Data Communications Company

DCC Response to the Firmware Management consultation

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1 Introduction

On 5 November 2018, DCC issued a consultation to invite views on proposals for improvements to the current SMETS2 DCC Communications Hub (Comms Hub) Firmware Management processes. The consultation focussed on improvements to the end to end delivery of Comms Hub firmware. The proposed improvements are intended to:

- Improve Comms Hub delivery stages to ensure new firmware delivers the functionality it intends to;
- Achieve confidence that new Comms Hub firmware is operable with Devices deployed on the production estate to facilitate the Smart Metering System;
- Improve governance and accountability for processes related to Comms Hub firmware.

The recommended improvements are divided into four key stages:

- Comms Hub Firmware Content Agreement and Communication;
- Comms Hub Firmware Development and Testing;
- Co-operative Comms Hub Firmware Over the Air (OTA) Deployment; and
- Comms Hub Manufacturing and Supply Chain.

The consultation closed on 17 December 2018 and in total 14 organisations responded. Respondents included energy suppliers, meter manufacturers, Meter Asset Providers (MAPs) and other smart metering market participants.

1.1 Structure of this document

This document comprises of the following sections:

- The questions that were asked, together with a summary of views of respondents and DCC's responses to these;
- Additional comments received and DCC responses to these;
- DCC's conclusions; and
- Next Steps.

2 Feedback on Firmware Management

2.1 Responses to the consultation questions on Firmware Management

Q1	Do you agree with the proposal to use Devices in Pre-Integration Testing (PIT)? Please provide a rationale for your views.

Stakeholders' response

All of the respondents to this question agreed with the DCC's proposal to use Devices in Pre-Integration Testing (PIT). A number of respondents also welcomed the proposals to apply entry criteria to PIT and the use of the Deployed Products List (DPL) to support the selection of device model combinations (DMC).

Whilst supporting the concept of using real Devices in PIT, one respondent highlighted that the DCC should continue to consider the benefits of assurance gained and risk of impact on delivery timescales.

One respondent requested clarity in relation to the proposal that PIT should include "some level of testing with meters and other Devices, where feasible and where Devices are available". This is because the respondent believes that this proposal appears to undermine the scope and potential value of PIT.

A number of respondents noted concerns in relation to the use of emulators in PIT, System Integration Testing (SIT) and Device Integration Testing (DIT). Respondents noted that where firmware cannot be proven to operate with DMC, then the firmware cannot be deemed to have been fully tested. One respondent believed that "unproven" firmware should not be deployed into subsequent test phases such as User Integration Testing (UIT), as this places testing burdens on DCC Users. However, the respondent also believed that this should not apply to firmware being deployed as part of an emergency (i.e. a security incident).

On the other hand, a number of respondents recognised that in some instances the pressure of time or logistics may still require some use of emulators. One respondent noted that during major change (e.g. testing of 868MHz Comms Hubs), Devices may not be available and in those cases the use of emulators is forced and must be accepted. However, these cases should be kept to a minimum and should be unacceptable when determining exit criteria.

One respondent also highlighted the need for DCC Users, wherever reasonable, to assist DCC in obtaining test Devices which is representative of the equipment that they are using. The respondent suggested that the mechanism to enable such an approach is explored

further and suggested that the existing Testing Design and Execution Group (TDEG) working group could be a platform for initial discussions.

With regard to the proposal to use the DPL to support the selection of DMC, three respondents welcomed further clarity on how the process will work to support testing. Additionally, the respondents welcomed full visibility of which DPL entries and which Devices and their firmware versions have been used during PIT. This would help to understand test coverage for Devices.

One respondent also requested clarity on the exit stage to understand what the required criterion is in order for firmware to be approved to exit PIT.

DCC's response

The introduction of Devices in PIT follows the moving "quality to the left" philosophy where, with lessons learnt from previous releases, the potential to identify and address major issues can be managed as early as possible in the delivery lifecycle of the firmware. DCC believes the value of the additional effort spent within PIT amplifies as the firmware makes its way through testing and into production use.

Where possible, testing should be conducted with meters and Devices if the firmware change is considered to impact on the operation with such Devices. On a change by change basis, if there is no opportunity to test with meters and Devices, this should be documented as a risk.

Regarding the use of meter emulators, DCC notes that the reliance on meter emulators was greater in the past when single band Devices were not available. However, with the rollout progressing to ever greater production volumes there are meter versions proven in production which can be used for testing. So, barring new versions which DCC Customers have access to first, DCC would have access to the same pool of meter firmware versions as DCC Customers.

DCC are performing "Technical Account Management" with all the Device manufacturers and will notify them of this area of work in order to obtain Devices for testing. However, due to time DCC will not be able to test with all the Devices that are available and so a Device selection methodology approach may be needed. One approach would be to use the DPL (as stated in the consultation document) and market share but this may be unfair to smaller manufacturers. DCC therefore agrees that this needs to be discussed at the SEC Panel Testing Advisory Group (TAG) to seek a suitable solution as commercial sensitivities will also play a part in this selection.

The DCC are currently exploring how the process will work to use the DPL to support the selection of DMC to support testing. The DCC notes that the DPL information is already available from production reporting. With regard to visibility of the DPL entries that have been used for PIT, the DCC notes that it would not share full visibility of which DPL combinations have been tested due to competition implications. If this is required, and is

commercially possible, DCC would need to work with industry to discuss how this could be enabled.

DCC believes that the required criteria in order for firmware to be approved to exit PIT will be defined in the Test Approach. An example could be that all test scripts are executed, with an 85% percent pass rate and no Severity 1 or Severity 2 incidents outstanding.

Q2	**Please provide your views on the proposal to use business scenarios within SIT. In particular could you provide views on how these business scenarios can be defined and agreed as an industry through the relevant industry bodies?**

Stakeholders' response

All of the respondents to this question agreed with the DCC's proposal to use business scenarios within SIT.

One respondent recommended that, in addition to the four headline scenarios specified in the consultation document, specific tests are also included to validate that the Comms Hub is accurately processing and presenting key data items, including the Gas Calorific Value.

One respondent requested clarity on the approaches that will be utilised to monitor and drive completion of business scenarios testing on new Comms Hub firmware. They noted that it is important that the approach proposed by the DCC is appropriately structured to ensure that fault identification, triage and remediation is not adversely impacted during the various test phases.

A number of respondents suggested that the process to define and agree the key test scenarios should be led by existing testing groups, such as TAG, the Technical and Business Architecture Sub-Committee (TABASC) or the TDEG. Additionally, one respondent suggested that the Business Architecture Document (BAD) and model could provide a source of information for this testing. Whereas another respondent suggested that industry forums can be further complemented by DCC's existing material from the Common Test Scenarios or more recent material from the DCC's Business Forum. The respondent also suggested that the DCC could also consider leveraging expertise and input from some of the organisations which some independent suppliers look to in their smart metering implementation. For example, working with Shared Service Providers alongside Suppliers and their agents. The respondent also believed that, once the relevant working groups have developed a proposed package of scenarios, they should be consulted upon with SEC Parties before implementation. Three respondents also suggested that the DCC engage with the Smart Metering Device Assurance (SMDA) scheme as they already test business scenarios.

One respondent recommended that when assessing a release, a standard qualifying question set should be applied rather than accepting that a complete retest is required. For example, “Credit” Scenarios or “Prepayment” Scenarios only.

DCC’s response

DCC acknowledges the support for the four headline scenarios specified in the consultation document. In addition, DCC agrees that specific tests are also included to validate that the Comms Hub is accurately processing and presenting key data items, including the Gas Calorific Value.

