

Commission E (Electromagnetic Noise and Interference) Activity Report

June 2015 - September 2016

Commission E in Japan is 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, and some related technical groups.

Domestic academic activities of EMCJ and IEEEJ-EMC:

1. Regular Meetings

The EMCJ of IEICE had three regular technical meetings with technical co-sponsorship of IEEEJ-EMC, IEE-MAG (Magnetics), and IEICE-EMD (Electromechanical Devices). These regular meetings were also technically co-sponsored by IEEE EMC Society Sendai Chapter and IEEE EMC Society Japan Joint Chapter. In total, 45 presentation including one special talk, two invited talks and 9 poster papers were presented in the three meetings.

One of the regular meeting in June was held as “EMC Joint Workshop, 2016, Taipei”, which is the second EMC Joint Workshop annually held abroad in Asia; in detail, see the section “International Workshop and Symposiums” below.

The featuring technical topic of the July meetings was “Discharge, EMC”, and that in September meeting was “Absorber, Shield, EMC”.

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

Two invited talks and one special talk listed below were presented in the EMCJ meetings of this period.

[Invited Talks]

See the section “International Workshop and Symposiums” below.

[Special Talk]

- (1) Kennichi Hatakeyama (University of Hyogo), "Recent Topics Related to EM Wave Reflection/Transmission Control Device Using Artificially Engineered Material", Sep. 2016.

2. Activity of sub-committees of IEEEJ-EMC

The committee on EMC in IEEEJ has been organizing the five sub-committees listed below. The sub-committee (3) and (4) have finished their tasks of investigation, and final technical reports will be published soon.

- (1) Investigation committee on EMC problem of smart grit and city.
(Oct. 2014 – Sep. 2017)

- (2) Investigation committee on disturbance of transient electromagnetic fields to electronic equipment and wireless communications. (April 2014 – March 2017)
- (3) Investigation committee on technical trends in evaluation of human exposure to electromagnetic fields. (July 2013 – June 2016)
- (4) Investigation committee on the health risk analysis of electromagnetic field. (July 2013 – June 2016)
- (5) Investigation committee on EMC problem of automotive (PHEV / EV). (May 2016 – April 2018)

Domestic academic activities on Natural Electromagnetic Noise:

International Workshop and Symposiums related to EMCJ and IEEJ-EMC:

The second EMCJ WS ⁽¹⁾ was held in Taipei. This series of EMCJ-WS was started last year as “once a year” annual regular EMCJ technical meeting outside Japan. The purpose is to encourage young engineers and researchers in Japan and East Asian area to present their works in English and to exchange information in international environment.

The “EMCJ WS 2016” was collocated by Technical Meeting on Electromagnetic Compatibility of IEEJ (IEE-EMC) and Technical Meeting on Magnetics of IEEJ (IEE-MAG), and hosted and supported by the Department of Electrical Engineering, NTU. It was also supported by “Taiwan Electromagnetic Industry-Academia Consortium (TEMIAC)”, “IEEE EMC Society Taipei Chapter”, “IEEE EMC Society Sendai Chapter”, “IEEE EMC Society Japan Joint Chapter”, “IEICE Taipei Section”, and “Japan National Committee of URSI (URSI-JNC)”. The workshop had 16 regular and 2 invited talks. In addition, we also had a poster session with 11 papers following a short oral presentation. Technical visit to EMC laboratories of NTU was also arranged and attendees enjoyed technical information exchange.

The “IEEE EMC 2016” ⁽²⁾ was held in Ottawa, Canada. Almost 200 original research papers were presented. One tutorial, 10 regular papers, one poster paper and one panel discussion were presented by authors including Japanese. The following is one of the contributions from Japan.

- [Half-day Tutorial]: (Sponsored by TC5 IEEE-EMCS)
 - “State-of-the-art research and education in electromagnetic information security”
 - Focusing on the problem of reduced security concerning electromagnetic waves (electromagnetic information security), and introducing the mechanisms of these information leaks and countermeasures, this session presents the latest research trends and education. In this session four topics out of five were presented by Japanese speakers.
 - ✓ Overview of EM Information Leakage from Cryptographic Modules
 - ✓ Proactive and Reactive Countermeasures Against Passive and Active EM Attacks

- ✓ Estimation Method of EM Information Leakage from Cryptographic-Devices Embedded Circuit Boards
- ✓ EM Information Leakage Threats in Public Spaces
- ✓ Education for Practical Hardware Security Technology

“EMC Europe 2016”⁽³⁾ was held in Wroclaw, Poland. Almost 200 original research papers were presented. One tutorial, 10 regular papers, one poster paper and one panel discussion were presented by authors including Japanese. The following is one of the contributions from Japan. Fourteen regular papers, five poster papers and the following Keynote talk were presented by Japanese groups and authors.

