

## AURSINC NanoVNA-H4

# AURSINC NanoVNA-H4 Vector Network Analyzer Instruction Manual

Model: NanoVNA-H4

## 1. PRODUCT OVERVIEW

The AURSINC NanoVNA-H4 is a compact, handheld Vector Network Analyzer designed for precise RF measurements. It features a 4-inch LCD display, a 1950mAh battery for portable use, and can also be powered via USB. This device is ideal for antenna performance measurement, S-parameter analysis, and various RF testing applications for hobbyists and professionals.

Equipped with the latest HW 4.3 version, the NanoVNA-H4 includes an SD card slot for convenient data storage and screenshots. Its improved frequency algorithm extends measurement capabilities up to 1.5GHz, offering excellent dynamic range across different frequency bands.

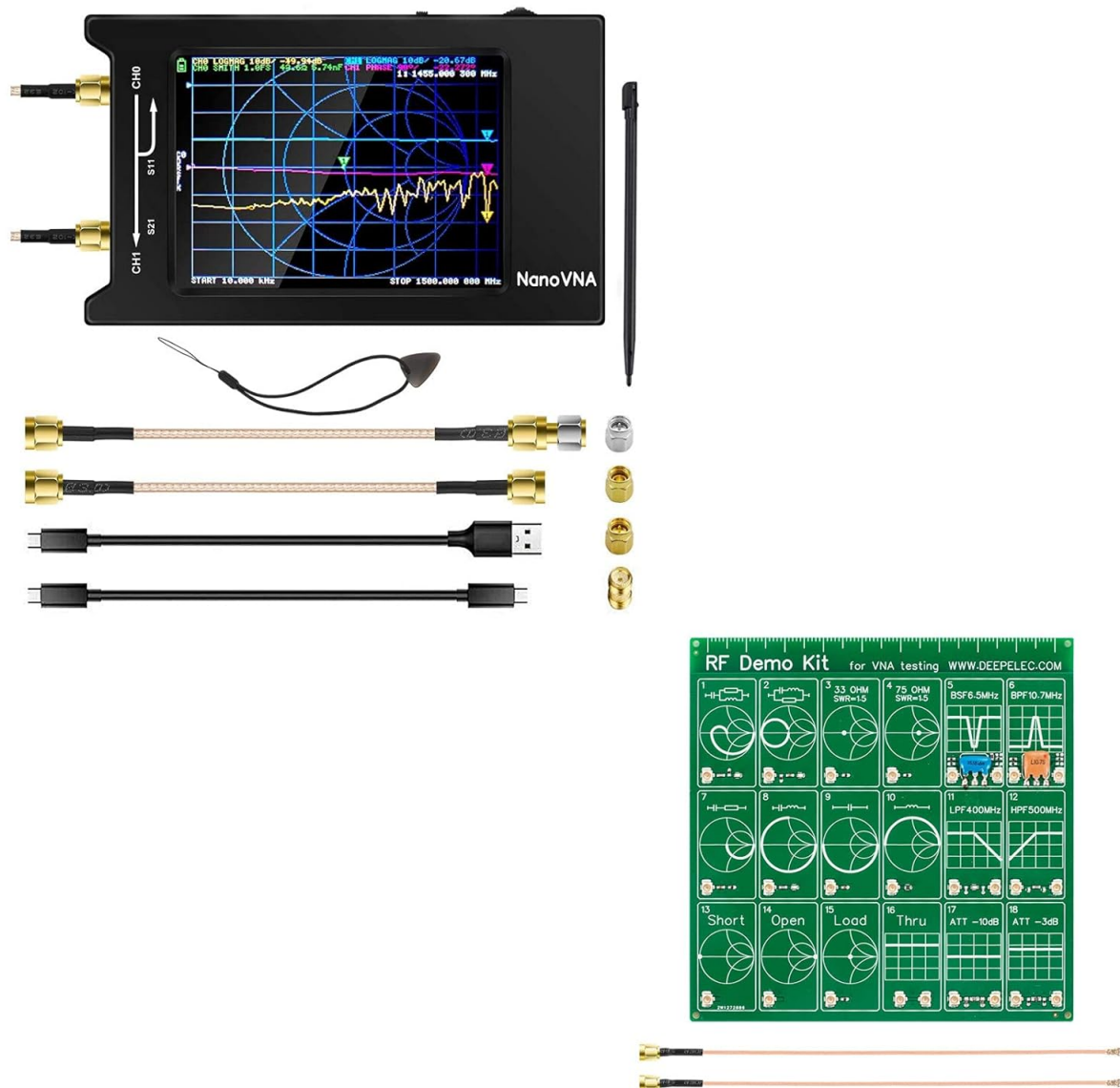


Figure 1.1: The NanoVNA-H4 Vector Network Analyzer with included cables, calibration kit, and RF Demo Kit.

## 2. PACKAGE CONTENTS

Please verify that all items listed below are included in your package:

- 1 x NanoVNA-H4 Host (with 1950mAh battery)
- 1 x USB Type-C Data Cable
- 2 x 30mm SMA Male to Male RG174 RF Cables
- 1 x SMA Simple Calibration Kit (OPEN/LOAD/SHORT)
- 1 x SMA Female to Female Connector
- 1 x PCB RF Tester Board (RF Demo Kit)
- 2 x 20cm Adapter Cables (for RF Demo Kit)

## 3. SETUP

### 3.1 Initial Charging

Before first use, ensure the NanoVNA-H4 is fully charged. Connect the included USB Type-C data cable to the device and a standard USB power adapter (not included) or a computer USB port. The device can be used while charging.

### 3.2 Powering On/Off

To power on the device, press and hold the power button located on the side. To power off, press and hold the power button again until the display shuts down.

### 3.3 SD Card Installation

The NanoVNA-H4 supports MicroSD cards up to 32GB for data storage and screenshots. Insert the MicroSD card into the dedicated slot on the side of the device. Ensure the card is inserted correctly to avoid damage. Note that only low-speed, SPI mode SD cards are currently compatible.

