Coexistence Challenges: Analyzing SBSP-Induced Interference in Terrestrial Communication Systems

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Abstract

I specialize this year in the experimental evaluation of electromagnetic interference (EMI) caused by Space-Based Solar Power (SBSP) systems on terrestrial wireless communication networks, with a strong focus on Industrial, Scientific, and Medical (ISM) bands, including 5.8 GHz and others. My research relies on real-world communication signals and technologies actually used in daily systems, moving beyond simulations to understand practical coexistence challenges. Using QAM-based testing under controlled interference conditions, I quantify signal degradation through metrics such as Error Vector Magnitude (EVM), Bit Error Rate (BER), and constellation diagram analysis, while varying parameters like Signal-to-Interference Ratio (SIR), interference frequency, and receiver linearity. These measurement-based studies allow for accurate EMI threshold definition and the identification of characteristic interference signatures, providing actionable insights into EMC design, spectrum coexistence, and policy guidance for the future integration of SBSP and high-power wireless transmission into existing communication infrastructures.

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