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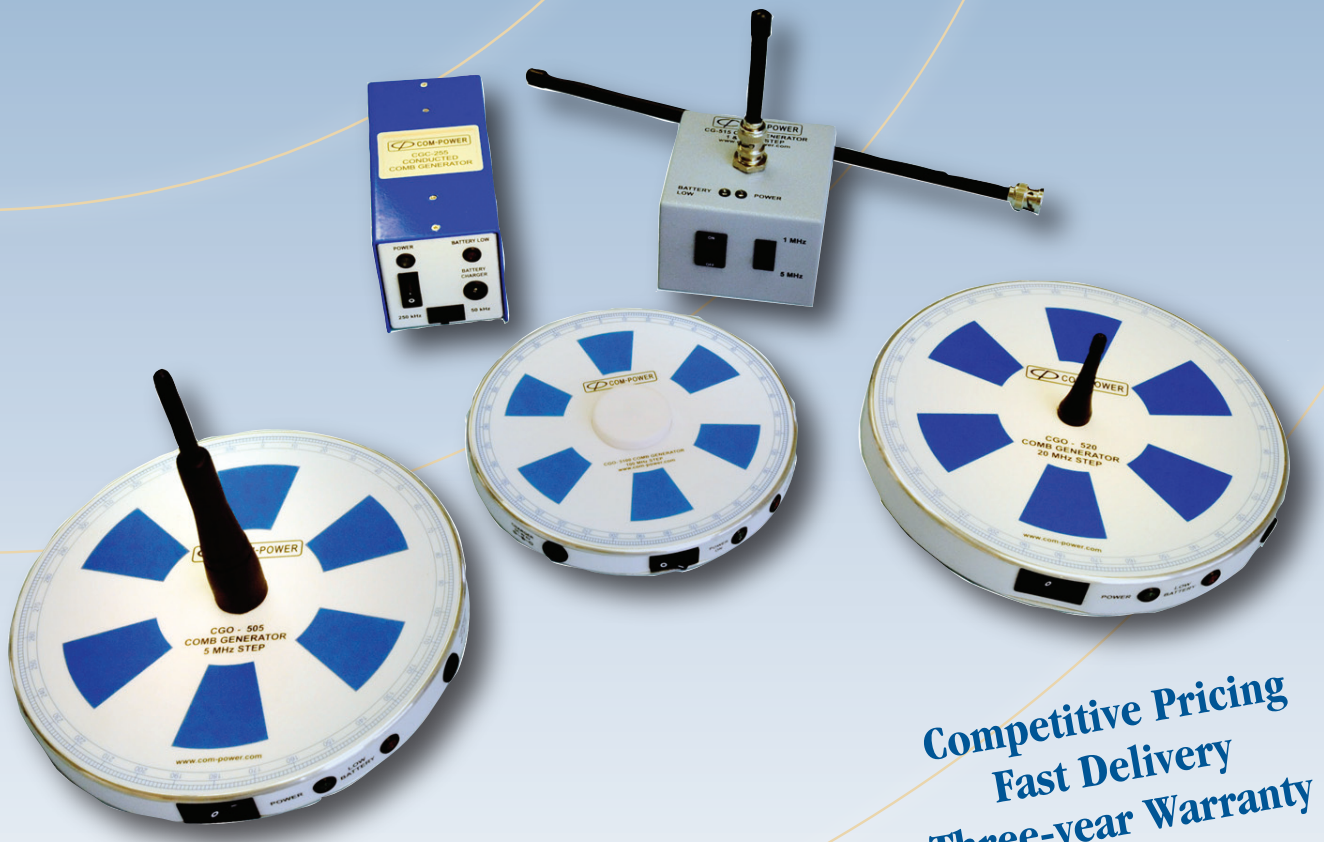

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FCC Sees Looming Spectrum Crunch

The Federal Communications Commission (FCC) has released a detailed study which forecasts a shortage of available frequencies in the electromagnetic spectrum in the face of the exponential growth of mobile data usage.

The Commission's study, "Mobile Broadband: The Benefits of Additional Spectrum," projects a spectrum deficit of nearly 300 megahertz within the next five years. According to the study, this deficit will be driven by significant growth in mobile broadband traffic, which is expected to increase as much as 35 times over current levels. Further, this growth is likely to outpace technology and network improvements designed to increase the efficiency of spectrum use, requiring prompt and definitive action to reallocate under-utilized airwaves.

On the positive side, the Commission's study predicts that the provision of the necessary spectrum for expanded mobile broadband use will create $120 billion in additional spectrum value, and hundreds of billions more in total value to the overall U.S. economy.

The National Broadband Plan released earlier this year by the Commission called for the reallocation of 500 MHz of spectrum for wireless broadband within 10 years, including 300 MHz for use within the next five years. However, the plan notes that the reallocation of portions of the spectrum has historically taken between six and 13 years.

The complete text of the FCC's forecast of mobile broadband spectrum use is available at http://www.fcc.gov/Daily_Releases/Daily_Business/2010/db1102/DOC-302324A1.pdf.

On the positive side, the Commission's study predicts that the provision of the necessary spectrum for expanded mobile broadband use will create $120 billion in additional spectrum value, and hundreds of billions more in total value to the overall U.S. economy.

FCC Looks Back on 70 Years of Regulations

The Federal Communications Commission (FCC) has published a noteworthy working paper that presents a historical review of key decisions by the Commission that have helped to shape the communications landscape in the United States.

The working paper, entitled "Transformative Choices: A Review of 70 Years of FCC Decisions," was authored by Sherille Ismail, a senior attorney at the Commission. According to Ismail, the paper addresses the oft-asserted view that Commission decisions in the 1970s represented a significant turning point in its oversight of participants in the communications industry, and a shift from policies and regulations that protected incumbent players toward those that promoted increased competition.

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Indeed, the working paper asserts that there have been several periods during the FCC's history in which the Commission crafted policies designed to promote market participation by new entrants, most notably in commercial radio, cable television, telephone equipment and direct broadcast satellites.

The complete text of the Commission's White Paper, "70 Years of FCC Decisions," is available at http://www.fcc.gov/Daily_Releases/Daily_Business/2010/db1117/DOC-302496A1.pdf.

FCC Wireless Data Charges Investigation Yields Record Settlement

The Enforcement Bureau of Federal Communications Commission (FCC) has reached an agreement with Verizon Wireless involving allegations that the company billed its wireless customers for unauthorized data transfers.

The agreement, reached in late October 2010, resolved complaints that Verizon Wireless inappropriately billed certain customers who did not subscribe to a data package or plan. The billed charges included:

- Unauthorized data transfers initiated automatically by applications (such as games) built into certain phones;
- Accessing certain web lines that were designated as free-of-charge (e.g., the Verizon Wireless Mobile Web homepage);
- Unsuccessful attempts to access data when there was insufficient network coverage to complete the requested data transfer;
- Unwanted data file transfers initiated by third parties and affecting customers who had content filters installed on their phones.

The Commission's Consent Decree with Verizon Wireless will result in a record $25 million monetary forfeiture and a refund of at least $52.8 million to approximately 15 million Verizon Wireless customers. Verizon Wireless also agreed to implement a number of consumer protection measures to prevent future overbilling.

The text of the Consent Decree between the FCC and Verizon Wireless is available at http://www.fcc.gov/Daily_Releases/Daily_Business/2010/db1028/DA-10-2068A2.pdf.

EU Commission Releases Updated Standards List for EMC Directive

The Commission of the European Union (EU) has published an updated list of standards that can be used to demonstrate conformity with the essential requirements of the EU's directive on electromagnetic compatibility (also known as the EMC Directive, 2004/108/EC).

The EMC Directive applies to "any apparatus or fixed installation." and regulates the "ability of equipment to function satisfactorily…without introducing intolerable electromagnetic disturbances to other equipment."

The provisions of the EMC Directive do not apply to telecommunications terminal equipment, which are covered under the essential requirements of Directive 1999/5/EC (also known as the R&TTE Directive).

The updated list of CEN, CENELEC and ETSI standards that can be used to demonstrate compliance with the EMC Directive was published on November 2010 in the *Official Journal of the European Union*, and replaces all previously published standards list for the Directive.

The complete list of standards can be viewed at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:306:0001:0017:EN:PDF.

EU Sets Eco-Design Requirements for Dishwashers

The Commission of the European Union (EU) has issued a regulation implementing new energy efficiency requirements for household dishwashers.

The regulation, which was published in November 2010 in the *Official Journal of the European Union*, is considered an implementation measure under the EU's Eco-Design Directive, 2009/125/EC. That directive gives the Commission the authority to establish minimum efficiency standards for those "energy-related products representing significant volume of sales and trade, having significant environmental impact and presenting significant potential for improvement in terms of their environmental impact without entailing excessive costs."

The new energy efficiency requirements for dishwashers, which come into effect beginning on 1 December 2011, are defined in Sections 1 and 2 of Annex I of the regulation. The requirements are based on the unit's Energy Efficiency Index, its Cleaning Efficiency Index, and its Drying Efficiency Index, which are calculated following the methods described in Annex II of the regulation.

The complete text of the Commission's regulation regarding the eco-design of dishwashers is available at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:293:0031:0040:EN:PDF.

EU Sets Eco-Design Requirements for Household Washing Machines

The Commission of the European Union (EU) has issued a regulation implementing new energy efficiency requirements for household washing machines.

The regulation, which was published in November 2010 in the *Official Journal of the European Union*, is considered an implementation measure under the EU's Eco-Design Directive, 2009/125/EC. That directive gives the Commission the authority to establish minimum efficiency standards for those "energy-related products representing significant volume of sales and trade, having significant environmental impact and presenting significant potential for improvement in terms of their environmental impact without entailing excessive costs."

The new energy efficiency requirements for washing machines, which come into effect beginning on 1 December 2011, are defined in Sections 1 and 2 of Annex I of the regulation. The requirements are based on the unit's Energy Efficiency Index, its Washing Efficiency Index, its water consumption and the remaining moisture content, which are calculated following the methods described in Annex II of the regulation.

The complete text of the Commission's regulation regarding the eco-design of washing machines is available at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:293:0021:0030:EN:PDF. A correction to typographical error in the implementation date of one of the generic eco-design requirements is available at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:298:0087:0087:EN:PDF.

Commission Amends Marine Equipment Directive

The Commission of the European Union (EU) has amended the directive on marine equipment (96/98/EC) to bring the Community's regulations in line with the current requirements of international maritime conventions and treaties, as well as recently developed standards.

The amended directive on marine equipment, 2010/68/EC, was published in the *Official Journal of the European Union* in November 2010. It includes a revised and expanded Annex A, which covers a surprisingly wide range of electrical and electronic equipment used in marine environments. Covered equipment includes the following categories:

- Pollution prevention equipment, including oil filtering equipment and oil-content meters;
- Fire protection equipment, including portable oxygen analysis and gas detection equipment, low-location lighting systems, emergency escape breathing devices, and alarm devices;
- Navigation equipment, including various types of radar equipment and echo-sounding equipment, GPS equipment, voyage data recorders;
- Radio communications equipment, including radio transmitters and receivers.

The complete text of the amended directive on marine equipment is available at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:305:0001:0054:EN:PDF.

Ryobi Recalls Cordless Drills

Ryobi Technologies Inc. of Anderson, S.C. has announced the recall of about 455,000 of its Ryobi-brand cordless power drills manufactured in China.

The company reports that the switch on the device can overheat, posing a fire and/or burn hazard to consumers. Ryobi says that is has receive 47 reports of the drills overheating, smoking, melting or catching fire, including 12 reports of property damage to homes or vehicles. In two of the reported incidents, consumers suffered minor burns from touching the overheated switch.

The recalled cordless power drills were sold at Home Depot stores from January 2001 through July 2003 for about $100.

Additional details about this product recall are available at http://www.cpsc.gov/cpscpub/prerel/prhtml11/11009.html.

Frigidaire/Electrolux Cooktops Recalled

Electrolux Home Products Inc. of Charlotte, NC has recalled about 122,000 of its Frigidaire and Electrolux-brand electric cooktops and slide-in ranges manufactured in Canada.

According to Electrolux, liquids can pool under the control knobs of the appliances, causing the heating elements to turn on unexpectedly, heat to temperatures other than expected, and then fail to turn off. This potential condition poses a risk of fire and burn hazards to consumers.

The company has received 70 reports of incidents related to the recalled products, including three reports of fires that resulted in property damage, and three reports of minor burn injuries.

The recalled cooktops and ranges were sold by mass merchandise and independent retail stores from January 2005 through August 2010 for between $500 and $2500.

Additional information about this product recall is available at http://www.cpsc.gov/cpscpub/prerel/prhtml11/11016.html.

GE Recalls Dishwashers

GE Appliance & Lighting of Louisville, KY is recalling about 174,000 of its GE Profile and GE Monogram-brand dishwashers manufactured in the United States.

GE reports that water condensation can drip onto the electronic control board, causing a short circuit and resulting in an overheated connector, posing a fire hazard to consumers. The company says that it has received five reports of fires, resulting in minor property damage to kitchen countertops and adjacent kitchen cabinetry. However, there have been no reports of injuries.

The recalled dishwashers were sold at retail stores nationwide, appliance dealers and authorized builder distributors from July 2003 through December 2006 for between $750 and $1400.

Additional details about this product recall are available at http://www.cpsc.gov/cpscpub/prerel/prhtml11/11022.html.

UL Standards Updates

Underwriters Laboratories has announced the availability of the following standards, revisions and bulletins. For additional information regarding the standards listed below, please visit their website at http://www.ul.com.

