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GNSS system for operating vehicles - Video communication protocol

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Contents

Preface.....	i
1 Scope	1
2 Normative references.....	1
3 Terms, definitions and abbreviations	1
3.1 Terms and definitions	1
3.2 Abbreviations	2
4 Basis of protocol between video terminal and video platform	2
4.1 Basic convention of protocol.....	2
4.2 Real-time audio and video transmission channel protocol.....	3
4.3 Classification of audio and video communication messages	3
5 Communication protocol between video terminal and video platform.....	4
5.1 Protocol instruction set	4
5.2 Inheriting instructions	4
5.3 Parameter setting instruction	4
5.4 Video alarm instruction	12
5.5 Real-time audio and video transmission instructions	14
5.6 Historical audio and video query, playback and download instructions	18
5.7 Pan-tilt control instruction	24
5.8 Dormancy wake-up instruction to the terminal	27
6 Bit stream communication between audio and video stream server and client media player	27
6.1 Audio and video stream and transparent transmission data encapsulation format.....	27
6.2 Format of URL instruction for audio and video stream request	27
7 Communication protocol basis between video platforms	28
8 Communication protocol flow between video platforms	29
8.1 Time-limited password reporting and request services	29
8.2 Real-time audio and video services.....	29
8.3 Remote video retrieval services	29
8.4 Remote video download services.....	30
8.5 Remote video playback services	31
9 Definition of constants on communication protocol between video platforms.....	31
9.1 Identification of service data types	31
9.2 Identification of sub-service types	32
9.3 Video-alarm type codes	34
10 Format of data bodies of communication protocol between video platforms	34
10.1 Time-limited password reporting and request services.....	34
10.2 Real-time audio and video services	36
10.3 Remote video retrieval.....	39

10.4 Remote video playback43

10.5 Remote video download47

Appendix A (Nominative) Comparison table of messages between video terminal and
video
platform52

Preface

This standard is developed in accordance with the rules given in GB/T 1.1-2009.

This standard is under the jurisdiction of National Technical Committee on Transportation Information Communication and Navigation of Standardization Administration of China.

GNSS system for operating vehicles

- Video communication protocol

1 Scope

This standard specifies the protocol basis and communication protocol between vehicle video terminal and video platform, the bit stream communication between audio and video stream server and client media player, and the communication protocol basis, communication protocol flow, constant definition and protocol data body format between video platforms in the GNSS system for operating vehicles.

This standard is applicable to the transmission of audio and video data between the vehicle video terminal of GNSS system for operating vehicles and the enterprise video monitoring platform, as well as the exchange and sharing of audio and video resources between different video platforms.

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.

JT/T 808-2011	<i>GNSS system for operational vehicles - General specifications for vehicle terminal communication protocol and data format</i>
JT/T 809-2011	<i>GNSS system for operating vehicles - General specifications for data exchange between platforms</i>
JT/T 1076-2016	<i>GNSS system for operating vehicles - Technical specification for vehicle video terminal</i>
JT/T 415-2006	<i>Electronic government platform for administration of road transportation - Cataloguing and coding rules</i>
IETF RFC 3550	<i>Real-time transport protocol</i>
IETF RFC 2854	<i>The text/html media type</i>

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

3.1.1

bit rate

number of data bits transmitted per unit time during data transmission, which is commonly expressed by kilobits per second (kbps)

3.1.2

frame rate

indicating the number of times that the graphics processing unit can update every second when processing the field, and is used to measure the display frame number, and the measurement unit is Frame per Second (FPS)

3.2 Abbreviations

For the purposes of this document, the following abbreviations apply.

AAC: Advanced Audio Coding

MPEG: Moving Pictures Experts Group

RTP: Real-time Transport Protocol

TCP: Transmission Control Protocol

UDP: User Datagram Protocol

URL: Uniform Resource Locator

UTF-8: 8-bit Unicode Transformation Format

FTP: File Transfer Protocol

4 Basis of protocol between video terminal and video platform

4.1 Basic convention of protocol

The communication mode, data type, transmission rules and message composition of the protocol shall be as specified in JT/T 808-2011, clause 4.

The communication connection mode of signaling data messages in the protocol shall be as specified in JT/T 808-2011, clause 5.

The message processing mechanism of signaling data messages in the protocol shall be as specified in JT/T 808-2011, clause 6.

The encryption mechanism of signaling data messages in the protocol shall be as specified in JT/T 808-2011, clause 7.

All parties with respect to the platform and terminal communication in the protocol shall meet the following requirements:

—Unless otherwise expressly agreed, all messages shall be replied;

—For those no special reply message is specified, general reply shall be adopted;

—For subpacketed messages, the reply party shall reply each subpacketed message packet by packet.

4.2 Real-time audio and video transmission channel protocol

One real-time audio and video transmission channel may transmit one channel of video information or one channel of audio information, and may also transmit one channel of video information and one channel of audio information. There are two kinds of real-time audio and video transmission channel protocols:

—Where TCP is adopted, each TCP connection may carry multiple audio and video channels. If there is no data transmission within the set timeout period, both the terminal and the monitoring center may actively close the TCP connection for audio and video data transmission.

—Where UDP is adopted, each UDP port may carry multiple audio and video channels.

4.3 Classification of audio and video communication messages

Audio and video data messages shall be classified into the following two categories:

—Signaling data message: the data format shall comply with JT/T 808-2011, and new protocol instructions and data formats shall be added on the basis of its protocol format. For the message communication, the link having already been established between the vehicle video terminal and the enterprise video monitoring platform shall be used, and no link shall be newly established.

—Bit stream data message: used for network real-time audio and video transmission, network video playback, voice conversation, voice monitoring, voice broadcast, etc. A link shall be newly established for message communication, instead of using the link for transmitting the locating information.

5 Communication protocol between video terminal and video platform

5.1 Protocol instruction set

See Annex A for comparison table of instruction messages between video terminal and video platform.

5.2 Inheriting instructions

Instructions other than message ID 0x8804 (recording start command) in JT/T 808-2011 shall be inherited. In addition, for the fields of multimedia type in five instructions, namely 0x0800 (multimedia event message upload), 0x0801 (multimedia data upload), 0x8802 (storage multimedia data retrieval), 0x0802 (storage multimedia data retrieval reply) and 0x8803 (storage multimedia data upload), in JT/T 808-2011, only those of picture type are included in this standard, and the data of audio and video types shall be transmitted according to those specified in 5.4 and 5.5.

5.3 Parameter setting instruction

5.3.1 Audio and video parameter setting of terminal

For the audio and video parameter setting message of the terminal, the 0x8103 message defined in JT/T 808-2011, 8.8 shall be adopted, with the following audio and video parameter settings added, as shown in Table 1.

Table 1 Audio and video setting parameters

Parameter ID	Data type	Description and requirement
0x0075		Audio and video parameter settings, see Table 2 for description
0x0076		Audio and video channel list settings, see Table 3 for description
0x0077		Individual video channel parameter settings, see Table 5 for description
0x0079		Particular alarm recording parameter settings, see Table 7 for description

0x007A	DWORD	Video-related alarm mask word, corresponding to the definition of video alarm mark bit in Table 13. Where the corresponding bit is 1, the corresponding type of alarm is masked
0x007B		Image analysis alarm parameter settings, see Table 8 for description
0x007C		Terminal dormancy wake-up mode settings, see Table 9 for description

Table 2 Definition and statement of audio and video parameters

Start byte	Field	Data type	Description and statement
0	Real-time stream coding mode	BYTE	0: CBR (constant bit rate); 1: VBR (variable bit rate); 2: ABR (average bit rate); 100~127: Customized
1	Resolution of real-time streams	BYTE	0: QCIF; 1: CIF; 2: WCIF; 3: D1; 4: WD1; 5: 720P; 6: 1080P; 100~127: Customized
2	Keyframe interval of real-time stream	WORD	Range (1~1,000) frames
4	Target frame rate of real-time stream	BYTE	Range (1~120) frames/s
5	Target bit rate of real-time stream	DWORD	Unit is kilobits per second (kbps)
9	Stored stream coding mode	BYTE	0: CBR (constant bit rate); 1: VBR (variable bit rate); 2: ABR (average bit rate); 100~127: Customized

10	Resolution of stored streams	BYTE	0: QCIF; 1: CIF; 2: WCIF; 3: D1; 4: WD1; 5: 720P; 6: 1080P; 100~127: Customized
11	Keyframe interval of stored stream	WORD	Range (1~1,000) frames
13	Target frame rate of stored stream	BYTE	Range (1~120) frames/s
14	Target bit rate of stored stream	DWORD	Unit is kilobits per second (kbps)
18	OSD subtitle overlay settings	WORD	Set by bit: 0 means no overlay and 1 means overlay; bit0: date and time; bit1: license plate number; bit2: logical channel number; bit3: longitude and latitude; bit4: driving record speed; bit5: satellite positioning speed; bit6: continuous driving time; bit7~bit10: reserved; bit11~bit15: customized
20	Enable audio output or not	BYTE	0: not enable; 1: enable

Table 3 List of audio and video channels

Start byte	Field	Data type	Description and statement
0	Total number of audio and video channels	BYTE	Indicated by 1
1	Total number of audio channels	BYTE	Indicated by m
2	Total number of video channels	BYTE	Indicated by n
3	Audio and video channel	BYTE	See Table 4.

	comparison	[4x(1+m+n)]	
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Table 4 Audio and video channel comparison

Start byte	Field	Data type	Description and statement
0	Physical channel number	BYTE	Start from 1
1	Logical channel number	BYTE	As specified in JT/T 1076-2016, Table 2
2	Channel type	BYTE	0: video and audio; 1: audio; 2: video
3	Connect pan-tilt or not	BYTE	This field is valid where the channel type is 0 or 2; 0: not connect; 1: connect

