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**Space systems — Program  
management — Test reviews**

*Systèmes spatiaux — Management de programme — Revue d'essais*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

Space products are complicated, but need to work reliably in space. Tests on the ground which simulate the space environment are complicated as well, but help to confirm the readiness status of equipment. Evaluation after testing confirms the effectiveness of test data and is very important to ensure the achievement of test objectives. Test reviews are effective management tools to ensure the test is successful on the first attempt, and these are composed of three types of reviews:

- Test Readiness Review (TRR);
- Post Test Review (PTR);
- Test Review Board (TRB).

TRRs, PTRs and TRBs are necessary especially for system tests and complicated tests. Sometimes, the PTR and TRB can be combined, and TRRs for several tests can also be combined.

This document provides the requirements for organizing and performing test reviews which include management for test reviews, processes for test reviews, content of test reviews, and implementation for test reviews. In addition, this document provides common set requirements for test reviews which will encourage international space co-operation and reduce the costs of planning and performing test reviews.

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# Space systems — Program management — Test reviews

## 1 Scope

This document defines procedures, contents and requirements for test reviews which are composed of the Test Readiness Review (TRR), Post Test Review (PTR) and Test Review Board (TRB).

This document is applicable to tests of space systems and space products, including environment tests and functional and performance tests, especially for system level tests and complicated tests.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 10795, *Space systems — Programme management and quality — Vocabulary*

## 3 Terms, definitions and abbreviated terms

### 3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10795 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

#### 3.1.1

##### **milestone**

designated project status that indicates the amount of progress made toward project completion, or that should be achieved before the project proceeds to a new phase

[SOURCE: ISO 21349:2007, 3.2]

#### 3.1.2

##### **milestone criteria**

observable facts that indicate a milestone has been reached

[SOURCE: ISO 21349:2007, 3.3]

#### 3.1.3

##### **review board**

body, organized into sub-entities, as necessary, consisting of a chairperson or delegated person and members, charged with evaluating the evidence of project status, along with identifying issues and necessary corrective actions, to determine that the objectives and success criteria of a review milestone have been met

Note 1 to entry: The purpose of the review board is to prepare an objective evaluation of the project status. Achievement of an objective evaluation is aided by use of independent experts who have no prior association with the project and no personal conflict of interest with respect to the outcome of the review.

[SOURCE: ISO 21349:2007, 3.8, modified — duplication of "review board" within definition has been removed]

**3.1.4**

**review policy**

policy that provides either requirements or guidance (or both) for the overall conduct of the review

[SOURCE: ISO 21349:2007, 3.11]

**3.1.5**

**test block**

aggregation of several tests grouped by discipline

Note 1 to entry: Typical test blocks for space segment elements are (not all):

- integration;
- leak pressure;
- EMC conducted;
- thermal;
- functional and performance test.

**3.2 Abbreviated terms**

AIT	Assembly, Integration and Test
AITP	Assembly, Integration and Test Plan
EMC	Electromagnetic Compatibility
EGSE	Electrical Ground Support Equipment
GSE	Ground Support Equipment
KIP	Key Inspection Point
MGSE	Mechanical Ground Support Equipment
MIP	Mandatory Inspection Point
NCR	Non-conformance Report
PTR	Post Test Review
TRB	Test Review Board
TRR	Test Readiness Review

**4 Management requirements for test reviews**

**4.1 Purpose of test reviews**

Test reviews are a series of formal reviews to determine the suitability, adequacy and effectiveness of test readiness, test procedures and test results as the milestone of starting the test or declaring the test completed formally.

Test reviews shall conclude the following formal reviews:

- a) Test Readiness Review (TRR): Before the start of test activity, a TRR shall be held to verify that all conditions allow the test to proceed.
- b) Post-Test Review (PTR): A PTR shall be held in order to formally declare the test completed and allow the release of the item under test and test facility for further activities.
- c) Test Review Board (TRB): A TRB shall be held to review all results and conclude on test completeness and achievement of objectives.

The purpose of test reviews is to implement effective test management for the project. TRR, PTR and TRB can ensure that execution of the test programme and delivery of the test results meet the requirements of the customer and the project.