DCC also acknowledges the point that it is important that the approach proposed by DCC is appropriately structured to ensure that fault identification, triage and remediation is not adversely impacted during the various test phases. DCC would work to ensure that there are no adverse impacts to the other test phases.

DCC considers that the process to define and agree the key test scenarios should be led by the TDEG and taken to TAG for decision. DCC also agrees that industry forums can be further complemented by DCC’s existing material from the Common Test Scenarios or more recent material from the DCC’s Business Forum. Once the relevant fora have developed the test scenarios these will be detailed in the Test Strategy/Approach which will be consulted upon with industry.

As well as the above engagement, DCC will continue to support SMDA with current work and welcomes engagement with the SMDA on their key test scenarios as these are developed. DCC understands the value for industry in DCC testing complementing SMDA interoperability and interchangeability testing, avoiding duplication.

DCC will also seek to ensure that testing is targeted as appropriate and addresses the relevant risks, rather than all-encompassing every time. For example, testing “Credit Scenarios or “Prepayment” Scenarios only. In this area also, DCC will develop these questions with industry at TDEG and TAG.

Q3	**Do you agree with the proposal for increased use of Devices in SIT? Please provide a rationale for your views.**

Stakeholders’ response

All of the respondents to this question agreed with the DCC’s proposal for increased use of Devices in SIT. Respondents highlighted that this is because:

- It is appropriate that real Devices are used in SIT to demonstrate that the DCC Total System works correctly. It is important that the DCC focuses on validating that it does not compromise commercially-available schemes that demonstrate correct operation of Devices.

- Emulators do not allow for sufficiently robust testing to be undertaken. This issue has been practically demonstrated in the evaluation and delivery of previous releases.
- It provides the confidence needed in the new CH firmware and reduce the likelihood of high priority defects emerging late in testing or production leading to increased costs and deployment issues.
- Including a range of real Devices in the early stages of testing will identify incompatibilities and areas where different interpretation of key new specification points has occurred. Flushing this out at an early stage of testing will significantly cut down on the overall cost of testing and improve delivery of the Smart Meter roll-out.

One respondent highlighted that the DCC must ensure that the mechanism for sampling the DPL configuration sets needs to be clear and transparent to give the industry confidence that the correct representative Devices are being tested in SIT. Another respondent reiterated that DCC should specify which Devices and firmware versions they have used during this stage of testing, to allow DCC Users to understand how closely the DCC testing matches their chosen combinations of Devices.

Whilst noting that the use of actual Devices is preferred, a respondent recognised that during major changes (e.g. 868MHz testing) such Devices may not be available and in those cases the use of emulators is forced and must be accepted. The respondent noted that at this point, the DCC should be open about the outstanding defects and business process impacts before releasing any firmware to DCC Users to test in UIT.

One respondent considered that usage of real Devices in SIT should be in line with requirements set out in the Smart Energy Code (SEC) and the Device Selection Methodology for DCC Releases, noting the caveats and controls that DCC should consider regarding availability and managing the impact on timescale. The respondent also noted that testing in SIT should not replicate testing in PIT as the time and cost of repeating such testing is likely to outweigh the benefits of greater assurance gained. Finally, the respondent also believed that the DCC should consider using at least two Devices using different Zigbee stacks.

One respondent also emphasised their preference for increased Device usage in SIT, rather than DIT. This is because DIT testing is not business specific and DCC Users have more visibility of progress within SIT.

A respondent noted that the DCC should take care not to compromise commercially available testing schemes, particularly SMDA. One respondent also believed that the DCC should consider opportunities to contract for independent assurance of Comms Hubs to complement SIT and considered that this could reduce the overall cost of testing for industry.

DCC's response

DCC notes that the method for sampling the DPL configuration sets needs to be clear and transparent. As previously noted, DCC are unable to share full visibility of which DPL combinations have been tested because it would adversely impact the market. If this level of

visibility is required, DCC and industry would need to agree a process to share this information.

DCC will communicate any outstanding defects and business process impacts before releasing any firmware to DCC Users to test in UIT. DCC believes that a more customer centric approach to testing in SIT needs to be adopted and DCC will endeavour to be fully transparent with DCC Customers.

DCC agrees that the usage of real Devices in SIT should be in line with requirements set out in the SEC and the Device Selection Methodology.

DCC also believes that testing in SIT should not replicate testing in PIT, noting that PIT covers testing which is Device focussed, to ensure the Comms Hub firmware release is of sufficient quality. Whereas SIT is focussed on integration to the wider DCC and Device ecosystem.

DCC will consider using at least two Devices using different Zigbee stacks in SIT on a case by case basis. Whilst noting that testing for Release 2.0 was focussed on two stacks, DCC would need to provide evidence as to whether this is justified for all Comms Hubs firmware releases.

Regarding DIT, this was a specific Release 2.0 term. In the future SIT will cover testing with Devices.

Regarding the suggestion that DCC should consider opportunities to contract for independent assurance of Comms Hubs, DCC will work with SMDA and other independent testing schemes to investigate ways in which it can complement SIT. DCC has no intention to compromise any commercially available testing schemes and will continue to support SMDA going forward.

Q4	**Please provide your views on the proposal for DCC Customers to be given a specified time period to test their Devices in UIT in response to different release types. In particular, can you provide your view to the DCC proposal that this testing is mandatory for DCC Customers before new Comms Hub firmware is approved for production use?**

Stakeholders' response

The majority of respondents to this question agreed with the proposal for DCC Customers to be given a specified time period to test their Devices in UIT in response to different release types. This is because:

- Having a specified time period for DCC Customers to test their Devices in UIT will create a more structured and efficient testing process.
- There is no substitute for testing in an environment as close to live as possible to mitigate against finding issues in live operation.

- The proposed windows for testing of new Comms Hub firmware will help users further develop confidence in the new firmware and prepare themselves for deployment.

Specified Time Periods

Many of the respondents requested that the DCC provides further information on what the specified period means, how long the window should be and who defines this period. One respondent suggested 6 to 8 weeks as a specified time period for UIT. Another respondent stated that the test time period window should be DCC User's choice and subject to the User's own assessment of their readiness to test during this period. One respondent also highlighted that the DCC will have to take account of the potential demand and congestion on the relevant testing environments when considering the testing periods for UIT. They noted it is important that the DCC processes and environments do not unnecessarily constrain the UIT activities being planned or completed by different DCC Users. Depending on test environment capacity, this may mean the DCC having to alter its expectations around the timescales for UIT being concluded. Finally, another respondent highlighted that too short a time period means Users will only have the ability to perform perfunctory tests and this cannot give the DCC the assurance of firmware it requires.

With regard to testing time periods for maintenance releases, one respondent noted that 4 weeks is not sufficient because:

1. This assumes DCC Customers can immediately incorporate this testing as top priority amongst all other competing activities. Standard regression cycle can take 4+ weeks depending on the available resource. This issue is further compounded by the lack of foresight and visibility of what date the release will be available in UIT to allow for it to be incorporated into test plans. A firmware roadmap is therefore essential to aid planning.
2. This timeboxed window should only commence when the firmware is made available in Remote Test Labs (RTL), and not only when it is available in DCC labs. DCC Users runs its testing from RTL and only use DCC labs for triage, so Users cannot suspend all triage activities to test new firmware in DCC lab, nor can Users send additional resource to DCC labs to run this testing in parallel with triage due to Communication Service Provider (CSP) restrictions.
3. Any timeboxed window must consider the time taken for RTL hubs to be OTA'd to the new version, which can take several weeks to complete from the point a User submits the OTA request form. Alternatively, DCC should provide a capability for users to order new RTL Devices on the specified version to be delivered prior to the start of the timeboxed UIT window.

