Propagation channel models for next-generation wireless communications systems

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Abstract:

As new systems and applications are introduced for next-generation wireless systems, the propagation channels in which they operate need to be characterized. This paper discusses propagation channels for four types of next-generation systems: (i) distributed MIMO and Cooperative MultiPoint (CoMP), systems, which require the characterization of correlation between properties of links from a mobile station to different base stations or access points; (ii) device-to-device communications, where propagation channels are characterized by strong mobility at both link ends (e.g., in vehicle-to-vehicle communications), and/or significant impact of moving shadowing objects; (iii) full-dimensional MIMO, where antenna arrays extend in both the horizontal and vertical dimension, so that azimuthal and elevation dispersion characteristics of the channel become relevant, and (iv) millimeter wave WLAN and cellular communication systems, where the high carrier frequency leads to a change (compared to microwave communications) in which propagation processes are most relevant. For each of these areas, we give an overview of measurements and models for key channel properties. A discussion of open issues and possible future research avenues is also provided.