
Ettus USRP

X420

Specifications

2026-05-01



Contents

Ettus USRP X420 Specifications..... 3

Ettus USRP X420 Specifications

Ettus USRP X420 Specifications

These specifications apply to the Ettus USRP X420.

Revision History

Version	Date changed	Description
379277A-01	April 2026	Initial release.

Looking For Something Else?

For information not found in the specifications for your product, such as operating instructions, browse *Related Information*.

Related information:

- [Ettus USRP X420 User Manual](#)
- [Software and Driver Downloads](#)
- [Dimensional Drawings](#)
- [Product Certifications](#)
- [Letter of Volatility](#)
- [Knowledgebase](#)
- [Discussion Forums](#)
- [NI Learning Center](#)
- [SC 2510](#)

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**—describes the performance met by a majority of models.
- **Nominal**—describes an attribute that is based on design, conformance testing, or supplemental testing.
- **Measured**—describes the measured performance of a representative model.

Specifications are *Measured* unless otherwise noted.

Conditions

Specifications are valid under the following conditions unless otherwise noted.

- Specifications are valid at 23 °C ambient temperature.
- Specifications that reference dBFS are based on a full-scale digital level at the ADC or DAC interface.
- For receive operations below 500 MHz tuning frequency, specifications are based on a -6 dBFS full-scale level.
- Specifications are based on the default exhaust airflow configuration.

Software

Table 1. Software

Operating system	OpenEmbedded Linux (ARM Cortex-A53)
Device software	USRP Hardware Driver™ version 4.10.0 or later
FPGA framework	RFNoC
Application environments	GNU Radio
Programming languages	C/C++, Python

Ettus USRP X420 Pinouts

Use the pinouts to connect to terminals on the Ettus USRP X420.



Note RF and LO connectors are repeated on the front panel and organized into two identical groups labeled DB0 and DB1. Each DB group provides equivalent radio frequency and local oscillator connectivity.

Ettus USRP X420 RF Connectors

Table 2. RF Connector Signal Descriptions

Connector	Connector Type	Description
TX/RX 0	SMA (f), 50 Ω	Bidirectional radio frequency signal connector used for transmit and receive operations.
RX 1	SMA (f), 50 Ω	Radio frequency signal connector used for receive-only operations.

Ettus USRP X420 LO Connectors

Table 3. LO Connector Signal Descriptions

Connector	Connector Type	Description
LO IN	SMA (f), 50 Ω	Input for an external transmit and receive local oscillator signal. +10 dBm damage level. By default, the internal LO source is used.
LO OUT	SMA (f), 50 Ω	Output of the transmit and receive local oscillator signal for sharing or external reference. +9 dBm maximum output level. By default, the internal LO source is used.

Ettus USRP X420 GPIO Connector Pinout

Table 4. GPIO Connector Signal Descriptions

Connector	Connector Type	Description
GPIO 0, GPIO 1	HDMI Type-A	General Purpose Input/Output digital terminals. Output voltage can be configured per individual connector, either 1.8 V (default), 2.5 V, or 3.3 V.

Figure 1. Ettus USRP X420 GPIO Connector Pinout

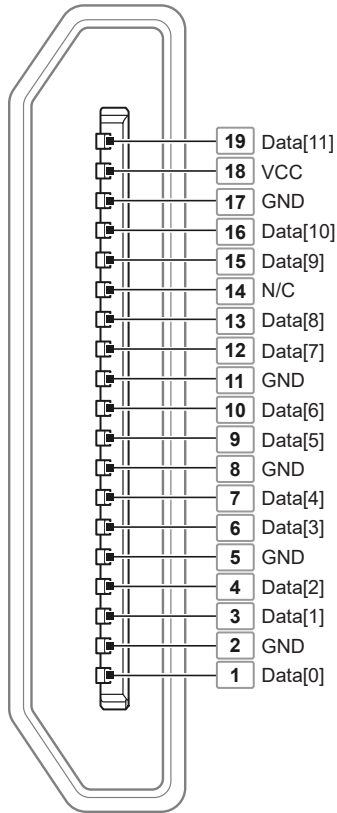


Table 5. GPIO Connector Pinout

Pin	Name	Direction	Voltage Domain	Description
1	Data[0]	In/Out	Configurable (1.8 V, 2.5 V, or 3.3 V)	General-purpose digital I/O
2	GND	N/A	N/A	Ground reference
3	Data[1]	In/Out	Configurable (1.8 V, 2.5 V, or 3.3 V)	General-purpose digital I/O
4	Data[2]	In/Out	Configurable (1.8 V, 2.5 V, or 3.3 V)	General-purpose digital I/O
5	GND	N/A	N/A	Ground reference
6	Data[3]	In/Out	Configurable (1.8 V, 2.5 V, or 3.3 V)	General-purpose digital I/O
7	Data[4]	In/Out	Configurable	General-purpose

