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**NATIONAL STANDARD OF THE  
PEOPLE'S REPUBLIC OF CHINA**

**GB/T 28029.10-2020**

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**Electronic railway equipment - Train communication network  
(TCN) - Part 3-2: Multifunction Vehicle Bus (MVB) conformance  
testing**

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### 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 section is Part 3-2 of GB/T 28029.

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

This part replaces GB/T 28029.2-2011 "Traction bus of traction electrical equipment Part 2.

## Train communication network consistency test

Compared with GB/T 28029.2-2011, the main technical changes in the content of MVB conformance test in the test are as follows.

--- Modify "test procedure" to "test suite" (see 4.1, 4.2, 4.3.2, 4.3.3.2, 4.3.4, 4.3.5, 4.3.6.1, 4.4.2, 5.1, 5.3,

Chapter 7, B.2.1, B.2.3, B.2.4, B.3.3, B.3.4, B.4.3, C.1, 2011 editions 2.1, 2.2, 2.3.2, 3.2, 4.1.6.7,

4.1.6.14, Chapter 5, 6.3, Chapter 7, A.2, A.3.2, A.3.3, A.4.1.1, A.4.2, B.1.1.1, NA.4);

--- Added two items. "Question" column and "Response" column (see 5.2.2.1);

--- Modified Table 49 ESD measurement (see 5.3.5.3.3, 2011 version 3.2.4.3.3 Table 13);

--- Added schematic diagram of input impedance test (see 5.3.5.5.2);

--- Added the use of network analyzer to measure insertion loss (see 5.3.6.2);

--- Added the content of receiver insensitivity test (see 5.3.6.4).

This part uses the redrafting method to modify the use of IEC 61375-3-2:2012 "railway electronic equipment train communication network

(TCN) Part 3-2. MVB (Multifunction Vehicle Bus) Conformance Test".

Compared with IEC 61375-3-2:2012, this part has more structural adjustments. Appendix A lists this part and IEC 61375-3-2.

A comparison list of chapter numbers in 2012.

Compared with IEC 61375-3-2:2012, there are technical differences between this part and the clauses 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.

\* Replaced IEC 60063. 1963 with GB/T 2471 equivalent to international standards (see 5.3, 5.3.2);

\* Replace ISO /IEC 9646-1:1994 with GB/T 17178.1 equivalent to international standards (see Chapter 3, 4.1);

\* Replace ISO /IEC 9646-7:1995 with GB/T 17178.7 equivalent to international standards

(see 4.1);

\* Replaced IEC 60571 with GB/T 25119 modified to adopt international standards (see 4.3.8);

\* Replaced IEC 61375-2-1 with GB/T 28029.2-2020 modified to adopt international standards (see Chapter 3, Table 24,

5.3.9.3.2.3, 5.3.9.3.4.2.4 ~ 5.3.9.3.4.2.10, 6.2, 6.3.1 ~ 6.3.7, 6.4 ~ 6.6);

\* Replaced IEC 61375-2-2 (see Chapter 3, 6.1) with GB/T 28029.3 modified to adopt international standards;

\* Replaced IEC 61375-3-1 with the revised GB/T 28029.9-2020 adopting international standards (see Chapter 1, Chapter 3, 4,

3.1, 4.3.6.1, 5.2.2.4, 5.2.2.6, 5.2.2.8.2, Table 11 to Table 24, Table 26 to Table 41, 5.3.3, 5.3.5.2, 5.3.5.3.1

~ 5.3.5.3.3, 5.3.5.4.2, 5.3.5.5, 5.3.6.1 ~ 5.3.6.4, 5.3.7.2.3.2 ~ 5.3.7.2.3.9, 5.3.7.3.4, 5.3.7.4.

2.4, 5.3.7.4.3.4 ~ 5.3.7.4.3.6, 5.3.7.4.4.3, 5.3.7.4.4.4, 5.3.8.1, 5.3.8.2.4, 5.3.8.3.4.3,

5.3.8.4.5.2, 5.3.9.3.4.2.2, 5.3.10.1, 5.3.10.2.1, 5.3.10.2.3, 5.3.10.3.1, 5.3.10.4.1, 5.3.10.5.1,

5.3.10.5.3, 5.3.10.6.1, 5.3.10.7.1, 5.3.10.7.2.1, B.3.2.2).

