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1997 IEEE MTT-S
INTERNATIONAL MICROWAVE
SYMPOSIUM DIGEST

Technical Program Contents
Wednesday, June 11





1997 Microwave Symposium

Technical Program Schedule

Session WE1A

Nonlinear Modeling and Analysis

8:00 am–9:40 am **Room A201** **Wednesday, June 11, 1997**

Chair: J.C.M. Hwang, Lehigh University

WE1A-1	Analysis of Electrothermal Transients and Digital Signal Processing in Electrically and Thermally Nonlinear Microwave Circuits	367
8:00 am	V. Rizzoli, F. Mastri, A. Neri and A. Lipparini	
WE1A-2	The Effect of a Variation in Tone Spacing on the Intermodulation Performance of Class A & Class AB HBT Power Amplifiers	371
8:20 am	P.M. McIntosh and C.M. Snowden	
WE1A-3	Comparison of Hybrid Pi and Tee HBT Circuit Topologies and Their Relationship to Large Signal Modeling	375
8:30 am	D.A. Teeter and W.R. Curtice	
WE1A-4	A Non-Quasi-Static Model of GaInP/AlGaAs HBT for Power Applications	379
8:40 am	J.Ph. Frayssé, D. Floriot, Ph. Auxémery, M. Campovecchio, R. Quéré and J. Obregon	
WE1A-5	Modeling of Nonlinear Active and Passive Devices in Three-Dimensional TLM Networks	383
8:50 am	L. Cascio, G. Tardioli and W.J.R. Hoefer	
WE1A-6	Scaleability of DC/AC Non-Linear Dispersion Models for Microwave FETs	387
9:10 am	V.I. Cojocar and T.J. Brazil	
WE1A-7	A Physical Large Signal Si MOSFET Model for RF Circuit Design	391
9:20 am	M.C. Ho, K. Green, R. Culbertson, J.Y. Yang, D. Ladwig and P. Ehnis	

Session WE1B

Passive Components II

8:00 am–9:40 am **Room A207** **Wednesday, June 11, 1997**

Chair: E.J. Denlinger, David Sarnoff Research Center

WE1B-1	A Wide Band Multiport Planar Power Divider Design by Radially Combining Matched Sectorial Components	397
8:00 am	Y.-J. Chen and R.-B. Wu	
WE1B-2	Design and Performance of GaAs MMIC CPW Baluns Using Overlaid and Spiral Couplers	401
8:20 am	T. Gokdemir, S.B. Economides, A. Khalid, A.A. Rezazadeh and I.D. Robertson	
WE1B-3	An Octave Bandwidth Monopulse Processor	405
8:40 am	N.S. Barker and G.M. Rebeiz	
WE1B-4	A Compact Ku-Band Power Combining Network Using Rectangular Coaxial Line Technology	409
8:50 am	H. Oh-hashii, H. Yukawa and M. Miyazaki	
WE1B-5	Cavity-Type Directional Couplers with Simple Structure	413
9:00 am	T. Kawai, M. Kishihara, Y. Kokubo and I. Ohta	
WE1B-6	Analysis and Design of H-Plane Waveguide Bends with Compact Size, Wide-Band and Low Return Loss Characteristics	417
9:10 am	Z. Ma, T. Yamane and E. Yamashita	
WE1B-7	Thin-Film Microstrip Lines for MM and Sub-MM-Wave On-Chip Interconnects	421
9:20 am	H.-M. Heiliger, M. Nagel, H.G. Roskos, H. Kurz, F. Schnieder and W. Heinrich	

Session WE1C

Millimeter Wave Devices and Components

8:00 am-9:40 am

Room A102

Wednesday, June 11, 1997

Chair: P. Smith, Sanders, a Lockheed Martin Co.

