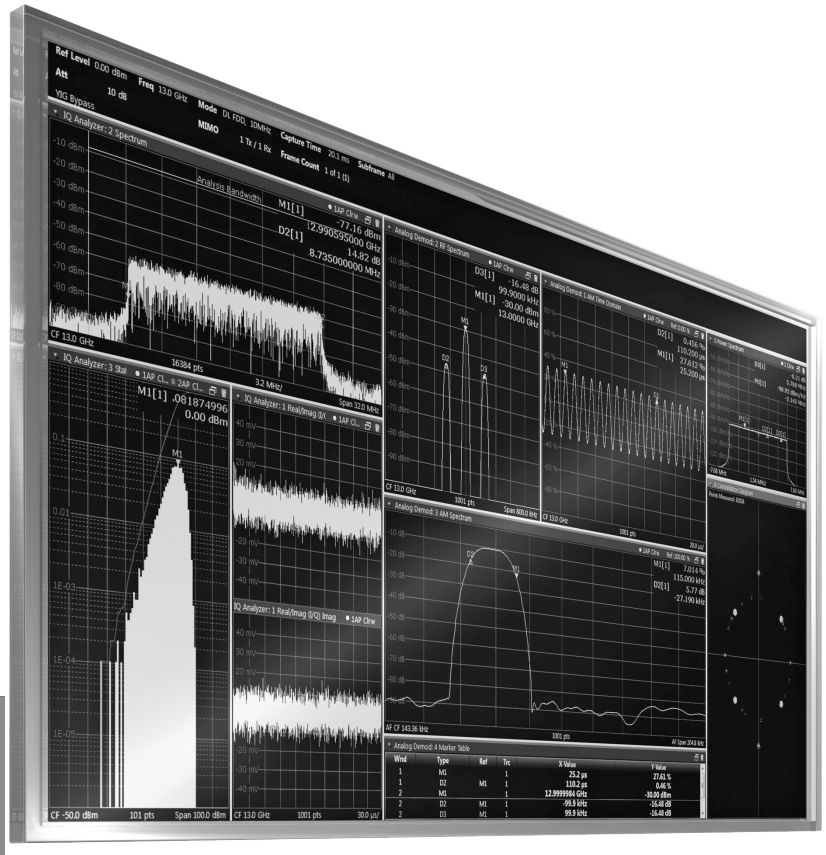
R&S®VSE
VECTOR SIGNAL EXPLORER
BASE SOFTWARE

Specifications



Data Sheet
Version 13.00

ROHDE&SCHWARZ
Make ideas real

CONTENTS

Definitions

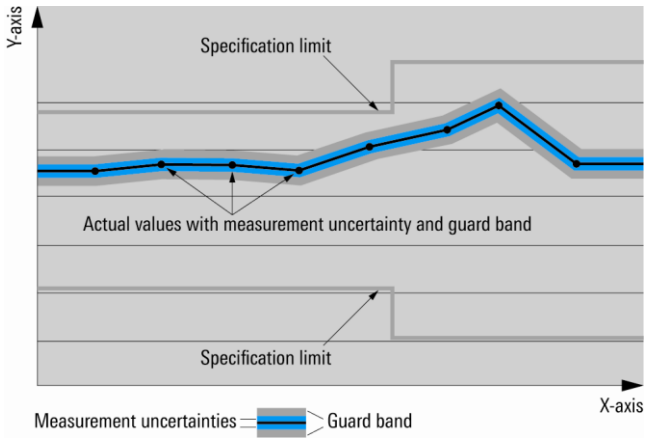
General

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 designated with the format “parameter: value”.

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

Specifications

The specifications of the R&S®VSE are based on the data sheet specifications of the R&S®FSW, R&S®FSWP, R&S®FSVA3000, R&S®FSV3000, R&S®FSVA, R&S®FSV, R&S®FPS, R&S®FPL1000 and R&S®FSL analyzers as well as the R&S®RTP, R&S®RTO2000 and R&S®RTO1000 oscilloscopes in the default operating mode. They have not been checked separately and are not verified during instrument calibration. Measurement uncertainties are given as 95 % confidence intervals. The specified level measurement errors do not take into account systematic errors due to reduced signal-to-noise ratio (SNR).

