

# TABLE OF CONTENTS

## Volume 1

|                                                                                     |         |
|-------------------------------------------------------------------------------------|---------|
| Table of Contents .....                                                             | iii     |
| Welcome from the 1997 Symposium Chairs .....                                        | vii     |
| 1997 Symposium Steering Committee .....                                             | xi      |
| Message from the 1997 Technical Program Co-Chairs .....                             | xvi     |
| Technical Program Committee .....                                                   | xvii    |
| MTT-S Administrative Committee .....                                                | xxii    |
| Radio Frequency Integrated Circuits (RFIC) Symposium Committees .....               | xxiv    |
| Automatic RF Techniques Group Conference .....                                      | xxv     |
| 1997 Awards .....                                                                   | xxvii   |
| Microwave Career Award .....                                                        | xxix    |
| Pioneer Award .....                                                                 | xxx     |
| Microwave Prize .....                                                               | xxxii   |
| Distinguished Educator Award .....                                                  | xxxv    |
| Distinguished Service Award .....                                                   | xxxvi   |
| N. Walter Cox Award .....                                                           | xxxvii  |
| IEEE Fellow Awards .....                                                            | xxxviii |
| Future IEEE MTT-S International Microwave Symposia .....                            | xliii   |
| Historical Exhibit .....                                                            | xliv    |
| 1997 Microwave Symposium Technical Program Schedule .....                           | xlvii   |
| Technical Sessions                                                                  |         |
| TU1A Joint RFIC and IMS Session: Amplifier Technology .....                         | 1       |
| TU1B Focused Session: Millimeter-Waves Over Fiber Systems .....                     | 21      |
| TU1C Focused Session: Microwave Applications of Silicon Carbide .....               | 43      |
| TU1D Numerical Methods in Time Domain I .....                                       | 61      |
| TU1E Medical Applications and Biological Effects .....                              | 93      |
| TU2A Plenary Session: New Microwave Telecommunication Infrastructures .....         | 119     |
| TU3A Joint RFIC and IMS Session: Monolithic Wireless Technology .....               | 121     |
| TU3B Focused Session: EM Wave Interactions with Electron Devices and Circuits ..... | 149     |
| TU3C Focused Session: Acoustic Wave Devices for Portable Telecommunications .....   | 167     |
| TU3D Numerical Methods in Frequency Domain I .....                                  | 189     |
| TU3E Analog Fiber Optic Link Technology .....                                       | 215     |
| TU4A Joint RFIC and IMS Session: Millimeter-Wave Monolithic Circuits .....          | 241     |
| TU4B Passive Components I .....                                                     | 263     |
| TU4C Superconductive Technology .....                                               | 293     |
| TU4D Numerical Methods in Time Domain II .....                                      | 315     |
| TU4E Microwave Photonic Systems and Components .....                                | 345     |
| Focused Sessions .....                                                              | III     |
| Panel and Rump Sessions .....                                                       | V       |
| Workshops .....                                                                     | VII     |
| $\mu$ APS-Microwave Application and Product Seminars-Technical Program .....        | XV      |
| 1997 IEEE RFIC Symposium Schedule .....                                             | XVII    |
| Automatic RF Techniques Group Conference Schedule .....                             | XIX     |
| Author Index .....                                                                  | XXIII   |
| Exhibitor List .....                                                                | xxx 1   |

# TABLE OF CONTENTS

## Volume 2

|                                                                            |      |
|----------------------------------------------------------------------------|------|
| Table of Contents .....                                                    | iii  |
| 1997 Microwave Symposium Technical Program Schedule .....                  | 363  |
| Technical Sessions                                                         |      |
| WE1A Nonlinear Modeling and Analysis .....                                 | 365  |
| WE1B Passive Components II .....                                           | 395  |
| WE1C Millimeter-Wave Devices and Components .....                          | 425  |
| WE1D Digital Microwave Circuits .....                                      | 455  |
| WE1E New Leakage Effects in Planar Guiding Structures .....                | 477  |
| WE2A Packaging and Interconnect Technologies.....                          | 499  |
| WE2B High Power Sources and Control Components .....                       | 525  |
| WE2C Millimeter and Sub-Millimeter Waves: J.C. Bose Memorial Session ..... | 551  |
| WE2D Phased Arrays .....                                                   | 577  |
| WE2E Guided Waves and Discontinuity Effects .....                          | 603  |
| WE3A Advanced CAD Methodologies .....                                      | 621  |
| WE3B Frequency Converters and Mixers .....                                 | 651  |
| WE3C Quasi-Optical Amplifiers .....                                        | 673  |
| WE3D Active and Passive Filters .....                                      | 695  |
| WE3E Hybrid Interconnections and Components .....                          | 721  |
| WE3F Interactive Forum I .....                                             | 751  |
| WE4A Electromagnetic Theory Based CAD.....                                 | 1007 |
| WE4B Millimeter-Wave Mixers and Switches .....                             | 1033 |
| WE4C Quasi-Optical Oscillators .....                                       | 1051 |
| WE4D Passive Bandpass Filters .....                                        | 1077 |
| WE4E Ferrite Devices: Modeling and Applications .....                      | 1107 |
| Author Index .....                                                         | III  |

# TABLE OF CONTENTS

## Volume 3

|                                                                                  |      |
|----------------------------------------------------------------------------------|------|
| Table of Contents .....                                                          | iii  |
| 1997 Microwave Symposium Technical Program Schedule .....                        | 1131 |
| Technical Sessions                                                               |      |
| TH1A Innovations in Microwave Systems.....                                       | 1133 |
| TH1B Focused Session: Microwave Metrology and Standards: a Historical View ..... | 1159 |
| TH1C Millimeter and Microwave Power Amplifiers .....                             | 1173 |
| TH1D Signal Generation .....                                                     | 1203 |
| TH1E Application Oriented Concepts in Field Theory .....                         | 1229 |
| TH2A Transportation Systems Technology .....                                     | 1251 |
| TH2B Low Noise Millimeter-Wave Components .....                                  | 1273 |
| TH2C Devices and Circuits for Wireless Power Applications .....                  | 1297 |
| TH2D Probing Techniques and Dielectric Measurement.....                          | 1327 |
| TH2E Recent Developments in Field Theory .....                                   | 1359 |
| TH3A Wireless Components and Systems.....                                        | 1385 |
| TH3C High Power Transistor Amplifiers .....                                      | 1407 |
| TH3D Topics in Microwave Measurements .....                                      | 1437 |
| TH3E HBT/HEMT Modeling .....                                                     | 1463 |
| TH3F Interactive Forum II .....                                                  | 1489 |
| TH4A Antennas and Systems for Personal Communications .....                      | 1745 |
| TH4D Joint ARFTG and IMS Session:                                                |      |
| Crosstalk, Coupling and Multiconductor Transmission Line Characterization .....  | 1767 |
| TH4E Numerical Methods in Frequency Domain II .....                              | 1797 |
| Late Papers .....                                                                | 1819 |
| Author Index .....                                                               | III  |

**1997 IEEE MTT-S  
INTERNATIONAL MICROWAVE  
SYMPOSIUM DIGEST**

***Technical Program Contents  
Thursday, June 12***



# 1997 Microwave Symposium Technical Program Schedule

## Session TH1A Innovations in Microwave Systems

8:00 am-9:40 am

Room A201

Thursday, June 12, 1997

Chair: D. Meharry, Sanders a Lockheed-Martin Co.

