Agenda
IEEE EMC Society TC 5: High Power Electromagnetics (HPEM)
Wednesday, 20 August 2025 (Noon-1:30 PM EDT)
Room 304
Raleigh, North Carolina USA

1. Opening of the meeting and approval of the agenda	W. Radasky, Chair
2. Review and approval of the minutes of the last TC 5 Meeting in Phoenix, Arizona	W. Radasky
3. Current TC 5 membership list	W. Radasky
4. Report on the paper review process for Raleigh - Review Tutorials, Special Sessions, Regular Sessions	W. Radasky
5. Report from the Lightning Subcommittee -Note change of Subcommittee Chair	A. Tatematsu
6. Report from the EM Information Leakage Subcommittee	Y. Hayashi
7. Report from the HEMP/IEMI Subcommittee	M. McInerney, W. Radasky, S. Fisahn
8. Report from ESD Subcommittee	S. Marathe, M. Khazhinsky, J. Kinnear
9. Coordination with SC 1, Smart Grid	M. McInerney, Chair SC 1
10. Status of the TC 5 web page	M. McInerney, TC 5 Vice Chair
11. Review of HPEM activities since last TC 5 meetings (Phoenix)	All
12. Discussion concerning whether tutorials, workshops, and/or special sessions should be organized for next year in Dallas, Texas, USA	All
13. Discussion of standardization activities PAR 2838 Lightning Test Standard Working Group Meeting	All
14. Election of TC 5 officers (serving 3 year term, ending 31 December 2028)	All
15. Any other business	All
16. Adjournment	All

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)

Cnconfirmed 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 McInerney 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

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

Minutes of the Phoenix Hybrid Meeting
Wednesday, 7 August 2024 (Noon – 1:30 PM Mountain Standard U.S. Time)

Confirmed Minutes

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

Chairman Dr. William (Bill) Radasky brought the meeting to order at Noon, Mountain Standard Time. It is noted that this was a hybrid meeting with 25 individuals attending in person and 4 individuals attending virtually. The Chairman, Bill Radasky, the Vice Chairman, Mike McInerney and the Secretary, Yuichi Hayashi were all present. Radasky welcomed the attendees, reviewed the agenda (see Attachment 1) and asked for suggested changes; none were offered. McInerney made a motion to approve the agenda. Motion Seconded and Carried (MSC).

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

Due to the fact that this year we had two meetings in the past and current year (one in Grand Rapids in 2023 and one in Okinawa in 2024, there are two sets of now confirmed minutes (see Attachments 2A and 2B). It was decided that we would lose significant time reviewing both of the minutes, so it was agreed that all members should check the TC 5 website, and after reviewing both sets of minutes, members should provide any comments/corrections to both minutes to the officers of TC 5 within 30 days (6 September 2024). After that date the minutes will be considered to be confirmed. Since these minutes will not be posted until after 6 September 2024, we have changed the two attachments to indicate that the previous minutes are confirmed, as we received no comments on them.

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

The TC 5 current membership list covering the past 5 meetings was reviewed, and for the minutes we will provide the membership list, including this meeting (Attachment 3A). We had 29 attendees at this meeting with 25 in person and 4 virtual. This was the best attendance over the past 4 years. The current membership list was displayed during the meeting with email addresses (but the email addresses will not be included when the minutes are distributed); it was noted that several attendees during the past 2 virtual meetings (2020 and 2021) do not have email addresses identified (and none of these individuals were present this year to update those addresses). Thus it will not be possible

to reach them by email (hopefully they will know to access the TC 5 web page). Only the TC officers' and subcommittee chairs' email addresses are published on the website, and this procedure has been approved by the IEEE EMC Society.

As part of the meeting, one of our new members, Mark Steffka wished to introduce himself to the rest of the group. He presented a slide of his background and experience, and it is included in Attachment 3B.

4) **Report on the paper review process and tutorials – Bill Radasky**

Radasky reviewed the paper review process for both the Okinawa APEMC/Japan EMC Conference and this Phoenix Conference and also the two tutorials that were presented in Phoenix (Attachment 4). In Okinawa in May 2024 there were 43 papers submitted and 41 papers accepted in the HPEM topic area. This was the largest number of submitted papers in memory for the HPEM topic in a regular EMC conference. One of the reasons for the large number was that there were 4 special sessions organized, with 27 papers presented.

For Phoenix there were only 7 HPEM papers submitted (3 regular papers and 4 abstract papers) and only 5 papers were accepted (3 regular papers and 2 abstract papers). The quality of the abstract papers continue to be a concern. This was the smallest number of papers submitted for TC 5 in recent memory. It is possible that the APEMC/Japan EMC Conference drew some of the submissions away from the IEEE EMC Conference this year. It is noted that 2 of the accepted papers were nominated as best student papers, although they did not win an award. Those papers are listed in Attachment 4.

Two tutorials were organized and presented during the Phoenix conference:

- Monday, 5 August 2024, 8:30 AM - Noon
  "Electromagnetic Wave Information Security to Enhance the Reliability of the Information Infrastructure as the Foundation of Society"
  Organizer: Yuichi Hayashi
  Presentations by: Yuichi Hayashi, Chulsoon Hwang, Kengo Iokibe, Shahin Tajik, Youngwoo Kim
- Friday, 9 August 2024, 1:30 - 5:00 PM
  "Progress in IEC SC 77C Standards Regarding HEMP and IEMI Environments, Test Methods and Protection Methods"
  Organizer: William Radasky
  Presentations by: Edl Schamiloglu, William Radasky, Sergio Longoria, Richard Hoad

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

A presentation was prepared by Marcos Rubinstein and Farhad Rachidi. The conferences and other lightning events planned and held thus far in 2024 were discussed along with the events planned for 2025. Also 9 WGs in CIGRE Study Committee C4 currently working were identified during the presentation. One WG in IEEE PES was also mentioned. In addition, other lightning activities were summarized including the status of the Santis

Tower data. Radasky thanked the Lightning Subcommittee for providing a comprehensive report.

Further details can be found on this agenda item in Attachment 5.

