This document is classified as **White** in accordance with the Panel Information Policy. Information can be shared with the public, and any members may publish the information, subject to copyright.

MP170

'Firmware updates to Point to Point Alt HAN Devices'

Modification Report

Version 0.4

7 December 2021

Corporate member of Plain English Campaign
Committed to clearer communication
592

About this document

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.

Contents

This document also has three annexes:

- **Annex A** contains the business requirements for the solution.
- **Annex B** contains the redlined changes to the Smart Energy Code (SEC) required to deliver the Proposed Solution.
- **Annex C** contains the full Data Communications Company (DCC) Preliminary Assessment response.

Contact

If you have any questions on this modification, please contact:

Kev Duddy

020 3574 8863

kev.duddy@gemserv.com

1. Summary

This proposal has been raised by David Jones from AltHANCo.

The Alternative Home Area Network (Alt HAN) solution is being developed to address situations where one, or both, of the gas meter or In Home Display (IHD) are out of range of the Communications Hub, using Point to Point (P2P) Alt HAN P2P Devices.

Over-The-Air (OTA) firmware updates are used to deploy updates that either fix faults or provide new functionality to certain Devices. The SEC and its subsidiary documents facilitate OTA firmware updates to meters and the Gas Proxy Function (GPF) which is part of the Communications Hub. It also supports OTA updates for other Device types such as Prepayment Meter Interface Devices (PPMIDs) and HAN Connected Auxiliary Load Control Switches (HCALCS) but has no provision for Alt HAN P2P Devices.

This means that any new firmware functionality that is developed to deploy security updates or improve the service to consumers can only be deployed by physical onsite exchanges. The result is higher costs, longer deployment timescales, and more inconvenience to the consumer than if an OTA firmware update was available to fix the issue.

The Proposed Solution will re-use the existing functionality for PPMID OTA firmware updates. The Preliminary Assessment indicates the costs for the Design, Build and Pre-Integration Testing (PIT) will be £636,500. If approved, this modification will target the next SEC Release that includes a DCC User Interface Specification (DUIS) uplift, which is currently November 2023.

This modification affect all Suppliers and the DCC. It will be progressed as a Self-Governance Modification.

2. Issue

What are the current arrangements?

What is Alt HAN?

In most cases, a standard smart metering installation will include Gas Smart Metering Equipment (GSME), Electricity Smart Metering Equipment (ESME), an IHD and a Communications Hub. All Devices must be within the expected proximity to the Communications Hub for the Home Area Network (HAN) to be able to connect them. Achieving a HAN in some premises such as blocks of flats (Multi Dwelling Units (MDUs)) has additional challenges and the Alt HAN solution is being developed to address these concerns. The Alt HAN solution is required when the GSME or the IHD are out of range of the Communications Hub and the ESME.

Alt HAN P2P Devices

Alt HAN P2P Devices are being developed that will offer a solution in situations where one, or both, of the gas meter or IHD are out of range and act as a Range Extender. AltHANCo uses four different P2P device types (B1, B2, B3, B4) known as ‘bridges’ and these are configured in different ways depending on the set up of the premises. There will be either two or three Devices at each premise to

provide a solution. This will depend on whether it is the IHD or the GSME that is out of range, whether they are close together, and whether the GSME has a nearby electricity source.

Each bridge will then join the network and act as a Range Extender, to broaden the HAN. It is envisaged that the Alt HAN P2P Devices will join the network by Service Requests specified in DUIS.

Over-The-Air firmware updates

OTA firmware updates to meters and the GPF (which is part of the Communications Hub) are currently carried out via the DCC infrastructure. They are used to deploy updates that either fix faults with Devices or provide new functionality to a Device. Without the use of OTA firmware updates, the only way to remedy these would be by a site visit.

There are already defined processes in the SEC and its subsidiary documents to facilitate OTA firmware updates to Communications Hubs, ESMEs and GSMEs. Following the implementation of SECMP0007 'Firmware updates to IHDs and PPMIDs' this will also be possible for PPMIDs and HCALCSs. However, there is no capability to carry out OTA firmware updates for Alt HAN P2P Devices.

SECMP0007 implementation

SECMP0007 documentation changes and Data Services Provider (DSP) elements were implemented on 4 November 2021 (November 2021 SEC Release). The Communication Services Provider (CSP) system changes will then be delivered in the June 2022 SEC Release. Finally, the subsequent Communications Hub firmware updates will be rolled out as soon as they are available. It is expected that this will be during Q4 2022.

What is the issue?