Pin	Name	Direction	Voltage Domain	Description
			(1.8 V, 2.5 V, or 3.3 V)	digital I/O
8	GND	N/A	N/A	Ground reference
9	Data[5]	In/Out	Configurable (1.8 V, 2.5 V, or 3.3 V)	General-purpose digital I/O
10	Data[6]	In/Out	Configurable (1.8 V, 2.5 V, or 3.3 V)	General-purpose digital I/O
11	GND	N/A	N/A	Ground reference
12	Data[7]	In/Out	Configurable (1.8 V, 2.5 V, or 3.3 V)	General-purpose digital I/O
13	Data[8]	In/Out	Configurable (1.8 V, 2.5 V, or 3.3 V)	General-purpose digital I/O
14	N/C	N/A	N/A	Do not connect
15	Data[9]	In/Out	Configurable (1.8 V, 2.5 V, or 3.3 V)	General-purpose digital I/O
16	Data[10]	In/Out	Configurable (1.8 V, 2.5 V, or 3.3 V)	General-purpose digital I/O
17	GND	N/A	N/A	Ground reference
18	VCC	Out	+3.3 V	External power for GPIO accessories (450 mA maximum)
19	Data[11]	In/Out	Configurable (1.8 V, 2.5 V, or 3.3 V)	General-purpose digital I/O



Note The GPIO connector is not intended to drive large loads.



Note Although the GPIO uses an HDMI connector, it is not an HDMI interface and must not be connected to HDMI equipment.



Note Digital I/O voltage is selectable per GPIO port and applies to all data pins.



Note The +3.3 V power pin is disabled by default and can be enabled in software.



Note The GPIO connector pins are mapped to indexed data signals in software. For details, see the *X4x0 GPIO API* documentation on uhd.readthedocs.io.

Ettus USRP X420 Timing and Reference Connectors

Table 6. Timing and Reference Connector Signal Descriptions

Connector	Connector Type	Description
REF IN	SMA (f), 50 Ω	Input for an external 10MHz reference clock signal used for frequency synchronization.
PPS IN	SMA (f), 50 Ω	Input for an external pulse-per-second (PPS) signal used for time synchronization.
TRIG IN/OUT	SMA (f), 50 Ω	Bidirectional trigger signal used for external event synchronization.
GPS ANT	SMA (f), 50 Ω	Input for an external GPS antenna used by the onboard GPSDO.

Ettus USRP X420 High-Speed Data Interfaces

Table 7. High-Speed Serial Connector Signal Descriptions

Connector	Connector Type	Description
QSFP28	zQSFP+	Supports high-speed, low-latency data streaming. Provides four lanes with data rates of up to 25 Gbps per lane and an aggregate bandwidth of up to 100 Gbps. Conforms to QSFP28 industry-standard electrical and signaling specifications.
iPass+ zHD	iPass+ zHD	The iPass+ zHD connectors are not used on this product. Do not connect peripheral devices to these connectors.

Ettus USRP X420 System Interfaces

Table 8. System Interface Connector Signal Descriptions

Connector	Connector Type	Description
CONSOLE JTAG	USB-C	USB Type-C connector for development and debugging. Provides access to JTAG, PS serial console, and SCU serial console. Use 115200 baud, 8 data bits, 1 stop bit, no parity.
USB to PS	USB-C	USB Type-C connector supporting USB 2.0 for peripheral devices connected to the processing system (PS). Supports tasks such as accessing USB mass storage devices and writing a new file system to internal storage.
ETHERNET	RJ45	1 Gb Ethernet connector that

Connector	Connector Type	Description
		interfaces with the onboard processing system (PS). Supports SSH access and UHD management traffic in Network Mode. The interface uses a DHCP-assigned IP address by default.

Physical Characteristics

Table 9. Physical Characteristics

Dimensions, enclosure	26.7 cm × 22.2 cm × 4.4 cm (10.5 in. × 8.7 in. × 1.7 in.)
Dimensions, enclosure with connectors	28.5 cm × 22.2 cm × 4.4 cm (11.2 in. × 8.7 in. × 1.7 in.)
Weight	2.8 kg (6.2 lb)
Form factor	1U half-wide 19" rack



Note For more information on product dimensions, visit ni.com/dimensions, search by model number, and click the appropriate link.

Controller

Table 10. Processing System

CPU	Quad-core ARM Cortex-A53 (1200 MHz)
RAM	4 GB DDR4, 2.4 GT/s
Storage	32 GB eMMC (Pseudo SLC)
Host Ethernet interface	1 GbE host connection (RJ45)
USB interface	USB to PS: USB-C (USB 2.0) Console/JTAG: USB-C

Table 11. Programmable Logic

FPGA model	AMD RFSoc XCZU28DR
FPGA speed grade	Speed Grade -1
RAM	2 × 4 GB DDR4, 2.4 GT/s
SD-FEC cores	8 dedicated SD-FEC cores
Interfaces and protocols	2 × QSFP28, 4 lanes each, 10/100 GbE, Aurora (with custom FPGA bitfile) 2 × iPass+ zHD, 4 lanes each
GPIO	2 × HDMI GPIO <ul style="list-style-type: none"> • 12 I/O lines per connector; 100 Mbps max • Selectable I/O voltage: 3.3V, 2.5V, 1.8V
Trigger	SMA trigger interface with bidirectional trigger input and output; 3.3V I/O voltage

Table 12. Baseband

Supported I/Q sample rates	<p>Default I/Q Sample Rate (Master Clock Rate) applicable for RF specifications:</p> <ul style="list-style-type: none"> • 1.25 GSps <p>Other supported rates:</p> <ul style="list-style-type: none"> • 491.52 MSps • 250 MSps • 245.76 MSps <p>Lower rates are supported through integer resamplers in the x4_200 bitfile.</p>
Number of available channels	2

