

UNIVERSITI TEKNOLOGI MARA

HANDOVER PROCEDURE BETWEEN
MACROCELL AND FEMTOCELL IN LONG
TERM EVOLUTION (LTE) NETWORK

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ABSTRACT

Femtocell is a small base station that deployed in homes, buildings or other locations and designed to improve indoor capacity and signal coverage, and also reduce the macrocell traffic. Femtocell becomes a solution for indoor capacity and coverage issues. Frequent and unnecessary handover is another issue in femtocell network. The UEs with various velocities moving through the femtocell usually lead problem and perform some frequent and unnecessary handovers especially for high speed users. These cause the reduction of the system capacity and the QoS level. In this project, handover algorithm between macrocell and femtocell has been proposed and developed based on User Equipment (UE) velocity and Receive Signal Strength (RSS). The proposed handover algorithm divide into two parts which is handover from macrocell to femtocell (hand-in) and handover from femtocell to macrocell (hand-out). This proposed algorithm was developed and simulated to evaluate the performance of handover procedure in order to minimize an unnecessary handover, enhance the system capacity and improve the user's QoS level in the femtocell networks. Simulation results show the proposed algorithm gives the better simulation result and achievement to minimize an unnecessary handover and also decrease the number of handover failure. The handover procedures between macrocell and femtocell by using proposed scheme are efficient and reliable compared to conventional handover. The optimization of handover procedure and algorithm will improve the performance of both femtocell and LTE networks.

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CHAPTER 1

INTRODUCTION

1.1 Background

World today witnessed rapid developments and changes in telecommunications technology. Telecommunication is a rapidly growing field and continues to grow in the years to come. Various innovations produced so as to enable communication and human interaction faster and able to go beyond the confines of time and place. Integrating information technology and telecommunications world produce speedier development of advanced technology that brings the world into the new century based on information technology. Nowadays, modern telecommunications include phone, Internet, 3G (3rd Generation), 4G, LTE, LTE-A, WiFi (wireless-fidelity) are sophisticated medium to connection between humans and consolidation of all information.

The development of telecommunication and wireless technology continues to evolve, especially in the technical issues such as mobility issues, the higher demand for data transfer, the demand of an optimization of radio frequency spectrum as a limited resource and others. The experts and researchers in the field of telecommunications are constantly developing technologies trying to address the challenges and needs, both in terms of modulation techniques, access techniques, and a variety of other techniques.