

ONVIF™

ONVIF Real Time Streaming using Media2 Test Specification

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Revision History

Ver.	Date	Description
16.06	April 2016	Original publication
16.07	June 2016	Small changes based on feedback received.
16.07	July 8, 2016	Added G.711 and AAC RTP-Multicast tests for IPv4 and IPv6 (4.2.8 , 4.2.9 , 4.2.15 , 4.2.16) Section 4.5 (Start and Stop Multicast streaming) deleted
16.07	July 28, 2016	Review comments implemented.
16.07	August 8, 2016	More comments and spelling errors.

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1 Introduction

The goal of the ONVIF test specification set is to make it possible to realize fully interoperable IP physical security implementations from different vendors. The set of ONVIF test specifications describes the test cases needed to verify the [ONVIF Network Interface Specs] and [ONVIF Conformance] requirements. In addition, the test cases are to be basic inputs for some Profile specification requirements. The ONVIF test specification set also describes the test framework, test setup, pre-requisites, test policies needed for the execution of the described test cases.

This ONVIF Media Test Specification acts as a supplementary document to the [ONVIF Network Interface Specs], illustrating test cases to be executed and passed. This specification also acts as an input document to the development of a test tool that will be used to test ONVIF device implementation conformance to the ONVIF standard. This test tool is hereafter referred to as ONVIF Client.

1.1 Scope

This ONVIF Media Test Specification defines and regulates the conformance testing procedure for ONVIF conformant devices. Conformance testing is meant to be functional black-box testing. The objective of this specification is to provide test cases to test individual requirements of ONVIF devices according to ONVIF Media Service and the Realtime Streaming Specification which is defined in [ONVIF Network Interface Specs].

The principal intended purposes are:

- Provide self-assessment tool for implementations.
- Provide comprehensive test suite coverage for [ONVIF Network Interface Specs].

This specification does not address the following.

- Product use cases and non-functional (performance and regression) testing.
- SOAP Implementation Interoperability test i.e. Web Service Interoperability Basic Profile version 2.0 (WS-I BP 2.0).
- Network protocol implementation Conformance test for HTTP, HTTPS, RTP and RTSP protocol.
- Poor streaming performance test (audio/video distortions, missing audio/video frames, incorrect lib synchronization etc.).
- Wi-Fi Conformance test

The set of ONVIF Test Specification will not cover the complete set of requirements as defined in [ONVIF Network Interface Specs]; instead it covers a subset of the requirements. The scope of this specification is to derive all the normative requirements of [ONVIF Network Interface Specs] which are related to ONVIF Media Service and Realtime Streaming Specification and some of the optional requirements.

This ONVIF Media Test Specification covers the ONVIF Media service and Real-time Streaming specification which is a functional block of [ONVIF Network Interface Specs]. The following sections describe the brief overview of and scope of each functional block.

1.1.1 Real Time Streaming

Real Time Streaming covers the test cases needed for the verification of real time streaming features as mentioned in [ONVIF Network Interface Specs]. Real time streaming defines different media streaming options based on RTP for video, audio and metadata streams. Media control is done using RTSP protocol.

The scope of this specification covers the following real time streaming options for JPEG, MPEG4 and H.264 video streams, and JPEG/ G.711, JPEG/ G.726 and JPEG/ AAC Audio & Video streams.

- RTSP control requests
- RTP Unicast over UDP
- RTP over RTSP over TCP
- RTP over RTSP over HTTP over TCP
- RTCP

2 Terms and Definitions

2.1 Definitions

This section defines terms that are specific to the ONVIF Media Service and tests. For a list of applicable general terms and definitions, please see [ONVIF Base Test].

Configuration Entity	A network video device media abstract component that is used to produce a media stream on the network, i.e. video and/or audio stream.
Media Profile	A media profile maps a video and/or audio source to a video and/or an audio encoder, PTZ and analytics configurations.

2.2 Abbreviations

This section describes abbreviations used in this document.

AAC	Advanced Audio Coding
JPEG	Joint Photographic Experts Group
MPEG-4	Moving Pictures Experts Group-4
QVGA	Quarter Video Graphics Array
TTL	Time To Live

3 Test Overview

This section describes about the test setup and prerequisites needed, and the test policies that should be followed for test case execution.

3.1 Test Setup

3.1.1 Network Configuration for DUT

The generic test configuration for the execution of test cases defined in this document is shown below (Figure 1)

Based on the individual test case requirements, some of the entities in the below setup may not be needed for the execution of those corresponding test cases.

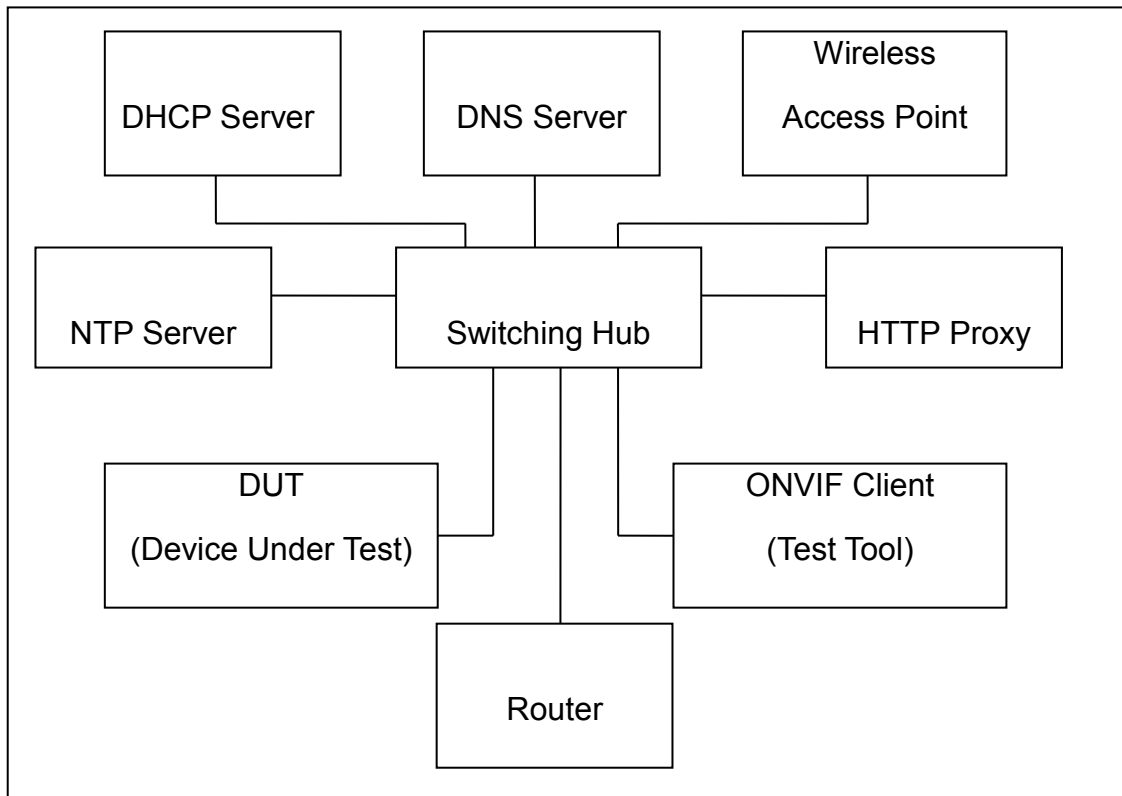


Figure 1: Test Configuration for DUT

DUT: ONVIF device to be tested. Hereafter, this is referred to as DUT (Device Under Test).

ONVIF Client (Test Tool): Tests are executed by this system and it controls the behavior of the DUT. It handles both expected and unexpected behavior.

HTTP Proxy: provides facilitation in case of RTP and RTSP tunneling over HTTP.

Wireless Access Point: provides wireless connectivity to the devices that support wireless connection.

DNS Server: provides DNS related information to the connected devices.

DHCP Server: provides IPv4 Address to the connected devices.

NTP Server: provides time synchronization between ONVIF Client and DUT.

Switching Hub: provides network connectivity among all the test equipment in the test environment. All devices should be connected to the Switching Hub.

Router: provides router advertisements for IPv6 configuration.

3.2 Prerequisites

The pre-requisites for executing the test cases described in this Test Specification are

- The DUT shall be configured with an IPv4 address.
- The DUT shall be IP reachable [in the test configuration].
- The DUT shall be able to be discovered by the Test Tool.
- The DUT shall be configured with the time i.e. manual configuration of UTC time and if NTP is supported by DUT then NTP time shall be synchronized with NTP Server.
- The DUT time and Test tool time shall be synchronized with each other either manually or by common NTP server.

3.3 Test Policy

This section describes the test policies specific to the test case execution of each functional block.

The DUT shall adhere to the test policies defined in this section.

3.3.1 Real Time Streaming

Real time streaming test case execution would need the successful execution of some of the Media Configuration test cases. So, Media Configuration features shall be implemented successfully in order to execute the Real Time Streaming test cases.

ONVIF Client shall explicitly specify the optional transport protocols supported by DUT.

ONVIF Client and DUT time should be synchronized for media streaming.

Real time streaming testing will test only one media stream at a time.

Poor streaming test is outside the scope of the ONVIF Test Specification

4 Real Time Streaming Test Cases

4.1 Video Streaming

4.1.1 MEDIA2 STREAMING – H.264 (RTP-Unicast/UDP)

Test Label: Real Time Viewing DUT H.264 media streaming using RTP-Unicast/UDP transport.

