2012 Workshop on Integrated Nonlinear Microwave and Millimetre-wave Circuits

(INMMIC 2012)

Dublin, Ireland
3 – 4 September 2012
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Opening Session
Chair: Thomas J. Brazil, University College Dublin, Ireland
Date: Monday, 3rd September 2012

Keynote Talk 1 09:10-09:50
Why It is so Hard to Find Small Radio Frequency Signals in the Presence of Large Signals
Michael B. Steer, Jonathan R. Wilkerson, Nikhil M. Kriplani, and Joshua M. Wetherington
North Carolina State University, USA

Keynote Talk 2 09:50-10:30
Point-to-Point Radio Technology Roadmap for Addressing Mobile Data Growth - A Semiconductor Company's Perspective
Martin Cotter
Analog Devices, Inc., Ireland

Session 1: Modelling and Simulation
Chair: Dominique Schreurs, K. U. Leuven, Belgium
Date: Monday, 3rd September 2012

S1-1 10:50-11:10
On the Implementation of Device Processing Tolerances in FET Large Signal Models
Ilitcho Angelov, Mattias Ferndahl, and Marcus Gavell
Chalmers University of Technology, Sweden

S1-2 11:10-11:30
Non-Linear Look-up Table Modeling of GaAs HEMTs for Mixer Application
Giovanni Crupi1, Antonio Raffo2, Giuseppe Sivverini3, Gianni Bosi2, Gustavo Avolio4, Dominique Schreurs4, Alina Caddemi1, and Giorgio Vannini2
1University of Messina, Italy, 2University of Ferrara, Italy, 3TriQuint Semiconductor, USA, 4K.U.Leuven, Belgium

S1-3 11:30-11:50
Modelling of Transistor Feeding Structures Based on Electro-Magnetic Field Simulations
Sebastian Diebold1, Matthias Seelmann-Eggebert2, Heiko Gulan1, Arnulf Leuther2, Thomas Zwick1, and Ingmar Kallfass1,2
1Karlsruhe Institute of Technology, Germany, 2Fraunhofer Institute for Applied Solid State Physics, Germany

S1-4 11:50-12:10
Physics-based SS and SSLS Variability Assessment of Microwave Devices through Efficient Sensitivity Analysis
Francesco Bertazzi, Fabrizio Bonani, Simona Donati Guerrieri, and Giovanni Ghione
The Polytechnic University of Turin, Italy

S1-5 12:10-12:30
Modeling and Simulation of Silicon-Based Planar Transmission Lines for Micromachined Filter Applications
Jin Li, Xiaochuan Zhang, and Jun Xu
University of Electronic Science and Technology of China, China
Session 2: Power Amplifiers (I)
Chair: Jose C. Pedro, University of Aveiro, Portugal
Date: Monday, 3rd September 2012

S2-1 13:30-13:50
A Generalized MIMO Design Technique for Broadband Doherty Power Amplifiers Based on Complex Network Synthesis Methods
Gayle Collins
Maxentric Technologies, USA

S2-2 13:50-14:10
Design of a 55 W Packaged GaN HEMT with 60% PAE by Internal Matching in S-Band
Jerome Cheron1, Michel Campovecchio1, Denis Barataud1, Tibault Reveyard1, Sebastien Mons1, Michel Stanislawiak2, Philippe Eudeline2, and Didier Floriot1
1XLIM, University of Limoges, France, 2Thales Air System, France

S2-3 14:10-14:30
A UHF Outphasing Transmitter Based on Class E Power Amplifiers
Reinel Marante, M. Nieves Ruiz, and Jose A. Garcia
University of Cantabria, Spain

S2-4 14:30-14:50
Intrinsic Class-F RF GaN Power Amplifier with a Commercial Transistor Based on a Modified "Hybrid" Approach
Song Liu, and Dominique Schreurs
K. U. Leuven, Belgium

S2-5 14:50-15:10
Analysis of the Integration of Envelope Tracking with Continuous Class F Amplifiers
Brian Merrick, and Thomas J. Brazil
University College Dublin, Ireland

