MHHS PROGRAMME
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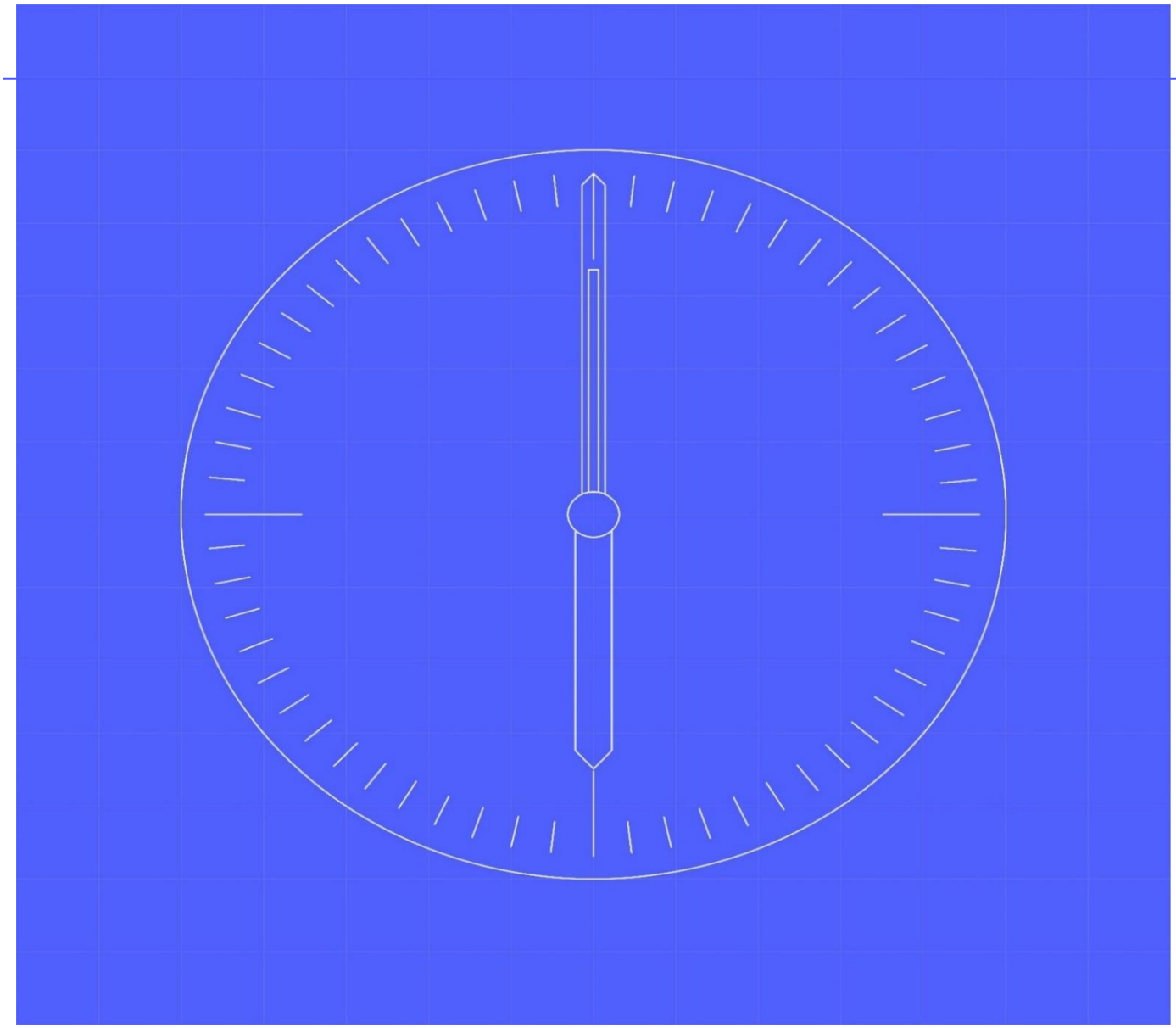
QA&P Annex 3 - Non-SIT LDSO New Entrant (Post M10) MHHS QT Approach & Plan



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Figures

Tables

Change Record

Date	Author(s)	Version	Change Detail
28/11/2024	Non-SIT QT Team	0.1	Initial draft
21/01/2025	Non-SIT QT Team	0.2	Updated post Code Bodies review
27/03/2025	Non-SIT QT Team	1.0	Baseline version

Reviewers

Reviewer	Role
Non-SIT S&A QT Team	Various
MHHSP LDSO QT Team	Various
LDP	Various
SRO	Various
Code Bodies (BSC and REC)	Various
DIP Manager	Various

References

Ref No.	Document/Link	Publisher	Published	Additional Information
REF-01	MHHS-DEL1118 The Qualification Approach and Plan (QA&P)	BSC and REC Code Bodies	13th January 2025	
REF-02	Qualification Assessment Document	BSC and REC Code Bodies	20th December 2024	
REF-03	REC Assessment Criteria for MHHS Qualification *Please note this document is under review and will be updated to reflect the DIP Manager Assessment Criteria.*	REC Code Manager	27th June 2024	Please note, this document is under review and will be updated to reflect the DIP Manager Assessment Criteria
REF-04	BSC Assessment Criteria for MHHS Qualification *Please note this document is under review and will be updated to reflect the DIP Manager Assessment Criteria.*	BSC Code Manager	26th September 2024	Please note, this document is under review and will be updated to reflect the DIP Manager Assessment Criteria
REF-05	DIP Assessment Criteria	DIP Manager	Early 2025	To be Published
REF-06	MHHS-DEL961- Migration Design Document v1.1	MHHSP	3rd April 2023	
REF-07	MHHS-DEL974 Migration Design requirements	MHHSP	3 April 2023	
REF-08	MHHS Operational Choreography	MHHS Design Team	21st Sep 2023	
REF-09	MHHS- E2E002 Requirements	MHHSP	4th June 2024	
REF-10	MHHS Placing Reliance Policy	MHHS Design Team	27th April 2023	
REF-11	MHHS-DEL618 MHHS Programme Environment Approach & Plan	SI Environment Lead	27th March 2024	
REF-12	MHHS-DEL466 Defect Management Plan	MHHSP	29th February 2024	

REF-13	MHHS-DEL1332 - Test Management Tool User Guide.	MHHSP	16th June 2023	
REF-14	MHHS-DEL852 - Pre-Integration Test Guidance.	MHHSP	5 April 2024	
REF-15	MHHS DEL1671 DIP Onboarding Guide	MHHSP	24th November 2023	
REF-16	MHHS-DEL1477 DIP Certification Process Map	MHHSP	13 July 2023	
REF-17	MHHS-DEL1197 Interface Code of Connection Guide.	MHHSP	30th November 2023	
REF-18	MHHS-DEL1911-Webhook URL Configuration Guide	MHHSP	24 November 2023	
REF-19	MHHS Programme Release and Configuration Approach and Plan	MHHSP	17 May 2023	

Terminology

Term	Description
Various	For terminology, see MHHSP Glossary on the MHHS portal: Programme Glossary (SharePoint.com) Please also see Appendix 15 in QA&P: List of Acronyms

1 Executive Summary

This document is an annex of the Qualification Approach and Plan (QA&P) [REF-01] which sets out the scope, approach and plan for Programme Participants to qualify as part of the MHHS Programme.

The Non-SIT LDSO New Entrant (Post M10) MHHS Qualification Testing Approach and Plan is applicable to all new entrant Licensed Distribution System Operators (LDSOs) seeking to qualify through the non-SIT route who are seeking to operate in the market post M10 but prior to M14. It describes the scope and MHHS Qualification testing requirements, along with the test framework for MHHS Qualification and the assurance processes to assess whether Non-SIT LDSO Qualification Testing (Non-SIT LDSO QT) Qualification Wave Participants have met the MHHS Qualification testing requirements.

The Code Bodies (REC and BSC) have overall accountability for MHHS Qualification, which includes reviewing Qualification Assessment Document submissions and confirming a Programme Participant has met the requirements to become qualified under the BSC and the REC. The DIP Manager is responsible for assuring that a Programme Participant can meet its requirements, set out in the DIP Rules, and approving an application to become a DIP User. As each Programme Participant must be approved as a DIP User before they are MHHS Qualified, there are aspects of Qualification activity that will be delivered by the DIP Manager, such as Non-Functional test assurance.

Non-SIT LDSO QT during the Qualification Waves will be managed by the Non-SIT Qualification Testing (QT) Team[1], which is part of the Elexon Helix Programme, with the Code Bodies and DIP Manager undertaking an assurance role to confirm the scope of testing and the output satisfies the wider MHHS Qualification needs, whilst Non-SIT LDSO QT (QT) for Non-SIT LDSOs qualifying before M10 will be managed via MHHSP. The successful completion of Qualification Testing (QT) and associated test evidence will provide an input into the participant's final Qualification Assessment Document (QAD) submission.

The current working assumption is that Non-SIT LDSO QT execution post M10 will align to the Qualification Waves, with QT for the first wave starting in August 2025 and all waves completing before M14. Participants who have not completed QT prior to M14 would likely need to be transferred into the Enduring Qualification process, however, this process is still being defined and will be documented separately. All LDSOs wishing to enter the market prior to M15 will have to complete the BAU BSC and REC Qualification prior to completing MHHS Qualification.

[1] This team is referred to as the Elexon Qualification Test Manager in the Qualification Approach & Plan [REF-01].

2 Introduction

This section covers the purpose and content of this annex as well as how it works in conjunction with other documentation.

2.1 Document Purpose

The Non-SIT LDSO New Entrant (Post M10) MHHS QT Approach and Plan (this document) sets out the testing framework, objectives, and approach to Non-SIT LDSO QT during the Qualification Waves – only for the Non-SIT LDSO QT participants, who are choosing to qualify through the Non-SIT route to operate in the MHHS market post M10 but prior to M14. Any new entrant LDSOs who are intending to operate in the market at M10 should follow the approach set out in Annex 1.

The purpose of the document is to:

- Define the QT scope, test management and assurance activities necessary to demonstrate that Non-SIT LDSOs in the Qualification Waves can operate under the new MHHS arrangements.
- Identify activities and responsibilities of Non-SIT LDSO QT participants to be able to successfully complete QT.
- Deliver an approach to Non-SIT LDSO QT that meets Code Body and DIP Manager requirements, and is practicable, appropriate, and achievable.
- Provide a robust schedule to implement Non-SIT LDSO QT in accordance with the MHHSP implementation timetable that will enable LDSO parties to be MHHS Qualified ahead of the M14 milestone.
- Describe governance and change processes, resources, environment, data and tools to underpin Non-SIT LDSO QT and effective delivery of the expected capabilities.

The document provides the technical components, i.e. preparation, development and execution of the tests, environments, data, harnesses and assurance methods.

As this document only covers activities needed for Non-SIT LDSO QT participants to successfully complete Qualification Testing, it must be read in conjunction with Qualification Approach & Plan [REF-01], Qualification Assessment Document [REF-02], Code Bodies Assessment Criteria [REF-03 and REF-04] and DIP Assessment Criteria [REF-05] which are the overarching documents for Qualification, as well as any other documents reference in Section 5 of the Qualification Approach & Plan [REF-01]. There are also a number of testing documents that are relevant to QT which Non-SIT LDSO QT Participants should be familiar with. The full hierarchy of documents is shown on the diagram below. Please note that the DIP Assessment Criteria is under development and is expected to be published in early 2025.

