|  |  |
| --- | --- |
| C:\Users\FOY-KirilMiazi\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\B7E4NJBC\autoPASS-logo-orig1 (003).jpg | |
| AP-2.3A | |
| AutoPASS TSP Suitability for Use – Test Plan Template | |
|  | |
|  | |
| Version: | 1.0 |
| Date: | 23 February 2024 |

DOCUMENT STATUS

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| Document nr. | AP-2.3A AutoPASS TSP Suitability for Use – Test Plan Template |

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| Version | Date | Author | Main Changes |
| 1.0 | 23 February 2024 | NPRA | First version as AP-2.3A |
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This document is a template intended as a starting point for the TSP to create the test plan required for the execution of a Suitability for Use test.

This page and the preceding cover page shall be deleted from the test plan.

*AutoPASS - Suitability for use*

*Test Plan for <TSP name>*

Version *<0.1>*

*<dd/mmm/yyyy>*

***Note to the Author***

[This document is a template of a **Test Plan** document for a TSP seeking approval into AutoPASS Samvirke or for new or changed equipment for a TSP already approved in AutoPASS Samvirke. The template includes instructions to the author, example text (simplified), and fields that should be replaced with the values specific to the project.

* Blue italicized text enclosed in square brackets, i.e. [text], provides instructions to the document author, or describes the intent, assumptions and context for content included in this document. In a Test Plan, this text is removed.
* Text and tables in black are provided as boilerplate examples of wording and formats that may be used or modified as appropriate to a specific project. These are offered only as suggestions to assist in developing project documents; they are not mandatory formats.]

VERSION HISTORY

[Provide information on how the development and distribution of the **Test Plan**, up to the final point of approval, was controlled and tracked. Use the table below to provide the version number, the author implementing the version, the date of the version, the name of the person approving the version, the date that particular version was approved, and a brief description of the reason for creating the revised version.]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Version #** | **Implemented**  **By** | **Revision**  **Date** | **Approved**  **By** | **Approval**  **Date** | **Reason** |
| 0.1 | *<Author name>* | *<dd/mm/yy>* | *<name>* | *<dd/mm/yy>* | Test Plan draft |
|  |  |  |  |  |  |
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# Introduction

## Purpose of the test

[Provide the purpose of the suitability for use test. This document should be tailored to fit a particular project’s needs.]

In this context, a “suitability for use” test is a test to validate that a Toll Service Providers (TSP) has correct functionality with regard to requirements for AutoPASS Samvirke. When one of the following main “events” occur in AutoPASS Samvirke, there is a need for a suitability for use test:

1. Inclusion of a new TSP in AutoPASS Samvirke
2. Introduction of new OBE by an AutoPASS TSP
3. Changes made by TCs, TSPs or AutoPASS HUB/IP and/or interfaces between these actors if this significantly affects the AutoPASS TSP

This test plan template is meant to be filled out by a TSP when one or more of these events occur (event 1 usually also includes event 2). The TSP must describe which of the events that shall be tested and the objectives with this test.

The test plan described in this document is in line with ref. [1] (TSP: Suitability for use, AutoPASS Test Strategy) and follows the principles described here.

## Purpose of the test plan document

[Provide the purpose of the Test Plan Document. This document should be tailored to fit the needs of the particular “event” to be tested.]

The Test plan documents and tracks the necessary information required to effectively define the responsibilities, time schedules and approach to be used in the testing.

# Test description

## Overview of items to be tested

[Describe shortly the items/features/functions to be tested that are within the scope of this test plan. Include a description of how they will be tested, when, by whom, and to what quality standards. Also include a description of those items agreed not to be tested.]

Example in the event of a new AutoPASS TSP:

|  |  |
| --- | --- |
| Items to be tested | 1. Validation that OBE provided by the TSP are able to communicate with the DSRC transceivers provided by TCs in Norway. 2. Validation that the central system of the TSP is able to communicate correctly with the AutoPASS infrastructure, exchanging the required information. |
| Test responsible | TSP |
| Verification method | Testing, Demonstration, Analysis, Inspection |
| Test procedure accepted by | NPRA |
| Testing performed by | Test team consisting of representatives from ….. |

Items not to be tested:

* Functionality “inside” central system of TSP (only “black box”-testing)
* Functionality “inside” AutoPASS IP and HUB (only “black box”-testing)
* …

## Test approach(es)

[Describe the overall testing approach to be used to test the items. Provide an outline of any planned tests for each item to be tested. Also provide a reference to Test procedures (defined in Appendix A) including a document location where it is stored.]

