

## **ABSTRACT**

*This study designs a 5G NR network using a frequency of 700 MHz and 2.3 GHz with a bandwidth of 30 MHz in the Jababeka industrial area with an area of 5600 hectares. The propagation model used to calculate the downlink and uplink link budget is Urban Macrocell (UMa) with non line of sight (NLOS) conditions according to the 3GPP TR 38,901 standard. Coverage prediction simulation on Atoll 3.4 which consists of 4 simulation scenarios. Scenario 1 is an analysis of the performance of the SS-RSRP and SS-SINR parameters at a frequency of 2.3 GHz, based on the number of sites from the results of the downlink link budget calculation. Scenario 2 is an analysis of the performance of the SS-RSRP and SS-SINR parameters at a frequency of 2.3 GHz based on the number of sites from the calculation of the uplink link budget. Scenario 3 is an analysis of the performance of the SS-RSRP and SINR parameters at a frequency of 700 MHz, based on the number of sites from the results of the downlink link calculation. And scenario 4, namely the analysis of the performance of the SS-RSRP and SINR parameters at a frequency of 700 MHz, based on the number of sites from the calculation of the uplink link budget. The simulation results in scenario 1 show that 61% of the Jababeka area can be covered by SS-RSRP with a value of  $>-110$  dBm, and the SS-SINR simulation shows that 73.71% of the area can be covered with a quality  $>5$  dB. The simulation results in scenario 2 show that 100% of the Jababeka area can be covered by SS-RSRP with a value of  $>-110$  dBm, and the SS-SINR simulation shows that 75.35% of the area can be covered with SINR signal quality level  $> 5$  dB. The simulation results in scenario 3 show that 72.27% of the Jababeka area can be covered by SS-RSRP with a value of  $>-110$  dBm, and the SS-SINR simulation shows that 85.30% of the area can be covered with signal quality at the SINR level  $>5$  dB. The simulation results in scenario 4 show that 100% of the Jababeka area can be covered by SS-RSRP with a value of  $>-110$  dBm, while the SS-SINR simulation shows that 71.04% of the area can be covered with signal quality at the SINR level  $>5$  dB. With the simulation results that have been made, it is recommended to use a frequency of 700 MHz, because the calculation results of the site required are less and the simulation results are better than the 2.3 GHz frequency.*

*Keywords: 5G NR, Atoll, Downlink, SS-RSRP, SS-SINR*