Get the same great Agilent
*ENA series network analyzer—**faster***

Agilent ENA Series Network Analyzer Express Configurations

Technical Overview

Agilent Technologies

When You Just Can't Wait …

Sometimes the best answer is a **great tool** at the right time.

That's why Agilent offers preconfigured RF and microwave instruments that are ready for off-the-shelf delivery from authorized distributors.

Address your immediate needs with pre-configured built-in capabilities

A great tool at the right time is often the best solution. That's why Agilent offers preconfigured RF and microwave instruments that are ready for off-the-shelf delivery from our authorized distributors.

Six express models available: CXA and EXA signal analyzers, RF and micro-wave MXG analog signal generators, and two ENA series network analyzers: E5071C and E5061B. The ENA express configurations deliver the same specifications and functionality as Agilent's build-to-order instruments. They also provide the same level of upgradeability, ensuring that they — and you — can evolve as your test needs change.

Best of all, the included features are value priced. It's an unbeatable combination: save time and money while keeping your project or production line moving.

www.agilent.com/find/express
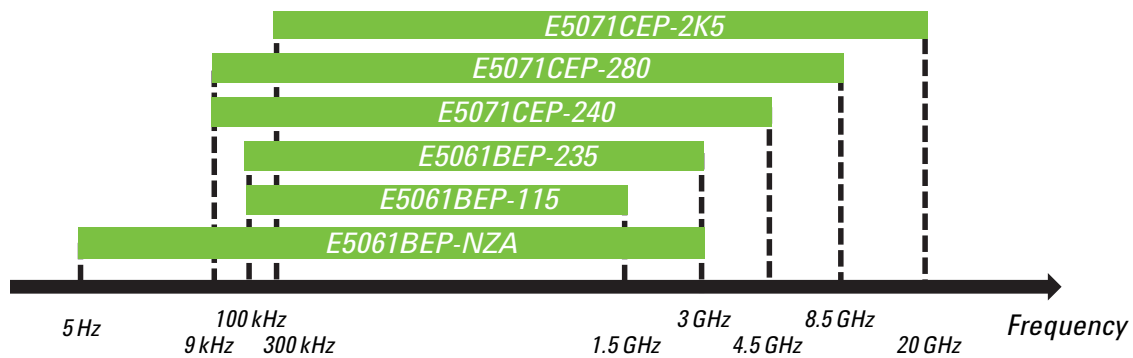
ENA Series Network Analyzers
– Setting the Standard in Speed and Accuracy

Agilent's E5071C and E5061B ENA series network analyzers provide exceptional performance with industry-leading specifications; wide dynamic range, very low trace noise, and fast measurement speed. The ENA series network analyzers are the ideal solution for manufacturing and R&D engineers evaluating components in LF to RF.

The E5071CEP and E5061BEP are the express configuration version of the E5071C and E5061B. The E5071CEP is the de facto industry standard RF network analyzer up to 20 GHz. The E5061BEP Option 115/235 are economy network analyzers up to 3 GHz that provide solid performance at an affordable price. The E5061BEP Option NZA is a custom packaged, versatile one-box solution, that covers a broad frequency range from 5 Hz to 3 GHz for network and impedance analysis in the LF to RF range.

Address your immediate needs with most popular configuration

The express ENA's are configured with the most common options. This ensures that you get the functionality you need today – and the ability to upgrade easily in the future.

	E5071CEP	E5061BEP-115/235	E5061BEP-NZA
Frequency range	Opt. 240: 9 kHz to 4.5 GHz Opt. 280: 9 kHz to 8.5 GHz Opt. 2K5: 300 kHz to 20 GHz	Opt. 115: 100 kHz to 1.5 GHz Opt. 235: 100 kHz to 3 GHz	5 Hz to 3 GHz
Test set	2-port S-parameter (50 Ω)	Opt. 115: 2-port Transmission/ Reflection (50 Ω) Opt. 235: 2-port S-parameter (50 Ω)	2-port S-parameter (50 Ω) and Gain-phase port (1 MΩ/50 Ω)
Source power	−55 to +10 dBm	−45 to +10 dBm	−45 to +10 dBm
DC bias	Opt. 240/280: No Opt. 2K5: Built-in bias tees	No	Built-in DC bias source (0 to ± 40 Vdc, max 100 mAdc, sweepable)
Impedance analysis with equivalent circuit	No	No	Yes
Fixture simulator	Yes	No	No

The Industry Standard in RF Network Analysis

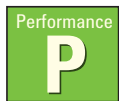**E5071CEP-240 : 2-port S-parameter test set, 9 kHz to 4.5 GHz without bias tees**
E5071CEP-280 : 2-port S-parameter test set, 9 kHz to 8.5 GHz without bias tees
E5071CEP-2K5 : 2-port S-parameter test set, 300 kHz to 20 GHz with bias tees

Agilent's E5071CEP ENA series network analyzer – express configuration delivers new standards in speed, accuracy, and versatility for RF network analysis. Designed with a wide range of measurement capabilities to meet multiple network analysis needs, the E5071CEP offers efficiency and flexibility for both manufacturing and R&D applications in industries such as: wireless communications, automotive, semiconductor, and medical.
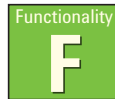
Superior measurement performance contributes to the highest throughput , thus increasing your production capability, while high repeatability and stability improve test yield.

F Enhanced measurement capability for a variety of applications
Functionality

The Agilent E5071CEP ENA series network analyzer combines the highest RF performance with powerful analysis capabilities and automated test tools that increase test efficiency and yield.

