JT

TRANSPORTATION INDUSTRY STANDARD

OF THE PEOPLE'S REPUBLIC OF CHINA

ICS 03.220.20; 33.160.99

M 32

Registration No.:

JT/T 1076-2016

GNSS System for Operating Vehicles - Technical Specifications for Vehicle Video Terminal

道路运输车辆卫星定位系统

车载视频终端技术要求

Issued on: October 21, 2016 **Implemented on: January 1, 2017**

Issued by: Ministry of Transport of the People's Republic of China

Table of Contents

GNSS System for Operating Vehicles - Technical Specifications for Vehicle Video Terminal

1 Scope

This Standard specifies the general requirements, functional requirements, performance requirements, installation requirements and test methods of vehicle video terminal of GNSS system for operating vehicles.

This Standard is applicable to the design, manufacture, inspection and installation of main engine, camera and other external equipment of vehicle video terminal of GNSS system for operating vehicles.

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 2423.5 Environmental Testing for Electric and Electronic Products - Part 2: Test Methods - Test Ea and Guidance: Shock

GB/T 2423.10 Environmental Testing for Electric and Electronic Products - Part 2: Test Methods - Test Fc and Guidance: Vibration (Sinusoidal)

GB/T 15865 Video Cameras (PAL/SECAM/NTSC) - Methods of Measurement - Part 1: Non-broadcast Single-sensor Cameras

GB/T 19056-2012 Vehicle Travelling Data Recorder

GB/T 20090.2 Information Technology - Advanced Coding of Audio and Video - Part 2: Video

GB 20815-2006 Digital Video Record Equipment of Video Surveillance System in Security & Protection Systems

GB/T 25724 Technical Specifications for Surveillance Video and Audio Coding for Public Security

GJB 367A General Specifications for Military Communication Equipment

JT/T 325-2013 Type Dividing and Class Rating for Commercial Motor - Vehicles

f) Disaster backup storage device interface for real-time mirror image recording;

g) USB Host 2.0 or above standard interface.

The main engine should include Ethernet interface and WIFI module.

4.2.2 External equipment

External equipment shall comply with the stipulation in 4.1.2 in JT/T 794-2011; it shall also include the following devices:

a) Vehicle-mounted camera;

b) Pickup;

c) Main storage device, which is removable.

Real-time mirror image disaster backup storage device, passenger counting device and driving behavioral analysis device are optional external equipment.

4.2.3 Form of interface

Please refer to A.1 for the form of audio and video connector interface of video terminal.

Please refer to A.2 for the form of connector interface of disaster backup storage device.

5 Functional Requirements

5.1 Basic Requirements

5.1.1 The functions of the terminal shall satisfy stipulations in Chapter 5, other than 5.4.8 and 5.4.9 in JT/T 794-2011; specifically speaking, the mode of communication should also support TD-LTE or FDD-LTE, etc.

5.1.2 The overall performance of the terminal shall comply with the stipulation in 6.1 in JT/T 794-2011.

5.1.3 The performance of the terminal's satellite positioning module shall comply with the stipulation in 6.2 in JT/T 794-2011.

5.1.4 The performance of the terminal's wireless communication module shall comply with the stipulation in 6.3 in JT/T 794-2011.

5.2 Requirements of Audio and Video Recording

5.2.1 Audio and video signal compression mode

The adopted audio and video signal compression mode shall be clearly indicated in

Image resolution (pixel) shall at least be 704 x 576 (D1). One route shall adopt 1,280 x 720 (720P) or above; horizontal resolution shall be more than or equals to 400 TVL.

5.2.4 Requirements of playback image quality

5.2.4.1 Subjective evaluation indexes

The playback image screen information shall not manifest obvious defects, frozen pictures or frame losses. When an object is moving, the edges of the image shall not manifest obvious jags, trailing, mosaics or breakages, etc.

