Agilent 8720E Family Network Analyzers

Configuration Guide

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8719ET, 50 MHz to 13.5 GHz
8720ET, 50 MHz to 20 GHz
8722ET, 50 MHz to 40 GHz
8719ES, 50 MHz to 13.5 GHz
8720ES, 50 MHz to 20 GHz
8722ES, 50 MHz to 40 GHz

The Agilent Technologies 8720E family of microwave network analyzers integrates a microwave source, tuned-receiver, and transmission/reflection or S-parameter test set into a single, cost-effective instrument. To complete a microwave measurement system, select the desired network analyzer options, test port cables, and calibration kits. Also, additional measurement accessories may be selected.

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Agilent Technologies

Transmission/Reflection Network Analyzers

8719ET vector network analyzer, 50 MHz to 13.5 GHz
8720ET vector network analyzer, 50 MHz to 20 GHz
8722ET vector network analyzer, 50 MHz to 40 GHz

Included with a standard network analyzer is a manual set which includes an installation and quick start guide, user's guide, reference guide, programmer's guide, example programs CD-ROM, and a CD-ROM containing the manual set. A bandpass filter test device (P/N 0955-0446) and a 3-year return-to-Agilent service warranty are also included.

Transmission/reflection analyzer options

Any combination of the following options may be ordered with an ET model analyzer.

004 step attenuator: adds a 55-dB step attenuator to increase the source output power range.
010 time-domain capability: allows time-domain measurements.
1D5 high-stability frequency reference: replaces standard frequency reference with a higher stability unit.

S-parameter Network Analyzers

8719ES vector network analyzer, 50 MHz to 13.5 GHz
8720ES vector network analyzer, 50 MHz to 20 GHz
8722ES vector network analyzer, 50 MHz to 40 GHz

Included with a standard network analyzer is a manual set which includes an installation and quick start guide, user's guide, reference guide, programmer's guide, example programs CD-ROM, and a CD-ROM containing the manual set. A bandpass filter test device (P/N 0955-0446) and a 3-year return-to-Agilent service warranty are also included.

Network Analyzer Options

S-parameter analyzer options

Some ES options cannot be ordered with other options. See option compatibility table below.

007 mechanical transfer switch: replaces the solid-state transfer switch with a mechanical transfer switch. Increases test port power and dynamic range by 5 dB.

010 time-domain capability: allows time-domain measurements.

012 direct sampler access: configures the test set with direct access to A and B sampler receiver inputs. Operates as a standard instrument with the jumpers installed.

085 high-power S-parameter test set modification: deletes bias tees and adds a mechanical transfer switch and internal attenuators. Allows insertion of an amplifier before the transfer switch and insertion of isolators in the measurement configuration. Includes direct sampler access (Option 012).

089 frequency offset mode: modifies the test set and firmware. Provides mixer measurement capability, allowing a receiver frequency offset from the source.

1D5 high-stability frequency reference: replaces standard frequency reference with a higher stability unit.

400 adds fourth sampler and TRL calibration firmware: replaces the transfer switch with a solid-state switch/splitter.

The following options apply to both ET and ES models:

Hardware options

1CM adds rack mount flange kit for use without handles

1CP adds rack mount flange kit for use with handles[1]

Information options

0B0 deletes manual set

0B1 adds extra manual set

0BW adds service guide, part number 08720-90397

The following language options provide a translated user's guide:

ABF French manual, part number 5967-8509

ABJ Japanese manual, part number 5967-8503

Service options

W01 converts three year return-to-Agilent service warranty to one year on-site service warranty.[2]

W32 adds three years of return-to-Agilent calibration.

W34 adds three years of return-to-Agilent standards-compliant calibration.

W52 adds five years of return-to-Agilent calibration.

W54 adds five years of return-to-Agilent standards-compliant calibration.

Certification options

UK6 commercial calibration certification with test data

1BN mil standard 45662A calibration certification

1BP mil standard 45662A calibration certification with test data

S-Parameter Network Analyzer Option Compatibility

Option		Option 1D5	Option 007	Option 010	Option 012	Option 085	Option 089	Option 400
1D5	High-stability frequency reference	—	Yes	Yes	Yes	Yes	Yes	Yes
007	Mechanical transfer switch	Yes	—	Yes	Yes	No[4]	Yes	No[3]
010	Time domain	Yes	Yes	—	Yes	Yes	Yes	Yes
012	Direct sampler access	Yes	Yes	Yes	—	No[5]	Yes	Yes
085	High-power test	Yes	No[4]	Yes	No[5]	—	Yes	No[3, 4]
089	Frequency offset mode	Yes	Yes	Yes	Yes	Yes	—	Yes
400	Four-sampler test set	Yes	No[3]	Yes	Yes	No[3, 4]	Yes	—

1. The 8720E family of network analyzers is supplied with handles.
2. Only where on-site service is available.
3. Option 400 uses solid-state switch splitter in place of transfer switch.
4. Option 085 requires and includes a mechanical transfer switch.
5. Option 085 includes direct sampler access (Option 012).

