

IoT power consumption verification

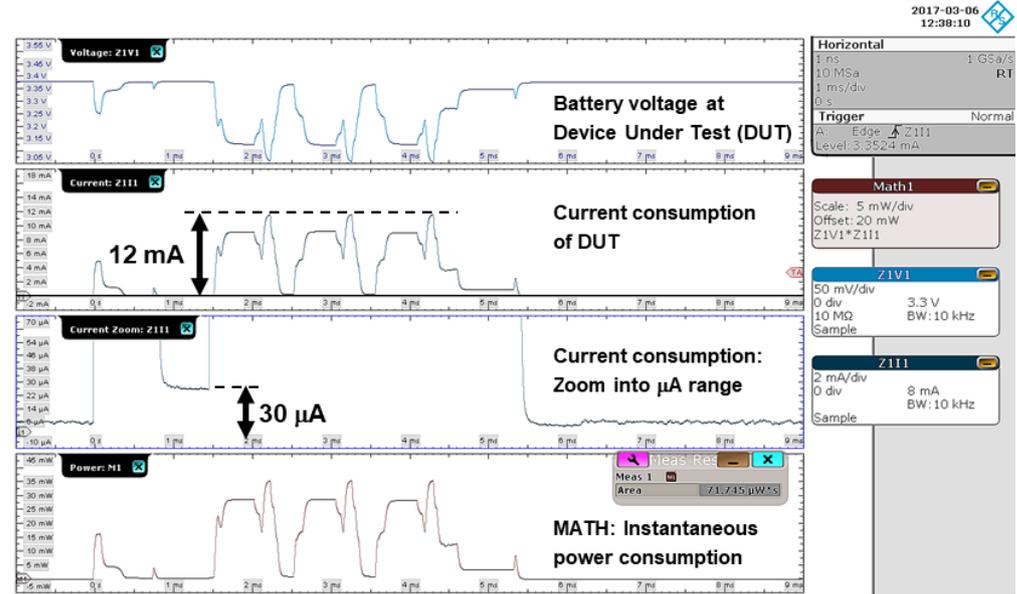
R&S®RT-ZVC: 18-bit multi-channel oscilloscope probe

Challenge

In order to optimize the battery life of embedded IoT devices, the device's current consumption in active, sleep and hibernate mode needs to be balanced. While in active mode, current consumption can reach levels of tens to hundreds of mA. Sleep mode currents are often as low as single-digit μA , but it still significantly influences battery life since IoT devices are in sleep mode most of the time.

Solution

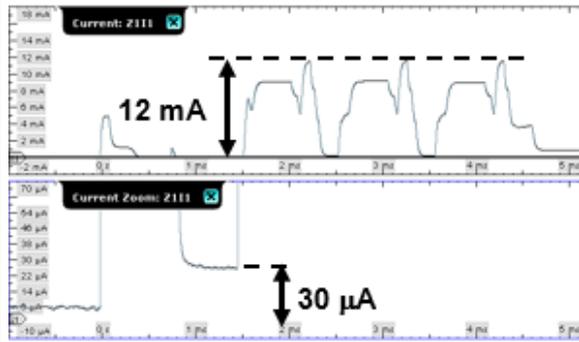
The R&S®RT-ZVC multi-channel probe is an external 18-bit acquisition system that adds up to four high-resolution current and voltage channels to an R&S®RTE1000 or R&S®RTO2000 oscilloscope. Due to its high resolution and excellent accuracy, it can be used to measure both active mode and sleep mode currents of the battery operated device within the same acquisition. Fully integrated into the oscilloscope, the R&S®RT-ZVC probe allows detailed power consumption analysis by correlating current consumption to actual device activities.



