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**Co-Chair:** Ji Chen, University of Houston, Houston, TX, USA

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	* Nominated for Best Technical Paper Award	

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**Chair:** Bob Johnk, Institute for Telecommunication Sciences (NTIA/ITS), Boulder, CO, USA

**Co-Chair:** Sarah Seguin, University of Kansas, Lawrence, KS, USA

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## TUESDAY POSTER PAPERS

**Tuesday, August 6, 2013**

### Technical Committee Poster Session

**Chair:** Perry Wilson, NIST, Boulder, CO, USA

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## TUESDAY TECHNICAL PAPERS

**Tuesday, August 6, 2013**

### TC2 Reverberation

**Chair:** Galen Koepke, NIST, Boulder, CO, USA

**Co-Chair:** William A. Radasky, Metatech Corporation, Goleta, CA, USA

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## TC-9 Practical Applications of Numerical Modeling

**Chair:** Samuel Connor, IBM Corporation, Raleigh, NC, USA

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## **Special Session (TC10-CPMT/TC12) High Speed Signaling Design Optimization**

**Chair:** Xiaoning Ye, IBM Corporation, Poughkeepsie, NY, USA

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# WEDNESDAY TECHNICAL PAPERS

Wednesday, August 7, 2013

## TC2 Measurements – General

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**Co-Chair:** Clifford Hauser, Raytheon, Tucson, AZ, USA

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\* Nominated for Best Technical Paper Award
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## TC-4 Radiation and Susceptibility

**Chair:** Phil Berger, EMC Consultant, New Hartford, IA, USA

**Co-Chair:** John Kraemer, Rockwell Collins, Cedar Rapids, IA, USA

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**Chair:** Marina Koledintseva, Missouri University of Science and Technology, Rolla, MO, USA

**Co-Chair:** Maria Sabrina Sarto, Sapienza University of Rome, Rome, Italy

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Ned Bryant (*RTP Company, Winona, MN, USA*)  
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## TC-1 Managing Risk in EMC Compliance

**Chair:** Doug Kramer, ETS-Lindgren, Cedar Park, TX, USA

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David Staggs (*Regulatory Consultant, Hunt, TX, USA*)

## Special Session (TC5) New Developments in Intentional Electromagnetic Interference (IEMI)

**Chair:** William Radasky, Metatech Corporation, Goleta, CA, USA

**Co-Chair:** Michael Caruso, ETS-Lindgren, Cedar Park, TX, USA

- 8:30 am **A Survey of Narrowband IEMI Global Threats** ..... 397  
Sarita Prasad (*University of New Mexico, Albuquerque, NM, USA*); Edl Schamiloglu (*University of New Mexico, Albuquerque, NM, USA*)
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	Felix Vega ( <i>National University of Colombia, Bogota, Colombia</i> ); Nicolas Mora ( <i>Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland</i> ); Farhad Rachidi ( <i>Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland</i> ); Nestor Peña ( <i>Los Andes University, Bogota, Colombia</i> ); Francisco Roman ( <i>Swiss Federal Institute of Technology-EPFL, Lausanne, Switzerland</i> )	
	* Nominated for Best Technical Paper Award	

## TC2 Antennas

**Chair:** Zhong Chen, ETS-Lindgren, Cedar Park, USA

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3:30 pm	<b>Design of Electromagnetic Field Immunity Test System Applying with 128-Element Array Antenna</b> .....	445
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4:00 pm	<b>Measurement Model based Uncertainty Evaluations for Calibrations of Dipole-Like Antennas</b> .....	450
	Zhong Chen ( <i>ETS-Lindgren, Cedar Park, TX, USA</i> )	
	* Nominated for Best Technical Paper Award	

## TC-4 Shielding, Transmission lines and Grounding

**Chair:** Ross Carlton, National Instruments, Austin, TX, USA

**Co-Chair:** Phil Berger, EMC Consultant, New Hartford, IA, USA

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Samuel Connor (*IBM Systems & Technology Group, Research Triangle Park, NC, USA*);  
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Miroslav Pajovic (*Cisco Systems Inc., San Jose, CA, USA*); John Savic (*Cisco Systems Inc., San Jose, CA, USA*); Alpesh Bhobe (*Cisco Systems Inc., San Jose, CA, USA*); Xiaoxia Zhou (*Cisco Systems Inc., San Jose, CA, USA*)
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- 4:30 pm **Modeling Timing Variations in Digital Logic Circuits Due to Electrical Fast Transients** ..... 484  
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## TC-9 Time Domain Methods

