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# MP231

## ‘Firmware upgrade pathways’

### Modification Report

Version 0.2

22 February 2022



## About this document

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This document is a draft Modification Report. It currently sets out the background, issue, and progression timetable for this modification, along with any relevant discussions, views and conclusions. This document will be updated as this modification progresses.

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## Contact

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## 1. Summary

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This proposal has been raised by Gordon Hextall on behalf of the Security Sub-Committee (SSC).

The SSC has noted a concern raised at TABASC and reflected in reports from the DCC that certain Device models need to have a firmware upgrade applied in a specific order. Failure to follow the specific order can result in unintended consequences. Investigation of the issue indicates that it is not an uncommon requirement for firmware updates to be implemented in a specific order.

The Firmware Information Repository (FIR) is available for manufacturers to update and contains some information relating to upgrades for Electricity Smart Metering Equipment (ESMEs) and Gas Smart Metering Equipment (GSMEs) that Suppliers can access. However, the information required to ensure each Device has its firmware upgrade applied in the correct order is not included, nor is there a requirement in the Smart Energy Code (SEC) for that information to be provided.

## 2. Issue

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### What are the current arrangements?

#### What is required in a Device upgrade?

The requirements relating to Device upgrades are included in the Great Britain Technical Specification (GBCS), specifically section 11, which contains information relating to downloading firmware images to Devices. Section 11.1 states:

*“...the contents of Manufacturer Images sent to Devices are manufacturer defined. Thus, a particular Manufacturer Image may consist of whatever the manufacturer requires to achieve the necessary update which could be a full image or just a patch to application code or any other manufacturer specified content.*

*Therefore, the steps taken by a Device when it activates the contents of a particular Manufacturer Image are manufacturer specific and specified in the release note for that Manufacturer Image.”*

This means a Device Manufacturer can specify any special requirements to be applied to a firmware upgrade on their Device, and what controls or dependencies are included. Some Devices may require a sequence of firmware versions to be applied in a particular order, whereas other Devices may be able to move from an earlier firmware version to any later firmware version.

#### Who upgrades Devices?

Suppliers are responsible for the distribution and activation of firmware on Devices and as such should understand the implications of carrying out the upgrade. However, there are several reasons why an upgrade process may not be successful. For instance, the technical dependencies of the upgrade may not be understood by those initiating the upgrade due to not having in-depth technical understanding. A technical dependency might be that a particular image needs to be installed and operating prior to the upgrade of a subsequent image.

### **Where is information relating to firmware upgrades held?**

There is currently no location where this information relating to certain dependencies for each Device is publicised as a reliable source. The information may be able to be found within the Release Notes for that particular Device and firmware version. However, that information may either not be available to a Supplier as they could contain confidential information, or they could be difficult to interpret as Release Notes can be very complex or the Supplier may have inherited the Device as the consumer changed Supplier.

The Release Notes by themselves without specialist Device Manufacturer or engineer knowledge may not provide the clarity required to inform a Supplier.

### **What is the issue?**

The SSC has highlighted that Devices could have a firmware upgrade applied that causes unintended consequences. Deeper investigation found that it is not uncommon for firmware updates to be required to be implemented in a specific order. Furthermore, there are examples where this required sequence of updates was not able to be verified during the update process. Whilst the Release Notes for one of the Devices specified a specific upgrade sequence, others did not.

When a firmware image is created by a Device Manufacturer, the Manufacturer will understand many of the variables required for the successful activation of that image on one of their Devices. Whilst the Device Manufacturer may have the capability and expertise to understand how the firmware image may need to be successfully activated, the same cannot always be said of those who need to apply the image.

A previous modification, [SECMP0009 'Centralised Firmware Library'](#), delivered the [Firmware Information Repository \(FIR\)](#) which can be accessed only by SEC Parties, via the SEC website. This contains additional information for ESMs and GSMs, including contact details for the Manufacturer and Release information. However, that information is provided voluntarily at the discretion of the party making the CPL submission and does not necessarily specify an upgrade path.

### **What is the scope of the modification?**

Whilst other issues, such as interoperability of Devices, can also cause Devices to have unintended consequences, the scope of this modification is limited to identifying the correct upgrade path of Devices.

### **What is the impact this is having?**

As certain Devices require their firmware to be upgraded in a specific order, failing to do this can result in a Device having unintended consequences, including losing functionality. In these instances, a Supplier would then be required to carry out a site visit to exchange the Device. This is an unnecessary cost on the Supplier and an inconvenience for the consumer. Device Manufacturers could also have their reputation negatively impacted if their Devices suffer from this situation.

