

# R&S®FSVA3000/R&S®FSV3000

## Signal and Spectrum Analyzer

### Release Notes

### Firmware Version V1.40

These Release Notes apply to the following models of the R&S®FSV3000 and R&S®FSVA3000 Signal and Spectrum Analyzers:

<b>R&amp;S®FSV3004</b>	<b>order no. 1330.5000K04</b>
<b>R&amp;S®FSV3007</b>	<b>order no. 1330.5000K07</b>
<b>R&amp;S®FSV3013</b>	<b>order no. 1330.5000K13</b>
<b>R&amp;S®FSV3030</b>	<b>order no. 1330.5000K30</b>
<b>R&amp;S®FSV3044</b>	<b>order no. 1330.5000K43</b>

<b>R&amp;S®FSVA3004</b>	<b>order no. 1330.5000K05</b>
<b>R&amp;S®FSVA3007</b>	<b>order no. 1330.5000K08</b>
<b>R&amp;S®FSVA3013</b>	<b>order no. 1330.5000K14</b>
<b>R&amp;S®FSVA3030</b>	<b>order no. 1330.5000K31</b>
<b>R&amp;S®FSVA3044</b>	<b>order no. 1330.5000K44</b>

© 2021 Rohde & Schwarz GmbH & Co. KG  
Muehldorfstr. 15, 81671 Munich, Germany  
Phone: +49 89 41 29 - 0  
Fax: +49 89 41 29 12 164  
E-mail: <mailto:info@rohde-schwarz.com>  
Internet: <http://www.rohde-schwarz.com>

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The following abbreviations are used throughout this document:

R&S®FSVA3000/R&S®FSV3000 is abbreviated as R&S FSVA/  
R&S FSV.

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# 1 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 functions of Firmware V1.40

Version	Function
V1.40	Support for new options: <ul style="list-style-type: none"> <li>• FSV3-B8E "Resolution bandwidth up to 40 MHz"</li> <li>• FSV3-K54 "EMI measurements"</li> <li>• FSV3-K60 "Transient measurements"</li> <li>• FSV3-K60C "Transient chirp measurements"</li> <li>• FSV3-K60H "Transient hop measurements"</li> <li>• FSV3-K148 "5G NR Rel.16 extension for uplink / downlink measurements"</li> </ul>
V1.40	ASCII trace export function has been extended by a selectable column separator in spectrum mode, I/Q Analyzer and R&S FSV3-K7.
V1.40	R&S FSV3-B10: Source calibration data can be stored and loaded in configuration files.
V1.40	R&S FSV3-B10: Supports R&S SMCV100B vector signal generator.
V1.40	Support for Thermal power sensor R&S NRP90T, order no. 1424.6473.02. Thermal power sensor R&S NRP90TN, order no. 1424.6480.02.
V1.40	I/Q Analyzer: Input source "I/Q File" supports additional formats: <ul style="list-style-type: none"> <li>• .iqw: A binary file format containing one channel of complex IQ data. The file contains float32 data in a binary format (interleaved IQIQ or in blocks, IIIQQQ).</li> <li>• .csv: A file containing I/Q data as comma-separated values (CSV).</li> <li>• .mat: Matlab® v4, Matlab® v7.3, Simple Matlab®</li> <li>• .aid: AMMOS intermediate frequency data format (*.aid).</li> <li>• .wv: Proprietary file format used by Rohde &amp; Schwarz signal generators to store waveform data. <b>Hint:</b> Once the file has been loaded, the settings for sample rate and measurement time are indicated as "nan" by this firmware version and have to be set according to the input data.</li> </ul>
V1.40	I/Q Analyzer: The marker function "Time domain power" is available now in I/Q analyzer mode as well.
V1.40	SCPI Recorder: Additional output format "C#" supported.
V1.40	FSV3-K6: <ul style="list-style-type: none"> <li>• Support for segmented capture on base configuration and bandwidth extensions B200, B400, B600 and B1000.</li> <li>• Support for absolute timestamps on table export with sweep count &gt; 1 and after aborting RUN CONT.</li> <li>• Increased numerical resolution of marker display for Parameter Trend and Parameter Distribution displays with unit dB.</li> </ul>
V1.40	FSV3-K18: <ul style="list-style-type: none"> <li>• Trace statistics now available for all traces.</li> <li>• ACLR result table now shows selected RBW in diagram header.</li> <li>• Trace detectors and configurable number of trace points now available for all traces.</li> </ul>