--- Modify the resistance of  $R_u$  and  $R_d$  390ohm in Figure 2 to 383ohm,  $R_m$  150ohm to 143ohm, to better meet the technical standard requirements (see

5.3.5.1, 5.2.4.1 of IEC 61375-3-2..2012).

--- Modify the minimum test current 70.0mA to 20.0mA, and the 4.4.6.3ESD connector in GB/T 28029.9-2020

The power supply remains the same (see 5.3.4.3.2, 5.2.4.3.2 of IEC 61375-3-2..2012).

--- Modify the results corresponding to Pin6 and Pin1 in Table 49 to  $2.1 \times (1 \pm 10\%)$  V, and the corresponding structure of Pin6 and Pin2

If the result is modified to  $2.9 \times (1 \pm 10\%)$  V, the corresponding result of Pin7 and Pin4 is modified to  $2.1 \times (1 \pm 10\%)$  V, Pin7 and

The result corresponding to Pin5 is modified to  $2.9 \times (1 \pm 10\%)$  V. Because  $R_u$  and  $R_d$  are modified to 383ohm,  $R_n$  is modified to 143ohm,

It is calculated that the voltage of Pin6-Pin1 is about 2.059V, the voltage of Pin6-Pin2 is about 2.941V, and the voltage of Pin7-Pin4 is about

2.059V, Pin7-Pin5 voltage is about 2.941V, so leave one decimal place, ESD terminal connector test each measurement

The point voltage should satisfy Pin6-Pin1 voltage is  $2.1 \times (1 \pm 10\%)$  V, Pin6-Pin2 voltage is  $2.9 \times (1 \pm 10\%)$  V,

Pin7-Pin4 voltage is  $2.1 \times (1 \pm 10\%)$  V, Pin7-Pin5 voltage is  $2.9 \times (1 \pm 10\%)$  V (see 5.3.5.3.3,

(IEC 61375-3-2. 5.2.4.3.3 of.2012).

--- Added schematic diagram of input impedance test. The newly added diagram is a typical input impedance test diagram. After testing, the test topology is adopted.

Can meet the input impedance test requirements (see 5.3.5.5.2).

--- Increase the method of measuring the insertion loss using the network analyzer, after the test verification and analysis, use the network analyzer to measure the insertion

The loss test accuracy is higher, and the test environment has less effect on the test results (see 5.3.6.2).

--- Increase the receiver insensitivity test content, the receiver's anti-interference ability is also an important indicator of receiver performance, increase

The receiver insensitivity test can verify the anti-interference ability of the receiver (see 5.3.6.4.1, 5.3.6.4.2).

--- Modified the note as a clause because it contains requirements (see 5.3.7.2.2.2, 5.3.8.2.4, IEC 61375-3-2..2012 5.2.6.1.1.1,

5.2.7.1.3).

This section also made the following editorial changes.

--- Modified the standard name.

--- Added two items in the "Question" column and "Answer" column in the PICS table, which is consistent with GB/T 28029.3, in the PICS table content

There are "question" column and "answer" column (see 5.2.2.1).

--- Modify the number 0 in 5.1.2.20.1 of IEC 61375-3-2..2012 to the number 4, the original text is wrong (see 5.2.3.20.2).

--- Amend 2.4.8.3 in 5.2.4.4.2 of IEC 61375-3-2..2012 to 4.4.9.3, adjust Figure 4 to Figure 6, the original text is wrong (see

5.3.5.4.2).

--- Added Figure 3, Figure 4, Figure 7, Figure 8, Figure 9, Table 48 (see 5.3.5.3.1, 5.3.5.3.2, 5.3.5.4.2, 5.3.5.5.2).

--- Modified the expression of 5.2.5.1.4 of IEC 61375-3-2..2012 (see 5.3.6.3).