International Symposium on Electromagnetic Compatibility

September 4 - 8, 2006
Barcelona, Spain

FINAL PROGRAMME

Organized by
Technical University of Catalonia (UPC)
Ramon Llull University (URL)

With the collaboration of
Spanish Electronic, Information Technology
and Telecommunication Industries Association (AETIC)
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- 4 semi-anechoic chambers for measurements up to a distance of 10 m.
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www.emceurope2006.org
Chairman’s message

This year we are celebrating the seventh edition of the EMC Europe. We have come a long way since the first EMC Europe was held twelve years ago in Rome in 1994 where, enchanted by the magic of the Eternal City, we returned until 1998. In the year 2000, the medieval city of Bruges was chosen to usher in the new millennium. Two years later we traveled south again, to Sorrento, and then in 2004 north again, to Eindhoven, where the last EMC Europe was held in 2004. Now we return once more to the Mediterranean, to Barcelona, where we invite you to make yourself at home. The next edition of the EMC Europe will take place in Hamburg in 2008.

On this occasion the Symposium has received 244 papers from 31 different countries. After an anonymous reviewing process carried out by three members of the Editorial Board, the accepted papers will be presented in 24 oral sessions and 9 poster sessions. Furthermore, 14 parallel workshops and tutorials on hot EMC issues will also be held. A technical exhibition has also been organized within the EMC framework, while students will have the opportunity of attending a Socrates Course in which the leading European professors in the field of EMC will participate.

On behalf of the Local Organizing Committee, I would like to express my gratitude to the International Steering Committee for the opportunity of organizing the symposium here in Barcelona, to the reviewers who have ensured the high standard of the papers selected, as well as the chairpersons of the sessions and the organizers of the workshops and tutorials. I would also like to thank the sponsors, and of course the members of the Local Organizing Committee for all their efforts to make the project a success. Last, but not least, a word of thanks for all those who in one way or another have made the EMC Europe 2006 in Barcelona possible.

Finally, I sincerely trust that the EMC Europe 2006 will be a fruitful professional experience for everyone, and take this opportunity to welcome you all to Barcelona, a city which in the words of Woody Allen “is probably the most perfect of cities.”

Ferran Silva
Chairman of the EMC Europe 2006
TECHNICAL PROGRAMME
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**WORKSHOPS**

**WTuA1**  Tuesday, Sep. 5, 2006  9:00 – 11:00 and 11:15 – 13:00  
**DESIGN & TEST OF SYSTEMS ON CHIP FOR EMC**  Room 3  
Chair: F. Vargas and V. Champac  

- Analog front-end susceptibility to EMI *(invited talk)*  
  F. Fiori, Politecnico di Torino, Italy  

- Emission and susceptibility issues in systems-on-chip for EMC  
  E. Sicard, INSA, France  

- Modeling and design of on-chip inter-block decoupling capacitors for PSN and EMI reduction  
  J. Rius, UPC, Spain  
  M. Meijer  

- Hybrid solutions for leveraging SoC robustness in EMI-exposed environments  
  F. Vargas, PUCRS, Brazil  
  L. Picolli, A. A. de Alecrim Jr., M. Moraes, M. Gama  

- Signal integrity verification for complex IC's  
  V. Champac, IFACOE, Mexico  
  N. Hernandez, J. Figueras  

- Panel: SoC design & test roadmap for EM compatibility and collaborative perspectives  
  E. Sicard, INSA, France. F. Vargas, PUCRS, Brazil. F. Fiori, Politecnico di Torino, Italy. J. P. Teixeira, INESC/ID, Portugal. J. Rius, UPC, Spain  

**WTuB1**  Tuesday, Sep. 5, 2006  9:00 – 11:00 and 11:15 – 13:00  
**CHARACTERIZATION OF SMALL SHIELDING ENCLOSURES**  Room 4  
Chair: J. Catrysse and M.S. Sarto  

- Shielding effectiveness of enclosures: An introduction  
  M.S. Sarto, University of Rome “La Sapienza”, Italy  

  J. Catrysse, KHBO, Belgium  

- Finding the representative contents for the measure of shielding effectiveness  
  A. Marvin, University of York, UK  
  Y. Cui  

- Suggested definitions of shielding for enclosures at microwave frequencies  
  A. Marvin, University of York, UK  
  Y. Cui  

- Nested reverberation chamber measurements for the shielding effectiveness of advanced materials  
  C. L. Holloway, NIST, USA  

- Questions and open forum discussion  
  J. Catrysse, M.S. Sarto, A. Marvin and C. L. Holloway
TUESDAY

WORKSHOPS (cont.)

WTuA2 Tuesday, Sep. 5, 2006 14:00 – 15:30 and 15:45 – 17:00
EMC FOR FUNCTIONAL SAFETY.
Including an introduction to IEC 61000-1-2. Room 3

TUTORIAL:
Where EMI could increase safety risks, the normal approach to EMC (based on testing alone) is inadequate. Keith Armstrong will introduce the issues and discuss how they can be dealt with by EMC design/mitigation and verification/testing activities.

IEC 61000-1-2 is the basic IEC publication on EMC and Functional Safety, now under maintenance to align with IEC 61508. Bernd Jaekel, its convenor, will describe its planned structure, contents and open questions.

Lecturers:
K. Armstrong, Cherry Clough Consultants, UK and B. Jaekel, Siemens AG, Germany

Program:
Introduction to EMC for Functional Safety
Introduction to IEC 61000-1-2
EMC design/mitigation techniques for Functional Safety

WTuB2 Tuesday, Sep. 5, 2006 14:00 – 15:30 and 15:45 – 17:00
INTERFERENCES IN DTT (Digital Terrestrial Television)
Room 4

Chair: X. Puig

Presentation of the DVB-T technology (CTTI)
Which planning schemes are used in DTT?
Point of view of the network operators
Transmitter manufacturer
Explanation of the topology of the community aerials in the state
Subject discussion and open turn for questions

X. Puig, CTTI, Spain
V. Roger, J. Torra
PLENARY OPENING SESSION

Wednesday September 6, 2006  9:00 – 10:00  Auditorium

The New EMC European Directive, an easier procedure for companies
Luis Montoya Head of Unit, European Commission DG ENTR H/5 "Mechanical & electrical equipment"

ORAL morning

OWeA1  Wednesday September 6, 2006  10:45 – 13:00
MEASUREMENTS, INSTRUMENTATION AND TESTING (I)
Chair: H. Garbe  Room 1

An alternative test method for in-situ radiation measurements
K.H. Gonschorek, Dresden University of Technology, Germany
F. Schlagenhauber

On site receiver testing. Application to long distance HF links
C. Vilella, Enginyeria La Salle (Universitat Ramon LLul), Spain
D. Badia, J.Ll. Pijuan, M. Deumal, M. Ribó, J.R. Regué

The impact of phase in GTEM and TEM emission measurements
X.T.I. Ngu, The University of Nottingham, United Kingdom
C. Christopoulos, D.W.P. Thomas, A. Nothofer

Radiating impedance of mains cabling during emissions testing
U. Kappel, EMC Test NRW GmbH, Germany
M. Hillgärtner

Compensation method to improve prediction results at 10 m distance by EUT modeling using site attenuation
M. Kawabata, Fukuoka Industrial Technology Center, Japan
Y. Ishida, N. Kuwabara

Simulations and measurements applying the test wire method
F. Schröder, Dresden University of Technology, Germany
K. H. Gonschorek, J.E. Rodriguez, E. Perea, E. Zabala

A near-field measurement system for the analysis of PCB radiated emissions
A. Sona, University of Padova, Italy
M. Bertocco, P. Zanchetta

High-speed system for measuring electromagnetic field distributions
M. Takahashi, NICI, Japan

OWeB1  Wednesday September 6, 2006  10:45 – 13:00
COMPUTATIONAL ELECTROMAGNETICS (I)
Chair: F. Canavero  Room 2

Optimization of PEEC based electromagnetic modeling code using grid computing
J. Ekman, Lulea University of Technology, Sweden
F. Monsefi

Adaptive building of accurate and stable PEEC models for EMC applications
G. Antonini, University of L’Aquila, Italy
D. Deschrijver, T. Dhaene

Improvement of PEEC models via multipoint approximations of potentials
S.V. Kochetov, O.v.G-University Magdeburg, Germany
G. Wollenberg

Accuracy and stability enhancement of PEEC models for the time and frequency domain
A. E. Ruehli, J. Ekman

Broad-band analysis of a feed point to coaxial transition
J.M. López-Villegas, Universitat de Barcelona, Spain
N. Vidal

