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SW Unit Test Guide

About This Document

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# Establishment of SW unit test plan

|  |  |  |
| --- | --- | --- |
| **Task Description** | **Procedure** | **Outcomes** |
| The SW test manager establishes the SW unit test goal that the project must achieve, and describes it in the SW unit test plan. It also defines the scope of SW unit test execution of the project. | 1.1 SW Unit Test Goal Definition [SW Test Manager]  1.2 Defining SW Unit Test Roles and Responsibilities [SW Test Manager]  1.3 SW Unit Test Strategy Definition [SW Test Manager]  1.4 SW Unit Test Scope Definition [SW Test Manager]  1.5 SW Unit Test Schedule Definition [SW Test Manager]  1.6 Defining SW Unit Test Case Design Criteria [SW Test Manager]  1.7 Define SW unit test entry/stop/resume criteria [SW Test Manager]  1.8 Definition of SW Unit Test End Criteria [SW Test Manager]  1.9 SW Unit Test Environment Definition [SW Test Manager] | SW unit test plan, WBS |

## SW Unit Test Goal Definition

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

Project SW unit test goal establishment 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 SW unit test goal follows the customer's goal if there is a SW unit test scope and goal that the customer requested or agreed with the customer through discussion between project-related departments.

## Defining SW Unit Test Roles and Responsibilities

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

SW Test Manager

• Establishment of SW unit test plan

• Review SW unit test plan

• SW unit test case review

• Report SW unit test results

SW ENG. (Software Engineer)

• Participate in SW unit test plan review

• SW unit test case development

• Participate in SW unit test case review

• SW unit test case tracking

• Perform SW unit tests

SW PL (Software Reader)

• Participate in SW unit test plan review

• Participate in SW unit test case review

• Participation in SW unit test result reporting

PL (Project Leader)

• Participate in SW unit test plan review

• Participation in SW unit test result reporting

## SW Unit Test Strategy Definition

The SW test manager defines the scope of SW unit tests to be performed in the project.

Basically, all SW components are included in the SW unit test scope, but except for the SW implemented by the company, SW implemented by the customer and SW automatically generated on the tool are excluded from the SW unit test scope.

## SW Unit Test Scope Definition

The SW test manager defines the SW unit test strategy that should be carried out in the project. Based on the FRP, the SW components that can be implemented are identified according to the sample release time, and the SW unit test time is defined so that the SW unit test can be performed. After 100% of function implementation, plan so that all components can perform SW unit test.

| SW Components | B2 | B3 | B4 | B5~ |
| --- | --- | --- | --- | --- |
| Component A | ● | ● | ● | ● |
| Component B |  | ● | ● | ● |
| Component C |  |  | ● | ● |
| Component D |  |  |  | ● |
| Component E |  |  |  | ● |

Table 1 Sample - SW unit test strategy definition

## SW Unit Test Schedule Definition

The SW test manager establishes the SW unit test schedule and writes the WBS in consideration of the SW unit test goal, scope, and strategy.

## Defining SW Unit Test Case Design Criteria

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

However, if there is a special requirement for the customer's SW unit test case design criteria, define the SW unit test case design criteria according to the customer's requirements.

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test Type | Test Case Design Criteria | | | |
| 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

## Define SW unit test entry/stop/resume criteria

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

|  |  |
| --- | --- |
| Criteria | |
| Entry | Completed the implementation of unit function |
| Suspension | Failed the build or coverage on unit function |
| Resumption | Completed the build and coverage on unit function |

Table 3 SW unit test entry/stop/resume criteria

## Definition of SW Unit Test End Criteria

The SW test manager can define the SW unit test termination criteria for each sample release according to the SW unit test strategy that needs to be carried out in the project. It is defined as a coverage goal.

If the defined end criterion is not satisfied, the SW unit test is repeated until the end criterion is satisfied.

