

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	TU
8:30 am	J.D. Adam, H. Buhay, M.R. Daniel, M.C. Driver, G.W. Eldridge, M.H. Hanes and R.L. Messham		1C
TU1E-2	Normal-Mode Analysis of Coupled-Slots with an Axially-Magnetized Ferrite Substrate	99	TU
8:50 am	C.S. Teoh and L.E. Davis		1D
TU1E-3	A Latching Ferrite Rotary-Field Phase Shifter	103	TU
9:10 am	C.R. Boyd, Jr.		1E
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	TU
9:40 am	T. Kuki and T. Nomoto		2G



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. Pusi, B. Agarwal, R. Pullala, 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. Chandrashekhara and L.M. Lunardi	
TU3C-3	Travelling-Wave Optoelectronic Devices for Microwave Applications	163
2:30 pm	D. Jäger, R. Kremer and A. Stöhr	

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	
TU3D-4	High Density Microwave Packaging for T/R Modules	181
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
1:30 pm	K.F. Raihn, N.O. Fenzi, E.R. Soares and G.L. Matthaei		3B
TU3E-2	High-Temperature Superconducting Microstrip Filters with High Power-Handling Capability	191	TU
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		3C
TU3E-3	Miniature Circulators for Microwave Superconducting Systems	195	TU
2:00 pm	A. Fathy, E. Denlinger, D. Kalokitis, V. Pendrick, H. Johnson, A. Pique, K.S. Harshavardhan and E. Belohoubek		3D
TU3E-4	Frequency Agile Superconducting Thin-Film (FAST TM) Filter	*	TU
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. Cuchiario		3E
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
3:30 pm	K.W. Kobayashi, A.K. Oki, L. Tran and D.C. Streit	
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	
TU4A-4	A Monolithic Integrated HEMT Frontend in CPW Technology from 10-50 GHz for Measurement Systems or Broadband Receivers	211
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
3:30 pm	J. Cina and L. Carin	
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

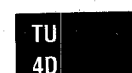
3:30 p.m.–5:00 p.m.

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	
TU4E-4	Monopoles for Microwave Catheter Ablation of Heart Tissue	303
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
4:50 pm	C. Michel, L. Dubois, P.-Y. Cresson, M. Chive and J. Pribetich	

Session WE1A

Microwave Power Devices and Amplifiers I

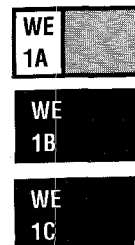
8:30 a.m.–10:00 a.m.

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. Gippich, 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
9:10 am	P. Ciampolini, P. Mezzanotte, L. Roselli, D. Sereni, R. Sorrentino and P. Torti	
WE1B-5	Modelling of General Constitutive Relationships in SCN TLM	365
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
8:30 am	D. Zhang, G.-C. Liang, C.F. Shih and R.S. Withers	
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
9:10 am	F. Mernyei, I. Aoki and H. Matsuura	
WE1C-4	A Miniaturized Ceramic Bandpass Filter for Cordless Phone Systems	391
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

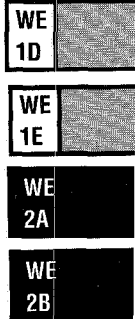
10:30 a.m.–12:00 p.m.

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
10:50 am	R. Actis, K.B. Nichols, W.F. Kopp, T.J. Rogers and F.W. Smith	
WE2A-3	Robust GaAs MMIC Amplifiers Using Planar Ion-Implanted Power MESFETs with Improved Open-Channel Burnout	449
11:10 am	D.C. Miller, R.A. Sadler and A.H. Peake	
WE2A-4	GaAs/InGaAs Heterostructure FETs with 1.6W Output Power at 1GHz	453
11:20 am	J.W. Lee, M.K. Gong, S.G. Cho and B. Kim	
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 HBT's	461
11:40 am	R. Hattori, T. Shimura, M. Kato, T. Sonoda and S. Takamiya	
WE2A-7	High Performance Millimeter Wave AlInAs/GaInAs/InP HEMTs with Individually Grounded Source Finger Vias	465
11:50 am	K.Y. Hur, R.A. McTaggart, M.P. Ventresca, R. Wohlert, 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

