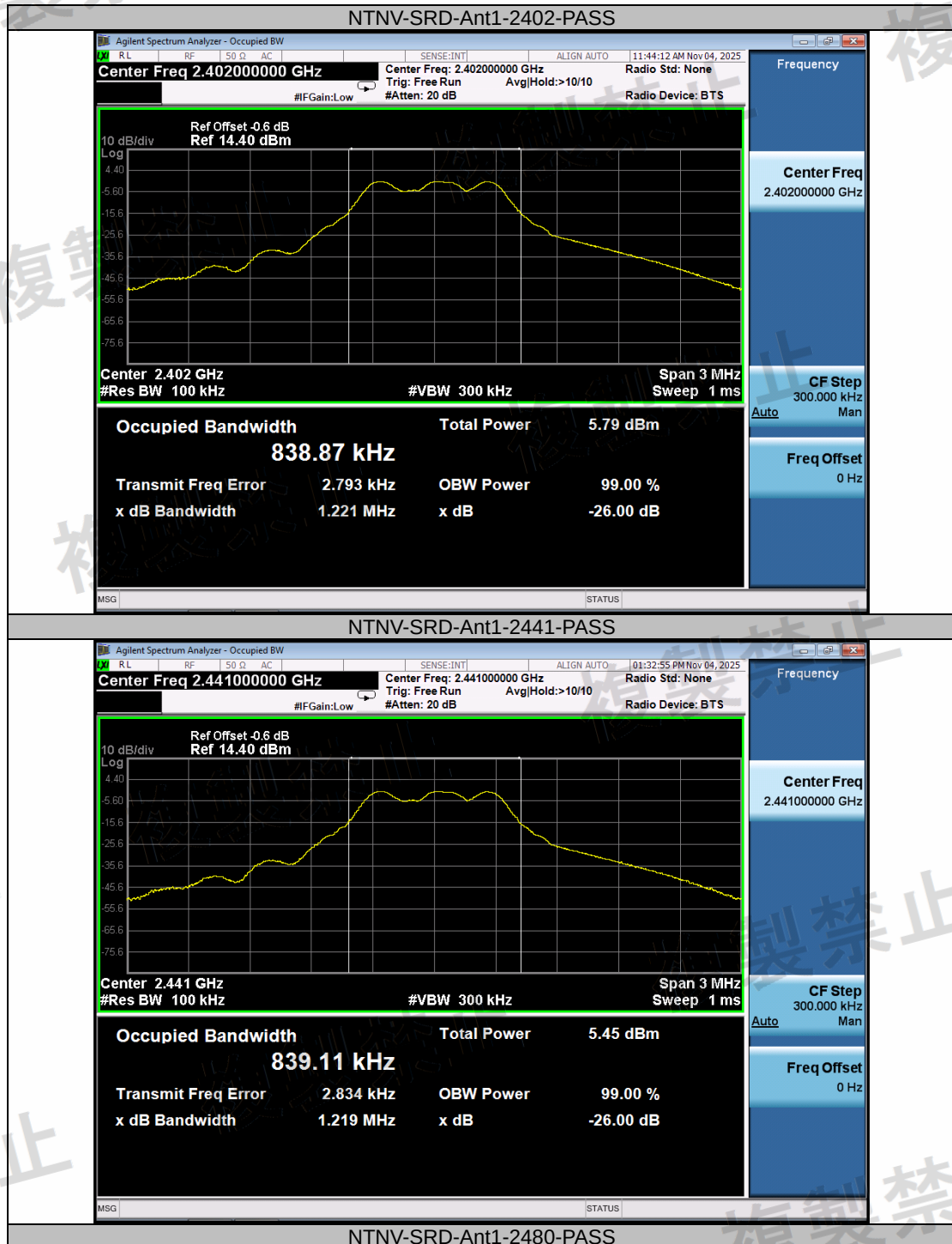
Starting with the data of the minimum frequency, the power is summed sequentially, and the limiting data point where the value achieves 0.5% of the total power is sensed. The limiting point is converted to frequency, stored as "lower limit".

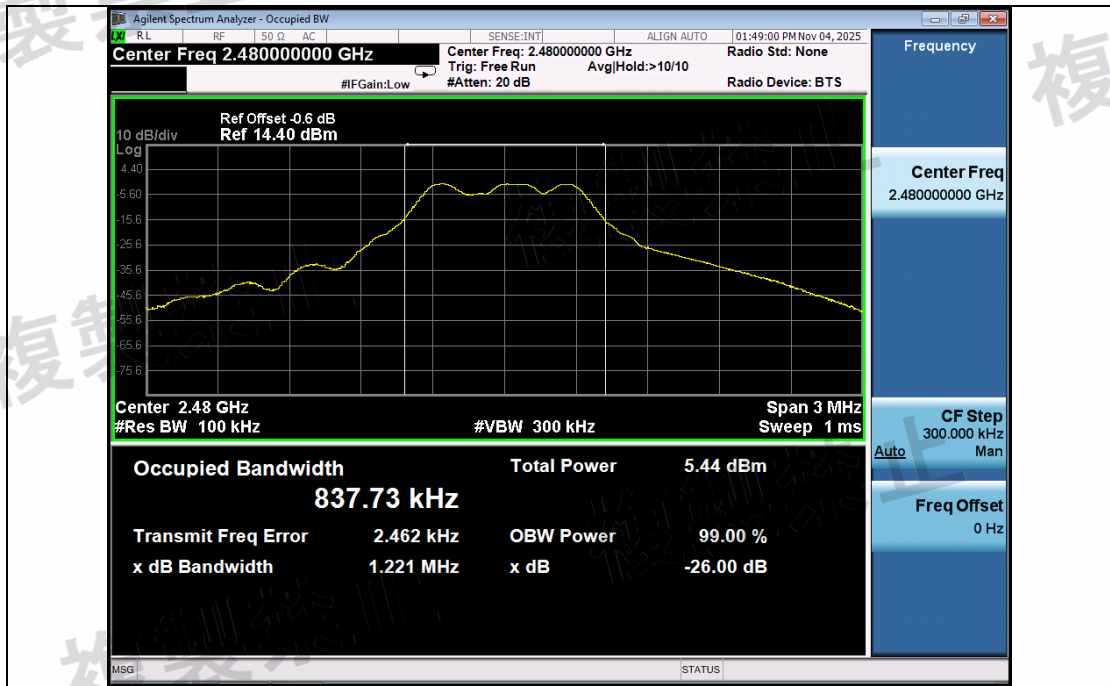
Starting with the data of the maximum frequency, the power is summed sequentially, and the limiting data point where the value achieves 0.5% of the total power is sensed. The limiting point is converted to frequency, stored as "upper limit"

8.2.5 Test Results

Temperature :	25°C	Test Date :	November 6, 2025
Humidity :	60 %	Test By:	ZGJ
		Test voltage	Normal voltage

TestCondition	TestMode	Antenna	Freq(MHz)	Result [MHz]	Limit [MHz]	Verdict
NTNV	SRD	Ant1	2402	0.83887	≤26	PASS
NTNV	SRD	Ant1	2441	0.83911	≤26	PASS
NTNV	SRD	Ant1	2480	0.83773	≤26	PASS





8.3 SPREADING BANDWIDTH

8.3.1 Applicable Standard

According to ARIB STD-T66 Clause 3.2(2).(8)

8.3.2 Conformance 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 500kHz or more.

8.3.3 Test Configuration

Test according to clause 6.1 radio frequency test setup 1

8.3.4 Test Procedure

Spectrum analyzer is set as below

Central Frequency	Test frequency
Sweeping Bandwidth	2 to 3.5 times the allowable value (SPAN=4MHz)
Resolution Bandwidth	Lower than 3 % of allowable value (RBW=10kHz)
Video Bandwidth	Same level as Resolution Bandwidth
Y-Axis Scale	10 dB/Div
Input Level	Carrier level is sufficiently higher than spectrum analyzer noise
Sweep Time	Minimum time to assure the measurement accuracy (In case of burst wave, 1 burst per 1 sample)
Sampling points	More than 400 points
Sweep Mode	Consecutive sweep
Phase-Detection Mode	Positive peak
Trigger Condition	Max-hold

The measured value of the spectrum analyzer is processed by the computer internally or externally
Conditions of EUT

Set the test frequency and the modulation is performed with the standard coded test signal. In case of OFDM with burst wave, the modulation is conducted to minimize the rate of the time that the number of sub-carrier is less (short preamble).

After a repetition of sweep so that no variation is found, values of all the data points are loaded into the array variable on the computer.

For all the data, the dB values are converted to antilogarithm of power dimension.

Power summation of all the data is estimated and stored as "total power value".

