**Commission K (Electromagnetics in Biology & Medicine) Activity Report**

**2011-2012**

November 6th, 2012  By Yasuhiko Jimbo

1  **Activity**

1.1  **1st preparatory meeting of Japanese URSI-Commission K for 22nd term of the Science Council of Japan**

- **Date:** December 19, 2011
- **Place:** Tokyo Metropolitan University’s Akihabara satellite campus, Tokyo
- **Topics:**
  - Approvalment of the proposal list of the members of Japanese URSI-Commission K for the 22nd term of the Science Council of Japan: Among the member, Prof. Yasuhiko Jimbo (The University of Tokyo) was elected as the nominee of the committee chairperson with bylaw.
  - Definition of activity as Japanese URSI-Commission K for 22nd term: To make an effort to expand the study field, especially application in medicine. For this purpose, Dr. Masaki Sekino (The University of Tokyo) joined us as a secretary. And Japanese URSI-Commission K will act in collaboration with the society of electromagnetics in biology and medicine. Furthermore, since Prof. Masao Taki (Tokyo Metropolitan University) was elected for the chair of the international URSI-Commission K, international collaboration will be also emphasized in this term.
  - Summary of the XXXth URSI General Assembly: Number of presentations in the sessions related to URSI-Commission K (90 oral and 21 poster) and topics in the business meeting of the international URSI-Commission K were reported.
- **Topical Lecture:**
  - “Carcinogenicity assessment of radio frequency electromagnetic field by IARC” by Dr. Kanako Wake (National Institute of Information and Communications Technology; NICT)
  - “Bioinstrumentation using terahertz frequency” by Prof. Kodo Kawase (Nagoya University)

1.2  **2nd preparatory meeting of Japanese URSI-Commission K for 22nd term of the Science Council of Japan**

- **Date:** March 7, 2012
- **Place:** Tokyo Metropolitan University’s Akihabara satellite campus, Tokyo
- **Topics:**
  - A trend of International Commission on Non-Ionizing Radiation Protection (ICNIRP): Dr. Soichi Watanabe (NICT) was elected as a member of main commission and will serve from May, 2012. Public consultation about “Draft guideline for limiting exposure to electromagnetic fields induced by movement of the human body in a static magnetic field and by time-varying magnetic field below 1Hz” was introduced.
  - Brief topics of the Bioelectromagnetics society (BEMS) board of directors meeting
  - 4th symposium on electromagnetics in biology and medicine (under the auspices of the society of electromagnetics in biology and medicine): There were 8 technical presentations and 2 special lectures. The titles of special lectures were follows;
    - “Heavy particle radiotherapy –from basic study to recent trend” by Dr. Shinichi Minohara (Kanagawa Cancer Center)
    - “Biological effect of electromagnetic field –historical progress” by Dr. Tsukasa Shigemitsu (Committee chairperson of Japanese URSI-Commission K for 21st term of the Science
1.3 3rd preparatory meeting of Japanese URSI-Commission K for 22nd term of the Science Council of Japan

- Date: August 2, 2012
- Place: Tokyo Metropolitan University’s Akihabara satellite campus, Tokyo
- Topics:
  - URSI-Commission K international workshop: The workshop will be scheduled in Europe under organization of URSI-Commission K chair, Prof. Taki (Tokyo Metropolitan University) collaborated with URSI-Commission K vice chair, Dr. Joe Wiart.
  - A trend of the related meetings: ICNIRP, 2012 Korea-Japan EMT/EMC/BE Joint Conference (KIJJC-2012), Technical Committee on Medical Information & Communication Technology (MICT) and BEMS etc.
  - A trend of Radiofrequency Environmental Health Criteria Monograph: The World Health Organization was planned to publish EHC until summer, 2014.
- Topical Lecture:
  - “Teratogenicity study of intermediate frequency magnetic field and the review of BEMS2012” by Dr. Akira Ushiyama (National Institute of Public Health)
  - “Terahertz spectroscopic imaging technology for medical application” by Prof. Hitoshi Tabata (The University of Tokyo)

1.4 Update on electromagnetic field issue

1) The draft of ICNIRP guideline “Draft guideline for limiting exposure to electromagnetic fields induced by movement of the human body in a static magnetic field and by time-varying magnetic field below 1Hz” was closed for public consultation in May, 2012. The final guidelines will be published in near future.

2) Ministry of Economy Trade and Industry, Japan introduced a regulation of power frequency magnetic field (50 and 60 Hz) generated from electric installations of utility company to protect general public from adverse health effects such as nerve stimulation. The regulation adopted the ICNIRP guideline (200 micro-T at 50/60 Hz) and came into force March 1, 2012.

3) Ministry of Land, Infrastructure, Transport and Tourism, Japan introduced a regulation of power frequency magnetic field (50 and 60 Hz) generated from fixed installations in railway field to protect general public from adverse health effects such as nerve stimulation. The regulation adopted the ICNIRP guideline (200 micro-T at 50/60 Hz) and came into force August 1, 2012.

