

ABSTRACT

The development of mobile technology is growing. The increase in data traffic that is very explosive encourages the development of previous mobile technology to the next technology, namely 5G. The deployment of 5G mobile networks is held in areas with high population density, namely dense urban. However, mobile operators who have rolled out 4G networks have the challenge of deploying 5G mobile networks in dense urban areas. So, it becomes a big question for mobile operators whether 5G is worth holding in urban areas.

On the other hand, 5G has the advantage of low delay, has high-capacity data faster, and produces more mobile traffic data that can be connected to the device. Therefore, this research will result in a feasibility study of the deployment of a 5G mobile network in urban areas with a case study of Bandung City. Bandung was chosen as the object of research because it is one of the largest cities experiencing network congestion in Indonesia, as well as being a pilot project for 5G implementation in Indonesia.

According to the research findings, the total required 5G NR 3.5 GHz gNodeB and generated traffic demand forecast for all municipalities in Bandung City is 172 gNodeB, respectively. Furthermore, the mean value of Synchronization Signal-Reference Signal Received Power (SS-RSRP) is -84.12 dBm and is considered excellent. In contrast, the Synchronization Signal-Signal Interference Noise Ratio (SS-SINR) mean value is 13.51 dB and is considered good. In terms of economic aspects, the obtained total Capital Expenditure (CAPEX) is \$2,219,598.51, the total Operational Expenditure (OPEX) is \$15,412,366.91, the total revenue is \$34,284,423.72. Net Present Value (NPV) is \$5,219,311.34, Internal Rate of Return (IRR) is 23.13%, Payback Period (PP) resulted in 3.89 years, and lastly Profitability Index (PI) pf 1.11. There-fore, overall, 5G NR 3.5 GHz deployment in Bandung City is feasible.

Keywords: 5G NR, Urban, Network Planning, Feasibility Study