

# Speed up amplifier measurements

The R&S®FPS-K18 amplifier measurement option in combination with the R&S®FPS signal and spectrum analyzer and the R&S®SGT100A SGMA vector RF source enables high-speed amplifier characterization.



## Your task

Amplifier and power amplifier (PA) characterization during production and for design verification requires highly optimized measurement routines in order to maximize throughput. Before amplifier measurements can be performed, the amplifier output power must be adjusted to a target level. This power level adjustment is also known as power-servoing or power servo loop. All consecutive measurements, such as adjacent channel leakage ratio (ACLR) and harmonics measurements, are then performed on a device under test (DUT) that is transmitting at exactly the desired output power.

The challenge is to combine power leveling with other amplifier measurements in a way that minimizes the total test time. Since it is repeated over and over again, power leveling is one main focus for test time reduction.

## T&M solution

Rohde & Schwarz offers a compact and fast solution for amplifier characterization based on the R&S®FPS signal and spectrum analyzer and the R&S®SGT100A SGMA vector RF source. The R&S®FPS-K18 amplifier measurement option not only provides all tools required for characterizing amplifiers including envelope tracking PAs, such as digital predistortion (DPD) and DUT modeling. It also features speed-optimized routines for power leveling, ACLR, harmonics and other amplifier measurements.

Just one click starts the power leveling algorithm that fully automatically converges to the amplifier target power. Although it is a separate measurement, it is well integrated in the R&S®FPS-K18 tool set. Thus, power leveling can be combined with any other amplifier measurement such as ACLR in the same measurement configuration, which significantly reduces setup time.

Two unique features of the R&S®FPS and R&S®SGT100A reduce the test time even further: hardware trigger handshaking and a direct high-speed LAN connection for power leveling (power servo).

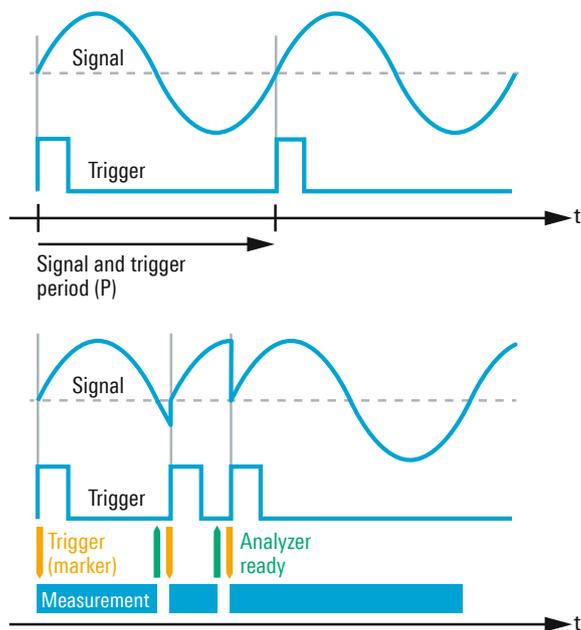
## Trigger handshaking shortens test time

Triggering is a frequently used feature that allows shorter measurement time at a given repeatability. However, it raises latency time, since the analyzer has to wait for the trigger signal. Trigger handshaking reduces latency time to a minimum, as the analyzer directly signals when ready to measure. In return, the signal generator immediately re-starts its waveform, thereby generating the trigger event. Such synchronized instruments reduce latency time to only a few microseconds.

## High-speed LAN connection

Accurate power leveling requires fast communications between the instruments. This is provided by a direct high-speed LAN connection between the R&S®FPS and the R&S®SGT100A. The combination of digital attenuation (digital scaling of the signal) and a low-level communications link makes it possible to control the generator output power typically within 130  $\mu$ s.

## Standard and handshake triggering



Standard triggers (top) operate at constant frequency. With trigger handshake (bottom) the generator restarts the waveform to initiate the trigger event when the analyzer is ready for the next measurement.

Providing a frequency range up to 40 GHz makes the R&S®FPS ideal for harmonics measurements. Unlike other solutions, the R&S®FPS can measure with image suppression even at 40 GHz. In high-speed mode frequency settling at 40 GHz typically takes about 3.1 ms, for frequencies below 7 GHz only 2.5 ms.

