

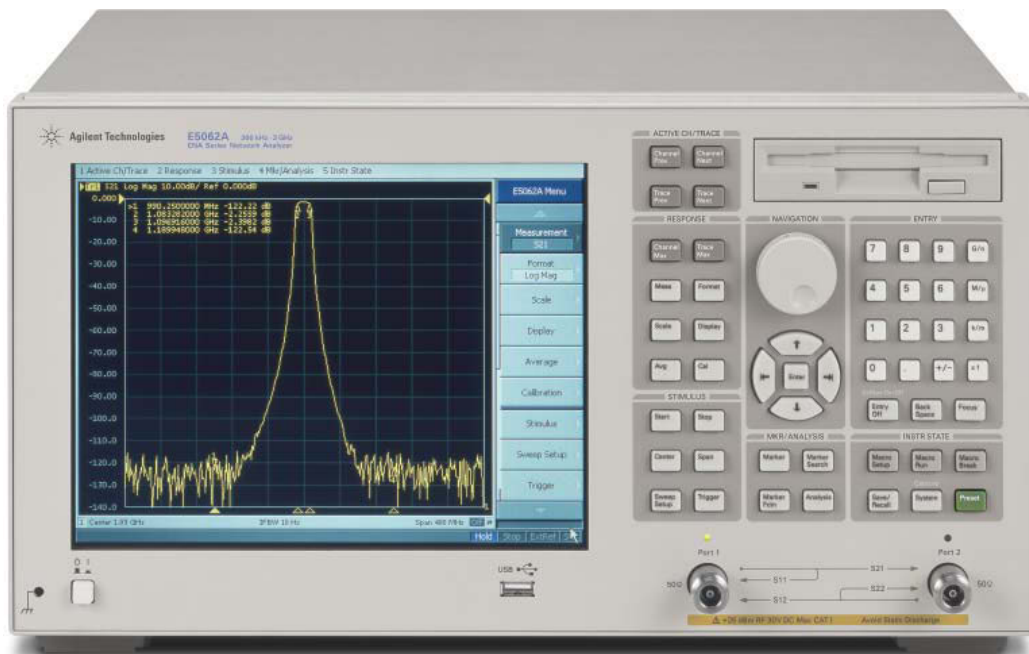


Agilent ENA-L RF Network Analyzers

E5061A, 300 kHz to 1.5 GHz

E5062A, 300 kHz to 3 GHz

Data Sheet



Definitions

All specifications apply over a 23 °C \pm 5 °C range (unless otherwise stated) and 90 minutes after the instrument has been turned on.

Specification (spec.):

Warranted performance. Specifications include guardbands to account for the expected statistical performance distribution, measurement uncertainties, and changes in performance due to environmental conditions.

Supplemental information is intended to provide information that is helpful for using the instrument but that is not guaranteed by the product warranty.

Typical (typ.):

Describes performance that will be met by a minimum of 80% of all products. It is not guaranteed by the product warranty.

Supplemental performance data (SPD):

Represents the value of a parameter that is most likely to occur; the expected mean or average. It is not guaranteed by the product warranty.

General characteristics:

A general, descriptive term that does not imply a level of performance.

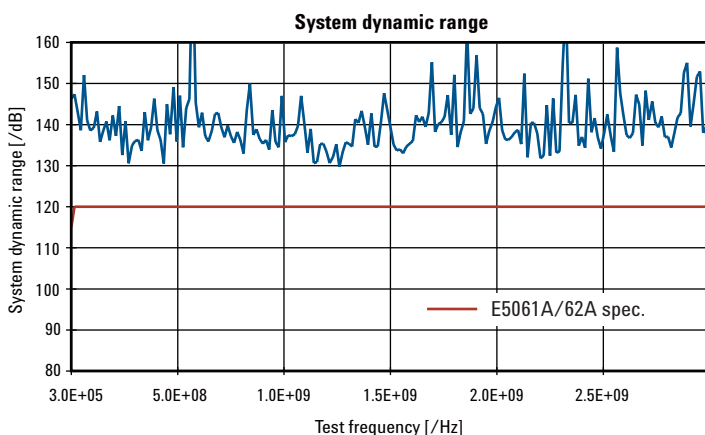
Corrected system performance

The specifications in this section apply for measurements made with the Agilent E5061A/E5062A network analyzer with the following conditions:

- No averaging applied to data
- Environmental temperature of 23 °C \pm 5 °C, with less than 1 °C deviation from the calibration temperature
- Response and isolation calibration not omitted

Table 1-1 System dynamic range^{1 2}

| Description | Specification | SPD |
|--|---------------|--------|
| System dynamic range | | |
| 300 kHz to 1 MHz, IF bandwidth = 3 kHz | 90 dB | |
| 1 MHz to 3 GHz, IF bandwidth = 3 kHz | 95 dB | |
| 300 kHz to 1 MHz, IF bandwidth = 10 Hz | 115 dB | |
| 1 MHz to 3 GHz, IF bandwidth = 10 Hz | 120 dB | 130 dB |



System dynamic range: specification and measurement example

1. The test port dynamic range is calculated as the difference between the test port rms noise floor and the source maximum output power. The effective dynamic range must take measurement uncertainty and interfering signals into account.
2. Applicable to the units with serial prefix MY442 and above .

Table 1-2 Corrected system performance with Type-N 50 Ω connectors, 85032F calibration kit, full 2-port calibration

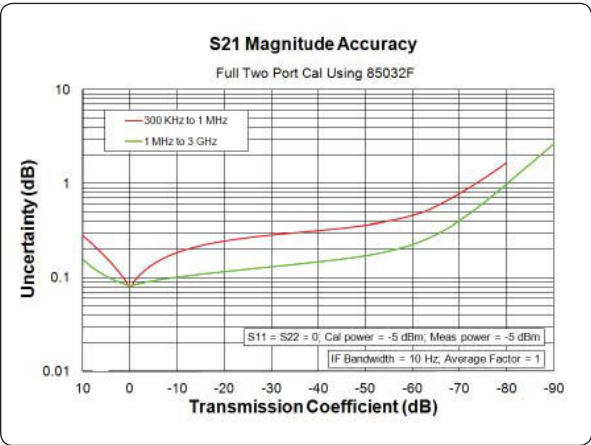
Network analyzer: E5061A/E5062A, calibration kit: 85032F (Type-N, 50 Ω), calibration: full 2-port

IF bandwidth = 10 Hz, No averaging applied to data, environmental temperature = 23 °C ±5 °C with < 1 °C deviation from calibration temperature, isolation calibration not omitted

