

**1987
Technical
Program**

Contents

Papers by Sessions

Technical Program Contents

Session A

Ziegfeld Room: Opening Ceremony

8:30 a.m. – 10:00 a.m.

Tuesday, June 9, 1987

Welcome

Mr. Steve March
Dr. Dave McQuiddy
Dr. Rey Kagiwada

Keynote Address

Mr. Les Besser

Session B
Ziegfeld Room: Joint with Monolithics Symposium
– Non-Linear and Power Circuits

10:30 a.m. to Noon

Tuesday, June 9, 1987

Chairman: D.R. Chen, Microwave Monolithics, Inc.
Co-Chairman: Z.J. Lemnios, Ford Microelectronics, Inc.

B-1	Nonlinear Modeling for MMICs (Invited)	85
10:30 a.m.	Don Estreich Hewlett-Packard, Microwave Technology Division, Santa Rosa, CA	
B-2	Ka-Band Monolithic GaAs Power FET Amplifiers	89
11:00 a.m.	H.L. Hung, A. Ezzeddine, L. Holdeman, F. Phellips, J. Allison, A. Cornfeld, T. Smith, and H. Huang Comsat Laboratories, Clarksburg, MD.	
B-3	Wideband GaAs MMIC Receiver	93
11:20 a.m.	D.C. Yang, R. Estandiari, T.S. Lin and T. O'Neill TRW Inc., Microwave and Millimeter-Wave Technology Center Redondo Beach, CA	
B-4	1-6 GHz GaAs MMIC Linear Attenuator with Integral Drivers	97
11:40 a.m.	T. Andrade, G. Lazama, R. Benton Pacific Monolithics, Inc. Sunnyvale CA	

Session C

Gable 5, 6, 7 Room: Computer-Aided Design Analysis and Synthesis

10:30 a.m. to Noon

Tuesday, June 9, 1987

Chairman: Ulrich L. Rohde, Compact Software

C-1 10:30 a.m.	Simple Analytical Modeling of GaAs MESFET Nonlinear Behavior T. Kawai, and F.J. Rosenbaum Washington University, St. Louis, MO.	103
C-2 10:40 a.m.	Large-Signal Modeling of GaAs Power FET Amplifiers M.A. Khatibzadeh, R.J. Trew and I.J. Bahl* Electrical and Computer Engineering Department North Carolina State Univ. Raleigh, NC *ITT-GTC, Roanoke, VA	107
C-3 10:50 a.m.	Optimum Design of Non Linear Power FET Amplifiers C. Guo*, M. Camiade**, D. Rousset*, A. Cessey**, J. Obregon*, and A. Bert** *IRCOM Université de Limoges, France **Thomson Composants DHM, Massy, France	111
C-4 11:10 a.m.	Generalized Power Series Analysis of Intermodulation Distortion in a MESFET Amplifier: Simulation and Experiment G.W. Rhyne and M.B. Steer Department of Electrical and Computer Engineering North Carolina State University, Raleigh, NC	115
C-5 11:30 a.m.	The Spectral Balance: A General Method for Analysis of Nonlinear Microwave Circuits Driven by Non-Harmonically Related Generators M. Gayral, E. Ngoya, R. Quere, J. Rousset, J. Obregon Université de Limoges, France	119
C-6 11:50 a.m.	Modeling of Circular Spiral Inductors for MMICs I. Wolff Dept. of Elect. Engr. Duisburg University, FRG. and H. Kapusta, Siemens AG, Munchen, FRG.	123

Session D

Gable 3, 4 Room: Microwave Filters and Multiplexers

10:30 a.m. to Noon

Tuesday, June 9, 1987

Chairman: R.V. Snyder, R.S. Microwave Company, Inc.

D-1 10:30 a.m.	Quasi-Lowpass, Quasi-Elliptic Symmetric Filter M.C. Horton MCH Associates Thousand Oaks, CA	129
D-2 10:50 a.m.	Dielectric High-Power Bandpass Filter Using Quarter-Cut TE_{018} Image Resonators for Cellular Base Stations T. Nishikawa, K. Wakino, K. Tsunoda, Y. Ishikawa Murata Manufacturing Co., Ltd. Kyoto, Japan	133
D-3 11:10 a.m.	Canonical Bandpass Filters Using Dual-Mode Dielectric Resonators Y. Kobayashi, and K. Kubo Department of Electrical Engineering Saitama University Urawa, Saitama, Japan	137
D-4 11:20 a.m.	Dual Mode Dielectric Resonator Filters Without Iris K.A. Zaki and C. Chen Electrical Engineering Department University of Maryland College Park, MD A.E. Atia Comsat Corporation, 950 L'Enfant Plaza S.W. Washington, DC	141
D-5 11:30 a.m.	Quadruple-Mode Filters R.R. Bonetti and A.E. Williams Comsat Laboratories Clarksburg, MD	145
D-6 11:50 a.m.	Matched Four Port Hybrid Filters C.I. Mobbs Filtronic Components, Ltd. Shipley, UK	149

Session E

Ziegfeld Room: Joint with Monolithics Symposium

– Low Noise Techniques

1:30 p.m to 3:00 p.m.

Tuesday, June 9, 1987

Chairman: V. Nair, Motorola, Inc.
Co-Chairman: S. Moghe, Pacific Monolithics

E-1	A 2-20 GHz, High-Gain, Monolithic HEMT Distributed Amplifier	155
1:30 p.m.	C. Nishimoto, R. LaRue, S. Bandy, N. Day, J. Eckstein, C. Webb, C. Yuen, and G. Zdasiuk Varian Research Center, Palo Alto, CA	
E-2	State-of-the-Art Low Noise GaAs MESFET and Monolithic Amplifier	
1:50 p.m.	Using Shallow Ion Implanted Channels	161
	K.G. Wang and S.K. Wang Hughes Aircraft Company Torrance, CA	
E-3	A Low Noise Distributed Amplifier with Gain Control	165
2:10 p.m.	C.P. Hutchinson, W. Kennan Avantek, Inc. Santa Clara, CA	
E-4	Wide-Band Monolithic GaAs Phase Detection for Homodyne	
2:30 p.m.	Reception	169
	P. Jean, V. Pauker, and P. Dautriche Laboratoires D'Electronique Et De Physique Appliqué Limeil-Brevannes, France	

Session F

Gable 5, 6, 7 Room: Microwave Integrated Circuits

1:30 p.m. to 3:00 p.m.

Tuesday, June 9, 1987

Chairman: C. Buntschuh, Narda Microwave

F-1 1:30 p.m.	High Q Dielectric Resonator Frequency Discriminator S. Fiedziuszko Ford Aerospace and Communications Co. Western Development Laboratories Palo Alto, CA	175
F-2 1:40 p.m.	A High Gain GaAs MESFET Frequency Quadrupler E. Camargo, and F. Correra Universidade De Sao Paulo, Brazil	177
F-3 2:00 p.m.	Uni-Planar MIC Balanced Multiplier – A Proposal of New Structures for MICs H. Ogawa, T. Hirota, and A. Minagawa NTT Electrical Communications Lab Nippon Telegraph and Telephone Corp. Yokosuka-Shi, Japan	181
F-4 2:20 p.m.	Stabilization and Power Combining of Planar Microwave Oscillators with an Open Resonator S. Young and K.D. Stephan Dept. of Electrical and Computer Engineering University of Massachusetts Amherst, MA	185
F-5 2:30 p.m.	Fast Switching X and Ku Band Multi Frequency Dielectric Resonator Oscillator Using a Single GaAs FET A.P.S. Khanna and R. Sooho Avantek Inc. Santa Clara, CA	189
F-6 2:50 p.m.	A Low-Noise L-Band Dielectric Resonator Stabilized Microstrip Oscillator E.C. Niehenke and P.A. Green Westinghouse Defense and Electronics Center Baltimore, MD	193

Session G

Gable 3, 4 Room: Couplers and Power Dividers

1:30 p.m. to 3:00 p.m.