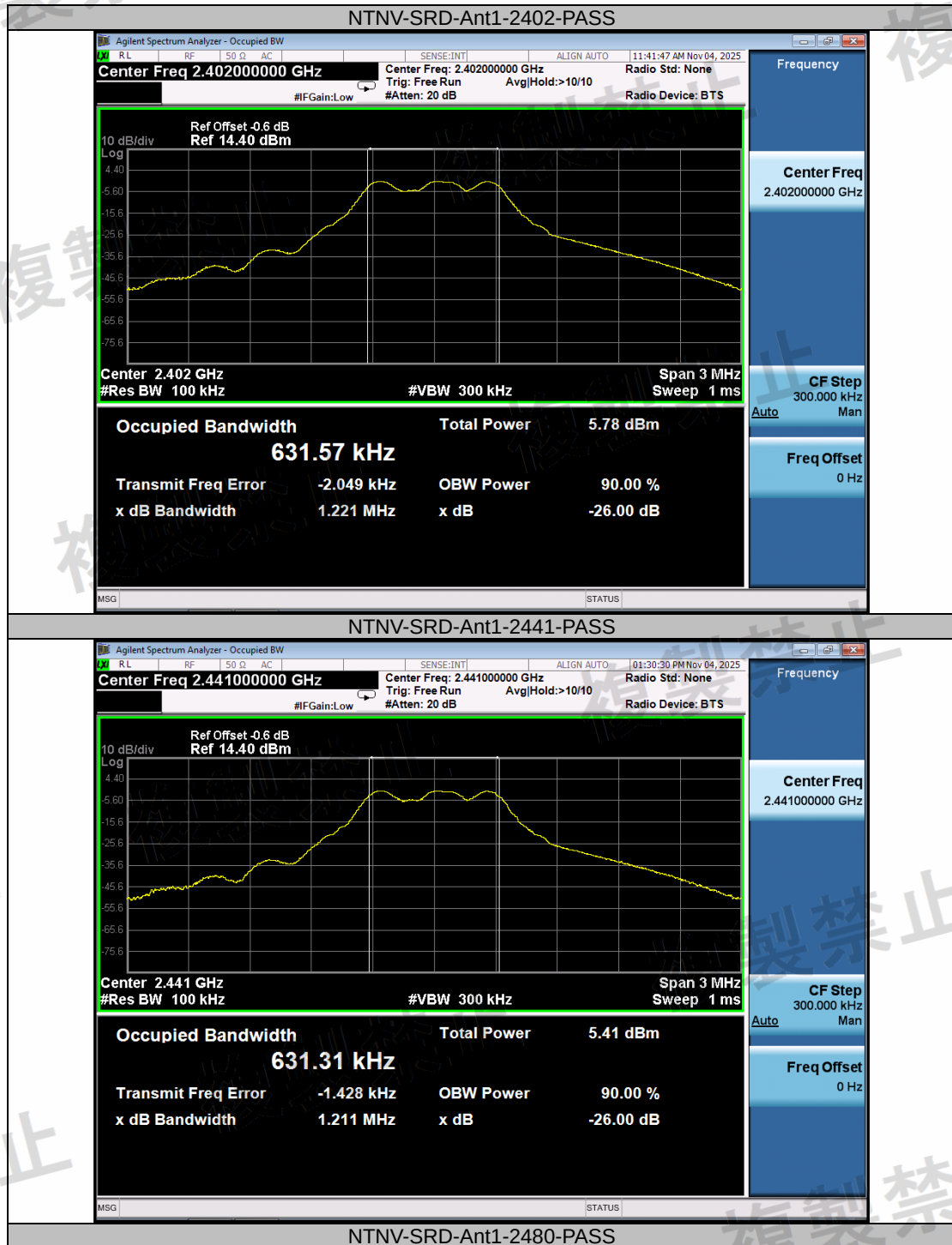
Starting with the data of the minimum frequency, the power is summed sequentially, and the limiting data point where the value achieves 5% of the total power is sensed. The limiting point is converted to frequency, stored as "lower limit".

Starting with the data of the maximum frequency, the power is summed sequentially, and the limiting data point where the value achieves 5% of the total power is sensed. The limiting point is converted to frequency, stored as "upper limit".

8.3.5 Test Results

Temperature :	25°C	Test Date :	November 6, 2025
Humidity :	60 %	Test By:	ZGJ
		Test voltage	Normal voltage

TestCondition	TestMode	Antenna	Freq(MHz)	Result [MHz]	Limit [MHz]	Verdict
NTNV	SRD	Ant1	2402	0.63157	≥0.5	PASS
NTNV	SRD	Ant1	2441	0.63131	≥0.5	PASS
NTNV	SRD	Ant1	2480	0.63064	≥0.5	PASS





8.4 POWER TO ANTENNA (CONDUCTED)

8.4.1 Applicable Standard

According to ARIB STD-T66 Clause 3.2

8.4.2 Conformance Limit

- The antenna power of a transmitting equipment (with a frequency band of 2427.00 – 2470.75 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 1MHz 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 1MHz is 10mW 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 systems other than any of those in “a” or “b” shall be 10mW or less.

8.4.3 Test Configuration

Test according to clause 6.1 radio frequency test setup 1

8.4.4 Test Procedure

Set the EUT on the test frequency and the consecutive TX mode or continuous (constant period, constant burst length) burst TX mode.

In case of spreading code used, set on the test spreading code, then the modulation is performed with standard coding test signal.

(1) Measure the equivalent noise bandwidth at the spectrum analyzer for resolution bandwidth of 1 MHz, then read the value correcting the resolution bandwidth on the 1 MHz equivalent bandwidth. In case of a spreading bandwidth lower than 1 MHz, however, perform the correction only for a higher value than “Spreading bandwidth (MHz) / Equivalent noise bandwidth (MHz)”.

(2) The attenuation value of the attenuator shall be set to achieve the optimal operating input level at the spectrum analyzer.

(3) Spectrum analyzer for seeking the maximum antenna power is set as below.

Central Frequency	Test frequency
Sweeping Bandwidth	Approx. twice the Occupied Bandwidth
Resolution Bandwidth	1 MHz
Video Bandwidth	Approx. twice the resolution bandwidth (VBW=2MHz)
Y-Axis Scale	10 dB/Div
Sweep Time	Minimum time to assure the measurement accuracy (In case of burst wave, 1 burst per 1 sample)
Trigger Condition	Free run
Data points	More than 400 points
Sweep Mode	Consecutive sweep
Phase-Detection Mode	Positive peak
Display mode	Max-hold

(4) Spectrum analyzer for measuring the antenna power is set as below. In this case, calibrate the indication of

the RF Power Meter on the output of the EUT with the RF Power Meter connected to the IF output of the spectrum analyzer.

Central Frequency	Frequency to achieve the maximum power (sought frequency)
Sweeping Bandwidth	0 Hz
Resolution Bandwidth	1 MHz
Video Bandwidth	Same level as the resolution bandwidth
Sweep Mode	Consecutive sweep
Phase-Detection Mode	Sample

Measurement Procedure

(1) No frequency hopping systems:

- Configure the settings of the spectrum analyzer to 2(3).
- After repeating sweeps (until no display changes are found), measure the maximum power frequency per MHz.
- Connect the high frequency power meter to the IF output of the spectrum analysers.
- Configure the settings of the spectrum analyzer to 2(4).
- Set the antenna power as follows:
 - Continuous waves: value indicated on the high frequency power meter, corrected according to 2(1).
 - Burst waves: value similarly corrected in the case of continuous waves and value calculated from the average power within bursts from rates of transmission times (i.e. correction on the duty-cycle, to find the average within the transmit burst)

8.4.5 Test Results

Temperature :	25°C	Test Date :	November 6, 2025
Humidity :	60 %	Test By:	ZGJ
		Test voltage	Normal voltage

TestCondition	TestMode	Antenna	Freq(MHz)	Result(dBm)	Result(mW)	Limit(mW)	Verdict
NTNV	SRD	Ant1	2402	0.66	1.164	≤10	PASS
NTNV	SRD	Ant1	2441	0.42	1.102	≤10	PASS
NTNV	SRD	Ant1	2480	0.32	1.076	≤10	PASS

TestCondition	TestMode	Antenna	Freq(MHz)	Power (dBm)	EIRP(dBm)	Limit(dBm)	Verdict
NTNV	SRD	Ant1	2402	0.66	-0.94	≤12.14	PASS
NTNV	SRD	Ant1	2441	0.42	-1.18	≤12.14	PASS
NTNV	SRD	Ant1	2480	0.32	-1.28	≤12.14	PASS

Test Condition	Test Mode	Antenna	Freq(MHz)	Power (mW)	RatedPower (mW)	Result (%)	Limit (%)	Verdict
NTNV	SRD	Ant1	2402	1.164	2	-41.80	+20	PASS
NTNV	SRD	Ant1	2441	1.102	2	-44.90	+20	PASS
NTNV	SRD	Ant1	2480	1.076	2	-46.20	+20	PASS

8.5 SPURIOUS EMISSIONS INTENSITY

8.5.1 Applicable Standard

According to ARIB STD-T66 Clause 3.2(6)

8.5.2 Conformance 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 (-16dB) or less |
| b. $2,387\text{MHz} > f$ and $2,496.5\text{MHz} < f$ | 2.5 μW (-26dB) or less |

8.5.3 Test Configuration

Test according to clause 6.1 radio frequency test setup 1

8.5.4 Test Procedure

(1) Spectrum analyzer for seeking the spurious emission is set as below

Sweeping Bandwidth	For seeking the spurious emission, from frequency lowest possible to the 5 times the carrier frequency
Resolution Bandwidth	1 MHz
Video Bandwidth	Approx. As same as Resolution bandwidth
Y-Axis Scale	10 dB/Div
Input Level	Value of maximum dynamic range
Sweep Time	Minimum time to assure the measurement accuracy (Note 1)
Sweep Mode	Single sweep
Phase-Detection Mode	Positive peak

(2) The settings of the spectrum analyzer while conducting spurious amplitude measurements are as follows:

- Central Frequency: Acquired spurious frequencies in (1)
- Sweep Frequency 0 Hz
- Resolution Bandwidth 1 MHz
- Video Bandwidth same as Resolution Bandwidth
- Note: take into account that the requirement limits the power in a bandwidth of 1 MHz.
- If the measurement is carried out with a bandwidth of 100 kHz (for frequencies below 1 GHz), the limit shall be reduced with 10 dB.
- For example 2.5 μW in 1 MHz = -26 dBm limit, becomes -36 dBm for 100 kHz bandwidth.
- Y-Axis Scale 10 dB/Div
- Input Level: choose input level within the linear range of the SA mixer (so that no additional spurious are generated by the mixer)
- Sweep Time: Minimum amount of time to ensure measurement accuracy. However, in the case of burst waves, time exceeds duration of 1 burst.
- Data Points Over 400 points
- Sweep Mode: Single sweep
- Detection Mode Sample (BIN-Width $\ll$ RBW, so that all spurious emissions are captured) [BIN-width is the frequency difference between 2 adjacent sample points on the display]

(3) Set EUT as occupied bandwidth is measure. That is, Set the EUT on the test frequency and the continuous TX mode or continuous (constant period, constant burst length) burst TX mode. In case of spreading code used, set on the test spreading code, then the modulation is performed with standard coding test signal.

The spectrum analyzer is set as 2 (1). Seek the spurious emission If the amplitude of the sought spurious emission satisfies the specified value (in case of 2 (2) Note 1, the specified value is -3dB), the measurement of 2 (2) is not performed, then the estimated value is employed as the measured value.