## 4.2 Test reviews point

Test reviews start at the end of the production phase and are implemented at the stage of AIT. Completeness of the TRR is the milestone of the start-up test, and completeness of the PTR and TRB are the milestones of the concluding test.

## 4.3 Organization of test reviews

Test reviews are organized by the supplier. According to programme management requirements, customers should participate in some test review meetings.

- a) The following parties shall participate or check the implementation process of TRR and confirm its results:
  - 1) the chairperson, who is the product assurance manager of the authority responsible for the test;
  - 2) product assurances from all involved parties;
  - 3) project engineers from all involved parties;
  - 4) test director;
  - 5) AIT representatives from all involved parties;
  - 6) specialists, when necessary from all involved parties;
  - 7) facility representatives;
  - 8) others as relevant.
- b) The following parties shall participate or check the implementation process of PTR and confirm its results:
  - 1) the chairperson, who is the test director;
  - 2) project engineers;
  - 3) AIT representatives;
  - 4) facility representatives;
  - 5) others, including specialists, as relevant.
- c) The following parties shall participate or check the implementation process of TRB and confirm its results:
  - 1) the chairperson, who is the director of the authority responsible for project technology;

- 2) project engineers;
- 3) AIT representatives;
- 4) facility representatives;
- 5) others, include specialists, as relevant.

#### 4.4 Documentation of test reviews

Before the test review, the supplier shall develop and prepare test review documents according to customer requirements.

Prior to the TRR, the supplier should develop a test readiness checklist and/or a TRR report, and should prepare relevant documents used to implement tests according to [6.1.2](#). For system level tests and large-scale tests, a TRR report is needed, such as for the EMC tests of spacecraft. However, a TRR checklist can replace a TRR report for subsystem tests and a product level test. [Annex A](#) provides an example of a test readiness checklist. [Annex B](#) provides example contents of a TRR report. Prior to the PTR, the supplier should prepare test data according to customer requirements. Prior to the TRB, the supplier should develop a test report according to ISO 17566.

### 5 Process for test reviews

#### 5.1 Test review procedures

A TRR shall be implemented before a test. When the test is completed, a PTR shall be implemented, following which, based on the summary of the test activity, a TRB shall be implemented. For the procedures of a test review see [Figure 1](#).

- a) The process of a TRR should comprise 4 steps:
  - 1) Step 1: "initiate process" of the TRR;
  - 2) Step 2: "check process" of the TRR on the spot;
  - 3) Step 3: implement a "review process" of the TRR;
  - 4) Step 4: "conclude process" of the TRR.
- b) The process of a PTR should comprise 3 steps:
  - 1) Step 1: "initiate process" of the PTR;
  - 2) Step 2: implement a "review process" of the PTR;
  - 3) Step 3: "conclude process" of the PTR.
- c) The process of a TRB should comprise 3 steps:
  - 1) Step 1: "initiate process" of the TRB;
  - 2) Step 2: implement a "review process" of the TRB;
  - 3) Step 3: "conclude process" of the TRB.