Test Case ID: RTSS-1-5-1

ONVIF Core Specification Coverage: RTP data transfer via UDP, RTP, RTCP, Stream control, RTSP.

Command Under Test: None

WSDL Reference: None

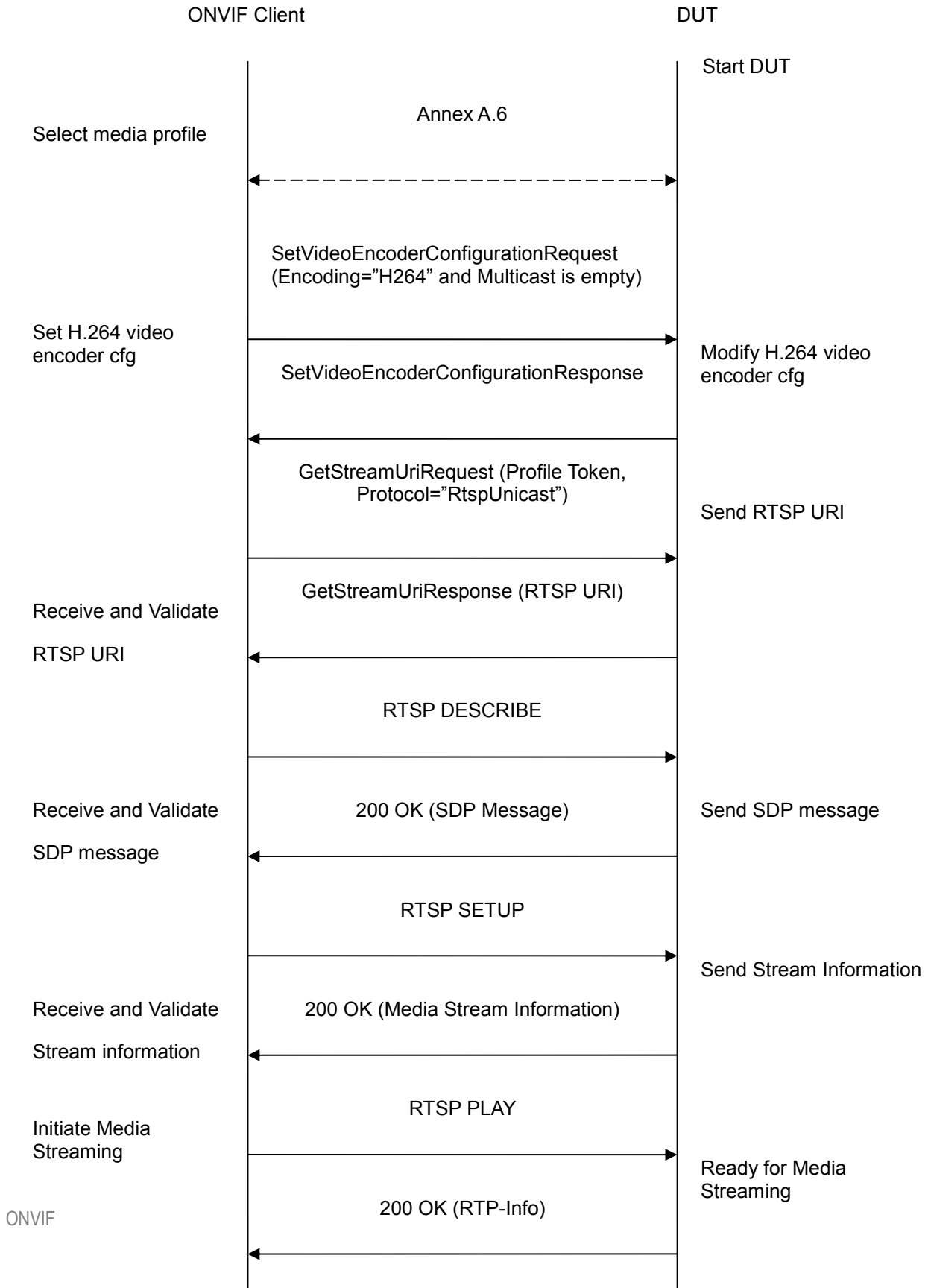
Test Purpose: To verify H.264 media streaming based on RTP/UDP Unicast Transport.

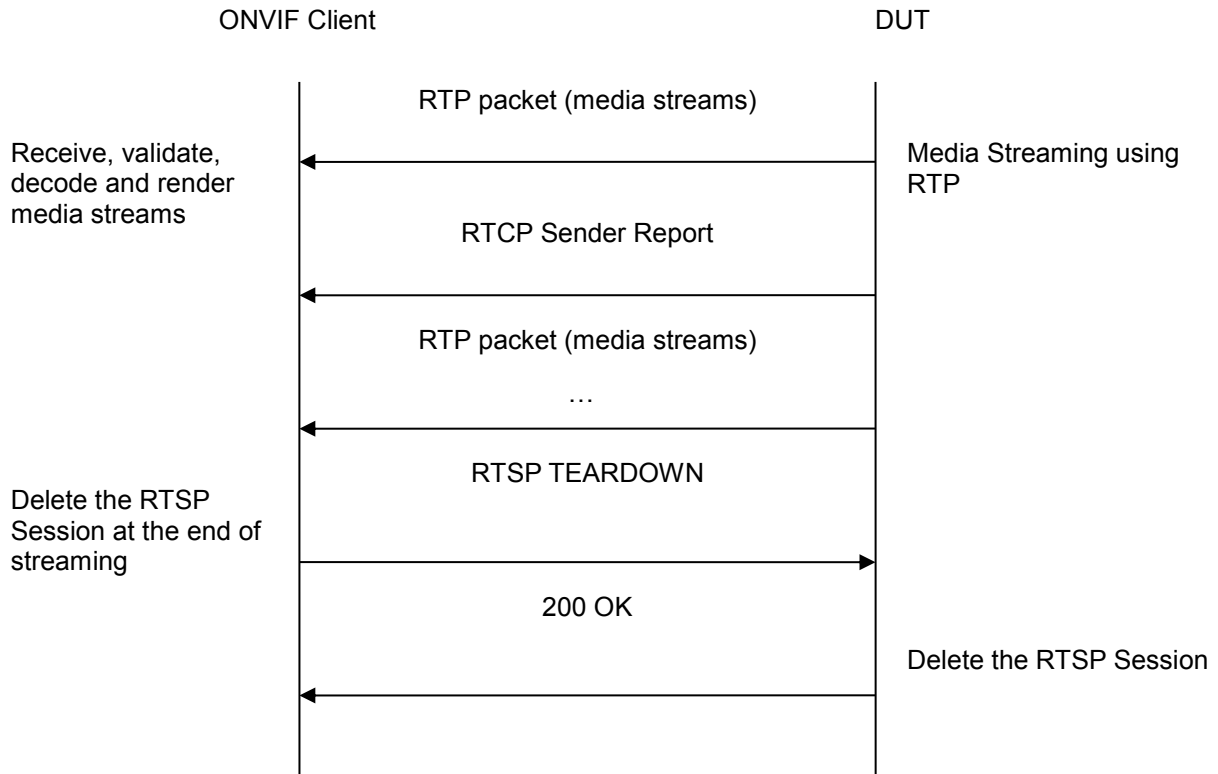
Pre-Requisite: Media2 Service is supported by DUT. Media2_H.264 feature is supported by DUT. Real-time streaming supported by DUT.

A media profile with H.264 video encoder configuration.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client selects a media profile with H264 video encoding support by following the procedure mentioned in Annex A.6
4. ONVIF Client invokes SetVideoEncoderConfigurationRequest (Encoding = "H.264", Resolution = ["Width", "Height"], Quality = q1, GovLength = g1 and empty Multicast). The parameter of Profile is set the highest value that DUT supports as the order is High/Extended/Main/Baseline. These values will be taken from the GetVideoEncoderConfigurationOptions response in A.6.
5. DUT modifies video encoder configuration and responds with SetVideoEncoderConfigurationResponse message indicating success.
6. ONVIF Client invokes GetStreamUriRequest message (Profile Token, Protocol="RtspUnicast") to retrieve media stream URI for the selected media profile.
7. DUT sends RTSP URI in the GetStreamUriResponse message.
8. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
9. ONVIF Client invokes RTSP DESCRIBE request.

10. DUT sends 200 OK message and SDP information.
11. ONVIF Client invokes RTSP SETUP request with transport parameter as RTP/UDP.
12. DUT sends 200 OK message and the media stream information.
13. ONVIF Client invokes RTSP PLAY request.
14. DUT sends 200 OK message and starts media streaming.
15. DUT sends H.264 RTP media stream to ONVIF Client over UDP.
16. DUT sends RTCP sender report to ONVIF Client.
17. DUT validates the received RTP and RTCP packets, decodes and renders them.
18. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
19. DUT sends 200 OK Response and terminates the RTSP Session.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

DUT did not have valid media profile.

DUT did not send SetVideoEncoderConfigurationResponse message.

DUT did not send GetStreamUriResponse message.

DUT did not send RTSP URI in the GetStreamUriResponse message.

DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

DUT did not send valid RTP header in one or more media streams.

DUT did not send RTCP sender report correctly.

RTSP Session is terminated by DUT during media streaming.

Note: Annex A.1 for Invalid RTP header definition.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.1.2 MEDIA2 STREAMING – H.264 (RTP-Unicast/RTSP/HTTP/TCP)

Test Label: Real Time Viewing DUT H.264 media2 streaming using HTTP transport.

