ABSTRACT

The advancement of 5G network technology has opened new opportunities for implementing private networks across various sectors, including manufacturing, healthcare, and education. This research focuses on the analysis and monitoring of the implementation design for two 5G private networks, utilizing open-source software Open5GS and UERANSIM. The implementation process began with the installation and configuration of Open5GS as the 5G core network and UERANSIM as the gNodeB and UE simulator. Testing was conducted to evaluate connectivity between network components and ensure communication could run well in private network scenarios, including tests with 5 and 10 UEs on a local network and 1 UE on a public network. Each test scenario was carried out using a bandwidth of 100 Mbps and a duration of 60 seconds.. The results showed that in local TCP and UDP testing, the 5G private network achieved throughput of no less than 90 Mbps, latency below 150 ms, and packet loss under 2%. These performance metrics fall into the "excellent" category based on the TIPHON standard, demonstrating that a private 5G network can be built using open-source software. In addition, monitoring error logs plays an important role in the debugging process and network optimization. This study is expected to provide further insight into the implementation of open-source-based 5G private networks, enabling wider adoption across various sectors, both industrially and academically.

Keywords: Private 5G Network, Open5GS, UERANSIM, Open Source, 5G Implementation