UL 1012: **Standard for Power Units Other Than Class 2**
New Edition dated November 9, 2010

UL 2790: **Standard for Commercial Incinerators**
New Edition dated November 8, 2010

UL 154: **Carbon-Dioxide Fire Extinguishers**
Revision dated November 8, 2010

UL 291: **Standard for Automated Teller Systems**
Revision dated November 12, 2010

UL 325: **Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems**
Revision dated November 3, 2010

UL 508C: **Standard for Power Conversion Equipment**
Revision dated November 9, 2010

UL 626: **Water Fire Extinguishers**
Revision dated November 8, 2010

UL 924: **Standard for Emergency Lighting and Power Equipment**
Revision dated November 30, 2010

UL 1448: **Electric Hedge Trimmers**
Revision dated November 10, 2010

UL 1815: **Standard for Nonducted Heat Recovery Ventilators**
Revision dated November 12, 2010

UL 1994: **Standard for Luminous Egress Path Marking Systems**
Revision dated November 9, 2010

UL 471: **Standard for Commercial Refrigerators and Freezers**
New Edition dated November 24, 2010
UL 1448: **Electric Hedge Trimmers**
Revision dated November 22, 2010

UL 1694: **Standard for Tests for Flammability of Small Polymeric Component Materials**
Revision dated November 24, 2010

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The iNARTE Informer
Provided by the International Association for Radio, Telecommunications and Electromagnetics

THE DEMOGRAPHICS OF EMC CERTIFICATION

In recent years, iNARTE management has witnessed some dramatic changes regarding the levels of interest in becoming an iNARTE Certified Engineer or Technician. Twenty years ago, when our EMC Certifications were first available, just about all applicants were living and working in the USA, and this has remained the case until last year, 2010. Last year we awarded more new EMC certificates and renewed more EMC certificates to members outside the US. We can now truly claim to be *"International."* However, we needed to understand more of the reasoning behind this change because it is not simply the result of movement of manufacturing to offshore locations. Certainly this has something to do with it, but actually the level of interest in EMC Certification in countries to which manufacturing has moved is about the same that we have now in the US. The big game changer has been Japan.

WHAT IS HAPPENING IN JAPAN

In Japan, iNARTE programs are offered through our cooperation with KEC Electronic Industry Development Center. KEC arrange to proctor iNARTE EMC Certification Exams once each year in the month of February. Since February 2007, there have been more than 200 applicants each year, and already there are more than 200 signed up again for February 2011. If the passing rate for 2011 remains about the same, we will have more than 50% of our EMC members in Japan in March 2011. Yet Japanese industry has also moved much manufacturing offshore, so what is different there and what should we learn from these figures? iNARTE has recently spent time in Japan meeting with KEC and representatives of industry to find out.

It came as no surprise to learn that Japanese industry considers their intellectual property to be all important for their future, and that their strategic planning always includes programs for innovation and continuing improvement of products, as well as for the regular introduction of new products. So although manufacturing has moved to regions with lower labor costs, the design and development work, through pre-production and early production, is kept close to home. In order to meet corporate strategic goals, their EMC Engineers and Technicians need to be well trained and employers need to be able to identify the best of the best. We found that there are a number of Centers of Excellence, KEC being one of the best, that offer comprehensive EMC training courses, and employers require that those attending such training demonstrate their knowledge through Certification.

So, iNARTE Certification has become a principal benchmark for EMC career development in Japan. Corporations not only support iNARTE candidates, but many now insist that their EMC departments send their employees through our certification program.

All of this sounds like great news for iNARTE, but given the great support we are getting from Japan, we needed to know what, if anything, we should be doing to better serve their needs. And it turns out that there is something significant that needs to be done that will result in a whole new EMC

Candidates taking the iNARTE Exam in Tokyo (one of three Test Centers)

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26 MHz - 6 GHz, up to 5000 watts
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- Reliable

Hybrid Modules
- Power up to 37 dBm from 6 to 18 GHz.
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Certification program that we will offer in 2011. A program that will be developed jointly between iNARTE and KEC and which will be defined according to inputs received from both US and Japanese industry leaders, together with leading academics and independent experts from both countries.

Our current EMC certification program will remain in place unchanged. The new program will be an addition to our offerings and will serve the needs of a significant segment of the EMC industry whose focus is geared to **EMC DESIGN** and **PRODUCT DEVELOPMENT.**

THE NEW EMC PROGRAM – "CERTIFIED EMC DESIGN ENGINEER"

First consider the origins of our current EMC certification program. It began 20 years ago as a result of a request to help the US Navy identify EMC experts able to troubleshoot EMC problems in the fleet. So testing and mitigating engineering were key factors in defining the skill sets for certification. In 20 years the program has developed as EMC focus has moved from military to commercial sectors, but still testing for compliance with standards has been a main feature of the program. EMC design is just one of 26 categories of questions that appear in the current examination. So the current program is in demand because it is the best available, but there is now room for a second program where EMC design is the focus and question categories supporting design skill sets will be featured:

- EMC/EMI Theory
- Mathematics of EMC
- Electronic Circuitry
- EMC and Printed Circuit Boards
- Methods of Communication
- Safety standards
- Laboratory Management
- EMI standards
- EMS Standards
- Measurement Techniques
- Countermeasures Techniques

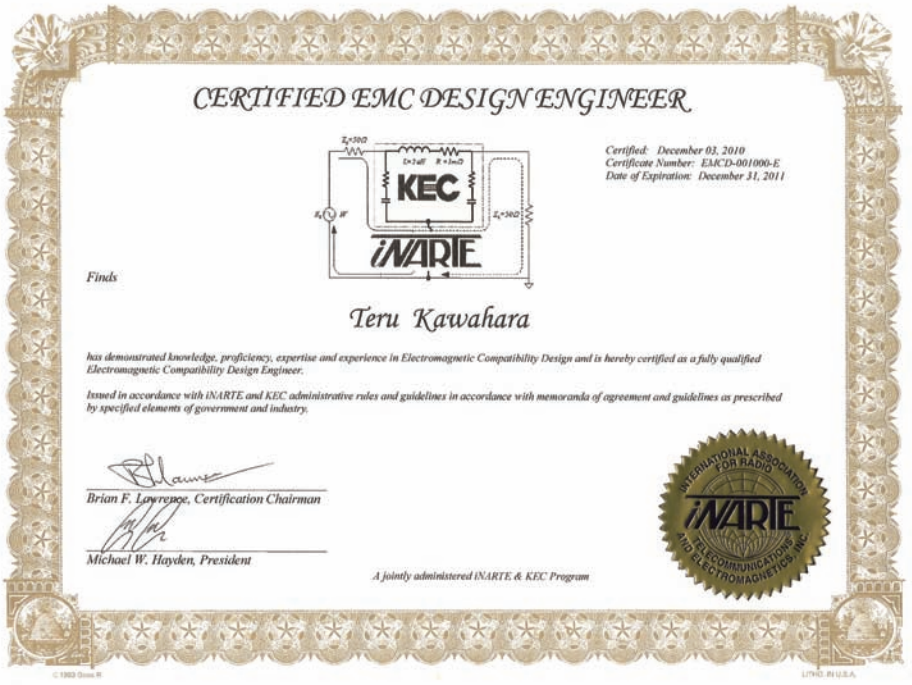
The above categories are still under development and are subject to modification. Many questions from the current program pools will be suitable for use in the new program, but many new pools will be created.

To effect this new program development there will be a Design Development Committee in Japan and another in the USA. The two committees will share their work and the end result will be one coordinated program with a common set of question pools available.

Some other rules for the new program that are now under consideration:

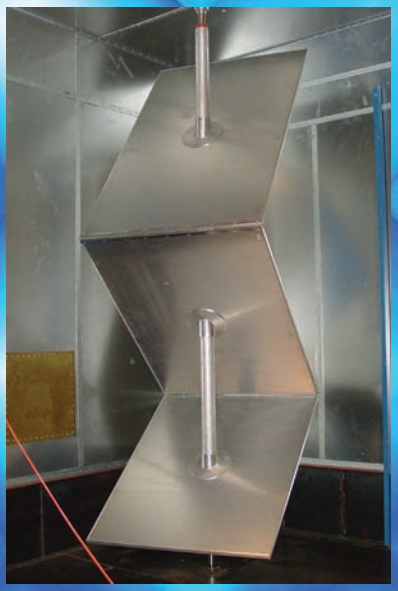
- Three levels of Certification
  - *Engineer*
  - *Senior Engineer*
  - *Master Engineer*
- Experience requirement for Engineer level will be education background only.
- Certification will be for life, no annual renewal fees, but upgrades will require re-certification.

It is anticipated that the first EMC DESIGN ENGINEER certification examinations will be available for EMCS 2011 in Long Beach. Watch *The iNARTE Informer* here in *IN Compliance* each month and visit the iNARTE web site www.narte.org to keep up to speed with the development of this new and exciting program. ■



Certificate of proficiency as an EMC Design Engineer (Draft Concept)

Facility Solutions For Global EMC



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Furthering Your

Professional Development in 2011

The start of a new year is a time when, traditionally, we reflect on the progress we made during the year passed and set our goals for the new year. More often than not, your professional development goals include training or some form of higher education to expand or refresh your technical knowledge. We've queried training resources in our niche industry to provide you with an overview of affordable solutions to meet your training goals in 2011. You'll find here sources of compliance related seminars and workshops offered online and on location, public and private.

We invite you to submit your own suggestions for additional listings as we continue to update our Events section online at www.incompliancemag.com. Send your comments to us at editor@incompliancemag.com.

EMC CLASSES AND WORKSHOPS

EMC By Your Design: A Practical Applications Seminar and Workshop - D.L.S. Electronic Systems, Inc. **(**www.dlsemc.com/1101) -Learn to design products to avoid EMC problems by gaining an understanding of EMC design principles through three days of lecture multiple video clips and hands on workshops. Included are the basics from passive components, such as inductors, capacitors, grounding and cabling, to the shielding characteristics of the housing, circuit board design, ESD troubleshooting, controlling signal return currents of PCBs, how EMC and signal integrity are interrelated and how all this relates to the regulatory standards. Participants will apply these EMC principles through hands-on calculations for actual products.
For further information please visit www.dlsemc.com/1101.

The current schedule for 2011:

- April 12-14, 2011 - Northbrook, IL
- October 18-20, 2011 - Northbrook, IL

High Intensity Radiated Field Effects in Aircraft - EMCC Dr. Rasek (www.emcc.de) offers a two day seminar at the EMCC Seminar Centre in Unterleinleiter, Germany. The seminar covers physical phenomena, certification regulation and standards, associated test methods and procedures - aircraft, system and avionics design to reach compliance.
For further information visit www.emcc.de.
This public seminar is currently scheduled for May 2011.

Lightning Electromagnetic Effects on Aircraft - EMCC Dr. Rasek (www.emcc.de) offers a two day seminar at the EMCC Seminar Centre in Unterleinleiter, Germany. The seminar covers physical phenomena, certification regulation and standards, associated test methods and procedures - aircraft, system and avionics design to reach compliance.
For further information visit www.emcc.de.
This public seminar is currently scheduled for May 2011.

Learn how to make EMC Compliance tests - ETS Lindgren offers a three day, hands on class on how to perform radiated and conducted emissions for immunity tests according to published standards. Instructors are experienced EMC experts with practical lab experience. Participants will apply concepts by making actual measurements in a 3 meter EMC chamber. For further information visit www.ets-lindgren.com/learning.

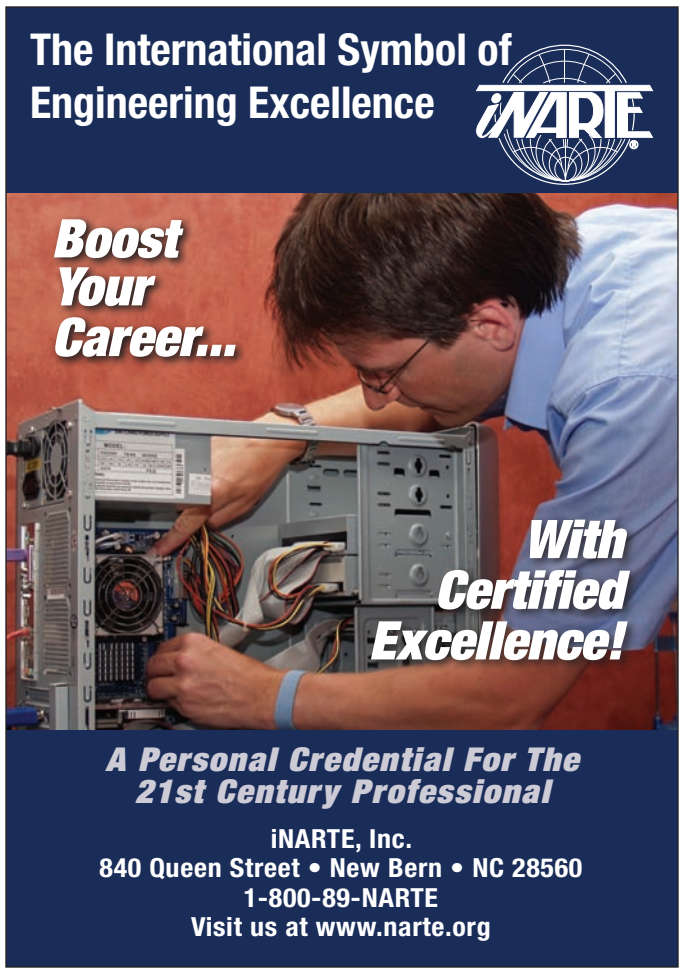
Next class is scheduled for:

- February 15-17, 2011 - Austin, TX

Designing for EMC/SI: Grounding and Shielding EMC/SI in Printed Circuit Boards - Kimmel Gerke Associates - EMI Guru (www.emiguru.com) - This two-day program addresses emissions, ESD, RFI, power disturbances and more. We focus on components, printed circuit boards, power electronics, grounding, and shielding. This workshop includes over 35 practical design EMC fixes and is offered at locations throughout the U.S.

The current schedule for 2011:

- February 7-9, 2011: Orlando, FL area
  Best Western Lakeside, Kissimmee, FL



- February 22-24, 2011: San Diego, CA
  Arrow Electronics Inc.
- March 22-23, 2011: Dallas, TX area
  Tektronix Regional Office, Plano, TX
- April 5-6, 2011: Boston, MA area
  Courtyard by Marriott, Marlborough, MA

EMC Troubleshooting Workshop - Kimmel Gerke Associates - EMI Guru (www.emiguru.com) - This one day seminar provides troubleshooting methods and techniques for electronics and systems engineers and EMC personnel. Students should take Design for EMC prior to this workshop. This workshop is offered exclusively as part of a Winter Getaway package therefore locations are limited. Please visit www.emiguru.com for additional information and registration.

- February 9, 2011: Orlando, FL area
  Best Western Lakeside, Kissimmee, FL
- February 24, 2011: San Diego, CA
  Arrow Electronics Inc.