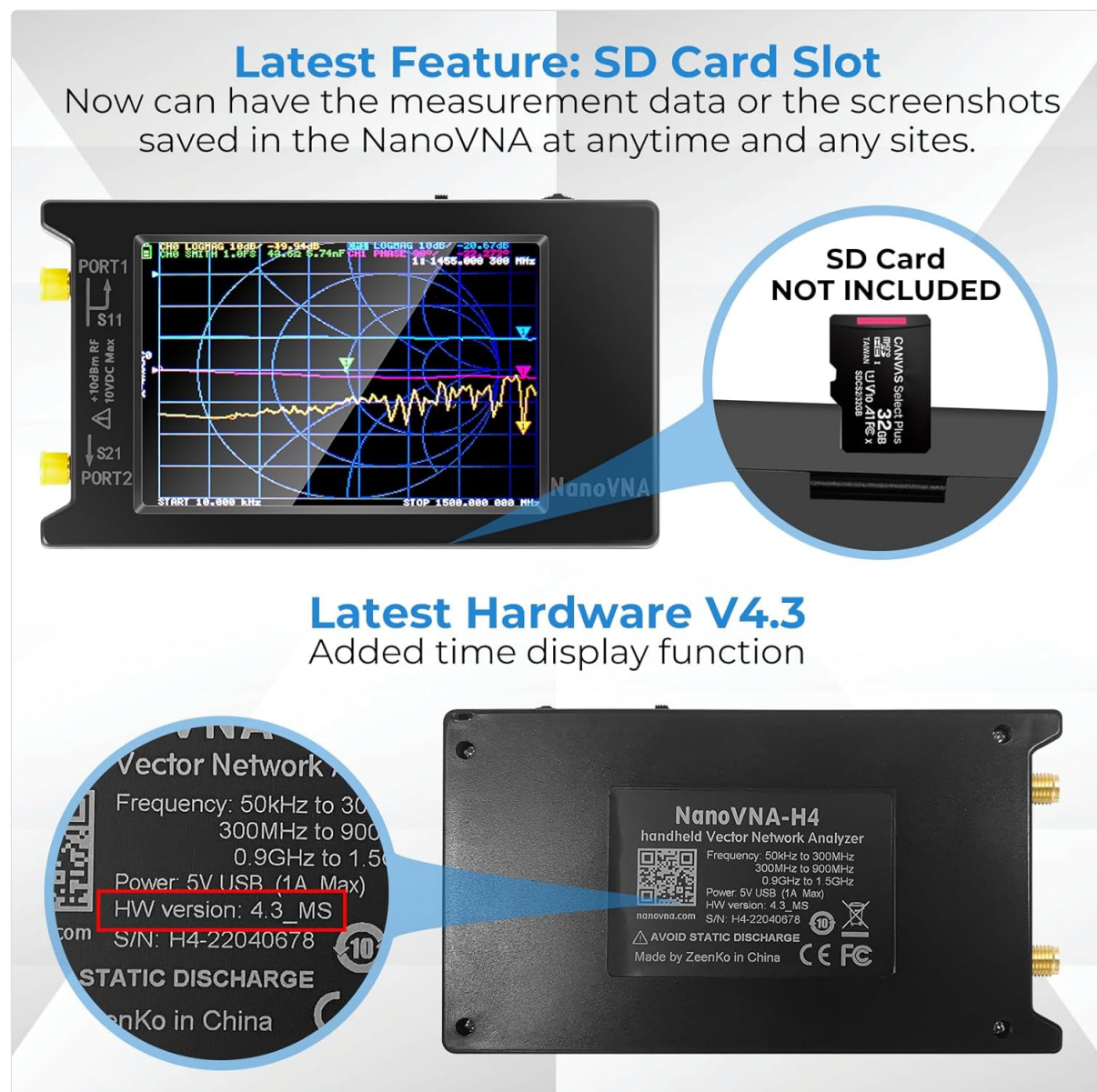


Figure 3.1: Location of the SD card slot on the NanoVNA-H4. An SD card is not included in the package.

## 4. OPERATING THE NANOVNA-H4

### 4.1 User Interface and Navigation

The NanoVNA-H4 features a 4-inch touch-sensitive LCD display for interaction. Navigate through menus and settings by tapping on the screen. A stylus is included for precise input.



Figure 4.1: The NanoVNA-H4's 4-inch display supports touch input. Key features include 10KHz-1.5GHz frequency range, USB connectivity, 1950mAh battery, and Hardware Version 4.3.

### 4.2 Calibration

Calibration is crucial for accurate measurements. It should be performed whenever the frequency range is changed. The calibration status will be displayed on the screen. Use the provided OPEN, SHORT, and LOAD calibration standards.

1. Connect the appropriate calibration standard (OPEN, SHORT, or LOAD) to the NanoVNA-H4's port.
2. Follow the on-screen instructions to perform the calibration steps.
3. Once calibration is complete, the status display will show 'CnDRSTX', where 'n' indicates the data number being loaded.

# Calibration NanoVNA

Calibration basically be performed whenever the frequency range to be measured is changed. If the error has been corrected correctly, the calibration status display on the screen will be CnDRSTX.  
n is the data number being loaded

