Agilent Power Meters and Sensors

Explore the latest power meters and power sensors for RF and microwave measurements

Selection Guide

Peak Power Measurement

8990B peak power analyzer

- 5 ns rise time/fall time
- 100 MSa/s sampling rate
- 15 inch XGA color and touchscreen display

N8262A P-Series modular power meters

- 1U half-rack size
- 100 MSa/s continuous sampling, single-shot 30 MHz VBW
- Wireless presets include WLAN, radar and MCPA
- Code-compatible with N1912A P-Series power meter

N1911A/2A P-Series power meters

- 100 MSa/s continuous sampling, single-shot 30 MHz VBW
- Includes time-gated and statistical (CCDF) power measurements
- Wireless presets include WiMAX™, HSDPA and DME

E4416A/7A EPM-P Series power meters

- 20 MSa/s continuous sampling, 5 MHz VBW
- Bundled analyzer software for pulse and statistical analysis
- Wireless presets include GSM, Bluetooth™ and W-CDMA

Average Power Measurement

N1913A/14A EPM Series power meters

- Single, dual or four-channel measurements
- Frequency range of 9 kHz to 110 GHz; power range of –70 dBm to +44 dBm (depending on power sensor)
- Fast measurement speed of 400 readings/s
- Code-compatible with legacy E4418B/9B EPM Series, 436A, 437B and 438A power meters (43X compatibility only with option N191xA-200)

N432A thermistor power meters

- High Accuracy (≤ 0.2% ± 0.5 uW), excellent for 1 mW transfer calibration (with 478A-H75/H76)
- Built-in 6.5-digit ADC eliminates the need for an external DMM
- Digital color LCD display, and user-friendly interface

Portable Power Measurement

V3500A handheld RF power meters

- Broad 10 MHz to 6 GHz frequency range
- Wide dynamic range (–63 dBm to +20 dBm)
- Absolute accuracy up to ± 0.21 dB
- Built-in display with backlight and integrated power sensor
- Internal power reference enables self-calibration before use
- 3-ways power up capability (via AA batteries, USB interface, and AC power adaptor)

U2000 Series USB power sensors

- –60 dBm to +44 dBm, 9 kHz to 26.5 GHz average power measurements without power meters
- Quick and easy set up with USB connectivity
- Internal zeroing without disconnecting from device under-test
- Bundled N1918A Power Analysis Manager software for easy monitoring and troubleshooting

U8480 Series USB thermocouple power sensors

- DC/10 MHz to 18/33 GHz, –35 dBm to +20 dBm
- Measurement speed of 400 readings/second and power linearity of < 0.8%
- Built-in trigger in function
- Bundled with N1918A Power Panel software

U2020 X-series USB peak and average power sensors

- –35 dBm to +20 dBm, 50 MHz to 18 GHz/40 GHz
- > 3500 readings/second measurement speed (buffer mode)
- Quick and easy set up with USB connectivity and internal zero and calibration
- Built-in trigger in/trigger out

Power Sensors

Peak and Average power sensors

N1921A/22A P-Series power sensors
N1923A/24A wideband power sensors
E9320 E-Series power sensors

Average power sensors

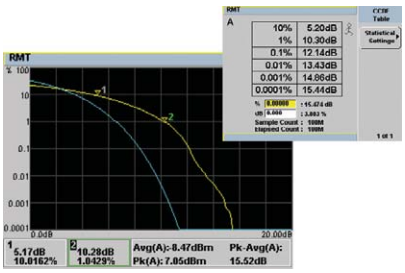
E4410, E9300 E-Series power sensors
N8480 Series thermocouple power sensors
848xD Series, V/W8486A diode power sensors
478A, 8478B thermistor power sensors

Anticipate ___Accelerate ___Achieve

Agilent Technologies

Designed for Manufacturing

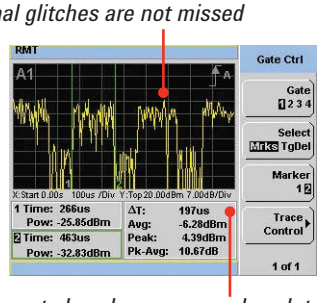
- **Up to 100 MSa/s sampling rate and 1500 readings/s** for high productivity
- **Code-compatible with legacy power meter** so you save time and effort in developing new codes
- **Backward-compatible with all legacy power sensors** to protect sensor investment
- **Wide selection of average and peak power sensors** for various applications
- **CCDF statistical measurement** in graphical and tabular formats for wireless component manufacturing