Co-Chair: M. Matloubian, Hughes Research Labs

WE1C-1	A Low Cost Miniature MMIC W-Band Transceiver with Planar Antenna	427
8:00 am	H. Fudem, P. Stenger, EC. Niehenke, M. Sarantos and C. Schwerdt	
WE1C-2	A Miniature, MMIC One Watt W-Band Solid-State Transmitter	431
8:20 am	P. Stenger, M. Sarantos, E. Niehenke, H. Fudem, C. Schwerdt, F. Kuss, D. Strack, G. Hall and J. Masti	
WE1C-3	A Comparison of W-Band MMIC Mixers Using InP HEMT Technology	435
8:40 am	R.S. Virk, L. Tran, M. Matloubian, M. Le, M.G. Case and C. Ngo	
WE1C-4	A DC-60 GHz GaAs MMIC Switch Using Novel Distributed FET	439
8:50 am	H. Mizutani and Y. Takayama	
WE1C-5	A Single-Bias Diode-Regulated 60GHz Monolithic LNA	443
9:10 am	K. Maruhashi, K. Ohata and M. Madihian	
WE1C-6	60GHz Flip-Chip Assembled MIC Design Considering Chip-Substrate Effect	447
9:20 am	Y. Arai, M. Sato, H.T. Yamada, T. Hamada, K. Nagai and H.I. Fujishiro	
WE1C-7	RF Performance Characteristics of InP Millimeter-Wave $n^+ - n^- - n^+$ Gunn Devices	451
9:30 am	H. Eisele, G.O. Munns and G.I. Haddad	

Session WE1D

Digital Microwave Circuits

8:00 am-9:40 am

Room A101

Wednesday, June 11, 1997

Chair: A. Oki, TRW

WE1D-1	Over-60-GHz Operation of SCFL Dynamic Frequency Divider Using InP-Based HEMTs	457
8:00 am	Y. Umeda, K. Osafune, T. Enoki, H. Yokoyama, Y. Ishii and Y. Imamura	
WE1D-2	A 40-Gbit/s Optical Repeater Circuit using InAlAs/InGaAs HEMT Digital IC Chip Set	461
8:20 am	M. Yoneyama, A. Sano, K. Hagimoto, T. Otsuji, K. Murata, Y. Imai, S. Yamaguchi, T. Enoki and E. Sano	
WE1D-3	A 40 Gbit/s Super-Dynamic Decision IC Using 0.15-μm GaAs MESFETs	465
8:40 am	K. Murata, T. Otsuji, M. Yoneyama and M. Tokumitsu	
WE1D-4	Monobit Receiver	469
9:00 am	J.B.Y. Tsui, J.J. Schamus and D.H. Kaneshiro	
WE1D-5	A 10 Gb/s Package for Digital ICs	473
9:10 am	J.B. Hacker, T.C. Banwell, D.T. Kong	

Session WE1E

New Leakage Effects in Planar Guiding Structures

8:00 am-9:40 am

Room A108

Wednesday, June 11, 1997

Chair: A.S. Omar, Technical University Hamburg, Germany

Co-Chair: N . K. Das , Polytechnic University

WE1E-1	The Nature of the Spectral Gap for Leaky Waves on a Periodic Strip Grating Structure	479	WE
8:00 am	S. Majumder, D.R. Jackson and M. Guglielmi		1E
WE1E-2	The Spectral Gap When Power Leaks Into More Than One Type of Surface Wave on Printed-Circuit Lines	483	WE
8:20 am	M. Tsuji, H. Shigesawa, H. Sannomiya and A.A. Oliner		2A
WE1E-3	Upper Cut-Off Frequency of the Bound Wave and New Leaky Wave on the Slotline	487	WE
8:40 am	J. Zehentner, J. Macháč, M. Miglioizzi		2B
WE1E-4	The Role of Complex Waves of Proper Type in Radiative Effects of Nonreciprocal Structures	491	WE
9:00 am	P. Baccarelli, C. Di Nallo, F. Frezza, A. Galli and P. Lampariello		2C
WE1E-5	Leaky-Modes Leakage From Planar Circuits	495	
9:20 am	K.-C. Chen and C.-K.C. Tzuang		

