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BSI Standards Publication

Electricity metering data exchange — The DLMS/COSEM Suite

Part 1-1: Template for DLMS/COSEM communication profile standards

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National foreword

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A list of organizations represented on this committee can be obtained on request to its secretary.

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Electricity metering data exchange – The DLMS/COSEM suite – Part 1-1: Template for DLMS/COSEM communication profile standards

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRICITY METERING DATA EXCHANGE – THE DLMS/COSEM SUITE –

Part 1-1: Template for DLMS/COSEM communication profile standards

FOREWORD

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Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 62056-1-1, which is a technical specification, has been prepared by IEC technical committee 13: Electrical energy measurement and control.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
13/1643A/DTS	13/1656/RVC

Full information on the voting for the approval of this technical specification can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62056 series, published under the general title *Electricity metering data exchange – The DLMS/COSEM suite*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

This Technical Specification defines a communication profile template, to be used for establishing IEC 62056 communication profile standards which follow the IEC 62056-1-0 standardization framework.

NOTE It is foreseen that this TS will be integrated into IEC 62056-1-0 as an informative Annex at the next revision of that standard.

In particular, this template is suited for establishing communication profile standards that specify how DLMS/COSEM is used on a specific communication technology where it is assumed that the specific communication technology is already defined by a specific communication standard. The purpose of this template is:

- to improve the readability of the standards;
- to improve the efficiency to develop communication profile standards.

In the Introduction of an IEC 62056 communication profile standard, remove the text above (starting with "This Technical Specification defines ..." and ending with "...to improve the efficiency to develop communication profile standards") and add the following text:

As defined in IEC 62056-1-0, the IEC 62056 DLMS/COSEM suite provides specific communication profile standards for communication media relevant for smart metering.

Such communication profile standards specify how the COSEM data model and the DLMS/COSEM application layer can be used on the lower, communication media specific protocol layers.

Communication profile standards refer to communication standards that are part of the IEC 62056 DLMS/COSEM suite or to any other open communication standard.

This International Standard specifies DLMS/COSEM communication profiles for <*add a brief description of the communication technology and the smart metering interfaces covered*>.

It follows the rules defined in IEC 62056-5-3:2016, Annex A.

Add one paragraph to justify the relevance of the standard by summarising the main use cases of this profile.

ELECTRICITY METERING DATA EXCHANGE – THE DLMS/COSEM SUITE –

Part 1-1: Template for DLMS/COSEM communication profile standards

The title of an IEC 62056 communication profile standard shall be:

ELECTRICITY METERING DATA EXCHANGE – THE DLMS/COSEM SUITE –

Part x-x: XXXX communication profile for YYYY networks

Where:

- *XXXX identifies the communication technology as it appears in the lower layer standard(s) referenced);*
- *YYYY identifies the smart metering network section(s) (WAN, NN, LN) the communication technology is used for.*

1 Scope

This part of IEC 62056 defines a template for IEC 62056 communication profile standards.

It provides the “Table of contents” of such standards and provides guidance to develop the content of the relevant clauses and subclauses.

NOTE The parts of the standard providing guidance are written in italic font.

In the Scope of an IEC 62056 communication profile standard, remove the text above and add the following:

This International Standard specifies DLMS/COSEM communication profiles for <*add a brief description of the communication technology and the smart metering interfaces covered*>.

The scope of this communication profile standard is restricted to aspects concerning the use of communication protocols in conjunction with the COSEM data model and the DLMS/COSEM application layer. Data structures specific to a communication protocol are out of the Scope of the communication profile standard.

They should be specified in the specific protocol standards.

Any project specific definitions of data structures and data contents may be provided in project specific companion specifications.

Add any other relevant information identifying what is and what is not in the Scope of the communication profile standard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

List here the standards which are normatively referenced in this document.

IEC 62056-1-0, *Electricity metering data exchange – The DLMS/COSEM suite – Part 1-0: Smart metering standardisation framework*

IEC 62056-4-7, *Electricity metering – Data exchange for meter reading, tariff and load control: DLMS/COSEM transport layers for IP networks*

IEC 62056-5-3:2016, *Electricity metering data exchange – The DLMS/COSEM suite – Part 5-3: DLMS/COSEM application layer*

IEC 62056-6-1, *Electricity metering data exchange – The DLMS/COSEM suite – Part 6-1: Object Identification System (OBIS)*

IEC 62056-6-2, *Electricity metering data exchange – The DLMS/COSEM suite – Part 6-2: COSEM interface classes*

IEC 62056-9-7, *Electricity metering data exchange – The DLMS/COSEM SUITE – Part 9-7: Communication profile for TCP-UDP/IP networks*

3 Terms, definitions and abbreviations

Include here the relevant terms, definitions and abbreviations as shown below:

3.1 Terms and definitions

For the purposes of this document, the terms and definitions in IEC 60050-300, IEC 62051, IEC 62051-1, IEC 62056 (all parts) as well as the following apply.

