

ABSTRACT

Visible Light Communication (VLC) is an alternative choice in information transmission technology after radio frequency. System capacity in this technology is limited by limited modulation bandwidth. Until the advent of Non-Orthogonal Multiple Access (NOMA) capable of increasing system capacity. In NOMA, Successive Interference Cancellation (SIC) is used to cancel information signals Other users are stronger in order to be able to detect their own signals. But The complex of SIC often causes Error Detection (ED).

In this research, a new Multi User Detection (MUD) method will be applied, namely FREE SIC, on downlink NOMA VLC. Later in this method no longer use SIC to Get your own information signal. This FREE SIC method uses two different modulations each channel quality, OOK modulation is used to users with poor channel quality, while MPPM modulation is used for users with good channel quality. This research is to do simulation in a room measuring $5 \times 5 \times 3 \text{ m}^3$ and using one LED and there is one user with poor canal quality and one users again with good canal quality.

From the simulations obtained from this study that the application of FREE SIC as a substitute for SIC to overcome errors detection proved successful, seen from the BER value FREE SIC obtained results for users with poor channel quality of $3,42 \times 10^{-6}$ and for users with good channel quality $3,08 \times 10^{-5}$. For the value of BER SIC with residue 0,09 for users with poor channel quality of $4,43 \times 10^{-2}$ and for users with good channel quality of $4,91 \times 10^{-2}$.

Keywords: *VLC, NOMA, ED MPPM, OOK, FREE SIC.*