## Investigation & Performance Analysis of Downlink Radio Resource Allocation Techniques in LTE-Advanced

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## ABSTRACT

The present thesis work is based on investigation & performance analysis of scheduling schemes/algorithms in LTE -A (Long Term Evolution - Advanced) networks. LTE is an evolution version of UMTS (Universal Mobile Telecommunications System) which has been standardised in Release 8 by the 3GPP (3rd Generation Partnership Project) to promote the development of very high data rates wireless broadband networks. LTE facilitate mobile devices such as smartphones, tablets, laptops, etc. to access high speed internet. The LTE networks operating bandwidths range from 1.4MHz to 20MHz. International Mobile Telecommunications-Advanced (IMT Advanced), defined by (ITU) for 4G systems, requires that mobile communication systems meet a requirement of a downlink peak data rate of 1 Gbps and an uplink peak data rate of 500 Mbps. To achieve the peak data rate required by IMT-Advanced, LTE-A under the (3GPP) specifies that user equipments (UEs) should support bandwidth up to 100 MHz. Scheduling is essentially a task of making decisions by a scheduler in base station about the allocation of time & frequency resources in a network among user equipments (UEs). This thesis work includes the performance analysis of different LTE schedulers consisting of Round Robin, Best CQI and Proportional Fair scheduling algorithms. The performance analysis of the scheduling algorithms has been conducted through MATLAB based simulations in LTE-A downlink system level simulator from University of Vienna. The investigation of the impact of the scheduling algorithms reveals that the Best CQI scheduler is very good in terms of providing very high UE and network throughput, however, it lacks the fairness among all the users. Round Robin & Proportional Fair schedulers are good in terms of fairness, however, the UE & cell throughput is quite less in comparison to Best CQI scheduler. Further, the Proportional Fair scheduler is better than Round Robin scheduler as the performance of Proportional Fair schedulers at cell edge is almost double than Round Robin and have higher cell edge & overall throughput. The fairness index of PF scheduler is also 10% better than RR scheduler.