Where there is a difference between the definitions in the glossaries and those contained in communication profile standards established by TC 13, then the latter shall take precedence in applications of the relevant standard.

For terms and definitions, use the format below:

3.1.1
term 1
definition 1

EXAMPLE 1 First example for term 1.

EXAMPLE 2 Second example for term 1.

Note 1 to entry: First note for term 1.

Note 2 to entry: Second note for term 1.

[SOURCE: where definition 1 was found]

3.1.2
term 2
definition 2

EXAMPLE Only one example for term 2 – no numbering.

Note 1 to entry: Only one note for term 2 – still needs to be numbered.

Examples (to be deleted):

3.1.3
new system
server system, which is in the unconfigured state: its MAC address equals "NEW-address"

[SOURCE: IEC 61334-4-511:2000, 3.9.3]

3.1.4
new system title
system-title of a new system

[SOURCE: IEC 61334-4-511:2000, 3.9.4]

Note 1 to entry: This is the system title of a system, which is in the new state.

3.2 Abbreviations

Include here all abbreviations used in the text:

Examples (to be deleted if not used):

AA	Application Association
APDU	Application Layer Protocol Data Unit
COSEM	Companion Specification for Energy Metering
DLMS	Device Language Message Specification
HDLC	High-level Data Link Control
IP	Internet Protocol
TCP	Transmission Control Protocol
xDLMS_ASE	Extended DLMS Application Service Element

4 Targeted communication environments

Define the communication environment – with respect to the smart metering architecture used in IEC 62056-1-0 – for which the communication profile standard is specified. In the text, identify the entities and interfaces implementing the communication profile standard. See Figure 1.

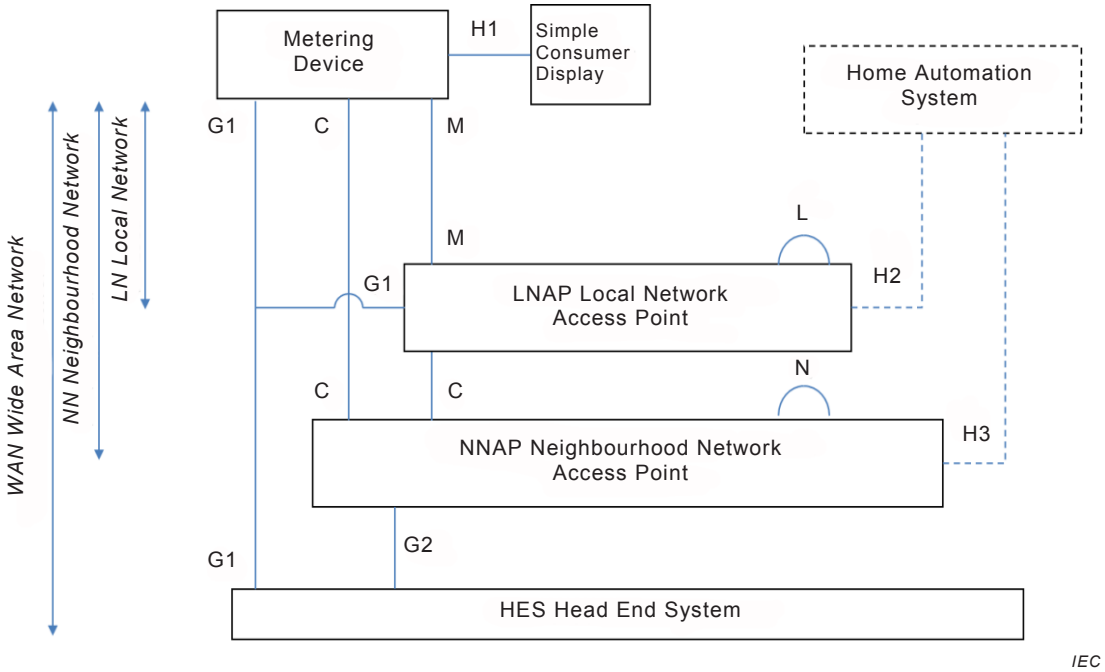

Figure 1 – Entities and interfaces of a smart metering system using the terminology of IEC 62056-1-0

5 Use of the communication layers for this profile

5.1 Information related to the use of the standard specifying the lower layers

*Provide here all information that is relevant for using the communication standard in the communication profile standard but which is **not part** of the communication standard referenced:*

- *selection from the options which are foreseen by the communication standard;*
- *parts of the communication standard which are not used;*
- *restrictions concerning the use of the communication standard in the communication profile standard;*
- *addressing (apart from the elements specified in Clause 6).*

Extensions to the existing communication standards should be avoided. Modifications to the existing communications standards shall be avoided.

