



**NSAI**  
Standards

Irish Standard Recommendation  
S.R. CLC/TS 50586:2019

## Open Smart Grid Protocol (OSGP)

© CENELEC 2019 No copying without NSAI permission except as permitted by copyright law.

**S.R. CLC/TS 50586:2019**

*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:*

CLC/TS 50586:2019

*Published:*

2019-11-01

*This document was published under the authority of the NSAI and comes into effect on:*

2019-11-26

*ICS number:*

*NOTE: If blank see CEN/CENELEC cover page*

NSAI  
1 Swift Square,  
Northwood, Santry  
Dublin 9

T +353 1 807 3800  
F +353 1 807 3838  
E standards@nsai.ie  
W NSAI.ie

Sales:  
T +353 1 857 6730  
F +353 1 857 6729  
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

## National Foreword

S.R. CLC/TS 50586:2019 is the adopted Irish version of the European Document CLC/TS 50586:2019, Open Smart Grid Protocol (OSGP)

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

For relationships with other publications refer to the NSAI web store.

**Compliance with this document does not of itself confer immunity from legal obligations.**

*In line with international standards practice the decimal point is shown as a comma (,) throughout this document.*

This page is intentionally left blank

TECHNICAL SPECIFICATION  
SPÉCIFICATION TECHNIQUE  
TECHNISCHE SPEZIFIKATION

**CLC/TS 50586**

November 2019

ICS

English Version

**Open Smart Grid Protocol (OSGP)**

Protocole ouvert pour Réseau Intelligent

Open Smart Grid Protocol (OSGP)

This Technical Specification was approved by CENELEC on 2019-09-02.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, 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: Rue de la Science 23, B-1040 Brussels**

## **Contents**

	Page
<b>European Foreword .....</b>	<b>9</b>
<b>Introduction .....</b>	<b>10</b>
<b>1 Scope .....</b>	<b>11</b>
<b>2 Normative references .....</b>	<b>11</b>
<b>3 Terms and definitions and abbreviations .....</b>	<b>11</b>
<b>3.1 Terms and definitions .....</b>	<b>11</b>
<b>3.2 Abbreviations .....</b>	<b>16</b>
<b>4 PLC network management.....</b>	<b>18</b>
<b>4.1 Overview .....</b>	<b>18</b>
<b>4.2 Metering device lifecycle .....</b>	<b>19</b>
<b>4.3 ATM Protocol.....</b>	<b>19</b>
<b>4.3.1 Overview .....</b>	<b>19</b>
<b>4.3.2 ATM responsibilities.....</b>	<b>20</b>
<b>4.3.3 Automatic discovery .....</b>	<b>20</b>
<b>4.3.4 Discovery domain .....</b>	<b>20</b>
<b>4.3.5 ATM messages.....</b>	<b>20</b>
<b>4.4 Commissionning.....</b>	<b>24</b>
<b>4.4.1 Overview .....</b>	<b>24</b>
<b>4.4.2 Commissionning operations .....</b>	<b>25</b>
<b>5 OSGP Device data representation .....</b>	<b>25</b>
<b>5.1 General overview .....</b>	<b>25</b>
<b>5.2 Data types .....</b>	<b>25</b>
<b>5.3 Pending tables .....</b>	<b>27</b>
<b>5.4 Value Control Identifiers (VCI).....</b>	<b>28</b>
<b>5.5 Value .....</b>	<b>28</b>
<b>5.6 Register Naming Convention .....</b>	<b>28</b>
<b>5.7 Table and Procedure Naming Convention .....</b>	<b>28</b>
<b>5.8 Interface Change Alarm (ICA NACK) .....</b>	<b>29</b>
<b>6 Security.....</b>	<b>29</b>
<b>6.1 Overview .....</b>	<b>29</b>
<b>6.2 Security suites .....</b>	<b>29</b>
<b>6.2.1 Overview .....</b>	<b>29</b>
<b>6.2.2 OSGP-AES-128-PSK .....</b>	<b>29</b>
<b>6.2.3 OMAK .....</b>	<b>30</b>
<b>6.2.4 Access control .....</b>	<b>30</b>
<b>6.3 Hardware Lock .....</b>	<b>30</b>
<b>7 Device Functional Description of the case the OSGP device is an electric power metering device.....</b>	<b>30</b>
<b>7.1 Overview .....</b>	<b>30</b>
<b>7.2 Time-Of-Use Calendar (optional).....</b>	<b>30</b>
<b>7.2.1 Overview .....</b>	<b>30</b>
<b>7.2.2 Manual Override Option (optional).....</b>	<b>31</b>
<b>7.2.3 Over Power Threshold Tariff (optional).....</b>	<b>32</b>
<b>8 Clock Adjustment (mandatory) .....</b>	<b>32</b>
<b>8.1 Absolute Time Synch .....</b>	<b>32</b>
<b>8.1.1 General.....</b>	<b>32</b>
<b>8.1.2 Clock Adjustment by Delta .....</b>	<b>32</b>
<b>8.2 Billing Functions.....</b>	<b>33</b>