WE2B-1	An Entire-Domain Basis Galerkin's Method for the Modeling of Integrated MM-Wave and Optical Circuits	471
10:30 am	G. Athanasoulis and N.K. Uzunoglu	
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
10:30 am	R. Levy	
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	
11:40 am	Evanescence-Mode Waveguide Filters	513
	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	
11:30 am	Transistors for Low Power Wireless Applications	531
	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	
10:50 am	Millimeter-Wave Oscillators	545
	M. Curow	
WE2E-3	A Ka-Band Planar Tripler Based on a Stacked Symmetric InP Heterostructure-Barrier	
11:10 am	Varactor	549
	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	
WE2E-5	Absolute Loss Measurement of Highly Reflective Samples by Using a High Q Gaussian Beam	
11:40 am	Open Resonator at Short Millimeter Wave Frequencies	557
	T. Matsui, M. Kiyokawa and K. Araki	

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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
1:30 pm	M. Versleijen, R. Dekker, W.v.d. Einde and A. Pruijmboom	
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	
WE3A-3	A 3.3V, 1.4W GaAs Power Amplifier for CDMA/AMPS Dual-Mode Cellular Phone	571
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
2:30 pm	T. Kunii, Y. Kohno, T. Kitano, S. Miyakuni, J. Udomoto, K. Yamamoto, K. Maemura, H. Takano, O. Ishihara and N. Tsubouchi	
WE3A-5	A High Power and High Efficiency Amplifier with Controlled Second-Harmonic Source	
2:40 pm	Impedance	579
	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
1:30 pm	P.J. Tasker and J. Braunstein	
WE3C-2	An Improved GaAs MESFET Model for the Pulsed I-V Measurement	615
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	
WE3C-5	A Novel Algorithm for Bias-Dependent Cascode FET Modeling	627
2:20 pm	P.B. Winson, L.P. Dunleavy, H.C. Gordon, Jr., M.V. Calvo and J. Sherman	
WE3C-6	Small-Signal Equivalent Circuit Scaling Properties of AlGaAs/GaAs HBTs	631
2:40 pm	D.-W. Wu, M. Fukuda, Y.-H. Yun and D.L. Miller	

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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WE3D-2	Slow-Wave Phenomena and Pulse Distortions in Optically Excited Schottky-Contacted Coplanar Waveguide	641
1:50 pm	A.S. Rong, S.M. Goodnick, V.K. Tripathi, H.X. Wang, Z.L. Sun and W.B. Dou	
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WE3D-4	Full Wave Analysis of Microstrip Filters Containing Dielectric and Metallic Resonators with the Method of Lines	649
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WE3D-6	A Novel Leaky-Mode Cylindrical Dielectric Resonator Used as Feeds of Omnidirectional Antenna for Wireless Communications	657
2:40 pm	T. Wang, H. An, K. Wu, J.-J. Laurin and R.G. Bosisio	

Session WE3E

Passive Planar Components

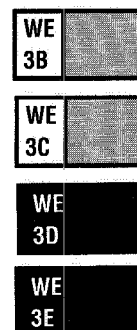
1:30 p.m.—3:00 p.m.

Room A4

Wednesday, May 17, 1995

Chairman: J. Taub—Consultant

WE3E-1	MMIC Wilkinson Couplers for Frequencies up to 110 GHz	663
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WE3E-3	A Broadband, High Directivity 3 DB Coupler Using Coplanar Waveguide Technology	671
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WE3E-5	Quasi Static Analysis of Microstrip Bondwire Interconnects	679
2:20 pm	F. Alimenti, U. Goebel and R. Sorrentino	
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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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	J.K.A. Everard and M. Page-Jones	
WE3F-A3	Comparison of the Phase Noise Performance of HEMT and HBT Based Oscillators	697
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WE3F-B4	Comprehensive Experimental Investigation of Gate Current Limitation Effects on Power GaAs FETs RF Performances	717
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WE3F-L3	Field Theory Analysis of Distributed Microwave Effects in High Speed Semiconductor Lasers and Their Interconnection with Passive Microwave Transmission Lines	861
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	A.H. Baree, I.D. Robertson and J.S. Bharj	
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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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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	
WE4A-4	A New Balanced-Type RF-Band SAW Filter Using SAW Resonators	891
4:20 pm	Y. Taguchi, S. Seki, K. Onishi and K. Eda	
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

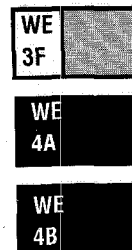
3:30 p.m.–5:00 p.m.

