VECTOR NETWORK ANALYZER
2-Port or 4-Port

BNA1000 SERIES
6.5/8.5 GHz

Accuracy Meets Agility
for VNA Testing

For RF and manufacturing engineers who prioritize precision and versatility in design and production, we provide the BNA1000 Modular Vector Network Analyzer. This analyzer uniquely combines the detailed analysis capabilities of a benchtop unit with the adaptability required for diverse manufacturing and R&D environments.

Exceeding the constraints of typical lab-focused analyzers and the restricted capabilities of portable models, the BNA1000 offers a broad dynamic range and rapid measurement speed that superbly caters to the diverse requirements of both manufacturing and RF engineering. This ensures a seamless transition from design to production, enhancing both innovation and efficiency.

Enabling VNA measurements with the accuracy and confidence you expect from Bird without breaking your budget.

KEY PERFORMANCE SPECIFICATIONS

- 2- or 4-port, 300 kHz to 6.5/8.5 GHz S-parameter measurements
- > 125 dB dynamic range
- -50 to +10 dBm output power
- 0.002 dB RMS trace noise
- 42 us/point fast measurement speed
- Time Domain analysis with Gating
- User interface software included

APPLICATIONS

- Manufacturing Test
- Passive/Active Component Characterization
- RF & Microwave Product Design
- Filter Design and Testing
- Fault Location
- Antenna Tuning
- Quality Control and Incoming Inspection

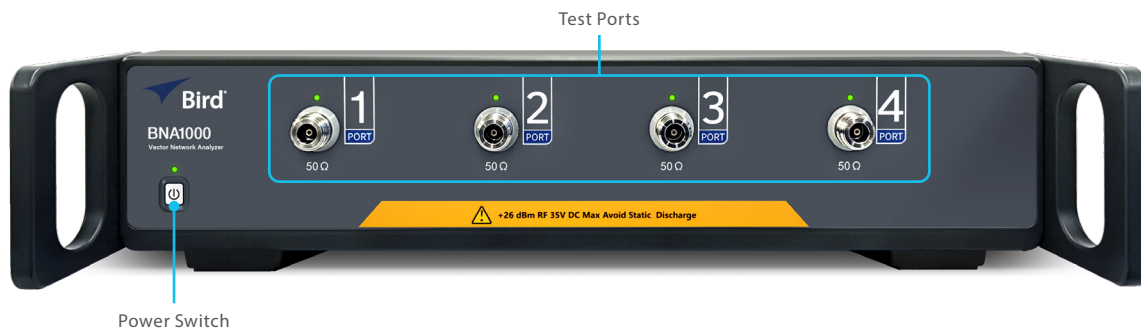**Bird**®

Accurate Measurements Delivered Fast

Wide frequency range, high dynamic range and easy-to-use interface.

Bird's BNA1000 series represents a new era in vector network analyzers, offering high performance through an innovative, PC-controlled design. By transferring the complex data processing demands typically found within the instrument to a sophisticated software platform, Bird offers a cost-effective and feature-rich VNA solution suitable for every testing environment. The BNA1000 excels in scenarios where high throughput is crucial, seamlessly replacing costly and bulky production test systems while saving space and reducing the total cost of ownership.
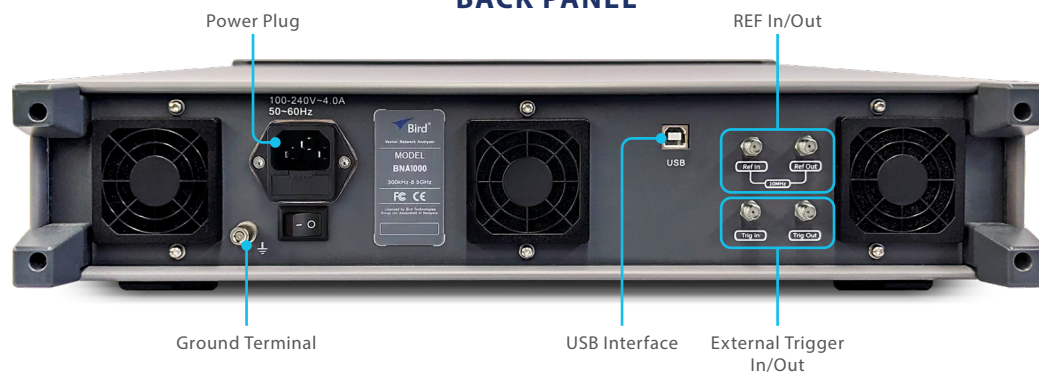
This product line is accompanied by Bird's intuitive BNA1000 series User Interface (UI) software, designed to provide a familiar yet powerful control application for any engineer experienced with contemporary VNA tools. The package also includes the BNA1000 Application Programming Interface (API) and supports a standardized SCPI command-set, facilitating the easy automation of VNA calibrations, measurements, trace displays, and data exports across various programming environments.