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

Hayashi began his report mentioning the special session that he organized at the APEMC/Japan EMC Conference held in Okinawa from 20-24 May 2024. Both Yuichi Hayashi and Bill Radasky attended the conference, which included a TC 5 meeting, organized by Yuichi Hayashi.

For the Phoenix conference Yuichi reviewed the tutorial that had been presented on Monday focusing on IEMI and EM Information Leakage. Future plans include workshops and special sessions for IEEE EMC 2025 and EMC Europe.

Prof. Hayashi was complemented on his efforts to provide a complete review of activities in the EM 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 (see Attachment 7). For the HEMP aspects, Bill Radasky provided a summary of HEMP activities including:

- Updates of IEC standards, focusing on commercial versus military approaches to HEMP standardization and the inclusion of new HEMP waveform data.

- Emphasized the importance of differentiating between worst-case scenarios and realistic applications for commercial environments.

- Discussed the need for statistical environments for testing and protection standards.

Radasky recommended that a special session be organized for the IEEE EMC Conference in 2025 dealing with the new understanding of the HEMP E1, E2 and E3 environments and how they should be used for coupling and protection for commercial applications.

With regard to the IEMI aspects, Sven Fisahn mentioned the 2023 IEEE EMC Symposium tutorial presented in Grand Rapids, and the workshop to be held at EMC Europe in 2024 dealing with “Risk Management for Critical Infrastructures”.

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

John Kinnear presented the report from the ESD subcommittee (remotely) which had been prepared by Shubhankar Marathe, Michael Khazhinsky, and John Kinnear (see

Attachment 8). He discussed the paper exchange program between ESDA and the IEEE EMC Society. Also he provided an update of ESD standards mainly from ANSI.

After some discussion it was thought to be worthwhile to hear more details about the standards being developed by ESDA, and it was recommended that a tutorial be organized for the Raleigh 2025 IEEE EMC Conference.

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

McInerney introduced the activities of Special Committee 1 (Smart Grid), which is a coordinating committee, and he indicated that the SC 1 meeting had been held on Monday, with good attendance. It is noted that Mike McInerney is the Chairman of SC 1 and Bill Radasky continues in his role as Vice Chair while Prof. Thomas was not able to continue as Secretary. Leonardo Sandrolini was elected as Secretary last year. McInerney commented that TC 5 is keeping track of any issues involving Smart Grid and HPEM, and both the Chair and the Vice Chair of TC 5 have been attending the SC 1 meetings for many years.

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

McInerney is continuing in his role as webmaster for TC 5. He is usually able to quickly update the website, although this year there is a new system and software for updating the web page, and unfortunately the TCs were not notified of this in advance. The TAC promises to try to warn the TCs in the future of 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**

Recent Advancements:

- Insights were shared on recent advancements in high-power electromagnetics (HPEM) and their impact on commercial electronics.
- The discussion emphasized the importance of understanding how HPEM can affect different types of equipment and the need for robust protection measures.

Military and Commercial Overlap:

- Interest was expressed in exploring programs from the Office of Naval Research (ONR) and the Defense Advanced Research Projects Agency (DARPA), which are focusing on HEMP and IEMI effects.
- The overlap between military applications and commercial intentional electromagnetic interference (IEMI) concerns was highlighted, stressing the importance of sharing knowledge and strategies across these fields.

Detection and Protection Strategies:

- There was a discussion on the need for effective detection methods for IEMI threats. It was noted that while HEMP events are typically single-pulse occurrences,

intentional electromagnetic interference (IEMI) can involve continuous pulses causing equipment to reset repeatedly.

- The group discussed the potential for using detection systems to identify and mitigate these threats, especially in critical infrastructure and sensitive environments.

IEMI and Criminal Activity:

- The conversation included examples of IEMI being used for criminal activities, such as manipulating gambling machines to produce fraudulent payouts.
- The importance of understanding these threats and updating standards and practices to counteract them was emphasized.

Participant Contributions:

- Participants were encouraged to share their experiences and knowledge related to HEMP activities, particularly in areas where they have observed or studied significant effects.
- There was a call for continued collaboration and information sharing to enhance the collective understanding of HEMP and develop effective countermeasures.

12) **TC 5 Tutorials/Special Sessions planned for the EMC 2025 in Raleigh – All**

Several proposals were presented and discussed regarding special sessions and tutorials for the 2025 Raleigh conference.

- Tutorial on HPEM Protection: This tutorial will focus on the similarities and differences between HEMP/IEMI countermeasures and lightning protection – Fisahn
- Tutorial on ESDA Standards dealing with ESD: The ESD subcommittee is proposing a tutorial aimed at informing the IEEE community about ESD standards – Kinnear
- Special Session on Information Leakage: This subcommittee has previously proposed a special session at the last IEEE conference and is likely to propose a similar session this time – Hayashi
- Special Session on the Theory and Applications of HEMP: This special session follows much of the new work in updating IEC 61000-2-9 – Radasky

The TC 5 Chair will follow up with the identified volunteers when the time arrives for submitting official proposals for tutorials and/or special sessions.

13) **Discussion of standardization activities – Fred Heather**

After many years of discussion concerning the need for a new IEEE standard dealing with the effects on electronics when an aircraft is struck by lightning, a new PAR 2838 has been approved and work is ongoing. It is titled, “Aircraft Component Lightning Strike Direct Effects Qualification.”

Progress and Challenges:

- Fred Heather discussed the progress on the IEC 2838 standard, highlighting the ongoing efforts and challenges.
- A recent meeting with the Society of Automotive Engineers (SAE) revealed that they did not see value in the standard from their perspective, primarily due to economic reasons.
- Despite this, it was confirmed that the development of the standard will continue, with a meeting scheduled for Thursday at 9:30 AM to address the integration of independent test methods. The agenda for that meeting is in Attachment 13.

Development of Test Methods:

- Fourteen different test methods have been identified for testing various components in aircraft and space vehicles.
- Expertise from those experienced in conducting these tests is needed to independently establish the techniques to be used for testing these components.

