R&S®IQR
I/Q Data Recorder
Specifications

Test & Measurement
Data Sheet | 13.00

ROHDE&SCHWARZ

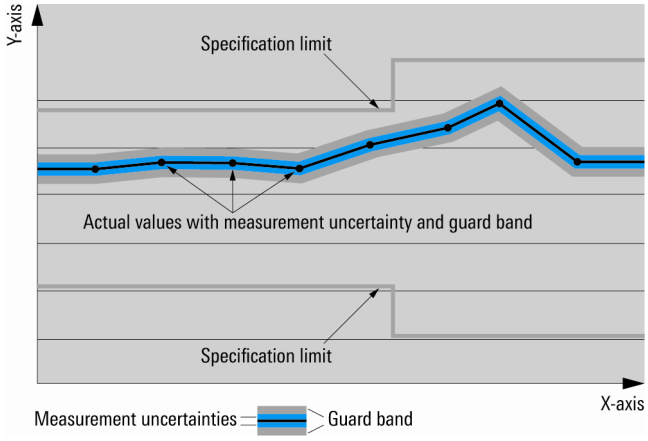
CONTENTS

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.



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

Signal interfaces

DIG IQ IN/OUT	interface for connecting the Rohde & Schwarz instrument	in line with Rohde & Schwarz standard for digital I/Q interface [1], version 1.0
	use of either digital input or digital output (no simultaneous operation of input and output)	1 × IN (multiplexing), 2 × OUT (I/Q data, control signals, interface clock)
	logic level	LVDS
	connector	26-pin MDR
	clock rate in	66 MHz to 100 MHz
	clock rate out	100 MHz
Control signals I/O 1 to I/O 8	programmable I/O for trigger	8 (2 groups of 4 I/O each)
	logic level output	0 V to 3.3 V
	logic level input	0 V to 3.3 V; threshold and 50 Ω termination can be programmed for each group
	connectors	BNC female
10 MHz reference clock	input connector	BNC female
	output connector	BNC female

R&S®Digital I/Q Interface

Data rate	R&S®IQR20	up to 80 Mbyte/s
	R&S®IQR100	up to 398 Mbyte/s
DIGITAL IQ IN		
Interface	direction	input
	connector	26-pin MDR
	level	LVDS
Standard protocol	R&S®IQR20 sample rate	1 ksample/s to 20 Msample/s
	R&S®IQR100 sample rate	1 ksample/s to 99.5 Msample/s
	resolution	16 bit for I and 16 bit for Q, 14 bit for I and 14 bit for Q (using channel multiplex)
	general-purpose signals	unused
Transfer modes	enable mode	supported
Channel multiplex	reception of several I/Q data streams in time division multiplex	up to 2 channels
DIGITAL IQ OUT		
Interface	direction	output
	connector	I/Q word size (resolution)
	level	LVDS
Standard protocol	R&S®IQR20 sample rate	1 ksample/s to 20 Msample/s
	R&S®IQR100 sample rate	1 ksample/s to 99.5 Msample/s
	resolution	16 bit for I and 16 bit for Q, 14 bit for I and 14 bit for Q (using channel multiplex)
	general-purpose signals	unused
Transfer modes	enable mode	supported (in channel multiplex mode)
	resampling at DIG IQ IN	supported (in single mode)
Channel multiplex	transmission of several I/Q data streams in time division multiplex	up to 2 channels

[1] R&S®Digital I/Q Interface for the transmission of digital I/Q data. It is supported by a wide range of instruments (signal generators, signal analyzers, communications testers and receivers).