To discover the extensive measurement capabilities of the BNA1000 series, download the BNA1000 software from BirdRF.com and explore its full potential.

FRONT PANEL

Test Ports

Power Switch

BACK PANEL

Power Plug

REF In/Out

Ground Terminal

USB Interface

External Trigger In/Out

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BNA1000 SERIES

Product Overview

When evaluating small form factor vector network analyzers from various vendors, discerning differences can be challenging, especially when their specifications appear similar on paper. Merely presenting figures can be simplistic; therefore, let's dive into some of the critical specifications and why they are important.

Dynamic range, power range, and Intermediate Frequency (IF) bandwidth form a critical trio in the context of noise reduction. The ability to effectively manage these specifications provides a significant advantage in distinguishing your signal from surrounding noise.

HIGH DYNAMIC RANGE

Enables VNAs to accurately measure very weak signals, ensuring that even the smallest signals are accurately captured and analyzed. This aspect is particularly vital in tasks such as filter characterization, where there is a substantial variation between stopband and passband power levels. A broader dynamic range allows for the setting of a wider IF bandwidth, thereby enhancing the efficiency of measurements.

DESCRIPTION	SPECIFICATION	TYPICAL
300 kHz to 10 MHz	112 dB	115 dB
10 MHz to 6 GHz	125 dB	130 dB
6 GHz to 7 GHz	124 dB	129 dB
7 GHz to 8.5 GHz	123 dB	128 dB

The specifications for dynamic range in the table above are under the following conditions:

- 10 Hz IF bandwidth
- No averaging applied to data

MEASUREMENT BANDWIDTH

The measurement bandwidth stands as one of the most pivotal parameters in a network analyzer. It enables the balancing act between noise reduction and measurement speed. Depending on the nature of the device under test and the testing environment, the optimal setting can vary significantly. For instance, in a laboratory setting where precision is paramount, a narrower bandwidth might be chosen, while in a production line, speed might take precedence, necessitating a wider bandwidth.

The BNA1000 family has a measurement bandwidth between 1 Hz to 2 MHz, providing flexibility for laboratory and manufacturing applications.

POWER RANGE

The importance of power range in RF test equipment lies in its ability to provide comprehensive testing capabilities, versatility, and efficiency. An optimal power range is crucial for the characterization of nonlinear devices through power sweeps. It also facilitates testing without the need for an external power amplifier, thereby conserving bench space and reducing the overall cost of testing.

LOW TRACE NOISE

At 0.002 dB rms at IFBW=3 kHz, the BNA1000 series ensures cleaner and more precise signal measurements. Lower trace noise reduces the likelihood of measurement anomalies or inaccuracies, thus enhancing overall precision.

MEASUREMENT SPEED

The 42 µs/point measurement speed at an IFBW of 500 kHz means faster data acquisition with less time for environmental or situational variables to affect the measurement. This speed contributes to consistent and repeatable results.

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USB VECTOR NETWORK ANALYZER
BNA1000 SERIES

Software

Included with the BNA1000 is the user-friendly graphical interface VNA measurement and calibration software. With the BNA1000 controlled via USB from an external PC, the software simplifies the testing process with easy navigation and effective data analysis tools, enhancing your workflow efficiency. A comprehensive range of measurements and plot formats can be visualized, supporting various RF testing scenarios and offering a practical and streamlined experience for precise data analysis.