1. Powerful analysis capabilities
   ◦ Fixture Simulator for:
      - Embedding and de-embedding
      - Matching circuit simulation
      - Port impedance conversion
   ◦ Equation editor for real-time data processing

2. State-of-the-art calibration techniques
   ◦ Automatic port extension
   ◦ Adapter removal or insertion

3. Intuitive user interface and PC connectivity
   ◦ Windows OS with LAN/USB/GPIB connection (LXI class C compliance)
   ◦ Built-in VBA for test automation or making customized GUI
   ◦ 8753-like user interface and code translator

P Excellent measurement accuracy and speed
Performance

Best-in-class performance for accurate and high-cost-performance tests and measurements
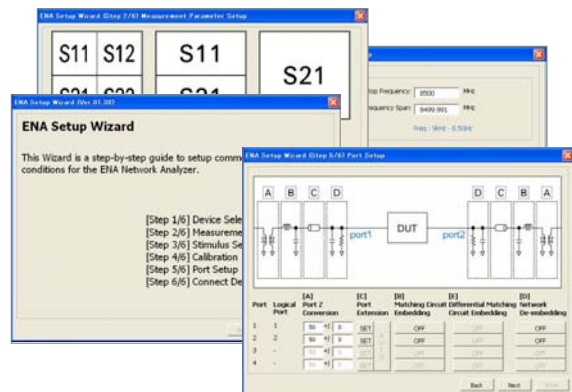
- Wide dynamic range: > 123 dB

- Fast measurement speed: 41 ms at 1601 points with full 2-port cal

- Low trace noise: < 0.004 dBrms at 70 kHz IFBW

- High stability: 0.005 dB/°C

The Set-up Wizard using built-in VBA guides you through all the required steps to setup, error correction, making measurements intuitive and error free.

Solid Performance at an Affordable Price

E5061BEP-115 : Transmission/Reflection test set, 100 kHz to 1.5 GHz, 50 Ω
E5061BEP-235 : S-parameter test set, 100 kHz to 3 GHz, 50 Ω

The E5061BEP network analyzer with Options 115/235 provides high-performance 2-port network analysis at an affordable price. Enhanced digital processing capabilities and a smaller footprint improve throughput and efficiency for testing RF components, including cellular BTS filters/antennas, MRI coils, and RFIDs.

Port-1 Port-2   Port-1 Port-2

S_{21} S_{21}

S_{11} DUT S_{11} DUT S_{22}

                         S_{12}
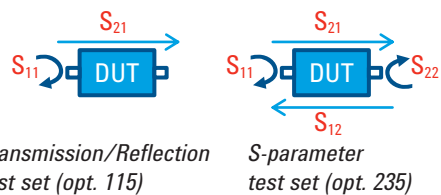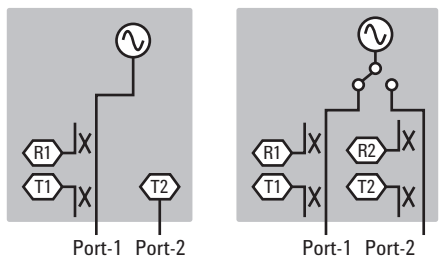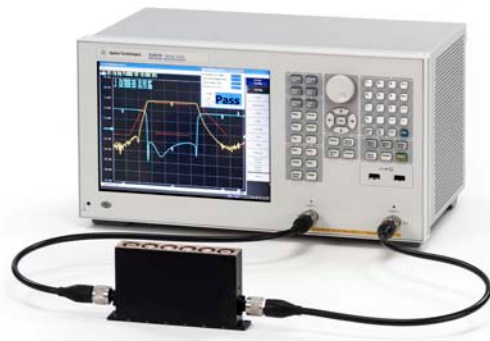
Transmission/Reflection test set (opt. 115)

S-parameter test set (opt. 235)

The E5061BEP Option 115/235 offers all of the critical performance and features needed in R&D, manufacturing, and service to test RF components.

Affordably priced and equipped with the core functions of the industry-standard E5071CEP, the E5061BEP includes many easy-to-use features and is optimized for efficient measurements and high reliability.

Performance
P Lower your cost of test with solid performance

The wide 300 kHz IF bandwidth and high analog performance enables high-speed measurements for evaluating many types of RF components.

- Wide dynamic range: > 120 dB
- Low trace noise: 0.005 dB rms at 3 kHz IFBW
- 1 Hz to 300 kHz IFBW
- Fast measurement speed
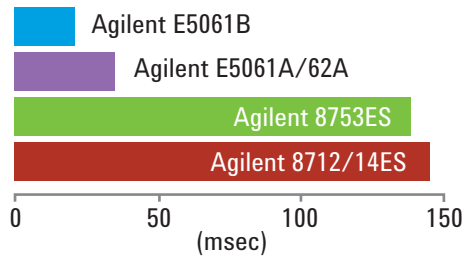
Sweep speed comparison with typical data (201 points, 2-port cal, max IFBW)
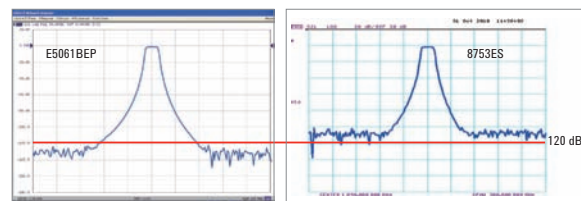
Dynamic range comparison (IFBW = 10 Hz, Power 10 dBm, 20 dB/div)

Functionality
F Enhanced frequency range

An expanded lower-end frequency range allows you to test components that require measurements in the 100 kHz range, such as LAN filters and automotive antennas.

Impedance and Network Analysis Capability in a Single Instrument

E5061BEP-NZA: LF-RF network analyzer with impedance analysis, 5 Hz to 3 GHz

The E5061BEP-NZA is special packaged configuration [1] for distribution partners. The E5061BEP-NZA covers a broad frequency range from 5 Hz to 3 GHz and provides a versatile one-box solution for network and impedance analysis in the LF to RF range. The E5061B-NZA is an ideal solution for the R&D environment.

1. Gain-phase test port, 5 Hz to 30 MHz, BNC;
     - LF OUT (source)
     - R (1 MΩ / 50 Ω)
     - T (1 MΩ / 50 Ω)
2. Built-in DC bias source DC bias (up to ± 40 Vdc) can be applied from the LF OUT or port 1.
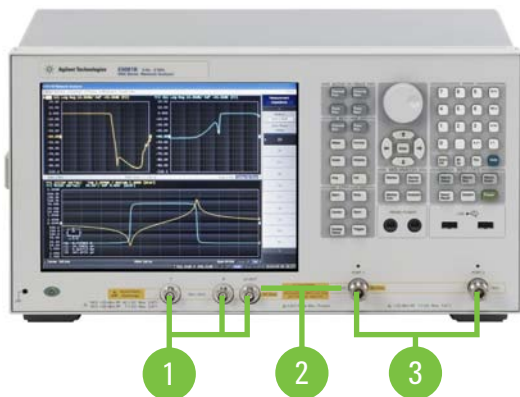3. S-parameter test port, 5 Hz to 3 GHz, type-N (50 Ω)

The E5061BEP-NZA allows you to evaluate a broad range of impedance from 1 mΩ to 40 kΩ [2] using a combination of three methods of measurement configurations (reflection, series-thru, and shunt-thru method).

