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SERIES T: TERMINALS FOR TELEMATIC SERVICES

General multimedia application frameworks

Test specification for video surveillance networking

Recommendation ITU-T T.627

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Recommendation ITU-T T.627

Test specification for video surveillance networking

Summary

Recommendation ITU-T T.627 describes the test specification for video surveillance networking. The Recommendation specifies the test objects, test classification and test tools, test environment, and test requirements that can be used for testing against ITU-T H.626 and ITU-T H.627. Recommendation ITU-T H.626 specifies the architecture of the video surveillance system, and Recommendation ITU-T H.627 specifies the signalling and protocols for a video surveillance system.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T T.627	2021-06-13	16	11.1002/1000/14692

Keywords

Conformance test, networking, test specification, video surveillance.

* To access the Recommendation, type the URL http://handle.itu.int/ in the address field of your web browser, followed by the Recommendation's unique ID. For example, http://handle.itu.int/11.1002/1000/11830-en.

FOREWORD

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Recommendation ITU-T T.627

Test specification for video surveillance networking

1 Scope

This Recommendation describes the test specification for video surveillance networking based on the architecture and protocols specified in [ITU-T H.626] and [ITU-T H.627]. In particular, this Recommendation specifies test objects, test classification and test tools, test environment, and test requirements.

2 References

The following ITU-T Recommendations and other references contain provisions, which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T H.626] Recommendation ITU-T H.626 (2019), *Architectural requirements for a video surveillance system*.

[ITU-T H.626.3] Recommendation ITU-T H.626.3 (2018), *Architecture for visual surveillance system interworking*.

[ITU-T H.627] Recommendation ITU-T H.627 (2020), *Signalling and protocols for a video surveillance system*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 central control server (CCS) [ITU-T H.626.3]: A device located at the central part of the visual surveillance system. It is used for centralized system management, service operation management and access control.

3.1.2 control protocol gateway (CPG) [ITU-T H.626.3]: A gateway device located between two heterogeneous visual surveillance systems. It is used for routing, forwarding and transformation of control signals between heterogeneous visual surveillance systems.

3.1.3 media gateway (MG) [ITU-T H.626.3]: A gateway device located between two heterogeneous visual surveillance systems. It is used for routing, forwarding and transformation of media between heterogeneous visual surveillance systems.

3.1.4 media server [ITU-T H.626]: A device located at the centre part of a video surveillance system. It is used to forward real-time media stream as well as store, retrieve and replay historical media stream. The media server receives the media stream from premises unit or other media server and forwards the media stream to other customer unit or media server. It consists of media distribution unit and media storage unit.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 conversion gateway: Device or system that converts the communication protocol, and the format of video and audio media data between a session initiation protocol (SIP) surveillance domain and a non-SIP surveillance domain, which is the combination of a unit control protocol gateway and a media gateway defined in [ITU-T H.626.3].

3.2.2 standard device: Device compliant with the provisions of [ITU-T H.626] and [ITU-T H.627], used for conformance testing of devices and platform.

3.2.3 video surveillance networking platform: Platform used for centralized system management, service operation management, access control and forwarding real-time media stream, as well as storage, retrieval and replay of historical media stream, which corresponds to a unit central control server defined in [ITU-T H.626.3] and media server defined in [ITU-T H.626].

3.2.4 video surveillance networking test system: System compliant with the provisions of [ITU-T H.626] and [ITU-T H.627], used to conduct ITU-T H.626 and ITU-T H.627 conformance testing on a video surveillance networking platform, conversion gateway and main video surveillance devices in the video surveillance networking application.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

CCS Central Control Server

CPG Control Protocol Gateway

DVR Digital Video Recorder

ID Identifier

IPC Internet Protocol Camera

MG Media Gateway

NVR Network Video Recorder

OSD On-Screen Display

PTZ Pan/Tilt/Zoom

SIP Session Initiation Protocol

TCP Transmission Control Protocol

UDP User Datagram Protocol

5 Conventions

None.

6 Test objects

The test objects include the products in the video surveillance networking application. The products include the video surveillance-networking platform (hereinafter referred to as the "platform"), conversion gateway and main video surveillance devices. The main video surveillance devices include acquisition, encoding, storage, decoding and other related devices, i.e., Internet protocol camera (IPC), digital video recorder (DVR), network video recorder (NVR), encoder, decoder, etc.

7 Test classification and test tools

7.1 Test classification

7.1.1 Conformance test of acquisition, encoding and storage devices

The conformance test of [ITU-T H.626] and [ITU-T H.627] (hereinafter referred to as "the conformance test") is carried out by connecting the tested acquisition, encoding and storage devices to the video surveillance interworking test system (hereinafter referred to as the "test system").

7.1.2 Conformance test of decoding device

The conformance test is carried out by connecting the tested decoding devices to the test system.

7.1.3 Conformance test of conversion gateway

The conformance test is carried out by connecting the tested conversion gateway to the test system.

7.1.4 Conformance test of platform

The conformance test of the platform is divided into three parts as follows.

1) When the tested platform is regarded as the lower level and the test system is regarded as the upper level to carry out the conformance test, it is referred to as an "uplink test".
2) When the tested platform is regarded as the upper level and the test system is regarded as the lower level to carry out the conformance test, it is referred to as a "downlink test".
3) The standard devices are connected to the tested platform for the conformance test and it is referred to as a "device access test".

7.2 Test tools

7.2.1 Test system

The test system is a conformance test tool. It has the service functions of registration message debugging, extended control command set message debugging, video and audio debugging, status detection, cross level forwarding message processing, link status management, subscription and notification, etc.

The related network protocol analysis software tool installed on the test system has the functions of real-time network packet capture, network protocol analysis and statistics compilation. It aids the analysis of the signalling and media stream in the conformance test.

7.2.2 Standard devices

Standard devices include a standard IPC, standard NVR and standard decoding device.

8 Test environment

8.1 Device test environment

8.1.1 Acquisition, encoding, storage device

To test the acquisition, encoding and storage devices, the test system and auxiliary device should be deployed and configured in the test environment. The test objects are acquisition, encoding and storage devices. Table 8-1 describes the test environment for the acquisition, encoding and storage devices. Figure 8-1 is a device connection diagram of the acquisition, encoding, storage device conformance test.

Table 8-1 – Test environment for acquisition, encoding and storage devices

Number	Name	Usage	Note
1	Acquisition, encoding, storage devices	Test object	Test whether the signalling a device sends and receives, and the media streams it sends, meet the relevant requirements of [ITU-T H.627]. The acquisition, encoding and storage devices should be configured with parameters such as device identifier (ID), channel ID, and alarm input device ID in accordance with [ITU-T H.626].
2	Test system	Test tools	Used for platform, conversion gateway and main video surveillance device-related functional test.
3	Auxiliary device	Auxiliary test	A standard IPC provides a video source for an NVR; an analogue camera provides a video source for a DVR; a pan/tilt/zoom (PTZ) auxiliary device is used for the remote control functional test of the encoder and camera without PTZ; an alarm switch is used to trigger the alarm to assist in the test of alarm-related functions; audio output, audio input and front-end audio acquisition devices are used for the voice broadcasting and voice intercom-related functional test of the tested encoding device.

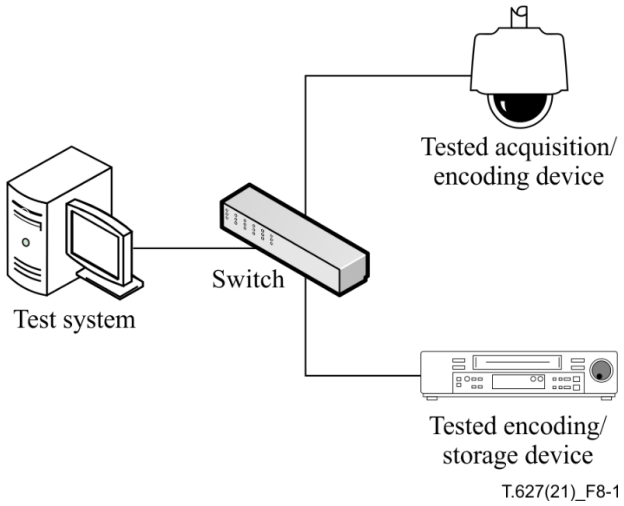

Figure 8-1 – Device connection diagram of an acquisition, encoding and storage device conformance test

8.1.2 Decoding device

To test the decoding device, the test system and monitor should be deployed and configured in the test environment. The test object is the decoding device. Table 8-2 describes the test environment for the decoding device. Figure 8-2 is a device connection diagram of the decoding device conformance test.