Additional details may be specified in 5.3.

5.2 Structure of the communication profiles

This subclause specifies the structure of the communication profile, i.e. the protocol layers included.

If DLMS/COSEM can be used over the lower layers specified by the protocol standard in different ways, several communication profiles can be specified in the standard.

Define the reference architecture according to Figure 2 below:

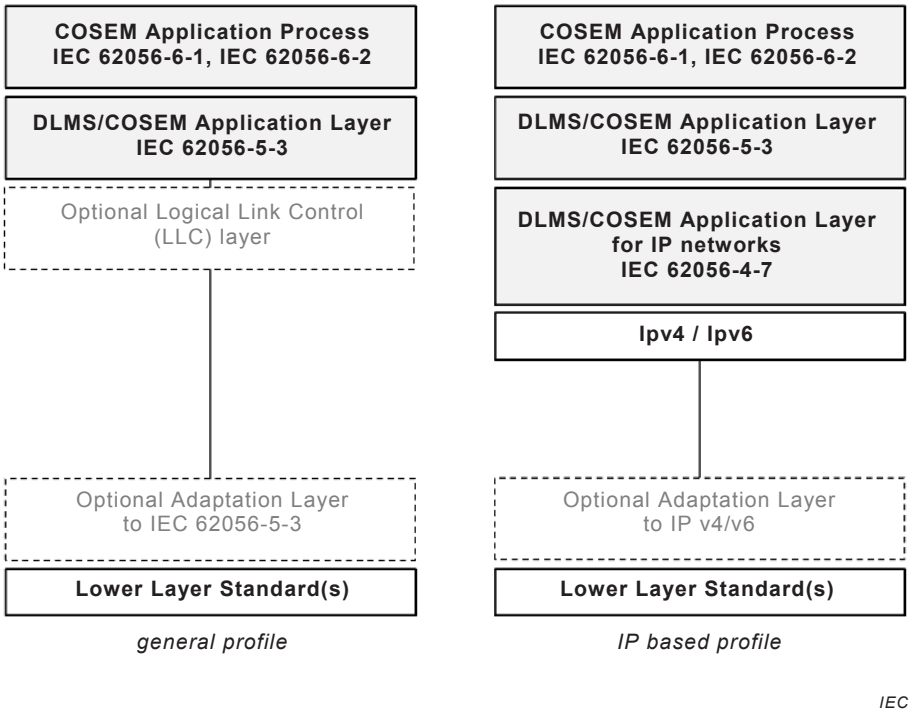

Figure 2 – The DLMS/COSEM *xxx* communication profile(s)

In the case of IP based communication profiles, the DLMS/COSEM transport layer specified in IEC 62056-4-7 shall be present supporting the DLMS/COSEM application layer. The DLMS/COSEM communication profile for TCP-UDP/IP networks is specified in IEC 62056-9-7.

NOTE That standard leaves the selection and use of lower layers open.

The layers below the DLMS/COSEM application or the IPv4 / IPv6 layer are specific to the communication profile standard.

All lower layers shall be specified in existing open standards.

If necessary, an adaptation layer may be introduced:

- *In case of the general profile: the adaptation layer is placed either immediately below the DLMS/COSEM application layer or, if the optional LLC layer is present, the adaptation layer is placed below the LLC layer.*
- *In case of the IP based profile: the adaptation layer is placed below the IPv4 / IPv6 layer.*

5.3 Lower protocol layers and their use

5.3.1 Overview

If necessary, provide an overview here on using the protocol standard and justify the choice of the options.

List then all layers which are specified in the referenced standard(s).

5.3.2 Physical Layer

<Add>

5.3.3 MAC layer

<Add>

5.3.4 xxx layer

<Add any additional protocol layer that is specified in the protocol standard>.

5.4 Service mapping and adaptation layers

In the case of a "general profile" – see Figure 2 – specify how the DLMS/COSEM application layer uses the services provided by the highest layer of the communication standard used by this profile.

NOTE This may be the data link layer which, in the OSI model, consists of the MAC layer and the LLC layer.

In the case of an "IP based" profile" – see Figure 2 – specify how the highest layer of the communication standard transports IP packets.