**Chair:** Alan Roden, The Aerospace Corporation, Chantilly, VA, USA

**Co-Chair:** Wen-Yan Yin, Shanghai Jiao Tong University, Shanghai, China

- 1:30 pm **Co-Simulation of Distributive and Lumped Systems using the Discontinuous Galerkin Finite Element Time Domain Method** ..... 494  
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	Tim McDonald ( <i>Electro Magnetic Applications, Inc., Lakewood, CO, USA</i> ); Robert Fisher ( <i>Electro Magnetic Applications, Inc., Lakewood, CO, USA</i> ); Greg Rigden ( <i>Electro Magnetic Applications, Inc., Lakewood, CO, USA</i> ); Rod Perala ( <i>Electro Magnetic Applications, Inc., Lakewood, CO, USA</i> )	
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3:30 pm	<b>Enhanced Conformal FDTD Method for Predicting Transient Responses of Arbitrary PEC Wedges Illuminated by an Electromagnetic Pulse</b> .....	509
	Xiang Yuan ( <i>Zhejiang University, Hangzhou, China</i> ); Xiang-Hua Wang ( <i>Zhejiang University, Hangzhou, China</i> ); Jing Jin ( <i>Zhejiang University, Hangzhou, China</i> ); Jun Hu ( <i>Zhejiang University, Hangzhou, China</i> ); Wen-Yan Yin ( <i>Zhejiang University, Hangzhou, China</i> )	
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## **Special Session (TC-11) Nanotechnology in EMC**

**Chair:** Marina Koledintseva, Missouri University of Science and Technology, Rolla, MO, USA

**Co-Chair:** Alessio Tamburrano, Sapienza University of Rome, Rome, Italy

**Co-Chair:** Maria Sabrina Sarto, Sapienza University of Rome, Rome, Italy

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2:00 pm	<b>Energy Band Gap Study of Semiconducting Single Walled Carbon Nanotube Bundle</b> .....	534
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2:30 pm	<b>High Frequency Performance Limits of Nanointerconnects based on CVD-Grown Graphene Films Transferred on SiO<sub>2</sub>-Substrate</b> .....	539
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## **Special Session (TC9/TC10) System Level SI/PI Analysis for High Speed Design**

**Chair:** Jianmin Zhang, Altera Corporation, San Jose, CA, USA

**Co-Chair:** Mauro Lai, Intel Corporation, Dupont, WA, USA

1:30 pm	<b>Decompositional Electromagnetic Analysis of Digital Interconnects</b> .....	563
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	Jane Lim ( <i>Cisco Systems, Inc., San Jose, CA, USA</i> ); Ji Zhang ( <i>Cisco Systems, Inc., San Jose, CA, USA</i> ); Wei Yao ( <i>Cisco Systems, Inc., San Jose, CA, USA</i> ); Kenneth Tseng ( <i>Cisco Systems, Inc., San Jose, CA, USA</i> ); Kelvin Qiu ( <i>Cisco Systems, Inc., San Jose, CA, USA</i> ); Rick Brooks ( <i>Cisco Systems, Inc., San Jose, CA, USA</i> ); Jun Fan ( <i>Missouri University of Science and Technology, Rolla, MO, USA</i> )	
2:30 pm	<b>A New Design Flow to Evaluate High-Speed SerDes Link Performance with Re-Driver</b> .....	575
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4:30 pm	<b>System Level Simulation Solutions for High-Speed Channels – Package and PCB Interface</b> .....	593
	Jianmin Zhang ( <i>CST, Framingham, MA, USA</i> ); Antonio Ciccomancini Scogna ( <i>Altera Corp., San Jose, CA, USA</i> ); Tracey Vincent ( <i>Altera Corp., San Jose, CA, USA</i> ); Hong Shi ( <i>CST, Framingham, MA, USA</i> ); Hui Liu ( <i>CST, Framingham, MA, USA</i> )	
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	Wei Xu ( <i>Intel Corporation, Chandler, AZ, USA</i> ); Jiangqi He ( <i>Intel Corporation, Chandler, AZ, USA</i> ); Dong Zhong ( <i>Intel Corporation, Chandler, AZ, USA</i> )	

