

ICS 01.100.01;03.220.20
CCS R04



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

GB/T 42517.2-2023

**Intelligent transportation systems - Intelligent driving electronic
road data model and expression specification - Part 2:
Non-controlled access road**

智能运输系统 智能驾驶电子道路图数据模型与表达 第2部分：开放道路

Issued on: May 23, 2023

Implemented on: December 1, 2023

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

Table of Contents

4 Introduction...	5
1 Scope...	6
2 Normative references...	6
3 Terms and definitions...	6
4 Framework data model...	7
4.1 Element model...	7
4.2 Coordinate frame system...	7
4.3 Accuracy...	7
4.4 Range of expression...	7
4.5 Expression of general attributes of roads...	7
5 Roads and lanes...	8
5.1 Road data model and expression...	8
5.2 Lane data model and expression...	8
5.3 Intersection data model and expression...	8
5.4 Ordinary intersections...	8
5.5 Complex intersections...	13
5.6 Roundabout...	18
5.7 Entrances and exits of main and auxiliary roads...	23
5.8 U-turn...	26
5.9 Roads without lane markings...	32
6 Road facilities...	33
6.1 Pedestrian crossing...	33
6.2 Lateral prohibition markings...	35
6.3 Bus stop...	37
6.4 On-street parking space...	40
6.5 Safety island...	42
6.6 Road traffic signs...	44
6.7 Roadside traffic facilities...	44
6.8 Road traffic markings...	44
6.9 Traffic signal lights...	44
6.10 Speed bumps...	45
6.11 Toll booths...	46

6.12 Checkpoints...	46
6.13 Upper obstacles...	46
6.14 Roadside structures...	46
6.15 Pole-like objects...	46
6.16 Gantry...	46
6.17 Tunnels...	46

1 Scope

GB/T 42517.2-2023 extends the intelligent driving road model from motorways to ordinary roads, which is where the difficulty lies. Part 1 covered controlled access roads: no pedestrians, no intersections, predictable geometry. An open road has all of it - intersections whose permitted movements have to be encoded lane by lane, traffic signals that govern them, crossings, parking, bus lanes, unmarked or worn lane boundaries, and rules that change by time of day. A map for automated driving on such roads has to represent not only where the lanes are but what a vehicle is allowed to do in each of them, which is a far larger modelling problem than geometry. This part specifies the framework data model for non-controlled access roads within the electronic road data model for intelligent driving, together with the data model and expression of roads, lanes and road facilities. It applies to the production and application of such maps. Under CCS R04, it is written for high-definition map providers, for automated driving developers, and for the traffic authorities whose signal and regulation data has to reach the map. It is the companion to GB/T 42517.1-2023.

This document specifies the framework data model of uncontrolled access roads in the electronic road data model for intelligent driving, the data model and expression of roads and lanes, the road facilities. This document is applicable to the production and application of intelligent driving electronic road data model products, which use uncontrolled access roads as the main scene.

2 Normative references

The contents of the following documents constitute the essential provisions of this document through normative references in the text. Among them, for dated references, only the version corresponding to the date applies to this document; for undated references, the latest version (including all amendments) applies to this document.

GB 5768.3 Road traffic signs and markings - Part 3: Road traffic markings

GB/T 42517.1-2023 Intelligent transportation systems - Intelligent driving electronic road data model & expression specification - Part 1: Controlled access road

3 Terms and definitions

The terms and definitions, as defined in GB 5768.3 and GB/T 42517.1-2023, as well as the following terms and definitions, apply to this document.

3.1 Ordinary intersection A level intersection that does not allow motor vehicles to pass through side roads, in the inbound and outbound directions.

3.2 Complex intersection A level intersection that allows motor vehicles to pass through side roads, in at least one inbound or outbound directions.

4 Framework data model

4.1 Element model The description of the element model, the theme of the element, the conceptual model shall comply with the provisions in

4.1 of GB/T 42517.1-2023.

4.2 Coordinate frame system The coordinate frame, time system, coordinate expression, etc. shall comply with the provisions in

4.2 of GB/T 42517.1-2023.

4.3 Accuracy The absolute accuracy, relative accuracy, accuracy index of the electronic road data model for intelligent driving shall comply with the provisions in

4.3 of GB/T 42517.1- 2023.

4.4 Range of expression The expression range of the uncontrolled access road on the intelligent driving electronic road data model shall comply with the provisions in

4.4 of GB/T 42517.1- 2023.

4.5 Expression of general attributes of roads The positive and negative value requirements of longitudinal slope, curvature, transverse slope, heading shall comply with the provisions in

4.5 of GB/T 42517.1- 2023. Ordinary intersections shall provide a lane geometric topological relationship table, to record the inbound and outbound connections of the lane-level geometric paths in the intersection; reserve a traffic status ID interface, to facilitate the expansion of subsequent phase information. See Table 2, for the simplified connection geometry and topological relationship of ordinary intersection lanes.

5.4.2.3 Maximized geometric connection of lanes at ordinary intersection In the same direction of entry and exit in the intersection, all the entry lanes and exit lanes have lane-level path connections, meanwhile the connected lanes are not capped in the intersection, which is the basic principle of maximizing the geometric connection of ordinary intersection lanes. The specific principles of connection are as follows:

- a) When the number of exit lanes is an integer multiple of the number of entry lane, each entry lane is allocated the same number of exit lanes, as per the multiple;
- b) When the number of exit lanes is greater than the number of entry lanes and cannot be divisible, the principle of equal division of entry lanes is adopted first, then the remainder is added from right to left for each entry lane;
- c) When the number of exit lanes is less than the number of entry lanes and cannot be divisible, the principle of equal division of the exit lanes is adopted first, then the remainder is added to each exit lane from right to left.

6.9 Traffic signal lights

6.9.1 Expression related to traffic signal lights The data model, attribute, geometric expression, association relationship, table structure of traffic lights shall comply with the provisions in

6.4 of GB/T 42517.1-2023.

6.9.2 Association relationship between traffic lights and lanes at ordinary intersections At intersections, traffic lights shall be associated with each controlled entry lane, as shown in Figure 38.

6.11 Toll booths The data model, attribute, geometric expression, association relationship, table structure of the toll station shall comply with the provisions in

6.6 of GB/T 42517.1-2023.

6.12 Checkpoints The data model, attribute, geometric expression, association relationship, table structure of the checkpoint shall comply with the provisions in

6.7 of GB/T 42517.1-2023.

6.13 Upper obstacles The data model, geometric expression, association relationship, table structure of the upper obstacle shall comply with the provisions in

6.8 of GB/T 42517.1-2023.

6.14 Roadside structures The data model, attribute, geometric expression, association relationship, table structure of roadside structures shall comply with the provisions in

6.9 of GB/T 42517.1-2023.

6.15 Pole-like objects The data model, attributes, geometric expression, association relationship, table structure of rods shall comply with the provisions in

6.10 of GB/T 42517.1-2023.

6.16 Gantry The data model, attribute, geometric expression, association relationship, table structure of the gantry shall comply with the provisions in