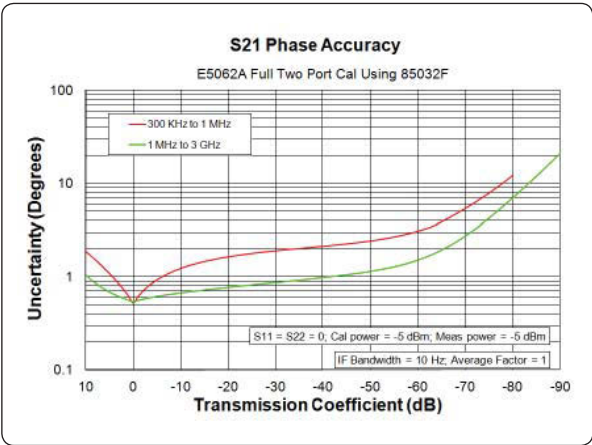
| Description | Specification (dB) | |
|-----------------------|--------------------|--------------|
| | 300 kHz to 1.5 GHz | 1.5 to 3 GHz |
| Directivity | 49 | 46 |
| Source match | 41 | 40 |
| Load match | 49 | 46 |
| Reflection tracking | ±0.011 | ±0.021 |
| Transmission tracking | ±0.015 | ±0.018 |

Transmission uncertainty (specification)

Magnitude

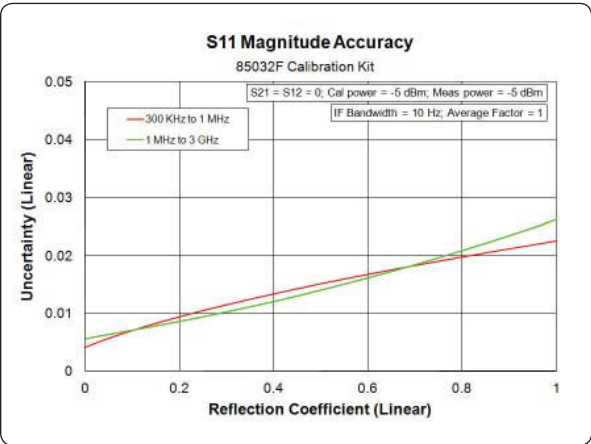


Phase



Reflection uncertainty (specification)

Magnitude



Phase

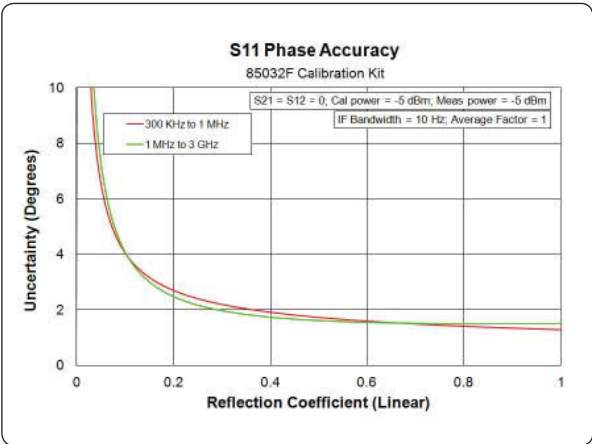


Table 1-3 **Corrected system performance with Type-N 50 Ω connectors, 85032F calibration kit, enhanced response calibration**

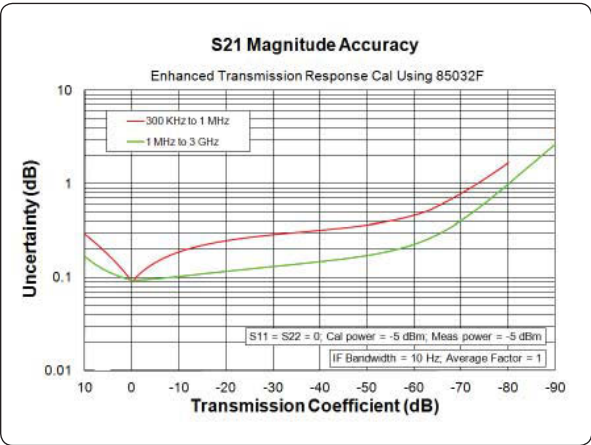
Network analyzer: E5061A/E5062A, calibration kit: 85032F (Type-N, 50 Ω) calibration: enhanced response

IF bandwidth = 10 Hz, no averaging applied to data, environmental temperature = 23 °C ±5 °C with < 1 °C deviation from calibration temperature, isolation calibration not omitted

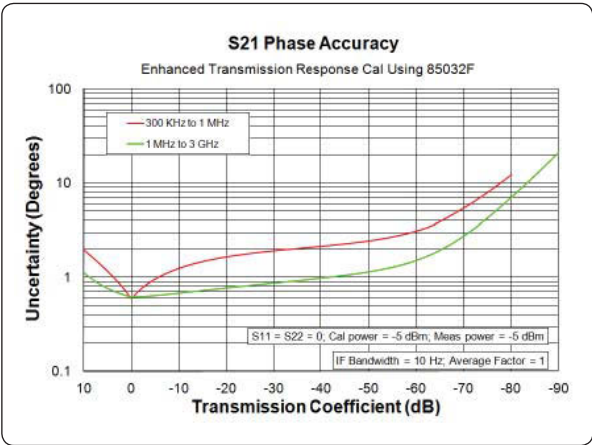
| Description | Specification (dB) | |
|-----------------------|--------------------|--------------|
| | 300 kHz to 1.5 GHz | 1.5 to 3 GHz |
| Directivity | 49 | 46 |
| Source match | 41 | 40 |
| Load match | 15 | 15 |
| Reflection tracking | ±0.011 | ±0.021 |
| Transmission tracking | ±0.015 | ±0.018 |

Transmission uncertainty (specification)

Magnitude

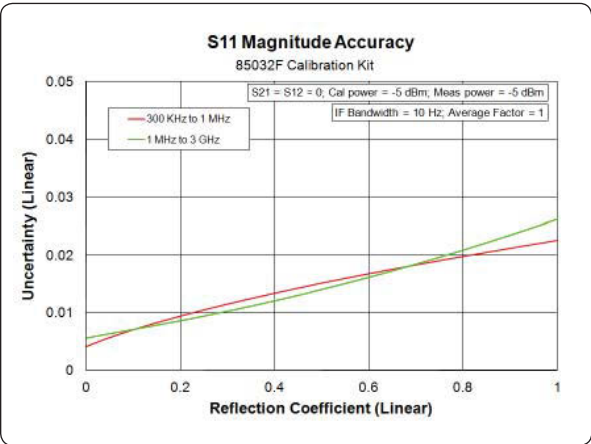


Phase



Reflection uncertainty (specification)

