

Keysight Technologies

E5080A ENA Series Network Analyzer

- 9 kHz to 4.5/6.5/9 GHz



The Next-Generation ENA

The Keysight E5080A is the next-generation ENA, providing best-in-class performance, flexible functionality and advanced usability. With its intuitive, touch-based interface, the E5080A is designed to help users streamline their measurement flow and achieve better results in less time. This new instrument implements a converged platform that leverages the best attributes of the ENA and PNA families. The E5080A sets the new standard in RF component testing for both R&D and manufacturing environments. The E5080A offers comprehensive functionalities for measuring active and passive components such as amplifiers, mixers, filters, antennas, cables, and many more. It builds on the over 45-year legacy of excellence in network analysis and 75-year electronic test and measurement experience.

Best-in-Class Performance

Wide dynamic range	152 dB (typical, 3 Hz IFBW)
Fast measurement speed	3 ms (401 points, uncorrected)
Low trace noise	0.0005 dBrms (typical, 10 kHz IFBW)
High temperature stability	0.005 dB/°C (typical)
Wide source power range	-90 to +15 dBm (spec)

The E5080A provides wide dynamic range from 9 kHz. More than 10 dB better dynamic range than E5071C enables to measure high-blocking DUTs such as filters accurately and improve measurement speed using wider IFBW. The unparalleled measurement speed compared to competitor products maximizes the test throughput in production line.

The 0.0005 dBrms low trace noise and the 0.005 dB/°C excellent temperature stability provide the best-in-class measurement repeatability and long-term stability. The E5080A offers excellent trace noise across the entire frequency range.

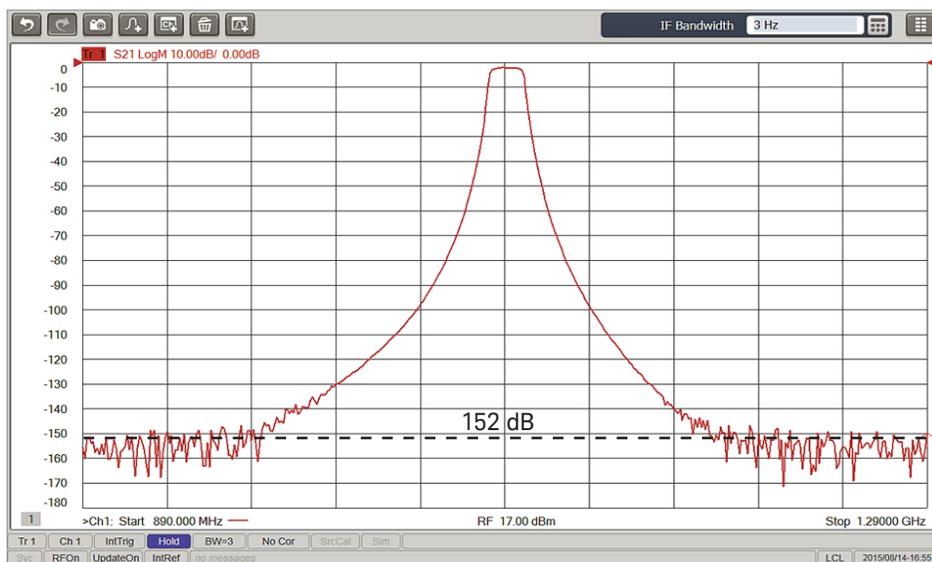


Figure 1. Wide dynamic range (IFBW = 3 Hz)

Intuitive and Flexible Operations with Modern User Interface

The E5080A is designed to help users streamline their measurement flow. Measurement flow proceeds from right to left: front panel keys, touch-activated softkeys with tabs, and touch-driven trace displays and windows

Easy access to frequently used functions

The Tabbed Soft Panel enables you to access the analyzer's major functions within a few steps. Your frequently used softkeys can be registered to the Favorite menu. A long touch on the screen activates the Context Popup menus, and these present the most relevant choices without needing to access the softkeys.

