PRODUCED BY THE OPERATIONS DIRECTORATE OF ENERGY NETWORKS ASSOCIATION

Engineering Recommendation M30

Issue 2 2018

Standard Electricity Network Operator Electricity Smart Meter Configurations

www.energynetworks.org

PUBLISHING AND COPYRIGHT INFORMATION

Operations Directorate
Energy Networks Association
6th Floor, Dean Bradley House
52 Horseferry Rd
London
SW1P 2AF

First published, September 2016

Amendments since publication

Issue	Date	Amendment
Issue 1	September 2016	First issue
Issue 2	January 2018	Updated 1. Document clarifies the requirement to send an alert at the point in time when an event condition is no longer present. 2. Document now incorporates the changes associated with revisions to SMETS and the GBCS: • v1.0/v1.1 • v2.0/v2.1 • v3.0

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Foreword

This Engineering Recommendation (EREC) is published by the Energy Networks Association (ENA) and comes into effect from the date of publication. It has been prepared under the authority of the ENA Engineering Policy and Standards Manager and has been approved for publication by the ENA Electricity Networks and Futures Group (ENFG). The approved abbreviated title of this engineering document is “EREC M30”.

This is the second issue of the document replacing the previous issue from September 2016. The update clarifies the requirement to send an alert at the point in time when an event condition is no longer present and incorporates the changes associated with revisions to SMETS and the GBCS.

1 Scope

This document specifies a set of standard configurations relating to Electricity Network Operator functionality that should be applied to an electricity smart meter prior to commissioning. It is anticipated that these settings will be applied as part of the manufacturing or testing process by the smart meter manufacturer. The Electricity Network Operator is able to change some of these settings post commissioning using the appropriate DCC Service Request.

2 Normative references

The following referenced documents, in whole or part, are indispensable for the application 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.

BEIS SMETS Smart Metering Equipment Technical Specifications (SMETS)

BEIS GBCS Great Britain Companion Specification (GBCS)

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
BEIS
The Department for Business, Energy & Industrial Strategy

3.2
GBCS
Great Britain Companion Specification

3.4
DNO
Distribution Network Operator

3.10
ENA
Energy Networks Association

3.11
engineering document
document published and maintained by **ENA** on behalf of its **member companies** being a Technical Specification (TS), Engineering Recommendation (EREC) or Engineering Report (EREP)

3.13
informative
advice, information and guidance that supplements **normative** requirements

3.15
member companies
licensed owners and operators of energy networks in the UK, who are members of **ENA**

3.16
normative
essential to the application of the engineering document in the manner intended, and characteristics against which it is possible to demonstrate and claim conformity to the engineering document

3.17
Smart Energy Code
a multiparty contract which sets out the terms for the provision of the Data Communication Company's services and specifies other provisions to govern the end-to-end management of smart metering in gas and electricity

4 General

4.1 Introduction

The Government has a policy to ensure that every home in Great Britain should have smart energy meters, giving people better information about and control over their energy consumption. The rollout of smart meters should play an important role in Britain's transition to a low-carbon economy, and help GB meet some of the long-term challenges faced in ensuring an affordable, secure and sustainable energy supply.

Smart electricity meters will also provide information to the DNO on the performance of distribution networks which should help them develop economical, efficient and co-ordinated systems of electricity distribution as required by their distribution licences.

The specification of the smart meter is set out in a number of key documents including:

- SMETS– Smart Metering Equipment Technical Specification, which sets out the functional requirements of smart meters; and
- GBCS– Great Britain Companion Specification, which describes the detailed integration protocols.

These documents define the functions of smart meters, including voltage event related functionality that is specifically aimed at the DNO. The functionality enables DNOs to set parameters to define when an event is deemed to have occurred, whether to log the event in the Power Event Log and whether to send an alert via the WAN. The parameters relate to the following functionality:

Single phase electricity meters

- Average RMS Under Voltage Threshold
- Average RMS Over Voltage Threshold
- Average RMS Voltage Measurement Period
- RMS Extreme Under Voltage Threshold
- RMS Extreme Over Voltage Threshold
- RMS Extreme Under Voltage Measurement Period

- RMS Extreme Over Voltage Measurement Period
- RMS Voltage Sag Threshold
- RMS Voltage Swell Threshold
- RMS Voltage Sag Measurement Period
- RMS Voltage Swell Measurement Period
- Maximum Demand Configurable Time Period

Three phase electricity meters

- Phase [n] Average RMS Under Voltage Threshold
- Phase [n] Average RMS Over Voltage Threshold
- Phase [n] Average RMS Voltage Measurement Period
- Other parameters as per single phase meters

The above items can be configured by the DNO to define network event scenarios in order to provide operational and planning related information that is relevant to each particular network.