Standardization Approach:

- The test methods are planned to be conducted in a standardized manner similar to general electromagnetic compatibility (EMC) testing.
- The main objective is to ensure that all equipment is tested using a consistent method, resulting in reliable, repeatable outcomes.
- To maintain the independence of IEC standards and to meet industry user needs, collaboration with IEEE experts will be sought.

14) **Election Status of TC 5 Officers – Bill Radasky**

The current officers of TC 5 are serving 3-year terms that ends on 31 December 2025. Elections will be held at the TC 5 meeting in Raleigh.

15) **Any other business - All**

No other business was raised.

16) **Adjournment – All**

The meeting was adjourned at 1:30 PM.

Attachments (labeled with agenda item and found on the TC 5 Website)

1-Meeting Agenda
2-Confirmed Okinawa and Phoenix Minutes
3-TC 5 Membership Update (including 2024 meeting attendees)
4-Report on Paper Review Process in Okinawa and Phoenix

5-Lightning Subcommittee Report
6-EM Information Leakage Subcommittee Report
7-HEMP/IEMI Subcommittee Report
8-ESD Subcommittee Report
13-IEEE P2838 Standard Meeting Agenda

2025 TC 5 Membership List	Updated: 3 September 2025						
		Spokane	Grand Rapids	Okinawa	Phoenix	Raleigh	
Name	Affiliation	2022	2023	2024	2024	2025	
Soki Akutsu	Mitsubishi Heavy Industry			X		X	
Carlos Aviles	Northrup Grumman		X			X	
Dr. Daryl Beetner	Missouri University of Science and Technology			X		X	
Edwin van Bladel	Dutch MOD				X		
Dr. Tyler Bowman	Sandia National Laboratories	X	X		X		
Ross Carlton	Gibbs & Cox				X	X	
Dong Hoon Choi	Yonsei University			X		X	
Paul Clem	Boeing		X				
Larry Cohen	Consultant		X			X	
Steven Deppen	GE Aerospace					X	
Paul Edwards	Aegis Aerospace, NASA					X	
Sven Fisahn	Bundeswehr Research Institute, Germany	V			X	X	
Patrick Flowers	Armag Corp.					X	
Dr. Ali Foudazi	Amazon Lab126	*	V				
Juwichi Fujigaki	Noise Laboratory			X			
Daisuka Fujimoto	NAIST			X			
Dave Garagnani	Armag Corp.				X	X	
Dr. Heyno Garbe	Leibniz University, Hannover, Germany		V		V	V	
Petter Gardin	Swedish Armed Forces				X		
Flavia Grassi	Politecnico di Milano			X	X	X	
Mikael Grudd	Roxtec			X			
Gordie Halt	ITC Holdings Corp.					X	
Aaron Harmon	MST EMC Lab		X				
Dr. Yu-ichi Hayashi	NAIST	X	X	X	X	X	
Fred Heather	USN	X	X		X		
Greg Hiltz	Consultant				X		
Harry Hodes	NASA JSC				X	X	
Takuya Hoshino	NTT-AT			X		X	
Tom Hussey	Consultant				X		
Kengo Iokibe	Okayama University, Japan			X	X		
Takeshi Ishida	Noise Laboratory			X			
Shinobu Ishigami	Tohuku Gakuin University			X			
Tom Jerse	Boeing	X	X			X	
Randy J. Jost	Utah State University		X				
Shugo Kaji	NAIST					X	
Ken Kawamata	Tohuku Gakuin University			X			
Tara Kellogg	ETS-Lindgren				X	X	
Youngwoo Kim	Sejong University			X		X	
John Kinnear Jr.	ESDA				V	X	

Masahiro Kinugawa	The University of Fukuchiyama			X			
Taiki Kitazawa	NAIST			X		X	
Sebastian Koj	Jade HS				X		
John Kraemer	Collins Aerospace, retired					X	
Takayuki Kubo	Noise Laboratory			X			
Jong Hwa Kwon	ETRI	X	X		X	X	
Matt Lara	APELC	X					
Euibum Lee	Yonsei University			X			
Dr. Frank Leferink	Thales, Univ of Twente, Netherlands			X	X	X	
Dr. Sergio Longoria	ETS-Lindgren		X		X	X	
Jim Lukash	Lockheed Martin Space	X			X	X	
Shubhankar Marathe	Amazon Lab126	X	X		X		
David Martinez	Technology Innovation Institute			X			
Mike McInerney	Mac & Ernie	X	X		X	X	
Dr. Nicolasa Mora	University of Columbia	X			X		
Truong Nguyen	NASA				X		
Chris Nicholes	Cherry Clough					X	
Mike Oliver	MAJR Products Corp.		X				
Robert Olsen	Washington State University					X	
Dr. Michal Pietrzyk	Thysseukrupp Marine Systems		X				
Dr. Andrew Podgorski	Consultant	V					
Dr. William Radasky	Metatech	X	X	X	X	X	
Martin Robertsson	Roxtec			X			
Dr. Frank Sabath	Bundeswehr Research Institute, Germany	X	X				
Dr. Edward Savage	Metatech	X					
Martin Schaarschmidt	Bundeswehr Research Institute, Germany	X					
John Simpson	Armag Corp.					X	
Harry Skinner	Intel	X					
Hywel Sollis	UK Ministry of Defence	X					
Abtin Spantman	AETANT				V		
Mark Steffka	IQM Research Institute				X	X	
Dr. Adrian Sun	Aerospace Corporation		X				
Kin Sze	National Defence QETE, Canada		X		V	X	
Akiyoshi Tatematsu	CRIEPI			X		X	
Tetsuya Tominaga	NTT-AT			X			
Minoru Tsukazaki	Otowa Electric, Japan					X	
Bella Yao	GE Aerospace					X	
Jong-Gwan Yook	Yonsei University	X				X	
Takahiro Yoshida	Tokyo University of Science			X			
Corresponding Members							
Dr. Harald Gossner	Intel						

Joe P. Huynh	Boeing/BR&T						
Phil Johns	Johns Hopkins APL						
		20	22	25	29	39	
Note: V is for virtual attendee during an in-person meeting							
* Joined after annual meeting							
Note: In 2025 we had 28 previous members attend, plus 11 new members							