Tuesday, June 9, 1987

Chairman: Peter LaTourette, Consultant

G-1 1:30 p.m.	S-Band Mode Coupler Design For Antenna Feeds Gerry Seck Datron Systems, Inc. Simi Valley, CA	199
G-2 1:50 p.m.	Impedence Transforming 3-dB Hybrids R.Gupta, S. Anderson, and W. Getsinger Comsat Laboratories Clarksburg, MD	203
G-3 2:10 p.m.	Analysis and Synthesis of T Triplate Branch-Line 3dB Coupler Based on the Planar Circuit Theory T. Anada and J. Hsu Kanagawa University Yokohama-shi, Japan	207
G-4 2:30 p.m.	Multiple-Port Power Dividers/Combiners Circuits Using Circular Microstrip Disc Configuration M.D. Abouzahra MIT Lincoln Laboratory Lexington, MA, and K.C. Gupta University of Colorado Boulder, CO	211
G-5 2:40 p.m.	A Wideband Finline Power Divider In a Metallized Plastic Housing: Design and Performance J. Ruxton Boiriet Technologies, Inc. Carleton Place Ontario, Canada and R. Vahldieck University of Victoria Victoria, B.C., Canada	215

Session H

Gable 5, 6, 7 Room: Joint with Monolithics Symposium – MMIC Manufacturability

3:30 p.m. to 5:00 p.m.

Tuesday, June 9, 1987

Chairman: James Schellenberg, Hughes Aircraft Co.

H-1 3:30 p.m.	Successful Automated Alloy Attachment of GaAs MMICs J.S. Pavio Texas Instruments Dallas, TX	221
H-2 3:50 p.m.	Low Cost MMIC Insertion Using Thick Film Processing A. Bettner, B. Hundley, and P. Salisbury Varian Associates Santa Clara, CA	225
H-3 4:10 p.m.	A Low Cost Packaging/Testing Procedure for Manufacturing GaAs MMICs R. Esfandiari, D. Yang, S. Chan, S. Lin, R.K. Ellis TRW Microwave and Millimeter Wave Technology Center Redondo Beach, CA	229
H-4 4:30 p.m.	A Low Noise GaAs MMIC Satellite Downconverter for the 6 to 4 GHz Intelsat Band A.R. Harvey, F.J. Cotton, R.M. Eaton and P.D. Cooper Plessey Research Caswell, England	233

Session I

Gable 3, 4 Room: Biomedical Aspects of Microwaves

3:30 p.m. to 5:00 p.m.

Tuesday, June 9, 1987

Chairman: Arye Rosen, RCA David Sarnoff Research Center

- | | | |
|--------------------------------|---|------------|
| I-1
3:30 p.m. | A New Type of Lightweight Low Frequency Electromagnetic Hyperthermia Applicator
R.H. Johnson
Royal Military College of Science, Shrivenham, UK
A.W. Preece
Royal Infirmary, Bristol, UK
J.W. Hand
Hammersmith Hospital, London, UK
and J.R. James
Royal Military College, Shrivenham, UK | 239 |
| I-2
3:50 p.m. | Regional Heating of Tissue with Control of Applied Power and with Minimized Leakage Radiation
J. Brose and G. Flachenecker
Institute of High Frequency Technique
Univ. of the Bundeswehr
Munich, FRG | 243 |
| I-3
4:10 p.m. | Optimal Source Distribution for Maximum Power Dissipation at the Center of a Lossy Sphere
C.M. Rappaport and F.R. Morgenthaler
MIT
Cambridge, MA | 247 |
| I-4
4:30 p.m. | Measurement of Dielectric Properties of Biological Substances Using Improved Open-Ended Coaxial Line Resonator Method
X. Deming, L. Liping and J. Zhiyan
Department of Radio & Electronics
Shanghai University of Science & Technology
Shanghai, P.R. China | 251 |
| I-5
4:50 p.m. | The Use of Coaxial Probes for Precise Dielectric Measurements: A Reevaluation
R. Epstein
David Sarnoff Research Center, Princeton, NJ
K.R. Foster
University of Pennsylvania, Philadelphia, PA
and M. Gealt
Drexel University, Philadelphia, PA | 255 |

Session J

Garland Ballroom: Open Forum I

3:30 to 5:30 p.m.

Tuesday, June 9, 1987

J-1	The Noise Behavior of an Injection-Locked Magnetron Reflection Amplifier	261
	R.D. Weglein and H.A. Leach Hughes Aircraft Company Canoga Park, CA	
J-2	Radial Line Stubs Improve Performance of Microstrip Impedance Matching Network	*
	J.L. Hutchings Council for Scientific and Industrial Research Pretoria, South Africa	
J-3	Linearization of Diode Detector Characteristics	265
	C. Zhaowu and X. Binchun Dept. of Information Electronics Tsinghua University Beijing, China	
J-4	Statistical Analysis of Simulated Automatic Network Analyzer Measurements	269
	V. Sotoudeh and M. Roos EIP Microwave Inc. San Jose, CA	
J-5	Measurement of Non-Planar Dielectric Samples Using an Open Resonator	273
	W.F.P. Chan and B. Chambers Dept. of Electronic and Electrical Engr. University of Sheffield, UK	
J-6	Precise Measurement Method for Temperature Coefficient of Microwave Dielectric Resonator Material	277
	T. Nishikawa, K. Wakino, H. Tamura, H. Tanaka and Y. Ishikawa Murata Mfg., Ltd. Koyoto, Japan	
J-7	Microwave Scanning Microscopy for Planar Structure Diagnostics	281
	R.J. Gutmann, J.M. Borrego, P. Chakrabarti and M.S. Wang Rensselaer Polytechnic Inst. Troy, NY	

*Manuscript not available at the time of printing

J-8	Wideband Measurement of Nonstandard Transmission Paths R. Garver, J. Tatum, and S. Hayes Harry Diamond Labs Adelphi, MD	285
J-9	Steady-State, Quasi-Steady-State and Transient-State Analyses of Delay Line Discriminators for FM Noise Measurement J. Ruan Ministry of Electronics Shijiazhuang, China	289
J-10	An Improved Microwave Instrument for On-Line Continuous Monitoring of Water Content In Crude Oil L. Yue-Xuan Society of Microwaves CIE, Shanghai, China	*
J-11	A Practical Method for Calibrating a Coaxial Noise Source with a Waveguide Standard Y. Kato and I. Yokoshima Radio Electronics Section Electrotechnical Laboratory Ibaraki-Ken, Japan	291
J-12	An Efficient Electromagnetic Analysis of Arbitrary Microstrip Circuits J.C. Rautio and R.F. Harrington Syracuse University, NY	295
J-13	Spectral-Domain Analysis for Dielectric Antenna Loaded with Metallic Strips T.H. Wu and K.S. Chen Zhejiang University, Hangzhou, Zhejiang, P.R. of China and S.T. Peng New York Institute of Technology Old Westbury, NY	299
J-14	Resonant Frequencies of the Axial Symmetric Modes in a Dielectric Resonator W.C. Chew and M. Moghaddam Dept. of Electrical and Computer Engineering, University of Illinois Urbana, IL	303