A definition of the different tests and test phases can be found in ref. [1].

A reference to OBE Test description can be found in ref. [2].

If the test requires user-written test procedures (must be developed by TSP) this must be added in the reference list. This must describe step-by-step how the test shall be executed with expected result.

## Test regulatory / mandate criteria

*[If applicable - describe any regulations or mandates that the system must be tested against.]*

## Test entry criteria

[Describe the entry criteria used to start testing.]

Before a test may commence it must be documented in Test plan or referenced in Test plan that the test entry criteria listed in ref. [1] are met.

## Test exit criteria

[Describe the exit criteria used to determine when to stop testing.]

Before a test may be signed off it must be documented that the test exit criteria listed in ref. [1] are met.

## Test acceptance criteria

[Describe the criteria used to determine if a test item has passed or failed.]

A definition of the error levels to be used for error classification and the determination of test acceptance criteria can be found in ref. [1].

## Test deliverables

[Describe the deliverables that will result from the testing process (documents, reports, charts, etc.).]

Actors involved in the testing will report test results from their part of testing. The results from the test will be compiled in the Test Report.

Please refer to ref. [1] for details.

Appendices to the Test Report shall be:

* a NPRA approved list of deviations, errors and change proposals.
* a NPRA approved Error Correction Plan.

## Test suspension / resumption criteria

[Describe the suspension criteria that may be used to suspend all or portions of testing. Also describe the resumption criteria that may be used to resume testing.]

# Test resources

## Test organisation, personnel and roles

[Describe the roles in the test team including any specific requirements needed for the testing to be performed (staffing, skills, skills training, etc).)]

Test organisation with roles/responsibilities must be in line with ref. [1]. Staffing with names and contact information is provided in Appendix B.

## Time resources for all roles and actors

*[Describe estimated/quantified time resources needed from all actors involved in the test for each test item. This estimate will be a basis for the test agreement signed with all actors to commit to the availability of correct resources*]

Example of setup:

|  |  |  |
| --- | --- | --- |
| Organisation | Test phase | Estimated time resources needed |
| TSP: x |  |  |
|  |  |
|  |  |
| TC: y |  |  |
|  |  |
|  |  |
| NPRA |  |  |
|  |  |
|  |  |
| ….. |  |  |

## Test environment and locations

[Describe the environment and locations where the testing for each test item and for each test phase is to be performed.]

A definition of the different tests and test phases can be found in ref. [1].

Example of a setup:

|  |  |  |
| --- | --- | --- |
| Test phase | Test environment | Location |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

## Test tools

[Describe all the tools to be used in the test (hardware/software or other types of tools). In particular, a bug tracking tool is normally necessary. Also, other tools e.g. to analyse test results or create test data may be necessary. Describe how these test tools will be used in the test, if necessary with screen dumps etc.]

## Test data

[Describe the test data necessary for the test and how this data is created (synthetic/real). This also includes which actor is responsible for providing these resources.]

Example (simplified) in the event of a new OBE type from TSP:

* AIT data (EFC\_ContextMark for new OBE)
* Test/real security keys
* Status list
* ..
* ..

## Other test resources

[Describe any other specific items, personnel or requirements needed for the testing to be performed. This also includes which actor is responsible for providing these resources.]

Example in the event of a new OBE type from TSP:

|  |  |
| --- | --- |
| Resources | Number needed |
| OBE used for test. Also list the PAN’s of the OBE. | X |
| Spare OBE (if desired) | Y |
| OBE test reader (if desired) | Z |
| Test vehicles (large/small vehicles) | V |
| Test drivers | W |
| ……. |  |

## Distribution of test resources

[Describe all distribution of test resources (not personnel) that must be made in order to execute the different phases of the test.]

