Guideline

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Transport Infrastructure CT – Model

Transport Infrastructure Conformance and Test Guidelines

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1.00	01.02.2012	Alexander Forst-Rakoczy	42virtual	first version
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Statement of originality

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Statement of copyright

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[1] English: Agency for Public Management and eGovernment
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1 Introduction

1.1 Objective and Scope

The scope of this document is to provide a guideline to PEPPOL conformance and interoperability as well as the PEPPOL agreed standards on quality assurance for testing of the PEPPOL transport infrastructure. The target group for this document is implementers of PEPPOL specifications – they should use it as a guideline for testing and as specification for claiming PEPPOL conformance.

1.2 Audience

The audience for this document is organizations wishing to be PEPPOL enabled for exchanging electronic business documents via the PEPPOL transport infrastructure, i.e. the following PEPPOL Stakeholders:

- PEPPOL Community Governance
- Contracting Authorities
- Economic Operators
- ICT Providers
- Service Providers

More specific it is the following roles:

- Business Experts
- ICT Architects
- ICT Developers
- ICT Governing participants

2 Overall PEPPOL QA and testing landscape

2.1 PEPPOL Interoperability and clarification of terms

The goal of PEPPOL interoperability is to enable parties to electronically exchange a set of information to be used within a minimal but well defined set of procurement processes without previous bilateral setup of data, content rules and process specifications. Electronic documents that are conformant to PEPPOL BIS specifications can be exchanged widely within Europe in open procurement communities using the PEPPOL Transport Infrastructure that ensures transport between existing eProcurement solutions. An issuer of a document can with high degree of certainty expect the document to pass validation by the receiver. The conformance specifications also serve as a basis for bi lateral specification of additional information to be exchanged between trading parties. In this way, PEPPOL does deliver both transport interoperability as well as semantic interoperability.

An important cornerstone for the Test Guidelines is the European Interoperability Framework [EIF], an initiative run by IDABC (Interoperable Delivery of European eGovernment Services to public Administrations, Business and Citizens).

2.1.1 PEPPOL conformance

PEPPOL compliance means, that a solution or implementation of PEPPOL process is conformant to specific legal and business requirements, process, semantic and technical solutions defined by PEPPOL or committed and approved by PEPPOL.

PEPPOL conformance testing is defined as a process for implementers to claim conformance to a set of legal and technical specifications defined by PEPPOL. PEPPOL conformance is currently based on self-assessment.

Figure 1 explains the relationship between compliance and conformance and demonstrates the role of testing in conformance.
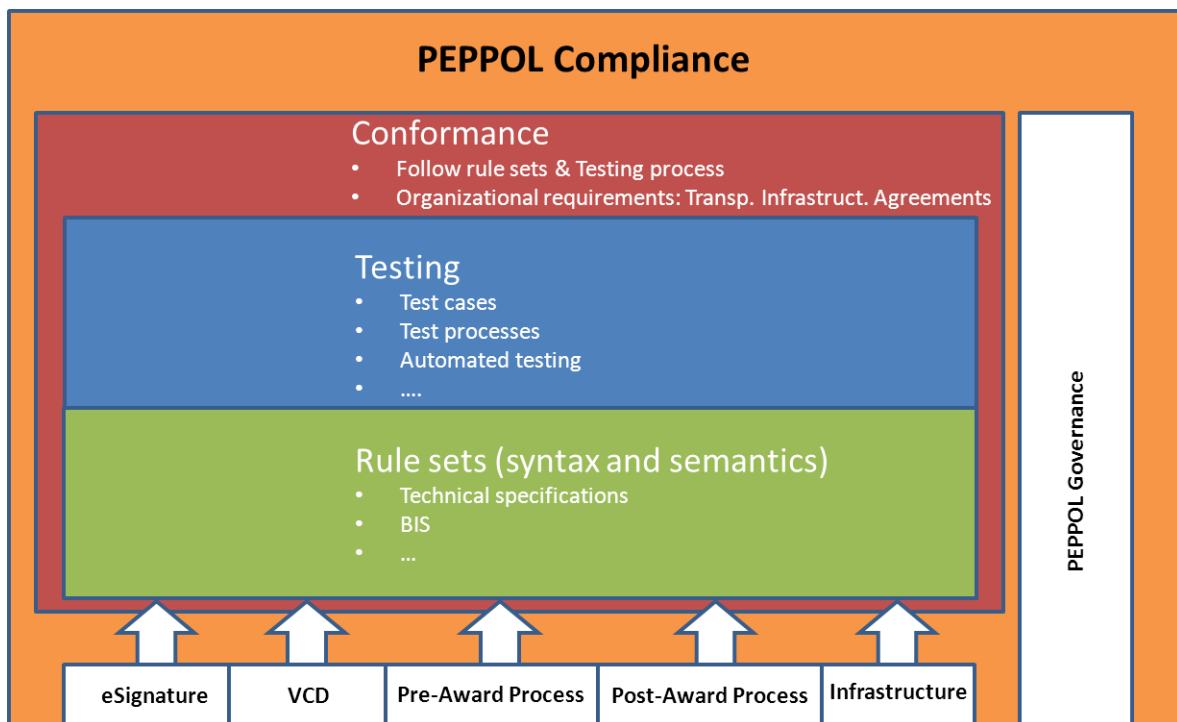

