Interoperability Test Guideline

for IP Camera / Client

HATS Conference

(Promotion Conference of Harmonization of Advanced Telecommunication Systems)

Multimedia Communication Test Implementation Liaison Committee

Revision History

(Interoperability Test Guideline for IP Camera / Client)

Revision	Date	Description	Person in Charge
1.0	-----	Skipped revision	-----
1.1	2013/07/19	First edition	Oikawa

Contents

1 Background and Purpose

1.1 Background

With raising awareness of security and rapid progress in information technology, the usage of IP camera is increasing mainly as a surveillance camera. Due to the different protocols for each vendor, however, it is hard to integrate with the products of multiple vendors.

It is strongly required that the standardization of the protocol is promoted to create a favorable situation, or to shift the market from analogue camera to IP camera. For the sound development of these technologies, it is necessary to resolve various problems regarding interoperability between terminals and reflect the results to the standard.

1.2 Purpose

With the market share of the products based on the above standard growing, it is essential to ensure interoperability between the products in order to utilization of IP camera systems.

In this guideline, the contents and the procedures are provided to conduct such tests which check the minimum interoperability between the devices made by different manufacturers.

The specific interoperability tests are conducted by the "Multimedia Communication Test Implementation Liaison Committee: MMC TILC" of HATS admitted by "Communication and Information network Association of Japan: CIAJ". These tests attempt to ensure interoperability between each product and consequently, it is expected that the infrastructure to put the IP camera system in practice would be improved. We also hope that the effectiveness of the standard itself would increase and when planning new standards, it could be used as a reference.

1.3   Scope of interoperability test

The scope defined by this guideline is the interoperability between equipment compliant with the "ONVIF (Open Network Video Interface Forum) Profile Specification", instituted by ONVIF.

This guideline principally confirms the proper operations of device discovery, network connection, streaming configuration and decoding streaming by one-to-one connection of different devices.

This guideline provides a minimum necessary procedure for the interconnectivity test environment. Additional function tests may be added in the future according to necessity and demand.

Hereinafter, the "ONVIF Device" and "ONVIF Client", described in the specifications of ONVIF, are referred to as "IP camera" and "client" respectively.

2   Preconditions of Test

2.1   Standards to be confirmed

Following list shows the standards to be confirmed:

(1) ONVIF Core Specification

(2) ONVIF Profile S Specification

(3) ONVIF Test Specification

(4) ONVIF Conformance Process Specification

It is strongly recommended to support the latest version for each specification.

2.2   Pre-test

For each IP camera vendor, it is recommended to test with the latest "ONVIF Test Tool" that is provided by ONVIF under the local area network (LAN) environment defined in section 3.

For each client, it is recommended to correctly operate with at least FIVE (5) ONVIF Conform Devices supporting the same profile(s) the client claims conformance to. The FIVE ONVIF Devices shall be from FIVE (5) different manufacturers.

3   Interoperability Tests

3.1   Test environment

(1) Use the private environment separated from the local area network that is usually operated.

(2) Figure 3.1 and 3.2 shows the connection between the components of the test. Speakers or mikes are connected as necessary.
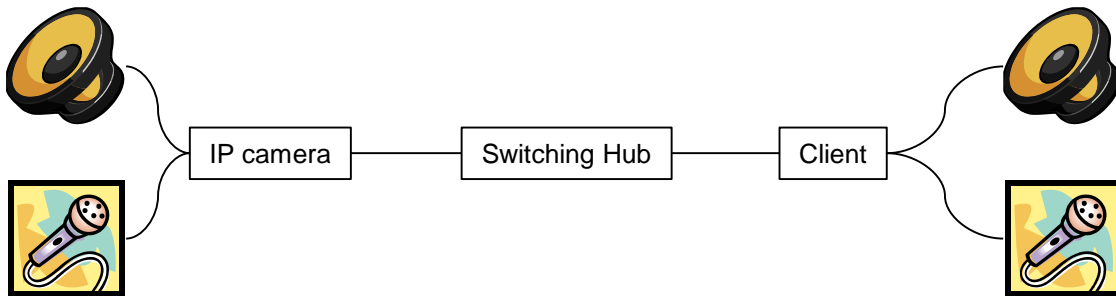