8.2.1	Self Reads (mandatory) .....	33
8.2.2	Total Energy (optional) .....	33
8.2.3	On-Demand Read of Current Billing Register Values (mandatory).....	33
8.3	Load Profile (mandatory) .....	33
8.3.1	Overview.....	33
8.3.2	Use case: Reading Load Profile Data.....	34
8.3.3	Use case: Parsing M-Bus Load Profile Data.....	35
8.4	Self-Test (Alarms, Error Codes) (optional) .....	36
8.5	Pulse Inputs (optional).....	36
8.6	Power Quality (optional) .....	37
8.6.1	Functional Description.....	37
8.7	Display (optional) .....	38
8.7.1	Overview.....	38
8.7.2	Display Source List (optional).....	38
8.7.3	Display configuration (optional) .....	42
8.7.4	Error Codes Configuration (optional).....	42
8.7.5	Simulated Wheel Rotation Configuration (optional).....	42
8.7.6	Disconnect Configuration (optional) .....	42
8.7.7	CT and VT Ration (optional) .....	43
8.7.8	Firmware version on Power-Up (optional).....	43
8.7.9	PLC signal quality Icons (optional) .....	43
8.7.10	Scheduled Display Messages (optional).....	43
8.8	Local Disconnect Contactor (optional) .....	43
8.8.1	Overview.....	43
8.8.2	Maximum Power and Current Level Thresholds.....	44
8.8.3	Prepaid Metering (optional).....	46
8.8.4	Local Manual Control (optional) .....	46
8.8.5	Load Contactor Remote Control (optional) .....	46
8.9	Control Relay (optional).....	47
8.9.1	Overview.....	47
8.9.2	Control Relay Randomization .....	47
8.9.3	Time-Based Control Relay Calendar .....	47
8.9.4	Remote Control.....	48
8.10	History Log (optional) .....	48
8.10.1	Overview.....	48
8.10.2	Critical event (optional).....	48
8.10.3	Critical event Categories .....	49
8.11	One-Time Reads (optional).....	50
8.12	Group Broadcast (optional).....	51
8.13	Demand Metering (optional) .....	51
8.13.1	Overview.....	51
8.13.2	Demand Values (optional) .....	52
8.14	Test Mode.....	54
8.15	MEP Device Overview .....	55
8.15.1	General .....	55
8.15.2	Downlink Data Transfer .....	55
8.15.3	Uplink Data Transfer .....	59
8.16	M-Bus Device support (optional) .....	66
8.16.1	Overview.....	66
8.16.2	Billing Data Collection .....	66
8.16.3	Auto-discovery .....	69
8.16.4	Device Removal.....	69
8.16.5	M-Bus Status and Alarms .....	69
8.17	Compatibility Setting (mandatory).....	69
9	Basic OSGP services .....	70
9.1	Overview.....	70
9.2	Matching of requests and responses .....	70
9.3	Buffer restrictions .....	70
9.4	Full Table Read service.....	70

