

SEC Modification Proposal MP102B

DCC CR4483

**Power Outage Alerts triggered by an OTA
firmware upgrade - enduring solution**

Preliminary Impact Assessment (PIA)

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1 Executive Summary

The Change Board are asked to approve the following:

- Total cost to complete the Full Impact Assessment of £11,697
- The timescales to complete the Full Impact Assessment of 30 days
- ROM costs for MP102B, up to the end of Pre-Integration Testing (PIT) of between £151,000 and £350,000

Problem Statement and Solution

Over the Air (OTA) firmware updates can cause some Electricity Smart Metering Equipment (ESME) to interrupt power to the Comms Hub and thus generate a Power Outage Alert (POA). The Distribution Network Operator (DNO) is unable to tell whether there is a real issue with the power to the premises or whether the POA was generated as a result of a firmware upgrade to the ESME.

The fundamental business requirement for DCC under MP102B is to build a mechanism to suppress any Power Outage Alerts (AD1) which may have been caused by a firmware update to a specific set of Landis + Gyr (L+G) ESME Devices. To align to the two scenarios described in the business requirements, DCC proposes that:

- The “Core Solution” described below will do this for all L+G ESME devices
- The “Enhanced Solution” will do the same but only for a specific list of L+G ESME GUIDs

Modification Benefit

By implementing either solution proposed in this Modification, DNOs will be able to more reliably interpret POAs as an indication of a genuine supply outage at a consumer’s premises and, conversely, will not receive spurious POAs caused by OTA firmware updates, which may currently lead DNOs to expend resource unnecessarily to:

- either to check the energisation status of each meter from which a POA is received
- or send a member of staff to site to investigate

2 Document History

2.1 Revision History

Revision Date	Revision	Summary of Changes
12/11/2021	0.1	Initial draft
15/11/2021	0.2	Completed internal review
15/11/2021	1.0	Issued

2.2 Associated Documents

This document is associated with the following documents:

Ref	Title and Originator's Reference	Source	Issue Date
1	MP102B Modification Report v0.8	SECAS	22/05/2021
2	MP102B Business Requirements v0.4	SECAS	13/09/2021

References are shown in this format, [1].

2.3 Document Information

The Proposer for this Modification is Matthew Alexander of SSEN.

The Preliminary Impact Assessment was requested of DCC on 15 October 2021, and accepted on 22 October 2021.

3 Context and Requirements

In this section, the context of the Modification, assumptions, and the requirements are stated.

The requirements have been provided by SECAS, the Proposer, and the Working Group.

3.1 Context

POAs are used by DNOs to improve customer service by becoming aware of power outages sooner rather than relying on their customers to contact them. POAs enable the DNO to restore supply to affected customers more efficiently and more quickly.

OTA firmware updates can cause ESME to generate a POA. The DNO is unable to tell whether there is a real issue with the power to the premises or whether it the POA was generated as a result of a firmware upgrade to the ESME.

Investigations during the Refinement Process found the scale of the issue affecting existing meters much greater than initially envisaged. Due to an anticipated lengthy lead time for implementation where meter Manufacturers could potentially still produce Devices that cause erroneous POAs, it was agreed that there should be two separate solutions to address the issue:

- MP102A: a Technical Specifications document change for meter Manufacturers to abide by for ESME produced after implementation (implemented as part of the November 2020 SEC Release); and
- MP102B: an enduring solution for the set of meters that are currently installed and which cannot be upgraded OTA to eliminate the behaviour.

3.2 Problem Statement

Over the Air (OTA) firmware updates can cause some Electricity Smart Metering Equipment (ESME) to interrupt power to the Comms Hub and thus generate a POA. The DNO is unable to tell whether there is a real issue with the power to the premises or whether the POA was generated as a result of a firmware upgrade to the ESME.

This impacts SMETS2 only.

3.3 Business Requirements

There are three business requirements for this Modification.

Ref	Requirements
1	An OTA firmware update to a tracked L+G ESME currently installed will not result in a Power Outage Alert (AD1 Alert) reaching the Network Operator in the first instance.
2	The Data Services Provider (DSP) will track firmware activations on tracked Landis + Gyr ESME and then suppress AD1 Alerts from the tracked L+G ESME for 30 minutes.
3	If the Service Requests for firmware activations on a tracked L + G ESME contain a firmware activation date and time, the DSP will extract and record the firmware activation date and time. The DSP shall then suppress AD1 Alerts from the tracked L+G ESME for 30 minutes starting at the recorded firmware activation time.