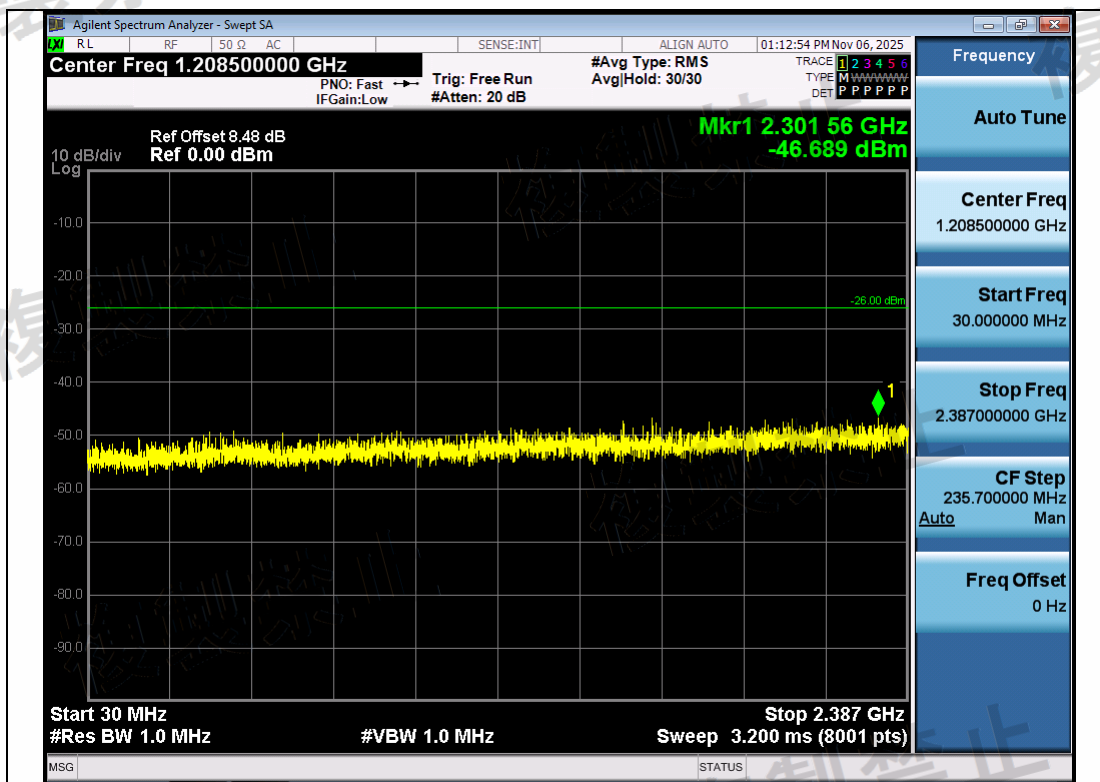
In case the sought spurious emission amplitude exceeds the specified value, seek the spurious frequency by narrowing the sweeping band sequentially as 100 MHz, 10 MHz, 1 MHz for the purpose of higher accuracy of the spectrum analyzer. Set the spectrum analyzer as 2 (2). Estimate the mean value of the spurious amplitude, then employ it as the measured value (In case DSSS as well as OFDM with burst wave, the mean inside of the burst).

Sweep Bandwidth: 30MHz~2387MHz, 2483.5MHz~2496.5MHz, 2496.5MHz~12500MHz
Respectively mark the maximum results in the above sweep bandwidth.

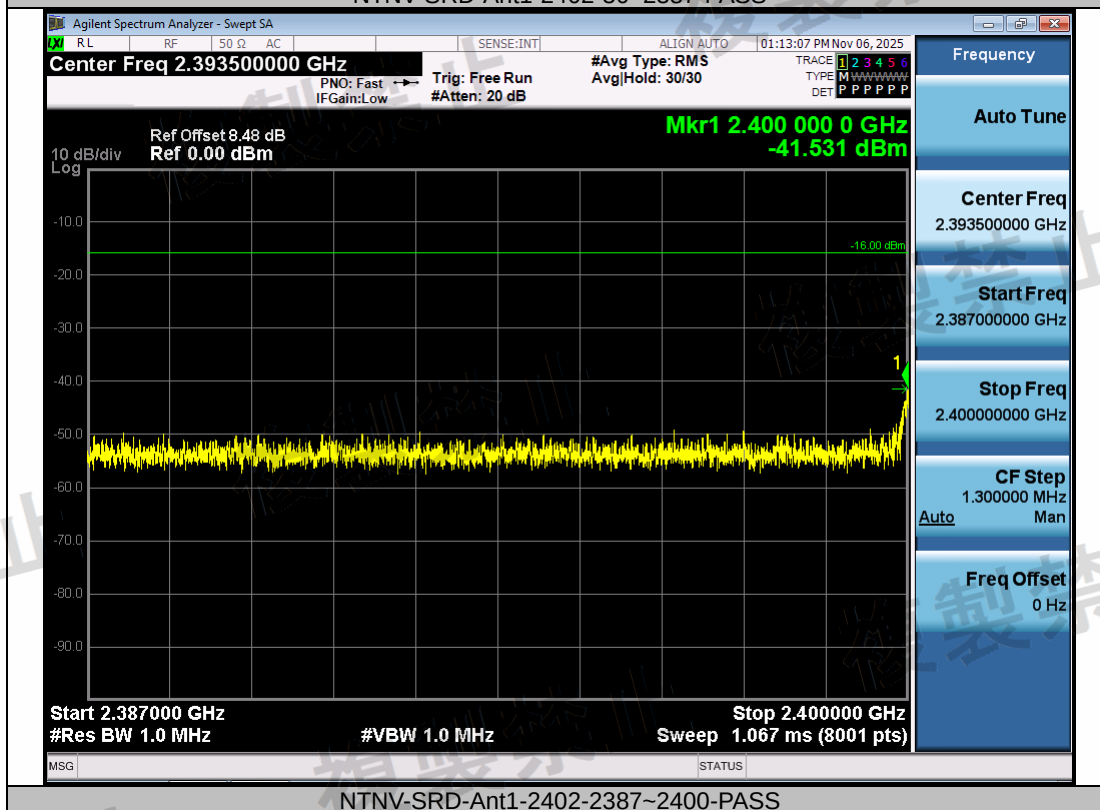
8.5.5 Test Results

All the antenna(Antenna 1) and modes(GFSK_1M, GFSK_2M) mode have been tested, and the worst(Antenna 1, GFSK_2M) result recorded was report as below:

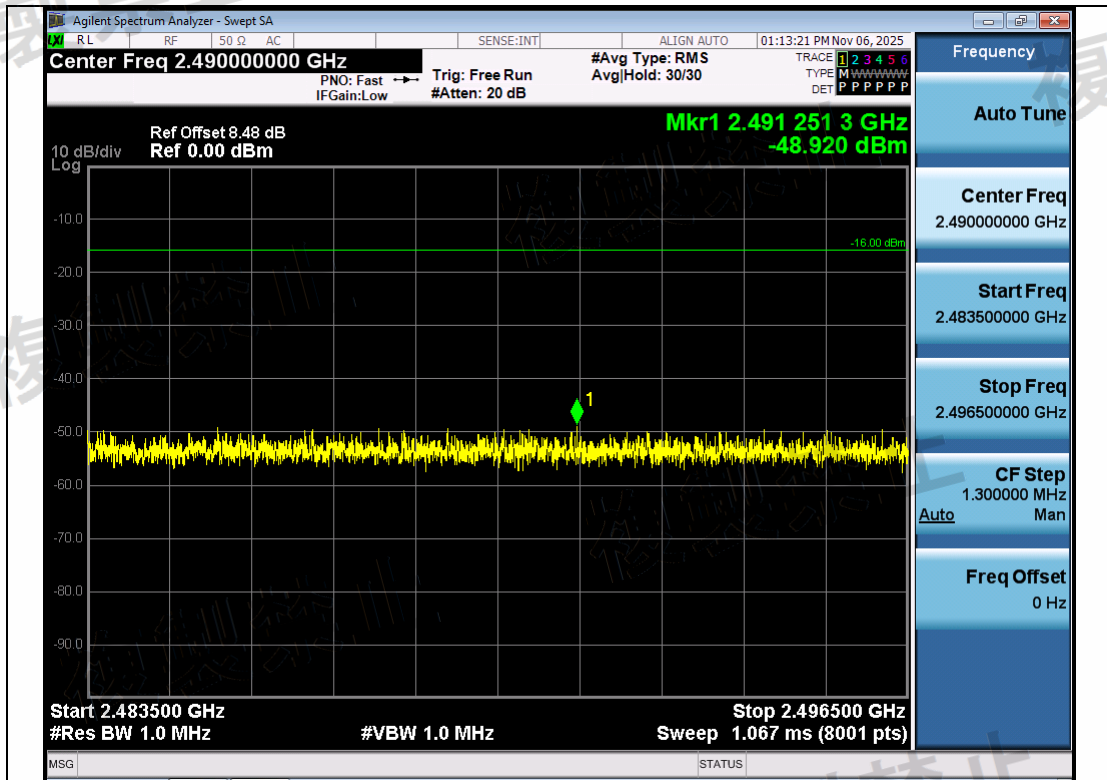
TestCondition	TestMode	Antenna	Freq(M Hz)	Freq.Range [MHz]	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [μW]	Limit [μW]	Verdict
NTNV	SRD	Ant1	2402	30~2387	2301.56	-46.69	≤-26	0.02143	≤2.5	PASS
NTNV	SRD	Ant1	2402	2387~2400	2400.00	-41.53	≤-16	0.07031	≤25	PASS
NTNV	SRD	Ant1	2402	2483.5~2496.5	2491.25	-48.92	≤-16	0.01282	≤25	PASS
NTNV	SRD	Ant1	2402	2496.5~13000	6073.65	-43.58	≤-26	0.04385	≤2.5	PASS
NTNV	SRD	Ant1	2441	30~2387	2197.56	-45.70	≤-26	0.02692	≤2.5	PASS
NTNV	SRD	Ant1	2441	2387~2400	2392.31	-49.18	≤-16	0.01208	≤25	PASS
NTNV	SRD	Ant1	2441	2483.5~2496.5	2491.99	-48.13	≤-16	0.01538	≤25	PASS
NTNV	SRD	Ant1	2441	2496.5~13000	5371.98	-44.61	≤-26	0.03459	≤2.5	PASS
NTNV	SRD	Ant1	2480	30~2387	2149.53	-44.31	≤-26	0.03707	≤2.5	PASS
NTNV	SRD	Ant1	2480	2387~2400	2391.27	-48.78	≤-16	0.01324	≤25	PASS
NTNV	SRD	Ant1	2480	2483.5~2496.5	2484.07	-48.65	≤-16	0.01365	≤25	PASS
NTNV	SRD	Ant1	2480	2496.5~13000	5679.74	-43.40	≤-26	0.04571	≤2.5	PASS