Co-Chair: R. Ranson, Filtronic Comtech

|               |                                                                                                                |      |
|---------------|----------------------------------------------------------------------------------------------------------------|------|
| <b>TH1A-1</b> | <b>An Ultra-Wideband Exciter for Ground-Penetration Radar Systems</b>                                          | 1135 |
| 8:00 am       | P. Phu, E. Adler, J. Speulstra, J. Clark and J. Fisher                                                         |      |
| <b>TH1A-2</b> | <b>Broadband Waveguide-Based Spatial Combiners</b>                                                             | 1139 |
| 8:20 am       | A. Alexanian and R.A. York                                                                                     |      |
| <b>TH1A-3</b> | <b>60-GHz-Band Ultracompact Transmitter for HDTV</b>                                                           | 1143 |
| 8:30 am       | H. Nakakita, F. Sugino-shita and N. Yazawa                                                                     |      |
| <b>TH1A-4</b> | <b>A 28 GHz LMDS Transceiver for Subscriber Applications</b>                                                   | late |
| 8:40 am       | D. Vik, D. Donoghue, A. Borghetti and Z. Bogan                                                                 |      |
| <b>TH1A-5</b> | <b>Channel Loading Effects on Power Limited Wireless Transmitters Utilizing Discrete Multitone Modulation</b>  | 1147 |
| 8:50 am       | A. Leke and J.S. Kenney                                                                                        |      |
| <b>TH1A-6</b> | <b>A Novel RF to Baseband Monolithic Microwave Receiver with On-Chip Tuning</b>                                | 1151 |
| 9:10 am       | L.A. Geis, M.A. Wyatt and D. Starratt                                                                          |      |
| <b>TH1A-7</b> | <b>A High Performance Transceiver Hybrid IC for PHS Hand-Set Operating with Single Positive Voltage Supply</b> | 1155 |
| 9:20 am       | M. Nishijima, J. Itoh, T. Kuni-hisa, T. Yokoyama, S. Yamamoto, K. Miyatsuji, M. Nishitsuji and O. Ishikawa     |      |

## Session TH1B

(Focused Session)

## Microwave Metrology and Standards: A Historical View

8:00 am-9:40 am

Room A207

Thursday, June 12, 1997

Chair: R.A. Kamper, National Institute of Standards and Technology

|               |                                                                 |      |
|---------------|-----------------------------------------------------------------|------|
| <b>TH1B-1</b> | <b>Microwave Standards at the Boulder Laboratories of NBS</b>   | late |
| 8:00 am       | W.F. Snyder                                                     |      |
| <b>TH1B-2</b> | <b>Cesium Beam Frequency Standards</b>                          | 1161 |
| 8:20 am       | W.D. Lee and D.B. Sullivan                                      |      |
| <b>TH1B-3</b> | <b>The Waveguide Below Cutoff Attenuation Standard</b>          | 1165 |
| 8:40 am       | D.H. Russell                                                    |      |
| <b>TH1B-4</b> | <b>(Invited) A Review of the Six-Port Measurement Technique</b> | 1171 |
| 9:00 am       | G.F. Engen                                                      |      |
| <b>TH1B-5</b> | <b>Near-Field Characterization of Antennas</b>                  | late |
| 9:20 am       | Allen C. Newell, NIST, Boulder, CO                              |      |

## Session TH1C

# Millimeter and Microwave Power Amplifiers

**8:00 am-9:40 am**

**Room A102**

**Wednesday, June 12, 1997**

Chair: H.J. Kuno, Quin Star Technology  
Co-Chair: K.K. Ikossi-Anastasiou, Louisiana State University

|                |                                                                                                                                                 |      |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>TH1C-1</b>  | <b>A 94 GHz Monolithic High Output Power Amplifier</b>                                                                                          | 1175 |
| <b>8:00 am</b> | P. Huang, E. Lin, R. Lai, M. Biedenbender, T.W. Huang, H. Wang, C. Geiger, T. Block and P.H. Liu                                                |      |
| <b>TH1C-2</b>  | <b>60 GHz High-Efficiency HEMT MMIC Chip Set Development for High-Power Solid State Power Amplifier</b>                                         | 1179 |
| <b>8:10 am</b> | Y. Hwang, J. Lester, G. Schreyer, G. Zell, S. Schrier, D. Yamauchi, G. Onak, B. Kasody, R. Kono, Y.C. Chen and R. Lai                           |      |
| <b>TH1C-3</b>  | <b>A 6 Watt Ka-Band MMIC Power Module Using MMIC Power Amplifiers</b>                                                                           | 1183 |
| <b>8:20 am</b> | D.L. Ingram, D.I. Stones, T.W. Huang, M. Nishimoto, H. Wang, M. Siddiqui, D. Tamura, J. Elliott, R. Lai, M. Biedenbender, H.C. Yen and B. Allen |      |
| <b>TH1C-4</b>  | <b>High Gain and High Efficiency K-Band Power HEMT with WSi/Au T-Shaped Gate</b>                                                                | 1187 |
| <b>8:40 am</b> | T. Kunii, N. Yoshida, S. Miyakuni, T. Shiga, T. Oku, T. Kitano, J. Udomoto, M. Komaru, A. Inoue, S. Tsuji, N. Tanino, T. Ishikawa and Y. Mitsui |      |
| <b>TH1C-5</b>  | <b>Novel InGaP/AlGaAs/InGaAs Heterojunction FET for X-Ku Band Power Applications</b>                                                            | 1191 |
| <b>9:00 am</b> | Y. Okamoto, K. Matsunaga, M. Kuzuhara and M. Kanamori                                                                                           |      |
| <b>TH1C-6</b>  | <b>Development of a Compact, Broadband FET Linearizer for Satellite Use</b>                                                                     | 1195 |
| <b>9:20 am</b> | S. Ogura, K. Seino, T. Ono, A. Kamikokura and H. Hirose                                                                                         |      |
| <b>TH1C-7</b>  | <b>A Microwave Miniaturized Linearizer Using a Parallel Diode</b>                                                                               | 1199 |
| <b>9:30 am</b> | K. Yamauchi, K. Mori, M. Nakayama, Y. Mitsui and T. Takagi                                                                                      |      |

## Session TH1D

# Signal Generation

**8:00 am-9:40 am**

**Room A101**

**Thursday, June 12, 1997**

Chair: S. Wetenkamp, SCEAN

|                |                                                                                                           |      |
|----------------|-----------------------------------------------------------------------------------------------------------|------|
| <b>TH1D-1</b>  | <b>High Efficiency Planar Oscillator with RF Power of 100 mW Near 140 GHz</b>                             | 1205 |
| <b>8:00 am</b> | M. Wollitzer, J. Buechler, J.-F. Luy                                                                      |      |
| <b>TH1D-2</b>  | <b>A Low-Power X-band Frequency Synthesizer Module</b>                                                    | 1209 |
| <b>8:10 am</b> | T. Nakagawa, H. Okazaki and Y. Yamaguchi                                                                  |      |
| <b>TH1D-3</b>  | <b>A DC to X-Band Frequency Doubler Using GaAs HBT MMIC</b>                                               | 1213 |
| <b>8:30 am</b> | X. Zhang and Y.-H. Yun                                                                                    |      |
| <b>TH1D-4</b>  | <b>A 5 to 10GHz Low Spurious Triple Tuned Type PLL Synthesizer Driven by Frequency Converted DDS Unit</b> | 1217 |
| <b>8:40 am</b> | K. Tajima, Y. Imai, Y. Kanagawa and K. Itoh                                                               |      |
| <b>TH1D-5</b>  | <b>A Very Wide-Tuning Range 5-GHz-band Si Bipolar VCO Using Three-Dimensional MMIC Technology</b>         | 1221 |
| <b>9:00 am</b> | K. Kamogawa, K. Nishikawa, C. Yamaguchi, M. Hirano, I. Toyoda and T. Tokumitsu                            |      |
| <b>TH1D-6</b>  | <b>W Band Monolithic Multipliers</b>                                                                      | 1225 |
| <b>9:20 am</b> | F. Brauchler, J. Papapolymerou, J. East and L. Katehi                                                     |      |

