SEC Modification Proposal, SECMP0170, DCC CR4435

Firmware Updates to Alt HAN Point to Point Devices

Full Impact Assessment (FIA)

Version:	**1.0**
Date:	**25th May, 2022**
Author:	**DCC**
Classification:	**Public**

Contents

1   Executive Summary

The Change Board are asked to approve:

- Total cost to implement SECMP0170 of £1,081,473 which comprises:

    o £530,197 in Design, Build and PIT costs; and

    o £551,276 in estimated release costs (SIT, UIT, TTO and Systems Integration).

- The timescale to complete the implementation of **10** months

- Include SECMP0170 as part of November 2023 SEC System Release.

Problem Statement and Solution

Alt HAN Point to Point (P2P) Devices are being developed that will act as a range extender to offer a solution in situations where one, or both, of the gas meter (GSME) or In Home Display (IHD)/ Prepayment Metering Interface Device (PPMID) are out of range of the Home Area Network (HAN).

The SEC does not currently support remote firmware updates to 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 Over-the-Air (OTA) firmware update to fix the defect would be quicker and cheaper than a site visit and thus reduces the length of time that a consumer's premise is a security risk.

SECMP0170 proposes to introduce the OTA firmware update to Alt HAN P2P Devices in the same way as SECMP0007- Firmware updates to IHD and PPMIDs.

Benefit Summary

The benefits of providing remote firmware updates to Alt HAN P2P Devices are:

- Risk mitigation - OTA firmware updates enable the User to remedy faults, fix security issues without a site visit which can avoid partial/mass recall of Alt HAN P2P Devices.

- Future change delivery– OTA firmware updates are also 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 Alt HAN P2P Devices as well as other Devices that would rely on them.

- Reduce Impact on Consumers – Without OTA firmware updates, any changes needed will rely on Engineer's site visits to consumer premises which is inconvenience to consumers and incur additional cost to industry Parties.

2 Document History

2.1 Revision History

Revision Date	Revision	Summary of Changes
09/03/2022	0.1	Initial compilation
17/03/2022	0.15	Reviewed with Service Providers' Response
09/05/2022	0.2	Updated for solution preview to AltHANCo.
11/05/2022	0.25	Updated following internal review
24/05/2022	0.3	Updated following revised IA from SPs
25/05/2022	1.0	Updated following internal review and for SECAS review

2.2 Associated Documents

This document is associated with the following documents:

#	Title and Originator's Reference	Source	Issue Date
1	DP170 Modification Report	SECAS	17/06/2021
2	MP170 Business Requirements v0.3	SECAS	17/12/2021

2.3 Document Information

This document contains the requirements, design for the proposed solution along with the business requirements, volumetric information and the costing information required to complete the Full Impact Assessment.

The Proposer for this Modification is David Jones of AltHANCo. The proposal was submitted on 17th June 2021.

The Preliminary Impact Assessment (PIA) was requested of DCC on 13th August 2021. The completed PIA was submitted on 30th September 2021.

A Full Impact Assessment (FIA) request was accepted from SECAS on 7th February 2022.

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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

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)/Prepayment Metering Interface Device (PPMID) are out of range of the Communications Hub (Comms Hub), using Alt HAN Point to Point (P2P) Devices.

AltHANCo uses four different P2P Device Types (B1, B2, B3, B4) known as 'bridges' - these acts as range extender and are configured in different ways depending on the set up of the premises. There will be either two or three P2P Devices at each premise to provide a solution – this is dependent on a number of factors:

- Whether it is the IHD or GSME that is out of range of the HAN;
- Whether the IHD and GSME are close together;
- Whether the GSME has a nearby electricity source.

Each bridge joins the ZigBee network as a range extender to transfer traffic. This is achieved via whitelist functionality and performed by Service Users by sending existing DCC User Interface Specification (DUIS) Service Requests.

3.2   Problem Statement

The SEC does not currently support firmware updates to 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 limits the length of time that a consumer's premise is a security risk.

3.3   Modification Benefits

Following are the benefits of providing remote firmware updates to Alt HAN P2P Devices.

