

From Technical Validation to Policy Implementation A Dynamic Spectrum Sharing Framework for 6G Networks in West Africa

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Abstract— The transition toward 6G networks in West Africa; specifically, in the emerging Alliance of Sahel States or Alliance des Etats du Sahel (AES), is probably going to be restricted by static approaches to spectrum management which results in significantly reduced efficiency of use of available spectra and significant economic waste. This research develops a comprehensive dynamic spectrum sharing framework that addresses both the technical potential of dynamic spectrum sharing and the need for implementation as it relates to the institutional and economic realities of West Africa. This is accomplished through a three-part framework which includes (1) collaborative spectrum pooling, (2) dynamic spectrum markets, and (3) public service spectrum banking based upon an assessment of existing regional spectrum allocations and identified saturation risks. A phased roadmap of implementation (2025-2030) is provided along with an assessment of the expected technical, economic, and social impacts, such as improved efficiencies in the use of available spectra, increased economic activity, and increased availability of broadband services. Through the combination of technical feasibility with practical policy design, this research identifies a viable path toward reforms in spectrum usage that will promote digital inclusion and the development of a sustainable 6G ecosystem throughout the AES and the broader West African region.

Keyword—6G networks, dynamic spectrum sharing, cognitive radio, West Africa, regulatory framework, spectrum efficiency, telecommunications policy, digital transformation.



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