LGE Internal Use Only

System Test Guide

About This Document

Document Information

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# Establish a system test plan

|  |  |  |
| --- | --- | --- |
| **Task Description** | **Procedure** | **Outcomes** |
| The system test manager establishes the system test goal that the project must achieve, and describes it in the system test plan. It also defines the scope of system testing of the project. | 1.1 Defining System Test Goals [System Test Manager]  1.2 Defining System Test Roles and Responsibilities [System Test Manager]  1.3 Defining System Test Scope [System Test Manager]  1.4 Defining a System Test Strategy [System Test Manager]  1.5 Defining a system test regression test strategy [System Test Manager]  1.6 Defining a System Test Schedule [System Test Manager]  1.7 Defining System Test Case Design Criteria [System Test Manager]  1.8 Defining system test entry/stop/resume criteria [System Test Manager]  1.9 Defining System Test End Criteria [System Test Manager]  1.10 Defining the System Test Environment [System Test Manager] | System Test Plan, WBS |

## Defining System Test Goals

The system test manager establishes the goals the project must achieve based on the needs of the organization and customers.

Establishing project system test goals should be considered in terms of:

- Schedule: Objectives in terms of meeting key milestone schedules for organizations and customers

- Cost: Target in terms of development cost including human and material resources

- Quality: Objectives in terms of product quality and process quality

The organization's system test goals are two-fold, and they have Reliability/Functionality goals.

**[Reliability Quality Goal]**

|  |  |  |  |
| --- | --- | --- | --- |
| **HW Quality** | | **Goal** | |
| Part | Item | DV | PV |
| Test Quality | Defect Resolution Rate | 100%  (Full reliability) | 100%  (Full reliability) |

**[Functionality Quality Goal]**

However, if there is a system test goal requested by the customer or agreed with the customer, the customer's goal will be followed.

|  |  |  |  |
| --- | --- | --- | --- |
| **System Quality** | | **Goal** | |
| Part | Item | DV | PV |
| function implementation rate | | 100% | 100% |
| Problem improvement rate | | 100% | 100% |
| Test Quality | Critical issue | 0 | 0 |
| Major issue | 0 | 0 |
| Minor issue | - | 0 |
| Comment | - | 0 |

## Defining System Test Roles and Responsibilities

The system test manager creates the roles and responsibilities for each role related to the system test test execution in the project.

System test manager

• Establish a system test plan

• Review the system test plan

• Review system test cases

• Review reporting of system test results

System tester

• Participate in system test plan reviews

• System test case development

• Track system test cases

• Participate in system test case reviews

• Perform system tests

Part PL

• Participate in system test plan review

• Participate in system test case reviews

• Review reporting of system test results

PL

* • Participate in system test plan review
* • Review reporting of system test results

## Defining System Test Scope

The system test manager defines the scope of system tests that must be performed on the project.

## Defining a System Test Strategy

The system test manager defines the system test strategy that the project should carry out.

**[Functional Test]**

Based on the FRP, the test function that can be implemented is identified according to the sample release time, and the system test time is defined so that the system test can be performed. After 100% implementation of the function, plan so that all system elements can be system tested.

| Test Function | B2 | B3 | B4 | B5~ |
| --- | --- | --- | --- | --- |
| Function A | ● | ● | ● | ● |
| Function B |  | ● | ● | ● |
| Function C |  |  | ● | ● |
| Function D |  |  |  | ● |
| Function E |  |  |  | ● |

Table 1 Example - Defining a system test strategy

[Reliability Test]

• Reliability requirements are different for each OEM company, and the reliability test strategy is defined by referring to the detailed product reliability test specifications for each OEM company specified below.

1. [LG(35)-F-1026]Daimler\_DC CID Product Reliability Test Standard\_Rev0\_160617.pptx

2. [LG(35)-F-1014] Porsche\_CID Product Reliability Test Standard\_Rev1\_160308.pptx

3. [LG(35)-F-1019]Bentley\_CID Product Reliability Test Standard\_Rev0\_160308.pptx

4. [LG(35)-F-1015]CEVT\_IHU\_Product reliability test standard\_Rev00.pptx (6390K)

5. [LG(35)-F-1008] Renault Product Reliability Test Standard\_Rev3\_20140109.ppt (7522K)

6. [LG(35)-F-1023] GM WCU Product Reliability Test Standard\_Rev01.ppt (4593K)

## Defining a system test regression test strategy

The system test manager defines a regression test strategy for re-verification when a defect occurs through system test execution.

In case of critical grade issue, full test

If an issue below the major grade occurs, a regression test is performed.

## Defining a System Test Schedule

The system test manager establishes a system test schedule and writes the WBS taking into account the system test goals, scope, and strategy.

## Defining System Test Case Design Criteria

The system test manager defines the system test case design criteria for the project by referring to the table below.

However, if there is a special requirement for the system test case design standard of the OEM, the system test case design standard is defined according to the OEM's requirements.

