

Mário Marques da Silva, Américo Correia, Nuno Souto, João C. Silva, Francisco Cercas, António Rodrigues "Interference Suppression consisting of Pre-Distortion Filtering and Beamforming with joint Transmit Diversity" – SEACORN Workshop on Simulation of Enhanced UMTS Access and Core Networks, Cambridge, UK, March 23, 2004;

Abstract: The purpose of the current paper is to combat both the MAI and fading, in the downlink direction. First, we propose a new pre-distortion (PD) filtering technique, which can be used to combat the Multiple Access Interference (MAI), combined the Selective Transmit Diversity (STD) for high data rate transmissions over frequency selective Rayleigh fading channels. The proposed PD scheme considers a RAKE in the receiver. By pre-distorting the signals to be transmitted by the Base Station (BS) with a Minimum Variance (MV) algorithm, the orthogonality between the desired signal and all interfering signals can be improved. With the PD, the increase in performance is achieved with a small increase in power processing at the BS, avoiding any need to increase complexity at the Mobile Station (MS). Second, we consider a combination of the Beamforming (BF) and Transmit Diversity (TD). The performances of space-time transmit diversity (STTD) in combination with STD, beamforming (BF) and beam selective transmit diversity (BSTD), which is a composite scheme of STD and BF, have been studied at the system level using BER as performance index. It is shown that the use of the proposed PD filter, alone or combined with the STD tends to achieve a performance improvement over the corresponding schemes without PD. A good alternative scheme for BSTD, BF and STTD+STD is the use of PD filter, which corresponds to a decrease in complexity.