9.4.1	Request.....	70
9.4.2	Full Read Response .....	71
9.5	Full Table write service .....	71
9.5.1	Request.....	71
9.5.2	Response.....	72
9.6	Partial table read.....	72
9.6.1	Request.....	72
9.6.2	Response.....	73
9.7	Partial table write .....	73
9.7.1	Request.....	73
9.7.2	Response.....	73
9.8	Response error codes.....	73
9.9	Transactions.....	75
9.10	Procedure invocation .....	76
9.10.1	Overview .....	76
9.10.2	Procedure Timing .....	77
9.10.3	Slow and Non-Responsive Procedures.....	77
	<b>Annex A (normative) Basic Tables.....</b>	<b>79</b>
A.1	<b>Basic Table 00 (BT00): General configuration .....</b>	<b>79</b>
A.2	<b>Basic Table 01 (BT01): General Manufacturer Identification .....</b>	<b>95</b>
A.3	<b>Basic Table 02 (BT02): Device Nameplate .....</b>	<b>96</b>
A.4	<b>Basic Table 03 (BT03): End Device Mode Status .....</b>	<b>98</b>
A.5	<b>Basic Table 04 (BT04) Pending Status .....</b>	<b>101</b>
A.6	<b>Basic Table 05 (BT05): Device Identification .....</b>	<b>103</b>
A.7	<b>Basic Table 06 (BT06) Utility Information.....</b>	<b>103</b>
A.8	<b>Basic Table 07 (BT07): Procedure Initiate .....</b>	<b>104</b>
A.9	<b>Basic Table 08 (BT08): Procedure Response .....</b>	<b>104</b>
A.10	<b>Basic Table 10 (BT10): Dimension Sources Limiting.....</b>	<b>105</b>
A.11	<b>Basic Table 12 (BT12): Unit of Measure Entry .....</b>	<b>106</b>
A.12	<b>Basic Table 13 (BT13): Demand Control .....</b>	<b>108</b>
A.13	<b>Basic Table 15 (BT15): Constants.....</b>	<b>109</b>
A.14	<b>Basic Table 16 (BT16): Source Definition .....</b>	<b>109</b>
A.14.1	<b>General.....</b>	<b>109</b>
A.14.2	<b>Measurement Source Definition Records .....</b>	<b>110</b>
A.14.3	<b>Extended Source IDs .....</b>	<b>120</b>
A.15	<b>Basic Table 20 (BT20): Dimension Register .....</b>	<b>121</b>
A.16	<b>Basic Table 21 (BT21): Actual Register.....</b>	<b>122</b>
A.17	<b>Basic Table 22 (BT22): Data Selection .....</b>	<b>123</b>
A.18	<b>Basic Table 23 (BT23): Current Register Data .....</b>	<b>124</b>
A.19	<b>Basic Table 24 (BT24): Previous Season Data .....</b>	<b>126</b>
A.20	<b>Basic Table 25 (BT25): Previous Demand Reset Data .....</b>	<b>126</b>
A.21	<b>Basic Table 26 (BT26): Self Read Data .....</b>	<b>126</b>
A.22	<b>Basic Table 27 (BT27): Present Register Selection.....</b>	<b>127</b>
A.23	<b>Basic Table 28 (BT28): Present Register Data .....</b>	<b>127</b>
A.24	<b>Basic Table 30 (BT30): Dimension Display .....</b>	<b>129</b>
A.25	<b>Basic Table 33 (BT33): Primary Display List .....</b>	<b>129</b>
A.26	<b>Basic Table 50 (BT50): Dimension Time and TOU .....</b>	<b>130</b>
A.27	<b>Basic Table 52 (BT52): Clock.....</b>	<b>131</b>
A.28	<b>Basic Table 53 (BT53): Time Offset.....</b>	<b>132</b>
A.29	<b>Basic Table 54 (BT54): Calendar .....</b>	<b>132</b>
A.30	<b>Basic Table 55 (BT55): Clock state .....</b>	<b>134</b>
A.31	<b>Basic Table 60 (BT60): Dimension Load Profile .....</b>	<b>135</b>
A.32	<b>Basic Table 61 (BT61): Actual Load Profile .....</b>	<b>137</b>
A.33	<b>Basic Table 62 (BT62): Load Profile Control.....</b>	<b>138</b>
A.34	<b>Basic Table 63 (BT63): Load Profile Status .....</b>	<b>139</b>
A.35	<b>Basic Table 64 (BT64): Load Profile Data.....</b>	<b>140</b>
A.36	<b>Basic Table 70 (BT70): Dimension Log .....</b>	<b>143</b>
A.37	<b>Basic Table 71 (BT71): Actual Log.....</b>	<b>143</b>
A.38	<b>Basic Table 72 (BT72): Events Identification .....</b>	<b>144</b>

