

Commission E (Electromagnetic Noise and Interference) Activity Report

August 2015 - November 2015

Commission E 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 (IEEJ-EMC), IEEE EMC Society Japan Joint Chapter and Sendai Chapter, and some related technical groups.

Activities on IEEJ Technical Committee on EMC:

Chairperson: Ken Kawamata (Tohoku Gakuin University)

Secretaries: Tomoo Ushio (Osaka University), Hidenori Sekiguchi (NMRI)

Assistant Secretaries: Yu-ichi Hayashi (Tohoku Gakuin University)

1. Overall of Technical Committee on EMC

The Technical Committee on Electromagnetic Compatibility (EMC) has a vital role of researching following subjects;

- (1) Comprehensive understanding of electrical power system and EMC issue,
- (2) Establishment of the interdisciplinary cooperation among several groups and/or institutes related with EMC problem,
- (3) Investigations on new and high technologies for EMC,
- (4) Advertisement to the public on EMC issue and key technologies,
- (5) Introductory advertisement of international EMC standards to the domestic EMC researchers.

For these purposes the committee pays their attention to the causes of electromagnetic interference phenomena, the situation of electromagnetic interferences occurrence, the novel measurement techniques and method for EMC, the protection technology and counter measurement for EMC and international and domestic EMC regulations.

The committee holds some operating meetings. They were Mar. 2nd (59th), Jun. 29th (60th), Oct. 16th (61th) in 2015. Also, the technical meetings held in Mar. 2nd (4 papers), Jun. 25-26 (5 papers, joint with the EMCJ of IEICE), Oct. 22-23 (2 papers, joint with the EMCJ of IEICE) and Dec. 8th (1 paper, joint with the EMCJ of IEICE) in 2015.

2. Activity of sub-committees

The committee on EMC has been organizing four dedicated research sub-committees to realize the effective activity in 2015.

- (1) Investigation committee on EMC problem of smart grid and city.
- (2) Investigation committee on disturbance of transient electromagnetic fields to electronic equipment and wireless communications.
- (3) Investigation committee on technical trends in evaluation of human exposure to electromagnetic fields.

- (4) Investigation committee on the health risk analysis of electromagnetic field.

Domestic academic activities of EMCJ:

1. Regular Meetings

The Technical Committee on Electromagnetic Compatibility (EMCJ) of the Institute of Electronics, Information and Communication Engineers (IEICE) had three regular technical meetings in the period of September to November 2015, where 37 regular reports and two invited talks were presented. The total number of presentations is 39.

The featuring technical topic of the September meeting was “Printed Circuit and EMC”, and an invited talk (1) listed below was presented. The special talk (2) was in the October meeting, the featuring technical topic of which was “Microwave, Electromagnetic simulation and EMC”, co-sponsored by the Technical Committee on Microwave Engineering (IEICE-MW), Technical Committee on Electronics Simulation Technology (IEICE-EST) and the Technical Meeting on Electromagnetic Compatibility of the Institute of Electrical Engineers of Japan (IEEJ-EMC).

(<http://www.ieice.org/ken/program/index.php?instsoc=IEICE-B&tgid=IEICE-EMCJ>)

[Invited Talks] presented in September and October EMCJ meetings;

- (1) Mr. Kenji Masaoka, Mr. Kazuo Ogasawara (KEC), "Introduction of KEC striving for the contribution to the development of the electronics industry. - From Training engineers to the state-of-the-art EMC Testing facilities. -".
- (2) Prof. Nobuyuki Itoh, Hiroki Tsuji (Okayama Pref. Univ.), Yuka Itano (Okayama Pref. Univ./Toshiba), Takayuki Morishita, Kiyotaka Komoku (Okayama Pref. Univ.), Sadayuki Yoshitomi (Toshiba Corp.), " A Study of High-Frequency Characteristics of Stripe Shaped Inductor and its application for Voltage-Controlled Oscillator ".