Direct access to essential features through the toolbar

Measurement traces, channels, and windows can be quickly added by pressing the icons on the toolbar. The list of icons is customizable depending on your preference.

Flexible traces and windows layout

The layout of traces and windows can be flexibly allocated with intuitive drag-and-drop operations. Or the layout can also be changed by using the softkeys that split or combine traces and windows in a single action.

Magnifying the display

With multi-touch or single-touch gestures, you can magnify the display area on the screen.



Figure 2. Tabbed soft panel and popup menu

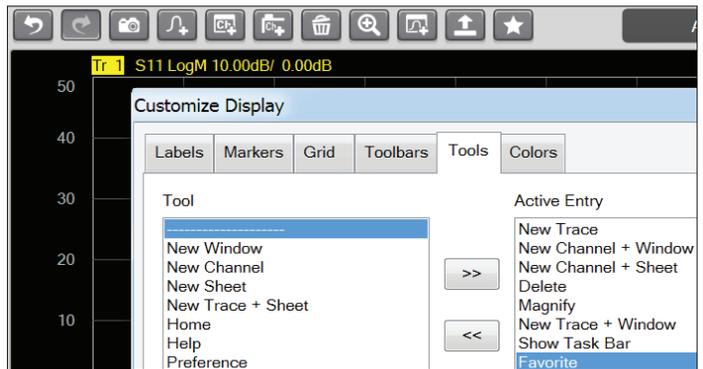


Figure 3. Customizable toolbar menus



Figure 4. Drag-and-drop for traces/windows



Figure 5. Multi-touch magnification

Streamline Your Measurements with Advanced Usability

The E5080A's advanced usability simplifies the measurement setup tasks, and its flexible display capabilities give excellent visibility of the measurement data.

Quick setups using dialog menus and Copy Channel

A variety of dialog menus assist you in making complex measurement setups easily. The Quick Start dialog gives the templates of display layouts for typical measurement applications, and the subsequent Sweep Setup dialog completes necessary stimulus settings in a single page. Moreover, once you have completed making the setup for one channel, you can copy it to other channels by using the Copy Channel function. This significantly reduces the time required for making multi-channel measurement setups.

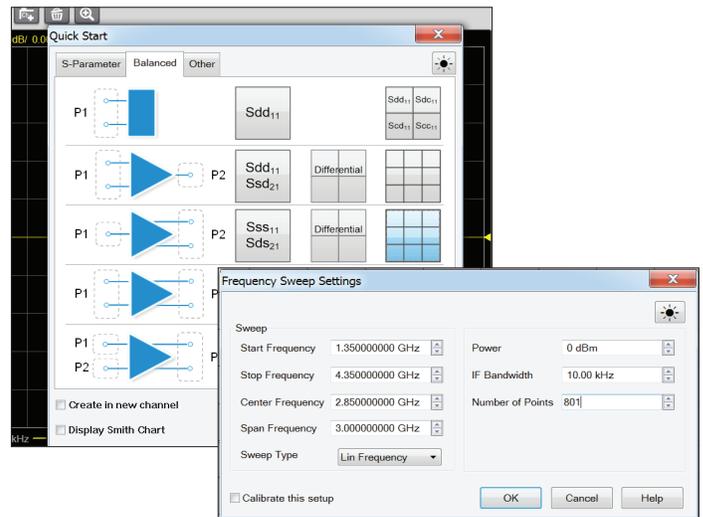


Figure 6. Quick Start dialogs

Tabbed Sheet

The Tabbed Sheet function allows you to split the measurement display into multiple pages within a single instrument state. Complicated multi-channel measurement data can be easily observed by splitting the channels into the sheets. The active sheet can be switched not only with the touch or mouse operations but with the Prev/Next hardkeys on the front panel. This is useful for manufacturing applications such as the BTS filter tuning where the hardkey operation is preferred.

