Agilent

# 8753ET and 8753ES *RF Vector Network Analyzers*

Product Overview

Powerful Solutions
for Tough Measurement Problems


Agilent Technologies
Innovating the HP Way

## What's new in the 8753ET/ES analyzers?

- **Electronic calibration made simpler**
  Perform fast, accurate, automatic calibrations with Agilent's ECal products. Control ECal modules directly with the 85097A control unit without an external PC.

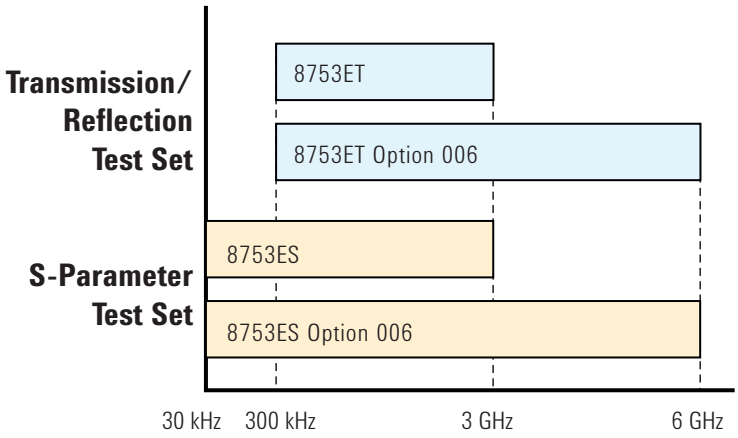
- **Enhanced response calibration**
  With enhanced response calibration, you'll improve the accuracy of your transmission measurements without sacrificing measurement speed. Enhanced response calibration corrects for the effects of source match without a full two-port calibration.

- **Easier-to-use four-parameter display**
  All four display channels can be used without performing a full two-port calibration. Access channels 3 and 4 more easily with new front panel keys.

- **Improved user interface**
  Front panel keys also give you faster access to the power menu and the marker search functions. The **Return** key brings you quickly back to the prior menu.

- **Configurable test set**
  The 8753ES Option 014 offers you many ways to customize your test set for applications such as high power testing, high dynamic range measurements, and mixer measurements.

# Now...more choices for solving your measurement challenges




**The 8753ET and 8753ES analyzers offer choices to fit your performance and budget needs.**

The world's most popular network analyzer offers more choices than ever to meet your measurement needs. You can now choose either the Agilent 8753ES – which offers the same integrated S-parameter test set found in the Agilent 8753E – or the Agilent 8753ET, with its more economical transmission/reflection test set.

The 8753ET replaces the 8752C analyzer and provides a wide range of transmission and reflection measurements of devices in the forward direction. The 8753ES allows you to measure both the forward and reverse characteristics of most components with a single connection, and provides full two-port calibration for high measurement accuracy. Test set options[1] give you more flexibility in configuring the 8753ES for your application.

Both the 8753ET and 8753ES analyzers cover frequency ranges to 3 or 6 GHz and offer up to 110 dB of dynamic range. Frequency and power sweeps allow you to characterize the linear and nonlinear behavior of most active and passive components with magnitude and phase information, absolute power, gain compression, group delay, and time-domain measurements. With their superb measurement accuracy, fast measurement and data transfer speed, and thoughtfully-designed productivity features, 8753ET and 8753ES analyzers are excellent tools to help you improve your designs in R&D or maximize your measurement throughput in manufacturing.

1. Priced separately

# An unbeatable combination of speed and performance

## Minimize test time

The 8753ET/ES analyzers provide rapid sweep speeds for real-time tuning, and fast register recalls and data transfers to help minimize your test time.

## Display it all

The 8753ET/ES analyzers have two in dependent measurement channels. Each channel can have different stimulus settings, such as start and stop frequencies and number of points. View the measurement results using up to four display channels in split or overlaid mode on the built-in color LCD, or use the VGA-compatible display output to drive a larger external monitor. You can display any combination of reflection and transmission parameters in magnitude, phase, group delay, Smith chart, polar, SWR or time-domain formats.

## Improve your measurement accuracy with a variety of calibrations

Improve accuracy with a broad range of calibration techniques. Enhanced response calibration helps decrease the effects of source match on transmission measurements, providing improved accuracy over a simple response calibration. The 8753ES also offers full two-2-port calibrations for optimum accuracy. Use short-open-load-through calibration in coaxial environments, or TRL*/LRM* calibration[2] for non-coaxial environments such as microstrip fixtures. Adapter-removal calibration is available on the 8753ES to provide better accuracy for measuring most non-insertable devices.

