Version 1.~~0~~2

APPENDIX AK

SEC Variation Testing Approach Document for SMETS1 Services

1 Definitions and Interpretations:

1.1 In this SEC Variation Testing Approach Document (SVTAD), except where the context otherwise requires, the expressions in the left-hand column below shall have the meanings given to them in the right-hand column below. Where not defined in this SVTAD, capitalised terms used in this document are set out in Section A of the Amended SMETS1 SEC~~.~~ or in Schedules or Appendices of the Amended SMETS1 SEC.

1.2 Where there are conflicts between this SVTAD for SMETS1 Services and any of the Testing Approach Documents, this SVTAD shall take precedence.

1.3 Where obligations are expressed in respect of DCC Service Providers in this SVTAD, these shall be construed as obligations on the DCC. Where text is included in this SVTAD which does not explicitly place obligations on a Party, the Panel, or Testing Participant, these shall be construed as obligations on the DCC.

Active Meter Migration Testing (Active MMT)	has the meaning set out in the MTAD.
Amended SMETS1 SEC	means: (i) in the case of changes to Sections of the Code, those that have most recently been published by the Secretary of State setting out Services in respect of SMETS1 Smart Metering Systems and other provisions relating to SMETS1 Smart Metering Systems that apply in respect of the Device Models and/or Device Model Combinations that are being used in testing in respect of IOC, MOC, or FOC, as the case may be and (ii) in the case of changes to Schedules and Appendices of the Code, the versions

	that apply in respect of the Device Models and/or Device Model Combinations that are being used in testing in respect of IOC, MOC, or FOC, which are set out in a document published by the Secretary of State entitled "SMETS1 Testing Baseline Requirements Document".
Completion Report	means a report that is produced at completion of a Test Phase, with the exception of the UTS Phase where the Completion Report is produced at the end of SMETS1 Interface Testing, setting out evidence demonstrating how the criteria for the completion of that Test Phase (or SMETS1 Interface Testing) have been met.
Device Model Combination (DMC)	means a combination of SMETS1 Device Models.
Dormant Meter Migration Testing (Dormant MMT)	has the meaning set out in the MTAD.
Eligibility Testing	comprises the undertaking of tests to demonstrate that a Party can successfully send Service Requests and receive Service Responses and Alerts in respect of SMETS1 Devices, such tests being set out in the UTSAD.
Entry Criteria	means the criteria that must be met in order for a Test Phase to start.
Exit Criteria	means the criteria that must be met in order for a Test Phase to complete.
Environment Guide for UTS Participants	has the meaning set out in Table 10.1.

Final Operating Capability (FOC)	has the meaning set out in the DCC's delivery plan for SMETS1 services produced pursuant to Condition 13 of the DCC Licence.
Initial Operating Capability (IOC)	has the meaning set out in the DCC's delivery plan for SMETS1 services produced pursuant to Condition 13 of the DCC Licence.
Middle Operating Capability (MOC)	has the meaning set out in the DCC's delivery plan for SMETS1 services produced pursuant to Condition 13 of the DCC Licence.
Migration Dormant Meter Readiness Testing	has the meaning set out in the MTAD.
Migration Testing (MT)	~~means testing of the systems and processes that will be used to Enrol SMETS1 Smart Metering Systems comprising SMETS 1 Devices that have previously been commissioned by a SMETS1 SMSO.~~means: (i) Active Meter Migration Testing; (ii) Dormant Meter Migration Testing; and/or; ~~(i)~~(iii) Mixed Meter Migration Testing.
Migration Testing Approach Document (MTAD)	means a document that sets out supplementary rights and obligations in relation to Migration Testing and Migration DUST.
Migration DUST	means a Testing Service provided by the DCC within Device and User System Testing to enable testing of the interactions with the systems and processes used by the DCC to Migrate SMETS1 Installations.
Migration Solution Testing	has the meaning set out in the MTAD.

Mixed Meter Migration Testing (Mixed MMT)	has the meaning set out in the MTAD.
Modified DCC Total System	means the DCC Total System as will be modified to enable the delivery of Services as set out in the Amended SMETS1 SEC.
Pre-Integration Testing (PIT)	means a set of tests undertaken by a DCC Service Provider to verify that the part of the Modified DCC Total System being provided by that DCC Service Provider meets the SMETS1 Testing Objective.
SIT Audit	means a review of the testing and assurance undertaken by the DCC during SIT.
SIT Auditor	means the independent person appointed to perform the SIT Audit and advise on whether the SIT Exit criteria have been met.
SMETS1 SIT Auditor Report	has the meaning set out in Table 10.1.
SMETS1 Interface Testing	means the testing activity that further assures, through the involvement of Users, that the part of the Modified DCC Total System that comprises the DCC User Interface operates in accordance with the Amended SMETS1 SEC.
SMETS1 Interface Test Completion Report	has the meaning set out in Table 10.1.
SMETS1 Services	means Services in relation to SMETS1 Smart Metering Systems.
SMETS1 SIT Completion Report	has the meaning set out in Table 10.1
SMETS1 SVTAD Large Supplier	means a Supplier Party which, as of 18 September 2018, supplies electricity and/or gas to 250,000 (two hundred and fifty thousand) or more Domestic Premises.

SMETS1 Testing Objective	means the objective set out in Clause 5.
Solution Test	means a test stage within the System Integration Test Phase that will include testing to ensure that changes to existing interfaces, and new interfaces within the solution, as a result of the Amended SMETS1 SEC, work as intended and to confirm that integration of those parts of the Modified DCC Total System that have changed as a result of the Amended SMETS1 SEC has not caused any regression to existing functionality.
System Capacity Testing (SCT)	means additional non-functional tests that assure that DCC is capable of meeting the SMETS1 Testing Objective.
System Capacity Testing Approach Document (SCTAD)	means a document that sets out the supplementary rights and obligations in relation to System Capacity Testing.
Systems Integration Testing (SIT)	means a set of tests undertaken by the DCC and the DCC Service Providers collectively to verify that the parts of the Modified DCC Total System being provided by those DCC Service Providers and the DCC operate together in a way that meets the SMETS1 Testing Objective.
TAG	has the meaning given in Clause 3.1.
Testing Approach Document(s)	means one or more of the User Testing Services Approach Document, the Migration Testing Approach Document, and the System Capacity Testing Approach Document.
Test Assurance Board (TAB)	means the DCC body established to approve or reject DCC assurance reports relating to code promotion between environments; consider Test

