# June 2024 SEC Release
# Testing Approach Document

| | |
|---|---|
| **Version:** | **V 2.0** |
| **Date:** | **02 January 2024** |
| **Author:** | **DCC** |
| **Classification:** | **DCC Controlled** |

# Document Control

| Revision Date | Summary of Changes | Changes Marked | Version Number |
|---|---|---|---|
| 13/11/2023 | Initial Draft | n/a | 0.1 |
| 16/11/2023 | Internal Review | n/a | 0.2 |
| 20/11/2023 | Final Internal Review | n/a | 0.3 |
| 21/11/2023 | Submitted to TAG108 (29/11/2023) for review & issued for consultation | No | 1.0 |
| 02/01/2024 | Updated Section 5.1 to reflect change to the CR | Yes | 1.1 |
| 02/01/2024 | Published to TAG 109X (10/01/2024) for Approval | No | 2.0 |
| | | | |

# References

**Table 1 – References**

| Ref | Title | Source | Date | Version |
|---|---|---|---|---|
| 1 | Glossary of Testing Terms | ISTQB | Mar 2016 | 3.1 |
| 2 | June 2023 Release Implementation Document | SECAS | TBC | TBC |

Where this document references sections of the Smart Energy Code (SEC), those references shall be construed by reference to any intended future variations to those Sections (and the SEC Subsidiary Documents associated with those Sections) which are due to take effect at the June 2024 SEC Release Go Live.

# Abbreviations & Acronyms

This document uses standard testing terminology, a glossary of which can be found on the International Software Testing Qualification Board website www.istqb.org

In addition, the meanings of abbreviations and acronyms specific to Section A of the Smart Energy Code and DCC services and systems are shown below.

**Table 2 - Abbreviations & Acronyms**

| Abbreviation | Meaning |
|---|---|
| APC | Auxiliary Proportional Controller |
| CH | Communications Hub |
| CHTS | Communications Hub Technical Specification |
| CPL | Central Products List |
| CR | Change Request |
| CSP | Communications Service Provider |
| DBCH | Dual Band Comms Hub |
| DCC | Data Communications Company |
| DESNZ | Department of Energy Security Net Zero |
| DSP | Data Service Provider |
| DUIS | DCC User Interface Specification |
| ESME | Electricity Smart Metering Equipment |
| ETAD | Enduring Test Approach Document – Appendix J of the SEC |
| FAT | Factory Acceptance Testing |
| FOC | Final Operating Capability |
| GBCS | Great Britain Companion Specification |
| GSME | Gas Smart Metering Equipment |
| HAN | Home Area Network |
| HCALCS | HAN Connected Auxiliary Load Control Switch |
| HHT | Hand-held Terminal |
| IOC | Initial Operating Capability |
| MMC | Message Mapping Catalogue |
| MOC | Middle Operating Capability |
| PIT | Pre-Integration Testing |
| PPMID | Pre-Payment Meter Interface Device |
| SAPC | Standalone Auxiliary Proportional Controller |
| SBCH | Single Band Comms Hub |
| SCT | System Capacity Testing |
| SEC | Smart Energy Code (The Code) |
| SECAS | Smart Energy Code Administrator and Secretariat |
| SI | System Integrator |
| SIT | Systems Integration Testing |
| SMETS | Smart Metering Equipment Technical Specifications |
| SMI | Smart Meter Inventory |
| SM WAN | Smart Metering Wide Area Network |
| SP | DCC Service Provider |
| SRV | Service Reference Variant |
| TAB | DCC's Test Assurance Board |
| TAD | Testing Approach Document |
| TAG | SEC Panel's Testing Advisory Group |
| TTM | Test Traceability Matrix |

| Abbreviation | Meaning |
|---|---|
| UIT | User Integration Testing |

# Glossary

Table 3 defines terms not listed in Table 2, or otherwise defined in Section A – Definitions and Interpretation - of the Smart Energy Code.

**Table 3 - Glossary**

| Term | Meaning |
|---|---|
| DCC Meter Protocol Emulators | Testing Stubs developed by DCC to emulate the functional aspects of smart metering Devices |
| Go Live | Deployment date of a change in production |
| Modified DCC Total System | Means the DCC Total System as modified in order to meet (or to be designed to meet) the DCC's obligations under the Code at the June 2024 SEC Release Go Live. |

# Table of Contents

# 1 Introduction

## 1.1 General

This is the Testing Approach Document to cover the changes being implemented as elements of the June 2024 SEC Release. This approach will be used in conjunction with the SEC Release Implementation Document for June 2024 SEC Release, in accordance with Section D and Section H.

The June 2024 SEC Release includes three modifications:

- MP162 SEC Change required to deliver Market Wide Half Hourly Settlements[1],
- MP211 Aligning the SMI with the CPL,
- MP178 Removing DSP validation against the SMI join status for SRV8.8.x

with two DCC Change Requests:

CR4879 Capacity and Scheduling Associated with MHHS in the Scope section of this document.

CR4090 Network Evolution – Comms Hub & Networks (CH&N) DSP Interfaces.

This document sets out the information required of the SEC Release Testing Approach Document, Section D10.18 - D10.20 of the SEC, including the way testing will be conducted by DCC for the June 2024 SEC Release.

## 1.2 Approval of this Document

Section D10.20 of the SEC states that the DCC shall prepare and consult upon each SEC Release Testing Approach Document and any subsequent amendments. The Panel shall review each SEC Release Testing Approach Document and any subsequent amendments.

The Panel's Testing Advisory Group (TAG), in line with its Terms of Reference, provides support and advice to the Panel in relation to SEC Release Approach Documents.

The following process shall be followed:

- This document shall be produced by DCC, and a draft provided to the Panel's TAG for their review.
- In parallel the draft document shall also be issued to SEC Parties for consultation. SEC Parties will have until 15 December 2023 to review and provide feedback via the DCC website. The link to this will also be provided on the SECAS website.
- DCC shall consider the feedback from TAG and the consultation and, where appropriate, will revise the draft document.

[1] Please note SIT testing took place during June 23 SEC Release. This delivery will include regression testing, to support the route to live of the MDR role code base.

- The revised draft shall be presented to the Panel's TAG for recommendation to the SEC Panel for an approval decision.
- The SEC Panel shall consider the views of the TAG and shall:

| | |
|---|---|
| Either | Approve the Testing Approach Document |
| Or | Reject the Testing Approach Document and specify to the DCC the areas requiring further work |

## 1.3 Revision of this Document

For SEC Modifications and the DCC Change Requests, following approval of this document it:

- Shall be revised by DCC in accordance with any direction to do so made by the SEC Panel
- May be revised by DCC following consultation with the Panel's TAG, provided that:
  - Prior to making any such revision, DCC must present a summary of the views to the Panel's TAG and an explanation of how the DCC has taken them into account.
  - The document may not be revised to the extent that the Panel's TAG directs otherwise.
- May be revised by DCC without consultation where the revision is of a minor typographical nature, or where the revision does not have any material effect on the rights or obligations of SEC Parties or any other person who is entitled to undertake testing in accordance with this document.

# 2 Scope

The June 2024 SEC Release will modify the DCC Total System to accommodate the changes detailed in Table 4.

**Table 4 Testing Scope for June 2024 SEC Release**

| SEC Modification # | Description | CR # | PIT & SIT |
|---|---|---|---|
| MP162 | SEC Changes Required to deliver MHHS | CR4813 | SIT |
| MP178 | Removing DSP validation against SMI join status for SR8.8.x | CR4837 | PIT |
| MP211 | Aligning the SMI with the CPL | CR4725 | PIT |
| - | Capacity Uplift and Scheduling Associated with Market-wide Half Hourly Settlement (MHHS) | CR4879 | SIT |
| - | Network Evolution – Comms Hub & Networks (CH&N) DSP Interfaces. | CR4090 | SIT |

## Changes forecast for this Approach Document

For the purposes of drafting this document, any potential pending changes targeted for this release have been included in assessing the test approach. Following the scope being finalised, the Testing Approach Document will be reviewed and, where the changes are material, the content may be revised.

## 2.1 Documents for June 2024 SEC Release

Table 5 lists the links to the SEC modification documents that were used to create this Testing Approach Document for the June 2024 SEC Release.

**Table 5 Referenced Documents for June 2024 SEC Release**

| SEC modification link | Number |
|---|---|
| Modification » (smartenergycodecompany.co.uk) | MP162 |
| Modification » (smartenergycodecompany.co.uk) | MP178 |
| Modification » (smartenergycodecompany.co.uk) | MP211 |

| SEC Subsidiary Documents | SEC Appendix |
|---|---|
| DCC User Interface Specification | Appendix AD |
| Message Mapping Catalogue | Appendix AF |
| Definitions and Interpretations | Section A |

## 2.2 Other DCC Testing Approach Documents

This Testing Approach Document and any related Solution Test Plans developed for this Release shall take precedence over other DCC Test documents for June 2024 SEC Release.

