Throughput Evaluation of the CDMA 2000 Systems

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ABSTRACT

The performance and throughput capacity of the third generation mobile radio communication system, cdma 2000, is investigated, where we emphasize the effect of dedicated physical control channels (DCCHs) on the system performance, and the capability of RAKE receivers in combating the multi-path fading. Firstly, the performance of the cdma 2000 system is analyzed in terms of outage probability, and the system capacity and throughput are evaluated according to an outage probability of 2%. Secondly, the capacity degradation due to the introduction of DCCHs is examined. Thirdly, the performance improvement due to the application of RAKE receivers in multi-path fading channels is considered. We found that the throughput without the DCCH loading was approximately the same irrespective of the transmission rates. When the DCCH loading was taken into account, the throughput for different transmission rates became different, where the higher transmission rate produced higher throughput. Under multi-path fading, in addition to the intercellular interference, there is intracellular interference as the multi-path components could not maintain orthogonality with the desire signal. The percentage capacity decrease were 50, 51%, 52%, 57%, 66%, 100% for R0~R6 transmission rate, respectively. With RAKE receivers and Maximum Ratio Combining, the percentage of capacity increase was 47%, 43%, 47%, 38%, 42%, 66%, 100% for R0~R6 transmission rate, respectively.

Keywords: cdma 2000; capacity; multi Carrier; outage probability; traffic loading


