Initial Characterization of Massive Multi-User MIMO Channels at 2.6 GHz in Indoor and Outdoor Environments

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Abstract:

The channel properties have a large influence on user separability in massive multi-user multiple-input multiple-output (massive MIMO) systems. In this paper we present spatio-temporal characteristics obtained from massive MIMO channel measurements at 2.6 GHz. The results are based on data acquired in both indoor and outdoor scenarios where a base station equipped with 64 dual-polarized antenna elements communicates simultaneously with nine single-antenna users. In the outdoor scenarios the base station is placed at two rooftops with different heights and the users are confined to a five-meter diameter circle and move rando mly at pedestrian speeds. In the indoor scenarios, the users are located close to each other in a lecture theater and the base station is placed at various locations in the room. We report on the observed distribution of the delay spreads and angular spreads. Furthermore, the multi-user performance in terms of singular value spread of the MU-MIMO channel is also reported. Finally, statistics of the coherence time and coherence bandwidth of the propagation channel in various scenarios are given. The results are important for the design and analysis of massive MU-MIMO systems, as well as in the development of realistic massive MU-MIMO channel models.