MP085 ‘Synchronisation of smart meter voltage measurement periods’ Request for Information

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1. Purpose

[MP085 ‘Synchronisation of smart meter voltage measurement periods’](https://smartenergycodecompany.co.uk/modifications/synchronisation-of-smart-meter-voltage-measurement-periods/) was raised by Alan Creighton of Northern Powergrid on behalf of Distribution Network Operators.

**This modification directly affects ESME Manufacturers.**

This paper presents an overview of the issue identified by the Proposer, the Proposed Solution and items SECAS would like to discuss with meter Manufacturers. The Proposer and the Smart Energy Code Administrator and Secretariat (SECAS) would like to better understand if installed Devices could be upgraded by firmware to align Root Mean Square (RMS) voltage readings to the hour/half hour.

SECAS are requesting ESME Manufacturers to provide feedback to the questions provided.

1. Issue identified

The expectation of Electricity Network Parties during the development of the smart meter technical specification was that the average RMS voltage readings from smart meters would be measured across a consistent period. For example, with the default being for an average to be made across a 30-minute period starting on the hour and on the half hour as per the half hour consumption profile data. This is not an explicit requirement codified in the Smart Metering Equipment Technical Specification (SMETS) nor the GB Companion Specification (GBCS).

Whilst some electricity meter Manufacturers’ meters work in this way, other Manufacturers’ meters do not. Without voltage measurements being made in a consistent way, Electricity Network Parties must either make conservative, less efficient analysis assumptions to account for the lack of data alignment or recreate synchronised data by downloading high granularity (for example minute resolution) data and calculating the required half hourly data.

During the Refinement Process, SECAS obtained information from a Network Party relating to meters that do not commence average RMS voltage readings on the hour. Of the meters checked by the Network Party, over 50% provide average RMS voltage readings that were not aligned to the hour/half hour.

Average RMS voltage readings that relate to any 30-minute period are helpful for identifying voltage problems at an individual customer premises. However, without synchronised recording times it will be difficult to:

* understand voltage issues on Low Voltage feeders that may be affecting more than one customer;
* identify trends or forecast future voltage issues; or
* validate power flows and voltages on a network model relating to a defined 30-minute period, and hence identify the most efficient solution.
1. Proposed Solution

The Proposed Solution is for Electricity Smart Metering Equipment (ESME) to commence calculating average RMS voltage readings at 00:00 or 00:30 (whichever occurs first). The default maximum duration of the measurement period will be 1,800 seconds (30 minutes), with alternative periods being factors of 1,800 (11 available periods in total). Also, the ESME is to retain any existing entries in the Average RMS Voltage Profile Data Log relating to the period before the ESME was energised or the measurement period changed.

It is intended that this will apply to newly manufactured Devices, as well as Devices that are currently installed. This is based on the assumption that meter Manufacturers are capable of updating ESME firmware to include this functionality.

1. Business requirements

| **Business Requirements** |
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| **Ref.** | **Requirement** |
| 1 | Electricity Smart Metering Equipment (ESME) to commence calculating the average Root Mean Square (RMS) voltage at 00:00 or 30:00 (whichever occurs first) of the first hour once the ESME has been first energised. |
| 2 | ESME to commence calculating the average RMS voltage at 00:00 or 30:00 (whichever occurs first) of the first hour after a command has been received to change the average RMS voltage measurement period. |
| 3 | ESME to continue to calculate the average RMS voltage at a frequency in accordance with the average RMS voltage measurement period, until a command is received to change the average RMS voltage measurement period.  |
| 4 | Average RMS voltage measurement period is to be a maximum duration of 1,800 seconds with alternative periods being factors of 1,800 seconds. |
| 5 | ESME to retain any existing entries in the Average RMS Voltage Profile Data Logrelating to the period before the ESME was energised or before a command to change the Average RMS Voltage Measurement Period has been received. |
| 6 | The MP085 solution shall not cause any changes to the current security access or rights. |
| 7 | The MP085 solution shall not cause any changes to the storage or network requirements. |
| 8 | The MP085 solution will not modify or create a new GBCS command/message. |

Please note that business requirements 6 to 8 were requested by the DCC to clarify that the proposed functionality would not change particular elements that are already in place relating to the Profile Data Log, storage and security. The requirements further clarify that it is not the intention of the Modification to create a new GBCS command/message.