A respondent preferred time-boxed periods to enable testing rather than mandating a specified number or class of User to complete testing. They said that the period should reflect User availability to conduct testing as well as the DCC's ability to deliver change. DCC should also consider whether the content of any change necessitates a User to prove

functionality and the requirements for this should be defined in the Release Implementation Document (RID).

One respondent also noted concerns in relation to multiple Users testing simultaneously. They stated that this could result in a duplicated and an unmanageable level of defects for Device combinations and such an approach could also mean that the release is held up by the slowest testing participant.

Mandatory UIT

With regard to mandatory UIT, the majority of respondents did not agree with this approach. Respondents highlighted that:

- DCC has a responsibility to ensure that their systems and Comms Hubs meet required standards to operate with User Devices that have met the requirements to be included on the Certified Products List (CPL), and which have been installed and commissioned successfully to make it into the DPL.
- It is DCC and not the DCC User's responsibility to test changes introduced into Comms Hubs and ensure these do not impact existing Devices on the Home Area Network (HAN) or the performance of the HAN itself.
- Mandatory UIT testing of new Comms Hub firmware within the windows proposed could lead to ineffective or poor-quality testing and or increased costs across all parties.
- Smaller suppliers may not be able to allocate sufficient resource to testing. Ultimately the firmware upgrade process should not be allowed to be delayed significantly due to suppliers not cooperating in UIT.
- Mandatory UIT could disrupt User's test plans and enforce a period of testing for which the User was not prepared. This could distract resource from their rollout programmes and impact their progress towards the 2020 goals.
- User's would likely see higher costs.

Three respondents also questioned how mandatory UIT would be enforced. One respondent believed that such a change would require a SEC Modification Proposal. They noted that if such a modification should be raised, further clarity would have to be provided on arrangements and requirements for DMC that had not undergone testing within PIT and SIT (e.g. would these DMC have to undergo UIT assessment). One of the three respondents also questioned how enforcement would work and if UIT windows would be extended if a customer missed their tests or what mitigations would be put in place to ensure the required levels of assurance were still met.

Additionally, the respondent expected the DCC to provide greater clarity on the approach that will be adopted should a Comms Hub firmware incompatibility issue be identified post testing, particularly where this impacts operational / production SMETS2 assets. Given the likelihood that Field Technician visits may be required in such a scenario, they would also welcome the DCC clarifying how Suppliers would be compensated should such issues arise.

Exit Criteria

Three respondents suggested an alternative which could see suitable exit criteria being established for Comms Hub firmware before it is approved for production. For example, a minimum number of suppliers that have tested (to their own timescales), with a minimum set of Devices from the DPL. One respondent highlighted that this exit criteria should be used to verify appropriate testing has been conducted in the correct environments and associated agreed scenarios had been completed by DCC potentially supported by non-mandatory user testing evidence.

One respondent would also like to understand the criteria on firmware being approved to be released from UIT. For example, it is not clear if each DCC customer have to approve the firmware image before it is approved to exit UIT. They noted that consideration around examples where a release is approved to exit UIT despite one supplier having found a defect will need to be given.

One respondent highlighted that the DCC also needs to consider:

- How a DCC User might test Devices it has gained through the churn process where the supplier may not have a close working relationship with the Device manufacturer.
- How it would avoid repetitive testing of the same Device sets by different suppliers.

SMDA

Many of the respondents recommended that the DCC should consider gaining additional assurance by submitting Comms Hub firmware to the SMDA. One respondent noted that SMDA has been established to specifically deliver further confidence in terms of interoperability and interchangeability with the HAN and therefore it should be used to reduce the risk of issues being found in live. Another respondent highlighted that the SMDA already has Device manufacturers, suppliers and Meter Asset Providers (MAPs) as active stakeholders.

One respondent would be open to discussions in making SMDA or another alternative mandatory as was originally suggested. Such an approach has worked with ZigBee, DLMS and CPA as relevant parties ensure they arrange and pay for such testing and factor the costs into all supply contracts, knowing that DCC Users cannot install equipment on the DCC unless it has said certifications.

Erroneous Results

Finally, one respondent highlighted that the DCC needs to consider in depth how they will manage erroneous results coming from such a wide range of testing resources, ensuring that time is not wasted on User error issues but also that genuine defects are not discounted. It is therefore important that key lessons learnt from the R1.x and R2 testing programmes are taken into account, and for DCC to make clear what these lessons learnt are that it intends to take into account.

DCC's response

Specified Time Periods

Regarding the specified time periods, DCC agrees that they should reflect User availability to conduct testing as well as the DCC's ability to deliver change. Currently, it is envisaged the minimum time allotted for UIT testing is three weeks, however items such as this will be discussed at the customer workshops to be scheduled after this response is issued. UIT may continue for longer however as current is the case there is no formal end to UIT testing. Testing Parties are encouraged to commence UIT testing as early as possible after the UIT window opens.

DCC believes DCC Customers are best placed to tell how long it will take them to test their systems upon an introduction of new firmware. Therefore, DCC will engage with DCC Customers through forthcoming industry workshops to define the process on specifying time periods. This can then be documented once agreed.

DCC acknowledges that the RID defines the level of User Testing, including the timescales for the commencement and completion of User testing phases. DCC therefore agrees the requirements for a User to prove functionality should be defined in the RID for SEC Releases.

Mandatory UIT

DCC respects the views provided by DCC Customers in terms of mandatory UIT of new Comms Hub firmware.

DCC wishes to clarify that this proposal is not intended to be additional enforcement on DCC Customers. The proposal has arisen directly from the feedback of concerns from DCC Customers in engagement DCC conduced prior to the consultation. As highlighted in the consultation the shared goal of industry as defined by DCC Customers in the problem statement was "How industry will coordinate the deployment of Device firmware to the GB Smart Metering estate in a safe, robust and controlled manner whilst protecting smart functionality and the associated consumer experience." DCC believes it is vital that as an industry we collectively have solutions which enable the problem statement to be solved. DCC has its own part to play in terms of improved testing to be conducted in PIT and SIT, however, DCC believes that DCC Customers have a vital role to play in UIT. DCC is willing to continue to work with DCC Customers to deliver an approach that works for the industry, however, DCC believes that this is a question we must answer as an industry to ensure Device firmware can be upgraded with confidence; confidence that on the main can only be attained from results proven in testing.

In response to other comments provided by DCC Customers, DCC would wish to clarify that Comms Hub firmware that does not meet CPL accreditation will not be approved for use in the production environment. Also as outlined in the consultation to ensure that Comms Hub firmware can be used in the production environment DCC's improvements to the testing and

the acceptance of Comms Hub firmware is focused on operational use, not limited to only fulfilling regulatory requirements.

The future agreed position and commitments would determine final processes and costs but DCC does not see the feedback of DCC Customers as slowing down the acceptance of new Comms Hub firmware. This feedback is seen as vital information required to inform any operational decisions DCC wishes to make for the use of new Comms Hub firmware. Also, information for timing and content of new Comms Hub firmware will be shared well in advance with DCC Customers in the form of Comms Hub product roadmaps, with the intention of allowing DCC Customers sufficient time to plan for its release.

If incompatibility is identified in Comms Hub firmware, then this would be rectified with new Comms Hub firmware. As detailed in Appendix B “Firmware Principles” DCC is applying these principles to all new Comms Hub firmware versions and if these principles are not met then the firmware will not be operationally accepted. In this instance this would primarily be covered by the first two principles “**manufactured firmware versions must allow DCC Customers to complete their installation SMICOP obligations and not require a second site visit”** and “**manufactured firmware should not necessitate an OTA Upgrade at point of installation**”.