## 2.3 Out of Scope

The following assurance activities are outside the scope of the testing approach for the June 2024 SEC Release:

a. Testing of firmware for Meters and Other Devices (individual manufacturers are responsible for this activity).

b. Full SIT Functional Testing of the MHHS MDR Role, as this was tested during June 2023 SEC Release. The MHHS SIT Exit TAB is targeted for 15th November 2023.

c. DCC is not responsible for proving Devices are compliant with SMETS1 and SMETS2 requirements.

d. Testing of the Home Area Network (HAN) except for:

e. Its interaction with the Modified DCC System.

f. Where the HAN is tested as part of System Integration Testing and User Integration Testing.

g. Testing the inter-changeability of Devices connected to the Home Area Network.

# 3 Governance Approach

The June 2024 SEC Release will follow a standard Release Management approach through the B stream environments. The following governance will apply:

**PIT**

PIT will be conducted in the SP PIT environment and will follow the standard governance approach of a DCC's Test Assurance Board (TAB) agreeing:

- PIT Completion for the DSP and S1SP delivery; and
- Suitability for promotion into SIT-B.

Post agreement by TAB, the PIT Test Completion Report will be provided to the TAG for information.

The 4G CH DUIS 5.3 changes to support WAN data completed PIT functional testing on 31 October 2023.

At present only one deployment of code / configuration change is planned to be taken into SIT-B. All PIT deliveries and TAB are due to be completed prior to SIT execution commencement.

As part of the MHHS MDR Role, DUIS 5.3 is already available in SIT. This would also apply to the changes which are being utilised by 4G CH&N programme.

**Note:** No Emulator assurance is required for the June 2024 SEC Release, there are no impacting device changes as part of this release. In addition, the previous Emulator version (A.2.0.7) remains unchanged.

**SIT**

SIT will be executed in the DCC's SIT-B Environment and will follow the standard governance approach of a (TAB) agreeing:

- SIT completion; and
- suitability for promotion into UIT-B.

Post agreement by TAB, the SIT Test Completion Report will be provided to the TAG for approval.

TAG recommend approval of SIT exit to the Panel to support code promotion to SIT-A.

For the changes being made under CR4090, DESNZ will determine any disputes between DCC and TAG over test completion.

**Route to Live**

Route to Live will follow the standard Release Management approach which would see code moved from SIT-A into UIT-A prior to go live and account taken of any findings from User Testing in the UIT environments.

# 4 Objectives of Testing

## 4.1 Testing Objectives

The following testing objectives shall apply:

a) Demonstrate that the changes brought into the DCC System by the in-scope items conform to the requirements and do not have any adverse impact on the DCC System.

b) Demonstrate that DCC and the component parts of the Modified DCC System and Devices compliant with GBCS technical specifications can operate and interoperate with each other, and with User Systems and to the extent necessary that DCC can comply with its obligations for Security and DCC Services.

c) Enable (to the extent that it is reasonably practicable to do so for the June 2024 SEC Release Go Live) Users to test the interoperability of their User Systems with the Modified DCC System together with selected versions of SMETS2 Devices on the CPL or Emulators.

d) Demonstrate that Users can continue to successfully install and commission and operate a few Devices on the CPL using the Modified DCC System.

e) Demonstrate that the Modified DCC System can operate successfully within the wider Smart metering ecosystem comprised of multiple Devices operating to different technical specifications in a consistent manner.

f) Test end-to-end communication from an authorised User device and back again for all technical specifications in operation, together with security modules.

g) Verify that all other functional changes that are part of the June 2024 SEC Release are functionally correct including consequential amendments.

h) Ensure that the changes do not materially adversely impact the security risks associated with the Modified DCC System, and that any changes impacting security are identified, tested (where necessary), and accepted. Consideration should be given to the security capabilities in the DCC security architecture including the protection of data and infrastructure.

In respect of the testing objectives described above references to the Smart Energy Code shall be construed as a reference to the version of the Smart Energy Code (including any Subsidiary Documents) which is due to have effect with the June 2024 SEC Release.

# 5 Changes and Testing Approach

This section describes the change and testing approach for each testing phase, provide a release timeline. It also provides information on device selection and an environment usage overview.

## 5.1 High Level CR Detail

The elements below form the high-level areas of change which will be applied in the June 2024 SEC Release.

The Functional Heatmap will be provided and added to Appendix A when available. This will detail the SRs, SRVs, Alerts and other scenarios which will be tested for the changes in the June 2024 SEC Release. Below is a summary of the specific detail for each change and the high-level view of testing of June 2024 SEC Release new functionality:

**MP162 (CR4813) - SEC Changes Required to deliver MHHS**

As referenced in v2.0 MHHS Test Assurance Document, which was approved by TAG at TAG102 on 31 May 2023, the June 24 SEC release delivers the Market Wide Half Hourly Settlement MDR User Functionality.

As a summary MP162 introduced the changes needed to allow Supplier Agents to be able to collect half-hourly meter readings from ESME for MHHS. This CR enabled the creation of a new User Role for non-Supplier Parties carrying out the Meter Data Retrieval service and enable the set of Service Requests the MDRA User Role will have access to and the associated Target Response Times.

There are no changes associated to this release which impacts DSP or S1SPs for June 2024 delivery. However, to support the wider changes introduced with June 2024 SEC release, a cycle of regression testing will be undertaken to prove existing functionality remains for MHHS MDR role and is not impacted by the additional changes being implemented.

**MP178 (CR4837) - Removing DSP validation against SMI join status for SR8.8.x**

The DCC has received reports that the on-site Install and Commission (I&C) of Smart Metering Systems (SMS) or exchange of Devices within a SMS are failing due to on-site installers being unable to ‘unjoin’ devices.

There are occasions when the initial join is unsuccessful or there was an issue with the Devices being joined, and therefore the engineer will need the unjoin the Devices before attempting to re-join them again. Alternatively, when a Device is being exchanged it needs to be un-joined before the new Device can be joined.

The unjoin request currently requires validation of the initial join. However, where the join has not been processed properly, the unjoin command will fail. When this occurs the only way to complete the I&C process for that specific Device is a manual update of the Smart Metering Inventory (SMI) database.

The scope of the solution will remove the Data Service Provider (DSP) validation of Join status in the SMI when sending an Unjoin Service Request. This will allow the processing of unjoin commands irrespective of the join status held in the SMI.

Testing will ensure SRV 8.8.1 and 8.8.2 skips join validation where devices are un-joined and will send a successful unjoin response back.

**MP211 (CR4725) - Aligning the SMI with the CPL**

As part of the Firmware Distribution and Activation process carried out by the Service User, it has been discovered that some devices may implement a “partial” update to the firmware, which is reported as successful in terms of verification and activation.

To rectify this issue a change is required to prevent Devices that do not have a matching Device Model on the Central Products List (CPL) from communicating with the DCC.

This change will ensure the firmware is checked against the CPL and if there are discrepancies the following will occur:

- N51 will be generated.
- SMI will be updated with the actual firmware on the device.
- The Device will be suspended in SMI.”

Testing will prove, when a device firmware is reported via the SRV 11.2/11.3 isn’t in SMI, it will create an entry for that firmware in the SPs database and will update the Device status to ‘Invalid’ (I) and the device is then suspended, schedules removed and the device firmware version is updated.

**CR4879: DSP delivery of Capacity Uplift and Scheduling Associated with Market-wide Half Hourly Settlement (MHHS):**

This change will deliver the ability to make SRV 4.2 schedulable. To do this, the request structure must be added to the DUIS schema for SRV 5.1 Create Schedule and SRV 5.2 Read Schedule.

In addition, amendments will be required to existing SRV 5.1 validation specific to SMETS1 and to MDR to add SRV 4.2 to the allowed SRV set.

This change introduces an IE S1SP Reading’s Cache solution to which will be used to hold data recently obtained from ESME devices for Service Requests 4.6.1, 4.8.1 and 4.8.3 and store the response in the cache for the Data Retention Period range of between twenty-five (25) and seventy-two (72) hours. Upon receipt of a SRV whereby the same SRV, Date and Time is within the cache then the response will be serviced from the cache without sending the request onto the device.

Please note this delivery by DSP will be sat within a Feature Switch configurable by each S1SP until those S1SPs have developed the capability to support this change.

NOTE: DCC will release the required changes to support capacity updates in advance any impacts arising from the start of MHHS migration. DCC to manage and mitigate against this risk

## CR4090 Network Evolution - Comms Hub & Networks (CH&N) DSP Interfaces

As referenced in v2.0 MHHS Test Assurance Document, which was approved by TAG at TAG102 on 31 May 2023, the June 24 SEC, DUIS 5.3 was delivered to support the inclusion of the MDR role for the MHHS. As confirmed in Section 2.3 the SIT Exit TAB for MHHS MDR role was approved on 15th November 2023.

In accordance SEC Appendix AQ - SEC Variation Testing Approach Document for the CH&N Arrangements, version 5.3 of the DUIS will be utilised to validate the updates to contents of SMETS2 Service Responses (specifically SRV8.2 and SRV12.1) to support 4G Comms Hubs and Coverage Check results. This is due for release in conjunction with the June 2024 SEC Release.