Trigger

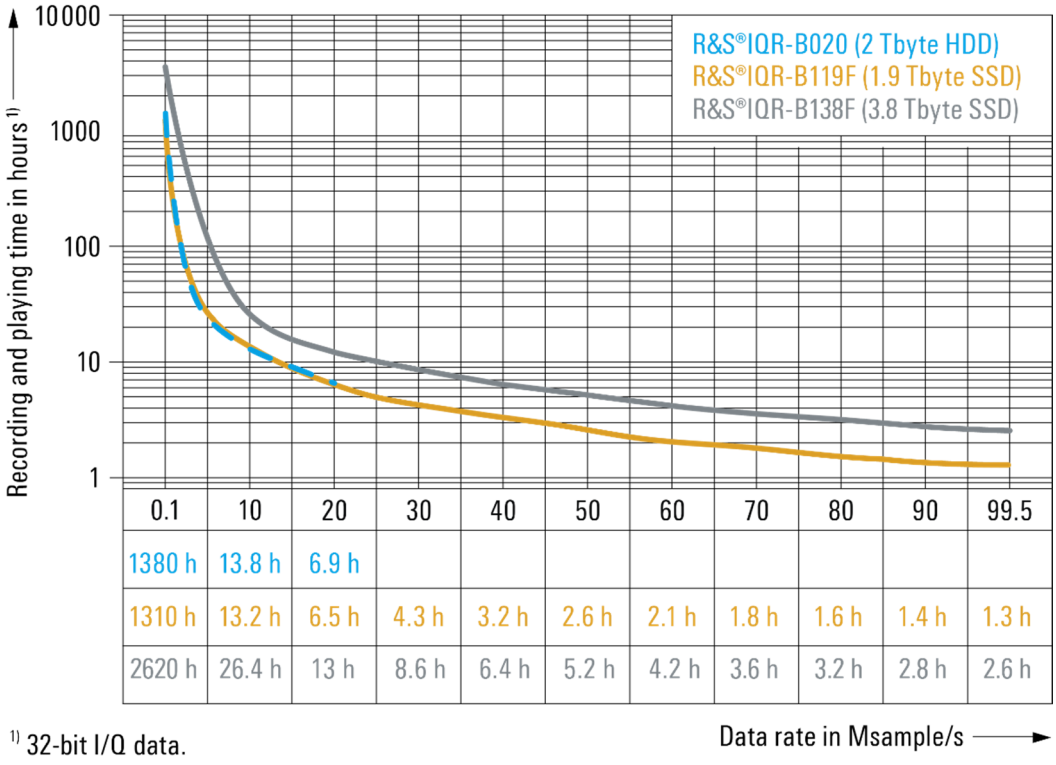
Start trigger modes	manual, LAN, external BNC, timer, I/Q level	single, continuous [2]
Stop trigger modes	manual, LAN, external BNC, timer	single
External trigger source	any control signal on I/O 1 to I/O 8; programmable slope, level, polarity	1 × start, 1 × stop

Reference clocks

Reference clock		internal or external
Internal reference source	frequency	10 MHz ± 10 ppm
Reference input	frequency	10 MHz
	impedance	50 Ω
	required level	> 0 dBm into 50 Ω
Reference output	level	> 0 dBm

Mass memory

Type of memory	operating system and special data files	8 Gbyte, SSD [3], included
	ARB generator	1 Gbyte, solid-state memory, included
	I/Q data	1 × removable memory pack with HDDs or SSDs [3], 2 × SATA disk, 2.5"



Relationship between I/Q data rate and recording/streaming time.

[2] Only for player.

[3] Lifespan and data retention time of a NAND Flash SSD typically depend on the number of write cycles and the temperature. The SSD data storage module used in the R&S®GX460/R&S®IQR storage module has a volume of up to 0.96 Tbyte or to 1.92 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 SSD lifespan from several years to an ensured value of over 60 days.

Lifespan example:
The lifespan is approx. five years if the SSD storage package is written completely once a day.