Discussions with meter manufactures facilitated by BEAMA identified that manufacturers prefer to populate the relevant fields in the smart meter data structure with a standard set of parameters in order to facilitate the manufacturing and testing process. For the smart meter items that are specific to DNOs, manufacturers suggested that it would be helpful for a standard set of network operator configuration parameters to be made available to them so that these could be applied to all smart meters at manufacture. ENA members have agreed to provide the standard configurable data items.

4.2 Configurable data items

SEC Appendix AC clause 3.3 states:

3.3 Where and to the extent that the Electricity Distributor or Gas Transporter for a Device has notified the Responsible Supplier for the Device of the values for the 'NP Configurable Data Items' that the Electricity Distributor or Gas Transporter (as applicable) wishes to have configured on the Device at the time of its Commissioning, the Responsible Supplier shall take all reasonable steps to ensure that those data items are so configured on the Device at the time of its Commissioning. In this Clause 3.3, 'NP Configurable Data Items' means those data items held on Devices that are capable of being configured via Services Requests for which the User Role of 'Electricity Distributors' or 'Gas Transporter' (as applicable) is an Eligible User Role.

This requires that, as part of Suppliers Pre-Commissioning obligations i.e. before a smart meter is installed, the supplier needs to arrange for the DNO configuration settings to be correctly applied to the meter being installed provided that they have been advised of this requirement.

The Electricity Network Operator configurable data items are set out in Annex A – C of this document. ENA is in the process of applying via the Smart Energy Code change management

process to include these standard configurations in the GBCS[1]. In the interim, SECAS have agreed to write to all Suppliers referring to SEC Appendix AC stating that the required configurable data items are those set out in this Engineering Recommendation. It is recognised that this EREC M30 presents these data items in a 'plain English' form and that these will need to be translated into the appropriate protocols so that they can be applied to a meter; it is assumed that such translation will be carried out by the Supplier or their agent.

Annex A sets out the configurable data items relating to the definition of voltage related events for single and three phase meters. These values are applicable to smart designed to comply with:

- GBCS v1.0 & 1.1 i.e. SMETS 2.0 Draft 1.59
- GBCS v2.0 Draft 6 i.e. SMETS 3.0 Draft 4
- GBCS v2.1 Draft 2 i.e. SMETS 3.1 Draft 1
- GBCS v3.0 Draft 1 i.e. SMETS 4.0 Draft 1

This annex also provides additional explanation on the rationale behind the assumptions made in the selection of these standard configurations.

Annex B sets out the configurable data items relating to the sending of alerts across the WAN. These settings are applicable to smart designed to comply with:

- GBCS v1.0 & 1.1 i.e. SMETS 2.0 Draft 1.59

Annex C sets out the configurable data items relating to the sending of alerts across the WAN and the recording of events in the Power Outage Log[2]. These settings are applicable to smart designed to comply with:

- GBCS v2.0 Draft 6 i.e. SMETS 3.0 Draft 4
- GBCS v2.1 Draft 2 i.e. SMETS 3.1 Draft 1
- GBCS v3.0 Draft 1 i.e. SMETS 4.0 Draft 1

Annexes B and C are based on Table 16.2 in the relevant version of the GBCS.

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[1] SECMP0018

[2] As implemented by CRP412 in SMETS v3.0,GBCS v2.0

Annex A

Electricity Network Party Configurable Data items

The table below sets out the configurable data items relating to the definition of voltage related events for single and three phase meters.

Meter Type	SMETS V2.0 Draft 1.59 V3.0 Draft 4 V3.1 Draft 1 V4.0 Draft 1	Configurable Data Item Name	Configurable Data Item Description	Configuration Value	Units	Rationale
Single Phase	5.7.4.4	Average RMS Over Voltage Threshold	The average RMS voltage above which an over voltage condition is reported. The threshold shall be configurable within the specified operating range of ESME.	258	V	Statutory Max Voltage x 1.02 (to take into account of assumed meter voltage inaccuracy of +/- 2% to avoid false flagging). 258.1 rounded down to 258.
Single Phase	5.7.4.5	Average RMS Under Voltage Threshold	The average RMS voltage below which an under voltage condition is reported. The threshold shall be configurable within the specified operating range of ESME.	212	V	Statutory Min Voltage x 0.98 (to take into account of assumed meter voltage inaccuracy of +/- 2% to avoid false flagging). 211.9 rounded to 212.
Single Phase	5.7.4.6	Average RMS Voltage Measurement Period	The length of time in seconds over which the RMS voltage is averaged.	1800	s	Aligns with hh profiles
Single Phase	5.7.4.26	Maximum Demand Configurable Time Period	A single time period of up to 24 hours comprising a number of half-hour periods (commencing at the start of minutes 00 and 30 in each hour) during which recording to the Maximum Demand (Configurable Time) Active Power Import Value (5.7.5.20) is active	16:00 to 20:00 hrs	n/a	To capture demand during the evening peak.
Single Phase	5.7.4.34	RMS Extreme Over Voltage Measurement Period	The duration in seconds used to measure an extreme over voltage condition.	180	s	Network switching events can cause temporary voltage rise of 6-10% until corrected by tap change operation in say 180 seconds

