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Title: Capacity Enhancement Using MIMO Antenna Arrays in Realistic Macro-Cellular Urban Environment

Source: Wireless Personal Communications, 55 (2): 201-224 OCT 2010

Language: English

Document Type: Article

Author Keywords: MIMO; Channel model; Antenna arrays; Water-filling

KeyWords Plus: MODEL

Abstract: In MIMO systems the antenna array configuration in the BS and MS has a large influence on the available channel capacity. In this paper, we first introduce a new Frequency Selective (FS) MIMO framework for macro-cells in a realistic urban environment. The MIMO channel is built over a previously developed directional channel model, which considers the terrain and clutter information in the cluster, line-of-sight and link loss calculations. Next, MIMO configuration characteristics are investigated in order to maximize capacity, mainly the number of antennas, inter-antenna spacing and SNR impact. Channel and capacity simulation results are presented for the city of Lisbon, Portugal, using different antenna configurations. Two power allocations schemes are considered, uniform distribution and FS spatial water-filling. The results suggest optimized MIMO configurations, considering the antenna array size limitations, specially at the MS side.

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Publisher: SPRINGER

Publisher Address: VAN GODEWIJCKSTRAAT 30, 3311 GZ DORDRECHT, NETHERLANDS

ISSN: 0929-6212

DOI: 10.1007/s11277-009-9795-z

29-char Source Abbrev.: WIREL PERS COMMUN

ISI Document Delivery No.: 652FS