

## **ABSTRACT**

The frequency spectrum is a limited resource in a wireless communication system. This limitation can be an obstacle in implementing the new wireless technology. On the other hand the use of frequencies available and owned by the primary user is not optimal. In this case the presence of cognitive radio is a solution in order to optimize the use of frequencies that exist and facilitate the implementation of the new wireless technology. Wimax, LTE, WiFi, WRAN, all this technology use OFDM at their transmitter.

Among some of its duties, the cognitive radio's main role is to do spectrum sensing in the surrounding radio environment. In order to do mapping and can determine the frequency of use vacant frequencies which can be optimized for the use of cognitive radio communication. Even to the worst conditions in which the detector system has no knowledge of the signal and noise. There are several techniques that can be used to perform spectrum sensing the condition has no knowledge of the signal, among these techniques are simpler implementation of energy detection techniques. This technique has a weakness at noise conditions are unknown and uncertainty. In this condition, a technique that can be used and better than energy detection is GLRT detector. However, this detector requires choose threshold with empirically. This process has a problem when we move from one location to another, it is

necessary to conduct empirical calculations again. And would face difficulties if we do detect a signal that is already active in a new place. so it is necessary to know the exact time the signal was not active. In this condition the bootstrap approach can help determine the threshold detector directly from the active signal is received. So the detector can gain threshold which is always updated with any condition, anytime and anywhere.

The simulation result show that GLRT detector with bootstrap approach has a toughness in the face of uncertainty noise. Even able to exceed the performance of which is owned by the energy detector and GLRT. At condition SNR -5 dB and uncertainty noise 1 dB, GLRT with bootstrap approach improve probability of miss detection almost 0.030 than ordinary GLRT and 0.094 than energy detector.