DATA SHEET

N8480 Series
Thermocouple Power Sensors

KEYSIGHT TECHNOLOGIES

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Introduction

The Keysight Technologies, Inc. N8480 Series thermocouple power sensors are amongst the most accurate and reliable sensors, plus they include EEPROM, and extended frequency and power ranges.

Accurate, repeatable measurements

Here's how: Excellent linearity (1% approximately) and noise specifications. The sensors' low SWR further enhances accuracy by minimizing mismatch uncertainty. These sensors also come with dual-range power for greater sensitivity to fluctuating signals. With high accuracy and stability, the N8480 helps you test confidently, faster.

Calibration-easy testing

During test, calibrating your sensor is an essential step. Minimizing the time this step takes is essential. The N8480 sensor eliminates cumbersome keying-in of the calibration factor (CF), eliminates manual input errors, and saves you time and effort. CF, linearity, and temperature corrections are all stored in the sensors' EEPROM—auto-downloaded on calibration. The N8480 Series streamlines the calibration procedure making overall testing faster and more efficient.

One sensor, WIDEST range

Pick an N8480 sensor and you'll see how its wide dynamic range equips you for various applications: metrology labs, radar, mobile radio, TDMA, GSM, W-CDMA, and WiMAX™, among others. With up to 55 dBm wide dynamic range, the N8480 Series offers you the widest thermocouple sensor power range in the industry.

System integration can be difficult, but not with the N8480

The N8480 Series sensors are backward compatible with the Keysight leading range of power meters, including the P-Series, EPM-P Series, and EPM Series. All that's needed is a simple firmware upgrade that's downloadable for free from the Website.

All SCPI codes used on the E-Series sensors are re-usable on the N8480, including most of the codes used on the 8480 Series. When migrating code from the 8480 Series, Option CFT [1] will allow SCPI codes to behave much like they do on the 8480 Series.

1. Option CFT is not available for the N8488A power sensor.

Features

- High accuracy with excellent linearity and noise specifications
- Wide dynamic range in a single sensor
- Auto-download of calibration factor and corrections from EEPROM
- Option CFT provides full code compatibly between sensors and the 8480 Series (excluding the N8488A)
- Broad compatibility with existing power meters: P-Series (N1911A/12A), EPM-P Series (E4416A/17A), and EPM Series (N1913A/14A, E4418B/19B)

Compatible Power Meters

To get your existing power meters up-and-running in supporting the N8480 Series, just download their firmware upgrades online at

www.keysight.com > Technical Support > Drivers & Software > Firmware Update

Power meter	Model number	Compatible firmware revision
EPM Series power meters	E4418B	A1.09.01 and above
	E4419B	A2.09.01 and above
	N1913A	A.01.00 and above
	N1914A	A.01.00 and above
EPM-P Series power meters	E4416A	A1.05.01 and above
	E4417A	A2.05.01 and above
P-Series power meters	N1911A	A.05.02 and above
	N1912A	A.05.02 and above

Specification Definitions

There are two types of product specifications:

- Warranted specifications
- Characteristic specifications

Warranted specifications

Warranted specifications are covered by the product warranty and apply over 0 to 55 °C, unless otherwise noted. Warranted specifications include measurement uncertainty calculated with 95% confidence.

Characteristic specifications

Characteristic specifications are not warranted. They describe product performance that is useful in the application of the power sensors by giving typical, but non-warranted performance parameters. These characteristics are shown in *italics* or denoted as “typical,” “nominal” or “approximate.”

Characteristic information is representative of the product. In many cases, it may also be supplemental to a warranted specification.

Characteristic specifications are not verified on all power sensors. The types of characteristic specifications can be placed in two groups:

- The first group of characteristic types describes ‘attributes’ common to all products of a given model or option. Examples of characteristics that describe attributes are product weight and 50-Ω input Type-N connector. In these examples, product weight is an approximate value and a 50-Ω input is nominal. These two terms are most widely used when describing a product’s attributes.
- The second group of characteristic types describes ‘statistically’ the aggregate performance of the population of products. These characteristics describe the expected behavior of the population of products. They do not guarantee the performance of any individual product. No measurement uncertainty value is accounted for in the specification. These specifications are referred to as typical.

Conditions

The power meter and power sensor meet their specifications when:

- Stored for a minimum of two hours at a stable temperature within the operating temperature range and turned on for at least 30 minutes
- The power meter and power sensor are within their recommended calibration periods
- Used in accordance to the information provided in the power meter’s user’s guide

Performance Characteristics

Specifications stated hereon refer to all N8480 Series power sensors, unless otherwise stated. The term “standard” refers to all N8480 Series sensors except Option CFT.

