



IEEE TC 5: High Power Electromagnetics (HPEM) Technical Committee
<https://www.emcs.org/technical-committees/tc-5-high-power-electromagnetics/>

Minutes of the Dallas Hybrid Meeting
Wednesday, 5 August 2026 (Noon - 1:30 PM CT)

Unconfirmed Minutes

1. Opening of Meeting and Approval of Agenda

Chair M. McInerney called the meeting to order at approximately 12:05 PM and introduced the 2026-2028 officers: M. McInerney, Chair; Y. Hayashi, Vice Chair; and A. Tatematsu, Secretary. The agenda was approved without objection. The IEEE P2838 status report was moved earlier in the agenda to accommodate the presenter, and the precision-agriculture presentation was included as agenda item 14.

2. Review and Approval of Minutes from Raleigh Meeting

The minutes from the previous TC-5 meeting in Raleigh, North Carolina, had been distributed and posted on the TC-5 web page. No corrections or objections were raised, and the minutes were approved.

3. Current TC-5 Membership List

Presented by: M. McInerney

- The active membership list contains more than 70 people with recent participation or interest in TC-5 activities.
- The Dallas sign-in sheets recorded 32 attendees: 22 previous members and 10 new members.
- Several agenda emails had bounced. Members who did not receive the agenda were asked to provide a clearly written, current address to the officers.
- Email addresses are maintained for committee communication but are not published in the public membership list.
- TC-5 meetings are open. Members were encouraged to invite interested colleagues and to contribute papers, workshops, references, or committee service.

4. Report on Paper Review Process for Dallas Conference

Presented by: M. McInerney

- **Paper review:** 17 papers were reviewed and 16 were accepted: seven regular papers (all accepted), six special-session papers (all accepted, including one abstract paper), and four additional abstract papers (three accepted).

- **Regular sessions:** Three regular sessions were organized: EMP Coupling; Lightning EMP Topics; and EMP Protection. One ESD paper was placed in a TC-9 Modeling and Simulation session.
- **Special session:** Electromagnetic Information Security against Leakage and Interference Threats, organized by Y. Hayashi and co-chaired by M. McNerney, included six papers.
- **Workshop:** Recent Advances in Numerical Analysis Techniques for Lightning Transients in Power Systems and Electric Facilities included four presentations.
- **Experiment and demonstration:** Lightning Zoning of Aircraft per ARP5414 and its application in MIL-STD-464D testing was presented as an experiment and demonstration.
- **Best paper nominees:** Two TC-5 papers advanced as Best EMC Paper nominees: “Pin-Selective Contactless Data Injection into Multi-Line CMOS Interfaces using Dual-Wave IEMI” and “Circuit Modeling of Granular Metal Arresters for Nanosecond Transients.”

5. Report from Lightning Subcommittee

Presented by: A. Tatematsu

- Nine major events with lightning-related content were identified for 2026, including APEMC, ICLP, GlobalEM, IEEE EMC+SIPI, URSI GASS, the CIGRE Paris Session, EMC Europe, GROUND/LPE, and ICOLSE. Eight principal events were listed for 2027.
- **CIGRE SC C4:** CIGRE SC C4 currently has 11 active working groups related to lightning and insulation coordination. Interested experts should contact their national CIGRE SC C4 committee.
- **Publications:** Five lightning-related papers appeared in issues 1-3 of the 2026 IEEE Transactions on Electromagnetic Compatibility.
- **Dallas activity:** The Dallas lightning-transient workshop covered FDTD-based analysis, the Hybrid Electromagnetic Model, circuit-theory-based techniques, and machine-learning-assisted wind-turbine modeling.
- **ICLP 2026:** ICLP 2026 was held in Sapporo, Japan, with 215 papers and 365 participants from 37 countries. A. Tatematsu served as Secretary of the Local Organizing Committee. Two reported contributions received a Young Scientist Award and a Young Scientist Diploma.
- **Future work:** CIGRE WG C4.43 continues preparing a Technical Brochure on lightning problems and risk management for nuclear power plants. The Subcommittee also plans further conference papers in 2027.

