

Session CC

Advances in FET Amplifiers Convention Center, Terrace Theater

8:30 a.m. to 10:00 a.m.

Thursday, June 15, 1989

Chairman: Richard Van Wagoner—Department of Defense

CC-1 8:40 a.m.	Performance of a 2–18 GHz Ultra Low-Noise Amplifier Module K. B. Niclas and R. R. Pereira Watkins-Johnson Co Palo Alto, CA	841
CC-2 9:00 a.m.	A Balanced Cascade 26–40 GHz Amplifier D. M. F. McCann Marconi Electronic Devices Ltd Lincoln, England	845
CC-3 9:10 a.m.	A 1 to 40 GHz MESFET Hybrid Distributed Amplifier H. Brouzes, G. Deredec and Y. W. Bender Thomson-CSF Malakoff, France	849
CC-4 9:30 a.m.	A Cryogenic 43-GHz-Band Low-Noise Amplifier for Radio Astronomy T. Saito, Y. Oohashi, H. Kurihara and Y. Hirachi Fujitsu Laboratories, Kawasaki, Japan T. Kasuga and K. Miyazawa Nobeyama Radio Observatory National Astronomical Observatory Minamimaki-mura, Japan	853
CC-5 9:50 a.m.	High-Efficiency Power Amplification for Microwave and Millimeter Frequencies W. S. Kopp and S. D. Pritchett Texas Instruments Dallas, TX	857

Session DD (Focused Session)

High-Power Microwave Convention Center, California Room

8:30 a.m. to 10:00 a.m.

Thursday, June 15, 1989

Chairman: Jitendra Goel—TRW/ESG

DD-1 8:30 a.m.	Operation of Solid State Power Amplifiers at Cryogenic Temperatures (Invited) J. H. Johnson P. D'Anna Microwave Modules & Devices	861
DD-2 8:40 a.m.	Power Amplifier Linearization Using If Feedback K. G. Voyce and J. H. McCandless Boeing Electronics Co Seattle, WA	863
DD-3 8:50 a.m.	A Production 30 KW L-Band Solid-State Transmitter S. Bird and M. Reinhart Westinghouse ESG Baltimore, MD	867
DD-4 9:10 a.m.	Progress in the Development of Gyroklystrons Producing High Energy Microwave Pulses (20–200J) (Invited) V. L. Granatstein, W. Lawson, P. E. Latham, D. Welsh, J. Calame, Y. Carmel, C. D. Striffler, and M. Reiser University of Maryland College Park, MD A. Mondelli and D. Chernin Science Appl.Int'l, VA (Paper not available at the time of printing)	
DD-5 9:20 a.m.	The Sophisticated Properties of the Microwave Oven Magnetron W. C. Brown Consultant, Microwave Power Transmission Systems Weston, MA	871
DD-6 9:30 a.m.	High-Power Microwave Diagnostic System Based on Compact, Single-Unit, Radiate-And-Receive Devices T. A. Treado*, R. S. Smith III*, W. O. Doggett, and D. J. Jenkins* North Carolina State University Raleigh *Varian Beverly Microwave Division Beverly, MA	875
DD-7 9:40 a.m.	Microstrip Plasma Limiter S. D. Patel*, L. Dubrowsky*, S. E. Saddow**, R. Kaul**, and R. V. Garver** *Westinghouse ESG Baltimore, MD **Harry Diamond Labs Adelphi, MD	879

Session EE

Microwave Measurements Convention Center, Center Theater

8:30 a.m. to 10:00 a.m.

