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MONDAY, JUNE 3, 2002

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Co-Chair: N. Camilleri, *RF & Wireless Design Services*

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Co-Chair: J. P. Mondal, *Motorola, Inc.*

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Chair: J. Lin, *Agere Systems*

Co-Chair: N. Camilleri, *RF & Wireless Design Services, Inc.*

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1:20 pm–3:00 pm

Room 6B

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Chair: W.B. Kuhn, *Kansas State University*

Co-Chair: A. Jerng, *DSP Group*

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Room 602–3–4

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1:20 pm–3:00 pm

Room 606–607

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Chair: J. Lin, *Agere Systems*

Co-Chair: N. Camilleri, *RF & Wireless Design Services, Inc.*

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Room 6B

SESSION MO4A: 3G CELLULAR SYSTEMS & CHIP SETS

Chair: F. Ali, *Nokia Mobile Phones*

Co-Chair: J. Mondal, *Motorola*

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Room 6A

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Chair: D. Nobbe, *Peregrine Semiconductor*

Co-Chair: Y. Deval, *IXL*

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Room 602–3–4

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Co-Chair: M. Kumar, *Lockheed Martin*

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3:30 pm–5:10 pm

Room 606–607

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Chair: T. Quach, *Motorola Inc.*

Co-Chair: N. Suematsu, *Mitsubishi Electronic Corp.*

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TUESDAY, JUNE 4, 2002

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INTEGRATED CIRCUITS FOR 3G**

Chair: R. Weigel, *University of Linz, Austria*

Co-Chair: C.C.W. Ruppel, *EPCOS AG*

TU2A-1 10:10 am	(Invited) Integrated Even Harmonic Type Direct Conversion Receiver for W-CDMA Mobile Terminals K. Itoh, T. Yamaguchi, T. Katsura, K. Sadahiro, T. Ikushima, R. Hayashi*, F. Ishizu*, E. Taniguchi*, T. Nishino*, M. Shimozawa*, N. Suematsu*, T. Takagi*, and O. Ishida*, <i>Mobile Communication Business Division, Mitsubishi Electric Corp., Hyogo, Japan;</i> <i>*Information Technology R&D Center, Mitsubishi Electric Corporation, Kamakura, Kanagawa, Japan</i>	263
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10:10 am–11:50 am

Room 606–607

SESSION TU2B: JOINT IMS-RFIC SESSION: MMIC TECHNOLOGY

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TUESDAY, JUNE 4, 2002

1:20 pm–3:00 pm

Room 608–609

**SESSION TU3A: JOINT IMS-RFIC SESSION: SILICON SUBSTRATE
AND INDUCTOR MODELING**

Chair: A. Gupta, *Anadigics*

Co-Chair: A. Westwick, *Silicon Laboratories*

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TU3A-5 2:40 pm	A New Methodology for the Computation of the Substrate Parasitics of Octagonal Inductors W. Tatinian*†, P. Pannier*, and R. Gillon†, <i>L2MP-ICF c/o IMT Technopôle de Château Gombert, Marseille, France; †Alcatel Microelectronics Westerring, Oudenaarde, Belgium</i>	319

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1:20 pm–3:00 pm

Room 606–607

SESSION TU3B: JOINT IMS-RFIC SESSION: SIGE RFIC PROCESS TECHNOLOGIES

Chair: K. Ashby, *Microtune Inc.*

Co-Chair: B. Xavier, *National Semiconductor*

TU3B-1	(Invited) Review of SiGe Process Technology and its Impact on RFIC Design	325
1:20 pm	A. Das, M. Huang, J. Mondal, D. Kaczman, C. Shurboff, and S. Cosentino, <i>Motorola Inc., Libertyville, IL</i>	
TU3B-2	(Invited) High Performance Circuits in 0.18 um SiGe BiCMOS Process for Wireless Applications	329
1:40 pm	P. Ye, B. Agarwal, M. Reddy, L. Li, J. Cheng, P.C. Mudge, E. McCarthy, and S.L. Lloyd, <i>Conexant Systems Inc., Newport Beach, CA</i>	
TU3B-3	Low-Frequency Noise Figures-of-Merit in RF SiGe HBT Technology	333
2:00 pm	J. Tang, G. Niu, Z. Jin, J.D. Cressler, S. Zhang, A.J. Joseph*, and D.L. Harame*, <i>ECE Department, Auburn University, Auburn AL; *IBM Microelectronics, Essex Junction, VT</i>	
TU3B-4	COM2 Enhanced Graded Base SiGe Technology for High Speed Applications	337
2:20 pm	T. Ivanov, M. Carroll, S. Moinian*, M. Mastrapasqua*, M. Frei*, A. Chen, C. King*, A. Hamad, E. Martin, S. Shive, T. Esry, C. Lee, R. Johnson*, T. Sorsch*, M. Carroll*, K. Banoo*, P. Smith, and W. Cochran, <i>Agere Systems, Orlando, FL; *Agere Systems, Murray Hill, NJ</i>	
TU3B-5	Advanced Passive Devices for Enhanced Integrated RF Circuit Performance	341
2:40 pm	D. Coolbaugh, E. Eshun, R. Groves*, D. Harame, J. Johnson, M. Hammad, Z. He, V. Ramachandran, K. Stein*, S. St Onge, S. Subbanna*, D. Wang†, R. Volant*, X. Wang†, and K. Watson, <i>IBM Corp., Essex Junction, VT; *IBM Corp., Hopewell Junction, NY; †IBM Corp., Lowell, MA</i>	