Frequency and dynamic power range

Sensor option	Sensor model	Frequency range	Dynamic power range
Standard	N8481A	10 MHz to 18 GHz	–35 to +20 dBm
	N8482A	100 kHz to 6 GHz	
	N8485A	10 MHz to 26.5 GHz	
	N8485A - Option 033	10 MHz to 33 GHz	
	N8487A	50 MHz to 50 GHz	
	N8488A	10 MHz to 67 GHz	
		67 GHz to 70 GHz	
	N8486AR	26.5 to 40 GHz	
	N8486AQ	33 to 50 GHz	
	N8481B	10 MHz to 18 GH	–5 to +44 dBm
	N8482B	100 kHz to 6 GHz	
	N8481H	10 MHz to 18 GHz	–15 to +35 dBm
	N8482H	100 kHz to 6 GHz	
Option CFT	N8481A	10 MHz to 18 GHz	–30 to +20 dBm
	N8482A	100 kHz to 6 GHz	
	N8485A	10 MHz to 26.5 GHz	
	N8485A - Option 033	10 MHz to 33 GHz	
	N8487A	50 MHz to 50 GHz	
	N8486AR	26.5 to 40 GHz	
	N8486AQ	33 to 50 GHz	
	N8481B	10 MHz to 18 GHz	0 to +44 dBm
	N8482B	100 kHz to 6 GHz	
	N8481H	10 MHz to 18 GHz	–10 to +35 dBm
	N8482H	100 kHz to 6 GHz	

Damage level

Sensor model	Damage level (average power)	Damage level (peak power)
N8481A	+25 dBm	15 W/2 µs
N8482A		
N8485A		
N8487A		
N8488A		
N8486AR		
N8486AQ		
N8481B N8482B	+49 dBm	500 W/1 µs
N8481B N8482B		
N8481H N8482H	+40 dBm	100 W/1 µs
N8481H N8482H		

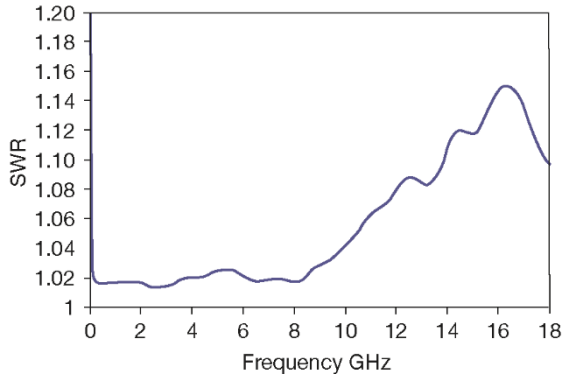
Maximum SWR

		Maximum SWR	
Sensor model	**Frequency band**	**25 ± 10 °C**	**0 to 55 °C**
N8481A	10 to 30 MHz	1.37	1.57
	> 30 to 50 MHz	1.14	1.16
	> 50 MHz to 2 GHz	1.08	1.11
	> 2 to 12.4 GHz	1.16	1.16
	> 12.4 to 18 GHz	1.23	1.25
N8482A	100 to 300 kHz	1.54	1.57
	> 300 kHz to 1 MHz	1.17	1.17
	> 1 MHz to 2 GHz	1.06	1.06
	> 2 to 6 GHz	1.07	1.08
N8485A	10 to 50 MHz	1.33	1.53
	> 50 to 100 MHz	1.08	1.11
	> 100 MHz to 2 GHz	1.05	1.07
	> 2 to 12.4 GHz	1.14	1.14
	> 12.4 to 18 GHz	1.19	1.20
	> 18 to 26.5 GHz	1.26	1.28
	> 26.5 to 33 GHz [1]	1.32	1.36

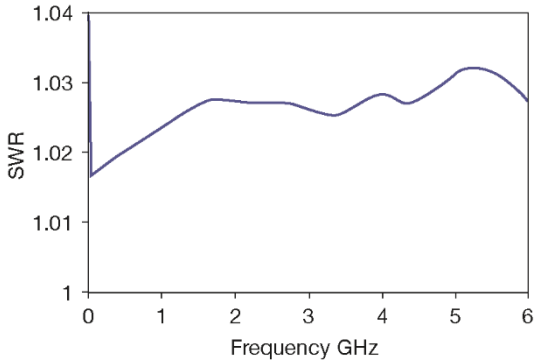
1. Only applicable for N8485A Option 033.

N8487A	50 to 100 MHz	1.08	1.10
	> 100 MHz to 2 GHz	1.05	1.07
	> 2 to 12.4 GHz	1.10	1.10
	> 12.4 to 18 GHz	1.16	1.16
	> 18 to 26.5 GHz	1.22	1.22
	> 26.5 to 40 GHz	1.30	1.30
	> 40 to 50 GHz	1.34	1.33
N8488A	10 to 100 MHz	1.08	1.08
	>100 MHz to 2.4 GHz	1.08	1.08
	> 2.4 to 12.4 GHz	1.10	1.10
	> 12.4 to 18 GHz	1.12	1.14
	> 18 to 26.5 GHz	1.21	1.23
	> 26.5 to 40 GHz	1.30	1.31
	> 40 to 67 GHz	1.46	1.47
	> 67 to 70 GHz	*1.48*	*1.50*
N8486AR	50 MHz [2]	1.17	1.20
	26.5 to 40 GHz	1.40	1.40
N8486AQ	50 MHz [2]	1.17	1.20
	33 to 50 GHz	1.50	1.50
N8481B	10 MHz to 2 GHz	1.09	1.10
	> 2 to 12.4 GHz	1.14	1.18
	> 12.4 to 18 GHz	1.23	1.28
N8482B	100 kHz to 2 GHz	1.08	1.10
	> 2 to 6 GHz	1.16	1.18
N8481H	10 MHz to 8 GHz	1.16	1.16
	> 8 to 12.4 GHz	1.22	1.22
	> 12.4 to 18 GHz	1.32	1.41
N8482H	100 kHz to 6 GHz	1.13	1.14

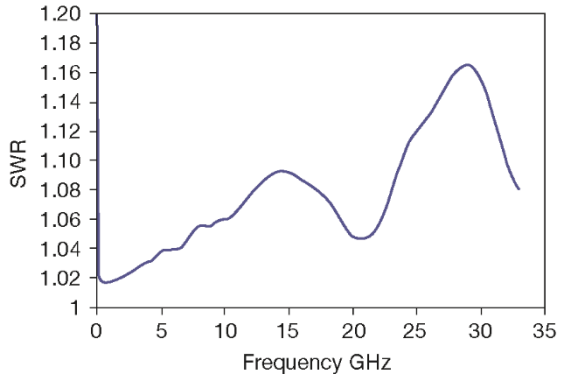
2. SWR for 50 MHz calibration port. Type-N (m) coaxial connector is used in the 50 MHz calibration.