Circuit-to-Circuit Interference - Silent Solutions (www.silent-solutions.com) - This unique class is for electrical design engineers at all levels challenged by electrical noise problems in products containing RF (wireless), analog, switching power supply and digital electronics. Through a unique combination of lecture and hands-on experiments, class participants will master the ability to anticipate, solve and avoid electrical noise problems that can inhibit functionality in new product designs. By participating in this class, design engineers will be able to accelerate time-to-market design. For more information please visit http://silent-solutions.com/education.htm.

Drive a Spectrum Analyzer Like an Expert for EMC Test and Troubleshooting - Silent Solutions (www.silent-solutions.com) is offering a new one-day class packed with practical tips, applications, and demonstrations to help make it easy to pick up a spectrum analyzer and start measuring and troubleshooting electrical noise and EMC problems. A minimum of 3 different spectrum analyzers in class to help explain and demonstrate operating techniques honed over the last twenty years. For more information please visit http://silent-solutions.com/education.htm.

Electronic Product Design and Retrofit for EMC - Silent Solutions (www.silent-solutions.com) **-** This two-day class gives engineering professionals the ability to successfully recognize, solve and avoid common EMI problems. Demonstrations using working hardware illustrate concepts such as radiated emissions, high frequency antennas, radiated and conducted immunity, and crosstalk in connectors, cables and IC packages. This class is appropriate for experienced circuit and system design engineers, EMC engineers, as well as those who are new to EMI problem solving. Engineers with time-to-market projects will find this workshop extremely useful. For more information please visit http://silent-solutions.com/education.htm.

EMC - Printed Circuit Board Design - Silent Solutions (www.silent-solutions.com) -This one-day class provides technical training intended for electrical and EMC engineers interested only in PC board design. It is an excellent follow-up class for students who have recently completed our two or three-day EMC class. Course topics include component placement, signal routing and stack up, power bus decoupling, signal theory and signal integrity, "ground" splits, and a critique of bad applications notes from IC vendors. Students will examine good and bad design techniques using hardware demonstrations, schematic reviews, and sample PCB layouts. For more information please visit http://silent-solutions.com/education.htm.

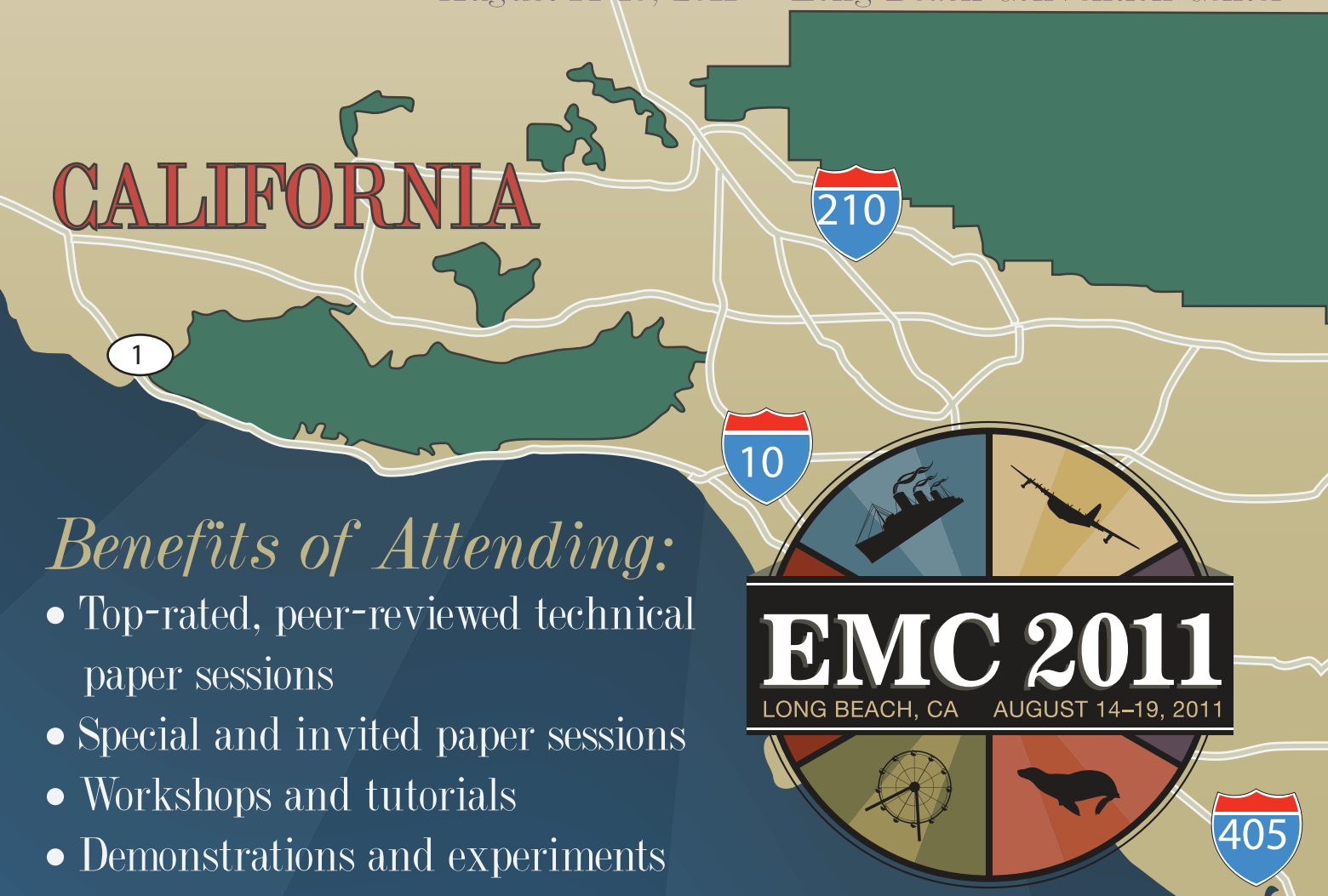
Grounding for EMC, Signal Integrity and Instrumentation - Silent Solutions (www.silent-solutions.com) - Theory, applications and hardware demonstrations in this one-day class describe effective design and troubleshooting techniques. The real-time demonstrations use a spectrum analyzer, oscilloscope and signal generators to illustrate inductance, common-impedance coupling, and ground loops. Specific examples of single-point, multi-point, "good" and "bad" grounds will be discussed. For more information please visit http://silent-solutions.com/education.htm.

Mechanical Design for EMC - Silent Solutions (www.silent-solutions.com) - Unique to the industry, this one-day class provides clear applications, theory and demonstrations for the successful design of mechanical enclosures for good system emissions and immunity performance. Key topics include grounding at the PCB and enclosure, system ground maps, PCB component placement and control drawings, enclosure and cable shielding, PCB device "cans," resonant slots and enclosures, heat sinks, unintentional antennas, as well as connector, screw, and conductive gasket spacing. For more information please visit http://silent-solutions.com/education.htm.

Washington Labs Academy offers EMC Seminars through their Washington Labs Academy. Visit them online for topics, locations and dates (http://wll.com/academy.html).

2011 IEEE International Symposium on Electromagnetic Compatibility

August 14-19, 2011 • Long Beach Convention Center



EMC 2011
LONG BEACH, CA AUGUST 14–19, 2011

Benefits of Attending:

- Top-rated, peer-reviewed technical paper sessions
- Special and invited paper sessions
- Workshops and tutorials
- Demonstrations and experiments
- Global EMC University–tutorials with CEUs
- Exhibitors showcasing the latest EMC products and services
- Fun, imaginative, entertaining social events
- Adjacent modern hotel and exhibit facilities - no shuttles, cab rides or long walks
- Close to a wide variety of great tour attractions

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www.emc2011.org

PRODUCT SAFETY SEMINARS

Understanding Ground Resistance Testing - A One Day Training Seminar - AEMC Instruments (www.aemc.com) This one day course offers the information needed to understand testing of grounding systems. Through a combination of classroom instruction and hands-on demonstrations attendees learn the various types of ground resistance test, proper application and how to operate equipment used in conducting these tests. For dates and locations please visit http://www.aemc.com/techinfo/Seminars/Ground_Resistance_Testers/ground-seminar-listings.html.

Compliance Tech University, founded by ED&D (www.ProductSafeT.com), offers seminars in electrical product safety covering topics of IT Equipment, Industrial and Medical electrical product safety. Please visit ED&D's website for dates, locations or to register.

TÜV SÜD Academy (www.tuvamerica.com) offers one, two, three and five day training sessions on a variety of topics throughout the year. Please visit the company's website for further information.

UL University offers a host of additional training opportunities throughout the year. Visit their website to view topics, dates and locations: www.uluniversity.com. UL University will offer over 150 courses in 2011, on 50+ subjects throughout the U.S. and Canada.

Following are some of UL University's new offerings. For dates and locations visit www.uluniversity.com.

- Electronics Laboratory Technician
- UL's Data Acceptance Program
- Designing for Compliance to IEC 60601-1, 3rd Edition
- Audio/Video, Information Technology and Communications Equipment Safety Requirements: Introduction to IEC 62368001
- LED Luminaires - Designing for Compliance to UL 8750 (In accordance with UL 1598).
- Test, Measurement and Laboratory Use Equipment: Designing for Compliance to UL 61010-1 - Transition to the 3rd Edition.

In addition, UL University has expanded into Personnel Certification programs with the addition of a **Photovoltaic System Installation Training and Certification and a Six Sigma training and certification program.**

Washington Labs Academy offers Product Safety Seminars through their Washington Labs Academy. Visit them online for topics, locations and dates (http://wll.com/academy.html).

ESD SEMINARS

The ESD Association holds educational opportunities throughout the year. For full details visit the ESD Association website at www.esda.org.

The current schedule:

- **Essentials for ESD Programs**
  January 24-26, 2011 - Shenzhen, China
- **ESD Basics for the Program Manager**
  March 1-2, 2011 - Austin, TX
- **How to's of In Plant ESD Survey and Evaluation Measurements**
  March 2, 2011 - Austin, TX
- **ESD On-Chip Protection in Advanced Technologies**
  March 2, 2011 - Austin, TX
- **Grounding in an Electrostatic Area**
  March 15, 2011 11:00 AM EDT - Online
- **Calculations**
  March 23, 2011 - Sunnyvale, CA
- **ESD Standards Overview for the Program Manager**
  March 23, 2011 - Sunnyvale, CA
- **System Level ESD/EMI: Testing to IEC and Other Standards**
  March 24, 2011 - Sunnyvale, CA
- **Ionization and Answers for the Program Manager**
  March 24, 2011 - Sunnyvale, CA
- **Ionization**
  April 14, 2011, 1:00 PM EDT - Online
- **ESD Effects**
  April 26, 2011, 11:00 AM EDT - Online
- **5th Annual International Electrostatic Discharge Workshop**
  May 16-19, 2011 Lake Tahoe, CA
- **ESD Program Development & Assessment**
  May 18-19, 2011- Bloomington, MN

Level 1 Plant Auditor - Stephen Halperin & Associates (www.halperinassoc.com) - The Level 1: Plant Auditor Course is a three day intensive that will teach the fundamentals of ESD and train technicians to make the ESD Control Measurements required by ANSI/ESD S20.20 and IEC 61340-5-1 ESD. For additional information or to register visit: http://www.halperinassoc.com/services/esdtraining/esdspecialistprogram/schedule.asp.

Current schedule:

- January 18-20, 2011 - Bensenville, IL
- March 22-24, 2011 - Bensenville, IL

Level 2 Program Design & Administration - Stephen Halperin & Associates (www.halperinassoc.com) - The SH&A Certified ESD Specialist[SM] Level 2: Program course is a five day course that will teach advanced elements of ESD Program Design, Documentation, Implementation and Management in accordance with ANSI/ESD S20.20 and IEC 61340-5-1. It includes advanced calculations, Troubling Shooting and Supplier Auditing techniques. For additional information or to register visit: http://www.halperinassoc.com/services/esdtraining/esdspecialistprogram/schedule.asp.

Level 3: Process Capability Analysis- Stephen Halperin & Associates (www.halperinassoc.com) - Attendees successfully completing the SH&A Certified ESD Specialist[SM] Level 3: Process Specialist course and take home project will be capable of analyzing the electrostatic characteristics of a manufacturing process. They will be able to identify the most sensitive device the process can handle in terms of HBM, CDM, FIM and MM, locate electrostatic process problems and recommend corrective action to enhance the process as necessary. This is a three day course. For additional information or to register visit: http://www.halperinassoc.com/services/esdtraining/esdspecialistprogram/schedule.asp.

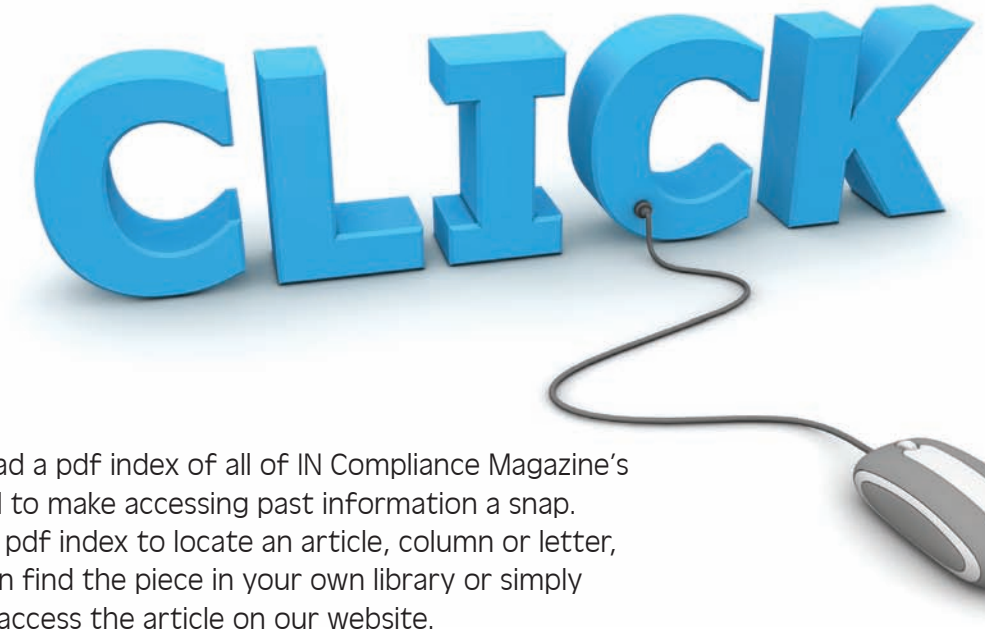
OTHER PROFESSIONAL DEVELOPMENT SEMINARS

iNARTE Certified Laboratory Auditor, (iNCLA) Training and Credentialing Program -
iNARTE (www.narte.org)
For more information and to register visit http://www.narte.org/h/iNCLAConference.asp.

iNARTE is adding a new program in 2011 to serve the needs of a significant segment of the EMC industry whose focus is geared to EMC design and product development. The new program "Certified EMC Design Engineer" will be developed jointly between iNARTE and the KEC Electronic Industry Development Center in Japan. See the iNARTE Informer in this issue for further details.

iNARTE also offers the following workshops throughout the year. Please visit their website for additional details www.narte.org: HPEM/HEMP/IEMI Workshop, Personal Development through Engineering Excellence, Workshop on ANSI C63.10 - 2009: Testing Unlicensed Wireless Devices.

