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Symposium and Exhibition

17th International Zurich Symposium on Electromagnetic Compatibility

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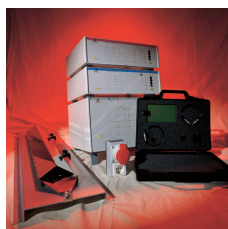
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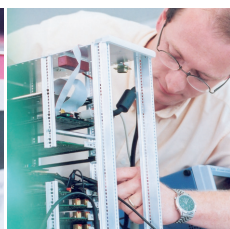
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Calibration laboratory

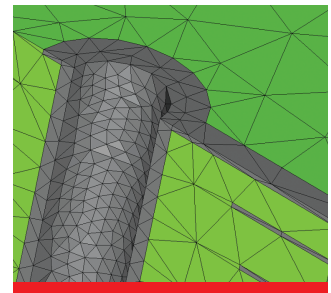
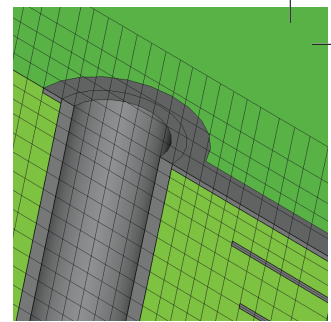
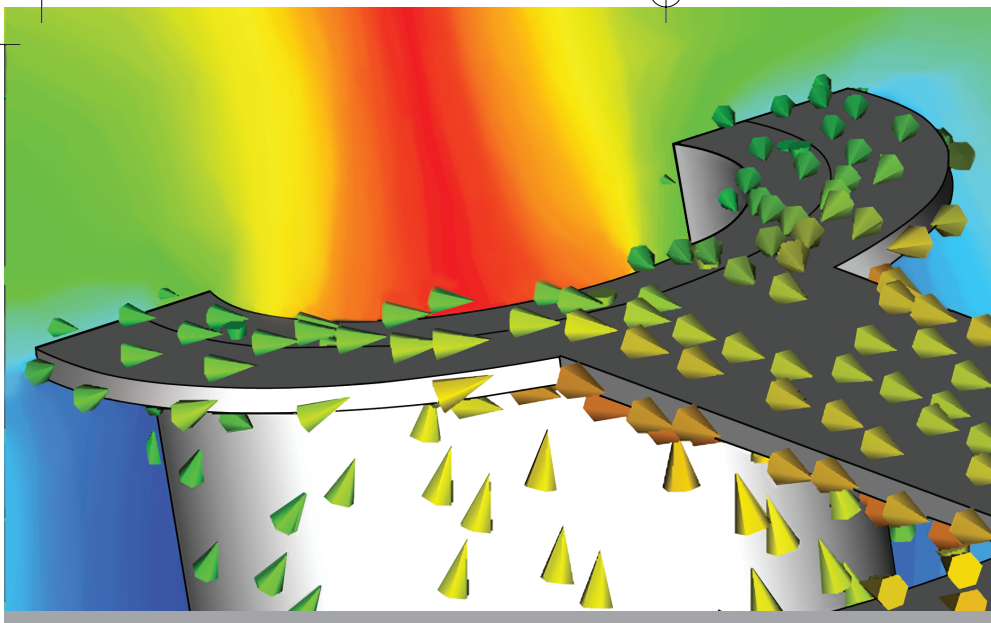


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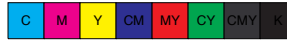
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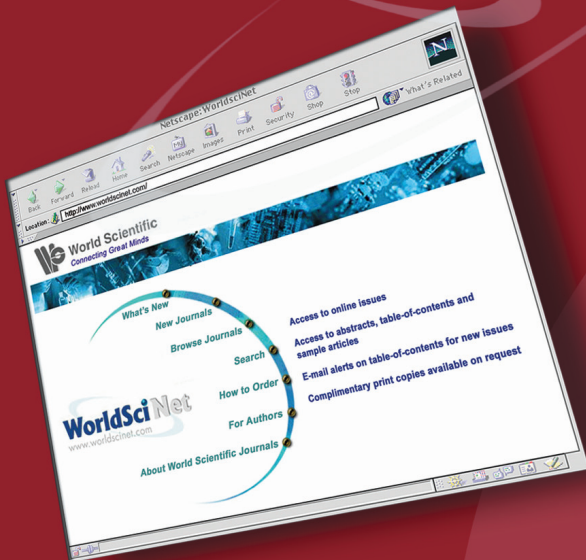
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- On-line help facility and tutorials

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- Wideband dispersive convolution boundaries
- Wideband nonlinear superconducting walls
- Perfectly matched absorbing layers (PML)

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- Homogeneous and inhomogeneous ϵ and μ
- Isotropic and anisotropic (tensor) ϵ and μ
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- Metamaterials with negative refractive index

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- Point and spatially distributed (modal) sources
- Hertz dipole and Gaussian beam sources
- Electric, magnetic and TLM impulse excitations
- Matched (soft) and imposed (hard) sources
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- User-defined waveform specified in text format
- Multiple independent sources and waveforms

DATA AND FIELD DISPLAY MODES

- Dynamic on-the-fly data and field display
- Simultaneous time & frequency responses
- Wire mesh, 3D vector, 2D and 3D color map, 2D and 3D color contour field display
- S-Parameters (Magnitude/Phase & Smith Chart)
- Field integrals (induced voltage, current, electric and magnetic flux, power flow) in TD and FD
- E-Plane waveguide frequency mapping
- Cartesian and polar radiation pattern
- Dissipated power density and SAR
- Capture of displays for movie creation
- Backward-in-time simulation mode

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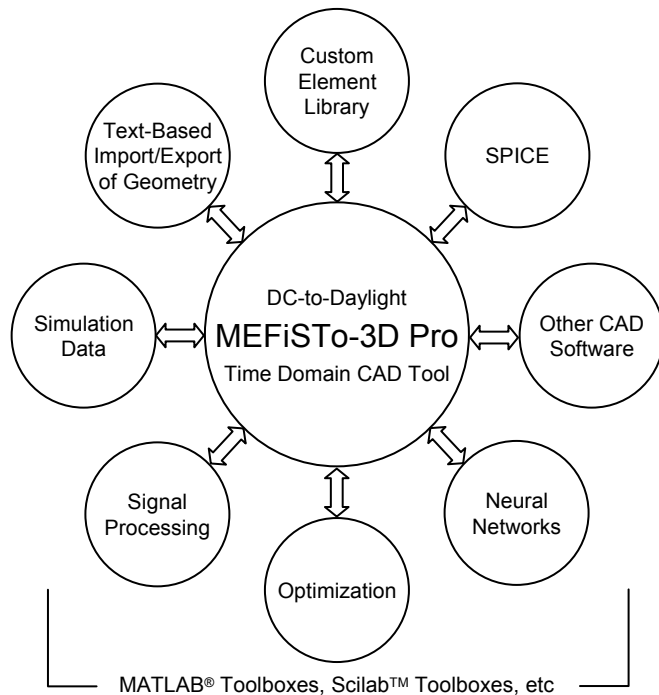
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Letter from the General Chair and Symposium President



Er-Ping Li

It is our great pleasure to welcome you to EMC-Zurich in Singapore 2006.

The EMC-Zurich, which dates back to 1975, is a premier international event in the field of Electromagnetic Compatibility (EMC). Significantly, the EMC Zurich will for the first time take place outside Europe, and Singapore has been proudly selected to host the EMC Zurich 2006.



*Ruediger
Vahldieck*

The EMC Zurich 2006 in Singapore follows EMC Zurich's excellent tradition and offers you a variety of exceptional programs. It will provide you with a superior platform to showcase your cutting edge research, accomplishments and products, to identify new issues, and to shape future directions for research and industry users in the areas of EMC, RF/Microwave engineering and wireless communications.

The symposium itself will address diverse topics by a variety of invited speakers from all over the world. Besides the stimulating Topical Meetings, Workshops, Tutorials and parallel sessions designed both for academia and industry alike, specially tailored sessions--EMC in Asia, biomedical EM, Automotive EMC, and Wireless communication EMC will be conducted on a large number of interesting EMC topics by acknowledged specialists.

The EMC Zurich 2006 in Singapore will also feature a 3-day International Exhibition on the state-of-the-art EMC and RF/Microwave Measurements and Instrumentation. It will provide an excellent opportunity for your company to showcase your equipments, software or services.

Particularly, in conjunction with this symposium, IEEE EMC Society will also hold its international EMC chapter Chairs retreat meeting, and USA NARTE EMC Certification Examination.

Your presence and contributions to the EMC Zurich 2006 in Singapore will make it an exciting and fruitful event. You will certainly benefit from the exceptional programs we provide, and the networking and quality time you spend with your peers.

I look forward to welcoming you at the EMC Zurich 2006 in Singapore!

Er-Ping Li, Symposium President
Ruediger Vahldieck, General Chair

Letter from the Technical Chairs



Todd H. Hubing

For nearly three decades, EMC researchers and practitioners have met every other year in Zurich to hear and present technical papers that have been subjected to one of the most thorough review processes of any engineering conference worldwide. EMC Zurich has become one of the world's premier events for showcasing new technologies and research results at the forefront of the EMC field.



Jian-Guo Ma

A significant factor in this success has been the high quality of its technical programs under the leadership of technical program chairs such as Dr. Clayton Paul and Dr. Fred Tesche.

Now, for the first time, the EMC Zurich symposium is moving to Singapore. It is our hope that this conference will encourage better communication between EMC specialists in Asia and other parts of the world. Although this event is being held more than 6000 miles from Switzerland, the technical program committee has worked hard to ensure that the program and the quality of the technical papers are held to the same high standards set by previous EMC Zurich symposia.

We were overwhelmed by the response to the call for papers for this event. 250 full paper submissions were received. Each paper was reviewed by multiple qualified reviewers and final decisions were made by the technical program committee at a meeting in Singapore. Approximately 70% of the submissions were accepted for oral presentation at the symposium. In addition, more than 40 papers were received under the special topical meetings, which shall feature the advancements and recent developments in the particular areas such as bio-medical EMC.

Computational modeling, EMC test procedures and environments, and printed circuit board design papers represent the largest portion of the submissions. However, the number of papers in the areas of integrated circuit design for EMC and intentional EMI seems to be on the rise. Traditional topics such as shielding, grounding and power systems are also well represented. Several papers present unique perspectives or methods that many EMC engineers will find immediately useful.

Whatever your EMC field of specialization, we're sure that you'll find something of interest in this technical program. We hope to see you in Singapore!

Todd H. Hubing

Jian-Guo Ma

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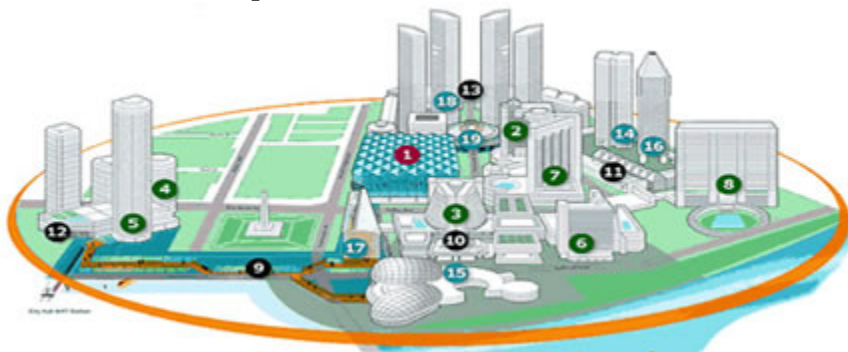
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General Information

Venue - Location map



CONVENTION & EXHIBITION CENTRE

- 1 Suntec Singapore

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- 2 Conrad Centennial Singapore
- 3 Marina Mandarin Singapore
- 4 Raffles The Plaza
- 5 Swissotel The Stamford Singapore
- 6 The Oriental Singapore
- 7 The Pan Pacific Singapore
- 8 The Ritz-Carlton Millenia Singapore

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- 11 Millenia Walk
- 12 Raffles City Shopping Centre
- 13 Suntec City Mall

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- 16 Millenia Tower
- 17 One Raffles Link
- 18 Suntec City Office Towers
- 19 The Fountain of Wealth

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Website www.suntecsingapore.com

Nearest MRT Station: City Hall Station in Raffles City (15 minutes walk)

Registration Hours

Admission to all sessions and hosted functions requires identification.
Please wear your name badge at all times.

- **27 February – Monday**
From 7:30am to 5:00pm outside Level 2 Meeting Rooms
- **28 February – Tuesday**
From 8:00am to 2:00pm outside Level 2 Meeting Rooms
From 3:00pm to 8:00pm at Exhibition Hall - Level 3 Concourse
- **1 March – Wednesday**
From 7:30am to 5:00pm at Exhibition Hall - Level 3 Concourse
- **2 March - Thursday to 3 March – Friday**
From 8.00am to 5.00pm at Exhibition Hall - Level 3 Concourse

Useful Telephone Numbers

Symposium Secretariat – Meeting Matters International

Cheng-Hoon Khoo (Ms), Conference Manager

Tel: (65) 9819 9462 Email: kch@meetmatt.net

Information & Assistance Desk (Feb 27 to 3 Mar)

Tel: (65) 9125 9292 Email: info@emc-zurich.org

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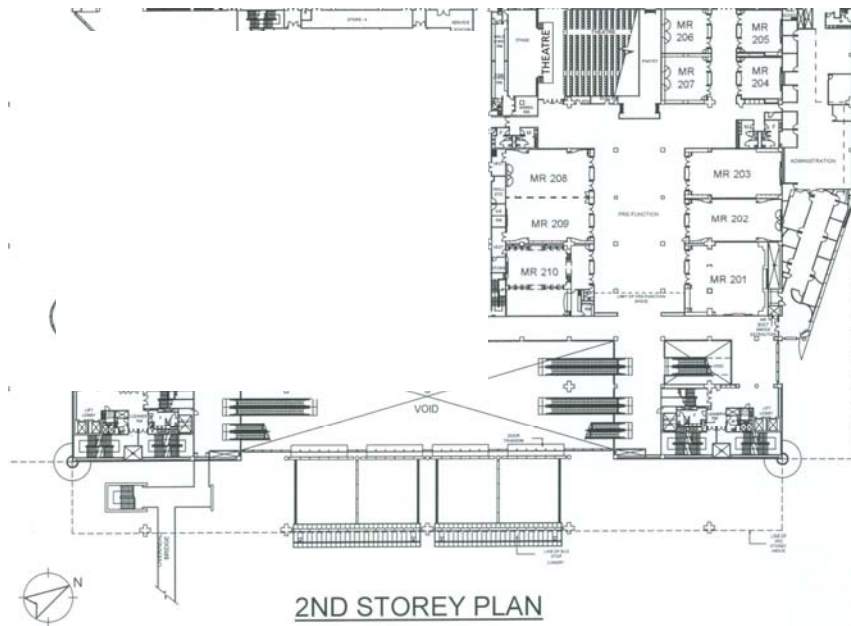
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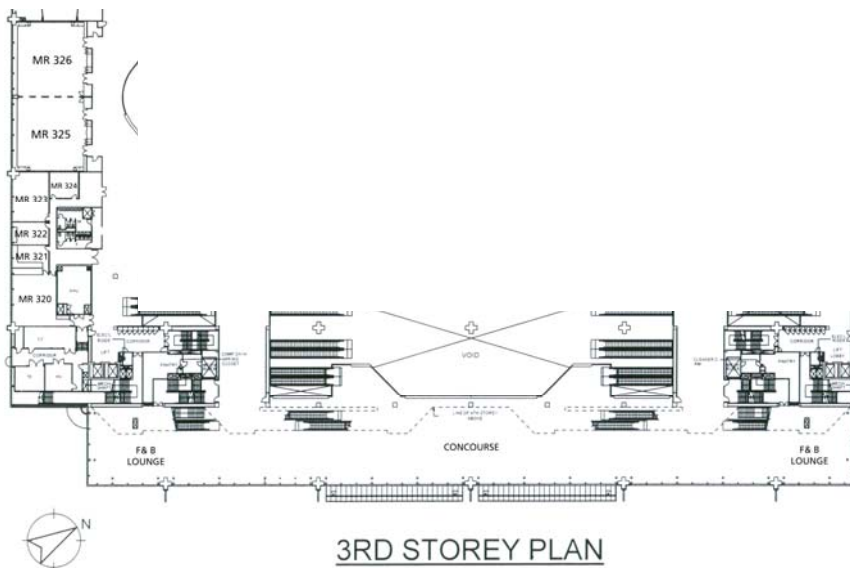
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Floor Plan – Level 2: Meeting Rooms 203 to 209



Floor Plan – Level 3: Exhibition Hall Concourse and Meeting Rooms 325 and 326



Speaker Guides

Speaker Ready Room (SUNTEC 204 - Level 2)

Opens daily 8:30am to 5:30pm. 1 March – Wed to 3 March – Fri

If desired, you may review your presentation materials in this room.

Poster Presentation

Poster sessions will be located on Suntec Level 3 Concourse with the exhibition. Please register at the Registration Desk before proceeding to locate your assigned poster board. To locate your assigned poster board, look for the board marked with your Paper ID.

1. Prepare your poster

Each presenter is provided with a 2.4 metre high by 1 metre wide poster board.

