

## **ABSTRACT**

Long Term Evolution (LTE) scheduling is responsible for achieving the transferring rate standard of 3GPP (3<sup>rd</sup> Generation Partnership Project). This standard requires LTE to have a downlink speed of 100 Mbit/s and uplink speed of 50 Mbit/s. This LTE system is also designed to serve 200 users per eNode-B cell with a short latency of about 10ms. Therefore, in LTE cellular network scheduling algorithm to improve throughput and fairness is required.

This thesis is to improve throughput and fairness by integrating the scheduling algorithm with HARQ process. The Redundancy Version (RV) obtained from HARQ process was integrated with the service priority value and Channel Quality Information (CQI) to get one metric value which was then used to decide the packet priority in scheduling process. Scheduling algorithms used in this thesis were Round Robin (RR), Maximum C/I (CI), and Proportional Fairness (PF). The HARQ process in the receiver carried out both Error Detection (ED) and Forward Error Correction (FEC) in the received packet. The User Equipment (UE) sent feedback to the eNode-B containing information whether the packet was received correctly or not. The 3GPP standard did not have any standardized scheduling algorithm in LTE system yet. Therefore, it was free to select and

modify the scheduling algorithm to achieve the expected QoS (Quality of Service).

The results of this study revealed that each scheduling algorithm (RR, CI, and PF) integrated with CQI, data packet rank, and RV value improved the throughput fairness. Jain's Fairness Index as the parameter for throughput fairness resulted from the integration was higher than those which did not consider the RV parameter. Scheduling algorithm with integrated HARQ was user's throughput-adaptive.

Key words: scheduling, HARQ, LTE, Round Robin, Maximum C/I, Proportional Fairness, throughput, fairness.