Measurement Accessories

Accessories are available in these connector types: 7 mm, K-connector (2.92 mm), Type-N, 3.5 mm (SMA-compatible), 2.4 mm coaxial, 7-16, WR-90 (X Band), WR-62 (P Band), WR-42 (K Band), WR-28 (R Band)

For a complete list of Agilent's coaxial and waveguide accessories, ask your Agilent sales representative for the RF & Microwave Test Accessories Catalog (literature number 5968-4314E).

Calibration kits

Coaxial measurements

For coaxial measurements, Agilent offers two types of calibration kits:

Economy, includes:
- open standards (male and female)
- short standards (male and female)
- fixed-termination standards (male and female)
- in-series adapters

Standard, includes the devices in the economy kit and adds:
- sliding loads
- connector gages

Precision, includes the devices in the economy kit and adds:
- 50 ohm airline for TRL calibration
- TRL adapters
- connector tools

Waveguide measurements

For waveguide measurements, Agilent offers calibration kits that include:
- waveguide-to-coax adapters (X, P, K)
- precision waveguide section
- flush short circuit
- fixed terminations
- straight section

Electronic calibration

Agilent also offers electronic calibration systems. These systems require an Agilent 85097A interface kit and electronic calibration kit. The calibration kit includes:
- highband ECal module
- torque wrench
- optional adapters
- optional lowband ECal module

Verification kits

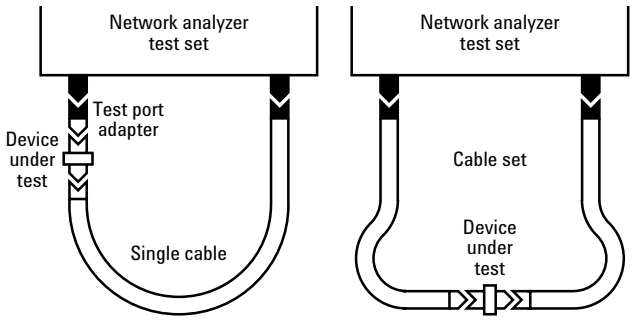
All Agilent verification kits include:
- precision Z_0 airline
- mismatched airline
- fixed attenuators
- traceable measured data and uncertainties

Cables and adapter sets

Agilent offers cables in the following types:
- single cables in semi-rigid and flexible
- cable set in semi-rigid and flexible

There are also adapter sets available that protect the test port and convert the port to the desired connector interface. These kits contain:
- one male adapter
- one female adapter

To attain the best mechanical rigidity for device connection, use a single cable and the appropriate special adapter set. To attain the greatest flexibility for device connection, use a cable set.



For devices with 3.5 mm or SMA connectors

Calibration kits

85052B standard: 0.045 to 26.5 GHz. Includes:
00902-60003 3.5 mm (m) fixed load
00902-60004 3.5 mm (f) fixed load
00911-60019 3.5 mm (m) sliding load
00911-60020 3.5 mm (f) sliding load
85052-60006 3.5 mm (m) short
85052-60007 3.5 mm (f) short
85052-60008 3.5 mm (m) open
85052-60009 3.5 mm (f) open
85052-60012 3.5 mm (f) to 3.5 mm (f) adapter
85052-60013 3.5 mm (f) to 3.5 mm (m) adapter
85052-60014 3.5 mm (m) to 3.5 mm (m) adapter
Option K11 PSC-3.5 slotless female center contact repair kit

85052C[1] precision TRL: 0.045 to 26.5 GHz. Includes:
00902-60003 3.5 mm (m) fixed load
00902-60004 3.5 mm (f) fixed load
85052-60006 3.5 mm (m) short
85052-60007 3.5 mm (f) short
85052-60008 3.5 mm (m) open
85052-60009 3.5 mm (f) open
85052-60032 3.5 mm (f) to 3.5 mm (f) adapter
85052-60033 3.5 mm (m) to 3.5 mm (m) adapter
85052-60034 3.5 mm (f) to 3.5 mm (m) adapter
85052-60035 3.5 mm short TRL line
85052-60036 3.5 mm long TRL line

85052D economy: 0.045 to 26.5 GHz. Includes:
00902-60003 3.5 mm (m) fixed load
00902-60004 3.5 mm (f) fixed load
85052-60006 3.5 mm (m) short
85052-60007 3.5 mm (f) short
85052-60008 3.5 mm (m) open
85052-60009 3.5 mm (f) open
85052-60012 3.5 mm (f) to 3.5 mm (f) adapter
85052-60013 3.5 mm (f) to 3.5 mm (m) adapter
85052-60014 3.5 mm (m) to 3.5 mm (m) adapter