Figure 1: Overview of compliance, conformance and testing.

2.1.2 Role of Testing and validation

Testing and validation provide the processes and tools for service providers to claim conformance. PEPPOL testing therefore defines a set of activities containing test processes and test cases to ensure the functional and non-functional requirements of the system work together as defined by the different PEPPOL artefact interoperability requirements (eSignature validation, Pre Award eProcurement, Post Award eProcurement and Transport Infrastructure).

The **rule sets** are provided by PEPPOL subject communities and are the relevant specifications that must be tested for claiming conformance.

2.1.3 How is conformance achieved

Providers must claim conformance to PEPPOL specifications. This is based on a self-assessment process supported by guidelines, test documents and compliance criteria's.

2.1.4 Conformance criteria for PEPPOL Communities

Every PEPPOL Community defines a set of specifications and requirements that must be fulfilled as part of definition of conformance for that Community. These are the rule sets (requirements) that must be met by all who claim conformance in the Community.

For PEPPOL infrastructure, conformance is defined as:

▶ The provider has signed the PEPPOL Transport Infrastructure Agreement

▶ The provider has implemented his solution according to PEPPOL specifications.

▶ The provider must follow the Access Point Service Acceptance Test Plan [APSATP].

▶ The provider must follow the Service Metadata Publishing Services Test Plan [SMPSATP].

▶ The provider must execute at least two sets of interoperability tests with two other AP/SMP implementations.

To claim conformance a provider must conform to the above specifications.

The Access Point Service Acceptance and Service Metadata Publishing Services Test Plans [APSATP, SMPSATP] are available as separate documents.

2.2 General QA and Testing Methodology

The general QA and testing methodology follows the V-Model of the CEN ISSS WS/BII Test Guidelines [CENBIITG] which has been adapted for PEPPOL in the PostAward Testing Framework [CTPATF]. The testing scope and terminology is also influenced by the GITB Testing Framework [GITB]. PEPPOL strongly recommends a test bed which allows automatic testing.

The PHLOC server is used as a repository for test cases and Test Bed [PHLOC].

2.3 PEPPOL Interoperability Testing

PEPPOL interoperability testing defines a set of (testing) activities to ensure the functional and non-functional requirements of the system work together, documents can be sent and received as specified and the documents exchanged are valid business documents (as defined) in order to achieve PEPPOL conformance.

The aim of the PEPPOL Interoperability Testing is to find potential bugs and problematic issues in implementations of the BIS specifications or transport infrastructure at testing stage, before Production. Besides that, the testing – as all software testing activities - will save time and money by detecting problems as soon as possible and is therefore a crucial measure of QA within the general PEPPOL quality framework.

