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   Nota di contenuto    Introduction -- Orthogonal Signaling Enabled Cooperative Cognitive
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   Sommario/riassunto   This SpringerBrief examines the active cooperation between users of
                        Cooperative Cognitive Radio Networking (CCRN), exploring the system
                        model, enabling techniques, and performance. The brief provides a
                        systematic study on active cooperation between primary users and
                        secondary users, i.e., (CCRN), followed by the discussions on research
                        issues and challenges in designing spectrum-energy efficient CCRN. As
                        an effort to shed light on the design of spectrum-energy efficient
                        CCRN, they model the CCRN based on orthogonal modulation and
                        orthogonally dual-polarized antenna (ODPA). The resource allocation
                        issues are detailed with respect to both models, in terms of problem
                        formulation, solution approach, and numerical results. Finally, the
                        optimal communication strategies for both primary and secondary
                        users to achieve spectrum-energy efficient CCRN are analyzed.