VN SERIES
PRODUCT MANUAL



USB
Vector Network Analyzer

VNB-60

100 kHz - 6 GHz

V1.2
09/11/2026

HAROGIC

VNB-60 Overview.

FOCUSED ON HIGH-QUALITY S-PARAMETER MEASUREMENTS AND MINIATURIZATION

The VNB-60 is highly optimized for basic S-parameter measurements. It incorporates high-performance directional couplers with an effective directivity of ≥ 40 dB and a professional receiver design that delivers a dynamic range of 100 dB to 120 dB. Its ultra-compact design makes it one of the smallest vector network analyzers available. This breakthrough combination of professional performance and extreme miniaturization greatly expands the application possibilities of the VNB-60 beyond conventional vector network analyzers.

EASY OPERATION AND RELIABLE MEASUREMENTS

The VNB-60 can be paired with the ECB-60 electronic calibration module and verified amplitude- and phase-stable cables to form a complete test solution. The dedicated ECB-60 significantly simplifies calibration while providing sufficient accuracy for most applications. The verified cables help prevent measurement errors caused by poor cable performance. Together with VNStudio, the VNB-60 provides an interactive experience comparable to, or even more convenient than, a benchtop vector network analyzer, making instrument setup, calibration, and S-parameter measurements more intuitive and efficient.

Key Features

- Frequency range: 100 kHz to 6 GHz
- Number of Ports: 2 ports
- High-performance directional coupler with effective directivity ≥ 40 dB
- Output power: -40 dBm to +5 dBm
- Dynamic range: 100 dB to 120 dB (typ.)
- Trace noise: ≤ 0.003 dB rms (typ.)
- IF bandwidth: 15 Hz to 75 kHz
- Sweep speed: 150 us/point at 75 kHz IF bandwidth
- Supports the ECB-60 electronic calibration module
- Supports validated amplitude- and phase-stable cables
- Supports SCPI commands
- Ultra-compact design: 86 × 70 × 36 mm

VNB-60 Interface Description



VNStudio Software Overview*

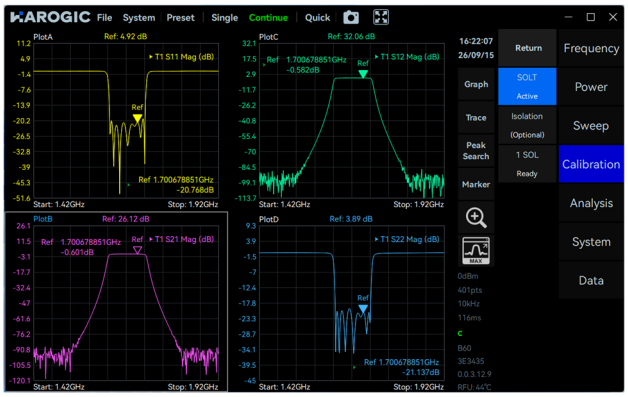
Clear and User-Friendly Interface

VNStudio features a modular interface with five clearly organized functional areas: the menu bar, measurement display area, graph settings area, parameter settings area, and status information bar.



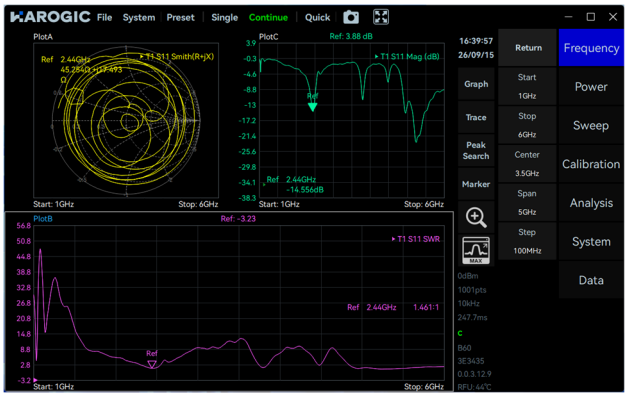
Two-Port S-Parameter Measurements

Supports S11, S12, S21, and S22 measurements with multiple display formats, including logarithmic magnitude, linear magnitude, phase, real, imaginary, SWR, and Smith chart. Suitable for network parameter measurements of RF devices such as filters, amplifiers, cables, and antennas.



