IEC 61375-3-1

Edition 1.0 2012-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Electronic railway equipment – Train communication network (TCN) – Part 3-1: Multifunction Vehicle Bus (MVB)

Matériel électronique ferroviaire – Réseau embarqué de train (TCN) – Partie 3-1: Bus de Véhicule Multifonctions (MVB)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRONIC RAILWAY EQUIPMENT – TRAIN COMMUNICATION NETWORK (TCN) –

Part 3-1: Multifunction Vehicle Bus (MVB)

FOREWORD

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International Standard IEC 61375-3-1 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

This first edition cancels and replaces the clauses of IEC 61375-1, second edition, published in 2007, relevant to the specification of MVB and constitutes a technical revision.

It was prepared taking into account IEC 61375-1 third edition.

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

FDIS	Report on voting
9/1644/FDIS	9/1668/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, under the general title *Electronic railway equipment – Train communication network (TCN)*, 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 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- withdrawn,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.

INTRODUCTION

This part of IEC 61375 specifies one component of the Train Communication Network, the Multifunction Vehicle Bus (MVB), a serial data communication bus designed primarily, but not exclusively, for interconnecting equipment where interoperability and interchangeability are needed.

This part specifies:

a) the physical media in single-line and double-line configurations;
b) the signalling and the redundancy handling;
c) the format and timing of the transmitted frame and telegrams;
d) the organisation of the bus traffic;
e) the allocation of Mastership;
f) the management of the bus;
g) the Link Layer interface and the layer management interface.

This part is structured following the OSI layers of a reference MVB device as shown in Figure 1:

Caluse 4 Physical Layer

- Electrical medium for short distance (RS-485, 20,0 m)
- Electrical medium for middle distance (transformer-coupled, 200,0 m)
- Optical fibre for long distances (glass fibres, 2,0 km)

Clause 5 Medium-dependent signalling

- Frame encoding and decoding
- Line Unit interface
- Physical redundancy handling

Clause 6 Frames and telegrams

- Master Frame and Slave Frame encoding, Telegram timing

Clause 7 Link Layer Control

- Addressing
- Master Frame and Slave Frame format

Clause 8 Medium allocation

- Periodic Polling
- Event Polling
- Devices Scan

Clause 9 Mastership transfer

- Regular and exceptional mastership transfer

Clause 10 Link Layer Interface

- Link Process Data Interface (LPI),
- Link Message Data Interface (LMI),
- Link Supervision Interface (LSI).

