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MP085A 'Synchronisation of smart meter voltage measurement periods'

Annex B

Legal text – version 0.9

About this document

This document contains the redlined changes to the SEC that would be required to deliver this Modification Proposal.

SEC Schedule 9 'Smart Metering Equipment Technical Specifications 2'

These changes have been redlined against SEC Schedule 9 version 5.0.

Amend Section 5.7.4.6 as follows:

5.7.4.6 Average RMS Voltage Measurement Period

The length of time in seconds over which the RMS voltage is averaged.

The ESME shall determine the start of the next *Average RMS Voltage Measurement Period(5.7.4.6)* as the next multiple of the *Average RMS Voltage Measurement Period(5.7.4.6)* calculated from the start of the current UTC day.

Amend Section 5.19.1.3 as follows:

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].

The ESME shall determine the start of the next *Phase [n] Average RMS Voltage Measurement Period(5.19.1.3)* as the next multiple of the *Phase [n] Average RMS Voltage Measurement Period(5.19.1.3)* calculated from the start of the current UTC day.

Amend Section 5.4 as follows:

5.4 Physical Requirements

ESME shall as a minimum include the following components:

i. a Clock;
ii. a Data Store;
iii. an Electricity Meter containing one measuring element;
iv. a HAN Interface;
v. a Load Switch;
vi. a Random Number Generator;
vii. a User Interface; and
viii. where installed with a Communications Hub provided by the Data and Communications Company, a Communications Hub Physical Interface (this may comprise a Communications Hub Physical Interface forming part of GSME where present at the time of installation in the Premises).

The Communications Hub Physical Interface shall as a minimum include a physical interface that meets the requirements defined by the Data and Communications Company at the time of installation (pursuant to section H12 of the Smart Energy Code) and includes provision for a DC power supply to the Communications Hub.

The ESME shall supply the DC power to the Communications Hub at all times during normal operation. Under all other operating conditions, except when the Supply is interrupted, the

ESME shall ensure that any interruption to the DC power supply to the Communications Hub is kept under three minutes, ensuring no spurious power outage alerts are generated.

ESME shall be mains powered and be capable of performing the minimum functional, interface and data requirements set out in *Sections 5.5*, *5.6* and *5.7* respectively operating at a nominal voltage of 230VAC without consuming more than an average of 4 watts of electricity under normal operating conditions.

ESME shall be capable of automatically resuming operation after a power failure, firmware activation or any other event that results in a Firmware Start Up, in its operating state prior to any such event.

ESME shall:

ix. permanently display the *ESME Identifier(5.7.1.1)* on the ESME; and
x. have a Secure Perimeter.

The HAN Interface of ESME shall be capable of joining a ZigBee SEP Smart Metering Home Area Network which:

xi. operates within the 2400 – 2483.5 MHz harmonised frequency band; and
xii. supports the Communications Links described in S*ections 5.6.1*, *5.6.3* and *5.6.4*.

On joining a ZigBee SEP Smart Metering Home Area Network ESME shall be capable of generating and sending an Alert to that effect via its HAN Interface.

ESME shall be designed taking all reasonable steps so as to prevent Unauthorised Physical Access and Unauthorised communications through its Secure Perimeter that could compromise the Confidentiality and / or Data Integrity of:

xiii. Personal Data;
xiv. Consumption data used for billing;
xv. Security Credentials;
xvi. Random Number Generator;
xvii. Cryptographic Algorithms;
xviii. the Electricity Meter; and
xix. Firmware and data essential for ensuring its integrity,

stored or executing on ESME.

ESME shall be capable of detecting any attempt at Unauthorised Physical Access through its Secure Perimeter that could compromise such Confidentiality and / or Data Integrity and on such detection shall be capable of:

xx. providing evidence of such an attempt through the use of tamper evident coatings or seals,

and where reasonably practicable:

xxi. generating an entry to that effect in the *Security Log(5.7.5.31)*;
xxii. generating and sending an Alert to that effect via its HAN Interface; and
xxiii. where the *Supply Tamper State(5.7.4.44)* is configured to require Locking, sending an Alert that the Supply is being disabled for this reason via its HAN Interface, and establishing a Locked state whereby the Supply is Disabled and can only be Enabled or Armed in response to a Command to Arm the Supply (as described in *Section 5.6.3.7*) or Enable the Supply (as described in *Section 5.6.3.12*).