Risk mitigation - OTA firmware updates enable the User to remedy faults on a Device without the need for a site visit. There is a risk that an Alt HAN P2P 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 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 but highlighted as significant should there be an issue that requires either a partial or a mass recall. If the capability for an OTA firmware update is 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 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.

Reduces 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.

3.4 Business Requirements

The table below contains the business requirements provided by SECAS that support the solution(s) for this Modification and are expected to be used by the DCC to shape the solution.

Ref.	Requirement	Impacted Party
1	AltHANCo shall be able to develop and assure firmware upgrades for Alternative Home Area Network (Alt HAN) Point to Point (P2P) Devices.	AltHANCo
2	Energy Suppliers shall be able to deploy Over-The-Air (OTA) firmware upgrades for Alt HAN P2P Devices over the Smart Metering System.	DCC/ Suppliers
3	Energy Suppliers shall keep AltHANCo up to date following any Alt HAN P2P Device firmware upgrades.	DCC/ Suppliers
4	DCC shall provide AltHANCo with reports on deployed firmware versions.	DCC
5	The DCC shall be able to maintain records on firmware deployments and current firmware versions of Alt HAN P2P Devices.	DCC
6	Energy Suppliers shall be able to confirm that Firmware upgrades for Alt HAN P2P Devices have been successful.	DCC/ Suppliers
7	Energy Suppliers shall be able to read the current Firmware version on Alt HAN P2P Devices.	DCC/ Suppliers
8	Energy Suppliers shall be able to replace any Smart Metering Key Infrastructure (SMKI) credentials on Alt HAN P2P Devices.	DCC/ Suppliers
9	Alt HAN P2P Devices shall be resilient to the deployment of firmware to other Alt HAN P2P Devices in any order of deployment within a Home Area Network (HAN).	AltHANCo
10	Alt HAN P2P Devices shall minimise the impact to other Devices on the HAN.	AltHANCo
11	DCC and Energy Suppliers shall be able to distinguish Alt HAN P2P Devices from other Devices	DCC/ Suppliers

Ref.	Requirement	Impacted Party
12	The DCC shall ensure that only known Firmware images are sent to Alt HAN P2P Devices	DCC/AltHAN Co

Along with the above functional requirements, SECAS and AltHANCo also shared the frequency of firmware download and expected number of Alt HAN P2P devices. Please see the document "MP170 Business Requirements v0.3" as listed above in section 2.2 for additional context and information.

3.5 Business Case

The Modification looks to address the issue defined in Section 3.2 and benefits of this modifications are outlined in Section 3.3.

As this modification introduces the capability of registering Alt HAN P2P Devices as PPMID Devices on the Smart Metering Inventory (SMI) along with few P2P device specific information, this impacts SEC Parties as follows :

Suppliers   Suppliers would need to uplift to a new DUIS version in order to benefit from the proposed solution and make internal changes to accommodate this.

In summary, this Modification would lower the security risk and maintenance cost of installed Alt HAN P2P Devices and enhances the customer experience, future upgrade ability.

4   Solution Overview

The objective of this Modification is to add support for OTA firmware updates to the Alt HAN P2P Devices for SMETS2+ Devices. Two solution options were proposed to the Industry in the PIA.

- **Option 1**, where the Alt HAN P2P Device is considered as a Prepayment Metering Interface Device (PPMID), and;

- **Option 2**, where the Alt HAN P2P Device acts as if it were a Consumer Access Device (CAD).

4.1   Updates from PIA Response

Following the feedback received from the Preliminary Impact Assessment (PIA) and subsequent engagement with Industry via Working Group and TABASC forum, it is agreed to consider the option 1 design approach for the Full Impact Assessment where the Alt HAN P2P Device is considered as a Prepayment Metering Interface Device (PPMID) instead of a Consumer Access Device (CAD). This approach has ensured that SECMP0007 capability is reused at most and minimise changes on DCC Total System.

