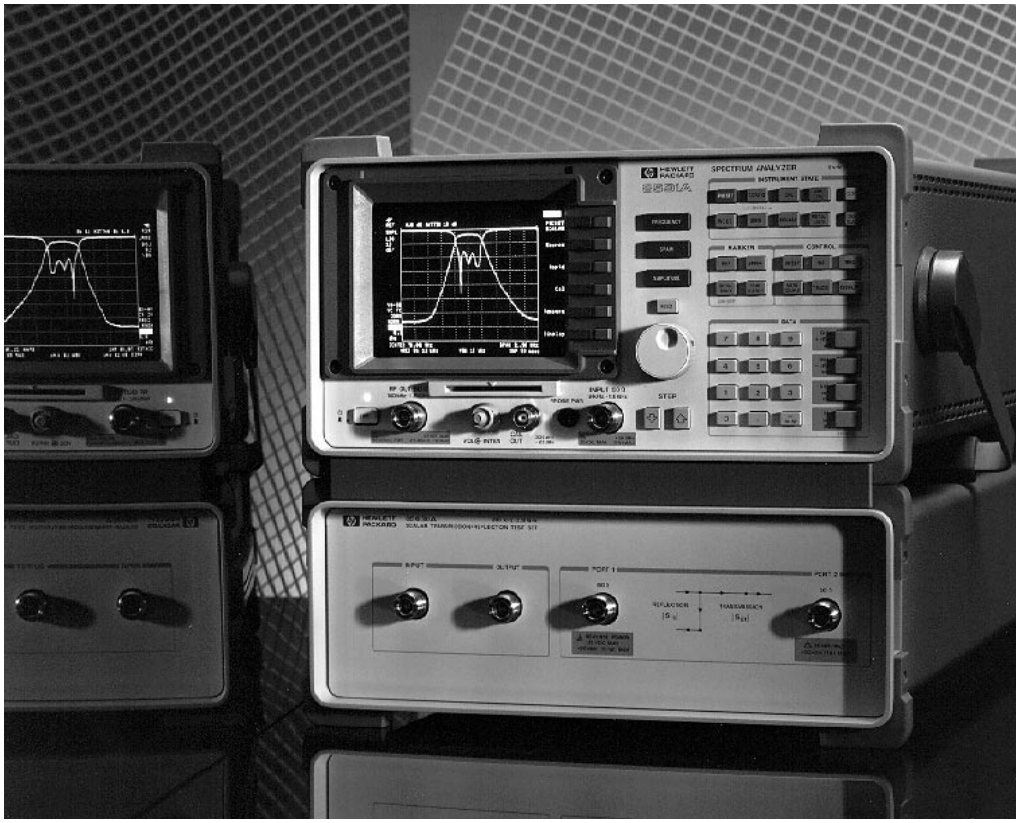
HEWLETT® PACKARD

Scalar Network Analysis with the HP 8590 Series Spectrum Analyzers

Product Overview

HP 85714A Scalar Measurements Personality

HP 85630A Scalar Transmission/Reflection Test Set



Scalar Analysis
300 kHz to 2.9 GHz

Spectrum Analysis
9 kHz to 26.5 GHz

HP 8590 Series Scalar/Spectrum Measurement Solution

Simple Softkey Operation
Combined softkey and hardkey operation for ease of use.

Mode/Personality Indicator
Active measurement personality easily identified.

Trace Positioning
Access to reference level, autoscaling, log scale, and normalized reference position.

Scalar or Spectrum Analysis
Easy switching between measurement modes.

Guided Calibration
Simple "thru" and "open/short average" calibration for normalized measurements.

Source Power Control
0 to 60 dB step attenuator in the HP 8591A or 0 to 70 dB step attenuator in the HP 85630A.

Printer Output
Hardcopy outputs of fully annotated displays.