2025 IEEE EMC Society TC 5 (HPEM) Paper Review Process and Tutorials, Special and Regular Sessions

Prepared by

Bill Radasky, TC 5 Chair

20 August 2025

TC5

Paper Review Process for Raleigh

- We reviewed 6 regular papers and 4 abstract papers
  - All regular papers were accepted as were 4 abstract papers
  - Reasonable number given 2 large special sessions
- Regular and Abstract reviews were summarized by the Chair under the current procedures (cut and paste process)
- Special Session reviews were organized by the Vice Chair as the Chair was involved in both special sessions
- The quality of abstract papers improved this year

Paper Session Organization

- Three regular sessions have been organized
  - EMI topics (Wednesday, 8:30 - 10:00 AM) in Room 305B
  - HEMP topics (Wednesday, 10:30 AM - Noon) in Room 305B
  - Abstract Papers: HEMP and ESD Modeling (Thursday, 1:30 - 4:00 PM) in Room 305A
- Best Paper Nominees
  - **Simulation-Based Approach to Target EMI Attenuation for Meeting Required Power Side-Channel Attack Success Rate,** Masaki Himuro, Rei Mitsuyasu, Kengo Iokibe, Yoshitaka Toyota
  - **Pixel Level Character Reconstruction by Background Profiling against TMDS Emanations**, (Student Paper Finalist) Taiki Kitazawa, Shohei Matsumoto, Yuichi Hayashi
  - **Electromagnetic Energy from Multiple Sources within Perfect and Imperfect Faraday Shields,** Robert G. Olsen, John B. Schneider
  - **Update of IEC 61000-2-9: Description of the HEMP Radiated Environment,** William A. Radasky, Edward B. Savage

Special Sessions

- Two special sessions were organized this year
  - EM Information Security and Its Countermeasures (organized by Yuichi Hayashi), 8 papers on Tuesday morning
  - Advances in High Altitude Electromagnetic Pulse (HEMP) Environments and Protection, (organized by William Radasky), 6 papers on Thursday afternoon

Tutorials

- One tutorial was organized for APEMC in May 2025 and two for this IEEE EMC Conference
  - APEMC tutorial on “HEMP/IEMI Overview: Publications, Detection, Protection,” organized by Janet O’Neil
  - Two tutorials were organized on ESD at the IEEE EMC Symposium and sponsored by TC 5 on Friday, August 22
    - “Optimization of System Level ESD and Signal Integrity when using External ESD Protection Devices,” 8:30AM - 12:00PM, Room 305B, organized by Andreas Hardock
    - “Direct-to-Pin Component-Level ESD Testing Using System-Level ESD Standards and Equipment,” 1:30PM - 5:00PM. Room 305B, organized by Hans Kunz and John Kinnear

2026 Conference Plans

- As usual we will review the submitted regular papers, abstract papers, and also any special session papers that may be organized for the Dallas, TX IEEE EMC Conference from 3-7 August 2026
- We will support the HPEM reviews for the following conferences, when requested
  - From 4-7 May 2026, the APEMC Conference will be held in Kuala Lumpur, Malaysia
  - EMC Europe will be held from 31 August - 3 September 2026 in Prague, Czech Republic
  - GlobalEM will be held from 29 June - 3 July 2026 in Seoul, South Korea

Report on Lightning Activities

Akiyoshi Tatematsu

TC-5 Meeting@Raleigh, North Carolina

August 20, 2025

Main Events with Lightning Related Content in 2025

- AMS Annual meeting, Jan. 12-16, New Orleans, USA
- IPST, Jun. 8-12, Guadalajara, Mexico
- IEEE EMC & SIPI, Aug. 18-25, Raleigh, NC, USA
- URSI AP-RASC 2025, Aug. 17-22, Sydney, Australia
- EMC Europe 2025. Sept. 1-5, Paris, France
- SIPDA, Sept. 21-26, Thessaloniki, Greece
- APL 2025, Jun. 17-20, Bali, Indonesia
- AGU Fall Meeting, Dec. 15-19, New Orleans, USA

Main Events with Lightning Related Content in 2026

- APEMC, May 4-7, Kuala Lumpur, Malaysia
- ICLP, May 31-Jun. 5, Sapporo, Japan
- GlobalEM, Jun. 29-Jul. 3, Seoul, Korea
- IEEE EMC & SIPI, Aug. 3-7, Dallas TX, USA
- URSI GASS, Aug. 15-22, Krakow, Poland
- CIGRE Paris Session, Aug. 23-28, Paris, France
- EMC Europe, Aug. 31-Sept. 3, Prague, Czech Republic
- ICOLSE, Oct. 5-8, South Carolina, United States

CIGRE SC C4 Working Groups on Lightning

WG	Title
WG C4.36	Winter Lightning – Parameters and Engineering Consequences for Wind Turbines
WG C4.43	Lightning problems and lightning risk management for nuclear power plants
WG C4.50	Evaluation of Transient Performance of Grounding Systems in Substations and Its Impact on Primary and Secondary Systems
WG C4.57	Guidelines for the Estimation of Overhead Distribution Line Lightning Performance and its Application to Lightning Protection Design Scope
WG C4.59	Real-time Lightning Protection of the Electricity Supply Systems of the Future
WG C4.66	New concept for analysis of multiphase back-flashover phenomena of overhead transmission lines due to lightning
WG C4.67	Lightning Protection of Hybrid Overhead Lines
WG C4.69	Quantifying the lightning response of tower-footing electrodes of overhead transmission lines: methods of measurement

CIGRE SC C4 Working Groups on Lightning

WG	Title
WG C4.70	Application of space-based lightning detection in power systems
WG C4.73	Insulation Coordination of HVDC Overhead Lines
JWG C4/B4.72	Lightning and switching induced electromagnetic compatibility (EMC) issues in DC power systems and new emerging power electronics-based DC equipment
JWG B1/C4.69	Recommendations for the insulation coordination on AC cable systems
JWG B4/B1/C4.73	Surge and extended overvoltage testing of HVDC Cable Systems
JWG B2/C4.76	Lightning & Grounding Considerations for Overhead Line Rebuilding and Refurbishing Projects, AC and DC