RF Frequency

Table 13. Frequency Characteristics

Frequency range	10 MHz to 20 GHz
Frequency step	< 1 kHz

Table 14. Maximum Instantaneous Real-Time Bandwidth Per Channel

10 MHz to 2.2 GHz	200 MHz ¹
2.2 GHz to 20 GHz	1000 MHz (xx_1000 FPGA image)
	200 MHz (other FPGA image flavors)

RF Transmitter

Table 15. TX Baseline Characteristics

Number of channels	2 (independent)
TX/RX switch settling time	1.5 μ s
Non-harmonic spurs ²	better than -60 dBc

Table 16. TX Maximum Output Power, Typical

< 100 MHz	≥ 15.0 dBm
100 MHz to 500 MHz	≥ 20.0 dBm
500 MHz to 6 GHz	≥ 18.5 dBm
6 GHz to 9 GHz	≥ 19.0 dBm
9 GHz to 15 GHz	≥ 13.0 dBm
15 GHz to 18 GHz	≥ 10.0 dBm
18 GHz to 20 GHz	≥ 7.5 dBm

- 1.5 GHz (L-Band) center frequency supports up to 1000 MHz instantaneous real-time bandwidth.
- Measured at TX Gain = 45 dB. Excludes LO leakage, residual sideband image, and baseband harmonics.



Note The values listed in [Table 16. TX Maximum Output Power, Typical](#) were measured at the maximum gain setting (TX Gain = 68 dB) using a 0 dBFS CW signal. The output power is not leveled and can be compressed.

Table 17. TX Gain Range, Nominal

10 MHz to 6 GHz	22 dB to 68 dB
6 GHz to 9 GHz	0 dB to 68 dB
9 GHz to 20 GHz	19 dB to 68 dB

Table 18. TX Gain Step, Nominal

10 MHz to 6 GHz	2 dB
6 GHz to 20 GHz	1 dB

Table 19. TX Gain Settling Time

10 MHz to 6 GHz	2 μ s
6 GHz to 20 GHz	10 μ s ³



Note The values listed in [Table 19. TX Gain Settling Time](#) include both analog settling and configuration latency.

Table 20. TX Average Noise Density

100 MHz to 500 MHz	≤ -152.5 dBm/Hz
500 MHz to 3.6 GHz	≤ -145.2 dBm/Hz
3.6 GHz to 6 GHz	≤ -143.9 dBm/Hz
6 GHz to 9 GHz	≤ -141.8 dBm/Hz
9 GHz to 12 GHz	≤ -139.1 dBm/Hz
12 GHz to 16 GHz	≤ -141.2 dBm/Hz
16 GHz to 20 GHz	≤ -143.4 dBm/Hz

- For center frequencies above 9GHz, TX gain may overshoot by up to 18dB during the settling interval. Resulting output power depends on the baseband signal and does not exceed the maximum specified output power.



Note The values listed in [Table 20. TX Average Noise Density](#) were measured at TX Gain = 45 dB.

Table 21. TX OIP3

10 MHz to 6 GHz	14.9 dBm
6 GHz to 9 GHz	19.9 dBm
9 GHz to 15 GHz	14.8 dBm
15 GHz to 20 GHz	9.5 dBm



Note The values listed in [Table 21. TX OIP3](#) were measured at TX Gain = 45 dB.

Table 22. TX Phase Noise

1 GHz center frequency, 1 kHz offset	-96 dBc/Hz
1 GHz center frequency, 10 kHz offset	-111 dBc/Hz
1 GHz center frequency, 100 kHz offset	-121 dBc/Hz
5.8 GHz center frequency, 1 kHz offset	-81 dBc/Hz
5.8 GHz center frequency, 10 kHz offset	-96 dBc/Hz
5.8 GHz center frequency, 100 kHz offset	-106 dBc/Hz
18 GHz center frequency, 1 kHz offset	-71 dBc/Hz
18 GHz center frequency, 10 kHz offset	-84 dBc/Hz
18 GHz center frequency, 100 kHz offset	-95 dBc/Hz



Note The values listed in [Table 22. TX Phase Noise](#) represent single-sideband phase noise, measured at TX Gain = 46 dB.

Table 23. TX LO Leakage

10 MHz to 500 MHz	N/A
500 MHz to 6 GHz	< -33 dBc
6 GHz to 9 GHz	< -40 dBc

9 GHz to 20 GHz	< -40 dBc
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Table 24. TX Residual Sideband Image

10 MHz to 500 MHz	N/A
500 MHz to 6 GHz	< -45 dBc
6 GHz to 9 GHz	< -40 dBc
9 GHz to 20 GHz	< -45 dBc



Note The values listed in [Table 23. TX LO Leakage](#) and [Table 24. TX Residual Sideband Image](#) were measured at Tone offset = 10 MHz, TX Gain = 45 dB, and USRP Hardware Driver™ TX corrections applied.