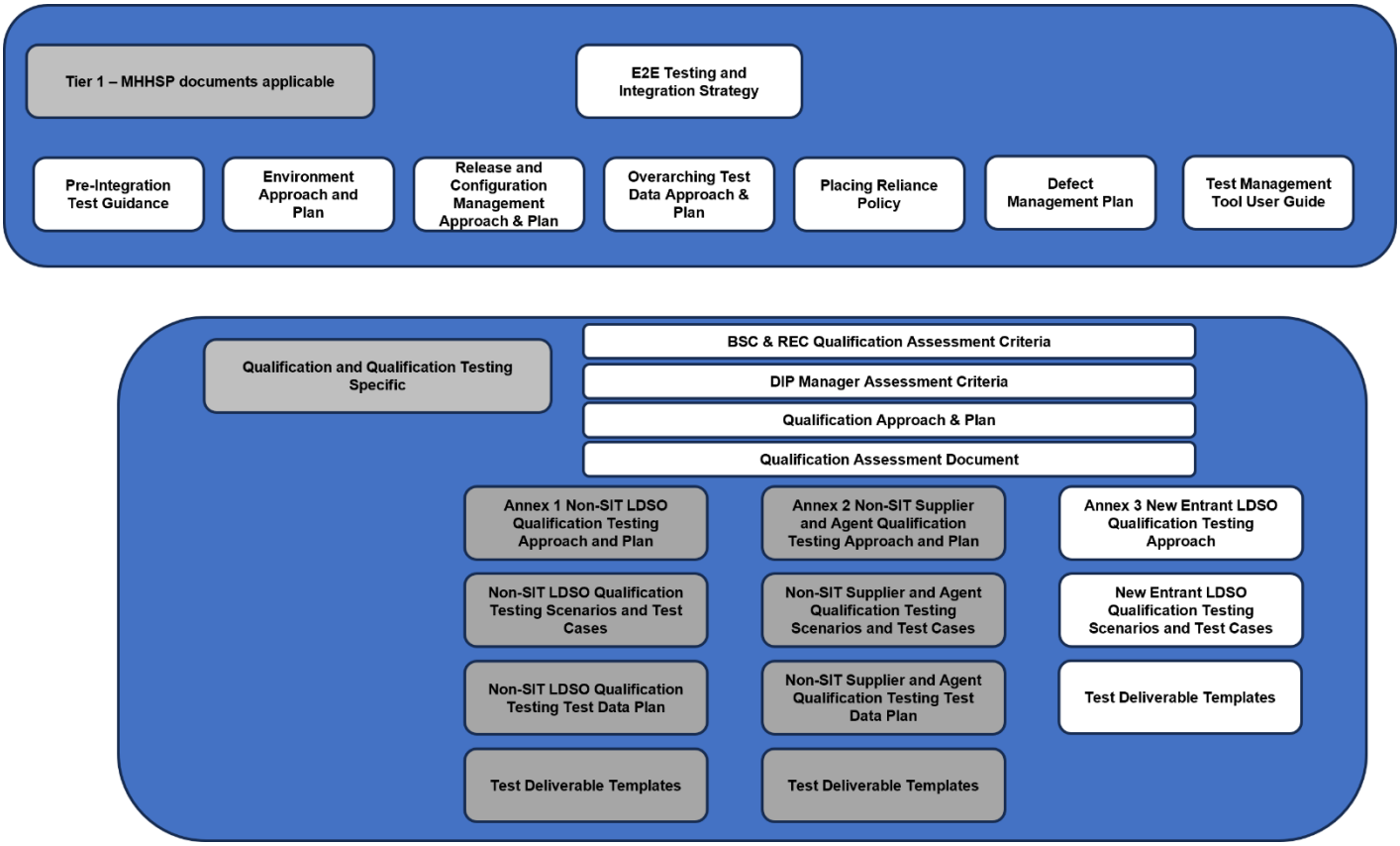

Figure 1: Document Hierarchy

The Non-SIT LDSO New Entrant (Post M10) MHHS Qualification Testing Approach and Plan covers:

- Test Stage Objectives
- Scope
- Architecture and Coverage
- Approach for Preparation & Execution, this sets out requirements for Non-SIT LDSO QT Participants' preparation and the Non-SIT QT Team's preparation, covering:
    - Test Scenarios and Cases
    - Test Data
    - Test Harnesses
    - Test Management Tool
    - Evidence Capture
    - Defects Management
    - Environment & Release Management
    - Readiness Activities and Documentation
    - Entry and Exit Criteria
- Test Schedules
- Management and Organisation
- Governance and Reporting

- Assurance

This document is intended to be read by the following groups:

- New Entrant LDSOs and 3rd parties
- SRO Function (SRO)
- Lead Delivery Partner (LDP)
- Qualification Advisory Group (QAG) & Qualification Working Group (QWG)
- BSC, REC Code Body Qualification teams and DIP Manager
- BSC and REC Performance Assurance Boards (PAB)
- Independent Programme Assurance (IPA).

2.2 Reviewers and Approvals

As the Non-SIT LDSO New Entrant MHHS Qualification Testing Approach and Plan is an annex to the Qualification Approach and Plan [REF-01], it will follow the review and approval cycle set out in Section 5 of that document.

2.3 Document Change Control

The Non-SIT QT Team are responsible for maintaining this document. Each new version supersedes the previous version in its entirety.

This document has been developed based on the best view of MHHSP design, Qualification Assessment Criteria, and test artefacts available at the time, and will be approved subject to MHHSP, BSC PAB, REC PAB governance and DIP Manager approval. Subsequent versions of the document will be subject to appropriate governance in line with the updates being made.

3 Objectives

Is it the objective of Non-SIT LDSO QT to:

- Provide confidence that individual Non-SIT LDSO QT participants wishing to enter the market prior to M14 can successfully operate under the MHHS arrangements for the scope of their roles and MPIDs, meeting the assessment criteria defined by Code Bodies and DIP Manager and approved by the BSC and REC PABs...
- Ensure sufficient testing evidence is provided by each Non-SIT LDSO QT participant to demonstrate that it has tested its systems in an integrated MHHSP test environment and those systems meet MHHS design requirements and assessment criteria defined by Code Bodies and DIP Manager.
- Provide opportunity to non-SIT LDSO QT participants to test using their own environment connected to the DIP to minimise risk of future operational issues.
- Prove the capabilities of Non-SIT LDSO Participants against the MHHS Design Baseline, including functional, migration, operational and non-functional requirements (covered in more detail later in this document).

4 Scope

This section sets out what is considered in and out of scope of Non-SIT LDSO QT. For information on the full scope of MHHS Qualification, please refer to Section 7 of the Qualification Approach and Plan [REF-01].

4.1 In Scope

The scope of the MHHS ecosystem that needs to be available to support LDSO QT, corresponds to MHHSP design required for LDSO roles and is shown at high level in the red outline on the logical architecture diagram, Figure 2. It is the orange boxes that are the LDSO services under test.

The systems and interfaces in scope relate to LDSO services: Registration, Unmetered Supplies Operator (UMSO) and LDSOs[2] that are connected to MHHSP central system – DIP. All other roles, services and systems, including the BSC Central Systems (known as Helix), are out of scope for Non-SIT LDSO QT and will be simulated if required to facilitate testing.

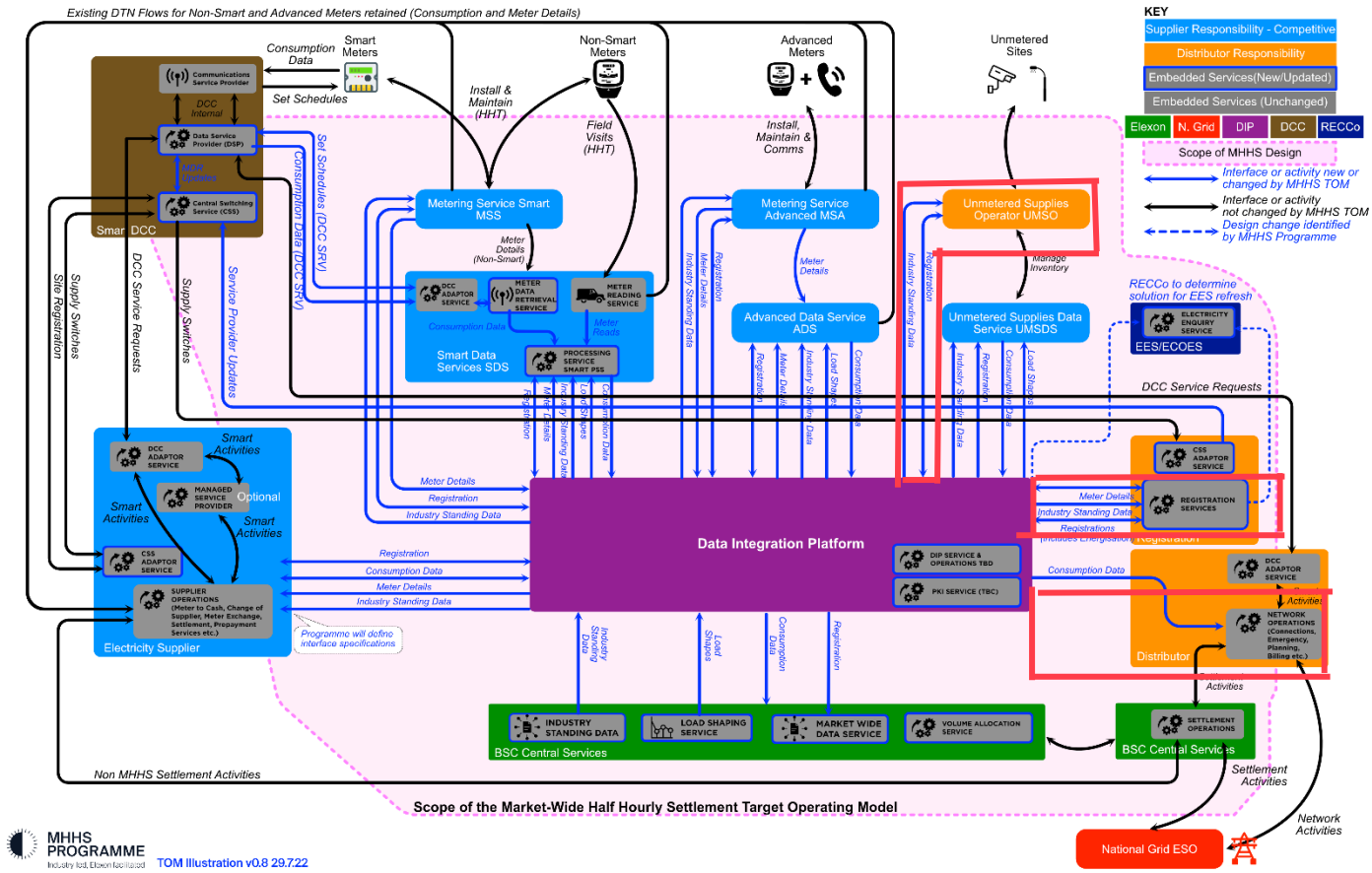

Figure 2: MHHSP TOM

[2] Please note, this role can also be referred to as Network Operations but the terminology of LDSO is used within this document. Network Operations or LDSO is a defined role within the MHHS Design Baseline which encompasses LDSO functions that are required for MHHS, but not part of Registration or UMSO

4.1.1 Roles

LDSOs will execute tests covering the following roles (as defined in the MHHSP design baseline) as the primary structure for demonstrating LDSO capability:

LDSO Role In Scope	Industry Code
Registration Service (REGS)	BSC/REC
Licensed Distribution System Operator (LDSO)	BSC/REC
Unmetered Supplies Operator (UMSO)	BSC

Table 1: Testing Roles

4.1.2 Participants

The anticipated scope of participants is new entrant LDSOs who are looking to enter the market post M10 and prior to M14 (and are able to complete BSC and REC Qualification prior to entering their Qualification Wave[3]).

For further information on MHHS Qualification routes and regulatory context, please refer to Section 4 of the Qualification Approach and Plan [REF-01].

4.1.3 Test Items

The LDSO Systems under test are as follows:

- UMSO (Unmetered Supplies Operator) - the service that interfaces with the Unmetered Supplies (UMS) customer and other industry stakeholders.
- Registration Service - the LDSO service that holds meter point standing data information about each MPAN within its distribution region.
- LDSO – the LDSO service that is defined role within the MHHS Design Baseline which encompasses LDSO functions that are required for MHHS, but not part of Registration (e.g. services related to billing, operation and maintenance of the distribution networks).

