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Kerkey

Security Module for Smartgrid applications

Data brief

VQFN32

Features

- Protection profile for the Security Module of a Smart Meter Gateway (Security Module PP)
- ECC support for NIST-P-256
- Digital signature generation and verification with ECDSA
- Key agreement with Diffie-Hellman (ECKA-ECDH) and El Gamal (ECKA-EG)
- PACE with ECDH-GM-AES-CBC-CMAC-128 for secure messaging
- On-chip ECC key pair generation
- ISO7816-4 file system with EFs, DFs and ADFs, including nesting of DFs
- Key pair, public key and PIN objects
- Extended length APDUs
- ECOPACK® 32-lead VFQFPN 5x5 mm (0.5 mm pitch)

Platform

- Java Card™ inside (Version 2.2)
- GlobalPlatform™ (Version 2.1.1)
- ISO/IEC 7816 T=0 and T=1 contact protocols
- Common personalization specification (CPS) compliant

Hardware

- Enhanced 8/16-bit ST23 CPU core with 16 Mbytes linear addressable memory
- 80 Kbytes of User EEPROM including 128 bytes of User OTP area:
  - 30-year data retention at 25° C
  - 500,000 erase/write cycles at 25° C
  - 1 to 64 bytes Erase or Program in 1.5 ms
- Operating temperature: –25° to +85° C
- Enhanced NESCRYPT crypto-processor for public key cryptography
- Hardware security enhanced DES accelerator
- Contact assignment compatible with ISO/IEC 7816-3 standards
- Asynchronous receiver transmitter (IART) for high speed serial data support (ISO/IEC 7816-3 and EMV™ compliant)
- ESD protection greater then 6 kV (HBM)
- 3V and 5V supply voltage ranges
- EMVCo / CC (EAL6+) certification

Security

- AIS-31 class P2 compliant true random number generator (TRNG)
- Enhanced cryptographic algorithms:
  - DES/3DES, RSA, ECC and AES
  - SEED, SHA-1, SHA-256, MD5 and CRC16
  - Password Authenticated Connection Establishment (PACE) protocol
- Differential power analysis (DPA) and differential fault analysis (DFA) countermeasures against side channel attacks
- Active shield
- ISO 3309 CRC calculation block
- Memory protection unit (MPU)
- Unique serial number on each die

Applications

- Security module for smart metering applications

Certifications

- Product Candidate for:
  - Certification-ID BSI-CC-PP-0077
  - TR-03109-2

1 Description

The Kerkey device implements the commands defined by the BSI for the Security Module of a Smart Meter Gateway as well as Global Platform v2.1.1 commands.

