2011 Asia Pacific EMC Symposium

Date: May 16~19, 2011
Venue: Ramada Plaza Jeju Hotel, Jeju, Korea

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It is our great pleasure to announce the 2011 APEMC in Jeju Island, Korea. Continuing the success of the 2008 APEMC in Singapore jointly organized with the 19th EMC Zurich Symposium and the 2010 Asia Pacific EMC Symposium in Beijing, we cordially invite you to Jeju Island. Jeju Island has very beautiful and peculiar landscape with rich cultures and fabulous facilities. We are sure that the APEMC 2011 will provide an excellent opportunity to exchange their expertise and to build up friendship for the members of the EMC community of the Asia Pacific region as well as other regions of the world.

The 2011 Asia Pacific EMC Symposium and Technical Exhibition will be held in Jeju Island, Monday, May 16 through Thursday, May 19, 2011. Following the tradition of APEMC, the symposium will cover the entire scope of electromagnetic compatibility, including electromagnetic interference, EMC measurement techniques, system-level & PCB-level EMC, lightning & power system EMC, high power EMC, transportation & automotive EMC, antenna and wave propagation issues, computational electromagnetics, nanotechnology for EMC, semiconductor & chip-level EMC, communication EMC, EMC material, bio-medical electromagnetics, EMC management, Regulatory activities and safety trends etc. In addition to regular sessions, we also solicit proposals for special sessions, industrial forums, workshops, tutorials and topical meetings.

All members of the EMC community are invited to submit papers for their recent findings and join us to enjoy all the delightful things in Jeju Island and to make the APEMC 2011 successful. A variety of invited speakers will give excellent talks on new and upcoming issues. The TPC (Technical Program Committee) members are consisted of the well-known EMC experts worldwide as in the previous meetings. Papers will be selected on the basis of their scientific contribution, their impact on industry as well as their interest to the EMC community as usual.

Come and join the Asia Pacific EMC Week in Jeju Island in May 2011!!

We will provide a rich scientific and social program, and offer a good forum for mutual exchange among all participants. Please encourage your colleagues to join the meeting.
It is indeed a great pleasure for me to be here today at this important international conference held in the most beautiful island in Korea, in this wonderful season. I would like to congratulate all of you to be the distinguished participants with your great contributions at this 2011 Asia Pacific EMC Symposium.

First of all, I would like to express my sincere thanks to professor Jeong-Ki Pack of Chungnam University who has made great effort for successful conference. And I also express my sincere thanks to all the EMC experts participating in this event. Now the world is advancing the information society in a huge trend of green ICT and digital convergence. Development of ICT technology and convergence services has created smart-phones and smart-pads with a wide range of applications available for social network.

The rapid increase of the use of broadcasting/communication equipments, computers, and electric/electronic devices may effect more interfere on the radio communications and more malfunctions on those devices, which raises the urgent need for EMC measures and development of technical standards in order to minimize those adverse effects.

The APEMC symposium has, I believe, made a great contribution to the development of the EMC technology by exchanging of academic information and I am very proud of being a supporter of the APEMC. At this event, there are keynote presentations about EMC issues of wireless power transmission and automobiles and many other major papers about electromagnetic interference, EMC measurement technologies and high power electromagnetic waves. Realizing that the best experts in the EMC field are meeting together at this conference, I hope 2011 APEMC gives us an opportunity to move EMC technology one step further through active discussions and encouragement among participants. I hope this symposium helps to strengthen the industry, academia, institutes, and the government and contributes to development of EMC technology and vigorous R&D activities through the sharing of information on EMC technology.

Jeju island has its prominent mountain Halla at the center and is surrounded by sea outside, so you can enjoy fantastic views wherever you go on this island. I wish you can enjoy your stay in Jeju having relax time to refresh your spirits at the wonderful tourist site.

Finally I sincerely appreciate to those who did not spare any effort in preparation for 2011 APEMC despite of many difficulties and again to all of you for taking time from your busy schedule to participate in this event.

Thank you very much.

Leem, Cha Sik
President of the Radio Research Agency
Korea Communications Commission
TPC Chair’s Message

At the 2011 Asia Pacific EMC (APEMC) Symposium, the most important papers will be introduced by many talented professionals.

The Technical Program Committee (TPC), consisting of 36 international TPC members from all over the world and 41 local TPC members from Korea, has worked hard to ensure the technical quality of the papers which are presented at this conference. There are 5 kinds of technical sessions: plenary session, tutorial session, regular paper session, special paper session, and workshop session. The two most famous speakers will present the plenary session. The 26 tutorials for 10 topics will be presented by 27 speakers on Monday and Thursday and the 4 workshops for 4 topics will be held on Thursday. The 50 papers for 10 special sessions are scheduled on Tuesday and Wednesday.

The TPC received 115 technical papers from 20 countries just for regular paper session. Each paper was reviewed by multiple qualified 76 reviewers and final decisions regarding the technical papers and program were made at a TPC meeting held in Daejeon last February. Paper submissions for the APEMC 2011 Symposium covered a wide range of EMC-related topics. The topic areas receiving the most submissions were Sources of Electromagnetic Interference, EMC Management, EMC Measurement Techniques, System-Level EMC and PCB EMC, Antenna and Propagation Issues, Electronic Packaging and Integration EMC, Power Integrity and Signal Integrity, Computational Electromagnetics, Semiconductor EMC, and Electromagnetic Interference with Medical Devices.

We hope that you can find something you want. Please enjoy APEMC 2011 in beautiful Jeju.

Joungho Kim (KAIST)
TPC Chair, APEMC 2011
Symposium Committee

Symposium Chair
Jeong-Ki Pack (Chungnam National Univ.)

International Advisory Committee
F. Maradei (IEEE EMC Society President 10-11)  Elya B. Joffe (IEEE EMC Society President 09-10)
Osamu Fujiwara (Japan EMC society President)  Erping Li (A-STAR IHPC)
Bruce Archambeault (IBM)  Dong-Chul Park (Chungnam National Univ.)
Jing Liang He (Tsinghua Univ.)  Dong-Il Kim (Korea Maritime Univ.)

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Jae-Hyun Lee (Chungnam National Univ.)  Jungyu Yang (RRA)

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Ki-Chai Kim (Yeungnam Univ.)

Exhibition Chair
Wansoo Nah (Sungkyunkwan Univ.)

Symposium Secretary
Sungtek Kahng (Incheon Univ.)
TPC Committee

TPC Chair
Joungho Kim (KAIST)

TPC Co-chair
Todd Hubing (Clemson Univ.)

Workshop & Special Program Chair
Jong-Gwan Yook (Yonsei Univ.)

International TPC Members

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<thead>
<tr>
<th>Todd Hubing</th>
<th>Wenlie Liang</th>
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<td>Yoshihiro Baba</td>
<td>Vladimir A. Rakov</td>
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<td>Ing. Heyno Garbe</td>
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<td>Francesca Maradei</td>
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<td>Franz Schlagenhauer</td>
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<td>Sonia Ben Dha</td>
<td>Thomas Steinecke</td>
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<td>Hong Wei</td>
<td>Hiroshi Inoue</td>
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<td>Antonio Orlandi</td>
<td>Jeong-Ki Pack</td>
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<td>Toshio Sudo</td>
<td>Osamu Fujiwara</td>
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<td>Christos CHRISTOPOULOS</td>
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Local TPC Members

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<td>Taeheon Jang</td>
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### Symposium at a Glance

#### Sunday, May 15, 2011
- **15:00-18:00**: Registration / Convention Lobby, 2F
- **18:00-20:00**: Welcome Reception / Ramada Ballroom 1

#### Monday, May 16, 2011
- **9:00-18:00**: Registration / Convention Lobby, 2F

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<tr>
<th>Room</th>
<th>Session</th>
<th>Topic</th>
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<tr>
<td>Ramada Ballroom 2, 2F</td>
<td>Tutorial Tu-Mo1</td>
<td>WPT &amp; EMC</td>
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<tr>
<td>Ramada Ballroom 3, 2F</td>
<td>Tutorial Tu-Mo2</td>
<td>Intro. to Auto. EMC Testing</td>
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<tr>
<td>Ramada Ballroom 4, 2F</td>
<td>Tutorial Tu-Mo3</td>
<td>Modeling of IC Susceptibility to EMI</td>
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<tr>
<td>Biyang Room, 2F</td>
<td>Tutorial Tu-Mo4</td>
<td>Radiated Meas. using Ant. &amp; Field Probes</td>
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<tr>
<td>Chuja Room, 2F</td>
<td>Tutorial Tu-Mo5</td>
<td>EMP2 - EM Pulses &amp; EM Protection</td>
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<thead>
<tr>
<th>Time</th>
<th>Room</th>
<th>Topic</th>
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<tr>
<td>10:00-12:00</td>
<td>Tu-Mo1</td>
<td>Tu-Mo2 Tu-Mo3 Tu-Mo4 Tu-Mo5</td>
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<td>12:00-13:00</td>
<td>Tu-Mo1</td>
<td>Tu-Mo2 Tu-Mo3 Tu-Mo4 Tu-Mo5</td>
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<td>14:00-15:00</td>
<td>Tu-Mo1</td>
<td>Tu-Mo2 Tu-Mo3 Tu-Mo4 Tu-Mo5</td>
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<td>15:00-15:30</td>
<td>Tu-Mo1</td>
<td>Tu-Mo2 Tu-Mo3 Tu-Mo4 Tu-Mo5</td>
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<td>15:30-17:30</td>
<td>Tu-Mo1</td>
<td>Tu-Mo2 Tu-Mo3 Tu-Mo4 Tu-Mo5</td>
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#### Tuesday, May 17, 2011
- **8:30-18:00**: Registration / Convention Lobby, 2F
- **9:30-18:30**: Exhibition / Exhibition Hall, 2F
- **9:30-09:50**: Welcome Speech / Ramada Ballroom 1, 2F
- **09:50-10:50**: Plenary Speech P-Tu1 / Ramada Ballroom, 2F
- **10:50-11:50**: Plenary Speech P-Tu2 / Ramada Ballroom 1, 2F
- **11:50-13:00**: Lunch / Plenary Speakers Lunch

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<tr>
<th>Room</th>
<th>Session</th>
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<td>Ramada Ballroom 2, 2F</td>
<td>Technical T-Tu1</td>
<td>EMC on System</td>
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<td>Ramada Ballroom 3, 2F</td>
<td>Technical T-Tu2</td>
<td>Fundamental EMC</td>
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<td>18:30-21:30</td>
<td>Banquet &amp; Award</td>
<td>Banquet &amp; Award / Ramada Ballroom 1</td>
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# APEMC 2011
2011 Asia Pacific EMC Symposium

## Wednesday, May 18, 2011

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<td>9:00-17:00</td>
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<td>Session</td>
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<tr>
<td>Ballroom 2, 2F</td>
<td>Technical T-We1</td>
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<tr>
<td>Ballroom 3, 2F</td>
<td>Technical T-We2</td>
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<td>Ballroom 4, 2F</td>
<td>Technical T-We3</td>
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<td>Ramada</td>
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<td>Chuja Room, 2F</td>
<td>Special S-We2</td>
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<tr>
<td>Topic</td>
<td>Lightning &amp; Power System</td>
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<td>Antenna &amp; Propagation</td>
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<td>Ora Hall 4, 8F</td>
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<tr>
<td>Topic</td>
<td>Modeling and Design of Chip-PKG-PCB Level SI &amp; PI</td>
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<td>PDN Analysis and Design for PCBs and PKGs</td>
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<td>Meta-Mat., Periodic Structures &amp; EBG in EMC/Ant./RF</td>
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<td>Tu-Th1-3 De-,Bypass-, &amp; Embedded Caps.</td>
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Automotive technology is advancing at a record pace. Ten years ago, cars and trucks were primarily mechanical machines with various electronic controls. Development cycles were 5 years or longer and designs were largely driven by mechanical innovations and constraints. The vehicles being developed today are highly integrated electronic systems. Computers play a key role in everything from running the engine to “rolling down” the windows. Very few aspects of vehicle operation are controlled directly by the driver without one or more computer systems intervening. As a result, today’s automobiles are safer, more reliable and more fuel efficient than ever before. However, greater reliance on electronic systems demands greater emphasis the electromagnetic compatibility and reliability of these systems. It is more important than ever before to ensure that system failures due to electromagnetic interference, electrical faults or software glitches do not compromise vehicle safety. As we continue to incorporate more electronics into the automotive platform, we must rethink the way that automobiles are designed, manufactured and tested. This will require abandoning certain aspects of traditional automotive development in favor of processes borrowed from the aerospace and consumer electronics industries. The leading automotive companies in the next decade will be those companies that successfully make this transition.

**Biography**

Prof. Todd Hubing is the Michelin Professor of Vehicle Electronics at the Clemson University International Center for Automotive Research (CU-ICAR) in Greenville, South Carolina, USA. He holds a BSEE from the Massachusetts Institute of Technology, an MSEE from Purdue University, and a Ph.D. from North Carolina State University. He began his career as an EMC engineer for IBM in 1982, where he did EMC testing and troubleshooting on a variety of computer and network communications products. In 1989, he became a faculty member at the University of Missouri-Rolla (now the Missouri University of Science and Technology) where he worked with other faculty and students to analyze and develop solutions for a wide range of EMC problems affecting the electronics industry. Since coming to Clemson in 2006, he has continued his work in electromagnetic compatibility and computational electromagnetic modeling, particularly as it is applied to automotive and aerospace electronics. He is a Past-President of the IEEE Electromagnetic Compatibility Society, an IEEE Fellow and a Fellow of the Applied Computational Electromagnetics Society.
Concerns about possible health risks of electromagnetic fields (EMF) are growing in many countries with the rapid penetration of wireless technology and novel applications of electrical energy into daily lives. A vast amount of resources has been invested to researches on this issue since 1990’s. The results mainly confirmed the absence of health effects of low-level exposures especially of researches with good dosimetry or quantitative exposure assessment. The demands on the good dosimetry stimulated progress in computational electromagnetics and development of sophisticated numerical human models. We now have much more evidences about the safety of EMF exposure owing to the progress in the electromagnetic dosimetry. Some recent progress regarding those topics will be shown in the talk. On the other hand epidemiological studies have been suggesting possible associations between EMF exposure and cancer. The limitation in epidemiology derives from the precision of exposure assessment in spite of great efforts devoted to exposure assessment for epidemiology. World Health Organization recommended adopting international guidelines on the limit of exposures, and assessment of exposures from sources where exposures might be expected to exceed limit values. The exposure assessment is mandatory in the development of any products of application of electromagnetic energy. Assessment of compliance with the guidelines is of interest in emerging technologies. Some recent progress in this issue will be discussed.

Biography
Prof. Masao Taki is a Professor of Electrical and Electronic Engineering at Tokyo Metropolitan University, Tokyo, Japan. He received his B.E., M.E., and Ph.D. degrees in electronic engineering from the University of Tokyo in 1976, 1978, and 1981, respectively. He then joined Department of Electrical Engineering of Tokyo Metropolitan University, where he started researches on bioelectromagnetics in 1981. Since then he has been engaged in electromagnetic dosimetry and assessment of health risks of humans exposed to electromagnetic fields. He has also been involved in biological studies in vivo and in vitro, and also in epidemiological studies for risk assessment of electromagnetic field exposures. He was a member of International Commission of Non-ionizing Radiation Protection (ICNIRP) from 1995 to 2008, and chairing the ICNIRP SCIII from 2000 until 2004. He served as a board member of Bioelectromagnetics Society in 2005 – 2007. He is currently the Vice-chair of Commission K of the International Union of radio Science (URSI).
# Tutorial

## Monday, May 16, 2011

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<td>Metamaterials, Periodic Stuructures and EBG in EMC/ Antenna/RF Designs</td>
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<td>Tu-Th1-1: Introduction to Printed Circuit Board Design, Specification, Manufacturin and Construction</td>
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<td>Tu-Th1-3: Decoupling, Bypassing and Embedded Capacitance for Enhanced PCB Performance</td>
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Tutorial Tu-Mo1  Wireless Power Transfer and Electromagnetic Compatibility
Ramada Ballroom 2, 2F | 10:00 ~ 17:30
Organizer & Chair : Seungyoung Ahn, KAIST, Korea

Abstract
Since wireless power transfer technology using strong-coupled regime is proposed a few years ago, there is a global movement where cables are taken away from electrical equipment for real mobile electronics. And recently, researches on the first stage are now appearing by the pioneers in each country based on the wireless power transfer technology. As various types of commercial products from the industries are about to be released in near future, it is a high time to share the technologies, trends, and ideas with engineers in wireless power transfer technology fields.

