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## Ray-Tracer Based Channel Characteristics for Distributed Massive MIMO

Massive MIMO systems promise remarkable capacity and spectral efficiency increases over conventional wireless techniques in multi-user setups. In a favorable propagation environment, the large number of base station antennas yields mutually orthogonal channels and therefore spatial separation of the user terminals. Distributing the base station antennas in space offers advantages over collocated antennas such as better channel separation and robustness against large-scale shadowing. We investigate the channel characteristics of a distributed MIMO setup by a ray-tracing simulation of a real-world urban scenario. The setup consists of three linear transmit antenna arrays with 96 antennas each and 129 receiver positions closely spaced on a  $\lambda/2$  grid. For favorable propagation evaluation of multi-user channels, a small subset of the receive antennas is considered. For evaluation of the electromagnetic field focusing, all receiver positions on the grid are taken into account what allows assessing the transmit power distribution in space. The paper concludes with remarks concerning opportunities and challenges for distributed antenna setups.

David Löschenbrand  
Markus Hofer  
Thomas Zemen  
AIT Austrian Institute of Technology  
Donau-City-Straße 1  
Vienna, Austria  
Phone: +43 50550 4138  
Fax: +43 50550 4150  
Email: {david.loeschenbrand.fl, markus.hofer, thomas.zemen}@ait.ac.at