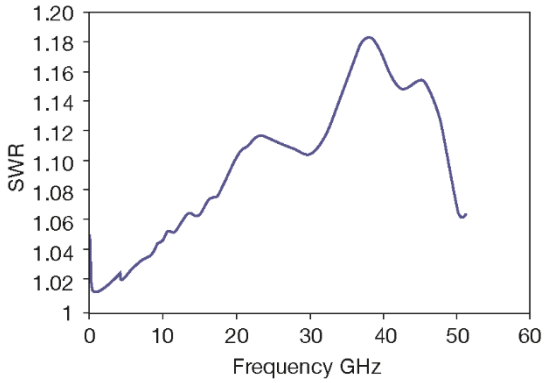
Typical SWR, 10 MHz to 18 GHz (25 ± 10 °C) for N8481A sensor



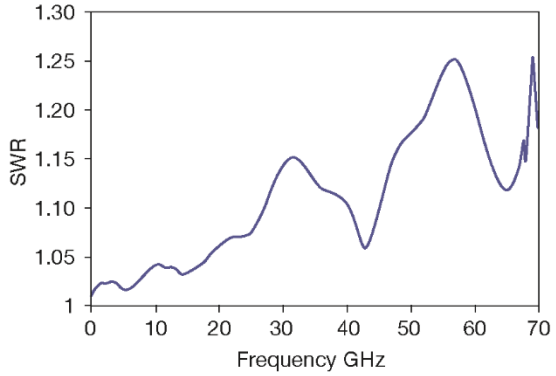
Typical SWR, 100 kHz to 6 GHz (25 ± 10 °C) for N8482A sensor



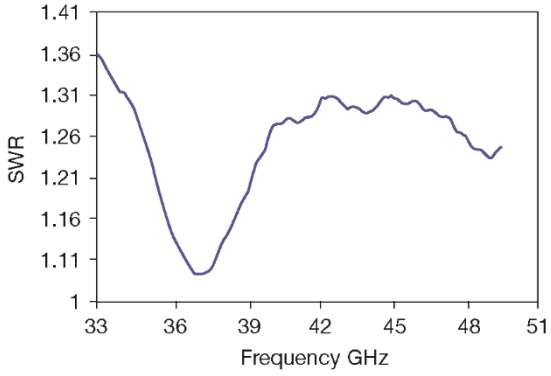
Typical SWR, 10 MHz to 26.5 GHz (25 ± 10 °C) for N8485A sensor



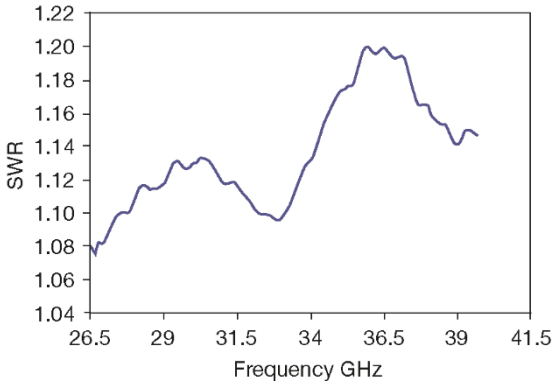
Typical SWR, 50 MHz to 50 GHz (25 ± 10 °C) for N8487A power sensor



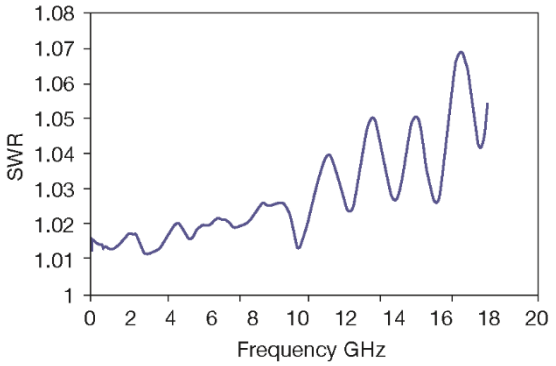
Typical SWR, 10 MHz to 70 GHz (25 ± 10 °C) for N8488A power sensor



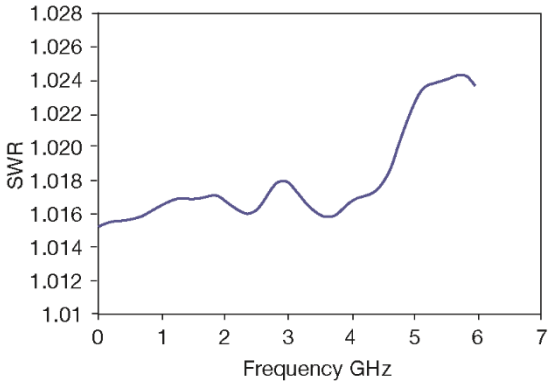
Typical SWR, 33 to 50 GHz (25 ± 10 °C) for N8486AQ power sensor