4.2   High level Architecture

The following diagram gives a high level view of the proposed solution.
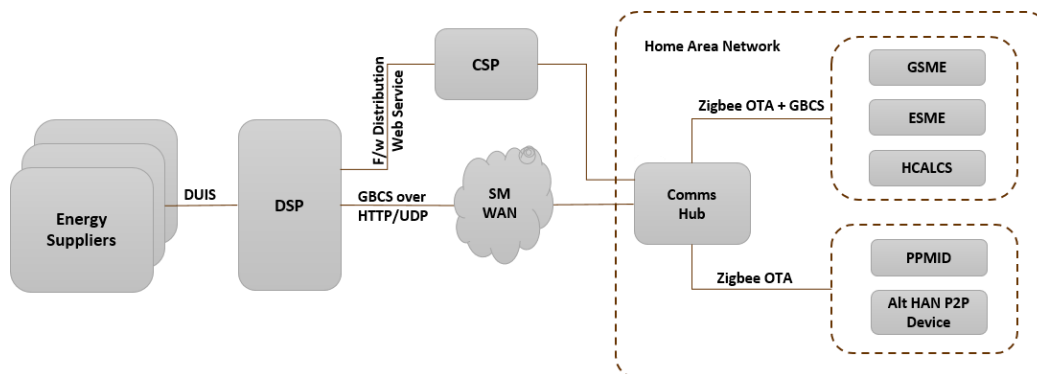
Treating Alt HAN P2P Devices as PPMID to avoid CH firmware change

The Alt HAN P2P Devices will be configured in the same way as PPMIDs by the Comms Hubs. Comms Hub allows up to six Type 1 Devices (PPMID or HCALCS). This approach reuses SECMP0007 capability and avoids the need for making any changes to the Comms Hub firmware as changes to Comms Hub firmware typically are expensive and time consuming.

Identifying P2P Devices differently

DCC Total Systems will build the capability to differentiate the Alt HAN P2P Devices from the regular PPMID Devices. To support this, the existing SMETS Variant Type attribute (available to ESME Devices for recording ESME Variant) will also be made available to PPMID Devices for recording the 'Alt HAN Device Variant' information. There are four main types of Alt HAN P2P Devices (also known as bridges) namely B1, B2, B3 and B4 and for each type there will be a unique 'Alt HAN Device Variant' value.

Device Management

DCC Total Systems will rely on 'Alt HAN Device Variant' information to identify an Alt HAN P2P Device and the same needs to be provided as part of device pre-notification using SRV 12.2. While it would be possible to include the Alt HAN Device Variant information in the Central Product List (CPL) record, DSP will use only the data received via SRV 12.2 as the mechanism to identify an Alt HAN P2P Device.

After an Alt HAN P2P Device has been successfully pre-notified, the Service Users may update (SRV 8.4 Update Inventory) and read (SRV 8.2 Read Inventory) the Alt HAN P2P Device information stored in the Smart Metering Inventory (SMI). The Service Users will also be able to view the Alt HAN P2P Device information using the Self-Service Interface (SSI). No changes are required to the format of CPL to allow Alt HAN P2P Devices.

Some of the Service Requests that are applicable to PPMIDs will not be applicable to Alt HAN P2P Devices and Service Users shall not be allowed to submit those such as SRV 8.7.2 – Join Service (Non-Critical) , SRV8.8.2 – Unjoin Service (Non-Critical) and SRV 8.9- Read Device Log.

Service Reference Variant	Service Reference Title	Applicable to Alt HAN P2P Device?
8.2	Read Inventory	Yes (Needs changes)
8.4	Update Inventory	Yes (Needs changes)
8.7.2	Join Service (Non-Critical)	No
8.8.2	Unjoin Service (Non-Critical)	No
8.9	Read Device Log	No
8.11	Add to HAN	Yes (Needs changes)
11.2	Read Firmware	Yes
11.4	Update PPMID Firmware	Yes
12.2	Device Pre-Notification	Yes (Needs changes)

New validation check will be introduced to enforce this for Alt HAN P2P Devices. The existing DSP internal credentials management mechanism used for managing the certificates in PPMIDs will also be applicable to the Alt HAN P2P Devices.