85033D economy: DC to 6 GHz. Includes:
1250-1746 3.5 mm (f) to 7 mm adapter
1250-1747 3.5 mm (m) to 7 mm adapter
85033-60009 3.5 mm (m) load
85033-60010 3.5 mm (f) load
85033-60011 3.5 mm (m) open
85033-60012 3.5 mm (f) open
85033-60013 3.5 mm (m) short
85033-60014 3.5 mm (f) short
Option 001 deletes 3.5 mm to 7 mm adapters

Electronic calibration kits

85093B RF ECal:[2] 30 kHz to 9 GHz. Includes:
85093-60005 3.5 mm (f) to 3.5 mm (m) RF ECal module
Option 00M substitutes:
85093-60006 3.5 mm (m) to 3.5 mm (m) RF ECal module
Option 00F substitutes:
85093-60007 3.5 mm (f) to 3.5 mm (f) RF ECal module
Option 00A adds:
85052-60012 3.5 mm (f) to 3.5 mm (f) adapter
85052-60014 3.5 mm (m) to 3.5 mm (m) adapter

85062B MW ECal:[2] 1 GHz to 26.5 GHz. Includes:
85062-60002 3.5 mm (f) to 3.5 mm (m) MW ECal module
Option 00M substitutes:
85062-60004 3.5 mm (m) to 3.5 mm (m) MW ECal module
Option 00F substitutes:
85062-60006 3.5 mm (f) to 3.5 mm (f) MW ECal module
Option 001 adds:
a 30 kHz to 9 GHz RF ECal module
85093-60005 3.5 mm (f) to 3.5 mm (m) RF ECal module
Option 00A adds:
85052-60012 3.5 mm (f) to 3.5 mm (f) adapter
85052-60014 3.5 mm (m) to 3.5 mm (m) adapter

Verification kits

85053B 0.045 to 26.5 GHz
Option 1BP MIL-STD 45662A calibration certificate with test data

Cables for either 8719ET/ES or 8720ET/ES

85131C single, semi-rigid: 3.5 mm to 3.5 mm, 81 cm, 32 inches
85131D set, semi-rigid: 3.5 mm to 3.5 mm, 53 cm each, 21 inches
85131E single, flexible: 3.5 mm to 3.5 mm, 96 cm, 38 inches
85131F set, flexible: 3.5 mm to 3.5 mm, 53 cm each, 21 inches

Cables for the 8722ET/ES

85134C single, semi-rigid: 3.5 mm to 2.4 mm, 81 cm, 32 inches
85134D set, semi-rigid: 3.5 mm to 2.4 mm, 53 cm each, 21 inches
85134E single, flexible: 3.5 mm to 2.4 mm, 96 cm, 38 inches
85134F set, flexible: 3.5 mm to 2.4 mm, 53 cm each, 21 inches

Adapter sets

85130D 8719/8720 only: 3.5 mm[3] to 3.5 mm
85130F 8722 only: 2.4 mm[3] to 3.5 mm

1. Kit includes open and short circuits, fixed broadband loads, precision short airlines, TRL adapters, and 3.5 mm connector tools.
2. Requires an Agilent 85097A interface kit.
3. Special rugged female connector specifically for connecting to the network analyzer test port, but does not mate with a standard male connector.

Measurement Accessories, continued

For devices with 7 mm connectors

Calibration kits

85050B standard: 0.045 to 18 GHz. Includes:
00909-60008 7 mm coax termination
85050-60006 7 mm fixed broadband load
85050-80007 7 mm short
85050-80010 7 mm open
85050-80011 7 mm sliding load
85050C[1] precision TRL: 0.045 to 18 GHz. Includes:
00909-60008 7 mm coax termination
85050-60003 7 mm to 7 mm airline
85050-60005 7 mm to 7 mm TRL adapter
85050-60006 7 mm fixed broadband load
85050-80007 pin collet assembly
85050-80008 7 mm short
85050-80009 7 mm short collet
85050-80010 7 mm open
85050D economy: 0.045 to 18 GHz. Includes:
85050-60006 7 mm fixed broadband load
85050-80007 7 mm short
85050-80010 7 mm open
85031B economy: 30 kHz to 6 GHz. Includes:
00909-60008 7 mm coax termination
85050-60001 7 mm open/short

Electronic calibration kits

85091B RF ECal:[2] 30 kHz to 9 GHz. Includes:
85091-60003 7 mm to 7 mm RF ECal module
85060B MW ECal:[2] 1 GHz to 18 GHz. Includes:
85060-60002 7 mm to 7 mm MW ECal module
Option 001: adds a 30 kHz to 9 GHz RF ECal module
85091-60003 7 mm to 7 mm RF ECal module

Verification kit

85051B 8719/8720 only: 0.045 to 18 GHz
Option 1BP MIL-STD 45662A calibration certificate with test data

