R&S®FSV and R&S®FSVA Signal and Spectrum Analyzer Family

The right choice of general purpose analyzers

3 year warranty

ROHDE&SCHWARZ

Product Brochure | Version 03.00

R&S®FSV and R&S®FSVA Signal and Spectrum Analyzer Family

At a glance

The R&S®FSV and the R&S®FSVA are a family of versatile signal and spectrum analyzers for users working in the development, production, installation and servicing of RF systems.

The R&S®FSV and R&S®FSVA signal and spectrum analyzer family always provides the right model with the optimum combination of price and performance, whether for testing wireless devices in production in accordance with the latest communications standards or for measurements on microwave components with low phase noise, high sensitivity and high analysis bandwidth at frequencies up to 40 GHz.

In development applications, the R&S®FSV and R&S®FSVA excel due to their RF properties, a 160 MHz signal analysis bandwidth and a wide range of analysis packages. These include measurement applications for noise figure and phase noise, EMI diagnostics, analog and vector signal modulation as well as wireless and wideband communications standards. Furthermore, analysis software for pulse measurements, OFDM vector signal analysis and distortion analysis of amplifiers is available.

The R&S®FSV and R&S®FSVA help users save test time in production. They offer measurement routines that are optimized for speed and efficient remote-control operation.

Featuring compact dimensions, low weight, direct support of power sensors and an optional battery pack, the analyzers are ideal for installation and service work.

The R&S®FSV and R&S®FSVA are easy to operate via their touchscreen based user interface and clearly structured menus.

Key facts

- Frequency range up to 4/7/13.6/30/40 GHz
- Up to 160 MHz signal analysis bandwidth
- Convenient, intuitive operation with touchscreen based user interface
- 0.4 dB level measurement uncertainty up to 7 GHz
- Low displayed average noise level (DANL) (e.g. typ. –168 dBm (1 Hz) for the R&S®FSVA)
- High third-order intercept (TOI) (e.g. typ. 20 dBm for the R&S®FSVA)
- Very low phase noise (e.g. typ. –118 dBc (1 Hz) at 1 GHz and 10 kHz offset for the R&S®FSVA)
- General-purpose measurement applications for phase noise, noise figure, vector signal analysis, analog demodulation, EMI diagnostics
- Wireless measurement applications for 5G NR, LTE (including LTE-Advanced), WLAN (including IEEE 802.11ac), WCDMA/HSPA+, TD-SCDMA, GSM/EDGE, CDMA2000®/1xEV-DO, Bluetooth®
- Frequency range up to 500 GHz with harmonic mixers
- Keeping test data confidential with removable solid state or hard disk drives

Rich set of analysis software

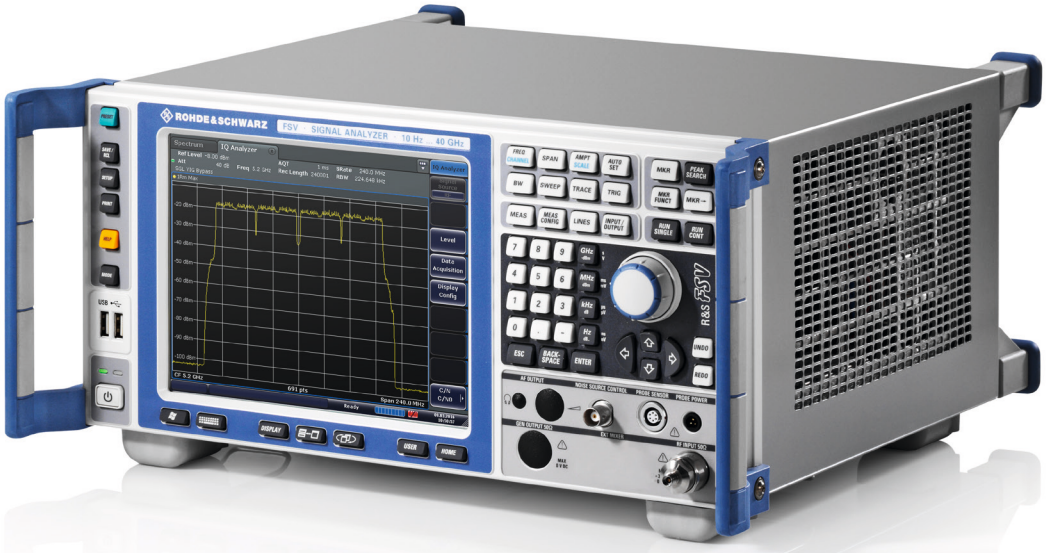
- Remote signal analysis on user's desktop with R&S®VSE vector signal explorer
- In-depth pulse analysis with R&S®VSE-K6
- OFDM vector signal analysis with R&S®VSE-K96
- EUTRA/LTE NB-IoT (narrowband internet of things) UL and DL with R&S®VSE-K106

Powerful measurement and analysis functions

- 200 Msample signal memory for recording long signal sequences
- Hotkeys for fast access to all important functions
- Rich set of spectral measurement functions such as channel power/ACLR, C/N, C/N_0, occupied bandwidth, spectrum emission mask (SEM) and spurious emissions
- Statistical measurements such as amplitude probability distribution (APD) and complementary cumulative distribution function (CCDF)
- Marker functions for signal count, noise measurements, phase noise, peak search, marker demodulation and n dB down
- I/Q analyzer for wideband capturing and export of digital I/Q data
- Scalar network analysis with optional tracking generator up to 7 GHz for easy measurement of frequency response, bandwidth, gain

A safe investment

- R&S®Legacy Pro for easy replacement of obsolete analyzers
- Free-of-charge firmware updates – always in step with new developments



Always the right choice

R&S®FSV signal and spectrum analyzer

The R&S®FSV is the ideal instrument for all general-purpose measurement tasks – on the bench, in production, and in the field. It provides digital modulation analysis for the latest cellular and wireless standards with up to 160 MHz analysis bandwidth for measurements on components, chipsets and base stations.

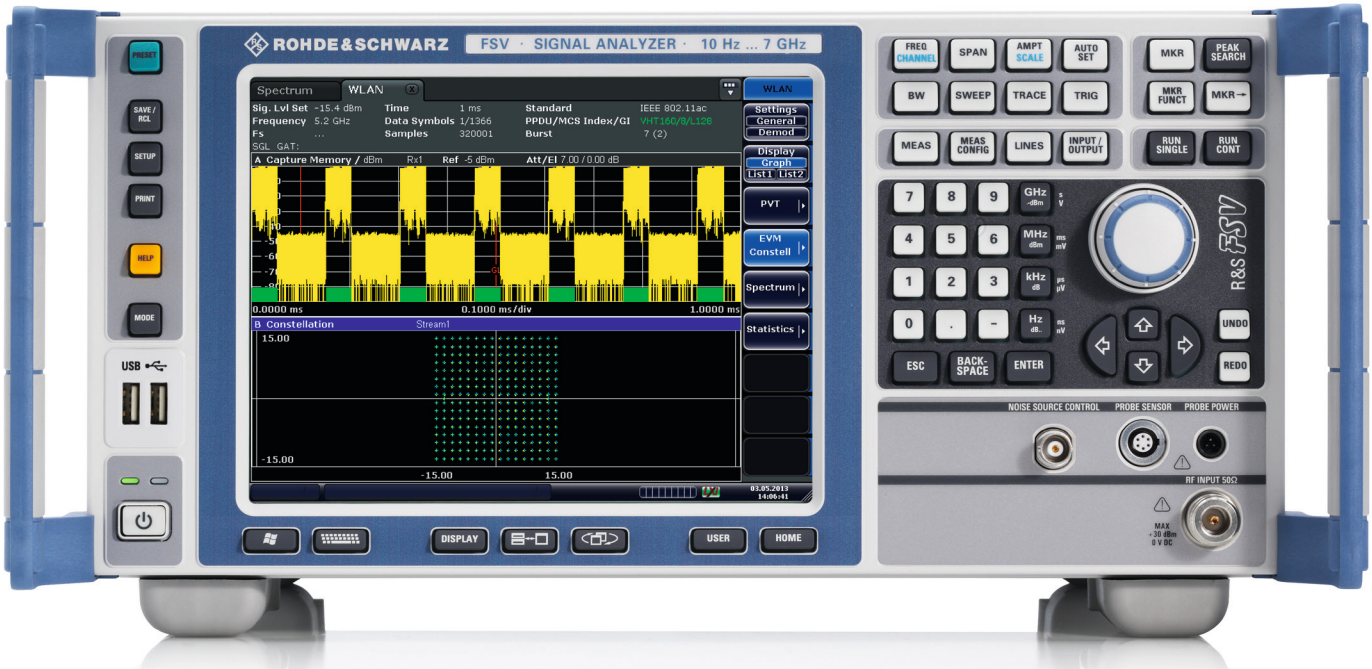
Typical measurement tasks include standard-compliant spectrum emission mask measurements as well as spurious emission and adjacent channel leakage ratio (ACLR) measurements.

