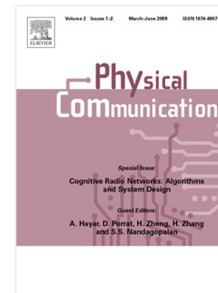


## Accepted Manuscript

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PII: S1874-4907(17)30346-4

DOI: <https://doi.org/10.1016/j.phycom.2017.10.002>

Reference: PHYCOM 440

To appear in: *Physical Communication*

Received date: 13 August 2017

Revised date: 7 October 2017

Accepted date: 9 October 2017

Please cite this article as: X. Liu, D. He, W. Lu, F. Li, Bandwidth allocation-based simultaneous cooperative spectrum sensing and energy harvesting for multicarrier cognitive radio, *Physical Communication* (2017), <https://doi.org/10.1016/j.phycom.2017.10.002>

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# Bandwidth Allocation-based Simultaneous Cooperative Spectrum Sensing and Energy Harvesting for Multicarrier Cognitive Radio

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## Abstract

In cognitive radio (CR), a secondary user (SU) may consume more energy due to spectrum sensing. In order to guarantee transmission performance of the SU, a bandwidth allocation-based simultaneous cooperative spectrum sensing and energy harvesting for multicarrier CR is proposed, which can collect the radio frequency (RF) energy of the wireless signal from primary user (PU) to supply the consumed sensing energy. Each subcarrier is split into spectrum sensing bandwidth, energy harvesting bandwidth and transmission bandwidth, thus cooperative spectrum sensing, energy harvesting and data transmission can be implemented simultaneously within transmission time. Multicarrier cooperative spectrum sensing is proposed to improve sensing performance and decrease cooperative overhead through combining the sensing results from all the subcarriers. A joint optimization problem has been formulated to achieve the maximal throughput of the SU by jointly optimizing sensing bandwidth ratio and subcarrier power. Simulation results have shown that there exists an optimal sensing bandwidth that maximizes the throughput and the performance of the proposed model is predominant.

*Keywords:* Cognitive radio; Energy harvesting; Multicarrier cooperative

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