# Session TH1E

## Application Oriented Concepts in Field Theory

**8:00 am-9:40 am**

**Room A108**

**Thursday, June 12, 1997**

Chair: F. Arndt, University of Bremen, Germany  
Co-Chair: J. Mink, North Carolina State University

|                |                                                                                                                                          |      |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>TH1E-1</b>  | <b>Application of the TLM-Method for the Analysis of Longitudinally Periodic Structures</b>                                              | 1231 |
| <b>8:00 am</b> | M. Walter, U. Müller and A. Beyer                                                                                                        |      |
| <b>TH1E-2</b>  | <b>Modal Block-LU-Decomposition Technique for the Efficient CAD of Ridged Waveguide Filters</b>                                          | 1235 |
| <b>8:20 am</b> | R. Beyer, F. Arndt and W. Hauth                                                                                                          |      |
| <b>TH1E-3</b>  | <b>A New Global Time Domain Electromagnetic Simulator of Microwave Circuits Including Lumped Elements Based on Finite Element Method</b> | 1239 |
| <b>8:40 am</b> | K. Guillaud, M.F. Wong, V. Fouad Hanna and J. Citerne                                                                                    |      |
| <b>TH1E-4</b>  | <b>Variational Analysis of Arbitrarily Oriented Thick Iris Coupling a Rectangular and an Elliptical Waveguide</b>                        | 1243 |
| <b>9:00 am</b> | A. Morini, T. Rozzi, M. Pistolesi and F. Spinsanti                                                                                       |      |
| <b>TH1E-5</b>  | <b>Field Theory Analysis of Conically Shaped Coupling Elements in Dual Mode Filters and Polarizers</b>                                   | 1247 |
| <b>9:20 am</b> | U. Balaji and R. Vahldieck                                                                                                               |      |

TH  
1E

TH  
2A

TH  
2B

TH  
2C

# Session TH2A

## Transportation System Technology

**10:10 am-1150 am**

**Room A201**

**Thursday, June 12, 1997**

Chair: R. Henning, University of South Florida

|                 |                                                                                                              |      |
|-----------------|--------------------------------------------------------------------------------------------------------------|------|
| <b>TH2A-1</b>   | <b>Radar Requirements and Architecture Trades for Automotive Applications</b>                                | 1253 |
| <b>10:10 am</b> | R. Dixit and L. Rafaelli                                                                                     |      |
| <b>TH2A-2</b>   | <b>Millimeter Wave Radar Sensor for Automotive Intelligent Cruise Control (ICC)</b>                          | 1257 |
| <b>10:30 am</b> | M.E. Russell, A. Crain, A. Curran, R.A. Campbell, C.A. Drubin and W.F. Miccioli                              |      |
| <b>TH2A-3</b>   | <b>Millimeter-wave Dual Mode Radar for Headway Control in IVHS</b>                                           | 1261 |
| <b>10:50 am</b> | K. Konno and S. Koshikawa                                                                                    |      |
| <b>TH2A-4</b>   | <b>Active SIMMWIC-Antenna for Automotive Applications</b>                                                    | 1265 |
| <b>11:10 am</b> | M. Singer, K.M. Strohm, J.-F. Luy, E.M. Biebl                                                                |      |
| <b>TH2A-5</b>   | <b>A Novel Circularly Polarized W-Band Direct Detection Receiver for Six-Port Polarimetric Radar Systems</b> | 1269 |
| <b>11:20 am</b> | M.O. Thieme, R.H. Raschofer, A. Stiller and E.M. Biebl                                                       |      |
| <b>TH2A-6</b>   | <b>24.125 GHz Dual Monopulse Microstrip Patch Antenna Array for K-Band Collision Warning Systems</b>         | late |
| <b>11:40 am</b> | J.A. Navarro                                                                                                 |      |

**10:10 am-1150 am                      Room A207                      Thursday, Junk 12, 1997**

|                                  |                                                                                                                                                                                                                      |      |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>TH2B-1</b><br><b>10:10 am</b> | <b>A 155-GHz Monolithic InP-Based HEMT Amplifier</b><br>H. Wang, R. Lai, Y.C. Chen, Y.L. Kok, T.W. Huang, T. Block, D. Streit, P.H. Liu, P. Siegel and B. Allen                                                      | 1275 |
| <b>TH2B-2</b><br><b>10:30 am</b> | <b>Full-Waveguide Band, 90 to 140 GHz, MMIC Amplifier Module</b><br>S. Weinreb, P.C. Chao and W. Copp                                                                                                                | 1279 |
| <b>TH2B-3</b><br><b>10:40 am</b> | <b>Compact Monolithic Coplanar 94 GHz Front Ends</b><br>W.H. Haydl, L. Verweyen, T. Jakobus, M. Neumann, A. Tessmann, T. Krems, M. Schlechtweg, W. Reinert, H. Massler, J. Rüdiger, W. Bronner, A. Hülsmann, T. Fink | 1281 |
| <b>TH2B-4</b><br><b>10:50 am</b> | <b>Millimeter-Wave Waveguide-Bandwidth Cryogenically-Coolable InP HEMT Amplifiers</b><br>M.W. Pospieszalski, W.J. Lakatos, E. Wollack, L.D. Nguyen, M. Le, M. Lui and T. Liu                                         | 1285 |
| <b>TH2B-5</b><br><b>11:10 am</b> | <b>Efficient Modeling of Microscopic and Macroscopic Noise Behavior of Submicron-Highly-Doped Semiconductor Devices at Millimeter-Wave Frequencies</b><br>A. Abou-Elnour, D. Liebig and K. Schünemann                | 1289 |
| <b>TH2B-6</b><br><b>11:30 am</b> | <b>Design and Characterization of FET Based Cold/Hot Noise Sources</b><br>L.P. Dunleavy, M.C. Smith, S.M. Lardizabal, A. Fejzuli and R.S. Roeder                                                                     | 1293 |

