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INTERNATIONAL STANDARD

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Electronic railway equipment – On board driving data recording system – Part 2: Conformity testing

Matériel électronique ferroviaire – Système embarqué d'enregistrement de données de conduite – Partie 2: Essais de conformité

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRONIC RAILWAY EQUIPMENT – ON BOARD DRIVING DATA RECORDING SYSTEM –

Part 2: Conformity testing

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The text of this standard is based on the following documents:

FDIS	Report on voting
9/2081/FDIS	9/2118/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62625 series, published under the general title *Electronic railway equipment – On board driving data recording system*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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INTRODUCTION

In consideration that IEC 62625-1 specifies the ODDRS (On Board Driving Data Recording System) requirements in terms of functional and system descriptions, a standardized conformity testing approach was developed in this standard on the base of the ISO/IEC 9646 series standards.

The ISO/IEC 9646 series standards apply to the assessment of communication protocol and are based on the concept of PICS (Protocol Implementation Conformity Statement) and PIXIT (Protocol Implementation eXtra Information for Testing). This standard extends the concepts to functional and system description introducing FICS (Function Implementation Conformity Statement), SICS (System Implementation Conformity Statement) and IXIT (Implementation eXtra Information for Testing).

The IEC 62625-1 requirements implementation, formally described by FICS, SICS and IXIT are verified by design review and other test methods applied to ODDR Unit and ODDRS installed on the train.

ELECTRONIC RAILWAY EQUIPMENT – ON BOARD DRIVING DATA RECORDING SYSTEM –

Part 2: Conformity testing

1 Scope

This part of IEC 62625 covers the standardized test methods for verifying the compliance of an On board Driving Data Recording System implementation with the requirements specified by IEC 62625-1.

Furthermore, it covers the conformity testing criteria for designed and manufactured ODDRS. This part of IEC 62625 includes the list of the requirements specified by IEC 62625-1 and the relevant acceptance conditions for ODDRS at design review, type test and routine test phases. For the train level design review and train level test phases, this part provides guidelines for the conformity testing methods to be applied to the ODDRS installed on the train.

This part does not cover the conformity assessment schemes that, according to ISO/IEC Directives Part 2, are the responsibility of ISO policy committee "Committee on conformity assessment" (ISO/CASCO). Consequently, this part does not include elements related to conformity assessment aspects other than design review and testing provisions for the products, processes or services which implements the requirements specified in IEC 62625-1. This part does not delete, change or interpret the general requirements for conformity assessment procedures and vocabulary detailed in ISO/IEC 17000.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60571, *Railway applications – Electronic equipment used on rolling stock*

IEC 61375 (all parts), *Electronic railway equipment – Train communication network (TCN)*

IEC 62498-1, *Railway applications – Environmental conditions for equipment – Part 1: Equipment on board rolling stock*

IEC 62625-1:2013, *Electronic railway equipment – On board driving data recording system – Part 1: System specification*

ISO/IEC 8824 (all parts), *Information technology – Abstract Syntax Notation One (ASN.1)*

3 Terms, definitions, abbreviations, acronyms, and conventions

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1
accident
unintended event or series of events that results in death, injury, loss of a system or service, or environmental damage

Note 1 to entry: Accidents are divided into the following categories: collisions, derailments, level crossing accidents, accidents to persons caused by rolling stock in motion, fires and others.

3.1.2
consist
single vehicle or a group of vehicles which are not separated during normal operation

EXAMPLE The vehicles of a consist are steadily connected in a workshop, and automatic couplers are mounted at both ends of the consist to facilitate the coupling and de-coupling of complete consists in the workshop or during operation.

Note 1 to entry: A consist may contain one or more traction units.

3.1.3
incident
any occurrence, other than accident or serious accident, associated with the operation of trains and affecting the safety of operation

3.1.4
non-volatile storage medium
memory and the relevant interface circuitry, which store the data for investigative use in case of accidents and incidents

Note 1 to entry: The non-volatile storage medium may be protected.

3.1.5
ODDR unit
physical unit which implements the ODDRS

Note 1 to entry: ODDRS may be implemented by one or more ODDR units.

3.1.6
resolution
smallest change in the measurand, or stored quantity, which causes a perceptible change in the indication

[SOURCE: IEC 60050-311:2001, 311-03-10, modified – ‘stored quantity’ instead of ‘quantity supplied’ has been used]

3.1.7
test verdict
statement of “pass”, “fail”, or “inconclusive”, as specified in an abstract test case, concerning conformity of an IUT with respect to the test case when it is executed

3.1.8
train safety function
technical barrier to prevent a hazard to become an accident during the train operation

3.2 Abbreviations and acronyms

CSV	Comma Separated Values
DR	Design Review
EMC	Electromagnetic Compatibility
FICS	Function Implementation Conformity Statement
GPS	Global Positioning System

