

**TC-5: High Power Electromagnetics**  
**Annual Meeting at the 2012 IEEE International Symposium on EMC at Pittsburgh, PA**  
**Wednesday, 8 August 2012 (Noon – 1:30 pm)**

Draft minutes

### **1. Opening of the meeting**

Chairman Dr. William (Bill) Radasky brought the meeting to order at 12:09 PM. Chairman Radasky welcomed the attendees, reviewed the agenda and asked for suggested changes; none were offered. Dr. Radasky made a motion to approve the agenda. MSC.

### **2. Minutes**

Secretary Dr. William Price reviewed the minutes of the 2011 meeting in Long Beach, CA. No corrections were suggested. A motion was made to approve the minutes as written. MSC.

### **3. Update TC-5 membership list**

All attendees introduced themselves. The Secretary circulated a roster, a summary of which is attached to these minutes.

### **4. Technical papers**

Dr. Radasky reported that 17 papers were submitted to this symposium for review of which 15 were accepted. There were 12 oral papers accepted, 7 of which addressed HPEM and 5 information leakage. Three poster papers were accepted.

### **5. Report on Monday's Workshop on the "Update on the Standardization Activities for Intentional Electromagnetic Interference (IEMI) Protection"**

The Monday workshop, organized by Dr. Frank Sabath, was well attended. Dr. Sabath offered 2 presentations, as did Dr. Radasky.

### **6. Report from the Lightning Subcommittee**

Prof. Rachidi reported for chairman Dr. Rubinstein. Prof. Rachidi reported two significant lightning related activities in 2012:

- A tutorial on the EMC aspects of lightning at EMC Europe (Rome, Italy: September 16-20, 2012)
- The 31<sup>st</sup> International Conference on Lightning Protection (Vienna, Austria: September 2-6, 2012)

Prof. Rachidi also reported these lightning activities within CIGRE:

- Working Group C4.407, "Lightning Current Parameters for Engineering Application" (2008, Chair Vladimir Rakov)

- Working Group C4.408, “Lightning Protection of LV Lines” (2009, Chair Alexandre Piantini)
- Working Group C4.409, “Lightning Protection of Wind Turbine Blades” (2009, Chair Shigeru Yokoyama)
- Working Group C4.410, “Lightning Striking Characteristics for Very High Structures” (2010, Chair Takatoshi Shindo)

Dr. Radasky mentioned a new CIGRE project on protecting wind turbine electronics is in the planning stages.

## **7. Report from the EM Information Leakage Subcommittee**

Prof. Yuichi Hayashi highlighted the technical session in this symposium on electromagnetic information leakage featuring 5 papers.

Prof. Hayashi also announced there will be a special section in the *IEEE Trans. EMC* in April 2013, on electromagnetic information security. Dr. Radasky will be the guest editor.

A special session on EM information leakage will be held at EMC’14 in Tokyo, May 13-16, 2014.

Mr. McInerney suggested a demonstration on information leakage should be considered for a future symposium.

## **8. Report from the IEMI Subcommittee**

Dr. Sabath mentioned two conferences (past and future) in 2012 with papers or sessions on IEMI:

- EUROEM 2012 (Toulouse, France: July 2-6, 2012)
- ICEAA’12 and URSI Commission E (Cape Town, South Africa: September 3-7, 2012)

Dr. Sabath announced plans for future symposia:

- EMC 2013 (Denver, CO)—a half day tutorial, Fundamentals of High Power Electromagnetics
- EMC 2014 (Raleigh, NC)—a special session on IEMI Protection of Critical Infrastructure

## **9. Identification of Point of Contact for iNarte questions**

Dr. Radasky told the committee we are asked to review iNarte test questions at a rate of 10 to 15 per year. He will continue to serve as a point of contact for iNarte and may call on members to respond, when needed.

Mr. McInerney mentioned a TAC committee is forming to coordinate iNarte activities.

## **10. Coordination with SC1, Smart Grid**

The IEEE EMC Society's Special Committee 1: Smart Grid, chaired by Don Heirman and vice-chaired by Dr. Radasky, coordinates EMC Society activity with other organizations concerned with the efficient use of the AC power grid. NIST's Smart Grid Interoperability Panel (US SGIP) committee, chaired by Dr. Galen Koepke, is tasked with coordinating standards (EMC, reliability, etc.) for the Smart Grid. SC 1 will sponsor a Smart Grid workshop Friday afternoon.

## **11. Status of the IEMI standard practice activities**

The balloting for IEMI standard practice (P1642) was delayed due to copyright issues. Apparently the fact that all figures were provided by the authors and all were previously published in IEEE publications does not suffice. Ed Hare from the EMC standards committee is trying to solve the problem.

## **12. Status of the Special Issue on HEMP**

The objective of a special issue on HEMP is to update research activities on HEMP since the last special issue in 1978. There are 19 invited papers covering a mix of historical reviews from different countries together with a few new topics. The emphasis of the special issue will be on international work in commercial (not military) areas. First drafts of the papers are to be submitted by 31 August 2012.