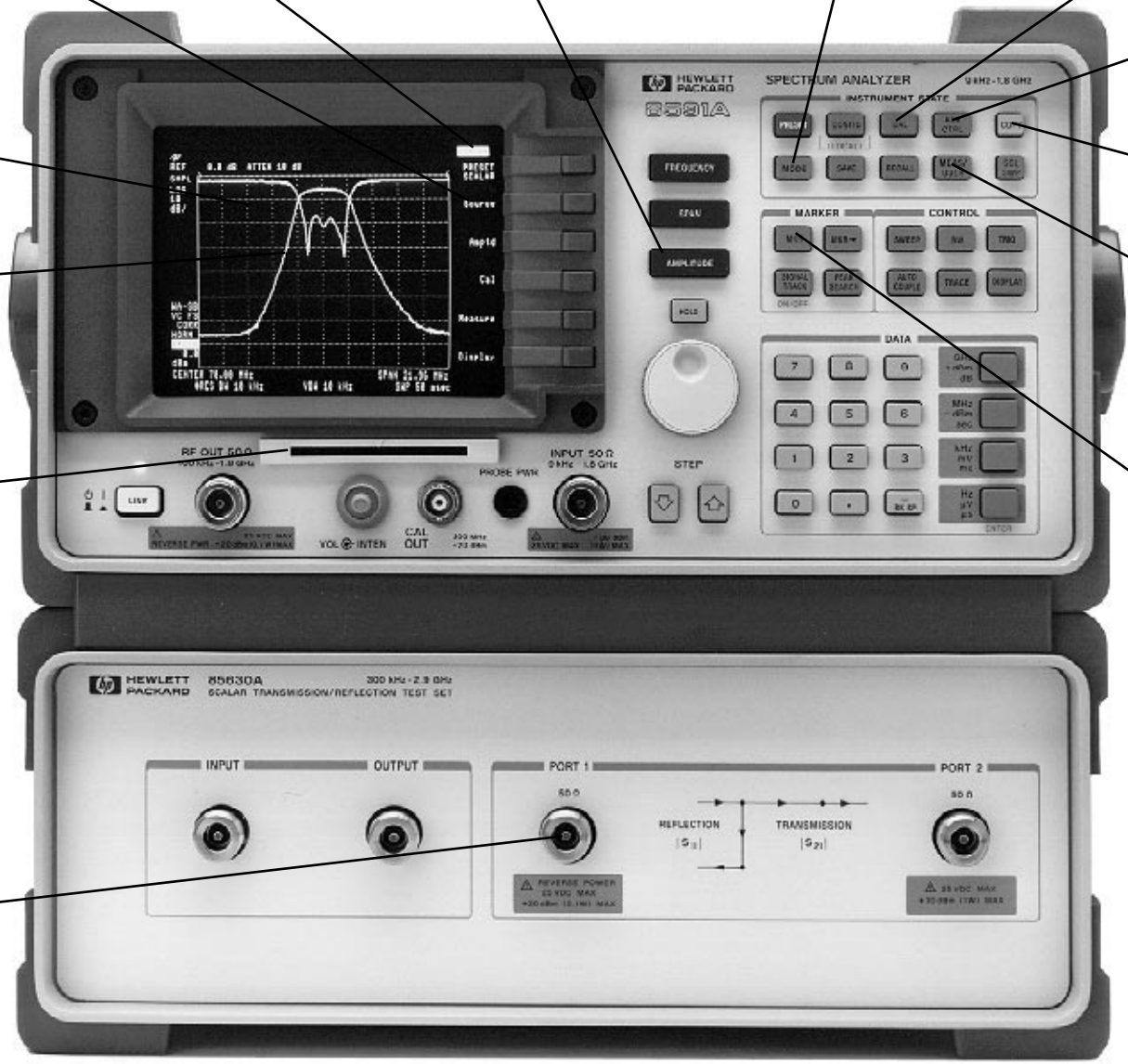
Onscreen Results
Measurement results calculated and displayed.

Three Additional Displays to Choose From
Simultaneous transmission/ reflection, extended 120 dB, or tabular data display.

Automatic Filter/Amplifier Measurements
Measurements such as 3 dB bandwidth and insertion loss/ gain with results displayed onscreen.

Built-in Memory Card Reader
Memory cards store measurement setups, data, and limit lines.