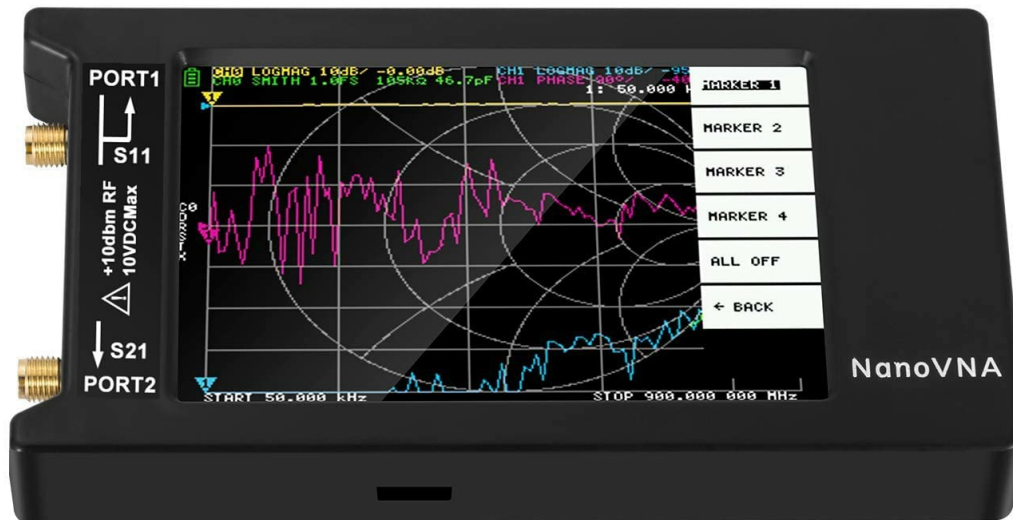


Figure 4.2: The calibration process involves connecting Open, Short, and Load standards to the device's ports.

## 4.3 Measurement Parameters

The NanoVNA-H4 can measure various S-parameters:

- **S11 (Reflection Measurement):** Measures the reflection coefficient of a device.
- **S21 (Transmission Measurement):** Measures the transmission coefficient between two ports.

For S12 and S22 measurements, the transceiver port wiring needs to be manually swapped.

## 4.4 PC Control with NanoVNASaver

The NanoVNA-H4 can be connected to a computer via the USB Type-C cable to use the NanoVNASaver software. This software allows for data extraction, display on a larger screen, and saving data to Touchstone (.snp) files for further analysis and simulation.

For more information and software downloads, please visit the official NanoVNA website:

<http://nanovna.com>



# PC Control via Nano Saver

A multiplatform tool to save Touchstone files from the NanoVNA, sweep frequency spans in segments to gain more than 101 data points, and generally display and analyze the resulting data.



Figure 4.3: The NanoVNA-H4 connected to a PC, displaying measurement data via NanoVNASaver software.

## 5. USING THE RF DEMO KIT

The included RF Demo Kit is a PCB test board designed for learning and testing various RF circuits with your NanoVNA-H4. It features 18 functional modules, including filters, attenuators, and calibration circuits.