Table 5 Definition and statement of individual channel video parameters

Start byte	Field	Data type	Description and statement
0	The number of channels for which the video parameters needs to be set individually	BYTE	Indicated by n
1	Individual channel video parameter setting list	BYTE[21xn]	See Table 6

Table 6 Individual channel video parameter settings

Start byte	Field	Data type	Description and statement
0	Logical channel number	BYTE	As specified in JT/T 1076-2016, Table 2

Start byte	Field	Data type	Description and statement
1	Real-time stream coding mode	BYTE	0: CBR (constant bit rate); 1: VBR (variable bit rate); 2: ABR (average bit rate); 100~127: Customized
2	Resolution of real-time streams	BYTE	0: QCIF; 1: CIF; 2: WCIF; 3: D1; 4: WD1; 5: 720P; 6: 1080P; 100~127: Customized
3	Keyframe interval of real-time stream	WORD	Range (1~1,000) frames
5	Target frame rate of real-time stream	BYTE	Range (1~120) frames/s
6	Target bit rate of real-time stream	DWORD	Unit is kilobits per second (kbps)
10	Stored stream coding mode	BYTE	0: CBR (constant bit rate); 1: VBR (variable bit rate); 2: ABR (average bit rate); 100~127: Customized
11	Resolution of stored streams	BYTE	0: QCIF; 1: CIF; 2: WCIF; 3: D1; 4: WD1; 5: 720P; 6: 1080P; 100~127: Customized
12	Keyframe interval of stored stream	WORD	Range (1~1,000) frames
14	Target frame rate of stored stream	BYTE	Range (1~120) frames/s

15	Target bit rate of stored stream	DWORD	Unit is kilobits per second (kbps)
19	OSD overlay settings	WORD	Set by bit: 0 means no overlay and 1 means overlay; bit0: date and time; bit1: license plate number; bit2: logical channel number; bit3: longitude and latitude; bit4: driving record speed; bit5: satellite positioning speed; bit6: continuous driving time; bit7~bit10: reserved; bit11~bit15: customized

Table 7 Definition and statement of particular alarm video parameters

Start byte	Field	Data type	Description and statement
0	Storage threshold of particular alarm recording	BYTE	Threshold percentage of particular alarm recording in main memory, valued from 1 to 99, with default value of 20
1	Duration of particular alarm recording	BYTE	Maximum duration of particular alarm recording, in minutes (min), with the default value of 5
2	Particular alarm identification start time	BYTE	Recording time marked before particular alarm occurs, in minutes (min), with the default value of 1

Table 8 Definition and statement of video analysis alarm parameters

Start byte	Field	Data type	Description and statement
0	Approved passengers capacity of vehicle	BYTE	Approved passengers capacity of passenger vehicles; alarm when it is exceeded by the video analysis result

1	Fatigue threshold	BYTE	Alarm threshold for fatigue driving according to video analysis; alarm when it is exceeded
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Table 9 Data format of terminal dormancy wake-up mode settings

Start byte	Field	Data type	Description and statement
0	Dormancy wake-up mode	BYTE	Set by bit: 0 means it is not set , 1 means it is set; bit0: wake-up conditionally; bit1: wake up by timing; bit2: wake up manually
1	Wake-up condition type	BYTE	otherwise, it is set to 0. Set by bit: 0 means it is not set , 1 means it is set; bit0: emergency alarm; bit1: collision rollover alarm; bit2: vehicle door open
2	Setting of periodic wake-up day	BYTE	Set by bit: 0 means it is not set , 1 means it is set; bit0: Monday; bit1: Tuesday; bit2: Wednesday; bit3: Thursday; bit4: Friday; bit5: Saturday; bit6: Sunday
3	Daily periodic wake-up parameter list	BYTE[17]	See Table 10, each time period shall not overlap

Table 10 Daily wake-up parameter definition

Start byte	Field	Data type	Description and statement
0	Mark for enabling periodic wake-up	BYTE	Set by bit: 0 means it is not set , 1 means it is set; bit0: time period 1 wake-up time is enabled; bit1: time period 2 wake-up time is enabled; bit2: time period 3 wake-up time is enabled; bit3: time period 4 wake-up time is enabled
1	Time period 1 wake-up time	BCD[2]	HHMM, value range is 00:00~23:59
3	Time period 1 close time	BCD[2]	HHMM, value range is 00:00~23:59
5	Time period 2 wake-up time	BCD[2]	HHMM, value range is 00:00~23:59
7	Time period 2 close time	BCD[2]	HHMM, value range is 00:00~23:59
9	Time period 3 wake-up time	BCD[2]	HHMM, value range is 00:00~23:59
11	Time period 3 close time	BCD[2]	HHMM, value range is 00:00~23:59
13	Time period 4 wake-up time	BCD[2]	HHMM, value range is 00:00~23:59
15	Time period 4 close time	BCD[2]	HHMM, value range is 00:00~23:59

5.3.2 Querying terminal audio and video attribute

Message ID: 0x9003.

The message body is empty.

5.3.3 Attribute of audio and video uploaded by terminal

Message ID: 0x1003.

Message type: signaling data message.

Reply the message of querying terminal audio and video attribute issued by the platform with the instruction of attribute of audio and video uploaded by terminal; see Table 11 for the data format of the message body.

Table 11 Data format of attribute of audio and video uploaded by terminal

Start byte	Field	Data type	Description and statement
0	Input audio coding mode	BYTE	See Table 12
1	Number of input audio sound channels	BYTE	
2	Input audio sampling rate	BYTE	0: 8kHz; 1: 22.05kHz; 2: 44.1kHz; 3: 48kHz
3	Input audio sampling bits	BYTE	0: 8 bits; 1: 16 bits; 2: 32 bits;
4	Audio frame length	WORD	Range of 1~4,294,967,295
6	Support audio output or not	BYTE	0: not support; 1: support
7	Video coding mode	BYTE	See Table 19

8	Maximum number of audio physical channels supported by terminal	BYTE	
9	Maximum number of video physical channels supported by terminal	BYTE	

Table 12 Definition of audio and video coding types

S.N.	Item	Remarks
0	Reserved	
1	G.721	Audio
2	G.722	Audio
3	G.723	Audio
4	G.728	Audio
5	G.729	Audio
6	G.711A	Audio
7	G.711U	Audio
8	G.726	Audio
9	G.729A	Audio
10	DVI4_3	Audio
11	DVI4_4	Audio
12	DVI4_8K	Audio
13	DVI4_16K	Audio
14	LPC	Audio
15	S16BE_STEREO	Audio
16	S16BE_MONO	Audio
17	MPEGAUDIO	Audio
18	LPCM	Audio
19	AAC	Audio
20	WMA9STD	Audio

21	HEAAC	Audio
22	PCM_VOICE	Audio
23	PCM_AUDIO	Audio
24	AACLC	Audio
25	MP3	Audio
26	ADPCMA	Audio
27	MP4AUDIO	Audio
28	AMR	Audio
29~90	Reserved	
91	Transparent transmission	System
92~97	Reserved	Video
98	H.264	Video
99	H.265	Video
100	AVS	Video
101	SVAC	Video
102~110		Reserved
111~127		Customized

5.4 Video alarm instruction

5.4.1 Video alarm report

For the video alarm report, the mode of reporting it together with the location information is adopted, and it is treated as the additional information of 0x0200 location information report. Table 20 “Additional information definition table” in JT/T 808-2011 is extended; see Table 13 for the extended definition of additional information.

Table 13 Extension to additional information definition table

Additional information ID	Length of additional information	Description and requirement
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0x14	4	Video-related alarm, DWORD, set by bit, see Table 14 for the definition of mark bit
0x15	4	Video signal loss alarm status, DWORD, set by bit; bit0~bit31 respectively represents the 1st~32nd logical channel, and corresponding bit being 1 indicates that video signal loss occurs in this logical channel
0x16	4	Video signal blockage alarm status, DWORD, set by bit; bit0~bit31 respectively represents the 1st~32nd logical channel, and the corresponding bit being 1 indicates that video signal blockage occurs in this logical channel
0x17	2	Memory fault alarm status, WORD, set by bit; bit0~bit11 respectively represents the 1st~12th main memory, bit12~bit15 respectively represents the 1st~4th disaster recovery storage device, and the corresponding bit being 1 indicates that the memory has failed
0x18	2	Detailed description of aberrant driving behavior alarm, WORD, see Table 15 for the definition

Table 14 Definition of video alarm mark bit

Bit	Definition	Processing statement
0	Video signal loss alarm	The mark is maintained until the alarm condition is released
1	Video signal blockage alarm	The mark is maintained until the alarm condition is released
2	Memory cell fault alarm	The mark is maintained until the alarm condition is released
3	Other video equipment fault alarm	The mark is maintained until the alarm condition is released
4	Passenger vehicle seating capacity-exceeding alarm	The mark is maintained until the alarm condition is released
5	Aberrant driving behavior alarm	The mark is maintained until the alarm condition is released
6	Alarm for particular alarm recording reaching storage threshold	Cleared after receiving the reply
7~31	Reserved	

Table 15 Definition of mark bit of aberrant driving behavior

Start byte	Field	Data type	Description and statement
0	Types of aberrant driving behavior	WORD	Set by bit: 0 means no, 1 means yes; bit0: fatigue; bit1: calling; bit2: smoking; bit3~bit10: reserved; bit11~bit15: customized
2	Fatigue degree	BYTE	The fatigue degree is expressed as 0~100, and the greater the value, the more serious the fatigue degree is

5.4.2 Passenger flow uploaded by terminal

Message ID: 0x1005.

