LGE Internal Use Only

System Integration Test Guide

About This Document

Document Information

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# System integration test plan

|  |  |  |
| --- | --- | --- |
| **Task Description** | **Procedure** | **Outcomes** |
| The system integration test manager establishes the system integration test goal to be achieved by the project and describes it in the system integration test plan. It also defines the scope of system integration testing of the project.. | 1.1 System Integration Test Goal Definition [System Integration Test Manager]  1.2 Defining System Integration Test Roles and Responsibilities [System Integration Test Manager]  1.3 System Integration Test Scope Definition [System Integration Test Manager]  1.4 Defining a System Integration Strategy [System ENG.]  1.5 Definition of System Integration Test Strategy [System Integration Test Manager]  1.6 System Integration Test Regression Test Strategy Definition [System Integration Test Manager]  1.7 System Integration Test Schedule Definition [System Integration Test Manager]  1.8 System Integration Test Case Design Criteria Definition [System Integration Test Manager]  1.9 System integration test entry/stop/resume definition [System Integration Test Manager]  1.10 Definition of system integration test termination criteria [System integration test manager]  1.11 System Integration Test Environment Definition [System Integration Test Manager] | system integration test plan,  WBS |

## System Integration Test Goal Definition

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

The establishment of the project system integration test goal should be considered from the following perspectives.

- 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 system integration test goal follows the customer's goal if there is a system integration test scope and goal requested by the customer or agreed with the customer after consulting between project-related departments.

## Defining System Integration Test Roles and Responsibilities

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

System Integration Test Manager

• Establishment of system integration test plan

• Review of system integration test plan

• System integration test case review

• Reporting of system integration test results

System integration tester

• Participate in system integration test plan review

• System integration test case development

• System integration test case tracking

• Participate in system integration test case review

• System integration test

System ENG.

• Participate in system integration test plan review

• Participate in system integration test case review

PL

• Participate in system integration test plan review

• Report and review system integration test results

## System Integration Test Scope Definition

The system integration test manager defines the scope of the system integration test to be performed in the project.

Basically, Interfaces between System Elements are included in the scope of system integration test.

## Defining a System Integration Strateg

System ENG. defines the system integration test strategy to be carried out in the project. Based on the FRP, the system elements that can be implemented are identified according to the sample release time, and the integration strategy is established.

## Definition of System Integration Test Strategy

The system integration test manager defines the system integration test strategy to be carried out in the project. Based on the FRP, the system elements that can be implemented are identified according to the sample release time, and the system integration test time is defined so that the system integration test can be performed. After 100% of functional implementation, plan to perform system integration test for all System Elements.

| System Elements | B2 | B3~ | B4 | B5~ |
| --- | --- | --- | --- | --- |
| Element A | ● | ● | ● | ● |
| Element B |  | ● | ● | ● |
| Element C |  |  | ● | ● |
| Element D |  |  |  | ● |
| Element E |  |  |  | ● |

Table 1 Sample - System integration test strategy definition

## System Integration Test Regression Test Strategy Definition

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

The test execution range can be defined as follows.

* If a critical grade issue occurs, select all test cases..
* If an issue below the major level occurs, a test case related to the root cause is selected according to the issue impact analysis.

## System Integration Test Schedule Definition

The system integration test manager establishes the system integration test schedule and prepares the WBS in consideration of the system integration test goal, scope, and strategy.

## System Integration Test Case Design Criteria Definition

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

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

In the case of an interface between 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 integration 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

## System integration test entry/stop/resume definition

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

|  |  |  |
| --- | --- | --- |
| Criteria | | Remark |
| Entry | When a new HW version came out or SW version release aligned with WBS. |  |
| Suspension | A critical issue occurred (for example. When SW binary updated but Test target does not reboot successfully. Accordingly Test cannot be started) |  |
| Resumption | A critical issue should be addressed. Test resumption should be determined by stakeholders meeting. | Stakeholder : PL, HWPL, SWPL, Architect, QA, SysQT TM, SWQT TM |

Table 3 Sample - System integration test entry/stop/resume criteria

## Definition of system integration test termination criteria

The system integration test manager can define the system integration test termination criteria for each sample release according to the system integration test strategy to be performed in the project.

Criteria for the completion of the system integration test

At the time of sample release corresponding to 100% of function implementation,

1. Test coverage – interface coverage (System) 100%

2. Defect Zero must be satisfied.

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

## System Integration Test Environment Definition

The system integration test manager describes the system integration test environment in the system integration test plan, and describes the resources necessary for establishing the system integration test environment.

# Review of system integration test plan

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

## Preparation for review meeting

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

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

## Conducting a review meeting

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

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

## System Integration Test Plan Supplement

The system integration test manager supplements the system integration test plan based on the review results. VR can be performed again if necessary.

