

August

Volume 9 2008

# DLS News & Views

To help keep you better informed

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## DLS Celebrates 25th anniversary

Back when D.L.S. was formed, open field testing was literally done outside in a field or parking lot located as far away as possible from buildings and other sources of ambient noise.



We chose an undeveloped field surrounded by a protective hill in the small town of Genoa City, Wisconsin far from the interference of Chicago radio stations. A typical testing day began in the wee hours of the morning loading the equipment into the station wagon, driving to the site, dragging out the custom-made table, an EMC 25 tuned receiver, a CRM 25 meter module, a dual pen chart recorder, and then setting up the biconical and log periodic antennas. Snakes, frogs, insects and other animals were common witnesses to our tests. Weather was a major factor and a test in progress was often interrupted to wait out a rainstorm. Even when precipitation was not a problem, the summer heat and frigid winter temperatures made life difficult for the test engineer. It also wasn't easy on the receiver, which often found itself wrapped in heating pads. After the tests were run and the customer and his equipment were sent home, the test equipment had to be dismantled, again loaded into the wagon and driven 55 miles back to its Glenview storage.

And now twenty-five years later, we have 36 employees, 3 modern all-weather test buildings



in Genoa City, Wisconsin, 13 anechoic chamber/test labs in a 30,000 sq. ft. building in Wheeling, Illinois with a 10,000 sq. ft. military/RTCA addition, and a fully accredited product safety testing subsidiary. We have been called to places all over the country to do custom evaluations ranging from electronic control systems being installed in a nuclear power plant to on-site



evaluations at a naval shipyard to study the EMC environment in some of the newest ships joining the U.S. fleet. We've also expanded into global compliance testing for countries around the world. We have design engineers from many countries attend our extensive hands-on EMC training seminars.

**How did we manage to come so far in 25 years?** With a lot of help from people like you. And we would like to take this opportunity to say:

Thank You  
for your support  
over the years..

We could not have done it without you. We appreciate your business, your confidence in us and your motivating us to delve into new areas of expertise. Along the way we've also learned how to be the extensive problem solvers you need and how to match our services to your requirements. The road hasn't always been easy, but our outstanding, innovative, hard-working, loyal employees have truly made D.L.S. what it is today.

Our goal for the next twenty-five years and beyond is to continue to provide you with the easiest possible route to EMC and product safety compliance without compromising any of our high standards of excellence.

If you would like an eight-page in-depth description of D.L.S.'s first 15 years, please contact Carol at 847-537-6400 or at cgorowski@dlsemc.com and ask for the article *A history of one company's EMI testing*.



# NVLAP Audit

This photo, with everyone smiling, was taken after three days with this year's NVLAP auditors, Dan Hoolihan and Pryor McGinnis. We have been a NVLAP EMC lab since the inception of the program back in 1986 when only two listings were available: FCC Part 15 radiated and conducted. Today we have over eight pages of accreditations, with Korea our latest addition. These accreditations are your assurance of quality testing. Many are then forwarded to NIST who grants D.L.S. CAB status through the various world MRAs.



# DLS Upgrades Appliance Evaluation Program

D.L.S. has expanded capabilities to include worldwide requirements for household and similar appliances. Some examples of these types of products are commercial cooking appliances, battery chargers, industrial cleaning equipment and refrigeration equipment. D.L.S. can assist manufacturers with all their compliance needs, including North American agency certification to UL/CSA standards. Contact Jack Black at 847-537-6400 today for details.



# regulatory requirements **UPDATE**

## New Military Standard 461F

A new revision of MIL STD 461 has been issued, with the current level now Revision F. A brief overview of the changes are listed below. For a more detailed description including tables and charts, please go to [www.dlsemc.com/461F](http://www.dlsemc.com/461F). Then contact Jack Black at 847-537-6400 to review your upcoming project for possible impact with respect to the new revision.

**RS103 Susceptibility Scanning Changes** - Above 1 GHz, step size has been increased resulting in a much faster RS103 test in that frequency range as shown in the table below.

Comparison of 461E & F Susceptibility Sweep Times			
Frequency Range	461E Step Size	461F Step Size	Relative Sweep Time F vs. E
30 Hz - 1 MHz	5%	5%	Same
1 - 30 MHz	1%	1%	Same
30 MHz - 1 GHz	0.5%	0.5%	Same
1 - 8 GHz	0.1%	0.25%	40% (250% faster)
Above 8 GHz	0.05%	0.25%	20% (500% faster)

Also positioning of the radiating antenna at 1 meter or more from the EUT was incorporated, eliminating the capability of moving the antenna closer to achieve some of the specified field strengths at all test frequencies. This will cause many labs to lower the test levels they can support or create a demand for higher-power amplifiers. Either way, the cost of testing will increase.

