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ELECTRICAL & COMPUTER ENGINEERING
TEXAS A&M UNIVERSITY

S E M I N A R

Room 1003 ETB

November 12, 2013 3:55-5:10 P.M.

A 5.1-13GHz Triple-Resonance Low Phase Noise CMOS VCO for Software-Defined Radio Applications

by

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Abstract: In recent years, there has been a growing interest toward multi-band multi-standard transceivers covering a large number of frequency bands such as Software Defined Radios (SDR). One of the key building blocks in an SDR is the local oscillator which needs to generate the quadrature signals from 100MHz to 6GHz while meeting the stringent phase noise performance requirements. Moreover, the oscillator needs to consume low power and have a compact size. If a VCO with one octave of tuning range from 6 to 12GHz is available, all frequencies below 6GHz can be simply synthesized in quadrature without spurs employing a chain of divide-by-2 circuits. However, single-tank LC VCOs relying on only switched capacitor technique cannot cover such a wide frequency range while satisfying the required phase noise performance. In this seminar, a triple-mode low-phase-noise CMOS VCO for SDR applications is presented. The proposed VCO uses a switch-less sixth-order resonator, implemented by three coupled inductors and an active G_m-network for switching between different modes. The implemented prototype in 0.18μm CMOS technology shows 5.1-13GHz continuous tuning range, phase noise FoM of 190 dB at 6GHz and better than 185dB across the entire operation frequency while consuming 5-10mA from 1-V supply. The VCO occupies a chip area of 0.33mm^2.

Masoud Moslehi Bajestan received the M.Sc. degree in electronics engineering from Sharif University of Technology, Tehran, Iran, in 2010, and is currently working toward the Ph.D. degree at Texas A&M University, College Station, TX.
His current research mainly concerns RF/analog integrated circuits with a special interest in wideband and low phase-noise oscillators and frequency synthesizers.