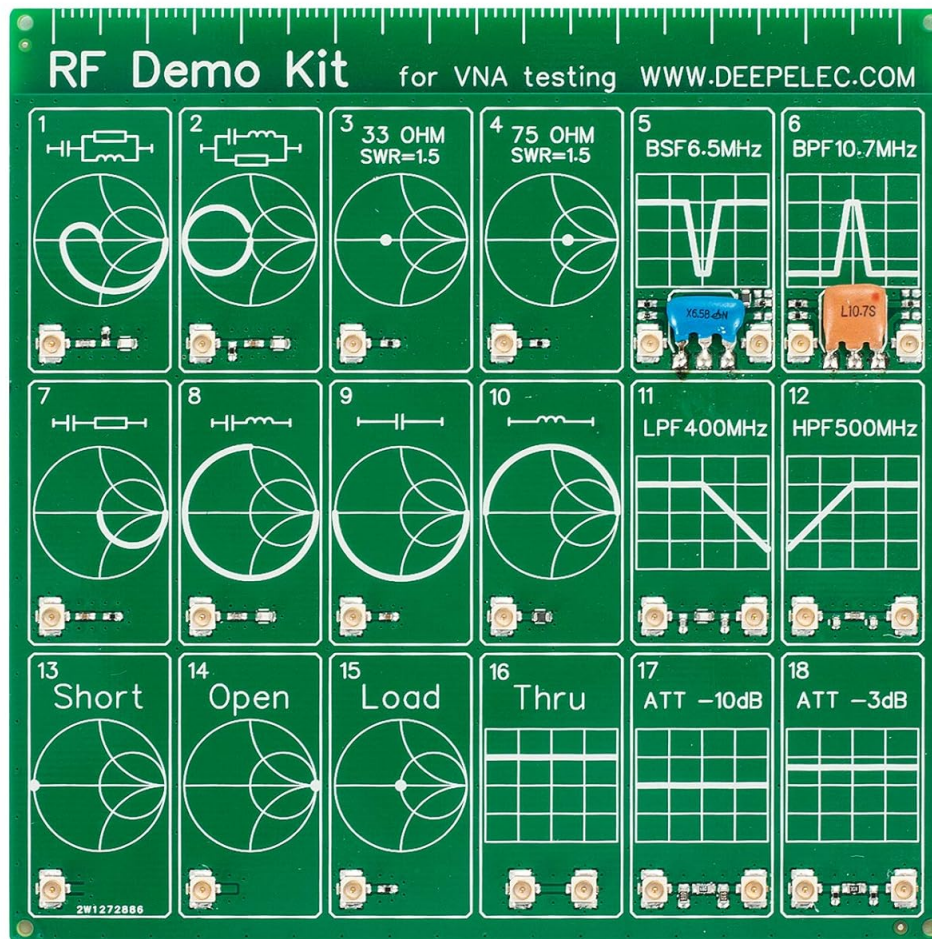
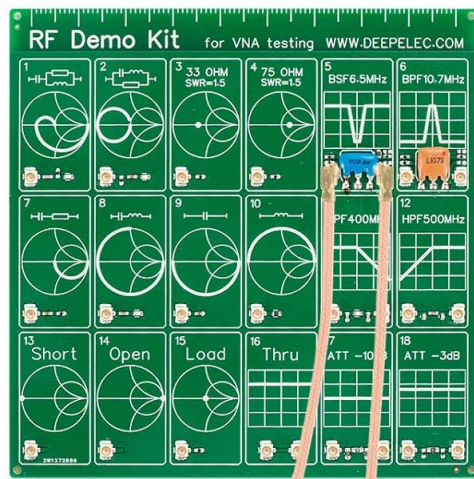


Figure 5.1: The RF Demo Kit PCB board, measuring 10cm x 10cm, featuring 18 distinct functional modules for RF testing.

## 5.1 Preparing the RF Demo Kit

1. Connect the two 20cm SMA to IPEX adapter cables to the NanoVNA-H4 (or NanoVNA-F, as shown in some diagrams).
2. Before testing specific circuits on the board, recalibrate your NanoVNA-H4 using the calibration circuits (13 Short, 14 Open, 15 Load, and 16 Thru) located on the RF Demo Kit itself. Save these parameters to SAVE 0 on your device.



# RF Demo Kit

Help to measure 6.5m  
ceramic notch filter and homemade  
low-pass-filter,  
3db bandwidth about 400mhz