Navigate the IN Compliance library with just a



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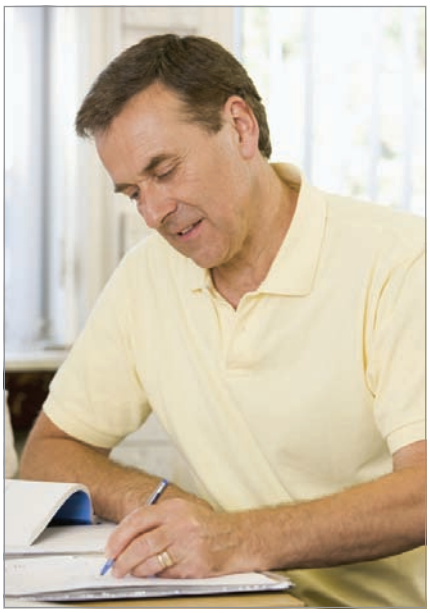
IN COMPLIANCE Magazine

OTHER PUBLIC SEMINARS

MIL-STD-461F: Methods and Procedures - Washington Labs Academy - The MIL-STD-461F will be introduced, including the new/modified test methods and test article configurations. This course offers critical information for military compliance professionals, testing industry professionals, and developers involved with electronics systems development. For more details and registration information, please visit http://www.wll.com/mil_std_461course.html.



PRIVATE/CUSTOM SEMINARS

Many experts offer private seminars designed to train select personnel at your location. These seminars offer companies an opportunity to train multiple compliance personnel with a customized approach designed for their needs. Following is a list of experts who offer private seminars.

Best ESD Technical Services (www.bestesd.com) - Classes and seminars can be arranged on different topics - from basic introduction to highly-specialized classes on a particular subject of ESD or EMC/EMI relevant to your applications.

Cherry Clough Consultants (www.cherryclough.com) - Seminars allow for a customized approach to training in basic and advanced EMC design, the EMC Directive and EMC engineering practices for EMC testing techniques and EMC functional safety.

DLS Electronics Systems (www.dlsemc.com/1101) - DLS experts offer practice oriented seminars and workshops on EMC design and regulatory compliance issues.

Kimmel Gerke Associates, Ltd. (www.emiguru.com) - offers seminars on EMC design fundamentals and techniques for ensuring EMC Compliance.

LaMothe Associates (www.lamotheapprovals.com) - offers fully customizable design seminars. Seminars are targeted towards understanding the design requirements of either IEC 61010-1 or IEC 60950-1 - specifically as they apply to the products you are designing. Both new and seasoned designers will benefit from these seminars with LaMothe Associates' hands-on approach.

Montrose Compliance Services (www.montrosecompliance.com) - offers worldwide customized training programs on achieving EMC compliance, EMC design fundamentals and techniques.

Henry Ott Consultants offers one to three day EMC seminars (in plant and public) on over 25 different topics, including "Partitioning and Layout of Mixed-Signal PCBs" and EMC Considerations in Switching Power Supply Designs". Please visit Mr. Ott's website for additional information www.hottconsultants.com/seminary.html.

Mr. Ott has also released a new book **"Electromagnetic Compatibility Engineering"** by Henry W. Ott (John Wiley & Sons, 2009, 872 pages). This book is the winner of the PROSE AWARD from the Association of American Publishers as the best technical book published in 2009. Visit www.hottconsultants.com/EMCE_book_files/emce_book.html for further information.

Wyatt Technical Services, LLC - An independent consulting firm that specializes in EMC design, troubleshooting and training services to commercial and industrial manufacturers with global distribution in the consumer, computer, network & telecommunications, industrial and scientific industries. Visit www.emc-seminars.com for further information.

INDUSTRY SYMPOSIA AND TABLE TOP PROGRAMS

These annual symposia, sponsored by the IEEE's EMC and Product Safety Engineering Societies, and the ESD Association, are an excellent resource for extensive technical training, and exchange of new ideas and technical concepts. The benefit of attending these events is that attendees can sample a vast array of workshops quickly and efficiently while networking with colleagues and professionals with the same interests.

IEEE EMC Society - International Symposium on Electromagnetic Compatibility (http://www.emc2011.org) - Long Beach, CA, August 14-19, 2011.

33rd Annual Electrical Overstress/Electrostatic Discharge Symposium (http://esda.org/symposia.html) - Disneyland Hotel, Anaheim, CA, September 11-16, 2011.

IEEE Symposium on Product Compliance Engineering (http://www.psessymposium.org) San Diego, CA, October 10-12, 2011.

33rd Annual Symposium of the Antenna Measurement Techniques Association (AMTA)
(http://www.amta.org) -
Englewood, CO, October 16-21, 2011.

IEEE EMC SOCIETY REGIONAL EVENTS

Milwaukee, WI: March 22, 2011 -
Todd Hubing will be speaking
Contact Jim Blaha at GE Healthcare,
Phone: (262) 548-2978 or e-mail:
jblaha@ieee.org or James.Blaha@GE.com.

Chicago, IL: May 10, 2011 -
Multiple speakers on various topics.
Contact Frank Krozel, Electronic Instrument (630) 924-1600 or frank@electronicinstrument.com.

Detroit, MI: May 18, 2011 - Speaker and topic to be announced. Contact Scott Lytle at Yazaki North America, (734) 983-6012 or scott@emcsociety.org.

Additional events are in development with possible locations being **Santa Clara, CA** in the fall.

ON-LINE TRAINING

If webinars are your preferred style of learning, many companies sponsor on demand style webinars for viewing at your convenience. Please visit the following sites to view topics and make your selection.

Associated Research (www.asresearch.com) - offers webinar programs providing detailed information on many aspects of electrical safety testing. They are a valuable resource that can be used to learn more about common electrical safety tests.

- **Ground Bond and Ground Continuity Testing**
  January 19, 2011
- **Hipot Testing Basics**
  February 2, 2011
- **Electrical Safety Testing Your Product - A Complete Overview**
  March 2, 2011
- **A Crash Course in Safety and Circuit Theory**
  March 23, 2011
- **Medical Device Testing**
  April 20, 2011
- **Solar Panel Testing**
  May 11, 2011

The start of a new year is a time when, traditionally, we reflect on the progress we made during the year passed and set our goals for the new year. More often than not, your professional development goals include training or some form of higher education to expand or refresh your technical knowledge.

- **Is Repeated Hipot Testing Destructive**
  June 8, 2011
- **Succeeding in Advanced Hipot Test Applications**
  July 20, 2011
- **Hipot Testing in a Production Environment**
  August 11, 2011
- **Earth and Enclosure Leakage Testing**
  September 21, 2011
- **Hipot Testing Your Product**
  October 19, 2011
- **Understanding the Features (Settings) of your Hipot Tester**
  November 9, 2011

Intertek Academy
(http://www.intertek.com/training/) -
offers educational opportunities in quality, safety and Energy Efficiency. Intertek's 2011 line-up of technical seminars, webinars, workshops, training events, conferences and White Papers provide in-depth guidance for understanding new standards and specs, innovative techniques and compliance. Visit their website for dates and details.

Kimmel Gerke (EMI Guru) is offering a free webinar **EMC Impact on Design by Industry** in late February early March. Please visit their website for details (http://www.emiguru.com).

TUV SUD America (www.tuvamerica.com/tuvnews/webinars.cfm) - TUV offers webinars and online seminars in the areas of Safety, EMC, Management Systems and Competency Assessments.

UL University (www.uluniversity.com) - offers a selection of online courses including self-paced eLearning and live and pre-recorded webinars. UL's professional design staff can also create custom eLearning solutions to meet your specific needs. In addition to an extensive portfolio of online training courses, UL University is adding the following featured topics to their 2011 line-up.

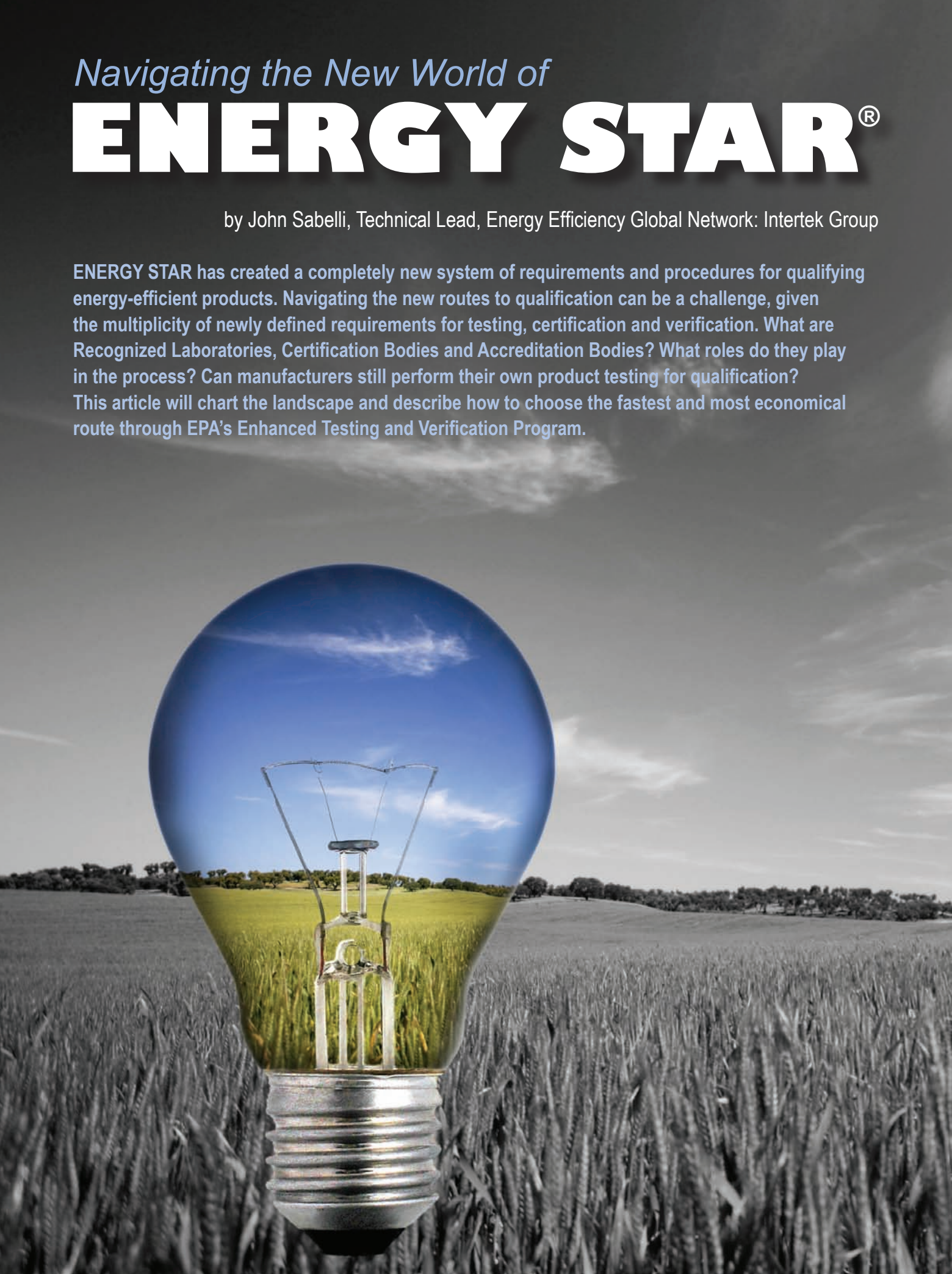
- **Components 101**
- **Electric Vehicle Charging System Installation**
- **Learn Six Sigma Foundations**
- **Electronically Controlled and Electronically Protected Motors: UL 1004** ■

Navigating the New World of

ENERGY STAR®

by John Sabelli, Technical Lead, Energy Efficiency Global Network: Intertek Group

ENERGY STAR has created a completely new system of requirements and procedures for qualifying energy-efficient products. Navigating the new routes to qualification can be a challenge, given the multiplicity of newly defined requirements for testing, certification and verification. What are Recognized Laboratories, Certification Bodies and Accreditation Bodies? What roles do they play in the process? Can manufacturers still perform their own product testing for qualification? This article will chart the landscape and describe how to choose the fastest and most economical route through EPA's Enhanced Testing and Verification Program.



ENERGY STAR has just gone through the biggest transformation in its 30-plus year history. It has changed from a program based on manufacturer self declaration to a program based on 3rd Party Testing and Certification – very similar to the process for electrical safety listing in North America.

Although ENERGY STAR is a voluntary program, it now has all of the characteristics of the world's most demanding regulatory compliance systems. Yet for some manufacturers and large retailers ENERGY STAR qualification *is* a must, from a marketing standpoint, for at least some of the products they make or sell. You might as well use the word "compliance" for ENERGY STAR.

Recently, the US Environmental Protection Agency (EPA) and the Department of Energy (DOE) signed a Memorandum of Understanding (MOU) regarding operation of the ENERGY STAR program. Responsibilities for various aspects of the program were reassigned among the EPA and the DOE. According to the MOU, EPA will manage the ENERGY STAR program, including executing Partner Agreements, setting policy on use of the ENERGY STAR logo and posting web listings. The DOE will provide technical support in assessing the impact of new technologies on test procedures and qualification criteria. These roles will help in addressing issues on test procedures and issuing interpretations.