Cables for either 8719ET/ES or 8720ET/ES

85132C single, semi-rigid: 7 mm to 3.5 mm, 81 cm, 32 inches
85132D set, semi-rigid: 7 mm to 3.5 mm, 53 cm each, 21 inches
85132E single, flexible: 7 mm to 3.5 mm, 96 cm, 38 inches
85132F set, flexible: 7 mm to 3.5 mm, 53 cm each, 21 inches

Cables for the 8722ET/ES

85135C single, semi-rigid: 7 mm to 2.4 mm, 81 cm, 32 inches
85135D set, semi-rigid: 7 mm to 2.4 mm, 53 cm each, 21 inches
85135E single, flexible: 7 mm to 2.4 mm, 96 cm, 38 inches
85135F set, flexible: 7 mm to 2.4 mm, 53 cm each, 21 inches

Adapter sets

85130B 8719/20 only: 3.5 mm[3] to 7 mm
85130E 8722 only: 2.4 mm[3] to 7 mm

For devices with Type-N connectors

Calibration kits

85054B standard: 0.045 to 18 GHz. Includes:
00909-60011 Type-N (m) fixed lowband load
00909-60012 Type-N (f) fixed lowband load
85054-60025 Type-N (m) short
85054-60026 Type-N (f) short
85054-60027 Type-N (m) open
85054-60028 Type-N (f) open
85054-60031 Type-N (f) to 7 mm adapter
85054-60032 Type-N (m) to 7 mm adapter
85054-60037 Type-N (f) to Type-N (f) adapter
85054-60038 Type-N (m) to Type-N (m) adapter
85054-80010 Type-N (f) sliding load
85054-80009 Type-N (m) sliding load
85054-60050 Type-N (f) connector gage
85054-60052 Type-N (f) gage master
85054-60051 Type-N (m) connector gage
85054-60053 Type-N (m) gage master
Option K11 PSC-N slotless contact repair kit
85054D economy: 0.045 to 18 GHz. Includes:
85054-60025 Type-N (m) short
85054-60026 Type-N (f) short
85054-60027 Type-N (m) open
85054-60028 Type-N (f) open
85054-60031 Type-N (f) to 7 mm adapter
85054-60032 Type-N (m) to 7 mm adapter
85054-60037 Type-N (f) to Type-N (f) adapter
85054-60038 Type-N (m) to Type-N (m) adapter
85054-60046 Type-N (m) fixed load
85054-60047 Type-N (f) fixed load

Electronic calibration kits

85092B RF ECal:[2] 30 kHz to 9 GHz. Includes:
85092-60005 Type-N (f) to Type-N (m) RF ECal module
Option 00M substitutes:
85092-60006 Type-N (m) to Type-N (m) RF ECal module
Option 00F substitutes:
85092-60007 Type-N (f) to Type-N (f) RF ECal module
Option 00A adds:
85054-60037 Type-N (f) to Type-N (f) adapter
85054-60038 Type-N (m) to Type-N (m) adapter
85064B MW ECal:[2] 1 GHz to 18 GHz. Includes:
85064-60002 Type-N (f) to Type-N (m) MW ECal module
Option 00M substitutes:
85064-60004 Type-N (m) to Type-N (m) MW ECal module
Option 00F substitutes:
85064-60006 Type-N (f) to Type-N (f) MW ECal module
Option 001: adds a 30 kHz to 9 GHz RF ECal module
85092-60005 Type-N (f) to Type-N (m) RF ECal module
Option 00A adds:
85054-60037 Type-N (f) to Type-N (f) adapter
85054-60038 Type-N (m) to Type-N (m) adapter

1. Kit includes open and short circuits, fixed loads, precision short airline, 7 mm connector tools, and gauges.
2. Requires an Agilent 85097A interface kit.
3. Special rugged female connector specifically for connecting to the network analyzer test port, but does not mate with a standard male connector.

Verification kit
85055A 8719/8720 only: 0.045 to 18 GHz
Option 1BP MIL-STD 45662A calibration certificate with test data

Cables
Use the test port cables recommended for devices with 7 mm connectors, and 7 mm to Type-N adapters that are from the 85054B/D Type-N calibration kit (see 7 mm connector section).