IDRR	Integration DR Report
ITTR	Integration Type Test Report
IUT	Implementation Under Test
IXIT	Implementation eXtra Information for Testing
LSB	Least Significant Bit
NTP	Network Time Protocol
ODDR	On Board Driving Data Recording
ODDRS	On Board Driving Data Recording System
RAL	Colour Standard
SICS	System Implementation Conformity Statement
TCMS	Train Control and Monitoring System
TCN	Train Communication Network
TLDR	Train Level Design Review
TLDRR	Train Level Design Review Report
TLT	Train Level Test
TLTR	Train Level Test Report
TT	Type Test
USB	Universal Serial Bus
UTC	Universal Time, Coordinated
XML	eXtensible Markup Language

4 Conformity testing

4.1 Overview

4.1.1 General

Clause 4 specifies the process and methodology for the conformity testing, in terms of procedures, design review requirements, testing requirements, and conformity testing documentation requirements.

4.1.2 Applicability

This standard is applicable to verify and test ODDRS at sub-system level or at unit level. The conformity testing shall be performed and concluded for units carrying any function covered by 4.2 of IEC 62625-1:2013 and respecting the requirements specified by 4.3 of IEC 62625-1:2013.

4.1.3 Methodology

4.1.3.1 General

The ODDRS conformity testing process shall follow the phases listed below, see Figure 1. The relevant documentation shall be part of the conformity testing and documentation folder.

Phases of the conformity testing process:

a) Device/function conformity checking
b) Subsystem integration Design Review (DR)
c) Subsystem integration Type Test (TT)
d) Subsystem type and traction unit type – Train Level Design Review (TLDR)

e) Subsystem type and traction unit type – Train Level Type Test (TLTT)

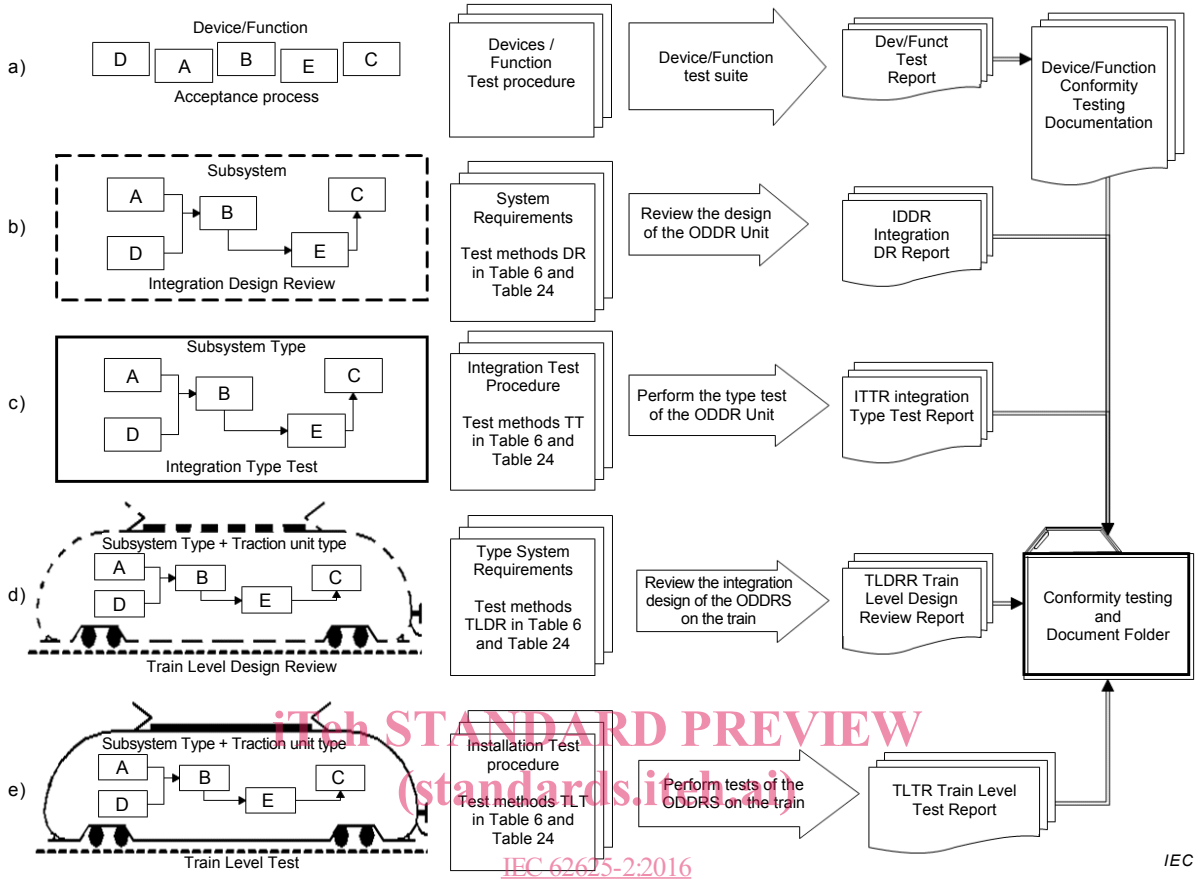

Figure 1 – Conformity testing process

4.1.3.2 Device/function conformity checking

The compliance to the requirements specified by IEC 62625-1:2013 is mandatory for all the functions/devices composing the ODDR unit. Each device/function shall be verified according to the provided test procedure.

