

2002 Microwave Symposium Technical Program Schedule



Session TU1 Plenary Session

8:00–9:40 am

Sixth Floor Ballroom

Tuesday, June 4, 2002

Chair: Donn Harvey, Techlink Northwest

TU1

8:00 am J. Christensen

3

Session TU2A

Joint RFIC/IMS2002 Special Session on Radio Frequency Integrated Circuits for 3G

10:10–11:50 am

Room 608–609

Tuesday June 4, 2002

Chair: R. Weigel, University of Linz, Austria

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

TU2A-1 10:10 am	Integrated Even Harmonic Type Direct Conversion Receiver for W-CDMA Mobile Terminals (Invited) 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	9
TU2A-2 10:40 am	An Analog Baseband Chain for a UMTS Zero-IF Receiver in a 75 GHz SiGe BiCMOS Technology W. Schelmbauer, H. Pretl, L. Maurer, B. Adler, R. Weigel, R. Hagelauer, and J. Fenk	13
TU2A-3 11:10 am	A 2-GHz RF Front-End Transceiver Chipset in CMOS Technology for PCS and IMT-2000 Applications Y.-S. Youn, N.-S. Kim, J.-H. Chang, Y.-J. Lee, and H.-K. Yu	17
TU2A-4 11:30 am	System Analysis of a W-CDMA Base-Station PA Employing Adaptive Digital Predistortion C. Potter	21

Session TU2B
(Joint IMS-RFIC Session)
MMIC Technology

10:10–11:50 am

Room 606–607

Tuesday, June 4, 2002

Chair: A. Madjar, Rafael

Co-Chair: T. Lee, Boeing Satellite Systems

TU2B-2	Ku-Band MMIC's in Low-Cost, SMT Compatible Packages	27
10:30 am	H.C. Huang, A. Ezzeddine, A. Darwish, B. Hsu, J. Williams, and S. Peak	
TU2B-3	ESD Protection of RF Circuits in Standard CMOS Process	31
10:50 am	K. Higashi, A.O. Adan, M. Fukumi, N. Tanba, T. Yoshimasu, and M. Hayashi	
TU2B-4	Novel BiCMOS Compatible, Short Channel LDMOS Technology for Medium Voltage RF & Power Applications	35
11:10 am	A. Litwin, O. Bengtsson, and J. Olsson	
TU2B-5	Electromagnetic Coupling Effects in RFCMOS Circuits	39
11:20 am	A.O. Adan, M. Fukumi, K. Higashi, T. Suyama, M. Miyamoto, and M. Hayashi	
TU2B-6	Ultra Low-Power VCO Based on InP-HEMT and Heterojunction Interband Tunnel Diode for Wireless Application	43
11:30 am	A. Cidronali, G. Collodi, M. Camprini, V. Nair, G. Manes, J. Lewis, and H. Goronkin	

Session TU2C
Phased Arrays and Beam Steering Techniques

10:10–11:50 am

Room 611–612

Tuesday, June 4, 2002

Chair: B. Perlman, USA Communications—Electronics R&D

Co-Chair: R. Sudbury, MIT Lincoln Laboratory

TU2C-1	Correlation of Nonlinear Distortion in Digital Phased Arrays: Measurement and Mitigation	49
10:10 am	L.C. Howard and D.J. Rabideau	
TU2C-2	Planar Implementation of the Partially Overlapped Subarrays for Millimeterwave Beam Steerable Antenna Applications	53
10:30 am	A. Abbaspour-Tamijani and K. Sarabandi	
TU2C-3	A Novel Multibeam Grating Antenna with Applications to Low-Cost Millimeter-Wave Beam-Steering	57
10:50 am	C.T. Rodenbeck, M. Li, and K. Chang	
TU2C-4	Highly Integrated RF-Modules for Ka-Band Multiple-Beam Active Phased Array Antennas	61
11:00 am	J. Butz, M. Spinnler, J. Christ, and U. Mahr	
TU2C-5	High Performance Voltage Controlled Bi-Directional Amplifiers in Support of Component Reuse for Large Aperture Phase Array	65
11:10 am	J.M. Yang, Y.H. Chung, M. Nishimoto, R. Lai, R. Tsai, R. Kagiwada, and C.C. Yang	
TU2C-6	Experimental Investigation of a Varactor Loaded Reflectarray Antenna	69
11:20 am	L. Boccia, F. Venneri, G. Amendola, and G. Di Massa	