Easy Data Analysis
Markers to measure transmission and reflection coefficients, VSWR, frequency, and power.



50 Ohm Type N Measurement Ports
Two measurement ports allow a single test setup for transmission and reflection measurements.

Scalar analysis with HP 8590 series spectrum analyzers . . . a cost effective solution

Features

- **Simultaneous Transmission /Reflection Display**
- **Guided Calibration**
- **Pass /Fail Limit Line Testing**
- **120 dB Display**
- **One-Button Measurements**
  3 dB or 6 dB Bandwidth
  Q Factor
  Shape Factor
  Insertion Loss/ Gain
- **Marker Measurements**
  Frequency
  Power
  Return Loss
  VSWR
  Reflection / Transmission Coefficients

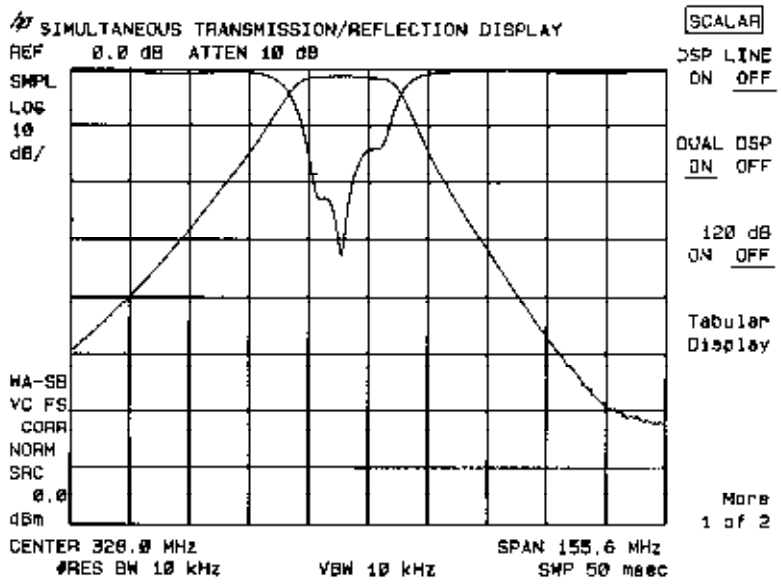
HP 8590 series spectrum analyzers offer an economical and powerful solution for both your scalar network analysis and spectrum analysis needs. Add an HP 85714A scalar measurements personality and HP 85630A scalar transmission/ reflection test set to an HP 8590 series analyzer with optional built-in tracking generator, and you'll be performing fast and accurate scalar measurements from 300 kHz to 2.9 GHz.
HP 8590 series spectrum analyzers are available from 9 kHz to 1.8, 2.9, 6.5, 12.8 or 26.5 GHz, depending on your application needs.

With a wide combination of products and options available, the HP 8590 series provides a versatile and easy-to-use scalar measurement solution.

Capabilities include simultaneous transmission/reflection display, pass/fail testing using limit lines, and a 120 dB display for high dynamic-range measurements. Powerful one-button measurements provide onscreen results for test routines such as bandwidth, insertion loss/gain, Q, center frequency, and shape factor. To make testing even easier, HP 8590 series spectrum analyzers include guided OPEN/ SHORT average and THRU calibrations, and markers that readout frequency, power, return loss, VSWR, reflection coefficient, transmission coefficient, and insertion loss/gain. This broad range of transmission and reflection measurement capability is ideal for general-purpose component, sub-system, and system testing.

Simultaneous transmission/ reflection display
View transmission and reflection trace data simultaneously on the display of the analyzer. You'll be able to adjust insertion loss on a filter while monitoring the effect on return loss.