Message type: signaling data message.

Terminal equipment counts passengers getting on and off the vehicle through video analysis, and sends the counting results to the platform. See Table 16 for the data format of the message body.

Table 16 Data format of passenger flow uploaded by terminal

Start byte	Field	Data type	Description and statement
0	Start time	BCD[6]	YY-MM-DD-HH-MM-SS (GMT+8 time, this time zone is adopted for all the time involved in this standard)
6	End time	BCD[6]	YY-MM-DD-HH-MM-SS
12	Number of people getting on	WORD	Number of people getting on from start time to end time

14	Number of people getting off	WORD	Number of people getting off from start time to end time
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5.5 Real-time audio and video transmission instructions

5.5.1 Real-time audio and video transmission request

Message ID: 0x9101.

Message type: signaling data message.

The platform requests real-time audio and video transmission from the terminal equipment, including real-time video transmission, active initiation of two-way voice intercom, one-way monitoring, voice broadcast and specific transparent transmission to all terminals, etc. See Table 17 for the data format of the message body. After receiving this message, the terminal replies with the video terminal general reply, then establishes a transmission link through the corresponding server IP address and port number, and then transmits the corresponding audio and video stream data according to the audio and video stream transmission protocol.

Table 17 Data format of real-time audio and video transmission request

Start byte	Field	Data type	Description and statement
0	Server IP address length	BYTE	Length n
1	Server IP address	STRING	Real-time video server IP address
$1+n$	Server video channel listening port number (TCP)	WORD	TCP port number of real-time video server
$3+n$	Server video channel listening port number (UDP)	WORD	UDP port number of real-time video server
$5+n$	Logical channel number	BYTE	As specified in JT/T 1076-2016, Table 2

6+n	Data type	BYTE	0: audio and video; 1: video; 2: two-way intercom; 3: listening; 4: central broadcast; 5: transparent transmission
7+n	Bit stream type	BYTE	0: main bit stream; 1: subbit stream

After receiving the particular alarm from the video terminal, the platform shall actively issue this instruction without waiting for artificial acknowledgment to start the real-time audio and video transmission.

5.5.2 Audio and video real-time transmission control

Message ID: 0x9102.

Message type: signaling data message.

The platform sends audio and video real-time transmission control instructions for switching bit streams, suspending bit stream transmission, closing audio and video transmission channels, etc. See Table 18 for message data formats.

Table 18 Audio and video real-time transmission control data format

Start byte	Field	Data type	Description and statement
0	Logical channel number	BYTE	As specified in JT/T 1076-2016, Table 2
1	Control instruction	BYTE	The platform may control the real-time audio and video of the equipment through this instruction:

Start byte	Field	Data type	Description and statement
			<p>0: close audio and video transmission instruction;</p> <p>1: switch the bit stream (adding suspend and continue);</p> <p>2: suspend the delivery of all streams in this channel;</p> <p>3: resume the stream delivery before suspension, with the stream type consistent with that before suspension;</p> <p>4: close the two-way intercom</p>
2	Close audio and video types	BYTE	<p>0: close the audio and video data related to this channel;</p> <p>1: only close the audio related to this channel and reserve the video related to this channel;</p> <p>2: only close the video related to this channel and reserve the audio related to this channel</p>
3	Type of bit stream switched	BYTE	<p>Switch the previously applied bit stream to the newly applied bit stream, and the audio is kept consistent with that before switching.</p> <p>The newly applied bit streams are:</p> <p>0: main bit stream;</p> <p>1: subbit stream</p>

5.5.3 Real-time audio and video stream and transparent transmission data transmission

Message type: bit stream data message.

For real-time audio and video stream data, reference shall be made to RTP protocol for its transmission, and it shall be carried by UDP or TCP. For the payload packet format, on the basis of RTP definition in IETF RFC 3550, fields such as message serial number, SIM card number and audio and video channel number are supplemented. See Table 19 for the definition of the payload packet format. The bits of the definitions in the table shall be filled in according to the big-endian mode.

Table 19 Definition of payload packet format of audio and video stream and transparent transmission data transmission protocol

Start byte	Field	Data type	Description and statement
0	Frame header identification	DWORD	Fixed as 0x30 0x31 0x63 0x64
4	V	2 BITS	Fixed as 2
	P	1 BIT	Fixed as 0
	X	1 BIT	Whether RTP header needs extension bit; fixed as 0
	CC	4 BITS	Fixed as 1
5	M	1 BIT	Mark bit, to determine if it is the boundary of a complete data frame
	PT	7 BITS	See Table 19 for payload types
6	Packet serial number	WORD	The initial value is 0, which is increased by 1 for every RTP data packet delivered
8	SIM card No.	BCD[6]	Terminal equipment SIM card number
14	Logical channel number	BYTE	As specified in JT/T 1076-2016, Table 2
15	Data type	4 BITS	0000: video I frame; 0001: video P frame; 0010: video B frame; 0011 Audio frame; 0100: transparent transmission data

	Subpacket processing mark	4 BITS	<p>0000: original subpacket, which cannot be split;</p> <p>0001: the first packet for subpacket processing;</p> <p>0010: the last packet for subpacket processing;</p> <p>0011: mid-packet for subpacket processing</p>
16	Timestamp	BYTE[8]	<p>Identifies the relative time of the current frame of this RTP data packet, in millisecond (ms).</p> <p>Where the data type is 0100, there is no such field</p>
24	Last I Frame Interval	WORD	<p>The time interval between this frame and the previous keyframe, in millisecond (ms); there is no such field if the data type is non-video frame</p>
26	Last Frame Interval	WORD	<p>The time interval between this frame and the previous frame, in millisecond (ms); there is no such field if the data type is non-video frame</p>
28	Data body length	WORD	<p>Length of subsequent data body, excluding this field</p>
30	Data body	BYTE[n]	<p>Audio and video data or transparent transmission data, with the length not exceeding 950 byte</p>

5.5.4 Real-time audio and video transmission status notification

Message ID: 0x9105.

Message type: signaling data message.

In the process of receiving audio and video data uploaded by the terminal, the platform sends notification packets to the terminal according to the set time interval. See Table 20 for the data format of the message body.

Table 20 Data format of real-time audio and video transmission status notification

Start byte	Field	Data type	Description and statement
0	Logical channel number	BYTE	As specified in JT/T 1076-2016, Table 2
1	Packet loss rate	BYTE	The packet loss rate of the current transmission channel, the integer part is taken after the value is multiplied by 100

5.6 Historical audio and video query, playback and download instructions

5.6.1 Resource list query

Message ID: 0x9205.

Message type: signaling data message.

The platform queries the video file list from the terminal according to the combined conditions of audio and video type, channel number, alarm type and start-end time. See Table 21 for the data format of the message body.

Table 21 Video file list query data format

Start byte	Field	Data type	Description and statement
0	Logical channel number	BYTE	As specified in JT/T 1076-2016, Table 2; 0 indicates all channels
1	Start time	BCD[6]	YY-MM-DD-HH-MM-SS; all being 0 indicates there is no the condition of start time
7	End time	BCD[6]	YY-MM-DD-HH-MM-SS; all being 0 indicates there is no the condition of end time
13	Alarm mark	64 BITS	See Table 18 "Definition of alarm mark bit" in JT/T 808-2011 for bit0~bit31; See Table 13 for bit32~bit63; All bits being 0 indicates there is no condition of alarm type
21	Audio and video resource types	BYTE	0: audio and video; 1: audio; 2: video; 3: video or audio/video
22	Bit stream type	BYTE	0: all bit stream; 1: main bit stream; 2: subbit stream
23	Memory type	BYTE	0: all memories; 1: main memory; 2: disaster recovery memory

5.6.2 List of audio and video resource uploaded by terminal

Message ID: 0x1205.

Message type: signaling data message.

The terminal responds to the platform's instruction of audio and video resource list query by replying with the message of audio and video resource list uploaded by terminal. If the list is too large and needs to be subpacketed for transmission, it shall be processed by the subpacket mechanism defined in JT/T 808-2011, 4.4.3, and the platform shall reply each individual subpacket with video platform general reply. See Table 22 for the data format of the message body.

Table 22 Data format of list of audio and video resource uploaded by terminal

Start Byte	Field	Data type	Description and statement
0	Serial number	WORD	Serial number corresponding to the instruction of querying audio and video resource list
2	Total audio and video resources	DWORD	It is set to 0 if there is no audio and video resource meeting the conditions
6	Audio and video resource list		See Table 23

Table 23 Format of list of audio and video resource uploaded by terminal

Start Byte	Field	Data type	Description and statement
0	Logical channel number	BYTE	As specified in JT/T 1076-2016, Table 2
1	Start time	BCD[6]	YY-MM-DD-HH-MM-SS
7	End time	BCD[6]	YY-MM-DD-HH-MM-SS
13	Alarm mark	64 BITS	See Table 18 "Definition of alarm mark bit" in JT/T 808-2011 for bit0~bit31; See Table 13 for bit32~bit63;
21	Audio and video resource types	BYTE	0: audio and video; 1: audio; 2: video
22	Bit stream type	BYTE	1: main bit stream; 2: subbit stream
23	Memory type	BYTE	1: main memory; 2: disaster recovery memory
24	File size	DWORD	In BYTE

5.6.3 Platform issuing remote video playback request

Message ID: 00201.

Message type: signaling data message.

