ABSTRACT

The use of wireless sensor network technology and also machine to machine (M2M) continues to grow today. And to support those needs, wireless networks also continue to grow. In telecommunications equipment networks a station is limited to resources such as wide coverage areas, and battery power. IEEE 802.11ah is the standard that is present to answer these challenges because it supports wireless networks with many devices, wide coverage areas, and low energy. In 802.11ah there is a RAW (restricted access window) mechanism that supports the efficiency and energy used by stations.

In this final project, the writer analyzes the addition of station in 802.11ah with changes in RAW (restricted access window), namely the RAW group, timeslot, slotnum and RAW station to find out the best setting for improving network performance. The simulation is using Network Simulator 3 with output parameters namely throughput, delay, energy consumption and packet loss on access point (AP) side. The simulation will be done with three station scenarios which will be analyzed separately, the first scenario is when there is an addition of station when the station are stationary and moves with Random direction mobility. The second scenario is the change in RAW (restricted access window) when the station are stationary, and the third scenario is the change in RAW (restricted access window) when the station are moving with Random direction mobility.

The results of this final project indicate that the performance on 802.11ah is getting better with changes in RAW and the network performance decreases with increasing stations. In the scenario of an increase in station with station station conditions obtained an average throughput of 0.146 Mbps, an average delay of 4,514 milli second, an average PLR of 14% and an average energy consumption of 7.114 Joules. Whereas when moving random direction, the average throughput obtained is 0.145 Mbps, the average delay is 4,724 milli seconds, the average PLR is 18% and the average energy consumption is 7.128 Joules. The addition of stations that still provide good performance especially the aspect of packet loss ratio is under 80 stations.

In the stationary station scenario, the best average throughput is obtained when using RAW group 2 which is 0.172 Mbps, the best average delay at timeslot 0.0035 seconds with 3,247 milliseconds, the best average packet loss ratio when using RAWsta 100% with 13%, and the best average energy when RAW slot 3 with 7, 078 joules. Whereas when the station scenario moves, the best average throughput is when the RAW group 10 is 0.174 Mbps, the best average delay is at timeslot 0.0035 seconds with 3,223 milliseconds, the best packet loss ratio when using timeslot 0,0065 seconds with 16%, and the best average energy is at timeslot 0.0065 seconds with 7.093 joules.

Keywords: RAW (restricted access window), IEEE 802.11ah, Random direction, Network Simulator 3