	Phase Completion Reports; and approve or revoke the issuance of Test Completion Certificates.
Test Completion Certificate	has the meaning of a certificate issued by the DCC to a DCC Service Provider when the DCC considers that the DCC Service Provider has met the relevant Exit Criteria for a Test Phase.
Testing Issue Thresholds	means the maximum number of extant Testing Issues that may be permitted at Test Phase exit or, in the case of the UTS Test Phase, at the end of SMETS1 Interface Testing.
Test Phase	means one of the following: • Pre-Integration Testing (PIT); • System Integration Testing (SIT); • User Testing Services (UTS); • Active Meter Migration Testing (~~MT);~~Active MMT) in respect of a specified planned entry on the list of SMETS1 Eligible Product Combinations; • Dormant Meter Migration Testing (Dormant MMT) in respect of a specified planned entry on the list of SMET1 Eligible Product Combinations; • Mixed Meter Migration Testing (Mixed MMT) in respect of a specified planned entry on the list of SMETS1 Eligible Product Combinations;; or • System Capacity Testing (SCT).
Test Stage	means a sub-component part of a Test Phase that may be executed sequentially or in parallel with other sub-components within that Test Phase.

Test Traceability Matrix (TTM)	means a document employed to map requirements to test cases that is used to demonstrate how the requirements are covered by the test cases.
User Testing Services (UTS)	means a Test Phase during which Eligibility Testing and SMETS1 Interface Testing may be undertaken.
User Testing Services Guidance	means a document containing explanatory information regarding the testing undertaken by Users during the User Testing Services Test Phase as set out in Table 10.1.
User Testing Services Approach Document (UTSAD)	means the document that sets out any supplementary rights and obligations that apply to the testing undertaken during the User Testing Services Test Phase.
Work Off Plan	Means a plan produced on completion of a Test Phase or, in the case of the UTS Test Phase at the completion of Interface Testing, that specifies the outstanding Testing Issues, and the dates by which these Testing Issues should be resolved.

2 General

2.1 This document is the SEC Variation Testing Approach Document for SMETS1 Services.

2.2 Section X11.7 of the Code requires that the DCC and each person other than the DCC that participates in (or is required to participate in) testing under a SEC Variation Testing Approach Document shall comply with the SEC Variation Testing Approach Document.

2.3 Section X11.8 of the Code specifies that Section H14 of the Code (Testing Services) and the Enduring Testing Approach Document shall apply in respect of testing under a SEC Variation Testing Approach Document as if such

testing was a Testing Service under Section H14.34 (Modification Implementation Testing); and each participant in such testing shall be deemed to be a Testing Participant for such purposes.

2.4 This SVTAD sets out:

(a) the testing that is required to be undertaken prior to each of IOC, MOC and FOC of the DCC SMETS1 Service and obligations to undertake such testing; and

(b) the requirement for Parties to undertake Eligibility Testing prior to being eligible to send Service Requests in respect of SMETS1 Devices.

3 Testing Approach Documents

3.1 The Testing Approach Documents shall be developed by the DCC. In developing a Testing Approach Document, the DCC shall consult with the Testing Advisory Group of the Panel ("**TAG**"), Parties and other relevant stakeholders prior to the submission of the document to the Secretary of State.

3.2 The DCC shall submit each draft Testing Approach Document to the Secretary of State, indicating:

(a) why the DCC considers the draft to be fit for purpose;

(b) copies of the consultation responses received; and

(c) any areas of disagreement that arose during the consultation process and that have not been resolved.

3.3 The DCC shall comply with any direction given by the Secretary of State to re-consider, re-consult, and/or re-submit the draft document.

3.4 Once a Testing Approach Document has been approved by the Secretary of State, the DCC and each person other than the DCC that participates in (or is required to participate in) testing in the Test Phase to which that Testing Approach Document relates shall comply with that Testing Approach Document.

3.5 The Testing Approach Document for a Test Phase must describe the Parties or other persons who are entitled or required to participate in that Test Phase.

4 Modification of the SMETS1 SEC Variation Testing Approach Document and Testing Approach Documents

4.1 This SMETS1 SVTAD and the Testing Approach Documents shall be modified by the DCC in accordance with any direction to do so made by the Secretary of State. The DCC shall consult with Parties concerning any proposed modification to those documents in accordance with any direction to do so made by the Secretary of State.

4.2 This SMETS1 SVTAD and the Testing Approach Documents may be modified by the DCC following consultation with Parties and other relevant persons, the TAG, the Authority, and the Secretary of State, provided that:

(a) prior to making any such modification, the DCC must present to the Secretary of State a summary of the consultation responses received and an explanation of how the DCC has taken them into account; and

(b) it may not be modified to the extent that the Secretary of State directs otherwise.

4.3 This SMETS1 SVTAD and the Testing Approach Documents may be modified by the DCC without consultation where the modification is of a minor typographical nature or where the modification has no material effect on the rights or obligations of Parties or any other person who is entitled to undertake testing in accordance with this document. Prior to making such changes, the DCC shall provide notice of its intention to do so, together with the intended changes, to relevant stakeholders and the Code Administrator and shall publish such notice on the DCC Website. Additionally, the DCC shall notify relevant stakeholders and the Code Administrator and shall publish the revised document(s) on the DCC Website once the changes have taken effect.

5 SMETS1 Testing Objective:

5.1 The objective of testing undertaken pursuant to this SMETS1 SVTAD (the

"**SMETS1 Testing Objective**") is to:

(a) demonstrate that the DCC ~~and~~, the component parts of the Modified DCC Total System and SMETS1 SMSO Systems where used by a SMETS1 SMSO acting in the capacity of DCC Service Provider:

(i) operate; and

(ii) interoperate with User Systems, Active Meters, Dormant Meters and Smart Metering Systems comprising SMETS1 and SMETS2+ Devices, ~~and SMETS1 SMSO Systems~~

to the extent necessary for the DCC to comply with the relevant requirements in Sections F, G, H, L, N and P of the Amended SMETS1 SEC; and

(b) demonstrate the capability of a User to interoperate with the DCC User Interface that forms part of the Modified DCC Total System before becoming eligible to send Service Requests in respect of SMETS1 Devices~~.~~; and

(c) provide a service to enable testing of the interactions with the DCC systems and processes used to Migrate SMETS1 Installations.