The SEC does not currently support firmware updates to P2P Alt HAN P2P Devices.

Without the ability to perform a remote firmware upgrade, new innovations and functionality to improve the service to consumers will not be cost effective. Additionally, if a security defect is identified then an OTA firmware update to fix the defect would be quicker than a site visit and thus reduces the length of time that a consumer's premise is a security risk.

What is the impact this is having?

Mitigating against risk

OTA firmware updates enable the User to remedy faults on a Device without the need for a site visit. There is a risk that a P2P Alt HAN Device may lose its ability to communicate if there is a ZigBee stack upgrade that needs to be applied to fix a security related issue. This would lead to a mass recall of P2P Alt HAN P2P Devices if there was not a remote firmware update capability.

The costs associated with either of these events would vary depending on the stage of the rollout that it occurred, but high-level estimations are provided below. These figures were produced by AltHANCo based on initial projections and will evolve as this modification is refined.

Estimated costs of recall events without OTA firmware update capability			
Risk	**Detail**	**High-Level Estimate**	**Likelihood**
Mass Recall Event	Low Impact (early stage in rollout: Jun 22)	£25m	Low
	High Impact (end of rollout: Mar 25)	£112m	Very Low
Partial Recall Event	Low Impact (10% of Solutions)	£6m	Low – Medium
	High Impact (25% of Solutions)	£22m	Low

This highlights a significant impact should there be an issue that requires either a partial or a mass recall. If the capability for an OTA firmware update was available, then it is envisaged that these issues could be addressed remotely and in a much shorter timeframe than Device replacement.

Delivering future change

Smart Metering requirements continue to change as the Smart Metering Implementation Programme (SMIP) evolves. OTA firmware updates are needed to support and deliver innovative advancements within the Alt HAN and DCC ecosystems. If OTA firmware updates are not possible this would limit the opportunity for future innovation for P2P Alt HAN P2P Devices as well as other Devices that would rely on them. Additionally, developments in security features would not be able to be rolled out without a Device being physically exchanged via site visit.

Impact on consumers

If OTA firmware updates are not possible then any changes needed will rely on site visits to consumer premises. This is an inconvenience to consumers to accommodate an onsite visit, and additional cost to industry Parties. Consumers may be unable to receive an improved service that could be developed where the benefits may outweigh the costs of an OTA firmware update but not a mass rollout.

In addition, essential security or functionality updates to ensure P2P Alt HAN P2P Devices are 'fixed' will not be able to take place remotely but will require site visits.

Site visits and Device exchange will create a negative impact on the environment and additional costs.

3. Solution

The Proposed Solution will re-use the OTA functionality that was developed as part of SECMP0007. To do this, the Alt HAN P2P Devices will join the HAN as if it were a PPMID. The Communications Hub will not be able to differentiate between a genuine PPMID and an Alt HAN P2P Device but the DSP and therefore Service Users will be able to. To facilitate this, DUIS will be updated to include a new "PPMID Variant" field that will be mapped to existing Service Requests used for PPMID firmware updates.

Service Users will use the existing SRVs for updating and reading firmware on PPMIDs and receive the same Alerts in response, but there will be additional data item to differentiate between a genuine PPMID and an Alt HAN P2P Device.

4. Impacts

This section summarises the expected impacts that would arise from the implementation of this modification.

SEC Parties

SEC Party Categories impacted			
✓	Large Suppliers	✓	Small Suppliers
	Electricity Network Operators		Gas Network Operators
	Other SEC Parties	✓	DCC

Supplier Parties

Suppliers are responsible for the procurement, installation and maintenance of Smart Metering Equipment Technical Specifications (SMETS)2 Devices in consumers' premises. They have a responsibility to ensure Devices are operating correctly and efficiently. Therefore, a fit for purpose OTA firmware management process covering all mandated Devices would support Suppliers in delivering their obligation consistently.

DCC System

The DSP and CSPs are both impacted by this modification. There will be a minor impact to the CSPs and they will need to test and monitor the increased traffic from Service Requests. This is not expected to be of a particularly high volume. The DSP will need to make some changes to existing Service Requests and Alerts to differentiate between a genuine PPMID, and an Alt HAN P2P Device acting as a PPMID. There will also be changes required to ensure Users can differentiate the difference between the PPMID and Alt HAN Devices.

DCC has also noted an impact on their Technical Operation Centre (TOC), needed to create new reports for stakeholders, as well as on their Parse & Corelate software to be updated due to changes in the DUIS schema.

There is no impact to SMETS1 Service Providers.