Session TU2D

Integrated Circuits for 40Gb/s Fiber Systems

10:10–11:50 am

Room 615–6–7

Tuesday, June 4, 2002

Chair: K.C. Wang, OpNext

Co-Chair: J.F. Luy, DaimlerChrysler

TU2D-1	A 50-Gbit/s 1:4 Demultiplexer IC in InP-Based HEMT Technology	75	
10:10 am	H. Kano, T. Suzuki, S. Yamaura, Y. Nakasha, K. Sawada, T. Takahashi, K. Makiyama, T. Hirose, and Y. Watanabe		
TU2D-2	A 0.15-μm GaAs MHEMT Transimpedance Amplifier IC for 40-Gb/s Applications	79	■ TU ■ 2D
10:30 am	C.F. Campbell, M.S. Heins, M.Y. Kao, M.E. Muir, and J.M. Carroll		
TU2D-3	A Fully Integrated 40-Gbit/s Clock and Data Recovery Circuit Using InP/InGaAs HBTs	83	■ TU ■ 2
10:50 am	H. Nosaka, E. Sano, K. Ishii, M. Ida, K. Kurishima, T. Enoki, and T. Shibata		
TU2D-4	40-Gb/s Optical Receiver IC Chipset—Including a Transimpedance Amplifier, a Differential Amplifier, and a Decision Circuit—Using GaAs-Based HBT Technology	87	TU 2F
11:10 am	Y. Amamiya, Y. Suzuki, M. Kawanaka, K. Hosoya, Z. Yamazaki, M. Mamada, H. Takahashi, S. Wada, T. Kato, Y. Ikenaga, S. Tanaka, T. Takeuchi, and H. Hida		
TU2D-5	40-GHz MMICs for Optical Modulator Driver Applications	91	TU 3A
11:30 am	R.S. Virk, E. Camargo, R. Hajji, S. Parker, R. Benelbar, S. Notomi, and H. Ohnishi		

Session TU2E

Couplers, Dividers, and Baluns

10:10–11:50 am

Room 602–3–4

Tuesday, June 4, 2002

Chair: C. Buntschuh, Microwave Engineering Services

TU2E-1	Design of a Miniaturized Stripline-to-Microstrip-Line Coupler	97	
10:10 am	K. Rambabu and J. Bornemann		
TU2E-2	A High-Directivity Microstrip Directional Coupler with Feedback Compensation	101	
10:30 am	J.-L. Chen, S.-F. Chang, and C.-T. Wu		
TU2E-3	An all 50 Ohm Divider/Combiner Structure	105	
10:40 am	E. Turan and S. Demir		
TU2E-4	Vertical Balun and Wilkinson Divider	109	
10:50 am	A. Darwish, A. Ezzeddine, H.C. Huang, K. Bumman, L. Joonyoul, Y. Sungwhan, M. Mah, and J. Cook		
TU2E-5	Analysis and Design of a High-Performance Planar Marchand Balun	113	
11:10 am	C.Y. Ng, M. Chongcheawchamnan, and I.D. Robertson		
TU2E-6	Analysis and Design of Low-Loss Planar Microwave Baluns Having Three Symmetric Coupled Lines	117	
11:30 am	J.-W. Lee and K.J. Webb		

Session TU2F

Nonlinear CAD Techniques for Circuits and System

10:10–11:50 am

Room 613–614

Tuesday, June 4, 2002

Chair: J.C. Pedro, Aveiro University
Co-Chair: T. Brazil, University College of Dublin

TU2F-1	Coupled Electromagnetic/Nonlinear Optimization of Self-Oscillating Microstrip	
10:10 am	Antennas with Far-Field Performance Specifications	123
	V. Rizzoli, A. Costanzo, and E. Montanari	
TU2F-2	Analog Frequency Divider by Variable Order 6 to 9	127
10:30 am	F. Ramírez, E. de Cos, and A. Suárez	
TU2F-3	Intermodulation Distortion Behavior in LDMOS Transistor Amplifiers	131
10:40 am	C. Fager, N.B. de Carvalho, J.C. Pedro, and H. Zirath	
TU2F-4	Augmented Behavioral Characterization for Modeling the Nonlinear	
11:00 am	Response of Power Amplifiers	135
	P.M. Asbeck, H. Kobayashi, M. Iwamoto, G. Hanington, S. Nam, and L.E. Larson	
TU2F-5	Extraction of Accurate Behavioral Models for Power Amplifiers with Memory	
11:20 am	Effects Using Two-Tone Measurements	139
	H. Ku, M.D. Mckinley, and J.S. Kenney	
TU2F-6	Statistical Modeling of the Interaction of Multiple Signals in Nonlinear RF Systems	143
11:40 am	K.M. Gharaibeh, K. Gard, and M.B. Steer	

