



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

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**Intelligent transportation systems -- Forward vehicle collision
warning systems -- Performance requirements and test
procedures**

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1 Scope

This Standard specifies performance requirements and test procedures for forward vehicle collision warning systems (hereinafter referred to as FVCWS).

This Standard covers operations on roads with radius of curvature over 125 m, and motor vehicle including cars, trucks, buses and motorcycles.

Note. Responsibility for the safe operation of the vehicle remains with the driver.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB 7247.1-2012, Safety of laser products - Part 1.Equipment classification and requirements

GB/T 20608-2006, Intelligent transportation systems - Adaptive cruise control systems - Performance requirements and test procedures
JTG B01-2014, Technical Standard of Highway Engineering

3 Terms and definitions

The following terms and definitions are applicable to this document.

3.1 collision warning

Information that the system gives to the driver indicating the need for urgent action to avoid a collision.

3.2 preliminary collision warning

Warning information that the system gives to the driver of an obstacle vehicle ahead.

3.3 subject vehicle; SV Vehicle equipped with forward vehicle collision warning system as defined herein.

3.4 forward vehicle Vehicle in front of and moving in the same direction and traveling on the same roadway as the subject vehicle.

3.5 forward vehicle collision warning system System capable of warning the driver of a potential rear-end collision with the forward vehicle.

3.6 obstacle vehicle Vehicles, both moving and stationary, considered potential hazards that can be detected by the system.

4.1 System functionality

The main functionality of the forward vehicle collision warning system is to issue a warning to the driver when there is a potential conflict between the subject vehicle and the forward vehicle. The system functionality is realized by judging the following information.

4.2 Necessary functionalities

Vehicle equipped with a forward vehicle collision warning system shall be equipped to fulfill the following functionalities.

4.3.3 Operational limits

The value of the minimum velocity V_{min} shall be at most 11.2 m/s when the system works. The value of the maximum velocity V_{max} shall be at least 27.8 m/s or the maximum vehicle operating velocity when the system works. The minimum value of the relative velocity shall not be higher than 4.2 m/s, and the maximum value shall not be lower than 20 m/s.

4.4.1 Warning target object

Forward vehicle collision warning systems shall provide warnings for moving (including "has been detected as moving by the sensor and now stopped") obstacle vehicles. Providing warnings for stationary obstacle vehicles is optional.

4.4.2 Monitoring distance and relative velocity between obstacle vehicle and subject vehicle

4.4.3 Judging the time to collision

One possible way to judge the time to collision is by the results of evaluating the subject vehicle velocity, the distance to the obstacle vehicle, and the relative velocity. When the system detects multiple obstacle vehicles at the same time, it shall select one in the subject vehicle expected trajectory that the subject vehicle may collide with first.

4.4.4 Preliminary collision warning and collision warning

Forward vehicle collision warning systems shall provide two different warnings. preliminary collision warning and collision warning.

4.4.5 Fault indication

The driver shall be informed when a malfunction is detected during system startup or operation.

4.5.1 System output

The forward vehicle collision warning system shall be able to issue a collision warning to the driver, as well as a preliminary collision warning.

4.5.2 Warning modality

FVCWS warning modalities shall meet the following requirements.

4.5.3 Required deceleration threshold

The required deceleration thresholds involved in the forward vehicle collision warning system shall meet the following requirements.

4.5.4 Response time

The value of the response time involved in the forward vehicle collision warning system shall meet the following requirements.

4.5.5 No Warning requirements

The FVCWS warning shall be suppressed or delayed under the following conditions.

4.8 FVCWS performance on curves

The forward vehicle collision warning system belonging to Class I system shall be able to issue a warning on the obstacle vehicles on the curve with a radius greater than or equal to 500 m; the forward vehicle collision warning system belonging to Class II system shall be able to issue a warning on the obstacle vehicles on the curve with a radius greater than or equal to 250 m; the forward vehicle collision warning system belonging to Class III system shall be able to issue a warning on the obstacle vehicles on the curve with a radius greater than or equal to 125 m.

4.9 User safety requirements

Different safety requirements shall be met according to the type of sensor used by the system, see Appendix C.

4.10.1 Warning modality

Among the warning modalities, the warning characteristics of the visual and auditory modalities are shown in Table 4.

4.10.2 Interference with other warnings

Even when a vehicle is equipped with a forward vehicle collision warning system along with other warning systems such as those for rear or side obstacles, the warning shall be clearly distinguishable to the driver relative to other unrelated warnings.

4.11 Awareness of system limitations

The driver shall be informed of system limitations by appropriate means such as the owner's manual or warning labels.

Head-on collision warning, crossing-patch collision warning, operations beyond the sensor limit (including short radius curve, etc.) and the maximum velocity beyond the system are not available within this system.

5.1 Test target specification

Test targets that meet different requirements shall be selected according to the sensor type, see Appendix C.

5.2 Environmental conditions

The test environment shall meet the following requirements.

5.3 Test method for detection area

The most realistic test method for detection area is a dynamic test; however, a static test is available as an option also. The test shall be performed as follows.