

RapiTime tool qualification for DO-178B/C projects



Introduction

Tool qualification is essential in the production of software designed for critical embedded systems. In the qualification process, the user of a tool must provide evidence that it satisfies qualification objectives.

When you use Rapi**Time** in a DO-178B/C project, we can provide documents, engineering effort and tests to support your tool qualification.

According to DO-178B/C guidelines, you need to qualify software tools used in your project if each of the following is true:

- The tool could potentially insert an error or fail to detect an existing error.
- The tool's output will not be verified or confirmed by another verification activity.
- Processes necessary for certification are eliminated, reduced or automated by the tool.

If you use a tool that requires qualification in a DO-178B/C project, you must demonstrate that the tool works correctly in your development environment.

Tool qualification evidence

The RTCA/EUROCAE guidelines listed in DO-178B and DO-330 recommend that you supply the documents listed in Table 1 below when qualifying a tool for use in a DO-178B/C project.

Table 1. Tool qualification documents for DO-178B/C projects

Document	DO-178B reference	DO-330 reference	Usage	Description
Plan for Software Aspects of Certification (PSAC)	11.1, 12.2.3a, 12.2.4	1.3c, 10.1.1	Submit to the certification authority (CA, e.g. FAA) early in development to discuss timescale, acceptable qualification methods and documentation approaches.	Describes the need for tool qualification. Identifies tools used in the project and their impact on the software life cycle. References many of the other documents in this list.
Tool Qualification Plan (TQP)	12.2.3c(1), 12.2.3.1, 12.2.4	10.1.2	Optional, but simplifies production of the PSAC.	Describes the process used to qualify the tool.
Tool Operational Requirements (TOR)	12.2.3c(2), 12.2.3.2	5.1	Must be available for review by the CA.	Describes what the tool does, how it is used and the environment it is used in.
Tool Verification Results (TVR)	11.14	10.2.6, 10.3.4	Must be available for review by the CA.	Summary of the data showing that all requirements in the TOR have been verified.
Tool Accomplishment Summary (TAS)	11.20, 12.2.4, 12.2.3c(3)	10.1.15	Optional, but simplifies production of the PSAC.	Demonstrates compliance with the TQP. Lists discrepancies between planned and actual qualification.

RapiTime tool qualification

A tool qualification describes a software tool and its integration into the development environment it is used in, and demonstrates that the tool works correctly in this environment. When you purchase a license for RapiTime (RPT), we can provide documents that you can use to qualify the tool for use in your project. These are part of a fully qualified installation of RapiTime, which contains the following components:

- The RapiTime tool (RPT).
- Target Integration Kit (TIK): integration of RPT into your development environment (see our *Target Integration Service* product brief for more details).
- RapiTime Qualification Kit (QK-RPT): documents describing qualification for the version of RapiTime you use in your project.
- Qualified Target Integration Kit (QTIK): documents describing qualification of the integration of RapiTime into your development environment, including tests of the integration.

Tool Qualification Kit

The tool qualification kit contains documents that describe the version of RapiTime you are using. This forms part of the evidence you need to qualify the tool, and contains the following documents:

- Developer TQP (Tool Qualification Plan)
- Developer TQS (Tool Qualification Scope)
- Developer TOR (Tool Operational Requirements)
- Developer TCD (Test Case Design)
- Developer TVR (Tool Verification Record)
- Developer TAS (Tool Accomplishment Summary)
- Template IQR (Integration Qualification Report)

The documents in this kit must be supported with documents describing the integration of RapiTime into your development environment, and tests of the integration.

Qualified Target Integration Kit

To complete your RapiTime qualification, you must provide evidence describing the integration of RapiTime into your development environment and tests demonstrating its use on your system.

If we provided a TIK, we can provide this evidence through our qualified target integration kit (QTIK), which includes the following:

- Full IQR (Integration Qualification Report).
- On-site tests.
- A list of expected results.

When the documents and tests in the QK-RPT and QTIK are combined, they complete the evidence you need to submit for tool qualification.

Qualification options and licensing

You have a number of qualification options when you purchase RapiTime, as shown in Table 2.

Each use of a qualification kit requires a separate license of the qualification kit. A use is defined as a tool installation specific to one target and test environment and typically represents a single submission or application for certification. We offer multiple license discounts if you want to use our tools multiple times on the same system or project.

Table 2. RapiTime qualification options

		Tool		Qualification	
		RapiTime tool (RPT)	Target Integration Kit (TIK)	RapiTime Qualification Kit (QK-RPT)	Qualified Target Integration Kit (QTIK)
Option 1	Provided by:	Rapita	Customer	Customer	Customer
Option 2		Rapita	Rapita	Customer	Customer
Option 3		Rapita	Customer	Rapita	Customer
Option 4		Rapita	Rapita	Rapita	Customer
Option 5		Rapita	Rapita	Rapita	Rapita



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