ABSTRACT

LTE (Long Term Evolution) is known standard as 4G technology that was introduced by 3GPP (3rd Generation Partnership Project). It has the advantages by make use of OFDM in its downlink. OFDM is a multicarrier modulation technique that can overcome the effects of multipath fading. This multipath fading can cause one symbol to be received in multiple copies. In the other word can cause intersymbol interference (ISI). To overcome these issue, OFDM employ guard interval (cyclic prefix) during its transmission.

In this final project, the effect of cyclic prefix length on the performance of OFDM in LTE is simulated with the SUI (Stanford University Interim) channel as a multipath fading channel modeling. There are total 3 scenarios in the simulation to see the performance of OFDM LTE in the defined system. The first scenario will simulate all cyclic prefix LTE through SUI channel (1-6), the second scenario is a simulation of modified cyclic prefix LTE, and the third scenario is a simulation of modified SUI channel under mobile conditions. Measured parameters used to determine the system performance is BER and Eb / N0which are generated from the simulation using Matlab.

The simulation results show that the use of LTE short and long cyclic prefix give the best BER value on channel conditions SUI SUI 1 and 2 while the worst BER values obtained on the condition of SUI channel 6. However, LTE long cyclic prefix is capable of overcoming delay in SUI-5 channel conditions which is in the range 5-10 μs. Improvement on value of BER can be obtained by using longer cyclic prefix duration, for example on the modified long cyclic prefix with duration up to 24.24 μs. In addition, channel conditions vary over OFDM system due to user movement shows worse BER than relatively static user.

Keyword: LTE, OFDM, cyclic prefix, ISI, BER, Eb / No.