Session WE2A

Packaging and Interconnect Technologies

10:10 am-11:50 am

Room A201

Wednesday, June 11, 1997

Chair: J. Pavio, Motorola

Co-Chair: M. Harris, Georgia Institute of Technology

WE2A-1	Design and Performance of a High Density 3D Microwave Module	501	
10:10 am	R. Sturdivant, C. Ly, J. Benson, M. Hauhe		
WE2A-2	Using MMIC Flip Chips and CVD Diamond for Improved Thermal Management of Microwave Modules	505	
10:30 am	R. Sturdivant, C. Ly, J. Benson, J. Wooldridge		
WE2A-3	Line-Loss and Size-Reduction Techniques for Millimeter-Wave RF Front-End Boards by Using a Polyimide/Alumina-Ceramic Multilayer Configuration	509	
10:50 am	M. Nakatsugawa, A. Kanda, H. Okazaki, K. Nishikawa and M. Muraguchi		
WE2A-4	InP HBT on Si Substrates with Integral Passive Components: A Wafer Scale Package	513	
11:10 am	C. Chun, N. Evers, J. Laskar, N.M. Jokerst, H.-F. Chau and E. Beam III		
WE2A-5	A Si Micromachined Conformal Package for a K-Band Low Noise HEMT Amplifier	517	
11:30 am	S.V. Robertson, M. Matloubian, M. Case and L.P.B. Katehi		
WE2A-6	Silicon-Based Micromachined Packages for Discrete Components	521	
11:40 am	R.M. Henderson and L.P.B. Katehi		

Session WE2B

High Power Sources and Control Components

10:10 am-1150 am

Room A207

Wednesday, June 11, 1997

Chair: J. Goel, TRW

WE2B-1	A 6-18 GHz 20W SPDT Switch Using Shunt Discrete Pin Diodes	527
10:10 am	T. Shigematsu, N. Suematsu, N. Takeuchi, Y. Iyama and A. Mizobuchi	
WE2B-2	Low Cost Microwave Receiver Protectors/AGC's Using Surface Mount Components	531
10:30 am	D. Strack and F. Harris	
WE2B-3	An Investigation of GaAs MMIC High Power Limiters for Circuit Protection	535
10:40 am	C. Trantanella, M. Pollman and M. Shifrin	
WE2B-4	3-Watt Q-Band Waveguide PHEMT MMIC Power Amplifier Module	539
11:00 am	J.A. Lester, J. Chi, R. Lai, M. Biedenbender, D. Garske, R. Rordan and P.D. Chow	
WE2B-5	Power Combining Port Impedance Model	543
11:20 am	M.J. Lee and J.A. Faulkner Jr.	
WE2B-6	A High Conversion Efficiency 5.8 GHz Rectenna	547
11:30 am	J.O. McSpadden, L. Fan and K. Chang	
WE2B-7	New Type Accelerator for Millimeter and Infrared Electron-Wave Devices	late
11:40 am	V.V. Kulish, P.B. Kosel, O.B. Krutko and I.V. Gubanov	

Session WE2C

Millimeter and Sub-Millimeter Waves: J.C. Bose Memorial Session

10:10 am-1150 am

Room A102

Wednesday, June 11, 1997

Session Chair: K. Agarwal, Texas Instruments
Co-Chair: J.W. Dees, Georgia Institute of Technology

WE2C-1	The Work of Jagadis Chandra Bose: 100 Years of MM-Wave Research	553
10:10 am	D.T. Emerson	
WE2C-2	Sir J.C. Bose and Radio Science	557
10:30 am	A.K. Sen	
WE2C-3	Integrated Micro-Machined Antenna for 200 GHz Operation	561
10:40 am	J.W. Digby, C.E. Collins, B .M. Towlson, L.S. Karatzas, G.M. Parkhurst, J.M. Chamberlain, J.W. Bowen, R.D. Pollard, R.E. Miles, D.P. Steenson, D.A. Brown and N.J. Cronin	
WE2C-4	Single- and Dual-Polarized Slot-Ring Subharmonic Receivers	565
1050 am	S.Raman and G.M. Rebeiz	
WE2C-5	Miniature Low Power Submillimeter-Wave Spectrometer for Detection of Water in the Solar System	569
11:10 am	O. Boric-Lubecke, R.F. Denning, M.A. Janssen and M.A. Frerking	
WE2C-6	A High-Efficiency Millimeter-Wave Holographic Power Splitter/Combiner	573
11:30 am	M. Shahabadi, K. Schünemann and H.-G. Unger	