Table 8-2 – Decoding device test environment

Number	Name	Usage	Note
1	Decoding device	Test object	Test whether the sending and receiving signalling meets the relevant requirements of [ITU-T H.627] and the ability to decode the standard media streams. The decoding device should be configured with parameters such as decoding device ID, display ID, IP, port and password in accordance with [ITU-T H.626].

Table 8-2 – Decoding device test environment

Number	Name	Usage	Note
2	Test system	Test tools	Used for the platform, conversion gateway and main video surveillance device-related functional test.
3	Monitor	Auxiliary decoding test output display	Used to view the decoded video stream.

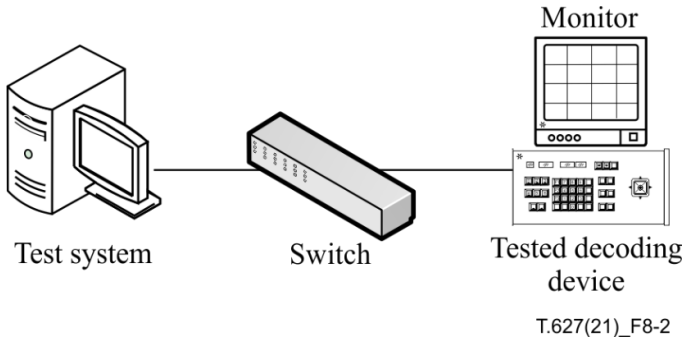

Figure 8-2 – Device connection diagram of a decoding device conformance test

8.2 Conversion gateway test environment

To test the conversion gateway, the test system and auxiliary device should be deployed and configured in the test environment. The test object is the conversion gateway. Table 8-3 describes the test environment of the conversion gateway. Figure 8-3 is a device connection diagram of the conversion gateway conformance test.

Table 8-3 – Conversion gateway test environment

Number	Name	Usage	Note
1	Conversion gateway	Test object	Test whether the signalling a gateway sends and receives, and the media streams it sends, meet the relevant requirements of [ITU-T H.627]. The conversion gateway should be configured with parameters such as device ID, channel ID and alarm input device ID in accordance with [ITU-T H.626].
2	Test system	Test tools	Used for the platform, conversion gateway, and main video surveillance device-related functional test.

Table 8-3 – Conversion gateway test environment

Number	Name	Usage	Note
3	Auxiliary device	Auxiliary test	Acquisition, encoding and storage devices are used for video and audio on demand, video download, PTZ control and other related functional tests; an alarm switch is used to trigger the alarm to assist in the test of alarm-related functions; audio output, audio input and front-end audio acquisition devices are used for the voice broadcasting and voice intercom related functional test of the test object.

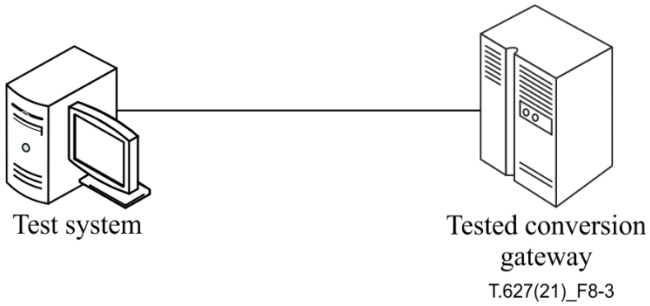

Figure 8-3 – Device connection diagram of a conversion gateway conformance test

8.3 Platform test environment

To test the platform, the test system and auxiliary device should be deployed and configured in the test environment. Table 8-4 describes the test environment description of the platform. Figure 8-4 is a device connection diagram of the platform conformance test.

Table 8-4 – Platform test environment

Number	Name	Usage	Note
1	Platform	Test object	Test whether the signalling a platform sends and receives, and the media streams it sends, meet the relevant requirements of [ITU-T H.627].
2	Test system	Test tools	Used for the platform, conversion gateway and main video surveillance device-related functional test.
3	Auxiliary device	Auxiliary test	A standard NVR is used for the video recording-related functional test; a standard IPC is used for the video source and remote control related functional test; a standard decoding device is used for the decoding-related functional test; a monitor is used to view the decoded video stream; an alarm switch is used to trigger the alarm to assist in the test of alarm-related functions; audio output, audio input and front-end audio acquisition devices are used for the voice broadcasting and voice intercom related functional test of the test object.

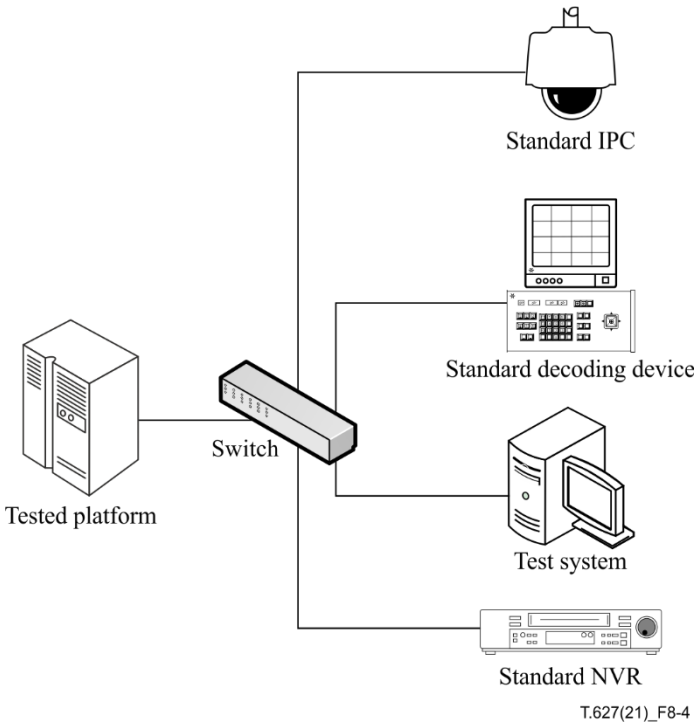

Figure 8-4 – Device connection diagram of the platform conformance test

9 Test requirements

9.1 Test items and test methods

According to the functions specified in [ITU-T H.627], the conformance test is carried out for the platform, conversion gateway and main devices in the video surveillance system. The test items and test methods are specified in Annex A.

9.2 Test content and test criteria

9.2.1 Registration and de-registration

For the registration and de-registration of the tested platform and tested device, the test objective is to check whether the basic registration/de-registration signalling process and content meet the requirements of clause 8.1 of [ITU-T H.627]. Table 9-1 describes the registration and de-registration tests.

Table 9-1 – Registration and de-registration tests

Test items	Test contents	Test criteria
Registration and de-registration	The tested platform (uplink test)/the tested device registers/de-registers with the test system; the tested platform (downlink test) accepts registration/de-registration of the test system.	The signalling process and content are correct, and registration/de-registration is successful.

9.2.2 Real-time media stream

For the real-time media stream of a tested platform and tested device, the test objective is to check whether the signalling process and the content of requesting the real-time media stream meet the requirements of clause 8.2 of [ITU-T H.627], as well as whether the media stream meets the requirements of clause 7.6 of [ITU-T H.627]. Table 9-2 describes the real-time media steam test.

Table 9-2 – Real-time media stream test

Test items	Test contents	Test criteria
Real-time media stream	The test system requests a real-time media stream from the tested platform (uplink test) and the tested device; the tested platform (downlink test) requests a real-time media stream from the test system.	The signalling process and content are correct, and audio and video playback formats are compliant.

9.2.3 Device control

9.2.3.1 Non-responsive device control

For non-responsive device control of the tested platform and tested device, the test objective is to check whether the signalling process and content of the non-responsive device control meet the requirements of clause 8.3.3 of [ITU-T H.627]. Table 9-3 describes the non-responsive device control test.

Table 9-3 – Non-responsive device control test

Test items	Test contents	Test criteria
Non-responsive device control	The test system sends PTZ control, remote booting, mandatory key frame, zoom-in, zoom-out, PTZ precise angle control and on-screen display (OSD) configuration commands to the tested platform (uplink test) and tested device; the tested platform (downlink test) sends PTZ control, remote booting, mandatory key frame, zoom-in, zoom-out, PTZ precise angle control and OSD configuration commands to the test system.	The signalling process and content are correct, and the device control is effective.

