

ETSI TS 104 001 V2.1.1 (2016-12)



TECHNICAL SPECIFICATION

Open Smart Grid Protocol (OSGP); Smart Metering/Smart Grid Communication Protocol

PREVIEW
iTech STANDARDS
(standards.iteh.ai)
Full standard
https://standards.iteh.ai/catalog/standards-iteh.org/etsi/ts-104-001-v2.1.1-2016-12

Reference

RTS/PLT-0051

Keywords

smart grid, smart meter

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommitteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2016.

All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.
3GPP™ and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.
GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Contents

Intellectual Property Rights	11
Foreword.....	11
Modal verbs terminology.....	11
1 Scope	12
2 References	12
2.1 Normative references	12
2.2 Informative references.....	12
3 Definitions and abbreviations.....	13
3.1 Definitions.....	13
3.2 Abbreviations	15
4 OSGP operation overview.....	18
5 OSGP network formation and maintenance.....	20
5.0 Foreword	20
5.1 Discovery Protocol.....	20
5.2 Discovery Domain.....	20
5.3 ADD Proxy Message.....	20
5.4 ATM Query ID.....	21
5.5 ATM Respond to Query	22
5.6 Signal Strength Values	22
5.7 Examples	23
5.8 Fast Commission Message (FCM).....	23
5.8.1 Overview	23
5.8.2 FCM message and response description.....	23
6 OSGP Device data representation	25
6.1 General overview	25
6.2 Data Types.....	25
6.3 Pending tables	27
6.4 Value Control Identifiers (VCI).....	28
6.5 Value	28
6.6 Register Naming Convention.....	28
6.7 Table and Procedure Naming Conventions	28
6.8 Interface Change Alarm (ICA NAK)	29
7 Security.....	29
7.0 Foreword	29
7.1 OMA Key (OMAK).....	29
7.2 OSGP-RC4-PSK Authentication.....	30
7.3 OSGP-RC4-PSK Encryption.....	31
7.4 OSGP-AES-128-PSK Security Suite	31
7.5 Hardware Lock	32
8 Device Functional Description for the case the OSGP device is an electric power metering device	32
8.1 General	32
8.2 Time-Of Use Calendar (Optional).....	32
8.2.0 Foreword.....	32
8.2.1 Manual Override Options (optional).....	33
8.2.2 Over Power Threshold Tariff (optional).....	33
8.3 Clock Adjustment (mandatory).....	34
8.3.1 Absolute Time Synch.....	34
8.3.2 Clock Adjustment by Delta.....	34
8.4 Billing Functions	34
8.4.1 Self-Reads (mandatory)	34
8.4.2 Total Energy (optional).....	35
8.4.3 On-Demand Reads of Current Billing Register Values (mandatory).....	35

8.5	Load Profile (mandatory)	35
8.5.0	Foreword.....	35
8.5.1	Use case: Reading Load Profile Data	36
8.5.2	Use case: Parsing M-Bus Load Profile Data.....	36
8.5.2.0	Foreword	36
8.5.2.1	M-Bus Data Types and ET57	36
8.5.2.2	Load Profile Poll Rate.....	37
8.5.2.3	Time Stamping	37
8.5.3	Load Profile Unread Entries Alarm	38
8.6	Self-Test (Alarms, Error Codes) (optional).....	38
8.7	Pulse Inputs (optional).....	38
8.8	Power Quality (optional)	38
8.8.1	Functional Description.....	38
8.9	Display (optional).....	40
8.9.0	Foreword.....	40
8.9.1	Display Sources List (optional)	40
8.9.2	Display Configuration (optional).....	42
8.9.3	Error Codes Configuration (optional)	42
8.9.4	Simulated Wheel Rotation Configuration (optional)	42
8.9.5	Disconnect Configuration (optional)	43
8.9.6	CT and VT Ratios (optional)	43
8.9.7	Firmware Version on Power-Up (optional)	43
8.9.8	PLC signal quality Icons (optional)	43
8.9.9	Scheduled Display Messages (optional)	43
8.10	Load Disconnect Contactor (optional)	43
8.10.0	Foreword.....	43
8.10.1	Maximum Power and Current Level Thresholds	44
8.10.1.0	Foreword	44
8.10.1.1	Changing the Device's Maximum Power Level Threshold	44
8.10.1.2	Changing the Device's Maximum Current Level Threshold	45
8.10.1.3	Choosing Power or Current (optional)	45
8.10.2	Prepaid Metering (optional)	45
8.10.3	Local Manual Control (optional)	46
8.10.4	Load Contactor Remote Control (optional)	46
8.11	Control Relay (optional).....	47
8.11.0	Foreword.....	47
8.11.1	Control Relay Randomization.....	47
8.11.2	Time-Based Control Relay Calendar	47
8.11.3	Remote Control.....	47
8.12	History Log (optional).....	48
8.12.0	Foreword.....	48
8.12.1	Critical Events (optional).....	48
8.12.1.0	Foreword	48
8.12.1.1	Critical Event Categories	48
8.12.1.2	Critical Event Bitmasks.....	49
8.12.1.2.0	Foreword	49
8.12.1.2.1	Example Critical Event Bitmask	49
8.13	One-Time Reads (optional)	50
8.14	Group Broadcasts (optional).....	50
8.15	Demand Metering (optional)	51
8.15.0	Foreword.....	51
8.15.1	Demand Values (optional)	51
8.15.1.0	Foreword	51
8.15.1.1	Present Demand	52
8.15.1.2	Previous Demand	52
8.15.1.3	Maximum (Peak) Demand	52
8.15.1.4	Coincident Sources.....	52
8.15.1.5	Cumulative Demand.....	52
8.15.1.6	Continuous Cumulative Demand	52
8.15.1.7	Demand Reset	52
8.15.1.8	Historical Demand Reset Log	53
8.15.1.9	Initializing Demand Metering	53