5.2 The Testing Objective is demonstrated in the following ways:

(a) SIT demonstrates that the individual systems and processes of the Modified DCC Total System can operate together and interoperate with Smart Metering Systems comprising SMETS1 and SMETS2+ Devices to meet the Testing Objective, except where the systems are those referred to in Clause 5.2 (c);

(b) User Testing Services demonstrates:

(i) for Eligibility Testing, that Parties can successfully send Service Requests to SMETS1 Devices and receive the corresponding Service Responses and Alerts; and

(ii) for SMETS1 Interface Testing, that the Modified DCC Total

System can interoperate with User Systems.

(c) Migration Testing demonstrates that

(i) the individual systems ~~and processes~~ of the Modified DCC Total System ~~used to Enrol~~and SMETS1 ~~Smart Metering~~SMSO Systems ~~that comprise Devices that have previously been commissioned with~~where used by a SMETS1 SMSO acting in the capacity of DCC Service Provider used to Migrate SMETS1 Installations can operate together and interoperate with Active Meters, Dormant Meters, User Systems, ~~SMETS1 SMSO systems~~ and Smart Metering Systems comprising SMETS1 Devices and SMETS2+ Devices to meet the Testing Objective; and

(ii) the systems ~~and processes~~ used by a SMETS1 SMSO that apply a configuration to Dormant Meters and any associated Devices, and/or instruct the upgrade of the firmware on Dormant Meters and any associated Devices, (in each case pursuant to the requirements in Clause 4.27 of the TMAD) operate and interoperate with Dormant Meters to meet the Testing Objective;

~~(c)~~(d) System Capacity Testing demonstrates that the operational performance of the Modified DCC Total System is not adversely affected by the introduction of SMETS1 Services and that the SMETS1 Services will operate at the requisite performance levels~~.~~; and

(e) through the provision of Migration DUST.

5.3 Testing shall be performed by the DCC in accordance with Good Industry Practice.

5.4 In order to achieve the SMETS1 Testing Objective the DCC shall undertake testing activities which include the following:

(a) communication tests from Users to SMETS1 Devices and from SMETS1 Devices to Users;

(b) verifying that all other functional changes, in accordance with the

relevant requirements in Sections F, G, H, L, N and P of the Amended SMETS1 SEC, operate as intended;

(c) wherever practicable, the use of automated testing;

(d) monitoring and evaluation of all impacts on the Services, including regression testing of the Service, as defined in this SVTAD and the relevant Testing Approach Documents;

(e) monitoring and evaluation of test data used for testing under this SVTAD and the relevant Testing Approach Documents; and

(f) resolution of testing issues via the Testing Issue resolution process as set out in Clause 14.

5.5 Testing shall be performed in respect of each of IOC, MOC, and FOC and the SMETS1 Testing Objective applies in respect of each of IOC, MOC, and FOC.

5.6 The DCC shall, in accordance with Good Industry Practice, develop User Testing Services Guidance. Where the DCC needs to make amendments to the User Testing Services Guidance, the DCC shall ensure that the amendments that are made reflect Good Industry Practice and shall notify Users of the changes and make the revised document available.

Overlapping of SMETS1 Testing

5.7 The DCC shall not overlap SIT and SMETS1 Interface Testing without the prior review of the TAG and agreement of the Panel.

6 SMETS1 Security Testing

6.1 Security testing is integral to all Test Phases and shall be undertaken to demonstrate that the Modified DCC Total System remains Secure.

6.2 Security testing shall be managed by the DCC and undertaken in conjunction with the DCC Service Providers in accordance with Good Industry Practice.

6.3 In order to demonstrate the security of the Modified DCC Total System, during testing the DCC shall undertake activities which shall include the following:

(a) ensuring that all security-enforcing functionality has been adequately tested, including user account provisioning and resets, protective monitoring, SMKI/key management, gateway interfaces, and network infrastructure; and

(b) confirming that security needs have been taken into account in the development of test use cases and the subsequent development of test scripts, including testing of all security-relevant 'misuse' cases, i.e. error conditions that would cause a potential security alert to be raised.

6.4 The DCC shall ensure that appropriate security testing in respect of the Modified DCC Total System is performed across all Test Phases, and that it covers both applications and infrastructure. This will be achieved by:

(a) reviewing and approving IT security vulnerability/penetration test approaches and scope;

(b) reviewing testing reports, identifying outstanding Testing Issues, and ensuring that their security impacts are properly considered at TAB approval points;

(c) ensuring that all security functional and non-functional requirements are appropriately tested (or otherwise assured) and evidenced through the use of a traceability matrix for each Test Phase; and

(d) reviewing all identified Testing Issues that impact security to ensure that they are satisfactorily resolved, or where such issues remain outstanding notify the relevant persons before progression to the next Test Phase and/or before live operation.

7 Approach to Testing

7.1 This SVTAD sets out the generic testing requirements for all Test Phases for each of IOC, MOC, and FOC. Where there are specific testing requirements for a Test Phase these shall be set out in this SVTAD or in the Testing Approach Document for that phase.

7.2 The PIT, SIT, SCT, and MT Test Phases shall be conducted for each of IOC,

MOC, and FOC.

7.3 SMETS1 Interface Testing shall be conducted for IOC only. Should a material change to the DCC User Interface be proposed as part of MOC and/or FOC, then SMETS1 Interface Testing shall be repeated for that operating capability. Where any change to the DCC User Interface is proposed as part of MOC and/or FOC, the DCC shall consult with the TAG on whether such change is considered to be material. The DCC shall subsequently notify the Secretary of State of the DCC's views and that of TAG as to whether the change is considered to be material. Where directed to do so by the Secretary of State, the DCC shall propose and consult upon the necessary changes to this SVTAD and any relevant Testing Approach Documents to support repeated SMETS1 Interface Testing in respect of MOC and/or FOC, in accordance with Clause 4. Where the Secretary of State has not issued a direction under this Clause 7.3, then Clause 5.2 (b)(ii) shall be deemed to have been met by virtue of SMETS1 Interface Testing having been successfully completed for IOC.