9.2.3.2 Responsive device control

For responsive device control of the tested platform and tested device, the test objective is to check whether the signalling process and content of the responsive device control meet the requirements of clauses 8.3.1, 8.3.2, and 8.13 of [ITU-T H.627]. Table 9-4 describes the responsive device control test.

Table 9-4 – Responsive device control test

Test items	Test contents	Test criteria
Responsive device control	The test system sends recording control, guard/unguard, alarm reset, guard control, device configuration and instant image snapshot commands to the tested platform (uplink test) and tested device; the tested platform (downlink test) sends recording control, guard/unguard, alarm reset, guard control, device configuration and instant image snapshot commands to the test system.	The signalling process and content are correct, and the device control is effective.

9.2.4 Alarm event notification and distribution

For alarm emission from the alarm device of the tested platform and the tested alarm device, the test objective is to check whether the signalling process and content of the alarm event notification and distribution meet the requirements of clause 8.4 of [ITU-T H.627], and whether the alarm parameters comply with clause A.2.5 b) of [ITU-T H.627]. Table 9-5 describes the alarm event notification and distribution test.

Table 9-5 – Alarm event notification and distribution test

Test items	Test contents	Test criteria
Alarm event notification and distribution	The tested platform (uplink test) and tested device send alarm event notifications to the test system; the tested platform (downlink test) receives the alarm event notification sent by the test system.	The signalling process and content are correct, and the alarm message is sent successfully.

9.2.5 Device information query

For a device information query of the tested platform and tested device, the test objective is to check whether the signalling process and content of the device information query meet the requirements of clause 8.5 of [ITU-T H.627]. Table 9-6 describes the device information query test.

Table 9-6 – Device information query test

Test items	Test contents	Test criteria
Device information query	The test system sends directory query, information query, status query, configuration query and preset position query commands to the tested platform (uplink test) and tested device; the tested platform (downlink test) sends directory query, information query, status query, configuration query and preset position query commands to the test system.	The signalling process and content are correct, and the device information query is correct.

9.2.6 Status information reporting

For status information reporting of the tested platform and tested device, the test objective is to check whether the signalling process and content of status information reporting meet the requirements of clause 8.6 of [ITU-T H.627]. Table 9-7 describes the status information-reporting test.

Table 9-7 – Status information-reporting test

Test items	Test contents	Test criteria
Status information reporting	The tested platform (uplink test) and tested device send heartbeat status information reporting to the test system; the tested platform (downlink test) receives heartbeat status information reporting sent by the test system.	The signalling process and content are correct, and the heartbeat status information sent according to the set time interval.

9.2.7 Historical media file retrieval

For historical media file retrieval of the tested platform and tested device, the test objective is to check whether the signalling process and content of historical media file retrieval meet the requirements of clause 8.7 of [ITU-T H.627]. Table 9-8 describes the historical media file retrieval test.

Table 9-8 – Historical media file retrieval test

Test items	Test contents	Test criteria
Historical media file retrieval	The tested platform (uplink test) and tested device accept the historical media file retrieval request of the test system; the tested platform (downlink test) retrieves the historical media files from the test system.	The signalling process and content are correct, and the retrieval result of the historical media file is correct.

9.2.8 Historical media file playback

For historical media file playback of the tested platform and tested device, the test objective is to check whether the signalling process and content of historical media file playback and playback control meet the requirements of clause 8.8 of [ITU-T H.627], as well as whether the media streams meet the requirements of clause 7.6 of [ITU-T H.627]. Table 9-9 describes the historical media file playback test.

Table 9-9 – Historical media file playback test

Test items	Test contents	Test criteria
Historical media file playback	The test system sends historical media file playback and playback control commands to the tested platform (uplink test) and tested device; the tested platform (downlink test) sends historical media file playback and playback control commands to the test system.	The signalling process and content are correct, the format of historical media file is compliant, and the playback control is effective.

9.2.9 Historical media file download

For historical media file download from the tested platform and tested device, the test objective is to check whether the signalling process and content of historical media file download meet the requirements of clause 8.9 of [ITU-T H.627], as well as whether the media streams meet the requirements of clause 7.6 of [ITU-T H.627]. Table 9-10 describes the historical media file download test.

Table 9-10 – Historical media file download test

Test items	Test contents	Test criteria
Historical media file download	The test system downloads historical media files from the tested platform (uplink test) and tested device; the tested platform (downlink test) downloads historical media files from the test system.	The signalling process and content are correct, and the historical media file is downloaded successfully.

9.2.10 Time calibration

For time calibration of the tested platform and tested device, the test objective is to check whether the signalling process and content of time calibration meet the requirements of clause 8.10 of [ITU-T H.627]. Table 9-11 describes the time calibration test.

Table 9-11 – Time calibration test

Test items	Test contents	Test criteria
Time calibration	The test system sends a time calibration command to the tested platform (uplink test) and tested device; the tested platform (downlink test) sends a time calibration command to the test system.	The signalling process and content are correct, and the time is calibrated successfully.

9.2.11 Subscription and notification

9.2.11.1 Directory subscription/unsubscription

For directory subscription/unsubscription of the tested platform, the test objective is to check whether the signalling process and content of directory subscription/unsubscription between the platforms meet the requirements of clause 8.11.3 of [ITU-T H.627]. Table 9-12 describes the directory subscription/unsubscription test.

Table 9-12 – Directory subscription/unsubscription test

Test items	Test contents	Test criteria
Directory subscription/un-subscription	The test system sends the directory subscription/unsubscription commands to the tested platform (uplink test); the tested platform (downlink test) sends the directory subscription/unsubscription command to the test system.	The signalling process and content are correct, and the directory subscription/unsubscription between the platforms is successful.

9.2.11.2 Directory notification

For the directory notification of the tested platform, the test objective is to check whether the signalling process and content of directory notification between the platforms meet the requirements of clause 8.11.4 of [ITU-T H.627]. Table 9-13 describes the directory notification test.

Table 9-13 – Directory notification test

Test items	Test contents	Test criteria
Directory notification	The tested platform (uplink test) sends a directory notification command to the test system; the tested platform (downlink test) receives the directory notification sent by the test system.	The signalling process and content are correct, and the directory notification between the platforms is effective.

9.2.11.3 Event subscription/unsubscription

For event subscription/unsubscription of the tested platform and tested device, the test objective is to check whether the signalling process and content of event subscription/unsubscription meet the requirements of clause 8.11.1 of [ITU-T H.627]. Table 9-14 describes the event subscription/unsubscription test.

Table 9-14 – Event subscription/unsubscription test

Test items	Test contents	Test criteria
Event subscription unsubscription	The test system sends the event subscription/unsubscription command to the tested platform (uplink test) and tested device; the tested platform (downlink test) sends the event subscription/unsubscription command to the test system.	The signalling process and content are correct, and the event subscription/unsubscription is successful.

9.2.11.4 Event notification

For event notification of the tested platform and tested device, the test objective is to check whether the signalling process and content of event notification meet the requirements of clause 8.11.2 of [ITU-T H.627]. Table 9-15 describes of the event notification test.

Table 9-15 – Event notification test

Test items	Test contents	Test criteria
Event notification	The tested system (uplink test) and the tested device send an event notification to the test platform; the tested platform (downlink test) receives the event notification sent by the test system.	The signalling process and content are correct, and the event notification is effective.

9.2.12 Audio broadcast and audio intercom

For audio broadcast and audio intercom of the tested platform and tested device, the test objective is to check whether the signalling process and content of audio broadcast and audio intercom meet the requirements of clause 8.12 of [ITU-T H.627], as well as whether the media streams meet the requirements of clause 7.6 of [ITU-T H.627]. Table 9-16 describes the audio broadcast and audio intercom test.

Table 9-16 – Audio broadcast and audio intercom test

Test items	Test contents	Test criteria
Audio broadcast and audio intercom	The test system sends audio broadcast and audio intercom commands to the tested platform (uplink test) and tested device; the tested platform (downlink test) sends the audio broadcast and audio intercom commands to the test system.	The signalling process and content are correct, and the audio broadcast and audio intercom is effective.

Annex A

Test items and test methods

(This annex forms an integral part of this Recommendation.)

A.1 Test of acquisition, encoding and storage devices

The test of video acquisition, encoding and storage devices is carried out according to Table A.1.