The Working Group requested that during the Preliminary Assessment, the DCC assess tracking firmware activations and subsequent AD1 Alerts for two scenarios:

- all L+G ESME Devices in the field,
- for the list of Globally Unique Identifiers (GUID) that L+G have provided

DCC noted Requirement 3 adds a degree of complexity and cost to the solution, particularly to any testing scenarios. DCC provided analysis from the DCC Technical Operations Centre showing that over the last two years an average of 14% Activate Firmware Commands sent to L+G ESME were device future dated. The Working Group believed this level of usage warranted the extra complexity and cost for a full solution.

4 Description of Technical Solution

Changes to the DSP are required to implement either the Core Solution or the Enhanced Solution.

The fundamental business requirement for DCC under MP102B is to build a mechanism to suppress any Power Outage Alerts (AD1) which may have been caused by a firmware update to a specific set of ESME Devices (Landis + Gyr). To align to the two scenarios described in the business requirements, DCC proposes that:

- The “Core Solution” described below will do this for all L+G ESME devices.
- The “Enhanced Solution” will do the same but only for a specific list of L+G ESME GUIDs.

4.1 DSP Core Solution Overview

The core solution will track all Service Request (SR)11.3 firmware activation requests sent to L+G ESME devices. The firmware activation request can be issued either in the ‘On Demand’ or ‘Future Dated’ mode of operation.

On Demand Firmware Activation

The DSP will track the time it receives a SR11.3 firmware activation request for an L+G ESME.

If a POA is received from the Comms Hub on the same HAN as that ESME within 30 minutes of the firmware activation request then the DSP will suppress creation of the AD1 Alert and nothing will be sent to any User.

Future Dated Firmware Activation

For future dated activation, the SR11.3 firmware activation request can be issued up to 30 days in advance of the firmware activation time. In this scenario, the DSP will track the execution time specified within the SR11.3 firmware activation request as the firmware activation time. If a POA is received from the Comms Hub on the same HAN as that ESME within 30 minutes of the recorded firmware activation time then the DSP will suppress creation of the AD1 Alert and nothing will be sent to any User.

In both modes of operation, the details of any POAs which are suppressed will be recorded in a ‘Power Outage Suppression Log’ for the purpose of any future investigations and will contain the following data:

- Comms Hub ID
- ESME ID
- SR11.3 Request ID
- Firmware Activation Time associated with SR11.3
- Alert Generation Time as recorded within the POA
- Alert Receipt Time
- Alert Status (“Suppressed”)

This log will be for use by the DSP Operations Team and is not expected to be shared with DCC or Users.

4.2 DSP Enhanced Solution Overview

It is only a subset of L+G ESME Devices that can create spurious Power Outage Alerts and a list of the specific Device GUIDs which exhibit this problem has been created and shared by L+G.

The enhanced solution will operate in the same way as the core solution above, but the DSP will only track SR11.3 firmware activation requests for devices which are present in the L+G GUID list.

This enhanced solution variant requires DSP to build a mechanism to store the GUID List of the applicable devices. Although the build effort associated with this solution variant is higher than the core solution variant, this enhanced filtering eliminates the need to track firmware activation of devices that work as desired. As a result, the memory needed to hold the tracking data will be reduced. However, the GUID List will require allocation of additional memory.

Note: The estimates presented in this PIA assume that the GUID List will remain unchanged, without having to add or remove items from it.

5 Impact on Systems, Processes and People

This section describes the impact of MP102B on Services and Interfaces that impact Users and/or Parties.

5.1 Request Management

In southbound processing Request Management will build a tracking mechanism that involves recording the firmware activation time for any On Demand or Future Dated firmware activation service requests sent to the relevant L+G ESME devices.

In northbound processing Request Management will not create an AD1 Alert for a POA that is received within 30 minutes of a firmware activation on a tracked L+G ESME device. The details of the suppressed AD1 Alerts will be recorded within the 'Power Outage Suppression Log'.

Request Management will also need to build housekeeping functionality to manage the firmware activation tracking data.

5.2 Data Management/ Data Model

Data Management needs to support tracking of firmware activation requests. There will be changes to the data model to support this.

5.3 Security Impact

The implementation will be security assured throughout. This assurance includes reviewing designs, test artefacts and providing consultancy to the implementation and test teams. No additional Protective Monitoring is assumed to be required. No penetration testing is included in the ROM pricing.

A more detailed assessment of Security impact will be carried out as part of the Full Impact Assessment (FIA).

5.4 Infrastructure Impact

There will be no change to the infrastructure design as a result of this change. Additional processing and storage will be required, but they are not sufficiently large to warrant the procurement of additional compute power or storage. Note that the aggregated impact of many such changes to the DSP solution will ultimately result in a reduction of the available processing headroom assumed as part of the original DSP agreement. As such, DSP reserves the right to raise a CR for the provision of additional infrastructure should the DCC Data System experience performance problems that are the direct result of such changes.

