VNA-3000

Vector Network Analyzer

- SMA connectors for better isolation
- Calibration using open-short-load for accurate results
- Two ports VNA with S11 and S21; displayed and save results
- Full Phase measurement
- Export data in several formats JPEG, EXCEL, ZPLOT, S2P, PDF
- User friendly interface for PC Windows Linux and Mac
- Integrated Smith chart in software

VNA3000

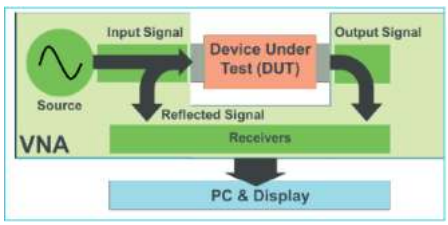
The Akademika VNA3000 2-port, vector network analyzer gives RF design and validation engineers, education professionals, and manufacturing organizations the ability to accelerate their time-to-market by reducing prototype iterations and making everyday measurements with accuracy and confidence.

Introduction to VNA

Vector Network Analyzers (VNAs) measure the magnitude and phase characteristics of networks that include passives, power amplifiers; and tower mounted amplifiers.
They function by comparing the incident signal that leaves the analyzer with either the signal that is transmitted through the test device or the signal that is reflected from its input.
The VNA-3000 is a personal computer-driven Vector Network Analyzer capable of operation over the range of 1MHz to 3GHz. It incorporates s-parameter test set allowing direct measurements of forward and reverse parameters over 70 dB dynamic range below 500 MHz . The test frequency can be set with a resolution of 10 Hz

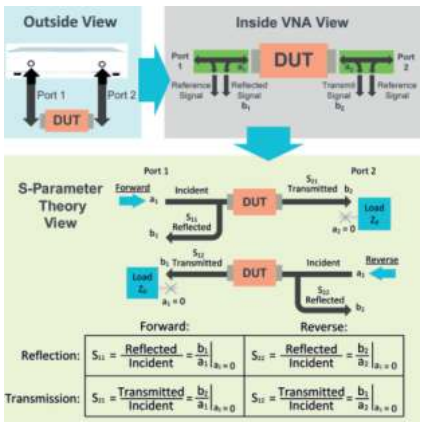
BASIC VNA OPERATION

- A VNA contains both a source, used to generate a known stimulus signal, and a set of receivers, used to determine changes to this stimulus caused by the device-under test or DUT. This illustration highlights the basic operation of a VNA. For the sake of simplicity, it shows the source coming from Port 1, but most VNAs today are multipath instruments and can provide the stimulus signal to either port.



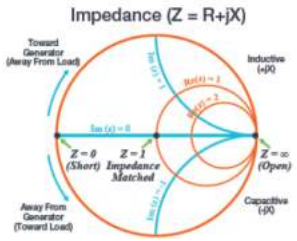
S-PARAMETER BASICS

- S-Parameter: Scattering parameters or S-parameters describe the electrical properties and performance of RF electrical components or networks of components when undergoing various steady state electrical signal stimuli. They are unit less complex numbers, having both magnitude and phase, and are related to familiar measurements such as gain, loss, and reflection coefficient

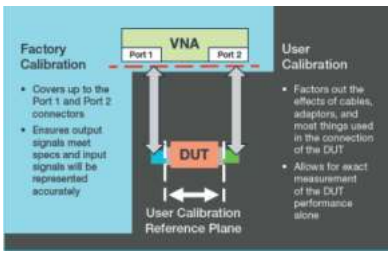


SMITH CHART

- The Smith chart is a very useful tool used to determine complex impedances and admittances of RF circuits. Most network analyzers can automatically display the Smith chart, plot measured data on it, and provide adjustable markers to show the calculated impedance