TUESDAY, JUNE 4, 2002

3:30 pm–5:10 pm

Room 608–609

**SESSION TU4A: JOINT IMS-RFIC SESSION: ACTIVE DEVICE MODELING
AND CHARACTERIZATION**

Chair: J. Staudinger, *Motorola*

Co-Chair: P. Murphy, *University College Cork*

TU4A-1 3:30 pm	(Invited) A Robust High Voltage Si LDMOS Model Extraction Process to Achieve First Pass Linear RFIC Amplifier Design Success J.A. Plá and D. Bridges, <i>Motorola, Semiconductor Products Sector, Wireless Infrastructure Systems Division, Tempe, AZ</i>	347
TU4A-2 3:50 pm	Large-Signal Modeling of GaN FET and Nonlinearity Analysis Using Volterra Series S.S. Islam and A.F.M. Anwar, <i>Dept. of Electrical and Computer Engineering, University of Connecticut, Storrs, CT</i>	351
TU4A-3 4:10 pm	Direct Parameter Extraction on RF-CMOS F.X. Pengg, <i>CSEM, Neuchâtel, Switzerland</i>	355
TU4A-4 4:30 pm	Low Frequency Noise Characterization and Modeling of Microwave Bipolar Devices: Application to the Design of Low Phase Noise Oscillator L. Bary, G. Cibiel, I. Telliez*, J. Rayssac, A. Rennane, C. Boulanger†, O. Llopis, M. Borgarino, R. Plana‡, and J. Graffeuil‡, <i>LAAS-CNRS, Toulouse, France</i> ; *STMicroelectronics, Crolles, France; †CNES, Toulouse, France; ‡LAAS-CNRS and University Paul Sabatier, Toulouse, France	359
TU4A-5 4:50 pm	Linearity Analysis of CMOS for RF Application S. Kang, B. Choi, and B. Kim, <i>Dept. of Electronic and Electrical Engineering and Microwave Application Research Center, Pohang University of Science and Technology, Kyungbuk, Republic of Korea</i>	363

TUESDAY, JUNE 4, 2002

3:30 pm–5:00 pm

Room 606–607

**SESSION TU4B: JOINT IMS-RFIC SESSION: RFIC POWER
AMPLIFIER TECHNOLOGIES**

Chair: B. Xavier, *National Semiconductor*

Co-Chair: K. Ashby, *Microtune Inc.*

TU4B-1 3:30 pm	(Invited) RF Power Devices for Wireless Communications C.E. Weitzel, <i>Motorola, Inc., Semiconductor Products Sector, Tempe, AZ</i>	369
TU4B-2 3:50 pm	SiGe/Si Power HBTs for X- to K-Band Applications S. Mohammadi, Z. Ma, J. Park, P. Bhattacharya, L.P.B. Katehi, G.E. Ponchak*, S.A. Alterovitz*, K.M. Strohm†, and J.-F. Luy†, <i>EECS Dept., University of Michigan, Ann Arbor, MI</i> ; *NASA Glenn Research Center, Cleveland, OH; †Daimler-Chrysler Research Center, Ulm, Germany	373
TU4B-3 4:10 pm	RF Power Characteristics of SiGe Heterojunction Bipolar Transistor with High Breakdown Voltage Structures T. Matsuno, K. Nishii, S. Sonetaka, Y. Toyoda, N. Iwamoto, <i>Semiconductor Device Research Center, Discrete Device Division, Semiconductor Co., Matsushita Electric Industrial Co., Ltd.</i>	377
TU4B-4 4:30 pm	Design Techniques for Improved Microwave Performance of Small Outline Packages D. Jessie and L. Larson, <i>University of California–San Diego, La Jolla, CA</i>	381
TU4B-5 4:50 pm	Spiral Inductor Performance in Deep-Submicron Bulk-CMOS with Copper Interconnects W.B. Kuhn, A.W. Orsborn, M.C. Peterson, S.R. Kythakyapuzha, A.I. Hussein, J. Zhang, J. Li, E.A. Shumaker, and N.C. Nair, <i>Dept. of Electrical and Computer Engineering, Kansas State University, Manhattan, KS</i>	385

