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Parking Electronic Toll Collection - Part 2: Technical Specification for Terminal Equipment

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终端设备技术要求

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Parking Electronic Toll Collection - Part 2: Technical Specification for Terminal Equipment

1 Scope

This Part of GB/T 35070 specifies the technical specification for roadside unit and IC card read-write terminal of parking electronic toll collection system.

This Part is applicable to the design and manufacture of non-cash payment card or roadside unit and IC card read-write terminal, which implement automatic payment through exclusive short-range communication protocol in parking electronic toll collection system and vehicle access management system.

2 Normative References

The following documents are indispensable to the application of this Standard. In terms of references with a specified date, only versions with a specified date are applicable to this Standard. The latest version (including all the modifications) of references without a specified date is applicable to this Standard.

GB/T 4208-2017 Degrees of Protection Provided by Enclosure (IP code)

GB/T 9254 Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement

GB/T 16649.1 Identification Cards - Integrated Circuit(s) Cards with Contacts - Part 1: Physical Characteristics

GB/T 16649.2 Identification Cards - Integrated Circuit(s) Cards with Contacts - Part 2: Dimensions and Location of the Contacts

GB/T 16649.3 Identification Cards - Integrated Circuit(s) Cards with Contacts - Part 3: Electronic Signals and Transmission Protocols

GB/T 17618 Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement

GB/T 18239-2000 Generic Specification for Integrated Circuit Card Reader

GB/T 20135 Intelligent Transport Systems - Electronic Toll Collection - System Architecture

GB/T 20851.1-2007 Electronic Toll Collection - Dedicated Short Range Communication - Part 1: Physical Layer

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3.6 Effective Communication Area

Effective communication area refers to the area where roadside unit can conduct normal electronic toll transaction with electronic tag.

3.7 Lane Controller

Lane controller is equipment which is installed in the toll lane and connected with RSU and other peripheral equipment to coordinate lane software to control the logical flow of the lane.

4 Abbreviations

The following abbreviations are applicable to this document.

ASK: Amplitude Shift Keying

CPU: Central Processing Unit

e.i.r.p: equivalent isotropically radiated power

IC: Integrated Circuit

IP: Internet Protocol

OBU: On Board Unit

RSU: Roadside Unit

SAM: Secure Access Module

TCP: Transmission Control Protocol

USB: Universal Serial Bus

5 Technical Requirements of Roadside Unit

5.1 Communication Protocol

5.1.1 Physical layer

Physical layer shall comply with relevant stipulation in 5.2 and 5.3 in GB/T 20851.1-2007. In addition, e.i.r.p shall be less than or equals to +30 dBm.

5.1.2 Data link layer

Data link layer shall comply with relevant stipulation in Chapter 5 ~ Chapter 9 in GB/T

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---Standard serial interface: adopt RS-232 and RS-485 interface; communication Baud rate shall at least reach 115,200 bps. The following should be set up: serial port adopts half-duplex asynchronous serial communication; protocol format: “115200, N, 8, 1” (namely, Baud rate: 115,200 bps; no parity; 8-bit data; 1 stop bit);

---The definition of communication data format between RSU and lane controller shall comply with GB/T 28423.

5.2.7 Security

Security shall comply with relevant stipulation in Chapter 8 in GB/T 20851.4-2007.

5.2.8 Protection level

The protection level of RSU shell shall comply with the requirement of Level-IP65 in GB/T 4208-2017.

5.2.9 Power

AC220 V ± 22 V/50 Hz ± 1 Hz AC power supply shall be supported.

5.3 Inter Lane Interference

RSU shall merely transact with OBU within the communication area of this lane; it shall not be affected by other inter lanes.

5.4 Transaction Success Rate

RSU’s transaction success rate shall be more than or equals to 99.97%.

5.5 Installation

5.5.1 Side-mounted mode

The typical installation height of side-mounted RSU is 2 m ~ 2.5 m.

5.5.2 Ceiling-mounted mode

The typical installation height (clearance) of ceiling-mounted RSU is 3 m ~ 3.5 m.

RSU mounting bracket shall have explicit scale indication; the range of installation angle is: 30° ~ 60°.

5.5.3 Others

Other parameters that are not listed out shall comply with relevant stipulation in 5.2.6 in GB/T 20851.4-2007.

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---Communication distance: in terms of standard CPU card: the minimum write-read distance is 40 mm; the maximum write-read distance is 100 mm; within an effective range, there shall be no blind zone; the included angle between IC card and antenna plane shall be not more than 80° and allows normal read and write;

---In the area where read and write is effective, field strength shall be within the range of 1.5 A/m (rms) ~ 7.5 A/m (rms);

---Communication Baud rate: 106 kbps, 202 kbps, 424 kbps, 848 kbps;

---Mode of modulation: ASK 100% (TYPE A) or ASK 10% (TYPE B).

6.3.2 Display module

Displayed characters shall be distinct and intact. It shall be able to program and set up display information; have the function of double-sided indicator light.

6.3.3 Voice module

Speaker output shall include voice and buzzer. It shall be able to store customized voice data information; program and set up prompt voice.

6.3.4 Non-volatile storage module

Non-volatile storage module's storage capacity shall be not less than 2 GB; may be configurated and replaced in accordance with demands. After power failure, it shall be able to store data for over 10 years.

6.3.5 SAM card holder

SAM card holder shall comply with the following requirements:

---At least have 4 SAM card holders;

---Physical interface shall comply with the stipulation in GB/T 16649.1 and GB/T 16649.2;

---Communication interface shall comply with the stipulation in GB/T 16649.3;

---At least support 2.7 V ~ 3.3 V of operating voltage;

---Able to automatically identify and support 9,600 bps ~ 115,200 bps of data communication;

---When there is short circuit between any two contacts, it shall not lead to damage of IC card reader-writer.

6.3.6 Power supply

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