R&S®DWR100
DIGITAL WIDEBAND RECORDER

Specifications

**ROHDE & SCHWARZ**

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CONTENTS

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 <, ≤, >, ≥, ±, 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.
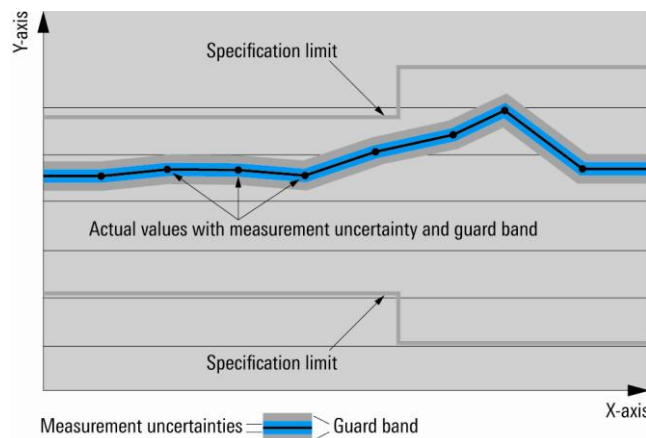
Non-traceable specifications with limits (n. trc.)

Represent product performance that is specified and tested as described under "Specifications with limits" above. However, product performance in this case cannot be warranted due to the lack of measuring equipment traceable to national metrology standards. In this case, measurements are referenced to standards used in the Rohde & Schwarz laboratories.

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 designated with the format "parameter: value".

Non-traceable specifications with limits, typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

In line with the 3GPP/3GPP2 standard, chip rates are specified in million chips per second (Mcps), whereas bit rates and symbol rates are specified in billion bits per second (Gbps), million bits per second (Mbps), thousand bits per second (kbps), million symbols per second (Msps) or thousand symbols per second (ksps), and sample rates are specified in million samples per second (Msample/s). Gbps, Mcps, Mbps, Msps, kbps, ksps and Msample/s are not SI units.

Specifications

Base unit

Data interfaces	1 × 1 Gbit Ethernet
	2 × 10 Gbit SFP+ (with R&S®DWR-10G option)
	2 × 10 Gbit 10GBase-T (with R&S®DWR-10G option)
Data rate via 1 Gbit interfaces	sustained data transfer rate of 50 Mbyte/s for recording baseband I/Q data with a maximum bandwidth of 10 MHz
Data rate via 10 Gbit interfaces (with R&S®DWR-10G option)	sustained data transfer rate of 210 Mbyte/s for recording baseband I/Q data with a maximum bandwidth of 40 MHz
Data formats	raw data
	R&S®AMMOS IF data
	R&S®EB200 IF data
	R&S®AMMOS spectrum data
	R&S®AMMOS decoded text
	R&S®AMMOS image data
	R&S®AMMOS instantaneous data
	R&S®AMMOS symbol data
	R&S®AMMOS tuner spectrum data
	R&S®AMMOS analog audio
	R&S®AMMOS emission list data
	R&S®AMMOS burst emission list data
	R&S®AMMOS time domain data
	R&S®AMMOS histogram data
	R&S®AMMOS pulse description word data
	R&S®AMMOS hop density waterfall data
	R&S®AMMOS tuner PIFPan data
	R&S®AMMOS digital audio
	R&S®AMMOS I/Q burst data
Software interfaces	XML control interface
	web interface for configuring R&S®DWR100 and retrieving the documentation, system parameters and log files
	recordings can be imported and exported using file transfer protocol (FTP)
Operational reliability	initial built-in test (BIT) and consistency check performed after power-on
	runtime BIT monitors device operation
	faults collected in a log file and made known via the interface
	storage status query (free, used disk space)
Support functions	up to 40000 recordings can be managed by the software
	all recordings in R&S®AMMOS IF data format and in R&S®EB200 IF data format are indexed; recorded data stream is analyzed by relating recording file offsets, time-stamps, sample rates, center frequency and bandwidth of a recording; result of analysis is stored in a database and can be queried
	further database administration possible by indexing any position of a recording with comments
	history function facilitates setting of comments for recordings; the timestamp indicates when the data was entered; this function can be used to write the history of a recording
	bookmarking function facilitates settings of comments within a recording; this function can be used to mark an interesting time range in the recording
	query list of recordings
	beginning and end of a replay can be configured; replay can be repeated 1 to n times
	recordings can be deleted
	recordings can be write-protected
	reliable erasure (WIPE) of the data storage can be triggered
	overview spectrum for recordings of type content (R&S®AMMOS IF data) or R&S®EB200 IF data: The overview is a spectrogram with a low time resolution to provide a quick information in which time portions of the recording there are signals of interest.

General data

Environmental conditions		
Temperature	operating temperature range	0 °C to +50 °C
	permissible temperature range	−5 °C to +55 °C
	storage temperature range	−20 °C to +70 °C
Damp heat		+25 °C/+40 °C, 85 % rel. humidity, cyclic, in line with EN 60068-2-30
Mechanical resistance		
Vibration	sinusoidal	5 Hz to 55 Hz, 0.15 mm amplitude const., 55 Hz to 150 Hz, 0.5 g const., in line with EN 60068-2-6
	random	10 Hz to 300 Hz, acceleration 1.9 g RMS, 300 Hz to 500 Hz, acceleration 1.2 g RMS, in line with EN 60068-2-64
Shock		40 g shock spectrum, in line with MIL-STD-810E, method 516.4, procedure I
AC power supply		
Rated voltage		100 V to 240 V AC (± 10 %)
Rated frequency		50 Hz to 60 Hz (± 5 %)
Rated current		1.5 A to 3.6 A
Rated power		≤ 150 W (meas.)
Product conformity		
Electromagnetic compatibility	EU: in line with EMC Directive 2014/30/E	applied harmonized standards: EN 61326-1 (industrial environment), EN 61326-2-1, EN 55011 (class B)
Electrical safety	EU: in line with Low Voltage Directive 2014/35/EC	applied harmonized standard: EN 61010-1
	USA	UL 61010-1
	Canada	CAN/CSA-C22.2 No. 61010-1
International safety approvals	VDE – Association for Electrical Electronic and Information Technology	VDE-GS
	CSA – Canadian Standard Association	$_{c}CSA_{US}$
RoHS	EU: in line with Directive 2011/65/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment	applied harmonized standard: EN 50581
Dimensions	W × H × D	249.5 mm × 150 mm × 451 mm (9.82 in × 5.91 in × 17.76 in), ½ 19", 3 HU
Weight		6.3 kg (13.9 lb)

