

EMC HARDWARE EXPERIMENTS & COMPUTER SOFTWARE DEMONSTRATIONS

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IEEE EMC SOCIETY EDUCATION & STUDENT ACTIVITIES COMMITTEE (ESAC)

TIME: Tuesday, 18 August & Wednesday, 19 August: 9:30 AM to 5:00 PM
Thursday, 20 August: 9:30 AM to 12:00 PM

PLACE: Austin Convention Center, Exhibit Hall 4

CO-CHAIRS/ORGANIZERS: Colin Brench and Michael Vrbanac

A series of EMC hardware experiments and computational electromagnetic (CEM) software demonstrations will be intermingled and held continuously over a 2½ day period during the Symposium.

EMC Hardware Experiments. Now in its 17th consecutive year, this continues to be a highly popular symposium event. The experiments are devoted to demonstrating important EMC concepts focusing on electromagnetic coupling phenomena and effects, EMC measurement, and troubleshooting methods. These include demonstrations of the effects of PC board radiation coupling; component-cable crosstalk; grounding and shielding strategies; spectral analysis techniques using test hardware; effective EMC test methods and practices; use of EMC instrumentation to measure interference at the device or component level; and the role of EMC standards as part of overall measurement practices. These demonstrations show how, in most cases, fairly simple test hardware can be used to measure a wide range of electromagnetic effects. The experiments are partly based upon those documented in the ESAC's **EMC Experiments Manual**, originally compiled by Clayton Paul and Henry Ott. New experiments are added each year and several popular demonstrations from previous years will be reprised. The hardware experiments will continue to focus on innovative concepts and methods that are of interest to the practical EMC engineer. Hands-on participation during the demonstrations is encouraged.

EMC Software Demonstrations. In these demonstrations, fundamental EMC modeling approaches and simulation methods will be illustrated. Various CEM modeling techniques will be demonstrated illustrating their application to simple canonical-type problems in order to show how specific EMC problems can be solved. These include the application of the moment method (MoM), uniform theory of diffraction (UTD) and variations on the asymptotic ray tracing method, finite difference time-domain (FDTD), finite element modeling (FEM), finite integration techniques (FIT), transmission line (TL) methods, and other techniques. The demonstrations will be conducted using general-purpose codes*. This year's agenda will include many new demonstrations, and several popular problems from prior years will also be reprised.

*Hardware equipment and computer codes used shall not be demonstrated for commercial or promotional purposes. The IEEE EMC Society does not specifically endorse any equipment item or software code used in any of the demonstrations. The sponsor of the demonstrations, the EMC Society Education & Student Activities Committee, reserves the right to cancel any presentation or topic that is deemed to be of a commercial nature at any time prior to or during this session.

AGENDA[†]

18 August, Tuesday Morning (9:30 AM - 12:00 PM)

Finite-Difference Time-Domain Transmission Line Code Model Validation

Jennifer Kitaygorsky; and Cody Weber, -- Electro Magnetic Applications, Lakewood, Colorado, U.S.A.
(computer demo)

Demonstration of Antenna Pattern Measurements

Dr. Michael Foegelle, Director of Technology Development, ETS-Lindgren, L.P., Cedar Park, TX, U.S.A.
(hardware demo)

Demonstration of Antenna Design Tools for EMC Applications

Dr. C. J. Reddy, President, EM Software & Systems Inc., Hampton, Virginia, U.S.A.
(computer demo)

Demonstration of Enclosure Transfer Impedance

Colin Brench, Staff Engineer; Herbert Walker Jr., Senior Engineering Technologist; and David Smith, Staff Technician, -- Southwest Research Institute, San Antonio, Texas, U.S.A
(hardware demo)

18 August, Tuesday Afternoon (2:00 - 5:00 PM)

Damping of Cavity-Modes in a PCB Power-Bus

Gerd Heinrich; and Stefan Dickmann,-- Institute of Electrical Engineering, Helmut-Schmidt-University, Hamburg, Germany
(hardware demo)

Improving EMC Test Productivity with Automated EMC Test Software

Joe Tannehill, EMC Software Engineer, ETS-Lindgren, Cedar Park, Texas, U.S.A.; and David Guzman, Consultant, RFTEK, Raleigh, NC, U.S.A.
(hardware demo)

