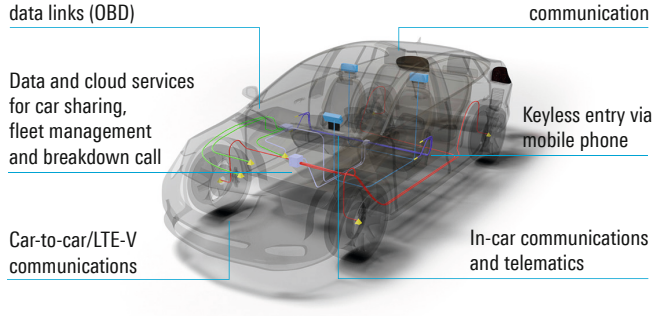
Battery life measurements in the connected car

The battery life measurement solution for the R&S®CMW500 platform identifies which ECUs and which applications running on telematics units impact battery life.

Connected car



Your task

As complex applications are added to the connected car, it becomes increasingly important to understand how cellular and non-cellular wireless connections consume power. For example, modules such as those defined for eCall/ERA-Glonass are expected to continue transmitting after a crash for a defined period of time, and telematics units need to regularly attach to the cellular network and may even be required to download a large firmware update over a cellular connection when the car's engine isn't running.

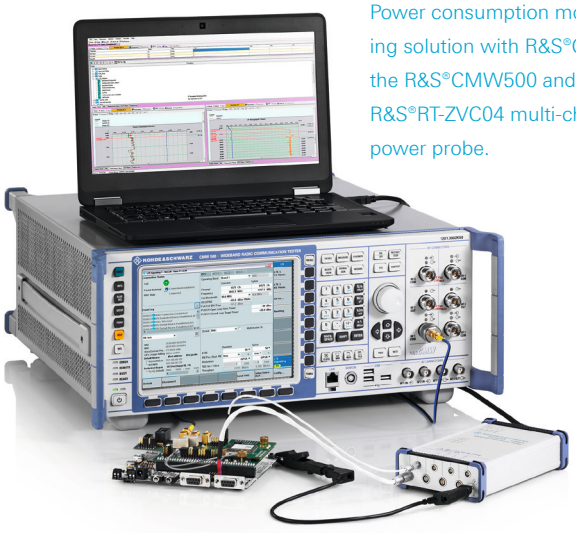
T&M solution

For the connected car and its diverse applications, battery life testing becomes more important than ever. And for infotainment systems where an increasing number of apps are running, it is crucial to test the latest features for reducing power consumption.

Driven by the new requirements for ultra-low power, the latest releases (12 and 13) of the 3GPP standard recently defined features such as power save mode (PSM), enhanced DRX (eDRX) and connected mode DRX (cDRX) seek to reduce power consumption as much as possible.

The ability of these features to reduce power consumption can only be tested and analyzed in a controlled emulated network environment. R&S®CMWrun offers the right solution for such tests under real, yet controlled conditions based on the well-known R&S®CMW500. The R&S®CMWrun CMW-KT051 collects samples from the R&S®RT-ZVC02/R&S®RT-ZVC04 multi-channel power probe at a high sample rate and displays the current and voltage or even the calculated instantaneous power (in Watt) over time.

Specific signaling trigger events (e.g. LTE attach, connected, idle signaling state or IMS registration) have been implemented, providing more details (i.e. more samples). These are displayed and time-correlated on the power consumption diagram. The power consumption diagram is also correlated to events at the IP level by using IP traffic analysis (R&S®CMW-KM051), which indicates which app or IP flow affects the battery lifetime of telematics units or other wireless devices.



Power consumption monitoring solution with R&S®CMWrun, the R&S®CMW500 and the R&S®RT-ZVC04 multi-channel power probe.

ROHDE&SCHWARZ

The latest specifications for battery life measurement require not only monitoring of the current over time but also the voltage, including calculation of the instantaneous power at high sampling rates. For such testing requirements, it must be possible to measure the power a device consumes based on a real use case, i.e. powered by a real battery or from the USB interface or even from an AC adapter.

The R&S®RT-ZVC02/R&S®RT-ZVC04 multi-channel power probe is designed to cover precisely such uses cases, and even offers up to two (R&S®RT-ZVC02) or four (R&S®RT-ZVC04) voltage and current channels.