Firmware Distribution Management

The OTA firmware update for Alt HAN P2P Devices will make use of the same method used for updating the firmware of PPMIDs. The Service Users will send firmware images using the existing Service Request 11.4 - *Update PPMID Firmware*. DCC Total Systems will determine the Device Type using the data held in SMI.

DCC Total Systems will process the received request that contains the firmware image and the list of devices, and forward that to the Communication Service Providers (CSPs) along with the corresponding Comms Hub identifiers. DSP will make use of the existing Web Service interface at CSP SMWAN Gateway to deliver the firmware image to the CSPs. DSP will mark the Device Type of the Alt HAN P2P Devices as PPMID for the subsequent processing.

The CSPs will deliver the firmware image to the corresponding Comms Hubs and the Comms Hubs will in turn deliver it to the target device within the HAN using the ZigBee OTA delivery currently used for PPMIDs. Although the Alt HAN P2P Devices are a different type of Device, they are joined to a HAN as though they are PPMIDs and therefore a Comms Hub will not be able to differentiate Alt HAN P2P Devices from a PPMID.

DCC Total Systems tracks the progress of the firmware update request at a device level. If a firmware update request is already in progress for a given Alt HAN P2P Device, any further firmware update requests will be blocked and the Service Users will be notified using the already existing functionality.

The Device Alerts received from the Alt HAN P2P Devices will be delivered to the Service Users using the DCC Alert N39, as with PPMIDs.

Service Users will be able to read the version of an Alt HAN P2P Device firmware by using the Service Request 11.2 Read Firmware Version. If the SRV 11.2 is targeted at an Alt HAN P2P Device, then DCC Total Systems will employ the URP (Unknown Remote Party) pattern to process this, as with the PPMIDs.

If the Response to SRV11.2 contains a version of firmware different to the version in SMI, the SMI will be updated with the new version subject to the rules applicable for the other Devices.

It is assumed that the Alt HAN P2P Device will implement the existing GBCS Use Case CS08 (*Read PPMID Firmware Version*) and the 0x8F8B Alert, which are currently implemented by the PPMID.

Reporting

The existing interface from DSP to DCC Technical Operation Centre (TOC) will be modified such that, for Alt HAN P2P Devices, the field 'SMETS Variant Type' will include the relevant Alt HAN Device Variant value. This data extract contains all the necessary information including the active firmware version required to create the required reports for AltHANCo.

Summary

- Alt HAN P2P device will be configured as PPMID device type on SMI, and existing database attribute will be reused to record the variants of Alt HAN P2P devices. The Alt HAN Device Variant information will be used to differentiate an Alt HAN P2P Device from a real PPMID.

- Service User will be able to manage the lifecycle of the Alt HAN P2P device using existing capability including its security credentials and firmware.

  o Service Requests 12.2, 8.4 and 8.2 will be modified to include the Alt HAN Device Variant information.

  o Service Request 8.11 will be modified to update the Alt HAN P2P Device to Commissioned when added to the HAN.

  o Service Users will be able to use SRV 11.4 to send the firmware update requests for Alt HAN P2P Devices. No changes are needed to the Service Request definition. These implies Supplier will consider the Firmware Download (FWDL) to Alt HAN P2P Devices in their forecast and Threshold Anomaly Detection Procedure (TADP) parameter settings.

  o Service Users will receive notifications at different stages of processing across DSP, CSP and the Comms Hubs.

  o Service Users will be able to use SRV 11.2 to read the firmware version of an Alt HAN P2P Device.

- o The existing DCC Alert N39 will be used to notify the firmware activation on an Alt HAN P2P Device.

- Alt HAN P2P device will implement the relevant GBCS use cases for security credentials and firmware management capability on these devices including the Firmware Activation alert (0x8F8B – DCC N39).

- As P2P Devices will be configured on SMI as PPMID, CSPs will not be able to differentiate Alt HAN P2P devices from regular PPMIDs. Existing CSP capability for FWDL such as trigger from CSP for DCC N59/60/61 alerts and existing CH capability (post SECMP0007) such as 0x8F8A/ 0x8F89 alert to trigger N62 should be reused.

- DCC TOC will provide Alt HAN P2P device specific reports to AltHANCo using existing report delivery mechanism to SEC Parties.