Measurement applications for EMI diagnostics, phase noise, noise figure, analog demodulation and vector signal analysis complete the range of functions offered by the versatile R&S®FSV.

Key performance parameters of the R&S®FSV	
Third-order intercept (TOI)	+16 dBm
Displayed average noise level (DANL) in 1 Hz bandwidth with preamplifier	–165 dBm
Phase noise at 1 GHz and 10 kHz offset from carrier	–110 dBc (1 Hz)
WCDMA ACLR dynamic range (noise correction on)	70 dB
Max. frequency with 160 MHz analysis bandwidth	7 GHz
Level measurement uncertainty	0.39 dB

▷ For R&S®FSV data sheet see PD 3606.7982.22 and www.rohde-schwarz.com

R&S®FSV signal and spectrum analyzer



Always the right choice

R&S®FSVA signal and spectrum analyzer

Its high dynamic range and low phase noise make the R&S®FSVA the perfect instrument for demanding spectral measurements such as ACLR measurements on narrowband signals and phase noise measurements with the R&S®FSV-K40 option.

The optional YIG preselector bypass allows signal analysis with up to 160 MHz analysis bandwidth over the instrument's full frequency range, up to 40 GHz.

Together with the PC based R&S®VSE signal analysis software and the R&S®VSE-K6 pulse measurement option, the R&S®FSVA signal and spectrum analyzer delivers an in-depth pulse analysis solution. The software displays all relevant parameters such as pulse duration, pulse period, pulse rise and fall times, power drop across a pulse and intrapulse phase modulation, and produces a trend analysis over many pulses.

Key performance parameters of the R&S®FSVA	
Third-order intercept (TOI)	+20 dBm
Displayed average noise level (DANL) in 1 Hz bandwidth with preamplifier	–168 dBm
Phase noise at 1 GHz and 10 kHz offset from carrier	–118 dBc (1 Hz)
WCDMA ACLR dynamic range (noise correction on)	79 dB
Max. frequency with 160 MHz analysis bandwidth	40 GHz
Level measurement uncertainty	0.4 dB

▷ For R&S®FSVA data sheet see PD 3607.2790.22 and www.rohde-schwarz.com

R&S®FSVA signal and spectrum analyzer

Wideband digital modulation analysis

The R&S®FSV and the R&S®FSVA offer up to 160 MHz signal analysis bandwidth. The R&S®FSV analyzes today's cellular and wireless standards, including IEEE 802.11ac, for frequencies up to 7 GHz. The R&S®FSVA features an optional YIG preselector bypass, which allows signal analysis with up to 160 MHz analysis bandwidth for frequencies up to 40 GHz to demodulate satellite or microwave backhaul signals.

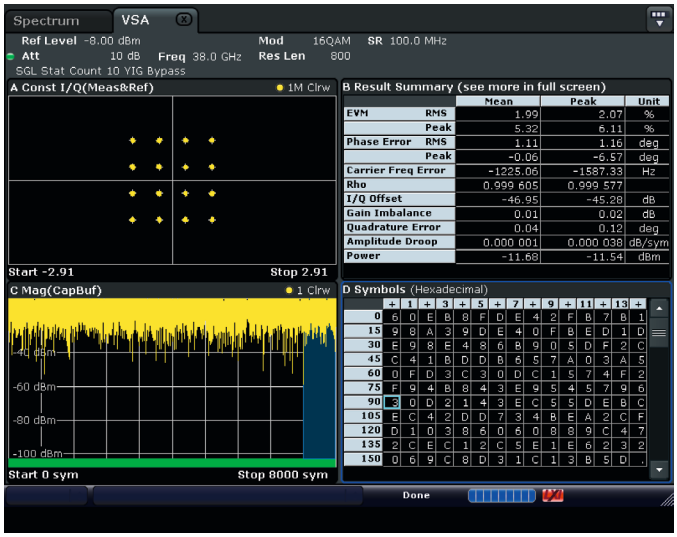
Key features

- 28 MHz signal analysis bandwidth with base unit; 40 MHz and 160 MHz optional
- 200 Msample signal memory for capturing long signal sequences
- For the R&S®FSVA: optional YIG preselector bypass for signal analysis up to 40 GHz with up to 160 MHz analysis bandwidth

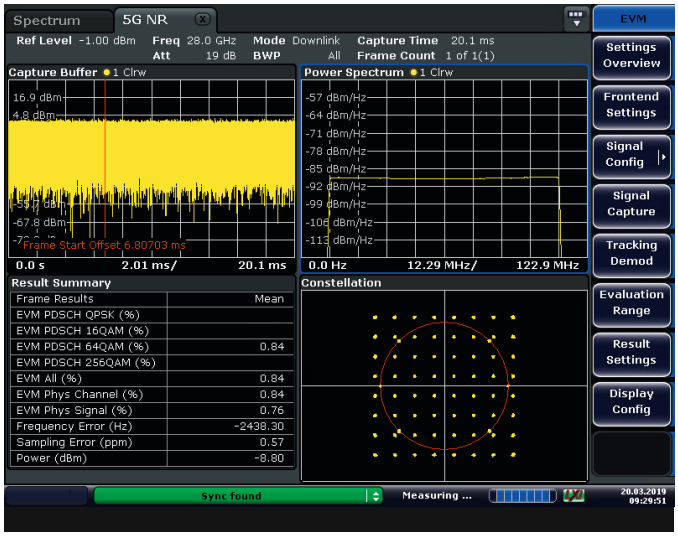
Digital signal modulation analysis at microwave frequencies

The R&S®FSVA features an optional YIG preselector bypass. This option enables signal analysis also at microwave frequencies up to 40 GHz. Research engineers and manufacturers of satellite radios or microwave backhauls can perform modulation quality measurements over the full K band. The R&S®FSVA is the only instrument in its class that can demodulate digitally modulated signals with up to 160 MHz analysis bandwidth for carrier frequencies up to 40 GHz.

Demodulation of a 16QAM signal with 100 MHz symbol rate at 38 GHz center frequency using an R&S®FSVA40 with R&S®FSV-K70 option.



Demodulation of a 5G NR signal with 100 MHz bandwidth at 28 GHz using the R&S®FSV-K144 option.