In this tutorial course, the fundamental technologies of wireless power transfer system are introduced, and practical issues for commercialization, international standards and trends, and future applications will be discussed. Six professionals will provide with basic theories and applications to the mobile phones, electrical vehicles, and medical instruments on the cutting edge from the years of experience. We expect this tutorial course would be helpful to researchers and engineers for the inspiration of the future research directions and ideas for solutions of current problems.

Speakers list
1. Basic theory of magnetic-coupled-resonant wireless power transfer and recent progress
Hiroshi Hirayama, Nagoya Institute of Technology, Nagoya, Japan

2. Practical design issues of wireless power transmission system based on magnetic resonance
Young Jin Park, KERI, Changwon, Korea

3. Frequency Tracing of Resonance Frequency Variation of L-C Circuit for Wireless Energy Transmission to Medical Devices in the Human Organs
Yoon-Myoung Gim, Dankook University, Yongin, Korea

4. Design of Dual-Rail Pickup with Gradual multi-windings for KAIST OLEV
Seong-Jeub Jeon, Pukyong National University, Busan, Korea

5. Standardization trends and Design Review for Wireless power transfer system
Yoon-Sang Kook, Hanrim Postech, Suwon, Korea
Tutorial Tu-Mo2  Introduction to Automotive EMC Testing  
Ramada Ballroom 3, 2F  |  10:00 ~ 17:30  
Organizer & Chair : Kefeng Liu, ETS-Lindgren, USA / Janet O’Neil, ETS-Lindgren, USA

Dr. Kefeng Liu dedicated his industrial career to the application of numerical electromagnetic computational methods to the analysis and design verification of RF and microwave absorbers, anechoic chambers, and antenna design; and to the accurate evaluation of low observable RF absorber performance and antenna measurements from 10 MHz to 110 GHz. He was the designer of the ETS-Lindgren’s curvilinear, FS-series, and PS-Series absorber product lines, and the broadband dual-polarized ridged horn antennas. Mr. Liu also led the business development of the ETS-Lindgren’s telecommunication Over-The-Air test system and the EMC certification test system solutions. Mr. Liu is a member of IEEE-APS/EMC and MTT societies, and Antenna Measurement Technique Associations (AMTA).

Dr. Janet O’Neil is a customer relations specialist with ETS-Lindgren. Her responsibilities include coordination of the company’s technical contributions to industry conferences worldwide. She has over 20 years experience in the RF Microwave and Electromagnetic Compatibility (EMC) industries. She is a member of the Board of Directors of the IEEE Electromagnetic Compatibility (EMC) Society as well as of the Antenna Measurement Techniques Association (AMTA). She is also a member of Subcommittee 1 (Techniques and Development) of ANSI ASC C63® and vice-chair of the 2011 IEEE International Symposium on EMC in Long Beach, California.

Abstract
This “Introduction to Automotive EMC Testing” tutorial is designed to be a full-day, two-part workshop. The morning session will provide an overview of EMC design theory related to automotive EMC compliance. We will also include illustrations on emerging EMC challenges on electric and hybrid vehicle testing. The afternoon session will include an overview on the construction of both component level and full vehicle size EMC test facilities. EMC test system planning for both component level and full-vehicle level radiated emission and radiated immunity will be addressed. The session concludes with an overview of global automotive EMC standards, including SAE standards in the US as well as ISO and CISPR standards in European and Asian countries. This tutorial is intended for both experienced and beginner EMC design and test engineers interested in the international automotive EMC test requirements and learning about hands-on EMC testing and design experiences for both component and full vehicle levels. Automotive EMC lab managers and vehicle project planners will benefit from attending this tutorial.

Speakers list
1. Designing Automotive Components for Compliance with EMC Requirements  
   Todd H. Hubing, Clemson University, Clemson, USA

2. Hybrid Electric Vehicle EMI Challenges  
   Gary Skibinski, Rockwell Automation/Rockwell Collins, WI, USA

3. Automotive EMC Test Chamber Design and Validation and "Test System Overview for Full-Vehicle and Component Testing"  
   Kefeng Liu, ETS-Lindgren, CA, USA

4. Automotive EMC Standards and Testing  
   Jaekon Shin, KATRI, Hwasung, Korea
**Tutorial Tu-Mo3**  
Initiation to the modeling and simulation of susceptibility of integrated circuits to electromagnetic interferences  

Ramada Ballroom 4, 2F  |  10:00 ~ 17:30  
Organizer & Chair : Alexandre Boyer, LAAS-INSa de Toulouse, France / Sonia Ben Dhia, LAAS-INSa de Toulouse, France

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Dr. Alexandre Boyer obtained his Master degree in electrical engineering in 2004 and a PhD in Electronics from the Institut Nationale des Sciences Appliquées (INSA) in Toulouse, France, in 2004. He is currently an Assistant Professor in the Department of Electrical and Computer Engineering at INSA, Toulouse. His current research interests include IC susceptibility modeling, reliability of ICs and computer aided design (CAD) tool development for electromagnetic compatibility (IC-EMC freeware).

Dr. Sonia Ben Dhia obtained her Master degree in electrical engineering in 1995, and a Ph.D. in Electronic Design from the Institut Nationale des Sciences Appliquées (INSA), Toulouse, France, in 1998. She currently holds the rank of associate professor at INSA-Toulouse, Department of Electrical and Computer Engineering, where she teaches digital electronics, IC testability and reliability, and analog and RF CMOS design. She is a member of the INSA Studies Directorate board, organizes transversal educational courses and is responsible for internal organization. Her research interests include signal integrity in deep sub-micron CMOS ICs and electromagnetic compatibility and reliability of ICs. She has authored technical papers on signal integrity and EMC. She has also contributed to the publication of 3 books.

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**Abstract**

Susceptibility of integrated circuits (IC) to electromagnetic interferences (EMI) constitutes a tricky issue for IC and electronic systems designers. Ensuring high immunity of ICs requires a solid knowledge about the coupling of EMI to circuits and the complex behaviors of IC submitted to disturbances. Specific modeling and simulation techniques are in development for several years to predict susceptibility levels before IC and electronic systems fabrication and help designers to fix immunity issues.

The proposed tutorial aims at presenting the basic concepts of conducted susceptibility modeling and simulation at IC level. The tutorial is not a lecture but a lab with a set of problems associated to the major issues of susceptibility of ICs. The lab is based on IC-EMC, software entirely dedicated to EMC of ICs and developed by the speaker of the tutorial for research and training purposes (more information on IC-EMC at www.ic-emc.org).

The covered topics proposed during this tutorial are: identification of the origins of susceptibility issues at IC level, main coupling paths of EMI in ICs, typical responses of circuits (digital, analog, RF) to EMI, evaluating the impact of circuit power distribution network on noise coupling, susceptibility modeling and simulation at IC level.

**Speakers list**

1. Initiation to the modeling and simulation of susceptibility of integrated circuits to electromagnetic interferences  
Alexandre Boyer, LAAS – INSA de Toulouse, Toulouse, France

2. Initiation to the modeling and simulation of susceptibility of integrated circuits to electromagnetic interferences  
Sonia Ben Dhia, LAAS – INSA de Toulouse, Toulouse, France
Tutorial Tu-Mo4  Practical Radiated Measurements using Antennas and Field Probes - Fundamental and Advanced Topics

Biyang room, 2F  |  10:00 ~ 17:30
Organizer & Chair : Zhong Chen, ETS-Lindgren, USA / Janet O'Neil, ETS-Lindgren, USA

Dr. Zhong Chen is a senior principal design engineer with ETS-Lindgren, USA. He has over 10 years of experience in research and product development, responsible for numerous antenna and field probe designs. He is also active in US and international standards development committee. He is a chair person for the standard IEEE 1309 (calibration for field probes), and a member of the ANSI ASC C63* committees (including the standard C63.5 on antenna calibration).

Dr. Janet O’Neil is a customer relations specialist with ETS-Lindgren. Her responsibilities include coordination of the company’s technical contributions to industry conferences worldwide. She has over 20 years experience in the RF Microwave and Electromagnetic Compatibility (EMC) industries. She is a member of the Board of Directors of the IEEE Electromagnetic Compatibility (EMC) Society as well as of the Antenna Measurement Techniques Association (AMTA). She is also a member of Subcommittee 1 (Techniques and Development) of ANSI ASC C63* and vice-chair of the 2011 IEEE International Symposium on EMC in Long Beach, California.

Abstract

This tutorial is designed to be a half-day session addressing the applications of radiated measurements using antennas and field probes. The discussions are concentrated on specific aspects of antennas and probes in calibration and testing to EMC industry standards, such as background information and rationales for recent changes in the standards, and the impact of these changes on daily EMC measurements. Other topics addressed include the novel uses of antennas for remote sensing and tomographic applications.

Speakers list

1. Basic Antenna Theory
   John Norgard, NASA Houston, TX, USA

2. Properly Applied Calibration Factors for Antennas and Electric Field Probes
   Zhong Chen, ETS-Lindgren, CA, USA

3. High Precision Radiated Field and Correction Methods for Probe Calibration
   Kefeng Liu, ETS-Lindgren, CA, USA

4. Tomographic Techniques (Microwave CAT Scans) for Detecting/Imaging Obscured Objects
   John Norgard, NASA Houston, TX, USA
**Abstract**

This tutorial will be focused on three parts as follows:

1. Description of Various Electromagnetic Pulses (EMP);
2. Hybrid Time-Domain Computational Electromagnetic Methods (TDIE-TDPO, etc.) for Fast Capturing Various EMP Effects, Together with Some Experimental Results Given;
   - Typical Methods for Electromagnetic Protection (EMP) of Various Platforms.

**Speakers list**

1. EMP2- Electromagnetic Pulses and Electromagnetic Protection
   Wen-Yan Yin, Zhejiang University, Hangzhou, China

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**Tutorial Tu-Mo5**  EMP2- Electromagnetic Pulses and Electromagnetic Protection
Chuja room, 2F  |  10:00 ~ 14:00
Organizer & Chair : Wen-Yan Yin, Zhejiang University, China

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Prof. Wen Yan Yin (M’99‐SM’01) received his M.Sc. degree from Xidian University in 1989 and Ph.D. degree from Xi’an Jiaotong University in 1994. He worked in the Department of Electronic Engineering, Northwestern Polytechnic University as an Associate Professor from 1993 to 1996. He was a Research Fellow with the Department of Electrical Engineering at Duisburg University, granted by the Alexander von Humboldt-Stiftung of Germany from 1996 to 1998. Since Dec. 1998, he has been with the MMIC Modeling and Packing Lab, Department of ECE of National University of Singapore (NUS) as a Research Scientist. From April 2005 to Dec. 2008, he was with the School of Electronic Information and Electrical Engineering, as a Professor of Shanghai Jiao Tong University (SJTU). He was also the Director of Center for Microwave and RF Technologies (CMRFT) of SJTU. From Jan. 2009 to now, he is the "Qiu Shi" Chair Professor of Zhejiang University (ZJU), working at the Centre for Optical and Electromagnetic Research, National State Key Lab of MOI, ZJU of China. He is also the adjunct Professor of CMRFT, SJTU. His main research interests are in the development of modeling techniques for passive and active RF and millimeter wave device and circuits, nanoelectronics, electromagnetic compatibility (EMC) and electromagnetic protection (EMP) of communication platforms, computational multiphysics methods and its applications.

He has published more than 180 international journal articles (including one international book, 15 book chapters and more than sixty IEEE Papers). One chapter of “Complex Media” is included in the Encyclopedia of RF and Microwave Engineering, published in 2005 by John Wiley & Sons, Inc. Dr. Yin is the IEEE EMC Society Distinguished Lecturer from 2011 to 2012, General Co-Chair of IEEE EDAPS’2011. He received the Science and Technology Promotion Award of the first class from the local Shanghai government of China in 2005, the Technology Invention Award of the first class from the Educational Ministry of China in 2008, the National Technology Invention Award of the second class from Chinese government in 2008, and the Best Paper Award of APEMC’2008.
**Introduction to Printed Circuit Board Design, Specification, Manufacturing and Construction**

Organizer & Chair: Mark Montrose, Montrose Compliance Services Inc., CA, USA

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Mr. Mark Montrose is principle consultant of Montrose Compliance Services, a full service regulatory compliance company in California with 30 years of applied EMC experience. His consulting activities include system and printed circuit board design to achieve EMC, testing and troubleshooting, and in-house training. He is a past Board of Director for both the IEEE (Division VI Director) and the IEEE EMC Society, and authored popular textbooks on EMC with translation in Chinese, Japanese and Korean.

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**Abstract**

The field of electrical engineering has reached new levels of complexity. Printed circuit boards must be designed to minimize EMI while also being immune to external field disruption. To work with state of the art technology and higher speed circuits, physical characteristics for printed circuit board construction material must change for functional and operational requirements. Higher speed components and the RoHS Directive is making use of FR-4 difficult and obsolete, causing this inexpensive and popular core substrate to become sub-optimal related to performance. Newer board materials are now required for enhanced signal integrity, minimize transmission line losses, and to survive higher process temperatures in addition to second and third order effects rarely considered during the selection of board material and its interface with logic circuitry and I/O interconnects.

Areas presented include an overview on the PCB manufacturing process including RoHS, material selection parameters and characteristics, internal losses, different types of flex circuit configurations, maintaining impedance control for transmission line routing, fiber optic interconnects, buried capacitive structures, and both active and passive embedded components, including nanotechnology circuits which cannot be implemented on FR-4.

**Speakers list**

1. Introduction to Printed Circuit Board Design, Specification, Manufacturing and Construction
   
   Mark Montrose, Montrose Compliance Services Inc., CA, USA
Mr. Mark Montrose is principal consultant of Montrose Compliance Services, a full service regulatory compliance company in California with 30 years of applied EMC experience. His consulting activities include system and printed circuit board design to achieve EMC, testing and troubleshooting, and in-house training. He is a past Board of Director for both the IEEE (Division VI Director) and the IEEE EMC Society, and authored popular textbooks on EMC with translation in Chinese, Japanese and Korean.

Mr. Ed Nakauchi is currently a consultant for G&M Compliance and senior advisor for Beijing CQC Testing Services Ltd. He is a NARTE Certified EMC/ESD Engineer with senior membership in the IEEE. He helped develop the CASSPER system which is an innovative correlation analyzer and has worked on projects that include the Space Shuttle, Global Positioning Satellite, submarines, Tesla Motors, and the B-2 Bomber. Mr. Nakauchi co-authored a book with Mr. Montrose titled, “Testing for EMC Compliance: Approaches and Techniques.”

Abstract

Technology of today, when designing systems for both EMC compliance and functionality, has advanced to where current design techniques and rules of thumb are becoming less effective. A new view of the field of electrical engineering must occur if one is to be successful based on what the future is bringing with higher speed components, greater power consumption, higher bandwidth interconnects, along with lightweight enclosures and their relationship to shielding effectiveness.

This course has a focus toward hands-on or applied engineering along with fundamentals of both time- and frequency-domain aspects of system design. Without understanding what Maxwell tells us, we can spend considerable time, money and effort experimenting to achieve EMC.

All EMC problems begin and end with electronic circuitry. One must recognize there are second order effects that may cause system-wide failure. EMC engineers of today need to understand both signal integrity (time domain) as well as EMI (frequency domain), along with advances in printed circuit board manufacturing technology, system reliability, lossy transmission line implementation, and use of new, higher-speed printed circuit board materials for GHz-based systems.

Realizing that suppression of EMI at the component and printed circuit board level is nearly impossible for most applications, shielding becomes the final solution to solving EMC. Internal radiated field coupling, light-weight plastic enclosures, Gigahertz signals, and numerous other variables must be understood for a cost effective design. In addition, if improper handling of return currents is ineffective, additional problems may occur. One must consider overall system level design aspect of a product for EMC, and not focus strictly at the printed circuit board or how well an enclosure performs. In addition, new test procedures are being required to evaluate systems at higher frequencies.

Speakers list

1. Printed Circuit Board and System Design for Technology of the Future
   Mark Montrose, Montrose Compliance Services Inc., CA, USA

2. Printed Circuit Board and System Design for Technology of the Future
   Edward Nakauchi, G&M Compliance, China
Tu-Th1-3
Decoupling, Bypassing and Embedded Capacitance for Enhanced PCB Performance
Organizer & Chair : Mark Montrose, Montrose Compliance Services Inc., CA, USA

Mr. Mark Montrose is principle consultant of Montrose Compliance Services, a full service regulatory compliance company in California with 30 years of applied EMC experience. His consulting activities include system and printed circuit board design to achieve EMC, testing and troubleshooting, and in-house training. He is a past Board of Director for both the IEEE (Division VI Director) and the IEEE EMC Society, and authored popular textbooks on EMC with translation in Chinese, Japanese and Korean.

