AURSINC NanoVNA-H4

AURSINC NanoVNA-H4 Vector Network Analyzer User Manual

Model: NanoVNA-H4

1. Introduction

The AURSINC NanoVNA-H4 is a compact and portable Vector Network Analyzer (VNA) designed for precise RF measurements. It features a 4-inch LCD touchscreen and supports a frequency range from 10 KHz to 1.5 GHz. This manual provides detailed instructions for setting up, operating, and maintaining your NanoVNA-H4, ensuring optimal performance for amateur radio enthusiasts, electrical engineers, and antenna builders.

2. Package Contents

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

Image: The NanoVNA-H4 unit with its full set of accessories, including cables, calibration kit, and stylus.

- 1x NanoVNA-H4 Host (with 1950mAh battery)
- 1x USB Type-C data cable
- 2x 30cm / 11.8 inch SMA male to male RF cables
- 1x Simple SMA calibration kit (Open/Load/Short)
- 1x SMA female to female connector
- 1x Lanyard with stylus
- 1x Touchscreen pen

Image: A detailed layout of all components included in the NanoVNA-H4 package, clearly labeled.

3. Setup

3.1 Powering On and Charging

The NanoVNA-H4 comes with a built-in 1950mAh rechargeable battery. To charge the device, connect it to a PC or a USB power adapter using the provided USB Type-C cable.

Image: The NanoVNA-H4 connected to a laptop via a USB Type-C cable, illustrating the charging process and battery indicator.

A full charge provides approximately 8 hours of standby time. The charging indicator will provide status updates.

3.2 SD Card Installation (Optional)

The NanoVNA-H4 features an SD card slot for data storage and saving screenshots. It supports memory cards up to 32GB (SD card not included).

