R&S® EVSG1000 / EVSF1000
Release Notes
Firmware Version 01.30

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The software makes use of several valuable open source software packages. For information, see the "Open Source Acknowledgment" provided with the product.

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ROHDE&SCHWARZ

Contents

1 Information on the Current Version and History

Attention: Please also read the information about heatsink in chapter 4!

1.1 Version 01.30

Released 7.2019

Release 1.30 introduces the new option "EVSG1-K25 I/Q data streaming" as an extension to the existing "EVSG-K21 data recording". It enables the EVSG1000 / EVSF1000 to stream and record I/Q samples of the signal with a bandwidth of 100 kHz while doing "normal" measurements in parallel. The recorded signal may be used for further analysis, or can be reproduced by a vector signal generator. It is also possible to get I/Q data as an infinite stream over network.

The VOR analysis mode (EVSG-K2) offers now more fine adjustment for bandwidth and filtering. It was found that measurements at low RF levels (<= -100dBm) work best with measurement time >=500ms, FM BW at 1kHz and "Bearing Filter" is set to "narrow". However these setting are not default and need to be set explicitly when required, for example in flight inspection.

Beside of that Release 1.30 comes with lots of optimizations and bug-fixes to increase performance and stability.

Compatibility

Component	Version
RX-Board	Rev 3.00 +
Mainboard	Rev 4.00 +
Keyboard Controller	V 1.01
Startup-Controller	V 1.11 +

REMARK:

Please be aware that Release 1.30 will not be able to read and visualize old data recordings. There is simply no access to old recordings. A "factory preset" will delete these recordings.
Please save old data recordings before performing the software update.

Firmware package contents

Version	Contents
01.26f	EVSx1000 Software
00.43.00	RX FPGA
00.09.01	GBAS FPGA

New Functionality

Functions
EVSG1-K25 I/Q-data streaming: Record I/Q data internally and export to USB memory stick
EVSG1-K25 I/Q-data streaming: Stream I/Q data over network
EVSG-K4/K5 (GBAS and SCAT): Measurements are now possible without PPS signal. While this is very handy especially for field measurements, only the PPS signal can guarantee the correct slot order and meaningful values for "Sync Seq. Start"
EVSG-K4/K5 (GBAS and SCAT): Automatic RF Attenuator Mode (like in ILS mode etc.)
EVSG-K4/K5 (GBAS and SCAT): Counting of valid and failed messages
EVSG-K2 (VOR analysis): Configuration of AM30Hz and FM Bandwidth
EVSG-K2 (VOR analysis): Selectable bandwidth for FM and AM30 components and bearing calculation
EVSG-K2 (VOR analysis)-mode: Configuration of a frequency offset
EVSG-K6 (COM analysis): Simultaneous measurement of 1000Hz and 1200Hz test tones
ILS LLZ,GP,MB, VOR,COM: "Zoom-View" shows the most important values with big font
EVSF1-B4 (Slide in option): Support for "Demod Out", "Trigger_in" and "Audio-Out"
Support for multiple VNC clients

Modified Functionality

Functions
Bugfix Data streaming: When connections were not properly terminated the EVSG/EVSF freezed. This happened e.g. if the client crashes or is disconnected (CR219)
Bugfix: The GBAS decoder was out of memory after several days or hours of operation, depending on the signal content and active view. This caused application crashes and reboots (CR222)
Bugfix: When ILS-LLZ was in 2F and an autocal was started, the generated autocal values was faulty sometimes. This led to level inaccuracy of up to 50 dB (CR 184)
Bugfix: The EVSx was unable to decode VOR ID when 5% modulation depth is used. Limits were changed.
Improved timing when switching from "Low Noise" to "Norm" (and back) to reduce switching spikes (CR224)
Fixed a configuration flaw of the controller PC which may cause crashes, especially on high temperatures.
GBAS Burst view: Possible crashes when zoomed and an "OVERLOAD" occurs → fixed (CR223)
The ENTER key does no longer terminate data input. It takes the value, but the data input box remains active. This behavior is similar to other R&S-equipment.
ILS-LLZ: Frequency range is now limited from 70 MHz to 200 MHz, while ILS-GP is limited from 200 MHz to 410 MHz. This avoids the use LLZ mode to measure GP and vice versa
Data Recording: "Clear all Lists" deletes all lists of the current RX board and mode.
GPS: With no GPS the data is now filled with dashes. Former versions showed Zeroes.
Marker positions in RF/IF/AF-Spectrum and TD are stored when the device is switched off
Bugfix: "ID period" showed useless values before 2 ID were received (CR128)
Bugfix: EVSF did not store its error log when switched OFF (CR152)
Bugfix: GBAS Frame- and Burst View: Graphic showed increased noise floor because of limited internal resolution (CR157)
GBAS Burst View: Values are now shown with green/red background to indicate their status, like in Frame view (CR160)
GBAS: The valid/invalid classification is now based on the message-CRCs. It was based on the success of the FEC before, which does not necessarily indicate the signal is correct (CR 182)
VOR: The EVS300 compatible dataset ("FULL") now also provides the 60 Hz distortion value (CR 187)
BUGFIX: GBAS: Sometimes recorded messages were not decoded properly (CR 192)
Bugfix: EVSG/EVSF: Sometimes the settings were not correctly saved when the device was switched OFF (CR 203)

