VTC2016-Spring Best Paper Award

On May 17, 2016, General Director Takehiro Nakamura and Tetsuo Imai of 5G Laboratory, Research Laboratories at NTT DOCOMO, and Yuichi Kakishima and Haralabos Papadopoulasi from DOCOMO Innovations, Inc. were presented with the Best Paper Award at the 83rd IEEE Vehicular Technology Conference (VTC2016-Spring) held in Nanjing, China. The paper for which the award was presented was "5G 3GPP-like Channel Models for Outdoor Urban Microcellular and Macrocellular Environments" [1]. This paper is related to the 5th Generation mobile communications system (5G) evaluation channel model jointly developed with universities and external companies under the guidance of NTT DOCOMO (Aalto University, BUPT, CMCC, Ericsson, Huawei, Intel, KT Corporation, Nokia, NYU WIRELESS, Qualcomm, Samsung, University of Bristol, University of Southern California, AT&T).

The channel model models radio channel propagation characteristics required for designing mobile communications systems, and focuses on modeling modern characteristics such as channel latency, angle of departure/arrival and polarization in addition to channel loss. Models cited include the IMT Advanced Model standardized by the ITU-R as a 4th Generation (4G) model, and the 3D Channel Model standardized by 3GPP. New considerations for 5G include:

- Application of higher frequencies—Targeting frequencies from 6 GHz to 100 GHz in addition to existing frequencies
- Array antenna technology advancements—Support for Massive MIMO technologies etc.
- Diversification of system construction scenarios—scenarios including D2D (Device to Device) or V2V (Vehicle to Vehicle) for addition to existing scenarios, which were also studied as new requirements for the channel model

To efficiently develop a channel model for 5G systems, NTT DOCOMO has been driving studies with the above universities and companies over nearly two years since 2014. The results of these studies are summarized in the "5G Channel Model for bands up to 100 GHz" white paper [2]. This channel model is characterized by its high affinity with the existing 3GPP channel model and modeling based on lots of actual and simulation data from work done by partner universities and companies.

The paper for which this award was presented was appraised at VTC2016-Spring for its particular focus describing a model for outdoor urban macrocell and microcell environments from the aforementioned white paper. A model for indoor environments was also reported at IEEE ICC2016 [3]. Please refer to the white paper for details about these channel models.

References

[1] K. Haneda, L. Tian, Y. Zheng, H. Asplund, J. Li, Y. Wang, D. Steer, C. Li, T. Balercia, S. Lee, Y. Kim, A. Ghosh, T. Thomas, T. Nakamura, Y. Kakishima, T. Imai, H. Papadopoulas, T. S. Rappaport, G. R. MacCartney Jr., M. K. Samimi, S. Sun, O. Koymen, S. Hur, J. Park, C. Zhang, E. Mellios, A. F. Molisch, S. S. Ghassamzadeh and A. Ghosh: "5G 3GPP-like Channel Models for Outdoor Urban Microcellular and Macrocellular Environments," VTC 2016-Spring, May 2016.
http://arxiv.org/abs/1602.07533

[2] 3rd Workshop on Mobile Communications in Higher Frequency Bands (MCHFB): "White paper on "5G Channel Model for bands up to 100 GHz."
http://www.5gworkshops.com/5GCM.html

[3] K. Haneda, L. Tian, H. Asplund, J. Li, Y. Wang, D. Steer, C. Li, T. Balercia, S. Lee, Y. Kim, A. Ghosh, T. Thomas, T. Nakamura, Y. Kakishima, T. Imai, H. Papadopoulas, T. S. Rappaport, G. R. MacCartney Jr., M. K. Samimi, S. Sun, O. Koymen, S. Hur, J. Park, J. Zhang, E. Mellios, A. F. Molisch, S. S. Ghassamzadeh and A. Ghosh: "Indoor 5G 3GPP-like Channel Models for Office and Shopping Mall Environments," IEEE ICC2016-Workshop, pp.694-699, May 2016.