As part of this MOU, EPA took on the massive job of creating the new Enhanced Testing and Verification system. For manufacturers, or *Manufacturing Partners*, this means up-front work well before a product is tested for ENERGY STAR compliance.

PARTNER COMMITMENTS

A manufacturer (or U.S. distributor) who wishes to use the ENERGY STAR logo on or in connection with its products must first become an ENERGY STAR Partner, that is, sign a Partnership Agreement with ENERGY STAR. This is a licensing agreement for the use of the ENERGY STAR logo. The right to use the logo is granted in exchange for the Partner's "Commitment" that their use of the ENERGY STAR logo will be in accordance with ENERGY STAR rules.

While this part of the Partnership Agreement has always existed in the ENERGY STAR program, new elements have been added. From this point onward, products will be tested in EPA Recognized Laboratories and certified by an EPA Recognized Certification Body before using the ENERGY STAR logo. Additionally, a sampling of each company's ENERGY STAR certified products will be re-tested each year as part of the new Annual Verification Testing requirements.

CHANGE FROM SELF-DECLARATION TO CERTIFICATION-AND-VERIFICATION

Manufacturer self-declaration is history. All ENERGY STAR products must go through some form of 3rd Party, independently-supervised laboratory testing and certification. In turn, laboratories must be EPA recognized, either by accreditation to ISO 17025 or by participating in a 3rd Party Certification Body's Data Acceptance Program. Also, selected products must be periodically re-tested by EPA-recognized laboratories and certification bodies.

To make this shift to independent third party testing, certification and verification, EPA had to define what it meant by *certification* and *verification*. Similarly, it had to set requirements for qualifying organizations to perform these functions. By doing so, EPA in effect created several new entities which exist to run the new Enhanced Testing and Verification System.

In summary of the new EPA requirements, each product is to be independently tested and certified to confirm meeting ENERGY STAR requirements. EPA now requires annual verification testing of certain products to verify that products continue to meet ENERGY STAR requirements. Furthermore, Laboratory Accreditors and 3rd Party Certification Bodies themselves must also go through an application and approval process to become EPA Recognized.

ROLES OF EPA RECOGNIZED LABS AND CERTIFICATION BODIES

EPA Recognized Testing Laboratories

EPA Recognized Testing Laboratories are able to test products to ENERGY STAR criteria and provide test reports to an EPA Recognized Certification Body (CB). Testing Laboratories must be either ISO 17025 accredited for the appropriate tests and recognized by EPA, or qualified by an EPA Recognized CB as meeting the applicable requirements of ISO 17025 and having demonstrated competency in the appropriate tests.

Manufacturer laboratories may be qualified by a CB in the Supervised Manufacturer Testing Laboratory (SMTL) program and/or the Witnessed Manufacturer Testing Laboratory (WMTL) program. SMTL is a program in which the CB assesses the manufacturer laboratory and assembles evidence to establish confidence that the laboratory will produce accurate results without the presence of a CB representative. Once qualified, the manufacturer laboratory performs testing and submits data to the CB for review and acceptance for program certification purposes. Through the WMTL program, the CB assesses the manufacturer laboratory and assembles evidence to establish confidence

that the laboratory will produce accurate results while a CB representative is present. Once qualified, the manufacturer laboratory performs testing in the presence of a CB representative, and submits data to the CB for review and acceptance for program certification purposes.

EPA Recognized Certification Bodies

As dictated by the new EPA Enhanced Testing and Verification procedures, EPA Recognized Certification Bodies must maintain ISO Guide 65 accreditation for conducting conformity assessment certification programs in the required testing disciplines. A CB's responsibilities include communicating with EPA on listing qualified products, maintaining auditable records of each product's qualification and verification history, as well as issuing each Notice of ENERGY STAR Certification. Essentially, this certification notice is a green light for manufacturers to use the ENERGY STAR logo with each certified product.

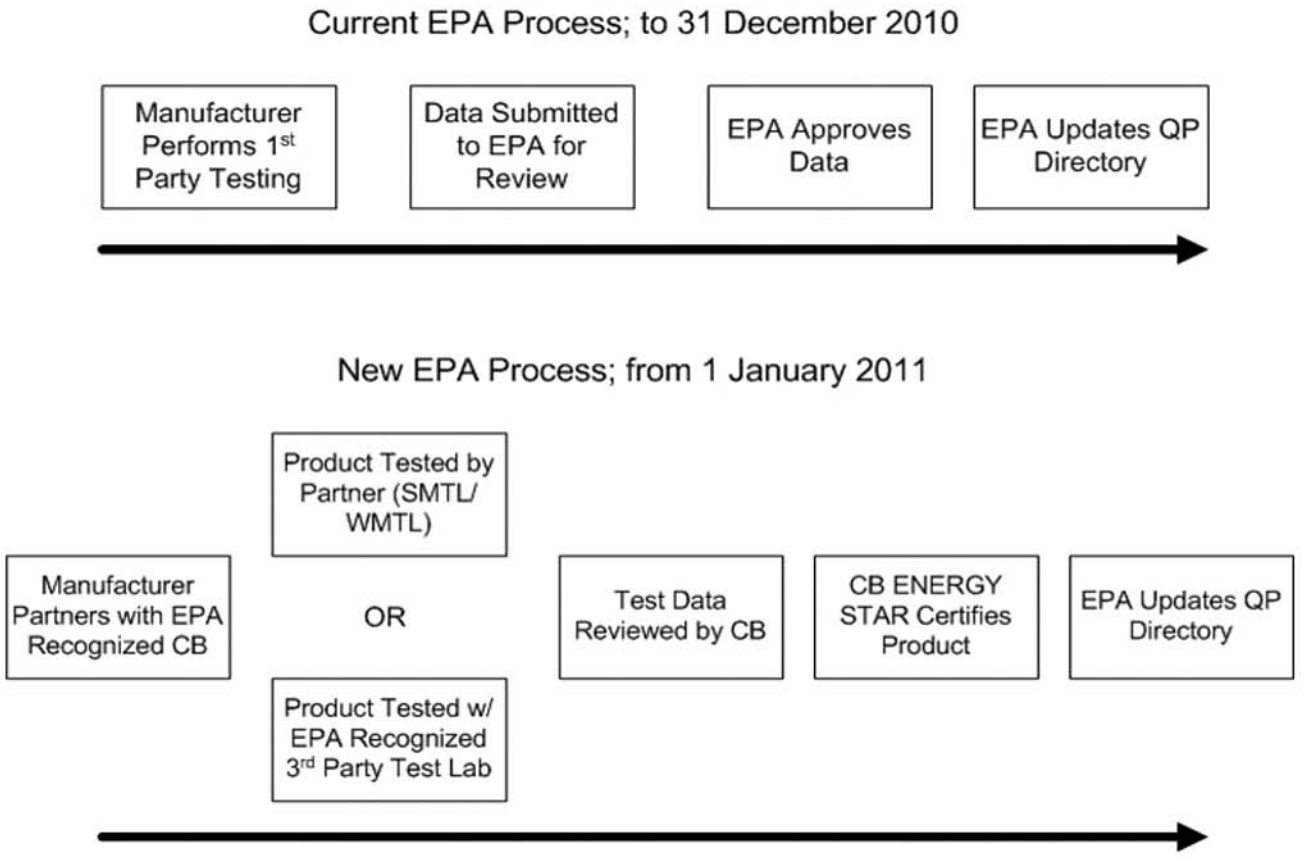
EPA Recognized Accreditation Bodies

The role of EPA Recognized Accreditation Bodies is to provide loose oversight of both EPA Recognized Testing Laboratories and Certification Bodies. These accreditation organizations are recognized by the EPA as qualified to assess the competency and adherence to best practices of testing laboratories and Certification Bodies. In turn, the accreditations issued by these bodies are recognized as valid by EPA.

THE ENERGY STAR PROCESS

Initial ENERGY STAR Qualification

In the past, manufacturers reported their products' energy efficiency ratings directly to the ENERGY STAR program. Now, EPA will only accept certified energy efficiency ratings straight from an EPA Recognized Certification Body. Essentially, EPA has re-assigned the responsibility for certifying and verifying ENERGY STAR products. Manufacturers are to partner with an EPA-Recognized CB and have products tested at EPA-Recognized laboratories (as designated by the CB) that have reciprocal agreements with that CB. As a next step, recognized laboratories must conduct an engineering review of test results and reports. Once reviewed and approved, test reports are sent by the laboratory to the Certification Body. After conducting a certification review of the test reports, product characteristics, and ratings, the CB certifies the product for ENERGY STAR.



18 Global laboratories for ENERGY STAR® testing, very efficient.

As a manufacturer, you don't want spin. You want it straight. Your product isn't some pet project. That's why Intertek has Energy Efficiency solutions that bring home the you-know-what. For starters, we have the size and speed to save you both time and money. Our 18 Energy Efficiency testing laboratories across the globe have the capacity to get you up and out to market, faster. What's more, with our core of energy expert reviewers ready to roll, you'll get ENERGY STAR certification in 24 hours after testing is complete.

Bolstered by 50 years of Energy Efficiency testing experience, from the innovators who brought you 15-day ETL testing, we deliver a package that helps products produce. So, steer clear of the mud. Get Intertek and get to market first. With our brand of efficiency, you can master the sales cycle and bring more profits all the way home.

1-800-WORLDLAB
www.intertek.com/energystar

Intertek

Currently Qualified Products (as of 11/10/10)

Appliances

- Clothes Washers
- Dishwashers
- Refrigerators
- Freezers
- Water Coolers

Lighting

- Decorative Light Strings
- Luminaires (including sub-components)
- Lamps

Home Electronics

- Audio/Video Equipment
- Set-top Boxes & Cable Boxes
- Telephony
- Televisions
- Battery Charging Systems

Information Technology

- Computers
- Displays
- Imaging Equipment
- Computer Servers
- Enterprise Storage
- Uninterruptible Power Supplies
- Small network Equipment

Commercial Food Service

- Commercial Dishwashers
- Commercial Fryers
- Commercial Griddles
- Commercial Hot Food Holding Cabinets
- Commercial Ice Machines
- Commercial Ovens
- Commercial Refrigerators & Freezers
- Commercial Steam Cookers

Home & Building Envelope

- Roof Products
- Water Heater, Gas Condensing
- Water Heater, Heat Pump
- Water Heater, High Efficiency Gas Storage
- Water Heater, Solar
- Water Heater, Whole Home Gas Tankless

Other

- New Refrigerated Vending Machines
- Rebuilt Refrigerated Beverage Vending Machines
- Lab-grade Refrigerators/ Freezers

Heating & Cooling Products (HVAC)

- Boilers, Furnaces
- Central Air Conditioning
- Dehumidifiers
- Heat Pumps (Air-Source, Geothermal)
- Light Commercial HVAC
- Res. Fans, Ceiling and Ventilating
- Res. Water Heaters
- Room Air Cleaners/Purifiers
- Room Air Conditioners
- Climate Controls

Having issued the Notice of ENERGY STAR Certification to the manufacturer in its certification program, the CB transmits listings of ENERGY STAR certified products to EPA for posting on ENERGY STAR web site. Keep in mind that manufacturers need not wait for their products to appear on EPA's Qualified Products list – once the Notice of ENERGY STAR Certification has been issued, manufacturers may proceed to use the ENERGY STAR logo to market their products.

Annual Verification Testing

Another significant new element of the ENERGY STAR program is Annual Verification testing. EPA's objective is to ensure that a product continues to comply with ENERGY STAR requirements in production after initial certification. Here again, the CB is given the task of managing the annual verification testing. For these purposes, each CB must maintain listings of all products certified as ENERGY STAR in its program. Every year, the CB will select at least 10% of the products in its certification program, procure appropriate test samples, and direct the testing of those samples for continued compliance to ENERGY STAR criteria.

Using each manufacturer's listings of certified ENERGY STAR models, the CB designates models for annual retests. The minimum number of models that are selected and retested must be at least 10% of the total number of models that the manufacturer has in certification. It is at the discretion of EPA to direct the CB to select specific models for annual retests. These special models may represent up to half of the total models selected for the year.

The CB arranges procurement of samples of each of the selected models from one of several sources. Of these, the CB may obtain samples via open-market purchase (retail outlets for household products or contractor supply channels for commercial products) in which case the purchase cost is charged back to the manufacturer. This is EPA's preferable procurement method when dealing with high volume consumer products seeing as open market purchase is most representative of products going into consumers' homes.

As a secondary alternative, a CB representative may obtain warehouse stock for use as samples. These are collected from a designated distribution point at which the product is available in quantity and packaged for shipment to its point of sale.

Samples may also be collected straight off the production line, though this method is least preferred by EPA because of the associated risk that test specimens may have been specially prepared. In this case, a sample of the product is taken directly from the end of the production line, which does offer an advantage for collecting low-volume commercial products, especially those that are custom made or built to order. It is especially beneficial for manufacturers of these products to participate in a CB's Supervised Manufacturer Testing Laboratory (SMTL) program. For custom product orders, a sample can be tested on completion of assembly and then prepared for shipment. This eliminates the added cost and burden of building extra samples just for testing purposes.

If samples are to be tested at another laboratory, the CB representative designates the destination laboratory and seals the sample for shipment. For annual verification testing, testing must either be done at an accredited, independent EPA Recognized Testing Laboratory or it must be witnessed by a CB Representative at a CB-qualified manufacturer laboratory. The latter option requires the use of a Witnessed Manufacturer Testing Laboratory (WMTL) system. Be advised that for annual verification testing, a CB representative must be present to witness a test in a manufacturer's laboratory. Submission of data from tests performed in the absence of a CB representative will not be accepted.

Products whose energy efficiency criteria remain unchanged from 2010 are subject to annual verification testing starting this year. By March 31, 2011, manufacturers must submit a list of currently qualified products to be kept in the ENERGY STAR program to a CB of its choosing. This list of qualified products will be used to conduct annual verification testing. Note that products undergoing specification changes in 2011 – 2012, will NOT be subject to this process because "re-qualification" testing will be required as part of individual products' revised eligibility specifications.