The impact to SR8.2 and SR12.1 is set out below.

### SR8.2 Read Inventory

Three 4G regions (4G South, 4G Central, 4G North) will be additional values for the attribute "CSP Region" in the Service Response when reading the information about a device from the Inventory.

There is no change to the Service Response structure.

The new values will only ever be returned if the User has upgraded to DUIS v5.3 and the device is associated with a 4G Comms Hub. This change is not visible to customers until the 4G Comms Hubs are delivered as part of the CH&N programme into production.

A User on any earlier version of DUIS will not receive a CSP Region value if the device is associated with a 4G Comms Hub.

For devices associated with 2G/3G Comms Hubs the User will remain as is regardless of DUIS version.

### SR12.1 Request WAN Matrix

The Service Response structure will be changed to allow coverage data to be returned for multiple CSP Regions in a single Service Response.

For a given input postcode the new response structure will contain 2G/3G coverage data for the South/Central Region and 4G coverage data for the 4G South/4G Central Region.

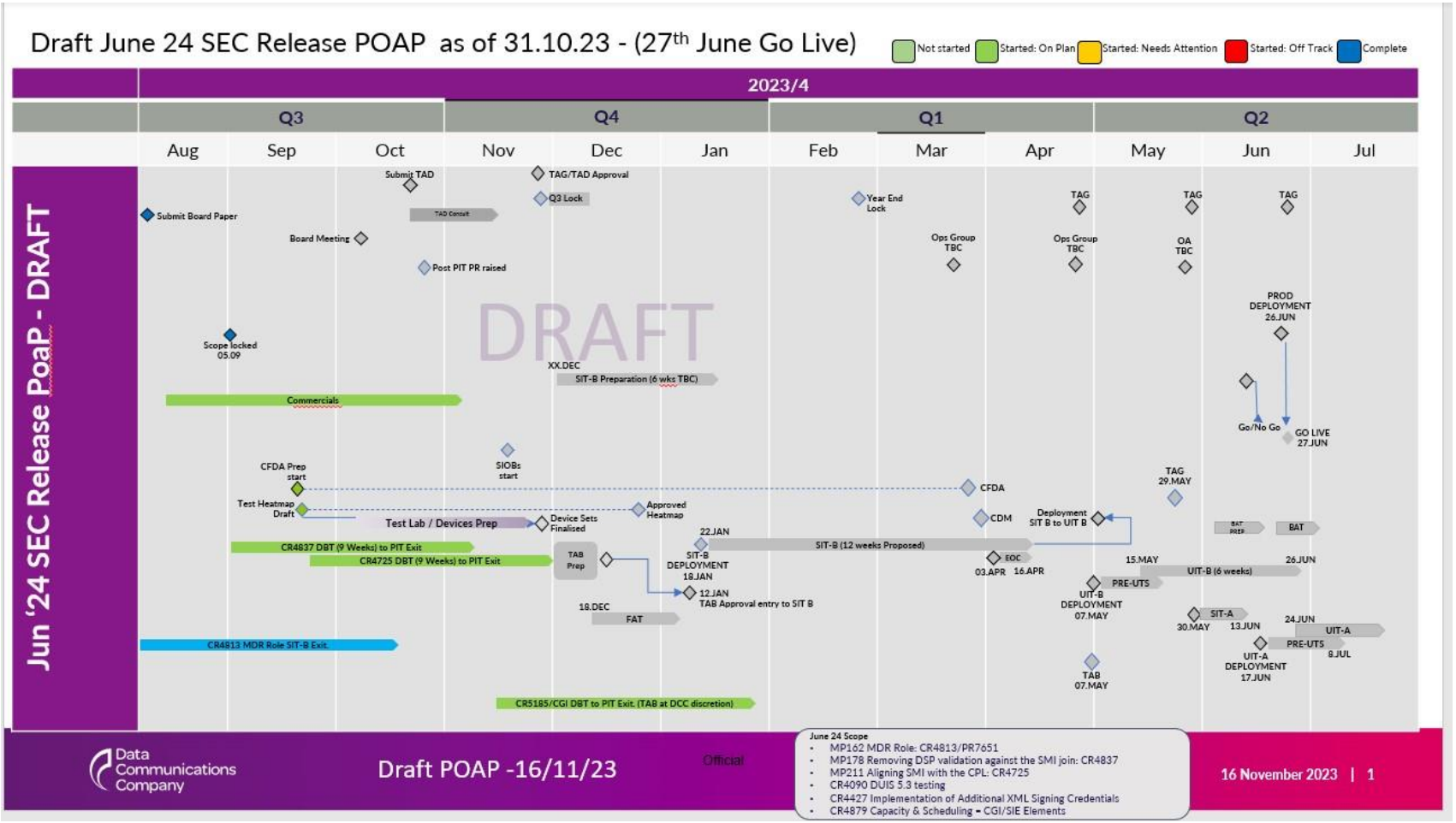
The coverage data returned for each region is unchanged from previous versions. It is now a repeating group with a CSP Region identifier in each group.

The new structure will only ever be returned if the User has upgraded to DUIS v5.3.

A User on any earlier version of DUIS will only receive 2G/3G coverage data and the structure of the response will be unchanged.

## 5.2 Draft High Level Plan

A draft high-level final plan as of 31 October 2023 is shown below. The plan is separate to the Test Approach Document, and TAG will be advised of any material changes.



## 5.3 Device Selection

The DCC shall recommend which of the existing Devices that are in use in production shall be employed to test the June 2024 SEC Release against.

Emulators will be used for changes w

hich require DUIS v5.3, GBCS v4.3 or SMETS2 Devices as outlined in this Test Approach Document, and where real Devices are yet to be available in the CPL or the EPCL.

## 5.4 Description of Test Phases

The June 2024 SEC Release changes will be delivered using a waterfall delivery methodology. The approach to testing of the June 2024 SEC Release will include defined Test Phases.

Table 6 contains the Test Phases / Stages, whether or not a stage is mandatory, organisations involved in delivering testing and the environments to be used.

**Table 6 – Testing Phases and Stages**

| Test Phase | Test Stages | Mandatory (Y/N) | Organisation Involved | Environment Used |
|---|---|---|---|---|
| PIT | System Test (to include FAT) | Y | DSP<br>DCC | PIT |
| SIT | Solution Test (using Devices / Appropriate) Firmware for Devices | Y | DSP<br>CSPs<br>DCC | SIT-B |
| | Solution Test (using Emulators) | Where Devices / Appropriate Firmware are not available | DSP<br>CSPs<br>DCC | |
| | Solution Test Regression | Y | DSP<br>CSP<br>DCC<br>S1SP<br>DCO<br>DCC | |
| UIT | UIT Proving / Pre-UTS | Y | SI<br>DCC | UIT-B<br>UIT-A |
| | User Test | N | Service Users<br>DCC | UIT-B |
| | User Test | N | Service Users<br>DCC | UIT-A |

Note: System capacity testing requirements have been assessed for the June 2024 SEC Release, and as the changes in this release do not materially impact the use of the DCC Total Systems it is deemed that System Capacity testing is not required.

The Test Phases are as follows:

- The Pre-Integration Test (PIT) phase covers the testing by DCC Service Providers, undertaken individually, to verify that the solution meets the requirements. The DSP and is the only Service Provider that are in scope for June 2024 SEC Release.
    - All SMETS1 cohorts, MOC and FOC will be subject to the standard regression that will be run as per the standard approach across SIT environment.

System capacity testing requirements have been assessed for the June 2024 SEC Release, and as the changes in this release do not materially impact the use of the DCC Total Systems it is deemed that System Capacity testing is not required.

- Systems Integration Testing (SIT) consists of:
    - Solution Testing by DCC Service Providers collectively, to verify the end-to-end functionality using Devices and where not available, Emulators. It also confirms interoperability between the modified DCC System and existing Devices in production.
    - Service Provider System Integration Testing to initiate the Quality Gate Review for exiting the SIT phase.

- User Integration Testing (UIT) allows Users to test their systems and Devices with the Modified DCC System before changes are made available in the production environment.
    - UIT Proving/Pre-UTS will be completed following code deployment into the UIT environment to test the CR changes and regression testing the UIT environment. The critical aspects of this testing will be completed ahead of opening the service to Testing Participants
    - For the June 2024 SEC Release, Users with Devices deployed in Production will be invited to undertake testing of their DUIS systems against the Modified DCC Solution and to self-certify the results of this testing to the DCC.
    - Users will be invited to complete regression testing before moving to the new schema[2] for the June 2024 SEC Release.

## 5.5 Delivery of Test Phases and Stages

The execution of the testing to support the June 2024 SEC Release will be undertaken in appropriate test environments as per Table 6.

The Test Phases and Stages to support the June 2024 SEC Release will be subject to the DCC quality gating process including the DCC Test Assurance Board (TAB) for Test Phase exits.

The SI will manage the usage of environments (except Service Providers' PIT environments). Should there be any contention in resources this will be escalated to the DCC for determination and any impact notified to Testing Participants.