Minimum system requirements for the R&S®VSE

Running on a PC

Operating system	Windows 7, 64 bit/Windows 10, 64 bit
Hard disk space	5 Gbyte
RAM	≥ 4 Gbyte
CPU	min. 1.5 GHz (> 2.5 GHz recommended)
Graphics resolution	≥ 1280 × 1024 pixel
USB	1 free USB port for connecting the R&S®FSPC smart card reader (if no floating server or PC built-in smart card reader is used)
Measuring instrument connection	LAN connection (VXI-11, Hi-Slip), VISA driver [1]

Running on an instrument

Using a keyboard and mouse with the instrument is suggested for optimum operation. Front panel keys of the instrument are only for operating the firmware and not the R&S®VSE.

R&S®FSW	R&S®FSW firmware version 2.40 or newer
R&S®FSVA3000, R&S®FSV3000	R&S®FSVA3000/R&S®FSV3000 firmware version 1.10 or newer
R&S®RTP	Windows 10, 64 bit operating system
R&S®RTO	Windows 7, 64 bit/Windows 10, 64 bit operating system

R&S®VSE

Frequency

Frequency range	RF input	same as supported instrument

Level

Level range	RF input	same as supported instrument

[1] R&S®VISA is provided with the R&S®VSE Installer.

Signal acquisition

Signal analysis bandwidth RF	same as supported instrument
Signal analysis bandwidth, baseband I/Q [2]	same as supported instrument × 2
Signal analysis bandwidth, baseband I only [2]	same as supported instrument

	R&S®FSW	**R&S®FSWP [3]**	**R&S®FSVA3000, R&S®FSV3000**	**R&S®FSVA**	**R&S®FSV**	**R&S®FPS**
Capture length						
Maximum record length	400 Msample I and Q		800 Msample I and Q [4]	200 Msample I and Q		400 Msample I and Q
Max. capture time for analysis bandwidth						
10 MHz	36.90 s	36.90 s	83 s	16.77 s		36.90 s
28 MHz	13.18 s [5]	13.18 s [6]	23.9 s	2.09 s [7]	2.09 s [8, 9]	13.18 s [10]
40 MHz	9.22 s [11]	9.22 s [6]	16.7 s [12]	2.99 s [7, 13]	2.99 s [8, 9, 14]	9.22 s [10, 15]
80 MHz	4.61 s [16]	4.61 s [6]	8.3 s [18]	0.26 s [7, 19]	0.26 s [8, 9, 19]	1.44 s [10, 20]
160 MHz	2.30 s [17]	–	4.1 s [18]	0.26 s [7, 19]	0.26 s [8, 9, 19]	1.15 s [10, 20]
320 MHz	0.49 s [21]/ 1.15 s [23]	–	2 s [22]	–		–
500 MHz	730 ms [23]	–	–	–		–
1.0 GHz	369 ms [24]	–	–	–		–
2 GHz	190 ms [25]/ 184 ms [26]	–	–	–		–

	R&S®FPL1000 R&S®ZNL	**R&S®FSL**
Capture length		
Maximum record length	25 Msample I and Q	512 ksample I and Q
Max. capture time for analysis bandwidth		
10 MHz	2 s	41.90 ms
28 MHz	745 ms [27]	14.90 ms
40 MHz	520 ms [27]	–

[2] Only available with R&S®RTO or R&S®RTP.
[3] R&S®FSWP-B1 option required.
[4] R&S®FSV3-B114 option required.
[5] R&S®FSW-B28 option required.
[6] R&S®FSWP-B80 option required.
[7] R&S®FSVA-B11 option required for f > 7 GHz.
[8] Only for f ≤ 7 GHz.
[9] Not available for R&S®FSV40, model .39.
[10] R&S®FPS-B11 option required for f > 7 GHz.
[11] R&S®FSW-B40 option required.
[12] R&S®FSV3-B40 option required.
[13] R&S®FSVA-B40 option required.
[14] R&S®FSV-B70 option required.
[15] R&S®FPS-B40 option required.
[16] R&S®FSW-B80 option required.
[17] R&S®FSW-B160 option required.
[18] R&S®FSV3-B200 option required.
[19] R&S®FSV-B160 option required.
[20] R&S®FPS-B160 option required.
[21] R&S®FSW-B320 option required.
[22] R&S®FSV3-B400 option required.
[23] R&S®FSW-B500/R&S®FSW-B512 or R&S®FSW-B1200 option required.
[24] R&S®FSW-B1200 option required.
[25] R&S®FSW-B2000 option required.
[26] R&S®FSW-B2001 option required.
[27] R&S®FPL-B40 option required.

