

R&S®WPU500

Wideband Processing Unit

Specifications



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Definitions

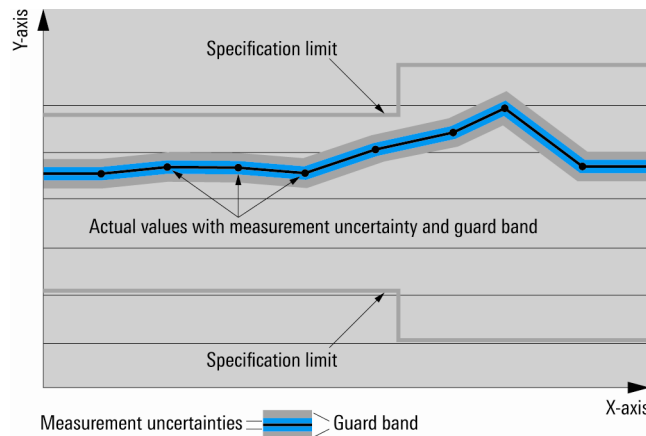
General

Product data applies under the following conditions:

- Three hours storage at ambient temperature followed by 30 minutes warm-up operation
- Specified environmental conditions met
- Recommended calibration interval adhered to
- All internal automatic adjustments performed, if applicable

Specifications with limits

Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as $<$, \leq , $>$, \geq , \pm , or descriptions such as maximum, limit of, minimum. Compliance is ensured by testing or is derived from the design. Test limits are narrowed by guard bands to take into account measurement uncertainties, drift and aging, if applicable.



Specifications without limits

Represent warranted product performance for the specified parameter. These specifications are not specially marked and represent values with no or negligible deviations from the given value (e.g. dimensions or resolution of a setting parameter). Compliance is ensured by design.

Typical data (typ.)

Characterizes product performance by means of representative information for the given parameter. When marked with $<$, $>$ or as a range, it represents the performance met by approximately 80 % of the instruments at production time. Otherwise, it represents the mean value.

Nominal values (nom.)

Characterize product performance by means of a representative value for the given parameter (e.g. nominal impedance). In contrast to typical data, a statistical evaluation does not take place and the parameter is not tested during production.

Measured values (meas.)

Characterize expected product performance by means of measurement results gained from individual samples.

Uncertainties

Represent limits of measurement uncertainty for a given measurand. Uncertainty is defined with a coverage factor of 2 and has been calculated in line with the rules of the Guide to the Expression of Uncertainty in Measurement (GUM), taking into account environmental conditions, aging, wear and tear.

Device settings and GUI parameters are indicated as follows: "parameter: value".

Typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

Specifications

Frequency

Frequency range	base unit	20 MHz to 18 GHz
	with the R&S®WPU500-HF option	8 kHz to 18 GHz
Frequency resolution		1 Hz
Frequency accuracy		$\leq 1 \times 10^{-7}$
Input for external reference		10 MHz
Synthesizer settling time		≤ 1 ms
Oscillator phase noise	8 kHz to 32 MHz	≤ -130 dBc (1 Hz) at 1 kHz offset
	20 MHz to 650 MHz	≤ -115 dBc (1 Hz) at 10 kHz offset
	650 MHz to 6 GHz	≤ -103 dBc (1 Hz) at 10 kHz offset
	2.2 GHz to 18 GHz	≤ -94 dBc (1 Hz) at 10 kHz offset, span ≤ 80 MHz
		≤ -89 dBc (1 Hz) at 10 kHz offset, span > 80 MHz

Linearity

Second-order intercept point (SOI)		
8 kHz to 32 MHz	low distortion mode (at -6 dBm)	
	$1 \text{ MHz} \leq f \leq 32 \text{ MHz}$	≥ 70 dBm
20 MHz to 6 GHz	low distortion mode, span = 20 MHz	
	$20 \text{ MHz} \leq f \leq 80 \text{ MHz}$	≥ 30 dBm
	$80 \text{ MHz} \leq f \leq 200 \text{ MHz}$	≥ 35 dBm
	$200 \text{ MHz} \leq f \leq 6000 \text{ MHz}$	≥ 40 dBm
	low distortion mode, span = 80 MHz	
	$20 \text{ MHz} \leq f \leq 200 \text{ MHz}$	≥ 20 dBm
2.2 GHz to 18 GHz	low distortion mode	
	$4.5 \text{ GHz} \leq f \leq 18 \text{ GHz}$	≥ 55 dBm
Third-order intercept point (TOI)		
8 kHz to 32 MHz	low distortion mode (150 kHz spacing at -6 dBm)	
	$1 \text{ MHz} \leq f \leq 32 \text{ MHz}$	≥ 30 dBm
	$8 \text{ kHz} \leq f < 1 \text{ MHz}$	typ. 30 dBm
20 MHz to 6 GHz	low distortion mode, span ≤ 20 MHz (2 MHz spacing at -20 dBm)	
	$20 \text{ MHz} \leq f \leq 650 \text{ MHz}$	≥ 15 dBm
	$650 \text{ MHz} \leq f \leq 6 \text{ GHz}$	≥ 10 dBm
	low distortion mode, span = 80 MHz (2 MHz spacing at -24 dBm)	
2.2 GHz to 18 GHz	$20 \text{ MHz} \leq f \leq 6 \text{ GHz}$	≥ 0 dBm
	low distortion mode, span = 20 MHz (at -16 dBm)	≥ 11 dBm
	low distortion mode, span ≥ 80 MHz (at -23 dBm)	≥ 0 dBm