Magnitude



Phase

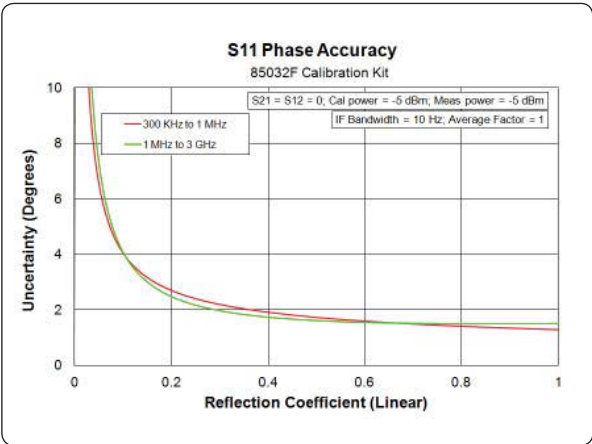


Table 1-4 **Corrected system performance with Type-N 75 Ω connectors**
85036B calibration kit, full 2-port calibration

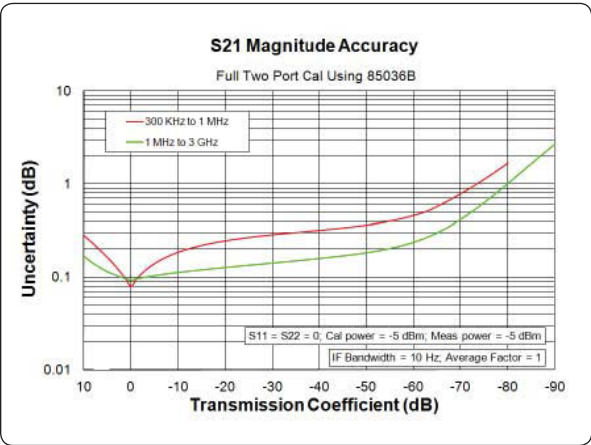
Network analyzer: E5061A/E5062A, calibration kit: 85036B (Type-N, 75 Ω), calibration: full 2-port

IF bandwidth = 10 Hz, no averaging applied to data, environmental temperature = 23 °C ±5 °C with < 1 °C deviation from calibration temperature, isolation calibration not omitted

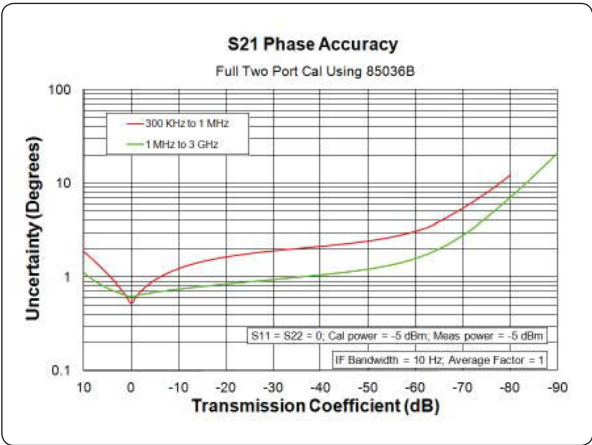
| Description | Specification (dB) | |
|-----------------------|--------------------|--------------|
| | 300 kHz to 1.5 GHz | 1.5 to 3 GHz |
| Directivity | 48 | 44 |
| Source match | 41 | 35 |
| Load match | 48 | 44 |
| Reflection tracking | ±0.010 | ±0.019 |
| Transmission tracking | ±0.015 | ±0.029 |

Transmission uncertainty (specification)

Magnitude

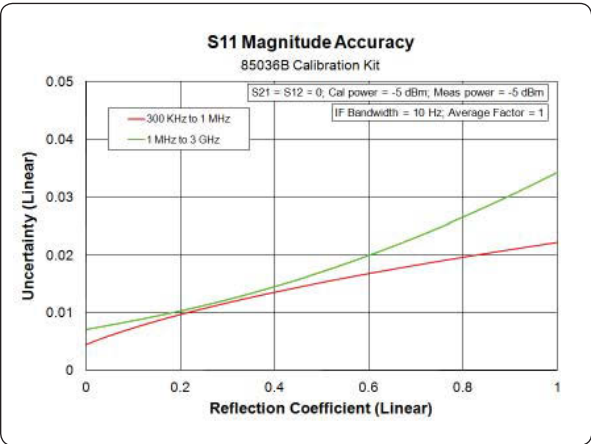


Phase



Reflection uncertainty (specification)

Magnitude



Phase

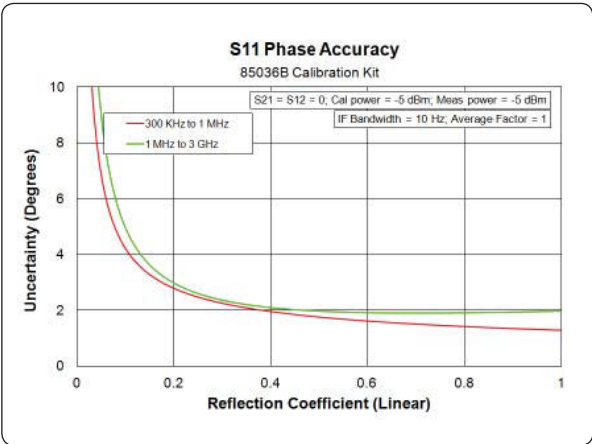


Table 1-5 **Corrected system performance with Type-N 75 Ω connectors**
85036B calibration kit, enhanced response calibration

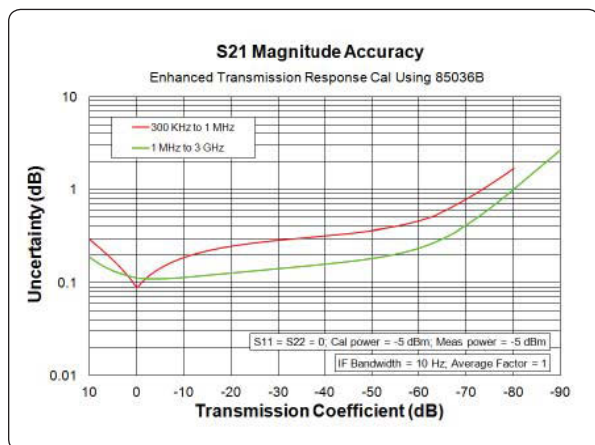
Network analyzer: E5061A/E5062A, calibration kit 85036B (Type-N, 75 Ω), calibration: enhanced response

IF bandwidth = 10 Hz, no averaging applied to data, environmental temperature = 23 °C \pm 5 °C with
< 1 °C deviation from calibration temperature, isolation calibration not omitted