5.2.4.2 Objective evaluation indexes

In terms of system with multi-channel audio and video acquisition, the resolution of playback video of various channels shall be clearly indicated in product's technical documents. The local playback image's horizontal resolution of corresponding resolution shall comply with the following requirements:

a) In terms of playback image whose resolution (pixel) is 704 x 576 (D1), the horizontal resolution shall be more than or equals to 400 TVL;

b) In terms of playback image whose resolution (pixel) is 960 x 576, the horizontal resolution shall be more than or equals to 500 TVL;

c) In terms of playback image whose resolution (pixel) is 1,280 x 720, the horizontal resolution shall be more than or equals to 650 TVL;

d) In terms of playback image whose resolution (pixel) is 1,920 x 1,080, the horizontal resolution shall be more than or equals to 800 TVL.

5.2.5 Requirements of total resources of video recording

Under the circumstance when all cameras and one route pickup that the equipment practically supports are initiated for recording, the vehicle-mounted terminal shall have the capability of at least 150 h of video recording. In addition, the image playback shall comply with the stipulation in 5.2.4.1 and 5.2.4.2.

Total resources of video recording have the following specific requirements:

a) Be equipped with multi-channel audio and video acquisition system; the coded video frame rate of Channel 2 shall at least be 25 frame/second; the coded video frame rate of the remaining channels shall at least be 15 frame/second. Meanwhile, this shall be clearly indicated in product's technical documents;

b) All channels shall be able to simultaneously reach the requirement of frame rate and playback quality.

5.2.6 Data recording mode

b) Storage device failure: trigger an alarm when it detects failure of the main storage device or storage device for disaster backup, for example, storage medium cannot be written, etc.;

c) Particular alarm storage overrun: trigger an alarm when it detects that particular alarm video data's occupation of the capacity of the main storage device has reached the set value; remind users to deal with it in time;

d) Failure of other video equipment: trigger an alarm when it detects failure of other video equipment, for example, failure of cloud platform, etc.

5.4.2 Alarm linkage

When it detects alarm event, it shall be able to add alarm marker to the audio and video data stored in all the channels. The marking shall be divided into two states, namely, particular alarm and common alarm. The marking of particular alarm shall start at least 1 min before the triggering of the alarm, and last till the alarm is over or till it reaches the set conditions.

5.5 Requirements of data security

5.5.1 Data coverage

It shall support the function of automatic video coverage. When the storage device reaches its maximum capacity, the oldest video data shall be automatically covered. When users are reminded to deal with video data with the marking of particular alarm, and such data is not deleted, the data shall be covered if necessary.

5.5.2 Requirements of main storage device

The main storage device shall support manual assembly and disassembly in a non-disassembled mode; there shall be protective measures. It can only be disassembled after being opened with exclusive instruments.

When the core component of the main storage device is hardware, the disassembled main storage device shall have the function of preventing from falls or collisions. Meanwhile, it shall have USB Device 2.0 or above interface; when USB interface's power supply capability is insufficient to support power consumption of the main storage device, the main storage device shall have a standard power supply interface: DC005 interface, 5V/2A.

5.5.3 Real-time mirror image recording and disaster backup storage function

The disaster backup storage device shall support real-time image's function of recording audio and video data of all the channels. The mode of recording shall comply with the stipulation in 5.2.6.

The disaster backup storage device shall have the function of protecting from fire,

The system shall support the surveillance center to retrieve appointed video in accordance with certain conditions, such as date, channel number, alarm type and search result, etc. When video is retrieved in accordance with time, the range of time error of the retrieved video shall be not more than 10 s. The retrieval of videos on the terminal shall support the function of breakpoint transmission; video files that are retrieved to the surveillance center shall be in the format of AVI or MP4.

5.6.3.4 Remote setting of audio and video parameters

The system shall support remote setting of audio and video parameters, including code rate, frame rate, resolution, key frame interval and subtitle overlaying, etc.

