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Electric railway equipment – Train bus –

Part 2: Train communication network conformance testing

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRIC RAILWAY EQUIPMENT – TRAIN BUS –

Part 2: Train communication network conformance testing

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 61375-2 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

This standard is to be read in conjunction with IEC 61375-1, second edition.

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

FDIS	Report on voting
9/1014/FDIS	9/1034/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 of IEC 61375 series, published under the general title *Electric railway equipment – Train bus* can be found on the IEC website.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

Following the decision of the committee, some parts of the text and some figures of this publication are copied from the IEC 61375-1 for keeping the maximum of clarity.

A bilingual version of this standard may be issued at a later date.

INTRODUCTION

TCN is an International Standard with the aim of defining interfaces so as to achieve plug-in compatibility:

a) between equipment located in different vehicles, and

b) between equipment and devices located within the same vehicle.

One of the key success factors for deployment of any technology is the standardisation and the ensuring interoperability among various implementations. To facilitate interoperability a conformance test should be implemented.

In this part of IEC 61375, the TCN hierarchical structure deals with two levels of busses:

a) the train bus called the Wire Train Bus (WTB);

b) the vehicle bus called the Multifunction Vehicle Bus (MVB).

No other busses are taken into consideration even though they are foreseen by IEC 61375-1, see the note below.

WTB and MVB share the same real-time protocols, which offer two communication services:

a) process variables, a distributed, real-time database periodically refreshed through broadcasting;

b) messages, transmitted on demand either as:

   0. unicast messages (point-to-point) or/and

   1. multicast messages.

WTB and MVB share a common network management, which allows debugging, commissioning and maintenance over the network.

NOTE TCN states that several vehicle busses may apply, provided that such busses are able to provide the services of Real_Time Protocols. However, this part of IEC 61375 is focused on MVB as vehicle bus, even if the conformance test may apply to other busses, the exact conformance test should be derived upon.

This standard is structured into 7 clauses and 2 annexes.

The clauses and annexes are listed and briefly described in the Table 1.

Table 1 – Document structure

Clause/sections	Description
1. General	This clause describes the scope of this standard and introduces basic terms and abbreviations not reported in IEC 61375-1.
2. Conformance test: approach, requirements and boundaries	This clause is an overview of the methods of TCN implementation verification that are available to the developer and regulatory personnel. Supplies information concerning the ICS and IXIT pro-forma(s).
3. Conformance test of an MVB device	This clause covers all tests on MVB devices that are grouped by classes, from Class 0 up to Class 4. The main contents are: the MVB PICS and PIXIT; the MVB test suites; the MVB test procedures.
4. Conformance test of a WTB device	Contents: All tests on WTB are classified by nodes related to WTB itself and MVB only. The main contents are: the WTB PICS and PIXIT; the WTB test suites; the WTB test procedures.
5 Conformance test of RTP	This clause lists the tests covered in Clauses 3 and 4 fulfilling the real time protocol.
6. Conformance test of a WTB-equipped vehicle	This clause covers the Physical Layer while the Services given by the WTB node are covered by the previous clauses. Application profiles are covered by other bodies, like UIC for profile UIC 556.
7 Conformance test of NM	Partially covered by Clauses 3 and 4. Remaining parts are not covered.
Annex A – Test laboratory role and client role	This annex is normative.
Annex B – Test instrumentation and dedicated test bed	This annex is informative.

ELECTRIC RAILWAY EQUIPMENT – TRAIN BUS –

Part 2: Train communication network conformance testing

1 General

1.1 Scope

This part of IEC 61375 applies to all equipment and devices implemented according to IEC 61375-1, i.e. it covers the procedures to be applied to such equipment and devices when the conformance should be proven.

The applicability of this standard to a TCN implementation allows for individual conformance checking of the implementation itself and is a pre-requisite for further interoperability checking between different TCN implementations.

NOTE 1 For a definition of TCN implementation see 1.3.

1.2 Normative references

The following referenced documents are indispensable for the application 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.

IEC 60571:*Electronic equipment used on rail vehicles*

IEC 60807, *Rectangular connectors for frequencies below 3 MHz*

IEC 61375-1: 2007, *Electric railway equipment – Train bus – Part 1: Train communication network*

ISO/IEC 9646-1:1994, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 1: General concepts* (Also available as ITU-T Recommendation X.290 (1995))

ISO/IEC 9646-7:1994, *Information technology – Open Systems Interconnection –Conformance testing methodology and framework – Part 7: Implementation Conformance Statements* (Also available as ITU-T Recommendation X.296 (1995))

UIC 556, *Information transmission in trains (train bus)*