8.15.1.10	Reconfiguration.....	53
8.16	Test Mode.....	53
8.17	MEP Device Overview.....	54
8.17.0	Foreword.....	54
8.17.1	Downlink Data Transfer	54
8.17.1.0	Foreword	54
8.17.1.1	Reading Non-Urgent Data.....	54
8.17.1.2	Reading and Processing On-Demand Requests	56
8.17.2	Uplink Data Transfer	58
8.17.2.0	Foreword	58
8.17.2.1	Responding to a Scheduled Read Request (With and Without Alarms)	58
8.17.2.2	Responding to an On-Demand Read Request (With and Without Alarms)	60
8.17.2.3	Posting Unsolicited Non-urgent Data (With and Without Alarms).....	62
8.17.2.4	Posting Unsolicited Urgent Data.....	63
8.17.2.5	Posting Alarms Only	64
8.18	M-Bus Device support (optional).....	65
8.18.0	Foreword.....	65
8.18.1	Billing Data Collection	65
8.18.1.0	Foreword	65
8.18.1.1	On-Demand Reads for M-Bus Devices.....	65
8.18.1.2	Scheduled Reads for M-Bus Devices	66
8.18.1.3	One-Time-Reads for M-Bus Devices	67
8.18.1.4	Power Outage Data-Read Interruptions	67
8.18.2	Auto-discovery	68
8.18.3	Device Removal.....	68
8.18.4	M-Bus Status and Alarms	68
8.19	Compatibility Settings (mandatory)	68
9	Basic OSGP services	69
9.0	Foreword	69
9.1	Matching of requests and responses	69
9.2	Buffer sizing restrictions	69
9.3	Full Table Read service	69
9.3.1	Request	69
9.3.2	Full Read Response	70
9.4	Full Table write service	70
9.4.1	Request	70
9.4.2	Response	71
9.5	Partial table read.....	71
9.5.1	Request	71
9.5.2	Response.....	71
9.6	Partial table write.....	71
9.6.1	Request	71
9.6.2	Response	72
9.7	Request/Response sequencing.....	72
9.8	Request/Response OSGP APDU example	72
9.9	Response error codes.....	73
9.10	Transactions	74
9.11	Secure Broadcasts.....	75
9.12	Downloading	75
9.13	Procedure invocation	75
9.13.0	Foreword.....	75
9.13.1	Procedure Timing	77
9.13.2	Slow and Non-Responsive Procedures	77
Annex A (normative):	Basic Tables.....	78
A.1	Basic Table 00 (BT00): General Configuration	78
A.2	Basic Table 01 (BT01): General Manufacturer Identification	85
A.3	Basic Table 02 (BT02): Device Nameplate.....	86
A.4	Basic Table 03 (BT03): End Device Mode Status	87