## **13. Status of the TC-5 web page**

The officers have worked to keep the web site up to date, but there have been problems with the IEEE EMC Society webmasters doing updates and breaking links in the process. It is claimed that this problem has been solved. Mr. McInerney requested suggestions for reference documents for the site.

## **14. Review of HPEM activities since last TC-5 meeting**

Since the last symposium there have been several conferences with HPEM papers

- URSI GA in Istanbul, Turkey, August, 2011
- ICEAA Conference in Torino, Italy, September, 2011
- CIGRE International Symposium, Bologna, Italy, September, 2011
- APEMC, Singapore, May, 2012
- EUROEM, Toulouse, France, July, 2012
- IEEE APS, Chicago, July, 2012

There is activity in the US Congress regarding HPEM, but the bills are not progressing.

Dr. Sabath mentioned 2 groups in Europe have begun activities involving IEMI.

Dr. Radasky reported on conferences in the next year with HPEM interest.

- EMC Europe, Rome, September, 2012
- URSI Commission E, Cape Town, September, 2012
- ICEAA, Cape Town, September, 2012
- CIGRE C4, Hakodate, Japan, October, 2012
- CEEM, Shanghai, November, 2012
- DEPS, Albuquerque, November, 2012
- APEMC, Melbourne, May, 2013
- IEEE EMC, Denver, August, 2013

Dr. Radasky compared the number of all papers presented at this year's IEEE EMC symposium with those at APEMC 2012, EUROEM 2012, and EMC Europe 2012, and noticed a radical drop from past years. Papers dealing with HPEM have been "stable" over the same period of time.

### **15. Discussion concerning whether a tutorial, workshop, and/or special session should be organized for next year**

Dr. Radasky suggested two possible workshops or tutorials for next year's symposium in Denver:

- EM leakage basic workshop (Prof. Hayashi)
- Design of HPEM sources (Mr. Fred Heather)

Dr. Radasky asked the committee of their interest in special sessions on HEMP or IEMI. Dr. Sabath suggested enlarging the second beyond design of HPEM sources. Mr. Heather suggested discussing different sources and their respective capabilities.

Prof. Pommerenke suggested a special session with TC 4 on ESD might be of interest.

Prof. Rachidi suggested organizing a special session on lightning. He offered to speak with Dr. Rubinstein concerning the session.

### **16. Other business**

Dr. Radasky suggested the committee consider the scope of its effort. The existing scope statement is presented below with possible new content in italics.

This committee is concerned with the effects and protection methods for electronic equipment and systems for all types of high power electromagnetic environments. These environments include electromagnetic pulse (EMP), intentional EMI environments (i.e., *narrowband and wideband*), lightning electromagnetic currents and fields, electrostatic discharge *and geomagnetic storms*. *In addition this committee deals with the commercial data security issue through electromagnetic information leakage activities.* Interactions with aircraft and other mobile systems are included *in addition to fixed facilities*. [Chair note: an option is to eliminate the last sentence to keep the types of systems considered open]

Dr. Radasky urged members of the committee to consider the proposed language and provide him with comments. It is intended to vote on a change at the next TC 5 meeting.

### **17. Adjournment**

The committee adjourned at 1:32 PM.

Attachment:  
Attendance List

**Attendance List**  
**2012 IEEE EMCS TC-5 Meeting**  
**Pittsburgh, PA**  
**8 August 2012**

<b>Name</b>	<b>Affiliation</b>
Dr. Fujio Amemiya	NTT Advanced Technology
Mr. Sven Batterman	Leibniz University, Hannover
Dr. Daryl Beetner	Missouri University of Science and Technology
Mr. Steve Behm	CKC Laboratories
Dr. Heyno Garbe	Leibniz University, Hannover
Mr. William Gjertson	Boeing
Mr. Michael Hatfield	US Navy
Dr. Yu-ichi Hayashi	Tohoku University
Dr. Naofumi Homma	Tohoku University
Dr. Vesna Javor	University of Niš, Serbia
Mr. Michael Joester	Fraunhofer INT
Mr. Don Jones	CKC Laboratories
Mr. Randy J. Jost	Ball Aerospace
Mr. Galen Koepke	NIST
Mr. Mike McInerney	USACE-ERDC
Mr. Klyte Mills	US Space & Naval Warfare Facility (SPAWAR)
Prof. David Pommerenke	Missouri University of Science and Technology
Dr. William Price	Boeing
Prof. Farhad Rachidi	Swiss Federal Institute of Technology
Dr. Bill Radasky	Metatech Corp.
Ms. Melanie Rohe	Leibniz University, Hannover
Dr. Frank Sabath	German MoD
Mr. Edward Savage	Metatech Corp.
Mr. Walter Scott	TASC, Inc.
Mr. Hideaki Sone	Tohoku University
Mr. Kimihiro Tajima	NTT Energy & Environment Lab
Dr. Perry Wilson	NIST-EM Div.
Prof. Wen-Yan Yin	Zhejiang University, China
Prof. Gingsheng Zeng	University of Ottowaw