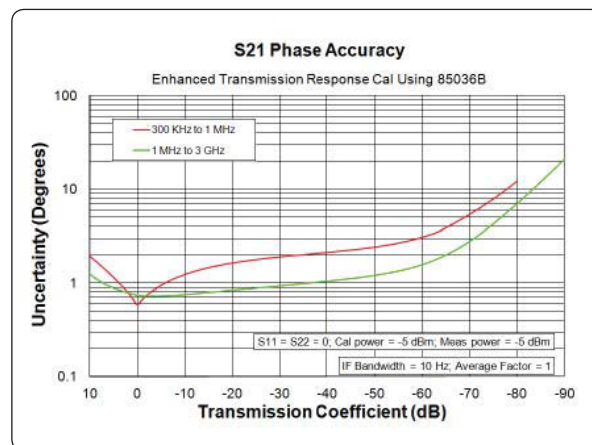
| Description | Specification (dB) | |
|-----------------------|--------------------|--------------|
| | 300 kHz to 1.5 GHz | 1.5 to 3 GHz |
| Directivity | 48 | 44 |
| Source match | 41 | 35 |
| Load match | 15 | 15 |
| Reflection tracking | ± 0.010 | ± 0.019 |
| Transmission tracking | ± 0.015 | ± 0.029 |

Transmission uncertainty (specification)

Magnitude

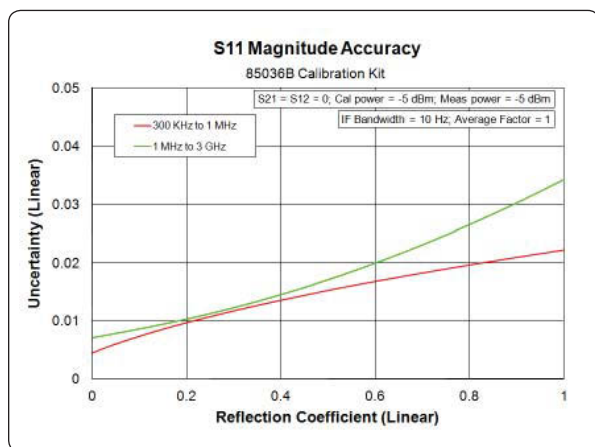


Phase

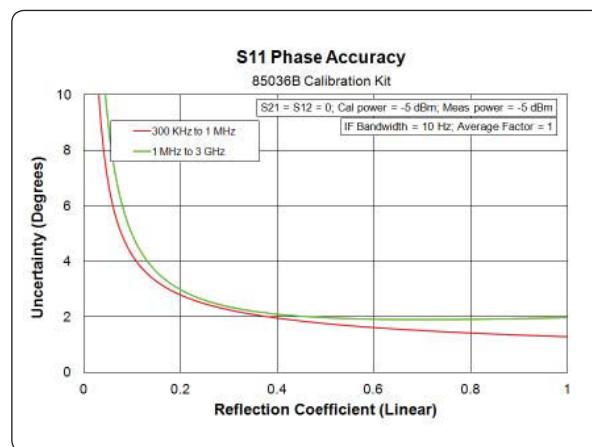


Reflection uncertainty (specification)

Magnitude



Phase



Uncorrected system performance

Table 1-6 **Uncorrected system performance**
(correction: off, 23 °C ±5 °C)

| Description | Specification |
|-----------------------|-------------------------|
| | 300 kHz to 3 GHz |
| Directivity | 25 dB |
| Source match | 25 dB |
| Load match | 15 dB |
| Transmission tracking | ±1.0 dB |
| Reflection tracking | ±1.0 dB |

Test port output (source)

Table 1-7 **Test port output frequency**

| Description | Specification | Typical |
|-------------------------|---------------------|------------------------|
| Range | | |
| E5061A | 300 kHz to 1.5 GHz | |
| E5062A | 300 kHz to 3 GHz | |
| Resolution | 1 Hz | |
| Source stability | | |
| E5061A/E5062A | | ±5 ppm (5 °C to 40 °C) |
| CW accuracy | | |
| E5061A/E5062A | ±5 ppm, 23 °C ±5 °C | |

Test port output (source)

Table 1-8 Test port output power

| Description | Specification | Typical |
|--|---|--|
| Level accuracy (at 23 °C ±5 °C)¹ | | |
| 300 kHz to 3 GHz | ±0.8 dB (at 0 dBm, 50 MHz absolute) ±1.0 dB (at 0 dBm, relative to 50 MHz reference) | |
| Level linearity (at 23°C ±5°C) | | |
| 300 kHz to 3 GHz | ±0.75 dB (at –5 to 10 dBm) | |
| Range (standard) | | |
| 300 kHz to 3 GHz | –5 to 10 dBm | |
| Range (extended power) | | |
| 300 kHz to 3 GHz | | –45 to 10 dBm (non-harmonics spurious may limit power range) |
| Sweep range (without extended power range) | | |
| 300 kHz to 3 GHz | –5 to 10 dBm | |
| Level resolution | 0.05 dB | |

Test port output (source)

Table 1-9 Test port output signal purity

| Description | Specification | Typical |
|-------------------------------|---------------|----------------------|
| Harmonics (2nd or 3rd) | | |
| 10 MHz to 2 GHz | | < –25 dBc (at 5 dBm) |
| Non-harmonic spurious | | |
| 10 MHz to 3 GHz | | < –30 dBc (at 0 dBm) |

1. Level accuracy for 75Ω analyzers is not a specification for frequencies >2 GHz; it is a typical characteristic.

Test port input

Table 1-10 Test port input levels

| Description | Specification | Typical |
|--------------------------------------|---------------|-----------------------|
| Maximum test port input level | | |
| 300 kHz to 3 GHz | +10 dBm | |
| Damage level | | |
| 300 kHz to 3 GHz | | +20 dBm, ± 30 VDC |
| Crosstalk¹ | | |
| 300 kHz to 3 GHz | –110 dB | |

Table 1-11 Test port input (trace noise²)

| Description | Specification | Typical |
|--|------------------------------|---------|
| Trace noise magnitude | | |
| 300 kHz to 1 MHz (source power level = +10 dBm) | 8 mdB rms (23 °C ± 5 °C) | |
| 1 MHz to 3 GHz (source power level = +10 dBm) | 5 mdB rms (23 °C ± 5 °C) | |
| Trace noise phase | | |
| 300 kHz to 1 MHz (source power level = +10 dBm) | 0.05° rms (23 °C ± 5 °C) | |
| 1 MHz to 3 GHz (source power level = +10 dBm) | 0.03° rms (23 °C ± 5 °C) | |