## Power to the network analyzer

An Agilent 8753ET and 8753ES network analyzer captures key measurement data; Agilent IntuiLink software allows that data to be put to work effortlessly. IntuiLink provides easy access to measurement data and images from *within* your standard PC applications. You work in a familiar environment at all times, using PC applications such as Microsoft Excel® or Word® to transfer, display, print, and document the data you get from the network analyzer. The IntuiLink application toolbar makes it easy, providing a simple way to download data and screenshots into a spreadsheet or document. Programmers can use ActiveX to control instruments directly using high-level toolbar functions. IntuiLink brings the barriers down, simplifying the way you do your job. For additional information, go to: www.agilent.com/find/IntuiLink

## Leverage your current investment

The 8753ES analyzer has GPIB commands and front-panel features that are compatible with the 8753E. This backward compatibility means you can easily transition to the new model while leveraging your investment in software and operator training[3]. The 8753ET has a more limited feature set than the 8753ES, but is similar to the 8753ES and just as easy to use.

2. TRL*/LRM* is a special implementation of TRL/LRM calibration, modified for the three-sampler receiver in the 8753ES.

3. Agilent stries to deliver the highest degree of backward compatibility; however, full backward compatibility is not guaranteed.

# Expand your measurement capabilities with these options[4]

**Option 014 allows access to test set signal paths for flexible configurations.**

## Extend the frequency range with Option 006

Option 006 allows you to characterize components up to 6 GHz.

## Use time-domain analysis with Option 010

Option 010 allows you to locate and resolve most discontinuities and mismatches in your test device, fixture, or cable versus distance. Gain more insight into the behavior of your device by displaying the step response, or use gating to remove unwanted responses such as connector mismatch. Simplify tuning of cavity-resonator band-pass filters by using time-domain analysis to identify the resonators and coupling apertures that need to be adjusted and to show when they are properly tuned.

## Display harmonic measurements with Option 002

With Option 002, you can display swept second and third harmonic measurements of your amplifier, either directly or relative to the fundamental carrier (dBc), to levels as low as –40 dBc.

## Customize your test set configurations (8753ES only)

Option 014 provides front-panel access to many points in the test set signal paths for customizing your network analyzer. For example, you can insert an amplifier in the source path for higher output power, bypass the couplers and put signals directly into the samplers for better sensitivity, or reverse the port 2 coupler for higher dynamic range in the forward direction. You can also delete the built-in S-parameter test set with Option 011 and add a separate dedicated test set.

## Extend source power range with Option 004 (8753ET only)

Option 004 adds a step attenuator to the source in the 8753ET analyzer, extending the output power range. The step attenuator is standard in the 8753ES.

## Improve frequency stability with Option 1D5

Option 1D5 improves the frequency accuracy of your measurements by adding a high-stability frequency reference.

4. Most options are priced separately.

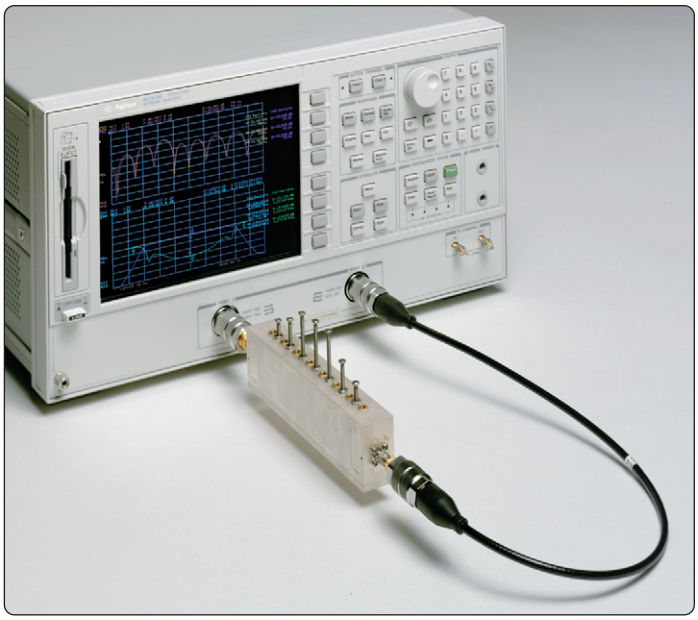
# Everything you need for powerful analysis of RF components

The 8753ET/ES analyzers provide quick, high-performance measurements for a broad range of devices used in today's RF communications, aerospace/defense, and consumer electronics industries, including filters, duplexers, amplifiers, mixers, cables, and antennas. These network analyzers are the ideal tools for characterizing your devices, whether you are in R&D or high-volume manufacturing.