Thursday, June 15, 1989

Chairman: Stephen F. Adam—Adam Microwave Consulting

EE-1 8:30 a.m.	Measurement of Memory Effects in Predistortion Linearizers W. Boesch and G. Gatti RF Systems Division ESA/ESTEC, Noordwijk, The Netherlands	885
EE-2 8:50 a.m.	Picosecond Optoelectronic Characterization of a Heterojunction Bipolar Transistor M. Matloubian and H. Fetterman Dept. of Electrical Engineering University of California, Los Angeles M. Kim, A. Oki and J. Camou TRW, Inc. Redondo Beach, CA S. Moss, D. Smith and J. Knudsen The Aerospace Corporation Los Angeles, CA	889
EE-3 9:10 a.m.	Noise Characterization Uncertainty of Microwave Devices Under Low Current Operation R. Lucero, C. Moyer, R. Vaitkus, and M. Dydyk Motorola Phoenix Corporate Research Laboratories Tempe, AZ	893
EE-4 9:20 a.m.	A Parameter Extraction Technique for Heterojunction Bipolar Transistors R. J. Trew, U. K. Mishra and W. L. Pribble North Carolina State University Raleigh, NC J. F. Jensen Hughes Research Laboratories Malibu, CA	897
EE-5 9:30 a.m.	Advances in NIST Dielectric Measurement Capability Using a Mode-Filtered Cylindrical Cavity E. J. Vanzura and W. A. Kissick National Institute of Standards and Technology Boulder CO	901
EE-6 9:40 a.m.	Microstrip Noncontacting Thickness Monitor R. B. Hurley, I. Kaufman and R. P. Roy Arizona State University Tempe, AZ	905

Session FF

Losses in Guided-Wave Structures Convention Center, Pacific Room

8:30 a.m. to 10:00 a.m.

Thursday, June 15, 1989

Chairman: Arvind K. Sharma—TRW/ESG

FF-1 8:30 a.m.	Full-Wave Analysis of Conductor Losses on MMIC Transmission Lines W. Heinrich Technische Hochschule Darmstadt Darmstadt, West Germany	911
FF-2 8:40 a.m.	Channelized Coplanar Waveguide: Discontinuities, Junctions, and Propagation Characteristics R. N. Simons, G. E. Ponchak, K. S. Martzaklis and R. R. Romanofsky NASA Lewis Research Center Cleveland, OH	915
FF-3 9:00 a.m.	High Frequency Conductor and Dielectric Losses in Shielded Microstrip T. E. van Deventer*, P. B. Katehi*, and A. C. Cangellaris** *Radiation Laboratory University of Michigan Ann Arbor, MI **Electrical and Computer Engineering Department University of Arizona Tucson, AZ	919
FF-4 9:20 a.m.	Analysis of the "Microstrip Loaded Inset Dielectric Waveguide" T. Rozzi, R. De Leo, and A. Morini Dipartimento di Elettronica ed Automatica University of Ancona Italy	923
FF-5 9:30 a.m.	Complex Guidance Properties of the Slitted Asymmetric Ridge Waveguide F. Frezza*, M. Guglielmi** and P. Lampariello* *University of Rome Rome, Italy **New Jersey Institute of Technology Newark, NJ	927

Session GG

Power FET Amplifiers Convention Center, Terrace Theater

10:30 a.m. to 12:00 noon

Thursday, June 15, 1989

Chairman: Karl B. Niclas—Watkins-Johnson Company

GG-1 10:30 a.m.	A 12-Watt 20 GHz GaAs FET Power Amplifier R. Auricchio and R. A. Rhodes Hughes Aircraft Co. El Segundo, CA D. S. Day Avantek, Inc. Santa Clara, CA	933
GG-2 10:50 a.m.	Broadband Power Amplifiers Based on a New Monolithic Ceramic Technology F. N. Sechi and M. Bujatti Microwave Power, Inc. Santa Clara, CA	937
GG-3 11:10 a.m.	Design Technique for High Power, High Efficiency, Broadband Distributed Amplifiers J. B. Cole and A. Platzker Raytheon Co. Research Division Lexington, MA	941
GG-4 11:30 a.m.	Monolithic High-Voltage FET Power Amplifiers K. E. Peterson, H-L. Hung, F. R. Phelepps, T. F. Noble and H. C. Huang COMSAT Laboratories Clarksburg, MD	945
GG-5 11:40 a.m.	A Technique for the Maintenance of FET Power Amplifier Efficiency Under Backoff B. D. Geller, F. T. Assal, R. K. Gupta and P. K. Cline COMSAT Lab. Clarksburg, MD	949

