R&S®FSV3000
Signal and
Spectrum Analyzer
Fast setup and fast
measurements

3 year warranty

ROHDE&SCHWARZ

# R&S®FSV3000 Signal and Spectrum Analyzer

At a glance

Measurements at the push of a button, capturing rare events with event based actions and simple script programming with the SCPI recorder – setting up complex measurements in no time is the strength of the R&S®FSV3000 signal and spectrum analyzer. Its other major advantage is its fast measurement speed, for high throughout in production applications.

The R&S®FSV3000 features functions that make complex measurements fast and easy. Setting up RF parameters with touchscreen gestures is as easy as using your smartphone. The auto set feature automatically sets the most important parameters such as frequency, level and gating. The SCPI recorder, which translates manual operation into remote control command scripts, is the dream of any test system software engineer. And event based actions support you when debugging your DUT by capturing and documenting rare events.

The R&S®FSV3000 has been designed for high-speed measurements. Production lines benefit from fast measurement times for spectral measurements, high-speed signal demodulation and rapid switching between different measurement modes.

The R&S®FSV3000 provides digital modulation analysis up to 200 MHz analysis bandwidth for cellular and wireless standards, including 5G NR.

Front view of the R&S®FSV3000
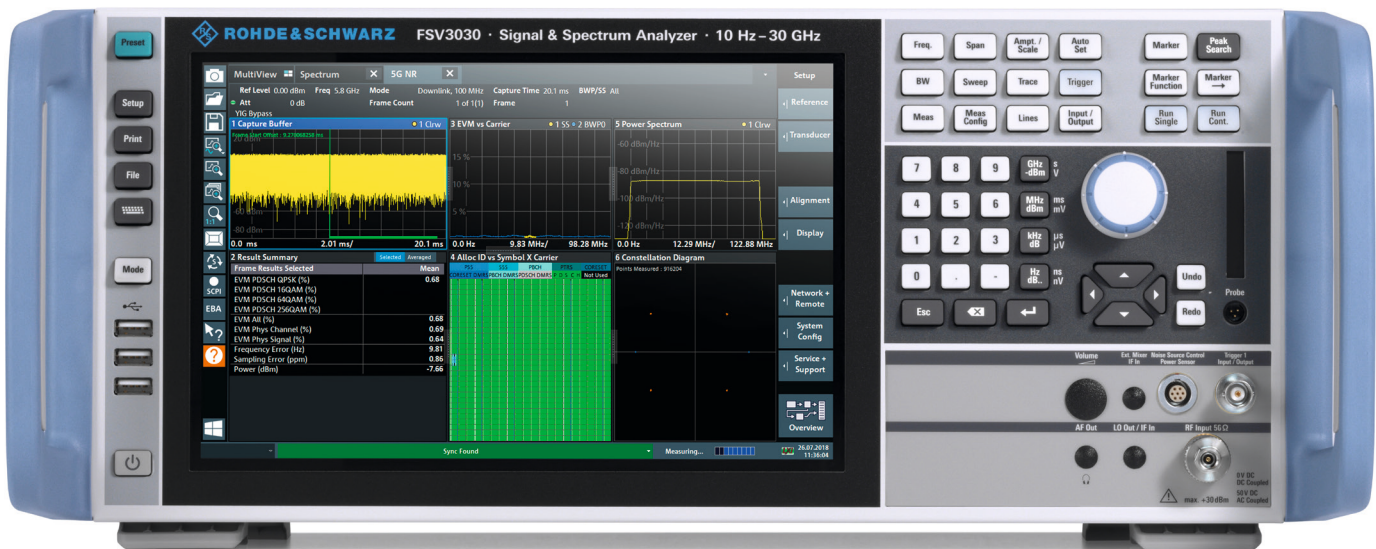
Key facts

- Frequency range of 10 Hz to 4 GHz, 7.5 GHz, 13.6 GHz, 30 GHz or 44 GHz (up to 500 GHz with external harmonic mixers from Rohde & Schwarz)
- Analysis bandwidth up to 200 MHz (option)
- SSB phase noise at 10 kHz offset (1 GHz): −107 dBc (1 Hz)
- Third-order intercept (TOI) at 1 GHz: +18 dBm (typ.)
- DANL at 1 GHz: −151 dBm
- DANL at 1 GHz with optional preamp: −165 dBm
- Ready for cloud based testing
- 10 Gbit/s LAN interface (option)
- User interface with multitouch, SCPI recorder and event based actions
- Measurement applications for analog and digital signal analysis, including 5G NR

Benefits

Advanced user interface

Well-arranged operating elements

Ready for 5G and other wireless standards

Fast measurement speed for production

Wide range of measurement applications

Rear view of the R&S®FSV3000

Advanced user interface

Before measurement results can be obtained, signal and spectrum analyzers require certain settings to be made. For simple spectral measurements, this can be just a few parameters; in the case of complex automated conformance tests, lengthy programming may be required. Whatever the objective, the R&S®FSV3000 excels with fast access to measurement results thanks to its simple and fast setup.