TX Measurements

TX Error Vector Magnitude

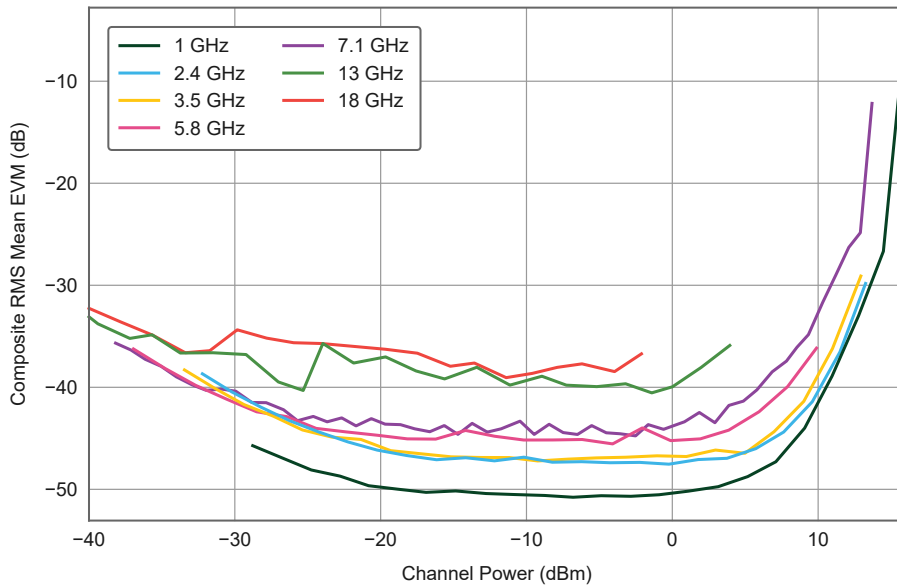
Table 25. TX EVM Measurement Conditions

Link direction	UL
Duplex	FDD
Antenna configuration	SISO
Carrier aggregation	4CC × 100 MHz
Bandwidth	400 MHz
Subcarrier spacing	120 kHz
Modulation	256-QAM
UHD IQ and DC Offset Correction	Applied
Frequency	Tune Frequency (no offset)



Note For the Carrier aggregation and Bandwidth characteristics listed in [Table 25. TX EVM Measurement Conditions](#), a 1 GHz frequency measurement utilizes 1CC × 100 MHz.

Figure 2. TX EVM Bathtub Curves, 5G NR



TX Output Power



Note Linear output power represents output power within the linear operating region of the transmit chain. Maximum output power can be higher and can involve gain compression and increased distortion.