Also, Agilent's existing and newly added fixtures support both gain-phase test port and S-parameter test port

1. *The E5061BEP-NZA combines the E5061B LF-RF network analyzer (Option 3L5), impedance analysis (Option 005), high stability timebase (Option 1E5), HDD (Option 020), and 50 Ω resister set (Option 720) for impedance calibration.*

2. *10% accuracy range*

P **Comprehensive LF-to-RF network analysis**

Performance

The E5061BEP-NZA offers full-fledged LF network measurements with two types of test ports. The built-in S-parameter test set sweeps from 5 Hz to 3 GHz with excellent dynamic range. The gain-phase test port provides direct receiver access for LF applications from 5 Hz to 30 MHz. The input impedance of the gain-phase ports can be switched to 50 Ω or 1 MΩ. The built-in 1 MΩ input allow you to easily perform in-circuit probing measurements for amplifiers and DC-DC converter control loops.

- 5 Hz to 3 GHz wide frequency range
- 1 MΩ input (gain-phase test port, up to 30 MHz)
- Wide dynamic range: > 120 dB
- Low trace noise: 0.005 dB rms at 3 kHz/AUTO IFBW
- 1 Hz to 300 kHz IFBW and IFBW Auto mode

F **NA plus ZA in one compact box**

Functionality

The E5061BEP-NZA has the capability of the network analysis (NA) and the impedance analysis (ZA). The ZA function enables the analyzer to measure impedance parameters of electronic components such as capacitors, inductors, and resonators. The combination of NA and ZA capabilities further enhances the analyzer's versatility as a general R&D tool. Basic ZA functionalities including fixture compensation and equivalent circuit analysis are supported by the firmware. The DC biased impedance measurement is possible with the built-in DC bias source.

NA + ZA in one box
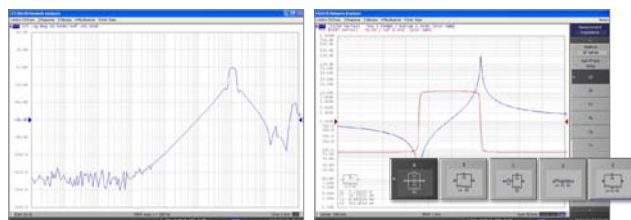
Network analysis   *Impedance analysis*

Options and Accessories

E5071CEP ENA series network analyzer- express configuration

The Agilent E5071CEP ENA series network analyzer express configuration is the most popular configuration for fast delivery and value. Select options based on frequency range requirements.
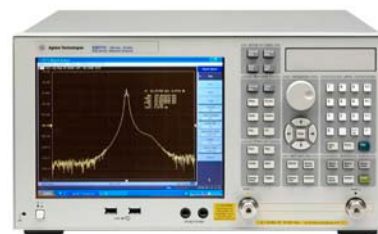
Model

Options	Description
E5071CEP	ENA Series Network Analyzer – Express Configuration

Options

Options	Frequency	Connector Type	Number of Port	Bias Tee	Equivalent standard model option [1]
E5071CEP-240	9 kHz to 4.5 GHz	Type-N (f)	2	No	E5071C-240/UNQ/019
E5071CEP-280	9 kHz to 8.5 GHz	Type-N (f)	2	No	E5071C-280/UNQ/019
E5071CEP-2K5	300 kHz to 20 GHz	3.5mm (m)	2	Yes	E5071C-2K5/UNQ/019

1. Equivalent standard model options
    Option UNQ : Standard stability time base
    Option 019 : Standard hard disk drive

Recommended accessories

Cables and bias tee

Options	Description
N6314A	Test port cable, type-N (m-m), 50 ohm, 24 inches
N4419AK20	Test port cable, 3.5mm (m-f), 36 inches
11612A	Bias network, 45 MHz to 26.5 GHz

Calibration kit for option 240 and 280 (below 9 GHz)

Options	Description
85032F	Standard mechanical calibration kit, DC to 9 GHz, type-N, 50-ohm
85033E	Standard mechanical calibration kit, DC to 9 GHz, 3.5 mm
85092C	RF electronic calibration module, 300 kHz to 9 GHz, type-N(f), 2-port
85093C	RF electronic calibration module, 300 kHz to 9 GHz, 3.5 mm, 2-port

Calibration kit for option 2K5 (over 9 GHz)

Options	Description
85052D	Economy mechanical calibration kit, 3.5 mm, DC to 26.5 GHz
N4691B	Electronic calibration module, 300 kHz to 26.5 GHz, 3.5 mm, 2-port

Options and Accessories, continued

E5061BEP ENA series network analyzer express configuration

The Agilent E5061BEP ENA series network analyzer express configuration is the most popular configuration for fast delivery and value. Select options based on frequency range/test set, and functionality (impedance analysis).

Model

Options	Description
E5061BEP	ENA Series Network Analyzer – Express Configuration

Options

Options	Frequency	Test Set	Connector Type	Impedance analysis	Equivalent standard model option [1]
E5061BEP-115	100 kHz to 1.5 GHz	Transmission/ Reflection	Type-N (f)	No	E5061B-115/020
E5061BEP-235	100 kHz to 3 GHz	S-parameter	Type-N (f)	No	E5061B-235/020
E5061BEP-NZA	5Hz to 3 GHz	S-parameter and Gain-phase	Type-N (f) and BNC (f)	Yes	E5061B-3L5/020/005/ 720/1E5

1. Equivalent standard model options
   Option 3L5 : LF-RF network analyzer with DC bias source, 5 Hz to 3 GHz
   Option 020 : Standard hard disk drive
   Option 005 : Impedance analysis for LF-RF network analyzer
   Option 720 : Add 50 Ω resistor set
   Option 1E5 : High stability time base

Recommended accessories

For Type-N

Options	Description
N6314A	Test port cable, Type-N (m-m), 50 Ω
85032E	Economy mechanical calibration Kit, DC to 6 GHz, Type-N, 50 Ω
85092C	RF electronic calibration module, 300 kHz to 9 GHz, Type-N, 50 Ω, 2-port

For 3.5 mm

Options	Description
11500E	Test port cable, 3.5mm (m-m), 50 Ω
85033E	Standard mechanical calibration kit, DC to 9 GHz, 3.5mm 50 Ω
85093C	RF electronic calibration module, 300 kHz to 9 GHz, 3.5mm, 50 Ω, 2-port

Recommended accessories for network analysis with gain/phase port (opt NZA only)

Options	Description
11667L	BNC-type power splitter (for transmission measurement with gain-phase port)

For more details on accessories, refer to the E5061B Configuration Guide, part number 5990-4391EN.