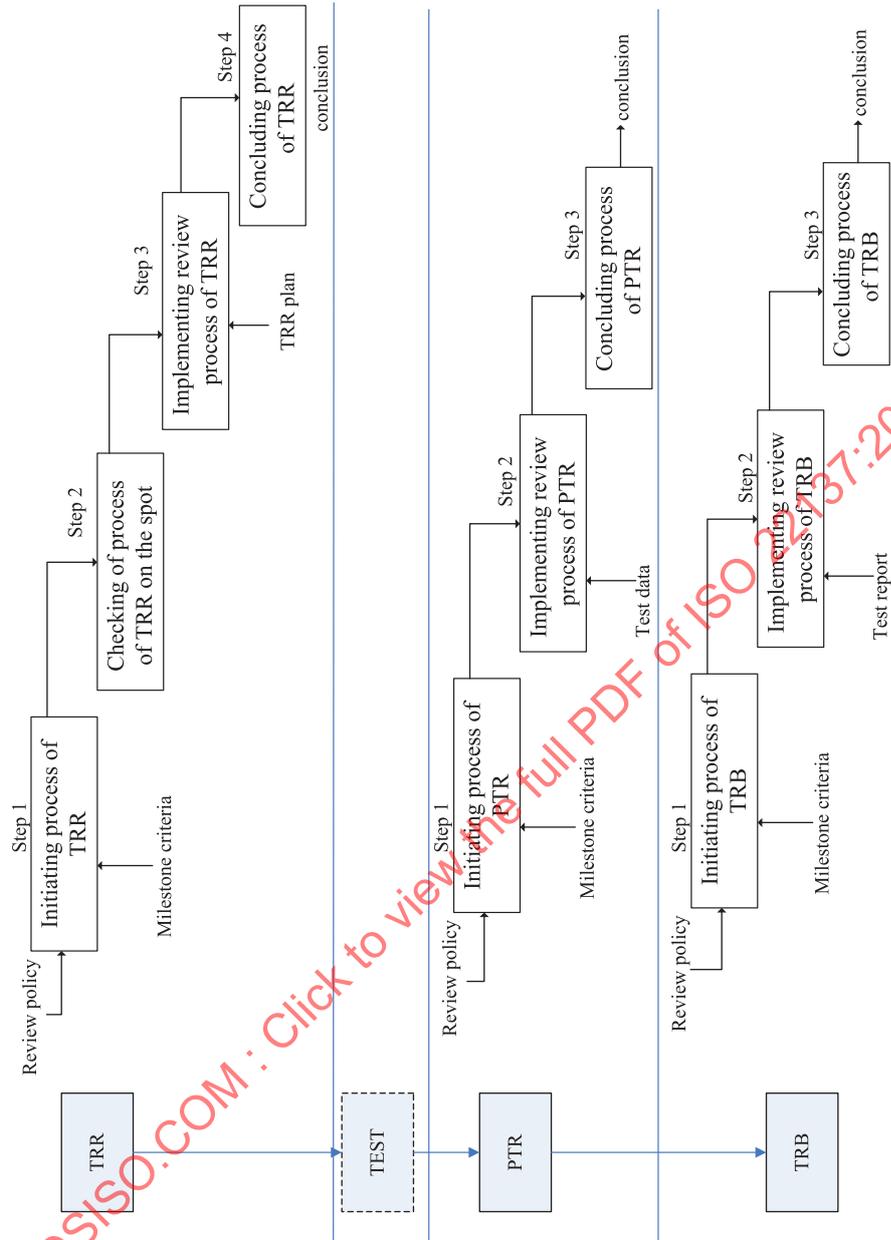


Figure 1 — Procedures for a test review

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## 5.2 Process for a TRR

### 5.2.1 Overview

A TRR activity is performed to check, verify and review all the conditions including the test item, test facility, test procedures, test risks control and so on. In the initiate process, preparation of documents, review board, and milestone criteria shall be completed. In the on-site review process, the item under test, documents used in the test, test facility, and other test conditions shall be checked one by one, organized by the supplier. In the review implementation process, a TRR report shall be completed and reviewed. In the concluding review process, the conclusion of whether to proceed with the test or not shall be provided.

### 5.2.2 Initiate process of TRR

The initiate process of TRR is performed to complete the precondition for the review, including the establishment of the organization, the requirements of the review and the milestone criteria. Activities implemented in the initiate process of the TRR are as follows:

- a) Establish a review board for the TRR which should contain the participants specified in 4.3 and a project representative from customers.
- b) Select the TRR board chairperson.
- c) Determine the review policy for the TRR that should contain the style and format of review documents, the scope of distribution of the TRR meeting minutes, when and how the TRR is implemented, and how to address the disagreement about items in the TRR between the supplier and customers.
- d) Determine the review items included in the TRR activity.
- e) Develop the milestone criteria for the TRR. The criteria can be specified where all the conditions are ready for test and risks are identified and controlled.