The change does not impact the DSP resilience or DR implementation.

5.5 Service Impact

This change has potential to increase service team activity as a result of the additional functionality, although it is not expected to have a material impact on service charges. The increased service team activity will result from maintenance of the functionality introduced by the Modification and responding to requests for information made possible through the existence of the new functionality. A more detailed service impact will be completed as part of the FIA. No changes to SLAs or reporting are expected as a result of this change.

6 Implementation Timescales and Approach

This change is expected to be included in a future SEC Release. Design, Build, and PIT is expected to take approximately three months to complete after the CAN is signed.

Details of the implementation will be finalised in the FIA.

6.1 Testing and Acceptance

There will be an impact to System Integration Testing (SIT) as a result of this Modification. SIT Preparation activities will involve:

- Preparation of Functional Heatmap
- Create one new Test Scenario and Script
- Loading Test Scripts ready for execution

It is anticipated that a new test scenario and script are required for this change to suppress the AD1 alert for a minimum of 30 minutes.

Based on initial analysis, it is thought that the Enhanced Solution will require one additional test case to load the GUID list. However, the Enhanced Solution will require DCC to provide three separate Landis + Gyr ESME device sets, each with a specific version of a boot operating system.

The UIT Projects Team has analysed the requirements and proposed solution. It does not expect any additional testing to be required in UIT as a result of this change. When the change is included in a SEC Release, the release will be subject to standard regression testing within a UIT environment prior to Production release.

The System Integrator will be required to manage SIT. These costs will be included in the FIA.

7 Costs and Charges

The table below details the cost of delivering the changes and Services required to implement this Modification Proposal.

The Rough Order of Magnitude cost (ROM) shown below describes indicative costs to implement the functional requirements. The price is not an offer open to acceptance. It should be noted that the change has not been subject to the same level of analysis that would be performed as part of a Full Impact Assessment and as such there may be elements missing from the solution or the solution may be subject to a material change during discussions with the DCC. As a result the final offer price may result in a variation.

The table below details the cost of delivering the changes and Services required to implement this Modification. For a PIA, only the Design, Build and PIT indicative costs are supplied.

	Design, Build and PIT	Days to Create FIA	Cost to Create FIA
DSP	£151,000 – 350,000	30	£11,697

Table 1 MP102B Standalone Cost

The phases included are as follows.

Design	The production of detailed System and Service designs to deliver all new requirements.
Build	The development of the designed Systems and Services to create a solution (e.g. code, systems, or products) that can be tested and implemented. It includes Unit Testing (also referred to as System Testing), Performance Testing and Factory Acceptance Testing by the Service Provider or supplier.
Pre-Integration Testing (PIT)	Each Service Provider tests its own solution to agreed standards in isolation of other Service Providers. This is assured by DCC.

Based on the existing requirements, the fixed price cost for a Full Impact Assessment is **£11,697** and would be expected to be completed in 30 days.

Appendix A: Risks, Assumptions, Issues, and Dependencies

The tables below provide a summary of any Risks, Assumptions, Issues, and Dependencies (RAID) observed during the production of this PIA. DCC requests that the Working Group considers this section and considers any material matters that have been identified. Changes may impact the proposed solution, implementation costs and/or implementation timescales.

Assumptions

These assumptions have been used in the creation of this PIA. Any changes to the assumptions may require DCC to undertake further assessment, prior to the contracting and implementation of this change.

Ref	Description	Status/Mitigation
MP102B-A1	The estimates presented in this PIA for the Enhanced Solution assume that the GUID List will remain unchanged, without having to add or remove items from it.	Open

Appendix B: Glossary

The table below provides definitions of the terms used in this document.

Acronym	Definition
CAN	Contract Amendment Note
DCC	Data Communications Company
DNO	Distribution Network Operator
DSP	Data Service Provider
ESME	Electricity Smart Metering Equipment
FIA	Full Impact Assessment
GUID	Globally Unique Identifier
L+G	Landis and Gyr
OTA	Over the Air
PIA	Preliminary Impact Assessment
PIT	Pre-Integration Testing
POA	Power Outage Alert
ROM	Rough Order of Magnitude (cost)
SEC	Smart Energy Code
SECAS	Smart Energy Code Administrator and Secretariat
SIT	Systems Integration Testing
SLA	Service Level Agreement
SMETS	Smart Metering Equipment Technical Specification
SR	Service Request
UIT	User Integration Testing