Multitouch display

Basic RF measurements typically require the right settings for center frequency, span, level and probably resolution bandwidth. Finding the ideal settings can be tricky when measuring an unknown signal. The R&S®FSV3000 features a multitouch display and intuitive menu structure for exceptional ease of operation. A one-finger swipe across the screen adjusts the center frequency or the reference level. Two-finger gestures adjust the displayed span or level range. The right settings are done in no time.

Various measurements can be displayed simultaneously in separate windows on the large 10.1" screen. This greatly facilitates result interpretation. The MultiView function displays all tabs on one screen. With the sequencer, all measuring channels are measured consecutively, one after the other. The user is provided with constantly updated results, and no time-consuming parameter adjustments are necessary.

SCPI recorder for fast automation

The R&S®FSV3000 embedded SCPI recorder accelerates the programming of executable control scripts. All manual user input is translated into SCPI commands that can be exported as plain SCPI or in the syntax of common programming languages and tools such as C++, Python and Matlab.

If manual code adaption is required, context-sensitive online help offers comprehensive information, including SCPI commands and parameters.

MultiView displays several measurements at the same time
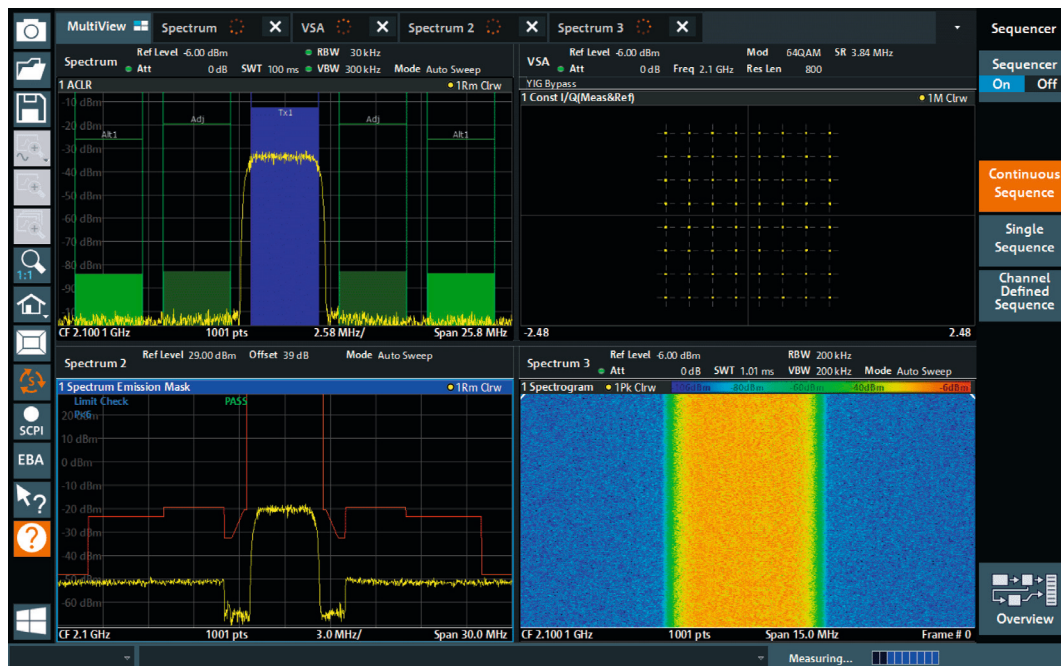
Event based actions dialog

Troubleshooting in R&D regularly requires the analysis of sporadic events, for instance the failure of limit lines or EVM values. The R&S®FSV3000 lets you define rules to perform specific actions on such events, for instance storing I/Q data or screenshots. A final report lists all triggered events over a long period.

The setup is done on a simple GUI, eliminating the need for an external PC for remote control.

Auto set

The auto set feature allows you to quickly configure frequently performed measurements such as occupied bandwidth, spectrum, TDP, CCDF, APD and C/N. With the auto set feature, the instrument detects the parameters of an applied signal and automatically sets the frequency, level, trigger and gating. For standard conformant ACLR and SEM measurements, the settings are automatically set in line with the corresponding standard.

Smart signal generator control

Many measurements require a signal generator, either to provide a simple CW signal or a modulated carrier. For such applications, the interaction between the R&S®FSV3000 and a generator such as the R&S®SMBV100B vector signal generator goes far beyond classical signal tracking. With the coupling manager, the analyzer directly controls the generator. Changes of frequency or level on the analyzer are directly taken over by the generator. The user interface of the generator can be displayed on the analyzer, so the user can operate the complete setup from a single screen. The SCPI recorder can also be coupled. Manual settings on either instrument are recorded in a single script. Advanced amplifier measurements with digital predistortion are possible. The analyzer directly provides the predistorted waveform to the generator. The hardware can be coupled by the optional 1 GHz clock reference for better phase synchronization.