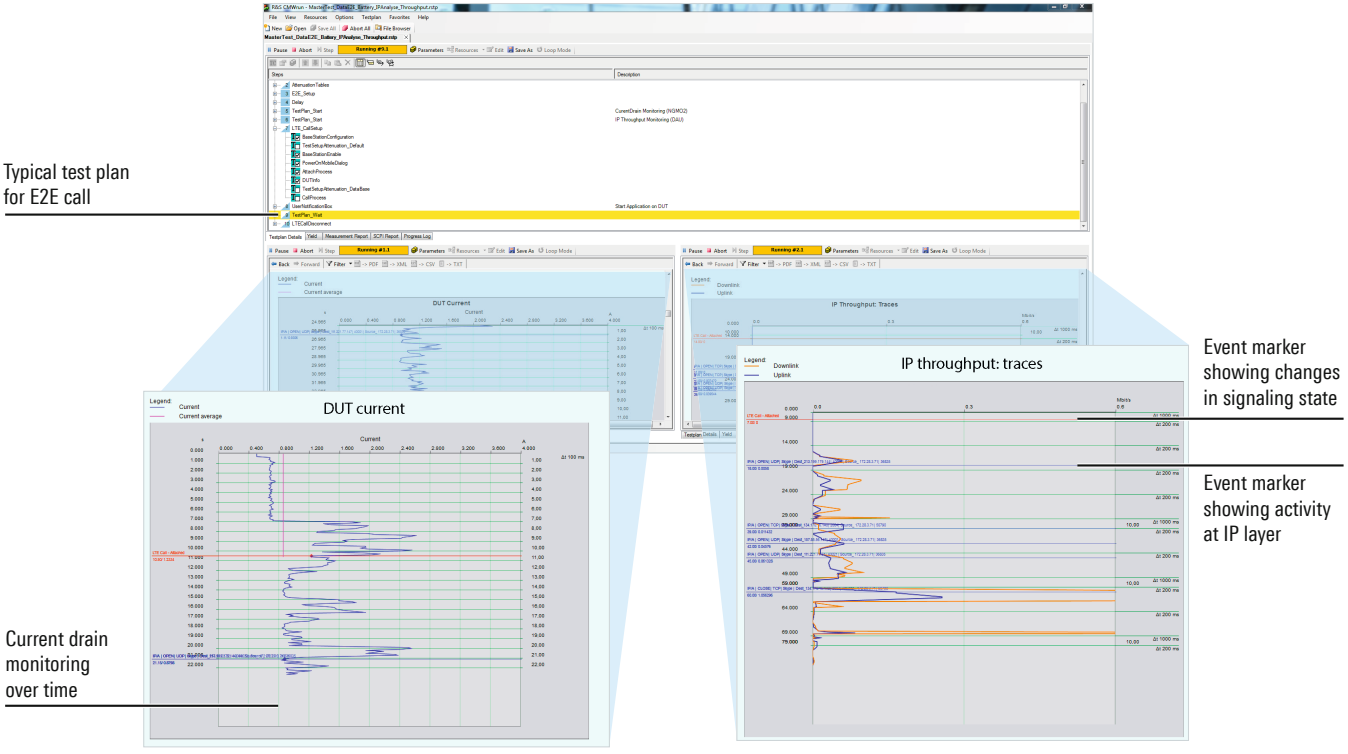
Each power measurement group consists of a voltmeter and ammeter with 18-bit A/D resolution and 5 Msample/s sampling rate. The built-in multiplier function, available for each group, ensures synchronous, sample-by-sample multiplication of current and voltage samples at a rate of 5 Msample/s. An internal decimation unit accumulates the consumed power by averaging over 100, 1000 or 10 000 samples. This ensures that even very short power consumption peaks are captured, while reducing the data transfer rate to a level a PC can handle. Based on this data, the R&S®CMWrun estimates the battery life and displays all power group measurements such as current, voltage and instantaneous power on the event graph.

The R&S®RT-ZVC02/R&S®RT-ZVC04 multi-channel power probe's ammeter is equipped with internal shunts that can be selected for one of the different measurement ranges of interest. The current can also be measured based on an external shunt that is configured and fitted directly into the DUT. In this case, the current is calculated based on the voltage drop on this reference external shunt – the internal ammeter becomes a high impedance voltmeter, avoiding connection cables losses caused by high currents. Various connectivity options such as 4 mm plugs, pin connectors and solder-in pins are available to cover all kinds of application scenarios.

R&S®CMWrun offers selectable monitoring and display rates (after decimation) of 10/100/1000 sample/s and up to 50 ksample/s as well as an auto zoom function for short time intervals. Signaling trigger events can be used to increase the monitor sampling rate.

See also
www.rohde-schwarz.com/CMW

Battery life and IP throughput testing with IP analysis, fully automated with R&S®CMWrun



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

PD 5215.3233.92 | Version 01.01 | August 2017 (he)
Battery life measurements in the connected car
Data without tolerance limits is not binding | Subject to change

5215323392

5215.3233.92 01.01 PDP 1 en