If the platform requests audio and video recording playback from the terminal equipment, the terminal shall reply with 0x1205 (list of video files uploaded by terminal) instruction, and then transmit the video data in the packet format defined in Table 18 “Payload packet format for real-time audio and video stream data transmission RTP protocol”. See Table 24 for the data format of the message body.

Table 24 Data format for platform issuing remote video playback request

Start byte	Field	Data type	Description and statement
0	Server IP address length	BYTE	Length n
1	Server IP address	STRING	Real-time audio and video server IP address
1+ n	Server audio and video channel listening port number (TCP)	WORD	Real-time audio and video server port number, which is set to 0 if TCP is not used for transmission
3+ n	Server audio and video channel listening port number (UDP)	WORD	real-time audio and video server port number, which is set to 0 if UDP is not used for transmission
5+ n	Logical channel number	BYTE	As specified in JT/T 1076-2016, Table 2
6+ n	Audio and video types	BYTE	0: audio and video; 1: audio; 2: video; 3: video or audio/video
7+ n	Bit stream type	BYTE	0: main bit stream or subbit stream; 1: main bit stream; 2: subbit stream; if this channel only transmits audio, this field is set to 0
8+ n	Memory type	BYTE	0: main memory or disaster recovery memory; 1: main memory; 2: disaster recovery memory

9+n	Playback mode	BYTE	0: normal playback; 1: fast forward playback; 2: fast backward playback by keyframe; 3: keyframe play; 4: single frame upload
10+n	Fast forward or fast backward time	BYTE	If the playback mode is 1 and 2, the content of this field is valid; otherwise, it is set to 0. 0: invalid; 1: 1 time; 2: 2 times;
10+n	Fast forward or fast backward time	BYTE	3: 4 times; 4: 8 times; 5: 16 times;
11+n	Start time	BCD[6]	YY-MM-DD-HH-MM-SS; if the playback mode is 4, this field indicates the single frame upload time
17+n	End time	BCD[6]	YY-MM-DD-HH-MM-SS; it being 0 means playing back all the time; if the playback mode is 4, this field is invalid

5.6.4 Platform issuing remote video playback control

Message ID: 0x9202.

Message type: signaling data message.

When the terminal equipment plays back the audio and video recordings, the platform may issue playback control instructions to control the playback process. See Table 25 for the data format of the message body.

Table 25 Data format for platform issuing remote video playback control

Start byte	Field	Data type	Description and statement
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0	Audio and video channel number	BYTE	As specified in JT/T 1076-2016, Table 2
1	Playback control	BYTE	0: playback start; 1: playback pause; 2: playback stop; 3: fast forward playback; 4: fast backward playback by keyframe; 5: drag playback; 6: keyframe play
2	Fast forward or fast backward time	BYTE	If the playback control is 3 and 4, the content of this field is valid, otherwise, it is set to 0. 0: invalid; 1: 1 time; 2: 2 times; 3: 4 times; 4: 8 times; 5: 16 times;
3	Drag playback position	BCD[6]	YY-MM-DD-HH-MM-SS; this field is valid if playback control is 5

5.6.5 File upload instruction

Message ID: 0x9206.

Message type: signaling data message.

The platform issues a file upload command to the terminal, and the terminal, after replying with general reply, uploads the file to the specified path of the target FTP server by FTP. See Table 26 for the data format of the message body.

Table 26 Data format of file upload instruction

Start byte	Field	Data type	Description and statement
0	Server address length	BYTE	Length <i>k</i>
1	Server address	STRING	FTP server address

1+k	Port	WORD	FTP server port number
3+k	User name length	BYTE	Length <i>l</i>
4+k	User name	STRING	FTP user name
4+k+l	Password length	BYTE	Length <i>m</i>
5+k+l	Password	STRING	FTP password
5+k+l+m	File upload path length	BYTE	Length <i>n</i>
6+k+l+m	File upload path	STRING	File upload path
6+k+l+m+n	Logical channel number	BYTE	See JT/T 1076-2016, Table 2
7+k+l+m+n	Start time	BCD[6]	YY-MM-DD-HH-MM-SS
13+k+l+m+n	End time	BCD[6]	YY-MM-DD-HH-MM-SS
19+k+l+m+n	Alarm mark	64 BITS	See Table 18 "Definition of alarm mark bit" in JT/T 808-2011 for bit0~bit31; See Table 12 for bit32~bit63; All bits being 0 indicates that no alarm is specified.
27+k+l+m+n	Audio and video resource types	BYTE	0: audio and video; 1: audio; 2: video; 3: video or audio/video
28+k+l+m+n	Bit stream type	BYTE	0: main bit stream or subbit stream; 1: main bit stream; 2: subbit stream
29+k+l+m+n	Storage location	BYTE	0: main memory or disaster recovery memory; 1: main memory; 2: disaster recovery memory
30+k+l+m+n	Task execution conditions	BYTE	Indicated by bit: bit0: WIFI; if it is 1, it means download may be conducted under WI-FI; bit1: LAN; if it is 1, it means download may be conducted under LAN connection; bit2: 3G/4G; if it is 1, it means download may be conducted under 3G/4G connection;

5.6.6 File upload completion notification

Message ID: 0x1206.

Message type: signaling data message.

When all files are uploaded via FTP, the terminal reports this instruction to inform the platform. See Table 27 for the data format of the message body.

Table 27 Data format of file upload completion notification

Start byte	Field	Data type	Description and statement
0	Reply serial number	WORD	Serial number corresponding to platform file upload information
2	Results	BYTE	0: successful; 1: failed

5.6.7 File upload control

Message ID: 0x9207.

Message type: signaling data message.

The platform informs the terminal to suspend, continue or cancel all files being transmitted. See Table 28 for the data format of the message body.

Table 28 Data format of file upload control

Start byte	Field	Data type	Description and statement
0	Reply serial number	WORD	Serial number corresponding to platform file upload information
2	Upload control	BYTE	0: suspend; 1: continue; 2 cancel

5.7 Pan-tilt control instruction

5.7.1 Pan-tilt rotation

Message ID: 0x9301.

Message type: signaling data message.

The platform requests the terminal to rotate the lens. See Table 29 for the data format of the message body.

Table 29 Data format of pan-tilt rotation

Start byte	Field	Data type	Description and statement
0	Logical channel number	BYTE	As specified in JT/T 1076-2016, Table 2
1	Direction	BYTE	0: stop; 1: up; 2: down; 3: left; 4: right
2	Speed	BYTE	0~255

5.7.2 Control over focal length adjustment through pan-tilt

Message ID: 0x9302.

Message type: signaling data message.

The platform requests the terminal to adjust the focal length of the lens. See Table 30 for the data format of the message body.

Table 30 Data format for control over lens focal length adjustment through pan-tilt

Start byte	Field	Data type	Description and statement
0	Logical channel number	BYTE	As specified in JT/T 1076-2016, Table 2
1	Focus length adjustment direction	BYTE	0: focal length enlarged; 1: focal length reduced

5.7.3 Control over aperture adjustment through pan-tilt

Message ID: 0x9303.

Message type: signaling data message.

The platform requests the terminal to adjust the lens aperture. See Table 31 for the data format of the message body.

Table 31 Data format for control over lens aperture adjustment through pan-tilt

Start byte	Field	Data type	Description and statement
0	Logical channel number	BYTE	As specified in JT/T 1076-2016, Table 2
1	Aperture adjustment mode	BYTE	0: enlarge; 1: reduce

5.7.4 Windshield wiper control through pan-tilt

Message ID: 0x9304.

Message type: signaling data message.

Platform requests windshield wiper from terminal. See Table 32 for the data format of the message body.

Table 32 Data format for control over windshield wiper through pan-tilt

Start byte	Field	Data type	Description and statement
0	Logical channel number	BYTE	As specified in JT/T 1076-2016, Table 2
1	Start-stop identification	BYTE	0: stop; 1: tart

5.7.5 Infrared light supplement control

Message ID: 0x9305.

Message type: signaling data message.

The platform requests infrared light supplement control from the terminal. See Table 33 for the data format of the message body.

Table 33 Data format for infrared light supplement control

Start byte	Field	Data type	Description and statement
0	Logical channel number	BYTE	As specified in JT/T 1076-2016, Table 2
1	Start-stop identification	BYTE	0: stop; 1: tart

5.7.6 Pan-tilt zoom control

Message ID: 0x9306.

Message type: signaling data message.

The platform requests zoom control from the terminal. See Table 34 for the data format of the message body.

Table 34 Data format for pan-tilt zoom control

Start byte	Field	Data type	Description and statement
0	Logical channel number	BYTE	As specified in JT/T 1076-2016, Table 2
1	Zoom control	BYTE	0: enlarge; 1: reduce

5.8 Dormancy wake-up instruction to the terminal

The platform awakens the terminal in dormancy status to start working by sending a wake-up short message whose content is "WAKEUPXX", in which XX represents the wake-up time, in minutes (min), with the value range of 0~65,536. If the value is 0, it means that the terminal is always in a wake-up status until its ACC is ON or the voltage is lower than the rated one.

6 Bit stream communication between audio and video stream server and client media player

6.1 Audio and video stream and transparent transmission data encapsulation format

See Table 18 for the definition of encapsulation format of audio and video stream and transparent transmission data between video platform and client media player.

6.2 Format of URL instruction for audio and video stream request

The government video supervision platform, after sending a real-time preview or remote playback request instruction to the enterprise video monitoring platform and getting a reply, obtains the IP address and port number of the audio and video stream server, and the government video supervision platform client directly sends a URL instruction to the enterprise audio and video stream server and, after establishing a link, obtains audio and video stream data, and the client plays through browser plug-in or special software.

