THE 4TH INTERNATIONAL CONFERENCE ON
COMPUTER COMMUNICATION AND THE INTERNET

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Chiba Institute of Technology, Japan | 24th - 26th June 2022

Lecture by

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Modelling of Terahertz Antenna and Propagation Characteristics for Beyond 5G Mobile Communication

Terahertz (THz) wireless links, such as those in the 300 GHz band, is currently being considered as a means to achieve 100 Gbit/s data rate in the next generation mobile communications, Beyond 5G. In Beyond 5G, the use of THz wireless link is being considered in various fields, such as wireless backhaul/fronthaul, mobile access, and body area network (BAN) that connects wearable devices and smartphones. For the practical application of these use cases, it is necessary to construct a radio propagation models and antenna models in the 300 GHz band for the link budged analysis, and for the interreference evaluation between wireless stations. However, due to the difficulties of constructing wide dynamic range measurement system in the 300 GHz band and the need to obtain a license for an experimental radio station for outdoor experiments, experiments to evaluate antenna and propagation characteristics in the 300 GHz band have not progressed. We had obtained 300-GHz-band experimental radio station license in 2020, and have been conducting various radio propagation experiments to construct radio propagation models and antenna radiation pattern models for the promising use cases of THz wireless links, such as mobile wireless fronthaul/backhaul link, BAN to connect smartphone and wearable devices, and kiosk download system. In this presentation, we introduce our experimental results on 300-GHz-band antenna and propagation characteristics for the modelling of antenna and propagation characteristics.

About the author

Akihiko Hirata completed his B.S. and M.S. degrees in chemistry and Dr. Eng. Degree in electrical and electronics engineering from the Tokyo University, Tokyo, Japan, in 1992, 1994, and 2007, respectively. He joined the Atsugi Electrical Communications Laboratories of Nippon Telegraph and Telephone Corporation (presently NTT Device Technology Laboratories) in Kanagawa, Japan, in 1994, where he worked as a senior research engineer and supervisor. Since 2016, he has been a professor for Chiba Institute of Technology. His current research involves terahertz passive devices, ultra-broadband terahertz wireless systems, and millimeter-wave and terahertz imaging. He was awarded the 2002 Asia-Pacific Microwave Conference APMC prize, the 2004 YRP Award, the 2007 Achievement Award presented by the Institute of Electronics,

Information, and Communication Engineers (IEICE), the 2008 Maejima Award presented by the Post and Telecom Association of Japan, the 2009 Radio Achievement Award presented by the Association of Radio Industries and Businesses, the 2010 Foundation Award presented by the Hoso Bunka Foundation, the 2010, 2012, and 2013 Asia-Pacific Microwave Conference APMC prize, and the 2011 Commendation for Science and Technology from the Ministry of Education, Culture, Sports, Science and Technology. Prof. Hirata is a senior member of IEEE and IEICE.