

## ABSTRACT

*Third Generation Partnership Project (3GPP) and other different cellular network standardization organizations have started working on developing global standards for supporting Machine-to-Machine (M2M) over existing mobile networks. LTE Advanced is the first wireless system to standardize the constraint of latency and traffic policies for M2M applications. The emergence of the Internet of Things (IoT) introduces a vast ecosystem of new network-enabled objects. Although most current cellular IoT services run over 2G and 3G cellular networks, the Long Term Evolution (LTE) is expected to be one of the main platforms for the emergence of new Machine to Machine (M2M) communication systems. Cellular communication protocols were designed and optimized to handle human-originated communications.*

*3GPP has identified Random Access Channel (RACH) overload as the critical problem in cellular M2M. RACH is the first channel initially used by Mobile Station (User Equipment (UE) in LTE) or M2M device to the accessed cellular network (from 2G through to LTE(4G)). Also, 5G networks are expected to have similar RACH structure and access techniques to its predecessors. RACH, as the first link to the cellular network, is an imperative channel which is organized into frames and slots where access attempts are only allowed in slots.*

*In this paper, I am evaluating the delay that a device may undergo while accessing an LTE network in the case of a massive number of access requests in a real deployment. In particular, address a Smart City scenario using one of the most accurate open-source system-level network simulators, network simulator 3. We found that the current implementation of the RA procedure in ns-3 is idealized; therefore, we developed a patch to make the routine suitable to study the impact of M2M traffic in LTE networks in urban scenarios. Simulation results show calculate of delay toleran, throungput and random access from LTE network to M2M in Random Access Procedure*

*The simulation results obtained that the RACH will affect most of the QoS parameters. That is caused by the addition of simulation delay time to do the RACH Preamble process to get Contention Resolution.*

**Keyword : M2M, LTE, UE, RACH, NS 3.24 Simulator**