A.39	Basic Table 73 (BT73): History Log Control .....	160
A.40	Basic Table 74 (BT74): History Log Data .....	160
A.41	Basic Table 4150 (BT4150): Pending TOU Calendar.....	161
<b>Annex B (normative) Extended Tables.....</b>		<b>163</b>
B.1	Extended Table 00 (ET00) (2048): Manufacturer Specific .....	163
B.2	Extended Table 01 (ET01) (2049): Manufacturer Specific .....	163
B.3	Extended Table 02 (ET02) (2050): RTC calibration .....	163
B.4	Extended Table 03 (ET03) (2051): Utility Information .....	163
B.5	Extended Table 04 (ET04) (2052): System Information .....	165
B.6	Extended Table 05 (ET05) (2053): Control Output Settings .....	171
B.7	Extended Table 06 (ET06) (2054): Pulse Inputs.....	180
B.8	Extended Table 07 (ET07) (2055): Display Configuration.....	181
B.9	Extended Table 08 (ET08) (2056): Manufacturer Specific .....	184
B.10	Extended Table 09 (ET09) (2057): Power Quality .....	184
B.11	Extended Table 10 (ET10) (2058): Internal Power Outages.....	189
B.12	Extended Table 11 (ET11) (2059): MFG Dimension.....	189
B.13	Extended Table 12 (ET12) (2060): Daily Consumption .....	191
B.14	Extended Table 13 (ET13) (2061): M-Bus/MEP Device config.....	191
B.15	Extended Table 14 (ET14) (2062): M-Bus/MEP Device Status .....	194
B.16	Extended Table 15 (ET15) (2063): MEP On-demand Requests .....	197
B.17	Extended Table 17 (ET17) (2065): Code Bank Info.....	199
B.18	Extended Table 18 (ET18) (2066): Manufacturer Specific .....	201
B.19	Extended Table 19 (ET20) (2067): Meter One-Time Read Queue.....	201
B.20	Extended Table 20 (ET20) (2068): M-Bus One Time Read Queue .....	202
B.21	Extended Table 21 (ET21) (2069): Load Profile Internam Configuration .....	202
B.22	Extended Table 22 (ET22) (2070): Error Codes Configuration .....	204
B.23	Extended Table 27 (ET27) (2075): Transaction Request Table .....	205
B.24	Extended Table 28 (ET28) (2076): Transaction Response Table .....	206
B.25	Extended Table 29 (ET29) (2077): Hardware Configurations .....	206
B.26	Extended Table 30 (ET30) (2078): Maximum power or current level control .....	209
B.27	Extended Table 31 (ET31) (2079): Meter One-Time Read Log .....	209
B.28	Extended Table 32 (ET32) (2080): MEP One-Time Read Log .....	211
B.29	Extended Table 33 (ET33) (2033): Group Configuration.....	212
B.30	Extended Table 34 (ET34) (2082): MEP Device Configuration 2.....	213
B.31	Extended Table 35 (ET35) (2083): Manufacturer Specific .....	214
B.32	Extended Table 36 (ET36) (2084): Mfg Actual Dimensions .....	214
B.33	Extended Table 37 (ET37) (2085): Build Information .....	216
B.34	Extended Table 38 (ET38) (2086): Manufacturer Specific .....	216
B.35	Extended Table 39 (ET39) (2087): Previous Demand.....	216
B.36	Extended Table 40 (ET40) (2088): Demand Configuration .....	216
B.37	Extended Table 41 (ET41) (2089): Historical Demand Reset Log .....	217
B.38	Extended Table 42 (ET42) (2090): Interface Definition .....	219
B.39	Extended Table 43 (ET43) (2091): Test Mode Configuration.....	223
B.40	Extended Table 44 (ET44) (2092): Test Mode Status .....	224
B.41	Extended Table 45 (ET45) (2093): MEP Recurring Read Log .....	224
B.42	Extended Table 46 (ET46) (2094): Control Output Read Only Data.....	225
B.43	Extended Table 47 (ET47) (2095): Calendar Override Settings .....	226
B.44	Extended Table 48 (ET48) (2096): Feature Activation Table .....	226
B.45	Extended Table 49 (ET49) (2097): LCD Output Table .....	227
B.46	Extended Table 50 (ET50) (2098): MEP Inbound Data Space .....	227
B.47	Extended Table 51 (ET51) (2099): MEP Device Configuration .....	229
B.48	Extended Table 52 (ET52) (2100): MEP Transaction Request Table .....	229
B.49	Extended Table 53 (ET53) (2101): MEP Transaction Response Table .....	229
B.50	Extended Table 54 (ET54) (2102): Meter Status .....	230
B.51	Extended Table 55 (ET55) (2103): Meter Configuration.....	233
B.52	Extended Table 56 (ET56) (2104): Load side state calibration .....	238
B.53	Extended Table 57 (ET57) (2105): M-Bus Data Type Table .....	239
B.54	Extended Table 58 (ET58) (2106): MEA Status Extension.....	240
B.55	Extended Table 59 (ET59) (2107): MEP Procedure Response .....	240

