

Electronic Counters

CW Microwave Frequency Counters

53150A
53151A
53152A

- Ultra wide range, single input (from 50 MHz up to 46 GHz)
- Simultaneous frequency and power measurement with analog peaking indicator
- Fully programmable via GPIB and RS-232 standard
- Lightweight with optional battery



53152A

53150A, 53151A, 53152A Microwave Counters

The Agilent 53150 series represent a total re-thinking of microwave counters: innovative designs that offer no-compromise performance and quality while attaining true portability. The 53150A, 53151A, and 53152A measure both frequency and power over the frequency ranges of 20 GHz, 26.5 GHz, and 46 GHz, respectively, and feature a single, extremely wideband microwave input (50 MHz up to 46 GHz).

No Compromise Performance

Utilizing a unique single board design with low phase noise PLL circuitry, the 53150 series offers exceptional sensitivity, excellent power measurement accuracy and repeatability as well as fast acquisition times and full programmability. Performance equals or surpasses the industry standard Agilent 5350 series in virtually every aspect, and in a package that is less than half the weight and size.

Frequency and Power Measurements with a Single Connection

The heart of the 53150 series is an advanced sampler design that integrates a separate zero bias Schottky diode for the accurate measurement of input power. This allows the convenient measurement of both frequency and power with a single connection. The unique cable-loss-compensation feature (power correction) yields accuracies and repeatabilities that rival power meters. Best of all, since the frequency of the test signal is measured simultaneously, the diode's frequency response is automatically adjusted for. And like the latest in diode sensors, deviation from square law is also compensated for.

Functionality Without Clutter

The 53150 series offers a clean, uncluttered front panel with a minimum of push buttons. Despite their simple appearance, these counters retain all the powerful functions one expects in precision instrumentation, with such useful functions as: measurement averaging, arbitrary as well as nulling offsets for both frequency and power, display of power in either dBm or Watts and full control of resolution, sampling rate, and GPIB address plus extensive self-diagnostics.

Field Tough but Ready for Benchtop or ATE Applications

The 53150 series is as comfortable in the field as in the laboratory. The rugged case with an integrated tilting handle can tolerate the vibration and shock expected in field use. For easy transportation, a soft carrying case is also available. The "see anywhere" backlit LCD display ensures visibility in all environments, from dark to full sunlight. And in situations where AC is unavailable, the internal, replaceable camcorder batteries provide over 2.5 hours of continuous operation. Alternatively, the unit can be powered from an external 11-18 VDC source.

For benchtop and ATE applications, the 53150 series delivers full functionality and high measurement speed along with fully programmable RS-232 interface and high speed GPIB (SCPI compliant) as standard. In addition, these counters are compatible with standard Agilent rackmount hardware.

53150 Series Abridged Measurement Specifications and Characteristics

All measurement specifications are over the full signal ranges of channels 1 and 2. For full specifications, please call your Agilent representative and request a Product Overview for the 53150 series microwave counters.

Input Characteristics

	Input 1 (1 M Ω)	Input 2 (50 Ω)	
Frequency Range			
53150A	10 Hz to 125 MHz	0.05 – 20 GHz	
53151A	10 Hz to 125 MHz	0.05 – 26.5 GHz	
53152A	10 Hz to 125 MHz	0.05 – 46 GHz	
Sensitivity		53150/51	53152
<30 Hz	40 mVrms	—	—
to 125 MHz	25 mVrms	—	—
<250 MHz	—	-20 dBm	-20 dBm
to 12.4 GHz	—	-33 dBm	-33 dBm
to 18 GHz	—	-33 dBm	-30 dBm
to 20 GHz	—	-29 dBm	-27 dBm
to 26.5 GHz	—	-25 dBm (151)	-27 dBm
to 40 GHz	—	—	-23 dBm
to 46 GHz	—	—	-17 dBm
Maximum Input	2 Vrms	+5 dBm, <2 GHz +13 dBm, >2 GHz	
Damage Level	5 Vrms to 120 Vp	+27 dBm	
Coupling	AC	AC	

Channel 1

Resolution: Selectable 1 Hz to 1 MHz

Connector: BNC female

Low Pass Filter: 50 kHz, selectable

Channel 2

Resolution: Selectable 1 Hz to 1 MHz

Acquisition Time: 100 ms to 140 ms

Gate Time: 1/Resolution

FM Tolerance: 20 MHz p-p max. @10 MHz rate to 26.5 GHz;
12 MHz p-p max. @10 MHz rate to 46 GHz

AM Tolerance: Any depth/rate within dynamic range of input

Amplitude Discrimination (above 250 MHz): 20 dB typ. for greater than 75 MHz separation; 10 dB typ. for less than 75 MHz separation

Connector: 3.5 mm SMA compatible (53150A/53151A);
2.92 mm removable (53152A)

Power Measurement

Range: Counter sensitivity to +7 dBm

Units: dBm or milliwatts/microwatts

Resolution: 0.01 dB

Accuracy* (0 to -20 dBm):

	53150/51	53152
<12.4 GHz	± 1.5 dB	± 1.0 dB
to 20 GHz	± 1.5 dB	± 1.5 dB
to 26.5 GHz	± 2.0 dB (151)	± 1.5 dB
to 46 GHz	—	± 2.0 dB

* At channel two input connector

General

Display: Backlit LCD

Sample Rate: User-selectable Fast, Medium, Slow or Hold

Programming: GPIB and RS-232C, SCPI compatible

Math Functions

- Offset: Last reading and/or entered offset to reading for either power or frequency
- Averaging: 1 to 99 measurement running average
- Power Correction (Cable Loss Compensation): Offsets power reading via linear interpolation of up to 10 user-entered frequency attenuations

Save and Recall: Up to 9 complete instrument setups may be saved and later recalled

Sleep Mode (battery option only): Automatically activated if no input is present for 5 minutes

Power Requirements

- 75 VA max. (25 W typ.)
- 90 – 132 VAC; 50, 60, 400 Hz
- 216 – 264 VAC; 50, 60 Hz
- 11 – 18 VDC; 2 A max.: battery option only

Battery (option):

- Type: VHS camcorder, sealed lead acid (2 each)
- Charge Time: 8 hours in unit
- Capacity: 2.5 hours minimum at 25°C

Timebase:

	TCX0 (std)	Option 001
Aging Rate	1×10^{-7} /mo	5×10^{-10} /day
Short Term (1 sec. avg.)	1×10^{-9}	2×10^{-10}
Temperature (0° – 55°C)	$<1 \times 10^{-6}$	$<3 \times 10^{-9}$

Accessories Furnished: Power cord and operating, programming, and service manuals

Size: 88.5 mm H x 213 mm W x 300 mm D (3.54 in x 8.52 in x 12 in)

Weight: 4 kg (8.8 lb) without battery option; 6.4 kg (14.08 lb) with battery option

Ordering Information

53150A 20 GHz Microwave Counter

53151A 26.5 GHz Microwave Counter

53152A 46 GHz Microwave Counter

5315xA-001 Oven Timebase

5315xA-002 Battery/DC Input

5315xA-007 Soft Carrying Case

5315xA-A6J ANSI Z540 Compliant Calibration

5315xA-1CM Rack Mounting Kit

53150A

53151A

53152A