Temperature distribution examinations of lambda/4 type EM-absorber using resistive film under high power injection
S. Watanabe, Aoyama Gakuin University, Japan
K. Saito, A. Taniguchi, O. Hashimoto, T. Saito, H. Kunhara

Transient scattering analysis of arbitrarily shaped combined dielectric and conducting structures
R. Aghajafari, Hamburg university of technology, Germany
H. Singer

FDTD study of the mutual coupling between microstrip antennas for diversity wireless systems
L.M. Khashan, Mier International University, Egypt
H. A. Elsadek, E. A. Hashish

OWeC1  Wednesday September 6, 2006  10:45 – 12:00
TRANSIENTS
Chair: J.L. ter Haserborg  Room 3

Influence of repetitive pulses on the breakdown behavior of electronics
S. Korte, University of Hannover, Germany
H. Garbe, F. Sabath

Modelling of the IEC 61000-4-4 electrical fast transient injection clamp
F. Musolino, Politecnico di Torino, Italy
F. Fiori

ESD: an improved human body model with frequency-dependent parameters
V. Amoruso, Politecnico di Bari, Italy
E. Chiarianti, S. Vergura

12GHz Real time measurement of voltage rise time and current rise time due to micro gap discharge in voltage below 1kV
K. Kawamata, Hachinohe Institute of Technology, Japan
S. Minegishi, A. Haga, O. Fujiwara
**WEDNESDAY**

**ORAL morning** (cont.)

**OWeC2**  Wednesday September 6, 2006  12:00 – 13:00

**FILTERING**  Room 3

**Chair:** J. Balcells

**On the decoupling of the DC supply**
B. Danker, Bicon laboratories, Netherlands

**A method to design a 2nd order power line emi filter for switched mode power supplies**
J. Vazquez, Univ. Carlos III de Madrid, Esc. Pol. Sup., Spain
G. Soria, A. Barrado, E. Olias

**Design of an EMI output filter for frequency converters**
A. Roch, University of Twente, Netherlands
H. Bergmsa, F. Leferink, D. Zhao, H. Polinder, B. Ferreira

**WORKSHOPS morning**

**WWeA**  Wednesday, Sep. 6, 2006  10:45 – 13:00 & 15:00 – 17:00

**TESTING OF LARGE MACHINES: TEMCA2 PROJECT**

**Chair:** J. E. Rodriguez  Room 4

**Introduction to the Workshop**
J. E. Rodriguez, LABEIN-Tecnalia, Spain

**Overview of the TEMCA2 project**
I. Hendriks, KHBO, Belgium

**The Generic Test Object (GTO)**
J. Catrysse, KHBO, Belgium

**Radiated emission testing: test-wire method**
F. Schröder Dresden University of Technology, Germany
H. Gonschorek

**Conducted emission testing: capacitive foil probe**
J. E. Rodriguez, LABEIN-Tecnalia, Spain
E. Perea, E. Zabala

**Immunity testing**
F. Sobaru, CETIM, France

**The new EMC Directive 2004/108/EC and large machines**
I. Hendriks, KHBO, Belgium

**The TEMCA2 guide**
F. Sobaru, CETIM, France

**WWeB**  Wednesday, Sep. 6, 2006  10:45 – 13:00 & 15:00 – 17:00

**EMC/EME AND WIRELESS COMMUNICATION SYSTEMS**

**Chair:** A. Faraone and M. Feliziani  Room 5

**Overview on select EME and EMI standards related to mobile wireless transmitters**
A. Faraone, Motorola Labs, USA

**Radiated interference measurements in the radiating near-field**
A.C Marvin, University of York, UK
Y. Cui

**Experimental wireless system immunity and coexistence testing**
J. Marwe, Electrom. & Cooling Competence Center-Philips Applied Technologies, The Netherlands
M. Coenen

**Experimental EMC assessment of different ultra band technologies**
G. Manzi, Philips Semiconductors-Reference Design Center, Austria
M. Feliziani, P. Beeckman, N. van Dijk

**Interference impact on GPS receivers of unintentional radiated emission from personal computers**
K. Fors

**Generation of ultra wide bandwidth (UWB) pulses for cognitive radio applications**
C. Buccella, University of L’Aquila, Italy
M. Feliziani, G. Manzi

**Wide-band wireless communications in railway systems: performances of the radio link between train and base station; analysis of the related EMC problems**
P. Bernardi, University of Rome “La Sapienza”, Italy
D. Caratelli, R. Cicchetti, V. Schena, O. Testa

**EMC management of wireless transceivers in EMI sensitive environments**
J. Morrissey, Motorola Labs, USA
A. Faraone, Q. Balzano

**Assessment of human exposure to electromagnetic fields from general mobile transmitters**
S. Kuehn, IT’IS Foundation, Swiss Federal Institute of Technology, Switzerland
A. Kramer, U. Lott, N. Kuster

**Human exposure induced by operating wireless systems**
A. Cortel, France Telecom Research & Development, France
A. Gati, M. F. Wong, J. Wiart

**EMI in medical systems**
D. McLain, Philips Medical Systems, USA

**EMI and hospital devices**
M. Hietanen, Finnish Institute of Occupational Health, Finland
S. Sibakov, S Hällfors
PWeA: EMISSIONS, IMMUNITY AND EMC STANDARDS

High frequency effect of randomized switching time in DC-DC converters
N. Boudjerda, Jijel university, Algeria
M. Melit, B. Nekhoul, K. El Khamlichi, K. Kerroum

A systematic approach for modelling the effect of EMC absorbers in semi-anechoic chambers
S. R. Esparza, Politecnica de Valencia, Spain
L. Nuño, J. V. Balbastre

Using transfer ratio to evaluate EMC design of adjustable speed drive systems
D. Zhao, Technical University of Delft, Netherlands
J.A. Ferreira, H. Polinder, A. Roc'h, F.B.J. Leferink

Circumferential slot in a coaxial cable
D. Assante, University of Naples Federico II, Italy
L. Verolino, S. D'Agostino

Magnetic field emissions up to 400 kHz from a welding equipment
D. Desideri, University of Padova, Italy
A. Maschio

On the effect of high speed connector shields distributed contact resistance to radiated emissions
T. Tarvainen, Esju Oy, Finland
L. Hynynen, M. Rouvala, A. Renko

Mitigating the effects of electromagnetic interferences on substation secondary circuits
S. Carsimamovic, University of Sarajevo, Bosnia and Herzegovina
Z. Bajramovic, M. Veledar, M. Ljevak, A. Carsimamovic

Criteria for EMI reduction in sensor-conditioner measuring system
J. Gago, Technical University of Catalonia, Spain
D. Gonzalez, J Balcells, J.C. Le Bunetel, J Mon

Susceptibility of GPS receivers and wireless cameras to a single radiated UWB pulse
D. Månsson, University of Uppsala, Sweden
T. Nilsson, R. Thottappillil, M. Bäckström

Standardization for defence procurement - european handbook, recommendations electromagnetic environmental effects
F. Leferink, Thales/University of Twente, Netherlands
R. Malabiau

A theoretical approach to the procedures of the ANSI/AAMI PC69:2000 standard
T. Samaras, Aristotle University of Thessaloniki, Greece
D. Kitsou, J. Sahalos

PWeB: EMC AT CHIP LEVEL

Modeling the near electric and magnetic fields at the surface of an integrated circuit
C. Labussière, Freescale Semiconductor Inc., France
S. Ben Dhia, E. Sicard, B. Vrignon, C. Lochot

Evaluation of LSI power supply voltage noise caused by injected RF power using a LECCS model
T. Nakayama, Matsushita Electric Industrial Co., Ltd., Japan
E. Takahashi, Y. Saio, K. Shimazaki, M. Nagata, O. Wada

Assessing reconfigurable systems robustness in EMI-exposed environments
F. Vargas, Catholic University - PUCRS, Brazil
J. Benfica, A. Farina, E. Gatti, L. Garcia, D. Lupi, F. Hernández

Adequacy checkout of thermal models for degradation prediction of integrated circuits at HEMP action
V.I. Zhuravliov, Belarusian State University of Informatics and Radioelectronics, Belarus
V.F. Alexeev

PWeC: POWER LINE AND TRANSIENTS

Switch mode power supply emission decreasing using blocking impedance between primary and secondary
L. Filipic, Iskraemeco d.d., Slovenia
M. Martinjak

Simulation of stair stepping on inverter-fed induction motors
J.G. Knockaert, KHBO, Belgium
J. Peuteman, J. Catrysse, R. Belmans