**CS106, A New Requirement** - MIL STD 461F includes a Navy ships-only "CS106" requirement that is superficially similar to the obsolete MIL STD 461A/B/C CS06.

**CS114** - For Navy ships and submarines, there is a low frequency add-on to this requirement that models common mode noise generated by new power systems. The add-on is a level of 77dBuA from 4 kHz to 1 MHz.

**CS116** - Whereas there were previously two CS116 limits, there is now just one, the more stringent of the two, which peaks at 10 amps.

## CISPR 22 and FCC Part 15, Subpart B are NOT the same

Often the assumption is made that if you test your product to meet CISPR 22 requirements, you have no need for FCC testing. While it is true that the FCC will currently accept testing to CISPR 22 limits, the testing must be done using U.S. voltage and line frequency, and ANSI C63.4 test procedures. Keep in mind that the EU generally does not accept FCC test data as equivalent to EN 55022. There are a few significant differences between CISPR 22 and FCC Part 15, Subpart B mandated ANSI C63.4 test procedures.

In recent years, the FCC has implemented changes to the limits for AC line conducted emissions, in that they now mirror the CISPR 22 limits. The FCC and CISPR standards committees have very closely aligned the setup of EUT's, cables, and peripheral equipment for AC line conducted and radiated emissions, but there are subtle differences that may need to be taken into account when setting up the EUT for test.

For radiated emissions testing below 1000 MHz, the biggest difference between the standards is the required test distance. The FCC Rules state the test distances as 10-meters for Class A equipment and 3-meters for Class B equipment. CISPR 22:2005 requires that testing be done at 10-meters for both Class A and Class B equipment; however, it does allow for small equipment to be tested at 3-meters. Earlier versions of CISPR 22 & EN 55022 are still applicable and do not make this allowance. Also, the FCC and CISPR definitions of Class A and Class B equipment types differ fundamentally, and a product that may fall under the FCC Class A category may be considered Class B equipment under CISPR 22.

The FCC has for years required testing for radiated emissions above 1 GHz with the frequency range to test based on the highest

(continued on next page)

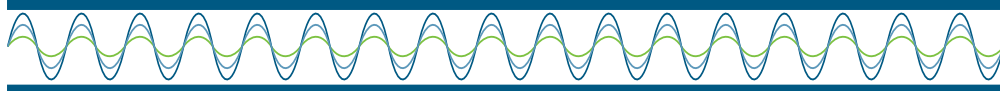
## FCC/CISPR Comparison - cont'd

clock or timing signal in the EUT. The last release of CISPR 22 has added this requirement also. It must be noted, however, that the FCC and CISPR test methods for testing radiated emissions above 1 GHz are quite different. ANSI methods applicable to FCC Part 15 require full height scanning of the receive antenna, tilting of the receive antenna, and horizontal scan of the receive antenna to maintain the emissions in the cone of radiation for maximum field strength. Currently emissions are assumed to be measured over a standard test site with ground plane. CISPR 22 refers to CISPR 16-1-4 for test procedures. No height scan is done unless the EUT is larger than the 3 dB beam width of the receive antenna. Horizontal placement of the antenna may be moved if the EUT is wider than the 3

db beam width of the antenna. In addition, the test site should approximate a free-space environment, which requires placement of specific RF absorbing material over the floor around the EUT and between the EUT and receive antenna.

One last major difference to consider is that CISPR 22 requires testing for telecom port conducted emissions. CISPR 22/EN 55022:1998 limits, test procedures and test equipment requirements are not the same as those in CISPR 22:2005/EN 55022:2006.

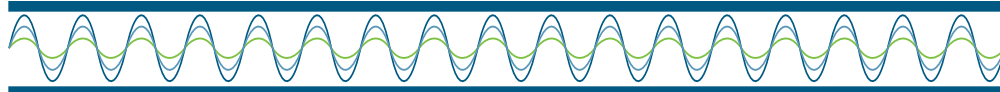
In conclusion, although the FCC Part 15, Subpart B and CISPR 22 test requirements have been brought closer into alignment over the years, testing to one does not automatically mean compliance with the other.



## did you **KNOW?**

Studies show that the cost of mitigating an EMI related problem rise sharply as the program development time to market decreases. Finding out that you have a problem early can save both time and money. Schedule an EMI emissions prescan today

with D.L.S. Let our engineering staff help with troubleshooting and mitigation. Bad news early is better than finding out you have a problem late in the development process. Call Steve Grimes today at 847-537-6400 to schedule your prescan.