Session HH

Microwave Integrated Circuits—I Convention Center, California Room

10:30 a.m. to 12:00 noon

Thursday, June 15, 1989

Chairman: Harlan Howe, Jr.—Adams-Russell

HH-1	Lossless, Broadband Monolithic Microwave Active Inductors	955
10:40 a.m.	S. Hara, T. Tokumitsu and M. Aikawa ATR Optical and Radio Communication Research Laboratories Kyoto, Japan	
HH-2	A 2–18 GHz 180 Degree Phase Splitter Network	959
11:00 a.m.	S. S. Bharj, S. P. Tan and B. Thompson Anadigics, Inc. Warren, NJ	
HH-3	Very Small, Ultra-Wideband MMIC Magic-T and Applications to Combiners and Dividers	963
11:20 a.m.	T. Tokumitsu, S. Hara and M. Aikawa ATR Optical and Radio Communications Research Laboratories Kyoto, Japan	
HH-4	A New Coplanar Waveguide/Slotline Double-Balanced Mixer	967
11:30 a.m.	D. Cahana AVANTEK, Inc. Milpitas, CA	
HH-5	Recrystallized Silicon-On-Alumina as a Monolithic Circuit Technology	969
11:50 a.m.	T. J. Letavic, S. Wu, E. W. Maby, and R. J. Gutmann Dept. of Electrical, Computer and Systems Engineering Rensselaer Polytechnic Institute Troy, NY	

Session II

HEMT Technology

Convention Center, Center Theater

10:30 a.m. to 12:00 noon

Thursday, June 15, 1989

Chairman: Ronald L. Carter—University of Texas at Arlington

II-1 10:40 a.m.	Ultra-Low-Noise Millimeter-Wave Pseudomorphic HEMTs R. E. Lee and R. S. Beaubien Linear Monolithics, Inc. Westlake Village, CA R. H. Norton and J. W. Bacon Varian Research Center Palo Alto, CA	975
II-2 11:00 a.m.	Low-Noise InGaAs HEMT Using the New Off-Set Recess Gate Process O. Ishikawa, K. Nishii, T. Matsuno, C. Azuma, Y. Ikeda, S. Nanbu, and K. Inoue Semiconductor Research Center Matsushita Electric Industrial Co. Ltd. Osaka, Japan	979
II-3 11:10 a.m.	A 0.15 μm Gate Length Pseudomorphic HEMT P. M. Smith, M. Y. Kao, P. Ho, P. C. Chao, K. H. G. Duh, A. A. Jabra, R. P. Smith, and J. M. Ballingall General Electric Co. Syracuse, NY	983
II-4 11:30 a.m.	44 GHz Hybrid HEMT Power Amplifiers D. W. Ferguson, P. M. Smith, P. C. Chao, L. F. Lester, R. P. Smith, P. Ho, A. Jabra and J. M. Ballingall GE Aerospace Syracuse, NY	987
II-5 11:40 a.m.	Theoretical Comparison of 0.35 μm Gate Length GaAs and GaInAs HEMTs D. H. Park and K. F. Brennan School of Electrical Engineering Georgia Institute of Technology Atlanta, GA	991