Meter Type	SMETS V2.0 Draft 1.59 V3.0 Draft 4 V3.1 Draft 1 V4.0 Draft 1	Configurable Data Item Name	Configurable Data Item Description	Configuration Value	Units	Rationale
Single Phase	5.7.4.35	RMS Extreme Over Voltage Threshold	The RMS voltage above which an extreme over voltage condition is reported. The threshold shall be configurable within the specified operating range of ESME.	265	V	Network switching events can cause temporary voltage rise of 6-10% until corrected by tap change operation in say 180 seconds. 253 X 1.06 = 268.2. Max value for meter used.
Single Phase	5.7.4.36	RMS Extreme Under Voltage Measurement Period	The duration in seconds used to measure an extreme under voltage condition.	180	s	Network switching events can cause temporary voltage drop of 6-10% until corrected by tap change operation in say 180 seconds
Single Phase	5.7.4.37	RMS Extreme Under Voltage Threshold	The RMS voltage below which an extreme under voltage condition is reported. The threshold shall be configurable within the specified operating range of ESME.	190	V	Network switching events can cause temporary voltage drop of 6-10% until corrected by tap change operation in say 180 seconds. 253 X 0.94 x0.9 = 194.6. Use .98 x 194.6 = 190.7 to account for meter inaccuracy. Round to 190V
Single Phase	5.7.4.38	RMS Voltage Sag Measurement Period	The duration in seconds used to measure a voltage sag condition.	180	s	Set as 5.7.4.36 See Note
Single Phase	5.7.4.39	RMS Voltage Swell Measurement Period	The duration in seconds used to measure a voltage swell condition.	180	s	Set as 5.7.4.34 See Note
Single Phase	5.7.4.40	RMS Voltage Sag Threshold	The RMS voltage below which a sag condition is reported. The threshold shall be configurable within the specified operating range of ESME.	190	V	Set as 5.7.4.37 See Note
Single Phase	5.7.4.41	RMS Voltage Swell Threshold	The RMS voltage above which a swell condition is reported. The threshold shall be configurable within the specified operating range of ESME.	265	V	Set as 5.7.4.35 See Note

Meter Type	SMETS V2.0 Draft 1.59 V3.0 Draft 4 V3.1 Draft 1 V4.0 Draft 1	Configurable Data Item Name	Configurable Data Item Description	Configuration Value	Units	Rationale
Three Phase	5.19.1.1	Phase [n] Average RMS Over Voltage Threshold	The average RMS voltage for phase [n] above which an over voltage condition is reported. The threshold shall be configurable within the specified operating range of ESME.	258	V	Set as 5.7.4.4
Three Phase	5.19.1.2	Phase [n] Average RMS Under Voltage Threshold	The average RMS voltage for phase [n] below which an under voltage condition is reported. The threshold shall be configurable within the specified operating range of ESME.	212	V	Set as 5.7.4.5
Three Phase	5.19.1.3	Phase [n] Average RMS Voltage Measurement Period	The length of time in seconds over which the RMS voltage is averaged for phase [n].	1800	s	Set as 5.7.4.6
Three Phase	Other parameters are as per single phase meter					

Note: The initial intention was for extreme under / over voltage thresholds to be higher than those proposed here, but the voltage settings are capped by the Measuring Instrumentation Directive mandated operating range of the meter; it may be possible to increase these thresholds with experience. This, coupled with the higher than originally envisaged settings for the average RMS voltage thresholds (to account for the meter inaccuracy), means that there is a relatively small difference between these two thresholds. The merit of having a third set of voltage thresholds (sag / swell) at this stage seems limited at the moment. The requirement is therefore to set the sag / swell settings to be the same as the extreme under / over voltage settings but to configure them not to send alerts or record them in the Power Event log. All these settings can be reviewed when there is more experience operating smart meters on distribution networks.

Please Note: In the event that SECMP0018 is implemented, should the standard Electricity Smart Meter Configurable Data items described in these Annexes of this document be changed in future revisions of this document, the authors should note that a change request may need to be made to the GBCS and hence also the Smart Energy Code.