Table 1-12 Test port input (stability³)

| Description | Specification | Typical |
|----------------------------|---------------|-------------------------------------|
| Stability magnitude | | |
| 3 MHz to 3 GHz | | 0.01 dB/°C (at 23 °C ± 5 °C) |
| Stability phase | | |
| 3 MHz to 3 GHz | | 0.1°/°C (at 23 °C ± 5 °C) |

1. Response calibration not omitted.

2. Trace noise is defined as a ratio measurement of a through, at IF bandwidth = 3 kHz.

3. Stability is defined as a ratio measurement at the test port.

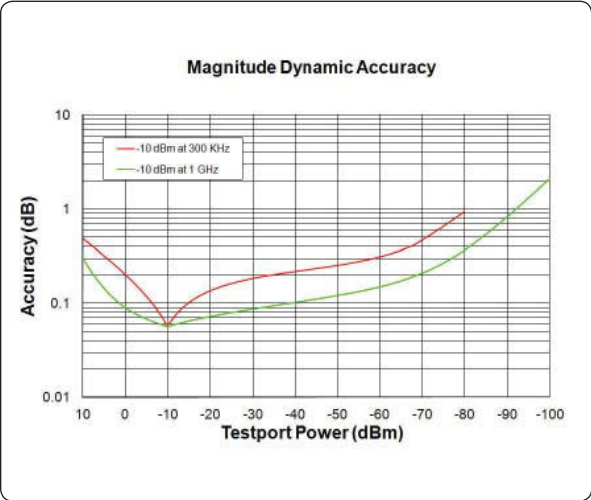
Table 1-13 Test port input (dynamic accuracy)

Accuracy of the test port input power reading is relative to -10 dBm reference input power level.

Specification

Typical

Magnitude



Phase

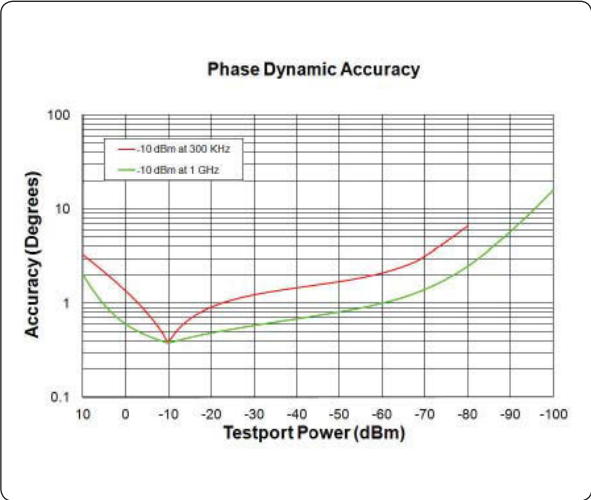
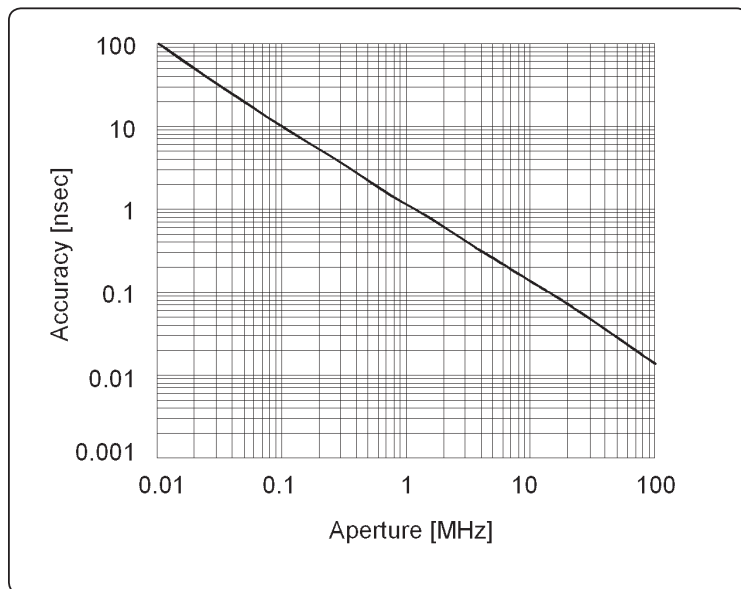


Table 1-14 Test port input (group delay¹)

| Description | Specification | Supplemental information |
|-----------------------|--|---|
| Aperture (selectable) | (frequency span)/(number of points –1) | |
| Maximum aperture | 25% of frequency span | |
| Minimum delay | | Limited to measuring no more than 180° of phase change within the minimum aperture. |
| Accuracy | | See graph below |

The following graph shows group delay accuracy with Type-N full 2-port calibration and a 10 Hz IF bandwidth. Insertion loss is assumed to be < 2 dB.

Group delay (typical)



In general, the following formula can be used to determine the accuracy, in seconds, of specific group delay measurement:
 $\pm \text{phase accuracy (deg)} / [360 \times \text{aperture (Hz)}]$

1. Group delay is computed by measuring the phase change within a specified step (determined by the frequency span and the number of points per sweep).

General information

Table 1-15 System bandwidths

| Description | General characteristics |
|------------------------------|--|
| IF bandwidth settings | |
| Range | 10 Hz to 30 kHz Nominal settings are: 10, 30, 100, 300, 1 k, 3 k, 10 k, 30 k |

Table 1-16 Front panel information

| Description | General characteristics |
|----------------------|--|
| RF connectors | |
| Type | Type-N, female; 50 Ω or 75 Ω |
| Display | |
| Size | 10.4 in TFT color LCD |
| Resolution | VGA (640 x 480) ¹ |

1. Valid pixels are 99.99% and more. Below 0.01% of fixed points of black, blue, green or red are not regarded as failure.

Table 1-17 Rear panel information

| Description | General characteristics |
|---|---|
| External trigger connector | |
| Type | BNC, female |
| Input level | LOW threshold voltage: 0.5 V HIGH threshold voltage: 2.1 V Input level range: 0 to +5 V |
| Pulse width | $\geq 2 \mu\text{sec}$ |
| Polarity | Negative (downward) only |
| External reference signal input connector | |
| Type | BNC, female |
| Input frequency | 10 MHz ± 10 ppm |
| Input level | 0 dBm ± 3 dB |
| Internal reference signal output connector | |
| Type | BNC, female |
| Output frequency | 10 MHz ± 10 ppm |
| Signal type | Sine wave |
| Output level | 0 dBm ± 3 dB into 50 Ω |
| Output impedance | 50 Ω |
| VGA video output | 15-pin mini D-Sub; female; drives VGA compatible monitors |
| GPIB | 24-pin D-Sub (type D-24), female; compatible with IEEE-488 |
| Parallel port | 36-pin D-Sub (type 1284-C), female; provides connection to printers, or multiport test set |
| USB port | Universal serial bus jack, type A configuration (4 contacts inline, contact 1 on left); female; provides connection to printer, ECal module, USB/GPIB interface |
| Contact 1 | Vcc: 4.75 to 5.25 VDC, 500 mA, maximum |
| Contact 2 | -Data |
| Contact 3 | +Data |
| Contact 4 | Ground |
| LAN | 10/100 BaseT Ethernet, 8-pin configuration; auto selects between the two data rates |
| Handler I/O port | 36-pin Centronics, female; provides connection to handler system |
| Line power¹ | |
| Frequency | 47 Hz to 63 Hz |
| Voltage | 90 to 132 VAC, or 198 to 264 VAC (automatically switched) |
| VA max | 350 VA max. |