Clause 11 Real-Time Protocols

Clause 12 Gateway Function

Clause 13 Network Management

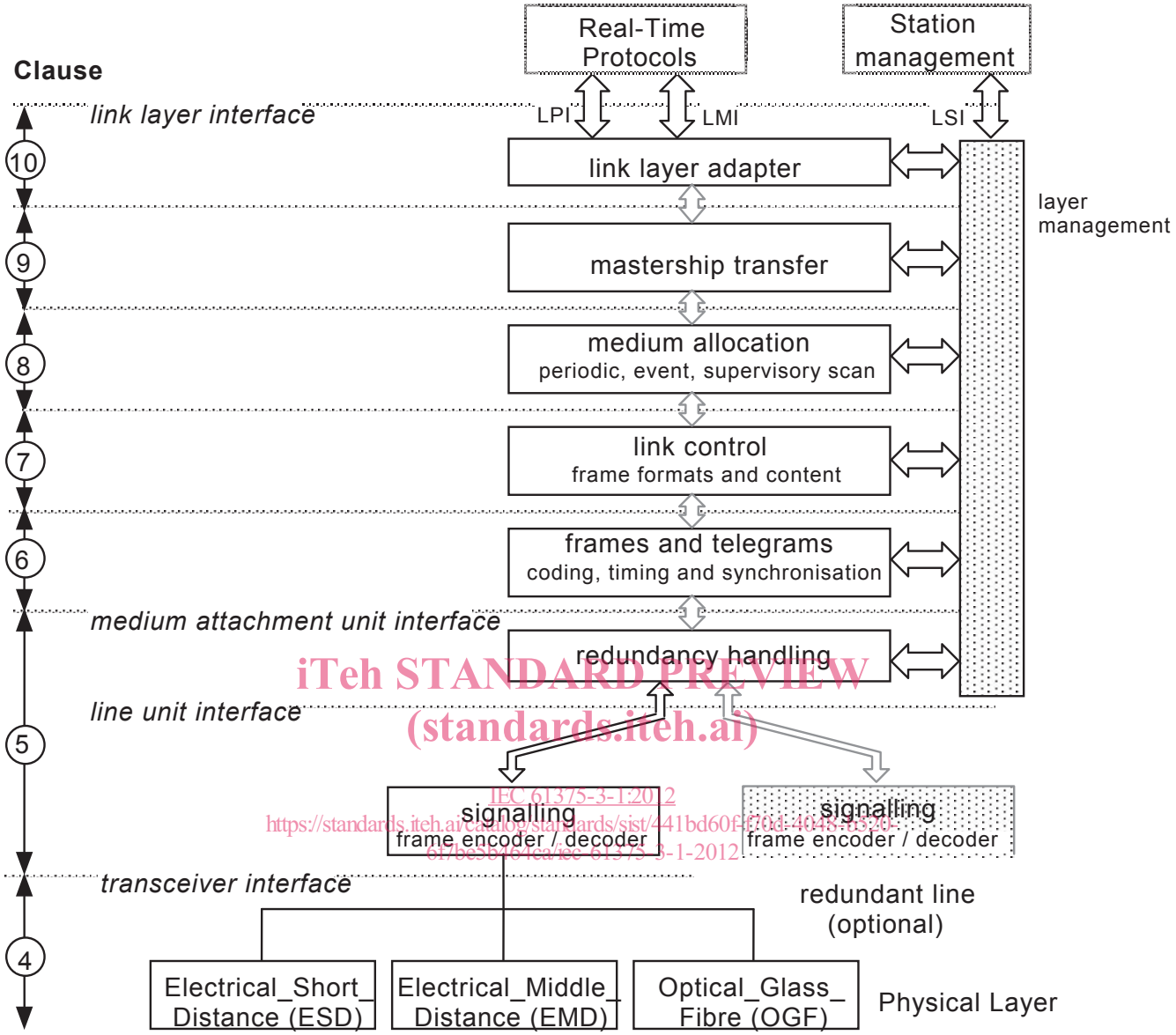

Figure 1 – Reference device and structure of the document

ELECTRONIC RAILWAY EQUIPMENT – TRAIN COMMUNICATION NETWORK (TCN) –

Part 3-1: Multifunction Vehicle Bus (MVB)

1 Scope

This part of IEC 61375 applies where MVB is required.

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 60245-1, *Rubber insulated cables – Rated voltages up to and including 450/750 V – Part 1: General requirements*

IEC 60304, *Standard colours for insulation for low-frequency cables and wires*

IEC 60332-1-1, *Tests on electric and optical fibre cables under fire conditions – Part 1-1: Test for vertical flame propagation for a single insulated wire or cable – Apparatus*

IEC 60571, *Electronic equipment used on rail vehicles*

IEC 60794-1-1, *Optical fibre cables – Part 1-1: Generic specification – General*

IEC 60807 (all parts), *Rectangular connectors for frequencies below 3 MHz*

IEC 60870-5-1, *Telecontrol equipment and systems – Part 5: Transmission protocols – Section One: Transmission frame formats*

IEC 61375-2-1, *Electronic railway equipment – Train Communication Network (TCN) – Part 2-1: Wire Train Bus (WTB)*

ISO/IEC 8482, *Information technology – Telecommunications and information exchange between systems – Twisted pair multipoint interconnections*

ISO/IEC 8802-2, *Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 2: Logical link control*

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

ISO/IEC 8825 (all parts), *Information technology – ASN.1 encoding rules*

ISO/IEC 9646 (all parts), *Information technology – Open Systems Interconnection – Conformance testing methodology and framework*

ISO/IEC 13239, *Information technology – Telecommunications and information exchange between systems – High-level data link control (HDLC) procedures*

ITU-T Recommendation Z.100, *Specification and Description Language (SDL)*

3 Terms and definitions, abbreviations and conventions

3.1 Terms and definitions

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

NOTE Keywords in this standard are written with the first letter of each word in upper case and, when they are composed of two or several words, these are joined by an underscore. This convention allows keywords to be tracked in the documents.

3.1.1
address
identifier of a communication partner, of which several types exist, depending on the layer

3.1.2
agent
application process in a Station which accesses the local managed objects on behalf of the Manager

3.1.3
Aperiodic Data
transmission of Process Data on a demand basis. This service is not used

3.1.4
Application Layer
upper layer in the OSI model, interfacing directly to the Application

3.1.5
Application Layer Interface
definition of the services offered by the Application Layer

3.1.6
Application Messages Adapter
code directly called by the application implementing the Messages services

3.1.7
Application Messages Interface
definition of the Messages services

3.1.8
Application Process
communicating entity, implemented for instance by a task

3.1.9
Application Processor
processor which runs a communicating Application Process

3.1.10
Application Supervision Interface
definition of the Supervision services available in particular to the Agent