R&S®FPS Release Notes

Firmware Version V1.70

These Release Notes are for following models of the R&S®FPS Signal and Spectrum Analyzer:
R&S® FPS4, order no. 1319.2008K04
R&S® FPS7, order no. 1319.2008K07
R&S® FPS13, order no. 1319.2008K13
R&S® FPS30, order no. 1319.2008K30
R&S® FPS40, order no. 1319.2008K40

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1321.4533.02 | Version 01 | R&S®FPS |
The software makes use of several valuable open source software packages. For information, see the "Open Source Acknowledgment" provided with the product.
The following abbreviations are used throughout this document: R&S®FPS is abbreviated as R&SFPS

PAD-T-M: 3574.3288.02/04.00/CI/1/EN

Contents

1 Information on the current version and history

1.1 New functions

The following table lists the new functions and indicates the version in which the new function was introduced.

New function of firmware V1.70:

Version	Function
V1.70	Support for FPS-K148 5G NR Rel. 16 extension for uplink/downlink measurements.
V1.70	Maximum number of peaks of marker peak list has been increased to 500.
V1.70	Switchable x-axis value distribution in frequency domain.
V1.70	TOI measurements: An additional maximum and minimum third-order intercept point value is calculated and displayed in the marker table and can be queried using the remote commands: `CALCulate<n>:MARKer<m>:FUNCtion:TOI:RESULT:MAXimum?` and `CALCulate<n>:MARKer<m>:FUNCtion:TOI:RESULT:MINimum?`
V1.70	Self alignment scheduler to perform self alignments regularly at specific days and times.
V1.70	Power sensor measurements: Support for thermal power sensor R&S NRP90T, order no. 1424.6473.02. thermal power sensor R&S NRP90TN, order no. 1424.6480.02. three-path diode power sensor R&S NRP67S, order no. 1424.6396.02. three-path diode power sensor R&S NRP67SN, order no. 1424.6409.02.
V1.70	Power sensor measurements: An independent level offset for power sensor results can be set.
V1.70	FPS-B10: Additionally supports R&S SMW200A 40 GHz, R&S SMW200A 44 GHz and R&S SMCV100B.
V1.70	FPS-B10: Source calibration data can be stored and loaded in configuration files.
V1.70	FPS-K6: • Increased numerical resolution of marker display for Parameter Trend and Parameter Distribution displays. • The overall measured pulse count is now shown in the Pulse Results table header and per parameter as an extra row in the Pulse Statistics table.
V1.70	FPS-K18: • Trace detectors and configurable number of trace points are now available for all traces.

	• Trace statistics is now available for all traces. • New GUI layout in Reference Signal dialog. • New statistical evaluation of results including a Statistics Table display. • New control switches for signal estimation / compensation (Frequency Error, Sample Rate Error). • K18D: new default value for power linearity tradeoff and modified algorithm. New default value of 50% provides same results as previous versions with 100%.
V1.70	FPS-K30: • Supports ENR measurements inside the option. • Supports saving and recalling calibration results.
V1.70	FPS-K70 • New predefined digital standard: DMR (Digital Mobile Radio). • Improved burst search for low reference levels. • Improved coarse synchronization for 64APSKs.
V1.70	FPS-K144: • Signal demodulation and analysis in line with TS38.211 V16.2.0. • Test Models, Time Alignment, ACLR, SEM measurements in line with TS38.141-1/2 V16.4.0. • Supports slotwise calculation of result summary. • Supports EVM peak, frame start offset in result summary. • Supports PDSCH VRB to PRB mapping. • Supports a shortcut for I/Q export in capture buffer display header. • Supports LTE-CRS Coexistence. • Supports PRB bundling combining PDSCH allocations with same user ID. • Supports frequency error limit check. • Supports half frame offset for synchronization signals. • PDSCH/CORESET reference data "All 0" or "NR-TM PN23". • Supports CSI periodicities greater than one frame Supports analysis of multiple CSI RS resources. • Supports transport block scaling factor. • Supports timing position Custom, EVM_h and EVM_l as EVM calculation method. • Supports additional settings to ease the configuration of multi carrier setups. • Supports Extended Cyclic Prefix. • Supports extended frequency lock range. • Major enhancement of DL auto detection. • Extension of results summary for All CC results in multi carrier scenarios. • Supports slot / allocation copying for eased signal configuration. • Supports faster Auto EVM speed via additional Auto Set configuration settings. • Supports parsing of DCI parameters (all DCI formats). • Supports Auto Demod Once functionality. • Supports RS Magnitude display. • Supports Frequency Error vs. Subframe display. • Extension of Beamforming Summary for Average RS Weights and rel. power results. • Extension of Bitstream for total number of bits and bit errors of PDSCH/PUSCH. • Supports Generator to Analyzer settings transfer (requires generator 5G application version 20.12 or higher). • Supports 3D display view for Alloc ID / Power / EVM vs. Symb X carrier displays.
V1.70	FPS-K100: • Supports Custom Sync Weight for P-/S-sync.

	• Supports Suppress Interferer for synchronization. • Multi carrier SEM (MSEM) supports up to 5 component carriers. • Supports "Layer EVM" in Allocation Summery. • Supports modulation type information for 2D result displays in marker result.
V1.70	FPS-K106: • Supports "After MIMO/CDMA Decoder" filter for Constellation result. • Supports "MIMO Compensate Crosstalk" setting in Demodulation dialog. • Supports "NB-IoT Power" in Result Summary for Stand-alone and Guardband modes. • Supports "Layer EVM" in Allocation Summery. • Supports modulation type information for 2D result displays in marker result.

New function of firmware V1.60:

Version	Function
V1.60	Firmware supports Windows 10 operating system.
V1.60	Support of R&S FPS-K144 5G-NR Downlink Measurements (in line with TS38.211 15.6.0).
V1.60	Frequency offset limit has been extended from 100 GHz to 1 THz.
V1.60	Supports 5G ACLR standard configurations in spectrum mode.
V1.60	The behavior of the number block for text input in entry fields and dialogs can now be switched from text (default) to number.
V1.60	New self alignment features: “Await warm-up operation” and “Shutdown after Alignment” supported. These features can also be selected from the FPSSetup.exe installation program.
V1.60	Support for Thermal Waveguide Power Sensor WR-15 NRP75TWG, order no. 1700.2529.02. Thermal Waveguide Power Sensor WR-12 NRP90TWG, order no. 1700.2312.02. Thermal Waveguide Power Sensor WR-10 NRP110TWG, order no. 1173.8709.02.
V1.60	Spurious Emission Measurement: Added SCPI command `LIST:XADJust` for adjusting the x axis.
V1.60	I/Q Analyzer: Support of Time Domain Power markers (under Marker Functions).
V1.60	FPS-B10: Supports R&S SMW 12.75 GHz and R&S SMW 31.8 GHz.
V1.60	FPS-B10: Supports generator control for R&S SMB100B and R&S SMBV100B.
V1.60	FPS-B10: Support generator control for R&S SMA100B.
V1.60	FPS-K6: The maximum possible analysis pulse width has been increased from 1 million to 25 million I/Q samples.
V1.60	FPS-K6: The overall measured pulse count is now shown in the Pulse Results table header and per parameter as an extra row in the Pulse Statistics table.
V1.60	FPS-K6: New Pulse-Pulse Spectrum display useful for Doppler measurements. New user-definable Detection Range for analyzing a subset of the acquisition.

	New fixed-level algorithm for pulse envelope measurements. Incorporation of Trigger Position in Sample into timestamp values for better resolution with external trigger.
V1.60	FPS-K7: New marker function AF Phase. This function allows relative signal delay measurements for the result displays AM/FM/PM spectrum.
V1.60	FPS-K7: Supports Band Power/Deviation Markers in the displays: RF spectrum, AM spectrum, PM spectrum and FM spectrum.
V1.60	FPS-K18: Generator control can now be activated or deactivated with an extra ON/OFF-button.
V1.60	FPS-K18: The “Read and Load Current Signal from Generator” functionality now also supports the R&S®SMW-K355 application.
V1.60	FPS-K18: Added a configurable delay that is automatically applied whenever the input signal changes (e.g. when the generator power changes).
V1.60	FPS-K18: Added a configurable delay that is automatically applied whenever the input signal changes (e.g. when the generator power changes).
V1.60	FPS-K18: Equalizer results can now be exported in “*.fres” file format.
V1.60	FPS-K18: The `TRACe:DATA` command now also supports 64 bit format.
V1.60	FPS-K18: Support of “Moving Average” for I/Q averaging.
V1.60	FPS-K18: The “Read and Load Current Signal from Generator”-functionality now also supports SMW-K141 (802.11ad), SMW-K118 (V5GTF) and SMW-K542 (Power Sweep).
V1.60	FPS-K18D: New gain expansion parameter now allows for increasing peak power during Direct DPD.
V1.60	FPS-K30: Supports trace smoothing similar to spectrum mode.
V1.60	FPS-K30: Supports smart noise sources R&S®FS-SNS.
V1.60	FPS-K30: Supports measurements with variable RBW and sweep time for frequencies below 10 MHz.
V1.60	FPS-K30: Support of calibration loss. Temperatures can be considered for input loss, output loss and calibration loss.
V1.60	FPS-K70: New predefined standard: GBAS (Ground Based Augmentation System).
V1.60	FPS-K70: New mapping "Gray" for pi/4-QPSK.
V1.60	FPS-K70: Density trace mode for polar displays and eye diagram.
V1.60	FPS-K70: New “Marker To” functionality to move the marker to the start of the current result range automatically, i.e. the result range highlighted in blue.
V1.60	FPS-K70: Various new SCPI commands that facilitate the handling of burst/pattern search scenarios and bit error rate measurements.
V1.60	FPS-K70: Auto-refresh functionality in Run Single mode.
V1.60	FPS-K70: New "SMx" mapping for π/8-D8PSK and π/4-DQPSK.

