ABSTRACT

Spectrum frequency is a finite resource. The user of spectrum frequency that increase is not proportional to the availability of spectrum frequency. The divided of the use of spectrum frequency so that an orderly, organized, and efficient. But there are still under-utilized of spectrum frequency. One of the solution to reduce the under-utilization of spectrum frequency is a Dynamic Spectrum Access. Dynamic Spectrum Access is supported by the Cognitive Radio. Cognitive radio is an intelligent wireless communication system that is easy to adapt to their environment, and programmable. One of the functional part in Cognitive Radio is Spectrum Sensing. Spectrum sensing has function to detect the presence of Licensed User (LU) on a licensed frequency. When Licensed Users occupying his licensed frequency property, Cognitive Radio User (CRU) can not use the frequency spectrum. The weakness at the local detection is the possibility of shadowing, and receiver uncertainty. This can lead to detection errors whether or not a Licensed User (LU) on a frequency spectrum. This detection error causes interference between Licensed User (LU) and Cognitive Radio user (CRU).

This research analyze the performance of Cooperative Spectrum Sensing with Soft Decision Combining methods(SDC) and Hard Decision Combining(HDC) to minimize the possibility of interference because of shadowing, and receiver uncertainty. Cooperative Spectrum Sensing is a spectrum sensing method by combining information from each of Cognitive Radio user using the Fusion Rule in the Fusion Center. Fusion Center will determine the global decision about whether or not the licensed User in a spectrum frequency or channel.

The results of this study is the performance of cooperative spectrum sensing which has a value of Pd(probability of detection) as high as 100 % when using 30 CRU comparison of local spectrum sensing only reach a value of 39 % Pd with 1 CRU . Found also on performance comparison of each method that existed at Hard Decision Combining and Soft Decision Combining . Good performance is characterized by the value of a high probability of detection of 90% on the value SNR’s of -20 db. Provided some scenarios with SNR’s parameters , and the number of CRU to measure the value of probability of detection and probability of false alarm to determine the performance of the detector. The best detector performance with the highest value of 100 % Pd using 32 CRU , with a value SNR’s of -4 dB obtained by the method HDC and Optimum Optimum SDC . The best method between Optimum and Optimum SDC HDC depends on the bandwidth that provided.

Keywords: Cognitive Radio, Spectrum Sensing, Cooperative Spectrum Sensing, Fusion Rule