## THURSDAY TECHNICAL PAPERS

**Thursday, August 8, 2013**

### TC2 Measurements I

**Chair:** Don Heirman, Don HEIRMAN Consultants, Lincroft, NJ, USA

**Co-Chair:** Dave Arnett, Hewlett Packard, Vancouver, WA, USA

8:30 am	<b>Pre-Compliance Test Method for Radiated Emissions with Multiple Segment Transfer Functions</b> .....	605
	D. Schneider ( <i>University of Stuttgart, Stuttgart, Germany</i> ); M. Böttcher ( <i>University of Stuttgart, Stuttgart, Germany</i> ); S. Tenbohlen ( <i>University of Stuttgart, Stuttgart, Germany</i> ); W. Köhler ( <i>University of Stuttgart, Stuttgart, Germany</i> )	
9:00 am	<b>Comparison of Conducted Disturbance Voltages at Telecommunication Ports Measured using Different Reference Ground Planes in Accordance with CISPR 32</b> .....	611
	Yoshiharu Akiyama ( <i>NTT Energy and Environment Systems Laboratories, Tokyo, Japan</i> ); Yoshihisa Aotani ( <i>NEC Access Technica Ltd., Shizuoka, Japan</i> ); Kazuo Okada ( <i>Ishikawa Co. Ltd., Yokohama-shi, Japan</i> ); Hidenori Muramatsu ( <i>VCCI Council, Tokyo, Japan</i> )	
9:30 am	<b>Investigation of Interference in a Mobile Phone from a DC-to-DC Converter</b> .....	616
	Satyajeet Shinde ( <i>Missouri University of Science and Technology, Rolla, MO, USA</i> ); Andriy Radchenko ( <i>Missouri University of Science and Technology, Rolla, MO, USA</i> ); Jingnan Pan ( <i>Missouri University of Science and Technology, Rolla, MO, USA</i> ); Kang Sung-Hee ( <i>LG Electronics, Seoul, South Korea</i> ); Dongjin Kim ( <i>LG Electronics, Seoul, South Korea</i> ); Sangyeob Lee ( <i>LG Electronics, Seoul, South Korea</i> ); Jun Fan ( <i>Missouri University of Science and Technology, Rolla, MO, USA</i> ); David Pommerenke ( <i>Missouri University of Science and Technology, Rolla, MO, USA</i> )	
10:30 am	<b>Double Position-Signal-Difference Method for Electric Near-Field Measurements</b> .....	621
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## TC-4 Emissions, Filters and Enclosure Suppression Techniques

**Chair:** John Kraemer, Rockwell Collins, Cedar Rapids, IA, USA

**Co-Chair:** Phil Berger, EMC Consultant, New Hartford, IA, USA

- 8:30 am **Estimating the Radiated Emissions from Cables Attached to a Switching Power Supply in a MIL-STD 461 Test** ..... 626  
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Pujitha Davuluri (*Intel Corporation, Hillsboro, OR, USA*); Chung-Hao Chen (*Intel Corporation, Hillsboro, OR, USA*)
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Yu-nan Han (*Beijing University of Chemical Technology, Beijing, China*); Biao Yang (*China Academic of Aerospace Technology, Beijing, China*); Qing Guo (*Beijing University of Chemical Technology, Beijing, China*)
- 10:30 am **A Reconfigurable Dual-Band Metasurface for EMI Shielding of Specific Electromagnetic Wave Components** ..... 640  
M.M. Masud (*North Dakota State University, Fargo, ND, USA*); B. Ijaz (*North Dakota State University, Fargo, ND, USA*); A. Iftikhar (*North Dakota State University, Fargo, ND, USA*); M.N. Rafiq (*North Dakota State University, Fargo, ND, USA*); B.D. Braaten (*North Dakota State University, Fargo, ND, USA*)  
\* Nominated for Best Technical Paper Award
- 11:00 am **Sheet Absorbing Material Modeling and Application for Enclosures** ..... 645  
Andriy Radchenko (*Missouri University of Science and Technology, Rolla, MO, USA*); Joseph Bishop (*Missouri University of Science and Technology, Rolla, MO, USA*); Richard Johnson (*Laird Technologies, San Marcos, CA, USA*); Paul Dixon (*Laird Technologies, San Marcos, CA, USA*); Marina Koledintseva (*Missouri University of Science and Technology, Rolla, MO, USA*); Roman Jobava (*EMCoS Ltd., Tbilisi, Georgia*); David Pommerenke (*Missouri University of Science and Technology, Rolla, MO, USA*); James Drewniak (*Missouri University of Science and Technology, Rolla, MO, USA*)
- 11:30 am **Prediction of 3D-Near Field Coupling between a Toroidal Inductor and a Transmission Line** ..... 651  
H. Shall (*IRSEEM/ESIGELEC, Rouen, France*); Z. Riah (*IRSEEM/ESIGELEC, Rouen, France*); M. Kadi (*IRSEEM/ESIGELEC, Rouen, France*)

