

1995
IEEE MTT-S
INTERNATIONAL MICROWAVE SYMPOSIUM
DIGEST

*1995 Microwave Symposium
Technical Program Schedule*



1995 Microwave Symposium Technical Program Schedule

Session TU1A (Joint with MMWMC) Systems Applications

8:30 a.m.–10:00 a.m.

Room A1

Tuesday, May 16, 1995

Chairman: A. Gupta—Westinghouse, ESG

Co-Chairman: S. Bharj—Princeton Microwave Technology

TU1A-1	A Family of Low Cost High Performance HEMT MMICs for Commercial DBS Applications	1649
8:30 am	K. Hubbard, K. MacGowan, C. Kau, D. Smith and S. Maas	
TU1A-2	K-Band T/R-Converter Modules for the IRIDIUM® Satellite Program	1653
8:50 am	D.W. Corman, B.T. Agar, K.V. Buer, D.L. Cook	
TU1A-3	Performance of a 6 to 18 GHz Frequency Translator Utilizing GaAs MMIC 5-Bit Digital Phase Shifter	5
9:10 am	S.R. Mazumder and C.M. Isham	
TU1A-4	A 1.9 GHz-Band Ultra Low Power Consumption Amplifier Chip Set for Personal Communications	9
9:30 am	M. Muraguchi, M. Nakatsugawa, H. Hayashi and M. Aikawa	
TU1A-5	Miniature GPS Translator Module	13
9:50 am	J. Smuk, P. Katzin, V. Aparin and M. Shifrin	

Session TU1B Progress in Time-Domain Techniques

8:30 a.m.–10:00 a.m.

Room A2

Tuesday, May 16, 1995

Chairman: A. Cangellaris—University of Arizona

TU1B-1	The Alternating Transmission Line Matrix (ATLM) Scheme	19
8:30 am	P. Russer and B. Bader	
TU1B-2	Compensation of Coarseness Error in TLM Modeling of Microwave Structures with the Symmetrical Condensed Node	23
8:50 am	J.L. Herring and W.J.R. Hoefer	
TU1B-3	Some Improvements to the FDTD Algorithm for the Analysis of Passive Circuits	1657
9:00 am	R.C. Tupynambá and A.S. Omar	
TU1B-4	Application of the PML Absorbing Boundary Condition to the FDTD Analysis of Microwave Circuits	27
9:10 am	A. Bahr, A. Lauer and I. Wolff	
TU1B-5	A Stretched Coordinate Technique for Numerical Absorption of Evanescent and Propagating Waves in Planar Waveguiding Structures	31
9:30 am	M.A. Gribbons, W.P. Pinello and A.C. Cangellaris	
TU1B-6	A Broadband Absorbing Boundary Condition for the FDTD Modeling of Circular Waveguides	35
9:40 am	T.G. Jurgens	
TU1B-7	Treatment of Instabilities of One-Way Equation Absorbing Boundary Conditions Using Digital Filters	39
9:50 am	C. Eswarappa and W.J.R. Hoefer	

Session TU1C

Photonic Devices

8:30 a.m.–10:00 a.m.

Room 12A,B,C

Tuesday, May 16, 1995

Chairman: C. Gee—Ortel Corporation

TU1C-1	Ultrahigh Speed Cryogenic Laser Diodes for Broadband Optical Fiber Link Applications	45
8:30 am	R.-C. Yu, R. Nagarajan, T. Reynolds, J.E. Bowers, M. Shakouri, J. Park, K.Y. Lau, C.-E. Zah, W. Zou and J. Merz	
TU1C-2	Analytical Model With Empirical Verification for Heterojunction Bipolar Transistors Under Illumination	49
8:40 am	L.E.M. de Barros Jr., A. Paoletta, P.R. Herczfeld and P. Enquist	
TU1C-3	1 × 8 Metal-Semiconductor-Metal Photodetector and HEMT Receiver Array with 5 GHz Bandwidth	53
8:50 am	T. Seniuk, Q.Z. Liu and G.D. Cormack	
TU1C-4	A Low Noise Broadband GaAs MESFET Monolithic Distributed Preamplifier	57
9:10 am	A.P. Freundorfer and P. Lionais	
TU1C-5	Measurement of Intermodulation Distortion in Optical Diodes	61
9:20 am	B. Kanack	
TU1C-6	Photonic Switched True Time Delay Beam Forming Network Integrated on Silica Waveguide Circuits	65
9:40 am	K. Horikawa, I. Ogawa, H. Ogawa and T. Kitoh	

Session TU1D

Sources and Control Components

8:30 a.m.–10:00 a.m.

Room A3

Tuesday, May 16, 1995

Chairman: A.P.S. Khanna—Hewlett Packard Company

TU1D-1	A 60GHz MMIC Stabilized Frequency Source Composed of a 30GHz DRO and a Doubler	71
8:30 am	M. Funabashi, T. Inoue, K. Ohata, K. Maruhashi, K. Hosoya, M. Kuzuhara, K. Kanekawa and Y. Kobayashi	
TU1D-2	Dielectric Loaded Gaussian Beam Oscillator in the 40 GHz Band	75
8:40 am	M. Kiyokawa, T. Matsui and N. Hirose	
TU1D-3	Microwave Oscillator Control Using a Switched Delay-Line Technique	79
9:00 am	C.E. Free and C.S. Aitchison	
TU1D-4	Microwave Oscillators and Filters Based on Microstrip Ring Resonators	83
9:10 am	D.K. Paul and P. Gardner	
TU1D-5	The Influence of I-Region Width Modulation on PIN Diode Attenuator Design	87
9:20 am	R.H. Caverly and Z.W. Tang	
TU1D-6	Micromechanical Membrane Switches for Microwave Applications	91
9:30 am	C. Goldsmith, T.-H. Lin, B. Powers, W.-R. Wu and B. Norvell	

Session TU1E

Advances in Ferrite Technologies

8:30 a.m.–10:00 a.m.

Room A4

Tuesday, May 16, 1995

Chairman: J.M. Owens—Auburn University

TU1E-1	Monolithic Integration of an X-Band Circulator with GaAs MMICs	97
8:30 am	J.D. Adam, H. Buhay, M.R. Daniel, M.C. Driver, G.W. Eldridge, M.H. Hanes and R.L. Messham	
TU1E-2	Normal-Mode Analysis of Coupled-Slots with an Axially-Magnetized Ferrite Substrate	99
8:50 am	C.S. Teoh and L.E. Davis	
TU1E-3	A Latching Ferrite Rotary-Field Phase Shifter	103
9:10 am	C.R. Boyd, Jr.	
TU1E-4	Thin Film Isolators Utilizing MSSW Transducers	107
9:30 am	E.-B. El-Sharawy and J.-S. Guo	
TU1E-5	A Reflection Type of MSW Signal-to-Noise Enhancer in the 400-MHz Band	111
9:40 am	T. Kuki and T. Nomoto	



Session TU2G

(Plenary Session)

Moving Cellular Communications into Space

10:30 a.m.–12:00 a.m.

Hall A5

Tuesday, May 16, 1995

Session TU3A

(Joint with MMWMC)

Mixers and Related Components

1:30 p.m.–3:00 p.m.

Room A1

Tuesday, May 16, 1995

Chairman: A. Chu—MITRE Corporation
Co-Chairman: L. Liu—TRW Incorporated

TU3A-1	A Monolithic Broadband Doubly Balanced EHF HBT Star Mixer with Novel Microstrip Baluns	119
1:30 pm	Y.I. Ryu, K.W. Kobayashi and A.K. Oki	
TU3A-2	A PMHFET Based MMIC Gate Mixer for Ka-Band Applications	123
1:50 pm	M. Matthes, J.-M. Dieudonné, W. Stiebler, L. Klapproth	
TU3A-3	A K-Band Monolithic CPW Upconverter Utilizing a Source Mixing Concept	127
2:00 pm	M. Madihian, L. Desclos, K. Maruhashi, K. Onda and M. Kuzuhara	
TU3A-4	Monolithic Mixers with MESFETs Technology to Up and Down Convert Between C and V Band	131
2:10 pm	J.P. Torres, F. Fortes, M.J. Rosário, J.M. Dieudonné and J. Costa Freire	
TU3A-5	MMIC Active Bandpass Filter Using Negative Resistance Elements	135
2:20 pm	U. Karacaoglu and I.D. Robertson	
TU3A-6	Capacitive-Division Traveling-Wave Amplifier with 340 GHz Gain-Bandwidth Product	1661
2:40 pm	J. Puhl, B. Agarwal, R. Pullela, L.D. Nguyen, M.V. Le, M.J.W. Rodwell, L. Larson, J.F. Jensen, R.Y. Yu and M.G. Case	

Session TU3B

Leaky-Wave Effects on Planar Transmission Lines

1:30 p.m.–3:00 p.m.