TUESDAY, JUNE 4, 2002

1:30 pm–4:30 pm

Room 6E

SESSION IF-TU: (JOINT IMS-RFIC SESSION) TUESDAY INTERACTIVE FORUM

Chair: R. Lutz, *Maxim Integrated Products*

IF-TU-33 1:30 pm	A 6.5-mW Receiver Front-End for Bluetooth in 0.18-μm CMOS F. Beffa, R. Vogt, W. Bächtold, E. Zellweger*, and U. Lott†, <i>Swiss Federal Institute of Technology (ETH), Zürich, Switzerland</i> ; *Asulab S.A., Marin, Switzerland; †Acter A.G., Zürich, Switzerland	391
IF-TU-34 1:30 pm	An Active SiGe Sub-Harmonic Direct-Conversion Receiver Front-End Design for 5–6 GHz Band Applications R. Svitek, D. Johnson*, and S. Raman, <i>Wireless Microsystems Lab, Bradley Dept. of ECE, Virginia Tech, Blacksburg, VA</i> ; *Now with the Integrated Semiconductor Business Unit, M/A-COM, Roanoke, VA	395
IF-TU-35 1:30 pm	Soft Breakdown and Hot Carrier Reliability of CMOS RF Mixer and Redesign Q. Li, W. Li, J. Zhang*, and J.S. Yuan, <i>Chip Design and Reliability Lab, School of Electrical Engineering & Computer Science, University of Central Florida, Orlando, FL</i> ; *VLSI Tech. Lab, Agere Systems, Orlando, FL	399

IF-TU-36 1:30 pm	High-Q Copper Inductors on Standard Silicon Substrate with a Low-k BCB Dielectric Layer X. Huo, K.J. Chen, and P.C.H. Chan, <i>Dept. of Electrical and Electronic Engineering, Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong</i>	403
IF-TU-37 1:30 pm	Geometry and Bias Current Optimization for SiGe HBT Cascode Low-Noise Amplifiers Q. Liang, G. Niu, J.D. Cressler, S. Taylor*, and D.L. Harnage†, <i>Alabama Microelectronics Science and Technology Center, Electrical and Computer Engineering Department, Auburn University, Auburn, AL; *Maxim Integrated Products, Hillsboro, OR; †IBM Microelectronics, Essex Junction, VT</i>	407
IF-TU-38 1:30 pm	High Linearity Low-k BCB-Bridged AlGaAs/InGaAs Power HFETs H.-C. Chiu, M.-J. Hwu, S.-C. Yang, and Y.-J. Chan, <i>Department of Electrical Engineering, National Central University, Chungli, Taiwan, ROC</i>	411
IF-TU-39 1:30 pm	Performance of a CMOS Bluetooth Transceiver IC with Copper RF Passives M.T. Doan, Q. Yin, K.E. Sze, P.B. Khannur, S.C. Rustagi, S. Jinglin, P.D. Foo, and A.B. Ajikuttira, <i>Institute of Microelectronics, Singapore</i>	415
IF-TU-40 1:30 pm	Effects of Dummy Patterns and Substrate on Spiral Inductors for Sub-Micron RFICs J.-H. Chang*†, Y.-S. Youn†, H.-K. Yu†, and C.-K. Kim*, <i>*Dept. of EECS, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Republic of Korea; †Electronics and Telecommunications Research Institute (ETRI), Daejeon, Republic of Korea</i>	419
IF-TU-41 1:30 pm	Schottky Junction Transistors for Micropower RFICs J. Spann, Z. Wu, P. Jaconelli, J. Yang, and T.J. Thornton, <i>Arizona State University, Dept. of Electrical Engineering and Center for Solid State Electronics Research, Tempe, AZ</i>	423
IF-TU-42 1:30 pm	ESD Protection Design for 900-MHz RF Receiver with 8-kV HBM ESD Robustness M.-D. Ker, W.-Y. Lo, C.-M. Lee, C.-P. Chen*, and H.-S. Kao*, <i>Integrated Circuits & Systems Laboratory, Institute of Electronics, National Chiao-Tung University, Hsinchu, Taiwan; *R&D Division, Alfabius Semiconductor Inc., Hsinchu, Taiwan</i>	427
IF-TU-43 1:30 pm	Improvements to Performance of Spiral Inductors on Insulators D. Kelly and F. Wright, <i>Peregrine Semiconductor Corp., San Diego, CA</i>	431
IF-TU-44 1:30 pm	Octave Tunable, Highly Linear, RC-Ring Oscillator with Differential Fine-Coarse Tuning, Quadrature Outputs and Amplitude Control for Fiber Optic Transceivers M.A.T. Sanduleanu, D. van Goor, and H. Veenstra, <i>Philips Research, Eindhoven, Netherlands</i>	435
IF-TU-45 1:30 pm	A 2.45GHz Fully-Differential CMOS Image-Reject Mixer for Bluetooth Application P.B. Khannur and K.S. Ling*, <i>Institute of Microelectronics (IME), Singapore; *Oki Techno Centre, Singapore</i>	439
IF-TU-46 1:30 pm	Super Compact RFIC Inductors in 0.18μm CMOS with Copper Interconnects H. Feng, G. Jelodin, K. Gong, R. Zhan, Q. Wu, C. Chen, and A. Wang, <i>Integrated Electronics Laboratory, Dept. of Electrical & Computer Engineering, Illinois Institute of Technology, Chicago, IL</i>	443
IF-TU-47 1:30 pm	High Performance Single Supply Power Amplifiers for GSM and DCS Applications Using True Enhancement Mode FET Technology E. Glass, M. Shields, and A. Reyes, <i>Motorola, Inc., Semiconductor Product Sector, Tempe, AZ</i>	447