# Test Plan Approval

The undersigned acknowledge they have reviewed this Suitability for Use Test Plandocument and agree with the approach it presents. Any changes to this Requirements Definition will be coordinated with and approved by the undersigned or their designated representatives.

[List the individuals whose signatures are required. Examples of such individuals are Business Steward, Technical Steward, and Project Manager. Add additional signature lines as necessary.]

|  |  |  |  |
| --- | --- | --- | --- |
| Signature: |  | Date: |  |
| Print Name: |  |  |  |
| Title: |  |  |  |
| Role: |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Signature: |  | Date: |  |
| Print Name: |  |  |  |
| Title: |  |  |  |
| Role: |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Signature: |  | Date: |  |
| Print Name: |  |  |  |
| Title: |  |  |  |
| Role: |  |  |  |

# Appendix A: References

[Insert the name, version number, description, and physical location (URL or Network path where document is located) of any documents referenced in this document. Add rows to the table as necessary.]

The following table summarizes the documents referenced in this document.

|  |  |  |
| --- | --- | --- |
| Ref. no. | Document Name and Version | Description |
| 1 | AP-2.2 AutoPASS TSP Suitability for use - Test strategy | Describes how suitability for use test shall be executed, including organization and roles. |
| 2 | AP-2.3 OBE Test Description - AutoPASS TSP Suitability for use | Describes how OBE shall be tested. |
| 3 | AP-1.4 AutoPASS Processing of Signal codes | Describes the algorithm and possible results of a passage in an AutoPASS toll station |
| 4 | AP-1.2B AutoPASS Data formats Appendixes  AP-3 document series | Data formats of interface files |
| 5 | OBE test log and report | A template for how to present the log and results of a driving test. In a Test Plan, this document is the basis for Appendix D in this Test Plan template and also a template for the Test Report. |

# Appendix B: test team manning with contact information

*[Provide all names and contact information for personnel involved in testing. Must also contain role and attendance in each test.]*

The following roles and persons are participating in the test:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Organisation | Role in testing | Name | Telephone | E-mail address |
|  |  |  |  |  |
|  |  |  |  |  |

# Appendix C: Detailed time schedule

*[Provide detailed schedules for all tests, - if necessary and applicable down to program within the day]*

Example in the event of a new OBE type from TSP:

The schedule for driving test is as follows (see also Appendix D):

Test at test site xxxx: xx-yy Dec. 20zz  
Test at test site aaaa: bb-cc Dec. 20dd  
………

# Appendix D: Driving test of OBE

*[*

***Instructions to TSP for use of this Appendix:***

*TSP shall provide detailed information about locations of driving tests and also a detailed driving log to be filled out by the test driver and personnel handling the test results. A table showing summary of the test results shall also be included. The tables below have the purpose of showing how test-driving logs and reports are expected to be presented. In the preparation of Test Plan, the TSP will be provided with a separate document (ref. [5]) where the tables are filled in with proposals for test stations. The document ref. [5] is also intended as a template for the test report of a driving test of new or changed OBE from a TSP.*

***Instructions to test driver:***

*As high readability of the OBE is required by the NPRA, it is important that the OBE to be tested has optimal reading conditions. There are some few important instructions that the test driver must be aware of:*

* *The OBE to be tested must be mounted in the correct location of the windshield of the vehicle according to mounting instructions.* *It must never be placed so that e.g. windshield wiper or other things prevent a clear view to the roadside antenna during a passage.*
* *As the test driver has several OBE in the vehicle, all other OBE than the one in the windshield must be placed in a well-closed metallic cookie box or similar. Otherwise, signal leakage from the other OBE in the vehicle can significantly reduce the readability of the OBE in the windshield.*
* *An OBE has functionality to prevent multiple readings of the OBE when being in the communication zone of roadside equipment for a long time. Therefore, when the same test OBE is used for more than one passage through the same toll station, it must be more than 4 minutes (to be exact 256 seconds) between each passage. Otherwise the OBE will not be read in the second passage. In cases where short time between passages may occur, the test driver should change OBE in the windshield between two successive passages in a test station unless he/she prefers to wait for the expiration of this time.*

