

## ABSTRACT

Growth of digital applications currently have reached a very phenomenal number. This is supported by growth of smartphone that is really significant. In order to support the development of digital era in the future therefore it will be needed broadband access services that has high quality, which can provide speed and reliability for users. LTE Advanced or LTE release 10 has been present as a solution to current broadband access service. By using Carrier Aggregation feature in LTE-A, speed given can penetrate approximately 3 Gbps. In term of reliability, LTE-A support Soft Frequency Reuse method, which is expected to overcome the interference that is experienced by users who are at the edge of the cell.

In this Final project will be done planning LTE – Advanced network followed by Carrier Aggregation feature, which will be using frequency band at 1800 and 2100 MHz. In order to get optimal scenario, Carrier Aggregation featured will be combined with frequency reuse method SFR. This Planning will be done with 2 approximation method which are planning by coverage and planning by capacity, through simulation in Atoll software. Desired parameters from simulation's result are Throughput, CINR and User Rejected. Analysis on this project will be done according to parameter –parameter as mentioned above.

The final project result in producing the performance effect of LTE-A network to Carrier Aggregation and SFR's application. 17 sites is required for the Carrier Aggregation's implementation. Whereas once CA has been implemented the number of site needed reduced to 14 sites. In addition the throughput parameter increased by 6,5 Mbps and rejected user decreased by 2 %. However, the CA's application gives negative effect to CINR parameter which its value decreased insignificantly. Thus for the appliance of the overall SFR scheme can improve the CINR for more than 4 dB, the throughput parameter by 3 Mbps and lowering rejected connection for more than 4 %. The 3<sup>rd</sup> scenario with a smaller cell edge bandwidth is the best scheme in order to increase network capacity while the second scenario with a larger cell edge bandwidth is the best scheme to improve network reliability.

Keywords: LTE-A, SFR, Carrier Aggregation, Throughput, CINR, User Rejected