

ABSTRACT

IEEE 802.11ah is a new wireless communication standard developed by Task Group 802.11ah (TGah). This standard is designed for data communication with low data rates and wireless sensor network. One of the advantages of this standard is the ability to support up to 8.000 stations with an access point (AP). However, there is a disadvantage if a large number of stations try to connect with the AP at the same time, large collisions and frame retransmissions can not be avoided. Eventually, stations require very long time to connect to the network and could be there are no stations can connect to the AP if the collisions is severe.

The proposed method in this research incorporates a sectorization mechanism and Authentication Control Threshold (ACT). The integration of the two mechanisms has purpose to minimize the occurrence of frame collision at the initial network stage. Sectorization decreases the number of active stations for the authentication process by using beamforming antenna, so only certain stations that receive beamforming signals are actively performing the authentication process. Then, the ACT mechanism regulate the stations within the sector to send their authentication request frame to the AP by comparing the value generated by the station itself with the threshold value sent by the AP. If the value of the station is smaller than the ACT threshold then the station in the sector is allowed to send the frame authentication request. In contrast, stations within the sector must postpone their transmission.

The result is probability of frame collisions in the initialization phase is reduced 30.23% compared to the IEEE 802.11 standard. Proposed system is faster 9.4 times compared to IEEE 802.11 to associate station to AP in average.

Keywords: IEEE 802.11ah, Authentication Control Threshold, Sectorization