Lightning induced voltages on power distribution lines: influence of rate of rise of lightning current
P. D. Kannu, National Institute of Technology Karnataka, India
J. Thomas
**PWeD:**  SHIELDING, COUPLING, FILTERING, GROUNDING

Textile shields of electromagnetic fields-application aspects
J. Koprowska, Textile Research Institute, Poland
H. Aniołczyk

An analytical model for the shielding effectiveness of a planar multi-layered shield
I. Mowete, University of Lagos, Nigeria
A. Ogunsola

Measurement of shielding effectiveness of small enclosures
S. Zvanovec, Czech Technical University, Faculty of Electrical, Czech Republic
P. Hazdra, T. Korinek, P. Pechac, M. Mazanek

Effective power bus noise mitigation on multilayer printed circuit board: design of the experimental set-up and measurements
V. Ricchiuti, TechnoLabs S.p.A., Italy
A. Orlandi, L. Giovannucci, E. Di Michele, G. Antonini, F. De Paulis

Analysis of the performances of a multi-loop active shield reducing ELF magnetic field exposure
V. Amoruso, Politecnico di Bari, Italy
E. Chiarantoni, S. Vergura

A search for economical shielding improvement of windows
J. S. Hämäläinen, PwTT, Finland
J. Peltonen, R. Jääskeläinen, M. Moisio

3D analysis for the design impact of cover-wall join on enclosure’s shielding performances
A. Orlandi, University of L’Aquila, Italy
G. Antonini, M. Italiani

Study of the transfer impedance and shielding effectiveness of cable trays for industrial wires
C. Munteanu, Technical University of Cluj-Napoca, Romania
B. Demoulin, I. Bacancios, L. Kone

Application of simulation of conducted EMI in AC-DC power converter to EMI optimal design
J.C. Le Bunetel, Université F. Rabelais de Tours, France
D. Gonzalez, S. Brehaut, D. Magnon, J. Gago. J. Balcells

Detection and localization of defects on buried conductor by E. M. fields radiation
M. Lefouili, Jijel University, Algeria
B. Harrat, B. Nekhoul, K. Kerroum, K. El Khamilchi

**PWeE:**  MEDICAL EQUIPMENT AND HUMAN EXPOSURE

Immunity assessment of medical devices working in electrosurgical unit vicinity
M. Fernández-Chimeno, Technical University of Catalonia, Spain
S. Verdaguer, M. Quílez, F. Silva

A 1800 MHz loop antenna for experimental studies on auditory system of rats
R. Pinto, ENEA, C.R. Casaccia, Italy
A. De Vita, V. Lopresto, S. Mancini, G. Marrocco, G. A. Lovisolo

3D FEM model for localized SAR estimate in human exposure to microwaves
M. Morega, Politehnica University of Bucharest, Romania
A.M. Morega, A. Machedon

Evaluate damage in DNA molecules caused by intermediate frequency magnetic fields using bacterial gene expression system for mutation repairing
A.K. Haga, Tohoku Gakuin University, Japan
G.I. Endo, K.O. Kobayashi

Application of a MoM/FDTD-hybrid method to helical dipole antenna
P. Pongpaibool, National Institute of Information and Communication, Japan
S. Watanabe, S. Mochizuki, H. Shira, T. Uno

**Hands on:**

Wednesday  Sep. 6, 2006  13:00 – 15:00  Exhibition Area

Induced electric field demonstration
G. Bargboer, Technische Universiteit Eindhoven, The Netherlands. A.P.J. van Deursen

IC-EMC : EMC of integrated circuits
E. Sicard, INSA, France

RF-receiving system check with RefRad and antenna coupler
H. Haider, ARC Seibersdorf research, Austria

PCB demo boards
I. Knijff, Technische Universiteit Twente, The Netherlands. F. Leferink

**Technical Presentations :**

Wednesday  Sep. 6, 2006  13:00 – 15:00  Room 5

Practical EMI filter design
WÜRTH ELEKTRONIK

WaveCell: a new TEM cell complying with the new basic standard IEC 61000-4-20
WAVECONTROL
Indirect method of measurement for conducted emissions of high-power equipments
S. Coets, University of Liege, Belgium
V. Beauvois, J. Catrysse, W. Legros

Comparison of alternative conducted emission measurement methods by using FSV and IELF algorithms
J. Knockaert, KHBO, Belgium
J. Catrysse, R. Belmans

Comparison of different probes to measure line coupled UWB pulses in running systems
R. Krzikalla, Hamburg University of Technology, Germany
J. L. ter Haseborg

Modeling of large ground structures by multiport measurements
T. Stadtkler, Hamburg University of Technology, Germany
J.L. ter Haseborg

In-situ broadband characterization of complex permittivity and permeability of magnetic dispersive materials
C.P. Chen, Kanagawa University, Japan
Z.W. Ma, T. Anada, J.P. Hsu, C. Christopoulos

An improved algorithm for finding electric property of grounded dielectric slab with finite size by use of model-based standing wave method
Y. Nishikata, Niigata University, Japan
N. Ishii, M. Miyakawa

Testing the robustness of the feature selective validation (FSV) method for EMC/SI applications
A. Duffy, De Montfort University, United Kingdom
A. Orlandi, G. Antonini

Vertical wire YAGI structure above a lossy half-space: current distribution and input impedance
M.P. Raničić, University of Nis, Faculty of Electronic Engineering, Yugoslavia
P.D. Raničić

Mode conversion on high-frequency signal propagation on asymmetric interconnects
A. Maffucci, Università di Cassino, Italy
A.G. Chiariello, G. Miano, F. Villone, W. Zamboni

Efficient modal analysis of anechoic and semianechoic chambers
I. Monterde, Polytechnical University of Valencia, Spain
L. Nuño, J. V. Balbastre

Upper and lower bounds for the simulation of frequency dependent interconnects with uncertain parameters
S. Barmada, University of Pisa, Italy
A. Musolino, M. Raugi

Wide-band analysis of radiating and scattering structures using the improved MM-PO method
A. Noga, Silesian University of Technology, Poland
A. Karwowski

EM fields in the vicinity of aperture antennas: assessment of the expected measurement values and accuracy
J.N. Sahalos, Aristotle University of Thessaloniki, Greece
A.A. Nanos, K. Siakavara, T. Samaras

Electromagnetic interference from high speed railway line on telecommunication cable: results of a measurement campaign and comparison with calculations
G. Lucca, Sirti S.p.A., Italy
M. Moro, A. Pagani, L. Zucchelli

Railway electrical systems integration - practical application of the "V" cycle for electromagnetic compatibility (EMC)
L.M. McCormack, Atkins Rail, United Kingdom
R.D. White, S. Seller, R. Hutchison, P.W. Hooper

Lightning protection of transit railway track circuits
R.A. Peralta, Electro Magnetic Applications, Inc., United States

Optimal bit-loading for broadband multicarrier power line communication subject to radiated emission limits
M. D’Amore, Univ. of Rome, Italy
M.S. Sarto, E. Baccarelli, M. Biagi

Measurement method to describe the attenuation characteristics of the mains network
S. Battenmann, University of Hannover, Germany
H. Garbe, L. Dunker

Equivalent two-port network for indoor outlet and its application
Y. Kami, University of Electrotechnical-Communications, Japan
F. Xiao
**THURSDAY**

**ORAL morning**

OThA1  Thursday September 7, 2006  9:00 – 10:45  
PRINTED CIRCUIT BOARDS (I)  
Chair: M. Ribó  
Room 1

- **Radiation model of small horizontal submodules**  
  M. Leone, Siemens Com, Germany  
  M. Válek

- **Optimization of connector-track interface**  
  A.P.J. van Deursen, Eindhoven University of Technology, Netherlands

- **EMI from ICs and PCBs inside high speed networking equipment**  
  S.K. Goudos, Aristotle University of Thessaloniki, Greece  
  C.S. Hilas, I.T. Rekanos, J.N. Sahalos

- **Radiation immunity of RF receiver located on the same PCB with a microcontroller**  
  N. Hojjat, Carleton University, Canada  
  L. Roy, O. Maurice, E. Sicard

- **Microstrip line coupling to a dual-plane electromagnetic band-gap microstrip filter structure**  
  S.Y. Huang, Nanyang Technological University, Singapore  
  Y.H. Lee

OThB1  Thursday September 7, 2006  9:00 – 10:45  
WIRELESS COMMUNICATION SYSTEMS  
Chair: M. Feliziani  
Room 2