Session JJ

The Time Domain and Electromagnetics Convention Center, Pacific Room

10:30 a.m. to 12:00 noon

Thursday, June 15, 1989

Chairman: James C. Rautio—Sonnet Software

JJ-1 10:40 a.m.	Time-Domain Method of Lines Applied to the Uniform Microstrip Line and its Step Discontinuity S. Nam, H. Ling and T. Itoh University of Texas Austin, TX	997
JJ-2 11:00 a.m.	Distortion of Transient Signals on Multilayer Coupled Symmetric Microstrip Transmission Lines J. P. Gilb and C. A. Balanis Arizona State University Tempe, AZ	1001
JJ-3 11:20 a.m.	Analysis of Coplanar Waveguide by Time-Domain Finite Difference Method G.C. Liang, Y.W. Liu, and K.K. Mei Dept. of Electrical Engineering, Computer Sciences and the Electronics Research Laboratory Univ. of California Berkeley, CA	1005
JJ-4 11:40 a.m.	Analysis of Microstrip Discontinuities Using the Finite Difference Time Domain Technique C. J. Railton and J. P. McGeehan Dept. of Electrical Engineering University of Bristol, UK	1009
JJ-5 11:50 a.m.	Accurate Calculation of the Capacitance Matrix of a Multiconductor Transmission Line in a Multilayered Dielectric Medium W. Delbare, and D. De Zutter Lab of Electromagnetism and Acoustics University of Ghent Ghent, Belgium	1013

Session KK

FET Devices and Applications Convention Center, Terrace Theater

2:00 p.m. to 3:30 p.m.

Thursday, June 15, 1989

Chairman: Joseph A. Calviello—Eaton Corporation/AIL

KK-1 2:05 p.m.	The Effects of P Co-Implants Upon the RF Performance of Ion-Implanted GaAs Power FETs T. A. Winslow and R. J. Trew North Carolina State University Raleigh, NC I. J. Bahl, A. E. Geissberger and M. L. Balzan ITT, GTC Roanoke, VA	1019
KK-2 2:25 p.m.	A True Off-Set Self-Aligned Process for High-Efficiency Ku-Band Power FETS K. Wakamoto, K. Imura, M. Yamamoto, S. Shimoyama, T. Kameyama, M. Isomae, Y. Okubo, M. Ohoka and T. Nagashima Nippon Mining Co. Toda, Saitama, Japan D. A. Figueredo, L. H. McCarty, C-Y. Su, M. Yam and S. Kakihana Menlo Industries, Inc. Fremont, CA	1023
KK-3 2:45 p.m.	Zero Bias GaInAs MISFET Mixers K. W. Chang, B. R. Epstein, E. J. Denlinger and P. D. Gardner David Sarnoff Research Center Princeton, NJ	1027
KK-4 3:05 p.m.	A Practical Distributed FET Mixer for MMIC Applications I. D. Robertson and A. H. Aghvami University of London, King's College London, England	1031
KK-5 3:15 p.m.	An Easy-To-Use FET DRO Design Procedure Suited to Most CAD Programs P. G. Wilson and R. D. Carver British Telecom Research Labs Ipswich, UK	1033

Session LL

Microwave Integrated Circuits—II Convention Center, California Room

2:00 p.m. to 3:30 p.m.

Thursday, June 15, 1989

Chairman: John A. Pierro—Eaton Corporation/AIL

LL-1 2:00 p.m.	Taper and Forward-Feed in GaAs MMIC Distributed Amplifiers M. Ross*, R. G. Harrison**, and R. K. Surridge*** *Northern Telecom Ltd. St.-Laurent, Quebec, Canada **Dept. of Electronics Carleton Univ. Ottawa, Ontario, Canada ***Bell-Northern Research Ottawa, Ontario, Canada	1039
LL-2 2:20 p.m.	Active Broadband Impedance Transformations Using Distributed Techniques K. R. Cioffi Rockwell Internationl Anaheim, CA	1043
LL-3 2:40 p.m.	A Ku-Band MMIC PLL Frequency Synthesizer T. Ohira, M. Muraguchi, T. Hirota, K. Osafune*, and M. Ino* NTT Radio Communication System Lab. Yokosuka, Japan *NTT LSI Laboratories Atsugi, Japan	1047
LL-4 3:00 p.m.	An Octave Band GaAs Analog Phase Shifter S. T. Salvage, R. J. Hash and B. E. Petted Harris Corp. Melbourne, FL	1051

Session MM

Solid-State Devices and Circuits

Convention Center, Center Theater

2:00 p.m. to 3:30 p.m.

