Modeling time-variant fast fading statistics in indoor peer-to-peer scenarios

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Abstract:

Investigation of fast fading in indoor peer-to-peer networks based on radio channel measurements shows that Rayleigh or double-Rayleigh fading with or without line-of-sight (LOS) component can occur, depending on the mobility and on the scattering properties of the environment. Additionally, measurements show that the fading statistics change over time over time even for small-motions of the nodes, since the propagation environment is inhomogeneous. While in double mobile scenarios the predominant fading mechanism is a combination of Rayleigh and double-Rayleigh fading, Rician fading and fading events caused by combination of LOS and Double Rayleigh components are also occasionally observed. In single mobile scenarios, fading is Rician or Rayleigh distributed. We model these effects using a hidden Markov model, parameterized from our measurements. Eventually, we propose a simulation model generating fast fading realizations with geometry-based second order statistics and allowing to reproduce the measured first-order statistics for both types of mobility.