MEASUREMENT AND DISPLAY CAPABILITIES

FULL S-PARAMETERS MEASUREMENTS

- **Independent Measurement Channels:** Up to 16
- **Display Traces per Channel:** Up to 16
- **Markers per Trace:** Up to 16
- **Store Traces for Recall or Trace Math Operations:** Data + Mem, Data - Mem, Data * Mem, Data / Mem
- **Flexible Trace Format Options:** Log Mag, Phase (Deg), Phase (Rad), Group Delay, Lin Mag, SWR, Real, Imaginary, Unwrapped Phase, Positive Phase, Smith, Polar
- **BN1000 4-Port Instrument Includes:**
  - Forward and reverse transmission parameters (S12, S13, S14, S21, S23, S24, S31, S32, S34, S41, S42, and S43)
  - Reflection parameters (S11, S22, S33, S44)
- **BN1000 2-Port Instrument Includes:**
  - Forward and reverse transmission parameters (S12, S21)
  - Reflection parameters (S11, S22)

SWEEP STIMULUS

- **Sweep Type:** Lin Freq, Log Freq, Power, Segmented
- **Sweep Mode:** Normal or Fast
- **Number of points:** Up to 20,001
- **IF Bandwidth:** 1 Hz to 500 kHz
- **Port Power Setting:** -50 dBm to +10 dBm
- **Power Slope Setting:** -2 to +2 dB/GHz

ANALYSIS AND MARKER FUNCTIONS

- **Marker Search:** Max, Min, Peak, Target
- **Marker Function:** Set sweep and scaling settings using markers as reference
- **Limit and Bandwidth Tests:** Integrated Pass/Fail testing for Min/Max, ripple, and bandwidth limits
- **Time Domain Transform:** Lowpass and Bandpass Time Domain transform
- **Time Domain Gating:** Fixture De-Embedding using time domain techniques

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DATA EXPORT OPTIONS

- S-parameter files
- Trace data .csv
- Touchstone file
- Instrument / calibration / data states

CALIBRATION AND CORRECTION CAPABILITIES

- Response calibration
- Enhanced Response calibration
- 1-port SOL
- 2-port SOLT
- Electronic calibration

SOFTWARE DOWNLOAD

- BNA1000 software package and operation manual can be downloaded from BirdRF.com.

MINIMUM PC SYSTEM REQUIREMENTS

	SPECIFICATION
Host PC System Requirements	Windows 7 and above
PC Hardware	CPU frequency of 1.5 GHz, 1 GB RAM minimum
Interface	USB 2.0 or later

AUTOMATION AND CONTROL

- **BNA1000 Test Automation Tools:** The BNA1000 software suite incorporates a SCPI command set and API (application programming interface) which allows custom automation programs to be created for the vector network analyzer. Most common programming environments are supported, including Python, LabVIEW, C# and MatLab.

- **SCPI Control:** BNA1000 supports a comprehensive set of SCPI control commands which should be familiar to anyone that has previously programmed with a VNA. These commands expose the full range of the BNA1000 capabilities, from calibration to display configuration, to measurement, to data processing.

- **API Control From the Host PC:** The host PC has the BNA1000 software package installed and is connected by USB to the BNA1000. The API can be used to create custom automation programs running on the host PC, using SCPI commands to control the BNA1000.

- **API Control From a Remote PC:** The complete BNA1000 system (host PC + BNA1000 software + BNA1000 VNA instrument) can be configured to allow remote control over a network connection. The remote PC connects to the BNA1000 host PC using a TCP/IP connection and then has access to the full range of SCPI commands for BNA1000 control.

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TIME DOMAIN ANALYSIS

This powerful tool, provides detailed insights into the behavior of various electronic components and systems over time. This analysis transforms frequency domain data into time domain information, providing a different and often more insightful perspective on the device under test (DUT).

WHAT IS TIME DOMAIN ANALYSIS?

