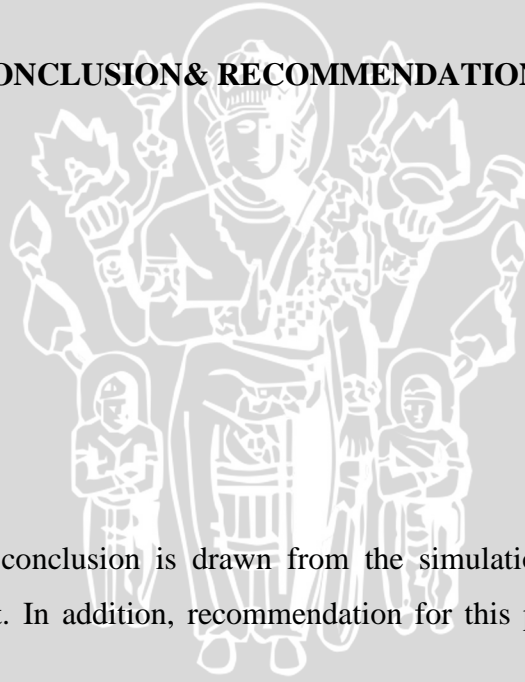


## CHAPTER 5

## UNIVERSITAS BRAWIJAYA

## CONCLUSION &amp; RECOMMENDATION

**5.1 Introduction**

In this chapter, final conclusion is drawn from the simulation and measurement process of this project. In addition, recommendation for this project developing is discussed briefly.

**5.2 Conclusion**

A narrow-bandwidth rectangular microstrip antenna is designed to work at frequency of 2.4 GHz. Then EBG is applied in antenna to improve the performance of the antenna particularly the bandwidth and gain. To make sure EBG can work properly at frequency of 2.4 GHz, EBG is simulated to get  $S_{21}$  response.

Simulation results are validated by experimental measurements. Fabrication process is done to confirm simulation result. Comparison between simulation and measurement results are shown in table 4.1 and 4.2. From all of above analysis and simulation results, it can be observed, that the simulation method has better result than measurement result. Many factor causes the measurement result worse than simulation result as imperfect soldering that makes unmatching condition on port.

Application of EBG structure increases bandwidth of a microstrip patch antenna. Also, EBG structure implementation in the design of microstrip antenna increases antenna directivity and antenna gain without sacrificing the bandwidth of the array antenna. Finally, the antenna gain is increased to 5.690 dB and directivity is increased to 5.911 dBi.

### 5.3 Recommendation

Application of EBG on microstrip antenna have achieved its target, but it can be developed again to get a better result. Several limitations on this project make this project possible to be developed again. The absence of other looking forward microwave device is needed to get better result. Recommendation such as:

- i. Application of another substrate such as ROGER can make broader bandwidth
- ii. Employ EBG with antenna to observe other antenna performances such as radiation pattern, Voltage Wave Standing Ratio (VSWR).
- iii. Conform EBG for beamforming.
- iv. Make the process of soldering better so power-loss in port of antenna can be minimized.