Annex B

Electricity Network Party Configurable Data items

The table below sets out the configurable data items relating to the sending of alerts across the WAN. These settings are applicable to smart designed to comply with:

- GBCS v1.0 & 1.1 i.e. SMETS2.0 Draft 1.59

The Electricity Network Party Configurable Data items are identified in the yellow shaded columns.[3]

Mandated / Non-mandated	SMETS 2.0 Draft 1.59	Event / Alert Code	Event / Alert Code Meaning	Alert WAN (Alert Type)	Alert WAN DNO Configuration	Power Event Log	Power Event Log DNO Configuration	Known Remote Party Role	ESME / GSME Event/Alert Configuration Responsibility	Applicable Device Type for the relevant Event / Alert			
										0x01 ESME (all variants)	0x01 ESME (excluding multiphase)	0x01 ESME (multi-phase)	0x01 ESME (twin element)
Mandated	5.5.12.1 (ii)	0x8002	Average RMS Voltage above Average RMS Over Voltage Threshold (current value above threshold; previous value below threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator		x		
Mandated	5.17.2.1 (ii)	0x8003	Average RMS Voltage above Average RMS Over Voltage Threshold on Phase 1 (current value above threshold; previous value below threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.1 (ii)	0x8004	Average RMS Voltage above Average RMS Over Voltage Threshold on Phase 2 (current value above threshold; previous value below threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.1 (ii)	0x8005	Average RMS Voltage above Average RMS Over Voltage Threshold on Phase 3 (current value above threshold; previous value below threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.5.12.1 (iv)	0x8006	Average RMS Voltage below Average RMS Under Voltage Threshold (current value below threshold; previous value above threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator		x		
Mandated	5.17.2.1 (iv)	0x8007	Average RMS Voltage below Average RMS Under Voltage Threshold on Phase 1 (current value below threshold; previous value above threshold)	Y (1) w	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.1 (iv)	0x8008	Average RMS Voltage below Average RMS Under Voltage Threshold on Phase 2 (current value below threshold; previous value above threshold)	Y (1) w	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.1 (iv)	0x8009	Average RMS Voltage below Average RMS Under Voltage Threshold on Phase 3 (current value below threshold; previous value above threshold)	Y (1) w	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.5.12.2 (i)	0x8020	RMS Voltage above Extreme Over Voltage Threshold (voltage rises above for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator		x		
Mandated	5.17.2.2 (i)	0x8021	RMS Voltage above Extreme Over Voltage Threshold on Phase 1 (voltage rises above for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	

[3] In this version of GBCS there is not the facility for the DNO to configure whether events are recorded in the Power Event Log via a DCC Service request, hence all mandated alerts are configured as 'Y'.

Mandated / Non-mandated	SMETS 2.0 Draft 1.59	Event / Alert Code	Event / Alert Code Meaning	Alert WAN (Alert Type)	Alert WAN DNO Configuration	Power Event Log	Power Event Log DNO Configuration	Known Remote Party Role	ESME / GSME Event/Alert Configuration Responsibility	Applicable Device Type for the relevant Event / Alert			
										0x01 ESME (all variants)	0x01 ESME (excluding multiphase)	0x01 ESME (multi-phase)	0x01 ESME (twin element)
Mandated	5.17.2.2 (i)	0x8022	RMS Voltage above Extreme Over Voltage Threshold on Phase 2 (voltage rises above for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.2 (i)	0x8023	RMS Voltage above Extreme Over Voltage Threshold on Phase 3 (voltage rises above for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.5.12.5 (i)	0x8024	RMS Voltage above Voltage Swell Threshold (voltage rises above for longer than the configurable period)	Y (1)	N	Y	Y	Network Operator	Network Operator		x		
Mandated	5.17.2.5 (i)	0x8025	RMS Voltage above Voltage Swell Threshold on Phase 1 (voltage rises above for longer than the configurable period)	Y (1)	N	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.5 (i)	0x8026	RMS Voltage above Voltage Swell Threshold on Phase 2 (voltage rises above for longer than the configurable period)	Y (1)	N	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.5 (i)	0x8027	RMS Voltage above Voltage Swell Threshold on Phase 3 (voltage rises above for longer than the configurable period)	Y (1)	N	Y	Y	Network Operator	Network Operator			x	
Mandated	5.5.12.3 (i)	0x8028	RMS Voltage below Extreme Under Voltage Threshold (voltage falls below for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator		x		
Mandated	5.17.2.3 (i)	0x8029	RMS Voltage below Extreme Under Voltage Threshold on Phase 1 (voltage falls below for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.3 (i)	0x802A	RMS Voltage below Extreme Under Voltage Threshold on Phase 2 (voltage falls below for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.3 (i)	0x802B	RMS Voltage below Extreme Under Voltage Threshold on Phase 3 (voltage falls below for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.5.12.4 (i)	0x802C	RMS Voltage below Voltage Sag Threshold (voltage falls below for longer than the configurable period)	Y (1) e	N	Y	Y	Network Operator	Network Operator		x		
Mandated	5.17.2.4 (i)	0x802D	RMS Voltage below Voltage Sag Threshold on Phase 1 (voltage falls below for longer than the configurable period)	Y (1)	N	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.4 (i)	0x802E	RMS Voltage below Voltage Sag Threshold on Phase 2 (voltage falls below for longer than the configurable period)	Y (1)	N	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.4 (i)	0x802F	RMS Voltage below Voltage Sag Threshold on Phase 3 (voltage falls below for longer than the configurable period)	Y (1)	N	Y	Y	Network Operator	Network Operator			x	
Mandated	5.5.12.1 (iii)	0x8085	Average RMS Voltage below Average RMS Over Voltage Threshold (current value below threshold; previous value above threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator		x		
Mandated	5.17.2.1 (iii)	0x8086	Average RMS Voltage below Average RMS Over Voltage Threshold on Phase 1 (current value below threshold; previous value above threshold)	Y (1) w	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.1 (iii)	0x8087	Average RMS Voltage below Average RMS Over Voltage Threshold on Phase 2 (current value below threshold; previous value above threshold)	Y (1) w	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.1 (iii)	0x8088	Average RMS Voltage below Average RMS Over Voltage Threshold on Phase 3 (current value below threshold; previous value above threshold)	Y (1) w	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.5.12.1 (v)	0x8089	Average RMS Voltage above Average RMS Under Voltage Threshold (current value above threshold; previous value below threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator		x		
Mandated	5.17.2.1 (v)	0x808A	Average RMS Voltage above Average RMS Under Voltage Threshold on Phase 1 (current value above threshold; previous value below threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	