Session TU3A

(Joint IMS-RFIC Session)

Silicon Substrate and Inductor Modeling

1:20–3:00 pm

Room 608–609

Tuesday, June 4, 2002

Chair: A. Gupta, Anadigics
Co-Chair: A. Westwick, Silicon Laboratories

TU3A-1	Modeling of Passive Elements with ASITIC (Invited)	149
1:20 pm	A.M. Niknejad	
TU3A-2	Modeling of Frequency Dependent Losses in Two-Port and Three-Port	
1:40 pm	Inductors on Silicon	153
	T. Kamgaing, T. Myers, M. Petras, and M. Miller	
TU3A-3	Characterization and Modeling of On-Chip Inductor Substrate Coupling Effect	157
2:00 pm	C.-J. Chao, S.-C. Wong, C.-J. Hsu, M.-J. Chen, and L.-Y. Leu	
TU3A-4	Characterization and Modeling of Small-Signal Substrate Resistance Effect	
2:20 pm	in RF CMOS	161
	Y.-S. Lin, S.-S. Lu, T.-H. Lee, and H.-B. Liang	
TU3A-5	A New Methodology for the Computation of the Substrate Parasitics of	
2:40 pm	Octagonal Inductors	165
	W. Tatinian, P. Pannier, and R. Gillon	

Session TU3B

(Joint IMS-RFIC Session)

SiGe RFIC Process Technologies

1:20–3:00 pm





Room 606–607

Tuesday, June 4, 2002

Chair: K. Ashby, Microtune Inc.

Co-Chair: B. Xavier, National Semiconductor

TU3B-1	Review of SiGe Process Technology and its Impact on RFIC Design (Invited)	171
1:20 pm	A. Das, M. Huang, J. Mondal, D. Kaczman, C. Shurboff, and S. Cosentino	
TU3B-2	High Performance Circuits in 0.18 um SiGe BiCMOS Process for Wireless Applications (Invited)	175
1:40 pm	P. Ye, B. Agarwal, M. Reddy, L. Li, J. Cheng, P.C. Mudge, E. McCarthy, and S.L. Lloyd	
TU3B-3	Low-Frequency Noise Figures-of-Merit in RF SiGe HBT Technology	179
2:00 pm	J. Tang, G. Niu, Z. Jin, J.D. Cressler, S. Zhang, A.J. Joseph, and D.L. Harnome	
TU3B-4	COM2 Enhanced Graded Base SiGe Technology for High Speed Applications	183
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	
TU3B-5	Advanced Passive Devices for Enhanced Integrated RF Circuit Performance	187
2:40 pm	D. Coolbaugh, E. Eshun, R. Groves, D. Harnome, J. Johnson, M. Hammad, Z. He, V. Ramachandran, K. Stein, S. St Onge, S. Subbanna, D. Wang, R. Volant, X. Wang, and K. Watson	

Session TU3C

Integrated Passives for RF and Millimeter Wave Applications

1:20–3:00 pm

Room 611–612

Tuesday, June 4, 2002

Chair: K. Kornegay, School of ECE, Cornell University

TU3C-1	High Quality Factor and High Self-Resonant Frequency Monolithic Inductor for Millimeter-Wave Si-Based IC's	193
1:20 pm	D. Dubuc, É. Tournier, I. Telliez, T. Parra, C. Boulanger, and J. Graffeuil	
TU3C-2	Two-Port Type Ferromagnetic RF Integrated Inductor	197
1:40 pm	M. Yamaguchi, T. Kuribara, and K.-I. Arai	
TU3C-3	RF MIM Capacitors Using High-K Al₂O₃ and AlTiO_x Dielectrics	201
2:00 pm	S.B. Chen, C.H. Lai, A. Chin, J.C. Hsieh, and J. Liu	
TU3C-4	Performance Analysis of Monolithic RF Transformers by Experimental Characterization	205
2:20 pm	T. Kamgaing, T. Myers, F. Ling, M. Petras, M. Miller, and O. Ramahi	
TU3C-5	Lumped and Distributed Lattice-Type LC-Baluns	209
2:40 pm	W. Bakalski, W. Simbürger, H. Knapp, H.-D. Wohlmuth, and A.L. Scholtz	
TU3C-6	Design of a Novel Lumped Element Backward Directional Coupler Based on Parallel Coupled-Line Theory	213
2:50 pm	T.-Y. Song, J.-H. Kim, S.-H. Kim, J.-B. Lim, and J.-S. Park	