2. 27th EMC Workshop on Electrical and Electronic Equipment

EMCJ technical committee started the EMC Workshop on Electrical and Electronic Equipment (Yuzawa Workshop) in 1989, and continued it annually. On Nov.11-12, 2015, the 27th workshop was held at Echigo-yuzawa, Niigata, under the topic of “EMC of the IoT Era”. Keynote Speech in the title of "The Revolution toward the Data-driven Society", Invited Lecture on "Complex Cavity Measurement Techniques for the Assessment of Aircraft Electromagnetic Environments", Special Lecture on "Latest Trend on Security Technology in IoT Era", and nine regular presentations were given.

Domestic academic activities in URSI Japan:

“2015 URSI-Japan Radio Science Meeting (URSI-JRSM 2015)” September 3-4, 2015, Tokyo, Japan

This is the second URSI-Japan meeting followed by 2014 sponsored by IEICE and supported by URSI. Commission E presented one invited oral paper and 10 poster papers. Three research papers among them were related to EMC problems. Seven papers deal with natural electromagnetic noise and/or natural science such as EM emissions from lightning, lightning detection and characterization, applications of VLF sub-ionospheric wave propagation

to monitor the lower ionosphere disturbed by various physical phenomena, and EM imaging of active volcanoes.

[Invited talk] Prof. Yuichi Hayashi (Tohoku Gakuin University, Japan) ,“EM Information Leakage from Smart Devices”

International Workshop and Symposium on Natural Electromagnetic Noise:

Two international conferences were listed where our committee members were organized/presented the scientific results.

1. IS- GNSS (International Symposium on GNSS), 16-19 Nov, 2015, Kyoto, Japan.
(<http://www.isgnss2015.org/>)
Eight research paper were presented in the oral session: GNSS Seismology (Earthquake Prediction with GNSS Monitoring) (<http://www.isgnss2015.org/schedule/18nov/18b/>)
2. AOGS (Asia Oceania Geosciences Society) 12th Annual meeting, 2 -7 Aug., 2015, Singapore.
(<http://www.asiaoceania.org/aogs2015/public.asp?page=home.htm>)
Fourteen papers including seismo-electromagnetics were presented in Sun-Earth System Response to Extreme Solar and Seismic Events (ST09)

International Workshop and Symposiums on EMC:

1. “Joint IEEE EMC & EMC Europe 2015 (EMC 2015)”, Aug. 16-22, 2015. Dresden, Germany
(<http://conference.vde.com/emc2015>).
2. “7th Asia-Pacific Conference on Environmental Electromagnetics (CEEM)”, November 4-7, 2015. Hangzhou, China. (<http://www.ceem2015.org/>)
This international conference was started in 1996 by several Chinese and Japanese EMC researchers, and was held every three years from then. Now it is sponsored by China Institute of Communications. More than ten EMC researchers from Japan attended this-year’s conference, and presented seven papers in the technical sessions. Several URSI-E committee members were involved in the Technical Program Committee, and contributed largely to organize the technical sessions.
3. “The 10th International Workshop on Electromagnetic Compatibility of Integrated Circuits (EMC Compo 2015)”, November 10-13, 2013, Edinburgh, Scotland, United Kingdom.
(<http://www.emccompo2015.org/>)
EMC Compo (International Workshop on Electromagnetic Compatibility of Integrated Circuits) was started as a domestic workshop in France in 1999, mainly focusing on EMC issues related to integrated circuit (IC) and semiconductor devices. Since the 3rd workshop in 2002 at Toulouse, France, the workshop has been organized as an international workshop and giving opportunities to exchange the latest research and experience in IC-level EMC for

researchers and engineers from both industry and academia. Some applications in automotive communication devices have been also discussed. (<http://www.emccompo.org/>)

In 1865, James Clerk Maxwell (13th June 1831 - 5th November 1879), published a set of equations that had such far-reaching implications, they are fundamental to our world today. EMC Compo 2015 celebrates 150 years since these equations were published, and was held at Edinburgh, the city of Maxwell's birth. During EMC Compo 2015, attendees had the opportunity to visit the place of Maxwell's birth and home during his formative years.