Mandated / Non-mandated	SMETS 2.0 Draft 1.59	Event / Alert Code	Event / Alert Code Meaning	Alert WAN (Alert Type)	Alert WAN DNO Configuration	Power Event Log	Power Event Log DNO Configuration	Known Remote Party Role	ESME / GSME Event/Alert Configuration Responsibility	Applicable Device Type for the relevant Event / Alert			
										0x01 ESME (all variants)	0x01 ESME (excluding multiphase)	0x01 ESME (multi-phase)	0x01 ESME (twin element)
Mandated	5.17.2.1 (v)	0x808B	Average RMS Voltage above Average RMS Under Voltage Threshold on Phase 2 (current value above threshold; previous value below threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.1 (v)	0x808C	Average RMS Voltage above Average RMS Under Voltage Threshold on Phase 3 (current value above threshold; previous value below threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.5.12.2 (ii)	0x808D	RMS Voltage above Extreme Over Voltage Threshold (voltage returns below for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator		x		
Mandated	5.17.2.2 (i)	0x808E	RMS Voltage above Extreme Over Voltage Threshold on Phase 1 (voltage returns below for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.2 (i)	0x808F	RMS Voltage above Extreme Over Voltage Threshold on Phase 2 (voltage returns below for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.2 (i)	0x8090	RMS Voltage above Extreme Over Voltage Threshold on Phase 3 (voltage returns below for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.5.12.5 (ii)	0x8091	RMS Voltage above Voltage Swell Threshold (voltage returns below for longer than the configurable period)	Y (1)	N	Y	Y	Network Operator	Network Operator		x		
Mandated	5.17.2.5 (i)	0x8092	RMS Voltage above Voltage Swell Threshold on Phase 1 (voltage returns below for longer than the configurable period)	Y (1)	N	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.5 (i)	0x8093	RMS Voltage above Voltage Swell Threshold on Phase 2 (voltage returns below for longer than the configurable period)	Y (1)	N	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.5 (i)	0x8094	RMS Voltage above Voltage Swell Threshold on Phase 3 (voltage returns below for longer than the configurable period)	Y (1)	N	Y	Y	Network Operator	Network Operator			x	
Mandated	5.5.12.3 (ii)	0x8095	RMS Voltage below Extreme Under Voltage Threshold (voltage returns above for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator		x		
Mandated	5.17.2.3 (i)	0x8096	RMS Voltage below Extreme Under Voltage Threshold on Phase 1 (voltage returns above for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.3 (i)	0x8097	RMS Voltage below Extreme Under Voltage Threshold on Phase 2 (voltage returns above for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.3 (i)	0x8098	RMS Voltage below Extreme Under Voltage Threshold on Phase 3 (voltage returns above for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.5.12.4 (ii)	0x8099	RMS Voltage below Voltage Sag Threshold (voltage returns above for longer than the configurable period)	Y (1)	N	Y	Y	Network Operator	Network Operator		x		
Mandated	5.17.2.4 (i)	0x809A	RMS Voltage below Voltage Sag Threshold on Phase 1 (voltage returns above for longer than the configurable period)	Y (1)	N	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.4 (i)	0x809B	RMS Voltage below Voltage Sag Threshold on Phase 2 (voltage returns above for longer than the configurable period)	Y (1)	N	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.4 (i)	0x809C	RMS Voltage below Voltage Sag Threshold on Phase 3 (voltage returns above for longer than the configurable period)	Y (1)	N	Y	Y	Network Operator	Network Operator			x	
Non-mandated	N/A	0x8010	Over Current	Y (1)	N	Y	N	Network Operator	Network Operator		x		
Non-mandated	N/A	0x8011	Over Current L1	Y (1)	N	Y	N	Network Operator	Network Operator			x	