Table 26. TX Output Power Measurement Conditions

Baseband level	0 dBFS
Signal type	CW
Frequency	Tune frequency + 10 MHz offset

Figure 3. TX Maximum Output Power, Gain Setting Maximum

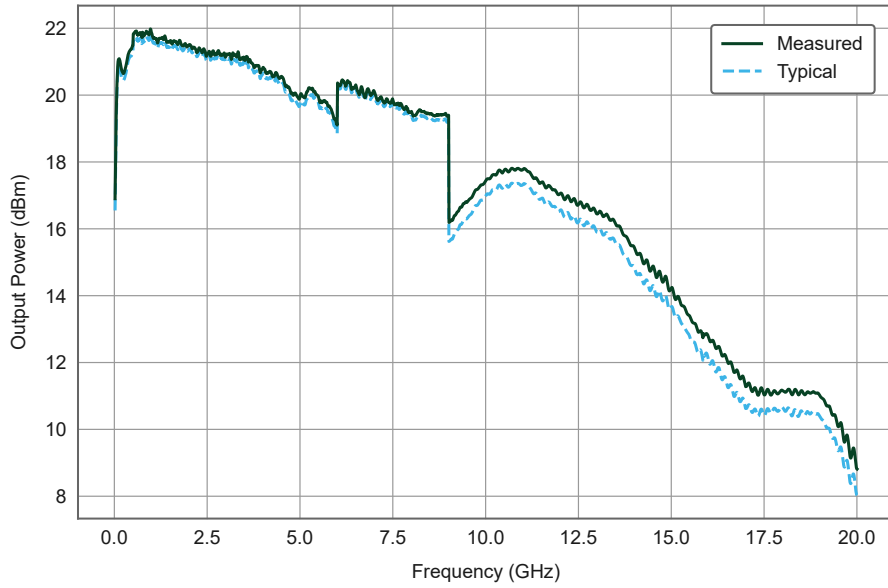


Figure 4. TX Maximum Output Power, Gain Setting Maximum, 0 °C to 50 °C

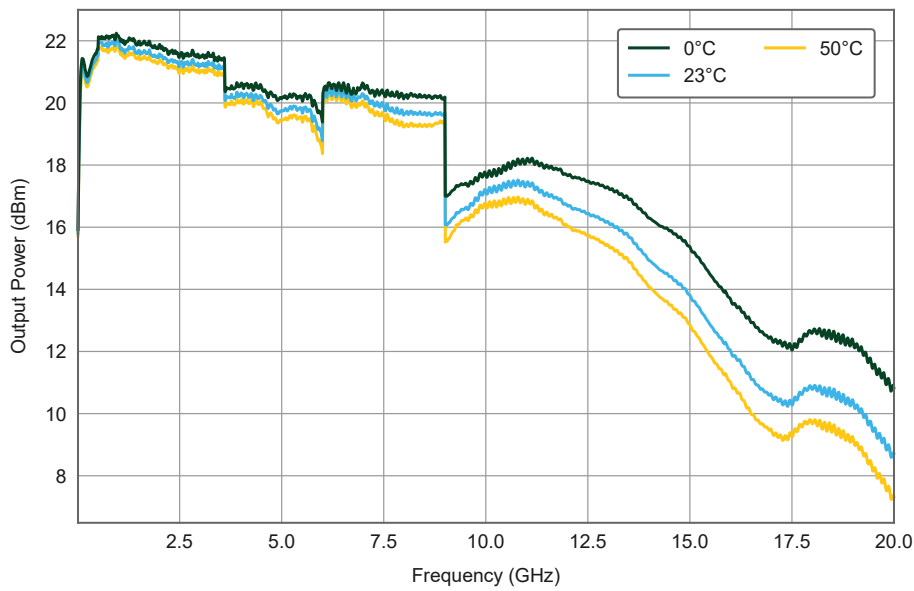


Figure 5. TX Output Power, Gain Setting 52, 23 °C

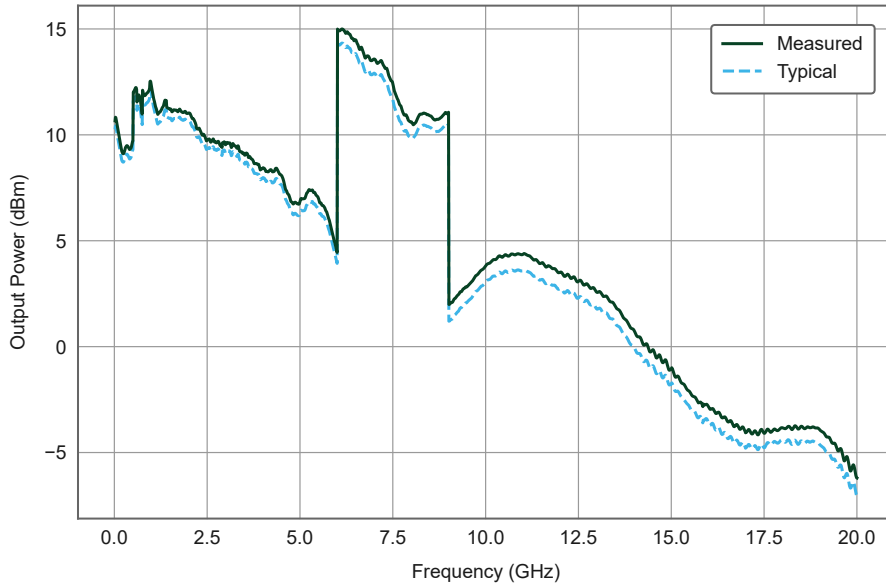
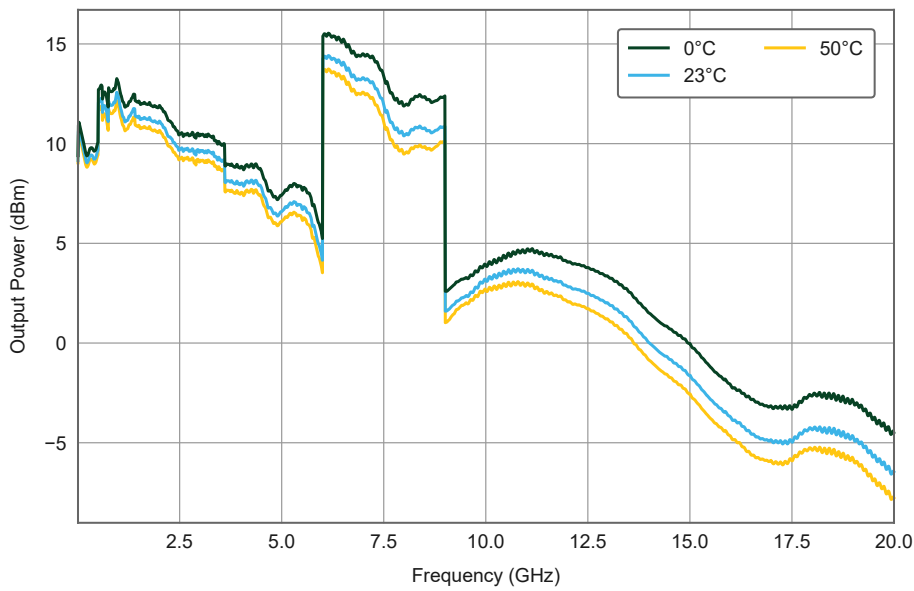


Figure 6. TX Output Power, Gain Setting 52, 0 °C to 50 °C



RF Receiver

Table 27. RX Baseline Characteristics

Number of channels	2 (independent)
Maximum input power, damage level	0 dBm, nominal



Notice Supplying input power in excess of the maximum input power can

result in permanent device damage. Using the manual RX gain profile can reduce the hardware damage threshold and increase the risk of damage at lower input power levels.