Session WE2D

Phased Arrays

10:10 am–11:50 am

Room AI01

Wednesday, June 11, 1997

Chair: M. Thursby, Florida Institute of Technology

WE2D-1	Low Cost T/R Modules for Planar Arrays	579
10:10 am	ID. Strack, G. Ferrell, A. Piloto, J. Gipprich, J. Fisher, J. Kennedy, D. Heffernan and S. Caswell	
WE2D-2	Unaccelerated Reliability Testing for T/R Modules: Need, Methodology and Supporting Data	583
10:30 am	B.A. Kopp, T.A. Axness and C.R. Moore	
WE2D-3	Megalithic Microwave Signal Processing for Phased-Array Beam Forming and Steering	587
10:40 am	T. Ohira, Y. Suzuki, H. Ogawa and H. Kamitsuna	
WE2D-4	Active Antenna Oscillator Arrays in Communication Systems	591
11:00 am	C. Kykkotis, P. S. Hall and H. Ghafouri-Shiraz	
WE2D-5	A Polarization Flexible Phased Array Antenna for a Mobile Communication SDMA	595
11:10 am	Field Trial	
	C. Passmann, G. Villino and T. Wixforth	
WE2D-6	Automatic Beam Steered Active Antenna Receiver	599
11:30 am	S. Gupta and V.F. Fusco	

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2D**

**WE
2E**

**WE
3A**

**WE
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Session WE2E

Guided Waves and Discontinuity Effects

10:10 am-1150 am

Room A108

Wednesday, June 11, 1997

Chair: M. Dydyk, Motorola

Co-Chair: S. El-Ghazaly, Arizona State University

WE2E-1	Analysis of the Propagation and Leakage Effects for Various Classes of Traveling-Wave Sources in the Presence of Covering Dielectric Layers	605
10:10 am	C. Di Nallo, F. Frezza, A. Galli and P. Lampariello	
WE2E-2	Discontinuity Effects on High Frequency Transistors	609
10:30 am	M.A. Megahed and S.M. El-Ghazaly	
WE2E-3	Characterization of Power Loss from Discontinuities in Guided Structures	613
10:50 am	T.K. Sarkar, Z.A. Maricevic and M. Salazar-Palma	
WE2E-4	Analysis of Unbounded and Bounded Circuits and Antennas Considering Finite Extent and Inhomogeneous Dielectric	617
11:10 am	X. Jiang and K. Wu	

Session WE3A

Advanced CAD Methodologies

1:20 pm-3:00 pm

Room A201

Wednesday, June 11, 1997

Chair: R.M. Biernacki, Optimization Systems Associates

Co-Chair: M.D. Abouzahra, MIT Lincoln Laboratory

WE3A-1	Stability Envelope-New Tool for Generalised Stability Analysis	623
1:20 pm	T. Närhi and M. Valtonen	
WE3A-2	Knowledge Based Neural Models for Microwave Design	627
1:40 pm	F. Wang and Q.J. Zhang	
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2:00 pm	M. AbuShaaban, T.J. Brazil and J.O. Scanlan	
WE3A-4	Space Mapping Optimization of Waveguide Filters Using Finite Element and Mode-Matching Electromagnetic Simulators	635
2:10 pm	J.W. Bandler, R.M. Biernacki, S.H. Chen and D. Omeragić	
WE3A-5	A New Design of Microwave Filters by Using Continuously Varying Transmission Lines	639
2:30 pm	M. Le Roy, A. Perennec, S. Toutain, L.C. Calvez	
WE3A-6	A Procedure for the Design of Microwave Filters Based on a Distributed Parameter Model	643
2:40 pm	R. Tascone, P. Savi, D. Trincherio and R. Orta	
WE3A-7	Design of an Electronically Tunable Microwave Impedance Transformer	647
2:50 pm	J.H. Sinsky and C.R. Westgate	

Session WE3B

Frequency Converters and Mixers

1:20 pm-3:00 pm

Room A207

Wednesday, June 11, 1997

Chair: B.E. Sigmon, Motorola SSTG, Inc.