Using the FDTD Method to Determine Shielding Effectiveness in Standardized Applications

Cody Weber; Electro Magnetic Applications; Lakewood, Colorado, U.S.A.
(computer demo)

Modeling of (i) a Horn-Antenna Array and (ii) a Cassegrain Antenna (use of shaped reflector dish) to Demonstrate Improved Field Uniformity of RF Immunity Test Fields over 1.0 to 6.0 GHz

Vince Rodriguez; and Thomas Mullineaux, -- ETS-Lindgren, L.P., Cedar Park, TX, U.S.A.
(computer demo).

19 August, Wednesday Morning (9:30 AM - 12:00 PM)

Radiated Emissions and Susceptibility Hardware Experiment Demonstration

Bogdan Adamczyk, Grand Valley State University, Grand Rapids, MI, U.S.A.; and Jim Teune, Lead EMC Engineer, Gentex Corporation, Zeeland, MI, U.S.A.
(hardware demo)

Multi-Fidelity System-Level Modeling and Simulation for Cosite EMI Analysis

Fred German, Delcross Technologies, Champaign, IL U.S.A.
(computer demo)

[†]Subject to change up to Symposium time.

Demonstration of MIL-STD-461F Methods CS-115 & CS-116

Steve Ferguson, Washington Laboratories, Gaithersburg, MD, U.S.A.; and Tom Revesz, HV Technologies, Manassas, VA, U.S.A.
(hardware demo)

Finite Element Simulation of Reverberation Chamber EM Fields

Charles F. Bunting, Oklahoma State University, Stillwater, OK, U.S.A.
(computer demo)

19 August, Wednesday Afternoon (2:00 - 5:00 PM)

Predicting Near-Field Emission of Radio-Frequency Device for 3G Mobile using IC-EMC

Celine Dupoux; Samuel Akue-Boulingui; Alexandre Boyer; and Etienne Sicard, -- INSA-DGEI, Toulouse, France
(computer demo)

Illustrating a Progressive Modeling and Simulation Approach Using Both Conservative and Numerical Models to Analyze EMI for Large, Complex Systems

Andrew L. Drozd; and Irina Kasperovich, -- ANDRO Computational Solutions, LLC, Rome, NY, U.S.A.
(computer demo)

Demonstration of a Metrology Grade Cable TDR

Mike Royer; and Robert Flake, -- University of Texas, Austin, Texas, U.S.A.
(hardware demo)

Lightning and P-Static Effects to Aircraft

Fred Heather, EM Environmental Effects Lead, U. S. Naval Air System Command, Joint Strike Fighter (JSF), Patuxent River, Maryland, U.S.A.
(hardware demo)

20 August, Thursday Morning (9:30 AM - 12:00 PM)

Overview and Demonstration of Measurements of Shielding Effectiveness Using IEEE P299.1 Techniques

Kermit O. Phipps, EMC Specialist, Electric Power Research Institute, Power Distribution and Energy Utilization, Knoxville, Tennessee, U.S.A.; Dr. Lothar O. (Bud) Hoeft, Consultant, Electromagnetic Effects, Albuquerque, New Mexico, U.S.A.; and Garth D'Abreu, Technical Manager, ETS-Lindgren, RF Engineering Group, Austin, Texas, U.S.A.
(hardware demo)

Power/Ground Plane Noise on PCBs using Cavity Resonance Method

Dr. Bruce Archambeault, IBM Distinguished Engineer, IEEE Fellow, IBM Corporation, Research Triangle Park, North Carolina, U.S.A.
(computer demo)

Analyzing the Coupling of Radiated High Intensity Fields to Cables Attached to Electrically-Initiated Devices (EIDs) in Electrically-Large Structures

Irina Kasperovich; and Andrew L. Drozd, -- ANDRO Computational Solutions, LLC, Rome, NY, U.S.A.
(computer demo)

Basic EMI Effects at the PCB level

Frank Leferink; and Frits Buesink, -- University of Twente, Enschede, The Netherlands
(hardware demo)