The audio and video stream request URL shall not be displayed in the interface, and the instruction format is specifically defined as follows:

Http://[server IP address]: [port number]/[license plate number]. [license plate color]. [logical channel number]. [audio and video mark]. [time-limited password]

See Table 35 for the definition of each data item of audio and video stream request URL instruction.

Table 35 Definition of data item of audio and video stream request URL instruction

Field		Description and requirement
Address attribute information	Server IP address	Audio and video stream server IP address
	Port number	Audio and video stream service port number
	License plate number	UTF-8 coding shall be adopted, and uniformly converted into application/x-www-form-urlencoded MIME format in IETF RFC 2854
	License plate color	As specified in JT/T 415-2006, 5.4.12.
	Logical channel number	As specified in JT/T 1076-2016, Table 2; 0 indicates all channels
	Audio and video mark	0: video and audio; 1: audio; 2: video
	Time-limited password	The time-limited password generated by the enterprise platform server and belonging to the district government platform client is different from that of the cross-district government platform. The time-limited password shall only be composed of English letters (including uppercase and lowercase) and Arabic numerals, with a length of 64 ASCII characters, which shall be updated once every 24h

Additional information	Location identification	<p>Satellite positioning time and latitude and longitude of the vehicle at any time within 5min are used for verification when accessed by the cross-district government platform, and may be blank when accessed by the platform client of the district government located in the same district as the vehicle. It is represented by ASCII characters in the following format:</p> <p>YYYYMMDD-HHMMSS-NXX.XXXXXX - EXXX.XXXXXX</p>
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7 Communication protocol basis between video platforms

The communication mode, data type, security authentication mode and protocol message format between different video platforms shall comply with JT/T 809-2011, clause 4.

For the data transmission between different video platforms, authentication is unnecessary, and the link with connection having already been established between positioning platforms shall be adopted for the transmission channel, with no link newly added.

8 Communication protocol flow between video platforms

8.1 Time-limited password reporting and request services

The time-limited password is automatically generated by the enterprise video monitoring platform daily and actively uploaded to the local government video supervision platform which, after receiving the time-limited password of the current day, actively uploads it to the superior government video supervision platform. When the cross-district government video supervision platform needs to access the cross-district vehicle audio and video information, it shall request the cross-district time-limited password of the current day from the superior government video supervision platform which, after receiving the request, gives corresponding reply according to the geographic location of the vehicle at that time.

8.2 Real-time audio and video services

8.2.1 Audio and video data upload in real time from enterprise video monitoring platform to government video supervision platform

The government video supervision platform sends a real-time audio and video upload request to the enterprise video monitoring platform which, after receiving the request, shall reply to the government video supervision platform. If the reply result is "success", the government video supervision platform requests real-time audio and video data from the IP and port of the video server designated by the enterprise video monitoring platform.

8.2.2 Enterprise video monitoring platform stopping uploading audio and video data in real time to government video supervision platform

The government video supervision platform sends a request to stop uploading real-time audio and video to the enterprise video monitoring platform which, after receiving the request, shall reply to the government video supervision platform. If the reply result is "success", the enterprise video monitoring platform stops sending real-time audio and video data to the government video supervision platform.

8.3 Remote video retrieval services

8.3.1 Government video supervision platform obtaining audio and video resource directory from enterprise video monitoring platform

The government video supervision platform sends a request to obtain the audio and video resource directory to the enterprise video monitoring platform which, after receiving the request, shall immediately retrieve the latest audio and video resource directory from the terminal, update the local catalog, and then reply to the government video supervision platform. If the reply result is "success", the enterprise video monitoring platform shall send audio and video resource directory data to the government video supervision platform.

8.3.2 Enterprise video monitoring platform actively uploading audio and video resource directory to government video supervision platform

After receiving the particular alarm information uploaded by the terminal and awaiting the complete record of such video information, the enterprise video monitoring platform shall retrieve the latest audio and video resource directory with particular alarm identification from the terminal, update the local catalog and actively upload the audio and video resource directory to the government video supervision platform.

8.4 Remote video download services

8.4.1 Government video supervision platform downloading video data from enterprise video monitoring platform

The government video supervision platform sends a request for obtaining video data to the enterprise video monitoring platform which, after receiving the request, shall reply to the former. If the reply result is "success", the government video supervision platform may request the video data from the IP and port of FTP server designated by the enterprise video monitoring platform.

8.4.2 Enterprise video monitoring platform sending download completion notification to government video supervision platform

The enterprise video monitoring platform sends a download completion notification to the government video supervision platform which, after receiving the notification, shall indicate that the video data has been downloaded from the terminal and may request the video data from the IP and port of the FTP video server designated by the enterprise video monitoring platform.

8.4.3 Government video supervision platform sending download control instructions to enterprise video monitoring platform

The government video supervision platform sends download control instructions to the enterprise video monitoring platform which, after receiving the instructions, shall respond by corresponding control actions in a timely manner and reply to the government video supervision platform.

8.5 Remote video playback services

8.5.1 Government video supervision platform requesting video playback from enterprise video monitoring platform

The government video supervision platform sends a video playback request to the enterprise video monitoring platform which, after receiving the request, shall reply to the former. If the reply result is "success", the government video supervision platform

requests the historical audio and video stream data from the IP and port of the audio and video stream server designated by the enterprise video monitoring platform.

8.5.2 Government video supervision platform stopping requesting video playback from enterprise video monitoring platform

The government video supervision platform sends a request to stop playing back videos to the enterprise video monitoring platform which, after receiving the request, shall reply to the government video supervision platform and stop sending historical audio and video stream data to the government video supervision platform.

9 Definition of constants on communication protocol between video platforms

9.1 Identification of service data types

See Table 36 for the names and identifications of service data types specified in the audio and video data exchange protocol.

Table 36 Comparison of names and identifications of service data types

Message category	Name of service data types	Message link	Identification of service data types	Value
Time-limited password service	Time-limited password interactive message at main links	Main links	UP_AUTHORIZE_MSG	0x1700
	Time-limited password interactive message at subordinate links	Subordinate links	DOWN_AUTHORIZE_MSG	0x9700
Real-time audio and video service	Real-time audio and video interactive message at main links	Main links	UP_REALVIDEO_MSG	0x1800
	Real-time audio and video interactive message at subordinate links	Subordinate links	DOWN_REALVIDEO_MSG	0x9800

Remote video retrieval	Remote video retrieval interactive message at main links	Main links	UP_SEARCH_MSG	0x1900
	Remote video retrieval interactive message at subordinate links	Subordinate links	DOWN_SEARCH_MSG	0x9900
Remote video playback	Remote video playback interactive message at main links	Main links	UP_PLAYBACK_MSG	0x1A00
	Remote video playback interactive message at subordinate links	Subordinate links	DOWN_PLAYBACK_MSG	0x9A00
Remote video download	Remote video download interactive message at main links	Main links	UP_DOWNLOAD_MSG	0x1B00
	Remote video download interactive message at subordinate links	Subordinate links	DOWN_DOWNLOAD_MSG	0x9B00
	Remote video download interactive message at subordinate links	Subordinate links	DOWN_DOWNLOAD_MSG	0x9B00

9.2 Identification of sub-service types

See Table 37 for the names and identifications of sub-service types specified in the data exchange protocol.

Table 37 Comparison of names and identifications of sub-service types

Service data type	Name of sub-service types	Identification of sub-service data types	Value
Message belonging to time-limited password	Time-limited password reporting message	UP_AUTHORIZE_MSG_STARTUP	0x1701

services (UP_AUTHORIZE_MSG)	Time-limited password request message	UP_AUTHORIZE_MSG_STARTUP_REQ	0x1702
Message belonging to time-limited password services at subordinate links (DOWN_BASE_DATA_MSG)	Reply message to time-limited password request	DOWN_AUTHORIZE_MSG_STARTUP_REQ_ACK	0x9702
Real-time audio and video interactive messages at main links (UP_REALVIDEO_MSG)	Reply message to real-time audio and video request	UP_REALVIDEO_MSG_STARTUP_ACK	0x1801
	Reply message to message of actively requesting to stop the real-time audio and video	UP_REALVIDEO_MSG_END_ACK	0x1802

Service data type	Name of sub-service types	Identification of sub-service data types	Value
	transmission		
Real-time audio and video interactive messages at subordinate links (DOWN_REALVIDEO_MSG)	Real-time audio and video request message	DOWN_REALVIDEO_MSG_STARTUP	0x9801
	Message of actively requesting to stop the real-time audio and video transmission	DOWN_REALVIDEO_MSG_END	0x9802
Remote video retrieval interactive message at main links (UP_SEARCH_MSG)	Message of actively uploading audio and video resource directory	UP_FILELIST_MSG	0x1901
	Reply message to message of querying audio and video resource directory	UP_REALVIDEO_FILELIST_REQ_ACK	0x1902
Remote video retrieval interactive message at	Reply message to message of actively uploading audio and video resource directory	DOWN_FILELIST_MSG_ACK	0x9901

subordinate links (DOWN_SEARCH_MSG)	Request message of querying audio and video resource directory	DOWN_REALVIDEO_FILELIST_REQ	0x9902
Remote video playback interactive messages at main links (UP_PLAYBACK_MSG)	Reply message to remote video playback request	UP_PLAYBACK_MSG_STARTUP_ACK	0x1A01
	Reply message to remote video playback control	UP_PLAYBACK_MSG_CONTROL_ACK	0x1A02
Remote video playback interactive message at subordinate links (DOWN_PLAYBACK_MSG)	Remote video playback request message	DOWN_PLAYBACK_MSG_STARTUP	0x9A01
	Remote video playback control message	DOWN_PLAYBACK_MSG_CONTROL	0x9A02
Remote video download interactive message at main links (UP_DOWNLOAD_MSG)	Reply message to remote video download request	UP_DOWNLOAD_MSG_STARTUP_ACK	0x1B01
	Remote video download completion notification message	UP_DOWNLOAD_MSG_END_INFORMATION	0x1B02
	Reply message to remote video download control	UP_DOWNLOAD_MSG_CONTROL_ACK	0x1B03
Remote video download interactive message at subordinate links (DOWN_DOWNLOAD_MSG)	Remote video download request message	DOWN_DOWNLOAD_MSG_STARTUP	0x9B01
	Reply message to remote video download completion notification	UP_DOWNLOAD_MSG_END_INFORMATION_ACK	0x9B02
	Remote video download control message	DOWN_DOWNLOAD_MSG_CONTROL	0x9B03

9.3 Video-alarm type codes

See Table 38 for video-alarm type codes reported through the platform.