	R&S®RTP		R&S®RTO2000 [28]		R&S®RTO1000 [28]	
	speed optimized [29]	**memory optimized**	**speed optimized**	**memory optimized [30]**	**speed optimized**	**memory optimized [30]**
Capture length						
Maximum record length	40 Msample with one or two input channels [31]	2 Gsample [31]	40 Msample with one or two input channels [32, 34]	2 Gsample with one or two input channels [32, 34]	10 Msample with one or two input channels	800 Msample with one or two input channels [33, 34]
Max. capture time for analysis bandwidth						
10 MHz	3.2 s	**199 ms**	3.2 s	199 ms	800 ms	79 ms
28 MHz	1.14 s	**199 ms**	1.14 s	199 ms	285.75 ms	79 ms
40 MHz	800 ms	199 ms	800 ms	199 ms	200 ms	79 ms
80 MHz	400 ms	199 ms	400 ms	199 ms	100 ms	79 ms
160 MHz	200 ms	199 ms	200 ms	199 ms	50 ms	79 ms
320 MHz	100 ms	199 ms	100 ms	199 ms	25 ms	79 ms
500 MHz	64 ms	199 ms	64 ms	199 ms	16 ms	79 ms
1 GHz [35]	32 ms	199 ms	32 ms	199 ms	8 ms	79 ms
2 GHz [36]	16 ms	199 ms	16 ms	199 ms	4 ms	79 ms
3 GHz [37]	10 ms	199 ms	10 ms	199 ms	2.6 ms	79 ms
4 GHz [38]	8 ms	199 ms	8 ms	199 ms	2 ms	79 ms
6 GHz [39, 40]	5 ms	99 ms [41]	–	99 ms [41]	–	–
8 GHz [42]	4 ms	99 ms [41]	–	–	–	–
13 GHz [43]	–	49 ms [44]	–	–	–	–
16 GHz [45]	–	49 ms	–	–	–	–

Analog baseband input [2]

	R&S®RTP		R&S®RTO2000		R&S®RTO1000	
	I and Q	**differential I and Q**	**I and Q**	**differential I and Q**	**I and Q**	**differential I and Q**
Maximum record length	2 Gsample [31]	1 Gsample [31]	2 Gsample [32]	1 Gsample [32, 34]	800 Msample [33]	400 Msample [33, 34]
Max. capture time for analysis bandwidth						
10 MHz	199 ms	99 ms	199 ms	99 ms	79 ms	39 ms
80 MHz	199 ms	99 ms	199 ms	99 ms	79 ms	39 ms
160 MHz	199 ms	99 ms	199 ms	99 ms	79 ms	39 ms
500 MHz	199 ms	99 ms	199 ms	99 ms	79 ms	39 ms
1 GHz	199 ms	99 ms	199 ms	99 ms	79 ms	39 ms
2 GHz [35]	199 ms	99 ms	199 ms	99 ms	79 ms	39 ms
4 GHz [36]	199 ms	99 ms	199 ms	99 ms	79 ms	39 ms
6 GHz [37]	199 ms	99 ms	199 ms	99 ms	79 ms	39 ms
8 GHz [38]	199 ms	99 ms	199 ms	99 ms	79 ms	39 ms
12 GHz [39, 40, 41]	99 ms	49 ms	99 ms	49 ms	39 ms	19 ms
16 GHz [41, 42]	99 ms	49 ms	–	–	–	–

[28] R&S®RTO-K11 I/Q software interface required.
[29] R&S®RTP-K11 I/Q software interface required. Firmware version 4.60 required.
[30] For R&S®RTO1000 firmware version 3.0.1.1 or higher required, for R&S®RTO2000 firmware version 3.50.3.1 or higher required.
[31] R&S®RTP-B110 required.
[32] R&S®RTO-B110 required.
[33] R&S®RTO-B104 required.
[34] R&S®RTO with four inputs required. R&S®RTO with two inputs is limited to half the record length when using two channels, R&S®RTO with four channels is limited as well when using CH1 and CH2 or CH3 and CH4 at the same time.
[35] R&S®RTO with 1 GHz bandwidth required.
[36] R&S®RTO with 2 GHz bandwidth required.
[37] R&S®RTO with 3 GHz bandwidth required.
[38] R&S®RTO with 4 GHz bandwidth required.
[39] R&S®RTO with 6 GHz bandwidth required.
[40] R&S®RTP with 6 GHz bandwidth required.
[41] Always using 20 GHz sample rate and therefore limited to a half of the record length.
[42] R&S®RTP with 8 GHz bandwidth required.
[43] R&S®RTP with 13 GHz bandwidth required.
[44] Always using 40 GHz sample rate and therefore limited to a fourth of the record length.
[45] R&S®RTP with 16 GHz bandwidth required.