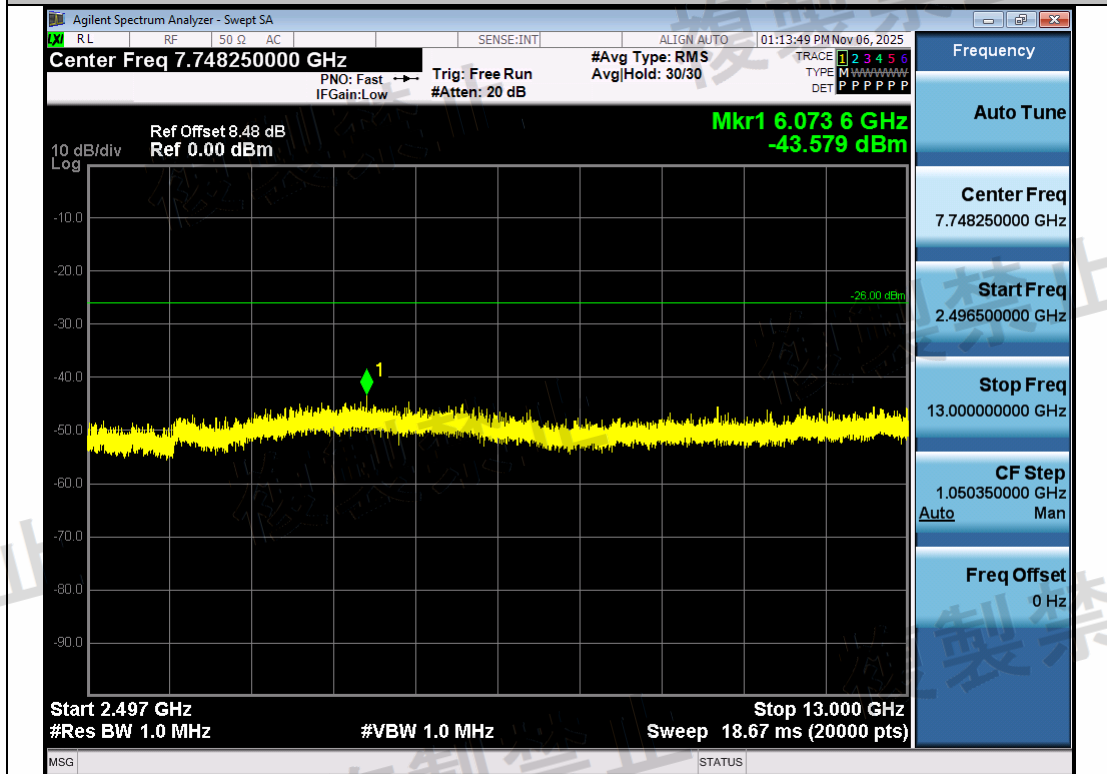
NTNV-SRD-Ant1-2402-30~2387-PASS



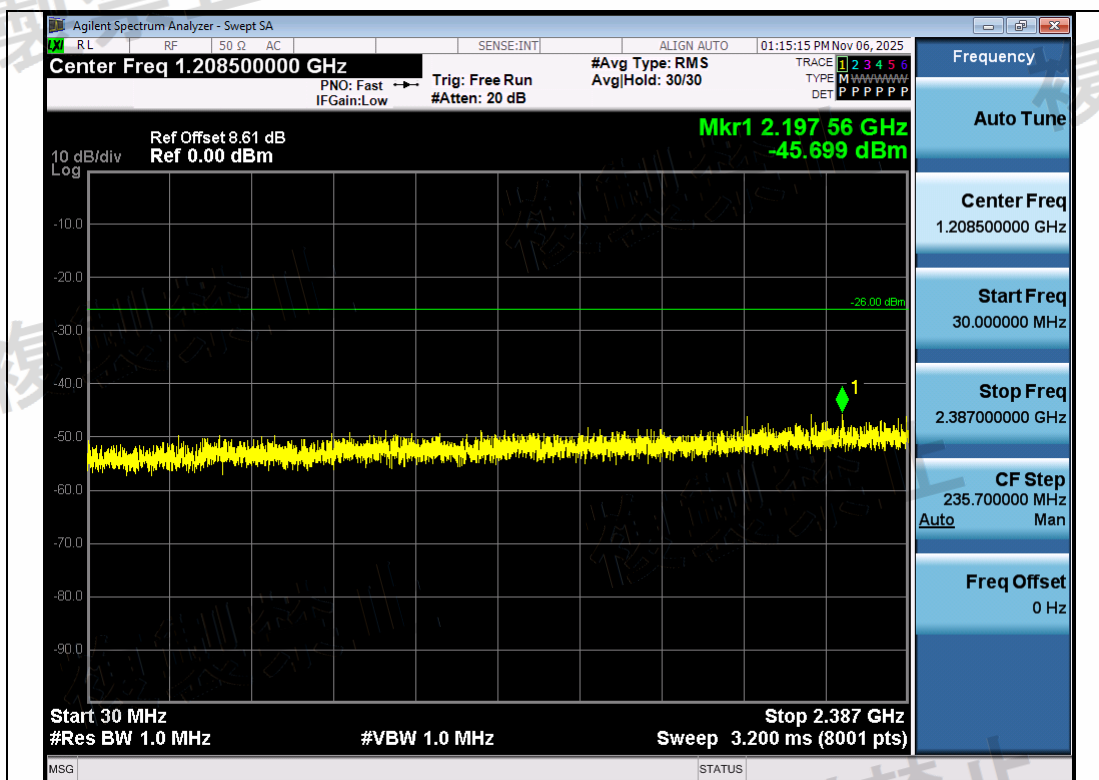
NTNV-SRD-Ant1-2402-2387~2400-PASS



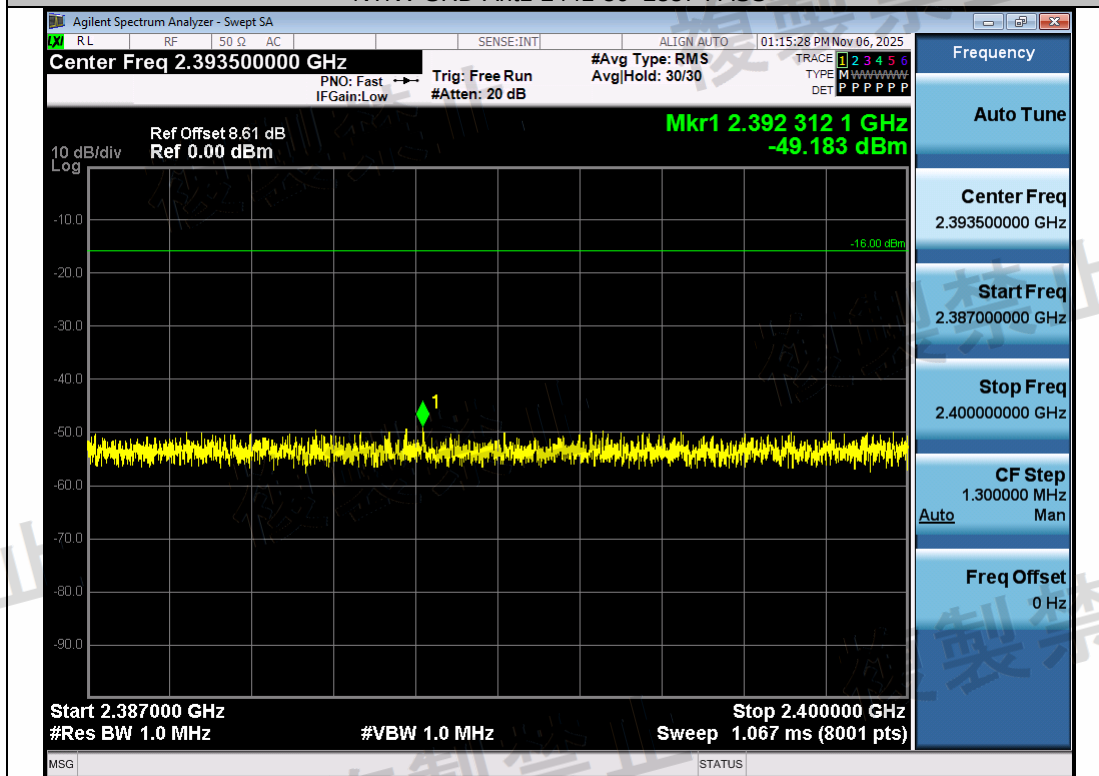
NTNV-SRD-Ant1-2402-2483.5~2496.5-PASS



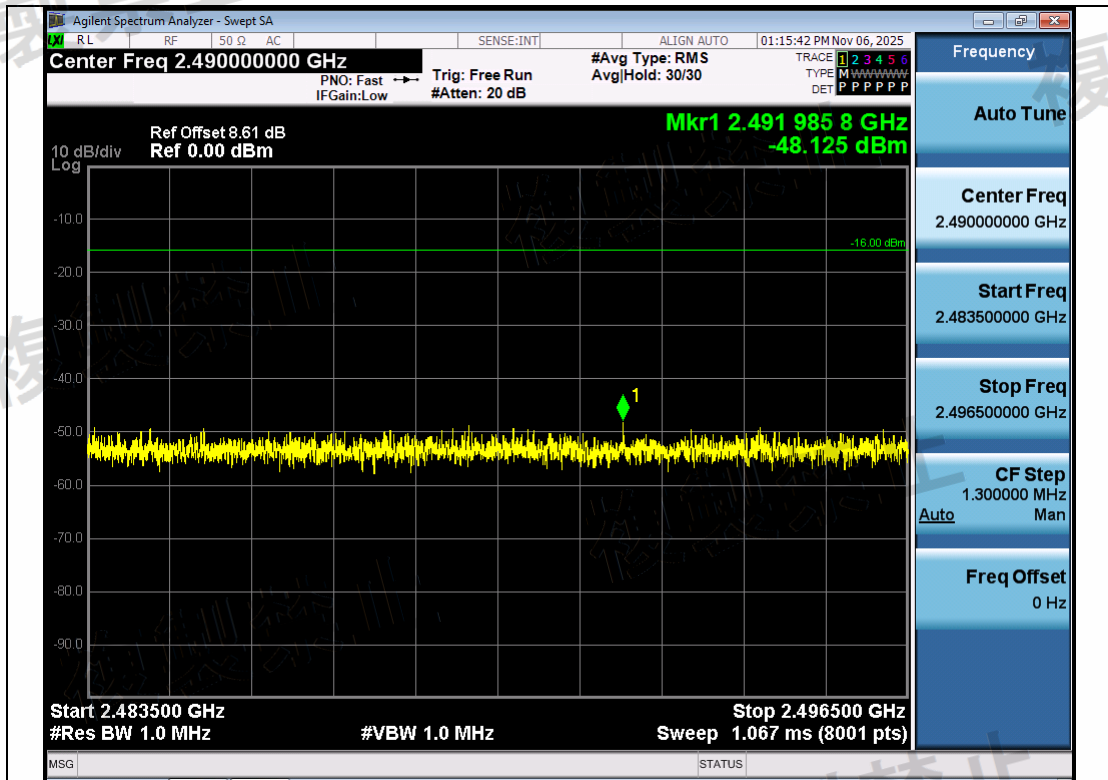
NTNV-SRD-Ant1-2402-2496.5~13000-PASS



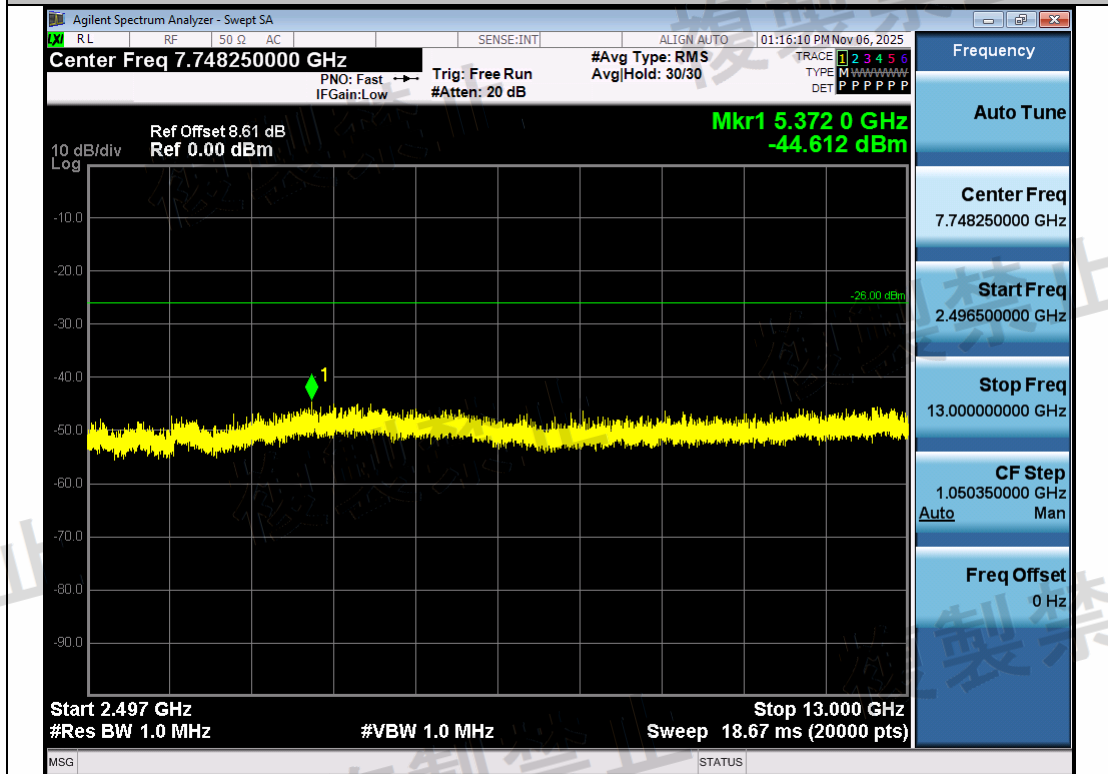
NTNV-SRD-Ant1-2441-30~2387-PASS



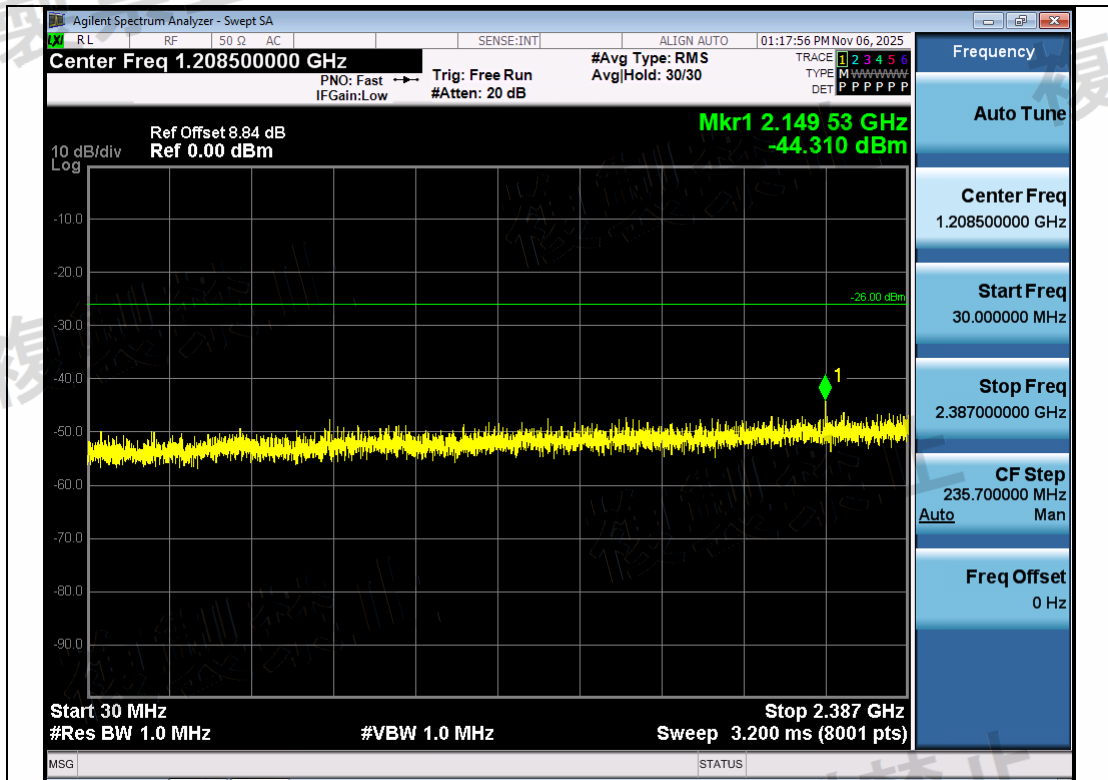
NTNV-SRD-Ant1-2441-2387~2400-PASS



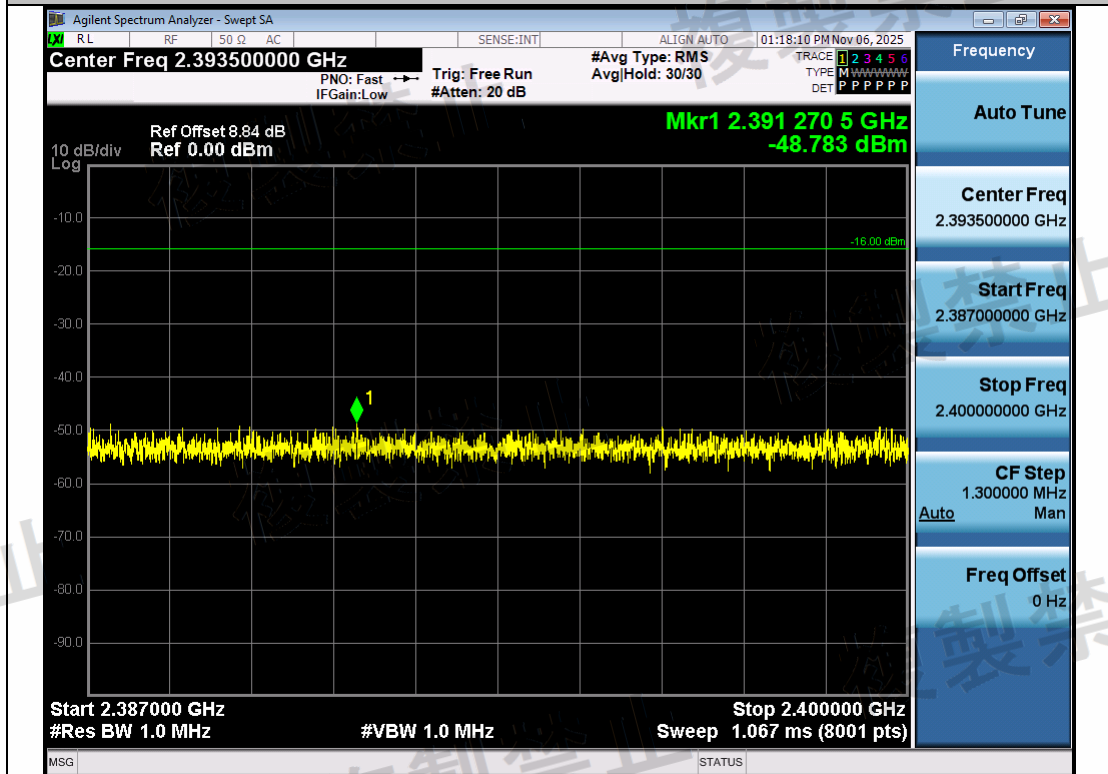
NTNV-SRD-Ant1-2441-2483.5~2496.5-PASS



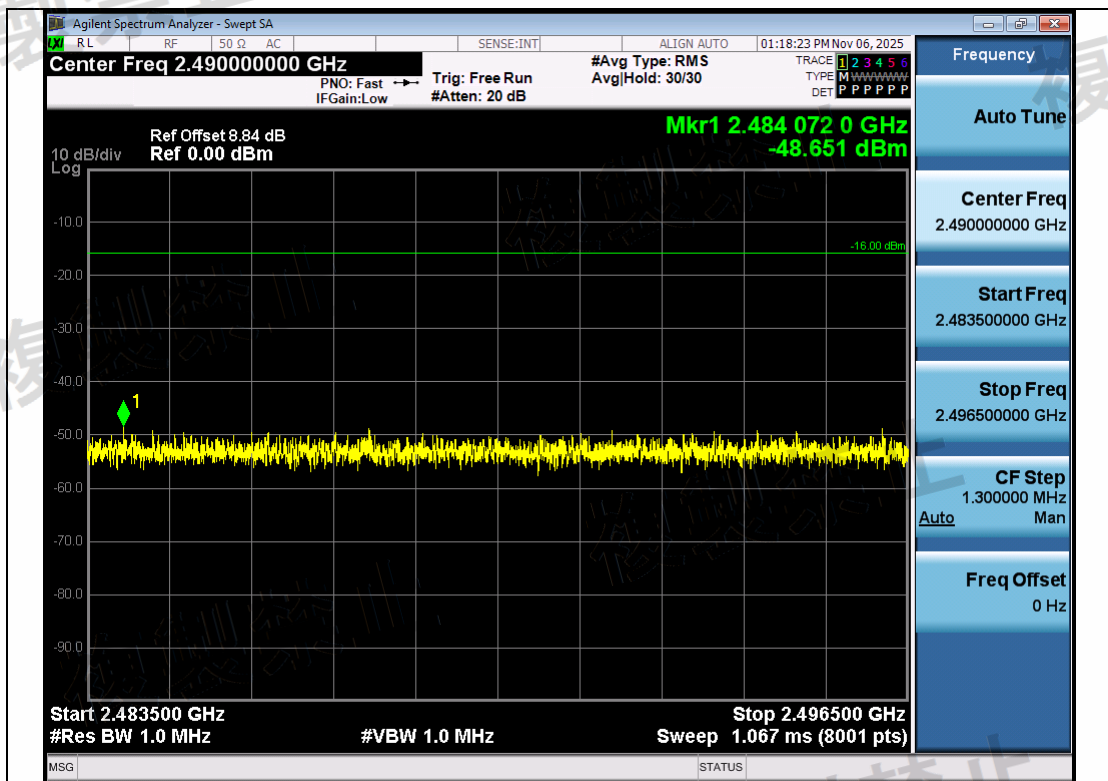
NTNV-SRD-Ant1-2441-2496.5~13000-PASS



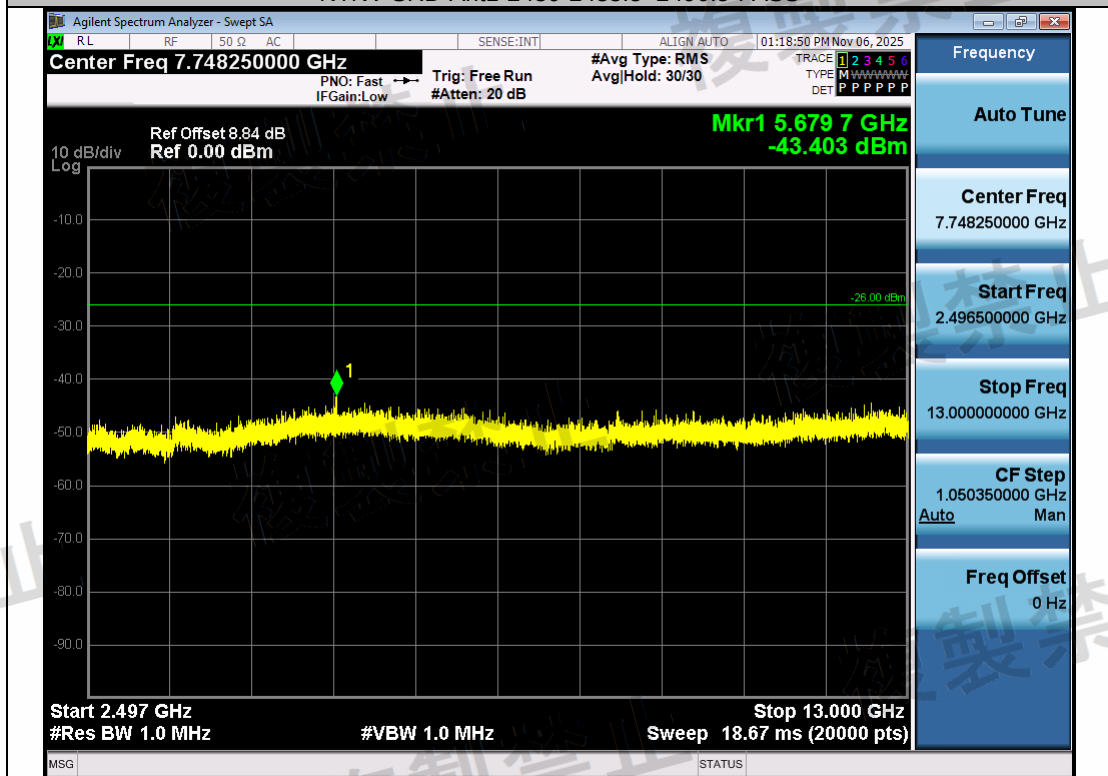
NTNV-SRD-Ant1-2480-30~2387-PASS



NTNV-SRD-Ant1-2480-2387~2400-PASS



NTNV-SRD-Ant1-2480-2483.5~2496.5-PASS