Version	Function
	<ul style="list-style-type: none"> <li>New statistical evaluation of results including a Statistics Table display.</li> </ul>
V1.40	FSV3-K30: Saving and recalling calibration results supported.
V1.40	FSV3-K70: New predefined digital standard: DMR (Digital Mobile Radio).
V1.40	<p>FSV3-K144/-K145/-K147/-K148:</p> <p>Signal demodulation and analysis in line with TS38.211 V16.2.0.</p> <p>Time alignment, Transmit on/off power, ACLR, SEM measurements in line with TS38.141-1/2 V16.4.0 and TS38.521-1/2 V16.4.0.</p> <p>Test models in line with TS38.141-1/2 V16.4.0.</p> <p>Generator to Analyzer settings transfer (requires generator 5G application version 20.12 or higher).</p> <p>Major enhancement of DL auto detection and support of auto detection in UL.</p> <p>Support parsing of DCI parameters (all DCI formats).</p> <p>Auto Demod Once functionality.</p> <p>Auto detection of Cell IDs in the range of 0-10 for downlink.</p> <p>Intra slot frequency hopping for PUCCH format 2.</p> <p>UL frequency hopping.</p> <p>Extension of results summary for All CC results in multi carrier scenarios.</p> <p>Slot / allocation copying for eased signal configuration.</p> <p>Faster Auto EVM speed via additional Auto Set configuration settings.</p>

### New functions of Firmware V1.31

Version	Function
V1.31	Support for option FSV3-B600 "600 MHz Analysis Bandwidth"
V1.31	Support for option FSV3-B710 "Enhanced Performance"

### New functions of Firmware V1.30

Version	Function
V1.30	Support for option FSV3-B1000 "1000 MHz Analysis Bandwidth"
V1.30	Additional trigger sources available: <ul style="list-style-type: none"> <li>- RF Power</li> <li>- Time</li> </ul>
V1.30	FSV3-K18: Trace detectors and configurable number of trace points now available for all traces
V1.30	FSV3-K18: "Force ARB Mode" now uses peak power as the reference point
V1.30	FSV3-K18: New GUI layout in Reference Signal Dialog
V1.30	FSV3-K18: Crest Factor Reduction (SMx-K548) now supports Enhanced Mode
V1.30	FSV3-K18: Frequency span now configurable for all K18F displays (magnitude, phase, group delay)
V1.30	FSV3-K70: Improved burst search for low reference levels.
V1.30	FSV3-K70: Improved coarse synchronization for 64APSKs.
V1.30	FSV3-K70 DVB-S2(X) Tool: Support Capture Lengths > 256,000 Samples.
V1.30	FSV3-K70P: Additionally supported PRBS types 7 and 31.
V1.30	FSV3-K70: Support of "Time" trigger and "RF Power" trigger.
V1.30	FSV3-K100: Supports Custom Sync Weight for P-/S-sync.
V1.30	FSV3-K100: Supports Suppress Interferer for Synchronization.
V1.30	FSV3-K100: Multi Carrier SEM (MSEM) supports up to 5 component carriers.
V1.30	FSV3-K100/K106: Supports "Layer EVM" in Allocation Summary (Downlink only).
V1.30	FSV3-K100/K106: Supports modulation type information for 2D result displays in marker result (Downlink only).
V1.30	FSV3-K106: Supports "After MIMO/CDMA Decoder" filter for Constellation result.
V1.30	FSV3-K106: Supports "MIMO Compensate Crosstalk" setting in Demodulation dialog.

Version	Function
V1.30	FSV3-K106: Supports "NB-IoT Power" in Result Summary for Stand-alone and Guardband modes.
V1.30	FSV3-K144/K145: Signal demodulation and analysis in line with TS38.211 V15.8.0 Test models in line with TS38.141-1/2 V15.5.0 Time Alignment, Transmit On/Off Power, ACLR, SEM measurements in line with TS38.141-1/2 V15.4.0 and TS38.521-1/2 V15.3.0 Frequency error limit check in line with 38.141-1/2 V15.4.0 and 38.521-1/2 V15.3.0 Inband Emission limit check for FR1/FR2 according to 38.521-1/2 V15.3.0 Equalizer spectrum flatness limit check according to 38.521-1/2 V15.3.0 UL measurement mode PRACH Analysis Extended Cyclic Prefix LTE-CRS Coexistence Dynamic spectrum sharing for 30kHz/60kHz SCS (improved synchronization robustness) 3D display view for Alloc ID / Power / EVM vs. Symb X carrier displays Event based actions within the 5G application Precise time trigger for triggered measurements without external trigger availability Analysis of short captures without trigger for repetitive signals (e.g. repeating slot 0) Extended frequency lock range PRB bundling combining PDSCH allocations with same user ID Half frame offset for synchronization signals PDSCH reference data "All 0" or "NR-TM PN23" Fixed CC offset for easier multi component carrier configuration CSI periodicities greater than one frame Analysis of multiple CSI RS resources Transport block scaling factor Timing position EVM_h and EVM_L as EVM calculation method Slotwise calculation of result summary PDSCH VRB to PRB mapping EVM peak in result summary A shortcut for I/Q export in capture buffer display header Configuration of multiple BWPs with same SCS in UL Frame start offset in result summary
V1.30	Support for FSV3-K147 - 5G-NR Combined EVM / SEM / ACLR measurements
V1.30	FSV3-K30: Supports ENR measurement inside the option.

