ABSTRACT

Wireless communication systems called Multiple Input Multiple Output (MIMO) using multiple antennas both on the transceiver and the receiver side. The usage of multiple antennas may improve the quality of a communication system. MIMO antenna technology applied on the Long Term Evolution (LTE) to obtain high bit rates and increase capacity. Besides these advantages, the use of multiple antennas may cause mutual coupling effects, which the effects can reduce the quality of an antenna because of the influence of the adjacent antenna. The need for a small antenna dimensions also become one of the considerations in designing MIMO antenna. Therefore, we need a method which can reduce the size of the antenna by taking into account the effect of mutual coupling on MIMO antenna.

In this final project designed and realized a 2x2 MIMO antenna microstrip with circular patch featured by metamaterial elements as well as the addition of Complementary split ring resonator (CSRR) in the ground plane. CSRR metamaterial placement on the ground will result in a shift in the resonant frequency of the antenna so it can be used to reduce the size of the antenna. Microstrip antenna designed and simulated using Ansoft HFFS Version 13 software.

Results from this study indicate that the use of CSRR metamaterial antenna can reduce as much as 62.32% the size of the conventional antenna. At a frequency of 2.6 GHz MIMO antenna metamaterial actual results have return loss S11 = -19.29 dB, S12 = -25.86 dB, S21 = -26.06, and S22 = -21.63. Radiation pattern which produced for each MIMO antenna patch form omnidirectional with vertical polarization so that the antenna is good as receiver antenna.

Keywords: microstrip, MIMO, metamaterial, CSRR.