Papers published on IEEE Trans. EMC in 2025 (issues 1 to 3)

- Measurements of Induced Voltages on Overhead Distribution Line Due to Altitude-Triggered Lightning
- On the Application of the Guided-Wave Approach to Reproduce the Electromagnetic Fields Radiated by Precursory Pulses in Altitude-Triggered Lightning
- Correlated Lightning Electric Field and High-Speed Video Observations of Recoil Leaders Recorded in Rzeszow, Poland
- Estimation of Apparent Ionospheric Reflection Height from LEMP Waveforms for the Case of Tilted Lightning Channel
- Return-Stroke Field Near the Air–Soil Interface With Realistic Soil
- Lightning Attachment Behavior of Metamaterial Plate From Lightning and Switching Impulse Discharge Tests

Examples of this year's activities

- The following paper was presented at IPST 2025.

A. Yamanaka, K. Ishimoto, and A. Tatematsu, "Lightning Overvoltages Incoming to a Substation: Analysis with Emphasis on the LEMP Impact"

Lightning overvoltages incoming to a substation are an important factor for determining insulation levels of electric power equipment. Although electromagnetic transient (EMT) analysis disregarding the lightning electromagnetic pulse (LEMP) has been widely used for insulation coordination studies, several observational and analytical studies indicated the LEMP impact on overvoltages incoming to a substation. This study clarified that LEMP has almost no impact on overvoltages generated by a lightning strike on the tower top.

- The following paper will be presented at SIPDA 2025.

A. Yamanaka, K. Ishimoto, and A. Tatematsu, "Lightning Overvoltages of Transmission Lines: Effect of Tower Modeling vs LEMP Impact"

Proposed work for 2026

- Papers to be published at international conferences with lightning content, for example, ICLP 2026 in Sapporo, Japan.
- Contribution to organizing ICLP 2026 as a member of the local organizing committee.

The 38th International Conference on Lightning Protection:
ICLP2026 will be held in Sapporo, Japan on 31st May - 5th June 2026.

Important Dates

Proposals for special/invited sessions and topical meetings, workshops and tutorials	Sep. 20, 2025
Paper submissions	Oct. 31, 2025
Notification of acceptance	Jan. 30, 2026
Final paper submission	Feb. 27, 2026

Conference websites: https://iclp2026.org

IEEE EMC Society TC5 Subcommittee: Electromagnetic Information Leakage

Yuichi Hayashi

20 August 2025

EMC+SIPI 2025 SYMPOSIUM

ELECTROMAGNETIC INFORMATION SECURITY AND ITS COUNTERMEASURES

Special Session SS1

August 19, 2025 Room 305A 10:30 AM - 4:30 PM

Session Organizers

Chair: Yuichi Hayashi (Nara Sentan Kagaku Gijutsu Daigakuin Daigaku) **Co-Chair:** William Radasky (Metatech Corporation)

Paper Title	Authors	Affiliation
Special Session on Emerging Security Threats from EM Information Leakage and IEMI	Y. Hayashi, W.A. Radasky	*NAIST; Metatech Corp., USA*
Pixel Level Character Reconstruction by Background Profiling against TMDS Emanations	T. Kitazawa, S. Matsumoto, Y. Hayashi	*NAIST, Japan*
Integrating Advanced Signal Analysis and Deep Learning in TEMPEST Techniques	T. Nam, D-H. Choi, E. Lee, J-G. Yook	*Yonsei University, Korea*
Anti-Phase Signal Approach to Echo TEMPEST Self-Interference Suppression	K. Kaji, D. Fujimoto, Y. Hayashi	*NAIST, Japan*
There's Waldo: PCB Tamper Forensic Analysis using Explainable AI	M.S. Safa, S. Nouraniboosjin, F. Ganji, S. Tajik	*Worcester Polytechnic Inst., USA*
Simulation-Based Approach to Target EMI Attenuation for Power Side-Channel Attack	M. Himuro, R. Mitsuyasu, K. Iokibe, Y. Toyota	*Okayama University, Japan*
Mitigating IEMI Induced Faults in PLL-based Cryptographic Modules	H. Nishiyama, D. Fujimoto, Y. Hayashi	*NAIST, Japan*
Simulation of Intentional EMI Attack Against RNG Power Delivery Network	Y. Kim	*Sejong University, Korea*

Session Overview

Information security has become a critical challenge in modern society, with physical-layer security gaining importance alongside upper-layer security measures. The proliferation of high-precision measurement equipment, advances in computing performance, and developments in AI technology have transformed sophisticated attacks, previously considered technically unfeasible, into realistic threats that now extend beyond military and diplomatic domains to affect consumer devices.

This special session focuses on electromagnetic information security, a crucial aspect of physical layer security where attacks leave minimal traces and are difficult to detect. Key topics include:

- Security threats posed by passive and active electromagnetic attacks
- Application of conventional EMC evaluation techniques to assess and counter threats
- Integration of AI and deep learning in TEMPEST techniques
- Side-channel attack mitigation strategies
- Latest research findings in electromagnetic information security

Physical Layer Security against Compromising Electromagnetic Emanations

EMC Europe 2025 Tutorial Session

Monday, September 1, 2025 Room 107 2:20 PM - 5:50 PM (Half-day)

Part 1 — 2:20 PM - 3:50 PM

Time	Duration	Presentation Title	Speaker(s)	Affiliation
2:20-2:30 PM	10 min	Tutorial Session Introduction and Overview	Yuichi Hayashi	*NAIST, Japan*
2:30-3:10 PM	40 min	Dealing with TEMPEST threat in its entirety - beyond video emanations in electric field	Emmanuel Cottais	*SGDSN/ANSSI, France*
3:10-3:50 PM	40 min	Eavesdropping on DisplayPort: challenges and opportunities	Dimitrije Erdeljan Markus G. Kuhn	*University of Cambridge, UK*

Coffee Break (3:50 PM - 4:20 PM)