4.3   Volumetrics

Following volumetric assumptions provided by AltHANCo are considered for the FIA of SECMP0170.

Number of P2P Devices	• Bridge 1: 716,374 • Bridge 2: 597,956 • Bridge 3: 144,127 • Bridge 4: 144,127		
Frequency of FW update per year	Up to two per year for Bridge 1, 2 and 3. Up to one per year for Bridge 4.		
Indicative FW Image Size	There are 5 binaries in 4 bridges.		

SiLabs binaries for Bridge 1	505 KB	
SiLabs binaries for Bridge 2	514 KB	
SiLabs binaries for Bridge 3	621 KB	
SiLabs binaries for Bridge 4	621 KB	
Broadcom binary (same image applicable for Bridge 1, Bridge 2 and Bridge 3)	869 KB	
Note: DUIS validation (E110405) restricts firmware image size to around 750 KB (max 1024000 in Base64). So Broadcom binary image need to be within 750 KB. See risk in Section 7 for details.		

The SiLabs and Broadcom binaries are independent of each other and would always process upgrades separately.

Rollout period	2023-2025 in line with Supplier obligations		

Predicted premise candidacy by Building type (a very high level predicted geographical projection for count of premise candidacy by post code in different building category)	Building Type	Predicted Building Category	Premise Candidacy
	MDU	Compact	161206
	MDU	High rise	150384
	LSP	LSP	91100
	MDU	Sprawling	313684
	Total		716374

4.4　Impact on DSP

Component	Requirement
DUIS, DUGIDS	Add AltHANVariant to DevicePrenotification and UpdateDeviceDetails requests and to ReadInventory response. Validation for SRVs 8.7.2, 8.8.2 and 8.9 will prevent these from being used for a PPMID when AltHANVariant is set. On successful 8.11, set PPMID to Commissioned when Alt HAN Variant is set.
Request Management	Add validation checks to prevent use of SRVs 8.7.2, 8.8.2 and 8.9 with Alt HAN devices. Add support for Alt HAN Variant in SRVs 12.2 and 8.4 processing. Include Alt HAN Variant in SRV 8.2 response. Amend 8.11 post processing to set Alt HAN device to commissioned when added to HAN.
Data Manager	Store Alt HAN Variants as SMETS Variant where provided in SRVs 12.2 / 8.4. Retrieve SMETS Variant as Alt HAN Variant for SRV 8.2. Logical Data Model - Amend Device entity SMETS Variant Type to encompass Alt HAN Variant for PPMIDs and add SMETS Alt HAN Type.
SSI	When displaying device details, include Alt HAN Variant where set.
Feature Switches	New DUIS version. Enable Alt HAN Variants

4.5　Impact on CSPs

4.5.1　CSP-N

There are no system changes required for this Modification since all the relevant functional changes are handled by SECMP0007. In addition, GBCS 4.1 will be the enabler to allow CHs to download firmware images for Alt HAN P2P devices. Performace related enhancements may be reuqired. Only regression testing and performance testing would be carried out by the CSP.

4.5.2　CSP-C & S

There are no system changes required for this Modification since all the relevant functional changes are handled by SECMP0007. In addition, GBCS 4.1 will be the enabler to allow CHs to download firmware images for Alt HAN P2P devices. Performace related enhancements may be reuqired. Only regression testing and performance testing would be carried out by the CSP.

4.6 Impact on DCC

Based on the changes to the ESI file, DCC's Data Science and Analytics Team will create new reports to share with AltHANCo on firmware distribution to Alt HAN P2P devices.

4.7 SEC Changes

The DCC and Service Providers have proposed the following legal text changes in SEC Appendix AD - DCC User Interface Specification (DUIS).

sec-appendix-ad-duis
-v51%20-%20SECMP

The changes in DUIS XML schema would be available during design phase of this Modification.

4.8 Deliverables

The deliverables of this Modification are described in the table below.