## SC-4 Wireless EMC

**Chair:** Antonio Orlandi, University of L'Aquila, L'Aquila, Italy

**Co-Chair:** Wilson Wu, Shenzhen Sunway Communication Co., Ltd., Shanghai, China

- 8:30 am **In-Band Spurious Attenuation in LTE-Class RFIC Chip using a Soft Magnetic Thin Film** ..... 657  
Sho Muroga (*Tohoku University, Sendai, Japan*); Yasushi Endo (*Tohoku University, Sendai, Japan*);  
Tetsuo Ito (*Tohoku University, Sendai, Japan*); Satoshi Tanaka (*Tohoku University, Sendai, Japan*);  
Motoki Murakami (*Renesas Electronics Corporation, Tokyo, Japan*); Kazuaki Hori (*Renesas  
Electronics Corporation, Tokyo, Japan*); Satoru Takahashi (*Renesas Mobile Corporation, Tokyo,  
Japan*); Azuma Naoya (*Kobe University, Kobe, Japan*); Tetsuya Makita (*Kobe University, Kobe,  
Japan*); Satoshi Imai (*Kobe University, Kobe, Japan*); Makoto Nagata (*Kobe University, Kobe,  
Japan*); Masahiro Yamaguchi (*Tohoku University, Sendai, Japan*)
- 9:00 am **Wireless Power Transmission for Oil Well Applications** ..... 662  
Xiyao Xin (*University of Houston, Houston, TX, USA*); David Jackson (*University of Houston,  
Houston, TX, USA*); Ji Chen (*University of Houston, Houston, TX, USA*); Paul Tubel (*Tubel Energy,  
Inc., The Woodlands, TX, USA*)
- 9:30 am **Measurement Validation of the Dipole-Moment Model for IC Radiated Emissions** ..... 666  
Jingnan Pan (*Missouri University of Science and Technology, Rolla, MO, USA*); Guanghua Li  
(*Missouri University of Science and Technology, Rolla, MO, USA*); Yan Zhou (*Huawei Technologies  
Co., Ltd, Shenzhen, China*); Yadong Bai (*Huawei Technologies Co., Ltd, Shenzhen, China*);  
Xuequan Yu (*Huawei Technologies Co., Ltd, Shenzhen, China*); Yao-Jiang Zhang (*Missouri  
University of Science and Technology, Rolla, MO, USA*); Jun Fan (*Missouri University of Science and  
Technology, Rolla, MO, USA*)  
\* Nominated for Best Technical Paper Award
- 10:30 am **Proximity and Antenna Orientation Effects for Large-Form-Factor  
Devices in a Reverberation Chamber** ..... 671  
Willem T.C. Burger (*Technical University of Eindhoven, Eindhoven, The Netherlands*);  
Kate A. Remley (*NIST, Boulder, CO, USA*); Christopher L. Holloway (*NIST, Boulder, CO, USA*);  
John M. Ladbury (*NIST, Boulder, CO, USA*)
- 11:00 am **Impact of Parasitic Inductance on Effectiveness of TVS Diodes** ..... 677  
Qian Huang (*BlackBerry, Waterloo, ON, Canada*); Gang Feng (*BlackBerry, Waterloo, ON, Canada*)
- 11:30 am **Distributed Wireless Coexistence, Middleware Solutions and Immunity Hardening** ..... 682  
Dheena Moongilan (*Alcatel-Lucent, Murray Hill, NJ, USA*)

## Special Session (TC-9) EMC in and on Transportation Structures

**Chair:** Giuseppina Dall'Armi-Stoks, DSTO, Edinburgh, Australia

**Co-Chair:** Giulio Antonini, Università degli Studi dell'Aquila, L'Aquila, Italy

- 8:30 am **Automotive EMC Analysis using the Hybrid Finite Element Boundary Integral Approach** ..... 688  
J.F. Mologni (*ESSS / ANSYS, São Paulo, Brazil*); M. Kopp (*ESSS / ANSYS, São Paulo, Brazil*);  
C.L.R. Siqueira (*ESSS / ANSYS, São Paulo, Brazil*); A. Collin (*FIAT, Betim, Brazil*); A. Nogueira  
(*FIAT, Betim, Brazil*); M.A.R. Alves (*UNICAMP, Campinas, Brazil*)