Abstract
With advances in semiconductor manufacturing, larger pin count devices, greater power consumption and higher clock speeds, an optimal power distribution network on printed circuit boards is now a primary concern for designers. Signal integrity must be ensured while maintaining electromagnetic compatibility for an intended operating environment, such as telecommunication, information technology or industrial control.

Power plane resonances and lack of energy charge to digital components are now causing functional and operational problems. Understanding how to incorporate basic capacitive structures in power distribution networks is becoming a mandatory aspect of design engineering along with the PCB layout process. Areas of concern deal with application of use, proper implementation techniques, equivalent series resistance/inductance, minimizing lead and loop inductance, discrete component placement, multi-pole methodology, and of course capacitance value. Characteristic parameters on how capacitors function and selection criteria are presented. A case study analyzes of what may happen when incorrect implementation of a single decoupling capacitor occurs with excessive lead inductance is presented.

This is an introductory course on the concept of designing a power distribution network that targets design engineers who need to understand how and why capacitive structures work in a simplified manner, and how to design an efficient power distribution network at minimal cost.

Speakers list
1. Decoupling, Bypassing and Embedded Capacitance for Enhanced PCB Performance
   Mark I. Montrose, Montrose Compliance Services, Inc., CA, USA
Abstract

As the operating frequency goes higher and the demands on complex architectures of electronics and new materials increase, the classic guide lines and design rules on EMC and RF device designs are facing the challenges and limitations in meeting the requirements.

In response to the need to find the alternatives, periodic structures such as FSS are adopted or hybridized with the conventional practices to stop the radiated/conducted noise and unwanted resonance more effectively.

Especially, the photonic bandgap design as the periodic structures with perfect or imperfect periodicity is revisited and becomes the EBG by being adapted to RF frequency from optics.

With a different motivation, metamaterial is researched that when permittivity and permeability the constitutive parameters of a material are given unusual or usual values, they possibly result in phenomena interpreted meaningful to overcome the limitations above in EMC and microwave engineering. Particularly, the left-handedness and the infinite wavelength are introduced by negative permittivity and negative permeability and zero refractive index, respectively, and they are used to change the direction or phase of wave propagation. The dispersion engineering stemming from the metamaterials has drawn attention in that it is helpful to reduce the volume of a structure and form a bandgap free from the resonance condition of the conventional periodic structure approach.

So, in this session, the analysis and design methods of FSS, DNG/SNG/AMC and EBG are dealt with as well as advanced applications to EMC/antenna/RF designs. Also, we discuss the slow-wave effects of a periodic geometry and the resonant slots(non-metamaterial) of DGS and SRR/CSRR. Last but not least, a number of electromagnetic computational methods are shown to efficiently and accurately predict the scattering and radiation of the aforementioned structures.

Speakers list

1. Metamaterials, Periodic Structures and EBG in EMC/Antenna/RF Designs Part 1
   Sungtek Kahng, University of Incheon, Incheon, Korea

2. Metamaterials, Periodic Structures and EBG in EMC/Antenna/RF Designs Part 2
   Jeongho Ju, ETRI, Daejeon, Korea
**Workshop**

**Thursday, May 19, 2011**

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<td>Power Distribution Network Analysis and Design for PCBs and Packages</td>
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<td>Workshop W-Th3</td>
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<td><strong>Topic</strong></td>
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<td>Modelling and Solutions for Common Mode Noise on High-speed Differential Channels</td>
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<td>13:00-15:00</td>
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Workshop W-Th1    Modeling and Design of Chip-Package-PCB level Signal Integrity and Power Integrity
Tamra Hall, 8F | 09:00 ~ 17:30 | Thursday, May 19, 2011
Organizer & Chair : Wei Xing Chang, Zhejiang University / Liu En Xiao, A*STAR IHPC

Prof. Xing-Chang Wei (M’01-SM’09) received the Ph.D degree in electrical engineering from Xi’an University of Electronic Science and Technology, China, in 2001. From 2001 to 2010, he has been with the ASTAR Institute of High Performance Computing, Singapore, as a research fellow, senior research engineer, and then a research scientist. He joined Zhejiang University, Hangzhou, China as a professor in 2010. His main research interests include 3D IC analysis, power integrity and signal integrity simulation and design, EMC modelling and simulation, and the development of fast algorithms for computational electromagnetics.

He authored over 40 papers published in prestigious international journals and conferences. He was the recipient of the 2007 Singapore IES (Institution of Engineers) Prestigious Engineering Achievement Award for his contribution on the development of a novel electromagnetic compatibility simulation facility. He was the Co-Chair of technical program committee of 2010 IEEE electrical design of advanced packaging & systems symposium.

Dr. En-Xiao Liu (M’05-SM’09) received the Ph.D. degree in electrical engineering from the National University of Singapore in 2005. In 2005 he joined the Institute of High Performance Computing (IHPC), A*STAR, Singapore, where he is currently a group manager cum senior research engineer of the RF engineering group, Electronics and Photonics Department. He has published over 50 papers in refereed international journals and conferences. His research interests are in the areas of computational electromagnetics, high-speed interconnects and packaging, 3D IC and TSV, and electromagnetic compatibility (EMC).

Dr. Liu received the Best-Paper-of-the-Year Award (FY09) from the IHPC in 2010. He was the chair of the IEEE EMC Society Singapore Chapter in 2009. He has served 9 international conferences in different capacities including the organizing chair, technical Subcommittee chair, session chair, and organizing committee member.

Abstract
The ever-increasing demand of digital computing and wireless communication have been driving the semiconductor industry to integrate more and more circuits into one single package or printed circuit board (PCB), such as the System-in-Package (SiP) and 3D integration. At the same time, the voltage supply level is continuously reduced with the increased power density. These make the electromagnetic compatibility (EMC) become very critical for the successful design of a complex integrated system. The signal integrity and power integrity are two main EMC issues for the high-speed and high-density integration system. According to the prediction of International Technology Roadmap of Semiconductors (ITRS), the on-chip clock speed will increase to 14.3 GHz by 2022. Considering the harmonic of the clock frequency, the interesting EM spectrum on the chip and inside the package will cover very high frequency. The size of those tiny structures on the chip and inside the package is now comparable with the wavelength of interest. The EM wave propagation and coupling effects must be considered for multi-scale region: chip, package, and PCB.

This workshop will present the state-of-the-art of the modeling and design of the chip-package-PCB level signal and power integrity problems, which are still challenges for both industry and academic research. In this workshop, we will illustrate the methodologies to efficiently model the signal interconnect, through-hole vias, and power distribution network (PDN). This will help EMC engineers to better understand the EM filed behavior inside the complex integrated system. We will present the latest development of the noise suppression structures including the electromagnetic bandgap (EBG) structures. This workshop also introduces the novel
technology for the electrical and electromagnetic modeling of the three-dimensional ICs and through-silicon vias (TSVs) array. Many examples will be discussed in this workshop. This workshop provides a training course for practical EMC engineers to understand the fundamental and last progress on chip-package-PCB level EMC, and help them to mitigate EMC problems in real integrated systems.

**Speakers list**

1. Co-design of Power and Signal Integrity for High-Speed Digital Systems  
   Toshio Sudo, Shibaura Institute of Technology, Japan

2. Models for Signal and Power Integrity Analysis of TSV Based 3D IC  
   Jun So Pak, KAIST, Daejoen, Korea

3. Rigorous Electromagnetic-Thermal Co-Analysis for 3-D Real-life ICs using Non-conformal Domain Decomposition Method  
   Zhen Peng, Ohio State University, Ohio, USA

4. PI/SI/EMI Simulation Technology for Chip/Package/Board Co-Design  
   Hideki Asai, Shizuoka University, Shizuoka, Japan

5. Simulation of Signal and Power Integrity by using Integral Equation Equivalent Circuit Method  
   WEI Xing Chang, Zhejiang University, Hangzhou, China

6. Modeling Techniques for Signal and Power Integrity (SI/PI) Simulation – overview and recent developments  
   LIU En Xiao, A*STAR IHPC, Singapore
Abstract

Fundamental principles for moving from complicated PCB and package PDN layouts and constraints to models from which design methodologies and directions can be established are detailed. The physics-based modeling approach will begin with a production 26-layer board design and outline the design considerations including choosing the layer stackup; decoupling capacitor mounting, location, and distribution around the IC; package PWR/GND pin layout; and noise coupling to other logic levels through the PDN. The current-path physics underlying these details will be presented, the resulting inductance and mutual inductance identified, and the basics for developing a physics-based model will be given.

A physics-based modeling approach will be detailed that begins with the complex layer stackup, and breaks down the PDN geometry on a layer-by-layer basis and then connects all layers together in a straightforward and systematic fashion. The resulting network will then be reduced in a fashion that will provide direct design insight without any loss of generality. The 26-layer production PCB will provide the example for this approach. Modeling and experimental results will be presented.

Design guidelines that result from the physics-based modeling paradigm will be provided and demonstrated. The resulting PDN response in frequency will be related to the physics and design choices, and will be related to voltage ripple on the PDN in time as well.

Speakers list

1. Fundamental Concept and Methodology for Power Distribution Network Design
   James L. Drewniak, Missouri University of Science and Technology, Rolla, USA

2. Physics-Based PDN Modeling Approach
   Tzong-Lin Wu, National Taiwan University, Taipai, Taiwan

3. Design Applications for Power Distribution Network
   Joungho Kim, KAIST, Daejeon, Korea
Workshop W-Th3  Modelling and Solutions for Common Mode Noise on High-speed Differential Channels
Halla Hall, 8F  |  13:00 ~ 17:30  |  Thursday, May 19, 2011
Organizer & Chair : Tzong-Lin Wu, National Taiwan University / Ryuji Koga, Okayama University

Prof. Tzong-Lin Wu received BS and Ph.D. degree from National Taiwan Univ. in 1991 and 1995. Now, he is Professor of Department of Electrical Engineering, National Taiwan University, Taiwan.

Prof. Ryuji Koga graduated from Doc. Course, Kyoto Univ. in 1972. He experienced Research and Education both in Kyoto and Okayama Universities. He retired on Spring, 2010, from Okayama University. He was past Chair of EMCJ, and now, he is a Director in Large of BoD, IEEE EMCS.

Abstract
This workshop will focus on design and modelling techniques for common mode noise mitigation on above-GHz differential signal links. The normal modes of the coupled lines will be first derived based on the telegrapher’s equations. The impact of the common-mode on the signal integrity is discussed. A simple model to evaluate the quantity of the common mode current/voltage is proposed and exemplified of its convenience based on the assumption of TEM mode being retained over the two lines. The equivalent circuit for the common mode noise based on travelling wave scattering parameters will also be proposed and the application on EMC design will be shown. The solutions for the common mode noise suppression will also be highlighted based on the defected ground structure or meta-material concept.

Speakers list
1. Modal analysis for multi-conductor transmission line and application to estimating signal integrity in differential-mode networks
   Yoshio Kami, University of Electro-Communications, Tokyo, Japan

2. A Brief Model of the Common-mode Excitation in Non-uniform Transmission Lines
   Ryuji Koga, Okayama University, Okayama, Japan

3. Equivalent Circuit for Common Mode Current and Some Applications
   Umberto Paoletti, Hitachi, Ltd., Yokohama, Japan

4. Common Mode Currents and Radiated Emissions from Differential Signals in Multi-Board Systems
   Christian Schuster, Technische Universität Hamburg-Harburg, Hamburg, Germany

5. Solutions for Common-mode Noise Mitigation
   Tzong-Lin Wu, National Taiwan University, Taipei, Taiwan
### Special Session

**Tuesday, May 17, 2011**

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**Wednesday, May 18, 2011**

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<td>IEMI/HEMP</td>
<td>EMC problem with medical electronic equipment caused by wireless communications and radiated interferences</td>
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<td>Computational Dosimetry in RF</td>
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<td>ESD Transient</td>
<td>Computational Dosimetry in ELF/Intermediate Frequency</td>
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Tuesday, May 17, 2011 – Afternoon Schedule / 13:00~17:10

Special S-Tu1 Biomedical Devices
Biyang Room, 2F | 13:00 ~ 17:10
Chair: Jianqing Wang, NiTech / Soon Ik Jeon, ETRI

13:00~13:20 | S-Tu1-1
• A Study of Wireless Power Transmission for Capsular Endoscope in Consideration with the Effect of Human Body
  T. Kumagai, K. Saito, M. Takahashi, K. Ito
  Chiba University, Chiba, Japan

13:20~13:40 | S-Tu1-2
• Media Channel Evaluation in UHF EM Tomography System for Breast Cancer Detection
  Soon Ik Jeon, Nikolai Simonov, Hyuk Je Kim, Seong Ho Son, Jong Moon Lee
  ETRI, Daejeon, Korea

13:40~14:00 | S-Tu1-3
• Electrode Design for Watch-type Intra-body Communication Device
  Ken Sasaki, Takuma Maesaka, Fukuro Koshiji, Shudo Takenaka
  University of Tokyo, Kashiwa, Japan

14:00~14:20 | S-Tu1-4
• X-band Radar System for Detecting Heart and Respiration Rates
  Jee-Hoon Lee, Yun-Taek Im, Seong-Ook Park
  KAIST, Daejeon, Korea

14:20~14:40 | S-Tu1-5
• Investigations of an IR-UWB Based Hardware Demonstrator for Wireless Patient Monitoring
  Oliver Lauer, David Barras, Marco Zahner, Jürg Fröhlich
  ETH Zürich, Switzerland

14:40~15:00 | S-Tu1-6
• Electromagnetic Characteristics of an Aperture Antenna in Metal Housing Wall of Handheld Equipments
  Fukuro Koshiji¹, Kohji Koshiji¹, Takahiko Yamamoto¹, Ken Sasaki²
  1 Tokyo University of Science, Noda, Japan
  2 The University of Tokyo, Kashiwa-, Japan

15:30~15:50 | S-Tu1-7
• Consideration on the Reconstruction Algorithms for Breast Cancer Detection
  Min-Gyeong Seo¹, Tac-Hong Kim¹, Ki-Chai Kim², Jeong-Ki Pack¹
  1 Chungnam National University, Daejeon, Korea
  2 Yeungnam University, Gyeonsan, Korea
15:50~16:10 | S-Tu1-8
• A Low Power CMOS Chirp-Spread-Spectrum OOK Transmitter for In-Body Communication
  Junghee Choi, Kihyun Kim, and Sangwook Nam
  Seoul National University, Seoul, Korea

16:10~16:30 | S-Tu1-9
• A Feasibility Study of In-body to On-body Transmission with IR-UWB Transceiver
  Jingjing Shi, Jianqing Wang
  Nagoya Institute of Technology, Nagoya, Japan

16:30~16:50 | S-Tu1-10
• Evaluating of Surface Heating for Medical Implants Associated with MRI RF Exposure
  Yan Liu, Ji Chen¹, Wolfgang Kainz², Frank G. Shellock³
  ¹ University of Houston, Houston, U.S.A
  ² Food and Drug Administration, Silver Spring, USA
  ³ Keck School of Medicine and University of Southern California Institute for Magnetic Resonance Safety,
    Education, and Research, LA, USA

16:50~17:10 | S-Tu1-11
• Experimental Assessment of Interference in the 2.4 GHz ISM Band from Wireless Medical Sensors on the
  Imaging System of an Advanced Operating Room
  R. Chávez-Santiago¹,²,³, K. Oyri¹,², S. Sista¹,²,³, I. Balasingham¹,²,³, E. Fosse¹,²
  ¹ Oslo University Hospital, Oslo, Norway
  ² University of Oslo, Oslo, Norway
  ³ NTNU, Trondheim, Norway
  ⁴ Novelda AS, Oslo, Norway

Special S-Tu2  EMC Techniques in GHz Range
Chuja Room, 2F | 13:00 ~ 15:00
Chair : Takashi Harada, NEC / Eiji Hankui, NEC

13:00~13:20 | S-Tu2-1
• Real-Time Visualization of Propagations of Electric Waves in GHz Range
  Masahiro Tsuchiya¹, Takahiro Shiozwa²
  ¹ National Institute of Information and Communications Technology, Tokyo, Japan
  ² Kagawa National College of Technology, Kagawa, Japan

