SESSION 17 – TAPA III
MM-Wave

Friday, June 16, 1:30 p.m.
Chairpersons: M. Huang, Freescale Semiconductor
M. Ugajin, NTT Microsystem Integration Labs

17.1 – 1:30 p.m.
A Millimeter-Wave Schottky Diode Detector in 130-nm CMOS Technology, E. Seok, C. Cao, S. Sankaran, K.K. O, University of Florida, Gainesville, FL

A 182-GHz schottky barrier diode detector has been demonstrated in 130-nm foundry CMOS using signals generated on-chip by modulating the bias current of a push-push voltage controlled oscillator as input. This work demonstrated that it is possible to build a detector operating near the top end of millimeter-wave range using digital CMOS.

17.2 – 1:55 p.m.
A 60GHz CMOS Differential Receiver Front-End Using On-Chip Transformer for 1.2 Volt Operation with Enhanced Gain and Linearity, D. Huang, R. Wong, Q. Gu, N.-Y. Wang, T.W. Ku, C. Chien*, M.-C.F. Chang, University of California, Los Angeles, CA, *SST Communications Co., Los Angeles, CA

A compact 60GHz CMOS differential direct conversion receiver front-end based on eight-metal-layer interleaved on-chip transformers is realized for low voltage (1.2V) and high gain (24dB) operation with input 1dB compression point of -11dBm, Noise Figure of 10.5dB and power consumption of 4.3mW/arm. Compared with prior arts in CMOS, this receiver achieves the highest gain without an output buffer, highest linearity, lowest noise, and lowest power consumption with smallest die area of 0.022mm^2.

17.3 – 2:20 p.m.
A 9.5-dB 50-GHz Matrix Distributed Amplifier in 0.18-µm CMOS, J.-C. Chien, T.-Y. Chen, L.-H. Lu, National Taiwan University, Taipei, Taiwan

Implemented in a 0.18-um CMOS process, a 2X4 matrix amplifier is presented in this paper. Due to the use of the second-tier gain cells in the distributed amplifier architecture, the proposed circuit exhibits a remarkable nominal gain of 9.5 dB with a 3-dB bandwidth of 50 GHz while maintaining input and output return losses better than 10 dB over the entire frequency band. A gain-bandwidth product of 150 GHz is demonstrated in this work.

17.4 – 2:45 p.m.
A 24-GHz Transmitter with an On-chip Antenna in 130-nm CMOS, C. Cao, Y. Ding, X. Yang, J.-J. Lin, A. K. Verma, J. Lin, F. Martin*, K.K. O, University of Florida, Gainesville, FL, *Motorola Labs, Fort Lauderdale, FL

A transmitter with an on-chip dipole antenna operating in the 24-GHz ISM band was fabricated in 130-nm CMOS. It provides 8-dBm output power and 7.7% rms EVM while consuming 100-mW power. An integer-N synthesizer consuming 36-mW power is also integrated. The signal transmitted by the chip has been picked up 95m away using a horn antenna. This work demonstrates that communication between a base station and an integrated circuit with on-chip antenna over a distance of 100m is possible.