The accuracy and convenience of RF Measurements at microwave frequencies.

Complete system control from HP 8970B front panel.

A single test port for 0.01 to 20 GHz calabration and measurement.

1 to 20 GHz synthesized signal generator for accuracy and ecomomy.*

*The system pictured is the HP 8970V which operates to 20 GHz. With the HP 8970S system, you may choose any combination of HP 8971C options and any of the recommended local oscillators listed under ordering information. Frequency operation depends on the LO selected.

(Note: For calibration and measurement repeatability in the HP 8970S/V system, the local oscillator must be synthesized.)

Amplifiers

- Simultaneous noise figure and gain measurement
- Automatic correction for measurement system noise
- Real time, swept, corrected oscilloscope output for easy tuning
- Single-test-port calibration and measurement from 10 MHz to 26.5 GHz (with HP 8970S system)
- Permanent hard-copy plot of noise figure and gain vs. frequency with a digital plotter

Transistors

- Single-sideband allows accurate measurements with tuners
- Easy to compensate for tuner insertion loss
- Real time correction for 2nd stage effects

Receivers

- Tunable IF ranges from 10 to 1600 MHz (2047 MHz optional) with the HP 8970B and 10 MHz to 26.5 GHz with the HP 8970S
- External LO control
- Displays noise temperature for ultra-low-noise receivers

Mixers

- Simultaneous noise figure and conversion loss for design tradeoffs
- Noise figure vs. IF or LO frequency
- Noise figure as a function of LO power

System Interface Bus

The addition of a System Interface Bus (SIB) makes computer control of the HP 8970S/V Noise Figure Measurement System as easy as controlling a single instrument. The HP 8970B uses the SIB to control instruments in the noise figure system, allowing a computer to maintain system control over GPIB while the noise figure system makes measurements. This greatly simplifies programming by taking full advantage of the controlling capabilities of the HP 8970B.

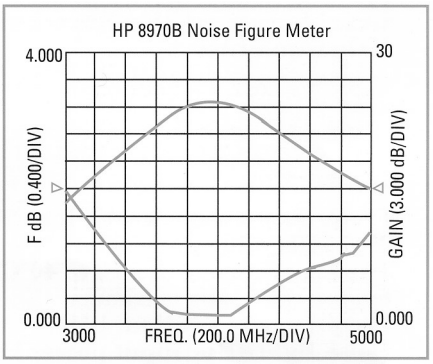
Millimeter-wave Measurements

Millimeter-wave receiver measuremets require two noise sources, for calabration (at the IF), and one for the actual measurements (at the RF). The HP 8970B can store up to four noise sourse ENR tables. This means you can calibrate and measure noise figure at several millimeter bands without re-entering ENR data. The meter displays measurement frequencies up to 99.999 GHz.

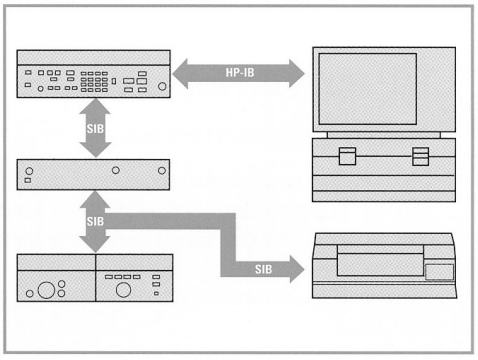
The HP 8970B also has a double down-conversion modes that use the HP 8971C as the second down-converter. These modes are helpful for measuring receivers and mixers with IFs greater than 1600 MHz or amplifiers and transistors above 26.5 GHz. With the HP 8970S/V Noise Figure Measurement System, millimeter single-sideband measurements can be made across almost a 52 GHz band (twice the HP 8970S/V's frequeny coverage) with a single filter.

Plotter Dump Capability

A noise figure and gain versus frequency display can be outputed to a digital plotter over the HP 8790B's System Interface Bus. What you see on the X vs. Y oscilloscope display is dumped to the plotter, complete with axis labeling and title.



Example of HP 8970B plot output.



HP 8970B in an automated system.

HP 8970S/V Noise Figure Measurement System Specifications

Specifications are the same as the HP 8970B Noise Figure Meter with the following exceptions

Noise Measurement

Noise Figure Measurement Range: 0 to 30 dB

Noise Figure Instrumentation Uncertainty: (for a 14 to 16 dB ENR noise source in a 10 to 40°C environment and for device under test noise figure plus gain greater than 10 dB). (For HP 8971C with option 002, assumes the use of a preamplifier with <10 dB noise figure and >20 dB gain).
10 MHz to 18 GHz: ±0.2 dB
Plus typical drift of ±0.015 dB /°C
18 to 26.5 GHz:±0.4 dB
Plus typical drift of ±0.08 dB /°C

Gain Measurment

Gain Instrumentation Uncertainty: less than ±0.28 dB Plus typical drift of ±0.05 dB / °C 10 MHz to 18 GHz, ±0.07 dB / °C 18 to 26.5 GHz.

Input Specifications

Frequency Range:

HP 8970S: Tunable from 10 MHz to 26.5 GHz
(upper frequency will be limited by the LO upper frequency)

HP 8970V: Tunable from 10 MHz to 20 GHz.

Noise Figure (max.): same as HP 8971C

Input SWR: same as HP 8971C

Maximum Operating RF Noise Input Power:
10-1600 MHz: -29 dBm
1.6-26.5 GHz: -26 dBm

Maximum Safe RF Input Power: -5 dBm

Maximum Net External Gain: greater than 35 dB

General

Power requirements, net weight, shipping weight, dimensions: Sum of individual instruments.

Supplemental Characteristics

Sensitivity: -100 dBm (no external gain required; able to measure it's own noise figure with HP 346A/B/C).

Double Sideband (DSB) Noise Figure (2.4-26.5 GHz): same as HP 8971C.

Measurement Speed: 6 to 9 measurements per second with minimum smothing.

Sweep Speed at Minimum Smothing: (given for each HP 8971C frequency band with corrected readings).

SSB1 (10 to1600 MHz): 140 ms per frequency point

SSB2 (1.6 to 2.4 GHz): 150 ms per frequency point

SSB3 (2.4 to 26.5 GHz): 435 ms frequency point

DSB (2.4 to 26.5 GHz): 150 ms per frequency point

HP 8970B Noise Figure Meter

Option 020: Extends upper frequency from 1600 to 2047 MHz
Option 700: External MATE translator
Option 907: Front panel handle kit
Option 908: Rack mounting flange kit
Option 909: Front panel handle kit plus rack mounting flange kit
Option 914: Delete operating manual
Option 915: Service manual
Option 916: Extra operating manual

HP 8971C Noise Figure Test Set

All RF and GPIB cables needed to connect the HP 8971C to the HP 8970B and a Synthesized Source are included with the HP 8971C.

Option 001: Add internal LO power amp
Option 002: Delete internal RF pre amp
Option 907: Front panel handle kit
Option 908: Rack mounting flange kit
Option 909: Front panel handle kit plus rack mounting flange kit
Option 915: Service manual
Option 916: Extra operating manual

HP 8970V Noise Figure Measurement System

HP 8970B, HP 8971C, HP 83711B

Accessories

1494-0060 Rack Slide Kit for HP 8970B or HP 8971C
9211-2649 HP 8970B Transit case
9211-2648 HP 8971C Transit case