Test Case ID: RTSS-1-5-2



ONVIF Core Specification Coverage: RTP/RTSP/HTTP/TCP, RTP, RTCP, Stream control, RTSP, RTSP over HTTP.

Command Under Test: None

WSDL Reference: None

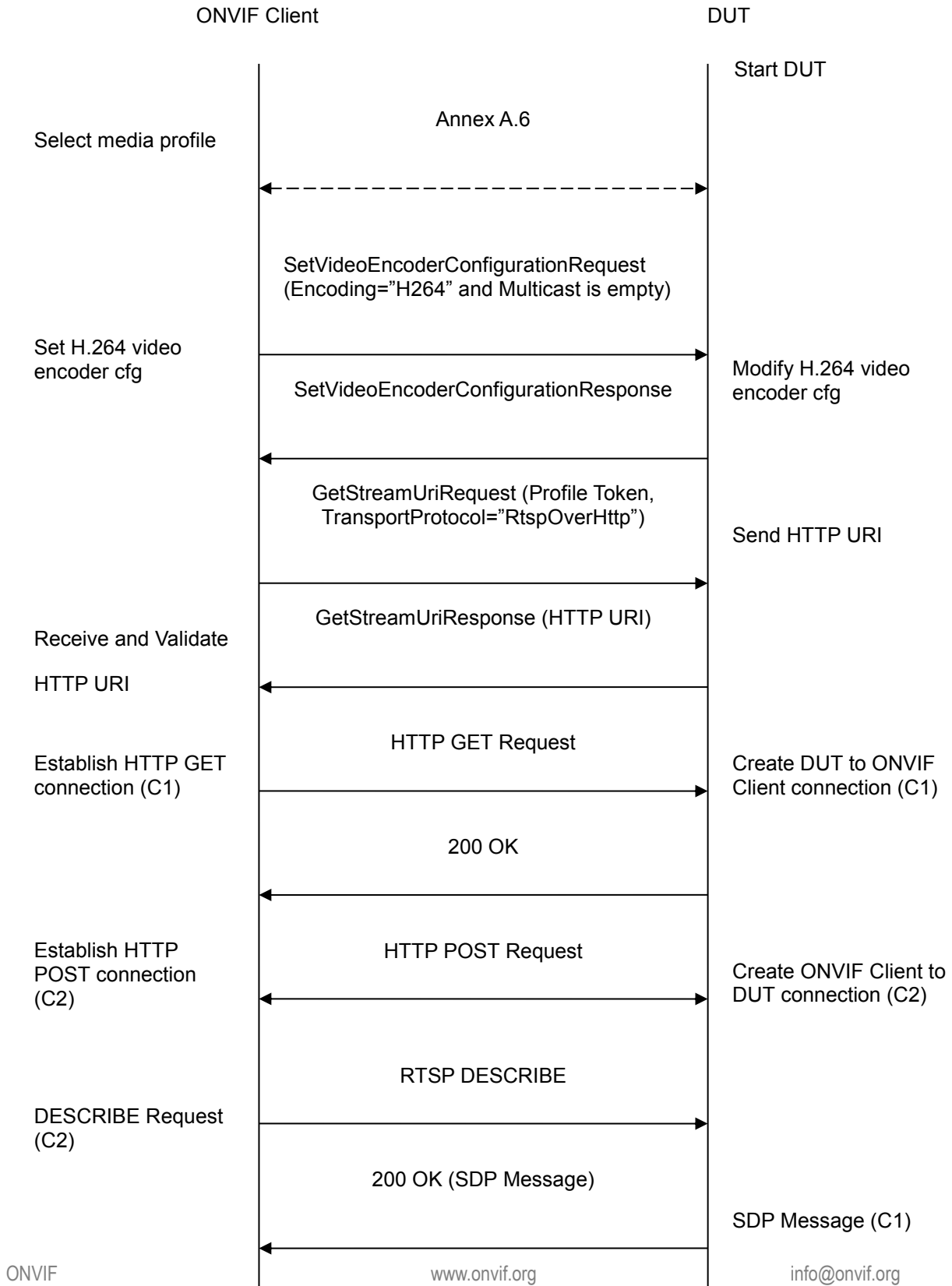
Test Purpose: To verify H.264 media streaming based on HTTP Transport.

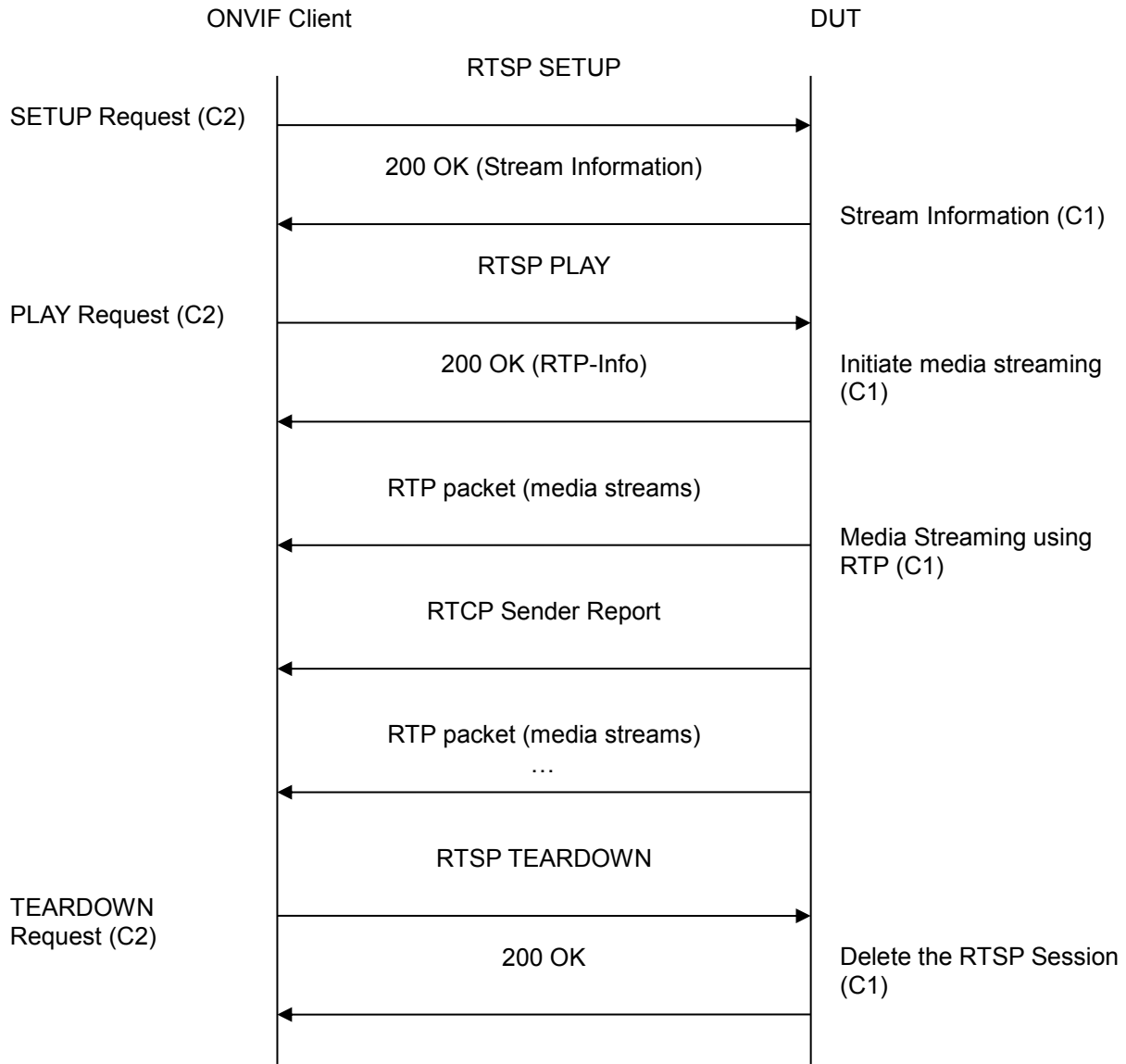
Pre-Requisite: Media2 service is supported by DUT. Media2_H.264 feature is supported by DUT. Real-time streaming supported by DUT.

A media profile with H.264 video encoder configuration.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client selects a media profile with H264 video encoding support by following the procedure mentioned in Annex A.6
4. ONVIF Client invokes SetVideoEncoderConfigurationRequest (Encoding = "H.264", Resolution = ["Width", "Height"], Quality = q1, GovLength = g1 and empty Multicast). The parameter of Profile is set the highest value that DUT supports as the order is

High/Extended/Main/Baseline. These values will be taken from the GetVideoEncoderConfigurationOptions response in A.6.

5. DUT modifies video encoder configuration and responds with SetVideoEncoderConfigurationResponse message indicating success.
6. ONVIF Client invokes GetStreamUriRequest message (Profile Token, Protocol="RtspOverHttp") to retrieve media stream URI for the selected media profile.
7. DUT sends RTSP URI in the GetStreamUriResponse message.
8. ONVIF Client verifies the HTTP media stream URI provided by the DUT.
9. ONVIF Client invokes HTTP GET Request on DUT and establishes DUT to ONVIF Client connection for RTP data transfer (C1).
10. ONVIF Client invokes HTTP POST Request and establishes ONVIF Client to DUT connection for RTSP control requests (C2).
11. ONVIF Client invokes RTSP DESCRIBE request on C2.
12. DUT sends 200 OK message and SDP information on C1 connection.
13. ONVIF Client invokes RTSP SETUP request on C2 connection with transport parameter as 'RTP/TCP' along with 'interleaved' parameter.
14. DUT sends 200 OK message and the media stream information on C1 connection.
15. ONVIF Client invokes RTSP PLAY request on C2 connection.
16. DUT sends 200 OK message and starts media streaming on C1 connection.
17. DUT transfers H.264 RTP media stream to ONVIF Client on C1 connection.
18. DUT sends RTCP sender report to ONVIF Client on C1 connection.
19. DUT validates the received RTP and RTCP packets, decodes and renders them.
20. ONVIF Client invokes RTSP TEARDOWN control request on C2 connection and closes the HTTP POST connection.
21. DUT sends 200 OK Response on HTTP GET connection and closes the C1 connection.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

DUT did not have valid media profile.

