

R&S® FSV3000 SIGNAL AND SPECTRUM ANALYZER

Fast setup and fast measurements



Product Brochure
Version 03.00

ROHDE & SCHWARZ
Make ideas real



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 and performing complex measurements in no time is the strength of the R&S®FSV3000 signal and spectrum analyzer. Its fast measurement speed is a major asset especially in automated production applications as it yields high throughput.

The R&S®FSV3000 offers functions that make the configuration of complex measurements fast and easy. Setting up RF parameters with touchscreen gestures is as easy as using your smartphone. The autoselect feature automatically sets key parameters such as frequency, level and gating. An SCPI recorder, which translates manual operation into remote control command scripts, considerably speeds up script programming. 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 measurement speed. This is a major advantage especially in production environments, which 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.



BENEFITS

Key facts

- ▶ Frequency range from 10 Hz to 4 GHz/7.5 GHz/ 13.6 GHz/30 GHz/44 GHz (up to 500 GHz with external harmonic mixer from Rohde&Schwarz)
- ▶ Analysis bandwidth up to 200 MHz
- ▶ SSB phase noise at 10 kHz offset (1 GHz):
< -114 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 preamplifier: -165 dBm
- ▶ Ready for cloud based testing
- ▶ 10 Gbit/s LAN interface (option)
- ▶ User interface with multitouch display, SCPI recorder and event based actions
- ▶ Measurement applications for analog and digital signal analysis, including 5G NR

Advanced user interface

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Clearly structured intuitive GUI

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Ready for 5G and other wireless standards

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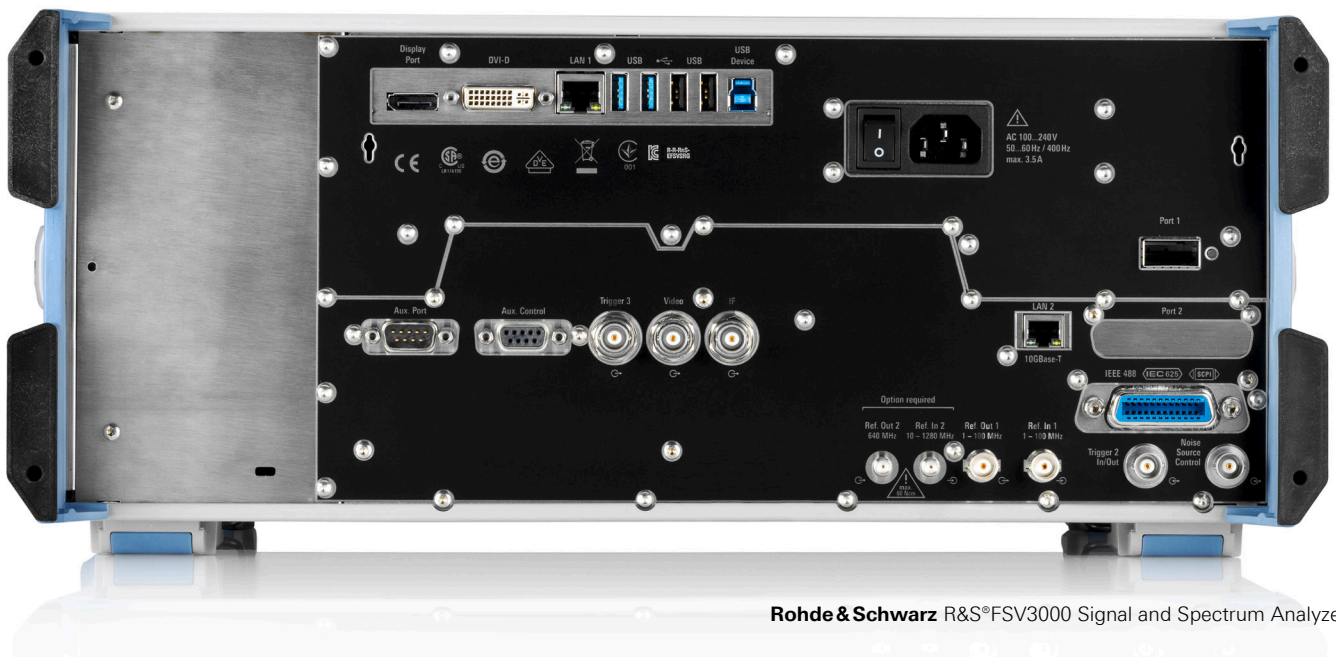
Fast measurement speed for production

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Wide range of measurement applications

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Rear view of the R&S®FSV3000.