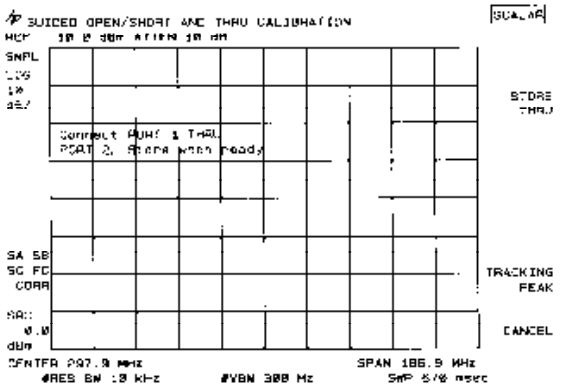
The scalar/spectrum measurement solution accomplishes these measurements by switching the test set between transmission and reflection mode and updating the data on alternate sweeps. Fast, internal solid-state switching effectively allows a real-time update.



The fast update in the simultaneous transmission/reflection display effectively allows for real-time measurements.

Guided Calibration

Accurate measurements require calibration. Guided calibration procedures lead any user through OPEN/SHORT average calibration for reflection measurements and THRU calibration for transmission measurements. And you won't have to re-calibrate every time you change measurement conditions; up to 10 sets of calibration data can be saved and recalled. You can change the log scale factor at any time from 0. 1 dB to 15 dB per division without affecting the calibration.

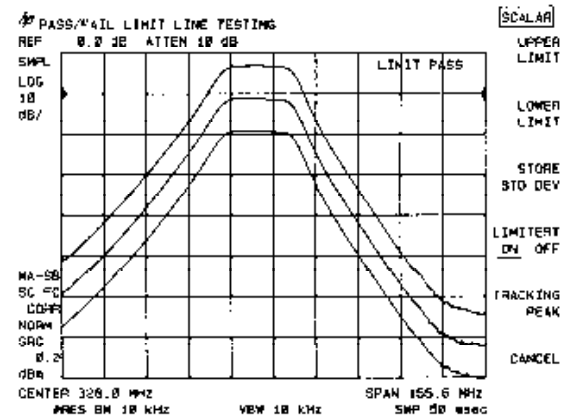


Onscreen message prompts lead the user through calibration procedures.

Pass/Fail Limit Line Testing

Results from limit-line testing are displayed directly on the screen. You'll be able to determine instantly whether the device passed or failed the specified limits.

Since limit-lines are electronically drawn and the limit comparison is performed by the analyzer, you can be assured that your device is being consistently tested to the same specifications.

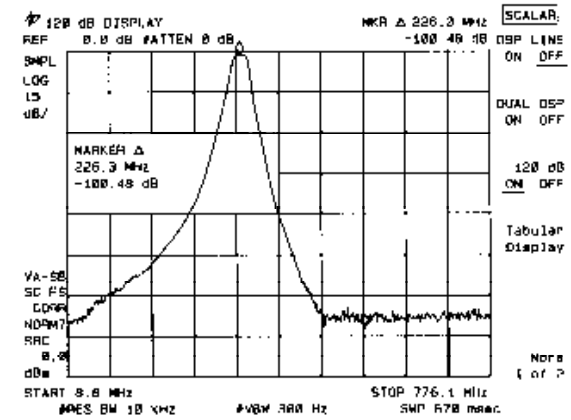


Automatically create pass/fail limit lines with the cal standard device function for fast and accurate testing.

The "cal standard device" function uses your reference or standard device to automatically create upper and lower limit lines based upon the device's response. Or, you can use the built-in capability of the analyzer to create limit-lines to your specifications.

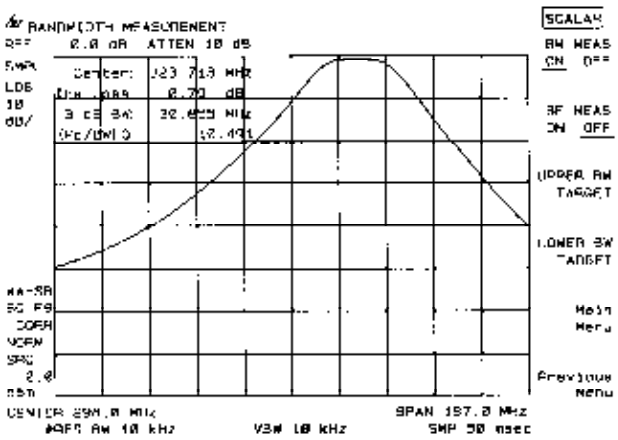
High Dynamic Range – 120 dB Display

The combined spectrum analyzer and tracking generator permits a dynamic range of greater than 100 dB. A wide dynamic range is especially useful in measuring filter rejection and switch isolation. The full measurement range can be displayed with the 120 dB display function.