13:20~13:40 | S-Tu2-2
• Noise Coupling and Shielding in Through-Silicon Via (TSV)-based 3D IC
  Jonghyun Cho¹, Joohie Kim¹, Jun So Pak², Jongho Kim¹, Junho Lee¹, Hyungdong Lee², Kunwoo Park²
  ¹ KAIST, Daejeon, Korea
  ² Hynix Semiconductor Inc., Ichon, Korea
13:40~14:00 | S-Tu2-3
• Vertically Alternating Impedance Electromagnetic Bandgap (VAI-EBG) Structure for Noise Mitigation in Multi-layer PCBs
Myunghoi Kim, Kyoungchoul Koo, Sunkyu Kong, Bumhee Bae, Sangrok Lee, Joungho Kim
KAIST, Daejeon, Korea

14:00~14:20 | S-Tu2-4
• Estimating Radiated Emissions from Heatsinks on Printed Circuit Boards above 1 GHz
Todd H. Hubing, X. He
Clemson University, Clemson, USA

14:20~14:40 | S-Tu2-5
• Prediction of EM Radiation at GHz Frequency from a PCB Driven by a Connected Feed Cable
Yoshiki Kayano, Hiroshi Inoue
Akita University, Akita-shi, Japan

14:40~15:00 | S-Tu2-6
• GHz Noise Suppression of Printed Wiring Boards Using a Directly-plated Ferrite Thin Film
Koichi Kondo¹, Shigeyoshi Yoshida¹, Hiroshi Ono¹, Tadashi Kubodera²
1 NEC Tokin Corp., Sendai, Miyagi, Japan
2 System Design Laboratory Co., Ltd., Kanagawa, Japan

Special S-Tu3  EMC Design of PCB Related to Digital Wireless Communication
Chuja Room, 2F | 15:30 ~ 17:30
Chair : Masahiro Yamaguchi, Tohoku University / Takashi Harada, NEC

15:30~15:50 | S-Tu3-1
• APD Measurement of Electromagnetic Noise as an Approach to Effective Detection of EMI Issues in Wireless Systems
Yasushi Matsumoto
National Institute of Information and Communications Technology, Tokyo, Japan

15:50~16:10 | S-Tu3-2
• Wide-angle EM-wave Absorber Design Using Loop Array Metamaterial
Atsuhiro Nishikata, Tatsuya Yamaguchi, Takuya Nasu
Tokyo Institute of Technology, Tokyo, Japan

16:10~16:30 | S-Tu3-3
• Evaluation of Electromagnetic Noise Coupling Channel in Wireless LAN Mounted Printed Circuit Boards
Mizuki Iwanami, Hiroshi Fukuda, Manabu Kusumoto, and Takashi Harada
NEC Corporation, Kawasaki, Japan
16:30~16:50 | S-Tu3-4
• Experimental Demonstrations of EMI Suppression Using Open Stub Electromagnetic Bandgap Structures
Hiroshi Toyao, Masashi Kawakami, Akira Shojiguchi, Manabu Kusumoto, Hisashi Ishida, Takashi Harada
NEC Corporation, Kawasaki, Japan

16:50~17:10 | S-Tu3-5
• Detecting Electromagnetic Coupling paths in Printed Circuit Boards Using Time Series Analysis
Akira Shojiguchi, Manabu Kusumoto, Takashi Harada
NEC Corporation, Kanagawa, Japan

17:10~17:30 | S-Tu3-6
• Miniature EBG Designs Using SPICE Models of Multiple Planes
Naoki Kobayashi, Noriaki Ando, Hiroshi Toyao
NEC Corporation, Kawasaki, Japan
Special S-We1  IEMI/HEMP
Biyang Room, 2F | 09:00 ~ 11:20
Organizer & Chair : William A. Radasky, Metatech / Leonid Siniy, All Russia Research Institute of Automatic

09:00~09:20 | S-We1-1
• Approach for the Threat Assessment of E1 HEMP and Wideband IEMI on Commercial Electronics
  W. A. Radasky, E. B. Savage, J. L. Gilbert
  Metatech Corporation, CA, USA

09:20~09:40 | S-We1-2
• Options for Mitigation of IEMI Induced Pulses on Commercial Building Cabling
  E. B. Savage, W. A. Radasky, J. L. Gilbert
  Metatech Corporation, CA, USA

09:40~10:00 | S-We1-3
• IEMI Detection Method Based on the Observation of the Network Traffic
  Evgeni Genender¹, Heiko Bell¹, Adrian Kreth¹, Heyno Garbe¹, Stefan Potthast²
  ¹ Leibniz Universität Hannover, Hannover, Germany
  ² Bundeswehr Research Institute for Protective Technologies and NBC-Protection, Munster, Germany

10:00~10:20 | S-We1-4
• Stochastic Topological Approach Using Wave-chaos for Electromagnetic Effects (STUWEE)
  Edl Schamiloglu¹, Sameer D. Hemmady²
  ¹ University of New Mexico, Albuquerque, USA
  ² TechFlow Inc., Albuquerque, USA

10:40~11:00 | S-We1-5
• Modeling of Surface Transfer Impedance in Time Domain
  Qi Zhang, Li-hua Shi
  Nanjing Engineering Institute, Nanjing, China

11:00~11:20 | S-We1-6
• Improvement of Russian Regulatory System on Protection against Electromagnetic Attacks
  Vladimir Chvanov, Ruslan Kirichek
  FSUE “CenterInform”, Saint-Petersburg, Russia
Special S-We2  EMC Problem with Medical Electronic Equipment caused by Wireless Communications and Radiated Interferences
Chuja Room, 2F  |  09:00 ~ 10:00
Chair: Eisuke Hanada, Shimane University Hospital

09:00~09:20  |  S-We2-1
• A Safe and Reliable Method for Installing Wireless LAN into a Hospital
  Eisuke Hanada¹, Takato Kudou²
  1 Shimane University Hospital, Izumo, Japan
  2 Oita University, Oita, Japan

09:20~09:40  |  S-We2-2
• FDTD Simulations for Constructing Appropriate Medical/Healthcare Electromagnetic Environment
  Takato Kudou¹, Eisuke Hanada²
  1 Oita University, Oita, Japan
  2 Shimane University Hospital, Izumo, Japan

09:40~10:00  |  S-We2-3
• Method for Evaluating EMI of Implanted Medical Devices from Body Area Network Devices
  Satoshi Ishihara, Takahiro Iyama, Teruo Onishi, Yoshiaki Tarusawa
  NTT Doicom, Inc., Yokosuka, Japan

Special S-We3  Recent Topics Concerning EMC Technology of Telecommunication System
Chuja Room, 2F  |  10:40 ~ 12:00
Chair: Nobuo Kuwabara, KiTech / Kazuo Murakawa, NTT / Yoshiharu Akiyama, NTT

10:40~11:00  |  S-We3-1
• Lightning Protections for Telecommunication Equipment of FTTH Services in Customer Premises
  Kazuo Murakawa¹, Shoichi Kuramoto², Hironori Makino¹
  1 NTT East Technical Tokyo, Japan
  2 NTT Energy, Tokyo, Japan

11:00~11:20  |  S-We3-2
• Lightning Surge Current Inducing on In-house Power and Telecommunication Networks
  Toshihisa Masuda, Shouichi Kuramoto, Yasuhiro Honma, Kazuaki Yano
  NTT Energy Musashino, Japan

11:20~11:40  |  S-We3-3
• Investigating Relation between EFTB Test and RF Conductive Immunity Test using BER
  Nobuo Kuwabara¹, Yasuhiro Irie¹, Norihiro Hiraiwa², Yoshihara Akiyama³
  1 Kyushu Institute of Technology, Kitakyushu, Japan
  2 NTT, Musashino, Japan
11:40~12:00 | S-We3-4
• Comparison of Common Mode Disturbances Measured by using Different Types of Impedance Stabilization Networks
Norihito Hirasawa, Yasuao Suzuki, Yoshiharu Akiyama
NTT, Tokyo, Japan

Wednesday, May 18, 2011 – Afternoon Schedule / 14:00~17:10

Special S-We4  Computational Dosimetry in RF
Ramada Ballroom 4, 2F | 14:00 ~ 15:40
Chair : Soichi Watanabe, NICT / Ae-Kyoung Lee, ETRI

14:00~14:20 | S-We4-1
• Korean Voxel Models and FDTD Calculations of Whole-Body Averaged SAR in Free Space
Ae-Kyoung Lee¹, Hyung-Do Choi¹, Richard Findlay²
1 ETRI, Daejeon, Korea
2 Health Protection Agency, Chilton, UK

14:20~14:40 | S-We4-2
• Chinese Adult Anatomical Models for EMF Exposure Assessment and Discussion on Population Representation
WU Tongning¹, TAN Liwen²
1 M.I.I.T., Beijing, China
2 College of Basic Medical Sciences Third, Military Medical University, Chongqing, China

14:40~15:00 | S-We4-3
• Variability in Whole-Body Averaged SAR for Young Children Exposed to Vertically and Horizontally Polarized Electromagnetic Plane Waves from 30 MHz to 3 GHz
Tomoaki Nagaoka, Soichi Watanabe
NICT, Tokyo, Japan

15:00~15:20 | S-We4-4
• SAR Calculations for Mice in a Cage in the Whole-Body Exposure Environment.
Joon-Hyeok Oh, Ji-Yeon Mun, Tae-Hong Kim, Jeong-Ki Pack
Chungnam National University, Daejeon, KOREA

15:20~15:40 | S-We4-5
• Whole-Body Averaged SAR Estimation of Japanese Humans Exposed to 2 GHz H-Polarized Plane-Wave Using External Electric-Field Scanning
Yoshifumi Kawamura¹, Takashi Hikage¹, Toshio Nojima¹, Tomoaki Nagaoka², Soichi Watanabe³
1 Hokkaido University, Sapporo, Japan
2 NICT, Tokyo, Japan
**Special S-We5  ESD and Transient**

**Ramada Ballroom 3, 2F | 16:10 ~ 17:50**

*Chair: Ken Kawamata, HiTech*

16:10~16:30 | S-We5-1

- **Two-dimensional clustering approach to an analysis of electrostatic discharge in terms of EMI assessment**
  
  Masao Masugi\(^1\), Norihito Hirasawa\(^2\), Yoshiharu Akiyama\(^2\)
  
  \(^1\) Ritsumeikan University, Kusatsu, Japan
  \(^2\) NTT Corporation, Tokyo, Japan

16:30~16:50 | S-We5-2

- **Characteristic of Radiated Electromagnetic Wave by ON/OFF Discharge on Sub-micron Gap**
  
  Takayoshi Ohtsu, Shunsuke Okada, Shota Ito, Shogo Imai, Ryota Oka, Kazuyuki Tanitsuji, Taro Takai, Hiromichi Fujikawa
  
  Suzuka National College of Technology, Shiroko-cho, Japan

16:50~17:10 | S-We5-3

- **Wideband Measurement of Discharge Currents below 2 kV for Air Discharges of an ESD-gun**
  
  Ikuko Mori\(^1\), Osamu Fujiwara\(^2\), Heyno Garbe\(^3\)
  
  \(^1\) Suzuka National College of Technology, Suzuka, Japan
  \(^2\) Nagoya Institute of Technology, Nagoya, Japan
  \(^3\) Leibniz Universität Hannover, Hannover, Germany

17:10~17:30 | S-We5-4

- **Amplitude Properties of Radiated Electromagnetic Field Intensity Caused by Low Voltage ESD in Spherical Electrode**
  
  Ken Kawamata\(^1\), Shigeki Minegishi\(^2\), Osamu Fujiwara\(^3\)
  
  \(^1\) HiTech, Hachinohe, Japan
  \(^2\) Tohoku Gakuin University, Tagajo, Japan
  \(^3\) Nagoya Institute of Technology, Nagoya, Japan

17:30~17:50 | S-We5-5

- **EMC Problem Caused by Arc Discharge at Slowly Separating Silver-Based Contacts**
  
  Hiroshi Inoue, Yoshiki Kayano, Kazuaki Miyanaga
  
  Akita University, Akita, Japan
**Special S-We6**  Computational Dosimetry in ELF/Intermediate Frequency

**Ramada Ballroom 4, 2F | 16:10 ~ 17:30**

Organizer & Chair: P. S. W. Leung, City University of Hong Kong / A. Hirata, NiTech / Dr. Heesung Ahn, KESRI

16:10~16:30  |  S-We6-1

- **Numerical Investigation of Contact Current and Internal Body Resistances of Human at 60 Hz**
  Isao Hamamoto\(^1\), Noriyuki Hayashi\(^1\), Hiroo Tarao\(^2\), Katsuo Isaka\(^3\)
  1 Miyazaki University, Miyazaki, Japan
  2 Kagawa NCT, Kagawa, Japan
  3 Tokushima University, Tokushima, Japan

16:30~16:50  |  S-We6-2

- **Measurement of Induced Current in Phantom Brain Model under Uniform 60Hz Magnetic field**
  EungSik Kim\(^1\), Suk Won Min\(^2\), Sung Ho Myung\(^3\), HeeSung Ahn\(^4\), Chany Lee\(^5\)
  1 Hoseo University Asan, Korea
  2 Soonchunhyang University Asan, Korea
  3 KERI, Changwon, Korea
  4 Korea Electrical Engineering & Science Research Institute, Seoul, Korea
  5 Korea University Medical Center, Seoul, Korea

16:50~17:10  |  S-We6-3

- **Dosimetry of Induced Quantities within Human Body due to Non-uniform Magnetic Field Exposure in Intermediate Frequency Band**
  Yukihisa Suzuki\(^1\), Masao Taki\(^2\), Kanako Wake\(^2\)
  1 TMU, Tokyo, JAPAN
  2 NICT, Tokyo, JAPAN

17:10~17:30  |  S-We6-4

- **A Study on Human Exposure to Power Frequency Radiation in High-Rise Buildings**
  K H Chan, S W Leung, Y M Siu, and K T Ng
  City University of Hong Kong, Hong Kong SAR, China
# Technical Session

## Tuesday, May 17, 2011

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<td>Fundamental EMC</td>
<td>EMC on PKG &amp; Semicon.</td>
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## Wednesday, May 18, 2011

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<td>EMC on Bio-Medical</td>
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Technical T-Tu1  EMC on System
Ramada Ballroom 2, 2F  |  13:00~17:10
Chair : Toshio Sudo, Shibaura Institute / Jae-Hyun Lee, Chungnam National University

13:00~13:20  |  T-Tu1-1
•  EMC Expert System for Architecture Design
  Marcel van Doorn
  Philips Electromagnetics Competence Center, Eindhoven, Netherlands

13:20~13:40  |  T-Tu1-2
•  A Time-Domain System for CISPR 16-1-1 Compliant Measurements above 1 GHz
  Christian Hoffmann, Peter Russer
  Technische Universität München, Munich, Germany

13:40~14:00  |  T-Tu1-3
•  Prediction of Noise Coupling Mechanism from External Digital Interconnect to Antenna System
  Hee-do Kang, Tong-Ho Chung, Il-Young Oh, Jong-Gwan Yook
  Yonsei University, Seoul, Korea

14:00~14:20  |  T-Tu1-4
•  Mode-equivalent Modelling of System Consisting of Transmission Lines with Different Imbalance Factors
  Yoshitaka Toyota¹, Kengo Iokibe¹, Ryuji Koga¹, Tetsushi Watanabe²
  1 Okayama University, Okayama, Japan
  2 Industrial Technology Center of Okayama Prefecture, Okayama, Japan

14:20~14:40  |  T-Tu1-5
•  Transmitted Signal Analysis in Multiplexing Transmission Lines
  Gyu-Yeol Kim, Jongmin Kim, Wansoo Nah
  Sungkyunkwan University, Suwon, Korea

14:40~15:00  |  T-Tu1-6
•  Influence of the PCB Dielectric Material on the Coupling of PCB Traces to Enclosure Cavities
  Christian Poschalko¹, Siegfried Selberherr²
  1 Robert Bosch AG, Vienna, Austria
  2 Technische Universität Wien, Vienna, Austria

15:30~15:50  |  T-Tu1-7
•  Analysis of Multilayer PCB Resonance and Enclosure Aperture Radiation
  Hwan Su Yoo¹, Hyoung Seok Jang², Soong Keum Lee¹, Jae Hyun Lee¹, Dong Chul Park¹
  1 Chungnam National University, Daejeon, Korea
  2 Hyundai Mobis, Yongin, Korea
15:50~16:10 | T-Tu1-8
• Impact of Bend Routing on Radiated Emission from Differential Signal Pairs
  Hongmei Fan¹, Xiaoxia Zhou¹, Alpesh Bhobe², Jinghan Yu¹, Hailong Zhang¹, Philippe Sochoux²
  1 Cisco Systems (China) R&D Co., Ltd., Shanghai, China
  2 Cisco Systems, Inc., San Jose, USA