Table 28. RX Input Power to Reach 0 dBFS, at 32 dB Gain

10 MHz to 500 MHz ⁴	< -8.4 dBm
500 MHz to 20 GHz	< -0.6 dBm

Table 29. RX Gain Range, Nominal

10 MHz to 1.4 GHz	0 dB to 48 dB
1.4 GHz to 2.9 GHz	0 dB to 47 dB
2.9 GHz to 4.1 GHz	0 dB to 40 dB
4.1 GHz to 6 GHz	0 dB to 38 dB
6 GHz to 8 GHz	0 dB to 36 dB
8 GHz to 9 GHz	0 dB to 34 dB
9 Hz to 14 GHz	0 dB to 35 dB
14 GHz to 20 GHz	0 dB to 32 dB

Table 30. RX Gain Step

Step size	1 dB, nominal
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Table 31. RX Gain Settling Time

10 MHz to 2.9 GHz	< 3.5 μ s
2.9 GHz to 9 GHz	< 18 μ s
9 GHz to 20 GHz	< 11 μ s

Table 32. RX Noise Figure

1.0 GHz	9.9 dB
2.4 GHz	11.1 dB

4. Full scale definition is -6 dBFS below 500 MHz tuning frequency where the direct sampling path is used.

3.5 GHz	12.8 dB
5.8 GHz	16.4 dB
7.1 GHz	16.3 dB
13 GHz	19.9 dB
18 GHz	22.5 dB

Table 33. RX Input IP3

1.0 GHz	5.7 dBm
2.4 GHz	10.5 dBm
3.5 GHz	2.1 dBm
5.8 GHz	3.5 dBm
7.1 GHz	2.6 dBm
13 GHz	7.2 dBm
18 GHz	5.5 dBm



Note The values listed in [Table 33. RX Input IP3](#) were measured at -30 dBm input power and maximum gain.

Table 34. RX DC Offset

10 MHz to 500 MHz	N/A
500 MHz to 6 GHz	< -54 dBFS
6 GHz to 9 GHz	< -42 dBFS
9 GHz to 20 GHz	< -61 dBFS

Table 35. RX Residual Sideband Image

10 MHz to 500 MHz	N/A
500 MHz to 6 GHz	< -45 dBc
6 GHz to 9 GHz	< -45 dBc
9 GHz to 20 GHz	< -45 dBc



Note The values listed in [Table 34. RX DC Offset](#) and [Table 35. RX Residual Sideband Image](#) were measured with Tone offset = 10 MHz, RX Gain = 30 dB, and USRP Hardware Driver™ RX corrections applied.

RX Measurements

RX Error Vector Magnitude

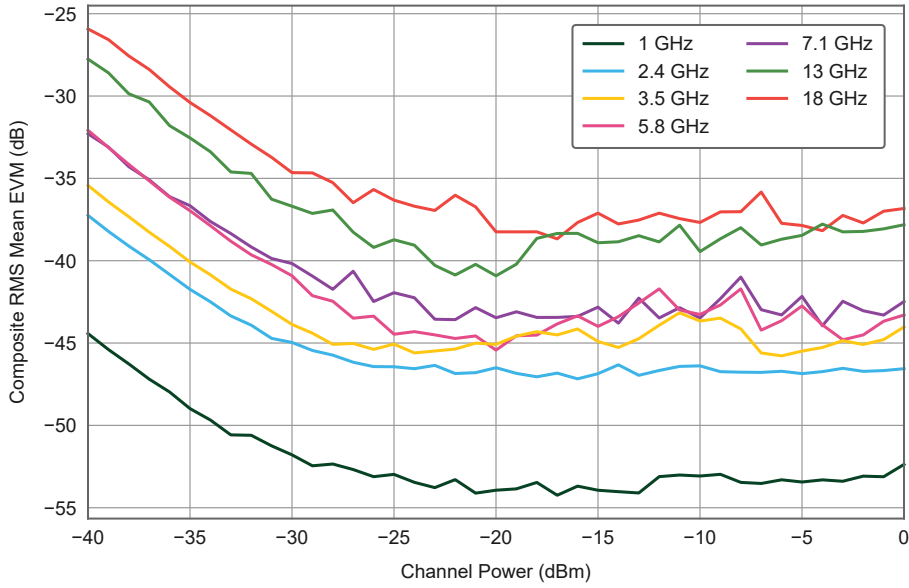
Table 36. RX EVM Measurement Conditions

Link direction	UL
Duplex	FDD
Antenna configuration	SISO
Carrier aggregation	4CC × 100 MHz
Bandwidth	400 MHz
Subcarrier spacing	120 kHz
Modulation	256-QAM



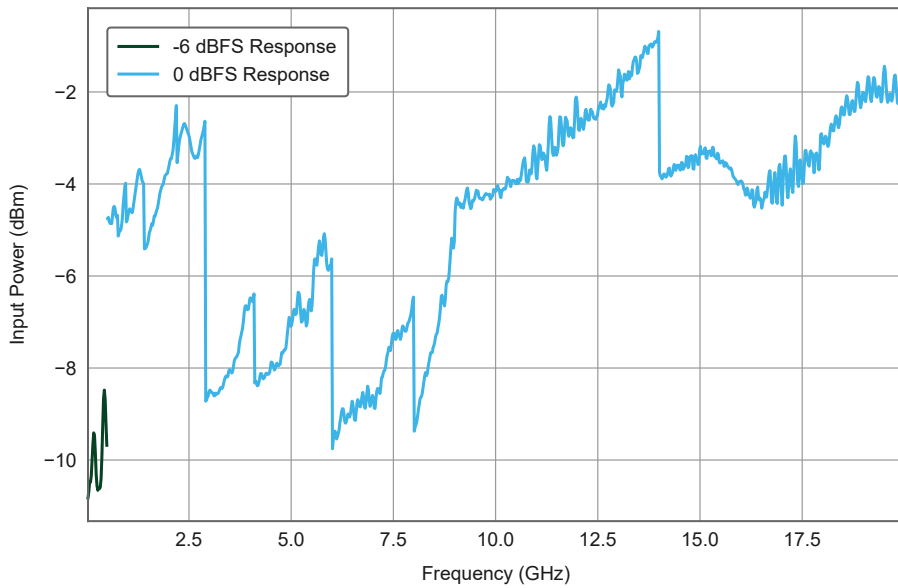
Note For the Carrier aggregation and the Bandwidth characteristics listed in [RX EVM Measurement Conditions](#), a 1 GHz frequency measurement utilizes 1CC × 100 MHz.