The expected impacts on DCC Systems can be found in the DCC Preliminary Assessment response in Annex C.

SEC and subsidiary documents

The following parts of the SEC will be impacted:

- Appendix E ‘DCC User Interface Services Schedule’

The changes to the SEC required to deliver the proposed solution can be found in Annex B.

Technical specification versions

These changes will be applied to the next sub-Version of the following Technical Specification series at the time the modification is implemented:

- DUIS v5.x

These changes will also be applied to any new Principal Versions of these documents that subsequently become effective on or before the implementation date.

Consumers

Consumers who will require an Alt HAN solution will be positively impacted by this modification. Being able to deliver firmware updates means that new functionality and security fixes will be able to be rolled out to consumers faster and with less inconvenience. This will also save on costs which could have been passed onto the consumer.

Other industry Codes

This modification will not have an impact on any other Industry Codes.

Greenhouse gas emissions

If this modification is not implemented, the inability to update the firmware on a Device may lead to additional otherwise unnecessary replacement of functional Devices. The disposal of these Devices may then have a detrimental impact on greenhouse gases.

5. Costs

DCC costs

The estimated DCC implementation costs for Design, Build and PIT are £636,500. The breakdown of these costs are as follows:

Breakdown of DCC implementation costs	
Activity	**Cost**
Design, Build and Pre-Integration Testing (PIT)	£636,500
Systems Integration Testing (SIT)	TBC
User Integration Testing (UIT)	TBC
Implement to Live	TBC
Application Support	TBC

More information can be found in the DCC Preliminary Assessment response in Annex C.

SECAS costs

The estimated the Smart Energy Code Administrator and Secretariat (SECAS) implementation cost to implement this as a stand-alone modification is one day of effort, amounting to approximately £600. This cost will be reassessed when combining this modification in a scheduled SEC Release. The activities needed to be undertaken for this are:

- Updating the SEC and releasing the new version to the industry.

SEC Party costs

These will be gathered as part of the Refinement Consultation.

6. Implementation approach

Recommended implementation approach

SECAS is recommending an implementation date of:

- **02 November 2023** (November 2023 SEC Release) if a decision to approve is received on or before 2 May 2023; or
- **07 November 2024** (November 2024 SEC Release) if a decision to approve is received after 2 May 2022 but on or before 6 May 2023.

DUIS uplifts are scheduled to only have one uplift per year with the next scheduled uplift as part of the June 2022 SEC Release. It is not possible for this modification to target June 2022. The following DUIS uplift is currently scheduled for November 2023, although is subject to change. Therefore, SECAS recommends that this modification be implemented in the next scheduled release that includes a DUIS uplift.

7. Assessment of the proposal

Observations on the issue

The Change Sub-Committee (CSC) noted that SECMP0007 was not yet implemented at that time, and parts of the solution, namely the Communications Hub firmware upgrade to facilitate this, were not scheduled to be implemented for another two years. This was noted by the Proposer who advised that the rollout of Devices would begin in April 2022. Rollout would need guidance from Parties to ensure Devices could be capable of receiving updates in time for implementation. The Proposer has

already been in contact with the Department for Business, Energy & Industrial Strategy (BEIS) and the DCC with regards the solution.

One CSC member noted that OTA updates to the Alt HAN P2P Devices would be a necessity going forwards.

Solution development

Request for information

A request for information (RFI) was issued to SEC Parties to gain further information from industry to help scope the business requirements, and potential solution options. Responses to the RFI indicated Suppliers need to be able to confirm that firmware updates were successful, and that they need to be able to read the current firmware version on the Device. Some Parties did note that their answers were dependent on the costs for implementing a solution. A Working Group member queried whether the costs should be separated for each requirement to assess whether each one should be included in a solution. The DCC advised that they wouldn't be able to split out costs for each requirement. Working Group members noted that it must be clear whether a full solution should be used, or a reduced solution that is cheaper would be more appropriate. The Working Group stated that this is only possible to be discussed if costs can be apportioned.

Should Smart Metering Key Infrastructure (SMKI) credentials be replaceable on Alt HAN P2P Devices?

The Security Sub-Committee (SSC) were presented with this question, and they supported the requirement that SMKI credentials should be replaceable, but not as part of a business-as-usual process. SSC members noted that the security requirements of Consumer Access Devices (CADs) were a risk that was being monitored. Therefore, SSC members suggested that Alt HAN P2P Devices should mirror the security requirements set out for PPMIDs.