Options and Accessories, continued

E5061BEP-NZA LF-RF network analyzer with impedance analysis

For S-parameter port (reflection method)

Adapter for connecting fixtures	
Model	Description
16201A-001	7 mm terminal adapter kit for E5061B

7 mm test fixture		
Model	Frequency	Description
16092A	DC to 500 MHz	Spring clip test fixture for SMD and leaded device.
16197A	DC to 3 GHz	For bottom electrode SMD from 1005 (mm) /0402 (inch) to 3225 (mm)/1210 (inch).
16192A	DC to 2 GHz	For parallel electrode SMD.
16196A	DC to 3 GHz	For parallel electrode SMD, 1608 (mm)/0603 (inch).
16196B	DC to 3 GHz	For parallel electrode SMD, 1005 (mm)/0402 (inch).
16196C	DC to 3 GHz	For parallel electrode SMD, 0603 (mm)/0201 (inch).
16196D	DC to 3 GHz	For parallel electrode SMD, 0402 (mm)/01005 (inch).
16194A	DC to 2 GHz	High temperature component test fixture for SMD and leaded device. Temperature range: –55 ºC to + 200 ºC
16200B	1 MHz to 1 GHz	DC bias adaptor, it allows you to supply a bias current across the device of up to 5 Adc through a 7 mm port by using an external dc current source.

7 mm calibration kit		
Model	Frequency	Description
16195B	DC to 3 GHz	7-mm calibration kit. Contains Open, Short, 50 Ω Load and Low-loss capacitor terminations.
85031B	DC to 6 GH	7-mm calibration kit. Contains Open, Short, and 50 Ω Load terminations.

For Gain-phase port (series-thru method)

4-terminal pair test fixture		
Model	Frequency	Description
16047E	DC to 110 MHz	For axial or radial lead device.
16034E	DC to 40 MHz	For SMD, (0.1 to 8) L x (0.5 to 10) W x (0.5 to 10) H in mm.
16034G	DC to 110 MHz	For SMD, (0.1 to 5) L x (0.3 to 1.6) W x (0.3 to 1.6) H in mm.
16034H	DC to 110 MHz	For array-type SMD, (0.1 to 5) L x (≤ 15) W x (0.6 to 3) H in mm.

For more details on accessories, refer to the E5061B-3L5 LF-RF Network Analyzer with Option 005 Impedance Analysis Function Data Sheet , part number 5990-7033EN.

1. 10% accuracy range

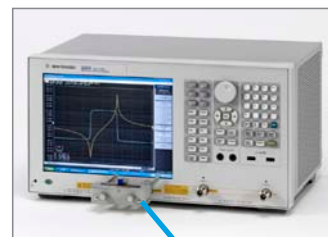16092A fixture   16201A adapter

Impedance measurement with reflection method (for 1 Ω to 2 kΩ) [1]

16201A-001

16092A

16047E fixture

Impedance measurement with gain-phase series-thru method (for 3 Ω to 40 kΩ) [1]

16047E

Specifications

Definitions

Specification (spec.):
Warranted performance. All specifications apply at 23 ºC (± 5 ºC), unless otherwise stated, and 90 minutes after the instrument has been turned on. Specifications include guard bands to account for the expected statistical performance distribution, measurement uncertainties, and changes in performance due to environmental conditions.

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):
Supplemental performance data 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.

E5071CEP ENA series network analyzer – express configuration

For detailed specifications, refer to the E5071C ENA Series Network Analyzer Data Sheet, part number 5989-5479EN.

System dynamic range
Option 240, 280

Description		Specification	SPD
System dynamic range [1, 2]			
9 kHz to 300 kHz		72 dB	
300 kHz to 10 MHz	IF bandwidth = 3 kHz	82 dB	
10 MHz to 6 GHz		98 dB	
6 GHz to 8.5 GHz		92 dB	
9 kHz to 300 kHz		97 dB	115 dB
300 kHz to 10 MHz		107 dB	115 dB
10 MHz to 6 GHz		123 dB	130 dB
6 GHz to 7 GHz	IF bandwidth = 10 Hz	117 dB	128 dB
7 GHz to 8 GHz		117 dB	126 dB
8 GHz to 8.5 GHz		117 dB	124 dB

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. *The specification might not be met at 5 MHz or 50 MHz.*

Specifications, continued

E5071CEP ENA series network analyzer – express configuration

For detailed specifications, refer to the E5071C ENA Series Network Analyzer Data Sheet, part number 5989-5479EN.

System dynamic range
Option 2K5

Description		Specification	SPD
System dynamic range [1,2]			
300 kHz to 1 MHz		70 dB	
1 MHz to 10 MHz		82 dB	
10 MHz to 100 MHz		85 dB	
100 MHz to 6 MHz	IF bandwidth = 3 kHz	98 dB	
6 GHz to 8.5 GHz		92 dB	
8.5 GHz to 10.5 GHz		80 dB	
10.5 GHz to 15 GHz		75 dB	
15 GHz to 20 GHz		71 dB	
300 kHz to 1 MHz		95 dB	105 dB
1 MHz to 10 MHz		107 dB	115 dB
10 MHz to 100 MHz		120 dB	129 dB
100 MHz to 6 MHz		123 dB	130 dB
6 GHz to 8 GHz	IF bandwidth = 10 Hz	117 dB	129 dB
8 GHz to 8.5 GHz		117 dB	127 dB
8.5 GHz to 10.5 GHz		105 dB	115 dB
10.5 GHz to 15 GHz		100 dB	111 dB
15 GHz to 20 GHz		96 dB	105 dB

Corrected system performance with calibration kit
Option 240, 280
IFBW: 10 Hz, Calibration kit: 85032F (Type-F, 50 Ω), Calibration: full 2-port