## Filter measurements

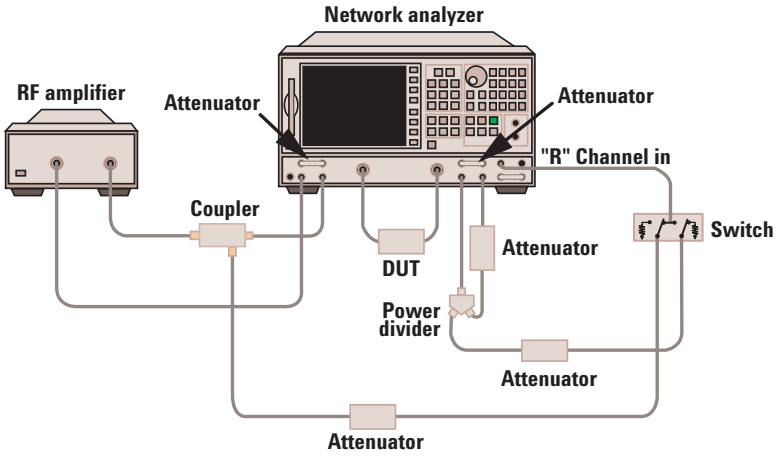
The 8753ET/ES analyzers provide up to 110 dB of dynamic range and a synthesized source with 1 Hz resolution for accurate measurements of many narrowband devices such as resonators, filters, and duplexers. Use swept-list frequency mode to optimize measurement speed and accuracy by setting up sweep segments with independent numbers of points, IF bandwidths, and power levels. This allows the analyzer to sweep quickly using wide IF bandwidths in segments where high dynamic range is not needed, and to use slower narrow IF bandwidths only in segments where higher dynamic range is critical.

Marker functions such as marker search, 3 dB bandwidth, center frequency, and passband ripple help minimize adjustment time.

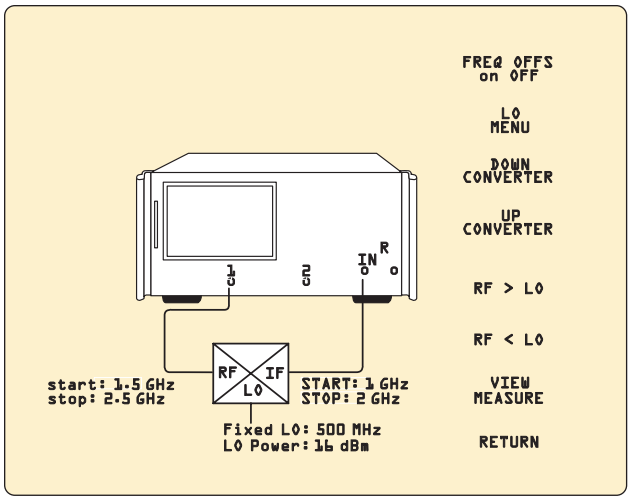


**Use time-domain to simplify tuning of cavity-resonator bandpass filters.**

Combine the 8753ES with the optional time-domain capability to provide a simple, deterministic method for tuning cavity-resonator bandpass filters. Viewing the filter's reflection response in the time-domain and comparing it with the response of a properly tuned filter helps reveal which resonators or coupling adjustments need to be tuned and how to tune them. This capability makes it easy to train new personnel, and simplifies fine-tuning and troubleshooting of these filters, even for experienced filter tuners.




High-power measurement setup using 8753ES Option 014.




8753ES mixer measurement menu.

## Amplifier measurements

Frequency and power sweeps enable the 8753ET/ES analyzers to measure amplifier gain, return loss, reverse isolation, gain compression, and AM-PM conversion. These analyzers also provide power meter calibration to accurately set the source power level and receiver calibration for excellent absolute power measurement accuracy. With Option 002, you can measure the swept second and third harmonics of most amplifiers by pressing a single button. The 8753ES Option 014 allows you to add an external amplifier to increase the power to the device under test, or to add attenuators or isolators in the input path for testing high-power amplifiers.

Protect your network analyzer in high-power applications with the 11930 RF limiter. This optional accessory attaches to one or both ports of the analyzer to protect against potential high-power transients from external devices that may cause hardware failures.

