

Macro-cell and Pico-cell Propagation in Heterogeneous LTE Networks using Measured Antenna Patterns and Handset Rotation

Author(s) - Institution(s):

Evangelos Mellios, UoBris
Zuhanis Mansor, UoBris
Geoffrey S. Hilton, UoBris
Andrew R. Nix, UoBris
Joseph P. McGeehan, UoBris

Corresponding author email: Evangelos.Mellios@bristol.ac.uk

Corresponding WG group: WG3

Abstract:

This paper studies the impact of antenna pattern and user handset random orientation on macro-cell and pico-cell propagation in heterogeneous LTE networks. The analysis combines measured 3D radiation patterns of basestations and handset antennas with state-of-the-art 3D ray-tracing for a large number of macro-cell and pico-cell basestations and user locations/orientations in an urban environment. Macro and pico propagation characteristics are presented as cumulative distribution functions of the received signal strength, the K-factor, the RMS delay spread and the RMS angle-of-departure and angle-of-arrival azimuth and elevation spreads. It is shown that using measured antenna patterns and considering the random user handset orientation has significant impact on the propagation characteristics of a heterogeneous LTE network.