Mandated / Non-mandated	SMETS 2.0 Draft 1.59	Event / Alert Code	Event / Alert Code Meaning	Alert WAN (Alert Type)	Alert WAN DNO Configuration	Power Event Log	Power Event Log DNO Configuration	Known Remote Party Role	ESME / GSME Event/Alert Configuration Responsibility	Applicable Device Type for the relevant Event / Alert			
										0x01 ESME (all variants)	0x01 ESME (excluding multiphase)	0x01 ESME (multi-phase)	0x01 ESME (twin element)
Non-mandated	N/A	0x8016	Over Current L2	Y (1)	N	Y	N	Network Operator	Network Operator			x	
Non-mandated	N/A	0x8013	Over Current L3	Y (1)	N	Y	N	Network Operator	Network Operator			x	
Non-mandated	N/A	0x8014	Power Factor Threshold Below	Y (1)	N	Y	N	Network Operator	Network Operator	x			
Non-mandated	N/A	0x8015	Power Factor Threshold Ok	Y (1)	N	Y	N	Network Operator	Network Operator	x			

Annex C

Electricity Network Party Configurable Data items

The embedded table below sets out the configurable data items relating to the sending of alerts across the WAN and the recording of events in the Power Outage Log[4]. These settings are applicable to smart designed to comply with:

- GBCS v2.0 Draft 6 i.e. SMETS 3.0 Draft 4
- GBCS v2.1 Draft 2 i.e. SMETS 3.1 Draft 1
- GBCS v3.0 Draft 1 i.e. SMETS 4.0 Draft 1

The Electricity Network Party Configurable Data items are identified in the yellow shaded columns.

Mandated / Non-mandated	SMETS	Event / Alert Code	Event / Alert Code Meaning	Alert WAN (Alert Type)	Alert WAN DNO Configuration	Power Event Log	Power Event Log DNO Configuration	Known Remote Party Role	ESME / GSME Event/Alert Configuration Responsibility	Applicable Device Type for the relevant Event / Alert			
										0x01 ESME (all variants)	0x01 ESME (excluding multiphase)	0x01 ESME (multiphase)	0x01 ESME (twin element)
Mandated	5.5.12.1 (ii)	0x8002	Average RMS Voltage above Average RMS Over Voltage Threshold (current value above threshold; previous value below threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator		x		
Mandated	5.17.2.1 (ii)	0x8003	Average RMS Voltage above Average RMS Over Voltage Threshold on Phase 1 (current value above threshold; previous value below threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.1 (ii)	0x8004	Average RMS Voltage above Average RMS Over Voltage Threshold on Phase 2 (current value above threshold; previous value below threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.1 (ii)	0x8005	Average RMS Voltage above Average RMS Over Voltage Threshold on Phase 3 (current value above threshold; previous value below threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.5.12.1 (iv)	0x8006	Average RMS Voltage below Average RMS Under Voltage Threshold (current value below threshold; previous value above threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator		x		
Mandated	5.17.2.1 (iv)	0x8007	Average RMS Voltage below Average RMS Under Voltage Threshold on Phase 1 (current value below threshold; previous value above threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.1 (iv)	0x8008	Average RMS Voltage below Average RMS Under Voltage Threshold on Phase 2 (current value below threshold; previous value above threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.1 (iv)	0x8009	Average RMS Voltage below Average RMS Under Voltage Threshold on Phase 3 (current value below threshold; previous value above threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.5.12.2 (i)	0x8020	RMS Voltage above Extreme Over Voltage Threshold (voltage rises above for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator		x		
Mandated	5.17.2.2 (i)	0x8021	RMS Voltage above Extreme Over Voltage Threshold on Phase 1 (voltage rises above for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	

