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SPECIFICATIONS

# USRP-2944

Software Defined Radio Reconfigurable Device

## Contents



## Definitions

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

*Characteristics* 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 expected performance met by a majority of the models.
- *Nominal* specifications describe parameters and attributes that may be useful in operation.

Specifications are *Characteristics* unless otherwise noted.

## Conditions

Specifications are valid at 25 °C unless otherwise noted.

NATIONAL INSTRUMENTS

# Transmitter

| | |
|---|---|
| Number of channels | 2 |
| Frequency range | 10 MHz to 6 GHz |
| Frequency step | <1 kHz |
| Maximum output power ($P_{out}$) | 50 mW to 100 mW (17 dBm to 20 dBm) |
| Gain range[1] | 0 dB to 31.5 dB |
| Gain step | 0.5 dB |
| Frequency accuracy[2] | 2.5 ppm |
| Maximum instantaneous real-time bandwidth[3] | 160 MHz |
| Maximum I/Q sample rate | 200 MS/s |
| Digital-to-analog converter (DAC) | |
| Resolution | 16 bit |
| Spurious-free dynamic range (sFDR) | 80 dB |

# Receiver

| | |
|---|---|
| Number of channels | 2 |
| Frequency range | 10 MHz to 6 GHz |
| Frequency step | <1 kHz |
| Gain range[4] | 0 dB to 37.5 dB |
| Gain step | 0.5 dB |
| Maximum input power ($P_{in}$) | -15 dBm |
| Noise figure | 5 dB to 7 dB |

[1] The output power resulting from the gain setting varies over the frequency band and among devices.

[2] *Frequency accuracy* is based on temperature-compensated crystal oscillator (TCXO) vendor specifications and is not measured. Alternatively, you can incorporate an external reference source to provide a more precise frequency Reference Clock and to achieve better frequency accuracy.

[3] The NI 2944 transmitter path has 160 MHz of bandwidth throughout the full frequency range of the device.

[4] The received signal amplitude resulting from the gain setting varies over the frequency band and among devices.

| | |
|---|---|
| Frequency accuracy[5] | 2.5 ppm |
| Maximum instantaneous real-time bandwidth[6] | 160 MHz |
| Maximum I/Q sample rate | 200 MS/s |
| Analog-to-digital converter (ADC) | |
| Resolution | 14 bit |
| sFDR | 88 dB |

# Power

**Caution** The protection provided by this product may be impaired if it is used in a manner not described in this document.

| | |
|---|---|
| Input voltage | 9 V to 16 V, DC |
| Input current | 7.5 A, maximum |
| Typical power consumption | 38 W to 44 W, varies by application |

**Caution** You must use an LPS or Class 2 power supply with the USRP-2944. The power supply must also meet any safety and compliance requirements for the country of use.

# Onboard DRAM

| | |
|---|---|
| Memory size | 1,024 MB |

# Physical Characteristics

If you need to clean the module, wipe it with a dry towel.

| | |
|---|---|
| Physical dimensions | |
| (L × W × H) | 26.67 cm × 4.06 cm × 21.84 cm<br>(10.5 in. × 1.6 in. × 8.6 in.) |
| Weight | 1.588 kg (3.50 lb) |

[5] *Frequency accuracy* is based on temperature-compensated crystal oscillator (TCXO) vendor specifications and is not measured. Alternatively, you can incorporate an external reference source to provide a more precise frequency Reference Clock and to achieve better frequency accuracy.

[6] The NI 2944 receiver path has 84 MHz of bandwidth for center frequencies from 10 MHz to 500 MHz.

# Environment

| | |
|---|---|
| Maximum altitude | 2,000 m (800 mbar) (at 25 °C ambient temperature) |
| Pollution Degree | 2 |

Indoor use only.

## Operating Environment

| | |
|---|---|
| Operating temperature | 23 °C ± 5 °C |
| Relative humidity range | 10% to 90%, noncondensing (tested in accordance with IEC 60068-2-56) |

# 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 C22.2 No. 61010-1

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

## 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
- EN 55022 (CISPR 22): Class A emissions
- EN 55024 (CISPR 24): Immunity
- AS/NZS CISPR 11: Group 1, Class A emissions
- AS/NZS CISPR 22: 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, certifications, and additional information, 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）

**中国客户** National Instruments 符合中国电子信息产品中限制使用某些有害物质指令(RoHS)。关于 National Instruments 中国 RoHS 合规性信息，请登录 `ni.com/environment/rohs_china`。(For information about China RoHS compliance, go to `ni.com/environment/rohs_china`.)

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