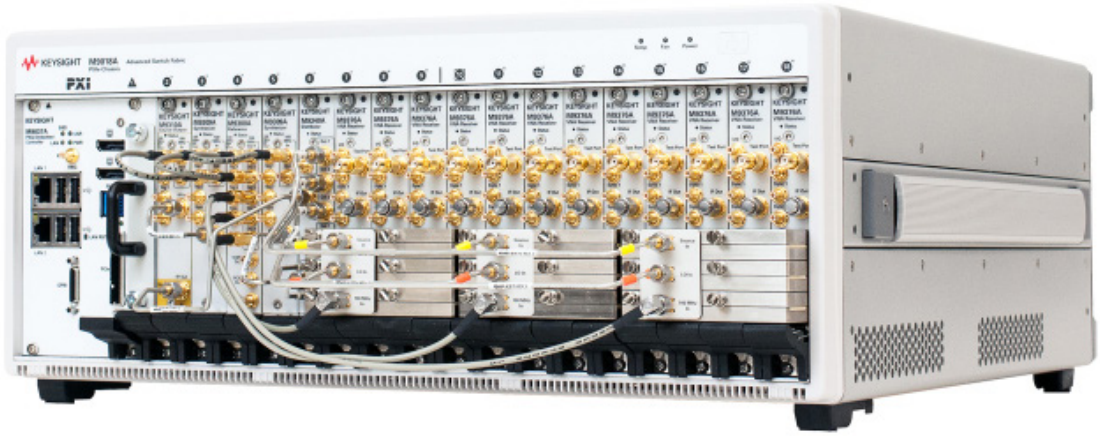
Keysight M9485A

PXIe Multiport Vector Network Analyzer



KEYSIGHT TECHNOLOGIES

Unlocking Measurement Insights

High-Performance PXI Multiport Vector Network Analyzer (VNA)

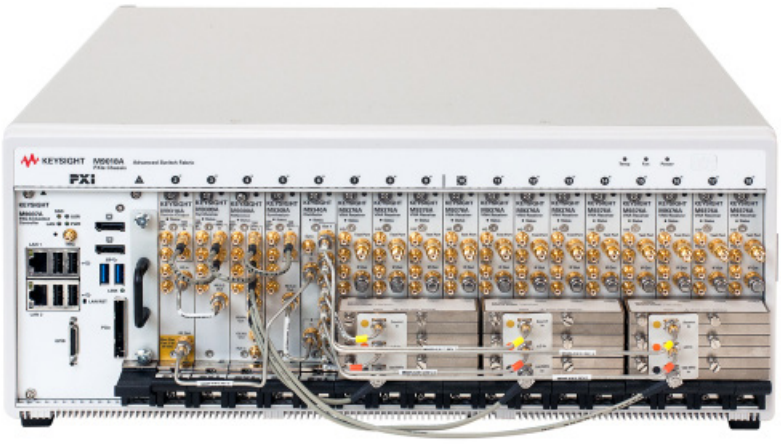
Innovative solution

Today's measurement requirements of components or modules used for wireless communication are getting more complicated based on growing technology and multi-carrier and multi-band coverage needs. The Keysight M9485A PXI multiport VNA is an ideal solution that provides flexible and scalable configuration, and solves your increasing challenges. Adapting independent source and receiver configuration, it offers the best measurement performance in multiport network analysis. Using the latest converged software platform that leverages the best attributes of the ENA and PNA families, it also offers comprehensive functions to test multiport components like front-end modules, filters, and switches. Build the production line with the M9485A and drive down the cost of test.

Best-in-class performance for multiport testing

The M9485A has best-in-class fast measurement speed and wide dynamic range, as well as Keysight VNA's common high stability and low trace noise for multiport testing. It helps you achieve the lowest cost of test with fast throughput, high accuracy, better yields and less down time.

Product feature	Product performance (typ.)	Fast throughput	High accuracy	Better yield	Less down time
Fast speed	Max 5 msec @ 201 point, full 2-port calibration	Yes			
Wide dynamic range	Up to 142dB @ 10 Hz IFBW	Yes	Yes	Yes	
High stability	Min 0.005 dB/°C		Yes	Yes	Yes
Low trace noise	Min 0.001 dBrms @ 10 kHz IFBW	Yes	Yes	Yes	



Fast speed

The M9485A's measurement speed increases throughput and decreases cost of test, especially in high-volume manufacturing, with best-in-class measurement speed in multiport network analysis.