*Manuscript not available at the time of printing

J-15	A Generalized Description of the Spherical Three-Layer Resonator with an Anisotropic Dielectric Material I. Wolff Dept. of Electrical Engineering Duisburg University W. Germany	307
J-16	Numerical Spectral Matrix Method for Propagation in Anisotropic Layered Media A.A. Mostafa and K. Zaki Dept. of Electrical Engineering University of Maryland College Park, MD and C.M. Krowne Electronics Technology Division NRL Washington, DC	311
J-17	Compact Grating Structure for Application to Filters and Resonators for Monolithic Microwave Integrated Circuits T.H. Wang and T. Itoh University of Texas Austin, TX	315
J-18	On the Consistency of Two Conventional Coupled-Mode Formulations for Parallel Dielectric Waveguides H.C. Chang Department of Electrical Engineering National Taiwan University Taipei, Taiwan, Republic of China	319
J-19	Analysis of the Transmission Properties of Grounded Finline on Anisotropic Substrates A. Beyer and D. Kother Duisburg University Department of Electrical Engineering FRG	323
J-20	The Method of Lines for the Analysis of Planar Waveguides having Uniaxially Anisotropic Substrates B.M. Sherrill and N.G. Alexopoulos Electrical Engineering Dept. University of California Los Angeles, CA	327

J-21	A Generalized Dispersive Analysis of Integrated Circuit Transmission Line Structures in Anisotropic Substrates A.G. D'Assuncao, M.R.G. Maia, D.A. Rogers* and A.J.Giarola** Univ. of Rio Grande, Brazil *North Dakota State Univ. Fargo ND **State Univ. of Campinas Brazil	331
J-22	Dual Bounds Variational Formulation of Skin Effect Problems P. Waldow and I. Wolff Dept. of Elect. Engr. Duisburg University W. Germany	333
J-23	An Adaptive Spectral Response Modeling Prodedure for Multi-port Waveguide Junctions J.-F. Lee and Z.J. Cendes Department of Electrical and Computer Engineering Carnegie Mellon University Pittsburg, PA	337
J-24	A Unified Hybrid Mode Analysis for Planar Transmission Lines with Multilayer Isotropic/Anisotropic Substrate R.R. Mansour and R.H. MacPhie Department of Electrical Engineering University of Waterloo Canada	341
J-25	Resonant Frequency Stability Analysis of Dielectric Resonators with Tuning Mechanisms F. Hernandez-Gil, R. Perez-Leal, and A. Gebauer Telefonica Madrid, Spain	345
J-26	A Broadband Groove Guide Coupler for Millimeter-Wave Applications R. Vahldieck and J. Ruxton Department of Electrical Engineering University of Victoria Victoria, B.C., Canada and J. Ruxton Bolriet Tech Inc. Ontario, Canada	349

J-27	Tunable Waveguide-to-Microstrip Transition for Millimeter Wave Applications A.K. Sharma RCA Laboratories Princeton, NJ	353
J-28	Optimum Synthesis of Symmetrical Branch-Waveguide Directional Couplers P.L. Carle (CSELT, PM) Torino, Italy	357
J-29	A Generalized Theory of Tapered Transmission Line Matching Transformers and Asymmetric 180° Couplers Supporting Non-TEM Modes P. Pramanick COM DEV Ltd. Cambridge, Canada and P. Bhartia Department of National Defense, Ottawa, Canada	361
J-30	Design Techniques for GaAs Logic Boards W.R. Curtice and R. Rudnick RCA Laboratories Princeton, NJ	*
J-31	Bandstop Filter in Nonradiative Dielectric Waveguide Using Rectangular Resonators J.A.G. Malherbe and J.C. Coetzee Dept. of Electronics and Computer Engineering University of Pretoria South Africa	365
J-32	Whispering-Gallery Modes of Dielectric Structures Applications to Millimeter Wave Bandstop Filter X.H. Jiao, P.Y. Guillon, L.A. Bermudez, and P. Auxemery Faculté Des Sciences Université De Limoges France	367
J-33	A 0.5-4.0 GHz Tunable Bandpass Filter Using YIG Film Grown by LPE Y. Murakami, T. Ohgihara and T. Okamoto Sony Corporation Research Center Yokohama, Japan	371

*Manuscript not available at the time of printing

J-34	Determination of Dual Mode Q Factors From Measured Data W.P. Wheless, Jr. Dept. of Electrical and Computer Engineering New Mexico State University Las Cruces, NM and D. Kajfez University of Mississippi, MS	375
J-35	A Bandpass Filter Using High-Q Dielectric Ring Resonators Y. Kobayashi and M. Minegishi Saitama University Urawa, Saitama, Japan	379
J-36	A Grooved Monoblock Comb-Line Filter Suppressing the Third Harmonics Y. Isota, M. Miyazaki, O. Ishida and F. Takeda Mitsubishi Electric Corp. Kanagawa, Japan	383
J-37	18-30 GHz Broadband Harmonic Reject Filter T.N. Yon, Y.C. Shih, and L.Q. Bui MM-Wave Technology Inc. Torrance, CA	387
J-38	A Planar Integrated Antenna and Receiver Front End V.D. Hwang, T. Uwano and T. Itoh Department of Electrical and Computer Engineering University of Texas, Austin, TX	391
J-39	ICRF Wave Coupling and Optimization of a Dielectric-Filled Waveguide Launcher J. Lee and J. Scharer Electrical and Computer Engineering Dept. University of Wisconsin-Madison, WI	395
J-40	High-Power, Short-Pulse Forming Circuits R. Garver, R. Tan and M. Berry Harry Diamond Labs Adelphi, MD	399

J-41	A Rigorous Field Analysis of Multilayered SAW Devices W.J. Ghijsen, and P.M. van den Berg Delft University of Technology The Netherlands	403
J-42	Ferrite Phase Shifter Finite-Element Analysis Including Losses G. Forterre, P.H. Giesbers and E. Laroche Thomson Semiconductors Montreuil, France	407
J-43	The Absorption Character of Ferrite-Ceramic Complex Material D.Z. Zhang National Research Institute of Radar China and Y.X. Zhang State Run Beijing 3RD Radio Appliances Factory China	411
J-44	Microwave Ferrite Dual-Mode Polarization Technology X. Yiwei, J. Renpei and L. Shigen Nanjing Research Institute of Electronic Technology China	415
J-45	A Bandpass Filter Using Circular Discontinuities in Nonradiative Dielectric Waveguide J.C. Oliver and J.A.G. Malherbe Department of Electrical and Computer Engineering University of Pretoria South Africa	419

Session K

Ziegfeld Room: MMW Technology and Applications

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

Wednesday, June 10, 1987

Chairman: J. Horton, TRW

K-1 8:30 a.m.	Application of Grating-Filter Techniques in Microstrip to Obtain Narrowband Millimeter-Wave Bandpass Filters with Low Radiation Losses	425
	P.K. Ikalainen and G.L. Matthaei Department of Electrical and Computer Engineering University of California Santa Barbara, CA	
K-2 8:50 a.m.	Recent Advances in the Modelling and Performance of Millimeter Wave InP and GaAs VCO's and Oscillators	429
	L.D. Cohen, and E. Sard Eaton Corp, AIL Division Melville, NY	
K-3 9:10 a.m.	A 94 GHz Synchronized Oscillator-Chain for Fast, Continuous 360° Phase Modulation	433
	H. Barth AEG Aktiengesellschaft Ulm, W. Germany	
K-4 9:30 a.m.	Millimeter Wave Characteristics of Fresnel Zone Plates	437
	D.N. Black and J.C. Wiltse Georgia Tech Research Institute Georgia Institute of Technology Atlanta, GA	
K-5 9:40 a.m.	35 GHz Low Noise HEMT Amplifier	441
	J.M. Schellenberg, M.V. Maher, S.K. Wang, K.G. Wang and K.K. Yu Hughes Aircraft Company Microwave Products Division Torrance, CA	