V1.60	FPS-K70: Supports QAMs with orders up to 16,384.
V1.60	FPS-K70: New mappings for 512QAM and 2048QAM.
V1.60	FPS-K70: Added DVB-S2(X) start of frame pattern.
V1.60	FPS-K70: Support of I/Q skew measurement and compensation (only for PSK/QAM/Offset QPSK).
V1.60	FPS-K70: Support of 64FSK.
V1.60	FPS-K70: Support of new Bluetooth standards Bluetooth5_LE1M and Bluetooth5_LE2M.
V1.60	FPS-K70: Increased precision for filter roll-off factor (Alpha/BT). Now three digits after the decimal point can be entered.
V1.60	FPS-K70: Several new mappings (e.g. for 1024QAM and 4096QAM).
V1.60	FPS-K91: Added Error Vector Magnitude results according to the legacy standard versions IEEE802.11b-1999 and IEEE802.11b-2012 for FPS-K91 standards 802.11b & 802.11g DSSS.
V1.60	FPS-K91N: Added spectrum emission mask files `802_11n_20MHz_2.4GHz_band.XML` and `802_11n_40MHz_2.4GHz_band.XML`.
V1.60	FPS-K91N/AC: New setting to resolve the cyclic shift delay (CSD) ambiguity in case of SISO signals. `:CONFigure:WLAN:MIMO:CSD <APPLy | IGNore>`
V1.60	FPS-K100: New settings to exclude a specific resource block which is used for embedded NB-IoT. This feature is only available in case that option FPS-K102 is installed.
V1.60	FPS-K100/101: Support for measuring additional operating band limits in Spectrum Emission Mask measurement.
V1.60	FPS-K102/103: Support of carrier aggregation measurements for up to 5 CCs.
V1.60	FPS-K106: New result “RB power excluding E-UTRA (dBm)” in result summary of downlink inband mode. This result is necessary for calculating the “NB-IoT RB power dynamic range” in 3GPP specification 36.141 chapter 6.3.3.
V1.60	FPS-K118: Support of xPUCCH, dual UL-PCRS transmission, xPDSCH/xPUSCH DMRS rel. power.
V1.60	FPS-K118: Extended Physical Broadcast Channel is supported.

New function of firmware V1.51:

Version	Function
V1.51	Support for function “FSV Mode RF Att” in dialog Setup – Network & Remote – Compatibility (remote command `”SYST:COMP DEF | ATT”`).
V1.51	Support for option K150 "Support for User Calibration".

V1.51	FPS-K106: Support of guard-band deployment.

New function of firmware V1.50:

Version	Function
V1.50	Support for new options: ● R&S FPS-K18D - Direct DPD Measurements. ● R&S FPS-K106 - NB-IoT Measurements. ● R&S FPS-K118 - V5GTF Downlink Measurements.
V1.50	Support of remote command CALC:MARK:FUNC:POW:RES? AOB which delivers the same result as CALC:MARK:FUNC:POW:RES? AOBW similar to R&S FSU.
V1.50	Band Power Measurement: Support of relative band power added. The band power span is added to the result table. The absolute band power reading supports now units different to dBm depending on the setting of the reference level unit.
V1.50	OBW measurement supports the readings Centroid and Offset Frequency (remote command "`CALC:MARK:FUNC:POW:RES? COBW`").
V1.50	Hardcopy extended to show a preview before printing. Hardcopy of multiple windows on multiple pages in PDF format is now supported.
V1.50	The PDF reader "Foxit Reader" was added to the installation in order to view PDF files directly on the device.
V1.50	Supports remote command SENSE`:CORR:TRAN:CAT?` to read out all transducer names.
V1.50	Supports Relative Band Power measurements in Spectrum mode and I/Q Analyzer mode for the display "Spectrum". For Band Power measurements the result now supports units other than dB and the Band Power Span is added to the result table.
V1.50	Support added for Trace Import from .DAT files (ASCII) or .CSV files (comma separated) to a Reference Trace which is in View Mode to prevent overwriting with next sweep data.
V1.50	Supports Transducer and Limit Line Import and Export using CSV (comma separated) files.
V1.50	Support for free selectable Impedance Value (in addition to 50/75 ohm) and support for the Impedance Matching Pad Types "Series-R" or "Minimum Loss Pad (MLP)". These features are supported in Spectrum mode, I/Q Analyzer or MSRA mode and in the application FPS-K70.
V1.50	Remote trace query and IQ trace query now support 64 bit (more precise) or 16 bit (faster). Select the format with the commands FORMat REAL,64 or FORMat REAL,16 prio to querying the trace data.
V1.50	Support of open source acknowledgement information pages on the instrument.
V1.50	Version of the applied Frequency Response Alignment software is shown in the Hardware Info dialog.
V1.50	SEM Measurement: WLAN IEEE802.11ax supports now standard files with VBW of 7.5 kHz in FFT mode.

V1.50	I/Q Analyzer: Supports trace export for all diagrams.
V1.50	I/Q Analyzer and FPS-K7: Support of Spectrogram Diagram (switched on via trace menu).
V1.50	FPS-K6: Added support for the TRACe:IQ command.
V1.50	FPS-K6: Supports Pulse I and Q result range trace display. FPS-K6: Supports Pulse I and Q amplitude values in the Pulse Results and Pulse Statistics table displays.
V1.50	FPS-K6: Supports measurement results for pulse envelope model.
V1.50	FPS-K6: Supports configuration to highlight data points in the trend display.
V1.50	FPS-K18: Support of FPS-K18D Direct DPD Measurements.
V1.50	FPS-K18: Support of linear modeling scale (configurable). FPS-K18: Deactivate gridding for model calculation (select 0 modeling points). FPS-K18: New ACLR measurement settings allow much more specific ACLR measurements.
V1.50	FPS-K18: New measurement results ‘Gain Deviation vs Time’ and ‘Phase Deviation vs Time’. FPS-K18: Model trace is now shown in gain compression.
V1.50	FPS-K18: Generation of predistorted waveform files. FPS-K18: Supports SMW-K526 (SMW wideband extension). FPS-K18: Added new measurement AM/EVM.
V1.50	FPS-K18: Supports equalizer function.
V1.50	FPS-K18: Supports I/Q averaging function.
V1.50	FPS-K18: Equalized I/Q data (generated with K18 equalizer) can now be stored to file.
V1.50	FPS-K70: Support of Shaped Offset QPSK modulation added. This includes the new modulation “Shaped Offset QPSK”, the new transmit filter “Shaped Offset QPSK TG” and the new digital standard “SOQPSK-TG”. FPS-K70: Support of 16FSK modulation. FPS-K70: All eye diagrams support two horizontal and two vertical display lines, which allow a manual measurement of the eye size. FPS-K70: A symbol rate error can now also be estimated and compensated for MSK, QPSK and SOQPSK modulations.
V1.50	FPS-K70: Predefined display configurations are offered for e.g. PSK/QAM signals and FSK signals (MEAS hardkey). FPS-K70: Supports six additional predefined standards for Bluetooth (2-DH1/DH3/DH5 and 3-DH1/DH3/DH5). FPS-K70: Supports two additional predefined standards for DOCSIS 3.0 Downlink (J83B). FPS-K70: Bit errors are highlighted in the symbol table. Their position can be queried with TRACe:DATA? MSTR. FPS-K70: The position of incorrect pattern symbols can now be queried with TRACe:DATA? PSTR. FPS-K70: User Patterns can now be imported from the symbol table.

	FPS-K70: Lower limit for Alpha/BT of the transmit and measurement filter is now 0.03 for Gauss, GMSK, RC and RRC filters.
V1.50	FPS-K70: Supports π/2-BPSK and π/2-DBPSK modulation.
V1.50	FPS-K70: Support of noise source output.
V1.50	FPS-K70: Supports 32-FSK.
V1.50	FPS-K70: Supports an oversampling of 64 and 128.
V1.50	FPS-K70: Supports dBmV and dBµV as units.
V1.50	FPS-K70: Start of the current result range within the capture buffer can now be queried with sample precision by [SENSe:]DDEMod:SEARch:MBURst:STARt:SAMPles?
V1.50	FPS-K70: Supports an oversampling of 2 (i.e. Sample Rate = 2*Symbol Rate) for PSK/QAM modulations.
V1.50	FPS-K72/73: Added Trace Export and Table Export.
V1.50	FPS-K91/N/AC: Spectrum Flatness Result Configuration supports the trace units “dBm” and “dB”.
V1.50	FPS-K91N/AC: Tracking results from Preamble+Payload or Payload can be used for Preamble Channel Estimation.
V1.50	FPS-K91N/AC MIMO: Reference Frequency Coupling mode can be set from master.
V1.50	FPS-K91N/AC MIMO: Reference Level Offset can be set individually for master and slaves.
V1.50	FPS-K100: Supports following new result displays: - UE-specific RS Weights Magnitude - UE-specific RS Weights Phase - Cell ID RS Weights Magnitude - Cell IR RS Weights Phase - CSI RS Weights Magnitude - CSI RS Weights Phase - Beamforming Allocation Summary
V1.50	FPS-K100/102/104: Supports measuring of up to 2 component carriers in EVM measurements with one sweep. This feature requires FPS-K102.
V1.50	FPS-K100/102/104: Supports measuring of up to 2 component carriers in EVM measurements with one sweep. This feature requires FPS-K102. FPS-K100/102/104: Added new Softkey “Auto LTE Config” detecting automatically the Signal bandwidth and MIMO mode in EVM measurement. This functionality only works for signals with a valid PBCH and requires FPS-K102. FPS-K100/102/104: Supports new LTE-Advanced test models with 256QAM allocations. This feature requires FPS-K102. FPS-K100/102/104: Readout of EVM, Power and Allocation ID by SCPI in the diagrams “EVM vs Symbol x Carrier”, “Power vs Symbol x Carrier” and “Allocation ID vs Symbol x Carrier”. FPS-K100/102/104: Implementation of SCPI query command `MMEM:LOAD:TMOD:DL?`
V1.50	FPS-K100/104: Supports 1024QAM demodulation in Detection Mode “Predefined”. This feature requires the FPS-K102 option.