The 120 dB extended display function allows for easy measurement of devices that require the full dynamic range capability of the spectrum analyzer and tracking generator.

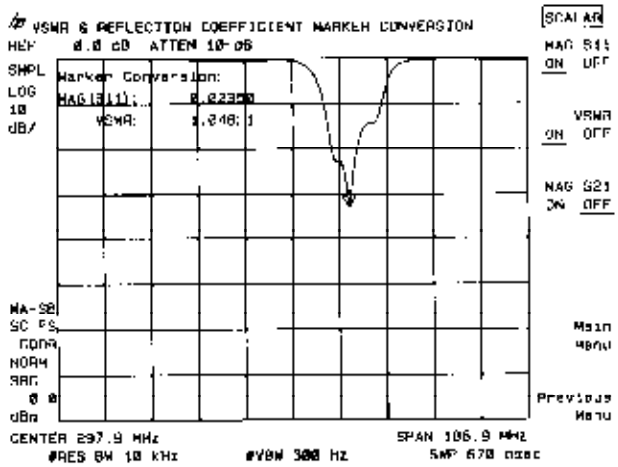
One-Button Measurements
With the bandwidth-measure ment function, you can measure the 3 dB, 6 dB, or any specified bandwidth. Insertion loss, center frequency, and Q are displayed along with the bandwidth. All measurement results are updated with each sweep, ideal for making real-time adjustments to devices.



Continuous update of measurement results enables the user to make adjustments to a device and view the real-time effects.

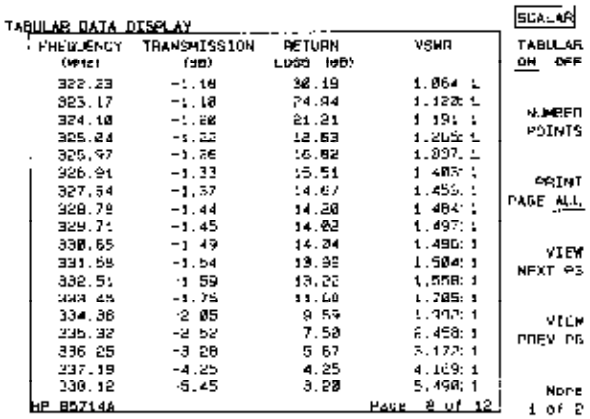
Data Output
Data, most often presented using onscreen traces, can also be read using markers. Markers normally read the frequency and amplitude, but the scalar personality has functions to convert data to readout in transmission coefficient, insertion loss/gain, reflection coefficient, and VSWR.

If you prefer numerical information, you can choose an alternate tabular display format. You can specify up to 401 data points to be displayed. Tabular data can be sent directly to a printer for hardcopy output.



Marker measurement functions convert the marker value to the selected units and display the result on screen, as shown by the VSWR function.

Programmability
Improve test efficiency and reduce test time by programming your analyzer for your specific tests. The new measurement features included in the scalar personality are programmable over the HP-IB or RS-232 interfaces, as are all front-panel functions of the HP 8590 series.