The DCC also agrees with the DCC Customer comment regarding that any significant changes to the current regulation and approach would require a SEC Modification. To summarise, DCC plans to continue to work with DCC Customers in the planned workshops for the Firmware Management Project and other engagement to ensure DCC Customers are happy to engage with any proposed new approaches for testing in UIT. Dependent on the outcomes of this engagement, DCC will raise the necessary SEC Modification Proposal(s) to progress the proposal further.

<u>Exit Criteria</u>

DCC notes the suggestion for an alternative proposal which could see suitable exit criteria being established for Comms Hub firmware before it is approved for production. Adoption of this suggestion would likely minimize the amount of UIT testing. There are also limitations as to what information DCC could share with other Testing Parties (e.g. if a particular meter/Comms Hub combination generated a defect).

Regarding exit criteria, each DCC customer would not have to individually approve firmware before it gained Operational Acceptance (OA). The OA process would look at UIT test results holistically and judge whether OA was to be approved. For example, if a Testing Party identified a high severity defect with the Comms Hub firmware then the firmware would likely fail OA.

<u>Churn</u>

DCC notes concern in relation to how a DCC User may test Devices it has gained through churn where the supplier may not have a close working relationship with the Manufacturer. This issue was raised and considered through SECMP0009 "Centralised Firmware Library".

DCC considers that the soon to be implemented Firmware Information Repository will provide suppliers with Manufacturer's contact details and this should assist with building relationships for the purpose of testing. DCC recommends that DCC Customers investigate setting up the required commercial arrangements as soon as reasonably possible.

Erroneous Results

DCC believes that transparency is key when it comes to managing erroneous results. DCC has changed the way it deals with testing issues in UIT i.e. implementing tickets/defects to give increased focus and clarity for DCC Customers. DCC recommends DCC Customers participate in focussed testing offered by DCC. DCC are also planning to implement 'training' for new Testing Parties to help reduce User errors.

Q5	**Do you agree with the proposal for DCC Customers to play an active part in the initial deployment of new Comms Hub firmware? Please provide a rationale for your views.**

Stakeholders' response

The majority of respondents to this question agreed with the DCC's proposal for DCC Customers to play an active part in the initial deployment of new Comms Hub firmware. Respondents highlighted the following reasons as to why they support the proposal:

- Early and consistent engagement with Suppliers will help ensure that early phases are controlled and where possible managed across specific DCC Customers (e.g. "super-friendly" accounts) to ensure that vulnerable or high-risk consumers are not included in early deployments until the assurance of live operation has been confirmed.
- Engagement in the process will allow Suppliers to mitigate any risks identified early and ensure appropriate consumer communications and support are in place.
- The ability to validate that the new firmware does not impact the service provided is key to approving wider deployment.
- Rollout phases need to cater for small to significant changes and differentiate between Credit and Pre-Payment customers.
- DCC Users are best placed to confirm that initial deployment of Comms Hub firmware has been successful or not.

With regard to phase 1 of the proposed approach, one respondent noted that the stage should allow sufficient time for DCC Users to assess, test and diagnose issues. Ideally, DCC should provide a production triage process where debug production Comms Hubs can be used in phase 1.

One respondent believed the opportunity for the initial deployment in phase 1 should be optional. This is because there may be a requirement for the DCC User to roll the firmware out as soon as possible, and so the respondent noted that this option should be included in

the process. One respondent also questioned whether the participation in the entire process will be voluntary or mandated.

One respondent agreed with the proposal that DCC Users should play an active part in selecting targets for the initial deployment of new Comms Hubs firmware. However, they requested clarity of communication with manufacturers and CSPs to ensure they understand their meter estate at any given time. The same respondent also recommended that DCC Users are given a clear notice of the numbers of CH Firmware Upgrades that are expected, together with the drivers for each.

Whilst some respondents welcomed the opportunity to feedback findings into the proposed assessment meetings, a number of respondents requested further clarity on the “Firmware Content Committee” and its membership. One respondent suggested that, rather than creating another industry forum, existing forums should be considered. However, the respondent did not believe that the current DCC-led Comms Hub and SM WAN Forum has the structure or appropriate membership to hold responsibility for this critical decision-making role.

A number of respondents also questioned how the proposals relate to SECMP0024 ‘Enduring approach to CH firmware management’. One respondent highlighted that it is unclear whether the DCC’s proposal as set out in the consultation document is an alternative to SECMP0024 or whether it is supplementary to it. Two respondents highlighted the importance of maintaining the concepts within SECMP0024, specifically the need for sequencing firmware updates and the automated feedback of successful CH firmware updates.

One respondent also welcomed:

- additional detail on the ‘co-operative Communications Hub firmware OTA deployment phase’, including the anticipated timelines and delivery of activities associated with Certified Product Assurance (CPA);
- the consideration of an addition of a “supplier emergency stop” mechanism that could be utilised if an operational issue is identified during the roll-out of new Comms Hub firmware;
- detail on the testing and deployment arrangement that will be adopted in a Dual Fuel/Dual Supplier scenario.

Noting that the consultation assumes that this process may not be required in the long run as the protocols and implementations mature, one respondent believed it to be beneficial for DCC to set out how that assumption will be validated. The respondent proposed that this should be through a further consultation prior to the point DCC considers it appropriate to decommission such a process.

DCC's response

DCC notes the interactions with SECMP0024 and therefore plans to present and develop this proposal with industry through the SEC Modification Working Group process. DCC will work with SECAS to ensure that all options are considered as part of the SEC Modification Process. With this approach DCC's intention is to close multiple discussions on this subject so that a chosen industry solution can be selected in the SEC Modification Process before being expedited for delivery, where possible.

Q6	**Do you agree with the proposal to govern Comms Hub firmware entering the supply chain? Please provide a rationale for your views.**

Stakeholders' response

All of the respondents to this question agreed with the DCC's proposal to govern Comms Hub firmware entering the supply chain.

One respondent stated that new firmware should only be introduced into the supply chain when there is a clear benefit in doing so, this may include:

- resolving operational issues in the previous versions;
- resolving security issues in the previous versions;
- improving processes or adding proven functionality.

One respondent requested that the DCC ensure that this approach does not introduce any delay or uncertainty into the Comms Hub Supply Chain. They noted that responses to this Firmware Management Consultation should be considered in parallel with the DCC's "Enhanced Non-Standard Communications Hub" consultation. One respondent also noted that it is their understanding that should the Enhanced Non-Standard Delivery process be approved that this can be taken advantage of up to the maximum permissible quantity, at this stage/phase.

The same respondent believed that the proposed decision point must be aligned with a relevant stage in the DCC's overall testing approach, and a successful test outcome being confirmed (with industry agreement as to the correct criteria to define success). Fundamentally, it is highly unlikely that Comms Hub firmware deemed unsuitable for OTA deployment would be considered suitable for roll-out to newly manufactured Comms Hub assets. The respondent noted expectations that the DCC and its Service Providers will have identified and adopted improvement opportunities from the recent Telefonica Comms Hub v11.30 firmware issue.

One respondent agreed that the deployment of firmware upgrades to the supply chain should only occur once all DCC testing has been completed and when DCC Customers have had the opportunity to test the upgrade in a UIT environment. They noted, that although this may mean that more Comms Hubs OTA upgrades are required, that this

slower deployment to manufacturing will overall provide benefits through less consumer Devices being impacted by poorly tested firmware upgrades.

Whilst agreeing with the proposal, one respondent questioned how a high severity defect would be handled should it be detected whilst Comms Hubs with affected firmware were in transit. Additionally, they would like to understand what processes may be in place to ensure that any Comms Hubs that have been delivered which are on old firmware versions can be updated following install and commission.