### New functions of Firmware V1.20

Version	Function
V1.20	SCPI recorder now supports R&S SMBV100B.
V1.20	User coupling now also supports coupling of reference level and center frequency with a R&S SMBV100B.
V1.20	The toolbar is now configurable by the user.
V1.20	A new action to start an external application has been added to the Event Based Actions.
V1.20	Frequency offset limit has been extended from 100 GHz to 1 THz.
V1.20	The measurements APD and CCDF can now use the full analysis bandwidth of the device.
V1.20	The SCPI Recorder can now load previous SCPI recordings.
V1.20	FSV3-K18: New option FSV3-K18F Frequency Response Measurements provides Channel Response Magnitude, Channel Response Phase, and Group Delay.
V1.20	FSV3-K18D: New parameter Gain Expansion now allows increasing peak power during Direct DPD.
V1.20	FSV3-K30: Supports trace smoothing similar to spectrum mode.
V1.20	FSV3-K70: Density trace mode for polar displays and eye diagram.
V1.20	FSV3-K70: New "Marker To" functionality to automatically move the marker to the start of the current result range, i.e. the result range highlighted in blue background color.
V1.20	FSV3-K70: Various new SCPI commands that facilitate the handling of e.g. burst/pattern search scenarios, bit error rate measurements.
V1.20	FSV3-K70: New mapping "SMx" for $\pi/8$ -D8PSK and $\pi/4$ -DQPSK.

Version	Function
V1.20	FSV3-K70: QAMs with orders up to 16,384 can now be used.
V1.20	<p>FSV3-K144/K145:</p> <p>Signal demodulation and analysis in line with TS38.211 V15.6.0</p> <p>Supports Time Alignment Error, Transmit On/Off Power, ACLR, SEM in line with TS38.141-1/2 V15.1.0 and TS38.521-1/2 V15.2.0</p> <p>Supports Multi Carrier and Cumulative ACLR measurements</p> <p>Supports Multi Carrier SEM measurements</p> <p>Supports CSI reference signal</p> <p>Supports SRS reference signal</p> <p>Supports test models according to TS38.141 V15.2.0</p> <p>Supports configuration of PDCCH within CORESET (including interleaving)</p> <p>Supports beamforming summary for phase measurements</p> <p>Supports "RS Phase Difference" display</p> <p>Supports RSTP, CSI-RSRP, SS-RSRP in result summary</p> <p>Supports configuration of number of slots to analyze</p> <p>Supports phase tracking option "Pilot only"</p> <p>Supports display of up to 16 component carrier results at once in result summary</p> <p>Supports custom configuration of parameters displayed in result summary</p> <p>Supports DMRS only selection for PDSCH allocations</p> <p>Supports CORESET start as reference point for CORESET DMRS</p> <p>Supports BWP start as reference point for PDSCH DMRS</p> <p>Supports Channel Estimation Time Averaging (only Downlink mode)</p> <p>Supports EVM calculation method.</p>
V1.20	FSV3-K104: Supports Transmit On/Off Power measurement (only Downlink TDD-mode).
V1.20	FSV3-K544: Constant group delays in all files will now be compensated.