- ◇ EMI Evaluation and Immunity Testing Methods for Wearable devices
Jianqing Wang (Nagoya Institute of Technology, Japan)

International Workshops and Symposiums on Natural Electromagnetic Noise:

Two international meetings, “AOGS (Asia Oceania Geosciences Society) 13th Annual Meeting”⁽⁴⁾ and “41st COSPAR Scientific Assembly”⁽⁵⁾, were held where our committee members were organized/presented the scientific results.

2016 URSI Asia-Pacific Radio Science Conference (URSI AP-RASC 2016)

In the AP-RASC 2016 held at Seoul, Korea, the following six sessions were organized on the topics related to Commission E. Unfortunately the number of papers was the least among the committees. Contributions from Japan were 10 papers; 2 from China, 2 from USA, 19 from Korea. Sessions related to natural EM noise were not included.

- [S-E1] Common-Mode Issues Related to Power Electronics: (5, Japan:4, Korea:1)
Yoshitaka Toyota (Okayama University, Japan) and
Wansoo Nah (Sungkyunkwan University, Korea)
- [S-E2] Signal Integrity and EMI of Chip, Package, and PCB: (5, Korea:3, USA:2)
Joungho Kim (Korea Advanced Institute of Science and Technology) and
Wen-Yan Yin (Zhejiang University, China)
- [S-E3] Modeling of Electromagnetic Immunity, EMS, and ESD: (6, Korea:5, Japan:1)
Jonghoon Kim (Korea Advanced Institute of Science and Technology, Korea) and
Jingook Kim (Ulsan National Institute of Science and Technology, Korea)
- [S-E4] EMC Problems in Mobile Devices: (5, Korea:5)
Dong Gun Kam (Ajou University, Korea) and
Hyun Ho Park (University of Suwon, Korea)
- [S-E5] EMC and Information Security: (6, Japan:3, Korea:3)
Jong-Gwan Yook (Yonsei University, Korea) and
Yu-Ichi Hayashi (Tohoku Gakuin University, Japan)
- [S-EB] EMC Modeling and Techniques: (6, China:2, Korea:2, Japan:2)
Sungtek Kahng (Incheon National University, Korea) and

Erping Li (Zhejiang University, China)

1. “EMC Joint Workshop 2016 Taipei (EMCJ WS 2016, Taipei)”, June 2-3, National Taiwan University, Taipei, Taiwan. (<http://www.ieice.org/cs/emcj/jpn/regular/emcj-ws.html>)
2. “2016 IEEE International Symposium on Electromagnetic Compatibility (EMC 2016)”, July 25-29, 2016, Ottawa, Canada; (<http://www.emc2016.emcss.org/>)
3. “International Symposium and Exhibition on Electromagnetic Compatibility (EMC Europe 2016)”, September 5-9, 2016, Wroclaw, Poland; (www.emceurope.org/2016).
4. “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>)
5. “41st COSPAR Scientific Assembly”, 30 July - 7 Aug. 2016, Istanbul, Turkey (<https://www.cospar-assembly.org/>)
6. “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)

Future International Conferences and Meetings:

7. "Asia-Pacific International Symposium on EMC (APEMC 2017)", June 20-23, 2017, Yonsei University, Seoul, Korea; (www.apemc2017.org)
Proposals for Special Session/ Workshop/ Tutorial: November 16, 2016.
Regular/ Special Session Paper Submission: December 31, 2016.
8. “The 11th International Workshop on the Electromagnetic Compatibility of Integrated Circuits (EMC Compo 2017)", July 4-8, 2017, Saint-Petersburg, Russia;
(www.emccompo2017.eltech.ru)
Paper Submission Deadline: 30th Dec. 2016,
Submission of Final Paper: 23d May, 2017.
9. “2017 IEEE International Symposium on Electromagnetic Compatibility, Signal and Power Intergity (EMC + SIPI 2017)”, August 7-11, 2017, Washington DC, USA;
(<http://www.emc2017.emcss.org/>)
Preliminary Full Paper Manuscript: Nov. 1, 2016 – Jan. 16, 2017
Final Paper Due: May 3, 2017.
10. “International Symposium and Exhibition on Electromagnetic Compatibility (EMC Europe 2016)”, September 4-8, 2017, ESEO Graduate School of Engineering, Angers, France;
(www.emceurope2017.org).
Paper Submission Deadline: 15 Feb. 2017
Final Submission Deadline: 15 May 2017