7.4 In undertaking testing for each of IOC, MOC, and FOC the DCC shall:

(a) include regression testing in SIT of the functionality employed in the DCC Live Systems at the point at which regression testing begins; and

(b) include the testing in SIT of the new functionality that is introduced.

7.5 In undertaking regression testing, the DCC shall ensure that the regression testing undertaken is adequate and that it is undertaken in a suitable manner which may include a combination of automated and targeted testing. DCC shall consult with the TAG on the scope of regression testing undertaken during each Test Phase. Where the TAG proposes a change to the regression testing undertaken by the DCC, the DCC shall assess the impact of this and where practical shall accommodate the change and inform TAG of its decision. Should TAG disagree with the DCC's decision, it may refer the matter to the Secretary of State, whose decision shall be final and binding.

8 Generic Testing Activities

8.1 For each of the Test Phases, the DCC shall perform the following activities in

accordance with Good Industry Practice:

(a) implement testing infrastructure;

(b) undertake Test Phase planning;

(c) identify test scenarios;

(d) design test scripts;

(e) produce a test specification document;

(f) produce a relevant traceability matrix;

(g) design and prepare test data, and load the test data into the test environment;

(h) prepare a test execution schedule;

(i) execute testing;

(j) perform quality gate reviews;

(k) Testing Issue management;

(l) Testing Issue resolution;

(m) release and configuration management;

(n) test progress reporting;

(o) test assurance;

(p) test completion reporting; and

(q) in addition, for the User Testing Services Test Phase, the DCC shall provide support for Users undertaking testing.

Test principles

8.2 The DCC shall develop its testing methodologies, test scenarios, and regression testing in accordance with Good Industry Practice.

Test Environment

8.3 Testing of SMETS1 Services shall make use of the DCC test environments and shall permit the use of additional cloud-based environments for DCC Service Provider development and integration activities.

8.4 SMETS1 Eligibility Testing shall be conducted against the appropriate DCC user test environment. The DCC shall notify Parties of the DCC user test environment that is to be used.

8.5 Each DCC Service Provider shall:

(a) establish, maintain, and control their own secure test environments;

(b) design, develop, and support test stubs, test data and test labs that are required for execution of the respective Test Phases; and

(c) ensure the firmware and software versions required for each Test Phase are installed on the SMETS1 Devices that are used for testing.

Environment Management

8.6 The DCC shall manage and communicate to persons participating in a Test Phase any changes and/or fixes arising from production that are to be deployed into the SIT and UIT environments. Such deployments shall be undertaken in accordance with Good Industry Practice.

Timetable for Testing

8.7 Test Phases shall be commenced in the timescales that are necessary to facilitate testing in accordance with the DCC's delivery plan for SMETS1 Services produced pursuant to Condition 13 of the DCC licence.

9 General Requirements for SMETS1 Testing

9.1 The DCC Service Providers shall produce a test plan & test schedule for each Test Phase for the DCC which shall detail:

(a) the extent of testing to be carried out; and

(b) the responsibilities of the DCC Service Providers including the provision of test data.

9.2 Testing Issues logs shall be produced and retained by the DCC detailing all Testing Issues found during test execution.

9.3 An adequate level of regression testing shall be used to test the Modified DCC Total System to ensure defects are not introduced or uncovered as a result of changes made when the software or its environment is changed.

9.4 Where the DCC considers that a Test Phase (other than the UTS Test Phase) should complete, or where the DCC considers that code should be promoted from one DCC test environment to another, the DCC shall have its DCC Service Provider produce a report that shall include:

(a) an overview of the testing that was planned, that details the breadth and depth of the planned tests;

(b) information on the actual number of tests run, passed, failed, and not run, mapped to the overview of testing referred to in Clause 9.4(a);

(c) an explanation of why any tests were not run;

(d) the details of any failed tests, including impact, severity, and quantity;

(e) details on the number and severity of any Testing Issues that were raised;

(f) information on any outstanding Testing Issues and their severity;

(g) specification of the test environment used;

(h) recommendations for any additional tests to be included in subsequent testing; and

(i) lessons learnt during the testing.

9.5 Following receipt of a report as referred to in Clause 9.4, the DCC shall produce a DCC assurance report that shall include:

(a) details of the test assurance activities undertaken by DCC in the Test Phase;

(b) data on tests executed and assured as passed;

(c) an evaluation of whether the governing exit criteria have been met; and

(d) a view on the acceptability of any open Testing Issues and the associated Work Off Plans.

9.6 The DCC assurance report and supporting documentation will be presented to the TAB for their approval or rejection. Where approved, the DCC assurance report shall be provided to the TAG for information. Where requested by a TAG member, the DCC shall also make available supporting documentation including the report referred to in Clause 9.4 and shall include the appropriate confidentiality markings when doing so.

9.7 For SIT, following approval of the report referred to in Clause 9.6 and where the DCC considers that the SIT Test Phase is completed, the DCC shall produce a Completion Report (as specified in Table 10.1 which shall include the reports produced pursuant to Clauses 9.4 and 9.5) and shall provide the Completion Report to the TAG for recommendation to the Panel. In the case of SIT, the Completion Report shall be accompanied by the SIT Auditor Report referred to in Clause 19.4, which shall also be provided to the TAG for information.

9.8 Where the DCC considers that code should be promoted from a DCC test environment into production, the DCC shall produce a report setting out the testing that has been undertaken, which shall be provided to such persons or bodies as directed by the Secretary of State.

9.9 The DCC shall discuss with TAG the format and content (including the level of granularity) of any reports that are to be produced pursuant to this Clause 9 in advance of them being produced and sufficiently early such that any information that needs to be reported is captured as part of the DCC's test activities.

9.10 Prior to promoting code into an environment in which a Testing Participant(s)

is undertaking testing, the DCC shall provide to the Testing Participant(s) a release note. The DCC shall provide such release note in advance of promoting such code to enable the Testing Participant(s) to consider any possible impacts.

