

Strong team for production

The R&S®SGT100A vector signal generator and the screenless R&S®FPS signal and spectrum analyzer form an exceptionally compact package. Optimized for use in production environments and test systems, they help to ensure high throughput during testing of RF components and devices, including mobile radio base stations.

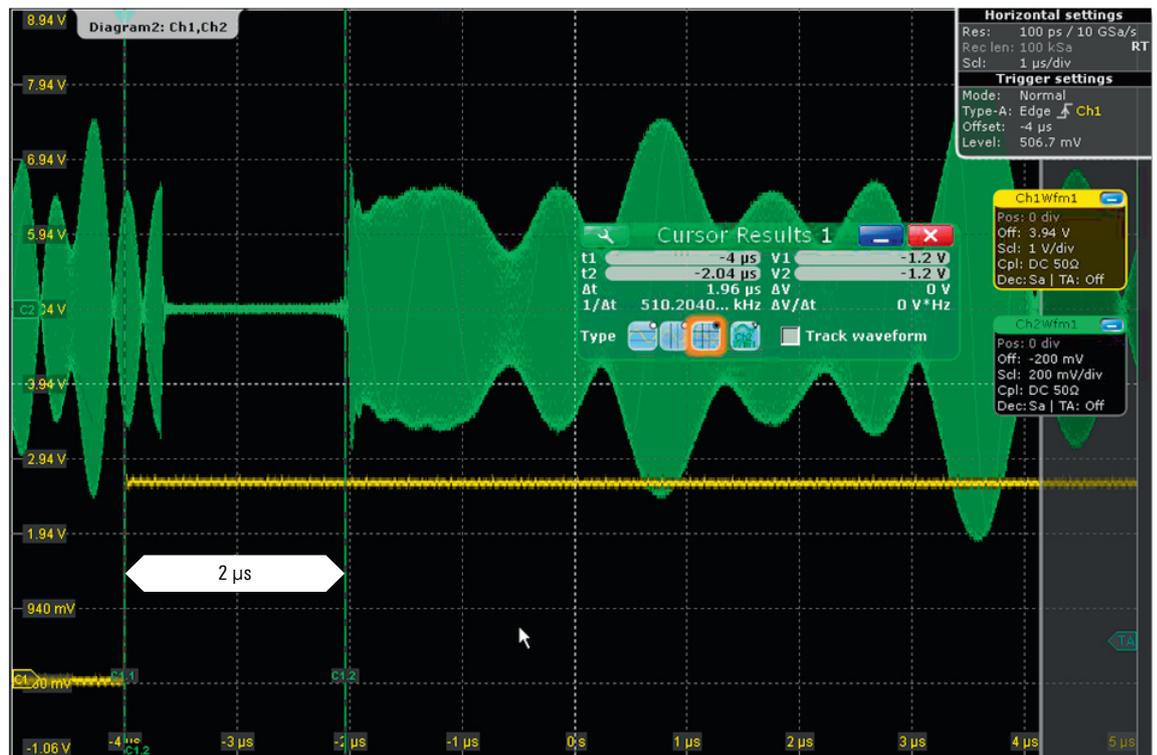
Specialized instruments for use in production combine three key characteristics: They take up very little space in typically jam-packed racks; they generate and analyze complex signals very fast, increasing the production throughput in spite of the wide range of tests to be performed on state-of-the-art components; they make very accurate and reproducible measurements so that DUTs can be reliably and correctly assessed.

These three key characteristics were the driving force behind the development of the two specialized instruments for production, the R&S®SGT100A vector signal generator and the R&S®FPS signal and spectrum analyzer (Fig. 1). Together they represent a versatile mini-system for measurements of RF components, in particular those used for wireless communications. They integrate perfectly into the production environment as well as into automated test systems.

Fig. 1: Requiring very little space in test systems: the R&S®SGT100A vector signal generator (top) and the R&S®FPS signal and spectrum analyzer.



Fig. 2: The R&S®SGT100A takes just 2 μ s to switch between two signals in multisegment waveform mode (WDCMA test signal at a sampling rate of 30.72 MHz).



Signal generation in its most compact form

The R&S®SGT100A is the first vector signal generator with integrated baseband whose housing requires only one height unit and ½ 19" width. This compact design makes the generator ideal for use in automated test environments where the racks are usually crammed full. Conventional signal generators with a full 19" width generally require two height units, whereas four R&S®SGT100A instruments can be housed in the same space.

Though small, the R&S®SGT100A does not skimp on performance. With RF frequencies up to 6 GHz and an I/Q modulation bandwidth up to 160 MHz (RF), the R&S®SGT100A supports all common mobile radio standards. It generates good-quality, modulated signals with low EVM and is therefore a reliable reference source for correct analysis of DUTs.

Its typical maximum output level of +22 dBm compensates for any attenuation resulting from cable loss or switching matrices. This makes an external amplifier unnecessary in many instances.