One respondent highlighted the availability of Comms Hubs, including instrumented versions, in User RTLs. Whilst they enabled Users to test in the most efficient manner, it was noted that they are relatively expensive for Users to obtain. They suggested that DCC should include the availability of testing versions in any upgrade assessments. This will ensure that existing test units can be OTA'd at little or no additional cost to the DCC User.

A respondent agreed with Comms Hub firmware having 'been tested by DCC Customers on UIT environments' before it is deemed suitable for Production deployment, however, only if this is on a voluntary basis. They suggested that DCC could look at setting up a 'friendly user' forum, possibly as a sub group of Implementation Managers Forum (IMF) and/or Smart Metering Delivery Group (SMDG), where key stakeholders and decision makers can be involved in the voluntary process.

The same respondent questioned whether the DCC refers to UIT environments as UITA and UITB or both. If both, and DCC code uplift is also required, then careful management of UITA timings would be required. The respondent believed that common sense would be applied but noted this point as any regulatory documents need to allow for some degree of flexibility.

Another respondent considered that DCC should set out expected behaviour in situations that could reasonably be foreseen, such as:

- Confirming that n-1 continues to be maintained until all Comms Hubs have been upgraded;
- Confirming what happens in a situation when n+1 is available for OTA but not subsequently available for manufacture; and
- Confirming what happens in a situation where multiple firmware versions are developed in quick succession, for reasons other than a decision not to promote a firmware version to manufacture.

With regard to minimising the frequency of Comms Hub firmware changes, many respondents believed this to be the preferred practice, provided such constraints do not unreasonably impede the time redress of issues. One respondent also believed that DCC should also implement similar governance for any changes to Comms Hub hardware, taking into account the lessons learnt from the approach when it introduced the recent Arqiva (EDMI) Revision D Comms Hubs and the DCC communications around their introduction.

DCC's response

DCC can confirm that the outcome of the "Enhanced Non-Standard Communications Hub" consultation has been considered alongside this consultation. The core idea of that consultation is to build a new process which enables DCC Customers to get new Comms Hub firmware delivered as early as possible prior to mass delivery. This decision gate would be for mass manufacture and the Enhanced Comms Hubs proposal therefore no decision gate follows this. In effect this would be the last gate enabling the firmware to enter mass manufacture.

DCC notes the suggestion that the proposed decision point must be aligned with a relevant stage in the DCC's overall testing and deployment approach. This follows the OA process and the principles that DCC introduced as part of this. With the improvements in the testing phases this should enable more confidence going forward.

In the event of a high severity defect being detected whilst Comms Hubs with affected firmware were in transit, DCC would treat this as a Major Incident. Where required the proposed emergency release process would be adopted to manage this defect if a suitable option. From an OA perspective, the Firmware Management Policy would minimise the risk of high severity defects being discovered after a reasonable level of UIT has taken place.

Regarding the suggestion for DCC to set up a "friendly user" forum, the DCC believes the current Smart Metering Devices and WAN forum or TDEG are the appropriate forums for discussions with users.

DCC also notes that if testing is not mandatory there is no mechanism to ensure that firmware is tested by at least 1 customer prior to OA. However, DCC would always endeavour to engage with users to facilitate user testing.

DCC is looking into the process and governance around hardware revision and will provide feedback through a number of workshops with DCC Customers once it has been agreed how to take this forward. Many elements of this are already defined by the SEC and contractual obligations on the DCC and the CSP's but documenting and formalising this is needed to ensure clarity on roles, responsibilities and expectations is clear.

Q7	**Do you agree that industry should adopt a strategy on minimising firmware versions for Devices? Please provide a rationale for your views.**

Stakeholders' response

The majority of the respondents to this question agreed with the principle of industry minimising firmware versions for Devices. However, the majority of respondents did not support the proposal of N-1, N and N+1.

One respondent requested clarity on the impacts, risks and benefits associated with this longer term DCC strategic aim prior to any decision being made. The respondent believed that a suitable business case for this principle must be prepared, presented and consulted upon.

The respondent stated that in taking any decision, the DCC will have to take account of supplier demands and expectations around the stability of Comms Hub firmware. For example, they would not necessarily support replacing an older version of Comms Hub firmware with a new one to achieve minimisation where the new firmware version has not been adequately tested or has known and significant operational issues. The respondent noted that rushing the deployment of Comms Hub firmware increases the risk of interoperability issues, which may not have been identified during PIT, SIT or UIT phases.

Two respondents highlighted the SEC obligations on how different versions of the Technical Specifications interact / apply to Comms Hubs and Services as captured in SEC Schedule 11 'Technical Specification Applicability Table' (TSAT). The respondents stated that they were unclear based on the consultation document if DCC has considered this when referring to the nomenclature of N-1, N and N+1. The respondent suggested that the DCC considers mapping out how it sees its N-1, N and N+1 nomenclature aligning to the TSAT regulatory requirements. Otherwise it is unclear how the nomenclature for the DCC firmware development stage relate to each firmware to the SEC (e.g. SMETS2, Communication Hub Technical Specification (CHTS) and Great Britain Companion Specification (GBCS)). The respondents emphasised that it is important industry is clear on this DCC mapping for the Comms Hubs N, N-1 and N+1 firmware and its relation to the Technical Specifications and therefore compatible Devices. A single view of the roadmap will help Suppliers and manufacturers understand the most effective deployment combinations over time and how they relate to the SEC requirements.

Another respondent highlighted that at this stage of the rollout, this principle should be approached via collaboration rather than mandating. They suggested that the DCC look at an approach that minimises impact but does not stifle innovation. Every update imposes a risk, and a potential for unintended consequences, so even if the updates are exhaustively tested there will still be a residual risk. There should be agreed criteria that define whether an upgrade should be deployed, held for consolidation with subsequent changes, or even abandoned in edge cases. The respondent also noted that hardware impacts need to be taken into consideration, for example the impacts of firmware updates on gas meters affecting the battery life.

A respondent noted that a requirement to move all Devices up to the most recent firmware version (which may perform worse than the preferred firmware version) does not help the User or their end customers. The respondent would rather maintain a stable population and to move to new firmware versions for HAN Devices once there is a proven case to do so. They noted that upon churn, they will take some time to decide whether to:

- leave the Devices on the firmware versions that they arrived on;

- upgrade the Devices to a preferred firmware version that is known to be stable and operationally efficient;
- upgrade the Devices to the most recent firmware version.

This decision will largely depend on experience gained from previous gains and on any issues associated with particular Device configuration practices that particular suppliers may have used.

The same respondent requested clarity on how DCC plans to resolve 'unhappy path' Comms Hub firmware upgrade activities, as this could help with understanding the driver for this proposed DCC strategy.

Another respondent could not agree to the proposal for an N-1 firmware strategy because they deemed the risk of Devices being uncontactable during firmware upgrades to be high, especially with the packet size of some images. An N-1 strategy could mean several attempts are required to reach Devices having a significant impact on their operations and could lead to many stranded assets where the upgrade fails. This drives costs into suppliers' business for otherwise working Devices.

One respondent considered it too early to determine whether and when all Devices should attempt to minimise the number of firmware versions maintained. They considered it inappropriate to attempt to mandate upgrading to latest versions of firmware because:

- the consequences of firmware upgrades on gas meter battery life needs to be considered;
- the possibility of Devices failing is increased during a firmware upgrade; and
- Devices may not be capable of upgrading to later versions of SMETS.

The respondent also considered that testing with a small number of the most prevalent Devices is appropriate and that DCC should not be obliged to test using multiple versions of Devices, especially where they are left on older versions of firmware through Supplier choice. They noted that it is still evident that Device (including Comms Hub) firmware needs to become more mature and more work is necessary to determine if, or when, firmware for all Devices can move in lock-step.