A.5	Basic Table 04 (BT04): Pending Status	90
A.6	Basic Table 05 (BT05): Device Identification	91
A.7	Basic Table 06 (BT06): Utility Information.....	91
A.8	Basic Table 07 (BT07): Procedure Initiate.....	92
A.9	Basic Table 08 (BT08): Procedure Response.....	92
A.10	Basic Table 10 (BT10): Dimension Sources Limiting	93
A.11	Basic Table 12 (BT12): Unit of Measure Entry	93
A.12	Basic Table 13 (BT13): Demand Control	95
A.13	Basic Table 15 (BT15): Constants	96
A.14	Basic Table 16 (BT16): Source Definition.....	96
A.14.0	Foreword	96
A.14.1	Measurement Source Definition Records.....	97
A.14.2	Extended Source IDs	101
A.15	Basic Table 20 (BT20): Dimension Register	102
A.16	Basic Table 21 (BT21): Actual Register	103
A.17	Basic Table 22 (BT22): Data Selection.....	104
A.18	Basic Table 23 (BT23): Current Register Data	105
A.19	Basic Table 24 (BT24): Previous Season Data	106
A.20	Basic Table 25 (BT25): Previous Demand Reset Data	107
A.21	Basic Table 26 (BT26): Self Read Data	107
A.22	Basic Table 27 (BT27): Present Register Selection	108
A.23	Basic Table 28 (BT28): Present Register Data.....	109
A.24	Basic Table 30 (BT30): Dimension Display	110
A.25	Basic Table 33 (BT33): Primary Display List.....	110
A.26	Basic Table 50 (BT50): Dimension Time and TOU	111
A.27	Basic Table 52 (BT52): Clock.....	111
A.28	Basic Table 53 (BT53): Time Offset.....	112
A.29	Basic Table 54 (BT54): Calendar.....	112
A.30	Basic Table 55 (BT55): Clock state	114
A.31	Basic Table 60 (BT60): Dimension Load Profile.....	115
A.32	Basic Table 61 (BT61): Actual Load Profile	116
A.33	Basic Table 62 (BT62): Load Profile Control.....	117
A.34	Basic Table 63 (BT63): Load Profile Status	117
A.35	Basic Table 64 (BT64): Load Profile Data.....	118
A.36	Basic Table 70 (BT70): Dimension Log	120
A.37	Basic Table 71 (BT71): Actual Log	120
A.38	Basic Table 72 (BT72): Events Identification.....	121
A.39	Basic Table 73 (BT73): History Log Control.....	132
A.40	Basic Table (BT74): History Log Data	133

A.41	Basic Table 4150 (BT4150): Pending TOU Calendar	134
Annex B (normative): Extended Tables.....		135
B.1	Extended Table 00 (ET00) (2048): Manufacturer Specific.....	135
B.2	Extended Table 01 (ET01) (2049): Manufacturer Specific.....	135
B.3	Extended Table 02 (ET02) (2050): RTC calibration.....	135
B.4	Extended Table 03 (ET03) (2051): Utility Information.....	135
B.5	Extended Table 04 (ET04) (2052): System Information.....	136
B.6	Extended Table 05 (ET05) (2053): Control Output Settings	141
B.7	Extended Table 06 (ET06) (2054): Pulse Inputs.....	147
B.8	Extended Table 07 (ET07) (2055): Display Configuration.....	148
B.9	Extended Table 08 (ET08) (2056): Measurement Data	150
B.10	Extended Table 09 (ET09) (2057): Power Quality	150
B.11	Extended Table 10 (ET10) (2058): Internal Power Outages.....	154
B.12	Extended Table 11 (ET11) (2059): MFG Dimension	154
B.13	Extended Table 12 (ET12) (2060): Daily Consumption.....	155
B.14	Extended Table 13 (ET13): M-Bus/MEP Device Config	156
B.15	Extended Table 14 (ET14): M-Bus/MEP Device Status.....	158
B.16	Extended Table 15 (ET15): MEP On-demand Requests.....	160
B.17	Extended Table 17 (ET17) (2065): Code Bank Info.....	162
B.18	Extended Table 18 (ET18) (2066): Manufacturer Specific.....	163
B.19	Extended Table 19 (ET19) (2067): Meter One-Time Read Queue	163
B.20	Extended Table 20 (ET20) (2068): M-Bus One-Time Read Queue	164
B.21	Extended Table 21 (ET21) (2069): Load Profile Internal Configuration.....	165
B.22	Extended Table 22 (ET22) (2070): Error Codes Configuration.....	166
B.23	Extended Table 23 (ET23) (2071): Meter Internal Use Only	167
B.24	Extended Table 27 (ET27) (2075): Transaction Request Table.....	170
B.25	Extended Table 28 (ET28) (2076): Transaction Response Table	171
B.26	Extended Table 29 (ET29) (2077): Hardware Configurations.....	171
B.27	Extended Table 30 (ET30) (2078): Maximum power or current level control	173
B.28	Extended Table 31 (ET31) (2079): Meter One-Time Read Log	174
B.29	Extended Table 32 (ET32) (2080): MEP One-Time Read Log	175
B.30	Extended Table 33 (ET33) (2081): Group Configuration.....	176
B.31	Extended Table 34 (ET34) (2082): MEP Device Configuration 2.....	176
B.32	Extended Table 35 (ET35) (2083): Manufacturer Specific.....	177
B.33	Extended Table 36 (ET36) (2084): Mfg Actual Dimensions	177
B.34	Extended Table 37 (ET37) (2085): Build Information.....	179
B.35	Extended Table 38 (ET38) (2086): Manufacturer Specific.....	179
B.36	Extended Table 39 (ET39) (2087): Previous Demand	179