The perfect partner: R&S®FPS signal and spectrum analyzer

The R&S®FPS boasts similarly excellent characteristics that have been optimized for production. At only two height units, it is half the height of conventional instruments, while providing the full functionality of a signal and spectrum analyzer. Five models are available, providing upper frequency limits of 4 / 7 / 13 / 30 / 40 GHz.

The R&S®FPS features high measurement speed, 160 MHz analysis bandwidth and numerous measurement applications for analog modulation as well as for all essential mobile radio and wireless standards. It is up to five times faster than comparable analyzers and offers measurement routines that are optimized for high speed and large data throughput – exceptional advantages in production environments.

An external monitor or remote operation via a PC ensure full access to all instrument functionality via the user interface. This simplifies development of remote control programs or troubleshooting during operation.

Cost of ownership – the most significant factor during production

With a power consumption of just 65 W, the R&S®SGT100A reduces the overall cost of ownership thanks to its low current drain and correspondingly low heat dissipation. This decreases cooling costs for the entire test system.

Costs are closely linked to an instrument’s operating time. One of the key points of focus during the development of the generator lay in ensuring the greatest possible system uptime. For the R&S®SGT100A, this was achieved by extending the recommended calibration interval to three years. And if a defect does show up, the modular design makes the instrument fast and cost-effective to repair.

Changing requirements in production can be addressed simply by enabling software options on the generator. For example, a key code can be entered on site to quickly extend the frequency range from 3 GHz to 6 GHz.

Both instruments are optimized for fast tests

Short switchover times

Tests on state-of-the-art DUTs require a wide variety of signals that must be made available as quickly as possible. The R&S®SGT100A was designed with

this in mind. Its memory depth of up to 1 Gsample permits playback of long signal sequences or storage of many different signals, minimizing the switchover times (Fig. 2). For example, in multisegment waveform mode, up to 100 different test signals are available within microseconds.

PCIe interfaces for fast remote control

For communications with the control PC or with test instruments, the R&S®SGT100A uses the standard USB and Gbit LAN interfaces, while the R&S®FPS also uses GPIB. For automated tests, however, any time that can be saved when switching the frequency or amplitude is of tremendous significance. This is why both instruments also have a PCIe interface, as used on PCs. With this interface, key remote control commands can directly access the instrument-internal architecture, without needing to be routed through an SCPI interpreter. As a result, the commands are performed exceptionally fast – at three times the speed of communications using SCPI command sets – as proven e.g. by the very short setting times on the R&S®SGT100A for frequency or amplitude changes (Fig. 3).

High measurement accuracy and speed

The R&S®FPS features an absolute measurement uncertainty of < 0.4 dB up to 7 GHz – a considerably better value than that exhibited by comparable modular systems. Of greater importance is

