POWER CONTROL IN CDMA SYSTEM

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ABSTRACT

THE POWER ESTIMATION AND POWER CONTROL IN W-CDMA RADIO SYSTEMS EMPLOYING ARRAY ANTENNAE ARE INVESTIGATED, AND THE ASSOCIATE SIMULATIONS ARE PERFORMED TO VERIFY THE SYSTEM PERFORMANCE. WE BEGIN WITH THEORETIC ANALYSIS OF THE ESTIMATION SCHEME FOR THE RECEIVED POWER UNDER MULTI-RATE TRANSMISSION, AND FOLLOW BY SIMULATION TO VERIFY THE PERFORMANCE OF THE ESTIMATION SCHEME AND TO EVALUATE THE PERFORMANCE OF THE FIXED STEP-SIZE POWER CONTROL SCHEME. AS THE RECEIVED BIT-ENERGY-TO-INTERFERENCE POWER SPECTRAL DENSITY (PSD) RATIO IS LOG NORMALLY DISTRIBUTED, THE STANDARD DEVIATION IS THEREFORE USED AS A CRITERION FOR EVALUATING THE SYSTEM PERFORMANCE. IN RECEIVED POWER ESTIMATION, THE MEAN OF THE RECEIVED BIT-ENERGY-TO-INTERFERENCE PSD RATIO FOR THE SINGLE-USER BEAM HAS AN ERROR OF 0.4 ~ 0.6 DB, WHICH IS IRRELEVANT TO THE AVERAGING PERIOD AND SPREADING FACTOR, WHILE THE STANDARD DEVIATION OF THE RECEIVED BIT-ENERGY-TO-INTERFERENCE PSD RATIO DECREASES AS THE AVERAGING PERIOD INCREASES. THE STANDARD DEVIATION IS 0.16~0.84 DB FOR AN AVERAGE PERIOD OF 1.625 MS. FOR MULTIPLE USERS IN A BEAM, THE NUMBER OF USERS HAS NO SIGNIFICANT EFFECT ON THE ESTIMATION PERFORMANCE. FINALLY, THE SIMULATION OF POWER CONTROL SYSTEM BY COMBINING THE PROPOSED POWER ESTIMATION AND POWER CONTROL SCHEME IS PERFORMED FOR A RAKE RECEIVER HAVING THREE TAPS, AND THE STANDARD DEVIATION OF THE RECEIVED BIT-ENERGY-TO-INTERFERENCE PSD RATIO IS LESS THAN 2 DB FOR A SPREADING FACTOR GREATER THAN EIGHT, WHILE THE STANDARD DEVIATION BECOMES 4.5DB FOR A SPREADING FACTOR OF FOUR.

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