B.37	Extended Table 40 (ET40) (2088): Demand Configuration.....	179
B.38	Extended Table 41 (ET41) (2089): Historical Demand Reset Log.....	180
B.39	Extended Table 42 (ET42) (2090): Interface Definition.....	181
B.40	Extended Table 43 (ET43) (2091): Test Mode Configuration.....	185
B.41	Extended Table 44 (ET44) (2092): Test Mode Status.....	185
B.42	Extended Table 45 (ET45) (2093): MEP Recurring Read Log.....	186
B.43	Extended Table 46 (ET46) (2094): Control Output Read Only Data.....	187
B.44	Extended Table 47 (ET47) (2095): Calendar Override Settings.....	187
B.45	Extended Table 48 (ET48) (2096): Feature Activation Table.....	188
B.46	Extended Table 49 (ET49) (2097): LCD Output Table.....	188
B.47	Extended Table 50 (ET50) (2098): MEP Inbound Data Space.....	189
B.48	Extended Table 51 (ET51) (2099): MEP Device Configuration.....	190
B.49	Extended Table 52 (ET52) (2100): MEP Transaction Request Table.....	190
B.50	Extended Table 53 (ET53) (2101): MEP Transaction Response Table.....	191
B.51	Extended Table 54 (ET54) (2102): Meter Status.....	191
B.52	Extended Table 55 (ET55) (2103): Meter Configuration.....	193
B.53	Extended Table 56 (ET56) (2104): Load side state calibration.....	197
B.54	Extended Table 57 (ET57)(2105): M-Bus Data Type Table.....	198
B.55	Extended Table 58 (ET58)(2106): MEA Status Extension.....	199
B.56	Extended Table 59 (ET59)(2107): MEP Procedure Response.....	199
B.57	Extended Table 60 (ET60) (2108): Configurable Energy Accumulator Settings.....	200
B.58	Extended Table 61 (ET61)(2109): Time-Based Relay Control.....	200
B.59	Extended Table 62 (ET62) (2110): Load Profile Display Configuration.....	201
B.60	Extended Table 66 (ET66) (2114): Load Profile Source ID Mapping Table.....	203
B.61	Extended Table 67 (ET67) (2115): Display Source ID Mapping Table.....	203
B.62	Extended Table 68 (ET68)(2116): Critical Events.....	203
B.63	Extended Table 69 (ET69)(2117): Critical Event Bitmasks.....	204
B.64	Extended Table 70 (ET70)(2118): RAM only status.....	204
B.65	Extended Table 71 (ET71) (2119): MEP Delta Data and Config.....	205
B.66	Extended Table 1038 (ET1038) (3086): Manufacturer Specific.....	206
B.67	Extended Table 4143 (ET4143) (6191): Calendar Override Settings.....	206
B.68	Extended Table 4156 (ET4156) (6204): Configurable Energy Accumulator Settings.....	207
Annex C (normative): Basic Procedures.....		208
C.1	Basic Procedure 04 (BP04): Reset List Pointers.....	208
C.2	Basic Procedure 05 (BP05): Update Last Read Entry.....	208
C.3	Basic Procedure 06 (BP06): Change Mode.....	209
C.4	Basic Procedure 10 (BP10): Set Date and Time.....	209
C.5	Basic Procedure 12 (BP12): Activate All Pending Tables.....	210