- The presentation must cover the same material as the abstract.
- Place the title of your paper and your paper number prominently at the top of the poster to allow viewers to identify your paper easily. Indicate 1) the abstract's identification number, 2) title, and 3) authors' names.
- Highlight the authors' names, e-mail and address information in case the viewer is interested in contacting them for more information.
- You have complete freedom in displaying your information in figures, tables, text, photographs, etc in the poster.
- Include the background of your research followed by results and conclusions. A successful poster presentation depends on how well you convey information to an interested audience.

2. Set Up Your Poster

- Posters should be set up between 7:30am and 8:30am daily on 1st and 2nd March.
- Posters are scheduled to be on display from 8:30am to 6:00 pm daily on 1st and 2nd March.
- Please make sure that your paper number is clearly visible on your poster board.
- Open forum is as scheduled presenters are required to be at their posters during that time.
- Tapes and other materials are available at the Information Desk, nearby the poster boards.

3. Remove Your Poster

Posters must be removed on the presentation day between 6:00pm and 6:30pm.

Posters remaining after these times will be removed. EMC-Zurich in SINGAPORE 2006 will not be responsible for posters and materials left on poster boards after the stated hours.

4. Information Desk

Staff at the Information Desk will be available to assist you with location and other on-site needs. Tapes and scissors will be available for your use. If you have special needs for your poster presentation, please bring those supplies with you to the meeting.

If you have questions, please contact the Symposium Secretariat at info@emc-zurich.org

Oral Presentation

1. Prepare Your Presentation

Length of presentation material should be in accordance to your time allotted. You are requested to load your presentation materials if it is Power Point before the session starts.

2. Determine Your Audio Visual Needs

All meeting rooms are equipped with the following audio-visual equipment:

- 1-LCD Projector
- 1-Window-based PC
- 1-Screen
- 1-Laser Pointer

The computers in the meeting rooms are being provided to Windows-based PC users. The PC will be configured with Microsoft Windows XP Professional operating system as well as with Microsoft Office XP.

3. Create a Backup Copy of Your Presentation

We recommend you bring at least 2 copies of your presentation to the meeting in case there is a problem with one of them. Thumb Drive, CD-R and CD-RW are accepted.

4. Give Your Presentation

- Be considerate of the other speakers and audience by staying within your allocated time. The allocated time for your presentation includes a discussion and changeover to the next speaker. Session Chairs will hold you to the allotted time. This is essential to ensure adequate time for questions and discussion as well as adherence to the schedule.
- Please discuss the same materials as reported in your paper submission. At the end of the meeting, all presentation files will be destroyed.

Program Overview and Highlights

27 February - Monday to 3 March - Friday

Delegate Arrival & Registration

27 February - Monday and 28 February – Tuesday

Workshops/Tutorials

28 February – Tuesday

- Booth Dressing for Exhibitors (Level 3, Concourse)
- IEEE EMC Chapter Chair Retreat (SUNTEC Room 204)
- IEC SC 77C Project Meeting (SUNTEC Room 205)

1 March - Wednesday

- Keynote Speeches (SUNTEC Room 325 & 326)
- Technical Visit and Evening Reception (*see also Page 16*)

1 March – Wednesday to 3 March – Friday

- Technical Sessions
- Topical Meetings
- Technical Exhibition

2 March - Thursday

- Dinner Banquet at the Singapore Night Safari (*See also page 17*)

Symposium Hours and Special Events

Symposium Hours

1 March – Wednesday to 3 March – Friday, 8:30 AM – 6:00 PM

Official Opening & Program – Meeting Room 325/326 at Level 3

1 March – Wednesday, 8:30 AM – 10.30AM

- Opening Remarks by Symposium Chair
- Official Address by Guest of Honour – Prof Er Meng Hwa, Deputy President, Nanyang Technological University, Singapore
- Official Address by the Swiss Ambassador to Singapore, Dr Daniel Woker
- Address by the President of IEEE EMC Society, Dr Andrew Drozd
- Address by the Technical Chairman, Prof. Todd Hubing
- Keynote Speeches by
Dr Peter Siegel, NASA JPL, California Institute of Technology, United States
- Rob Shaddock, Chief Technology Officer (CTO), Motorola Inc., USA
- Refreshments and Walkthrough the Technical Exhibition

Refreshments (Workshops/Tutorials – Lunch is on Delegates' Own)

- 27 February - Monday to 28 February-Tuesday
Outside Meeting Rooms

Refreshments and Daily Lunches – Included in fees

Please present lunch tickets at gate. Thank you.

- 1 March - Wednesday to 3 March – Friday, 12:00 PM – 2:00 PM
Exhibition Hall at Level 3 Concourse

IEEE Region 10 EMC Chapter's Retreat and Asia Pacific EMC Chairperson's Meeting

28 February (Tuesday), 9:00am to 5pm
SUNTEC Room 204

The IEEE Region 10 EMC Chairperson's retreat aims for the exchange of information between the EMC Chairpersons and the EMCS global and regional officers. In addition, the meeting shall also address the issue on one unified Asia Pacific EMC Symposium. It is open to all EMC Chapters and Asia Pacific EMC Chairpersons.

IEC SC 77C Project Meeting

28 February (Tuesday), 9.00am to 5.00pm
SUNTEC Room 205

A project meeting for IEC SC 77C (EMC: High power transient phenomena) will be held at SUNTEC Level-2 Room 205 on Tuesday, 28 February from 9:00 am until 5:00 pm. The purpose of this meeting is to begin work on two new publications dealing with high power EM transients. All project team members are invited as are guests who are interested in this field. If there are questions about the subject of the meeting, please contact the SC 77C Chairman, Dr. William Radasky at: wradasky@aol.com.

Optional Local Tours

Find out more about Singapore with the exciting local tours specially arranged for you. For more details and booking, please visit Tour Desk at Exhibition Hall, Level 3.

For enquiries, please contact Tradewinds at
Tel 64192188 Fax 64900532
Email: *Tradewinds_mice@singaporeair.com.sg*

Dinner Banquet at the Singapore Night Safari

2 March – Thursday, from 6:00pm

Coach Departs Suntec 6:15pm

Please assemble at ground floor main lobby

Coach Departs Night Safari 11:00pm

Please present dinner ticket to coach driver

Other Useful Information

Add: 80 Mandai Lake Road, Singapore 729826

Ticket Purchase: See Tour/Hospitality Desk at Level 3 Concourse

The drama and mystery of the tropical jungle comes alive after dusk, at the world's premier Night Safari. Creatures from South America, Asia, & India greet visitors from their own naturalistic enclosures, which simulate that of their own homeland. Not to miss are of course the awesome giraffes towering over the gorgeous reservoir, the rare clouded leopards, and endangered greater Asian rhinoceros and of course the feisty fishing cats. Dine amidst the wild for a totally new exhilarating experience.

Time	Program
6:15pm	Leave Convention Centre for Singapore Zoo (There will be trams to bring guests from the entrance to Forest Lodge)
7:15pm	45 mins Reception at Forest Lodge Entrance
8:00pm	Dinner at Forest Lodge
9:00pm	Journey into the magic & mystery of the Night Safari (There will be trams to bring guests to Night Safari and starts the Night Safari tour)
10:00pm	Catch the Creatures of the Night Show
11:00pm	End of show and return to hotel

Technical Program

27 Feb., Mon

Rooms	206	204	207	205
08:30 - 10:30			T3: Fundamentals of EMC & Signal Integrity	Secretariat Room
10:30 - 12:30	T1: EMC Aspects of Lighting	T2: Theory & Practice of Time Domain Electromagnetics	W1: Shielding of Electromagnetic Wave	
13:30 - 17:30			W2: Transportation and System EMC	

28 Feb., Tues

Rooms	206	208	209	204
08:30 - 12:00	T1: EMC Aspects of Lighting (cont'd)	W4: PCB, IC Packaging & Semiconductor Device EMC	W6: Naval EMC Engineering	IEEE EMC Chapter Chair Retreat
13:00 - 17:40	W3: EMC Simulation and Design	W5: RF Biological Effects and Standards Update		Secretariat Room
08:30 - 10:30	Opening Ceremony / Keynote speeches	Location: Suntec Room 325 & 326 Level 3		
10:30 - 11:00	<i>Tea Break</i>			

1 Mar., Wed

Rooms	203	208	209	207	Concourse, Level 3
11:00 - 12:40	CEM-1: Computational Electromagnetics	BIO-1: MRI (Invited)	AUTO-1: Automotive EMC	LIGHT-1: Lightning 1	Exhibition
12:40 - 13:40	<i>Lunch Break</i>				
13:40 - 15:20	CEM-2: Materials, Absorbers And Shields	BIO-1: MRI (Cont'd)	PCB-1: EMC AT PCB Level: Practical Cases	MGT: EMC Management & Standards	Poster Session
15:20 - 15:40	<i>Tea Break</i>				
15:40 - 18:00	CEM-3: Radiation and Scattering	BIO-2: High Frequency (Invited)	COM-1: SS-Wireless Communication EMC	IEMI-1: SS-Intentional EMI	

2 Mar., Thu

08:40 - 10:20	CEM-4: Time-Domain Modeling	COM-2: EMC in Communication	ICEM-1: SS-IC EMC	MAA: Magnetic Material Applications	Exhibition
10:20 - 10:40	<i>Tea Break</i>				
10:40 - 12:20	CEM-5: EM Modelling for Complex Problems	MEAS-1: EMC Measurement Techniques	SI-1: Signal Integrity	LIGHT-2: Lightning 2	Poster Session
12:20 - 13:20	<i>Lunch Break</i>				
13:20 - 15:00	CEM-6: Frequency-Domain Modelling	BIO-3: Biomedical EM	AUTO-2: Automotive EMC	POW-1: Power System EMC	Student Poster Session
15:00 - 15:20	<i>Tea Break</i>				
15:20 - 18:00	CEM-7: Field-Circuit Interactions	BIO-4: Biomedical	PCB-2: EMC at PCB Level-Design Issues	IEMI-2: Intentional EMI	
<i>Banquet Dinner</i>					

3 Mar., Fri

08:40 - 10:20	MEAS-2: EMC Measurement Techniques 2	COM3: RFID	PCB-3: EMC at PCB Level-Modeling	PROT-1: EMC-Protection	Exhibition
10:20 - 10:40	<i>Tea Break</i>				
10:40 - 12:20	IMMU-1: Immunity Testing	EASIA-1: EMC In Asia	PCB-4: Circuit Simulation	PROT-2: Shielding	NARTE Examination
12:20 - 13:20	<i>Lunch Break</i>				
13:20 - 15:00	MEAS-3: EMC Testing Facilities	EMI-1: Conducted EMI	ICEM-2: IC Packaging	POW-2: Power System EMC	
15:00 - 15:20	<i>Tea Break</i>				
15:20 - 18:00	MEAS-4: EMC Measurement Techniques 4	IF-1: EMC Industry Forum	Mil-1: EMC in Military		

Workshop Program

27 February 2006, Monday, 8:30am - 17:30pm

Time	Room No.	W/T	Workshop / Tutorial Title
08:30 - 17:30	206	T1	EMC Aspects of Lighting Organizers: F. Rachidi, Switzerland and R. Thottappillil, Sweden
08:30 - 17:30	204	T2	Theory and Practice of Time Domain Electromagnetics Organizers: Wolfgang J.R. Hoefler, Canada
08:30 - 10:30	207	T3	Fundamentals of Electromagnetic Compatibility and Signal Integrity Mark Montrose, USA
10:50 - 12:30	207	W1	Shielding of Electromagnetic Wave George Kunkel, USA
		W2	TRANSPORTATION AND SYSTEM EMC
13:30 - 14:30	207	W2-1	EMC in Fixed Installations and Large Systems Peter Leung, Hong Kong
14:30 - 16:00	207	W2-2	Transportation EMC Alessio Gaggelli and Prof. Sergio A. Pignari, Italy
16:20 - 17:30	207	W2-3	Automotive EMC Achim Gerstner, USA

28 February 2006, Tuesday, 8:30am - 17:30pm

Time	Room No.	W/T	Workshop / Tutorial Title
08:30 - 12:30	206	T1	EMC Aspects of Lighting Organizers: F. Rachidi, Switzerland and R. Thottappillil, Sweden
		W3	EMC SIMULATION AND DESIGN
13:00 - 15:00	206	W3-1	Computational Modelling for EMC Paul Duxbury, UK
15:30 - 17:30	206	W3-2	State of the Arts of 3D EMC Field Simulation Marko Walter, Germany
		W4	PCB, IC PACKAGING & SEMICONDUCTOR DEVICE EMC
08:30 - 09:30	208	W4-1	PCB Radiated Emission Models Todd Hubing, University of Missouri-Rolla, USA
09:30 - 12:00	208	W4-2	Power and Ground Integrity Design in High-speed Chip, Package, and PCB Joungho Kim, KAIST, Korea
13:00 - 13:30	208	W4-3	Semiconductor Device EMC WADA Osami, Kyoto University, Japan
13:30 - 14:00	208	W4-4	Modeling and Verification Techniques to Ensure System-Wide Electromagnetic Reliability Thomas Steinecke, Infineon Technologies AG, Germany
14:00 - 14:30	208	W4-5	EMC Design on Component Level is the Key Success Siegfried Reinhardt, Siemens VDO, Germany
14:30 - 15:30	208	W4-6	Theoretical Consideration & practical Solution for EMC and Reliability Problems for Motor Drive Systems (Power Electronics Device EMC) Wolfgang L. Klampfer, Switzerland
16:00 - 17:30	208	W5	RF Biological Effects and Standards Update Dr. C K Chou, Motorola Inc., USA
08:30 - 17:30	209	W6	Naval EMC Engineering Organizers: F. B.J. Leferink, Netherlands and Elya Joffe, Israel

Workshops / Tutorials

Tutorial 1: EMC Aspects of Lightning
Time: 8:30am-05:30pm, Monday, 27 February 2006
8:30am-12:30pm, Tuesday, 28 February 2006
Venue: SUNTEC Room 206
Organizers: F. Rachidi, Swiss Federal Institute of Technology, Switzerland
R. Thottappillil, Uppsala University, Sweden
Co-Sponsor: Swiss House Singapore

Abstract

Lightning represents one of the most important sources of electromagnetic disturbances. The objective of this tutorial is to give an overview of measured lightning parameters and modeling its major EMC effects for engineering applications.

Tutorial Outline

8:30am to 5:30pm, Monday, 27 February 2006

8:30-8:35AM: Introduction

8:35AM: T1.1: Lightning Currents for Engineering Applications

A. Borghetti, University of Bologna, Italy, G. Diendorfer, OVE-ALDIS, Austria, V. Rakov, University of Florida, United States

10:20AM: T1.2: Lightning Electric and Magnetic Fields

V.A. Rakov, University of Florida, United States

11:25AM: T1.3: Lightning Return Stroke Models and Electromagnetic Field Computation

V. Cooray, R. Thottappillil, Nelson Theethayi, Uppsala University, Sweden

1:30PM: T1.4: Lightning to Tall Structures

Y. Baba, Doshiya University, Japan, F. Rachidi, Swiss Federal Institute of Technology, Switzerland, R. Thottappillil, Uppsala University, Sweden

2:30PM: T1.5: Lightning Location Systems

G. Diendorfer, OVE-ALDIS, Austria, M. Rubinstein, University of Applied Science of Western Switzerland, Switzerland

3:50PM: T1.6: Lightning-Induced Voltages on Power Lines

C.A. Nucci, University of Bologna, Italy, F. Rachidi, Swiss Federal Institute of Technology, Switzerland

5:00PM: Discussions

8:30- 12:30pm, Tuesday, 28 February 2006

8:30AM: T1.7: Lightning Protection of Buildings

Z.A. Hartono, I.Robiah, Lightning Reasearch Pte Ltd, Malaysia

9:30AM: T1.8: Lightning Protection of Power Systems

C.A. Nucci and M. Paolone, University of Bologna, Italy

10:50AM: T1.9: Lightning Interaction with Electrified Railways

N. Theethayi and R. Thottappillil, Uppsala University, Sweden

11:50AM: T1.10: Lightning Interaction with Aircrafts

A. Larsson, FOI-Swedish Defense Research Institute, Sweden

12:10-12:30PM: Discussions

Tutorial 2: Theory and Practice of Time Domain Electromagnetics

Time: 8:30am-5:30pm, Monday, 27 February 2006

Venue: SUNTEC Room 204

**Organizer: Wolfgang J.R. Hoefler
University of Victoria, Canada**

Abstract

This full-day tutorial provides an introduction to the theoretical foundations, the operational characteristics and the practical engineering applications of time domain electromagnetic simulators. The purpose of this tutorial is to introduce practitioners who are mostly familiar with the classic frequency-domain approaches, to the concepts and operating principles of time-domain electromagnetic simulators, and to show how these translate into their special properties as engineering tools for high-frequency, signal integrity and EMC work.

Speakers: Wolfgang J.R. Hoefler and Poman P. M. So, University of Victoria, Canada

Tutorial 3: **Fundamentals of Electromagnetic Compatibility and Signal Integrity**
Time: **8:30am-10:30pm, Monday, 27 February 2006**
Venue: **SUNTEC Room 207**
Speaker: **Mark Montrose**
 Montrose Compliance Inc., United States

Abstract

For those just entering the exciting field of EMC, trying to figure out what to learn and details of fundamental concepts can be a job in itself. Due to lack of universities not offering courses in EMC, (some aspects of EMC may however, be discussed) this course presents a potpourri of concepts and information in a simplified manner. Most engineers enter the field of EMC by default and are thus untrained to think in terms of propagated fields (frequency domain) instead of voltage and current (time domain), which causes electric and magnetic fields to travel through free space or a transmission line.