6. Report from EM Information Leakage Subcommittee

Presented by: Y. Hayashi

- **Overview:** The 2026 program spans four conferences, five organized sessions, 41 named presentation slots, and one GlobalEM plenary lecture. The technical arc covers passive leakage, active IEMI, measurement and evaluation, and practical countermeasures.
- **APEMC 2026:** APEMC 2026 hosted a six-paper special session; two contributions reached the Best Paper or Best Student Paper finalist stage.
- **GlobalEM 2026:** GlobalEM 2026 hosted a two-part, 10-talk special session and a plenary lecture on “EMC as a Fundamental of Hardware Security.”
- **Dallas 2026:** The Dallas special session contained six papers on sound and screen leakage, key recovery, aging-related fault behavior, and contactless data injection. A data-injection paper was a Best Paper finalist.

- **EMC Europe 2026:** EMC Europe 2026 in Prague will include a three-part, 12-paper special session and a half-day practical TEMPEST tutorial.
- **Plans for 2027:** For 2027, the Subcommittee plans to propose a special session on EM security and side-channel analysis for APEMC in Jeju, and a special session plus tutorial for the Glasgow joint symposium. Portland participation is expected primarily through regular papers.

7. Report from HEMP/IEMI Subcommittee

Presented by: M. McInerney and W. Radasky; material also prepared with S. Fisahn

- **HEMP standards:** IEC SC 77C plans maintenance work on IEC 61000-4-24, IEC 61000-4-33, IEC 61000-5-5, and IEC 61000-6-6. A proposed IEC 61000-2-X project would define radiated and conducted environments for geomagnetic storms. Participation is arranged through national committees.
- **Power-system protection:** Power companies continue evaluating and improving the shielding effectiveness of substation control buildings. Practical upgrades include screened openings, shielded or fiber-optic yard cables, improved bonding, gaskets, and surge protection. Reported projects have raised building shielding effectiveness from about 20 dB to about 40 dB.
- **Conference activity:** EMC Europe 2026 will include a multi-part workshop on IEMI risk management for critical infrastructures and technical sessions on intentional EMI, EMP, and high-power electromagnetics.
- **Publications:** Recent publications addressed IEMI security taxonomies, smoke detectors, UAV motor controllers, detection antennas, power substations, victim-risk assessment, facial recognition, and cryptographic fault injection.
- **Publication quality:** The committee discussed the importance of distinguishing high-quality peer-reviewed work from low-quality or commercially driven publications. An IEMI USENIX Security 2026 systematization paper was noted as a substantial, highly selective security-conference contribution.
- **Member input:** Members were asked to send relevant papers, reports, and references to the Subcommittee because no individual can monitor all applicable publication venues.

8. Report from ESD Subcommittee

Presented by: J. Kinnear

- The ESD Association, founded in 1982, is ANSI-accredited, develops device and factory-control standards, operates certification programs, publishes a technology roadmap, and serves as the U.S. Technical Advisory Group for IEC TC 101.
- **Published documents:** Nine ESD documents were reported as published in 2025-2026, including work on air-ionizer verification, worksurface measurements, symbols, near-field immunity scanning, process assessment, packaging materials, electronic-design-automation checks, and the ESD Handbook.
- **Upcoming publications:** Upcoming work includes standards for seating, floor materials, bags, gloves and finger cots, and floor/footwear voltage measurement.
- **Technical trends:** Current technical drivers include CDM classification below 100 V, updates to ANSI/ESD S20.20 process control, increased device sensitivity associated with high AI transaction rates, and 2.5-D/3-D packaging.

9. Coordination with Smart Grid (TC-7 Subcommittee)

Presented by: M. McInerney

The former Smart Grid Special Committee completed much of its original coordination mission after approximately 15 years and now operates as a subcommittee of TC-7, where low-frequency EMC and harmonics are a closer technical fit. TC-5 will no longer prepare a separate Smart Grid report; related activities will be reported through TC-7.

10. Status of TC-5 Web Page

Presented by: M. McInerney

- The web page currently provides officer information, meeting minutes and attachments, and subcommittee contacts.
- The Chair proposed developing topic-specific resource pages under each subcommittee, including public reports, key references, review articles, and concise descriptions.
- Only public, non-sensitive material will be posted. Personal phone numbers and email addresses will not be published.
- Subcommittee members were asked to recommend seminal review papers, public government reports, textbooks, and other useful references. Volunteers for web and professional-network outreach were also requested.

11. Review of HPEM Activities Since Raleigh Meeting

The principal activities since Raleigh were covered in the paper-review and subcommittee reports. Members highlighted APEMC 2026, ICLP 2026, GlobalEM 2026, the Dallas special session and workshop, and the forthcoming EMC Europe 2026 program. No additional activity requiring committee action was raised.