### New functions of Firmware V1.10

Version	Function
V1.10	<p>Support for options:</p> <ul style="list-style-type: none"> <li>FSV3-B6 - 10 Gbit/s LAN interface</li> </ul>
V1.10	<p>Support for applications:</p> <ul style="list-style-type: none"> <li>FSV3-K9 – Power Sensor Support</li> <li>FSV3-K10 – GSM Measurements</li> <li>FSV3-K18 – Amplifier Measurements</li> <li>FSV3-K18D – Direct DPD Measurements</li> <li>FSV3-K30 – Noise Figure Measurements including support of smart noise sources FS-SNS</li> <li>FSV3-K33 – Security Write Protection</li> <li>FSV3-K40 – Phase Noise Measurements</li> <li>FSV3-K70 – Vector Signal Analysis</li> <li>FSV3-K70M – Multi-Modulation Analysis</li> <li>FSV3-K70P – BER PRBS Measurements</li> <li>FSV3-K72 – 3GPP FDD BS Measurements</li> <li>FSV3-K73 – 3GPP FDD MS Measurements</li> <li>FSV3-K91 – WLAN 802.11a/b/g Measurements</li> <li>FSV3-K91N – WLAN 802.11n Measurements</li> <li>FSV3-K91P – WLAN 802.11p Measurements</li> <li>FSV3-K91AC – WLAN 802.11ac Measurements</li> <li>FSV3-K91AX – WLAN 802.11ax Measurements</li> <li>FSV3-K100 – EUTRA/LTE FDD DL</li> <li>FSV3-K101 – EUTRA/LTE FDD UL</li> <li>FSV3-K102 – EUTRA/LTE Advanced DL</li> <li>FSV3-K103 – EUTRA/LTE Advanced DL</li> <li>FSV3-K104 – EUTRA/LTE TDD DL</li> <li>FSV3-K105 – EUTRA/LTE FDD UL</li> </ul>

Version	Function
	<ul style="list-style-type: none"> <li>FSV3-K106 – NB-IoT Measurements</li> <li>FSV3-K144 – 5G-NR DL Measurements</li> <li>FSV3-K145 – 5G-NR UL Measurements</li> <li>FSV3-K544 – Frequency Response Correction</li> </ul>

### New functions of Firmware V1.06

Version	Function
V1.06	1 <sup>st</sup> version for: <ul style="list-style-type: none"> <li>FSV3044</li> <li>FSVA3044</li> </ul>

## 1.2 Modified Functions

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

Version	Function
V1.40	The video filtering for level range LIN uses the linear voltage domain now. In previous versions this was done for RMS and average detector, only.
V1.40	I/Q Analyzer: The commands to read I/Q data ("TRACe:IQ:DATA?" and "TRACe:IQ:DATA:MEMory?") additionally support the formats "REAL,16" and "REAL,64".
V1.40	FSV3-B5: The IF output level for low signal power and a reference level < -100 dBm is increased.
V1.40	FSV3-K70: Preview windows have been removed to allow for more compact dialogs.
V1.40	FSV3-K70 and FSV3-K10: Deprecated soft key 'I/Q Import' has been removed. Please use hardkey Input->Input Source->I/Q File instead.
V1.40	FSV3-K144: Relative and absolute limit check in 5G ACLR according to TS38.141-1/2.
V1.40	FSV3-K144: In case of a specific LTE-CRS coexistence scenario, I1 is now 12 instead of 11 for MBSFN subframes according to R1-1909800.
V1.40	FSV3-K145: The PTRS rel. power is now calculated automatically for UL TP.
V1.40	FSV3-K145: N_ID^RS can now be configured explicitly for UL TP.
V1.40	FSV3-K144/K145: One micro service file is now exported for each component carrier.
V1.31	I/Q Analyzer: The maximum output sample rate is now 10 GHz.
V1.30	Maximum number of peaks of marker peak list has been increased to 500.
V1.30	FSV3-K144: The symbol offset of the CORESET was restricted to 3. It can now be set in the range 0-13.
V1.30	FSV3-K144: On/Off Power: After changing the ref level offset with activated noise cancellation, the noise cancellation is automatically reconfigured.
V1.30	FSV3-K144: Time Alignment restricted to multi layer configurations
V1.30	FSV3-K145: In UL, antenna port mapping is extended for PUSCH DMRS
V1.30	FSV3-K144/K145: Renaming of Deploy frequency selections to "FR1 <= 3GHz", "FR1 > 3GHz" and "FR2"
V1.30	FSV3-K145: In specific scenarios, the PUSCH DMRS was moved to a different symbol for mapping type B.
V1.30	FSV3-K144: Calculate OSTP according to R4-1916043 and R4-1916044
V1.30	FSV3-K144/K145: Renaming of "DMRS-Scrambling-ID" to "N_ID^DMRS" in PDSCH and "N_ID^PUSCH" to "N_ID^DMRS" in PUSCH enhanced settings
V1.30	Marker Peak List: The maximum number of peaks is increased to 500.
V1.30	The RF probe support is enabled.