Time Domain Analysis involves converting the measured frequency domain data (S-parameters) into the time domain using mathematical algorithms, typically an Inverse Fourier Transform. The result can be an impulse or a step response, which shows how a device responds over time to a fast transition, offering a time-resolved view of the DUT's behavior.

This analysis can pinpoint the location and nature of discontinuities or faults within a DUT by showing reflections or other signal alterations over time.

Time Domain Analysis & Gating

WHAT IS TIME DOMAIN GATING?

Time Domain Gating is a powerful feature that enhances the analyzer's ability to focus on specific parts of a DUT, improving the accuracy and relevance of measurements in various complex testing scenarios.

Once the data is in the time domain, Time Domain Gating allows the user to 'gate' or isolate specific time intervals corresponding to certain physical locations or components in the DUT. This enables the analysis of just those parts of the signal path, ignoring others.

This feature is particularly useful in removing the effects of fixtures, cables, or other elements that might introduce reflections or distortions to the measurement of the actual DUT.

APPLICATIONS REQUIRING TIME DOMAIN ANALYSIS AND GATING

- **Fault Location in Cables and Transmission Lines:** Identifying the exact location of faults or breaks in cables and transmission lines is a primary application. Time domain reflectometry (TDR) techniques allow for precise fault localization.

- **PCB Trace Characterization**: Useful to evaluate the characteristics of PCB traces and layers, such as impedance discontinuities, crosstalk issues and defects, which are crucial in high-speed digital circuit design.

- **Material Characterization:** Effective in material science for determining properties like dielectric constant and loss tangent of materials at different frequencies. Gating can examine the properties of different materials by isolating the response from the material itself, separate from the measurement setup.

- **Antenna Design and Testing:** Understand antenna behaviors like bandwidth and radiation patterns over time, which is particularly useful for transient or pulsed signal applications.

- **Radar and Microwave Component Testing:** For components like filters, couplers, or antennas in radar and microwave systems, the Gating feature can help isolate and analyze individual components within a complex system.

- **Filter and Network Analysis:** It allows for the examination of filter responses and network behavior, helping in designing more efficient filters and network components.

- **Quality Control and Manufacturing:** In manufacturing, it's used for quality control, ensuring components and systems meet their specified time domain response criteria.
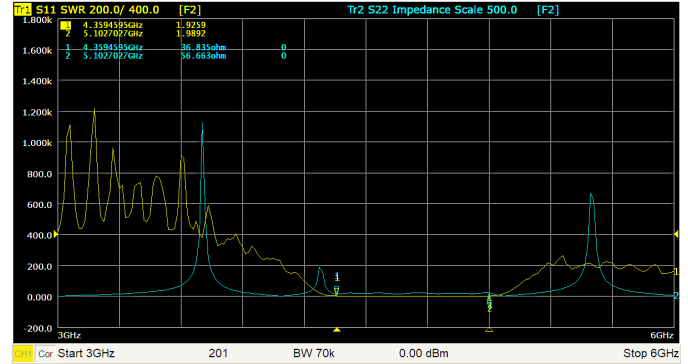
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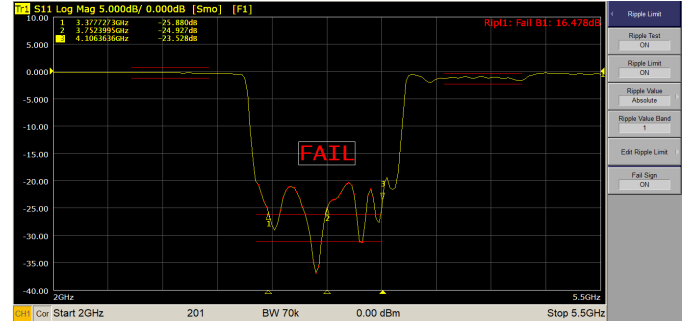## LIMIT AND RIPPLE LIMIT TESTING

Both tests are important tools for evaluating the uniformity and stability of a device under test (DUT) across a specified frequency range. While Limit testing offers a broad assessment of a wide range of parameters, Ripple Limit Testing delves into the specifics of passband performance.

The BNA1000 series simplifies these tests by providing six limit line segments to be defined for each displayed plot. A visual alarm will be shown when a limit line is crossed.