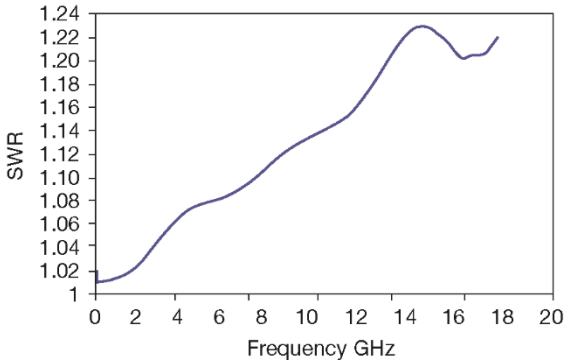
Typical SWR, 26.5 to 40 GHz (25 ± 10 °C) for N8486AR power sensor



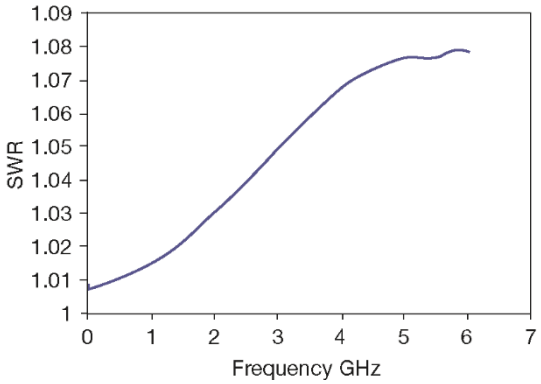
Typical SWR, 10 MHz to 18 GHz (25 ± 10 °C) for N8481B power sensor



Typical SWR, 100 kHz to 6 GHz (25 ± 10 °C) for N8482B power sensor



Typical SWR, 10 MHz to 18 GHz (25 ± 10 °C) for N8481H power sensor



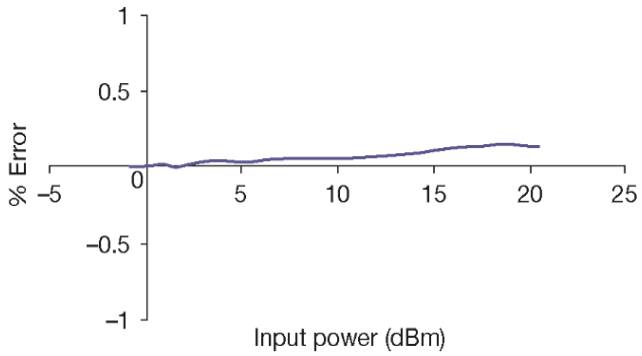
Typical SWR, 100 kHz to 6 GHz (25 ± 10 °C) for N8482H power sensor

Power linearity [1]

The N8480 Series power sensors' linearity is negligible except for the power range specified in the table below.

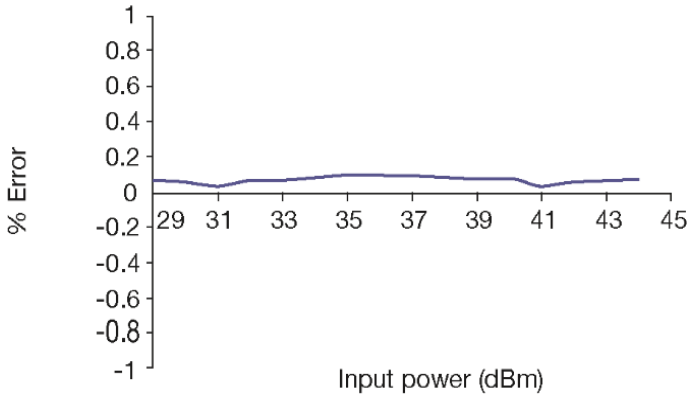
Sensor model	Power range	Linearity (25 ±10 °C)	Linearity (0 to 55 °C)
N8481A, N8482A, N8485A, N8487A, N8488A, N8486AR, N8486AQ	–1 to < +15 dBm	± 0.52%	± 0.80%
	+15 to +20 dBm	± 0.80%	± 1.90%
N8481B, N8482B	+29 to < +39 dBm	± 0.52%	± 0.80%
	+39 to +44 dBm	± 1.66%	± 2.75%
N8481H, N8482H	+17 to < +30 dBm	± 0.77%	± 1.05%
	+30 to +35 dBm	± 2.84%	± 3.93%

1. After zero and calibration at ambient environment conditions.



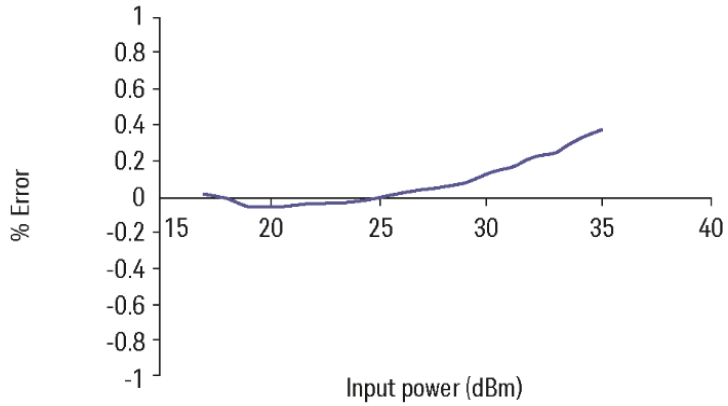
Typical N8481A/2A/5A/7A/8A and N8486AR/AQ power linearity at 25 °C, after zero and calibration with associated measurement uncertainty