Room A2

Tuesday, May 16, 1995

Chairman: P. Lampariello—"La Sapienza" University of Rome

TU3B-1	The Effect of Substrate Anisotropy on the Dominant-Mode Leakage from Stripline with an Air Gap	141
1:30 pm	D. Nghiem, J.T. Williams, D.R. Jackson and A.A. Oliner	
TU3B-2	Simultaneous Propagation of Bound and Leaky Dominant Modes on Printed-Circuit Lines: A New General Effect	145
1:50 pm	H. Shigesawa, M. Tsuji and A.A. Oliner	
TU3B-3	Analysis and Design of Feeding Structures for Microstrip Leaky Wave Antenna	149
2:10 pm	Y.-D. Lin, J.-W. Sheen and C.-K.C. Tzuang	
TU3B-4	Leaky Dominant Modes and Microwave Circuit Coupling in Layered Symmetric Coupled Lines	153
2:30 pm	C.-K.C. Tzuang and S.-P. Liu	

Session TU3C

Millimeter Wave Frequency Optical Detectors

1:30 p.m.–3:00 p.m.

Room 12A,B,C

Tuesday, May 16, 1995

Chairman: P. Herczfeld—Drexel University
Co-Chairman: N. Dietrich—AT&T Bell Laboratories

TU3C-1	Travelling-Wave Photodetectors	159
1:30 pm	K. Giboney, J. Bowers and M. Rodwell	
TU3C-2	Monolithic High Speed Long Wavelength Photoreceivers Incorporating Photodetectors with Transistor Preamplifiers	*
2:00 pm	S. Chandrashekhhar and L.M. Lunardi	
TU3C-3	Travelling-Wave Optoelectronic Devices for Microwave Applications	163
2:30 pm	D. Jäger, R. Kremer and A. Stöhr	

*Manuscript not available at time of printing.

Session TU3D

High Density Microwave Packaging (HDMP) Program

1:30 p.m.–3:00 p.m.

Room A3

Tuesday, May 16, 1995

Chairman: T. Kemerley—USAF—Wright Laboratory

TU3D-1	High Density Microwave Packaging Program	169
1:30 pm	E.D. Cohen	
TU3D-2	High Density Microwave Packaging Program Phase 1—Texas Instruments/Martin Marietta Team	173
1:45 pm	J.A. Reddick III, R.K. Peterson, M. Lang, W.R. Kritzler, P. Piacente and W.P. Kornrumpf	
TU3D-3	The Westinghouse High Density Microwave Packaging Program	177
2:10 pm	J.A. Costello, M. Kline, F. Kuss, W. Marsh, R. Kam, B. Fasano, M. Berry and N. Koopman	
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2:35 pm	J. Wooldridge	

Session TU3E

Superconducting Components and Applications

1:30 p.m.–3:00 p.m.

Room A4

Tuesday, May 16, 1995

Chairman: C. Jackson—TRW

TU3E-1	An Optical Switch for High Temperature Superconducting Microwave Band Reject Resonators	187	TU 3B
1:30 pm	K.F. Raihn, N.O. Fenzi, E.R. Soares and G.L. Matthaei		
TU3E-2	High-Temperature Superconducting Microstrip Filters with High Power-Handling Capability	191	TU 3C
1:40 pm	G.-C. Liang, D. Zhang, C.-F. Shih, M.E. Johansson, R. Withers, A.C. Anderson, D.E. Oates, P. Polakos, P. Mankiewich, E. de Obaldia and R.E. Miller		TU 3D
TU3E-3	Miniature Circulators for Microwave Superconducting Systems	195	TU 3E
2:00 pm	A. Fathy, E. Denlinger, D. Kalokitis, V. Pendrick, H. Johnson, A. Pique, K.S. Harshavardhan and E. Belohoubek		
TU3E-4	Frequency Agile Superconducting Thin-Film (FAST TM) Filter	*	
2:20 pm	G.A. Koepf, R.R. Bonetti, M. Hiney, M. Rivkin, R.M. Yandrofski, D.A. Rudman, J.S. Horwitz, D. Dumos and J.D. Cuchiaro		
TU3E-5	Comparison Between Direct and Aperture Coupling Y-Ba-Cu-O Mixer Antennas	*	
2:40 pm	K. Suzuki, K. Yamaguchi, K. Hayashi, M. Ban, S. Tokunaga and Y. Enomoto		

*Manuscript not available at time of printing.

Session TU4A

(Joint with MMWMC)

Monolithic Receiver Components

3:30 p.m.–5:00 p.m.

Room A1

Tuesday, May 16, 1995

Chairman: V. Nair—Motorola-PCRL
Co-Chairman: S. Moghe—Northrop-Grumman

TU4A-1	A Novel Baseband-1.5 GHz Monolithic HBT Variable Gain Amplifier with PIN Diode Gain Control	201
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TU4A-2	A 9-16 GHz Monolithic HEMT Low Noise Amplifier with Embedded Limiters	205
3:50 pm	P. Huang, W.L. Jones, A. Oki, D. Streit, W. Yamasaki, P. Liu, S. Bui and B. Nelson	
TU4A-3	A W-Band Monolithic Low Noise AlGaAs/InGaAs Pseudomorphic HEMT Amplifier Mounted on a Small Hermetically-Sealed Package with Waveguide Interface	207
4:00 pm	Y. Itoh, M. Nakayama, K. Nakahara, T. Takagi, T. Sakura, N. Yoshida, T. Katoh, T. Kashiwa and Y. Ito	
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4:10 pm	R. Heilig, D. Hollmann, G. Baumann	
TU4A-5	A 2-32 GHz Coplanar Waveguide InAlAs/InGaAs-InP HBT Cascode Distributed Amplifier	215
4:20 pm	K.W. Kobayashi, J. Cowles, L. Tran, T. Block, A.K. Oki and D.C. Streit	
TU4A-6	A Distributed Optical Receiver Preamplifier with Unequal Gate/Drain Impedances	219
4:40 pm	I. Darwazeh, P. Moreira, A. Borjak and J. O'Reilly	

Session TU4B

Leaky-Wave Effects and Discontinuities

3:30 p.m.–5:00 p.m.

Room A2

Tuesday, May 16, 1995

Chairman: S.M. El-Ghazaly—Arizona State University

TU4B-1	Mode Conversion and Leaky-Wave Excitation at Open-End Coupled Microstrip Discontinuities	225
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TU4B-2	Surface-Wave Leakage Properties of Coplanar Strips	229
3:50 pm	Y.-D. Lin, J.-W. Sheen and C.-Y. Chang	
TU4B-3	Analysis of the Effects of Metal Discontinuities in Nonradiative Dielectric Waveguide	233
4:00 pm	C. Di Nallo, F. Frezza, A. Galli and P. Lampariello	
TU4B-4	Study of Non-Leaky Coplanar (NLC) Waveguide Discontinuities	237
4:20 pm	C.-Y. Lee, Y. Liu and T. Itoh	
TU4B-5	Multimode Network Representation for H- and E-Plane Uniform Bends in Rectangular Waveguide	241
4:30 pm	B. Gimeno and M. Guglielmi	

Session TU4C

High Speed Optical Modulators Fabricated on III-V Compounds

3:30 p.m.–5:00 p.m.

