System Level Simulation of Urban Micro-cellular 4G Scenarios in the sub-6 GHz Frequency Bands

Rui R. Paulo and Fernando J. Velez

Instituto de Telecomunicações and Universidade da Beira Interior
DEM, Faculdade de Engenharia Covilha, Portugal
rrp@lx.it.pt; fjv@ubi.pt

Abstract—This work analyses the Ultra High Frequency (UHF) and Super High Frequency (SHF) bands performance in a Urban Micro-cellular (UMi) scenario. We consider the two-ray dual slope path loss model while extracting the performance metrics, exponential effective SINR mapping (EESM) and transport block size (TBS). This study of the EESM and TBS facilitates to understand the behaviour of the link state. Performance evaluation includes the analysis of the packet loss ratio, maximum number of supported users, goodput and delay. One can conclude that the performance at the 2.6 GHz frequency band is better than at the 3.5 GHz or 5.62 GHz ones for coverage distances, ranging from circa 40 up to 400 m radius. In fact, average supported throughputs near the maximum (of more than 16 Mb/s) are achieved for cell radii of circa 200 m and 250 m, at 2.6 and 3.5 GHz, respectively, and 400 m for the 5.62 GHz frequency bands.

Index Terms—Urban micro-cell, two-slope model, UHF/SHF, LTE-Sim, exponential effective SINR mapping, transport block size, system level simulation, line of sight, performance evaluation, small-cell networks.