DUT did not send SetVideoEncoderConfigurationResponse message.

DUT did not send GetStreamUriResponse message.

DUT did not send RTSP URI in the GetStreamUriResponse message.

DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

DUT did not send valid RTP header in one or more media streams.

DUT did not send RTCP sender report correctly.

RTSP Session is terminated by DUT during media streaming.

Note: Annex A.1 for Invalid RTP header definition.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.1.3 MEDIA2 STREAMING – H.264 (RTP/RTSP/TCP)

Test Label: Real Time Viewing DUT H.264 media2 streaming using RTP/RTSP/TCP transport.

Test Case ID: RTSS-1-5-3

ONVIF Core Specification Coverage: RTP/RTSP/TCP, RTP, RTCP, Stream control, RTSP.

Command Under Test: None

WSDL Reference: None

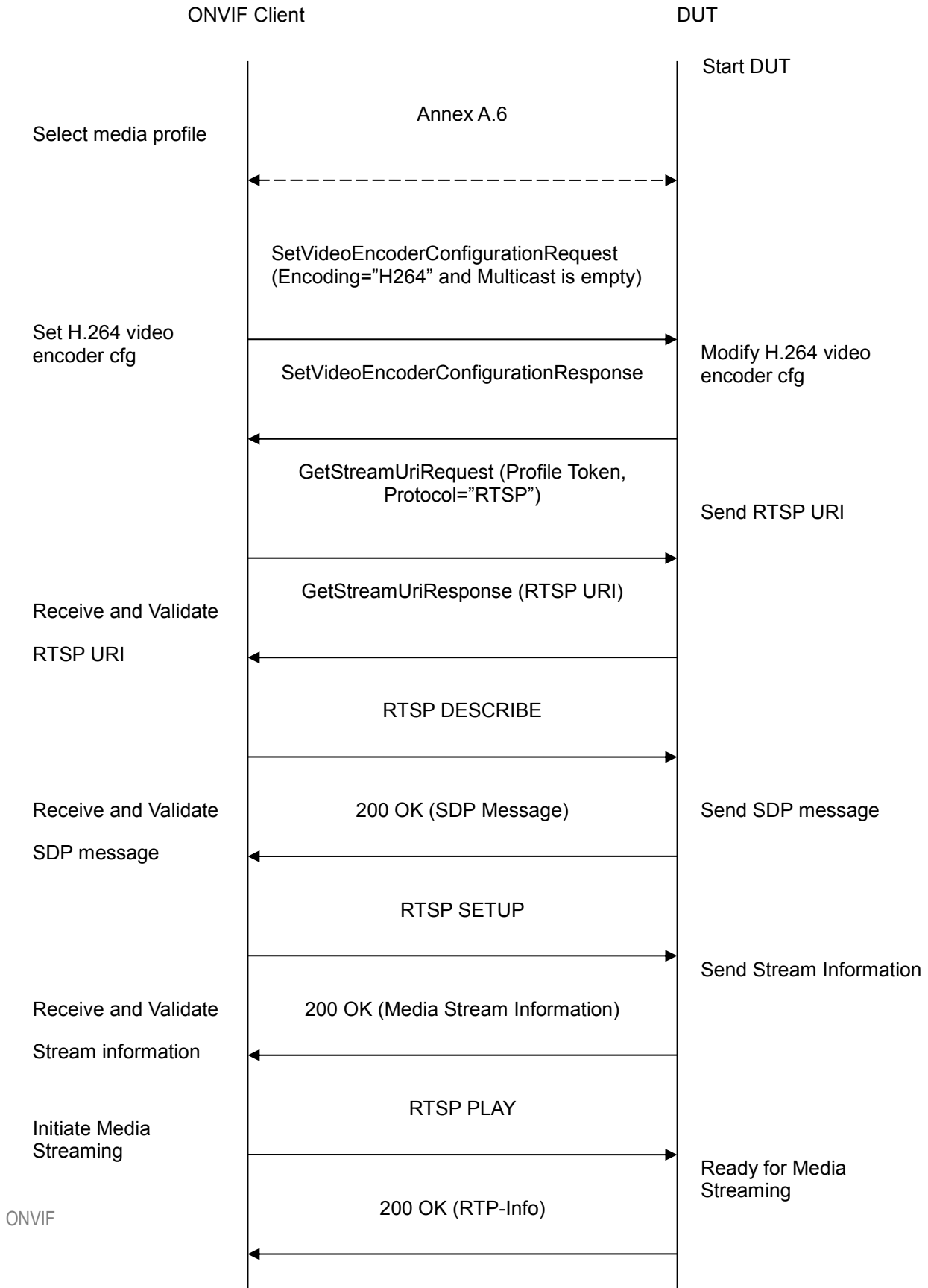
Test Purpose: To verify H.264 media streaming based on RTP/RTSP/TCP using RTSP tunnel.

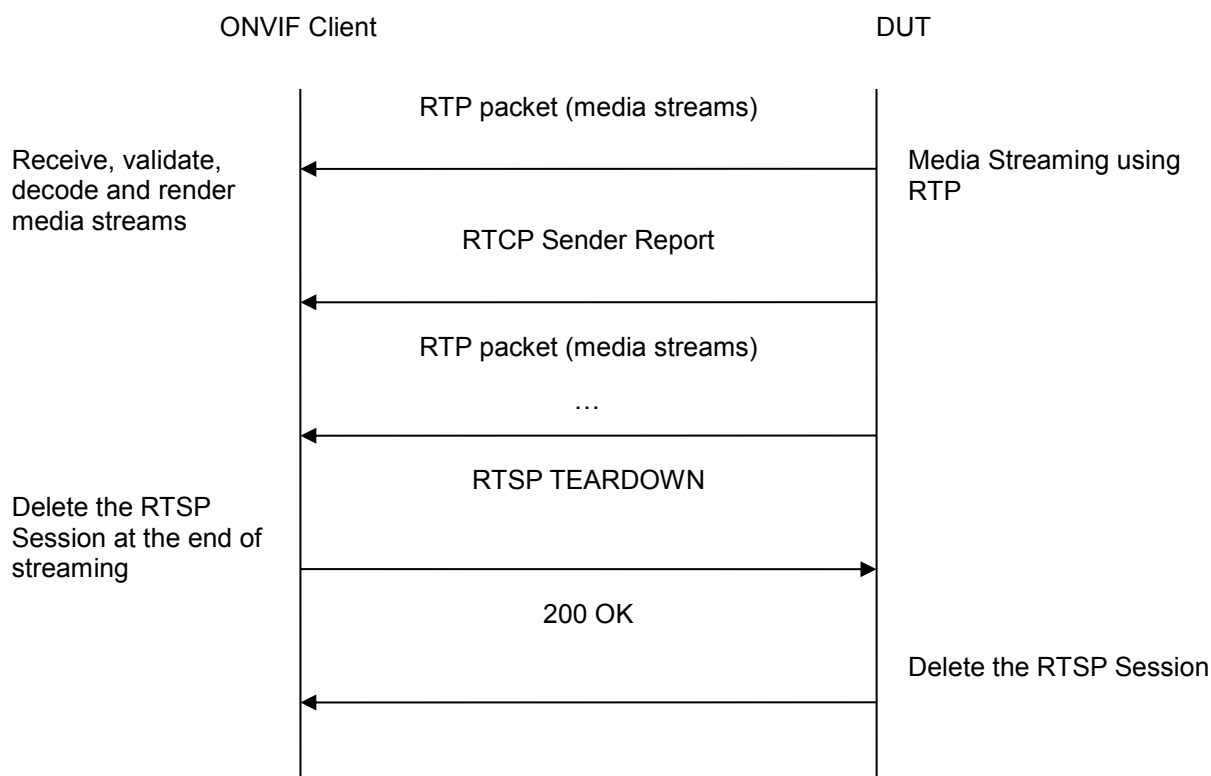
Pre-Requisite: Media2 Service is supported by DUT. Media2_H.264 feature is supported by DUT. Real-time streaming supported by DUT.

A media profile with H.264 video encoder configuration.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client selects a media profile with H264 video encoding support by following the procedure mentioned in Annex A.6
4. ONVIF Client invokes SetVideoEncoderConfigurationRequest (Encoding = "H.264", Resolution = ["Width", "Height"], Quality = q1, GovLength = g1 and empty Multicast). The parameter of Profile is set the highest value that DUT supports as the order is High/Extended/Main/Baseline. These values will be taken from the GetVideoEncoderConfigurationOptions response in A.6.
5. DUT modifies video encoder configuration and responds with SetVideoEncoderConfigurationResponse message indicating success.
6. ONVIF Client invokes GetStreamUriRequest message (Profile Token, Protocol="RTSP") to retrieve media stream URI for the selected media profile.
7. DUT sends RTSP URI in the GetStreamUriResponse message.
8. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
9. ONVIF Client invokes RTSP DESCRIBE request.

