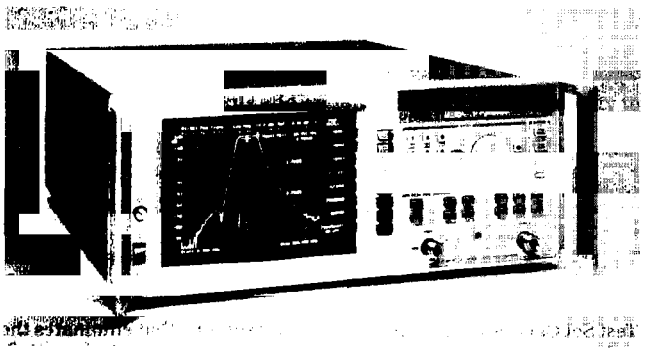
8712ET
8712ES
8714ET
8714ES

- 300 kHz to 1.3 GHz (8712ET/ES) or 3 GHz (8714ET/ES)
- S-parameter measurements (ES models)
- Up to 100 dB dynamic range
- Narrowband and broadband detection
- Real-time sweep speeds
- 50 Ω or 75 Ω system impedance
- 1 Hz resolution synthesized source
- Standard LAN interface
- Standard GP Instrument BASIC (IBASIC)
- Optional fault-location and SRL measurements
- Standard multiport test sets available



8712E RF Network Analyzer Series

8712E RF Network Analyzer Series

Designed for Manufacturing

The 8712E Series of economical RF network analyzers provides speed, accuracy, and automation features in compact, integrated instruments for high-volume RF component manufacturing. These analyzers help reduce tune and test times, increase throughput, and lower your overall cost per component. A choice of transmission/reflection analyzers (ET models) or S-parameter analyzers (ES models) allows you to choose the the optimum level of performance versus price to meet your measurement needs.

Standard Family Features

The 8712ET and 8714ET feature built-in transmission/reflection test sets with a full range of magnitude and phase measurements. These analyzers also employ advanced vector-error correction techniques to enhance measurement accuracy.

The 8712ES and 8714ES feature S-parameter test sets with full two-port vector-error correction, providing the highest level of measurement accuracy.

All these analyzers provide fast, complete swept-frequency and swept-power characterizarion of RF components. In addition:

- 300 kHz to 1.3 or 3 GHz models are available in both 50 Ω or 75 Ω options
- A synthesized source provides fast, stable, high-resolution (1 Hz) stimulus for accurate measurements on a variety of RF components
- Power sweeps enable testing of amplifier gain compression and AM-PM conversion.
- A 60 dB step attenuator (standard on ES models, optional on ET models) provides a wide range of output power levels for testing active devices
- Real-time sweep speeds with better than 10 updates per second facilitate high device throughput and increase tuning efficiency
- A built-in 3.5-inch DOS-format disk drive provides unlimited data storage
- Serial, parallel, LAN and GPIB interfaces make it easy to print or plot data to all printers and plotters

Flexible, sensitive receivers offer a choice between narrowband and broadband detection. Broadband detection allows scalar characterization of frequency-translating devices, while narrowband detection provides up to 100 dB of dynamic range for vector measurements of high-rejection devices.

The instruments are equipped with a large, 9-inch monochrome display for clear view of measurement data, softkey functions, IBASIC programs, and markers. Display pass/fail indicators and trace data in color by connecting any VGA-compatible monitor. Two independent measurement channels let you display transmission and reflection data simultaneously. Each channel can have independent measurement parameters such as frequency range, IF bandwidth, number of points, and display formats. Display formats include SWR, linear and log magnitude, phase and group delay, Smith chart, polar, real and imaginary, dBW, dBm, dBμW, dBV, dBmV, and dBμV.

Manufacturing Features

A network connection provides an efficient and reliable way to communicate with your test systems. The standard TCP/IP-compliant Ethertwist LAN interface makes connecting to a factory-wide network easy. Use a variety of standard protocols, such as ftp, http, bootp, telnet, sockets, and network file system (NFS) to simultaneously distribute new test programs, test parameters, limit lines, and custom interfaces to all of the instruments on your production lines. With LAN capability, data can be directly imported into your PC applications, such as Microsoft Word, and Excel, or sent to a networked printer. You can also remotely troubleshoot test station problems from anywhere on the network by using any standard web browser.