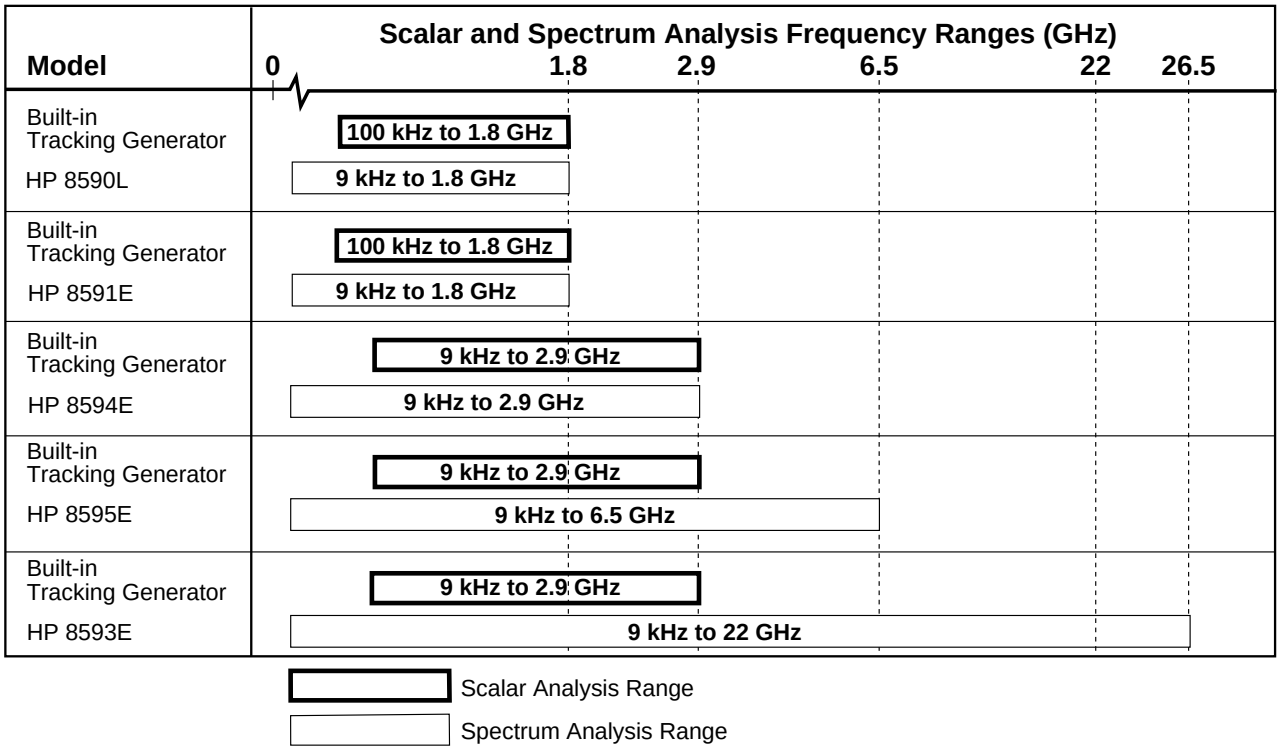
Numeric tabular data can be displayed and easily sent to a printer for hardcopy records.

Use the HP 85714A scalar measurements personality to enhance the transmission measurement capability of the HP 8590 series spectrum analyzers and tracking generator. Or, add the HP 85630A to enhance both transmission and reflection capability.

HP 85714A Scalar Measurements Personality
One of a series of application-specific downloadable programs for the HP 8590 series spectrum analyzers, the HP 85714A scalar measurements personality provides the user interface for the scalar measurement capabilities and the accessory scalar test set.

For greater measurement flexibility, the scalar personality can operate independent of the scalar test set, with just the spectrum analyzer and tracking generator combination. So, the scalar personality meets your needs whether you are interested in transmission measurements only, or both transmission and reflection measurements but want to use your own signal separation device (bridge or coupler). Both configurations let you perform the same measurements; however, the simultaneous transmission/reflection display function requires the scalar test set.

Fully Capable Spectrum Analyzer
Even when you consider all this scalar measurement capability, you shouldn't forget that this system is spectrum-analyzer based. The spectrum analyzer provides important benefits – a thorough analysis of components, sub-systems, and systems requires spectrum-measurement capabilities. You can easily perform harmonic, intermodulation distortion, noise, spur, frequency, and power testing. Each of these measurements is among those measurements for which the HP 8590 series of analyzers are designed.



System Characteristics

Characteristics provide information about non-warranted instrument performance in the form of nominal values. These values are based on estimated worst-case system performance.