The focus of this presentation is on fundamental principles that help explain EMC in simplistic terms. Topics of discussion include EMC requirements, non-ideal behavior of passive components, signal spectra, fundamentals of signal integrity related to printed circuit boards, shielding and grounding for EMC.

Workshop 1: **Shielding of Electromagnetic Wave**
Time: **10:50am-12:30pm, Monday, 27 February 2006**
Venue: **SUNTEC Room 207**
Speaker: **George Kunkel**
 Spira Manufacturing Corporation, USA

Tutorial Outline

- An Overview of Antenna Theory.
- Penetration of the Wave into/through Shielding Barrier Materials and Seams and Gasketed Joints.
- Test Results of Various Gasketed Joint Combinations.
- Penetration of Shielded Enclosures.
- Corrosion Effects on Shielding.
- Wire and Cable Coupling.
- Test Methods for Shielding Effectiveness of Shielded Cables.

Workshop 2: Transportation and System EMC
Time: 1:30pm-5:30pm, Monday, 27 February 2006
Venue: SUNTEC Room 207
Organizers: Prof. Sergio A. Pignari
 Politecnico di Milano, Milan, Italy
 Prof Peter Leung
 City University of Hong Kong, Hong Kong, China

Abstract

The workshop consists of three parts: Part I is in a more general and tutorial fashion on EMC assurance and management in Fixed Installation; it could be taken as prerequisite to Part II, which deals with technologies employed in high-speed railways and related critical EMC issues, involving modern trains and infrastructure.

The third part shall cover the automotive EMC Due to the increasing amount of electronic components throughout a vehicle, EMC tests on the subsystem (module) level as well as on the full vehicle become more and more important. This talk will first of all give an update on the current standards situation in the automotive industry. The speaker will overview the details of the different sub tests.

Workshop Outline:

W2.1 EMC in Fixed Installations and Large Systems

Peter S. W. Leung, City University of Hong Kong

W2.2 Transportation EMC

Alessio Gaggelli, Trenitalia S.p.A, Sergio A. Pignari, Politecnico di Milano, Italy

W2.3 Automotive EMC

Achim Gerstner , Rohde & Schwarz Inc., Texas, USA

Workshop 3: EMC Simulation and Design
Time: 1:00pm-5:30pm, Tuesday, 28 February 2006
Venue: SUNTEC Room 206
Organizer: Marko Walter, CST, Germany

Workshop Outline

W3.1: Computational Modelling for EMC
Paul Duxbury, Flomerics Ltd, UK

W3.2: State of the Arts of 3D EMC Field Simulation
Marko Walter, Computer Simulation Technology, Germany

Workshop 4: PCB, IC Packaging & Semiconductor Device EMC
Time: 8:30am-3:30pm, Tuesday, 28 February 2006
Venue: SUNTEC Room 208
Organizers: Li ErPing, IHPC, Singapore
Joungho Kim, KAIST, Korea
Todd Hubing, University of Missouri-Rolla, USA
Osami Wada, Kyoto University, Japan

Abstract

Clock frequencies of high-speed semiconductor IC's, packages, and systems are increased over GHz frequency ranges. Management of current wave propagation, loss, decoupling, resonance, and radiation at the PDN and the return current path becomes a crucial part of the IC, package, and system co-design in order to maintain power and ground integrity of the system.

In this workshop, we will discuss fundamental design principles and challenges to achieve the electromagnetic reliability, in particular the topics include PCB EMC modeling and design; Power and Ground Integrity Design in High-speed Chip, Package and PCB ; semiconductor device EMC, IC and System-wide Electromagnetic Reliability.

Workshop Outline

W4.1: PCB Radiated Emission Models
Todd Hubing, University of Missouri-Rolla, USA

W4.2: Power and Ground Integrity Design in High-speed Chip, Package and PCB
Joungho Kim, KAIST, Korea

W4.3: Semiconductor Device EMC

Osami Wada, Kyoto University, Japan

W4.4: Modeling and Verification Techniques to Ensure System-Wide Electromagnetic Reliability

Thomas Steinecke, Infineon Technologies AG, Germany

W4.5: EMC Design on Component Level is the Key Success

Siegfried Reinhardt, SiemensVDO, Germany

W4.6: Theoretical Consideration & practical Solution for EMC and Reliability Problems for Motor Drive Systems (Power electronics device EMC)

Wolfgang L. Klampfer, Schaffner EMV AG, Switzerland

Workshop 5: RF Biological Effects and Standards Update

Time: 4:00pm-5:30pm, 28 Feb 2006

Venue: SUNTEC Room 208

Speaker: Dr C-K. Chou, Corporate EME Research Laboratory, Motorola Inc., USA

Abstract:

The dramatic increase in man-made radio frequency (RF) fields in the environment during the last few decades has led to public health concerns in many parts of the world. Specifically, questions have been raised on the safety of exposure to RF energy emitted from radar, television and radio communication systems, microwave ovens, video display terminals, and most recently, mobile telephones and base stations. In this presentation, recent epidemiological, human, animal and in vitro studies will be summarized. Reviews of independent expert panels and health authorities will be discussed also. Proper engineering and biological study designs will be emphasized to ensure any observed effects are genuine RF-field induced effects and not due to experimental artifacts. RF dosimetry will be emphasized because the complexity of RF dosimetry is part of the reason why there are so many controversial reports in the literature. Recently developed standards for protecting human health as well as measurement standards for RF emitting devices for compliance requirements will be discussed. Safety standards include the new IEEE C95.1 human exposure guidelines and IEEE C95.7 RF safety program recommendations. The IEEE C95.1 standard will be compared to the 1998 guidelines of the International Commission on Non-Ionizing Radiation Protection. An overview of global RF safety regulations will be presented. Measurement standards to be discussed include IEEE 1528 and IEC 62209 part 1 (characterizing mobile phone exposure in the head) and IEC 62209 part 2 (two-way radios and body worn devices). Harmonization of both RF safety and measurement standards is important for minimizing confusion in global regulations and public concerns.

Workshop 6: Naval EMC Engineering
Time: 8:30am-5:30pm, Tuesday, 28 February 2006
Venue: SUNTEC Room 209
Organizers: Frank B.J. Leferink, Thales/University of Twente,
Netherlands
Elya Joffe, K.T.M. Engineering, Israel

Abstract:

Modern warships contain a huge number of electromagnetic sensors and electronics. At the same time, the operational shift towards littoral warfare calls for smaller ships, without loss of capabilities. This brings the many sensors in even closer proximity. Functionality may require higher EM-field levels while safety (RadHaz) tries to avoid these in certain areas. As a result, EMC is becoming more and more a critical issue.

EM engineering is an important factor in the total systems engineering effort. Naval EMC engineering involves the necessary activities from concept to deployment phase. In this workshop, shipboard EMC installations will be discussed, including bonding and grounding and lightning protection, as well as modelling and simulations of electromagnetic fields. Furthermore, validation of (large) systems onboard (in-situ) naval vessels will be shown. Some visions about naval ships in the near future will be presented too.

Workshop Outline:

- W6.1: Introduction to Shipboard EMC**
Moshe Netzer, EMC Engineering and Safety, Israel
- W6.2: Shipboard Electromagnetic Radiation Hazards**
Moshe Netzer, EMC Engineering and Safety, Israel
- W6.3: Naval Topside EM Modelling and Validation**
Jasper van der Graaff, Thales, Netherlands
- W6.4: Computer Simulation of Shipboard Communications Antennas**
Franz Schlagenhauser, Western Australian Telecommunications Research Institute, Australia
- W6.5: Development of Efficient Hybrid Methods for Electrically Large and Complex Electromagnetic Compatibility (EMC) Simulation**
Xingchang Wei, Institute of High Performance Computing, Singapore
- W6.6: Examples for Shipboard EMC Installations**
Moshe Netzer, EMC Engineering and Safety, Israel

W6.7: Naval Integrated Topdeck Design: An Engineering Effort Leading to Integrated Mast Modules

Frank Leferink, Thales/ University of Twente, Netherlands

W6.8: Principles of Shipboard Grounding

Elya Joffe, K.T.M. Engineering, Israel

W6.9: In-situ EMI Testing of Large Naval Radar Systems Using a Vibrating Intrinsic Reverberation Chamber (VIRC)

Frank Leferink, Thales/University of Twente, Netherlands

W6.10: European Commission Initiative: 'Standardization for Defence Procurement - European Handbook' By: Expert Group 7, Electromagnetic Environmental Effects

Rene Malabiau, French MoD, France, and Frank Leferink, Thales, Netherlands

NARTE EMC Certification Examination

Time: 9:00am to 5:00pm, Friday, 3 March 2006

Examiner: Russell Carstensen

Enquiries: NARTE Booth at A11

USA NARTE, a non-profit organization, certifies qualified practitioners of EMC/EMI control. The purpose of NARTE EMC Certification is to foster technical excellence in EMC engineering. This approach establishes competency criteria for EMC/EMI work certification benefits the individual engineer or technician and the EMC community by establishing a standard of excellence in EMC. Details at www.narte.org.

The NARTE EMC Examination is co-locating with the EMC-Zurich Symposium, and is open all the symposium attendees including EMC Engineers, Consultants, Researchers, certification officers, and practitioners, etc. Additional registration fee is required for the examination. Registration is open at the symposium site.

Technical Sessions

- AUTO : Automotive EMC
- BIO : Biomedical EMC
- CEM : Computational Electromagnetics
- COM : Communication EMC
- EASIA : Topical Session-EMC in Asia
- ICEM : IC & Packaging EMC
- IEMI : Intentional Electromagnetic Interference
- LIGHT : Lightning EMC
- MEAS : EMC Measurement and Testing Techniques
- MGT : EMC Management and Standards
- Mil : Topical Session-EMC in Military
- MMA : Magnetic Material Applications
- MRI : Magnetic Resonance Image
- PCB : PCB EMC
- POW : Power System EMC
- PROT : EMC Protection
- SI : Signal Integrity
- SS : Special Session

Keynote Address

Terahertz Technology in Outer and Inner Space

By Peter Siegel, California Institute of Technology, United States

Summary

After more than 30 years of niche applications in the space sciences area, the field of Terahertz Technology is entering a true Renaissance. While major strides continue to be made in submillimeter wave astronomy and spectroscopy, the past few years have seen an unprecedented expansion of terahertz applications, components and instruments. Broad popular interest in this unique frequency domain has emerged for the first time, spanning applications as diverse as biohazard detection and tumor recognition. Already there are groups around the world who have applied specialized Terahertz techniques to disease diagnostics, recognition of protein structural states, monitoring of receptor binding, performing label-free DNA sequencing and visualizing contrast in otherwise uniform tissue. A commercial terahertz imaging system has recently started tests in a hospital environment and new high sensitivity imagers with much deeper penetration into tissue have begun to emerge. Solicitations for more sophisticated instruments and enabling terahertz components have filtered into US agency proposal calls from DoD and NASA, to NSF and NIH, and many new research groups have sprung up, both in this country and in Europe and Asia. This talk will broadly survey terahertz technology from its cradle applications in space science and spectroscopy to more recent biomedical and chemical uses.

Speaker Biography:

Peter H. Siegel obtained a BA in astronomy and physics from Colgate University, Hamilton NY in 1976, a Masters in Physics and a PhD in Electrical Engineering from Columbia University in 1978 and 1983 respectively. He has been involved in the analysis and development of millimeter-and submillimeter-wave sensors for over 30 years since 1975. In 1987, He moved to JPL to work on advanced technology development for NASA astrophysics applications. In 1993, he founded the JPL Submillimeter Wave Advanced Technology team (SWAT) on the development of submillimeter-wave technology for NASA's near and long term astrophysics, Earth remote sensing, and planetary mission applications. At JPL, Dr. Siegel has led or co-I'd more than sixty R&D programs as well as developing and delivering hardware for four major space flight instruments. Recently Dr. Siegel joined the staff at Caltech as a Senior Scientist at the Beckman Institute, Division of Biology, where he is working on biological applications of THz technology. Dr. Siegel and his JPL team have won numerous awards for



their technical achievements and are internationally recognized as leaders in THz technology development. Dr. Siegel is a member of AAAS, an elected Fellow of the IEEE, Chair of IEEE MTT Committee 4 - Terahertz Technology and Applications, Vice-Chair of the International Organizing Committee of the Symposium on Infrared and Millimeter Waves (IRMMW), and Organizer of the 33rd IRMMW & 16th THz Electronics Symposium to be held at Caltech in Pasadena, California in 2008 – to which you are all invited!

Technical Program

Keynote Speeches

Title: Terahertz Applications for Outer and Inner Space
Time: 9:00-9:45am on 1 March 2006
Speaker: Dr Peter Siegel
California Institute of Technology, United States

Title: The Potential of EMC in a Seamless Mobility Environment
Time: 9:45-10:30am, 1 March 2006
Speaker: Rob Shaddock
Chief Technology Officer (CTO) for Mobile Devices
Motorola Inc., USA

Venue: SUNTEC Room 325/326

Technical Sessions

CEM-1: Computational Electromagnetics (Invited)

Wednesday, 1 March 2006, 11:00am-12:40pm

Chair: Prof. Ruediger Vahldieck
SUNTEC Room 203

- W1-CEM-1-1 **Developments of Finite-Volume Techniques for Electromagnetic Modeling in Unstructured Meshes**
11:00am Christophe Fumeaux¹, Dirk Baumann¹, Pierre Bonnet², Ruediger Vahldieck¹
¹Swiss Federal Institute of Technology (ETH), Zurich, Switzerland
²Université Blaise Pascal, LASMEA, Clermont-Ferrand, France
- W1-CEM-1-2 **EMC Computer Modeling of Distributed Wireless Systems to Assure Efficient Utilization of the RF Transmission Hyperspace**
11:20am Andrew Drozd, ANDRO Computational Solutions, United States
- W1-CEM-1-3 **FIT for EMC**
11:40am Marko Walter and Irina Munteanu, CST GmbH, Germany
- W1-CEM-1-4 **Model Order Reduction for Subgridding in FDTD Scheme**
12:00pm Lukasz Kulas, P Sypek, Jakub Podwalski and Michal Mrozowski
Gdansk University of Technology, Poland

W1-CEM-1-5 A State-Space Formulation for Field-Averaging for Finite Volume Models

12:20pm Klaus Krohne , Dirk Baumann and Ruediger Vahldieck
Swiss Federal Institute of Technology (ETH), Zurich,
Switzerland

CEM-2: Materials, Absorbers and Shields

Wednesday, 1 March 2006, 1:40pm-3:20pm

Chairs: Prof. Zhongxian Shen, Dr. Andrew Drozd
SUNTEC Room 203

W1-CEM-2-1 Analysis of Electromagnetic Field Using CIP Method and Its Application of One-Layer Wave Absorber

1:40pm Shinya Watanabe, Youichi Kakuta and Osamu Hashimoto
Aoyama Gakuin University, Japan

W1-CEM-2-2 Fast and Accurate Evaluation of the Shielding Effectiveness of Complex Enclosures

2:00pm Femke Olyslager and Jan Fostier
Ghent University, Belgium

W1-CEM-2-3 Modeling Shielding Properties of Concrete

2:20pm Ade Ogunsola¹, Ugo Reggiani² and Leonardo Sandrolini²
¹Parsons Group International, UK
²University of Bologna, Italy

W1-CEM-2-4 Shielding Effectiveness of Cylindrical Enclosures with Annular Ring Apertures

2:40pm Zhongxiang Shen
Nanyang Technological University, Singapore

W1-CEM-2-5 Novel Architecture for Waveguide Based Metamaterials

3:00pm Rakhesh Kshetrimayum
Indian Institute of Technology, India

CEM-3: Radiation and Scattering

Wednesday, 1 March 2006, 3:40pm-6:00pm

Chairs: Prof. Le-Wei Li, Prof. Degui Chen

SUNTEC Room 203

- W1-CEM-3-1 **A Symmetric Domain Decomposition Formulation of Hybrid FEM-BEM Coupling for Electromagnetic Analysis**
3:40pm Kezhong Zhao, Marinos Vouvakis, Seung Mo Seo, Seung-Choel Lee and Jin-Fa Lee
Ohio State University, United States
- W1-CEM-3-2 **A New Approach for Analysis of Transient Scattering from Arbitrarily Shaped 3D Dielectric Bodies**
4:00pm Ramin Aghajafari and Hermann Singer
Technical University of Hamburg-Harburg, Germany
- W1-CEM-3-3 **Modeling and Simulation of Branched Wiring Network**
4:20pm Chet Lo and Cynthia Furse
University of Utah, United States
- W1-CEM-3-4 **Numerical Analysis of Scattering from a General Bi-Isotropic Cylindrical Shell with an Interior Metal Coating**
4:40pm Chung-I. G. Hsu, Cheng-Nan Chiu, Chin-Ming Wu and Yu-Cheng Kang
Da-Yeh University, Taiwan
- W1-CEM-3-5 **Hybrid of Periodic Dyadic Green's Function and FEM for Quiet Zone Analysis in Anechoic Chamber**
5:00pm Feiyan Lv, Song Chen and Fei Sha
Beijing Jiaotong University, Beijing, China

