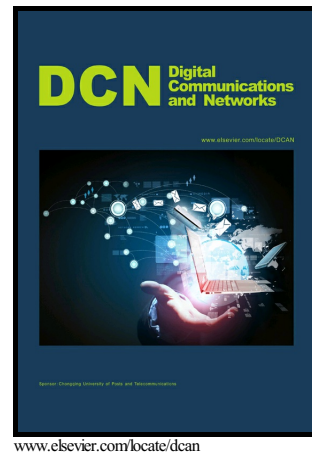


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UNDERLAY COGNITIVE USERS

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## A NEW PROTOCOL for ALLOCATING LICENSED SPECTRUM CONCURRENTLY to UNDERLAY COGNITIVE USERS

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### **ABSTRACT**

Cognitive Radio technology efficiently uses the valuable radio frequency spectrum in a non-interfering manner to solve spectrum scarcity problem. The aim of this paper is to design a scheme for concurrent use of licensed frequencies by Underlay Cognitive Users (UCUs). We have developed a new receiver initiated Medium Access Control (MAC) protocol to facilitate choice of alternative reliable carrier frequency. A circuit is designed to establish RSSI (Received Signal Strength Indicator) based reliable carrier selection at the receiver end. Based on packet-level simulations and various performance parameters, comparison is carried out between a few conventional techniques (like MACA and MACA-BI) and our scheme. From the simulated results, it is observed that with conventional techniques, system overhead time increases from 0.5 seconds in the first attempt to 16.5 seconds in the sixth attempt. In our proposed scheme, for the same failure condition, overhead time varies from 0.5 seconds to 2 seconds. This improvement is due to complete elimination of exponential waiting time during failed transmissions. An average efficiency of 60% is achieved in our scheme while only 43% and 34% average efficiency can be achieved with MACA and MACA-BI techniques respectively. Throughput performance of our scheme in fourth attempt stands at 7Mbps whereas for MACA and MACA-BI protocols, it is 1.9Mbps and 2.2 Mbps respectively.

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