Ripple Limit Testing

WHAT IS LIMIT TESTING?

The limit testing feature allows users to set specific upper and lower threshold limits for any measurable parameter. Pass/fail criteria is determined whether the DUT meets predefined criteria set by the user. The VNA flags any data point that falls outside of the set limits, indicating a fail condition.

This test can be applied to a wide array of parameters like S-parameters (such as return loss, insertion loss, gain), phase, group delay, and others.

Used in a wide range of applications, including filter performance, antenna testing, cable testing, amplifier testing, and more, wherever specific performance criteria need to be met.

WHAT IS RIPPLE LIMIT TESTING?

Ripple Limit Testing is a more specialized form of limit testing. It specifically measures the variations or 'ripples' in the amplitude response of a device within its passband. This test is particularly focused on evaluating how consistently a device like a filter or amplifier performs within a certain frequency range (usually the passband), checking for uniformity in the amplitude.

Predominantly used in scenarios where uniformity in the passband is critical, such as in filters and RF amplifiers, to ensure consistent signal quality.

KEY FEATURES THAT SIMPLIFY TESTING

- **Automated Testing Procedures:** The VNA can automate the Limit Testing process, rapidly assessing whether a device under test (DUT) meets predefined criteria across a wide frequency range. This automation speeds up testing and reduces the likelihood of human error.
- **Intuitive User Interface:** With a user-friendly interface, the VNA allows for easy setup of limit parameters. Operators can quickly define upper and lower thresholds for various measurements, making the process straightforward even for less experienced users.

- **Fast Data Processing:** The VNA's rapid data processing capabilities mean quicker sweep times and faster analysis of results. This is crucial in high-throughput manufacturing environments where time efficiency is paramount.
- **Integration with Manufacturing Systems:** Its ability to integrate with existing automated manufacturing systems and relay pass/fail results directly aids in streamlining the production process.

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Component Test

PASSIVE COMPONENT EVALUATION AND TEST

For advanced communications systems, the performance of passive devices like filters, combiners, switches, and transmission lines is critical. These components need to exhibit low ripple and minimal insertion loss within their pass bands, alongside high rejection ratios in their stop bands.

When integrated into balanced circuits with multiple input and output ports, these devices introduce complexities in measurement system setups. The primary challenge in testing these devices lies in obtaining precise data swiftly and efficiently.
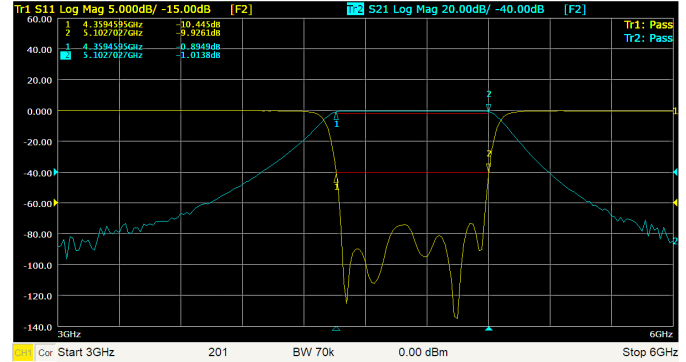
Passive Component Evaluation and Test

WHY CHOOSE BIRD'S VNA SOLUTIONS

Time Domain Analysis involves converting the measured frequency domain data (S-parameters) into the time domain using mathematical algorithms, typically an Inverse Fourier Transform. The result can be an impulse or a step response, which shows how a device responds over time to a fast transition, offering a time-resolved view of the DUT's behavior.

This analysis can pinpoint the location and nature of discontinuities or faults within a DUT by showing reflections or other signal alterations over time.

KEY FEATURES THAT SIMPLIFY TESTING

- **Wide Frequency Range:** Passive devices often operate over a wide range of frequencies. A VNA with a broad frequency range can accurately characterize the performance of these devices across all relevant frequencies.

- **High Dynamic Range:** This is crucial for measuring devices with low insertion loss and high rejection ratios. A high dynamic range allows the VNA to accurately measure both strong and weak signals, which is essential for assessing the quality of filters and other passive components.