C.6	Basic Procedure 13 (BP13): Activate Specific Pending Tables	211
C.7	Basic Procedure 14 (BP14): Clear All Pending Tables	212
C.8	Basic Procedure 15 (BP15): Clear Specific Pending Tables	212
Annex D (normative): Extended Procedures		214
D.1	Extended Procedure 00 (EP00) (2048): Manufacturer Specific	214
D.2	Extended Procedure 01 (EP01) (2049): NV Memory Refresh	214
D.3	Extended Procedure 02 (EP02) (2050): Control Output Command	214
D.4	Extended Procedure 03 (EP03) (2051): Clear Alarms	215
D.5	Extended Procedure 04 (EP04) (2052): Manufacturer Specific	216
D.6	Extended Procedure 05 (EP05) (2053): Manufacturer Specific	216
D.7	Extended Procedure 06 (EP06) (2054): NVM Config	216
D.8	Extended Procedure 07 (EP07) (2055): Manufacturer Specific	217
D.9	Extended Procedure 08 (EP08) (2056): Erase code memory	217
D.10	Extended Procedure 09 (EP09) (2057): Download Code Packet	217
D.11	Extended Procedure 10 (EP10) (2058): Switch Code Bank	218
D.12	Extended Procedure 11 (EP11) (2059): Configure/Reset Load Profile Data Set	218
D.13	Extended Procedure 12 (EP12) (2060): Record Self-Read	220
D.14	Extended Procedure 13 (EP13) (2061): Write Single Bit in Table	221
D.15	Extended Procedure 14 (EP14) (2062): Manufacturer Specific	221
D.16	Extended Procedure 15 (EP15) (2063): Set Tariff	221
D.17	Extended Procedure 16 (EP16) (2064): Change System Clock by Delta	222
D.18	Extended Procedure 17 (EP17) (2065): Remove M-Bus/MEP Device	223
D.19	Extended Procedure 18 (EP18) (2066): Clear MEP Alarms	223
D.20	Extended Procedure 19 (EP19) (2067): Post On-demand M-Bus Request	224
D.21	Extended Procedure 20 (EP20) (2068): Change OMA Encryption Key	225
D.22	Extended Procedure 21 (EP21) (2069): Add prepay credit	226
D.23	Extended Procedure 22 (EP22) (2070): Switch maximum power or current level	227
D.24	Extended Procedure 23 (EP23) (2071): Remote Disconnect Reconnect	228
D.25	Extended Procedure 24 (EP24) (2072): Post One-Time Read Request	228
D.26	Extended Procedure 25 (EP25) (2073): Reset Extended Table Logs and Queues	229
D.27	Extended Procedure 26 (EP26) (2074): Update Mfg Lists Unread Entries	229
D.28	Extended Procedure 27 (EP27) (2075): Add/Remove Group ID	230
D.29	Extended Procedure 28 (EP28) (2076): Enable/Disable Battery	231
D.30	Extended Procedure 29 (EP29) (2077): Read/Write Diagnostic Counters	231
D.31	Extended Procedure 30 (EP30) (2078): Synchronize Disconnect Status	232
D.32	Extended Procedure 31 (EP31) (2079): Activate Feature	232
D.33	Extended Procedure 32 (EP32) (2080): Billing Dimension Configuration	233
D.34	Extended Procedure 33 (EP33) (2081): Billing Reconfiguration	235

D.35	Extended Procedure 34 (EP34) (2082): Demand Reset	236
D.36	Extended Procedure 36 (EP36) (2084): Schedule Disconnect Lock Open	236
D.37	Extended Procedure 37 (EP37) (2085): NVM Config	237
D.38	Extended Procedure 39 (EP39) (2087): Post MEP Data (Urgent or Non-Urgent).....	238
D.39	Extended Procedure 41 (EP41) (2089): MEP Download Initialize.....	240
D.40	Extended Procedure 42 (EP42) (2090): Control Output Settings.....	241
D.41	Extended Procedure 44 (EP44) (2092): IO Control	242
D.42	Extended Procedure 45 (EP45) (2093): Manufacturer Specific	243
D.43	Extended Procedure 46 (EP46) (2094): Manufacturer Specific	243
D.44	Extended Procedure 47 (EP47) (2095): Manufacturer Specific	243
D.45	Extended Procedure 48 (EP48) (2096): Manufacturer Specific	243
D.46	Extended Procedure 49 (MP49) (2097): Manufacturer Specific.....	243
Annex E (normative):	OSGP OMA Digest Algorithm.....	244
Annex F (informative):	Void.....	246
Annex G (informative):	Bibliography.....	247
Annex H (informative):	Change History	248
History		249

iTeh STANDARD PREVIEW
 (standards.iteh.ai)
 Full standard:
<https://standards.iteh.ai/catalog/standards/sist/06d6c60e-dfcb-403f-af07-61d10283e9ec/etsi-ts-104-001-v2-1-1-2016-12>

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Powerline Telecommunications (PLT).