Figure 3.1 Connection between components
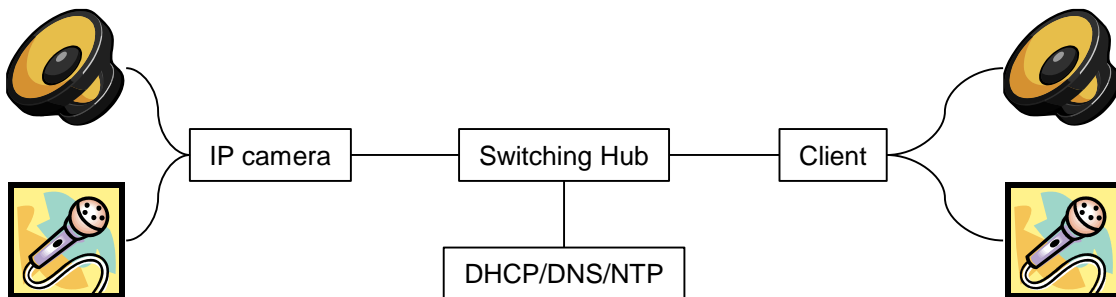
Figure3.2 Connection between components with external server(s)

(3) The components used for the test is connected to the test LAN. At this time, more than one component which is not used for the test may be connected to the same LAN. However, the caution needs to be taken so that these components do not affect each other's performance such as the bandwidth used.

3.2   Execution method

(1) On the date arranged beforehand, the test is conducted according to the procedures described in this chapter.

(2) The combination of the connection is round robin. Note that each manufacturer is responsible for the interoperability between the products made by its own and the test is assumed to have

been completed. Therefore, it is not included in the combination.

3.3   Testing procedures

First of all, turn on the client and confirm the normal operation. After that, turn on the IP camera.

(1)   Discover the IP camera from the client

(2)   Query the capabilities of IP camera from the client

(3)   Configure the desired setting to the IP camera from the client

(4)   Request streaming to the IP camera from the client

(5)   Confirm that the receiving and decoding of streaming is performed properly on the client

And then, change the order of power-up of the client and the IP camera, and repeat from (1) to (5).

Note that the detailed test items are described in the separate check sheet (Attachment 1).

3.4   Test results notation

On completion of the test, after both of the IP camera and the client check the results, the client fills in the separate check sheet (Attachment 1). If errors occur during the test, describe the situation as detailed as possible in the check sheet (phenomena, causes, actions, etc.) after the discussion between the testing vendors or with the Secretariat office. If you wish to re-test, indicate it in the MEMO of the check sheet.

3.5   Test items

In this guideline, the mandatory (1-3, 5) and conditional (4) items are defined as follows under normal operation. And the other items, for instance changing the mode during the communication, are the optional test items.

(1) Discovery of the IP camera

Confirm that the client searches for available IP cameras using the WS-Discovery.

(2) Configurations of the IP camera

Confirm that the client queries the capabilities of the IP camera and configure it properly.

(3) Confirmation of streaming

In accordance with the configuration in (2), confirm that the streaming is started from the IP camera by using RTSP, and the client receives and decodes the streaming properly.

(4) Pause and restart streaming (OPTIONAL)

It is recommended to confirm that the pause and restart streaming is properly performed. If supported, it may also be confirmed that the restart is properly performed after changing to the other media profile during pause of the streaming.

(5) Event handling

Confirm that the client can subscribe to and receive notifications (events) from the IP camera.

3.6 Optional test items

It is preferable to conduct more advanced connectivity tests when both terminals obviously have more capabilities.

Whether to conduct the OPTIONAL tests or not SHOULD to be considered when requested. The needs for such tests are closely linked to improvement of the terminal capabilities.

4   Results Handling and Future Issues

4.1   Results handling

The results of the interoperability tests submitted by each company are collected by the Secretariat office. The organized results, in principle, are to be published accordingly. In order to improve the efficiency of the tests, the test procedures, the methods, the locations, and the results are recorded for future reference.

During the interoperability test, the IP camera and client confirm the functions of 'MUST' or 'MUST if supported' defined by ONVIF specifications. The test results are recognized as passed when the operations defined in section 3.5 have been confirmed between IP camera and client.

If any requests or suggestions for this guideline arise upon conducting the interoperability tests, they can be submitted at any time to the MMC TILC, which will deliberate on whether to accept them.

