

# Vector Network Analyzers

Bode 100 - 1 Hz to 50 MHz

Bode 500 - mHz to 450 MHz



## Transmission/Reflection

Measure S-parameters of filters such as EMI filters, cables, amplifiers, antennas and more.



## Resonance Frequency

Detect even very narrow, high-Q resonance peaks of piezo elements, RFID and NFC transponders.



## Frequency Response

Measure the complex transfer function (Gain/Phase) of active and passive electronic systems.



## Bode Analyzer Suite

Easy-to-use PC software with advanced analysis features like circuit fitting, math expressions and more.



## Complex Impedance

Analyze passive electronic components and active electronic circuits.



## Stability Analysis

Analyze electronic control systems such as power supplies. Generate Bode diagrams and Nyquist plots.



## Automated Measurements

Integrate the analyzer into automated systems via its versatile automation capabilities.



# Bode Analyzer

The Bode 100 / Bode 500 system consists of hardware and software. The high quality hardware ensures **accurate** measurement results in a **wide frequency range** up to 450 MHz. The **portable** and **compact** design enables you to test wherever you want. Due to the **versatile** system design, the Bode Analyzers work as **three devices in one**:

## 1. Vector Network Analyzer

The vector network analyzer function allows you to measure:

- Swept S-parameters in the 50  $\Omega$  system
- Reflection coefficient and return loss
- Insertion loss of filters
- Group delay characteristics
- Influence of termination on amplifiers

## 2. Frequency Response Analyzer

The Bode Analyzers serve as a Gain/Phase meter and are ideally suited to measure:

- Transfer functions of electronic circuits
- Stability of control systems such as DC/DC converters and voltage regulators
- Power Supply Rejection Ratio (PSRR) respectively Audio Susceptibility



## 3. Impedance Analyzer

Easily measure and analyze the impedance spectrum of:

- Electromagnetic devices such as transformers and inductors
- Capacitors and their parasitics
- Power delivery networks (PDN)
- Ultrasonic and piezo electric components
- Very high Q-circuits such as quartz crystals and oscillators
- Resonance frequency of RFID, NFC and wireless power systems
- DC/DC converter input and output

### Your benefits:

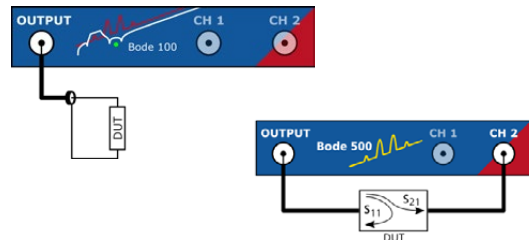
- One device for multiple applications
- Accurate measurement results
- Simple setup - fast results
- Easy data processing
- Automated measurements

# Bode Analyzer Suite

You can fully control the Bode Analyzer hardware via the Bode Analyzer Suite (BAS). The BAS is an **easy-to-use**, intuitive software, which is **included** in the Bode 100 / Bode 500 delivery. It allows you to control the analyzer from your Windows PC. The BAS helps you to quickly **measure and analyze** your device under test. It offers great functions to **save, document and share** your measurement results.

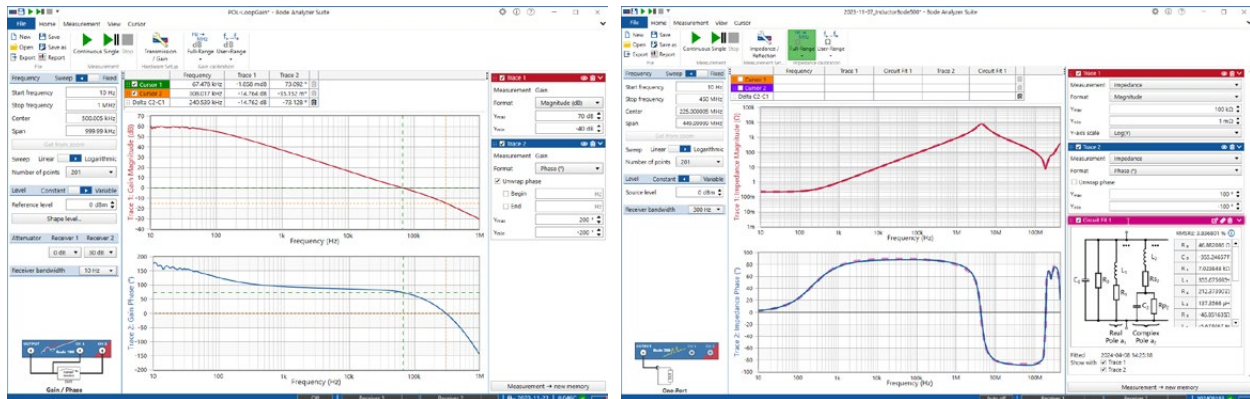
## Measurement Modes

Pre-defined measurement modes provide the correct hardware setup of your Bode Analyzer, ensuring accurate measurement results in your desired application.



