INTERFERENCE INVESTIGATION OF UMTS FEMTOCELL NETWORKS

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ABSTRACT

Wireless data traffic has been increasing significantly in recent years. In order to meet demands for mobile broadband services, we must improve quality of services, data rates and capacity of network systems. There are some solutions is considered, the reduction of cell size is the most effective solution. However, this solution may cause the increase of cost since more infrastructures is needed. Femtocell may be good solution for our network systems. Femtocell is used to improve coverage and provide high data rate in indoor environment. Unfortunately, it also has some drawbacks such as femtocell may cause interference to other femtocells or to the macrocellular wireless network. Therefore, investigating and analyzing interference in network systems including femtocells and macrocells is very important.

In this thesis, I supposed three network models containing Femtocell Access Point (FAP), Macrocell Base Station (Macro NodeB), User Equipment (UE) and based on the simulation, I analyze and investigate the interference between macrocell and femtocells under three scenarios. Specifically, in the first scenario, I analyze and evaluate the effect from the downlink of macrocell caused to the femtocell receiver, from that we can find the maximum range of the femtocell at which the UE can detect and decode the femto beacon and connecting to it. In the second scenario, I focus on evaluation the influence from the uplink of Macrocell User (MUE) caused to the received SINR (Signal plus Interference to Noise Ratio) of Femtocell User (FUE) from FAP and calculating the minimum transmitted power of FUE need to maintain the uplink connection between the FUE and femtocell. The final scenario, I investigate the effects of the numbers of Femtocell caused to MUE based on the received SINR of MUE. Experimental results show the big effects of signal interference between macrocell and femtocells, thus we need more effective solutions to manage interference between them.

Keywords: *Femtocell, Macrocell, Interference.*