Triggering

R&S®	FSW	FSWP	FSVA3000, FSV3000	FSVA, FSV	FPS	FPL1000, ZNL	FSL	RTP, RTO
RF input [46]	same as supported instrument							only external trigger
I/Q file	magnitude, time							

Measurement parameters

Input		RF
Swap I/Q		on/off
FFT parameter	algorithm	single, average
	FFT length	3 to 524288
	window function	flattop, Gaussian, rectangle, 5-term, Blackman-Harris
	window length	3 to current record length
	window overlap	0 to 0.95
Spectrum display	frequency points	51 to 524288
Statistic display	histogram bins	up to 1024
Overlap processing		0 % to 99.9 %
I/Q file recording	record length	same as supported instrument [47]

Software features

I/Q file handling	recording
	playback
Hardware support	up to 20 instruments in parallel when using R&S®VSE enterprise edition
Sequencer	parallel measurement execution on different instruments when using R&S®VSE enterprise edition
	sequential measurement execution on the same instrument
Multi-measurement	configure multiple measurements in parallel

Supported measurement modes

Adjacent channel leakage ratio (ACLR)	measures the active channel or adjacent channel power for one or more carrier signals, depending on the current measurement configuration
Occupied bandwidth (OBW)	measures the occupied bandwidth, i.e. the bandwidth which must contain a defined percentage of the power
Spectrum emission mask (SEM)	defines a measurement that monitors compliance with a spectral mask; the mask is defined with reference to the input signal power
I/Q analyzer	general I/Q data analysis

[46] Trigger availability depends on the instrument used.

[47] The maximum record length can be restricted in case the R&S®VSE needs to use a resampler.

Result displays in I/Q analyzer

Magnitude	traces	up to 6
	markers	up to 17
	scaling	lin/log/lin with unit
Spectrum	traces	up to 6
	markers	up to 17
	scaling	lin/log/lin with unit
	marker functions	band power marker
I/Q vector	traces	up to 6
	markers	up to 17
Real/image (I/Q)	traces	up to 6
	markers	up to 17
Marker table	for each marker	X value
		Y value
		band power value
		reference marker
		trace
Statistics APD	traces	2
	markers	up to 17
Statistics CCDF	traces	1
	markers	up to 17
Phase versus time	traces	up to 6
	markers	up to 17

Remote programming

SCPI	The SCPI remote interface allows full access to the R&S®VSE features.
Remote display	To operate the R&S®VSE software or view its display from a remote PC, the use of Windows remote desktop or VNC is recommended.

File formats

MATLAB®	.mat(v4)	native support, maximum file size is 2 Gbyte or 500000 complex samples, please refer to the MathWorks® documentation for details
	.mat(v7.3)	native support; maximum size of the MAT-file is imposed only by your native file system, please refer to the MathWorks® documentation for details
ASCII	.csv	
Rohde & Schwarz formats	.iq.tar	I/Q data is always formatted as complex and float32. For details, see www.rohde-schwarz.com.
	.iqw	float32 is always exported as (II…, QQ…)
	.wv	see R&S®WinIQSIM2™ or R&S®SMW user manual for details
	.iqx	see R&S®IQW user manual for details

Connectivity

	R&S®VSE basic edition	**R&S®VSE enterprise edition**
Max. number of channels	3	30
Max. number of groups	1	30
Max. number of connected instruments	1	128

Supported instruments

For details, see the corresponding data sheets.