Therefore the scope of the interoperability test is:

▶ a measure of the ICT Architecture quality assurance ensuring the PEPPOL artefacts work together exchanging PEPPOL documents

▶ to test interconnectivity on basis of a number of test scenarios. The test scenarios contain the inter-connectivity between one source AP and one destination AP including the necessary transactions with individual SMPs and the SML. They should as well contain all relevant types of BIS implemented by the provider

▶ the testing process is based on self-assessment of conformance within the project scope

Activities that are not in scope of Interoperability Testing:

▶ the (internal) testing of individual / national implementations and interfaces

▶ the full process of document transfer for all PEPPOL BIS with all BIS´s details

3 Overall Testing Process

3.1 Test Roles

When executing tests different roles must be assigned [GITB]. One person can often easily be assigned to several roles; the purpose of describing several roles is to simplify the division of responsibility in larger test assignments.

The names of the roles come from [GITB]. Corresponding roles from [CTPATF] are in parentheses.

Role	Responsibilities	Assignment
Test Designer (Test manager, Test data manager)	Creates test suites (test cases, document assertion tests, configuration artifacts) Understands eBusiness domain Understands testing conditions and constraints Familiar with the testing framework methodology and best practices	Mandatory
Test Participant (Tester)	Owns or operates the SUT (System Under Test) Responsible for eBusiness implementation Must have business domain expertise	Mandatory
Test Manager (Test manager)	Responsible for executing Test Suites Coordinates with Test Participants Assists Test Participants in using the Test Bed Familiar with the Test Suite Logic and related eBusiness domain	Recommended
Test Bed Provider (Test environment manager)	Operates the Test Bed Responsible for keeping the Test Bed functionally operational	Recommended

3.2 Test Process

The Test Process follows the sub processes that are outlined in [CTPATF]: Mobilize, Prepare, Execute, and Summarize. Figure 2 gives a more detailed overview.

Test planning and controlling → Test preparation → Test case design → Test execution → Defect management → Reporting

Figure 2: QA and testing process

▶ Test planning and controlling (Mobilize)

   ▶▶ Requirements analysis: Determine what aspects of a design are testable and with which parameters those tests work.

   ▶▶ Create the test concept

   ▶▶ Define the test environment and infrastructure, e.g. Hardware, Software

   ▶▶ Define the functions or components to be tested according to the requirements analysis

   ▶▶ Define the acceptance criteria

   ▶▶ Organize the test team

   ▶▶ Allocate resources and budget

▶ Test preparation (Prepare)

   ▶▶ Kick-off workshop for the test team

   ▶▶ Setup the test environment and infrastructure

   ▶▶ Create a test plan

   ▶▶ Define test data and test scripts

▶ Test case design (Prepare)

- ▶▶ Review the test cases on the Test Bed
- ▶▶ Recommended: Create new test cases and upload them on the Test Bed
- ▶ Test execution and documentation (Execute)
  - ▶▶ Execute the test cases based on the test plan
  - ▶▶ Re-test any previous defects that have been solved by the development team.
  - ▶▶ Test Participants report any errors to the Test Designer (and Test Manager if available)
- ▶ Defect management (Execute)
  - ▶▶ Record defects and monitor bug fixing
  - ▶▶ Regression tests: Build a subset of tests for each integration test phase of new, modified, or fixed software in order to ensure that the software is still working correctly.
- ▶ Reporting (Summarize)
  - ▶▶ Once the test meets the exit criteria report the results, key outputs, logs, and related documents.

4 Functional Testing Scope

The functional testing scope covers the recommended CEN ISSS WS/BII Test levels [CTPATF] (Process level, Semantic level, and Technical level – profile dependent) and follows the testing methodologies of [GITB], specifically:

- ▶ Interoperability Testing
- ▶ Two-phase Testing

4.1 Interoperability Testing

Interoperability Testing for PEPPOL Transport and Infrastructure consists of the testing of the START protocol between two Access Points.

4.2 Two-phase Testing

Two-phase Testing is only feasible with an automatic test system, e.g., a test bed following the GITB specifications.

5 Test Environment and Execution

5.1 Test planning and controlling

Follow the guidelines in [CTPATF] and align the planning with the overall project plan, possibly by executing a series of workshops in order to verify that the all entities of solution are covered by the test plan. It is also important to identify and include indirectly related systems into the test plan.