In many cases, the event based actions dialog eliminates the need for an external PC. Instead of SCPI programming, IF-THEN commands are set up via the GUI.
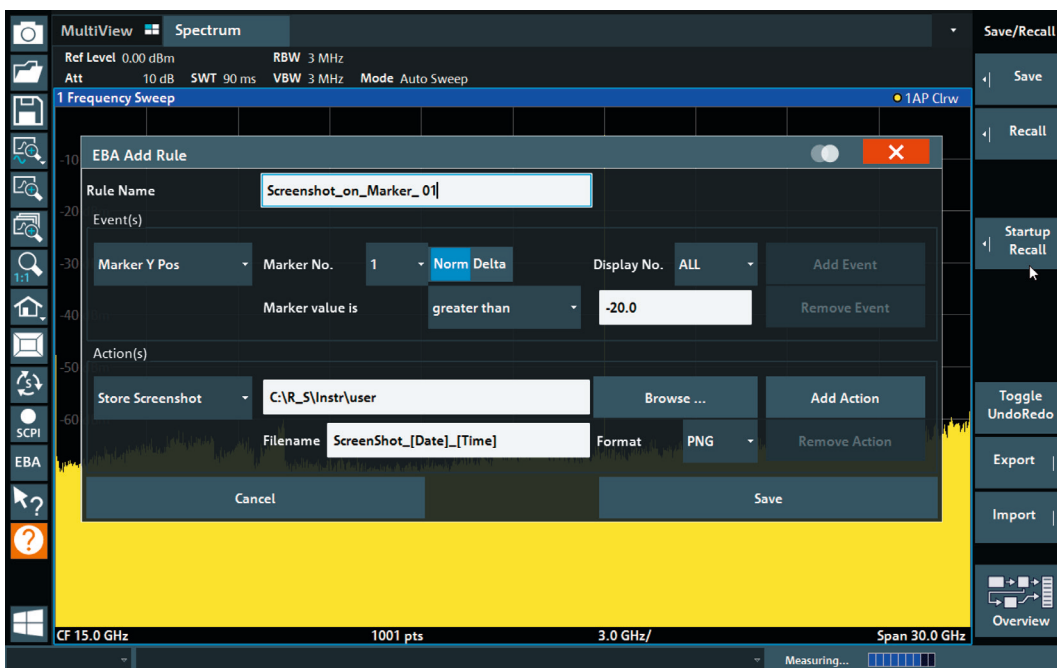
Well-arranged operating elements

12.1" high-resolution, multitouch display
ı 1280 × 800 pixel resolution
ı Multitouch operation

Toolbar
ı Quickly access frequently used functions
ı Load and save configurations
ı Take screenshots
ı Zoom graphs
ı Configure displayed items

Zoom into graphs
ı Graphical zoom for detailed view
ı MultiView of different regions
ı Adapt hardware settings to
  zoom region

SCPI recorder
Simplified code generation for
automatic, remote controlled
measurements

Event based actions
ı Apply IF-THEN tasks from the GUI
ı Trigger on sporadic events for
  quick troubleshooting

Application starter
Quick access to .exe or .com
Windows programs

Three USB 2.0 ports
ı For storage media
ı For connecting accessories
ı For power sensors with USB connector
(additional USB 2.0/USB 3.0 ports on rear panel)
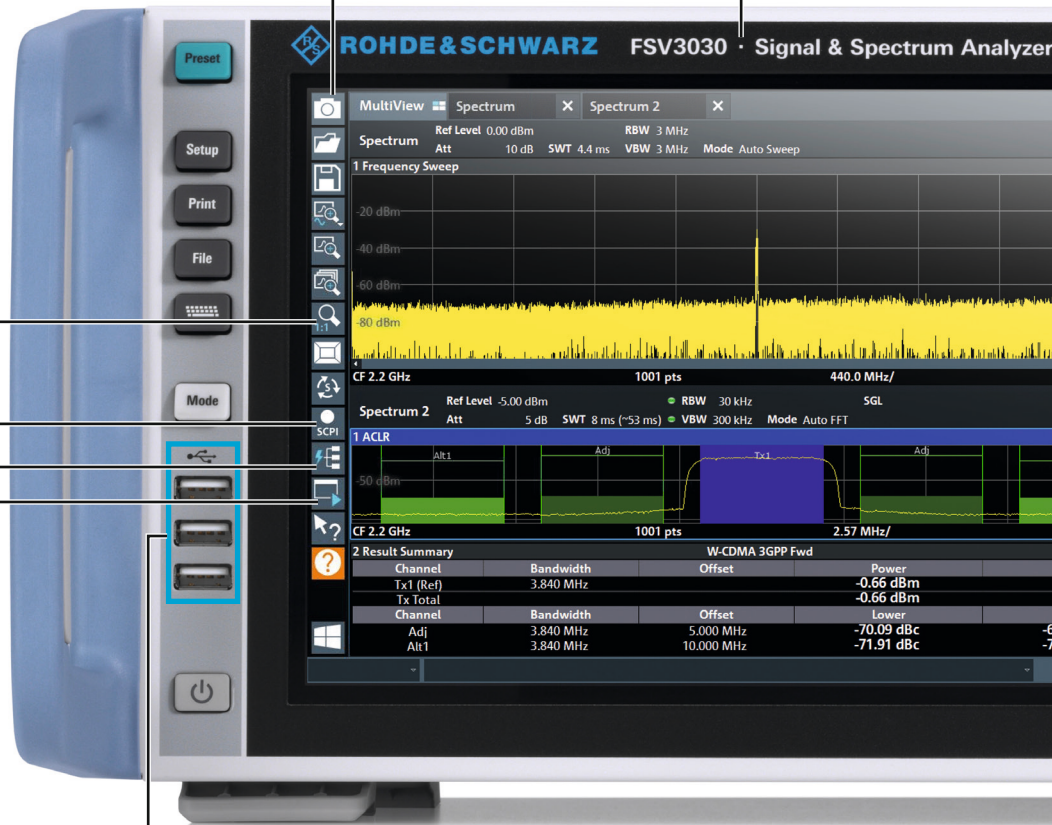
R&S®MultiView and R&S®Sequencer
ı Display all tabs on one screen
ı Measure consecutively
ı Receive continually updated results

