ABSTRACT

At the beginning of 2022 the number of internet users in Indonesia reached 54.25% which caused an increase in data traffic so that the network quality worsened. Therefore, in this study, a 2.3 GHz 5G New Radio (NR) coverage planning design was carried out in the city of Semarang with an area of 373.7 km2 using the Atoll 3.4 application. The purpose of this design is to determine the maximum allowable pathloss value (MAPL), the results of signal strength or Secondary Synchronization - Reference Signal Received Power (SS-RSRP), signal quality or signal-to-interference-plus-noise ratio (SS-SINR) and data rate or data rate. This study uses 2 scenarios, namely scenario 1 uplink and scenario 2 downlink in non-line-of-sight (NLOS) conditions with the propagation model used, namely urban macro (Uma) based on the standardization of 3GPP 38,901. The simulation results show that the average SS-RSRP value for scenario 1 is -91.77 dBm in the "Normal" category, the SS-SINR average value of 10.14 dB is in the "Normal" category and the average value of the data rate of 68.625 Mbps is included in the "Normal" category. For scenario 2, the average SS-RSRP value of -89.81 dBm is in the "Good" category, the SS-SINR average value of 6.17 dB is in the "Normal" category and the average data rate is 61,787 Mbps is included in the "Normal" category. It is hoped that this research will be used as a reference if 5G New Radio (NR) technology is implemented in Indonesian cities, especially the city of Semarang.

Keywords: *5G NR network planning, 2.3 GHz frequency, coverage area, 5g link budget, SS-RSRP, SS-SINR, Data rate*