V1.30	Continuous Gating: The upper limit for "Gate Period" is changed to 16 sec.
V1.30	FSV3-K70: 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
V1.30	FSV3-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
V1.30	FSV3-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?
V1.30	FSV3-K30: Option renamed in Mode dialog to Noise Figure.
V1.20SP2	I/Q Analyzer: Improved level flatness for instruments R&S FSV3044 and R&S FSVA3044 at 7.5 GHz with option B200 and B400.
V1.20SP1	The YIG preselector setup algorithm was optimized for FSV3044 and FSVA3044.
V1.20	The function I/Q Import of the IQ Analyzer has been disabled. Please use hardkey Input->Input Source->I/Q File instead.
V1.20	FSV3-K70: Improved layouts for the "Predefined Display Configurations".
V1.20	FSV3-K70: Up/Down increment for the parameters capture length and result length has been increased, both for the scroll wheel step size and for the respective SCPI commands.
V1.20	FSV3-K70: When saving an iq-tar file, the number of pre-/posttrigger samples is now stored as meta information.
V1.20	FSV3-K70: "Channel Bar" now displays more setting parameters.
V1.20	The YIG preselector setup algorithm was optimized at the transition from RF to microwave range at 7.5 GHz.
V1.20	The self-alignment pass / fail criteria were changed to avoid unexpected fails.
V1.20	The internal resolution for gate limits was increased for the CCDF measurement.
V1.20	Using the Trace Maxhold routine in measurement mode "Dynamic" was modified to avoid trace artefacts.

## 1.3 Improvements

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

### Improvements of Firmware V1.40:

Since	Function
V1.06	Function "Save/Recall - Startup Recall" It was not possible to reactivate this function, if it was once switched off. This issue is solved.
V1.06	FSV3-B3: An observed distortion of the audio output signal was removed.
V1.31	FSV3-K30: The needed time for loading loss tables into the option could have increased at multiple loads. This issue is solved.
V1.20	FSV3-K145: The sequence generation of the PTRS in case of UL TP was adapted according to TS38.211 with respect to m and m'.
V1.20	FSV3-K145: For test model 3.2 and 3.3, the user ID (RNTI) was switched for different PDSCH allocations. The issue is solved.



**Improvements of Firmware V1.31SP1:**

Since	Function
V1.20SP2	Production related changes.

**Improvements of Firmware V1.31:**

Since	Function
V1.20	Improved marker count result for the frequency ranges 10 GHz to 16 GHz, 29 GHz to 33 GHz and 38 GHz to 44 GHz.

**Improvements of Firmware V1.30:**

Since	Function
V1.20	FSV3-K144: CSI-RS with antenna ports other than 3000 could not be analyzed. The issue is solved.
V1.20	FSV3-K144: The PDCCH RNTI was restricted to a maximum of 3. The issue is solved.
V1.00	Limit Line: A relative limit line (in y axis) in combination with a relative grid (y-axis in dB) is now supported.
V1.00	The "Warming up" is cleared at the end of the warm up time. The message remained persistently visible in earlier versions in CCDF and APD measurements.
V1.20	Continuous Gating: measurement sweep improved for normal sweep and FFT Sweep.
V1.00	The Trigger Output signal jitter is minimized.
V1.20	Spurious Measurement: An unlock indication was shown for a certain combination of measurement ranges. This issue is fixed now.

**Improvements of Firmware V1.20:**

Since	Function
V1.00	In IQ Analyzer, the range for the parameter Reference Level Offset has been increased in order to be able to properly zoom into low power signals.
V1.00	In case of using power sensor as trigger source, no trigger was detected. This issue has been solved.
V1.00	After switching from internal reference to external reference a message "Ref Unlock" or "No Ref" appeared in rare cases. This issue has been solved.
V1.00	Using an analysis bandwidth of more than 40 MHz, the trigger output port 2 did not send a trigger signal. This issue has been solved.
V1.00	When Windows Defender or other virus protection was activated at startup, the boot process stopped showing the message "Failed to start R&S License Server". This issue has been solved.
V1.10	The "Auto All"-function of menu "Auto Set" needed more than 25 seconds to identify that no signal was connected. This time was minimized.
V1.10	The data entry of parameters "Shift-x" and "Shift-y" in the limit line editor had no effect. This issue has been solved.

**Improvements of Firmware V1.10SP4:**

Since	Function
V1.10	Production related changes.

