ABSTRACT

With the ever increasing number of wireless communication networks, the current technologies are no longer able to keep up with the demands of the subscribers who continually ask for a better service, such as higher data rate, less interference, among others. These reasons lead to the development of 4G LTE, which is among the most modern wireless technologies that provide the requirements of the users, and it is the core of this study.

The newness of 4G LTE means that it has a large limit for research and development. We focused in this thesis on two main objectives, these are increasing throughput and capacity. To accomplish these objectives, we proposed two main methodologies. The first method is a new developed technique for assigning a Physical Cell Identification (PCI) for each sector in a way that ensures that each PCI value is unique to the sector and is not duplicated. The second proposed methodology is suggesting a procedure that gives an optimum network distribution with the least number of eNodeBs using Atoll, which is advanced industrial software used for designing real world scenario wireless communication networks.

Throughout our research and simulations, we saw that our proposed technique for PCI assignment resulted in a significantly lower interference between sectors. On the other hand, we proved through our results that the network subscriber has become able to obtain higher power, which leads to higher throughput and a better performance from the network. This work was conducted in real world using technological equipment supplied by Mada telecommunications company and was analyzed in their laboratories. This thesis work is an empirical work, which can be followed up by further research propositions.