

AN
ADAPTIVE POWER CONTROL MECHANISM IN
FEMTOCELL LTE NETWORK

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ABSTRACT

The increase in capacity and system data rate may lead to capacity problems and hence become one of the crucial issues of any Mobile Communication Networks. Although the Long Term Evolution (LTE) is called as 4th Generation of the Mobile Cellular Communication Network, it can no longer solve the problem regarding the capacity of the cell. Deployed femtocells in macrocell are one of the efficient technologies to improve the performance of mobile services in high traffic congested areas. Femtocells, also known as home base station, are cellular network access points that connect standard mobile devices to a mobile operator's network using residential Digital Subscriber Line (DSL), optical fibres, cable broadband connections or wireless last-mile technologies. It is fully user deployed and can set it by themselves thereby reduce maintenance and operating costs of the operator and at the same time providing better Quality of Service (QoS) to end users. This thesis presents the 3rd Generation Partnership Project (3GPP) LTE Power Control mechanism applying to the LTE femtocells for maximising system performance by adapting LTE Fractional Power Control (FPC) scheme on the environment and propose new Open Loop Uplink Power Control (OLUPC) techniques for LTE femtocells environment. A Simulation-based PC program is made to analyse the performance of the LTE femtocell power control schemes. The simulation results indicate the propose scheme is advantageous and can control the transmit power of the UE in femtocell along with the SINR (Signal to Interference plus Noise Ratio) as compared to the conventional open loop power control.

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CHAPTER 1

INTRODUCTION

1.0 Introduction

In telecommunications, LTE is an evolution of the GSM/UMTS standards and one of the wireless data communications technologies in the world. LTE is being developed by the 3GPP standards body that is also responsible for GSM and W-CDMA. The 3GPP unites 6 telecommunications standards bodies, ATIS USA, ARIB Japan, TTA Korea, CCSA China, TTC Japan and ETSI Europe and known as Organizational Partners. They provide their members with a stable environment in order to produce the highly successful Reports and Specifications that define 3GPP technologies. Since Femtocell LTE is the leading next generation wireless system, hence it is the reason why this network has been chosen in this project. By referring to Figure 1.0, we can see how the architecture of UMTS 3G has evolved in this LTE network. From this figure, it can clearly be seen that the architecture of LTE network has been simplified which have only E-UTRAN NodeB (eNB) and Mobility Management Entities (MME).