5.7 Requirements of image analysis

5.7.1 Passenger counting function

Passenger counting device shall implement the following functions:

a) Through video analysis technology, distinguish and conduct statistics of the number of passengers getting on and getting off the vehicle;

b) Under the circumstance when passengers line up to get on the vehicle, the accuracy of single count shall be more than or equals to 95%;

c) When there are 10 or more passenger counts, the accuracy of total count shall be more than or equals to 90%;

d) In accordance with the parameter setting of the number of loads, the alarm function for overloading shall be implemented.

The test method for the passenger counting device shall be clearly indicated in product's technical documents.

5.7.2 Driving behavioral analysis function

Driver's driving behavioral analysis device shall implement the following functions:

a) Through video analysis technology, determine whether the driver is physiologically fatigue; the accuracy shall be more than or equals to 90%;

b) Through video analysis technology, determine whether the vehicle is driving in accordance with the stipulation traffic lanes; the accuracy shall be more than or equals to 90%;

c) In accordance with the parameter setting of abnormal driving behaviors, the alarm function for abnormal driving behaviors shall be implemented.

The test method for the driver's driving behavioral analysis device shall be clearly

8.2 Functional Test

8.2.1 Video and sound recording test

8.2.1.1 Audio and video compression mode

The test method for audio and video compression mode is as follows:

a) Adopt standard decoding software, which is corresponding with the equipment's compression mode; it shall be able to normally play corresponding video data;

b) Adopt general software for playing, consult audio coding standard; it shall comply with product's technical documents and the stipulation in 5.2.1.

8.2.1.2 Playback image quality

Conduct the test in accordance with the method in 10.2.2 and 10.2.3 in GB 20815-2006. Test result shall comply with the stipulation in 5.2.4.

8.2.1.3 Total video resource

Have all the audio and video channels simultaneously in the recording state; operate them continuously for 0.5 h; inspect the resolution and frame rate of each channel. The test result shall comply with the stipulation in 5.2.3 and 5.2.5.

8.2.1.4 Information recording mode

The test method for audio and video information recording mode is as follows:

a) The synchronous recording function of audio and video shall comply with the stipulation in 8.5 in GB 20815-2006;

b) Take down the storage medium of the terminal's main engine, then, assemble it onto another terminal's main engine of the same model; it shall be able to normally play back data;

c) Take down the storage medium of the terminal's main engine, then, connect it to a computer. Through matching computer software, it shall be able to normally play back data and comply with the stipulation in 5.2.4.

8.2.1.5 Video recording mode

The test method for video recording mode is as follows:

a) After the equipment boots and reboots, it shall automatically start to record.

b) Set up the equipment's recording mode into "particular alarm trigger" mode, let the terminal enter the state of dormancy. Through switching value input to the interface, simulate an emergency alarm event; the equipment shall

d) Disconnect the connecting wire of the disaster backup storage device;

e) Through the surveillance center, issue: particular alarm storage overrun parameter: 1%; after the duration of 60 s, restore the previous particular alarm storage overrun parameter;

f) Disconnect the connecting wire of the cloud platform.

In the surveillance center, inspect whether the equipment has triggered corresponding audio and video alarm.

8.2.3.2 Alarm linkage

When the equipment is normally functioning, conduct the test in accordance with the following steps:

a) Simulate conditions of triggering overspeed alarm, inspect audio and video data stored in all the channels; it shall comply with the requirement in 5.4.2;

b) Through the surveillance center, issue: initiatively initiated channel for particular alarm: Channel 1 and Channel 2; through switching value input, simulate the emergency alarm button to trigger the alarm state, duration: 1 s; the equipment shall initiatively initiate real-time video transmission in Channel 1 and Channel 2, duration: 10 min; inspect audio and video data stored in all the channels; it shall comply with the stipulation in 5.4.2.

8.2.4 Data security test

8.2.4.1 Data coverage

After the equipment reboots, conduct the test in accordance with the following steps:

a) Operate the equipment under static state with full load for 1 h, then, play back the video; image quality shall comply with the stipulation in 5.2.4;

b) Check the size of all the information generated within the 1 h, including audio and video data; check the storage's capacity; calculate the time of continuous recording, which shall be more than or equals to 150 h.