Define the test context, i.e., which profile you want to test and who is responsible for what parts. Design a draft of the test plan.

Choose a partner with whom you want to execute the test case with. Be sure that the resources you need for testing are available during the planned test track.

5.2 Test preparation

- ▶ Kick-off workshop for the test team
- ▶ Setup the test environment and infrastructure
- ▶ Create a test plan

- Define test data and test scripts

The precondition for individual software tests is to have an up and running test environment with test datasets, supporting tools, equipment and technical support for the testers. This environment has to be established in time. On an individual level the responsibility to provide the test environment including a transparent and useful release management for updates of the SUT and test data lies within the implementation team of the components to be tested.

The following checklist may help to get all relevant preconditions for technical test preparation:

- SMP and AP of both testing partners are up and running and test-ready (unit-tested) – deployment on test environment, if test environment has to be used
- Network ports have to be opened – delegate it to network team
- Define client for triggering the test (demo client, test clients)
- Test cases (technically) defined
- Start all components in the correct order
- SMP registered in SML
- Agree on schedule for testing and nominate technical contact person(s)
- Pre-Test connection between AP1 and AP2
- Agree on test scenario incl. preconditions like doc type for testing
- Sign peering agreements and get certificate

5.3 Test case design

PEPPOL uses the Test Management Tool on [PHLOC] to provide tools, documents, documents, and test cases. A standardized test case template makes sure that the relevant information will be contained in all test cases and will make the test cases reusable.

- Review the test cases on the Test Bed
  - Navigate to the appropriate folder on [PHLOC] and review the test cases that are marked as mandatory, i.e., have the priority "high"
  - The test cases describe the steps to conduct the test execution including preconditions to verify the required condition.
- Recommended: Create new test cases and upload them on the Test Bed

Every PEPPOL pilot should submit valid test cases (describing what has to happen) and invalid cases (non-valid constellations), with known errors the testers are expected to find. This is to ensure that not only functional transactions but also all validation rules and error handling are working correctly.

The standardized test case template makes sure, that the relevant information will be contained in all test cases and makes test cases reusable (for different test phases, levels)

5.4 Test execution and documentation

5.4.1 Interoperability Testing

According to chapter 2.1.4 conformance is achieved when the provider follows the Access Point Service Acceptance Test Plan and executes tests at least twice with two different AP/SMP implementations.

As the execution of tests cannot be done automatically yet each provider must create appropriate test cases herself. The test cases on [PHLOC] are examples and can assist providers before and during test runs.

The steps to read the test cases are as follows:

- Log on to the [PHLOC] Test Management Tool: http://peppol.phloc.com/config

- Navigate to the test category "Transport Infrastructure"
- Review the test cases (Figure 3)
- Create appropriate test cases according to your role in the test scenario
- Create artefacts according to your test cases
- Validate the artefacts using the validation tool on [PHLOC]
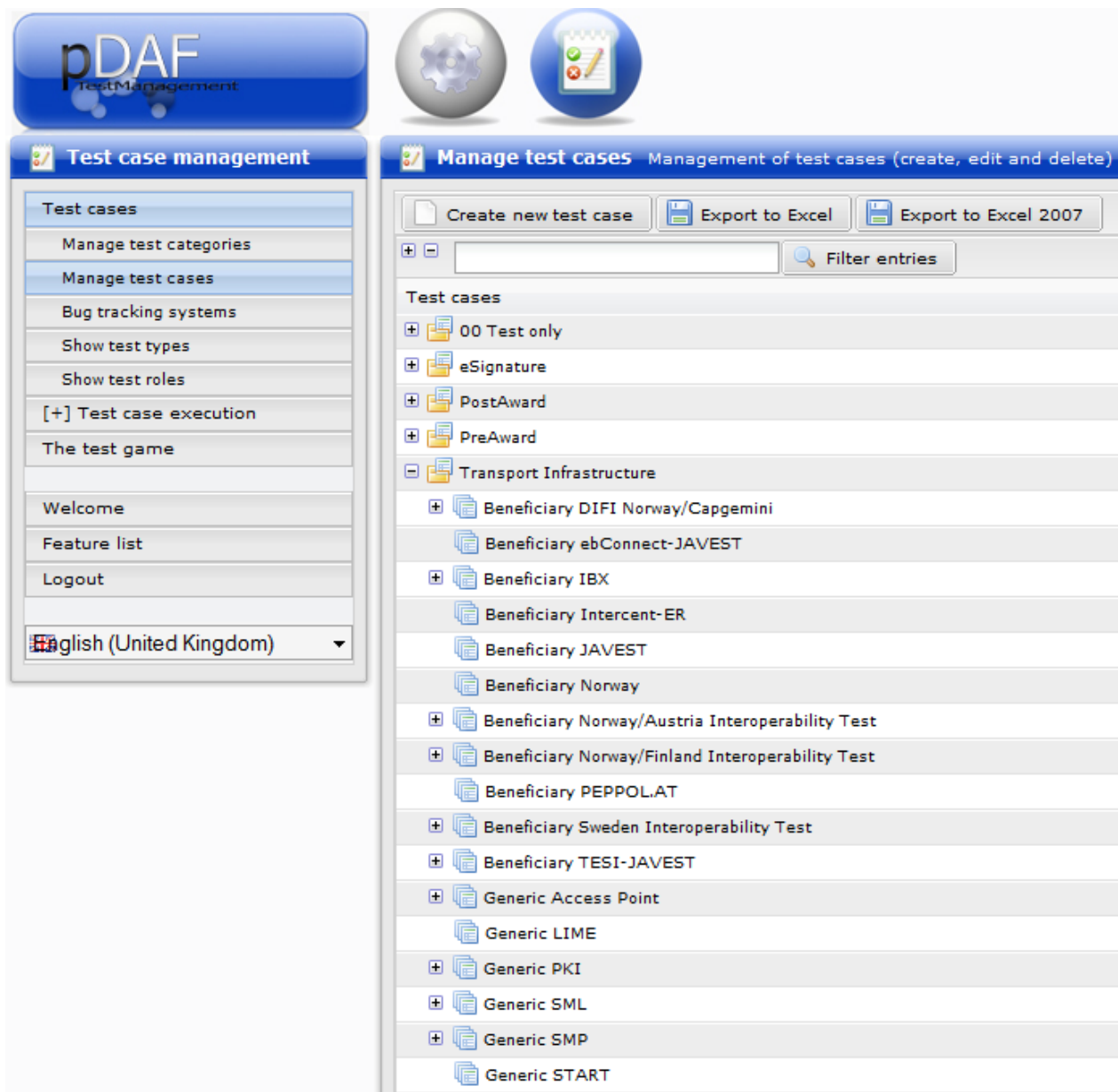- Execute your test cases on [PHLOC] and set the result (Figure 4)

Figure 3: Test Cases for Transport Infrastructure

Figure 4: Execute a Test Case

5.5 Defect Management

Issues found in the PEPPOL artefacts or the validation artefacts can be tracked on [PHLOC]. There is a list of test cases available that were executed by the user (Figure 5). This list can be sorted by the success status.