2 Meetings

2.1 Past meetings

1) (Domestic) 2012 IEICE General Conference, Okayama, Japan, March 20-23, 2012
   http://www.ieice.org/jpn/event/program/2012G/index.html

2) (Domestic) 2012 IEEJ General Conference, Hiroshima, Japan, March 21-23, 2012
   http://www2.iee.or.jp/ver2/honbu/03-conference/12-taikai/index.html

3) 6th European Association on Antennas and Propagation (EuCAP2012), Prague, Czech Republic, March 26-30, 2012
   http://www.eucap2012.org/

4) ISMRM 20th Annual Meeting & Exhibition, Melbourne, Australia, May 5-11, 2012
   http://ismrm.org/12/
5) 7th ICNIRP International NIR workshop, Edinburgh, Scotland, May 9-11, 2012
   http://www.icnirp.de/NIR2012/NIR2012.htm
   http://www.kiees.or.kr/kjjc2012/
   http://www.apemc2012.org/
8) The 34th Annual Meeting of the Bioelectromagnetics Society, Brisbane, Australia, June 17-22, 2012
9) The 11th International Congress of Hyperthermic Oncology (ICHO) & The 29th Japanese Congress of Thermal Medicine (JCTM), Kyoto, Japan, August 28-31, 2012
   http://icho2012.umin.jp/
10) (Domestic) JBMES 2012, Osaka, Japan, September 7-8, 2012
    http://www.jbmtes2012.bpe.es.osaka-u.ac.jp/
    http://www.gakkai-web.net/gakkai/ieice/2012spro/index.html
12) EMC Europe, Rome, Italy, September 17-21, 2012.
    http://www.emceurope2012.it/
13) IEEE Life Sciences Grand Challenges Conference, Washington DC, USA, October 4-5, 2012
14) 7th International Workshop on Biological Effects of Electromagnetic Fields (7th IWSBEEMF), Malta, Greece, October 8-12, 2012

2.2 Future meetings
1) 2012 International Symposium on Antennas and Propagation, Nagoya, Japan, October 29 – November 2, 2012
   http://www.isap12.org
2) ICNIRP/WHO International Workshop on NIR in Medicine, Bonn, Germany, December 2, 2012
   http://www.icnirp.de/NIRmed/NIRmed.htm
3) (Domestic) 2012 IEICE General Conference, Gifu, Japan, March 19-22, 2013
   http://www.toyoag.co.jp/ieice/G_top/g_top.html
4) (Domestic) 2013 IEEJ General Conference, Nagoya, Japan, March 20-22, 2013
   http://www2.iee.or.jp/ver2/honbu/03-conference/13-taihai/index.html
5) 7th European Association on Antennas and Propagation (EuCAP2013), Gothenburg, Sweden, April 8-12, 2013
   http://www.euca2013.org/
6) ISMRM 21th Annual Meeting & Exhibition, Salt Lake City, USA, April 20-26, 2013
   http://ismrm.org/13/
   http://ursi-emts2013.org/
8) BioEM2013, Thessaloniki, Greece, June 10-14, 2013
   http://www.bioem2013.org/bioem2013/
3 Published papers by the member of Japanese URSI-Commission K (2011 Oct.-2012 Oct.)

3.1 Static, Low and Intermediate Frequency Field


Ueno S, [2012], “Biomagnetism—Past, Present and Future—“, Theme Keynote Lecture, World Congress on Medical Physics and Biomedical Engineering, T.08, Beijing, China, 26th-31st May.


3.2 Radiofrequency Field

Arima T., Watanabe H., Wake K., Masuda H., Watanabe S., Taki M., Uno T., [2011], "Local Exposure System for Rats Head Using a Figure-8 Loop Antenna in 1500-MHz Band", IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING, vol.58, no. 10, pp. 2740-2747.


Endo Y., Saito K., Watanabe S., Takahashi M., Ito K., [2011], "Experimental evaluation on SAR around the implanted cardiac pacemaker by mobile phone.", Proceedings of ISABEL2011, Oct.,


Kawai H., Wake K., Arima T., Watanabe S., [2011], "A head-local-exposure system for rats using a figure-8 loop antenna in the 2 GHz band", IEICE TRANSACTIONS ON


Onishi T., [2012], "AR variations in wireless data communication terminals caused by host devices", 34th BEMS Annual Mtg., PB-24, Brisbane, June 2012.


3.3 Medical application


Nakajima H, Takahashi M, Saito K and Ito K [2012] "Basic characteristics of RFID antenna for urination detection." Proceedings of International Conference on Modern Materials and


Sekino M, Tsugeki T, Ohsaki H and Kusakabe M [2012] "Numerical simulations of magnetic sensing systems for identifying sentinel lymph nodes." World Congress on Medical Physics and Biomedical Engineering, Beijing, China, 28 May.


