RFIC Tutorial Workshop -- Wireless Made Simple
Dr. J. J. Lee

ABSTRACT:
The escalating markets of wireless applications in cellular, Internet, cordless or notebook PC devices have impacted and benefited our daily life more and more. These seemingly ubiquitous wireless gadgets are exposed so much around our working and living environments that they stimulate people's inquiries and interests in generic principles of their operations.

This non-expert oriented wireless tutorial workshop will cover various, generic RF principles in the conceptual senses instead of quantitative details. Physics concepts will be illustrated by examples to explain trade-offs, issues or problem solving in the front-end RF layer and related back-end digital signal modulations of wireless communications.

Major commercial wireless markets in WWAN / WLAN / WPAN appliances and their RF standards are to be summarized, and will be highlighted on the key factors. Examples will address some newest digital baseband modulations and their impacts to RFIC designs, pros and cons, and the architectural choices.

The CMOS and SiGe BiCMOS processes are also compared in the RFIC performance with Intersil's 802.11b case study on the low-noise-amplifier and receiver mixer designs. Other sampled transmitter's power amplifier specs of IEEE / FCC compliance and RFIC layout will be reviewed for some critical points.

On a system level, the EM wave's propagations, coverage ranges and their modeling will illustrate the physics concepts of wireless transmission over air and obstacles. The antenna's applications in wireless systems will also offer radiation's concepts and patterns.

Hope this workshop provides a good balance between the depth and the breadth of the non-expert audience's interests in RFICs and other wireless aspects. Longer discussions for some questions could be held in the part-2 Q&A session.

Brief Biography of Dr. J. J. Lee

Dr. J.J. Lee, of consulting company RadioWise Technology, received M.S. & Ph.D. from University of Wisconsin-Madison, both in EE. His 15-year technical and managerial experiences are half in RFIC chips and half in RF systems. Theses include TI, Peregrine, CEL / NEC, and eWave on RFIC chips from CMOS to GaAs processes; and also include Hitachi and Pico on RF systems from WWAN / Cell-Phones, Bluetooth to WLAN / WiFi. He is an IEEE Senior Member and has published 10+ papers. E-mail at: jjlee5858@yahoo.com.