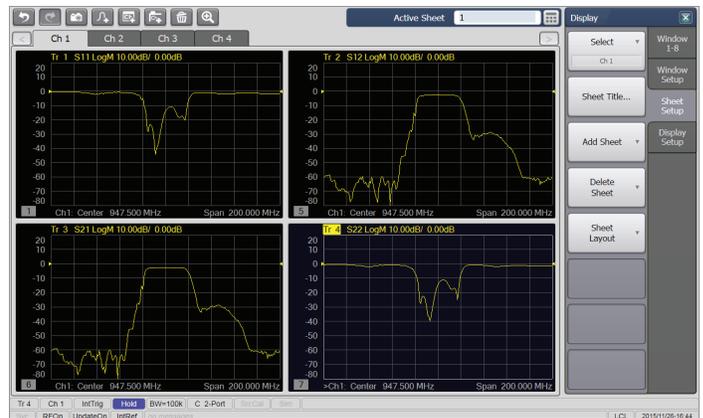


Figure 7. Displaying four channel data using Tabbed Sheet

Flexible marker capabilities

You can place up to 15 markers per trace. For better visibility, the locations of the marker lists are flexibly movable, and the number of decimal places can be changed as you like. In addition, a variety of marker search functions are available, including the single or multiple max/min/peak/target search, the bandwidth/notch search, and the gain compression search.



Figure 8. Up to 15 markers per trace

Powerful Measurement Capability for a Variety of Applications

The E5080A ENA 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 E5080A 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

Comprehensive hardware capability

The E5080A offers useful hardware features such as bias tees and AUX DC inputs as standard features.