V1.50	FPS-K101/105: Support of 256QAM demodulation. This feature requires the FPS-K103 option.
V1.50	FPS-K100 to K105: Added Trace Export and Table Export.
V1.50	FPS-K100 to K105: New results Mean, Peak, Crest, 10%, 1%, 0.1% and 0.01% for CCDF-EVM.

New function of firmware V1.40 SP1:

Version	Function
V1.40 SP1	FPS-K70: Support for pi/2 BPSK modulation.
V1.40 SP1	Support for Power Sensors: R&S NRP40S/SN, R&S NRP50S/SN, NRP-18T/TN, NRP-33T/TN, NRP-40T/TN, NRP-50T/TN, NRP67T/TN, NRP110T, NRP6A/AN and NRP18A/AN. (USB cable length tested up to 1.5 m)

New function of firmware V1.40:

Version	Function
V1.40	Support for new options: • R&S FPS-K6 - Pulse Measurement. • R&S FPS-K18 - Amplifier Measurements
V1.40	Support for Power Sensors: R&S NRP8S, R&S NRP8SN, R&S NRP18S, R&S NRP18SN, R&S NRP33S and NRP33SN (USB cable length tested up to 1.5 m).
V1.40	Sweep Type selection “Sweep” supported to enforce using sweep mode instead of FFT mode.
V1.40	Bandpower Marker supports new power mode RelPower (`CALC:MARK:FUNC:BPOW:MODE RPO`).
V1.40	Support for Web Control on the LXI webpage (`http://<address of device>`) allowing remote display and easy interaction with the device from any browser. **Note:** The installing of the DFMirage driver onto the FPS is needed, if the analyzer application is indicated as a black window. Please refer to the operating manual for more details.
V1.40	Spurious Emission Measurement: Remote command `CALC:PEAK:DET` added to configure the details of the list evaluation via remote.
V1.40	I/Q Analyzer: For triggered measurements added vertical TRG line in magnitude display at the trigger offset position.
V1.40	FPS-B10: Support for SMW 20GHz/40GHz.
V1.40	FPS-K7: Gauss filter with demodulation bandwidth 40 MHz and 80 MHz supported with option B160.

V1.40	FPS-K70: New SCPI command to query length of a found burst: `CALCulate:DDEMod:BURSt:LENGth?` FPS-K70: New Signal Source "MultiSource". Two new result types added, to show different spectrum traces in one window. FPS-K70: Support of Shaped Offset QPSK modulation added. This includes the new modulation order “Shaped Offset QPSK”, the new transmit filter “Shaped Offset QPSK TG” and the new digital standard “SOQPSK-TG”. FPS-K70: Support of 16FSK modulation. FPS-K70: All Eye Diagrams support two horizontal and two vertical display lines, which allow a manual measurement of the eye size. FPS-K70: A symbol rate error can now also be estimated and compensated for MSK, QOPSK and SOQPSK modulations.
V1.40	FPS-K72: The Time Alignment Error measurement now supports the analysis of up to 4 carriers. FPS-K72/K73: Traces and table results can now be exported to ASCII file.
V1.40	FPS-K91: Support of Multi Standard Radio Analyzer. FPS-K91: New graphical measurements: Gain Imbalance vs Carrier, Quadrature Error vs Carrier, Phase Tracking. FPS-K91: New Result Summary Detailed measurements: MIMO Cross Power, Center Frequency Error, Symbol Clock Error, Common Phase Error (CPE). FPS-K91: MIMO Compensate Crosstalk setting. FPS-K91: Restrict analysis to a selected PPDU. FPS-K91: IF-Power trigger of Master supported for Simultaneous MIMO measurements. FPS-K91: New SCPI command to change the position of the splitter between result windows. (`LAYout:SPLitter`).
V1.40	FPS--K91N/AC: IF-Power trigger of Master supported for Simultaneous MIMO measurements. FPS--K91N/AC: Control External Reference of slaves from master. FPS--K91N/AC: Remote Control: Scalar MIMO results are appended to their corresponding Result Summary values.
V1.40	FPS-K100/104: In measurement Transmit On/Off Power, the off-power can now be displayed in dBm/MHz. FPS-K100/104: In measurement Transmit ON/OFF Power, the limit lines have been updated according to the 3GPP test specification release 12. This results in a slightly relaxed test requirement. FPS-K100/104: Calculation of EVM for 256QAM-modulation. The value is displayed in the Result Summary.
V1.40	FPS-K100/102/104: New measurement Multi Carrier ACLR for measuring ACLR for carrier aggregated signals. Requires option FPS-K102. FPS-K100/102/104: The Time Alignment Error measurement now supports measuring of 2 contiguous component carriers with only one device by making a broadband sweep. Requires option FPS-K102. FPS-K100/102/104: The Time Alignment Error measurement now supports measuring of 2 contiguous component carriers with only one device by making a broadband sweep. Require option FPS-K102.
V1.40	FPS-K101/103/105: New measurement Time Alignment Error including support for carrier aggregated signals. Two contiguous carriers can be measured with only one device by making a broadband sweep. Requires option FPS-K103.

V1.40	FPS-K100/101/104/105:	Traces and table results can now be exported to ASCII file.

New function of firmware V1.31:

Version	Function
V1.31	Support for new options: ● R&S FPS-K30 - Noise Figure Measurements. ● R&S FPS-K40 - Phase Noise Measurements. ● R&S FPS-K103 - EUTRA/LTE Advanced UL Measurements.
V1.31	FPS-K91N/AC: New SCPI command “LAYout:SPLitter” to change the position of the splitter between result windows.
V1.31	FPS-K91N/AC: Analysis range (no of data symbols) can now be specified to determine which data symbols can be analyzed in each PPDU.
V1.31	FPS-K91N/AC: Tracking results from Preamble+Payload or Payload can be used for Preamble Channel Estimation.
V1.31	FPS-K91N/AC MIMO: Amplitude Settings of master and slave analyzers can be coupled. Individual auto levelling on the slave requires the FPS-K91n/ac option installed on each slave with version 1.31 or higher.

New function of firmware V1.30:

Version	Function
V1.30	Support for new option R&S FPS-K33 - Security Write Protection
V1.30	Support for option R&S FPS-B11 - YIG Preselector Bypass
V1.30	Support for option R&S FPS-B28V - Noise Source Control
V1.30	FPS-B10: Support for R&S SMW added
V1.30	Support for trace smoothing in Spectrum and IQ Analyzer mode
V1.30	Spectrum Emission Mask (SEM): Multi-SEM measurement now supports non-contiguous multi standard radio base stations. Up to three sub blocks with individual range definition and the possibility of summing up limits in the sub block gaps are available now. Spectrum Emission Mask (SEM): Added 802.11ad standard Spectrum Emission Mask (SEM): The minimum number of sweep points per range can now be defined. The number of measurement points obtained in narrow frequency ranges can thus be increased manually compared to the default value.
V1.30	ACLR measurement: Independent setup of upper and lower adjacent or alternate channels is now supported for Multi-Standard Radio
V1.30	Out of range behavior in entry fields in manual operation can be changed from 'Warning' to 'Set Max/Min Value'.
V1.30	Sub folders for transducers and limit lines can now be used.

V1.30	MSRA: Support for I/Q export
V1.30	Error messages generated during remote operation are listed in the “Remote Errors” tab and can be shown directly on the display.
V1.30	Mini Front Panel (invoke with ALT+M) enhanced with unit keys.
V1.30	I/Q Analyzer: Support for swapping I/Q
V1.30	LegacyPro: Support MKPK HL
V1.30	LegacyPro: Agilent PXA emulation added

V1.30	PSA emulation: For remote control by VXI-11 or Raw Socket protocol the termination with <LF><CR><LF> (0xA, 0xD, 0xA) is now supported.
	PSA emulation: Support for `CALC:MARK:CENT` added.
	PSA emulation: Support for `CALC:MARK:CENT` added.
	PSA emulation extended with the following commands:
	`[SENSe]:POWer:ATTenuation` changed to `[SENSe]:POWer[:RF]:ATTenuation`
	`[SENSe]:POWer[:RF]:ATTenuation:AUTO`
	`[SENSe]:AVERage:COUNt, [SENSe]:AVERage[:STATe]`
	`[SENSe]:AVERage:CLEar, [SENSe]:DETector[:FUNCtion]`
	`[SENSe]:DETector:AUTO, TRAC:MODE`
	`MMEM:STOR:SCR, CALC:MARK:FCO:STAT`
	`CALC:MARK:FCO:X?, CALC:MARK:FCO:GAT:AUTO`
	`TRAC:DATA, FORMat:BORD` changed to `FORMat:BORDer`

V1.30	FPS-K7: Support for units Watt and dBµV added FPS-K7: Support for relative measurements results added FPS-K7: Export trace to ASCII file supported via remote control
V1.30	FPS-K10: Support of 'Auto Frequency' feature. In Multi-Carrier Wideband Noise (MCWN) mode: User now gets a warning if an active carrier is outside the span. FPS-K10: Support for multicarrier BTS measurements as in chapter 6.12 of 3GPP TS 51.021 V12.3.0. FPS-K10: Support for markers in Spectrum Graph display FPS-K10: New displays Wideband noise inner / outer tables FPS-K10: Support for multicarrier BTS measurements as in chapter 6.12 of 3GPP TS 51.021.
V1.30	FPS-K70: New modulation orders 2048QAM and 4096QAM FPS-K70: New SCPI command `CALC:Y:UNIT:TIME S|SYM` for switching y-unit of equalizer group delay measurements FPS-K70: new digital standard `Bluetooth_LowEnergy` FPS-K70: Support for Trigger Out added
V1.30	FPS-K72: The number of analyzed slots can be reduced to increase the measurement speed.
V1.30	FPS-K76: Supporting synchronization on slot 0 for signals without DwPTS FPS-K77: Support of UpPTS evaluation FPS-K77: Support of time synchronization on UpPTS FPS-K77: User can now define the maximum modulation type in order to avoid false detection
V1.30	FPS-K91/P/N/AC: Support of Multi Standard Radio Analyzer.