- **EMC challenges in emerging wireless technologies**  
  A. Rojas, CETECOM, S.A., Spain  
  M.M. Pérez, J.C. Soler, A. Llamas, J. Baños

- **Shielding and attenuation properties of large buildings and structures**  
  C.L. Holloway, NIST, United States  
  G. Koepke, D. Camell, K. Remley, S. Schima

- **Evaluation of a method based on the impulsiveness ratio to estimate the communication performance**  
  S. Linder, Swedish Defence Research Agency, Sweden

- **Characterization of a leaky line antenna for wireless communication**  
  J. Müller, W. L. Gore & Associates, Germany  
  S. Fisahn, H. Garbe

OThC1  Thursday September 7, 2006  9:00 – 10:45  
MEASUREMENTS, INSTRUMENTATION AND TESTING (III)  
Chair: M. Klinger  
Room 3

- **Investigation of HPM susceptibility levels on low noise amplifiers**  
  T. Nilsson, Swedish Defence Research Agency FOI, Sweden  
  R. Malmqvist, M. Bäckström

- **Large-scale parallel FDTD analysis of electromagnetic fields (EMF) excited with cellular phones in actual train carriages**  
  M. Hirono, Hokkaido University, Japan  
  T. Hikage, Y. Abiko, T. Nojima, S. Watanabe, T. Shinozuka

- **Electric field-power relationship in mode stirred reverberation chamber**  
  S. Girard, Blaise Pascal, France  
  F. Diouf, F. Paladian

- **Verification of the HERO requirements of an explosive system with reference to the MIL-STD 464A (HERO testing)**  
  M.R. Pocai, C.I.S.A.M., Italy  
  I. Dotto, D. Festa

- **Low-Q reverberation chamber to reproduce aircraft-like EM environment**  
  M.S. Sarto, University of Rome, Italy  
  S. Greco

- **Analysis of the antenna behaviour inside a resonant cavity for a source-stirring-mode reverberation**  
  P. Russo, Università Politecnica delle Marche, Italy  
  G. Cerri, V. Mariani Primiani, C. Monteverde

- **An immunity test bench generating a perturbation of variable polarization in the lower frequencies**  
  V. Deniau, INRETS, France  
  J. Rioul, J.P. Ghys, S. Bazzoli

OThA2  Thursday September 7, 2006  10:45 – 13:00  
PRINTED CIRCUIT BOARDS (II)  
Chair: M. Ribó  
Room 1

- **Methods to reduce coupling between traces over split ground and power planes**  
  F. Xiao, University of Electro-Communications, Japan  
  Y. Kami

- **Ground an reference and the fiction of return conductors**  
  B. Danker, Bicon laboratories, Netherlands
THURSDAY

ORAL morning (cont.)

Statistical analysis of the PWB resonance suppression with randomly positioned ground vias
M. S. Vahtola, Esju Oy, Finland
T. J. Tarvainen

Characterization of electromagnetic environment in power converters using \([S]\) matrix
M. Meilt, Jijel university, Algeria
N. Boudjerda, B. Nekhoul, K. El khamli, K. Kerroum

Dielectric properties of insulation layers of printed circuit boards at high frequencies
K. Fukunaga, NICT, Japan
A. Nishikata, M. Koza, S. Kurahashi

OThB2 Thursday September 7, 2006 10:45 – 13:00
CABLES AND CONNECTORS
Chair: K. Gonschorek  Room 2

Time-domain analysis of the performances of unshielded twisted pairs in high-speed circuits
A. Maffucci, Università di Cassino, Italy
S. Caniggia, F. Maradei, F. Villone, W. Zamboni

Common mode interference coupled via a buried armored cable
A.P.J. van Deursen, Technische Universiteit Eindhoven, Netherlands
H.T. Steenstra, S. Meijer

An equivalent circuit model for LEMP-excited transmission lines
F. Delfino, University of Genoa, Italy
R. Procopio, M. Rossi, P. Girdinio

Calculation of emitted electromagnetic field from UTP cable by moment method from 0.3 GHz to 2 GHz
H. Tamaki, Kyushu Institute of Technology, Japan
N. Kuwabara, Y. Ishida, M. Kawabata

Predicting high crosstalk frequencies in twisted pair cables
J. Poltz, OptEM Engineering Inc., Canada
J. Beckett

Transfer impedance of different cable types and single wire current distribution
H.T. Steenstra, Delft University of Technology, Netherlands
S. Meijer, J.J. Smit, S.A. Ananda

OThC2 Thursday September 7, 2006 10:45 – 13:00
HUMAN EXPOSURE (I)
Chair: O. Fujiwara  Room 3

A numerical model of a commercial dual-band cellular phone equipped with a planar antenna
S. Pisa, University of Rome, Italy
M. Cavagnaro, V. Lopresto, E. Piazza, G. A. Lovisolo, P. Bernardi

Influence of passengers on computed field exposure due to a personal TETRA radio used inside a vehicle
A. R. Ruddle, MIRA Limited, United Kingdom

Mechanism for double-humped frequency characteristics of whole-body average SAR due to far-field exposure at ICNIRP reference level
A. Hirata, Nagoya Institute of Technology, Japan
S. Kodera, J. Wang, O. Fujiwara

Investigation of the effect of the dielectric property of phantom liquid on SAR probe calibration
L. Hamada, National Institute of Information and Communication, Japan
J. S. Ryu, S. Watanabe, Y. Miyota, K. Sato, T. Iwasaki

An experimental study on the gain measurement in the tissue equivalent liquid to calibrate the SAR probe
N. Ishii, Niigata University, Japan
T. Akagawa, K. Sato, L. Hamada, S. Watanabe

The effects of the phantom shell on SAR and the implications to 802.11x technologies (including WiFi and VoIP)
S. Nicol, APREL Laboratories, Canada
A. Tran, J. Wojcik, Yagoub M.C.E.
THURSDAY

WORKSHOPS morning

WThA1 Thursday, Sep. 7, 2006.  9:00 - 10:45 & 11:15 – 13:00

IMMUNITY AT THE IC LEVEL

Chair: S. Ben Dhia

Opening workshop: overview of immunity of ICs
S. B. Dhia, INSA-LESIA, France

EMC measurement for Wireless IC in automotive application
C. Marot, Siemens-VDO, France

Influence of the device packaging on immunity results and analysis
O. Maurice, EADS-CRR, France

Power modelling for susceptibility prediction in integrated circuits
M. Ramdani, ESEO, France
A. Alaeldine, R. Perdriau

Solving internal immunity issues in ICs
J.L. Levant, Atmel, France
M. Ramdani, R. Perdriau, M. Drissi

Near field scan immunity measurement with RF continuous wave
A. Boyer, INSA, France
S. Ben Dhia, E. Sicard

Near field immunity cartography method to characterize an IC to fields radiated by an ESD
F. Lafon, Valeo, France
F. De Daran

Investigation of the direct effects of a VF-TLP ESD pulse injected into a printed circuit board
N. Lacrampe, LAAS-CNRS, France
A. Boyer, B. Vrignon, N. Nothier, F. Caignet, M. Bafleur

Conducted impulse injection method (CIIM)
G. Auderer, Freescale, Germany

WThB1 Thursday, Sep. 7, 2006.  9:00 - 10:45 & 11:15 – 13:00

EMC MEASUREMENTS AND TEST FACILITIES

Chair: C. Holloway and P. Wilson

Welcome and overview
P. Wilson, NIST, USA

Ultra-wideband pulse measurements in a GTEM Cell
M. Koch, University of Hannover, Germany
H. Schär

Free Field Time Domain Measurements
D.R. Novotny, NIST, USA
R. Johnk, C. Grosvenor, D. Camell, N. Canales, B. Davis

Electromagnetic sensors for fast transient and high-power situations
C. E. Baum, University of New Mexico, USA
A. Marvin, University of York, UK
L. Dawson, I. Flintoft

Introduction, overview, and applications of reverberation chambers
C. L. Holloway, NIST, USA

Measurement based uncertainty analysis for EMC facilities
P. Wilson, NIST, USA
THURSDAY
POSTER
PTh Thursday September 7, 2006 13:00 – 15:00
Chair: A. Frost, M. Koch and J.R. Regué
Exhibition Area

PThA: MODELLING AND COMPUTATIONAL ELECTROMAGNETICS

Software module for numerical modelling of transients propagation on high voltage lines using non-uniform transmission lines
C. Munteanu, Technical University of Cluj-Napoca, Romania
V. Topa, O. Antonescu, C. Vermesan, T. I. Pop