Session L

Gable 5, 6, 7 Room: Microwave Measurements

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

Wednesday, June 10, 1987

Chairman: H. George Oltman, Jr., Tecom Industries

L-1 8:30 a.m.	A Nondestructive Microwave Beam Lead Diode Measurement J.F. White and S.J. Parisi M/A-COM, Inc. Burlington, MA	445
L-2 8:40 a.m.	A Measurement and Calibration Technique for the Accurate Measurement of Amplifier S Parameters M. Roos and V. Sotoudeh EIP Microwave, Inc. San Jose, CA	449
L-3 8:50 a.m.	An 18 to 26.5 GHz Waveguide Load-Pull System Using Active-Load Tuning K. Kotzebue, T.S. Tan and D. McQuate Microwave Technology Division Hewlett-Packard Co., Santa Rosa, CA	453
L-4 9:10 a.m.	Dielectric Constant Evaluation of Insulating Materials: an Accurate, Practical Measurement System J.A. Weiss Department of Physics Worcester Polytechnic Institute, MA and D.A. Hawks ASIC Package Engineering Digital Equipment Corp., Hudson, MD	457
L-5 9:30 a.m.	Method for Determining Dielectric Properties of Solids from Measurements on Pulverized Materials S.O. Nelson U.S. Dept. of Agriculture Athens, Georgia	461
L-6 9:50 a.m.	Dielectric and Temperature Measurements During Microwave Curing of Epoxy Resins in a Sweeping Resonant Cavity J. Low, M. Finzel, J. Asmussen* and M.C. Hawley Dept. of Chemical Engineering *Dept. of Electrical Engineering & System Science, Michigan State University, East Lansing, MI	465

Session M

Gable 3, 4 Room: Communications Systems

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

Wednesday, June 10, 1987

Chairman: Peter G. Petrelis, TRW

M-1 8:30 a.m.	Performance of a Ka-Band Satellite System Under Variable Transmitted Signal Power Conditions G. Fujikawa and R. Kerczewski NASA Lewis Research Center Cleveland, OH	471
M-2 8:50 a.m.	Phase Transients in Digital Radio Local Oscillators M. Znojkwicz and B. Vassilakis Northern Telecom Canada LTD. Montreal, Canada	475
M-3 9:10 a.m.	Power Amplifier for Microwave Digital Radios with Inherent Phase Compensation P. Bura, D. Gelerman, P. Ntake Northern Telecom St. Laurent, Canada	479
M-4 9:30 a.m.	Advanced 6/4 GHz Receiver for Space Application L. Duque, S. Jarvis, G. Gatti*, and R. Dion Spar Aerospace Ltd. Montreal, Canada *European Space Agency	483
M-5 9:40 a.m.	GHz Band Monolithic Modem ICs H. Kikuchi, S. Konaka, and M. Umehira NTT Electrical Communications Laboratories Kanagawa, Japan	487

Session N

Ziegfeld Room: – Focused Session –

Advances in Millimeter Wave Systems (60-230 GHz)

10:30 a.m. to Noon

Wednesday, June 10, 1987

Chairman: James C. Wiltse, Georgia Tech Research Institute

N-1 (Invited) 10:30 a.m.	Recent Advances in Millimeter Wave Instrumentation for Radio Astronomy J.M. Payne National Radio Astronomy Observatory Tucson, AZ	493
N-2 (Invited) 10:50 a.m.	A Survey of Advanced Developments in Millimeter Wave Seeker Front Ends T.T. Fong TRW Redondo Beach, CA	497
N-3 (Invited) 11:10 a.m.	A High Power Coherent 95 GHz Radar (HIPCOR-95) J.C. Butterworth Georgia Tech Research Institute Atlanta, GA	499
N-4 (Invited) 11:30 a.m.	Recent Advances in Gyrotrons and Free Electron Lasers R.J. Temkin Plasma Fusion Center, MIT Cambridge, MA	503

Session O

Gable 5, 6, 7 Room: Noise Measurements

10:30 a.m. to Noon

Wednesday, June 10, 1987

Chairman: Stephen F. Adam, Adam Microwave Consulting, Inc.

O-1	A New Measurement System for Oscillator Noise	
10:30 a.m.	Characterization	509
	A.N. Riddle Avantek Inc. Milpitas, CA and R.J. Trew North Carolina State University Raleigh, NC	
O-2	Microwave Noise Characterization of GaAs MESFETs by	
10:50 a.m.	On-Wafer Measurement of the Output Noise Current	513
	M.S Gupta*, O. Pitzalis, Jr., S.E. Rosenbaum and P.T. Greiling Hughes Research Laboratories Malibu, CA *University of Illinois at Chicago	
O-3	A New Automated Noise and Gain Parameter Measurement	
11:10 a.m.	System	517
	V.A. Hirsch and T.H. Miers Ball Aerospace Systems Division Boulder, CO	
O-4	The Evaluation of Phase Noise in Low Noise Oscillators	521
11:20 a.m.	D.M. Harrison, M.J. Howes and R.D. Pollard Dept. of Electrical and Electronic Engineering University of Leeds, UK	
O-5	New Millimeter Wave Noise Sources with High Reliability	525
11:40 a.m.	P. Tong, N. Fernandez, J. Gladstone and E. Cristal Hewlett-Packard Palo Alto, CA	

Session P

Gable 3, 4 Room: Radar Systems

10:30 a.m. to Noon

Wednesday, June 10, 1987

Chairman: Kiyo Tomiyasu, General Electric Co.

- | | | |
|-------------------|---|------------|
| P-1 | Solid State Transmitter/Modulator for the Mode Select | |
| 10:30 a.m. | Airport Beacon System Sensor | 531 |
| | T.M. Nelson, M.J. Reinhart, K.J. Yoo, D.A. Poltorak and R.K. Palmer
Westinghouse Electric Corp.
Baltimore, MD | |
| P-2 | 94 GHz Integrated Monopulse Radar Demonstrator | 535 |
| 10:50 a.m. | C.E. Burnett | |
| | Marconi Electronic Devices Ltd.
Lincoln, England | |
| P-3 | Self Adaptive Bandpass Filters with Applications to | |
| 11:10 a.m. | 'Frequency Set-On' Oscillators | 539 |
| | J.D. Rhodes
Filtronic Components Ltd.
Charlestown, UK | |
| P-4 | Noise in Pulsed Microwave Systems | 543 |
| 11:30 a.m. | C. Wong, E. Caramanis, A. Skantzaris, J. Bender and R. Campbell | |
| | Raytheon Co.
Bedford, MA | |

Session Q

Garland Ballroom: Open Forum II

1:30 to 3:30 p.m.

Wednesday, June 10, 1987

- | | | |
|------------|---|------------|
| Q-1 | Multioctave Multithrow Active Switches
D.L. Dunn, P.G. Asher, and C.D. Chang
Hughes Aircraft Company
Torrance, CA | 549 |
| Q-2 | A Comparative Study of TEGFET and MESFET Large Signal Characteristics and Saturation Mechanisms
M. Weiss
Thomson Semiconductors, Orsay, France
and D. Pavlidis
University of Michigan, Ann Arbor, MI | 553 |
| Q-3 | Comparative Study of Phase Noise in HEMT and MESFET Microwave Oscillators
M. Pouysegur
LAAS du CNRS, Toulouse, France
J. Graffeuil, J.F. Sautereau
Université Paul Sabatier, Toulouse, France
and J.P. Fortea
Centre Nat. D'Études Spatiales, Toulouse, France | 557 |
| Q-4 | A GaAs Monolithic 6 GHz Low-Noise Amplifier for Satellite Receivers
R. Mott
COMSAT Laboratories
Clarksburg, MD | 561 |
| Q-5 | Miniature Gain Block for Satellite Communication Transceivers
A. Fathy, R. Brown and E. Belohoubek
RCA Laboratories
Princeton, NJ | 565 |
| Q-6 | A GaAs Microwave MESFET with Extremely Low Distortion
G.G. Zhou, T. Curtis and R. Chen
Gould Inc. Microwave Products Division
San Jose, CA | 569 |
| Q-7 | The Deformable-Channel Model-A New Approach to High-Frequency MESFET Modeling
F. Crowne, A. Eskandarian, H.B. Sequeira and R. Jahkete
Martin Marieta Laboratories/Gamma Monolithics
Baltimore, MD | 573 |

