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

GB/T 28181-2022

Replacing GB/T 28181-2016

**Technical requirements for information transmission, switching
and control in video surveillance networking systems for public
security**

公共安全视频监控联网系统信息传输、交换、控制技术要求

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1 Scope

China's national standard for the transmission, switching and control of information in networked public security video surveillance systems. It specifies the peer-to-peer networking structure, the transmission, exchange and control requirements, the security requirements for all three, and the control and transmission processes with their protocol interfaces - together with fifteen normative annexes defining the command sets, the media encapsulation, the coding requirements and the message formats in full. This is the standard that makes Chinese video surveillance interoperable, and it is one of the most consequential technical documents in the country's security infrastructure. A city's

surveillance system is not built by one supplier: cameras, encoders, storage platforms and management software come from dozens of manufacturers and are installed over two decades, and a provincial platform has to see all of them. GB/T 28181 is the interface that allows it, and support for it is a commercial requirement for any device sold into the Chinese security market. The design is built on SIP, the session initiation protocol of internet telephony, with the media carried over RTP - a deliberate choice to reuse an established signalling model rather than inventing one. Around that core the standard defines its own protocols: MANSCDP for control and description, MANSRTSP for real-time streaming, plus the directory, catalogue, alarm, recording, PTZ control and device management messages that a surveillance platform actually needs. The 2022 edition adds the security requirements as a clause of their own and extends the annexes considerably, reflecting a system that now carries video the state relies on and that has to be protected accordingly. Issued on 30 December 2022 and in force since 1 July 2023, it replaces GB/T 28181-2016.

This document specifies the peer-to-peer networking structure of the video surveillance networking system for public security (hereinafter referred to as "surveillance networking system"), the basic requirements and security requirements for transmission, exchange, and control, as well as the technical requirements for control, transmission process, and protocol interface. This document is applicable to the scheme design, system testing, acceptance and related device development and production of the video surveillance networking system for public security. Other video surveillance networking systems can be implemented by using this document as reference.

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/T 4754, Industrial classification for national economic activities

GB/T 10114-2003, Rules for the code representation of administrative divisions under counties

GB 18030, Information technology - Chinese coded character set

GB/T 25724, Technical specifications for surveillance video and audio coding

GB 35114, Technical requirements for information security of video surveillance network system for public security GA/T 380, Coding rules for public security organs ISO/

IEC 13818-1.2019, Information technology - Generic coding of moving pictures and associated audio information - Part

3 Terms and definitions, abbreviations

3.1 Terms and definitions For the purposes of this document, the following terms and definitions apply.

3.1.1 video surveillance networking system for public security An video integrated network system that for the purpose of maintaining national security and social stability, preventing and combating illegal and criminal activities, it comprehensively applies audio-visual, communication, computer network, system integration and other technologies to build functions such as information collection, transmission, exchange, control, display, storage, and processing and be able to realize the interconnection, intercommunication and mutual control between different devices and systems.

3.1.2 front-end device Information collection, encoding/processing, storage, transmission, security control and other devices installed in the networking system at the observation site.

3.1.3 user terminal A client device that is registered and authorized by a networking system and has operational requirements for data and/or devices within the system.

3.1.4 session initiation protocol; SIP Developed by the Internet Engineering Task Force (IETF), it is a framework protocol for multi-party multimedia communication.

3.1.5 session control The process of establishing, modifying or ending a communication between one or more participants.

4.1 Peer-to-peer networking structure of SIP surveillance realm

4.1.1 Overview See Figure 1 for the peer-to-peer networking structure of SIP surveillance realm in terms of information transmission, exchange, and control of the networking system. Figure 1 describes the connection relationship between functional entities in a single SIP surveillance realm and between different SIP surveillance realms.

4.1.3 Cross-regional networking Several relatively independent SIP surveillance realms or non-SIP surveillance realms take the secure signal routing gateway and streaming media server as the core. Through the IP transmission network, information transmission, exchange and control between cross-regional surveillance realms are realized.

4.1.4 Networking methods

4.2.2 Control protocol gateways The control protocol gateway converts network transmission protocols, control protocols, and device addresses between devices in the SIP surveillance realm and non- SIP surveillance realm. Specific functions shall include one or more of the following.

4.2.3 Media gateways The media gateway converts media transmission protocols and media data encoding formats between devices in the SIP surveillance realm and non-SIP surveillance realm. Specific functions shall include one or more of the following.

4.3 Communication protocol structure of networking system

4.3.1 General requirements When the networking system carries out video, audio, data and other information transmission, exchange, and control, the communication protocol specified in

4.3 shall be followed. The structure of the communication protocol is shown in Figure 7.

4.3.2 Session initiation protocol The session control of applications such as security registration, real-time video and audio on demand, and historical video and audio playback is implemented using the request and response methods such as REGISTER and INVITE specified in the SIP protocol IETF RFC 3261. Historical video and audio playback control is implemented using the INFO method stipulated in the SIP extension protocol IETF RFC 2976. The session control of applications such as front-end device control, information query,

5 Transmission requirements

5.1 Requirements for network transmission protocol The network layer of the networking system shall support the IP protocol. The transport layer shall support TCP and UDP protocols.

5.2 Requirements for media transfer protocol Video and audio streams shall support RTP/RTCP protocol when transmitted on IP- based network. The data encapsulation format of video and audio streams shall meet the requirements of 4.3.6.

5.3 Information transmission delay time When networking system information is transmitted via an IP network, the end-to-end information delay time (including the time elapsed during information collection, encoding, network transmission at the sending end, and information decoding and displaying at the receiving end) shall meet the following requirements.

5.4 Network transmission bandwidth The network bandwidth design of the networking system shall be able to meet the bandwidth requirements of front-end device access to the monitoring center, peer-to- peer networking of monitoring center, and user terminal access to the monitoring center. There shall be allowance.

5.5 Network transmission quality The transmission quality (such as transmission delay, packet loss rate, packet error rate, false packet rate, etc.) of the networking system IP network shall meet the following requirements.

5.6 Video frame rate The maximum video frame rate of local recording and network transmission of Class I video surveillance points and Class II video surveillance points shall not be lower than 25 frames/s.

6.1 Uniform encoding rules