



Keynote Speech

Day 2: Wednesday, 24 Nov. 2010

Venue: Sicily Hall



Keynote Speech 3:

Small Antennas for Body-Centric Communications

Prof. Koichi Ito, IEEE Fellow and IEICE Fellow

Chiba University, Japan

11:05 ~ 12:00

In recent years, a study on body-centric communications has become an active and attractive area of research because of their various applications such as e-healthcare, support systems for specialized occupations, monitoring systems for elderly and handicapped people, entertainment, and so on. Whereas UHF bands are subjects of interest especially in Europe and USA, HF bands are of great interest especially in Japan and Korea. Hence, all of the prospective frequencies are in an extremely wide range, and an objective idea on how to select a right frequency band for individual applications is required. As for the antennas, many types of wearable (on-body) and implantable (in-body) antennas have been reported, and they should be as small as possible.

Currently in our laboratory, we have been studying on frequency dependence of basic characteristics of simple wearable antennas as well as body-centric wireless communication channels in the range of HF to UHF (3 MHz – 3 GHz). Also, we have been investigating numerically and experimentally thin implantable antennas in UHF band.

In this presentation, firstly, electric field distributions around the human body wearing a small top-loaded monopole antenna are numerically calculated and compared in a wide range of HF to UHF bands. Then, received open voltages at receiving antennas which are equipped at several different points on the human body are numerically investigated. The received open voltages are also numerically calculated and compared with several different postures of the human body. Finally, some basic performances of miniaturized thin implantable antennas are numerically calculated in UHF band. Experimental validation is also demonstrated.





About the speaker

Koichi Ito was born in Nagoya, Japan and received the B.S. and M.S. degrees from Chiba University, Chiba, Japan, in 1974 and 1976, respectively, and the D.E. degree from Tokyo Institute of Technology, Tokyo, Japan, in 1985, all in electrical engineering. From 1976 to 1979, he was a Research Associate at the Tokyo Institute of Technology. From 1979 to 1989, he was a Research Associate at Chiba University. From 1989 to 1997, he was an Associate Professor at the Department of Electrical and Electronics Engineering, Chiba University, and is currently a Professor at the Department of Medical System Engineering, Chiba University. From 2005 to 2009, he was Deputy Vice-President for Research, Chiba University. From 2008 to 2009, he was Vice-Dean of the Graduate School of Engineering, Chiba University. Since April 2009, he has been appointed as Director of Research Center for Frontier Medical Engineering, Chiba University. In 1989, 1994, and 1998, he visited the University of Rennes I, France, as an Invited Professor.

His main research interests include analysis and design of printed antennas and small antennas for mobile communications, research on evaluation of the interaction between electromagnetic fields and the human body by use of numerical and experimental phantoms, microwave antennas for medical applications such as cancer treatment, and antenna systems for body-centric wireless communications.

Professor Ito is a Fellow of the IEEE, a Fellow of the IEICE and a member of AAAS, the Bioelectromagnetics Society (BEMS), the Institute of Image Information and Television Engineers of Japan (ITE) and the Japanese Society for Thermal Medicine. He served as Chair of the Technical Group on Radio and Optical Transmissions, ITE from 1997 to 2001, Chair of the Technical Committee on Human Phantoms for Electromagnetics, IEICE from 1998 to 2006, Chair of the IEEE AP-S Japan Chapter from 2001 to 2002, TPC Co-Chair of the 2006 IEEE International Workshop on Antenna Technology (iWAT2006), Vice-Chair of the 2007 International Symposium on Antennas and Propagation (ISAP2007), General Chair of iWAT2008, Co-Chair of ISAP2008 and an AdCom member for the IEEE AP-S from 2007 to 2009. He currently serves as an Associate Editor for the IEEE Transactions on Antennas and Propagation, a Distinguished Lecturer for the IEEE AP-S, and Chair of the Technical Committee on Antennas and Propagation, IEICE. He has been appointed as General Chair of ISAP2012 to be held in Nagoya, Japan in 2012 and a member of the Board of Directors, BEMS.