Future revisions to ENERGY STAR Eligibility Criteria will require currently qualified products to undergo re-qualification testing at an EPA Recognized Laboratory and certification by an EPA Recognized Certification Body.

What To Do Next

Given the multitude of newly enhanced requirements and eligibility factors, the logical order for going forward starts with selecting a Certification Body and signing up through its Energy Efficiency Certification Program. When choosing an ENERGY STAR Certification Partner, consider an organization that can offer you the following:

Global Scope to cover ALL your product types. Look for a CB with recognition or accreditations in global markets as this will provide access to worldwide Energy Efficiency compliance organizations such as DOE, Natural Resources Canada (NRCan), Europe's Energy related Products (ErP) Directive, EcoLabel, and the Saudi Arabian Standards Organization. There is enormous potential for reducing the duplication of testing, inspection and certification in markets with similar (yet diversely created) energy efficiency requirements.

Global Testing Network with plenty of capacity to meet your needs and perform program services at a variety of locations near manufacturing and distribution centers and points of sale.

Expertise: Partner with a team of experts that understand your products inside and out.

Excellent Working Relationships with EPA, DOE and the worldwide organizations noted above. Consider a CB that is actively involved with regulatory and standard development processes. Your CB should be able to serve as a direct link with EPA to help you provide feedback to the ENERGY STAR process.

Guidance Throughout the Process: Look for an organization with personnel who are in tune with the latest ENERGY STAR developments and can explain practical details of the process that are not apparent from just reading EPA documents.

Speed and Capacity for the fastest turnarounds. Meet all ENERGY STAR and product testing needs quickly and efficiently before the competition with 24-hour certification turnaround.

After partnering, the manufacturer and CB work together to determine a testing and certification plan for products to be qualified or to maintain qualification. When determining what products need to be ENERGY STAR qualified, consult the product-specific Partner Commitments and Product Criteria documents published by EPA. ■

ABOUT THE AUTHOR

John Sabelli is the Technical Lead for Intertek's Energy Efficiency Global Network, and is responsible for the continuing development of Intertek's Energy Efficiency Certification Program, to meet constantly changing demands of regulators and premium level energy efficiency programs like ENERGY STAR. John has been involved in various aspects of product energy efficiency testing and regulatory compliance for 24 years at Intertek. He has participated on standards committees of ASHRAE, ASTM, ANSI, ISO and IEC throughout this time.

Fundamentals of Electrostatic Discharge

Part 6: ESD Standards

by the ESD Association

The electronics industry is continually shifting. Device density and technology is more complex. Electronics manufacturing is more heavily reliant on out-sourcing. The ESD industry seems to have jumped into this swirling eddy headfirst. ESD control programs have mushroomed. Black has been replaced by green, blue and gold. Shielding bags dominate the warehouse. Ionizers exist along side wrist straps and ground cords. An early history of "smoke and mirrors," magic and lofty claims of performance is rapidly and safely being relegated to the past.

Today, more than ever, meeting the complex challenge of reducing ESD losses requires more than reliance on faith alone. Users require a way to legitimately evaluate and compare competing brands and types of products. They need objective confirmation that their ESD control program provides effective solutions to their unique ESD problems. Contract manufacturers and OEMs require mutually agreed-upon ESD control programs that reduce duplication of process controls.

That's where standards come into play. They provide guidance in developing programs that effectively address ESD process control. They help define the sensitivity of the products manufactured and used. They help define the performance requirements for various ESD control materials, instruments and tools. Standards are playing an ever-increasing role in reducing marketplace confusion in the manufacture, evaluation and selection of ESD control products and programs.

THE WHO AND WHY OF STANDARDS

Who uses ESD standards? Manufacturers and users of ESD sensitive devices and products, manufacturers and distributors of ESD control products, certification registrars and third party testers of ESD control products.

Why use ESD standards? They help assure consistency of ESD sensitive products and consistency of ESD control products and services. They provide a means of objective evaluation and comparison among competitive ESD control products. They help reduce conflicts between users and suppliers of ESD control products. They help in developing, implementing, auditing and certifying ESD control programs. And, they help reduce confusion in the marketplace.

In the United States, the use of standards is voluntary, although their use can be written into contracts or purchasing agreements between buyer and seller. In most of the rest of the world, the use of standards, where they exist, is compulsory.

KEY STANDARDS AND ORGANIZATIONS

Just 20 years ago, there were relatively few reliable ESD standards and few ESD standards development organizations. Today's ESD standards landscape is not only witnessing an increase in the number of standards, but also increasing cooperation among the organizations that develop them.

Today's standards fall into three main groups. First, there are those that provide ESD program guidance or requirements. These include documents such as *ANSI ESD S20.20-2007 – Standard for the Development of an ESD Control Program*, *ANSI/ESD S8.1 – Symbols-ESD Awareness* or *ESD TR20.20 – ESD Handbook*.

A second group covers requirements for specific products or procedures such as packaging requirements and grounding. Typical standards in this group are *ANSI/ESD S6.1 – Grounding* and *ANSI/ESD S541 – Packaging Materials for ESD Sensitive Items*.

A third group of documents covers the standardized test methods used to evaluate products and materials. Historically, the electronics industry relied heavily on test methods established for other industries or even for other materials (e.g., *ASTM-257 – DC Resistance or Conductance of Insulating Materials*). Today, however, specific test method standards focus on ESD in the electronics environment, largely as a result of the ESD Association's activity. These include standards such as *ANSI/ESDA-JEDEC JS-001-2010 – Device Testing, Human Body Model* and *ANSI/ESD STM7.1: Floor Materials – Resistive Characterization of Materials* to cite just a few.

WHO DEVELOPS STANDARDS?

Standards development and usage is a cooperative effort among all organizations and individuals affected by standards. There are several key ESD standards development organizations.

MILITARY STANDARDS

Traditionally, the U.S. military spearheaded the development of specific standards and specifications with regard to ESD control in the U.S. Today, however, U.S. military agencies are taking a less proactive approach, relying on commercially developed standards rather than developing standards themselves. For example, the ESD Association completed the assignment from the Department of Defense to convert MIL-STD-1686 into a commercial standard called ANSI/ESD S20.20.

ESD ASSOCIATION

The ESD Association has been a focal point for the development of ESD standards in recent years. An ANSI-accredited standards development organization, the Association is charged with the development of ESD standards and test methods. The Association also represents the US on the International Electrotechnical Commission (IEC) Technical Committee 101-Electrostatics.

The ESD Association has published 36 standards documents and 23 Technical Reports. These voluntary standards cover the areas of material requirements, electrostatic sensitivity and test methodology for evaluating ESD control materials and products. In addition to standards documents, the Association also has published a number of informational advisories. Advisory documents may be changed to other document types in the future.

ESD ASSOCIATION STANDARDS CLASSIFICATIONS AND DEFINITIONS

There are four types of ESD Association standards documents with specific clarity of definition. The four document categories are consistent with other standards development organizations. These four categories are defined below.

Standard: A precise statement of a set of requirements to be satisfied by a material, product, system or process that also specifies the procedures for determining whether each of the requirements is satisfied.

Standard Test Method: A definitive procedure for the identification, measurement and evaluation of one or more qualities, characteristics or properties of a material, product, system or process that yields a reproducible test result.

Standard Practice: A procedure for performing one or more operations or functions that may or may not yield a test result. Note: If a test result is obtained, it may not be reproducible between labs.

Technical Report: A collection of technical data or test results published as an informational reference on a specific material, product, system, or process.

As new documents are approved and issued, they will be designated into one of these four new categories. Existing documents have been reviewed and have been reclassified as appropriate. Several Advisory Documents still exist and may be migrated to either Technical Reports or Standard Practices in the future.

INTERNATIONAL STANDARDS

The international community, led by the European-based International Electrotechnical Commission (IEC), has also climbed on board the standards express. IEC Technical Committee 101 has released a series of documents under the heading IEC 61340. The documents contain general information regarding electrostatics, standard test methods, general practices and an ESD Control Program Development Standard that is technically equivalent to ANSI/ESD S20.20. A Facility Certification Program is also available. Global companies can seek to become certified to both ANSI/ESD S20.20 and to IEC61340-5-1 if they so choose. Japan also has released its proposed version of a national electrostatic Standard, which also shares many aspects of the European and U.S. documents.

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ORGANIZATIONAL COOPERATION

Perhaps one of the more intriguing changes in ESD standards has been the organizational cooperation developing between various groups. One cooperative effort was between the ESD Association and the U.S. Department of Defense, which resulted in the Association preparing ANSI/ESD S20.20 as a successor to MIL-STD-1686. A second cooperative effort occurred between the ESD Association and JEDEC, which started with an MOU and resulted in the development of 2 documents: a joint HBM document was published in 2010; a joint CDM document will be published in 2011.

Internationally, European standards development organizations and the ESD Association have developed working relationships that result in an expanded review of proposed documents, greater input and closer harmonization of standards that impact the international electronics community.

For users of ESD standards, this increased cooperation will have a significant impact. First, we should see standards that are technically improved due to broader input. Second, we should see fewer conflicts between different standards. Finally, we should see less duplication of effort.

SUMMARY

For the electronics community, the rapid propagation of ESD standards and continuing change in the standards environment mean greater availability of the technical references that will help improve ESD control programs. There will be recommendations to help set up effective programs. There will be test methods and specifications to help users of ESD control materials evaluate and select products that are applicable to their specific needs. And there will be guidelines for vendors of ESD products and materials to help them develop products that meet the real needs of their customers. Standards will continue to fuel change in the international ESD community. ■

SOURCES OF STANDARDS

- ESD Association, 7900 Turin Road, Building 3, Rome, NY 13440. Phone: 315-339-6937. Fax: 315-339-6793. http://www.esda.org
- IHS Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112. Phone: 800-854-7179. Fax: 303-397-2740. http://global.ihs.com
- International Electrotechnical Commission, 3, rue de Varembe, Case postale 131, 1211 Geneva 20, Switzerland. Fax: 41-22-919-0300. http://www.iec.ch
- Military Standards, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120
- JEDEC Solid State Technology Association, 3103 North 10th Street, Suite 240-S, Arlington, VA 22201-2107, http://www.jedec.org

PRINCIPLE ESD STANDARDS

U.S. Military/Department of Defense

MIL-STD-1686C: Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices)
This military standard establishes requirements for ESD Control Programs. It applies to U.S. military agencies, contractors, subcontractors, suppliers and vendors. It requires the establishment, implementation and documentation of ESD control programs for static sensitive devices, but does NOT mandate or preclude the use of any specific ESD control materials, products, or procedures. It is being updated and converted to a commercial standard by the ESD Association. Although DOD has accepted the new ANSI/ESD S20.20 document as a successor, it has not yet taken action to cancel STD-1686

MIL-HBDK-263B: Electrostatic Discharge Control Handbook for Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices)
This document provides guidance, but NOT mandatory requirements, for the establishment and implementation of an electrostatic discharge control program in accordance with the requirements of MIL-STD-1686.

MIL-PRF 87893 – Workstation, Electrostatic Discharge (ESD) Control
This document defines the requirements for ESD protective workstations.

MIL-PRF-81705 –Barrier Materials, Flexible, Electrostatic Protective, Heat Sealable
This documents defines requirements for ESD protective flexible packaging materials.

MIL-STD-129 –Marking for Shipment and Storage
Covers procedures for marketing and labeling ESD sensitive items.

ESD Association

Standards Documents

ANSI/ESD S1.1: Evaluation, Acceptance and Functional Testing of Wrist Straps

A successor to EOS/ESD S1.0, this document establishes test methods for evaluating the electrical and mechanical characteristics of wrist straps. It includes improved test

methods and performance limits for evaluation, acceptance and functional testing of wrist straps.

ANSI/ESD STM2.1: Resistance Test Method for Electrostatic Discharge Protective Garments
This Standard Test Method provides test methods for measuring the electrical resistance of garments used to control electrostatic discharge. It covers procedures for measuring sleeve-to-sleeve and point-to-point resistance.

ANSI/ESD STM3.1: Ionization
Test methods and procedures for evaluating and selecting air ionization equipment and systems are covered in this standard. The document establishes measurement techniques to determine ion balance and charge neutralization time for ionizers.

ANSI/ESD SP3.3: Periodic Verification of Air Ionizers.
This Standard Practice provides test methods and procedures for periodic verification of the performance of air ionization equipment and systems (ionizers).

ANSI/ESD S4.1: Worksurfaces – Resistance Measurements
This Standard establishes test methods for measuring the electrical resistance of worksurface materials used at workstations for protection of ESD susceptible items. It includes methods for evaluating and selecting materials and testing new worksurface installations and previously installed worksurfaces.

ANSI/ESD STM4.2: Worksurfaces – Charge Dissipation Characteristics
This Standard Test Method provides a test method to measure the electrostatic charge dissipation characteristics of worksurfaces used for ESD control. The procedure is designed for use in a laboratory environment for qualification, evaluation or acceptance of worksurfaces.

ESDA-JEDEC JS-001: Electrostatic Discharge Sensitivity Testing – Human Body Model
This Standard Test Method updates and revises an existing Standard. It establishes a procedure for testing, evaluating and classifying the ESD sensitivity of components to the defined Human Body Model (HBM).

ANSI/ESD STM5.2): Electrostatic Discharge Sensitivity Testing – Machine Model
This Standard establishes a test procedure for evaluating the ESD sensitivity of components to a defined Machine Model (MM). The component damage caused by the Machine Model is often similar to that caused by the Human Body Model, but it occurs at a significantly lower voltage.

ANSI/ESD STM5.3.1: Electrostatic Discharge Sensitivity Testing – Charged Device Model – Non-Socketed Mode
This Standard Test Method establishes a test method for evaluating the ESD sensitivity of active and passive components to a defined Charged Device Model (CDM).

ANSI/ESD SP5.3.2: Electrostatic Discharge Sensitivity Testing – Socketed Device Method (SDM) – Component Level
This standard practice provides a test method generating a Socketed Device Model (SDM) test on a component integrated circuit (IC) device.

ANSI/ESD SP5.4: Latchup Sensitivity Testing of CMOS/ BiCMOS Integrated Circuits – Transient Latchup Testing – Component Level Suppl Transient Simulation
This standard practice method was developed to instruct the reader on the methods and materials needed to perform Transient latchup testing.