10 Specific Deliverables

10.1 The DCC shall publish or update published versions of the documents detailed in Table 10.1.

10.2 The development of the Environment Guide specified in Table 10.1 shall include a review process via the DCC's Testing Design Expert Group. The structure of the Completion Reports specified in Table 10.1 shall be discussed with the TAG prior to production.

Table 10.1 Specific Deliverables

Deliverable	Description	Created by	Audience	Timing	Where available
User Testing Services Guidance	Guidance for Testing Participants testing in an environment where Eligibility Testing is being undertaken and other Testing Services are being provided. As a minimum, shall include details of triage, defect and fix management, change management, and device management in UTS.	DCC	Testing Participants	To be provided by the DCC as soon as possible following the UTS Testing Approach Document being approved	Publish on DCC Website
SIT Auditor Reports	Using the SIT Auditor as referenced in Clause 19.1, a range of independent assurance activities shall be conducted and reports relating to said activity shall be produced in accordance with Clause 19	DCC	Panel / TAG	As determined by the timing for the reports in Clause 19	Provided to Parties in accordance with Clause 13.17
SMETS1 SIT Completion Report	Evidence of success against the SMETS1 SIT Exit Criteria for each of IOC, MOC, and FOC.	DCC	Panel / TAG	Following TAB approval of SIT Exit for each of IOC, MOC, and FOC.	Provided to Parties in accordance with Clause 13.17
SMETS1 Interface Test Completion Report	Evidence of success against the SMETS1 Interface Testing Exit Criteria	DCC	Panel / TAG	As determined by the timing for the completion of SMETS1 Interface Testing	Publish on DCC Website (in line with any arrangements specified in the UTS Approach Document)

11 Traceability

11.1 The overall scope of testing in SIT shall be validated by the DCC to ascertain that it is correct through the use of a TTM, assured by the DCC, which shall set out the requirements in Sections F, G, H, L, N and P of the Amended SMETS1 SEC that are to be tested and the associated test scenarios.

11.2 In respect of IOC, the DCC shall assure the TTM (and any subsequent updates to it) in timescales that do not adversely impact upon the timely undertaking of SIT. In respect of MOC and FOC, the TTM shall be assured by the DCC prior to the commencement of SIT for those operating capabilities. If, during SIT, further changes are made to the Sections F, G, H, L, N and P of the Amended SMETS1 SEC, the TTM will be updated to reflect these changes.

11.3 The TTM shall be used by the DCC to track SIT progress and to demonstrate the completion of SIT and shall form a key element of the SIT Audit.

12 Test Procedure

12.1 Progression through the Test Phases for SMETS1 Services shall be gated using Entry Criteria and Exit Criteria.

12.2 The generic Exit Criteria for any Test Phase are set out in Clause 12.5.

12.3 Additional specific Entry Criteria and Exit Criteria shall be established for other Test Phases where required. These shall be set out in the relevant Testing Approach Document (with the exception of SIT where, should such specific Entry Criteria or Exit Criteria be required, they shall be set out in this SVTAD). The DCC shall not commence Migration Testing or the User Testing Services Phase unless the Test Approach Document for that Test Phase has been approved. The DCC shall produce any other Testing Approach Document in timescales that do not have an adverse impact upon the timely undertaking of the Test Phase to which it relates.

12.4 Test Phases may be subdivided into Test Stages. In these circumstances, Entry and Exit criteria may be established at the Test Stage level to support internal DCC Test Stage gating. Where this occurs, this will be specified in the relevant

test plan.

Generic Entry Criteria

12.5 The fulfilment of the following generic Entry Criteria is required to permit entry to all Test Phases:

(a) test plan signed off by the DCC;

(b) Test Completion Certificates for any precursor Test Phase issued, unless in accordance with Clause 5.7 it is determined that the Test Phase may overlap;

(c) test specification prepared, including the production of a TTM, with the exception of SIT for IOC;

(d) confirmation that the required test laboratories, SMETS1 Devices, tools, stubs, environments, and data are in place, secure and are ready for testing; and

(e) an approval to proceed certificate for the Test Phase has been issued by the DCC.

Generic Exit Criteria for PIT and SIT

12.6 The following generic Exit Criteria are required to exit and complete any PIT and SIT Test Phase:

(a) all planned tests have been executed. In exceptional circumstances, it may be proposed to de-scope a planned test. This shall be subject to approval by the TAB. In the case of SIT, the DCC shall refer the TAB's recommendation to the Secretary of State and the test shall only be de-scoped if the Secretary of State approves;

(b) the test success rate that is achieved shall be at or above the minimum levels specified in the relevant Testing Approach Document (for the purposes of SIT this is set out in Table 13.1 of this SMETS1 SVTAD);

(c) the number and severity of any outstanding Testing Issues is at or

below the Testing Issue Thresholds specified in Clause 13 for PIT or SIT as appropriate;

(d) test results and other requisite evidence is documented;

(e) test issue logs are produced;

(f) regression testing is successfully completed in accordance with the criteria specified in the relevant Testing Approach Document (for the purposes of SIT this is set out in Table 13.1 of this SMETS1 SVTAD);

(g) production of Work Off Plans for any outstanding Testing Issues that occurred in the Test Phase;

(h) Work Off Plans from preceding Test Phases have been completed and the associated tests successfully re-run; and

(i) the reports referenced in Clauses 9.4 and 9.5 have been produced and, where specified, the associated Test Completion Certificates have been issued by the DCC.

12.7 Supplementary information on the SIT Exit Criteria set out above is set out in Table 13.1.

13 SMETS 1 System Integration Testing

Selection of DMCs for use in testing for each of IOC, MOC, and FOC

13.1 Each Supplier Party shall provide the DCC with any information that the DCC reasonably requests relating to the SMETS1 Devices in respect of which it is the current Supplier. This information may include:

(a) corresponding SMETS1 Device Models;

(b) configuration settings of the SMETS1 Devices;

(c) DMC quantities;

(d) the number of Smart Metering Systems that the Supplier Party intends to enrol in relation to IOC, MOC, and FOC;

(e) the mapping of numbers of SMETS1 Devices to the associated DMCs; and

(f) notification of any changes or proposed changes to such SMETS1 Devices including to firmware and configuration settings.

