

## **ABSTRACT**

IEEE 802.11ah (WiFi Halow) is development of Wireless Local Area Network (WLAN) standard. This standard can improve the range of an Access Point (AP) up to 1 km<sup>2</sup>, can handle up to 8000 stations (STA). Additionally, the user characteristics of IEEE 802.11ah are either static or mobile. There are many stations that are connected make collision at this standar high enough, which will affect the performance of the IEEE 802.11ah standard.

In this Final Project, the installation of supporting device namely Network Simulator 3 (NS-3) for the IEEE 802.11 ah simulation will be carried out and the traffic calculation on that standard will be done with mathematical model using Bianchi, Markov Chain approach to determine the effect of change distance on collisions levels. Parameters to be analyzed are RAW for mathematical model and for simulation, parameters to be analyzed are throughput, delay and energy consumption.

From the calculation results, it can be seen that an increase in RAW slot duration and changes in distance can reduce performance on the IEEE 802.11ah standard. This happens because the further the distance of the node to the AP, the throughput will decrease, the telay will increase and energy consumption will increase. In the scenario of changing the duration of the RAW slot, the value throughput highestis 355.29 Kbps, the lowest delay is 0.023 s and the lowest energy consumption is 0.208694 KJoules / Data Packets, this is obtained when the RAW slot duration is 50 ms with the number of nodes 70. For the changes in distance scenario, the highest throughput value is 8.0755 Kbps, the lowest delay is 1.0134 s and the lowest energy consumption is 20.7 KJoules / Data Packets, obtained at the distance of the node and AP as far as 100 m. For the change probability of collision value scenario, decreases performances of this standard along with the increases the value of probability collision.