[2] Please note the DUIS schema remains unchanged for June 2024 SEC Release which was tested as part of the MHHS MDR Function as referenced in v2.0 of the MHHS TAD.

# 6 Test Phase Activity Description

This section of the June 2024 SEC Release DCC Testing Approach Document defines the testing activities and assurance requirements for individual Test Phases.

The provision of the testing deliverables detailed in Section 8 of this document shall ensure that these requirements and focus areas are suitably covered by each DCC Service Provider and each Test Phase and are assured accordingly. All requirements and deliverables for each phase shall ensure that the test objective is met.

## 6.1 Requirements & Focus Areas for Pre-Integration Testing

The PIT Phase for the June 2024 SEC Release is required to provide assurance of the quality of the Service Provider solutions early in the development cycle.

As an overall requirement, all testing which can be reasonably, and cost effectively undertaken prior to SIT should be undertaken in PIT. Should any testing initially planned for the PIT Phase prove to be untestable during that Test Phase then the test(s) will be added to the scope of testing to be conducted during the SIT Phase. Any such movement will be reported to TAG.

For the June 2024 SEC Release all changes will be delivered and tested in PIT for all the impacted Service Providers. Testing will include the feature switches for all changes both on and off.

**Table 7 PIT Requirements**

| Ref | Requirement |
|---|---|
| PIT.1 | DCC Service Provider PIT shall cover all functional areas impacted for testing the June 2024 SEC Release. |
| PIT.2 | DCC Service Providers shall produce and maintain individual PIT approach documents, the System and FAT plans, and shall produce test completion reports and Work off Plans. |
| PIT.3 | DCC Test Assurance will perform assurance activities in PIT across all activities except unit and link testing, as subsequent activities within PIT provide assurance of outputs from those tests. |
| PIT.4 | DCC Test Assurance shall review the PIT test cases for the DSP, where used, for appropriateness and to ensure functional coverage. |

## 6.2 Requirements & Focus Areas for Systems Integration Testing

SIT for the June 2024 SEC Release shall be planned and based on successful testing in PIT. It shall confirm the successful integrated operation of the Service Provider solutions and shall support delivery of final, assured code for User testing.

For the June 2024 SEC Release only CRs 4090 and 4879 will be tested in SIT fully.

To support the CH&N programme governance, CR4090 SIT Functional Testing will focus on the following elements:

- 4G Wan coverage data will be retrievable through the 12.1 SR.
- BAU coverage data will be retrievable.
- Provisioning of the new 4G CSP Region attributes via the 8.2SR in the Service Response when reading the information about a device from the Inventory.

Due to the June 24 and CH&N having different timelines on the route to live, DCC will test the DUIS 5.3 without the 4G WAN coverage data during the SIT A testing window.

Testing for CRs 4725 and 4837 cannot be tested in SIT.

- CR4725 is a DSP component change not part of the DCC ecosystem. It would not be possible to test an 'Invalid Firmware' version can be returned from a device in the SIT Environment as there is no option to inject an 'invalid firmware' version in response to SRV11.2 or 11.3.

- CR4837 due to the intrusive nature of this test as this would require database manipulation, this would not be effect, efficient or economical, the results from PIT will be utilised. Regression testing will be the source of the test results.

The SI shall produce a SIT Approach Document detailing the testing to be undertaken during this Test Phase. This document shall be reviewed and assured by the DCC and shall be shared with the Panel's TAG for information in support of the Test Completion Report.

### 6.2.1 Testing in SIT

**Table 8 SIT Requirements**

| Ref | Requirement |
|---|---|
| SIT.1 | SIT will be undertaken using scenario testing and will ensure that Service Requests are validated for the correctness and consistency of content, alongside the correctness of formatting. |
| SIT.2 | SIT coverage will be proved using a test traceability matrix. This will be used to review SIT progress. |
| SIT.3 | SIT will be designed to make use of automation where practicable to improve testing throughput rates. |
| SIT.4 | SIT will use agreed Devices available in CPL and/or EPCL to perform the Service Request testing. |
| SIT.5 | SIT will include verification of the correct operation of all modified interfaces in the Modified DCC System. |
| SIT.6 | SIT will include verification that the correct end-to-end data is contained in all relevant DCC enterprise system produced report feeds. |
| SIT.7 | Where SIT makes use of the DCC SIT and UIT Emulator, testing must include emulator configuration to provide valid data in a Service Response.<br>A blank / null response cannot result in a passed test.<br>The response **must** include valid data that can be successfully parsed and, where relevant, decrypted, to prove the response data received is as expected based on the emulator configuration for that test. |
| SIT.8 | SIT will ensure that the agreed selection of Devices and Emulators are installed and commissioned in the test environment prior to the deployment of the changes, then deploying the code and carrying out regression testing of the existing functionalities only for backwards compatibility. |

| | |
|---|---|
| SIT.9 | Regression testing will be undertaken following the final drop of code into the SIT phase. |
| SIT.10 | Two EOC runs for June 2024 changes will be executed following SIT functional testing completion on the final drop of code. If issues are found after End-of-Cycle (EOC) testing, and fixes applied prior to Test Phase Completion, then further targeted regression testing will take place. |

### 6.2.2 Service Provider Witness Testing in SIT

The SIT Phase includes Witness and/or Evidence Testing which allows DCC to witness and or/evidence an agreed subset of the tests carried out in SIT either real time or via post event evidence reviews.

The DCC Systems Integrator will provide DCC with a schedule of when and where tests will be executed and invite DCC to witness via video conferencing giving at least 1 Working Days' notice should there be a change to the agreed schedule.

Witnessing of the test execution, or reviewing evidence of executed tests, will adhere to three key rules.

1. There will be no deviation from test scripts
2. There will be no hands-on execution by the witness
3. Where a gap in testing is witnessed, this will be recorded as an observation for further testing

Witness Testing will be reported by DCC before SIT exit on test completion, test failures and test pass rate as part of SIT Testing.

## 6.3 Requirements & Focus Areas for User Integration Testing

The provision of User Integration Testing (UIT) environments (UIT-A & UIT-B) and associated services is part of DCCs ongoing activities. This section describes the specific requirements and focus areas for the June 2024 SEC Release.

DCC shall provide a Testing Window (User Testing Window) that allows Users to test the interoperability of its User Systems and Devices (or Emulators where needed) with the Modified DCC System (including via the Self-Service Interface). The UIT environment shall be made available in accordance with the Enduring Test Approach Document (ETAD)– Appendix J of the SEC.

Following Code promotion into the UIT environment, DCC will undertake UIT Proving / Pre-UTS to test the upload prior to opening the environment for User testing of the June 2024 SEC Release. DCC shall ensure that all critical tests are completed prior to declaring that the User Testing window is open.

There will be a 6-week period between the completion of priority Pre-UTS and promoting functionality to live operations, where Users will be asked to volunteer to demonstrate that they can successfully operate the new June 2024 SEC Release functionality prior to the release going into production. Users can also carry out User Regression Testing to demonstrate that the June 2024 code does not adversely affect their existing production service. Where time permits, findings that are shared with DCC by Users will be reviewed by DCC and presented for consideration as part of the Go Live governance.

Whilst Testing Participants may carry out regression testing immediately following the promotion of code into the User Test environments, they are asked to wait until the Testing window is declared open prior to testing any new functionality delivered as part of the June 2024 SEC release.

Should DCC need to reduce the 6-week time boxed User Testing window period, then DCC will present its proposal and rationale to TAG for their agreement. Where TAG agrees to DCC's proposal, then the reduced period shall be adopted. Where TAG and DCC disagree on the duration, then the matter shall be referred to the SEC Panel for determination. Where a reduction to the planned 6-week period is agreed, or a change is made to its planned start date, this shall be promptly communicated to Test Participants.

**Table 9 UIT Requirements**

| Ref | Requirement |
|---|---|
| UIT.1 | UIT will enable Parties to test the June 2024 SEC Release functionality for a time boxed 6-week User Testing window. |
| UIT.2 | UIT will be planned for Parties to be able to test against their systems and Devices ahead of the Release "Go Live" |
| UIT.3 | The deployment of releases into UIT will be subject to specific entry criteria and DCC governance to ensure minimal risk of disruption to ongoing participant testing in the environment |
| UIT.4 | UIT shall include the capability for Users to verify their end-to-end data is operating correctly over DUIS |
| UIT.5 | Volunteer Users with Devices deployed in Production are asked to confirm at least 20 Working Days prior to the start of the UIT Window;<br>• whether they intend to test during the UIT Window and if so,<br>• what they intend to test (e.g., Regression, new functionality, and impacted SRs) and how much they plan to complete within the UIT Window |

It is noted that DCC maintains its obligations to provide and support an integrated environment for the purposes of User Testing, which includes ongoing assurance of the provision of DCC Test Lab and Remote Test Labs used within UIT and demonstrating that the UIT environments are secure.