4.2   Others

If any problems arise about the contents of the standard regulations during the interoperability tests, they will be examined and if necessary, will be reflected in future standardization efforts.

IP Camera / Client Interoperability Test	Appendix 1

Date and Time		
Testing Site		

IP Camera

	1	2	3	4	5
Manufacturer					
Model Name/No.					
Version					
Person in Charge					

Client

	1	2	3	4	5
Manufacturer					
Model Name/No.					
Version					
Person in Charge					

List of test items

1. Mandatory Items
2. Conditional Items
3. Device Mandatory Items
4. Device Discovery

Test Environment

DHCP server existence : Yes / No
DNS server existence : Yes / No
NTP server exsistence : Yes / No

System Diagram

Configuration of Testing

MEMO

Descriptions for Observed Issues   1. IP camera's matter   2. Client's matter   3. Both devices matter   4. Failure due to differences of specification

Entry Example

Y : Confirmed OK
N : Confirmed NG (Describe the detailes in remarks)
--- : Not Supported

Check Sheet of Interoperability Test for IP Camera / Client

Mandatory Items

No.	Item	Evaluation Criteria	IP Camera	Client	Results (Y/N)	Remarks
1	Video streaming	1. Succeeded in listing media profiles. 2. Succeeded in streaming of video using RTSP.				GetProfiles GetStreamUri Media Streaming using RTSP
2	Video streaming (MJPEG)	Succeded in streaming of MJPEG video using RTSP.				Media Streaming using RTSP - JPEG RTP header extension
3	Video encoder configuration	Succeeded in listing and modification of video encoder configurations on the IP camera.				GetVideoEncoderConfiguration GetVideoEncoderConfigurations AddVideoEncoderConfiguration RemoveVideoEncoderConfiguration SetVideoEncoderConfiguration GetCompatibleVideoEncoderConfigurations GetVideoEncoderConfigurationOptions GetGuaranteedNumberOfVideoEncoderInstances
4	User authentication	1. User authentication is succeeded. 2. User authentication is failed with wrong user name. 3. User authentication is failed with wrong password.				WS-Usernametoken Authentication HTTP Digest
5	Capabilities	Succeeded in querying device for capabilities.				GetCapabilities GetWsdlUrl

Check Sheet of Interoperability Test for IP Camera / Client

Conditional Items

No.	Item	Evaluation Criteria	IP Camera	Client	Results (Y/N)	Remarks
1	Video streaming (MPEG4)	Confirmation of decoding of streaming with MPEG4	(if supported)	(if supported)		SetSynchronizationPoint
2	Video streaming (H.264)	Confirmation of decoding of streaming with H.264	(if supported)	(if supported)		SetSynchronizationPoint
3	PTZ	Succeeded in moving and stopping a PTZ device using continuous move.	(if supported)	(if supported)		AddPTZConfiguration RemovePTZConfiguration GetNodes GetNode GetConfigurations GetConfiguration GetConfigurationOptions SetConfiguration ContinuousMove Stop GetStatus
4	PTZ (Absolute Move)	Succeeded in moving a PTZ device to an absolute position.	(if supported)	(if supported)		AbsoluteMove
5	PTZ (Relative Move)	Succeeded in moving a PTZ device to a relative position.	(if supported)	(if supported)		RelativeMove
6	PTZ (Preset)	1. Succeeded in listing of presets. 2. Succeeded in moving a PTZ device to a preset.	(if supported)	(if supported)		SetPreset GetPresets GotoPreset RemovePreset
7	PTZ (Home Position)	Succeeded in moving a PTZ device to its home position.	(if supported)	(if supported)		GotoHomePosition SetHomePosition
8	PTZ (Auxiliary Command)	Succeeded in supporting for PTZ specific auxiliary commands.	(if supported)	(if supported)		SendAuxiliaryCommand
9	Audio streaming	Succeeded in streaming of audio with G.711	(if supported)	(if supported)		GetAudioSources GetAudioSourceConfiguration GetAudioSourceConfigurations AddAudioSourceConfiguration RemoveAudioSourceConfiguration SetAudioSourceConfiguration GetCompatibleAudioSourceConfigurations GetAudioSourceConfigurationOptions GetAudioEncoderConfiguration GetAudioEncoderConfigurations AddAudioEncoderConfiguration RemoveAudioEncoderConfiguration SetAudioEncoderConfiguration GetCompatibleAudioEncoderConfigurations GetAudioEncoderConfigurationOptions
10	Audio streaming (G.726)	Succeeded in streaming of audio with G.726	(if supported)	(if supported)		(No specific function requirement.)
11	Audio streaming (AAC)	Succeeded in streaming of audio with AAC	(if supported)	(if supported)		(No specific function requirement.)
12	Multicast streaming	Succeeded in streaming video over multicast.	(if supported)	(if supported)		StartMulticastStreaming StopMulticastStreaming
13	Relay outputs	Succeeded in listing, configuration and triggering of relay outputs.	(if supported)	(if supported)		GetRelayOutputs SetRelayOutputSettings SetRelayOutputState
14	NTP	Succeeded in synchronization of time using NTP servers.	(if supported)	(if supported)		GetNTP SetNTP
15	Dynamic DNS	Succeeded in configuration of Dynamic DNS.	(if supported)	(if supported)		GetDynamicDNS SetDynamicDNS
16	Zero configuration	Succeeded in configuration of Zero Configuration.	(if supported)	(if supported)		GetZeroConfiguration SetZeroConfiguration
17	IP address filtering	Succeeded in configuration of IP address filters.	(if supported)	(if supported)		GetIPAddressFilter SetIPAddressFilter AddIPAddressFilter RemoveIPAddressFilter