	FPS-K91/P/N/AC: New graphical measurements: Gain Imbalance vs Carrier, Quadrature Error vs Carrier, Phase Tracking FPS-K91/P/N/AC: Support of AM/AM, AM/PM, AM/EVM measurements FPS-K91/P/N/AC: Support of 'PVT Rising' and 'PVT Falling' diagram FPS-K91/P/N/AC: Support of Frequency Error vs Preamble Samples measurement FPS-K91/P/N/AC: New measurement result: IQ Skew FPS-K91/P/N/AC: Unit selection dB, % for diagrams 'EVM Measurements EVM vs Carrier', 'EVM vs Symbol' FPS-K91N/AC: New Result Summary Detailed measurements: MIMO Cross Power, Center Frequency Error, Symbol Clock Error, Common Phase Error (CPE) FPS-K91N/AC: Control External Reference of slaves from master FPS-K91N/AC: MIMO Compensate Crosstalk setting FPS-K91N/AC: IF-Power trigger of Master supported for Simultaneous MIMO measurements FPS-K91N/AC Remote Control: Scalar MIMO results are appended to their corresponding Result Summary values FPS-K91N/AC: Support for R&S FS-Z11 Trigger Unit or FPS Trigger Output for simultaneous MIMO measurements
V1.30	FPS-K91N: Analysis of up to 4 Tx antennas for IEEE802.11n MIMO capable devices FPS-K91AC: Support of proprietary 1024 QAM. Using the temporary MCS indices 10 and 11. FPS-K91AC: Analysis of up to 8 Tx antennas for IEEE802.11ac MIMO capable devices. FPS-K91: Support of IEEE 802.11j standard FPS-K91: Support of tolerance limits in line with the 'IEEE802.11-2012 Standard' [default setting] or 'Prior to the IEEE802.11-2012 Standard' [setting for the V1.21 or earlier version].
V1.30	FPS-K91: Support of single antenna measurements in case of direct spatial mapping. 802.11n: single antenna 1,2,3,4. 802.11ac: single antenna 1,2,3,4,5,6,7,8.
V1.30	FPS-K100/104: The number of analyzed subframes can be reduced to speed up the measurement FPS-K100/104: Support of EPDCCH analysis FPS-K100/104: Support of MBSFN analysis. This feature requires the option FPS-K102 FPS-K100/104: Support of modulation type 256QAM FPS-K104: Support of Medium Range Base Station limits in Spectrum Emission Mask measurement
V1.30	FPS-K101/105: Support of new result displays "EVM vs Symbol x Carrier" and "Power vs Symbol x Carrier" FPS-K101: Support of measuring Carrier Aggregated Signals in measurement Transmit On/Off Power (requires the option FPS -K102)
V1.30	Support for FPS-K103 EUTRA / LTE Advanced UL measurements
V1.30	FPS-K100/104: New function Marker Coupling for synchronization of markers between displays. FPS-K100/104: Support of Cumulative ACLR (requires the option FPS -K102) FPS-K101/105: Support of Multi-Carrier ACLR for measuring the ACLR of carrier aggregated signals (requires the option FPS -K103)

	FPS-K101/105: Spectrum emission mask now supports the measurement of carrier aggregated signals (requires the option FPS -K103)
V1.30	FPS-K101/105: Support of LTE Uplink in MSRA mode
V1.30	FPS-K100/K104: Time Alignment Error measurement now supports Carrier Aggregation. FPS-K100/K104: Support of MIMO measurements with multiple devices. FPS-K100/K104: Support of new enhanced features for PDSCH Subframe Configuration. All these functions require option FPS -K102.
V1.30	FPS-K100/K104: Support of new Result Displays: EVM vs Symbol x Carrier, Power vs Symbol x Carrier, Allocation ID vs Symbol x Carrier and UE-Specific RS Weights Magnitude
V1.30	FPS-K101/K105: Support of Single Subframe Mode for fast analysis of a single subframe

New function of firmware V1.21:

Version	Function
V1.21	Support for Spectrogram Measurement in Spectrum Mode (no option key required)
V1.21	Support for Power Sensors
V1.21	R&S FPS-B160: Support for Trigger Source IF Power

New function of firmware V1.20:

Version	Function
V1.20	Support for FPS40
V1.20	Support for options: ● R&S FPS-B160 - Bandwidth Extension ● R&S FPS-K76 / K77 - TD-SCDMA Measurement Options ● R&S FPS-K82 / K83 -.CDMA2000 Measurements ● R&S FPS-K84 / K85 – 1xEV-DO Measurements ● R&S FPS-K91ac - WLAN Measurements

New function of firmware V1.11:

Version	Function
V1.11	Support for FPS13 and FPS30

New function of firmware V1.10:

Version	Function
V1.10	Support for options: ● R&S FPS-K7 - Analog Demodulation Measurement ● R&S FPS-K10 - GSM Measurement ● R&S FPS-K70 - Vector Signal Analysis ● R&S FPS-K72 / K73 - 3GPP FDD Measurements Options ● R&S FPS-K91 / K91n / K91p - WLAN Measurements ● R&S FPS-K100 / K101 / K102 / K104 / K105 - LTE Measurement Application
V1.10	FPS-K72: Support for a 'Slot' mode analyzing a single slot instead of the whole frame. SENSe:CDPower:BASE SLOT | FRAMe
V1.10	FPS-K73: Support for 'QPSK Modulation Only' mode to analyze special WCDMA Uplink signal which contain only QPSK Modulation in a very fast way. SENSe:CDPower:QPSKonly <boolean>

New function of firmware V1.00:

Version	Function
V1.00	Support for FPS4 and FPS7
V1.00	Support for options: ● R&S FPS-B4 OCXO Reference Frequency ● R&S FPS-B22 RF Preamplifier (9 kHz to 7 GHz) ● R&S FPS-B25 Electronic Attenuator, 1 dB steps ● R&S FPS-B40 40 MHz Analysis Bandwidth

1.2 Modified functions

The following table lists the modified functions and indicates the version in which the modification was carried out.

Modifications of firmware V1.70:

Version	Function
V1.70	Zero span: The same x-axis scaling algorithm is now used for traces and diagram grid.
V1.70	ACLR measurement: ACLR power bars are shown as transparent bars for better readability.
V1.70	R&S FSW-K7: Resolution of modulation frequency in Result Summary table improved.
V1.70	FPS-K70: • Preview windows have been removed to allow for more compact dialogs. • In order to better visualize the symbol transitions, the sample points are now connected in the density trace mode for result type 'Vector I/Q'. • After preset and for the predefined standard 3G_WCMDA.xml, the trace in the constellation diagram in window 1 is now a "Density" trace and no longer a "Clear Write" trace. This only affects the coloring of the trace. The trace values remain the same.
V1.70	FPS-K100/K101: SEM measurement in line with TS36.141 V16.2.0 / TS36.521-1 V16.1.0 [SENSe]:POWer:SEM:UL:REQuirement GEN|NS3|NS4|NS67|NS27|NS35
V1.70	FPS-K106: Rename "RB Power Excluding EUTRA" to "NB-IoT Power" in Result Summary for Inband mode. FETCh[:CC{cc}]:SUMMary:NBPower[:AVERage]? FETCh[:CC{cc}]:SUMMary:NBPower:MAXimum? FETCh[:CC{cc}]:SUMMary:NBPower:MINimum?
V1.70	FPS-K144: Relative and Absolute limit check in 5G ACLR according to TS38.141-1/2
V1.70	FPS-K18: Power Servoing no longer available

Modifications of firmware V1.60:

Version	Function
V1.60	Grid annotations displayed semi-transparent in front of traces to enhance the readability of the annotation values.
V1.60	The maximum frequency of transducers and limit lines is increased to 2.5 THz.
V1.60	FPS-B10: Switching the B10 source state to OFF now also sets the RF state of the connected external generator to OFF.
V1.60	Online help now also supports result displays in FPS-K18, FPS-K30 and FPS-K40.
V1.60	FPS-K7: The Marker AF Phase Display result is now displayed with 5 decimal digits in unit rad, 2 digits in unit mrad and 3 digits in unit deg.
V1.60	FPS-K7: The Modulation Frequency result is now display with 7 decimal digits.
V1.60	FPS-K18: Default Synchronization Confidence has been reduced to 80%.
V1.60	FPS-K18: The trace export dialog has been redesigned and improved. It is now also possible to export all traces of a selected window.
V1.60	FPS-K18: The attenuator of the connected SMW is no longer changed by FPS-K18 during Parameter Sweep. This leads to more stable Parameter Sweep results when sweeping over Input Power.
V1.60	FPS-K18: Segments configured in the “Custom Waveform File” dialog are now automatically activated on the connected generator when pressing the “Load and Export Selected Waveform to Generator” button.
V1.60	FPS-K18: Marker 1 is now automatically set to “Restart” on the connected generator when using “Generate Own Signal” or Direct DPD.
V1.60	FPS-K18D: The Direct DPD sequence now checks if the synchronization was successful for every iteration. If no synchronization was found for an iteration, the iteration automatically gets repeated up to 10 times until a synchronization is found.
V1.60	FPS-K18D: Continuous sweeping is no longer stopped when pressing “Abort” or “Finish” while the Direct DPD is running.
V1.60	FPS-K18D: Direct DPD now also supports bursted (= TDD) signals.
V1.60	FPS-K30: Maximum number of measurement points increased to 1201.
V1.60	FPS-K30: The frequency in trace export files now reflects either RF or IF.
V1.60	FPS-K30: For ENR table import the ENR table values can now be separated by spaces or commas
V1.60	FPS-K40: Its now possible to edit the Nominal Frequency & Level during a tracked measurement
V1.60	FPS-K70: "Channel Bar" now displays more setting parameters.
V1.60	FPS-K70: Only relevant for capture lengths > 256,000 samples: Title of the window now clarifies whether the entire capture buffer or only a section of the entire capture buffer is displayed.

