

# The R&S®FSVR real-time spectrum analyzer boasts expanded functionality

The R&S®FSVR, a unique combination of realtime spectrum analyzer and full-featured signal and spectrum analyzer, was introduced to the market around a year ago. Many users have been persuaded by its speed, ease of operation and the range of new display alternatives. The only missing features were measurement results in the time domain and more ways to postprocess recorded data. The R&S®FSVR has now been enhanced to include a wealth of additional functions, leaving hardly any wish unfulfilled.

## Power versus time

This function displays the power in the time domain in real-time, so that users can measure the duration of signals or sporadic interference. In order to detect interference, the frequency mask trigger (FMT) can also be used in this display mode. Plus, a time domain trigger can be used, for example, to trigger pulse edges. A pre- and post-trigger domain determines how much I/Q data will be stored before and after the trigger event for subsequent in-depth analysis. If, for example, the user wants to check the stability of the repetition rate of pulse sequences (often referred to as pulse-to-pulse jitter), it helps to monitor how the power or spacing of the pulses changes over time. The waterfall diagram in the power versus time function is an indispensable tool for this purpose (FIG 1).

## New trigger functions

The R&S®FSVR stops signal processing as soon as the FMT detects an event. This allows the user to analyze the current spectrum and its generation, and then rearm the trigger. The new automatic rearming feature simplifies the analysis as the user only sees the spectra that are of interest. Pre- and post-triggers can be used to define the I/Q data that is captured with each event. The spectrogram is postprocessed in this mode, which makes it possible to increase the time resolution to 4  $\mu$ s (instead of 52  $\mu$ s in the realtime spectrogram mode).

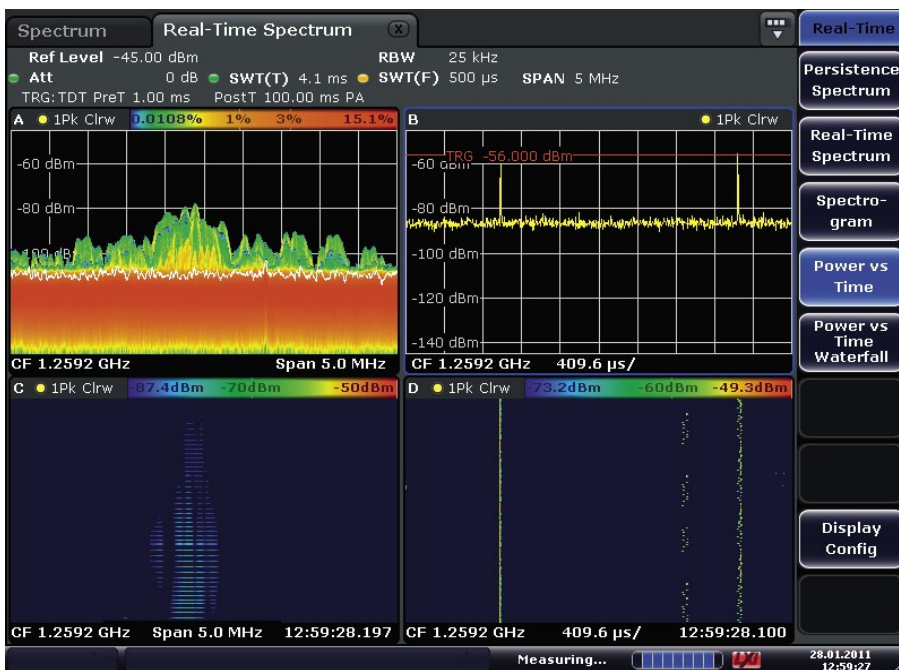


FIG 1 The many display functions in the frequency and time domain, here for a radar signal. The signal spectrum (in persistence mode) and the spectrogram in the frequency domain can be seen on the left. Power versus time is displayed in the upper right part of the screen. The new time domain trigger triggers the display on the first pulse. The window below shows a power versus time waterfall diagram. The solid line represents the pulse that activates the trigger. The line on the far right is no longer linear and clearly shows variations in the pulse spacing. Additional reflections can be seen from time to time (line in the middle).

### Transfer of I/Q data in realtime operation

The 1.56 firmware version allows the I/Q data that was captured in the R&S®FSVR in realtime mode to be transferred to an external computer via GPIB or LAN, making it available for postprocessing in MATLAB®, for example. The FMT can be used to detect exactly the data that needs to be analyzed in more detail using external programs. This is useful when performing troubleshooting in development labs.