Q-8	Load-Line Analysis in the Frequency Domain with Distributed Amplifier Design Examples M.L. Salib, D.E. Dawson, and H.K. Hahn Westinghouse Electric Corp. Baltimore, MD	575
Q-9	Fast Settling, Low Noise Ku Band Fundamental Bipolar VCO A.P.S. Khanna Avantek Inc. Santa Clara, CA	579
Q-10	Long Term Stability of DROs Compared to Crystal Oscillators K.R. Varian Rockwell International Dallas, TX	583
Q-11	Low Phase Noise X/KU-Band VCO D.A. Boyd Eaton Corp., Microwave Products Division Sunnyvale, CA	587
Q-12	Microwave Resistance of Gallium Arsenide and Silicon P-I-N Diodes R. Caverly Southeastern Mass. University N. Dartmouth, MA and G. Hiller M/A-COM Semiconductor Products Burlington, MA	591
Q-13	W Band Crossbar Mixers Integrated Entirely on a Single-Sided Substrate Yielding 15 GHz Instantaneous Bandwidth S. Low COM DEV Ltd. Cambridge, Canada	595
Q-14	Diode Phase Shifter and Model in Waveguide J.A. Lester and C.M. Jackson TRW Redondo Beach, CA and K. Chang Texas A & M University, TX	599

Q-15	Wide-Band True Time Delay Phase Shifter Device P.R. Herczfeld, A. Daryoush Drexel University, Philadelphia, PA M. Kieli Thomas & Betts, Raritan, NJ S. Siegel RCA, David Sarnoff Lab, Princeton, NJ and R. Soref RACD/ESO Hanscom AFB, MA	603
Q-16	A Novel Whiskerless Schottky Diode for Millimeter and Submillimeter Wave Application W.L. Bishop, K. McKinney, R.J. Mattauch, T.W. Crowe, and G. Green Department of Electrical Engineering University of Virginia, Charlottesville, VA	607
Q-17	Filled Image Guide for Millimeter-Wave Circuits M.Q. Shi and D.H. Jiang Peking University Beijing, People's Republic of China	611
Q-18	A Tunable Grating Impedance Transformer J.D. Xu Northwestern Polytechnical University Xian Shaanxi, China	*
Q-19	A Novel Technique for Evaluation and Integration of Connectorless (Drop-In) Microwave Components D. Herstein General Microwave Corporation Amityville, NY	613
Q-20	Coupling Between Hybrid Mode Dielectric Resonators K.A. Zaki and C.M. Chen Electrical Engineering Department University of Maryland College Park, MD	617
Q-21	Exact Calculation of Scattering Parameters of the Coplanar – Slot Transition in a Unilateral Finline Technology O. Picon, J.P. Lefevre, V.F. Hanna CNET, Issy-Les-Moulineaux, France and J. Citerne Laboratoires Structures Rayonnantes, Rennes Cedex, France	621

Q-22	Analysis of VLSI Interconnect Structures L. Carin, Q. Xu, and K. J. Webb University of Maryland College Park, MD and J.A. McClintock Martin Marietta Labs Baltimore, MD	625
Q-23	Towards a Unified Efficient Algorithm for Characterizing The Planar Periodic Waveguides K. Wu and P. Saguet Laboratoire D'Électromagnétisme Et Optique Guidée E.N.S.R.G. Grenoble, France	629
Q-24	Centering and Tolerancing the Components of Microwave Amplifiers A. MacFarland, J. Purviance Department of Electrical Engineering University of Idaho Moscow, Idaho and D. Loesch, K. Diegert, and T. Ferguson Sandia National Laboratories Albuquerque, NM	633
Q-25	Analysis of Discontinuities in Optical Waveguides J.B. Davies and B.M.A. Rahman University College London, UK	637
Q-26	Optical Crosstalk Due to Electrical Coupling in High Speed LINb03 P. Perlmutter, J.E. Baran and Y Silberberg Bell Communications Research Red Bank, NJ	641
Q-27	Optoelectronic Generation and Sensing of Millimeter Waves A.P. DeFonzo and C. Lutz University of Massachusetts Amherst, MA	645
Q-28	Generation of Kilowatt/Kilovolt Broadband Microwave Bursts with a Single Picosecond Photoconductive Switch H.A. Sayadian, M.G. Li and C.H. Lee University of Maryland College Park, MD	649

Q-29	Large Signal Modulation of Semiconductor Lasers with Optical Feedback for Millimeter Wave Applications V.M. Contarino Naval Air Development Center Warminster, PA and A.S. Dayoush and P.R. Herczfeld Drexel University Philadelphia, PA	653
Q-30	Optically Controlled Millimeter Wave Phase Shifter in a Metallic Waveguide G. Hadjicostas and J. Butler Southern Methodist University Dallas, TX and M. Scott LTV Aerospace & Def. Co. Dallas, TX	657
Q-31	A New Generalised Approach to the Design of Microwave Oscillators Y. Xuan and C.M. Snowden Department of Electrical & Electronic Engineering University of Leeds Leeds, UK	661
Q-32	A Refractory Self-Aligned Gate Process for Monolithically Combined Microwave and Digital GaAs ICs A. Geissberger, R. Sadler, E. Griffin, H. Singh, I. Bahl and M. Drinkwine ITT Gallium Arsenide Technology Center Roanoke, VA	665
Q-33	Analysis of Multiple-Step Radial-Resonator Waveguide Diode Mounts with Application to IMPATT Oscillator Circuits B.D. Bates Department of Electrical and Electronic Engineering University of Melbourne Australia	669
Q-34	Absorbed Power Distribution in Heart Lung System Due to Microwave Irradiation at 750 MHz J. Behari School of Environmental Sciences Jawaharlal Nehru University New Delhi, India	673

Q-35	Dielectric-Resonator-Stabilized Second Harmonic Ka-Band Microstrip Gunn Oscillator S. Zhong-Liang and C. Ning Department of Radio Engineering Nanjing Institute of Technology Nanjing, China	677
Q-36	Edge Corrections for Microstrip Planar Analysis Models H.A. Burger Goodyear Aerospace Corporation Litchfield Park, AZ	681
Q-37	Characterization Method and Simple Design Formulas of MCS Lines Proposed for MMICs E. Yamashita, K.R. Li, E. Kaneko, and Y. Suzuki University of Electro-Communications Tokyo, Japan	685
Q-38	Global Stability Analysis of Microwave Circuits by a Frequency-Domain Approach V. Rizzoli Department Di Electronica University of Bologna Bologna, Italy A. Neri Fondazione Ugo Bordoni Bologna, Italy	689
Q-39	Analysis Equations for Shielded Suspended Substrate Microstrip Line and Broadside-Coupled Stripline Y. Shu, X. Qi, Y. Wang Department of Radio Engineering Nanjing Institute of Technology Nanjing, China	693
Q-40	The Effectiveness of Four Direct Search Optimization Algorithms R.W. Rhea Scientific Atlanta, Inc. Atlanta, GA	697
Q-41	Computer Aided Design Models for Unilateral Finlines with Finite Metallization Thickness and Arbitrarily Located Slot Widths P. Pramanick, R.R. Mansour COM DEV Ltd. Cambridge, Canada and R.H. MacPhie University of Waterloo Ontario, Canada	703

Q-42	Puff, an Interactive Microwave Computer Aided Design Program for Personal Computers	707
	R.C. Compton, W.L. Williams, and D.B. Rutledge Division of Engineering and Applied Science California Institute of Technology Pasadena, CA	
Q-43	An Automatic Decomposition Technique for Device Modeling and Large Circuit Design	709
	J.W. Bandler and Q.J. Zhang Electrical Engineering Department McMaster University Hamilton, Canada	
Q-44	Modeling the Dispersion in a Suspended Microstripline	713
	R.S. Tomar Bolriet Technologies, Inc. Carleton Place, Ontario, Canada and P. Bhartia Department of National Defense Ottawa, Ontario, Canada	
Q-45	An Almost-Periodic Fourier Transform for Use with Harmonic Balance	717
	K.S. Kundert, G. Sorkin and A. Sangiovanni-Vincentelli University of California Berkeley, CA	
Q-46	Generalized Analysis of E-Plane Septa Discontinuities	721
	A. Rong, S. Li Nanjing Institute of Technology Nanjing, China	

Session R

Gable 5, 6, 7 Room: Guided Waves

1:30 p.m. to 3:00 p.m.