Room 12A,B,C

Tuesday, May 16, 1995

Chairman: J. Bowers—University of California at Santa Barbara
Co-Chairman: A. Rosen—SRI

TU4C-1	Integrated Laser/Modulators for High Capacity WDM Transmission Systems	247
3:30 pm	W.T. Tsang, J.E. Johnson, P.A. Morton, T. Tanbun-Ek, S.N.G. Chu and W.D. Johnston	
TU4C-2	Ultra Wide Electrical Bandwidth GaAs/AlGaAs Electrooptic Modulators	251
4:00 pm	N. Dagli, R. Spickermann, S. Sakamoto and M. Peters	
TU4C-3	High-Speed Directional Coupler Modulator with Velocity-Matched Electrode Structure	255
4:30 pm	M. Yu and A. Gopinath	
TU4C-4	Integrated Optic Distributed Bragg Reflector Fabry-Perot Modulator for Microwave Applications	259
4:50 pm	W.J. Zubrzycki, B.V. Borges, P.R. Herczfeld, S.H. Kravitz, G.R. Hadley, G.A. Vawter, R.F. Corless, R.E. Smith, J.R. Wendt, J.C. Word and T.M. Bauer	

Session TU4D

Field Theory I

3:30 p.m.–5:00 p.m.

Room A3

Tuesday, May 16, 1995

Chairman: A. Beyer—Gerhard-Mercator—University at Duisburg

TU4D-1	Field Theory Analysis of Circular Ridge Waveguides with Partial Dielectric Filling	265
3:30 pm	S. Xiao, R. Vahldieck and M. Guglielmi	
TU4D-2	Generalized Scattering Matrix of Waveguide Corners Distorted by Discontinuities in the Resonator Region	269
3:50 pm	V.A. Labay and J. Bornemann	
TU4D-3	A Wide-Band S-Parameter Extraction Procedure for Arbitrarily Shaped, Inhomogeneous Structures Using Time Domain Numerical Techniques	273
4:00 pm	J. Ritter, V.J. Branković, D.V. Krupežević and F. Arndt	
TU4D-4	The Generalized Scattering Matrix Separation Technique Combined with the MM/FE Method for the Efficient Modal Analysis of a Comprehensive Class of 3D Passive Waveguide Circuits	277
4:20 pm	R. Beyer and F. Arndt	
TU4D-5	Modelling of Cascaded Coplanar Waveguide Discontinuities by the Mode-Matching Approach	281
4:40 pm	R. Schmidt and P. Russer	
TU4D-6	Axisymmetric Edge-Based Finite Element Formulation for Bodies of Revolution: Application to Dielectric Resonators	285
4:50 pm	M.F. Wong, M. Prak and V.F. Hanna	



Session TU4E

Biomedical Applications

3:30 p.m.–5:00 p.m.

Room A4

Tuesday, May 16, 1995

Chairman: P. Yu—University of California at San Diego

TU4E-1	Field Calculation in Models of Man in the Near-Field of Antennas	291
3:30 pm	G. Schaller, R. Engelbrecht and J. Erb	
TU4E-2	Variations of the Somatosensory Evoked Potentials Due to Microwave Fields in Rabbits Spinal Cord	295
3:50 pm	J. Teng, D. Carton de Tournai, F. Duhamel and A. Vander Vorst	
TU4E-3	Modeling a Microwave Catheter Antenna for Cardiac Ablation	299
4:10 pm	A. Khebir, Z. Kaouk and P. Savard	
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4:20 pm	S. Labonté, H.O. Ali and L. Roy	
TU4E-5	Field Simulation of Applicators for Interstitial Microwave Hyperthermia	307
4:30 pm	G. Schaller, J. Erb, R. Engelbrecht and H.M. Seegenschmiedt	
TU4E-6	Coupled Radiation Between Concentrically Placed Waveguide Applicators: Optimization of the Deposited Power Distribution Inside A Lossy Medium	311
4:40 pm	K.S. Nikita, N.K. Uzunoglu and N.G. Maratos	
TU4E-7	Design and Modeling of Multipatches Planar Applicators for Microwave Hyperthermia	315
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Session WE1A

Microwave Power Devices and Amplifiers I

8:30 a.m.–10:00 a.m.

Room A1

Wednesday, May 17, 1995

Chairman: H.J. Kuno—Quin Star Technology, Incorporated

WE1A-1	High Power, High Efficiency PHEMTs for Use at 8 GHz	323
8:30 am	D. Teeter, S. Bouthillette, L. aucoin, A. Platzker, C. Alfaro and D. Bradford	
WE1A-2	A High Efficiency 10 Watt HBT Power Amplifier Assembly using Combining Techniques	327
8:50 am	G. Ferrell, L. Dickens, J. Gipprich, B. Hayes and F. Sacks	
WE1A-3	Development of a Low Cost X-Band Solid State Transmitter for Low Volume Commercial Applications	331
9:10 am	J. Faulkner, E. Lee, J. Masti and M. Pingor	
WE1A-4	Ku-Band 10W High Efficiency HJFET Power Amplifier	335
9:30 am	K. Matsunaga, Y. Okamoto and M. Kuzuhara	
WE1A-5	An 11 W Ku-Band Heterostructure FET with WSi/Au T-Shaped Gate	339
9:50 am	J. Udomoto, S. Chaki, M. Komaru, T. Kunii, Y. Kohno, S. Goto, K. Gotoh, A. Inoue, N. Tanino, T. Takagi and O. Ishihara	
WE1A-6	Ku-Band 20 W Power GaAs FETs	343
10:00 am	Y. Saito, T. Kuzuhara, T. Ohmori, K. Kai, H. Ishimura and H. Tokuda	



Session WE1B

Applications of Time Domain Methods

8:30 a.m.–10:00 a.m.

Room A2

Wednesday, May 17, 1995

Chairman: W.J.R. Hoefer—University of Victoria

WE1B-1	3D FDTD Simulation of Superconductor Coplanar Waveguides	349
8:30 am	S. Xiao and R. Vahldieck	
WE1B-2	Analysis of Anisotropic Conductors on Anisotropic Substrates	353
8:50 am	M.A. Megahed and S.M. El-Ghazaly	
WE1B-3	FDTD Simulation of a Microwave Amplifier	357
9:00 am	C.-N. Kuo, S.T. Chew, B. Houshmand and T. Itoh	
WE1B-4	Simulation of HF Circuits with FDTD Technique Including Non-Ideal Lumped Elements	361
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9:20 am	L. de Menezes and W.J.R. Hoefer	
WE1B-6	Dispersion Characteristics of the TLM Scheme with Symmetrical Super-Condensed Node	369
9:40 am	M. Krumpholz, L. Roselli and P. Russer	
WE1B-7	Dispersion of TLM Condensed Nodes in Media with Arbitrary Electromagnetic Properties	373
9:50 am	V. Trenkic, C. Christopoulos and T.M. Benson	

Session WE1C

Miniaturized Filters

8:30 a.m.–10:00 a.m.

Room 12A,B,C

Wednesday, May 17, 1995

Chairman: Y.-C. Shih—Hughes Space and Communications Company

WE1C-1	Narrowband Lumped-Element Microstrip Filters using Capacitively-Loaded Inductors	379
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WE1C-2	A New Semi-Lumped Microwave Filter Structure	383
8:50 am	A.F. Sheta, K. Hettak, J.Ph. Coupez, C. Person, S. Toutain and J.P. Blot	
WE1C-3	A Novel MMIC Filter—Measured and Simulated Data	387
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9:30 am	S. Kobayashi and K. Saito	
WE1C-5	Generalized Slot Coupled Combline Filters	395
9:40 am	H.-W. Yao, K.A. Zaki, A.E. Atia and R. Hershtig	



Session WE1D

(Joint with NTC)

Wireless Communications Systems

8:30 a.m.–10:00 a.m.

Room A3

Wednesday, May 17, 1995

Chairman: J.B. Horton—TRW

WE1D-1	Opening Remarks NTC “95” Microwave Systems Conference	*
8:30 am	M.A. Belkerdid and D.C. Malocha	
WE1D-2	Recent Advances on Millimeterwave PCN System Development in Europe (Invited)	401
8:40 am	H.H. Meinel	
WE1D-3	Recent Activities on Millimeter Wave Indoor LAN System Development in Japan (invited)	405
9:00 am	Y. Takimoto	
WE1D-4	Advanced MMIC Components for Ka-Band Communications Systems—A Survey	409
9:20 am	J.-M. Dieudonné, B. Adelseck, P. Narozny and H. Dämbkes	
WE1D-5	Microwave and Millimetre-Wave Technology Requirements for the European Fourth Framework Programme	413
9:40 am	J.G. Gardiner	

Session WE1E

Millimeter-Wave Circuits and Systems

8:30 a.m.–10:00 a.m.