Signal analysis applications

Configuration	Maximum analysis bandwidth	Application(s)
Standard	28 MHz	Standard applications and modulation measurements on cellular and wireless signals, e.g. GSM, WCDMA, LTE, WLAN IEEE 802.11a/b/g/p
R&S®FSVA-B40	40 MHz	▪ Modulation measurements on WLAN IEEE 802.11n signals ▪ Amplifier characterization and linearization ▪ Wideband satellite signal analysis
R&S®FSV-B160	160 MHz	▪ Amplifier characterization and linearization ▪ Wideband pulse measurements with R&S®VSE-K6 ▪ Modulation measurements on WLAN IEEE 802.11ac signals ▪ Wideband satellite signal analysis

R&S®FSV and R&S®FSVA in combination with R&S®VSE vector signal explorer

Remote signal analysis on user's desktop

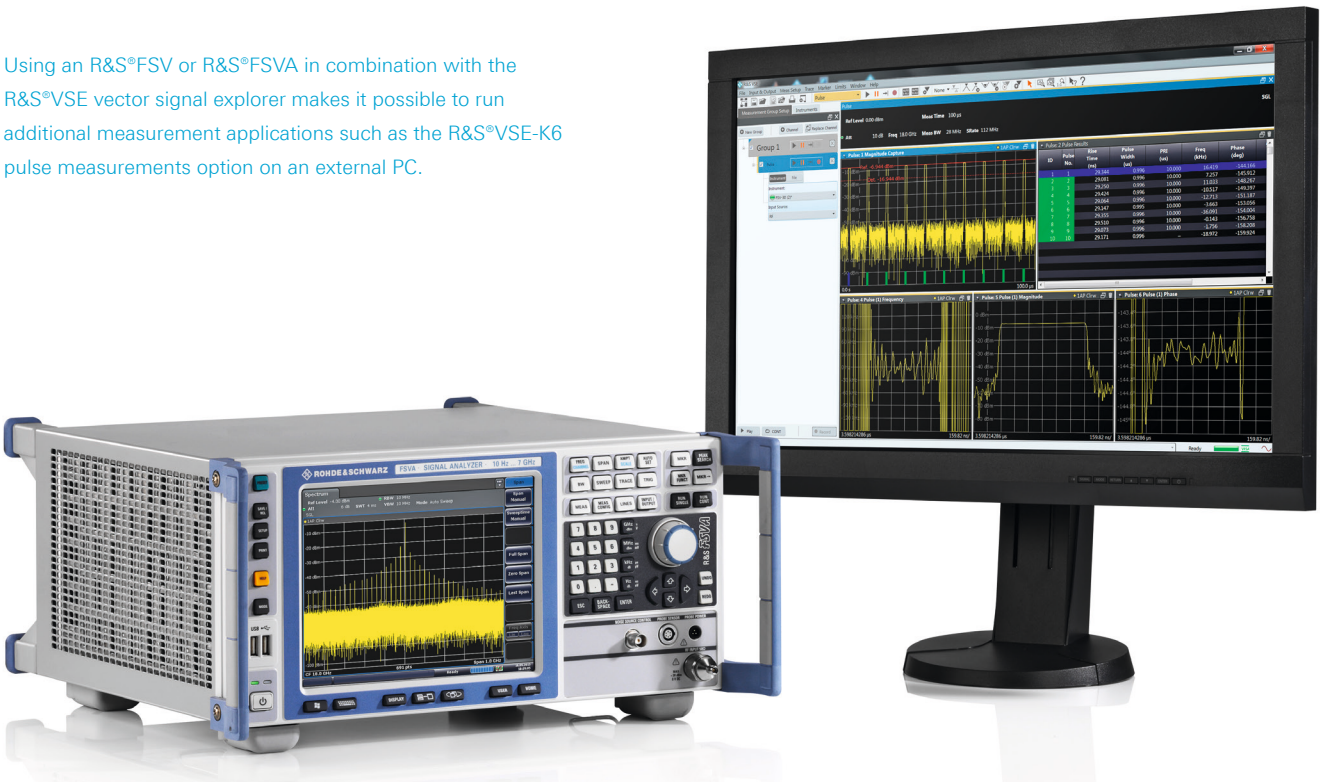
The R&S®VSE vector signal explorer brings the experience and power of the R&S®FSV and the R&S®FSVA signal and spectrum analyzers to the user's desktop, offering a wide range of analysis tools to troubleshoot and optimize the design of RF devices from a PC. It enables users to analyze and solve problems on analog and digitally modulated signals from a wide range of standards. Measurements that are not directly available on the instrument, such as pulse analysis, are also possible with R&S®VSE.

The R&S®VSE vector signal explorer allows users to analyze and debug signals from the desktop. This can be done with signals from several different instruments controlled from one PC. R&S®VSE can easily handle files with recorded data or data from simulations, saving a trip to the lab. The software can also be remotely controlled, for instance when large amounts of data are to be analyzed. R&S®VSE not only supports the R&S®FSV and R&S®FSVA, but also most signal and spectrum analyzers and oscilloscopes from Rohde&Schwarz.

Key facts

- Control of multiple instruments from one PC
- Remote control capability
- Advanced pulse analysis with the R&S®VSE-K6 option for users in the A&D sector
- Support of all relevant mobile and wireless communications standards
- Support of the following Rohde&Schwarz instruments:
  - R&S®FSL spectrum analyzer
  - R&S®FSV signal and spectrum analyzer
  - R&S®FSVA signal and spectrum analyzer
  - R&S®FSW signal and spectrum analyzer
  - R&S®FPS signal and spectrum analyzer
  - R&S®RTO digital oscilloscope

Using an R&S®FSV or R&S®FSVA in combination with the R&S®VSE vector signal explorer makes it possible to run additional measurement applications such as the R&S®VSE-K6 pulse measurements option on an external PC.



Applications

Transmitter and modulation measurements on wireless communications systems

Software option/ technology	Power	Modulation quality	Spectrum measurement	Miscellaneous	Special features
R&S®FSV-K8 ▪ Bluetooth®/EDR	▪ Output power ▪ Average and peak power ▪ EDR relative TX power	▪ Deviation ▪ Initial carrier frequency tolerance (ICFT) ▪ Carrier frequency drift ▪ EDR frequency stability ▪ EDR modulation accuracy	▪ Adjacent channel power ▪ EDR ▪ In-band spurious emissions	▪ Trigger: IF power, external, free run ▪ Support for packet types DH1, DH3 and DH5 and power classes 1 to 3	▪ In line with Bluetooth® RF test specification 2.0
R&S®FSV-K10 ▪ GSM/EDGE/ EDGE Evolution	▪ Power measurement in time domain including carrier power	▪ EVM ▪ Phase/frequency error ▪ Origin offset suppression	▪ Modulation spectrum ▪ Transient spectrum	–	▪ Single burst and multiburst
R&S®FSV-K72/-K73 ▪ WCDMA	▪ Code domain power ▪ Code domain power versus time ▪ CCDF	▪ EVM ▪ Peak code domain error ▪ Constellation diagram ▪ I/Q offset ▪ Residual code domain error ▪ Gain imbalance ▪ Center frequency error (chip rate error)	▪ Spectrum mask ▪ ACLR ▪ Power measurement	▪ Channel table with summary of channels used on base station ▪ Timing offset ▪ Power versus time	▪ Automatic detection of active channels and decoding of payload information ▪ Automatic detection of encryption code ▪ Automatic detection of HSDPA modulation format ▪ Support for signals with compressed mode ▪ Support for HSPA+ (HSDPA+ and HSUPA+)
R&S®FSV-K76/-K77 ▪ TD-SCDMA	▪ Code domain power ▪ Code domain power versus time ▪ CCDF	▪ EVM ▪ Peak code domain error ▪ Constellation diagram ▪ Residual code domain error ▪ I/Q offset ▪ Gain imbalance ▪ Center frequency error (chip rate error)	▪ Spectrum mask ▪ ACLR ▪ Power measurement	▪ Channel table with summary of channels used on base station ▪ Timing offset ▪ Power versus time	▪ Automatic detection of active channels and decoding of payload information ▪ Automatic detection of HSDPA modulation format ▪ Support for HSPA+ (HSDPA+ and HSUPA+)
R&S®FSV-K82/-K83 ▪ CDMA2000®	▪ Carrier power ▪ Code domain power ▪ Code domain power versus time ▪ CCDF	▪ RHO ▪ EVM ▪ Peak code domain error ▪ Constellation diagram ▪ Residual code domain error ▪ I/Q offset ▪ Gain imbalance ▪ Center frequency error (chip rate error)	▪ Spectrum mask ▪ ACLR ▪ Power measurement	▪ Channel table with summary of channels used on base station ▪ Timing offset	▪ Automatic detection of active channels and decoding of payload information ▪ Robust demodulation algorithms for reliable measurement of multicarrier signals

