This is a free page sample. Access the full version online.

NSAI Standards

Irish Standard Recommendation
S.R. CLC/TS 50568-8:2015

Electricity metering data exchange - The DLMS/COSEM suite - Part 8: SMITP B-PSK PLC communication profile for neighbourhood networks - Including: The Original-SMITP PLC B-PSK communication profile, The Original-SMITP Local data exchange profile and The Original-SMITP IP communication profile

© CENELEC 2015 No copying without NSAI permission except as permitted by copyright law.

This is a free page sample. Access the full version online.

S.R. CLC/TS 50568-8:2015

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:	*Published:*
CLC/TS 50568-8:2015	2015-04-24

This document was published under the authority of the NSAI and comes into effect on:	ICS number:
2015-05-12	NOTE: If blank see CEN/CENELEC cover page

NSAI	T +353 1 807 3800	Sales:
1 Swift Square,	F +353 1 807 3838	T +353 1 857 6730
Northwood, Santry	E standards@nsai.ie	F +353 1 857 6729
Dublin 9	W NSAI.ie	W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

This is a free page sample. Access the full version online.

TECHNICAL SPECIFICATION

SPÉCIFICATION TECHNIQUE

TECHNISCHE SPEZIFIKATION

CLC/TS 50568-8

April 2015

ICS 35.240.60; 91.140.50

English Version

Electricity metering data exchange - The DLMS/COSEM suite - Part 8: SMITP B-PSK PLC communication profile for neighbourhood networks - Including: The Original-SMITP PLC B-PSK communication profile, The Original-SMITP Local data exchange profile and The Original-SMITP IP communication profile

This Technical Specification was approved by CENELEC on 2014-11-11.

CENELEC members are required to announce the existence of this TS in the same way as for an EN and to make the TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

© 2015 CENELEC All rights of exploitation in any form and by any means reserved worldwide for CENELEC Members.

Ref. No. CLC/TS 50568-8:2015 E

This is a free page sample. Access the full version online.

CONTENTS

Foreword 9
Introduction 10
1 Scope 11
2 Normative references 12
3 Acronyms and abbreviations, terms, definitions and notations 13
3.1 Acronyms and abbreviations 13
3.2 Terms and definitions 14
3.3 Notations 15
4 The DLMS/COSEM SMITP B-PSK PLC profile 16
4.1 Structure of the profile 16
4.2 Physical layer 17
4.3 Data link layer 17
4.4 Application to data link convergence layer 17
4.5 Application layer 27
4.6 Application process 27
4.7 PLC network management 28
4.8 Addressing 31
4.9 System variables 32
5 The Original-SMITP B-PSK PLC profile 33
5.1 Overview 33
5.2 Structure of the profile 33
5.3 Physical layer 34
5.4 Data Link layer 35
5.5 Application layer 35
5.6 SMITP Data model 35
5.7 Application process 35
6 The Original-SMITP IP profile 43
6.1 Overview 43
6.2 Structure of profile 43
6.3 Physical and data link layers 44
6.4 Transport and network layers 44
6.5 Application layer 48
6.6 SMITP Data model 48
7 Original-SMITP Local Optical interface profile 49
7.1 Overview 49
7.2 Physical layer 49
7.3 Data transmission protocol 50
7.4 Packet’s protocol format 51
7.5 Data Link Layer 53
8 Discovery and registration services 55
8.1 DLMS/COSEM over B-PSK discovery and registration services 55
8.2 Original-SMITP over B-PSK discovery and registration services 68

This is a free page sample. Access the full version online.