Room A4

Wednesday, May 17, 1995

Chairman: K. Agarwal—University of Bridgeport

Co-Chairman: M. Matloubian—Hughes Research Laboratories

WE1E-1	A W-Band Monolithic 175-mW Power Amplifier	419
8:30 am	H. Wang, Y. Hwang, T.H. Chen, M. Biedenbender, D.C. Streit, D.C.W. Lo, G.S. Dow and B.R. Allen	
WE1E-2	W-Band Integrated Monopulse Radar Transceiver	423
8:50 am	P. Toullos, Y.-H. Shu, J. Navarro and R. Knox	
WE1E-3	A 40 to 50 GHz HEMT Test Fixture	427
9:10 am	A. Prabhu and N. Erickson	
WE1E-4	Manufacturable and Reliable Millimeter-Wave HJFET MMIC Technology Using Novel 0.15μm MoTiPtAu Gates	431
9:20 am	Y. Hori, K. Onda, M. Funabashi, H. Mizutani, K. Maruhashi, A. Fujihara, K. Hosoya, T. Inoue and M. Kuzuhara	
WE1E-5	A High Performance, High Yield, Dry-Etched, Pseudomorphic HEMT for W-Band Use	435
9:40 am	N.I. Cameron, M.R.S. Taylor, H. McLelland, M. Holland, I.G. Thayne, K. Elgaid and S.P. Beaumont	

*Manuscript not available at time of printing.

Session WE2A

Microwave Power Devices and Amplifiers II

10:30 a.m.–12:00 p.m.

Room A1

Wednesday, May 17, 1995

Chairman: B. Bayraktaroglu—Westinghouse EGS

WE2A-1	Variable Output, High Efficiency-Low Distortion S-Band Power Amplifiers and Their Performances Under Single Tone and Noise Power Excitations	441
10:30 am	A. Platzker and S. Bouthillette	
WE2A-2	High-Performance 0.15-μm-Gate-Length pHEMTs Enhanced with a Low-Temperature-Grown GaAs Buffer	445
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WE2A-5	A Scalable MMIC-Compatible Power HBT	457
11:30 am	G. Jackson, D. Teeter, D. Bradford and M. Cobb	
WE2A-6	Three-Dimensional Modeling of Thermal Flow in Multi-Finger High Power HBTs	461
11:40 am	R. Hattori, T. Shimura, M. Kato, T. Sonoda and S. Takamiya	
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11:50 am	K.Y. Hur, R.A. McTaggart, M.P. Ventresca, R. Wohler, L.M. Aucoin and T.E. Kazior	



Session WE2B

Frequency-Domain Electromagnetic Modeling

10:30 a.m.–12:00 p.m.

Room A2

Wednesday, May 17, 1995

Chairman: R. Sorrentino—University of Perugia

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WE2B-2	Proximity Coupled Microstrip Elements and Interconnects of Arbitrary Shape in Multilayered Media	475
10:50 am	M-J. Tsai and N.G. Alexopoulos	
WE2B-3	Full-Wave Modal Analysis of Arbitrarily-Shaped Dielectric Waveguides Through an Efficient Boundary-Element-Method Formulation	479
11:00 am	C. Di Nallo, F. Frezza and A. Galli	
WE2B-4	The Finite-Integration Beam-Propagation Method (FIBPM)	483
11:20 am	M. Niederhoff, W. Heinrich and P. Russer	
WE2B-5	A New Frequency-Domain TLM Symmetrical Condensed Node Derived Directly from Maxwell's Equations	487
11:30 am	H. Jin and R. Vahldieck	
WE2B-6	The Method of Lines for the Hybrid Analysis of Multilayered Dielectric Resonators	491
11:50 am	D. Kremer and R. Pregla	

Session WE2C

Coupled Mode Waveguide Filters

10:30 a.m.–12:00 p.m.

Room 12A,B,C

Wednesday, May 17, 1995

Chairman: A.E. Williams—COMSAT Laboratories

WE2C-1	Direct Synthesis of Cascaded Quadruplet (CQ) Filters	497
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WE2C-2	Mixed Modes Cylindrical Planar Dielectric Resonator Filters with Rectangular Enclosure	501
10:50 am	C. Wang, H.-W. Yao and K.A. Zaki	
WE2C-3	Complete Design for Five-Pole in Line Elliptic Filter	505
11:10 am	Ph. Guillot, H. Baudrand, S. Vigneron and B. Theron	
WE2C-4	Dual-Mode Dielectric-Loaded Resonators with Cross-Coupling Flats	509
11:20 am	J.-F. Liang, K.A. Zaki and R. Levy	
WE2C-5	Mode-Selective Negative Coupling for Implementing Multiple Attenuation Poles in Evanescent-Mode Waveguide Filters	513
11:40 am	K. Iguchi, M. Tsuji and H. Shigesawa	

Session WE2D

(Joint with NTC)

Wireless Technologies

10:30 a.m.–12:00 p.m.

Room A3

Wednesday, May 17, 1995

Chairman: V. Nair—Motorola—PCRL
Co-Chairman: D. Maki—Raytheon Company

WE2D-1	A Low Cost Mixer for Wireless Applications	519
10:30 am	J.-M. Maurant	
WE2D-2	A Low-Current Linearity Sweet Spot in HFET's	523
10:50 am	R. Vaitkus, V. Nair and S. Tehrani	
WE2D-3	A Novel 3V, 7 mA PHEMT GaAs Active MMIC Mixer/LNA for Wireless Applications	527
11:10 am	H. Morkner, M. Frank, B. Ingram	
WE2D-4	A Double-Polysilicon Bipolar Process with a 0.3-μm Minimum Emitter Width and NMOS Transistors for Low Power Wireless Applications	531
11:30 am	K. O, C. Tsai, T. Tewksbury, G. Dawe, C. Kermarrec and J. Yasaitis	
WE2D-5	A Low Cost 3.6V Single-Supply GaAs Power Amplifier IC for the 1.9-GHz DECT System	535
11:50 am	J. Griffiths and V. Sadhir	

Session WE2E

Millimeter Wave Sources and Measurements

10:30 a.m.–12:00 p.m.

Room A4

Wednesday, May 17, 1995

Chairman: M. Frerking—Jet Propulsion Laboratory

Co-Chairman: M. Afsar—Tufts University

WE2E-1	60-GHz Monolithic Oscillator using InGaP/InGaAs/GaAs HEMT Technology	541
10:30 am	Y. Kawasaki, K. Shirakawa, Y. Ohashi and T. Saito	
WE2E-2	New Insight in Operation Principles and Accurate Design of Fundamental and Harmonic Millimeter-Wave Oscillators	545
10:50 am	M. Curow	
WE2E-3	A Ka-Band Planar Tripler Based on a Stacked Symmetric InP Heterostructure-Barrier Varactor	549
11:10 am	K. Krishnamurthi, E. Boch and R.G. Harrison	
WE2E-4	Millimeter-Wave Fresnel Zone Planar Lens and Antenna	553
11:30 am	H.D. Hristov and M.H.A.J. Herben	
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11:40 am	T. Matsui, M. Kiyokawa and K. Araki	

Session WE3A

Power Amplifiers for Wireless Applications

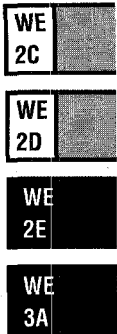
1:30 p.m.–3:00 p.m.