Smart metering system

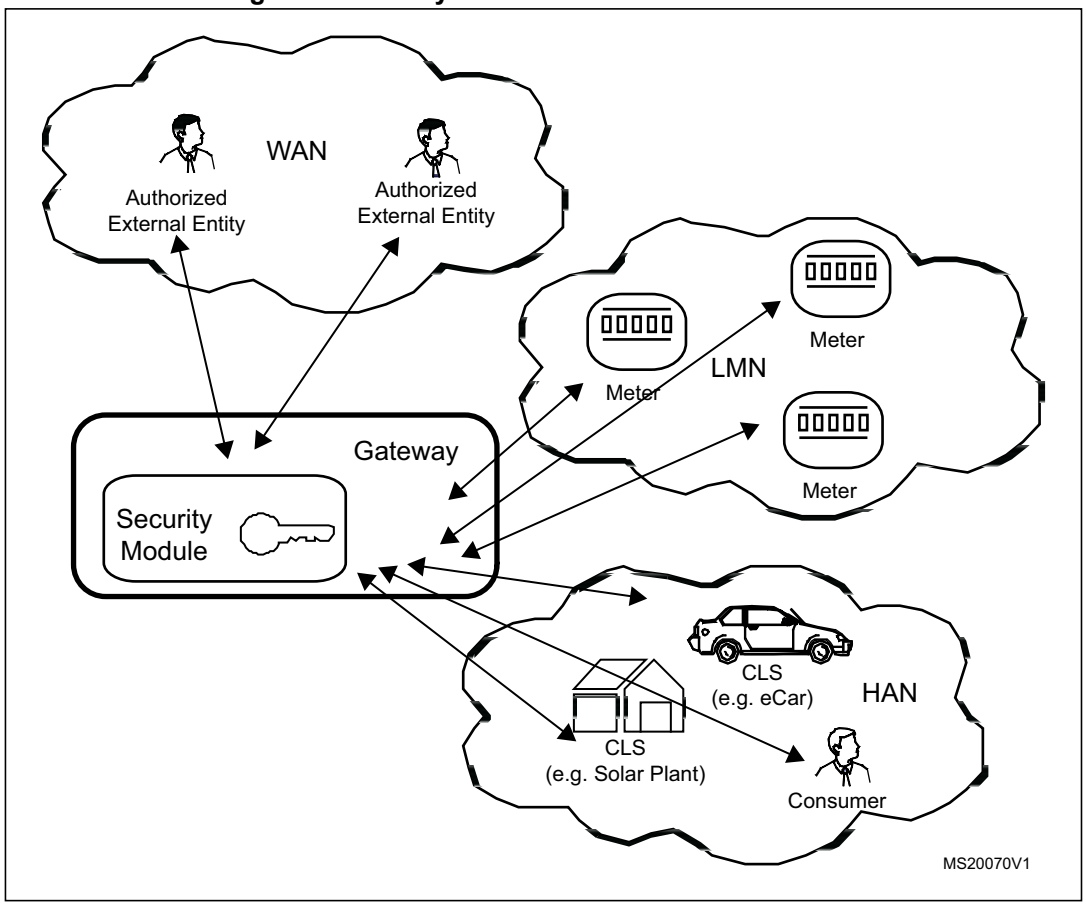
A Smart Metering System comprises the following functional units:

- The **Gateway** serves as the communication component between the components in the LAN of the consumer and the outside world. It can be seen as a special kind of firewall dedicated to the Smart Metering functionality. It also collects, processes and stores the records from Meter(s) and ensures that only authorised parties in a Wide Area Network (WAN) have access to them or derivatives thereof. Before sending relevant information the information will be signed and encrypted using the services of the Security Module (SM). The Gateway features a mandatory user interface, enabling authorised consumers to access the data relevant to them.
- The **Meter** itself is part of a Local Metrological Network (LMN) and records the consumption or production of one or more commodities (e.g. electricity, gas, water, heat) in defined intervals and submits those records to the Gateway. The Meter Data has to be signed before transfer in order to ensure their authenticity and integrity. The Meter is comparable to a classical meter[(a)] and has comparable security requirements; it must be sealed according to regulations. The Meter further supports the encryption of its connection to the Gateway[(b)].
- The Gateway utilises the services of a **Security Module** as a cryptographic service provider for different cryptographic functionalities based on elliptic curve cryptography as the generation and verification of digital signatures and key agreement which is used by the Gateway in the framework of TLS, content data signature and content data encryption. The Security Module contains the cryptographic identity of the Gateway, and it serves as a reliable source for random numbers as well as a secure storage for cryptographic keys and certificates. The Security Module is addressed within this Protection Profile. It is embedded into the Gateway and directly communicates with the Gateway.
- **Controllable Local Systems** (CLS) may range from local power generation plants, controllable loads such as air condition and intelligent household appliances (“white goods”) to home automation applications in a Home Area Network (HAN). CLS may utilise the services of the Gateway for communication services.

a. In this context, a classical meter denotes a meter without a communication channel, i.e. whose values have to be read out locally.

b. It should be noted that it is not implied that the connection is cable based.

Figure 1. Security Module and its Direct Environment



Development tools

ST provides a complete toolkit with an easy-to-use interface to manage Key and PIN objects.

2 Revision history

Table 1. Document revision history

Date	Revision	Changes
04-Oct-2013	1	Initial release.
07-Nov-2013	2	Updated logo information on page 2.

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