ADVANCED USER INTERFACE

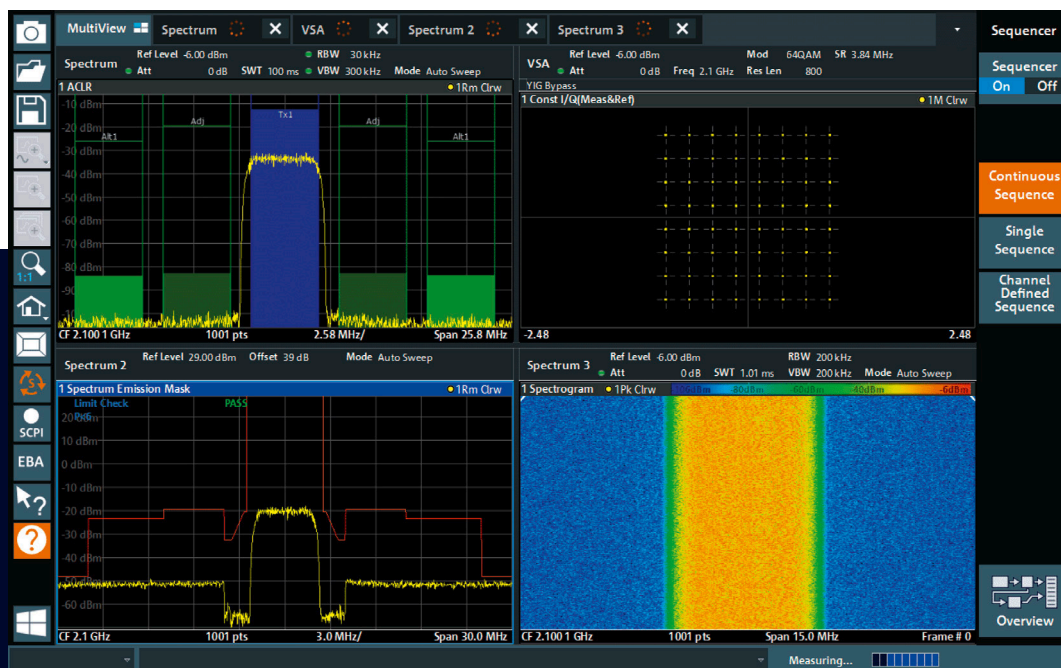
Depending on the application, certain settings need to be made on the signal and spectrum analyzer. For simple spectral measurements, this can be just a few parameters; in the case of complex automated conformance tests, lengthy programming may be required. Whatever the objective, the R&S®FSV3000 excels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

Multitouch display

Basic RF measurements typically require the center frequency, span, level and probably the resolution bandwidth to be configured. 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 active measurements on one screen. With the sequencer function, all channels are measured consecutively, one after the other. The user is provided with constantly updated results, and no time-consuming parameter adjustments are necessary.

MultiView displays all active measurements at the same time.



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 adaptation is required, context-sensitive online help provides comprehensive information, including SCPI commands and parameters.