V1.60	FPS-K70: Only relevant for capture lengths > 256,000 samples: Lines in the Mag Overview (Capture Buffer) display now visualize which section of the capture buffer is displayed in windows that show only a part of the entire capture, e.g. Mag (Selected CB Section).
V1.60	FPS-K70: Only relevant for capture lengths > 256,000 samples: Windows that display just a section of the capture buffer only support the trace modes “ClearWrite” and “View”.
V1.60	FPS-K70: Improved layouts for the “Predefined Display Configurations”.
V1.60	FPS-K70: Up/Down increment for the capture length and result length parameters has been increased, both for the scroll wheel step size and for the corresponding SCPI commands.
V1.60	FPS-K70: Adding/changing a result window triggers an auto refresh on the current capture buffer. The currently selected result range is then the last possible result range in the current capture buffer.
V1.60	FPS-K70: The name of the default QPSK mapping has changed from “WCDMA” to “GRAY”. The mapping values themselves remain identical. Depending on the order of settings in a remote script, this might change the default mappings for other modulation schemes as well.
V1.60	FPS-K70: The blue marker that highlights the currently analyzed result range in the capture buffer is now also displayed if there is only one result range in the capture buffer.
V1.60	FPS-K70: The default directories for file manual loading (e.g. user modulation, user filter) have changed
V1.60	FPS-K70: SCPI commands that involve file loading can now be defined relative to the default directory path, too. (Absolute paths still work as before).
V1.60	FPS-K70: PSK/QAM constellations are now always normalized to an RMS value of 1. This may lead to a different scaling of the results based on the measurement or reference signal, e.g. the I/Q constellation diagram.
V1.60	FPS-K70: The bit error rate result is now displayed in scientific format.
V1.60	FPS-K70: Symbol Errors that are detected in a bit error rate measurement are no longer highlighted with a red frame anymore, but are displayed in red text within the symbol table.
V1.60	FPS-K70: Increased limit for maximum burst length (upper limit now equal to the limit for the result length)
V1.60	FPS-K91N: The outer-most ranges for the spectrum emission mask files `802_11n_20MHz_5GHz_band.XML` and `802_11n_40MHz_5GHz_band.XML` have been revised.
V1.60	FPS-K106: Extended F_offset for SEM measurement to +/- 200 kHz in case of standalone distribution according to table 5.6-3A of 3GPP of document 36.141 revision 14
V1.60	FPS-K106: Deployment guard-band now provides a list of all possible offsets to the E-UTRA carrier frequency

Modifications of firmware V1.51:

Version	Function
V1.51	FPS-K106: Adjusted SEM limits to latest 3GPP specification 36.141 Rel. 15

Modifications of firmware V1.50:

Version	Function
V1.50	Additional information in the status bar about “External Reference missing” added, which also reflects the status after a finished single sweep.
V1.50	Spurious measurement now supports noise markers.
V1.50	Scrolling in result tables is now possible by swiping inside the table in addition to using the scroll bars.
V1.50	The scaling factor of IQ.TAR files is now taken into account during import I/Q data.
V1.50	For the gated trigger functionality the minimum gate length is reduced from 125 ns to 5 ns. For the gate delay any value can be entered and is internally rounded to the resolution of 5 ns as the trigger offset parameter.
V1.50	Spectrum Emission Mask Measurement: The TX Channel can now be set to a value of up to 10 GHz (maximum was 100 MHz before)
V1.50	The query answer string of *OPT? is now always terminated with a ‘comma’ to simply string comparison.
V1.50	Remote Control: The length of the Error Queue has been changed from 5 to 16 entries. Now, after 16 errors, the error queue is full and the last error will be "Queue Overflow". It is possible to clear the error queue, e.g. with *CLS, or to read the errors with SYST:ERR? and empty the queue entry by entry.
V1.50	If a self alignment was started in an aligned instrument state and this alignment is aborted upon user request, the previous alignment data are now restored.
V1.50	FPS-K7: Maximum FM scaling setting increased from 100 to 250 MHz/div.
V1.50	FPS-K18: General measurement speed improvements have been implemented.
V1.50	FPS-K18: Iq-tar files containing more than one I/Q data stream can now be used as reference signal (the first stream will be used and the other streams will be ignored).
V1.50	FPS-K18: When connecting a signal generator for the first time after starting the application, the signal generator will now be configured according to the DPD settings of the FPS-K18. Earlier versions of K18 just used the settings which were present in the signal generator when connecting it to the FPS.
V1.50	FPS-K18: Changed name of “AM/EVM” measurement to “EVM vs Input Power” or “EVM vs Output Power”.
V1.50	FPS-K30: new SCPI command `SENSe:CONFigure:MODE:SYSTem:LO`, (replaces the deprecated command `SENSe:CONFigure:MODE:SYSTem:LOSC`)

V1.50	FPS-K30/K40: The visibility and limit check functions of limit lines can now be controlled separately.
V1.50	FPS-K70: Switching the symbol table between hexadecimal, decimal, octal and binary, can now also be done via Remote Control (`CALC:FORM`). When reading the symbol table via remote control this setting is taken into account if the command `TRAC:DATA? STR` is used.
V1.50	FPS-K70: The maximum number of “Display Points/Sym” for all result windows is now limited to 32 (exceptions: Result Summary and Capture Buffer Displays).
V1.50	FPS-K70: The error message “Pattern not found” is replaced by “Pattern symbols incorrect” or “Pattern waveform not found” depending on the actual issue. FPS-K70: If the symbol table format is “binary”, the leading zeros are no longer suppressed when the values are queried with TRAC:DATA? STR. FPS-K70: Changed behavior upon manual refresh, if the statistic count exceeds the number of possible evaluations within the current capture buffer.
V1.50	FPS-K70: FSK Ref Deviation can now be set to 60 * Symbol Rate (15 * Symbol Rate before)
V1.50	FPS-K91: File can now be selected as Input source .
V1.50	FPS-K91 802.11ax: N_HE_LTF is also available for Trig Based PPDU types

Modifications of firmware V1.40:

Version	Function
V1.40	SETUP – System Config – Hardware Info: The indication of option FPS-B11 “Microwave Preselector Bypass” is moved to “Versions + Options”.
V1.40	SEM: The minimum sweep time for FAST SEM was previously limited to 1ms. Now smaller values are accepted as well.
V1.40	The Signal Track softkey has been moved one position up to prevent accidentally pressing it when using the Local softkey.
V1.40	Legacy Pro: MKMIN will return now minimum value in auto peak configuration.
V1.40	FPS-K10: SCPI commands of Multicarrier Mode round frequencies to whole numbers FPS-K10: Better support of triggers in Multicarrier Mode
V1.40	FPS-K30: The preamplifier default state is changed to ON
V1.40	FPS-K70: In the ASCII export of Meas- Ref- and Error-Traces an additional line has been added, giving the position of the evaluation within the capture buffer. FPS-K70: The maximum possible length for a burst has been increased from 15000 to 32000 symbols. FPS-K70: Improved convergence behavior for equalizer tracking mode. FPS-K70: Improved display area for the measurement result "Phase Unwrap" for Meas/Ref Signal. FPS-K70: Compensate for Symbol Rate Error” now also available for MSK and OQPSK modulations. FPS-K70: Improved demodulation stability for non-MSK modulations in combination with a GMSK filter with a roll-off of <=0.6 and a Gauss filter with a roll-off of

<= 0.4. (This change might slightly reduce the measurement speed for the abovementioned scenarios.)

Modifications of firmware V1.31:

Version	Function
V1.31	SETUP – System Config: The indication of option FPS-B11 “Microwave Preselector Bypass” is moved from tab “Hardware Info” to “Versions + Options”.