Power level	Measurement uncertainty
–1 to +20 dBm	*± 0.35%*



Typical N8481B/2B power linearity at 25 °C, after zero and calibration with associated measurement uncertainty

Power level	Measurement uncertainty
29 to 40 dBm	± *0.35%*
40 to 44 dBm	± *1.21%*



Typical N8481H/2H power linearity at 25°C, after zero and calibration with associated measurement uncertainty

Power level	Measurement uncertainty
17 to 30 dBm	± *0.60%*
30 to 35 dBm	± *2.39%*

Zero set, zero drift and measurement noise

Sensor model	Sensor option	Range	Conditions (RH) [1]	Zero set [4]	Zero drift [2, 4]	Measurement noise [3, 4]
N8481A, N8482A, N8485A, N8487A, N8486AR, N8486AQ	Standard	Upper	Up to 70%	± 63 nW	< ± *7 nW*	< *114 nW*
		Lower	Up to 70 %	± 25 nW	< ± *3 nW*	< *80 nW*
	Option CFT	N/A [5]	Up to 70%	± 63 nW	< ± *7 nW*	< *114 nW*
N8488A	Standard	Upper	Up to 70%	± 63 nW	< ± *7 nW*	< *114 nW*
		Lower	Up to 70 %	± 25 nW	< ± *3 nW*	< *80 nW*
	Option CFT	N/A [5]	N/A [5]	N/A [5]	*N/A* [5]	*N/A* [5]
N8481B, N8482B	Standard	Upper	Up to 70%	± 63 µW	< ± *7 µW*	< *114 µW*
		Lower	Up to 70 %	± 25 µW	< ± *3 µW*	< *80 µW*
	Option CFT	N/A [5]	Up to 70%	± 63 µW	< ± *7 µW*	< *114 µW*
N8481H, N8482H	Standard	Upper	Up to 70%	± 6.3 µW	< ± *0.7 µW*	< *11.4 µW*
		Lower	Up to 70 %	± 2.5 µW	< ± *0.3 µW*	< *8 µW*
	Option CFT	N/A [5]	Up to 70%	± 6.3 µW	< ± *0.7 µW*	< *11.4 µW*

1. RH is the abbreviation for relative humidity.
2. Average hourly drift, at constant temperature. If there is an abrupt change of temperature, it is strongly recommended to perform zeroing or waiting for 30 minutes before taking the measurement.
3. The number of averages at 16 for normal mode and 32 for x2 mode, at a constant temperature, measured over one-minute interval and two standard deviations.
4. The zero set, zero drift, and measurement noise specifications are tested at 50 MHz.
5. N/A is the abbreviation for “not applicable.”

Effects of Averaging on Noise

Averaging over 1 to 1024 readings is available for reducing noise. The table below provides the measurement noise for a sensor with the number of averages set at 16 (for normal mode) and 32 (for x2 mode). Use the noise multiplier, for the appropriate mode (normal or x2) and number of averages, to determine the total measurement noise value.

Example:

N8481A power sensor, normal mode, number of averages = 4

Measurement noise calculation:

< 80 nW x 2.75 = < 220 nW

Number of averages	1	2	4	8	16	32	64	128	256	512	1024
Noise multiplier											
Normal mode	*5.5*	*3.89*	*2.75*	*1.94*	*1*	*0.85*	*0.61*	*0.49*	*0.34*	*0.24*	*0.17*
x2 mode	*6.5*	*4.6*	*3.25*	*2.3*	*1.63*	*1*	*0.72*	*0.57*	*0.41*	*0.29*	*0.2*

Switching point

The N8480 Series power sensors (excluding Option CFT) have two measurement ranges: a lower power range and an upper power range. The power meter automatically selects the proper power level range. To avoid unnecessary switching when the power level is near the switch point, switching point hysteresis has been added.

N8481A/82A/85A/87A/88A and N8486AQ/AR power sensors

This hysteresis causes the lower power range to remain selected until approximately –0.5 dBm as the power level is increased. Above this power, the upper power range is selected. Likewise, the upper power range remains selected until approximately –1.5 dBm as the signal level decreases. Below this power, the lower power range is selected.

N8481B/82B power sensors

This hysteresis causes the lower power range to remain selected until approximately 29.5 dBm as the power level is increased. Above this power, the upper power range is selected.

Likewise, the upper power range remains selected until approximately 28.5 dBm as the signal level decreases. Below this power, the lower power range is selected.

N8481H/82H power sensors

This hysteresis causes the lower power range to remain selected until approximately 17.5 dBm as the power level is increased. Above this power, the upper power range is selected.

Likewise, the upper power range remains selected until approximately 16.5 dBm as the signal level decreases. Below this power, the lower power range is selected.