Session TU3D

RF MEMS Switch Design and Modeling

1:20–3:00 pm

Room 615–6–7

Tuesday, June 4, 2002

Chair: T. Weller, University of South Florida
Co-Chair: C. Goldsmith, Cogent Solutions, Inc.

TU3D-1	Toggle-Switch—A New Type of RF MEMS Switch for Power Applications	219
1:20 pm	B. Schauwecker, K.M. Strohm, W. Simon, J. Mehner, and J.-F. Luy	
TU3D-2	Low Contact Resistance Series MEMS Switches	223
1:40 pm	D. Peroulis, K. Sarabandi, and L.P.B. Katehi	
TU3D-3	High-Isolation BST-MEMS Switches	227
2:00 pm	Y. Liu, T.R. Taylor, J.S. Speck, and R.A. York	
TU3D-4	RF MEMS Capacitive Switches Fabricated with HDICP CVD SiN_x	231
2:10 pm	C.H. Chang, J.Y. Qian, B.A. Cetiner, Q. Xu, M. Bachman, H.K. Kim, Y. Ra, F. De Flaviis, and G.P. Li	
TU3D-5	A Study of Thermal Effects in RF-MEM-Switches Using a Time Domain Approach	235
2:20 pm	W. Thiel, K. Tornquist, R. Reano, and L.P.B. Katehi	
TU3D-6	Steady State Thermal Analysis and High-Power Reliability Considerations of RF MEMS Capacitive Switches	239
2:40 pm	J.B. Rizk, E. Chaiban, and G.M. Rebeiz	

Session TU3E

Frequency Conversion Circuits

1:20–3:00 pm

Room 602–3–4

Tuesday, June 4, 2002

Chair: E. Camargo, Fujitsu Compound Semiconductor Inc.
Co-Chair: M. Goldfarb, Analog Devices

TU3E-1	A Balanced Resistive Mixer Avoiding an IF Balun	245
1:20 pm	T.A. Bös and E. Camargo	
TU3E-2	A Compact L-Band LTCC Mixer with High Image Rejection	249
1:40 pm	G. Passiopoulos and K. Lamacraft	
TU3E-3	An Even Harmonic Mixer Using Self-Biased Anti-Parallel Diode Pair	253
2:00 pm	M. Shimosawa, T. Katsura, K. Maeda, E. Taniguchi, T. Ikushima, N. Suematsu, K. Itoh, Y. Isota, and T. Takagi	
TU3E-4	A Monolithic, 2 to 18GHz Upconverter	257
2:20 pm	L.M. Devlin, A.W. Dearn, G.A. Pearson, P.D.L. Beasley, and G.D. Morgan	

Session TU4A

(Joint IMS-RFIC Session)

Active Device Modeling and Characterization

3:30–5:10 pm

Room 608–609

Tuesday, June 4, 2002

Chair: J. Staudinger, Motorola

Co-Chair: P. Murphy, University College Cork

TU4A-1	A Robust High Voltage Si LDMOS Model Extraction Process to Achieve First Pass Linear RFIC Amplifier Design Success (Invited)	263
3:30 pm	J.A. Plá and D. Bridges	
TU4A-2	Large-Signal Modeling of GaN FET and Nonlinearity Analysis Using Volterra Series	267
3:50 pm	S.S. Islam and A.F.M. Anwar	
TU4A-3	Direct Parameter Extraction on RF-CMOS	271
4:10 pm	F.X. Pengg	
TU4A-4	Low Frequency Noise Characterization and Modeling of Microwave Bipolar Devices: Application to the Design of Low Phase Noise Oscillator	275
4:30 pm	L. Bary, G. Cibiel, I. Telliez, J. Rayssac, A. Rennane, C. Boulanger, O. Llopis, M. Borgarino, R. Plana, and J. Graffeuil	
TU4A-5	Linearity Analysis of CMOS for RF Application	279
4:50 pm	S. Kang, B. Choi, and B. Kim	

Session TU4B

(Joint IMS-RFIC Session)

RFIC Power Amplifier Technologies

3:30–5:10 pm

Room 606–607

Tuesday, June 4, 2002

Chair: B. Xavier, National Semiconductor

Co-Chair: K. Ashby, Microtune Inc.