Event based actions dialog

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

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

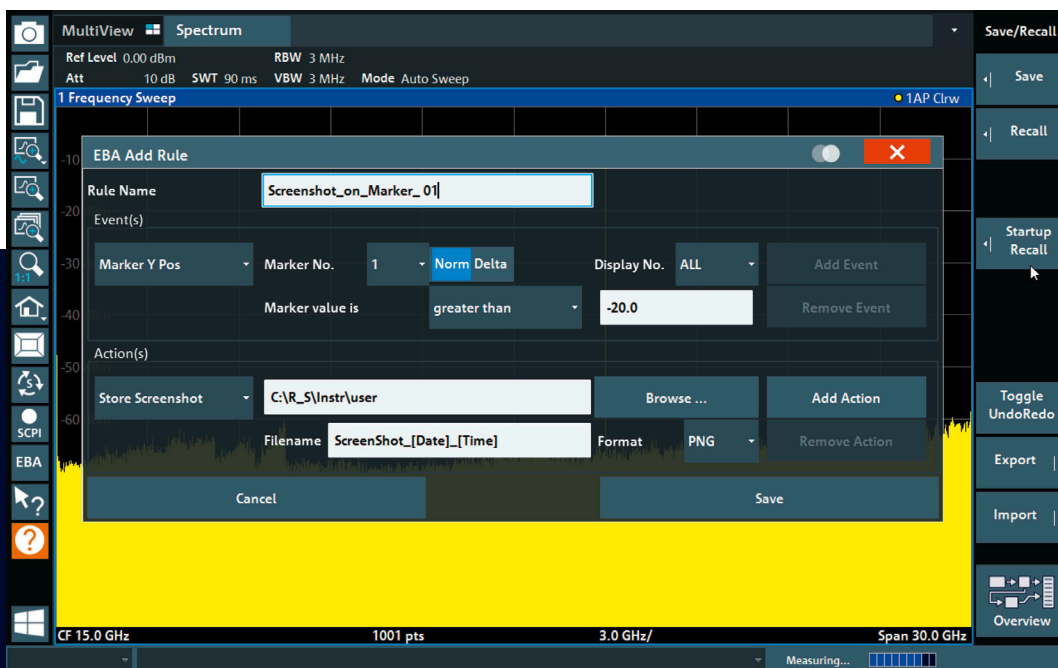
Autoset

The autoset feature allows you to quickly configure frequently performed measurements such as occupied bandwidth, spectrum, TDP, CCDF, APD and C/N. With the autoset feature, the instrument detects the parameters of an incoming signal and automatically sets the appropriate frequency, level, trigger and gating. For standard conformant ACLR and SEM measurements, the settings are automatically configured 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 classic 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 via 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.



CLEARLY STRUCTURED, INTUITIVE GUI

10.1" high-resolution, multitouch display

- ▶ 1280 × 800 pixel
- ▶ Multitouch operation

Toolbar

- ▶ Quickly access frequently used functions
- ▶ Load and save configurations
- ▶ Take screenshots
- ▶ Zoom into graphs
- ▶ Configure displayed items

Zoom into graphs

- ▶ Zoom into graphs for a detailed view
- ▶ Zoom into multiple areas simultaneously
- ▶ Adapt hardware settings to zoom area

SCPI recorder

- ▶ Simplified code generation for automatic, remote controlled measurements

Event based actions

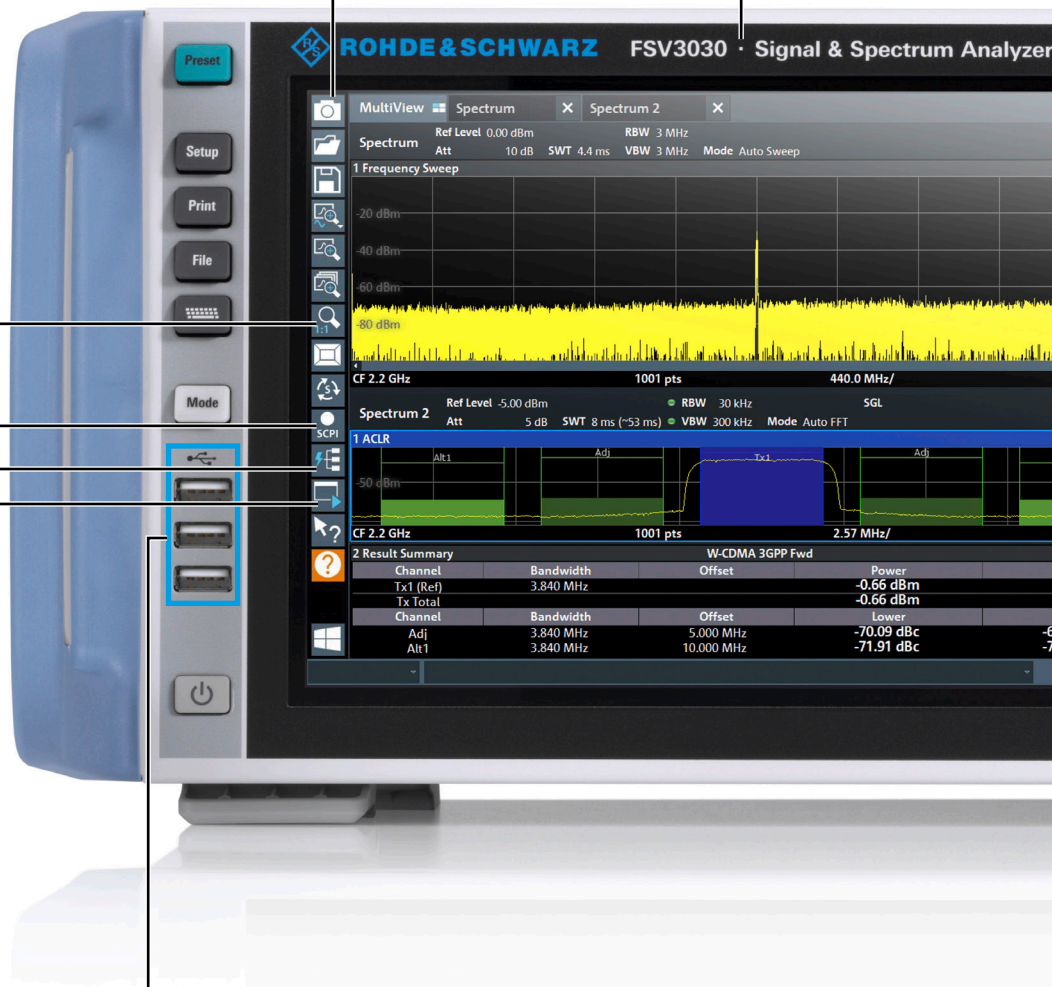
- ▶ Configure and apply IF-THEN tasks right on the GUI
- ▶ Trigger on sporadic events for quick troubleshooting