Wednesday, June 10, 1987

Chairman: Prof. Jeffrey B. Knorr, Naval Postgraduate School

R-1 1:30 p.m.	Simple Analytic Formulas for Dielectric Waveguides S.T. Peng New York Institute of Technology Old Westbury, NY S.L. Wang University of New Haven West Haven, CT F.K. Schwering U.S. Army CECOM Ft. Monmouth, NJ	727
R-2 1:50 p.m.	Guidance and Leakage Properties of Offset Groove Guide H. Shigesawa, M. Tsuji Doshisha University Koyoto, Japan A.A. Oliner Polytechnic University Brooklyn, NY P. Lampariello, F. Frezza University of Rome "La Sapienza" Rome, Italy	731
R-3 2:10 p.m.	Analysis and Design of Microslab™ Waveguide B. Young and T. Itoh University of Texas Austin, TX	735
R-4 2:30 p.m.	Microstrip Circuit Elements on Cylindrical Substrates A. Nakatani Phraxos Research and Development Inc. Santa Monica, CA and N.G. Alexopoulos University of California Los Angeles, CA	739
R-5 2:50 p.m.	Analysis of Double-Layered Finlines Containing a Magnetized Ferrite M. Geshiro On Leave From Ehime University, Ehime, Japan and T. Itoh University of Texas Austin, TX	743

Session S

Ziegfeld Room: – Focused Session –

Advances in Millimeter Wave Technology (60-230 GHz)

1:30 p.m. to 3:00 p.m.

Wednesday, June 10, 1987

Chairman: James C. Wiltse, Georgia Tech Research Institute

S-1 (Invited) 1:30 p.m.	Millimeter Wave Material Properties and Measurements G.J. Simonis U.S. Army Harry Diamond Laboratories Adelphi, MD	747
S-2 (Invited) 1:50 p.m.	Advances in HEMT Technology and Applications P.M. Smith, P.C. Chao, K.H.G. Duh, L.F. Lester B.R. Lee and J.M. Ballingall General Electric Co. Syracuse, NY	749
S-3 (Invited) 2:10 p.m.	Imaging Antenna Arrays D. Rutledge California Institute of Technology Pasadena, CA	*
S-4 (Invited) 2:30 p.m.	GaAs Schottky Barrier Diodes for High Sensitivity Millimeter and Submillimeter Wavelength Receivers T.W. Crowe and R.J. Mattauch University of Virginia Charlottesville, VA	753

*Manuscript not available at the time of printing

Session T

Ziefeld Room: Invited European Session

3:30 p.m. to 5:00 p.m.

Wednesday, June 10, 1987

Chairman: R. Sparks, Raytheon

T-1 (Invited) 3:30 p.m.	Detection of Millimeter and Submillimeter Waves E. Kollberg Chalmers University of Technology Gothenburg, Sweden	759
T-2 (Invited) 4:00 p.m.	State-of-the-Art of MMIC Technology and Design in West Germany E. Pettenpaul Siemens AG Munich, West Germany	763
T-3 (Invited) 4:30 p.m.	Modeling of New Microwave Devices G. Salmer Université de Lille France	767

Session U

Gable 5, 6, 7 Room: Waveguide Discontinuity Structures

3:30 p.m. to 5:00 p.m.

Wednesday, June 10, 1987

Chairman: James W. Mink, U.S. Army Research Office

- | | | |
|------------------|--|------------|
| U-1 | A Dynamic Model for Microstrip – Slotline Transition | |
| 3:30 p.m. | and Related Structures | 773 |
| | H.-Y. Yang and N.G. Alexopoulos | |
| | Electrical Engineering Department | |
| | University of California | |
| | Los Angeles, CA | |
| U-2 | Characterization of Stripline Crossing by Transverse | |
| 3:50 p.m. | Resonance Analysis | 777 |
| | T. Uwano | |
| | Matsushita Electric Co. | |
| | Osaka, Japan | |
| | R. Sorrentino | |
| | University of Rome Tor Vergata | |
| | Roma, Italy | |
| | and T. Itoh | |
| | University of Texas | |
| | Austin, TX | |
| U-3 | An Improved Multimode Small Aperture/Obstacle Theory | 781 |
| 4:10 p.m. | M. Guglielmi and A.A. Oliner | |
| | Polytechnic University | |
| | Brooklyn, NY | |
| U-4 | An Accurate Analysis of Discontinuities in Dielectric Rectangular | |
| 4:30 p.m. | Waveguide and its Application to Grating Filters | 785 |
| | M. Tsuji and H. Shigesawa | |
| | Department of Electronics | |
| | Doshisha University | |
| | Kyoto, Japan | |
| U-5 | Variational Bound Analysis of a Discontinuity in Nonradiative | |
| 4:50 p.m. | Dielectric Waveguide | 789 |
| | J.C. Olivier and J.A.G. Malherbe | |
| | University of Pretoria | |
| | South Africa | |

Session V

Gable 3, 4 Room: Microwave Acoustics: Developments & Applications

3:30 p.m. to 5:00 p.m.

Wednesday, June 10, 1987

Chairman: Ted Lukaszek, U.S. Army Labcom

- | | | |
|--------------------------------|---|------------|
| V-1
3:30 p.m. | Applications of Custom SAW Devices
Ronald C. Rosenfeld
Sawtek Inc.
Orlando, FL | * |
| V-2
3:50 p.m. | Evolution of SAW Technology from Discrete Devices to Functional RF Building Blocks
H.G. Vollers and D. L. Ash
RF Monolithics
Dallas TX | 793 |
| V-3
4:10 p.m. | Miniature SAW Antenna Duplexer for Portable Telephone
M. Hikita, Y. Ishica, T. Tabuchi and H. Kojima
Central Research Laboratory
Hitachi, Ltd.
Tokyo, Japan
and K. Kurosawa
Hitachi Toukai Works
Katsuta, Japan | 797 |
| V-4
4:20 p.m. | Design and Evaluation of UHF Monolithic Film Resonator-Stabilized Oscillators and Bandpass Filters
M.M. Driscoll, R.A. Moore, J.F. Rosenbaum
Westinghouse Defense and Electronics Center
Baltimore,MD
and S.V. Krishnaswami, and J.R. Szedon
Westinghouse Research and Development Center
Pittsburgh, PA | 801 |
| V-5
4:40 p.m. | Performance of Acoustic Charge Transport Chirp Filters
F. Fiegel, R. Martin, and F. Guedin
Electronic Decisions, Inc.
Urbana, IL | 805 |