13.2 When selecting DMCs for use in testing pursuant to the SMETS1 SVTAD for each of IOC, MOC, and FOC, the DCC shall do so with the objective of facilitating the enrolment of all SMETS1 Smart Metering Systems that are in scope for enrolment as soon as reasonably practicable. For the purposes of this Clause 13, the SMETS1 Smart Metering Systems that are in scope for enrolment are those which, once enrolled, would comprise SMETS1 Meters for which the Secretary of State has concluded that DCC should be required to provide SMETS1 Services (or, if such conclusions have not yet been reached, those for which the Secretary of State is consulting on as being minded to require DCC to provide SMETS1 Services).

13.3 The DCC shall determine which DMCs to use for testing pursuant to this SMETS1 SVTAD. Prior to making such a determination, the DCC shall discuss its proposals with stakeholders and set out the rationale for its selection.

13.4 The DCC shall notify Supplier Parties of the DMCs that it has decided to use for testing. Where any Supplier Party disagrees with the DCC's decision on the DMCs that it shall use in testing, the matter may be referred to the Secretary of State within 10 Working Days of the DCC's decision, and the decision of the Secretary of State shall be final and binding for the purposes of this Code.

DMC De-selection

13.5 Where:

(a) a Testing Issue has arisen with a selected DMC and:

(i) the resolution reached pursuant to the Testing Issue resolution process specified in Clause 14 requires action to be taken in respect of the DMC; and

(ii) where the DCC considers that SIT completion should not be delayed as a consequence, having regard to the objective of facilitating the enrolment of all SMETS1 Smart Metering Systems that are in scope for enrolment as soon as reasonably practicable; or

(b) the DCC having taken all reasonable steps to do so, is unable to obtain a selected DMC for use in testing,

then the DCC shall consult with the TAG on de-selection of the DMC from testing, and in so doing shall anonymise and redact information where appropriate.

13.6 Following the TAG consultation, the DCC shall decide whether to de-select the DMC from testing pursuant to this SMETS1 SVTAD and notify the TAG and Supplier Parties accordingly.

13.7 Where a Supplier Party disagrees with the DCC de-selection decision, the Party may refer the issue to the Secretary of State within 10 Working Days of the DCC's decision. Pending the determination by the Secretary of State, the Secretary of State shall inform the DCC as to whether it should continue testing with the DMC in SIT.

13.8 Where the Secretary of State determines that the DMC should not be omitted from SMETS1 testing, the DCC shall not de-select it from SIT.

13.9 In the case of Clause 13.5(b), the DCC shall recommend to the Secretary of State any alternative course of action, having regard to the objective of facilitating the enrolment of all SMETS1 Smart Metering Systems that are in scope for enrolment as soon as reasonably practicable.

DCC Witnessing of SIT Testing

13.10 The DCC shall produce and maintain a document (the "**SMETS1 SIT Approach Release**"). This document shall contain supplementary information setting out the testing to be undertaken in SIT for IOC, MOC and FOC including a description of the testing to be undertaken, the scope of planned

tests, test methods and test procedures. The DCC shall provide this SMETS1 SIT Approach Release to the TAG as part of the ongoing oversight of SIT.

13.11 The DCC shall observe a subset of the tests carried out in Solution Test. The subset of tests to be observed shall be selected by the DCC having regard to providing assurance that the Testing Objective has been met.

13.12 The DCC shall observe test execution, and record results produced from executed tests. There shall be:

(a) no deviation from test scripts; and

(b) no involvement by observers in the execution.

13.13 The DCC shall in its SIT Completion Report describe the results of DCC's witnessing including:

(a) the number of successfully completed tests;

(b) the number and reason for tests that have failed; and

(c) the number of successfully completed tests as a ratio or percentage of the total number of tests executed.

SIT Exit Criteria

13.14 The Exit Criteria in Clause 12.6 apply to SIT and are supplemented with the additional details and additional Exit Criteria set out in Table 13.1. SIT testing shall be performed for each of IOC, MOC, and FOC and these additional details and Exit Criteria will apply for each of IOC, MOC, and FOC.

Table 13.1 SIT Exit criteria

#	Exit Criteria	Success	Evidence
1	Functional SIT Execution	Successful completion will be 100% of planned tests (unless as set out in Clause 12.6 tests have been de-scoped and such de-scoping approved by the Secretary of State) for functional testing have been executed, with a 90% pass rate for any planned tests on the same DMC (excluding those tests that have been de-scoped).	SMETS1 SIT Completion Report and TAB Test Completion Certificate
2	SIT Regression Execution	Successful completion will be 100% of planned tests for regression testing have been executed on the stage exit versions of the software, with a 100% pass rate	SMETS1 SIT Completion Report and TAB Test Completion Certificate
3	Testing Issue Thresholds	Extant Testing Issues are within the relevant Testing Issue Threshold (Clause 13)	SMETS1 SIT Completion Report and TAB Test Completion Certificate
4	Test results documented and evidence captured	Results of testing documented and evidence stored	SMETS1 SIT Completion Report
5	Complete set of Testing Issue logs produced	Logs have been produced and stored for all Testing Issues identified in Testing	Referenced in SMETS1 SIT Completion Report
6	Full Test traceability to the requirements	Test Traceability (as defined in the TTM) demonstrated and	SIT Auditor Report

#	Exit Criteria	Success	Evidence
		documented as set out in Clause 19.4	
7	Full Test traceability of executed tests	Test heatmap produced that shows coverage and success of testing, and traceability to the TTM as set out in Clause 19.4	SIT Auditor Report
8	DCC assurance report approved	TAB approval of the DCC assurance report referred to in Clause 9.6	Issuing of SMETS1 SIT Completion Report by the TAB for consideration by the Panel

Process for agreeing SIT Completion

13.15 SIT for each of IOC, MOC, and FOC shall only complete when the Panel determines that the SIT Exit Criteria have been met. When the DCC considers that SIT ought to be complete, the DCC shall:

(a) notify the Secretary of State, the Authority, the Panel, and the Parties that the DCC considers that SIT has been completed;

(b) provide the Authority, the Panel, and the Secretary of State with copies of the SIT Completion Report and the SIT Auditor Report, and a list of the sections of such reports that the DCC considers should be redacted; and

(c) review the supporting documentation and evidence with regards to the relevant entry and exit criteria with the TAG.