Description	IFBW	Frequency	Specification
Assume S21 at –2 dB	10 Hz	3 GHz	0.05 dB
Assume S11 at –10 dB	10 Hz	3 GHz	0.25 dB
Directivity	10 Hz	3 GHz	46 dB
Source match	10 Hz	3 GHz	40 dB
Load match	10 Hz	3 GHz	46 dB

Option 2K5
IFBW: 10 Hz, Calibration kit: 85052D (3.5 mm, 50 Ω), Calibration: full 2-port

Description	IFBW	Frequency	Specification
Assume S21 at –2 dB	10 Hz	3 GHz	0.13 dB
Assume S11 at –10 dB	10 Hz	3 GHz	0.49 dB
Directivity	10 Hz	3 GHz	38 dB
Source match	10 Hz	3 GHz	31 dB
Load match	10 Hz	3 GHz	38 dB

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. The specification might not be met at 5 MHz or 50 MHz.

Specifications, continued

E5071CEP ENA series network analyzer – express configuration

For detailed specifications, refer to the E5071C ENA Series Network Analyzer Data Sheet, part number 5989-5479EN.

Test port output power [1]
Option 240, 280

Description	Specification	Typical

Frequency range
   Option 240
   Option 280
	
	9 kHz to 4.5 GHz
	9 kHz to 8.5 GHz	

Nominal Power (preset power)	0 dBm	
Level accuracy [2, 5] (stepped sweep mode) [3]	± 0.650 dB (at 0 dBm, 50 MHz absolute) ± 1.0 dB	
Level accuracy [2] (swept sweep mode)		± 2.5 dB

Output power range [4, 5]
   9 kHz to 5 GHz
   5 GHz to 6 GHz
   6 GHz to 7 GHz
   7 GHz to 8.5 GHz
	
	−55 to 10 dBm
	−55 to 9 dBm
	−55 to 8 dBm
	−55 to 7 dBm	

Level resolution	0.05 dB	
Max leveled power [4, 5] 9 kHz to 8.5 GHz		10 dBm

Option 2K5

Description	Specification	Typical
Frequency range	300 kHz to 20 GHz	
Nominal Power (preset power)	−5 dBm	

Level accuracy [5] (stepped sweep mode) [2]
   300 kHz to 1 MHz
   1 MHz to 5 MHz
   5 MHz to 8.5 GHz
   8.5 GHz to 20 GHz
	± 0.650 dB (at −5 dBm, 50 MHz absolute) ± 1.0 dB
	+2.0 dB, −6.0 dB
	± 2.0 dB
	± 1.0 dB
	± 2.5 dB	

Level accuracy (swept sweep mode) [2]
   300 kHz to 1 GHz
   1 GHz to 8.5 GHz
   8.5 GHz to 20 GHz
		
		± 5.0 dB
		± 2.5 dB
		+5.0 dB, −7.0 dB

Output power range [4, 5]
   300 kHz to 1 MHz
   1 MHz to 6 GHz
   6 GHz to 8 GHz
   8 GHz to 10.5 GHz
   10.5 GHz to 15 GHz
   15 GHz to 20 GHz
	
	−85 to 8 dBm
	−85 to 10 dBm
	−85 to 9 dBm
	−85 to 7 dBm
	−85 to 3 dBm
	−85 to 0 dBm	

Level resolution	0.05 dB	

Max leveled power [4, 5]
   300 kHz to 1 MHz
   1 MHz to 10 GHz
   10 GHz to 13 GHz
   13 GHz to 15 GHz
   15 GHz to 18 GHz
   18 GHz to 20 GHz
		
		9 dBm
		10 dBm
		9 dBm
		7 dBm
		5 dBm
		4 dBm

1. *Source output performance on port 1 only. Other port output performance is typical.*
2. *Level accuracy is taken at 0 dBm, relative to 50 MHz reference unless otherwise stated.*
3. *The specification might not be met at 5 MHz or 50 MHz.*
4. *The level accuracy specification needs to be taken into account for test port output power level.*
5. *Power calibration using an external power meter improves level accuracy of the test port output power.*
   Proper power meters/sensors, and the 82357B USB-GPIB interface are required to conduct power calibration.

Specifications, continued

E5071CEP ENA series network analyzer – express configuration

For detailed specifications, refer to the E5071C ENA Series Network Analyzer Data Sheet, part number 5989-5479EN.

Test port input
Option 240, 280

Description	IFBW	Maximum test port input level	Specification	SPD
Trace noise magnitude [1]				
9 kHz to 30 kHz	3 kHz	+10 dBm	0.004 dBrms	0.001 dBrms
30 kHz to 100 kHz	3 kHz	+10 dBm	0.003 dBrms	0.001 dBrms
100 kHz to 10 MHz	3 kHz	+10 dBm	0.003 dBrms	0.0005 dBrms
10 MHz to 4.38 GHz	3 kHz	+10 dBm	0.004 dBrms	0.001 dBrms
4.38 GHz to 5 GHz	70 kHz	+10 dBm	0.006 dBrms	0.0012 dBrms
5 GHz to 6 GHz	70 kHz	+9 dBm	0.006 dBrms	0.0012 dBrms
6 GHz to 7 GHz	70 kHz	+8 dBm	0.006 dBrms	0.0012 dBrms
7 GHz to 8.5 GHz	70 kHz	+7 dBm	0.006 dBrms	0.0012 dBrms

Description	Typical
Stability [2]	
9 kHz to 3 GHz	± 0.005 dB/°C
3 GHz to 6 GHz	± 0.01 dB/°C
6 GHz to 8.5 GHz	± 0.04 dB/°C

Option 2K5

Description	IFBW	Specification	SPD
Trace noise magnitude [1, 3]			
300 kHz to 1 MHz	3 kHz	0.006 dBrms	0.0009 dBrms
1 MHz to 10 MHz	3 kHz	0.003 dBrms	0.0005 dBrms
10 MHz to 4.38 GHz	70 kHz	0.004 dBrms	0.0010 dBrms
4.38 GHz to 8.5 GHz	70 kHz	0.006 dBrms	0.0012 dBrms
8.5 GHz to 13.137 GHz	70 kHz	0.009 dBrms	0.0024 dBrms
13.137 GHz to 17 GHz	70 kHz	0.013 dBrms	0.0040 dBrms
17 GHz to 20 GHz	70 kHz	0.023 dBrms	0.0065 dBrms

Description	SPD
Stability [2]	
9 kHz to 3 GHz	± 0.005 dB/°C
3 GHz to 6 GHz	± 0.01 dB/°C
6 GHz to 8.5 GHz	± 0.04 dB/°C

1. *The specification might not be met at the following frequencies: 333.333 kHz, 406.25 kHz, 857.143 kHz, 928.571 kHz, 1.3 MHz, 2.4 MHz and 4.333333 MHz.*

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

3. *At maximum output power level of sweep range.*

Specifications, continued

E5071CEP ENA series network analyzer – express configuration

For detailed specifications, refer to the E5071C ENA Series Network Analyzer Data Sheet, part number 5989-5479EN.