1. A third-wire ground is required.

Table 1-18 EMC and safety





| Description | General characteristics |
|---|---|
| EMC | |
|  | <p>European Council Directive 89/336/EEC EN / IEC 61326-1:1997+A1:1998 CISPR 11:1997+A1:1999 / EN 55011:1998+A1:1999 Group 1, Class A IEC 61000-4-2:1995 / EN 61000-4-2:1995+A1:1998 4 kV CD / 4 kV AD IEC 61000-4-3:1995 / EN 61000-4-3:1996+A1:1998 3 V/m, 80-1000 MHz, 80% AM IEC 61000-4-4:1995 / EN 61000-4-4:1995 1 kV power / 0.5 kV Signal IEC 61000-4-5:1995 / EN 61000-4-5:1995 0.5 kV Normal / 1 kV Common IEC 61000-4-6:1996 / EN 61000-4-6:1996 3 V, 0.15-80 MHz, 80% AM IEC 61000-4-11:1994 / EN 61000-4-11:1994 100% 1cycle</p> |
| ICES/NMB-001 | <p>Canada ICES001:1998 Note: The performance of EUT will be within the specification over the RF immunity tests according to EN 61000-4-3 or EN 61000-4-6 except under the coincidence of measurement frequency and interference frequency.</p> |
|  N10149 | AS/NZS 2064.1/2 Group 1, Class A |
| Safety | |
|  | <p>European Council Directive 73/23/EEC IEC 61010-1:1990+A1+A2 / EN 61010-1:1993+A2 INSTALLATION CATEGORY II, POLLUTION DEGREE 2 INDOOR USE IEC60825-1:1994 CLASS 1 LED PRODUCT</p> |
|  LR95111C | CAN/CSA C22.2 No. 1010.1-92 |

Table 1-19 Analyzer environment and dimensions

| Description | General characteristics |
|--|--|
| Operating environment | |
| Temperature | +5 °C to +40 °C |
| Error-corrected temperature range | 23 °C ±5 °C with < 1 °C deviation from calibration temperature |
| Humidity | 20% to 80% at wet bulb temperature < +29 °C (non-condensing) |
| Altitude | 0 to 2,000 m (0 to 6,561 feet) |
| Vibration | 0.5 G maximum, 5 Hz to 500 Hz |
| Non-operating storage environment | |
| Temperature | −10 °C to +60 °C |
| Humidity | 20% to 90% at wet bulb temperature < 40 °C (non-condensing) |
| Altitude | 0 to 4,572 m (0 to 15,000 feet) |
| Vibration | 0.5 G maximum, 5 Hz to 500 Hz |
| Dimensions | See figure 1-1 through figure 1-3. |
| Weight | 13.5 kg |

Figure 1-2. Dimensions (front view, in millimeters)

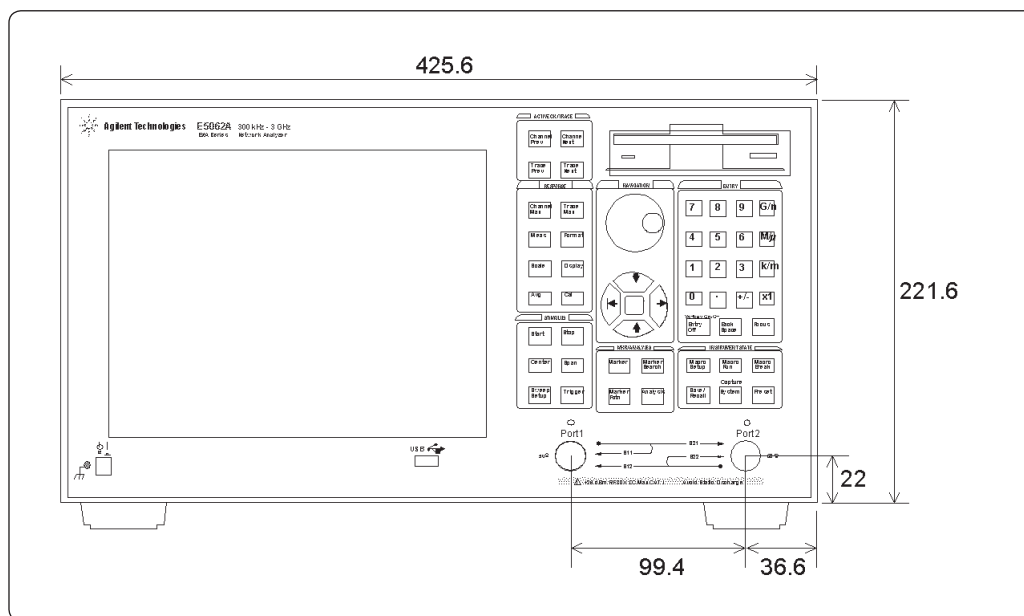


Figure 1-3. Dimensions (rear view, in millimeters)