### 5.2.3 On-site review process of TRR

Prepare a test readiness checklist according to the test requirements and review items of the TRR. The test director should organize the implementation of the test readiness check on-site and complete the test readiness checklist.

NOTE The on-site review is the check to confirm the spacecraft configuration and test configuration.

### 5.2.4 Implement review process of TRR

A TRR report should be developed by the director of the test based on the results of the test readiness check on the spot. A review meeting can be held to assess the items included in the TRR report which is attended by the TRR board.

### 5.2.5 Conclude process of TRR

A conclusion on whether a test can be started or not should be released based on the result of the TRR meeting and TRR milestone criteria. All the open actions are recorded and logged with a deadline. The TRR meeting minutes are distributed.

## 5.3 Process for PTR

### 5.3.1 Overview

A PTR activity is performed to evaluate the test data for completeness. In the initiate process, the preparation of test data and a check of the item under test and the test facility shall be completed. In the

process of the implementation review, the execution of the test for effectiveness and the test data for completeness shall be reviewed. In the process of concluding review, a conclusion of whether the test should be completed or not should be provided.

### 5.3.2 Initiate process of PTR

The initiate process of the PTR is performed to complete the precondition for review, including the establishment of the organization, the requirements of the review and the milestone criteria. Activities implemented in the initiate process of the PTR are as follows:

- a) When the abnormality of test data or the curve of test data appears, the PTR meeting is necessary. Otherwise, the PTR can be implemented as the confirming process of test data and the test item. For the PTR meeting, the following activities are needed:
  - Establish a review board and select the PTR board chairperson for the PTR which should contain the participants specified in 4.3 and a project representative from customers or the TRR review board.
  - Determine the review policy for the PTR that should contain the scope of distribution of the PTR meeting minutes, when and how the PTR is implemented, and how to address disagreements about items in the PTR between the supplier and customers.
- b) Collect and pack up test data for the trend analysis when the test activity is finished.
- c) Check the status of the item under test and the facility status.
- d) Pick up test anomalies during the test performance.
- e) Identify the open actions.
- f) Develop the milestone criteria for PTR.

### 5.3.3 Implement review process of PTR

The test director should report the process of the test and provide the test data. A review meeting can be held to assess all the items specified in 6.2 by the PTR board. The review is concerned only with the completeness of the test, rather than the test results.

### 5.3.4 Conclude process of PTR

A conclusion of whether or not a test can be completed should be released based on the result of the PTR and PTR milestone criteria. The release of the item under test and the test facility for further activity should be declared. All the open actions are recorded and logged with a deadline. The PTR meeting minutes are distributed.

## 5.4 Process for TRB

### 5.4.1 Overview

A TRB activity is performed to conclude the test formally and to review the test results in order to provide the conclusion of whether the test is successful or not. In the initial process, the trend analysis and the test report should be completed according to the test requirements. In the process of implementation review, a review meeting should be held to review the test results. In the process of concluding review, a conclusion on whether or not the test was successful should be provided and the test data should be delivered to the customers.

#### 5.4.2 Initiate process of TRB

The initiate process of the TRB is performed to complete the precondition for review, including the establishment of the organization, requirements of the review and milestone criteria. Activities that should be implemented in the initiate process of the TRB are as follows:

- a) Establish a review board for the TRB or use the TRR board which should contain the participants specified in 4.3 and a project representative from customers.
- b) Select the TRB board chairperson or use the TRR board chairperson.
- c) Determine the review policy for the TRB that should contain the scope of style and format of review documents, the distribution of TRB meeting minutes, when and how the TRB is implemented, and how to address disagreements about items in the TRB between the supplier and customers.
- d) Develop the milestone criteria for the TRB.
- e) Perform the trend analysis using test data acquired across test sequences.
- f) Check the status of item under test and the facility status.
- g) Summarize the lessons learned.
- h) Develop the test report.

#### 5.4.3 Implement review process of TRB

A review meeting can be held to review the items specified in 6.3 by the TRB board.

#### 5.4.4 Conclude process of TRB

A conclusion of whether or not the test is successful should be released based on the result of the TRB meeting and the TRB milestone criteria. All the open actions should be closed. The test data should be delivered according to customer requirements. The TRB meeting minutes are distributed.

