

## ABSTRACT

Cimahi Tengah is one of districts that have high population density in Cimahi City because of this city center located in District Cimahi Tengah. Based on the evaluation of LTE network in Cimahi Tengah sub-district, the  $RSRP \geq -90$  dBm and  $RSRQ \geq 5$  dB are still below the standard of KPI Telkomsel operator which is 90%, with the total number of users in some LTE sites in Cimahi Tengah subdistrict having more than 1500 users.

In overcoming this on LTE-Advanced technology there is a scheme that is heterogeneous network. Heterogeneous networks (heterogeneous networks) are topologies in a cellular network that applies small cells to macro cells with different cellular technologies to address capacity issues and provide better coverage. This Final Project performs LTE-Advanced heterogeneous network planning with pico cell using expansion range in Cimahi City using coverage and capacity planning as well as existing LTE network traffic in Cimahi Tengah subdistrict. Frequency used is 1800 MHz on macro cell and 2300 MHz in pico cell. The analysis is done by comparing the application of heterogeneous network with pico cell and existing LTE network of Cimahi City. In doing the simulation of heterogeneous network planning using Atoll 3.3 software.

The simulation results are in accordance with the standards of KPI operators. The  $RSRP$  value obtained on the heterogeneous network simulation result is  $\geq -90$  dBm The coverage area is 98.89%, the  $CINR$  value obtained for the value  $> 5$  dB is 91.99%, the average for the downlink throughput is 38.51 Mbps, for uplink throughput ie 17.22 Mbps, and the number of users whose services are 20150 users, with 20125 (99.9%) of connected users. These results indicate a simulation of heterogeneous network planning with pico cells using a feasible range expansion implemented.

**Keywords: LTE-Advanced, Heterogeneous Network, Pico Cell, Range Expansion.**