NTNV-SRD-Ant1-2480-2496.5~13000-PASS

8.6 COLLATERAL EMISSIONS OF RECEIVER

8.6.1 Applicable Standard

According to ARIB STD-T66 Clause 3.3(1)

8.6.2 Conformance 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 (-54dBm) or less at a frequency below 1 GHz and 20 nW(-47dBm) or less at a frequency of 1 GHz or higher as measured using the circuit.

- | | |
|----------------------|-----------------------|
| a. 30 MHz - 1000 MHz | 4 nW (-54dBm) or less |
| b. 1GHz – 12.5 GHz | 20 nW(-47dBm) or less |

8.6.3 Test Configuration

Test according to clause 6.1 radio frequency test setup 1

8.6.4 Test Procedure

Set the EUT so that the test frequency is can be measured receipt consecutively all the time.

- (1) Set the attenuation value of the dummy load lowest as possible, due to low level of the measured object.
- (2) Set Spectrum analyzer for seeking the collateral emission is set as below.

Sweeping Bandwidth	30MHz to 5 times of carrier frequency
Resolution Bandwidth	In case of frequency lower than 1 GHz, 100 kHz In case of frequency higher than 1 MHz
Video Bandwidth	Same level as the resolution bandwidth
Sweep Time	Minimum time to assure the measurement accuracy
Y-Axis Scale	10 dB/Div
Sweep Mode	Single sweep
Phase-Detection Mode	Positive peak

- (3) Spectrum analyzer for measuring the collateral emission is set as below.

Central Frequency	Collateral emission frequency
Sweeping Bandwidth	0 Hz
Resolution Bandwidth	In case of frequency lower than 1 GHz, 100 kHz In case of frequency higher than 1 MHz
Video Bandwidth	Same level as the resolution bandwidth
Sweep Mode	Single sweep
Detection Mode	Sample