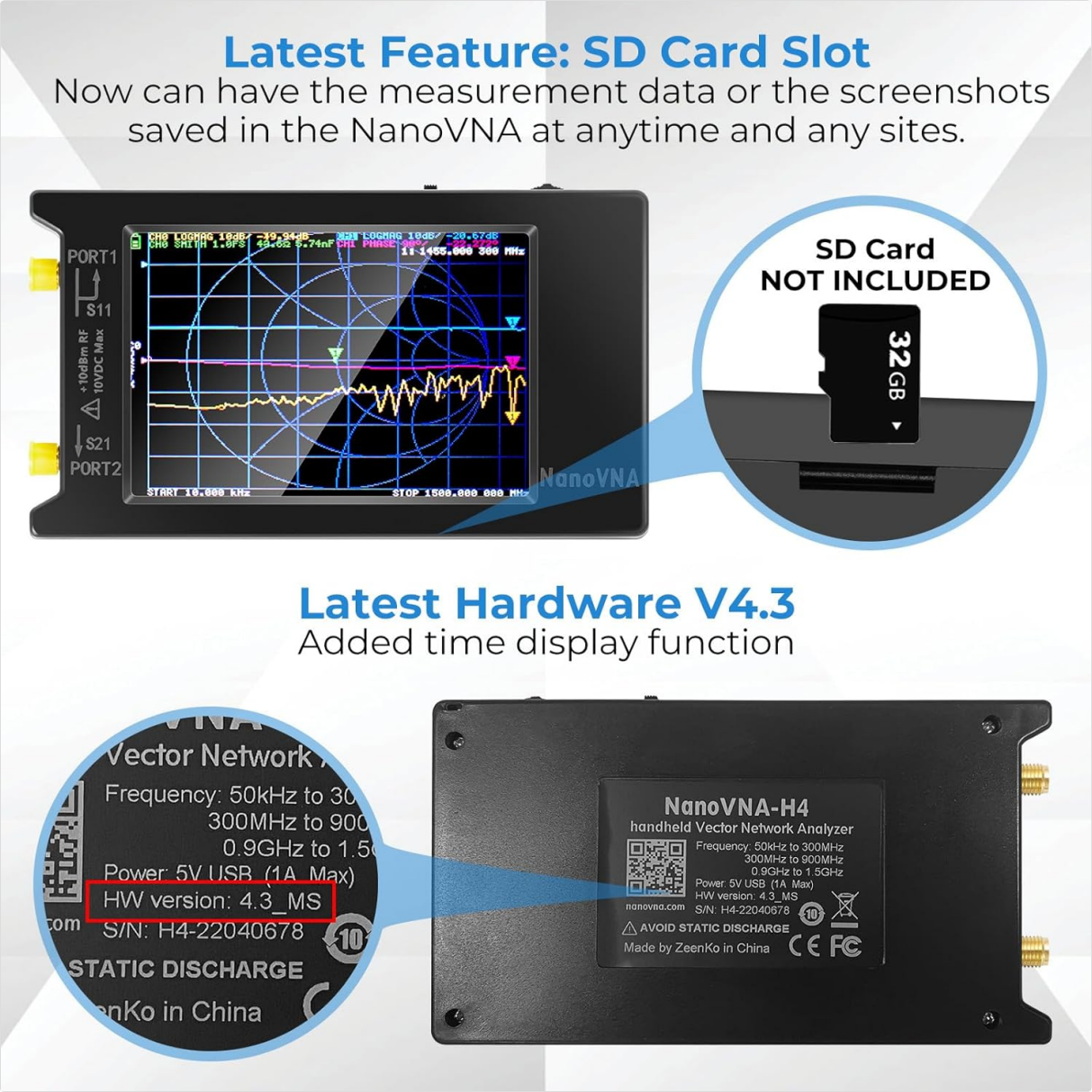

Image: Close-up view of the NanoVNA-H4 showing the SD card slot and the hardware version (V4.3).

Note: The NanoVNA currently only supports low-speed SD cards in SPI mode.

4. Operating Instructions

4.1 User Interface and Navigation

The NanoVNA-H4 features a 4-inch large touchscreen for clear data display and sensitive operation. Use the included stylus or your finger for interaction.

Image: A hand interacting with the NanoVNA-H4 touchscreen, highlighting the large display and showing the power and SD card ports.

4.2 Frequency Range and Measurement Capabilities

The NanoVNA-H4 utilizes an improved frequency algorithm, extending its measurement range up to 1.5 GHz by using the odd harmonic extension of the Si5351.

- **50 KHz - 300 MHz:** Direct output from Si5351, offering dynamic range greater than 70 dB.
- **300 MHz - 900 MHz:** Extended band, providing dynamic range greater than 60 dB.
- **900 MHz - 1.5 GHz:** Dynamic range better than 40 dB.