Power range in range setting

Sensor	Range setting	Lower range	Upper range
N8481A/82A/85A/87A/88A and N8486AQ/AR excluding Option CFT	AUTO (default)	-35 to –1 dBm	-1 to +20 dBm
	LOWER	-35 to –1 dBm	—
	UPPER [1]	—	-30 to +20 dBm
N8481B/82B excluding Option CFT	AUTO (default)	-5 to +29 dBm	+29 to +44 dBm
	LOWER	-5 to +29 dBm	—
	UPPER [1]	—	0 to +44 dBm
N8481H/82H excluding Option CFT	AUTO (default)	-15 to +17 dBm	+17 to +35 dBm
	LOWER	-15 to +17 dBm	—
	UPPER [1]	—	-10 to +35 dBm

1. Recommended for pulse signals measurement with period of more than one second.

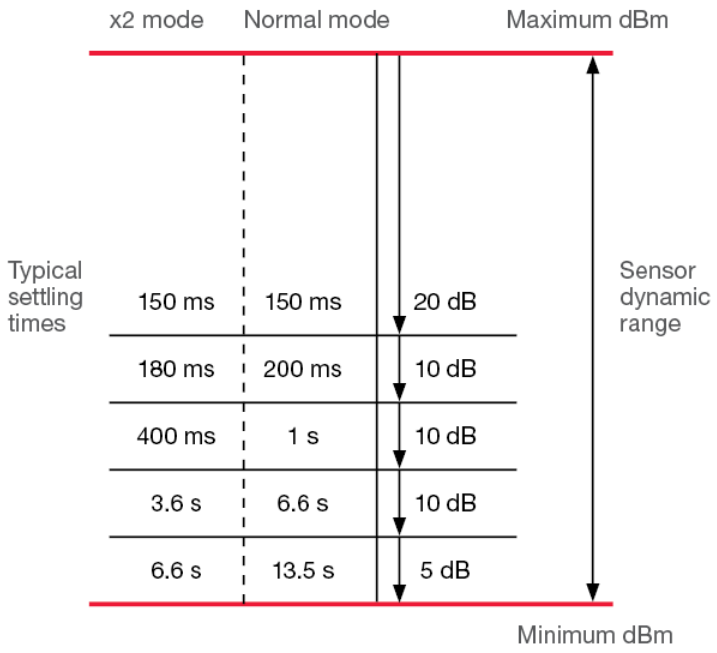
Settling time [1]

Manual filter, 10-dB decreasing power step for normal and x2 modes (not across switching point).

Number of averages	1	2	4	8	16	32	64	128	256	512	1024
Settling time (s) [1]											
Normal mode	*0.15*	*0.2*	*0.3*	*0.5*	*1.1*	*1.9*	*3.4*	*6.6*	*13*	*27*	*57*
x2 mode	*0.15*	*0.18*	*0.22*	*0.35*	*0.55*	*1.1*	*1.9*	*3.5*	*6.9*	*14.5*	*33*

1. Settling time: 0 to 99% settled readings over the GPIB.

Auto filter, default resolution, 10-dB decreasing power step for normal and x2 modes (not across switching point)



Calibration factor and reflection coefficient

Calibration factor (CF) and reflection coefficient (Rho) data are unique to each sensor. The CF corrects for the frequency response of the sensor. The Keysight EPM Series, EPM-P Series, and P-Series power meters automatically read the CF data stored in the sensor's EEPROM and use it to make the corrections.

The reflection coefficient (Rho or ρ) relates to the SWR according to the following formula:

$$SWR = \frac{1+\rho}{1-\rho}$$

Maximum relative measurement uncertainties of the calibration factor (CF) are listed in the following table. There is only one set of CF data used for both the high and low range of each sensor. The uncertainty analysis for the calibration of the sensors was done in accordance with the ISO Guide. The uncertainty data reported on the calibration certificate is the expanded uncertainty with a 95% confidence level and a coverage factor of 2.

Calibration factor relative uncertainty [1]

N8481A frequency band	25 °C ± 3 °C	25 °C ± 10 °C	0 °C to 55 °C
10 to 30 MHz	1.00	1.65	4.64
> 30 to 500 MHz	0.87	1.13	1.67
> 500 MHz to 1.2 GHz	0.82	1.01	1.69
> 1.2 to 6 GHz	0.96	1.28	2.09
> 6 to 14 GHz	1.16	1.75	2.52
> 14 to 18 GHz	1.57	2.15	3.25

N8481B frequency band	25 °C ± 3 °C	25 °C ± 10 °C	0 °C to 55 °C
10 to 30 MHz	1.70	2.26	3.92
> 30 to 500 MHz	1.48	1.91	2.22
> 500 MHz to 1.2 GHz	1.48	1.91	2.49
> 1.2 to 6 GHz	1.56	1.95	2.83
> 6 to 14 GHz	1.65	2.57	3.69
> 14 to 18 GHz	1.82	3.10	4.20

N8481H frequency band	25 °C ± 3 °C	25 °C ± 10 °C	0 °C to 55 °C
10 to 30 MHz	1.05	1.67	3.11
> 30 to 500 MHz	0.74	0.95	1.29
> 500 MHz to 1.2 GHz	0.72	0.98	1.43
> 1.2 to 6 GHz	0.97	1.33	1.87
> 6 to 14 GHz	1.16	3.57	4.51
> 14 to 18 GHz	1.69	6.97	9.70

N8482A frequency band	25 °C ± 3 °C	25 °C ± 10 °C	0 °C to 55 °C
100 kHz to 10 MHz	0.91	1.28	1.59
> 10 to 30 MHz	0.79	1.04	1.28
> 30 to 500 MHz	0.76	1.02	1.16
> 500 MHz to 1.2 GHz	0.75	1.05	1.54
> 1.2 to 6 GHz	0.95	1.87	1.99