Figure 7. RX EVM Bathtub Curves, 5G NR



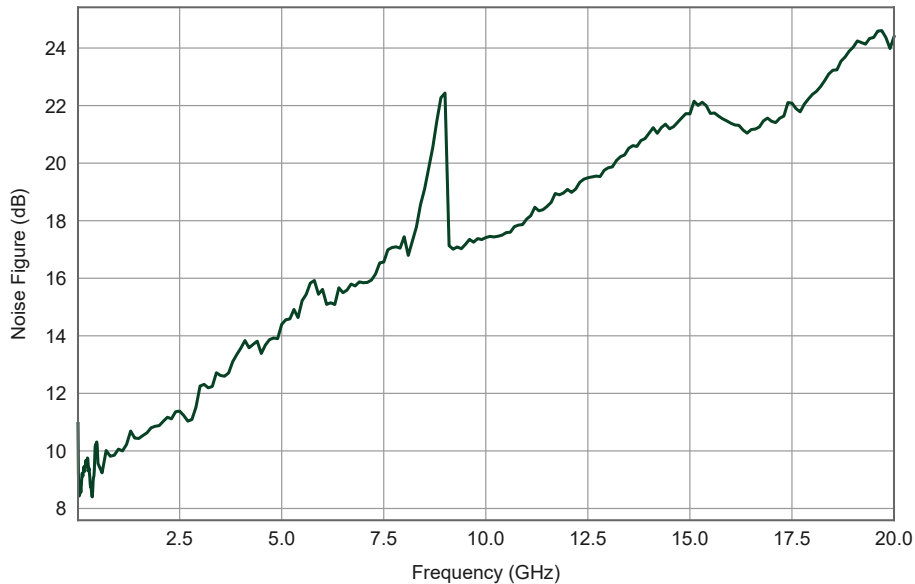
RX Input Power

Figure 8. RX Input Power to Reach 0 dBFS, at 32 dB Gain



RX Noise Figure

Figure 9. RX Noise Figure, Gain Setting Maximum



RF Isolation

Table 37. TX-RX Isolation

500 MHz	97 dBc
6 GHz	103 dBc
9 GHz	102 dBc
18 GHz	71 dBc



Note The values listed in [Table 37. TX-RX Isolation](#) were measured at 0 dBm TX output power and 0 dBm RX input power.

RF Local Oscillator



Note Local oscillator import/export and multi-channel phase behavior depend on configuration.

Table 38. General Specifications

LO IN damage level	+10 dBm, nominal
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Table 39. Frequency Range

LO IN	500 MHz to 6 GHz, nominal
LO OUT	500 MHz to 6 GHz, nominal



Note Internal LO multiplication is applied to achieve higher frequencies.

Table 40. Power Level

LO IN ⁵	<p>–5 dBm for RF tune frequencies ≤ 1.6 GHz</p> <p>0 dBm for RF tune frequencies > 1.6 GHz</p>
LO OUT	<p>–5 dBm nominal for RF tune frequencies ≤ 1.6 GHz</p> <p>0 dBm nominal for RF tune frequencies > 1.6 GHz</p>

RF Phase Coherency



Note This section describes measured phase and delay stability between channels under defined operating conditions. Phase coherency depends on configuration and reference distribution.



Note Phase stability and repeatability depend on reference clock quality, LO distribution, and system configuration. Frequency retunes, session restarts, and power cycles are treated as repeatability events unless otherwise noted.



Note Phase coherency results are sensitive to LO import/export configuration, reference clock quality, and LO power levels. Results may vary for different configurations.

5. Recommended LO IN power level.

Definitions

- **Phase stability**—describes the short-term variation of phase and delay measured over a continuous observation window.
- **Phase repeatability**—describes the variation of phase and delay observed after configuration-changing events such as power cycles.
- **Repeatability events**—include frequency retunes, session restarts, and power cycles unless otherwise noted.

Measurement Conditions

Table 41. RF Phase Coherency Measurement Conditions

Master clock rate	1250 MS/s ⁶
Baseband stimulus	Constant-amplitude multitone
Signal bandwidth	800 MHz (80% of in-band)
RX number of tones	1600
TX number of tones	400
Tone spacing	500 kHz
Observation window (single data point)	1 ms
IQ imbalance and DC correction	Enabled
Reference clock	External 10 MHz (OctoClock-G CDA-2990)
PPS	OctoClock-G CDA-2990
LO distribution	Device 0 LO OUT to all LO IN ports ⁷
Temperature	23 °C after 30-minute warm-up

6. For coherent operation, the Ettus USRP X420 supports a 1250 MS/s master clock rate at initial release. Support for additional master clock rates is planned for a future software release.