Thursday, June 15, 1989

Chariman: Dean J. Peterson—Steinbrecher Corporation

MM-1 2:10 p.m.	2.5 W CW X-Band Heterojunction Bipolar Transistor B. Bayraktaroglu, R. D. Hudgens, M. A. Khatibzadeh and H. Q. Tserng Texas Instruments Inc. Dallas, TX	1057
MM-2 2:20 p.m.	Design Optimization of Microwave Power Heterojunction Bipolar Transistor Cells G. W. Wang, L. W. Yang, R. W. Laird, D. A. Williams, J. P. Sadowski and P. D. Wright Ford Microelectronics, Inc. Colorado Springs, CO	1061
MM-3 2:30 p.m.	A 20 GHz Silicon Microwave Monolithic Integrated Circuits Process and a 7.4 GHz Frequency Divider S. Miyazaki, C. Takai, K. Eguchi and T. Nakata NEC Corp. Kawasaki, Japan	1065
MM-4 2:50 p.m.	Quasi-Optical Watt-Level Millimeter-Wave Monolithic Solid-State Diode-Grid Frequency Multipliers R. J. Hwu, L. P. Sadwick, N. C. Luhmann, Jr., D. B. Rutledge*, M. Sokolich**, and B. Hancock*** University of California Los Angeles, CA *California Institute of Technology Pasadena, CA **Hughes Aircraft Co. Torrance, CA ***Jet Propulsion Laboratory Pasadena, CA	1069
MM-5 3:10 p.m.	Distortion in Microwave and RF Switches by Reverse Biased PIN Diodes R. H. Caverly* and G. Hiller** *Southeastern Massachusetts University N. Dartmouth, MA **M/A-COM, Inc. Burlington, MA	1073

Session NN

Microwave Systems Applications Convention Center, Pacific Room

2:00 p.m. to 3:30 p.m.

Thursday, June 15, 1989

Chairman: Joseph Levy—Eaton Corporation/AIL

NN-1 2:00 p.m.	Performance of Five 30 GHz Satellite Receivers R. J. Kerczewski, G. E. Ponchak, and R. R. Romanofsky NASA Lewis Research Center Cleveland, OH	1079
NN-2 2:20 p.m.	Millimeter-Wave Transmitter and Receiver Using the Nonradiative Dielectric Waveguide T. Yoneyama Research Inst. of Electrical Communication Tohoku Univ. Sendai, Japan	1083
NN-3 2:40 p.m.	A 4-Device Power Combiner Used as a Lossless High Power Polarization Switch at 94 GHz H. Barth AEG Aktiengesellschaft Ulm, W. Germany	1087
NN-4 2:50 p.m.	94 GHz 3D-Imaging Radar for Sensor-Based Locomotion M. Lange and J. Detlefsen Technische Universität München München, FRG	1091
NN-5 3:00 p.m.	mm-Wave Direct-To-Home Multichannel TV Delivery System M. Pilgrim and R. P. Searle British Telecom Research Laboratories Martlesham Heath, UK	1095
NN-6 3:10 p.m.	Millimetre-Wave Downconverter Using Monolithic Technology for High Volume Application P. G. Wilson and B. C. Barnes British Telecom Research Labs Martlesham Heath, UK	1099

Session OO
Monolithic Integrated Circuits
Convention Center, Terrace Theater

4:00 p.m. to 5:30 p.m.

Thursday, June 15, 1989

Chairman: John R. Selin—Raytheon Company

OO-1 4:10 p.m.	Ka-Band 2-Watt Power GaAs MMIC S. Arai, T. Yoshida, K. Kai, S. Takatsuka, Y. Oda and S. Yanagawa Toshiba Corporation Kawasaki, Japan	1105
OO-2 4:30 p.m.	A Monolithic 2–20 GHz GaAs Pin Diode SP16T Switch S. D. Pritchett and D. Seymour Texas Instruments, Dallas, TX	1109
OO-3 4:50 p.m.	Voltage-Tolerant Monolithic L-Band GaAs SPDT Switch S. W. Cooper and G. A. Truitt Texas Instruments, Dallas, TX	1113
OO-4 5:00 p.m.	An RLC Matching Network and Application in 1–20 GHz Monolithic Amplifier P. K. Ikäläinen Technical Research Centre of Finland Espoo, Finland	1115
OO-5 5:20 p.m.	Broadband High-Efficiency MMIC Power Amplifiers Using Ion-Implanted MESFET Technology Y. C. Shih, K. Tan, K. Kasel, K. K. Yu, and S. K. Wang Hughes Aircraft Co. Microwave Products Div. Torrance, CA	1119

Session PP

Open Forum

Convention Center, Alamitos and Cerritos Rooms

4:00 p.m. to 6:00 p.m.

