• News •

2015 Wireless Innovation Forum Technology of the Year Award

NTT DOCOMO Research Laboratories and DOCOMO Communications Laboratories Europe GmbH received the Wireless Innovation Forum's "2015 Wireless Innovation Forum Technology of the Year Award" for twoyear long endeavor beginning in 2013 to develop "METIS channel models" for the Mobile and wireless communications Enablers Twenty-twenty Information Society (METIS), an European research project on 5th generation mobile communications (5G) systems. Selected by members, this award is given to individuals or organizations for innovative products and technologies in the software radio and cognitive radio fields, and in this case, was awarded for contribution made to the development of the next-generation mobile communications (5G) by developing a new channel model to suit realistic scenarios and requirements. This model earned this award for its usefulness in promoting the development of next-generation radio technologies, as it enables next-generation radio device testing and optimization by targeting a wide range of frequency bands from those currently used for mobile communications through to those in the millimeter wavelengths. Development members other than the award winning channel model include Anite, Ericsson, Fraunhofer HHI, Nokia, Aalto University, University of Oulu and Elektrobit.

Channel model is made by modeling radio wave propagation characteristics required for designing mobile communications systems. In recent years, characteristics such as propagation delay, arrival direction and polarization in addition to propagation loss are modeled. Fourth generation (4G) models include the IMT Advanced Model standardized by the International Telecommunication Union-Radiocommunication Sector (ITU-R) and the 3D Channel Model standardized by the 3rd Generation Partnership Project (3GPP), while 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 in which large numbers of people gather er in one place such as open-air festivals or stadiums are added to existing scenarios.

These are also new requirements added in channel model. METIS channel models is developed in consideration of these aspects.

In METIS, two models with different approaches have been proposed. One is a "stochastic model" similar to the conventional statistical analysis of measurement data, while the other is a "map-based model" made by analyzing propagation characteristics by using structure data like ray tracing.

The stochastic model is constructed by newly making measurement and analyzing data to suit 5G requirements. Since the basic approach to modeling is the same, this model is characterized by its high affinity with 4G channel modeling. However, because this model uses statistical analysis of measurement data, it can only model the average characteristics of various scenarios. For example, it does not reflect spacial and temporal distributions of flows of people.

For this reason, the map-based model was developed. This model analyzes propagation characteristics by seeking paths between the transmitting and receiving stations using structure data. Although the use of structure data make this model more difficult to use than the stochastic model, by further defining obstacles such as people and vehicles in addition to structures such as buildings, this model has the advantage of enabling analysis of propagation characteristics that reflect spacial and temporal distribution of these obstacles. In addition, the map-based model offers a way to keep the amount of computation as small as possible despite the fact that seeking paths between transmitting and receiving stations by using ray tracing generally involves a lot of computation.

As discussed above, this channel model was developed in METIS and meets the requirements assumed for 5G, and its achievements have been evaluated and awarded by the Wireless Innovation Forum. Please refer to the METIS home page for more details about this channel model [1].

Reference

[1] METIS web site.



https://www.metis2020.com/