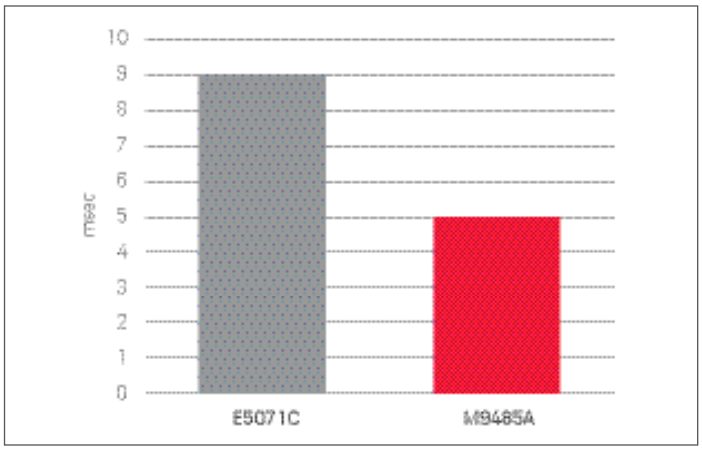


Figure 1. Fast measurement speed[1]

Wide dynamic range

Wide dynamic range not only helps increase throughput of high rejection device test, but also improves test accuracy and yield. M9485A has up to 142 dB[2] dynamic range, best-in-class in PXI VNA, and comparable to the best bench-top VNAs.

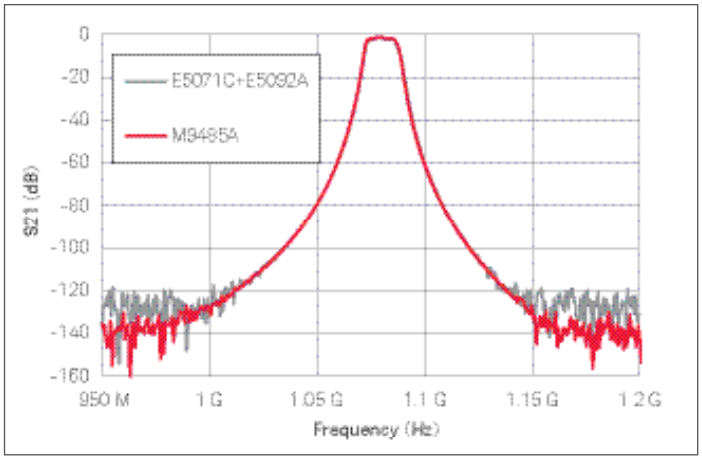


Figure 2. Wide dynamic range[2]

Low trace noise and high stability

The M9485A inherits excellent low trace noise and high stability, common factors to all Keysight VNAs. Low trace noise of 0.001 dBrms[3] enables fast and accurate measurements. High stability of 0.005 dB/°C[4] increases calibration interval time and maintains accurate measurement performance, which decreases the operation down time for calibration.

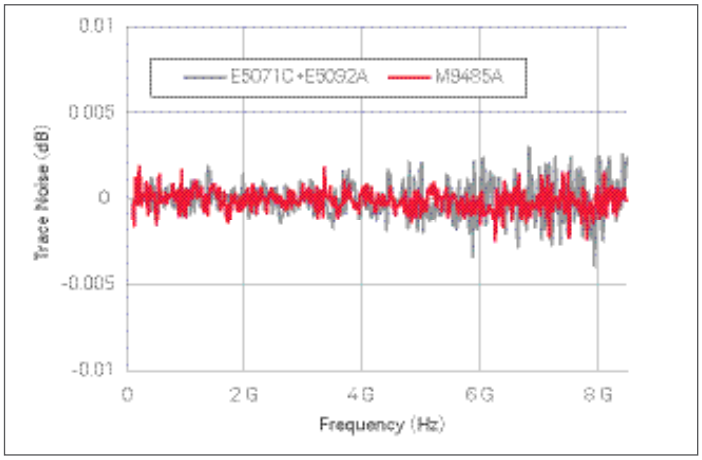


Figure 3. Low trace noise[3]

1. 1601 pts, linear sweep, full span, full 2-port calibration, typical
2. IFBW 10 Hz, max output power, typical
3. IFBW 10 kHz, max output power, typical
4. Up to 3 GHz, typical

Flexible Multiport Configuration with Full N-Port Correction

You can customize the M9485A to measure your DUTs most effectively. The M9485A supports from 4-port to 24-port configurations and users can easily increase or decrease the number of ports by adding, re-assigning, or removing modules in the system according to current and future test needs.

