# *ABSTRACT*

*Wireless Sensor Network* is one of the most rapid developing technology in information and telecommunication technology industries. Internet of Things triggering wireless sensor technology development to be used in many sectors mainly for everyday use such a smart home system. However, there are many challenge for wireless sensor technology to be implemented for every day use.

The number of *nodes* that will be implemented in the network will be calculated to sum the power consumption of the network itself. Though, a power efficient network should be deployed then network lifetime is also guaranteed. The 802.15.4 communication standard now is used to develop a wireless sensor network, this standard can stand the regulation of a low power, low bandwidth and lossy communication being implemented.

In this research, the superiority of 802.15.4 standards and its following protocol will be examined by simulating Telkom Akses smarthome prototype with CoAP and MQTT-SN as upper layer protocol and increasing number of nodes to compare, starts from 5,8 until 10 nodes in the simulation. The simulation is conducted using Cooja network simulator and there will be *delay, throughput, packet received* and *power consumption* analysis after the simulation run.

The result shows MQTT-SN protocol is performing better than CoAP protocol to fulfill a better environment for the wireless sensor network. MQTT-SN could run in a low bandwidth environment and use less power than CoAP protocol, with a total average delay of 0.09386 second, total average throughput of 8.45013 Kbps, total average of packet received of 35.79073 Bytes, and the total average of power consumption of 7.66233 mW.

**Keywords :** 802.15.4, CoAP, MQTT-SN, Simulation, Wireless Sensor Network