Thursday, June 15, 1989

Chairman: Michael Kim—TRW/Systems

- PP-1** **Analysis and Synthesis Equations for Edge-Coupled Suspended Substrate Microstrip Line** **1123**
Y. Y. Wang, Q. L. Wang and Y. H. Shu
Department of Radio Engineering
Southeast University
Jiangsu, Nanjing, China
- PP-2** **Extending the Use of the Conformal Mapping Technique for the Calculation of the Quasi-TEM Parameters of Several Cylindrical and Wrapped Transmission Lines** **1127**
S. S. Bedair and I. Wolff
Department of Electrical Engineering
Duisburg University
W. Germany
- PP-3** **Computation of Capacitance Matrix of Arbitrarily Shaped Conductors in Multiple Dielectric Regions**
J. T. Tung and T. K. Sarkar
Dept. of Electrical and Computer Engr.
Syracuse University, NY

S. N. Rao
Dept. of Electrical Engr.
University of Alabama
(Paper not available at the time of printing)
- PP-4** **Analysis and Design of Slow-Wave Structures Using an Integral Equation Approach** **1131**
T. G. Livernois and P. B. Katehi
Radiation Laboratory
University of Michigan
Ann Arbor, MI
- PP-5** **Formulation of Mode-Coupling Equations at Step Discontinuity Based on the Planar Circuit Theory** **1135**
J. P. Hsu*, T. Anada*, A. A. Oliner and S. T. Peng**
*Kanagawa Univ.
Yokohama, Japan
**Polytechnic Univ.
New York Institute of Technology

PP-6	Modeling of High-Frequency MMIC Passive Components A. Nakatani, S. A. Maas* and J. Castaneda Phraxos Research & Development Inc. Santa Monica, CA *Consultant	1139
PP-7	Analysis And Modeling of Coupled Right Angle Microstrip Bend Discontinuities A. Hill and V.K. Tripathi Dept. of Electrical and Computer Engr. Oregon State University Corvallis, Oregon	1143
PP-8	Equivalent Circuits of Microstrip Discontinuities Including Radiation Effects A. Skrivervik, J.R. Mosig Ecole Polytechnique Fédérale Lausanne, Switzerland	1147
PP-9	Three Dimensional Finite Element Method Applied to Dielectric Resonator Devices S. Verdeyme, P. Auxemery, M. Aubourg and P. Guillon I.R.C.O.M. University de Limoges Limoges Cédex, France	1151
PP-10	New Possibilities of Cavity-Filter Design by a Novel TE-TM-Mode Iris-Coupling U. Rosenberg and D. Wolk ANT Telecommunications Backnang, West Germany	1155
PP-11	Computer-Aided Design of Evanescent-Mode Waveguide Bandpass Filter With Non-Touching E-Plane Fins K. S. Kong and T. Itoh The University of Texas at Austin Austin, TX	1159
PP-12	Microwave Characteristics of GaAs MMIC Integratable Optical Detectors P. C. Claspy, S. M. Hill and K. B. Bhasin NASA Lewis Research Center Cleveland, OH	1163