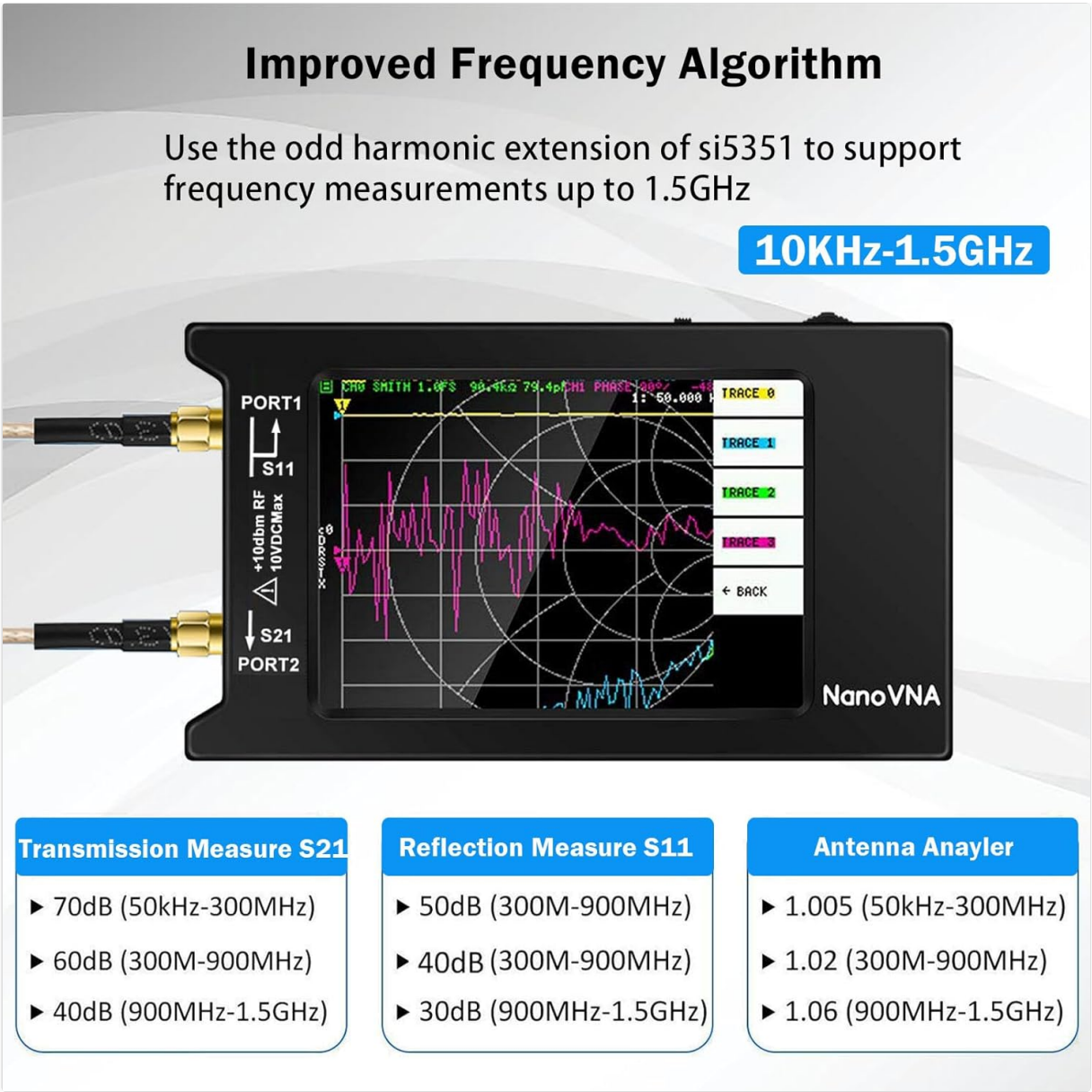

Image: The NanoVNA-H4 display showing frequency measurements, with a table detailing transmission (S21), reflection (S11), and antenna analysis capabilities across different frequency bands.

The primary function of the default firmware is for antenna performance measurement, providing excellent RF performance for S-parameter measurements (S11 and S21).

4.3 PC and Android Control

The NanoVNA-H4 can be connected to a computer or Android device using the NanoVNASaver software. This allows you to view data on a larger screen, save measurements, and export Touchstone (.snp) files for various radio design and simulation programs.

Image: The NanoVNA-H4 connected to a laptop and an Android phone, demonstrating control and data visualization via NanoVNASaver software.

To measure S12 and S22 parameters, you will need to manually swap the transceiver port wiring.

5. Calibration Function

Calibration is crucial for accurate measurements and should be performed whenever the frequency range changes. If an error has been correctly corrected, the calibration status display on the screen will show "CnDRSTX" where "n" represents the data number being loaded.

Image: The NanoVNA-H4 display during calibration, showing the use of Open, Short, and Load calibration standards.

Use the provided SMA calibration kit (Open, Short, Load) for precise calibration.

6. Applications

The NanoVNA-H4 is a versatile tool suitable for a wide range of RF applications, including:

- Antenna tuning and performance measurement (MF, VHF, HF, UHF)
- Testing new cable installations
- RF filter analysis (e.g., 10.7m Crystal filter)
- Measuring S-parameters (S11, S21)
- SWR (Standing Wave Ratio) measurement
- Balun testing
- Short wave analysis
- Time Domain Analysis for tracing errors