Responses to the RFI were not unanimous as to whether Suppliers should be able to replace any SMKI credentials on Alt HAN P2P Devices. At the Working Group, the Proposer clarified that this requirement should have been aimed at whether SMKI credentials should be replaceable in general, not specifically by Suppliers. A Working Group member highlighted that this changed the question substantially and that would have resulted in a decision in favour of the requirement.

Joining the HAN as a PPMID or a CAD

Alt HAN P2P Devices were initially being designed as Type 2 Devices and were expected to join the HAN as a CAD. An alternative would be for the Alt HAN P2P Devices to join the HAN as a PPMID and be a Type 1 Device. This would be expected to minimise Communications Hub firmware development by utilising the SECMP0007 functionality.

The Chair of the Technical Architecture and Business Architecture Sub-Committee (TABASC) raised a concern that Service Users would have issues from an operational perspective if they were not able to identify a real CAD or PPMID from an Alt HAN P2P Device. They suggested that the Devices implement firmware update functionality as laid out for PPMIDs and should be identified in the Smart Metering Inventory (SMI) as an Alt-HAN Device, as Type 1 options in Communications Hub Technical Specifications (CHTS).

A Working Group member observed that there could be further implications of treating an Alt HAN Device as a PPMID, stating that the Devices would not meet certain criteria that are required of PPMIDs that is detailed within the SMETS. They suggested that the Alt HAN Device should be defined within SMETS or should utilise Wi-Fi as opposed to updating across over the Smart Metering Network. The Proposer countered that this had been considered as part of the Device development and was not a viable option for them.

The Proposer argued that this option would require CSP changes at great cost to industry. The DCC suggested that the Alt HAN P2P Devices could be tagged as part of a Great Britain Companion Specifications (GBCS), to show that they are not genuine PPMIDs, as part of the pre-notification process. Suppliers could access this information via a Service Request; this is currently an option for PPMIDs.

The TABASC Chair questioned whether the CAD option would result in changing firmware capability in the (DSP. The DCC advised that the DSP will need to change whichever solution is implemented.

A DCC Preliminary Assessment was requested to consider both options and document the constraints of each approach. The Preliminary Assessment stated that the solution for the Alt HAN P2P Devices to re-use the functionality brought in by PPMIDs would provide a more cost-effective solution. This option would mean the Communications Hub would not be able to distinguish between a PPMID and an Alt HAN P2P Device, and that a change would be required at the DSP to enable the HAN to distinguish between the two Devices.

SSC members noted that a clear distinction between PPMIDs and Alt HAN P2P Devices was crucial. It would be particularly important for personnel without technical knowledge, such as those that may work directly with consumers within a call centre. The DCC advised that a clear flag would have to be placed on Alt HAN Devices in the SMI. This will be detailed within the Full Impact Assessment.

The TABASC challenged the proposed costs associated with this relatively minor change. These will be challenged as part of the Full Impact Assessment.

The Preliminary Assessment also highlighted that to develop the solution of treating the Alt HAN P2P Devices as a CAD would be more complex, more expensive and have a longer implementation timescale.

The TABASC agreed that although the technical merits of the PPMID option did meet the business requirements, it did not meet the architectural principles for smart metering and therefore was not endorsed by the TABASC as a long-term solution. However, the Chair also acknowledged that due to the time constraints of the rollout of Alt HAN Devices, Option 1 did provide a short-term solution.

The TABASC requested that a longer-term approach be developed based on the architectural principles of smart metering, recognising the opportunities present in the re-procurement of both DSP and CSP solutions. This will be taken forward separately to this modification.

A Working Group member also commented that the DCC costs should not be considered in isolation. They highlighted that any changes to the Alt HAN P2P Devices will have different design and development costs, and these should be considered along with the DCC costs. The Proposer advised that they were currently impact assessing this on their own Devices, and although they could not share specifics, confirmed joining the HAN as a PPMID was also lower cost on their Device development.

Battery powered Devices

One Working Group member noted that the Alt HAN P2P Devices were not alike, and one of the Alt HAN P2P Devices relies on battery power. They questioned whether this battery powered Alt HAN Device should be able to process firmware updates without losing power and affecting the Alt HAN. It should be important that any firmware update for that Device should not impact the other Devices on the HAN. They also questioned the priority of the Alt HAN P2P Device, in relation to situations where multiple OTAs were to be carried out across several Devices. The Proposer advised that the intent would be for the Alt HAN P2P Device to mirror the priority and Service Level Agreements (SLAs) that have been defined for a PPMID. The Proposer also added a business requirement to minimise impacts to other Devices on the Alt HAN and will investigate this potential issue further.