At the EMC Compo 2015, 3 keynote speeches and 49 technical papers including 25 poster presentations were presented on "Design for EMC", "Measurement Techniques", "Immunity", "Emission" and "ESD" issues of IC/LSI. Also 6 topical workshops on "EMC Behaviour of COTS Components After Ageing", "System Decoupling Capacitor Selection and Placement to Minimize", "Radiation and Immunity Issues" and "Signal/Power Integrity and EMC Simulations of Chip/Package/Board", and one demonstration on "EMC modeling of Integrated Circuits" were presented.

4. "Korea-Japan EMT/EMC/BE Joint Conference (KJJC-2015)", November 23-24, Sendai International Center, Japan. (<http://www.ieice.org/cs/emcj/kjic2015/>)

The 2015 Korea-Japan Joint Conference is the 8th conference intended to provide an academic forum for the exchange of information on the progress of research and development in Electromagnetic Theory (EMT), Electromagnetic Compatibility (EMC), and Biological Effect by Electromagnetic Field (BE). KJJC was started in 1996 as Korea-Japan Joint Conference on Electromagnetic Theory and Compatibility (KJJC-EMTC), and the 2nd to 6th KJJC were organized as Korea-Japan AP/EMC/EMT Joint Conference (KJJC-AP/EMC/EMT). Since the 7th KJJC in 2012 it changes the name to EMT/EMC/BE Joint Conference. In KJJC-2015 two plenary speeches (Korea:1, Japan:1), 42 oral presentations (Korea:18, Japan:24), and 33 posters (Korea:13, Japan:20) were presented. The friendship between Japanese and Korean scholars was more enhanced through the scientific exchanges in this joint conference.

(<http://www.ieice.org/cs/emcj/jpn/non-regular/nonregular-j.html>)

Future International Conferences and Meetings:

1. "7th Asia-Pacific International Symposium on Electromagnetic Compatibility & Signal Integrity and Technical Exhibition (APEMC2016)", May 18-21, 2016, Shenzhen, China; (<http://www.apemc.org/>) Preliminary Paper Submissions Deadline: Dec. 05, 2015, Notification of Acceptance: Jan. 29, 2016, Final Paper Submission: Mar. 09, 2016.
2. "2016 IEEE International Symposium on Electromagnetic Compatibility (EMC 2016)", July 25-29, 2016, Ottawa, Canada; (<http://www.emc2016.emcss.org/>) Preliminary Full Paper Manuscript Deadline: Jan. 15, 2016, Acceptance Notification: Feb. 21, 2016, Final paper Material Due: May 1, 2016.
3. "International Symposium and Exhibition on Electromagnetic Compatibility (EMC Europe 2016)", September 5-9, 2016, Wroclaw, Poland; (www.emceurope.org/2016) Full Paper Deadline: Feb. 15, 2016, Notification of paper acceptance: Mar. 15, 2016, Final paper submission: May 16, 2016.

4. “AGU (American Geophysical Union) Fall Meeting”, 14-18 Dec, 2015, San Francisco, USA.
(<http://fallmeeting.agu.org/2015/>)
5. “EGU (European Geosciences Union) General Assembly 2016”, 17-22 April, 2016, Vienna, Austria. (<http://www.egu2016.eu>) Abstract submission deadline: 13 Jan., 2016.
6. “JpGU (Japan Geoscience Union) Meeting 2016”, May 22nd - 26th, Makuhari Messe, Chiba, Japan. (http://www.jpгу.org/meeting_2016/greeting.html)
Abstract submission deadline: 18 Feb., 2016.
7. “AOGS (Asia Oceania Geosciences Society) 13th Annual Meeting”, 31 Jul to 5 Aug, 2016 Beijing, China (<http://www.asiaoceania.org/aogs2016/public.asp?page=home.htm>)
Abstract submission deadline: 19 Feb., 2016.
8. “2016 URSI Asia-Pacific Radio Science Conference (URSI AP-RASC’16)”, August 21 to 25, 2016 in Seoul, Korea. (http://aprasc2016.org/Welcome_Message.php) Abstract submission deadline: 15 March, 2016.
9. “41st COSPAR Scientific Assembly”, 30 July - 7 Aug. 2016, Istanbul, Turkey
(<https://www.cospar-assembly.org/>) Abstract submission deadline: 12 Feb., 2016.