N8482B frequency band	25 °C ± 3 °C	25 °C ± 10 °C	0 °C to 55 °C
100 kHz to 10 MHz	1.54	2.46	2.67
> 10 to 30 MHz	1.44	1.82	2.19
> 30 to 500 MHz	1.47	1.81	2.17
> 500 MHz to 1.2 GHz	1.43	1.88	2.12
> 1.2 to 6 GHz	1.55	2.67	3.91

N8482H frequency band	25 °C ± 3 °C	25 °C ± 10 °C	0 °C to 55 °C
100 kHz to 10 MHz	0.99	1.09	1.51
> 10 to 30 MHz	0.89	0.96	0.96
> 30 to 500 MHz	0.80	0.89	0.94
> 500 MHz to 1.2 GHz	0.73	0.84	0.91
> 1.2 to 6 GHz	0.94	1.11	1.32

N8485A frequency band	25 °C ± 3 °C	25 °C ± 10 °C	0 °C to 55 °C
10 to 30 MHz	1.17	1.29	1.60
> 30 to 500 MHz	0.95	1.14	1.69
> 500 MHz to 1.2 GHz	0.98	1.24	1.79
> 1.2 to 6 GHz	1.18	1.51	2.23
> 6 to 14 GHz	1.58	2.18	2.91
> 14 to 18 GHz	1.69	2.33	3.21
> 18 to 26.5 GHz	2.25	3.33	4.28
> 26.5 to 33 GHz	2.63	4.10	5.72

N8487A frequency band	25 °C ± 3 °C	25 °C ± 10 °C	0 °C to 55 °C
50 to 500 MHz	1.21	1.72	2.02
> 500 MHz to 1.2 GHz	1.21	1.96	2.31
> 1.2 to 6 GHz	1.23	2.18	2.47
> 6 to 14 GHz	1.61	2.87	3.17
> 14 to 18 GHz	1.81	3.22	3.49
> 18 to 26.5 GHz	2.31	3.82	4.09
> 26.5 to 33 GHz	2.89	4.48	4.74
> 33 to 34 GHz	2.85	4.60	4.89
> 34 to 35 GHz	3.14	4.89	5.18
> 35 to 40 GHz	3.73	5.48	5.77
> 40 to 45 GHz	4.00	5.74	6.04
> 45 to 50 GHz	4.04	5.83	6.00

N8486AR frequency band	25 °C ± 3 °C	25 °C ± 10 °C	0 °C to 55 °C
26.5 to 33 GHz	2.68	3.48	3.76
> 33 to 34 GHz	3.19	4.07	4.25
> 34 to 35 GHz	3.19	4.07	4.25
> 35 to 40 GHz	3.19	4.07	4.25

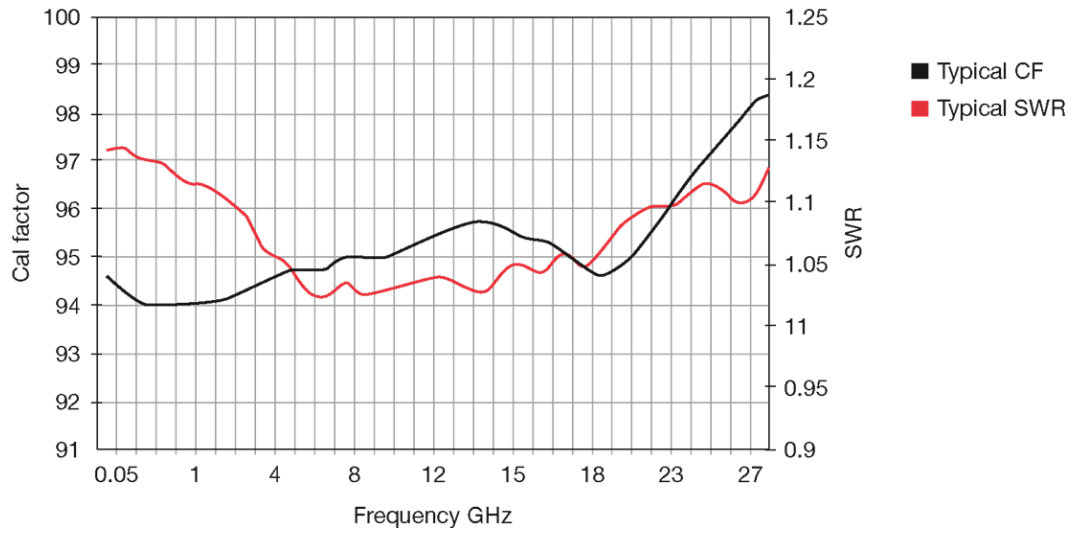
N8486AQ frequency band	25 °C ± 3 °C	25 °C ± 10 °C	0 °C to 55 °C
33 to 34 GHz	3.14	5.02	6.04
> 34 to 35 GHz	3.40	4.99	6.04
> 35 to 40 GHz	3.14	5.02	6.04
> 40 to 45 GHz	3.19	5.17	5.86
> 45 to 50 GHz	3.26	5.20	6.59

N8488A frequency band	25 °C ± 3 °C	25 °C ± 10 °C	0 °C to 55 °C
10 to 50 MHz	1.50	2.63	3.49
> 50 to 100 MHz	1.72	2.10	2.75
> 100 MHz to 2 GHz	1.76	2.02	2.58
> 2 to 12.4 GHz	2.00	2.70	2.86
> 12.4 to 18 GHz	2.10	3.07	3.33
> 18 to 26.5 GHz	2.60	3.69	4.67
> 26.5 to 40 GHz	3.40	3.83	4.51
> 40 to 50 GHz	4.82	5.25	5.93
> 50 to 67 GHz	5.18	6.34	7.06
> 67 to 70 GHz	*5.80*	*7.28*	*8.68*

1. The characterized calibration factor should not deviate between periodic calibrations by more than the specified maximum relative uncertainty. Compliance is confirmed by the relative deviation $(\frac{|CF_1 - CF_2|}{CF_1} * 100)$ being less than or equal to √2 times the specified maximum uncertainty. $\sqrt{2} * Umax$ with a reference calibration factor of 100%.

