

COMMISSION E: Electromagnetic Noise and Interference

(November 2020 – May 2023)

Edited by *Tomoo Ushio (Osaka University)*

1. Summary

URSI Commission E (Electromagnetic Noise and Interference) in Japan has been holding technical meetings and sub-committee activities in collaboration with the Technical Committee on Electromagnetic Compatibility (EMCJ) of the Institute of Electronics, Information and Communication Engineers (IEICE), the Technical Committee on Electromagnetic Compatibility of the Institute of Electrical Engineers of Japan (IEEEJ-EMC), IEEE EMC Society Japan Joint Chapter and Sendai Chapter, Society of Atmospheric Electricity Japan and some related technical groups. The workshops, conferences, and meetings at domestic and international level for this term are summarized as follows.

Domestic academic activities of EMCJ and IEEEJ-EMC:

1. Regular EMCJ Meetings

The EMCJ of IEICE had 10 regular technical meetings in the period of September 2020 to July 2021, and 17 regular technical meetings in the period of July 2021 to May 2021. These regular meetings were technically co-sponsored by IEEE EMC Society Japan Joint Chapter and IEEE EMC Society Sendai Chapter. Three of them were co-organized with Technical Committee on Electromagnetic Compatibility of the Institute of Electrical Engineers of Japan (IEEEJ-EMC). In total 247 regular technical reports including 6 invited talks were presented.

The featuring technical topic of the July meeting was “Wireless power transfer technology and Electronic device implementation” and “EM Simulation, EMC and Microwaves” co-organized with the Technical Committee on Wireless Power Transfer (WPT of IEICE) and Electro-Mechanical Devices (EMD of IEICE), and with the addition of the Technical committee on Photonics-applied Electromagnetic Measurement (PEM of IEICE) in 2022 and 2021. October meeting was focused on “EM Simulation, EMC and Microwaves” co-organized with the Technical Committee on Microwaves (MW of IEICE) and Electronics Simulation Technology (EST of IEICE). The March meeting was co-organized by the Technical Committee on Healthcare and Medical Information Communication Technology (MICT) of IEICE. Also in July, the meeting was held as the annual “EMCJ Young Researchers' Presentation Meeting” which is co-sponsored by the Japan Institute of Electronics Packaging (JIEP) Electromagnetic Technology Committee.

2. Regular IEEEJ-EMC Meetings

IEEEJ-EMC held 3 technical meetings in the period of September 2020 to July 2021 and 7 technical meetings from July 2021 to May 2023. Two of them were sponsored by this technical committee, and five were technically co-sponsored by the IEICE-EMCJ and IEEE EMC Society

Japan Joint and Sendai Chapters. During this period, due to the influence of the COVID-19, it was held online or as a hybrid of onsite and online. A total of 19 technical reports were presented by IEEJ-EMC at 10 meetings.

3. Activity of sub-committees of IEEJ-EMC

As of May 2023, there are three continuing sub-committees and one new sub-committee under the IEEJ-EMC Technical Committee as follows. These are (1) Investigation committee on the health risk analysis of electromagnetic field (July 2014 - June 2016 / June 2016 - May 2020 (Phase 2) / July 2021 - June 2024 (Phase 3)), (2) Investigation committee on Measurement and evaluation technology for EMC elucidation of ESD phenomena (Oct. 2020 - Sept. 2023), and (3) Investigation committee on trend survey of advanced electromagnetic field exposure evaluation basic technology (July 2021 - June 2024). And a new investigation committee was established which is (4) Investigation committee on energy management systems towards carbon neutrality (April 2023 - March 2026).

Domestic academic activities in the field of natural electromagnetic noise:

Commission E members in Japan working actively in the field of natural electromagnetic noise are presented their research results in the following meetings and/or symposiums.

1. International conference/workshop

(1) 34th URSI General Assembly (URSI GASS) 2021

The URSI GASS in Rome was originally scheduled for the week 29 August – 5 September, 2020. Due to the Covid-19 pandemic, it has been officially delayed to 28 August – 4 September, 2021 with hybrid format for the conference, allowing mutual interaction of in-presence and on-line participants. Several URSI-E committee members played session conveners and presents papers in the field of atmospheric electricity and seismo-electromagnetics.