Business requirement 5 relates to SEC Schedule 9 ‘Smart Metering Equipment Technical Specifications 2’ Section 5.7.5.9 ‘Average RMS Voltage Profile Data Log’, shown below. The circular nature of the buffer implies that entries are only deleted when the log is full.

#### **5.7.5.9 Average RMS Voltage Profile Data Log[[1]](#footnote-1)**

A log capable of storing 4320 entries (including the UTC date and time at the end of the period to which the value relates*)* comprising the averaged RMS voltage for each Average RMS Voltage Measurement Period*(*5.7.4.6*)* arranged as a circular buffer such that when full, further writes shall cause the oldest entry to be overwritten.

1. Feedback requested

In order to better understand the issues and implementation options associated with the Modification Proposal and help develop the solution, SECAS are seeking assistance from ESME manufacturers. It is recognised that there are two aspects of this Modification Proposal: i) Synchronisation of voltage measurement periods and ii) Non-deletion of voltage profile log. Hence, these two aspects are considered separately in this RFI.

**Part 1 Synchronisation of voltage measurement periods**

| Question 1 |
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| Could ESME Manufacturers implement the synchronisation of the average Root Mean Square (RMS) voltage measurement with half hourly intervals starting at 00:00 and 00:30 by means of a firmware upgrade for existing ESMEs?*Please provide your rationale.* |
| **Response** | Click and select your response |
| **Rationale** | Click and insert the rationale for your response |

| Question 2 |
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| If implementing this change is possible via a firmware upgrade, what is the complexity of changes required?*Please provide your rationale.* |
| **Response** | Click and select your response |
| **Rationale** | Click and insert the rationale for your response |

| Question 3 |
| --- |
| If implementing this change is possible, via a firmware upgrade, what costs do you believe are involved for introducing the firmware upgrade, e.g. firmware design, testing efforts etc?Would these costs be reduced if the firmware upgrade was incorporated within another firmware upgrade?*Please provide your rationale.* |
| **Response** | Click and select your response |
| **Rationale** | Click and insert the rationale for your response |

As an alternative, Network Parties may set the Average RMS voltage readings to one-minute intervals and retrieve the Average RMS Voltage Profile Data Log from the devices in shorter intervals and calculate a ’synchronised’ Average RMS voltage from this data.

| Question 4 |
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| If Network Parties elect to use shorter measurement intervals, e.g. one-minute do you foresee any impact on the ESME (performance / lifespan etc.)?*Please provide your rationale.* |
| **Response** | Click and select your response |
| **Rationale** | Click and insert the rationale for your response |

| Question 5 |
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| If Network Parties elect to use shorter measurement intervals, do you think the Data Communications Company (DCC) System can handle Network Parties requesting high granularity data on e.g. a daily basis from the Device (as opposed to monthly)?*Please provide your rationale.* |
| **Response** | Click and select your response |
| **Rationale** | Click and insert the rationale for your response |

**Part 2 Non-deletion of voltage profile log**

| Question 6 |
| --- |
| Could ESME Manufacturers implement changes to avoid deleing entries in the voltage profile log (unless it’s full) by means of a firmware upgrade for existing ESMEs?*Please provide your rationale.* |
| **Response** | Click and select your response |
| **Rationale** | Click and insert the rationale for your response |

| Question 7 |
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| If implementing this change is possible via a firmware upgrade, what is the complexity of changes required?*Please provide your rationale.* |
| **Response** | Click and select your response |
| **Rationale** | Click and insert the rationale for your response |

| Question 8 |
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| If implementing this change is possible, via a firmware upgrade, what costs do you believe are involved for introducing the firmware upgrade, e.g. firmware design, testing efforts etc?Would these costs be reduced if the firmware upgrade was incorporated within another firmware upgrade?*Please provide your rationale.* |
| **Response** | Click and select your response |
| **Rationale** | Click and insert the rationale for your response |

**Bradley Baker**

**SECAS Team**

**13 November 2020**

1. 5.19.2.3 is the equivalent for a three phase meter. [↑](#footnote-ref-1)