### 6 Content of test reviews

#### 6.1 Content of TRR

##### 6.1.1 Overview

The following can be included in the contents of a TRR:

- a) test documentation;
- b) configuration of item under test;
- c) test configuration;
- d) inspection status of the KIP, the MIP;
- e) test facility, environmental conditions, test instrumentation;
- f) cleanliness conditions, hazards and safety;
- g) GSE;
- h) status of test software;
- i) status of non-conformance;

- j) status of waivers and deviations;
- k) engineering change status;
- l) personnel qualification;
- m) test procedure status;
- n) test pass/fail criteria completeness;
- o) assignment of responsibilities;
- p) test schedule;
- q) risk identification and control measures.

### 6.1.2 Test documentation

The following test documents shall be checked for availability and suitability:

- a) approved AITP;
- b) approved test specification;
- c) test predictions (where relevant);
- d) approved test procedures;
- e) approved measurement point plan;
- f) approved test facility readiness report;
- g) approved test schedule (can be included in other test documents);
- h) accepted data package of lower level items.

### 6.1.3 Configuration of item under test

An inspection of the test article shall be performed prior to the start of testing. The configuration of the test article shall be in conformance with requirements of the test plan which can include, but are not limited to, the following:

- a) size/dimensions.
- b) weight.
- c) test article interfaces (electrical, mechanical, pressure, temperature, other).
- d) deviations from flight configuration.
- e) test article functional configuration, including:
  - 1) operation mode;
  - 2) electrical system state;
  - 3) pyrotechnic system state;
  - 4) propulsion system state.
- f) cleanliness of test article.

#### 6.1.4 Test configuration

An inspection of the test configuration shall be performed prior to the start of testing. The set-up of the test should be in conformance with requirements of the test plan which can include, but are not limited to, the following:

- a) test conditions;
- b) power on or not for test article;
- c) operating time of test article;
- d) fixing of testing cable;
- e) positions for testing temperature;
- f) grounding states.

EXAMPLE For thermal vacuum tests, requirements for the test set-up/conditions are as follows:

- 1) maximum test temperatures for all equipment are:
  - above  $T^A$  Max, and ( $T^A$ : acceptance level temperature);
  - as close as possible to  $T^Q$  Max, and ( $T^Q$ : qualification level temperature);
  - with no equipment temperature above  $T^Q$  Max.
- 2) all equipment minimum temperatures are:
  - below  $T^A$  Min, and
  - as close as possible to  $T^Q$  Min, and;
  - with no equipment temperature below  $T^Q$  Min.

#### 6.1.5 Inspection status of the KIP, the MIP

The inspection for the KIP and the MIP shall be completed before a test with the participation with customers. The status of the KIP and the MIP should be checked for conformance with the requirements of the test.

#### 6.1.6 Test facility, environmental conditions, test instrumentation

The inspection of test facility shall be performed in conformance with the test plan which can include:

- a) test facility identification and location;
- b) interfaces to test article;
- c) infrastructure required for the performance of the test;
- d) data acquisition and analysis systems;
- e) software;
- f) test facility safety limitations (electrostatic discharge protection, power safety, etc);
- g) test facility operational limitations (test equipment load limits, lifting limits, etc);
- h) contamination control.

The inspection of environmental conditions shall be performed in conformance with the requirements of the test plan which can include temperature, humidity, pressure, etc.

The inspection of test instrumentation should be performed in conformance with the requirements of the test plan which can include calibration, physical set-up, etc.

#### **6.1.7 Cleanliness conditions, hazards and safety**

The inspection of cleanliness conditions shall be performed in conformance with the requirements of the test plan.

The review of potential hazards and material compatibility shall be performed to ensure that controls are in place to mitigate hazards identified in test hazard analyses.

The review of safety that shall be performed includes:

- a) test article protective handling and control: protective measures to be implemented for the safe handling of test articles;
- b) electrostatic discharge control: control measures to be implemented regarding static electricity protection;
- c) personnel safety: safety procedures and measures to be adopted for the safety of personnel.