Functions
Bugfix: When the Energy Saver was activated and the display off, the missing display voltage was reported as failure and the UNCAL indication gets active (CR 204)
The VNC-server did not recover when the IP address changes. This was especially unpleasant when operating an EVSF. It was solved by using a more robust VNC server (CR205)
More Remote commands for many settings
Warning when the data export would overwrite an existing file (CR210)
ILS LLZ and GP: Residual FM with ICAO filtering also available in 2F (CR215)

Known Issues

Known-Issues
LF IN / BASEBAND IN still does not support measurements. However an implementation is present and shall be ready in the next release
Missing configuration for GPS output: Export position as floating point number, Height as WGS84
I/Q data export: After 34 minutes the I/Q file is larger than 2GB and cannot be exported to a FAT-formatted USB stick. The EVSG/EVSF cannot handle NTFS formatted media. The only way is to use a stick formatted with a Linux-filesystem (ext2/3/4). On MS Windows, a tool like "ext2explorer" may help to import the data. For longtime I/Q recording it is recommended to stream I/Q data over network which does not have any limitations

1.2 Version 01.20

Released 12.2018

This Release introduces the software options "EVSG-K4 GBAS" and "EVSG-K5 SCAT-I" for GBAS and SCAT-I signal analysis available for both EVSG1000 and EVSF1000. It offers physical measurements like signal level and timings along with several graphical visualizations. Message content decoding is implemented for all common message types, but is also configurable and expansible for future developments.

Residual FM measurements according to the ICAO standards were added to the ILS analysis available in the base firmware of EVSG1000 and EVSF1000 (no option necessary).

Compatibility

Component	Version
RX-Board	Rev 3.00 +
Mainboard	Rev 4.00 +
Keyboard Controller	V 1.01
Startup-Controller	V 1.11 +

REMARK:

Please be aware that Release 1.20 will not be able to read and visualize old data recordings. There is simply no access to old recordings. A "factory preset" will delete these recordings.
Please save old data recordings before performing the software update.

Firmware package contents

Version	Contents
01.17k	EVSx1000 Software
00.36.02	RX FPGA
00.06.16	GBAS FPGA

New Functionality

Functions
"EVSG-K4 GBAS analysis" and "EVSG-K5 SCAT-I analysis"
GBAS/SCAT-I Sequence, frame and burst view
GBAS/SCAT-I time domain visualization
GBAS/SCAT-I constellation diagram
GBAS/SCAT-I data recording
GBAS/SCAT-I message decoding
GBAS/SCAT-I external message definitions to configure the decoding
ILS residual FM 90Hz/150Hz with ICAO filtering. It's also possible to use narrow filters to improve 90Hz/150Hz separation.
Support for GPS-receivers with USB interface - see note in chapter 4.2

Modified Functionality

Functions
Negative values for GPS undulation are now correct (CR159)
Audio output level is increased by factor 2 (CR155)
Adjustable trigger offset time for ILS/VOR/MB/COM/TD (-180ms … 1000ms) (CR153, CR151)
Corrected VOR AM voice modulation (CR 143)
Taking the selected DDM and SDM unit into account in exported recordings and streams
Possibility to use the PPS input as trigger for ILS/VOR/MB/COM. Since the EVSF without option EVSF1-B4 has no dedicated trigger input, this is the only way to handle a hardware trigger. (CR137)
Fine-adjustment of PPS and trigger timings. Measurements should be more accurate, so there may be slight differences compared to measurements with older EVSG/EVSF software.

Known Issues

Known-Issues
LF IN / BASEBAND IN does not support measurements
Online Help not context sensitive
A heatsink is required to operate RF/IF/AF spectrum and TD analysis with full performance (see chapter 4)
When autocalibration is performed with non-zero level correction, level measurements afterwards will be wrong. It is recommanded to reset device settings before autocalibration.
GBAS/SCAT-I: An external PPS source is needed to receive and decode GBAS signals. The possibility to go without PPS is planned for future developments.
GBAS/SCAT-I: No automatic gain control. However the EVSG/EVSF still handles bursts with more that 40dB level difference due to its high dynamic
GBAS/SCAT-I: GBAS-decoding is based on XML definitions of the message types. It is also possible to use user defined XML definitions. However there are only basic possibilities to handle those files.
GBAS/SCAT-I: The status of the received bursts ("green" or "red") does not include the message CRCs. Data decoding on bursts with invalid CRC will propably result in invalid data.