Topical Meeting on Biomedical Electromagnetics

BIO-1: MRI (Invited)

Wednesday, 1 March 2006, 11:00am-12:40pm

Chairs: Tamer Ibrahim and Tommy Vaughn

SUNTEC Room 208

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| W2-BIO-1-1 | RF Power Deposition in a Human Model with a Pacemaker in MRI |
| 11:00am | Houman Abrishamkar and Maria Stuchly
University of Victoria, Canada |
| W2-BIO-1-2 | 2-D and 3-D Homogeneous/Localized Excite Fields at 3 Tesla and 7 Tesla Body Imaging |
| 11:20am | Tamer S. Ibrahim and Roney Abraham
The University of Oklahoma, United States |
| W2-BIO-1-3 | Optimization of B1+ Excitation while Minimizing SAR Hotspots for Phase Amplitude Controlled High Field MRI Using a Hyperthermia Treatment Planning System and Realistic Patient Anatomies |
| 11:40am | C.A.T. van den Berg, B. van den Bergen, J.J.W. Lagendijk, L.W. Bartels and H. Kroeze ¹
University Medical Centre Utrecht, Netherlands |
| W2-BIO-1-4 | Custom Tailored High Frequency B₁-Fields for Designer Needs: Uniformity Optimization on Large Parameter Space using Genetic Algorithms and Closed Form Solutions |
| 12:00pm | T. Eagan ¹ , T. Baig ¹ , V. Taracila ¹ , L.Petropoulos ^{1,2} , X.Yang ¹ , H. Fujita ¹ and R. Brown ¹
¹ Case Western Reserve University, United States
² Hitachi Medial Systems, Twinsburg, Ohio, United States |
| W2-BIO-1-5 | Transceive Grappa: A Scheme for High Field Imaging with Reduced Field/Tissue RF Artifacts |
| 12:20pm | Bing Keong Li, Feng Liu and Stuart Crozier
The University of Queensland, Australia |

BIO-1: MRI (Invited)

Wednesday, 1 March 2006, 1:40pm-3:20pm

Chairs: Tamer Ibrahim and Tommy Vaughn

SUNTEC Room 208

- W2-BIO-1-6 **Tissue Equivalent Phantoms for High Field Magnetic Resonance Imaging (MRI)**
1:40pm Barbara L. Beck¹, Kelly A. Jenkins¹, Stuart Crozier² and Jeffrey Fitzsimmons¹
¹University of Florida, United States
²University of Queensland, Australia
- W2-BIO-1-7 **Highest Field Human Imaging**
2:00pm Thomas Vaughan, Lance Dela Barre, Carl Snyder, Lizann Bolinger, Jinfeng Tian, Pat Bolan, Mike Garwood, Gregor Adrian, John Strupp, Andersen and Kamil Ugurbil
University of Minnesota, United States
- W2-BIO-1-8 **SAR and Temperature: Calculations and Comparison to Regulatory Limits for MRI**
2:20pm Christopher M. Collins¹, Weihua Mao¹, Wanzhan Liu², and Michael B. Smith¹
¹The Pennsylvania State University, College of Medicine, United States
²University of Minnesota, Center for MR Research, United States
- W2-BIO-1-9 **Modeling of Pacing Lead Electrode Heating in the MRI RF Field**
2:40pm Piotr Przybyszewski¹, M. Wiktor² and M. Mrozowski²
¹Medtronic Inc. USA
²Technical University of Gdansk, Poland
- W2-BIO-1-10 **Implementation of Mode-Scanning Excitation Method with a 16-ch Transmit/Receive Volume Strip Array at 7T**
3:00pm R. Lee¹, R. Brown², G. Mizsei³, R. Xue¹, Y. Wang², Roney Abraham⁴, Tamer Ibrahim⁴ and C. Stefanescu¹
¹New York University, United States
²Cornell University, United States
³Mont Sinai School of Medicine, United States
⁴The University of Oklahoma, United States

BIO-2: High Frequency (Invited)

Wednesday, 1 March 2006, 3:40pm-6:20pm

Chairs: Prof. Michal Okoniewski and Prof. Koichi Ito

SUNTEC Room 208

W2-BIO-2-1 **On Various ‘Worst Case’ Situations for Power Absorption in Homogeneous and Heterogeneous Phantoms**

3:40pm Benoît Derat¹ and Jean-Charles Bolomey²

¹SAGEM Communication, France

²SUPELEC, France

W2-BIO-2-2 **Temperature Rise in the Human Eye and Orbit due to RF Exposure Calculated with a Realistic Vascularised Model: Temperature Distributions and the Enormous Impact of Cooling by Perfusion**

4:00pm V.M.M. Flyckt, B.W. Raaymakers, H. Kroeze and J.J.W.

Legendijk

University Medical Centre Utrecht, Netherlands

W2-BIO-2-3 **EMF Estimations in a Train Carriage: Assessing Implantable Cardiac Pacemaker EMI from Cellular Radios**

4:20pm Yusuke Abiko¹, Takashi Hikage¹, Louis Harris¹, Masahiko

Hirono¹, Toshio Nojima¹, Manabu Omiya¹, Masaaki

Komazaki², Soichi Watanabe³ and Takashi Shinozuka³

¹Hokkaido University, Japan

²Nippon COMSYS Corporation, Japan

³National Institute of Information and Communication Technology, Japan

W2-BIO-2-4 **Hybrid Analysis of SAR in Human Body for Base-Station Exposure in Underground Environment**

4:40pm Masayuki Komatsu¹, Jianqing Wang¹, Osamu Fujiwara¹ and Shinji Uebayashi²

¹Nagoya Institute of Technology, Japan

²NTT DoCoMo Inc, Japan

W2-BIO-2-5 **Development and Application of Human Voxel Models in Japan**

5:00pm Tomoaki Nagaoka and Soichi Watanabe

National Institute of Information and Communications

Technology Japan

W2-BIO-2-6 **Dosimetric Analysis for Human Exposure to Body-Mounted Wireless Devices**

5:20pm Min-Young Park, Chea-Ok Ko and Jeong-Ki Pack

Chungnam National University, South Korea

- W2-BIO-2-7 **Experimental Investigation of Breast Cancer Detection using a Fully-populated Array of Antennas and Real Aperture Synthetically Organised Radar**
5:40pm I. J. Craddock¹, R. Nilavalan², J. Leendertz¹, A. Preece¹ and R. Benjamin¹
¹University of Bristol, United Kingdom
² Brunel University, United Kingdom
- W2-BIO-2-8 **Thin Coaxial Antennas for Interstitial and Intracavitary Microwave Thermal Therapies**
6:00pm Koichi Ito and Kazuyoki Saito
Chiba University, Japan

AUTO-1: Automotive EMC

Wednesday, 1 March 2006, 11:00am-12:40pm

Chairs: Prof. Robert Weigel, Guenter Seibert

SUNTEC Room 209

- W3-AUTO-1-1 **Design Methodology to Limit Electromagnetic Coupling Between Board Tracks on PCB Level in Realtime**
11:00am Alexander Stadler¹, Manfred Albach¹, Hans Roßmanith¹ and Mr Göran Schubert²
¹University of Erlangen-Nuremberg, Germany
²Conti-TEMIC Microelectronic GmbH, Germany
- W3-AUTO-1-2 **Inductive and Capacitive Couplings in DC Motors with Built-In Damping Chokes**
11:20am Jens Benecke and Stefan Dickmann
Helmut-Schmidt-Universität (Universität der Bundeswehr Hamburg), Germany
- W3-AUTO-1-3 **Analysis of Cable Parameters on the Real Chassis by Measurement**
11:40am Shaofeng Yu, Wei Li, Bo Zhang, Jinliang He and Yong Huang
Tsinghua University in Beijing, China
- W3-AUTO-1-4 **Simulation and Analysis of Electromagnetic Environment for the Mobile Receiver**
12:00pm JungHoon Kim and JoongGeun Rhee
Hanyang University South Korea

PCB-1: EMC at PCB Level - Practical Cases

Wednesday, 1 March 2006, 1:40pm-3:20pm

Chairs: Prof. Frank Leferink, Prof. Jianguo Ma

SUNTEC Room 209

- W3-PCB-1-1 **Iterative Methods for Reluctance Based PEEC Models**
1:40pm Martin Zitzmann¹, Tanja Clees² and Robert Weigel¹
¹University of Erlangen-Nuremberg, Germany
²Fraunhofer Institute for Algorithms and Scientific
Computing, Germany
- W3-PCB-1-2 **Improved Impedance Calculation of Populated PCB Power-
Bus Structures**
2:00pm Matthias Hampe and Stefan Dickmann
Helmut-Schmidt-University, Germany
- W3-PCB-1-3 **Hybridized 3D-FDTD and Circuit Simulator For Analysis of
PCB Via's Signal Integrity**
2:20pm Xiaoshe Zhai, Zhengxiang Song, Yingsan Geng, Jianhua Wang
and Degui Chen
Xi'an Jiaotong University, China
- W3-PCB-1-4 **Parameterized Macromodels for Lossy Multiconductor
Transmission Lines**
2:40pm Stefano Grivet-Talocia¹, Silvia Acquadro¹, Carlo
Peraldo¹, Flavio Canavero¹, Ilkka Kelderer², Markku
Rouvala², Ali Arslan²
¹Politecnico di Torino, Italy
²Nokia Research Center, Finland
- W3-PCB-1-5 **Comparison of Methods for Calculating the Loading Effect
of Capacitors on Power Ground Planes**
3:00pm Joe Trinkle and Antonio Cantoni
Western Australian Telecommunication Research
Institute, Australia

COM-1: SS-Wireless Communication EMC

Wednesday, 1 March 2006, 3:40pm-5:20pm

Chair: Prof. Peter Leung

SUNTEC Room 209

- W3-COM-1-1 **Crosstalk Immunity Improvement in Digital Systems Using Binary Phase Shift Keying**
3:40pm Vicente Gonzalez, Enrique Sanchis, Alberto Valero
University of Valencia, Spain
- W3-COM-1-2 **SAR Compliance in Australia – Requirements for Mobile and Portable Transmitting Devices**
4:00pm Chris Zombolas, Aaron Sargent
EMC Technologies Pty Ltd, Australia
- W3-COM-1-3 **RFI Assessment on Human Safety of RFID System at Hong Kong International Airport**
4:20pm Y F Wong¹, Paul W K Wu¹, Daniel M H Wong¹, Denny Y K Chan¹, L C Fung² and S W Leung²
¹Hong Kong Airport Authority, Hong Kong, China
²City University of Hong Kong, China
- W3-COM-1-4 **Co-existence of GSM1800 and GSM1900: BTS-to-BTS Interference**
4:40pm N. Petchinda¹, S. Malisuwan^{1,2}, P. Ritthiruangdech³ and V. Ungvichian⁴
¹Rangsit University, Thailand
²Chulachomklao Royal Military Academy, Thailand
³Office of Auditor General, Thailand
⁴Florida Atlantic University, Thailand
- W3-COM-1-5 **To Estimation of Level of Co-Channel Interference in the Communication Systems**
5:00pm Vladimir B. Trigubovich
Belarusian Medical Academy of Post-Graduate Education, Belarus

LIGHT-1: Lightning EMC

Wednesday, 1 March 2006, 11:00am-12:40pm

Chairs: Prof. Vladimir A. Rakov, Prof. Liew Ah Choy

SUNTEC Room 207

- W4-LIGHT-1-1 **Transmission Line Model of Lightning Return Strokes Generalized to Include a Tall Grounded Strike Object and an Upward Connecting Leader**
11:00am Yoshihiro Baba¹ and Vladimir Rakov²
 ¹Doshisha University, Japan
 ² University of Florida, United States
- W4-LIGHT-1-2 **Computation of Power Line Tower Lightning Surge Impedance Using the Electromagnetic Field Method**
11:20am Changzheng Gao, Lin Li, Bing Li and Zhibin Zhao
 North China Electric Power University, China
- W4-LIGHT-1-3 **A Review of Studies on Early Streamer Emission and Charge Transfer System Conducted in Malaysia**
11:40am Zainal Hartono and Ibrahim Robiah
 Lightning Research PLC, Malaysia
- W4-LIGHT-1-4 **Comparison of On-line Lightning Monitoring System Data with Derived EM Responses of Space Launch Systems to Lightning**
12:00pm Jason Chai, A. Britting, Jr. and Samuel Feng
 The Aerospace Corporation, United States
- W4-LIGHT-1-5 **A TDOA Based Approach for Locating Cloud-to-Ground Lightning Strokes, Using Taylor Series Expansion**
12:20pm Paria Sattari, Keyhan Sheshyekani, Mehran Hazrati,
 Rouzbeh Moini and Seyed Hossein Sadeghi
 Amirkabir University of Technology, Iran

MGT-1 EMC Management and Standards

Wednesday, 1 March 2006, 1:40pm-3:20pm

Chairs: Elya Joffe, Andrei Marinescu

SUNTEC Room 207

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| W4-MGT-1-1
1:40pm | EMC Progress in Romania
Andrei Marinescu ¹ , Aurelia Scornea ¹ and Lucian Ursea ²
¹ ICMET R&D Institute, Romania
² Ministry of Economy and Commerce, Romania |
| W4-MGT-1-2
2:00pm | Research for EMI Basic Standards (Invited)
Manfred Stecher
Rohde & Schwarz, Munich, Germany |
| W4-MGT-1-3
2:20pm | Efficient Identification of Major Contributions to EMI-induced Rectification Effects in Analog Automotive Circuits
Johan Loeckx and Georges Gielen
ESAT/MICAS (K.U.Leuven), Belgium |
| W4-MGT-1-4
2:40pm | Impedance Bond Mitigation of Inductive Interference to Railway Wayside Signal Systems
Rod Perala
Electro Magnetic Applications Inc., United States |
| W4-MGT-1-5
3:00pm | EMC Technology Roadmapping: A Long-Term Strategy
Marcel van Doorn
Philips Electromagnetics & Cooling Competence Center, Netherlands |

IEMI-1: SS- Intentional EMI

Wednesday, 1 March 2006, 3:40pm-6:00pm

Chair: Dr William Radasky

SUNTEC Room 207

- W4-IEMI-1-1 **The Threat of Intentional Electromagnetic Interference (IEMI) to Wired and Wireless Systems**
3:40pm W. Radasky, Metatech Corp., United States
- W4-IEMI-1-2 **Dangerous Pulse Excitation of Coupled Lines**
4:00pm A. M. Zabolotsky¹, T. R. Gazizov¹, A.G. Bova¹ and W.A. Radasky²
¹Tomsk State University of Control System and Radioelectronics, Russia
²Metatech Corp., USA
- W4-IEMI-1-3 **HPEM and HEMP Susceptibility Assessments of Computer Equipment**
4:20pm R. Hoad, A. Lambourne and A. Wraight
QinetiQ, United Kindom
- W4-IEMI-1-4 **IEMI Against Modern Civilian Electronic Technologies**
4:40pm O. H. Arnesen, E. Krogager, M. Backstrom, S. Bo-Sande, J. Godo, S. Harkonen, K. Lovstrand, M. Moisio, B. Nordstrom, J. Peltonen and O. Oystad
Norwegian Defence Research Establishment, Norway
- W4-IEMI-1-5 **Susceptibility of WLAN and GPS Systems: An Initial Study**
5:00pm T. Nilsson, O. Lunden and M. Backstrom
Swedish Defence Research Agency, Sweden
- W4-IEMI-1-6 **Susceptibility of Sensor Networks to Intentional Electromagnetic Interference**
5:20pm Jerker Delsing¹, Jonas Ekman¹, Jonny Johansson¹, Sofia Sundberg¹, Mats Backstrom² and Tony Nilsson²
¹Lulea University of Technology, Sweden
²FOI-Swedish Defence Research Agency, Sweden
- W4-IEMI-1-7 **Resistance to Extended IEMI by Physical/Correlated Wireless Random and Non-random Networks**
5:40pm H. Potrykus¹ and I. Kohlberg²
¹Institute for Defense Analyses, United States
²Kohlberg Associate, Inc., United States

Open Forum-1: Poster Session

Wednesday, 1 March 2006, 1:40pm-3:40pm

Chairs: Dr. Zhang Yaojiang, Dr. Sungtek Kahng

Suntec Level 3, Concourse

- W-OF-001 **Method of Forces: A Novel Approach for Finding Current Distributions on Single and Coupled Microstrip Lines**
Mehdi Ardavan and Ahmad Cheldavi
Iran University of Science & Technology, Iran
- W-OF-002 **Effect of Water Contents and Dissolved Salt in the Sand under High Impulse Currents (P013)**
Norlina Mohamad Nor
Multimedia University, Malaysia
- W-OF-003 **An Improved Printed Double-Y Balun**
Luming Deng¹, Xingchang Wei², Erping Li² and Yilong Lu¹
¹Nanyang Technological University, Singapore
²Institute of High Performance Computing, Singapore
- W-OF-004 **Reverberation Chambers - Design and Application for EMC**
Ralf Heinrich and Uwe Karsten
Schaffner Electrotest GmbH, Germany
- W-OF-005 **Active Diagnostics of the Failures in Printed-Circuit-Boards**
V. N. Dianov
Moscow State Industrial University, Russia
- W-OF-006 **Air-Gap Effect Shielding on Multiple Reflection at 900MHz**
Toshihide Tosaka¹, Isamu Nagano², Satoshi Yagitani², Toshio Matsumoto², Nobuyasu Hiramatsu³ and Hiroto Nomura³
¹National Institute of Information and Communications Technology, Japan
²Kanazawa University, Japan
³Hiramatsu Industrial Company, Japan
- W-OF-007 **Study on the Effect of Metal Strips Loaded on the Walls of the DC Power-Bus**
Sungtek Kahng, University of Incheon, South Korea
- W-OF-008 **Different Excitation Feed Models for Full-wave Simulation of Aperture Antenna Systems**
Zaw Zaw Oo¹ and Le-Wei Li²
¹Institute of High Performance Computing, Singapore,
²National University of Singapore