#### **6.1.8 Ground Support Equipment**

The interface verification and compatibility testing of EGSE and MGSE shall be performed to confirm that the status of EGSE and MGSE are in conformance with the test requirements.

#### **6.1.9 Status of test software**

The review shall be performed to check the revision of software and evaluate the readiness of software.

#### **6.1.10 Status of non-conformance**

The status of non-conformance that affects the test shall be confirmed and validated by customers.

#### **6.1.11 Status of waivers and deviations**

The check shall be performed to confirm that the waivers and deviations from previous tests have been resolved or adequately addressed.

#### **6.1.12 Engineering change status**

The status of engineering change shall be reviewed and confirmed.

#### **6.1.13 Personnel qualification**

The verification of personnel qualification shall be performed to ensure that test personnel are certified.

#### **6.1.14 Test procedure status**

A check shall be performed to confirm that the test procedure has been released.

#### **6.1.15 Test pass/fail criteria completeness**

Test pass/fail criteria shall be reviewed to ensure that there is no disagreement between customers and suppliers.

EXAMPLE For a random vibration test, the success criteria can be:

- a) Less than 5 % in frequency shift for modes with an effective mass greater than 10 %;

- b) Less than 20 % in amplitude shift for modes with an effective mass greater than 10 %.

#### **6.1.16 Assignment of responsibilities**

A check should be performed to ensure that responsibility for implementation of the test is clearly assigned.

#### **6.1.17 Test schedule**

The test schedule should be reviewed for the achievement of test objectives.

#### **6.1.18 Risk identification and control measures**

A review should be performed to ensure that risks have been identified before the test and that control measures are in place to mitigate the risks identified.

### **6.2 Content of Post Test Review**

#### **6.2.1 Overview**

The contents of the PTR can include the following:

- a) test data;
- b) test anomalies and NCRs;
- c) test performance;
- d) status of the item under test;
- e) GSE status;
- f) the item under test configuration;
- g) open points.

#### **6.2.2 Test data**

The verification shall be performed to ensure that all test data are acquired, recorded, and archived in conformance with the test specification and test procedure requirements.

#### **6.2.3 Test anomalies and Non-Conformance Reports**

Verification shall be carried out to ensure that the process for test anomalies and NCRs raised during the test was initiated and that all necessary inspections, test data and test configuration were acquired.

#### **6.2.4 Test performance**

It shall be confirmed that tests are performed according to the AITP, the test specification and test procedures, with the exception of what is covered by the agreed procedure variations or NCRs.

#### **6.2.5 Status of the item under test**

The review shall be performed to assess the status of conformance of the item under test to relevant requirements.

#### **6.2.6 Ground Support Equipment status**

The review shall be performed to assess the post-test status of the GSE for further activities.

### 6.2.7 Item under test configuration

The inspection of the item under test shall be performed to confirm the configuration and cleanliness.

### 6.2.8 Open points

Open points shall be identified with assignment of actions for their closure.

## 6.3 Content of Test Review Board

### 6.3.1 Overview

The activities of the TRB can include the following:

- a) test documentation;
- b) test performance;
- c) test results;
- d) status of the item under test;
- e) open NCRs;
- f) lessons learned to be drawn.

### 6.3.2 Test documentation

The following test documents shall be checked for availability:

- a) test report;
- b) facility report where relevant;
- c) inspection report including cleanliness report;
- d) list of NCRs;
- e) copy of NCRs raised during the test with the related TRB meeting minutes and associated requests for waiver;
- f) list of procedure deviations.

### 6.3.3 Test performance

The review of the test performance shall be performed to evaluate conformance to the test specification, and variations to the AITP.

### 6.3.4 Test results

The review shall be performed to evaluate test data with respect to the test requirements and test response data with respect to predicted responses and to provide conclusions in light of the test data evaluations and test deviations.

### 6.3.5 Status of the item under test

A review shall be performed to assess the status of conformance of the item under test to the relevant requirements.