16:10~16:30 | T-Tu1-9
• Study of Effectiveness of Edge-Mounted Capacitors on High-Speed Board Emission
  Wei-Shan Soh¹, Weng-Yew Chang, Richard², Lin-Biao Wang¹, Kye-Yak See¹
  1 Nanyang Technological University, Nanyang, Singapore
  2 DSO National Laboratories, Park Drive, Singapore

16:30~16:50 | T-Tu1-10
• PCB Edge Structure for Reducing Radiated Emission
  Ha Yeon Kim, Haeng Seon Lee
  Sogang University, Seoul, Korea

16:50~17:10 | T-Tu1-11
• Equivalent Circuit for Common Mode Current and Some Applications
  Umberto Paoletti, Takashi Suga, Hideki Osaka
  Hitachi, Ltd., Yokohama, Japan

Technical T-Tu2  Fundamental EMC
Ramada Ballroom 3, 2F | 13:00~16:50
Chair: Erping Li, A*STAR IHPC / Yeon-Choon Chung, Seokyung University

13:00~13:20 | T-Tu2-1
• Current Status of Standardization related to Electromagnetic Compatibility and Functional Safety
  Bernd W. Jaekel¹, Aleksandra V. Miroshevskaya²
  1 Siemens AG, Erlangen, Germany
  2 University Graz, Graz, Austria

13:20~13:40 | T-Tu2-2
• Design of the Radar Absorbing Structure for Wind Turbine Blades
  Jin-Bong Kim, Jung-Eun Nam
  KIMS, Changwon, Korea

13:40~14:00 | T-Tu2-3
• Approximation Methods in Insertion Loss Analysis of Transmission Line Crossing a Rectangular Aperture in an Infinite Ground Plane
  Sung-Woo Jung¹, Jung-Hi Jin², Beom-Jin Choi³, Ki-Chai Kim¹
  1 Yeungnam University, Gyeongsan, Korea
  2 Korea Electromagnetic Research, Daejeon, Korea
  3 KATECH, Cheonan, Korea
14:00–14:20 | T-Tu2-4
• The Interference Effect of Radiated Emissions below 30 MHz from PDP TV onto AM and SW Broadcasting Reception
  Jungyu YANG¹, Hongsik Keum²
  1 RRA, Seoul, Korea
  2 RAPA, Seoul, Korea

15:30–15:50 | T-Tu2-5
• Transient Responses of 3-D PEC Composites Illuminated by an EMP
  Ming-Da Zhu¹, Xi-Lang Zhou¹, Wen-Yan Yin¹,²
  1 Shanghai Jiao Tong University, Shanghai, China.
  2 Zhejiang University, Hangzhou, China

15:50–16:10 | T-Tu2-6
• An Improved Method for Evaluating Low-frequency Shielding Performance of 3D Conductive Plates
  Y. Du, Nenghou Xia, Mingli Chen
  The Hong Kong Polytechnic University, Hong Kong

16:10–16:30 | T-Tu2-7
• Modified Theory of Physical Optics and Applications
  Mücahit Sarnik, Ugur Yalçın
  Uludağ University, Görükle-BURSA, Türkiye

16:30–16:50 | T-Tu2-8
• Investigation on Electromagnetic Responses of Wire-Surface Composite Objects Illuminated by an EMP using Hybrid TDPO-MOT Method
  Wei Luo¹, Ming-Da Zh¹, Jun-Fa Mao¹, and Wen-Yan Yin¹,²
  1 Shanghai Jiao Tong University, Shanghai, China
  2 Zhejiang University, Hangzhou, China

Technical T-Tu3  EMC on PKG & Semicon
Ramada Ballroom 4, 2F | 13:00~17:10
Chair : Sonia Ben Dhia, INSA de Toulouse / Wansoo Nah, Sungkyunkwan University

13:00–13:20 | T-Tu3-1
• The Effects of Substrate Doping Density on The Electrical Performance of Through-Silicon-Via (TSV)
  Hanfeng Wang, Jingook Kim, Yiyu Shi, Jun Fan
  Missouri University of Science and Technology, Rolla, USA

13:20–13:40 | T-Tu3-2
• GHz EMI Generator in 3D Stacked Chip-PDN with Through Silicon Via (TSV) Connections
  Jun So Pak¹, Jonghyun Choi¹, Joohee Kim¹, Kiyoung Kim¹, Heegon Kim¹, Joungho Kim¹, Junho Lee²,
  Hyungdong Lee², and Kunwoo Park²
  1 KAIST, Daejeon, Korea
  2 Hynix Semiconductor Inc. Icheon, Korea
13:40–14:00 | T-Tu3-3
• Vein Power Plane for Printed Circuit Board Based on Constructed Vein Tree
Hui - Fen Huang, Shi - yun Liu, Qing – Xin Chu
South China University of Technology, Guangzhou, China

14:00–14:20 | T-Tu3-4
• Modeling and Analysis of Power Supply Noise Effects on Analog-to-Digital Converter with Off-chip PDN Effects
Bumhee Bae, Yujeong Shim, Myunghoi Kim, Jonghyun Cho, and Joungho Kim
KAIST, Daejeon, Korea

14:20–14:40 | T-Tu3-5
• Magnetoresistive Sensor Readout Circuit and Field Canceling System in Next Generation Nano-Fab
Feng-Chang Chuang1,2, Ching-Yuan Yang1, Yu-Lin Song1, Chwen Yu1, Sen-Gui Shsu3, Tzyh-Ghuang Ma6, Tzong-Lin Wu2, Luh-Maan Chang2
1 National Chung Hsing University, Taichung, Taiwan.
2 National Taiwan University, Taipei, Taiwan
3 Yen Tjing Ling Industrial Research Institute, Taipei, Taiwan
4 Taiwan Semiconductor Manufacturing Company, Ltd., Hsinchu, Taiwan
5 National Taiwan University of Science and Technology, Taipei, Taiwan

15:30–15:50 | T-Tu3-6
• Effect of Electromagnetic Interference (EMI) on the DC Shift and Harmonic Performance of DIODE-Connected NMOSFET
Muhammad Taher Abuelma’atti1, Ali Muhammad Taher Abuelmaatti2
1 King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia
2 RFMD (UK) Ltd., County Durham, U.K.

15:50–16:10 | T-Tu3-7
• Estimation of Vertical Noise Coupling on 900MHz Low Noise Amplifier from 200MHz On-chip Switching-mode Power Supply in 3D-IC
Kyoungchoul Koo, Myunghoi Kim, Sangrok Lee and Joungho Kim
KAIST, Daejeon, Korea

16:10–16:30 | T-Tu3-8
• Investigations on the Suitability of Reverberation Chambers for Radiated EMC Testing of Integrated Circuits
Ralf Heinrich, Robert Bechly
Teseq GmbH, Berlin, Germany

16:30–16:50 | T-Tu3-9
• Development of an Immunity Model of a Phase-Locked Loop
A. Boyer, B. Li1, S. Ben Dhia1, C. Lemoine1, B. Vrignon2
1 INSA de Toulouse, University of Toulouse, Toulouse, France
2 Freescale Semiconductor, Toulouse, France
16:50~17:10 | T-Tu3-10

• Bulk Current Injection modeling and validation on passive loads and an active circuit
  Bertrand Vrignon¹, Mikael Deobarro¹, Alexandre Boyer², Sonia Ben Dhia³
  1 Freescale Semiconductor, Toulouse, France
  2 INSA-LATTIS, University of Toulouse, Toulouse, France
APEMC 2011
2011 Asia Pacific EMC Symposium

Wednesday, May 18, 2011 – Morning Schedule / 09:00~12:00

Technical T-We1  Lightning & Power System
Ramada Ballroom 2, 2F  |  09:00~12:00
Chair : Yoshino Baba, Doshisha Univ. / Dongshik Shin, LG

09:00~09:20  |  T-We1-1
• Development of A Wideband Transient Electric Field Sensor
  Zhang Xiaoming¹, Meng Cui¹, Wei Ming², Liu Shanghe²
  1 Tsinghua University, Beijing, China
  2 Institute of Electrostatic & Electromagnetic Protection Ordnance Engineering College, Shijiazhuang, China

09:20~09:40  |  T-We1-2
• A Simplified Model of Corona Discharge on an Overhead Wire for FDTD Simulations
  Tran Huu Thang¹, Yoshihiro Baba¹, Naoto Nagaoka¹, Akihiro Ametani¹, Jun Takami², Shigemitsu Okabe³
  Vladimir A. Rakov³
  1 Doshisha University, Kyoto, Japan
  2 Tokyo Electric Power Company, Kanagawa, Japan
  3 University of Florida Gainesville, FL, USA

09:40~10:00  |  T-We1-3
• Modeling and Calculation for Conductive Coupling Caused by Lightning Over-voltage in Substation
  Based on Numerical Inverse Laplace Transform
  Zhong-yuan Zhang, Shuai Tang, Shi-peng Bian
  School of Electrical and Electronic Engineering, North China Electric Power University, Baoding, China

10:00~10:20  |  T-We1-4
• The Field of Power/Ground Planes influenced by the HPEM Source, and its Damage Reduction
  Sungtek Kahng
  Incheon University, Incheon, Korea

10:40~11:00  |  T-We1-5
• Micro-Air gap Velocity Effect of Inter-electrode on Parameters
  Fangming Ruan¹, Rui Zhang², Tomasz Dlugosz³, Feng Zhou¹, Xiaolu Wang¹, Liang Wu¹
  1 Guizhou Normal University, Guiyang, China
  2 Communication Metrology Center, Ministry of Industry & Informatization of China, Beijing, China
  3, Wroclaw University of Technology, Wroclaw, Poland

11:00~11:20  |  T-We1-6
• Electromagnetic Numerical and Experimental Study for Optimizing the Lightning Protection System of
  the SOYUZ Launching Pad in Kourou
  E. Bachelier, F. Issac, S. Bertuol, JP. Parmantier
  ONERA, Toulouse, France
11:20~11:40 | T-We1-7

**Detection Efficiency of A Regional Lightning Location Network in China**
Mingli Chen¹, Yaping Du¹, Dong Zheng², Yijun Zhang²
1 The Hong Kong Polytechnic University, Hong Kong, China
2 Chinese Academy of Meteorological Sciences, Beijing, China

11:40~12:00 | T-We1-8

**EMC in Power Systems including Smart Grid**
William A. Radasky¹, Alex McEachern¹, Magnus Olofsson³
1 Metatech Corporation, Goleta, CA, USA
2 Power Standards Lab, Alameda, CA, USA
3 Swedish National Electrical Safety Board, Kristinehamn, Sweden

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**Technical T-We2 ** EMC Measurement
**Ramada Ballroom 3, 2F | 09:00~11:40**
Chair: Wei Xing Chang, Zhejiang University / Ki-Chai Kim, Yeungnam University

09:00~09:20 | T-We2-1

**A New Method for Measuring of Complex Near Electromagnetic Field on PCB**
Toshihiro Takatsu¹, Fengchao Xiao¹, Yoshio Kami¹, Kimitoshi Murano²
1 The University of Electro-communications, Tokyo, Japan
2 Tokai University, Kanagawa, Japan

09:20~09:40 | T-We2-2

**Conditional use of Spectrum Analyzers for EMI Compliance Measurements**
Jens Medler
Rohde & Schwarz GmbH & Co. KG, Munich, Germany

09:40~10:00 | T-We2-3

**A Measurement Method for 2-D EMF Distributions Using Infrared Tracker**
Ken Sato, Hiroaki Kawata, Yoshitsugu Kamimura
Utsunomiya University, Utsunomiya, Japan

10:00~10:20 | T-We2-4

**Design of Radiated EMI Analysis System in GTEM cell Based on Lab VIEW®**
Rong Rong¹, Wei Yan¹, Pengchao Chu¹, Yang Zhao¹, Zhiyi Zhu¹, Lingxiang Deng⁴, Lei Zhou¹
1. Nanjing Normal University, Nanjing, China
2. Suzhou 3cTest Electronic Co., Ltd, Suzhou, China
3. Southeast University, Nanjing, China
4. Jiangsu Metrology Institute of Science & Technology, Nanjing, China
10:40–11:00 | T-We2-5
• Analysis of Reference Site Method in Korean OATs
  Seungwoo Lee¹, Nam Kim¹, Jungyu Yang², Bohyun Kim³
  1 Chungbuk National University, Cheongju, Korea
  2 Seoul, Korea
  3 RAPA, Seoul, Korea

11:00–11:20 | T-We2-6
• Radiated Emissions Measurements in an Open Area Test Site
  Dennis Handlon
  Agilent Technology, Santa Rosa, USA

11:20–11:40 | T-We2-7
• Effect of a Shelter on SVSWR Validation at OATS
  Jungyu Yang¹, Seungwoo Lee², Hongsik Keum³, Nam Kim²
  1 RRA, Seoul, Korea
  2 Chungbuk National University, Cheongju, Korea
  3 RAPA, Seoul, Korea

Technical T-We3  EMC on Bio-Medical
Ramada Ballroom 4, 2F | 09:00–12:00
Chair : Fukuro Koshiji, Tokyo University / Nam Kim, Chungbuk National University

09:00–09:20 | T-We3-1
• Magnetic Field Analysis and Lumped Inductance Extraction for Wireless Power Transfer in Implanted Medical Devices
  Mauro Feliziani, Valerio De Santis
  University of L’Aquila, L’Aquila, Italy

09:20–09:40 | T-We3-2
• Conservative Estimation of Whole-Body Averaged SAR in Grounded Human Models for Plane Wave Exposure at Resonant Frequencies
  Akimasa Hirata¹, Kazuya Yanase¹, Osamu Fujiwara¹, Tomoaki Nagaoka², Soichi Watanabe²
  1 Nagoya Institute of Technology, Nagoya, Japan
  2 National Institute of Information and Communications Technology, Tokyo, Japan

9:40–10:00 | T-We3-3
• Propagation of UWB Electromagnetic Noise Due to Electrostatic Discharge on the Human Body
  Akimasa Hirata, Toshihiro Nagai, Teruyoshi Koyama, Osamu Fujiwara
  Nagoya Institute of Technology, Nagoya, Japan
10:00~10:20 | T-We3-4

- Investigations Concerning Far-Field to Near-Field Relations in the Frequency Range 30 – 1000 MHz Assessment with regard to the Generic Standard IEC 62311
  Bernd W. Jaekel¹, Ana Mladenovic², Mirjana Peric², Dusan Vuckovic², Slavoljub Aleksic²
  1 Siemens AG, Erlangen, Germany
  2 University of Nis, Nis, Serbia

10:40~11:00 | T-We3-5

- Application of Improved Multi-scale Sample Entropy Method to Analyze the Complexity of Red Blood Cell's Flickering with the Effect of Aging and ELF Exposure
  Chen Zhang¹, Congsheng Li², Yu Li³, Tongning Wu¹
  1 M.I.T, Beijing, China
  2 Beijing Information Science and Technology University, Beijing, China
  3 Beijing University of Aeronautics & Astronautics Science and Technology University, Beijing, China

11:00~11:20 | T-We3-6

- Effect of Extremely Low Frequency Electromagnetic Fields on Levels of Intracellular Reactive Oxygen Species and Gene Expression Profile in MCF10A Cells
  Mi-Na Hong¹, Bong-Cho Kim¹, Yun-Sil Lee², Yoon-Myung Gimm³, Sung-Ho Myung⁴, Jae-Seon Lee¹
  1 KIRAMS, Seoul, Korea
  2 Ewha womans university, Seoul, Korea
  3 Dankook University, Yongin, Korea
  4 KERI, Changwon, Korea

11:20~11:40 | T-We3-7

- On the Construction of Physics-inspired Integral Representations for the Dirac δ-Function in EMC Applications (Invited)
  Alireza Baghai-Wadji¹, ²
  1 RMIT University, Melbourne, Australia
  2 BIT, Beijing, China

11:40~12:00 | T-We3-8

- On the Genesis of Differential Operators in EMC Applications (Invited)
  Alireza Baghai-Wadji¹, ²
  1 RMIT University, Melbourne, Australia
  2 BIT, Beijing, China
**Technical T-We4**  PI & SI  
**Ramada Ballroom 2, 2F | 14:00 ~ 17:10**

Chair: James L. Drewniak, MUST / Jong-Gwan Yook, Yonsei University

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**14:00~14:20 | T-We4-1**  
**F/2-Rule: In-Depth Jitter Analysis from Spectral, Noise, and System Perspectives**  
Lian Nee Soh, Joseph Kho, Chee Seong Fong  
Altera Corporation (M) Sdn Bhd, Penang, Malaysia

