

**PERFORMANCE ANALYSIS OF DOWNLINK SCHEDULING
IN 3GPP LTE SYSTEM**

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ABSTRACT

In this report an overview of the Long Term Evolution (LTE) is presented. LTE is the new revolution of wireless technology especially in cellular 4G services. The service allows mobile users to access Internet through their devices. LTE intends to deliver higher speed data and multimedia services for the next generation. In coming years, LTE technology will be widely used by people on their devices such as notebooks, smartphones, gaming devices and video cameras.

LTE technology is based on 3GPP standard and provides downlink speed up to 150 megabits per second (Mbps) and an uplink speed of up to 50 Mbps, and both using 20 MHz bandwidth. LTE is the new way for cellular communications to operate at higher data rate, achieving 100 Mbps or faster. LTE also supports a low latency of 10ms round-trip delay, improves system capacity and coverage and reduces operating costs. Furthermore, it supports Multiple Input Multiple Output (MIMO) and allows continuous integration with existing systems.

A scheduler assigns the shared resources (time and frequency) among users terminals. In this thesis, the focus is on the downlink scheduling. The Round Robin, Best CQI and Proportional Fair scheduling algorithm have been considered in this report. All the implementation, analysis and comparison of these scheduling algorithms were done through simulations executed on a MATLAB-based downlink link level simulator, Vienna LTE Simulator.

The main role of this thesis work is to compare the performance of LTE with different scheduling strategies in terms of throughput, packet loss rate and fairness.

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Table of Contents

APPROVAL

DECLARATION

ABSTRACT

ACKNOWLEDGEMENT

ABBREVIATIONS

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION

1.1 Background 1

1.2 Problem Statements 3

1.3 Objectives 4

1.4 Thesis scope 5

2 LITERATURE REVIEW 6

3 OVERVIEW OF 3GPP LTE TECHNOLOGY

3.1 LTE Architecture 10

3.1.1 Radio Access Network (RAN) 12

3.1.2 E-UTRAN 12

3.1.3 Core Network (CN) 13

3.1.4 User Equipment (UE) 15

3.2 LTE Specifications 16

3.3 Spectrum Flexibility 17

3.4 LTE Downlink

3.4.1 OFDM 18

3.4.2 Frame Structure 21

3.4.3 Resource Block 22

3.5 Downlink physical resource 23

3.6 Downlink transport channel processing 25

3.7 Downlink reference signal 28

CHAPTER 1

INTRODUCTION

We will start this chapter with the introduction to the 3GPP LTE. Then, we present the background of the project which is presented in section 1.1. The objective of the project is stated in section 1.3. Finally the last section gives the thesis scope and outlines.

1.1 BACKGROUND

Recently, the world was introduced to the mobile broadband. Multimedia applications through the Internet have become a trend and gathered more attention. Applications such as live video streaming, online gaming, mobile TV require higher data rate. The Third Generation Partnership Project (3GPP) started to work on the solutions to these challenges and came up with the High Speed Packet Access (HSPA). The HSPA is currently used in 3G phones for such applications. Later, the 3GPP has worked on the Long Term Evolution (LTE) and intends to surpass the performance of HSPA. Thus LTE will enhance applications such as online gaming and broadcast services. It is expected that in 2014, 80% of broadband users will be mobile broadband subscribers and they will be served by HSPA and LTE networks [1].

The 3GPP is the standard-developing body that specifies the 3G UTRA and GSM systems. LTE was developed by the 3GPP defined as the evolution of 3G of mobile communication system. It was released in the 4th quarter of 2008. LTE is designed to meet carrier needs for high-speed data and media transport as well as high-capacity voice support well into the next decade. It encompasses high-speed data, multimedia unicast and multimedia broadcast services. Although technical specifications are not yet finalized, significant details are emerging.

In December 2008, the LTE specification was published as part of Release 8. The first release of LTE namely release-8 supports peak rates of 300Mb/s, a radio-network delay of