

## High-Efficiency, High-Gain Power Amplification for PCS

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Abstract –The next generation of mobile telecommunications systems will continue to integrate higher level computing functions, thus increasing the power demand of the device by virtue of increasing the throughput ( $E_b/n_0$ ), and increasing on-time. The development of battery technology has not kept up with needs of the industry, therefore OEMs can only maintain their competitive edge in terms of cost, size, functionality, and features, by utilizing the source power more efficiently. In this paper we describe a new concept in power amplification, called *syncrodyne amplification*, which uses fundamental properties of chaotic oscillators to provide high-efficiency, high gain amplification of standard communication waveforms. We show results of this system providing nearly 60-dB power gain and 80% PAE for communications waveforms conforming to GSM and CDMA modulation. Finally we show results from a fabricated syncrodyne amplifier operating in the 824 –850 MHz (PCS) band utilizing heterojunction bipolar transistors (HBTs).