9 The Original-SMITP AL Services 75
9.1 Application messages exchanged in distribution line networks 75
9.2 Application messages exchanged in telecommunication public networks 107
9.3 Encryption, Authentication and Playback Attacks Protection 131
9.4 Enconding examples 136
9.5 TCP/IP encapsulation example of SMITP TB Application layer message 141
10 The Original-SMITP Data model 144
10.1 Introduction 144
10.2 Internal parameters 145
10.3 Total energies 148
10.4 Daily energies 149
10.5 Load profiles and setting parameters 150
10.6 Communication address and keys of authentication 153
10.7 Meter identification information 156
10.8 Temporal information 157
10.9 Billing period information 160
10.10 Software, Hardware and Security information 162
10.11 Supply contract information 165
10.12 Weekly tariff information 169
10.13 Annual tariff information 179
10.14 Public holidays programming 181
10.15 Load modulation parameters 182
10.16 Voltage interruption information 185
10.17 Voltage variation information 191
10.18 Control information 197
10.19 Normal Status Word 200
10.20 Extended Status Word 202
10.21 Cut-off device control information 204
10.22 Display management 206
10.23 Download parameters 208
10.24 Measurand profiles and parameters 211
10.25 Synchronized measurand registers 215
10.26 Event log management 219
10.27 Billing data information 221
10.28 Virtual billing data registers 237
10.29 Time stamp of maximum power demand 246
10.30 Measurand information 252
10.31 Reading mode management 255
10.32 Management of log's events 256
Annex A (informative) Node discovery procedure example using the DLMS/COSEM SMITP B-PSK PLC profile 261
A.1 Node Discovery 261
A.1.1 Discover nodes directly accessible from the Concentrator 261
A.1.2 Enable L1 meters to discover nodes not directly accessible from the Concentrator 263
A.1.3 Gathering discovered nodes from L1 meters 263

This is a free page sample. Access the full version online.

A.1.4 Repeating the process with L1 meters until no new meters are discovered 265
A.2 Registration and routing management 268
Annex B (informative) Node discovery procedure example using the Original-SMITP over B-PSK PLC profile 270
B.1 Node Discovery 270
B.1.1 Discover nodes directly accessible from the Concentrator 272
B.1.2 Enable L1 meters to discover nodes not directly accessible from the Concentrator 272
B.1.3 Gathering discovered nodes from L1 meters 272
B.1.4 Repeating the process with L1 meters until no new meters are discovered 274
B.2 Registration and routing management 278
Annex C (informative) SMITP specific definitions 280
C.1 Management of reserved elements 280
C.2 ECTL structure 280
Annex D (normative) MIB and COSEM Set-up class interface 281
D.1 General 281
D.2 Types definition 281
D.3 SMITP configuration attributes 281
D.4 SMITP statistical attributes 284
Annex E (informative) Specification of communication mode F for direct local data exchange 285
E.1 Introduction 285
E.2 Mode F for direct local data exchange 285
E.2.1 General 285
E.2.2 Sign-on flow 285
E.2.3 Physical layer primitives 286
E.2.4 Timers 287
E.3 Sign on example 287
E.3.1 Identifier request -300 baud- (TP) 287
E.3.2 Meter identifier response from meter -300 baud- 287
E.3.3 Work mode selection -300 baud- (HHU) 288

List of figures

Figure 1 – Document structure of CLC/TS 50568-8 11
Figure 2 – The DLMS/COSEM SMITP B-PSK PLC communication profile 16
Figure 3 – Services of the COSEM to B-PSK convergence layer 18
Figure 4 – Type 1 CLPDU format 20
Figure 5 – Type 2 CLPDU format 20
Figure 6 – Control field format 21
Figure 7 – Sequence chart of a CL transfer not requiring segmentation 22
Figure 8 – sequence chart of a CL transfer requiring segmentation at both sides 23
Figure 9 – sequence chart of a CL transfer requiring segmentation using the unconfirmed service 25

This is a free page sample. Access the full version online.