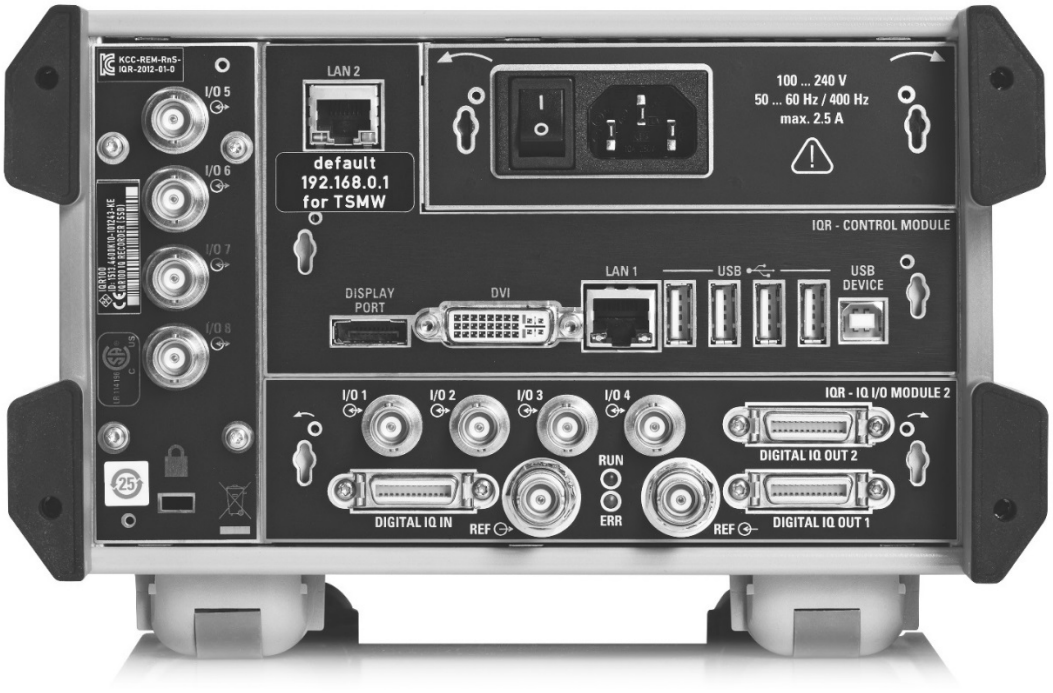
General data

Environmental conditions		
Temperature	operating temperature range	0 °C to +50 °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	
	R&S®IQR20 and R&S®IQR100 nonoperating and operating mode without removable memory packs	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
	R&S®IQR20 and R&S®IQR100 operating mode with SSD memory packs (R&S®IQR-B1xx)	
	R&S®IQR20 and R&S®IQR100 operating mode with HDD memory packs (R&S®IQR-B0xx)	limited by HDD [4] (ideal for stationary use)
Shock	nonoperating	40 g shock spectrum, in line with MIL-STD-810, method 516.4, procedure I
Power rating		
AC power supply		
Rated voltage		100 V to 240 V AC (± 10 %)
Rated frequency		50 Hz to 60 Hz/400 Hz (± 5 %)
Rated current		2.5 A to 1.1 A
Rated power		60 W
DC power supply	R&S®PSDC-B200 option	
Rated voltage		10.0 V to 30.0 V DC
Rated current		max. 23 A
Rated power		60 W
External inductance		max. 5 µH
Dimensions	W × H × D, overall	249.5 mm × 150 mm × 401 mm (9.82 in × 5.91 in × 15.79 in), ½ 19", 3 HU, depth 350 mm (13.78 in)
Weight		6.6 kg (14.55 lb)

Product conformity		
Electromagnetic compatibility	EU: in line with EMC Directive 2004/108/EC	applied harmonized standards: • EN 61326-1 (industrial environment) • EN 61326-2-1 • EN 55011 (class A) • EN 61000-3-2 • EN 61000-3-3
	EU: in line with Automotive EMC Directive 2004/104/EC	• EN 50498
Electrical safety	EU: in line with Low Voltage Directive 2006/95/EC	applied harmonized standard: EN 61010-1
	USA	UL 61010-1
	Canada	CAN/CAS-C22.2 NO. 61010.1
International safety approvals	VDE – Association for Electrical, Electronic and Information Technologies	GS mark: 40031504
	CSA – Canadian Standards Association	$_{C}CSA_{US}$ mark: 2367942

[4] No values specified by the manufacturer of the HDD.

Controller interfaces		
Front panel		
USB	for keyboard, mouse or USB stick	2 × USB 2.0, type A connector (f)
Display	with touchscreen	5.7", 640 × 480 pixel, color, LED backlighting
Rear panel connectors		
DVI	for external monitor	DVI-D (f)
DISPLAY PORT	not activated	display port (f)
LAN	remote control via LAN	2 × Ethernet RJ-45 (f), 10/100/1000 Mbit/s
USB	host	4 × USB 2.0, type A (f)
	device	1 × USB 2.0, type B (f)



Rear view of the R&S®IQR with the I/Q I/O module 2
(prepared for the second I/Q output channel, see R&S®IQR-K107 option).