Designation	Type	Order No.
Analyzers		
R&S®FSW [48]		
Signal and spectrum analyzer, 2 Hz to 8 GHz	R&S®FSW8	1331.5003.08
Signal and spectrum analyzer, 2 Hz to 13.6 GHz	R&S®FSW13	1331.5003.13
Signal and spectrum analyzer, 2 Hz to 26.5 GHz	R&S®FSW26	1331.5003.26
Signal and spectrum analyzer, 2 Hz to 43.5 GHz	R&S®FSW43	1331.5003.43
Signal and spectrum analyzer, 2 Hz to 50 GHz	R&S®FSW50	1331.5003.50
Signal and spectrum analyzer, 2 Hz to 67 GHz	R&S®FSW67	1331.5003.67
Signal and spectrum analyzer, 2 Hz to 85 GHz	R&S®FSW85	1331.5003.85
R&S®FSWP [49]		
Phase noise analyzer, 1 MHz to 8 GHz	R&S®FSWP8	1322.8003.08
Phase noise analyzer, 1 MHz to 26.5 GHz	R&S®FSWP26	1322.8003.26
Phase noise analyzer, 1 MHz to 50 GHz	R&S®FSWP50	1322.8003.50
R&S®FSVA3000, R&S®FSV3000		
Signal and spectrum analyzer, 10 Hz to 4 GHz	R&S®FSVA3004	1330.5000.05
Signal and spectrum analyzer, 10 Hz to 7.5 GHz	R&S®FSVA3007	1330.5000.08
Signal and spectrum analyzer, 10 Hz to 13.6 GHz	R&S®FSVA3013	1330.5000.14
Signal and spectrum analyzer, 10 Hz to 30 GHz	R&S®FSVA3030	1330.5000.31
Signal and spectrum analyzer, 10 Hz to 44 GHz	R&S®FSVA3044	1330.5000.44
Signal and spectrum analyzer, 10 Hz to 4 GHz	R&S®FSV3004	1330.5000.04
Signal and spectrum analyzer, 10 Hz to 7.5 GHz	R&S®FSV3007	1330.5000.07
Signal and spectrum analyzer, 10 Hz to 13.6 GHz	R&S®FSV3013	1330.5000.13
Signal and spectrum analyzer, 10 Hz to 30 GHz	R&S®FSV3030	1330.5000.30
Signal and spectrum analyzer, 10 Hz to 44 GHz	R&S®FSV3044	1330.5000.43
R&S®FSVA [50], R&S®FSV [51]		
Signal and spectrum analyzer, 10 Hz to 4 GHz	R&S®FSVA4	1321.3008.05
Signal and spectrum analyzer, 10 Hz to 7 GHz	R&S®FSVA7	1321.3008.08
Signal and spectrum analyzer, 10 Hz to 13.6 GHz	R&S®FSVA13	1321.3008.14
Signal and spectrum analyzer, 10 Hz to 30 GHz	R&S®FSVA30	1321.3008.31
Signal and spectrum analyzer, 10 Hz to 40 GHz	R&S®FSVA40	1321.3008.41
Signal and spectrum analyzer, 10 Hz to 4 GHz	R&S®FSV4	1321.3008.04
Signal and spectrum analyzer, 10 Hz to 7 GHz	R&S®FSV7	1321.3008.07
Signal and spectrum analyzer, 10 Hz to 13.6 GHz	R&S®FSV13	1321.3008.13
Signal and spectrum analyzer, 10 Hz to 30 GHz	R&S®FSV30	1321.3008.30
Signal and spectrum analyzer, 10 Hz to 40 GHz [52]	R&S®FSV40	1321.3008.39
Signal and spectrum analyzer, 10 Hz to 40 GHz	R&S®FSV40	1321.3008.40
R&S®FPS [53]		
Signal and spectrum analyzer, 10 Hz to 4 GHz	R&S®FPS4	1319.2008.04
Signal and spectrum analyzer, 10 Hz to 7 GHz	R&S®FPS7	1319.2008.07
Signal and spectrum analyzer, 10 Hz to 13.6 GHz	R&S®FPS13	1319.2008.13
Signal and spectrum analyzer, 10 Hz to 30 GHz	R&S®FPS30	1319.2008.30
Signal and spectrum analyzer, 10 Hz to 40 GHz	R&S®FPS40	1319.2008.40
R&S®FPL1000		
Signal and spectrum analyzer, 5 kHz to 3 GHz	R&S®FPL1003	1304.0004.03
Signal and spectrum analyzer, 5 kHz to 7 GHz	R&S®FPL1007	1304.0004.07
R&S®FSL [54, 55]		
Spectrum analyzer, 9 kHz to 3 GHz	R&S®FSL3	1300.2502.03
Spectrum analyzer, 9 kHz to 3 GHz, with tracking generator	R&S®FSL3	1300.2502.13
Spectrum analyzer, 9 kHz to 6 GHz	R&S®FSL6	1300.2502.06
Spectrum analyzer, 9 kHz to 6 GHz, with tracking generator	R&S®FSL6	1300.2502.16
Spectrum analyzer, 9 kHz to 18 GHz	R&S®FSL18	1300.2502.18
Spectrum analyzer, 9 kHz to 18 GHz, with tracking generator	R&S®FSL18	1300.2502.28