Room A1

Wednesday, May 17, 1995

Chairman: R.E.S. Bryan—Ericsson, Incorporated

WE3A-1	Low-Voltage High-Performance Silicon RF Power Transistors	563
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WE3A-2	Analogue/Digital Dual Power Module Using Ion-Implanted GaAs MESFETs	567
1:50 pm	H. Masato, M. Maeda, H. Fujimoto, S. Morimoto, M. Nakamura, Y. Yoshikawa, H. Ikeda, H. Kosugi and Y. Ota	
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2:10 pm	S.-J. Maeng, C.-S. Lee, K.-J. Youn, J.-L. Lee and H.-M. Park	
WE3A-4	A High Power Density and High Efficiency UHF-Band HFET for Low Voltage Operation	575
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WE3A-5	A High Power and High Efficiency Amplifier with Controlled Second-Harmonic Source Impedance	579
2:40 pm	M. Maeda, H. Takehara, M. Nakamura, Y. Ota and O. Ishikawa	



Session WE3B

Quasi-Optical Passive and Amplifier Arrays

1:30 p.m.–3:00 p.m.

Room A2

Wednesday, May 17, 1995

Chairman: J.F. Harvey—U.S. Army Research Office

WE3B-1	High-Power Hybrid Quasi-Optical Ka-Band Amplifier Design	585
1:30 pm	J. Hubert, J. Schoenberg and Z.B. Popovic	
WE3B-2	Two Stage Double Layer Microstrip Spatial Amplifiers	589
1:50 pm	T. Ivanov and A. Mortazawi	
WE3B-3	Quasi-Optical Amplifier Array Using Direct Integration of MMICs and 50 Ω Multi-Slot Antennas	593
2:10 pm	H.S. Tsai and R.A. York	
WE3B-4	Metal Mesh Couplers Using Evanescent Waves at Millimeter and Submillimeter Wavelengths	597
2:20 pm	J. Bae, J. Chiao, K. Mizuno and D.B. Rutledge	
WE3B-5	Analysis of Cascaded Quasi-Optical Grids	601
2:30 pm	S.C. Bundy, W.A. Shiroma and Z.B. Popović	
WE3B-6	Quasi-Optical Antenna Array Amplifiers	605
2:40 pm	J. Schoenberg, T. Mader, B. Shaw, Z.B. Popović	

Session WE3C

Active Device Modeling

1:30 p.m.–3:00 p.m.

Room 12A,B,C

Wednesday, May 17, 1995

Chairman: A.K. Sharma—TRW
Co-Chairman: J. Laskar—Georgia Tech.

WE3C-1	New MODFET Small Signal Circuit Model Required for Millimeter-Wave MMIC Design: Extraction and Validation to 120 GHz	611
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1:50 pm	K. Fujii	
WE3C-3	High-Frequency Large-Signal Physical Modeling of Microwave Semiconductor Devices	619
2:00 pm	M.A. AlSunaidi and S.M. El-Ghazaly	
WE3C-4	A Table Based Bias and Temperature Dependent Small Signal and Noise Equivalent Circuit Model	623
2:10 pm	P.B. Winson, S.M. Lardizabal and L. Dunleavy	
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Session WE3D

Field Theory II

1:30 p.m.—3:00 p.m.

Room A3

Wednesday, May 17, 1995

Chairman: J.W. Mink—North Carolina State University

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Session WE3E

Passive Planar Components

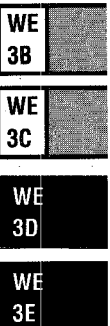
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Room A4

Wednesday, May 17, 1995

Chairman: J. Taub—Consultant

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Session WE3F

Open Forum I

2:30 p.m.–5:00 p.m.

Hall A5

Wednesday, May 17, 1995

Chairman: E. Rizzo—ECC International

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WE3F-J4	Analysis of Microstrip Filters with a Combined Mode-Matching and Method-Of-Lines Procedure	837
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Session WE4A

Acoustic Filters: Performance and Applications

3:30 p.m.–5:00 p.m.

Room A1

Wednesday, May 17, 1995

Chairman: T.J. Lukaszek—U.S. Army Research Laboratory

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3:30 pm	K.M. Lakin, G.R. Kline and K.T. McCarron	
WE4A-2	Thin-Film Resonator Ladder Filter	887
3:50 pm	L. Mang, F. Hickernell, R. Pennell and T. Hickernell	
WE4A-3	Design of Mobile Radio SAW Front-End Filters Based on Finite Element Modeling of Leaky SAW	*
4:00 pm	R. Weigel, D. Cohrs, G. Fischerauer, U. Rosler, W. Ruile and P. Russer	
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WE4A-5	An Efficient and Cost Effective SAW Device Measurement Method Based on an S-Parameter Estimation Technique	895
4:40 pm	J. Johnson and R. Weigel	
WE4A-6	A SAW Matched Filter Based Spread Spectrum Technique for Indoor Multiple Access Systems	899
4:50 pm	Z. Zhang, F. Seifert and R. Weigel	

Session WE4B

Active and Quasi-Optic Antennas

3:30 p.m.–5:00 p.m.

Room A2

Wednesday, May 17, 1995

Chairman: Z. Popovic—University of Colorado

WE4B-1	A Conformal Retrodirective Array for Radar Applications Using a Heterodyne Phased Scattering Element	905
3:30 pm	C.W. Pobanz and T. Itoh	
WE4B-2	A High Power Two-Dimensional Coupled-Oscillator Array at X-Band	909
3:50 pm	P. Liao and R.A. York	
WE4B-3	Use of the Moment Method and Dyadic Green's Functions in the Analysis of Quasi-Optical Structures	913
4:10 pm	T.W. Nuteson, G.P. Monahan, M.B. Steer, K. Naishadham, J.W. Mink and F.K. Schwering	
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WE4B-5	A Dielectric Slab Waveguide with Four Planar Power Amplifiers	921
4:30 pm	H. Hwang, G.P. Monahan, M.B. Steer, J.W. Mink, J. Harvey, A. Paolletta and F.K. Schwering	
WE4B-6	A 2x2 Beam-Switching Active Antenna Array	925
4:40 pm	S.T. Chew and T. Itoh	



*Manuscript not available at time of printing.

Session WE4C

Noise Modeling

3:30 p.m.–5:00 p.m.

Room 12A,B,C

Wednesday, May 17, 1995

Chairman: S. Pritchett—Texas Instruments

WE4C-1	Simulation of Temperature Dependencies Using a New and CAD Suitable Physical GaAs-MESFET Model Including the Electron Preheating Effect	931
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WE4C-2	Ultra-Low Noise HEMT Device Models: Application of On-Wafer Cryogenic Noise Analysis and Improved Parameter Extraction Techniques	935
3:50 pm	J.J. Bautista, M. Hamai, M. Nishimoto, J. Laskar, P. Szydlak and R. Lai	
WE4C-3	A Novel Millimeter-Wave HEMT Noise Modeling Procedure	939
4:00 pm	M.D. DuFault, J.Z. Lin and A.K. Sharma	
WE4C-4	Improved FET Noise Model Extraction Method for Statistical Model Development	943
4:20 pm	S. Pritchett, A. Fernandez, D. Bridges and K. Whelan	
WE4C-5	Analysis of g-r Noise Upconversion in Oscillators	947
4:40 pm	T. Felgentreff, W. Anzill, G. Olbrich and P. Russer	

Session WE4D

(Joint with NTC)

Subsystems for Commercial Communications and Automotive Sensor Applications

3:30 p.m.–5:00 p.m.

Room A3

Wednesday, May 17, 1995

Chairman: D.N. McQuiddy, Jr.—Texas Instruments, Incorporated

WE4D-1	Low Cost and Compact Active Integrated Antenna Transceiver for System Applications	953
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3:50 pm	K. Hettak, E. Rius, J.Ph. Coupez, S. Toutain, P. Legaud and E. Penard	
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4:10 pm	P. Heide, V. Mágori and R. Schwarte	
WE4D-5	Improvement of Angular Resolution of a Millimeterwave Imaging System by Transmitter Location Multiplexing	969
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WE4D-6	A Test Target Generator for Wideband Pulsed Doppler Radars	973
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Wednesday, May 17, 1995

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WE4E-2 3:50 pm	Analysis and Design of Wide-Band Matched Waveguide Bends Including Discontinuities M. Mongiardo, A. Morini and T. Rozzi	983
WE4E-3 4:10 pm	Rigorous Analysis of Compensated E-Plane Junctions in Rectangular Waveguide F. Alessandri, M. Dionigi and R. Sorrentino	987
WE4E-4 4:30 pm	Field Theoretical Characterization of Microwave Cavities S. Xiao, R. Vahldieck and M. Guglielmi	991
WE4E-5 4:40 pm	Filter-Like Design and Optimization of NRD-Guide Mode Suppressors J. Huang, K. Wu, F. Kuroki and T. Yoneyama	995

Thursday, May 18, 1995

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Session TH1C

On-Wafer Measurements

8:30 a.m.–10:00 a.m.

