ABSTRACT

IEEE 802.11ah is a wireless LAN (WLAN) standard that operates on sub 1 GHz license free bands. Through a number of optimization of the physical layer and the mac layer which aims for wider reach, energy efficiency, and scalability. This makes IEEE 802.11ah one of the perfect technologies to provide connectivity to the Internet of Things (IoT) device. For this reason, it is hoped that IEEE 802.11ah can provide guarantees for each category access service. Quality of Service (QoS) is important in WiFi to support limited network capacity. Enchaced Distributed Channel Access (EDCA) this standard provides a new method for supporting QoS. The EDCA scheme provides four types of category access to determine priorities. In EDCA there are three main paramer to improve QoS, namely Transmission Opportunity (TXOP), Arbitrary Inter Frame Space (AIFS), and Contention Windows (CW)..

In this study, the performance evaluation of IEEE 802.11ah was carried out using the EDCA mechanism based on the AIFSN and CW priority parameter values. This research was conducted through Network Simulator 3, with the parameters being tested namely throughput, delay, packet delivery ratio, and energy consumption. Simulation system design is done with three different simulations, namely, the comparison of the performance of default EDCA parameters with improved EDCA parameters accompanied by increasing number of nodes, changes in the number of RAW groups accompanied by increasing nodes, and changes in the number of RAW slots accompanied by increasing nodes.

It can be concluded that overall network performance in the scheme of changes in the value of EDCA parameter improvements has a better performance than the default EDCA parameter value. In the parameter improvement scheme, the average delay value is 2,556 seconds, the average PDR is 96.5%, the average throughput is 0.2878 Mbps and the average energy consumption is 5.68909 joules. The RAW group scheme shows the lowest average delay value when RAW group = 1 which is 2.939 seconds, the highest PDR when RAW group = N / 2 with an average of 95%, high throughput when RAW group = N / 2 with an average of 0.25761 Mbps and the lowest energy consumption when RAW group = 1 with an average of

7.09687 joules. Then the RAW group scheme shows that the best network performance at RAW slot = 6 with an average delay value of 2.763 seconds, an average PDR value of 96.75%, an average throughput of 0.273 Mbps, and the average energy consumption amounting to 6,856 joules.