Designed for R&D

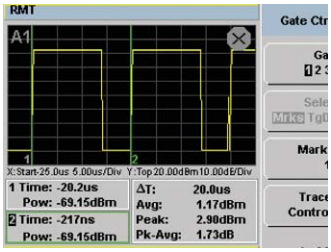
- **Calibration factors in EEPROM** ensures accurate measurements
- **Intuitive user interface** enables quick setup time
- **Graphical representation of delta** measurements eases visualization and analysis
- **Trace zoom** helps in investigating glitches, overshoot, and rise/fall time
- Capture wireless burst signals easily with P-Series power meter's **WLAN/GSM/LTE/WIMAX preset**

***100 MSa/s continuous sampling** ensures signal glitches are not missed*



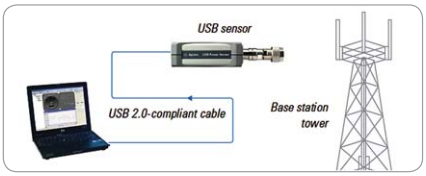
Time-gated peak, average and peak-to-average ratio power measurements

- Setting up faster and easier with **radar preset** in the P-Series power meter



Designed for Installation and Maintenance

- **Wide dynamic range** in E-Series, N8480 Series and 848xD Series power sensors allows high and low power measurements with a single sensor
- **Internal rechargeable battery option and operating case** add to the EPM Series power meter's portability
- **High resolution display with wide viewing angle and split-screen** eases reading in subdued lighting conditions
- **Light weight and palm size** V3500A and U2000 Series bring greater convenience in field tasks



When you need to take power measurements on the road or up a base station tower, smaller, lighter and fewer is better. With the U2000 Series USB power sensors, the only other thing you'll need is a laptop with the N1918A Power Analysis Manager installed.

Power Meters Selection Chart for Wireless Communication

Peak Power Measurement

EPM-P E4416A/17A
(VBW: 5 MHz)

Power sensor options

- E932x Peak-and-Average Sensors (300 kHz, 1.5 MHz, 5 MHz)

** Also compatible with all average power sensors*

P-Series
N1911A/12A
(VBW: 30 MHz)

U2020 X-Series
USB power sensors
(VBW: 30 MHz)

P-Series modular
N8262A
(VBW: 30 MHz)