Test cases will also be organized in Test tracks that make it easy to get an overview about test executions that were successful or failed (Figure 6).
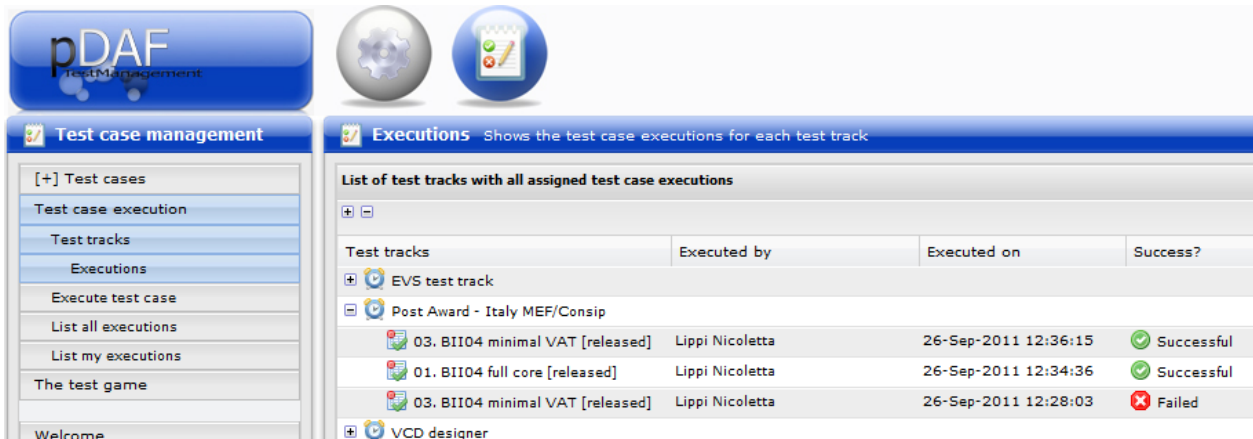
Figure 5: List my executions

Figure 6: Test track executions

5.6 Reporting

Process of testing and testing results has to be documented as part of the process for reporting and for verification purposes. PEPPOL will report to project beneficiaries and the EU on results of interoperability testing and hindrances to cross border trade identified. To support these objectives the Participants have developed templates and reporting tools [CTPATF, PHLOC].

Participants are encouraged to input test cases by using provided templates and tools to report the outcome of the execution – you can save a lot of work!

A report of the executed test cases and results can be automatically generated by the PEPPOL Test Management and Development tool [PHLOC].

Appendix – Abbreviations

Abbreviation	Meaning
AP	Access Point
ASAP	As soon as possible
BIS	Business Interoperability Specification (former: PEPPOL profile)
CA	Contracting authority (e.g. buyer)
EO	Economic operator
EUGEN	European Union Generic
OSOR	Open Source Observatory and Repository
OSS	Open Source Software
PEPPOL	Pan-European Public Procurement On-Line
SML	Service Metadata Locator
SMP	Service Metadata Publisher
SVN	Subversion
WPM	Work Package Manager
SUT	System Under Test
CEN	Comité Européen de Normalisation European Committee for Standardization
BII	Business Interoperability Interface
CENBII	CEN/ISSS Business Interoperability Interfaces for Public procurement in Europe
EIF	European Interoperability Framewokr 2.0

Appendix – References

Reference	Title/Source
GITB	Global eBusiness Interoperability Test Bed methodologies http://www.cen.eu/cen/Sectors/Sectors/ISSS/Workshops/Pages/Testbed.aspx ftp://ftp.cen.eu/CEN/Sectors/List/ICT/GITB2_draft_CWA.pdf
PHLOC	PEPPOL Test Management and Development http://peppol.phloc.com/ http://peppol.phloc.com/config
BISSWG	ICT-PostAward-BIS_Software_Guideline-100.pdf http://www.peppol.eu/peppol_components/peppol-eia/ict-architecture/post-award-eprocurement/services-components
CENBIITG	Test Guidelines ver 1.0 BII WG4 WG4 5 Test Guidelines ver 1.0.doc http://www.cen.eu/cwa/bii/specs/Pilot/IndexWG4.html http://www.cen.eu/cwa/bii/specs/Pilot/Annex%201/BII%20WG4%20WG4%205%20Test%20Guidelines%20ver%201.0.doc
EIF	European Interoperability Framework http://blog.webwereld.nl/wp-content/uploads/2009/11/European-Interoperability-Framework-for-European-Public-Services-draft.pdf http://ec.europa.eu/isa/strategy/doc/annex_ii_eif_en.pdf
CTPATF	Conformance and Testing, PostAward Test Framework http://www.peppol.eu/peppol_components/peppol-eia/eia#conformance-test/post-award-eprocurement/framework
APSATP	Access Point Service Acceptance Test Plan CT-Transport-AP_Service_Acceptance_Testplan-100
SMPSATP	Service Metadata Publishing Services Acceptance Test Plan CT-Transport-SMP_Service_Acceptance_Testplan-100