Amend Section 5.5.12.1 as follows:

5.5.12 Voltage Quality Measurements

5.5.12.1 Average RMS voltage

ESME shall be capable of calculating the average value of RMS voltage over a configurable period as defined in the *Average RMS Voltage Measurement Period(5.7.4.6)* and:

i. recording the value calculated (including the UTC date and time at the end of the period to which the value relates) in the *Average RMS Voltage Profile Data Log(5.7.5.9)*;

ii. detecting when the value calculated is above the *Average RMS Over Voltage Threshold(5.7.4.4)*, and on detection:
   a) counting the number of such occurrences in the *Average RMS Over Voltage Counter*(*5.7.5.7*);
   b) where the value calculated in the prior configurable period was below the *Average RMS Over Voltage Threshold*(*5.7.4.4*):
      - generating an entry to that effect in the *Power Event Log(5.7.5.25)*; and
      - generating and sending an Alert to that effect via its HAN Interface.

iii. detecting when the value calculated is below the *Average RMS Over Voltage Threshold(5.7.4.4)*, and where the value calculated in the prior configurable period was above the *Average RMS Over Voltage Threshold(5.7.4.4)*:
   a) generating an entry to that effect in the Power Event Log(5.7.5.25); and
   b) generating and sending an Alert to that effect via its HAN Interface.

iv. detecting when the value calculated is below the *Average RMS Under Voltage Threshold(5.7.4.5)*, and on detection:
   a) counting the number of such occurrences in the *Average RMS Under Voltage Counter*(*5.7.5.8*);
   b) where the value calculated in the prior configurable period was above the *Average RMS Under Voltage Threshold*(*5.7.4.5*):
      - generating an entry to that effect in the *Power Event Log(5.7.5.25)*; and
      - generating and sending an Alert to that effect via its HAN Interface.

v. detecting when the value is above the *Average RMS Under Voltage Threshold(5.7.4.5)*, and where the value calculated in the prior configurable period was below the *Average RMS Under Voltage Threshold(5.7.4.5)*:
   c) generating an entry to that effect in the Power Event Log(5.7.5.25); and
   d) generating and sending an Alert to that effect via its HAN Interface.

vi. in the event of a Firmware Start Up, executing a change of *Average RMS Voltage Measurement Period(5.7.4.6)* command, or a *Set Clock(5.6.3.32)* Command:
   a) the average RMS voltage value (including the associated UTC date and time) shall not be recorded in the *Average RMS Voltage Profile Data Log(5.7.5.9)* for the current *Average RMS Voltage Measurement Period(5.7.4.6)*; and
   ~~c)~~b) the next *Average RMS Voltage Measurement Period(5.7.4.6)* shall start in accordance with the *Average RMS Voltage Measurement Period(5.7.4.6)* definition, and the calculation of the average value of the RMS Voltage shall resume in accordance with the requirement of this clause (5.5.12.1).

Amend Section 5.16 as follows:

Physical Requirements

Physical Requirements(5.4) in Part A shall not apply to ESME.

ESME shall as a minimum include the following components:

i. a Clock;
ii. a Data Store;
iii. an Electricity Meter containing three measuring elements;
iv. a HAN Interface;
v. a Load Switch;
vi. a Random Number Generator;
vii. a User Interface; and
viii. where installed with a Communications Hub provided by the Data and Communications Company, a Communications Hub Physical Interface (this may comprise a Communications Hub Physical Interface forming part of GSME where present at the time of installation in the Premises).

The Communications Hub Physical Interface shall as a minimum include a physical interface that meets the requirements defined by the Data and Communications Company at the time of installation (pursuant to section H12 of the Smart Energy Code) and includes provision for a DC power supply to the Communications Hub.

The ESME shall supply the DC power to the Communications Hub at all times during normal operation. Under all other operating conditions, except when all connected phases of the Supply are interrupted, the ESME shall ensure that any interruption to the DC power supply to the Communications Hub is kept under three minutes, ensuring no spurious power outage alerts are generated.

ESME shall be mains powered and be capable of performing the minimum functional, interface and data requirements set out in *Sections 5.17*, *5.18* and *5.19* respectively operating at a nominal voltage of 230VAC without consuming more than an average of 7 watts of electricity under normal operating conditions.

ESME shall be capable of automatically resuming operation after a power failure, firmware activation or any other event that results in a Firmware Start Up, in its operating state prior to any such event.

ESME shall:

ix. permanently display the *ESME Identifier(5.7.1.1)* on the ESME; and
x. have a Secure Perimeter.

The HAN Interface of ESME shall be capable of joining a ZigBee SEP Smart Metering Home Area Network which:

xi. operates within the 2400 – 2483.5 MHz harmonised frequency band; and
xii. supports the Communications Links described in *Sections 5.6.1*, *5.6.3*, *5.6.4* and *5.18.1*.

On joining a ZigBee SEP Smart Metering Home Area Network ESME shall be capable of generating and sending an Alert to that effect via its HAN Interface.

ESME shall be designed taking all reasonable steps so as to prevent Unauthorised Physical Access and Unauthorised communications through its Secure Perimeter that could compromise the Confidentiality and / or Data Integrity of:

xiii. Personal Data;
xiv. Consumption data used for billing;
xv. Security Credentials;
xvi. Random Number Generator;
xvii. Cryptographic Algorithms;
xviii. the Electricity Meter; and
xix. Firmware and data essential for ensuring its integrity,

stored or executing on ESME.