12. TC-5 Participation in Upcoming EMC Conferences

- **APEMC 2027 - Jeju:** The EM Information Leakage Subcommittee intends to propose an APEMC 2027 special session. Other members considering sessions or workshops were asked to contact the Chair promptly because proposal deadlines were approaching.
- **IEEE EMC+SIPI 2027 - Portland:** TC-5 plans to support paper review and hold a committee meeting. Officers attending Portland and F. Heather offered to support the meeting.
- **Joint EMC Europe / IEEE EMC+SIPI 2027 - Glasgow:** M. McInerney plans to request a TC-5 meeting at the joint symposium, subject to organizer approval and room availability. The meeting would broaden participation among European members. A special session and tutorial building on the Prague program are also planned.
- **Meeting plan:** The committee therefore intends to pursue TC-5 meetings in both Portland and Glasgow in 2027, subject to conference approval.
- **Call for proposals:** Members with proposals for tutorials, workshops, special sessions, or demonstrations were invited to contact the Chair for assistance.

13. Standardization Activities

Presented by: F. Heather

- IEEE P2838, Standard for Aerospace Component Lightning Strike Direct Effects Qualification, is nearing completion.

- Authorization to form the balloting group was requested, with a target of completing that step by the end of August 2026 and publishing the standard around December 2026.
- The draft is effectively frozen except for typographical and editorial corrections before ballot.
- A working-group meeting was scheduled for Thursday at 10:00 AM, and an introductory presentation was scheduled in the Aerospace Standards Workshop.

14. Presentation on Intelligent IoT-Based Precision Agriculture

Presented by: Marian-Stefan Nicolae

- **Objective:** The project aims to move from a TRL-4 monitoring prototype to a TRL-9 precision-agriculture system using IoT, Big Data, and AI. Deployment is expected to expand from about 50 sensors to 400 sensors.
- **Sensing:** Nine channels include air temperature, humidity, pressure, soil temperature, volumetric moisture, soil conductivity, light intensity, node voltage, and radio signal strength. Battery/solar-powered nodes transmit approximately every 15 minutes over LoRaWAN.
- **Architecture:** The architecture uses LoRaWAN gateways, The Things Network, Azure IoT Hub, data persistence, LightGBM and LSTM models, retraining/versioning, a recommender, APIs, and an operator dashboard.
- **EMC observations:** A digital-twin testbed was used for indirect EMC assessment. The reported baseline showed about -57 dBm average RSSI, 0% packet loss, 98.5% data integrity, and approximately 30 seconds of synchronization latency.
- **Discussion:** Members recommended including direct and indirect lightning effects in the risk analysis and consulting European lightning-location data. Discussion also covered gateway placement, local data storage, redundancy, acknowledgments, and resilience to unexpected interference.

15. Any Other Business

- A Schneider Electric participant asked for documented evidence, relevant spectra, test-field levels, and defensive approaches for intentional electromagnetic interference affecting energy meters. The Chair invited knowledgeable members to provide information through him so it could be forwarded to the participant.
- Members were reminded that TC-5 welcomes new subcommittee topics when they fall within high-power electromagnetics and do not fit the existing Lightning, EM Information Leakage, HEMP/IEMI, or ESD structure.

16. Adjournment

The Chair thanked the presenters and attendees. The meeting was adjourned at approximately 1:26 PM.

Attachments (labeled with agenda item)

- **Meeting Agenda:** 01_TC5_2026_Dallas_Agenda_v4.docx
- **Raleigh Meeting Minutes (approved during this meeting):**
02_TC5_Unconfirmed_Minutes_2025_Raleigh_no_attachments.pdf
- **TC-5 Membership Update:** 03_TC5_Aug_2026_Membership_no_emails.xlsx
- **Dallas Attendee Contact List (internal distribution only):**
TC5_2026_Dallas_Attendees_INTERNAL.xlsx
- **Report on Paper Review Process for Dallas:** 04_TC-5 Paper Rev Process-2026.pptx
- **Lightning Subcommittee Report:** 05_Lightning_TC5_2026.ppt.pptx
- **EM Information Leakage Subcommittee Report:**
06_TC5_EM_Information_Leakage_Subcommittee_Activity_Report_2026.pptx
- **HEMP/IEMI Subcommittee Reports:**
07_TC5_HEMP_IEMI_Report_2026_(McInerney).pptx
- **ESD Subcommittee Report:** 08_2026 -TC-5 - EMC Meeting - ESD.pptx
- **Precision-Agriculture Presentation:** 14_Intelligent IoT-Based System for Precision Agriculture.pdf