- **Low Trace Noise:** Minimizing measurement noise is vital for precision. Low trace noise in a VNA ensures the accuracy of measurements, particularly in the passband where ripple and insertion loss are critical parameters.

- **Excellent Directivity and Source Match:** These features improve the accuracy of S-parameter measurements by reducing measurement errors due to reflections.

- **Advanced Calibration Techniques:** Accurate calibration is key to reliable measurements. VNAs with sophisticated calibration capabilities can compensate for systematic errors and ensure the validity of the data collected.

- **Multiple Port Capability:** For devices with multiple input and output ports, such as those used in balanced circuits, a multi-port VNA allows for simultaneous measurement of all ports, simplifying the setup and improving efficiency.

- **Time Domain Analysis:** This feature is useful for locating faults and understanding the behavior of components in the time domain, which can be particularly important for transmission lines and filters.

- **User-Friendly Interface and Software:** An intuitive interface and robust software support efficient testing and analysis, enabling easier setup, measurement, and interpretation of results.

- **Automation and Connectivity Options:** For high-throughput environments, USB connectivity provides robust automation capabilities to significantly enhance efficiency.

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MANUFACTURING TEST

Reducing the cost of testing is a critical challenge in manufacturing, with various factors contributing to it. A crucial element is throughput. The overall measurement time of the BNA1000 encompasses several aspects, including sweep speed, data analysis, display processing, and data transfer.

Often in manufacturing settings, the analyzer is required to relay pass/fail outcomes to an automated system. Here, the sweep and data analysis speeds of the BNA1000 become vital for high-volume production.

Minimizing operator involvement, along with reducing the time for connections and calibrations, also plays a significant role in enhancing measurement throughput.
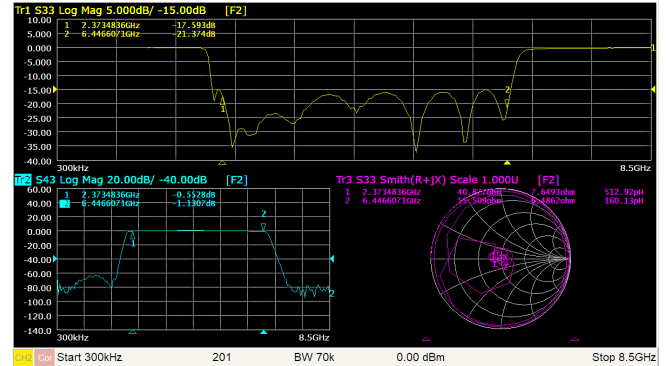

Manufacturing Test

Furthermore, factors like the initial purchase cost, system reliability, ongoing maintenance expenses, and the potential for future performance upgrades are instrumental in determining the total cost of ownership for test stations utilizing the BNA1000.

WHY CHOOSE BIRD'S VNA SOLUTIONS

In a manufacturing test environment, where efficiency, accuracy, and reliability are paramount, certain features of a Vector Network Analyzer (VNA) are particularly crucial.

KEY FEATURES THAT SIMPLIFY MANUFACTURING

- **High Measurement Speed:** Fast sweep speeds and rapid data processing are essential for high throughput in volume production. Quick measurement times reduce overall test duration, increasing production efficiency.
- **Accuracy and Repeatability:** Reliable and consistent measurement accuracy is vital to ensure product quality. The VNA should deliver precise results that can be replicated across multiple tests and devices.
- **Ease of Calibration:** Simplified and quick calibration processes are important to maintain accuracy without causing significant downtime or requiring extensive operator intervention.
- **Automated Testing Capability:** Integration with automated testing systems and the ability to be controlled via software for automated pass/fail determinations are key for streamlining the manufacturing process.
- **Durability and Reliability:** In a manufacturing environment, VNAs are often used extensively. Therefore, they should be robust and reliable with minimal downtime for maintenance.

