R&S®GX470
Digital Wideband Storage Device
Specifications

ROHDE&SCHWARZ

Data Sheet | Version 02.00

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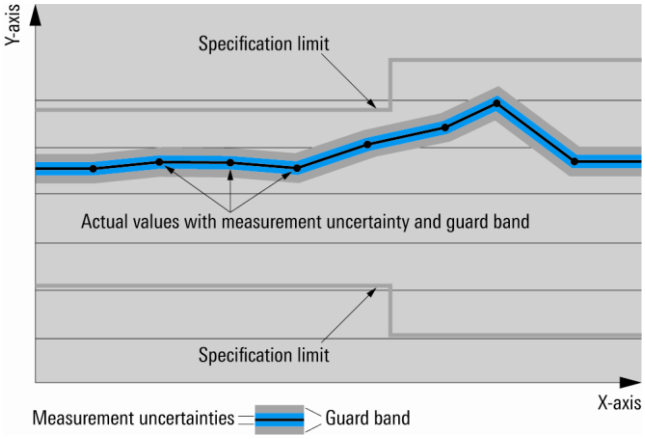
Definitions

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 <, ≤, >, ≥, ±, 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.

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

Specifications

Base unit

Data rate LAN	sustained data transfer rate of at least 52 Mbyte/s for recording baseband I/Q data with a maximum bandwidth of 10 MHz via LAN
Data rate R&S®Digital I/Q Interface 40G	sustained data transfer rate of at least 2.64 Gbyte/s for recording baseband I/Q data with a maximum bandwidth of 500 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
	R&S®AMMOS IQDW
Interfaces	2 × R&S®Digital I/Q Interface 40G for recording baseband I/Q data [1] up to 500 MHz. One of these ports can be used also for replaying baseband I/Q data [1] up to 500 MHz.
	2 × 1 Gbit Ethernet for recording and replaying data
	2 × 10 Gbit Ethernet for recording and replaying data
	2 × USB 3.0
	IPMI interface for remote maintenance purposes
	XML control interface, via Ethernet
	web interface for configuring R&S®GX470 and retrieving the documentation, system parameters and log files
	recordings can be imported and exported using file transfer protocol (FTP)
Mass memory	7.68 Tbyte (8 × 960 Gbyte) SSD removable memory [2]
Operational reliability	initial built-in test (BIT) and data 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)

[1] Recording and replaying via R&S®Digital I/Q Interface 40G interface requires a compatible receiver. For details, see table Interface with Rohde & Schwarz products on page 6.

[2] Lifespan and data retention time of a NAND Flash SSD typically depend on the number of write cycles and the temperature. The SSDs data storage module used in the R&S®GX470 has a volume of 7 Tbyte. Each byte can be overwritten 2000 times. When this value is reached, the SSD enters a read-only mode to ensure data retention. Depending on the operating and storage temperatures, the data retention period decreases over the lifespan from several years to a guaranteed period of over 60 days. Although continuous recording is offered by the R&S®GX470, it is recommended to use this feature sparingly. Continuous recording reduces the life span of an SSD significantly.
Lifespan example: A lifespan of approximately 5 years is obtained if the SSD storage package is overwritten completely once a day.

Support functions	Up to 40 000 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; the beginning and the end of the 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.
	History function facilitates setting of comments for recordings; the timestamp indicates the moment of data entry; 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
	storage temperature range	–40 °C to +70 °C
Damp heat		8 % up to max. 90 % rel. humidity, noncondensing
Degree of protection (IP code) of the front side	only with closed front filter doors	IP50
Operating altitude		max. 3000m (10 000 ft)
Mechanical resistance		
Vibration	random	1.2 g (RMS), 10 Hz to 2000 Hz
Shock		35 g at 25 ms half-sine, 3 axes
Power rating		
Rated voltage		100 V to 240 V AC ± 10 %
Rated frequency		47 Hz to 63 Hz
Rated power		max. 300 W (as seen from AC power source)
Product conformity		CE
Dimensions	W × H × D	482.6 mm × 88.9 mm × 431.8 mm (19 in × 2 HU × 17 in") [3]
Front panel width	chassis corpus width incl. flanges	483 mm (19.02 in)
	without flanges	434 mm (17.09 in)
Mounting brackets		R&S®GX470 is always delivered with mounting brackets.
Weight		12 kg (26.46 lb)

[3] Depth measured from rear side of mounting brackets down to rear wall of chassis.

Simultaneous recording and replaying

The R&S®GX470 digital wideband storage device manages the bandwidth of the storage and of all interfaces to get the maximum possible number of simultaneous recording and replay sessions. The table shows the maximum number of recording sessions depending on the used data rate class if all simultaneous sessions are using the same data rate class. Combinations of different data rate classes are possible.