## Mixer measurements

The 8753ET/ES analyzers have a frequency offset mode that allows the receiver frequency to be offset from that of the internal synthesized source. This helps you test the transmission characteristics of mixers (conversion loss, amplitude and phase tracking, and group delay). You can stimulate the device with the analyzer's source as the RF input and a fixed LO signal from an external source, and measure the swept IF with the network analyzer's receiver. Test sequencing or a computer can be used to control the LO frequency over GPIB for swept LO/fixed IF measurements. Power meter calibration and receiver calibration can be used to improve the accuracy of the measurement.

### Measure balanced components with exceptional accuracy

The ATN-4000 series of multiport test systems from ATN Microwave combines an 8753ES with a four-port test set and Windows®-based software. These systems measure a wide range of devices with up to two balanced ports or four single-ended ports, including baluns, balanced transmission lines, and power dividers/combiners. You can make both differential and common-mode measurements on these balanced devices. The test systems incorporate full four-port error correction to provide exceptional measurement accuracy.

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85 Rangeway Road
N. Billerica, MA 01862-2105
Telephone: (978) 667-4200
Fax: (978) 667-8548
website: www.atnmicrowave.com

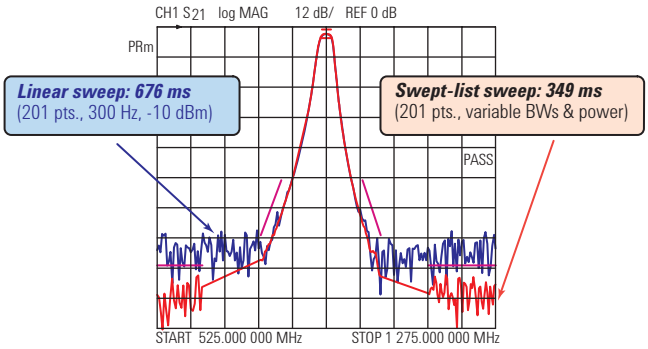
### Need test fixtures?

For information about test fixtures for your measurement systems, ask for Agilent literature number 5962-9723E or contact:

**Inter-Continental Microwave**
1515 Wyatt Drive
Santa Clara, CA 95054, USA
Telephone: (408) 727-1596
Fax: (408) 727-0105
website: www.icmicrowave.com
E-mail: icmfixture@aol.com

## It's about speed and precision

**Rely on the analyzer for pass/fail testing**
Help reduce test time and improve measurement consistency by letting the network analyzer determine whether measurement results are within the user-defined limits. The pass/fail test result is indicated visually on the display, audibly with a beep, over GPIB, and from a BNC rear-panel TTL output, which can be used as an input for automated part handlers.




**A filter measurement made using swept-list mode with five customized sweep segments can be much faster than using simple linear frequency sweep.**

## Optimize throughput and accuracy with swept-list frequency mode

Speed up your testing by measuring your device only at selected frequencies. You can define up to 30 CW frequencies or frequency sweep segments, each with its own frequency range, number of points, IF bandwidth and power level. Optimize each segment for your test requirements by using narrow IF bandwidths, or measure numerous data points only when necessary.

## Automate repetitive tasks with test sequencing

You can set up a simple test sequence by making a measurement while the network analyzer records the keystrokes. Many complex measurements can be stored in a sequence and then recalled and repeated at the touch of a button. With keystroke recording, no additional programming expertise is required. Test sequencing also allows you to display user prompts, make decisions during a test and branch to other sequences, control other GPIB instruments, or use the parallel port to control test sets or part handlers.

**Simplify measurement calibration with RF ECal.**

## Link to your CAE program

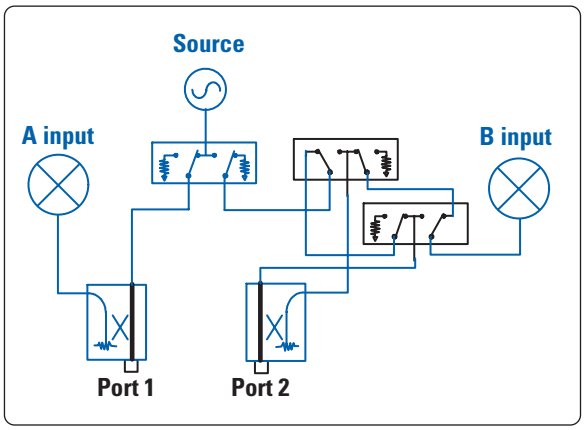
Use electronic design programs such as EEsof's Advanced Design System (ADS) in conjunction with the 8753ET/ES to help you optimize and verify the performance of a device or create device models. You can store ASCII data files to disk in conformance with CITIFILE or Touchstone-compatible (S2P) formats for importing to your design software. EEsof's programs can also upload and download data to and from the network analyzer via GPIB.