If necessary, specify an adaptation layer that can support the DLMS/COSEM application layer or the IPv4 / IPv6 layer and that can use the services of the highest layer of the communication standard.

For the adaptation layer, specify their services and the protocol of those services.

Several service mappings / adaptation layers may be specified for example for communication profiles using IP or not, using IPv4 or IPv6, using TCP or UDP.

5.5 Registration and connection management

If necessary, specify the way the devices hosting DLMS/COSEM servers and implementing the communication profile join/leave the network, get registered, obtain their network address and get the lower communication layers connected.

If this is specified by the communication standard, then reference the relevant Clauses of that standard.

Specify also how the COSEM application process and the DLMS/COSEM application layers are informed about the network and connection status as well as the current address(es) of the devices.

For COSEM interface classes used to set up the communication media and to manage, see Clause 8.

6 Identification and addressing schemes

Specify here how the client and server COSEM Application Process are identified and addressed in this communication profile, so that Application Associations can be established and released.

At least the following elements need to be identified / addressed:

- *Physical devices hosting clients and servers;*
- *Client and server SAPs (Service Access Points).*

Specify addressing needed at the intermediate layers.

Table 1 provides an example of specifying client and server SAPs.

Table 1 – Client and server SAPs

Client SAPs	
No-station	*0x00*
Client Management Process	*0x01*
Public Client	*0x10*
Open for client SAP assignment	*0x02 …0x0F*
	0x11… 0xFF
Server SAPs	
No-station	*0x00*
Management Logical Device	*0x01*
Reserved for future use	*0x02…0x0F*
Open for server SAP assignment	*0x10…0x7E*
All-station (Broadcast)	*0xFF*

7 Specific considerations for the application layer services

7.1 Overview

Specify constraints and options as appropriate, resulting from the choice of the specific communication layers in using DLMS/COSEM application layer services.

7.2 Application Association establishment and release: ACSE services

Specify here, with reference to IEC 62056-5-3 how Application Associations are established and released using the ACSE services.

Specify the use of confirmed, unconfirmed and pre-established AAs.

Specify the values and use of the communication profile specific parameters of the COSEM-OPEN service, specified in IEC 62056-5-3, including the following parameters:

- *Protocol_Connection_Parameters;*
- *User_Information;*
- *Service_Class.*

7.3 xDLMS services

Specify here how the various solicited (request/response type) and unsolicited, confirmed and unconfirmed, unicast / multicast / broadcast xDLMS services can be used.

7.4 Security mechanisms

Specify here how the security mechanisms provided by the COSEM object model and the DLMS/COSEM application layer can be used in the communication profile.

Specify the particularities of establishing and updating security keys and public key Certificates.

Describe also if and how (by reference) security features provided by the lower layer protocol standard are used.

7.5 Transferring long application messages

Specify here how long application messages can be transferred using DLMS/COSEM application layer level block transfer and/or segmentation and reassembly provided by the lower layers or the adaptation layers.

This subclause may refer to the specification of the lower layers or the adaptation layers if segmentation / reassembly are provided by them.

7.6 Media access, bandwidth and timing considerations

Specify here any media access, bandwidth and timing related considerations on using DLMS/COSEM.

7.7 Other considerations

Specify here, as needed, any other elements.

8 Communication configuration and management

For all aspects visible to the COSEM application process existing configuration COSEM interface classes specified in IEC 62056-6-2 *shall be referenced.*

If new COSEM Interface Classes or new OBIS codes are needed then they shall be defined in Annex B.

9 The COSEM application process

Specify here, as needed, all communication profile specific features/restrictions concerning the COSEM application process.

If the communication profile does not affect the COSEM AP then this clause shall be empty.

10 Additional considerations for the use of this profile

Specify here all aspects which cannot be covered by the other clauses. Ideally this clause shall be empty.

Annex A
(informative)

Examples

Add here examples illustrating all aspects treated in the main part:

- *Configuration of the lower layers*
- *Encoding examples of 62056-5-3 APDUs transported though the lower communication layers*

A.1 Example 1: xxx

A.2 Example 2: xxx

Annex B
(normative)

New COSEM interface classes and OBIS codes

This Annex contains the specification of new COSEM interface classes related to the communication profile. New COSEM interface classes shall not have any impact on the existing COSEM interface classes specified in IEC 62056-6-2.

It also specifies the relation of the COSEM interface classes to OBIS.

The COSEM interface classes and the OBIS codes specified in this Annex will be integrated into the next edition of IEC 62056-6-2 and IEC 62056-6-1 as appropriate.

Integration of the COSEM interface classes and the OBIS codes into IEC 62056-6-2 and IEC 62056-6-1 cancels and supersedes this Annex.

Index

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