## 6.4 System Capacity Testing

System Capacity testing requirements have been assessed for the June 2024 SEC Release, and as the changes in this release do not materially impact the use of the DCC Total Systems it is deemed that System Capacity testing is not required.

## 6.5 Security Testing

Security testing requirements have been assessed for the June 2024 SEC Release, and as the changes in this release do not materially impact the use of the DCC Total Systems it is deemed that Security testing is not required.

# 7 Test Activities

For each Test Phase, the following activities will be performed:

- Prepare and maintain Solution Test Plans
- Implementation of the testing infrastructure
- Test Phase planning
- Identification of appropriate test scenarios
- Design of test scripts
- Produce a test specification document
- Produce a test traceability matrix, or equivalent
- Design and preparation of test Data, including loading of test Data into the test environment
- Preparation of a test execution schedule
- Execution of testing
- Performance quality gate reviews
- Test Issue management
- Test Issue resolution
- Release management
- Configuration management
- Test progress reporting
- Production of a Test Phase Completion Report
- Test assurance of third-party components
- Definition and execution of a Work off Plan
- Test metrics collected for each test run, execution time, triage cycle time and daily volume report for Test Assurance

## 7.1 Test Method

For the June 2024 SEC Release, DCC is continues to seek further improved testing throughput. By making more effective use of automation in SIT and extending the SMETS1 automation solution to encompass SMETS2 functionality DCC are aiming to increase throughput and regression coverage. DCC shall also seek to measure the effectiveness of the use of automation in SIT across releases by collecting metrics that quantify the coverage and efficiency of automation throughout the overall test pack, which will include both functional and regression tests. More detail will be provided in the SIT approach document, including reporting to demonstrate that expectations around the use of automation have been met.

For manual and automated testing, DCC shall use scenarios based on DCC SMETS2 Business scenarios, in addition to existing SMETS1 testing. The supporting test phase approach documents will specify the detailed testing methodologies employed in each test phase.

Test design for June 2024 SEC Release will have the following critical areas for testing:

- Devices are installed and commissioned in the test environment prior to the deployment of the changes, then deploying the code and carrying out regression testing of the existing functionalities only for backwards compatibility.
- Devices can be installed and commissioned and can operate as per the requirement using the changed code.
- Changes introduced as part of the June 2024 SEC Release are working as per the requirement.

Priority, within the design of testing for the June 2024 SEC Release, shall be on:

- The changes introduced by the scope of the Release
- The functionality and Service Requests that are of highest risk to Users in the production system
- Validating there is no adverse effect on the existing Devices in the DCC system. These will be derived from the heat map and the TTM

Testing will cover both functional and non-functional aspects of the dynamic interaction between solution elements and shall cover, to an agreed level, the DCC service request variables – User Role, Command Variant, and mode of operation. Where a changed interface is to be tested, all associated or impacted interfaces shall also be tested. Similarly, testing should account for all elements of the Modified DCC System, for example the internal DCC-Enterprise components that support billing and reporting.

In general, testing with combinations of real Devices will form the basis of a default test setup. Testing with Emulators, which are yet to be introduced into the CPL or EPCL, in SIT shall in general only be conducted where Devices are unavailable to be tested. Where testing makes use of the SIT emulator necessary, testing shall include emulator configuration to provide valid data in a service response. Where new emulator functionality is required, the device will be subject to testing and assurance.

**Note:** There is no new, device impacting, functionality being delivered in the June 2024 SEC Release. DCC will therefore utilise devices, and emulators where real devices are not

available. The emulators that will be utilised have been tested and assured for the November SEC Release, and the GBCS v4.1 Programme.

The tests planned to be executed using an emulator will be reviewed against the known Testing Issues identified against the Emulators. Where the recorded emulator issues could impact the planned tests, then DCC will look to employ alternative Devices available to complete the test. Should this prove impossible, then DCC will promptly discuss with TAG the impact of this on the overall planned testing.

In relation to the design of testing for SIT, consideration has been given to the coverage of DUIS and how testing between regression and new elements is balanced across the interfaces and Communications Hub types and CHTS versions.

## 7.2 Test Scenarios

Test scenarios may, within the context of the individual Test Phases, be represented by defined sequences of Service Requests and/or other relevant activities.

Each Test Phase will define test scenarios as a deliverable as appropriate, but as a minimum the definition of test scenarios will include:

- Description
- Responsibility for development
- Type (Normal, Exception, Alternative)
- Pre-requisites
- Test conditions
- Verification method
- Traceability to requirements (or use case for DSP PIT)
- Test variations – User Roles, Communications Hub, mode of operation, Command variant, Device, DUIS and GBCS versions

The definition of Test Scenarios for SIT shall include and consider:

- Key common scenarios that will be experienced by the Parties in production
- A relevant subset of scenarios (or Service Request sequences) to reflect Network Operator Party use cases

For SIT, DCC will review testing progress with Parties at the DCC monthly testing forum – the Testing Design and Execution Group (TDEG) and following the start of SIT shall provide an update to the monthly TAG meeting.

Test Scenarios may be updated to take account of activities from live operation, subject to suitable change controls.

Test scenarios must cover exercising all modified / impacted interfaces in DCC Systems in an end-to-end manner verifying functionality as well as that the data is reported correctly.

Where Emulators are needed to be used, test scripts should define the required emulator configuration to provide valid data in a Service Response.

## 7.3 Regression Testing

All new releases of any element of the solution from every DCC Service Provider will be subject to completion of a successful regression test prior to being accepted into subsequent Testing Phases and environments.

The following requirements for regression testing shall apply:

- SMETS2 Regression Test Coverage will include the following as a minimum:

**Table 10 – Regression Testing Devices**

| DUIS | P&C | CH/MMC | Devices |
|---|---|---|---|
| 5.2 | D5-G4-4.1 | GBCS 4.1CH* (CHTS1.4(CHM2)) | S2v4.2 / S2v3.1 |
| 5.2 | D5-G4-4.1 | GBCS 3.2CH* (CHTS1.3) | S2v4.2 / S2v3.1 |
| 5.2 | D5-G4-4.1 | GBCS 2.1CH SBCH/DBCH | S2v4.2 / S2v3.1 |
| 5.1 | D5-G4-3.0 | GBCS 3.2CH* (CHTS1.3) | S2v4.2 / S2v3.1 |
| 5.0 | D5-G4-3.0 | GBCS 3.2CH* (CHTS1.3) | S2v4.2 / S2v3.1 |
| 4.0 | D5-G4-3.0 | GBCS 3.2CH* (CHTS1.3) | S2v4.2 / S2v3.1 |

    - Regression will cover Critical Business Scenarios and Impacted SRs

**Note**: the GBCS indicated by * will be tested if available. If this is not available, then GBCS 2.1 (CHTS1.1) will be used as an alternative. This is indicated in Table 10 above.

- The PPMID, v5.8.0, which was used by the November 2023 SEC Release. This is equivalent to S2v2 GBCS 1.0.
- SMETS1 Regression Test Coverage will include the following:
    - Each DMC will be tested.
- Regression will include IOC, MDS and MOC Secure, and FOC
    - There will be no migration activities planned for IOC and MDS.
- Wherever practicable, regression testing will be automated.
- Regression testing in the SIT-B environment will start following the final planned deployment from PIT for SMETS2 and SMETS1
- The full regression test approach for each phase will be outlined in the Regression Heat Map and described in each detailed Test Plan Document
- The scope of regression, where appropriate, is permitted to be risk-based with regard to combinations of User Role, command variant etc. The exact scope of regression shall be defined in the detailed Test Plan Document for each phase
- If risk-based regression testing is used within a Test Phase, as a minimum it should include key Service Requests. The key Service Requests will be derived from the heat map and TTM. This will then be discussed and agreed between DCC and SI
- The Regression Test Pack (test scripts, test data and documentation) will be available to the DCC during the test phase within ALM, with any agreed omissions being rectified promptly

- Regression testing for SIT shall be completed using real Devices that are used in production and available in the CPL

# 8 Deliverables

DCC will follow the testing documentation practices established for earlier releases. These are described at a high level in this section, and specific enhancements and requirements for the June 2024 SEC Release are highlighted.

## 8.1 By Test Phase

Various deliverables will be produced for each Test Phase. The Test Phase Approach Documents will detail the deliverables required for the individual Test Phase.

The relevant Service Provider for each individual Test Phases will create the deliverable, which will be subject to the established governance processes. Below is a list of responsible Service Providers for various test phases.