ANSI/ESD STM5.5.1: Electrostatic Discharge Sensitivity Testing – Transmission Line Pulse (TLP) – Component Level
This document pertains to Transmission Line Pulse (TLP) testing techniques of semiconductor components. The purpose of this document is to establish a methodology for both testing and reporting information associated with TLP testing.

ANSI/ESD SP5.5.2: Electrostatic Discharge Sensitivity Testing – Very Fast Transmission Line Pulse (VF-TLP) – Component Level
This document pertains to Very Fast Transmission Line Pulse (VF-TLP) testing techniques of semiconductor components. It establishes guidelines and standard practices presently used by development, research and reliability engineers in both universities and industry for VF-TLP testing. This document explains a methodology for both testing and reporting information associated with VF-TLP testing.

ANSI/ESD SP5.6: Electrostatic Discharge Sensitivity Testing – Human Metal Model (HMM) – Component Level
Establishes the procedure for testing, evaluating and classifying the ESD sensitivity of components to the defined HMM.

ANSI/ESD S6.1: Grounding
This Standard recommends the parameters, procedures and types of materials needed to establish an ESD grounding system for the protection of electronic hardware from ESD damage. This system is used for personnel grounding devices, worksurfaces, chairs, carts, floors and other related equipment.

ANSI ESD S7.1: Floor Materials – Resistive Characterization of Materials
Measurement of the electrical resistance of various floor materials such as floor coverings, mats and floor finishes is covered in this document. It provides test methods for qualifying floor materials before installation or application and for evaluating and monitoring materials after installation or application.

ANSI ESD S8.1: ESD Awareness Symbols
Three types of ESD awareness symbols are established by this document. The first one is to be used on a device or assembly to indicate that it is susceptible to electrostatic charge. The second is to be used on items and materials intended to provide electrostatic protection. The third symbol indicates the common point ground

ANSI/ESD S9.1: Resistive Characterization of Footwear
This Standard defines a test method for measuring the electrical resistance of shoes used for ESD control in the electronics environment.

ANSI/ESD SP10.1: Automated Handling Equipment
This Standard Practice provides procedures for evaluating the electrostatic environment associated with automated handling equipment.

ANSI ESD STM11.11: Surface Resistance Measurement of Static Dissipative Planar Materials
This Standard Test Method defines a direct current test method for measuring electrical resistance. The Standard is designed specifically for static dissipative planar materials used in packaging of ESD sensitive devices and components.

ANSI/ESD STM11.12: Volume Resistance Measurement of Static Dissipative Planar Materials
This Standard Test Method provides test methods for measuring the volume resistance of static dissipative planar materials used in the packaging of ESD sensitive devices and components.

ANSI/ESD STM11.13: Two-Point Resistance Measurement
This Standard Test Method provides a test method to measure the resistance between two points on an items surface.

ANSI ESD STM11.31: Evaluating the Performance of Electrostatic Discharge Shielding Bags
This Standard provides a method for testing and determining the shielding capabilities of electrostatic shielding bags.

ANSI/ESD STM12.1: Seating-Resistive Characterization
This Standard provides test methods for measuring the electrical resistance of seating used to control ESD. The test methods can be used for qualification testing as well as for evaluating and monitoring seating after installation. It covers all types of seating, including chairs and stools.

ANSI/ESD STM13.1: Electrical Soldering/Desoldering Hand Tools
This Standard Test Method provides electric soldering/desoldering hand tool test methods for measuring the electrical leakage and tip to ground reference point resistance and provides parameters for EOS safe soldering operation.

ANSI/ESD SP15.1: Standard Practice for In-Use Testing of Gloves and Finger Cots
This document provides test procedures for measuring the intrinsic electrical resistance of gloves and finger cots as well as their electrical resistance together with personnel as a system.

ANSI ESD S20.20: Standard for the Development of an ESD Control Program
This Standard provides administrative, technical requirements and guidance for establishing, implementing and maintaining an ESD Control Program.

ANSI/ESD STM97.1: Floor Materials and Footwear – Resistance in Combination with a Person
This Standard Test Method provides for measuring the electrical resistance of floor materials, footwear and personnel together, as a system.

ANSI/ESD STM97.2 – Floor Materials and Footwear Voltage Measurement in Combination with a Person
This Standard Test Method provides for measuring the electrostatic voltage on a person in combination with floor materials and footwear, as a system.

Just 20 years ago, there were relatively few reliable ESD standards and few ESD standards development organizations. Today's ESD standards landscape is not only witnessing an increase in the number of standards, but also increasing cooperation among the organizations that develop them.

Advisory Documents

Advisory Documents and Technical Reports are not Standards, but provide general information for the industry or additional information to aid in better understanding of Association Standards.

ESD ADV1.0: Glossary of Terms
Definitions and explanations of various terms used in Association Standards and documents are covered in this Advisory. It also includes other terms commonly used in the ESD industry.

ESD ADV3.2: Selection and Acceptance of Air Ionizers
This Advisory document provides end users with guidelines for creating a performance specification for selecting air ionization systems. It reviews four types of air ionizers and discusses applications, test method references and general design, performance and safety requirements.

ESD ADV11.2: Triboelectric Charge Accumulation Testing
The complex phenomenon of triboelectric charging is discussed in this Advisory. It covers the theory and effects of tribocharging. It reviews procedures and problems associated with various test methods that are often used to evaluate triboelectrification characteristics. The test methods reviewed indicate gross levels of charge and polarity, but are not necessarily repeatable in real world situations.

ESD TR53.1: ESD Protective Workstations
This Advisory document defines the minimum requirements for a basic ESD protective workstation used in ESD sensitive areas. It provides a test method for evaluating and monitoring workstations. It defines workstations as having the following components: support structure, static dissipative worksurface, a means of grounding personnel and any attached shelving or drawers.

ESD TR 20.20: ESD Handbook
New handbook provides detailed guidance for implementing an ESD control program in accordance with ANSI/ESD S20.20.

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MIL-STD-464~~B~~C

A Review of the Latest Revisions to the Standard

Part 2

by Ken Javor, EMC Compliance

AUTHOR'S NOTE

Due to problems in the digital publishing process, MIL-STD-464B 01 October 2010 is scrapped and MIL-STD-464C, release date 01 December 2010 will take its place. There are no technical changes from what are described in this three part article, but the replacement for MIL-STD-464A will be MIL-STD-464C. MIL-STD-464B dated 01 October 2010 will cease to exist.

This is Part 2 of 3 parts of a review of the newly released MIL-STD-464C, "Electromagnetic Environmental Effects Requirements for Systems." The following is a summary of Part 1 of the review, then on to new material.

MIL-STD-464 is the DoD top-level E3 requirement set for procurement of complete, or modified systems. "Systems" meaning an integrated platform of one type or another, such as a ground or air vehicle, a ship or submarine, a spacecraft or launch vehicle. Note that some systems can be parts of other systems, such as an F-18 fighter aircraft that operates from an aircraft carrier.

MIL-STD-464C is the latest in a long line of standards that goes back to at least MIL-I-6051, Interference Limits and Methods of Measurement; Aircraft Radio and Electronic Installations, released in 1950. The -6051 series culminated in MIL-E-6051D, Electromagnetic Compatibility Requirements, Systems, released in 1967 and used until MIL-STD-464 replaced it in 1997.

The A & C revisions of MIL-STD-464 amend the original release but are evolutionary, not revolutionary changes.

MIL-STD-464C has many changes, so many that the new Section 6.8, "Changes from Previous Issue" states, "Marginal notations are not used in the revision to identify changes with respect to the previous issue due to the extensiveness of the changes." However, there are no major departures from MIL-STD-464A. There are some additional requirements and changes to environment definitions, but the overall standard has the same look and feel, and, if readers have worked with MIL-STD-464A, they will be right at home with the "C" revision. In fact, the changes are subtle and buried enough that the point of this review is to flag things that might not leap out at the reader at first glance. This review functions as the non-existent "marginal notations."

Aside from the contractual aspect of being the E3 discipline procurement standard, the appendix of MIL-STD-464C continues to be where the really good lessons-learned type information may be found. The appendix has been significantly revised. For each main body change identified in the article, the reader is well-advised to seek out the corresponding Appendix section(s).

Part 1 of the review gave a broad-brush treatment to what was new in the standard, the high power microwave requirement and the co-located systems compatibility requirement, and then went through Section 3 definitions and listed all the changes.

We pick up with changes to Section 4 and then move on to Section 5. This part of the review ends with Section 5.3, which is the electromagnetic environment tables. Part 3 will pick up where Part 2 leaves off, with Section 5.4, High Power Microwave.

-464A	-464C
The system shall be electromag-netically compatible among all subsystems and equipment within the system and with environments caused by electromagnetic effects external to the system. Verification shall be accomplished as specified herein on production representative systems. Safety critical functions shall be verified to be electromagnetically compatible within the system and with external environments prior to use in those environments. Verification shall address all life cycle aspects of the system, including (as applicable) normal in-service operation, checkout, storage, transportation, handling, packaging, loading, unloading, launch, and the normal operating procedures associated with each aspect.	Each system shall be electromagnetically compatible among all subsystems and equipment within the system and with environments caused by emitters and other electromagnetic sources external to the system to ensure safe and proper operation and performance. This standard identifies baseline design requirements and verification to address E3 issues. Requirements and verification approaches may be tailored based on engineering justification derived from the system's operational requirements and engineering analysis. Design techniques used to protect equipment against EMI effects shall be verifiable, maintainable, and effective over the rated lifecycle of the system. Design margins shall be established based on system criticality, hardware tolerances, and uncertainties involved in verification of system-level design requirements. Verification shall address all life cycle aspects of the system, including (as applicable) normal in-service operation, checkout, storage, transportation, handling, packaging, loading, unloading, launch, and the normal operating procedures associated with each aspect. The Data Item Description (DID) called out in the standard provide a means for establishing an overall integrated E3 design and verification approach to identify areas of concern early in the program, mitigate risk, and document test results.

Table 1

And now, a section-by-section summary of changes. Only changed sections are listed. In the list that follows, the bold section number is for MIL-STD-464C. If the section number is the same as it was for MIL-STD-464A, then it only appears once. If the number is different, then the -464A number appears after it in parentheses.

Section 4.1, General Requirements, has been greatly expanded. The -464A and -464C versions are shown side-by-side in Table 1.

Section 5.2 Intra-system EMC adds this statement to the heritage -464A requirement: "For surface ships, MIL-STD-1605(SH) provides test methods used to verify compliance with the requirements of this standard for intra- and inter-system EMC, hull generated intermodulation interference, and electrical bonding." Stressing here what was mentioned earlier, the appendix to this section has much new information and some rearrangement.

Section 5.2.1 Hull-generated intermodulation interference (IMI) contains a bit of a sleeper change: The requirement is changed from controlling IMI products of 19th order and higher (in -464A) to above the 19th order in -464C.

Section 5.2.2 Shipboard internal electromagnetic environment (EME) adds verbiage related to the use of wireless systems below decks, which is a growing trend. Such sources can be Wi-Fi, RFID systems, handheld communications, and other low-power transmitters. Also, the EME for non-metallic ships has been raised to 50 V/m below 2 MHz, from a previous requirement of 10 V/m. The submarine EME above 30 MHz has been raised from a previous level of 5 V/m to 10 V/m in -464C.

Section 5.2.4 is a new section entitled, "Induced levels at antenna ports of antenna-connected receivers." This section basically brings an excellent verification technique that resided in the appendix in MIL-STD-464 and MIL-STD-464A into the requirements main body in MIL-STD-464C. Sections of the appendix that dealt with spectrum analyzer surveys of platform antennas in A5.2 have been moved to the A5.2.4 part of the appendix.

Section 5.3 External EME has updated tables and lots of new appendix material. The Table numbering scheme has changed from 1A, 1B, etc. to Roman numerals. Thus Tables 1A-F in -464A now comprise Tables I-VI in -464C. In general, changes to the table vary by frequency range. The changing entries reflect updates to MIL-HDBK-235 and are unclassified versions of detailed tables in that handbook. In the following annotated tables, the new -464C values are shown first, the old -464A values second, where different. Color coding: Red fill means level has increased. Yellow fill means change is less than 1 dB, either higher or lower, and blue highlight means -464C level is lower than for -464A. * means no emitters in that frequency range.

-464C **TABLE I. Maximum external EME for deck operations on Navy ships** vs. -464A **TABLE 1A. External EME for deck operations on ships**

Frequency Range		Shipboard Flight Decks		Shipboard Weather Decks	
		Electric Field (V/m-rms)		Electric Field (V/m-rms)	
(MHz)	(MHz)	Peak	Avg	Peak	Avg
0.01	2	*/45	*/45	*	*
2	30	164/100	164/100	169/200	169/200
30	150	61	61	61	61
150	225	61	61	61	61
225	400	61	61	61	61
400	700	196/151	71	445/151	71
700	790	94/94	94/95	94/162	94/95
790	1000	246/1125	100/99	1307/1125	244/99
1000	2000	212/550	112	112/550	112/180
2000	2700	159/184	159/158	159/184	159/158
2700	3600	2027/2030	200/184	897/2030	200/158
3600	4000	298/290	200	1859/290	200
4000	5400	200/290	200	200/290	200
5400	5900	361/345	213/200	711/345	235/200
5900	6000	213/345	213/200	235/345	235/200
6000	7900	213/345	213/200	235/345	235/200
7900	8000	200/345	200	200/345	200
8000	8400	200/345	200	200/345	200
8400	8500	200/483	200	200/483	200
8500	11000	200/510	200	913/510	200
11000	14000	744/310	200	833/310	200
14000	18000	744/310	200	833/310	200
18000	45000	200	200	267/200	200
45000	50000	200/*	200/*	267/*	200/*

-464C TABLE II Maximum external EME for ship operations in the main beam of transmitters vs. **-464A TABLE 1B. External EME for shipboard operations in the main beam of transmitters**

Frequency Range (MHz)		Main Beam (distances vary with ship class and antenna configuration)	
		Electric Field (V/m –rms)	
		Peak	Avg
0.01	2	*	*
2	30	200	200
30	150	10/20	10/20
150	225	10	10
225	400	43/25	43/25
400	700	2036/1940	268/260
700	790	10/15	10/15
790	1000	2528/2160	485/410
1000	2000	930/2600	156/460
2000	2700	10/6	10/6
2700	3600	27460	2620
3600	4000	8553/9710	272/310
4000	5400	139/160	139/160
5400	5900	3234/3500	267/160
5900	6000	267/310	267/310
6000	7900	400/390	400/390
7900	8000	400/860	400/860
8000	8400	400/860	400/860
8400	8500	400/390	400/390
8500	11000	4173/13380	907/1760
11000	14000	3529/2800	680/390
14000	18000	3529/2800	680/310
18000	40000	2862/7060	576/140
40000	45000	2862/570	576/570
45000	50000	2862/*	576/*

‡ The EME levels in the table apply to shipboard operations in the main beam of systems in the 2700 to 3600 MHz frequency range on surface combatants. For all other operations, the unrestricted peak EME level is 12667 V/m and the unrestricted average level is 1533 V/m.