10. DUT sends 200 OK message and SDP information.
11. ONVIF Client invokes RTSP SETUP request with transport parameter as 'RTP/TCP' along with 'interleaved' parameter.
12. DUT sends 200 OK message and the media stream information.
13. ONVIF Client invokes RTSP PLAY request.
14. DUT sends 200 OK message and starts media streaming.
15. DUT interleaves RTP and RTCP packets, send them over RTSP control connection.
16. DUT validates the received RTP and RTCP packets, decodes and renders them.
17. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
18. DUT sends 200 OK Response and terminates the RTSP Session.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

DUT did not have valid media profile.

DUT did not send SetVideoEncoderConfigurationResponse message.

DUT did not send GetStreamUriResponse message.

DUT did not send RTSP URI in the GetStreamUriResponse message.

DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

DUT did not send RTP and RTCP packets as per [RFC 2326] section 10.12.

RTSP Session is terminated by DUT during media streaming.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.1.4 MEDIA2 SET SYNCHRONIZATION POINT – H.264

Test Label: Media2 Configuration DUT Synchronization Point – H.264

Test Case ID: RTSS-1-5-4

ONVIF Core Specification Coverage: Set synchronization point.

Command Under Test: SetSynchronizationPoint

WSDL Reference: media2.wsdl

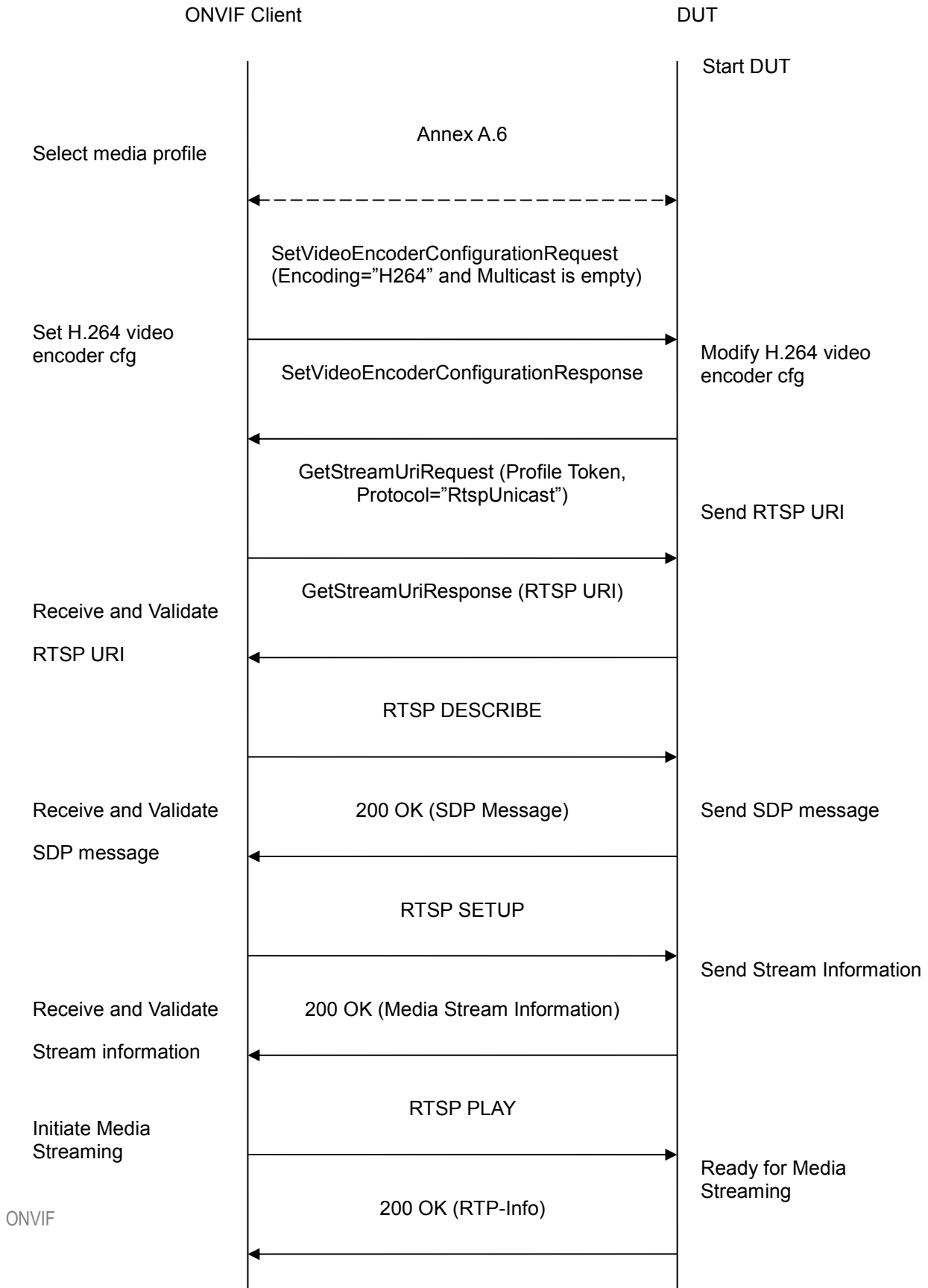
Test Purpose: To request synchronization point from DUT for H.264 media stream.

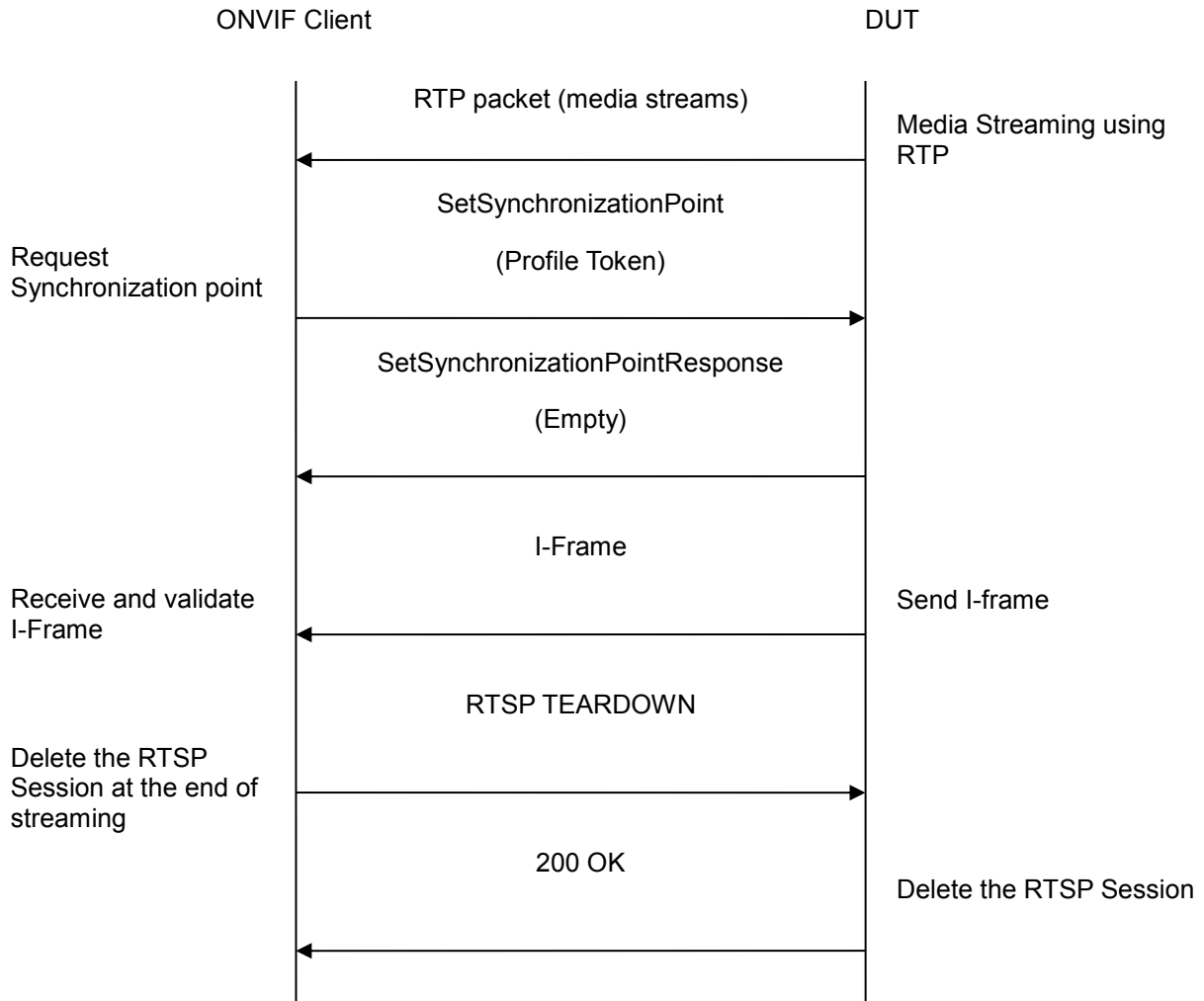
Pre-Requisite: Media2 Service is supported by DUT. Media2_H.264 feature is supported by DUT. Real-time streaming supported by DUT.

