

# Power integrity measurements with R&S®RTP oscilloscopes

Make more accurate power rail measurements.



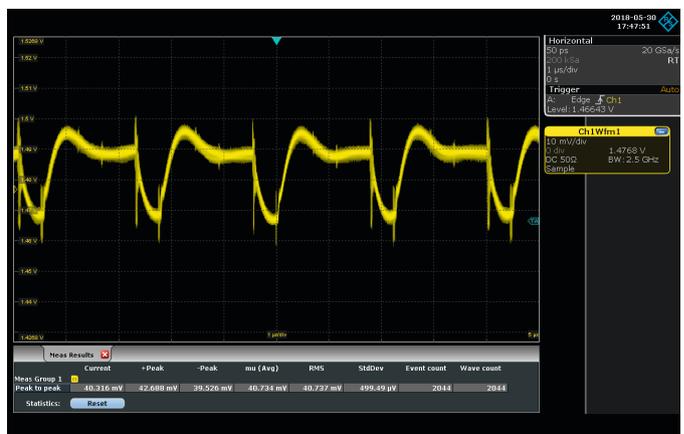
Measurement of a 1.5 V power rail using an R&S®RT-ZP10 10:1, 500 MHz passive probe (50 mV ( $V_{pp}$ ), noise masks signal detail).

## Your task

Measuring noise and ripple on power rails with small voltages and increasingly tighter tolerances is a challenge for oscilloscopes. Fast clock and data edges can be coupled onto rails, requiring higher bandwidth oscilloscopes for power integrity measurements.

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.

Such a probe does not have sufficient bandwidth to isolate coupled signals. The higher bandwidth of R&S®RTP oscilloscopes allows isolation of coupled signals as shown in the gated FFT image.

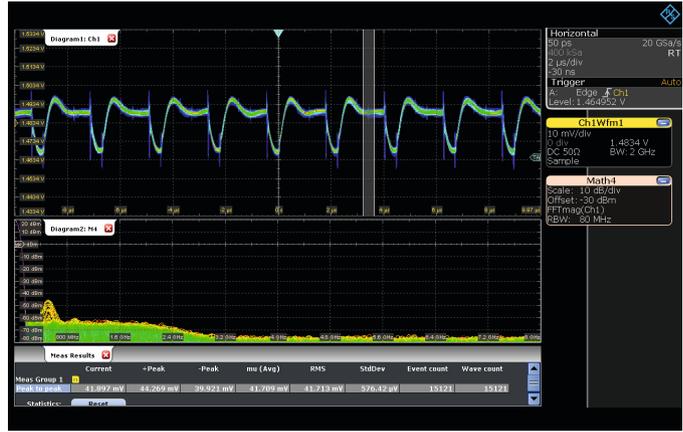


Measurement of a 1.5 V power rail using an R&S®RT-ZPR20 1:1 active power rail probe (-38.3 mV ( $V_{pp}$ )). The captured waveform includes higher frequency transients riding on the rail.

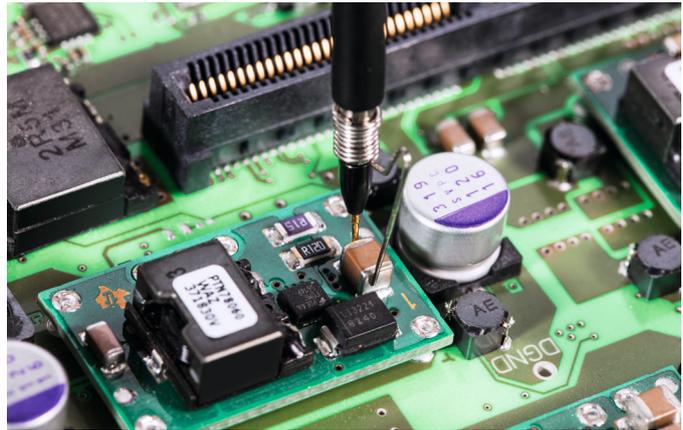
## Our solution

The R&S®RT-ZPR20 and R&S®RT-ZPR40 power rail probes with a 1:1 attenuation ratio have very little noise and sufficient bandwidth to not attenuate critical signal content. Both probes are compatible with R&S®RTP oscilloscopes. The combination results in a measurement system that delivers high-bandwidth, accurate measurements:

- The probe's 1:1 attenuation provides minimal noise for a system noise of less than 500  $\mu\text{V}$  (at 1 GHz bandwidth and 10 mV/div)
- With  $\pm 60\text{ V}$  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. Increased vertical sensitivity means less noise and that more of the oscilloscope's ADC bits are used, resulting in a more accurate measurement. 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 R&S®RT-ZPR40 has a typical 3 dB bandwidth of 4 GHz
- 50 k $\Omega$  DC input impedance minimizes loading, so DC values remain accurate
- An integrated 16-bit R&S®ProbeMeter provides a simultaneous five-digit readout of each power rail's DC value, even if the waveform is not on the oscilloscope display



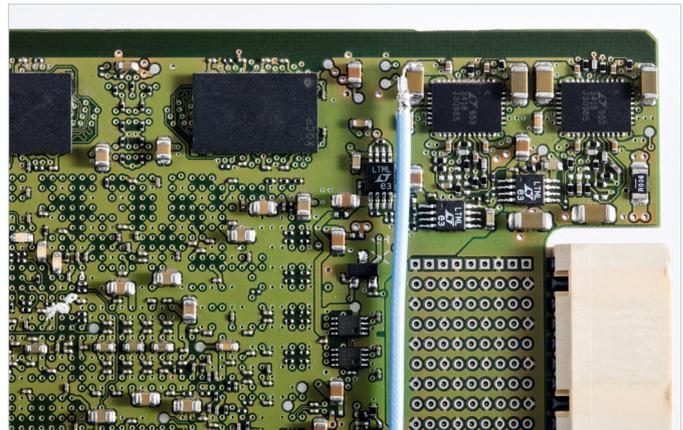
Gated FFTs let user zero in on disturbances in the time domain, and see associated tones.



Use the supplied 350 MHz browser with a variety of probing accessories.



R&S®RT-ZPR20 power rail probe.



Easily connect using an SMA or solder-in coax pigtail.

### Power integrity tools

R&S®RTP high-performance oscilloscope	4 channels, 4 GHz to 8 GHz bandwidth; power rail probes work all models
R&S®RT-ZPR20	2 GHz power rail probe
R&S®RT-ZPR40	4 GHz power rail probe

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