[48] R&S®FSW firmware version 2.21 or higher required.
[49] R&S®FSWP-B1 option and R&S®FSWP firmware version 1.20 required.
[50] R&S®FSVA firmware version 2.30 or higher required.
[51] R&S®FSV firmware version 2.30 or higher required.
[52] Max. bandwidth 10 MHz.
[53] R&S®FPS firmware version 1.30 or higher required.
[54] R&S®FSL firmware version 2.40 or higher required.
[55] Only R&S®FSL with motherboard order number 2112.1800.xx supported. Limited option support.

Designation	Type	Order No.
R&S®ZNL		
Vector network analyzer, two ports, 3 GHz, N	R&S®ZNL3	1323.0012.03
Spectrum analysis, for R&S®ZNL3	R&S®ZNL3-B1	1323.1802.02
Oscilloscopes		
R&S®RTP		
Oscilloscope, 4 GHz, 4 channels	R&S®RTP044	320.5007.04
Oscilloscope, 6 GHz, 4 channels	R&S®RTP064	320.5007.06
Oscilloscope, 8 GHz, 4 channels	R&S®RTP084	320.5007.08
Oscilloscope, 13 GHz, 4 channels	R&S®RTP134	320.5007.13
Oscilloscope, 16 GHz, 4 channels	R&S®RTP164	320.5007.16
R&S®RTO2000 [28, 56]		
Oscilloscope, 600 MHz, 2 channels	R&S®RTO2002	1329.7002.02
Oscilloscope, 600 MHz, 4 channels	R&S®RTO2004	1329.7002.04
Oscilloscope, 1 GHz, 2 channels	R&S®RTO2012	1329.7002.12
Oscilloscope, 1 GHz, 4 channels	R&S®RTO2014	1329.7002.14
Oscilloscope, 2 GHz, 2 channels	R&S®RTO2022	1329.7002.22
Oscilloscope, 2 GHz, 4 channels	R&S®RTO2024	1329.7002.24
Oscilloscope, 3 GHz, 2 channels	R&S®RTO2032	1329.7002.32
Oscilloscope, 3 GHz, 4 channels	R&S®RTO2034	1329.7002.34
Oscilloscope, 4 GHz, 4 channels	R&S®RTO2044	1329.7002.44
Oscilloscope, 6 GHz, 4 channels	R&S®RTO2064	1329.7002.64
R&S®RTO1000 [28, 57]		
Oscilloscope, 600 MHz	R&S®RTO1002	1316.1000.02
Oscilloscope, 600 MHz	R&S®RTO1004	1316.1000.04
Oscilloscope, 1 GHz	R&S®RTO1012	1316.1000.12
Oscilloscope, 1 GHz	R&S®RTO1014	1316.1000.14
Oscilloscope, 2 GHz	R&S®RTO1022	1316.1000.22
Oscilloscope, 2 GHz	R&S®RTO1024	1316.1000.24
Oscilloscope, 4 GHz	R&S®RTO1044	1316.1000.44
Power sensor		
Frequency selective power sensor	R&S®NRQ6	1421.3509.02
I/Q data interface	R&S®NRQ6-K1	1421.4705.02

Available measurement applications

The following table lists the general connectivity and I/Q capture capability of the measurement applications with a listed instrument. For performance values (if applicable), see the corresponding application specific data sheets.