9:00 am	<b>A Surface PEEC Formulation for the Analysis of Electrical Networks in Airplanes</b> .....	694
	Mauro Bandinelli ( <i>IDS Ingegneria Dei Sistemi S.p.A, Pisa, Italy</i> ); Alessandro Mori ( <i>IDS Ingegneria Dei Sistemi S.p.A, Pisa, Italy</i> ); Mirko Bercigli ( <i>IDS Ingegneria Dei Sistemi S.p.A, Pisa, Italy</i> ); Daniele Romano ( <i>Università degli Studi dell'Aquila, Gronchi, Italy</i> ); Giulio Antonini ( <i>Università degli Studi dell'Aquila, Gronchi, Italy</i> )	
9:30 am	<b>A High Frequency EMI/EMC Analysis Methodology for Ships</b> .....	701
	Giuseppina Dall'Armi-Stoks ( <i>Edinburgh, Australia, )</i>	
10:30 am	<b>A Methodology for Modelling IEMI Problems on Transportation Platforms</b> .....	707
	Mauro Bandinelli ( <i>IDS Ingegneria Dei Sistemi S.p.A, Pisa, Italy</i> ); Mirko Bercigli ( <i>IDS Ingegneria Dei Sistemi S.p.A, Pisa, Italy</i> ); GianMarco Sammarone ( <i>IDS Ingegneria Dei Sistemi S.p.A, Pisa, Italy</i> ); Kevin Mitchell ( <i>IDS Ingegneria Dei Sistemi (UK) Limited, Fareham, United Kingdom</i> )	

## **TC10 Signal Integrity Enhancement and Crosstalk Management**

**Chair:** Bill Chen, Yangtze Delta Region Institute of Tsinghua University, Beijing, China

**Co-Chair:** Antonio Ciccomancini, CST of America, Framingham, MA, USA

8:30 am	<b>Signal Integrity Enhancement of High-Speed Digital Interconnect with Discontinuous and Asymmetric Structures for Mobile Applications</b> .....	713
	Tae-Wan Koo ( <i>Yonsei University, Seoul, South Korea</i> ); Hee-do Kang ( <i>Yonsei University, Seoul, South Korea</i> ); Jeunguk Ha ( <i>LG Electronics, Seoul, South Korea</i> ); EunKwang Koh ( <i>LG Electronics, Seoul, South Korea</i> ); Jong-Gwan Yook ( <i>Yonsei University, Seoul, South Korea</i> )	
9:00 am	<b>Crosstalk Analysis for Dual Stripline with Parallel and Angled Routing</b> .....	718
	Weifeng Shu ( <i>Intel Asia Pacific Research and Development Ltd, Shanghai, China</i> ); Xiaoning Ye ( <i>Intel Corporation, Hillsboro, OR, USA</i> ); Yinglei Ren ( <i>Intel Asia Pacific Research and Development Ltd, Shanghai, China</i> ); Xinjun Zhang ( <i>Intel Asia Pacific Research and Development Ltd, Shanghai, China</i> )	
9:30 am	<b>Inter-Layer Crosstalk Management in Differential Dual-Striplines</b> .....	724
	Kai Xiao ( <i>Intel Corp, DuPont, WA, USA</i> ); Jimmy Hsu ( <i>Intel Microelectronics Asia Ltd, Taipei, Taiwan</i> ); Yuan-Liang Li ( <i>Intel Microelectronics Asia Ltd, Taipei, Taiwan</i> ); Richard Kunze ( <i>Intel Corp, DuPont, WA, USA</i> ); Yinglei Ren ( <i>Intel Asia-Pacific Research &amp; Development Ltd., Shanghai, China</i> ); Trung-Thu Nguyen ( <i>Intel Corp, DuPont, WA, USA</i> )	
10:30 am	<b>Differential Symmetry Principle for Differential Crosstalk Cancellation</b> .....	730
	Raul Enriquez ( <i>Intel Corp., Guadalajara, Mexico</i> ); Kai Xiao ( <i>Intel Corp., DuPont, WA, USA</i> ); Beomtaek Lee ( <i>Intel Corp., Santa Clara, CA, USA</i> ); Miguel Tlaxcalteco ( <i>Intel Corp., Guadalajara, Mexico</i> )	
11:00 am	<b>Differential Mode to Common Mode Conversion on Differential Signal vias due to Asymmetric GND via Configurations</b> .....	735
	Alma Jaze ( <i>IBM, Poughkeepsie, NY, USA</i> ); Bruce Archambeault ( <i>IBM Corporation, Research Triangle Park, NC, USA</i> ); Sam Connor ( <i>IBM Corporation, Research Triangle Park, NC, USA</i> )	
11:30 am	<b>Debugging and Analysis of a Noise Coupling Mechanism in Computer System</b> .....	741
	Weifeng Shu ( <i>Intel Asia Pacific Research and Development Ltd, Shanghai, China</i> ); Xiaoning Ye ( <i>Intel Corporation, Hillsboro, OR, USA</i> ); Yinglei Ren ( <i>Intel Asia Pacific Research and Development Ltd, Shanghai, China</i> )	