**10:10 am-1150 am                      Room A102                      Thursday, June 12, 1997**

|                                  |                                                                                                                                                                                                                                                   |             |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>TH2C-1</b><br><b>10:10 am</b> | <b>SiGe Bipolar Junction Transistors for Microwave Power Applications</b><br>G.N. Henderson, M.F. O'Keefe, T.E. Boles, P. Noonan, J.M. Sledziewski and B.M. Brown                                                                                 | <b>1299</b> |
| <b>TH2C-2</b><br><b>10:30 am</b> | <b>High Efficiency Submicron Gate LDMOS Power FET for Low Voltage Wireless Communications</b><br>G. Ma, W. Burger, X. Ren, J. Gibson and M. Shields                                                                                               | <b>1303</b> |
| <b>TH2C-3</b><br><b>10:50 am</b> | <b>High-Efficiency, Small-Chip AlGaAs/GaAs Power HBTS for Low-Voltage Digital Cellular Phones</b><br>N. Hayama, C.-W. Kim, H. Takahashi, N. Goto and K. Honjo                                                                                     | <b>1307</b> |
| <b>TH2C-4</b><br><b>11:00 am</b> | <b>A 1.9GHz Variable Gain Linear Power Amplifier MMIC for PHS Using Novel Cascaded MESFETs</b><br>M. Kimishima, K. Hayashi and M. Takahashi                                                                                                       | <b>1311</b> |
| <b>TH2C-5</b><br><b>11:10 am</b> | <b>An E-Mode GaAs FET Power Amplifier MMIC for GSM Phones</b><br>W. Abey, T. Kawai, I. Okamoto, M. Suzuki, C. Khandavalli, W. Kennan, Y. Tateno, M. Nagahara and M. Takikawa                                                                      | <b>1315</b> |
| <b>TH2C-6</b><br><b>11:20 am</b> | <b>A 2W, 65% PAE Single-Supply Enhancement-Mode Power PHEMT for 3V PCS Applications</b><br>D.-W. Wu, R. Parkhurst, S.-L. Fu, J. Wei, C.-Y. Su, S.-S. Chang, D. Moy, W. Fields, P. Chye and R. Levitsky                                            | <b>1319</b> |
| <b>TH2C-7</b><br><b>11:40 am</b> | <b>High Efficiency, Low Adjacent Channel Leakage 2-V Operation GaAs Power MESFET Amplifier for 1.9-GHz Digital Cordless Phone System</b><br>M. Nagaoka, H. Wakimoto, K. Kawakyu, K. Nishihori, Y. Kitaura, T. Sasaki, A. Kameyama and N. Uchitomi | <b>1323</b> |

## Session TH2D

### Probing Techniques and Dielectric Measurement

**10:10 am-1150 am**                      **Room A101**                      **Thursday, June 12, 1997**

Chair: R.D. Pollard, The University of Leeds, United Kingdom  
Co-Chair: Z. Skvor, Czech Technical University, Prague

|                 |                                                                                                                    |      |
|-----------------|--------------------------------------------------------------------------------------------------------------------|------|
| <b>TH2D-1</b>   | <b>Wavelength Optimized Electra-Optic Scanning of MMICS with Fabry-Perot Enhancement</b>                           | 1329 |
| <b>10:10 am</b> | P.O. Müller, D. Erasme and B. Huyart                                                                               |      |
| <b>TH2D-2</b>   | <b>MM-Wave Near-Field Scanning Resistivity Microscope</b>                                                          | 1333 |
| <b>10:20 am</b> | M. Golosovsky and D. Davidov                                                                                       |      |
| <b>TH2D-3</b>   | <b>An SOLR Calibration for Accurate Measurement of Orthogonal On-Wafer Duts</b>                                    | 1335 |
| <b>10:30 am</b> | S. Basu and L. Hayden                                                                                              |      |
| <b>TH2D-4</b>   | <b>Coplanar Waveguide Technique for Measurement of Dielectric Constant or Thickness of Dielectric Films</b>        | 1339 |
| <b>10:40 am</b> | M.K. Waldo, I. Kaufman and S. El-Ghazaly                                                                           |      |
| <b>TH2D-5</b>   | <b>Permittivity Characterization from Transmission-Line Measurement</b>                                            | 1343 |
| <b>10:50 am</b> | M.D. Janezic and D.F. Williams                                                                                     |      |
| <b>TH2D-6</b>   | <b>Complex Permittivity Measurements of Extremely Low Loss Dielectric Materials Using Whispering Gallery Modes</b> | 1347 |
| <b>11:00 am</b> | J. Krupka, K. Derzahowski, A. Abramowicz, M. Tobar and R.G. Geyer                                                  |      |
| <b>TH2D-7</b>   | <b>Precision Free-Space Measurements of Complex Permittivity of Polymers in the W-Band</b>                         | 1351 |
| <b>11:20 am</b> | G.L. Friedsam and E.M. Biebl                                                                                       |      |
| <b>TH2D-8</b>   | <b>Measurement of Transmittance and Scattering of Radome Membranes from 30 to 1000 GHz</b>                         | 1355 |
| <b>11:40 am</b> | M.N. Afsar, I. Tkachov and T. Wells                                                                                |      |

TH  
2D

TH  
2E

TH  
3A

TH  
3C

## Session TH2E

### Recent Developments in Field Theory

**10:10 am-1150 am**                      **Room A108**                      **Thursday, June 12, 1997**

Chair: A. Beyer, Duisburg "University, Germany

|                 |                                                                                                     |      |
|-----------------|-----------------------------------------------------------------------------------------------------|------|
| <b>TH2E-1</b>   | <b>Finite-Difference Vector Potential Time-Domain Approach to the Analysis of Planar Structures</b> | 1361 |
| <b>10:10 am</b> | N. Georgieva and E. Yamashita                                                                       |      |
| <b>TH2E-2</b>   | <b>Investigation of Various H-shaped Antennas with an ATLM Field-Solver</b>                         | 1365 |
| <b>10:30 am</b> | S. Lindenmeier, B. Bader and P. Russer                                                              |      |
| <b>TH2E-3</b>   | <b>Unified Analysis of Quasi-Tern and Higher Order Modes in Planar Transmission Lines</b>           | 1369 |
| <b>10:50 am</b> | C. Rieckmann, A.S. Omar and A. Jöstingmeier                                                         |      |
| <b>TH2E-4</b>   | <b>Global Edge-Conditioned Basis Functions from Local Solutions of Maxwell's Equations</b>          | 1373 |
| <b>11:10 am</b> | S. Amari, A. Motamedi, J. Bornemann and R. Vahldieck                                                |      |
| <b>TH2E-5</b>   | <b>Circuit Based Model for Coupling Between MMICs in Multi-Chip Assemblies</b>                      | 1377 |
| <b>11:30 am</b> | R.W. Jackson and Z. Wang                                                                            |      |
| <b>TH2E-6</b>   | <b>Nonlinear PML for Absorption of Nonlinear Electromagnetic Waves</b>                              | 1381 |
| <b>11:40 am</b> | J.-G. Ma, J. Xu and Z. Chen                                                                         |      |

