



**IEEE TC 5: High Power Electromagnetics (HPEM) Technical Committee**

**Minutes of Okinawa Meeting at Japan EMC/APEMC Symposium**

**Okinawa, Japan**

**Wednesday, 22 May 2024 (1:00 – 2:00 PM Japan Time)**

**Unconfirmed Minutes**

**1) Opening of the meeting and approval of the agenda – Bill Radasky, Chairman**

Chairman Dr. William (Bill) Radasky brought the in person meeting to order at 12:00 PM, Japan time. This meeting was organized to attract attendees to the Japan EMC/APEMC Conference. The Chairman, Bill Radasky, and the Secretary, Yuichi Hayashi, were present and the Vice Chair, Mike McNerney was not able to attend. Radasky welcomed the attendees, reviewed the agenda (Attachment 1) and asked for suggested changes; none were offered. A motion was made to accept the agenda as written. Motion Seconded and Carried (MSC).

**2) Review and approval of minutes of previous TC 5 meeting – Bill Radasky, Chairman**

The unconfirmed minutes from the Grand Rapids, Michigan, TC 5 meeting on 2 August 2023 were mentioned, but due to the short time available for the meeting and the fact that most of the attendees at this meeting did not attend the meeting in Grand Rapids, it was decided to skip the review of these minutes. The minutes will be reviewed in Phoenix at the IEEE TC 5 Meeting on Wednesday, 7 August 2024. See Attachment 2.

**3) TC 5 membership list update – All**

The TC 5 membership list covering the past 5 years was reviewed by Radasky. The previous membership list was displayed without email addresses, although it was noted that several attendees during the past 2 virtual meetings did not provide email addresses. Thus it will not be possible to reach them by email. This previous list is provided in Attachment 3.

We had 25 attendees at this meeting, and they will be added to the overall membership list, so they will receive information concerning HPEM topics. Their names and affiliations are provided in Attachment 4, without email addresses. We do not publish the detailed 5-year list (with email addresses) on the website or in the minutes, as there may be private

information contained in it. Only the TC 5 officers' and subcommittee chairs' email addresses are published on the website, and this procedure has been approved by the IEEE.

4) **Report on the paper review process and sessions for Okinawa – Bill Radasky**

Radasky reviewed the paper review process for both this Summer's IEEE EMC Phoenix Symposium and this Okinawa Symposium. For the IEEE EMC Symposium there were only 3 regular papers submitted and 4 abstract papers. Of the 7 papers, 5 were accepted. Three of the papers dealt with ESD, 1 with EM Information Leakage, and 1 with immunity of equipment. We had a sufficient number of reviewers this year, and they should be recognized for their hard work. The reviewers were: Bowman, Hayashi, Khazhinsky, McInerney, Nicolae, Savage and Willemen.

In Okinawa, 43 papers were submitted for the HPEM topic, which is a record for any EMC conference. There were 16 regular papers submitted, and 4 special sessions were organized as follows:

- SS-3 on HEMP/IEMI: 5 submitted and accepted
- SS-5 on ESD 8 submitted and accepted
- SS-9 on HPEM transients 5 submitted and accepted
- SS-10 on EM Info Leakage 9 submitted and accepted

Of the 43 papers, 41 were accepted and presented. The review process was performed mainly through the efforts of the Japan EMC technical experts with some support from the IEEE EMC TC 5.

5) **Report from the Lightning Subcommittee – Marcos Rubinstein and Farhad Rachidi**

A presentation was prepared by Marcos Rubinstein and Farhad Rachidi, but as they could not attend, Radasky reviewed the charts for the attendees. They listed the planned lightning community meetings and conferences for the rest of 2024 and 2025. The status of the 9 CIGRE working groups dealing with lightning was reviewed, along with one WG in the IEEE PES Society. Finally a tutorial is planned for GlobalEM 2024 in Austin, Texas in July 2024. Radasky thanked Marcos and Farhad for their usual high quality presentation indicating the worldwide activities in the field of lightning. The presentation is provided in Attachment 5.

6) **Report from the EM Information Leakage Subcommittee – Yuichi Hayashi**

Yuichi Hayashi provided his report beginning with an overview of the 10 special session papers submitted and presented at this year's Okinawa conference. He then reviewed the planned tutorial to be presented in Phoenix at the August IEEE EMC Symposium. He also mentioned the special session with 12 papers to be presented at EMC Europe in Bruges in September this year.

Radasky complemented Prof. Hayashi on his efforts to organize special sessions and tutorials in the EM Information Leakage area, worldwide. Further details can be found on this agenda item in Attachment 6.

7) **Report from the HEMP/IEMI Subcommittee – Mike McInerney**

Mike McInerney presented the HEMP/IEMI report in two parts. For the HEMP aspects, Bill Radasky provided a summary of HEMP activities including:

- The IEC is updating IEC 61000-2-9 (HEMP radiated environment): the CDV was circulated and accepted with a unanimous vote. It is expected that Edition 2 will be published in 2025.
- Power companies are investigating ways to protect their electronics from HEMP (and IEMI). One company has selected their best substation building construction design after testing, and is planning to update the design to reduce the penetration of high-frequency fields. If successful, this new design will be their prototype for their future substation control house construction.
- GlobaleM is the new name for the old AMEREM/EUROEM/ASIAEM series of HPEM conferences. The next conference is in Austin, Texas from 14-19 July 2024. <https://www.globalemconf.com>.