B.56	Extended Table 60 (ET60) (2108): Configurable Energy Accumulator Settings .....	241
B.57	Extended Table 61 (ET61) (2109): Time-Based Relay Control .....	241
B.58	Extended Table 62 (ET62) (2110): Load profile Display Configuration .....	242
B.59	Extended Table 66 (ET66) (2114): Load Profile Source ID Mapping Table .....	244
B.60	Extended Table 67 (ET67) (2115): Display Source ID Mapping Table .....	244
B.61	Extended Table 68 (ET68) (2116): Critical Events .....	245
B.62	Extended Table 69 (ET69) (2117): Critical Events Bitmasks .....	245
B.63	Extended Table 70 (ET70) (2118): RAM only status .....	246
B.64	Extended Table 71 (ET71) (2119): MEP Delta Data and Config .....	247
B.65	Extended Table 1038 (ET1038) (3086): Manufacturer Specific.....	248
B.66	Extended Table 4143 (ET4143) (6191): Calendar Override Settings.....	248
B.67	Extended Table 4156 (ET4156) (6204): Configurable Energy Accumulator Settings .....	248
<b>Annex C (normative) Basic Procedures .....</b>		<b>249</b>
C.1	Basic Procedure 04 (BP04): Reset List Pointers .....	249
C.2	Basic Procedure 05 (BP05): Update Last Read Entry .....	249
C.3	Basic Procedure 06 (BP06): Change Mode .....	250
C.4	Basic Procedure 10 (BP10): Set Date and Time .....	251
C.5	Basic Procedure 12 (BP12): Activate All Pending Tables .....	252
C.6	Basic Procedure 13 (BP13): Actvate Specific Pending Tables .....	252
C.7	Basic Procedure 14 (BP14): Clear All Pending Tables .....	253
C.8	Basic Procedure 15 (BP15): Clear Specific Pending Tables .....	254
<b>Annex D (normative) Extended Procedures .....</b>		<b>255</b>
D.1	Extended Procedure 00 (EP00) (2048): Manufacturer Specific .....	255
D.2	Extended Procedure 01 (EP01) (2049): NV Memory Refresh .....	255
D.3	Extended Procedure 02 (EP02) (2050): Control Output Command .....	255
D.4	Extended Procedure 03 (EP03) (2051): Clear Alarms.....	256
D.5	Extended Procedure 04 (EP04) (2052): Manufacturer Specific .....	257
D.6	Extended Procedure 05 (EP05) (2053): Manufacturer Specific .....	257
D.7	Extended Procedure 06 (EP06) (2054): NVM Config .....	257
D.8	Extended Procedure 07 (EP07) (2055): Manufacturer Specific .....	258
D.9	Extended Procedure 08 (EP08) (2056): Erase code memory .....	258
D.10	Extended Procedure 09 (EP09) (2057): Download Code Packet.....	259
D.11	Extended Procedure 10 (EP10) (2058): Switch Code Bank .....	259
D.12	Extended Procedure 11 (EP11) (2059): Configure/Reset Load Profile Data Set .....	260
D.13	Extended Procedure 12 (EP12) (2060): Record Self-Read.....	262
D.14	Extended Procedure 13 (EP13) (2061): Write single Bit in Table.....	262
D.15	Extended Procedure 14 (EP14) (2062): Manufacturer Specific .....	263
D.16	Extended Procedure 15 (EP15) (2063): Set Tariff .....	263
D.17	Extended Procedure 16 (EP16) (2064): Change System Clock by Delta.....	264
D.18	Extended Procedure 17 (EP17) (2065): Remove M-Bus/MEP Device .....	264
D.19	Extended Procedure 18 (EP18) (2066): Clear MEP Alarm.....	265
D.20	Extended Procedure 19 (EP19) (2067): Post On-demand M-Bus Request.....	266
D.21	Extended Procedure 21 (EP21) (2069): Add prepay credit .....	267
D.22	Extended Procedure 22 (EP22) (2070): Switch maximum power or current level .....	268
D.23	Extended Procedure 23 (EP23) (2071): Remote Disconnect Request.....	269
D.24	Extended Procedure 24 (EP24) (2072): Post On-Time Read Request .....	269
D.25	Extended Procedure 25 (EP25) (2073): Reset Extended Table Logs and Queues .....	270
D.26	Extended Procedure 26 (EP26) (2074): Update Mfg Lists Unread Entries .....	271
D.27	Extended Procedure 27 (EP27) (2075): Add/Remove Group ID .....	271
D.28	Extended Procedure 28 (EP28) (2076): Enable/Disable Battery.....	272
D.29	Extended Procedure 29 (EP29) (2077): Read/Write Diagnostic Counters.....	273
D.30	Extended Procedure 30 (EP30) (2078): Synchronize Disconnect Status.....	273
D.31	Extended Procedure 31 (EP31) (2079): Activate Feature.....	274
D.32	Extended Procedure 32 (EP32) (2080): Billing Dimension Configuration.....	274
D.33	Extended Procedure 33 (EP33) (2081): Billing Reconfiguration .....	277
D.34	Extended Procedure 34 (EP34) (2082): Demand Reset.....	278
D.35	Extended Procedure 36 (EP36) (2084): Schedule Disconnect Lock Open.....	278
D.36	Extended Procedure 37 (EP37) (2085): NVM Config .....	279