13.16 The Panel shall confirm the completion of SIT, or shall highlight where it believes the Exit Criteria have not been met. Where the Panel believes the Exit Criteria have not been met, it shall direct the DCC to continue SIT and to address outstanding matters and submit further documentation and evidence to

support the completion of SIT, following receipt of additional materials the Panel shall determine whether or not SIT has completed (and this Clause 13.16 shall apply again).

13.17 On direction from the Panel, the DCC shall provide the Parties with copies of the Completion Report and the SIT Auditor Report, having first redacted any sections specified by the Panel.

Testing Issue Thresholds by DCC Service Provider

13.18 Testing Issue Thresholds shall be applied as a component of the Exit Criteria for a Test Phase in each of IOC, MOC, and FOC (except in the case of the UTS Test Phase, where they shall be applied to the Exit Criteria for SMETS1 Interface Testing). Within a Test Phase, all Testing Issues that are raised during that Test Phase or that were raised in the equivalent Test Phase for IOC or MOC (as the case may be), and which remain open shall be counted as extant Testing Issues within that Test Phase for that Test Phase exit or for SMETS1 Interface Testing exit. In addition, in the case of SMETS1 Interface Testing, any extant Testing Issues identified elsewhere across the DCC test environments, or production issues identified in the production environment, which could impact the decision to deploy the SMETS1 code into the production environment will also be assessed and where agreed by TAG shall be treated as extant Testing Issues and included in the overall assessment for SMETS1 Interface Testing exit as further set out in Clause 13.23.

13.19 The Testing Issue Thresholds per DCC Service Provider in each Test Phase are set out in Table 13.2 below, with the exception of Testing Issue Thresholds for the Migration Test Phase (which shall be detailed in the Migration Testing Approach Document), The Testing Issue severity levels shall be applied where the Testing Issue has arisen as a consequence of the DCC or the Modified DCC Total System and shall be defined by reference to the testing issue severity descriptions in clause 12 of the Common Test Scenarios Document.

Table 13.2 Testing Issue Thresholds per DCC Service Provider

Testing Issue Severity	PIT	SIT	UTS - SMETS1 Interface Testing	SCT
1	0	0	0	0
2	0	0	0	0
3	15	15	5	15
4	30	30	10	30
5	60	60	20	60

13.20 If during the SIT Test Phase or the SMETS1 Interface Testing component of the UTS Test Phase, a Testing Issue is opened that the DCC believes should not be counted against the Testing Issue Threshold for that Test Phase, the DCC shall inform the TAB, the TAG, and the Panel; and shall state its rationale for proposing the exclusion. The Testing Issue shall be excluded for the purposes of calculating whether the Testing Issue Threshold has been exceeded only if the TAG agrees. Information on all Testing Issues so excluded from the calculation shall be included in the Completion Report produced pursuant to Clause 16.5.

13.21 Where the DCC's initial exclusion proposal is not supported, the Testing Issue shall be counted when calculating whether the Testing Issue Threshold has been exceeded. Should the TAG and the DCC disagree on the exclusion of a Testing Issue and where this decision has a material impact on the ability to deliver IOC, MOC, or FOC, the DCC may refer the matter to the Secretary of State, within 5 Working Days of the TAG's decision, for determination. The Secretary of State's decision shall be final and binding for the purposes of this Code.

13.22 In reviewing extant Testing Issues for SIT, the DCC shall discuss with TAG whether any Testing Issues that have been raised in the SCT Test Phase to date, should be counted for the purposes of determining whether the SIT Testing Issue Threshold has been exceeded and therefore whether the Testing Issue Threshold exit criterion for SIT has been met.

13.23 In reviewing extant Testing Issues for SMETS1 Interface Testing exit for the

UTS Test Phase, the DCC shall present:

(a) all open severity 1-3 Testing Issues raised by any Testing Participant; and

(b) all open severity 4-5 Testing Issues raised by any Party that has completed Eligibility Testing; and

(c) any other open severity 1-3 issues that have arisen in DCC test or production environments that the DCC believes could impact the decision to deploy the SMETS1 code into the production environment,

to the TAG, to:

(i) confirm that the correct severities have been assigned; and

(ii) determine which of the issues in (a), (b) and (c) should be counted for the purposes of determining whether the Testing Issue Threshold has been exceeded and therefore whether the Testing Issue Threshold exit criterion for SMETS1 Interface Testing has been met.

13.24 Should the DCC disagree with the TAG on whether a Testing Issue raised in the SCT Test Phase should be counted under Clause 13.22, or on the matters set out in Clause 13.23 (i) or (ii), the DCC may refer the matter to the Secretary of State for determination, whose decision shall be final and binding for the purposes of this Code.

Eligibility Testing

13.25 Each Party that has completed User Entry Process Testing for a particular User Role without having undertaken Eligibility Testing must successfully complete Eligibility Testing in respect of that User Role prior to being eligible to send Service Requests in respect of SMETS1 Devices in that User Role. The UTS Approach Document shall set out the scope of and process for undertaking Eligibility Testing.

13.26 Each SMETS1 SVTAD Large Supplier shall take all reasonable steps to

complete Eligibility Testing as soon as reasonably practicable.

13.27 Each Supplier Party that is a SMETS 1 SVTAD Large Supplier shall notify the DCC of their status as such within one month after the time that this SMETS1 SVTAD comes into effect.

14 Testing Issue resolution:

14.1 The process set out in Section H14.37 onwards of the Code shall apply for the purposes of Testing Issue resolution during SIT, UTS, SCT, and MT; subject to Clauses 14.2 and 14.3.

14.2 Where a Testing Participant disagrees with a determination by the DCC pursuant to Section H14.39(a) (with regards to the severity level only) then the matter may be referred to the TAG, whose decision will be final and binding for the purposes of this Code.

14.3 Where the Testing Participant disagrees with the DCC's determination pursuant to Section H14.41 of the matters set out at Section H14.39(c) (but not otherwise), then the Testing Participant may request that the DCC refers the matter to the Secretary of State.