In the case of specific system elements, if it is difficult to apply the test case design criteria specified in the table below, the reason shall be specified in the system test plan.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test Type | Test Case Design Criteria | | | | Remark |
| Analysis of Requirements | Equivalence Partitioning | Analysis of Boundary Value | Error Guessing |
| SW Unit Test | ● | ○ | ○ | ○ |  |
| SW Integration Test | ● | ○ | ○ | ○ |  |
| SW Test | ● | ○ | ○ | ○ |  |
| System Integration Test | ● | ○ | ○ | ○ |  |
| System Test | ● | ● | ● | ● |  |

(●: Required, ○: Optional)

Table 2 Test Case Design Criteria

• For details on TC Design when writing test cases, refer to the guide below.

1. LGE\_VS\_SysT\_G02\_Test Technique Guide

## Defining system test entry/stop/resume criteria

The system test manager specifies the system test entry/stop/resume criteria in the system test plan.

|  |  |  |
| --- | --- | --- |
| Criteria | | Remark |
| Entry | . System integration test completion rate of 80% or higher  2. If the improvement rate of the system integration test problem is more than 90%  3. If there is no critical problem in the system integration test  4. In case SW improvement or know issue is provided by the research institute  5. Start the test after having a Start meeting with items 1, 2, and 3 |  |
| Suspension  & Resumption | 1. If a critical problem occurs during the test, the PL and the Test Manager discuss the severity of the problem and decide whether to stop.  1) Severity Critical: Stop the test and fix the SW bug in the lab  Resume the test.  2) Severity Major, Minor: Write the content in the test report (know issue), Continue the test. |  |

Table 3 System Test Entry/Stop/Resume Criteria

## Defining System Test End Criteria

The system test manager can define the sample release and system test termination criteria for each development stage according to the system test strategy that needs to be performed in the project.

The system test termination criteria must satisfy the Reliability/Functionality goal (refer to Section 1.1)

If the defined termination criterion is not satisfied, the system test is repeated according to the regression test strategy until the termination criterion is satisfied.

## Defining the System Test Environment

The system test manager describes the system test environment in the system test plan, and describes the resources required to establish the system test environment.

# Review the system test plan

|  |  |  |
| --- | --- | --- |
| **Task Description** | **Procedure** | **Outcomes** |
| The system test manager reviews the system test plan and related deliverables with stakeholders. | 2.1 Preparing for a Review Meeting [System Test Manager]  2.2 Conducting a review meeting [System Test Manager]  2.3 System Test Plan Supplement [System Test Manager] | System Test Plan, VR Report |

## Preparing for a Review Meeting

The system test manager identifies review participants and convenes a review meeting.

* Ensure that the deliverables under review are ready.
  + The subject of review may be the system test plan.
* Prepare a review checklist..
  + You can select the items to be reviewed from the standard checklist and add items to be reviewed if necessary.
* Schedule with review participants.
  + Required Review Participants: Systems Test Manager, Systems Test Officer, QA, Part PL, PL
  + Additional review participants may be selected as needed.
* Distribute review materials in advance and convene review meetings.

## Conducting a review meeting

The system test manager conducts a review meeting based on the review checklist.

For detailed review items, refer to ‘Review Checklist’.

## System Test Plan Supplement

The system test manager supplements the system test plan based on the review results along with PL and Part PL. VR can be performed again if necessary.

※ The detailed review process follows the ‘review process’.

# System test case development

|  |  |  |
| --- | --- | --- |
| **Task Description** | **Procedure** | **Outcomes** |
| The system tester develops system test cases by referring to the system test plan and system requirements specification. | 3.1 System test case development [system test person in charge] | system test case |

## System test case development

The system tester develops system test cases by referring to the system test plan and system requirements specification.

• Consider the following when writing system test cases.

1. System Requirements Statement

• The system test case is written including the following items.

| Item | Description | Remark |
| --- | --- | --- |
| Requirements ID | Specify the Requirement ID to be tested. |  |
| TC ID | Specify TC ID, write TC\_Requirements ID\_#.  # is the test case no for the corresponding requirement.  Ex. Requirements ID: SAD\_38  TC ID: TC\_SAD\_38\_1, TC\_SAD\_38\_2 |  |
| TC Title | Enter the name of the test that can distinguish the test.  Ex. Sensor\_Monitoring, BrightnessControl |  |
| TC Design Type | Select and specify among Analysis of Requirements, Equivalence Partitioning, and Analysis of Boundary Value Error Guessing. |  |
| Preconditions | Write prerequisites for performing the test. |  |
| Input | When testing, describe the input value. |  |
| Expected Output | It describes the expected output value when the test input value is entered. |  |
| Observed Output | Write the observed output value through the actual test. |  |
| Pass/Fail/NA | Write whether the test is Pass/Fail/NA. |  |
| Remarks | Describe the specifics during the test.. |  |

When a test case is automatically generated using a separate system test tool, the tool usage standards are followed.

* For details on TC Design when writing test cases, refer to the guide below.