Modifications of firmware V1.30:

Version	Function
V1.30	When switching the attenuator coupling from AC to DC a warning message is shown first.
V1.30	SEM measurement: Added remote command for naming TX channels also in MSR (multi standard radio) mode: SENSe:POWer:ACHannel:SBLock<subblock>:NAME:CHANnel<numeric> “<name>”
V1.30	Remote only: The query result of the marker signal count is now formatted as defined with the signal count resolution.
V1.30	Increased the maximum sweep points for Spectrum, I/Q analyzer and FPS-K7 from 32001 to 100001.
V1.30	Changing the reference level offset will also change the limit line with relative y-values. (aligned behavior to FSU/FSQ)
V1.30	If the signal track function is activated with an even number of sweep points, the sweep point number is increased by one. This ensures a stable peak value in the middle of the screen when the signal is constant in frequency.
V1.30	The remote command `:SYSTem:REBoot` will now reboot the operating system as well and not only the firmware application.
V1.30	FPS-B10: Support long computer names for generator setup (e.g. for name of R&S SGS)
V1.30	LegacyPro: HP emulation: Support of unit SEC
V1.30	Spectrum Emission Mask: Multi-Standard Radio (MSR) limits now compliant with specification 3GPP TS 37.141 V12.2.0.
V1.30	FPS-K10: Changed format of Limit Line response returned by SCPI : Start and stop frequencies are rounded to multiples of 1 Hz. Multiple adjacent segments are merged to a single one if possible (same limit level, no gap).
V1.30	FPS-K10: The minimum value for parameter 'capture time' is calculated as follows: For 'trigger source' set to 'external': (First Slot to measure+Number of Slots to measure+0.5) * T_slot, with T_slot = 577 us. For 'trigger source' set to 'Free Run': 10 ms

V1.30	FPS-K10 Multicarrier parameters modified: BTS Class parameter and `CONFigure:MS:MCARrier:BTSClass` removed. Previously the standard supported BTS classes 1 and 2. Now three new device types have been introduced as device type (Multicarrier BTS Wide Area, Medium Range, Local Area). Compatibility mode for `CONFigure:MS:MCARrier:ACTCarriers` introduced. Compatibility mode for `CONFigure:MS:MCARrier:MCBTs` and `CONFigure:MS:MCARrier:STATe` introduced. New Carrier tab added to Signal Description dialog.
V1.30	FPS-K10: MEAS key now opens dialog to select the measurement mode (I/Q or Multicarrier Wide Spectrum mode)
V1.30	FPS-K10: Device tab of Signal Description dialog split into a Device and a Frame tab.
V1.30	FPS-K70: The maximal capture length has been increased to 200 000 000 samples.
V1.30	FPS-K70: Minimum roll off of RRC filters reduced from 0.1 to 0.05 (needed for DVB-S2X)
V1.30	FPS-K70: Auto level measurement with trigger now can be aborted.
V1.30	FPS-K70: Further variants of 64-APSK supported.
V1.30	FPS-K91: The range of the Max number of Data symbols setting has been increased to 10000.

Modifications of firmware V1.11:

Version	Function
V1.11	Multi-Standard Radio Analyzer (MSRA) mode: The default sample rate of the MSRA master has been changed from 100 MHz to 50 MHz.

Modifications of firmware V1.10:

Version	Function
V1.10	In version 1.00 the Auto Level function performs an additional measurement with the new level setting before the end of operation is reported. Since V1.10 this is suppressed for performance reasons.

1.3 Improvements

The following tables list the improvements and indicate since which version the issue could be observed:

Improvements of firmware V1.70:

since	Function
V1.10	The firmware remote installation was sometimes not possible on FPS-13 devices. This issue is solved.

Improvements of firmware V1.60 SP1:

since	Function
V1.60	Due to a driver installation issue the remote control via GPIB may fail with version V1.60 on some devices. This is now solved.
V1.60	The configuration of the LAN IP address in case of “DHCP off” via FPS mini display is now supported again.

Improvements of firmware V1.60:

since	Function
V1.50	ACLR measurement limited Multi-Standard Radio standard sub block frequency to 20 GHz. This issue is solved.
V1.50	Trace export frequency values in frequency domain could differ from the marker readout frequency values when using an even number of sweep points. This issue is solved.
V1.50	FPS-B10: The interface configuration could not always be reloaded after recalling a saveset. This issue is solved.
V1.50	FPS-B33 did not appear in the version and option dialog although the USB Mass Memory Write Protection was active. The functionality of the write protection was not affected. This issue is solved.
V1.50	I/Q Analyzer: During I/Q Vector ASCII Trace Export, the I-values were sorted in ascending order. This issue is solved and these values are not sorted anymore.
V1.50	FPS-K6: The delta marker on magnitude displays did show units of dBm instead of dB. This issue is solved.
V1.50	FPS-K6: The order of table headers and table column data did not correctly match up in an exported CSV file. This issue is solved.

V1.50	FPS-K7: Relative FM/PM results were not updated in the result table. Remote Control was not affected. This issue is solved.
V1.50	FPS-K7: The values of HP and LP filters were missing on hardcopies. This issue is solved.
V1.50	FPS-K18: The indices returned for the "TRACe<n>:DATA?" command by the SCPI recorder did not match the selected result display. This issue is solved.
V1.50	FPS-K18: Files created by the Trace Export functionality always contained the instrument settings, even when "Include Instrument & Measurement Settings" was disabled. This issue is solved.
V1.50	FPS-K18: Accidentally it was possible to activate Moving Average during Direct DPD calculation. This issue is solved.
V1.50	FPS-K18: A running FPS-K18 application unintentionally stopped continuous sweeping when using the sequencer functionality. This issue is solved.
V1.50	FPS-K18: I/Q averaging in combination with Parameter Sweep was not working as expected. This issue is solved.
V1.50	FPS-K18: When training the FPS-K18 equalizer, instead of the averaged I/Q data, only the last I/Q capture was used. This issue is solved.
V1.50	FPS-K18: Improved appearance of spectrum trace for short result ranges.
V1.50	FPS-K18: Polynomial DPD did not produce optimum results when using AM/AM first in combination with "Generate Predistorted Waveform File". This issue is solved.
V1.50	FPS-K18D: Activating and deactivating the Direct DPD in quick succession could lead to a state in which the output level of the connected generator and the generator level displayed in FPS-K18 were not matching each other. This issue is solved.
V1.50	FPS-K30: For ENR table import the ENR table values can now be separated by spaces or commas
V1.50	FPS-K40: Reference Measurement did not work below 30 Hz, this issue is solved.
V1.50	FPS-K70: Improved measurement speed, if pattern search is active.
V1.50	FPS-K70: Remote commands INP:IMP? and INP:IMP:PTYP? did not work. This issue is solved.
V1.50	FPS-K91: Very short PPDUs (1 to 5 symbols) gave too optimistic EVM if payload channel estimation was used. In this case, a warning message was displayed. This issue is solved.
V1.50	FPS-K91: An HE SU PPDU was detected as an HE MU PPDU due to CSD (cyclic shift delay). This issue is solved.
V1.50	FPS-K91: MIMO measurements using R&S OSP (open switch and control platform) did not work. This issue is solved.
V1.50	FPS-K91N: In cases when statistics and time tracking is used, the message "No PPDU of desired type to analyze!" might occur. This issue is solved.
V1.50	FPS-K100: after loading a predefined standard the editor of the PDSCH allocation table showed a strange behaviour. This problem is solved.

V1.50	FPS-K104: Power vs Time: Measurement did not work if Reference Level Offset was set to values below -20 dB. This issue is solved.
V1.50	FPS-K118: Running multi carrier analysis for a long time could result in an out of memory indication. This issue is solved.

Improvements of firmware V1.51 SP1:

since	Function
V1.00	IQ Analyzer: At some devices and specific frequencies, spurious responses with small carrier offset were visible. This affected also the EVM value in R&S FPS-K70. This issue is solved.
V1.00	In Spurious Emissions Measurement with special configuration, some devices displayed an irregular signal in addition to the provided RF signal. This issue is solved.

Improvements of firmware V1.51:

since	Function
V1.50	FPS-K100/104: In case that the synchronization failed, a logfile has been stored into directory C:\Temp. This problem is solved and the log file will be deleted during installation.
V1.50	Fan control improved for new motherboard revisions (model ≥ 3, see “setup – system config – hardware info – row motherboard”)

Improvements of firmware V1.50:

since	Function
V1.10	FPS-K70: “Known Data” files for 512QAM, 1024QAM, 2048QAM and 4096QAM modulations could not be loaded. This issue is solved.
V1.40	Zooming into traces with logarithmic x-axis may lead to an invisible trace. This issue is solved.
V1.40	CALC:MARK:FUNC:POW:RES? AOBW now returns the values of the temporary markers as defined in the manual.
V1.40	FPS-K6: Fixed an issue where exporting the Result Range could export more than the selected Result Range length.
V1.20	FPS-K10: Absolute lower limits for Multicarrier BTS device types are considered even in “Modulation Accuracy” measurement mode. This issue is solved.
V1.20	FPS-K10: Constellation diagram not rotated for MSRA mode and Multicarrier BTS device types
V1.40	FPS-K18: The SCPI command “CONFigure:HSPeed:MODE” is now documented in the user manual.

V1.30	FPS-K40: Calculation of Random Jitter (in Spurious List) was incorrect. This is now resolved.
V1.10	FPS-K70: Improved accuracy of recursive calculation of standard deviation for result summary. For small sweep counts, this results in slightly higher values.
V1.30	FPS-K18: Automatic result recalculation after changing a DPD related setting in manual operation is now activated correctly.
V1.40	FPS-K70: Resolved update issue of Result Summary in MSRA mode
V1.20	SEM and Spurious Emission measurements: The drop down box for transducer factors did not show all transducer factors due to missing scroll bars. This issue is solved.
V1.20	Remote control: Using the driver function rsspecan_ReadToFileFromInstrument() or the `MMEM:DATA?` command to transfer files with more than 1 Mio. Bytes to the controller PC a firmware lock up happened. This issue is solved, but needs also a driver update to version 3.5.0.0 or higher for CVI, LabVIEW and VXIpnp or version 1.5.0.0 or higher for IVI.NET.
V1.20	I/Q Analyzer: In spectrum displays the trace copy mode did not work. This issue is solved.
V1.20	FPS-B10: IP addresses containing zeros were not accepted. This issue is solved.
V1.40	FPS-K10: Active switch “SWAP IQ” disturbed the AUTO FREQUENCY feature. This issue is solved
V1.30	FPS-K10: Improved behavior of the shown ARFCN number when changing the frequency or the GSM band parameter or device type.
V1.10	ACLR measurement: Remote query in Multi-Standard Radio mode now also supports unit dBmV
V1.30	FPS-K40: The offset frequency of the spur was removed from the calculation of discrete Jitter results.
V1.10	FPS-K70: Increased resolution of the value returned by CALCulate<n>:MSRA:WINDow<n>:IVAL?

Improvements of firmware V1.40 SP2:

since	Function
V1.20	Several dropouts are visible in spectrum mode with RMS detector, FFT sweep, large span (e.g. 40GHz) and a large number of sweep points (e.g. 10001). This has now been fixed.