Part 2 — 4:20 PM - 5:50 PM

Time	Duration	Presentation Title	Speaker(s)	Affiliation
4:20-4:45 PM	25 min	FFT-based TEMPEST receiver for compromising emanations measurements	Patrick Mayer	*Rohde & Schwarz, Germany*
4:45-5:10 PM	25 min	TEMPEST radiated emission measurements below noise using a reverberation chamber	Frank Leferink	*University of Twente & THALES Netherlands*
5:10-5:30 PM	20 min	Side-channel attack: Introduction and recent trends	Naofumi Homma	*Tohoku University, Japan*
5:30-5:50 PM	20 min	On-Chip Side-Channel Measurements, Simulation and Assessments	Makoto Nagata	*Kobe University, Japan*

Electromagnetic Information Security Threats and Countermeasures

EMC Europe 2025 Special Session • Room 106

Part 1 — Wednesday, September 3, 2025

Paper Title	Authors	Affiliation
Impact of Triggering-Probe-Connection on Evaluating Side-Channel Information Leakage from Cables	D. Hamamoto, M. Himuro, K. Iokibe, Y. Toyota, N. Kawanishi	*Okayama Univ., Japan; GopherTec Inc., Japan*
Multiband pixel colour classification from HDMI emissions	D. Erdeljan, M.G. Kuhn	*University of Cambridge, UK*
Diode-Based Multi-Trojan RF Retroreflector Attack	P. Granier, M-A. Nicolas, J. Lorandel, C. Moy, P. Besnier, M. Davy, F. Sarrazin	*IETR, France*
A Countermeasure Against Eavesdropping on a Display Using Time-Varying Frequency-Selective Shielding	K. Furuya, T. Kobayashi, Y. Kusano, E. Taniguchi	*Mitsubishi Electric Corp., Japan*

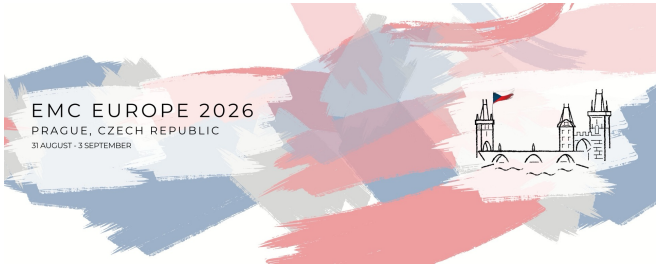
Part 2 — Thursday, September 4, 2025

Paper Title	Authors	Affiliation
Modeling of Cryptographic Module with SoC FPGA for Side-Channel Leakage Simulation	K. Iokibe, S. Tanimoto, H. Chikamori, M. Himuro, Y. Toyota	*Okayama University, Japan*
Clock-to-Clock Modulation Covert Channel	M.A.E. Bahi, M. Mendez Real, E. Nogues, M. Pelcat	*Univ Rennes, INSA Rennes, IETR, France; Univ Bretagne-Sud, Lab-STICC, France*
Arbitrary Data Injection into CMOS Integrated Circuits via Dual-Wave Electromagnetic Irradiation	M. Kinugawa, Y. Hayashi	*Univ. of Fukuchiyama; NAIST, Japan*
Robustness Evaluation of Software-Jamming Countermeasure against Multivariate and Nonlinear Analysis	T. Kitazawa, S. Matsumoto, Y. Hayashi	*NAIST, Japan*

FUTURE ACTIVITY

Activities to be carried out at future EMC symposiums and related conferences to promote the field of EM information security

Activity	Conference	Date	Location
Special Session	**APEMC 2026**	May 4 – May 7, 2026	**Kuala Lumpur Convention Centre** *Kuala Lumpur, Malaysia*
Special Session	**EMC Europe 2026**	August 31 – September 3, 2026	**Prague Conference Center** *Prague, Czech Republic*
Tutorial Session			



HEMP/IEMI Subcommittee Report to TC 5 (HPEM)

Mike McInerney

20 August 2025

TC 5 HEMP / IEMI Subcommittee

- Created in 2020 to improve the organization of the website and ease subcommittee reporting
  - Mike McInerney is the General POC for the HEMP / IEMI subcommittee
  - Bill Radasky is the POC for the HEMP subcommittee
  - Sven Fisahn is the POC for the IEMI subcommittee

Recent HEMP Activities

Report from the TC 5 Subcommittee on HEMP
Compiled by William Radasky
20 August 2025

Recent HEMP Activities

- Several important HEMP activities have continued since our last IEEE EMC Conference in 2024 and the APEMC Conference in May 2025
  1. The IEC has published Ed. 2 of IEC 61000-2-9 (HEMP radiated environment)
  2. The IEC has published Amd. 1 of IEC 61000-4-23 Ed. 1 (Test methods for the radiated environment)
  3. Tutorials and Special Sessions concerning HEMP were held at and planned for APEMC 2025 and IEEE EMC, respectively
  4. CIGRE Study Committee C4 has a working group considering approaches to protect high voltage power control house electronics against HEMP
  5. Power companies are investigating ways to protect their electronics from HEMP (and IEMI)
  6. The GlobalEM 2026 Conference is in the planning stages for Seoul, South Korea from 29 June to 3 July 2026: One-page abstracts due: 10 Jan 2025
  7. Several of these items are discussed in a more detail in the following charts

IEC 61000-2-9 Ed. 2

- Key improvements added
  1. Provide information for the variation of the E1 HEMP fields as a function of position. This will include range-dependent variations for the peak values and the pulse shapes for E1 HEMP
  2. Add new additional analytic E1 HEMP waveforms with different rise times and pulse widths for the variations
  3. Provide new analytic E3 HEMP waveforms (both B- and E-fields) based on new openly published information from the U.S. EMP Commission
  4. Provide information on how to compute the E3 E-field from the incident B-field and provide a few ground conductivity profiles for those calculations
  5. Provide an annex that shows an equivalent QEXP (Quotient of Exponentials) waveform that is more accurate above 100 MHz for the E1 HEMP waveform. This will help those who try to apply the DEXP (Difference of Exponentials) waveform in the frequency domain for coupling problems above 100 MHz
  6. Explain why the E1 HEMP waveform in time does not require a “zero area”. This has caused a great deal of confusion regarding the way the E1 HEMP waveform is specified