D.37	Extended Procedure 39 (EP39) (2087): Post MEP Data (Urgent or Non-Urgent) .....	280
D.38	Extended Procedure 41 (EP41) (2089): MEP Download Initialize .....	282
D.39	Extended Procedure 42 (EP42) (2090): Control Output Settings.....	283
D.40	Extended Procedure 44 (EP44) (2092): IO Control.....	285
D.41	Extended Procedure 45 (EP45) (2093): Manufacturer Specific.....	285
D.42	Extended Procedure 46 (EP46) (2094): Manufacturer Specific.....	285
D.43	Extended Procedure 47 (EP47) (2095): Manufacturer Specific.....	285
D.44	Extended Procedure 48 (EP48) (2096): Manufacturer Specific.....	285
D.45	Extended Procedure 49 (EP49) (2097): Manufacturer Specific.....	285
<b>Annex E (normative) OSGP OMA Digest Algorithm .....</b>		<b>286</b>
<b>Annex F (normative) OSGP-AES-128-PSK Security Suite.....</b>		<b>288</b>
F.1	Introduction.....	288
F.2	Background.....	289
F.2.1	System Assumptions.....	289
F.2.2	Threat Model .....	289
F.2.3	Design Goals.....	289
F.2.4	Inspiration .....	290
F.3	Tems and Notation .....	290
F.3.1	Terms .....	290
F.3.2	Notation .....	292
F.3.3	Other conventions.....	292
F.4	Cryptographic Primitives.....	292
F.4.1	CMAC .....	293
F.4.2	CCM.....	293
F.5	Cryptographic Functions.....	293
F.5.1	OSGP_KDF: Key Derivation Function.....	293
F.5.2	OSGP_MAC: Messagre Authentication Code Function .....	294
F.5.3	OSGP_MAC_VERIFY: Message Authentication Code Verification Function .....	295
F.5.4	OSGP_AE/OSGP_AD: Authenticated Encryption/Decryption Functions .....	295
F.5.5	OSGP_CSPRG(num_of_bytes): Cryptographically Secure Pseudo Random Number Generator .....	297
F.6	Keys .....	297
F.7	Secure Channel Initialization .....	299
F.7.1	Overview.....	299
F.7.2	Secure Channel State(CryoContext) .....	299
F.7.3	Flow.....	300
F.7.4	Security Suite Negotiation.....	306
F.7.5	Meter commissioning.....	306
F.7.6	Error Handling and Intrusion Detection .....	306
F.7.7	Messages .....	306
F.8	Secure Channel Communication .....	310
F.8.1	Overview.....	310
F.8.2	The General Process .....	311
F.8.3	Unicast Communication .....	312
F.8.4	Broadcast Communication.....	316
F.9	Firmware Downloading .....	318
F.10	Key Management .....	319
F.10.1	Renewing the Short-term, Meter-unique Keys .....	319
F.10.2	Renewing the Short-term, Domain-unique Keys.....	319
F.10.3	Updating the Long-term, Meter-unique Keys .....	321
F.10.4	Key Validity Periods .....	321
F.11	Error Messages.....	321
F.11.1	Overview.....	321
F.11.2	AuthenticationFailure .....	321
F.11.3	SequenceError .....	321
F.12	Security Considerations .....	322
F.12.1	Reasoning .....	322
F.12.2	Recommendation and Guidance for Implementers .....	324