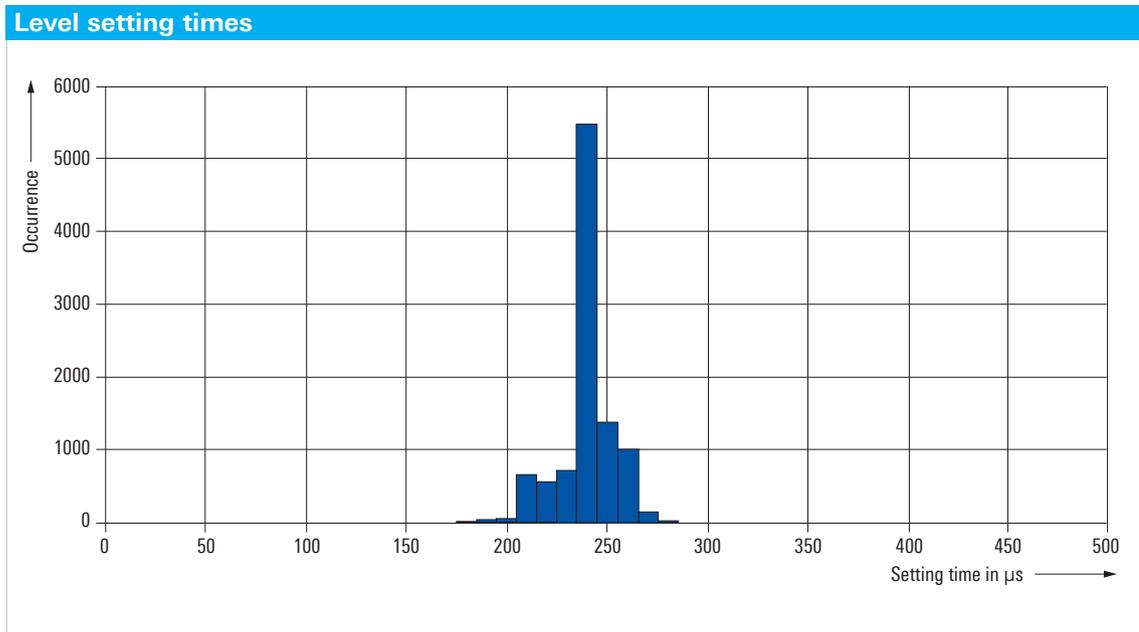
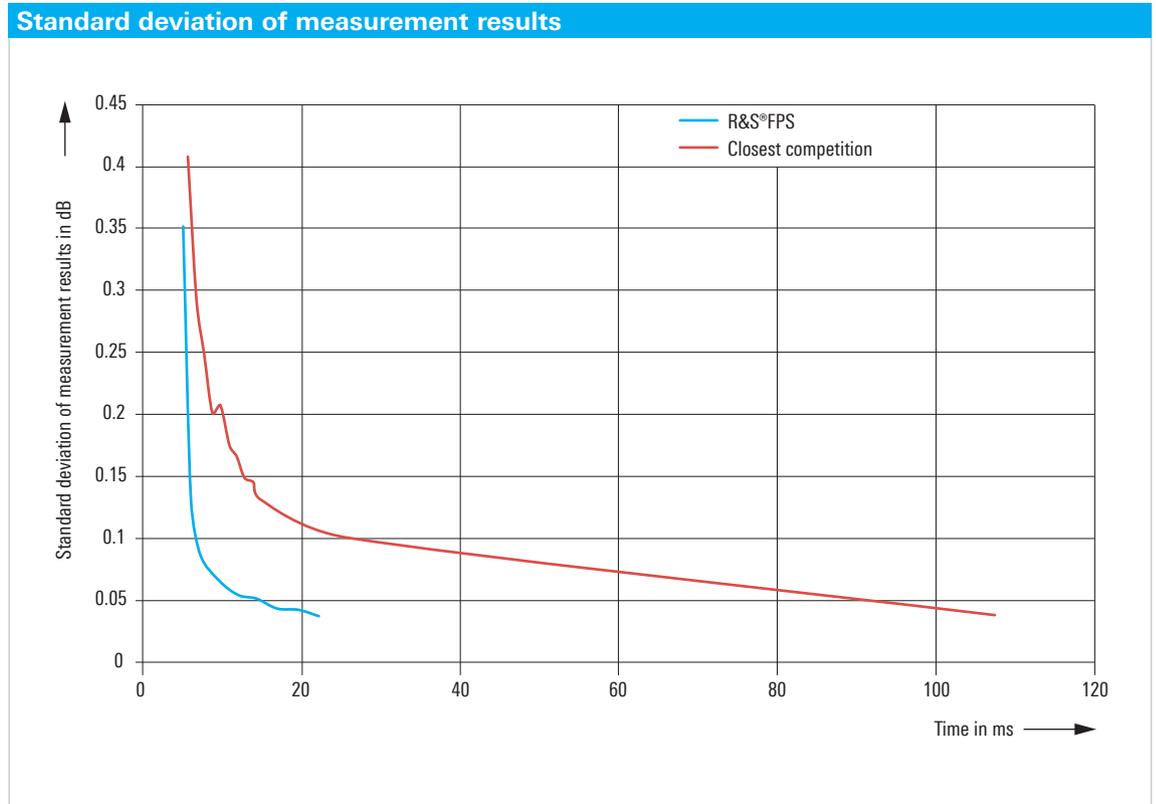


Fig. 3: Histogram of level setting times via the PCIe interface on the R&S®SGT100A (I/Q modulation via the integrated baseband generator; setting characteristic: AUTO).

Fig. 4: Standard deviation of the results of a power measurement on a WCDMA signal as a function of measurement time.



the reproducibility of the measurements, as they directly affect the production yields. The yield could be increased through longer test times, but that would negatively affect throughput. No compromises are necessary with the R&S®FPS because its high measurement accuracy and good reproducibility ensure a large production throughput.

Its fast measurement speed also contributes to a high production throughput. For example, the analyzer can measure the level of a WCDMA signal with a standard deviation of < 0.01 dB and transmit the results to the control PC in under 15 ms. That is five times faster than the competition. The same is true for adjacent channel measurements: The R&S®FPS offers a reproducibility of 0.1 dB, making it five times faster than the closest competitor (Fig. 4).

Simultaneous analysis of signals from multiple mobile radio standards

With the increasing complexity of modern communications scenarios, a conventional RF connection transmits signals from a variety of mobile radio standards. When measuring signal quality and signal interactions, analyzers face major

challenges with respect both to speed and the ability to analyze different signals simultaneously. The R&S®FPS handles the challenges with ease. With its multistandard analysis function and an analysis bandwidth of 160 MHz, it can measure signals of different standards (GSM, WCDMA, LTE, etc.) at different frequencies simultaneously. That is also an advantage when optimizing sequences in automated test systems, such as when the time required to configure a DUT represents a significant amount of the overall test time. In these cases, the R&S®FPS can analyze the acquired data while the DUT is already being configured for the next measurement.

Summary

The R&S®SGT vector signal generator and the R&S®FPS signal and spectrum analyzer are measuring instruments for use in automated test systems for production or verification. They were designed to provide fast and accurate measurements in a compact unit with low cost of ownership.

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