Room 12A,B,C

Thursday, May 18, 1995

Chairman: H.M. Cronson—The MITRE Corporation

TH1C-1 8:30 am	Accurate on Wafer Measurement of Phase and Amplitude of the Spectral Components of Incident and Scattered Voltage Waves at the Signal Ports of a Nonlinear Microwave Device J. Verspecht, P. Debie, A. Barel and L. Martens	1029
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TH1C-3 9:00 am	A Novel Computerized Multiharmonic Active Load-Pull System for the Optimization of High Efficiency Operating Classes in Power Transistors F. Blache, J.M. Nebus, Ph. Bouysse and J.P. Villotte	1037
TH1C-4 9:20 am	A 0.5–50 GHz On-Wafer, Intermodulation, Load-Pull and Power Measurement System M. Demmler, B. Hughes and A. Cognata	1041
TH1C-5 9:30 am	On-Wafer Calibration Techniques for Measurement of Microwave Circuits and Devices on Thin Substrates J. Plá, W. Struble and F. Colomb	1045
TH1C-6 9:40 am	2D Electro-Optic Probing Combined with Field Theory Based Multimode Wave Amplitude Extraction: A New Approach to On-Wafer Measurement G. David, W. Schroeder, D. Jäger and I. Wolff	1049
TH1C-7 9:50 am	High-Frequency On-Wafer Testing with Freely Positionable Silicon-On-Sapphire Photoconductive Probes T. Pfeifer, H.-M. Heiliger, E. Stein von Kamienski, H.G. Roskos and H. Kurz	1053

Session TH1D

Dual-Use and Defense Conversion: Technologies and Applications

8:30 a.m.–10:00 a.m.

Room A3

Thursday, May 18, 1995

Chairman: F. Ali—Westinghouse ESG
Co-Chairman: E. Cohen—ARPA

TH1D-1 8:30 am	Dual-Use and Defense Conversion: A View from the Second Tier G.C. DiPiazza	1059
TH1D-2 8:50 am	The PCN-Smart Munition Connection R. Goldwasser	*
TH1D-3 9:10 am	MMIC Radar Transceivers for Industrial Sensors S.F. Paik	1063
TH1D-4 9:30 am	MSAG®-Lite: GaAs IC Process Technology Addressing Defense Conversion C.E. Lindberg and D.G. Fisher	1067

*Manuscript not available at time of printing.

Session TH1E

Simulation and Design Techniques

8:30 a.m.–10:00 a.m. Room A4 Thursday, May 18, 1995

Chairman: R. Goyal—Mentor Graphics Corporation

TH1E-1 8:30 am	Accurate Prediction of the Small-Signal Gain of the HBT Dual-Fed Distributed Amplifier I.A. Botterill and C.S. Aitchison	1073
TH1E-2 8:40 am	Modeling and Electrical Characterization of Parasitic Effects for GaAs Integrated Circuits. Experimental Validation and CAD Formulas N. Hassaine, M. Lecours and G.Y. Delisle	1077
TH1E-3 8:50 am	Modeling and Simulation of Switching Noise Including Power/Ground Plane Resonance for High Speed GaAs FET Logic (FL) Circuits J.-M. Jong and V.K. Tripathi	1081
TH1E-4 9:00 am	Heterogeneous Parallel Yield-Driven Electromagnetic CAD J.W. Bandler, R.M. Biernacki, Q. Cai, S.H. Chen, P.A. Grobelny and D.G. Swanson, Jr.	1085
TH1E-5 9:20 am	The Use of Hopf Bifurcations Loci for Spurious-Free Nonlinear Microwave Circuit Design V. Rizzoli and A. Neri	1089
TH1E-6 9:40 am	The Role of MHD in Microwave System and Subsystem Design R.G. Hicks and D.L. Rhodes	1673



Session TH2A

(Joint with NTC)

Phased and Active Array Technologies

10:30 a.m.–12:00 p.m. Room A1 Thursday, May 18, 1995

Chairman: D. Zimmerman—Texas Instruments

TH2A-1 10:30 am	W-Band Active Transmit and Receive Phased Array Antennas B.J. Edward, D.R. Helms, R.S. Webb and S. Weinreb	1095
TH2A-2 10:50 am	An 18 GHz Circularly Polarized Multilayer Active Microstrip Antenna Subarray Using MMIC Amplifiers D. Sánchez-Hernández, M. Gillick and I. Robertson	1099
TH2A-3 11:00 am	Demonstrated 60 GHz Active Phased Array D. Bates, D. McPherson, D. Helms, W. Kopp, B. Cleveland, B. Edward, J. Komiak, R. Brown and R. Csongor	*
TH2A-4 11:20 am	X-Band Receiver Protector Using Glass Technology R. Keenan and E. Higham	1103
TH2A-5 11:30 am	MMIC Antenna Front End for Optically Distributed MMW Antennas D. Sturzebecher, X. Zhang and A.S. Daryoush	1107
TH2A-6 11:40 am	True Time-Delay Fiber-Optic Control of a Phased-Array Transmitter with Three-Octave Bandwidth R.D. Esman, M.Y. Frankel and M.G. Parent	1111

*Manuscript not available at time of printing.

Session TH2B

Low Noise Receivers

Room A2

Thursday, May 18, 1995

Chairman: J. Whelehan—AIL Systems, Incorporated

TH2B-1 10:30 am	A Monolithic W-Band High-Gain LNA/Detector for Millimeter Wave Radiometric Imaging Applications D.C.W. Lo, G.S. Dow, B.R. Allen, L. Yujiri, M. Mussetto, T.W. Huang, H. Wang and M. Biedenbender	1117
TH2B-2 10:50 am	Q- and E-Band Cryogenically-Coolable Amplifiers using AlInAs/GaInAs/InP HEMT's M.W. Pospieszalski, W.J. Lakatos, L.D. Nguyen, M. Lui, T. Liu, M. Le, M.A. Thompson and M.J. Delaney	1121
TH2B-3 11:00 am	A C-Band 4-Stage Low Noise Miniaturized Amplifier Using Lumped Elements Y. Tsukahara, S. Chaki, Y. Sasaki, K. Nakahara, N. Andoh, H. Matsubayasi, N. Tanino and O. Ishihara	1125
TH2B-4 11:20 am	Low-Noise High-Power Heterojunction Bipolar Transistors for Mixed-Mode Applications T. Jenkins, D. Barlage, J. Barrette, R. Lee, L. Liou, C. Bozada, R. Dettmer, R. Fitch, M. Mack and J. Sewell	1129
TH2B-5 11:30 am	Q- and V-Band MMIC Chip Set Using 0.1 μm Millimeter-Wave Low Noise InP HEMTs R. Isobe, C. Wong, A. Potter, L. Tran, M. Delaney, R. Rhodes, D. Jang, L. Nguyen and M. Le	1133

Session TH2C

Microwave Measurements

Room 12A,B,C

Thursday, May 18, 1995

Chairman: S.F. Adam—Adam Microwave Consulting, Incorporated

TH2C-1 10:30 am	A Microwave Circuit Electric Field Imager T.P. Budka and Gabriel M. Rebeiz	1139
TH2C-2 10:50 am	GaAs MMIC Thermal Modeling for Calculation of Accurate Channel Temperatures V.J. Ferrara, A. Garnett, S. Park and A.B. Solan	1143
TH2C-3 11:10 am	Moisture Measurement in Walls Using Microwaves F. Menke, R. Knöchel, T. Boltze, C. Hauenschild, W. Leschnik	1147
TH2C-4 11:20 am	Characterization of Planar Resonators by Means of Integrated Schottky Diodes A. Stiller, M. Singer, K.M. Strohm, E.M. Biebl	1151
TH2C-5 11:30 am	A High Performance MM-Wave Electron Spin Resonance Spectrometer G.M. Smith, J.C.G. Lesurf, R.H. Mitchell and P.C. Riedi	1677
TH2C-6 11:40 am	Calibrated Measurements of Nonlinearities in Narrowband Amplifiers Applied to Intermodulation and Cross Modulation Compensation T. Van den Broeck	1155
TH2C-7 11:50 am	A Miniature Magnetic Field Probe for Measuring Fields in Planar High-Frequency Circuits Y. Gao and I. Wolff	1159