- PIT – DSP
- SIT – DCC Systems Integrator

Table 11 describes the generic content and anticipated timing of the deliverables that may be required to be produced for each Test Phase

**Note:** Pre-UTS is an activity performed by the UIT team, to facilitate the opening of User Testing window.

**Table 11 – Deliverables**

| Deliverable | Description | Test Phase | Timing |
|---|---|---|---|
| Detailed Test Plan | Describes the relevant test phase: the activities, participants, resources, roles and responsibilities, assurance requirements, reporting, success criteria, and other information relating to the execution of the Test Phase.<br><br>Where relevant, the Test Phase Approach Documents shall also define the entry and exit criteria, and the basis of any risk for regression | PIT<br>SIT<br>Pre-UTS | Following any review cycles, a definitive version shall be submitted to DCC by the relevant DCC Service Providers including CSPs, S1SPs, DCO no later than (10) Working Days before the commencement of test execution. |
| Test Specifications | Test Traceability Matrix, Test Scenarios and Heatmap | PIT<br>SIT | To be provided to DCC-by-DCC Service Providers including CSPs, S1SPs, DCO no later than (10) days before the commencement of test execution |
| Test Results | Details may vary by Test Phase – report content and frequency will be defined by the Detailed Test Plan | PIT<br>SIT<br>Pre-UTS | Made available by DCC Service Providers including CSPs, S1SPs, DCO for review by DCC throughout test execution |
| Test Issue Log | Outstanding Testing Issues | PIT<br>SIT<br>Pre-UTS | Made available by DCC Service Providers including CSPs, S1SPs, DCO for review by DCC throughout test execution |
| Regression Test Pack | A Regression Test pack is a set of test cases run to ensure the core product remains unaffected by new feature additions. | PIT<br>SIT | Access granted to DCC-by-DCC Service provider including CSPs, S1SPs, DCO to review beforehand and monitor throughout |

| Deliverable | Description | Test Phase | Timing |
|---|---|---|---|
| Test Phase Completion Report | Will follow the format and content established for earlier DCC releases and will include.<br>• Overview of testing undertaken and confirmation of test coverage and traceability<br>• Actual number of tests run, passed, failed, and not run<br>• Explanation of any tests not run<br>• Testing Issue IDs and details of the associated failed tests<br>• All the Open Testing Issues outstanding, split by severity<br>• Number and severity of all Testing Issues raised<br>• Explanation of any Testing Issues which have been closed without a fix and successful retest<br>• Specification of test environments, Devices and firmware used<br>• Recommendations for any tests to be added to the next Test Phase<br>• Lessons learnt during the Test Phase | PIT<br>SIT<br>Pre-UTS | DCC will work closely with the DCC Service Providers including CSPs, S1SPs, DCO during test execution window to ensure the completion report is issued on the final day of testing. |
| Test Scenarios | Shall comprise of planned and sequenced series of Service Requests. | PIT<br>SIT | To be available from DCC Service Providers including CSPs, S1SPs, DCO at the same time as the finalised Solutions Test Plan |
| Work off Plan | A plan to resolve (fix, retest and close) all assigned outstanding issues. Once the fix is made available, retesting of the issue should be completed within 5 Working Days. | PIT<br>SIT<br>PreUTS | To be provided to DCC-by-DCC Service Providers including CSPs, S1SPs, DCO with the final Test Stage Completion Report. |

## 8.2 Requirements Traceability

The DCC will provide a Requirement Traceability Matrix (RTM) detailing the requirements for each change. This will be provided to the SI. The test teams will use this RTM to generate the required Test Traceability Matrix (TTM).

The DSP will use their own tools to manage their requirements and demonstrate traceability to both the solution design and the Pre-Integration Tests. The DSP will provide DCC with a PIT TTM, extracted from these separate tools.

For the changes that are being implemented by other Service Providers including CSPs, S1SPs, DCO (where applicable) will provide DCC with a PIT TTM individually, mapping requirements to test cases planned for execution.

The scope of testing in both PIT and SIT will be validated by use of a TTM, setting out how each requirement within the scope of the release is met. Should any testing initially planned for PIT be untestable during that Test Phase the test(s) will be added to the scope of testing to be conducted during SIT. Any such movement will be reported to TAG.

The TTM will be generated by the SI, based on the updates to the specifications listed in section 2.1, and will consider the resulting impact of those changes and resulting co-existence of enrolled Devices operating to different variations of versions of those specifications as well as current version of those specifications. Production of the TTM is a requirement for SIT to commence.

At the completion of SIT, any additional tests which have been created during SIT will be added to the TTM.

The TTM will be used by DCC to demonstrate the completion of SIT, alongside the heat map.

# 9 Test Procedure

This section describes the requirements for the testing process to prove the solution for June 2024 SEC Release.

The Solution Test Plans will define specific Entry and Exit Criteria for the individual Test Phases, with generic requirements for these described below.

The Solution Test Plans will also define specific entry and exit criteria for individual Test Phases, the governance process relating to the approval of the criteria, and the evaluation of success against them.

## 9.1 Generic Entry and Exit Criteria

Progression through Testing Phases for the June 2024 SEC Release will be gated using generic and specific Entry and Exit Criteria.

The Solution Test Plans will provide detail of the evidence to be gathered in the form of an evidence pack.

### 9.1.1 Generic Entry Criteria

The following generic Entry Criteria will gate the entry to all Test Phases:

| Entry Criterion | Description |
|---|---|
| GeEn 1 | Solution Test Plans signed off |
| GeEn 2 | Test Phase Completion Certificate for any preceding Test Phase issued, unless advanced agreement from TAG that the Test Phases may overlap |
| GeEn 3 | Solution Test Plans signed off |
| GeEn 4 | Test Phase Completion Certificate for any preceding Test Phase issued, unless advanced agreement from TAG that the Test Phases may overlap, |
| GeEn 5 | Test Specification and heat map prepared, including traceability to Requirements / Design documents |
| GeEn 6 | Test labs, Devices, tools, stubs, environments, and data are assured and accepted as fit for purpose, including external assurance, where applicable |
| GeEn 7 | Regression test pack has been prepared or updated |
| GeEn8 | DCC and all relevant Service Providers have confirmed they have resources with the requisite skills and access available to support the Test Phase |
| GeEn 9 | Approval to proceed certificate issued by DCC, where contractually required, unless the plan states that Test Phases may overlap, i.e., from PIT to SIT, where Work-Off plans are in progress |

A device selection process will be used to select a subset of Devices, from the CPL, to be used for testing. These Devices will be used to successfully complete SIT

In the case of User Testing in UIT there will be no Test Plan, or Test Specification.

### 9.1.2 Exit Criteria

The following Exit Criteria will gate the exit of PIT and SIT. All test success criteria are to be achieved, with any exceptions documented and agreed by:

- TAB for PIT
- TAB and TAG for SIT

| Exit Criterion | Description |
|---|---|
| Ex 1 | Scope<br>• Any variations to the scope of testing set out in this TAD documented and agreed |
| Ex 2 | Functional Testing<br>• All planned functional tests run, with any exceptions documented and agreed<br>• A minimum of 90% of functional tests passed |
| Ex 3 | Regression Testing (SIT only)<br>• Regression testing successfully completed with no new Testing Issues identified |
| Ex 4 | End of Cycle Testing<br>• Repeatability between the two cycles run demonstrated, with a target of no variance shown between cycles. Any exceptions determined between the two cycles documented and agreed with TAB and/or TAG as applicable<br>• No new Testing Issues detected |
| Ex 5 | Testing Issues<br>• Any Testing Issues closed without a successful retest agreed<br>• Any discounting of Testing Issues agreed.<br>• The number and severity of any outstanding Testing Issues is at or below the specified thresholds |
| Ex 6 | Work Off Plans<br>• The Work off Plans for any extant and assigned Testing Issues raised during the Test Phase endorsed |

| Exit Criterion | Description |
|---|---|
| | • (SIT Only) Any Work off Plans from the preceding PIT Test Phase have been discharged. |
| Ex 7 | Test Records<br>• All test results documented, and evidence captured |
| Ex 8 | Testing Issue Logs<br>• A full set of Testing Issue logs have been produced |
| Ex 9 | Test Completion Reports<br>• A Test Exit Report has been produced by the SP and approved by DCC<br>• A Test Completion Report has been produced by DCC and approved by:<br>  ○ TAB for PIT<br>  ○ TAB and TAG for SIT |
| Ex 10 | Test Completion Criteria Met<br>• Criteria 1 -9 achieved |
| Ex 11 | Test Completion Certificates Issued<br>• Where required, issuing of Test Completion Certificates agreed by TAB |

Where practical, if a test fails with an emulator* / device, it will be retested against another device, if available.

If a Testing Issue arises while using an emulator and the test cannot be run in any other way, The Testing Issues will be discussed with TAG as part of early engagement for transparency and completeness.

## 9.2 Specific Entry Criteria for Test Phases

Any additional specific Entry criteria for individual Test Phases shall be detailed in the relevant Solution Test Plans.

The following entry specific criteria shall also be applied.

### 9.2.1 Entry into SIT

The following shall be achieved prior to SIT commencement:

SEn1. DCC to ensure all required devices and Emulators are available 2 weeks before commencement

SEn2. The remaining generic entry criteria has been met at least 1 week before SIT commencement

SEn3. Given that both DSP and CSS can start their SIT using Emulators and the CSS Simulator, the CSS simulator must be made available to DSP 1 week before SIT commencement

Note: TAB may recommend that the SIT Phase can start even if the thresholds set in the PIT Exit Criteria have been exceeded, provided that an agreed Work off Plan is in place. This decision will be reported to the Panel's TAG but is not subject to their agreement

### Entry into UIT

The Entry Criteria for UIT shall include:

UITEn1. Successful completion of testing, assurance and DCC governance of the SIT phase for the functionality to be promoted into UIT.