Auto set
ı Automatic setting of frequency, level, trigger and gating based on the applied signal
ı Automatic selection of ACLR and SEM parameter tables in line with the corresponding standard

Start commonly used measurements
ACLR, OBW, TOI , C/N, SEM

Removable solid state disk
Option

Probe power supply
+15 V DC, −12.6 V DC and ground

Smart port
ı For power meters
ı For smart noise sources

Settings overview
Display and adapt all hardware related settings on one screen

Ready for 5G and other wireless standards

The R&S®FSV3000 signal and spectrum analyzer is ideal for analyzing wireless communications signals in R&D, system testing, verification and production.

More bandwidth

Modern communications signals require more and more bandwidth. With 200 MHz of analysis bandwidth, the R&S®FSV3000 sets a new standard in its class. It allows capturing of two neighboring 5G NR carriers at once. This saves measurement time and makes it possible to analyze interactions and timing between the carriers. With the optional YIG bypass, the 200 MHz bandwidth is available up to the maximum frequency of the respective model, i.e. 44 GHz.

The R&S®FSV3000 features an excellent dynamic range, which is beneficial not only for spectral measurements but also for analyzing and demodulating signals with a high crest factor, such as OFDM signals or signals with a high modulation order. Excellent EVM values better than 1% are possible with 160 MHz wide WLAN signals at 2.4 GHz or 5.8 GHz and also for 5G NR signals at 28 GHz. This increases the margin for the DUT – minimizing the influence of the measuring instrument on the measurement result.

Support of all modern wireless standards

The R&S®FSV3000 provides signal analysis options for all modern wireless and cellular communications standards, i.e.
- 3GPP 5G NR
- EUTRA/LTE/LTE-Advanced
- NB-IoT DL
- WCDMA
- GSM/EDGE/EDGE Evolution
- WLAN 802.11 a/b/g/n/p/ac/ax

Analysis of a 5G NR signal with the R&S®FSV3-K144 (downlink) and R&S®FSV3-K145 (uplink) options

Fast measurement speed for production

Automated production of components, modules and devices requires spectral measurements as well as signal demodulation. The R&S®FSV3000 signal and spectrum analyzer performs even complex measurement scenarios in a minimum amount of time.

The R&S®FSV3000 has been designed for high-speed performance in automated test systems. It performs spectral measurements, signal demodulation and switching between different measuring modes in the shortest possible time. Its synthesizer technology is prepared for fast frequency switching. FFT based ACLR and SEM measurements are faster than swept spectrum measurements while showing the same dynamic range.

The enhanced computer power option provides a faster clock speed, higher data transfer rates and more memory to accelerate digital signal demodulation.

Ready for cloud based testing

In cloud based test systems, signal analysis is done on external CPUs. This requires the transfer of huge amounts of I/Q data. The R&S®FSV3000 perfectly interacts with cloud based processing. Its architecture enables fastest transfer of I/Q measurement data. The optional 10 Gbit/s LAN interface enables I/Q data transfer towards the network side even at the high sample rates required for 200 MHz analysis bandwidth.

Emulation modes for legacy instruments

Replacing outdated equipment in automated test systems can be a major challenge if all remote code has to be rewritten.

The R&S®FSV3000 simplifies the replacement of obsolete instruments. Emulation modes for many obsolete analyzers make it possible to keep existing code. There is no reason to hesitate to upgrade to an R&S®FSV3000.

