

## **ABSTRACT**

*4G LTE technology has become the standard for telecommunications services that can provide faster data exchange rates than previous technologies. LTE technology utilizes the MIMO system to improve performance quality and obtain high channel capacity. MIMO (Multiple-Input Multiple-Output) systems have the advantage of being able to transmit and receive multiple signals. The transmitting device that can transmit and receive signals is an antenna. The microstrip antenna is one of the most widely used antennas in telecommunications equipment. This research discusses the design of a triangular patch microstrip antenna with 4x4 MIMO modeling and the butler matrix method. The purpose of this study was to design a 4x4 MIMO microstrip antenna with the butler matrix method for LTE 2,3 GHz applications and to compare performance parameters between 4x4 MIMO antennas before and after the addition of the butler matrix method. The research methodology is literature study, antenna calculation and design, simulation, and data analysis. Based on the simulation data, the return loss on port 1, port 2, port 3, and port 4 is -20.12 dB, -22.57 dB, -22.09 dB, and -24.46 dB. VSWR of 1.718; 1.296; 1.368; and 1.039. The gain is 10.92 dB and the radiation pattern is unidirectional. This proves that the use of the 4x4 butler matrix method in the design of a 4x4 MIMO microstrip antenna can increase the antenna gain value and produce a directional antenna radiation pattern.*

**Keywords:** LTE, MIMO, Butler Matrix, Microstrip Antenna