Software option/ technology	Power	Modulation quality	Spectrum measurement	Miscellaneous	Special features
R&S®FSV-K84/-K85 ▮ 1xEV-DO	▮ Carrier power ▮ Code domain power ▮ Code domain power versus time ▮ CCDF	▮ RHO Pilot (R&S®FSV-K84) ▮ RHO Data (R&S®FSV-K84) ▮ RHO MAC (R&S®FSV-K84) ▮ RHO Overall ▮ EVM ▮ Peak code domain error ▮ Constellation diagram ▮ Residual code domain error ▮ I/Q offset ▮ Gain imbalance ▮ Center frequency error (chip rate error)	▮ Spectrum mask ▮ ACLR ▮ Power measurement	▮ Channel table with summary of channels used on base station ▮ Timing offset	▮ Automatic detection of active channels and decoding of payload information ▮ Robust demodulation algorithms for reliable measurement of multicarrier signals
R&S®FSV-K91/-K91n/ -K91p/-K91ac ▮ WLAN IEEE 802.11 a/b/g/j/n/p/ac	▮ Power measurement in time and frequency domains ▮ Rising/falling edge ▮ CCDF	▮ EVM ▮ Constellation diagram ▮ I/Q offset ▮ Gain imbalance ▮ Quadrature error ▮ Center frequency error (symbol clock error)	▮ Spectrum mask ▮ ACP ▮ Spectrum flatness	▮ Bitstream ▮ Signal field ▮ Averaging over multiple measurements	▮ 160 MHz bandwidth for WLAN IEEE 802.11ac
R&S®FSV-K93 [1] ▮ WiMAX™ ▮ IEEE 802.16e ▮ OFDM ▮ OFDMA	▮ Power measurement in time and frequency domains ▮ Rising/falling edge ▮ CCDF	▮ EVM ▮ Constellation diagram ▮ I/Q offset ▮ Gain imbalance ▮ Quadrature error ▮ Center frequency error (symbol clock error)	▮ Spectrum mask ▮ ACP ▮ Spectrum flatness	▮ Bitstream ▮ Signal field ▮ Averaging over multiple measurements ▮ Burst summary list ▮ Graphical display of DL map	▮ Automatic demodulation in line with DL map ▮ User-editable spectrum mask
R&S®FSV-K100/ -K101/-K102/-K103/ -K104/-K105 ▮ LTE	▮ 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 flatness	▮ Bitstream ▮ Allocation summary list ▮ Signal flow diagram ▮ Averaging over multiple measurements	▮ Automatic detection of modulation, cyclic prefix length and cell ID ▮ MIMO measurements
R&S®FSV-K144	▮ Power measurement in time and frequency domains ▮ CCDF	▮ EVM ▮ Constellation diagram ▮ Quadrature error ▮ Center frequency error (symbol clock error)	▮ Spectrum flatness	▮ Allocation summary list ▮ All bandwidths from 5 MHz to 100 MHz	▮ Automatic detection of cell ID & subcarrier spacing

[1] For the R&S®FSV models (not available for the R&S®FSVA).

R&S®FSV-K7 option AM/FM/φM measurement demodulator

The R&S®FSV-K7 AM/FM/φM measurement demodulator option converts the R&S®FSV or R&S®FSVA into an analog modulation analyzer for amplitude-, frequency- or phase-modulated signals. It measures not only characteristics of the useful modulation, but also factors such as residual FM and synchronous modulation.

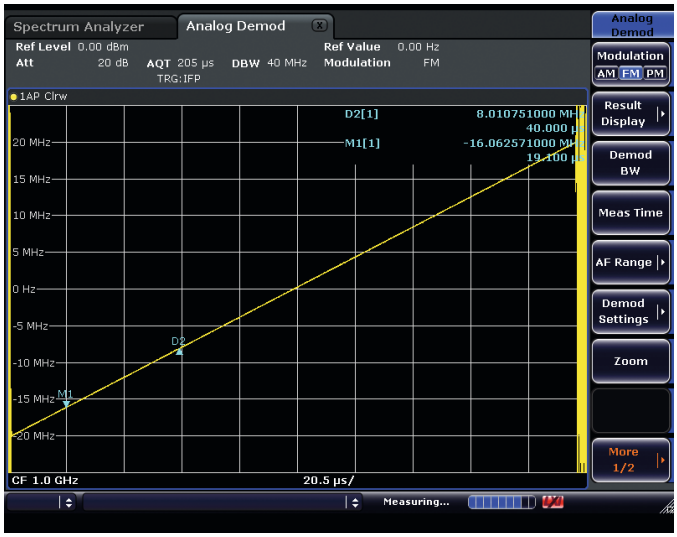
Display and analysis functions

- Modulation signal versus time
- Spectrum of modulation signal (FFT)
- RF signal power versus time
- Spectrum of RF signal (FFT over max. 18 MHz)
- Table with numerical display of
  - Deviation or modulation factor, RMS weighted, +peak, –peak, ±peak/2
  - Modulation frequency
  - Carrier frequency offset
  - Carrier power
  - Total harmonic distortion (THD) and SINAD

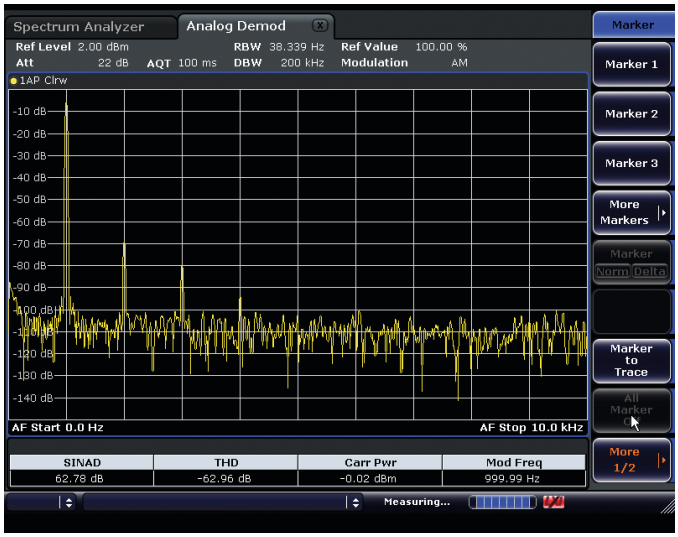
Specifications in brief

Demodulation bandwidth	100 Hz to 28 MHz; 40 MHz and 160 MHz optional
Recording time (depends on demodulation bandwidth)	7.5 ms to 3932 s
AF filters	
Highpass filters	20 Hz, 50 Hz, 300 Hz
Lowpass filters	3 kHz, 15 kHz, 23 kHz, 150 kHz and 5%, 10% or 25% of demodulation bandwidth
Deemphasis	25/50/75/750 µs
Modulation frequency	< 14 MHz; > 20 MHz optional, max. 0.5 × demodulation bandwidth
Measurement uncertainty (deviation or modulation factor)	3%

Measurement of linearity of an FM ramp over a 40 MHz bandwidth.



THD measurement on an amplitude-modulated signal. The first harmonic of the modulation signal is well suppressed by 69 dB. This corresponds to a THD (D2) < 0.1%.



R&S®FSV-K7S option FM stereo measurement application

The R&S®FSV-K7S option for the R&S®FSV models expands the functionality of the R&S®FSV-K7 option by providing measurements on FM stereo transmitters.

