## ABSTRACT

Long Term Evolution (LTE) technology application in Indonesia especially in Bandar Lampung City has limited on contiguous frequency allocation for the cellular operator. Release 10 3GPP generate LTE-Advanced which supports carrier aggregation feature allows two or more usage of component carrier simultaneously. With this carrier aggregation feature, cellular operator can start LTE technology by utilizing the non-contigous frequency.

In this final task research, the design of LTE-Advanced uses carrier aggregation inter-band non-contiguous and intra-band non-contiguous method by utilizing GSM frequency in one of the cellular operator, Indosat. The design of LTE-Advanced uses 20 MHz bandwidth by comparing carrier aggregation inter-band non-contiguous scenario on 900 MHz and 1800 MHz frequency, and intra-band non-contiguous on 1800 MHz frequency. This LTE-Advanced planning based on capacity planning and coverage planning in Bandar Lampung City.

The parameter analyzed in this research include: the number of sites, signal level, CINR level, percentage of user connected, and throughput based of simulation on Software Atoll 3.2.1. The design with intra-band non-contiguous obtained the number of site by 29,  $\geq -80$  dBm signal level is 82.15%,  $\geq 5$  dB CINR level is 71.98%, the average of user connected percentage is 93.33%, and the average of throughput is 1364.22 Mbps. Whereas, in the inter-band non-contiguous technique design obtained the number of sites by 21,  $\geq -80$  dBm signal level is 86.13%,  $\geq 5$  dB CINR is 76.358%, the average of user connected is 87.3%, and the average of throughput is 1273.97 Mbps. Based on parameter analyzed in this research, carrier aggregation inter-band non-contiguous network is better to be applied in Bandar Lampung.

**Keywords:** LTE-Advanced, Component carrier, Carrier Aggregation, Intra-band non-contiguous Inter-band non-contiguous, Atoll