## Session TH3A

### Wireless Components and Systems

**1:20 pm-3:00 pm**

**Room A201**

**Thursday, June 12, 1997**

**Chair:** J.F. Sevic, QUALCOMM

**Co-Chair:** J. Bellantoni, Watkins-Johnson

|                                 |                                                                                                                                                                                                 |             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>TH3A-1</b><br><b>1:20 pm</b> | <b>Radio Architecture of a Wideband DS-CDMA Testbed for Future Cellular Systems</b><br>W. Anzill and T. Melander                                                                                | <b>1387</b> |
| <b>TH3A-2</b><br><b>1:40 pm</b> | <b>Mobitex PC Card Wireless Modem</b><br>S. Moghe, J. Stone, S. Stratmoen, S. Consolazio, K. Rausch, S. Geske and M. Pate1                                                                      | <b>1391</b> |
| <b>TH3A-3</b><br><b>2:00 pm</b> | <b>A Low Cost 16.2 GHz Phase Locked Oscillator for Wireless LAN</b><br>T.A. Bös, F. Bayer and U. Lott                                                                                           | <b>1395</b> |
| <b>TH3A-4</b><br><b>2:20 pm</b> | <b>A True Enhancement Mode Single Supply Power HFET for Portable Applications</b><br>E. Glass, J.-H. Huang, J. Abrokwhah, B. Bernhardt, M. Majerus, E. Spears, R. Droopad and B. Ooms           | <b>1399</b> |
| <b>TH3A-5</b><br><b>2:40 pm</b> | <b>3.4V Operation 1W MMIC Power Amplifier with SrTiO<sub>3</sub> Capacitors for Digital Cellular Phones</b><br>K. Yamaguchi, T.B. Nishimura, N. Iwata, K. Takemura, M. Kuzuhara and Y. Miyasaka | <b>1403</b> |

## Session TH3C

### High Power Transistor Amplifiers

**1:20 pm-3:00 pm**

**Room A102**

**Thursday, June 12, 1997**

**Chair:** T. Cisco, Hughes Aircraft

**Co-Chair:** L. Kushner, MIT Lincoln Laboratory

|                                 |                                                                                                                                                             |             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>TH3C-1</b><br><b>1:20 pm</b> | <b>A S-Band Push-Pull 60-Watt GaAs MESFET for MMDS Applications</b><br>G. Sarkissian, R. Basset, Z. Shingu and F. Ono                                       | <b>1409</b> |
| <b>TH3C-2</b><br><b>1:40 pm</b> | <b>60W L-Band Power AlGaAs/GaAs Heterostructure FETs</b><br>J. Morikawa, K. Asano, K. Ishikura, H. Oikawa, M. Kanamori and M. Kuzuhara                      | <b>1413</b> |
| <b>TH3C-3</b><br><b>1:50 pm</b> | <b>High Efficiency S-Band 30W Power GaAs FETs</b><br>I. Takenaka, H. Takahashi, K. Asano, J. Morikawa, K. Ishikura, M. Kanamori, M. Kuzuhara and H. Tsutsui | <b>1417</b> |
| <b>TH3C-4</b><br><b>2:00 pm</b> | <b>High Efficiency 11 Watt Octave S/C-Band PHEMT MMIC Power Amplifier</b><br>J.J. Komiak, S.C. Wang and T.J. Rogers                                         | <b>1421</b> |
| <b>TH3C-5</b><br><b>2:10 pm</b> | <b>A 15-Watt Dual Band HBT MMIC Power Amplifier</b><br>M.R. DeHaan, M. Jones, G. Wilcox, J. McLeod, S.C. Miller                                             | <b>1425</b> |
| <b>TH3C-6</b><br><b>2:30 pm</b> | <b>A 6-18 GHz Broadband High Power MMIC for EW Applications</b><br>A.R. Barnes, M.T. Moore and M.B. Allenson                                                | <b>1429</b> |
| <b>TH3C-7</b><br><b>2:40 pm</b> | <b>Push-Pull Power Amplifiers in the X band</b><br>S. Toyoda                                                                                                | <b>1433</b> |

## Session TH3D

### Topics in Microwave Measurement

**1:20 pm-3:00 pm**

**Room Al01**

**Thursday, June 12, 1997**

**Chair: M. Solomon, The MITRE Corp.**

**Co-Chair: D. Wait, National Institute of Standards and Technology**

|                                 |                                                                                                                                                                                                                                                                      |      |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>TH3D-1</b><br><b>1:20 pm</b> | <b>W-Band Measurements of 100<math>\mu</math>m Height Micro-Machined Air-Filled Rectangular Waveguides</b> 1439<br>C.E. Collins, J.W. Digby, R.D. Pollard, R.E. Miles, G.M. Parkhurst, J.M. Chamberlain,<br>D.P. Steenson, N.J. Cronin, L.S. Karatzas and J.W. Bowen |      |
| <b>TH3D-2</b><br><b>1:30 pm</b> | <b>Broadband Noise Parameter and S-Parameter Measurement Technique</b><br>M.L. Schmatz and W. Baechtold                                                                                                                                                              | 1443 |
| <b>TH3D-3</b><br><b>1:40 pm</b> | <b>Determination of Wave Noise Sources Using Spectral Parametric Modeling</b><br>T. Werling, E. Bourdel, D. Pasquet, A. Boudiaf                                                                                                                                      | 1447 |
| <b>TH3D-4</b><br><b>2:00 pm</b> | <b>High Speed Noise Power Ratio Measurement Techniques on RF Power Amplifiers</b><br>W.G. Vaillancourt and S.E. Yates                                                                                                                                                | 1451 |
| <b>TH3D-5</b><br><b>2:20 pm</b> | <b>A Dynamic AM/AM and AM/PM Measurement Technique</b><br>A.A. Moulthrop, C.J. Clark, C.P. Silva and M.S. Muha                                                                                                                                                       | 1455 |
| <b>TH3D-6</b><br><b>2:40 pm</b> | <b>A Broadband Heterodyne Measurement Setup for Active Millimeter Wave Integrated Antennas</b><br>R.H. Rasshofer, A. Stiller, M.O. Thieme, H. Schulz and E.M. Biebl                                                                                                  | 1459 |

## Session TH3E

### HBT/HEMT Modeling

**1:20 pm-3:00 pm**

**Room A108**

**Thursday, June 12, 1997**

**Chair: A.K. Sharma, TRW ES & TD**

|                                 |                                                                                                                                          |  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>TH3E-1</b><br><b>1:20 pm</b> | <b>GaAs HBT Profile Optimization Using the Taguchi Method</b> 1465<br>G.N. Henderson and D.-W. Wu                                        |  |
| <b>TH3E-2</b><br><b>1:40 pm</b> | <b>Bias and Temperature Dependent Noise Modeling of HBTs</b> 1469<br>T. Daniel                                                           |  |
| <b>TH3E-3</b><br><b>2:00 pm</b> | <b>Transmission Line Model of the Distributed Heterojunction Bipolar Transistor</b> 1473<br>L.L. Liou                                    |  |
| <b>TH3E-4</b><br><b>2:10 pm</b> | <b>Capacitance Topology for High Frequency Modeling of Bipolar Transistors</b> 1477<br>A.A. Ciubotaru and R.L. Carter                    |  |
| <b>TH3E-5</b><br><b>2:20 pm</b> | <b>Electrothermal Simulation of HBT by TLM Method with Quasi Two Dimensional Model</b> 1481<br>J. Shen, K. Chen and Z. Xie               |  |
| <b>TH3E-6</b><br><b>2:40 pm</b> | <b>A Physics-Based Electra-Thermal Model for Microwave and Millimetre Wave Hemts</b> 1485<br>R.G. Johnson, C.M. Snowden and R.D. Pollard |  |