A media profile with H.264 video encoder configuration.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client selects a media profile with H264 video encoding support by following the procedure mentioned in Annex A.6
4. ONVIF Client invokes `SetVideoEncoderConfigurationRequest` (Encoding = "H.264", Resolution = ["Width", "Height"], Quality = q1, GovLength = g1 and empty Multicast). The parameter of Profile is set to the highest value that DUT supports as the order is High/Extended/Main/Baseline. These values will be taken from the `GetVideoEncoderConfigurationOptions` response in A.6.
5. DUT modifies video encoder configuration and responds with `SetVideoEncoderConfigurationResponse` message indicating success.

6. ONVIF Client invokes GetStreamUriRequest message (Profile Token, Protocol="RtspUnicast") to retrieve media stream URI for the selected media profile.
7. DUT sends RTSP URI in the GetStreamUriResponse message.
8. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
9. ONVIF Client invokes RTSP DESCRIBE request.
10. DUT sends 200 OK message and SDP information.
11. ONVIF Client invokes RTSP SETUP request with transport parameter as **RTP/UDP**.
12. DUT sends 200 OK message and the media stream information.
13. ONVIF Client invokes RTSP PLAY request.
14. DUT sends 200 OK message and starts media streaming.
15. DUT sends H.264 RTP media stream to ONVIF Client over UDP.
16. DUT sends RTCP sender report to ONVIF Client.
17. DUT validates the received RTP and RTCP packets, decodes and renders them.
18. ONVIF Client invokes SetSynchronizationPoint request on the selected media profile.
19. DUT sends the SetSynchronizationPointResponse indicating success.
20. DUT inserts the I-frame in the ongoing media stream.
21. ONVIF Client verifies that I-frame is sent by DUT before the regular 'I-frame insertion time interval'.
22. ONVIF Client invokes RTSP TEARDOWN control request to terminate the RTSP session.
23. DUT sends 200 OK Response and terminates the RTSP Session.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

DUT did not have valid media profile.

DUT did not send SetVideoEncoderConfigurationResponse message.

DUT did not send GetStreamUriResponse message.

DUT did not send SetSynchronizationPointResponse message.

DUT did not send I-frame before the regular 'I-frame insertion time interval' upon invoking SetSynchronizationPoint request.

DUT did not send RTSP URI in the GetStreamUriResponse message.

DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

RTSP Session is terminated by DUT during media streaming.

Note: See Annex A.2 for details on 'I-frame insertion time interval'.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.1.5 MEDIA2 STREAMING – H.264 (RTP-Unicast/UDP, IPv6)

Test Label: Real Time Viewing DUT H.264 media2 streaming using RTP-Unicast/UDP transport for IPv6.

Test Case ID: DRAFT-RTSS-1-5-5

ONVIF Core Specification Coverage: RTP data transfer via UDP, RTP, RTCP, Stream control, RTSP.

Command Under Test: None

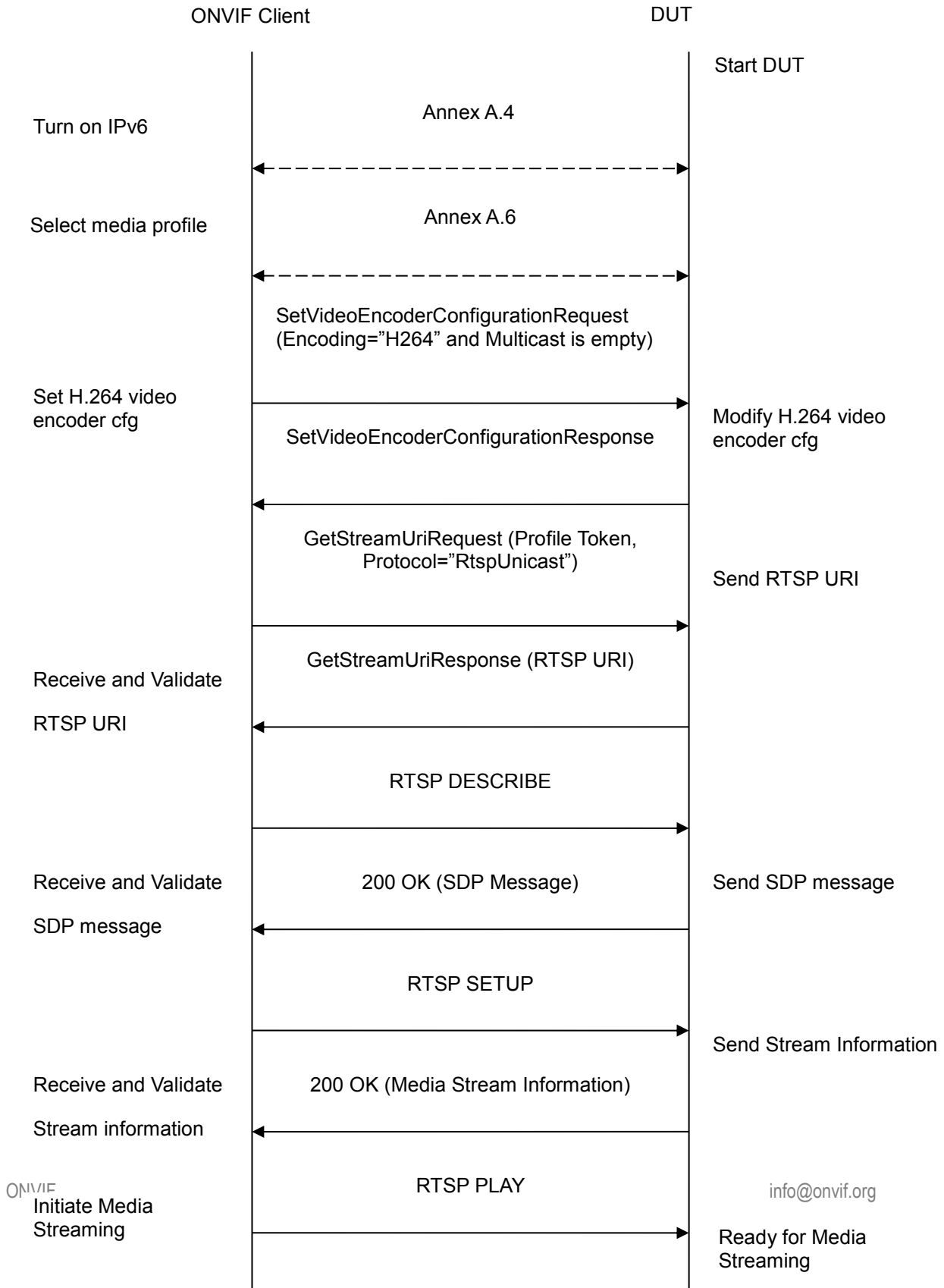
WSDL Reference: None

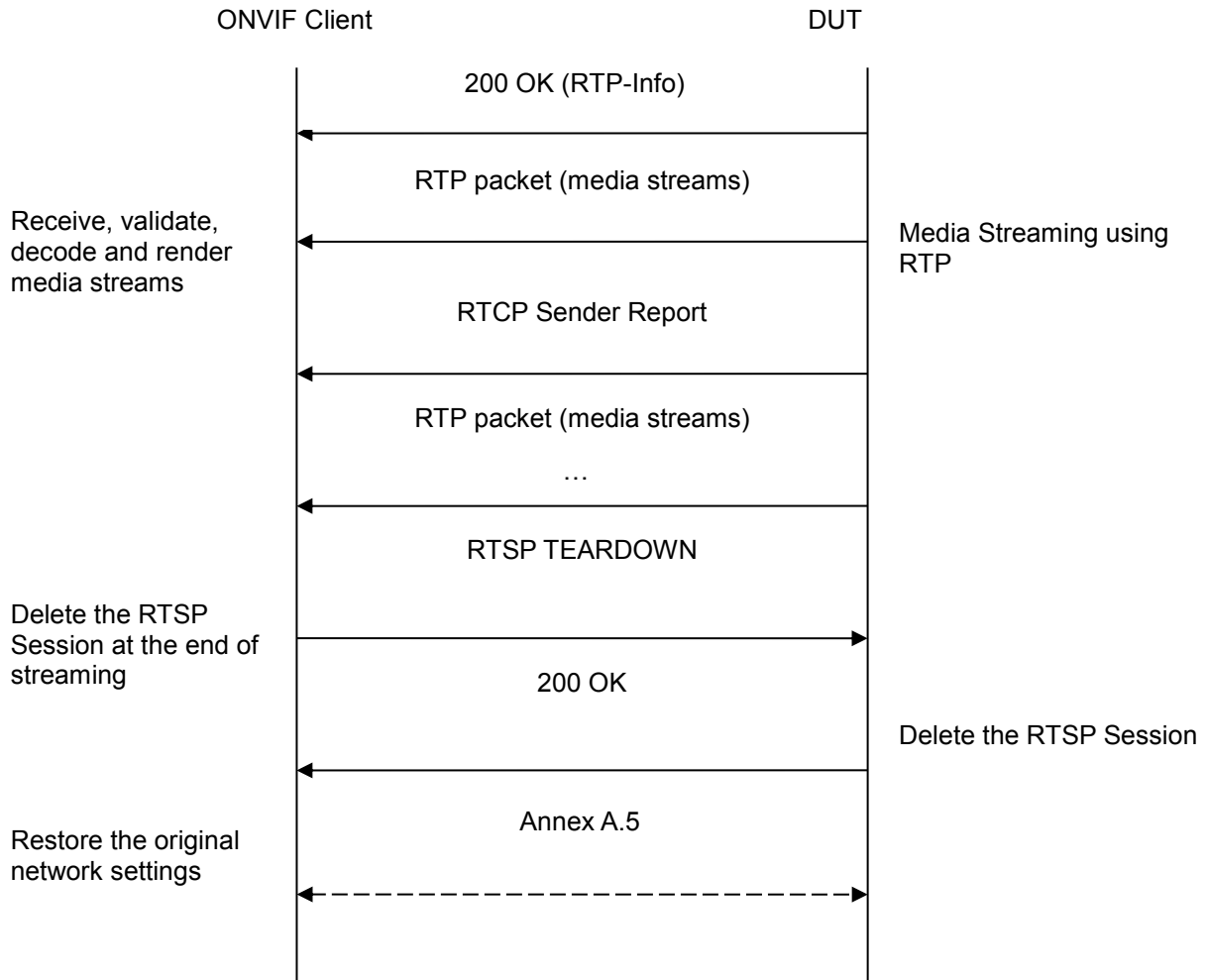
Test Purpose: To verify H.264 media streaming based on RTP/UDP Unicast Transport for IPv6.

