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General multimedia application frameworks

Test specification for video surveillance networking

Recommendation ITU-T T.627

ITU-T

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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

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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>.

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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.

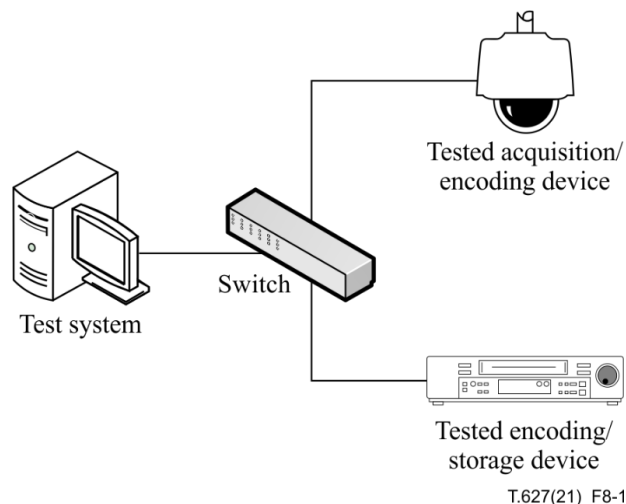


Figure 8-1 – Device connection diagram of an acquisition, encoding and storage device conformance test

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.

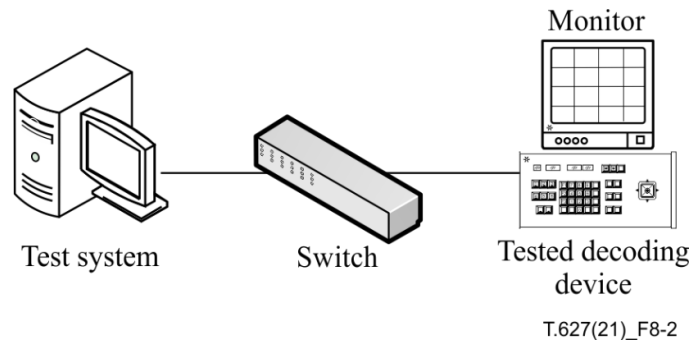


Figure 8-2 – Device connection diagram of a decoding device conformance test

8.2 Conversion gateway test environment

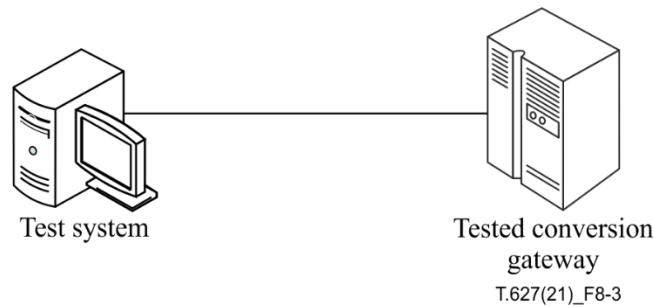
To test the conversion gateway, the test system and auxiliary device should be deployed and configured in the test environment. The test object is the conversion gateway. Table 8-3 describes the test environment of the conversion gateway. Figure 8-3 is a device connection diagram of the conversion gateway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

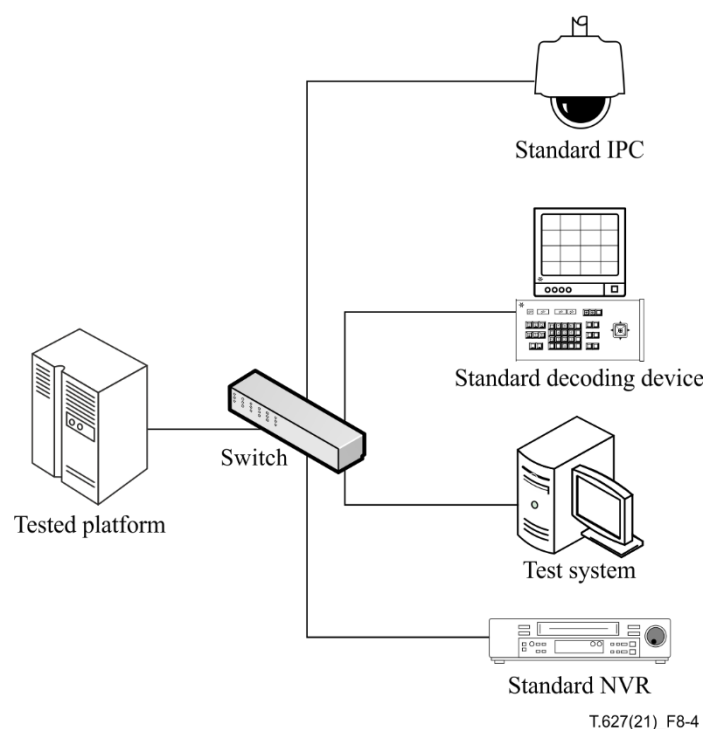


Figure 8-4 – Device connection diagram of the platform conformance test

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 stream test.