

KEYSIGHT TECHNOLOGIES (AGILENT HP)

U2004A

The Keysight Technologies U2004A is a USB-based RF diode power sensor operating across a wide frequency range of 9 kHz to 6 GHz. Designed for fast and accurate power measurements, it eliminates the need for an external power meter by connecting directly to a PC or compatible Keysight instrument. The sensor features internal zeroing and calibration capabilities, high measurement speed up to 1000 readings per second in double-buffered mode, and a wide dynamic range of -60 dBm to +20 dBm, making it ideal for manufacturing, installation, maintenance, and automated test environments.

SPECIFICATIONS

General

Interfaces	USB 2.0 High Speed (USBTMC-USB488)
Display	None (results displayed via host PC software or compatible Keysight instrument)
Warm-up Time	30 minutes
Standard Warranty	3 years

Physical

Power Supply	USB bus powered, 4.5 V to 5.5 V, < 200 mA (measurement), < 275 mA (zeroing/calibration)
Operating Temperature	0 to 55 °C °C
Dimensions (W×H×D)	46 mm W x 30 mm H x 134 mm D (including RF connector) mm
Weight	0.262 kg

RF Performance

Frequency Range	9 kHz to 6 GHz
Power Range	-60 dBm to +20 dBm
RF Impedance	50 Ω nominal
RF Input Connector	Type-N (male)
Maximum SWR (9 kHz to 2 GHz)	1.13
Maximum SWR (2 GHz to 6 GHz)	1.17
Maximum SWR (0 to 55 °C, 9 kHz to 2 GHz)	1.15
Maximum SWR (0 to 55 °C, 2 GHz to 6 GHz)	1.21

Measurement Accuracy & Uncertainty

Power Linearity (-60 to -10 dBm)	±3.0% (at 25 °C ± 5 °C)
Power Linearity (-10 to +20 dBm)	±4.0% (at 25 °C ± 5 °C)
Zero Set	±4.0 nW
Zero Drift	±1.5 nW
Measurement Noise	4.0 nW

Measurement Speed

Measurement Speed (Normal Mode)	110 readings/s
Measurement Speed (Double-Buffered Mode)	1000 readings/s

Triggering

Trigger Sources	Continuous (Free Run), Internal, External
Trigger Delay Range	1 µs to 400 ms
Trigger Delay Resolution	1 µs
Trigger Jitter	±1 µs
External Trigger Input Level	TTL compatible (low < 0.8 V, high > 2.0 V)
External Trigger Input Impedance	> 10 kΩ nominal
External Trigger Output Level	TTL compatible (low < 0.4 V, high > 2.4 V)
Trigger Connector Type	SMB (male)
Trigger Holdoff Range	1 µs to 400 ms
Trigger Holdoff Resolution	1 µs
Internal Trigger Level Range	-20 dBm to +20 dBm
Internal Trigger Level Resolution	0.1 dB
Trigger Latency	11 µs ± 2 µs
External Trigger Output Pulse Width	450 ns (typical)
External Trigger Input Minimum Pulse Width	15 ns

Damage & Maximum Ratings

Maximum Continuous RF Input Power	+25 dBm (300 mW)
Maximum DC Input Voltage	5 VDC

Calibration & Traceability

Internal Calibration & Zeroing	Supported (built-in internal zeroing and calibration)
Calibration Cycle	1 year

Connectivity & Software

Host Interface USB Class	USBTMC-USB488
Command Set / Programming Language	SCPI
Compatible Software Applications	Keysight BenchVue (BV0007B Power Meter App), N1918A Power Analysis Manager

Environmental & Compliance

Storage Temperature Range	-40 °C to 70 °C
Operating Humidity	Up to 95% RH at 40 °C (non-condensing)
Storage Humidity	Up to 90% RH at 65 °C (non-condensing)
Operating Altitude	Up to 4,600 m (15,000 ft)
Storage Altitude	Up to 15,240 m (50,000 ft)
EMC Compliance	IEC 61326-1 / EN 61326-1
Safety Standards	IEC 61010-1 / EN 61010-1
Vibration Limit (Random)	3.21 g rms, 5 to 500 Hz
Shock Limit	30 g, 11 ms half-sine

Physical Characteristics

Form Factor	Compact USB sensor
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Accuracy & Uncertainty

Calibration Uncertainty (25 °C ± 10 °C, 9 kHz to 2 GHz)	1.8%
Calibration Uncertainty (25 °C ± 10 °C, 2 GHz to 6 GHz)	2.0%
Calibration Uncertainty (0 °C to 55 °C, 9 kHz to 2 GHz)	2.0%
Calibration Uncertainty (0 °C to 55 °C, 2 GHz to 6 GHz)	2.5%

Performance

Frequency Resolution	1 kHz
Manual Averaging Range	1 to 1024

Power Requirements

Current Consumption	< 220 mA (maximum), < 160 mA (typical) @ 5 V
Power Consumption	< 1.1 W

Compliance & Safety

Overvoltage Category	CAT I
Pollution Degree	2

Calibration & Zeroing

Internal Zeroing Duration	14 s (typical)
Internal Calibration Duration	6 s (typical)

Accuracy & Linearity

Power Linearity (0 to 55 °C, -60 to -10 dBm)	±4.5% (±0.20 dB)
Power Linearity (0 to 55 °C, -10 to +20 dBm)	±4.5% (±0.20 dB)
Zero Set (0 to 55 °C)	±10 nW

Connectivity

USB Cable Length Options	1.5 m (standard), 3.0 m, 5.0 m
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Software & Drivers

Supported Drivers	IVI-COM, IVI-C, LabVIEW
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TECHNOLOGY

Diode Power Sensor

APPLICATIONS

RF and microwave average power measurements

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