Special Session on Wireless Test

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The session consists of three presentations spanning multiple aspects of wireless test: fixturing, which is a vital issue for industrial test development, embedded source generation, which will assist integration of radio components into SOC design, and an overview of open problems in RF/wireless test, to give researchers an idea of the exciting challenges in the field.

Presentation 1: Test Hardware Design Challenges in RF Testing

Mustapha Slamani and H. Ding, IBM Microelectronics

Abstract

Problems such as self-inductance, mutual inductance and contact resistance of a socket/probe, can no longer be ignored in RF test development. Other parasitic PCB effects and non-ideal ground effects have to be considered also. Modeling the package and the socket reduces the test development time and shrinks time to production. A robust methodology allows us consistently generate high quality RF test hardware solutions, allowing the test engineer to address the technical issues with RF signals and RF IC's prior to building the hardware. This saves time, money and sets an appropriate level of expectation with the RF IC design team on what is feasible to test.

Presentation 2: Programmable Embedded IF Source for Wireless Test

William R. Eisenstadt and Sanghoon Choi, University of Florida

Abstract

Projected SoC designs with embedded RF components will need to be debugged in the design phase and will need expensive RF test in the production phase. RF/mixed-signal portions of an SoC must be verified with high-frequency parametric test, typically requiring RF signal sources, spectrum analyzers, network analyzers, etc. Often, critical RF and analog circuit nodes in such ICs are unobservable and uncontrollable by today's test techniques. The lack of circuit observability and controllability will result in more design iterations, slower design time to market, and inadequate manufacturing test coverage. RF/mixed-signal test issues can add large test cost to the SoC and delay introduction of new SoCs.

We are extending prior work (G. Roberts et al) of methodologies for area-efficient and cost-effective analog source generation into IF and ultimately RF frequencies. The key element we are developing is a compact high dynamic range programmable IF/RF source. The design schematic is finished and the layout is on-going using the IBM SiGe 6HP BiCMOS process. Preliminary simulation results show about 30dB of spurious free dynamic range, (SFDR) in single tone case, using 32-bit code, 2 nd order delta-sigma modulator model and 16x oversampling ratio, (OSR). We can use this source directly in the receiver IF band and also push the functionality to RF frequencies by using faster on-chip digital clocks or mixers and an LO.

Presentation 3: Open Problems in Wireless Test and Why You Should Care

John McLaughlin, Agilent Technologies

Abstract

Testing RF designs presents many challenges not encountered during conventional digital test, or even mixed signal test. Among these are accurate measurements at GHz frequencies, standards conformance, and board/chip interaction. The presenter, who has extensive experience in RF instrumentation, describes these challenges and outlines open areas in need of further study.

Proceedings of the 20 th IEEE VLSI Test Symposium (VTS'02)
1093-0167/02 $17.00 © 2002 **IEEE**

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