Study on energy consumption and coverage of hierarchical cooperative of small cell base stations in heterogeneous networks

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***Abstract*— The demand for communication services in the era of intelligent terminals is unprecedented and huge. To meet such development, modern wireless communications must provide higher quality services with higher energy efficiency in terms of system capacity and quality of service (QoS), which could be achieved by the high-speed data rate, the wider coverage and the higher band utilization. In this paper, we propose a way to offload users from a macro base station(MBS) with a hierarchical distribution of small cell base stations(SBS). The connection probability is the key indicator of the implementation of the unload operation. Furthermore, we measure the service performance of the system by finding the conditional probability-coverage probability with the certain SNR threshold as the condition, that is, the probability of obtaining the minimum communication quality when the different base stations are connected to the user. Then, user-centered total energy consumption of the system is respectively obtained when the macro base station(MBS) and the small cell base stations(SBS) serve each of the users. The simulation results show that the hierarchical SBS cooperation in heterogeneous networks can provide a higher system total coverage probability for the system with a lower overall system energy consumption than MBS.**

***Keyword*— Cooperative Communication, Small Cell Base Stations, Energy Consumption, Heterogeneous Network, Offloading.**

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