With regard to the proposal for suppliers to share some testing information such as sequencing and Device compatibility, one respondent highlighted that it has obvious benefits in reducing duplication of effort and therefore costs. However, the respondent requested further detail on the exact mechanisms for this knowledge sharing before they could fully support it.

DCC's response

As outlined originally within the consultation paper with the work DCC has done to date DCC believes there is a need to actively work to reduce the risks associated with the complexity that could occur if multiple firmware versions remain deployed on the production estate versions for the various Comms Hub variants. This is demonstrated in the DPL as the

SMETS2 rollout to date has already resulted in over 800 different configuration sets active on the production environment. If the deployed Device estate becomes fragmented into potentially thousands of different configuration sets, testing for all the variation could become very difficult and as a result key stakeholders would not be able to gain confidence that changes don't have undesired impacts. As such DCC believes it is vital to effectively manage Comms Hub firmware deployed on the production estate in order to provide a stable platform. DCC has the ability to reduce complexity by managing the firmware versions of deployed Comms Hub estate and if they wish DCC Customers can do the same for Device firmware versions.

DCC understands and agrees with customer comments around the need for Comms Hub firmware stability. Comms Hub firmware is a crucial component in delivering the DCC service and as such new Comms Hub firmware will be required amongst other things to resolve test defects, provide resolutions for production incidents and provide new functionality. For the foreseeable future it is likely that new Comms Hub firmware will be demanded by the key stakeholders within Smart Metering so during this period as an industry we must have the rules and framework in place to gain the confidence required to use all new Device firmware and effectively manage the complexity and risks associated to this change. As seen on other technology platforms DCC agrees with DCC Customers that in the future we will enter a steady state where as the technology matures Device firmware change will be associated more with innovation on the platform as opposed to firmware to resolve issues.

DCC notes that in the responses to the consultation that DCC Customers agreed with the principle of industry minimising firmware versions for Devices but did not support the proposal of N-1, N and N+1. DCC plans to discuss this point further within the planned workshops and will aim to establish alternative mechanisms which DCC Customers believe are potentially more viable and suited to how DCC Customers wish to operate. Maintaining Devices other than Comms Hubs is a DCC Customer obligation and in work to date DCC believes there is no desire within industry to change this obligation. Therefore, the aim of the discussion in the workshops will be centred around how within the current regulatory framework DCC Customers believe the industry can collective collaborate and manage the complexity of the deployed Device estate and DCC is willing to support DCC Customers with their chosen solutions. If DCC Customers wish to make changes to the regulatory framework, where possible, DCC will support any such modifications.

In response to related comments DCC would like to clarify that the consultation outlined the many enhancements which will be made to the end to end lifecycle of Comms Hub firmware, from development to the time that firmware version is no longer used in DCC environments. As a result, DCC Comms Hubs firmware which has not passed all the required quality gates will never be a candidate for mass OTA deployment to the deployed estate, all steps leading up to mass deployment of Comms Hub firmware will be aiming to mitigate the associated risks of this. DCC also agrees with the related customer comment which stated that the latest firmware version for any device is not necessary the best, the latest firmware version

must be proven before it can replace the previous firmware version approved for mass deployment to the deployed production estate. As referenced in Customer comments if an "unhappy path" Comms Hub firmware version was deployed to the production estate the further rollout of it would be immediately halted. Depending on severity the resolution for this would either be in the next maintenance firmware version or if deemed to be required the resolution would be as an emergency firmware release.

DCC would also like to clarify that DCC will align to the TSAT. DCC will provide greater clarity on details such as this within Product Roadmaps that will be provided to DCC Customers for greater clarity on the future of the various Comms Hub variants. For example, DCC Product Roadmaps will clarify the points at which specification uplifts are being targeted, providing DCC Customers with the key information required to manage this in context of other Devices or technology which also needed to be uplifted.

DCC also wishes to clarify that during the deployment of new Comms Hub firmware the Comms Hub will remain contactable, there would only be relatively small downtime when the Comms Hub switches from the previous firmware version to the new firmware version.

Regarding Devices (other than Comms Hubs): this will be a matter for the Suppliers and Device manufacturers to decide upon. However, for DCC to manage the inventory of firmware versions DCC would expect Suppliers to work with manufacturers and only upgrade where appropriate to do so and where benefits can be seen in performing the upgrade. Benefits such as high impact bug fixes or providing stability of comms and functionality would be to name a few examples.

To summarise DCC will dedicate time in the planned workshops to discuss this topic of minimising firmware versions to reduce the complexity of firmware versions in the deployed estate of all devices. As far as reasonably possible DCC will adapt to the working practices that DCC Customers wish to adopt but DCC will be taking steps in this area to reduce complexity. As previously stated DCC Customers have the freedom to operate as best suits their businesses, however there is a risk that without a collective industry approach the net effect could be an extremely complex deployed device estate which it is difficult to introduce change to with any confidence.

Q8	**Please provide your views on the current issues facing wider industry collaboration and suggestions on how this could be improved? Provide a rationale for your views and ideas on how such collaboration could be enhanced.**

Stakeholders' response

A number of respondents provided views on the current issues facing wider industry collaboration and suggestions on how this could be improved. One respondent highlighted that DCC recently published a separate consultation titled "Improving Engagement with

Smart DCC Customers and Stakeholders" and believed it more appropriate to respond via this consultation as it covers a range of engagement topics.

Three respondents highlighted that DCC has a key role in bringing together various parties into the discussions to collaborate and find ways forward to progress the issues facing industry. Another respondent agreed that the DCC should bring the industry together again in renewed firmware management discussions. They noted that there were two main reason why industry discussions have previously broken down:

- The sharing of test data – in the past not all suppliers agreed to share their test data to validate new firmware. However, the respondent noted that this position may have changed given the experience of Production pilots/rollout and discussion within groups like DCC's Common Issues Forum.
- Obtaining firmware/support for churned assets – in the past manufacturers wanted commercial agreements in place with all suppliers, which was difficult to achieve. More recently, the Security Sub-Committee (SSC) and the Department for Business, Energy and Industrial Strategy (BEIS) have begun citing SEC Section G3.20 which obligates suppliers to have "established relationships" with all meter manufacturers, together with associated Meter Asset Provider (MAP) contracts, allowing firmware and support to be obtained.

One respondent highlighted that all of the proposals set out in this consultation would be more easily achieved if sincere effort was put into practical planning of delivery milestones.

Whilst recognising that the consultation seeks to define and agree outline approaches, a respondent requested clarity on whether and how the DCC intends to make these approaches applicable within the regulatory framework.

They also noted that further consideration needs to be given to the growing number of DCC Users and the role that new entrants and smaller suppliers play in both this process and the wider assurance of end-to-end service delivery. The respondent would therefore support a review of the relevant governance and operational effectiveness, particularly with respect to firmware upgrades of Comms Hubs alongside other Device upgrades, to ensure all are being undertaken in a safe, secure and consistent manner.

The same respondent also raised matters in relation to the DCC's relationship with its Service Providers. They noted that it would be good for DCC to facilitate closer relationships with the Comms Hubs providers and wider user groups. They also suggested that the DCC's relationship with Service Providers needs to be reviewed and a transparent view of what can and cannot be done under the auspices of the contracts needs to be confirmed to wider industry.

Finally, the respondent highlighted the need for more co-operation between the DCC and Device manufacturers to provide confirmation design notes that give manufacturers a clear steer when it comes to different interpretations of the Technical Specifications. The respondent noted that this is a wider industry and regulatory drafting body issues, rather than a specific DCC issue.