An integrated stereo decoder measures the frequency deviation of the left, right, mono and stereo channels as well as the pilot and RDS carrier. The variety of analysis capabilities is expanded to include THD measurements, time domain analysis (oscilloscope mode display) and frequency domain analysis (AF spectrum) for the respective channels. To perform standard-compliant S/N ratio measurements, both the compulsory audio filters and the quasi-peak detectors are available. A clear result summary displays the numerical results for all measurement channels; crosstalk attenuation measurements are possible without having to switch between channels. This means that all measurements necessary on FM stereo transmitters can be performed with the R&S®FSV-K7S option.

Comprehensive measurement functions for complete FM stereo analysis

- Frequency deviation measurement in the MPX, L, R, M and S channels and of the pilot and RDS carrier
- Crosstalk measurement
- Carrier power and carrier frequency measurement
- Audio frequency measurement
- Absolute and relative deviation measurement for easy-to-perform S/N ratio and crosstalk attenuation measurement
- Audio frequency spectrum display
- Up to four measurement windows

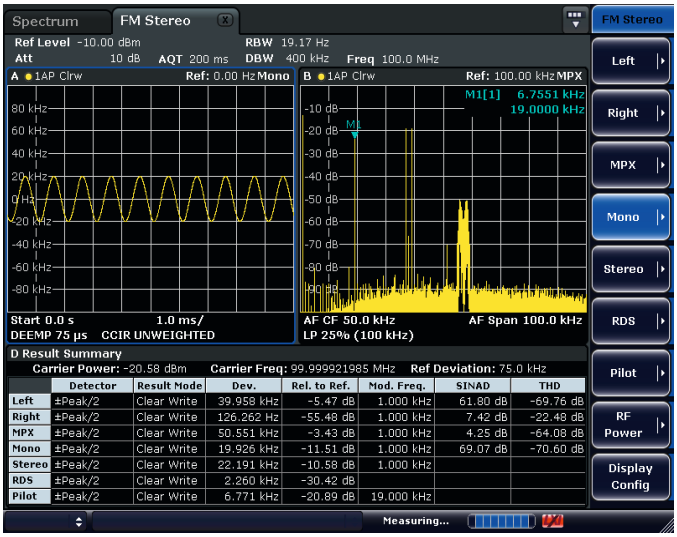
Variety of audio filters and detectors for standard-compliant measurements

- ITU-R filter, weighted and unweighted
- Highpass filters: 20 Hz, 50 Hz, 300 Hz; lowpass filters: 3 kHz, 15 kHz, 23 kHz, 150 kHz
- Selectable deemphasis: 25 µs, 50 µs, 75 µs, 750 µs
- Detectors: ±peak/2, +peak, –peak, RMS, RMSxSQR2, quasi-peak (in line with ITU-R 468) and quasi-peakxSQR2

Built-in THD measurement

- Automatically tuned to the fundamental
- Simultaneous display of SINAD and THD values
- Selective THD measurements of individual harmonics using marker functions in the AF spectrum display

The result summary clearly displays the measurement results for all channels; no switchover is required. Additional displays such as the mono signal or MPX spectrum are available for analysis.



R&S®FSV-K30 option

Noise figure and gain measurement application

The R&S®FSV-K30 option expands the R&S®FSV or R&S®FSVA signal and spectrum analyzer by adding measurement functionality otherwise only provided by special noise measurement analyzers.

The following parameters can be measured at a specified frequency or in a selectable frequency range:

- Noise figure in dB
- Noise temperature in K
- Gain in dB

The R&S®FSV-K30 option can perform a wider variety of RF measurements than is possible with conventional noise measurement systems. The R&S®FSV and R&S®FSVA support the measurement of harmonics, intermodulation, spurious responses and many other RF parameters (for measurements on amplifiers and frequency-converting DUTs, e.g. low-noise converters).

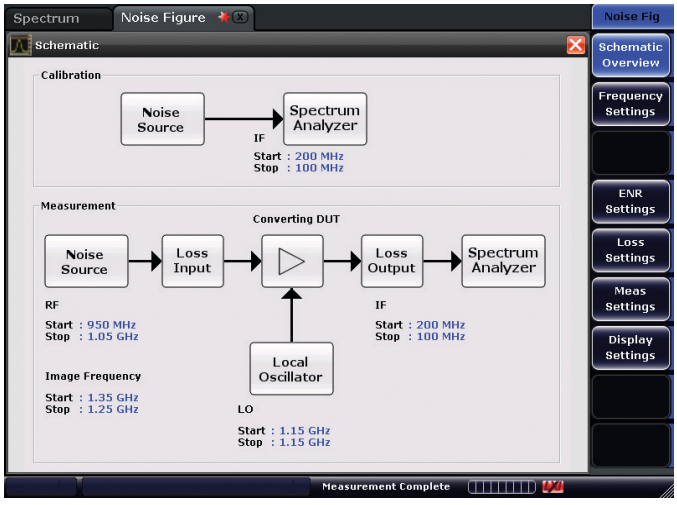
Noise measurements

- Measurement range: 0 dB to 35 dB
- Resolution: 0.01 dB
- Device measurement uncertainty: 0.05 dB

Gain measurements

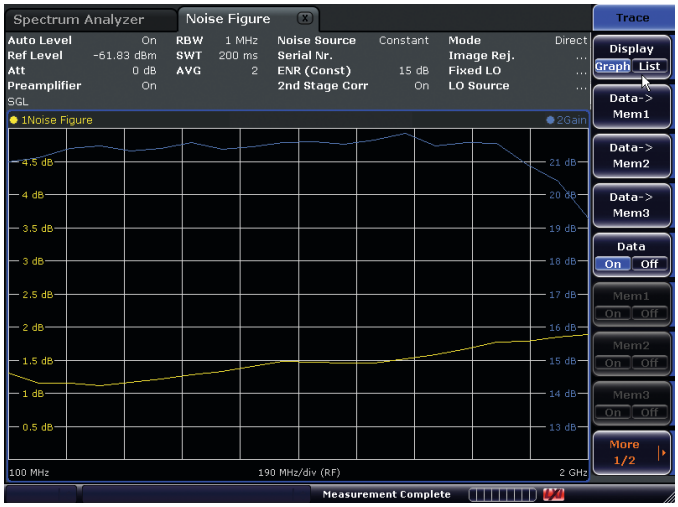
- Measurement range: –20 dB to +60 dB
- Resolution: 0.01 dB
- Measurement uncertainty: ±0.2 dB

The schematic view of the test setup simplifies measurements on frequency-converting DUTs.



Tabular representation of measurement results.

Measurements on an amplifier.



R&S®FSV-K40 option Phase noise measurement application

Phase noise is an important parameter in wireless communications systems. The R&S®FSV-K40 option enables the R&S®FSV and R&S®FSVA to perform fast and easy phase noise measurements in development and production.

Equipped with the R&S®FSV-K40 option, the R&S®FSV and R&S®FSVA can measure single sideband phase noise across a selectable carrier offset frequency range displayed on a logarithmic axis. Based on the measured phase noise, the user can determine the residual FM/φM and the jitter.

