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IEEE SCV EMC Society
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**IEEE/EMC/SCV CHAPTER**
**Meeting Tuesday February 10, 2004**
LOCATION: Applied Materials Bowers Café
3090 Bowers, Santa Clara, CA 95051-0804
5:30 p.m. Social
7:00 p.m. Discussions

# Spectral Lines

www.scvemc.org Santa Clara Valley Chapter of IEEE Electromagnetic Compatibility Society

February 2004 Issue

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$$\nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}$$

$$\nabla \times \vec{H} = \frac{\partial \vec{D}}{\partial t} + \vec{J}$$

$$\nabla \bullet \vec{D} = \rho$$

$$\nabla \bullet \vec{B} = 0$$

## SCV IEEE/EMC Society Meeting

**Tuesday February 10, 2004**

Time: 5:30 p.m. Social, 7:00 p.m. Presentation

Place: Applied Materials Bowers Cafe
3090 Bowers, Santa Clara, CA 95051-0804

Subject: "Signal Detection with EMI receivers"

Speaker: Werner Schaefer, Cisco Systems, Inc.

Abstract:

Mr. Schaefer will discuss how the sweep time settings for a scanning receiver or the dwell time for a stepping receiver will affect the probability of intercept of broadband and narrow-band signals. An interpretation of the expected test results on the receiver display is also provided, together with an explanation of the limitations of test equipment. The impact of frequency versus receiver display resolution on signal detection is explained as well as the available receiver display detection modes and their appropriate use and limitations.

In addition, the different receiver IF detectors, per CISPR 16-1-1, are presented and their hardware implementation, purpose and correct use are explained. Some EMI receiver specifications, as contained in CISPR 16-1-1 are discussed at the end of the presentation. This will also include a discussion of specifications like dynamic range and IF bandwidth specifications which are not called out in the standard.

Biography:

Werner Schaefer is a Quality Manager and Senior Compliance Engineer at Cisco Systems' Corporate Compliance Center in San Jose, CA. He has 19 years of EMC experience, including EMI test system and software design, EMI test method development and EMI standards development. He currently is the Secretary of CISPR/A, the Chairman of CISPR/A/WG1, a member of CISPR/A/WG2 and CISPR/H, ANSI C63, SC1/3/6, and serves as an A2LA Lead Assessor for EMI and wireless testing and RF/microwave calibration laboratories. He is also a NARTE-certified EMC Engineer and a RAB-certified Quality Systems Lead Auditor.

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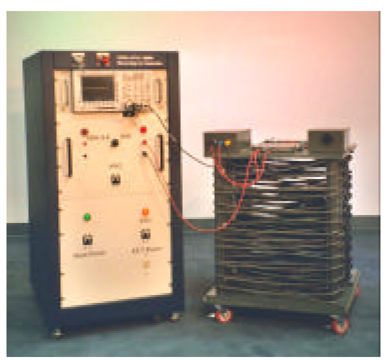
Space is available to any of the paid sponsors of the EMC SCV Chapter to present technical articles. For details or to submit articles, please contact: Dale Gutierrez at Dalegut@ieee.org

## NEMA ICS-1 (2000) Showering Arc Testing



When mechanical switches open to interrupt the currents flowing into inductive loads, arcing across the switch contacts occurs. Repeated ignition and quenching of the arc's plasma is typical in this instance, and the "showering arc" test was developed in the US and Europe to simulate this environment's effects on Power and I/O (control) lines. These environments would include those found in Utility power-switching or industrial installations or in other high-reliability applications. (Transportation, military, aerospace)

Dolan Labs at **American Electric Power (AEP) in Columbus, OH** states on their WEB site:
*"The showering arc test is essentially an electrical noise susceptibility test. A NEMA standard noise generator is used to perform the test. The test set generates broadband electrical noise via an arcing spark gap, and couples the noise onto individual conductors within a multiconductor cable. Conductors are then used as input/output paths for the device under test. The test is designed to test logic input and output circuits, excluding low-level logic such as TTL, and is appropriate for devices with solid-state control input and output circuits such as PLCs."*

The Showering Arc Generators referenced in **NEMA ICS-1 (2000)** use 3kV luminous-sign transformers to generate high peak voltages with 10mA of current. The oscillating-polarity Showering Arc Generator applies the transformer's secondary 60Hz high-voltage sine wave across a spark gap, and the single-polarity Showering Arc Generator rectifies the transformer's secondary output and applies the resulting DC voltage across the gap. In either case, the physical dimension of the spark gap is controlled with a lever-reduced micrometer to allow adjustment of the ionization potential (arc-over voltage or distance) across the gap. This mechanical adjustment sets the amplitude of the test voltage delivered from the Generator to the Coupler.

A "loom" of 15-conductor is wound onto a form, and lines are connected from the generator to the coupling cable assembly to form a transformer used for coupling the Generator's transients onto the Product's Power or Control lines. The test is run for one minute each on the power, input and output lines of the Product-Under-Test, and the Product must not change state (drop out or chatter) in order for the product to pass the test.

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## Map: Applied Materials Bowers Café 3090 Bowers, Santa Clara, CA 95051-0804