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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 28029.7-2020

Electronic railway equipment - Train communication network (TCN) - Part 2-6: On-board to ground communication

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Table of Contents

Foreword

GB/T 28029 "Train Communication Network (TCN) for Rail Transit Electronic Equipment" is divided into the following 12 parts.

--- Part 1. Basic structure;

--- Part 2-1. Stranded Train Bus (WTB);

--- Part 2-2. Conformance Test of Wire Train Bus (WTB)

--- Part 2-3. TCN Communication Protocol;

--- Part 2-4. TCN Application Specification;

--- Part 2-5. Ethernet Train Backbone (ETB);

--- Part 2-6. Vehicle-ground communication;

--- Part 2-7. Radio-based Wireless Train Backbone Network (WLTB);

--- Part 3-1. Multifunctional Vehicle Bus (MVB);

--- Part 3-2. Multi-function vehicle bus (MVB) conformance test;

--- Part 3-3. CANopen Marshalling Network (CCN);

--- Part 3-4. Ethernet Marshalling Network (ECN).

This part is part 2-6 of GB/T 28029.

This section was drafted in accordance with the rules given in GB/T 1.1-2009.

This part uses the redrafting method to modify the adoption of IEC 61375-2-6..2018 "railway electronic equipment train communication network (TCN)

Part 2-6. Vehicle-ground communication.

Compared with IEC 61375-2-6..2018, there are structural changes in this part. 6.1 is added.

There are technical differences between this part and IEC 61375-2-6..2018, and the terms involved in these differences have been passed on the outside margin

The vertical single line (|) in the white position is marked. The specific technical differences and the reasons are as follows.

--- With regard to normative quotation documents, this part has been adjusted with technical differences to adapt to China's technical conditions and adjustments

The situation is reflected in Chapter 2 "Regulatory Reference Documents", with specific adjustments as follows.

* Replace IEC 61375-1..2012 (see 3.1, 4.3.1, 5.4.1) with GB/T 28029.1-2020 modified to adopt international standards;

* Replace IEC 61375-2-3..2015 with the modified GB/T 28029.4-2020 adopting international standards (see Chapter 1, Table 3,

4.8, 4.9.1, 4.9.4.1, 5.3.2, 5.3.4, 5.3.5.2, 5.3.5.4, Table 20, 5.6.3.3.5, 6.4.3.1);

* Replace IEC 61375-3-4 (see 4.9.4.1) with GB/T 28029.12 modified to adopt international standards;

* Replace IEC 62443-3-3 with GB/T 35673-2017 equivalent to international standards (see 4.9.1);

* Replace IEEE802.11..2016 with IEEE802.11;

* Use IEEE802.1X to replace IEEE802.1X..2010;

--- Deleted the terms and definitions in IEC 61375-2-6..2018 3.1.3, 3.1.4, 3.1.6 ~ 3.1.10, 3.1.13 ~ 3.1.17,

3.1.19 ~ 3.1.21, 3.1.23, 3.1.24, 3.1.27 ~ 3.1.39, 3.1.41, 3.1.42, 3.1.44, 3.1.45, 3.1.48 ~ 3.1.53, because

Several parts have appeared before the standard;

--- Added abbreviations AP, CR, DNAT, SNAT for easy standard understanding; deleted DIN, ERA, EVN, PAM, SDT,

Does not appear in the standard (see 3.2);

--- Increase the information security of vehicle-to-ground transmission, and vehicle-to-ground transmission has relevant requirements for information security protection, because the rail-to-ground communication base

Implemented by open WiFi, GSM, LTE and other wireless communication technologies, there are information security risks (see Table 9);

--- Figure 29 has been modified to add a functional block diagram of the train's remote

monitoring to meet China's national conditions.

This section also made the following editorial changes.

--- Modify the EN number to CR;

--- Modified the application of device and function addressing in 4.9.3, modified to "device and function addressing requirements see Chapter 5" original IEC

Standard reference chapter error;

--- Added the contents of the system structure, services, protocols and data format definitions described in Chapter 5 and Chapter 6 "This chapter is for reference only.

"Examination and recommendations" statement;

--- Modified Figure 35, and changed tls to tlos in the figure according to the text identification, the original IEC standard error;

--- Modified Table 78, replacing the msgType parameter with 4, the original IEC standard error.

This part is proposed by the State Railway Administration.

This part is under the jurisdiction of the National Technical Committee for Standardization of Traction Electrical Equipment and Systems (SAC/TC278).

This section was drafted by. CRRC Zhuzhou Electric Locomotive Research Institute Co., Ltd., China Railway Science Research Institute Group Co., Ltd. rolling stock

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The company, CRRC Datong Electric Locomotive Co., Ltd.

Introduction

This part of GB/T 28029 follows the ISO -OSI model.

This section does not involve the specification of radio technologies and protocols related to wireless communication between the vehicle and the ground.

This section considers the following use cases for trains for ground communication.

a) Debug application.

1) Operational application;

2) Task data application;

3) Driver assistance application;

4) Energy recording application.

b) Maintenance application.

1) Configure data application;

2) Monitor the train status, such as remote monitoring;

3) Application of diagnostic data;

4) Event recording application.

c) Multimedia applications.

1) Passenger information application;

2) Passenger entertainment application;

3) Electronic ticketing application;

4) CCTV and video surveillance.

Rail Transit Electronic Equipment Train Communication Network (TCN)

Part 2-6. Vehicle-ground communication

1 Scope

This part of GB/T 28029 specifies the communication specifications between the on-board system and the ground system.

Communication systems, interfaces and protocols are defined as mobile communication functions, and all available wireless technologies can be used.

This section makes requirements for the following purposes.

a) Select the wireless network based on the quality of service (QoS) parameters requested by the application;

b) Train control and monitoring system (TCMS) and/or vehicle multimedia and remote

OMTS applications can remotely access applications running on ground facilities;

c) Allow applications running on ground facilities to remotely access in-vehicle TCMS and/or OMTS applications.

In order to make the terminal equipment connected to the TCN network and adopt the virtual/functional addressing mechanism specified in GB/T 28029.4-2020

To connect with ground applications and interact with each other, this section specifies further requirements.

In addition, this section covers security requirements to ensure that only authorized and