Power sensor options for
the P-series meters

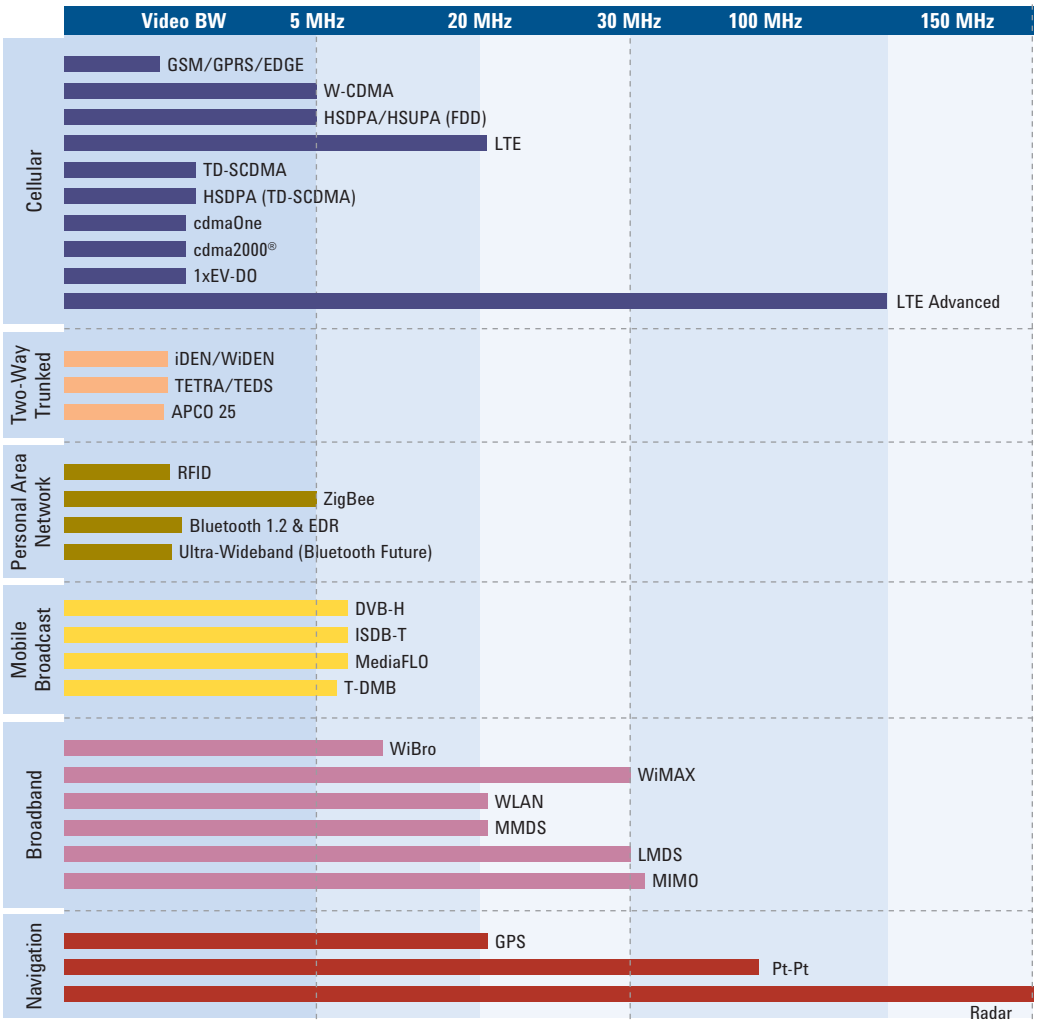
- N1921A/22A Wideband Sensors (30 MHz)
- E932x Peak-and-Average Sensors (300 kHz, 1.5 MHz, 5 MHz)

** Also compatible with all average power sensors*

8990B peak power analyzer
(VBW: 150 MHz)

Power sensor options

- N1923A/24A Wideband Sensors (30 MHz)
- N1921A/22A Wideband Sensors (30 MHz)



Average Power Measurement

EPM N1913A/14A

Power sensor options

- 848x Diode and Thermocouple Sensors
- N848x Thermocouple Sensors
- N848x and 848x Waveguide Sensors
- E441x 1-Path Diode CW-only Sensors
- E930x 2-Path Diode True-Average Sensors
- U200x USB Sensors

