



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

GB/T 44461.1-2024

**Intelligent and connected vehicles - Technical requirements and
test methods for combined driving assistance systems - Part 1:
Single-lane driving control**

智能网联汽车 组合驾驶辅助系统技术要求及试验方法 第1部分：单车道行驶控制

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1 Scope

GB/T 44461.1-2024 is the first part of the Chinese standard for combined driving assistance systems and it covers single-lane driving control: the level 2 function that holds the car in its lane and at a set distance from the vehicle ahead, sold under a hundred marketing names and meaning something slightly different in each. This standard is what fixes the meaning in China. It sets the technical requirements for the function, the operating conditions in which it must work and the boundary at which it must hand back, the driver monitoring and the hands-on requirements, the warning and takeover strategy and its escalation, the behaviour on system failure and on leaving the operational domain, the response to cut-in vehicles, to stationary obstacles and to lane markings of varying quality, and the human-machine interface requirements. It then gives the test methods, the track scenarios and the pass criteria for each. For a carmaker or a Tier 1 selling driving assistance into China, this is the text the function is assessed against.

This document specifies the general requirements and performance requirements and describes the test methods for the single-lane manoeuvre of intelligent and connected vehicles. This document is applicable to Category-M and Category-N vehicles equipped with single-lane manoeuvre system. NOTE. in the absence of confusion, the "single-lane manoeuvre system" in this document is referred to as the "system" in short.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in the 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 5768.3 Road Traffic Signs and Markings - Part

3 Terms and Definitions

The terms and definitions defined in GB/T 44373, and the following are applicable to this document.

3.1 single-lane manoeuvre system A combined driver assistance system that continuously controls the lateral and longitudinal motion of the vehicle based on the surrounding driving environment and assists the driver in controlling the vehicle to drive only in a selected single lane.

3.2 lane A state, in which, the system does not perform any lateral or longitudinal motion control on the vehicle.

3.9 partial active state A state, in which, the system does not perform lateral and longitudinal motion control on the vehicle at the same time but assists the driver in performing lateral or longitudinal motion control.

3.10 active state A state, in which, the system assists the driver in continuously controlling the lateral and longitudinal motion of the vehicle.

4 General Requirements

4.1 Functional Requirements The system shall have clear activation conditions. In the active state, it shall assist the driver in controlling the vehicle to drive in the selected lane, and allow the driver to adjust settings, for example, cruising speed. In addition, it shall not affect the activation of emergency assistance functions, for example, automatic emergency braking.

4.2 Self-inspection The system shall complete self-inspection before entering the active state and be equipped with at least the following self-inspection functions. When an abnormal state is detected, it shall not enter the active state.

- a) Check whether the relevant electrical components are normally operating;
- b) Check whether the relevant sensing elements are normally operating.

4.3 State Switching

4.3.1 Each time the vehicle is powered on / ignited, after the driver performs the system activation mode specified by the vehicle manufacturer, the system shall enter the partial active state or active state. NOTE. the operation of the vehicle's automatic start-stop system is not considered as vehicle power-on / ignition.

4.3.2 The system shall respond at any time to the driver performing a single operation specified by the vehicle manufacturer that brings the system from the partial active state or active state into the inactive state. After this operation, and after the driver performs the system activation mode specified by the vehicle manufacturer, the system shall re-enter the partial active state or active state.

4.4 Prompt Signal

4.4.1 The system shall at least continuously emit an optical prompt signal in the partial active state and active state, and at least optically distinguish the inactive state, partial active state and active state of the system.

4.4.2 If the system has a fault in the partial active state and active state, the system shall send out a fault indication message. This fault indication message shall at least include an optical prompt signal and be distinguished from other indication information of the system.

4.4.3 The optical signal shall be clearly visible to the driver in the normal driving position even during the day.

4.5 Driver Monitoring When the system is in the active state, and the vehicle speed is between the larger value of 10 km/h and $v_{\min-SL}$, and $v_{\max-SL}$, at least the hands-off detection method shall be adopted to continuously detect whether the driver is performing the corresponding dynamic driving task.

4.6 System Intervention Strategy The system shall respond to the driver's active intervention in vehicle motion control.

4.7 Electromagnetic Compatibility The electromagnetic compatibility of the system shall comply with the requirements of GB 34660.

4.8 Functional Safety The functional safety of the system shall comply with the requirements of Appendix A.

5.1 Lateral Motion Control

5.1.1 In accordance with 6.5, carry out the test. The lateral distance between the vehicle under test and the lane boundary line shall be maintained at $(W/2 \pm 0.3)$ m.

5.1.2 In accordance with 6.6, carry out the test. The outer edge of any wheel of the vehicle under test shall not cross the inner edge of the lane boundary line.

6.1 Test Conditions

6.1.1 Test road The test road shall comply with the following requirements.

a) The test road surface shall be compacted and free of irregularities (such as. large inclination angles, cracks, manhole covers or reflective bolts, etc.) that may cause abnormal operation of the sensor.

b) The test road shall contain at least two lanes of long straights and curves.

c) The test road surface shall be dry and flat, with no visible moisture on the surface.

d) The land width of the test road shall be

3.75 m, and the straight length shall not be less than 1 km.

e) The test road shall be equipped with lane markings, and it shall be ensured that the lane markings are clearly visible. The lane markings shall comply with the requirements of GB 5768.3.

f) The radius of curvature of the straight test road shall be greater than or equal to 5 km. The curved test road shall be a straight section connected to a curved section, with the length of the curve supporting the completion of the test. This curve is divided into a fixed curvature part and a variable curvature part. The fixed curvature part has a radius of curvature of RBC, and the variable curvature part is the connecting section of the straight section and the fixed curvature part, and its curvature shall linearly change with the length of the curve, gradually increasing from 0 to $1/RBC$; the curvature change rate dc/ds shall not exceed $4 \times 10^{-5} \text{ m}^{-2}$, as shown in Figure 5. Category-M3 urban buses is 65% of the loading mass; the other vehicles shall be full- loaded, and the passenger mass and loading requirements shall comply with the provisions of GB/T 12534.

c) During the test, the load of the vehicle under test shall not be adjusted.

6.2.2 If the system can actively adjust the headway by the driver, then, during the test, the headway of the system shall be set to the minimum headway.

6.2.3 The tires used in the test shall be run-in to normal condition, and the tire pressure shall be the cold inflation pressure recommended by the vehicle manufacturer.

6.3 Target Vehicle The target vehicle shall be a passenger car, and the wheelbase shall be within the range of

3.0 m. As an alternative, a flexible target with characterization parameters representative of the above-mentioned vehicle and adapted to the system sensors can also be adopted.

6.4 Test Equipment During the test, the test instruments and equipment shall comply with the following requirements.