TU4B-1	RF Power Devices for Wireless Communications (Invited)	285	TU 4C
3:30 pm	C.E. Weitzel		
TU4B-2	SiGe/Si Power HBTs for X- to K-Band Applications	289	TU 4D
3:50 pm	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		
TU4B-3	RF Power Characteristics of SiGe Heterojunction Bipolar Transistor with High Breakdown Voltage Structures	293	
4:10 pm	T. Matsuno, K. Nishii, S. Sonetaka, Y. Toyoda, and N. Iwamoto		
TU4B-4	Design Techniques for Improved Microwave Performance of Small Outline Packages	297	
4:30 pm	D. Jessie and L. Larson		
TU4B-5	Spiral Inductor Performance in Deep-Submicron Bulk-CMOS with Copper Interconnects	301	
4:50 pm	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		

Session TU4C

Smart Antennas and Digital Beam Forming Techniques

3:30–5:10 pm

Room 611–612

Tuesday, June 4, 2002

Chair: M. Thursby, SkyCross, Inc.
Co-Chair: W. Shiroma, University of Hawaii

TU4C-1	Digital Beamforming and Calibration for Smart Antennas Using Real-Time FPGA Processing	307
3:30 pm	T.W. Nuteson, J.S. Clark IV, D.S. Haque, and G.S. Mitchell	
TU4C-2	A Smart Antenna Receiver Array Using a Single RF Channel and Digital Beamforming	311
3:50 pm	J.D. Fredrick, Y. Wang, S.-S. Jeon, and T. Itoh	
TU4C-3	A 62/66 GHz Frequency Offset Retrodirective Array	315
4:10 pm	N.B. Buchanan, T. Brabetz, and V.F. Fusco	
TU4C-4	A Compact Beamforming Matrix Module for Use in Multibeam Communication Satellites	319
4:30 pm	W. Kornrumpf, A. Jacomb-Hood, and R. Melcher	
TU4C-5	Smart Antenna System Implementation Based on Digital Beam-Forming and Software Radio Technologies	323
4:50 pm	J. Wu, W.-X. Sheng, K.-P. Chan, W.-K. Chung, K.-K.M. Cheng, and K.-L. Wu	

Session TU4D

Application of RF MEMS

3:30–5:10 pm

Room 615–6–7

Tuesday, June 4, 2002

Chair: N. Scott Barker, University of Virginia
Co-Chair: K. Varian, Raytheon Company

TU4D-1	RF Power Handling of Capacitive RF MEMS Devices	329
3:30 pm	B. Pillans, J. Kleber, C. Goldsmith, and M. Eberly	
TU4D-2	A Very-Low-Loss 2-Bit X-Band RF MEMS Phase Shifter	333
3:50 pm	G.L. Tan, R.E. Mihailovich, J.B. Hacker, J.F. DeNatale, and G.M. Rebeiz	
TU4D-3	A Low-Loss Ka-Band Distributed MEMS 2-Bit Phase Shifter Using Metal-Air-Metal Capacitors	337
4:10 pm	J.S. Hayden and G.M. Rebeiz	
TU4D-4	V-Band Low-Loss and Low-Voltage Distributed MEMS Digital Phase Shifter Using Metal-Air-Metal Capacitors	341
4:30 pm	H.-T. Kim, J.-H. Park, Y.-K. Kim, and Y. Kwon	
TU4D-5	Differential Multi-Finger MEMS Tunable Capacitors for RF Integrated Circuits	345
4:50 pm	G.V. Ionis, A. Dec, and K. Suyama	