Figure 10 – Meter's state diagram 31
Figure 11 – Reference communication architecture 32
Figure 12 – Protocol stack for SMITP on PLC 33
Figure 13 – Meter's state diagram 36
Figure 14 – Synchronization without protection 37
Figure 15 – Synchronization with protection 37
Figure 16 – Individual registers reading 37
Figure 17 – Table registers reading 38
Figure 18 – Individual registers writing 38
Figure 19 – Table registers writing 38
Figure 20 – Download procedure 40
Figure 21 – Reference communication architecture 43
Figure 22 – Protocol stack for SMITP on IP 44
Figure 23 – Connection Opening 47
Figure 24 – Data exchange 47
Figure 25 – Connection Closing 48
Figure 26 – Optical interface protocl stack 49
Figure 27 – Messages sequence in connection procedure between meter and HHU 50
Figure 28 – Connection request message 52
Figure 29 – Identification response message 52
Figure 30 – Acknowledgement message 53
Figure 31 – MAC frame structure 53
Figure 32 – Discover messages exchange 58
Figure 33 – DiscoverReport messages exchange 59
Figure 34 – TCTset messages exchange 60
Figure 35 – DiscoverForward messages exchange 61
Figure 36 – DiscoverForwardReport messages exchange 63
Figure 37 – Status messages exchange 64
Figure 38 – Register messages exchange 65
Figure 39 – RegisterReport messages exchange 66
Figure 40 – Deregister messages exchange 67
Figure 41 – Ping.request messages exchange 68
Figure 42 – Ping.response messages exchange 68
Figure 43 – Subnets of the network 75
Figure 44 – Request A-Node to transmit data to B-Node 97
Figure 45 – Request A-Node to transmit data to B-Node: B-Node does not answer 98
Figure 46 – Structure of messages exchanged in telecommunication networks 108
Figure 47 – Structure of Message Header 109
Figure 48 – Structure of Message Data 109
Figure 49 – TB messages exchange in the On-Line transaction 113
Figure 50 – Error condition during the transaction 114

This is a free page sample. Access the full version online.

Figure 51 – TB messages exchange in the Off-Line transaction 115
Figure 52 – Messages to cancel a transaction required by AMM system 115

List of tables

Table 1 – Convergence layer error management scheme 26
Table 2 – Example of message structure to be displayed 42
Table 3 – Standard ASCII control characters 51
Table 4 – Baud Rate coded values 53
Table 5 – Discover service 58
Table 6 – Discover service arguments 58
Table 7 – DiscoverReport service 59
Table 8 – DiscoverReport service arguments 59
Table 9 – TCTset service 60
Table 10 – TCTSet service arguments 60
Table 11 – DiscoverForward service 61
Table 12 – DiscoverForward service arguments 61
Table 13 – DiscoverForwardReport service 62
Table 14 – DiscoverForwardReport service arguments 62
Table 15 – Status service 63
Table 16 – Status service arguments 63
Table 17 – Register service 64
Table 18 – Register service arguments 64
Table 19 – RegisterReport service 65
Table 20 – RegisterReport service arguments 65
Table 21 – Deregister service 66
Table 22 – Deregister service arguments 66
Table 23 – Ping service 67
Table 24 – Ping service arguments 67
Table 25 – Chl.Req 112 message 69
Table 26 – Chl.Resp 113 message 69
Table 27 – Address.Req 090 message 70
Table 28 – TCT_Set.Req 092 message 71
Table 29 – ReqAddr.Req 094 message 71
Table 30 – Address.Resp 091 message 72
Table 31 – ReqAddr.Resp 095 message 73
Table 32 – Structure of Struct Address.Resp 73
Table 33 – NACK.RESP 247 message 74
Table 34 – Application messages in distribution line network 77
Table 35 – Write.Req 004 message for clock synchronization 79
Table 36 - Write.Req 004 message for general parameter writing 79
Table 38 – WriteTab.Req 010 message 81

This is a free page sample. Access the full version online.