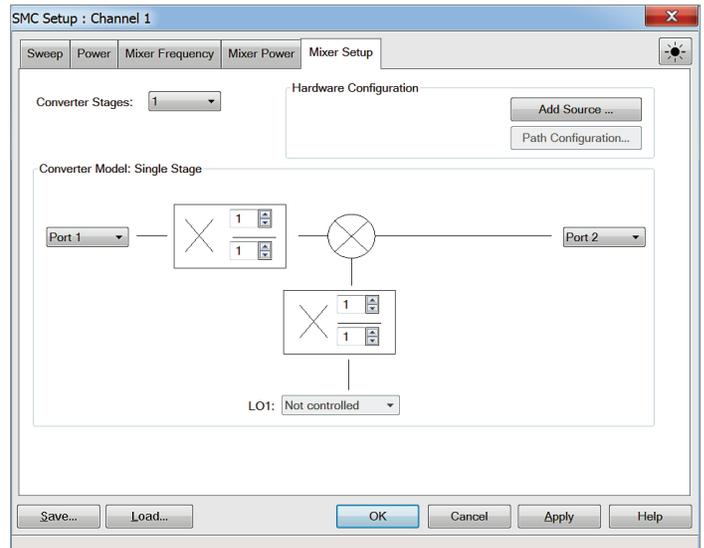


Figure 9. Mixer Setup

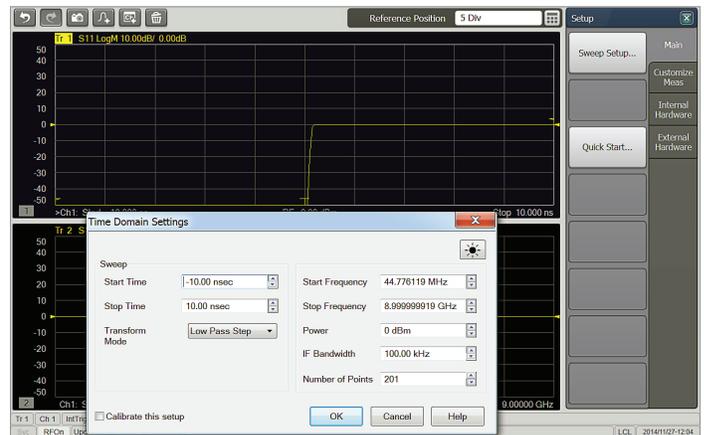


Figure 10. Time domain settings on Quick Start

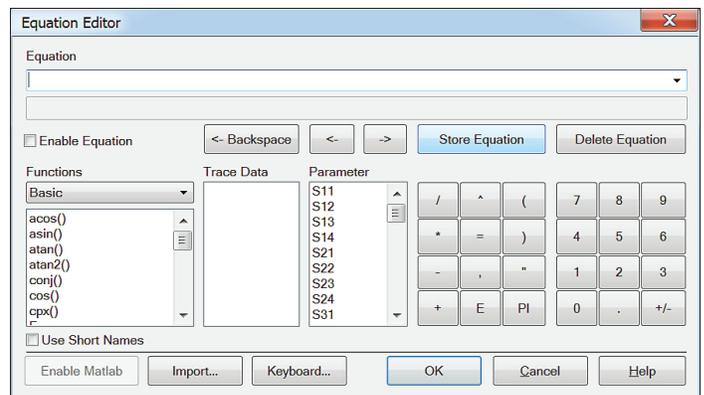


Figure 11. Equation editor

Advanced Calibration Tools

Calibrating network analyzers is critical for high accuracy measurements. The E5080A supports all common calibration methods for coaxial DUTs, waveguide DUTs and DUTs in test fixtures, on printed circuit boards (PCB) and on wafers. The built-in capabilities include advanced calibration methods and a new “basic calibration” feature that can simplify the calibration processes.

TRL/LRL/TRM/LRM calibration (Through, Reflect, Line, Match) for on PCB and on-wafer measurements.

Unknown Thru (SOLR) calibration for non-insertable devices.

Source Power Cal for amplifier measurements, and offers advanced techniques such as power cal using the analyzer’s receiver

Quick SOLT (QSOLT) reduces the number of correction standards and calibration steps for multiple ports calibration.

Electronic calibration (ECal) modules offer accurate calibration with simple one-connection operation.

Basic Cal

The E5080A offers a variety of calibration menus and you can choose an appropriate menu depending on the complexity of your calibration methods. The Basic Cal dialog is a very simple calibration UI providing all the calibration buttons in the same dialog page. This calibration menu is suitable for performing relatively simple calibrations such as the basic SOLT cal.

Advanced calibration methods

Cal Wizard

The E5080A also offers wizard-type calibration menus for complicated calibrations. The Smart Cal guides all the operation steps of the calibrations with the wizard menu. This calibration menu is suitable for performing complicated calibrations such as mixed-connector cal, and the combination of the SOLT cal and the source/receiver power calcs. The Cal All is the advanced wizard function of the Smart Cal. This calibration menu guides the calibrations of multi-channel measurement setups at minimal steps.

Cal Plane Manager

The Cal Plane Manager allows you to characterize the adapters, test fixtures, or probes to the S2P data, and mathematically de-embed them for improving the measurement accuracy at the DUT planes. This function also provides the capabilities for modifying the existing S2P files, such as reversing the port order of the S2P file and cascading two S2P files.

Fixture simulator

The fixture simulator offers functions for simulating fixtures and adapters such as embedding/deembedding, port matching, impedance transformation and port extensions.