Session TU4E

Frequency and Phase Control Circuits

3:30–5:10 pm

Room 602–3–4

Tuesday, June 4, 2002

Chair: M. Madihian, NEC USA

Co-Chair: B. Nelson, Sirenza

TU4E-1	Miniaturized and Broadband V-Band Balanced Frequency Doubler for Highly Integrated 3-D MMIC	351
3:30 pm	K. Nishikawa, B. Piernas, T. Nakagawa, and K. Araki	
TU4E-2	Integrated Quadrupler Circuit in Coplanar Technology for 60 GHz Wireless Applications	355
3:40 pm	M. Schefer	
TU4E-3	Some Rules for the Choice of the C(V) Characteristic for the Design of Frequency Triplers with Symmetrical Varactors	359
4:00 pm	J.M. Duchamp, P. Ferrari, J.W. Tao, and D. Lippens	
TU4E-4	Microwave Variable Delay Line Using a Membrane Impregnated with Liquid Crystal	363
4:20 pm	T. Kuki, H. Fujikake, H. Kamoda, and T. Nomoto	
TU4E-5	Tunable Inverted-Microstrip Phase Shifter Device Using Nematic Liquid Crystals	367
4:40 pm	C. Weil, G. Luessem, and R. Jakoby	

Session IF-TU

(Joint IMS-RFIC Session)

Tuesday Interactive Forum

1:30–4:30 pm

Room 6E

Tuesday, June 4, 2002

Chair: R. Lutz, Maxim Integrated Products

IF-TU-1	Harmonic Rejection Filters for the Dominant and the Higher Waveguide Modes Based on the Slotted Strips	373
1:30 pm	A. Kirilenko and L. Mospan	
IF-TU-2	A Novel Compact Millimeter Wave Diplexer	377
1:30 pm	E. Ofli and R. Vahldieck	
IF-TU-3	Broadband TEM-Mode Planar-Rectangular Dielectric Waveguide Bandpass Filter and Its Miniaturization	381
1:30 pm	A.C. Kundu	
IF-TU-4	$\lambda/4$ Stepped-Impedance Resonator Bandpass Filters Fabricated on Coplanar Waveguide	385
1:30 pm	A. Sanada, H. Takehara, T. Yamamoto, and I. Awai	
IF-TU-5	A Stepped Cavity Resonator with Optimized Spurious Performance and Its Applications to BPFs	389
1:30 pm	K. Konno and M. Kubota	
IF-TU-6	Efficient Analysis of Waveguide Filters by the Integral Equation Technique and the BI-RME Method	393
1:30 pm	V.E. Boria, M. Bozzi, F. Bruni, S. Cogollos, G. Conciauro, B. Gimeno, and L. Perregrini	
IF-TU-7	Generation of RF Pulsewidth Modulated Microwave Signals Using Delta-Sigma Modulation	397
1:30 pm	J. Keyzer, R. Uang, Y. Sugiyama, M. Iwamoto, I. Galton, and P.M. Asbeck	