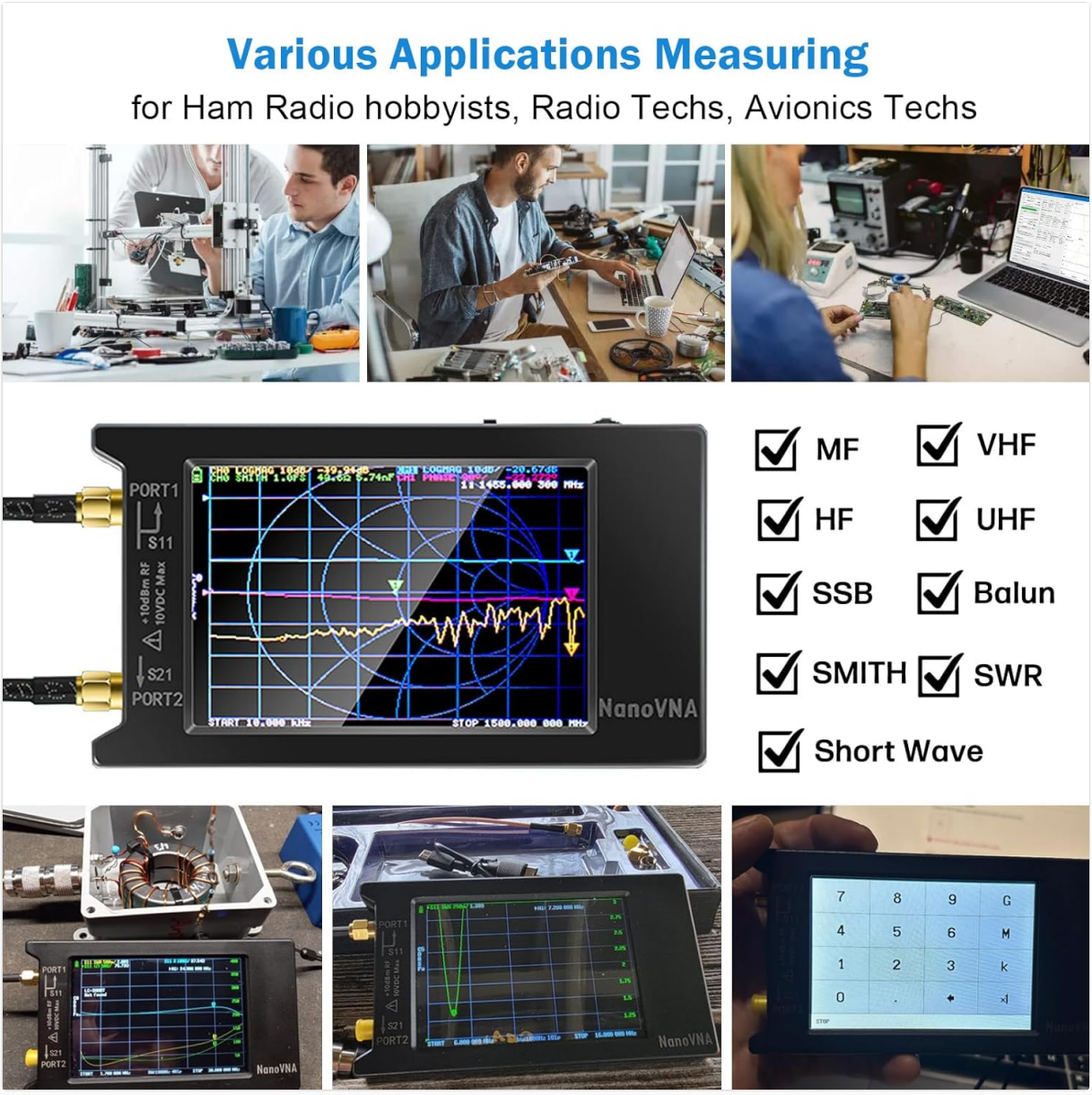

Image: A collage showing the NanoVNA-H4 being used in various scenarios, including ham radio setups, electronics labs, and field antenna testing.