Session 3: Digital Linearisation and Advanced Transmitters
Chair: Anding Zhu, University College Dublin, Ireland
Date: Monday, 3rd September 2012

IEEE MTT-S DML Talk 1 15:30-16:00
Behavioural Modelling and Linearisation of RF Power Amplifiers
John Wood
Maxim Integrated Products, Inc., USA

S3-1 16:00-16:20
Bandwidth-constrained Least Squares-based Model Extraction for Band-limited Digital Predistortion of RF Power Amplifiers
Lei Guan, Chao Yu, and Anding Zhu
University College Dublin, Ireland

S3-2 16:20-16:40
Implementing Crest Factor Reduction (CFR) by Offsetting Digital Predistortion (DPD) Coefficients
Richard N. Braithwaite
Powerwave Technologies, USA

S3-3 16:40-17:00
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Poster Session
Chair: Anding Zhu, University College Dublin, Ireland
Date: Monday, 3rd September 2012

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Joshua M. Wetherington, and Michael B. Steer
North Carolina State University, USA

P-2 12:30-13:30
A 0.13um Double Balanced Mixer for 3.2-4.8GHz IR-UWB Applications
Leonardo Pantoli, Vincenzo Stornelli, and Giorgio Leuzzi
University of L'Aquila, Italy

P-3 12:30-13:30
Distortion Contribution Analysis of an LDMOS Doherty Power Amplifier
Janne P. Aikio
University of Oulu, Finland

P-4 12:30-13:30
Band-pass Distributed Power Amplifier in Monolithic Technology for the LTE Band
Francisco Yak Ng-Molina¹, Teresa Maria Martin-Guerrero¹, Carlos Camacho-Penalosa¹, Diego Palombini², and Ernesto Limiti²
¹University of Malaga, Spain, ²University of Rome Tor Vergata, Italy

P-5 12:30-13:30
A Wideband Digital Pre-distortion Platform with 100 MHz Instantaneous Bandwidth for LTE-Advanced Applications
Huangjie Wu, Jing Xia, Jianfeng Zhai, Ling Tian, Mengsu Yang, Lei Zhang, and Xiaowei Zhu
Southeast University, China

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Maria J. Madero-Ayora¹, Michel Allegue-Martinez¹, Jose A. Garcia², Javier Reina-Tosina¹, and Carlos Crespo-Cadenas¹
¹University of Seville, Spain, ²University of Cantabria, Spain

P-7 12:30-13:30
Broadband MMIC Tuners Dedicated to Noise Parameter Measurements at Cryogenic Temperatures
Daniel Bruch¹, Matthias Seelmann-Eggebert², Ingmar Kallfass¹², Arnulf Leuther¹, Sebastian Diebold², Michael Schlechtweg¹, and Oliver Ambacher¹
¹Fraunhofer Institute for Applied Solid State Physics, Germany, ²Karlsruhe Institute of Technology, Germany

P-8 12:30-13:30
Implementation of Harmonic Balance Reduced Model Order Equation
Abdallah Hijazi, Sebastien Mons, and Edouard Ngoya
XLIM Laboratory - University Limoges, France

Session 4: Measurement and Characterisation
Chair: Paul J. Tasker, Cardiff University, UK
Date: Tuesday, 4th September 2012

**IEEE MTT-S DML Talk 2 09:00-09:30**
Towards Greener Smartphones with Microwave Measurements  
Dominique Schreurs  
K. U. Leuven, Belgium

**S4-1 09:30-09:50**
Active and Hybrid Harmonic Load Pull Systems: An Overview and Comparison  
Christos Tsironis  
Focus Microwaves Inc., Canada

**S4-2 09:50-10:10**
An Analytical Approach to Obtain Optimum Load Impedance Using X-Parameters  
Hosein Zargar¹, Ali Banaı¹, Jialin Cai⁰, and Thomas J. Brazil¹  
¹Sharif University of Technology, Iran, ²University College Dublin, Ireland

**S4-3 10:10-10:30**
Oscilloscope-based Two-port Measurement System Using Error-corrected Modulated Signals  
Kristoffer Andersson, and Christian Fager  
Chalmers University of Technology, Sweden