External DC battery options

R&S®IQR-B32 Li-ion battery pack

Interfaces	2 Li-ion batteries are hot swappable	4 Li-ion battery slots, DC output
Output voltage		12 V (nom.)
Output interface	DC cable to R&S®IQR-CAS1; R&S®IQR or R&S®TSMW	D-Sub, 2 pins, usable cable length: 110 cm
Operating time	R&S®IQR and R&S®TSMW	2 h (nom.) using 4 Li-ion batteries
Temperature	operating temperature range, discharge	0 °C to +50 °C
	storage temperature range	–20 °C to +60 °C [5]
Dimensions (W × H × D)	Li-ion battery pack	385 mm × 45 mm × 310 mm (15.2 in × 1.8 in × 12.2 in)
	case	430 mm × 90 mm × 450 mm (16.9 in × 3.5 in × 17.7 in)
Included accessories		4 Li-ion batteries, 1 DC cable, case for Li-ion battery pack
Net weight		4.8 kg (10.6 lb)

R&S®CMA-Z062A Li-ion battery charger for R&S®CMA-Z061A Li-ion battery

The R&S®CMA-Z062A Li-ion battery charger allows charging of R&S®CMA-Z061A Li-ion batteries.

AC input voltage range		100 V to 240 V AC (± 10 %)
AC supply frequency		50 Hz to 60 Hz
Slots for Li-ion battery		4 (2 × R&S®CMA-Z061A)
Charge time	of 4 Li-ion batteries (parallel)	3.5 h (nom.)
Power consumption		max. 300 W
Dimensions	W × H × D, overall	400 mm × 127 mm × 203 mm (15.8 in × 5.0 in × 8.0 in)
Weight		3.1 kg (6.9 lb)

R&S®CMA-Z061A Additional Li-ion battery set

Set		2 Li-ion batteries
Power	per Li-ion battery	14.4 V × 6.2 Ah = 89.28 Wh
Charge time	with R&S®CMA-Z062 charger, T = +25 °C	3.5 h (nom.)
Temperature	operating temperature range, discharge	0 °C to +50 °C (see R&S® IQR-B32batterypack)
	operating temperature range, charge	0 °C to +45 °C
	storage temperature range	–20 °C to +60 °C [5]
Dimensions	W × H × D, overall, single battery	77.6 mm × 23 mm × 151 mm (3.1 in × 0.9 in × 5.9 in)
Weight	single battery	approx. 0.43 kg (0.96 lb)

[5] The battery packs should be stored in an environment with low humidity, free from corrosive gas at a recommended temperature range of less than +21 °C. Extended exposure to temperatures above +45 °C could degrade battery performance and life.

Overview of Rohde & Schwarz instruments that work with the R&S®IQR and R&S®IQR-K1/-K2 options and list of the required options for the R&S®Digital I/Q Interface [6]

Rohde & Schwarz instruments	R&S®IQR option		Digital I/Q output option on source instrument	Digital I/Q input option on target instrument
	R&S®IQR-K1	R&S®IQR-K2		
Signal generation				
R&S®AMU200A baseband signal generator and fading simulator [6]	–	–	R&S®AMU-B18 digital baseband output	R&S®AMU-B17 analog/digital baseband inputs
R&S®SGT100A SGMA vector RF source [6]	–	yes	–	R&S®SGT-K18 digital baseband connectivity
R&S®SMBV100A vector signal generator [6]	–	yes	R&S®SMBV-K18 digital baseband connectivity	
R&S®SMU200A vector signal generator [6]	–	yes	R&S®SMU-B18 digital baseband output	R&S®SMU-B17 analog/digital baseband inputs
R&S®SMW vector signal generator [6]	–	yes	R&S®SMW-K18 digital baseband output	R&S®SMW-B10 baseband generator with ARB and digital modulation (realtime)
R&S®BTC broadcast test center [6]	–	yes	R&S®BTC-K2500, extended I/Q interfaces, analog and digital I/Q inputs and I/Q outputs	
R&S®SFC compact modulator [6]	–	yes	–	R&S®SFC-K80 digital I/Q input (SL)
R&S®SFE broadcast tester [6]	–	yes	–	R&S®SFE-K80 digital I/Q input interface
R&S®SFE100 test transmitter [6]	–	–	–	R&S®SFE-K80 digital I/Q input interface
R&S®SFU broadcast test system [6]	–	–	R&S®SFU-K80 extended I/Q (analog IN, digital IN/OUT) [7]	
Signal analysis				
R&S®FMU36 baseband analyzer	–	–	R&S®FSQ-B17 digital baseband interface [8]	
R&S®FSQ signal analyzer	–	–	R&S®FSQ-B17 digital baseband interface [8]	
R&S®FSV baseband signal analyzer	–	–	R&S®FSV-B17 digital baseband interface	
R&S®FSVR real-time spectrum analyzer	–	–	R&S®FSV-B17 digital baseband interface	
R&S®FSW signal and spectrum analyzer	–	–	R&S®FSW-B17 digital baseband interface	
RF wideband receiver/RF scanner				
R&S®TSMW radio network analyzer	yes	–	R&S®TSMW-B1 I/Q hardware interface, R&S®TSMW-K1 I/Q software license	–
Digital I/O				
R&S®EX-IQ-Box digital signal interface module	–	–	included	included

