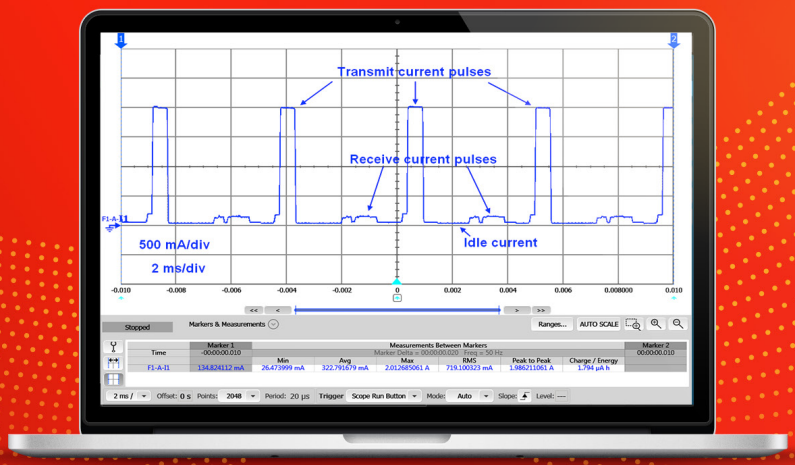

TECHNICAL OVERVIEW

Current Drain Waveforms Yield Deeper Insights on Optimizing Battery Run Time

Gaining deeper insights into a mobile device's operation is crucial for optimizing battery run time.

If you want to simply validate battery run time, you can treat the mobile device as a black box and either directly measure the run time or measure current drain for a prolonged period and extrapolate run time based on stated battery amp-hour capacity. Most conformance tests only validate battery run time.

However, optimizing battery run time usually requires the design team to use several different test methods to gain insights that go well beyond just validating battery run time. You need to test and characterize the device, its sub-circuits and the battery, both independently and in combination. A detailed characterization of battery current drain offers deeper insights into the device's operation so you can make informed tradeoffs for optimizing run time.

Just a few of the insights that were gained on the mobile phone include:

- Idle current base level value
- Idle period duration
- Current drain values and durations of activities during the idle period
- Transmit current value and RF power amp power added efficiency (PAE)
- Transmit current duration
- and more

High-speed, high-resolution current drain digitization yields deeper insights for optimizing battery run time.

Digitizing the battery current drain at 50 KSamples /second or greater and with a wide dynamic measurement range provides details yielding deeper insights for optimizing battery run time.

You can take a number of approaches, some of which have limitations:

- Current probes and oscilloscopes provide high-speed waveform digitization. However, limited dynamic range, inaccuracies, and noise limit their usefulness.

KEYSIGHT TECHNOLOGIES

- A high-sampling-speed data acquisition system and an accurate current shunt can provide better accuracy and wider range compared to a current probe and oscilloscope. However, you must keep maximum tolerable current shunt peak voltage drop small so that it does not unduly affect the mobile device. However, keeping the shunt voltage drop small limits the measurement dynamic range and accuracy.

- Some specialized DC sources incorporate a high-speed digitizing, wide-dynamic-rangemeasurement system that can accurately characterize a mobile device's current drain without the voltage drop issues you encounter when you use an external shunt resistor.

Example of gaining deeper insights from a device's current drain waveforms:

As one example, Figure 1 shows the current drain measured on a mobile phone during a call using the Keysight Technologies, Inc. N6781A source/measure unit and companion BV9200B software. The N6781A is a specialized battery emulator DC source tailored for powering a mobile device and measuring its current drain from µA to A at over 195 KSample/sec digitization rate. With both wide dynamic measurement range and high-speed digitizing, it quickly provides deeper insights for optimizing battery run time.

With the right measurement capabilities, current drain is a window for gaining deeper insights for optimizing your mobile wireless device's battery run time.

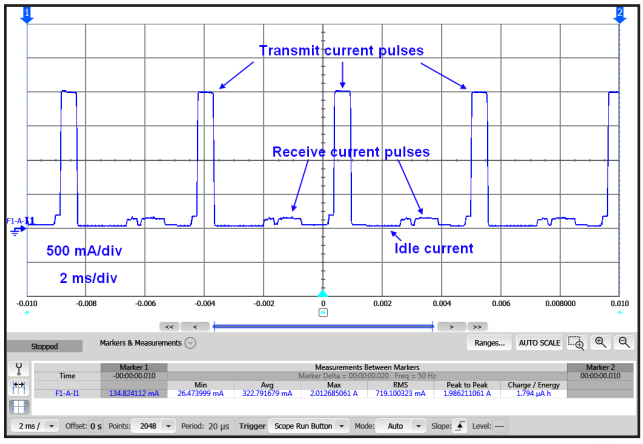

Figure 1. GPRS smart phone active mode current drain waveform details.

www.keysight.com/find/N6781A

Learn more at: www.keysight.com

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus

KEYSIGHT TECHNOLOGIES