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**14:20~14:40 | T-We4-2**  
**A Hybrid CIM/MoM Approach for Power Plane Analysis Including Radiation Loss**  
Xiaomin Duan, Renato Rimolo-Donadio, Heinz Dietrich Brüns, Christian Schuster  
Technische Universität Hamburg-Harburg, Hamburg, Germany

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**14:40~15:00 | T-We4-3**  
**Crosstalk Analysis of Sufficiently Separated Two Sets of Coupled Trace Pair Over Ground Split**  
Seiji Torigoe\(^1\), Fengchao Xiao\(^1\), Yoshio Kami\(^1\), Kimitoshi Murono\(^2\)  
\(^1\) The University of Electro-Communications Tokyo, Japan  
\(^2\) Tokai University, Kanagawa, Japan

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**15:00~15:20 | T-We4-4**  
**Quantifying High-Speed Channel Performance Using A Novel Time-Domain Convolution Method**  
Dazhao Liu\(^1\), Jun Fan\(^1\), Jiun Chen\(^2\), Zhiping Yang\(^2\)  
\(^1\) Missouri University of Science and Technology, Rolla, USA  
\(^2\) Cisco Systems, Inc. San Jose, CA, USA

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**16:10~16:30 | T-We4-5**  
**A Wide-band Passive Equalizer Design Using Multi-layer PCB Parasitics for 30 Gbps Serial Data Transmission**  
Eakhwan Song\(^1\), Jiseong Kim\(^1\), Heegon Kim\(^1\), Joungho Kim\(^1\), Jeonghyeon Cho\(^2\)  
\(^1\) KAIST, Daejeon, South Korea  
\(^2\) Samsung Electronics Co., Ltd, Suwon, Korea

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**16:30~16:50 | T-We4-6**  
**Equivalent Circuit Model for Modeling Via-Stripline Transition in Multilayered Electronic Packages**  
Zaw Zaw Oo\(^1\), En-Xiao Liu\(^1\), Xingchang Wei\(^1\), Erping Li\(^1\), Yao-Jiang Zhang\(^2\)  
\(^1\) A*STAR IHPC, Singapore  
\(^2\) Missouri University of Science and Technology, Rolla, USA

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**16:50~17:10 | T-We4-7**  
**Enhancement of Signal Integrity in Asymmetric Branch Structure for High-Speed Digital Circuits**  
Tae-Lim Song, Hee-do Kang, Tong-Ho Chung, Jong-Gwan Yook  
Yonsei University, Seoul, Korea

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Technical T-We5  Automotive EMC
Ramada Ballroom 3, 2F  |  14:00 ~ 15:20
Chair : Todd H. Hubing, Clemson University / Seungyoung Ahn, KAIST

14:00~14:20  |  T-We5-1
• Analysis of Radiated Emission Characteristic Generated from an Electric Railway System
  Jungyu Yang\textsuperscript{1}, Jaehyun Oh\textsuperscript{2}, Hongsik Keum\textsuperscript{2}
  1 RRA, Seoul, Korea
  2 RAPA, Seoul, Korea

14:20~14:40  |  T-We5-2
• Modeling, Simulation, and Measurement of Common-Mode Current for Automotive Electromagnetic Compatibility
  Shingo Okada\textsuperscript{1}, Takanori Uno\textsuperscript{2}, Hideki Asai\textsuperscript{1}
  1 Shizuoka University, Hamamatsu, Japan
  2 Denso Corp., Kariya, Japan

14:40~15:00  |  T-We5-3
• Analysis of Switching Noise and Radiation of Aperture and Cable
  Han Ol Choi\textsuperscript{1}, Eun Ha Kim\textsuperscript{2}, Dong Chul Park\textsuperscript{1}, Jae Hyun Lee\textsuperscript{1}
  1 Chungnam National University, Daejeon, Korea
  2 KATECH, Chonan, Korea

15:00~15:20  |  T-We5-4
• Improved Direct Power Injection Model of 16-bit Microcontroller for Electromagnetic Immunity Prediction
  Xuelian Gao, Congying Tian, Liyuan Lao, Jufang Wei, Yinhong Chen, Yanyu Chen
  North China Electric Power University, Beijing, China

Technical T-We6  Antenna & Propagation
Biyang room, 2F  |  14:00 ~ 16:50
Chair : Tzong-Lin Wu, NTU / Sungtek Kahng, Incheon University

14:00~14:20  |  T-We6-1
• Novel Approximate Electromagnetic Formulations to Estimate the Performance of Parabolic Reflector Antennas
  Shih-Chung Tuan\textsuperscript{1}, Hsi-Tseng Chou\textsuperscript{2}
  1 Oriental Institute of Technology, Pan-Chiao, Taiwan
  2 Yuan Ze University, Chung-Li, Taiwan
14:20~14:40  |  T-We6-2  
- Development of VHF and UHF Ferrite Fin Absorber Panel for Buildings and Evaluation with Edge Diffraction Treatment  
Toshihiro Yamane¹,², Atsuhiro Nishikata²  
¹ Shimizu Corp., Tokyo, Japan  
² Tokyo Institute of Technology, Tokyo, Japan

14:40~15:00  |  T-We6-3  
- A novel Multi-band CPW-fed Antenna with Band-passed and -notched Characteristics for WLAN/UWB Application  
Li Xiao, Nam Kim, Seungwoo Lee  
Chungbuk National University, Chungbuk, Korea

15:00~15:20  |  T-We6-4  
- CPW-fed Circular Slot Monopole Antenna with a Band-notch Structure for UWB Applications  
Mohsen Hosseini-Varkiani, Farokh Hojat-Kashani  
Islamic Azad University, Tehran, Iran

16:10~16:30  |  T-We6-5  
- Microwave Application using Rectangular Barium Strontium Titanate (BST) Dielectric Ceramic Array Antenna  
F.H. Wee, F. Malek  
Universiti Malaysia Perlis, Perlis, Malaysia

16:30~16:50  |  T-We6-6  
- Study of the Organic Semiconductor Thin Film Device Embedded Into A Patch Antenna  
Chia-Ching Chu¹, Lih-Shan Chen¹, Hsien-Chiao Teng¹, Yu-Jung Huang¹, Shen Cherng²  
¹ I-Shou University, Kaohsiung County, Taiwan.  
² Chengshiu University, Kaohsiung County, Taiwan
Poster Session

Tuesday, May 17, 2011

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<td>Poster Session I</td>
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Wednesday, May 18, 2011

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<tbody>
<tr>
<td>13:00-14:00</td>
<td>Poster Session II</td>
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</table>

Tuesday, May 17, 2011 – Afternoon Schedule / 17:30~18:30

Poster Session I
Convention Lobby, 2F
Chair: Hiroshi Inoue, Akita University / Jun So Pak, KAIST

Poster I-1
• Radiated EMI Analysis for CMOS Camera Module with TEM Cell and Far-field Testing
  Han-Nien Lin¹, Jing-Ting Cheng¹, Jian-Li Dong², Jay-San Chen²
  1 Feng-Chia University, Taichung, Taiwan
  2 M.O.E.A, Taipei, Taiwan

Poster I-2
• Design and Characteristic Analysis of TEM Cell for IC and Module EMC Testing
  Han-Nien Lin¹, Ming-Feng Cheng¹, Han-Chang Hsieh¹, Jay-San Chen²
  1 Feng-Chia University, Taichung, Taiwan
  2 M.O.E.A, Taipei, Taiwan

Poster I-3
• Material Measurement by the Waveguide-Penetration Method Calibrated using a Minimum Number of Reference Materials
  Alfred Kik, Atsuhiro Nishikata
  CRADLE Tokyo Institute of Technology, Tokyo, Japan
Poster I-4
- **Design of High Sensitivity Near-Field Probe and Application on IC EMI Detection**
  Han-Nien Lin¹, Chung-Shun Chang¹, Gang-Wei Cao², Cheng-Chang Chen², Jay-San Chen²
  1 Feng-Chia University, Taichung, Taiwan
  2 M.O.E.A, Taipei, Taiwan

Poster I-5
- **Non-destructive Slot Splitting Methods for Reducing Penetration Electromagnetic Fields**
  Byoung Jin Lim¹, Jun Ho Cho², Ki Chai Kim¹, Sung Min Lim³
  1 Yeungnam University, Gyeongsan, Korea
  2 KATECH, Chonan, Korea
  3 SL Corp., Gyeongsan, Korea

Poster I-6
- **Influence Analysis of LCD Modules Noise on Performance of 802.11b**
  Han-Nien Lin, Ming-Cheng Chang, Jia-Li Chang
  Feng-Chia University, Taichung, Taiwan

Poster I-7
- **Lumped Parameter Modeling of Transformer windings under VFTO**
  Juan Du, Guishu Liang, Haifeng Sun, Xin Liu, Xixiao Liu
  North China Electric Power University, Hebei, China.

Poster I-8
- **Design of Miniaturized Thin Metamaterial Absorber for 2 GHz Frequency Band**
  Hongmin Lee, Taejun Jo
  Kyonggi University, Suwon, Korea

Poster I-9
- **Analysis on Electric Field Distribution of ±1000kV DC Wall Bushing during Polarity Reversal**
  Li Zhang¹, Yudi Cong¹, Pan Gong¹, Qingmin Li¹, Yongchao Liu²
  1 Shandong University, Jinan, China
  2 SEPCO, Jinan, China

Poster I-10
- **Analysis and Proposal of a Protocol to measure the Levels of Radiation Emitted by Cell Phone Base Stations**
  Emmanuel Abundis Gutiérrez, Leonardo Soto Sumuano
  University of Guadalajara, Zapopan, México

Poster I-11
- **Modeling of FBGA Package for High Performance Digital System**
  Bo Pu¹, June-Sang Lee¹, Jongmin Kim¹, Wansoo Nah¹, Myoungho Cha², Hyouk Lee²
  1 Sungkyunkwan University, Suwon, Korea
  2 HANA Micron Inc., Asan, Korea
Poster I-12
• Implementation of LTCC-MCM to reduce PDP EMI
  Dongshik Shin, Taehoon Oh
  LG Electronics, Pyungtaik, Korea

Poster I-13
• Measurement and Analysis of the Radiated Disturbance Level from the Plasma TV below 30 MHz
  Tae Heon Jang1, Jong Hwa Kwon2, Seung Keun Park2
  1 KTL, Ansan, Korea
  2 ETRI, Daejeon, Korea

Wednesday, May 18, 2011 – Afternoon Schedule / 13:00~14:00

Poster Session II
Convention Lobby, 2F
Chair : Wen Yan Yin, Zhejiang University / Jun Gyu Yang, RRA

Poster II-1
• Complex Domain Analysis Method Based on EM Waving for Transmission Line Transient
  WANG Zezhong, PAN Chao, DONG Bo, ZHENG Qing
  North China Electric Power University, Beijing, China

Poster II-2
• The Effect of Conductor Parameters on the Lightning Protection Performance of ±800kV UHVDC Transmission Line
  Wei Shi, Xinchang Lv, Qingmin Li, Qiuqin Sun
  Shandong University, Jinan, China

Poster II-3
• Evaluation of EMI for BOP(Balance of Plant) of Fuel Cell Electric Vehicle(FCEV)
  Soonyong Lee, Wonbum Seo, Bongsik Kang, Jaehoon Choi
  Hanyang University, Seoul, Korea

Poster II-4
• Automotive Harness Length Effects on Conducted Emission
  Min Hee Nam1, Seung Ryul Ryu1, Dong Chul Park1, Jae Hyun Lee1
  1 Chungnam National University, Daejeon, Korea
  2 KATECH, Chunan, Korea
Poster II-5

• Standard Electromagnetic Interference (EMI) Measurement for Hybrid and Electrical Vehicles
  Seungyoung Ahn¹, Heejae Lee¹, Jung-Gun Byun¹, Joungho Kim¹, Jungyu Yang², Young-Choul Lim³, Hongsik Keum¹, Jae Man Song³
  1 KAIST, Daejeon, Korea
  2 RRA, Seoul, Korea
  3 RAPA, Seoul, Korea
  4 Busan Techno-Park, Busan, Korea

Poster II-6

• An observation of Hand Effects on Measurement of RF Strength in the HAC Evaluation of the Mobile Phones
  Dong-Geun Choi¹, Chung-Sang Ryu¹, Sungtek Kahng², Do-Hwan Kwon, Sun-Goo Kim¹, Chan-ho Jeong³, Jae-Hoon Choi³
  1 RRA, Seoul, Korea
  2 Incheon University, Incheon, Korea
  3 EPIK,
  4 LG Electronics, Seoul, Korea
  5 Hanyang university, Seoul, Korea

Poster II-7

• Comparison of Specific Absorption Rate from UHF RFID Reader Antenna in Various Homogeneous Phantom Models
  Sung-Sik Kong¹, Jae-Hoon Choi²
  1 RRA, Seoul, Korea
  2 Hanyang University, Seoul, Korea

Poster II-8

• Influence of Whole Body Exposure of 914 MHz RFID on Secretary Function of Thyroid System
  Hye Sun Kim¹, Youn Ju Kim¹, Man Jeung Paik¹, Jin Young Shin¹, Gwang Lee¹, Yun-Sil Lee¹, Nam Kim¹, Young Hwan Ahn¹
  1 Ajou University School of Medicine, Suwon, Korea,
  2 Ewha Womans University, Seoul, Korea
  3 Chungbuk National University, Cheongju, Korea.

Poster II-9

• A Band-notched Broadband Monopole Antenna using Complementary Split Ring Resonator
  Jang Yeol Kim, Nam Kim, Seungwoo Lee
  Chungbuk National University, Cheongju, Korea

Poster II-10

• Design of Internal Multiband Monopole Antenna by using 3D Structure
  Joo Hun Yang, Nam Kim, Seungwoo Lee
  Chungbuk National University, Cheongju, Korea
Poster II-11

• Impact of PDN Impedance Peak on Signal Integrity of DDR3 System
  Masato Kanazawa¹, Hayato Sasaki¹, Toshio Sudo¹, Atsushi Tomishima², Toshiyuki Kaneko³
  1 Shibaura Institute of Technology, Tokyo, Japan
  2 Toshiba Semiconductor, Kawasaki, Japan
  3 Toppan NEC Circuit Solution Inc., Shibaura, Tokyo, Japan

Poster II-12

• Chip-Package-Board Modelling for LCD Driver IC
  Koji Sakuma, Toshio Sudo
  Shibaura Institute of Technology, Tokyo, Japan

Poster II-13

• Partial EBG Structures for Mitigating Noise Coupling through Cutout in Multilayer PCB Structures
  Jong Hwa Kwon, Sang Il Kwak, Dong Uk Sim, and Hyung Do Choi
  ETRI, Daejeon, Korea

Poster II-14

• Research on EM Simulation and Certification Tests of Digital Electronics Devices
  Bong-sik Kang¹, Tae-seung Song², Jae-hoon Choi²
  1 Hanyang University, Seoul, Korea
  2 KTL, Ansan, Korea
Project Meeting of IEC SC77C
**Chuja room, 2F | 14:00 ~ 17:50 | Wednesday, May 18, 2011**
Organized by William A. Radasky, Metatech

This Project Meeting is intended to update project members on the states of approached projects in IEC SC77C (EMC: High Power Transient Phenomena). Discussions dealing with IEMI, Immunity, test methods, HEMP Immunity test methods and protection methods are planned. IEC project experts and quests are invited.
The iNARTE Examinations Preparation Tutorial will be valuable to those anyone interested in validating their expertise as an EMC or ESD professional. At the Workshop we will advise attendees as to the iNARTE certification process, and the format of our examinations. We will discuss the best approach to ensure success and provide some working examples of typical exam questions. There will also be presentations from two iNARTE regional Partners in Korea, RAPA and CORE Insight Inc. RAPA will discuss their EMC education and assistance programs and CORE will present their ESD programs. The last two hours of the Workshop will be devoted to a trial examination paper, were we will pose 24 typical questions. All attendees are invited to bring reference materials and laptop computers if planning to take this trial examination. There is no cost involved to take this trial exam.

iNARTE will be at an Exhibition Booth each day, together with representatives from both RAPA and CORE. We invite all our members and anyone interested in learning more about iNARTE and our Certification programs to come and visit us there. You can register for any of the Thursday Examinations at our Booth, if you have not previously registered. We will also have on display, and for purchase, books and CD’s that may be used as Study Guides for the Examinations.

