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机会频谱接入系统中基于次用户容量分析的检测参数设计

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Detection-parameters Design Based on Capacity Analysis of Secondary Users in OSA Systems

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摘要 该文对认知网络中基于机会频谱接入(OSA)技术的认知用户的信道容量表达式及其检测参数进行了研究。首先讨论了次用户信号干扰噪声比(SINR)的特性，得到存在干扰和不存在干扰两种状况下的SINR的均值表达式，探讨SINR对次用户信道容量的影响，以及次用户的信道容量在OSA方式下的变化。并在此基础上，结合信道统计特性，运用跨层设计思想，设计次用户的发送数据帧长和检测频率。从分析结果可以看出，主用户对授权信道的占用模型影响次用户的SINR，进而影响到次用户检测频率和传输帧长的设计，结果表明从次用户物理层特性和主用户业务特性结合角度设计次用户检测参数的方案，在保证次用户吞吐量要求的同时，降低了主次用户之间的干扰，同时提高了系统对频谱的利用率。

关键词： 无线通信 数据帧长 检测频率 信道噪声干扰比 信道容量 机会频谱接入

Abstract： Channel capacities and sensing parameters for Secondary Users (SUs) based on Opportunistic Spectrum Access (OSA) technique are studied in this paper. First, characteristics of the Signal-to-Interference-and-Noise Ratio (SINR) of SUs are discussed, from which the expressions about the average SINR are derived under interference and non-interference cases. Then, the influences of SINR on the channel capacity under OSA mode are discussed. After that, the data frame length and the detection frequency are designed from the cross layer design and stochastic characteristics of fading channels points of view. It can be seen from the analysis that the channel occupancy mode of the Primary Users (PUs) has influence on the SINR of SUs. It also has been proved that the scheme which joins the characteristics on the physical layer with occupancy mode of PUs, can reduce the collision probability between SUs and PUs. Meanwhile, it can improve the frequency efficiency of the system on the condition of meeting the required throughput of SUs.

Keywords： Wireless communication Data frame length Detection frequency Signal-to-Interference-and-Noise Ratio (SINR) Channel capacity Opportunistic Spectrum Access (OSA)

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