FFT based ACLR measurements provide significant speed improvements versus swept measurements. The R&S®FSV3000 still has an excellent dynamic range.
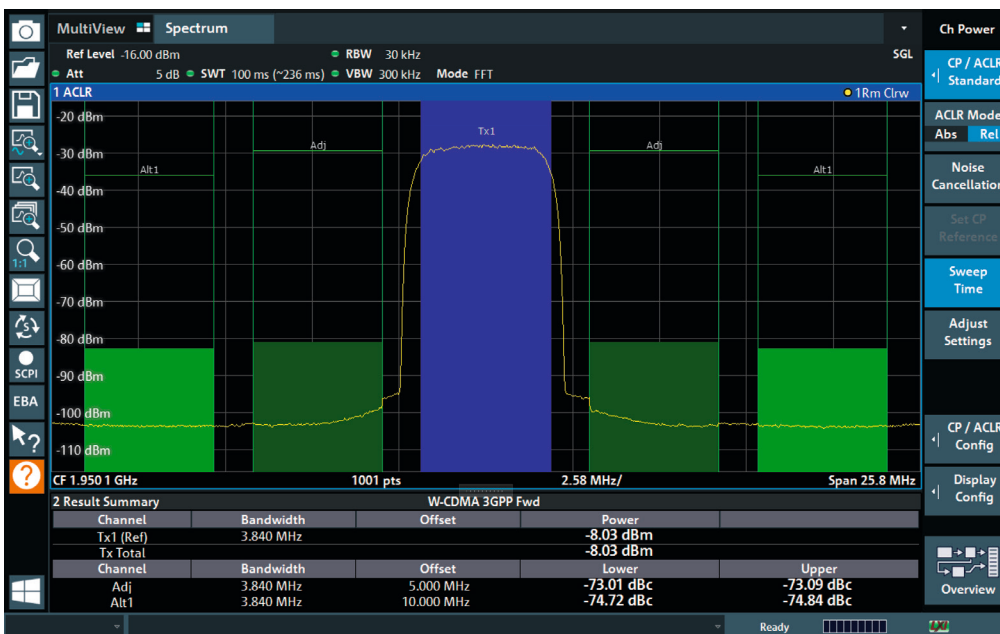
Wide range of measurement applications

General-purpose measurement applications

Measurement application	Measurement parameters	Measurement functions
R&S®FSV3-K6 Pulse measurements	**Pulse parameters:** ▪ Timing: pulse width, pulse repetition interval, duty cycle, rise/fall time, settling time, timestamp, off time ▪ Frequency: carrier frequency, pulse-to-pulse frequency difference, chirp rate, frequency deviation, frequency error ▪ Power: peak power, average power, peak-to-average power, pulse-to-pulse power ▪ Phase: carrier phase, pulse-to-pulse phase difference, phase deviation, phase error ▪ Amplitude: droop, ripple, overshoot width, top/base power, average on power, average transmitted power, minimum/peak power, peak-to-average/peak-to-min power ratio, pulse-to-pulse power ratio	▪ Point-in-pulse measurements: frequency, amplitude, phase versus pulse, trends and histograms for all parameters ▪ Pulse statistics: standard deviation, average, maximum, minimum ▪ Pulse tables ▪ User-defined measurement parameters
R&S®FSV3-K7 Modulation analysis for AM/FM/φM modulated single carriers	▪ Modulation depth (AM) ▪ Frequency deviation (FM) ▪ Phase deviation (φM) ▪ Modulation frequency ▪ THD and SINAD ▪ Carrier power	▪ AF spectrum ▪ RF spectrum ▪ AF scope display ▪ AF filters (lowpass and highpass) ▪ Weighting filters (CCITT) ▪ Squelch
R&S®FSV3-K18 Amplifier measurements [1] **R&S®FSV3-K18D** Direct DPD measurements [2]	▪ AM-AM, AM-PM, EVM ▪ Width of AM-PM and AM-AM curves	▪ General amplifier measurements ▪ Polynomial-based digital predistortion (R&S®FSV3-K18) ▪ Direct digital predistortion (R&S®FSV3-K18D) ▪ Control and synchronization of the R&S®SMW200A and R&S®SMBV100B vector signal generators
R&S®FSV3-K30 Noise figure and gain measurements based on Y-factor method [3]	▪ Noise figure ▪ Noise temperature ▪ Gain ▪ Y factor	▪ Analyzer noise correction (second stage correction) ▪ Measurements on frequency-converting DUTs ▪ Control of a generator as an LO in frequency-converting measurements ▪ SSB and DSB
R&S®FSV3-K40 Phase noise measurements	▪ SSB phase noise ▪ Residual FM and residual φM ▪ Jitter	▪ 1 Hz to 10 GHz offset range ▪ Selection of resolution bandwidth and number of averages for each offset range ▪ Definable evaluation ranges for residual FM/φM ▪ Signal tracking ▪ Optional suppression of spurious emissions
R&S®FSV3-K70 Vector signal analysis **R&S®FSV3-K70M** Multimodulation analysis [4] **R&S®FSV3-K70P** BER PRBS measurements [4]	Analysis of digitally modulated single carriers down to the bit level: ▪ EVM ▪ MER ▪ Phase error ▪ Magnitude error ▪ Carrier frequency error ▪ Symbol rate error ▪ I/Q skew ▪ Rho ▪ I/Q offset, I/Q imbalance, quadrature error ▪ Amplitude droop ▪ Power ▪ Bit error rate of known data streams ▪ Bit error rate of bitstreams generated with PRBS registers (R&S®FSV3-K70P) ▪ Analysis of vector modulated signals with multiple modulations, e.g. DVB-S2(X) (R&S®FSV3-K70M)	▪ Eye diagram ▪ Constellation diagram ▪ Vector diagram ▪ Histogram ▪ Equalizer ▪ Multiple modulation formats, e.g.: ▪ 2FSK to 64FSK ▪ MSK, GMSK, DMSK ▪ Multiple PSKs (e.g. BPSK, QPSK, 8PSK, 3π/8-8PSK and more) ▪ 16QAM to 1024QAM ▪ 16APSK (DVB-S2), 32APSK (DVB-S2), 2ASK, 4ASK ▪ User-definable constellations

[1] Requires the R&S®SMW200A vector signal generator.
[2] Requires R&S®FSV3-K18.
[3] Requires an external noise source, e.g. Noisecom NC346.
[4] Requires R&S®FSV3-K70.