UITEn2. Priority PreUTS is to be completed prior to the start of User Testing to the satisfaction of the DCC.

## 9.3 Acceptance Process Following SIT Completion

Following the agreement of SIT completion

For SEC Modifications, DCC will:

- Notify the Panel and Parties that SIT has ended
- DCC will provide the Panel with copies of the SIT Test Completion Report(s) along with a list of those sections of such reports that it considers should be redacted
- On direction from the Panel, DCC will provide the Parties and Service Providers with copies of the Test Completion Report(s) having first redacted any sections specified by the Panel

## 9.4 Testing Issues Threshold

Table 12 lists the standard thresholds for outstanding testing issues for the completion of each test phase, as defined in the Service Provider Contracts.

Thresholds shall be by Service Provider for PIT, whereas a single threshold will apply to all Service Providers for SIT.

**Table 12 – Testing Issues Thresholds**

| Test Issue Severity | PIT | SIT |
|---|---|---|
| 1 | 0 | 0 |
| 2 | 0 | 0 |
| 3 | 15 | 15 |
| 4 | 30 | 30 |
| 5 | 60 | 60 |

## 9.5 Calculation of Testing Issue Counts

The Testing Issue thresholds are applied as part of the Exit Criteria for relevant Test Phases and apply cumulatively if there are iterative deliveries within a Test Phase.

In the case of PIT the threshold stated is per Service Provider undertaking PIT. To be clear the threshold is not to be measured against the cumulative total across all Service Providers undertaking PIT.

Any Testing Issue found during the PIT Test Phase, which remains open at SIT exit shall be included in the SIT Exit Testing Issue Threshold and will be reported to TAG.

**Closures without a Retest**

All Testing Issues raised during the Test Phase shall be reviewed to confirm that any that were closed without a retest to confirm that the action was appropriate. Any such Testing Issues shall be listed in the Test Completion Report, grouped by closure reason. The reasons may include:

(a) An Invalid Test

(b) A Duplicate Test

(c) A Confirmed Behaviour

(d) Cannot be Reproduced

All such closures will be presented in line with the working practice agreed with TAG and shall be subject to:

- PIT - TAB endorsement
- SIT - TAB and TAG endorsement

Should DCC identify an additional rationale for closure, then its use will be subject to TAG approval.

**Discounting of Testing Issues**

DCC may request the discounting of a Testing Issue that can be demonstrated to be:

(a) A Duplicate

(b) Device Manufacturer accepted

(c) A Known Testing Issue

(d) A Pre-Existing Testing Issue

All such discount requests will be presented in line with the working practice agreed with TAG and shall be subject to:

- PIT – TAB endorsement
- SIT – TAB and TAG endorsement

Should DCC identify an additional rationale for closure, then its use will be subject to TAG approval.

**Suspected Device Manufacturer Testing Issues**

In the case where DCC suspect that a Testing Issue arises from a Device Manufacture defect, DCC shall ensure that it is promptly raised with the relevant Device Manufacturer. In the meantime testing will, where possible, be conducted using an alternative Device to demonstrate the functionality of the DCC System and further corroborate that the failure is expected to arise from a Device defect. Should the inclusion of such Testing Issues result in the Testing Issue threshold being breached, then DCC shall seek agreement that these Testing Issues be treated as exceptions from:

- PIT – TAB endorsement
- SIT – TAB and TAG endorsement

- TAB may judge that the SIT Phase can start even if the thresholds set in the PIT Exit Criteria have been exceeded, provided that an agreed Work off Plan is in place. This decision will be reported to the Panel's TAG but is not subject to their agreement.

### Agreeing Testing Issue Severities

As part of confirming the Test Phase completion, DCC shall present all extant Testing Issues identified during testing to TAB for PIT and TAB and TAG for SIT to confirm that the correct Severity has been assigned.

Where the DCC and the Panel's TAG cannot agree on the Severity of a Testing Issue identified in SIT, and this matter impacts achievement of the Test Phase Testing Issue Threshold, the DCC may refer the matter to the Panel for its determination, which shall be final for SEC Modification defects.

## 9.6 Work off Plans

Work off Plans, shall be produced detailing the Testing Issues that are outstanding and a plan for resolving them.

The Service Provider shall resolve all items within the Work off Plan within the following timescales.

- For Severity 3 defects, within 20 Working Days from the TAB meeting
- For Severity 4 defects, within 40 Working Days from the TAB meeting
- For Severity 5 defects, within 60 Working Days from the TAB meeting

The resolution of a Testing Issue will require the Service Provider to fix, retest and close the Testing Issue. Exceptions to these timescales may be proposed by the Service Provider as part of their proposed Work Off Plan but this shall be subject to TAB approval.

If the Service Provider becomes aware that the timescales for the Work off Plan are not going to be met, the Service Provider shall promptly produce a correction plan for approval by TAB.

If a Test Phase Completion Certificate has been issued subject to completion of a Work off Plan, and the Work off Plan has not been completed within the applicable time, then DCC may revoke the Test Phase Completion Certificate unless the failure relates solely to Severity 5 test issues.

# 10 Test Result Management & Reporting

Test Result Management and Reporting is to be provided to DCC by the DSP, CSPs, S1SPs, DCO (where applicable) for PIT and the SI with input from SPs for the SIT and UIT Test phases, on a frequency to be detailed in the Solution Test Plans.

## 10.1 Tracking & Reporting

HP's Application Lifecycle Management (ALM) Test Management tool will be used to manage testing and Testing Issues in SIT. In the case of PIT, a Service Provider may employ a different tool to manage Testing and Testing Issues.

All requirements, scripts, tests, execution results and defects are to be maintained in ALM. Connectivity between requirements, tests and defects is to be maintained for traceability and reporting purposes.

Overall responsibility of maintaining traceability of test and defects lies with the SI for all Test Phases.

The SI shall provide enhanced visibility and reporting of the progress, completion, and coverage of testing for SIT across a few parameters. This should include test automation metrics previously referenced in Section 6.

## 10.2 SIT Completion Reports

DCC will produce its own Test Completion Reports when it considers that the Exit Criteria specifies in this document have been met. The report will include:

- An overview of the Testing undertaken
- Details of any Variances from this Testing Approach Document
- Details of any De-scoped Scenarios, Requirements or Test Cases
- A summary of the results of testing
- The total count of extant Testing Issues and their severities
- Information on any Testing issues closed without a retest
- Information on any Testing Issues that DCC is proposing be discounted
- Information to support the Severity assigned to any extant Testing Issues that are not subject to discounting
- An assessment of the proposed Work Off Plan
- Any observations
- Confirmation of how the specified Exit Criteria have been met.

This report, together with any relevant independent assurance reports, will be provided to the TAB, Panel's TAG, and the Panel.

# 11 Acceptance and Test Assurance

DCC has established processes for the acceptance of testing activity completion – these will continue for the June 2024 SEC Release. The DCC's Test Assurance Board (TAB) will conduct quality gate meetings for test phase exit and review Test Completion Reports before, where required, issuing Test Completion and Approval to Proceed Certificates.

## 11.1 Service Provider Self Assurance

Service Providers will continue to assure their own PIT activities against this Testing Approach Document and their specific PIT Phase and Test Plan. Service Providers will also continue to make their relevant testing deliverables available to the other Service Providers and exchange constructive comments to ensure solution and testing compatibility.

## 11.2 Test Assurance by DCC

DCC will continue to assure Service Provider testing using the processes and activities established for earlier releases, and will include the following methods, at times determined by the individual Solution Test Plans:

- Test Assurance Board quality gates
- Test Witnessing
- Test Observation
- Product Inspections
- Document Review

### 11.2.1 Quality Gating

DCC will continue to operate the Quality Gating process developed for prior Releases and enhanced through experience. The Quality Gate process provides:

- Controlled entry of functionality into subsequent Test Phases
- Confirmation that the scope of tests shall provide adequate assurance of the changes introduced to the DCC System
- Formal and objective evidence that test criteria have been met for a Stage / Phase
- Transparency of test activities and outcomes to facilitate DCC Test Assurance
- Formal evidence for signoff of Service Provider test milestones and/or associated payments
- A mechanism for managing remedial work associated with closure of test stages / Phase

The Quality Gates for PIT and SIT exit are operated as TAB gates.

### 11.2.2 Test Witnessing

DCC will agree, in advance, with the SPs, including the CSPs, S1SPs, DCO (where applicable) and DSPs, which tests it wants to witness during Factory Acceptance Testing (FAT). Details of these tests (which will be a subset of System Tests for FAT will be described in the FAT plans.

The SPs will provide DCC with a schedule of when the tests will be executed and invite DCC to witness on-site or via MS Teams. The witness will have the skills required to fulfil the role. The SP will provide the witness with relevant documentation and access. DCC Test Assurance must be given full access to attend and witness such testing.

