

SESSION 9 – HONOLULU SUITE  
RF and New W Transceivers

Thursday, June 17, 8:30 a.m.

Chairperson: C.M. Hung, Texas Instruments, Inc.  
S. Mutoh, NTT Corporation

**9.1 - 8:30 a.m.**

**A Quad-Band GSM/GPRS/EDGE SoC in 65nm CMOS**, H. Darabi, P. Chang, H. Jensen, A. Zolfaghari, J. Leete, B. Mohammadi, J. Chiu, T. Li, X. Chen, Z. Zhou, M. Vadipour, C. Chen, Y. Chang, A. Mirzaei, A. Yazdi, M. Narima, A. Hadji, P. Lettieri, E. Chang, B. Zhao, K. Juan, P. Suri, C. Guan, L. Serrano, J. Leung, J. Shin, J. Kim, H. Tran, P. Kilcoyne, H. Vinh, E. Raith, M. Koscal, A. Hukkoo, C. Hayek, V. Rakhshani, C. Wilcoxson, M. Rofougaran, A. Rofougaran, Broadcom Corporation, USA

A quad-band 2.5G SoC integrates all the RF, DSP, ARM, audio and other baseband processing functions into a single 65nm CMOS die. The radio draws a battery current of 49mA in the receiver-mode, and 86mA in the GMSK transmit-mode. The low-IF receiver achieves a sensitivity of -110dBm at the antenna, corresponding to a noise figure of 2.4dB at the device input. The 8PSK  $\pm 400$ kHz modulation mask is -64.1/62.7dBc for high/low bands, with an RMS EVM of 2.45/1.95%.

**9.2 - 8:55 a.m.**

**A Carrier Leakage Auto-Calibration Circuit with a Direct DC-Offset Comparison Technique for a WiMAX Transmitter**, H. Nakamoto, M. Kudo, H. Ito\*, D. Yamazaki\*, Fujitsu Microelectronics Ltd. Japan, \*Fujitsu Laboratories Ltd

We propose an RF-detector-less carrier leakage suppressor for a WiMAX transmitter. The proposed circuit directly detects the DC offset of a transmitter path and minimizes it, thus reducing carrier leakage. The correct DC-offset feedback is achieved by performing an absolute offset comparison after the general binary search technique. The suppressor is integrated in the direct-conversion transceiver fabricated in 90-nm technology. The measured carrier leakage is better than -32 dBc over the complete transmitter power range.

**9.3 - 9:20 a.m.**

**1Gbps/ch 60GHz CMOS Multichannel Millimeter-Wave Repeater**, A. Oncu, S. Ohashi\*, K. Takano\*, T. Takada\*\*, J. Shimizu\*\*, M. Fujishima, Hiroshima University, \*The University of Tokyo, \*\*Silicon Library Inc, Japan

A 60GHz CMOS multichannel wireless repeater, which converts digital data and millimeter-wave pulses without applying signal processing, is proposed for high-speed communication. A chip containing three repeaters operating at 60.48GHz, 62.64GHz and 64.8GHz frequency bands is fabricated using a 90nm CMOS process. Each channel has a 1Gbps data rate with power consumptions of 51mW and 116mW in the transmitter and receiver modules, respectively.

**9.4 - 9:45 a.m.**

**A 60-GHz FSK Transceiver with Automatically-Calibrated Demodulator in 90-nm CMOS**, H. Wang, M.-H. Hung, Y.-C. Yeh, J. Lee, National Taiwan University, Taiwan

A fully-integrated 60-GHz transceiver utilizing analog FSK modulation/demodulation to replace baseband processor has been demonstrated. Employing a discriminator with automatic adjustment and a folded dipole antenna pair (5-dBi gain for each), the transceiver achieves > 1Gb/s data transmission over 1 meter with BER <  $10^{-12}$  while consuming a total power of 500 mW.