Table 38 Video-alarm type codes of vehicles

Code	Name	Description and requirement
0x0101	Video signal loss alarm	-
0x0102	Video signal blockage alarm	-
0x0103	Memory cell fault alarm	-
0x0104	Other video equipment fault alarm	-
0x0105	Passenger vehicle seating capacity-exceeding alarm	-
0x0106	Aberrant driving behavior alarm	-
0x0107	Alarm for particular alarm recording reaching storage threshold	-

10 Format of data bodies of communication protocol between video platforms

10.1 Time-limited password reporting and request services

10.1.1 Time-limited password reporting message

Link type: main link

Message direction: from the inferior platform to the superior platform

Identification of sub-service type: UP_AUTHORIZE_MSG_STARTUP.

Description: The enterprise video monitoring platform actively reports the time-limited password to the government video supervision platform or the inferior government video supervision platform reports it to the superior government video supervision platform. See Table 39 for the data body. This instruction is not required to be replied.

Table 39 Data body of time-limited password reporting message

Field name	Number of bytes	Data type	Description and requirement
DATA_TYPE	2	uint16_t	Identification of sub-service data types
PLATEFORM_ID	11	BYTES	The unique code of the enterprise video monitoring platform, the administrative code of the enterprise to which the platform belongs + the platform announcement number
AUTHORIZE_CODE_1	64	BYTES	Time-limited password used by the local government platform
AUTHORIZE_CODE_2	64	BYTES	Time-limited password used by cross-district government platform

10.1.2 Time-limited password request message

Link type: main link

Message direction: from the cross-district government video supervision platform to the superior government video supervision platform

Identification of sub-service type: UP_AUTHORIZE_MSG_STARTUP_REQ.

Description: The cross-district government video supervision platform obtains the time-limited password of the enterprise video monitoring platform where the designated vehicle is located from the superior government video supervision platform. See Table 40 for the data body.

Table 40 Data body of time-limited password request message

Field name	Number of bytes	Data type	Description and requirement
VEHICLE_NO	21	Octet String	License plate number
VEHICLE_COLOR	1	BYTE	License plate color, as specified in JT/T 415-2006, 5.4.12

DATA_TYPE	2	uint16_t	Identification of sub-service types
DATA_LENGTH	4	uint32_t	Subsequent data length, with a value of 0x00000000

10.1.3 Reply message to time-limited password request

Link type: subordinate link

Message direction: from the superior government video supervision platform to the cross-district government video supervision platform

Identification of sub-service data type: DOWN_AUTHORIZE_MSG_STARTUP_REQ_ACK.

Description: The superior government video supervision platform replies to the time-limited password request message sent by the cross-district government video supervision platform, and it determines the content of the reply according to the geographic location of the requesting vehicle within 5min. See Table 41 for the data body.

Table 41 Data body of reply message to time-limited password request

Field name	Number of bytes	Data type	Description and requirement
VEHICLE_NO	21	Octet String	License plate number
VEHICLE_COLOR	1	BYTE	License plate color, as specified in JT/T 415-2006, 5.4.12
DATA_TYPE	2	uint16_t	Identification of sub-service types
DATA_LENGTH	4	uint32_t	Data length of the subsequent 2 fields

10.2 Real-time audio and video services

10.2.1 Real-time audio and video request message

Link type: subordinate link

Message direction: from the platform of the initiating party to that of the receiving party

Identification of sub-service data type: DOWN_REALVIDEO_MSG_STARTUP.

Description: The government video supervision platform sends the command to the enterprise video monitoring platform, the superior government platform to the inferior government platform or the cross-district government platform to the local government platform to request the real-time audio and video of the vehicle. See Table 42 for the data body.

Table 42 Data body of real-time audio and video request

Field name	Number of bytes	Data type	Description and requirement
VEHICLE_NO	21	Octet String	License plate number
VEHICLE_COLOR	1	BYTE	License plate color, as specified in JT/T 415-2006, 5.4.12
DATA_TYPE	2	uint16_t	Identification of sub-service types
DATA_LENGTH	4	uint32_t	Data length of the subsequent 4 fields
CHANNEL_ID	1	BYTE	Logical channel number, as specified in JT/T 1076-2016, Table 2; 0 indicates all channels
AVITEM_TYPE	1	BYTE	Audio and video types, defined as follows: 0x00: audio and video; 0x01: audio; 0x02: video
AUTHORIZE_CODE	64	BYTES	Time-limited password
GNSS_DATA	36	BYTES	At any position within 5min after the vehicle enters the cross-district area, this field is only used for cross-district access request and in accordance with the requirements of protocol 4.5.8.1 in JT/T 809-2011

10.2.2 Reply message to real-time audio and video request

Link type: main link

Message direction: from the platform of the receiving party to that of the initiating party

Identification of sub-service type: UP_REALVIDEO_MSG_STARTUP_ACK.

Description: The enterprise video monitoring platform replies to the vehicle real-time audio and video request message sent by the government video supervision platform. See Table 43 for the data body.

Table 43 Data body of real-time audio and video response

Field name	Number of bytes	Data type	Description and requirement
VEHICLE_NO	21	Octet String	License plate number
VEHICLE_COLOR	1	BYTE	License plate color, as specified in JT/T 415-2006, 5.4.12
DATA_TYPE	2	uint16_t	Identification of sub-service types
DATA_LENGTH	4	uint32_t	Data length of the subsequent 3 fields
RESULT	1	BYTE	The response results are defined as follows: 0x00: success; 0x01: fail; 0x02: not supported; 0x03: session stop; 0x04: wrong time-limited password; 0x05: cross-district condition is not satisfied
SERVER_IP	32	Octet String	IP address of enterprise video server
SERVER_PORT	2	uint16_t	Port number of enterprise video server

10.2.3 Message of actively requesting to stop real-time audio and video transmission

Link type: subordinate link

Message direction: from the government video supervision platform to the enterprise video monitoring platform

Identification of sub-service type: DOWN_REALVIDEO_MSG_END.

Description: The government video supervision platform sends this command to the enterprise video monitoring platform, and actively requests to stop the real-time audio and video transmission of vehicles. See Table 44 for the data body.

Table 44 Data body of message of actively requesting to stop real-time audio and video transmission

Field name	Number of bytes	Data type	Description and requirement
VEHICLE_NO	21	Octet String	License plate number
VEHICLE_COLOR	1	BYTE	License plate color, as specified in JT/T 415-2006, 5.4.12
DATA_TYPE	2	uint16_t	Identification of sub-service types
DATA_LENGTH	4	uint32_t	Data length of the subsequent 2 fields
CHANNEL_ID	1	BYTE	Logical channel number, as specified in JT/T 1076-2016, Table 2; 0 indicates all channels
AVITEM_TYPE	1	BYTE	Audio and video types, defined as follows: 0x00: audio and video; 0x01: audio; 0x02: video

10.2.4 Reply message to message of actively requesting to stop the real-time audio and video transmission

Link type: main link

Message direction: from the enterprise video monitoring platform to the government video supervision platform

Identification of sub-service type: UP_REALVIDEO_MSG_END_ACK.

Description: The enterprise video monitoring platform replies to the message of actively requesting to stop real-time audio and video transmission sent by the government video supervision platform. See Table 45 for the data body.

Table 45 Data body of reply message to message of actively requesting to stop the real-time audio and video transmission

Field name	Number of bytes	Data type	Description and requirement
VEHICLE_NO	21	Octet String	License plate number
VEHICLE_COLOR	1	BYTE	License plate color, as specified in JT/T 415-2006, 5.4.12
DATA_TYPE	2	uint16_t	Identification of sub-service types
DATA_LENGTH	4	uint32_t	Data length of the subsequent 1 field
RESULT	1	BYTE	Audio and video types, defined as follows: 0x00: success; 0x01: fail; 0x02: not supported; 0x03: session stop

10.3 Remote video retrieval

10.3.1 Message of actively uploading audio and video resource directory

Link type: main link

Message direction: from the inferior platform to the superior platform

Identification of sub-service type: UP_FILELIST_MSG.

Description: The enterprise video monitoring platform actively sends audio and video resource directory with particular alarm marks to the government video monitoring platform or the inferior government platform actively sends them to the superior government platform. See Table 46 for the data body.

