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**Embedded software quality assurance requirement
(English Translation)**

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Table of Contents

Foreword...	3
1 Scope...	4
2 Normative references...	4
3 Terms and definitions...	4
4 General requirements...	6
4.1 Overview of quality assurance of embedded software...	6
4.2 Elements of quality assurance of embedded software...	7
4.3 Development documents of embedded software...	8
4.4 Problem Report for Embedded Software Development Projects...	8

1 Scope

This standard specifies the quality assurance process and general requirements for the development of embedded software projects.

This standard applies to the entire development process of embedded software, it can be used for project management, development, testing and quality assurance of embedded software.

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this standard.

GB/T 8566 Information technology - Software life cycle processes

GB/T 8567 Specification for computer software documentation

GB/T 11457 Information technology - Software engineering terminology

3 Terms and definitions

The terms and definitions as defined in GB/T 11457 as well as the following terms and definitions apply to this document.

3.1

Software quality assurance

A planned and systematic mode of action to enable people to fully believe that software work products meet the specified technical requirements. Its purpose is to provide managers with visual and management requirements for the software project development process.

3.2

Process

A collection of activities which are related to each other and convert the input

4.1 Overview of quality assurance of embedded software

In the development process of the embedded software projects, according to the application characteristics of the embedded software, the quality assurance work has the following specific requirements, as relative to the general software development projects.

- a) The specification of the embedded system is generally obtained after the system specification is formulated, through the decomposition distribution process of specification. Due to the tightly integrated nature of embedded software and hardware platforms, it requires paying attention to the distribution of the software specifications and product plans for embedded software development plans, in the process of system specification development and protocol decomposition distribution. In the early phase of the embedded software project, the software's quality assurance organization shall work with the software development team to determine the selection model of the embedded software project, as well as the development process of the selected or tailored standards, meanwhile assist in the development of the development plan and the quality assurance plane of the embedded software.
- b) In the process of the development project of the embedded software, in order to ensure the preparation and development of the operating environment of the embedded software as well as the effective implementation of the test plan, the embedded software development engineers and quality assurance engineers shall participate in the necessary quality assurance activities of other related project groups, to ensure the progress of the relevant systems and environment and the quality of delivery.
- c) In the quality assurance activities that ensure the release and delivery of embedded software projects, pay special attention to the delivery and release of relevant subsystems and system operating environments.
- d) Due to the difficulty in discovering and repairing legacy defects in embedded systems and high repair costs, the quality assurance activities place special emphasis on code quality control of embedded software projects prior to delivery testing.
- e) In the case of changes in the relevant platforms and environments, the quality assurance process shall clarify the relevant mechanisms and requirements, to ensure that the

- embedded software is updated a) Quality assurance engineer;
b) Project manager;
c) Project team members or software development engineers;
d) Quality assurance manager.

5.2.2 Responsibilities of quality assurance engineer

The responsibilities of the quality assurance engineer are as follows.

- a) Provide guidance on processes and templates for the development projects of embedded software;
- b) Develop and implement the project quality assurance plan, to evaluate the consistency of the project implementation process with the relevant process definitions in accordance with the plan;
- c) According to the review checklist as defined by the process, check the conformity, completeness, accuracy, rationality of the document;
- d) Develop an audit checklist for the phase audit, to check the compliance of the actual implementation of the phase with the process definition and project plan;
- e) Verify that all quality commitments from the project development team and surrounding support departments have been fulfilled, and if not, report and track the problem until it is closed;
- f) Communicate and coordinate the process implementation issues between the project team of the embedded software and the project team of hardware development;
- g) Report any violations in the execution of the process to the quality assurance manager and the project manager;
- h) Ensure that all reviewed and approved documents are placed in the project folder and configuration repository;
- i) Collect, analyze the project measurement data, provide recommendations for the improvement or prevention activities;
- j) Analyze, track the defects as found in the test, find effective ways to eliminate the problems in the testing process;
- k) Regularly review the implementation and effectiveness of the quality assurance activities together with the customer's quality assurance personnel as needed.

5.3.3.2 Output document

In this process, it shall generally generate or complete the process documentation related to the following quality assurance activities.

- a) Code review report;
- b) Code quality evaluation report.

5.3.3.3 Measurement item

In this process, it shall generally record the following measurement items.

- a) The amount of work required for checking the code;
- b) Code size;
- c) The number of defects found by the code review;
- d) The ratio of code that does not conform to the coding specification to all codes;
- e) Various static quality measurement items of the code.

5.3.4.1 Overview of process review

Process audit is the inspection and evaluation by the quality assurance engineer according to the "Quality assurance plan of the embedded software project", comparing with the organization's policies, customer's requirements and criteria, as well as the project-selected life cycle model, organizational process definition and template, against the implementation process of each phase of the project.

5.3.4.2 Specific requirements

The specific requirements for process audit are as follows.

- a) The quality assurance engineer shall prepare an "Audit checklist" for the process to be audited;
- b) The quality assurance engineer shall evaluate the effectiveness of the review of all delivery document at each phase, it shall ensure that defects identified during the review of all documents at each phase have been closed;
- c) The quality assurance engineer shall check whether the activities of each phase of the audited process are consistent with the organizational as running speed, processing time, support format, efficiency, and other specific requirements);
- b) The project manager shall ensure that the project team members of the embedded software fully understand the hardware operating environment and hardware resource allocation information of the embedded system;