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Project Name

System Verification Document  
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Approval

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| Title: System Verification Document | |
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Change Log

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Change Record

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# Introduction

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The purpose of the System Verification Document (SVD) is to plan the repeatable tests which will show how the system meets the requirements already set out in the Requirements Document. Once the tests have been planned they will be run by the consortium and the results recorded and presented to ESA as an update to the SVD. Remember that each test must have a clear pass/fail criterion.

In the present document is described the test plan, to be executed prior the Factory Acceptance Tests (FAT) and the on-Site Acceptance Tests (SAT) milestones, for the verification of the System Requirements, and of the User Requirements where relevant. Additional tests could be performed by the designer to continuously assess the HW or SW components but they should be kept internally if they are not directly related to the System Requirements verification activity.

This template structures the minimum requirement of content expected in System Verification Document deliverable to be reviewed by the ESA during the project execution.

Concerning the use of this template, please note the following:

* Material presented in this plain style is either suggested content for System Verification Document, or describes the content to be inserted in the corresponding paragraph, as relevant. This is intended to be an example of a response to the related Agency requirements, which the Contractor needs to properly complement. The suggested material may be adopted as is, or modified at the Contractors’ discretion. It remains the responsibility of the Contractor to ensure that all of the Agency’s requirements present in the Management Requirements are properly addressed.
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PLEASE, REMOVE THIS TEXT BOX AFTER YOU HAVE STARTED USING THIS TEMPLATE

## Reference Documents

| Ref. | Document ID. | Title | Rev. |
| --- | --- | --- | --- |
|  |  |  |  |

## Acronyms

| **Tag** | **Description** |
| --- | --- |
| SVD | System Verification Document |
|  |  |

# Verification Plan

## Verification Matrix

*This section shall include a Test Matrix that can easily create traceability between each test and the System Requirements identified in the RD together with the milestone review (i.e. Factory Acceptance Tests and/or On-Site Acceptance Test – see Section 3) prior to which the test will be executed.*

*The requirement referenced herein with the identifier SR-XXXX are the System Requirements as presented in [RD].*

| **Verification ID** | **Verification Descriptor** | **SR IDs** | **Stage** | **Verification Methodology** |
| --- | --- | --- | --- | --- |
| **T-0100** | **User Log in** | **SR-0100  SR-0300** | FAT/SAT | Inspection |
| **T-0200** | **IoT (Internet-of-Things) Device Data Transmission Reliability** | **SR-0200** | SAT | Test |
|  |  |  |  |  |

## Factory Acceptance Test (FAT) set up

*Describe the way the FAT will be performed for your system.*

## On-site Acceptance Test (SAT) set up

*Describe the way the SAT will be performed for your system (e.g. a software to be deployed on airplanes, ships, etc.).*

## Facilities and Equipment

*Describe the test facilities and equipment needed for the testing (e.g. Thermal vacuum chamber, PC running windows 10 connected to internet, Satellite signal in L band from 28 East antenna).*

*Make it clear what facilities and equipment will be used at FAT and what at SAT*

## Verification Methodology

* **Verification Method**:
* **Inspection (I)** – Verification by inspection shall consist of visual determination of

physical characteristics.  Visual inspection of either graphical interface, textual results, user manual, or equipment manufacturer specifications. It will require an analysis of the documentation and/or visual inspection, providing evidence of the correct implementation that satisfy the requirement by means of screenshot, extraction of sections from operational manuals, etc. Therefore no specific test procedure with detailed operations is envisaged.