-464C TABLE III. Maximum external EME for space and launch vehicle systems vs. **-464A TABLE 1C. External EME for space and launch vehicle systems**

Frequency Range (MHz)		Electric Field (V/m-rms)	
		Peak	Avg
0.01	2	1/20	1/20
2	30	73/20	73/20
30	100	17/20	17/20
100	150	17/100	17/100
150	225	4/100	1/100
225	400	*/100	*/100
400	700	47/100	6/100
700	790	1/100	1/100
790	1000	7/100	7/100
1000	2000	63/200	63/200
2000	2700	187/200	187/200
2700	3600	23/200	8/200
3600	4000	2/200	2/200
4000	5400	3/200	3/200
5400	5900	164/200	164/200
5900	6000	164/200	164/200
6000	7900	6/200	6/200
7900	8000	3/200	1/200
8000	8400	1/200	1/200
8400	8500	3/200	1/200
8500	10000	140/200	116/200
10000	11000	140/20	116/20
11000	14000	114/20	114/20
14000	18000	16/20	9/20
18000	40000	23/20	23/20
40000	50000	23/-	23/-

Color coding: Red fill means level has increased. Yellow fill means change is less than 1 dB, either higher or lower, and blue highlight means -464C level is lower than for -464A.
** means no emitters in that frequency range.*

-464C **TABLE IV Maximum external EME for ground systems** vs. -464A **TABLE 1D. External EME for ground systems**

Frequency Range (MHz)		Electric Field (V/m-rms)	
		Peak	Avg
0.01	2	73/25	73/25
2	30	103/50	103/50
30	150	74/50	74/50
150	225	41/50	41/50
225	250	92/50	92/50
250	400	92/1500	92/50
400	700	98/1500	98/50
700	790	267/1500	267/50
790	1000	284/1500	267/50
1000	2000	2452/2500	155/50
2000	2700	489/2500	155/50
2700	3600	2450/2500	219/50
3600	4000	489/2500	49/50
4000	5400	645/2500	183/50
5400	5900	6146/2500	155/50
5900	6000	549/2500	55/50
6000	7900	4081/2500	119/50
7900	8000	549/2500	97/50
8000	8400	1095/2500	110/50
8400	8500	1095/2500	110/50
8500	10000	1943/2500	139/50
10000	11000	1943/1500	139/50
11000	14000	3454/1500	110/50
14000	18000	8671/1500	243/50
18000	40000	2793/1500	76/50
40000	50000	2793/*	76/*

-464C **TABLE V Maximum external EME for rotary-wing aircraft, including UAVs, excluding shipboard operations** vs. -464A **TABLE 1E. External EME for Army rotary wing aircraft.**

Frequency Range (MHz)		Electric Field (V/m – rms)	
		Peak	Avg
0.01	2	200/264	200/264
2	30	200/264	200/264
30	150	200/264	200/264
150	225	200/3120	200/3120
225	249	200/3120	200/3120
249	400	200/2830	200/260
400	500	1311/2830	402/260
500	700	1311/1940	402/260
700	790	700/1550	402/240
790	1000	700/3480	402/460
1000	2000	6057/8420	232/588
2000	2700	3351/21270	200/490
2700	3600	4220/27460	455/2620
3600	4000	3351/21270	200/490
4000	5400	9179/21270	657/400
5400	5900	9179/21270	657/400
5900	6000	9179/21270	200/400
6000	7900	400/3750	200/390
7900	8000	400/2500	200/860
8000	8400	7430/8000	266/860
8400	8500	7430/8000	266/390
8500	11000	7430/13380	266/1760
11000	14000	7430/2800	558/390
14000	18000	730/2800	558/350
18000	40000	1008/7060	200/420
40000	45000	1008/570	200/570
45000	50000	1008/*	200/*

-464C **TABLE 1F Maximum external EME for fixed-wing aircraft, including UAVs, excluding shipboard operations** vs. -464A **TABLE 1F. External EME for fixed wing aircraft, excluding shipboard operations**

Frequency Range (MHz)		Electric Field (V/m-rms)	
		Peak	Avg
0.01	0.1	88/50	27/50
0.1	0.5	88/60	27/60
0.5	2	88/70	27/70
2	30	64/200	64/200
30	100	67/30	13/30
100	150	67/90	13/30
150	200	67/90	36/30
200	225	67/70	36/70
225	400	58/70	3/70
400	700	2143/730	159/80
700	790	80/1400	80/240
790	1000	289/1400	105/240
1000	2000	3363/3300	420/160
2000	2700	957/4500	209/490
2700	3600	4220/4500	455/490
3600	4000	148/4500	11/490
4000	5400	3551/7200	657/300
5400	5900	3551/7200	657/300
5900	6000	148/7200	4/300
6000	7900	344/1100	14/170
7900	8000	148/1100	4/170
8000	8400	187/2600	70/1050
8400	8500	187/2600	70/1050
8500	11000	6299/2600	238/1050
11000	12000	2211/2600	94/1050
12000	14000	2211/2000	94/330
14000	18000	1796/2000	655/330
18000	40000	533/1000	38/420
40000	50000	533/*	38/*

*Color coding: Red fill means level has increased. Yellow fill means change is less than 1 dB, either higher or lower, and blue highlight means -464C level is lower than for -464A. * means no emitters in that frequency range.*

***Ken Javor** has worked in the EMC industry for thirty years. He is a consultant to government and industry, runs a pre-compliance EMI test facility, and curates the Museum of EMC Antiquities, a collection of radios and instruments that were important in the development of the discipline, as well as a library of important documentation. Mr. Javor is an industry representative to the Tri-Service Working Groups that write MIL-STD-464 and MIL-STD-461. He has published numerous papers and is the author of a handbook on EMI requirements and test methods. Mr. Javor can be contacted at ken.javor@emccompliance.com.*

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New Product Video Debuts on YouTube

The two minute long high resolution video - available at http://www.youtube.com/watch?v=TgxsL6zAKPw - demonstrates how the HAL 104 combines the performance of a multi-function production line safety tester with load and power factor measurement for product energy consumption and ratings assessments.

Part of a new and extended range of specialist HAL electrical safety testing instrumentation, this highly versatile all in one tester has been specially designed for the fast and accurate electrical tests required by modern electronic manufacturing environments.

The new HAL104 meets all of the requirements of the various British and European standards in relation to high voltage testing and incorporates fully isolated high voltage outputs to ensure the highest levels of operator safety.

Engineering Kit for High Frequency Toroids

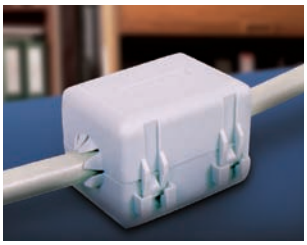
The High Frequency Toroid Kit was created for inductive applications operating at a frequency of 1 MHz and above. The High Frequency Toroid Kit contains eight (8) sizes and four (4) materials. The Toroids supplied in the kit are based on the most common industry sizes and the materials are selected for optimized performance for power conversion and low loss applications.

These Toroids and materials can be utilized for broadband transformers and high frequency chokes. Potential users who will benefit most from this kit are companies involved in Radio Frequency power supplies and transformers. Typical applications for these products include Medical Imaging, Semi-conductor processing, RF Communications and Plasma Chemical Deposition.

As well as the new High Frequency Toroid Kit, Fair-Rite also has a broad selection of Evaluation Kits containing components in a wide range of materials and geometries. EMI Suppression kits are available for board level and cable components including chip beads, common mode and differential mode surface mount beads, wound beads, multi-aperture cores, round and flat cable cores as well as round and flat cable snap-its. Ferrite components are available in materials optimized for impedance from 1MHz to over 1000 MHz. The Antenna/RFID Evaluation kit contains a range of rods in low loss high Q materials optimized for frequencies ranging from 10kHz to 50 MHz. The RF Power Rod kit contains a selection of ferrite rods intended for differential mode high current applications that require high saturation and Curie temperature. Visit www.fair-rite.com for more information.

Variable Diameter Cable Ferrite

One of the easiest ways to mitigate unwanted RFI/EMI interference is to install a cable mounted ferrite on both power and data transmission cables. To enhance final assembly flexibility and maximize RF suppression, Leader Tech has announced the availability of a variable diameter, bisected FerriShield Ferrite for applications that operate between 10 MHz and 1GHz.



In addition to offering 260 ohms of impedance at 100 MHz, Leader Tech's SS28B2044 Variable Diameter End Port (VDEP) ferrite integrates sixteen spring-like flutes around the inside diameter of its nylon case. This unique design characteristic allows for rapid and easy installation on cables ranging from .125" to .730". An optional adhesive mount pad can also be added to the ferrite base to help anchor cables inside an electronic enclosure. For additional information please visit www.leadertechinc.com.

Thermally Conductive Silicon Encapsulant

LORD Corporation has announced the availability of a new thermally conductive silicone encapsulant. Designed for encapsulation applications where high heat dissipation is required, LORD SC-305 is a two-component silicone system. Ideally suited for LED lighting power supply encapsulation, LORD SC-305 can be room temperature or heat cured for maximum adhesion. Benefits of the encapsulant include low stress, high thermal conductivity and superior environmental resistance.

Composed of an addition-curing polymer that will not depolymerize when heated in confined spaces, the silicone encapsulant is a durable solution. LORD SC-305 also meets the requirements of UL 94 V-O, providing excellent flame retardancy. Further, the three-step application process involving mixing, applying and curing is user-friendly, making LORD SC-305 an ideal solution for encapsulation. More information on LORD SC-305 can be found at http://www.lord.com/electronicmaterials.

QuadTech Announces New Vice President of Worldwide Sales

QuadTech has announced Len Schalkwyk as VP Worldwide Sales. Schalkwyk brings over 16 years of sales and marketing experience, and will have responsibility for providing sales strategy and leadership. Of his new role, Schalkwyk says, "I look forward to joining QuadTech's team. I'm excited to be back in the test instrumentation industry, helping QuadTech uncover new opportunities and expand their North American business."

Mr. Schalkwyk, MBA, was previously employed at DAP Technologies as the Vice President of Worldwide Sales. He was responsible for sales team management, sales support and customer management, as well as contract negotiations. Schalkwyk has also worked for The RealTime Group, Intrinsyc Software (USA), Inc., MacDonald Dettwiler, and Transport Canada. He also holds a technology degree from DeVry Institute of Technology/Ryerson Polytechnic Institute – Toronto.

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January & February 2011

UL University offers a host of training opportunities throughout the year. UL University will offer over 150 courses in 2011, on 50+ subjects throughout the U.S. and Canada. The offerings included in this month's list are new for 2011. Visit their website to view additional topics, dates and locations www.uluniversity.com.

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Data Acceptance Program: Requirements for Participation
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January 19
Ground Bond and Ground Continuity Testing
Associated Research, Inc.
Webinar
www.incompliancemag.com/events/110119

January 24 - January 26
Essentials for ESD Programs
ESD Association
Shenzhen, China
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January 24 - January 28
Electronics Laboratory Technician Training
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February 1 - February 2
Test, Measurement and Laboratory Use Equipment: Designing for Compliance to UL 61010-1, 2nd Edition
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February 2
Hipot Testing Basics
Associated Research, Inc.
Webinar
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Kimmel Gerke Associates & Tektronix Inc.
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February 7 - February 11
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February 7 - February 11
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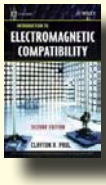

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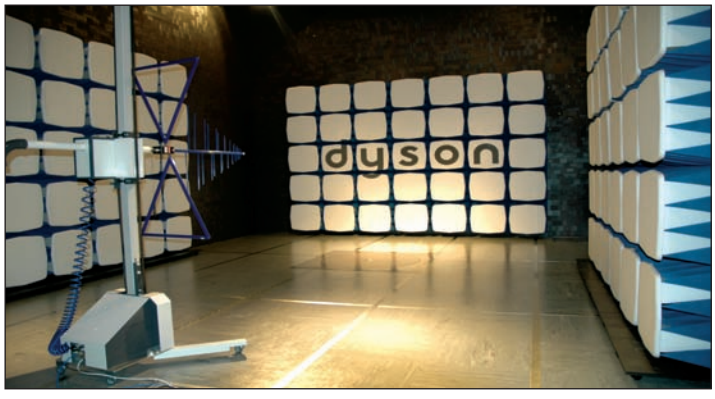

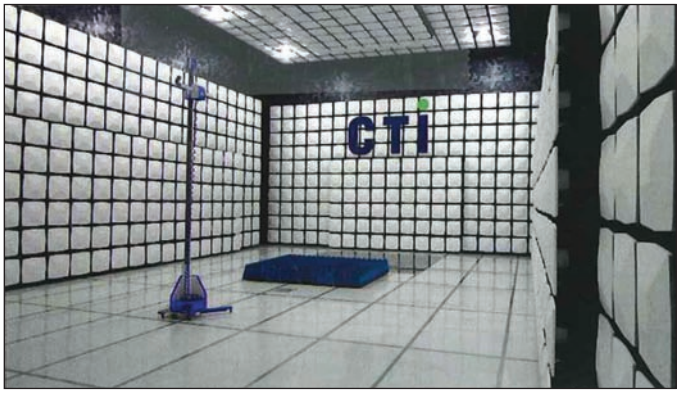

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