

## Combined Localization, Beamforming, and Interference Threshold Estimation in Underlay Cognitive System

**Authors :** Omar Nasr, Yasser Naguib, Mohamed Hafez

**Abstract :** This paper aims at providing an innovative solution for blind interference threshold estimation in an underlay cognitive network to be used in adaptive beamforming by secondary user Transmitter and Receiver. For the task of threshold estimation, blind detection of modulation and SNR are used. For the sake of beamforming several localization algorithms are compared to settle on best one for cognitive environment. Beamforming algorithms as LCMV (Linear Constraint Minimum Variance) and MVDR (Minimum Variance Distortion less) are also proposed and compared. The idea of just nulling the primary user after knowledge of its location is discussed against the idea of working under interference threshold.

**Keywords :** cognitive radio, underlay, beamforming, MUSIC, MVDR, LCMV, threshold estimation

**Conference Title :** ICCWNC 2015 : International Conference on Cognitive Wireless Networks and Communications

**Conference Location :** Paris, France

**Conference Dates :** January 23-24, 2015