Application starter

- ▶ Quick access to .exe or .com Windows programs

Three USB 2.0 ports

- ▶ For storage media
- ▶ For connecting accessories
- ▶ For power sensors with USB connector (additional USB 2.0/USB 3.0 ports on rear panel)



MultiView and Sequencer

- ▶ Display all active measurements on one screen
- ▶ Measure all channels consecutively
- ▶ Receive continually updated results

Autoset

- ▶ Automatic setting of frequency, level, trigger and gating based on the incoming signal
- ▶ 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

Settings overview

- ▶ Display and adapt all hardware related settings on one screen

Smart port

- ▶ For power sensors
- ▶ For smart noise sources

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 ever more bandwidth. With 200 MHz of analysis bandwidth, the R&S®FSV3000 sets a new standard in its class. It allows capturing two contiguous 5G NR component carriers simultaneously. This saves measurement time and makes it possible to analyze interactions and timing between the carriers. When the YIG filter is bypassed (YIG pre-selector bypass option), the 200 MHz bandwidth is available up to the maximum frequency of the respective analyzer model, e.g. 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% can be achieved for 160 MHz wide WLAN signals at 2.4 GHz and 5.8 GHz and also for 5G NR signals at 28 GHz. This increases the margin for the DUT as it minimizes the error introduced by the measuring instrument.

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 measurements in a minimum 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 a minimum of time. Its synthesizer technology enables fast frequency switching. FFT based ACLR and SEM measurements are faster than swept spectrum measurements while offering the same dynamic range.

The R&S®FSV3-K147 option enables combined and automated ACLR, SEM and EVM measurements on 5G NR downlink signals. This feature provides significant speed advantages thanks to parallelized calculations and adaptable trigger settings. It is especially advantageous for over-the-air (OTA) characterization of devices, which involves a large number of measurements.

The enhanced computing power option provides a quad core CPU and a PCIe 3.0 bus system to deliver faster clock speed, higher data transfer rates and more RAM capacity to accelerate digital signal demodulation.