EMC analysis of co-site RF/Microwave systems: simulation of signal demodulation
V. Mordachev, Belarusian State University of Informatics and Rad, Belarus
E. Sinkevich

Simulations and measurements of coupling phenomena between a radiating antenna and a cable
J. Skrzypczynski, Wroclaw University of Technology, Poland
V. Roje, S. Antonijevic, K. Staniec

Advanced options of expert system «EMC-Analyzer»
V.I. Mordachev, Belarusian State University of Informatics and Rad, Belarus
P.A. Litvinko

Field to shielded cable coupling inside a reverberation chamber: numerical and experimental analysis
A. P. Pastore, Universita` Politecnica delle Marche, Italy
V. Mariani Primiani, F. Moglie

RF emission analysis of differential busses
S.B. Worm, Philips Applied Technologies, Netherlands

Electromagnetic interferences between PLC and twisted cable
M Feliziani, University of L’Aquila, Italy
C Bucella, G Manzi

Improvement of calculation time for estimating electromagnetic disturbance level using emission source modeling method
Y. Okubo, Kyushu Institute of Technology, Japan
M. Kawabata, Y. Ishida, N. Kuwabara

Genetic algorithms applied to the modelling of the transfer function of PLC channels
R. Linares, Polytecnic of Mexico, Mexico
M.G. Salinas, J.H. Caltenco, A. Vazquez

GA-based complex image green’s functions for solving electromagnetic coupling through material-coated slots of metal plates
S. Kahng, Univ. of Incheon, South Korea
J. Anguera

Improvement of time-domain modelling of a reverberation chamber
S. Lalléchère, LASMEA - University Blaise Pascal - Clermont II, France
P. Bonnet, F. Paladian

One method which determines the influence of the solenoid coil system onto the permanent magnet
B.N. Raicevic, University of Nis, Faculty of Electronic Engineering, Yugoslavia
S.S. Ilic

Defrosting spots examinations of heated frozen material (tuna) in a microwave oven
S. Watanabe, Aoyama Gakuin University, Japan
Y. Kakuta, O. Hashimoto

PThB: MEASUREMENTS, INSTRUMENTATION AND TESTING

Treatment of a low cost spherical coordinates electric field scanner under consideration of radiation measurement
K. Haake, Hamburg University of Technology, Germany
T. Stadtl, J.L. ter Haseborg

Discussion between “real” electromagnetic environment and applied tests to a system level (free field plane waves vs reverberating environment)
F. Hoëppe, EADS CCR, France
F. Kosdikian, G. Peres

A novel ultra-fast high resolution time-domain EMI measurement system based on field programmable gate arrays
S. Braun, TU-Munich, Germany
R. Schneider, P. Russer

Electric field cartography in reactive near field region using the modulated scatterer technique
E. F. Silva, University Federal of Campina Grande, Brazil
K. C. Santos, G. F. Araglio, G. Fontgalland, R.C.S. Freire

Reconstruction of printed images by receiving the electromagnetic disturbance from a laser printer at various noise environment
T. Tosaka, National Institute of Information and Communication, Japan
K. Taira, Y. Yamanaka, A. Nishikata, M. Hattori

Microcontroller replacement: higher performance, more noise
J. Catrysse, KHBO, dept. IW&T, Belgium
D. Tessen

Comparison and validation of EMC-measurements by FSV and IELF
J. Knockaert, KHBO, Belgium
J. Catrysse, R. Belmans

A method for eveluating the accuracies of APD measuring instruments
K. Gotoh, NIC, Japan
S. Ishigami, Y. Matsumoto

FOR-EMC thematic network’s intercomparison exercises
K. Sieczkarek, Institute of Logistics and Warehousing, Poland
A. Mackowiak

The influence of the NSA on the uncertainty in radiated emission tests
M. Quilez, Universitat Politecnica de Catalunya, Spain
M. Pous, M. Fernandez, J. Gorchs, F. Silva
An optical feeding antenna with wide bandwidth for evaluation of radiated emission test site above 1 GHz
H. Tanaka, Musashi Institute of Technology, Japan
S. Itakura, Y. Okano, M. Tokuda

Impedance method for magnetic antenna factor measurement of shielded loop antenna.
M. Ishii, National Metrology Institute of Japan, Japan
K. Komiyama

Estimation of current distribution on dipole antenna elements using a double-output shielded loop probe
A. Kohmura, The university of electro-communications, Japan
T. Iwasaki

Circuit board scanning resolution enhancement by inverse filtering for low-frequency vertical magnetic dipole sources and level-only data
H. Nordström, Ericsson Microwave Systems AB, Sweden
P. Hallbjörner

The measurement of residential magnetic fields
V. David, Technical University of Iasi, Romania
R.C. Ciobanu, M. Crețu

A sensor for low frequency electric and magnetic fields measurement
V. David, Technical University of Iasi, Romania
R.C. Ciobanu, A. Salceanu

A fully CISPR 16-1-1 compliant EMI measurement system enhanced by fast Fourier transform
M. Stecher, Rohde & Schwarz, Germany

PThC: LARGE SYSTEMS AND INSTALLATIONS
Electromagnetic influence between electro-energetic group components
P.M. Nicolae, University of Craiova/Faculty of Electrotechnics, Romania
I.D. Nicolae

Experimental evaluation of earth currents generated by a DC traction network
G. Crotti, Istituto nazionale di ricerca metrologica (I.N.RI.M), Italy
M. Zucca

The problems of electromagnetic interferences generated by a trolley-bus and tram
W. Zajac, Cracow University of Technology, Poland
W. Czuchra

EMC performance evaluation of an electrically powered wheelchair
V. Serrao, University of Rome, Italy
L. Conti, A. Di Napoli, L. Solero

PThD: EMC IN COMMUNICATION SYSTEMS
Influence of electromagnetic interference on stability of packet radio networks
N. Azamatov, Agat State Reserch and Production Association, Belarus
V. Voloshin, Y. Mosienko

Development of microwave electromagnetic environment measurement system for UWB band
S.I. Ishigami, NICT, Japan
K.G. Gotoh, K.M. Mushiake, Y.O. Ohigashi, Y.M. Matsumoto

Interference potential of PC noises to ultra wideband systems
T. Murakami, Tohoku University, Japan
Y. Matsumoto, K. Fuji, A. Sugiura

Effects of intersystem interference in mobile ad hoc networks
U. Sterner, Swedish Defence Research Agency, Sweden
S. Linder

Impact of frequency-modulated harmonic noises on OFDM-based WLAN systems
Y. Matsumoto, National Institute of Information and Communication, Japan
T. Shimizu, T. Murakami, K. Fuji, A. Sugiura

Fixed channel assignment problem using a new hybrid algorithm
S. A. Ghasempour Shirazi, Information and Communications Technology Faculty, Iran

Transmission characteristics of an OFDM signal for power line communication system with high bit rate
A. Mori, Musashi Institute of Technology, Japan
Y. Watanabe, M. Tokuda

Calculation of balance-unbalance conversion factor and leaked electric field in power line for PLC
Y. Watanabe, Musashi Institute of Technology, Japan
M. Tokuda

Hands on :
Thursday Sep. 7, 2006 13:00 – 15:00 Exhibition Area

Induced electric field demonstration
G. Bargboer and A.P.J. van Deursen, Technische Universiteit Eindhoven, The Netherlands

IC-EMC : EMC of integrated circuits
E. Sicard, INSA, France

RF-receiving system check with RefRad and antenna coupler
H. Haider. ARC Seibersdorf research, Austria

PCB demo boards
I. Knijff and F. Leferink. Technische Universiteit Twente, The Netherlands

Technical Presentations :
Thursday September 7, 2006 13:00 – 15:00 Room 5

Review of the new radiated immunity, IEC 61000-4-3 Edition 3, standard and important test setup considerations. AMPLIFIER RESEARCH
Railcom project. Gert-Jan van Alphen, MOVARES NEDERLAND BV

EMC / EMI for PCB in computer housing. ANSOFT
THURSDAY

ORAL afternoon

OThA3 Thursday September 7, 2006 15:00 – 16:00
PRINTED CIRCUIT BOARDS (III)
Chair: T. Hubing Room 1

Appropriate approximations for an efficient impedance calculation of populated PCBs
M. Hampe, Helmut Schmidt University, Germany
S. Dickmann

High impedance surface analysis to reduce the EMI in a double layered PCB
R. Peña-Rivero, SEPI-ESIME-IPN (Polytechnic of Mexico), Mexico
R. Linares