Measurement applications for wireless communications systems

Measurement application/ technology	Power	Modulation quality	Spectrum measurements	Miscellaneous	Special features
R&S®FSV3-K544 Frequency response correction	∎ SnP file in Touchstone file format	∎ Corrects frequency response (amplitude and phase) of the measurement setup	**R&S®FSV3-K544** Frequency response correction	∎ SnP file in Touchstone file format	∎ Corrects frequency response (amplitude and phase) of the measurement setup
R&S®FSV3-K10 GSM/EDGE/ EDGE Evolution	∎ Power measurement in time domain, including carrier power	∎ EVM ∎ Phase/frequency error ∎ Origin offset suppression ∎ Constellation diagram	∎ Modulation spectrum ∎ Transient spectrum	–	∎ Single burst and multiburst ∎ Automatic detection of modulation
R&S®FSV3-K72/-K73 3GPP FDD (WCDMA)	∎ Code domain power ∎ Code domain power versus time ∎ CCDF	∎ EVM ∎ Peak code domain error ∎ Constellation diagram ∎ I/Q offset ∎ Residual code domain error ∎ I/Q imbalance ∎ Gain imbalance ∎ Center frequency error (chip rate error)	∎ Spectrum mask ∎ ACLR ∎ Power measurement	∎ Channel table with channels used on base station ∎ Timing offset ∎ Power versus time	∎ Automatic detection of active channels and decoding of useful information ∎ Automatic detection of encryption code ∎ Automatic detection of HSDPA modulation format ∎ Support of compressed mode signals ∎ Support of HSPA and HSPA+ (HSDPA+ and HSUPA+)
R&S®FSV3-K91 WLAN IEEE 802.11a/b/g **R&S®FSV3-K91P** WLAN IEEE 802.11p **R&S®FSV3-K91N** WLAN IEEE 802.11n **R&S®FSV3-K91AC** WLAN IEEE 802.11ac **R&S®FSV3-K91AX** WLAN IEEE 802.11ax	∎ Power versus time ∎ Burst power ∎ Crest factor	∎ EVM (pilot, data) ∎ EVM versus carrier ∎ EVM versus symbol ∎ Constellation diagram ∎ I/Q offset ∎ I/Q imbalance ∎ Gain imbalance ∎ Center frequency error ∎ Symbol clock error ∎ Group delay	∎ Spectrum mask ∎ ACLR ∎ Power measurement ∎ Spectrum flatness	∎ Bitstream ∎ Signal field ∎ Constellation versus carrier	∎ Automatic detection of burst type ∎ Automatic detection of MCS index ∎ Automatic detection of bandwidth ∎ Automatic detection of guard interval ∎ Estimation of payload length from burst ∎ IEEE 802.11ax PPDU formats: HE SU PPDU, HE MU PPDU, HE trigger-based PPDU, HE extended range SU PPDU
R&S®FSV3-K100/ -K101/-K104/-K105 EUTRA/LTE TDD and FDD UL and DL	∎ Power measurement in time and frequency domains ∎ CCDF	∎ EVM ∎ Constellation diagram ∎ I/Q offset ∎ Gain imbalance ∎ Quadrature error ∎ Center frequency error (symbol clock error)	∎ Spectrum mask ∎ ACLR ∎ Power measurement ∎ Spectrum flatness	∎ Bitstream ∎ Allocation summary list ∎ Averaging over multiple measurements	Automatic detection of modulation, cyclic prefix length and cell ID
R&S®FSV3-K102 EUTRA/LTE MIMO		∎ See R&S®FSV3-K100/ -K104 modulation quality measurements for each individual MIMO path			∎ MIMO time alignment for R&S®FSV3-K100/-K104 ∎ Interband carrier aggregation time alignment
R&S®FSV3-K103 EUTRA/ LTE-Advanced UL			∎ Multicarrier ACLR for FDD and TDD ∎ SEM for contiguously aggregated component carriers		
R&S®FSV3-K106 NB-IoT DL measurements	∎ Power measurement in time and frequency domains	∎ EVM ∎ Constellation diagram ∎ Frequency error ∎ Sampling error	∎ Spectrum flatness, ACLR, SEM	∎ Allocation summary list	∎ Standalone, guard band and in-band operation ∎ Automatic detection of cell ID
R&S®FSV3-K144 5G NR downlink **R&S®FSV3-K145** 5G NR uplink	∎ Power versus time	∎ EVM ∎ EVM xPDSCH ∎ Constellation diagram ∎ I/Q offset ∎ I/Q imbalance ∎ Gain imbalance ∎ Center frequency error		∎ Allocation summary ∎ Channel table with channels used on base station	∎ Automatic detection of Cell ID ∎ Support of multiple bandwidth parts

