NATIONAL STANDARD OF THE

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Road vehicles - Extended vehicle(ExVe) methodology - Part 2: Methodology for designing the extended vehicle

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1 Scope

This document specifies the rules and basic principles of the design methodology of extended vehicles.

This document is applicable to Category-M and Category-N vehicles.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in this text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 41901.1 Road Vehicles - Extended Vehicle (ExVe) Methodology - Part 1: General Information (GB/T 41901.1-2022, ISO 20077-1:2017, MOD)

3 Terms and Definitions

What is defined in GB/T 41901.1, and the following terms and definitions are applicable to this document.

3.1 Basic Principle

Basic principle refers to the design principle that is considered in the design of extended vehicles.

3.2 Life Cycle

Life cycle refers to the various situations that a vehicle can encounter throughout its life, including design, manufacture, customer use, maintenance, and recycling, etc.

3.3 Local Diagnostic Facilitator

Local diagnostic facilitator refers to a person who maintains communication with the remote technician and is able to perform the operations requested by the remote technician and answer questions of the remote technician, thereby facilitating the diagnosis.

NOTE: the local diagnostic facilitator has the ability to understand and describe the contents displayed by the on-board instruments and signaling devices.

3.4 Operator

Operator refers to a person who operates, controls or serves extended vehicle while in the vehicle.

EXAMPLE: local diagnostic facilitator.

3.5 Requester

Requester refers to an enterprise or legal entity that proposes new functional requirements to the manufacturer of extended vehicles.

NOTE 1: when submitting the requirements, the vehicle manufacturer, which is a provider of after-sales service, is deemed as the demand-side.

NOTE 2: if the vehicle manufacturer is the same as the manufacturer of extended vehicle, its internal request process can be used.

3.6 Rule

Rule refers to the basic design requirement to be satisfied when designing extended vehicle.

4 Abbreviations

The following abbreviations are applicable to this document.

BP: Basic Principle ECU: Electronic Control Unit ExVe: Extended Vehicle LDF: Local Diagnostic Facilitator NUM: Number R: Rule

5 Conventions for Identifying Rules and Basic Principles, and

for Specifying Relevant Contents

5.1 In this document, the rules and basic principles are expressed in the following mode:

?? NUM: content of the rule or basic principle.

5.2 ?? NUM represents the quoted rule (R) or basic principle (BP), in which:

---?? is the letter used to identify the rule (R) or basic principle (BP);

---NUM is an integer, which is between 001 and 999 (inclusive), and used to identify the number of the rule or basic principle.

EXAMPLE: R 025 and R 026 are two different rules.

NOTE: rules and basic principles can be followed by explanatory text.

6.1 Role of Design Methodology in the Design of Extended Vehicle

This document aims to provide guidance for the design (physics, documentation, and support, etc.) of extended vehicles and their interfaces by specifying a general system of rules and basic principles. The manufacturer of extended vehicles shall formulate corresponding methods or processes in accordance with the rules and basic principles for the design of extended vehicles on the basis of specific use cases or scenarios.

Each manufacturer of extended vehicles generally regulates the working mode of the design process through a collaborative method and process, as it is shown in Figure 1.

6.2 Main Content of Design Methodology of Extended Vehicle

The design methodology of extended vehicle includes the following contents (see Figure 2):

---When proposing new functional requirements, a template for technical request used to fully describe the minimum information (see Appendix B and Appendix C);

---A system of rules and basic principles used to guide the new functional design of extended vehicle (see Chapter 7 and Chapter 8);

---When responding to new functional requirements, a template for technical response used to fully describe the minimum information (see Appendix B and Appendix D).

by implementing the rules and basic principles of this document. The design methodology applies to the design or design alternations of extended vehicle, including direct or indirect communication between the vehicle the third party (for example, vehicle operator, vehicle owner, service provider or other related parties of extended vehicle).

The new functional requirements of extended vehicles may come from regulations, standards, and individual requests. The new functional requirements of extended vehicles shall be accurately described by the demand-side through the template for technical request for all necessary elements (for example, performance-related elements).

The design methodology also applies to the design of new interfaces for the remote communication of vehicles from regulatory requirements.

This document applies both to any request from the demand-side for new functionalities of

extended vehicles, and also to situations where existing functionalities need to be extended or remotely used. For vehicles produced in multiple phases, this document applies to all relevant manufacturers. Simply adding new equipment to enable new functionality without regard to the existing design may not achieve the desired results. On the one hand, the new function may uncontrollably interfere with the original or existing functionalities. On the other hand, the original vehicle system usually does not have all the components required for the new function.

The basic principle of the design methodology aims to emphasize the treatment of these risks.

These rules and basic principles stipulated by this document aim to deal with the internal risks of extended vehicle caused by the new function of extended vehicle (whether this function already exists or not) in an appropriate mode. Measures that can be taken to manage these risks include, but are not limited to:

---Modify the existing electronic system (resources, etc.) of extended vehicle to implement new function;

---DO NOT configure new function;

---Configure new function, but only under specific conditions;

---Modify other existing functionalities.

Non-technical measures (for example, contractual measures) may also be used to manage risks, for example, associated with the degradation or destruction of existing functionalities or services.

7.1 Overview

The design methodology of extended vehicles, which is based on remote access, shall maintain the basic safety and security of the vehicle throughout the entire life cycle of the vehicle.

Therefore, this document includes two rules (R 001 and R 002), which shall be adopted by the manufacturer of extended vehicles in the design methods and processes.

7.2 Safety-related Rules

R 001: when designing a new function of extended vehicle, the manufacturer of extended vehicle shall consider possible safety risks. Functionalities that affect safety shall be handled in accordance with the optimum safety practices.

When the manufacturer of extended vehicles is designing an extended vehicle, it shall consider the safety of the vehicle, drivers and passengers, operators and other users throughout the life cycle.