Updated and Consolidated

In response to many requests, we now have a new three-day format for our EMC by Your Design Seminar/Workshop. We will be keeping the same important concepts and material, including controlling signal return currents of PCB’s, how EMC and signal integrity are interrelated and the expanded section on filter design, but we will present them in a more comprehensive format.

The class still includes:
- Lecture, discussion and hands-on workshop
- 2 textbooks and a large workbook of slides used in class
- Take-home proprietary EMC design software
- Free optional design evaluation of your product
- Instructors with over 75 years combined engineering experience

The seminar/workshop applies to:
- Military
- Medical
- Industrial
- Radio
- Avionics
- Appliance
- ITE
- Wireless
- Other

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Seminar Schedule

Day 1-3: EMC Design Class, Lecture & Discussion
Day 3: Workshop using computer programs designed by instructors

Day 1
1. Introduction to EMC
   a. Why you need to consider EMC in your design
   b. The Real World & EMC Test Standards
      (1) FCC & Canadian EMC requirements
      (2) European EMC Directive
      (3) Mil 461 & RTCA EMC requirements
      (4) Other World EMC regulations
      (5) Real world measurements and levels

2. Interference overview
   a. Typical noise path
   b. Wavelengths, bandwidths and dB’s
   c. Overview of radiated interference

3. Grounding

4. Cabling - principles from crosstalk to how shielding works

5. Passive components

6. Electric and magnetic fields from simple circuits

7. Fields radiated by non-sinusoidal sources

8. General strategy for low emission product design

5:00-6:30 pm Laboratory Tour
Optional tour of a modern EMC test facility

Day 2
1. Controlling radiated emissions at the device
2. Digital circuit noise and layout
3. Control signal return currents on PCB’s
4. Learn how EMC and signal integrity are interrelated
5. Filtering - how filters work and ways they can be used in your design
6. Emission control in motherboards & backplanes
7. Hands-on calculations made throughout the day
8. Controlling radiated & conducted emissions from switch mode power supplies
9. Reducing emissions from cables and packaging.
10. Calculating emissions from a digital circuit
11. Shielding
12. Calculation of emissions from enclosures

Day 3
1. Troubleshooting radiated & conducted emissions
2. Electrostatic discharge (ESD)
3. Case study and validation of results

4. The Workshop
   Using an example of a real life product and following typical design principles,
regulatory requirements

Safety Updates

Audio Video Equipment

ITE Equipment
The new EN 60950-1:2006 standard for ITE equipment becomes effective on December 1, 2010.

Medical Standard
The European Union has reversed a previous decision and voted to delay requiring the new 3rd edition of the medical standard EN 60601-1 to June 1, 2012. The previous effective date was Sept 12, 2009. This is only for products covered by the Part 1 standard.

Machinery Directive Update
A new interpretation of the recent update for the Machinery Directive 2006/42/EC for European Compliance requires manufacturers to have a designated legal representative in the member states that they do business in. The directive makes several references to “manufacturers and their representatives.” Any product placed on the market must comply with the directive. D.L.S. can provide this as part of a comprehensive Machinery Directive compliance-testing program.

Intentional Radiators
Testing Program
D.L.S.’s new streamlined program for FCC listings eliminates wait time. We do the research, make the recommendations, perform the testing, submit the filings and follow up with each project through completion to ensure a smooth and timely route to product certification. A true value-added program that enables speed to market with economics in mind.

New Japan Requirements
Beginning April 1, 2010 telecom port emissions are required for VCCI compliance per VCCI V3/2009.04. Beginning Oct 1, 2010 emissions above 1 GHz will be required. Products already filed with VCCI and distributed in the market before the enforcement date will not be subject to these new requirements. These requirements will need to be applied to new VCCI applications and to products distributed after these dates. D.L.S. is currently providing this data for our clients in their VCCI reports.

Audio Video Equipment
(Few 3-day format cont’d)

we will:
a. Develop a block diagram
b. Determine the product’s EMC parameters
c. Using our proprietary computer programs (a copy of which you will take home), calculate the probable emissions of:
   (1) circuit boards
   (2) power supply
   (3) enclosure

While meeting the North American and European EMC regulations, students will design/analyze a unit consisting of:
a. A motherboard with microprocessor, clocks, digital inputs and outputs
b. A power supply
c. Cables with and without shielding for the digital and analog inputs and outputs
d. An enclosure
e. An external keyboard
f. An interface to a video monitor

Students will go through the product’s requirements and calculate its estimated emissions, providing rationale for various decisions.
The Chinese government started the China Compulsory Certification (CCC) system at the end of 2001. This system is the statutory compulsory safety certification system for electrical and electronic products (EMC compliance is also required). The basic approach is to safeguard the consumers’ rights and interests and protect personal safety and property. CCC system came into force since May 1, 2002 by State General Administration for Quality Supervision and Inspection and Quarantine of the People’s Republic of China (AQSIQ) and the Certification and Accreditation Administration of the People’s Republic of China (CNCA).

D.L.S. has established a comprehensive CCC compliance program that takes the guesswork out of this specific market. Many companies today need to formally apply for the approval to market products in China, and in doing so receive approval to display the CCC mark on their products. The CCC Mark program covers 163 products divided into 22 categories, including household appliances, motor vehicles, toys, medical devices, and information technology equipment.

In addition to the CCC Mark, some categories require additional certifications. Examples are certain medical devices, which also require an approval from the China State Drug Administration, somewhat similar to FDA requirements in the U.S. Additionally the China Ministry of Information Industry regulates telecom and internet equipment. In some cases for specific equipment, a Network Access License and Network Access Identifier Mark must be obtained.

D.L.S. can help your company determine what categories your products fall under, and determine which mandatory standards will be used for certification. Many times, the intended use of a product will determine the product category used for the formal certification process. Often companies have experienced serious delays in getting products to market based on an inaccurate application reference, Harmonized Tariff code or HS codes.

As a condition of the CCC Mark, the certification body will send an inspector to factory locations where the products are produced and perform an ISO style initial factory inspection if the factory never had factory inspection for that particular product category before. This can be a lengthy process, as the need to obtain a visa by the Chinese inspector can take time. In the event a new factory location is added, or a contract manufacturer is to be used, these facilities must also be audited under the same conditions and approved before products produced at these locations can be legally marked with the CCC logo.

D.L.S. can arrange for all testing and coordinate the total certification process including formal applications and the associated paperwork, along with a factory evaluation by representatives of the official governing agency.

Check with D.L.S. regarding your China compliance projects and find out the D.L.S. difference with respect to CCC compliance.

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EMC by Your Design

An EMC Practical Applications Seminar and Workshop
with a free 45 min. individual product design evaluation on Oct. 29,
take home proprietary computer program,
expanded chapter on filter design, signal integrity,
signal return currents on PCB’s
and a second textbook at no extra charge

Hilton Hotel, Northbrook, IL

We are offering a special
$300 discount if you register by October 5, 2010

Classes fill quickly so register early
email cgorowski@dlsemc.com or call 847-537-6400
www.dlsemc.com/1001