N432A Thermistor power meter

Power sensor options

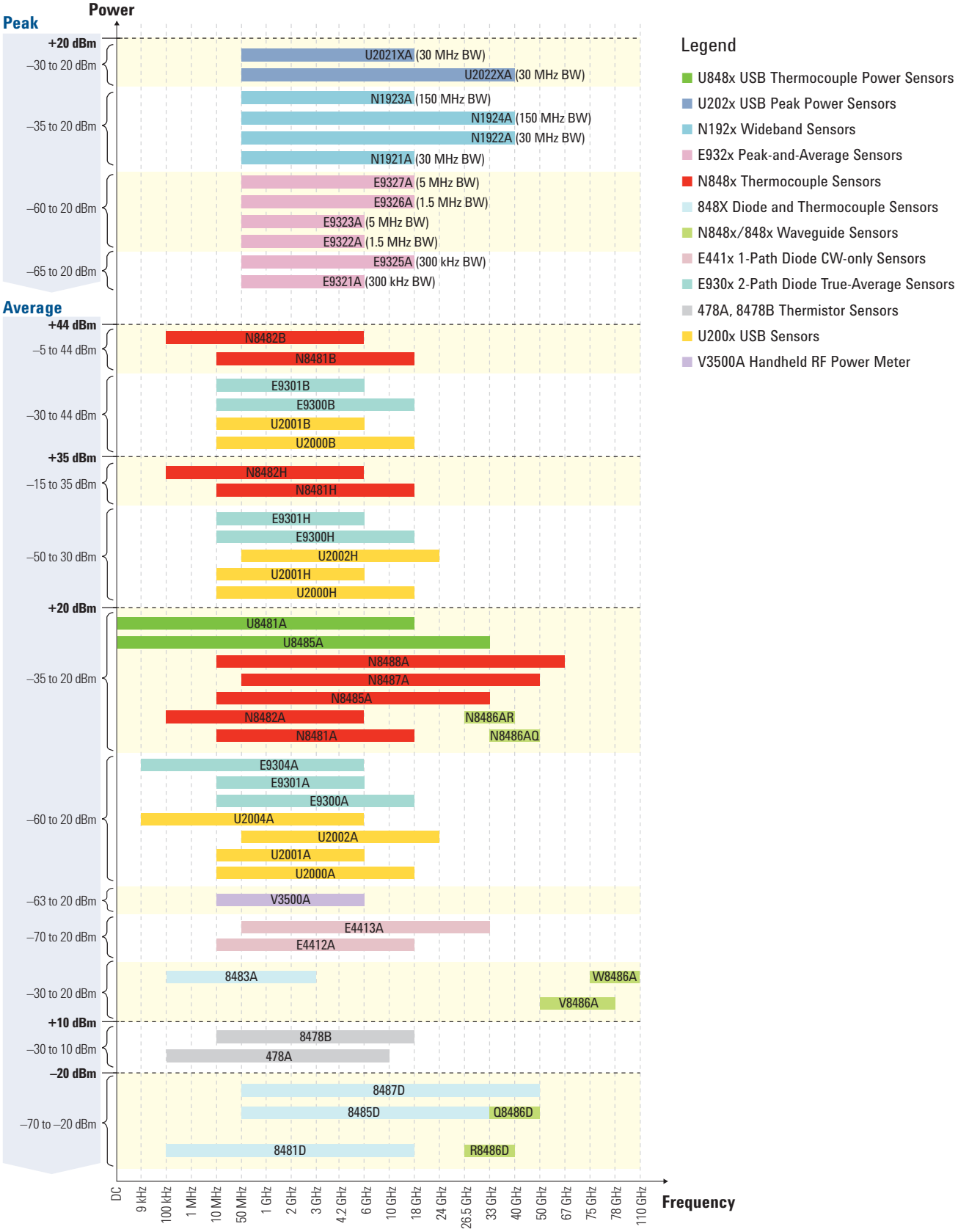
- 478A Thermistor Sensor
- 8478B Thermistor Sensor

