Keysight Technologies
Waveguide Power Sensors

Data Sheet

KEYSIGHT
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Unlocking Measurement Insights

Make accurate and reliable measurements in the 50 to 110 GHz frequency range with Keysight's family of waveguide power sensors.

Covering the V-band, E-band and W-band spectrums, the Keysight Technologies, Inc. waveguide power sensors offer best SWR, high reliability and low loss, and come with a 50 MHz calibration port to reduce measurement uncertainties. And with the Keysight E8486A (Option 200) waveguide sensor, you also get a wide dynamic range spanning from −60 to +20 dBm.

Compatible with your current Keysight power meter

Keysight waveguide power sensors are fully compatible with Keysight EPM (E4418B/19B, N1913A/14A), EPM-P (E4416A/17A) and P-Series (N1911A/12A) power meters. The V8486A and W8486A are also compatible with the discontinued or obsolete power meters such as 435B, 436A, 437B, 438A, 70100A, E1416A, E4418A, and E4419A power meters.

Best SWR available

In RF and microwave power measurements, the largest single source of error is usually sensor and source mismatch. To minimize any measurement uncertainty caused by mismatch, Keysight waveguide sensors offer excellent SWR of 1.06 (> 30 dB return loss).

50 MHz calibration

For easy calibration with the power meter, Keysight waveguide power sensors incorporate a 50 MHz calibration port. This eliminates the variance in making measurements with different meter/sensor combinations and the uncertainties due to temperature changes. It also provides traceability to the U.S National Institute of Standards and Technology (NIST) at millimeter-wave frequencies.

High reliability

Keysight waveguide sensors use the same proven Modified Barrier Integrated Diode (MBID) technology found in other Keysight sensors, and always operates in the square-law characteristic for true-average detection.

Waveguide power sensors comparison table

Model	Frequency range	Power linearity [1]	Maximum power	Connector type
E8486A-100	60 to 90 GHz	−30 to +10 dBm: < ±1% +10 to +20 dBm: < ±2% [2] +10 to +20 dBm: <+1, −3% [3]	200 mW avg, 40 W pk (10.µs per pulse, 0.5% duty cycle)	Waveguide flange: UG-387/U Flange, EIA WR-12
E8486A-200	60 to 90 GHz	−60 to −30 dBm: < ±1.5% −30 to +10 dBm; < ±1% +10 to +20 dBm: < ±1.5%	200 mW avg, 1 W pk (10.µs per pulse, 0.5% duty cycle)	Waveguide flange: UG-387/U Flange, EIA WR-12
V8486A	50 to 75 GHz	−30 +10 dBm: (±1%) +10 to +20 dBm: (±2%)	200 mW avg, 40 W pk (10.µs per pulse, 0.5% duty cycle)	Waveguide flange: UG-385/U
W8486A	75 to 110 GHz	±2%	200 mW avg, 40 W pk (10.µs per pulse, 0.5% duty cycle)	Waveguide flange: UG-387/U

1. Negligible deviation except for those power ranges noted
2. For EPM series power meters
3. For all other Keysight power meters

E8486A E-Band Waveguide Power Sensor

Figure 1. E8486A-100 comes without built-in EEPROM. Users need to pre-enter calibration factors printed on the back of the sensor into the power meter.

Figure 2. E8486A-200 comes with built-in EEPROM to store calibration factors.

Meet the rapid demand in E-band telecommunication applications with the E8486A waveguide power sensor. Designed with a WR-12 flange connector, the E8486A makes precise and direct waveguide measurements in the E-band frequency range and is compatible with most Keysight power meters. A wide dynamic range of -60 to +20 dBm and a SWR performance of 1.06 minimize measurement uncertainty caused by mismatch, providing high accuracy even with low power signals. With the E8486A waveguide power sensor, get the precision and accuracy you need for E-band applications in a single power sensor.

