Interface Specification for HES-GPRS Meter

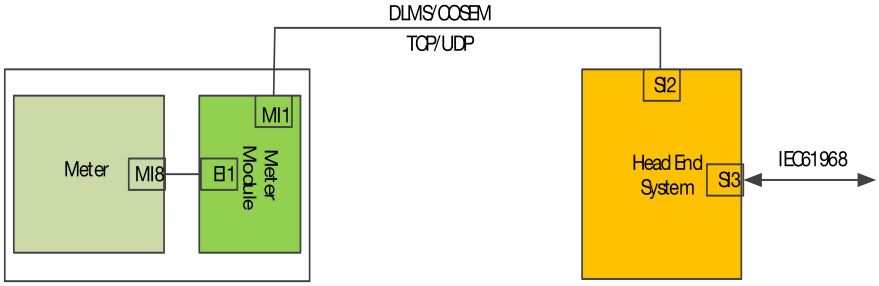
Content

1 Introduction

The purpose of this document is to specify the communication interface of the HES-GPRS Meter to facilitate faster integration with international standard communication protocols (DLMS/COSEM).

2 System Architecture

2.1 Brief Introduction



GPRS in the meter work as TCP client, it means the meter will initiate the TCP connection, it works in 'always on' mode. After TCP connection, the meter will send heartbeat to head-end periodically to keep connection alive.

3 Protocol

3.1 DLMS_IP

3.1.1General

Green Book specifies a profile for exchanging data between DLMS/COSEM clients and servers based on TCP/UDP.

The DLMS_IP frame format is:

Header				APDU(Data)
Version	Source Address	Destination Address	APDU Length	
2 bytes	2 bytes	2 bytes	2 bytes	N bytes

- Version: 0x0001
- Source Address/Destination Address:carries the wPort number identifying the sending/receiving DLMS/COSEM AE.
- APDU Length: the length of APDU data.

Compliance to DLMS UA 1000-2 Ed. 8.3/DLMS UA 1000-1 Ed. 12.2

3.2 Application Layer

The E-Meter communicates with the upper system using the IEC 62056-53 COSEM. Application Layer with extension documented in DLMS UA 1000-2 Ed. 8.3:2017.

3.2.1Client and Server

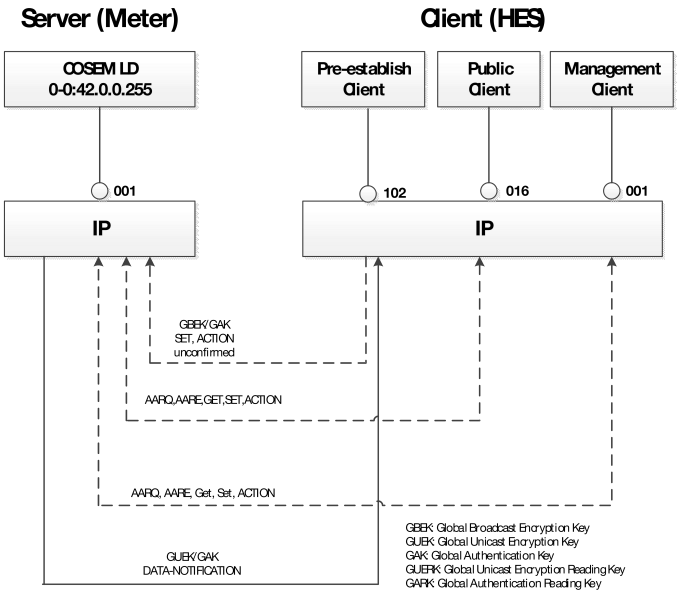
The COSEM server is structured into three levels as follows:

- Level 1: Physical Device
- Level 2: Logical Device
- Level 3: COSEM Objects

Each physical device (such as an electricity meter) can contain different Logical Devices. In here, only one logical device is defined as Management Logical Device (SAP: 001).

