ABSTRACT

IEEE 802.11 Wireless Local Area Network (WLAN) is one of the most wireless communication systems that are currently very popular in use. 802.11 WLAN systems operate in the 2.4 GHz and 5 GHz bands, which are prone to errors due to interference from other devices that use the same bandwidth. The IEEE 802.11ah Task Group (TGah) has defined a new WLAN standard, which operates in the sub 1 GHz ISM band. It aims to serve various sensor network applications such as smart grid and supports efficient power save mode. 802.11ah provides a fairly wide transmission range, namely; 1 km, compared to 802.11a / b / g / n / ac WLAN, allows access points (AP) to support more than 8000 nodes. One of the challenges in 802.11ah is the Hidden Node Problem. The possibility that every 2 nodes become hidden from another node reaches 41% in this case when the network is randomly deployed. CSMA / CA is a multiple access network method which can be a solution to hidden node problems by using carrier detection on nodes that try to avoid collisions by transmitting only when the channel is felt to be idle. This study analyzes the performance of 802.11ah networks due to the influence of Hidden Node Problems using NS-3 (Network Simulator-3). With parameters of measurement results, namely; delay, PDR, and throughput on the AP side. This simulation is carried out with a scenario of adding a minimum threshold value of node, namely; 10, 100, and 1000 for the addition of the number of hidden nodes and the number of stations starting from 10 stations with the addition of 10 stations to reach 100 stations. So that the best results obtained an average throughput of 0.1895877 Mbit / s, an average delay of 2.4030974 seconds, and an average packet delivery ratio of 59%.

Keywords: 5G, WLAN, IEEE 802.11ah, Hidden Node Problem, CSMA/CA.