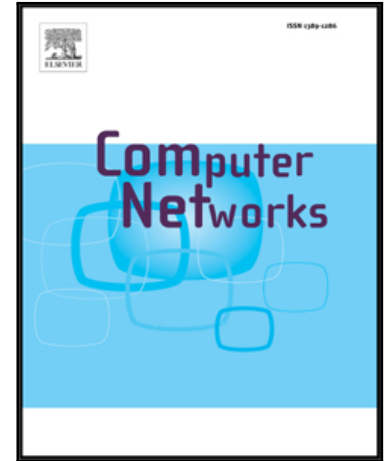


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## Incentivizing Spectrum Sharing via Subsidy Regulations for Future Wireless Networks

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### Abstract

Traditional regulatory methods for spectrum licensing have been recently identified as one of the causes for under-utilization of the valuable radio spectrum. Governmental regulatory agencies such as the Federal Communications Commission (FCC) are seeking ways to remove stringent regulatory barriers and facilitate broader access to the spectrum resources. The goal of such new FCC-backed efforts is to allow for an improved and ubiquitous sharing of the precious radio spectrum between commercial service providers. In this paper, an interdisciplinary framework for spectrum management is proposed in which the government, using its regulatory power, can motivate spectrum sharing among the service providers in order to gain a net social benefit. In this framework, a noncooperative game is used to analyze how to foster more sharing of the radio spectrum via the use of regulatory power. The providers are incentivized with subsidized spectrum bands from the regulators. In return, the providers will be

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<sup>\*</sup>An introductory version of this paper has been published in the proceedings of IEEE Allerton conference, 2013 [1].

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