With regard to industry collaboration, another respondent highlighted that it is required to provide a cost-efficient solution that delivers an effective system for delivering firmware upgrades that have been fully tested end-to-end from the DCC system to the deployed Devices.

Another respondent considered that more information is needed in order to answer this question. Any collaboration process would need to include joint agreement of issues, prioritisation, testing, availability of triage / analysis capabilities. It would be necessary to define how such a process might work, the impacts of the process and whether sufficient resources from all parties would be available to support such a process.

Another respondent raised potential improvements in relation to testing. They stated that improved coverage of DCC's early Test Phases (DIT, SIT, etc) to cover the main underlying types of HAN Devices will have benefit all along the test path by reducing the duplicated effort that DCC Users have had to put in so far. Once this has been proven, it may be sufficient reason for DCC Users to consider synchronising their processes, and/or firmware version selection practices with those used in the DCC's test suite. In the meantime, a coordinated period of UIT testing, based around defined processes and good access to DCC test-lab facilities would allow all DCC Users to contribute to testing, rather than depending on a few that maintain their own RTLs.

One respondent considered that a challenge facing industry surrounds managing split supplier sites. They noted that there are many aspects to this that needs to be overcome and they hoped this would be covered within this consultation. Clear guidelines on how suppliers should be managing firmware upgrades and failures are needed and ideally before mass-rollout begins in earnest. Another respondent noted that in the case of split supplies, the "lead" supplier (the Import Supplier) is responsible for applying the firmware to the Comms Hub. However, if the firmware upgrade "breaks" the HAN, this can leave the Gas Meter without connectivity. The respondent highlighted that despite numerous discussions aimed at avoiding situations where the lead supplier applies firmware to the Comms Hub without the Gas Supplier's consent, a solution has yet to be reached. The respondent highlights that this is a typical issue that the DCC is ideally placed to help addressing.

DCC's response

In engagement with key stakeholders, many expressed the view that industry could benefit from working together to deliver obligations collectively for all Device firmware. For this reason, DCC dedicated the final section of the consultation and the final question to provide DCC Customers the opportunity to discuss how such wider industry collaboration could be enabled. As stated in the consultation this topic will have time dedicated in the planned workshops to provide DCC Customers a platform to discuss the feedback from the consultation on what could be preferred industry solutions and how this collaboration could be established. There are no obligations around this and DCC is not proposing any

regulatory change to enable collaboration. DCC's intention is to support DCC Customers with any initiatives that the industry wishes to pursue.

The "Improving Engagement with Smart DCC Customers and Stakeholders" consultation was a separate consultation issued by DCC. This focuses on DCC engagement with DCC Customers and Stakeholders however Question 8 of the DCC Firmware Management Consultation was how desired wider industry collaboration could be enabled.

DCC has observed that sharing data has been viewed as problematic in the past but industry is now collaborating in the Common Issues Forum. DCC Customers may wish to consider how the basis for the success of this could be replicated. In terms of DCC itself, DCC will continue to share information and work with customers wherever possible, especially, as the customer comment suggests, where duplicated effort can be reduced.

SECMP0009 "Centralised Firmware Library" has been used by industry as the focal point for discussing the maintenance of churned assets and DCC has supported this SEC modification to its completion. The question was not intending to reopen this discussion however if DCC Customers require further clarifications DCC is willing to discuss. Equally DCC is willing to support DCC Customers with concerns associated to split supplier however DCC believes these may need to be explored elsewhere to be resolved. In response to the customer comment regarding new entrants, DCC believes new entrants to the market will be subject to the same device and firmware obligations as established DCC Customers.

Further to the customer comment DCC would like to state that we continue to work very closely with our service delivery partners, like the CSPs. The CSPs have been partners in the Firmware Management Project and have contributed greatly to the success to date. Where required contracts will be changed and DCC will inform customers on the exact details associated with this, particular regarding implications on cost. In terms of collaboration and further to the customer comment DCC would like to clarify that DCC is working very closely with Device manufacturers. Examples of this are formal innovation events, interoperability events and collective support for industry forums like the Technical Specification Issue Resolution Subgroup (TSIRS). DCC has supported this collaboration with Device Manufacturers with the establishment of a Technical Account Management function within the Product Team. This amongst other things aims to work closely on design changes to devices, provide access and support to Instrumented Test Comms Hubs (ITCH) to aide early integration with Device related testing and ensure confidence is built with new software or hardware in advance of DCC Customers being provided them for their own testing. In terms of industry level collaboration DCC continues to support all possible meetings or forums, which include GBSC Working Group, IRB amongst others.

2.2 Additional comments to consultation

In addition to the comments received in response to the eight consultation questions, general comments were provided by a number of respondents. This section summarises those comments, not already covered elsewhere, and provides the DCC's response to them.

Independent Testing Services

Many of the respondents suggested the DCC further collaborate with the SMDA scheme.

One respondent highlighted that the SMDA Scheme was set up to provide independent assurance for smart meter equipment including ESME, GSME, In Home Displays (IHD), Pre-payment Metering Interface Device (PPMID). Elements of the testing for the smart metering equipment utilises and works with the DCC equipment to ensure Interoperability with the DCC (and also the scheme assures equipment works with each other and therefore provides confidence of interchangeability).

Many of the respondents considered that the DCC should therefore work with the SMDA to extend the scheme further in order to include and test that the Comms Hubs and associated firmware gain the independent assurance, it will operate correctly and will be fully interoperable with the smart metering estate. The reasons given were:

- The ability of Devices to pass SMDA testing is contingent upon the successful and consistent operation of Comms Hubs – irrespective of Comms Hub manufacturer, Comms Hub variant or firmware loaded onto the Comms Hub;
- The SMDA Scheme has faced challenges arising from Comms Hubs not working consistently;
- At present the DCC occasionally has issues understanding whether there are common Device behaviours during their testing, as they don't have the same level of access to multiple Devices for defining common issues that the likes of SMDA has.
- This will provide another level of confidence and ensures the Comms Hubs (and associated firmware) will be tested against a number of actual Devices sets across a variety of business process tests.
- It ensures that effective competition and independence of testing outcomes for Comms Hubs Devices are fully considered and that the industry as whole does not face any duplication of effort or costs.
- The extension of the scheme would be far easier and cheaper for industry than establishing a new testing scheme (together with related tests, processes and other assets) from scratch.
- Correct design of DCC's use of SMDA testing for Comms Hubs could reduce the total cost to industry of Comms Hub and Device testing.
- Funding via DCC for Comms Hub testing would be appropriate as all DCC Service Users (and not just SMDA members) would derive benefits from the assurance gained from independent testing of Comms Hubs.
- Noting the National Audit Office's (NAO's) report, 'Rolling Out Smart Meters', Paragraph 1.24 describes the risk of interchangeability issues, particularly those that may arise after a customer changes supplier. The existing tests that demonstrate interchangeability, were they to be applied to all combinations of Comms Hubs and a representative sample of other Devices, would make a significant contribution to mitigating this risk.

DCC's response

DCC appreciates the detailed response provided and the responses of DCC Customers related to independent testing of Comms Hubs. DCC recognises the great value that the SMDA scheme provides the industry in terms of Device interoperability and interchangeability and as such DCC continues to work closely with SMDA to support this vital industry testing. DCC believes it has a strong relationship with SMDA with DCC attending all SMDA meetings and SMDA supporting DCC Customer forums like TDEG and the Common Issues Forum. DCC wishes to build on this relationship in the future. DCC has engaged with SMDA regarding formal testing of Comms Hubs via the scheme in the past. DCC does not currently have plans to conduct formal testing via an independent testing scheme however DCC would not rule this out as an option in future. If additional Comms Hub testing is to be conducted via an independent testing scheme like SMDA DCC would seek DCC Customers views via a separate consultation with complete details and the associated costs outlined.