8.2.4.2 Main storage medium

The test of the main storage medium shall be conducted in accordance with the following steps:

a) Disassembly test: inspect the main storage device, which is connected to the equipment's main engine; use exclusive instrument to open the lock, which is used to protect the main storage device; disassemble the main storage device; the disassembly of the outer shell of the equipment shall be unnecessary;

the LED stopwatch on the software interface of the client's side; check the difference in the reading of the stopwatches in the photos;

d) Every 1 min, repeat Step c) once; there shall be 5 times in total. The average value of the 5 calculation results shall be transmission delay; it shall comply with the stipulation in 5.6.2.

8.2.5.2.2 Real-time video surveillance frame rate

The test of real-time video surveillance frame rate has the following specific steps:

a) Use DVD to play standard test images. The standard test images shall be acquired from vehicle's movement environment; images shall manifest moderate sequence, content and quantity of motion; a unique number shall be marked on each image;

b) Place image signals exported by the DVD into any video input channel; use the surveillance center to control the client's side software to check video images of any channel in real time;

c) Use the surveillance center's software to implement remote recording of the channel's video images through wireless transmission. After 10 s, stop the recording, play back and check the number of image frames in that video. Thus, the per second image transmission frame rate can be obtained; it shall comply with the stipulation in 5.6.2.

8.2.5.3 Search, preview and retrieval of historical video

The test shall be conducted in accordance with the following steps:

a) Use the surveillance center to control the client's side software to implement remote search of video data in the terminal's main storage device and the disaster backup storage device in accordance with time, channel number and alarm type;

b) Randomly select the searched data; implement remote playback; it shall comply with the stipulation in 5.6.3.2;

c) Respectively implement remote downloading of video sections in accordance with appointed time, channel number and alarm type. After finishing downloading, play back the videos; the data shall be intact.

8.2.6 Image analysis function test

8.2.6.1 Passenger count

In accordance with the test instruction in the technical documents of the passenger counting device, conduct the test. It shall comply with the stipulation in 5.7.1.

Appendix B

(Normative)

Minimum Performance Requirements and Test Methods for Disaster Protection of Disaster Backup Storage Device

B.1 Minimum Performance Requirements

Minimum performance requirements for disaster protection of the disaster backup storage device are as follows:

a) Resistance to high-temperature flame: 1,100 °C; duration: 15 min;

b) Resistance to low-temperature flame: 260 °C; duration: 120 min;

c) Water soaking: water depth: 10 m; soak for 24 h;

d) Vibration and impact: reach the stipulation in 5.9 in GB/T 19056-2012; under the condition of power-on, cycle for 3 times.

B.2 Test Methods

Test methods for the minimum performance for disaster protection of the disaster backup storage device shall comply with the following sequence:

a) In accordance with the technical documents, connect the disaster backup storage device to the terminal's main engine; normally initiate the equipment; operate it for 2 h. Then, connect the disaster backup storage device to computer. Firstly, check all the data being recorded within the 2 h and the capacity of the disaster backup storage device; calculate the time of continuous recording, which shall be more than or equals to 2 h. Then, play back the video through computer software; the quality of the playback shall comply with the stipulation in 5.2.4.

b) In accordance with the test methods in the technical documents, conduct fire-proofing test of the disaster backup storage device. The requirement of the test level: "1,100 °C, duration: 15 min; then, 260 °C, duration: 120 min". After the test, disassemble the protective outer shell of the disaster backup storage device, video data shall be accessible through the internal storage unit, which is protected by the shell. Through computer software, play back the video; it shall comply with the stipulation in 5.2.4.

c) In accordance with the test methods in the technical documents, conduct water-proofing test of the disaster backup storage device. The requirement of the test level: "under 1 standard atmospheric pressure, water depth: 10 m, or equivalent

This is an excerpt of the PDF (Some pages are marked off intentionally)

------ The End ------