

Performance Analysis of the TD-WCDMA Wireless System

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ABSTRACT

This thesis investigates the multiple access interference (MAI) and the interference time ratio. Moreover, we introduce a guard time to prevent the situation that the mobile station (MS) simultaneously transmits and receives data, where a TDMA frame is composed of only one transmission and one receiving time slots. Since the MSs are uniformly distributed within a cell, in the downlink side, the degree of interference is according to thesis respective position. We take two points at the cell boundary that are severely interfered to analyze the interference. We analyze system capacity based on the outage probability. Only the path loss and shadowing effect are considered in channel modeling, the effect of multipath fading is assumed to be equalized by signal processing or compensated by channel coding. We find that as cell radius is limited within 3750m, the other users will not interfere to the desired MS except that the neighboring base stations (BSs). Due to the constraint of cell radius, we found that the interference time ratio arises from neighboring BSs is quite small. However, when the cell radius exceeds the constraint, the MSs from neighboring cells will severely interfere the desired user. We observe that when the radius is 500, 5000, 10000m the capacity is 29, 26, 20 users, respectively. We conclude that the outage probability is highly correlated with cell radius when it exceeds 3750m.

Keywords : TD-WCDMA ; proportion of interfering time ; cutting off rate of communication, ; capacity ; cell's radius ; efficiency

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