Paper ID: CS726 2024 International Conference on Applied Mathematics, Modeling and Computer Simulation (AMMCS 2024)

Evaluation of MIMO multipath fading channels based on the IEEE 802.11n channel models for indoor wireless local area networks

Trilochan PATRA[a*], Swarup Kumar MITRA [b]

[a] Dream Institute of Technology, Samali, Kolkata-700104 ,India

[b] Guru Nanak Institute of Technology, Kolkata-700114, India

*Corresponding author's email: trilochanpatra266@gmail.com

Introduction

- Cellular computer networks and future-generation cellular devices are thought to benefit greatly from the use of multi-antenna technology (WLANs).
- Compared to standard antenna systems, using multiple antennas offers increased transmission, durability, and range.
- Every antenna in a MIMO system has the capacity to simultaneously broadcast different signals inside the same bandwidth.

Research objectives

- The topic in this paper deals with the performance of a multi-input multi-output multi-path dissipating medium in indoor cellular computer network environments on the basis of the IEEE 802.11n channel model.

Methods

- Each tap is designed separately, making the energy azimuth spread (PAS) and the power delay spread (PDS) distinct.
- Each tap's PAS and Doppler spectrum can be separated; each tap's temporal correlation (represented by the Doppler spectrum) and spatial correlation (represented by correlation matrices) are modeled separately.
- Since the Kronecker's model for Rician mediums is used to describe each tap, it is assumed that the transiting and accepting parallel matrices for each tap are distinguishable.

Results

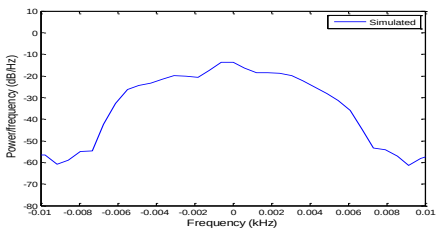

Figure1. Estimation of Welch power spectral density

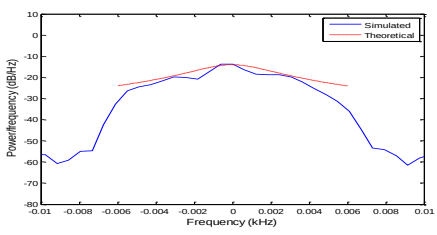

Figure 2. Estimation of Welch power spectral density for both simulation and theoretical

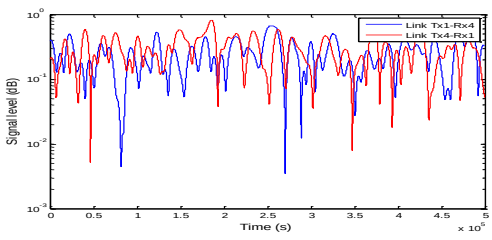

Figure 3. Dissipating covers for Tx1-Rx4 and Tx4-Rx1

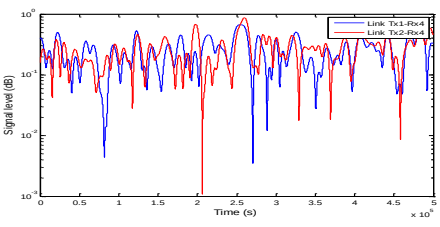

Figure 4. Dissipating covers for Tx1-Rx4 and Tx2-Rx4

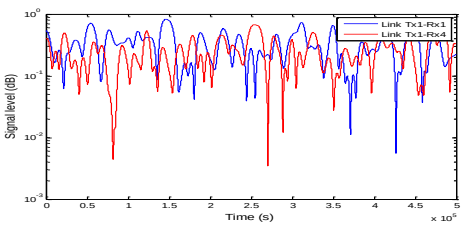

Figure 5. Dissipating covers forTx1-Rx1 and Tx1-Rx4

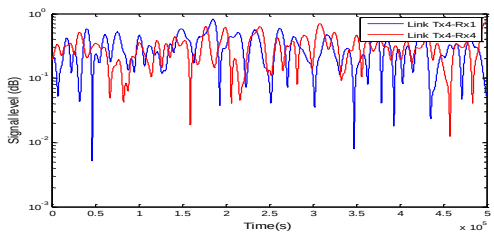

Figure 6. Dissipating covers for Tx4-Rx1 and Tx4-Rx4

Conclusions

- The Doppler range of the Tx1-Rx1 connection for the first route has been computed using composite route gain and is plotted in above Figure 1.
- Additionally, a favorable comparison between the theoretical and simulated values has been noted in above Figure 2.
- For each link receiver, a damping waveform envelope is plotted for route 1. An envelope fading correlation has been found.
- Figures 3, 4, 5, and 6 demonstrate that the Tx4-Rx4 connection produces superior outcomes to the other connections.

References

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