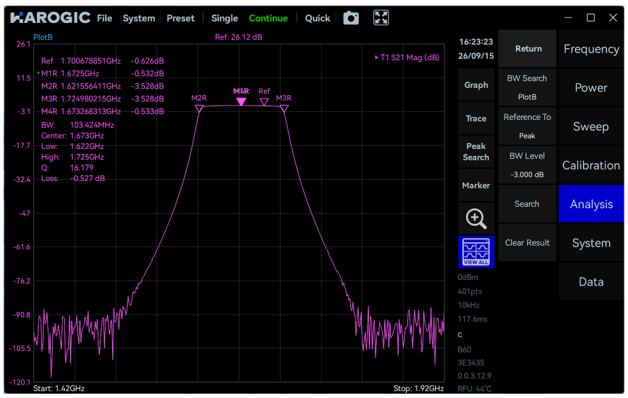
Flexible Sweep and Scenario Configuration

Supports linear frequency, logarithmic frequency, power, and CW sweeps, with configurable IF bandwidth, sweep points, averaging, and dwell time. Built-in measurement scenarios for typical devices allow quick recall of sweep and trace configurations for efficient setup.



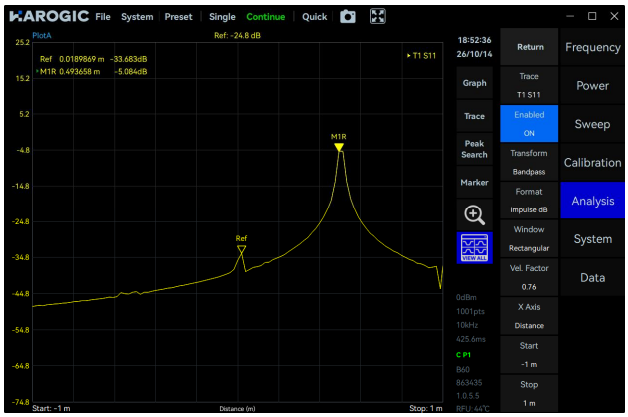
Automatic Search and Analysis

Supports bandwidth and X dB searches for quick extraction of key frequency characteristics from traces. DTF analysis converts frequency-domain measurements to the time or distance domain, with multiple transform modes, display formats, and window functions to help locate impedance discontinuities in cables and other devices.



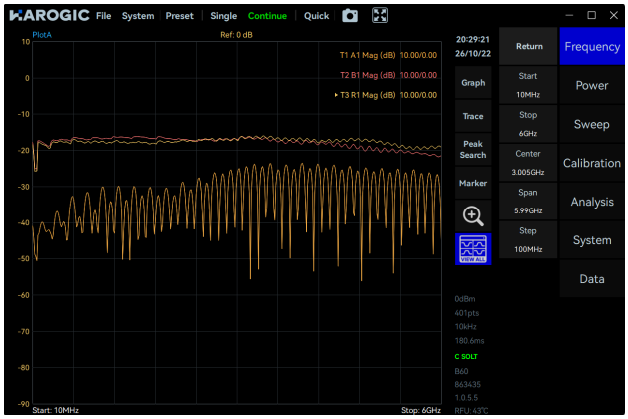
Time-Domain Analysis and Fault Location

Supports time-domain analysis and DTF (Distance to Fault), transforming frequency-domain S-parameter results into the time or distance domain to locate open circuits, short circuits, impedance discontinuities, and other anomalies in cables, connectors, and transmission paths. Configurable velocity factor, window function, and distance range enable flexible transmission-path diagnostics and fault location.



Wave Quantity Display and Analysis

Supports A/B/R wave quantity display, allowing measurement data from individual receiver channels to be viewed under different port excitation conditions. Multiple display formats, including magnitude, phase, real, and imaginary components, are available to support advanced network analysis, phase measurements, and customized test applications.



Calibration Kit Definition and Editing

Supports user-defined calibration kits and allows the electrical model parameters of Open, Short, Load, and Thru standards to be viewed and edited based on the actual calibration standards. Modified calibration kit definitions can be saved to the existing file or as a new file, providing flexibility for manual calibration with different mechanical calibration kits.



*Specifications**

FREQUENCY			
Frequency range		100 kHz to 6 GHz	
Frequency resolution		≤ 10 Hz	
Reference clock		Internal or external	
Frequency stability		< ± 2.5 ppm	
Aging rate		≤ 1 ppm/year	
Sweep points		11 to 10001	
IF Bandwidth Range		15 Hz to 75 kHz	