Brian Lawrence, Executive Director
lawrence@inarte.us

iNARTE, Inc.
840 Queen Street, New Bern, NC 28560
Phone : (252) 672-0200, 1-800-89-NARTE
Fax : (252) 672-0111 | Website : www.narte.org
Venue & Accommodations

Ramada Plaza Jeju
Website: http://www.ramadajeju.co.kr/
Address: 1255 Samdo 2-dong, Jeju City, Jeju-do, Korea
Tel: 82-64-729-8100, Fax: 82-64-729-8554

The Ramada Plaza Jeju Hotel was established on July 1, 2003, with a 100% investment by the Korea Teachers Credit Union. This internationally renowned deluxe resort-style business hotel was opened to raise management and its accommodation facilities to world class standards, and thus satisfy worldwide business travelers and tourists. Modeled after a deluxe cruise ship in Northern Europe, this floating hotel is located within five minutes’ ride from both Jeju harbor and Jeju International Airport. It can be reached within an hour wherever you are on the Jeju Island. Visitors from home and abroad can experience the essence of Jeju culture enjoying the nearby spectacles of Chilsung-Ro street, Tap-dong outdoor performance hall, Sanjicheon, Yongduam, and Yongyeon bridge especially during the night time. Ramada is the first floating hotel in Korea, whose guest rooms make its guests have a unique experience of feeling as if they were on the sea. Each room boasts off its characteristics with high quality interior design. Various types of 380 guest rooms which command a magnificent view of mountains and the sea are in place awaiting their guests. Besides, attached facilities such as the convention center which can accommodate up to 1200 people, small and medium-sized seminar rooms, health club, indoor and outdoor swimming pools, and hot spa, etc. guarantee successful business transactions and comfortable amenities to its guests.

Internet
Free wireless internet available inside the Ramada Ballroom 1. Participants will have free access to the internet café at the Ramada Ballroom 1 on the 2F.
Venue Plans

1st Floor

2nd Floor

8th Floor

Main Entrance

To 2nd Floor

Front Desk

Western Restaurant

Registration

Exhibition / Poster Area

Biyang, Chuja room
(Tutorials, Technical, Special, Project Meeting)

Ramada Ballroom1,2,3,4
(Reception, Tutorials, Plenary, Technical, Special Session)

Tamra, Halla, Ara, Ora hall
(Workshops, Tutorials)
Other Hotels

Jeju Pacific Hotel
Telephone: +82-64-758-2500
Fax: +82-64-758-2521
Address: 159-1, YONGDAM-1DONG, JEJUSI, SOUTH KOREA
Homepage: http://www.jejupacific.co.kr
Distance to venue: 10 minute walk

Robero Hotel
Telephone: +82-64-757-7111
Fax: +82-64-755-9001
Address: 57-2, SAMDO-1-DONG, JEJUSI, SOUTH KOREA
Homepage: http://www.roberohotel.com
Distance to venue: 10 minute walk
On-line registration is highly recommended at the official website of the APEMC 2011. If you want to register by e-mail or fax, you can make a payment by bank transfer, credit card. Notification of cancellation must be made in writing and sent to the congress secretariat by fax or e-mail before April 10, 2011.

E-mail: sejong3@sejongconvention.com / Fax: +82-2-783-3475

### Registration Fee

<table>
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<td>Regular</td>
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*Full registration fee includes Tutorial, Workshop, Welcome reception, Banquet, Lunch and Proceeding.
*Tutorial only registration fee includes Lunch and Tutorial materials.

### Registration Hours

Admission to all sessions and hosted functions requires identification.
Please wear your name badge at all times.
Registration Desk is composed of Pre-Registration Desk and On-Site Registration Desk in front of Ramada Ballroom

- Sunday, May 15 15:00 ~ 18:00
- Monday, May 16 09:00 ~ 18:00
- Tuesday, May 17 08:30 ~ 18:00
- Wednesday, May 18 08:00 ~ 18:00
- Thursday, May 19 08:00 ~ 12:00

*Symposium kit
A Symposium kit will be served when you are registered. Please swap symposium kit coupon for symposium kit. It contains a final program book, proceeding (USB Flash Memory), Tutorial book, Workshop Book, Welcome reception, Banquet and Lunch Coupon will be in the name badge.

*Name badges
You are kindly requested to wear your name badge during all the session. Please note that admission to the all session rooms is strictly restricted to the registered participants wearing their badges. If you lose your badge, ask the registration desk for a new one.
Transportation

Taxi Information

The Venue (Ramada Plaza Jeju Hotel) and Hotels are located near Jeju International Airport. The time getting to Venue is about 10 minute by Taxi from Jeju International Airport.

- Distance from the Airport: About 3.8 km
- Fee: about 3,500 KRW (USD $3~$4)

Shuttle Bus

During the symposium, free shuttle bus services will be provided for participants to commute between the Jeju Airport and Ramada Plaza Jeju Hotel (Conference venue.)

- Bus stand: Parking lot 7
- Required time: 10~15 min

Shuttle Bus Schedule

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<td>5.15(Sun)</td>
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Official & Social Program

Welcome Speech
Place: Ramada Ballroom 1, 2F | Time & Date: 09:30~09:50, Tuesday, 17 May, 2011

Plenary Speech
Place: Ramada Ballroom 1, 2F
P-Tu1 - Time & Date: 09:50~10:50, Tuesday, 17 May, 2011 | Speaker: Prof. Todd Hubing
P-Tu2 – Time & Date: 10:50~11:50, Tuesday, 17 May, 2011 | Speaker: Prof. Masao Taki

Welcome Reception
Place: Ramada Ballroom 1, 2F | Time & Date: 18:00~20:00, Sunday, May 15, 2011
Symposium participants are invited to mingle while enjoying the light food and drinks during the opening welcome reception.

Lunch
Place: Tammora, 1F (Korean Restaurant) / The Blue, 2F (Western Restaurant)
Time & Date: 12:00~13:00, Monday, May 16, 2011 | 11:50~13:00, Tuesday, May 17, 2011
12:00~13:00, Wednesday, May 18, 2011 | 12:00~13:00, Thursday, May 19, 2011
Every lunch will be prepared two different cuisine for your taste.

Coffee Break
Place: Convention Lobby, 2F
Time & Date: 15:00~15:30, Monday, May 16, 2011 | 15:00~15:30, Tuesday, May 17, 2011
15:00~15:30, Thursday, May 19, 2011

Banquet & Awards
Place: Ramada Ballroom 1 | Time & Date: 18:30~21:30, Tuesday, May 17, 2011
The highlight of the official & social program will be “Banquet”. Also, the awards will be presented during the banquet.

Tutorial Speakers Lunch
Place: Tmmora, 1F (Korean Restaurant) | Time & Date: 12:00~13:00, Monday, May 16, 2011
It will be served for tutorial speakers.

Plenary Speakers Lunch
Place: Tammora, 1F (Korean Restaurant) | Time & Date: 11:50~13:00, Tuesday, May 17, 2011
It will be served for plenary speakers.

Organizing Committee Dinner
Place: Ora room, 8F | Time & Date: 18:00~21:00, Wednesday, May 18, 2011
It will be served for organizing committee of APEMC 2011.
Oral Presentation
1. Prepare your Presentation
   1) All oral presentation materials should be prepared in English.
   2) Each oral presentation is limited to 20 minutes including Q&A’s and changeover to the next speaker.
   3) Power Point format or Adobe Acrobat format (PDF) is highly recommended.
   4) All video clips should have WMV file format.
   5) Each oral presentation materials should be uploaded to the equipped computer of each session room before the session starts. (USB memory stick and CD-R are acceptable)
   6) Each oral presentation should be checked in the preview room before the session starts.
      The preview room is open from Sunday 09:00~18:00 to Thursday 09:00~12:00
   7) All presentation materials will be deleted after the session finishes.

2. Equipments in the session room
   1) 1-Screen, 1-LCD Projector, 1-Window-based Laptop Computer, and 1-Laser Pointer
   2) MS Windows XP Professional OS and MS Office 2007 are installed in the computer.
   3) Private Laptop computers are not recommended for keeping each allocated time.

Posters Presentation
1. Prepare your poster
   1) Available poster board size for each poster speaker is 110cm (height) x 90cm (width).
   2) Each poster should have the title, all author names, and corresponding author’s contact information of your paper.
   3) There is no poster template, but it is recommended that ‘APEMC 2011’ is included in your poster.

2. Mount and demount your poster
   1) Poster boards will be prepared at the convention lobby (2F) in front of Registration desk.
   2) Each poster should be mounted and demounted following the designated times.
   3) Your paper ID number will be posted on Poster boards.
   4) The designated times are referred to the below time table.

3. Prepared materials for mounting your poster
   1) Cellular tapes, pushpins, scissors, and etc.
   2) Staffs around Poster board and Registration desk will help you if you are in trouble during mounting your poster
   3) After demounting time, all posters on poster boards will be discarded without notice.

<table>
<thead>
<tr>
<th>Session</th>
<th>Session Day</th>
<th>Mounting time</th>
<th>Presentation time</th>
<th>Demounting time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poster Session I</td>
<td>17 May, 2011</td>
<td>14:30~17:30</td>
<td>17:30~18:30</td>
<td>18:30~19:30</td>
</tr>
<tr>
<td>Poster Session II</td>
<td>18 May, 2011</td>
<td>10:00~13:00</td>
<td>13:00~14:00</td>
<td>14:00~15:00</td>
</tr>
</tbody>
</table>
Tour Program

1. Theme Tour (Southwest Course)
Experience well-known Korean culture. Visit to the set of Korean famous movies and the museum O-sulloc, which has the fields of green tea mingled with Mountain Halla.

<table>
<thead>
<tr>
<th>Time</th>
<th>09:00 – 17:30 Monday, 16 May</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course</td>
<td>Oedolgae (Dae Jang Geum) ➔ Yakchensa Temple (D-War) ➔ Lunch ➔ Teddy Bear Museum (Gung) ➔ Mountain Song-ak (Dae Jang Geum) ➔ O-sulloc</td>
</tr>
<tr>
<td>Remarks</td>
<td>Lunch, entry fees and transportation included. English-speaking guide assistance along the tour.</td>
</tr>
<tr>
<td>Price</td>
<td>More 10 persons 7<del>9 persons 5</del>6 persons 3~4 persons 2 persons</td>
</tr>
<tr>
<td></td>
<td>KRW 85,000 KRW 95,000 KRW 115,000 KRW 160,000 KRW 255,000</td>
</tr>
</tbody>
</table>

2. Theme Tour (East Course)
Jeju has become an even more popular destination since it has been the scenic set for several Korean TV dramas and movies. Jeju Island's diverse cultural attractions and breathtaking natural beauty draw many drama and filmmakers. An increasing number of tourists and newlyweds from Korea and around the world flock to this beautiful island to catch a glimpse of these much talked-about places. Take in the glamorous image of TV stars.

<table>
<thead>
<tr>
<th>Time</th>
<th>10:00 – 17:30 Monday, 16 May</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course</td>
<td>The Park Southern Land ➔ Seongsan Ilchulbong ➔ Lunch ➔ Seopjikoji (All in) ➔ Jeju Folk village museum(Dae Jang Geum)</td>
</tr>
<tr>
<td>Remarks</td>
<td>Lunch(@ Seongsan Ilchulbong), entry fees and transportation included. English-speaking guide assistance along the tour.</td>
</tr>
<tr>
<td>Price</td>
<td>More 10 persons 7<del>9 persons 5</del>6 persons 3~4 persons 2 persons</td>
</tr>
<tr>
<td></td>
<td>KRW 95,000 KRW 105,000 KRW 130,000 KRW 170,000 KRW 265,000</td>
</tr>
</tbody>
</table>
3. Jeju Olle Trekking (Route 7)
This route is a seaside walking trail beginning at Oedolgae Rock passing through Beophwan Pogu (port) and the Poonglim Resort. Pampas grass and wild flowers are abundant on this trail. One of the most loved points on the route is the Subong-ro (pathway) and Subong-gyo (bridge). They are named after Kim, Subong who built them himself. He used a shovel and picks to clear the road and moved big stones to make the bridge.

<table>
<thead>
<tr>
<th>Time</th>
<th>10:00 – 16:00 Tuesday, 17 May</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course</td>
<td>Oedolgae Rock ➔ Dombenang Gill(street) ➔ Street in Pension complex ➔ Sewage disposal plant in Hogeun-dong(3.1Km) ➔ Sokgol ➔ Subong-ro(pathway)(3.81km) ➔ Beophwan Pogu(port)(4.79km) ➔ Dumony Mul ➔ Ilgangeong/Seogeon Island(7.75km) ➔ Poonglim Resort(8.88Km) ➔ Teddy Bear Museum</td>
</tr>
<tr>
<td>Remarks</td>
<td>Lunch(@ Poonglim Resort), entry fees and transportation included. English-speaking guide assistance along the tour.</td>
</tr>
<tr>
<td>Price</td>
<td>More 10 persons</td>
</tr>
<tr>
<td></td>
<td>KRW 85,000</td>
</tr>
</tbody>
</table>

4. Luxury Yachting
Lurching at sudden winds and rocking on high tides, the yacht can be a unique experience! The view of the blue and magnificent ocean from Jeju is a beautiful sight, but the view of the Island from the ocean from the ocean will be an unforgettable sight also, experience the feeling of hope in a yacht on the coast of Jeju.

<table>
<thead>
<tr>
<th>Time</th>
<th>10:00 – 16:00 Wednesday, 18 May</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course</td>
<td>Yacht ➔ Lunch ➔ Seogwipo Recreational Forest</td>
</tr>
<tr>
<td>Remarks</td>
<td>Lunch(@ Seafood Buffet), entry fees and transportation included. English-speaking guide assistance along the tour.</td>
</tr>
<tr>
<td>Price</td>
<td>More 10 persons</td>
</tr>
<tr>
<td></td>
<td>KRW 175,000</td>
</tr>
</tbody>
</table>
5. Natural Dyeing Experience
You are invited to discover the wonder of natural dyes for yourself. Indigenous natural sources including persimmon extract will help you gain first-hand knowledge about dying textiles. The beautiful hues obtained from natural dyes are said to become permanent and have a harmony and a depth that are missing from synthetic ones.

<table>
<thead>
<tr>
<th>Time</th>
<th>13:00 – 18:00 Wednesday, 18 May</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course</td>
<td>Ichulland (Natural Dyeing Experience) ➔ Seongup Jeju Folk Village</td>
</tr>
<tr>
<td>Remarks</td>
<td>Entry fees and transportation included. English-speaking guide assistance along the tour. Experience fee is excluded.</td>
</tr>
<tr>
<td>Price</td>
<td>More 10 persons: KRW 70,000 7<del>9 persons: KRW 80,000 5</del>6 persons: KRW 105,000 3~4 persons: KRW 145,000 2 persons: KRW 240,000</td>
</tr>
</tbody>
</table>

6. World Heritage Tour
Jeju Island is the southernmost territory of the Republic of Korea. The island was formed from volcanic activities occurring at the end of the Tertiary Period. In other words, it was built up above the sea level as a result of volcanic activities that began about two million years ago. ‘Jeju volcanic Island and Lava Tubes’ were listed as the ‘World Natural Heritage’ of UNESCO in June, 2007.

<table>
<thead>
<tr>
<th>Time</th>
<th>09:00 – 16:00 Thursday, 19 May</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course</td>
<td>Geomunoreum Lava Tube ➔ Seongsan Ilchulbong ➔ Manjang Cave</td>
</tr>
<tr>
<td>Remarks</td>
<td>Lunch(@ Seongsan Ilchulbong), entry fees and transportation included. English-speaking guide assistance along the tour.</td>
</tr>
<tr>
<td>Price</td>
<td>More 10 persons: KRW 80,000 7<del>9 persons: KRW 90,000 5</del>6 persons: KRW 115,000 3~4 persons: KRW 155,000 2 persons: KRW 250,000</td>
</tr>
</tbody>
</table>
7. Eco Tour
Passing by the aromatic fields of green tea, enjoying the well-kept plants delicately and feeling the breeze of Jeju Island on the top of Suwol-bong.

<table>
<thead>
<tr>
<th>Time</th>
<th>13:00 – 18:00 Thursday, 19 May</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course</td>
<td>Green Tea Field ➔ Spirited Garden ➔ Suwol-bong</td>
</tr>
<tr>
<td>Remarks</td>
<td>Entry fees and transportation included. English-speaking guide assistance along the tour.</td>
</tr>
<tr>
<td>Price</td>
<td>More 10 persons</td>
</tr>
<tr>
<td></td>
<td>KRW 70,000</td>
</tr>
</tbody>
</table>

* The price depends on the number of applicants.
* For more information about tour program, please contact Jeju Moongchi Travel Agency.
* Tour reservation is available at Jeju Moongchi Travel Agency.

