USRP-2953 Specifications

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USRP-2953 Specifications

These specifications apply to the USRP-295340 MHz Software Defined Radio Device and the USRP-2953120 MHz Software Defined Radio Device. When not otherwise specified, the specifications for the USRP-2953 in this document refer to both the USRP-295340 MHz and the USRP-2953120 MHz. The USRP-2953 contains a GPS-disciplined oscillator (GPSDO), which enables you to lock the internal clocks to a GPS reference signal, synchronize using GPS timing information, and query GPS location information.

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

Specifications are **Characteristics** unless otherwise noted.

Conditions

Specifications are valid at 25 °C unless otherwise noted.

Transmitter

Number of channels	2
Frequency range	1.2 GHz to 6 GHz
Frequency step	<1 kHz

Maximum output power (P_{out})	
1.2 GHz to 3.5 GHz	50 mW to 100 mW (17 dBm to 20 dBm)
3.5 GHz to 6 GHz	5 mW to 32 mW (7 dBm to 15 dBm)
Gain range[1]	0 dB to 31.5 dB
Gain step	0.5 dB
Maximum instantaneous real-time bandwidth	
USRP-2953 40 MHz	40 MHz
USRP-2953 120 MHz	120 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	1.2 GHz to 6 GHz
Frequency step	<1 kHz
Gain range[2]	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
Maximum instantaneous real-time bandwidth	
USRP-2953 40 MHz	40 MHz
USRP-2953 120 MHz	120 MHz
Maximum I/Q sample rate	200 MS/s

Analog-to-digital converter (ADC)	
Resolution	14 bit
sFDR	88 dB

GPS Disciplined Oscillator (GPSDO)

Frequency accuracy[3]	
OCXO (not locked to GPS)	25 ppb
OCXO (locked to GPS)	5 ppb
Active antenna	
Voltage	5 V
Power	0.7 W

Power Requirements

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 device. The power supply must also meet any safety and compliance requirements for the country of use.

Attention Vous devez utiliser avec l'appareil une alimentation LPS ou de classe 2. L'alimentation doit également satisfaire aux exigences de sécurité et de conformité en vigueur dans le pays d'utilisation.

Onboard DRAM

Memory size	1,024 MB

Physical Characteristics

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

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 Compliance Standards

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 safety certifications, refer to the product label or the Product Certifications and Declarations 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 Product Certifications and Declarations 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)
- 2011/65/EU; Restriction of Hazardous Substances (RoHS)
- 2014/53/EU; Radio Equipment Directive (RED)
- 2014/34/EU; Potentially Explosive Atmospheres (ATEX)

Product Certifications and Declarations

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for NI products, visit ni.com/product-certifications, search by model number, and click the appropriate link.

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 **Engineering a Healthy Planet** 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.

EU and UK Customers

- **Waste Electrical and Electronic Equipment (WEEE)**—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 RoHS**— NI 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 NI 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.)

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

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

[3] **Frequency accuracy** is based on oven-controlled crystal oscillator (OCXO) 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.