4 to 12 ports with one chassis

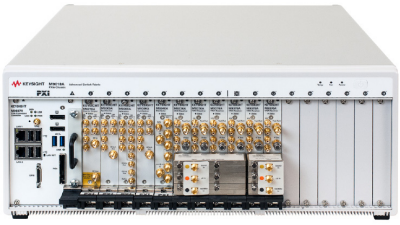


Figure 4. 6-port configuration

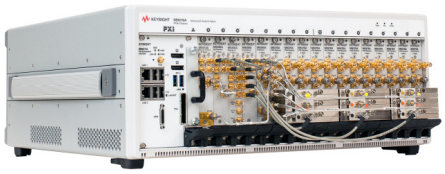


Figure 5. 12-port configuration

14 to 24 ports with two chassis

Figure 6. 24-port configuration

If one of the M9485A modules has damage, you can minimize production downtime by just sending that module for repair, or swap the module with a spare one.

The M9485A is a true multiport VNA with up to 24 ports, independent receivers at each port. This configuration drastically decreases the total number of sweep times for multiport measurements compared to a switch matrix based solution. For example, a 16 port measurement takes 16 sweeps for the M9485A, but takes up to 240 sweeps for a 2-port VNA with a switch matrix. By using the M9485A, you can dramatically increases test throughput.

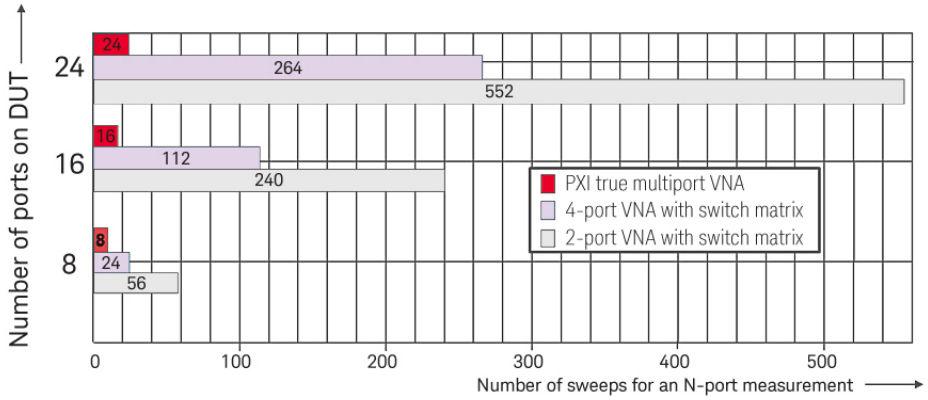


Figure 7. Number of sweeps comparison

Multiport measurements

The M9485A uses the latest Keysight VNA software platform. It helps you set and measure multiple traces easily and intuitively. Up to 200 measurement channels and unlimited traces setups enable setting flexible multiport measurements. A guided calibration menu and copy channel feature enable full N-port calibrations and set stimulus conditions quickly.

