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

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This thesis is presented in partial fulfilment for the award of the

Bachelor of Engineering (Hons) Electronic Communication

Universiti Teknologi Mara (UiTM)

FACULTY OF ELECTRICAL ENGINEERING

UNIVERSITI TEKNOLOGI MARA

JULY 2013

ACKNOWLEDGEMENT

First of all, I would like to thank Allah S.W.T for blessing me and giving me a good health during the completing of this Final Year Project report. I would like to give a million thanks to my project supervisor, Dr. Azita Laily Binti Yusof for her patience, guidance, knowledge and moral support all this while until I manage to complete this project successfully. Not to forget, special thanks to my parents for their support and encouragement to complete this project.

I would also like to thanks to all my friends for the sharing of knowledge and advice. Without their help and support, it would be hard for me to do this project successfully. Thank you for being my good friends and a good listener during my hardest time.

My gratitude also goes to all my family members who have always be by my side from the beginning until now. Thank you so much.

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JULY 2013

ABSTRACT

Long Term Evolution (LTE) is a new technology which is moving forward from the cellular 3G services. LTE is expected to reduce delays, increased user data rates, increased cell-edge-bit-rate and smoothen mobility with deployed Home eNodeB (HeNB). Femtocell which is also known as home base station is a small cellular base station. It is design to improve coverage and the capacity of the mobile network. However, because of huge number of femtocells deployment randomly in a macrocell area, this scenario can cause unnecessary handover. Therefore, an effective solution of these problems is needed to improve the performance of femtocell network. This paper proposed a handover procedure between macrocell and femtocell which it is divided into two cases. First is hand-out handover and second is hand-in handover for Closed Subscriber Group (CSG) user. Three parameters are considered in this paper which is velocity, Receive Signal Strength (RSS) and bandwidth. The results show that as the number of user increases, the number of handover is incrementing for both low and high speed. Second finding shows that this proposed procedure is able to reduce the number of unnecessary handover. This can be proven with the result which shows numbers of dropped call are decreasing when the user moved to high speed. Another result shows that by incrementing the number of femtocell in the macrocell, it will increase the number of handover.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

In this modern technology, the capacity demands in telecommunication networks are increasing tremendously. People nowadays used this network not only for voice call services but more to the internet services such as web surfing, video streaming and downloading by using their cell phones. All of these services require large amount of data to the network. With the existing of new technology, user's expectations will be high too.

Long Term Evolution (LTE) is the latest technology which is moving forward from the cellular 3G services. The standard of LTE is developed by the 3rd Generation Partnership Project (3GPP). LTE is a radio access which is known as Evolved UMTS Terrestrial Radio Access Network (E-UTRAN). It is a complete new technology [13].

Macrocell is a cell that provides the radio coverage for mobile phone which is served by a high power cellular base station. Coverage that is provided by macrocell is much larger than microcell. Macrocell provide radio coverage over different distance depend on the frequency capacity and clutter. The term macrocell is to describe the widest range of the cell sizes. Macrocell can be found in rural areas or along highway. With different characteristics between femtocell and macrocell, interference and unnecessary handover might occur. In order to have smooth mobility between femtocell and macrocell, appropriate handover procedures are needed.

Femtocell is also known as home base stations. It is a small cellular base station which is designed to use in subscriber's home, small enterprise, or outdoor areas. Femtocell connects the operator's network using available broadband connection such as cable or Digital Subscriber Line (DSL) [2]. It has several characteristics such as small communication range, low power, low cost and improves network capacity.