## Analysis

To understand and optimize your system under test, the BAS offers all kind of chart formats, like Smith, Polar, Nyquist and Bode plots. You can extract all required results and parameters from your measurements using a great variety of analysis features like circuit fitting and mathematical expressions.



## Documentation

The BAS helps you to easily extract the measurement results for your documentation. You can share and archive your results by:

- Exporting CSV, Excel, Touchstone or SPICE netlist files.
- Copying and pasting the results, charts and settings into your documents.
- Generating a PDF report containing all measurement graphs and device settings.
- Saving your entire measurement including the device settings to a \*.bode3 file which can be viewed on any Windows PC having the Bode Analyzer Suite 3.X installed.

## Integration & Automation

Easily automate your Bode measurements using:

- SCPI commands
- LabVIEW™ 2015 or newer (currently Bode 100 only, Bode 500 coming soon)
- .NET NuGet package (Bode 100 only)
- OLE/COM controllers such as VBA, MATLAB®, C++... (Bode 100 only)

# Technical Data

## Bode 100

## Bode 500

### Signal Source

|                   |                   |                   |
|-------------------|-------------------|-------------------|
|                   | BNC connector     | N connector       |
| Frequency range:  | 1 Hz to 50 MHz    | mHz* to 450 MHz   |
| Output impedance: | 50 $\Omega$       | 50 $\Omega$       |
| Waveform:         | Sinusoidal signal | Sinusoidal signal |
| Signal level:     | -30 dBm to 13 dBm | -50 dBm to 16 dBm |

### Inputs: CH1, CH2

|                     |                                         |                                      |
|---------------------|-----------------------------------------|--------------------------------------|
|                     | BNC connector                           | N connector                          |
| Input impedance:    | 50 $\Omega$ or 1 M $\Omega$    50 pF    | 50 $\Omega$ or 1 M $\Omega$    25 pF |
| Receiver bandwidth: | 1 Hz to 5 kHz                           | 1 Hz to 15 kHz*                      |
| Input attenuators:  | 0, 10, 20, 30 & 40 dB                   | 0 & 20 dB                            |
| Input sensitivity:  | 100 mV <sub>RMS</sub> full scale @ 0 dB | 1 V <sub>RMS</sub> full scale @ 0 dB |
| Dynamic range:      | > 100 dB                                | 120 dB*                              |
| Gain error:         | < 0.1 dB (calibrated)                   | < 0.1 dB (calibrated)*               |
| Phase error:        | < 0.5° (calibrated)                     | < 0.5° (calibrated)*                 |

### General

|                       |                                          |                                            |
|-----------------------|------------------------------------------|--------------------------------------------|
| Weight:               | 1.9 kg / 4.2 lbs                         | 2.2 kg / 4.9 lbs                           |
| Dimensions:           | 26 x 5 x 27 cm<br>10.25 x 2 x 10.65 inch | 26 x 5 x 27.5 cm<br>10.25 x 2 x 10.85 inch |
| DC power requirement: | 9 V - 24 V / < 10 W                      | 9 V - 24 V / < 25 W<br>USB-PD, PoE+        |
| Interface:            | USB 2.0 (USB-B)                          | USB 2.0 (USB-C), Ethernet                  |
| Operating system:     | Windows 10 & 11                          | Windows 10 & 11                            |

\*preliminary information

### Bode 100 - Delivery Includes:

Bode Analyzer Suite  
 Printed Quick Start Guide (English)  
 Wide-range AC power supply  
 USB-A to USB-B cable  
 4 x BNC cable 50 cm (m - m)  
 1 x BNC T-adapter (f - f - f)  
 1 x BNC thru adapter (f - f)  
 1 x BNC 50  $\Omega$  load (m)  
 1 x BNC short circuit (m)  
 Test objects: quartz filter and IF filter on PCB

### Bode 500 - Delivery Includes:

Bode Analyzer Suite  
 Printed Quick Start Guide (English)  
 Wide-range AC power supply  
 USB-A to USB-C cable  
 1 x N thru adapter (f - f)  
 1 x N short adapter (m)  
 1 x N 50  $\Omega$  load (m)  
 2 x N-N cable 50 cm (m - m)  
 2 x N-BNC adapter (m - f)  
 1 x BNC T-adapter (f - f - f)  
 3 x N-BNC cable 50 cm (m - m)  
 Test objects: quartz filter and IF filter on PCB