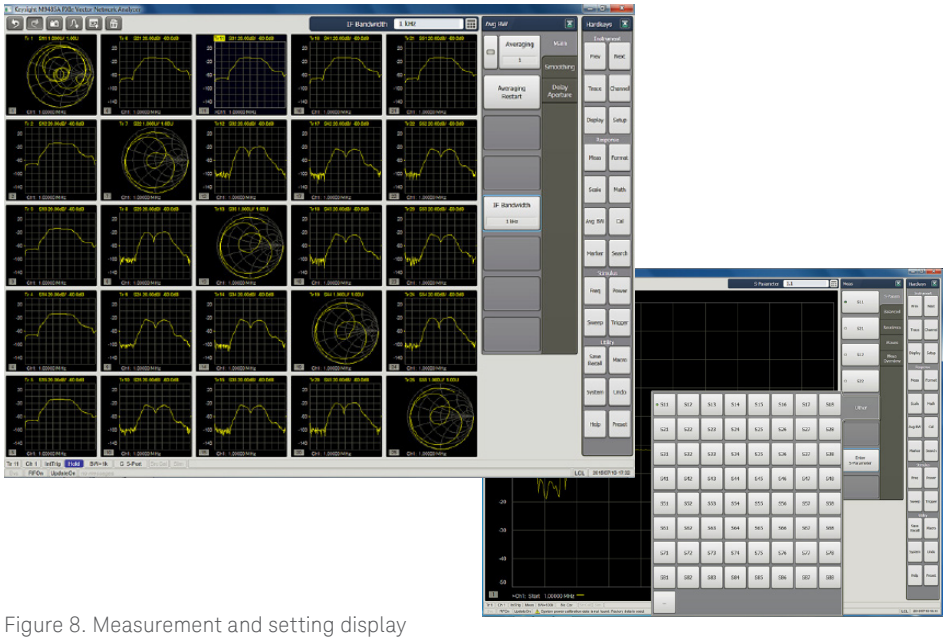


Figure 8. Measurement and setting display

Flexible setting of multi-site measurements

You can set a single stimulus source for multiple test ports at the same time. This feature enables simultaneous and flexible multiport and multi-site measurements. The multi DUT measurement tool helps setup multiport and multi-site measurement by the M9485A. You can drastically increase total test throughput and lower cost of test per device by this capability.

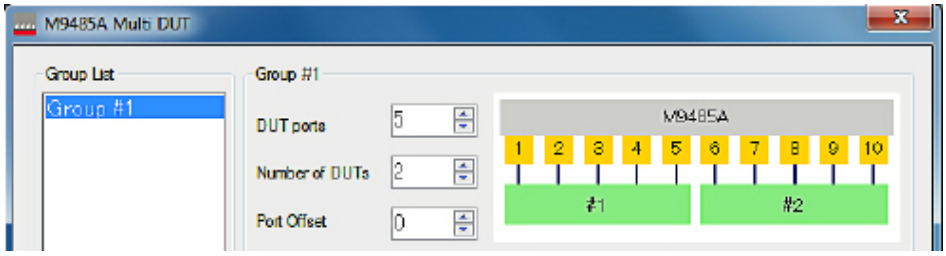


Figure 9. Multi DUT measurement tool

Flexible traces and windows layout

The layout of traces and windows can be flexibly allocated with intuitive drag-and-drop operations. It enables you to overly traces with different channel settings on the same windows.

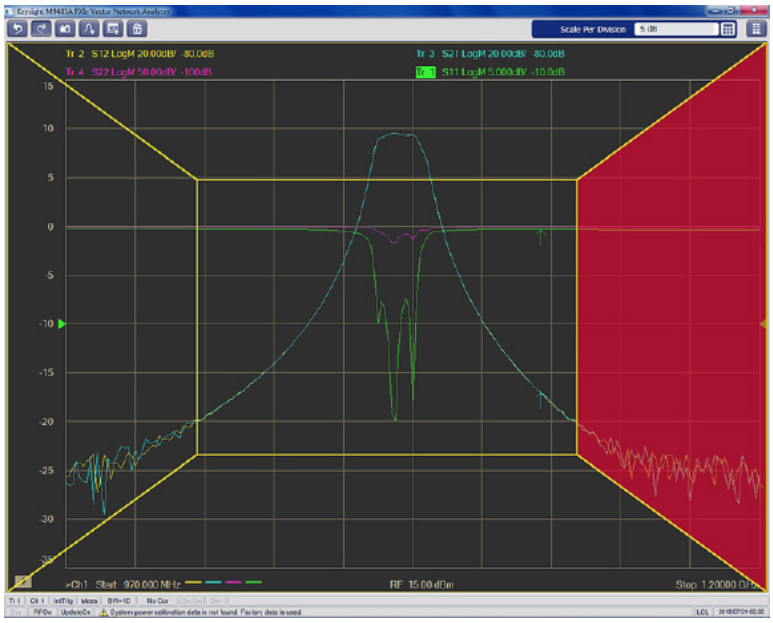


Figure 10. Drag-and-drop operatoin

Powerful Measurement Capability for a Variety of Applications

The M9485A combines the highest RF performance with powerful analysis capabilities that enables you to address a variety of applications and increase test efficiency.

