

ABSTRACT

The 4.0 industrial revolution is rapidly integrating cyber technology and automation with the online world through the internet as the main support. In this era, connectivity is a key factor that drives the digitalization of services. Driving the digitization of services. 5G private technology is emerging as a platform solution to provide flexible connectivity, both for public and private networks, to support industrial and enterprise needs. Public and private networks, to support industrial and enterprise needs. This research aims to design a private 5G network in Telkom University campus area by using a frequency of 2300 MHz frequency and 100 MHz bandwidth in an area of 0.44 km². The method used include capacity planning and coverage planning analysis, as well as simulation using Atoll software.

The design results show an estimated user growth of up to 53.197 users in the next 5 years, with network throughput requirements reaching 1,210 Mbps for uplink and 1,684 Mbps for downlink. Coverage planning results in the need for 3 sites with a cell radius of about 0.204 km coverage per site 0.212 km. While Capacity planning results in the need for 5 sites with a cell radius of about 0.197 km and coverage per site of 0.088 km. Simulations using Atoll show good network performance on the coverage plan, with an average RSRP of -79.99 dBm and an average SINR of 10.18 dB. Throughput analysis displays an average downlink capacity of 229,719.43 kbps. While on the capacity plan, with an average RSRP of -79.29 dBm and SINR of 5.35 dB, throughput analysis displays an average downlink capacity of 119,095.86 kbps. The designed system shows adequate performance to meet communication needs in the Telkom University campus environment, with even signal coverage and good performance consistency..

Keywords: 5G network, private 5G network, capacity planning, coverage planning, data rate