Ready for cloud based testing

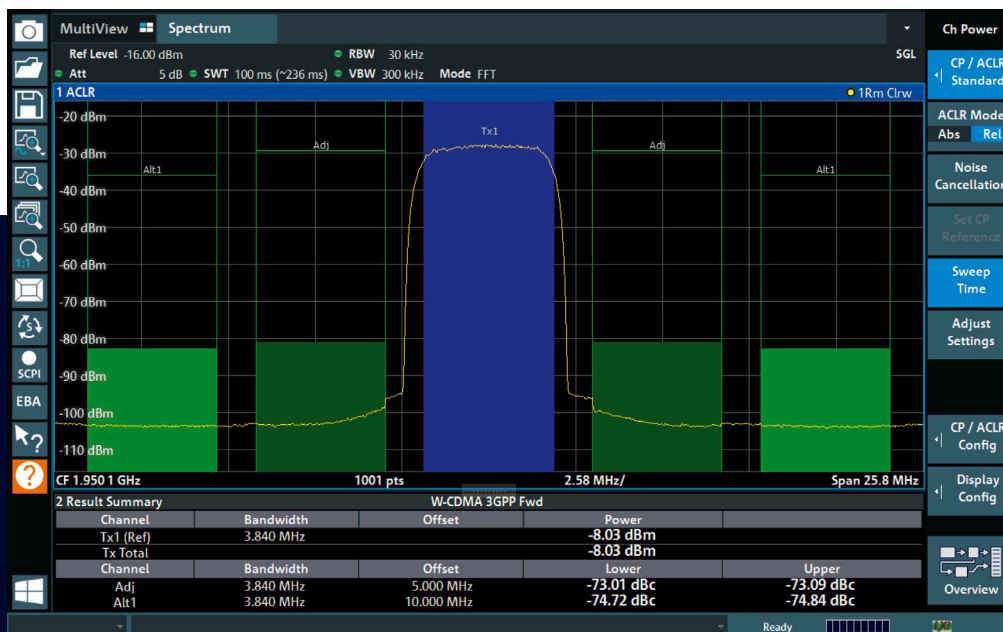
In cloud based test systems, signal analysis is done on external CPUs. This requires the transfer of huge amounts of I/Q data. The R&S®FSV3000 perfectly interacts with cloud based processing. Its architecture enables fastest transfer of I/Q measurement data. The optional 10 Gbit/s LAN interface allows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

Emulation modes for legacy instruments

Replacing legacy equipment in automated test systems can be a laborious task if all control code has to be rewritten.

The R&S®FSV3000 simplifies the replacement of obsolete instruments. Emulation modes for many legacy analyzers, including R&S®FSP, R&S®FSU/R&S®FSQ, R&S®FSV, PSA, PXA and HP 856x/HP 8560E, make it possible to keep existing code. Now there is no reason to hesitate to upgrade your legacy equipment to an R&S®FSV3000.

FFT based ACLR measurements provide significant speed improvements over swept measurements while the R&S®FSV3000 maintains its 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: <ul style="list-style-type: none"> ▶ 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 ratio, pulse-to-pulse power ratio ▶ 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 	<ul style="list-style-type: none"> ▶ Point-in-pulse measurements: frequency, amplitude, phase versus pulse, trend charts 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	<ul style="list-style-type: none"> ▶ Modulation depth (AM) ▶ Frequency deviation (FM) ▶ Phase deviation (φM) ▶ Modulation frequency ▶ THD and SINAD ▶ Carrier power 	<ul style="list-style-type: none"> ▶ 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⁾ R&S®FSV3-K18F Frequency response and group delay ²⁾	<ul style="list-style-type: none"> ▶ AM-AM, AM-PM, EVM ▶ Width of AM-AM and AM-PM curves ▶ Magnitude, phase and group delay versus frequency (R&S®FSV3-K18F) 	<ul style="list-style-type: none"> ▶ General amplifier measurements ▶ Polynomial based digital predistortion (R&S®FSV3-K18) ▶ Direct digital predistortion (R&S®FSV3-K18D) ▶ Control and synchronization of an external signal generator, e.g. the R&S®SMBV100B vector signal generator ▶ Characterization of dynamic behavior of two-port devices
R&S®FSV3-K30 Noise figure and gain measurements based on Y-factor method ³⁾	<ul style="list-style-type: none"> ▶ Noise figure ▶ Noise temperature ▶ Gain ▶ Y factor 	<ul style="list-style-type: none"> ▶ 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	<ul style="list-style-type: none"> ▶ SSB phase noise ▶ Residual FM and residual φM ▶ Jitter 	<ul style="list-style-type: none"> ▶ 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 bit level: <ul style="list-style-type: none"> ▶ 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 bit streams generated with PRBS shift registers (R&S®FSV3-K70P) ▶ Analysis of vector modulated signals with multiple modulations, e.g. DVB-S2(X) (R&S®FSV3-K70M) 	<ul style="list-style-type: none"> ▶ Eye diagram ▶ Constellation diagram ▶ Vector diagram ▶ Histogram ▶ Equalizer ▶ Multiple modulation formats, e.g.: <ul style="list-style-type: none"> - 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 an external signal generator, e.g. the R&S®SMBV100B vector signal generator.

²⁾ Requires R&S®FSV3-K18.