WE3B-1	Monolithic Silicon-Glass Double Balanced Mixers for Wireless Communications	653
1:20 pm	J. Putnam, M. Barter and J. Boian	
WE3B-2	Fully Monolithic Integrated Even Harmonic Quadrature Ring Mixer with an Active Matched 90 Degree Power Divider for Direct Conversion Receivers	657
1:40 pm	K. Kawakami, K. Tajima, M. Shimozawa, K. Itoh, N. Kasai and A. Iida	
WE3B-3	Push-Pull Frequency Converter for Mobile Communication	661
2:00 pm	A.V. Thangavelu, H.P. Moyer, M. Ghanevati, A.S. Daryoush and R. Gutierrez	
WE3B-4	A 2 GHz Subharmonic Sampler for Signal Downconversion	665
2:20 pm	A. Pärssinen, R. Magoon and S.I. Long	
WE3B-5	A Low Power GaAs Front-end IC with Current-Reuse Configuration Using 0.15 μm Gate MODFETs	669
2:30 pm	H. Ishida, H. Koizumi, K. Miyatsuji, H. Takenaka, T. Tanaka and D. Ueda	

Session WE3C

Quasi-Optical Amplifiers

1:20 pm-3:00 pm

Room A102

Wednesday, June 11, 1997

Chair: D. Rutledge, California Institute of Technology

WE3C-1	A Bi-Directional Quasi-Optical Lens Amplifier	675
1:20 pm	S. Hollung, J. Vian and Z.B. Popović	
WE3C-2	A Transmit-Receive Spatial Amplifier Array	679
1:40 pm	S. Ortiz, T. Ivanov and A. Mortazawi	
WE3C-3	A Terahertz Grid Frequency Doubler	683
2:00 pm	A. Moussessian, M.C. Wanke, Y. Li, J.-C. Chiao, F.A. Hegmann, S.J. Allen, T.W. Crowe and D.B. Rutledge	
WE3C-4	Class F Power Amplifier Integrated with Circular Sector Microstrip Antenna	687
2:20 pm	V. Radisic, Y. Qian and T. Itoh	
WE3C-5	TE Surface Wave Power Combining by a Planar 10-Element Active Lens Amplifier	691
2:30 pm	A.R. Perkins and T. Itoh	

Session WE3D

Active and Planar Filters

1:20 pm-3:00 pm

Room A101

Wednesday, June 11, 1997

Chair: D. Swanson, Watkins-Johnson

WE3D-1	Automatic Frequency Control Techniques for Microwave Active Filters	697
1:20 pm	H. Serhan, B. Jarry and P. Guillon	
WE3D-2	Narrow X-Band Tunable MMIC Filters Employing Active Resonators as Local Feedback	701
1:40 pm	F.E. van Vliet, J.L. Tauritz, F.L.M. van den Bogaart and R.G.F. Baets	
WE3D-3	Low-Noise Active Recursive MMIC Filters	705
1:50 pm	M. Danestig, H. Johansson, A. Ouacha and S. Rudner	
WE3D-4	Enhanced-Q Microstrip Bandpass Filter with Coupled Negative Resistors	709
2:10 pm	A. Romano and R.R. Mansour	
WE3D-5	Microstrip Slow-Wave Open-Loop Resonator Filters	713
2:30 pm	J.S. Hong and M.J. Lancaster	
WE3D-6	Characteristics of $\lambda/4$ CPW Resonators with Tap-Excitation and their Application to Bandpass Filters	717
2:40 pm	K. Wada, I. Awai and Y. Yamashita	



