Abstract

The explosive growth of wireless communication systems and computing devices is being hindered by the scarcity of readily available usable frequency band as most bands are licensed and the unlicensed bands are becoming overcrowded. Research has however, shown that a considerable portion of licensed bands lies idle at some points in time or location. This prompts the development of cognitive radios (CRs) to improve the overall utilisation of the limited spectrum by opportunistically using licensed spectrum. This paper observed that the two approaches of underlay and overlay of spectrum utilisation of CRs are not maximising the potentials of CRs. To further improve spectrum utilisation, a hybrid model of the two approaches is hereby presented. The model uses the principles of match filtering and interference temperature. The design is implemented within the scope of IEEE 802.22 research group which describes the coexistence of cognitive radios with TV bands. This paper therefore, presents a mathematical formalism that allows CRs to utilise the TV band while ensuring a minimum interference to the primary users.
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