Table A.1 – Test of acquisition, encoding and storage devices

Number	Test items	Test methods	Test tools
1	Tested device registration	Register the tested device on the test system; the tested device refreshes the registration before the registration expiry to check whether the signalling process and content are correct, and whether the registration is successful.	Test system
2	Tested device de-registration	De-register the tested device from the test system to check whether the signalling process and content are correct, and whether the de-registration is successful.	Test system
3	Tested device time calibration	The tested device obtains the time from the test system to check whether the time calibration is successful.	Test system
4	Tested device heartbeat	Check whether the tested device sends a heartbeat message to the registered test system according to the set time interval, and whether the signalling process and content are correct.	Test system
5	Tested device directory query	The test system queries the directory and information of the tested device to check whether the signalling process and content are correct, and whether the directory query result of the tested device is correct.	Test system
6	Tested device real-time media stream	The test system plays the video and audio stream transmitted by the tested device in real time to check whether the tested device supports transmission control protocol (TCP; active and passive connection)/user datagram protocol (UDP) media stream mode, and whether the media parameter values comply with the specification.	Test system
7	Tested device remote control	The test system remotely controls IPC and the acquisition devices connected to DVR/NVR to make up, down, left, right, zoom in, zoom out, pull frame zoom in, pull frame zoom out operations to check whether the remote control of the tested device is effective.	Test system
8	Tested device remote control cancel	The test system cancels the remote control of IPC and the acquisition devices connected to DVR/NVR to check whether the remote control cancel of the tested device is effective.	Test system
9	Tested device preset position setting	The test system sets the preset position of IPC and the acquisition devices connected to DVR/NVR to check whether the preset position setting of the tested device is effective.	Test system

Table A.1 – Test of acquisition, encoding and storage devices

Number	Test items	Test methods	Test tools
10	Tested device preset position query	The test system queries the preset position of IPC and the acquisition devices connected to DVR/NVR to check whether the preset position query result of the tested device is correct.	Test system
11	Tested device preset position call	The test system calls the preset position of IPC and the acquisition devices connected to DVR/NVR to check whether the preset position call of the tested device is effective.	Test system
12	Tested device preset position cancel	The test system deletes the preset position of IPC and the acquisition devices connected to DVR/NVR to check whether preset position deletion of the tested device is successful.	Test system
13	Tested device guard control	The test system sets/cancels the guard position of IPC and the acquisition devices connected to DVR/NVR to check whether the guard control of the tested device is effective.	Test system
14	Tested device mandatory key frame	The test system sends the mandatory key frame command to the tested device to check whether the tested device sends the key frame in the video stream immediately.	Test system
15	Tested device video files retrieval	The test system retrieves the video files of the tested device to check whether the retrieval results sent by the tested device are correct; whether the retrieval result reply supports UDP and TCP transmission; whether there are replies to the message with SumNum equal to 0 when there is no video file.	Test system
16	Tested device video and audio file playback and playback control	The test system plays the video recording of the tested device back to check whether the playback control including play, pause, fast play, slow play, and random drag and drop of the tested device is effective; after playback, checks whether the tested device sends a flag of playback end; checks whether the tested device supports TCP (active and passive connection)/UDP playback mode; and whether the media parameter values comply with the specification.	Test system
17	Tested device starts manual recording	The test system sends a manual recording control command to the tested device to check whether the signalling process and content are correct, and whether the tested device starts the manual recording successfully.	Test system
18	Tested device stops manual recording	The test system sends a command to stop manual recording to the tested device to check whether the signalling process and content are correct, and whether the tested device stops the manual recording successfully.	Test system
19	Tested device guard	The test system sends a guard control command to the tested device to check whether the signalling process and content are correct, and whether the guard of the tested device is successful.	Test system

Table A.1 – Test of acquisition, encoding and storage devices

Number	Test items	Test methods	Test tools
20	Tested device unguard	The test system sends an unguard control command to the tested device to check whether the signalling process and content are correct, and whether the tested device is successfully unguarded.	Test system
21	Tested device alarm	The tested device sends alarm messages to the test system to check whether the signalling process and content are correct.	Test system
22	Tested device alarm reset	The test system sends an alarm reset command to the tested device to check whether the signalling process and content are correct, and whether the alarm reset of the tested device is successful.	Test system
23	Tested device information query	The test system sends a device information query command to the tested device to check whether the signalling process and content are correct, and whether the device information query result is correct.	Test system
24	Tested device status query	The test system sends a device status query command to the tested device to check whether the signalling process and content are correct, and whether the device status query result is correct.	Test system
25	Tested device video and audio file download	The test system sends a video and audio file download command with parameters such as download speed to the tested device to check whether the tested device returns the parameters of download speed and file size to the test system, and sends the video and audio stream; checks whether the tested device sends the download completion notification message to the test system after the download is completed; checks whether the tested device supports TCP (active and passive connection)/UDP download mode; checks whether the media parameter values comply with the specification.	Test system
26	Tested device remote booting	The test system sends the remote booting command to the tested device to check whether the signalling process and content are correct and whether the tested device is rebooted successfully.	Test system
27	Tested device registered heartbeat status detection	Check whether the tested device can determine that the test system is offline after registration failure or continuous heartbeat timeout reaches the specified number, and reinitiate registration at an interval.	Test system
28	Tested device media stream keepalive mechanism detection	After the tested device detects that the test system is offline, check whether the tested device stops sending media stream to the test system.	Test system
29	Tested device configuration acquisition	The test system sends a device basic parameter configuration acquisition command to the tested device to check whether the signalling process and content are correct, and whether the configuration acquisition of the tested device is successful.	Test system

Table A.1 – Test of acquisition, encoding and storage devices

Number	Test items	Test methods	Test tools
30	Tested device configuration	The test system sends a device basic parameter configuration command to the tested device to check whether the signalling process and content are correct, and whether the parameter configuration of the tested device is successful	Test system
31	Tested device event subscription/ unsubscription	The test system sends an event subscription/ unsubscription command to the tested device to check whether the signalling process and content are correct, and whether the event subscription of the tested device is successful.	Test system
32	Tested device event notification	After the test system sends the event subscription to the tested device successfully, the tested device sends the event notification to the test system to check whether the signalling process and content are correct, and whether the event notification of the tested device is correct.	Test system
33	Tested device audio broadcast and audio intercom	The test system dispatches the tested device to establish a voice broadcast channel to check whether the signalling process and content are correct, and whether the voice intercom is realized, combined with the real-time media stream of the tested device.	Test system
34	Tested device image snapshot	The test system sends an instant image snapshot command to the tested device, and the tested device sends the snapshot path to the test system to check whether the signalling process and content are correct and whether the image is uploaded correctly.	Test system
NOTE – Test items with serial numbers 15-18, 25 and 31-34 can be selected according to the specific encoding device function.			

A.2 Decoding device test

The decoding device test is carried out according to Table A.2.

Table A.2 – Decoding device test

Number	Test items	Test methods	Test tools
1	Tested device registration	Register the tested device on the test system, and the tested device refreshes registration before registration expiry to check whether the signalling process and content are correct, and whether the registration is successful.	Test system
2	Tested device de-registration	De-register the tested device from the test system to check whether the signalling process and content are correct, and whether the de-registration is successful.	Test system
3	Tested device time calibration	The tested device obtains the time from the test system to check whether the time calibration is successful.	Test system

Table A.2 – Decoding device test

Number	Test items	Test methods	Test tools
4	Tested device heartbeat	Check whether the tested device sends a heartbeat message to the registered test system according to the set time interval, and whether the signalling process and content are correct.	Test system
5	Tested device directory query	The test system queries the directory and information of the tested device to check whether the signalling process and content are correct, and whether the directory query result of the tested device is correct.	Test system
6	Tested device real-time media stream	The test system plays a real-time media stream transmitted by the test system to check whether the tested device supports TCP (active and passive connection)/UDP media stream mode.	Test system
7	Tested device information query	The test system sends a device information query command to the tested device to check whether the signalling process and content are correct, and whether the device information query result is correct	Test system
8	Tested device status query	The test system sends a device status query command to the tested device to check whether the signalling process and content are correct, and whether the device status query result is correct.	Test system
9	Tested device remote booting	The test system sends a remote booting command to the tested device to check whether the signalling process and content are correct, and whether the tested device is rebooted successfully.	Test system
10	Tested device configuration acquisition	The test system sends a device basic parameter configuration acquisition command to the tested device to check whether the signalling process and content are correct, and whether the configuration acquisition of the tested device is successful.	Test system
11	Tested device configuration	The test system sends a device basic parameter configuration command to the tested device to check whether the signalling process and content are correct, and whether the parameter configuration of the tested device is successful.	Test system

A.3 Conversion gateway and platform test

The conversion gateway test is carried out according to Table A.3. The platform test is carried out according to Tables A.3 and A.4, including an uplink test (in Table A.3), a downlink test (in Table A.3), and a device access test (in Table A.4).