- W-OF-009 **Crosstalk Characterizations of Unshielded Twisted-Pair Cable using the Electromagnetic Topology Techniques**
Phumin Kirawanich¹ David Gleason¹, S. Yakura² and N. Islam¹
¹University of Missouri at Columbia, United States
²Air Force Research Laboratories, United States
- W-OF-010 **EMC Design of Automation Equipment in Power System**
Baoming Xiao, Jingbo Fu and Zhicheng Liang
Nanjing Automation Research Institute, China
- CEM-4: Time-Domain Modeling**
Thursday, 2 March 2006, 8:40am-10:20am
Chairs: Prof. W.J.R. Hoefer, Dr. Zhejie Liu
SUNTEC Room 203
- T1-CEM-4-1 **Improvement of Field Distribution in a Reverberation Chamber by Phase Shift of Exciting Wires, Calculated by TLM**
8:40am Djonny Weinzierl¹, Arnulf Kost² and Adroaldo Raizer³
¹Centro Universitário de Jaraguá do Sul, Brazil,
²Brandenburgische Technische Universitaet Cottbus, Germany
³Universidade Federal De Santa Catarina, Brazil
- T1-CEM-4-2 **Hanging Variables in Finite Element Time Domain Method with Hexahedral Edge Elements**
9:00am N. Venkatarayalu^{1,3}, Robert Lee², Yeow-Beng Gan¹ and Le-Wei Li³
¹Temasek Laboratories, National University of Singapore, Singapore
²Ohio State University, United States
³National University of Singapore, Singapore
- T1-CEM-4-3 **Extraction of Circuit Parameters for Transmission Lines by Compact 2D FDFD Method**
9:20am En-Xiao Liu^{1,2}, Er-Ping Li^{1,2} and Le-Wei Li²
¹Institute of High Performance Computing, Singapore
²National University of Singapore, Singapore
- T1-CEM-4-4 **A Kind of Mathematical Model of Numerical Calculation of Substation Grounding Grids in Time-Varying Fields**
9:40am Huina Yang
North China Electric Power University, China
- T1-CEM-4-5 **Subcell FDTD Modeling of Electrically Thin Dispersive Layers Using Z Transforms**
10:00am Chaoqun Jiao, Xiang Cui and Lin Li
North China Electric Power University, China

CEM-5: EM Modeling of Complex Problems

Thursday, 2 March 2006, 10:40am-12:20pm

Chairs: Dr. Poman So, Prof. Tat-Soon Yeo

SUNTEC Room 203

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| T1-CEM-5-1 | An Accelerated Non-Conforming DP-FETI Domain Decomposition Method for the Analysis of Large EMC Problems |
| 10:40am | Kezhong Zhao and Jin-Fa Lee
Ohio State University, United States |
| T1-CEM-5-2 | Computational Study of Significant Semi-Infinite Integrals in Electromagnetic and Atomic Interactions |
| 11:00am | Cheng-Wei Qiu ^{1,2} , Le-Wei Li ¹ , Tat-Soon Yeo ¹ , Said Zouhdi ²
¹ National University of Singapore, Singapore
² Ecole Superieure D'Electricite, France |
| T1-CEM-5-3 | Fast Solution of Foldy-Lax Equations for Two-dimensional Radiation and Scattering Problems |
| 11:20am | Zhang Yao Jiang and E P Li
Institute of High Performance Computing, Singapore |
| T1-CEM-5-4 | On the Use of the Equal Area Rule for the Wire-Grid Representation of Metallic Surfaces |
| 11:40am | Abraham Rubinstein ¹ , Cyrus Rostamzadeh ² , Marcos Rubinstein ³ and Farhad Rachidi ¹
¹ Swiss Federal Institute of Technology, Switzerland
² Robert Bosch Corporation, United States
³ Univeristy of Applied Science of Western Switzerland, Switzerland |
| T1-CEM-5-5 | On the Use of Wavelet Transform for Efficient Iterative Solution of the Electromagnetic Models in Lightning Studies |
| 12:00pm | Amir Geranmayeh, Rouzbeh Moini and S. H. Hesam Sadeghi
Amirkabir University of Technology, Iran |

CEM-6: Frequency-Domain Modeling

Thursday, 2 March 2006, 1:20pm-3:00pm

Chairs: Prof. Yilong Lu, Prof. W.J.R. Hoefer

SUNTEC Room 203

- T1-CEM-6-1 **Calculation of Dynamic Write Field for Perpendicular Recording Head**
1:20pm Z. J. Liu¹, J.T. Li², H. H. Long^{1,2}, E. P. Li³, E. T. Ong¹ and K. S. Chai¹
¹Data Storage Institute, Singapore
²Hitachi Global Storage Technology Singapore Pte Ltd, Singapore
³Institute of High Performance Computing, Singapore
- T1-CEM-6-2 **Proper Orthogonal Decomposition in Reduced Order Model Generation for Microwave Problem**
1:40pm Wu Zhong Lin, Yao Jiang Zhang and Er Ping Li
Institute of High Performance Computing, Singapore
- T1-CEM-6-3 **Harmonics Study for Three-Phase Transformer under DC Inrushing**
2:00pm Xiaoping Li, Xishan Wen, Cixuan Chen, Lan Lei
Wuhan University, China
- T1-CEM-6-4 **Electric and Magnetic Fields around an Unloaded via Port Structure**
2:20pm Matthew Wood and Franz Schlagenhauer
Western Australian Telecommunications Research Institute, Australia
- T1-CEM-6-5 **The Study of Nonlinear Characteristic Curve for the Core of Transformer with Magnetic Coupling**
2:40pm Xiaoping Li, Xishan Wen, Cixuan Chen and Lan Lei
Wuhan University, China

CEM-7: Field-Circuit Iterations

Thursday, 2 March 2006, 3:20pm-5:20pm

Chairs: Prof. Ban-Leong Ooi, Prof. Ruediger Vahldieck

SUNTEC Room 203

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| T1-CEM-7-1 | Electromagnetic Radiation from a Trace on a Dielectric Substrate |
| 3:20pm | Franz Schlagenhauer
The University of Western Australian, Australia |
| T1-CEM-7-2 | Efficient Closed-Form Green's Functions for Multilayered Structure and Its Applications on Circuit Analysis |
| 3:40pm | Tao Yuan, Le-Wei Li, Jian-Ying Li and Mook Seng Leong
National University of Singapore, Singapore |
| T1-CEM-7-3 | A New Analog Behavioral Module Linking Field and PSPICE-Circuit Simulations for Transient Analysis |
| 4:00pm | Huilian Du ¹ , Dan Gorcea ² , Poman So ¹ and Wolfgang J.R. Hofer ¹
¹ University of Victoria, Canada
² Flextronics, Canada |
| T1-CEM-7-4 | Calculation of Per-Unit-Length Parameters for Shielded and Unshielded Twisted Pair Cables |
| 4:20pm | Fahd Hassoun, R. Tarafi and A.Zeddami
France Telecom R&D RESA/FACE, France |
| T1-CEM-7-5 | Optimization of a Reflectarray Antenna via Hybrid Evolutionary Algorithms |
| 4:40pm | F.Grimaccia ¹ , M. Mussetta ¹ , P. Pirinoli ² and R. Zich ¹
¹ Politecnico di Milano, Italy
² Politecnico di Torino, Italy |
| T1-CEM-7-6 | Determination of Distribution Functions and Parameters for the Preisach Hysteresis Model |
| 5:00pm | Piyabutr Pruksanubal, Chulalongkorn University, Thailand,
A. Binner, K.H. Gonschorek, Dresden University of
Technology, Germany |

COM-2: EMC in Communication

Thursday, 2 March 2006, 8:40am-10:20am

Chairs: Prof. Donglin Su, Dr. Jean-Philippe Parmantier

SUNTEC Room 208

- T2-COM-2-1 **Prediction Design of the Noise and Gain Specifications of the RF Receiver**
8:40am Qiong Wang and Donglin Su
Beijing University of Aeronautics and Astronautics, China
- T2-COM-2-2 **Simultaneous Estimation of Mutual Coupling Matrix and DOAs for UCA and ULA**
9:00am Tongtong Zhang¹, Yilong Lu¹ and Hon Tat Hui²
¹Nanyang Technological University, Singapore
²University of Queensland, Australia
- T2-COM-2-3 **Analysis on Interference of DS-UWB Signal to Narrowband Systems**
9:20am Tao Jiang¹, Xuehuan Wang¹ and Zhengang Cui²
¹University of Harbin Engineering, China
²Heilongjiang Communication Corporation, China
- T2-COM-2-4 **Analyses of Several Realistic Exposure Scenarios near Cellular Base Stations**
9:40am Revaz Zaridze, David Kakulia, George Kajaia, Dmitriy Mazmanov, Tamriko Gogua, Nino Jejelava and Liana Manukyan
Tbilisi State University, Georgia
- T2-COM-2-5 **Directional UWB Planar Antenna for Operation in the 5-20 GHz Band**
10:00am Marco Peyrot-Solis^{1,2}, Giselle Galvan-Tejada¹ and Hildeberto Jardon-Aguilar¹
¹CINVESTAV-IPN, Mexico
²Mexican Navy Research Institute, Mexico

MEAS-1: EMC Measurement Techniques

Thursday, 2 March 2006, 10:40am-12:20pm

Chairs: Dr. Franz Schlagenhauer, Chris Zombolas

SUNTEC Room 208

- T2-MEAS-1-1 **Simultaneous EM Measurement System Using Parallel Modulated Probe Array (Invited)**
10:40am Qiang Chen¹, Kunio Sawaya¹, Tomohiro Habu² and Ryoichi Hasumi²
¹Tohoku University, Japan
²Device Co., Ltd, Japan
- T2-MEAS-1-2 **Magnetic Near-field Probe for GHz Band and Spatial Resolution Improvement Technique**
11:00am Hiroki Funato and Takashi Suga
Hitachi Ltd., Japan
- T2-MEAS-1-3 **Wireless Digital Data Acquisition System for EMI Measurement in Power Substations**
11:20am W H Siew, Yu Wang and Mir Faheem
University of Strathclyde, United Kingdom
- T2-MEAS-1-4 **Direct Diagnostic Testing of Phased Array Antennas Using IR Imaging Techniques**
11:40am John Norgard and Randall Musselman
Air Force Research Lab, DF/DFEE, United States
- T2-MEAS-1-5 **Time Domain Calibration of Pulsed Current Probe**
12:00pm Lihua Shi, Jianwen Tan and Bihua Zhou
Nanjing Engineering Institute, China

BIO-3: Biomedical EM

Thursday, 2 March 2006, 1:20pm-3:00pm

Chairs: Prof. Jianqing Wang, Prof. Jeong-Ki Pack

SUNTEC Room 208

- T2-BIO-3-1 **Electromagnetic Components in Silicon-on-Insulator (SOI) Waveguide for BioSensing Applications**
1:20pm Soon Thor LIM, Jason Png and Er Ping LI
Institute of High Performance Computing, Singapore
- T2-BIO-3-2 **Detection of Hip Prosthesis Depth Change Using an E-Pulse Technique**
1:40pm Hoi-Shun Lui, Nicholas Shuley, Shantanu Kumar Padhi and Stuart Crozier
University of Queensland, Australia
- T2-BIO-3-3 **Implications of the Revised ICNIRP Electric Field Exposure Guideline on the Design of Overhead AC Power Lines-400KV and Above**
2:00pm Roy Hubbard¹ and Pieter Pretorius²
¹Empetus Close Corporation, South Africa
²Eskom Holding Ltd, South Africa
- T2-BIO-3-4 **Accuracy Control of Finite Difference Time Domain (FDTD) Method Using Method of Auxiliary Sources (MAS) and Investigation of Correlation between SAR and Temperature Rise**
2:20pm Alexander Razmadze, Levan Shoshiashvili, David Kakulia, George Kajaia, Nino Jejelava and Revaz Zaridze
Tbilisi State University, Georgia
- T2-BIO-3-5 **Review of the Research and Development in EIT**
2:40pm Guizhi Xu, Huanli Wu, Shuo Yang, Ying Li, Shuai Zhang, Qingxin Yang and Weili Yan
HeBei University of Technology, China

BIO-4: Biomedical

Thursday, 2 March 2006, 3:20pm-6:00pm

Chairs: Dr. Maria Stuchly and Prof. Ian Craddock

SUNTEC Room 208

- T2-BIO-4-1 **Tissue Sensing Adaptive Radar for Breast Cancer Detection: Experimental Verification of an Improved Skin Sensing Method**
3:20pm Trevor Williams and Elise Fear
University of Calgary, Canada
- T2-BIO-4-2 **Experimental and Theoretical Investigation into a Microwave Breast Cancer Detection System**
3:40pm Wee Chang Khor, Hua Wang, Marek Bialkowski and Stuart Crozier
University of Queensland, Australia
- T2-BIO-4-3 **Time Domain Characterization of Dielectric Target in a Half Space Using Complex Natural Resonance Method**
4:00pm Shantanu Padhi, Nicholas Shuley, Hoi-Shun Lui and Stuart Crozier
University of Queensland, Australia
- T2-BIO-4-4 **Multi-Frequency Imaging System of EIT with DSP**
4:40pm Guizhi Xu, Shuai Zhang, Huanli Wu, Duyan Geng, Qingxin Yang and Weili Yan
HeBei University of Technology, China
- T2-BIO-4-5 **FDTD Analysis of UWB Pulse Interaction with Biological Tissues**
5:00pm Hooi Been Lim and Hui Xin Tan
Institute of High Performance Computing, Singapore
- T2-BIO-4-6 **The Electromagnetics of Wireless Brain Machine Interface Operation**
5:20pm Doney Abraham, Robert Rennaker and Tamer S. Ibrahim
University of Oklahoma, United States
- T2-BIO-4-7 **The Design of a Fully Integrated Regional Hyperthermia-3T MRI System for the Treatment of Pelvic Tumours**
5:40pm B. van den Bergen, C.A.T. van den Berg, L.W. Bartels, J.J.W. Lagendijk, H. Kroeze and A.A.C. de Leeuw
University Medical Centre Utrecht, Netherlands
- T2-BIO-4-8 **Application of Electromagnetic Modeling in Biophotonics: Characterizing Sub-Cellular Changes Using Visible Light**
6:00pm Xu Li, Yang Liu, Allen Taflove and Vadim Backman
Northwestern University, United States

ICEM-1: SS - IC EMC Modeling (Invited)

Thursday, 2 March 2006, 8:40am-10:20am

Chair: Prof. Osami Wada

SUNTEC Room 209

- T3-ICEM-1-1 **Evaluation of Packages by Simulating IC Emission with LECCS Model**
8:40am Eiji Takahashi, Takeshi Nakayama and Yoshiyuki Saito
 Matsushita Electric Industrial Co. Ltd., Japan
- T3-ICEM-1-2 **A LECCS Model Parameter Optimization Algorithm for EMC Designs of IC/LSI Systems**
9:00am Nobuo Funabiki¹, Yohei Nomura¹, Jun Kawashima¹, Yuichiro Minamisawa¹ and Osami Wada²
 ¹Okayama University, Japan
 ²Kyoto University, Japan
- T3-ICEM-1-3 **Simulation of Integrated Circuit Immunity with LECCS Model**
9:20am Kouji Ichikawa^{1,2}, Masashi Inagaki¹, Yukihiko Sakurai¹, Isao Iwase¹, Makoto Nagata² and Osami Wada³
 ¹Denso Corporation, Japan
 ²University of Kobe, Japan
 ³Kyoto University, Japan
- T3-ICEM-1-4 **Analysis of Electromagnetic Susceptibility on High Speed Circuits Located in a Shielded Enclosure**
9:40am Hla Phyu¹, Er-Ping Li¹ and Weiliang Yuan²
 ¹Institute of High Performance Computing, Singapore
 ²United Test and Assembly Center Ltd, Singapore
- T3-ICEM-1-5 **Standardization of EMC Models of IC/LSI**
10:00am Osami Wada
 Kyoto University, Japan