* **Analysis (A)** – Verification by analysis is done when other methods are not appropriate or too cumbersome to perform a verification by test. It is usually done by collecting data like test results related to some part of the system, and then, knowing the system design, an engeneering based judgement is perfomed to infer whether the verification was successful or not.
* **Demonstration (D)** – Verification by demonstration is done verifying the behaviour of the system, either once or more than once, without special test equipment or intrumentation. Demonstration can be documented in different ways, such as with pictures or screen captures.
* **Test (T)** - Verification tests consist of measuring system performance and functions under representative environments. Tests will be executed according to the type (Factory or on-Site) at the designated facility using the target delivered HW/SW with strict testing procedures, than shall be repeatable, and identifying the success/fail criteria (expected output) for each test.
  + - Factory testing – test shall be foreseen at prime contractor premises
    - On-site testing – test shall be foreseen on the target pilot system/s

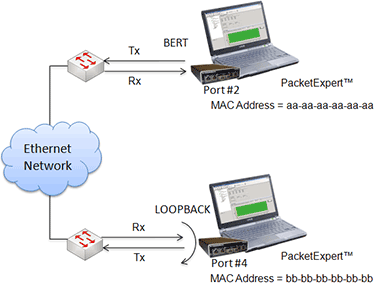
## Verification List and Procedures

### T-0200 IoT Device Data Transmission Reliability

#### Verification Objective

#### Verification Methodology

#### Verification Set-up and configuration



#### Verification Prerequisite

#### Verification Procedure and Outputs

Example:

1. Connect IoT sensor to SatCom gateway
2. Program IoT device to collect data at 5-minute intervals and measure data collection by reading logs directly from the device.
3. Transmit the data over X SatCom (Satellite Communications) network to cloud platform every 5-minutes for 4 hours, and measure packet loss of the SatCom link using Y network QoS (Quality of Service) measurement tool.
4. Compare the timestamped data received at the platform across the 4 hours to the data collected at the IoT device
5. Compute the % of successfully transmitted data packets.

#### Verification Success Criteria

*(Expected Output for each test shall be measurable and unambiguous) and Pass/Fail criteria.*

Example:

1. IoT device interfaces with the satellite communications gateway.
2. Logs show data is collected at the device at 5-minute intervals for 4 hours with 0% data loss.
3. Data is transmitted over the SatCom link every 5 minutes with a minimum of 95% of the data received at the platform successfully throughout the 4 hours.

All 3 criteria must be met to pass the test.

# Test Reports

## Overall Test Matrix Results

| **Test ID** | **Test Descriptor** | **FAT Results** | **SAT Results** |
| --- | --- | --- | --- |
| **T-0100** | **User Log in** | Passed | Failed |
| **T-0200** | **IoT Device Data Transmission Reliability** | Not Applicable | Passed |
|  |  |  |  |

## FAT Reports

*All FAT related signed test reports shall be shown with the proof of the test results, date and the signature of the test engineer/s. Please use the Test Report Template in the ANNEX A.*

*Please note that the SVD provided at the FAT has to demonstrate the compliance of the different elements of the system, with the exception of the pilot sites, with the system requirements identified in the RD.*

## SAT Reports

*All SAT related signed test reports shall be shown with the proof of the test results, date and the signature of the test engineer/s. Please use the Test Report Template in the ANNEX A.*

*Please note that the SVD provided at the SAT has to demonstrate the compliance of the different elements of the system, including all the pilot sites, with the system requirements identified in the RD.*

*The SVD provided at the SAT has the ultimate goals to demonstrate the readiness of the system before entering into the pilot utilisation activities.*

# Conclusion

*General consideration about the testing results to be completed later on, at the conclusion of the test stage.*

**Annex A**

**Verification Report Template**

|  |  |  |
| --- | --- | --- |
| **Test Id**: | Test Descriptor: | Notes |
| **Requirements Trace (e.g. SR)** |  |  |
| **Methodology** |  |  |
| **Prerequisite** |  |  |
| **Set-up and**  **Configuration** |  |  |
| **Procedure** |  |  |
| **Expected Output** |  |  |
| **Results & Evidences** (e.g. xls sheet, data file, log file, pictures, video, screen capture) |  |  |
| **Observation** |  |  |
| **Conclusion** | Passed/Not Passed |  |
| **Responsible** | Print Name and Signature | **Place:**  **Date:** |