Table 46 Data body of message of active uploading of audio and video resource directory

Field name	Number of bytes	Data type	Description and requirement
VEHICLE_NO	21	Octet String	License plate number
VEHICLE_COLOR	1	BYTE	License plate color, as specified in JT/T 415-2006, 5.4.12
DATA_TYPE	2	uint16_t	Identification of sub-service types
DATA_LENGTH	4	uint32_t	Data length of the subsequent 2 fields
ITEM_NUM	4	uint32_t	Total number of resource directory entries
ITEM_LIST			See Table 47 for the list of resource directory entries

Table 47 Format of list of uploaded audio and video resource directory entries

Field name	Number of bytes	Data type	Description and requirement
CHANNEL_ID	1	BYTE	Logical channel number, as specified in JT/T 1076-2016, Table 2; 0 indicates all channels
START_TIME	8	time_t	UTC time
END_TIME	8	time_t	UTC time
ALARM_TYPE	8	64BITS	See Table 18 "Definition of alarm mark bit" in JT/T 808-2011 for bit0-31; See Table 10 for bit 32-63
AVITEM_TYPE	1	BYTE	Audio and video types, defined as follows: 0x00: audio and video; 0x01: audio;

			0x02: video
STREAM_TYPE	1	BYTE	Bit stream types, defined as follows: 0x00: main bit stream; 0x01: subbit stream
MEM_TYPE	1	BYTE	Memory types, defined as follows: 0x00: main memory; 0x01: disaster recovery memory
FILE_SIZE	4	uint32_t	File size, in BYTE

10.3.2 Reply message to the request message of actively uploading audio and video resource directory

Link type: subordinate link

Message direction: from the superior platform to the inferior platform

Identification of sub-service type: DOWN_FILELIST_MSG_ACK.

Description: The government video supervision platform replies to the request message of actively uploading audio and video resource directory sent by the enterprise video monitoring platform. See Table 48 for the data body.

Table 48 Data body of reply message to the request of actively uploading audio and video resource directory

Field name	Number of bytes	Data type	Description and requirement
VEHICLE_NO	21	Octet String	License plate number
VEHICLE_COLOR	1	BYTE	License plate color, as specified in JT/T 415-2006, 5.4.12
DATA_TYPE	2	uint16_t	Identification of sub-service types
DATA_LENGTH	4	uint32_t	Data length of the subsequent 2 fields

RESULT	1	BYTE	The response results are defined as follows: 0x00: success; 0x01: fail; 0x02: not supported; 0x03: session stop
ITEM_NUMBER	1	BYTE	Total number of resource directories

10.3.3 Request message of querying audio and video resource directory

Link type: subordinate link

Message direction: from the superior platform to the inferior platform

Identification of sub-service type: DOWN_REALVIDEO_FILELIST_REQ.

Description: The government video monitoring platform initiates a request message of querying the audio and video resource directory to the enterprise video monitoring platform or the superior government platform to the inferior government platform. See Table 49 for the data body.

Table 49 Data body of request message of querying audio and video resource directory

Field name	Number of bytes	Data type	Description and requirement
VEHICLE_NO	21	Octet String	License plate number
VEHICLE_COLOR	1	BYTE	License plate color, as specified in JT/T 415-2006, 5.4.12
DATA_TYPE	2	uint16_t	Identification of sub-service types
DATA_LENGTH	4	uint32_t	Data length of the subsequent 9 Fields
CHANNEL_ID	1	BYTE	Logical channel number, as specified in JT/T 1076-2016, Table 2; 0 indicates all channels

START_TIME	8	time_t	Start time, YY-MM-DD-HH-MM-SS; all bits being 0 indicates there is no the condition of start time
END_TIME	8	time_t	Start time, YY-MM-DD-HH-MM-SS; all bits being 0 indicates there is no the condition of end time
ALARM_TYPE	8	BYTES	Alarm type, for bit0-31, see Table 18 of JT/T 808-2011 for the definition of alarm mark bit; See Table 9 for bit 32-63; All bits being 0 indicates there is no condition of alarm type
AVITEM_TYPE	1	BYTE	Type of audio and video, 0: audio and video; 1: audio; 2: video; 3: video or audio and video
STREAM_TYPE	1	BYTE	Type of bit stream, 0: all bit streams, 1: main bit stream, 2: subbit stream
MEM_TYPE	1	BYTE	Memory types, 0: all memories; 1: main memory; 2: disaster recovery memory
AUTHORIZE_CODE	64	BYTES	Time-limited password
GNSS_DATA	36	BYTES	At any position within 5min after the vehicle enters the cross-domain area, this field is only used for cross-domain access request and in accordance with the requirements of protocol 4.5.8.1 in JT/T 809-2011

10.3.4 Reply message to message of querying audio and video resource directory

Link type: main link

Message direction: from the inferior platform to the superior platform.

Identification of sub-service type: UP_REALVIDEO_FILELIST_REQ_ACK.

Description: The enterprise video monitoring platform responds to the government video supervision platform or the inferior government platform responds to the superior government platform for audio and video resource directory messages. See Table 50 for the data body.

Table 50 Data body of reply message to message of querying audio and video resource directory

Field name	Number of bytes	Data type	Description and requirement
VEHICLE_NO	21	Octet String	License plate number
VEHICLE_COLOR	1	BYTE	License plate color, as specified in JT/T 415-2006, 5.4.12
DATA_TYPE	2	uint16_t	Identification of sub-service types
DATA_LENGTH	4	uint32_t	Data length of the subsequent 3 fields
RESULT	1	BYTE	The response results are defined as follows: 0x00: success; 0x01: fail; 0x02: not supported; 0x03: session stop; 0x04: wrong time-limited password; 0x05: cross-district condition is not satisfied
ITEM_NUM	4	DWORD	Total number of resource directory entries
ITEM_LIST			See Table 47 for the list of resource directory entries

10.4 Remote video playback

10.4.1 Remote video playback request message

Link type: subordinate link

Message direction: from the platform of the initiating party to that of the receiving party

Identification of sub-service type: DOWN_PLAYBACK_MSG_STARTUP.

Description: The government video supervision platform sends this command to the enterprise video monitoring platform, the superior government platform to the inferior government platform or the cross-district government platform to the local government platform to request the audio and video of vehicles. See Table 51 for the data body.

Table 51 Data body of remote video playback request message

Field name	Number of bytes	Data type	Description and requirement
VEHICLE_NO	21	Octet String	License plate number
VEHICLE_COLOR	1	BYTE	License plate color, as specified in JT/T 415-2006, 5.4.12
DATA_TYPE	2	uint16_t	Identification of sub-service types
DATA_LENGTH	4	uint32_t	Data length of the subsequent 8 fields
CHANNEL_ID	1	BYTE	Logical channel number, as specified in JT/T 1076-2016, Table 2; 0 indicates all channels
AVITEM_TYPE	1	BYTE	Type of audio and video, 0: audio and video; 1: audio; 2: video; 3: video or audio and video
STREAM_TYPE	1	BYTE	Type of bit stream, 0: all bit streams, 1: main bit stream, 2: subbit stream
MEM_TYPE	1	BYTE	Memory types, 0: all memories; 1: main memory; 2: disaster recovery memory
PLAYBACK_STARTTIME	8	time_t	Playback start time, UTC time
PLAYBACK_ENDTIME	8	time_t	Playback end time, UTC time
AUTHORIZE_CODE	64	BYTES	Time-limited password

GNSS_DATA	36	BYTES	At any position within 5min after the vehicle enters the cross-district area, this field is only used for cross-district access request and in accordance with the requirements of 4.5.8.1 in JT/T 809-2011
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10.4.2 Reply message to remote video playback request

Link type: main link

Message direction: from the platform of the receiving party to that of the initiating party

Identification of sub-service type: UP_PLAYBACK_MSG_STARTUP_ACK.

Description: The enterprise video monitoring platform replies to the government video supervision platform, the inferior government platform replies to the superior government platform or the local government platform replies to the cross-district government platform with respect to the video playback request message sent by the latter. See Table 52 for the data body.

Table 52 Data body of reply message to remote video playback request

Field name	Number of bytes	Data type	Description and requirement
VEHICLE_NO	21	Octet String	License plate number
VEHICLE_COLOR	1	BYTE	License plate color, as specified in JT/T 415-2006, 5.4.12
DATA_TYPE	2	uint16_t	Identification of sub-service types
DATA_LENGTH	4	uint32_t	Data length of the subsequent 3 fields
SERVER_IP	32	Octet String	IP address of enterprise video server

SERVER_PORT	2	uint16_t	Port number of enterprise video server
RESULT	1	BYTE	The response results are defined as follows: 0x00: success; 0x01: fail; x02: not supported; 0x03: session stop; 0x04: wrong time-limited password; 0x05: cross-district condition is not satisfied

10.4.3 Remote video playback control message

Link type: subordinate link

Message direction: from the government video supervision platform to the enterprise video monitoring platform

Identification of sub-service type: DOWN_PLAYBACK_MSG_CONTROL.

Description: The government video supervision platform issues this command to the enterprise video monitoring platform to control the playback. See Table 53 for the data body.

Table 53 Data body of remote video playback control

Field name	Number of bytes	Data type	Description and requirement
VEHICLE_NO	21	Octet String	License plate number
VEHICLE_COLOR	1	BYTE	License plate color, as specified in JT/T 415-2006, 5.4.12
DATA_TYPE	2	uint16_t	Identification of sub-service types
DATA_LENGTH	4	uint32_t	Data length of the subsequent 3 fields

CONTROL_TYPE	1	BYTE	<p>0x00: normal playback; 0x01: playback pause;</p> <p>0x02: playback stop; 0x03: fast forward playback;</p> <p>0x04: fast reverse playback by keyframes; 0x05: drag playback;</p> <p>0x06: keyframe playback</p>
FAST_TIME	1	BYTE	<p>Fast forward or fast backward time. If the playback control is 3 and 4, the content of this field is valid, otherwise, it is set to 0.</p> <p>0x00: invalid;</p> <p>0x01: 1 time;</p> <p>0x02: 2 times;</p> <p>0x03: 4 times;</p> <p>0x04: 8 times;</p> <p>0x05: 16 times;</p>
DATE_TIME	8	time_t	<p>Drag position, expressed in UTC time. If the playback control is 3 and 4, the content of this field is valid.</p>

10.4.4 Reply message to remote video playback control

Link type: main link

Message direction: from the enterprise video monitoring platform to the government video supervision platform

Identification of sub-service type: UP_PLAYBACK_MSG_CONTROL_ACK.