Typical CF and SWR versus frequency

The chart below shows supplemental characteristics intended to provide additional information, useful in applying the power sensor by giving typical but not warranted performance parameters.



General Specifications

Dimensions and weight	
Dimensions (W x H x L)  	N8481A/82A: 38 mm W x 30 mm H x 130 mm L
	N8485A: 38 mm W x 30 mm H x 121 mm L
	N8487A: 38 mm W x 30 mm H x 121 mm L
	N8488A: 38 mm W x 30 mm H x 115 mm L
	N8486AR: 38 mm W x 62 mm H x 152 mm L
	N8486AQ: 38 mm W x 62 mm H x 152 mm L
	N8481B/82B: 83 mm W x 114 mm H x 283 mm L
	N8481H/82H: 38 mm W x 30 mm H x 174 mm L
Weight	N8481A/2A: Net: 0.181 kg (0.40 lb) Shipping: 0.90 kg (1.98 lb)
	N8485A: Net: 0.183 kg (0.40 lb); Shipping: 0.90 kg (1.98 lb)
	N8487A: Net: 0.154 kg (0.34 lb); Shipping: 0.874 kg (1.92 lb)
	N8488A: Net: 0.162 kg (0.36 lb); Shipping: 0.881 kg (1.94 lb)
	N8486AR: Net: 0.202 kg (0.45 lb); Shipping: 0.922 kg (2.03 lb)
	N8486AQ: Net: 0.204 kg (0.45 lb); Shipping: 0.924 kg (2.03 lb)
	N8481B/82B: Net: 0.684 kg (1.51 lb); Shipping: 1.404 kg (3.09 lb)
	N8481H/82H: Net: 0.234 kg (0.52 lb); Shipping: 0.954 kg (2.10 lb)
Operating environment	
Temperature	0 to 55 °C
Humidity	Maximum: 95% RH at 40 °C non-condensing
Altitude	Up to 4600 m (15,000 ft)
Storage conditions	
Temperature	–40 to 70°C
Humidity	Up to 90% RH at 65°C non-condensing
Altitude	Up to 4600 m (15,000 ft)
Others	
Connector [1]	N8481A/82A: N-type (male)
	N8485A: 3.5 mm (male)
	N8487A: 2.4 mm (male)
	N8488A: 1.85 mm (male)
	N8481B/82B: N-type (male)
	N8481H/82H: N-type (male)
	N8486AR: Waveguide flange UG-599/U
	N8486AQ: Waveguide flange UG-383/U
Programming language	Standard: SCPI code-compatible to E-Series sensors Option
	CFT: SCPI code-compatible to 8480 Series sensors
Safety and EMC compliance	IEC 61326-2002/EN 61326:1997+A1:1998+A3:2003
	Canada: ICES-001:2004, ICES/NMB-001:2004
	Australia/New Zealand: AS/NZS CISPR11:2004
Calibration interval	1 year

1. See “Ordering Information” for available options.

Mechanical Characteristic

Mechanical characteristics such as center conductor protrusion and pin depth are not performance specifications. They are, however, important supplemental characteristics related to electrical performance. At no time should the pin depth of the connector be protruding.

Ordering Information

Power sensors

Standard power sensors	Description	Frequency range	Power range
N8481A	Standard N8481A model with EEPROM feature	10 MHz to 18 GHz	–35 to +20 dBm
N8482A	Standard N8482A model with EEPROM feature	100 kHz to 6 GHz	–35 to +20 dBm
N8485A	Standard N8485A model with EEPROM feature	10 MHz to 26.5 GHz	–35 to +20 dBm
N8487A	Standard N8487A model with EEPROM feature	50 MHz to 50 GHz	–35 to +20 dBm
N8488A	Standard N8488A model with EEPROM feature	10 MHz to 67 GHz	–35 to +20 dBm
N8481B	Standard N8481B model with EEPROM feature	10 MHz to 18 GHz	–5 to +44 dBm
N8482B	Standard N8482B model with EEPROM feature	100 kHz to 6 GHz	–5 to +44 dBm
N8481H	Standard N8481H model with EEPROM feature	10 MHz to 18 GHz	–15 to +35 dBm
N8482H	Standard N8482H model with EEPROM feature	100 kHz to 6 GHz	–15 to +35 dBm
N8486AR	Standard N8486AR model with EEPROM feature	26.5 to 40 GHz	–35 to +20 dBm
N8486AQ	Standard N8486AQ model with EEPROM feature	33 to 50 GHz	–35 to +20 dBm
Other sensor options	**Description**		
Option CFT	N8480 sensor without the calibration factor table stored in the EEPROM. Calibration factor data is provided on the label attached to the power sensor		
N8485A-033	N8485A model with EEPROM feature with extended frequency range, 10 MHz to 33 GHz		
Standard-shipped	**Description**		
Shipped as standard with every power sensor	Certificate of Calibration		