Session TH2D

Lightwave Systems and Subsystems

10:30 a.m.–12:00 p.m. Room A3 Thursday, May 18, 1995

Chairman: H. Sobol—University of Texas at Arlington

TH2D-1	A Fiber-Optic Link Utilizing Subcarrier Transmission and Reception of Microwave Signals	1165
10:30 am	G.K. Gopalakrishnan, K.J. Williams, R.P. Moeller, W.K. Burns and R.D. Esman	
TH2D-2	Characterization of Fiber Optic Microwave Link with Monolithic Integrated Optoelectronic Upconverter	1169
10:50 am	Q.Z. Liu, R. Davies and R.I. MacDonald	
TH2D-3	Signal and Noise Analysis of External Modulation Fiber Optic Link with Optical Component and Arbitrary Lossless Matching Circuits	1173
11:00 am	E.I. Ackerman, J.L. Prince and J.A. MacDonald	
TH2D-4	Application of Semiconductor Optical Amplifiers to Microwave Signal Processing	1177
11:20 am	H. Ogawa, K. Horikawa, H. Kamitsuna, O. Kobayashi, Y. Imaizumi and I. Ogawa	
TH2D-5	Design of Clock Recovery MMIC Using Large-Signal Computer-Aided Analysis	1181
11:40 am	J.Y. Lin and A.S. Daryoush	

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Session TH2E

Field Theory Based CAD

10:30 a.m.–12:00 p.m. Room A4 Thursday, May 18, 1995

Chairman: I. Wolff—Duisburg University
Co-Chairman: S.M. Saad—Andrew Corporation

TH2E-1	Modelling of Passive Elements for Coplanar SiGe MMIC's	1187
10:30 am	R. Doerner, J. Gerdes, C. Rheinfelder, F.J. Schmückle, W. Heinrich, K. Strohm, F. Schäffler and J.-F. Luy	
TH2E-2	A Generalized Electromagnetic Optimization Procedure for the Design of Complex Interacting Structures in Hybrid and Monolithic Microwave Integrated Circuits	1191
10:50 am	M.A. Schamberger and A.K. Sharma	
TH2E-3	Elliptic Filter Rigorous Design and Modelling Applying the Finite Element Method	1195
11:00 am	D. Baillargeat, S. Verdeyme and P. Guillon	
TH2E-4	Electromagnetic Synthesis of Overlap-Gap-Coupled Microstrip Filters	1199
11:20 am	O. Fordham, M.-J. Tsai and N.G. Alexopoulos	
TH2E-5	An Alternative Way of Computing S-Parameters via Impulsive TLM Analysis Without Using Absorbing Boundary Conditions	1203
11:30 am	M. Righi, C. Eswarappa, W.J.R. Hoefer and P. Russer	
TH2E-6	Analysis of Waveguide Components Using H_0-Curl Hexahedral Edge Elements in MSC/EMAS	1207
11:40 am	J.F. DeFord and P. Saladin	
TH2E-7	Simulation of Multi-Chip Module Package Resonance Using Commercial Finite Element Electromagnetic Software	1211
11:50 am	R. Clark, A. Agrawal and S. Miller	

Session TH3A

(Joint with NTC)

Phased Array Antennas and Systems

1:30 p.m.–3:00 p.m.

Room A1

Thursday, May 18, 1995

Chairman: J. Bruder—GTRI/SEAL

TH3A-1	Active Phased Arrays for the Globalstar Satellite System	*
1:30 pm	M.H. Yam	
TH3A-2	High-Resolution Adaptive Nulling Performance for a Lightweight Agile EHF Multiple Beam Antenna	1217
1:50 pm	A.J. Fenn	
TH3A-3	Active Antenna Array with Optical Interaction for Application in Radar System	1221
2:10 pm	S.T. Chew, D.T.K. Tong, M.C. Wu and T. Itoh	
TH3A-4	A C-Band Beam-Forming Matrix for Phased-Array Antenna Applications	1225
2:30 pm	G. Estep, R. Gupta, T. Hampsch, M. Zaharovits, L. Pryor, C. Chen, A. Zaghloul and F. Assal	

Session TH3B

Nonlinear Transistor Modeling

1:30 p.m.–3:00 p.m.

Room A2

Thursday, May 18, 1995

Chairman: J.C.M. Hwang—Lehigh University

TH3B-1	A Heterojunction Bipolar Transistor Large-Signal Model for High Power Microwave Applications	1231
1:30 pm	A. Samelis and D. Pavlidis	
TH3B-2	A Novel Extraction Method for Accurate Determination of HBT Large-Signal Model Parameters	1235
1:50 pm	D.-W. Wu, M. Fukuda and Y.-H. Yun	
TH3B-3	Waveform Characterization of Microwave Power Heterojunction Bipolar Transistors	1239
2:10 pm	C.J. Wei, Y. Lan, J.C.M. Hwang, W.J. Ho and J.A. Higgins	
TH3B-4	A Vector Corrected Waveform and Load Line Measurement System for Large Signal Transistor Characterisation	1243
2:30 pm	J.G. Leckey, A.D. Patterson and J.A.C. Stewart	
TH3B-5	Modeling MESFETs for Intermodulation Analysis of Resistive FET Mixers	1247
2:40 pm	R.S. Virk and S.A. Maas	
TH3B-6	Resolving Capacitor Discrepancies Between Large and Small Signal FET Models	1251
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*Manuscript not available at time of printing.

Session TH3C

Non-Linear and Lossy Mechanisms in Guided Waves

1:30 p.m.–3:00 p.m.

Room 12A,B,C

Thursday, May 18, 1995

Chairman: M. Dydyk—Motorola

TH3C-1	Electron-Wave Interaction in Submicrometer Gate Field-Effect Transistors	1257
1:30 pm	M.A. AlSunaidi and S.M. El-Ghazaly	
TH3C-2	Finite Element Analysis of Microstrip Line on Ferroelectric (Ba-Sr)TiO₃ Substrate	1257
1:50 pm	Y.C. Sung, S. Choi and S. Nam	
TH3C-3	Full-Wave Nonlinear Analysis of Microwave Superconductor Devices: Application to Filters	1265
2:00 pm	M.A. Megahed and S.M. El-Ghazaly	
TH3C-4	Field Analysis and Design Criteria for T-Gate TW-FET's with Positive Gain	1269
2:20 pm	M. Farina, L. Pierantoni and T. Rozzi	
TH3C-5	Full-Wave Analysis of the Influence of Conductor Shape and Structure Details on Losses in Coplanar Waveguide	1273
2:30 pm	W. Schroeder and I. Wolff	
TH3C-6	Non-Perturbative Fullwave Analysis of Lossy Planar Circuits	1277
2:50 pm	S. Amari and J. Bornemann	

Session TH3D

Microwave-Optical Devices and Circuits

1:30 p.m.–3:00 p.m.

Room A3

Thursday, May 18, 1995

Chairman: A. Gopinath—University of Minnesota

TH3D-1	Demonstration of Photonically-Controlled GaAs Digital/MMIC for RF Optical Links	1283
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TH3D-2	Optical Control of MMIC Oscillators and Model Parameter Analysis of an Illuminated FET at the Ka- and V-Band	1287
1:50 pm	S. Kawasaki, M. Kimura, H. Shiomi, T. Wakabayashi, M. Funabashi and K. Ohata	
TH3D-3	Reduced Phase Noise in Microwave Oscillators Due to Optical Signal Injection	1291
2:00 pm	S.M. Genco and A.R. Mickelson	
TH3D-4	Dynamic Characterization of Optical-Microwave Transducers	1295
2:20 pm	T. Berceli, B. Cabon, A. Hilt, A.H. Quoc, É. Pic and S. Tedjini	
TH3D-5	Coherent Power Combining of Ultra-Wideband Pulsed Radiation in Free Space	1299
2:30 pm	E.E. Funk, S.E. Sadow, L.J. Jasper, Jr. and C.H. Lee	
TH3D-6	Microwave Phase Conjugation Using Antenna Coupled Nonlinear Optically Pumped Surfaces	1303
2:40 pm	Y. Chang, D.C. Scott and H.R. Fetterman	
TH3D-7	Real Frequency Method Applied to Broad-Band Laser Command Circuit Design with Lumped and Distributed Elements	1307
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Session TH3E

Frequency Conversion Circuits

1:30 p.m.–3:00 p.m.