7. The LO distribution uses an SC2510 microwave distribution amplifier from Signal Craft Technologies. For details, see *SC 2510* under *Related Information*.

TX Phase Stability

Table 42. TX Phase Stability (Standard Deviation)

Tune Frequency	Single Device Phase RMS	Single Device Delay RMS	Multi-Device Phase RMS	Multi-Device Delay RMS
2.4 GHz	0.082 deg	0.206 ps	0.150 deg	0.824 ps
5.8 GHz	0.031 deg	0.206 ps	0.045 deg	0.824 ps
10 GHz	0.040 deg	0.206 ps	0.072 deg	0.824 ps
13 GHz	0.038 deg	0.206 ps	0.075 deg	0.824 ps
18 GHz	0.045 deg	0.206 ps	0.093 deg	0.824 ps

RX Phase Stability

Table 43. RX Phase Stability (Standard Deviation)

Tune Frequency	Single Device Phase RMS	Single Device Delay RMS	Multi-Device Phase RMS	Multi-Device Delay RMS
2.4 GHz	0.010 deg	0.092 ps	0.029 deg	0.666 ps
5.8 GHz	0.003 deg	0.092 ps	0.006 deg	0.666 ps
10 GHz	0.017 deg	0.092 ps	0.043 deg	0.666 ps
13 GHz	0.016 deg	0.092 ps	0.054 deg	0.666 ps
18 GHz	0.038 deg	0.092 ps	0.073 deg	0.666 ps

TX Phase Repeatability

Table 44. TX Phase Repeatability (Power-Cycle Events)

Tune Frequency	Single Device Phase RMS	Single Device Delay RMS	Multi-Device Phase RMS	Multi-Device Delay RMS
2.4 GHz	0.016 deg	0.119 ps	0.280 deg	4.514 ps
5.8 GHz	0.048 deg	0.119 ps	0.106 deg	4.514 ps
10 GHz	0.066 deg	0.119 ps	0.141 deg	4.514 ps
13 GHz	0.072 deg	0.119 ps	0.202 deg	4.514 ps
18 GHz	0.087 deg	0.119 ps	0.239 deg	4.514 ps

RX Phase Repeatability

Table 45. RX Phase Repeatability (Power-Cycle Events)

Tune Frequency	Single Device Phase RMS	Single Device Delay RMS	Multi-Device Phase RMS	Multi-Device Delay RMS
2.4 GHz	0.002 deg	0.083 ps	0.011 deg	3.888 ps
5.8 GHz	0.005 deg	0.083 ps	0.012 deg	3.888 ps
10 GHz	0.011 deg	0.083 ps	0.030 deg	3.888 ps
13 GHz	0.013 deg	0.083 ps	0.039 deg	3.888 ps
18 GHz	0.013 deg	0.083 ps	0.021 deg	3.888 ps

GPS Disciplined Oscillator (GPSDO)

Table 46. Frequency Accuracy

OCXO (not locked to GPS) ⁸	2.5 ppm
OCXO (locked to GPS)	5 ppb



Note The values listed in [Table 46. Frequency Accuracy](#) are based on oven-controlled crystal oscillator (OCXO) vendor specifications and are not measured. You can use an external reference source to provide a more precise frequency reference clock and improve frequency accuracy.

Table 47. Active Antenna

Type	3.3 V active antenna
Power	0.19 W
Frequency band(s)	L1, C/A 1.574 GHz

Power



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

8. Factory default accuracy. To tune the OCXO output frequency, contact NI.

Table 48. Power

Voltage rating	12 V DC
Current/power rating	16 A, maximum
Power supply	190 W, minimum ⁹



Caution The product must be powered with an AC adapter offered by NI that meets the power requirements for the product and has appropriate safety certification marks for country of use.

Environmental Guidelines



Notice Failure to follow the mounting instructions in the *Ettus USRP X420 User Manual* can cause temperature derating.



Notice Use this product indoors only.



Notice Apply strain relief near the input connectors of all cables. Ensure the strain relief does not cause directional bias on the cable connectors within the input connectors.

Environmental Characteristics

Table 49. Temperature

Operating temperature, with exhaust fans (default)	0 °C to 50 °C
Operating temperature, with intake fans	0 °C to 45 °C
Storage temperature	-40 °C to 71 °C

Table 50. Humidity

Operating humidity	10% to 90%, non-condensing
Storage humidity	5% to 95%, non-condensing

9. For part numbers, see the *Ettus USRP X420 User Manual*.

Table 51. Pollution Degree

Pollution Degree	2
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Table 52. Maximum Altitude

Maximum altitude	2,000 m (800 mbar) (at 25 °C ambient temperature)
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Table 53. Shock and Vibration

Operating vibration	5 to 500 Hz, 0.3 g RMS
Non-operating vibration	5 to 500 Hz, 2.4 g RMS
Operating shock	30 g, half-sine, 11 ms pulse
Non-operating shock	50 g, half-sine, 11 ms pulse