Adapter set
85130C 8719/8720 only: 3.5 mm[1] to Type-N

For devices with 2.4 mm connectors

Calibration kits
85056A standard: 0.045 to 50 GHz. Includes:
00901-60003 2.4 mm (m) fixed broadband load
00901-60004 2.4 mm (f) fixed broadband load
00915-60003 2.4 mm (m) sliding load
00915-60004 2.4 mm (f) sliding load
85056-60005 2.4 mm (m) to 2.4 mm (m) adapter
85056-60006 2.4 mm (f) to 2.4 mm (f) adapter
85056-60007 2.4 mm (m) to 2.4 mm (f) adapter
85056-60020 2.4 mm (m) short
85056-60021 2.4 mm (f) short
85056-60022 2.4 mm (m) open
85056-60023 2.4 mm (f) open
85056D economy: 0.045 to 50 GHz. Includes:
00901-60003 2.4 mm (m) fixed broadband load
00901-60004 2.4 mm (f) fixed broadband load
85056-60005 2.4 mm (m) to 2.4 mm (m) adapter
85056-60006 2.4 mm (f) to 2.4 mm (f) adapter
85056-60007 2.4 mm (m) to 2.4 mm (f) adapter
85056-60020 2.4 mm (m) short
85056-60021 2.4 mm (f) short
85056-60022 2.4 mm (m) open
85056-60023 2.4 mm (f) open

Verification kit
85057B 8722 only: 0.045 to 50 GHz
Option 1BP MIL-STD 45662A calibration certificate with test data

Cables for the 8722ET/ES
85133C single, semi-rigid: 2.4 mm, 81 cm, 32 inches
85133D set, semi-rigid: 2.4 mm, 53 cm each, 21 inches
85133E single, flexible: 2.4 mm, 81 cm, 32 inches
85133F set, flexible: 2.4 mm, 53 cm each, 21 inches

Adapter set
85130G 8722 only: 2.4 mm[1] to 2.4 mm

For devices with K connectors (2.92 mm)

Calibration kit
85056K[2] economy, 2.92/2.4 mm: 0.045 to 40 GHz. Includes:
00901-60003 2.4 mm (m) fixed broadband load
00901-60004 2.4 mm (f) fixed broadband load
00915-60003 2.4 mm (m) sliding load
00915-60004 2.4 mm (f) sliding load
11904-60001 2.4 mm (m) to 2.92 mm (m) adapter
11904-60002 2.4 mm (f) to 2.92 mm (f) adapter
11904-60003 2.4 mm (m) to 2.92 mm (f) adapter
11904-60004 2.4 mm (f) to 2.92 mm (m) adapter
85056-60005 2.4 mm (m) to 2.4 mm (m) adapter
85056-60006 2.4 mm (f) to 2.4 mm (f) adapter
85056-60007 2.4 mm (m) to 2.4 mm (f) adapter
85056-60020 2.4 mm (m) short
85056-60021 2.4 mm (f) short
85056-60022 2.4 mm (m) open
85056-60023 2.4 mm (f) open
Option 001 adds 2.4 mm sliding loads and gages

Cables[3]
85133C single, semi-rigid: 2.4 mm, 81 cm, 32 inches
85133D set, semi-rigid: 2.4 mm, 53 cm each, 21 inches
85133E single, flexible: 2.4 mm, 81 cm, 32 inches
85133F set, flexible: 2.4 mm, 53 cm each, 21 inches

Adapters
11904A 2.4 mm (m) to K (m)
11904B 2.4 mm (f) to K (f)
11904C 2.4 mm (m) to K (f)
11904D 2.4 mm (f) to K (m)
11904S 2.4 mm to K adapter set

For devices with 7-16 connectors

Calibration kits
85038A standard: 30 kHz to 7.5 GHz. Includes:
85038-80002 7-16 (f) open
85038-80003 7-16 (m) open
85038-80004 7-16 (f) short
85038-80005 7-16 (m) short
85038-80006 7-16 (f) fixed load
85038-80007 7-16 (m) fixed load
8710-2175 torque wrench
8710-2174 open-end wrench
85038F economy: 30 kHz to 7.5 GHz. Includes:
85038-80002 7-16 (f) open
85038-80004 7-16 (f) short
85038-80006 7-16 (f) fixed load
11906-80016 7-16 (f) to 7-16 (f) adapter

1. Special rugged female connector specifically for connecting to the network analyzer test port, but does not mate with a standard male connector.
2. This kit can be used to calibrate in the 2.4 mm interface, as well as measure in the 2.92 mm (K connector).
3. 2.4 mm to K type adapters are required in addition to these cables.

Measurement Accessories, continued

85038M economy: 30 kHz to 7.5 GHz. Includes:
85038-80003 7-16 (m) open
85038-80005 7-16 (m) short
85038-80007 7-16 (m) fixed load
11906-80015 7-16 (m) to 7-16 (m) adapter

Electronic calibration kit

85098B RF ECal:[1] 30 kHz to 7.5 GHz. Includes:
85098-60005 7-16 (m) to 7-16 (f) RF ECal module
Option 00F substitutes:
85098-60007 7-16 (f) to 7-16 (f) RF ECal module
Option 00M substitutes:
85098-60006 7-16 (m) to 7-16 (m) RF ECal module
Option 00A adds:
11906-80015 7-16 (m) to 7-16 (m) adapter
11906-80016 7-16 (f) to 7-16 (f) adapter

Cables

Use the test port cables recommended for devices with 7 mm, 3.5 mm, or Type-N connectors and use the appropriate 11906 series adapter kit.