IF-TU-8 1:30 pm	Using Silicon-Germanium Mainstream BICMOS Technology for X-Band and LMDS (25–30 GHz) Microwave Applications S. Subbanna, R. Groves, B. Jagannathan, D. Greenberg, G. Freeman, E. Eld, R. Volant, D. Ahlgren, B. Martin, K. Stein, D. Herman, and B. Meyerson	401
IF-TU-9 1:30 pm	Low Frequency Noise in Boron Doped Poly-SiGe Resistors K.-M. Chen, G.-W. Huang, J.-F. Kuan, H.-J. Huang, C.-Y. Chang, and T.-H. Yang	405
IF-TU-10 1:30 pm	A Fully-Integrated Broadband Amplifier MMIC Employing a Novel Chip Size Package Y. Yun, M. Nishijima, M. Katsuno, H. Ishida, K. Minagawa, T. Nobusada, and T. Tanaka	409
IF-TU-11 1:30 pm	RF Performance Tradeoffs of SiGe HBT Fabricated by Reduced Pressure Chemical Vapor Deposition B. Mheen, D. Suh, H.S. Kim, S.-Y. Lee, C.W. Park, S.H. Kim, K.-H. Shim, and J.-Y. Kang	413
IF-TU-12 1:30 pm	A Novel Equivalent Circuit and Modeling Method for Defected Ground Structure and Its Application to Optimization of a DGS Lowpass Filter J.-S. Park, J.-H. Kim, J.-H. Lee, S.-H. Kim, and S.-H. Myung	417
IF-TU-13 1:30 pm	Microwave Planar Active Filters in GaAs and SiGe Technologies H. Bazzi, F. Biron, S. Bosse, L. Delage, B. Barelaud, L. Billonnet, and B. Jarry	421
IF-TU-14 1:30 pm	GSM 900/DCS 1800 Fractional-N Modulator with Two-Point-Modulation B. Neurauter, G. Märzinger, A. Schwarz, R. Vuketich, M. Scholz, R. Weigel, and J. Fenk	425
IF-TU-15 1:30 pm	On the Stability of Millimeter-Wave Power Amplifiers L. Samoska, K.-Y. Lin, H. Wang, Y.-H. Chung, M. Aust, S. Weinreb, and D. Dawson	429
IF-TU-16 1:30 pm	Output Harmonic Termination Techniques for AlGaIn/GaN HEMT Power Amplifiers Using Active Integrated Antenna Approach Y. Chung, C.Y. Hang, S. Cai, Y. Qian, C.P. Wen, K.L. Wang, and T. Itoh	433
IF-TU-17 1:30 pm	An Advanced 2 Watt High Power Amplifier for CDMA 900 MHz System T.H. Kim, C.S. Kim, K.Y. Lee, J.H. Moon, J.C. Lee, J.H. Kim, B. Lee, and N.Y. Kim	437
IF-TU-18 1:30 pm	2W Ku-Band Coplanar MMIC HPA Using HBT for Flip-Chip Assembly J.-P. Fraysse, O. Vendier, M. Soulard, P. Auxemery	441
IF-TU-19 1:30 pm	1 and 2-Watt MMIC Power Amplifiers for Commercial K/Ka-Band Applications J.M. Schellenberg	445
IF-TU-20 1:30 pm	Characteristics of Microwave Power GaN HEMTs on 4-Inch Si Wafers S. Manohar, A. Narayanan, A. Keerti, A. Pham, J. Brown, R. Borges, and K. Linthicum	449
IF-TU-21 1:30 pm	Intercept Point Behavior of Ka-Band GaAs High Power Amplifiers T. Merkle, A. Tessmann, and S. Ramberger	453
IF-TU-22 1:30 pm	Traveling-Wave Tube Amplifier Performance Evaluation and Design Optimization for Applications in Multi-Level Digital Communications J. Qiu, D. Abe, T.M. Antonsen, Jr., B.G. Danly, and B. Levush	457
IF-TU-23 1:30 pm	An Adaptive Volterra Predistorter for the Linearization of RF High Power Amplifiers A. Zhu and T.J. Brazil	461
IF-TU-24 1:30 pm	A Low Cost Traveling Wave Tube for Wireless Communications B.K. Vancil and E.G. Wintucky	465
IF-TU-25 1:30 pm	Effects of Anti-Aliasing Filters in Feedback Path of Adaptive Predistortion W. Shan and L. Sundström	469
IF-TU-26 1:30 pm	Error Signal Reuse in a Feedforward Amplifier A. Khanifar, M. Gurvich, and B. Vassilakis	473
IF-TU-27 1:30 pm	RF-Interconnect for Multi-Gb/s Digital Interface Based on 10-GHz RF-Modulation in 0.18μm CMOS H. Shin, Z. Xu, and M.F. Chang	477
IF-TU-28 1:30 pm	50 GHz High Output Voltage Distributed Amplifiers for 40 Gb/s EO Modulator Driver Application C. Yuen, K. Laursen, D. Chu, and K. Mar	481
IF-TU-29 1:30 pm	Development of 4-Gsps 2-Bit ADC with GaAs ICs for Radio Astronomy M. Okiura, S. Iguchi, S.K. Okumura, M. Momose, K. Matsumoto, and N. Kawaguchi	485