Interference rejection

Image rejection	$8 \text{ kHz} \leq f \leq 32 \text{ MHz}$	direct reception (no image frequency present)
	$20 \text{ MHz} \leq f \leq 18 \text{ GHz}$	≥ 80 dB
IF rejection	$8 \text{ kHz} \leq f \leq 32 \text{ MHz}$	direct reception (no IF present)
	$20 \text{ MHz} \leq f \leq 18 \text{ GHz}$	≥ 80 dB

Noise figure

8 kHz to 32 MHz	normal mode	
	50 kHz $\leq f < 400$ kHz	≤ 31 dB
	400 kHz $\leq f \leq 30$ MHz	≤ 15 dB
	$f > 30$ MHz	≤ 18 dB
20 MHz to 6 GHz	normal mode, span = 20 MHz	
	20 MHz $\leq f \leq 3.6$ GHz	≤ 14 dB (X44 VHF/UHF1)
		≤ 17 dB (X43 VHF/UHF2, X42 VHF/UHF3)
	3600 MHz $\leq f \leq 6$ GHz	≤ 21 dB (X44 VHF/UHF1)
		≤ 24 dB (X43 VHF/UHF2, X42 VHF/UHF3)
	normal mode, span = 80 MHz	
	20 MHz $\leq f \leq 3.6$ GHz	≤ 16 dB (X44 VHF/UHF1)
		≤ 19 dB (X43 VHF/UHF2, X42 VHF/UHF3)
2.2 GHz to 18 GHz	low noise mode	
	2.2 GHz $\leq f \leq 10$ GHz	≤ 9 dB
	10 GHz $\leq f \leq 18$ GHz	≤ 11 dB

Level measurement

The following parameters are valid within 100 Hz to 20 MHz measurement bandwidth.

Signal level		-30 dB μ V to +120 dB μ V, 0.1 dB resolution
Display error	8 kHz $\leq f \leq 32$ MHz	max. ± 2 dB
	at +23 °C + 7 °C/- 3 °C	max. ± 1.5 dB
	20 MHz $\leq f \leq 6$ GHz	max. ± 3 dB
	at +23 °C + 7 °C/- 3 °C	max. ± 2 dB
	2.2 GHz $< f \leq 18$ GHz	max. ± 5 dB
	at +23 °C + 7 °C/- 3 °C	max. ± 4 dB
Level detector		average, peak, fast, RMS
Level display mode		continuous, periodic
Measurement time	settable	1 μ s to 900 s or automatic

IF spectrum

IF spectrum span		1/2/5/10/20/40/80/125/250/500 MHz
Spectrum display		clear/write, average, max. hold, min. hold, histogram

A/D converter resolution

Resolution	≤ 20 MHz bandwidth	16 bit
	> 20 MHz bandwidth	12 bit

Pulse processing

Pulses with the following parameters can be processed:

Pulse duration		50 ns to 20 ms, CW
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Multichannel reception

Four channels within the selected IF spectrum span (up to 500 MHz) can be selected by the user as required.

Number of analysis channels		4
Channel bandwidth	channel 1	up to 500 MHz
	channel 2	up to 250 MHz
	channels 3 and 4	up to 125 MHz

Scan characteristics

Spectrum scan (PSCAN)		RF spectrum with user-selectable start/stop frequency and step width: 0.625/1.25/3.125/6.25/12.5/25/50/78.125/ 156.25/312.5 kHz
	speed	up to 200 GHz/s (step width = 312.5 kHz)

Antenna inputs

Antenna input	VHF/UHF	3 inputs, N female, 50 Ω
	VHF/UHF/SHF combined	2 inputs, K female, 50 Ω (internal switching)
	with the R&S®WPU500-HF option	
	HF	2 inputs, N female, 50 Ω
	VHF/UHF	2 inputs, N female, 50 Ω
	HF/VHF/UHF combined	1 input, N female, 50 Ω (internal switching)
	VHF/UHF/SHF combined	2 inputs, K female, 50 Ω (internal switching)
VSWR	8 kHz to 32 MHz	≤ 2
	20 MHz to 18 GHz	≤ 2.5
Input level	8 kHz to 6 GHz	-137 dBm to +10 dBm
	2.2 GHz to 18 GHz	-137 dBm to 0 dBm
Max. input level (nondestructive)		+15 dBm
Oscillator reradiation at antenna input	20 MHz $\leq f \leq 6$ GHz	≤ -90 dBm
	2.2 GHz $\leq f \leq 18$ GHz	≤ -95 dBm
Input selection	8 kHz to 400 kHz	lowpass filter
	400 kHz to 32 MHz	highpass/lowpass filter, switchable
	20 MHz to 1.5 GHz	tracking preselection
	1.5 GHz to 6 GHz	bandpass filter
	6 GHz to 18 GHz	bandpass filter
	switchable attenuation	manual or automatic
		25 dB in 5 dB steps from 400 kHz to 32 MHz (HF tuner)
		40 dB in 1 dB steps from 20 MHz to 6 GHz (VHF/UHF tuner)
		0/5/10/20/30 dB (nom.), frequency dependent, from 2.2 GHz to 18 GHz (SHF tuner)