Frequency offset mode, SMC and VMC for mixers

The Scalar Mixer Calibration (SMC) provides the most accurate conversion loss/gain measurements. The Vector Mixer Calibration (VMC) is Keysight's VNA unique feature that enables you to measure the phase and group delay. External sources can be synchronized by the handshake trigger function that realizes high-speed swept LO measurements.

Time domain analysis and gating function for cables, PCB and filters

The M9485A offers comprehensive time domain analysis functions including time gating. The 100,001 maximum points enable the analysis of electrically long DUTs. The Quick Start dialog offers easy setup for complicated time domain setting.

PMAR (power meter as receiver)

The PMAR plots the measured data of an external power meter/ sensor on the display. This function enables you to monitor RF power levels in amplifier measurements. Also, you can use the power sensor as a scalar detector for measuring devices like frequency converters.

Segment sweep

Features such as IFBW and source power can be set per test port to optimize measurement speed.

Extensive analysis functions

- Equation Editor. The MATLAB functions can be called from the Equation Editor to execute complicated analysis.
- Ripple limit & BW limit (for filter tuning)
- Point limit (for antenna tests)
- Multi peak search
- Fifteen markers per trace
- Trace Max/Min hold for EMC chamber site attenuation

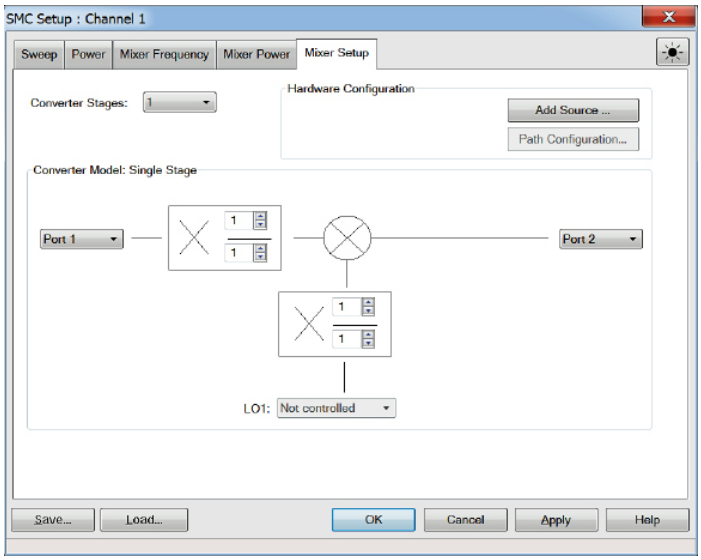


Figure 11. Mixer Setup

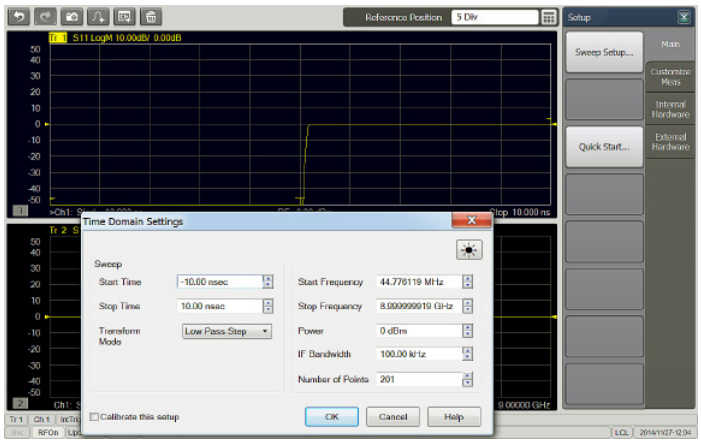


Figure 12. Time domain settings on Quick Start

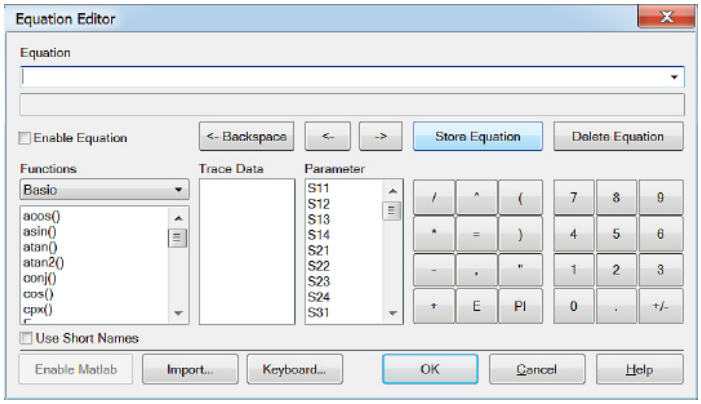
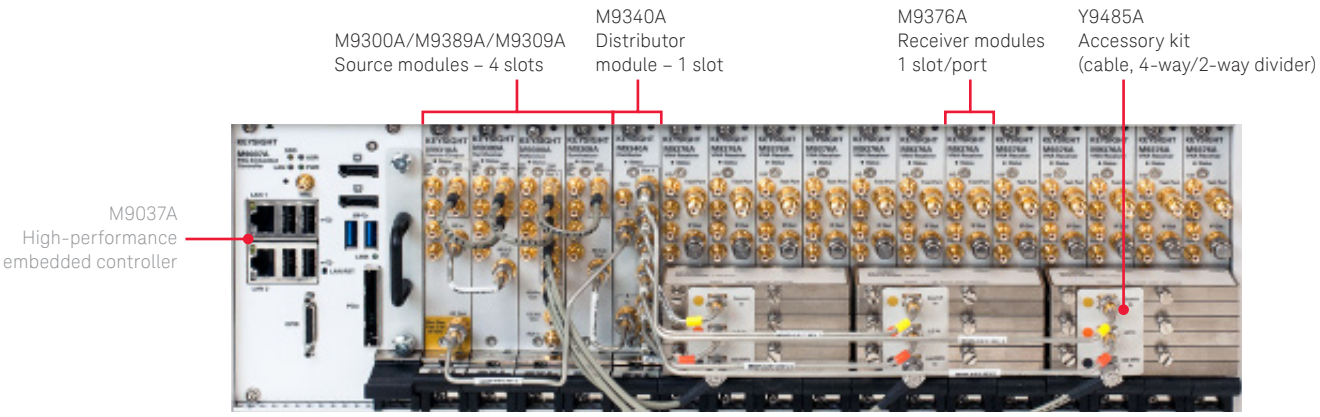


Figure 13. Equation editor

Product Configuration

M9485A



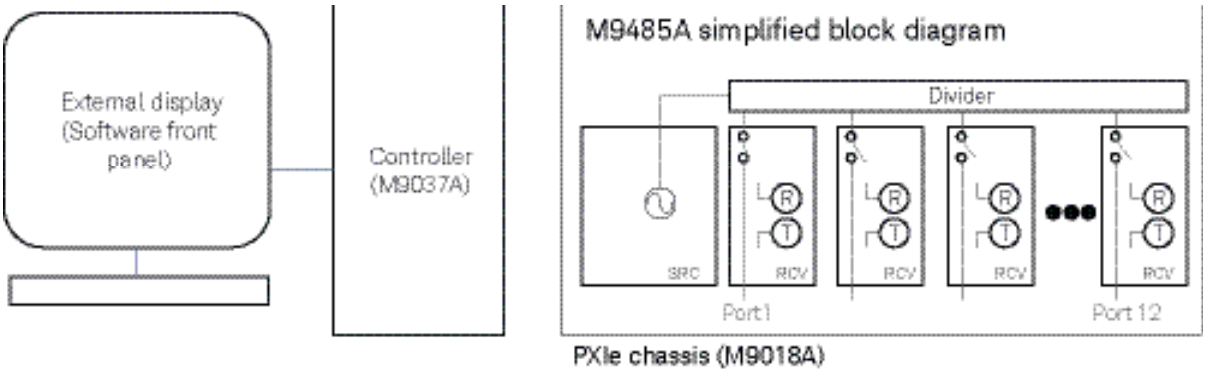
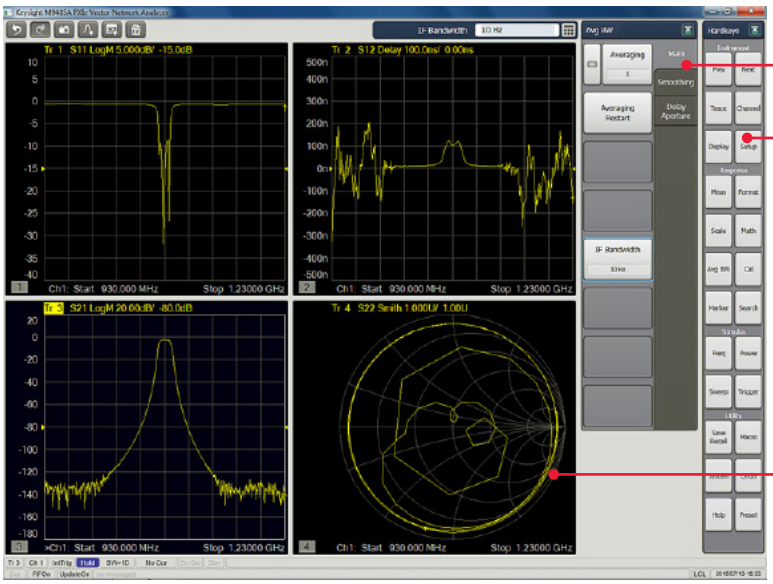