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	
WE4B-4	Demonstration of an Oscillating Quasi-Optical Slab Power Combiner	917
4:20 pm	F. Poegel, S. Irrgang, S. Zeisberg, A. Schuenemann, G.P. Monahan, H. Hwang, M.B. Steer, J.W. Mink, F.K. Schwering, A. Paolletta and J. Harvey	
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
3:30 pm	P. Nevermann and I. Wolff	
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. Szydluk 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
3:30 pm	R. Flynt, L. Fan, J. Navarro and K. Chang	
WE4D-2	A Novel Uniplanar Bi-Phase(0°–180°) Modulator/Mixer	957
3:50 pm	K. Hettak, E. Rius, J.Ph. Coupez, S. Toutain, P. Legaud and E. Penard	
WE4D-3	A Miniature 17/12 GHz MMIC Receiver for Satellite Communication	961
4:00 pm	C. Yuen, E. Quiles, J.J. McFarland, M. Yung, R. Klibo, W. Findley	
WE4D-4	Coded 24 GHz Doppler Radar Sensors: A New Approach to High-Precision Vehicle Position and Ground-Speed Sensing in Railway and Automobile Applications	965
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
4:30 pm	N. Kees, E. Schmidhammer, J. Detlefsen	
WE4D-6	A Test Target Generator for Wideband Pulsed Doppler Radars	973
4:40 pm	P. Phu, E. Adler, R. Innocenti and A. Paoletta	

Session WE4E

Passive Waveguide Components

3:30 p.m.–5:00 p.m. Room A4 Wednesday, May 17, 1995

Chairman: E.J. Denlinger—David Sarnoff Research Center

WE4E-1	Modeling Generalized Coaxial Probes in Rectangular Waveguides	979
3:30 pm	H.-W. Yao and K.A. Zaki	
WE4E-2	Analysis and Design of Wide-Band Matched Waveguide Bends Including Discontinuities	983
3:50 pm	M. Mongiardo, A. Morini and T. Rozzi	
WE4E-3	Rigorous Analysis of Compensated E-Plane Junctions in Rectangular Waveguide	987
4:10 pm	F. Alessandri, M. Dionigi and R. Sorrentino	
WE4E-4	Field Theoretical Characterization of Microwave Cavities	991
4:30 pm	S. Xiao, R. Vahldieck and M. Guglielmi	
WE4E-5	Filter-Like Design and Optimization of NRD-Guide Mode Suppressors	995
4:40 pm	J. Huang, K. Wu, F. Kuroki and T. Yoneyama	

Session TH1B

Digital Signal Processing

8:30 a.m.–10:00 a.m. Room A2 Thursday, May 18, 1995

Chairman: J. Tsui—Wright Laboratory

TH1B-1	2.8 GBIT/S Optical Interconnection Circuit Using d8b1c/d8b1m Coding Scheme	1003
8:30 am	Y. Uematsu, K. Murata, Y. Yamabayashi and Y. Kobayashi	
TH1B-2	A New Direct Digital Receiver Performing Coherent PSK Reception	1007
8:50 am	J. Li, R.G. Bosisio and K. Wu	
TH1B-3	A GaAs Integrated Circuit for Wideband Digital Quadrature Demodulation	1011
9:00 am	R.J. Inkol, V. Szwarc, L. Desormeaux, M. Esonu and D. Al-Khalili	
TH1B-4	A Spectral Estimation Technique to Improve the Efficiency of FDTD Method for Narrow-Band Microwave Circuits	1015
9:10 am	X.P. Lin and K. Naishadham	
TH1B-5	A Generalized Optimal Signal Processing Algorithm for Frequency-Stepped CW Data	1019
9:30 am	S.M. Wu, G.A. Ybarra and W.E. Alexander	
TH1B-6	A Microwave Model for Moisture Determination in Bulk Materials and a Maximum Likelihood Estimation Algorithm	1023
9:50 am	T. Boltze	