	Configuration HP 8591E Opt. 010 HP 85630A HP 85714A (f_{MAX} = 1.8 GHz)	 HP 8594E Opt. 010 HP 85630A Opt. 001 HP 85714A (f_{MAX} = 2.9 GHz)
Directivity		
300 kHz to 1.2 GHz	37.6 dB	37.6 dB
1.2 GHz to f_{MAX}	35.8 dB	35.8 dB
Port 1 Effective Source Match (10 dB Source Atten or Port 1 Atten)		
300 kHz to 1.2 GHz	18.2 dB	19.2 dB
1.2 GHz to f_{MAX}	17.5 dB	18.5 dB
Port 2 Input Match (10 dB Input Atten. Spectrum Analyzer)		
300 kHz to 1.2 GHz	15.3 dB	15.3 dB
1.2 GHz to f_{MAX}	12.0 dB	12.0 dB
Dynamic Range		
300 kHz to 1.2 GHz	86 dB	91 dB
1.2 GHz to f_{MAX}	83 dB	95 dB
100 kHz to 1.8 GHz	106 dB[1]	
300 kHz to 2.9 GHz		113 dB[1]
Isolation		
300 kHz to 1.2 GHz	100 dB	l00 dB
1.2 GHz to f_{MAX}	97 dB	97 dB
Sweep Time (10 kHz RBW, 10 kHz VBW)	50 ms/401 pts	58 ms/401 pts
Frequency Accuracy Readout Accuracy (Start, Stop, Center, Marker)		
Freq Span ≤l0 MHz	±(freq readout x freq reference error[2] + 3.0% of span +20% of RBW + 100 Hz)	
Freq Span >10 MHz	±(freq readout x freq reference error[2] +3.0% of span +20% of RBW)	
Amplitude Accuracy (After normalization, with pre-normalized trace starting at reference level)		
Log Incremental Acc.	±0.2 dB/2 dB, 0 to –70 dB from ref. level	
Log Max. Cumulative	±0.75 dB, 0 to –60 dB from ref. level ±1.0 dB, 0 to –70 dB from ref. level	

1. This range available when bypassing the HP 85630A and connecting DUT between tracking generator output and spectrum analyzer input.
2. Refer to spectrum analyzer datasheet.

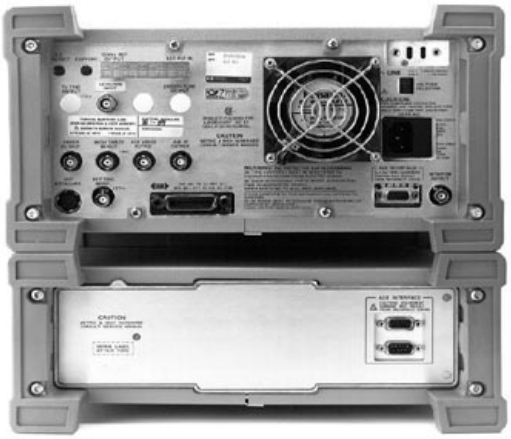
HP 85630A Specifications

Specifications describe the instrument's fully warranted performance.

Frequency Range 300 kHz to 2.9 GHz	
Port Match	
RF Input	
300 kHz to 1.2 GHz	>20.5 dB
1.2 GHz to 2.9 GHz	>19.7 dB
RF Output	
300 kHz to 1.2 GHz	>18.2 dB
1.2 GHz to 2.9 GHz	>16.9 dB
Port 1	
300 kHz to 1.2 GHz	>18.5 dB
1.2 GHz to 2.9 GHz	>16.3 dB
Port 2	
300 kHz to 1.2 GHz	>18.5 dB
1.2 GHz to 2.9 GHz	>16.3 dB
Insertion Loss	
RF Input to Port 1	<10 dB
RF Output to Port 2	<10 dB
Directivity	
300 kHz to 1.2 GHz	>35 dB
1.2 GHz to 2.9 GHz	>30 dB
Isolation	
RF Input to RF Output	>100 dB