- **Connectivity Options:** Features like LAN, GPIB, or USB connectivity are important for integrating the VNA into a manufacturing test setup and for efficient data transfer.
- **User-Friendly Interface:** An intuitive user interface helps reduce training time and errors, especially important in environments where operators may interact with multiple types of test equipment.
- **Portability and Compact Size:** Depending on the manufacturing setup, a compact and portable VNA might be beneficial, especially if the testing stations are reconfigured frequently.
- **Cost-Effectiveness:** Initial procurement cost, as well as long-term maintenance and upgrade costs, are important considerations in a manufacturing context to ensure a favorable return on investment.
- **Multi-Port Capability:** For testing devices with multiple ports, a VNA with several test ports can simplify setups and reduce testing time.

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USB VECTOR NETWORK ANALYZER
BNA1000 SERIES

Specifications

MEASUREMENT

Frequency Range	
BNA1000-4P6G5	300 kHz to 6.5 GHz
BNA1000-2P8G5	300 kHz to 8.5 GHz
BNA1000-4P8G5	300 kHz to 8.5 GHz
Impedance	50 Ohms
Frequency Accuracy	±5ppm
Frequency Resolution	1 Hz
Measurement Points	2 to 20001
Measurement Bandwidth	1 Hz to 2 MHz
Measurement Time/Point	42 µs
Dynamic Range (IFBW=10Hz)	112dB, typ.115dB (300kHz to 10MHz) 125dB, typ.130dB (10MHz to 6GHz) 124dB, typ.129dB (6GHz to 7GHz) 123dB, typ.128dB (7GHz to 8.5GHz)
Accuracy of Transmission Measurements (magnitude/phase)	+5 dB to +15 dB (0.2 dB/2°) -50 dB to +5 dB (0.1 dB/1°) -70 dB to -50 dB (0.5 dB/3°) -90 dB to -70 dB (2.5 dB/8°)
Accuracy of Reflection Measurements (magnitude/phase)	-15 dB to 0 dB (0.4 dB/3°) -25 dB to -15 dB (1.0 dB/6°) -35 dB to -25 dB (3.0 dB/20°)
Trace Noise (IFBW=3kHz)	2 mdB rms
Temperature Stability	0.01 dB/°C
Effective Directivity[1]	38 to 49 dB
Effective Source Match[1]	35 to 41 dB
Effective Load Match[1]	37 to 49 dB

TEST PORT OUTPUT

Match	18 dB (W/O system error correction)
Power range (Option-70 to +10dBm)	-50 dBm to +10d Bm (300 kHz to 7 GHz) -50 dBm to +8 dBm (7 GHz to 8.5 GHz)
Power Accuracy	±1.5dB
Power Resolution	0.05dB

TEST PORT INPUT

Match	18 dB (W/O system calibration)
Max Input Level	+23 dBm
Max Input Voltage	+35 V
Noise Level	-107 dBm/Hz (300 kHz to 10 MHz) -123 dBm/Hz (10 MHz to 5 GHz) -124 dBm/Hz (5 GHz to 6 GHz) -120 dBm/Hz (6 GHz to 8.5 GHz)

[1] Applies over the temperature range of 23°C ± 5° C after 40 minutes of warming-up, with the full two-port calibration, at output power of 0dBm and IF bandwidth 10Hz.

CONNECTORS

Connectors	Type N(f)
Test Ports	
BNA1000-4P6G5	4-port
BNA1000-2P8G5	2-port
BNA1000-4P8G5	4-port

ENVIRONMENTAL

Operating Temperature	+5 °C to +40 °C (+41 °F to +104 °F)
Storage Temperature	-20°C to +60 °C (-68 °F to +140 °F)
Humidity	90%, 25 °C (77 °F)

SYSTEM

Power Supply	110/220 VAC, 50 /60 Hz
Recommended Calibration interval	3 years
Warranty	3 years

REGULATORY COMPLIANCE

CE	Meets the requirements of the following applicable European directives and carries the CE marking accordingly: – LVD 2014/35 – EMC Directive 2014/30/EU **Restriction of the Use of certain Hazardous Substances in Electrical and Electronic Equipment (RoHS)** – Directive 2011/65/EU
RoHs	Compliant
FC	Complies with part 15 of the FCC Rule

