ABSTRACT

The deployment of 5G technology in Indonesia has received regulatory support from Kominfo by conducting service trials in several major cities, such as Bandung City in West Java. In addition, this research aims to analyze and determine areas with high potential or demand and the feasibility of implementing 5G NR networks. Based on the number of sites used by operator X, the distribution of 5G NR networks in Bandung City is still incomplete. Currently, 49 sites, or 12 of the 30 administrative districts, have been equipped with 5G infrastructure. Therefore, we attempt to plan to use non-standalone scenarios. The FR1 frequency range of 2300 MHz with a bandwidth of 50 MHz was used to calculate Bandung City's outdoor-to-outdoor coverage using coverage planning and capacity planning. In addition, a suitable priority plan is necessary to guarantee that resources are distributed according to user demand and Quality of Experience (QoE). Based on the following four primary parameters: Downlink (DL) Throughput, Uplink (UL) Throughput, Payload (Data Volume), and Active User (User Density). We employed the AHP Method and Min-Max Normalization to weight the findings in accordance with the parameters to determine P1–P5 based on the 5-year implementation target. Thus, 194 site-based capacity planning and an extra 117 sites are required to complete coverage. Beginning in 2026, there will be 30 sub-districts in Bandung City: P1 target 27 sites, P2 target 27 sites, P3 target 24, P4 target 24, and P5 target 15 sites. The 5G NR development in Bandung City's provided several key financial indicators, including a Net Present Value (NPV) of $894,801.66, an Internal Rate of Return (IRR) of 16.27%, a Payback Period (PP) of four years, and a Profitability Index (PI) of 1.622. According to each indicator's results, this project is both financially viable and feasible.

Keywords: 5G Technology, Bandung City, Coverage Planning, Capacity Planning, QoE Parameters, Business Feasibility