

ABSTRACT

The advancement of telecommunication technology is rapidly progressing. The role of this technology is highly significant in meeting human needs, especially in high-data transmission through 5G networks. This network offers high-speed data transmission services to meet user demands. Network planning is necessary in indoor locations with high user mobility and capacity to ensure optimal network service provision. 5G prioritizes high speed and data transmission efficiency through spectrum optimization. An indoor 5G network needs to be designed to enhance services so that visitors can exchange information effectively.

Utilizing multiple input and multiple output (MIMO) antenna systems can enhance the capacity and speed of communication systems. MIMO systems involve various antenna elements acting as transmitters (Tx) and receivers (Rx). MIMO antennas may experience interference due to mutual coupling effects. In this final project, the design of MIMO antennas builds upon previous research using a 2x2 MIMO system, focusing on the design of an 8x8 MIMO antenna. This represents a significant increase in channels and system complexity to improve wireless communication performance.

The antennas are designed using polarisation diversity with a truncated method to produce circular polarisation. The antennas will be configured with different polarisations, such as RHCP, LHCP, RLRL, and LRLR. The development involves increasing the number of antennas in polarization diversity using the truncated method. Using an 8x8 MIMO antenna with polarisation diversity in RHCP configuration yields an average SNR value of 30 dB, an average bitrate of 26 Mbps, and a channel capacity of 629.194 Mbps. LHCP configuration produces an average SNR value of 21 Mbps, an average bitrate of 24.5 Mbps, and a channel capacity of 405.523 bps. RLRL configuration achieves an average SNR of 32.5 Mbps, an average bitrate of 36.5 Mbps, and a channel capacity of 795.611 Mbps. Lastly, in LRLR configuration, it results in an average SNR of 25.3 Mbps, an average bitrate of 34.83 Mbps, and a channel capacity of 670.392 Mbps.

Keyword : Antenna, MIMO, 5G, OpenLTE