System bandwidth

Description	General characteristics
IF bandwidth settings range	10 Hz to 500 kHz Nominal settings are: 1, 1.5, 2, 3, 4, 5, 7

Front panel information

Description	Typical	General characteristics

RF connectors
  Option 240/280
  Option 2K5
		Type-N (f), 50 Ω
		3.5 mm (m), 50 Ω nominal

Prove power
  Connector
  Voltage & maximum current
	+15 V ± 2% (400 mA)
	−12.6 V ± 5% (300 mA)
	(combined load for both probe connections)
		3 terminal connector x 2

Display
  Type
  Resolution
		10.4 in TFT color LCD with touch screen
		XGA (1024 x 768) [1]

Rear panel information

Description	General characteristics
External trigger input	BNC, female, Low: 0.5 V, High: 2.1 V, Range: 0 to +5 V
External trigger output	BNC, female, Low: 0 V, High: 5 V
External reference signal input	BNC, female, 10 MHz ± 10 ppm, −3 to 10 dBm

Bias tee input connector (opt 2K5 only)
  Maximum voltage
  Maximum current (no degradation in RF specifications)
  Maximum current (damage level)
  Fuse
	BNC, female (for each port)
	± 35 VDC
	± 200 mA
	± 500 mA
	500 mA, bi-pin style

GPIB interface	24-pin D-Sub (Type D-24), female, compatible with IEEE-488
USB-host port	Universal serial bus jack, Type A
USB (USBTMC) interface port	Universal serial bus jack, Type B
Handler I/O port	36-pin centronics, female
LAN LXI compliance	10/100BaseT Ethernet, 8-pin Class C

Rear panel information, continued

Description	Specification	General characteristics
AUX input connector		BNC, female x2
Input range		± 1 V or ± 10 V selectable
Accuracy	1% + 1 mV for ± 1 V input 1% + 10 mV for ± 10 V input	

Dimensions and weight

Description	General characteristics
Dimensions	235 mm H x 426 mm W x 487 mm L
Weight (net)	18.2 kg (Option 240/280), 19.8 kg (Option 2K5)

1. *Valid pixels are 99.99% and more. Below 0.01% (approx. 30 points) of fixed points of black, blue, green or red are not regarded as failure.*

Specifications, continued

E5071CEP ENA series network analyzer – express configuration

For detailed specifications, refer to the E5071C ENA Series Network Analyzer Data Sheet, part number 5989-5479EN.

Cycle time for measurement completion [1,2] (ms)

Sweep mode: Swept, analyzer display turned off with: DISP : ENAB OFF, Number of traces = 1, system error correction: OFF

Option 240, 280

Start 1 GHz, stop 1.2 GHz, 100 kHz IF bandwidth, 2-port cal

Description	SPD			
Number of points	51	201	401	1601
Cycle time	6.6	10	15	42

Option 2K5

Start 11 GHz, stop 12 GHz, 100 kHz IF bandwidth, 2-port cal

Description	Number of points			
Number of points	51	201	401	1601
Cycle time	5.6	6.4	11	38

Data transfer time [1,2] (ms) (201 points)

Description	Format	
Data transfer time	Real 64	ASCII
SCPI over GPIB [3]	12	108
SCPI over 100 Mbps LAN (SICL-LAN) [3]	3	8
SCPI over USB [3]	2	13

1. *Supplemental performance data.*

2. *Measured with firmware version A.09.30*

3. *Measured using a VEE Pro 7.0 program running on a 3.2 GHz Pentium 4 DELL Precision 370, Transferred complex S11 data, using : CALC{1-36} : DATA : FDAT?*

Specifications, continued

E5061BEP ENA series network analyzer – express configuration

For detailed specifications, refer to the E5061B ENA Series Network Analyzer Data Sheet, part number 5989-4392EN.

System dynamic range
Option 115/235

Description		Specification	SPD
System dynamic range [1,2]			
100 kHz to 300 kHz		75 dB	
300 kHz to 1 MHz	IF bandwidth = 3 kHz	90 dB	
1 MHz to 3 GHz		95 dB	
100 kHz to 300 kHz		100 dB	
300 kHz to 1 MHz	IF bandwidth = 10 Hz	115 dB	
1 MHz to 3 GHz		120 dB	130 dB

Option NZA

Description		Specification	SPD
System dynamic range [1,2]			
100 kHz to 1MHz	IF bandwidth = 3 kHz	90 dB	
1 MHz to 3 GHz		95 dB	
5 Hz to 100 Hz		90 dB	
100 Hz to 9 kHz		100 dB	
9 kHz to 100 kHz	IF bandwidth = 10 Hz	110 dB	
100 kHz to 1 MHz		115 dB	
1 MHz to 3 GHz		120 dB	130 dB

Corrected system performance with calibration kit
IFBW: 10 Hz, Calibration kit: 85032F (Type-N, 50 Ω), Calibration: full 2-port

Description	IFBW	Frequency	Specification
Assume S21 at −2 dB	10 Hz	1.5 GHz	0.01 dB
Assume S11 at −10 dB	10 Hz	1.5 GHz	0.09 dB
Directivity	10 Hz	1.5 GHz	46 dB
Source match	10 Hz	1.5 GHz	40 dB
Load match	10 Hz	1.5 GHz	46 dB

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. The specification might not be met at the frequencies 1.4 MHz, 4.0 MHz, 4.333 MHz, 6.333 MHz, 25 MHz and 90 MHz.