TH  
3D

TH  
3E

TH  
3F

# Session TH3F

## Interactive Forum II

**2:30 pm-5:00 pm**

**Ballroom**

**June 12, 1997**

Chair: John Norgard, University of Colorado, Colorado Springs

|                |                                                                                                                              |      |
|----------------|------------------------------------------------------------------------------------------------------------------------------|------|
| <b>TH3F-1</b>  | <b>Magnetically Tunable Superconducting Microstrip Resonators Using Yttrium Iron Garnet Single Crystals</b>                  | 1491 |
|                | M. Tsutsumi and T. Fukusako                                                                                                  |      |
| <b>TH3F-2</b>  | <b>Analytic Design of High Efficiency Harmonic Loading Oscillator Using Harmonic Two Signal Method</b>                       | 1495 |
|                | M.-Q. Lee, S. Nam, Y. Kwon and K.-W. Yeom                                                                                    |      |
| <b>TH3F-3</b>  | <b>Simplified Nonquasi-Static FET Modelling Approach Experimentally Validated up to 118.5 GHz</b>                            | 1499 |
|                | M. Fernandez-Barciela, P.J. Tasker, M. Demmler, Y. Campos-Rota, H. Massler, E. Sanchez, C. Currás-Francos and M. Schlechtweg |      |
| <b>TH3F-4</b>  | <b>A Charge Model of Step Recovery Diode for CAD</b>                                                                         | 1503 |
|                | K. Opalska and J. Baranowski                                                                                                 |      |
| <b>TH3F-5</b>  | <b>Iterative Solution of Linear Systems in Harmonic Balance Analysis</b>                                                     | 1507 |
|                | M.M. Gourary, S.G. Rusakov, S.L. Ulyanov, M.M. Zharov, K.K. Gullapalli and B.J. Mulvaney                                     |      |
| <b>TH3F-6</b>  | <b>Nonlinear Dynamic Modeling of Micromachined Microwave Switches</b>                                                        | 1511 |
|                | E.K. Chan, E.C. Kan and R.W. Dutton and P.M. Pinsky                                                                          |      |
| <b>TH3F-7</b>  | <b>A Pulsed-Measurement Based Electrothermal Model of HBT with Thermal Stability Prediction Capabilities</b>                 | 1515 |
|                | T. Peyretailade, M. Perez, S. Mons, R. Sommet, Ph. Auxemery, J.C. Lalaurie and R. Quéré                                      |      |
| <b>TH3F-8</b>  | <b>Analysis and Design of Feedforward Power Amplifier</b>                                                                    | 1519 |
|                | S.-G. Kang, I.-K. Lee and K.-S. Yoo                                                                                          |      |
| <b>TH3F-9</b>  | <b>Mode Computation in Long Tapered Multi-Cell Linear Accelerator Structures Using the GSM Method</b>                        | 1523 |
|                | M. Dohlus, A. Jöstingmeier, A. S. Omar and C. Rieckmann                                                                      |      |
| <b>TH3F-10</b> | <b>Hybrid FEM Analysis of Thick CPW Discontinuities with Nonrectangular Cross Section</b>                                    | 1527 |
|                | F.-L. Lin and R.-B. Wu                                                                                                       |      |
| <b>TH3F-11</b> | <b>Practical Metal Loss Implementation for a Microstrip Line Structure Using SIBC in FDTD Simulation</b>                     | 1531 |
|                | E. Takagi, B. Houshmand and T. Itoh                                                                                          |      |
| <b>TH3F-12</b> | <b>MICs in a Multilayer Dielectric Media in a Rectangular Waveguide</b>                                                      | 1535 |
|                | O.M.C.P. Filho and T.K. Sarkar                                                                                               |      |
| <b>TH3F-13</b> | <b>Second Order Nonuniform Grid Spacing in the FDTD Technique</b>                                                            | 1539 |
|                | M. Falconer and V. Tripathi                                                                                                  |      |
| <b>TH3F-14</b> | <b>FDTD Method with a Conformal Polygonal Mesh and Perfectly Matched Layer Absorbing Boundary Condition</b>                  | 1543 |
|                | K. Naishadham and Z. Lin                                                                                                     |      |
| <b>TH3F-15</b> | <b>A S/V Potential Method for Maxwell's Equations Near Corners Using Nodal Elements</b>                                      | 1547 |
|                | W.E. Boyse and K.D. Paulsen                                                                                                  |      |
| <b>TH3F-16</b> | <b>New 3D Low Loss, Wide Band Microwave Interconnection</b>                                                                  | 1551 |
|                | P. Monfraix, A.C. Vera, O. Llopis, P. Ulian, S. George, C. Drevon, C. Tronche and J. Graffeuil                               |      |
| <b>TH3F-17</b> | <b>Time-Domain (Transient) Analysis of Capacitive Jaumann Absorbers</b>                                                      | 1555 |
|                | A. Cheldavi and M. Kamarei                                                                                                   |      |