U8480 Series USB thermocouple sensors

U2000 Series USB power sensors

V3500A handheld RF power meter

Power Sensors Selection Chart for Wireless Communication



Power Meters and Sensors Compatibility Table

			POWER METERS								
			N432A/432A [1]	E4416A/17A EPM-P	N1913A/14A E4418B/9B EPM [2]	E1416A VXI	N1911A/12A N8262A P-Series	8990B	Product Description / Sensor Tech.	Frequency Range	Power Range
POWER SENSORS	U8480 Series USB thermocouple sensors	U8481A	—	—	√[3]	—	—	√[4]	Thermocouple Power Sensor	DC/10 MHz to 18 GHz	–35 dBm (316 nW) to +20 dBm (100 mW)
		U8485A	—	—	√[3]	—	—	√[4]	Thermocouple Power Sensor	DC/10 MHz to 33 GHz	–35 dBm (316 nW) to +20 dBm (100 mW)
	X-series USB peak and average sensors	U2021XA	—	—	—	—	—	√[4]	Diode Power Sensor	50 MHz to 18 GHz	–35 dBm (316 nW) to +20 dBm (100 mW)
		U2022XA	—	—	—	—	—	√[4]	Diode Power Sensor	50 MHz to 40 GHz	–35 dBm (316 nW) to +20 dBm (100 mW)
	Wideband power sensors	N1923A	—	—	—	—	—	√	Diode Power Sensor	50 MHz to 18 GHz	–35 dBm (316 nW) to +20 dBm (100 mW)
		N1924A	—	—	—	—	—	√	Diode Power Sensor	50 MHz to 40 GHz	–35 dBm (316 nW) to +20 dBm (100 mW)
	P-Series Wideband sensors	N1921A	—	—	—	—	√	√	Diode Power Sensor	50 MHz to 18 GHz	–35 dBm (316 nW) to +20 dBm (100 mW)
		N1922A	—	—	—	—	√	√	Diode Power Sensor	50 MHz to 40 GHz	–35 dBm (316 nW) to +20 dBm (100 mW)
	E-Series Peak-and-Average sensors	E9321A	—	√	—	—	√	—	Diode Power Sensor	50 MHz to 6 GHz	–65 dBm (320 pW) to +20 dBm (100 mW)
		E9322A	—	√	—	—	√	—	Diode Power Sensor	50 MHz to 6 GHz	–60 dBm (1 nW) to +20 dBm (100 mW)
		E9323A	—	√	—	—	√	—	Diode Power Sensor	50 MHz to 6 GHz	–60 dBm (1 nW) to +20 dBm (100 mW)
		E9325A	—	√	—	—	√	—	Diode Power Sensor	50 MHz to 18 GHz	–65 dBm (320 pW) to +20 dBm (100 mW)
		E9326A	—	√	—	—	√	—	Diode Power Sensor	50 MHz to 18 GHz	–60 dBm (1 nW) to +20 dBm (100 mW)
		E9327A	—	√	—	—	√	—	Diode Power Sensor	50 MHz to 18 GHz	–60 dBm (1 nW) to +20 dBm (100 mW)
	E-Series True Average sensors	E9300A	—	√	√	—	√	—	Diode Power Sensor	10 MHz to 18 GHz	–60 dBm (1 nW) to +20 dBm (100 mW)
		E9301A	—	√	√	—	√	—	Diode Power Sensor	10 MHz to 6 GHz	–60 dBm (1 nW) to +20 dBm (100 mW)
		E9304A	—	√	√	—	√	—	Diode Power Sensor	9 kHz to 6 GHz	–60 dBm (1 nW) to +20 dBm (100 mW)
		E9300B	—	√	√	—	√	—	Diode Power Sensor	10 MHz to 18 GHz	–30 dBm (1 µW) to +44 dBm (25 W)
		E9301B	—	√	√	—	√	—	Diode Power Sensor	10 MHz to 6 GHz	–30 dBm (1 µW) to +44 dBm (25 W)
		E9300H	—	√	√	—	√	—	Diode Power Sensor	10 MHz to 18 GHz	–50 dBm (10 nW) to +30 dBm (1 W)
		E9301H	—	√	√	—	√	—	Diode Power Sensor	10 MHz to 6 GHz	–50 dBm (10 nW) to +30 dBm (1 W)
	E-Series CW-only sensors	E4412A	—	√	√	—	√	—	Diode Power Sensor	10 MHz to 18 GHz	–70 dBm (100 pW) to +20 dBm (100 mW)
		E4413A	—	√	√	—	√	—	Diode Power Sensor	50 MHz to 26.5 GHz	–70 dBm (100 pW) to +20 dBm (100 mW)
	N8480 / 8480 Series Thermocouple and Diode sensors	N8481A	—	√	√	—	√	—	Thermocouple Power Sensor	10 MHz to 18 GHz	–35 dBm (316 nW) to +20 dBm (100 mW)
		N8482A	—	√	√	—	√	—	Thermocouple Power Sensor	100 kHz to 6 GHz	–35 dBm (316 nW) to +20 dBm (100 mW)
		8483A	—	√	√	√	√	—	Thermocouple Power Sensor	100 kHz to 2 GHz	–30 dBm (1 µW) to +20 dBm (100 mW)
		N8485A	—	√	√	—	√	—	Thermocouple Power Sensor	10 MHz to 26.5 GHz	–35 dBm (316 nW) to +20 dBm (100 mW)
		N8487A	—	√	√	—	√	—	Thermocouple Power Sensor	50 MHz to 50 GHz	–35 dBm (316 nW) to +20 dBm (100 mW)
		N8488A	—	√	√	—	√	—	Thermocouple Power Sensor	10 MHz to 67 GHz	–35 dBm (316 nW) to +20 dBm (100 mW)

1. *The 432A model is superceded by the N432A.*
2. *The E4418B/19B models are superceded by the N1913A/14A.*
3. *Only with N1913A/14A.*
4. *Requires the N1918A Power Analysis Manager software.*

* *For the complete list of sensor options, please visit our Web site at* ***www.agilent.com/find/powermeters****.*

