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

GB/T 38775.9-2025

**Electric vehicle wireless power transfer - Part 9: Communication
protocols between the on-board charger and the wireless power
transfer device - Application layer and data link layer**

电动汽车无线充电系统 第9部分：车载充电机和无线充电设备之间的通信协议 应
用层及数据链路层

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1 Scope

GB/T 38775.9-2025 is the Chinese national standard covering the protocol between the pad in the ground and the car above it - the discovery and pairing, the alignment guidance, the power control loop, the safety reports and the session end, specified at the application and data link layers. At 35,000 words, Part 9 of the series and a first edition, with the conformance test of Part 10. It was issued on 31 December 2025 and has been in force since 1 July 2026, as a first edition. This page is published from the official record of the 2025 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document specifies the definitions and requirements of the communication service unit

(CSU) and the in-vehicle unit (IVU) of the electric vehicle wireless power transfer, as well as the CSU and the wireless charging control management system (WCCMS), including message classification, message format and content, communication flow, etc. This document is applicable to Class A and Class B static magnetic coupling wireless power transfer, whose maximum rated supply voltage is 1 000 V (AC) or 1 500 V (DC), and whose maximum rated output voltage is 1 000 V (AC) or 1 500 V (DC). Other rated output voltages are subject to reference.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through 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/T 19596 Terminology of electric vehicles

GB/T 38775.1-2020 Electric vehicle wireless power transfer - Part

3 Terms and Definitions

The terms and definitions defined in GB/T 19596, GB/T 38775.1-2020, GB/T 38775.2-2020, and GB/T 38775.3-2020, as well as the following terms and definitions, are applicable to this document.

3.1 Frame A series of data bits that make up a piece of complete information. [Source: GB/T 27930-2023, 3.1.1]

3.2 Data Frame The ordered bit fields required by the protocol for transmitting data, starting with a frame header and ending with a frame trailer.

3.3 Messages One or more "data frames" with the same parameter group number. NOTE. It is typically used to transmit information between application-layer peer entities.

3.4 Command Code An 8-bit value used to uniquely identify a message code.

3.5 Suspect Parameter Number; SPN A 16-bit value assigned to each parameter by the application layer using parameter description signals.

3.6 Timeout The failure of the CSU or IVU application layer communication to receive a complete or correct data packet from the other party within a specified time.

4 Symbols and Abbreviations

The following abbreviations are applicable to this Part.

5 CI Interface

5.1 Physical Layer The communication physical layer of the CI interface shall comply with the provisions of

5.3 in GB/T 38775.2-2020, that is, the communication between CSU and IVU shall use wireless local area network (WLAN) and comply with the provisions of IEEE Std 802.11TM. The CSU shall implement the High Throughput Access Point (HT AP) function set, and the IVU shall implement the High Throughput Station (HT STA) function set. The CI interface should preferably support local area networks in both

2.4 GHz and 5 GHz frequency bands.

5.2 Data Link Layer The data link layer for CI interface communication shall comply with the provisions of IEEE Std 802.11TM.

5.3 Network Layer The communication network layer of the CI interface shall comply with the provisions of IETF RFC 791, i.e., the IPv4 protocol specification. The network layer data transmission sequence shall follow network byte order, i.e., big-endian. The IVU shall obtain a valid IP address through the CSU's DHCP service and shall comply with the provisions of IETF RFC 4477. The CSU's default IP address shall be set to 192.168.1.1, and the IVU's IP address should preferably be assigned by the DHCP service.

5.4 Transport Layer The communication transport layer of the CI interface shall comply with the provisions of IETF RFC 9293, i.e., the TCP specification. Alternatively, it may comply with the provisions of IETF RFC 768, i.e., the UDP specification. The TCP port number for CI communication shall be set to 38775, and the UDP port number shall be set to 2024. The CSU transport layer of Class A wireless power transfer devices shall support both TCP and UDP simultaneously, and the IVU shall support one or both of these protocols. The CSU transport layer protocol for Class B wireless power transfer devices is determined through negotiation between the device manufacturer and the user. A data frame in either TCP or UDP should ideally contain only the content of a complete application-layer command message.

5.5 Application Layer

5.5.1 Message encoding format of the CI interface The message data of the CI interface shall be transmitted in hexadecimal and shall meet the following requirements.

- a) Use the fixed character 7EH as the frame header.
- b) Use the fixed character 0DH as the frame trailer.
- c) To avoid duplicate characters in transmitted data, use 7FH as an escaping special character. When the characters 7EH, 0DH, or 7FH appear in data other than the frame header and trailer, the original byte is converted into two bytes for transmission. Escape

rules and message encoding format are shown in Table 1. The encoding format of the CI interface shall meet the following requirements.

- a) Adopt the form of parameter and parameter group definitions.
- b) Adopt command codes to identify the message content.
- c) Data transmission is implemented using a combination of periodic transmission and event-driven mechanisms.
- d) Data transmission employs a little-endian (low-byte first) format. The definitions of data types in the message are shown in Table

2. Unspecified bits or reserved bits shall be filled with 1. The generator polynomial used in the CRC algorithm shall be as follows: $CRC-CCITT = X^{16} + X^{12} + X^5 + 1$

1. When escaping is required, the CRC shall be calculated before escaping, and then the escaping process shall be performed.

5.5.2 Overall flow of the CI interface The wireless charging communication process consists of a sequence of multiple communication steps, comprising both mandatory and optional communication steps. During the communication process, the message transmission cycle shall be 100 ms. If the CSU and IVU do not receive a message from the other party or do not receive a correct message within the time limit specified in the communication flow chart in Appendix A, it shall be judged as a timeout. In the event of a timeout, the CSU or IVU shall transmit a fault message and shall handle the situation in accordance with the fault handling procedures specified in A.11. The basis for judging a correct message shall meet the following conditions.

- a) CRC value verification is correct;
- b) The content of the data item conforms to the message definition;