[4] As implemented by CRP412 in SMETS v3.0,GBCS v2.0

Mandated / Non-mandated	SMETS	Event / Alert Code	Event / Alert Code Meaning	Alert WAN (Alert Type)	Alert WAN	Power Event Log	Power Event Log	Known Remote Party Role	ESME / GSME Event/Alert Configuration Responsibility	Applicable Device Type for the relevant Event / Alert			
					DNO Configuration		DNO Configuration			0x01 ESME (all variants)	0x01 ESME (excluding multiphase)	0x01 ESME (multiphase)	0x01 ESME (twin element)
Mandated	5.17.2.2 (i)	0x8022	RMS Voltage above Extreme Over Voltage Threshold on Phase 2 (voltage rises above for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.2 (i)	0x8023	RMS Voltage above Extreme Over Voltage Threshold on Phase 3 (voltage rises above for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.5.12.5 (i)	0x8024	RMS Voltage above Voltage Swell Threshold (voltage rises above for longer than the configurable period)	Y (1)	N	Y	N	Network Operator	Network Operator		x		
Mandated	5.17.2.5 (i)	0x8025	RMS Voltage above Voltage Swell Threshold on Phase 1 (voltage rises above for longer than the configurable period)	Y (1)	N	Y	N	Network Operator	Network Operator			x	
Mandated	5.17.2.5 (i)	0x8026	RMS Voltage above Voltage Swell Threshold on Phase 2 (voltage rises above for longer than the configurable period)	Y (1)	N	Y	N	Network Operator	Network Operator			x	
Mandated	5.17.2.5 (i)	0x8027	RMS Voltage above Voltage Swell Threshold on Phase 3 (voltage rises above for longer than the configurable period)	Y (1)	N	Y	N	Network Operator	Network Operator			x	
Mandated	5.5.12.3 (i)	0x8028	RMS Voltage below Extreme Under Voltage Threshold (voltage falls below for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator		x		
Mandated	5.17.2.3 (i)	0x8029	RMS Voltage below Extreme Under Voltage Threshold on Phase 1 (voltage falls below for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.3 (i)	0x802A	RMS Voltage below Extreme Under Voltage Threshold on Phase 2 (voltage falls below for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.3 (i)	0x802B	RMS Voltage below Extreme Under Voltage Threshold on Phase 3 (voltage falls below for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.5.12.4 (i)	0x802C	RMS Voltage below Voltage Sag Threshold (voltage falls below for longer than the configurable period)	Y (1)	N	Y	N	Network Operator	Network Operator		x		
Mandated	5.17.2.4 (i)	0x802D	RMS Voltage below Voltage Sag Threshold on Phase 1 (voltage falls below for longer than the configurable period)	Y (1)	N	Y	N	Network Operator	Network Operator			x	
Mandated	5.17.2.4 (i)	0x802E	RMS Voltage below Voltage Sag Threshold on Phase 2 (voltage falls below for longer than the configurable period)	Y (1)	N	Y	N	Network Operator	Network Operator			x	
Mandated	5.17.2.4 (i)	0x802F	RMS Voltage below Voltage Sag Threshold on Phase 3 (voltage falls below for longer than the configurable period)	Y (1)	N	Y	N	Network Operator	Network Operator			x	
Mandated	5.5.12.1 (iii)	0x8085	Average RMS Voltage below Average RMS Over Voltage Threshold (current value below threshold; previous value above threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator		x		
Mandated	5.17.2.1 (iii)	0x8086	Average RMS Voltage below Average RMS Over Voltage Threshold on Phase 1 (current value below threshold; previous value above threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.1 (iii)	0x8087	Average RMS Voltage below Average RMS Over Voltage Threshold on Phase 2 (current value below threshold; previous value above threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.1 (iii)	0x8088	Average RMS Voltage below Average RMS Over Voltage Threshold on Phase 3 (current value below threshold; previous value above threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.5.12.1 (v)	0x8089	Average RMS Voltage above Average RMS Under Voltage Threshold (current value above threshold; previous value below threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator		x		
Mandated	5.17.2.1 (v)	0x808A	Average RMS Voltage above Average RMS Under Voltage Threshold on Phase 1 (current value above threshold; previous value below threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.1 (v)	0x808B	Average RMS Voltage above Average RMS Under Voltage Threshold on Phase 2 (current value above threshold; previous value below threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	

