



MC-CDMA VERSUS OFDMA IN CELLULAR ENVIRONMENTS (TueAmOR3)

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✳ Abstract :

In this paper, two candidates for a next generation (4G) downlink system in a multi-cell environment are studied in respect to their error performance. We investigate on the one hand, an orthogonal frequency division multiplexing (OFDM) based multiple access scheme (OFDMA), and on the other hand, a multi-carrier code division multiple access (MC-CDMA) scheme. The studies of both transmission schemes are done in a cellular structure. The cellular environment model takes into account path loss and shadowing depending on the position of the mobile terminal. To enhance the performance of OFDMA, we introduce a radio resource management (RRM). Error performances are given to compare the two multiple access proposals. The results show that OFDMA outperforms MC-CDMA at the edge of the cell for low resource loads by using the RRM. In the inner part of the cell, OFDMA can gain up to 0.5 dB at a target bit error rate of $10E-3$ in a fully-loaded system. For a not fully-loaded system, MC-CDMA surpasses the OFDMA performance by utilizing its whole diversity of used sub-carriers. In this scenario, MC-CDMA can even gain 2 dB compared to OFDMA.

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