Specifications in brief

Specifications in brief		
Frequency		
Frequency range	R&S®FSV3004	10 Hz to 4 GHz
	R&S®FSV3007	10 Hz to 7.5 GHz
	R&S®FSV3013	10 Hz to 13.6 GHz
	R&S®FSV3030	10 Hz to 30 GHz
	R&S®FSV3044	10 Hz to 44 GHz
Aging of frequency reference		1×10^{-6} per year
	with R&S®FSV3-B4 option	1×10^{-7} per year
Bandwidth	standard filter	1 Hz to 10 MHz
Resolution bandwidths	RRC filter	18 kHz (NADC), 24.3 kHz (TETRA), 3.84 MHz (3GPP), 4.096 MHz
	channel filter	100 Hz to 5 MHz
	video filter	1 Hz to 10 MHz
I/Q demodulation bandwidth	standard	28 MHz
	with R&S®FSV3-B40 option	40 MHz
	with R&S®FSV3-B200 option	200 MHz
Phase noise	1 GHz carrier	
	1 kHz offset	< –101 dBc
	10 kHz offset	< –107 dBc
	100 kHz offset	< –115 dBc
	1 MHz offset	< –135 dBc
Displayed average noise level (DANL)	1 GHz	–151 dBm (typ.)
DANL with preamplifier (R&S®FSV3-B24 option)	50 MHz ≤ f < 3 GHz	–165 dBm (typ.)
Intermodulation		
Third-order intercept (TOI)	1 GHz	> 15 dBm, typ. 18 dBm
Total measurement uncertainty	2 GHz	0.29 dB

Ordering information

Designation	Type	Order No.	Remarks
Base unit			
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	
Hardware options			
Side carrying handles	R&S®FSV3-B1	1330.5700.02	
Audio demodulator	R&S®FSV3-B3	1330.3765.02	
OCXO frequency reference	R&S®FSV3-B4	1330.3794.02	
Additional interfaces	R&S®FSV3-B5	1330.3820.02	
10 Gbit/s LAN interface	R&S®FSV3-B6	1330.3913.02	requires R&S®FSV3-B114
External generator control	R&S®FSV3-B10	1330.3859.02	
YIG preselector bypass	R&S®FSV3-B11	1330.3865.02	
40 MHz analysis bandwidth	R&S®FSV3-B40	1330.4103.02	
200 MHz analysis bandwidth	R&S®FSV3-B200	1330.4132.02	requires R&S®FSV3-B114
Spare hard drive	R&S®FSV3-B18	1330.4003.02	requires R&S®FSV3-B20
Removable hard drive	R&S®FSV3-B20	1330.3971.02	
RF preamplifier for R&S®FSV3004 and R&S®FSV3007	R&S®FSV3-B24	1330.4049.07	
RF preamplifier for R&S®FSV3013	R&S®FSV3-B24	1330.4049.13	
RF preamplifier for R&S®FSV3030	R&S®FSV3-B24	1330.4049.30	
RF preamplifier for R&S®FSV3044	R&S®FSV3-B24	1330.4049.44	
Electronic attenuator, 1 dB steps	R&S®FSV3-B25	1330.4078.02	
USB mass memory write protection	R&S®FSV3-B33	1330.4861.02	
Enhanced computing power	R&S®FSV3-B114	1330.4910.02	
Noise source control via BNC	R&S®FSV3-B28V	1330.6664.02	
1 GHz reference	R&S®FSV3-K703	1330.7502.02	
Firmware options			
Pulse measurements	R&S®FSV3-K6	1346.3330.02	
Analog modulation analysis for AM/FM/φM	R&S®FSV3-K7	1330.5022.02	
Power sensor support	R&S®FSV3-K9	1346.3676.02	
GSM/EDGE/EDGE Evolution/VAMOS measurements	R&S®FSV3-K10	1330.5039.02	
Amplifier measurements	R&S®FSV3-K18	1346.3347.02	
Direct DPD measurements	R&S®FSV3-K18D	1346.3353.02	requires R&S®FSV3-K18
Noise figure measurements	R&S®FSV3-K30	1330.5045.02	
Security write protection of solid state drive	R&S®FSV3-K33	1346.3360.02	
Phase noise measurements	R&S®FSV3-K40	1330.5051.02	
Vector signal analysis	R&S®FSV3-K70	1330.5074.02	
Multimodulation analysis	R&S®FSV3-K70M	1346.3376.02	requires R&S®FSV3-K70
BER PRBS measurements	R&S®FSV3-K70P	1346.3382.02	requires R&S®FSV3-K70
3GPP FDD (WCDMA) BS measurements, incl. HSDPA and HSDPA+	R&S®FSV3-K72	1330.5080.02	
3GPP FDD (WCDMA) MS measurements, incl. HSUPA and HSUPA+	R&S®FSV3-K73	1330.5097.02	