Table A.3 – Test of conversion gateway, uplink and downlink of platform

Number	Test items	Test methods	Test tools
1	Tested gateway/platform registration (uplink)	Register the tested gateway/platform on the test system, and the tested gateway/platform refreshes registration before registration expiry to check whether the signalling process and content are correct, and whether the registration is successful.	Test system

Table A.3 – Test of conversion gateway, uplink and downlink of platform

Number	Test items	Test methods	Test tools
2	Tested gateway/platform de-registration (uplink)	De-register the tested gateway/platform from the test system to check whether the signalling process and content are correct and whether the de-registration is successful.	Test system
3	Tested gateway/platform time calibration (uplink)	The tested gateway/platform obtains the time from the test system to check whether the time calibration is successful.	Test system
4	Tested gateway/platform heartbeat (uplink)	Check whether the tested gateway/platform sends a heartbeat message to the test system according to the set time interval, and whether the signalling process and content are correct.	Test system
5	Tested gateway/platform directory query (uplink)	The test system queries the directory of a tested gateway/platform to check whether the signalling process and content are correct, and whether the directory query result of the tested gateway/platform is correct, check whether the tested gateway/platform supports UDP, TCP method to send the directory.	Test system
6	Tested gateway/platform real-time media stream (uplink)	The test system plays a video and audio stream transmitted by a standard IPC connected to the tested gateway/platform in real time to check whether the tested gateway/platform supports TCP (active and passive connection)/UDP media stream mode, and whether the media parameters comply with the specification.	Test system
7	Tested gateway/platform remote control (uplink)	The test system remotely controls a standard IPC connected to the tested gateway/platform to make up, down, left, right, zoom in, zoom out, pull frame zoom in, pull frame zoom out operations to check whether the remote control of the tested gateway/platform is effective.	Test system
8	Tested gateway/platform remote control cancel (uplink)	The test system cancels the remote control of a standard IPC connected to the tested gateway/platform to check whether the remote control cancel of the tested gateway/platform is effective.	Test system
9	Tested gateway/platform preset position setting (uplink)	The test system sets the preset position of a standard IPC connected to the tested gateway/platform to check whether the preset position setting of the tested gateway/platform is effective.	Test system
10	Tested gateway/platform position query (uplink)	The test system queries the preset position of a standard IPC connected to the tested gateway/platform to check whether the preset position query result of the tested gateway/platform is correct.	Test system
11	Tested gateway/platform preset position call (uplink)	The test system calls the preset position of a standard IPC connected to the tested gateway/platform to check whether the preset position call of the tested gateway/platform is effective.	Test system

Table A.3 – Test of conversion gateway, uplink and downlink of platform

Number	Test items	Test methods	Test tools
12	Tested gateway/platform preset position deletion (uplink)	The test system deletes the preset position of a standard IPC connected to the tested gateway/platform to check whether preset position deletion of the tested gateway/platform is successful.	Test system
13	Tested gateway/platform guard control (uplink)	The test system sets/cancels the guard position of a standard IPC connected to the tested gateway/platform to check whether the guard control of the tested gateway/platform is effective.	Test system
14	Tested gateway/platform mandatory key frame (uplink)	The test system sends a mandatory key frame command to a standard IPC connected to the tested gateway/platform to check whether the standard IPC sends the key frame in the video stream immediately.	Test system
15	Tested gateway/platform video files retrieval (uplink)	The test system retrieves video files of a standard IPC connected to the tested gateway/platform to check whether the retrieval result supplied by the tested gateway/platform supports UDP and TCP transmission; whether there are replies to the message with SumNum equal to 0 when there is no video file.	Test system
16	Tested gateway/platform video and audio file playback and playback control (uplink)	The test system plays the video recording back of a standard IPC connected to the tested gateway/platform to check whether the playback control including play, pause, fast play, slow play and random drag and drop of the tested gateway/platform is effective; after playback, checks whether the tested gateway/platform sends the flag of playback end; checks whether the tested gateway/platform supports TCP (active and passive connection)/UDP playback mode and whether the media parameters comply with the specification.	Test system
17	Tested gateway/platform starts manual recording (uplink)	The test system sends a manual recording control command to the standard IPC connected to the tested gateway/platform to check whether the signalling process and content are correct, and whether the tested gateway/platform starts the manual recording successfully.	Test system
18	Tested gateway/platform stops manual recording (uplink)	The test system sends a command to stop manual recording to a standard IPC connected to the tested gateway/platform to check whether the signalling process and content are correct, and whether the tested gateway/platform stops the manual recording successfully.	Test system
19	Tested gateway/platform guard (uplink)	The test system sends the guard control command to the standard IPC connected to the tested gateway/platform to check whether the signalling process and content are correct, and whether the guard of the tested gateway/platform is successful.	Test system

Table A.3 – Test of conversion gateway, uplink and downlink of platform

Number	Test items	Test methods	Test tools
20	Tested gateway/platform unguard (uplink)	The test system sends the unguard control command to a standard IPC connected to the tested gateway/platform to check whether the signalling process and content are correct, and whether the tested gateway/platform is successfully unguarded.	Test system
21	Tested gateway/platform alarm (uplink)	The standard IPC sends alarm messages through the tested gateway/platform to the test system to check whether the signalling process and content are correct.	Test system
22	Tested gateway/platform alarm reset (uplink)	The test system sends an alarm reset command to a standard IPC connected to the tested gateway/platform to check whether the signalling process and content are correct, and whether the alarm reset of the tested gateway/platform is successful.	Test system
23	Tested gateway/platform information query (uplink)	The test system sends a device information query command to a standard IPC connected to the tested gateway/platform to check whether the signalling process and content are correct, and whether the device information query result replied by the tested gateway/platform is correct.	Test system
24	Tested gateway/platform status query (uplink)	The test system sends a device status query command to a standard IPC connected to the tested gateway/platform to check whether the signalling process and content are correct, and whether the device status query result replied by the tested gateway/platform is correct.	Test system
25	Tested gateway/platform video and audio file download (uplink)	The test system sends a video and audio file download command with parameters such as download speed to a standard IPC connected to the tested gateway/platform to check whether the tested gateway/platform returns the parameters of download speed and file size to the test system and sends the video and audio stream; checks whether the tested gateway/platform sends a download completion notification message to the test system after download is completed; checks whether the tested gateway/platform supports TCP (active and passive connection)/UDP download mode; checks whether media parameters comply with the specification.	Test system
26	Tested gateway/platform remote booting (uplink)	The test system sends a remote booting command to a standard IPC connected to the tested gateway/platform to check whether the signalling process and content are correct, and whether the standard IPC connected to the tested gateway/platform restarts successfully.	Test system
27	Tested gateway/platform registered heartbeat status detection (uplink)	Check whether a tested gateway/platform can determine that the test system is offline after registration failure or continuous heartbeat timeout reaches the specified number, and reinitiate registration at an interval.	Test system