Specifications

Power range	Option 100: 1 µW to 100 mW (–30 to +20 dBm) Option 200: 1 nW to 100 mW (–60 to +20 dBm)
Frequency range [1]	60 to 90 GHz
Calibration factor input	Option 100: Does not include EEPROM. Users need to pre-enter calibration factors into the power meter; the calibration factor label will be provided on the power sensor unit. Option 200: Comes with EEPROM to store calibration factors. Users simply need to input the frequency and the correct calibration factor will be applied.
Maximum SWR	Option 100: < 1.06 Option 200: < 1.28
Maximum SWR at 50 MHz	Option 100: < 1.066 Option 200: < 1.077
Maximum power (damage level)	Option 100: 200 mW avg, 40 W pk (10.µs per pulse, 0.5% duty cycle) Option 200: 200 mW avg, 1 W pk (10.µs per pulse, 0.5% duty cycle)

Power linearity	Option 100: –30 to +10 dBm: < ±1%
	            +10 to +20 dBm: < ±2% [2]
	            +10 to +20 dBm: < +1, –3% [3]
	Option 200: –60 to –30 dBm: < ±1.5%
	            –30 to +10 dBm; < ±1%
	            +10 to +20 dBm: <1.5%

Zero set	Option 100: < ±200 nW Option 200: < ±200 pW
Measurement noise	Option 100: < 450 nW Option 200: < 450 pW
Zero drift	Option 100: < ±40 nW Option 200: < ±40 pW
Connector type	50 MHz calibration port: Type N (male), 50 Ω nominal impedance Waveguide flange: UG-387/U Flange, EIA WR-12
Net weight	Net: 0.4 kg (0.9 lb) Shipping: 1 kg (2.2 lb)
Dimensions	38 mm (w) x 199 mm (l) x 60 mm (h)

1. Option 201 is a standard E8486A-200 that has been calibrated at an extended frequency (54 to 95 GHz). Refer to E8486A Option 201 Product Note (E8486-90701) for more details.
2. For EPM series power meters
3. For all other Keysight power meters

V8486A V-Band Waveguide Power Sensor

Figure 3. V8486A comes without built-in EEPROM. Users need to pre-enter calibration factors printed on the back of the sensor into the power meter.

Make accurate average power measurements from 50 to 75 GHz with the V8486A V-band power sensor.

Specifications

Power range	−30 to +20 dBm
Frequency range	50 to 75 GHz
Maximum SWR	< 1.06
Maximum SWR at 50 MHz	< 1.073
Maximum power (waveguide port only)	200 mW average, 40 W peak (10 µs pulse, 0.5% duty cycle) or equivalent such that 200 mW maximum average power and 40 W peak power are not exceeded
Power linearity	−30 to +10 dBm: < ±1% +10 to +20 dBm: ±2% (for EPM series power meters) +10 to +20 dBm: < +1, −3% (for all other Keysight power meters)
Zero set	< ±200 nW
Measurement noise	< 450 nW
Zero drift	< ±40 pW
Connector type	EIA WR-15, UG-385/U
Equivalent waveguide band designators to EIA WR-15	IEC R-620 British WG-25 JAN RG-273 MIL-W-85/3-018
Equivalent flange designator to UG-385/U	MIL-F-3922/67B-002

A special option for the V8486A that extends the power range down to −60 dBm is available. Contact your local Keysight field engineer or sales office for more information.

W8486A W–Band Waveguide Power Sensor

Figure 4. W8486A comes without built-in EEPROM. Users need to pre-enter calibration factors printed on the back of the sensor into the power meter.

The W8486A waveguide power sensor measures average power over the frequency range 75 to 110 GHz and power range −30 to +20 dBm.

Specifications

Power range	−30 to +20 dBm
Frequency range	75 to 110 GHz
Maximum SWR	< 1.08
Maximum SWR at 50 MHz	< 1.076
Maximum power (waveguide port only)	200 mW average, 40 W peak (10 µs pulse, 0.5% duty cycle) or equivalent such that 200 mW maximum average power and 40 W peak power are not exceeded
Power linearity	(±2%)
Zero set	< ±200 nW
Measurement noise	< 450 nW
Zero drift	< ±40 pW
Weight	Net: 0.4 kg (0.9 lb) Shipping: 1.0 kg (2.2 lb)
Connector type	Waveguide flange: UG-387/U

A special option for the V8486A that extends the power range down to −60 dBm is available. Contact your local Keysight field engineer or sales office for more information.

Ordering Information

	Model	Description
E-Band	E8486A-100 E8486A-200 E8486A-201	E-band power sensor, 60 to 90 GHz, −30 to +20 dBm E-band power sensor, 60 to 90 GHz, −60 to +20 dBm E-band power sensor, 54 to 95 GHz, −60 to +20 dBm
V-Band	V8486A	V-band power sensor, 50 to 75 GHz, −30 to +20 dBm
W-Band	W8486A	W-band power sensor, 75 to 110 GHz, −30 to +20 dBm
Standard shipped accessories		
Hex ball driver Waveguide mounting screws User's and Service Guide, English		
Calibration cycle		
1 year		

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