With Instrument BASIC programming language (IBASIC), you can easily create custom test applications and user interfaces that include:

- Special softkey labels, graphical setup diagrams, and tailored user prompts
- Bar-code-reading capability for efficient tracking and documentation of individual device performance
- Control other test instruments via the LAN, GPIB, serial, or parallel interfaces
- For simpler applications, even those without programming expertise can use IBASIC as a keystroke recorder, to easily automate manual measurements.

Many manufacturing tests can be accomplished by merely recalling the appropriate instrument state, eliminating the need to change measurement parameters manually. Hundreds of instrument states can be programmed for a variety of uses. With Agilent's "fast-recall" feature, one of seven instrument states can be quickly recalled with a single softkey, or with a footswitch for hands-free switching during aligning or assembly operations.

Instrument states can include user-defined limit lines that let you easily and consistently compare measured data to test limits, providing automated pass/fail testing. The pass/fail results are displayed clearly on the instrument screen or external monitor to minimize operator errors or misinterpretation. Automated pass/fail testing eliminates the guesswork from your test processes and helps ensure that your components are aligned and tested to the same specifications at all test stations.

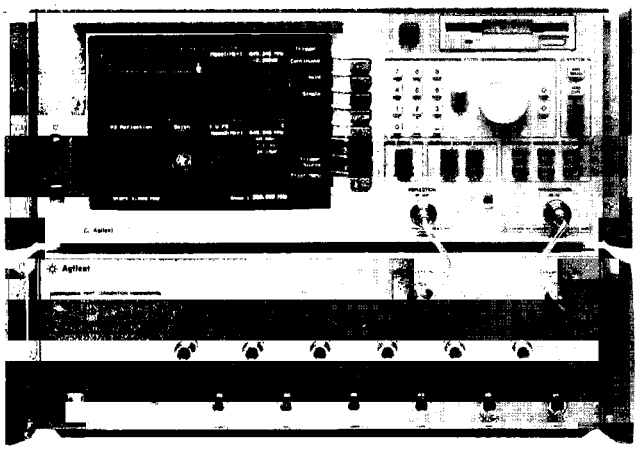
Speed up component test times by using the power of built-in data markers. Use the eight markers per channel to display data in absolute or relative terms. Or, perform automatic, real-time calculations of device characteristics such as maximum/minimum, center frequency, mean and standard deviation, peak-to-peak excursion, gain, slope and flatness, and filter 3-dB bandwidth, loss, and Q.

Comprehensive, Fast Cable Test

Option 100 adds fault-location and structural-return-loss (SRL) measurement capability for characterizing 50 Ω or 75 Ω cables that are still on a spool in a warehouse, or already installed on a cellular tower.

Agilent's fault-location option is easy to use and has many advantages over traditional time-domain reflectometry (TDR) techniques. You can also use the option to easily characterize the loss and velocity factors of your cables, and to accurately check the effect of cable damage by measuring SRL. Option 101 combines Option 100 with a rugged transport case to protect your instrument in the field during transport and operation.

8712ET
8712ES
8714ET
8714ES
87050E
87075C



87050E Option 12 and 8714ES

87050E and 87075C Multiport Test Sets

The 87050E (50 ohm) and the 87075C (75 ohm) multiport test sets are designed to work with the 8712E series of RF vector network analyzers to provide complete multiport measurement systems. The 87050E has specified performance from 3 MHz to 2.2 GHz, with typical performance to 3 GHz. The 50 ohm test set is offered in 4, 8 and 12-port options. The 87075C has a frequency range of 3 MHz to 1.3 GHz and is offered in 6- and 12-port options.

These systems dramatically increase measurement throughput by minimizing RF connections. Connect your device one time to measure all signal paths and ports. Reduce operator fatigue, misconnection rates, and the wear on cables, fixtures, and connectors as well. In addition, the 8712E series of network analyzers provides many productivity features that speed tune and test times, increase throughput, and simplify automation.

An 87050E or an 87075C coupled with an 8712E series network analyzer is the only low-cost, multiport test system with fully specified performance at the actual test ports, whether you measure in a fixture or at the end of test cables. Specified performances means you get the same measurement results on any test station, reduce measurement uncertainty to tighten your product specifications, and increase customer confidence in your products.