Session WE3E

Hybrid Interconnects and Components

1:20 pm-3:00 pm

Room A108

Wednesday, June 11, 1997

Chair: G. Brehm, Texas Instruments

WE3E-1 1:20 pm	DBIT-Direct Backside Interconnect Technology: A Manufacturable, Bond Wire Free Interconnect Technology for Microwave and Millimeter Wave MMICs T.E. Kazior, H.N. Atkins, A. Fatemi, Y. Chen, F.Y. Colomb and J.P. Wendler	723
WE3E-2 1:40 pm	Analysis and Design of a Vertical CPW Transition Between Microstrip Planes L. Hydén, S. Hagelin, P. Starski and K. Yhland	727
WE3E-3 1:50 pm	A Flip Chip Bonding Technology Using Gold Pillars for Millimeter-Wave Applications S. Aoki, H. Someta, S. Yokokawa, K. Ono, T. Hirose and Y. Ohashi	731
WE3E-4 2:00 pm	Characteristics of Trenched Coplanar Waveguide for SiMMIC Applications Z.R. Hu, V.F. Fusco, J.A.C. Stewart, Y. Wu, H.S. Gamble, B.M. Armstrong, N.B. Buchanan	735
WE3E-5 2:10 pm	A Novel Waveguide-to-Microstrip Transition for Low-Cost Millimeter-Wave and MMIC Applications F.J. Villegas, D.I. Stones and H.A. Hung	739
WE3E-6 2:30 pm	A Power Amplifier Module with Harmonics Suppression for Digital Mobile Communication H. Kayano, S. Obayashi, T. Maeda and Y. Suzuki	743
WE3E-7 2:50 pm	Improvements to the Design of the O-180° Rat Race Coupler and its Application to the Design of Balanced Mixers with High LO to RF Isolation J.L.B. Walker	747

Session WE3F

Interactive Forum I

2:30 pm–5:00 pm	Ballroom	Wednesday, June 11, 1997
WE3F-1	A Monolithic GaAs PIN Switch Network For A 77 GHz Automotive Collision Warning Radar J. Putnam, M. Barter, K. Wood and J. LeBlanc	753
WE3F-2	Temperature Analysis and On-Chip Compensation for an UHF VCO Y. Sun, H.G. van Veenendaal and J.L. Tauritz	757
WE3F-3	Multilayer Passive Components for Uniplanar Si/SiGe MMICs T. Gokdemir, U. Karacaoglu, D. Budimir, S.B. Economides, A. Khalid, A.A. Rezazadeh and I.D. Robertson	761
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WE3F-5	Accurate Passive Component Models in Coplanar Waveguide for 50 GHz MMICs R. Shimon, D. Scherrer, D. Caruth, J. Middleton, H. Hsia and M. Feng	769
WE3F-6	Alignment Tolerant Stripline Directional Couplers T.P. Budka and R.A. Flynt	773
WE3F-7	Experimental Study of Wideband Uniplanar Phase Inverters for MICs T. Wang, Z. Ou and K. Wu	777
WE3F-8	Theory on Rotated Excitation of a Circular Dual-Mode Resonator and Filter I. Awai and T. Yamashita	781
WE3F-9	Design Methodology for Multilayer Coupled Line Filters C. Cho and K.C. Gupta	785
WE3F-10	A Miniaturized Monolithic Dual Band Filter Using Ceramic Lamination Technique for Dual Mode Portable Telephones H. Miyake, S. Kitazawa, T. Ishizaki, T. Yamada and Y. Nagatomi	789
WE3F-11	Bandpass and Bandstop Filters Using Dominant TM₁₁ Mode Dielectric Rod Resonators Y. Kobayashi and C. Inoue	793
WE3F-12	Modeling of Conductor Loaded Resonators and Filters in Rectangular Enclosures C. Wang, H.-W. Yao and K.A. Zaki	797
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Session WE4A

