Dynamically adapting to signal conditions offers big savings on power, shows Theta

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Research conducted by Theta Microelectronics, and now published by Dr Yannis Tsividis as a white paper, shows significant reductions in average power dissipation in wireless receivers, using circuits that only dissipate the minimum power needed for the situation at hand.

The paper, Dynamic Power Dissipation in Wireless Receivers, describes several circuit techniques that make power savings of 50% or more possible. They are applicable to a variety of basic receiver building blocks, such as LNAs, mixers, filters, and VCOs.

Putting theory into practice, Theta has tested its techniques with six different receiver blocks, using two different receiver designs, at 2.5 GHz and 5 GHz. Analysis of these early results indicate that efficiencies even more drastic than the 50% power savings demonstrated are possible, with new designs developed by Theta based on this research.

The core techniques are now being extended to a range of portable wireless applications, all offering significantly extended battery life.

The savings achieved use the Theta dynamic techniques to vary power dissipation according to the properties of the desired signal and the interferers received. Both the signal overload ceiling and the noise floor are taken into account, as well as the spectral content of the desired signal. This includes cases where the same receiver handles different standards/protocols/modulation schemes and/or different frequency bands.

Dr Tsividis commented: "The extra overhead associated with the circuitry needed to make dynamic power dissipation possible is a small price to pay for the exceptional power savings we have obtained."

Dr Yannis Tsividis is Chief Scientific Officer of Theta Microelectronics, and also the Charles Batchelor Professor of Electrical Engineering at Columbia University. He has held positions at Motorola, AT&T Bell Laboratories, and the National Technical University of Athens, Greece.

The White Paper, which details the approach and the techniques developed, is available as a free download from Theta's website, **www.thetamicro.com**