Phase Deliverables	Deliverable	Changes Required
Design	SD2.1.1 Functional Specification - Instant Energy	Amend processing to cater for AltHAN Variant PPMIDs
	SD2.1.3 Functional Specification - Self Service Interface	Recognise AltHAN and present as separate device type
	SD2.2.1.2 Component Design Spec - Request Manager	Amend processing to implement AltHAN changes
	SD2.2.1.4 Component Design Spec - Data Management	Amend processing to implement AltHAN changes
	SD2.2.3 Technical Specification – Self Service Interface	Updates for *AltHANVariant*
	SD2.2.1.5 Technical Specification - Data Models	Add *AltHANVariant* to *SMETSVariant*
	SD4.1 DCC User Gateway Interface Design Specification	Add *AltHANVariant* to SRV request and responses
	SD4.5.1 Enterprise Systems Reporting Specification	include *AltHANVariant* in reports
PIT Completion	System Test and FAT Completion Report	To be created

5 Testing Considerations

This Full Impact Assessment includes the cost to develop, fully test and deliver this SEC Modification.

5.1 Testing Assumptions

The following Testing Assumptions were provided to Service Providers for their FIA submissions.

PIT Area	Assumption
Scope	Include only Production codebase products, e.g., exclude ITCH or RTL
Communication Hub	Change testing will be limited to PIT testing of the new functionality outlined in the Modification plus one cycle of targeted regression testing.
Alt HAN P2P Device	OTA capable AltHAN devices are, based on the Technology Services Vendor's preliminary assessment, expected to be available to DCC Service Providers for external test and trials circa 10 months from commencing the change for OTA.
Repeat Testing	A subset of PIT System test cases will be conducted for DCC Test Assurance witnessing
Non-Functional & Performance Testing	Will be carried out at this stage

SIT and UIT Area	Assumption
Standalone Release	As required by SECMP0049, with costs calculated as if no other Modifications or CRs are in the release
Test Sets (SMETS2)	10 Test Sets per Communication Hub type (meaning 20 for CSP South and Central, 5 Single Band CH, 5 Dual Band CH but two manufacturers). A device set will be agreed.
Regression Testing	Risk based regression testing.

5.2 Pre-Integration Testing (PIT)

Pre-Integration Testing (PIT) will be required to align DSP and CSP functionality for the functionality described above. The PIT phase of implementation will be subject to standard test phases and level of DCC assurance as defined in previous releases. Specifically, the development team will carry out unit testing and the build will be subject to continuous build and automated testing to identify build issues at the earliest opportunity. The implementation team will carry out system testing consisting of positive and negative path testing which will culminate in a short period of Factory Acceptance Testing (FAT), witnessed by DCC test assurance at DSP offices. The FAT tests will be a subset of System Tests.

Acceptance will be defined by:

1. An agreed set of design documentation.
2. DCC approving the Factory Acceptance Testing outcome in accordance with pre-agreed criteria, which shall not be unreasonably delayed or withheld.
3. Meeting Schedule 6.2 PIT exit criteria.

4. Approval for a MAC to be issued will be authorised by DCC's Test Assurance Board.

5.3   System Integration Testing (SIT)

This Modification impacts only SMETS2+ devices, however, the new functionality does not need to be tested against each Device Model Combination (DMC) of SMETS2+ Devices.

SIT will plan, prepare and execute tests that demonstrate the key changes in behaviour across the Total DCC system, comprising:
*   Alt HAN P2P Devices can be declared and used within the DCC Total System and will be treated like PPMIDs for processing within DCC Data Systems, where the Alt HAN P2P Device Variant information will be used to differentiate an Alt HAN P2P Device from a real PPMID;
*   The Alt HAN Device Variant information can be processed by Service Requests 12.2, 8.4 and 8.2 for Alt HAN P2P Devices;
*   ESI Reports are updated to include Alt HAN P2P Devices and the Alt HAN Device Variant information where required;
*   PPMID Service Requests 8.7.2, 8.8.2 and 8.9 cannot be sent to Alt HAN P2P Devices;
*   Alt HAN P2P Device firmware can be updated using Service Request 11.4, with Service Users receiving notifications at different stages of processing across DSP, CSP and the Comms Hubs;
*   Service Users will be able to use SRV 11.2 to read the firmware version of Alt HAN P2P Devices;
*   The existing DCC Alert N39 will be used to notify the firmware activation of Alt HAN P2P Devices;
*   Firmware update failure scenarios for Alt HAN P2P Devices
*   Testing and test execution readiness activities for the DUIS update are required for this change and will be covered within the Post PIT CR.