## TC2 Measurements II

**Chair:** H. Robert Hofmann, Hofmann EMC Engineering, Naperville, IL, USA

**Co-Chair:** Tom Fagan, Raytheon, Tucson, AZ, USA

- 2:30 pm **One-Port Time Domain Measurement Technique for Quality Factor Estimation of Loaded and Unloaded Cavities** ..... 747  
David L. Green (*Oklahoma State University, Stillwater, OK, USA*); Vignesh Rajamani (*Oklahoma State University, Stillwater, OK, USA*); Charles F. Bunting (*Oklahoma State University, Stillwater, OK, USA*); Bruce Archambeault (*IBM Corporation, Research Triangle Park, NC, USA*); Samuel Connor (*IBM Corporation, Research Triangle Park, NC, USA*)
- 3:00 pm **Cross-Validation of Transmission-Line Super Theory Radiated Power Calculations with Measurements for Open Waveguide Structures** ..... 751  
Ronald Rambousky (*Bundeswehr Research Institute for Protective Technologies and NBC-Protection (WIS), Munster, Germany*); Heyno Garbe (*Leibniz University, Hannover, Germany*); Hans Georg Krauthäuser (*Technical University Dresden, Dresden, Germany*)
- 4:00 pm **Prediction of Radiated Emission for Complex Systems under Realistic Operating Conditions** ..... 757  
David Hamann (*Leibniz Universität Hannover, Hannover, Germany*); Sven Battermann (*WAGO Kontakttechnik GmbH & Co KG, Minden, Germany*); Marcin Mleczko (*Leibniz Universität Hannover, Hannover, Germany*); Heyno Garbe (*Leibniz Universität Hannover, Hannover, Germany*)
- 4:30 pm **High Frequency Battery Impedance Measurements for EMI Prediction** ..... 763  
Mohammad Sami Tabbakh (*Lebanese University, Jdeidet, Lebanon*); Florent Morel (*Université de Lyon, E'cole Centrale de Lyon, E'cully Cedex, France*); Roberto Mrad (*Université de Lyon, E'cole Centrale de Lyon, E'cully Cedex, France*); Youssef Zaatar (*Lebanese University, Jdeidet, Lebanon*)
- 5:00 pm **A Novel Measurement Fixture for Characterizing USB 3.0 Radio Frequency Interference** ..... 768  
Chung-hao (Joseph) Chen (*Intel Corp., Hillsboro, OR, USA*); Pujitha Davuluri (*Intel Corp., Hillsboro, OR, USA*); Dong-ho Han (*Intel Corp., Hillsboro, OR, USA*)

## Special Session (SC4) EMC for Emerging Wireless Technologies

**Chair:** Yihong Qi, DBJ Technologies, Zhuhai, China

**Co-Chair:** Jun Fan, Missouri University of Science and Technology, Rolla, MO, USA

- 2:30 pm **Electromagnetic Interference Shielding Effects in Wireless Power Transfer using Magnetic Resonance Coupling for Board-to-Board Level Interconnection** ..... 773  
Sukjin Kim (*KAIST, Daejeon, South Korea*); Hongseok Kim (*KAIST, Daejeon, South Korea*); Jonghoon J. Kim (*KAIST, Daejeon, South Korea*); Bumhee Bae (*KAIST, Daejeon, South Korea*); Sunkyu Kong (*KAIST, Daejeon, South Korea*); Joungho Kim (*KAIST, Daejeon, South Korea*)
- 3:00 pm **Innovative O-Shape Spring Contact used in Mobile Devices** ..... 779  
Ye-Hai Bi (*Shenzhen Sunway Communication Co., Ltd., ShenZhen, China*); Wilson Wu (*Shenzhen Sunway Communication Co., Ltd., ShenZhen, China*); Joe Zhou (*Shenzhen Sunway Communication Co., Ltd., ShenZhen, China*)
- 4:00 pm **An Electromagnetic Interference (EMI) Evaluation Method for Components in Mobile Devices** ..... 783  
Eakhwan Song (*Samsung Electronics Company, Suwon, South Korea*); Hark-Byeong Park (*Samsung Electronics Company, Suwon, South Korea*); Hyun Ho Park (*University of Suwon, Suwon, South Korea*)