TC 5

IEC 61000-4-23 Ed. 1, Amd. 1

- Key improvements added
  1. Major improvement was to provide a new method for making internal measurements inside of a building using a mechanical stirrer to reduce the number of measurement locations when measuring the shielding effectiveness for IEMI (typically above 1 GHz)
  2. Other radiated test methods were improved with more information concerning how to measure the shielding effectiveness

2025 Tutorials and Special Sessions

- At the APEMC 2025 Conference in Taipei, Taiwan, Janet O'Neil organized a tutorial entitled: "HEMP/IEMI Overview: Publications, Detection, Protection" with 4 papers (authors: Schamiloglu, Taqoob, Kellogg, and Okech)
- At the IEEE EMC Conference in Raleigh, Bill Radasky organized a special session on Thursday morning entitled: "Advances in High Altitude Electromagnetic Pulse (HEMP) Environments and Protection" with 6 papers (authors: Radasky, Savage, Longoria, Gilbert, and Hoad)

Power Company Activities

- Over the past 4 years several power companies are evaluating the shielding effectiveness of their existing transmission substation buildings to protect internal electronics
- Several U.S. power companies have upgraded their current metal building design to improve its shielding effectiveness
  - Screen mesh windows
  - Shielded yard cables or the use of fiber optic cables
  - Better external cable bonding before entry into buildings
  - Testing before and after changes to demonstrate the effectiveness of improvements
- Many of the improvements in protection are based on papers from IEEE EMC Conferences and Transactions and IEC standards

Special Session/Tutorial Recommendations

- Since there was a great deal of activity in the HEMP area in 2025, we do not recommend a special session or tutorial in Dallas in 2026
  - This will leave an opportunity for the other HPEM subcommittees
- We expect to continue to receive regular submitted papers for the Dallas conference

Recent IEMI Activities

Report from the TC 5 Subcommittee on IEMI
Compiled by Sven Fisahn
26 July 2024

Report from the TC 5 Subcommittee IEMI

2024 2nd China Power Supply Society Electromagnetic Compatibility Conference (CPEMC) (Hangzhou, China)

- Technical Paper: Radiated Susceptibility Testing and IEMI Reinforcement of Unmanned Aerial Vehicles Against Motor-Related Failures; Jie Huamin, Mingke Yang, Zhen Tao, Zhenyu Zhao and K.Y. See.

Report from the TC 5 Subcommittee IEMI

2024 IEEE Joint International Symposium on Electromagnetic Compatibility, Signal & Power Integrity: EMC Japan / Asia-Pacific International Symposium on Electromagnetic Compatibility (EMC Japan/APEMC) (Okinawa, Japan)

- Technical Paper: Vulnerability Assessment of a Protection Relay in Electrical Substation to Radiated Intentional EMI; Fei Fan, Zhenyu Zhao, Jie Huamin, K.Y. See and Jinwee Koh.

TC 5

Report from the TC 5 Subcommittee IEMI

EMC EUROPE 2024 (International Symposium and Exhibition on Electromagnetic Compatibility) (Bruges, Belgium)

- Workshop: IEMI Risk Management; Session Chairs: Sven Fisahn, Dr. Marian Lanzrath and Janet Nichols O'Neil.
- Technical Paper: Improved Determination of the Electric Field in Radiated IEMI Tests with EMP and UWB Signals; Unai Aizpurua, Erik Kampert and Stefan Dickmann).

Report from the TC 5 Subcommittee IEMI

2025 Asia-Pacific International Symposium on Electromagnetic Compatibility (APEMC 2025) (Taipei, Taiwan)

- Tutorial: HEMP/IEMI Overview: Publications, Detection, Protection; Session Chairs: Janet O'Neil and William Radasky.
- Technical Paper: Fundamental Study of High-Frequency Data Injection Attacks via Multiple-Wave IEMI on CMOS ICs Beyond Their Operating Frequency Range; Masahiro Kinugawa and Yuichi Hayashi.

Report from the TC 5 Subcommittee IEMI

2025 IEEE International Symposium on Electromagnetic Compatibility, Signal & Power Integrity (Raleigh, North Carolina, USA)

- Special Session: Emerging Security Threats from EM Information Leakage and IEMI; Session Chairs: Yuichi Hayashi and William A. Radasky.
- Technical paper: Three-Dimensional Electromagnetic and Circuit Co-Simulation for Printed Circuit Boards Mounted Linear and Non-Linear Electric Elements; Soki Akutsu, Akio Ikeda, Hisashi Shimizu, Toshihiko Nishimori and Jun Yasui.

Report from the TC 5 Subcommittee IEMI

Journal Articles:

- A Novel Cost-Efficient Design for Electromagnetic Shielding in IoT Enclosures Against Intentional Electromagnetic Field Security Attacks; Guzlan Miskeen, Mohmad Alrweg and Mehdi Zeinali; The Journal of Engineering, Volume 2025, Issue1. https://ietresearch.onlinelibrary.wiley.com/doi/full/10.1049/tje2.70079

- Detection and Suppression of Intentional EMI Attacks to Smart Speakers; Ahmed Abdullah, Francesco Musolino and Paolo Stefano Crovetti; IEEE Transactions on Electromagnetic Compatibility, Volume: 67, Issue 2, April 2025. https://ieeexplore.ieee.org/document/10756507

TC5 Subcommittees

- We encourage all TC 5 committee members to submit information on TC 5 related activities to subcommittee POCs
  - Lightning
  - EM (Information) Leakage
  - HEMP / IEMI
  - ESD

ESD Update

Shubhankar Marathe
shumars@amazon.com
Michael Khazhinsky
Michael.Khazhinsky@silabs.com
John Kinnear
john.Kinnear@esda.org

TC-5 (HPEM) Meeting

August 2025

ESD Technical Exchange – 2025 Updates

- The 2024 EOS/ESD Symposium again has a focus on EMC and system-level related topics.
  - 1 Sessions with 4 papers
    - 1 EMC Society exchanges
    - 2 Accepted
    - 1 Invited Talk

