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Integration of project management in the implementation of 5G infrastructures for high-capacity public venues

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Abstract

The deployment of 5G infrastructures in high-density public venues such as sports arenas, exhibition centers, and airports requires the integration of technical network optimization with effective project management processes. This study presents a techno-managerial framework for the planning, deployment, and monitoring of indoor 5G infrastructures in environments characterized by intensive and highly variable traffic, integrating radio planning, capacity dimensioning, risk assessment, and project control mechanisms into a unified analytical approach. A quantitative relationship between traffic demand, radio cell densification, and key network performance indicators—such as RSRP, SINR, throughput, and latency—is established to support deployment decisions. The analytical evaluation of a representative high-capacity scenario indicates that an infrastructure composed of approximately 50 indoor small cells provides a balanced tradeoff between network capacity, deployment complexity, and investment cost while maintaining performance indicators within recommended operational thresholds. The integration of engineering parameters with project management constraints enables improved deployment predictability, optimized resource allocation, and enhanced control of operational and financial risks in high-density 5G environments.

Keywords: *5G; capacity dimensioning; indoor networks; project management; rf planning; risk analysis*

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