

## **ABSTRACT**

*In this final project, an implementation will be carried out for the 5G network. The implementation that will be carried out is the MIMO antenna, open source 5G core network, NTOPNG and improving the quality of the user plane on the 5G Core Network with Data Plane Development Kit (DPDK) and Vector Packet Processing (VPP). With this implementation and development, it is hoped that it will accelerate the development and implementation of 5G in Indonesia, and become part of global technology development. The expected output is that by using open source software as the initial foundation of the technology developed, it will make it easier to get the materials needed to develop.*

*The solution for implementation will involve several aspects of technology, such as Deep Packet Inspection (DPI), Data Plane Development Kit (DPDK), Vector Packet Processing (VPP), Open source 5G Core Network, and Multiple Input Multiple Output (MIMO) antennas. In the Core Network, Open5Gs software will be used, DPI will use NTOPNG and user plane improvements on the 5G Core Network will use DPDK and VPP. By using open source software and improving the quality of the User Plane, it is expected that there will be an increase in network quality in 5G for massive users.*

*By using a 4x4 MIMO antenna with a TIP logo, the antenna can transmit electromagnetic waves required for 5G communication with a return loss of -15.49 dB, VSWR of 1.40, bandwidth of 228MHz and mutual coupling of less than -20 at a working frequency of 2.6 GHz. UPF with DPDK support can improve the efficiency of 5G Core Network and can increase bandwidth to > 900Mbps with physical layer (NIC) bandwidth limitation of 1Gbps in 5G networks. With opensource solutions, it can be used to develop 5G technology more dynamically and freely using the Service Based Infrastructure (SBI) concept in open5Gs software. The designed system has been comprehensively tested and demonstrated optimal performance in accordance with the expected specifications. The test results show that the system is capable of operating efficiently and consistently, meeting all predefined success criteria.*

**Key Words: MIMO, 5G, Core, DPDK, VPP, DPI**