Power Meters and Sensors Compatibility Table

			POWER METERS								
			N432A/432A [1]	E4416A/17A EPM-P	N1913A/14A E4418B/9B EPM [2]	E1416A VXI	N1911A/12A N8262A P-Series	8990B	Product Description / Sensor Tech.	Frequency Range	Power Range
POWER SENSORS	N8480 / 8480 Series Thermocouple and Diode sensors	N8481B	—	√	√	—	√	—	High Power Thermocouple Sensor	10 MHz to 18 GHz	–5 dBm (316 µW) to +44 dBm (25 W)
		N8482B	—	√	√	—	√	—	High Power Thermocouple Sensor	100 kHz to 6 GHz	–5 dBm (316 µW) to +44 dBm (25 W)
		N8481H	—	√	√	—	√	—	High Power Thermocouple Sensor	10 MHz to 18 GHz	–15 dBm (32 µW) to +35 dBm (3 W)
		N8482H	—	√	√	—	√	—	High Power Thermocouple Sensor	100 kHz to 6 GHz	–15 dBm (32 µW) to +35 dBm (3 W)
		8481D	—	√	√	√	√	—	Diode Power Sensor	10 MHz to 18 GHz	–70 dBm (100 pW) to –20 dBm (10 µW)
		8485D	—	√	√	√	√	—	Diode Power Sensor	50 MHz to 26.5 GHz	–70 dBm (100 pW) to –20 dBm (10 µW)
		8487D	—	√	√	√	√	—	Diode Power Sensor	50 MHz to 50 GHz	–70 dBm (100 pW) to –20 dBm (10 µW)
	Waveguide sensors	R8486D	—	√	√	√	√	—	Waveguide Power Sensor	26.5 GHz to 40 GHz	–70 dBm (100 pW) to –20 dBm (10 µW)
		Q8486D	—	√	√	√	√	—	Waveguide Power Sensor	33 GHz to 50 GHz	–70 dBm (100 pW) to –20 dBm (10 µW)
		N8486AR	—	√	√	—	√	—	Thermocouple Waveguide Power Sensor	26.5 GHz to 40 GHz	–35 dBm (316 µW) to +20 dBm (100 mW)
		N8486AQ	—	√	√	—	√	—	Thermocouple Waveguide Power Sensor	33 GHz to 50 GHz	–35 dBm (316 µW) to +20 dBm (100 mW)
		V8486A	—	√	√	√	√	—	V-band Power Sensor	50 GHz to 75 GHz	–30 dBm (1 µW) to +20 dBm (100 mW)
		W8486A	—	√	√	√	√	—	Waveguide Power Sensor	75 GHz to 110 GHz	–30 dBm (1 µW) to +20 dBm (100 mW)
	Thermistor mount sensors	478A	√	—	—	—	—	—	Coaxial Thermistor Mount	10 MHz to 10 GHz	–30 dBm (1 µW) to +10 dBm (10 mW)
		8478B	√	—	—	—	—	—	Coaxial Thermistor Mount	10 MHz to 18 GHz	–30 dBm (1 µW) to +10 dBm (10 mW)
	USB average sensors	U2000A	—	—	√[3]	—	—	√[4]	Diode Power Sensor	10 MHz to 18 GHz	–60 dBm (1 nW) to +20 dBm (100 mW)
		U2001A	—	—	√[3]	—	—	√[4]	Diode Power Sensor	10 MHz to 6 GHz	–60 dBm (1 nW) to +20 dBm (100 mW)
		U2002A	—	—	√[3]	—	—	√[4]	Diode Power Sensor	50 MHz to 24 GHz	–60 dBm (1 nW) to +20 dBm (100 mW)
		U2004A	—	—	√[3]	—	—	√[4]	Diode Power Sensor	9 kHz to 6 GHz	–60 dBm (1 nW) to +20 dBm (100 mW)
		U2000B	—	—	√[3]	—	—	√[4]	Diode Power Sensor	10 MHz to 18 GHz	–30 dBm (1 µW) to +44 dBm (25 W)
		U2001B	—	—	√[3]	—	—	√[4]	Diode Power Sensor	10 MHz to 6 GHz	–30 dBm (1 µW) to +44 dBm (25 W)
		U2000H	—	—	√[3]	—	—	√[4]	Diode Power Sensor	10 MHz to 18 GHz	–50 dBm (10 nW) to +30 dBm (1 W)
		U2001H	—	—	√[3]	—	—	√[4]	Diode Power Sensor	10 MHz to 6 GHz	–50 dBm (10 nW) to +30 dBm (1 W)
		U2002H	—	—	√[3]	—	—	√[4]	Diode Power Sensor	50 MHz to 24 GHz	–50 dBm (10 nW) to +30 dBm (1 W)
	Discontinued 848x sensors	8481/2/5/7A	—	√	√	√	√	—	Thermocouple Power Sensor	100 kHz to 50 GHz	–30 dBm (1 µW) to +20 dBm (100 mW)
		848xB/H	—	√	√	√	√	—	High Power Thermocouple Sensor	100 kHz to 18 GHz	–10 dBm (100 µW) to +44 dBm (25 W)
		R8486A	—	√	√	√	√	—	Thermocouple Waveguide Power Sensor	26.5 GHz to 40 GHz	–30 dBm (1 µw) to +20 dBm (100 mW)
		Q8486A	—	√	√	√	√	—	Thermocouple Waveguide Power Sensor	33 GHz to 50 GHz	–30 dBm (1 µw) to +20 dBm (100 mW)