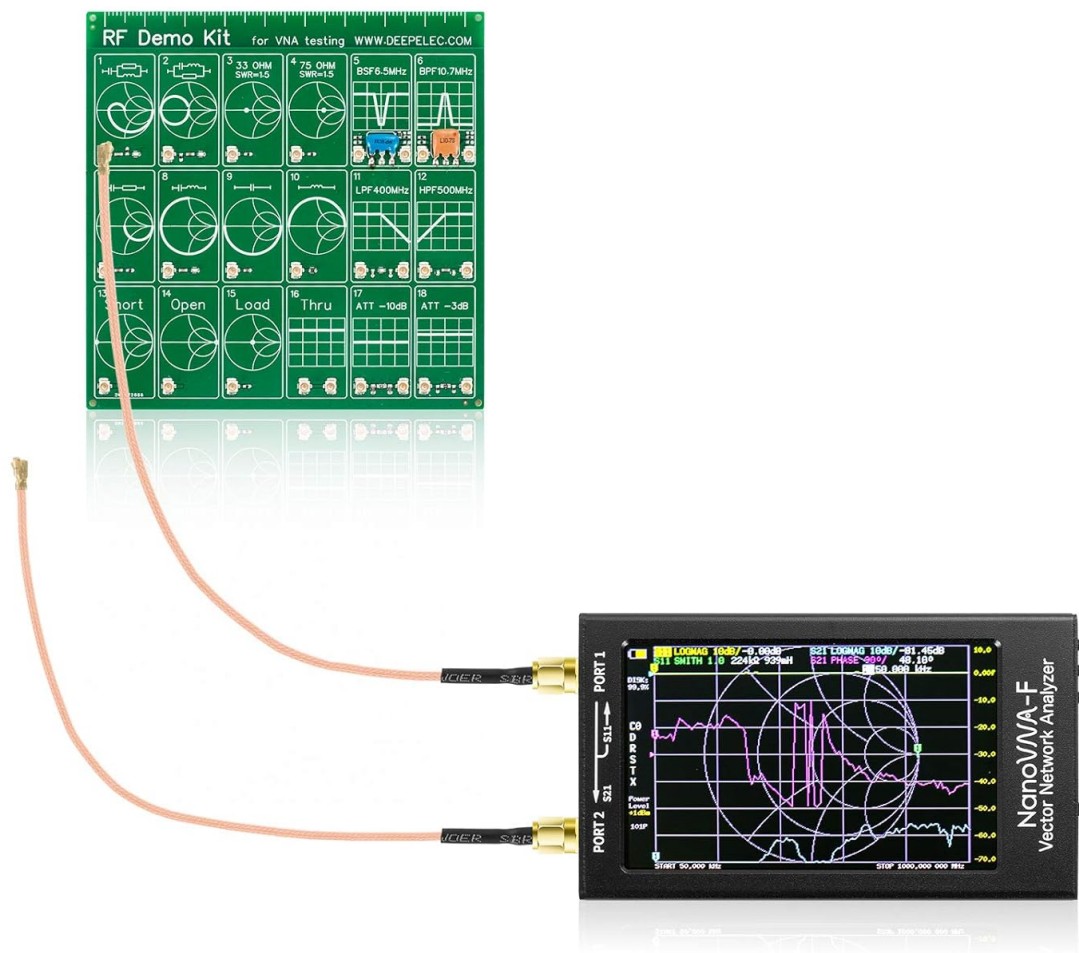
Figure 5.2: Example setup showing the RF Demo Kit connected to a NanoVNA for circuit analysis.

## 5.2 Functional Modules

The RF Demo Kit includes modules for testing various components and circuits, such as:

- 30MHz short wave low-pass filter (LPF)
- 100MHz FM high-pass filter (HPF)
- 433MHz common SAW band pass filter (BPF)
- 6.5MHz ceramic trap (BSF)
- Attenuators (-10dB, -3dB)
- RLC series-parallel circuits





## Circuit1. RLC Series-parallel circuit

Display S11 Smith Chart, START=50kHz, STOP=600MHz

Figure 5.3: Testing an RLC series-parallel circuit on the RF Demo Kit, displaying the S11 Smith Chart on the NanoVNA.

## 6. SPECIFICATIONS

Feature	Specification
Frequency Range	10KHz - 1.5GHz
Display	4-inch LCD (Touch Screen)
Battery Capacity	1950mAh
Power Supply	USB Type-C (5V) or Internal Battery
Hardware Version	HW 4.3
SD Card Support	Up to 32GB (MicroSD, low-speed, SPI mode)
Dynamic Range (50K-300MHz)	>70dB