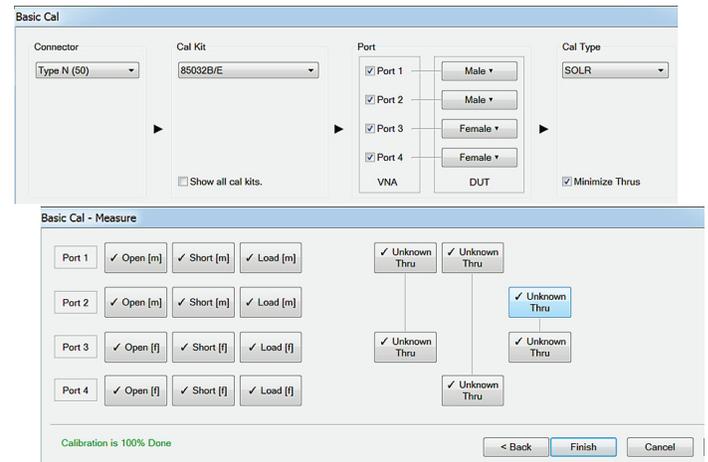


Figure 12. Basic Cal

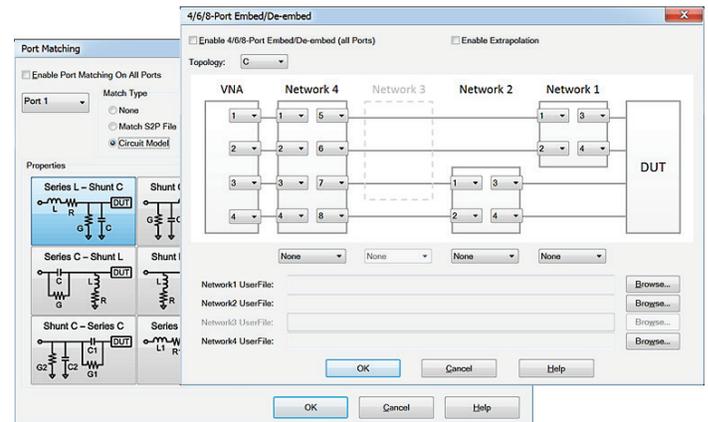


Figure 13. Fixture simulator

Measurements with up to 40 ports

The combination of the 4-port E5080A and E5092A configurable multiport test set offers a comprehensive multiport solution. Depending on your test requirements, you can flexibly build the test port configurations by changing the front jumper connections of up to two E5092A test sets. The optional Measurement Wizard Assistant (MWA) software simplifies complicated setup and calibration processes for multiport device tests with the E5080A and E5092A.

Code compatibility

The E5080A offers the compatibility solutions that help you migrate your E5071C and 8753 network analyzers to the E5080A. The compatibility solutions support the majority of commands and functions used in the S-parameter measurements. These solutions significantly reduce your efforts of migrating your test programs and instrument state files, and you can easily take advantage of improved performance and speed with the E5080A.

E5071C Code Emulation and State File Conversion

The E5071C Code Emulation mode is the remote control mode that the E5080A is controlled with the E5071C's SCPI commands. The command emulation is performed by the firmware in real time.

The E5071C State File Converter is the application software that converts the E5071C's state files to the E5080A's. The state file conversion between two analyzers can be easily done by using a USB memory stick.

8753 Code Emulation

The 8753 Code Translator (CxL) is the application software that runs on the E5080A and emulates the 8753 commands.