## 20 things **YOU WILL LEARN** in the **EMC by Your Design Seminar**

1. EMC is not black magic.
2. Products do fail in the field (learn how to keep this from happening to you)
3. Learn everything you need to know about EMC to sell in Europe
4. What happens when you don't comply (U.S. and Europe)
5. Be introduced to standards from around the world (CISPR, FCC to Mil 461)
6. If you change it, you test it
7. Learn about cable grounding, one or both ends (it depends)
8. Nonsinusoidal waves are different than sine waves
9. How ferrites work and how you can use them
10. Watch a video showing a decoupling capacitor being added
11. How do emissions vary - single layer vs. ground plane and DIP vs. surface mount
12. How do filters work and how you can choose one
13. Learn the design strategies for low emissions
14. How you can make shielding work for you
15. How you can keep from compromising your shielded cables
16. Learn about trouble shooting, including a simple tool you can use in your lab
17. Understanding ESD
18. Learn about a case study that ties the concepts learned to real life
19. Manual and automated emission predictions (you do them both)
20. End with a one-on-one consultation applying what you learned to your product

## EMC By Your Design

A new Approach to Learning  
EMC Design Techniques

An EMC Practical Applications  
Seminar/Workshop  
with take-home computer programs  
and 32 Professional Development Hours

October 2, 3, 6 and 7, 2008  
Hilton Hotel, Northbrook, IL



D.L.S. is offering a four-day seminar/workshop that applies EMC design fundamentals to real-life situations. It teaches how to design your product to pass compliance testing, thereby eliminating costly last-minute changes. Donald L. Sweeney and Roger Swanberg, with over 80 combined years of experience in the field of EMC, now bring these EMC design fundamentals to students through hands-on, practical application to real life products. Participants will receive a free copy of the proprietary computer program designed by the instructors to solve the most complex EMC issues. Participants may bring a product of their choice for a free 45-minute individual consultation (a \$500 value), during which they will have the opportunity to apply the concepts learned in the seminar.

To register call Carol at  
847-537-6400 or email at  
cgorowski@dlsemc.com.  
For more information visit  
[www.dlsemc.com/1001](http://www.dlsemc.com/1001)

**\$300 discount**  
if you register  
by Sept. 2nd

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 Wheeling, IL 60090  
 847-537-6400 [www.dlsemc.com](http://www.dlsemc.com)

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## Free Product Review

Included in seminar  
See page 3

For a PDF copy of this newsletter, go to [www.dlsemc.com/newsletter](http://www.dlsemc.com/newsletter)

## Trade Shows

We will be at the following trade shows so be sure to stop by and say hi.

IEEE International EMC Symposium  
 August 18-22, 2008  
 Cobo Center, Detroit, MI  
 Booth #721

NBAA 61st Meeting & Convention  
 October 6-8, 2008  
 Orange County Convention Center  
 Orlando, Florida  
 Booth #1432

IEEE PSES Symposium on Product Compliance Engineering  
 October 20-22, 2008  
 Marriott North  
 Austin, Texas

## 25 YEARS LATER thoughts and dreams

On this 25th anniversary of our company, I am reflecting. Why did I choose to go into business? Because I had a father who was a dreamer and he taught his sons to dream. All my life I dreamed of having a company involved in the sciences; one where each person was important and treated as I would want to be treated as an employee. I feel very fortunate to see my dream has become a reality.

What truly amazes me is the people I have met over the years and how they have helped in so many ways to make my dream possible: from the employees who work at D.L.S. daily making your certification possible, to the many friends and colleagues who have helped me think through some technical problem or business concern.

Everything came together for me two years ago. At 10 pm on a Saturday night, I got a call that there was a fire at our company. Your dreams go into a tailspin very quickly when you get news like that. When I arrived, Brian, our general manager, was already there. We were not allowed to enter the building until 2 am Sunday morning. When we did there was three inches of water near several of our labs. We had just started to clean up when five employees showed up, and the number kept increasing all the time. We started by draining water. As morning arrived, I think just about all the employees were cleaning. The insurance company arranged a crew to help. Monday morning, just 32 hours and \$400,000 in damage later, we were able to test for all scheduled customers. That is the spirit of D.L.S. It is wonderful to have a company of outstanding employees who are there for you.

Today I have the opportunity to travel to business meetings worldwide. Often I will call in to D.L.S. to see if anyone needs me. Carol, our receptionist, checks and comes back to the phone with the results, "Don, nobody needs you." Yes, D.L.S. is its employees, and they don't need me anymore. I hear that with mixed emotions. However, that's what it is all about--my dream will continue long after me.

Well that's it, a dream becomes a reality! Not by my efforts but by the efforts of so many of you. I thank God daily for giving me this opportunity and I also thank him for all of you.

*Don*

Donald L. Sweeney  
President