Improvements of firmware V1.40 SP1:

since	Function
V1.30	The applications now support the analysis of data, captured with an analysis bandwidth above 40 MHz by the MSRA master (with option B160).

V1.40	Windows Start Menu: The link to “VSA Sequence Recording” now uses the right path name.
V1.40	FPS-K91: For MIMO measurements for signals with small duty cycles and large idle periods between PPDUs auto level would occasionally provide non optimal results. This issue has been fixed.
V1.40	FPS-K100/104: The command MMEM:LOAD:TMOD:DL '<test model>' for selecting a standard test model did not work in the ACLR measurement of version FPS 1.40. Sending the command lead to an execution error. This issue is solved.

Improvements of firmware V1.40:

since	Function
V1.30	The Marker Auto Max Peak function was not performed when recalling a save set which included this feature.
V1.21	Trace export for all traces and all table results is now creating the expected export file.
V1.00	The remote command ADJ:CONF:LEV:DUR <value> neglected the unit (e.g. ms) which could lead to very long measurement times.
V1.20	Remote control: faster I/Q data readout
V1.30	Reconnecting via LAN and the RSIB protocol did not work reliably. This issue is solved.
V1.30	ACLR: Setting the sweep time below 1 ms is now also possible after setting Optimization to Speed Mode.
V1.30	APD/CCDF: Trace smoothing is now supported.
V1.30	FPS-B10: Interface Configuration: The TCPIP Address/Computer Name selection is now restored during startup.
V1.30	FPS-K7: In standard FM Narrowband the Low Pass Filtering is improved. FPS-K7: Trace export is now exporting the data of the focused window and not always of the first window.
V1.30	FPS-K10: Switching Wideband Noise measurement could have an effect on the limit line of the intermodulation measurement FPS-K10: Fixed sporadic issues with the `STAT:QUES:`SCPI registers in Multicarrier Mode FPS-K10: A comma was missing in output of SCPI command `FETC:WSP:IMPR:` FPS-K10: SCPI command `CONF:MS:MCAR:FALL?` returns `NCON` instead of `NCONT` FPS-K10: Improved handling of exceptions when using the 100 kHz intermodulation limit lines. FPS-K10: Power levels of successive slots now averaged in dBm FPS-K10: Fixed sporadic issue with SCPI command `SYST:ERR:EXT?` FPS-K10: FPS noise floor is now flat with Wideband noise measurement FPS-K10: Absolute lower limits for MC-BTS device types are considered even in “Modulation Accuracy” measurement mode

	FPS-K10: Modulation Spectrum limits for Multi-Carrier BTS devices were incorrect for offsets ±800 KHz and ±1000 KHz. This issue is solved. FPS-K10: Activated switch “SWAP IQ” disturbed the AUTO FREQUENCY feature. This issue is solved FPS-K10: Improved behavior of the shown ARFCN number when changing the frequency or the GSM band parameter or device type.
V1.31	FPS-K10: Modulation Spectrum Table marks all failed results in red FPS-K10: Constellation diagram not rotated for MSRA mode and Multicarrier BTS device types
V1.30	FPS-K30: The preamplifier default state was incorrectly Off on FPS K30 V1.30. This is corrected in FPS K30 V1.40, the default preamplifier is now On. **Note:** A save file saved with the preamplifier default value on FPS K30 V1.30 (Off) is recalled with the corrected default value (On) on FPS K30 V1.40.
V1.31	FPS-K40: DeltaMarker1 could not be dragged and sometimes showed an incorrect response. This issue is solved. FPS-K40: Auto scaling in some cases, would not generate correct results on the first sweep. This issue is solved.
V1.30	FPS-K70: Improved burst search algorithm robustness
V1.10	FPS-K70: The graph of the equalizer “Impulse Response Phase” measurement is now corrected. All other measurements with active equalizer are not affected.
V1.10	FPS-K91: The remote command `SENSe:DEMod:FORMat:AUTO 1` did not work correctly.
V1.30	FPS-K104: In case that a K104 was installed without a K100, loading a test model did not update the capture time. This issue is solved.

Improvements of firmware V1.31:

since	Function
V1.30	The instrument sometimes does not perform a shutdown after the power key on the front panel has been pressed. This issue is solved.
V1.10	Signal Track function now supports level units different from dBm.
V1.30	I/Q analyzer: Spurious Signal eliminated for I/Q Bandwidth > 40 MHz.
V1.30	I/Q Analyzer: A Trigger Offset > 0 has been ignored. This issue is solved.
V1.21	I/Q Analyzer: Improved measurement speed for I/Q Bandwidth > 40 MHz.
V1.30	FPS-K91/N/AC: Auto levelling has been improved to better optimize the amplitude settings for measurements.
V1.30	FPS-K91/N/AC: In case Auto Level Once was issued in RUN CONT mode, the application stopped the continuous measurement mode. This issue is solved.

Improvements of firmware V1.30:

since	Function
V1.10	Transducers with same units and all transducers in unit dB can now be combined. The button for selecting transducers is now correctly horizontally aligned with the name of the transducer.
V1.10	For Transducer Factors programmed from remote containing equal x values, the trace display update did not work under all circumstances. This issue is solved.
V1.10	After closing the data entry for new option keys once, entering further key code was never accepted unless the firmware was restarted. This issue is solved.
V1.10	Remote control via GPIB: A firmware lock up could happen if the remote session was established and destroyed for every individual remote command. This issue is solved.
V1.10	FPS-K10: Fixed sporadic sync issue with SCPI command `SYST:ERR:EXT?`
V1.10	FPS-K10: Improved manual scaling of y-axis of diagrams, to ensure 10 divisions with rounded values. SCPI command `:CONFigure:MCARrier:ACTCarriers DEFAULT` now sets the number of carriers to one (instead of zero). When being in Multi-Standard Radio Analyzer (MSRA) mode the IQ import is now deactivated. In Multi-Carrier Wideband Noise (MCWN) mode: When changing multi-carrier setup back and forth the setting 'gap start after carrier' is restored in the GUI.
V1.10	FPS-K10: In multi measurement mode the 'modulation spectrum list' now defaults to the '1.8 MHz list' (before '1.8 MHz sparse list'). Issuing the `CONF:BURS:PTEM` commands will not change the window layout or start an auto refresh in multi measurement mode.
V1.10	FPS-K10: Modulation spectrum limit at 1.8 MHz offset corrected for BTS Micro.
V1.10	FPS-K77: Improved the signal detection of signals with large differences in frequency offset, clock offset and level between slots.
V1.10	FPS-K91: 'Signal Field' measurement results had been missing. This issue is solved.
V1.10	FPS-K91: In case of an OVLD in Amplitude Manual Mode, the OVLD indicator wasn't cleared after Amplitude Auto Mode was selected. This issue is solved.
V1.10	FPS-K91: In case "number of space time streams (STS) > number of spatial streams (SS)", the Rx antenna results: *IQ Offset, Gain Imbalance, Quadrature Offset, PPDU Power, Crest Factor* for the second STS stream were missing [2Tx X 2Rx setup]. This issue is solved
V1.10	FPS-K100/102/104: When measuring MIMO and recalling a save set containing the same IP-addresses of the connected devices, the measurement stopped working. This problem is solved.
V1.10	FPS-K100/101/102/104/105: Improved software stability.

Improvements of firmware V1.21:

since	Function
V1.00	The Device Footprint now includes the B160 FPGA version number
V1.10	FPS-K70: improved algorithm for burst search within a signal with large carrier to noise ratio.
V1.00	FPS-K91/N/AC: In case the signal was successfully demodulated in the Modulation Accuracy mode, the Spectrum Emission Mask measurement uses the detected channel bandwidth to select the corresponding SEM tolerance limits.

Improvements of firmware V1.20:

since	Function
V1.00	IF output voltage scaling for units ≠ dBm is corrected

Improvements of firmware V1.11:

since	Function
V1.00	IQ Analyzer Mode: The default Y scaling of the Magnitude window now corresponds to the reference level.

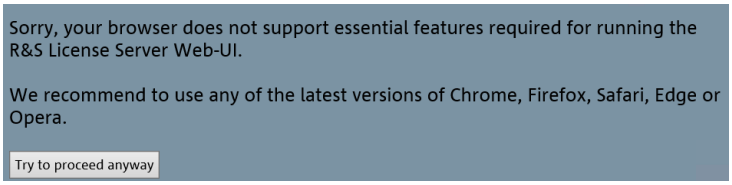
Improvements of firmware V1.10:

since	Function
V1.00	The FPS Mini Display indicates now the correct firmware version after a firmware update has been performed. A reboot was needed in V1.00 versions.
V1.00	A missing External Reference signal is now detected in single sweep aborted state.

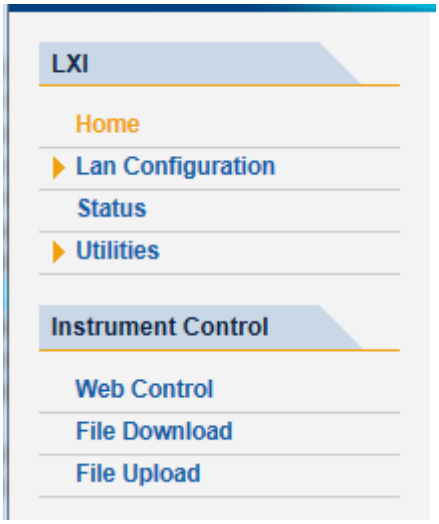
1.4 Known issues

The following tables list the known issues and indicate since which version the issue could be observed:

Known issues of firmware V1.70

since	Function
V1.70	The instrument's License Manager indicates the following message.  **Work around:** Open this page on your own browser with the instrument's IP address followed by a colon and the number 9444, e.g. "10.11.12.13:9444"
V1.40	Web Browser Interface : The browser window shows a windows login screen instead of the analyzer application, but the user log in is not possible. This only happens if a windows remote desktop connection was used before. Reboot the analyzer in that case and reopen the web browser window.
V1.21	Power Sensors: Remote command SENSe1:PMETer1:TRIGger:HOLDoff ignores the parameter unit. The base unit [s] is used instead.
V1.00	 The activation of the on-screen keyboard display is not supported.