Parametric macromodeling of flexible printed interconnects for mobile devices
S. Grivet-Talocia, Politecnico di Torino, Italy
F. Canavero, S. Acquadro, C. Peraldo, M. Rouvala, I. Kelander

OThA4 Thursday September 7, 2006 16:00 – 17:00
HUMAN EXPOSURE (II)
Chair: P. Riu Room 1

A software tool for the evaluation of the low frequency magnetic field in industrial environments
A. Sona, University of Padova, Italy
M. Bertocco, E. Sieni

A remote sensor for electromagnetic personal safety monitoring
F. Leferink, University of Twente, Netherlands
K. Pillet, F. Buesink

EM field level measurement system using a new RMS detector intended for BTS monitoring
L. Derousseau, Wavecontrol, S.L., Spain
C. Alonso, E. Cid, P.J. Riu, D. Belmonte

OThB3 Thursday September 7, 2006 15:00 – 17:00
EMC AT CHIP LEVEL
Chair: F. Fiori Room 2

Immunity investigation on a prototype field programmable gate array
I. Chahine, ESIGELEC/IRSEEEM, France
D. Pommerehen, M. Kadi, P. Rawa, A. Louis, B. Mazari

Characterization of a near-field probe for IC cartography.
G. Duchamp, University Bordeaux I, France
D. Castagnet, A. Meresse

Direct power injection immunity measurements above 1 GHz
S. Buntz, DaimlerChrysler AG - Research and Technology, Germany
M. Blatter, H. Leier, S. Fuchs, D. Gwisdalla, W. Menzel

EME filtering effect in a microcontroller power distribution network
F. Fiori, Politecnico di Torino, Italy

P. Crovetti

Characterization and modeling of the supply network from an integrated circuit up to 12 GHz
C. Labussière, Freescale Semiconductor Inc., France
G. Bouisse, J. W. Tao, E. Sicard, C. Locht

Brokaw bandgap susceptibility to RF interferences: measurements and analyses
N. Montemezzo, University of Padova, Italy
E. Orietti, S. Buso, G. Meneghesso, A. Neviani, G. Spiazzi

Measurement and analysis of substrate noise coupling for n+/p photodiodes on epi-type and low doped substrate
L. Boucher, SUPAERO, France
P. Magnan

OThC3 Thursday September 7, 2006 15:00 – 17:00
LIGHTNING AND EMP
Chair: F. Rachidi Room 3

Evaluation of underground lightning electromagnetic fields
F. Delfino, University of Genoa, Italy
R. Procopio, M. Rossi, F. Rachidi, C. A. Nucci

Influence of the semi-spherical semi-conducting ground inhomogenity on the grounding characteristics
N. N. Cvetković, University of Niš, Faculty of Electronic Engineering, Yugoslavia
P.D. Rančić

Using EMTP to evaluate the current distribution in a building structure during a lightning strike with PEEC modeling approach
Q. Zhou, Hong Kong Polytechnic University, Hong Kong
Y. Du

Transient analysis of grounding systems assosiated to substation structures under lightning strokes
B. Harrat, Jijel university, Algeria
B. Nekhoul, M. Lefouill, K. Kerroum, K. El Khamlich

Induced disturbance in power network by lightning
S. Kaouche, Jijel university, Algeria
S. Mezoued, B. Nekhoul, K. Kerroum, K. El Khamlich

Application of one suitable lightning return-stroke current model
V. Javor, Faculty of Electronic Engineering of Niš, Yugoslavia
P.D. Rančić

OLMS detection of EM transients at space launch sites
J.C. Chai, The Aerospace Corporation, United States
A.O. Britting, S.Y. Feng
THURSDAY

WORKSHOPS afternoon

WThA2  Thursday, Sep. 7, 2006.   15:00 - 17:00
EMC IN DIFFUSED COMMUNICATION SYSTEMS. COST 286
Chair: A. Marvin and J. Catrysse

Joint Technical Action 1: Antenna/Wire Coupling in the Near Field
C. Christopoulos, The University of Nottingham, UK

Joint Technical Action 2: EMC Analysis of LF Unstructured Telecom Networks
J. Catrysse, KHBO, Belgium
K. Vantomme

Joint Technical Action 3: EM-Ambient Site Survey of Industrial Environments
F. Leferink, Thales Naval Systems, The Netherlands

WThB2  Thursday, Sep. 7, 2006.   15:00 - 17:00
INDUSTRIAL HOT TOPICS
Chair: G. Peres

New EMC challenges in aircraft industry : more composite structures and more electrical technologies
R. Perraud, EADS CCR, France
O. Maurice, G. Peres

Scanner as help for EMC design in automotive applications
C. Marot, SIEMENS VDO, France

Future needs in EMC for Airbus computers
L. Saissi, A. Sauvage, Airbus, France
O. Maurice

EM protection of composite materials and possible about CND new EM techniques
J. L. Bouley, ONERA, France

Valeo EMC roadmap and hot topics
F. Lafon, VALEO, France
FRIDAY

ORAL morning

OFrA1  Friday September 8, 2006  9:00 – 10:45
IMMUNITY (I)
Chair: F. Leferink  Room 1

Immunity tests of implantable cardiac pacemaker against defibrillation: prediction of the induced disturbance
A. Augello, Università Politecnica delle Marche, Italy
G. Cerri, R. De Leo, V. Mariani Primiani, F. Moglie, G. Della Chiara

Concepts of new unified disturbance sources for immunity testing of multimedia products
N. van Dijk, Philips Electronics, Netherlands

EMC and functional safety - comments on compatibility, immunity and safety integrity levels
B. Jaecki, Siemens AG, Germany

Safety margins in immunity testing
M. Audone, Centro Ricerche Fiat, Italy
B. Audone

Application of statistical techniques to interpret immunity test results
B. Audone, EMC consultant, Italy
A. Tacchini, J. Montanari

Time domain analysis of the energy stored in the near field of finite length wires embedded in a dielectric half-space
D. Poljak, University of Split, Republic of Croatia

OFrB1  Friday September 8, 2006  9:00 – 10:45
SHIELDING (I)
Chair: J. Catrysse  Room 2

Selective shielding of RFID systems in presence of very high electromagnetic field levels
V. Mariani Primiani, Università Politecnica delle Marche, Italy
R. De Leo, F. Moglie, N. Diaferia, G. Nitrati

Suitability of new definitions of shielding effectiveness for enclosures
R. Araneo, University of Rome La Sapienza, Italy
S. Celozzi

Techniques for determination of Q-factors in EMC applications
M.P. Robinson, University of York, United Kingdom
A.C. Marvin, Y. Cui

Measurement method for comparison of SE of small enclosures
J. Catrysse, KHBO, dept. IW&T, Belgium
H. Cnudde

Prediction of the electrical properties and shielding effectiveness of conductive concrete
L. Sandrolini, University of Bologna, Italy
U. Reggiani, A. Ogunsola

Wave absorber formed by arranging cylindrical bars at intervals for improving ETC environment
K. Matsumoto, Aoyama Gakuin University, Japan
T. Ozawa, T. Nakamura, T. Aoyagi, O. Hashimoto, T. Miyamoto

OFrC1  Friday September 8, 2006  9:00 – 10:45
MODELLING (I)
Chair: P. Bernardi  Room 3

Modelling emitting sources to characterise the radiation of electronic components
Y. Vives, IRSEE, France
C. Arcambal, A. Louis, B. Mazari, M. Stanislavski, P. Eudeline

Near-field scanning of UWB-antenna-footprint in time domain
H. Herlemann, University of Hannover, Germany
T. Stadthler, M. Koch, J.L. ter Haseborg

Prediction of radiated emission from the EMC characteristics of subassemblies
J. Catrysse, KHBO, dept. IW&T, Belgium

Circuital characterization of an electronic equipment for narrow-band conducted emissions
A. Pérez, Enginyeria La Salle (Universitat Ramon Llull), Spain
J.R. Regué, M. Ribó, A.M. Sánchez, F.J. Pajares, D. Badia

Modeling automotive electronic equipment in a realistic sub-system
S. Baranowski, Université de Lille, France
S. Egot, M. Klingler, L. Kone, F. Lafon, C. Marot

Three dimensional high frequency models for air-core reactors based on partial element equivalent circuit theory
M. Enohnyakat, Lulea University of Technology, Sweden
J. Ekman

OFrA2  Friday September 8, 2006  10:45 – 13:00
IMMUNITY (II)
Chair: A.P.J. van Deursen  Room 1