(2) 17th International Conference on Atmospheric Electricity (ICAE)

This international conference is held every 4 years to promote the scientific research, stimulate discussions, presentation, and publication of scientific findings, as well as to enhance education and raise public awareness regarding electrical phenomena in the atmosphere. The 17th conference was held face-to-face in Tel Aviv, Israel during 19 - 24 June, 2022. 58 oral and 59 poster presentations were There were 58 oral and 59 poster presentations, and lively discussions took place. Several URSI-E committee members presented papers in the field of atmospheric electricity.

(3) American Geophysical Union (AGU) Fall Meeting 2020, 2021 and 2022

This international conference is held every December in USA and the most influential event in the world dedicated to the advancement of Earth and space sciences. In 2020, the meeting was held on line due to COVID 19 spreading from 1 to 17 December. About 25400 scientists from 107 countries including US, Canada, UK, Japan, China, etc. attended and about 12000 posters are presented with 1.1 million views on line. Also, the meetings were held in a hybrid

model, aiming to capitalize on both in-person and virtual participation, in New Orleans on 13-17 December, 2021 and in Chicago on 12-16 December, 2022. More than 20,000 scientific presentations were delivered, with over 25,000 attendees from more than 100 countries, including the US, Canada, UK, Japan, China, and others. Several URSI-E committee members presented papers in the field of atmospheric electricity and seismo-electromagnetics.

(4) 3rd URSI Atlantic / Asia-Pacific Radio Science Meeting (URSI AT-AP-RASC 2022)

Due to the COVID-19 pandemic, the 3rd URSI AT-RASC was moved from 2021 to 2022 and URSI AP-RASC couldn't be held in Australia as planned due to the travel restrictions. So the combined 2022 AT-AP-RASC event, hosted in Gran Canaria, was offered a hybrid format. Several URSI-E committee members presented papers in the field of atmospheric electricity and seismo-electromagnetics.

2. Domestic conference/workshop

(1) 2022 URSI-Japan Radio Science Meeting (URSI-JRSM 2022)

This meeting is the URSI conference organized by the Japan National Committee of URSI (JNC-URSI). The objective of this meeting is to review current research trends, present new discoveries, and make plans for future research and special projects in all areas of radio science, and a particular emphasis is placed on enhancing the visibility of URSI in the Asian countries and encouraging young scientists to contribute to various URSI activities. The URSI-JRSM 2022 was the fourth URSI-JRSM on 1 – 2 September, 2022. It consisted of Keynote Lectures and Invited Talks by outstanding scientists, Oral Sessions and a Poster Session for contributed papers. The topics of the meeting cover all the 10 URSI Commissions.

URSI-E committee members made valuable contributions to the meeting by presenting oral and poster sessions, delivering invited lectures, and actively participating in the organization of the meeting. A student in the research field in URSI-E Commission won the Student Paper Competition (SPC).

(2) Society of Atmospheric Electricity of Japan (SAEJ) annual meeting 2020, 2021, 2022 and 2023

This is an annual meeting held in January. The 100th and 101st meetings were held online on 7 – 8 January, 2022, and in Tokyo on 6-7 January, 2023, with 41 and 33 scientific papers presented, respectively. 5 commemorative lectures celebrating the 100th anniversary were also delivered in the 101st meeting. Several URSI-E committee members were presented the papers related to the areas covered by Commission E.

(3) Japan Geoscience Union Meeting (JpGU) 2021, 2022 and 2023

This is an annual meeting held in May. The meetings were held with a hybrid format in Chiba and online in 2021, on 22 – 27 May, 2022, on 21 – 26 May, 2023. Online Poster Session were also conducted on 29 May – 3 June, 2022 and during the same period as mentioned above in 2023. JpGU is a large organization consisting of 51 academic councils related to earth and planetary sciences with approximately 10,000 members. Prior to the pandemic, about 8,000 scientists participated in this event. The meeting has adopted a hybrid format since 2022,

allowing attendees to engage both in-person and online without reducing the number of participants and presenters. Several URSI-E committee members presented papers related to the areas covered by Commission E.