

## S-Parameter Test Sets

Several S-parameter test sets are available for the HP 8510C network analyzer for broadband coaxial measurements from 45 MHz to 50 GHz. The HP 8514B, 8515A, and 8517B test sets have an architecture that develops a separate reference channel for each incident port. RF switching is done with a built-in electronic switch. For active device measurements, the test sets include the ability to apply dc bias (external) to the test port center conductors. Also available are two 90 dB step attenuators (60 dB in the HP 8517B) which allow control of the port 1 and port 2 signal levels.

## Pulsed-RF Measurement Test Sets

The HP 85110A/L test sets are specially configured for operation in pulsed-RF measurement systems (HP 85108). Four 90 dB step attenuators protect each input of the fundamentally-mixed down converter to allow measurement of test devices with output power of 20 watts CW or 50 watts CW (HP 85110L). Special options are available to 50 GHz.

## Coaxial Test Set General Information

|                                     | HP 8514B    | HP 8515A       | HP 8517B                            | HP 85110A            | HP 85110L      |
|-------------------------------------|-------------|----------------|-------------------------------------|----------------------|----------------|
| <b>Frequency range (GHz)</b>        | 0.045 to 20 | 0.045 to 26.50 | 0.045 to 50                         | 2 to 20 <sup>2</sup> | 0.045 to 2     |
| <b>Test ports (port 1 or 2)</b>     |             |                |                                     |                      |                |
| Nominal operating power level (dBm) | 2 to -6     | -5 to -25      | +2 to -29<br>+5 to -16 <sup>1</sup> | 0 to -3              | 0              |
| <b>Test ports (port 1 or 2)</b>     |             |                |                                     |                      |                |
| Max. power in (CW)                  | +20 dBm     | +2 dBm         | +13 dBm                             | +43 dBm (20 W)       | +47 dBm (50 W) |
| <b>Test port connector type</b>     | 3.5 mm (m)  | 3.5 mm (m)     | 2.4 mm (m)                          | 3.5 mm (m)           | 7 mm           |

<sup>1</sup>HP 8517B Option 007

<sup>2</sup>Special test sets options are available from 0.5 to 20 GHz and 2 to 50 GHz

## Frequency Converters

With the HP 8511A (26.5 GHz) and 8511B (50 GHz) frequency converters, the HP 8510 becomes a general-purpose four-channel magnitude/phase receiver. Add your own power splitters for transmission measurements, and bridges or directional couplers for reflection measurements. Since one input is used for system phase-lock, the other three inputs are available for measurements of multi-port devices, subsystems, and antennas. All four inputs have precision 3.5 mm (HP 8511A) or 2.4 mm (HP 8511B) connectors.

## Multiple Test Set Operation

A single HP 8510C system may be configured with two test sets. In this configuration the test sets have different addresses, and the user may select between them from the front panel of the HP 8510 without reconections. This capability is useful, for example, when combining a microwave coaxial test set with a millimeter-wave test set in the same HP 8510 system or in manufacturing to increase throughput, one test set can be used to make a measurement while a device is being connected to a second test set.

IF switching (Option 001): In the multiple test set configuration, the 20 MHz IF signal is daisy-chained from the test sets to the HP 8510. This capability requires test set Option 001 in one of the two test sets.

The RF signal must be routed to the desired test set using a coaxial RF switch and an HP 11713A switch driver. The switch driver is controlled automatically by the HP 8510C over the HP 8510 system interface bus.

## Ordering Information

- HP 8511A Frequency Converter
- HP 8511B Frequency Converter
- HP 8514B S-Parameter Test Set
- HP 8515A S-Parameter Test Set
- HP 8517B S-Parameter Test Set
- HP 85110A Pulsed-RF S-Parameter Test Set
- HP 85110L Pulsed-RF S-Parameter Test Set
- HP 85105A Millimeter-Wave Controller

## Key Literature

- HP 8510 Systems Solutions Brochure, p/n 5965-8837E
- HP 8510C Family Network Analyzer Technical Data, p/n 5091-8484E
- HP 8510C Family Network Analyzer Configuration Guide, p/n 5091-8967E

## Test Port Cables and Adapters

Test port cables and adapter sets are available for various connector types. The cable/adapter configurations are described below. All cables are designed with one end that connects directly to the special rugged ports of the network analyzer test set, and one end that connects to the device-under-test.

