

**PERFORMANCE ANALYSIS OF POWER CONTROL  
FOR MINIMIZING INTERFERENCE ON LTE-A  
FEMTOCELL**

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## ABSTRACT

The increases of user network today may lead to the capacity degradation and problems hence become the major issue that must be concerned in Mobile Communication Networks. Even though the Long Term Evolution - Advanced (LTE-A) well known as the 4th generation of the Mobile Cellular Communication Network, it could not longer to solve the problems regarding capacity of the cell network. In fact that networking is an important thing to the world today. Femtocell deployment is considered to be the most efficient way to improve the capacity of cell and performance of mobile service especially in high traffic user at urban area. However, the radio signal interferences were occurs in Macrocell that cause the capacity degradation in LTE-A Femtocell. Therefore, minimizing the interference in LTE-A Femtocell power control technology is necessary. The objective of the research is to analyse power control for minimizing the interferences applying on LTE-A Femtocell. The method is by adapting the LTE-A Fractional Power Control (FPC) scheme to the LTE-A environment and proposing new Open Loop Uplink Power Control (OLUPC) technique for LTE-A Femtocell. The program is based on MATLAB simulation. From the compared simulation results the stable Signal to Interference plus Noise Ratio (SINR) performance is recommended for the proposed scheme.

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# CHAPTER 1

## INTRODUCTION

### 1.0 Introduction

In telecommunications, LTE-A is a term for Long Term Evolution – Advanced. It is most familiar to known as wireless data communications technology and an evolution of the GSM/UMTS standards. LTE-A was being developed by the 3<sup>rd</sup> Generation Partnership Project (3GPP) standards organization Release 10 that was responsible for GSM and W-CDMA standards [5]. The 3GPP standards were standardize 6 telecommunications standards organizations such as CCSA China, TTA Korea, ARIB Japan, TTC Japan, ETSI Europe and ATIS USA. They are also known as Organizational Telecommunications Standard Partners and provide their members with the safety environment to produce the highly successful Reports and Specifications for 3GPP technologies. Telecommunication Industries nowadays are involved a lot of innovations to meets the demand for wireless services started with the analog cellular network that was introduced almost 30 years ago until the latest technology today. The main goal of LTE-A was to improve the network coverage, capacity user and speed of the wireless data to ensure the user fairness.

LTE-A was designed to provide up to 10 times the speeds of 3G networks for mobile devices such as wireless hotspot, smartphone and broadband. One of the important LTE-A benefits was their ability to take advantage of improvement topology network, whereas optimized heterogeneous network with a mix of Macrocell to more lower power nodes such as Picocell, Femtocell and news Relays nodes. It introduces