Execution of the agreed set of tests will be performed by the relevant SP test analyst, and there will be:

- No deviation from the scripts (e.g., in response to “what if” questions raised by witnesses)
- No hands-on execution by witnesses
- Where a gap in testing is witnessed, this will be recorded as an observation for further testing

Testing Issues raised during witnessing will be entered into the relevant Test Issue Management tool and progressed through the Test Issue Management process.

As far as possible, any queries and issues arising during the witnessing period will be addressed at the time with the relevant Subject Matter Experts (SMEs). A wash-up session will be convened at the end of the witnessing period to discuss the outcome of witnessing and to agree any outstanding queries and issues.

### 11.2.3 Test Observation

With prior agreement with the SPs, including the CSPs, S1SPs, DCO (where applicable) and the DSPs, on the timing, duration, and scope, DCC staff may observe test execution and test issue management activities during System Testing and Solution Testing in order to familiarise themselves with SP processes and the systems under test. The DCC observers will have the skills required to fulfil the role.

# 12 Test Resources

This document will not provide detail of the DCC internal teams or the Service Providers who will be undertaking the actual testing but does provide details of the DCC Test Assurance Team and Testing Services Team who are responsible for assuring compliance with this Testing Approach Document.

This section also describes the Testing Stubs which will be used, and the other Testing Tools.

## 12.1 DCC

Notwithstanding, any organisational change at DCC affecting the structure of the team, dedicated DCC resources will support the assurance of testing described in this document.

The functions and services delivered by the DCC shall include:

a) Test Assurance – responsible for reporting progress to industry, assuring the progress of testing, including witnessing, and observing testing within PIT, SIT, reviewing test plans, scripts, and scenarios; co-ordinating with Product and Design teams to provide Device assurance, assuring reporting by Service Providers, providing evidence and documents into the TAB meetings, conducting TAB meetings;), maintaining this Testing Approach Document, submitting evidence and reporting to Panel as required

b) Testing Issue Management – responsible for operating the issue management process; including chairing the Issue Resolution Board and reporting on issues for all Test Phases except PIT. Responsible for producing reports on Testing Issues, including providing regular reporting to DCC problem management on issues potentially affecting the DCC production solution

c) Testing Services – responsible for being the point of escalation for Testing Participants, approving entry into UIT and associated entry criteria, responsible for supporting user testing and managing relationships with Testing Participants; reporting on user testing

## 12.2 Test Stubs

This Testing Approach Document allows for the use of Testing Stubs, where appropriate, across each of the Test Phases to support entry into and completion of those phases. Individual Service Providers, DCC and Testing Participants may utilise Testing Stubs to simulate or emulate elements of the solution which are either not available or practical for use in the relevant test phase.

The utilisation of test stubs, in particular Device Emulators, will only be utilised if a real Device does not exist.

For example, within SIT, a User Simulator will be used to act in the role of a DCC User.

DCC uses a variety of device Emulators capable of emulating:

- ESME (incl. APC and ALCS)
- SAPC
- GSME
- IHD
- PPMID
- HCALCS
- HHT (used to deliver service requests locally over the HAN)

Each emulated Device can operate in single or dual band mode.

The Emulators have specific functionality which will be used to generate test scenarios for DUIS 5.3, GBCS v4.2 and SMETS2 v5

The Emulators have been utilised since June 2023 SEC Release, and where subject to separate assurance during that release. As the emulator version has not changed a separate TAB approval is not required.

Note: Emulator Assurance for June 2024 SEC Release is not required as it will use the same emulator that was used November 2023 Release, GBCS 4.1 and ECoS Programmes

There are no firmware changes required for June 2024 SEC Release therefore CSP / S1SP scope of PIT will not test end-device functionality. End-device functionality will begin testing in SIT.

## 12.3 Test Laboratories

The DCC will provide a test lab facility and supporting services to enable Parties to test with their own Devices and DCC Communications Hubs and SM WAN infrastructure in the User Integration Testing environment.

# 13 Roles and Responsibilities

All parties involved in the June 204 SEC Release testing shall:

- Follow Good Industry Practice, as define in the SEC
- Take all reasonable steps to facilitate achievement of the testing objectives

- Ensure that all Testing Issues are evaluated for the potential impact on the DCC production solution and its Users, at the point of raising the issue or during triage, and recorded as such on the test management tool

## 13.1 DCC Systems Integrator

DCC shall ensure that the SI will manage SIT and be responsible for the following activities:

a) Producing and maintaining the SIT Test Plan
b) Ensuring that SIT activities are carried out in accordance with the SIT Approach, the SIT Test Plan
c) Overall planning and control of SIT, including chairing entry Quality Gates between FAT and Solution Test, and between Solution Test and User Interface Testing
d) Maintaining Risk, Assumption, Issue, and Dependency Logs for SIT
e) Leading the design and creation of test scenarios, test scripts, test data and test environments for SIT
f) Preparing test execution and environment usage schedules for SIT
g) Supporting the other SPs in their assigned test preparation and execution activities within SIT
h) Managing Testing Issue resolution, and supporting SPs in the resolution process for selective Test Phases
i) Producing the Test Stage Plans, Test Specifications, Test Traceability Matrices, Progress Reports, and Test Completion Reports for SIT
j) Operating the master Configuration Management Plan
k) Operating the master Release Schedule
l) Operating the Environment Plan
m) Support the Interoperability Test Events

## 13.2 DCC Service Providers

DCC shall ensure that the Service Providers shall:

Support the Systems Integrator in:

- Planning and control of test phases
- Design and creation of test scenarios, test scripts, test data and test environments
- Preparing test execution and environment usage schedules
- Diagnosing Testing Issues
- Producing Test Plans, Test Specifications, TTM, Progress Reports, and Test Completion Reports
- Contributing to the master Configuration Plan
- Contributing to the master Release Schedule
- Contributing to the Environment Plan
- Establish, maintain, and control their own test environments, in terms of software / hardware configuration and access control

For tests within their agreed test boundary, under the direction of the Systems Integrator

- Execute and monitor test scripts
- Capture evidence
- Report progress
- Resolve Testing Issues for their solution elements and undertake PIT testing (including regression testing) of any fixes required.

## 13.3 DCC

DCC shall:

a) Comply with its obligations under this Testing Approach Document (this document)

b) Ensure that activities attributed to Service Providers that are described in this document are undertaken

c) Use its reasonable endeavours to ensure that SIT is completed as soon as is reasonably practicable to do so

d) Enter into agreements with Device manufacturers to provide and support Devices for use in SIT, following appropriate qualification or selection activity

e) Support the DCC Systems Integrator in the planning, control, and operation of testing

f) Assure planning, preparation and execution activities undertaken by the DCC Systems Integrator and Service Providers as detailed in this document and through the Test Traceability Matrix

g) Operate and Chair the DCC TAB process to review and approve the DCC Test Completion Reports and Service Provider Work Off Plans. TAB shall issue t Approval to

Proceed certificates (where applicable) and Test Completion Certificates, and shall grant approvals of Test Phase Completion Reports

h) Participate in Quality Gate Reviews

i) Agree with the DCC Systems Integrator and Service Providers Tests to be witnessed

j) Witness the execution of SP SIT

k) Specify, procure, provide, and maintain the DCC Meter Protocol Emulator Devices and Service

l) Appoint and manage the independent audit and assurance activities described in this document (where applicable)

Note – No independent audit and assurance activities are proposed for this Release.

# 14 Environments

The June 2024 SEC Release will use the standard release approach through the B - stream DCC environments.

These environments are available as required by the plan for the June 2024 SEC Release. Specific deliverables relating to the management and use of environments, particularly co-existing with other programmes, will be published by DCC. This will clarify the approaches to usage of the environments by the June 2024 SEC Release and other projects. DCC will also present regular portfolio level updates to TAG on use of environments.

## 14.1 Code Management

DCC will operate a process to merge code changes into the test environments used by the June 2024 SEC Release. The SIT Approach Document will provide detail of the frequency of the operation of this process.

# 15 Appendices

## 15.1 Appendix A - Functional Heat Map

The Functional Heat Map is currently work in progress and will be included in the Test Phase (PIT, SIT) Completion Reports.

## 15.2 Appendix B – Device Selection Process

DCC Test approach/planning workshops are to be held to determine the Devices to be used in SIT. The attendees will include the SIT test team, the DCC product team, the DCC Devices team and DCC Test Assurance. The device selection will take a risk-based approach to selecting appropriate meter sets.

Device selection considerations will include the following:

- Current production use (“Day 1”)
- Soon-to-be production use (“Day 2”)
- The testing of all Comms Hub types
- The Meter Manufacturer used for each meter was based on availability and stability of required meters and as per the contract with DCC.
- Real ESME and GSME Devices to be used for regression device sets using combinations which were already available in production / testing.
- Emulators will only be used for testing the new functionality where real Devices are not available, e.g., GBCS4.2 [Device SLS version S2V5]
- Real PPMID Devices will be used as per the device availability.