*Manuscript not available at the time of printing

Session W

Gable 3, 4 Room: – Focused Session –

Optical Techniques for Microwave Applications I

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

Thursday, June 11, 1987

Chairman: Tatsuo Itoh, University of Texas, Austin

W-1 (Invited) 8:30 a.m.	Optical Generation and Control of Microwaves and Millimeter-Waves C.H. Lee Department of Electrical Engineering University of Maryland College Park, MD	811
W-2 9:00 a.m.	Microwave Performance of an Optically Controlled AlGaAs/GaAs High Electron Mobility Transistor and GaAs MESFET R.N. Simons NRC-NASA Research Associate Cleveland, OH and K.B. Bhasin NASA Lewis Research Center Cleveland, OH	815
W-3 9:20 a.m.	A High-Speed Phase Shifter Based on Optical Injection L.R. Brothers and C.H. Cox, III MIT Lincoln Laboratory Lexington, MA	819
W-4 9:40 a.m.	Phase and Frequency Coherency of Multiple Optically Synchronized 20 GHz FET Oscillators For Satellite Communications A.S. Daryoush, P.R. Herczfeld, R. Glatz Department of Electrical and Computer Engineering Drexel University, Philadelphia, PA and A.P.S. Khanna Avantek, Santa Clara, CA	823

Session X

Ziegfeld Room: FET Amplifiers

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

Thursday, June 11, 1987

Chairman: Eliot D. Cohen, Defense Logistics Agency

X-1 8:30 a.m.	Design and Performance of a New Multi Octave High-Gain Amplifier K.B. Niclas, R.R. Pereira, A.J. Graven and A.P. Chang Watkins-Johnson Company Palo Alto, CA	829
X-2 8:50 a.m.	A High Performance, Quasi-Monolithic 2-18GHz Distributed GaAs FET Amplifier A. Cappello, T. Alexander, J. Calviello, D. Ward, P. Bié and R. Pomian Eaton Corporation/AIL Division Melville, NY	833
X-3 9:00 a.m.	Operating Characteristics of 2-8 GHz GaAs MESFET Amplifiers at Elevated Case Temperatures to 200 Degrees Centigrade E.J. Crescenzi, Jr., J.A. Thompson, T.R. Kritzer and M.E. Kretschmar Watkins-Johnson Co. Palo Alto, CA	837
X-4 9:20 a.m.	A 6-18 GHz MMIC Power Amplifier Module Designed for Automated Assembly Fabrication* C.A. Sapashe, D.L. Green, C.D. Palmer, and J.S. Pavio Texas Instruments Dallas, TX	841
X-5 9:30 a.m.	A 6 Watt Power GaAs FET for 14.0-14.5 GHz Band Y. Kadowaki, S. Igi, M. Wataze, T. Sonoda, K. Hayashi, M. Yamanouchi, S. Takamiya and S. Mitsui Mitsubishi Electric Corporation Hoyogo, Japan	845
X-6 9:40 a.m.	K- and Ka-Band High Efficiency Amplifier Modules Using GaAs Power FETs D. Bechtel, J. Klatskin, G. Taylor, M. Eron, S.G. Liu, R. Camisa and H. Dudley David Sarnoff Research Center Princeton, NJ	849

*Public dissemination disapproved by sponsor

Session Y

Gable 5, 6, 7 Room: Solid State Devices/Circuits I

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

Thursday, June 11, 1987

Chairman: Michael Dydyk, Motorola

Y-1 8:30 a.m.	Silicon Bipolar MMIC for Frequency-Conversion Application up to 20 GHz L. Kipnas Avantek, Inc. Santa Clara, CA	855
Y-2 8:50 a.m.	Frequency Stability of L-Band Two-Port Dielectric Resonator Oscillators M. Loboda, T.E. Parker, and G.K. Montress Raytheon Research Division Lexington, MA	859
Y-3 9:10 a.m.	Solid State MM-Wave Oscillators with Large Tuning Range K. Jacobs, and B. Vowinkel University of Cologne West Germany	863
Y-4 9:20 a.m.	Varactor-Tuned Microstrip Ring Resonators K. Chang, S. Martin, and F. Wang Department of Electrical Engineering Texas A & M University College Station, TX	867
Y-5 9:40 a.m.	A Multi-Diode Cavity Power Combiner Using State-of-the-Art Pulsed Gunn Diodes B.E. Sigmon Motorola Government Electronics Group Tempe, AZ and M. Ayyagari MA/COM Semiconductor Burlington, MA	871

Session Z

Gable 3, 4 Room: – Focused Session –

Optical Techniques for Microwave Applications II

10:30 a.m. to Noon

Thursday, June 11, 1987

Chairman: N.R. Dietrich, AT&T Labs

Z-1 (Invited) 10:30 a.m.	Microwave Measurements of GaAs Integrated Circuits Using Electrooptic Sampling K.J. Weingarten, R. Majidy-Aky, M.J.W. Rodwell, D.M. Bloom and B.A. Auld Stanford University Stanford, CA	877
Z-2 11:00 a.m.	Picosecond Reflectometry Technique for On-Chip Characterization of Millimeter-Wave Semiconductor Devices C. Rauscher Naval Research Laboratory Washington, DC	881
Z-3 11:20 a.m.	Direct Fiber Optic Transmission of a Wideband Multi-Carrier Microwave Signal Spectrum to and from Satellite Earth Station Antennas J.W. Carlin, J.E. Bowers, A.C. Chipaloski and S. Boodaghians AT&T-Bell Laboratories Holmdel, NJ	885
Z-4 11:40 a.m.	Optical Feedback on Linearity Performance of 1.3 μm DFB and Multimode Lasers Under Deep Microwave Modulation W.I. Way and M.M. Choy Bell Communications Research Red Bank, NJ	889

Session AA

Ziegfeld Room: Non-Linear FET Applications

10:30 a.m. to Noon

Thursday, June 11, 1987

Chairman: E.C. Niehenke, Westinghouse Electric Corp.

AA-1 10:30 a.m.	A GaAs MESFET Balanced Mixer with Very Low Intermodulation Stephen A. Maas The Aerospace Corp. Los Angeles, CA	895
AA-2 10:50 a.m.	A Monolithic Double Balanced Single Sideband Modulator S.D. Thompson and A.M. Pavio Texas Instruments, Inc. Dallas, TX	899
AA-3 11:10 a.m.	Passive GaAs FET Switch Models and their Application in Phase Shifters L.C. Upadhyayula, R.L. Camisa, G. Taylor, S.N. Subbarao and S.G. Liu RCA Laboratories Princeton, NJ	903
AA-4 11:20 a.m.	A Non-Linear Design and Optimization Procedure for GaAs MESFET Oscillators T.J. Brazil and J.O. Scanlan Department of Electrical Engineering University College Dublin, Ireland	907
AA-5 11:40 a.m.	High Performance GaAs C-Band and Ku-Band MMIC Oscillators S. Moghe and T. Holden Pacific Monolithics, Inc. Sunnyvale, CA	911

Session BB

Gable 5, 6, 7 Room: Solid State Devices/Circuits II

10:30 a.m. to Noon

Thursday, June 11, 1987

Chairman: Clifford Krowne, Naval Research Lab

- | | | |
|-------------------|---|------------|
| BB-1 | Multi-Watt Power Generation at Millimeter-Wave Frequencies | |
| 10:30 a.m. | Using Epitaxially-Stacked Varactor Diodes | 917 |
| | P.W. Staecker, M.E. Hines, F. Occhiuti and J.F. Cushman | |
| | M/A Com Inc. | |
| | Burlington, MA | |
|
 | | |
| BB-2 | A New Reversible Varactor Frequency Halver/Double Device | 921 |
| 10:50 a.m. | Z. Nativ | |
| | Rafael State of Israel Armament Development Authority | |
| | Haifa, Israel | |
|
 | | |
| BB-3 | Measurements and Modeling of Kinetic Inductance Microstrip | |
| 11:10 a.m. | Delay Lines | 925 |
| | J.M. Pond, J.H. Claasen and W.L. Carter | |
| | Naval Research Laboratory | |
| | Washington, DC | |
|
 | | |
| BB-4 | A 100 GHz SIS Quasiparticle Mixer with 10 DB Coupled Gain | 929 |
| 11:30 a.m. | A.V. Raisanen, D.C. Crete, P.L. Richards and F.L. Lloyd* | |
| | Department of Physics | |
| | University of California | |
| | Berkeley, CA | |
| | *National Bureau of Standards | |
| | Boulder, CO | |

Session CC

Gable 3, 4 Room: Phased and Active Array Techniques

1:30 p.m. to 3:00 p.m.