Room A4

Thursday, May 18, 1995

Chairman: C. Buntschuh—Microwave Engineering Services

TH3E-1	Miniaturized Stripline Dual-Mode Ring Resonators and Their Application to Oscillating Devices	1313
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TH3E-2	High Efficiency Free Running Class F Oscillator	1317
1:50 pm	M. Prigent, M. Camiade, G. Pataut, D. Reffet, J.M. Nebus and J. Obregon	
TH3E-3	A K-Band Monolithic CPW Oscillator Co-Integrated with a Buffer Amplifier	1321
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2:50 pm	K.-E. Schmegner	

Session TH3F

Open Forum II

2:30 p.m.–5:00 p.m.

Hall A5

Thursday, May 18, 1995

Chairman: E. Rizzo, ECC International

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TH3F-A3	Monolithic Silicon Bolometers as Sensitive MM-Wave Detectors J.-W. Zhou, K. Farooqui, P.T. Timbie, G.W. Wilson, C.A. Allen, S.H. Moseley and D.B. Mott	1347
TH3F-A4	High Accuracy Digital Quadrature Demodulation R.J. Inkol, M. Herzig and R. Saper	1351
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TH3F-C3	Analysis of GaAs MESFET Spectrum Regeneration Driven by a $\pi/4$-DQPSK Modulated Source J.F. Sevic and M.B. Steer	1375
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TH3F-M1	Pulsed I-V and Temperature Measurement System for Characterisation of Microwave FETS	1523
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TH3F-M3	A Low-Loss 20 GHz Micromachined Bandpass Filter	1531
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TH3F-M4	A High Q Factor Microwave Cavity	1535
	R. Comte, S. Gendraud, S. Verdeyme, P. Guillon, C. Boschet and B. Theron	
TH3F-N1	A Miniaturized Dielectric Monoblock Duplexer Matched by the Buried Impedance Transforming Circuit	1539
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TH3F-N2	Micromachined Self-Packaged W-Band Bandpass Filters	1543
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3:30 p.m.–5:00 p.m. Room A2 Thursday, May 18, 1995

Room A2

Thursday, May 18, 1995

TH4B-1 3:30 pm	A New Large-Signal Model Based on Pulse Measurement Techniques for RF Power MOSFET J.M. Collantes, J.J. Raoux, J.P. Villotte, R. Quere, G. Montoriol and F. Dupis	1553
TH4B-2 3:50 pm	Empirical Modeling of Low-Frequency Dispersive Effects Due to Traps and Thermal Phenomena in III-V FETs F. Filicori, G. Vannini, A. Santarelli, A. Mediavilla, A. Tazon, and Y. Newport	1557
TH4B-3 4:10 pm	Enhancing the Linearity of Digital Communication Channels Using IQ Predistortion Based Upon an Inverse VIOMAP F. Verbyst and M. Vanden Bossche	*
TH4B-4 4:20 pm	Computer-Aided Noise Analysis of Integrated Microwave Front-Ends V. Rizzoli, D. Masotti and F. Matri	1561
TH4B-5 4:30 pm	Phase Noise Minimization of Microwave Oscillators by Optimal Design W. Anzill, O. von Stryk, R. Bulirsch and P. Russer	1565
TH4B-6 4:40 pm	Analysis of Chaotic Behaviour in Lumped-Distributed Circuits Applied to Practical Microwave Oscillators E.A. Hosny, A.A.A. Nasser and M.I. Sobhy	1569

Microwave Packaging and Interconnect Technology

Room 12A,B,C

Thursday, May 18, 1995

TH4C-1 3:30 pm	Aluminum Silicon Carbide for High Performance Microwave Packages J.L. Bugeau, K.M. Heitkamp and D. Kellerman	1575
TH4C-2 3:50 pm	A Study of Hermetic Transitions for Microwave Packages J.-G. Yook, N.I. Dib, E. Yasan and L.P.B. Katehi	1579
TH4C-3 4:10 pm	A Compact 8–14 GHz LTCC Stripline Coupler Network for High Efficiency Power Combining with Better than 82% Combining Efficiency J. Gippriich, L. Dickens, B. Hayes and F. Sacks	1583
TH4C-4 4:30 pm	3D FDTD Analysis of a SOT353 Package Containing a Bipolar Wideband Cascode Transistor Using the Compression Approach M. Rittweger, M. Werthen, J. Kunisch, I. Wolff, P. Chall, B. Balm and P. Lok	1587
TH3C-5 4:50 pm	Reducing the Effects of the Mounting Substrate on the Performance of GaAs MMIC Flip Chips R. Sturdivant	1591

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Session TH4D

High Power Sources and Control Components

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Room A3

Thursday, May 18, 1995

Chairman: J. Goel—TRW Space and Electronic Group

TH4D-1	94 GHz Power Amplifier Using PHEMT Technology	1597
3:30 pm	L. Marosi, M. Sholley, J. Goel, A. Faris, M. Siddiqui, D.I. Stones and K. Tan	
TH4D-2	22-KW Next Generation Low Cost S-Band Solid State Transmitter for Surveillance and Air Traffic Control Radars	1601
3:50 pm	M. Kumar, M. Hanczor, H. Voigt, G. Cambigianis, R. Sachs and C. Bonilla	
TH4D-3	400W X-Band GaAs MMIC CW Amplifier	1605
4:10 pm	M. Knox, R. Youmans, M. Kumar, L. Forker, H. Voigt, P. Brand, F. Marcotte and A.S. Hughes	
TH4D-4	High Power Amplifier Harmonic Output Level Measurement	1609
4:30 pm	R.M. Perez, D.J. Hoppe and A.R. Khan	
TH4D-5	TE₁₁ to TM₁₁ Compact Mode Converter for Circular Waveguide	1613
4:50 pm	T.U. Haq, K.J. Webb and N.C. Gallagher	

Session TH4E

Transmission Line, Amplifiers and Control Devices

3:30 p.m.–5:00 p.m.

Room A4

Thursday, May 18, 1995

Chairman: J.A. Pierro—AIL Systems

TH4E-1	An MMIC Low-Distortion Variable-Gain Amplifier Using Active Feedback	1619
3:30 pm	K. Nishikawa and T. Tokumitsu	
TH4E-2	A Miniaturized Ka-Band MMIC High-Gain Medium Power Amplifier in Coplanar Line Technique by Using a Conventional 0.5 μm MESFET Technology	1623
3:50 pm	Y. Kalayci, R. Tempel, W. Lütke, M. Akpınar and I. Wolff	
TH4E-3	Broadband, Low-Loss 5- and 6-BIT Digital Attenuators	1627
4:00 pm	D. Krafcsik, F. Ali and S. Bishop	
TH4E-4	77 GHz Monolithic MMIC Schottky- and PIN-Diode Switches Based on GaAs MESFET and Silicon SIMMWIC Technology	1631
4:10 pm	A. Klaassen and J.-M. Dieudonné	
TH4E-5	Design Methodology, Measurement and Application of MMIC Transmission Line Transformers	1635
4:20 pm	M. Engels, R.H. Jansen, W. Daumann, R.M. Bertenburg and F.J. Tegude	
TH4E-6	51 GHz Frontend with Flip Chip and Wire Bond Interconnections from GaAs MMICs to a Planar Patch Antenna	1639
4:30 am	G. Baumann, H. Richter, A. Baumgärtner, D. Ferling, R. Heilig, D. Hollman, H. Müller, H. Nechansky and M. Schlechtweg	
TH4E-7	An Inverted Microstrip Line IC Structure for Ultra High-Speed Applications	1643
4:40 pm	S. Yamaguchi, Y. Imai, T. Shibata, T. Otsuji, M. Hirano and E. Sano	

