

## **ABSTRACT**

*The increase in customer data services in Indonesia in 2021 increased by 49% which made the quality of cellular services unable to handle the increase. Therefore, in this research, a 2.3 GHz 5G New radio (NR) network coverage area was planned using Atoll 3.4.0 Software in Semarang City with an area of 373.7 km<sup>2</sup> with the aim of knowing how the maximum permissible loss value (MAPL) is. signal strength (SS-RSRP), and signal quality (SS-SINR). The method used is the Urban Macro (UMa) propagation model based on the 3GPP TR 38.901 standard, and uses 2 scenarios for uplink and downlink conditions, each using an Outdoor-to-outdoor (O2O) Line of sight scheme. From the simulation in Atoll 3.4, scenario 1 results in an average value of SS-RSRP of -87.82 dBm, this value is included in the "Good" category and for SS-SINR of 7.33 dB, this value is included in the "Normal" category. " for SS-SINR values. Meanwhile for scenario 2, the average value of SS-RSRP is -91.37 dBm, this value is included in the "Normal" category and for the average SS-SINR value of 7.96 dB, it is included in the "Normal" category for the value of SS-SINR.*

**Keywords:** *5G Network Planning, Coverage area, 2.3 GHz Frequency, 5G Link budget*