5.4   User Integration Testing (UIT)

The scope of the UIT for this Modification are:

*   Pre-Unit Testing Service preparation
    *   production of a Pre-UTS Test Plan which includes the test approach, test timeline and the detailed scope of the UIT tests;
    *   creation/update of UIT test scripts;
    *   preparation of device sets for Pre-UTS testing;
    *   preparation of test management system for test evidence capturing and defect reporting;
    *   population of test management system to enable test progress to be tracked and to capture test evidence.

*   Pre-Unit Testing Service execution : The scope and extent of this testing for the Alt-HAN Point to Point devices is expected to include:
    *   running the following Service Request regression test pack on three SMETS2 meter sets (one for each CHF manufacturer: Toshiba, WNC and EDMI):
        *   Install and Commission, which will also include the Install and Commission of the Alt HAN P2P devices;

- o Over-the-Air (OTA) firmware updates to Alt HAN P2P devices on each of the three SMETS2 meter sets;

- o Over-the-Air (OTA) firmware updates to a PPMID device on each of the three SMETS2 meter sets;

- decommissioning all three SMETS2 meter sets.

- UIT Management

6   Implementation Timescales and Releases

This Modification is expected to be included in a SEC Release in November 2023. Implementation timescales will be finalised as part of the relevant SEC Release Change Request.

6.1   Change Lead Times and Timelines

From the date of approval (in accordance with Section D9 of the SEC), to implement the changes proposed DCC requires a lead time of approximately 10 months.

The broad breakdown of the testing regime is shown in the following table in months after an approval decision date (D).

Phase	Duration
SECAS agreement on scope of release	D
CAN signature	D+ 1 Month
Design, Build and PIT Phase	5 Months
SIT and UIT Phase, aligned with Release Dates	4 Months
Transition to Operations and Go Live	D+10 Months

6.2   SEC Release Allocation and Other Code Impacts

This Modification is expected to be implemented as part of the November 2023 SEC Release, however the allocation to a release may be dependent on other Modification timings and the suitability of a release such as complete delivery of SECMP0007 and rollout of associated FW changes. No functionality overlap with other Modifications has been identified at the time of undertaking this Impact Assessment.

6.3   Costs and Charges

This section indicates the quote for all phases of application development stage for this Modification. Note these costs assume a release of just this SEC Modification without any other Modifications or Change Requests in the release. A further calculation of the post-PIT will be costs determined through a "Release CR" also referred to as a "post-PIT CR".

£	Design	Build	PIT	SIT	UIT	TTO	SP Total
Phase Total	243,003	122,839	164,355	369,427	135,945	45,904	**1,081,473**

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.
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.
Systems Integration Testing (SIT)	All the Service Provider's PIT-complete solutions are brought together and tested as an integrated solution, ensuring all SP solutions align and operate as an end-to-end solution. If the Modification makes up the entire November 2023 release, there are unlikely to be reductions in costs of PIT and SIT typically seen in other SEC Releases.
User Integration Testing (UIT)	Users are provided with an opportunity to run a range of pre-specified tests in relation to the relevant change.
Implementation to Live (TTO)	The solution is implemented into production environments and made ready for use by Users as part of a live service.

6.4   Application Support Cost

Application Support costs, which are costs associated with supporting the new functionality, have been calculated in the range of £88000 per annum across all DCC Service Providers. DCC are challenging these figures.

6.5   Impact on Contracts and Schedules

Contract updates will be required for this change. The detailed updates will be determined as part of the resulting Contract Amendment Note (CAN). Updates will be required to the following schedules:

- Schedule 2.1: update to reflect the addition of new DCC Requirements to enable achievement of the activities and / or deliverables;
- Schedule 3: update to reflect the addition of new DCC Responsibilities to enable achievement of the activities and / or deliverables;
- Schedule 4.1: Solution Design documents will need to be updated as per section 4.8;
- Schedule 6.1: addition of new milestones;
- Schedule 7.1: revisions to incorporate the charges and payment applicable for this Modification.