The R&S®FPS with the R&S®FPS-K18 option and the R&S®SGT100A typically complete a power servo loop and an ACLR measurement within 2.7 ms. An additional harmonics measurement (second and third, with fundamental at 3.8 GHz and harmonics at, respectively, 7.6 GHz and 11.4 GHz) can be measured within about 11 ms.

The R&S®FPS-K18 amplifier measurement option in combination with the R&S®FPS and R&S®SGT100A is a highly versatile test solution featuring high accuracy and high speed at the same time. Both are the key parameters to reduce the cost of testing in production and design verification of amplifiers.

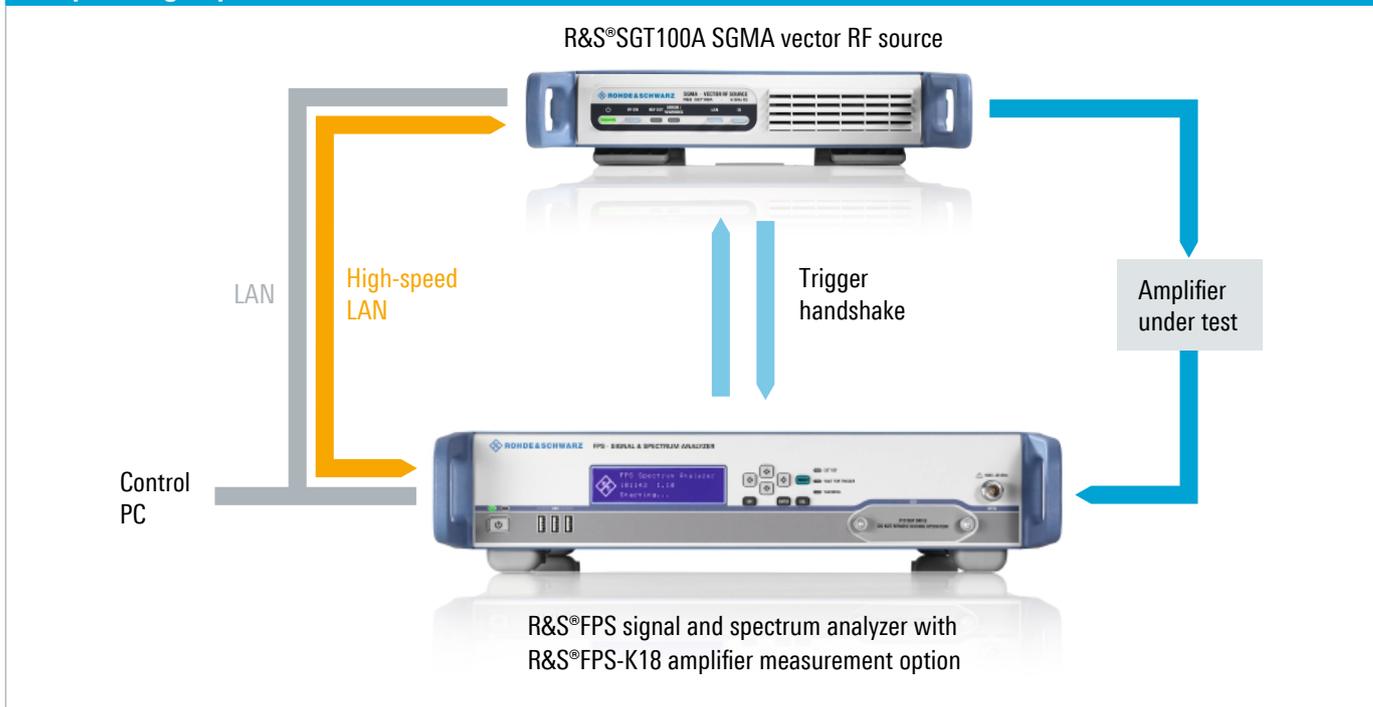
### See also

[www.rohde-schwarz.com/product/FPS](http://www.rohde-schwarz.com/product/FPS)  
[www.rohde-schwarz.com/product/SGT100A](http://www.rohde-schwarz.com/product/SGT100A)

### Application notes

Speeding up Spectrum Analyzer Measurements  
[www.rohde-schwarz.com/appnote/1EF90](http://www.rohde-schwarz.com/appnote/1EF90)

## Setup for high-speed PA measurements



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