

ABSTRAK

**IMPLEMENTASI JARINGAN 5G *STANDALONE* (SA) MENGGUNAKAN *OPEN5GS* DAN *SRSRAN* DENGAN PERANGKAT *UNIVERSAL SOFTWARE RADIO PERIPHERAL* (USRP) B210
(2025 : XV + 68 Halaman + 22 Gambar + 14 Tabel + 8 Lampiran)**

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**PROGRAM STUDI SARJANA TERAPAN TEKNIK TELEKOMUNIKASI
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Penelitian ini bertujuan untuk mengimplementasikan jaringan 5G *Standalone* (SA) berbasis perangkat lunak *open-source* menggunakan Open5GS sebagai core network dan srsRAN sebagai *Radio Access Network* (RAN), dengan perangkat *Universal Software Radio Peripheral* (USRP) B210 sebagai media transmisi sinyal. Sistem diuji dalam skala laboratorium untuk menilai keberfungsian dan performanya. Pengujian dilakukan melalui beberapa tahap, meliputi instalasi dan konfigurasi Open5GS dan srsRAN, penambahan *subscriber*, registrasi dan autentikasi *User Equipment* (UE), serta pengukuran parameter performa seperti *throughput* dan *latency*. Hasil menunjukkan bahwa sistem berhasil dibangun secara fungsional, dengan perangkat UE dapat terkoneksi dan menerima layanan jaringan 5G. Namun, performa jaringan belum sepenuhnya memenuhi standar ITU-R IMT-2020, terutama disebabkan oleh keterbatasan *backhaul* WiFi lokal dan daya pancar rendah dari perangkat USRP. Penelitian ini menunjukkan bahwa jaringan 5G SA berbasis *open-source* memiliki potensi sebagai solusi alternatif dalam pengembangan infrastruktur komunikasi, khususnya di wilayah yang belum memiliki jaringan memadai.

Kata Kunci: 5G Standalone, Open5GS, srsRAN, USRP B210, *Core Network*, *Radio Acces Network*.

ABSTRACT

IMPLEMENTATION OF 5G STANDALONE (SA) NETWORK USING OPEN5GS AND SRSRAN WITH UNIVERSAL SOFTWARE RADIO PERIPHERAL (USRP) B210 DEVICE

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This study aims to implement a Standalone 5G (SA) network using open-source software, namely Open5GS as the core network and srsRAN as the radio access network (RAN), with a Universal Software Radio Peripheral (USRP) B210 device as the signal transmission medium. The system was tested in a laboratory environment to assess its functionality and performance. The testing involved several stages, including the installation and configuration of Open5GS and srsRAN, subscriber registration, UE authentication, and performance measurement based on parameters such as throughput and latency. The results showed that the system was successfully built functionally, and User Equipment (UE) was able to connect and receive 5G network services. However, the network performance did not fully meet the ITU-R IMT-2020 standards, primarily due to limitations of the local WiFi backhaul and the low transmission power of the USRP device. This study demonstrates that open-source-based 5G SA networks have the potential to serve as an alternative solution for communication infrastructure development, especially in underserved areas.

Key Word: 5G Standalone, Open5GS, srsRAN, USRP B210, Core Network, Radio Acces Network.