Phase noise measurement

- Carrier offset frequency range selectable from 1 Hz to 1 GHz in 1/3/10 sequence (1 Hz, 3 Hz, 10 Hz, 30 Hz, etc.)
- Number of averages, sweep mode and filter bandwidth can be individually selected for every measurement subrange to optimize the measurement speed
- Fast results for the subranges are obtained by starting the measurement at the maximum carrier offset
- Verification of carrier frequency and power prior to each measurement to prevent incorrect measurements
- Improvement of dynamic range by measuring the inherent thermal noise and performing noise correction

Measurement of residual FM/φM and jitter

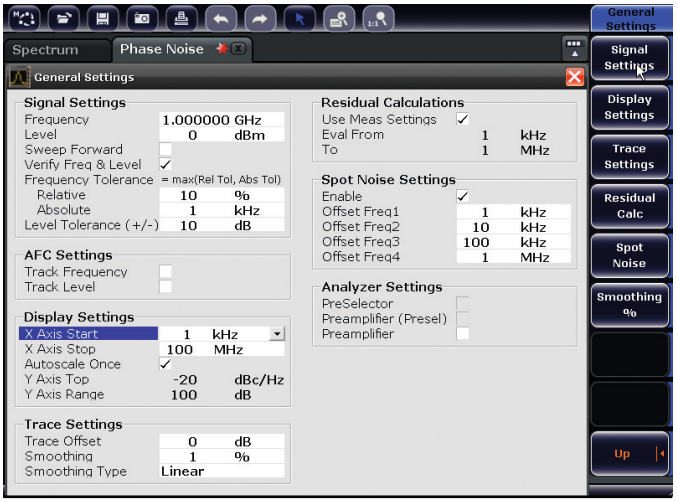
- Integration across the entire selected carrier offset frequency range or across a selectable subrange
- Tabular display of residual FM, residual φM and RMS jitter in addition to measurement trace

Evaluation aids

- Limit lines with pass/fail indication
- Display of phase noise at up to four selectable frequency offsets
- Maximum of four additional markers

Phase noise measurement at 1 kHz to 100 MHz offset from the carrier. The dynamic range, which is limited by thermal inherent noise at large carrier offsets, can be improved by noise correction. Trace 1 (yellow) shows the noise-corrected measurement; trace 2 (blue) shows the measurement without noise correction.

An overview of all important parameters is displayed in a clearly structured table.



R&S®FSV-K54 option EMI measurement application

Finding, classifying and eliminating electromagnetic interference

The R&S®FSV-K54 EMI measurement application adds EMI diagnostic functionality to the R&S®FSV and R&S®FSVA signal and spectrum analyzers. R&S®FSV-K54 offers EMI bandwidths for commercial and military applications, as well as CISPR detectors, limit lines and correction factors.

All electronic devices must be tested for electromagnetic compatibility (EMC) prior to market approval. The ability to assess and influence the EMC behavior of products during the design phase is one of the critical factors in developing successful products. Preventing expensive product redevelopment and performing smooth certification help to ensure a timely market launch. R&S®FSV-K54 allows users to analyze the effectiveness of shielding measures and the effects of changes to the circuit or design prior to testing in the EMC lab.

EMI detectors in line with CISPR 16-1-1

- Flexible allocation of EMI detectors such as quasi-peak, CISPR-average and RMS-average as well as allocation of peak and average detectors to different traces
- Fast, easy-to-read diagnostic measurements with high result reproducibility
- Easy detection of critical disturbance signal amplitudes

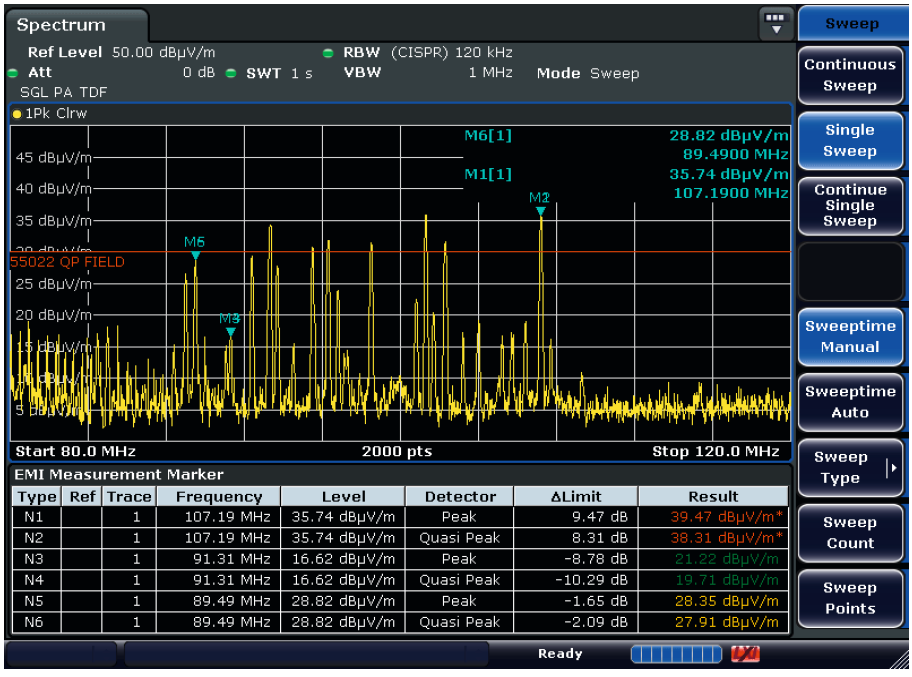
Marker demodulation

- Fast and reliable identification of AM and FM signals
- Measurement bandwidths in line with CISPR and MIL-STD
- Diagnostic measurements during development deliver the correct amplitude of the disturbance signal thanks to the 6 dB bandwidths (CISPR from 200 Hz to 1 MHz, MIL-STD from 10 Hz to 1 MHz)

Measurement markers for evaluating EMI

- Markers can be placed on the frequencies of disturbance signals to make targeted analysis easier
- The ability to link markers to up to six traces and to associated EMI detectors provides users with a direct reference to EMI limits
- Automatic searching for disturbance maxima for reliable detection of time-varying interferers
- Critical frequencies are entered in a peak list for fast evaluation of a frequency spectrum with respect to official EMI emission limits

Single sweep with EMI measurement markers.



EMI limit lines

- Choice of limit lines that meet international standards
- Easy generation, editing and use of customer-specific limit lines
- Fast pass/fail test using activated limit lines

Frequency-dependent correction value tables

- Database with correction value tables for EMI accessories such as antennas, clamps, line impedance stabilization networks (LISN), pulse limiters, preamplifiers, cables and attenuators
- Easy generation, editing and storage of new correction tables
- High accuracy by including correction values for frequency-dependent accessories in the trace
- Combination of several correction tables, for example for an antenna, cable and preamplifier, to compensate for the entire test setup

Logarithmic spectrum display

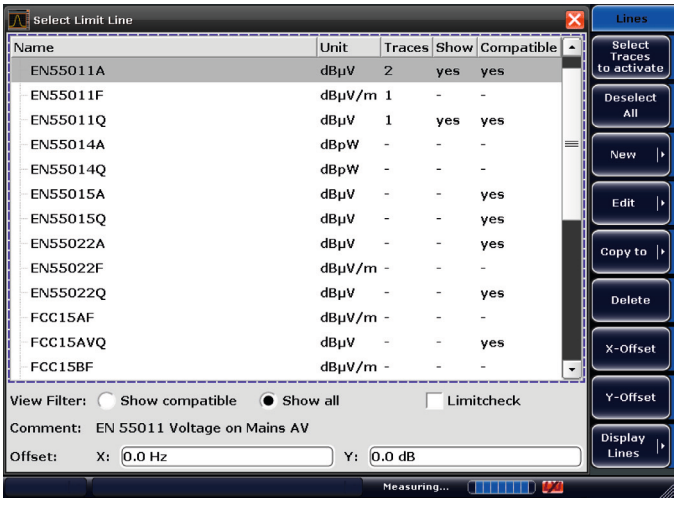
- The spectrum display with a logarithmic frequency axis makes it easy to analyze measurement results over a wide frequency range and allows displaying limit lines in accordance with standards
- Up to 200001 sweep points for higher spectrum resolution

Remote control of V-networks (LISN)

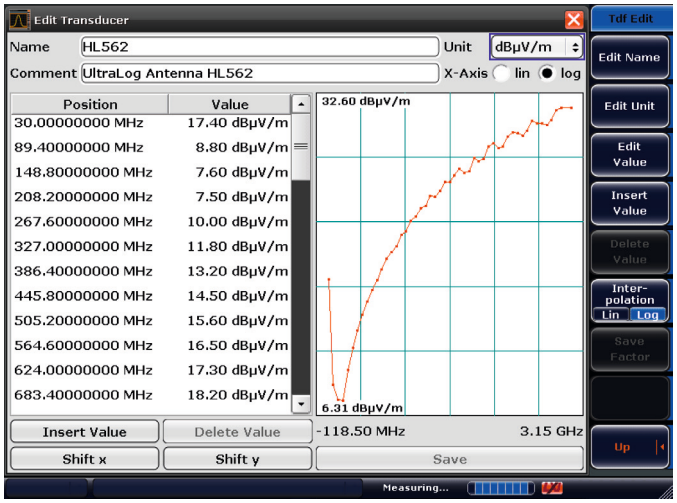
- Automatic line selection via the AUX port (R&S®FSV-B5 option required)

Measurement marker configuration.

