1.2 Specifications

Performance specifications describe the 58542 warranted performance, and apply when using the Series 80300A Power Sensors. Typical performance (shown in italics) is non-warranted.

1.2.1 Range

Frequency Range

10 MHz — 40 GHz¹

Power Range

-70 dBm - +47 dBm (100 pW - 50 Watt)¹

Single Sensor Dynamic Range

CW Sensors: 90 dB¹ Peak Power Sensors: 40 dB, Peak 50 dB, CW¹

1.2.2 Accuracy

Calibrator

Power Sweep calibration signal to dynamically linearize the sensors

Frequency

50 MHz nominal

Settability

The 1 mW (0.0 dBm) level in the Power Sweep Calibrator is factory set to $\pm 0.7\%$ traceable to the National Institute of Standards and Technology (NIST). Measure within 15 seconds of setting calibrator to 0.0 dBm

Accuracy

 $\pm 1.2\%$ worst case for one year, over temperature range of 5 °C - 35 °C

Connector

Type N(f) connector, 50 Ω

VSWR

<1.05 dB (Return Loss >33 dB)

System Linearity (@ 50 MHz for Standard CW Sensors)

```
\pm 0.02 dB over any 20 dB range from -70 - +16 dBm \pm 0.02 dB + (0 dB, -0.05 dB/dB) from +16 - +20 dBm \pm 0.04 dB from -70 - +16 dBm
```

Linearity Temperature Coefficient

<0.1%/ °C temperature change following Power Sweep Calibration, 24-hour warm-up required <0.3%/ °C temperature change following Power Sweep Calibration, 24-hour warm-up required (8035XA Series Sensors)

1.2.3 Zeroing Accuracy (Standard CW Sensors)

Zero Set

 $< \pm 50 \, pW^2$

Zero Drift

 $< \pm 100 \, pW$ during 1 hour²

Noise

 $< \pm 50 \, pW$ measured over any 1 minute interval²

Averaging

Auto-averaging or user-selectable averaging from 1 to 512 readings per measurement

Notes:

- 1. Depending on sensor used.
- 2. Specified performance applies with maximum averaging and 24-hour warm-up at constant temperature.

Figure 1-1 illustrates the instrument Linearity plus Typical Noise and Zeroing Error vs Input Power. (The X-axis scale is sensor dependent)



Figure 1-1: Instrument Linearity

1.2.4 Meter Functions

dB Offset & Relative

Allows both relative readings and offset readings. Power readings can be offset by -99.999 - +99.999 dB to account for external loss/ gain

Configuration Storage Registers

Up to ten instrument configurations can be stored and recalled from non-volatile memory for fast configuration changes

Power Measurements

Any two of the following channel configurations, simultaneously: 1, 2, 1/2, 2/1, 1-2, 2-1

1.2.5 Measurement Speed

Measurement speed increases significantly using the meter's data storage capabilities. Storing data in memory for later downloading to the controller reduces word serial protocol and protocol conversion overhead. Up to 128,000 readings can be buffered. The measurement rate depends on several factors, including controller speed and number of averages. Burst Mode speed does not include bus communication time. The following lists typical maximum measurement rates for CW power sensors or Series 80340 Peak Power Sensors.

Normal Mode	Swift Mode	Burst Mode
Non-Buffered	Buffered Data	Buffered Data
55 rdgs/sec	150 rdgs/sec	5100 rdgs/sec

Individual data points are read immediately after measurement in the Normal Mode. Swift Mode allows triggering of individual data points, and stores the data in the 58542 memory. Burst Mode also buffers measurement data: measurement timing of individual data points is controlled by setting the time interval (0.001 to 5.000 sec) between the data points following a single group burst trigger event.

1.2.6 Inputs/Outputs

Analog Output

Provides an output voltage (at the Analog Out BNC) that is configurable from -10 - +10 V from either Channel 1 or Channel 2 in either Lin or Log units¹

Accuracy

1.0% ±32 mV, -10 – +10 V

Linearity

<0.3%

Trigger Input

Connects EXT trigger (at the EXT TRIG BNC). TTL level input signal for fast reading of buffered data modes

Voltage Proportional to Frequency (in GHz)

Automated Cal Factor correction. Input the analog VpropF signal level from the microwave signal source to the VpROPF IN BNC¹

Input Range

0 – 10 V

Accuracy

1.0% ±32 mV (14 bit) (0.6 mV resolution)

Note:

1. Operates in Normal Mode only.

1.2.7 Power Requirements

Requirements

+5 Vdc @ 800 mA +24 Vdc @ 250 mA -24 Vdc @ 250 mA		

1.2.8 General Specifications

Temperature Range

	0 °C – 50 °C (32 °F – 122 °F)
Operating	Operating the 58542 Power Meter in a high level RF field (Approximately 3 V/m) may degrade performance, this degradation occurs at measured levels below -36 dBm and when the field frequency is nominally between 50 and 1000 MHz
Non-Operating	-40 °C – 70 °C (-40 °F – 158 °F)

Physical Characteristics

Dimensions	C-size, single slot VXI standard 30 mm (1.2 in) wide, 234 mm (9.2 in) high, 340 mm (13.4 in) deep
Weight	2.5 kg (5.5 lbs)

Accessories Included

Two detachable sensor cables