Figure 14. Simplified block diagram

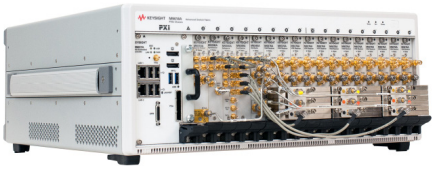
M9485A Software Front Panel



- Tabbed softkeys menu
- Hardkeys menu
  - Context sensitive help
  - Favorite keys
  - Undo/Redo
- 200 measurement channels
- Unlimited traces
- Up to 15 markers per trace

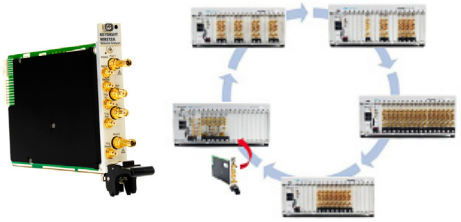
Figure 15. software front panel

Keysight PXIe VNA Comparison



High-performance multiport

True modular expands capabilities



Integrated 2-port VNA in one slot

Flexible, scalable, and re-configurable

	M9485A	**M9370/71/72/73/74/75A**
Frequency	1 MHz to 9 GHz	300 kHz to 4, 6.5, 9, 14, 20, or 26.5 GHz
Dynamic range, typ @10 Hz IFBW	142 dB	122 dB
Cycle time, typ (201 pts, 2-port cal)	5 msec	11.9 msec
Trace noise, typ @10 kHz IFBW	0.001 dBrms	0.001 dBrms
Source power max.	15 dBm	7 dBm
# of test ports	Up to 24-ports, 12-ports maximum per chassis	Up to 32-ports in single chassis
Multi-site test	YES (with same stimulus, 1 for one system)	YES (with independent stimulus, 1 for 2-port VNA)
Options	– N-port calibrated meas (551) (mandatory for > 4-port)	– N-port calibrated meas (551) (mandatory for > 2-port)
	– Time domain (010)	– Time domain (010)
	– Frequency offset mode (009)	– Advanced VNA features and capabilities (102)
Remote control command	Compatible to the E5080A	Compatible to the PNA

Ordering Information

Hardware option	
M9485A-1xx	X-port test set option. X is available as even number from 4-port (Option 104) to 24-port (Option 124) .
	Option 1xx include M9389A, M9309A, and M9340A source modules; M9376A standard receivers, necessary cables, and dividers[1].
M9485A-300	PXIe frequency reference

Software option	
M9485A-009	Frequency offset mode
M9485A-010	Time domain analysis
M9485A-551[2]	N-port calibrated measurement

Accessories	
M9018A	PXIe 18-slot chassis[3]
M9037A	PXIe high-performance embedded controller
Calibration	Electronic and mechanical kits available

System requirement	
Operating systems	Windows 7 (32 bit and 64 bit) or Windows 8.1 (32-bit and 64-bit)
Processor speed	1.5 GHz dual core (x86 or x64) minimum (2.4 GHz recommended)
Available memory	4 GB minimum (8 GB recommended)
Keysight IO libraries (version 17.1 or newer)	Includes: VISA libraries, Keysight Connection Expert, IO Monitor

1. Includes additional M9040As and one M9021A PCIe cable interface also when the configuration needs. Refer to configuration guide (5992-0758EN) for detail.
2. Required for > 4-port configurations. M9485A runs as maximum 4-port receiver configuration without Option 551.
3. M9485A-114 to -124 requires two M9018A chassis.