

Special Issue on
Channel Characterization and Modeling for 5G and Future Wireless System Based on Big Data

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Big Data is one of hottest research topics, which will greatly change the way we live and have received considerable attention in different applications. In various industries, the volume and scale of data increase exponentially. The rapidly expanding data brings great opportunities and profound changes to the world. Based on big data, we can extract the deep and potential relationship between different and irrelative cases, and hence we can make decisions better.

The emerging 5G combines Internet and Internet-of-Things (IoT), which brings a dramatic increase in the amount and type of wireless data. Deep knowledge of the vast amount of data residing in wireless systems can largely improve network design and service providing, which benefits users and operators. Mechanisms about radio propagation are the basis for the research of wireless channel modeling. In 5G systems, the bandwidth (over hundreds of MHz), central frequency (centimeter and millimeter wave band), amount of antennas (3-dimensional and massive MIMO), number of sensors (IoT), and application scenarios expand enormously compared with the 4G. The deep and precise characteristic properties reside in the vast amount of wireless channel big data, which makes conventional channel modeling methods intractable. By using the channel big data, we can depict the channel more accurately, and mine the deep fading properties of the 5G wireless channels which are never concerned.

As for IoT, the number of sensors exceeds 1 million/km² in 5G systems. Sensors are located everywhere (3 dimensions) in a typical scenario. The number of wireless links increases exponentially if considering communications between sensors, which make conventional characterization methods difficult to deal with. We consider that there are some new/improved measurement methods to probe the multiuser channel and some effective extraction technologies to parameterize the channel.

In response to such a need, this special issue aims to serve as a forum for the identification of problems and research trends, the dissemination of novel results and ideas, and the discussion of hot topics in the area of channel modeling and simulation for 5G systems using big data and other artificial intelligence theories. Prospective authors are welcome to submit original and high-quality papers in any of the topics of this special issue.

Potential topics include but are not limited to the following:

- ▶ Highly efficient channel sounding techniques and methodologies of establishing channel big data bank for 5G wireless channels
- ▶ Highly reliable, efficient, and accurate data mining techniques for 5G wireless channels, for example, data cleaning, dimensionality reduction, and high-resolution channel parameter estimation methods
- ▶ Intelligent modeling theory and simulation techniques based on channel big data for 5G wireless channels, for example, reconstruction of 3D propagation environments and mapping between the scatterer and the cluster of multipath components
- ▶ Channel characterization and parameterization using machine learning and deep learning theories
- ▶ Techniques of channel emulation and simulation based channel big data bank
- ▶ Characterization and simulation of rapidly time-varying channels for railroad communications and vehicular communications based on big data

Authors can submit their manuscripts through the Manuscript Tracking System at <https://mts.hindawi.com/submit/journals/wcmc/ccm5g/>.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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