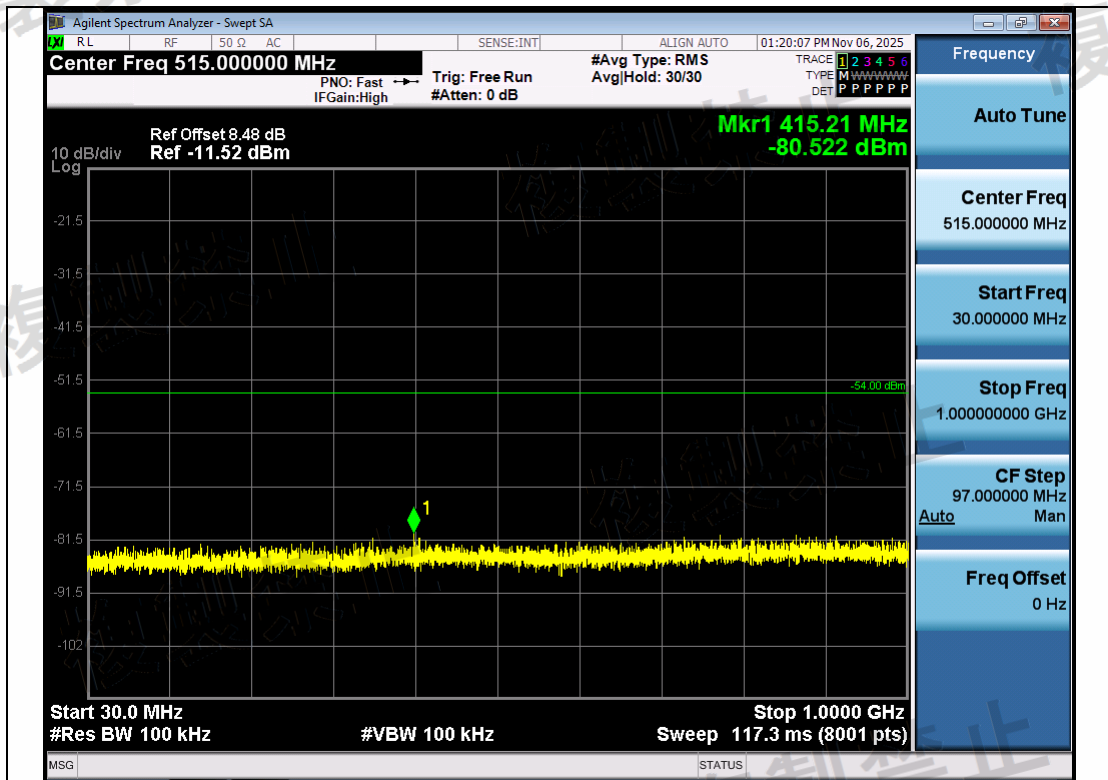
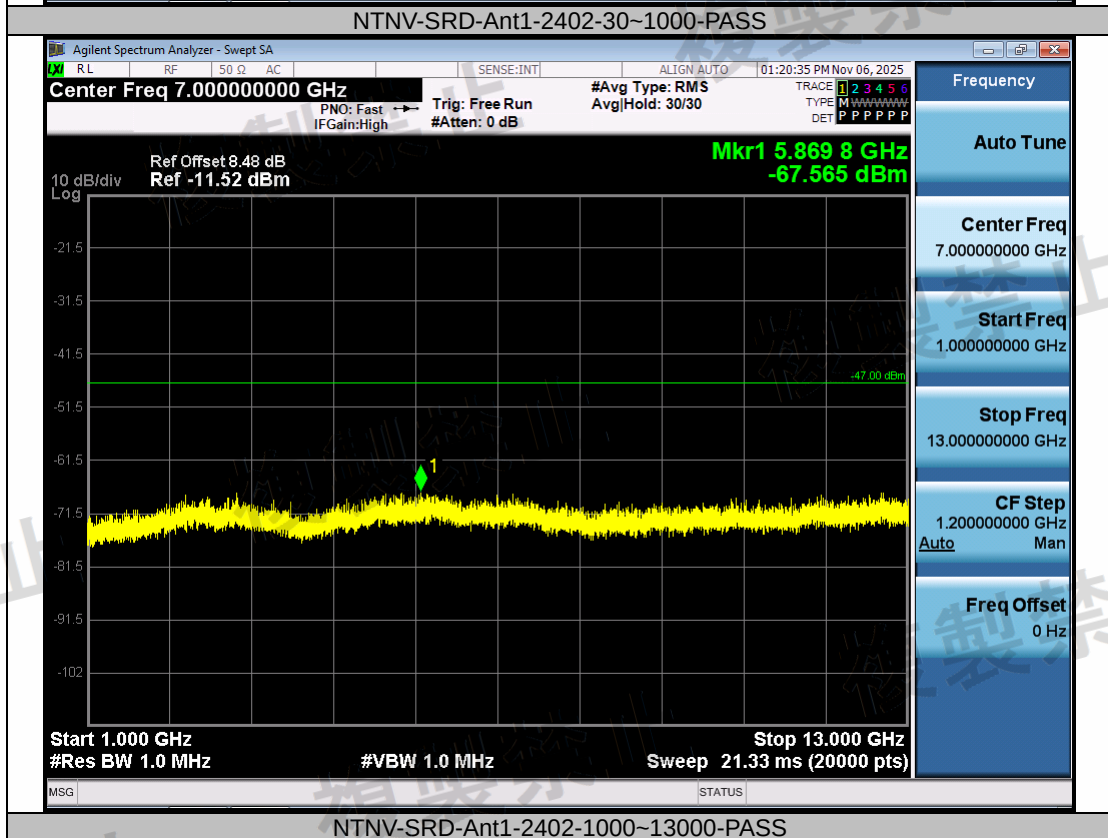
Set the spectrum analyzer as (2), seek the maximum amplitude of the collateral emission.

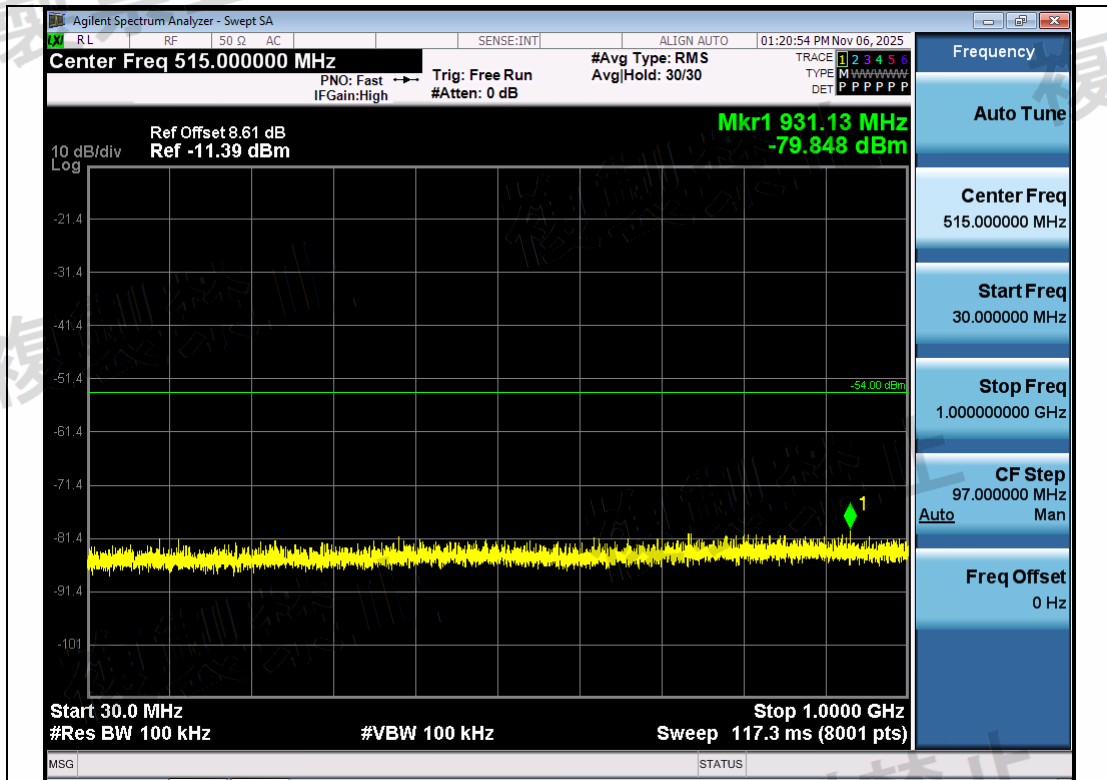
In case of sought result lower than 1/10 limit value, employ the sought value as the measured value.

In case the sought value exceeds 1/10 limit value, seek the collateral emission frequency by narrowing the sweeping band sequentially to 1/10 for the purpose of higher accuracy of the spectrum analyzer. Set the spectrum analyzer as (3).

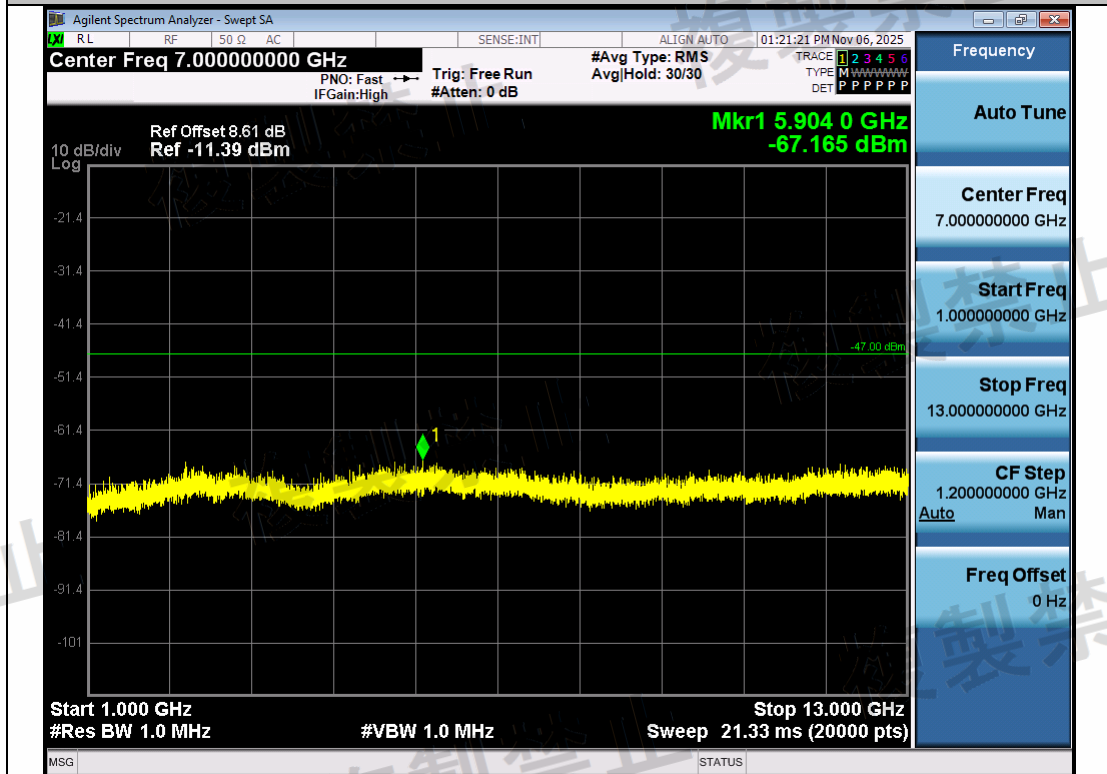
8.6.5 Test Results

TestCondition	TestMode	Antenna	Freq(MHz)	Freq.Range [MHz]	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [nW]	Limit [nW]	Verdict
NTNV	SRD	Ant1	2402	30~1000	415.21	-80.52	≤-54	0.00887	≤4	PASS
NTNV	SRD	Ant1	2402	1000~13000	5869.84	-67.57	≤-47	0.17498	≤20	PASS
NTNV	SRD	Ant1	2441	30~1000	931.13	-79.85	≤-54	0.01035	≤4	PASS
NTNV	SRD	Ant1	2441	1000~13000	5904.05	-67.17	≤-47	0.19187	≤20	PASS
NTNV	SRD	Ant1	2480	30~1000	741.98	-79.61	≤-54	0.01094	≤4	PASS
NTNV	SRD	Ant1	2480	1000~13000	3181.11	-66.64	≤-47	0.21677	≤20	PASS

