## Power integrity measurements with R&S®RTM3000 and R&S®RTA4000 oscilloscopes



R&S®RTA4004 oscilloscope

Make more accurate power rail measurements.

## Your task

Measuring noise and ripple on power rails with small voltages and increasingly tighter tolerances is a challenge for oscilloscopes. Using a standard 500 MHz passive probe with a 10:1 attenuation results in additional measurement noise, causing overstated peak-to-peak voltage measurements and masking signal details as shown below.



Measurement of a 1.5 V power rail using an R&S°RT-ZP10 10:1, 500 MHz passive probe (50 mV ( $V_{pn}$ ), noise masks signal details).

Passive probes with 1:1 attenuation have less noise, but are bandwidth limited to around 35 MHz. They miss higher frequency content that may be riding on the power rail and may understate peak-to-peak-voltages.



Measurement of a 1.5 V power rail using an R&S®RT-ZP1x 1:1 passive, 38 MHz probe (31.8 mV (V<sub>pp</sub>)). Bandwidth limiting eliminates the ability to see higher frequency transients.



Application Card | Version 01.00

## **Our solution**

Combining a low-noise oscilloscope with a power rail probe, developed uniquely for measuring power rails, provides a measurement system that delivers measurements that are more accurate. The R&S®RT-ZPR20 active probe with a 1:1 attenuation ratio has very little noise and enough bandwidth to not attenuate critical signal content.

When combined with an R&S®RTA4000 or R&S®RTM3000 oscilloscope, the R&S®RT-ZPR20 power rail probe provides the following benefits:

- $\scriptstyle\rm I$  The probe's 1:1 attenuation provides minimal noise for a system noise of less than 500  $\mu V$  (at 1 GHz bandwidth and 10 mV/div)
- With ±60 V of built-in offset, users can center and zoom in a wide variety of DC rail voltage standards without worrying about how much built-in offset the scope has. The offset eliminates the need to use AC coupling or DC blocking capacitors, which impede the ability to see true DC values and drift

- High-frequency transients and coupled signals are isolated. The probe's rated bandwidth is 2 GHz. When used with an R&S®RTA4000 or R&S®RTM3000, overall bandwidth is set by the oscilloscope bandwidth
- ${\scriptstyle I}$  50 k $\Omega$  DC input impedance minimizes loading, so DC values remain accurate
- An integrated 16-bit probe meter provides a simultaneous five-digit readout of each power rail's DC value

A power integrity package consisting of an R&S®RTA4004 200 MHz 4-channel oscilloscope, one power rail probe, and a spectrum analysis and spectrogram option can be ordered as a bundle at a reduced price. Bandwidth upgrades and additional probes or options can be added separately.



Meaurement of a 1.5 V power rail using an R&S<sup>®</sup>RT-ZPR20 1:1 active power rail probe (–38.3 mV (V<sub>pp</sub>)). The captured waveform includes higher frequency transients riding on the rail.



R&S®RT-ZPR20 power rail probe.

Ordering information			
Consisting of	Туре	Power integrity measurement package	Order No.
Oscilloscope, 200 MHz, 4 channels	R&S®RTA4004	R&S®RTA4K-PI	1335.7917P02
Power Rail Probe	R&S®RT-ZPR20		
Spectrum Analysis and Spectrogram	R&S®RTA-K18		

## Rohde & Schwarz GmbH & Co. KG

Europe, Africa, Middle East | +49 89 4129 12345 North America | 1 888 TEST RSA (1 888 837 87 72) Latin America | +1 410 910 79 88 Asia Pacific | +65 65 13 04 88 China | +86 800 810 82 28 | +86 400 650 58 96 www.rohde-schwarz.com customersupport@rohde-schwarz.com R&S° is a registered trademark of Rohde &Schwarz GmbH & Co. KG Trade names are trademarks of the owners PD 3607.7986.92 | Version 01.00 | January 2018 (GK) R&S°RTA4K-PI Power Integry Measurement Package; Data without tolerance limits is not binding | Subject to change © 2018 Rohde &Schwarz GmbH & Co. KG | 81671 Munich, Germany

