



The Computer Engineering Research Center

Mixed-Signal/RF Integrated Circuits Seminar Series

Digital RF Processing for Wireless Communication

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Texas Instruments Inc. Dallas, TX

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Abstract

RF circuits for 2GHz band have recently migrated to the state-of-the-art low-cost digital CMOS processes. This presentation visits fundamental techniques recently developed that migrate analog design complexity to digital domain both for transmitter as well as receiver in a radio transceiver. Single-chip radios have been successfully developed to address the Bluetooth and the GSM/GPRS standards demonstrating integration of RF, analog, digital baseband processing, power management and RF BIST in a 90nm CMOS process. All digital phase locked loop and direct RF sampling techniques allow great flexibility in reconfigurable radio transceiver design. Digital signal processing concepts are used to help relieve analog design allowing one to reduce the cost and power consumption in a reconfigurable design environment. Software layers are defined to enable these architectures to develop a frame-work for an efficient software defined radio.

Biography

Khurram Muhammad obtained his B.Sc., M.Eng.Sc. and Ph.D. degrees from the University of Engineering & Technology, Lahore, Pakistan, University of Melbourne, Australia and Purdue University, West Lafayette, IN, USA in 1990, 1992 and 1999, respectively, all in Electrical Engineering. He is currently working in Texas Instruments Inc. Dallas, TX as the Manager of DRP Receiver Architecture and Design Group and is one of the original inventors of the TI Digital RF Processing technology. He also leads system development on the third generation DRP. His experience as well as research interests span a wide range of areas from Information Theory to Modeling, Efficient Simulation, Low-complexity Algorithm and Architecture Design, RF, Analog and Digital designs, Test Methodology, RF BIST and DFT. He has been involved in the several technical program committees of IEEE conferences such as GLSVLSI, ISLPED, ISQED and CICC.

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