Electromagnetic Theory Based CAD

3:30 pm-5:10 pm

Room A201

Wednesday, June 11, 1997

Chair: I. Wolff, Duisburg University, Germany

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WE4A-2 3:50 pm	Rigorous and Efficient Fabrication-Oriented CAD and Optimization of Complex Waveguide Networks F. Alessandri, M. Dionigi, R. Sorrentino and L. Tarricone	1013
WE4A-3 4:10 pm	A Unified Approach for Mixed EM and Circuit Simulation Using Model-Reduction Techniques R. Achar, M.A. Kolbehdari and M. Nakhla	1017
WE4A-4 4:30 pm	Coupled Localized and Distributed Elements Analysis Applying an Electromagnetic Software in the Frequency Domain D. Baillargeat, E. Larique, S. Verdeyme, M. Aubourg, R. Sommet and P. Guillon	1021
WE4A-5 4:50 pm	New Formulae for the Initial Design in the Optimization of T-Junction Manifold Multiplexers A. Morini, T. Rozzi and M. Morelli	1025
WE4A-6 5:00 pm	From Layout to Schematic Using Pattern Recognition in Microwave Computer Aided Design S. Tadjiky and R.H. Jansen	1029

Session WE4B

Millimeter-Wave Mixers and Switches

3:30 pm-5:10 pm

Room A207

Wednesday, June 11, 1997

Chair: M. Schindler, ATN Microwave

WE4B-1 3:30 pm	Wide-Band SSB Subharmonically Pumped Mixer MMIC H. Okazaki and Y. Yamaguchi	1035
WE4B-2 3:50 pm	A Planar Circuit Design for High Order Sub-Harmonic Mixers T.J. Ellis	1039
WE4B-3 4:00 pm	Ka-Band Spur Canceling Mixer for High IF Application Y. Liu, O. Fordham and W. Copeland	<i>late</i>
WE4B-4 4:10 pm	Active, Monolithically Integrated Coplanar V-Band Mixer M. Schefer, U. Lott, H. Benedickter, Hp. Meier, W. Patrick and W. Bächtold	1043
WE4B-5 4:20 pm	High-Performance W-Band GaAs PIN Diode Single-Pole Triple-Throw Switch CPW MMIC M. Case, M. Matloubian, H.-C. Sun, D. Choudhury and C. Ngo	1047

Session WE4C

Quasi-Optical Oscillators

3:30 pm–5:10 pm

Room Al02

Wednesday, June 11, 1997

Chair; R. York, University of California-Santa Barbara

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3:30 pm	W.A. Shiroma and Z.B. Popović	
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3:50 pm	P. Preventza, M. Matloubian and D.B. Rutledge	
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4:00 pm	H.-C. Chang, X. Cao, U.K. Mishra and R.A. York	
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4:20 pm	M.J. Kelly, J.A.C. Stewart and A.D. Patterson	
WE4C-5	The Active Phased Array Antennas Coupled Through Slotlines	1069
4:30 pm	C. Mun, C.H. Kang, H.K. Park and Y.J. Yoon	
WE4C-6	Computer Aided Engineering Environment for Spatial Power Combining Systems	1073
4:40 pm	F. Nusseibeh, T.W. Nuteson, J. Patwardhan, M.A. Summers, C.E. Christoffersen, J. Kreskovsky and M.B. Steer	

Session WE4D

Passive Bandpass Filters

3:30 pm–5:10 pm

Room Al01

Wednesday, June 11, 1997

Chair: G.L. Matthaei, University of California-Santa Barbara

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4:40 pm	R.V. Snyder	
WE4D-6	Improvement of Spurious Performance of Combine Filters	1099
4:50 pm	H.-W. Yao, K.A. Zaki, A.E. Atia and T. Dolan	
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Session WE4E

Ferrite Devices: Modeling and Applications

3:30 pm-5:10 pm

Room A108

Wednesday, June 11, 1997

Chair: J.M. Owens, Auburn University

Co-Chair: M. Afsar, Tufts University

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WE4E-5 4:50 pm	C Band Ferrite Microstrip Limiter J.J. Green	1125
WE4E-6 5:00 pm	Effective-Field Theory for Ferrite Thin-Film Junction Circulator H. How, S. W. McKnight and C. Vittoria	1127