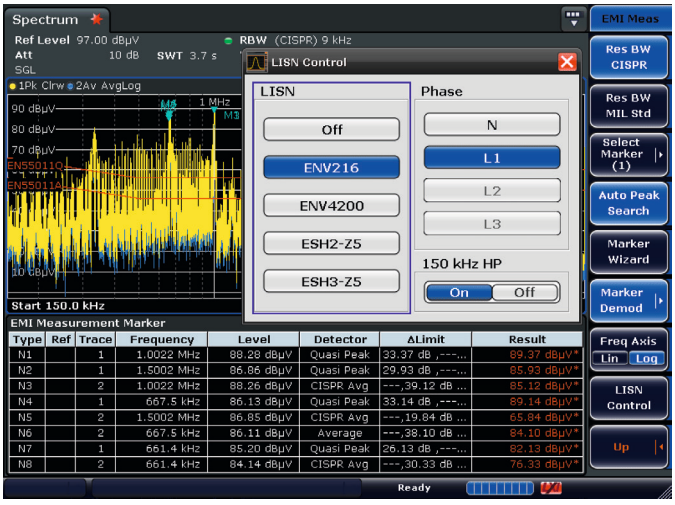
EMI limit lines.



Correction value table.



Configuration menu for remote-controlled LISNs.



R&S®FSV-K70 option

Vector signal analysis application

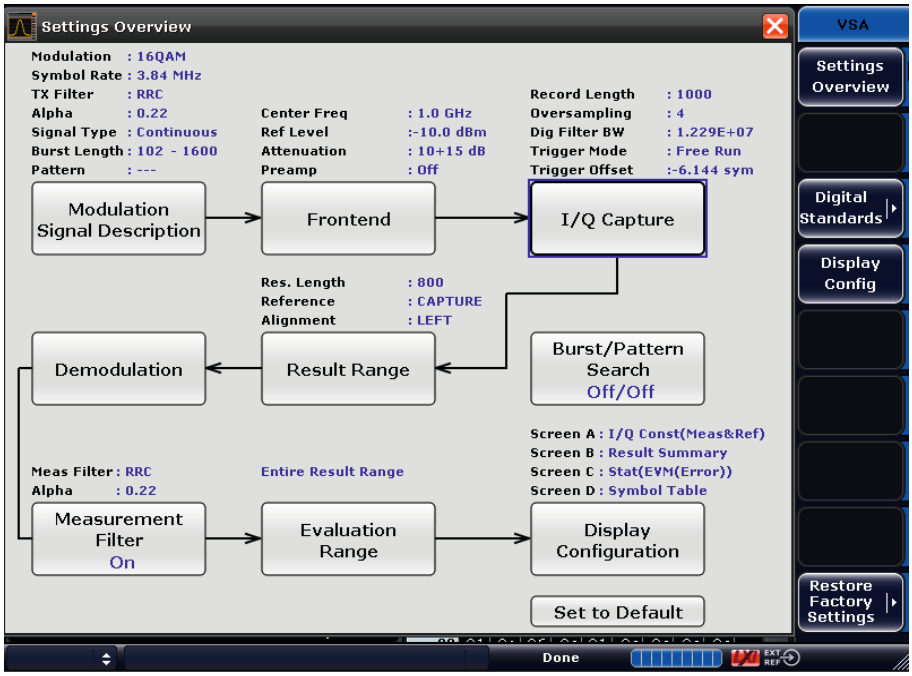
The R&S®FSV-K70 option enables users to flexibly configure the settings for analyzing digitally modulated single carriers down to the bit level. Straightforward configuration based on a clearly structured block diagram simplifies measurements, despite the wide range of analysis tools.

Flexible modulation analysis from MSK to 64QAM

- Modulation formats:
  - 2FSK, 4FSK
  - MSK, GMSK, DMSK
  - BPSK, QPSK, offset QPSK, DQPSK, 8PSK, D8PSK, π/4-DQPSK, 3π/8-8PSK, π/8-D8PSK
  - 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, 16APSK (DVB-S2), 32APSK (DVB-S2), π/4-16QAM (EDGE), –π/4-16QAM (EDGE)
  - π/2-BPSK, –π/2-BPSK, π/2-DBPSK
- Symbol rate up to 32 MHz
- Analysis length up to 50 000 symbols
- Signal analysis bandwidth 28 MHz; 40 MHz and 160 MHz optional

Numerous standard-specific default settings

- GSM, GSM/EDGE
- 3GPP WCDMA, CDMA2000®
- TETRA, APCO25
- Bluetooth®, ZigBee
- DECT



Clearly structured block diagram display.

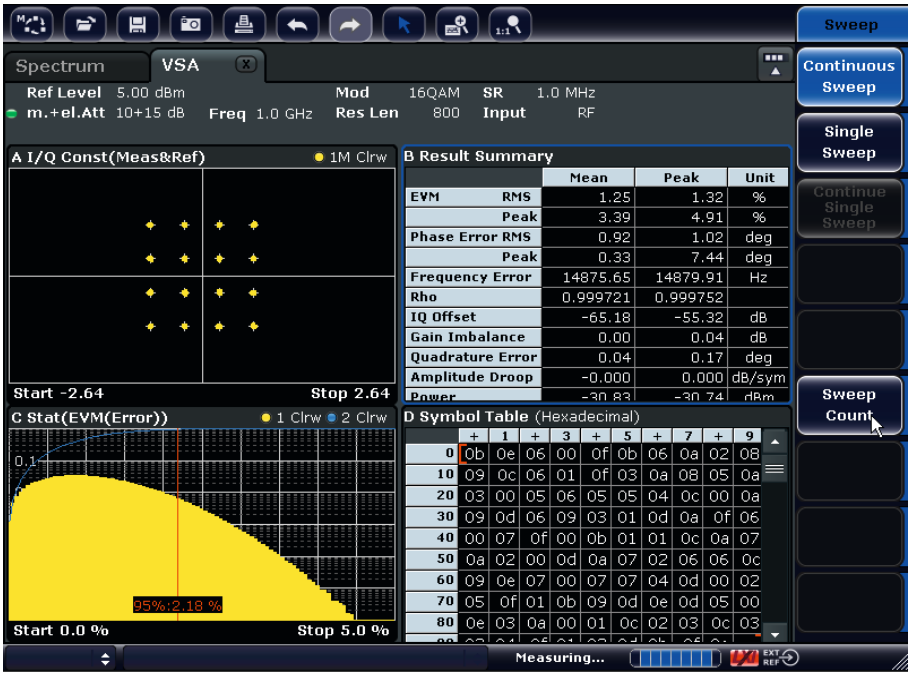
Easy operation with graphical support

The visualization of the demodulation stages and the associated settings is so clear that even beginners and infrequent users can find the correct settings. The combination of touchscreen and block diagram simplifies operation and representation.

Based on the description of the signal to be analyzed (e.g. modulation format, continuous or with bursts, symbol rate, TX filter), the R&S®FSV-K70 option supports users in automatically finding useful settings.

Flexible analysis tools for detailed signal analysis make troubleshooting easy

- Display choices for amplitude, frequency, phase, I/Q, eye diagram; amplitude, phase, or frequency error; constellation or vector diagram
- Statistical evaluations
  - Histogram representation
  - Standard deviation and 95th percentile in result summary
- Spectrum analyses of the measurement and error signal considerably support users in finding signal errors such as incorrect filtering or spurious
- Flexible burst search for analyzing complex signal combinations, short bursts or a mix of signals – capabilities that go beyond the scope of many signal analyzers



Analysis of 16QAM single-carrier signal with four result windows.