Table 39 – WriteTab.Req 110 message 82
Table 40 – SetTab.Req 014 message 83
Table 41 – SetTab.Req 114 message 84
Table 42 – Example of a table set command 85
Table 43 – ResetTab.Req 016 message 85
Table 44 – ResetTab.Req 116 message 86
Table 45 – Read.Req 002 message 87
Table 46 – Read.Resp 003 message 87
Table 47 – ReadTab.Req 006 message 88
Table 48 – ReadTab.Resp 007 message 88
Table 49 – ReadTab.Req 008 message (block read) 89
Table 50 – ReadTab.Resp 009 message (block read) 89
Table 51 – GetTab.Req 030 message 90
Table 52 – GetTab.Resp 031 message 91
Table 53 – Authenticated Read.Req 102 message 91
Table 54 – Authenticated Read.Resp 103 message 92
Table 55 – Authenticated ReadTab.Req 106 message 93
Table 56 – Authenticated ReadTab.Resp 107 message 93
Table 57 – Authenticated ReadTab.Req 108 message (block read) 94
Table 58 – Authenticated ReadTab.Resp 109 message (block read) 95
Table 59 – Authenticated GetTab.Req 130 message 95
Table 60 – Authenticated GetTab.Resp 131 message 96
Table 61 – SetIC.Req 040 message 97
Table 62 – Authenticated SetIc.Req 140 message 98
Table 63 – WriteTabIC.Req 042 message 99
Table 64 – Authenticated WriteTabIc.Req 142 message 100
Table 65 – Reprog 100 message (local programming) 101
Table 66 – Reprog 101 message (broadcast programming) 101
Table 67 – Command 018 message 102
Table 68 – Authenticated Command 118 message 102
Table 69 – A-Node ACK 253 message 103
Table 70 – Authenticated A-Node ACK 243 message 104
Table 71 – A-Node NACK 255 message 104
Table 72 – Authenticated A-Node NACK 245 message 104
Table 73 – Coding of field Value in A-Node Nack messages 105
Table 74 – Coding of sub field SSAP in LLC frame 105
Table 75 – B-Node ACK 251 message 106
Table 76 – Authenticated B-Node ACK 241 message 106
Table 77 – B-Node NACK 249 message 106
Table 78 – Authenticated B-Node NACK 239 message 107
Table 79 – Coding of field Value in B-Node Nack messages 107

This is a free page sample. Access the full version online.

Table 80 – Relationship between Message Code, Prot and Action fields 110
Table 81 – General description of a message using SMITP references 110
Table 82 – TB Message example 1 111
Table 83 – PLC translation of previous TB message 111
Table 84 – TB Message example 2 111
Table 85 – PLC translation of previous TB message 111
Table 86 – TB application messages in telecommunication public network 111
Table 87 – TB Write.Req 004 message (single programming of one parameter) 116
Table 88 – TB Write.Req 004 message (single programming of more parameters) 116
Table 89 – TB Sinc.Req 034 message 117
Table 90 – TB WriteTab.Req 010 message 118
Table 91 – TB SetTab.Req 014 message 119
Table 92 – TB ResetTab 016 message 119
Table 93 – TB GetTab.Req 030 message 120
Table 94 – TB GetTab.Resp 031 message 121
Table 95 – TB Read.Req 002 message 121
Table 96 – TB Read.Resp 003 message 122
Table 97 – TB ReadTab.Req 006 message 123
Table 98 – TB ReadTab.Resp 007 message 123
Table 99 – TB ReadTab.Req 008 message (entire table) 124
Table 100 – TB ReadTab.Resp 009 message (entire table) 124
Table 101 – TB Command 018 message 125

This is a free page sample. Access the full version online.

Foreword

This document (CLC/TS 50568-8:2015) has been prepared by CLC/TC 13, "Electrical energy measurement and control".

The following date is fixed:

- latest date by which the existence of this document has to be announced at national level (doa) 2015-07-24

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

The European Committee for Electrotechnical Standardization (CENELEC) draws attention to the fact that it is claimed that compliance with this International Standard may involve the use of a maintenance service concerning the stack of protocols on which the present Technical Specification CLC/TS 50568 is based.

The CENELEC takes no position concerning the evidence, validity and scope of this maintenance service.

The provider of the maintenance service has assured the CENELEC that he is willing to provide services under reasonable and non-discriminatory terms and conditions for applicants throughout the world. In this respect, the statement of the provider of the maintenance service is registered with the CENELEC. Information may be obtained from:

Meters and More Open Technologies
Brussels/Belgium
www.metersandmore.eu

This is a free page sample. Access the full version online.

Introduction

This Technical Specification is based on the results of the European OPEN Meter project, Topic Energy 2008.7.1.1, Project no.: 226369, www.openmeter.com.

This is a free page sample. Access the full version online.

1 Scope

This Technical Specification contains 4 profile specifications

- the DLMS/COSEM SMITP B-PSK PLC Profile (clause 4)
- the Original-SMITP B-PSK PLC Profile (clause 5)
- the Original-SMITP IP Profile (clause 6)
- the Original-SMITP Local data exchange profile (clause 7)

The **DLMS/COSEM SMITP B-PSK profile** (see Clause 4) defines the use of the CLC/TS 50568-4 communication protocol and methods to access and exchange data modelled by the COSEM objects of EN 62056-6-2 via the EN 62056-5-3 application layer. This clause is in line with the DLMS/COSEM suite as described in EN 62056-1-0.