PP-13	Distortion Characteristics in Directly Modulated Laser Diodes by Microwave Signals M. L. Majewski and L. A. Coldren* Dept. of Electrical Engineering University of Queensland St. Lucia, Australia *Department of Electrical and Computer Engineering University of California Santa Barbara, CA	1167
PP-14	Microwave Characteristics of Planar Electrooptic Modulator R. Delrue, E. Paleczny, J. F. Legier, P. Pribetich, and P. Kennis Centre Hyperfrequences et Semiconductors U.A. CNRS Villeveuve D'Ascq, France	1171
PP-15	Dispersion Studies Of a Single-Mode Triangular-Core Fiber with a Trench By The Vector Mode Analysis G. L. Yip and J. W. Jiang Dept. of Electrical Engineering McGill University Montreal, Que., Canada	1175
PP-16	An 8 mm FM and AM Noise Measuring Equipment D. Minren and X. Dezhong Beijing Institute of Radio Metrology and Measurement Beijing, China	1179
PP-17	Direct Measurement of the Optimum Source Impedance for Minimum Noise Figure O. Ishikawa, H. Yagita, T. Tanbo and T. Onuma Semiconductor Research Center Matsushita Electric Industrial Co. Osaka, Japan	1183
PP-18	Establishing the Complex Measurement Ability of a Homodyne Network Analyzer Via Self-Calibration H. J. Eul Ruhr-Universität Bochum Bochum, FRG	1187
PP-19	Theoretical and Experimental Characterization of Radial-Resonator Waveguide Mounting Structures A. Ko and B. D. Bates Department of Electrical and Electronic Engineering The University of Melbourne Victoria, Australia	1191

PP-20	Vector Measurements of Microwave Devices at Cryogenic Temperatures J. W. Smuk, M. G. Stubbs and J. S. Wight* Communications Research Centre Ottawa, Canada *Dept. of Electronics Carleton University Ottawa, Canada	1195
PP-21	A Multipath Fading Microwave Simulator for Studying Space Diversity Systems J. C. Guillard and X. Le Polozec ALCATEL ATFH Levallois Perret, France	1199
PP-22	A New W-Band Coplanar Waveguide Test Fixture J. V. Bellantoni*, R. C. Compton* and H. M. Levy** *School of Electrical Engineering Cornell University Ithaca, NY **Siemens Corporate Research and Support, Inc. Princeton, NJ	1203
PP-23	Varactor-Tuned Planar W-Band Oscillator J. Buechler*, J. F. Luy**, and K. M. Strohm** *Technische Universität München München, FRG **AEG Research Center Ulm, FRG	1205
PP-24	High-Performance Millimeter-Wave Local Oscillator Module for EW Applications E. Boch, and T. Stajcer COM DEV, Cambridge Ontario, Canada	1207
PP-25	A Novel W-Band Suspended Substrate Microstripline Second Harmonic GaAs Gunn Oscillator Y. Shu and Y. Wang Dept. of Radio Engineering South-East University Nanjing, China	1211
PP-26	A W-Band Dielectric Resonator Power Combiner D. Cros, P. Auxemery, X. H. Jiao, B. Jarry and P. Guillon University of Limoges Limoges Cédex, France	1215

PP-27	Theoretical and Experimental Characterization of Nonsymmetrically Shielded Coplanar Waveguides for Millimeter Wave-Circuits F. Alessandri*, U. Goebel**, F. Melai*** and R. Sorrentino* *Tor Vergata University of Rome Rome, Italy **Technical University Hamburg-Harburg Harburg, W. Germany ***Micrel S.p.a., Firenze, Italy	1219
PP-28	Higher-Order Frequency Multipliers—A Solution for MM-and Submm-Wave Local-Oscillator Signal Generation T. Tolmunen, A. Räisänen and M. Sironen Helsinki University of Technology Espoo, Finland	1223
PP-29	A Tunable, Temperature-Compensated Hybrid-Mode Dielectric Resonator S. W. Chen and K. A. Zaki University of Maryland College Park, MD R. West Trans-Tech, Inc. Adamstown, MD	1227
PP-30	Unloaded Q's of Axially Asymmetric Modes of Dielectric Resonators H. C. Chang and K. A. Zaki Electrical Engineering Dept. University of Maryland College Park, MD	1231
PP-31	Numerical Analysis of the Tubular Dielectric Resonator With a Dielectric Tuning Rod D. Kajfez* and J. Lebaric** *University of Mississippi University, MS **Rose Hulman Institute of Technology Terre Haute, IN	1235
PP-32	Frequency and Low-Temperature Characteristics of High-Q Dielectric Resonators Y. Kobayashi, Y. Kabe, Y. Kogami, and T. Yamagishi Department of Electrical Engineering Saitama University Urawa, Saitama, Japan	1239
PP-33	180° Lumped-Element Hybrids S. J. Parisi MITRE Corp. Bedford, MA	1243