Table A.3 – Test of conversion gateway, uplink and downlink of platform

Number	Test items	Test methods	Test tools
28	Tested gateway/platform media stream keepalive mechanism (uplink)	After a tested gateway/platform detects that the test system is offline, check whether the tested gateway/platform stops sending media stream to the test system.	Test system
29	Tested gateway/platform configuration acquisition (uplink)	The test system sends a device basic parameter configuration acquisition command to the standard IPC connected to the tested gateway/platform to check whether the signalling process and content are correct, and whether the configuration acquisition of the standard IPC connected to the tested gateway/platform is successful.	Test system
30	Tested gateway/platform configuration (uplink)	The test system sends a device basic parameter configuration command to the standard IPC connected to the tested gateway/platform to check whether the signalling process and content are correct, and whether the parameter configuration of a standard IPC connected to the tested gateway/platform is successful.	Test system
31	Tested gateway/platform event subscription/unsubscription (uplink)	The test system sends an event subscription/unsubscription command to a standard IPC connected to the tested gateway/platform to check whether the signalling process and content are correct, and whether the event subscription of the tested gateway/platform is successful.	Test system
32	Tested gateway/platform event notification (uplink)	After the test system sends an event subscription to a standard IPC connected to the tested gateway/platform successfully, the tested gateway/platform sends an event notification to the test system to check whether the signalling process and content are correct, and whether the event notification of the tested gateway/platform is correct.	Test system
33	Tested gateway/platform audio broadcast and audio intercom (uplink)	The test system dispatches a standard IPC connected to the tested gateway/platform to establish a voice broadcast channel to check whether the signalling process and content are correct, whether the voice stream sent to the standard IPC is effective, and whether the voice intercom is realized, combined with real-time video on demand of the tested gateway/platform.	Test system
34	Tested gateway/platform directory subscription/ unsubscription (uplink)	The test system sends a directory subscription/unsubscription command to the tested gateway/platform to check whether the signalling process and content are correct, and whether the directory subscription/unsubscription is successful.	Test system

Table A.3 – Test of conversion gateway, uplink and downlink of platform

Number	Test items	Test methods	Test tools
35	Tested gateway/platform directory subscription notification (uplink)	Check whether the tested gateway/platform reports offline status device information after the initial subscription; check whether the signalling process and content are correct, whether the tested gateway/platform notifies to the test system by subscription notification mode after the status and directory changes.	Test system
36	Tested gateway/platform image snapshot (uplink)	The test system sends an instant image snapshot command to the standard IPC connected to the tested gateway/platform, and the tested gateway/platform sends the snapshot path to the test system to check whether the signalling process and content are correct, and whether the image is uploaded correctly.	Test system
37	Tested gateway/platform registration (downlink)	Register the test system on the tested gateway/platform, and refreshes registration before registration expiry to check whether the signalling process and content are correct, and whether the registration is successful.	Test system
38	Tested gateway/platform de-registration (downlink)	De-register the test system from the tested gateway/platform to check whether the signalling process and content are correct and whether the de-registration is successful.	Test system
39	Tested gateway/platform time calibration (downlink)	The test system obtains the time from the tested gateway/platform to check whether the time calibration is successful.	Test system
40	Tested gateway/platform heartbeat (downlink)	Check whether the test system sends a heartbeat message to the tested gateway/platform according to the set time interval, and whether the signalling process and content are correct.	Test system
41	Tested gateway/platform directory query (downlink)	The tested gateway/platform queries the directory of the test system to check whether the signalling process and content are correct, and whether the directory query result of the tested gateway/platform is correct.	Test system
42	Tested gateway/platform real-time media stream (downlink)	Check whether the tested gateway/platform can play the video and audio steam from the test system in real time; whether the tested gateway/platform supports TCP (active and passive connection)/UDP media stream mode	Test system
43	Tested gateway/platform remote control (downlink)	The tested gateway/platform sends up, down, left, right, zoom in, zoom out, pull frame zoom in, pull frame zoom out operations to an IPC connected to the test system, check whether the signalling process and content are correct.	Test system
44	Tested gateway/platform remote control cancel (downlink)	The tested gateway/platform sends a remote control cancellation command to the IPC connected to test system, check whether the signalling process and content are correct.	Test system

Table A.3 – Test of conversion gateway, uplink and downlink of platform

Number	Test items	Test methods	Test tools
45	Tested gateway/platform preset position setting (downlink)	The tested gateway/platform sets the preset position of an IPC connected to the test system to check whether the signalling process and content are correct.	Test system
46	Tested gateway/platform position query (downlink)	The tested gateway/platform queries the preset position of an IPC connected to the test system to check whether the signalling process and content are correct.	Test system
47	Tested gateway/platform preset position call (downlink)	The tested gateway/platform calls the preset position of an IPC connected to the test system to check whether the signalling process and content are correct.	Test system
48	Tested gateway/platform preset position deletion (downlink)	The tested gateway/platform deletes the preset position of an IPC connected to the test system to check whether the signalling process and content are correct.	Test system
49	Tested gateway/platform guard control (downlink)	The tested gateway/platform sets/cancels the guard position of an IPC connected to the test system to check whether the signalling process and content are correct.	Test system
50	Tested gateway/platform mandatory key frame (downlink)	The tested gateway/platform sends a mandatory key frame command to an IPC connected to the test system to check whether the signalling process and content are correct.	Test system
51	Tested gateway/platform video files retrieval (downlink)	The tested gateway/platform retrieves video files from the test system to check whether the test gateway/platform supports receiving the video file information through UDP, TCP.	Test system
52	Tested gateway/platform video and audio file playback and playback control (downlink)	The tested gateway/platform plays the video recording back of the test system, and performs playback control of play, pause, fast play, slow play and random drag-and-drop; when the playback is over, the test system sends a playback completion notification message to check whether the tested gateway/platform disconnects the playback channel; checks whether the tested gateway/platform supports TCP (active and passive connection mode)/UDP playback mode.	Test system
53	Tested gateway/platform starts manual recording (downlink)	The tested gateway/platform sends a manual recording control command to an IPC connected to the test system, check whether the signalling process and content are correct.	Test system
54	Tested gateway/platform stops manual recording (downlink)	The tested gateway/platform sends a command to stop manual recording to the IPC connected to the test system, check whether the signalling process and content are correct.	Test system

Table A.3 – Test of conversion gateway, uplink and downlink of platform

Number	Test items	Test methods	Test tools
55	Tested gateway/platform guard (downlink)	The tested gateway/platform sends a guard command to the test system, check whether the signalling process and content are correct.	Test system
56	Tested gateway/platform unguard (downlink)	The tested gateway/platform sends an unguard command to the test system, check whether the signalling process and content are correct.	Test system
57	Tested gateway/platform alarm (downlink)	The IPC sends alarm messages through the test system to the tested gateway/platform to check whether the tested gateway/platform receives the messages and displays them.	Test system
58	Tested gateway/platform alarm reset (downlink)	The tested gateway/platform sends an arm reset command to the test system, check whether the signalling process and content are correct.	Test system
59	Tested gateway/platform information query (downlink)	The tested gateway/platform sends an information query command to the test system, check whether the signalling process and content are correct.	Test system
60	Tested gateway/platform status query (downlink)	The tested gateway/platform sends a status query command of to the test system, check whether the signalling process and content are correct.	Test system
61	Tested gateway/platform video and audio file download (downlink)	The tested gateway/platform sends a video and audio file download command to the test system, the test system sends the video and audio stream after receiving the command message, when the download is over, the test system sends a download completion notification message to the tested gateway/platform, checks whether the tested gateway/platform disconnects the download link; checks whether the tested gateway/platform supports the TCP (active and passive connection)/UDP download mode.	Test system
62	Tested gateway/platform remote booting (downlink)	The tested gateway/platform sends a remote booting command to the test system, check whether the signalling process and content are correct.	Test system
63	Tested gateway/platform registered heartbeat status detection (downlink)	Check whether the tested gateway/platform can determine that the test system is offline after the registration failure or continuous heartbeat timeout reaches the specified number.	Test system
64	Tested gateway/platform media stream keepalive mechanism (downlink)	After the tested gateway/platform detects that the test system is offline, check whether the tested gateway/platform disconnects the media stream link.	Test system

Table A.3 – Test of conversion gateway, uplink and downlink of platform

Number	Test items	Test methods	Test tools
65	Tested gateway/platform configuration acquisition (downlink)	The tested gateway/platform sends a device basic parameter configuration acquisition command to an IPC connected to the test system, check whether the signalling process and content are correct.	Test system
66	Tested gateway/platform configuration (downlink)	The tested gateway/platform sends a device basic parameter configuration command to an IPC connected to the test system, check whether the signalling process and content are correct.	Test system
67	Tested gateway/platform event subscription/ unsubscription (downlink)	The tested gateway/platform sends an event subscription/unsubscription command to the IPC connected to the test system, check whether the signalling process and content are correct.	Test system
68	Tested gateway/platform event notification (downlink)	After the tested gateway/platform sends an event subscription to an IPC connected to the test system successfully, the test system sends an event notification to the tested gateway/platform to check whether the signalling process and content are correct.	Test system
69	Tested gateway/platform audio broadcast and audio intercom (downlink)	The tested gateway/platform dispatches an IPC connected to the test system to establish a voice broadcast channel to check whether the signalling process and content are correct, check whether the voice intercom is realized, combined with the real-time media stream of the tested gateway/platform.	Test system
70	Tested gateway/platform directory subscription/ unsubscription (downlink)	The tested gateway/platform sends a directory subscription/unsubscription command to the IPC connected to the test system, check whether the signalling process and content are correct.	Test system
71	Tested gateway/platform directory subscription notification (downlink)	The test system reports offline status device information after initial subscription, check whether the signalling process and content are correct; the test system sends the status change, directory change message, check whether the signalling process and content are correct, whether the tested gateway/platform updates the directory.	Test system
72	Tested gateway/platform image snapshot (downlink)	The tested gateway/platform sends an instant image snapshot command to an IPC connected to the test system, and the test system sends the snapshot path to the tested gateway/platform, check whether the signalling process and content are correct and whether the image is uploaded correctly.	Test system