1.3 Version 01.10

Released 5.2018

This is the first major extension of the EVSG / EVSF Software.
It contains new features as well as improvements. There is an overhauled user manual, also available as online help with this update.

Compatibility

Component	Version
RX-Board	Rev 3.00 +
Mainboard	Rev 4.00 +
Keyboard Controller	V 1.01
Startup-Controller	V 1.11, V1.12

Please be aware that Release 1.10 will not be able to read old data recordings. There is no access to old recordings except that a "factory preset" will delete them. So if there are data recordings, they shall be exported before the update.

Firmware package contents

Version	Contents
01.10k	EVSx1000 Software
00.30.11	RX FPGA

New Functionality

Functions
RF Spectrum: Spectrum Analyzer Mode for frequency spans from 0.1 MHz to full span (70 MHz .. 410 MHz) This Mode is activated with EVSG-K10, which also covers the IF-Spectrum for smaller spans
ILS LLZ/GP: Distortion value 90+150 Hz and residual FM
VOR: Distortion K2 of 30 Hz and K2,K3,K4,K5 of 9960 Hz
RF/AF/IF Spectrum: Average and Max-Hold
UNDO / REDO keys to revert to old settings
Optioncodes can be read from XML files on USB

Modified Functionality

Functions
The GPS delay +/- sign was inverted compared to EVS300 → corrected (CR 120)
The shortcut from 2F ILS LLZ/GP to AF-spectrum/TD leads to the channel frequency, which was useless. Now there is a possibility to choose CRS or CLR. (CR 56)
Overload Indication for RF/IF/AF/TD modes (CR 116)
Shortcut from LLZ to GP and back is located on the frequency page. It keeps the channel number and sets the according frequency. (CR 109)

Functions
The ILS LLZ/GP autotune in 2F was searching for one signal above and one signal below the channel frequency. Because in GP it is OK to have both signals above or below, the autotune now searches for the 2 best signals from -25 kHz .. +25 kHz, no matter where they are. (CR 107)
AF-Spectrum: the reference value 0dB was 6dB too high → corrected (CR 103)
AF-Spectrum: The RF carrier was visible at 0 Hz. It is now suppressed, however some remains may still be seen (CR 102)
After a software update all settings will be set to default. This ensures that changed defaults are active after updates. (CR 97)
AF/IF-Spectrum: The selectable resolution bandwidths were inaccurate. The new values may be odd, but they are correct (CR 96)
Many graphical improvements on RF/IF/AF spectrum to align the usage to the current generation of R&S® spectrum analyzers
Frequency Offset values in kHz now with 3 post comma digits (CR 82)
The so called "Factory Presets" in Rel. 1.00 sets all operational settings to default, but network settings and data recordings were left unchanged. Now there is a choice between the "normal" preset, which works as before, and a real "factory preset" which also clears data and network settings. (CR 81)
It may happen that battery charging is stopped for temperature conditions. This is now indicated as "Ch.susp." (CR 76)
Errors on self-test voltages (BITE) were indicated, but not stored in the errorlog → corrected (CR 68)
VOR did not work well if the 30 Hz frequency deviates more that 0.5 Hz → corrected (CR64,65)
There is a remote command "help" which delivers an up-to date list of remote commands with a short description. This should be preferred over all legacy documentation. The current manual shall also be based on that list. (CR 60)
Remote commands "AUTOCALSTATUS" and the "FULL" list selection made compatible to the EVS300 output (CR 59,58,57)
ILS phase 90/90 and 150/150 did not work well with averaging (Meastime > 10 ms) →corrected (CR55)
Possibility to read NRP power values by remote (CR54)
The level value showed some overshoot behaviour on fast level changes → corrected (CR 27)
ID modulation value was unstable → corrected (CR 22)
Screenshots can be exported in inverted greyscale for better print results (CR 11)
In Rel 1.00, the FULL and ALL stream selection did not respect unit settings (e.g. DDM in PCT or µA,…) Now the settings are used, also to improve compatibility to EVS300 which also used the settings. (CR 59)
Improved navigation in the online help

Known Issues

Known-Issues
LF IN / BASEBAND IN still not supported for measurements
Online Help not context sensitive
A heatsink is required to operate RF/IF/AF spectrum and TD analysis with full performance (see chapter 4)

1.4 Version 01.01

Released 11.2017

This release patches two issues that slipped into the first Software Release.
Both issues and their patches do not affect the measurement performance or the remote control behaviour.

