

## ABSTRACT

Telecommunication world growth so rapidly, especially for wireless communication. However, one of which is the bottleneck of these developments is the limited allocation of frequencies that can be used. In fact, if researched further, the frequency of use is still not effect4e and efficient, especially for a certain time. In cognitive radio, frequency allocation is dynamic. Therefore, the most important component of cognitive radio technology is spectrum sensing, the ability to sense and detect the frequency of use uncertain.

In this final project will be simulated spectrum sensing algorithms using hidden markov model (HMM). This final project begins with the generation of a signal by using the software MATLAB R2009a. Signal generated at 1900 MHz spectrum. Having raised and the quantized signal will be sampled into 5 and 10 levels. The output of the quantization result is a pattern of power spectrum density (PSD) were observed at different frequencies. After that, the results of HMM training and the calculation of the forward variable, will be the detection of the variables – variables that exist. The pattern is the basis for decision making in cognitive radio.

The results of the simulation program can be concluded that the method of hidden markov model (HMM) can be used for spectrum sensing algorithms with 88.73% accuracy. In addition, the HMM method is also reliable when tested with a variety of different scenarios. Therefore, needs to be done further research and development to maximize the performance of the HMM method for spectrum sensing algorithms.

**Keywords:** *cognitive radio, spectrum sensing, power spectrum density (PSD), Hidden Markov Model (HMM).*