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Technology

When the number of smart meters reaches millions of units, it is important to achieve secure and reliable communications with utility control centers. Even more important is to guarantee the almost real time capabilities often demanded by Grid Control or Asset Monitoring solutions. Interoperability, scalability and security together with low cost of ownership, are the key ingredients for the successful rollout of smart metering and smart grid systems.

PRIME (PowerLine Intelligent Metering Evolution) defines an open, royalty-free and non-proprietary standard for the only commercially available, massively deployed OFDM PLC technology that ensures true interoperability and backward compatibility among equipment and systems enabling the building of the electricity networks of the future, or smart grids.

Specifications

The components of PRIME architecture are not subject to any intellectual property rights and are publicly available. Specifications are comprehensive and detailed enough so that any new entrant will be able to provide interoperable solutions to the market.

PRIME defines lower OSI layers of a PLC data transmission system over electricity grids of up to 1 Mbps. The stack has been designed to be low-cost but high-performance. It uses Orthogonal Frequency Division Multiplexing (OFDM) in far-reaching frequency ranges.



PRIME specifications now support frequency ranges going from the CENELEC A-band (<95kHz) up to 500 kHz, allowing for optimum usage in electric grids all over the world. Robust transmission modes have been designed to improve system performance against both high power impulsive noises and interfering noise. PRIME can be fitted for multiple applications – IEC 61334-4-32, IPv4, IPv6– enabling a variety of services

beyond smart metering. It can also be seamlessly fitted into solid, hybrid PLC/RF architectures which are gaining ground in several utility markets.

PRIME certification of members’ products is carried out by accredited laboratories (DNV-GL, ITE and TECNALIA), which have been facilitating the introduction of PRIME-compliant and interoperable products in the market (see Certification leaflet).

Security

Security functionalities in PRIME has been engineered to the needs of the technology adopters and PRIME v1.4 specifications include state-of-the-art cryptographic protection mechanisms at MAC Layer, enabling deployment of a PLC network that is secure.

PRIME v1.4 provides additional cybersecurity mechanisms so that utilities deploying PRIME telecommunication subnetworks can rely on a secure infrastructure that prevents intrusion, avoids data manipulation/tampering and guarantees data authentication and confidentiality. It supports three security profiles, all of which, thanks to its registration process, facilitate mechanisms for Service Node authentication. PRIME v1.4 MAC layer security has been designed with flexibility in mind so that utilities, as telecommunication infrastructure owners, can choose among different options to deploy a secure architecture for their PRIME subnetworks.

Standards

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