## Automate with RF ECal for fast, consistent calibrations

You can add the optional RF electronic calibration (RF ECal) products to your network analyzer for fast, accurate, automatic calibrations. RF ECal uses firmware control, an interface unit and ECal modules in a variety of connector types, including 3.5-mm, 7-mm, 50-ohm type-N, 7-16, 75-ohm type-N, and type-F. This easy-to-use solution helps reduce operator error and connector damage, and provides accurate calibrations for non-insertable devices, helping improve product yields.

# Customize your network analyzer to work the way you do

8753ES Option H39 three-port test set.




8753ES Option H16 low noise floor test set block diagram.

If your application requires a special configuration, ask us about our custom solutions, which offer specifications different from our standard products. Here are some examples of custom options for the 8753ES.

## Extended frequency range above 6 GHz

Option H68 allows you to characterize your components up to 6.8 GHz. Performance above 6 GHz is typical, not specified.

## Three-port test set

Measure all nine S-parameters associated with three-port devices (such as duplexers or couplers) with a built-in, three-port test set. There is a separate coupler for each test port. Solid-state switches, controlled by the internal TTL I/O, multiplex the source output power to each port, and switch the input signals from the couplers to the samplers. Option H39 provides three type-N test ports, while Option H93 provides three 7-mm test ports.

## Low noise floor

Option H16 includes switches that can reverse the port 2 coupler, so that the forward-transmitted signal is conveyed along the through path in the coupler instead of the coupled arm. This increases the forward dynamic range by approximately 12 dB, while reducing the port 2 output power and reverse dynamic range by 15 dB. This option allows the analyzer to be used in either the standard test set configuration or in low-noise-floor mode.

## High-power test set

Option H85 provides jumpers for adding an external power amplifier to provide up to 20 watts (+43 dBm) of power at the test ports, and for adding high-power attenuators or isolators for higher input power handling. The standard solid-state transfer switch is replaced by a mechanical transfer switch to handle higher output power, and step attenuators are added between the couplers and samplers to prevent receiver overload. Test ports are 3.5-mm, and the start frequency of this test set is 50 MHz.

# Agilent 8753ET and 8753ES analyzers at-a-glance

| Features | 8753ET | 8753ES |
|---|---|---|
| Transmision/reflection test set | X | |
| S-parameter test set | | X |
| Error correction | | |
| One-port calibration | X | X |
| Enhanced response calibration | X | X |
| Full two-port calibration | | X |
| TRL*/LRM* calibration[5] | | X |
| DC bias to device under test | | X |
| **Power range** | **8753ET** | **8753ES** |
| Standard | –20 to +5 dBm | –85 to +10 dBm |
| With Option 004 | –85 to +10 dBm | not applicable |
| **Options** | **8753ET** | **8753ES** |
| Harmonics measurement (Option 002) | X | X |
| Step attenuator (Option 004) | X | standard |
| 6 GHz operation (Option 006) | X | X |
| Time-domain (Option 010) | X | X |
| Delete test set (Option 011) | | X |
| Configurable test set (Option 014) | | X |
| 75 ohm impedance (Option 075) | | X |
| High-stability frequency reference (Option 1D5) | X | X |

5. TRL*/LRM* is a special implementation of TRL/LRM calibration, modified for the three-sampler receiver in the 8753ES.

# Service and support

## Applications expertise

Agilent's Application Engineers (AEs) are ready to help you with specialized training, consulting, and software development. AEs are high-frequency experts, with years of experience solving measurement problems. Application notes and product notes are available to help you get the most out of your instrument, in the shortest time. Visit our Website for a list of application notes: **www.tmo.agilent.com/find/tmappnotes**

## Exceptional quality and reliability

The 8753ET and 8753ES analyzers are manufactured in ISO 9002-registered facilities in concurrence with Agilent's renowned commitment to quality. We put our network analyzers through extensive environmental tests for shock, vibration, and extreme temperature cycling so you can count on them.

## Three-year warranty

Our commitment to quality is backed by a standard three-year return-to-Agilent warranty. Support options to extend your warranty, provide on-site support, or to cover periodic calibrations are also available.

## Agilent on the World Wide Web

For more information about the 8753ET/ES network analyzers and accessories, visit our website at **www.agilent.com/find/8753**.

## Other 8753ES/ET literature

| | |
|---|---|
| Configuration Guide | 5968-5158E |
| Data Sheet | 5968-5160E |

**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. Support is available for at least five years beyond the production life of the product. 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 use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

**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 on-site education and training, as well as design, system integration, project management, and other professional services. Experienced Agilent engineers and tech-nicians 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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