In meter, the logical device supports three COSEM clients as follows:

- Public Client (SAP: 016)
- Pre-established Client (SAP: 102)
- Management Client (SAP: 001)


Server (Meter)
Client (HES)
COSEM LD
0-0:42.0.0.255
Pre-establish
Client
Public
Client
Management
Client
001
102
016
001
IP
IP
GBEK/GAK
SET, ACTION
unconfirmed
AARQ,AARE,GET,SET,ACTION
AARQ, AARE, Get, Set, ACTION
GUEK/GAK
DATA-NOTIFICATION
GBEK Global Broadcast Encryption Key
GUEK Global Unicast Encryption Key
GAK Global Authentication Key
GUERK Global Unicast Encryption Reading Key
GARK Global Authentication Reading Key

3.2.2Security

The meter applies the information security methods described in sect. 9.2 of DLMS UA 1000-2 Ed. 8.3:2017. It need to supportthe management of the dedicated keys.

All messages should be authenticated and encrypted in HLS_5 (GMAC)association (Security Suite 0 is used).

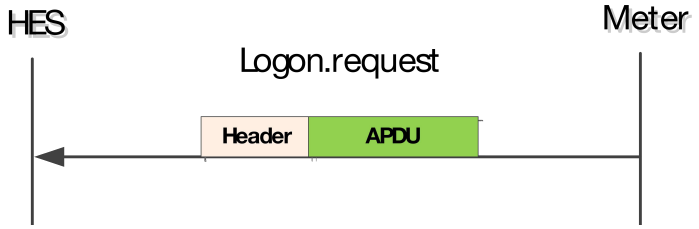
Security parameter	Default value (hex)
Global Authentication key	**********
Global Broadcast Encryption key	**********
Global Unicast Encryption key	**********
Master key	**********

Where "**********" is the default value of Global Authentication key/Global Broadcast Encryption key/Global Unicast Encryption key/Master key, them should be 16 bytes hexadecimal value in security suite 0 (AES-GCM-128) algorithm.

4 Use Cases

4.1 Meter Registration

Meter registered to HES by DLMS_IP.Establishment of the IP network connectivity is achieved following standard IP rules.



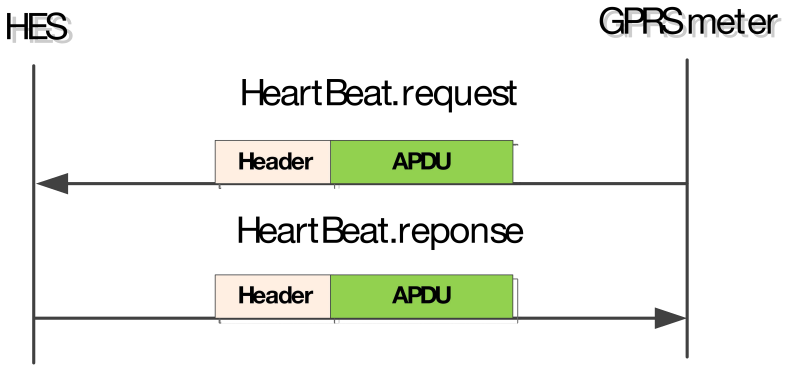
Note: Where 

is DLMS_IP protocol frame.

Meter initially sends **Logon. Request (Data_Notification Message)**to HES to inform master station its login request. In**Data_Notification Message**, Meter sends its device serial number to HES.

1) HeartBeat

HeartBeat is used to maintainTCP communication link. The default heartbeat sending cycle is 2 minuteswhich is configurable.



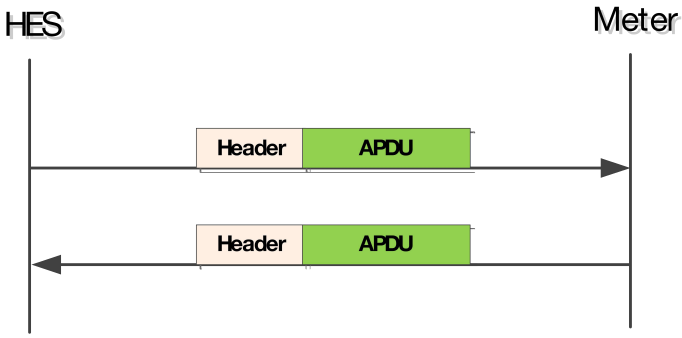
Note: Where 

is DLMS_IP protocol frame.

