

## ABSTRACT

The demand for reliable wireless communication and high system capacity cannot be separated from the availability of resources in the form of sufficient frequency spectrum. Meanwhile, the availability of the frequency spectrum is close to its limit. The most efficient use of spectrum with tolerable interference is an important goal of cognitive radio systems. The sparse nature of the placement of the spectrum has triggered this research to apply Compressive Sensing (CS) in CR communication.

Spectrum sensing is the main step that will enable cognitive radio networks, namely to determine the spectrum status and activity of the main user at regular intervals. When compared with the usual sensing spectrum, where the sensing process is carried out one by one in each subband, so it takes a longer time. In this study, the CS method was applied with reconstruction using the Convex Optimization (CVX) method, so that the whole sensing process was carried out with fewer samples.

With this proposed method, the energy detector performance results are not much different between the probability detection (Pd) values using the CS method and without CS with fewer samples so that it is more efficient. In this study, the best sensing quality is at point  $P_{fa} = 0.44$  with  $P_d = 0.98$  using the CS method. The greater the SNR value produce the better of Pd value. The smaller the compression ratio value produce the worse of Pd value.

**Keywords:** Cognitive Radio, Compressive Sensing, CVX, SpectrumSensing, Energy Detector.