*]*

## Overview of test stations

The OBE driving test is carried out in these stations:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **TC** | **Project** | **Station** | **Map location** | **Vendor** | **Type** | **Payment direction** | **Lanes** |
|  |  |  |  | EFKON | 1 portal |  |  |
|  |  |  |  | Q-Free | 3 portal |  |  |
|  |  |  |  | Q-free | 1 portal |  |  |
|  |  |  |  | Tecsidel | 3 portal |  |  |
|  |  |  |  | Tecsidel | 1 portal |  |  |
|  |  |  |  | Kapsch | 1 portal |  |  |

## Driving log and results

Explanation of columns to be filled out in Driving log:

* OBE-ID (short ID): Internal ID of the test-OBE, unique for each OBE (e.g. OBE1, OBE2,..)
* PAN: Personal Account Number; ID of the OBE printed on the OBE
* Date/Time of test passage: Must be filled out by the test driver
* Direction/lane: Specified in cases where there is more than one payment lane (official lane notation or explain it by northwards/ southwards/ eastwards/ westwards/ right/ left lane)
* Result RSE (TR-file): The Signal code of the passage from the TR-file sent from RSE to AutoPASS HUB/IP must be filled out according to ref.[3]. Most common signal codes are SC02 (=OK) and SC22 (=OBE not read, registered by video)
* Result TSP (TIF-file: The Passage code from the TIF-file sent from AutoPASS IP to TSP must be filled out according to ref.[4]. Most common passage codes are C1 (=OK) and C8 (=OBE not read, registered by video)

**Test driving log for station: xxxxx**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Passage no** | ***OBE-ID (short ID)*** | **PAN** | **Date/Time of test passage** | **Direction/ lane** | **Result RSE (TR-file)** | **Result TSP (TIF-file)** |
| 1 | TESTOBE1 | ……. |  | 1 |  |  |
| 2 | TESTOBE2 |  |  | 2 |  |  |
| 3 | TESTOBE3 |  |  | 1 |  |  |
| 4 | TESTOBE4 |  |  | 2 |  |  |
| 5 | TESTOBE5 |  |  | 1 |  |  |
| 6 | TESTOBE1 |  |  | 2 |  |  |
| 7 | TESTOBE2 |  |  | 1 |  |  |
| 8 | TESTOBE3 |  |  | 2 |  |  |
| 9 | TESTOBE4 |  |  | 1 |  |  |
| 10 | TESTOBE5 |  |  | 2 |  |  |

*<Similar driving test log tables for all test stations>*

## Summary of results

A summary of the test results of the driving test is presented below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Station** | **Number of passages** | **Number of correct OBE reading** | **Percentage of correct OBE reading** | **Comments (describe other Signal codes than SC02 and SC22)** |
|  | 10 |  |  |  |
|  | 10 |  |  |  |
|  | 10 |  |  |  |
|  | 10 |  |  |  |
|  | 10 |  |  |  |
|  | 10 |  |  |  |
| **TOTAL** | **60** |  |  |  |

“Number of correct OBE reading” is the number of passages where “Result RSE (TR-file)” is SC02 and “Result TSP (TIF-file)” is C1.

In “Comments” it is important to specify occurrences of other Signal codes than SC02 (correct reading) and SC22 (no OBE reading, video detection)

# Appendix E: Plan for pilot operation of new OBE

*[This Appendix provides expected content for the plan for pilot operation to be submitted to NPRA prior to commencement of pilot operation of a new or changed OBE for a TSP. Also a list of what is expected in the report after pilot operation is provided]*

## Expected content of plan for pilot operation:

* Time period for issuing OBE to pilot drivers:
* Criteria for selection of pilot drivers:
* App. number of pilot drivers:
* List of OBE issued to pilot drivers (where to find it):
* Estimated time to obtain the required number of passages for pilot operation:
* Responsible person to follow up pilot passages:
* Responsible person for the pilot report:

## Expected content of pilot report:

* Time period for pilot operation
* Number of issued OBE to pilot drivers:
* Number of different OBE registered in AutoPASS stations during pilot period:
* Table of number of passages per AutoPASS station and pr. C-code (and total)
* Percentage of passages with correct OBE reading (code = C1)
* Comments on results (special observations)