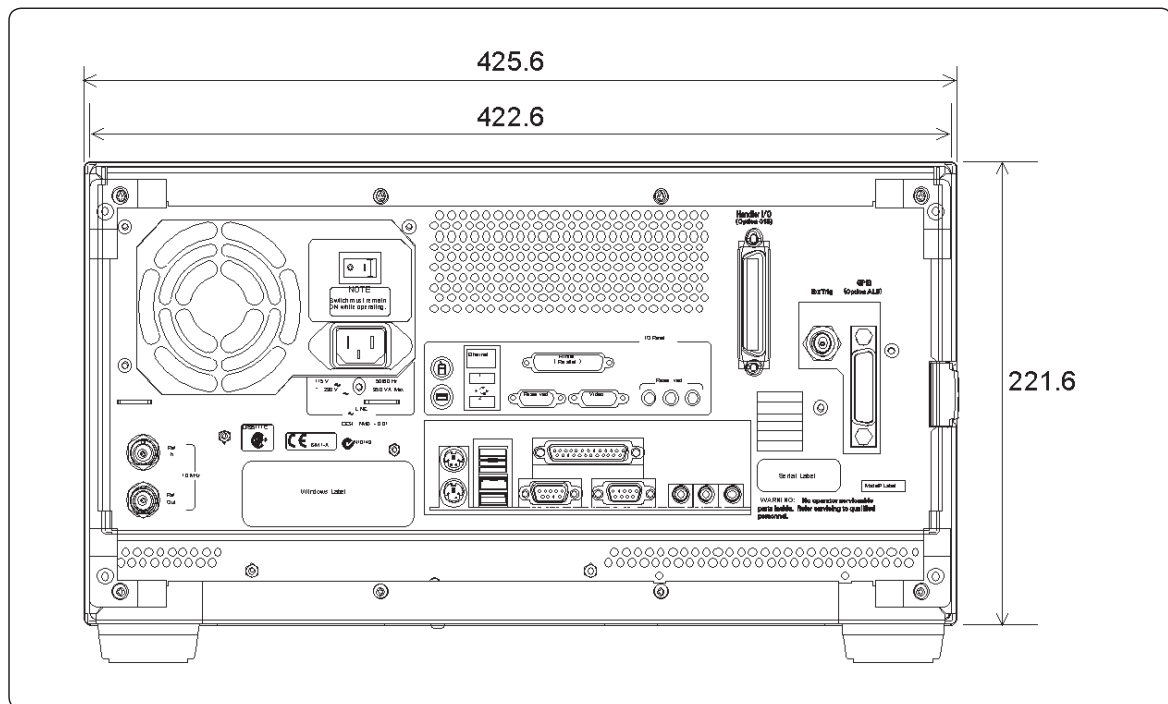
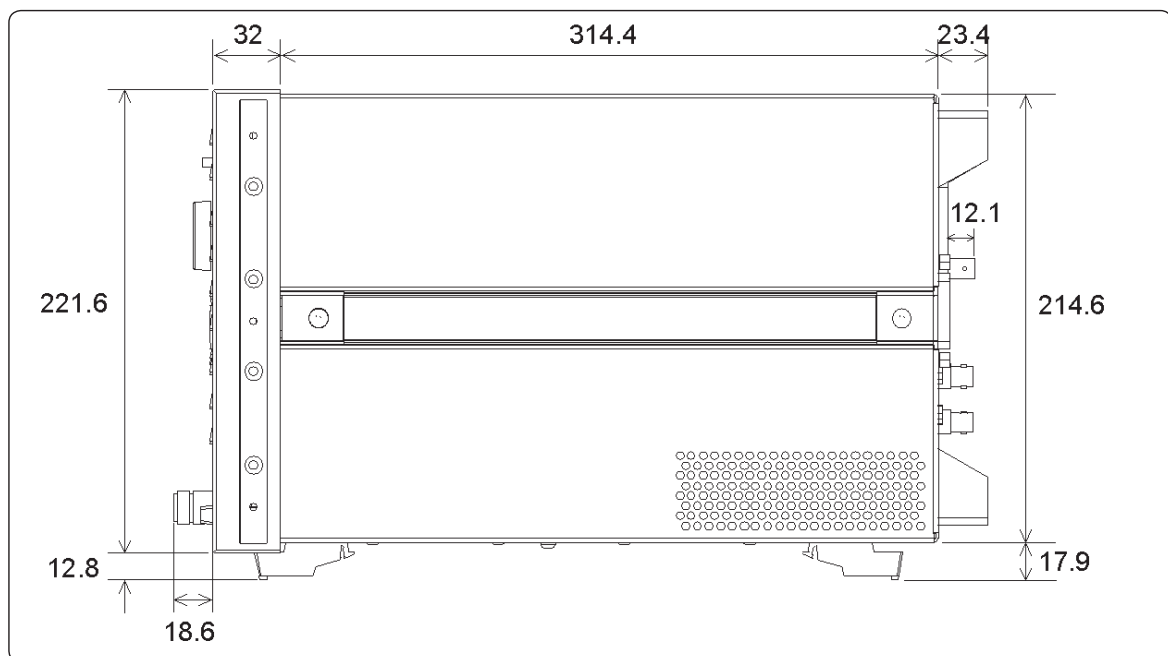


Figure 1-4. Dimensions (side view, in millimeters)



Measurement throughput summary

Table 1-20 Typical cycle time for measurement completion¹ (ms) (Display update: off)

| Number of points | | | | |
|---|----|-----|-----|------|
| | 51 | 201 | 401 | 1601 |
| Start 1 GHz, stop 1.2 GHz, 30 kHz IF bandwidth | | | | |
| Uncorrected | 8 | 19 | 33 | 117 |
| 2-port cal | 14 | 35 | 63 | 230 |
| Start 300 kHz, stop 1.5 GHz, 30 kHz IF bandwidth | | | | |
| Uncorrected | 15 | 25 | 39 | 123 |
| 2-port cal | 27 | 48 | 75 | 243 |
| Start 300 kHz, stop 3 GHz, 30 kHz IF bandwidth | | | | |
| Uncorrected | 17 | 28 | 41 | 125 |
| 2-port cal | 31 | 53 | 80 | 247 |

Table 1-21 Typical cycle time for measurement completion¹ (ms) (Display update: on)

| Number of points | | | | |
|---|----|-----|-----|------|
| | 51 | 201 | 401 | 1601 |
| Start 1 GHz, stop 1.2 GHz, 30 kHz IF bandwidth | | | | |
| Uncorrected | 59 | 68 | 83 | 172 |
| 2-port cal | 85 | 103 | 131 | 304 |
| Start 300 kHz, stop 1.5 GHz, 30 kHz IF bandwidth | | | | |
| Uncorrected | 64 | 74 | 89 | 178 |
| 2-port cal | 95 | 116 | 144 | 317 |
| Start 300 kHz, stop 3 GHz, 30 kHz IF bandwidth | | | | |
| Uncorrected | 66 | 78 | 91 | 180 |
| 2-port cal | 98 | 121 | 148 | 322 |

1. Typical performance.

Table 1-22 Data transfer time¹ (ms)

| Number of points | | | | |
|---|-----------|------------|------------|-------------|
| | 51 | 201 | 401 | 1601 |
| SCPI over GPIB² | | | | |
| REAL 64 | 6 | 14 | 25 | 89 |
| ASCII | 51 | 193 | 383 | 1522 |
| SCPI over 100 Mbps LAN (telnet)² | | | | |
| REAL 64 | 3 | 3 | 4 | 6 |
| ASCII | 92 | 354 | 510 | 2040 |
| SCPI over 100 Mbps LAN (SICL-LAN)² | | | | |
| REAL 64 | 7 | 7 | 8 | 12 |
| ASCII | 9 | 21 | 34 | 127 |
| COM (program executed in the analyzer)² | | | | |
| Variant type | 2 | 2 | 2 | 2 |

1. Typical performance.

2. Measured using a VEE 6.01 program running on a 500 MHz Pentium® III Dell Optiplex, Transferred complex S_{11} data, using :CALC:DATA?SDATA.