Known issues of the web browser Interface

since	Function
V1.40	With version V1.40 the Web Control on the LXI webpage (`http://<address of device>`) allows remote display and easy interaction with the device from any browser. If no external monitor is connected to the R&S FPS, an additional driver is required on the instrument in order to control the R&S FPS via its web browser interface. If the driver is not available, the browser does not show “Web Contol”.  Download the TightVNC DFMirage driver from the official TightVNC website (http://www.tightvnc.com/download.php) and install it as described on the website. The current R&S FPS firmware was tested with the TightVNC DFMirage driver version 2.0.301.

2 Modifications to the documentation

The current documentation is up-to-date.

3 Firmware update

3.1 Validity information

The FPS installer is valid for:

Device	Order Number
R&S® FPS4	1319.2008K04
R&S® FPS7	1319.2008K07
R&S® FPS13	1319.2008K13
R&S® FPS30	1319.2008K30
R&S® FPS40	1319.2008K40

3.2 Update information

The firmware update file for the R&S FPS is one file including the main firmware version number e.g. FPSsetup_V1.00.exe. It will be referred as FPSSetup.exe later in the text. The file can be found on Rohde & Schwarz web page.

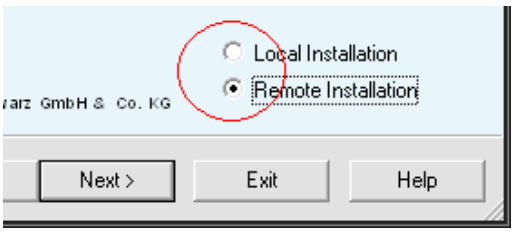
There are several ways to make the setup FPSsetup.exe visible to the device:

3.3 Updating the firmware from a Windows PC

There are several ways to make the setup FPSsetup.exe visible to the device.

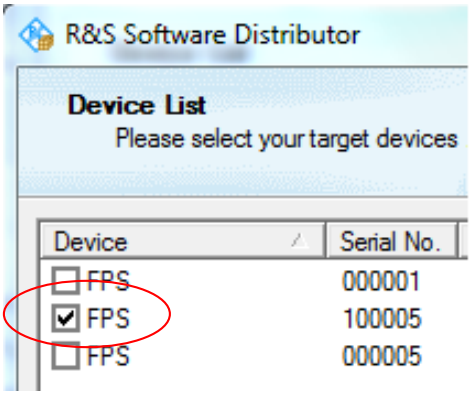
The new firmware can be uploaded without using a memory stick or a network drive. Just a LAN connection from the instrument and a Windows PC is necessary.

1. Run FPSsetup.exe on your PC.
2. Select Remote Installation and click the button Next.



3. Select the Packages which shall be installed and click the button Next .
HINT FOR FIRE WALL USERS: The FPSSetup.exe is communicating with the instruments via LAN. Therefore it is necessary that the FPSSetup.exe may pass the fire wall. After adding it to the fire wall rules, restart the scan by clicking on Rescan.

4. After scanning your LAN subnet all found instruments are listed. Select the instruments you want to update. It is possible to select up to 5 instruments for updating in parallel.



NOTICE

Please be careful and check twice whether you have selected the correct instruments. Depending on your company's network structure also instruments of other departments will show up!

5. Additional help will be displayed after clicking the button "Help" and further options are available by clicking the button "Options".
6. Start the installation by selecting "Install"
7. Confirm that you want to reboot the instrument in order to activate the firmware update (the instrument then restarts automatically)

3.4 Updating the firmware on the instrument

There are three ways to make the setup FPSsetup.exe visible to the device:

Using a memory stick:

1. Copy the file to a directory of the memory stick and insert the memory stick into one of the USB sockets of the R&S FPS.

Using the remote desktop and copying the installation files to a directory of the instrument:

1. Connect the R&S FPS to your LAN.
2. Start the remote desktop on your PC (C:\winnt\system32\mstsc.exe).
3. Enter the TCP/IP address of the instrument, you want to update. Ensure that the "local resources" > "drives" option is selected and press the "Connect" button. (To

get the TCP/IP address of the R&S FPS use the up/down keys to select “Network”. The IP address consists of 4 numbers between 0 and 255.

4. Login to the instrument (user name: “instrument” and default password “894129”).
5. Copy the FPSSetup.exe from your PC to a new folder, e.g. C:\FWUpdate.
6. You can now access this directory with the FPSsetup.exe from the R&S FPS analyzer firmware.

Using a network drive:

1. Connect your R&S FPS to your LAN, and establish a connection to one of your servers. (Please ask your local IT administrator for support)
2. Copy the FPSsetup.exe from your PC to a directory on this server
3. Connect your R&S FPS to your LAN, and establish a connection to one of your servers. (Please ask your local IT administrator for support)
4. You can now access the directory with the FPSsetup.exe from the R&S FPS analyzer firmware.

Performing the update on instrument:

The firmware update process is performed by the following steps:

1. Using external monitor and keyboard/mouse:
   Connect an external monitor, USB keyboard/mouse, switch the instrument on and wait until the Analyzer has resumed operation.
   Or using remote desktop connection:
   Switch the instrument on and wait until the Analyzer has resumed operation. Open the remote desktop on your PC and connect to the instrument as described above.
2. Select "SETUP", then the soft key “System Config”, and select the tab “Firmware Update”.
3. A file browser is displayed to select the proper FPS*.exe setup file. Change the path to the drive and directory which you prepared in the step **Fehler! Verweisquelle konnte nicht gefunden werden.** (USB stick directory, remote PC directory or directory on a server) and close the dialog with the “Install” button.
4. Press the "Next" button to come to the selection of the firmware packages. By default all application should be installed. Ensure that the applications needed are selected.
   Press the "Install" button.
5. The firmware will be stopped and the installation starts. After a few minutes the system restarts automatically. After the restart the firmware installation is complete.

NOTICE

The remote desktop connection will be closed during firmware update as it reboots the instrument. You have to reopen the remote desktop connection again

After the firmware update the "UNCAL" flag appears. A self alignment is necessary. Select "SETUP", the soft key "Alignment" and then press the button "Start Self Alignment" to invoke the alignment procedure.

Operation with and without Administrator Rights

With firmware version V1.30 or higher, the analyzer may be operated with or without administrator rights. Some administrative tasks (e.g. a firmware update or a LXI functions or network configuration) do require administrator rights. In the default configuration, auto login is enabled, and the “Instrument” account with administrator rights is active. This means that no password is required, and the full functionality of the analyzer is available. An additional user account (user name “NormalUser” with default password “894129”) is pre-defined. Use standard Windows functionality if you wish to deactivate the auto login mechanism and activate the “NormalUser” account. Please refer also to the Quick Start Manual of the FPS.

3.5 Installing firmware options

3.5.1 Firmware options included in basic instrument

The R&S FPS-K7 and R&S FPS-K33 application software package is included in the basic instrument firmware. They therefore do not have a separate item in the installer to be selected.

3.5.2 Other firmware options within the FPSsetup.exe File

The R&S FPS-K6, R&S FPS-K10, R&S FPS-K18, R&S FPS-K70, R&S FPS-K72/73, R&S FPS-K76/77, R&S FPS-K82/83, R&S FPS-K84/85, R&S FPS-K91, R&S FPS-K100/101/102/104/105/106, R&S FPS-K118, R&S FPS-K144/148 application software packages have their own installation item and are therefore added to the selection list during the firmware update. Ensure that the checkbox is checked ☑ if the installation is requested.

NOTICE

The functionality of the FPS-K91p, FPS-K91n and FPS-K91ac is integrated within FPS-K91 and are activated by their own key code.
The functionality of the FPS-K101, FPS-K102, FPS-K103, FPS-K104, FPS-K105 and FPS-K106 is integrated within FPS-K100 and is activated by it's own key code.
The functionality of the FPS-K18D is integrated within FPS-K18 and is activated by it's own key code.
The functionality of the FPS-K148 is integrated within FPS-K144 and is activated by it's own key code.

3.5.3 Enabling options by entering option key codes

NOTICE

Skip this section if the option key was entered once.

To activate application software packages, you must enter a license key for validation.

If an XML-file with an option key was sent to you see the install description below.

The license key is in the device certificate or delivered as a part of the software package. The process is performed in the following steps:

1. Open a Remote Desktop Connection to the instrument via ethernet or connect an external monitor and keyboard/mouse]
2. Select "SETUP".
3. Go to the tab “Versions + Options”
4. Press the button "Install Option".
   A dialog box is displayed.
5. Enter the option key number using the keypad.
6. Press "ENTER".
   After a successful validation the message "Option Key valid" is displayed. If the validation failed, the option software is not installed.
7. Reboot the device.

Installation of options via XML-file

8. Open a Remote Desktop Connection to the instrument via ethernet or connect an external monitor and keyboard/mouse]
9. Select "SETUP".

10. Go to the tab “Versions + Options”
11. Press the button "Install Option by XML".
    A file browser is displayed.
12. Select the path to the XML file (e.g. network drive or USB stick)
13. Press "Select".
    After a successful validation the message "Option Key valid" is displayed. If the validation failed, the option software is not installed.

6. Reboot the device.

4 Customer support

Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz product, contact our customer support center. A team of highly qualified engineers provides support and works with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz products.

Contact information

Contact our customer support center at www.rohde-schwarz.com/support or follow this QR code:

QR code to the Rohde & Schwarz support page