Innovative new calibration techniques save time and increase accuracy

Test Set Cal is an advanced calibration technique that eliminates the redundant connection of standards during a system calibration. Calibrating a multiport test set using two-port error correction and a traditional network analyzer requires a unique instrument state for each measurement path, forcing many redundant connections of calibration standards. As the number of ports increases, so does the number of connections required to calibrate all possible measurement paths. Full calibration of the 87050E and 87075C multiport test systems is quick and simple when performing a Test Set Cal:

- Connect short, open, and load standards only once to each measurement port
- Minimize the number of through standards required during calibration

In between Test Set Cals, the system can quickly recalibrate itself by using SelfCal. SelfCal is an internally automated calibration technique that uses solid-state switches to measure calibration standards located inside the test set. The network analyzer's firmware automatically controls the SelfCal process at an interval you define. SelfCal re-calibrates your multiport system to the same measurement accuracy achieved immediately after performing a Test Set Cal, thus reducing the effects of test-system drift and improving overall measurement accuracy between Test Set Cals. Using Test Set Cal and SelfCal, you can:

- Easily reduce your overall calibration times by a factor of twenty or more
- Increase the amount of time a test station can be used for measuring devices – typically, by three days per month!

Agilent-qualified Channel Partners provide measurement hardware and software solutions that combine with Agilent's network analyzer products to offer a complete solution for your testing needs. For additional information, please refer to page 337.

Detectors and Bridges

External detectors (50 Ω and 75 Ω) are available for remote device measurements.

86200B 50 Ω Scalar Detector

An external scalar detector for measuring 50 Ω devices.

86201B 75 Ω Scalar Detector

An external scalar detector for measuring 75 Ω devices.

Upgrade Kits

The following upgrade kits add optional measurement capability to existing 8712E series RF network analyzers.

To order, add a "U" to the end of the model number of the instrument to be upgraded, and specify one or more of these options:

Option 1E1 50 Ω Step Attenuator

Provides the necessary components to retrofit an 8712ET or 8714ET with a 60 dB step attenuator (for 50 ohm models only). Does not include installation. Requires recalibration.

Option UNE 75 Ω Step Attenuator

Provides the necessary components to retrofit an 8712ET or 8714ET with a 60 dB step attenuator (for 75 ohm models only). Does not include installation. Requires recalibration.

Option 099 Firmware Upgrade

Upgrade to the latest version of firmware. Does not include installation.

Option 100 Fault Location/SRL

Provides cable-measurement software. Does not include transport case. Does not include installation.

Option 101 Transport and Operating Case and Fault Location/SRL

Combines transport and operation case with Option 100. Does not include installation.

Transit Cases

Agilent offers a complete line of sturdy transit cases in Valise and Tote styles. The cases protect your instrument from shock, vibration, moisture, impact, and contamination, providing a secure enclosure for shipping. Model 9211-2656 (standard) or model 9211-7481 (tote) fit the 8712ET/ES and 8714ET/ES.

Key Literature

8712ET/ES and 8714ET/ES Brochure, p/n 5967-6316E
8712ET/ES and 8714ET/ES Technical Specifications, p/n 5967-6314E
8712ET/ES and 8714ET/ES Configuration Guide, p/n 5967-6315E
87050E Brochure, p/n 5968-4763E
87050E Technical Specifications, p/n 5968-4764E
87050E Configuration Guide, p/n 5968-4765E
87075C Brochure, p/n 5968-4766E
87075C Technical Specifications, p/n 5968-4767E
87075C Configuration Guide, p/n 5968-4768E

