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SPECIFICATIONS

USB-5680

RF Power Sensor Device

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Definitions

Warranted specifications describe the performance of a model under stated operating conditions and are covered by the model warranty.

The following characteristic specifications describe values that are relevant to the use of the model under stated operating conditions but are not covered by the model warranty.

- *Typical* specifications describe the performance met by a majority of models.
- *Nominal* specifications describe an attribute that is based on design, conformance testing, or supplemental testing.

Specifications are *Typical* unless otherwise noted.

NATIONAL INSTRUMENTS

Conditions

Minimum or maximum specifications are warranted under the following conditions unless otherwise noted.

- 1 hour warm-up time at ambient temperature
- Calibration cycle maintained
- Temperature 0 °C to 55 °C

General

Frequency range	50 MHz to 6 GHz
Dynamic range	-40 dBm to +23 dBm
Input return loss	
50 MHz to <2 GHz	<-26 dB
2 GHz to 6 GHz	<-20 dB
Measurement range	
Measurement range 1	-40 dBm to <-5 dBm
Measurement range 2	-5 dBm to +23 dBm

Table 1. Averaging, Low-Aperture Time Mode

Input Power (dBm)	Input Power (mW)	Number of Reads to Average for <±0.10 dB Noise	Number of Reads to Average for <±0.01 dB Noise
>10	>10.0	1	1
5	3.2	1	2
0	1.0	1	16
-5	0.32	1	78
-10	0.10	1	1
-15	0.032	1	1
-20	0.010	1	7
-25	0.0032	1	61
-30	0.0010	7	—

Table 1. Averaging, Low-Aperture Time Mode (Continued)

Input Power (dBm)	Input Power (mW)	Number of Reads to Average for <±0.10 dB Noise	Number of Reads to Average for <±0.01 dB Noise
-35	0.00032	62	—
-40	0.00010	—	—

Table 2. Averaging, High-Aperture Time Mode

Input Power (dBm)	Input Power (mW)	Number of Reads to Average for <±0.10 dB Noise	Number of Reads to Average for <±0.01 dB Noise
>10	>10.0	1	1
5	3.2	1	5
0	1.0	1	1
-5	0.32	1	1
-10	0.10	1	1
-15	0.032	1	1
-20	0.010	1	1
-25	0.0032	1	4
-30	0.0010	1	38
-35	0.00032	4	—
-40	0.00010	39	—

Signal-channel bandwidth 100 Hz

Uncertainty

Linearity

- Power level <18 dBm ±0.13 dB
- Power level ≥18 dBm ±0.18 dB

Calibration factor[1]	±0.06 dB

Table 3. Noise[2]

Input Power Measurement Range	Low-Aperture Time Mode	High-Aperture Time Mode
-40 to <-5 dB	<2.5 nW	<1.3 nW
-5 to +23 dBm	<0.6 µW	<1.7 µW

Zero set[3]	
-40 to <-5 dBm	<10 nW
-5 to +23 dBm	<1.7 µW
Zero drift[4]	
-40 to <-5 dBm	.<3.0 nW
-5 to +23 dBm	< 0.5 µW
Temperature compensation[5]	
0 °C to 50 °C	±0.06 dB
20 °C to 30 °C	0 dB
Effect of digital modulation	
Power level <18 dBm	±0.02 dB
Power level ≥18 dBm	±0.10 dB

System

Measurement	True root mean square/Average power
Measurement resolution	0.01 dB
Offset range	.±100 dB
Averaging range[6]	1 to 256

1 Expanded uncertainty with coverage factor K=2 for absolute power measurements on continuous wave (CW) signal at 0 dBm calibration level over a 50 MHz to 6 GHz frequency range.

2 Expanded uncertainty with coverage factor K=2 after zero operation for a five-minute measurement incorporating 128 averaged values. Includes effect of noise and zero offset.

3 After zero operation. 128 values averaged over one hour with temperature within ±1 °C

4 After zero operation. 128 values averaged over one hour with temperature within ±1 °C

5 Measurement error with reference to a CW signal of equal power and frequency at 25 °C. Negligible error at 20 °C to 30 °C.

6 Averaging range limit set by software. You can override this value; however, a value greater than 256 results in a higher measurement time.

Measurement speed	
Low-aperture time mode	15 measurements per second
High-aperture time mode	1 measurement per second
Interface	USB 2.0 and 1.1 compliant

Maximum Damage Levels

Maximum DC voltage at RF port	25 V
Absolute power	33 dBm

DC Power Requirements (5V) through Host US

Typical current	100 mA
Maximum current	150 mA

Calibration

Interval	1 year; calibration interval starts with the date the product is put into service by the customer

Physical Dimensions

Dimensions	8.5 cm × 3.0 cm × 5.6 cm (3.35 in × 1.18 in × 2.2 in)
Weight	180 g (6.4 oz)

Environment

Maximum altitude	2,000 m (at 25 °C ambient temperature)
Pollution Degree	2

Indoor use only.

Operating Environment

Ambient temperature range	0 to 55 °C (Tested in accordance with IEC 60068-2-1 and IEC 60068-2-2.)

Relative humidity range[7] (noncondensing)	
At 55 °C	45%
At 40 °C	75%
At 30 °C	95%

Storage Environment

Ambient temperature range	-51 °C to +71 °C (Tested in accordance with IEC 60068-2-1 and IEC 60068-2-2.)
Relative humidity range	5% to 95%, noncondensing (Tested in accordance with IEC 60068-2-56.)

Shock and Vibration

Operating shock	30 g peak, half-sine, 11 ms pulse (Tested in accordance with IEC 60068-2-27. Meets MIL PRF-28800F Class 2 limits.)
Random vibration	
Operating	5 Hz to 500 Hz, 0.3 g_{rms}
Non-operating	5 Hz to 500 Hz, 2.4 g_{rms} (Tested in accordance with IEC 60068-2-64. Nonoperating test profile exceeds the requirements of MIL PRF-28800F, Class 3.)

Compliance and Certifications

Safety

This product is designed to meet the requirements of the following electrical equipment safety standards for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA 61010-1

Note For UL and other safety certifications, refer to the product label or the *Online Product Certification* section.

[7] Tested in accordance with IEC 60068-2-56.

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326-1 (IEC 61326-1): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note In the United States (per FCC 47 CFR), Class A equipment is intended for use in commercial, light-industrial, and heavy-industrial locations. In Europe, Canada, Australia, and New Zealand (per CISPR 11), Class A equipment is intended for use only in heavy-industrial locations.

Note Group 1 equipment (per CISPR 11) is any industrial, scientific, or medical equipment that does not intentionally generate radio frequency energy for the treatment of material or inspection/analysis purposes.

Note For EMC declarations and certifications, refer to the *Online Product Certification* section.

CE Compliance CE

This product meets the essential requirements of applicable European Directives, as follows:

- 2014/35/EU; Low-Voltage Directive (safety)
- 2014/30/EU; Electromagnetic Compatibility Directive (EMC)

Online Product Certification

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for this product, visit *ni.com/certification*, search by model number or product line, and click the appropriate link in the Certification column.

Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the *Minimize Our Environmental Impact* web page at *ni.com/environment*. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

Waste Electrical and Electronic Equipment (WEEE)



EU Customers At the end of the product life cycle, all NI products must be disposed of according to local laws and regulations. For more information about how to recycle NI products in your region, visit *ni.com/environment/weee*.

电子信息产品污染控制管理办法（中国 RoHS）



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