**Contact Point : Jeju Moongchi Travel Agency** (Manager Nam-ki Lee)
Tel : +82-64-724-8667
Mobile : 010-7770-6932
Fax : +82-64-724-7542
E-mail : cute6932@nate.com
Exhibition

The exhibition will be held in the exhibition hall (Ramada Plaza Jeju Hotel 2F)

Exhibition Hours
09:30~18:30 | Tuesday, May 17
09:00~17:00 | Wednesday, May 18

Exhibitors

<table>
<thead>
<tr>
<th>Booth No.</th>
<th>Company Name</th>
<th>Booth No.</th>
<th>Company Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CMS Technologies</td>
<td>13</td>
<td>SAFETY &amp; EMC Magazine</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>14</td>
<td>Agilent Korea</td>
</tr>
<tr>
<td>3</td>
<td>EMF Safety</td>
<td>15</td>
<td>Ansys Korea</td>
</tr>
<tr>
<td>4</td>
<td>AR RF / Microwave Instrumentation</td>
<td>16</td>
<td>FRONTIS Corp.</td>
</tr>
<tr>
<td>5</td>
<td>TDK RF Solutions Inc.</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>EMC Solutions Inc.</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>CST of Korea</td>
<td>20</td>
<td>Rohde &amp; Schwarz Korea LTD</td>
</tr>
<tr>
<td>9</td>
<td>Eretec Inc.</td>
<td>21</td>
<td>EM TEST AG</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>INARTE</td>
<td>23</td>
<td>IEEE EMC Society</td>
</tr>
<tr>
<td>12</td>
<td>ETS-Lidgren</td>
<td>24</td>
<td>Korea Radio Promotion Association</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(RAPA)</td>
</tr>
</tbody>
</table>
Exhibitor Profiles

Agilent Korea  Booth 14,15,16
http://www.agilent.co.kr/
Tel : +82-1588-5522  Fax : +82-2-2004-5522
Address : 25-12, Yeouido-dong, Youngdeungpo-gu, Seoul, Korea.
As the world’s premier measurement company, Agilent is a technology leader in communications, electronics, life sciences and chemical analysis. The company’s 19,000 employees serve customers in more than 110 countries. Agilent provides a full line of test tools used in EMC labs worldwide from handheld instruments to bench top systems and integrated solutions – helping you meet your immunity and emissions testing requirements for pre-compliance through full CISPR compliance.

Ansys Korea  Booth 17
http://ansys.co.kr
Tel : +82-2-472-4703  Fax : +82-2-472-4704
Address : 448-8, Daseung Building 5F, Seungnae-dong, Gangdong-gu, Seoul, Korea
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AR RF/ Microwave Instrumentation (EMC Solution Inc.)  Booth 4,5
Tel : +1-888-933-8181 / +82-2-2168-3910  Fax : +1-866-859-0582 / +82-2-2168-3920
Address : 160 School House Rd. Souderton, PA 18964-9990 USA
604, Hyundai 41 Tower, 917-9, Mok-dong, Yangcheon-gu, Seoul, Korea
A R RF/Microwave Instrumentation is a manufacturer and distributor of high power broadband amplifiers from dc-45GHz, 1-50,000 watts that are well suited for radiated and conducted immunity testing as well as equally suitable for general laboratory use. Available are a full line of complimentary test accessories including antennas, directional couplers, field monitoring equipment, power meters, signal generators, EMI receivers and EMC test software. We also offer several RF conducted immunity generators and EMC test systems.

CMS Technologies  Booth 1,2
http://www.cms-tech.co.kr/
Tel : +82-2-711-8290  Fax : +82-31-711-8431
Address : 1505, Parkview Tower, JeongJa-dong, Bundang-gu, Seongnam-city, Gyeonggi, Korea
Sigrity develops and globally supports advanced software analysis solutions to ensure power integrity and signal integrity in chips, packages and printed circuit boards; and physical design tools for single die and SiP implementations. Over 200 companies utilize Sigrity products as part of industry standard design flows and with layout tools from Cadence, Mentor Graphics, Zuken and other EDA suppliers. Sigrity solutions help companies overcome design challenges to reduce costly respins and get to market faster. Over 60% of Sigrity’s 100+ employees are in research and development positions creating breakthrough solutions targeting real-world challenges.
CST of Korea  Booth 8
http://www.cst-korea.co.kr/
Tel : +82-31-781-6866
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STUDIO® TLM solver (Microstripes) and CST CABLE STUDIO™ Provide powerful features for complex EMC
analysis including coupled simulations which allow for large system analysis and installed performance studies.
Many years of in house expertise support the tools and give customers confidence in our simulation results.
Contact us for free technical support and samples.

EM TEST AG  Booth 21,22
http://www.emtest.com
Tel : +41-61-717-91-85
E-mail: a.straumann@emtest.ch
Address : Sternenhofstrasse 15, CH-4153 Reinach, Switzerland
EM Test is the world’s leading supplier of EMC test instruments to virtually all industries. Our testers provide a
wide range of capability from ESD, Surge, and avionics manufacturers. From test pulses, conducted RF or AF,
programmable AC/DC sources, Harmonic & Flicker analyzers to special couplers, probes and cables, we have it
all. Multiple software releases per year insure all EM Test instruments are up-to-date with the latest standards
and requirements changes, and all software is Windows 7 compatible.

EMF Safety  Booth 3
http://emfsafety.koreasme.com/
Tel : +82-2-793-7133      Fax : +82-2-793-1150
Address : Seventh Floor, Eongo Officetel, 72-17, Hannam 1 Dong, Yongsan-gu, Seoul, Korea
Safety Co., Ltd. was established as intramural venture company in Dankook Univ. with professors and other
willing people as shareholder on June 2000. EMF Safety means「human safety on electromagnetic field of
machinery and equipments」. We developed system to measure SAR that is generated from mobile phone, and
delivered to several organizations such as government authority, university, industries, and certificate authority
etc. And we performed electro wave policy research service (The Ministry of Labor Affairs, The Ministry of
Information & Communication) and electromagnetic field environment measuring service (Korean National
Railroad and other enterprises).

Eretec Inc.  Booth 9,10
http://www.eretec.com/
Tel : +82-31-436-1100      Fax : +82-31-436-1110
Address : SK Ventium, 101-703, #522, Dangjeong-dong, Gunpo-si, Gyeonggi-do, South Korea.
Eretec Inc. supplies all kinds of test facility, measurement system and software worldwide such as EMC
measurement chamber, Antenna (Cell phone, Radar, Aircraft, Military use, etc.) measurement chamber, EMC/
Antenna/Transient measurement system and Software, etc. by being provided from foreign companies or by
developing and manufacturing using our own technologies.
Currently not only the bright future industry RFID but also the safety for the microwave environment in the
various Electronic, Electromagnetic, Automobile, Health, Environment Industry, etc. is getting lots of interest.
The local technology in this field, however, has yet reached to the level of developed countries. So we will do
our best to deeply study from EMC field to RFID, EMP, EME, TEMPEST and HPEM, etc. and develop its application
technology and will provide upgraded customer support service based on the excellent technology.
ETS-Lidgren    Booth 12
http://www.ets-lindgren.com/
Tel : +1-512-531-6400      Fax : +1-512-531-6500
Address : 1301 Arrow Point Drive, Cedar Park, Texas 78613 USA
ETS-Lindgren is the proven world leader for components and systems that measure, shield and control electromagnetic energy. We provide solutions for EMI/RF/EMF test and measurement applications as well as medical, industrial and governmental RF shielding requirements. Our product line ranges from simple benchtop diagnostic tools to fully integrated turnkey facilities. ETS-Lindgren also offers Calibration Services Plus!TM, a special service offering a fully customized calibration and repairs management program. ETS-Lindgren has more than 75 years of combined company experience and expertise. We were formed by joining a number of leading companies which pioneered many of today's widely accepted products and practices in our industry. Not surprisingly, ETS-Lindgren continues to maintain its reputation as a leader and innovator today.

FRONTIS Corp.     Booth 18
http://www.frontis.co.kr/
Tel : +82-31-695-6988      Fax : +82-31-695-6988
Address : 101-1205, Digital Empire II, #486, Shin-dong, Yeongtong-gu, Suwoni, Gyeonggi-do, Korea
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We have been constantly growing more than 170 percent of revenue every year, and strongly trying to establish new business relationship with overseas companies to secure high-end technology and superior quality items of Reliability.

IEEE EMC Society    Booth 23
http://www.ieee.org
Tel : +1-732-981-0060      Fax : +1-732-562-6380
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iNARTE    Booth 11
http://www.inarte.us/
Tel : +1-252-672-0200      Fax : +1-252-672-0111
Address: 840 QUEEN STREET, NEW BERN, NC 28560 USA
iNARTE, (eye-NAR-tee) is an independent, non profit organization, offers Certification Programs to validate the credentials of professional Engineers and Technicians in EMC/EMI disciplines. The purpose of iNARTE EMC Certification is to foster technical excellence in EMC engineering. Our programs establish competency criteria for EMC/EMI work. Our Certification benefits the individual practitioner and the entire EMC community by establishing a standard of excellence and recognition for those that achieve it.

Korea Radio Promotion Association (RAPA)    Booth 24
http://www.rapa.or.kr
Tel : +82-2-317-6000
Address : 4F 160-4 Donggyo-dong Mapo-gu Seoul,121-817 Korea
The Association was founded based on Radio Legislation Act#66 as a special corporation with an objective of contribute to fostering the development basis for the radio promotion by scheming an effective utilization of radio resource, preparing to the change of radio circumstance, strengthening the cooperation and bond between radio related enterprise, preparing a sound upbringing development of radio use technology by internationalization of radio industry and radio use technology standardization.
Rohde & Schwarz Korea LTD  Booth 19,20  
http://www2.rohde-schwarz.co.kr/  
Tel : +82-2-3485-1900  Fax : +82-514-4549  
Address : Rohde & Schwarz Korea Ltd., 135-010, #83-29, Nonhyun-Dong, Kangnam-Ku, Seoul, Korea  
Rohde & Schwarz is a leading manufacturer of EMC, communication, signal analysis and signal generation equipment. We cover all EMC requirements in Automotive, Military and Commercial sectors. Established 75 years ago, Rohde & Schwarz has a global presence and a dedicated service network in over 70 countries including an accredited ISO 17025 calibration lab. It has approximately 7400 employees and achieved net revenue of € 1.3 billion (fiscal year July 09 to June 10). A service and sales network with subsidiaries and offices in more than 70 countries worldwide helps to ensure that customers always find a Rohde & Schwarz office nearby. Exports make up about 90 percent of company business.

SAFETY & EMC Magazine  Booth 13  
http://www.semc.cesi.cn  
Tel : +86-10-8402 9073  Fax : +86-10-8402-9210  
Address : N0. 1 Andigmen Dongdajie Beijing 100007 China  
SAFETY & EMC is a bimonthly publication with a cohesive, innovative and professional workforce. In 2008, it started its English edition yearly, and erected the bridge for international academic communication. Until now, its readers are more 500'000. Most of them are engineers, teachers and students; however, there are a lot of marketing and purchasing personnel becoming its faithful readers. Its column arrangement is subject to professional and technical features, for instance, Certification & Marks, Standard & Application, Testing & Measurement, Electromagnetic Interference Suppression Technology, Material Application in EMC, Professional Research, EMC Classroom, Conference Release, New Products, Company profile and so on.

TDK RF Solutions Inc. (EMC Solutions Inc.)  Booth 6,7  
Tel : +1 (512) 258-9478 / +82-2-2168-3910  Fax : +1 (512) 258-0740 / +82-2-2168-3920  
Address : 1101 Cypress Creek Rd., Cedar Park, Texas 78613 USA  
604, Hyundai 41 Tower, 917-9, Mok-dong, Yangcheon-gu, Seoul, Korea.  
TDK RF Solutions is a world leader in the design, development, and manufacture of technical solutions for the electromagnetic compatibility testing industry. We offer a complete range of solutions, including automated test systems, TDK anechoic chambers, software, antennas, and a wide range of test products. We call it Total System Technology®, and it means TDK RF Solutions is your best choice of partner for proven solutions and services backed by internal technical expertise.
자동차 부품산업 기술경쟁력 향상에 주도하는
자동차부품기술지원센터

사업목표
자동차부품의 고급기술의 기술개발 및 활용 기술지원센터 구축

세부사항
자동차부품 차별화 기술개발 지원사업
- 새로운 차량부품의 기술개발 및 출시
 - 자동차부품의 신기술 입력 및 기술 개발
 - 자동차부품의 기술개발 및 출시

자동차부품 현장기술지원 현장형기술지원사업
- 자동차부품 현장의 기술지원 및 기술 개발
- 자동차부품 현장형기술지원 사업
- 자동차부품 현장형기술지원 사업

전파방해와 유해 데크 (Green Net 사업)
- 자동차부품의 전파방해 및 유해 데크
- 자동차부품의 전파방해 및 유해 데크
- 자동차부품의 전파방해 및 유해 데크

B2C 도달 홍보 및 프로그램 개발사업
- 자동차부품의 B2C 도달 홍보 및 프로그램 개발
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Korea Communications Agency (KCA) was established in accordance with Article 66 of Radio Waves Act and has since contributed to an increased public accessibility to radio use and its promotion on radio, broadcasting, and communications. As the communication leader of the future convergence era, KCA conducts policy research on radio frequency, broadcasting and communications and strengthens foundations for radio, its frequency usage, the promotion of the broadcasting and communications industry, and the improvement and vitalization of media user rights while delivering customer satisfaction. Our key areas of interest and activity include:

**Policy Research**
- Enrich Relevant Radio Rules and Regulations
- Build an Infrastructure for Reframing Radio Spectrums
- Compensation for the withdrawal and relocation of radio frequency
- Boost Public Interest and Media Diversity of Broadcasting
- Vitalize Broadcasting Market and Establish Relevant Policies to Meet Changes

**Radio Industry Promotion**
- Radio Industry Promotion Planning and Foundation Establishment
- Support the Government’s Digital TV Transition Policies
- Technical Support for Radio Industry

**Broadcasting and Communications Industry Promotion**
- Support Policy Research to Facilitate Convergence
- Build an Infrastructure for Next Generation Broadcasting and Communications Industry
- Implementation of Viewer’s Welfare Programs

**Broadcasting Contents Industry Promotion**
- Support High-Quality Broadcasting Contents Production
- Support Overseas Korean Broadcasting Industry/Investment and Finance Contents Production
- Construct 'Digital Broadcasting Contents Support Center’ by 2012

**Improve Radio Spectrum Environment**
- Radio Station Inspection and EMF Strength Measurement
- Set up Radio Station Database
- National Certification Examination for Technical Analysis

**Customer Satisfaction Management, Funds Management and R&D Planning**
- Ethical Management and Social Contribution
- Expand R&D Activities on Convergence of Broadcasting Communication Industry
- Promote Broadcasting communications Convergence and Public Interest

Website is available at : www.kca.kr
Electromagnetic wave Technology Institute (EMTI) of Korea Radio Promotion Association (RAPA) has been dedicated to various activities, like troubleshootings and precautions against EMC problems facing many companies and also, provides EMC technical education for engineers. In addition, the Institute is offering measurement services for antennas of cell phones and wireless communication devices.

**Technical and measurement support for small and medium-sized companies**

EMTI supports companies with EMC design and solutions, operates an EMC Open Lab where they can freely use EMC design analysis tools and measurement equipment, and an antenna chamber where they can use equipment inside through the whole process of product, from design and development to production.

- Technical support for EMC design/solution (free of charge)
  - Technical support in a PCB design level considering EMC
  - Technical support in a system design level considering EMC
- Technical support for design/solution in a commercialization level
- Measurement services for antennas (charged services)
  - Measurements for medium-sized antennas
  - Measurements for cell phone antennas
  - Measurements for antenna measurement and test
  - Measurements for millimeter-wave antennas
  - Measurements for Passive Intermodulation Distortion (PIM)

**Technical education on electromagnetic compatibility**

EMTI offers EMC and antenna education courses with theory and experiment combined, with which engineers and developers in the EMC-related fields can apply in their works.

- Comprehensive EMC technical education (theory- and experiment-oriented)
- Antenna technical education
- Technical education associated with local authorities and communities
- Online education (beginning, intermediate, and advanced levels)

**Information on electromagnetic compatibilities**

EMTI conducts research and analysis on recent trends of electromagnetic regulations and EMC technologies, and offers the information to companies.

- EMC solutions (a database of cases)
- Technical information (standardization, recent papers/patents)
- Newsletters and webinars

EMTI also engages in various activities including EMC consulting (for example, electric locomotive), EMC/EMI standardization, and standard development for wireless power transmission. And the annual EMC Fest for this year will be held in October 2011. We welcome the participation of anyone who is interested in this event.

For more information, please visit our website [www.emti.or.kr](http://www.emti.or.kr).
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