|                |                                                                                                                           |      |
|----------------|---------------------------------------------------------------------------------------------------------------------------|------|
| <b>TH3F-18</b> | <b>Modal Analysis of Parallel and Crossed Rectangular Waveguide Broadwall Couplers with Apertures of Arbitrary Shape</b>  | 1559 |
|                | T. Sieverding, A.H. Motamedi, J. Reiter and F. Arndt                                                                      |      |
| <b>TH3F-19</b> | <b>A Generalized 3D Subgrid Technique for the Finite-Difference Time Domain Method</b>                                    | 1563 |
|                | J. Ritter and F. Arndt                                                                                                    |      |
| <b>TH3F-20</b> | <b>An Efficient Inversion Technique for Banded Linear Systems</b>                                                         | 1567 |
|                | V.E. Boria, G. Gerini and M. Guglielmi                                                                                    |      |
| <b>TH3F-21</b> | <b>General Full-Wave Green's Functions in Spectral Domain for Arbitrarily Multilayered Dielectric Media</b>               | 1571 |
|                | K. Li                                                                                                                     |      |
| <b>TH3F-22</b> | <b>Accurate CAD for Dual Mode Filters in Circular Waveguide Including Tuning Elements</b>                                 | 1575 |
|                | V. Boria and M. Guglielmi                                                                                                 |      |
| <b>TH3F-23</b> | <b>Input Noise Current Spectral Density Estimation for a Distributed Based Optical Receiver</b>                           | 1579 |
|                | A. Borjak, L. Moura and J.J. O'Reilly and I. Darwazeh                                                                     |      |
| <b>TH3F-24</b> | <b>Wide Band CAD Model for Coplanar Waveguide Using FDTD Technique</b>                                                    | 1583 |
|                | E. Lan, S.M. El-Ghazaly, V. Nair, K. Eisenbeiser, B. Ooms                                                                 |      |
| <b>TH3F-25</b> | <b>Application of the Harmonic-Balance Method to the Stability Analysis of Oscillators</b>                                | 1587 |
|                | J. Gerber and C.-R. Chang                                                                                                 |      |
| <b>TH3F-26</b> | <b>Accurate and Efficient CAD-Oriented Modeling of Circular Waveguide Bends</b>                                           | 1591 |
|                | A. Weisshaar, M. Mongiardo and V.K. Tripathi                                                                              |      |
| <b>TH3F-27</b> | <b>CAD and Electrical Performance of New Compact Power Divider Suitable for Use in M(H)MICS</b>                           | 1595 |
|                | J. Benbrahim, H. Kobeissi and K. Wu                                                                                       |      |
| <b>TH3F-28</b> | <b>Parasitic Resistance Extraction Errors with Implications for FET Model Accuracy Around <math>V_{ds} = 0</math></b>     | 1599 |
|                | V.I. Cojocaru and T.J. Brazil                                                                                             |      |
| <b>TH3F-29</b> | <b>EM-ANN Modeling and Optimal Chamfering of 90°CPW Bends with Air-bridges</b>                                            | 1603 |
|                | P.M. Watson and K.C. Gupta                                                                                                |      |
| <b>TH3F-30</b> | <b>On the Generalized Scattering Matrix of a Lossless Multiport</b>                                                       | 1609 |
|                | A. Morini and T. Rozzi                                                                                                    |      |
| <b>TH3F-31</b> | <b>Efficient Numerical Method to the Design of Microwave Active Circuits</b>                                              | 1611 |
|                | E. Kerherve and P. Jarry                                                                                                  |      |
| <b>TH3F-32</b> | <b>Analysis and Design of Microwave Structures Using Broad Frequency Band and Shape Driven Edge Finite Element Models</b> | 1615 |
|                | F. Thévenon, M.F. Wong, P. Guillaume, M. Masmoudi, M. Rochette and V. Fouad Hanna                                         |      |
| <b>TH3F-33</b> | <b>Synthesis of Impedance Matching Circuits Using Arbitrary Nonuniform Transmission Lines</b>                             | 1619 |
|                | A.H. Hamade, A.B. Kouki and F.M. Ghannouchi                                                                               |      |
| <b>TH3F-34</b> | <b>Characterization and Minimization of Mutual Coupling Between NLC-FED Slot Antennas</b>                                 | 1623 |
|                | Y. Qian and T. Itoh                                                                                                       |      |
| <b>TH3F-35</b> | <b>A New Broadband Coplanar Waveguide to Slotline Transition</b>                                                          | 1629 |
|                | K.-P. Ma and T. Itoh                                                                                                      |      |
| <b>TH3F-36</b> | <b>FDTD Investigation of Higher Order Mode Leakage from Three Dimensional Microstrip Line Structures</b>                  | 1631 |
|                | Z. Ma and E. Yamashita                                                                                                    |      |
| <b>TH3F-37</b> | <b>Scattering Parameters of Interdigital Microstrip Gap Under Laser Spot Illumination</b>                                 | 1635 |
|                | Y. Horii and M. Tsutsumi                                                                                                  |      |
| <b>TH3F-38</b> | <b>Measurements of Unloaded Q-Factor of Transmission Mode Dielectric Resonators</b>                                       | 1639 |
|                | K. Leong, J. Mazierska and J. Krupka                                                                                      |      |

|                |                                                                                                                                                                                                                                                                                                          |             |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>TH3F-39</b> | <b>Image Observation of Pico Second Electrical Pulse by Scanning Force Optoelectronic Microscope</b><br>K. Takeuchi and A. Mizuhara                                                                                                                                                                      | <b>1643</b> |
| <b>TH3F-40</b> | <b>Vizualisation of Portable Phone-User Interactions Via Near Field Mapping on Mannequins and Volunteers</b><br>L. Ahlonsou, D. Picard and J.C. Bolomey                                                                                                                                                  | <b>1825</b> |
| <b>TH3F-41</b> | <b>Microscopic Observation of the Temperature Coefficient Distribution of Dielectric Material for Microwave Application Using Scanning Photothermal Dielectric Microscope</b><br>Y. Cho, T. Kasahara and K. Fukuda                                                                                       | <b>1647</b> |
| <b>TH3F-42</b> | <b>Novel Methods of Measuring Impurity Levels in Liquid Tanks</b><br>M. Weiß and R. Knöchel                                                                                                                                                                                                              | <b>1651</b> |
| <b>TH3F-43</b> | <b>Network-Analyzer Self-Calibration with Four or Five Standards for the 15-Term Error-Model</b><br>A. Gronefeld and B. Schiek                                                                                                                                                                           | <b>1655</b> |
| <b>TH3F-44</b> | <b>Comparison of Air Coplanar Microprobes for On-Wafer Measurements at W-band</b><br>A. Pham, J. Laskar, S. Basu and J. Pence                                                                                                                                                                            | <b>1659</b> |
| <b>TH3F-45</b> | <b>A Calibration Procedure for W-band On-wafer Testing</b><br>Y.-L. Kok, M. DuFault, T.-W. Huang and H. Wang                                                                                                                                                                                             | <b>1663</b> |
| <b>TH3F-46</b> | <b>A New Field-Probing Technique for Millimeter-Wave Components</b><br>A. Basu and T. Itoh                                                                                                                                                                                                               | <b>1667</b> |
| <b>TH3F-47</b> | <b>A Membrane Quadrant Probe for R&amp;D applications</b><br>S. Basu and R. Gleason                                                                                                                                                                                                                      | <b>1671</b> |
| <b>TH3F-48</b> | <b>Known Good Die Testing of Wide S/C Band Power MMICs</b><br>S. Basu, R. Finke and E. Strid                                                                                                                                                                                                             | <b>1675</b> |
| <b>TH3F-49</b> | <b>Microstrip Ring Resonator as a Moisture Sensor for Wheat Grains</b><br>K.K. Joshi, M. Abegaonkar, R.N. Karekar and R.C. Aiyer                                                                                                                                                                         | <b>1679</b> |
| <b>TH3F-50</b> | <b>Measurement of Temperature Dependence of Relative Permittivity by the Cavity Perturbation Method</b><br>T. Takahashi, Y. Iijima and T. Miura                                                                                                                                                          | <b>1683</b> |
| <b>TH3F-51</b> | <b>A Novel Time Domain Characterization Technique of Intermodulation in Microwave Transistors. Application to the Vizualization of the Distortion of High Efficiency Power Amplifiers</b><br>D. Barataud, A. Mallet, J.P. Frayse, F. Blache, M. Campovecchio, J.M. Nebus, J.P. Villotte and J. Verspecht | <b>1687</b> |
| <b>TH3F-52</b> | <b>Improvement of Digital Mapping Predistorters for Linearising Transmitters</b><br>Q. Ren and I. Wolff                                                                                                                                                                                                  | <b>1691</b> |
| <b>TH3F-53</b> | <b>Sensitivity of Distortion Cancellation in Feedforward Amplifiers to Loops Imbalances</b><br>Y.K.G. Hau, V. Postoyalko and J.R. Richardson                                                                                                                                                             | <b>1695</b> |
| <b>TH3F-54</b> | <b>FFT Windows for Intermodulation Analysis of Microwave Circuits from Transient Simulation</b><br>K. Gard                                                                                                                                                                                               | <b>1699</b> |
| <b>TH3F-55</b> | <b>Phase Compensation in an Optically Controlled Microwave Attenuator</b><br>H. Shimasaki, S. Matsuda and M. Tsutsumi                                                                                                                                                                                    | <b>1703</b> |
| <b>TH3F-56</b> | <b>Millimetre Wave Generation by Filtering the FM-IM Spectra of a Directly Modulated DFB Laser</b><br>K.E. Razavi and P.A. Davies                                                                                                                                                                        | <b>1707</b> |
| <b>TH3F-57</b> | <b>40 GHz-Narrow Band Photoreceiver for Clock Recovery in 40 Gbit/s Optical Transmission Systems</b><br>A. Miras, E. Legros, S. Vuye, G. Wanlin and L. Giraudet                                                                                                                                          | <b>1709</b> |
| <b>TH3F-58</b> | <b>10Gb/s Clock Extraction and Data Regeneration Circuit Implemented with Phase-Locked Loop</b><br>T.-W. Yoo and M.-S. Park                                                                                                                                                                              | <b>1713</b> |