For more information, visit our web site:
http://www.agilent.com/find/ena

	8712ET 8712ES		8714ET 8714ES	
Impedance	50 ohm	75 ohm (Option 1EC)	50 ohm	75 ohm (Option 1EC)
Minimum frequency	300 kHz	30 0kHz	300 kHz	300 kHz
Maximum frequency	1.3 GHz	1.3 GHz	3.0 GHz	3.0 GHz
Frequency resolution	1 Hz	1 Hz	1 Hz	1 Hz
Max. source power				
ET (<1 GHz/>1 GHz)	16 dBm/13 dBm	13 dBm/10dBm	11 dBm/10dBm	8 dBm/7dBm
with Option 1E1	15 dBm/12 dBm	12 dBm/9 dBm	10 dBm/9 dBm	7 dBm/6dBm
ES (<1 GHz/>1 GHz)	13 dBm/10 dBm	10 dBm/7dBm	9 dBm/7dBm	6 dBm/4dBm
Min. source power				
ET	0 dBm	–3 dBm	–5 dBm	–8 dBm
with Option 1E1	–60 dBm	–60 dBm	–60 dBm	–60 dBm
ES	–60 dBm	–60 dBm	–60 dBm	–60 dBm
Power resolution	0.01 dBm	0.01 dBm	0.01 dBm	0.01 dBm
Power flatness				
ET	± 1.0 dB	± 1.5 dB	± 1.0 dB	± 1.5 dB
with Option 1E1	± 2.0 dB	± 3.0 dB	± 2.0 dB	± 3.0 dB
ES	± 2.0 dB	± 3.0 dB	± 2.0 dB	± 3.0 dB
Power sweep range	13 dB	13 dB	15 dB	15 dB
System dynamic range				
ET (narrowband/broadband)	>115 dB/>62 dB	>113 dB/>56 dB	>114 dB/>59 dB	>110 dB/>53 dB
with Option 1E1	>115 dB/>60 dB	>110 dB/>53 dB	>112 dB/>57dB	>107 dB/>50 dB
ES (narrowband/broadband)	>104 dB/>46 dB	>99 dB/>39 dB	>101 dB/>43 dB	>96 dB/>36 dB
Test port connector	Type-N (f)	Type-N (f)	Type-N (f)	Type-N (f)

Data applies at 25° C ±5° C. See product literature for more complete specifications and for total measurement uncertainty after error correction.

Size: 179 mm H x 425 mm W x 514 mm D (7.0 in x 16.75 in x 20.25 in)
Weight: 20.5 kg (45 lb) net; 27 kg (59 lb) shipping

Network Analyzers

RF Network Analyzers, 300 kHz to 3 GHz (cont.)

Ordering Information	Price
Note: A complete system consists of a network analyzer, calibration kit, and cables. Calibration kits and cables can be found in the Accessories section beginning on pg. 299.	
8712ET Network Analyzer	$9,750
8712ES Network Analyzer	$15,750
8714ET Network Analyzer	$16,250
8714ES Network Analyzer	$22,250
The following options apply to all three network analyzers:	
Opt 1EC 75 Ω Impedance	$0
Opt 1E1 60 dB Attenuator (ET models only)	+$1,520
Opt 1CL DIN Keyboard	+$98
Opt 1CM Rackmount Kit	+$78
Opt 100 Fault Location/SRL	+$1,550
Opt 101 Transport and Operating Case plus Fault Location/SRL	+$2,050
Opt AFN 50 Ω Economy Cable	+$129
Opt AFP 75 Ω Economy Cable	+$129
Opt B20 50 Ω Precision Cable	+$250
Opt B21 75 Ω Precision Cable	+$490
87050E Multiport Test Sets	
Opt 004 4 ports	$8,250
Opt 008 8 ports	$11,250
Opt 012 12 ports	$14,250
87075C Multiport Test Sets	
Opt 006 6 ports	$8,500
Opt 012 12 ports	$12,500
Upgrades for ET and ES models (Add "U" to model number)	
Opt 1E1 50 Ω Step Attenuator (ET only)	$2,050
Opt UNE 75 Ω step attenuator (ET only)	$2,050
Opt 099 Firmware Upgrade Kit	$102
Opt 100 FL/SRL Upgrade Kit	$1,530
Opt 101 Transport Operating Case plus FL/SRL Upgrade Kit	$2,030
Upgrades for C models	
86226C Firmware Upgrade Kit	$103
86227C LAN Upgrade Kit	$515
Accessories	
86200B 50 Ω Scalar Detector	$824
86201B 75 Ω Scalar Detector	$824
Transit Cases	
9211-2656 Standard Transit Case	$875
9211-7481 Tote-Style Transit Case	$1,450