1. *The 432A model is superceded by the N432A.*
2. *The E4418B/19B models are superceded by the N1913A/14A.*
3. *Only with N1913A/14A.*
4. *Requires the N1918A Power Analysis Manager software.*

* *For the complete list of sensor options, please visit our Web site at* ***www.agilent.com/find/powermeters****.*

Related Agilent Literature

Publication title	Pub number
Specifications	
Agilent N432A Thermistor Power Meter Data Sheet	5990-5740EN
Agilent N8262A P-Series Modular Power Meter and Power Sensors Data Sheet	5989-6605EN
Agilent N1911A/N1912A P-Series Power Meters and N1921A/N1922A Wideband Power Sensors Data Sheet	5989-2471EN
Agilent U2000 Series USB Power Sensors Data Sheet	5989-6278EN
Agilent E4416A/E4417A EPM-P Series Power Meters and E-Series E9320 Peak and Average Power Sensors Data Sheet	5980-1469E
Agilent N1913A and N1914A EPM Series Power Meters Data Sheet	5990-4019EN
Agilent E4418B/E4419B EPM Series Power Meters, E-Series and 8480 Series Power Sensors Data Sheet	5965-6382E
Agilent N8480 Series Thermocouple Power Sensors Data Sheet	5989-9333EN
Agilent V3500A Handheld RF Power Meter Data Sheet	5990-5483EN
Agilent N1918A Power Analysis Manager Data Sheet	5989-6612EN
Agilent 8990B Peak Power Analyzer and N1923A/N1924A Wideband Power Sensors Data Sheet	5990-8126EN
Agilent U2020 X-series Peak and Average Power Sensors Data Sheet	5990-0310EN
Agilent U8480 Series USB Thermocouple Power Sensors Data Sheet	5991-1410EN
Application Notes	
Agilent Choosing the Right Power Meter and Sensor Product Note	5968-7150E
Agilent Fundamentals of RF and Microwave Power Measurements (Part 1) Application Note 1449-1	5988-9213EN
Agilent Fundamentals of RF and Microwave Power Measurements (Part 2) Application Note 1449-2	5988-9214EN
Agilent Fundamentals of RF and Microwave Power Measurements (Part 3) Application Note	5988-9215EN
Agilent Fundamentals of RF and Microwave Power Measurements (Part 4) Application Note	5988-9216EN
Agilent P-Series Power Sensor Internal Zeroing and Calibration for RF Power Sensors Application Note	5989-6509EN
Agilent N1911A/N1912A P-Series Power Meters For WiMAX™ Signal Measurements Demo Guide	5989-6423EN
Agilent 4 Steps for Making Better Power Measurements Application Note 64-4D	5965-8167E
Agilent EPM-P Series Power Meters Used in Radar and Pulse Applications Application Note 1438	5988-8522EN
Agilent Compatibility of the U2000 Series USB Power Sensors with Agilent Instruments Application Note	5989-8743EN
Agilent N1918A Radar Pulse Measurement Application Note	5990-3415EN
MIMO Measurement Tips with Agilent P-Series Power Meters and U2000 Series USB Power Sensors Application Note	5990-3546EN
Agilent P-Series and EPM-P Power Meters for Bluetooth Testing Technical Overview and Self-Guided Demonstration	5989-8459EN
Agilent Maximizing Measurement Speed Using P-Series Power Meters Application Note	5989-7678EN
Agilent Using Linux® To Control the U2000 Series USB Power Sensors Product Note	5989-8744EN

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