[6] It is not possible to export recorded I/Q data as raw data from the R&S®IQR to a PC; see R&S®IQR-K101 option.

[7] This device contains the R&S®Digital I/Q Interface for I/Q data transfer but no I/Q info interface. The R&S®IQR currently does not support this instrument's I/Q output interface.

[8] The R&S®IQR currently does not support this instrument's I/Q input interface.

Ordering information

I/Q data recorder

Designation	Type	Order No.
Base unit (without memory pack)		
I/Q Data Recorder, with touchscreen, basic (optimized for HDD memory packs) I/Q interfaces: 1 × input (multiplexing [9]), 2 × output Sample rate: up to 20 Msample/s, data rate: up to 80 Mbyte/s Removable power supply (AC) Scope of delivery: R&S®IQR20, manual, software and documentation on CD, 4 × BNC cable, 1 × I/Q data cable	R&S®IQR20	1513.4600.02
I/Q Data Recorder, with touchscreen, high speed (optimized for SSD memory packs) I/Q interfaces: 1 × input (multiplexing [9]), 2 × output Sample rate: up to 99.5 Msample/s, Data rate: up to 398 Mbyte/s Removable power supply (AC) Scope of delivery: R&S®IQR100, manual, software and documentation on CD, 4 × BNC cable, 1 × I/Q data cable	R&S®IQR100	1513.4600.10
Memory pack (one module is required)		
Hard disk drives (HDD) recommended for the R&S®IQR20		
2 Tbyte HDD Memory Pack, up to 80 Mbyte/s	R&S®IQR-B020	1513.4700.20
High-speed and rugged solid-state disks (SSD), recommended for the R&S®IQR100		
1.92 Tbyte SSD Memory Pack, up to 400 Mbyte/s	R&S®IQR-B119F	1513.4723.19
3.8 Tbyte SSD Memory Pack, up to 400 Mbyte/s	R&S®IQR-B138F	1513.4723.38

Options

Designation	Type	Order No.
Options for the R&S®IQR		
Import/Export of I/Q and Meta Data Files via Ethernet or USB Interface [10]	R&S®IQR-K101	1513.5001.02
Recording of GPS Data from the R&S®TSMW (up to 4 Hz) or R&S®TSMX-PPS2 (1 Hz) on the R&S®IQR, as meta data file	R&S®IQR-K102	1513.5018.02
Graphical Display of GPS Position and Route Data (R&S®IQR-K102 required)	R&S®IQR-K103	1517.5024.02
Ref. Level Controlled Recording and Replay of RF Signals for AGC [11]	R&S®IQR-K104	1517.5182.02
Multiplexing of Two I/Q Data Streams [9]	R&S®IQR-K105	1517.5047.02
Second I/Q Output Channel [9]	R&S®IQR-K107	1517.5060.02
Software for configuring the R&S®TSMW via LAN, incl. AGC [9] (R&S®TSMW-K1 and R&S®TSMW-B1 required)	R&S®IQR-K1	1513.4730.02
Software for controlling external generators with the R&S®IQR [12]	R&S®IQR-K2	1513.4752.02
Upgrade to I/Q Streaming Board 2 and Activation of Second Output [9]	R&S®IQR-U107	1517.5118.03
Power Supply Module, 10 V to 30 V DC, 200 VA	R&S®PSDC-B200	1513.4617.02

[9] Can only be used with the R&S®TSMW.

[10] For the time being, only digital I/Q data from the R&S®TSMW, R&S®FSV, R&S®FSVR, R&S®FSQ, R&S®FSG, R&S®FSW and R&S®FMU36 can be exported as raw data via USB or LAN.

