

## ABSTRACT

Long Term Evolution (LTE) is a technology based on Internet Protocol (IP) that supports high data rate transfer of packet data. This technology will be able to meet the needs of users data communication that rised in recent years.

On the other hand, the user can move at high speed by using means of transportation. One of the tools that have a high-speed transport is train, which is also a favorite means of transportation in Indonesia. Most of users who are using this transportation service requires the services of packet data also when the train drove at high speed to meet their needs of communication.

In this research, design of a macro cell network dedicated along the railway lines to create an optimal network performance of LTE on the train. The design will be conducted at a frequency of 700 MHz using Frequendy Division Duplexing (FDD) with 10 MHz of bandwidth. With due respect of speed, bitrate, traffic, and intensity of the user on the train, we will get overlapping coverage for handover that can be run succesfully at a high speed. The results of this research, shows that the LTE network requires traffic delay of 43 ms and the handover delay of 89 ms. From the system total delay was obtained value by 10% overlapping coverage. Compared to other scenarios, ie, without overlapping, 40% overlapping and 100% overlapping, this network has optimal performance which the average power level reaches -81.6 dBm, average SINR 5.5 dB, and 78% area cover was above the standard of minimum power level that covered by 19 cells for case study of Jakarta to Cirebon railroad.

Keywords : Long Term Evolution (LTE), Frequency Division Duplexing (FDD), a broadband on trains, coverage, handover.