**Improvements of Firmware V1.10SP3:**

Since	Function
V1.10	FSV3-B10: Using the TTL handshake the measurement data showed signal dropouts, dependent on the parameter settings for sweep time, the number of sweep points and the resolution bandwidth. This has been fixed.
V1.10	FSV3-K9: The sweep with FFT filter and active power sensor is now supported.

**Improvements of Firmware V1.10SP2:**

Since	Function
V1.10SP1	A message box "detection of mandatory hardware component 'RF Attenuator' failed" is indicated in rare cases at low temperature. This issue has been solved.
V1.10	FSV3-B10: The analyzer firmware supports now the functions "Signal Count" and "Marker Demodulation" if the external generator is active. An update of the generator frequency is performed, if the "Frequency Coupling" state is changed (dialog "Input/Output – External Generator Config – Coupling State").
V1.10	The demo license key also enables the selection of the "External Reference Input 2" (dialog "Setup – Reference – Ext Ref 10...1280 MHz").

**Improvements of Firmware V1.10SP1:**

Since	Function
V1.10	When using long measurement times in I/Q analyzer or long observation times in spectrum analyzer mode with active FFT sweep, in rare situations a short spike with high amplitude appeared in the trace. This issue is solved with this firmware version.

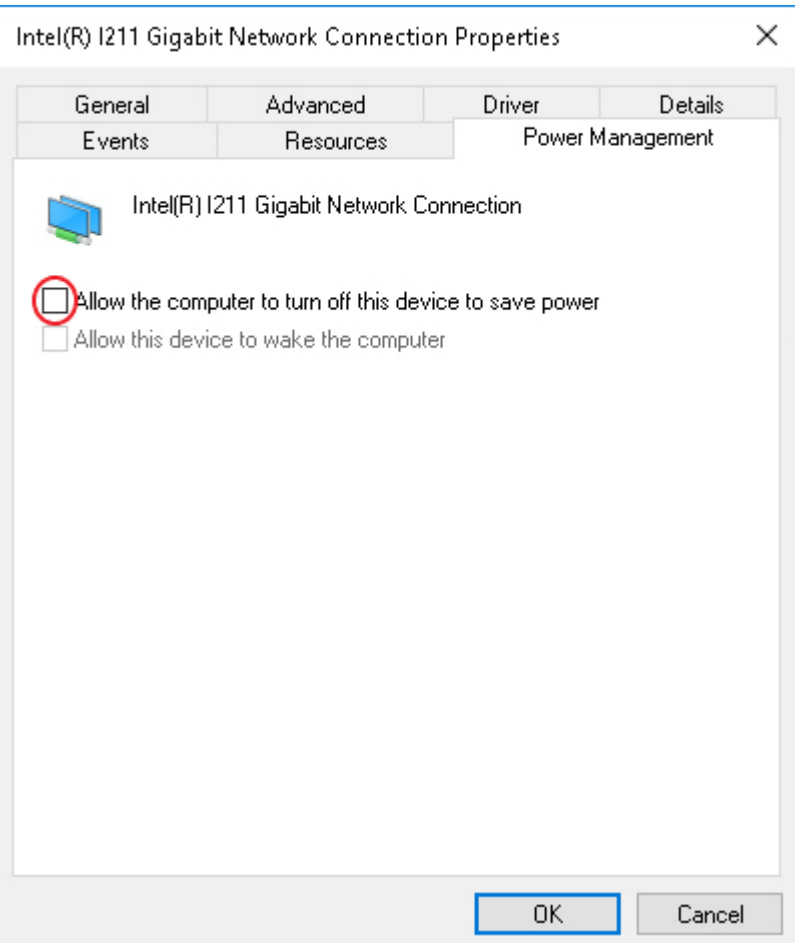
**Improvements of Firmware V1.10:**

Since	Function
V1.10	Function "Gated Sweep" is supported.
V1.10	The feature "Event Based Actions" is now fully supported
V1.04	The ASCII export of a limit line did not work using decimal separator "comma". This issue is fixed.

