PERFORMANCE ANALYSIS FOR MULTI-RATE TRANSMISSION IN W-CDMA

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ABSTRACT

THE COMMUNICATION PERFORMANCE OF THE MULTI-RATE TRANSMISSION SERVICE ON THE UP-LINK OF THIRD GENERATION OF MOBILE RADIO SYSTEM, NAMELY THE WIDE-BAND CDMA(W-CDMA) SYSTEM IS EVALUATED, WHERE THE PATH LOSS AND SHADOWING EFFECT IN THE MOBILE RADIO CHANNEL ARE CONSIDERED IN THIS THESIS. FIRST OF ALL , WE ANALYSIS THE INTRA- AND INTER-CELLULAR INTERFERENCE ACCORDING TO THE ALL THE POSSIBLE DATA RATES AND THEIR ASSOCIATE SPREADING FACTORS. FOR PERFECT POWER CONTROL, THE CAPACITY OF THE W-CDMA SYSTEMS IS DEVELOPED IN TERMS OF NUMBERS OF USER AND OUTAGE PROBABILITY. SECONDLY, ACCORDING TO A SPECIFIC COMMUNICATION QUALITY AND OUTAGE PROBABILITY, THE CAPACITY IS CALCULATED FOR THE SEVENTH DIFFERENT DATA RATE AND THEIR ASSOCIATE SERVICE ACTIVITY FACTORS (SAFS) WE FOUND THAT, THE VARIATION OF TELE-TRAFFIC IN THE SURROUNDING CELLS HAD SIGNIFICANT EFFECT ON THE CAPACITY OF THE LOW DATA RATE SERVICES. IT ALSO REVEALED THAT THE NUMBER OF USERS ACCOMMODATED IN A CELL DECREASED AS THE DATA INCREASED. FOR THE ZERO TO THE SIXTH DATA RATE HAVING A SAFS OF 0.38,0.2,0.2,0.1,0.1,0.05,0.05 RESPECTIVELY THE CAPACITY IS 147,152,66,58,20,15,4 USERS PER CELL. FINALLY, THE EFFECT OF THE IMPERFECT POWER CONTROL, DEDICATED PHYSICAL CONTROL CHANNEL (DPCCH) AND THE MULTIPLE PARALLEL DATA TRANSMISSION, A UNIQUE FEATURE IN W-CDMA ARE ANALYZED. IN IMPERFECT POWER CONTROL, WE FOUND THAT THE CAPACITY DECREASED AS THE STANDARD DEVIATION OF POWER CONTROL ERROR INCREASED, WHERE THE CAPACITY DEGRADATION BECAME NOT SIGNIFICANT AS THE DATA RATE INCREASED. WHEN DPCCH IS CONSIDER , THE NUMBER OF USERS BECAUSE 79,94,50,50,20,10,4 FROM THE FIRST TO THE SIXTH DATA RATE AND FOR SAFS OF 0.38, 0.2, 0.2, 0.1, 0.1, 0.05 ,0.05 RESPECTIVELY.

Keywords : W-CDMA ; multi-rate ; third generation of mobile radio system ; Dedicated physical data channel (DPDCH) ; Dedicated physical control channel (DPCCH) ; CDMA

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