S-PARAMETER MEASUREMENT CAPABILITY			
Dynamic range **15 Hz IF Bandwidth**	100 kHz to 1 MHz	90 dB, 100 dB (typ.)	
	1 MHz to 10 MHz	100 dB, 105 dB (typ.)	
	10 MHz to 3 GHz	115 dB, 120 dB (typ.)	
	3 GHz to 4.5 GHz	110 dB, 115 dB (typ.)	
	4.5 GHz to 6 GHz	110 dB, 115 dB (typ.)	
Corrected System Performance (typ.)	Frequency Range	85033E Mechanical Calibration Kit	ECB-60 Electronic Calibration Module
Directivity	100 kHz to 1 MHz	45 dB	32 dB
	1 MHz to 10 MHz	50 dB	45 dB
	10 MHz to 4.5 GHz	50 dB	48 dB
	4.5 GHz to 6 GHz	44 dB	42 dB
Load match	100 kHz to 1 MHz	40 dB	30 dB
	1 MHz to 10 MHz	46 dB	44 dB
	10 MHz to 4.5 GHz	48 dB	46 dB
	4.5 GHz to 6 GHz	44 dB	42 dB
Source match	100 kHz to 1 MHz	42 dB	25 dB
	1 MHz to 10 MHz	46 dB	44 dB
	10 MHz to 4.5 GHz	46 dB	38 dB
	4.5 GHz to 6 GHz	42 dB	32 dB
Transmission tracking	100 kHz to 1 MHz	± 0.05 dB	± 0.15 dB
	1 MHz to 10 MHz	± 0.03 dB	± 0.05 dB
	10 MHz to 4.5 GHz	± 0.02 dB	± 0.08 dB
	4.5 GHz to 6 GHz	± 0.02 dB	± 0.15 dB

Reflection tracking	100 kHz to 1 MHz	± 0.05 dB	± 0.40 dB
	1 MHz to 10 MHz	± 0.03 dB	± 0.05 dB
	10 MHz to 4.5 GHz	± 0.03 dB	± 0.06 dB
	4.5 GHz to 6 GHz	± 0.03 dB	± 0.10 dB
Trace noise	10 MHz to 6 GHz 1 kHz IF Bandwidth	0.003 dB rms / 0.02 degree rms (typ.)	
Sweep Speed	10 MHz to 6 GHz, 201 points, uncalibrated or one-port calibration	75 kHz IF Bandwidth	45 ms
		10 kHz IF Bandwidth	61 ms
		1 kHz IF Bandwidth	250 ms
	10 MHz to 6 GHz, 201 points, two-port calibration	75 kHz IF Bandwidth	51 ms
		10 kHz IF Bandwidth	85 ms
		1 kHz IF Bandwidth	450 ms

POWER

Range	100 kHz to 10 MHz	-35 dBm to -4 dBm
	10 MHz to 25 MHz	-35 dBm to +5 dBm
	25 MHz to 6 GHz	-40 dBm to +5 dBm
Resolution	0.25 dB	
Accuracy	± 1.5 dB	

GENERAL

Input and output		
Data and Power	Single USB Type-C port for USB 2.0 data transfer and 5 V, 1 A power supply Supply voltage range: 4.75 to 5.25 V, ripple < 200 mVpp	
RF Ports	SMA(F), 50 Ω output impedance Damage level: +20 dBm or ± 35 VDC	
External Reference Input	MMCX female, 10 MHz; input level range: −8 dBm to +10 dBm	
External Trigger Input	Integrated into AUXIO, 3.3 V CMOS	
Trigger Output	Integrated into AUXIO, 3.3 V CMOS	
Weight	≤ 246 g	
Dimensions (L × W × H)	≤ 86 × 70 × 36 mm	
Power Consumption	≤ 4.5 W	
Operating temperature (ambient)	0 to 50 °C	
Storage temperature (ambient)	-20 to +70 °C	
Operating relative humidity	Ambient Temp.: 0 to 40 °C	5 to 75%
	Ambient Temp.: > 40 °C	5 to 45%

System requirements	Windows 11/10/8/7(x86, x64), Debian 12/11/10(x64, AArch64) Ubuntu 24.04/22.04/20.04/18.04(x64, AArch64)
Packaging accessories	VNB-60 main unit *1, matched loads *2, ECB-60 electronic calibration module * 1, USB cables * 2, SMA female-to-female adapter * 1, wrench set * 1 CKB series armored amplitude- and phase-stable cables * 2

*Specifications apply under the following conditions:

(1) Dynamic range test conditions: 15 Hz IF bandwidth, +5 dBm output power; ambient temperature of 25 °C (± 3°C), with < 1 °C deviation from the calibration temperature.

(2) Corrected system performance test conditions: 15 Hz IF bandwidth; ambient temperature of 25 °C (± 3°C), with < 1 °C deviation from the calibration temperature.

(3) Typical and nominal values are not guaranteed and do not include measurement uncertainty.

(4) Calibration includes SOLT calibration and isolation calibration by default.

(5) Specifications are subject to change with hardware and software revisions without notice.

Standard Accessories

Electronic Calibration Module	ECB-60, 100 kHz to 6 GHz
RF Test Cable	CKB series armored amplitude- and phase-stable RF cable

VNB-60 Measurement Kit Overview



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