PHYSICAL

Size	18.8 in x 21.5 in x 4.1 in (470 mm x 545 mm x 105 mm)
Weight	17.9 lb (8.1 kg)

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Ordering Information

BNA1000 4-Port
Vector Network Analyzer

BNA1000 2-Port
Vector Network Analyzer

MODEL NUMBER

BNA1000-4P6G5	300 kHz to 6.5 GHz, 4-port, Type N(f)
BNA1000-2P8G5	300 kHz to 8.5 GHz, 2-port, Type N(f)
BNA1000-4P8G5	300 kHz to 8.5 GHz, 4-port, Type N(f)

INCLUDED WITH VNA

(1) VNA 2- or 4-port
(1) USB-B to USB-A Cable, 1 m
(1) 1 G USB Flash Drive with software installer
(1) Power Cord, 1 m

OPTIONS

BNA1000-010	Time Domain
BNA1000-1F5	Fixture circuit simulation function

CALIBRATION MODULES

E285A	Electronic calibration module, 2 ports, 100 kHz to 8.5 GHz, 3.5 mm (f)
E485A	Electronic calibration module, 4 ports, 100 kHz to 8.5 GHz, 3.5 mm (f)
E285C	Electronic calibration module, 2 ports, 100 kHz to 8.5 GHz, N(f)
E485C	Electronic calibration module, 4 ports, 100 kHz to 8.5 GHz, N (f)
SK-CAL-NF-90	Calibration Kit, SOLT, DC to 9 GHz, N(f)
SK-CAL-NM-90	Calibration Kit, SOLT, DC to 9 GHz, N(m)
SK-CAL-SMAF-90	Calibration Kit, SOLT, DC to 9 GHz, SMA(f)
SK-CAL-SMAM-90	Calibration Kit, SOLT, DC to 9 GHz, SMA(m)

RF CABLES

T5-RFCAB-NmNm-90101	Test Cable, 1m, DC to 9 GHz, N(m) to N(m)
T5-RFCAB-NmSMAm-90102	Test Cable, 1m, DC to 9 GHz, N(m) to SMA(m)

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Electronic Calibration Modules

SOLT (Short-Open-Load-Through) calibration standards are an essential component for achieving precise and accurate measurements with VNAs. The VNA is able to compensate for directivity, source match, frequency response, and reflection tracking errors, leading to more reliable and consistent measurements.

Bird's electronic calibration modules are designed to simplify the calibration process. The ECM achieves this with just a single connection, streamlining the entire calibration procedure.

MODEL	DESCRIPTION
E285A	Electronic calibration module, 2 ports, 100 kHz to 8.5 GHz, SMA (f-f)
E485A	Electronic calibration module, 4 ports, 100 kHz to 8.5 GHz, SMA (f-f)
E285C	Electronic calibration module, 2 ports, 100 kHz to 8.5 GHz, Type N (m-m)
E485C	Electronic calibration module, 4 ports, 100 kHz to 8.5 GHz, Type N (f-f)

Manual Calibration Kits

SOLT (Short-Open-Load-Through) manual calibration standards perform the same function as the Electronic Calibration Module without the automation.

MODEL	DESCRIPTION
SK-CAL-NM-90	Type N(m) mechanical calibration module, DC to 8.5 GHz, Short, Open, Load, Through (SOLT)
SK-CAL-NF-90	Type N(f) mechanical calibration module, DC to 8.5 GHz, Short, Open, Load, Through (SOLT)
SK-CAL-SMAM-90	Type SMA(m) mechanical calibration module, DC to 8.5 GHz, Short, Open, Load, Through (SOLT)
SK-CAL-SMAF-90	Type SMA(f) mechanical calibration module, DC to 8.5 GHz, Short, Open, Load, Through (SOLT)

RF Test Cables

Bird provides a complete series of precision, coaxial RF cables to complete your test solution.

MODEL	DESCRIPTION
T5-RFCAB-NmNm-90101	Type N(m) - male precision cable, 9 GHz
T5-RFCAB-NmSMAm-90102	Type N(m) – SMA male precision cable, 9 GHz

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