14.4 Except in the circumstances set out in Clause14.5, where a disagreement exists pursuant to Clause 14.2, the determination of the DCC including assigned Testing Issue severity shall remain and be included in any evaluation until the TAG reaches its determination and notifies the DCC and the Testing Participant for the purposes of this Code.

14.5 If the matter being disputed pursuant to Clause 14.2 could affect whether the Exit Criteria for a Test Phase have been met, a decision on whether the Exit Criteria have been met cannot be made until the TAG determination has been made.

15 Work Off Plans

15.1 At the point of Test Phase exit and, in the case of the UTS Test Phase, SMETS1 Interface Testing completion, all open Testing Issues shall be documented in a Work Off Plan which shall be approved by the TAB. The Work Off Plan will

form part of the underlying evidence considered by the DCC which is referenced in the Completion Report presented for agreement to the Panel. Any Work Off Plans shall set out the following timescales within which all open Testing Issues are to be resolved:

(a) for severity 3 Testing Issues, within 20 Working Days from the issuing of a Test Completion Certificate;

(b) for severity 4 Testing Issues, within 40 Working Days from the issuing of a Test Completion Certificate; and

(c) for severity 5 Testing Issues, within 60 Working Days from the issuing of a Test Completion Certificate.

15.2 The DCC shall monitor the discharge of Work Off Plans and report progress to the TAB. If the timescales for resolution of a Work Off Plan are not going to be met, as soon as reasonably practicable after the person responsible for implementing the Work Off plan becomes aware that this is the case, a correction plan shall be produced and presented to the TAB for its approval. The TAB will consider the correction plan and may elect to revoke any Test Completion Certificate that it has issued pending resolution of the open Testing Issues contained in the correction plan. The resolution of Work Off Plans shall be reported to the TAG and the Panel and the resolution of production issues shall be reported to the Panel.

16 Test Reporting

Weekly DCC Test Execution Report

16.1 The DCC shall provide a weekly test execution report to the Panel and the Secretary of State; the content shall be anonymised and redacted where appropriate.

16.2 The test execution report shall detail progress of testing undertaken pursuant to this SMETS1 SVTAD, including relevant test phases, test issue reporting, capacity, and the availability of Eligibility Testing.

16.3 In the case of Eligibility Testing the DCC shall report progress of testing prior

to SMETS1 Interface Testing completion.

16.4 During SIT, the test execution report shall, in addition to the requirements specified in Clauses 16.1 to 16.2, detail progress of testing and testing coverage of functional areas, including functional groups as detailed in the heatmap.

Completion Reports

16.5 With the exception of PIT, the DCC shall produce Completion Reports covering the matters set out in Table 10.1 where it considers the relevant Exit Criteria for the Test Phase or, in the case of the UTS Test Phase the Exit Criteria for SMETS1 Interface Testing, have been met.

17 Test Resources

Test Stubs

17.1 The DCC may during SIT use a service user simulator Testing Stub to simulate a User.

18 Additional Obligations

All Testing Participants and the DCC

18.1 The DCC and all Testing Participants involved in SMETS1 Services testing undertaken pursuant to this SMETS1 SVTAD shall:

(a) undertake testing in accordance with Good Industry Practice; and

(b) take all reasonable steps to facilitate achievement of the SMETS1 Testing Objective.

The DCC

18.2 The DCC shall ensure that:

(a) test activities are conducted in accordance with this SMETS1 SVTAD and the associated Testing Approach Documents;

(b) test plans are produced and employed;

(c) the necessary test scenarios, test scripts, Test Traceability Matrices, test data, and test environments are put in place;

(d) planned tests are executed and evidence captured;

(e) test issues are documented, diagnosed, and where it is within the remit of the DCC they are resolved;

(f) test progress is monitored and progress is reported;

(g) tests are assured, through witnessing and the review of evidence;

(h) Completion Reports are produced and submitted;

(i) the TAB is managed and supported;

(j) the Panel is supported in making their SMETS1 recommendations and decisions; and

(k) the Secretary of State is supported in making his or her SMETS1 decisions.

19 SIT Audit and Independent Assurance

19.1 The DCC shall appoint an independent SIT Auditor through the existing DCC audit and assurance framework agreement available on the DCC website.

19.2 Tender responses shall be assessed against criteria which inter alia shall include:

(a) independence from the DCC and the DCC Service Providers;

(b) proposed audit approach;

(c) relevant experience; and

(d) cost.

19.3 The identity of the SIT Auditor shall be notified to the Authority, the Panel, Parties, and the Secretary of State following contract award.

19.4 For each SIT Test Phase, the SIT Auditor shall produce a SIT Audit Report that

shall include:

(a) a review of the Test Traceability Matrix documentation produced by the DCC, to confirm that it provides a mapping of test scenarios to the Code requirements (being those requirements that need to have been tested in order to demonstrate the SMETS1 Testing Objective in Clause 5);

(b) a review of the test heatmap produced by the DCC to confirm that the planned tests map to the test scenarios and test them adequately;

(c) confirmation that DCC testing and assurance has been conducted in accordance with this SVTAD (including confirming its coverage and completeness);

(d) confirmation that each of the test Exit Criteria have been met;

(e) confirmation that all open Testing Issues have been captured and either closed or, where still open, Work Off Plans are in place; and

(f) a view on the acceptability of any open Testing Issues and the associated Work Off Plans.

19.5 The SIT Audit Report will accompany the SIT Completion Report that is presented to the TAB, the TAG, and Panel.

19.6 In the case of SIT for IOC, the DCC shall require the SIT Auditor to, as soon as reasonably practicable after SIT has commenced, provide an interim opinion on the matters set out in Clauses 19.4 (a) and (b). This opinion shall reflect the Test Traceability Matrix and heat map in use at that point. DCC shall share and discuss the interim opinion with the TAG.

19.7 Should a change be proposed in MOC or FOC that impacts the matters set out in Clause 19.4 (a) to (b), then the DCC shall require the SIT Auditor to, as soon as reasonably practicable, provide an interim opinion detailing the matters set out in Clause 19.4 (a) to (b) for any Operating Capability in which such change occurs, and focussed on those elements that are changed since the last report produced by the SIT Auditor. Where this occurs DCC shall share

and discuss the opinion with the TAG.