There will be no change to Schedule 2.2 SLAs due to this Modification.

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7 Risks, Assumptions, Issues, and Dependencies

The tables below provide a summary of the Risks, Assumptions, Issues, and Dependencies (RAID) observed during the production of the Full Impact Assessment. 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.

Risks

Ref	Description	Status/Mitigation
MP170-R1	AltHANCo. mentioned Broadcom binary firmware image size is 869 KB, which is higher than the maximum firmware image size (750 KB) allowed by DUIS validation (E110405). Broadcom binary image size need to be within 750 KB to be sent via the DUIS interface.	Open AHC need to provide confirmation on the reduced firmware image size.
MP170-R2	DCC's FIA solution proposes Service Users to notify the DCC's SMI via SRV12.2-Device Prenotification with an *AltHANVariant* attribute value (from a list of B1/B2/B3/B4) for an AltHAN P2P Device and no change in existing PPMID registration process. SECAS has proposed to introduce a PPMID variant value (along with B1/B2/B3/B4 values for AltHAN P2P Devices) for all existing PPMIDs and any new PPMID which is not considered in the current FIA solution. DCC believes introduction of PPMID variant value a) would bring unnecessary changes to numbers of existing PPMID devices across SMETS1 & 2. b) may enforces DCC Service Users to change their system/process to adopt the mandated PPMID variant attribute which would not have much business value to them. c) Cost of the solution would increase to ensure existing PPMID device data in SMI are updated with the new variant values and possible impact to Service Users. d) Does not solve any business problem related to firmware download to AltHAN P2P devices.	Open If DCC need to follow the SECAS proposal, the revised solution need to be presented to Working Group and TABASC forum for assessing the impact on the Industry.

Assumptions

These assumptions have been used in the creation of this Full Impact Assessment. 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
MP170-A1	Alt HAN P2P Device will implement the existing GBCS Use Case CS08 (Read PPMID Firmware Version) and the 0x8F8B Alert, which are currently implemented by the PPMID.	
MP170-A2	Alt HAN P2P Device will implement required GBCS Use Cases to support any SMKI Security Credentials management capability.	

Issues

None at this time.

Dependencies

Ref.	Area	Dependency	Impact
MP170-D1	IA	The provided solution Option 1 is dependent on the complete system delivery of SECMP0007 (DSP and CSP systems) and the roll out of associated GBCS 4.1 changes to existing Comms Hubs.	High

Appendix A: Glossary

Acronym	Definition
AltHAN	Alternative Home Area Network
AltHANCo	Alt HAN Company
CAD	Consumer Access Device
CAN	Contract Amendment Note
CPL	Central Product List
CR	DCC Change Request
CSC	Change Sub-Committee
CSP	Communication Service Provider
DCC	Data Communications Company
DSP	Data Service Provider
DUGIDS	DCC User Gateway Interface Design Specification
DUIS	DCC User Interface Specification
ESME	Electricity Smart Metering Equipment
FIA	Full Impact Assessment
GBCS	Great Britain Companion Specification
GSME	Gas Smart Metering Equipment
HAN	Home Area Network
HCALCS	HAN Connected Auxiliary Load Control Switch
IHD	In Home Display
OTA	Over the Air
P2P	Point to Point
PIA	Preliminary Impact Assessment
PIT	Pre-Integration Testing
PPMID	Prepayment Metering Interface Device
SEC	Smart Energy Code
SECAS	Smart Energy Code Administrator and Secretariat
SIT	Systems Integration Testing
SMETS	Smart Metering Equipment Technical Specification
SMI	Smart Metering Inventory
SMIP	Smart Metering Implementation Programme
SMWAN	Smart Metering Wider Area Network
SP	Service Provider
SR	Service Request
SRV	Service Request Variant
TADP	Threshold Anomaly Detection Procedure
TABASC	Technical Architecture and Business Architecture and Sub-Committee
UIT	User Integration Testing