Number of recording sessions	Data rate, mode	Typical bandwidth [4]	Interface type (number of connections)
128	64 ksample/s (long)	30 kHz	Ethernet
32	640 ksample/s (short)	300 kHz/500 kHz	Ethernet
16	1.28 Msample/s (short)	1 MHz	Ethernet
8	1.28 Msample/s (long)	1 MHz	Ethernet
6	6.4 Msample/s (short)	5 MHz	Ethernet
2	12.8 Msample/s (short)	10 MHz	Ethernet
2	25.6 Msample/s (short)	20 MHz	R&S®Digital I/Q Interface 40G (2 ×)
2	51.2 Msample/s (short)	40 MHz	R&S®Digital I/Q Interface 40G (2 ×)
2	102.4 Msample/s (short)	80 MHz	R&S®Digital I/Q Interface 40G (2 ×)
2	160 Msample/s (short)	125 MHz	R&S®Digital I/Q Interface 40G (2 ×)
2	320 Msample/s (short)	250 MHz	R&S®Digital I/Q Interface 40G (2 ×)
1	640 Msample/s (short)	500 MHz	R&S®Digital I/Q Interface 40G
256	result data	–	Ethernet

Note: It is also possible to use the 10GBASE-T interfaces of the R&S®GX470 for recording and replay. A corresponding network is required for an optimal usage of the 10G interfaces. The R&S®GX470 dynamically calculates the number of possible sessions for such a configuration and offers these values at its software interfaces.

Maximum recording time

The maximum recording time depends on the connected receiver, the bandwidth used, the receiver's sampling rate for this bandwidth, the data format used and the capacity of the storage unit. The following table applies for the receiver R&S®WPU500. The data format for samples 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 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
Max. input bandwidth	30 kHz	300 kHz	1 MHz	5 MHz	10 MHz	20 MHz
Max. recording time	3800 h	760 h	380 h	75 h	38 h	18 h

Data rate class	51.2 Msample/s short	102.4 Msample/s short	160 Msample/s short	320 Msample/s short	640 Msample/s short
Max. input bandwidth	40 MHz	80 MHz	125 MHz	250 MHz	500 MHz
Max. recording time	9 h	4.5 h	3 h	1.5 h	0.75 h

Interface with Rohde & Schwarz products

Receiver: R&S® **Max. bandwidth of R&S®GX470**	EB500/ EB510	ESMD(FFM), ESME(FFM), DDF255, DDF260 (receiver mode)	PR100/ EM100	DDF550	CA100/ CA120	WPU500	SMW200A
Recording via LAN	5 MHz	10 MHz	500 kHz	10 MHz	10 MHz	–	–
Replay via LAN	–	–	–	–	500 MHz [5]		
Recording via R&S®Digital I/Q Interface 40G	–	–	–	–	–	500 MHz	
Replaying via R&S®Digital I/Q Interface 40G	–	–	–	–	–	–	500 MHz

[4] Typical values for Rohde & Schwarz receivers and R&S®CA120.

[5] R&S®GX470 supports the replay of IQ recordings via LAN into several applications such as R&S®CA100 or R&S®CA120. Above the maximum LAN bandwidth, the replay does not work anymore in real-time.

Replay of recordings

The R&S®GX470 supports the quasi real-time replay of IQ data via port A of the R&S®Digital I/Q Interface 40G into the R&S®SMW200A. The following record types are supported:

Recordings from the receiver	Via interface	Data format
R&S®WPU500	R&S®RX-10G	short (32 bit/sample)
	R&S®RX-40G	short (32 bit/sample)
R&S®ESMD, R&S®ESME, R&S®DDF255, R&S®DDF260,	R&S®RX-10G	short (32 bit/sample)

Ordering information

Designation	Type	Order No.
Base unit (delivered with accessories such as power cable and manual)		
Digital Wideband Storage Device, for recording and replaying scenarios up to 500 MHz bandwidth with 7.68 Tbyte (8 × 960 Gbyte) solid state drives (SSD), R&S®RAMON basic AMREC manager software included	R&S®GX470	4107.0102.02
Copper Cable, for 40 Gbit, incl. two transceivers, length: 2 m, for connections between R&S®GX470 and R&S®WPU500	R&S®GX470-CCG	4107.0302.02
Cable for R&S®Digital I/Q Interface, optical cable, QSFP+ plug, length: 3 m; mandatory for replaying I/Q data from R&S®GX470 into the R&S®SMW200A	R&S®DIGIQ-HS	3641.2948.03

For product brochure, see PD 3607.5231.12 and www.rohde-schwarz.com

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ISO 9001

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