

# Center for Communications Circuits and Systems (CCCS) – Connection One

Arizona State University, University of Arizona, University of Hawaii

Dr. Sayfe Kiaei, Director (ASU)

Phone: 480-727-8044

E-mail: sayfe.Kiaei@asu.edu.

Dr. Jeffrey Rodriguez, Director (UA)

Dr. Magdy Iskander, Director (UH)

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## Universal Wireless Transceiver for World Phones



The ultimate goal in cellular communications is ubiquity: a world phone that is adaptable to all systems, such as GSM and WCDMA, as well as distinct frequency bands. In order to implement this phone, a highly efficient monolithic power system is needed in transceivers of continuously decreasing size. Two major components in transmitter architecture are the power amplifier and its modulator, because they dominate over 70% of the power consumption in handsets and consume a significant portion of the handset's volume. Therefore, altering the power amplifier topology to lower the demand on their bulky passive filters while simultaneously increasing the efficiency and linearity is essential when realizing high-efficiency monolithic transmitter architectures. A new method using a noise shaping technique to modulate the controller integrated circuits in switched-mode converters and power amplifiers reduces the demand on the output filters of the structures. High efficiency and linearity is accomplished with a novel power amplifier topology using a combination of either signal noise or pulse shaping and the Kahn technique. The new architecture for a switch-mode power amplifier has higher efficiency than

other techniques. It eliminates the need for a filter in the supply modulator by switching the drain of the PA and pushing the noise of the switching modulator to higher frequencies. The new topology presents a multimode, monolithic, highly efficient, linear power amplifier for use in future wireless handsets as well as other RF communication devices requiring minimum power dissipation. For more information, contact Sayfe Kiaei, 480-727-7761; e-mail: sayfe.Kiaei@asu.edu.