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	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	1029
8:30 am	J. Verspecht, P. Debie, A. Barel and L. Martens	
TH1C-2	Fully Integrated Nonlinear Modeling and Characterization System of Microwave Transistors with On-Wafer Pulsed Measurements	1033
8:50 am	J.P. Teyssier, J.P. Viaud, J.J. Raoux and R. Quéré	
TH1C-3	A Novel Computerized Multiharmonic Active Load-Pull System for the Optimization of High Efficiency Operating Classes in Power Transistors	1037
9:00 am	F. Blache, J.M. Nebus, Ph. Bouysse and J.P. Villotte	
TH1C-4	A 0.5–50 GHz On-Wafer, Intermodulation, Load-Pull and Power Measurement System	1041
9:20 am	M. Demmler, B. Hughes and A. Cognata	
TH1C-5	On-Wafer Calibration Techniques for Measurement of Microwave Circuits and Devices on Thin Substrates	1045
9:30 am	J. Plá, W. Struble and F. Colomb	
TH1C-6	2D Electro-Optic Probing Combined with Field Theory Based Multimode Wave Amplitude Extraction: A New Approach to On-Wafer Measurement	1049
9:40 am	G. David, W. Schroeder, D. Jäger and I. Wolff	
TH1C-7	High-Frequency On-Wafer Testing with Freely Positionable Silicon-On-Sapphire Photoconductive Probes	1053
9:50 am	T. Pfeifer, H.-M. Heiliger, E. Stein von Kamienski, H.G. Roskos and H. Kurz	

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

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



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

*Manuscript not available at time of printing.

Session TH2B

Low Noise Receivers

10:30 a.m.–12:00 p.m.

Room A2

Thursday, May 18, 1995

Chairman: J. Whelehan—AIL Systems, Incorporated

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

Session TH2C

Microwave Measurements

10:30 a.m.–12:00 p.m.

Room 12A,B,C

Thursday, May 18, 1995

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

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

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
2:50 pm	M.V. Calvo, A.D. Snider and L.P. Dunleavy	

*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
1:30 pm	A. Brunel, S.-L.G. Chu, S.E. Davis, A. Kelsey, M. O'Connell, J.A. Ruiz, R.C. Sharp, I.W. Smith and K. Tabatabaie-Alavi	
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
2:50 pm	D. Le Berre, A. Perennec, N. Julien, S. Toutain, R. Lefevre, D. Lemaillet and R. Soares	



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
1:30 pm	H. Yabuki, M. Matsuo, M. Sagawa and M. Makimoto	
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
2:10 pm	K. Maruhashi, M. Madihian, L. Desclos, K. Onda and M. Kuzuhara	
TH3E-4	A MIC X7 DHB T Frequency Multiplier with Low Spurious Harmonics	1325
2:20 pm	D.F. Filipovic	
TH3E-5	Novel Design Topology for Ultra Low Power Down Converters with Broadband on Chip Matching Network	1329
2:30 pm	M.L. Schmatz	
TH3E-6	A Single Chip Monolithic Integrated S-Band Frequency Discriminator	1333
2:50 pm	K.-E. Schmegner	

Session TH3F

Open Forum II

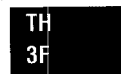
2:30 p.m.–5:00 p.m.

