

ABSTRACT

Long Term Evolution (LTE) is an IP-based technology which is issued by 3GPP as 3.9G, which is the standard for high-speed wireless data communications. However, the development of LTE in Indonesia have problems in terms of frequency allocation. The limited existing frequency allocation is still difficult to make LTE held in Indonesia. Not only in Indonesia but also in other countries. Then in March 2010 LTE-Advanced (4G) was born as the development of LTE Rel.8 with some new features, one of which is carrier aggregation (CA). This feature can combine two or more component carriers with a maximum bandwidth of 20 MHz per carrier either in one or different frequency bands.

In this research the use of CA is expected to optimize the existing frequency, which is still occupied by the GSM technology. Therefore made a LTE-A network architecture with a bandwidth of 15 MHz using two scenarios, namely: engineering carrier aggregation (CA) by the method of inter-band non-contiguous carrier at a frequency of 900 MHz and 1800 MHz; and without carrier aggregation (Non-CA) at a frequency of 700 MHz for comparison with the performance of CA frequency management case studies in Indonesia. The design is done with two approaches by coverage planning and capacity planning.

The parameters analyzed in this study include: the number of sites, the value of RSRP, as well as the percentage of users connected by Monte Carlo simulations on Software Atoll 3.2.1. To design the CA technique obtained the number of sites by 58, ≥ -80 dBm RSRP value equals to 72.1%, and the average percentage of connected users is 79.25%. While the design of the technique of Non CA obtained the number of sites by 54, ≥ -80 dBm RSRP value equals to 64.1%, and the average percentage of connected users is 82.94%. Based on the number of sites, there is a difference of sites amounts 4 sites more in CA, while for ≥ -80 dBm RSRP value, the difference is 8% more in CA. Based on the average percentage of users connected, the two techniques yield difference is not too much that is 3.69% more on non-CA. Some of the above parameters showed that the results of network planning design uses CA technique approached the value of Non CA technique. So based on these parameters it can be concluded that LTE-A network planning uses CA technique is feasible in Indonesia.

Keyword: carrier aggregation, bandwidth, frequency allocation.