

## **26. ENERGY EFFICIENCY OF COOPERATIVE RELAYING OVER A COGNITIVE RADIO NETWORK**

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The regulatory users in many parts of the world have been considers to allow unlicensed (secondary) users in licensed band if they would not cause any interference to licensed (primary) users. So, the cognitive radio networks is an emerging technology, most promising in rising the utilization of the radio frequency spectrum. The identified problem is how to optimally allocate the transmission power and use multiple relays for data transfer in single multi-hop cognitive radio network(CRN). To overcome this problem and to extend the lifetime of the network, we propose CRN with adaptive relay selection in multi-hop connection based on water filling algorithm and use orthogonal frequency division multiple access (OFDMA) technique, offset quadrature phase shift keying (OQPSK) modulation schemes and transmit the packets from source to destination through multiple relay. The multiple relay nodes eliminate the identified problem. So, it efficiently gathers the possible information with high channel capacity and also highlight's the use of water filling algorithm based on the power control technique which is propose to improve the transmission capacity of the cognitive system. The objective is to maximize the total transmission rate of all secondary users with given transmission power budget and to achieve the total transmission rate can be obtained over a overlay spectrum access mechanism. By providing the simulation results of measured parameters such as power consumption, transmission power, average delay, packet delivery ratio and prove that water filling algorithm is efficient to use than joint overlay underlay spectrum access mechanism(JOUSAM).

Keywords—Multiple Relay, Offset Quadrature Phase Shift Keying, Water filling algorithm.