Compatibility

Component	Version
RX-Board	Rev 3.00 +
Mainboard	Rev 4.00 +
Keyboard Controller	V 1.01
Startup-Controller	V 1.11

Firmware package contents

Version	Contents
01.00h	EVSx1000 Software
00.18.03	RX FPGA

New Functionality

Functions
No new functionality

Modified Functionality

Functions
EVSG: under some circumstances the device booted, but the display remains black. A patch was necessary to ensure the correct startup of the display controller. (CR 23)
EVSF: When using a static IP address it shall be entered with a USB keyboard by pressing "INSERT". Unfortunately the entered IP was not set, so the default IP remains active. (CR 36)

Known Issues

Known-Issues
The issues described in R1.00 are not solved by R1.01

1.5 Version 01.00

Released 10.2017

Initial version for EVSG1000 and EVSF1000

Compatibility

Component	Version
RX-Board	Rev 3.00 +
Mainboard	Rev 4.00 +
Keyboard Controller	V 1.01
Startup-Controller	V 1.11

Firmware package contents

Version	Contents
01.00g	EVSx1000 Software
00.18.03	RX FPGA

New Functionality

Functions
ILS LLZ and GS: 1F, 2F and Wideband analysis DDM, SDM AM depth and modulation frequencies of each signal component Distortion measurement K2, K3, K4, THD, AM 90+150 Hz Detailed ID analysis and decoding Independent analysis of Course and Clearance (EVSG-K1)
ILS MB (EVSG-K3): Analysis of pulsed 400Hz, 1300Hz and 3000Hz signals Detailed ID analysis
VOR (EVSG-K2): Bearing and Analysis of all signal components Detailed ID analysis and decoding
COM (EVSG-K6): Support for installations with 1 or 2 transmitters Independent analysis of each transmitter Analysis of 1 kHz test tones
IF Spectrum Analysis (EVSG-K10) for frequency spans up to 100kHz
AF Spectrum Analysis (EVSG-K11) up to 50 kHz
AF Timedomain measurements (EVSG-K12)
TCP/IP Remote control, compatible with EVS300
Data Recording (EVSG-K21) for LLZ, GS, MB, VOR and COM
GPS support (EVSG-K20) with PPS sync
Spectrum Preview for LLZ, GS, MB, VOR and COM
VNC Remote operations
ower Sensor support (EVSG-K24)

Modified Functionality

Functions
Nothing yet

Improvements

Improvements
Nothing yet

Known Issues

Known-Issues
RF Spectrum Analysis (sweeped spectrum) not yet implemented
LF IN / BASEBAND IN not yet supported for measurements
Only basic functionality for Spectrum and Scope modes
VOR distortion and residual FM not yet implemented
VOR ID needs a measurement time > 100ms to be stable
Online Help contains the full user manual, but is not context sensitive and hard to navigate

2 Modifications to the Documentation

This chapter is about issues in the user manual which do not match with the released software.

Issue
RX1 / RX2 BB Out bandwith: This is a developer setting which was not intended for end users. It was removed in the released software
RX1 / RX2 Source The baseband input analysis is not yet fully implemented. Therefore the selection of LF IN is disabled in the first software version
LF IN Range / Impedance / Coupling Since the baseband input cannot be used yet there is no use selecting its input parameters

3 Firmware Update

3.1 Validity Information

Device	Order Number
EVSG1000	1329.8009.02
EVSF1000	1330.0008.02

3.2 Updating the Firmware

The update is distributed as a single file with ending ".evs". Place this file in the main directory of a USB stick and apply the stick to the EVSx1000.

Go to Setup → Inventory (use the VNC access on EVSF1000).

Move the cursor to "SW Update" and press ENTER.

A list with files appears, select the required update file and press ENTER. The update procedure shall run for max. 20 s without errors.

Reboot the device to get the update working.

4 Additional Information

4.1 Heatsink Requirement

It was found that the graphical modes (RF/IF/AF spectrum and TD analysis) do some heavy calculation which cause the controllers CPU to get hot. Depending on the environmental temperature the CPU needs to decrease its speed. The device will still operate, and there is no risk of any hardware damage. However the performance may be limited.
A heatsink is mounted in all devices starting from 5.2018. Older devices will get the heatsink retrofit free of cost as soon as they appear in R&S Service.

4.2 GPS-Receiver on USB-Port

Recent GPS-Receivers may offer a USB-interface. There is no real standard for USB-GPS, so most of them use an internal RS232-USB-converter, which opens a virtual COM-port on the connected PC or device.
The Linux-System on the EVSG/EVSF1000 supports an impressive number of those chips, so many USB-GPS will work with both devices.

Nevertheless Rohde&Schwarz does not guarantee that all types of USB-GPS-Receivers are supported. It is advisable to run tests before buying expensive GPS equipment or using them for operational purposes.

5 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.

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