

## **ABSTRACT**

*Telecommunication services have a very important role in modern life to support communication access, cellular wireless access technology currently requires good network services. To support this, this research performs the Carrier Aggregation technique of 5G network planning at frequencies of 2100 MHz and 2300 MHz. 5G network coverage planning in this study uses Mentum Planet 7.4 software in Genuk District, Semarang City, covering an area of 27.38km<sup>2</sup> using the Urban Macrocell (UMa) propagation model to determine the performance of the 5G network coverage in the form of Synchronization Signal - Reference Signal Received Power (SS-RSRP), Secondary Synchronization Signal-to-Noise and Interference Ratio (SS-SINR) and Data rate parameters also using MATLAB software to see histograms of 5G network performance parameters. This research will prove that the network performance used will be much better when using the Carrier Aggregation technique. The results of the simulation obtained in the O2O scenario require fewer 29 gNodeB sites compared to the O2I scenario requiring 32 gNodeB sites. The SS-RSRP value is better using the Carrier Aggregation technique in the O2I scenario because it is able to reduce to -29.15 dBm, for the SS-SINR value with the Carrier Aggregation technique is more improved in the "Very Good" category in the O2O scenario. In the Data Rate value using the Carrier Aggregation technique in the O2I and O2O scenarios, the same increase as in the O2O scenario. So the use of Carrier Aggregation can help improve SS-RSRP; SS-SINR and Data Rate parameters, because it combines 2 different frequency bands.*

**Keywords** : 5G, Carrier Aggregation, Frequency 2100 MHz, Frequency 2300 MHz, Mentum Planet.