

Title: Compact RF CMOS Radios for Emerging 5G/6G Wireless



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Abstract

With the emerging 5G/6G wireless standards, it has become more important than ever to achieve the highest level of CMOS integration for wireless systems on chip. This requires the development of programmable low power multi band CMOS radios achieving maximum reduction in chip area. This tutorial will discuss radio architectures with a focus on direct conversion zero-IF CMOS radios. First a multi-band multi-standard radio architecture for V2X 5G wireless radios is presented for automotive applications. A compact design sharing the use of transmit and receive basebands for time division duplex (TDD) receivers is also introduced. Modeling of the DC offset problem in direct conversion receivers is presented and mixed signal solutions to mitigate or remove such DC offset is introduced. The tutorial concludes with CMOS design and implementation of some key CMOS baseband blocks including those achieving DC offset cancellation.

Brief Biography

Mohammed Ismail, Ph.D., has spent over 30 years in academia and industry, having worked in the United States, Canada, Sweden, Egypt, and most recently at Khalifa University in the United Arab Emirates. Ismail is the founding director of the Ohio State University's Analog VLSI Lab, one of the foremost research entities in the field of analog and RF integrated circuits. He was a research chair at the Swedish Royal Institute of Technology (KTH) and created the RaMSiS (Radio and Mixed Signal Integrated Systems) Research Group. Currently he is professor and Chair of ECE at Wayne State University in Detroit and serves as director of the WINCAS research center. He has

served the Institute of Electrical and Electronics Engineers in many editorial and administrative capacities, and has co-founded several startup companies in semiconductor and IC design services. He received several awards and recognitions including the 2018 UNESCO medal, Paris, France, for his contributions to the development of Nanotechnology. He is a fellow of IEEE.