SI-1: Signal Integrity

Thursday, 2 March 2006, 10:40am-12:20pm

Chairs: Mark Montrose, Dr Albert Lu

SUNTEC Room 209

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|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| T3-SI-1-1 | Generation of Common-Mode Currents on PCB Power-Bus Structures |
| 10:40am | Matthias Hampe and Stefan Dickmann
Helmut-Schmidt-University, Germany |
| T3-SI-1-2 | Study on Delay Time Characteristics of Shielded Meander Lines |
| 11:00am | Shigeo Nara and Kohji Koshiji
Tokyo University of Science, Japan |
| T3-SI-1-3 | Characterization of SSN Coupling to Signal Via in Multi-Layer PCBs and Packages |
| 11:20am | Jongbae Park ¹ , Hyungsoo Kim ² , Jun So Pak ³ and Joungho Kim ¹
¹ Korea Advanced Institute of Science and Technology, South Korea
² Hynix Semiconductor Inc., South Korea
³ National Institute of Advanced Industrial Sci. & Tech., Japan |
| T3-SI-1-4 | Modeling RF Voltage Drop of Printed Circuit Interconnects Using a Full-Wave Approach |
| 11:40am | Eng Kee Chua, Kye Yak See and Zhihong Liu
Nanyang Technological University, Singapore |
| T3-SI-1-5 | SPICE Model Extraction for Signal Integrity Analysis of Unshielded Twisted Pairs from Full Wave Simulation |
| 12:00pm | Rodolfo ARANEO ¹ , Spartaco ANIGGIA ² and F.MARADEI ¹
¹ University of Rome "La Sapienza", Italy
² EMC Consultant, Italy |

AUTO-2: SS-Automotive EMC

Thursday, 2 March 2006, 1:20pm-3:00pm

Chairs: Prof. Robert Weigel, Andreas Gstoettner

SUNTEC Room 209

- T3-AUTO-2-1 **Hybrid Solver Strategies in Automotive EMC Simulation**
1:20pm Martin Zitzmann¹, Robert Grillmair², Tanja Clees³ and Robert Weigel¹
¹University of Erlangen-Nuremberg, Germany
²University of Applied Science Munich, Germany
³Fraunhofer Institute for Algorithms and Scientific Computing, Germany
- T3-AUTO-2-2 **The Influence of Ground and Floating Planes on the Electromagnetic Coupling between Board Tracks**
1:40pm Alexander Stadler¹, Manfred Albach¹, Hans Rossmanith¹ and Goeran Schubert²
¹University of Erlangen-Nuremberg, Germany
²Conti-TEMIC Microelectronic GmbH, Germany
- T3-AUTO-2-3 **Odd-Mode Impedance-Controlled Shielded Flat Flexible Cables for In-Vehicle Data Transmission**
2:00pm Volker Zwillich¹, Wolfgang Menzel¹, Lars Roehrig² and Helmut Leier³
¹University of Ulm, Germany
²Innovation Technology AG, Germany
³DaimlerChrysler AG, Germany
- T3-AUTO-2-4 **EMC Analysis of Planar PCB-Based Coils in the Vicinity of the Automobile Carriage**
2:20pm Stephan Schuh and Manfred Albach
University Erlangen-Nuremberg, Germany
- T3-AUTO-2-5 **Behavioral Modelling of ICs for Investigations of Conducted Emissions in Automotive Systems**
2:40pm Guenter Seibert¹, Dieter Metzner², Frank Klotz², Georg Pelz² and Robert Weigel¹
¹University Erlangen-Nuremberg, Germany
²Infineon Technologies, Germany

PCB-2: EMC at PCB Level - Design Issues

Thursday, 2 March 2006, 3:20pm-6:00pm

Chairs: Prof. Todd Hubing, Prof. Frank Leferink

SUNTEC Room 209

- T3-PCB-2-1 **PCB Design Techniques for the SI and EMC of Gb/s Differential Transmission Lines**
3:20pm Keith Armstrong
Cherry Clough Consultants, United Kingdom
- T3-PCB-2-2 **A Simple Method of Crosstalk Reduction by Metal Filled Via Hole Fence in Bent Transmission Lines on PCBs**
3:40pm Jong Ho Kim and Dong Chul Park
Chungnam National University, South Korea
- T3-PCB-2-3 **EMC Shielding in Power Electronics Multilayers with Conductive Permeable Material**
4:00pm Stephan Schuh and Manfred Albach
University of Erlangen-Nuremberg, Germany
- T3-PCB-2-4 **Power Tracks Instead of Planes to Reduce Radiated Electromagnetic Fields**
4:20pm Frank Leferink^{1,2} and Wim C. van Etten²
¹Thales, Netherlands
²University of Twente, Netherlands
- T3-PCB-2-5 **Double and Single Summation Expression for the Impedance of Populated PCB Power-Bus Structures Including Asymmetrically Connected Components**
4:40pm Matthias Hampe and Stefan Dickmann
Helmut-Schmidt-University, Germany
- T3-PCB-2-6 **An Efficient Approach for the Power/Ground Plane Equivalent Circuit Extraction**
5:00pm Zhi Hong Liu¹, Kye Yak See¹, Er Ping Li² and Eng Kee Chua¹
¹Nanyang Technological University, Singapore
²Institute of High Performance Computing, Singapore

MMA-1: Magnetic Material Applications

Thursday, 2 March 2006, 8:40am-10:20am

Chairs: Prof. Qingxin Yang, Lee Hill

SUNTEC Room 207

T4-MMA-1-1 Utilizing Overlooked Characteristics of Ferrites for Improved Printed Circuit Board EMI Suppression

8:40am

Lee Hill¹ and Jeff Bruce²

¹Silent Solutions LLC (SILENT), United States

²Steward Inc, United States

T4-MMA-1-2 Study on Method of Modelling and Controlling of Magnetostrictive Material

9:00am

Jinlong An, Qingxin Yang and Zhengpin Ma
Hebei University of Technology, China

T4-MMA-1-3 Calculation of Effective Impedance of Common-mode Choke Made of Mn-Zn Ferrite

9:20am

Daming Zhang and Ruifeng Huang
Nanyang Technological University, Singapore

T4-MMA-1-4 Improvement on the Properties of SiC Absorbers

9:40am

Xiao-Ning Zhang and Qing Wang
China Power Science & Technology, China

T4-MMA-1-5 Micromagnetic Modeling Simulations and Applications

10:00am

H.H Long¹, Dr Z.J Liu², Dr E.T Ong³ and Dr E. P Li³

¹Hitachi Global Storage Technology Singapore Pte Ltd,
Singapore,

²National University of Singapore, Singapore

³Institute of High Performance Computing, Singapore

LIGHT-2: Lightning

Thursday, 2 March 2006, 10:40am-12:20pm

Chairs: Dr. Farhad Rachidi, Rashide

SUNTEC Room 207

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| T4-LIGHT-2-1 | On the VLF/LF Radiation Pulse Shapes at the Initial Milliseconds of Lightning Discharges (Invited) |
| 10:40am | Xuan-Min Shao ¹ and Matthew Heavner ²
¹ Los Alamos National Laboratory, United States
² University of Alaska Southeast, United States |
| T4-LIGHT-2-2 | Numerical Analysis of the Charge Distribution on Building Structure in the Preliminary Breakdown Phase of Lightning |
| 11:00am | Q. B. Zhou and Y. Du
Hong Kong Polytechnic University, China |
| T4-LIGHT-2-3 | Ionization Gradient of Low Resistivity Soils and Liquids |
| 11:20am | Normiza Mohamad Nor
Multimedia University, Malaysia |
| T4-LIGHT-2-4 | Real-Time Detection of Lightning Electromagnetic Field Data: A Wavelet Approach |
| 11:40am | Keyhan Shehyakani, Mehran Hazrati, Paria Sattari,
Hesam Sadeghi and Rouzbeh Moini
Amirkabir University of Technology, Iran |

POW-1: Power System EMC

Thursday, 2 March 2006, 1:20pm-3:00pm

Chairs: Prof. Xiang Cui, Prof. Michel Ianoz

SUNTEC Room 207

- T4-POW-1-1 **Analysis of Ionized Field under $\pm 800\text{kV}$ HVDC Transmission Lines**
1:20pm Tiebing Lu, Jie Zhao, Xiang Cui and Han Feng
North China Electric Power University, China
- T4-POW-1-2 **Toward a Global Approach Dedicated to Electromagnetic Compatibility and Energy Efficiency**
1:40pm J.-P. Gonnet¹, J.-M. Guichon², A. Anglade³, N. Maïzi⁴,
V. Mazaauric¹, J. Roudet², P. Wendling⁵
¹Schneider Electric Corporate Research, France
²Laboratoire d'Electrotechnique de Grenoble, France
³Agence de l'Environnement et de la Maitrise de l'Energie, France
⁴Centre de Mathématiques Appliquées, Ecole des Mines de Paris, France
⁵Magsoft Corporation, United States
- T4-POW-1-3 **Feasibility Study of Optical Isolator in Reducing CM Conducted Emission from PLC Modem**
2:00pm Azran Kamarul, Kye Yak See and Ping Lam So
Nanyang Technological University, Singapore
- T4-POW-1-4 **A Modeling Method for Simulation Analysis of Electromagnetic Susceptibility Problem**
2:20pm Ai Min Zhang, De Gui Chen, Hang Zhang and Gang Jiang
Xi'an Jiaotong University, China
- T4-POW-1-5 **Analysis of Resonance in Transformer Windings under Very Fast Transient Overvoltages**
2:40pm Haifeng Sun¹, Guishu Liang¹, Xile Zhang^{1,2} and Xiang Cui¹
¹North China Electric Power University, China
²Baoding Tianwei Baobian Electric Co., Ltd, China

IEMI-2: Intentional EMI

Thursday, 2 March 2006, 3:20pm-5:00pm

Chairs: Prof Wenyan Yin, Dr. William Radasky

SUNTEC Room 207

T4-IEMI-2-1 **Generation and Measurement of a Wide-Band Calculable
Electromagnetic Pulse**

3:20pm Takashi Iwasaki¹, Mohamed Naushad¹ and Lira Hamada²

¹University of Electro-Communications, Japan

²National Institute of Information and Communications
Technology, Japan

T4-IEMI-2-2 **Radiated Electric Field Strength from High-Power
Microwave Systems**

3:40pm Anders Larsson¹, Bo Johansson² and Sten E Nyholm¹

¹FOI-Swedish Defense Research Agency, Sweden

²Swedish Armed Forces, Sweden

T4-IEMI-2-3 **Breakdown Predictions of Microstrip Interconnects and
Coplanar Waveguide-Built Devices in the Presence of HP-
EMPs (Invited)**

4:00pm Wen-Yan Yin¹, Xiaoting Dong², Junfa Mao¹ and Lewei Li²

¹Shanghai Jiaotong University, China

²National University of Singapore, Singapore

Open Forum-2: Poster Session

Thursday, 2 March 2006, 10:40am-12:20pm

Chairs: Dr. James Cai, Dr Daming Zhang

SUNTEC Level 3, Concourse

- T-OF-001 **Computational Modeling to Predict Hazards of Electromagnetic Radiation**
Mark Tan¹ and Boon Hui Lim²
¹Institute of High Performance Computing, Singapore,
²ST Electronics (InfoComm) Ltd, Singapore
- T-OF-002 **A Novel Multi-Source Model to Predict the Radiated Emissions with a Time-domain EMI Measurement System**
Stephan Braun and Peter Russer, Technische Universität München, Germany
- T-OF-003 **Artificial Dielectric Circular Resonator with Novel Anisotropic Permittivity and Its Spurious Property Control**
Achmad Munir, Takeshi Uemura and Hiroshi Kubo
Yamaguchi University, Japan
- T-OF-004 **A Novel Design Scheme for Optimizing EMI and Efficiency of Continuous Mode PFC Converters**
Supratim Basu¹, Tore Undeland²
¹Bose Research Pvt Ltd, India
²Chalmers University of Technology, Sweden
- T-OF-005 **An Integrated Approach in EMC Management for Railway Projects**
Samuel Chan, Samuel Goh and Peng Hiong Than
Land Transport Authority, Singapore
- T-OF-006 **Coupling Effect between Chip Bonding Wire and Signal Trace on PCB**
Chung Hsiung Yeh, Kai Chuan Hung and Randall Lan
Ming Hsin University of Science and Technology, Taiwan
- T-OF-007 **Simulation of EMC Problems Caused by Lightning Using Cartesian Analytical Expressions**
Fernando Zago¹, Jose Pissolato Filho¹ and Geraldo Caixeta²
¹UNICAMP State University of Campinas, Brazil
²University São Francisco-CCET, Brazil
- T-OF-008 **Effects of Direct Lightning on Grounding Grids and EMC Problems**
Fernando Zago¹, Henry Mesa¹, Geraldo Caixeta² and Jose Pissolato Filho¹
¹UNICAMP State University of Campinas, Brazil,
²University São Francisco-CCET, Brazil

- T-OF-009 **Computation of Underground Electromagnetic Fields Generated by the Lightning Return Stroke**
T.T AnilKumar¹, P. Duraikannu²
¹Govt. College of Engineering Kannua, India
²National Institute of Technology Karnataka, India
- T-OF-010 **Novel Route to Perovskite Lead Titanate from Lead and Titanium Glycolates via Sol-Gel Process**
Nuchnapa Tangboriboon, Alexander Jameison, Anuvat Sirivat and Sujitra Wongkasemjit
Materials Engineering, Thailand
- T-OF-011 **Evaluation Method and Design of Multi-Layered Absorber using an NSGA-II Algorithm**
Ki-Bum Jung¹, Hyung-Do Choi² and Yeon-Choon Chung³
¹EMC Center, South Korea
²Electronics and Telecommunications Research Institute, Korea
³Seokyeong University, Korea

Student Prize Competition Poster Session

Thursday, 2 March 2006, 1:20pm-3:20pm

Chairs: Prof. Todd Hubing, Prof. Flavio Canavero

SUNTEC Level 3 Concourse (exhibition area)

The papers for student prize shall be presented at this session. To qualify for the student prize, the student must be the principal author and also the presenter.

MEAS-2: EMC Measurement Techniques

Friday, 3 March 2006, 8:40-10:20am

Chairs: Prof. Flavio Canavero, Dr. Kwok Soohoo

SUNTEC Room 203

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| F1-MEAS-2-1 | Erratic Nature of Product ESD Immunity Testing Investigated Using a Dual TEM Cell (Invited) |
| 8:40am | Kwok Soohoo, Andrew Rybak and Michael Wielgos
IBM Corporation, United States |
| F1-MEAS-2-2 | Field Distribution and Over-Moding in a TEM Cell |
| 9:00am | Paul Kay
University of South Australia, Australia |
| F1-MEAS-2-3 | Parametric Analysis of NSA Data by the Methods of Piecewise Multiple Linear Regression |
| 9:20am | David Wang, Ken Huang Lin and Mon-Na Lo Huang
National Sun Yat-Sen University, Taiwan |
| F1-MEAS-2-4 | An Efficient Modeling Method for Analysis of Shielding Rooms |
| 9:40am | Sheng Wang and Hooi Been Lim
Institute of High Performance Computing, Singapore |

IMMU-1: Immunity Testing

Friday, 3 March 2006, 10:40am-12:00pm

Chairs: Keith Armstrong, Chris Zombolas

SUNTEC Room 203

- F1-IMMU-1-1 **EMI and Functional Safety Why Traditional Immunity Testing Is Inadequate, and What Should be Done Instead**
10:40am Keith Armstrong
Cherry Clough Consultants, United Kingdom
- F1-IMMU-1-2 **Effects of DC Cable Routing in Immunity Testing**
11:00am Subramanian Chidambaram, Keng Kok Khoo and Jason White
Hewlett Packard Singapore (Private) Limited, Singapore
- F1-IMMU-1-3 **Radiated Immunity Measurement Comparison between OSL and Chamber**
11:20am Tae Heon Jang and Won Seo Cho
Korea Testing Laboratory (KTL), South Korea

MEAS-3: EMC Testing Facility

Friday, 3 March 2006, 1:20pm-3:00pm

Chair: Garth D'Abreu, Prof. Jinliang He

SUNTEC Room 203

- F1-MEAS-3-1 **Analysis of Correction Factor for Site Attenuation**
1:20pm Shinichi Ohtsu¹, Makoto Mukai², Shuichi Kobayashi³, Katsuyuki Tanakajima³, Seiichi Kawashima⁴, Jiro Kawano⁵ and Atsuya Maeda⁵
¹Fujitsu Ltd, Japan
²Japan Electro-Magnetic Soft Development, Japan
³Akzo-Nobel K.K., Japan
⁴Voluntary EMC Laboratory Accreditation Centre, Japan
⁵Japan Voluntary Control Council for Interference by IT Equip., Japan
- F1-MEAS-3-2 **Prediction of Maximum Electric Field with Given Independent Sampling Points in a Reverberation Chamber**
1:40pm Daming Zhang¹, Kye Yak See¹ and Wee Jin Koh²
¹Nanyang Technological University, Singapore
²DSO National Laboratories, Singapore
- F1-MEAS-3-3 **Comparison of Field Uniformity Characteristics in a Triangular Reverberation Chamber with QRS Diffusers**
2:00pm Eugene Rhee and Joong-Geun Rhee
Hanyang University, South Korea

- F1-MEAS-3-4 **Status of Standards for Alternate Test Sites**
2:20pm Friedrich-Wilhelm Trautnitz
 Albatross Projects GmbH, Germany
- F1-MEAS-3-5 **Antenna Height Scan for Minimizing EUT Emission
Measurement Uncertainty in Fully Anechoic Chambers
above 1 GHz**
2:40pm Tian Hong Loh and Martin Alexander
 National Physical Laboratory, United Kingdom