Inputs and outputs

Inputs		
External reference input	10 MHz	input level = 0 dBm to 10 dBm
Control signals, inputs		GPS, GPS trigger, compass, serial, trigger, blank
Outputs		
Internal reference output	10 MHz	output level = 3 dBm to 7 dBm
I/Q, digital		LAN, bandwidth ≤ 15 MHz
Audio, analog	headphone connector	typ. 2 V, $R_i = 100 \Omega$, $f_{\min} = 10$ Hz to 300 Hz, $f_{\max} = 12.5$ kHz (depending on IF filter and modulation)
	AF, line	0.5 V \pm 0.3 V ($m = 0.5$), $R_i = 100 \Omega$, $f_{\min} = 10$ Hz to 300 Hz, $f_{\max} = 12.5$ kHz (depending on IF filter and modulation)
	AF, balanced	0.4 V \pm 0.2 V ($m = 0.5$), $R_i = 600 \Omega$, $f_{\min} = 100$ Hz, $f_{\max} = 12.5$ kHz
Audio, digital	LAN	bandwidth ≤ 24 kHz
	AES3	AES/EBU interface (ANSI 4.40)
Control signals, outputs		antenna control
LAN	for data transmission and remote control	2 \times 1 Gbit LAN interfaces (Ethernet 1000BaseT)
10 Gbit Ethernet	10 Gbit Ethernet for I/Q data	optical/copper interface in line with SFP+, up to 125 MHz I/Q bandwidth

General data

Environmental conditions		
Temperature	operating temperature range	0 °C to +50 °C
	permissible temperature range	–10 °C to +55 °C
	storage temperature range	–40 °C to +70 °C
Damp heat		+25 °C/+55 °C, 95 % rel. humidity, cyclic, in line with EN 60068-2-30, without condensation
Altitude	operating	5000 m
Mechanical resistance		
Vibration	sinusoidal	5 Hz to 150 Hz, in line with EN 60068-2-6
	random	10 Hz to 500 Hz, in line with EN 60068-2-64
Shock		in line with EN 60068-2-27, MIL-STD-810E, method 516.4, procedure I
Power rating		
Rated voltage		100 V to 240 V AC
Rated frequency		50 Hz to 400 Hz
Rated current		max. 4.5 A
Rated power		200 VA to 400 VA (depending on optional equipment installed)
Product conformity		
Electromagnetic compatibility		in line with EN 300339 (antenna port only), ETSI EN 301489-1, ETSI EN 301489-22, EN 55022 class B
Safety		in line with EN 60950-1, CAN/CSA-C22.2 No. 60950-1
Dimensions	W × H × D, without feet and handles	426 mm × 176 mm × 450 mm (16.8 in × 6.9 in × 17.7 in) 19", 4 HU
Weight		approx. 20 kg (44 lb) (depending on optional equipment installed)
MTBF	EN/IEC 61709, SN29500	> 16000 h

Ordering information

Designation	Type	Order No.
Base unit (including accessories supplied such as power cord and manual)		
Wideband Processing Unit	R&S®WPU500	4092.9005.02
Options		
HF Option	R&S®WPU500-HF	4093.2227.02
Accessories		
19" Rack Adapter	R&S®ZZA411	1096.3283.00
19" Rack Mounting Kit, mobile	R&S®RMK411	4074.7504.02

For more information, see www.rohde-schwarz.com

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Sustainable product design

- ▮ Environmental compatibility and eco-footprint
- ▮ Energy efficiency and low emissions
- ▮ Longevity and optimized total cost of ownership

Certified Quality Management

ISO 9001

Certified Environmental Management

ISO 14001

Rohde & Schwarz GmbH & Co. KG

www.rohde-schwarz.com

Regional contact

- ▮ Europe, Africa, Middle East | +49 89 4129 12345
customersupport@rohde-schwarz.com
- ▮ North America | 1 888 TEST RSA (1 888 837 87 72)
customer.support@rsa.rohde-schwarz.com
- ▮ Latin America | +1 410 910 79 88
customersupport.la@rohde-schwarz.com
- ▮ Asia Pacific | +65 65 13 04 88
customersupport.asia@rohde-schwarz.com
- ▮ China | +86 800 810 82 28 | +86 400 650 58 96
customersupport.china@rohde-schwarz.com

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