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# NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA



# GB/T 34657.1-2025

Replacing GB/T 34657.1-2017

## Interoperability test specifications of electric vehicle conductive charging - Part 1: Supply equipment

电动汽车传导充电互操作性测试规范 第1部分：供电设备

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**Standardization Administration of the PRC**

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## 1 Scope

This document specifies the inspection rules, test conditions, test cases for conducting charging interoperability testing of conductive power supply equipment (CPSE) in electric vehicle power transmission systems.

This document applies to electric vehicle AC power supply equipment that complies with GB/T 18487.1-2023 and electric vehicle DC power supply equipment that complies with GB/T 18487.1-2023 or GB/T 18487.5-2024.

Note 1.In this document, Class A systems refer to charging systems that utilize the GB/T 20234.3 vehicle interface and whose control and guidance circuits comply with Appendix B of GB/T 18487.1-2023; Class B systems refer to charging systems that utilize the GB/T 20234.4 vehicle interface and whose control and guidance circuits comply with Appendix C of GB/T 18487.1-2023; Class C systems refer to charging systems that utilize the GB/T 20234.3 vehicle interface and whose control and guidance circuits comply with Appendix A and Appendix B.3 of GB/T 18487.5-2024.

Note 2.The DC power supply equipment for electric vehicles with charging and discharging functions specified in this document is limited to Class B and Class C systems.

## 2 Normative references

GB/T 14549

GB/T 18487.1-2023

GB/T 18487.5-2024

GB/T 20234.3

GB/T 20234.1-2023

GB/T 20234.2-2015

GB/T 20234.3-2023

GB/T 20234.4-2023

GB/T 27930-2023

GB/T 27930.2-2024

**20234.3 NB/T 33001 Specification for electric vehicle off-board conductive charger**

GB/T 29317 Terminology of electric vehicle charging/battery swap infrastructure GB/T 34658 Conformance test for communication protocols between off-board conductive charger and battery management system for electric vehicle GB/T 41589-2022 In-cable control and protection device for mode 2 charging of electric road vehicles (IC-CPD) GB 44263-2024 Safety requirements for electric vehicle conductive charging system



## 3 Terms and definitions

The terms and definitions defined in GB/T 18487.1-2023 and GB/T 29317, as well as the following terms and definitions, apply to this document.

### 3.1 Charging interoperability

The ability of power supply equipment of the same or different models and versions to achieve charging interoperability with electric vehicles, through information exchange and process control.

### 3.2 Charging interoperability test

Tests conducted to verify charging interoperability.

### 4.1 Test item coding rules

See Figure 1 for the charging interoperability test item coding rules. Among them.

"Positive test" refers to testing activities that verify whether the EV supply equipment can operate as expected, under normal operating conditions;

"Negative test" refers to testing activities that verify whether the EV supply equipment can correctly handle errors, under abnormal or unexpected conditions;

"Interface test" refers to testing activities that verify whether the interoperability between the power plug and the power outlet, and between the vehicle plug and the vehicle outlet, meets the design specifications;

"X" in "Unmated.X" includes but is not limited to power outlet (EVSocket-outlet), power plug (EVPlug), vehicle plug (VehicleConnector), vehicle outlet (VehicleInlet);

"X" in "Initialization.X" includes but is not limited to connection confirmation (Connection&Confirm), charging reservation, self-test (CableCheck), ready (ChargingReady/Pre-charge);

The "X" in "Energy transfer.X" includes, but is not limited to supply mode (SupplyMode), pause charging (PauseCharging), Charging (Charging);

The "X" in "Shutdown.X" includes, but is not limited to normal charging end (ChargingNormal), error charging end (ChargingError), emergency charging end (ChargingEmergency);

The "X" in "Session.X" includes, but is not limited to the entire charging process (Charging).

Figure 1 -- Test item coding rules



### 4.2 Evaluation criteria

According to Appendix A, the power supply device under test is considered qualified if it meets the requirements for all test items; otherwise, it is considered unqualified.

### 4.3 Test sequence

The charging interoperability test sequence is shown in Figure 2.

a) The testing organization shall provide documentation demonstrating that the charging connection device configured for the power supply equipment under test complies with the requirements of 5.5.1; the testing organization conducts testing in accordance with the requirements of 6.2.

b) The DC power supply equipment under test shall undergo communication protocol conformance testing for the corresponding system, in accordance with GB/T 34658, followed by DC charging interoperability testing in accordance with the requirements of 6.3.

c) If the AC power supply equipment under test is an AC charging station or an in- cable control and protection device, AC charging interoperability testing shall be conducted in accordance with the requirements of 6.4.

### 4.4 Voltage and current tolerance requirements

For voltage and current values where the tolerance is not explicitly specified, the allowable tolerance is ±5%.

### 5.1 Environmental conditions

During each item test period, the test environment shall be relatively stable and conducted under standard atmospheric conditions for measurement and testing, namely.

a) Ambient temperature. +15 °C ~ +35 °C;

b) Relative humidity. 45% ~ 75%;

c) Atmospheric pressure. 86 kPa ~ 106 kPa.

### 5.2.1 AC power supply

The AC power supply conditions during testing are.

a) Frequency. 50 Hz ± 0.5 Hz;

b) AC power supply voltage. 220 V/380 V, with an allowable deviation of ±5%.

Note. AC power supply is only used for testing in charging mode.

### 5.2.2 Grid simulator

The grid simulator shall meet the following requirements.

a) Each phase voltage can be independently adjustable and programmable;

b) The frequency can be adjustable and programmable;

c) Electric energy shall be able to flow in both directions;

d) The voltage harmonics on the power supply side connected to the EV power supply equipment (i.e., side A as specified in GB/T 18487.1-2023) shall be less than 50% of the permissible harmonic values specified in GB/T 14549;

e) The current harmonics injected into the grid shall be less than the permissible harmonic values specified in GB/T 14549;

f) The output voltage's fundamental wave deviation shall be less than 0.2% of the AC rated voltage of the EV power supply equipment under test, with the adjustable step size not exceeding the larger of 0.01% of the rated voltage and 0.5 V;

g) The output frequency deviation shall be less than 0.01 Hz, with the adjustable step size not exceeding 0.01 Hz;

h) The response time shall be less than 20 ms;