## 1.4 Known Issues

The following table lists the known issues and indicates since which version the issue could be observed:

since	Function
V1.30	FSV3-K6: When applying a trigger offset, the selected analysis bandwidth may be wider than expected: -200 MHz in case that the bandwidth was set to 160 MHz -400 MHz in case that the bandwidth was set to 320MHz or 250 MHz Other analysis bandwidth settings are not affected. There are two possibilities to avoid this issue: - adjust the trigger offset before setting the analysis bandwidth - set the trigger offset in two steps: set it first to any value $\neq 0$ s (example 100 ns) and in a second step to the desired value

since	Function
V1.10	For IQ-Export > 600 Mio. samples no Iq.tar preview is available and a Windows message warning about low memory may be displayed. This issue only occurs with option R&S FSV3-B114 Enhanced Computing Power.
V1.10	License key installation via the R&S License Manager webpage may show a red message in the last line. Nevertheless, the license key is properly installed on the device, which can be seen after a reboot.
V1.10	FSV3-K91/n/ac/ax: The R&S FSV3-K91 does not yet support the Auto Reference Level functionality. Before using remote control scripts developed for other R&S spectrum analyzers, the SCPI command [:CONF:POW:AUTO] must be commented out.
V1.10	<p>A message box "Warning: Missing smartcard or smartcard not initialized" may appear during startup of the instrument in rare cases.</p> <p>In this case, please switch the instrument off and on using the power switch on the rear side of the instrument or disconnect/reconnect the power line to solve this issue.</p>
V1.00	<p>In combination with a certain LAN-switch (SMC Switch 210) the VISA remote connection to the FSV3000 sometimes breaks. If this happens, the power save mode in the configuration of the Intel I211 network controller must be deactivated on the FSV3000:</p> 

## 1.5 Optimizing 10 Gbit LAN Speed (R&S FSV3-B6)

To obtain optimum LAN speed performance using the R&S FSV3-B6 (10Gbit/s LAN Interface), driver settings have to be adjusted. Here is a recommendation on how to adjust the settings for optimized speed:

1. Open Windows "Start Menu".
2. Search for "Network and Sharing Center".
3. Select "Network and Sharing Center".
4. Select "Change adapter settings".
5. Select "Ethernet 3 - Intel(R) Ethernet Converged Network Adapter X550-T1"
6. Select "Configure"
7. Select Tab "Advanced"
8. Adjust the following settings:
  - "Interrupt Moderation" > Value: "Enabled"
  - "Jumbo Packet" > "9014 Bytes"
  - "Maximum Number of RSS Queues" > "16 Queues"
  - "Performance Options" > "Properties"
  - "Interrupt Moderation Rate" > "Off"
  - "Receive Buffers" > "4096"
  - "Transmit Buffers" > "16384"

## 1.6 Windows 10

The R&S FSV3/R&S FSVA uses the Windows 10 IoT Enterprise LTSC operating system, which is the embedded version of Windows 10 with long term support for Windows patches.

## 2 Firmware Update

The firmware update file for the R&S FSVA/R&S FSV is one file including the main firmware version number e.g. `FSV3000_V1.30.exe`. It is referred to as `FSV3000Setup.exe` later in the text. The file can be found on the Rohde & Schwarz web page.

### 2.1 Performing the Firmware Update on the Instrument

There are three ways to make the `FSV3000Setup.exe` setup file visible to the device:

#### Using a memory stick:

9. Copy the file to a directory of the memory stick.
10. Insert the memory stick into one of the USB sockets of the R&S FSV3000.

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

1. Connect the R&S FSV3000 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. The IP address consists of 4 numbers between 0 and 255.  
(To get the TCP/IP address of the R&S FSVA/R&S FSV, press the "Setup" key, then select "Network + Remote".)
4. Ensure that the "local resources" > "drives" option is selected.
5. Press the "Connect" button.
6. Log on to the instrument (user name: "instrument" and default password "894129").
7. Copy the `FSV3000Setup.exe` from your PC to a new folder, e.g. `C:\FWUpdate`.
8. You can now access this directory with the `FSV3000Setup.exe` from the R&S FSVA/R&S FSV analyzer firmware.

#### Using a network drive:

1. Connect your R&S FSVA/R&S FSV to your LAN and establish a connection to one of your servers. (Ask the local IT administrator for support.)
2. Copy the `FSV3000Setup.exe` from your PC to a directory on this server.
3. You can now access the directory with the `FSV3000Setup.exe` file from the R&S FSVA/R&S FSV analyzer firmware.

#### Performing the update on the instrument:

Update the firmware by performing the following steps:

1. Switch the instrument on and wait until the analyzer has resumed operation.

2. Press the "SETUP" key, then select "System Config" > "Firmware Update" tab. A file browser is displayed to select the proper FSV3000\*.exe setup file.
3. Change the path to the drive and directory which you prepared in the step before (USB stick directory, remote PC directory or directory on a server).
4. Select "Install" to close the dialog.
5. Select "Next" to display the selection of the firmware packages. By default, all applications are installed. Ensure that the required applications are selected.
6. Select "Install".  
The firmware is stopped and the installation starts. After a few minutes, the system restarts automatically. After the restart, the firmware installation is complete. After the firmware update, the "UNCAL" flag appears. A self alignment is necessary.
7. Press the "SETUP" key, then select "Alignment" > "Start Self Alignment" to invoke the alignment procedure.