Applications R&S®VSE- / **Instruments**	**I/Q**	**K6**	**K7**	**K10**	**K60 K60C K60H**	**K70**	**K72**	**K91 K91p K91n K91ac**	**K96**	**K100 K102 K104**	**K106**	**K144 K146**
R&S®FSW	●	●	●	●	●	●	●	●	●	●	●	●
R&S®FSWP	●	●	●	●	●	●	●	●	●	●	●	●
R&S®FSVA3000/ R&S®FSV3000	●	●	●	●	●	●	●	●	●	●	●	●
R&S®FSVA/ R&S®FSV	●	●	●	●	●	●	●	●	●	●	●	●
R&S®FPS	●	●	●	●	●	●	●	●	●	●	●	●
R&S®FPL1000	●	–	●	●	●	●	●	–	●	●	●	●
R&S®FSL	●	–	●	●	●	●	●	–	●	●	●	–
R&S®ZNL [58]	●	–	●	●	●	●	●	–	●	●	●	●
R&S®RTP	●	●	●	● [29]	●	●	● [29]	● [29]	● [29]	● [29]	● [29]	● [29]
R&S®RTO1000 [28]/ R&S®RTO2000	●	●	●	●	●	●	●	●	●	●	●	●
R&S®NRQ [59]	●	●	●	●	●	●	●	●	●	●	●	●

[56] R&S®RTO2000 firmware version 3.50.3.1 or higher required.
[57] R&S®RTO1000 firmware version 2.51.1.0 or higher required.
[58] R&S®ZNL3-B1 required.
[59] R&S®NRQ6-K1 required.

Ordering information

Designation	Type	Order No. [60]
Vector signal explorer		
R&S®VSE basic edition [61, 62]	R&S®VSE	1345.1011.06
R&S®VSE enterprise edition [63]	R&S®VSE	1345.1105.06
R&S®VSE software maintenance	R&S®VSE-SWM	1320.7622.81
Measurement applications		
Pulse measurement application [56, 64]	R&S®VSE-K6	1320.7516.06
Analog modulation analysis (AM/FM/φM) [63, 64]	R&S®VSE-K7	1320.7539.06
GSM measurements [63, 64]	R&S®VSE-K10	1313.1368.06
Transient measurements [63, 64]	R&S®VSE-K60	1320.7868.06
Transient chirp measurements [63, 64]	R&S®VSE-K60C	1320.7874.06
Transient hop measurements [63, 64]	R&S®VSE-K60H	1320.7880.06
Vector signal analysis [63, 64]	R&S®VSE-K70	1320.7522.06
Multi-modulation vector signal analysis [63, 64, 65]	R&S®VSE-K70M	1345.1211.06
BER measurements with PRBS data [63, 64, 65]	R&S®VSE-K70P	1345.1228.06
3GPP FDD measurements [63, 64]	R&S®VSE-K72	1320.7580.06
IEEE 802.11a/b/g measurements [63, 64]	R&S®VSE-K91	1320.7597.06
IEEE 802.11p measurements [63, 64]	R&S®VSE-K91p	1320.7680.06
IEEE 802.11n measurements [63, 64]	R&S®VSE-K91n	1320.7600.06
IEEE 802.11ac measurements [63, 64]	R&S®VSE-K91ac	1320.7616.06
OFDM signal analysis [63, 64]	R&S®VSE-K96	1320.7922.06
EUTRA/LTE FDD uplink and downlink measurement application [63, 64]	R&S®VSE-K100	1320.7545.06
EUTRA/LTE Advanced and MIMO (downlink) [63, 64, 66]	R&S®VSE-K102	1320.7551.06
EUTRA/LTE TDD uplink and downlink measurement application [63, 64]	R&S®VSE-K104	1320.7568.06
EUTRA/LTE narrowband IoT analysis [63, 64]	R&S®VSE-K106	1320.7900.06
3GPP 5G NR downlink and uplink measurement application [63, 64]	R&S®VSE-K144	1309.9574.06
3GPP 5G NR downlink MIMO measurements [63, 64]	R&S®VSE-K146	1345.1305.06
User defined frequency correction by SnP file [63, 64, 67]	R&S®VSE-K544	1309.9580.06
License dongles		
License dongle	R&S®FSPC	1310.0002.03
Floating license dongle	R&S®FSPC-FL	1310.0002.04
Supported instruments		
For details, see table of supported instruments on page 9		

[60] Floating variant is xxxx.xxxx.51 and requires R&S®FSPC-FL.
[61] R&S®FSPC required.
[62] Not available for R&S®FSPC-FL.
[63] R&S®FSPC or R&S®FSPC-FL required.
[64] R&S®VSE basic edition or R&S®VSE enterprise edition required.
[65] R&S®VSE-K70 required.
[66] R&S®VSE-K100 or R&S®VSE-K104 required.
[67] R&S®VSE-K144 required.