

## ABSTRACT

*Wireless Local Area Network (WLAN) is data transmission technology on computer networks that relies on wireless distribution system with Access Point (AP) in limited coverage area. The standard which is widely used is IEEE 802.11. WLAN over Fiber (WiLANoF) itself is hybrid technology that integrate WLAN with optical fiber network in order to get the better quality of data transmit. The current problems are caused by AP's limited coverage area and delay on the network. In addition, the previous standards such as IEEE 802.11a/g could not maximize the coverage area and offered low data rate.*

*In this final project, WiLANoF network was implemented to overcome the existing problems. The study was done by calculating the maximum length of optical fiber extension depending to the delay bound parameter. Furthermore, WiLANoF performance analysis was done based on delay parameter corresponding to modulation and coding scheme (MCS). MCS parameter describes the number of spatial streams, bandwidth (BW), short guard interval (SGI), and modulation techniques which are applied. The experiment was done by sending data packets using HT-mixed format (HT-MF) and HT-greenfield (HT-GF) frame formats via two distributed coordination function (DCF) access methods, such as Basic Access (BA) and Request to Send/Clear to Send (RTS/CTS).*

*By simulating BA and RTS/CTS methods utilizing short interframe space (SIFS) duration, it obtained 660 m(s) of optical fiber lengths. Optical fiber lengths are too short for the distance of optical fiber access network, so it can not be used realistically. Then, it used ACK Timeout and CTS Timeout duration as delay bound parameter. It got the maximum optical fiber extension lengths of 5.96 km(s) on certain condition. Minimum delay was obtained when it used BA method, 400 ns SGI, 40 MHz BW and HT-GF frame format. Additionally, MCS 31-40 MHz scenario gave the lowest delay and highest data rate.*

**Keywords :** *Delay bound, IEEE 802.11n, MCS, WiLANoF.*