Specifications, continued

E5061BEP ENA series network analyzer – express configuration

For detailed specifications, refer to the E5061B ENA Series Network Analyzer Data Sheet, part number 5989-4392EN.

Test port output power

Description	Specification

Frequency range
   Option 115
   Option 235
   Option NZA
	
	100 kHz to 1.5 GHz
	300 kHz to 3 GHz
	5 Hz to 3 GHz

Level accuracy
   Option 115/235
 	
   Option NZA
	
	± 0.8 dB (at 0 dBm, 50 MHz absolute)
	± 1.5 dB (at 100 kHz to 300 kHz, 0 dBm, relative to 50 MHz)
	± 1.0 dB (at 300 kHz to 3 GHz, 0 dBm, relative to 50 MHz)
	± 0.8 dB (at 0 dBm, 50 MHz absolute)
	± 1.0 dB (at 5 Hz to 1.5 GHz, 0 dBm, relative to 50 MHz)
	± 1.5 dB (at 1.5 GHz to 3 GHz, 0 dBm, relative to 50 MHz)

Range
   Option 115/235
 	
   Option NZA
	
	–45 to 5 dBm (at 100 kHz to 300 kHz)
	–45 to 10 dBm (at 300 kHz to 3 GHz)
	–45 to 10 dBm

Level resolution	0.05 dB

Test port input

Description	IFBW	Source power level	Specification
Trace noise magnitude			
Option 115, 235			
100 kHz to 300 kHz	3 kHz	+10 dBm	0.015 dBrms
300 kHz to 1 MHz	3 kHz	+10 dBm	0.008 dBrms
1 MHz to 3 GHz	3 kHz	+10 dBm	0.005 dBrms
Option NZA			
< 10 kHz	Automatic IF Bandwidth	+10 dBm	0.005 dBrms
10 kHz to 3 GHz	3 kHz	+10 dBm	0.005 dBrms

Description	SPD
Stability	
Option 115, 235	
9 kHz to 3 GHz	± 0.005 dB/°C
3 GHz to 6 GHz	± 0.01 dB/°C
6 GHz to 8.5 GHz	± 0.04 dB/°C
Option NZA	
3 MHz to 3 GHz	± 0.01 dB/°C

Gain phase measurement port source (LF out) characteristics (Option NZA only)

Description	Specification
Frequency range	5 Hz to 30 MHz
Level accuracy	± 1 dB (at 0 dBm, absolute 200 Hz) ± 2 dB (at 0 dBm, relative to 200 Hz)
Range	–45 to 10 dBm
Level resolution	0.05 dB

Specifications, continued

E5061BEP ENA series network analyzer – express configuration

For detailed specifications, refer to the E5061B ENA Series Network Analyzer Data Sheet, part number 5989-4392EN.

Gain phase measurement port input characteristics (Option NZA only)

Description	Specification
Input attenuator	0 dB, 20 dB
Ratio accuracy	< ± 1 dB at (–15 dBm, 0 dB Att.) or (5 dBm, 20 dB Att.) 50 Ω impedance < ± 3 dB at (–15 dBm, 0 dB Att.) or (5 dBm, 20 dB Att.) 1 MΩ impedance using 50 Ω feedthrough

Trace noise
  at IF automatic bandwidth, < 10 kHz
  At 3 kHz bandwiidth, 10 kHz to 10 MHz, 0 dB attenuation, 50 Ω
	
	5 mdBrms
	5 mdBrms

DC bias (Option NZA only)

Description	Specification
Output port	Port 1 or LF Out
Range	0 to ± 40 V (100 mA max)
Resolution	1 mV ± (0 V to 10 V) 4 mV ± (10 V to 40 V)
Output impedance	50 Ω nominal

System bandwidth

Description	General characteristics
IF bandwidth settings range	1 Hz to 300 kHz Nominal settings are: 1, 1.5, 2, 3, 4, 5, 7

Front panel information

Description	Typical	General characteristics

RF connectors
  Option 115, 235
  Option NZA
		
		Type-N (f), 50 Ω
		Type-N (f), 50 Ω (ports 1 and 2)
		BNC (f), 50 Ω or 1 MΩ (Ports R and T)
		BNC (f), 50 Ω (LF out)

Prove power (Option NZA only)
  Connector
  Voltage & maximum current
	
	+15 V ± 2% (400 mA)
	–12.6 V ± 5% (300 mA)
	(combined load for both probe connections)
		
		3 terminal connector x 2

Display
  Type
  Resolution
		
		10.4 in TFT color LCD with touch screen
		XGA (1024 x 768)

Specifications, continued

E5061BEP ENA series network analyzer – express configuration

For detailed specifications, refer to the E5061B ENA Series Network Analyzer Data Sheet, part number 5989-4392EN.

Rear panel information

Description	General characteristics
External trigger input	BNC, female, Low: 0.5 V High: 2.1 V Range: 0 to +5 V
External trigger output	BNC, female, Low: 0 V High: 5 V
External reference signal input	BNC, female, 10 MHz ± 0 ppm 0 dBm ± 3 dB (Typical)
GPIB interface	24-pin D-Sub (Type D-24), female, compatible with IEEE-488
USB-host port	Universal serial bus jack, Type A
USB (USBTMC) interface port	Universal serial bus jack, Type B
Handler I/O port	36-pin centronics, female
LAN	10/100BaseT Ethernet, 8-pin
LXI compliance	Class C

Dimensions and weight

Description	General characteristics
Dimensions	235 mm H x 432 mm W x 277 mm L
Weight (net)	14.0 kg

Cycle time for measurement completion [1,2] (ms)
Analyzer display turned off with : DISP : ENAB OFF, number of traces = 1
Start 1 GHz, stop 1.2 GHz, 300 kHz IF bandwidth, 2-port cal

Description	Number of points			
Number of points	51	201	401	1601
Cycle time	11	21	33	88

Data transfer time [1,2] (ms) (201 points)

Description	Format	
Data transfer time	Real 64	ASCII
SCPI over GPIB [3]	16	109
SCPI over 100 Mbps LAN (SICL-LAN) [3]	5	8
SCPI over USB [3]	3	10

1. *Typical performance data*

2. *Measured with firmware version A.02.00*

3. *Measured using a VEE Pro 9.0 program running on a 2.4 GHz Pentium 4, Transferred complex S11 data, using :CALC1:DATA:FDAT?*

Specifications, continued

E5061BEP ENA series network analyzer – express configuration (Option NZA only)

For detailed specifications, refer to the E5061B-3L5 LF-RF Network Analyzer with Option 005 Impedance Analysis Function Data Sheet, part number 5990-7033EN.