There are financial and environmental costs from scrapping Devices that otherwise would work had a firmware upgrade been applied correctly.

## Impact on consumers

If a Device loses functionality, then the consumer is impacted by the period without a fully working Device, and the inconvenience of having to facilitate an engineer site visit. The added costs could also be fed back to all consumers through Supplier charges.

## 3. Assessment of the proposal

### Areas for assessment

#### What Devices are affected?

The affected Devices will be defined during the Refinement Process, but the Smart Energy Code Administrator and Secretariat (SECAS) recommends that Communications Hubs, ESMs, GSMs, Home Area Network (HAN) Connected Auxiliary Load Control Switches (HCALCS), Standalone Auxiliary Proportional Controllers (SAPCs) and Prepayment Meter Interface Devices (PPMIDs) should all be considered within any solution.

#### Sub-Committee input

SECAS has engaged with the Chairs from the Operations Group (OPSG), the Technical Architecture and Business Architecture Sub-Committee (TABASC), the SSC and the Smart Metering Key Infrastructure Policy Management Authority (SMKI PMA) to confirm what input is required from these forums. SECAS believes the following Sub-Committees will need to provide the following input to this modification:

| Sub-Committee input |                                                         |
|---------------------|---------------------------------------------------------|
| Sub-Committee       | Input sought                                            |
| OPSG                | Confirm issue and solution is appropriate for Suppliers |
| SMKI PMA            | No input required                                       |
| SSC                 | As Proposer seek input and feedback throughout          |
| TABASC              | Seek input on viable solution options                   |

### Observations on the issue

This issue was discussed at the SSC Commercial Product Assurance Issue Resolution Subgroup (SCIRS). Members noted that this was an urgent issue to be addressed. They questioned whether an interim solution could be delivered in the meantime. SECAS has confirmed that there is a free text field within the CPL submission that could be used now and would notify Parties of how this could be completed for this purpose.

At the Change Sub-Committee (CSC) a member noted that under the discussion at TABASC, a Guidance Note had been produced to also help Parties immediately. SECAS noted that this had been produced and would be shared with SEC Parties once it had been approved.

## Appendix 1: Progression timetable

This modification will be discussed with the Working Group on 1 March 2023.

| Timetable                                                            |                             |
|----------------------------------------------------------------------|-----------------------------|
| Event/Action                                                         | Date                        |
| Draft Proposal raised                                                | 13 Feb 2023                 |
| Presented to CSC for comment and conversion to Modification Proposal | 21 Feb 2023                 |
| Modification discussed with Working Group                            | 1 Mar 2023                  |
| <i>Modification discussed with TABASC</i>                            | <i>6 Apr 2023</i>           |
| <i>Refinement Consultation</i>                                       | <i>10 – 28 Apr 2023</i>     |
| <i>Modification discussed with Working Group</i>                     | <i>7 Jun 2023</i>           |
| <i>Modification Report approved by CSC</i>                           | <i>20 Jun 2023</i>          |
| <i>Modification Report Consultation</i>                              | <i>21 Jun – 12 Jul 2023</i> |
| <i>Change Board Vote</i>                                             | <i>26 Jul 2023</i>          |

*Italics denote planned events that could be subject to change*

## Appendix 2: Glossary

This table lists all the acronyms used in this document and the full term they are an abbreviation for.

| Glossary |                                                               |
|----------|---------------------------------------------------------------|
| Acronym  | Full term                                                     |
| CPL      | Central Products List                                         |
| CSC      | Change Sub-Committee                                          |
| ESME     | Electricity Smart Metering Equipment                          |
| FIR      | Firmware Information Repository                               |
| GBCS     | Great Britain Technical Specification                         |
| GSME     | Gas Smart Metering Equipment                                  |
| HAN      | Home Area Network                                             |
| HCALCS   | HAN Connected Auxiliary Load Control Switches                 |
| OPSG     | Operations Group                                              |
| PPMID    | Prepayment Meter Interface Devices                            |
| SAPC     | Standalone Auxiliary Proportional Controllers                 |
| SCIRS    | SSC Commercial Product Assurance Issue Resolution Subgroup    |
| SEC      | Smart Energy Code                                             |
| SECAS    | The Smart Energy Code Administrator and Secretariat           |
| SMKI PMA | Smart Metering Key Infrastructure Policy Management Authority |
| SSC      | Security Sub-Committee                                        |

| Glossary |                                                                |
|----------|----------------------------------------------------------------|
| Acronym  | Full term                                                      |
| TABASC   | Technical Architecture and Business Architecture Sub-Committee |