With regard to the IEMI aspects, Sven Fisahn compiled the report. The main point was that a workshop chaired by M. Lanzrath and S. Fisahn: “Risk Management for Critical Infrastructures“ is planned for the International Symposium and Exhibition on Electromagnetic Compatibility (EMC Europe 2024) in Bruges in September.

This presentation can be found in Attachment 7.

8) **Report from ESD Subcommittee – Shubhankar Marathe, Misha Khazhinsky and John Kinnear**

Radasky presented the charts prepared by the ESD Subcommittee of TC 5, as the authors were not able to attend. The status of the paper exchange program between ESDA and the IEEE EMC Society was discussed. In particular the EOS/ESD Symposium planned for 2024 will have 4 ESD papers, including 1 paper under the paper exchange agreement with the IEEE EMC Society. Also an update of ESD standards was provided. Further details can be found on this agenda item in Attachment 8.

9) **Coordination with SC-1, Smart Grid – Mike McInerney**

McInerney prepared the presentation that reviewed the activities of Special Committee 1 (Smart Grid), which is a coordinating committee among the IEEE EMC Society, and Radasky presented the charts. It was indicated that the SC 1 meeting will be held on Monday, 5 August 2024 in Phoenix. It is noted that Mike McInerney is the Chairman of SC 1 and Bill Radasky continues in his role as Vice Chair. Leonardo Sandrolini is the Secretary.

The presentation also indicated that there will be a tutorial in Phoenix this Summer covering the major topics covered by SC 1. See Attachment 9 for more details.

10) **TC 5 web page – Mike McInerney, Vice Chairman**

McInerney is continuing in his role as webmaster for TC 5, and he prepared a short presentation regarding the status of the TC 5 web page, which was presented by Radasky. The TC 5 web page is up-to-date. The EMC society TCs continues to update the society web pages, and McInerney has been able to keep up with the changes. The webpage for TC 5 can be found at: <https://www.emcs.org/technical-committees/tc-5-high-power-electromagnetics/>

11) **Review of HPEM activities since last TC 5 meeting in Grand Rapids – All**

There was a short discussion of the work within the IEC to update HEMP and IEMI standards (IEC 61000-2-9, 61000-4-23, and 61000-5-6) and the fact that Norway is protecting their high voltage grid against the threat of HEMP using IEC standards. Some power companies in the U.S. are also increasing their efforts to protect the grid.

Another organization increasing its activities in the field of HPEM is The Technology Innovation Institute (TII) in Abu Dhabi, UAE; they are focusing on applied research with emphasis on UAVs and the use of HPEM to defend against hostile UAVs.

There was a discussion about the safety of self-driving cars from HPEM threats whether intentional or accidental. Also there was a mention that the ITU-T has been engaged for some time in the HPEM field, including some new work on radiation effects on electronics. It is noted that the ITU-T standards are freely available for download on their website.

As many new members of TC 5 have joined our meeting here in Okinawa, Radasky suggested that researchers make an effort to check the TC 5 website for public papers that are found there dealing with HPEM, and that the attendees contribute more by sending additional papers to one of the officers of TC 5 to add to the website. In addition, we welcome proposals for special sessions and tutorials in the future.

It was mentioned again that the GlobalEM 2024 Conference is being held in Austin, Texas in July 2024, and there will be concentration on the topics of both HEMP and IEMI. Also the IEEE EMC TC 5 welcomes all of the Okinawa attendees to our TC meeting in Phoenix on 7 August 2024.

12) **TC 5 Tutorials/Special Sessions planned at the EMC 2024 in Phoenix**

Three proposals were discussed in 2023 for the 2024 Symposium: one tutorial on HEMP/IEMI IEC Standards (Radasky); one special session on IEMI Risk Management (Sabath); and one tutorial on EM Information Leakage (Hayashi). It turned out that the IEMI Risk Management Special Session has been converted to a tutorial and will not be presented in Phoenix, but rather in Bruges at the EMC Europe Conference in September 2024.

The two tutorials sponsored by TC 5 to be presented in Phoenix are:

- Progress in IEC SC 77C Standards Regarding HEMP and IEMI Environments, Test Methods and Protection Methods
- Electromagnetic Wave Information Security to Enhance the Reliability of the Information Infrastructure as the Foundation of Society

13) **Election Status of TC 5 Officers**

The current officers of TC 5 are serving 3-year terms that end on 31 December 2025. New elections will be held at the IEEE EMC Symposium TC 5 meeting in the Summer of 2025.

14) **Any other business - All**

No other business was raised.

15) **Adjournment**

The meeting was adjourned at 2:00 PM.

Attachments

- 1-Okinawa Meeting Agenda
- 2-Unconfirmed Grand Rapids (2023) Minutes
- 3-TC 5 Membership after Grand Rapids meeting in 2023
- 4-TC 5 Membership from the Okinawa meeting in 2024
- 5-Lightning Subcommittee Report
- 6-EM Information Leakage Subcommittee Report
- 7-HEMP/IEMI Subcommittee Report
- 8-ESD Subcommittee Report
- 9-SC 1 (Smart Grid EMC) Report