Support for Change

Working Group and TABASC members both voiced their support for the principle of the modification, stating that OTA firmware updates would be necessary for all Devices.

A Working Group member stated that they were a strong supporter of the modification. They noted that it was imperative due to potential future situations where the SSC could be faced with a security decision that would effectively cause the Alt HAN part of the smart infrastructure to fail if there were no OTA capability.

Views against the General SEC Objectives

Proposer's views

The Proposer believes that this modification will better facilitate SEC Objective (a)[1]. The Proposed Solution will provide for a fit for purpose, efficient and effective process for updating firmware for IHDs, PPMIDs and HCALCSs. It would additionally allow Energy Suppliers to avoid unnecessary costs relating to replacement of Devices and site visits thus helping to ensuring the sustainability of Devices for the longer term.

Industry views

These will be gathered as part of the Refinement Consultation.

Views against the consumer areas

Improved safety and reliability

Consumers will be positively impacted by the ability to deliver OTA upgrades to Alt HAN P2P Devices to deliver additional functionality and remedy possible defects on equipment.

Lower bills than would otherwise be the case

It would be expected that by reducing the potential for Device replacement then this should positively impact consumers bills as those costs will not be absorbed.

[1] To facilitate the efficient provision, installation, and operation, as well as interoperability, of Smart Metering Systems at Energy Consumers' premises within Great Britain.

Reduced environmental damage

Devices that have faults that can be fixed by OTA updates would not need to be exchanged and disposed of, thereby having a positive effect on the environment.

Improved quality of service

If implemented, this would be impacted positively be remotely fixing issues for consumers in a more efficient manner.

Benefits for society as a whole

If implemented, this modification will have a neutral impact against this consumer area.

Appendix 1: Progression timetable

This modification will now be issued for Refinement Consultation.

Timetable	
Event/Action	**Date**
Draft Proposal raised	16 Jun 2021
Presented to CSC for initial comment	29 Jun 2021
Request for information	6 Jul - 23 Jul 2021
Presented to CSC for final comment and conversion to a Modification Proposal	27 Jul 2021
Business Requirements discussed with Security Sub-Committee (SSC)	28 Jul 2021
Business Requirements discussed with Working Group	4 Aug 2021
Business Requirements discussed with the Technical Architecture and Business Architecture Sub-Committee (TABASC)	5 Aug 2021
DCC Preliminary Assessment requested	13 Aug 2021
DCC Preliminary Assessment returned	30 Sep 2021
Modification discussed with SSC	27 Oct 2021
Modification discussed with Working Group	3 Nov 2021
Modification discussed with TABASC	4 Nov 2021
Refinement Consultation	7 Dec – 4 Jan 2022
Modification discussed with Working Group	5 Jan 2022
Impact Assessment costs approved by Change Board	26 Jan 2022
Impact Assessment requested	27 Jan 2022
Impact Assessment discussed with Working Group	4 May 2022
Impact Assessment discussed with TABASC	5 May 2022

Timetable	
Event/Action	**Date**
Modification Report approved by CSC	17 May 2022
Modification Report Consultation	18 May 2022 – 7 Jun 2022
Change Board vote	22 Jun 2022

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**
Alt HAN	Alternative Home Area Network
BEIS	Department for Business, Energy & Industrial Strategy
CAD	Consumer Access Device
CHTS	Communications Hub Technical Specifications
CSC	Change Sub-Committee
CSP	Communications Service Provider
DCC	Data Communications Company
DSP	Data Services Provider
DUIS	DCC User Interface Specification
ESME	Electricity Smart Metering Equipment
GBCS	Great Britain Companion Specifications
GPF	Gas Proxy Function
GSME	Gas Smart Metering Equipment
HAN	Home Area Network
HCALCS	HAN Connected Auxiliary Load Control Switches
IHD	In-Home Display
MDU	Multi Dwelling Unit
OTA	Over The Air
P2P	Point To Point
PIT	Pre-Integration Testing
PPMID	Prepayment Meter Interface Device
RFI	Request for information
SEC	Smart Energy Code
SEC	Smart Energy Code Administrator and Secretariat
SIT	System Integration Testing
SLA	Service Level Agreement

Glossary	
Acronym	**Full term**
SMETS	Smart Metering Equipment Technical Specifications
SMI	Smart Metering Inventory
SMIP	Smart Metering Implementation Programme
SMKI	Smart Metering Key Infrastructure
SSC	Security Sub-Committee
TABASC	Technical Architecture and Business Architecture Sub-Committee
TOC	Technical Operation Centre
UIT	User Integration Testing