In terms of Device testing as outlined within the DCC Firmware Management Consultation DCC is planning to increase Device testing for all future Comms Hub firmware versions, with the intention of increasing product quality. DCC believes that the earlier defects can be found in the overall testing cycle the greater the time and cost savings for the whole of industry.

Further to comments regarding Device manufacturers DCC also wishes to clarify to DCC Customers that DCC is working very closely with Device Manufacturers on a technical account management basis, on the resolution of all Device defects and collaboration at interoperability and innovation events amongst other activities. DCC acknowledges the relevance of the interchangeability reference in the National Audit Office's (NAO's) report 'Rolling Out Smart Meters' and DCC believes the close working relationship with Device manufacturers and collaboration on a technical level at interoperability and innovation events is a positive step towards mitigating the risk which was called out and a position DCC wishes to build upon as the market evolves.

Costs, Business Case and Implementation

A number of respondents noted that the consultation did not include any indication of the costs of the proposals and any additional expenses that may be incurred. They requested that DCC provides confirmation on this to support understanding of the proposals in their entirety.

Two respondents also believe that a documented cost-benefit business case will need to be prepared and consulted upon by the DCC. They would expect this to include assessment and feasibility of the DCC utilising the testing facilities and capabilities of the SMDA Company, to ensure that effective competition and independence of testing outcomes for Comms Hub Devices are fully considered and that the industry as whole does not face any

duplication of effort or costs. Depending on the contents of this business case, one respondent reserves the right to amend its position on topics covered in this DCC Consultation.

One respondent also noted that cumulative timescales of the proposals are unknown. They requested that the DCC set out their views on the end-to-end process and timescales relating to these proposals.

DCC's response

DCC will be holding a number of customer workshops to discuss each proposal further and to agree next steps (further details can be found in the "next steps" section of this document). Following these workshops, DCC will be in a position to provide further information on costs and implementation timescales.

Additional points for consideration

The following points were also raised for the DCC's consideration:

- The consultation covers various proposals from DCC to improve the firmware management process; however, DCC has not made clear whether any regulatory changes in the SEC are required to facilitate any of the proposals – clarity on this would be helpful. Also, if any SEC changes are required, then expectation is that DCC would raise the appropriate SEC Modification and / or consult further on any changes to the SEC Subsidiary Documents.
- DCC refers to the Hypercare package being already established until 6 months after Release 2.0 go-live. It is unclear if this relates to the October 2018 go-live date for the R2.0 code base and the Single Band Comms Hubs, or if it also relates to when Dual Band Comms Hubs are made available at the Full Volume Production milestone in the Joint Industry Plan (JIP) – this is currently expected to be November 2019 subject to the outcome of the JIP Change Request to be raised by DCC.
- Appendix B of the consultation document covers Firmware Principles for Comms Hubs. These principles are helpful and welcomed to improve the process. The principles are currently written in a regulatory style language that makes clear these are requirements on CSPs to deliver to – the principles use words such as will, shall, must, should. The respondent requests DCC confirms that CSPs have signed up to these principles and if these principles are also intended to be backed in CSP Contracts so that CSPs and their Comms Hub manufacturers deliver to them.
- The proposals make reference to Production Comms Hubs; the respondent seeks clarity from DCC on whether this is also intended to cover the firmware management process for Test and Instrumented Test Comms Hubs, as well as ensuring a clear process is in place to deliver and assure any emergency firmware upgrades to all Comms Hubs.
- DCC referred to Production Proving activities within the consultation as another activity supporting the overall assurance of firmware; however, one respondent noted

that the DCC informed TABASC it is rethinking its approach on Production Proving. It is therefore unclear what the implications are for the firmware management proposals captured in the consultation. Furthermore, another respondent requested clarity as to how visible the outcome of this testing would be and what part, if any, it may play in the approvals process.

- Regarding the "Firmware Approval" section on page 17 of the consultation document, a respondent would like to know more detail around the criteria that the DCC will be using to support this process. Although the earlier stages of the process add in a greater level of assurance, they sought clarity on what will prevent a firmware released from being approved should it have defects impacting a DCC Customer. In addition, clarity on the decision makers and whether this is a sole DCC responsibility would be welcome.
- The proposal contained within the consultation document does not reference the possibility of rolling firmware on the Comms Hubs should any issues arise. The respondent asked that the DCC provides clarity on what would happen should issues be encountered.
- A respondent suggested that DCC works with SECAS to ensure the current Firmware Management Design Note is aligned to the latest process and any subsequent changes in future.

DCC's response

DCC will assess where proposals require a SEC Modification Proposals and will raise where necessary.

Dual Band Comms Hubs are not currently deployed in the Production environment and until such time Hypercare or any other safeguards to protect the deployed production estate are not required. Hypercare was established for DCC Customers to gain confidence with new Comms Hub firmware in production before being deployed to the remainder of the production estate. DCC will continue to work with DCC Customers for the safe early deployment of Comms Hub firmware to the deployed production estate before mass deployment. As mentioned in earlier comments DCC is working with SECAS to progressing SECMP0024 to agree an Enduring Approach for Comms Hub firmware deployment.

The CSP's are currently working to the principles set out in Appendix B of the consultation and have committed to deliver firmware that meets these principles.

As well as production Comms Hubs, the proposals also cover the firmware management process for Test and Instrumented Test Comms Hubs.

With regard to production proving, the capability will deliver the below core capabilities:

1. A monitoring and health check capability
2. A triage and diagnostics capability
3. A product validation capability
4. A functional verification capability

The project will procure a solution to provide DCC with a Production Proving capability where the DCC would be set up as a Production Proving Function and emulate an energy supplier and network operator. The key business driver is to provide DCC and User with increased assurance and confidence of DCC Systems in readiness to roll out at scale. The SEC has been modified to enable DCC to conduct production proving using DCC production meters that will be housed in the DCC Test Lab.

Regarding the approval criteria, DCC will hold a number of workshops where this matter will be discussed and agreed.

Finally, DCC will work with SECAS to ensure the Firmware Management Design Note is updated with any changes as necessary.

3 DCC Conclusions

3.1 Next steps

DCC will be holding a number of customer workshops to discuss and agree requirements for the four key stages. DCC will communicate full details of these prior to the workshops being held.

4 Contact

If you have any questions about this conclusion document, please contact Sasha Townsend at sasha.townsend@smartdcc.co.uk or contact@smartdcc.co.uk.

Annex A: Abbreviations & Acronyms

Abbreviation	Definition
BAD	Business Architecture Document
CHTS	Communications Hub Technical Specification
Comms Hub	Communications Hub
CSP	Communications Service Provider
DCC	Data Communications Company
DIT	Device Integration Testing
DMC	Device Model Combinations
DPL	Deployed Products List
GBCS	Great Britain Companion Specification
HAN	Home Area Network
IHD	In Home Display
IMF	Implementation Managers Forum
JIP	Joint Industry Plan
MAP	Meter Asset Provider
OA	Operation Acceptance

OTA	Over the Air
PIT	Pre-Integration Testing
PPMID	Pre-payment Metering Interface Device
RTL	Remote Test Labs
SIT	System Integration Testing
SMDA	Smart Metering Device Assurance
SMDG	Smart Metering Delivery Group
SMETS2	Smart Metering Equipment Technical Specification 2
TABASC	Technical and Business Architecture Sub-Committee
TAG	Testing Advisory Group
TDEG	Testing Design and Execution Group
TSAT	Technical Specification Applicability Table
TSIRS	Technical Specification Issue Resolution Subgroup
UIT	User Integration Testing