Designation	Type	Order No.	Remarks
WLAN IEEE 802.11a/b/g measurements	R&S®FSV3-K91	1330.5100.02	requires R&S®FSV3-B40 or R&S®FSV3-B200 to support signal analysis bandwidths > 28 MHz
WLAN IEEE 802.11n measurements	R&S®FSV3-K91N	1330.5139.02	requires R&S®FSV3-K91; requires R&S®FSV3-B40 or R&S®FSV3-B200 to support signal analysis bandwidths > 28 MHz
WLAN IEEE 802.11ac measurements	R&S®FSV3-K91AC	1330.5116.02	requires R&S®FSV3-K91; requires R&S®FSV3-B40 or R&S®FSV3-B200 to support signal analysis bandwidths > 28 MHz
WLAN IEEE 802.11ax measurements	R&S®FSV3-K91AX	1346.3399.02	requires R&S®FSV3-K91; requires R&S®FSV3-B40 or R&S®FSV3-B200 to support signal analysis bandwidths > 28 MHz
WLAN IEEE 802.11p measurements	R&S®FSV3-K91P	1330.5122.02	requires R&S®FSV3-K91
EUTRA/LTE FDD BS measurements	R&S®FSV3-K100	1330.5145.02	
EUTRA/LTE FDD UE measurements	R&S®FSV3-K101	1330.5151.02	
EUTRA/LTE BS MIMO measurements	R&S®FSV3-K102	1330.5168.02	requires R&S®FSV3-K100 or R&S®FSV3-K104
EUTRA/LTE UL advanced UL measurements	R&S®FSV3-K103	1330.7231.02	requires R&S®FSV3-K101 or R&S®FSV3-K105
EUTRA/LTE TDD BS measurements	R&S®FSV3-K104	1330.5174.02	
EUTRA/LTE TDD uplink measurements	R&S®FSV3-K105	1330.5180.02	
EUTRA/LTE NB-IoT downlink measurements	R&S®FSV3-K106	1346.3418.02	
3GPP 5G-NR DL measurements	R&S®FSV3-K144	1330.7219.02	requires R&S®FSV3-B200
3GPP 5G-NR UL measurements	R&S®FSV3-K145	1330.7225.02	requires R&S®FSV3-B200
User-defined frequency correction with SnP file (corrects frequency response – amplitude and phase – of measurement setup)	R&S®FSV3-K544	1346.3630.02	
Recommended extras			
Smart noise sources for noise figure and gain measurements up to 55 GHz	R&S®FS-SNS26/ R&S®FS-SNS40/ R&S®FS-SNS55	1338.8008.xx (xx = 26/40/55)	requires R&S®FSV3-K30
19" adapter, 4 HU 1/1	R&S®ZZA-KN4	1175.3033.00	
Headphone	R&S®ERST.2	0708.3010.00	requires R&S®FSV3-B3
IEC bus cable, length: 1 m	R&S®PCK	0292.2013.10	requires R&S®FSV3-B5
IEC bus cable, length: 2 m	R&S®PCK	0292.2013.20	requires R&S®FSV3-B5
Matching pad, 50/75 Ω, 0 Hz to 2700 MHz, matching at both ends	R&S®RAM	0358.5414.02	
Matching pad, 50/75 Ω, 0 Hz to 2700 MHz, matching at one end	R&S®RAZ	0358.5714.02	
Anti-glare film	R&S®FPL1-Z5	1323.1690.02	
DC block 10 kHz to 18 GHz, N connector	R&S®FSE-Z4	1084.7443.02	

Designation	Type	Order No.
PC software[1]		
R&S®VSE basic edition[2][3]	R&S®VSE	1345.1011.06
R&S®VSE enterprise edition[4]	R&S®VSE Enterprise Edition	1345.1105.06
License dongle		
License dongle	R&S®FSPC	1310.0002.03
Floating license dongle	R&S®FSPC-FL	1310.0002.04
Service option		
R&S®VSE software maintenance	R&S®VSE-SWM	1320.7622.81

[1] To obtain the floating license of the product, R&S®FSPC-FL is needed, and order number xxxx.xxxx.51 must be used instead of xxxx.xxxx.06.
[2] Requires R&S®FSPC.
[3] Not available for R&S®FSPC-FL.
[4] Requires R&S®FSPC or R&S®FSPC-FL.

Warranty		
Base unit		3 years
All other items[1]		1 year
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 with calibration coverage, one year	R&S®CW1	
Extended warranty with calibration coverage, two years	R&S®CW2	
Extended warranty with accredited calibration coverage, one year	R&S®AW1	
Extended warranty with accredited calibration coverage, two years	R&S®AW2	

[1] For options that are installed, the remaining base unit warranty applies if longer than 1 year. Exception: all batteries have a 1 year warranty.

Your local Rohde & Schwarz expert will help you determine the optimum solution for your requirements.
To find your nearest Rohde & Schwarz representative, visit www.sales.rohde-schwarz.com

Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, monitoring and network testing. Founded more than 80 years ago, the independent company which is headquartered in Munich, Germany, has an extensive sales and service network with locations in more than 70 countries.

www.rohde-schwarz.com

Sustainable product design

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

Certified Quality Management	Certified Environmental Management
ISO 9001	ISO 14001

Rohde & Schwarz training

www.training.rohde-schwarz.com

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