4.1.4 MHHSP Design Requirements

Requirements in scope for MHHS Qualification are all in reference to the three roles, highlighted above, in the MHHS Design Baseline, including:

Functional

- Requirement specifications covering all three roles as detailed in MHHSP baselined design.
- All relevant interfaces. The number of interfaces per role is shown in the table. Please note, several of the DIP publications are optional for LDSO and as such the number of DIP publications applicable to each LDSO will vary depending on if they are opting out.

	Interface IF (Sender Party)	Interface PUB (Recipient Party)
Registration Services	19 IF-050, IF-045, IF-044, IF-043, IF-039, IF-037, IF-036, IF-035, IF-033, IF-032, IF-026, IF-020, IF-018, IF-009, IF-008, IF-006, IF-003, IF-002, IF-001	9 PUB-47, PUB-040, PUB-038, PUB-034, PUB-031, PUB-025, PUB-019, PUB-007, PUB-005
LDSO	1	18

[3] This refers to the current BSC and REC qualification process as new entrant LDSO will need to be qualified to support exiting arrangement as well as new arrangements introduced by MHHSP.

	IF-020	PUB-47, PUB-044, PUB-043, PUB-041, PUB-040, PUB-36, PUB-037, PUB-026, PUB-021, PUB-20, PUB-019, PUB-018, PUB-013, PUB-009, PUB-008, PUB-006, PUB-003, PUB-001
UMSO	3	10
	IF-038, IF-034, IF-007	PUB-47, PUB-039, PUB-037, PUB-036, PUB-035, PUB-033, PUB-026, PUB-018, PUB-008, PUB-003

Table 2: Interfaces by Role

- The following business processes are included in LDSO QT scope:
    - MPAN Ownership
        1. Change of Supplier MHHSP-BP001
        2. Change of Registration Data MHHSP-BP010
        3. Change of Service – Metering Service MHHSP-BP002
        4. Change of Service – Data Service MHHSP-BP003[4]
        5. Change of Existing Service Appointment Details MHHSP-BP003B
    - Metering Changes
        1. Disconnection MHHSP-BP007
        2. Change of energisation Status MHHSP-BP008
        3. Change of Meter MHHSP-BP009
        4. Change of Market Segment and/or Connection Type MHHS-BP011
    - Meter to Bank[5]
        1. Data Processing MHHS-BP005
        2. Demand Disconnection Events MHHS-BP013
        3. Consumption Amendment MMHS-BP016
        4. Load Shaping Services MHHS-BP018
        5. BSC Central Services – Market Wide Data Service MHHS-BP019
        6. Industry Standing Data MHHS-BP021
- Generation of the REP-900 [E-Bill] and REP-901 [Aggregated DUoS Charges]

Migration Requirements

The below list includes migration processes as described in MHHS - Migration Design Document [REF-06] and MHHS-DEL974 Migration Design requirements [REF-07].

- Forward Migration: the transfer of an MPAN from the legacy arrangements to the new MHHS arrangements
- Reverse Migration: the transfer of an MPAN from the MHHS arrangements back to the legacy arrangements.
- The following business processes are included in LDSO QT scope:
    - MHHS-DEL962 - BPM-001 - Change of Supply – Forward Migration
    - MHHS-DEL963 - BPM-002 - Change of Service – Metering Service – Forward Migration

[4] MHHS-BP-003A - Registration Service – CSS/DCC MDR Update is not listed in scope, even though it involves Registration Service as CSS/DCC interactions are out of scope of QT.
[5] MHHSP-BP-004B – UMS Data Collection is not listed as in scope, even though it involves interaction with the UMSO, as UMSO/UMSDS Data Service interactions are Data flows which participant are expected to test in PIT and there is no UMSO activity that results in DIP interaction. MHHSP - BP020 – Volume Allocation Service Volume Allocation Service is not listed as in scope even though it involves the delivery of report to LDSO as this is an existing report and interface.

- MHHS-DEL964 - BPM-003 - Change of Service – Data Service – Forward Migration
- MHHS-DEL965 - BPM-001 - Change of Supply – Reverse Migration

Non-Functional and Operational Requirements

Operational and Non-Functional Requirements applicable to LDSO roles can be found in:

- MHHS Operational Choreography [REF-08].
- MHHS-E2E002 Requirements [REF-09]

4.1.5 Code Body and DIP Manager Assessment Criteria

The BSC [REF-04], REC [REF-03] and DIP Manager [REF-05] Assessment Criteria sets out which MHHS design requirements Code Bodies expect LDSOs to demonstrate in Qualification Testing. The Non-SIT LDSO QT artefacts reflect the latest version of the Assessment Criteria (or whatever baseline is agreed in the interim) and will be reviewed and updated as necessary.

4.2 Out of Scope

The following aspects are out of scope for this Annex, where appropriate they are covered in other documents.

- All SIT Stages – these will be the subject of separate Test Approach and Plan documents:
  - SIT Component Integration Test
  - SIT Functional Testing
  - SIT Migration Testing
  - SIT Non-Functional Test
  - SIT Operational Test
- All other Qualification routes and UIT Test stages - these will be the subject of separate Test Approach and Plan documents:
  - E2E Sandbox
  - Supplier & Agent QT – please see Annex 2 of the QA&P
  - Non-SIT LDSOs Pre-M10 – please see Annex 1 of the QA&P
- Other elements of the Qualification process, such as the QAD submission are covered by the Qualification Approach & Plan [REF-01] and Qualification Assessment Document [REF-02].
- Enduring Qualification approach and process as this will be the subject of separate documentation.
- Testing of LDSO's Registration Service and CSS interface, i.e. LDSO participant's CSS adaptor and CSS system.
- Data Transfer Network (DTN) interfaces are required to be tested in PIT.
- Interfaces or activities not changed by MHHS TOM.

Any requirements to be excluded from the scope of testing by Code Bodies as per the BSC Assessment Criteria [REF-04] and REC Assessment Criteria [REF-03] and DIP Manager as per the DIP Assessment Criteria [REF-05]. This includes the following which will be assessed based on the review of QAD responses and supporting evidence provided by the Participant (including evidence from PIT):

- Operational processes for system maintenance, capacity management and change management.
- Business Continuity and Disaster Recovery processes
- Service Management processes including error handling, fault resolution and escalation.
- Security testing and processes for access management, etc.
- Operation of controls to ensure Code obligations are met, including monitoring, reporting, etc.

    - System availability and performance. Participants are expected to demonstrate evidence that they have tested and proven systems by deploying them in the end state architecture.
- Testing of consequential changes, for example, changes parties need to make for MHHS that are outside of the MHHS Design baseline or changes that parties need to make to meet code requirements (e.g. billing).

5 Test Architecture and Approach

This section covers the way the Non-SIT QT Team will structure the project and plan to achieve its objectives. For information on the approach to MHHS Qualification as whole please see section 9 of the Qualification Approach and Plan [REF-01].

5.1 Approach

The testing approach is as follows:

- Non-SIT LDSO QT will be role based and in line with associated MHHSP design requirements and business processes.
- Test Roles will reflect the operational systems, processes and practices of the functions once live, recognising that fully scaled operational environments are not required for functional testing.
- Non-SIT LDSO QT participants will need to be able to demonstrate and evidence being able to send and receive messages through all interfaces within the scope of the LDSO, UMSO, and Registration Services roles. Please note, several DIP publications are optional for LDSO as such the number of DIP publications applicable to each LDSO will vary depending on if they are opting out.
- As MHHSP SIT will focus on testing of full E2E design, it is assumed that Registration Service have been functionally tested in SIT. If it is agreed that a LDSO can place reliance on the SIT testing of Registration Service, then Registration Service's functionality does not need to be retested in Non-SIT LDSO QT. Instead, the scope of Registration Services testing will be to support each Non-SIT LDSO QT participant being able to demonstrate that the Registration Services system works within their own infrastructure and set up, unless this set up has already been proven by testing in SIT.
- Non-SIT LDSO QT, therefore, will focus on verification of UMSO and LDSO roles/systems' ability to generate messages for onward processing (via DIP or between LDSO's systems) and receive and process messages generated by Registration Services and other roles.
- Duplication of testing will be avoided, where possible, if a test case is passed which covers a combination of LDSO, UMSO, and Registration Services roles, this would be considered successful for all the roles under test rather than having to be run multiple times.
- There will be a defined set of negative and exception test cases that will focus on areas that pose risk to settlement and retail arrangements and is consistent with the scope of negative and exception tests in SIT.
- Non-SIT LDSO QT for New Entrants Post M10 will run in parallel to the Non-SIT Supplier and Agent Qualification Waves and Non-SIT LDSOs will be expected to meet the timelines of their allocated wave.
- "Placing reliance" mechanisms set out within the MHHS Placing Reliance Policy [REF-10] will be available to Non-SIT LDSO QT participants. This will be subject to MHHSP, Code Body and DIP Manager (where applicable) approval. Please see section 10 of the Qualification Approach & Plan [REF-01] as well as section 8.4 of this annex.
- As a large portion of the systems being delivered as part of MHHSP already exist, results gathered during PIT NFT (at production volumes) will provide a sufficient level of assurance of processing new message volumes that the focus of Non-Functional testing in QT will be interface based testing.
- As per the BSC, LDSOs need to qualify all three roles for MHHS (i.e. Registration, Network Ops and UMSO), even if they do not intend to support Unmetered Segment (UMS) MPANs.

5.2 LDSO Roles and Services

In line with the Qualification Approach and Plan [REF-01], Non-SIT LDSO QT will be role based. However, to reduce complexities, be closer to how operational process will operate and increase assurance that LDSOs are able to operate under the new MHHS arrangements, Registration Services, UMSO and LDSO will be considered as a single suite of roles. Non-SIT LDSO QT participants will be expected to commission test instances of all roles in an integrated test environment as shown on Figure 3. This is expected to be consistent with the LDSO production infrastructure and host arrangements and, therefore, Non-SIT LDSO QT participants should be standing up like for like environments where possible. It is not expected, however, that these test environments will need to be scaled for production.

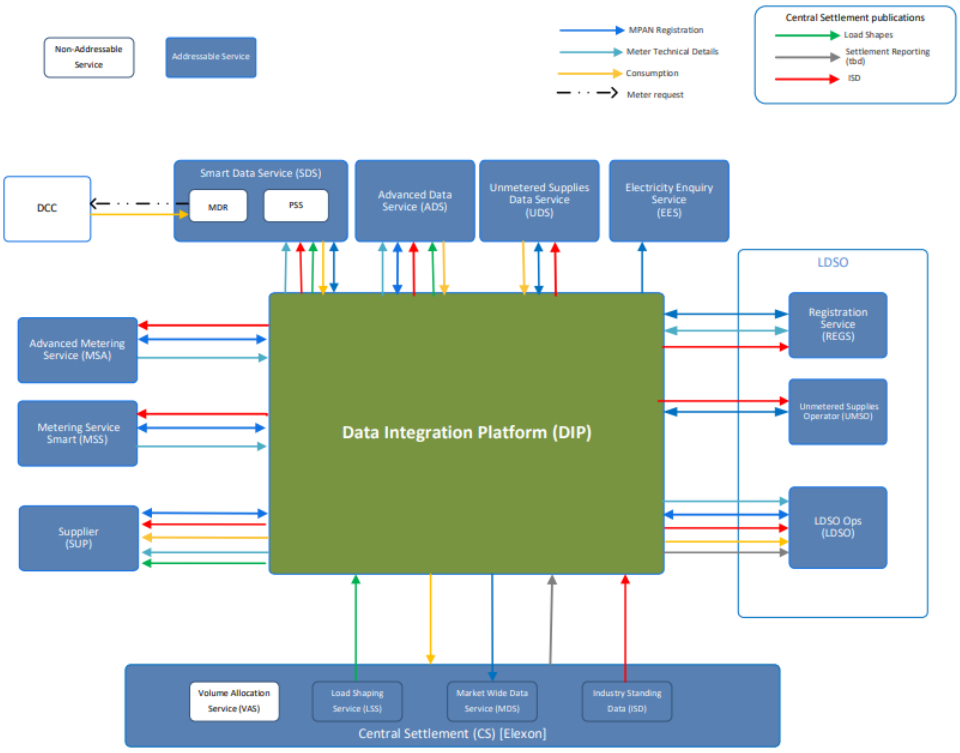

Figure 3: MHHSP TOM workflow

Please note, the requirement to stand up test instance of systems may vary depending on agreed placing reliance proposals.

As a Non-SIT LDSO QT participant will have to qualify in all roles, as per current BSC obligations, this will include UMSO even if a Non-SIT LDSO QT participant does not intend to support UMS MPANs.

Through this approach, considering all LDSO roles as a suite, it will be significantly easier to ensure LDSOs will operate effectively in a production like environment. LDSOs have different operational environments for services/systems and, in many cases, bespoke synchronisation between all these systems (with the MHHS Design baseline not prescribing the interfaces between roles in most instances), hence the need to perform testing on integrated components to reduce complexities for gathering evidence and setting up a test harness for each role. As the full MHHS ecosystem will not be available and to facilitate the aim that each Non-SIT LDSO QT participant can conduct their QT without the need for pairing with another participant, if an input would be needed from another industry role (outside of DIP) such as a supplier, this will be achieved by using common test harnesses. This is consistent with the principle of role-based testing for Qualification and not needing other Programme Participants to execute role specific testing.

5.3 Testing types

5.3.1 Functional

The purpose of Functional test scenarios is to verify that a LDSO's systems function correctly for all three LDSO roles, according to MHHSP design baseline and aligned to the BSC & REC Assessment Criteria [REF-04 & REF-03].

As part of DIP onboarding, smoke or connectivity test will be run to check connectivity between Non-SIT LDSO QT participant's systems and DIP in UIT before any Non-SIT LDSO QT is conducted.

Where new releases or defect fixes have been deployed in UIT during a participant's QT, the participants should perform regression tests to ensure its systems continue to behave as expected as part of its QT completion activity. Non-SIT LDSO QT participants should refer to section 7.3.7 of the Qualification Approach & Plan [REF-01] on the process to disclose changes to the Code Bodies in the window between them completing QT but not have commenced live MHHS operations.

5.3.2 Non-Functional

Non-Functional requirements, and therefore Non-Functional testing, falls into three broad categories:

- Volume and performance requirements – these will not be tested in QT due to the limitations of the UIT environment as such non-SIT LDSO participants are expected to test these as part of their PIT
- Requirements which can be proven during the QT Functional execution. Those activities already proven during the QT Functional phase of delivery will not be replicated. It is expected Non-SIT LDSO participant will capture test evidence during functional execution to support evidence of meeting these non-functional requirements. Examples of requirements that fall into this category are:
  - Security – NFRs around PKI and levels 3 through to 4 validations
  - Observability –In terms of compatibility based NFRs, messages must be traceable via participant/DIP created reference and transaction IDs should any issue occur during E2E processing.
  - Compatibility (message or schema validation) – Effectively the successful processing of messages between the participant, DIP and destination participants
- Requirements that cannot be proven during the QT Functional execution and, therefore, require a non-functional test to support Non-SIT LDSO participants evidencing they can meet them. Examples of requirements that fall into this category are:
  - Reliability/Recoverability (event/message buffering when failing to communicate with the DIP systems). This type of testing will treat each interface as a component rather than the internals of the participant's solution themselves.

As with SIT, the UIT environment will not be built to support full scale performance and volume/load testing, very low scaled scenarios for Non-Functional QT will be defined as part of Test Scenario/Test Case creation and go through the relevant review processes with all involved parties.

Participants will validate their own solutions, at expected messaging volumes during the PIT stage of delivery rather than within Non-SIT LDSO QT.

In terms of process start/injection points, these will be identified within the QT NFT Test Scenarios and Test Case creation process. As testing is expected to be at very low volumes it is not expected that Non-SIT LDSO participants will be required to support the automation of message injection/start point tests. Due to the low volumes envisioned, the existing test harness being developed to support functional testing is expected to be sufficient to support Non-SIT LDSO NF QT.

Where DIP Adaptors are utilised by Non-SIT LDSO QT participants, these will form the entry and exit points of their own test environment within the UIT Integrated environment, and so form the start/end timing points for message processing, where process timings are being logged or recorded. Where Non-SIT LDSO QT participants' systems are either the start or end point of a business process, it is expected to see evidence of message creation

or successful processing of received messages as a form of test evidence i.e. testing should include the systems adjacent to the DIP Adaptors. Where error handing and interface availability is also managed at this layer, these would also fall into the scope of QT NFT testing where, for example, error handling and buffering based testing will be taking place.

5.3.3 Migration

LDSO QT test scenarios will cover business processes including:

- Forward Migration
- Reverse Migration
- Import/Export MPANs

5.3.4 Operational

Operational test scope will cover the following areas:

Business Requirements – Functional

Operational Testing will assess any Functional Business Requirements identified during the SIT Functional and / or Non-SIT LDSO QT requirements traceability exercise - and where these requirements are deemed as applicable to Operational Testing whether as partial or full coverage to satisfy the requirement and where the Requirements have not been fully proven / covered by other Test Phases (e.g. due to elements of the Requirement being outside the remit of Functional Testing scope) have been considered for inclusion in the Operational Test scope.

Operational Choreography

Due to the nature of MHHS Operational Choreography [REF- 08] and the UIT environment, Non-SIT LDSO QT participants will be able evidence they have met the majority of requirements within the MHHS Operational Choreography [REF- 08] by QT Functional test cases. Those activities already proven during the QT Functional phase of delivery will not be replicated during Operational Testing. It is expected Non-SIT LDSO QT participants will capture test evidence during functional execution to support evidence of meeting the majority of Operational Choreography requirements. If there are any Operational Choreography requirements that cannot be mapped to QT Functional test cases, then additional test cases will be created. This is likely be test cases that focus on interfaces where manual work may be needed to validate that there are processes are in place to enable the any residual requests that have required manual corrections are being processed by the end of the next working day and error handling and fault management processes.

As Operational Choreography tests in QT will be low or single MPAN tests, Non-SIT LDSO QT participants are expected to conduct volumetric testing in PIT to evidence that MHHS Operational Choreography [REF- 08] timing requirements can be met at high volumes.

5.3.5 Testing coverage

Test scenarios and test cases have been designed to achieve coverage of requirements and Assessment Criteria in scope for Non-SIT LDSO QT: Design, Functional, Non-Functional, Migration and Operational. This will provide confidence in LDSO systems' ability to operate under new MHHS arrangements.

Each requirement in scope will has at least one scenario linked to it. Requirements deemed not testable, or for which evidence can't be gathered through testing or other assurance means, has been flagged accordingly and the reason for their status agreed with Code Bodies and/or DIP Manager.

5.3.6 Test prioritisation

Prioritisation of test cases will be considered for regression packs, deployment test packs and test execution schedules. If test prioritisation is needed, test cases will be prioritised considering operational criticality of MHHS elements they cover, probability of a high severity defect being raised as an outcome of the test and a priority of the related Assessment Criteria. Please note, Non-SIT LDSOs will need to successfully complete their full test scope to meet the exit criteria for QT.

6 Qualification Testing Process

This section provides high level information on the QT Process from PIT through to test exit. More detailed information on the different test stages is provided in later sections of this in this annex.

6.1 High level Qualification Process

There are number of high-level steps within MHHS Qualification process (Figure 4), of which QT is one. QT, (step 4b in Figure 4) itself, consists of a number of stages to support the successful and consistent management of the testing. For further information please see section 9 of the QA&P.

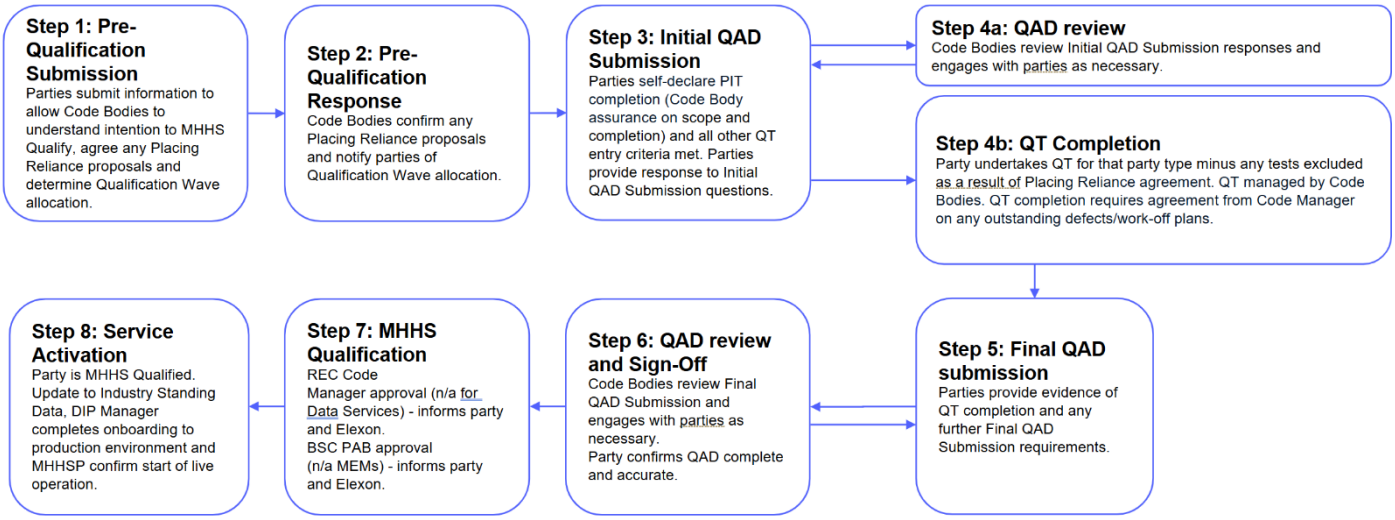

Figure 4: High level flowchart of MHHS Qualification process for non-SIT LDSO Programme Participants (Source: QA&P)

6.2 QT Process

The high-level test stages within QT are QT Preparation, QT Execution and QT Exit.

Please note, the figures below show key activities within each stage where LDSO input is needed. There is other activity in each stage that is not depicted.

QT Preparation (Entry) covers the activities that are needed to meet the entry criteria for the Non-SIT LDSO QT Participants entry by both the Non-SIT LDSO QT participant and the Non-SIT QT Team.

Pre-Integration Testing (PIT) is the internal testing that a Non-SIT LDSO QT Participant will complete within their own environment to confirm systems are developed and robust enough to move into QT execution. The Non-SIT QT Team will assure the output as a part of assurance of the entry to Non-SIT LDSO QT, this output will include the PIT RTTM and PIT Completion Report. Please refer to Section 10 of the Qualification Approach and Plan [REF-01] for more information.

As part of the QT Entry stage individual entry gates for each Non-SIT LDSO QT Participant to confirm that all entry criteria have been met and the Non-SIT LDSO QT Participants are ready to move into QT Execution. Please see section 8 of this annex for more information on Non-SIT QT Team test preparation and section 9 for more information on LDSO test preparation.

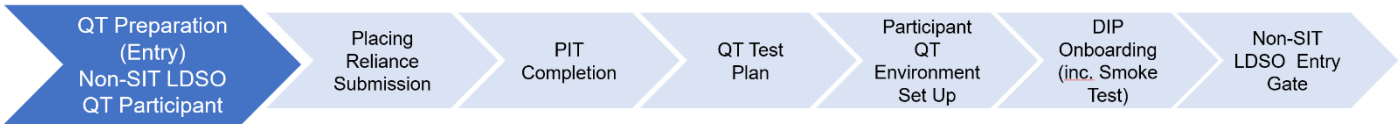

Figure 6 High Level QT Preparation (entry) Steps for Non-SIT LDSO Participant

Figure 5 High Level QT Preparation (entry) steps for Non-SIT QT Team

QT Execution covers execution of each LDSO's agreed test scope, monitoring of progress, and assurance of test output as well as support process needed to support testing such as defect and release management. Please see section 10.2 of this annex for more information. Non-SIT LDSO QT Participants are expected to engage regularly with the Non-SIT QT Team to report on progress against test schedule as well as discussing any issues or risks which may impact their completion.

Figure 8 High Level QT Execution Steps for Non-SIT LDSO QT Participant

Figure 7 High Level QT Execution Non-SIT QT Team

***QT Exit** covers activities and assurance to confirm that each LDSO has met all exit criteria so that the Non-SIT QT Team can confirm test completion to the Code Bodies and DIP Manager. Please see section 10.8 of this annex for more information.*

It will be not possible to progress into the next stage of testing until the exit criteria for the previous stage is met. Test phases and associate activities are described in more detail in the forthcoming sections.

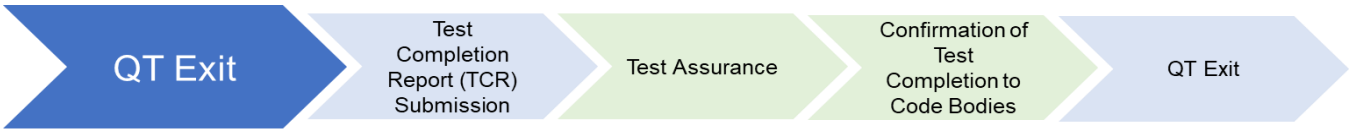

Figure 9 QT Exit High Level Steps for both Non-SIT LDSO QT Team and Non-SIT LDSO Participant

7 High Level Schedule

The high-level schedule for the Non-SIT QT waves is set out in Appendix C of the Qualification Approach and Plan [REF-01].

QT Execution provides a window for Non-SIT QT Participants to complete their QT. The schedule of test execution within the Qualification Wave should be detailed in the individual Non-SIT LDSO QT Participant's QT Test Plan which will be signed off as part of the QT entry criteria, please refer to section 9.6 for more information.

The Non-SIT QT Team will continually review any lessons learned from previous test phases, PIT/CIT/SIT, to ensure any learnings, improvements or corrective actions are implemented in Non-SIT LDSO QT.

8 Test Preparation

This section describes the test preparation activity undertaken by the Non-SIT QT Team, Code Bodies and DIP Manager. For Non-SIT LDSO QT Participant test preparation activity, please see section 9 of this annex.

8.1 Test Scenarios & Test Cases

Non-SIT LDSO Qualification Testing test scenarios and test cases created to support Non-SIT LDSO Qualification Testing pre-M10 will be used. The test scenarios and test cases will be reviewed post the completion of Non-SIT LDSO Qualification Testing and prior to the Qualification Waves commencing to ensure they remain fit for purposed and to apply any lessons learnt. This approach ensures consistency in Qualification Testing that Non-SIT LDSO need to execute.

Non-SIT LDSO Qualification Testing test scenarios and test cases were created by using the design artefacts and Assessment Criteria listed in section 4, and have been categorised as:

- Functional
- Non-Functional
- Operational (to be included alongside Non-Functional for execution)
- Migration

Non-SIT LDSO Qualification Testing test scenarios have been validated against MHHSP SIT test scenarios to ensure that no gaps exist in Non-SIT LDSO Qualification scope and requirements and processes have been sufficiently covered to provide confidence that LDSO participants that haven't undergone SIT can operate in production. Non-SIT LDSO Qualification Testing test scenarios will be reviewed against the scope of future interim design releases and necessary amendments made to ensure continue alignment with the MHHSP design baseline.

For more information on how Non-SIT LDSO Qualification Testing test scenarios were developed please see section 7.1 of Annex 1

Test Data

Test scenarios and associated test cases will drive detailed requirements for test data preparation. Test data attributes for each test case is documented in the Non-SIT LDSO Qualification Testing Test Data Matrix.

As each non-SIT LDSO will be completing QT individually and as there is no pairing as in MHHS SIT, test data does not need to align between different participants. Each new entrant Non-SIT LDSO will be expected to create new MPANs as required by executing the New Connection business process with the necessary attributes required, as per the Non-SIT LDSO Qualification Testing Test Data Matrix, and in line with their agreed test scope to complete their testing.

8.2 Test Environment

Non-SIT QT will take place in the MHHSP UIT environment, an environment that is separate from SIT. The same central system environment (DIP) will be used for all Programme Participants completing QT as will as any Programme Participants who choose to utilise the E2E Sandbox.

MHHSP UIT is made up of test environments provided by and under the control of the MHHSP Central Parties that the LDSO Test Participants will connect to with their respective test environments as described in [REF-11] MHHS Programme Environment Approach & Plan.

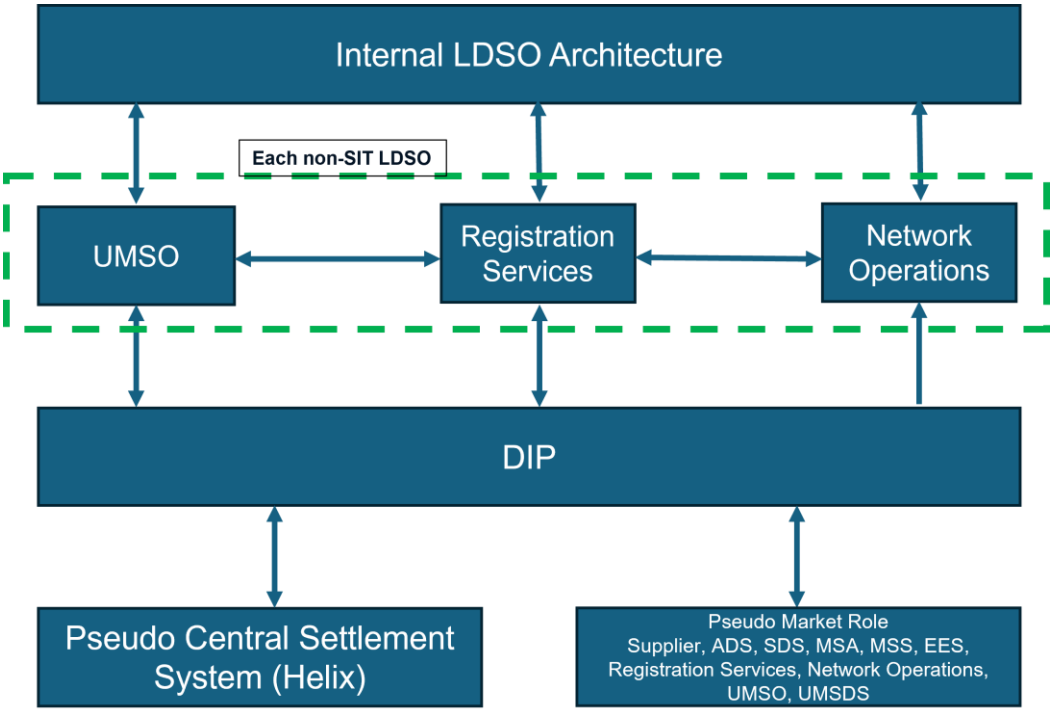

Figure 10: LDSO QT Test Environment

MHHSP central systems are not actively under test as part of Non-SIT LDSO QT but are there to facilitate LDSO QT. If issues are found with MHHSP central systems during Non-SIT LDSO QT, these will be managed as per the MHHSP Defect Management Process [REF-12].

MHHSP and MHHS Test Environment Manager will be responsible for provision of the following components on the UIT:

- Central systems - DIP to which LDSO may connect and test against.
- Balancing and Settlement Code (BSC) service (Helix) test harnesses to mimic flows sent by Helix to non-SIT LDSO parties
- Pseudo Market Role test harnesses to mimic flows sent by non-LDSO parties to Non-SIT LDSO parties and reduce manual creation of messages.

No test harness is needed for either Central Switching Service (CSS) or Electricity Enquiry Service (EES) systems. This is due to LDSO services not being required to use EES data for any operational processes and as there has been no material changes to CSS interfaces and both are involved in SIT. Non-SIT LDSO QT participants might want to utilise CSS Simulator to inject CSS messages prior to sending data to the DIP or validate that the messages sent to/from CSS are formatted correctly.

Use of the DTN is considered optional for Non-SIT LDSO QT functional testing, as DTN testing is expected to be tested as part of PIT and LDSOs involved in Non-SIT LDSO QT will have completed legacy Qualification which includes DTN testing. However, a Non-SIT LDSO QT participant can choose to use DTN if they think it would support their Functional or Migration QT execution. Test evidence of DTN interactions would not need to be submitted in this scenario.

There is no expectation for Non-SIT LDSO QT participants to connect to other programme participants during Qualification Testing. However, Non-SIT LDSO QT are expected to be able to connect and test against their various different LDSO roles.

Other LDSO environment considerations for Non-SIT LDSO QT environment management are:

- Availability and monitoring of environments
- User access permissions and control
- Maintenance of environment
- Environment issues logging and resolution.

MHHSP central systems test environment might not be available due to unplanned or planned downtime, because of code deployments, infrastructure maintenance or data refresh activities. Planned environment outages will be communicated (in accordance with the Release Management Approach) to LDSO, QWG and QAG and any impact that an outage might have on LDSO testing progress and mitigation plans should be discussed with MHHSP, Code Bodies, DIP Manager and Non-SIT QT Team at the earliest opportunity for agreement. For further information about the availability of UIT refer to MHHSP Environment Approach and Plan [REF-11.

As Non-Functional and Operational test scope is expected on low volumes. It is not expected Non-SIT LDSO QT participant would need to stand up another set of test environments to support this. As well as one UIT environment being sufficient to support all test phases of QT.

MHHSP will undertake proving activities of Central Systems as part of the environment readiness phase.

8.2.1 Deployment Verification

The objective of deployment verification is to:

- Verify MHHSP central systems release in UIT environment and eliminate any potential deployment, data, configuration, or any other issues before non-SIT LDSO Qualification Testing can commence.
- To minimise adverse impact of issues found later during non-SIT LDSO QT causing delays and rework.

This process will be followed for any major, minor, patch, or emergency releases and including releases as a result of a change request and a defect fix.

Issues raised during deployment verification will be captured in ADO within release and configuration category and will be coordinated and triaged as per defect workflow described in Defect Management Plan [REF-12].

It is expected that Non-SIT LDSO QT participants would complete deployment verification of releases of their internal systems.

8.2.2 Test Harness

As detailed in section 8.2, a number of test harnesses will be required to support test execution. The purpose of the test harness is to replace “missing” market roles that are not present in the UIT environment and to ensure pairing of participants will not be required. The test harness was developed by MHHSP and can generate flows sent by pseudo market roles to DIP for onward transmission to LDSO services. This enables the recipient to validate that they can receive DIP messages relevant to their LDSO role. The test harness will also act as an end point for receiving messages sent by LDSO roles.

The test harness developed to support Non-SIT LDSO Qualification Testing continue to be used to support this testing.

Although the test harness is built to support multiple LDSO participants, it is not designed for testing of Non-Functional requirements related to high volume processing.

Non-SIT QT Team will provide support for operation of test harness during QT test execution phase and a level of coordination is required between Non-SIT LDSO QT participants and Non-SIT QT Team to ensure smooth running of the test schedule. It is not expected that Non-SIT LDSO QT participants will need to interact directly with test harnesses as this will be undertaken by the Non-SIT QT Team.

Test scenarios and test cases will contain test harness and test data preconditions, so preparatory actions can be taken in time for the test execution, i.e. Non-SIT QT Team can validate received messages or trigger messages from the test harness according to test case schedule.

Design and build of the test harness has been completed. It was acceptance tested by MHHSP with test results shared with Code Bodies.

8.3 Test Management Tool

MHHSP Azure DevOps (ADO) Test Management Tool provides capability for Non-SIT LDSO QT participants and Non-SIT QT Team to:

- Track test execution progress
- Manage defects: raise defect that can only be viewed by them and Non-SIT QT Test Team, assign, reassign, close defects
- Report on defects and test progress
- Define dashboards
- Host test scenarios, test cases and test evidence
- Report of design / test coverage / test status traceability
- Managing test case execution
- Tracking and reporting test execution progress and coverage
- Tracking and reporting test coverage status

In preparation, all test cases applicable to participants' role in the test stage will be loaded by Non-SIT QT Team into Non-SIT LDSO participant's individual ADO test project ready for execution.

. During the execution period, Non-SIT LDSOs will be expected to keep ADO updated in real time as execution is carried out.

Non-SIT QT Team will provide access to the tool. It's expected that each Non-SIT LDSO participant will have a maximum of 5 ADO licences. Non-SIT QT Team will provide support for questions related to ADO that might arise during any test phase. Queries can be sent to MHHS Qualification mail inbox.

8.3.1 Test Management Tool Onboarding

The Non-SIT QT Team will set up all nominated test resources for each LDSO within ADO and provide the necessary access, training and user guidance tutorial material.

Details of ADO set up, onboarding and usage is published within MHHS-DEL1332 - Test Management Tool User Guide [REF-13].

8.4 Non-SIT QT Team Deliverables

The following deliverables will be produced by either MHHSP or the Non-SIT QT Test Team:

- Non-SIT LDSO New Entrant MHHS Qualification Test Approach and Plan (this annex)
- Test Scenarios
- Test Cases
- Pre-Qualification Submission form
- Templates for tracking assurance/readiness activities
- Programme increments to already published documentation:
    - Environment management
    - Defect management

- Release management
- ADO guidance
- PIT Guidance
- PIT Templates for Test Deliverables
- DIP On-boarding guide (incorporating lessons learned from previous test stages)

- Non-SIT LDSO QT documents, templates and guides:
  - Test readiness report
  - Test plan template
  - Test results reporting – test execution
  - Test completion report template
  - Test schedule
  - Requirements to Test Traceability Matrix Template

8.5 Test Preparation Schedule

The Non-SIT QT Team, Code Bodies and DIP Manager will need to meet the following entry criteria to confirm that all aspects are in place for Non-SIT Qualification Testing to commence subject to LDSO participants meeting their individual entry criteria. Each individual LDSO will also need to meet a set of entry criteria which is set out in section 9.6 of this annex.

The entry criteria are as follows:

	MHHSP Entry Criteria
1	IR8 release deployed on UIT environment
2	Non-SIT LDSO QT (pre-M10) has completed successfully.
3	Non-SIT QT Team is in place and ready to support operation of test harness
4	UIT environment is made available, deployment activities and verification checks competed.
5	Test Management Tool has been appropriately set up which includes: ● ADO access granted to LDSO participants. ● Test Management Tool Training material made available. ● Test cases uploaded to relevant participants' area in ADO.
6	Processes, documents and guidance listed in section 8.4 have been produced by the MHHSP and the Non-SIT QT Test Team, reviewed, assured, and approved as appropriate for the test stage.
7	Test governance agreed
8	Test meetings agreed and scheduled.
9	Test Reporting agreed and in place.
10	Non-SIT QT Team, Code Bodies and DIP Manager have sufficient resources to support Non-SIT LDSO Qualification Testing in place.
11	Defect Triage process has been set up and communicated to the Non-SIT LDSO QT Participants.
12	Test data agreed and aligned for each LDSO

Table 3 Non-SIT QT Entry Criteria

9 LDSO Test Preparation

This section covers the test preparation activities each Non-SIT LDSO QT participant will need to be complete to be ready to start QT. The test preparation activities that will need to be undertake by Non-SIT QT Team, MHHSP, Code Bodies and DIP Manager is set out in section 8 of this annex.

9.1 PIT

Pre-Integration Test (PIT), which takes place in a LDSO's own standalone test environment and is a pre-requisite for entry into QT and subject to a participant readiness review prior to QT. Please refer to section 10 of the QA&P [REF-01] for information on PIT overview, deliverables and PIT exit criteria. Additional guidance for this test phase can be found in MHHS-DEL852 - Pre-Integration Test Guidance [REF-14].

It is expected that Non-SIT LDSO participants will be expected to complete their NFT testing at expected volumes and capacity during PIT. Please see MHHS-DEL852 – Pre-Integration Test Guidance [REF-14] for further information.

As Operational Choreography tests in QT will be low or single MPAN tests, Non-SIT LDSO QT participants are expected to conduct volumetric testing in PIT to evidence that MHHS Operational Choreography [REF- 08] timing requirements can be met at high volumes.

Successful PIT exit criteria and submission of PIT deliverables and test evidence are a prerequisite for entry into QT and are subject to review and assurance by Non-SIT QT Team and where appropriate by Code Bodies and DIP Manager. For PIT exit criteria, please see section 10.1 of the QA&P.

PIT deliverables should be submitted to MHHSQualification@elexon.co.uk. Submissions should be in line with the dates for each Qualification Wave, as set out in Appendix C of the Qualification Approach and Plan [REF-01].

9.2 Environment Preparation and DIP Onboarding

Non-SIT LDSO participants will need to provision their test environments and complete DIP onboarding activities in preparation for QT.

More detail on the steps is provided below:

- Provide their own production like environments to support LDSO QT Functional, Non-Functional, Migration and Operational. It is expected that test environments have hosting and systems that match an LDSO's production set up. It is not expected, however, that these test environments will need to be production sized.
- Perform an internal connectivity test to ensure that they have their test environments stood-up. This activity can be taken independently from external smoke testing.
- For DIP Onboarding, appoint individuals responsible for digital certificate registration and request digital certificates. Guidance on how to request a digital certificate is provided in, MHHS-DEL1671 DIP Onboarding Guide [REF-15] and MHHSlDEl1477 DIP Certification Process Map [REF-16] and DIP 094 Interface Code of Connection Guide [REF-17].
- Perform an external smoke testing, connect their own systems to DIP, including registering webhooks, and verify that certificates are installed correctly on UIT. Guidance on how to register webhooks please see [REF-18] MHHS-DEL1911-Webhook URL Configuration Guide. If this step has been successfully completed, i.e. end to end connectivity of their test environment have been proven, Non-SIT LDSO will be ready to commence test execution, subject to all other entry criteria being satisfied. Appropriate data should exist on LDSO systems in advance of external smoke testing. For guidance on how to connect LDSO systems to the DIP please refer to MHHS DEL1671 DIP Onboarding Guide [REF-15].
- Deploy a code base that have passed PIT or in case of placing reliance, the release that has been tested against the latest, approved MHHSP interim release. If PIT/SIT was conducted against an earlier MHHSP interim release, or LDSO systems have a new code deployed, it is expected that the Non-SIT LDSO QT participant will retest defects and regression test against changes in staging/PIT environments prior to promoting the code into UIT.

- LDSO systems should be built and tested against the latest baseline and PIT undertaken against same release.

Non-SIT LDSO QT participants are responsible for monitoring of their own environments. Connection to the DIP will need to be monitored for availability and readiness as per Environment Approach and Plan [REF-11].

9.3 LDSO Test Scope

For QT Entry, each Non-SIT LDSO QT Participant will be required to submit an RTTM, along with their QT Test Plan, to the Non-SIT QT Team confirming whether for each requirement they intend to cover this via QT test execution of if they believe it is covered by the Placing Reliance submission. The Non-SIT QT team, Code Bodies and DIP Manager will work with participants to review and confirm their test scope.

Approval of the QT Test Plan and the QT RTTM will be considered confirmation of the individual Non-SIT LDSO QT Participant's QT scope. Templates for the QT RTTM and QT Test Plan are available on the MHHS collaboration base.

The approved QT Test Plan for each participant will be shared with the Migration Control Centre for the purpose of migration planning and regular updates will be provided to the Migration Control Centre of the individual Non-SIT LDSO QT Participant's progress against their plan.

The key principles for how MHHS Placing Reliance will be applied for QT is set out in Section 10 of the Qualification Approach and Plan [REF-01].

If a Non-SIT LDSO QT participant is choosing to opt out of receiving certain DIP publications, this would not change the test scenarios in scope, unless this has been agreed with the Code Bodies and DIP Manager, but rather what test evidence is expected to be submitted[6]. Please see section 10.9 of this annex for more information.

[6] As agreed, as part of CR29

9.4 Test Deliverables

During the testing lifecycle, each Non-SIT LDSO QT Participant will be required to produce and maintain documents, and reports. Non-SIT QT Team, Code Bodies and DIP Manager will provide templates for the test deliverables which will be made available via the collaboration base. The required artefacts are shown in the table below.

Please note, there are other Qualification deliverables, such as QAD, that a Non-SIT LDSO QT Participant will need to complete. Please see the section 9.1.8. Qualification Approach & Plan [REF-01] for more information.

QT deliverables, apart from test evidence uploaded into Teams or ADO and deliverables that are part of a QAD submission, should be submitted to MHHSQualification@elexon.co.uk in line with schedule set out in Appendix C of the Qualification Approach and Plan [REF-01]. Please indicate the name of the LDSO and deliverable being submitted in the email subject. Please note that deliverables expected may vary depending on level of placing reliance agreed and test scope. This would be agreed with non-SIT LDSO QT participant on an individual basis.

Deliverable	Purpose	Format	Phase	Non-SIT QT Team	Code Bodies / DIP Manager **Activity
Pre-Qualification Submission	Placing Reliance assessment and Wave Allocation	Word template	Initial Submission	Review and approval	Review and approval
PIT Test Plan and Approach	Plan to detail approach and scope of PIT	Word template	Initial Submission	Review and approval	Review
PIT Test Scenarios and Requirements to Test Traceability (incl. Test Scenarios)	RTTM showing mapping of requirements to PIT test scenarios	Excel template	Readiness Phase	Review	Review
PIT Draft Test Completion Report	Report to provide summary of how testing is progressing aligned with scope, exceptions,	Word template	Readiness Phase	Review	Review

	and details of any work off plans.				
Interim QT Readiness Report	An interim report on LDSO progress to completing preparation activity and entry criteria.	Word template	Readiness Phase	Review	Informed
QT RTTM	RTTM showing coverage of requirements by either QT tests or Placing Reliance	Excel template	Readiness Phase	Review and approve	Review
QT Test Plan	Plan to detail approach, scope and execution schedule for QT	Word/Excel template	Readiness Phase	Review and approve	Informed
PIT Final Test Completion Report	Report to provide summary of how testing completed aligned with scope, exceptions and details of any work off plans	Word/Excel template	Entry Criteria	Review and approve	Informed
Final Test Readiness Report	Self-declaration of completion status in relation to preparation activities for its Qualification Wave.	Word template	Entry Criteria	Review and approval	Informed
QT Execution Progress Reporting	Tracking of the progress during test execution phase	Updates via ADO	During QT execution phase	Review and escalation	Informed
Test Evidence	Screenshot, audit log etc. attached to a test case to confirm that a test case has been successfully completed	Updates via ADO	During QT execution phase	Assurance	Informed
QT Test Completion Report including work off	To include any exceptions and work off plans that have been agreed.	Word template	Exit Criteria	Review and Approval	Review and Approval

Table 4 Non-SIT LDSO Participants Expected Deliverables

** DIP Manager activity covers Non-Functional requirements and deliverables. Code Bodies activities cover Functional, Migration and Operational requirements and deliverables.

9.4.1 Test Readiness Reports

Prior to commencement of Non-SIT LDSO QT, each Non-SIT LDSO participant will be required to provide a Test Readiness Report as a self-declaration of their completion status in relation to preparation activities outlined in section 9 and entry criteria. This will need to include any exceptions and work off plans that have been agreed and must be agreed by Code Bodies and DIP Manager and signed by senior stakeholders within the LDSO's organisation. The Non-SIT QT Team will provide a template for participants to complete. Non-SIT LDSO QT Participant will be expected to submit an interim and final test readiness report. The Non-SIT QT Team will be engaged in Test Assurance and monitoring throughout these preparation activities; however, the report serves as a formal position at the point of Non- SIT LDSO QT entry governance.

9.4.2 Test Plan

Each Non-SIT LDSO QT participant will be required to provide a test plan. The test plan should include the agreed test scope (including information on if they are making use of the optionality of DIP interface messages), approach to testing and confirmation of resources available. A draft QT RTTM should also be submitted alongside the test plan. Non-SIT QT Team will provide a template for this artefact. The test plan should include a high-level view of Non-SIT LDSO test schedule preferences to support the Non-SIT QT Team.

9.5 LDSO Preparation Schedule

A high-level schedule for each Qualification Wave can be found in Appendix C of the Qualification Approach and Plan [REF-01]. More specific dates will be included in the participant readiness checklist which is available on the MHHS Collaboration Base.

9.6 Non-SIT LDSO QT Participant Entry Criteria

In addition to the Wave entry criteria (please see section 8.4), each individual Non-SIT LDSO QT participant must meet the below entry criteria as well as the entry criteria listed in the Qualification Approach & Plan [REF-01]. This will be confirmed by the final test readiness report as well as an entry gate for each Non-SIT LDSO QT participant.

	LDSO Entry Criteria
1	Evidence of successful PIT Completion has been submitted, assured by the Non-SIT QT Team and any work off plans agreed with Code Bodies and DIP Manager and tracked - please refer to MHHS-DEL852 - Pre-Integration Test Guidance [REF-14] for full details of the PIT exit criteria and submission timelines for PIT deliverables.
2	All relevant test artefacts listed as an entry criteria in section 9.4 must have been produced by the Non-SIT LDSO QT participant and approved by Non-SIT QT Team, Code Bodies and DIP Manager (where applicable).
3	Successful completion of DIP onboarding and connectivity proving with no open issues which would impact the test schedule for non-SIT LDSO QT
4	Test Data has been generated in the Participant UIT environment
5	Participants have confirmed they have resources with necessary skills and system access to support the test stage execution and defect management process
6	Participant users have been onboarded to the MHHS Test Management Tool
7	For any LDSO QT participants placing reliance, MHHS Placing Reliance submission reviewed and approved by Non-SIT QT Team, Code Bodies and DIP Manager.
8	Where test scope has been adjusted for Placing Reliance and or implementation of CR29, this has been documented in the LDSO QT test plan and this has been reviewed by Non-SIT QT Team, Code Bodies and DIP Manager.
9	Code Bodies and DIP Manager confirm that the Initial Qualification Assessment Document Submission has been completed.

Table 5 Non-SIT LDSO QT Participant Entry Criteria

10 Test Execution

This section provides information on how test execution will be managed on a day-to-day basis as well as including high level information on defect and release management processes.

10.1 Schedule

During Non-SIT LDSO QT test execution phase, Non-SIT LDSO QT Participants will be running migration, functional, non-functional and operational test cases and raising defects for failed test cases in ADO. Test scenarios and test cases may be required to be run in a specific order, to ensure they are executed correctly. Any prerequisites required and the order of executing are detailed within the test scenarios and test cases.

Non-SIT LDSO QT Participants will be running test cases and recording each test step in the Test Management Tool. The Non-SIT QT Team will keep the MHHSP, Code Bodies and DIP Manager up to date with the progress against participants' test plan and test schedule.

The test schedule and the scheduling of the execution of LDSO Qualification test scenarios will be managed by the Non-SIT QT Team with support from the Non-SIT LDSO QT participants. The detailed test execution schedule will take

input from Non-SIT LDSO QT participants' test plan as this will include a high-level view of Non-SIT LDSO QT participants' test schedule preferences.

10.2 Test Execution

During test execution, a high level of interaction is expected to be needed between the Non-SIT LDSO participant and their supporting test analyst from Non-SIT QT Team to coordinate the sending of messages from the test harness. This will need to include agree test data to be used. This is expected to be coordinated via daily stand up and dedicated team channels. Test execution is only expected to happen within working hours.

10.3 Test Case Status

Non-SIT LDSO participant will record the outcome of test steps execution status in ADO. A test step will be marked as "pass" if the actual result matches the expected result otherwise it will be marked as failed and a defect will be raised. Relevant evidence should be attached to each test step to allow review and assurance to take place.

If the subsequent triage process determines that the defect has been raised in error (e.g. due to a tester error), the test can be re-run and depending on the outcome, the status can be changed from "fail" to "pass". The test will be scheduled for re-testing once the defect fix becomes available. If any tests remain in the failed state at the end of testing and are deemed acceptable, then they will be clearly marked in the test completion report with an agreed work off plan which has been approved by Code Bodies and DIP Manager. All high severity defects (severity 1 and 2) must be fixed and retested for a participant's QT exit, it is expected that Non-SIT LDSO QT Participants will make all reasonable endeavours to fix and retest all lower severity defects (severity 3 and 4) prior to the end of their QT. Any work off items will need to be approved by Code Bodies and DIP Manager as part of the exit criteria for QT. Please refer to Section 10.4 of this annex for more information on defect management.

On some occasions, a Test Step required for a Test Case will be marked as "blocked" if they can't be run due to a known defect. This status will be used appropriately where it assists in informing stakeholders of the impact of open defects on LDSO QT participants' progress or completion.

10.4 Defect Management

Non-SIT LDSO QT participants are expected to comply with the MHHS Defect Management Plan [REF-12] which will be updated for Non-SIT LDSO QT to ensure process is suitable.

Non-SIT LDSO QT participant should raise a defect[7] in MHHS test management tool (ADO) if the outcome of the test execution doesn't match the expected outcome in the test case step being executed or the issue is preventing tests to be run. As well as if the scenario matches the definitions as set out in MHHS Defect Management Plan [REF-12].

All defects will be raised and managed within ADO, this includes any defects raised against MHHSP simulators, data generation tools or environment will be logged in ADO and assigned to the Non-SIT QT Team for an initial assessment.

If the defect related to either system or environment is identified by Non-SIT LDSO QT participant, it should be logged in ADO in the first instance and assigned correct priority and severity levels as per the guidance in [REF-12] Defect Management Plan.

Defect identified in the environment build during readiness stage should be raised by the LDSO Test Participant Test/ Environment Teams/SI Environment Manager and assigned directly to the relevant Non-SIT LDSO QT participant's environment team for resolution.

Defects identified by Non-SIT LDSO QT participant in the execution phase of QT will be assigned to the Non-SIT QT Team and then the process for defect management will be followed (as in Defect Management plan).

[7] The MHHS programme defines a defect, in respect of any tests, as anything that is preventing the execution of the tests; or once commenced or executed, the test has an unexpected or unexplained outcome or response.

All defects must be linked back to the test steps that were being run to ensure that the defect template is populated with a sufficient detail for anyone trying to reproduce the problem and appropriate evidence should be attached as well.

If the defect raised by a Non-SIT LDSO QT participant is deemed not valid by Non-SIT QT Team, it will be discussed with Non-SIT LDSO QT participant before being rejected and an appropriate explanation for Rejection will be provided.

There could be several reasons for defect rejection: it could be due to incorrect interpretation of a test case/test step, insufficient or no evidence provided, tester error or defect is a duplicate. The Non-SIT QT Team will support LDSO Test Participant to reduce the number of rejected defects by actively working on identifying root causes for rejection to remove any process or knowledge issues.

Non-SIT LDSO QT participants are expected to actively engage with defect management process and as such they may need to support triage and defect resolution meetings.

Known issues will be shared with Non-SIT LDSO QT participants so this can be factored into their test planning.

10.5 Release and Configuration Management

All Non-SIT LDSO participants are expected to comply with Release and Configuration Approach [REF-19] and plan. Non-SIT LDSO participants will be able to access the release management plan and schedule on the MHHS collaboration base.

In addition to major releases, MHHSP might be required to schedule minor releases, patch releases and emergency releases in order to promote defect fixes and configuration changes into UIT environment. The MHHSP change release process will ensure that thorough impact assessment is conducted to determine impact of change, code, configuration or other on LDSO QT and participant's testing prior to communicating and engaging with impacted test parties.

At the time of writing this document, Major Code Release (IR8) 8 has been published and this is the Design Baseline to be used in Non-SIT LDSO QT and for Non-SIT LDSO participants to build against for the execution of their PIT and preparation activities.

10.6 Regression Testing

Regression scope should cover testing for changes introduced by a new release. Regression testing should be based on the scope analysis of modification, impact the fixes might have on testing that have been previously executed and release notes for the build describing system versions, defect statuses, etc.

Non-SIT LDSO participants should ensure that they are deploying quality releases in UIT. For releases containing fixes of their internal systems, Non-SIT LDSO participants might choose to utilise a staging environment to perform verification checks prior to promoting those releases into UIT. Non-SIT LDSO participants should also consider regression testing releases of internal systems within the UIT environment.

Non-SIT LDSO participants might want to use the UIT environment to regression test their systems against MHHSP major, minor, and emergency releases to ensure no new defects have been introduced and the quality of release is stable.

10.7 Test Suspension and Resumption Criteria.

During Non-SIT LDSO QT, a participant has the right to suspend testing where it considers necessary, by agreement with the Non-SIT QT Team. Testing will only recommence when agreed between the participant and Non-SIT QT Team. Code Bodies and DIP Manager will also be informed about suspension, impact on MHHSP and MHHS Qualification timelines.

Reasonable grounds for suspending testing may include any of the following:

- Application components are not available as scheduled.
- A testing issue prevents further testing from proceeding.
- A large percentage of planned test scripts for a given day fail and significant root cause analysis needs to be undertaken to establish the cause.

Test scripts to be executed are in a “blocked” status due to an identified testing issue.

Where testing has been suspended, Non-SIT LDSO participants will produce a test suspension report reflecting the cause of the suspension and steps to be taken for testing to resume – the test resumption criteria. Testing will only resume once the test resumption criteria have been met and evidence demonstrated to Non-SIT QT Team.

10.8 Participant QT Test Completion Report

Each Non-SIT LDSO participant will be required to provide a finalised version of the QT Test Completion Report once they’ve completed their testing. Non-SIT LDSO participant should also submit an updated QT RTTM. This should be submitted as soon as possible post completing testing. It will need to include summary of how the testing completed aligned with the original scope and any exceptions, details of any updates made to the test environment during the course of testing, summary of the test results, details of all issues encountered during testing any exceptions and work off plans that have been agreed with Non-SIT QT Team, Code Bodies and DIP Manager. It is recommended that Non-SIT LDSO QT participants provide a draft version of the report for review ahead of final submission. This will be especially beneficial if the Non-SIT LDSO QT participant needs to agree any work off items.

The Non-SIT QT Team will be engaged in test assurance and monitoring throughout the execution activities; however, the report is required as evidence to support that the Non-SIT LDSO QT participant has met all test exit criteria as part of the QT exit governance.

10.9 Test Evidence

LDSO QT participants will be required to produce sufficient evidence of the successful execution of test steps that are executed in ADO and the test evidence is to be uploaded to ADO. This evidence must clearly show that the test step has met its objective when the test step passes or clear supporting evidence when the test step fails.

It will not be possible to provide evidence for each test step in the test case, as it could be a significant overhead to upload and assure that amount of information, however Non-SIT LDSO QT participants will be required to demonstrate:

- Receipt of a message by LDSO system and any subsequent onward processing such as validation and data update as per MHHS design business process steps.
- Message being generated by LDSO systems.
- For NFR and operational requirements evidence can vary depending on the type of assurance activities.
    - Self-declaration, statement of facts, annotations, and description of manual and automated processes.
    - Functional test evidence or performance test results (response times and environment usage stats)

If test evidence of receipt of a message by the test harness or a central system is required, the Non-SIT QT Team will support the LDSO on obtaining this.

The Non-SIT QT Team will provide guidance to LDSO participants on what will be appropriate evidence that should be captured and attached to a test case or a defect. Screenshots of the test system, messages or electronic logs of messages must be provided as appropriate. Test evidence from DIP adaptor would not be considered satisfactory - this includes non-functional testing. There is a general principle that QT participants should have a logging mechanism so they can diagnose issues and capture additional information required should further evidence be requested.

Test evidence will be expected to be captured and uploaded into ADO at the point of test execution, or no later than the end of the business day, any exceptions to this timing of evidence upload will need to be specifically agreed with the Non-SIT QT Team. This is to facilitate the Non-SIT QT Team being able to conduct test assurance activities during test execution.

If a Non-SIT LDSO QT participant is seeking to 'opt out' of the "receipt" of DIP Publications[8], they will still be expected to complete the relevant test scenarios or test cases but provide test evidence of this information being

[8] As agreed, as part CR29 DIP LDSO Interface Processing

received via their existing mechanism rather than the receipt of DIP Publications, unless it has been agreed with Code Bodies and DIP Manager that this is not needed.

Please see section 10 of the Qualification Approach and Plan [REF-01] for wider information of MHHS Qualification Evidence.

10.10 Test Exit Criteria

Non-SIT LDSO participant is deemed to have successfully completed QT if the following criteria have been satisfied, in line with Qualification Approach & Plan [REF-01]:

- No outstanding Severity 1 and Severity 2 Defects.
- Sev3 and Sev4 defects that cannot be resolved during QT are documented with impacts assessment and a work off plan by the Programme Participant, reviewed by the Non-SIT QT Team and agreed with Code Bodies and DIP Manager ahead of QT completion.
- 100% test execution coverage, including functional, non-functional, migration and operational testing with approval from Code Bodies and DIP Manager for any de-scoped/ failed test cases prior to QT completion. Test results and evidence has been captured in the test management tool and has been assured by Non-SIT QT Team.
- LDSO QT Completion Report including work off plans reviewed by Non-SIT QT Team and approved by Code Bodies and DIP Manager.
- Completion of any PIT work-off plans or deferred PIT activity (as agreed with Code Bodies and DIP Manager)

There will be no formal exit gate for each Non-SIT LDSO QT Participant as the submission of LDSO QT Completion Report to Code Bodies and DIP Manager will mark the end of test execution phase.

11 Test Management and Organisation

11.1 Roles and Responsibilities

This section contains a lower-level RACSI specifically for LDSO QT during the Qualification Waves. RACSI covering other aspects of MHHS Qualification are included in section 8 of the Qualification Approach & Plan [REF-01].

Type of Activity	Activity	Participant	Code Bodies (BSC&REC)/ DIP Manager	MHHSP	Non-SIT QT Team	REC/BSC PAB	QAG	SITAG	QWG
Approach / Governance	Scenarios and test cases for LDSO	C	A	R	R	I	AP		C
Approach / Governance	Test Guidance	C	C	S	A/R		AP		C
Approach / Governance	Programme Release & Change Management Process	C	I	A/R	S		C	AP	C
Approach / Governance	Defect Management Plan Update	I	I	A/R	R		C	AP	C
Approach / Governance	ADO provision	I	I	A/R	C				
Overall Test Preparation	QT Environment Set Up	I	I	A/R	S		I		I
Overall Test Preparation	LDSO QT Environment Readiness Checks	I	I	A	R		I		I
Overall Test Preparation	Test Stub Development	I	I	A/R	C				
Overall Test Preparation	Test Stub Readiness and Set Up	I	I	A/R	C				
Overall Test Preparation	Data Availability	R	C	S	A/R				
Overall Test Preparation	Test Data set up	R	C	S	A/R				
Overall Test Preparation	Data Allocation	R	C	S	A/R				
Overall Test Preparation	ADO Training Materials	C	C	S	A/R				
Overall Test Preparation	Templates for Participant Artefacts e.g. Test Readiness	C	C	R	A/R				C

	Reports, test completion, test plan				
Participant Readiness	Placing Reliance Review for LDSO QT	C	A/R	S	A/R
Participant Readiness	ADO Set Up	C	C	S	A/R
Participant Readiness	ADO Test Cases Assigned	C	I	I	A/R
Participant Readiness	ADO Training	C	C	S	A/R
Participant Readiness	Test Steps Added to ADO	A/R	I	I	C
Participant Readiness	Environment Connection for LDSO	A/R	I	S	S
Participant Readiness	Participant Engagement for QT Readiness	C	C	R	A/R
Participant Readiness	Participant Readiness Tracking for QT	C	C	R	A/R
Participant Readiness	Participant Scripts (PIT)	A/R	I	I	C
Participant Readiness	Test Plan	A/R	I	I	C
Participant Readiness	Test Readiness Report	A/R	I	I	C
Participant Readiness	DIP Onboarding for LDSO QT	A	I	I	S
Test execution	Test Management for LDSO	C	A	C	R
Test execution	Environment Deployment for Central System Providers (UIT)	I	I	A/R	C
Test execution	Environment Deployment of Participant Systems (UIT)	A/R		C	C
Test execution	Environment Coordination	C	I	A/R	C
Test execution	Test Execution For LDSO	R	A	C	R
Test execution	Defect Management Meetings	I	I	I	A/R
Test execution	Issue Resolution Central Systems	I	C	A	I
Test execution	Test Readiness Reports	A/R	I	I	C

Test execution	Participant Updating ADO with Test Progress	R	I	I	A
Test execution	Defect Reporting	I	I	I	A/R
Test execution	Programme Testing Progress Reporting	I	A	I	R
Test exit	Upload of Test Evidence to ADO	A/R			C
Test exit	QT Test Completion Report	A/R	C	I	C
Test exit	Participant Work off	A/R	AP	I	C
Test exit	Test Assurance	C	C	I	A/R
Test exit	Review of Test Evidence	C	C	I	A/R

Table 6: Non- SIT LDSO QT RACSI[9]

11.2 Organisation Structure

The following resources/roles are expected to be required to prepare and execute LDSO QT. The below list is a guideline to the types of resource/roles required by organisations participating in the day-to-day activities of LDSO QT. Multiple roles may be carried out by the same resource. It is the responsibility of each participant to provide sufficient and appropriate resources to support the Test Stage.

Organisation	Role/Resource Type
LDSO	• Test Manager • Test Analyst • Defect Manager / Analyst • Programme Management • Infrastructure, application and network support • Release and configuration management support • Environment Management support
Non-SIT QT Team	• Test Manager • Test Lead / Analyst(s) • Test Data Lead / Analyst(s) • Defect Lead / Analyst(s) • Project Manager • Environment and Release Manager • Engagement Lead • Test Management Tool Lead / Analyst

Table 7 Expected Resources per Organisation

[9] (R = Responsible, A = Accountable, C = Consulted, I = Informed, S = Supporting, AP = Approver)

11.3 Stakeholder Engagement

Participant will be given a named point of contact in Non-SIT QT Team who will support the participant through test preparation, test execution and test exit as well as assurance activities. A dedicated test participant contact will actively support the tracking of readiness activities and identify any issues that may hinder the progress of participants. This approach provides continuity for the participant and improved participant experience.

The Non-SIT QT Team will work in conjunction with MHHSP PPC engagement leads to provide expert support to LDSO participants during all test stages.

The engagement will be tailored to LDSO depending on their specific needs, and will take a form of bilateral meetings, fortnightly briefings, pre-governance meetings bilateral sessions, or wider QWG meetings. The Non-SIT QT Team, MHHSP, Code Bodies and DIP Manager will continue to work collaboratively with Non-SIT LDSO QT Participants and will maintain bespoke interactions to discuss progress and issues alongside with engagement through MHHSP channels such as the collaboration base and website.

11.4 Meetings

All participants involved in LDSO QT should attend regular meetings. Frequency will be dependent on the criticality of project deliverables and issues. This could involve daily stand-ups and weekly meetings based on testing schedules.

Typically, the following meetings will occur:

- Test Readiness meetings – track progress against plan of preparation activities
- Daily Test Meetings
- Defect Management Meetings
- Environments and Release Management Meetings – daily stand-up or weekly meetings

The Non-SIT QT Team will provide status updates to the relevant MHHSP governance forums including QWG and QAG.

12 Test Governance and Reporting

12.1 Governance

LDSO QT will operate in accordance with Qualification Approach and Plan [REF-01]. The Non-SIT QT Team will monitor progress of Non-SIT LDSO QT participants and adhering to the decision making and escalation principles set out within section 11 of Qualification Approach & Plan [REF-01].

It is expected that participants are open, transparent and communicate with the Non-SIT QT Team/Code Bodies and DIP Manager if they think they are facing an issue which is blocking their testing or if they have concerns that they will not be able to meet their Qualification Wave. The Non-SIT QT Team, Code Bodies and DIP Manager would then work with participants on mitigating actions to overcome blockers in progress to ensure participants complete QT within the MHHSP timelines.

The confirmation that each milestone related to Non-SIT LDSO QT has been met will happen in accordance with MHHSP governance framework. If there are escalations related to meeting a milestone this will be raised and managed via the MHHSP governance framework.

12.2 Reporting

Non-SIT QT Team will provide regular reporting on the progress towards meeting the entry criteria set out in this annex, milestones as well as the progress of LSDO QT participants.

The confirmation that each milestone related to Non-SIT LDSO QT has been met will happen in accordance with MHHSP governance framework. The Non-SIT QT Team will be responsible for reporting status and RAG for all Tier 2 and 3 QAG milestones.

During test execution, ADO will be used for test management and will be used to provide reports on LDSO QT participants' test progress and coverage. It will also be for assurance against LDSO QT participants' plans and scope. To support this non-SIT LDSO QT participants are expected to update ADO on a daily basis.

13 Test Assurance

Test assurance will fall into two categories, verification of test readiness to confirm entry criteria have been met and verification of test exit to confirm exit criteria will be met.

The Non-SIT QT Team will engage in assurance of Non-SIT LDSO QT readiness activities and artefacts, including those relating to PIT to ensure LDSO have met the entry criteria for entering QT i.e.

- Placing reliance submission form
- PIT artefacts
- LDSO QT Test Plan
- LDSO QT Requirements to Test Traceability Matrix
- Final Test Readiness Report
- Entry Gate

During and following Non-SIT LDSO QT execution, the Non-SIT QT Team will undertake assurance of test execution results with a specific focus, the below, to ensure LDSO have met the exit criteria for to exit QT.

- Validating evidence of actual vs. expected results of tests
- The quality of supporting information and evidence within defects.
- Test Completion Report

Additional assurance may be conducted by the Code Bodies and DIP Manager as part of their review of the final QAD submission. Please see section 10 of the Qualification Approach & Plan [REF-01]

13.1 Test Evidence

The Non-SIT QT Team will be responsible for assurance of test evidence provided by Non-SIT LDSO QT participants in ADO during test execution.

The Non-SIT QT Team will verify that sufficient evidence has been provided for a sample of test steps run during test execution. Evidence can be in the form of screenshots of the system under test, electronic logs of messages, or reports, and will be used during test assurance to validate actual vs. expected result of the test. In addition, test evidence will be critical for triaging defects.

14 Risks and Dependencies

The key risks, assumptions and dependencies for MHHS Qualification are being documented and monitored by the MHHS Programme, Code Bodies and DIP Manager using the MHHS Programme RAID Log which can be accessed via the MHHS Collaboration Base.