HeartBeat.Request message is actively sent by GPRS meter to HES.

4.2 Reading on Demand

At least the following types of registers are supported by the meter, these instances value could be reading on demand from HES to meter directly:



Note: Where 

is DLMS_IP protocol frame.

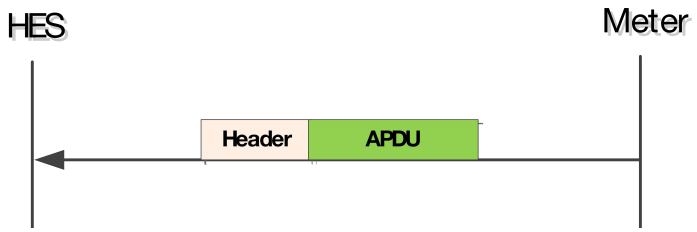
4.3 Reading for Billing and Load Profile

Different profiles are available in the meters:

- Load Profiles for electricity metering
- Billing profile for general metering

4.3.1 Reading for Billing and Load Profile using PUSH operation

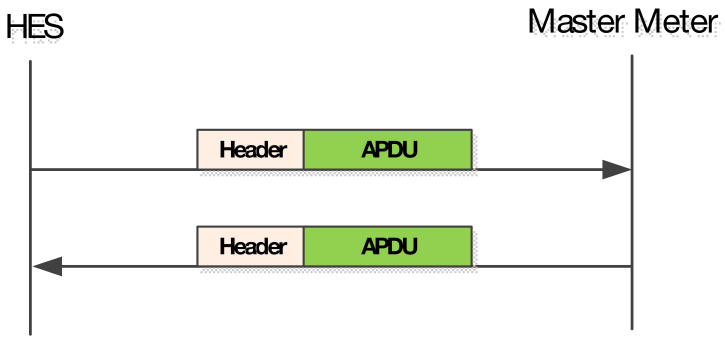
PUSH operation offers the possibility to periodically trigger Data-Notification services to transmitbilling/load profile data to the HES.



Note: Where 

is DLMS_IP protocol frame.

4.3.2 Reading for Billing and Load Profile using PULL operation

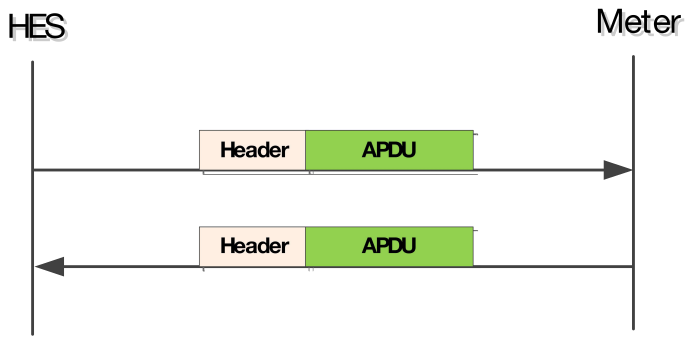


Note: Where 

is DLMS_IP protocol frame.

4.4 Remote Token Issue

The token can be sent to meter remotely, include vending token and management token.

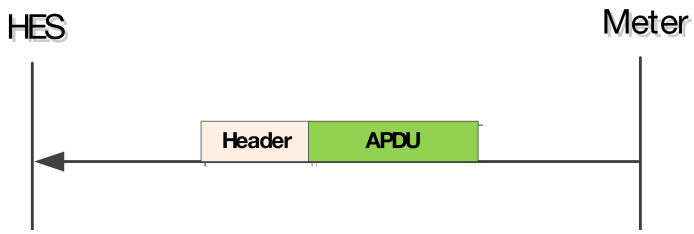


Note: Where 

is DLMS_IP protocol frame.

4.5 Events Report

A lot of events are generated by the meter itself,all these events are logged Inseveralevent logs.



Note: Where 

is DLMS_IP protocol frame.

Event can be report from meter to HES. The list of events which need to be report to HES can be configured as customer required.

5 Appendix

5.1 Events Code

Reference to“Object Model.xlsx” on sheet “Events”

5.2 Data Model

Reference to“Object Model.xlsx” on sheet “Object model”