### 6.3.6 Open Non-Conformance Reports

A review of all still open NCRs raised during the test shall be performed to ensure that there is no impact on the test objective achievements.

### 6.3.7 Lessons to be drawn

The lessons learned during the test process and the test data analysis process should be summarized.

## 7 Implement requirements for test reviews

- a) The requirements of test reviews which contain the form, schedule, and participants should be defined in the product assurance plan or management plan.
- b) The non-conformance occurring in test reviews should be addressed according to ISO 23461.
- c) Each test block shall include the TRR, PTR, and TRB formal reviews. The TRRs from several blocks can be combined, and the TRRs can also be combined with a PTR of the previous block.
- d) Once the TRB is completed, all open items should be closed.
- e) According to customer requirements, the PTR and TRB can be combined to Test Data Review after the test process, test data analysis, and test report are completed.

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## Annex A (informative)

### An example of a test readiness checklist

**Table A.1 — Thermal vacuum test readiness checklist**

Project:		Test:			Signature:	
Check Items	Check Contents	Check Result	Witness	Inspector	Time	
<b>Item configuration under test</b>	<p>Check and confirm the configuration of items under test in conformance with the requirements of the thermal vacuum test plan:</p> <ul style="list-style-type: none"> <li>— The satellite units are usually flight products.</li> <li>— Satellite appearance.</li> <li>— Temperature sensors.</li> <li>— All the cables, such as temperature measuring cables, heating cables and other measuring wires.</li> <li>— Satellite electrical and mechanical functions.</li> </ul>					
<b>Test configuration</b>	<p>The large units (such as a large antenna, solar arrays, etc.) outside the satellite are not mounted and the simulation work fluid within the propellant tank is generally not filled up; if required, the propellant tank can be filled up with them.</p> <p>Connect the temperature measuring cables, heating cables, signal cables and grounded wires inside the chamber with the satellite and check them.</p>					
<b>Test documentation</b>	<ul style="list-style-type: none"> <li>— Approved AITP;</li> <li>— approved test specification;</li> <li>— test predictions (when relevant);</li> <li>— approved test procedures;</li> <li>— approved measurement point plan;</li> <li>— approved test facility readiness report;</li> <li>— approved test schedule;</li> <li>— accepted data package of lower level items.</li> </ul>					

Table A.1 (continued)

Project:		Test:		Signature:	
Check Items	Check Contents	Check Result	Witness	Inspector	Time
Test facility and test instruments	<p>The size of the space simulation chamber shall meet the installation and operation requirements of the satellite and the thermal simulator. The chamber shall meet the following requirements:</p> <ul style="list-style-type: none"> <li>— Check the insulations and connectivity of the temperature measuring and heating cables.</li> <li>— Check the resistance of the grounded wires in the chamber, which shall be not greater than 1,0 Ω.</li> <li>— Heat sink temperature.</li> <li>— Suitable supporter to fix the satellite.</li> </ul> <p>After a 24 h no-load operation, the organic pollutants in the chamber are less than <math>1 \times 10^{-7}</math> g/cm<sup>2</sup> (sampling point temperature of -50 °C, pressure of less than <math>6,65 \times 10^{-3}</math> Pa).</p> <p>A variety of down-leads and sealed flanges equipped.</p>				
Test facility and test instruments	<p>Measurement uncertainty of the measuring instruments shall meet the requirements for the relevant parameters.</p> <p>Measuring instruments shall be calibrated by the relevant department and be used during the period of validity.</p>				
Test facility and test instruments	<p>External heat flux simulator:</p> <ul style="list-style-type: none"> <li>— Infrared heaters and film heaters are suitable for the external heat flux simulator and the heaters shall be divided into a number of heating zones in accordance with the temperature control requirements.</li> </ul>				
Test facility and test instruments	<p>Infrared heaters shall meet the following requirements:</p> <ul style="list-style-type: none"> <li>— The heating power range shall meet the maximum and minimum temperature control requirement in the corresponding temperature-controlled area.</li> <li>— The interference of heat flow among different heating zones shall be small.</li> <li>— The heating power of each heating zone can be regulated independently.</li> </ul>				