



# Agilent P-Series Power Meters and Power Sensors

Preliminary Technical Overview



## Wide Bandwidth Power Meters and Sensors

Continuous sampling with internal zero and calibration provides accurate and repeatable power measurements



Agilent Technologies

## Introducing the P-Series Power Meters and P-Series Wideband Power Sensors

The Agilent P-Series power meters and sensors provide fast, accurate and repeatable power measurements for R&D and manufacturing engineers in aerospace and defense, wireless communications and wireless 802.11a/b/g networking.

The two P-Series power meter models offer excellent performance optimized for radar, pulsed component test and multi-carrier power amplifier testing:

- N1911A single channel power meter
- N1912A dual channel power meter

The P-Series power meters and sensors provide comprehensive power, time and statistical measurements, such as peak, average, peak-to-average ratio, maximum and minimum power measurements, time-gated and free-run power measurements, rise time and fall time measurements, as well as the complementary cumulative distribution function (CCDF).

### High performance, wideband power sensors

The P-Series wideband power sensors only operate with the P-Series power meters, and cover two frequency ranges:

- N1921A wideband power sensor, 50 MHz to 18 GHz
- N1922A wideband power sensor, 50 MHz to 40 GHz

Along with storing the calibration factors, linearity and temperature compensation data in EEPROM, the P-Series sensors are the first to provide internal zero and calibration. This feature is implemented by integrating a DC reference source and switching circuits into the power sensor. This enables users to zero and/or calibrate the sensor while being connected to the device-under-test (DUT). Since zeroing and calibration are performed without the need to remove the sensor from the DUT, this feature eliminates the multiple connections associated with using the 0 dBm, 50 MHz calibrator. This minimizes connector wear, reduces test-time and measurement uncertainty.

### Capture repetitive and single shot pulses

The P-Series power meters and sensors offer a maximum sampling rate of 100 Msamples per second and a video bandwidth of 30 MHz to enable users to capture repetitive as well as single shot events over a wide bandwidth. Plus, perform repeatable and accurate peak power measurements. This continuous sampling capability provides users with confidence that multiple measurements of peak power and rise time of a DUT will give consistent results, under the same conditions.

### Compatibility with more than 30 Agilent sensors

Backwards compatibility with all Agilent 8480 and E-Series power sensors gives users additional choices for conventional average power measurements, over a wide dynamic range and frequency coverage from 9 kHz to 110 GHz.

## P-Series power meter and sensor specification highlights

### Sensor data

#### Power sensors<sup>1</sup>

#### Frequency range

P-Series sensors:	50 MHz to 40 GHz, (sensor dependent)
E-Series sensors:	9 kHz to 33 GHz (sensor dependent)
8480 Series sensors:	100 kHz to 110 GHz (sensor dependent)

#### Sensor dynamic range

P-Series sensors:	-35 to +20 dBm
E-Series sensors:	-70 to +44 dBm (sensor dependent)
8480 Series sensors:	-70 to +44 dBm (sensor dependent)

**Channel bandwidth** ≥ 30 MHz video bandwidth

**Sampling rate** 100 Msamples per second (continuous)

**Measurements** Average, peak power, peak-to-average ratio, rise time and fall time, maximum and minimum power, complementary cumulative distribution function (CCDF or 1-CDF)

**Display modes:** Power versus time display  
Numeric display

### Key system specifications

Rise time and fall time:	≤ 13 ns
Minimum pulse width:	50 ns
Maximum pulse repetition rate:	10 MHz (based on 10 samples per period)
0.5% settling time:	≤ 150 ns

### Triggering

**Trigger sources** Internal, external TTL, GPIB, LAN and USB

**Delay range** Delay range ± 1.0 s, maximum

**Delay resolution** 1% of delay setting  
10 ns minimum

#### Internal trigger

Range: - 20 to +20 dBm  
Resolution: 0.1 dB  
Level accuracy: 1 dB

**Timebase range:** 2 ns to 100 msec/div

### System configuration

**Display** LCD, color

**Save/recall** 10 settings stores (preset accessible on front panel)

**Secure mode** Erase the instrument memory of all user parameters (including save/recall states and power on last states)

**Connectivity I/O** Ethernet (LAN), USB, GPIB

### General specifications

**Operating temperature range** 0 to +55 °C

**Warranty** 1-year standard  
3-years optional  
5-years optional

1. P-Series power meters are compatible with all 8480, E-Series and P-Series power sensors.

## Literature References

*P-Series Power Meters and Power Sensors, technical overview*, literature number 5989-1049EN

*EPM-P Series Power Meters and E9320 Sensors, data sheet*, literature number 5980-1469E

*EPM Series Power Meters, E-Series and 8480 Series Power Sensors, data sheet*, literature number 5965-6382E

*Fundamentals of RF and Microwave Power Measurements (Part 1), application note 1449-1*, literature number 5988-9213EN

*Fundamentals of RF and Microwave Power Measurements (Part 2), application note 1449-2*, literature number 5988-9214EN

*Fundamentals of RF and Microwave Power Measurements (Part 3), application note 1449-3*, literature number 5988-9215EN

*Fundamentals of RF and Microwave Power Measurements (Part 4), application note 1449-4*, literature number 5988-9216EN

*4 Steps for Making Better Power Measurements, application note 64-4D*, literature number 5965-8167EN

*Choosing the Right Power Meter and Sensor, product note*, literature number 5968-7150E

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