General

Port Connectors	50 Ω Type N (f)
Operating Level	
RF Input	+30 dBm (1 watt) CW
Port 1	25 VDC, +20 dBm (0.1W)
Power	+15 VDC, –15 VDC, +5 VDC
Dimensions	340 (W) x 140 (H) x 465 (D) mm (13.5 x 5.6 x 18.3 in)
Weight	6.8 kg (15 lbs) net



HP 85630A Rear Panel

HP 8590 Series Scalar/Spectrum Measurement Solutions Comparison Table

Feature	HP 8590 Series Spectrum Analyzer and Tracking Generator	HP 85714A Scalar Measurements Personality HP 8590 Series Spectrum Analyzer and Tracking Generator	HP 85630A Scalar Transmission/Reflection Test Set HP 85714A Scalar Measurements Personality HP 8590 Series Spectrum Analyzer and Tracking Generator
Limit Lines	•	•	•
Normalization	•	•	•
> 80 dB Dynamic Range	•[1]	•[1]	•
Log Scale 0.1 to 15 dB/division	•	•	•
Guided "Thru" Calibration		•	•
Guided "Open/Short" Calibration		2	•
Autoscaling		•	•
Cal Data Storage/Recall		•	•
One Button Center Frequency Measurement		•	•
One Button Insertion Loss/Gain Measurement		•	•
One Button 3 dB or X dB Bandwidth Measurement		•	•
One Button Shape Factor Measurement		•	•
120 dB Extended Display		•	•
Tabular Data Display		•	•
Transmission Coefficient Measurement Marker		•	•
Reflection Coefficient Measurement Marker		2	•
VSWR Measurement Marker		2	•
Return Loss Measurement		2	•
Simultaneous Transmission/Reflection Display			•
Automatic Switching Between Transmission and Reflection			•
Source Attenuation	3		•

1. Actual dynamic range capability >100 dB.
2. Available, but signal separation device required for measurement.
3. Available in HP 8591 Option 010

Ordering Information

HP 85714A Scalar measurements personality
HP 85630A Scalar transmission/reflection test set[1]
Option 001 70 dB built-in attenuator
Option 910 Extra manual set (operation and service)

Compatible spectrum analyzers[2]
HP 8590L, 8591E, 8593E, 8594E, 8595E, or 8596E
Portable spectrum analyzers

Required spectrum analyzer options
Option 003 Memory card reader (HP 8590L only)
Option 010 Built-in tracking generator (50 ohm)

Recommeded accessories
HP 85032B 50 ohm Type N calibration kit
HP 11853A 50 ohm Type N accessory kit
HP 11851A 50 ohm Type N RF cable kit
HP C1405B Keyboard (requires HP C1405-60015 adapter)
HP C2184A HP DeskJet 600 printer[2]
HP 85700A 32 Kbyte RAM memory card
HP 85702A 128 Kbyte RAM memory card
HP 11852B minimum loss pad 50 ohm (f); 75 ohm (m), Type N
HP 11852B Option C04 minimum loss pad 50 ohm (m); 75 ohm (f), Type N
8120-4781 Type N Test port cable

Other measurement personalities
HP 85721A CATV measurements personality
HP 85712B EMC measurements personality
HP 85713A Digital radio measurements personality
HP 85715B GSM measurements personality

Accessories supplied with HP 85630A
5041-8971 Stacking support shoe
8120-5343 9-pin rear panel interconnect control cable
85630-20017 Input interconnect cable
85630-20018 Output interconnect cable

For more information on the HP 8590 series of spectrum analyzers, refer to product brochure (literature number 5091-3271E), individual data sheets HP 8590L (literature number 5962-7275E), and ordering guide (literature number 5963-6858E).

1. Requires HP 85714A for operation and must be ordered separately.
2. Requires Option 041 or 043 on spectrum analyzer.

For more information on Hewlett-Packard Test & Measurement products, applications or services please call your local Hewlett-Packard sales offices. A current listing is available via Web through AccessHP at http://www.hp.com. If you do not have access to the internet please contact one of the HP centers listed below and they will direct you to your nearest HP representative.

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