Measurement capabilities

| | |
|--|--|
| Number of measurement channels | Up to 4 independent measurement channels. A measurement channel is coupled to stimulus response settings including frequency, IF bandwidth, power level, and number of points. |
| Number of display windows | Each measurement channel has a display window. Up to 4 display windows (channels) can be displayed. |
| Number of traces | 4 data traces and 4 memory traces per channel |
| Measurement choices | Option E5061A/E5062A-150/175: S_{11} , S_{21} Option E5061A/E5062A-250/275: S_{11} , S_{21} , S_{12} , S_{22} |
| Measurement parameter conversion | Available to convert S-parameters into reflection impedance, transmission impedance, reflection admittance, transmission admittance, and 1/S. |
| Data formats | Log magnitude, linear magnitude, phase, expanded phase, positive phase, group delay, SWR, real, imaginary, Smith chart, polar. |
| Data markers | 10 independent markers per trace. Reference marker available for delta marker operation. Smith chart format includes 5 marker formats: linear magnitude/phase, log magnitude/phase, real/imaginary, $R + jX$, and $G + jB$. Polar chart format includes 3 marker formats: linear magnitude/phase, log magnitude/phase, and real/imaginary. |
| Marker functions | |
| Marker search | Max value, min value, multi-peak, multi-target, peak, peak left, peak right, target, target left, target right, and width parameters with user-defined bandwidth values. |
| Marker-to functions | Set start, stop, center to active marker stimulus value; set reference to active marker response value; set electrical delay to group delay at active marker. |
| Search range | User definable. |
| Tracking | Performs marker search continuously or on demand. |
| Fault location functions (Option E5061A/E5062A-100) | |
| Transformation to distance and time domain | Selectable transformation type from bandpass, lowpass impulse, lowpass step. Selectable window from maximum, normal and minimum. |
| LXI compliance | Class C (only applies to units that are shipped with firmware revision A.03.00 or later). |

Source control

| | |
|--|--|
| Measured number of points per sweep | User definable from 2 to 1601. |
| Sweep type | Linear sweep, segment sweep, log sweep and power sweep. |
| Segment sweep | Define independent sweep segments. Set number of points, test port power levels, IF bandwidth, delay time, sweep time and sweep mode independently for each segment. |
| Sweep trigger | Set to continuous, hold, or single, sweep with internal, external, manual, or bus trigger. |
| Power | Set source power from -5 dBm (-45 dBm for option E5061A/E5062A-1E1/250/275) to 10 dBm. The power slope function compensates source power level error. |

Trace functions

| | |
|-------------------------|---|
| Display data | Display current measurement data, memory data, or current measurement and memory data simultaneously. |
| Trace math | Vector addition, subtraction, multiplication or division of measured complex values and memory data. |
| Title | Add custom title to each channel window. Titles are printed on hardcopies of displayed measurements. |
| Autoscale | Automatically selects scale resolution and reference value to vertically center the trace. |
| Electrical delay | Offset measured phase or group delay by a defined amount of electrical delay, in seconds. |
| Phase offset | Offset measured phase or group delay by a defined amount in degrees. |
| Statistics | Calculates and displays mean, standard deviation and peak-to-peak deviation of the data trace. |

Data accuracy enhancement

| | |
|--|---|
| Measurement calibration | Measurement calibration significantly reduces measurement uncertainty due to errors caused by system directivity, source and load match, tracking and crosstalk. Full 2-port calibration removes all the systematic errors for the related test ports to obtain the most accurate measurements. |
| Calibration types available | |
| Response | Simultaneous magnitude and phase correction of frequency response errors for either reflection or transmission measurements. |
| Response and isolation | Compensates for frequency response and crosstalk errors of transmission measurements. |
| Enhanced response | Compensates for frequency response and source match errors |
| One-port calibration | Compensates for directivity, frequency response and source match errors. |
| Full 2-port calibration (Option E5061A/E5062A-250/275) | Compensates for directivity, source match, reflection tracking, load match, transmission tracking and crosstalk. Crosstalk calibration can be omitted. |
| Interpolated error correction | With any type of accuracy enhancement applied, interpolated mode recalculates the error coefficients when the test frequencies are changed. The number of points can be increased or decreased and the start/stop frequencies can be changed. |
| Velocity factor | Enter the velocity factor to calculate the equivalent physical length. |
| Reference port extension | Redefine the measurement plane from the plane where the calibration was done. |

Storage

| | |
|---------------------------------|--|
| Internal hard disk drive | Store and recall instrument states, calibration data, and trace data on 10 GB, minimum, internal hard drive. Trace data can be saved in CSV (comma separated value) format. All files are MS-DOS [®] -compatible. Instrument states include all control settings, limit lines, segment sweep tables, and memory trace data. |
| File sharing | Internal hard disk drive (D:) can be accessed from an external Windows [®] PC through LAN. |
| Disk drive | Instrument states, calibration data, and trace data can be stored on an internal 3.5 inch 1.4 MB floppy disk in MS-DOS [®] -compatible format. |
| Screen hardcopy | Printouts of instrument data are directly produced on a printer. The analyzer provides USB and parallel interfaces. |

System capabilities

| | |
|--|---|
| Familiar graphical user interface | The ENA-L analyzer employs a graphical user interface based on Windows [®] operating system. There are three ways to operate the instrument manually: you can use a hardkey interface, touch screen interface (option E5061A/E5062A-016) or a mouse interface. |
| Limit lines | Define the test limit lines that appear on the display for pass/fail testing. Defined limits may be any combination of horizontal/sloping lines and discrete data points. |

Automation

| | GPIB | Internal |
|------|-------------|-----------------|
| SCPI | X | X |
| COM | | X |

Methods

| | |
|-----------------------------|---|
| Internal analyzer execution | Applications can be developed in a built-in VBA® (Visual Basic for Applications) language. Applications can be executed from within the analyzer via COM (component object model) or using SCPI. |
| Controlling via GPIB | The GPIB interface operates to IEEE 488.2 and SCPI protocols. The analyzer can be controlled by a GPIB external controller. The analyzer can control external devices using a USB/GPIB interface. |

LAN

| | |
|---------------------|---|
| Standard conformity | 10 BaseT or 100 BaseTX (automatically switched), Ethertwist, RJ45 connector |
| Protocol | TCP/IP |
| Function | Telnet, SICL-LAN |



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