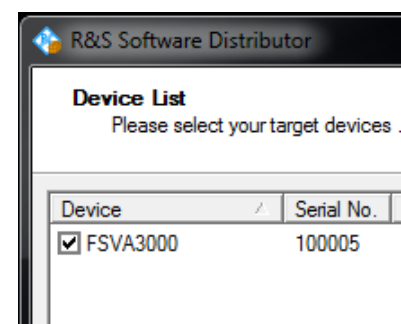
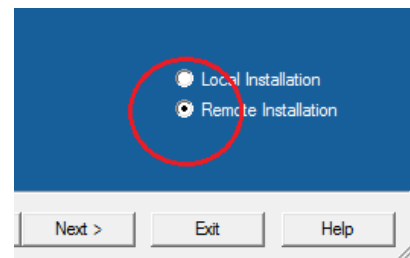
## 2.2 Performing the Firmware Update from a Windows PC

The R&S FSVA/R&S FSV firmware can also 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 FSV3000Setup.exe on your PC.
2. Select "Remote Installation".
3. Select "Next."
4. Select the packages to install.
5. Select "Next".

**Note:**

FOR FIREWALL USERS: The FSV3000Setup.exe communicates with the instruments via LAN. Therefore, the FSV3000Setup.exe file must pass the firewall. Add it to the firewall rules, then restart the scan using "Rescan".



6. The setup procedure scans your LAN subnet and displays all found instruments
7. Select the instruments you want to update.  
You can select up to 5 instruments to update in parallel.

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**NOTICE**

Be careful and check twice if you have selected the correct instruments. Depending on your company's network structure, also instruments of other departments are included!

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8. Select "Help" to display additional help.  
Select "Install" to start the installation.
9. Confirm the message to reboot the instrument to activate the firmware update.  
The instrument then restarts automatically.

## 2.3 Installing Firmware Options

### 2.3.1 Firmware Options Included in Basic Instrument

The R&S FSV3-K7 application software package is included in the basic instrument firmware. Therefore it has no separate item in the installer to be selected.

### 2.3.2 Enabling Options by Entering Option Key Codes

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**NOTICE**

You can skip this section if you already entered the option key before.

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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 installation description below.

If the license key is in the device certificate or delivered as a part of the software package, perform the following steps:

1. Press the "SETUP" key.
2. Go to the "Versions + Options" tab.
3. Select "Install Option".  
A dialog box is displayed.
4. Enter the option key number using the keypad.
5. Press "ENTER".  
After a successful validation, the "Option Key valid" message is displayed. If the validation failed, the option software is not installed.
6. Reboot the device.

#### Installation of options via XML-file

1. Press the "SETUP" key.
2. Go to the "Versions + Options" tab.
3. Select "Install Option by XML".  
A file browser is displayed.
4. Select the path to the XML file (e.g. a network drive or USB stick).
5. Press "Select".  
After a successful validation, the "Option Key valid" message is displayed. If the validation failed, the option software is not installed.
6. Reboot the device.



## 3 Customer Support

### Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz equipment, contact one of our Customer Support Centers. A team of highly qualified engineers provides telephone support and will work with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz equipment.

### Up-to-date information and upgrades

To keep your instrument up-to-date and to be informed about new application notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument and your wish. We will take care that you will get the right information.

#### Europe, Africa, Middle East

Phone +49 89 4129 12345

[customersupport@rohde-schwarz.com](mailto:customersupport@rohde-schwarz.com)

#### North America

Phone 1-888-TEST-RSA (1-888-837-8772)

[customer.support@rsa.rohde-schwarz.com](mailto:customer.support@rsa.rohde-schwarz.com)

#### Latin America

Phone +1-410-910-7988

[customersupport.la@rohde-schwarz.com](mailto:customersupport.la@rohde-schwarz.com)

#### Asia/Pacific

Phone +65 65 13 04 88

[customersupport.asia@rohde-schwarz.com](mailto:customersupport.asia@rohde-schwarz.com)

#### China

Phone +86-800-810-8828 / +86-400-650-5896

[customersupport.china@rohde-schwarz.com](mailto:customersupport.china@rohde-schwarz.com)