Table A.4 – Standard device access test

Number	Testing items	Testing methods	Test tools
1	NVR device registration	Register the standard NVR on the tested platform and refresh registration before registration expiry to check whether the signalling process and content are correct, and whether the registration is successful.	test system, standard NVR, standard IPC
2	NVR device de-registration	De-register the standard NVR from the tested platform, and check whether the signalling process and content are correct and whether the de-registration is successful.	test system, standard NVR, standard IPC
3	NVR device time calibration	The standard NVR obtains the time from the tested platform to check whether the time calibration is successful.	test system, standard NVR, standard IPC
4	NVR device heartbeat	Check whether the standard NVR sends a heartbeat messages to the registered tested platform according to the set time interval, and whether the signalling process and content are correct.	test system, standard NVR, standard IPC
5	NVR device directory query	The tested platform queries the directory and equipment information of the standard NVR to check whether the signalling process and content are correct, and whether the query result of the standard NVR directory is correct.	test system, standard NVR, standard IPC
6	NVR real time media stream	The tested platform plays the video and audio stream transmitted by the standard NVR in real time, and checks whether the platform under test supports TCP (active and passive connection mode)/UDP media stream mode.	test system, standard NVR, standard IPC
7	NVR device remote control	The tested platform remotely controls the acquisition device connected to the standard NVR, performs the operations of up, down, left, right, zoom in, zoom out, pull frame zoom out, etc., and checks whether the signalling process and content are correct, and whether the remote control of the standard NVR device is effective.	test system, standard NVR, standard IPC
8	NVR device remote control cancellation	The tested platform cancels the remote control of the acquisition device connected to the standard NVR, and checks whether the signalling process and content are correct, and whether the cancellation of the remote control of the standard NVR equipment is effective.	test system, standard NVR, standard IPC
9	NVR preset setting	The tested platform sets the preset position of the acquisition device connected to the standard NVR to check whether the signalling process and content are correct, and whether the preset bit setting of the standard NVR equipment is effective.	test system, standard NVR, standard IPC
10	NVR preset position query	The tested platform queries the preset position of the acquisition device connected to the standard NVR to check whether the signalling process and content are correct, and whether the query result of the preset position of the standard NVR device is correct.	test system, standard NVR, standard IPC

Table A.4 – Standard device access test

Number	Testing items	Testing methods	Test tools
11	NVR preset position calling	The tested platform calls the preset position of the acquisition device connected to the standard NVR to check whether the signalling process and content are correct, and whether the call of the preset position of the standard NVR device is effective.	test system, standard NVR, standard IPC
12	NVR preset position deletion	The tested platform deletes the preset position of the acquisition device connected to the standard NVR, checks whether the signalling process and content are correct, and whether the deletion of the preset position of the standard NVR device is effective.	test system, standard NVR, standard IPC
13	NVR guard control	The tested platform sets/cancels the guard position of the acquisition device connected to the standard NVR, and checks whether the signalling process and content are correct, and whether the guard bit control of the standard NVR device is effective.	test system, standard NVR, standard IPC
14	NVR mandatory key frame	The tested platform sends the mandatory key frame command to the standard NVR to check whether the standard NVR sends the key frame in the video and audio stream immediately.	test system, standard NVR, standard IPC
15	NVR device video file retrieval	The tested platform retrieves the video files in the standard NVR to check whether the tested platform supports receiving video file information through UDP and TCP.	test system, standard NVR, standard IPC
16	Video and audio file playback and playback control of NVR device	The tested platform plays video and audio files back in the standard NVR, and performs the playback control to check whether the playback control of standard NVR play, pause, fast play, slow play and random drag and drop is effective; at the end of playback, the standard NVR sends a playback completion notification message to check whether the tested platform has disconnected the playback link; and whether the tested platform supports TCP (active and passive connection mode)/UDP playback mode.	test system, standard NVR, standard IPC
17	NVR device starts manual recording	The tested platform sends a manual recording control command to the standard NVR to check whether the signalling process and content are correct, and whether the standard NVR starts the manual recording successfully.	test system, standard NVR, standard IPC
18	NVR device stops manual recording	The tested platform sends a command to stop manual recording to a standard NVR device to check whether the signalling process and content are correct, and whether the standard NVR stops the manual recording successfully.	test system, standard NVR, standard IPC
19	NVR device guard	The tested platform sends a guard command to the standard NVR to check whether the signalling process and content are correct and whether the guard of the standard NVR is successful.	test system, standard NVR, standard IPC

Table A.4 – Standard device access test

Number	Testing items	Testing methods	Test tools
20	NVR device unguard	The tested platform sends an unguard command to the standard NVR to check whether the signalling process and content are correct and whether the unguard of the standard NVR has successfully proceeded.	test system, standard NVR, standard IPC
21	NVR device alarm	The standard NVR sends device alarm messages to the tested platform with guard to check whether the signalling process and content are correct.	test system, standard NVR, standard IPC
22	NVR device alarm reset	The tested platform sends an alarm reset command to the standard NVR to check whether the signalling process and content are correct and whether the standard NVR alarm reset is successful.	test system, standard NVR, standard IPC
23	NVR device information query	The tested platform sends a device information query command to the standard NVR to check whether the signalling process and content are correct, and whether the standard NVR information query result is correct.	test system, standard NVR, standard IPC
24	NVR device status query	The tested platform sends a device status query command to the standard NVR to check whether the signalling process and content are correct, and whether the standard NVR status query result is correct.	test system, standard NVR, standard IPC
25	NVR device video and audio file download	The tested platform sends an video and audio file download command with download speed and other parameters to the standard NVR device, checks whether the standard NVR receives the message, whether the parameters such as download speed and file size are sent back to the tested platform, and sends the video and audio stream; checks whether the platform under test supports TCP (active and passive connection mode)/UDP download mode; after the download, the standard NVR sends the download completion notice message to check whether the tested platform is disconnected from the download link.	test system, standard NVR, standard IPC
26	NVR device remote start	The tested platform sends a remote boot command to the standard NVR to check whether the signalling process and content are correct and whether the standard NVR restart is successful.	test system, standard NVR, standard IPC
27	NVR device configuration query	The tested platform sends a device configuration query command to the standard NVR to check whether the signalling process and content are correct and whether the query of the basic parameter configuration of the standard NVR is successful.	test system, standard NVR, standard IPC
28	NVR device configuration	The tested platform sends the basic parameter configuration command to the standard NVR to check whether signalling process and content are correct and whether the basic parameter configuration of the standard NVR is successful.	test system, standard NVR, standard IPC

