Technology

When the number of smart meters reaches millions of units, it is an important task to achieve secure and reliable communications with utility control centers. Even more important is to guarantee the 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 roll-out 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, mass-deployed OFDM PLC technology that ensures true interoperability 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 available publically. Specifications are comprehensive and detailed enough so that any new entrant will be able to provide interoperable solutions to the market.

PRIME initially defines lower OSI layers of a narrowband PLC data transmission system over the electricity grid. The architecture has been designed to be low-cost but high-performance. It uses Orthogonal Frequency Division Multiplexing (OFDM) in narrowband 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. Additional robust transmission modes have been introduced, designed to improve system performance against both high power impulsive noises and interfering noises. PRIME can be fitted for multiple applications - IEC 61334-4-32, IPv4, IPv6 – which enables a variety of services beyond smart metering.

Security functionality 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 even at lowest levels. Two distinct security profiles allow users to optimize security and performance in their networks. Both profiles utilize 128-bit AES-CCM authenticated encryption; and recognized standards for key management, distribution and generation.

The PRIME Alliance and its members are committed to protecting investments in PRIME technology and provide backward compatibility in the evolution of the PRIME specifications.

Standards

PRIME Alliance's objective is to establish a complete set of international standards that will allow for full interoperability among equipment and systems from different providers. Thus benefiting the whole ecosystem of stakeholders.

PRIME is already an approved worldwide standard by ITU (through ITU-T, G.9901 and G.9904). PRIME is Normative Annex of IEEE P1901.2 standard and CENELEC EN 52056- 8-4 standard is ready to be published including DLMS/COSEM profile with PRIME protocol reference to ITU-T G.9904 recommendations.

Certification

PRIME certification of members products, is carried out by one of three 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).