Your benefit	Features
Very high dynamic range	18-bit ADC resolution, 6 current measurement ranges from 4.5 μA to 10 A (full-scale); 4 voltage ranges from 1.88 V to 15 V
High measurement bandwidth	1 MHz, optional lowpass filter for noise reduction
Multi-channel measurement	4 current and 4 voltage measurement channels per R&S®RT-ZVC; up to two R&S®RT-ZVC probes supported on an R&S oscilloscope
Correlation analysis	Correlation of current consumption to serial protocols, RF activity or other device signals
Excellent accuracy	0.1 % (voltage channel), 0.2 % (current channel)

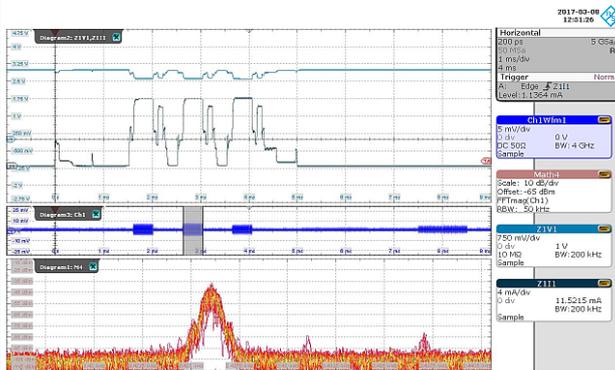
► For more information, visit www.rohde-schwarz.com/catalog/rt-zvcxx

18-bit resolution for high measurement dynamic range



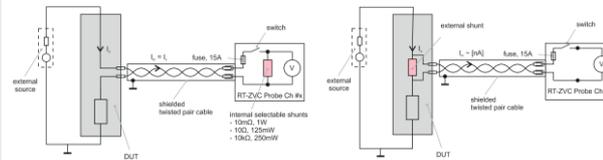
18-bit resolution allows users to measure both high and very low currents within one acquisition. With four voltage/current pairs available in one R&S RT-ZVC04, and two R&S RT-ZVC probes supported per R&S oscilloscope, multiple power rails can be analyzed at the same time.

Correlation of current consumption to device activities



Fully integrated into the oscilloscope and synchronized to the analog input channels, the R&S RT-ZVC probe allows correlation between current consumption and device activity.

Internal and external shunt operation



Internal shunt mode

External shunt mode

In addition to three built-in shunts, the R&S RT-ZVC features an external shunt mode with switchable sensitivity. This allows users to optimize the current measurement range for the device under test.

Dedicated accessories for high-quality measurements



Wide range of accessories provides flexibility in contacting on PCB boards or other electronic components. For higher voltage ranges, BNC connector cables are available, which allow the use of standard passive or active differential probes.

Popular options/accessories

Base Unit	
Digital oscilloscope, 3 GHz, 10 Gsample/s, 4 channels	R&S RT02034
Digital oscilloscope, 500 MHz, 5 Gsample/s, 4 channels	R&S RTE1054
Mixed signal option, 400 MHz, 16 channels, includes R&S RT0-B1 / R&S RTE-B1	R&S RT0-B1 R&S RTE-B1
Digital extension port supporting R&S RT-ZVC02 and R&S RT-ZVC04 hardware (does not include MSO functionality)	R&S RT0-B1E R&S RTE-B1E
Multi-channel power probes	
2 × 2 / 2 × 4 18-bit voltage/current probe, for R&S RT02000 and R&S RTE1000	R&S RT-ZVC02/ R&S RT-ZVC04
Voltage probes	
Extended cable set for R&S RT-ZVC, PCB probing, 1 current and voltage lead, length: 32 cm	R&S RT-ZA30
Extended cable set for R&S RT-ZVC, PCB probing, 1 current and voltage lead, length: 1 m	R&S RT-ZA35
Extended cable set for R&S RT-ZVC, 4 mm probing, 1 current and voltage lead, length: 32 cm	R&S RT-ZA31
Extended cable set for R&S RT-ZVC, 4 mm probing, 1 current and voltage lead, length: 1 m	R&S RT-ZA34
Extended cable set for R&S RT-ZVC, BNC connector, 1 current and voltage lead, length: 16 cm	R&S RT-ZA37
Set of 5 micro clips	R&S RT-ZA4

Rohde & Schwarz Representative