IF-TU-30	0.25μm pHEMT 40Gb/s E/O Modulator Drivers	489
1:30 pm	J.M. Carroll, M. Coutant, M.S. Heins, C.F. Campbell, and E. Reese	
IF-TU-31	Suppression of the Parallel-Plate Noise in High-Speed Circuits Using a Metallic Electromagnetic Band-Gap Structure	493
1:30 pm	R. Abhari and G.V. Eleftheriades	
IF-TU-32	Results on a Direct Digital Receiver Operated with Fast Learning Networks	497
1:30 pm	O. Mireux, J.-J. Brault, and R.G. Bosisio	
IF-TU-33	A 6.5-mW Receiver Front-End for Bluetooth in 0.18-μm CMOS	501
1:30 pm	F. Beffa, R. Vogt, W. Bächtold, E. Zellweger, and U. Lott	
IF-TU-34	An Active SiGe Sub-Harmonic Direct-Conversion Receiver Front-End Design for 5–6 GHz Band Applications	505
1:30 pm	R. Svitek, D. Johnson, and S. Raman	
IF-TU-35	Soft Breakdown and Hot Carrier Reliability of CMOS RF Mixer and Redesign	509
1:30 pm	Q. Li, W. Li, J. Zhang, and J.S. Yuan	
IF-TU-36	High-Q Copper Inductors on Standard Silicon Substrate with a Low-k BCB Dielectric Layer	513
1:30 pm	X. Huo, K.J. Chen, and P.C.H. Chan	
IF-TU-37	Geometry and Bias Current Optimization for SiGe HBT Cascode Low-Noise Amplifiers	517
1:30 pm	Q. Liang, G. Niu, J.D. Cressler, S. Taylor, and D.L. Harame	
IF-TU-38	High Linearity Low-k BCB-Bridged AlGaAs/InGaAs Power HFETs	521
1:30 pm	H.-C. Chiu, M.-J. Hwu, S.-C. Yang, and Y.-J. Chan	
IF-TU-39	Performance of a CMOS Bluetooth Transceiver IC with Copper Rf Passives	525
1:30 pm	M.T. Doan, Q. Yin, K.E. Sze, P.B. Khannur, S.C. Rustagi, S. Jinglin, P.D. Foo, and A.B. Ajjikuttira	
IF-TU-40	Effects of Dummy Patterns and Substrate on Spiral Inductors for Sub-Micron RF ICs	529
1:30 pm	J.-H. Chang, Y.-S. Youn, H.-K. Yu, and C.-K. Kim	
IF-TU-41	Schottky Junction Transistors for Micropower RFICs	533
1:30 pm	J. Spann, Z. Wu, P. Jaconelli, J. Yang, and T.J. Thornton	
IF-TU-42	ESD Protection Design for 900-MHz RF Receiver with 8-kV HBM ESD Robustness	537
1:30 pm	M.-D. Ker, W.-Y. Lo, C.-M. Lee, C.-P. Chen, and H.-S. Kao	
IF-TU-43	Improvements to Performance of Spiral Inductors on Insulators	541
1:30 pm	D. Kelly and F. Wright	
IF-TU-44	Octave Tunable, Highly Linear, RC-Ring Oscillator with Differential Fine-Coarse Tuning, Quadrature Outputs and Amplitude Control for Fiber Optic Transceivers	545
1:30 pm	M.A.T. Sanduleanu, D. van Goor, and H. Veenstra	
IF-TU-45	A 2.45GHz Fully-Differential CMOS Image-Reject Mixer for Bluetooth Application	549
1:30 pm	P.B. Khannur and K.S. Ling	
IF-TU-46	Super Compact RFIC Inductors in 0.18μm CMOS with Copper Interconnects	553
1:30 pm	H. Feng, G. Jelodin, K. Gong, R. Zhan, Q. Wu, C. Chen, and A. Wang	
IF-TU-47	High Performance Single Supply Power Amplifiers for GSM and DCS Applications Using True Enhancement Mode FET Technology	557
1:30 pm	E. Glass, M. Shields, and A. Reyes	
IF-TU-48	Integrated 2.4 GHz CMOS Quadrature VCO with Symmetrical Spiral Inductors and Differential Varactors	561
1:30 pm	B. Chi and B. Shi	
IF-TU-49	A Fully Monolithic SiGe Quadrature Voltage Controlled Oscillator Design for GSM/DCS-PCS Applications	565
1:30 pm	D. Cordeau, J.-M. Paillot, H. Cam, G. De Astis, and L. Dascalescu	
IF-TU-50	Hot Carrier and Soft Breakdown Effects on VCO Performance	569
1:30 pm	E. Xiao and J.S. Yuan	

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	573
IF-TU-52 1:30 pm	Very Low Phase-Noise Fully-Integrated Coupled VCOs H. Jacobsson, B. Hansson, H. Berg, and S. Gevorgian	577
IF-TU-53 1:30 pm	Wide-Tuning-Range Dual-VCOs for Cable Modem Receivers K. Stadius and K. Halonen	581
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	585
IF-TU-55 1:30 pm	A 5GHz Fast-Switching CMOS Frequency Synthesizer X. Yang, T. Wu, and J. McMacken	589
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	593
IF-TU-57 1:30 pm	Development and Verification of a New Non-Linear MOSFET Model H. Romdane, E. Bergeault, and B. Huyart	597
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. Castaneda	601
IF-TU-59 1:30 pm	Smoothing Gate Capacitance Models for CMOS Radio Frequency and Microwave Integrated Circuits CAD J. Dobeš	605