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										0x01 ESME (all variants)	0x01 ESME (excluding multiphase)	0x01 ESME (multiphase)	0x01 ESME (twin element)
Mandated	5.17.2.1 (v)	0x808C	Average RMS Voltage above Average RMS Under Voltage Threshold on Phase 3 (current value above threshold; previous value below threshold)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.5.12.2 (ii)	0x808D	RMS Voltage above Extreme Over Voltage Threshold (voltage returns below for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator		x		
Mandated	5.17.2.2 (i)	0x808E	RMS Voltage above Extreme Over Voltage Threshold on Phase 1 (voltage returns below for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.2 (i)	0x808F	RMS Voltage above Extreme Over Voltage Threshold on Phase 2 (voltage returns below for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.2 (i)	0x8090	RMS Voltage above Extreme Over Voltage Threshold on Phase 3 (voltage returns below for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.5.12.5 (ii)	0x8091	RMS Voltage above Voltage Swell Threshold (voltage returns below for longer than the configurable period)	Y (1)	N	Y	N	Network Operator	Network Operator		x		
Mandated	5.17.2.5 (i)	0x8092	RMS Voltage above Voltage Swell Threshold on Phase 1 (voltage returns below for longer than the configurable period)	Y (1)	N	Y	N	Network Operator	Network Operator			x	
Mandated	5.17.2.5 (i)	0x8093	RMS Voltage above Voltage Swell Threshold on Phase 2 (voltage returns below for longer than the configurable period)	Y (1)	N	Y	N	Network Operator	Network Operator			x	
Mandated	5.17.2.5 (i)	0x8094	RMS Voltage above Voltage Swell Threshold on Phase 3 (voltage returns below for longer than the configurable period)	Y (1)	N	Y	N	Network Operator	Network Operator			x	
Mandated	5.5.12.3 (ii)	0x8095	RMS Voltage below Extreme Under Voltage Threshold (voltage returns above for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator		x		
Mandated	5.17.2.3 (i)	0x8096	RMS Voltage below Extreme Under Voltage Threshold on Phase 1 (voltage returns above for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.3 (i)	0x8097	RMS Voltage below Extreme Under Voltage Threshold on Phase 2 (voltage returns above for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.17.2.3 (i)	0x8098	RMS Voltage below Extreme Under Voltage Threshold on Phase 3 (voltage returns above for longer than the configurable period)	Y (1)	Y	Y	Y	Network Operator	Network Operator			x	
Mandated	5.5.12.4 (ii)	0x8099	RMS Voltage below Voltage Sag Threshold (voltage returns above for longer than the configurable period)	Y (1)	N	Y	N	Network Operator	Network Operator		x		
Mandated	5.17.2.4 (i)	0x809A	RMS Voltage below Voltage Sag Threshold on Phase 1 (voltage returns above for longer than the configurable period)	Y (1)	N	Y	N	Network Operator	Network Operator			x	
Mandated	5.17.2.4 (i)	0x809B	RMS Voltage below Voltage Sag Threshold on Phase 2 (voltage returns above for longer than the configurable period)	Y (1)	N	Y	N	Network Operator	Network Operator			x	
Mandated	5.17.2.4 (i)	0x809C	RMS Voltage below Voltage Sag Threshold on Phase 3 (voltage returns above for longer than the configurable period)	Y (1)	N	Y	N	Network Operator	Network Operator			x	
Non-mandated	N/A	0x8010	Over Current	Y (1)	N	Y	N	Network Operator	Network Operator		x		
Non-mandated	N/A	0x8011	Over Current L1	Y (1)	N	Y	N	Network Operator	Network Operator			x	
Non-mandated	N/A	0x8016	Over Current L2	Y (1)	N	Y	N	Network Operator	Network Operator			x	
Non-mandated	N/A	0x8013	Over Current L3	Y (1)	N	Y	N	Network Operator	Network Operator				
Non-mandated	N/A	0x8014	Power Factor Threshold Below	Y (1)	N	Y	N	Network Operator	Network Operator	x		x	

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										0x01 ESME (all variants)	0x01 ESME (excluding multiphase)	0x01 ESME (multiphase)	0x01 ESME (twin element)
Non-mandated	N/A	0x8015	Power Factor Threshold Ok	Y (1)	N	Y	N	Network Operator	Network Operator	x			

Annex D

Overview of Technical Documents

The table below summarises the co-ordination the multiple technical specification documents by release.[5]

Tech Documents by Release – current view

Release 1	Release 2	Release 3	Release 4
Release 1.2, 1.3 & 1.4	14 IRPs from RFC055 (including DBCH) and 78 RPs from RFC052)	RPs that affect Devices & DSP only no CSP changes allowed. To include E&A requirements	SECAS lead release to include SEC Mods and including remaining RP's
GBCS V1.0/V1.1	GBCS V2.0	GBCS V2.1	GBCS V3.0
SMETS V2.0	SMETS V3.0	SMETS V3.1	SMETS V4.0
CHTS V1.0	CHTS V1.1	CHTS V1.1 (unchanged)	CHTS V1.2
DUIS V1.1	DUIS V2.0	DUIS V3.0	DUIS V4.0
MMC V1.0	MMC V2.0	MMC V3.0	MMC V4.0

[5] As at Summer 2017

Bibliography

Standards publications

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BEIS Smart Metering Implementation Programme, Smart Metering Equipment Technical Specifications (SMETS) versions:

- SMETS2.0 Draft 1.59 18 November 2015
- SMETS3.0 Draft 4 4 May 2017
- SMETS3.1 Draft 1 19 July 2017
- SMETS4.0 Draft 1 21 September 2017

BEIS Smart Metering Implementation Programme, Great Britain Companion Specification (GBCS) versions)

- GBCS v1.0
- GBCS v1.1 20 September 2017
- GBCS v2.0 Draft 6 20 September 2017
- GBCS v2.1 Draft 2 20 September 2017
- GBCS v3.0 Draft 1 21 September 2017