IF-TU-48 1:30 pm	Integrated 2.4 GHz CMOS Quadrature VCO with Symmetrical Spiral Inductors and Differential Varactors B. Chi and B. Shi, <i>Institute of Microelectronics, Tsinghua University, Beijing, China</i>	451
IF-TU-49 1:30 pm	A Fully Monolithic SiGe Quadrature Voltage Controlled Oscillator Design for GSM/DCS-PCS Applications D. Cordeau*†, J.-M. Paillot†, H. Cam*, G. De Astis*, and L. Dascalescu†, *ACCO, <i>Saint-Germain-en-Laye, France</i> ; †LAII-ESIP, <i>Angoulême, France</i>	455
IF-TU-50 1:30 pm	Hot Carrier and Soft Breakdown Effects on VCO Performance E. Xiao and J.S. Yuan, <i>Chip Design and Reliability Laboratory, School of Electrical Engineering and Computer Science, University of Central Florida, Orlando, FL</i>	459
IF-TU-51 1:30 pm	A 1.5-V 4-GHz Dynamic-Loading Regenerative Frequency Doubler in a 0.35-μm CMOS Process J.M.C. Wong and H.C. Luong, <i>Dept. of Electrical and Electronic Engineering, Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong</i>	463
IF-TU-52 1:30 pm	Very Low Phase-Noise Fully-Integrated Coupled VCOs H. Jacobsson*, B. Hansson*, H. Berg†, and S. Gevorgian*†, * <i>Microwave and High Speed Electronics Research Center, Ericsson Microwave Systems, Mölndal, Sweden</i> ; † <i>Microwave Electronics Laboratory, Chalmers University of Technology, Göteborg, Sweden</i>	467
IF-TU-53 1:30 pm	Wide-Tuning-Range Dual-VCOs for Cable Modem Receivers K. Stadius and K. Halonen, <i>Helsinki University of Technology, Electronic Circuit Design Laboratory, Finland</i>	471
IF-TU-54 1:30 pm	A 5.8 GHz Fully Integrated Low Power Low Phase Noise CMOS LC VCO for WLAN Applications J. Bhattacharjee, D. Mukherjee, E. Gebara, S. Nuttinck, and J. Laskar, <i>Yamacraw Design Center, Georgia Institute of Technology, Atlanta, GA</i>	475
IF-TU-55 1:30 pm	A 5GHz Fast-Switching CMOS Frequency Synthesizer X. Yang, T. Wu, and J. McMacken*, <i>University of Central Florida, Orlando, FL</i> ; * <i>Agere Systems, Inc., Orlando, FL</i>	479
IF-TU-56 1:30 pm	A Wilkinson Power Divider on a Low Resistivity Si Substrate with a Polyimide Interface Layer for Wireless Circuits J. Papapolymerou, G.E. Ponchak*, and E.M. Tentzeris, <i>School of Electrical and Computer Engineering, Georgia Tech, GA</i> ; * <i>NASA Glenn Research Center, Cleveland, OH</i>	483
IF-TU-57 1:30 pm	Development and Verification of a New Non-Linear Mosfet Model H. Romdane, E. Bergeault, and B. Huyart, <i>Ecole Nationale Supérieure des Télécommunications, Paris, France</i>	487
IF-TU-58 1:30 pm	Design and Analysis of a Multi-Layer Transformer Balun for Silicon RF Integrated Circuits H.Y.D. Yang, L. Zhang, and J.A. Cataneda, <i>Broadcom Corp., El Segundo, CA</i>	491
IF-TU-59 1:30 pm	Smoothing Gate Capacitance Models for CMOS Radio Frequency and Microwave Integrated Circuits CAD J. Dobeš, <i>Czech Technical University, Czech Republic</i>	495