## SW Unit Test Environment Definition

The SW test manager describes the SW unit test environment in the SW unit test plan, and describes the resources necessary for building the SW unit test environment.

# Review SW unit test plan

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

## Preparation for review meeting

SW test manager identifies review participants and convenes a review meeting

• Ensure that the deliverables under review are ready.

The subject of review can be the SW unit test plan.

• Prepare a review checklist.

Items to be reviewed can be selected from the standard checklist, and items to be reviewed can be added if necessary.

• Schedule with review participants.

- Required review participants: SW Test Manager, SW ENG., QA, SW PL, PL

- Additional review participants may be selected as needed.

• Distribute review materials in advance and convene review meetings.

## Conducting a review meeting

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

For detailed review items, refer to ‘LGE\_VS\_VR\_C01\_Review Checklist’.

## SW Unit Test Plan Supplement

The SW test manager supplements the SW unit test plan based on the review results along with the SW PL. If necessary, VR (Verification Review) can be performed again.

※ The detailed review procedure follows the ‘LGE\_VS\_VR\_P01\_Review Process Definition’.

# SW unit test case development

|  |  |  |
| --- | --- | --- |
| **Task Description** | **Procedure** | **Outcomes** |
| SW ENG. develops SW unit test cases with reference to the SW unit test plan and detailed SW design. | 3.1 SW Unit Test Case Development [SW ENG.] | SW unit test case |

## SW Unit Test Case Development

SW ENG. develops SW unit test cases by referring to the SW unit test plan and detailed SW design.

• Consider the following when writing SW unit test cases.

1. LGE\_VS Smart\_SWDC\_T01\_SW Detailed Design (SDD)

• SW unit test cases should be written including the following items.

| Item | Description |
| --- | --- |
| 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 testing. |

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

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

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

# SW unit test case traceability

|  |  |  |
| --- | --- | --- |
| **Task Description** | **Procedure** | **Outcomes** |
| SW ENG. defines the traceability relationship between SW unit test cases and SW detailed design. | 4.1 SW Detailed Design and Traceability Definition [SW ENG.] | equirements Traceability Matrix |

## SW Detailed Design and Traceability Definition

SW ENG. defines the trace relationship between the SW unit test case and the SW detailed 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.

- Manage the tracking relationship by selecting a requirements tracking management tool (DOORS, Excel, etc.).

- 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).

SW ENG. Reinforce test cases 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

# SW unit test

|  |  |  |
| --- | --- | --- |
| **Task Description** | **Procedure** | **Outcomes** |
| SW ENG. performs SW unit test according to the schedule set in the SW unit test plan, records and processes defects. | 5-1 SW unit test [SW ENG.]  5-2 SW Unit Test Defect Management [SW ENG.] | Issue |

## SW unit test

• SW ENG. performs SW unit tests according to the SW unit test plan. SW unit test can be performed through a separate SW tool (eg, controller test, Junit, etc.) specified in the SW unit test plan.

• Defects identified through SW unit tests are registered and retested after correction.

## SW Unit Test Defect Management

SW ENG. manages defects that occur as a result of test execution according to the ‘LGE\_VS Smart\_IM\_P01\_Issue Management Process Definition’.

# SW unit test result report

|  |  |  |
| --- | --- | --- |
| **Task Description** | **Procedure** | **Outcomes** |
| The SW test manager organizes the SW unit test results and reports the results to stakeholders. | 6-1 Summary of SW Unit Test Results [SW Test Manager]  6-2 SW unit test result report [SW Test Manager] | SW unit test result |

## Summary of SW Unit Test Results

The SW test manager is responsible for each SW ENG. Collects and organizes the SW unit test results performed by .

SW unit test results include the following items.

1. SW unit test case (specify check result)

2. test coverage

## SW unit test result report

The SW test manager prepares the SW unit test result and shares it with the stakeholders.

• Essential stakeholders: SW test manager, SW ENG., QA, SW PL, PL

• Additional stakeholders may be selected as needed.