Adapter kits

11906A 7-16 to 7-16. Includes:
11906-80015 7-16 (m) to 7-16 (m) adapter
11906-80016 7-16 (f) to 7-16 (f) adapter
11906-80017 7-16 (m) to 7-16 (f) adapter (two included)
11906B 7-16 to Type-N. Includes:
11906-80007 Type-N (m) to 7-16 (m) adapter
11906-80008 Type-N (f) to 7-16 (f) adapter
11906-80009 Type-N (f) to 7-16 (m) adapter
11906-80010 Type-N (m) to 7-16 (f) adapter
11906C 7-16 to 7-mm. Includes:
11906-80012 7-mm to 7-16 (m) adapter (two included)
11906-80013 7-mm to 7-16 (f) adapter (two included)
11906D 7-16 to 3.5-mm. Includes:
11906-80002 3.5-mm (m) to 7-16 (m) adapter
11906-80005 3.5-mm (m) to 7-16 (f) adapter
11906-80004 3.5-mm (f) to 7-16 (m) adapter
11906-80003 3.5-mm (f) to 7-16 (f) adapter

For devices with waveguide

X Band

X11644A calibration kit (standard, WR-90, 8.2 to 12.4 GHz). Includes:
00896-60008 X-band standard section
00910-60003 X-band termination
11644-20018 X-band short
11644-20021 X-band shim (open)
X281C waveguide to 7 mm coax adapter
8719/8720: 85132F cable set (set, flexible, 7 mm to 3.5 mm, 53 cm each, 21 inches)
8722: 85135F cable set (set, flexible, 7 mm to 2.4 mm, 53 cm each, 21 inches)
X281C adapter (included in calibration kit): WR-90 to 7 mm

P Band

P11644A calibration kit (standard, WR-62, 12.4 to 18 GHz). Includes:
00896-60007 P-band standard section
00910-60002 P-band termination
11644-20017 P-band short
11644-20020 P-band shim (open)
P281C waveguide to 7 mm coax adapter
8719/8720: 85132F cable set (flexible, 7 mm to 3.5 mm, 53 cm each, 21 inches)
8722: 85135F cable set (flexible, 7 mm to 2.4 mm, 53 cm each, 21 inches)
P281C adapter (included in calibration kit): WR-62 to 7 mm

K Band

K11644A calibration kit (standard, WR-42, 18 to 26.5 GHz). Includes:
00896-60006 K-band standard section
00910-60001 K-band termination
11644-20016 K-band short
11644-20019 K-band shim (open)
K281C waveguide to 3.5 mm (f) coax adapter
8719/8720: 85131F cable set (set, flexible, 3.5 mm to 3.5 mm, 53 cm each, 21 inches)
8722: 85134F cable set (set, flexible, 3.5 mm to 2.4 mm, 53 cm each, 21 inches)
K281C adapter (included in calibration kit): WR-42 to 3.5 mm (f)
Option 012 WR-42 to 3.5 mm (m)

R Band

R11644A calibration kit (standard, WR-28, 26.5 to 40 GHz). Includes:
00914-60028 R-band termination
11644-20005 R-band short
11644-20003 R-band shim (open)
11644-60001 R-band 10 cm straight waveguide
11644-60016 R-band 5 cm straight waveguide
8722: 85133F cable set (set, flexible, 2.4 mm, 53 cm each, 21 inches)
R281A adapter (2.4 mm (f) to WR-28 waveguide adapter)
R281B adapter (2.4 mm (m) to WR-28 waveguide adapter)

1. Requires an Agilent 85097A ECal interface kit.

Test Configuration Accessories

Power meters[1]
E4418B EPM series, single channel
E4419B EPM series, dual channel

Power sensors
8481B 10 MHz to 18 GHz, Type-N (m), 25 watt
8482B 100 kHz to 4.2 GHz, Type-N (m), 25 watt
8485A 50 MHz to 26.5 GHz, APC-3.5 mm (m), 100 mW
8481A 10 MHz to 18 GHz, Type-N (m), 100 mW
8482A 100 kHz to 4.2 GHz, Type-N (m), 100 mW
8483A 100 kHz to 2 GHz, Type-N (m), 75 ohm, 100 mW
R8486A 26 GHz to 40 GHz, waveguide flange UG-599/U, 100 mW
8487A 50 MHz to 50 GHz, 2.4 mm (m), 100 mW