Method for the evaluation of high frequency coupling on cable harnesses
G. Andrieu, Renault, France
B. Démoulin, L. Koné, F. Bocquet, J.P. Parmantier

Some discrepancies between the calibration and test phases of immunity testing
M. Audone, Centro Ricerche Fiat, Italy
B. Audone

Multiscale, multiphysic analytical method: MKME
O. Maurice, EADS-CRC, France

Quantifying the injected disturbance for susceptibility testing in ultrasonic imaging: objective physical parameters and correlation with the subjective image degradation
C. F. M. Carobbi, University of Florence, Italy
M. Cati, C. Panconi, M. Polignano

FRIDAY
Reverberation chamber: the quest for the distribution of the maximum stress onto the equipment under test
M. Höijer, Swedish Defence Research Agency FOI, Sweden
O. Lundén, M. Bäckström

Resonance suppression through conductive polymers in an enclosure with PCBs
A. J. Lozano, Universidad Politécnica de Cartagena, Spain
A. Díaz, J. V. Balbastre, A. B. Calvo, L. Nuño

An extended method of characteristics for lossy nonuniform transmission line analysis and its numerical stability
T. Sekine, Gifu University, Japan
Y. Horibe, Y. Takahashi, K. Kobayashi

A hybrid technique for the simulation of transmission lines over slotted ground
J. R. ter Haseborg, Hamburg University of Technology, Germany
H.-D. Brüns, H. Singer

Study on a rejection method of common mode current focusing on an output transformer in an AFE circuit
S. Saito, Mitsubishi Electric, Japan
Y. Akeboshi, S. Nitta

Design of broadband radar absorbing materials using particle swarm optimization
S.K. Goudos, Aristotle University of Thessaloniki, Greece
J.N. Sahalos

Performance prediction of 3 meter semi-anechoic chamber between 30 and 200 MHz taking into account the near field effect
G. Dun, SIEPEL, France
J-F. Rosnarho, F. Le Pennec, P. Gelin

Electromagnetic modeling of vertical single-walled carbon nanotube interconnects
M.S. Sarto, University of Rome, Italy
A. Tamburrano
FRIDAY

WORKSHOPS morning

WFrA  Friday, Sep. 8, 2006.  9:00 - 10:45 & 11:15 – 13:00
EMC AUTOMOTIVE SIMULATION
Chair: M. Klinger  Room 4

The virtual try-out space for electromagnetic compatibility: on the way to realistic simulation
J.C. Kedzia, ESI group, France

Modern electromagnetic field simulation techniques applied to automotive EMC problems within the
SAFETEL project
M. Schick, EM Software & Systems GmbH, Germany
N. Berger, U. Jakobus

Experimental validation of whole-vehicle electromagnetic models
A.R. Ruddle, MIRA Limited, UK

Comparison between simulations and measurements of the fields created by a mounted GSM
antenna using a car body instead of an entire vehicle
M. Klingler, PSA Peugeot Citroën, France
A. Lecca

Simulation of in-vehicle human exposure to electromagnetic fields
A.R. Ruddle, MIRA Limited, UK

Transient radiated fields in 14/42V powernet systems - FDTD assessment
P.J Riu, Technical University of Catalonia, Spain
R. Jauregui, S. Verdaguer, R. Santos, F. Silva

Numerical simulations of vehicle data buses
J. Carlsson, Swedish National Testing and Research Institute, Sweden
J. Welinder, K. Lamedschwandner, H. Preineder

System level analysis for automotive applications including IC, PCB and cable harness
M. Tröscher, SimLab Software GmbH, Germany

WFrB  Friday, Sep. 8, 2006.  9:00 - 10:45 & 11:15 – 13:00
STATISTICS IN EMC MEASUREMENTS AND PREDICTIONS
Chair: A. Marvin  Room 5

Direct computation of statistical variations in electromagnetic problems
A. Ajayi, University of Nottingham, UK
P. Sewell, C. Christopoulos

A possibility to use the APD for emission requirements to protect communication systems with error
correction codes
K. C. Wiklundh, Swedish Defence Research Agency, Sweden

Quantifying the rate of fluctuation of stochastic EM fields in time-varying environments
L. R. Arnaut, National Physical Laboratory, UK

Statistical treatment of the radiated field patterns of equipments-under-test
P. Wilson, NIST, USA

Statistical treatment of fields in vehicles
A.C. Marvin, University of York, UK
J.F. Dawson, M.P. Robinson, T Konefal

FRIDAY
Erasmus IP Course

EMC related to Wireless Communication Systems

Attendance to individual sessions is allowed during the Symposium. 15 €/session fee will be charged on site.

CMo1 Monday, September 4, 2006 11:30 – 13:30
A SHORT INTRODUCTION TO EMC
Prof. Catrysse Room 6
This module will present the fundamental principles of EMC, measurement methods and European standards, as well as a short introduction to designing systems under EMC constraints.

CMo2 Monday, September 4, 2006 15:00 – 18:40
ANTENNAS FOR WIRELESS SYSTEMS
Prof. Cerri Room 6
This module introduces an approach to mitigating multipath effects and optimizing radiated power through the minimization of the interference due to other users (multi-user detection) or to narrow band noise (transmitters), via channel coding or/and multiple antennas. The module will provide information about adaptive antennas, beamforming and/or space time coding, as well as general information about antennas, including propagation in free space and their main characteristics: radiation pattern, gain, input impedance, bandwidth, directive antennas (passive array).

CTu1 Tuesday, September 5, 2006 9:00 – 13:20
MEASUREMENTS OF EM FIELDS IN WIRELESS SYSTEMS
Prof. Garbe Room 6
The classic approach to electromagnetic field measurement is to use an antenna that has been calibrated on an open area test site (OATS) to pick up signals. However, many scientific papers have already demonstrated that this procedure cannot be used for complex environments, such as wireless systems. New alternative test procedures have been developed to cope with these complex environments, including near-field scans, TEM-waveguides, reverberation chambers, and fully anechoic rooms. This module will cover the following topics: measurement of radiated noise; parameters to ensure comparability; TEM waveguides; reverberation chambers; near-field scans; application to complex systems; correlation to OATS; dipole and multipole representation; behavior of complex systems.

CTu2 Tuesday, September 5, 2006 15:00 – 18:00
PASSIVE INTERMODULATION (PIM)
Prof. Catrysse Room 6
PIM can give rise to interference problems in both cabled networks and wireless networks. Caused by the corrosion of cable assemblies, connectors and antennas, PIM typically occurs in full-duplex systems that transmit high-power signals and receive very low-power signals. PIM occurs frequently in situations involving cosite sharing by different GSM operators at different frequencies and cosite sharing by UMTS and GSM systems, as well as in telephone networks operated over classic CATV cable networks. The results of a PIM characterization research program will be presented in this module, with special attention paid to mobile communication systems antennas.

CWe1 Wednesday, September 6, 2006 9:00 – 13:20
BASE STATION ENVIRONMENTAL IMPACT AND PLANNING
Prof. De Leo and Prof. Cerri Room 6
Scientific papers dealing with the optimization of cellular networks exist in the technical literature, but they tend to consider only communication system requirements. An alternative approach uses an automated tool to plan new BSs, taking both health and communication requirements into account. This tool consists of a Genetic Algorithm (GA)-based optimization technique that explores possible problem solutions, and is appropriate for theoretical and real-life applications. In this module, the tool will be applied to both an ideal and a real town situation, using selected characteristics.

This module will be structured as follows: introduction to the environmental impact of EM fields; presentation of the Genetic Algorithm; field evaluation in an urban environment; characteristics of wireless telecommunication systems; description of the optimization functions; explanation of the optimization procedure.

CWe2 Wednesday, September 6, 2006 15:00 – 18:00
INTERFERENCE IN WIRELESS SYSTEMS
Prof. Catrysse Room 6
This module deals with the characterization of interference in short distance radio communication systems for possible use in industrial environments. Results concerning the various communication systems that have been tested and analyzed with respect to noise and interference will be presented. Typically, systems that will be analyzed include a 433 MHz communication system based on a RS232 protocol, a 900 MHz frequency hopping system, a 1800 MHz DECT-like wireless modem, a 2.4 GHz DSS and a 2.4 GHz BlueTooth.