### R&S®FSV-B17 digital baseband interface

For the seamless recording of up to 40 MHz RF signals over a time frame of minutes or even hours, Rohde&Schwarz offers the R&S®FSV-B17 digital baseband interface. When combined with the R&S®IQR I/Q data recorder, users can record signals from sources such as radar, radio or DVB over an extended time period under real field conditions and replay them in the lab using a Rohde&Schwarz vector signal generator. Users can test components in the lab under real conditions and analyze signals in detail.

In addition, a direct connection between the digital interfaces of the R&S®FSVR and a Rohde&Schwarz vector signal generator allows users to modify or distort the captured RF signal and then retransmit it. This is useful for simulating fading during the development of wireless communications components.

### Frequency mask trigger for analyzing digital and analog modulation or in the I/Q analyzer

The R&S®FSV-K70 vector signal analysis option now includes the FMT (FIG 2) and can be used to analyze the modulation characteristics of digitally modulated signals in the presence of sporadic interference. This is a typical application for base station manufacturers who need to analyze how interference impacts data throughput.

The FMT can also be used to analyze analog modulated signals in the AM / FM /  $\phi$ M measurement demodulator or to display the frequency or phase versus time. Settling effects can now be studied in more detail, which is very helpful for developers of synthesizers. The FMT in the I/Q analyzer allows users to start the R&S®IQR I/Q data recorder with the trigger output while the data is being output over the digital baseband interface in realtime.

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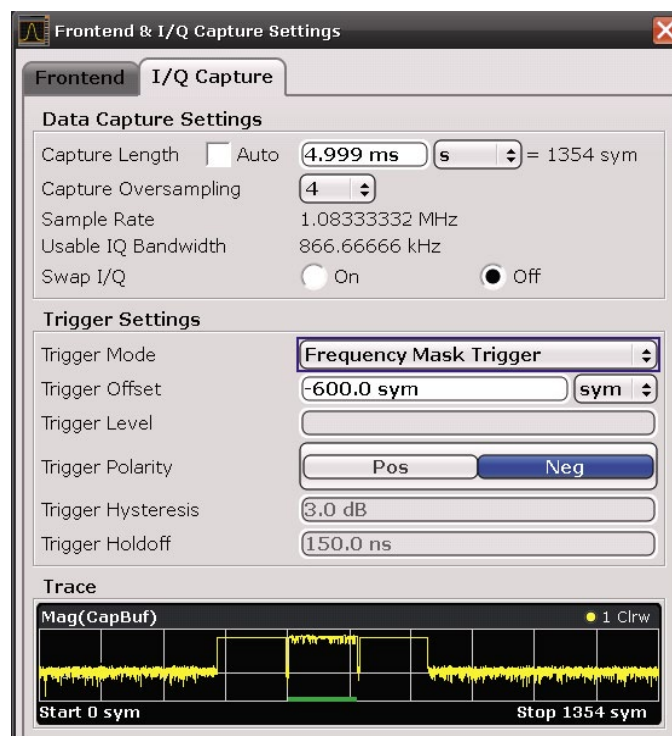
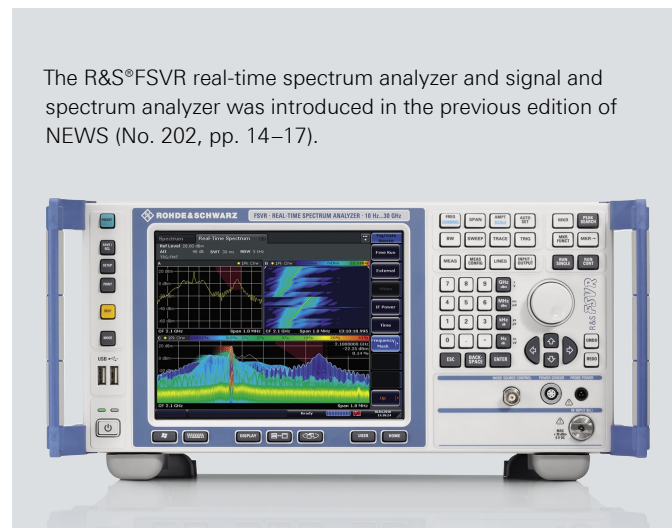


FIG 2 Typical input window for defining measurement parameters in the R&S®FSV-K70 vector signal analysis option. This option adds the “frequency mask trigger” as a trigger mode in the R&S®FSVR trigger settings.



The R&S®FSVR real-time spectrum analyzer and signal and spectrum analyzer was introduced in the previous edition of NEWS (No. 202, pp. 14–17).