Power amplifiers[2]
83006A 0.01 to 26.5 GHz, 20 dB gain, power out: +18 dBm to 10 GHz or +16 dBm to 20 GHz or +14 dBm to 26.5 GHz
83017A 0.05 to 26.5 GHz, 25 dB gain, power out: +20 dBm to 20 GHz or +15 dBm to 26.5 GHz
83018A 2 to 26.5 GHz, 27 dB gain to 20 GHz or 23 dB to 26.5 GHz, power out: +24 dBm to 20 GHz or +21 dBm to 26.5 GHz
83020A 2 to 26.5 GHz, 30 dB gain to 20 GHz or 27 dB to 26.5 GHz, power out: +30 dBm to 20 GHz or +26 dBm to 26.5 GHz
83050A 2 to 50 GHz, 23 dB gain, power out: +20 dBm to 40 GHz or +17 dBm to 50 GHz
83051A pre-amplifier, 0.045 to 50 GHz, 23 dB gain, power out: +12 dBm to 45 GHz or +10 dBm to 50 GHz

Couplers
87300B coaxial: 1 to 20 GHz, SMA (f), 10 dB coupling
87300C coaxial: 1 to 26.5 GHz, 3.5 mm (f), 10 dB coupling
87301D coaxial: 1 to 40 GHz, 2.4 mm (f) or optional 2.92 mm (f), 13 dB coupling
87310B 90° coaxial: 1 to 18 GHz, SMA (f), 3 dB coupling
87301E coaxial: 2 to 50 GHz, 2.4 mm (f), 10 dB coupling

Test fixtures
For TRL/LRM and TOSL calibration standards, microstrip adapters, and test fixtures, Agilent recommends ICM[3] adjustable test fixture mainframe series TF-3000, which is compatible with the ICM TRL-3000 series calibration kits.

Bias supplies[4]
6626A precision DC power supply; 2 A, 50 V maximum
6629A quad-out precision GPIB DC power supply
4142B modular DC source/monitor; 10 A, 200 V maximum

Bias networks[5]
11590B 100 MHz to 12.4 GHz, Type-N, 0.5 A and 100 V maximum bias
  Option 001 100 MHz to 18 GHz, 7 mm, 0.5 A and 100 V maximum bias
11612A 45 MHz to 26.5 GHz, 3.5 mm (f), 0.5 A and 40 V maximum bias
  Option 001 2 A maximum bias
11612B 45 MHz to 50 GHz, 2.4 mm (f), 0.5 A maximum bias

System software
85070C high-temperature dielectric probe kit. Includes the dielectric probe, software on 3.5 inch disk, cables, port/cable adapters, switch, short circuit, mounting bracket, adapters, 50-ohm termination, stand, vials, and stoppers. Measures complex permittivity of materials. Standard software version runs on PC with Windows® 95, 98, or NT 4.0.
85071C materials measurement software. Measures complex permeability and permittivity of materials in a transmission line environment. Software runs on a PC with Windows® 95, 98, or NT 4.0.
85190A IC-CAP modeling suite[6]
Design Software, Advanced Design System series (ADS) and Series IV[6] connector repair kits

Application support
Agilent 50629E productivity assistance; provides one hour of on-site consulting and assistance delivered by an application engineer. Hourly charges apply from portal to portal to cover travel costs.

1. A power meter with the appropriate Agilent 8480 series power sensor is required for use with the power meter calibration feature.
2. RF connectors: 3.5 mm (f) on RF input and output; BNC (f) detector out. 2.4 mm (f) on RF input and output for 85050A, 83051A.
3. Inter-Continental Microwave, 1515 Wyatt Drive, Santa Clara, CA 95054-1524, Telephone: (408) 727-1596
   Fax: (408) 727-0105
4. For internally biasing with the 8719ES/8720ES/8722ES.
5. For supplying DC bias externally from test sets. Internal bias networks have a current limit of 0.5 A.
6. Consult with an Agilent systems application engineer. The product you order will depend on the test environment.

Peripheral Accessories

Printers
For a current list of compatible printers, consult our printer-compatibility guide on the World Wide Web at www.agilent.com/find/pcg

Interface cables
10833A GPIB cable: 1.0 m (3.3 ft.)
10833B GPIB cable: 2.0 m (6.6 ft.)
10833D GPIB cable: 0.5 m (1.6 ft.)

Keyboard
A keyboard with mini-DIN cable can be connected to the Agilent 8720E family of netowrk analyzers interface to form a remote front panel and to provide a quicker, more convenient way to enter titles, labels, and file names.