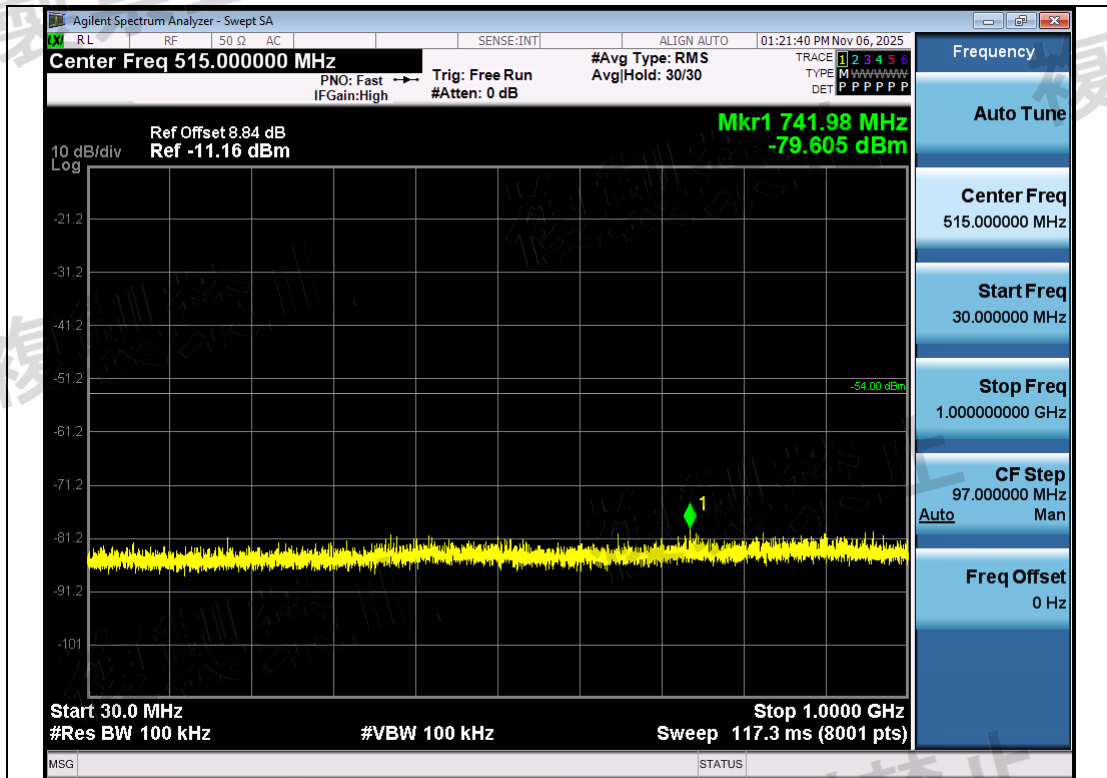




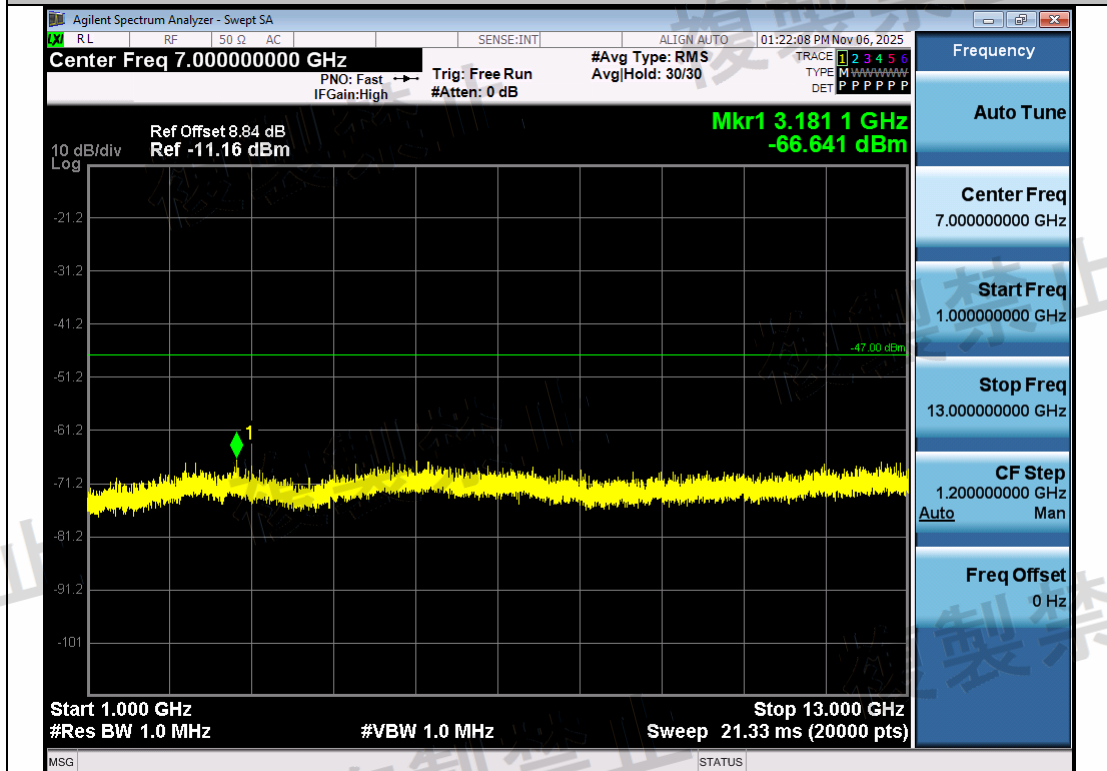
NTNV-SRD-Ant1-2441-30~1000-PASS



NTNV-SRD-Ant1-2441-1000~13000-PASS



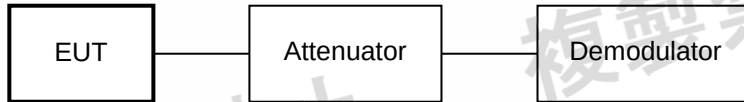
NTNV-SRD-Ant1-2480-30~1000-PASS



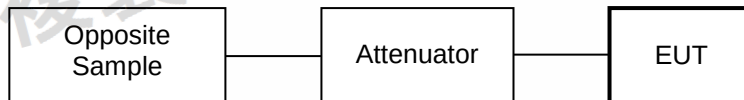
NTNV-SRD-Ant1-2480-1000~13000-PASS

8.7 INTERFERENCE PREVENTION FUNCTION

(1) In case identification code is transmitted



(2) In case identification code is received



(3) Measuring Equipment Conditions

- The Demodulator shall demodulate the TX-signal transmitted by the EUT and be able to display the contents of the identification code.
- The opposite sample shall be able to transmit TX-signal equivalent to the TX-signal transmitted by the EUT.

(4) Conditions of EUT

The EUT is set on the usual operating mode.

(5) Measurement Procedure

- In case the EUT possesses function to transmit identification code automatically
 - Predetermined identification code is transmitted by the EUT.
 - Verify the transmitted identification code.
- In case the EUT possesses function to receive identification code automatically
 - Predetermined identification code is transmitted by the opposite sample.
 - Verify the working of the normal communication.
 - Other code than the predetermined identification code is transmitted by the opposite sample.
 - Verify the EUT to stop transmitting or to display that the ID code is different.

8.7.1 Test Results

PASS

Test Item	Test Result
Transmitting Function of Identification Code	>48 bits
Receiving Function of Identification Code	>48 bits

8.8 RF ACCESSIBILITY

Standard requirement

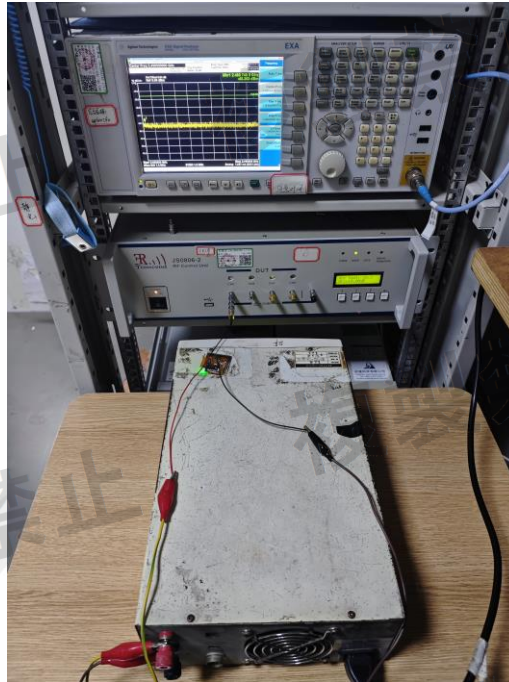
Article 49-20, paragraph 1 (a)

The EUT shall be constructed in such a way that sensitive RF parts, (like modulation and oscillator parts) cannot be reached easily by the user. These parts shall be covered by soldered metal caps or glue or by other mechanical covers. If the covers are fixed with screws, these shall be not the common type(s) like a Phillips, but special versions like Torx, so that the user cannot open the device with common tools.

☐	Sealed with special screws.
☐	Plastic chassis is being welded using ultrasonic waves.
☐	Chassis is glued using a special adhesive.
☐	Metal covers are spot-fused.
☐	Cover is specially interlocked.
☒	RF and Modulation components are covered with shielding case and this shielding case is soldered.
☐	Shield case is welded at RF and modulation parts, and ID-ROM is welded using the BGA Method.
☐	Shield case is welded at RF and modulation parts, and ID-ROM is glued at its lead with a special adhesive.
☐	Shield case is welded at RF and modulation parts, and ID-ROM is glued with anon-transparent laminating agent.
☐	RF and Modulation parts are mounted on PCB with surface mount technology, and there is no any adjustable parts on PCB or adjustable parts are not exposed.

Test result: Pass

9 APPENDIX PHOTOGRAPHS OF TEST SETUP



----- END OF REPORT -----