ESME shall be capable of detecting any attempt at Unauthorised Physical Access through its Secure Perimeter that could compromise such Confidentiality and / or Data Integrity and on such detection shall be capable of:

xx. providing evidence of such an attempt through the use of tamper evident coatings or seals,

and where reasonably practicable:

xxi. generating an entry to that effect in the *Security Log(5.7.5.31)*;
xxii. generating and sending an Alert to that effect via its HAN Interface; and
xxiii. where the *Supply Tamper State(5.7.4.44)* is configured to require Locking, sending an Alert that the Supply is being disabled for this reason via its HAN Interface, and establishing a Locked state whereby the Supply is Disabled and can only be Enabled or Armed in response to a Command to Arm the Supply (as described in *Section 5.6.3.7*) or Enable the Supply (as described in *Section 5.6.3.12*).

Amend Section 5.17.2.1 as follows:

5.17.2 Voltage Quality Measurements

Voltage Quality Measurements(5.5.12) in Part A shall not apply to ESME.

5.17.2.1 Average RMS voltage phase [n]

ESME shall be capable of calculating the average value of RMS voltage for phase [n] over a configurable period as defined in the *Phase [n] Average RMS Voltage Measurement Period(5.19.1.3)* and:

i. recording the values calculated (including the UTC date and time at the end of the period to which the values relate) in the *Phase [n] Average RMS Voltage Profile Data Log(5.19.2.3)*;
ii. detecting when the value calculated for phase [n] is above the *Phase [n] Average RMS Over Voltage Threshold(5.19.1.1)* and on detection:
    a) counting the number of such occurrences in the *Phase [n] Average RMS Over Voltage Counter(5.19.2.1)*;
    b) where the value calculated in the prior configurable period was below the Phase [n] Average RMS Over Voltage Threshold(*5.19.1.1*):
        - generating an entry to that effect (including identification of the relevant phase) in the *Power Event Log(5.7.5.25)*; and

- generating and sending an Alert to that effect (including identification of the relevant phase) via its HAN Interface.

iii. detecting when the value calculated for phase [n] is below the *Phase [n] Average RMS Over Voltage Threshold(5.19.1.1)* and where the value calculated in the prior configurable period was above the *Phase [n] Average RMS Over Voltage Threshold(5.19.1.1)*:

a) generating an entry to that effect (including identification of the relevant phase) in the *Power Event Log(5.7.5.25)*; and
b) generating and sending an Alert to that effect (including identification of the relevant phase) via its HAN Interface.

iv. detecting when the value calculated for phase [n] is below the *Phase [n] Average RMS Under Voltage Threshold(5.19.1.2)* and on detection:

a) counting the number of such occurrences in the Phase [n] Average RMS Under Voltage Counter(*5.19.2.2*);
b) where the value calculated for phase [n] in the prior configurable period was above the Phase [n] Average RMS Under Voltage Counter(*5.19.2.2*):

- generating an entry to that effect (including identification of the relevant phase) in the *Power Event Log(5.7.5.25)*; and
- generating and sending an Alert to that effect (including identification of the relevant phase) via its HAN Interface.

v. detecting when the value calculated for phase [n] is above the *Phase [n] Average RMS Under Voltage Threshold(5.19.1.2)* and where the value calculated in the prior configurable period was below the *Phase [n] Average RMS Under Voltage Threshold(5.19.1.2)*:

a) generating an entry to that effect (including identification of the relevant phase) in the *Power Event Log(5.7.5.25)*; and
b) generating and sending an Alert to that effect (including identification of the relevant phase) via its HAN Interface.

vi. in the event of a Firmware Start Up, executing a change of *Average RMS Voltage Measurement Period(5.7.4.6)* command, or *Set Clock(5.6.3.32)* Command:

a) the average RMS voltage values (including the associated UTC date and time) across all phases shall not be recorded in the *Phase [n] Average RMS Voltage Profile Data Log(5.19.2.3)* for the current *Phase [n] Average RMS Voltage Measurement Period(5.19.1.3)*; and
~~c)~~b) the next *Phase [n] Average RMS Voltage Measurement Period(5.19.1.3)* shall start in accordance with the *Phase [n] Average RMS Voltage Measurement Period(5.19.1.3)* definition, and the calculation of the average value of the RMS Voltage shall resume in accordance with the requirement of this clause (5.17.2.1).

Insert the following into the Glossary Section:

Firmware Start Up

A process by which a Device's Firmware is started for any reason, for example after being energised for the first time, restoration of Supply after an outage, hardware reboot, fault recovery or Firmware activation.