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**Session 5: Power Amplifiers (II)**
Chair: Teresa Maria Martin-Guerrero, University of Malaga, Spain  
Date: Tuesday, 4th September 2012

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Bandwidth Improvement of a Limit-Cycle Amplifier Using a Novel Hysteretic Relay  
Manuel J. Duarte, Pedro M. Cabral, and Jose C. Pedro  
University of Aveiro, Portugal

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GaN Power Amplifier Design Exploiting Wideband Large-Signal Matching  
Sergio Di Falco¹, Antonio Raffo², Davide Resca¹, Francesco Scappaviva¹, Valeria Vadala², and Giorgio Vannini²  
¹MEC srl, Italy, ²University of Ferrara, Italy

**S5-3 11:30-11:50**
X-band Wideband 5 W GaN MMIC Power Amplifier with Large-signal Gain Equalization  
Vittorio Camarchia, Jie Fang, Giovanni Ghione, Jorge Moreno Rubio, Marco Pirola, and Roberto Quaglia  
The Polytechnic University of Turin, Italy

**S5-4 11:50-12:10**
PAE Improvement Using 2nd Harmonic Source Injection at X-band  
Merv Haynes¹, Steve C. Cripps², Johannes Benedikt², and Paul J. Tasker²  
¹Selex Galileo Ltd, UK, ²Cardiff University, UK

**S5-5 12:10-12:30**
Transmit and Receive Amplifiers for E-band Communications Systems Using GaAs pHEMT Technology  
Jeff Powell¹, Mark Moore¹, Paul Munday¹, Robin Sloan², Chris Duff², and Paul Rice²  
¹Skyarna Ltd, UK, ²University of Manchester, UK

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**Session 6: Millimetre-wave Applications**
Chair: Ernesto Limiti, University of Roma Tor Vergata, Italy  
Date: Tuesday, 4th September 2012
Biasing an HBT MMIC Transistor for Efficiency and Output Power Enhancement
Juan F. Miranda Medina, Morten Olavsbraaten, and Karl Martin Gjertsen
Norwegian University of Science and Technology, Norway, Ceragon, Norway

A D-Band Phase Compensated Variable Gain Amplifier
Daniel Muller, Sebastian Diebold, Hermann Massler, Axel Tessmann, Arnulf Leuther, Thomas Zwick, and Ingmar Kallfass
Karlsruhe Institute of Technology, Germany, Fraunhofer Institute for Applied Solid State Physics, Germany

A Balanced 150-240 GHz Amplifier MMIC using Airbridge Transmission Lines
Joachim Langst, Sebastian Diebold, Hermann Massler, Axel Tessmann, Arnulf Leuther, Thomas Zwick, and Ingmar Kallfass
Karlsruhe Institute of Technology, Germany, Fraunhofer Institute for Applied Solid State Physics, Germany

255 to 330 GHz Active Frequency Tripler MMIC
Ulrich J. Lewark, Axel Tessmann, Sandrine Wagner, Arnulf Leuther, Thomas Zwick, and Ingmar Kallfass
Karlsruhe Institute of Technology, Germany, Fraunhofer Institute for Applied Solid State Physics, Germany

A Reconfigurable Class E Oscillator/Rectifier Based on an E- pHEMT
M. Nieves Ruiz, Alvaro Gonzalez, Reinel Marante, and Jose A Garcia
University of Cantabria, Spain

A Low Power, Eight-phase LC-ring Oscillator for Clock and Data Recovery Application
Nina Parkalian, and Khosrow Hajsadeghi
Sharif University Of Technology, Iran

SiGe V Band Wide Tuning-Range VCO and Frequency Divider for Phase Locked Loop
Jian Zhang, Guochi Huang, and Vincent Fusco
Queen's University Belfast, UK, Analog Devices Inc., Ireland

Closing Session
Chair: Anding Zhu, University College Dublin, Ireland
Date: Tuesday, 4th September 2012

Metrology Developments for Future Wireless Technologies
Nuno Borges Carvalho
University of Aveiro, Portugal