Pre-Requisite: Media2 Service is supported by DUT. Media2_H.264 feature is supported by DUT. A media profile with H.264 video encoder configuration. IPv6 is turned on for network interface. The DUT is configured with Manual IPv6 or LinkLocal IPv6 address.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client turns on IPv6 network interface by following the procedure mentioned in Annex A.4.
4. ONVIF Client selects a media profile with H264 video encoding support by following the procedure mentioned in Annex A.6
5. ONVIF Client invokes SetVideoEncoderConfigurationRequest (Encoding = "H.264", Resolution = ["Width", "Height"], Quality = q1, GovLength = g1 and empty Multicast). The parameter of Profile is set the highest value that DUT supports as the order is High/Extended/Main/Baseline. These values will be taken from the GetVideoEncoderConfigurationOptions response in A.6.

6. DUT modifies video encoder configuration and responds with SetVideoEncoderConfigurationResponse message indicating success.
7. ONVIF Client invokes GetStreamUriRequest message (Profile Token, Protocol="RtspUnicast") to retrieve media stream URI for the selected media profile.
8. DUT sends RTSP URI in the GetStreamUriResponse message.
9. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
10. ONVIF Client invokes RTSP DESCRIBE request.
11. DUT sends 200 OK message and SDP information.
12. ONVIF Client invokes RTSP SETUP request with transport parameter as RTP/UDP.
13. DUT sends 200 OK message and the media stream information.
14. ONVIF Client invokes RTSP PLAY request.
15. DUT sends 200 OK message and starts media streaming.
16. DUT sends H.264 RTP media stream to ONVIF Client over UDP.
17. DUT sends RTCP sender report to ONVIF Client.
18. DUT validates the received RTP and RTCP packets, decodes and renders them.
19. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
20. DUT sends 200 OK Response and terminates the RTSP Session.
21. ONVIF Client will restore the original settings by following the procedure mentioned in Annex A.5

Test Result:

PASS –

DUT passes all assertions.

FAIL –

DUT did not have valid media profile.

DUT did not send SetVideoEncoderConfigurationResponse message.

DUT did not send GetStreamUriResponse message.

DUT did not send RTSP URI in the GetStreamUriResponse message.

DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

DUT did not send valid RTP header in one or more media streams.

DUT did not send RTCP sender report correctly.

RTSP Session is terminated by DUT during media streaming.

Note: See Annex A.1 for Invalid RTP header definition.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.1.6 MEDIA2 STREAMING – H.264 (RTP-Unicast/RTSP/HTTP/TCP, IPv6)

Test Label: Real Time Viewing DUT H.264 media2 streaming using HTTP transport for IPv6.

Test Case ID: DRAFT-RTSS-1-5-6

ONVIF Core Specification Coverage: RTP/RTSP/HTTP/TCP, RTP, RTCP, Stream control, RTSP, RTSP over HTTP.