Check Sheet of Interoperability Test for IP Camera / Client

Device Mandatory Items

No.	Item	Evaluation Criteria	IP Camera	Client	Results (Y/N)	Remarks
1	Discovery	1. Succeeded in discovery of the IP camera on the network. 2. Succeeded in setting of discovery mode. 3. Succeeded in listing, adding, modifying and removing of discovery scopes.		(if supported)		WS-Discovery GetDiscoveryMode SetDiscoveryMode GetScopes SetScopes AddScopes RemoveScopes
2	Network configuration	Succeeded in configuration of netowrk settings on the IP camera.		(if supported)		GetHostname SetHostname GetDNS SetDNS GetNetworkInterfaces SetNetworkInterfaces GetNetworkProtocols SetNetworkProtocols GetNetworkDefaultGateway SetNetworkDefaultGateway
3	System	1. Succeeded in getting the information of the IP camera. 2. Succeeded in getting date and time of the IP camera 3. Succeeded in setting date and time of the IP camera 4. Succeeded in setting factory default of the IP camera. 5. Succeeded in rebooting the IP camera.		(if supported)		GetDeviceInformation GetSystemDateAndTime SetSystemDateAndTime SetSystemFactoryDefault Reboot
4	Uesr handling	Succeeded in managing users on the IP camera.		(if supported)		GetUsers CreateUsers DeleteUsers SetUser
5	Event handling	Succeeded in retrieving and filtering of events from the IP camera.		(if supported)		Notify Subscribe Renew Unsubscribe SetSynchronizationPoint CreatePullPointSubscription PullMessage GetEventProperties TopicFilter MessageContentFilter
6	Media profile configuration	Succeeded in creation, retrieval and deletion of media profiles.		(if supported)		GetProfiles GetProfile CreateProfile DeleteProfile
7	Video source configuration	Succeeded in listing and modification of video source configuration.		(if supported)		GetVideoSources GetVideoSourceConfiguration GetVideoSourceConfigurations AddVideoSourceConfiguration RemoveVideoSourceConfiguration SetVideoSourceConfiguration GetCompatibleVideoSourceConfigurations GetVideoSourceConfigurationOptions
8	Metadta configuration	Succeeded in listing and modification of metadata configuration on the IP camera.		(if supported)		GetMetadataConfiguration GetMetadataConfigurations AddMetadataConfiguration RemoveMetadataConfiguration SetMetadataConfiguration GetCompatibleMetadataConfigurations GetMetadataConfigurationOptions

Check Sheet of Interoperability Test for IP Camera / Client

Device Discovery

No.	Item	Evaluation Criteria	IP Camera	Client	Results (Y/N)	Remarks
1	Device Discovery	Succeeded in connection to Profile S devices.				onvif://www.onvif.org/Profile/Streaming