

“Self-Healing” Design Techniques for RF and mm-Wave Ics

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Abstract

To achieve the highest performance/price ratios of handheld wireless devices, the current trends in wireless chip set development call for a programmable cognitive-like multi-standard nanometer CMOS radios integrated on a single chip. This represents a grand challenge to both the yield and validation of such chip sets and typically requires several silicon spins which will increase the NRE development costs and may result in significant product delays and in missing important market windows. To meet this challenge we present design techniques for “self-awareness” and “self-healing” of multi-band, multi-mode CMOS radio systems and demonstrate the validity of these techniques in the design of WiMAX/LTE CMOS radio front ends. Moreover, we will review the Evolution of the wireless technology and chipsets beyond 3G as well as the basic principles of zero-IF CMOS multi band, multi mode radios from antenna to bits. We will also present a compact transceiver architecture suitable for TDD radio systems.

The talk is intended for RFIC, baseband and SoC design engineers, researchers and graduate students as well as product and marketing managers. The material will be given at an introductory level. So newcomers to the field are welcome.