|                |                                                                                                                                                        |      |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>TH3F-59</b> | <b>Synthesis of Amplitude Response of Optical Directional Coupler Modulators</b><br>S.W. Løvseth, C. Laliew and A. Gopinath                            | 1717 |
| <b>TH3F-60</b> | <b>A New Approach for Optical Millimeter Wave Generation Utilizing Locking Techniques</b><br>T. Berceli                                                | 1721 |
| <b>TH3F-61</b> | <b>Dual Mode Patch Superconductor Cavity Filters</b><br>X. Zhang, C. Wang, K.A. Zaki and K.S. Harshavardhan                                            | 1725 |
| <b>TH3F-62</b> | <b>Large-Signal Design of MMIC Ka-Band Power Amplifiers Based on Physical Models</b><br>A.D. Plews, C.M. Snowden and M.J. Howes                        | 1729 |
| <b>TH3F-63</b> | <b>Modeling and Characterization of Interconnects and IC Packages by FDTD 3D Simulation</b><br>M. Falconer and V. Tripathi                             | 1733 |
| <b>TH3F-64</b> | <b>Full-Wave Investigation on the Curved Bonding Wire Interconnection by using a Suitable FDTD Code</b><br>F. Alimenti, P. Mezzanotte and L. Roselli   | 1737 |
| <b>TH3F-65</b> | <b>Measurements of Field Distributions and Scattering Parameters in Multiconductor Structures Using an Electric Field Probe</b><br>Y. Gao and I. Wolff | 1741 |

## Session TH4A

### Antennas and Systems for Personal Communication

**3:30 pm–5:10 pm**

**Room A201**

**Thursday, June 12, 1997**

Chair: R.K. Gupta, COMSAT Laboratories

Co-Chair: W. Ou, OTC Telecom

|                                 |                                                                                                                                                                |      |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>TH4A-1</b><br><b>3:30 pm</b> | <b>An Adaptive Antenna Integrated with Automatic Gain Control for Receiver Front End</b><br>J.L. Dawson and J. Lin                                             | 1747 |
| <b>TH4A-2</b><br><b>3:50 pm</b> | <b>Finite-Difference Time-Domain Analysis of a Dual Resonance and Shielded Cellular Antenna</b><br>B.S. Yildirim and E.-B. El-Sharawy                          | 1751 |
| <b>TH4A-3</b><br><b>4:10 pm</b> | <b>Microstrip-Fed Cylindrical Slot Antennas for GPS Avionics Applications</b><br>C.H. Ho, P.K. Shumaker, K.B. Smith, D.W. Huang, J.W. Liao and Y.H. Wang       | 1755 |
| <b>TH4A-4</b><br><b>4:30 pm</b> | <b>Performance of PCS Handset Antennas in Mobile Environments</b><br>M.G. Douglas, M. Okoniewski and M.A. Stuchly                                              | 1759 |
| <b>TH4A-5</b><br><b>4:50 pm</b> | <b>The Implication of Nonlinear Effect On DS/CDMA With Imperfect Power Control In Optical Transmission</b><br>S. Geslin, A. Borjak, L. Moura and J.J. O'Reilly | 1763 |

TH  
4A

TH  
4D

TH  
4E

## Session TH4D

(Joint ARFTG and IMS Session)

# Crosstalk, Coupling and Multiconductor Transmission Line Characterization

3:30 pm-510 pm

Room Al01

Thursday, June 12, 1997

Chair: D. Williams, National Institute of Standards and Technology

Co-Chair: J. Laskar, Georgia Institute of Technology

|                                 |                                                                                                                                                                                                             |             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>TH4D-1</b><br><b>3:30 pm</b> | <b>An Accurate Determination of the Characteristic Impedance Matrix of Coupled Symmetrical Lines on Chips Based on High Frequency S-Parameter Measurements</b><br>T.-M. Winkel, L.S. Dutta and H. Grabinski | <b>1769</b> |
| <b>TH4D-2</b><br><b>3:50 pm</b> | <b>Embedded Multiconductor Transmission Line Characterization</b><br>D.F. Williams                                                                                                                          | <b>1773</b> |
| <b>TH4D-3</b><br><b>4:10 pm</b> | <b>Characterization of Multiconductor Coupled Lines from Multiport TDR Measurements</b><br>A. Tripathi and V.K. Tripathi                                                                                    | <b>1777</b> |
| <b>TH4D-4</b><br><b>4:20 pm</b> | <b>Experimental Circuit Model Generation of Non-Uniform Coupled Multi-Conductor Structures</b><br>S. Sercu and L. Martens                                                                                   | <b>1781</b> |
| <b>TH4D-5</b><br><b>4:30 pm</b> | <b>Waveform Relaxation Synthesis of Time-Domain Characteristic Model of Coupled Transmission Lines from FDTD Simulation</b><br>Q.-X. Chu and F.-Y. Chang                                                    | <b>1785</b> |
| <b>TH4D-6</b><br><b>4:40 pm</b> | <b>Excitation of the Parasitic Parallel-Plate Line Mode at Coplanar Discontinuities</b><br>K. Beilenhoff and W. Heinrich                                                                                    | <b>1789</b> |
| <b>TH4D-7</b><br><b>5:00 pm</b> | <b>Investigation of MMIC Inductor Coupling Effects</b><br>M. Werthen, I. Wolff, R. Keller and W. Bischof                                                                                                    | <b>1793</b> |

## Session TH4E

# Numerical Methods in Frequency Domain II

3:30 pm-5:10 pm

Room Al08

Thursday, June 12, 1997

Chair: H.-Y. Yang, University of Illinois-Chicago

|                                 |                                                                                                                                                 |             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>TH4E-1</b><br><b>3:30 pm</b> | <b>Wavelet-Based CAD Modeling of Microstrip Discontinuities Using Least Square Prony's Method</b><br>K.F. Sabet, L.P.B. Katehi and K. Sarabandi | <b>1799</b> |
| <b>TH4E-2</b><br><b>3:50 pm</b> | <b>Diakoptics and the Multilevel Moments Method for Planar Circuits</b><br>S. Ooms and D. De Zutter                                             | <b>1803</b> |
| <b>TH4E-3</b><br><b>4:10 pm</b> | <b>Design of Planar Circuit Structures with an Efficient Magneto-Static Field Solver</b><br>S. Lindenmeier and P. Russer                        | <b>1807</b> |
| <b>TH4E-4</b><br><b>4:30 pm</b> | <b>Influence of Conductor Loss and Thickness in Coplanar Circuit Elements</b><br>L. Vietzorreck and W. Pascher                                  | <b>1811</b> |
| <b>TH4E-5</b><br><b>4:50 pm</b> | <b>A Unified Method for Characterization of Microstrip and Waveguide Discontinuities of Irregular Shape</b><br>T.-S. Horng                      | <b>1815</b> |