Description: The enterprise video monitoring platform replies to the playback control message issued by the government video supervision platform. See Table 54 for the data body.

Table 54 Data body of reply message to remote video playback

Field name	Number of bytes	Data type	Description and requirement
VEHICLE_NO	21	Octet String	License plate number
VEHICLE_COLOR	1	BYTE	License plate color, as specified in JT/T 415-2006, 5.4.12
DATA_TYPE	2	uint16_t	Identification of sub-service types
DATA_LENGTH	4	uint32_t	Data length of the subsequent 1 field
RESULT	1	BYTE	The response results are defined as follows: 0x00: success; 0x01: fail; 0x02: not supported; 0x03: session stop

10.5 Remote video download

10.5.1 Remote video download request message

Link type: subordinate link

Message direction: from the government video supervision platform to the enterprise video monitoring platform

Identification of sub-service type: DOWN_DOWNLOAD_MSG_STARTUP.

Description: The government video supervision platform issues this command to the enterprise video monitoring platform to download the audio and video of vehicles. See Table 55 for the data body.

Table 55 Data body of remote video download request message

Field name	Number of bytes	Data type	Description and requirement
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VEHICLE_NO	21	Octet String	License plate number
VEHICLE_COLOR	1	BYTE	License plate color, as specified in JT/T 415-2006, 5.4.12
DATA_TYPE	2	uint16_t	Identification of sub-service types
DATA_LENGTH	4	uint32_t	Data length of the subsequent 10 fields
CHANNEL_ID	1	BYTE	Logical channel number, as specified in JT/T 1076-2016, Table 2; 0 indicates all channels
START_TIME	8	time_t	UTC time
END_TIME	8	time_t	UTC time
ALARM_TYPE	8	64BITS	See Table 18 "Definition of alarm mark bit" in JT/T 808-2011 for bit0~bit31; See Table 10 for bit32~bit63
AVITEM_TYPE	1	BYTE	Audio and video types, defined as follows: 0x00: audio and video; 0x01: audio; 0x02: video
STREAM_TYPE	1	BYTE	Bit stream types, defined as follows: 0x01: main bit stream; 0x02: subbit stream
MEM_TYPE	1	BYTE	Memory types, defined as follows: 0x01: main memory; 0x02: disaster recovery memory
FILE_SIZE	4	uint32_t	File size, in BYTE
AUTHORIZE_CODE	64	BYTES	Time-limited password
GNSS_DATA	36	BYTES	At any position within 5min after the vehicle enters the cross-district area, this field is only used for cross-district access request, see protocol 4.5.8.1 in JT/T 809-2011 for details

10.5.2 Reply message to remote video download request

Link type: main link

Message direction: from the enterprise video monitoring platform to the government video supervision platform

Identification of sub-service type: UP_DOWNLOAD_MSG_STARTUP_ACK.

Description: The reply message of the enterprise video monitoring platform to the request message for downloading vehicle audio and video sent by the government video supervision platform. See Table 56 for the data body.

Table 56 Data body of reply message to remote video download request

Field name	Number of bytes	Data type	Description and requirement
VEHICLE_NO	21	Octet String	License plate number
VEHICLE_COLOR	1	BYTE	License plate color, as specified in JT/T 415-2006, 5.4.12
DATA_TYPE	2	uint16_t	Identification of sub-service types
DATA_LENGTH	4	uint32_t	Data length of the subsequent 2 fields
RESULT	1	BYTE	The response results are defined as follows: 0x00: success; 0x01: fail; 0x02: not supported; 0x03: session stop; 0x04: wrong time-limited password; 0x05: cross-district condition is not satisfied
SESSION_ID	2	uint16_t	Serial number corresponding to the platform file upload message, which is valid when RE- SULT is 0

Link type: main link

Message direction: from the enterprise video monitoring platform to the government video supervision platform

Identification of sub-service type: UP_DOWNLOAD_MSG_END_INFORM.

Description: The enterprise video monitoring platform sends it to the government video supervision platform to inform the latter that the video files have been downloaded from the terminal. See Table 57 for the data body.

Table 57 Data body of remote video download completion notification message

Field name	Number of bytes	Data type	Description and requirement
VEHICLE_NO	21	Octet String	License plate number
VEHICLE_COLOR	1	BYTE	License plate color, as specified in JT/T 415-2006, 5.4.12
DATA_TYPE	2	uint16_t	Identification of sub-service types
DATA_LENGTH	4	uint32_t	Data length of the subsequent 7 fields
RESULT	1	BYTE	0x00: success, 0x01: fail
SESSION_ID	2	uint16_t	Serial number corresponding to the platform file upload message, which is valid when RESULT is 0
SERVER_IP	32	Octet String	IP address of FTP server, which is valid when RESULT is 0
TCP_PORT	2	uint16_t	FTP port, which is valid when RESULT is 0
USERNAEM	49	Octet String	FTP user name, which is valid when RESULT is 0
PASSWORD	22	Octet String	FTP password, which is valid when RESULT is 0
FILE_PATH	200	Octet String	File storage path, which is valid when RESULT is 0

10.5.4 Reply message to remote video download completion notification

Link type: subordinate link

Message direction: from the government video supervision platform to the enterprise video monitoring platform

Identification of sub-service type: UP_DOWNLOAD_MSG_END_INFORM_ACK.

Description: The government video supervision platform replies to the download completion notification of the enterprise video monitoring platform. See Table 58 for the data body.

Table 58 Data body of reply message to remote video download completion notification

Field name	Number of bytes	Data type	Description and requirement
VEHICLE_NO	21	Octet String	License plate number
VEHICLE_COLOR	1	BYTE	License plate color, as specified in JT/T 415-2006, 5.4.12
DATA_TYPE	2	uint16_t	Identification of sub-service types
DATA_LENGTH	4	uint32_t	Data length of the subsequent 2 fields
RESULT	1	BYTE	Response results: 0x00: success; 0x01: fail; 0x02: not supported; 0x03: session stop
SESSION_ID	2	uint16_t	Serial number corresponding to the platform file upload message, which is valid when RE- SULT is 0

10.5.5 Remote video download control request message

Link type: subordinate link

Message direction: from the government video supervision platform to the enterprise video monitoring platform

Identification of sub-service type: DOWN_DOWNLOAD_MSG_CONTROL.

Description: The government video supervision platform sends the download control message to the enterprise video monitoring platform. See Table 59 for the data body.

Table 59 Data body of remote video download control request

Field name	Number of bytes	Data type	Description and requirement
VEHICLE_NO	21	Octet String	License plate number
VEHICLE_COLOR	1	BYTE	License plate color, as specified in JT/T 415-2006, 5.4.12
DATA_TYPE	2	uint16_t	Identification of sub-service types
DATA_LENGTH	4	uint32_t	Data length of the subsequent 2 fields
SESSION_ID	2	uint16_t	Serial number corresponding to the platform file upload message
TYPE	1	BYTE	0x00: pause; 0x01: continue; 0x02: cancel

10.5.6 Reply message to remote video download control request

Link type: main link

Message direction: from the enterprise video monitoring platform to the government video supervision platform

Identification of sub-service type: UP_DOWNLOAD_MSG_CONTROL_ACK.

Description: The reply message of the enterprise video monitoring platform to the download control request sent by the government video supervision platform. See Table 60 for the data body.

Table 60 Data body of reply message to remote video download control request

Field name	Number of bytes	Data type	Description and requirement
VEHICLE_NO	21	Octet String	License plate number
VEHICLE_COLOR	1	BYTE	License plate color, as specified in JT/T 415-2006, 5.4.12
DATA_TYPE	2	uint16_t	Identification of sub-service types

DATA_LENGTH	4	uint32_t	Data length of the subsequent 1 field
RESULT	1	BYTE	Response results: 0x00: success; 0x01: fail; 0x02: not supported; 0x03: session stop

Appendix A (Nominative)

Comparison table of messages between video terminal and video platform

See Table A.1 for the comparison of communication protocol messages between video terminal and video platform.

Table A.1 Comparison of messages between video terminal and video platform

S.N.	Message body name	Message ID	S.N.	Message body name	Message ID
1	Query terminal audio and video attribute	0x9003	12	File upload instruction	0x9206
2	Attribute of audio and video uploaded by terminal	0x1003	13	File upload completion notification	0x1206
3	Real-time audio and video transmission request	0x9101	14	File upload control	0x9207
4	Passenger flow uploaded by terminal	0x1005	15	Pan-tilt rotation	0x8301
5	Real-time audio and video transmission control	0x9102	16	Control over focal length adjustment through pan-tilt	0x9302
6	Real-time audio and video stream and transparent transmission data transmission		17	Control over aperture adjustment through pan-tilt	0x9303
7	Real-time audio and video transmission status notification	0x9105	18	Control over windshield wiper through pan-tilt	0x9304
8	Resource list query	0x9205	19	Infrared light supplement control	0x9305

9	List of audio and video resource uploaded by terminal	0x1205	20	Pan-tilt zoom control	0x9306
10	Platform issuing remote video playback request	0x9201	21	Manual wake-up request (short message) issued by platform	WAKEUPXX
11	Platform issuing remote video playback request	0x9202			