

ABSTRACT

Coal exports in Kalimantan, especially in the Balikpapan area, are an important part of domestic economic activity to help improve the economy in Indonesia. Therefore, the development of 5G New Radio technology is the most important technology to help maximize export and import activities. With the planned implementation of 5G in Indonesia, each operator's frequency spectrum resources have been allocated to existing 2G, 3G and 4G technologies. As frequency spectrum is a limited and expensive resource, radio frequency planning becomes an important stage to optimize network quality and capacity. Based on 3GPP release-15, 5G NR technology is equipped with Dynamic Spectrum Sharing (DSS) feature, which allows 4G and 5G technologies to use the same frequency spectrum allocation. In this final project, planning and simulation are conducted in Balikpapan City at 2300 MHz frequency.

This research conducts 5G NR network planning by utilizing Dynamic Spectrum Sharing technique on the frequency used by LTE technology. Network planning calculations and parameter analysis include aspects of coverage and capacity. Furthermore, the simulation is performed using Atoll 3.4.0 software with Urban Macro (UMa) propagation model that has been standardized by 3GPP TR 38.901.

Based on the results of planning and simulation calculations, 73 sites are required to fulfill coverage and capacity requirements in Balikpapan City. With the application of DSS technique, the simulation of 5G radio frequency coverage with SS-RSRP testing parameter produces an average of -71.88 dBm. Meanwhile, the simulation of 5G quality with SS-SINR parameter obtained an average of 26.43 dB. In addition, the simulation of network access speed with throughput parameter shows an average of 281 Mbps.

Keywords: 5G NR, 2300 MHz, DSS, UMa, Atoll