Feature	Specification
Dynamic Range (300M-900MHz)	>60dB
Dynamic Range (900M-1.5GHz)	>40dB
PC Software Compatibility	NanoVNASaver (for Touchstone files)
RF Demo Kit Size	10cm x 10cm (3.9in x 3.9in)
RF Demo Kit Modules	18 functional modules (filters, attenuators, calibration)

## 7. TROUBLESHOOTING

### 7.1 Common Issues and Solutions

- **Device not powering on:** Ensure the battery is charged. Connect the USB Type-C cable to a power source and try again.
- **Inaccurate measurements:** Perform a full calibration using the provided OPEN, SHORT, and LOAD standards. Ensure cables are securely connected and not damaged. Recalibrate if the frequency range is changed.
- **SD card not recognized:** Ensure the MicroSD card is inserted correctly. Verify that it is a low-speed, SPI mode compatible card. Try formatting the card (this will erase all data on the card).
- **No display or flickering screen:** Recharge the device. If the issue persists, contact customer support.
- **PC software (NanoVNASaver) not connecting:** Ensure the USB cable is properly connected. Install the necessary drivers if prompted by your operating system. Restart both the NanoVNA-H4 and the computer.

## 8. MAINTENANCE

To ensure the longevity and optimal performance of your NanoVNA-H4, follow these maintenance guidelines:

- **Cleaning:** Use a soft, dry cloth to clean the device. Avoid using abrasive cleaners or solvents.
- **Storage:** Store the device in a cool, dry place away from direct sunlight and extreme temperatures.
- **Battery Care:** For long-term storage, charge the battery to approximately 50% to prevent deep discharge. Recharge periodically if not in use for extended periods.
- **Cable Care:** Handle RF cables carefully. Avoid sharp bends or kinks that can damage the internal conductors.

## 9. WARRANTY AND SUPPORT

AURSINC is committed to providing high-quality products and excellent customer service.

- **Warranty:** This product comes with a 365-day warranty from the date of purchase.
- **Returns/Exchanges:** We offer a 30-day exchange or return policy.
- **Customer Service:** For any questions or concerns, our customer service team is available to assist you within 24 hours.



Figure 9.1: AURSINC's commitment to customer satisfaction, including warranty and support details.

Please refer to your purchase documentation or visit the AURSINC store on Amazon for detailed warranty terms and contact information.



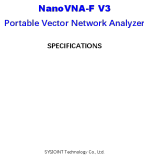

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### Related Documents - NanoVNA-H4

[NanoVNA-H4 Resources: Firmware, Software, and User Guides](#)

#### [NanoVNA Resources: Firmware, Software, and User Guides](#)

Find essential resources for the NanoVNA, including firmware downloads, VNA-QT software, NanoVNA-Saver, and user guides. Access the latest updates and community information.

	<p><a href="#">NanoVNA: Guida Introduttiva e Versioni</a></p> <p>Esplora il NanoVNA, un analizzatore di rete vettoriale compatto. Questa guida fornisce una panoramica delle sue versioni, funzionalità e menu, con collegamenti utili per utenti amatoriali e professionisti.</p>
	<p><a href="#">NanoVNA: Funktionen, Modelle und Messtechnik erklärt</a></p> <p>Umfassender Leitfaden zum NanoVNA: Erfahren Sie mehr über die Funktionen, verschiedenen Modelle (NanoVNA-H, V2, H4), Kalibrierung und HF-Messtechnik eines Vektornetzwerkanalysators.</p>
	<p><a href="#">NanoVNA-F V3 Portable Vector Network Analyzer Specifications</a></p> <p>Detailed specifications, features, and shipping contents for the SYSJOINT NanoVNA-F V3, a portable vector network analyzer designed for RF testing, antenna analysis, and S-parameter measurements across a 1MHz to 6GHz frequency range.</p>
	<p><a href="#">NanoVNA-F Handheld Vector Network Analyzer Manual</a></p> <p>This manual provides instructions and specifications for the NanoVNA-F Handheld Vector Network Analyzer, including product introduction, basic operations, calibration, firmware upgrades, and software usage.</p>