Considering that the user of this standard is free, at design level, to choose the functions mapping over devices, several situations may apply:

- One complete function is carried and executed by one device.
- More than one function is carried and executed by one device.
- One function is carried and executed by more devices, each one executing a part (sub-function) of the complete function.

Following this consideration, the device/function conformity checking is only covering the capability of the device to execute the functions/sub-functions which are carried by such device.

The test procedures are defined by the designer. The passing of such test procedure are a prerequisite to run the tests specified by 4.1.3.4 and 4.1.3.6.

Specific requirements related to practices necessary to assure the integration at ODDR unit and at train level are to be determined in accordance with relevant railway standards during the following phases.

4.1.3.3 Subsystem integration design review

The design review evaluates the design of an ODDR Unit against the requirements specified by IEC 62625-1:2013, through examination of technical documentation for the IUT together with any supporting evidence.

The functional and system requirements of ODDR unit shall be listed and described according to the FICS and SICS specified by the Clauses 5 and 6.

The design review shall also include documentation on reliability, availability, maintainability, interfaces, installation requirements and constraints.

If there are any changes to the ODDR unit, an evaluation shall be performed in order to identify if its functionality has been affected and which impact exists on the system. If so, the relevant test methods shall be applied in order to verify that the ODDR unit still complies with the requirements of IEC 62625-1:2013.

The Design Review test methods are specified in Table 6 and Table 24 (phase DR).

4.1.3.4 Subsystem integration type test

The aim of the type test of the ODDR Unit is to verify that the functional and system requirements specified by IEC 62625-1:2013 are met by the ODDR Unit.

The description of functional and system requirements which are implemented by the design of IUT and are submitted to type test shall be listed and described by the FICS and SICS specified by the Clauses 5 and 6.

Type test shall be performed on one or more unit of a given design and manufacturing procedure to ensure the full coverage of the specified requirements.

If there is any change to a previously tested unit, the type test shall repeat at least those test cases which are affected by the change.

The type test methods are specified in Table 6 and Table 24 (phase TT).

4.1.3.5 Subsystem type and traction unit type – Train level design review

The train level design review verifies the integration of an ODDRS in the train, through examination of technical documentation together with any supporting evidence.

The train level design review shall include documentation on reliability, availability, maintainability, interfaces, installation requirements and constraints.

The Train Level Design Review test methods are specified in Table 6 and Table 24 (phase TLDR).

4.1.3.6 Subsystem type and traction unit type – Train level test

The aim of train level test is to verify some functional and system requirements of the ODDRS after the installation in the train, in order to assure that the installation has not affected the fulfilment of those requirements.

The test cases, to be carried out during the train level test, are listed in Table 6 and Table 24.

The Train Level Test methods are specified in Table 6 and Table 24 (phase TLT).

4.2 Implementation conformity statements

4.2.1 General

The functional requirements are verified according to the declaration statements called FICS which are relevant to 4.2 of IEC 62625-1:2013.

The system requirements are verified according to the declaration statements called SICS which are relevant to 4.3 of IEC 62625-1:2013.

The supplier shall determine which extra IUT specific information is necessary for testing the functional and system requirements. The IUT supplier shall complete an IXIT pro-forma with the necessary information, and make it available.

4.2.2 FICS and SICS

To evaluate the conformity of a particular implementation, it is necessary to have a statement of the capabilities and options that have been implemented with reference to the requirements and any features which have been omitted, so that the implementation can be checked for acceptance against the requirements specified respectively in 4.2 and in 4.3 of IEC 62625-1:2013, and against those requirements only. Such statements are called respectively:

- Function Implementation Conformity Statement (FICS).
- System Implementation Conformity Statement (SICS).

The structure and instructions for completion of the FICS and SICS are given in the informative Annex A.

4.2.3 IXIT

In order to test a function implementation, the test authority needs information relating to the IUT and its testing environment in addition to that provided by the FICS and SICS. This "Implementation eXtra Information for Testing" (IXIT) will be provided by the supplier and system integrator submitting the implementation for testing, as a result of consultation with the test authority.

The IXIT may contain the following information:

a) information needed by the test authority in order to be able to run the appropriate test suite on the specific system (e.g. information related to the test method to be used to run the test cases, addressing information);

b) information already mentioned in the FICS and which needs to be made precise (e.g. a timer value range which is declared as a parameter in the FICS should be specified in the IXIT);

c) information to help determine which capabilities stated in the FICS as being supported are testable and which are not testable;

d) other administrative matters (e.g. the IUT identifier, reference to the related FICS).

The IXIT shall not conflict with the appropriate FICS or SICS.