Ordering information

Designation	Type	Order No.
Base unit (including supplied accessories such as power cable and manual)		
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	R&S®FSV40	1321.3008.40
Signal and spectrum analyzer, 10 Hz to 40 GHz	R&S®FSV40	1321.3008.39 [1]
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 [1]
Hardware options		
Ruggedized housing	R&S®FSV-B1	1310.9500.02
AM/FM audio demodulator	R&S®FSV-B3	1310.9516.02
OCXO, precision reference frequency	R&S®FSV-B4	1310.9522.02
OCXO, precision reference frequency stability	R&S®FSV-B4	1310.9522.03
Additional interfaces (IF/video/AM/FM output, AUX port, trigger output, two additional USB ports)	R&S®FSV-B5	1310.9539.02
Tracking generator, 100 kHz to 4 GHz/7 GHz	R&S®FSV-B9	1310.9545.02
External generator control	R&S®FSV-B10	1310.9551.02
YIG preselector bypass for R&S®FSVA13	R&S®FSVA-B11	1321.3714.13
YIG preselector bypass for R&S®FSVA30	R&S®FSVA-B11	1321.3714.30
YIG preselector bypass for R&S®FSVA40	R&S®FSVA-B11	1321.3714.40
Ultra-high precision frequency reference	R&S®FSV-B14	1310.9980.02
Digital baseband interface	R&S®FSV-B17	1310.9568.02
Spare solid state disk (SSD, removable hard disk)	R&S®FSV-B18	1310.9697.10
Spare hard disk drive (HDD, removable hard disk)	R&S®FSV-B19	1310.9574.10 [2]
LO/IF ports for external mixers	R&S®FSV-B21	1310.9597.02
Preamplifier, 9 kHz to 4 GHz/7 GHz	R&S®FSV-B22	1310.9600.02
Preamplifier, 9 kHz to 13.6 GHz	R&S®FSV-B24	1310.9616.13
Preamplifier, 9 kHz to 30 GHz	R&S®FSV-B24	1310.9616.30
Preamplifier, 9 kHz to 40 GHz	R&S®FSV-B24	1310.9616.40
Electronic attenuator (1 dB steps)	R&S®FSV-B25	1310.9622.02
DC power supply 12 V/24 V	R&S®FSV-B30	1329.0243.02
Lithium-ion battery pack	R&S®FSV-B32	1321.3750.04 [3]
USB mass memory write protection	R&S®FS-B33	1309.5991.02
Lithium-ion battery charger	R&S®FSV-B34	1321.3950.02
40 MHz analysis bandwidth for R&S®FSV	R&S®FSV-B70	1310.9645.02
40 MHz analysis bandwidth for R&S®FSVA	R&S®FSVA-B40	1329.0214.02
160 MHz analysis bandwidth for R&S®FSV4/7 and R&S®FSVA4/7	R&S®FSV-B160	1311.2015.02 [4]
160 MHz analysis bandwidth for R&S®FSV13 and R&S®FSVA13	R&S®FSV-B160	1311.2015.13 [4]
160 MHz analysis bandwidth for R&S®FSV30/40 and R&S®FSVA30/40	R&S®FSV-B160	1311.2015.40 [4] [6]
Software options		
Analog modulation analysis (AM/FM/φM)	R&S®FSV-K7	1310.8103.02
FM stereo measurements	R&S®FSV-K7S	1310.8126.02 [2] [5]
Bluetooth®/EDR measurement application	R&S®FSV-K8	1301.8155.02
Power sensor support (power measurements with the R&S®NRP power sensors)	R&S®FSV-K9	1310.8203.02
GSM/EDGE/EDGE evolution analysis	R&S®FSV-K10	1310.8055.02
Spectrogram measurements	R&S®FSV-K14	1310.8255.02
Noise figure and gain measurements	R&S®FSV-K30	1310.8355.02

Designation	Type	Order No.
Phase noise measurements	R&S®FSV-K40	1310.8403.02
EMI measurement application	R&S®FSV-K54	1310.0425.02
CISPR calibration for R&S®FSV-K54 (ISO 17025)	R&S®FSV-K54CAL	1329.0237.02 [9]
Vector signal analysis	R&S®FSV-K70	1310.8455.02
3GPP BS (DL) analysis, incl. HSDPA and HSDPA+	R&S®FSV-K72	1310.8503.02
3GPP UE (UL) analysis, incl. HSUPA	R&S®FSV-K73	1310.8555.02
TD-SCDMA BS measurements	R&S®FSV-K76	1310.8603.02
TD-SCDMA UE measurements	R&S®FSV-K77	1310.8655.02
CDMA2000® BS (DL) analysis	R&S®FSV-K82	1310.8703.02
CDMA2000® MS (UL) measurements	R&S®FSV-K83	1310.8755.02
1xEV-DO BS (DL) analysis	R&S®FSV-K84	1310.8803.02
1xEV-DO MS (UL) measurements	R&S®FSV-K85	1310.8773.02
WLAN IEEE 802.11a/b/g/j analysis	R&S®FSV-K91	1310.8903.02 [6]
WLAN IEEE 802.11n analysis	R&S®FSV-K91n	1310.9468.02 [6] [7]
WLAN IEEE 802.11ac analysis	R&S®FSV-K91ac	1310.8629.02 [6] [7] [8]
WLAN IEEE 802.11p analysis	R&S®FSV-K91p	1321.3314.02 [6] [7]
WiMAX™ IEEE 802.16 SISO analysis	R&S®FSV-K93	1310.8955.02 [2] [6]
EUTRA/LTE FDD downlink analysis	R&S®FSV-K100	1310.9051.02 [6]
EUTRA/LTE FDD uplink analysis	R&S®FSV-K101	1310.9100.02 [6]
EUTRA/LTE downlink MIMO analysis	R&S®FSV-K102	1310.9151.02 [6] [10]
EUTRA/LTE advanced uplink analysis	R&S®FSV-K103	1310.9200.02 [6] [11]
EUTRA/LTE TDD downlink analysis	R&S®FSV-K104	1309.9774.02 [6]
EUTRA/LTE TDD uplink analysis	R&S®FSV-K105	1309.9780.02 [6]
EUTRA/LTE NB-IoT downlink analysis	R&S®FSV-K106	1309.9797.02
5G NR downlink analysis	R&S®FSV-K144	1329.0537.02
Vector signal explorer PC analysis software		
License dongle	R&S®FSPC	1310.0002K02
VSE basic edition	R&S®VSE	1345.1011.06
OFDM signal analysis	R&S®VSE-K96	1320.7922.06
EUTRA/LTE NB-IoT (UL and DL)	R&S®VSE-K106	1320.7900.06
Pulse measurements	R&S®VSE-K6	1320.7516.06
Vector signal analysis	R&S®VSE-K70	1320.7522.06

[1] Max. bandwidth 10 MHz.
[2] Not available for the R&S®FSVA.
[3] Requires R&S®FSV-B1, R&S®FSV-B30 and R&S®FSV-B34.
[4] For frequencies up to 7 GHz. With the R&S®FSVA-B11 option, the 160 MHz analysis bandwidth can be used over the full frequency range of the R&S®FSVA. The R&S®FSV-B160 cannot be used together with the R&S®FSV-B10 and R&S®FSV-B14.
[5] Requires R&S®FSV-K7.
[6] Not available for the R&S®FSV40 model .39.
[7] Requires R&S®FSV-K91.
[8] Requires R&S®FSV-B160.
[9] Requires R&S®FSV-K54.
[10] Requires R&S®FSV-K100 or R&S®FSV-K104.
[11] Requires R&S®FSV-K101 or R&S®FSV-K105.

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.

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