Figure 14. Multiport configuration with E5080A and E5092A

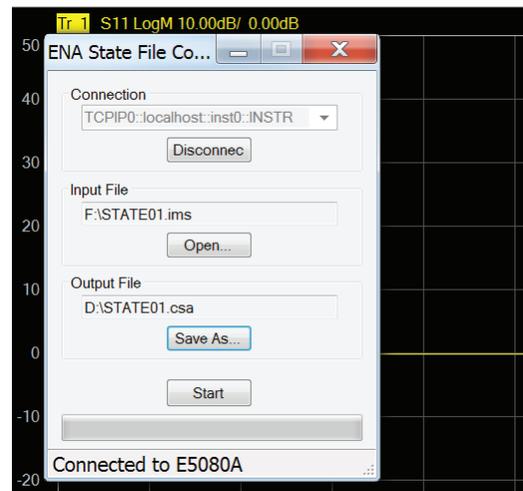


Figure 15. E5071C State File Converter

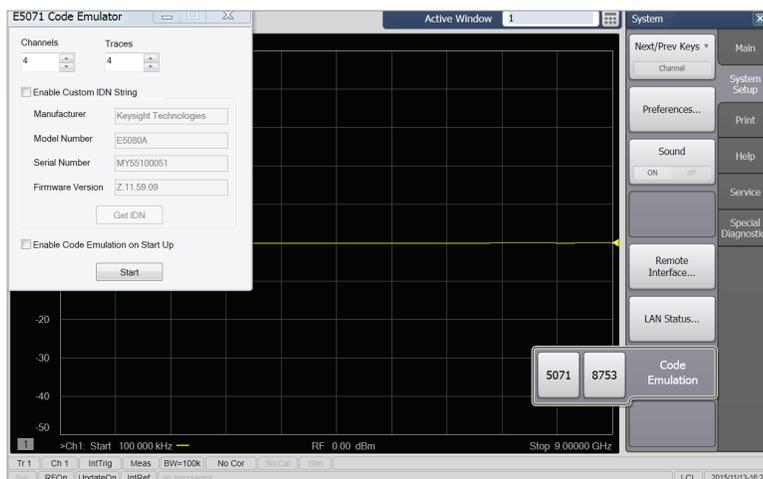
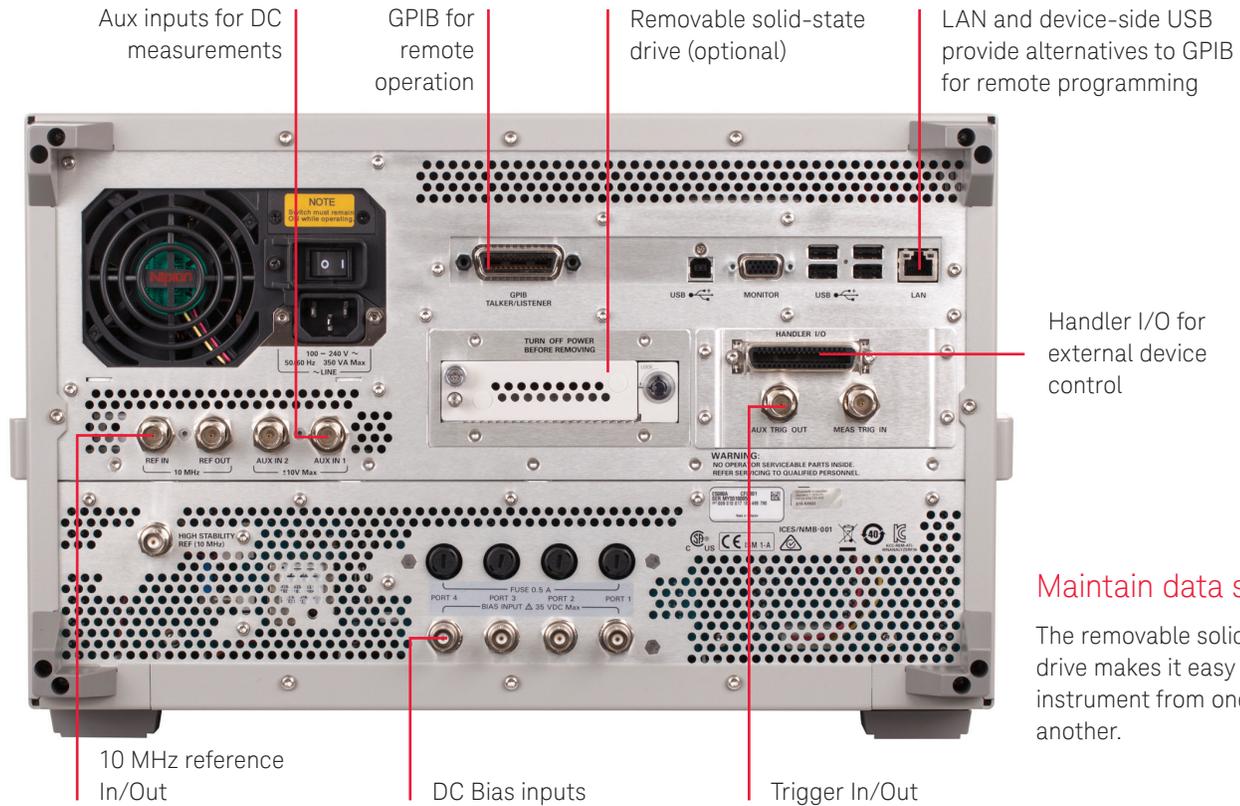
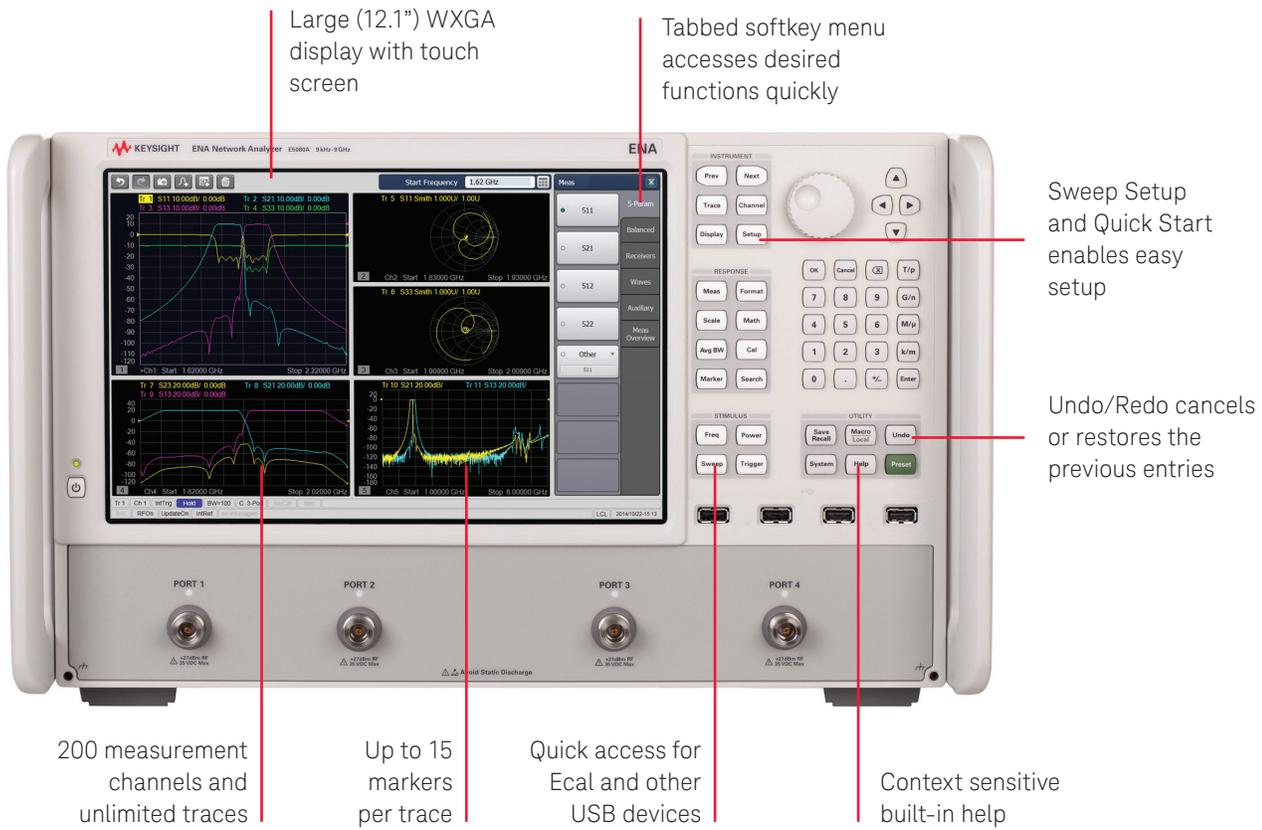