[11] The frontend must support AGC to provide complete AGC functionality.

[12] The scope of functions depends on the generator type, see table on page 9.

Service options		
Extended Warranty, one year	R&S®WE1	Please contact your local Rohde & Schwarz sales office.
Extended Warranty, two years	R&S®WE2	
Extended Warranty, three years	R&S®WE3	
Extended Warranty, four years	R&S®WE4	

Extended warranty with a term of one to four years (WE1 to WE4)
Repairs carried out during the contract term are free of charge [13]. Necessary calibration and adjustments carried out during repairs are also covered. Simply contact the forwarding agent we name; your product will be picked up free of charge and returned to you in top condition a couple of days later.

Accessories

Designation	Type	Order No.
Accessories for the R&S®IQR		
Additional Cable for connecting R&S®Digital I/Q Interfaces	R&S®SMU-Z6	1415.0201.02
19" Adapter, 3 HU, two ½ 19" devices side by side	R&S®ZZA-KN24	1175.3233.00
19" Adapter, 3 HU, one ½ 19" device plus dummy	R&S®ZZA-KN25	1175.3240.00
Carrier Trolley, with inlet for R&S®IQR and accessories Exterior dimensions (W × H × D): 538 mm × 269 mm × 406 mm (21.20 in × 10.60 in × 16.00 in)	R&S®IQR-Z5	1516.4260.02
Accessories for R&S®IQR and R&S®TSMW		
19" Case, 3 HU, for 1 × R&S®TSMW and 1 × R&S®IQR, incl. cables and R&S®IQR-Z19-T, without integration	R&S®IQR-CAS1	1513.4652.02
Integration of Devices and Accessories in R&S®IQR-CAS1 housing	R&S®IQR-CAS-I1	1517.5218.02
Carrier Trolley, with inlet for R&S®IQR, R&S®TSMW and accessories Exterior dimensions (W × H × D): 625 mm × 297 mm × 500 mm (24.60 in × 11.70 in × 19.70 in)	R&S®IQR-Z6	1516.4360.02
19" Rack Adapter, 3 HU, for 1 × R&S®TSMW and 1 × R&S®IQR	R&S®IQR-Z19-T	1513.4623.30
Y Cable, for two DC power supplies (R&S®IQR, R&S®TSMW) with D-Sub connectors	R&S®IQR-Z101	1513.4769.10
Accessories for R&S®IQR and other devices without GPS receiver		
GPS Module, ublox, external antenna, PPS, USB, 4-pin serial	R&S®TSMX-PPS2	1515.7120.02
DC battery options for R&S®IQR, R&S®TSMW and R&S®IQR-CAS1		
External Li-Ion Battery Pack for R&S®IQR-CAS1, R&S®TSMW, R&S®IQR [14] (includes 4 Li-ion batteries), external charger required	R&S®IQR-B32	1321.3750.10
Charger for Li-ion Batteries of R&S®CMA-Z061A, R&S®IQR-B32	R&S®CMA-Z062A	1209.5355K02
Additional Li-ion Battery Set (2 Li-ion batteries)	R&S®CMA-Z061A	1209.5303.02

Recommended extras for configuration

Designation	Type	Order No.
Compact Keyboard, with integrated trackball, USB interface (US character set)	R&S®TSPC-KEYB	1508.1607.02
17" TFT Monitor	R&S®PMC3	1082.6004.12

For product brochure, see PD 5214.4394.12 and www.rohde-schwarz.com

[13] Excluding defects caused by incorrect operation or handling and force majeure. Wear-and-tear parts are not included.

[14] Can only be used with the R&S®PSDC200 option.

Service that adds value

- Worldwide
- Local and personalized
- Customized and flexible
- Uncompromising quality
- Long-term dependability

About Rohde&Schwarz

The Rohde&Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, radiomonitoring and radiolocation. Founded more than 80 years ago, this independent company has an extensive sales and service network and is present in more than 70 countries. The electronics group is among the world market leaders in its established business fields. The company is headquartered in Munich, Germany. It also has regional headquarters in Singapore and Columbia, Maryland, USA, to manage its operations in these regions.

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

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R&S®IQR I/Q Data Recorder
Data without tolerance limits is not binding | Subject to change

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