1. LGE\_VS\_SysT\_G02\_Test Technique Guide

# System test cases Traceability

|  |  |  |
| --- | --- | --- |
| **Task Description** | **Procedure** | **Outcomes** |
| The system tester defines traceability between system test cases and system requirements. | 4.1 Defining traceability between system requirements [system test person] | Requirements Traceability |

## Defining traceability between system requirements

The system tester defines the trace relationship between the system test cases and the system architecture design.

Consider the following when defining a tracking relationship.

- In principle, tracing is reflected in the output of 100% development stage without omission of requirements.

- The principle of requirements tracking follows the structure and scope of tracking management of deliverables defined in the 'Requirements Tracking Guide' document.

- Requirements tracking manages the tracking relationship by selecting either DOORS or RTM as a tracking management tool.

- A traceability relationship can be defined during the creation or completion of a requirement or traceable artifact.

- If requirements or traceable artifacts are changed, review whether the traceability should be adjusted due to the change and reset the traceability.

- The structure and scope of tracking management and tracking management tools can be adjusted and used according to the characteristics of the project (eg, development environment).

The system tester reinforces the test case when checking the missing content through tracking.

• For details on tracking management when defining a tracking relationship, refer to the guide below.

1. LGE\_VS\_REQM\_G01\_Product Traceability Guide

# Review system test cases

|  |  |  |
| --- | --- | --- |
| **Task Description** | **Procedure** | **Outcomes** |
| System test managers review system test cases with stakeholders. | 5.1 Preparing for a Review Meeting [System Test Manager]  5.2 Conducting a review meeting [System Test Manager]  5.3 System test case supplement [system test person in charge] | System Test Case  VR Report |

## Preparing for a Review Meeting

The system test manager identifies review participants and convenes a review meeting.

* Ensure that the deliverables under review are ready.
  + The subject of review may be system test cases.
* Prepare a review checklist.
  + You can select the items to be reviewed from the standard checklist and add items to be reviewed if necessary.
* Schedule with review participants..
  + Required Review Participants: System Test Manager, System Test Officer, System ENG., QA, Part PL
  + Additional review participants may be selected as needed.
* Distribute review materials in advance and convene review meetings.

## Conducting a review meeting

The system test manager conducts a review meeting based on the review checklist.

The review should focus on the following: (For detailed checklist, refer to ‘Review Checklist’)

* Completeness: Are all TCs defined in the test scope of the test plan designed?
* Consistency: Is the TC defined by reflecting the technique defined in the Test Methodology of the test plan?
* Traceability: Is a unique ID assigned to the TC? Is the TC defined and traceable?
* Individual TC testability: Whether the TC execution procedure, input data, and expected result can be tested in detail?

## System test case supplement

The system tester, together with the system test manager, supplements the system test plan based on the review results. VR can be performed again if necessary.

※ The detailed review procedure follows the ‘review process’.

# Perform system tests

|  |  |  |
| --- | --- | --- |
| **Task Description** | **Procedure** | **Outcomes** |
| The system tester performs system tests according to the schedule set in the system test plan and records and handles defects.  The system test manager checks the performed test results and decides/performs the regression test with stakeholders. | 6-1 Performing a system test [System test person]  6-2 Perform regression test [system tester]  6-3 System Test Defect Management [System Test Personnel] | issue  system test results |

## Performing a system test

The system tester performs system tests according to the system test plan.

## Perform regression test

The system test manager plans to perform regression tests according to the system test regression test strategy (Section 1.5).

Establish a regression test plan with PL, SW PL, SW ARCH, System ENG., and issue resolution personnel under the supervision of the system test manager.

The regression test plan procedure is as follows.

1. 1. Issue impact analysis: Identify the part where the issue occurred, and analyze the impact relationship with other parts (requirement tracking table)
2. 2. Test range selection: Select the test range based on the impact analysis result.
3. 3. Selection of test cases to be performed: Select test cases within the selected range.
4. 4. Regression test person and schedule planning: Establish a test person and schedule plan and reflect it in WBS.

According to the plan established by the system test manager, the system test person performs the regression test.

## System Test Defect Management

The system tester manages defects that occur as a result of test execution according to the ‘issue management process’.

# Report system test results

|  |  |  |
| --- | --- | --- |
| **Task Description** | **Procedure** | **Outcomes** |
| The system test manager organizes the system test results and reports the results to stakeholders. | 7-1 System test results summary [System Test Manager]  7-2 Reporting System Test Results [System Test Manager] | system test results |

## System test results summary

The system test manager collects and organizes the system test results performed by the system test person in accordance with the system test plan.

The system test results include the following items.

1. System test case (specify check result)

2. test coverage

3. Test Pass/Fail

## Reporting System Test Results

The system test manager prepares a system test result and shares it with stakeholders.

• Essential Stakeholders: System Test Manager, System Test Officer, System ENG., QA, Part PL, PL

• Additional stakeholders may be selected as needed.