Figure 16. E5071C Code Emulator

E5080A Front and Rear Panels



E5080A Key Specs & Features (Comparison with E5071C)

Item	E5080A	E5071C (4.5/6.5/8.5 GHz options)
Frequency	9 kHz to 4.5/6.5/9 GHz, with bias-T	9 kHz to 4.5/6.5/8.5 GHz, without bias-T 100 kHz to 4.5/6.5/8.5 GHz, with bias-T
Test port	2 or 4-port, 50 Ω	2 or 4-port, 50 Ω
Dynamic range (at max source power)	135 dB (spec, 10 Hz IFBW) 152 dB (typical, 3 Hz IFBW)	123 dB (spec)
Trace noise	0.0015 dBrms (spec, 10 kHz IFBW) 0.0005 dBrms (typical, 10 kHz IFBW)	0.003 dBrms (spec, 70 kHz IFBW)
Stability	0.005 dB/ $^{\circ}$ C (typical)	0.005 dB/ $^{\circ}$ C (typical)
Measurement speed (401 pts, 200 MHz span, uncorrected)	3 ms	7 ms
Source power	-90 to +15 dBm (spec) -110 to +17 dBm (typical)	-55 to +10 dBm (spec)
NOP	Max 100,001	Max 20,001
Channels	200	160
Markers	15/trace	9/trace
Measurement parameters	S-parameters (single-ended, mixed-mode), Absolute power	S-parameters (single-ended, mixed-mode), Absolute power, TDR and TDT parameters ¹
Software options	FOM, Time domain, MWA	FOM, Time domain, MWA, Enhanced time domain (opt.TDR)
Other major software capabilities	Fixture simulator, Equation editor, cXL, PMAR (power meter as receiver)	Fixture simulator, Equation editor, cXL, External test set mode ²
Automation	Remote control with SCPI commands	Remote control with SCPI commands, Built-in VBA
Multipoint test set	E5092A	E5092A, E5091A ³
Display	12.1 inch	10.4 inch
Box height	6U	5U
Other major hardware capabilities	High stability oven (option), Bias tees, DC input ports	High stability oven (option), Bias tees, DC input ports, Probe power

1. Optional capabilities

2. Assigns 4 test ports as direct source/receiver ports, S, R, A, and B.

3. Discontinued test set, Dec. 2014 EOS.

For more detailed information, refer to E5080A Data Sheet.

E5080A Ordering Information

Model/Option No.	Description
E5080A	ENA series network analyzer
Test set options	
E5080A-245	2-port test set, 9 kHz to 4.5 GHz with bias tees
E5080A-265	2-port test set, 9 kHz to 6.5 GHz with bias tees
E5080A-295	2-port test set, 9 kHz to 9 GHz with bias tees
E5080A-445	4-port test set, 9 kHz to 4.5 GHz with bias tees
E5080A-465	4-port test set, 9 kHz to 6.5 GHz with bias tees
E5080A-495	4-port test set, 9 kHz to 9 GHz with bias tees
Software options	
E5080A-009	Frequency offset mode ¹
E5080A-010	Time domain analysis
E5080A-790	Measurement wizard assistant software
Other options	
E5080A-017	Removable solid state drive
E5080A-019	Standard solid state drive
E5080A-UNQ	Standard stability timebase
E5080A-1E5	High stability timebase
E5080A-1A7	Calibration + Uncertainties + Guardbanding (Calibration certificate option)
E5080A-A6J	ANSI Z540-1-1994 Calibration (Calibration certificate option)
E5080A-810	Add keyboard
E5080A-820	Add mouse
E5080A-1CM	Rack mount kit
E5080A-1CP	Rack mount and front handle kit

1. Provides basic FOM functions, scalar mixer measurement (SMC class), and vector mixer characterization macro.

Literature

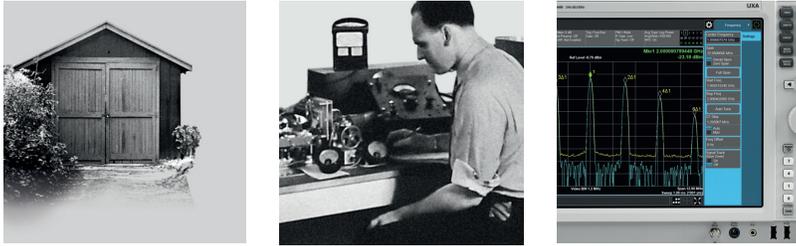
E5080A ENA Series Network Analyzer, Data Sheet, 5992-0291EN

E5080A ENA Series Network Analyzer, Configuration Guide, 5992-0292EN

Keysight Technologies Network Analyzer Selection Guide, 5989-7603EN

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