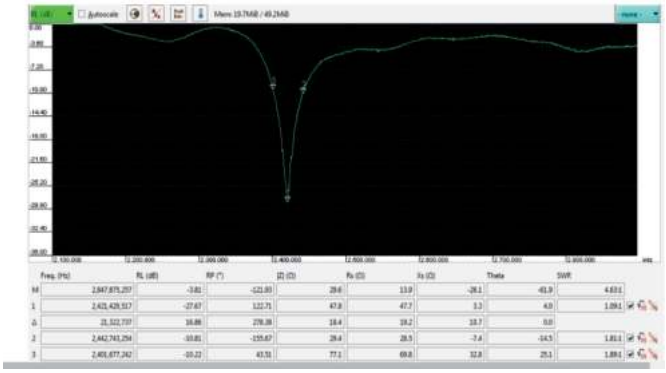
VNA CALIBRATION



VNA3000

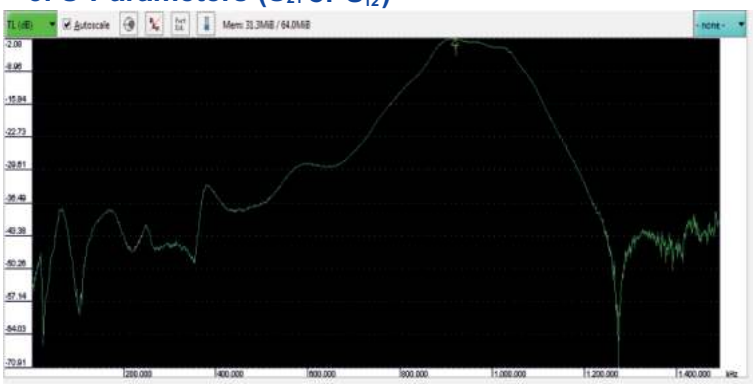
KEY MEASUREMENT PARAMETERS

1. Return Loss



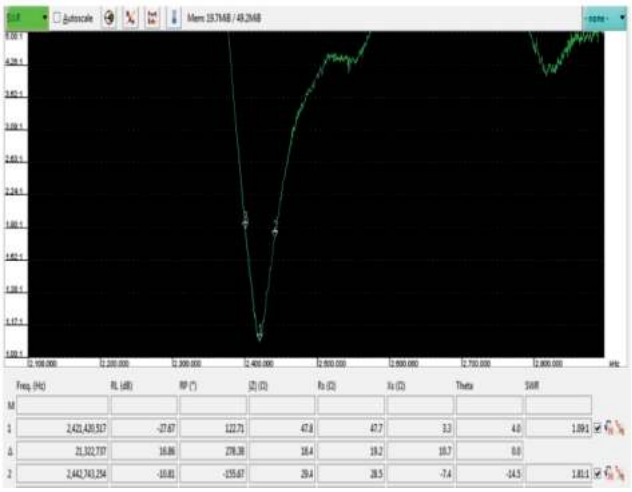
Graph shows return of patch antenna and its return loss value is -27.67dB at frequency 2421 MHz

3. S-Parameters (S_{21} or S_{12})



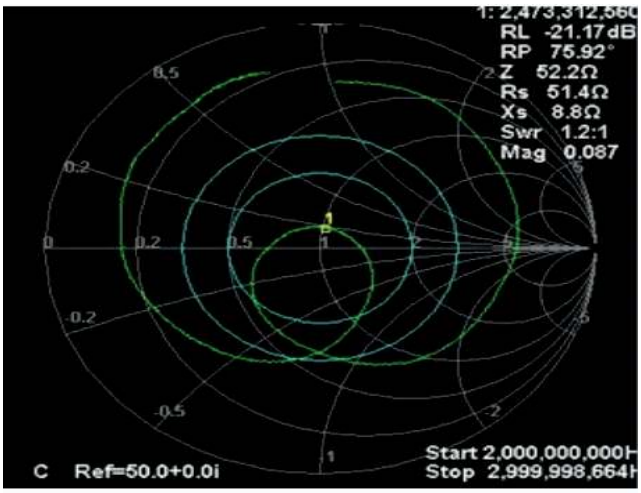
Graph shows transmission coefficients of Hair pin band pass filter and its insertion loss S_{21} value is 2dB at 900 MHz

2 . VSWR



Graph shows the VSWR of patch antenna and its VSWR value is 1.09 which is nearly equal to ideal value 1.

4. Smith chart



Graphs shows smith chart of antenna and its shows impedance of antenna is around 52 ohm

WHO USES VECTOR NETWORK ANALYZERS?

- RF design and validation engineers use VNAs to validate their design simulations.
- Manufacturing engineers assemble and test RF components and devices based on a certain set of specifications. Vector Network Analyzers are used to quickly and accurately validate the performance of the RF components and devices.
- Education professionals train the next generation of engineers with standard industry test instrumentation

VNA APPLICATION EXAMPLES

- Antenna matching and tuning
- Filter and Antenna measurements
- Amplifier measurements
- Radio Frequency (RF) cable and connector measurements
- RF component design and validation
- Education

VNA3000

SPECIFICATIONS

Technical Specifications	
Frequency range	1 MHz to 3 GHz
Frequency setting resolution	10 Hz
Dynamic Range (dB)	up to 70 dB @500 MHz (System dynamic range)
Output power	-6 dBm at 500 MHz
Impedance Range	1 to 1000 Ω
Number of steps	10000
Connection to PC	mini-USB
RF connectors	SMA female
ACCESSORIES	
Vector Network analyzer	01 No.
Calibration kits OSLT	01 No.
SMA (M) to SMA (M) 50 ohm cable	02 No.
USB cable	01 No.
Manual	01 No.

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