ABSTRACT

The growth of broadband services in mobile networks has led to a demand for data with faster and better quality transmissions. The mobile network technology called LTE (Long Term Evolution) or fourth generation (4G) came up with the objective of attending this demand for wireless access to services such as Internet access, online games, VoIP and video conferencing. LTE is part of the specifications of 3GPP Releases 8 and 9 operating in all-IP networks and providing transmission rates above 100 Mbps (DL), 50 Mbps (UL), low latency (10 ms) and compatibility with previous versions of mobile networks, 2G (GSM / EDGE) and 3G (UMTS / HSPA). The TCP protocol designed to operate in wired networks presents poor performance over wireless channels such as mobile cellular networks, due mainly to the characteristics of selective fading, shadowing and high error rates coming from the air interface. As all losses are interpreted as caused by congestion the protocol performance is bad. The objective of this dissertation is to evaluate the performance of several types of the TCP protocols through simulations, under the influence of channel interference between the mobile terminal (UE - User Equipment) and a remote server. For this, the NS3 (Network Simulator version 3) software and the protocols TCP Westwood Plus, New Reno, Reno and Tahoe were used. Results have shown that the TCP Westwood Plus protocol has a better performance than others. The New Reno and Reno TCP protocols had similar performance due to the proposed interference model, which has a uniform distribution and so the possibility of loss of consecutive bits is low on the same transmission window. TCP Tahoe, as expected has shown the worst performance among all because it does not have the fast recovery mechanism and its congestion window keeps coming back to one segment after a timeout. It was also observed that the delay has a greater importance in the performance of TCP when comparing with the bandwidth of the access and backbone links importance, once in the tested scenario the bottleneck was present in the air interface. The simulation performed with noise in the Air Interface, introduced by the NS3 fading script, showed that the RLC AM (acknowledged mode) had a better performance than the RLM UM (Unacknowledged mode).

Keywords**:** LTE, TCP/IP, NS3, Performance Analysis.