With more than 5 million OSGP compatible smart meters and other devices already installed in Europe, OSGP has become a defacto standard for smart meters and smart grid infrastructure communications in Europe. In addition, over 30 million more electricity meters already installed in Europe are using the same power line communications technology as used by OSGP.

Consistent with the general European objective to create European standards that will enable interoperability of smart grid devices including electricity meters, which can then improve the means by which customers' awareness of actual consumption can be raised in order to allow timely adaptation to their demands (commonly referred to as 'smart metering'), the Energy Services Network Association (ESNA), a non-profit corporation under Dutch law is partnering with utilities, manufacturers, system integrators and other interested parties to obtain their support for the promotion and adoption of OSGP as a European specification for smart grid communications to benefit utilities, their customers, and suppliers.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

1 Scope

The present document is a revision of ETSI GS OSG 001 [i.5] (mainly clause 7 on security). ETSI GS OSG 001 [i.5] was originally created under the ETSI ISG OSG. This ETSI ISG is now closed and no longer active and its area of work falls under the TC PLT. The security specified in ETSI GS OSG 001 [i.5] has become obsolete and there was an urgent need to update it to ensure continued protection and security of utility and end user customer information within the use of this protocol.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <https://docbox.etsi.org/Reference/>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

- [1] BS EN 14908-1:2014: "Open data communication in building automation, controls and building management. Building network protocol. Protocol stack".
- [2] BS EN 13757-2:2004: "Communication systems for remote reading of meters. Physical and link layer".
- [3] BS EN 13757-3:2013: "Communications systems for and remote reading of meters. Dedicated application layer".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] ISO/IEC 646:1991: "Information technology - ISO 7-bit coded character set for information interchange".
- [i.2] ISO 8859/1 (or ECMA-94): "Information technology - 8-bit single-byte coded graphic character sets - Part 1: Latin alphabet No. 1".
- [i.3] IEC 61000-4-7: "Electromagnetic compatibility (EMC) - Part 4-7: Testing and measurement techniques - General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto".
- [i.4] Void.
- [i.5] ETSI GS OSG 001: "Open Smart Grid Protocol (OSGP)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

active energy/power: measure of active power expended over time (resistive load)

AES: symmetric 128-bit block data encryption technique

authentication: process where data is validated to be current and to have come from the expected source

Base Encryption Key (BEK): 128 bit key derived from the OMA Key for the purpose of OSGP encryption

Billing Interface Definition Number (BIDN): identifier used to identify billing-related data in OSGP device logs

NOTE: See tables in clause D.33.

bootrom: part of the OSGP device firmware which is fixed and cannot be changed over the network

broadcast: message directed at all of the network population. In OSGP systems, only the data concentrator initiates broadcast messages

NOTE: OSGP devices may repeat a broadcast message.

ciphertext: output of encrypting plaintext

clone domain: domain where the most significant bit of the node number assigned to all nodes is set to zero

NOTE 1: This allows the node to receive messages that are sent by a node with the same domain, subnet and node number as the clone domain node. In BS EN 14908-1:2014 [1] addressing there can be up to 255 subnets and 127 nodes/subnet, so the high order bit of the node number byte is free for this special use.

NOTE 2: Normally, packets from the same domain, subnet and node as your own are rejected: in the Clone domain case, this is bypassed.

cycle count: cycle count is the maximum number of packet cycles to randomize access to the link over

NOTE: So, if the cycle count is 4, the responder generates a random number between 0 and 3, multiplies the result by the packet cycle width (see below in definitions) and then waits that long before responding to the message.

Data Concentrator (DC): server which supervises electrical utility OSGP devices and other devices

device (or OSGP device): device which implements the OSGP protocol

Daylight Saving Time (DST): adjustment from solar time to provide longer evenings during summer months

digest: 8-byte data block computed using the OSGP digest algorithm

NOTE: (see annex E) Along with the Open Media Authentication Key. The digest accounts for both message data and sequence number (Reference ID).

dip: measured quantity detected at a level below a defined threshold

encryption: process where data is converted to a format that can only be understood by someone sharing the key used by the source

energy: summation of power over time

Fast Commission Message (FCM): specific message type used for PLC traffic optimization during initial commissioning of an OSGP device

group ID: mechanism for selecting a subset of devices to process a broadcast message

in phase: phase angle between two sine waves is 0 degrees