Table A.4 – Standard device access test

Number	Testing items	Testing methods	Test tools
29	NVR event subscription/ unsubscription	The tested platform sends an event subscription/unsubscription command to the standard NVR to check whether the signalling process and content are correct, and whether the standard NVR event subscription/unsubscription is successful.	test system, standard NVR, standard IPC
30	NVR event notification	The standard NVR sends an event notification to the tested platform to check whether the signalling process and content are correct, and whether the event notification received by the tested platform is correct.	test system, standard NVR, standard IPC
31	NVR image snapshot	The tested platform sends a standard IPC image snapshot command to the standard NVR, checks whether the signalling process and content are correct, whether the image uploading is correct.	test system, standard NVR, standard IPC
32	IPC device registration	Register the standard IPC on the tested platform, and refresh registration before registration expiry to check whether the signalling process and content are correct, and whether the registration is successful.	test system, standard IPC
33	IPC device de-registration	De-register a standard IPC from the tested platform, and check whether the signalling process and content are correct and whether the de-registration is successful.	test system, standard IPC
34	IPC device time calibration	The standard IPC obtains the time from the tested platform to check whether the time calibration is successful.	test system, standard IPC
35	IPC device heartbeat	Check whether a standard IPC sends heartbeat messages to the registered tested platform according to the set time interval, and whether the signalling process and content are correct.	test system, standard IPC
36	IPC device directory query	The tested platform queries the directory and device information of a standard IPC to check whether the signalling process and content are correct, and whether the query result of the standard IPC directory is correct.	test system, standard IPC
37	IPC device real-time media stream	The tested platform plays the video and audio stream transmitted by a standard IPC in real time to check whether the platform supports TCP (active and passive connection mode)/UDP media stream mode.	test system, standard IPC
38	Remote control of IPC device	The tested platform remotely controls a standard IPC, performs the operations of up, down, left, right, zoom in, zoom out, pull frame zoom in, etc., checks whether the signalling process and content are correct, and whether the remote control of the standard IPC device is effective.	test system, standard IPC

Table A.4 – Standard device access test

Number	Testing items	Testing methods	Test tools
39	Remote control cancel of IPC device	The tested platform cancels the remote control of a standard IPC, and checks whether the signalling process and content are correct, and whether the cancellation of remote control of the standard IPC device is effective.	test system, standard IPC
40	IPC preset position setting	The tested platform sets the preset position of a standard IPC, to check whether the signalling process and content are correct, and whether the preset position setting of the standard IPC device is effective.	test system, standard IPC
41	IPC preset position query	The tested platform queries the preset position of a standard IPC, and checks whether the signalling process and content are correct, and whether the query results of the preset position of the standard IPC device are correct.	test system, standard IPC
42	IPC preset position call	The tested platform calls the preset position of a standard IPC to check whether the signalling process and content are correct, and whether the call of the standard IPC device preset position is effective.	test system, standard IPC
43	IPC preset position deletion	The platform under test deletes the preset position of a standard IPC, checks whether the signalling process and content are correct, and whether the deletion of preset position of the standard IPC device is effective.	test system, standard IPC
44	IPC guard control	The tested platform sets/cancels the guard position of a standard IPC, checks whether the signalling process and content are correct, and whether the guard position control of the standard IPC device is effective.	test system, standard IPC
45	IPC mandatory key frame	The tested platform sends a mandatory key frame command to a standard IPC, and checks whether the tested platform sends the key frame in the video stream to the IPC device immediately.	test system, standard IPC
46	IPC device video file retrieval	The tested platform retrieves the video files in a standard IPC to check whether the tested platform supports receiving video file information through UDP and TCP.	test system, standard IPC
47	Video and audio file playback and playback control of IPC device	The tested platform plays video and audio files back in the standard IPC, and performs playback control to check whether the playback control of the standard IPC play, pause, fast play, slow play and random drag and drop is effective; at the end of playback, the standard IPC sends a playback completion notification message to check whether the tested platform has disconnected the playback link, and whether the tested platform supports TCP (active and passive connection mode)/UDP playback mode.	test system, standard IPC

Table A.4 – Standard device access test

Number	Testing items	Testing methods	Test tools
48	IPC device starts manual recording	The tested platform sends a manual recording control command to a standard IPC to check whether the signalling process and content are correct, and whether the standard IPC starts the manual recording successfully.	test system, standard IPC
49	IPC device stops manual recording	The tested platform sends a command to stop manual recording to the standard IPC to check whether the signalling process and content are correct, and whether the standard IPC stops the manual recording successfully.	test system, standard IPC
50	IPC device guard	The tested platform sends a guard command to a standard IPC to check whether the signalling process and content are correct, and whether the standard IPC guard is successful.	test system, standard IPC
51	IPC device unguard	The tested platform sends an unguard command to the standard IPC to check whether the signalling process and content are correct, and whether the standard IPC unguard is successful.	test system, standard IPC
52	IPC device alarm	The standard IPC sends device alarm messages to the tested platform to check whether the signalling process and content are correct.	test system, standard IPC
53	IPC device alarm reset	The tested platform sends a device alarm reset command to the standard IPC to check whether signalling process and content are correct, and whether the device alarm reset of the standard IPC is successful.	test system, standard IPC
54	IPC device information query	The tested platform sends a device information query command to a standard IPC to check whether the signalling process and content are correct, and whether the query result of the standard IPC information is correct.	test system, standard IPC
55	IPC device status query	The tested platform sends a device status query command to a standard IPC to check whether the signalling process and content are correct, and whether the query result of the standard IPC status is correct.	test system, standard IPC

Table A.4 – Standard device access test

Number	Testing items	Testing methods	Test tools
56	IPC device audio and video file download	The tested platform sends a video and audio file download command with parameters such as download speed to a standard IPC device, checks whether the standard IPC receives the message, whether the parameters such as download speed and file size are sent back to the tested platform, and sends video and audio stream; checks whether the tested platform supports TCP (active and passive connection mode)/UDP download mode; when the download ends, the standard IPC sends a download completion notice message to check whether the tested platform is disconnected from the download link.	test system, standard IPC
57	IPC device remote start	The tested platform sends a remote start command to a standard IPC device to check whether the signalling process and content are correct, and whether the standard IPC is restarted successfully.	test system, standard IPC
58	IPC device configuration acquisition	The tested platform sends a device configuration acquisition command to the standard IPC to check whether the signalling process and content are correct, and whether the acquisition of basic parameter configuration of the standard IPC is successful.	test system, standard IPC
59	IPC device configuration	The tested platform sends a basic parameter configuration command to a standard IPC to check whether the signalling process and content are correct, and whether the basic parameter configuration of the standard IPC is successful.	test system, standard IPC
60	IPC event subscription/ unsubscription	The tested platform sends an event subscription/ unsubscription command to a standard IPC to check whether the signalling process and content are correct, and whether the standard IPC event subscription/unsubscription is successful.	test system, standard IPC
61	IPC event notification	A standard IPC sends event notification messages to the tested platform to check whether the signalling process and content are correct, and whether the event notification received by the tested platform is correct.	test system, standard IPC
62	IPC image snapshot	The tested platform sends the image snapshot command to the standard IPC to check whether the signalling process and content are correct, and whether the image uploading is correct.	test system, standard IPC
63	Decoding device registration	Register the standard decoding device on the tested platform, and refresh registration before registration expiry to check whether the signalling process and content are correct, and whether the registration is successful.	test system, standard decoder

Table A.4 – Standard device access test

Number	Testing items	Testing methods	Test tools
64	Decoding device de-registration	De-register a standard decoding device from the tested platform, and check whether the signalling process and content are correct, and whether the de-registration is successful.	test system, standard decoder
65	Decoding device time calibration	A standard decoding device obtains the time from the tested platform and checks whether the time calibration is successful.	test system, standard decoder
66	Decoding device heartbeat	Check whether a standard decoding device sends a heartbeat message to the registered tested platform according to the set time interval, and whether the signalling process and content are correct.	test system, standard decoder
67	Decoding device directory query	The tested platform queries the standard decoding device directory and device information to check whether the signalling process and content are correct, and whether the query result of the standard decoding device directory is correct.	test system, standard decoder
68	Decoding device real-time media stream	Check whether a standard decoding device can play the video and audio stream sent by the tested platform in real time, and whether the tested platform supports TCP (active and passive connection mode)/UDP media stream mode.	test system, standard decoder
69	Decoding device information query	The tested platform sends a device information query command to a standard decoding device to check whether the signalling process and content are correct, and whether the standard decoding device information query result is correct.	test system, standard decoder
70	Decoding device status query	The tested platform sends a device status query command to a standard decoding device to check whether the signalling process and content are correct, and whether the standard decoding device status query result is correct.	test system, standard decoder
71	Decoding device remote start	The tested platform sends a remote start command to a standard decoding device to check whether the signalling process and content are correct, and whether the standard decoding device is restarted successfully.	test system, standard decoder
72	Decoding device configuration acquisition	The tested platform sends a device configuration acquisition command to a standard decoding device to check whether the signalling process and content are correct, and whether the acquisition of the basic parameter configuration of the standard decoding device is successful.	test system, standard decoder
73	Decoding device configuration	The tested platform sends a device configuration command to a standard decoding device to check whether the signalling process and content are correct, and whether the basic parameter configuration of the standard decoding device is successful.	test system, standard decoder

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