- Paper exchange program between IEEE EMC+SIPI Symposium and ESDA continues in 2025.
  - ESD Behavior of RF Switches and Importance of System Efficient ESD Design
  - Workshop WT-E3
    - Direct-To-Pin Component-Level ESD Testing Using System-Level ESD Standards and Equipment

ESD Standards – 2025 Updates

- 7 ESD standard documents have been published:
  - ANSI/ESDA/JEDEC JS-001 – Human Body Model (HBM) Testing – Device Level
  - ANSI/ESD SP5.1.4 – Human Body Model (HBM) Testing – Device Level – A Method for Random Sampling of Power Pins
  - ANSI/ESDA/JEDEC JS-002 – Charged Device Model (CDM) Testing – Device Level
  - ESDA/JEDEC JTR002-01-25 – User Guide of ANSI/ESDA/JEDEC JS-002 – Charged Device Model Testing of Integrated Circuits
  - ANSI/ESD STM97.1 – Footwear/Flooring - Resistance Measurement in Combination with a Person
  - ANSI/ESD SP27.1 – Recommended Information Flow Regarding Potential EOS Issues Between Automotive OEM, Tier 1, and Semiconductor Manufacturers
  - ESD TR28.0-01-25 – Electrostatic Attraction
- Upcoming publications
  - ANSI/ESD STM4.1 – Worksurfaces – Resistance Measurements (Including Shelving and Mobile Equipment)
  - ANSI/ESD STM12.1 – Seating – Resistance Measurements

Global Electromagnetics (GlobalEM) 2026 Symposium
June 29~July 3, 2026 @ Yonsei Univ., Seoul, KOREA
KIEES and SUMMA Foundation

The next GlobalEM Symposium will be held at Yonsei University in Seoul, Korea. As announced at the 2022 Symposium in Abu Dhabi, our high-power electromagnetics symposia have been unified under the name "GlobalEM," replacing the previous regional titles AMEREM, EUROEM, and ASIAEM for consistency. The symposium will continue to serve as a premier international forum for discussing various aspects of high-power electromagnetics, with participation expected from leading experts around the world.

GENERAL INFORMATION

This symposium is jointly organized and sponsored by the Korean Institute of Electromagnetic Engineering and Science (KIEES) and the SUMMA Foundation. The working language of the conference is English. There will be a technical exhibition and a Welcome Reception. A Gala Banquet will also be arranged.

Technical Scope

General technical areas for GlobalEM 2026 are: High-Power Electromagnetics (HPEM) that includes Nuclear Electromagnetic Pulse (NEMP), Lightning and High-Power Microwaves (HPM), Ultra-Wideband (UWB) and Unexploded Ordnance (UXO). New technical areas, including electromagnetic security technologies and anti-drone systems, will be specially added.

PAPER SUBMISSION

We will require only a single page extended abstract in a A4 size paper with 2-column format. Paper submissions and reviews will be handled on-line using OpenConf software. Every paper will be reviewed and advocated by TC Chairs. Additional details will be provided on the website including the topics of interest for this conference.

IMPORTANT DATES

Proposal for Workshop & Tutorial	Dec. 3, 2025
Proposal for Special Session	Dec. 10, 2025
Paper Submission	Jan. 14, 2026
Notification of Acceptance	March 31, 2026
Final Manuscript Submission	April 16, 2026

KIEES

SUMMA FOUNDATION

AWARDS

Exceptional contributions will be recognized through the Best Symposium Paper and Best Student Paper Awards. To qualify for the Student Paper Award, the student must be the first and presenting author. The Outstanding Early Career Award will honor young researchers for significant contributions to High-Power Electromagnetics. Further details will be available on the symposium website.

CONFERENCE LOCATION

This conference will be held at Engineering Hall D(4) of Yonsei University in Seoul, South Korea. Situated in the heart of Seoul, Yonsei University provides a beautiful and historic campus with convenient access to public transportation, a wide range of accommodations, and various cultural attractions. The venue is easily accessible from both Incheon and Gimpo International Airports. Further details regarding registration and recommended hotels will be made available on the official conference website upon its launch.

SPONSORSHIP OPPORTUNITIES

We welcome sponsors for GlobalEM 2026. Sponsors will be recognized by logos added to the GlobalEM 2026 website with a link to their company website, a company advertisement in the abstract book, and advertisements provided during the conference. Please contact the General Chair for details.

Organizing Committee

General Chair: Jong-Gwan Yook (Yonsei Univ.)
General Co-Chair: Yeon-Choon Chung (Seokyeong Univ.)
Jin Soo Choi (ADD)
General Vice Chair: Teaheon Jang (Global EMH)
Advisory Committee Chair: Jae-Wook Lee (Aerospace Univ.)
TPC Chair: Dr. William Radasky (Metatech)
Co-Chair: Jong Hwa Kwon (ETRI)
TPC Vice Chair: Carlos Romero (Armasuisse)
Co-Vice Chair: Hyun Ho Park (Suwon Univ.)
General Secretary: Hanchul Shin (RAPA)

2025 IEEE EMC Society TC 5 Officer Election

Prepared by

Bill Radasky, TC 5 Chair

20 August 2025

TC5

Term of Office

- TC 5 has historically used a three-year term for stability for all three officers
- The current officers hold office until 31 December 2025
- New officers will serve from 1 January 2026 until 31 December 2028

Retirement of Chair

- Due to medical issues the current chair, Bill Radasky, will retire as TC 5 Chair
- I plan to continue to support the HEMP/IEMI Subcommittee in the future
- I recommend that our Vice Chair and Secretary “move up” to become Chair and Vice Chair, respectively
- As indicated on the next chart, additional nominations are solicited

Ballot Choices

- Chair
  - Mike McInerney
  - Additional Nominee(s)
- Vice Chair
  - Yuichi Hayashi
  - Additional Nominee(s)
- Secretary
  - Akiyoshi Tatematsu
  - Additional Nominee(s)