MEAS-4: EMC Measurement Techniques

Friday, 3 March 2006, 3:20pm-5:00pm

Chairs: Prof. Qiang Chen, Manfred Stecher

SUNTEC Room 203

- F1-MEAS-4-1 **A Novel Realtime Time-Domain EMI Measurement System
Based on Field Programmable Gate Arrays**
3:20pm Stephan Braun, Mohammed Al-Qedra and Peter Russer
 Technische Universität München, Germany
- F1-MEAS-4-2 **Shielding Effectiveness Measurements using a
Reverberation Chamber**
3:40pm Frank Leferink¹, Noel Steentjes², Hans Bergsma¹ and Wim
 van Etten²
 ¹Thales, Netherlands
 ²University of Twente, Netherlands
- F1-MEAS-4-3 **Improved Reproducibility of Conducted Emission
Measurements**
4:00pm Manfred Stecher
 Rohde & Schwarz, Munich, Germany

COM-3: RFID

Friday, 3 March 2006, 8:40am-10:20am

Chairs: Prof. Peter Leung, Dr. James Cai

SUNTEC Room 208

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| F2-COM-3-1
8:40am | Effect of Internal Patch Antenna Ground Plane on SAR
Kwok Hung Chan, L.C.Fung, S.W.Leung and Y.M.Siu
City University of Hong Kong, China |
| F2-COM-3-2
9:00am | Analyze of Dielectric Coated Personal Communication Systems (PCS) Antenna and Study of its Field Interaction with the User
Giorgi Ghvedashvili, George Kajaia, Giorgi Saparishvili and Revaz Zaridze
Tbilisi State University, Georgia |
| F2-COM-3-3
9:20am | Operational Considerations in Simulation and Deployment of RFID Systems
Kin Seong Leong, Mun Leng Ng and Peter Cole
University of Adelaide, Australia |
| F2-COM-3-4
9:40am | Analysis of the Electromagnetic Behavior of a Thin Finite Slot Aperture through Wiener-Hopf Technique
Riccardo Zich and Daniele Monopoli
Politecnico di Milano, Italy |

EASIA-1: Special Topic -EMC in Asia

Friday, 3 March 2006, 10:40am-12:20pm

Chairs: Dr. Leslie Bai, Dr. Erping Li

SUNTEC Room 208

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| F2-EASIA-1-1
10:40am | China Approvals - Break through the Unwritten Law
Leslie Bai ¹ , Peter Lin ² and Andrew He ²
¹ SIEMIC Inc., United States
² SIEMIC Info Tech., Ltd, China |
| F2-EASIA-1-2
11:00am | EMC Technology Development of Modern China
Telecommunication Field
He Guili and He Jianqiang
Ministry of Information Industry, China |
| F2-EASIA-1-3
11:20am | Progress of VCCI's Industry Self-Regulations in Japan and a
Look to the Future (Asia)
Akihisa Sakurai
VCCI & EMC of IBM, Japan |
| F2-EASIA-1-4
11:40am | EMC Regulations and Test Activities in Singapore
Daniel Yeo and Deng Jun Hong
PSB Corporation, Singapore |
| F2-EASIA-1-5
12:00pm | New Regulatory Requirements in Taiwan for Information
Technology Equipment (ITE)
Leslie Bai and Jackie Deng
SIEMIC, Inc., United States |

EMI-1: Conducted EMI

Friday, 3 March 2006, 1:20pm-3:00pm

Chairs: Dr. Daming Zhang, Prof. Gao YouGang

SUNTEC Room 208

- F2-EMI-1-1 **Measurements of Conducted Voltage in the Low-Frequency Range from 2 kHz to 30 MHz for High-Current Industrial Applications with Regeneration Drives**
1:20pm Fabian Beck and Wolfgang Klampfer
Schaffner EMV AG, Switzerland
- F2-EMI-1-2 **Study on Board-Level Noise Filters to Prevent Transient-Induced Latchup in CMOS Integrated Circuits during EMC/ESD Test**
1:40pm Sheng-Fu Hsu and Ming-Dou Ker
National Chiao-Tung University, Taiwan
- F2-EMI-1-3 **Characterization of RF Noise Source Impedance for Switched Mode Power Supply**
2:00pm Junhong Deng¹ and Kye Yak See²
¹PSB Corporation, Singapore
²Nanyang Technological University, Singapore
- F2-EMI-1-4 **A New Integrated Inductor with Balanced Switching Technique for Common Mode EMI Reduction in High Step-up DC/DC Converter**
2:20pm T. Dumrongkittigule¹, V. Tarateeraseth² and W. Khan-ngern¹
¹King Mongkut's Institute of Technology Ladkrabang (KMUTL), Thailand
²Srinakharinwirot University, Thailand
- F2-EMI-1-5 **Prediction of the DM Conducted EMI in PWM Rectifier System**
2:40pm Lei Zhang, Weiming Ma and Jin Meng
Naval University of Engineering, China
- F2-EMI-1-6 **Numerical Analysis of Electromagnetic Emission from Lightning Implement**
3:00pm Yoshihiko Namba¹, Tomohiko Morita² and Katsuhiro Hirata²
¹Matsushita Electric Works Analysis Center Co., Ltd., Japan
²Osaka University, Japan

IF-1: EMC Industry Forum

Friday, 3 March 2006, 3:20pm-5:00pm

Chairs: Elya Joffe, Mark Montrose

SUNTEC Room 208

- F2-IF-1-1 **Reverberation Chamber as a Radiation Source**
3:20pm Patrik Svensén
Saab Bofors Dynamics AB, Sweden
- F2-IF-1-2 **How to Generate Easily 3000V/m between 1 and 18 GHz**
3:40pm Jean-Francois Rosnarho, La Trinité sur Mer,
SIEPEL, France
- F2-IF-1-3 **A Closer Look into Radiated Emissions Prescan Measurement Approach**
4:00pm Yong Chian Wong
Hewlett Packard Singapore, Singapore
- F2-IF-1-4 **Managing Risks, Electrical and EMC on the High Speed Railway Project**
4:20pm Yin Kwong Leong¹, Chi Wong², Jonne TSE³ and Fernando Devis⁴
¹ QARS, Singapore
² QARS, United Kingdom
³ QARS, Hong Kong, China
⁴ Fedaring, Spain
- F2-IF-1-5 **Lightning Induced Surges on Coaxial Cables and its Protection Technique for Digital Transmission Interface (DTI)**
4:40pm A.Halim Samad and Mr Annuar Ramli
Telekom R&D Sdn. Bhd., Malaysia

PCB-3: EMC at PCB Level-Modeling Issues

Friday, 3 March 2006, 8:40am-10:20am

Chairs: Prof. Joungho Kim, Prof. Kye Yak See

SUNTEC Room 209

- F3-PCB-3-1 **Finite Difference Modeling of Multiple Planes in Packages**
8:40am Arif Engin¹, Madhavan Swaminathan¹ and Yoshitaka Toyota²
¹Georgia Institute of Technology, United States
²Okayama University, Japan
- F3-PCB-3-2 **Impact of PCB Layout Design on Final Product's EMI Compliance**
9:00am Kye Yak See¹, Manish Oswal¹, Werachet Khan-ngern², Flavio Canavero³, Christos Christopoulos⁴ and Hartmut Grabinski⁵
¹Nanyang Technological University, Singapore
²King Mongkut's Institute of Technology Ladkrabang, Thailand
³Politecnico di Torino, Italy
⁴Nottingham University, United Kingdom
⁵Hannover University, Germany
- F3-PCB-3-3 **Teaching Near Field Coupling with PCB Layout**
9:20am Timothy Foo and Johnny Chee
Ngee Ann Polytechnic, Singapore
- F3-PCB-3-4 **Electromagnetic Compatibility of a Dual-Planar Electromagnetic Band-Gap Microstrip Filter Structure**
9:40am Yee Hui Lee and Shao Ying Huang
Nanyang Technological University, Singapore
- F3-PCB-3-5 **Low Inductance Thin Film Capacitors for Decoupling Applications (Invited)**
10:00am N. Kamehara¹, J.D. Baniecki², T. Shioga², K. Kurihara², M Mizukoshi²
¹Fujitsu Analysis Laboratory Ltd, Japan
²Fujitsu Laboratories Ltd. Japan

PCB-4: Circuit Simulation

Friday, 3 March 2006, 10:40am-12:20pm

Chairs: Prof. Wenyan Yin, Dr. Toshio Sudo

SUNTEC Room 209

- | | |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| F3-PCB-4-1 | Behavior of Switching Noise and Electromagnetic Radiation in Relation to Package Properties and On-chip Capacitance (Invited) |
| 10:40am | Toshio Sudo
Toshiba Corp., Corporate Manuf. Eng. Ctr., Japan |
| F3-PCB-4-2 | Radiated Emission Analysis from Printed Circuit Board Edges Using Multiple Stimulus Sources |
| 11:00am | Mark I. Montrose ¹ and En-Xiao Liu ²
¹ Montrose Compliance Services, Inc., United States
² Institute of High Performance Computing, Singapore |
| F3-PCB-4-3 | Electrical Analysis and Design of Differential Pairs Used in High-Speed Flip-Chip BGA Packages |
| 11:20am | Weiliang Yuan, Hsian Pang Kuah, Chuen Kiang Wang, Chong Yok Rue Desmond and Alfian Daengdora Muhammad
United Test and Assembly Center Ltd, Singapore |
| F3-PCB-4-4 | EMC Strategy in Wireless Sensor Packaging |
| 11:40am | Alessandro Gandelli, Francesco Grimaccia and R. E. Zich
Politecnico di Milano, Italy |
| F3-PCB-4-5 | Investigation of Interconnect Effects in a Transimpedance Amplifier |
| 12:00pm | Xiaomeng Shi ^{1,2} , Zhenghao Lu ¹ , Jianguo Ma ¹ , Erping Li ² , Kiat Seng Yeo ¹ and Manh Anh Do ¹
¹ Nanyang Technological University, Singapore
² Institute of High Performance Computing, Singapore |

ICEM-2: IC Packaging EM Modeling

Friday, 3 March 2006, 1:20pm-3:00pm

Chairs: Prof. Jianguo Ma, Thomas Steinecke

SUNTEC Room 209

- F3-ICEM-2-1 **Sensitivity of On-wafer Interconnects to CMOS Process Parameters at Radio Frequency**
1:20pm Xiaomeng Shi^{1,2}, Erping Li², Jianguo Ma¹, Kiat Seng Yeo¹ and Manh Anh Do¹
¹Nanyang Technological University, Singapore
²Institute of High Performance Computing, Singapore
- F3-ICEM-2-2 **EMI Modeling and Simulation in the IC Design Process**
1:40pm Thomas Steinecke¹, Dirk Hesidenz¹ and Ekkehard Miersch²
¹Infineon Technologies AG, Germany
²EFM Consulting, Germany
- F3-ICEM-2-3 **Activity Based High Level Modeling of Dynamic Switching Currents in Digital IC Modules**
2:00pm Andreas Gstoettner¹, Thomas Steinecke² and Mario Huemer¹
¹University of Erlangen-Nuremberg, Germany
²Infineon Technologies AG, Germany
- F3-ICEM-2-4 **EMC Analysis on Stacked Packages**
2:20pm Ilkka Kelander, Matti Uusimäki and Ali Arslan
Nokia Corporation, Finland
- F3-ICEM-2-5 **EMI Analysis of TFT-LCD Driver IC**
2:40pm Sung Pil Choi¹, Jae Wook Kwon¹, Kye Eon Chang¹, Jin Tae Kim¹ and Min Koo Han²
¹SAMSUNG ELECTRONICS CO.,LTD, South Korea
²Seoul National University, South Korea

MIL-1: EMC in Military

Friday, 3 March 2006, 3:20pm-5:40pm

Chairs: Dr. Wee-Jin Koh, Dr. Jean-Philippe Parmantier

SUNTEC Room 209

- F3-MIL-1-1 **Analysis of E³ on Naval Surface Combatants**
3:20pm Avi Shechter¹ and Moshe Netzer²
¹Alion-JIMA Maritime Sector, United States
²EMC and Safety Engineering, Israel
- F3-MIL-1-2 **On EMC of ISM COTS Devices used for Military Experimentation**
3:40pm Kim-Seng Aw
DSO National Laboratories, Singapore
- F3-MIL-1-3 **HPM: Effects on Systems and Protection**
4:00pm Mats Backstrom
Swedish Defence Research Agency, FOI, Sweden
- F3-MIL-1-4 **EMI Effects on a Generic Missile with IR Position Sensitive Detector**
4:20pm Bruno Chevalier¹, Frank Sonnemann² and Thomas Leib³
¹Délégation générale pour l'armement, France
²Diehl BGT Defence, Germany
³BWB, Germany
- F3-MIL-1-5 **Consideration of the Packaging of HPM Sources on EMC Effects**
4:40pm Edl Schamiloglu
University of New Mexico, United States
- F3-MIL-1-6 **Investigation on the Connection of a Type A Lightning Strike to a Vertical Cable Conduit Installed Inside a Warship Integral Mast Structure**
5:00pm Yannick Le-Golvan¹, G. Pensec¹, D. Quiltu¹, J-P.Parmantier²,
X. Ferrieres², E Bachelier² and S. Bertuol²
¹DCN, France
²ONERA, France
- F3-MIL-1-7 **Military System EMC Engineering in Singapore**
5:20pm Chow Wee Sing, Simon Yip, Foo Say Ping and Foo Sek Joon
ST Electronics (Info-Comm Systems) Pte Ltd, Singapore

PROT-1: EMC Protection

Friday, 3 March 2006, 8:40am-10:20am

Chair: Dr. William Radasky

SUNTEC Room 207

F4-PROT-1-1 Electrical Strength of Distribution Insulators under Steep Front, Short Duration Pulse

8:40am Stanislaw Grzybowski¹, John Kappenman² and William Radasky²

¹Mississippi State University, United States

²Metatech Corporation, United States

F4-PROT-1-2 Experimental Investigation of Shielding Effects due to the Presence of Nearby Parallel Conductors

9:00am Yan-zhao Xie^{1,2}, Zan-ji Wang¹, Qun-shu Wang², Hui Xiang² and Xin Nie²

¹Tsinghua University, China

²Northwest Institute of Nuclear Technology, China

F4-PROT-1-3 Analytical and Experimental Study of the Shielding Effectiveness of a Metallic Enclosure with Off-Centered Apertures

9:20am Farhana Ahmad Po'ad¹, Mohd. Zazar Mohd. Jenu¹, C. Christopoulos² and D. Thomas²

¹Kolej Universiti Teknologi Tun Hussein Onn, Malaysia

²University of Nottingham, United Kingdom

F4-PROT-1-4 A Study of EMI Suppression Characteristics of Ferrite Cores

9:40am Junichiro Urabe, Katsumi Fujii, Armad Mukifza, Yasushi Matsumoto and Akira Sugiura

Tohoku University, Japan

PROT-2: Shielding EMC

Friday, 3 March 2006, 10:40am-12:20pm

Chairs: Prof. Jinliang He, Dr. Toshihide Tosaka

SUNTEC Room 207

- F4-PROT-2-1 **Shielding Performance of a Metallic Rack used for Telecommunication Equipment: FIT Modeling and Measurements**
10:40am Antonio Ciccomancini Scogna
CST of America Inc., United States
- F4-PROT-2-2 **Feasibility Study for Reconstruction of Information from Near Field Observations of the Magnetic Field of a Laser Printer**
11:00am Toshihide Tosaka¹, Kazumasa Taira², Yukio Yamanaka¹, Atsuhiko Nishikata^{1,3} and Mitsuo Hattori⁴
¹National Institute of Information and Communications Technology, Japan
²Ministry of Internal Affairs and Communications, Japan
³Tokyo Institute of Technology, Japan
⁴NTT Advanced Technology Corporation, Japan
- F4-PROT-2-3 **Simulation and Measurement of the Transient Field of Indirect Electrostatic Discharge**
11:20am Zhiyong Yuan, Tun Li, Jinliang He, Shuiming Chen, Weiyuan Chen, Rong Zeng
Tsinghua University, China
- F4-PROT-2-4 **High Frequency (HF) Suppression with a Shielded Fence**
11:40am Wee Jin Koh, Joo Huat Tan and Chew Hock Kek
DSO National Laboratories, Singapore
- F4-PROT-2-5 **Time-Domain Measurements of Transient Field Coupling Through Slots**
12:00pm Wee Jin Koh, Joo Huat Tan, Yeow Kwang Tai and Chew Hock Kek
DSO National Laboratories, Singapore

