ABSTRACT

Main limitation of visible light communication (VLC) is the narrow modulation bandwidth. NOMA, has been proposed recently as an effective multiple access technique that can be used for 5G network because this technique can save the modulation bandwidth.

In this Final Project, NOMA is implemented in the VLC downlink system. It performed multi-user detection (MUD) analysis on non-line of sight (NLOS) channel propagations in the form of channels affected by reflector and shadow effects. Successive interference cancellation (SIC) is being used as a MUD in this Final Project. In one user for example, SIC works by cancelling the other signal that have stronger signal to detect their own signal. This Final Project perform a simulation in a room with dimension 5 x 5 x 3 m^3 using 1 LED and 6 users.

The result of this Final Project shows that by implementing SIC as MUD in NOMA-VLC system can increasing the data rate system to the tune of 72% compared with VLC without using NOMA as a multiple access technique. Furthermore, performance of data rate system is increasing by adding reflector in the system with the highest achievable data rate is 74.7 Mbps by using NOMA and 50.6 Mbps without using NOMA. Meanwhile, the presence of light blocking between LED and user reduces the system performance with the lowest data rate is 31.7 Mbps by using NOMA and 14.2 Mbps without using NOMA.

Keywords: *Visible Light Communication*, *Non-Orthogonal Multiple Access*, *Multi User Detection*, *Succesive Interference Cancellation*, *Non-Line of Sight*.