Special test port adapter sets are also available to convert the rugged ports of the network analyzer test set to the desired connector interface. Each kit contains two adapters, one male and one female.

Both the cables and the special adapters have one special female connector which is designed to connect directly to the 3.5 mm test port (2.4 mm for HP 8517B and 8722C). This side of the cable or adapter can only be connected to the test set port, and cannot be mated to a standard 3.5 mm (or 2.4 mm) male connector. The male test set ports, however, can be mated to a standard 3.5 mm (or 2.4 mm) female connector.

### For HP 8719D/8720D Network Analyzer or HP 8514B/8515A Test Sets (3.5 mm test port)

|                    | Cable/adapters   | Connector type (on device side of cables/adapter) |
|--------------------|--|---|
| For 3.5 mm devices | HP 85131C Semi-rigid Cable   | 3.5 mm (f)  |
|                    | HP 85131E Flexible Cable   | 3.5 mm (f)  |
|                    | HP 85130D Adapter Set  | 3.5 mm (m and f)                                  |
| For 7 mm devices   | HP 85132C Semi-rigid Cable   | 7 mm  |
|                    | HP 85132E Flexible Cable   | 7 mm  |
|                    | HP 85130B Adapter Set  | 7 mm  |
| For Type-N devices | Use 7-mm cables and the 7 mm-to-Type-N adapters included in the HP 85054B/D calibration kit. |   |
|                    | HP 85130C Adapter Set  | Type-N (m and f)                                  |

### For HP 8722D Network Analyzer or HP 8517B Test Set (2.4 mm test port)

|                    | Cable/adapters             | Connector type (on device side of cables/adapter) |
|--------------------|----------------------------|---|
| For 2.4 mm devices | HP 85133C Semi-rigid Cable | 2.4 mm (f)  |
|                    | HP 85133E Flexible Cable   | 2.4 mm (f)  |
|                    | HP 85130G Adapter Set      | 2.4 mm (m and f)                                  |
| For 3.5 mm devices | HP 85134C Semi-rigid Cable | 3.5 mm (f)  |
|                    | HP 85134E Flexible Cable   | 3.5 mm (f)  |
|                    | HP 85130F Adapter Set      | 3.5 mm (m and f)                                  |
| For 7 mm devices   | HP 85135C Semi-rigid Cable | 7 mm  |
|                    | HP 85135E Flexible Cable   | 7 mm  |
|                    | HP 85130E Adapter Set      | 7 mm  |

### For HP 8719D/8720D Network Analyzer or HP 8514B/8515A Test Sets (3.5 mm test port)

|                    | Cable set   | Connector type (on device side of cables/adapter) |
|--------------------|---|---|
| For 3.5 mm devices | HP 85131D Semi-rigid Cable Set or   | 3.5 mm (one male, one female)                     |
|                    | HP 85131F Flexible Cable Set  | 3.5 mm (one male, one female)                     |
|                    |   |   |
| For 7 mm devices   | HP 85132D Semi-rigid Cable Set  | 7 mm  |
|                    | HP 85132F Flexible Cable Set  | 7 mm  |
| For Type-N devices | Use 7-mm cables and the 7 mm-to-Type-N adapters in the HP 85054B/D calibration kit. |   |

### For HP 8722D Network Analyzer or HP 8517B Test Set (2.4 mm test port)

|                    | Cable set  | Connector type (on device side of cables/adapters) |
|--------------------|--|--|
| For 2.4 mm devices | HP 85133D Semi-rigid Cable Set or HP 85133F Flexible Cable Set | 2.4 mm (m, f)                                      |
|                    |  | 2.4 mm (m, f)                                      |
| For 3.5 mm devices | HP 85134D Semi-rigid Cable Set or HP 85134F Flexible Cable Set | 3.5 mm (m, f)                                      |
|                    |  | 3.5 mm (m, f)                                      |
| For 7 mm devices   | HP 85135D Semi-rigid Cable Set or HP 85135F Flexible Cable Set | 7 mm   |
|                    |  | 7 mm   |