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Replicability analysis of PLC PRIME networks for smart metering applications

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Abstract— Advanced Metering Infrastructures (AMI) represent one of the first steps in the Smart Grid process, where Power Line Communication (PLC) is emerging as the most costeffective solution since it allows reusing electric infrastructures as communication channel. However, the performance of this technology is highly affected by the characteristics of the existing distribution network. This article presents a thorough sensitivity analysis to assess the operating limits of smart metering applications for multiple representative configurations of low voltage (LV) networks based on a PLC simulation framework that integrates DLMS/COSEM and PRIME standards. The number of registered nodes and the time to read all meters have been defined as Key Performance Indicators to assess the communication performance. The conclusions drawn from this study provide useful information for the integration of smart meter applications that take advantage of AMI under different local conditions.

Index Terms— smart meter, advance metering infrastructure (AMI), power line communications (PLC), PRIME, performance

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