CTh2 Thursday, Sep. 7, 2006 9:00 – 13:20 & 15:00 – 16:00
TECHNIQUES AND MATERIALS FOR EM SHIELDING
Prof. Catrysse Room 6
Portable electronic devices (PEDs) and new mobile phones are widespread in a market that demands cost-effective high performance combined with lightweight attractive housings. For this reason, there has been an increase in the use of plastics in the manufacturing of electronic equipment. One of the main drawbacks of using plastic rather than metallic cases is the increased risk of electromagnetic interference (EMI). New shielding products can reduce EM emissions from PEDs and electronic devices in general, as well as reducing EM pollution levels. The improved shielding performances of both the external plastic cases and the inner electronic components (e.g. printed circuit boards) will allow these PEDs to be used in critical environments, without electromagnetic interference, thus increasing the public safety. The market diffusion of PEDs with low electromagnetic emissions will also meet customer demands and preferences, thus leading to an expansion of both the internal and external market.

CFr1 Friday, September 8, 2006 9:00 – 13:20
ASSESSMENT OF TERMINAL EQUIP. INTERACTION WITH BIOL. BODIES
Prof. Nikita Room 6
The module deals with computational methods (semi-analytical, MoM and FDTD techniques), measurements in phantoms, and equipment assessment with regard to safety guidelines. The techniques presented are useful both for designing new portable systems and for assessing the safety of existing equipment.

CFr2 Friday, September 8, 2006 14:30 – 18:00
EMC DESIGN AND NUMERICAL ELECTROMAGNETICS
Prof. Marvin, Dawson and Porter Room 6
The module deals with the design technique for reducing electromagnetic emissions and susceptibility in electronic equipment. The most widely used numerical techniques for the analysis and design of the electromagnetic aspects of wireless systems will be presented. A critical overview of the existing numerical CAD tools will be provided to the students.
Authors’ information

ORAL PRESENTATIONS

Each paper is allowed 15 minutes for presentation and up to 3 minutes for discussion.

Video projectors and computers (MS Power point 2003 and Acrobat Reader) will be available for presentation in each room. Only presentations on CD-Rom or USB pen drives will be accepted.

Authors must meet their session chairman in the room before the beginning of the morning / afternoon sessions. Each speaker must give a short biography to the chairman and load the presentation in the computer.

- Wednesday Morning presentations meet the chairman at 9:45
- Wednesday Afternoon presentations meet the chairman at 14:45
- Thursday Morning presentations meet the chairman at 8:45
- Thursday Afternoon presentations meet the chairman at 14:45
- Friday Morning presentations meet the chairman at 8:45

Preview computers located in the Internet Room will be available for last minute presentations update.

Best Paper award will be given on Thursday at the Symposium Dinner.

POSTER PRESENTATIONS

Authors must prepare a poster up to 1 m (wide) and 1,5 m (high) for the presentation of the paper.

Posters must be set in the assigned space in the Exhibition Area before 10:30. At least one of the authors must be with the poster between 13:30 and 15:00 to discuss the presented work. Posters must be removed from the Exhibition Area before 17:00.

Best Paper award and Hewlett Packard Best Poster Presentation award will be given on Thursday at the Symposium Dinner.

WORKSHOP PRESENTATIONS

Authors must meet their session chairman in the indicated room 15 min before the beginning of the session. Each speaker must load the presentation in the computer.

Video projectors and computers (MS Power point 2003 and Acrobat Reader) will be available for presentation in each room. Only presentations on CD-Rom or USB pen drives will be accepted.

Preview computers located in the Internet Room will be available for last minute presentations update.

Technical Visits

Applus EMC lab:

Wednesday
September 6, 2006
14:00 – 17:00

Thursday
September 7, 2006
10:00 – 13:00

Collserola Communication Tower:

Friday
September 8, 2006
10:00 – 13:00

Each visit is limited to 50 people, please make your reservation at registration desk

Buses will depart from the Symposium Venue at the scheduled time

AUTHORS’ INFORMATION & TECHNICAL VISITS
Technical Exhibition

from Wednesday September 6, 2006  10:00
to Friday September 8, 2006  13:00

Exhibitors (June 2006):

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Technical Presentations:

TPWe Wednesday, Sep 6, 2006.  13:00 - 15:00  Room 5

Practical EMI Filter Design
WÜRTH ELEKTRONIK

WaveCell: a new TEM cell complying with the new basic standard IEC 61000-4-20
WAVECONTROL

TPTh Thursday, Sep 7, 2006.  13:00 - 15:00  Room 5

Review of the new radiated immunity, IEC 61000-4-3 Edition 3, standard and important test setup considerations.
AMPLIFIER RESEARCH

RAILCOM PROJECT
Gert-Jan van Alphen. Holland Railconsult, The Netherlands

EMC / EMI for PCB in computer housing
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- SINGLE PHASE UP TO 150A
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Visítenos en Barcelona EMC Europe 2006 Symposium
Stand 20

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**Generalitat de Catalunya**
Centre de Telecomunicacions i Tecnologies de la Informació
Social programme

Welcome Cocktail:
Wednesday September 6, 2006 19:00
La Llotja . Passeig d’Isabel II nº 1, 08003 Barcelona

La Llotja is in the city center (harbour area)

Public transportation:
BUS: 14, 17, 19, 36, 39, 40, 45, 51, 57, 59, 157

NOTE: You will be asked to show your ticket at La Llotja entrance

Symposium Dinner:
Thursday September 7, 2006 18:30 (bus)
Caves Codorniu
Sant Sadurni d’Anoia

Buses will depart at 18:30 from:
(a) the university campus
(b) city centre: PLAÇA ESPANYA (Av. Reina Maria Cristina)

Public transportation:
METRO: L1-L3 Plaça Espanya

Return will be around 24:00 at the same places.
NOTE: You will be asked to show your ticket at the bus
Accompanying programme

Tour 1: “STORIES” AND LEGENDS
Tuesday, September 5, 2006
Half-day excursion (3.00 to 6.00 PM)
9 €

Tour 2: MODERNIST DESIGNS COLOURS
Wednesday, September 6, 2006
Full-day excursion (10.00 AM to 5.00 PM)
65 € (Lunch included)

Tour 3: COSTA BRAVA TOUR
Wednesday, September 6, 2006
Full-day tour (9.30 AM to 5.30 PM)
70 € (Lunch included)

Tour 4: BARCELONA 1900’S: THE BOHEMIAN CITY
Thursday, September 7, 2006
Half-day excursion (10.00 AM to 1.00 PM)
16 €

Tour 5: MONTserrat TOUR
Friday, September 8, 2006
Full-day tour (10.00 AM to 5.00 PM)
70 € (Lunch included)

Tour 6: FIGUERES & GIRONA: DALÍ’S WORLD
Friday, September 8, 2006
Full-day tour (9.30 AM to 6.00 PM)
79 € (Lunch included)

ICONO serveis culturals will carry out the organization of the tourist programme. An information point will be located at the Symposium Registration desk on 5th and 6th September.

Advance booking can be done at www.emceurope2006.org

Venue

Campus Nord UPC – Technical University of Catalonia
Jordi Girona 1-3 08034 Barcelona

By Metro: Line 5 exiting at Zona Universitaria or Palau Reial
By Bus: Lines 7, 33, 54, 60, 67, 68, 74 and 75.
By Tram: Lines 15, 17 and 19 getting off at Zona Universitaria or Palau Reial.

You can buy a single ticket (1.20 €) or a 10-ticket card called “T-10” (6.65 €). Tickets are valid for Metro, Bus and Tram.

By Taxi: Ask for Campus Nord of the UPC.
Taxis are easy to find in Barcelona (about 10 € from the city centre).

Please refer to www.emceurope2006.org for further indications and Internet links.
General Information

Symposium Secretariat:
Campus Nord Edifici BO
Technical University of Catalonia
Jordi Girona 31 08034 Barcelona
Tel. (+34) 934 017 452 Fax: (+34) 934 017 473
secretariat@emceurope2006.org

Registration:
Regular registration: 525 €
One day registration: 225 €

Extra tickets (under availability):
Paper Proceedings: 100 €
Welcome Cocktail: 40 €
Symposium Dinner: 100 €

Please refer to www.emceurope2006.org for other details and advanced registration.

Symposium registration desk open hours:
Monday Sep. 4, 15:00-18:00
Tuesday Sep 5, 8:30-17:30
Wednesday Sep 6, 8:30-17:30
Thursday Sep 7, 8:30-17:30
Friday Sep. 8, 8:30-15:00

Internet:
An Internet point with computers is provided to attendees:
username = emceurope
password = emceurope06

A WiFi network is available in the campus:
Network: XSF-UPC
Open an Internet browser and access as a guest

Barcelona information:
You can find information about Barcelona in the following websites:
www.bcn.es (official website) www.tmb.net (public transportation)

English is the official language of the Symposium