Hardware options

R&S®DWR-10G	recording and replaying with a sustained data transfer rate of 210 Mbyte/s (corresponds to a bandwidth of 40 MHz)
R&S®DWR-S103	solid-state drive (SSD), 3 Tbyte storage capacity
R&S®DWR-S106	solid-state drive (SSD), 6 Tbyte storage capacity
R&S®DWR-S115	solid-state drive (SSD), 15 Tbyte storage capacity

Simultaneous recording and replaying

The R&S®DWR100 manages the bandwidth of the storage and of all interfaces to get the maximum possible number of simultaneous recording and replay sessions. The following tables show the maximum number of recording sessions depending on the used data rate class and the used interface if all simultaneous sessions are using the same data rate class. Combinations of different data rate classes are possible. The data format can be either short (32 bit/sample) or long (64 bit/sample).

Data rate class	Typical receiver bandwidth	Sample rate (mode)	Recording/replay via 1 Gbit interface, R&S®DWR100 without R&S®DWR-10G option	Recording/replay via 10 Gbit interface [1], R&S®DWR100 with R&S®DWR-10G option	Recording/replay via a direct 10 Gbit SFP+ connection between receiver and R&S®DWR100
result data	–	result data	256	256	–
20k	30 kHz	64 ksample/s (long)	128	128	1
300k	300 kHz/500 kHz	640 ksample/s (short)	32	32	1
1M	1 MHz	1.28 Msample/s (short)	19	32	1
4M	5 MHz	6.4 Msample/s (short)	3	16	1
10M	10 MHz	12.8 Msample/s (short)	1	4	1
20M	20 MHz	25.6 Msample/s (short)	–	2	1
40M	40 MHz	51.2 Msample/s (short)	–	1	1

Maximum recording time

The maximum recording time depends on the connected receiver, the bandwidth used or the sampling rate for this bandwidth which is given by the receiver, the data format used and the capacity of the storage unit. The following table applies for the R&S®ESME. The data format can be either short (32 bit/sample) or long (64 bit/sample).

The settings for the data format in the following example are taken from the R&S®CA120.

Data rate class	64 ksample/s, long	640 ksample/s short	1.28 Msample/s, short	6.4 Msample/s, short	12.8 Msample/s, short	25.6 Msample/s, short	51.2 Msample/s, short
Maximum input bandwidth	30 kHz	300 kHz	1 MHz	5 MHz	10 MHz	20 MHz	40 MHz
Recording time with R&S®DWR-S103	1650 h	335 h	165 h	32 h	17 h	8.5 h	4 h
Recording time with R&S®DWR-S106	3300 h	670 h	330 h	65 h	34 h	16 h	8 h
Recording time with R&S®DWR-S115	8000 h	1600 h	800 h	160 h	80 h	40 h	20 h

Interface with Rohde & Schwarz products

Receiver: R&S®	EB500, EB510	ESMD, ESME (FFM), DDF255, DDF260 (receiver mode)	PR100, EM100	EM200	PR200	DDF550	CA120	CA100
Via 1 Gbit LAN	5 MHz	10 MHz	500 kHz	1 MHz	1 MHz	10 MHz	10 MHz	10 MHz
Via 10 Gbit LAN	–	40 MHz	–	40 MHz	–	–	–	–
Recording I/Q	●	●	●	●	●	●	●	●
Replaying I/Q	–	●	–	–	–	–	●	●

● = yes, – = no

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[1] Requires R&S®DWR-10G option and a corresponding network.

Ordering information

Designation	Type	Order No.
Base unit		
Digital wideband recorder (up to 10 MHz bandwidth for recording and replaying)	R&S®DWR100	1525.7551.50
Scope of delivery: R&S®DWR100, manual, software and documentation on CD, power cable		
Storage media (one module is required)		
Solid-state drive, 3.2 Tbyte storage capacity	R&S®DWR-S103	1525.8293.50
Solid-state drive, 6.4 Tbyte storage capacity	R&S®DWR-S106	1525.8293.60
Solid-state drive, 15 Tbyte storage capacity	R&S®DWR-S115	1525.8293.65
Interface option		
Interface board with 4 plugs 10 Gbit Ethernet (2 × SFP+, 2 × 10G Base-T), enables recording and replaying up to 40 MHz bandwidth [2]	R&S®DWR-10GX4	1525.8264.60
Auxiliary equipment		
Copper cable, including two SFP+ connectors for 10 Gbit/s, length: 5 m	R&S®GX460-CCG	4094.8635.02
Optical cable, including two SFP+ optical transceivers for 10 Gbit/s, length: 20 m	R&S®GX460-OCG	4094.8641.02
Options for rack mounting		
19" rack adapter, 3 HU (1 × ½ 19" device + dummy)	R&S®IQW-Z19	1525.7574.02

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[2] Replay via 10 Gbit interface requires a compatible receiver, e.g. R&S®ESMD or R&S®ESME.

Rohde & Schwarz

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