ABSTRACT

Knowing the utilization of OFDM frequency spectrum is becoming increasingly necessary due to the increasing use of OFDM signal in cognitive radio for communication signals. Detection techniques for this type of signal was further developed. There is a condition on spectrum sensing of OFDM signal in cognitive radio that can be redeveloped from previous studies, which have not taken into account non ideal reporting channel conditions for more accurate spectrum detection.

One of the OFDM signal detection method that can provide good detection results is distributed detection with autocorrelation-based detector. In this method, detectors perform signal detection individually by using autocorrelation of the OFDM signal and then send the decision to a fusion center through ideal reporting channel. Channel-aware distributed detection method provides a new approach to distributed detection, where non ideal reporting channel condition is taken into account by the fusion center for global decision of the spectrum. This method has been applied in the detection of signals in Wireless Sensor Networks (WSN and may be adopted to detect the OFDM signal in cognitive radio. This thesis studies collaborative spectrum sensing for OFDM in cognitive radio, which is combine autocorrelation-based detection method for local detector with channel-aware distibuted detection method for fusion center, which using not ideal reporting channel in reporting channel. Fusion center provides global decision using some fusion rules which are Optimal Likelihood Ratio (LR), Chair-Varsney, Maximum Ratio Combining (MRC), Equal Gain Combining (EGC), and Likelihood Ratio Test based on channel statistic Channel Statistic (LRT-CS). The performance measure is Receiver Operating Characteristic (ROC) which shows the probability of detection (Pd) as a function of the probability of false alarm (Pfa).

By using theoritical analysis and simulations, the combination methode shows improvement for detection performance For SNR -5, Pfa 0.05, number of users is 16, Chair-Varsney fusion rule, probality of detection degrade from 0.9012 (using ideal reporting channel) to 0.22 (using non ideal reporting channel). Then if another channel-aware based fusion rule applied, probability of detection improve to 0.3498(35,6%, Optimal LR), 0.3063 (24.2%, MRC), 0.2823 (16.3%, EGC), and 0.2938 (19.8%, LRT-CS).