Impedance analysis feature (Option NZA only)

| Description	General information
Impedance parameters	IZI, θz , IYI, θy, Cp, Cs, Lp, Ls, Rp, Rs, D, Q, R, X, G, B
Measurement methods	Port 1 Reflection, Port 2 Reflection, Port 1-2 Series-thru, Port 1-2 Shunt-thru, Gain-phase Series-thru, Gain-phase Shunt-thru
Equivalent circuit analysis	3-component model (4 models), 4-component model (1 model)

Summary of major impedance measurement methods (Option NZA only)

| Method	Typical frequency range	10% accuracy |Z| range	Test fixtures	Application examples
S-parameter port 1 Reflection	5 Hz to 3 GHz	1 Ω to 2 kΩ	Agilent's 7 mm test fixtures with 16201 terminal adapter	Inductors, transformers, RF capacitors, RF diodes
Gain-phase series-thru (T:50 Ω 20 dB, R: 1M Ω 20 dB)	5 Hz to 30 MHz	3 Ω to 40 kΩ	Agilent's 4TP test fixtures	Resonators, piezo sensors, small capacitors, large inductors
S-parameter port 1-2 shunt-thru	100 kHz to 3 GHz	1 mΩ to 80 Ω	User-prepared coax probes, or shunt-thru test board	High frequency power distribution network applications (bypass capacitors, PCB measurements)
Gain-phase shunt-thru (T:50 Ω, 0dB, R: 50 Ω, 20 dB)	5 Hz to 30 MHz	< 1 mΩ to 5 Ω	User-prepared coax probes, or shunt-thru test board	Low frequency power distribution network applications (DC-DC converters, large bypass caps, PCB)

Impedance measurement accuracy SPD, (Option NZA only)

S-parameter port 1 reflection method
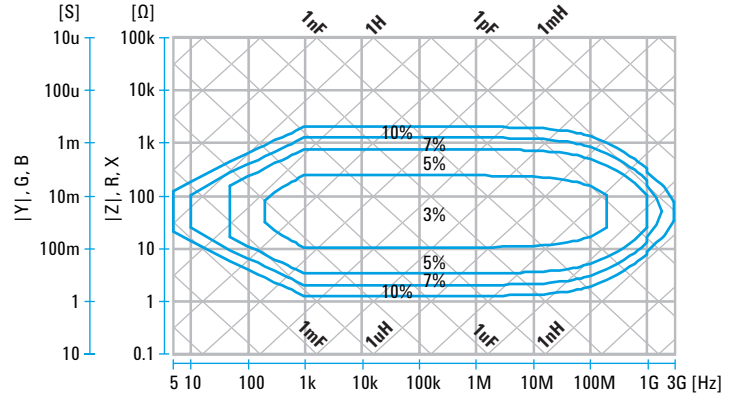
Gain-phase series-thru method
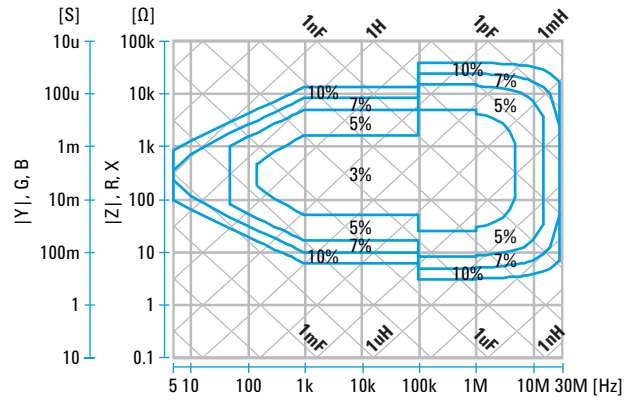
Literature resources

You can find information about key features, technical specifications for the ENA series network analyzer in the following documents:

Agilent E5071C ENA Network Analyzer
Brochure 5989-5478EN

Agilent E5071C ENA Network Analyzer
Data Sheet 5989-5479EN

Agilent E5071C ENA Network Analyzer
Configuration Guide 5989-5480EN

Agilent E5061B Network Analyzer
Brochure 5990-6794EN

Agilent E5061B Network Analyzer
Data Sheet 5990-4392EN

Agilent E5061B Network Analyzer
Configuration Guide 5990-4391EN

Agilent E5061B-3L5 LF-RF Network Analyzer with Option 005 Impedance Analysis Function
Data Sheet 5990-7033EN

EXPRESS

Pre-configured with the most **common features** in a build-to-order instrument

DEKRA Certified
ISO 9001:2008
Quality Management System

www.agilent.com/quality

LXI

www.lxistandard.org
LAN eXtensions for Instruments puts the power of Ethernet and the Web inside your test systems. Agilent is a founding member of the LXI consortium.

Agilent Email Updates

www.agilent.com/find/emailupdates
Get the latest information on the products and applications you select.

Agilent Channel Partners

www.agilent.com/find/channelpartners
Get the best of both worlds: Agilent's measurement expertise and product breadth, combined with channel partner convenience.

For more information on Agilent Technologies' products, applications or services, please contact your local Agilent office. The complete list is available at:

www.agilent.com/find/contactus

Americas
Canada	(877) 894 4414
Brazil	(11) 4197 3500
Mexico	01800 5064 800
United States	(800) 829 4444

Asia Pacific
Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 112 929
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Other AP Countries	(65) 375 8100

Europe & Middle East
Belgium	32 (0) 2 404 93 40
Denmark	45 70 13 15 15
Finland	358 (0) 10 855 2100
France	0825 010 700*
	*0.125 €/minute
Germany	49 (0) 7031 464 6333
Ireland	1890 924 204
Israel	972-3-9288-504/544
Italy	39 02 92 60 8484
Netherlands	31 (0) 20 547 2111
Spain	34 (91) 631 3300
Sweden	0200-88 22 55
United Kingdom	44 (0) 131 452 0200

For other unlisted countries:
www.agilent.com/find/contactus
Revised: June 8, 2011

Product specifications and descriptions in this document subject to change without notice.

Agilent Technologies