PP-34	Unilateral Microstrip Balanced and Doubly Balanced Mixers R. Knöchel, B. Mayer and U. Goebel Technische Universität Hamburg-Harburg Arbeitsbereich Hochfrequenztechnik Postfach, Hamburg, West Germany	1247
PP-35	The Power Transfer Mechanism of MMIC Spiral Transformers and Adjacent Spiral Inductors G. E. Howard, J. Dai, Y. L. Chow, and M. G. Stubbs University of Waterloo, University of Tianjin and Communications Research Centre of Canada	1251
PP-36	Focusing Mirrors for Gaussian Beams M. Boheim AEG Aktiengesellschaft Ulm, W. Germany	1255
PP-37	Parasitic Effects Induced by Power Strips Current Switching in Full Wafer Package J. Chilo and G. Angenieux LEMO Grenoble, France	1259
PP-38	Suppression of Resonant Modes in Microwave Packages D. F. Williams and D. W. Paananen Ball Communications Systems Division Broomfield, CO	1263
PP-39	Lossy Model of Diode Packages: An Alternative Method for Exact Evaluation of Active Chip Parameters K. Kazi, B. B. Szendrenyi, I. Mojzes Research Institute for Technical Physics Hungarian Academy of Sciences Budapest, Hungary	1267
PP-40	Dispersion in Anisotropic NRD Waveguide A. C. César School of Engineering of São Carlos, USP Brazil R. F. Souza School of Electrical Engineering, UNICAMP Brazil	1271
PP-42	Analysis and Tuning Efficiency Optimization of Magnetically-Tuned, Printed E-Plane Circuit Filters J. Uher and W. J. R. Hoefer Laboratory for Electromagnetics and Microwaves University of Ottawa, Canada	1273

PP-43	Design and Low Power Testing of a Microwave Vlasov Mode Converter	1277
	B. G. Ruth, R. K. Dahlstrom, C. D. Schlesiger and L. F. Libelo Harry Diamond Laboratories Adelphi, MD	
PP-44	50-W Class Multi-Port Amplifier for Multi-Beam Satellite Communications	1281
	K. Yamamoto and M. Tanaka NTT Radio Communication Systems Laboratories Take, Japan	

Session QQ
Solid-State Circuits
Convention Center, Center Theater

4:00 p.m. to 5:30 p.m.

Thursday, June 15, 1989

Chairman: Natalino Camilleri—Avantek

QQ-1 4:10 p.m.	Millimeter-Wave, Lumped Element, Gunn VCO'S With Ultrawideband (20 GHz) Tuning L. D. Cohen and E. Sard AIL Systems, Inc. Melville, NY	1287
QQ-2 4:30 p.m.	Second-Harmonic Reflector Type High-Gain FET Frequency Doubler Operating in K-Band Y. Iyama, A. Iida, T. Takagi and S. Urasaki Mitsubishi Electric Corp. Kanagawa Prefecture, Japan	1291
QQ-3 4:50 p.m.	A Monolithic DC-1.6 GHz Digital Attenuator J. Bayruns, P. Wallace, and N. Schienburg Anadigics, Inc. Warren, NJ	1295
QQ-4 5:10 p.m.	A Balanced 11 GHZ HEMT Up-Converter P. Bura and B. Vassilakis Transmission Networks Division Northern Telecom Montreal, Canada	1299
QQ-5 5:20 p.m.	Transient Response of PIN Limiter Diodes R. J. Tan, A. L. Ward, and R. Kaul Harry Diamond Laboratories Adelphi, MD	1303