³⁾ Requires an external noise source, e.g. the R&S®FS-SNSxx or 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	▶ 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 format
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	▶ Bit stream ▶ 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	▶ Bit stream ▶ Allocation summary list ▶ Averaging over multiple measurements	▶ Automatic detection of modulation format, cyclic prefix length and cell ID
R&S®FSV3-K102 EUTRA/LTE MIMO		▶ R&S®FSV3-K100 and -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 EUTRA/LTE 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 R&S®FSV3-K147 5G NR DL combined ACLR/SEM/EVM	▶ Power versus time	▶ EVM ▶ EVM xPDSCH ▶ Constellation diagram ▶ I/Q offset ▶ I/Q imbalance ▶ Gain imbalance ▶ Center frequency error		▶ Allocation summary list ▶ 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
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Resolution bandwidth	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

	standard	28 MHz
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	with R&S®FSV3-B40 option	40 MHz
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	with R&S®FSV3-B200 option	200 MHz
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Phase noise (with R&S®FSV3-B710 option)

	1 GHz carrier	
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	1 kHz offset	< -109 dBc (Hz)
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	10 kHz offset	< -114 dBc (Hz)
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	100 kHz offset	< -119 dBc (Hz)
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	1 MHz offset	< -135 dBc (Hz)
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Displayed average noise level (DANL)	1 GHz	-151 dBm (typ.)
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DANL with preamplifier (R&S®FSV3-B24 option)	$50 \text{ MHz} \leq f < 3 \text{ GHz}$	-165 dBm (typ.)
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Intermodulation

Third-order intercept (TOI)	1 GHz	> 15 dBm, typ. 18 dBm
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Total measurement uncertainty	2 GHz	0.29 dB
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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	
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	
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	
Enhanced performance	R&S®FSV3-B710	1346.4950.xx (xx = 04/07/13/30/43)	requires R&S®FSV3-B114
Firmware options			
Pulse measurements	R&S®FSV3-K6	1346.3330.02	
AM/FM/PM modulation analysis	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
Frequency response measurements	R&S®FSV3-K18F	1346.4408.02	requires R&S®FSV3-K18
Noise figure measurements	R&S®FSV3-K30	1330.5045.02	
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	
WLAN IEEE 802.11a/b/g measurements	R&S®FSV3-K91	1330.5100.02	
WLAN IEEE 802.11n measurements	R&S®FSV3-K91N	1330.5139.02	requires R&S®FSV3-K91
WLAN IEEE 802.11ac measurements	R&S®FSV3-K91AC	1330.5116.02	requires R&S®FSV3-K91
WLAN IEEE 802.11ax measurements	R&S®FSV3-K91AX	1346.3399.02	requires R&S®FSV3-K91
WLAN IEEE 802.11p measurements	R&S®FSV3-K91P	1330.5122.02	requires R&S®FSV3-K91

Designation	Type	Order No.	Remarks
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-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 UL measurements	R&S®FSV3-K105	1330.5180.02	
EUTRA/LTE NB-IoT DL measurements	R&S®FSV3-K106	1346.3418.02	
3GPP 5G-NR DL measurements	R&S®FSV3-K144	1330.7219.02	
3GPP 5G-NR UL measurements	R&S®FSV3-K145	1330.7225.02	
3GPP 5G-NR combined DL ACLR/SEM/EVM measurements	R&S®FSV3-K147	1346.4250.02	requires R&S®FSV3-K144
User-defined frequency correction with SnP file (corrects frequency response – amplitude and phase – of measurement setup)	R&S®FSV3-K544	1346.3630.02	
Instrument security			
USB mass memory write protection	R&S®FSV3-B33	1330.4861.02	
Security write protection for solid state drive	R&S®FSV3-K33	1346.3360.02	
Recommended extras			
Smart noise source 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" rack adapter, 4 RU 1/1	R&S®ZZA-KN4	1175.3033.00	
Headphones		0708.3010.00	requires R&S®FSV3-B3
IEC/IEEE bus cable, length: 1 m	R&S®PCK	0292.2013.10	requires R&S®FSV3-B5
IEC/IEEE bus cable, length: 2 m	R&S®PCK	0292.2013.20	requires R&S®FSV3-B5
Matching pad, 50 Ω /75 Ω , 0 Hz to 2700 MHz, matching at both ends	R&S®RAM	0358.5414.02	
Matching pad, 50 Ω /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 for 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⁾ R&S®FSPC-FL is not available for this product.

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	
Extended warranty, two years	R&S®WE2	
Extended warranty with calibration coverage, one year	R&S®CW1	Please contact your local Rohde & Schwarz sales office.
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

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