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

# System integration test case development

|  |  |  |
| --- | --- | --- |
| **Task Description** | **Procedure** | **Outcomes** |
| The person in charge of system integration test develops system integration test cases by referring to the system integration test plan and system architecture design. | 3.1 System integration test case development [System integration test person in charge] | System Integration Test Case |

## System integration test case development

* The person in charge of system integration test develops system integration test cases by referring to the system integration test plan and system architecture design.
* • Consider the following when writing system integration test cases.
* 1. system architecture design
* • The system integration test case should include the following items.

| Item | Description |
| --- | --- |
| TC ID | Enter a unique ID that can identify the test case.  However, you can use the ID automatically assigned when using the tool. |
| TC Name | Enter a unique name to identify the test case. |
| Purpose | Describe the purpose of executing the test case. |
| Requirements ID | Enter the requirement ID to be tested. |
| Precondition | Describe the prerequisites for performing the test. |
| Test Steps | Describe the procedure to be performed during testing. |
| Expected Results | Describe the results obtained after performing the test procedure. |
| Priority | Write the priority of test cases. |
| TC Design Technique | Select and fill out Analysis of Requirements, Equivalence Partitioning, Analysis of Boundary Value, State Transition Testing, and Error Guessing. |

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

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

# System Integration Test Case Traceability

|  |  |  |
| --- | --- | --- |
| **Task Description** | **Procedure** | **Outcomes** |
| The system integration tester defines the traceability between the system integration test case and the system architecture design. | 4.1 Definition of trace relationship between system architecture design [System integration test person] | Requirements Traceability Matrix |

## Definition of trace relationship between system architecture design

The system integration tester defines the trace relationship between the system integration test case and the system architecture design document.

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 tracing manages the trace relationship by selecting either the Tool (ex. codeBeamer, DOORS) or the Requirements Trace Table (RTM) as the trace 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 integration tester reinforces the test case when checking omissions through tracking.

* For details on tracking management when defining a tracking relationship, refer to the guide below.
* 1. LGE\_VSsmart\_REQM\_G01\_Product Traceability Guide

# System integration test case review

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

## Preparing for Review Meeting

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

* Ensure that the deliverables under review are ready.
  + The subject of review may be system integration 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 Integration Test Manager, System Integration Test Manager, System ENG., QA
  + Additional review participants may be selected as needed.
* Distribute review materials in advance and convene review meetings.

## Conduct a review meeting

The system integration 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: Are the TC performance procedures, input data, and expected result testable in detail?

## System integration test case supplement

The system integration test person supplements the system integration test case based on the review results. VR can be performed again if necessary.

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

# System integration and integration testing

|  |  |  |
| --- | --- | --- |
| **Task Description** | **Procedure** | **Outcomes** |
| System ENG. proceeds with system integration according to the system integration strategy.  The system integration test person performs system integration tests according to the schedule set in the system integration test plan, records and handles defects.  The system integration test manager checks the test results and decides/performs the regression test with stakeholders. | 6-1 System Integration [System ENG.]  6-2 System integration test [System integration test person in charge]  6.3 Perform regression test [System integration test person]  6-4 System integration test defect management [System integration test person in charge] | Issue |

## System Integration

System ENG. performs system integration according to the system integration test plan.

## System integration test

The person in charge of the system integration test performs the system integration test according to the system integration test plan.

The system integration test results include the following items.

1. Pass/Fail for test cases

2. Actual Result

(If it is a Fail, it is mandatory to leave it in the record, and if it is a Pass, it can be omitted depending on the project situation.)

3. Issue log (if applicable)

## Perform regression test

The system integration test manager plans to perform the regression test according to the system integration test regression test strategy (Section 1.6).

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

The regression test plan procedure is as follows.

1. Issue impact analysis: Identify the part where the issue occurred, and analyze the impact relationship with other parts (requirement tracking table)

2. Test range selection: Select the test range based on the impact analysis result.

3. Selection of test cases to be performed: Select test cases within the selected range.

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 integration test manager, the system integration test manager performs the regression test.

## System integration test defect management

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

# Reporting of system integration test results

|  |  |  |
| --- | --- | --- |
| **Task Description** | **Procedure** | **Outcomes** |
| The system integration test manager organizes the system integration test results and reports the results to stakeholders. | 7-1 System integration test results summary [System integration test manager]  7-2 System Integration Test Result Report [System Integration Test Manager] | System integration test result report |

## System integration test results summary

The system integration test manager creates a system integration test result report by collecting and organizing the system integration test results performed by the system integration test person in accordance with the system integration test plan.

The system integration test result report includes the following items.

1. Test information (SW version, HW version, test schedule)

2. Test Case Pass Rate, Test Coverage

3. Issue information

## System Integration Test Result Report

The system integration test manager shares the system integration test result report with stakeholders

• Essential stakeholders: PL, System ENG., QA, system integration test manager, system integration test manager

• Additional stakeholders may be selected as needed.