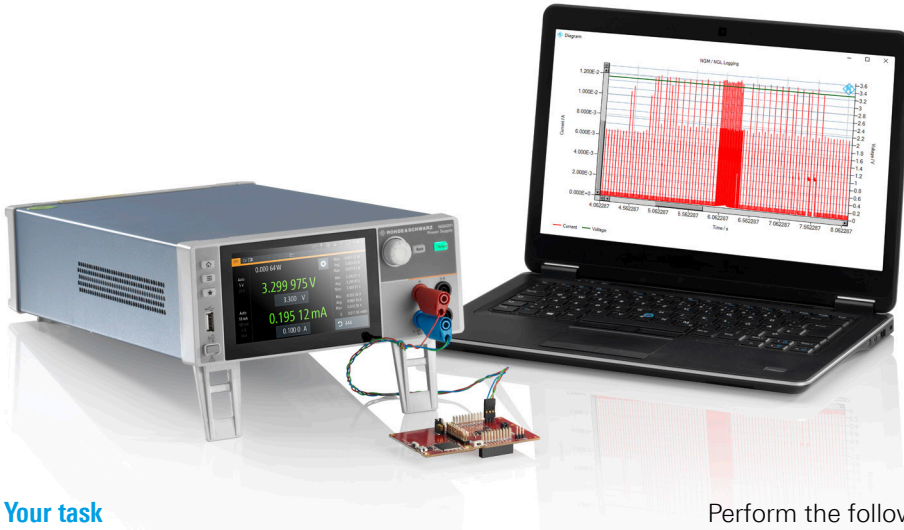


POWER CONSUMPTION ANALYSIS WITH THE ROHDE & SCHWARZ SPECIALTY DC POWER SUPPLIES



Your task

The world is getting more and more connected. Myriads of sensors and internet of things (IoT) devices are entering factories and households these days. Many of these products run on very small non-rechargeable batteries at low voltages and currents.

High replacement costs and environmental concerns demand for long operating times. Battery lifetime is a key aspect for the design and selection of IoT devices. Optimizing power consumption characteristics at the product design stage requires accurately characterizing the device's power consumption in different operating modes. Current consumption often has a high dynamic range, with fast switching between operational modes in the tens or hundreds of milliamperes and sleep modes measured in microamperes.

Rohde & Schwarz solution

Modern DC power supplies with advanced features and high-precision measuring capabilities are an easy and economical solution for these measurements. The R&S®NGL200 and R&S®NGM200 specialty power supplies offer an outstanding resolution. The R&S®NGM200 series provides resolutions down to 5 μ V/10 nA, allowing accurate measurements that easily match the requirements of today's standards used in IoT devices.

Perform the following steps to get high-quality results:

- ▶ Remove or disconnect the battery of your DUT and connect the power supply respectively
- ▶ You can also connect the sense lines to compensate voltage drops in the supply leads
- ▶ Set the designated output voltage and, if needed, current or power limits to protect the DUT
- ▶ After turning on the outputs, the output voltage, DUT current drain and consumption power are displayed in real time



- ▶ The additional R&S®NGM200 DVM port measures the voltage at certain points of the circuit other than the point of supply (R&S®NGM K104 option required)

Application Card | Version 01.00

ROHDE & SCHWARZ

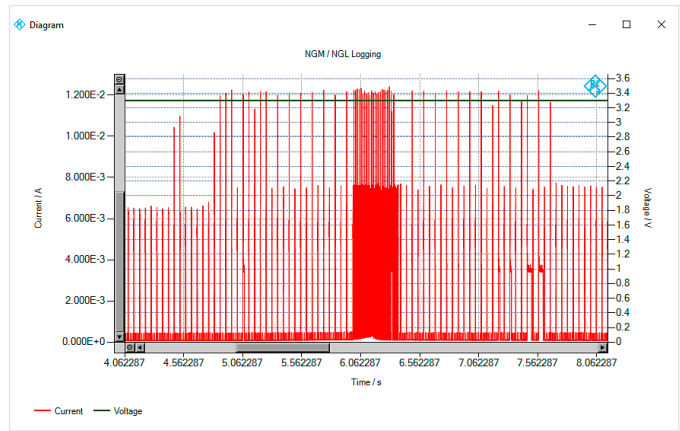
Make ideas real



For in-depth analysis and traceable results, the measurement values can be logged:

- ▶ Open the logging settings to choose the desired preferences
- ▶ With a user-definable acquisition rate of up to 500 ksample/s, voltage and current results are available every 2 μ s
- ▶ The logged data can be stored as .csv files on the power supply's internal memory or on an external USB storage device and transferred to an external PC via USB or LAN

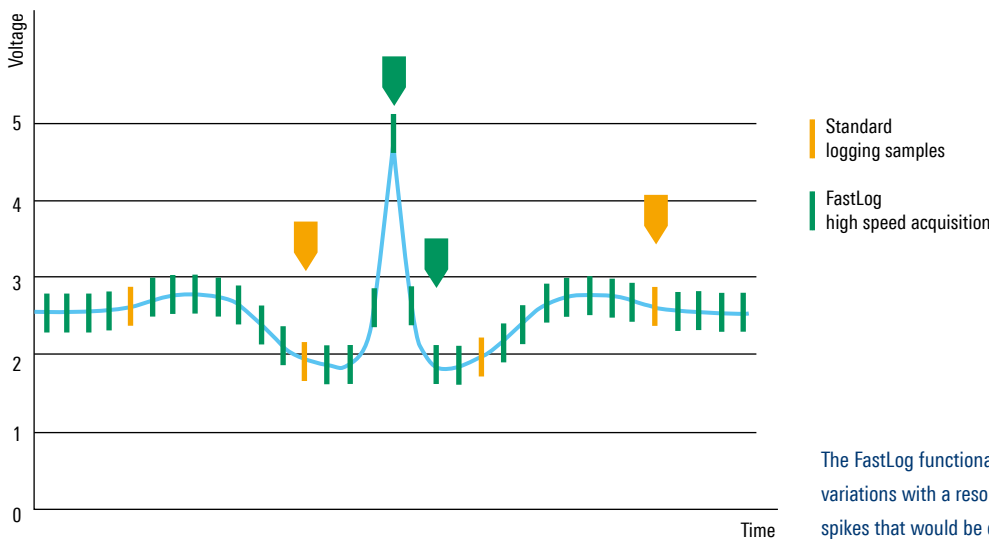
For automated and long-term tests, remote control software can be downloaded from the company website (see application note 1GP122). Parameters like power consumption, current drain or battery capacity can be easily determined and analyzed. The tool also offers a graphical representation of logged data with zoom function.



Summary

The R&S®NGL200 and R&S®NGM200 high-quality power supplies meet the requirements for high-precision power consumption measurements. They measure a wide dynamic range of current levels and are highly accurate even at extremely low voltage and current levels. Their linear design with minimum residual ripple and noise, and advanced remote monitoring features make the R&S®NGL200 and R&S®NGM200 power supplies an excellent choice for optimizing power consumption in IoT devices.

| | | | |
|------------------|---|------------------|---|
| Min.: 2.036 12 V | ▶ | Min.: 1.813 26 V | ▶ |
| Avg.: 2.313 08 V | ▶ | Avg.: 2.454 01 V | ▶ |
| Max.: 2.682 64 V | ▶ | Max.: 4.786 46 V | ▶ |



The FastLog functionality follows voltage/current variations with a resolution of up to 2 μ s. It detects spikes that would be overseen by slower instruments.