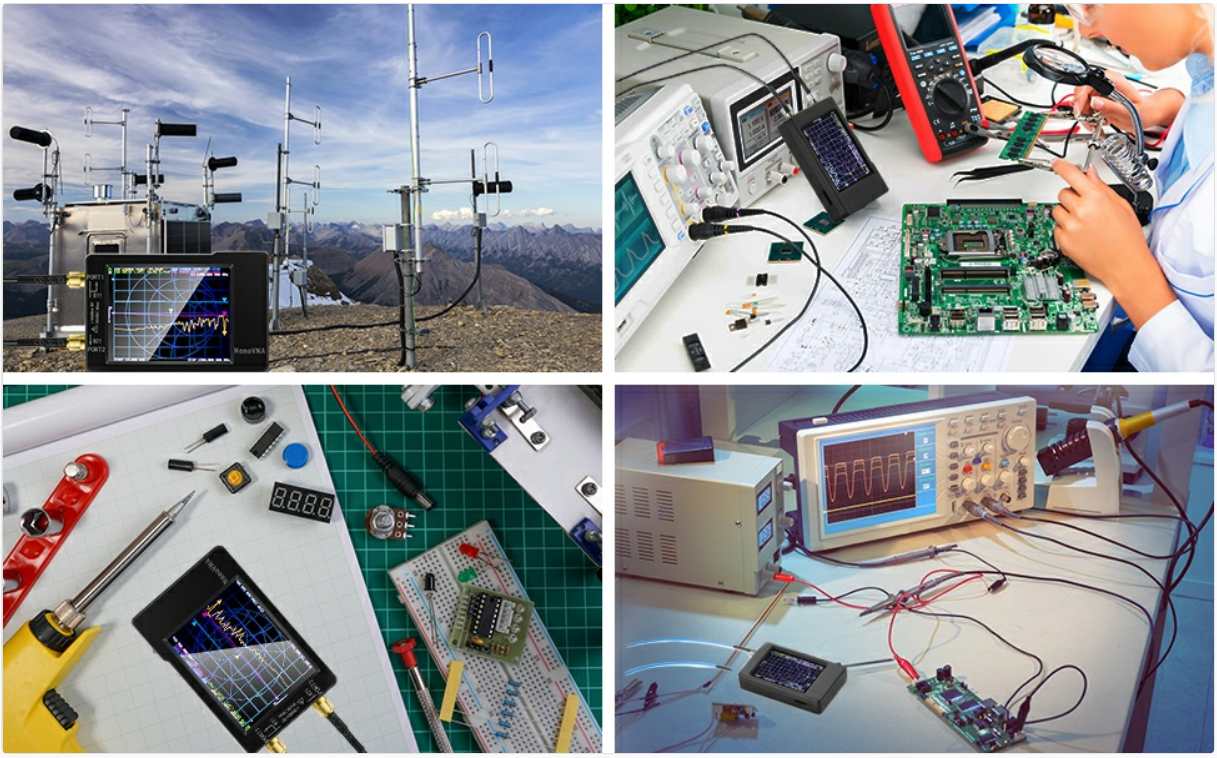

Image: Four distinct scenes demonstrating the NanoVNA-H4's utility in different measurement environments, from outdoor antenna setups to indoor circuit analysis.

Image: The NanoVNA-H4 connected to and measuring a 10.7m crystal filter.

Image: The NanoVNA-H4 connected to and measuring a UHF antenna.

Image: The NanoVNA-H4 connected to and measuring a VHF duplexer.

Image: The NanoVNA-H4 display showing a trace error using the time domain analysis function.