Thursday, June 11, 1987

Chairman: Eugene H. Gregory, Hughes Aircraft Co.

CC-1 1:30 p.m.	A 2 Watt GaAs TX/RX Module with Integral Control Circuitry, For S-Band Phased Array Radars C.R. Green, A.A. Lane, P.N. Tombs, R. Shukla, P.D. Cooper J.R. Suffolk, and J.A. Sparrow Plessey Research Caswell Ltd. Caswell, UK	933
CC-2 1:50 p.m.	A 35 GHz Electronically Steered Line Array R.J. Lang and B.J. Edward General Electric Company Syracuse, NY	937
CC-3 2:10 p.m.	An Ultraminiature 5-10 GHz, 2 Watt Transmit Module for Active Aperture Application J. Pierro and R. Clouse Eaton Corp./AIL Division Melville, NY	941
CC-4 2:30 p.m.	Microstrip FED Planar Frequency Multiplying Space Combiner S. Nam, T. Uwano, and T. Itoh Department of Electrical and Computer Engineering University of Texas Austin, TX	945
CC-5 2:40 p.m.	Low Cost Cartop Phased Array Steering G. Schaffner Teledyne Ryan Electronics San Diego, CA	949

Session DD

Ziegfeld Room: HEMT/MESFET Applications

1:30 p.m. to 3:00 p.m.

Thursday, June 11, 1987

Chairman: B.D. Geller, Comsat Corporation

- | | | |
|---------------------------------|---|------------|
| DD-1
1:30 p.m. | Bias-Dependent Microwave Characteristics of an Atomic Planar-Doped AlGaAs/InGaAs/GaAs Double Hetrojunction MODFET
Y.K. Chen, D.C. Radulescu, G.W. Wang, A.N. Lepore, P.J. Tasker and L.F. Eastman
School of Electrical Engineering
Cornell University
Ithaca, NY | * |
| DD-2
1:50 p.m. | FETs and HEMTs at Cryogenic Temperatures – Their Properties and Use in Low-Noise Amplifiers
M.W. Pospieszalski and S. Weinreb
National Radio Astronomy Observatory
Charlottesville, VA | 955 |
| DD-3
2:10 p.m. | Reliability of Low-Noise Microwave HEMT Using by MOCVD
K. Tanaka, H. Takakuwa, K. Togashi, Y. Kato and S. Watanabe
Sony Corp.
Kanagawa, Japan | * |
| DD-4
2:20 p.m. | Predicting Long Term Frequency Drift in FET Oscillators Using Device Modeling
K.K. Agarwal and C. Ho
Telecommunication Division
Rockwell International Corp.
Dallas, TX | 959 |
| DD-5
2:40 p.m. | Harmonic Reaction Amplifier – A Novel High-Efficiency and High-Power Microwave Amplifier
S. Nishiki and T. Nojima
NTT Electrical Communications Laboratories
Take Yokosuka-Shi, Kanagawa-Ken, Japan | 963 |

*Manuscript not available at the time of printing

Session EE

Gable 5, 6, 7 Room: Solid State Devices/Circuits III

1:30 p.m. to 3:00 p.m.

Thursday, June 11, 1987

Chairman: Robert L. Eisenhart, Hughes Aircraft Co.

- | | | |
|---------------------------------|---|------------|
| EE-1
1:30 p.m. | A1GaAs/GaAs Heterojunction Bipolar Transistors with
4W/mm Power Density at X Band
B. Bayraktaroglu, N. Camilieri, H.D. Shih, and H.G. Tserng
Texas Instruments
Dallas, TX | 969 |
| EE-2
1:50 p.m. | Millimeter Wave Heterojunction MITATT Diodes
N.S. Dogan, J.R. East
Department of Electrical Engineering
Washington State University
Pullman, WA
M.E. Elta and G.I. Haddad
The University of Michigan
Ann Arbor, MI | 973 |
| EE-3
2:10 p.m. | Improved Performance of Fundamental and Second Harmonic MMW
Oscillators Through Active Device Doping Concentration
Contouring
J. Ondria
Marconi Electronic Devices Ltd
Lincoln, England
and R.L. Ross
U.S. Army Electronic Technology and Devices Laboratory
Fort Monmouth, NJ | 977 |
| EE-4
2:30 p.m. | W-Band Microstrip Oscillator Using InP
Gunn Diode
D.R. Singh
Defense Systems Division
Honeywell Inc.
Minnetonka, MN | 981 |

Session FF

Gable 3, 4 Room: Microwave Ferrites

3:30 p.m. to 5:00 p.m.

Thursday, June 11, 1987

Chairman: W.E. Hord, Microwave Applications Group

- | | | |
|------------------|--|-------------|
| FF-1 | A New Type of Fast Switching Dual-Mode Ferrite Phase Shifter | 985 |
| 3:30 p.m. | W.E. Hord, C.R. Boyd, Jr. and D. Diaz
Microwave Applications Group
Santa Maria, CA | |
| FF-2 | Impact of Dielectric Loss Tangent on the Performance of | |
| 3:50 p.m. | Millimeter Wave Ferrite Circulators | 989 |
| | G.R. Harrison, S.B. Thompson, J.T. Vaughn
Electromagnetic Sciences, Inc.
Norcross, GA
and G.P. Rodrigue
School of Electrical Engineering
Georgia Institute of Technology
Atlanta, GA | |
| FF-3 | Full Wave Analysis of Slot Line and Coplanar Waveguide on a | |
| 4:00 p.m. | Magnetic Substrate | 993 |
| | E. El-Sharawy and R.W. Jackson
University of Massachusetts
Amherst, MA | |
| FF-4 | Magnetostatic Waves in a Normally Magnetized Waveguide Structure | 997 |
| 4:10 p.m. | M. Radmanesh
GMI Engineering & Management Institute
Flint, MI
and C.M. Chu and G.I. Haddad
University of Michigan
Ann Arbor, MI | |
| FF-5 | Energy Storage Effect in MSSW Metal-Finger Reflectors | 1001 |
| 4:20 p.m. | T.S. Cheng
Bell Communications Research
Red Bank, NJ
and J.P. Parekh and H.S. Tuan
Department of Electrical Engineering
State University of New York
Stony Brook, NY | |

Session GG

Gable 5, 6, 7 Room: HEMT Amplifiers and Devices

3:30 p.m. to 5:00 p.m.

Thursday, June 11, 1987

Chairman: Bert Berson, Berson & Associates

GG-1 3:30 p.m.	HEMT Low-Noise Amplifier for Ka-Band M.A.G. Upton, P.M. Smith and P.C. Chao General Electric Co. Syracuse, NY	1007
GG-2 3:50 p.m.	Broadband HEMT Amplifier for 26.5-40 GHz K. Shibata, B. Abe, S. Hori and K. Kamei Toshiba Corporation Kawasaki, Japan	1011
GG-3 4:10 p.m.	A Four Stage V-Band MOCVD HEMT Amplifier W. Yau, E.T. Watkins, S.K. Wang, K. Wang and B. Klatskin Hughes Aircraft Company Torrance, CA	1015
GG-4 4:30 p.m.	Super Low-Noise HEMTs with a T-Shaped Gate Structure S. Asai, K. Joshin, Y. Hirachi and M. Abe Fujitsu Laboratories Ltd. Atsugi, Japan	1019
GG-5 4:40 p.m.	Reliability of Super Low Noise HEMTs K. Hayashi, T. Sonoda, T. Yamaguchi, K. Nagahama, S. Takamiya, S. Mitsui, and M. Yamanouchi Mitsubishi Electric Corp. Itami, Japan	1023