4:30 pm	<b>The Application of Spark Gaps on Audio Jack for ESD Protection</b> .....	787
	Jing Li ( <i>Missouri University of Science and Technology, Rolla, MO, USA</i> ); Jun Fan ( <i>Missouri University of Science and Technology, Rolla, MO, USA</i> ); David Pommerenke ( <i>Missouri University of Science and Technology, Rolla, MO, USA</i> )	
5:00 pm	<b>Fast Characterization of the Radiated Desensitization of Mobile Devices</b> .....	792
	Jingyu Huang ( <i>Nokia Inc., San Diego, CA, USA</i> )	

## TC-9 Reverberation Chambers and Rectangular Cavities

**Chair:** Vignesh Rajamani, Oklahoma State University, Stillwater, OK, USA

**Co-Chair:** James West, Oklahoma State University, Stillwater, OK, USA

2:30 pm	<b>Calculation of Currents Induced in a Long Transmission Line Placed Symmetrically Inside a Rectangular Cavity</b> .....	796
	Ronald Rambousky ( <i>Bundeswehr Research Institute for Protective Technologies, Munster, Germany</i> ); Sergey Tkachenko ( <i>Otto-von-Guericke University Magdeburg, Magdeburg, Germany</i> ); Jürgen Nitsch ( <i>Otto-von-Guericke University, Magdeburg, Germany</i> )	
3:00 pm	<b>How to Handle a Huygens' Box Inside an Enclosure</b> .....	802
	Morten Sørensen ( <i>Aalborg University, Aalborg, Denmark</i> ); Ivan Bonev Bonev ( <i>Aalborg University, Aalborg, Denmark</i> ); Ondrej Franek ( <i>Aalborg University, Aalborg, Denmark</i> ); Gert Frølund Pedersen ( <i>Aalborg University, Aalborg, Denmark</i> ); Hans Ebert ( <i>Aalborg University, Aalborg, Denmark</i> )	
4:00 pm	<b>Simulation of Reverberation Chambers using Method of Moments with Cavity Green's Function and Spectral Domain Factorization</b> .....	808
	M.E. Gruber ( <i>Technische Universität München, München, Germany</i> ); T.F. Eibert ( <i>Technische Universität München, München, Germany</i> )	
4:30 pm	<b>Practical Considerations for the Evaluation of the 3-D Green's Function in a Rectangular Cavity Moment Method at High Frequency</b> .....	813
	James C. West ( <i>Oklahoma State University, Stillwater, OK, USA</i> ); Vignesh Rajamani ( <i>Oklahoma State University, Stillwater, OK, USA</i> ); Charles F. Bunting ( <i>Oklahoma State University, Stillwater, OK, USA</i> )	
5:00 pm	<b>Carousel Stirrer Efficiency Evaluation by a Volumetric Lattice-Based Correlation Matrix</b> .....	819
	Gabriele Gradoni ( <i>University of Maryland, College Park, MD, USA</i> ); Valter Mariani Primiani ( <i>Università Politecnica delle Marche, Ancona, Italy</i> ); Franco Moglie ( <i>Università Politecnica delle Marche, Ancona, Italy</i> )	

## TC5 High Power EM including Intentional EMI, ESD, and Lightning

**Chair:** William A. Radasky, Metatech Corporation, Goleta, CA, USA

**Co-Chair:** Michael McInerney, US Army Corp of Engineers, Champaign, IL, USA

2:30 pm	<b>Lightning Currents Measured on the Säntis Tower: A Summary of the Results Obtained in 2010 and 2011</b> .....	825
	Carlos Romero ( <i>Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland</i> ); Farhad Rachidi ( <i>Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland</i> ); Marcos Rubinstein ( <i>University of Applied Sciences of Western Switzerland, Yverdon-les-Bains, Switzerland</i> ); Mario Paolone ( <i>Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland</i> )	