Hall A5

Thursday, May 18, 1995

Chairman: E. Rizzo, ECC International

TH3F-A1	Temperature Dependent Functional Small-Signal and Noise Model of GaAs FET Z. Nosal	1339
TH3F-A2	The Hot-Electron Microbolometer as an Ultrasensitive Detector for Millimeter Wavelengths K. Farooqui, P.T. Timbie, G.W. Wilson, J.-W. Zhou and M. Nahum	1343
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
TH3F-B1	Rigorous Mode-Matching Method for the Modal Analysis of the T-Junction Circular to Sidecoupled Rectangular Waveguide P. Krauss and F. Arndt	1355
TH3F-B2	Modal Analysis of Arbitrarily Shaped Irises in Waveguides by a Hybrid Contour-Integral Mode-Matching Method F. Giese, J.M. Reiter and F. Arndt	1359
TH3F-B3	Coupling Characteristics Between Dielectric Disk and Ring Located in an Eccentric Configuration Q. Han, Y. Kogami, Y. Tomabechi and K. Matsumura	1363
TH3F-B4	Multilayer Aperture-Coupled Broadside Microstrip Lines S. Kunasani and C. Nguyen	1367
TH3F-C1	Composite Fan-Shaped SAW Transducers E.V. Bausk and I.B. Yakovkin	1681
TH3F-C2	Analysis of End Effects in SAW IDTs using the Finite Difference Method D. Jatkar and B. Beker	1371
TH3F-C3	Analysis of GaAs MESFET Spectrum Regeneration Driven by a $\pi/4$-DQPSK Modulated Source J.F. Sevic and M.B. Steer	1375
TH3F-C4	Combined Monte Carlo Simulation and Ray Tracing Method of Indoor Radio Propagation Channel T. Schöberl	1379
TH3F-D1	Self-Consistent Multi-Mode Time Domain Analysis of Gyrotrons A. Jöstingmeier, C. Rieckmann and A.S. Omar	1383
TH3F-D2	Micromachined Conformal Packages for Microwave and Millimeter-Wave Applications R.F. Drayton and L.P.B. Katehi	1387
TH3F-D3	An Advanced Co-Channel Operation Method for Multiple Wireless Gate K. Konno, T. Kojima and Y. Iitsuka	1391
TH3F-D4	A Novel Clock Extraction Circuit Using a New NRZ-to-PRZ Converter and a Dielectric Resonator Filter for 10Gbit/s Optical Receiver T.W. Yoo, J.H. Song, M.S. Park and C.S. Shim	1395
TH3F-E1	Uniplanar De Ronde's CPW-Slot Directional Couplers C.-H. Ho, L. Fan and K. Chang	1399
TH3F-E2	Active Low Noise Transition from Rectangular Waveguide to Microstrip Line W. Grabherr and W. Menzel	1403



TH3F-E3	Investigation of Coupling Structures for Coplanar Bandpass Filters	1407
	W. Menzel, W. Schwab and G. Strauss	
TH3F-E4	A Novel Single Device Balanced Resistive HEMT Mixer	1411
	K. Yhland, N. Rorsman and H. Zirath	
TH3F-F1	New Simple Procedure for the Computation of the Multimode Admittance Matrix of Arbitrary Waveguide Junctions	1415
	A. Alvarez and M. Guglielmi	
TH3F-F2	Stability Diagnosis of Microwave Recursive Structures Using the NDF Methodology	1419
	L. Billonnet, B. Jarry, P. Guillon	
TH3F-F3	On the Optimum Design of Microwave Active Frequency Doublers	1423
	P. Colantonio, F. Giannini, G. Leuzzi and E. Limiti	
TH3F-F4	Adaptive Frequency Sampling Algorithm for Fast and Accurate S-Parameter Modeling of General Planar Structures	1427
	T. Dhaene, J. Ureel, N. Faché and D. De Zutter	
TH3F-G1	Low-Frequency Noise in Millimeter-Wave Si/SiGe Heterojunction Bipolar Transistors	1431
	R. Plana, B. Van Haaren, J.P. Roux, L. Escotte, A. Gruhle, H. Dietrich and J. Graffeuil	
TH3F-G2	Order Recursive Gaussian Elimination and Efficient CAD of Microwave Circuits	1435
	K. Naishadham and P. Misra	
TH3F-G3	Model for a Novel CPW Phase Shifter	1439
	C.M. Jackson, T. Pham, Z. Zhang, A. Lee, C. Pettiette-Hall	
TH3F-G4	Cost-Driven Physics-Based Large-Signal Simultaneous Device and Circuit Design	1443
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Session TH4B

Nonlinear Devices and Circuits

3:30 p.m.–5:00 p.m.

Room A2

Thursday, May 18, 1995

Chairman: J.W. Bandler—Optimization Systems Associates Incorporated

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

Session TH4C

Microwave Packaging and Interconnect Technology

3:30 p.m.–5:00 p.m.

Room 12A,B,C

Thursday, May 18, 1995

Chairman: T. Kemerley—USAF—Wright Laboratory

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. Gipprich, 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

3:30 p.m.–5:00 p.m.

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	TE ₁₁ to TM ₁₁ 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 μ m 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	

