ABSTRACT

Smart Antenna is a system that is combination type antenna array is equipped with signa processing capability which optimize the radiation pattern automatically responded by a signal in the arounds. *Smart Antenna* can be implemented in wireless communication or radar. The advantages of using a *Smart Antenna* is capable of providing maxiumum gain and can set the direction of beam antenna (*beamforming*). One of component *Smart Antenna* is antenna feeder are *Rotman Less, Blass Matrix, and Butler Matrix. Butler Matrix* better than others because it is simple and it need a little of *hybrid* 90° so can reduce the dimensions.

This final project designed, realized and carried out measurement of the Butler Matriks 4x4 at frequency 1.27 GHz applied to *for radar application.* The components of Butler Matrix 4x4 consist of four *hybrid* 90 °, one *crossover* and two *phase shifter* 45˚. All components made using microstrip with type substrate *FR4 Epoxy* with a thickness of substrate is 1.6 mm.

Realization of *Butler Matrix* 4x4 has a dimension 26,5 x 16 cm. In this design, the parameters of *phase error* for each *port*s consecutive is 5.71 ˚, 2.11 ˚, 7.91 ˚, 15.49 ˚, so the *phase error*s already met the specification is ≤ 20˚. And also the result of *Return Loss* and *Isolation* already met the specification of magnitude ≤-10dB and *Insertion Loss* ≥ -10dB.

Keywords: *Beamforming*, Butler Matriks 4x4, microstrip, *hybrid, crossover*