3:00 pm	<b>A Framework for the Simulation of Electrostatic Discharge Immunity using the Unified Circuit Modeling Technique</b> .....	869
	Tadatoshi Sekine ( <i>Shizuoka University</i> ); Hideki Asai ( <i>Shizuoka University</i> )	
4:00 pm	<b>Map-Based Analysis of IEMI Fault Injection into Cryptographic Devices</b> .....	829
	Yu-ichi Hayashi ( <i>Tohoku University, Sendai, Japan</i> ); Naofumi Homma ( <i>Tohoku University, Sendai, Japan</i> ); Takaaki Mizuki ( <i>Tohoku University, Sendai, Japan</i> ); Takafumi Aoki ( <i>Tohoku University, Sendai, Japan</i> ); Hideaki Sone ( <i>Tohoku University, Sendai, Japan</i> )	
	* Nominated for Best Technical Paper Award	
4:30 pm	<b>Improvement of Linear Equivalent Circuit Model to Identify Simultaneous Switching Noise Current in Cryptographic Integrated Circuits</b> .....	834
	Kengo Iokibe ( <i>Okayama University, Okayama, Japan</i> ); Tetsuo Amano ( <i>Okayama University, Okayama, Japan</i> ); Kaoru Okamoto ( <i>Okayama University, Okayama, Japan</i> ); Yoshitaka Toyota ( <i>Okayama University, Okayama, Japan</i> ); Tetsushi Watanabe ( <i>Okayama University, Okayama, Japan</i> )	

## TC10 Signal Integrity and Power Integrity

**Chair:** Chunfei Ye, Intel Corporation, DuPont, WA, USA

**Co-Chair:** Jianfang Zhu, Intel Corporation, Hillsboro, OR, USA

2:30 pm	<b>De-Embedding Techniques for Transmission Lines: An Exploration, Review, and Proposal</b> ....	840
	Nicholas Erickson ( <i>Missouri University of Science and Technology, Rolla, MO, USA</i> ); Ketan Shringarpure ( <i>Missouri University of Science and Technology, Rolla, MO, USA</i> ); Jun Fan ( <i>Missouri University of Science and Technology, Rolla, MO, USA</i> ); Brice Achkir ( <i>Cisco Systems, Inc., San Jose, CA, USA</i> ); Siming Pan ( <i>Cisco Systems, Inc., San Jose, CA, USA</i> ); Chulsoon Hwang ( <i>Samsung, Gyeonggi-do, South Korea</i> )	
	* Nominated for Best Technical Paper Award	
3:00 pm	<b>Investigation of Power and Ground Co-Reference for High-Speed Signal in Package Design</b> ....	846
	Jianmin Zhang ( <i>Altera Corporation, San Jose, CA, USA</i> ); Siow Chek Tan ( <i>Altera Corporation, San Jose, CA, USA</i> ); Hong Shi ( <i>Altera Corporation, San Jose, CA, USA</i> ); Dan Oh ( <i>Altera Corporation, San Jose, CA, USA</i> )	
4:00 pm	<b>Major Error and Sensitivity Analysis for Characterization of Laminate Dielectrics on PCB Striplines</b> .....	852
	Alekssei Rakov ( <i>Missouri University of Science &amp; Technology, Rolla, MO, USA</i> ); Marina Koledintseva ( <i>Missouri University of Science &amp; Technology, Rolla, MO, USA</i> ); James Drewniak ( <i>Missouri University of Science &amp; Technology, Rolla, MO, USA</i> ); Scott Hinaga ( <i>CISCO Systems, Inc., San Jose, CA, USA</i> )	
4:30 pm	<b>Study of BGA Package Cap for High-Performance Computing GPU</b> .....	858
	Wenjie Mao ( <i>Nvidia Corporation, Santa Clara, CA, USA</i> ); Yaping Zhou ( <i>Nvidia Corporation, Santa Clara, CA, USA</i> ); Aniket Naik ( <i>Nvidia Corporation, Santa Clara, CA, USA</i> ); Sunil Sudhakaran ( <i>Nvidia Corporation, Santa Clara, CA, USA</i> )	
5:00 pm	<b>Fast Channel Performance Evaluation using Time Domain Metrics</b> .....	863
	Xiaoning Ye ( <i>Intel Corporation, Hillsboro, OR, USA</i> ); Weifeng Shu ( <i>Intel Corporation, Hillsboro, OR, USA</i> )	