POW-2: Power System EMC

Friday, 3 March 2006 1:20pm-3:00pm

Chairs: Prof. Michel Ianoz, Prof. Cui Xiang

SUNTEC Room 207

- F4-POW-2-1 **Full Harmonic Load Flow Calculation in Power Systems for Sensitivity Investigation**
1:20pm Cezary Dzienis¹, Andrzej Bachry² and Zbigniew Styczynski¹
¹Otto-von-Guericke-University of Magdeburg, Germany
²Siemens AG, Germany
- F4-POW-2-2 **A Simple Method for Measuring Complex Transfer Impedance and Admittance of Shielded Cable in Substations**
1:40pm Lei Qi, Xiang Cui, Xuesong Gu
North China Electric Power University, China
- F4-POW-2-3 **The Conducted Electromagnetic Interference of Small Grid Connected Inverter to Power System**
2:00pm P. Khamphakdi¹, V. Tarateeraseth², K. Karanun³ and W. Khanngern¹
¹King Mongkut's Institute of Technology Ladkrabang (KMITL), Thailand
²Srinakharinwirot University, Thailand
³Electrical and Electronics Institute (EEI), Thailand
- F4-POW-2-4 **On the Mechanisms of Differential-Mode to Common-Mode Conversion in the Broadband over Power Line (BPL) Frequency Band**
2:20pm Ana Vukicevic¹, Marcos Rubinstein², Farhad Rachidi¹, Jose-Luis Bermudez³
¹Swiss Federal Institute of Technology, Switzerland
²University of Applied Science of Western Switzerland, Switzerland
³ABB Secheron, Switzerland
- F4-POW-2-5 **High-frequency EMTP Model of Transformer Windings**
2:40pm Guishu Liang¹, Huaying Dong¹, Xiaohui Wang², Xile Zhang^{1,3}, Haifeng Sun¹ and Xiang Cui¹
¹North China Electric Power University, China
²Hebei Electric Power Research Institute, China
³Baoding Tianwei Baobian Electric Co., Ltd, China

Exhibition

Exhibition Hours

1 March-Wednesday, 08:30am – 6:00pm

Singapore Suntec Level 3 Concourse

2 March – Thursday, 08:30am – 6:00pm

Singapore Suntec Level 3 Concourse

3 March – Friday, Closes 5:00pm

Singapore Suntec Level 3 Concourse

Program

Exhibition Booth Set-up by Exhibition Services Provider

28 February - Tuesday, 9:00am – 2:00pm

Singapore Suntec Level 3 Concourse

Exhibition Booth Dressing by Exhibitors

28 February - Tuesday, 3:00pm – 8:00pm

Singapore Suntec Level 3 Concourse

Exhibition Booth Tear Down

3 March – Friday, 5:00pm – 6:00pm

Singapore Suntec Level 3 Concourse

Exhibitors

List of Exhibitors

S/N	Organization Name	Booth No.
1	Albatross Projects Gmbh	C6
2	Advanced Materials & Integration Co.Ltd	C3, C4, C5
3	AR Worldwide	C2
4	Chang Sung Corporation	C3, C4, C5
5	Cosmotec Enterprises Pte Ltd	A2
6	CST Computer Simulation Tech	A13
7	Dong-II Technology Ltd	C3, C4, C5
8	EMCIS	C3, C4, C5
9	EM Software & Systems	A1
10	EM Test GmbH	E1
11	Epsilon Corporation	C3, C4, C5
12	ETS-Lindgren	D1, D2
13	Fair-Rite Asia Pte Ltd	A12
14	Fastus Scientific Corporation	A7
15	Flomerics SE Asia Pte Ltd	A10
16	Frankonia GmbH	A8
17	Glocom Marketing Pte Ltd	C8
18	IEEE/ EMC	D9
19	Journal Safety & EMC China	D8
20	JS Denki	C9, C10
21	LabOne Singapore Pte Ltd	C7
22	NARTE	A11
23	PRANA	D10
24	PSB Corporation	C1
25	Quantel Pte Ltd	A14
26	Rohde & Schwarz Systems	B2
27	Schaffner EMC Pte Ltd	B3
28	SIEMIC Laboratories	D11
29	Speedy Tech	A4
30	ST Electronics (Info-Comm Systems)	B1
31	Sunkyong Silicone Tech Co.Ltd	C3, C4, C5
32	TME Systems Pte Ltd	A5, A6
33	TNC Co.Ltd	C3, C4, C5
34	World Scientific Publishing	A9



Albatross Projects GmbH (Booth No: C6)

Albatross Projects GmbH is an international positioned enterprise for the implementation of EMC Test Systems. We offer customised solutions and advanced technology in these fields:

- Anechoic Chambers
- Antenna Chambers
- Shielded Enclosures
- Tempest Facilities

We are focusing on superior quality for turnkey solutions to provide our customers with valuable equipment. Rely on our commitment to excellent service.



Advanced Materials & Integration Co.Ltd (Booth No: C3, C4, C5)

With our trademark "Expan" AMIC is providing total solution for the EMI/ESD/SAR/RFI by own EMC products manufactured in Korea. Our product ranges are Shielding, Absorbing, Thermal including Form in Gasket, EMI Paint, Conductive Silicone is a new Absorber for RF-ID tag applicable. Especially, our new item RF-Tape is dual performance is shielding/absorbing.



AR Worldwide (Booth No: C2)

AR Worldwide RF/Microwave Instrumentation is a world class manufacturer of broadband high-power amplifiers from dc to 40 GHz, from 1 – 50,000 watts. These amplifiers are primarily used for radiated and conducted susceptibility testing, but are equally suitable for general laboratory use. Available test accessories include antennas, directional couplers, field monitoring equipment, power meters and precompliance EMC test systems.



Chang Sung Corporation (*Booth No: C3, C4, C5*)

Chang Sung Corporation is one of the world's leading manufacturer of EMC products based on High Quality, Advance Technologies, and Qualified Staff & Equipment. It's production range is EMI Paste, Absorber Sheet, RF-ID Inductor Sheet, Magnetic Powder core, Magnetic Filler, Conductive Filler with wide range of standard specification and customized design. www.changsung.com



Cosmotec Enterprises Pte Ltd (*Booth No: A2*)

Founded in 1983, Cosmotec Enterprises is an established company in the test and measurement instrumentation business. With EMC business being one of our key focus technologies market, Cosmotec is committed to complete customer satisfaction by providing solutions founded on excellent engineering support and services, integrated solutions, and valued added services.



CST Computer Simulation Tech (*Booth No: A13*)

CST is one of the two largest suppliers of electromagnetic simulation software and has continuously enhanced its position as market and technology leader in 3D Time Domain simulation. With over 80 employees worldwide and a network of qualified distributors, 120 people are dedicated to the development and support of its EM products in more than 30 countries. Information about CST is available on the web at www.cst.com



Dong-II Technology Ltd (*Booth No: C3, C4, C5*)

Dong-II Technology is a total EMC solution provider since 1986, offering hundreds kinds of products as measures for conducted and radiated emission. Our major product lines are IEC Inlet Filter, Common mode and harmonics choke, Sockets, Fabric gaskets and customer specific products, and so on.



EMCIS (*Booth No: C3, C4, C5*)

EMCIS is one of creative solution provider in electromagnetic compatibility (EMC) analysis instruments and its related equipments/accessories. Approaching into new concept of noise separation in Conducted Emission Noise(EMI) as Common-Mode and Differential-Mode noise, provides faster, accurate, and perfect EMI solution including just-on size filter design.



EM Software & Systems (*Booth No: A1*)

FEKO www.feko.info is a comprehensive computational electromagnetics (CEM) code based on the accurate "full wave" Method of Moments. The leading MLFMM and the MoM hybrid with asymptotic high frequency techniques (PO and UTD) allows simulation of electrically large problems, e.g. antenna placement. Several techniques including Finite Element Method (FEM) available for dielectric regions.



EM TEST

EM TEST GmbH (*Booth No: E1*)

EM TEST is worldwide the leading supplier of EMC generators for the automotive industry and among the leaders for IEC, telecom, medical and component testing. Our transient generators match test routines exactly to specifications. Our senior engineers are active members in national and international standards committees. www.emtest.com



Epsilon Corporation (*Booth No: C3, C4, C5*)

Epsilon Silver Coated Copper powders are designed to provide the best EMI solution for modern electro-communication equipment. Silver offers the best electrical conductivity, thus is used as the coating. Epsilon's products are Silver Coated Glass powder, Silver Coated Hollow Glass Powder, Silver Coated Aluminum powder, Ag Core Pd Shell powder, Ag Flake powder.



ETS-Lindgren (*Booth No: D1, D2*)

ETS-Lindgren is the proven world leader for EMC, wireless and microwave test systems and components. Our product line includes antennas, anechoic, reverberant and acoustic chambers, positioners, test cells, antenna pattern measurement software and systems, shielding, GTEM /TEM Cells, probes and more. Click at www.ets-lindgren.com for more information.



Fair-Rite Asia Pte Ltd (*Booth No:A12*)

LISTING OF PRODUCTS TO BE EXHIBITED

Ferrite Products for the Electronic Industry:

Board Components	Shield Beads, Beads on Lead, Surface Mount Beads, Chip Beads, Wound Beads, Multi-Aperture Cores
Cable Components	Round Cable EMI Suppression Cores, Split Round Cable EMI Suppression Cores, Round Cable Snap-its, Flat Cable EMI Suppression Cores, Flat Cable Snap-its
Inductive Components	Rods, Toroids, E & I Cores, U Cores



Faustus Scientific Corporation (*Booth No: A7*)

Faustus Scientific Corporation translates cutting-edge research expertise into "Multi-Purpose Electromagnetic Field Simulation Tools": MEFiSTo™. These fast, accurate, and user-friendly 3D Time Domain CAD tools offer outstanding versatility and value. They empower design engineers, researchers and educators to solve challenging electromagnetic field problems. Ask for a free trial version and visit our website at <http://www.faustcorp.com/>

FLOMERICS

Flomerics SE Asia Pte Ltd (*Booth No: A10*)

Flomerics provides simulation software tools and services - primarily to the electronics industry - to improve and accelerate the physical design process. There are (FLOTHERM, FLO/EMC, FLO/PCB, FLOPACK, FLO/MCAD, SmartParts3D, Micro-Stripes). Our software enables engineers to predict the behavior of a proposed design prior to the build and test phase - this is often called "virtual-prototyping".



FRANKONIA

Frankonia GmbH (*Booth No: A8*)

FRANKONIA GmbH, a leading worldwide company specialized in RF shielded rooms, anechoic chambers, microwave absorbers and chambers accessories, like: turntables, antenna mast, controllers cctv and audio systems. Well known for its quality and its non combustible absorbers, Frankonia is certified ISO 9001 for research, development, manufacturing, installation and chambers tests.

GLOCOM

MARKETING PTE LTD

*Your source for
EMC products*

Glocom Marketing Pte Ltd (*Booth No: C8*)

Glocom Marketing Pte Ltd was incorporated in year 1983. We are a leading provider of innovative Electromagnetic Interference (EMI) shielding products and solutions for the Electronic Manufacturing Industry. We positioned ourselves as an integrated One-stop EMI Solutions provider with our wide range of EMI products for the flexibility of Design applications to your entire possible EMI problem.



IEEE / EMC (*Booth No: D9*)

IEEE (Eye-triple-E) EMC Society (<http://www.emcs.org>) is one of the 39 societies under IEEE. It is a non-profit, technical professional association providing services in the areas of electromagnetic.

安全与电磁兼容

Journal Safety & EMC China (*Booth No: D8*)

SAFETY & EMC is a science and technology periodical issued by the Chinese Electronic Standardization Institute. It has been established for over sixteen years and publishes 6 issues annually. This periodical covers the standards, testing, certification, design and many other aspects of EMC. In China, more than 100,000 engineers are our faithful readers.



JS Denki Pte Ltd (*Booth No: C9, C10*)

JS Denki is a 100% EMC Test & Measurement Solution Company with an experienced and technically competent group who are fully committed in the EMC field. As a customer oriented company, we provide customize EMC solution and high quality after sales support to our value customers because customer satisfaction is our main objective.



LabOne Singapore Pte Ltd (*Booth No: C7*)

LabOne's mission: To provide one-stop testing and certification services for ISM, ITE and AV products. LabOne has aggressively expanded its state-of-art facilities with a recent investment of S\$40million in Asia Pacific. LabOne is geared towards bolstering its position to support high-end product manufacturing and R&D activities and in being the biggest independent test centre for electronics and consumer products in Asia Pacific.



NARTE (*Booth No: A11*)

NARTE, a non-profit organization, certifies qualified practitioners of EMC/EMI control. The purpose of NARTE EMC Certification is to foster technical excellence in EMC engineering. This approach establishes competency criteria for EMC/EMI work certification benefits the individual engineer or technician and the EMC community by establishing a standard of excellence in EMC.

PRÂNA

PRANA (Booth No: D10)

PRÂNA is the European leading manufacturer of broadband RF pulsed or CW amplifiers. PRÂNA range of amplifiers covers a bandwidth from DC to 4,2 GHz with power levels up to 20 KW according to the applications. Reliable and robust, PRÂNA amplifiers are guaranteed to provide a defined stable power whatever the load mismatch is.



PSB Corporation (Booth No: C1)

PSB Corporation is an authorised test house of the Infocomm Development Authority of Singapore (IDA), and recognised by the Federal Communications Commission (FCC) in the US. Our test reports are accepted by many authorities, including countries under the Asia Pacific Economic Cooperation (APEC) MRA.



Quantel Pte Ltd (Booth No: A14)

Set up in 1989, Quantel has earned its reputation as a supplier of high quality, customer-oriented products in the field of power electronics, safety and EMC compliance testing in the SE Asia region. Quantel will showcase the latest EMC related test equipment in EMC-Zurich 2006 Exhibition.



Rohde & Schwarz Systems (Booth No: B2)

Rohde & Schwarz is one of the world's leading manufacturers of EMI, communication, signal analysis and signal generation equipment. We are leaders in turnkey EMI and EMS test systems. With 6000+ employees worldwide, subsidiaries and representatives in over 70 countries, you are assured of responsive support for all your EMC applications. For expert support committed to EMC, call us at 65-68463710 or www.rohde-schwarz.com.sg



Schaffner EMC Pte Ltd (*Booth No: B3*)

Schaffner - safety for electronic systems

Schaffner is the international leader in electromagnetic compatibility (EMC), focusing on high-growth sectors such as automotive, building automation, industrial and consumer electronics, aerospace, medical technology, power supplies, telecommunications, transportation, and the public sector. The Schaffner Group develops, produces and markets standard and customer-specific components, modules, test systems and test facilities.



SIEMIC Laboratories (*Booth No: D11*)

Headquartered in the heart of Silicon Valley with facilities and offices around the world, SIEMIC provides one-stop shop compliance testing and global certification services. With distinguished accreditation, SIEMIC Test Report is acceptable worldwide. SIEMIC Certification service covers over 220 countries that assist our clients access to the global markets. www.siemic.com



Speedy-Tech Electronics Ltd (*Booth No: A4*)

Founded in year 1985, Speedy-Tech is an Electronic Manufacturing Service (EMS) provider and specializes in design and manufacturing of power converters. In year 2004, a world class EMC 10m testing chamber was setup, combining with other EMC testing facilities for provision of Power Electronics solutions and EMC test services to the MNC customers based in Singapore and Asia.



Singapore Technologies Electronics (*Booth No: B1*)

ST Electronics, the electronics arm of ST Engineering, delivers innovative system solutions to defence, homeland security, commercial and industrial customers worldwide. A leader in Asia Pacific for EMC, RF/Microwave engineering and wireless communications, ST Electronics offers a range of solutions and services:

- Architectural Shielding Systems & Solutions
- EMI/EMC Consultancy, Test & Measurement Services
- One-stop Instrument Calibration Centre for Calibration & Repair of Test, Measuring & Diagnostic Equipment



Sunkyoung Silicone Tech Co.Ltd (*Booth No: C3, C4, C5*)

SunKyoung Silicone Tech Co.Ltd produces a special Product of general silicone rubber, sponge silicone rubber, EMI Conductive silicone elastomer, etc.



TME Systems (*Booth No: A5, A6*)

Established in 1986, TME Systems, its regional offices and affiliates have been providing customers with an international range of reputable products that come with strong research and development emphasis as well as high manufacturing standards.

Our products enable users to achieve higher productivity and efficiency whether in the office, the manufacturing plant, the laboratory, or the worksite.

TNC

TNC Co. Ltd (*Booth No: C3, C4, C5*)

TNC Co.Ltd specialized manufacturer of the Line Filter for EMI (CE) counterplan have several type of standard products. The fine quality has been making us enjoying a good reputation by our customers as our products are superior to those that are distributing now in our market. We hope to best helper concerning EMI(CE) counterplan for you.



World Scientific Publishing (*Booth No: A9*)

Established in 1981, World Scientific publishes more than 400 books and 100 journals annually in Science, Technology and Medicine. The company also holds exclusive rights to publish the complete series of Nobel lectures from 1901 onwards. In 1995, World Scientific co-founded the Imperial College Press with London University's Imperial College.



Meeting Matters International

Meet Matt, with its extensive network in the Asia Pacific, provides planning and operational support an organisation needs for its meetings and events. From the initial planning stage to the conclusion of the event, Meet Matt assists in managing a myriad of activities that contribute to a successful meeting or event. Meet Matt is a World Scientific subsidiary.



ST Electronics - Your Partner in EMC, RF/Microwave Engineering & Wireless Communications

At ST Electronics, we deliver innovative system solutions to government, defence, homeland security, commercial and industrial customers worldwide. A leader in Asia Pacific for EMC, RF/microwave engineering and wireless communications, we have more than two decades of experience and track records which consistently meet the stringent demands of our customers. We are committed to offer quality services to all our customers, so you can rely on our wide range of turnkey solutions and services to suit each of your business needs.

EMC Services & Consultancy

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- EMC Consultancy & Control Management Services
- Military & Commercial EMC Test & Measurement Services

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