<b>F.12.3 Question and Answers .....</b>	<b>326</b>
<b>Annex G (normative) Repeating mechanism.....</b>	<b>328</b>
G.1 Overview .....	328
G.2 Terms .....	328
G.3 Protocol specification .....	329
G.3.1 Overview .....	329
G.3.2 Addressing .....	329
G.3.3 Service Types .....	329
G.3.4 Timers .....	329
G.3.5 Request Flow.....	329
G.3.6 Response Flow.....	330
G.3.7 Authentication.....	330
G.3.8 Examples .....	331
G.3.9 Broadcast .....	332
G.4 Downlink Frame format.....	332
G.4.1 Overview .....	332
G.4.2 Proxy parameters of Request Frame.....	332
G.5 Uplink Frame format.....	337
G.5.1 Overview .....	337
G.5.2 Proxy success.....	337
G.5.3 Reapeating Failure.....	337
G.5.4 Authentication Failure .....	338
<b>Bibliography .....</b>	<b>339</b>

## **European foreword**

This document (CLC/TS 50586:2019) has been prepared by CLC/TC 13 “Electrical energy measurement and control”.

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

This Document does not have the status of a harmonized Standard and cannot therefore be listed in the Official Journal of the EU and therefore provides no presumption of conformity. However, this Document may be used for the risk evaluation in the framework of the EU conformity declaration. If this document provides requirements below the level of a harmonized standard, the harmonized standard takes precedence.

## **Introduction**

One of the outcomes of the mandate M/441 is the identification of OSGP as one of the protocols which can be used for Smart Metering deployment in Europe.

## **1 Scope**

This document describes the data interface model, application-level communication, management functionalities, and security mechanism for the exchange of data with smart-grid devices. The following five areas are referred to as the Open Smart Grid Protocol (OSGP).

- Data exchange with smart-grid devices allows Utility Suppliers to collect customer usage information such as billing data and load profiles, monitor and control grid utilization, provision scheduling of tariffs, detect theft and tampers, and to issue disconnects, to name a few. Meter features are described in Clauses 7 and 8.
- The OSGP data interface uses a representation-oriented model (tables and procedures) which require low overhead. The model is described in Clause 5, with specific tables specified in Annex A, Annex B, and procedures in Annex C and Annex D.
- The OSGP application protocol is designed to use the EN 14908-1:2014 communication stack over narrow-band power line channels. Clause 9 describes the messages that are used to access OSGP data. An essential feature of the protocol over power line channels is a repeating mechanism which gives the application layer the control and responsibility for forwarding packets among devices, independent of the routing protocol or limitations of underlying layers. Therefore OSGP can be adapted to other communication stacks and medium, although such adaptation is outside of the scope of this specification. The repeating mechanism is described in Annex G.
- OSGP management features include the discovery of devices and the routing topology in a protocol called Automated Topology Management (described in Clause 4) commissioning of devices for secured communication (Annex F), monitoring of device connectivity, and updating of device firmware.
- OSGP security covers authentication, encryption, and key management. This is detailed in Annex F.

## **2 Normative references**

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 14908-1:2014, *Information technology - Control network protocol - Part 1: Protocol stack*

ISO 8859-1 (or ECMA-94), *Information technology - 8-bit single-byte coded graphic character sets - Part 1: Latin alphabet No. 1*

ISO/IEC 646:1991, *Information technology - ISO 7-bit coded character set for information interchange*

IEEE Std 802.11ac-2013, *IEEE Standard for Information technology- Telecommunication and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 11 Wireless LAN Medium Access Control*

## **3 Terms, definitions and abbreviations**

### **3.1 Terms and definitions**

For the purposes of this document, the following terms and definitions apply. ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>



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