The **Original-SMITP Profiles** (Clauses 5, 6 and 7) define the use of the CLC/TS 50568-4 communication protocol and methods to access and exchange data modelled by the Original-SMITP Data Model (clause 10) via the Original-SMITP Application Layer (Clause 9). These clauses are not part of the DLMS/COSEM suite as described EN 62056-1-0.

NOTE The expression Original-SMITP refers to the open Smart Metering Information and Telecommunication Protocol originally developed and maintained by the Meters and More Association (see Foreword). The Original SMITP specifications were developed prior to the availability of the DLMS/COSEM SMITP B-PSK profile.

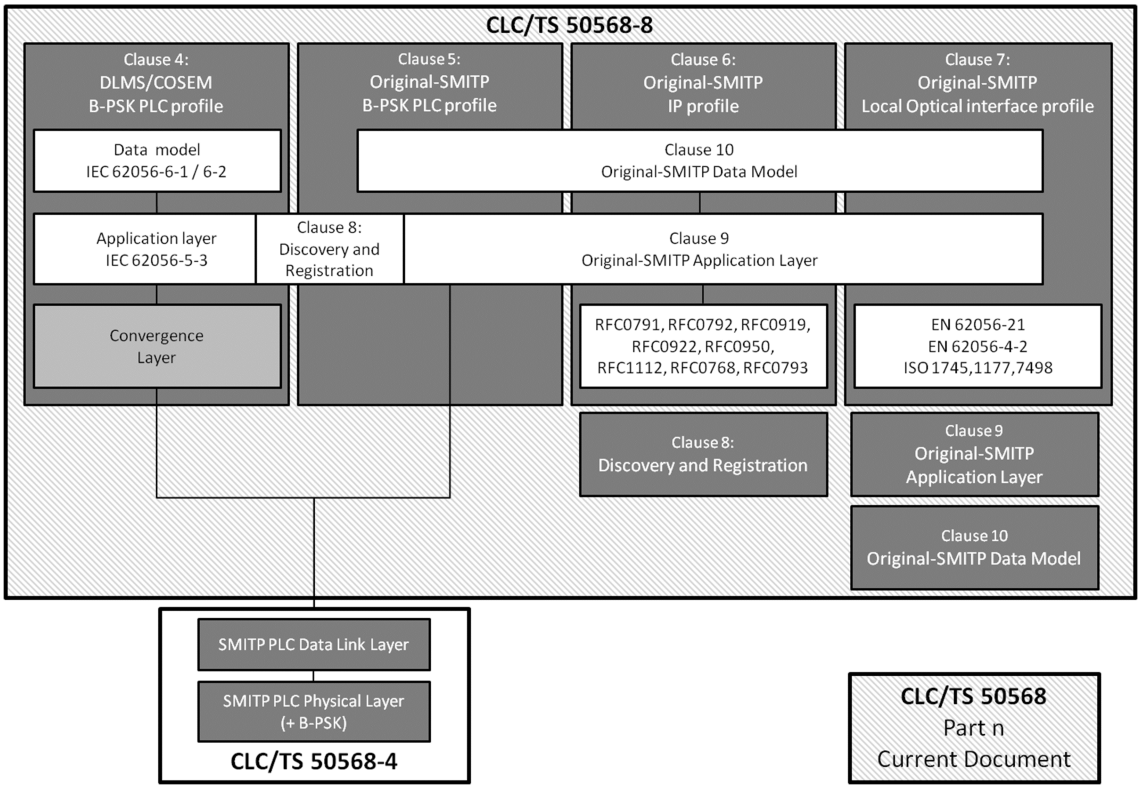

Figure 1 – Document structure of CLC/TS 50568-8

SAI GLOBAL

This is a free preview. Purchase the entire publication at the link below:

Product Page

Looking for additional Standards? Visit Intertek Inform Infostore

Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation