

Smart Metering Implementation Programme (SMIP)

End-to-End Testing Approach Document

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Document History

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3.10	17/06/16	Updated in line with Direction from DECC on 14 June regarding contingency request and overlap of SIT and Interface Testing	DCC
3.11	01/07/16	Minor updates following DECC review	DCC

References

This document is associated with the following other documents:

Ref	Title & Originator's Reference	Source	Release Date	Version
[1]	Glossary of Testing Terms	ISTQB	Oct 2012	2.2
[2]	Joint Test Strategy	DSP	Apr 2015	3.5
[3]	Smart Energy Code	DECC	15 June 2016	4.12
[4]	DSP Contracts	DCC	23 Sep 2013	1
[5]	CSP Contracts (North, Central and South)	DCC	23 Sep 2013	1
[6]	Device Selection Methodology	DCC	Nov 2014	1.0
[7]	CTSD (Common Test Scenarios Document)	DCC	15 June 2016	SEC Appendix R
[8]	Guide for Testing Participants (SEC H14.3)	DCC	3 Sep 2015	1.3
[9]	SEC Definitions (Section A1)	DECC	15 June 2016	SEC Section A
[10]	Enduring Testing Approach Document	DCC	15 June 2016	SEC Appendix J
[11]	Testing Issue Resolution Process	DCC	15 Sep 2015	1.0
[12]	DCC User Interface Specification (DUIS)	DSP	29 Jan 2015	
[13]	Interface Testing Approach Document	DSP	01 Apr 2016	2.2 consultation version
[14]	SMKI and Repository Test Scenarios Document	DCC	15 June 2016	SEC Appendix K
[15]	Release Management Policy	DCC	31 Mar 2016	1.0
[16]	End-to-End Testing Plan	DSP		Not published
[17]	Indicative Charging Statement for the Regulatory Year ending 31 st March 2017	DCC	April 2016	1.0
[18]	Test Data Plan	DSP		Not published
[19]	Testing Issue Management Tool Guide	DSP		Not published

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1 Introduction

1.1 Context

This document sets out the manner in which the End-to-End Testing (E2ET) Stage will be conducted for the Smart Metering eco-system, which is depicted in Figure 1, below.

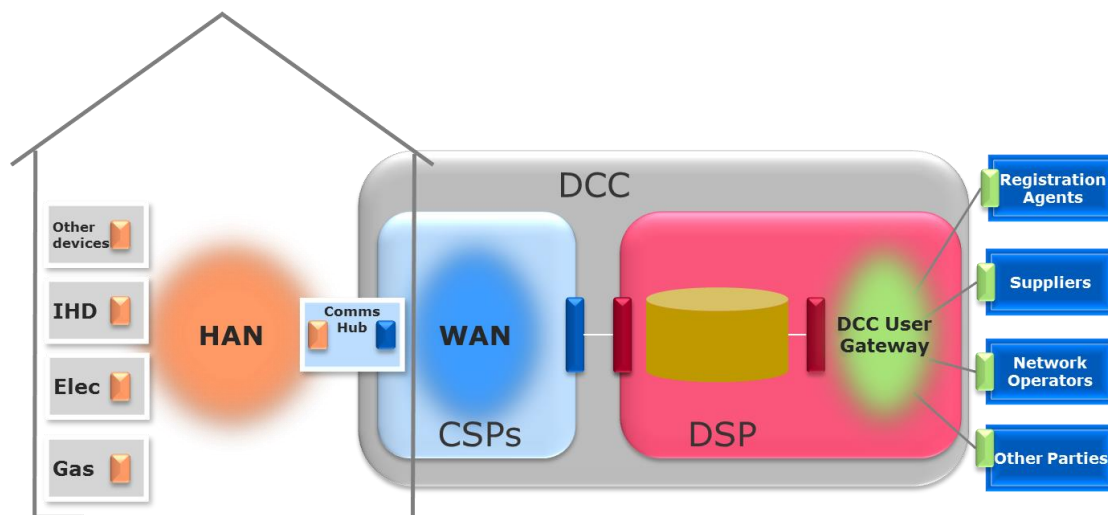


Figure 1 – DCC solution

This End-to-End Testing Approach is based on:

- the Smart Energy Code (SEC) [3]
- the Joint Test Strategy [2]
- the DSP and CSP Service Provider Contracts [4], [5].

Figure 2 demonstrates how this Test Approach (enclosed within the red oval) fits in with the overall hierarchy of test documents that will be produced for the programme.

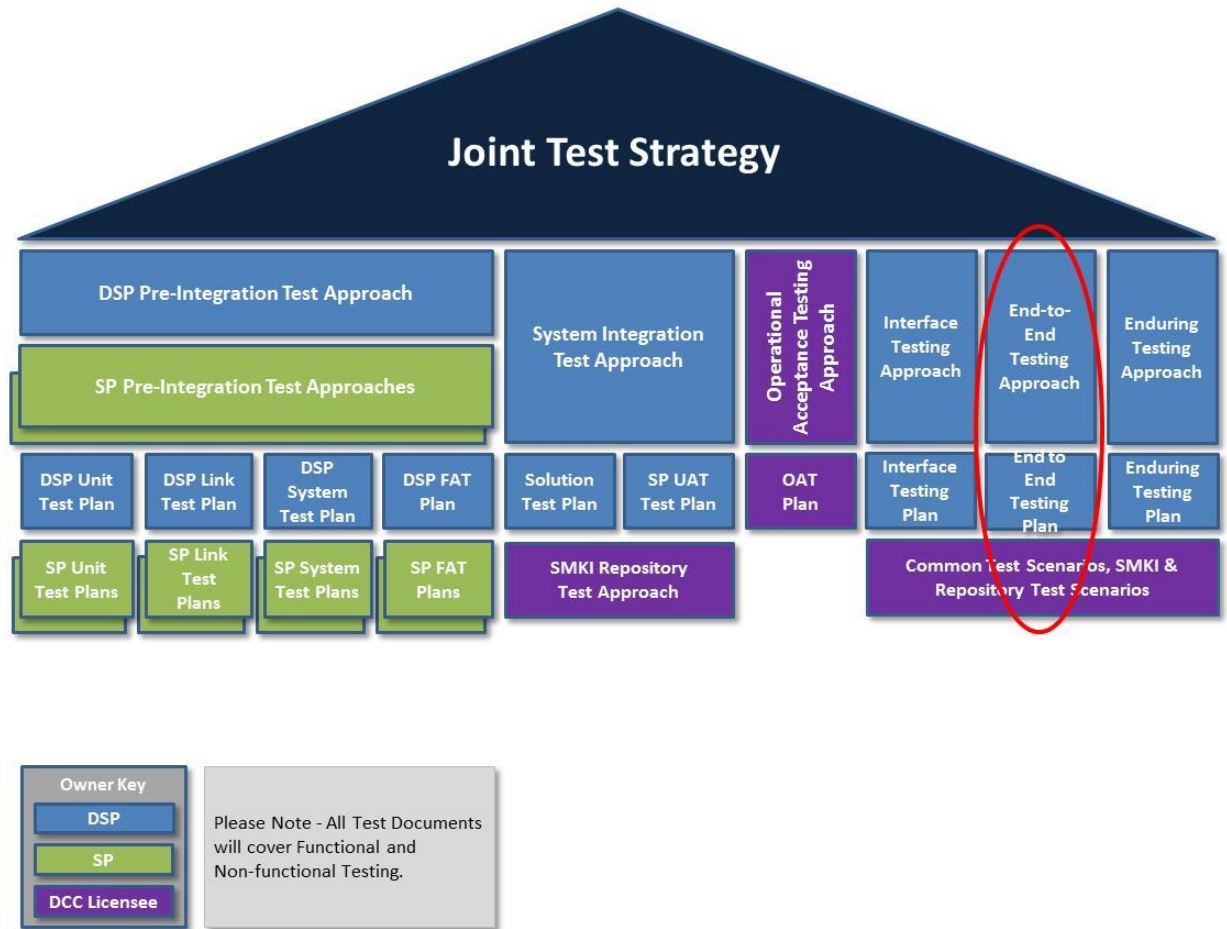


Figure 2 – Programme test documentation hierarchy

Figure 3 illustrates the documentation set for End-to-End Testing. Note that some of the documents in the diagram also apply to Interface Testing and Enduring Testing.

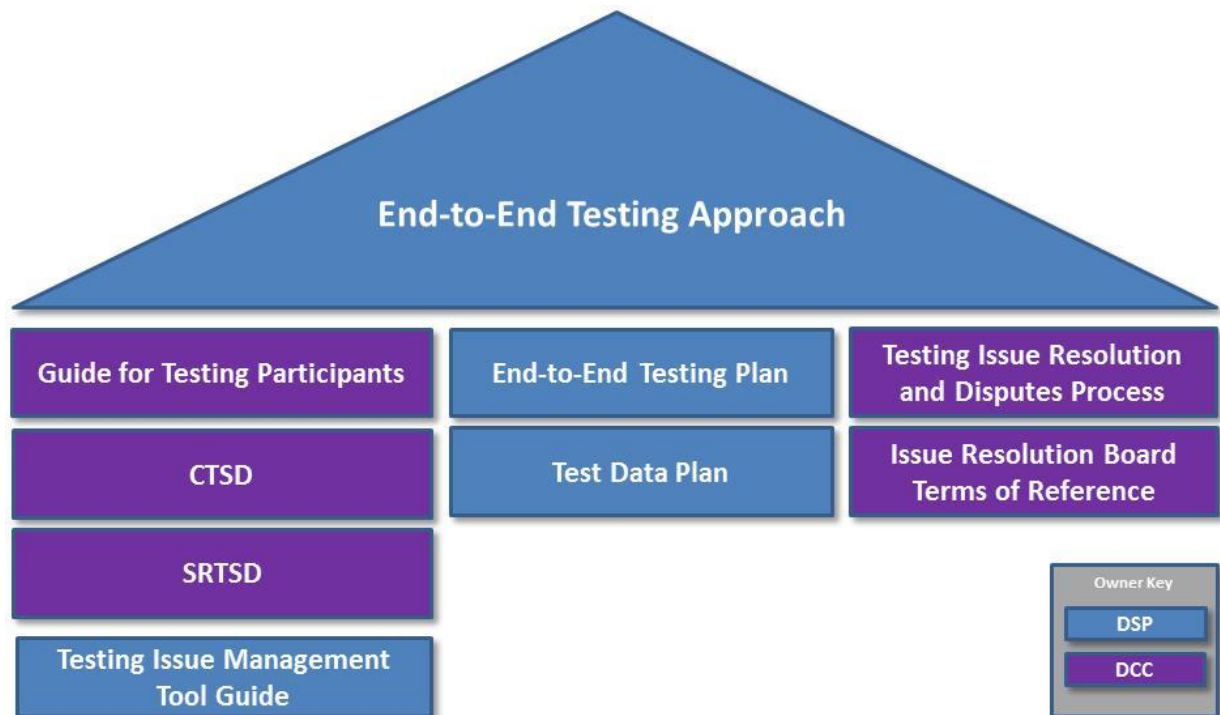


Figure 3 – End-to-End Testing documentation hierarchy

1.2 Change Forecast

This document will be assessed and, where applicable, updated by the DCC when any of the documents listed in the References table are modified.

Revisions to this document will be made in accordance with the review, approval and appeal process described in the SEC section T4.13 and outlined below.

1.3 Reviews, Approvals and Appeals

Following a period of consultation¹, the document will be presented to the Testing Assurance Group (TAG) for review and then to the SEC Panel for approval, along with the consultation responses. The initial version was published on the DCC website, www.smartdcc.co.uk, six (6) months before the start of End-to-End Testing.

The document can be rejected by the SEC Panel prior to approval and the decision of the SEC Panel (to either approve or reject the document) can be appealed. The SEC² sets out the process that will be followed by the DCC in such an event.

1.4 Terminology

In this document the term “Service Provider” includes all of the following:

¹ In accordance with Section T4.6 of the SEC.

² Sections T4.7-8 apply

- the DSP;
- both CSPs;
- the Trusted Service Provider (TSP), supplier of the SMKI solution element;
- the DCC Enterprise Service Provider (DCC Enterprise), i.e. the DCC in its role as supplier of Enterprise systems such as Billing and BI/MI;
- CGI in its role as provider of Service Management (encompassing the Remedy help desk and the Self-Service Interface); and
- Critical Software, supplier of Parse & Correlate software.

The term “Test Stub” is as defined in the SEC and is taken to mean systems and actions which simulate the behaviour of Devices and User Systems.

The term “Testing Issue” is as defined in the SEC and is taken to mean in respect of any tests (a) anything that is preventing the execution of the test or (b) once commenced or executed, the test has an unexpected or unexplained outcome or response.

The term “Testing Participant” is as defined in the SEC and is taken to mean in respect of each Testing Service, the persons (whether or not they are Parties) who are entitled to undertake such tests, as described in Section H14 (Testing Services) of SEC, together with any other persons identified as such in Section T (Testing During Transition).

The term “User System” is as defined in the SEC.

This document uses standard testing terminology, a glossary [1] of which can be found on the International Software Testing Qualification Board website, www.istqb.org.

Abbreviations used in this document are listed in Table 1, below.

Abbreviations	Full Title
BI	Business Intelligence
CI	Configuration Item
CoS	Change of Supplier
CPA	Commercial Product Assurance
CSP	Communication Service Provider
CTSD	Common Test Scenarios Document
DAB	Design Assurance Board
DCA	Device Certificate Authority
DCC	Data Communications Company
DCC KI	DCC Key Infrastructure
DC-PTCH	Debug Capable - Prototype Test Comms Hubs
DECC	Department of Energy and Climate Change
DLMS	Device Language Message Specification
DSP	Data Service Provider
DSM	Device Selection Methodology
DUIS	DCC User Interface Specification
E2ET	End-to-End Testing
GBCS	Great Britain Companion Specification
HAN	Home Area Network
IHD	In Home Display
IGT	Independent Gas Transporter
IRB	Issue Review Board (for Testing Issues)
IT	Interface Testing
MI	Management Information
MPRS	Meter Point Registration System
OAT	Operational Acceptance Testing
OCA	Organisation Certificate Authority

Abbreviations	Full Title
PIT	Pre-Integration Testing
RDP	Registration Data Provider
RTM	Requirements Traceability Matrix
SEC	Smart Energy Code
SIT	Systems Integration Testing
SM	Smart Meter
SMKI	Smart Meter Key Infrastructure
SP	Service Provider
SREPT	SMKI & Repository Entry Process Tests
SRTSD	SMKI & Repository Test Scenarios Document
SSI	Self Service Interface
SSMI	Self Service Management Interface
S/W	Software
TAG	Test Advisory Group
TBDG	Technical Business Design Group
TSP	Trusted Service Provider
UAT	User Acceptance Testing
UEPT	User Entry Process Test
UIT	User Integration Testing

Table 1- Abbreviations

2 Scope

2.1 Overview and Objectives

The DCC will manage the End-to-End Testing Stage in conjunction with its Service Providers and will provide an End-to-End Testing environment, software and services (including Testing Issue resolution support) which can be used by any eligible Testing Participant. The tests which Participants may conduct in the End-to-End Testing Stage are set out in SEC Section H14.1 (a) and (c), namely:

- User Entry Process Tests (UEPT); and
- User System and Device Testing.

Testing Participants that have completed their UEPT in a particular User Role during the Interface Testing Stage will not need to repeat them in that User Role prior to conducting User Systems and Device Testing.

One testing environment will be provided, which is shared between the Interface Testing and End-to-End Testing Stages. This will support concurrent IT and E2ET activities. The environment will allow the Testing Participant to use:

- The DCC physical test lab: UEPT must be conducted against Devices (provided by the DCC) in the DCC physical test labs. These test labs may also be used for User System and Device Testing; and/or
- The 'Remote Test Service': where Testing Participants conduct User System Testing and Device Testing using Devices located within their own test labs (Remote Test Labs).

The completion of UEPT for a particular User Role and SREPT is a mandatory requirement for any Testing Participant that wishes to become a User and take services from the DCC in that User Role.

User System Testing and Device Testing are voluntary activities and any Testing Participant with a valid reason to perform the tests against the DCC can use the test environments for this purpose³. These Testing Participants include:

- Energy Suppliers;
- Network Parties;
- Other Users;
- Device Manufacturers;
- Shared service providers;
- Other software providers; and
- Test houses.

A Testing Participant wishing to undertake User System Testing or Device Testing in a particular User Role must first successfully complete UEPT in that User Role and SREPT (see section 5.3). As the SEC Panel has agreed that Interface Testing and End-to-End Testing Stages can be conducted concurrently, any Testing Participant that completes

³ Subject to meeting the requirements for testing set out in this End-to-End Approach Document and the SEC.

SREPT and UEPT in a particular User Role (and receives a Test Completion Certificate from the DCC) can commence User System Testing in that User Role as soon as the End-to-End Testing Stage is open.

A Testing Participant wishing to conduct Device Testing with Devices and which is not eligible to undertake UEPT (eg a Device Manufacturer) must first:

- demonstrate that it is capable of sending DUIS Service Requests and receiving Service Responses by establishing a DCC Gateway Connection and performing a DUIS Connectivity Test, as defined in the Common Test Scenarios Document; and
- provide evidence that all DUIS Service Requests can be generated; the form of this evidence may include test results and will be agreed on an individual basis with each Testing Participant..

Should two (or more) Testing Participants wish to co-operate for certain User System or Device tests, such as Change of Supplier, then they may do so, without any need for DCC authorisation. Note that the DCC may need to be informed of changes of supplier, to ensure that the data is available to support this.

2.2 Use of the Test Services and Test Environments

The explicit charges associated with the use of:

- The Remote Test Service by any category of Testing Participant; and
- Test Support Services in addition to a base level of support, which will be available via the request to the Service Desk

will be set out in the Charging Statement [17] which will be published by the DCC on its website. The process for ordering Remote Test Services is set out in the Enduring Testing Approach Document and the Guide for Testing Participants [8] document will also set out the manner in which the Remote Test Service can be established and the lead times for establishing the service and for ordering Prototype Testing Communications Hubs for testing.

H14.33 which sets out that a Testing Participant must first agree to pay any applicable charges before the test support.

2.3 Commencement & Duration of End-to-End Testing Stage

The SEC Panel has approved a recommendation from the DCC to commence End-to-End Testing earlier than the point at which Interface Testing concludes and the End-to-End Testing Stage will commence in line with the date set out in the Joint Industry Plan..

The End-to-End Testing Stage will close in line with the provisions of SEC Section T4.

The Enduring Test Phase will commence immediately upon completion of the End-to-End Testing Stage. The DCC will provide Enduring Test environments in which the same test activities can be executed by Testing Participants (although the level of service that is provided and the associated costs may vary from time to time). This is described in the Enduring Testing Approach Document [10].

2.4 Phased implementation of DCC systems

The direction of the DECC Senior Responsible Officer, dated 18 December 2015, regarding the SMIP Contingency Request submitted by DCC, accepted the establishment and overlapping development of Releases R1.2 and R1.3.

Release R1.3 will be tested in a period of Additional Testing, in line with section 8.2 of DECC's consultation on New Smart Energy Code Content and Related Licence Conditions, dated 25 February 2016⁴.

Subsequently the Testing Baseline Requirements Document⁵ sets out transitional variations to Subsidiary Documents - i.e. requirements that are de-scoped from Release R1.2 and will be delivered in Release R1.3.

Subject to the agreement noted in section 2.5, the functionality will be made available for End-to-End Testing in line with the extant version of the Testing Baseline Requirements Document.

2.5 Overlap of SIT Solution Test Stage with End-to-End Testing Stage

On 20 May 2016, DCC published a consultation seeking Parties' views on proposals to request the further overlapping of elements of Systems Integration Testing (SIT) and Interface Testing (IT), in a manner which would not affect the ability of a User to conduct:

- i. User Entry Process Testing (UEPT),
- ii. other User facing activities in Interface Testing and End-to-End Testing, or
- iii. the ability of the DCC to conduct SIT UAT (User Acceptance Testing).

On 14 June 2016 DECC gave approval of the DCC's recommendation for the overlapping of SIT and IT pursuant to Section T3.7 of the SEC, regarding the continuation of additional elements of Systems Integration Testing after Interface Testing has commenced.

The approval, dated 14 June 2016, agreed that elements of SIT Solution Test would complete after the start date of Interface Testing and End-to-End Testing.

The R1.2 functional areas of the DCC solution that will overlap with IT are set out below:

- Testing of Non-Prioritised meters;
- Threshold Anomaly Detection Testing;
- DCC Service Management System (DSMS);
- Certified Product List Testing with SECAS;
- Telefonica – Toshiba 'Cellular and Mesh' Communication Hub SKU2 and SKU3 variants;
- DCC Enterprise Solution (BI/MI, Billing); and

⁴ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/503345/February_2016_SEC_consultation.pdf

⁵ <https://www.smartenergycodecompany.co.uk/docs/default-source/sec-documents/developing-sec/tbrd---testing-baseline-requirements-document-v1-3.pdf?sfvrsn=4>

- RDP Testing.

The R1.2 functional areas of the DCC solution that will be available at the start of IT / UEPT are:

- Processing of DUIS Service Requests and Responses;
- Self-Service Interface.

Scheduling of testing will minimise disruption to Testing Participants.

2.6 Scope of End-to-End Testing Environment

The following functionality will be provided⁶:

- processing of DUIS Service Requests and Responses, including transmission to and from the Metering Devices via the CSP systems and Communications Hubs and the generation of Alerts;
- TSP SMKI service;
- Self-Service Interface, with the exception that Forecasting and Ordering of Communications Hubs and Auxiliary Equipment will not be available. Although the remaining functionality will be available data will be limited. For instance, Reporting and FAQs is likely to be limited.

At the start of the End-to-End Testing Stage, the functions listed above will be available in the form intended for initial use in the live system, noting variations per section 2.4.

Parse & Correlate software will be made available to Testing Participants for installation on their systems.

During the End-to-End Testing Stage, a separate Remedy environment will be made available to Testing Participants to support development of internal systems/procedures.

⁶ Noting the phased implementation of functionality, per section 2.4.

3 Environments, Networks and Test Labs

3.1 Introduction

The DCC test environment for E2ET comprises a set of networked environments provided and supported by each Service Provider. In this test Stage, Communications Hubs and Devices may be housed in:

- DCC physical test labs - at each of the CSP's premises, furnished with:
 - Debug Capable Prototype Testing Communications Hubs provided by the CSP and Devices obtained by the DCC, for use in UEPT; and
 - Prototype Testing Communications Hubs and Devices obtained by the Testing Participants (unless agreed otherwise), for use in User System and Device Testing;
- Remote Test Labs - at the premises of Testing Participants, furnished with Communications Hubs and Devices obtained by the Testing Participants.

The DCC environment will contain DSP-delivered components of the Smart Metering System, including some features of the Self Service Interface (SSI), as set out in section 2.6. The CSPs will each provide a test environment. The TSP will provide a test environment containing all TSP-delivered components of the Smart Metering System. Test SMKI and DCCKI certificates will be used in this Stage, obtained in accordance with the process described in the Enduring Testing Approach Document [10]. The DCC will provide Debug Capable - Prototype Test Comms Hubs (DC-PTCHs)⁷ within the CSP test labs to support the triage process for E2E testing. Standard (non Debug Capable) Test Comms Hubs will be provided for use in Remote Test Labs. Each will be available at the start of End-to-End testing.

3.2 Test Labs

3.2.1 DCC physical test labs (CSP Test Labs)

Each CSP will provide one or more test labs in which Devices may be housed and connected to the CSP's test system. The CSP test systems will be linked to the DSP via test SM WAN networks. The planned locations of DCC physical test labs are: one in Winchester for CSP (N); one in Northampton (main site for CSP(C/S)) and another in Runcorn (secondary site for CSP (C/S)).

The DCC physical test labs that are established for the Interface Testing Stage will accommodate concurrent testing against 475⁸ Device sets (each Device set comprising a Communications Hub, a Gas Meter and an Electricity Meter). 375 Device sets will be housed in the CSP Central/South lab and 100 in the CSP North lab. These DCC physical test labs will also be used during the End-to-End Testing, but may be reduced in size during the Enduring Testing Phase should the number of predicted Testing Participants reduce and the

⁷ DC-PTCHs are Communications Hubs that are capable of providing information to support triage, analysis and resolution of issues that may occur between Devices on the HAN.

⁸ A number of spaces for Device sets will be reserved for other testing, including UAT, so the number of spaces available for UEPT and Device and User Systems testing is less than 475. The number of Devices (or Test Stubs) may also be subject to the availability of Devices (or Test Stubs) with which DCC has completed SIT.

costs associated with the provision of space for this same level of test meter sets be unjustifiable. The number of Device sets during End-to-End Testing is based on expected Testing Participant numbers of 15 Supplier Parties, 5 software/service providers and all of the Network Parties.

Each CSP will provide a secure physical environment in which to house Communications Hubs and Metering Devices and will use an appropriate asset management process. The same make/model/ (minimum) firmware version of Communications Hubs and Devices (or Test Stubs) which were used during SIT are those which will be used for UEPT.

Each Test Lab will house “sets” of Devices, with a set consisting of:

- one Communications Hub;
- one Electricity Smart Meter;
- one Gas Smart Meter;

and other Devices or stubs as required to complete UEPT.

3.2.2 DCC physical test labs for UEPT

A Testing Participant undertaking UEPT must use a DCC physical test lab (and not a Remote Test Lab). The Communications Hubs will be provided by the CSPs and the Devices by the DCC (in conjunction with the Meter Manufacturers).

The Communications Hubs will be installed, substituted and maintained by the CSPs. The metering Devices will be installed and substituted by the CSPs in conjunction with the Meter Manufacturers and maintained by the Meter Manufacturers. Sufficient numbers of spare Devices will be held in reserve so that faulty Devices can be replaced immediately.

The DCC will allocate a number of spaces in the Lab, together with Device sets to the Testing Participant, as agreed at the UEPT initiation meeting, according to the following allocation schedule:

- a) Parties that are Affiliates undertaking UEPT in the User Roles of Import Supplier and / or Gas Supplier will collectively be allocated a total of five Device sets to undertake UEPT in those User Roles;
- b) Parties that are Affiliates undertaking UEPT in the User Role of Export Supplier will collectively be allocated a total of five Device sets to undertake UEPT in that User Role;
- c) Parties that are Affiliates undertaking UEPT in the User Roles of Electricity Distributor and / or Gas Transporter will collectively be allocated a total of two Device sets to undertake UEPT in those User Roles. Where Parties that are Affiliates hold Electricity Distribution Licences and/or Gas Transportation Licences in different Regions, such Affiliates shall be offered on request two Device sets collectively in relation to each Region; and
- d) Parties that are Affiliates undertaking UEPT in the User Role of Other User will collectively be allocated a total of five Device sets to undertake UEPT in that User Role..

DCC will commission Devices for Parties who are not eligible to commission them themselves, i.e. the Party holds neither IS nor GS User Role.

The Device sets allocated for the conduct of User Entry Process Tests shall not be used for other testing without the agreement of DCC, such agreement not to be unreasonably withheld.

Note that these numbers refer to working Devices: where a Device is faulty, then it will be replaced from the spares held for this purpose.

CSP and Meter Manufacturer staff will be available to support the following:

- Device installation scenarios;
- Replacement of faulty Devices; and
- Testing Issue diagnosis.

Note that the functionality of the Devices will not be tested during UEPT.

3.2.3 DCC physical test labs for User System and Device Testing

A Testing Participant wishing to undertake User System and/or Device Testing may use a DCC physical test lab for this purpose, but must first comply with the required terms and conditions as described in section 3.2.4. The Testing Participant may provide its own Devices or may request the DCC to provide Devices and must book a test slot as described in section 5.1. The number of spaces that can be reserved will be agreed during the Test Initiation Meeting.

The Testing Participant is responsible for ordering the Prototype Testing Communications Hubs (if they do not want to use the DC-PTCH) and Metering Devices, ensuring their transport to the DCC physical test lab and installing them in the space allocated, as well as for their removal at the end of the test slot (unless otherwise agreed). Details of the procedure for ordering Communications Hubs for testing and associated charges for use of the DCC physical test lab is set out in the Guide for Testing Participants [8] and Charging Statement [17] and SEC Section F10. An order for Communications Hubs for testing must be placed at least 18 weeks before the required delivery date. However, DCC will also provide DC-PTCHs for Testing Participant's use, in preference to their own Test Communications Hubs. DCC will provide appropriate support for DC-PTCHs.

The Testing Participant may also provide other Devices, such as In-Home Displays, provided that:

- Prior agreement has been obtained from the DCC;
- The Devices can be accommodated in the space allocated; and
- The Devices meet the entry criteria described in section 3.2.5.

Upon request by the Testing Participant, the DCC will obtain Metering Devices selected via the Device Selection Methodology. Where the Testing Participant requests the DCC to provide metering Devices, the DCC will be responsible for placing the orders and ensuring the delivery of the equipment to the DCC physical test lab and arranging installation.

Any physical interaction with the Communications Hubs (with the exception of support provided for debug-capable Communications Hubs) or metering Devices must be carried out by the Testing Participant's staff. The following alerts may be generated by Devices and Communications Hubs from within a DCC physical test lab:

- Supply Armed (GBCS reference 0x8F32);

- Device Joined SM HAN (GBCS reference 0x8183);
- Average RMS Voltage above Average RMS Over Voltage Threshold (current value over threshold, previous value below threshold) (GBCS reference 0x8002);
- Future-Date HAN Interface Command Successfully Actioned (GBCS reference 0x8F66);
- Supply Outage Restored (GBCS reference 0x8F35);
- Supply Outage Restored – Outage >= 3 minutes (GBCS reference 0x8F36);
- Device Identity Confirmation (DUIS reference N16);
- Schedule removal because of CoS (DUIS reference N17);
- Device CoS (DUIS reference N27); and
- PowerOutageEvent (DUIS reference AD1).

Any additional alerts or response codes required by the CTSD [7] can also be generated when using metering Devices and Communications Hubs within a DCC physical test lab. Further alerts may be generated, provided they do not require physical interaction with the Devices or change to the power supply in the DCC physical test lab without prior agreement and comply with Health and Safety and any other reasonable instruction.

The storage space requirement for spare equipment will be arranged between the DCC and the Testing Participant when making application to use the Test Lab. The CSPs will provide related facilities for visiting Testing Participant/Meter Manufacturer staff, such as desk space and internet access (for general office communication, not connectivity to the Test Labs or Environments).

3.2.4 Terms and Conditions for use of DCC physical test labs

Where the Testing Participant is performing tests in a DCC physical test lab, it must comply with any reasonable supplemental terms and conditions that are required by the DCC and notified prior to testing which may include:

- identification and authorisation of the individual(s) requiring access to the DCC physical test laboratory;
- comply with requirements to maintain confidentiality of information;
- comply with policies relating to the acceptable use of the laboratory and equipment; and
- comply with requirements to follow:
 - health and safety guidance for test laboratories;
 - security guidance; and
 - training on use of test laboratories and installation of Devices in spaces provided.

Where the Testing Participant supplies its own Devices, the Testing Participant must:

- remove devices from the DCC physical test laboratory by 17:00 on the last day of the allocated test slot; and
- comply with any other reasonable restrictions notified by the DCC, which the DCC shall notify to a Testing Participant when informing them that their requested test slot is available.

Where DCC considers that the Testing Participant has breached any SEC obligations relating to the use of a Testing Service at the physical test laboratory it shall notify the Testing Participant to that effect. The DCC and Testing Participant shall use reasonable steps to rectify the situation. Where the DCC considers that the situation has not been rectified the DCC may request that the Testing Participant shall immediately remove its Devices from the Test Lab and the Testing Participant shall comply with such a request. DCC will provide the Testing Participant with:

- the reason(s) for this instruction; and
- the steps that must be taken and the evidence required, in order for the Participant to recommence testing.

3.2.5 Entry criteria for Devices placed in DCC physical test labs

The Testing Participant must provide the following to the DCC prior to installing a Device in a DCC physical test lab:

- Where a Testing Participant reasonably believes that devices do not conform to SMETS2, any variations are notified to, and agreed with, the DCC (such agreement not to be unreasonably withheld). Supporting information should be provided, including evidence of testing that has been undertaken, which could include the use of GIT for Industry.
- Evidence that all the supplied Devices are safe to store, install, operate and decommission. This may be in the form of statement of compliance with the relevant parts of the CE marking or equivalent.
- Confirmation that the Devices have been produced in accordance with a recognised assurance process and a defined testing issue management/configuration management process.

3.2.6 Remote Test Labs for User System and Device Testing

Testing Participants can choose to conduct User System Testing and Device Testing by using a Remote Test Service (available for both CSP N and CSP C/S), established on premises of their choice. As well as providing the necessary Communications Hubs, Metering Devices and any other Devices (such as In-Home Displays) which they choose to test, the Testing Participant will need to establish a connection to the chosen CSP's system (or to both CSPs if required). The type of connection depends on the CSP and on the location of the proposed Lab.

A Remote Test Lab may be used as soon as the relevant entry criteria described in section 5.10.1 have been met, which could be at the start of the End-to-End Testing Stage. A Testing Participant using a Remote Test Lab is not required to book a test slot in order to conduct testing.

3.2.7 Communications Hubs for testing

Communications Hubs for testing will be made available to Testing Participants in line with the milestones in the extant version of the Joint Industry Plan.

3.2.8 Device Testing

A Testing Participant wishing to conduct Device Testing with Devices and which is not eligible to undertake UEPT (eg a Device Manufacturer) must first:

- Provide evidence to the DCC to confirm that it is able to generate Service Requests as set out in DUIS; and
- Demonstrate that it is capable of sending DUIS Service Requests and receiving Service Responses by establishing a DCC Gateway Connection and performing a DUIS Connectivity Test, as defined in the Common Test Scenarios Document.

The evidence of compliance required by the DCC will be test results showing that all DUIS Service Requests can be generated; the form of this evidence will be agreed on an individual basis with each Testing Participant at a Testing Initiation Meeting.

3.3 Testing Participants' Environments and Equipment

Testing Participants conducting UEPT must use the Communications Hubs and Devices provided by the DCC for the purpose in the DCC physical test labs. UEPT cannot be conducted using the Remote Test Service.

Testing Participants are responsible for establishing connectivity with the DSP network via the DCC Gateway Connection. The DCC will provide support to the Testing Participant as requested and as appropriate. The DCC will also provide Parse & Correlate software to Testing Participants for installation on their test environments.

Testing Participants that are conducting Device Testing are responsible for providing a User System or a simulator which will “drive” the testing by generating DUIS Service Requests.

3.4 Support Hours

The DCC will make the test environments available from 08:00 to 18:00 and provide a test support service from 09:00 to 17:00 on each Working Day. The test environment (including Remote Test Labs) may be used for testing outside these hours, but will be unsupported. Should an issue occur during the night or weekend, then work to resolve it will not commence before 08:00 on the following Working Day.

Access to the DCC physical test labs will be possible 08:00-18:00 on each Working Day.

4 Test Data

4.1 Introduction

The DCC will produce documentation specifying the test data to be used and how it will be generated:

- Test Data Plan will describe responsibilities for provision of the data, the process for managing the data and give a timetable for the data provision; and
- Test Data Specification will define the data allocated to each Testing Participant.

It is the responsibility of each Service Provider and each Testing Participant to set up data on its system which conforms to this specification.

The Test Data Plan will be published on the DCC website or SharePoint 3 months prior to the start of E2E Testing, or at the earliest point in time thereafter. The Test Data Plan has been developed in consultation with the Test Design and Execution Group (TDEG) to ensure that it meets the needs of both data providers and Testing Participants.

Testing Participants must follow the requirements set out in the Enduring Testing Approach Document in order to obtain test SMKI and DCCKI certificates.

4.2 Test data principles

The principles stated in the Test Data Plan will include the following:

- Data provided will be adequate to support the planned number of participating Testing Participants;
- Data provision and maintenance will be co-ordinated and managed by the DSP, who may instruct an SP or Testing Participant to carry out an update or correction to the data for which they are responsible;
- The DCC will allocate MPxNs to Testing Participants;
- A single test data cut of all Live data will be taken by all RDPs on a nominated date and this data will be used for both IT and E2ET Stages. Therefore there will not be an undue or ongoing burden on the providing Network Party. The date chosen will be advised in advance to both RDPs and Testing Participants, in accordance with the Test Data Plan;
- Defined MPxNs will be reserved for IT and therefore not available for E2ET;
- The Supplier Party to an MPxN will not be divulged to another Supplier Party. This will be achieved by anonymising the data where necessary and by reserving specific MPxNs for Change of Supplier testing;
- Customer names will not be included in the data provided;
- Each Testing Participant will be allocated data with which to test (which will be enough to cover the number of Device sets it is using);
- The test data will be divided up such that defined MPxNs are segregated into:
 - UEPT; and
 - User System/Device Testing.

Within each of these categories, the data will be further segregated into separate sets of MPxNs:

- for each Testing Participant (where those for use by Network Parties will have a DCC dummy Supplier Party);
 - for new market entrants;
 - reserved for Change of Supplier; and
 - reserved for DCC use (for regression testing and resolving Testing Issues).
- The MPxNs a Testing Participant uses for UEPT will be assigned by the DCC and will be a small data set;
 - The MPxNs a Testing Participant uses for User System/Device Testing will be those associated with that Testing Participant in the cut of data taken, except for those reserved for other purposes, as described above. Testing Participants that are new entrants to the market will have MPxNs allocated by the DCC, taken from the existing data set;
 - The data one Testing Participant is using for testing will not be revealed to another Testing Participant; that Testing Participant will have exclusive use of the allocated data during the E2ET Stage (e.g. meter points allocated);
 - The data to be used by a Testing Participant will be provided as early as possible; however data relating to the Devices to be used (eg Device Id) will only be available around the time that testing is due to commence;
 - Data will comply with the provisioning and management guidelines in the Security section (Section G) of SEC [3];
 - Data will be reviewed before testing starts;
 - Storage and use of data will comply with the UK Data Protection Act; and
 - Data will be able to be restored (if needed because of a serious failure) at some point during the testing.

4.3 Test Data Plan

Full details of the test data to be used will be specified as part of a separate exercise and documented in the Test Data Plan.

The Test Data Plan will cover:

- Principles
 - How data is allocated to each Testing Participant;
 - How data allocation is communicated; and
 - How co-ordination will ensure no overlap/conflict between Testing Participants when testing (and between DSP-led tests and Testing Participants doing UEPT).
- Responsibilities of each SP/Testing Participant.
- Timetable, including
 - When data must be provided.
- Dependencies.
- Test Data Management
 - Process; and
 - Tool.

- Data Set-up Description - for each item of data needed for system set-up:
 - Party responsible for providing/maintaining;
 - How it relates to other data in the DCC Systems;
 - Source of the data; and
 - Quantity of data required.

The production of this Test Data Plan and subsequent provision of test data for IT will be a collaborative exercise between all SPs and the Testing Participants participating in TDEG. This will ensure that Testing Participants have adequate and correctly-functioning data with which to test. It will also ensure that the timetable allows adequate time for Testing Participants to set up the required data on their own systems.

4.4 Test Data Specification

A separate Test Data Specification, in the form of a spreadsheet, will be created for each Testing Participant. It will be divided into sections describing which data is reserved for:

- UEPT; and
- User System and Device Testing.

Within each of these, data will be allocated to Testing Participants, but some data will be reserved for Change of Supplier testing and for the DCC's own regression testing.

For all relevant data items, the values assigned to the Testing Participant will be listed.

A small set will be provided for UEPT. Another set will be provided for Change of Supplier testing, where the incumbent Supplier Party is a dummy one set up by the DCC and the DCC system data is set up such that the Testing Participant can take over the supply. The set provided for User System and Device Testing will be the MPxNs registered to that Testing Participant when the data cut was taken, except for those otherwise reserved.

5 Testing Principles

5.1 Scheduling

The DCC will schedule Testing Participants within DCC physical test labs in the End-to-End Testing Stage in accordance with the following principles:

- All Testing Participants that started UEPT in the Interface Testing Stage will continue these tests in the End-to-End Testing Stage without any disruption to their testing activity.
- As the SEC Panel has approved a recommendation from the DCC to commence End-to-End Testing before the end of Interface Testing, then all Testing Participants that completed UEPT for a particular User Role in the Interface Testing Stage will immediately (subject to the scheduled start date of End-to-End Testing) be eligible to commence User System Testing for that Role, even if the Interface Testing Stage has not completed. A Testing Participant may start User System Testing in one Role without having completed UEPT in all its Roles.
- 20 working days prior to the start of the End-to-End Testing Stage, the DCC will publish on its website a schedule of available 'test slots' for installation of Devices within the DCC physical test labs. Details of the manner in which requests for access to the Test Labs should be made and the lead times required will also be provided.
- The DCC will consider all requests for access to the DCC physical test labs and will attempt to accommodate these where reasonably practicable.
- Device Testing can commence at the start of the End-to-End Testing Stage using a Remote Test Lab, if this has been established by the Testing Participant.
- Device Testing can commence in a DCC physical test lab at the start of the End-to-End Testing Stage on the condition that sufficient space is available.
- The DCC will maintain the schedule of test space availability ("test slots") on SharePoint. This schedule will include details of those time periods during which access will be limited due to the requirement to test new releases of software/systems.
- The DCC will also maintain a list of Testing Participants that wish to conduct testing and will notify them if a space becomes available sooner than anticipated.
- A Testing Participant with a reserved test slot must notify the DCC immediately if it will not use that slot.
- A Testing Participant offered a different test slot from the one requested will be expected to make reasonable endeavours to use the slot offered, but is under no obligation to do so.

5.2 UEPT

SEC Parties choosing to start UEPT during the End-to-End Testing Stage must comply with the process that is set out in the CTSD [7] and perform a Technical Readiness Assessment as set out in these documents.

The DCC will support Testing Participants performing UEPT during the End-to-End Testing Stage and will facilitate the concurrent testing of these Testing Participants to the extent reasonably practicable. To facilitate UEPT Testing Participants are required to notify the DCC of their intention to participate in UEPT 60 working days prior to the start of testing.

Prior to starting UEPT SEC Parties must undertake a DUIS Connectivity Test (which may be conducted as part of Early UIT Connectivity) in order to verify that the Testing Participant's system can connect to the DCC.

Each Testing Participant will be expected to conduct their UEPT tests in a single Region, as allocated by the DCC. For Network Operators, the Region allocated will be in the geographical area covered by that Testing Participant, whilst Network Operators holding Electricity Distribution Licences whose geographical area extends across Regions may request devices to be provisioned in a DCC physical laboratory for each Region.

Having completed UEPT in one Region, the Testing Participant will not be required to repeat them in the other Region.

5.3 User System Testing

The purpose of User System Testing is to enable Users to validate the interoperability of their back office systems and associated procedures with the DCC Systems. It may be carried out in conjunction with Device Testing. The scope of tests that can be performed by a Testing Participant is limited to those tests for which the Testing Participant has successfully completed UEPT.

Any Testing Participant that has received confirmation from the DCC that it has successfully completed SREPT and UEPT may immediately commence User System Testing (subject to availability of space within the DCC physical test lab and notified start date of End-to-End testing, per the Joint Industry Plan) without waiting for the Interface Testing Stage to complete.

As stated earlier in this document, User System Testing can be undertaken using Equipment in a DCC physical test lab or by using a Remote Test Service. It is the responsibility of the Testing Participant to establish its own Remote Test Lab, obtain Devices and to order and install all the necessary equipment to establish the connection of the Remote Test Lab to the DCC systems. The DCC will provide support to the Testing Participant in establishing the remote test service, but the Testing Participant is responsible for verifying that the systems operate as intended.

The DCC will ask Testing Participants to immediately stop testing and remove Devices and personnel from the DCC physical test labs if they breach the agreed terms and conditions (see section 3.2.4). The DCC may also bar access to the system for that Participant.

5.4 Testing Participant suspension and resumption

Where there is deemed reasonable grounds to do so, the DCC may suspend a Testing Participant's Device and User System Testing. This may include where the Testing Participant has failed to comply with the terms and conditions for executing Device and User System Testing.

Where testing has been suspended, the DCC shall produce a test suspension report reflecting the cause of the suspension, and what actions are to be taken by whom and when in order for testing to resume – the 'Test Resumption Criteria'.

A Testing Participant may dispute the reasons for the suspension or the Test Resumption Criteria to the SEC Panel and the DCC and Testing Participant shall comply with any determination.

Testing will only resume once the Testing Participant has demonstrated to the DCC's satisfaction that the Test Resumption Criteria have been met, or where both the DCC and the Testing Participant agree that testing should resume.⁹

5.5 Shared Service Provision

The SEC enables Users to communicate with the DCC via a shared service provider – subject to compliance with the provisions set out in the SEC, including those associated with the conduct of UEPT and SREPT.

Testing Participants may conduct Device and User System Testing via a shared service provider, subject to compliance with the entry criteria set out in this document.

5.6 Security obligations

Security obligations on a Testing Participant are set out in the Enduring Testing Approach Document [10].

5.7 Threshold Anomaly Detection testing

The DCC will support Testing Participants in their testing of Threshold Anomaly Detection. The test exchange of signed files will be supported in order for:

- The Testing Participant to specify thresholds, such that the DCC can set them in the system;
- The DCC to send to the Testing Participant a file of messages quarantined; and
- The Testing Participant to process this file and submit to the DCC to instruct on the action to take on each Service Request.

5.8 Release management

End-to-End Testing will commence on Release R1.2 (comprising the functionality required for go-live, broadly limited to Credit Meters), and then switch to Release R1.3 (comprising the full functionality required for go-live, including Pre-Payment Meters) when it becomes available.

Releases of fixes and configuration changes will be scheduled according to a plan which will be communicated on the DCC website.

Each Release into the End-to-End Testing environment will be accompanied by a Release Note describing the contents of the Release. All fixes and configuration changes included in a Release will undergo PIT and SIT with the relevant SPs, including an appropriate degree of regression testing according to the principles laid out in the PIT and SIT Approaches. Once a Release has been installed in the End-to-End Test environment, it will be subject to:

- a smoke test, that will be undertaken by the DCC;
- testing of the constituent fixes and configuration changes, that will be undertaken by the relevant SPs and Testing Participants; and

⁹ Suspension and resumption of testing for all Testing Participants is described in the Testing Issue Resolution Process.

- an End-to-End regression test, undertaken by the DCC, based on an assessment, by the DCC, of the risk that the new release will cause features previously working in End-to-End testing environment to stop working.

The smoke test will be run using the DSP's Service User Simulator and will comprise end-to-end scenarios:

- at least one of each for the following Service Request types, in each User Role:
 - Device Requests (Critical);
 - Device Requests (Non Critical);
 - Non-Device Requests; and
 - Signed Pre-Commands.
- Install & Commission and Change of Supplier.

A single 'UIT' environment is expected to support Releases R1.2 and R1.3 for the purposes of End-to-End Testing. Alternative environment arrangements may be required to support future releases, which may or may not occur during the End-to-End Testing stage, and will be assessed separately.

The manner in which Testing Participants will be required to support testing will depend upon the nature of the change that is introduced by the release. Any impact on the DCC User Interface may require a change to the UEPT and a consequential requirement for Users to re-perform one or more of the test scenarios contained in the CTSD, as determined in line with SEC requirements.

5.9 Timetable

The high-level timetable for initiating testing during the End-to-End Testing Stage is set out in Table 2, below. This does not duplicate the information relating to UEPT activities which are set out on the CTSD. In the From and To columns, where an item is relevant to Test Labs, either “Remote Lab” or “CSP Lab” is shown, to clarify whether it relates to Testing Participants using Remote Test Labs or DCC physical test labs (or both).

Two separate tables are shown below: the first describes general testing events and the second describes events for the scheduling of test slots in a DCC physical test lab.

Ref	By When	Action	From	To	Information Required	Method
1	6 months prior to the start of E2ET (or as otherwise directed by the Secretary of State)	Publish initial version of End-to-End Testing Approach	DCC	Testing Participants	SEC Panel approval	DCC website
2	3 months prior, or as soon as possible afterwards, to the start of E2ET	Publish Test Data Plan	DCC	Testing Participants		DCC website / SharePoint
3	3 months prior to the start of E2ET, or in line with provision of Devices,	Supply Certificates (Test) for Devices to be used for UEPT	DCC	Meter Manufacturers, CSPs	Cryptographic data necessary for the manufacturing process of Metering Devices and Communications Hubs	n/a
4	3 months prior to the start of E2ET	Supply Test Data Specifications	DCC	Testing Participants, SPs		Agreed secure communication
5a	See lead times described in the Guide for Testing Participants	Order equipment required to commence testing	Testing Participant (Remote Lab)	DCC	This could include ordering <ul style="list-style-type: none"> Remote Test Service Components to connect Remote Lab to CSP test system Network Connection Communications Hubs 	Via DCC Service Desk
5b			Testing Participant (CSP Lab)	DCC	This could include ordering <ul style="list-style-type: none"> Network Connection Communications Hubs 	Via DCC Service Desk
6	See lead times agreed with Device manufacturer (or	Order Devices required to commence testing,	Testing Participant	Meter Manufacturer	Order Devices	n/a

Ref	By When	Action	From	To	Information Required	Method
	with DCC if Devices provided by DCC)	including supply of certificates	(Remote Lab + CSP Lab)	(or DCC)		
7	In accordance with Joint Industry Plan	Provide Parse & Correlate Software	DCC	Testing Participant (Remote Lab + CSP Lab)		Via DCC Service Desk
8	40 working days (or where less, as much prior notice as is reasonably practicable, as per H14.8) before Participant intends to commence testing ¹⁰	Notify DCC of intention to commence testing	Testing Participant (Remote Lab + CSP Lab)	DCC	Date to commence testing, whether testing to be conducted in DCC physical test lab (and which) or in remote test lab.	Email
9	30 working days before Participant intends to commence testing	Test Initiation Meeting	Testing Participants (Remote Lab + CSP Lab)	DCC	Entry criteria evidenced.	Meeting
10	20 working days prior to the start of E2ET	Publish Schedule of Available test slots in DCC physical test labs	DCC		Schedule – which will be updated throughout End-to-End Testing Stage	DCC SharePoint
11	15 working days prior to the start of E2ET	Health/safety & other CSP Lab training	DCC	Testing Participant (CSP Lab)	DCC to deliver training as described in 3.2.4. Method of training to be agreed.	Tba (depends on method of training)
12	No later than 10 working days prior to the start of testing	Provide test tool to participant to record Testing Issues	DCC	Testing Participant (Remote Lab + CSP Lab)	HPALM licence, if required.	

¹⁰ This notification can be given before a Testing Participant completes UEPT. The Testing Participant may commence User System/Device Testing immediately upon completing UEPT, providing that 40 working days have elapsed since giving notice.

Ref	By When	Action	From	To	Information Required	Method
13	No later than 5 working days prior to the start of testing	Complete Readiness Verification	Testing Participant (Remote Lab + CSP Lab)	DCC	Completed Quality Gate Checklist	Email
14	No later than 2 working days prior to the start of testing	Confirm Quality Gate Criteria met or request further preparatory work	DCC	Testing Participant (Remote Lab + CSP Lab)	Quality Gate checklist If DCC requests further preparatory work, it may be necessary to release the test slot and reschedule the testing	Meeting
15a	1 st Day of testing	Commence testing	Testing Participant (Remote Lab)		In accordance with terms and conditions provided by DCC.	
15b		Install Devices and commence Testing	Testing Participant (CSP Lab)			
16	Last day of testing	Remove Devices from Test Lab	Testing Participant (CSP Lab)		Terms and conditions required by DCC	
17	20 Working Days prior to scheduled start of new Release Testing	Confirm date that testing of release will commence and any impact upon Testing Participants	DCC	Testing Participants (Remote Lab + CSP Lab)	Information provided in accordance with the Release Strategy	DCC Website

Table 2 - Timetable for test initiation

Ref	By When	Action	From	To	Information Required	Method
1	15 th of each month (or previous working day)	Request test slot ¹¹	Testing Participant (CSP Lab)	DCC	Date of commencing test slot, number of meter Device sets to be tested, duration of testing.	Email
2	First working day after 15 th of each month	Publish test slot details	DCC	Testing Participant (CSP Lab)	Confirm that requested test slot is available (for slot commencing following month) or suggest alternative.	Email
3	Within 5 working days of DCC's publication of test slot	Confirm intention to use test slot in DCC physical test lab	Testing Participant (CSP Lab)	DCC		Email
4	Periodically, as required.	Update Test Schedule and notify Testing Participants	DCC	Testing Participants (CSP Lab)	Start and duration of test slot and number of spaces for Device sets	DCC SharePoint

Table 3 - Timetable for test slot scheduling

¹¹ Note that test slots commence on the first working day of each month. Notice must be given by the 15th of a month (or the previous working day if 15th is not a working day), to obtain a slot commencing the following month.

5.10 Stage Entry and Exit

5.10.1 Entry Criteria

General entry criteria for End-to-End Testing Stage per Region:

End-to-End Testing will take place firstly on Release R1.2 and then on Release R1.3 once it becomes available. Within a Release, testing will be undertaken on a per Region basis. Before testing can commence on either Release, the following Entry Criteria must be satisfied:

- Interface Testing (in the case of Release R1.2, or Additional Interface Testing in the case of Release R1.3) has started;
- SIT Solution Testing Complete for the purposes of commencing IT (in the case of Release R1.2, or Additional SIT in the case of Release R1.3) has successfully met its exit criteria for the respective Region - unless this criterion is refined by a further direction;
- End-to-End Testing Approach Document has been published in line with relevant direction;
- Service Provider test environments and Test Labs prepared. Note that it will be possible to start the Stage with a single CSP system/Test Lab;
- Service Provider resources are available to support the testing;
- Quality Gate Review has been held and concluded that E2ET can proceed (see section 7.5.2 for details).

For a Testing Participant conducting UEPT during E2ET Stage:

- confirmation from the DCC that the Testing Participant has met its Entry Criteria, as defined in the CTSD [7];

For a Testing Participant conducting User System and/or Device Testing during E2ET Stage:

- for a Testing Participant conducting User System Testing:
 - confirmation from the DCC that the Testing Participant has successfully completed SREPT and UEPT for the relevant User Role(s) (with the exception that the SSI test need not be completed), as appropriate (e.g. R1.2 or R1.3); and
 - compliance with the Security Requirements set out in the Enduring Testing Approach Document.
- for a Testing Participant conducting Device Testing, either:
 - compliance with the Security Requirements set out in the Enduring Testing Approach Document; and
 - confirmation from the DCC that the Testing Participant has successfully completed SREPT and UEPT for the relevant User Role(s) (with the exception that the SSI test need not be completed), as appropriate (e.g. R1.2 or R1.3); or
 - if the Testing Participant is not eligible to conduct UEPT:

- demonstrate that it is capable of sending DUIS Service Requests and receiving Service Responses by establishing a DCC Gateway Connection and performing a DUIS Connectivity Test, as defined in the Common Test Scenarios Document; and
 - provide evidence of that all DUIS Service Requests available at that time can be generated; the form of this evidence may include test results and will be agreed on an individual basis with each Testing Participant.
- for a Testing Participant using the DCC physical test labs for User System and/or Device Testing:
 - compliance with the Security Requirements set out in the Enduring Testing Approach Document;
 - evidence the Testing Participant can and will comply with requirements for using the DCC physical test labs as set out in sections 3.2.1 to 3.2.4; and
 - confirmation that Devices meet requirements set by the DCC as set out in section 3.2.5.

5.10.2 Exit Criteria

User System Testing and Device Testing are conducted on a voluntary basis and no exit criteria are applied to these testing activities.

Exit criteria for UEPT are set out in the CTSD.

The End-to-End Testing stage will close in line with SEC Section T4.

6 Testing Issue Management

Testing Issues will be managed in accordance with the Testing Issue Resolution Process, per SEC Section H14, published on the DCC website:

<https://www.smartdcc.co.uk/implementation/test-assurance/testing-issue-resolution/>

7 Roles & Responsibilities

7.1 General

All parties involved in End-to-End Testing shall:

- Comply with the SEC and follow “Good Industry Practice” when participating in End-to-End Testing i.e. that degree of skill, diligence, prudence and foresight which would reasonably and ordinarily be expected from a skilled and experienced person engaged in a similar type of undertaking as that Party under the same or similar circumstances.

7.2 Roles and Responsibilities

7.2.1 Roles of different parties/organisations

Party/Organisation	Role
DCC	<ul style="list-style-type: none"> • Management and delivery of testing service which allows Testing Participants to conduct their tests during End-to-End Testing Stage • Provision of test execution and environment usage schedules • Management of Testing Issue resolution • Provision of test assurance activities (see Section 11.5) • Production of CTSD and SRTSD • Provision of Devices for DCC physical test labs, working with Meter Manufacturers (see below): for UEPT or where requested by the Testing Participant • Creation and operation of the master Release Schedule • Distribution of Parse & Correlate software to Testing Participants • Provision of progress reports to the SEC Panel
CGI (Systems Integrator role)	<ul style="list-style-type: none"> • Provision of E2E Test Plan • Provision of Test Data Plan and Specifications • Provision of HP ALM • Provision of resource to support Testing Participants' testing • Provision of resource to triage Testing Issues
DSP	<ul style="list-style-type: none"> • Provision of DSP component of the End-to-End testing environment and related data • Provision of support for DSP solution elements and DSP component of End-to-End test environment • Provision of fixes required in DSP solution elements • Provision of resource to support Testing Participants' testing • Provision of resource to triage Testing Issues
CSPs	<ul style="list-style-type: none"> • Provision of CSP component of End-to-End testing environment and related data • Provision of support for CSP solution elements and CSP component of End-to-End test environment • Provision of fixes required in CSP solution elements • Provision of DCC physical test lab facility and Communications Hubs • Provision of support for DCC physical test lab • Provision of equipment and support for Remote Test Lab, where required • Provision of resource to support Testing Participants' testing • Provision of resource to triage Testing Issues • Provision of support to the DCC in: <ul style="list-style-type: none"> • design and creation of test data and test environments

Party/Organisation	Role
	<ul style="list-style-type: none"> • preparing test execution and environment usage schedules • triaging Testing Issues
Testing Participants	<ul style="list-style-type: none"> • Provision of detailed test scripts to support DUIS Connectivity Test and UEPT • Provision of Testing Participant test environment and related data • Provision of resource to carry out the UEPT, DUIS Connectivity, User System and Device Testing • Provision of resource to triage Testing Issues • Provision of any fixes required in Testing Participants' systems • Provision of Communication links to End-to-End testing environment • Provision of test evidence as set out in the CTSD and SRTSD • Provision of Communications Hubs and Devices (for Device and User System Testing) • Provision of Remote Test Labs (if applicable) • Provision of resource to manipulate Devices in the DCC physical test labs for UEPT and User System/Device Testing (if applicable)
RDP	<ul style="list-style-type: none"> • Provision of initial set of registration data to be used in testing
TSP	<ul style="list-style-type: none"> • Provision of SMKI component of End-to-End testing environment and related data needed for system set-up, including test certificates • Provision of support for SMKI solution elements and SMKI component of test environment • Provision of fixes required in SMKI solution elements • Provision of resource to support Testing Participants' testing • Provision of resource to triage Testing Issues • Provision of support to the DCC in: <ul style="list-style-type: none"> • management and delivery of End-to-End Testing • design and creation of test data and test environments • preparing test execution and environment usage schedules • triaging Testing Issues • creation and operation of the master Configuration Management Plan • creation and operation of the master Release schedule • creation and maintenance of the Environment Plan
Critical Software	<ul style="list-style-type: none"> • Provision of Parse & Correlate software • Provision of fixes required in Parse & Correlate software
Device manufacturer (together with DCC)	<ul style="list-style-type: none"> • Supplier of Devices to furnish the DCC physical test labs, working with the DCC • Provision of support for Devices both in DCC physical test labs and when returned to factory • Provision of resource to triage Testing Issues
SEC Panel	<ul style="list-style-type: none"> • Approval of End-to-End Testing Approach Document • Approval of End-to-End Testing Stage Completion Report • Recipient of escalated Testing Issues from DCC • Notify Testing Issues to the Secretary of State • Resolve of Testing Issues where directed by the Secretary of State • Recipient of progress reports
DECC	<ul style="list-style-type: none"> • Resolve Testing Issues notified by the SEC Panel • Recipient of progress reports where provided by the SEC Panel
Ofgem	<ul style="list-style-type: none"> • Resolve disputes on End-to-End Testing Approach Document unless otherwise directed by Secretary of State

Table 4 - Roles of participating organisations

Each Testing Participant conducting test execution activities is responsible for ensuring that the staff it provides are adequately trained and have adequate facilities to enable them to perform the tests.

7.3 Governance

The DCC will appoint an E2E Service User Analyst to manage all aspects of testing with Testing Participants. Requests to conduct testing will be placed through the DCC Service Desk but all other communication regarding testing activities should be directed to the Industry Test Team:

The DCC will provide regular progress updates (weekly) on End-to-End Testing to the SEC Panel and the Secretary of State as required by the Smart Energy Code.

Issues that are raised during testing will be placed on the DCC website in redacted form as required by the Testing Issue Resolution Process and the SEC.

The DCC may convene TDEG meetings from time to time to support it to address any issues which may arise in relation to the Testing Approach that is set out in this document.

7.4 Communication

The DCC will report plans and progress at each TDEG meeting. Communication of End-to-End Testing activity to the wider community will take place via a report at each Implementation Management Forum meeting (presented by the DCC Implementation Manager) and through reports to the SEC Panel and the Secretary of State.

The DCC will hold bilateral meetings with Testing Participants as part of the communication process.

7.5 Test Assurance

7.5.1 Introduction

The DCC will assure UEPT as described in the CTSD [7].

7.5.2 Quality Gate Reviews

A Quality Gate Review will be conducted before the start of the End-to-End Testing Stage. This Review will be chaired by the DSP, approved by the DCC and attended by the Service Providers. The Review will include an assessment of any Testing Issues which may be outstanding from the previous testing Stage and the associated work-off plan, as well as risks and the mitigation strategies. The meeting will be a short, checklist-driven event at which previously assembled and validated evidence relating to the Entry Criteria is considered and decisions made to start End-to-End Testing. It is expected that Quality Gate Review meetings will be dry-run to enable issues to be identified and resolved in a timely manner, and thereby avoid impacting the start date for E2E Testing.

7.5.3 Testing Participant Readiness Verification

The DCC will review evidence provided by prospective Testing Participants and confirm that all relevant entry criteria have been met prior to commencement of testing.

7.5.4 Test Quality Audits

There will be no quality audits of Service Providers during this Stage.

7.5.5 Product inspections

There will be no product inspections of Service Providers during this Stage.

7.5.6 Documentation review

There will be no documentation review of Service Providers during this Stage.

8 Deliverables

8.1 Responsibilities for Deliverables

The responsibilities of each Testing Participant with respect to each End-to-End Testing deliverable are set out in Table 5, below.

Key: R - Responsible A - Accountable
C - Consulted I - Informed

Testing Participant	DCC	CGI (Systems Integrator)	DSP	CSP	Critical Software	TSP	RDP	Testing Participant
Management of testing service during End-to-End Testing Stage, including scheduling test slots and Releases	A/R	C	I	I	-	I	I	I
End-to-End Testing Approach Document	A	R	C	C	I	C	C	C
Test Infrastructure/Environments – Service Providers	A	C	R	R	-	R	R	I
Test Infrastructure/ Environments (incl. network connection + P&C installation) – Testing Participants	I	-	-	-	C	-	-	R
DCC physical test labs – Premises	A	C	-	R	-	-	-	C
DCC physical test labs – Communications Hubs for UEPT	A	C	-	R	-	-	-	C
DCC physical test labs – smart metering Devices for UEPT	A/R	C	-	C	-	-	-	C
DCC physical test labs – Devices (incl Communications Hubs) for non-UEPT testing (Participant-provided)	R ¹²	I	-	C	-	-	-	A/R
DCC physical test labs – Devices (incl Communications Hubs) for non-UEPT testing (DCC-provided)	A/R	I	-	C	-	-	-	-
DCC physical test labs – storage for Devices for non-UEPT testing	A	I	-	R	-	-	-	C
Remote Test Labs – Premises + connection to CSP test system + Communications Hubs + other Devices	-	I	-	R	-	-	-	A/R
Test slot scheduling	A/R	C	-	-	-	-	-	C
Parse & Correlate software	A	-	-	-	R	-	-	I
End-to-End Testing Plan document	A/R	R	C	C		C	C	C
Test Data Plan document	A	R	C	C		C	C	C
Test Data Provision	A	R	R	R		R	R	R
Test Tools	A	R	R	-		-	-	I
Support for Test Execution	A	R	R	R		R	-	I

¹² DCC will provide debug-capable Communications Hubs in the CSP Labs, which the Testing Participant may use in preference to the Communications Hubs they can procure from the DCC

Testing Participant / Deliverable	DCC	CGI (Systems Integrator)	DSP	CSP	Critical Software	TSP	RDP	Testing Participant
Executed Tests	-	-	-	-		-	-	A/R
Recommendation on extension of E2ET by 6 months	A/R	C	I	I		I	-	C
E2ET Stage Completion Report	A/R	C	I	I		I	-	I

Table 5 - RACI matrix for deliverables

Appendices

A. DUIS Connectivity Test

i. Purpose

The purpose of the DUIS Connectivity Test is to demonstrate that the Testing Participant's system is capable of successfully sending Service Requests to and receiving Acknowledgements from the DCC System.

The DUIS Connectivity Test is referenced a number of times throughout this document, stating that it should be conducted in accordance with the CTSD [7]. This section provides a description of the DUIS Connectivity Test, but in the event of disagreement between the CTSD and this document the CTSD will take precedence.

The DUIS Connectivity Test consists of three test scenarios: one for each of the three webservices which connect the Testing Participant to the DCC.

ii. Scenarios

The scenarios comprising the DUIS Connectivity Test are, subject to the Service Request being available for the Testing Participant's User Role:

- 8.2 Read Inventory (IS, ES, GS, RSA, ED, GT, OU);
- 7.4 Read Supply Status (IS, ES, GS, RSA, ED, GT) or (only for Additional Testing) 7.7 Read Auxiliary Load Supply Data (IS, OU); and
- 7.2 Disable Supply (IS, GS).

The Testing Participant must provide the DCC with a copy of the SSI Service Audit Trail query as evidence that the scenarios have been completed successfully, unless alternative evidence is agreed with the DCC at the Test Initiation Meeting.