7. Specifications

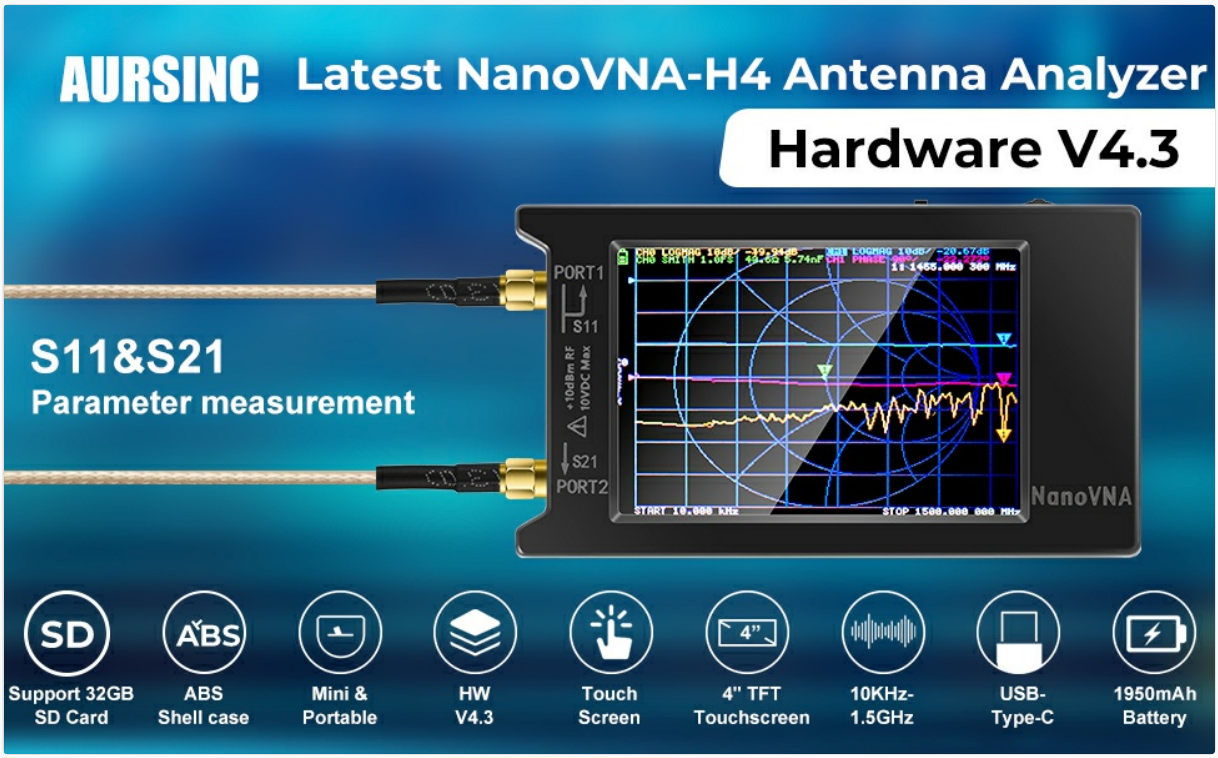

Image: The NanoVNA-H4 connected to a PC, with a list of key specifications displayed alongside.

Feature	Specification
Model Number	NanoVNA-H4
Display	4-inch TFT (320 x 240)
Measurement Frequency Range	10 KHz - 1.5 GHz
RF Output	0dBm (±2dBm)
Port SWR	< 1.1
Measurement Range (Dynamic)	70dB (50KHz-300MHz), 60dB (300M-900MHz), 40dB (900M-1.5GHz)
Battery	1950mAh Lithium-ion (included)
Power Supply	USB 5V 120mA (max charging current 300mA)

Feature	Specification
USB Communication Mode	CDC (serial)
Number of Scanning Points	101 (fixed)
Dimensions	54 x 85.5 x 11 mm (without connector, lever switch)
Weight	63 grams
Hardware Version	V4.3

8. Maintenance

- Keep the device clean and free from dust. Use a soft, dry cloth for cleaning.
- Avoid exposing the device to extreme temperatures, humidity, or direct sunlight.
- Store the NanoVNA-H4 and its accessories in a protective case when not in use to prevent damage.
- Ensure all connectors are clean and free of debris before making connections.

9. Troubleshooting

9.1 Device Not Powering On

- Ensure the battery is charged. Connect the device to a USB power source and allow it to charge for at least 30 minutes.
- Check the USB Type-C cable for damage and try a different cable or power source.

9.2 Inaccurate Measurements

- Perform a full calibration using the provided calibration kit. Calibration is essential for accurate results, especially when changing frequency ranges or test setups.
- Ensure all cable connections are secure and the cables are not damaged.
- Verify that the correct measurement parameters are selected on the device.

9.3 Connectivity Issues with PC/Android

- Ensure the correct drivers are installed on your PC.
- Verify that the NanoVNASaver software is the latest version.
- Try a different USB port on your computer or a different USB cable.
- For Android, ensure USB debugging is enabled if required by the app, and that the correct app is installed.

10. Warranty and Support

AURSINC is committed to providing professional measurement tools and electronic products. For any questions or concerns regarding your NanoVNA-H4, please contact AURSINC customer service. While specific warranty details are not provided in this manual, standard consumer rights and return policies apply as per the point of purchase.
For additional resources and community support, you may visit the official NanoVNA website: http://nanovna.com