

ABSTRACT

This research focuses on Balikpapan City, the capital city of East Kalimantan, which is designated as the new IKN buffer. With this status, Balikpapan is predicted to experience rapid development and has the potential to become a Smart City. This development requires qualified technology infrastructure, including 5G cellular networks that are 20 times faster than the previous generation.

5G New Radio (NR) development has been commercialized in various countries. In Indonesia, which will expand 5G NR, operators need to strategize spectrum allocation so that the quality and capacity of existing networks do not degrade, given that frequency spectrum is limited and expensive. Based on 3GPP Release-15, the Dynamic Spectrum Sharing (DSS) feature in 5G NR allows 4G and 5G to share the same frequency spectrum.

This final project plans and simulates Balikpapan network at 1800 MHz with 30 Mbps bandwidth, using Dynamic Spectrum Sharing (DSS) on existing LTE frequencies. Calculation and analysis include Coverage and Capacity, simulated with Atoll 3.4.0.1 using Urban Macro (UMa) propagation model according to 3GPP TR 38.901 standard.

Simulation results on 4G LTE coverage resulted in 31 site with good KPI: SS-RSRP -111.09 dBm, SS-SINR 15.81 dB, and throughput 44 Mbps. 5G NR coverage simulation resulted in 70 site (SS-RSRP -78.31 dBm, SS-SINR 28.65 dB, throughput 241 Mbps), and 70 site with DSS (SS-RSRP -70.16 dBm, SS-SINR 26.04 dB, throughput 275 Mbps).

Keywords: 5G NR, DSS, UMa, 1800 Mhz, Atoll