Equipment racks
5063-9223 rack mount flange kit, for use with handles; includes handles[1]
5063-9236 rack mount kit, for use with handles; does not include handles. May be ordered as Option 1CP.
5063-9216 rack mount kit, for use without handles. May be ordered as Option 1CM.
1181B system testmobile, 3 ft. tall (see literature number 5091-1233E)
1540-1695 operating case
9211-2657 transit case

Computers
Any computer configured with a GPIB interface card and software drivers

Monitors
Any VGA-compatible monitor

Literature and Manuals

Literature
Agilent 8720E family overview, literature number 5968-5161E
Agilent 8720E family data sheet, literature number 5968-5163E

For more information about the Agilent 8720E family, visit our Web site at www.agilent.com/find/8720

Manuals
One manual set is included with each network analyzer. Additional manual sets and service manuals may be ordered as options when a network analyzer is purchased, or separately using the part numbers. For on-line manuals, visit our Web site at www.agilent.com/find/manuals

8719/20/22 ET/ES manual set, part number 08720-90390. Includes:
- **Installation and Quick Start Guide,** 08720-90391
- **User's Guide**, 08720-90392
- **Reference Guide,** 08720-90393
- **Programmer's Guide,** 08753-90475
- **CD-ROM,** 08720-90418; includes all documents in the manual set

8719/20/22 ET/ES service guide, part number 08720-90397. Includes service guide on CD-ROM, part number 08720-90419.

1. The 8720E series of network analyzers is supplied with handles.

Upgrades

Network analyzer upgrade kits

Options may be added to an Agilent 8720E series network analyzer after initial purchase by ordering the instrument's model number followed by a "U" to indicate an upgrade, and specifying one or more of the following upgrade options. Some options are available only for certain models, as noted in the description. Refer to the option compatibility matrix on page 3 to determine if a desired option is compatible with existing options in an ES-model network analyzer.

004 adds 55-dB step attenuator to an ET model analyzer for extended output power range. Includes installation at an Agilent service center.

007 adds mechanical S-parameter transfer switch to an ES model analyzer, replacing the standard solid-state switch. Includes installation at an Agilent service center.

010 adds time domain capability. Includes installation at an Agilent service center.

012 modifies S-parameter test set in an ES model analyzer for direct sampler access. Front panel jumpers also allow standard instrument operation. Includes installation at an Agilent service center.

020 for 8719ET or 8719ES only. Adds 20 GHz operation. Includes installation at an Agilent service center.

040 for 8719ET/ES and 8720ET/ES only. Adds 40 GHz operation. Includes installation at the Agilent factory.

085 modifies S-parameter test set in an ES model analyzer for high power measurement capability and provides direct sampler access. Includes installation at the Agilent factory.

089 modifies S-parameter test set and firmware in an ES model analyzer for frequency offset mixer test capability. Includes installation at an Agilent service center.

1D5 adds high stability frequency reference. Includes installation at an Agilent service center.

400 adds fourth sampler and TRL calibration firmware to an ES model analyzer. Includes installation at the Agilent factory.

Agilent 8719D, 8720D, and 8722D analyzers can be upgraded to have their firmware include the new features introduced in the ES models with one of the following upgrades.

8719DU, 8720DU, or 8722DU upgrade kit

Option 000 performance upgrade kit for an 8719D, 8720D, or 8722D with firmware revision below 7.0. Adds new CPU board and firmware, which offers measurement and data- transfer speed improvements and the latest firmware. Includes installation at an Agilent service center.

Option 099 firmware upgrade for an 8719D, 8720D, or 8722D with firmware revision above 7.0.

This firmware upgrade can be installed by the user. The firmware is also available for download from Agilent's website. Go to www.agilent.com/find/8720

Application and Product Notes

	Pub. Number
Basics of Measuring the Dielectric Properties of Materials, Application note 1217-1	5091-3300E
Understanding the Fundamental Principles of Vector Network Analysis, Application note 1287-1	5965-7707E
Exploring the Architectures of Network Analyzers Application note 1287-2	5965-7708E
Applying Error Correction to Network Analyzer Measurements, Application note 1287-3	5965-7709E
Network Analyzer Measurements: Filter and Amplifier Examples, Application note 1287-4	5965-7710E
Improving Throughput in Network Analyzer Applications, Application note 1287-5	5966-3317E
Using a Network Analyzer to Characterize High-Power Components, Application note 1287-6	5966-3319E
Improving Network Analyzer Measurements of Frequency-Translating Devices, Application note 1287-7	5966-3318E
Simplified Filter Tuning Using Time-Domain Analysis, Application note 1287-8	5968-5328E
In-Fixture Measurements Using Vector Network Analyzers, Application note 1287-9	5968-5329E
8 Hints for Making Better Network Analyzer Measurements, Application note 1291-1	5965-8166E
Specifying Calibration Standards for the Agilent 8510 Network Analyzer, Product note 8510-5A	5956-4352
Applying TRL Cal to Non-Coaxial Measurements, Product note 8510-8A	5091-3645E
Testing Amplifiers and Active Devices with the Agilent 8720C, Product note 8720-1	5091-1942E
In-Fixture Measurements with the Agilent 8720C, Product note 8720-2	5091-1943E

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Agilent Technologies' Test and Measurement Support, Services, and Assistance
Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage."

Our Promise
Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you receive your new Agilent equipment, we can help verify that it works properly and help with initial product operation.

Your Advantage
Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and onsite education and training, as well as design, system integration, project management, and other professional engineering services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

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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

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

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