Command Under Test: None

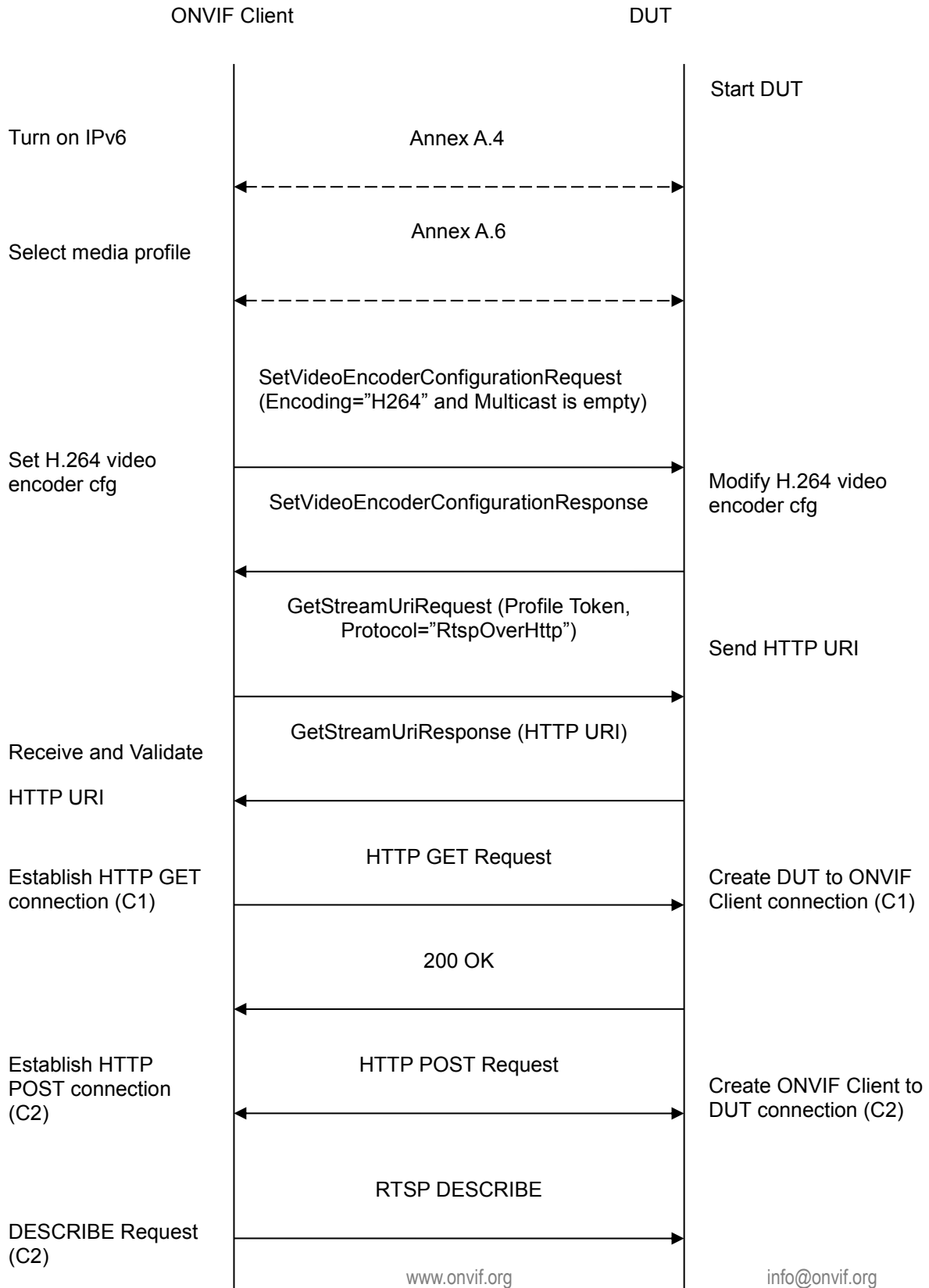
WSDL Reference: None

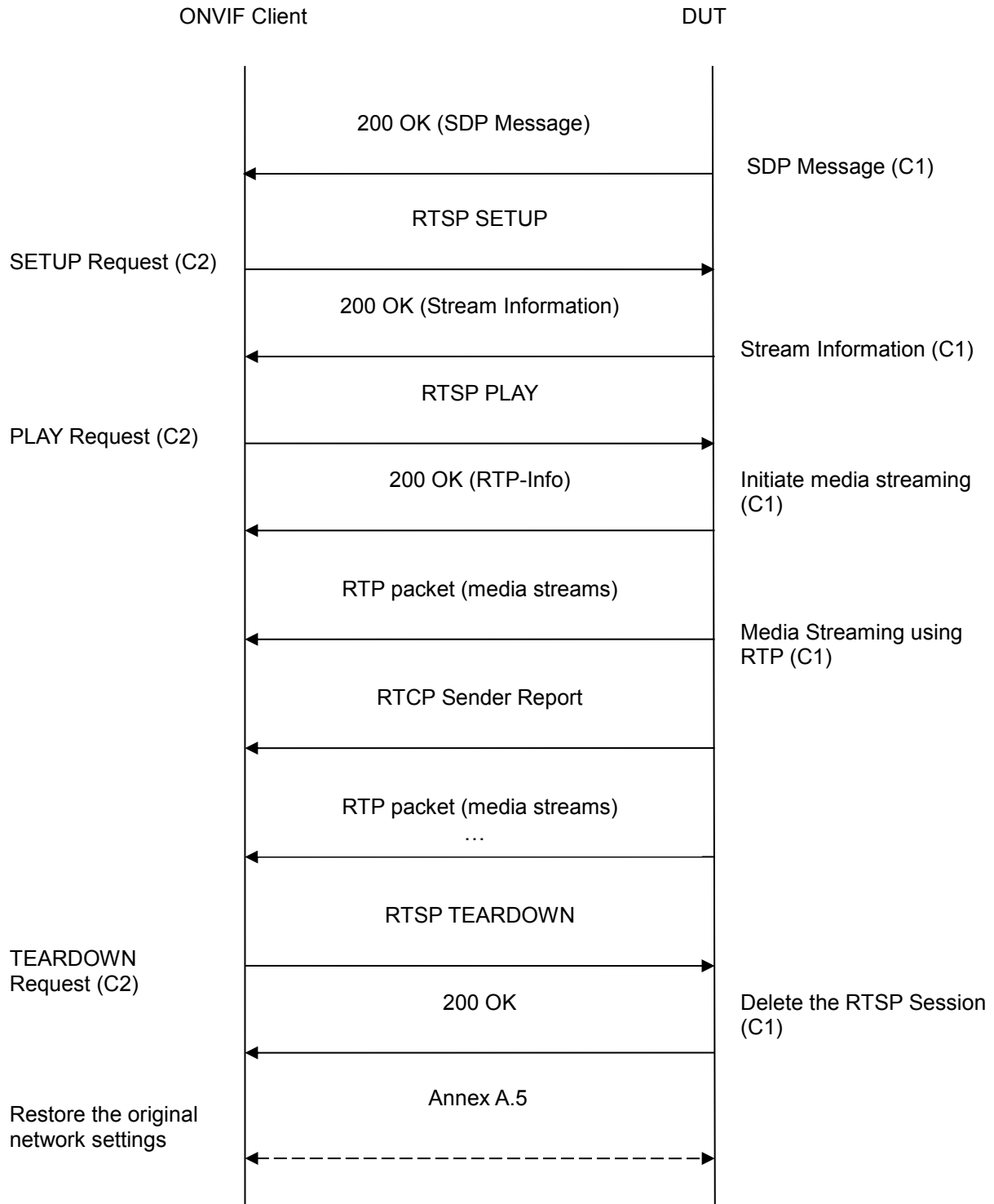
Test Purpose: To verify H.264 media streaming based on HTTP Transport for IPv6.

Pre-Requisite: Media2 Service is supported by DUT. Media2_H.264 feature is supported by DUT. A media profile with H.264 video encoder configuration. IPv6 is turned on for network interface. The DUT is configured with Manual IPv6 or LinkLocal IPv6 address.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

1. Start an ONVIF Client.

2. Start the DUT.
3. ONVIF Client turns on IPv6 network interface by following the procedure mentioned in Annex A.4.
4. ONVIF Client selects a media profile with H264 video encoding support by following the procedure mentioned in Annex A.6
5. ONVIF Client invokes SetVideoEncoderConfigurationRequest (Encoding = "H.264", Resolution = ["Width", "Height"], Quality = q1, GovLength = g1 and empty Multicast). The parameter of Profile is set the highest value that DUT supports as the order is High/Extended/Main/Baseline. These values will be taken from the GetVideoEncoderConfigurationOptions response in A.6.
6. DUT modifies video encoder configuration and responds with SetVideoEncoderConfigurationResponse message indicating success.
7. ONVIF Client invokes GetStreamUriRequest message (Profile Token, Protocol="RtspOverHttp") to retrieve media stream URI for the selected media profile.
8. DUT sends RTSP URI in the GetStreamUriResponse message.
9. ONVIF Client verifies the HTTP media stream URI provided by the DUT.
10. ONVIF Client invokes HTTP GET Request on DUT and establishes DUT to ONVIF Client connection for RTP data transfer.
11. ONVIF Client invokes HTTP POST Request and establishes ONVIF Client to DUT connection for RTSP control requests.
12. ONVIF Client invokes RTSP DESCRIBE request on HTTP POST connection.
13. DUT sends 200 OK message and SDP information on HTTP GET connection.
14. ONVIF Client invokes RTSP SETUP request on HTTP POST connection with transport parameter as 'RTP/TCP' along with 'interleaved' parameter.
15. DUT sends 200 OK message and the media stream information on HTTP GET connection.
16. ONVIF Client invokes RTSP PLAY request on HTTP POST connection.
17. DUT sends 200 OK message and starts media streaming on HTTP GET connection.
18. DUT transfers H.264 RTP media stream to ONVIF Client on HTTP GET connection.
19. DUT sends RTCP sender report to ONVIF Client on HTTP GET connection.
20. DUT validates the received RTP and RTCP packets, decodes and renders them.
21. ONVIF Client invokes RTSP TEARDOWN control request on HTTP POST connection and closes the HTTP POST connection.
22. DUT sends 200 OK Response on HTTP GET connection and closes the HTTP GET connection.
23. ONVIF Client will restore the original settings by following the procedure mentioned in Annex A.5A.5.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

DUT did not have valid media profile.

DUT did not send SetVideoEncoderConfigurationResponse message.

DUT did not send GetStreamUriResponse message.

DUT did not send RTSP URI in the GetStreamUriResponse message.

DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

DUT did not send valid RTP header in one or more media streams.

DUT did not send RTCP sender report correctly.

RTSP Session is terminated by DUT during media streaming.

Note: See Annex A.1 for Invalid RTP header definition.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.1.7 MEDIA2 STREAMING – H.264 (RTP/RTSP/TCP, IPv6)

Test Label: Real Time Viewing DUT H.264 media2 streaming using RTP/RTSP/TCP transport for IPv6.

Test Case ID: DRAFT-RTSS-1-5-7

ONVIF Core Specification Coverage: RTP/RTSP/TCP, RTP, RTCP, Stream control, RTSP.

Command Under Test: None

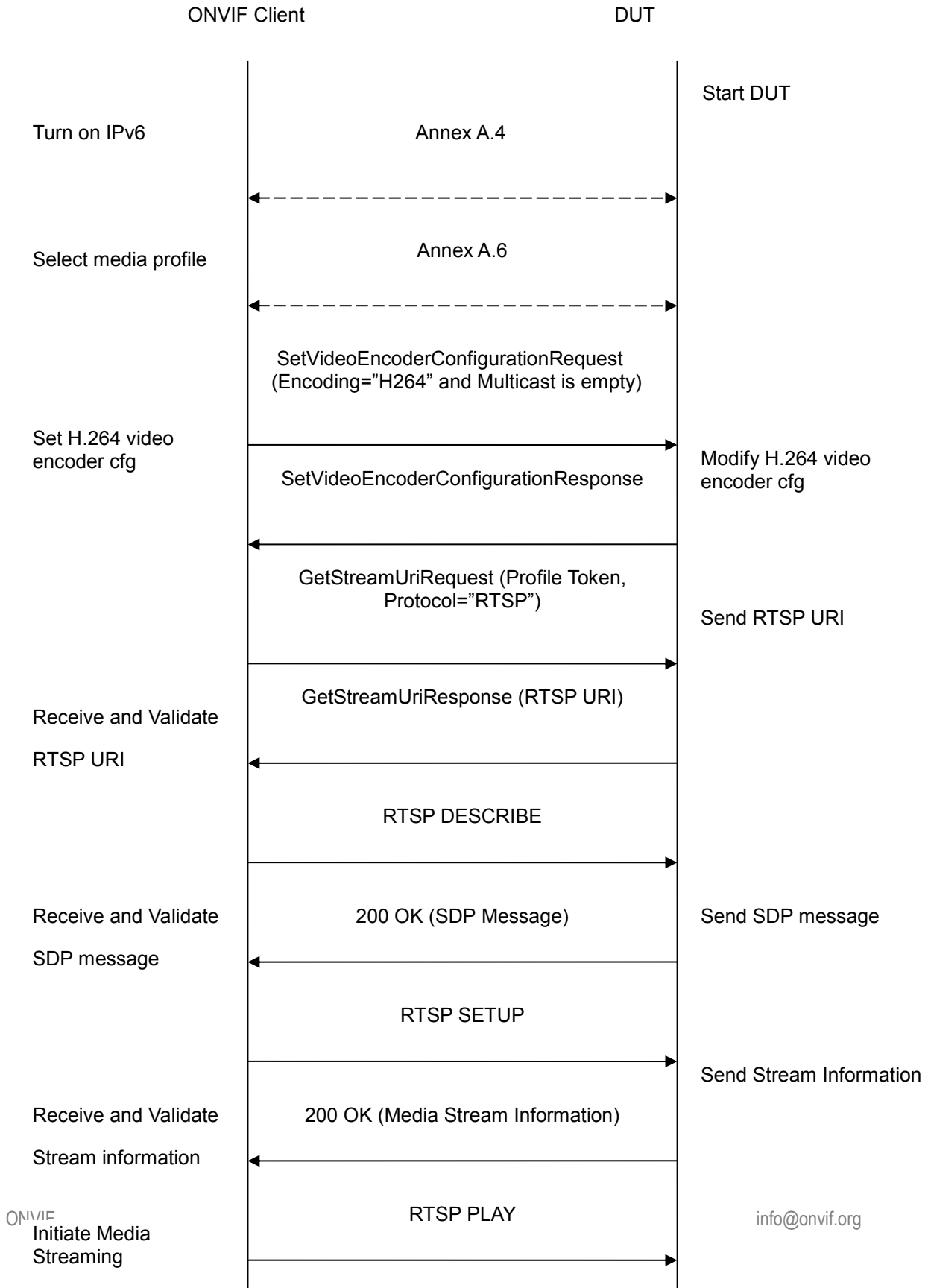
WSDL Reference: None

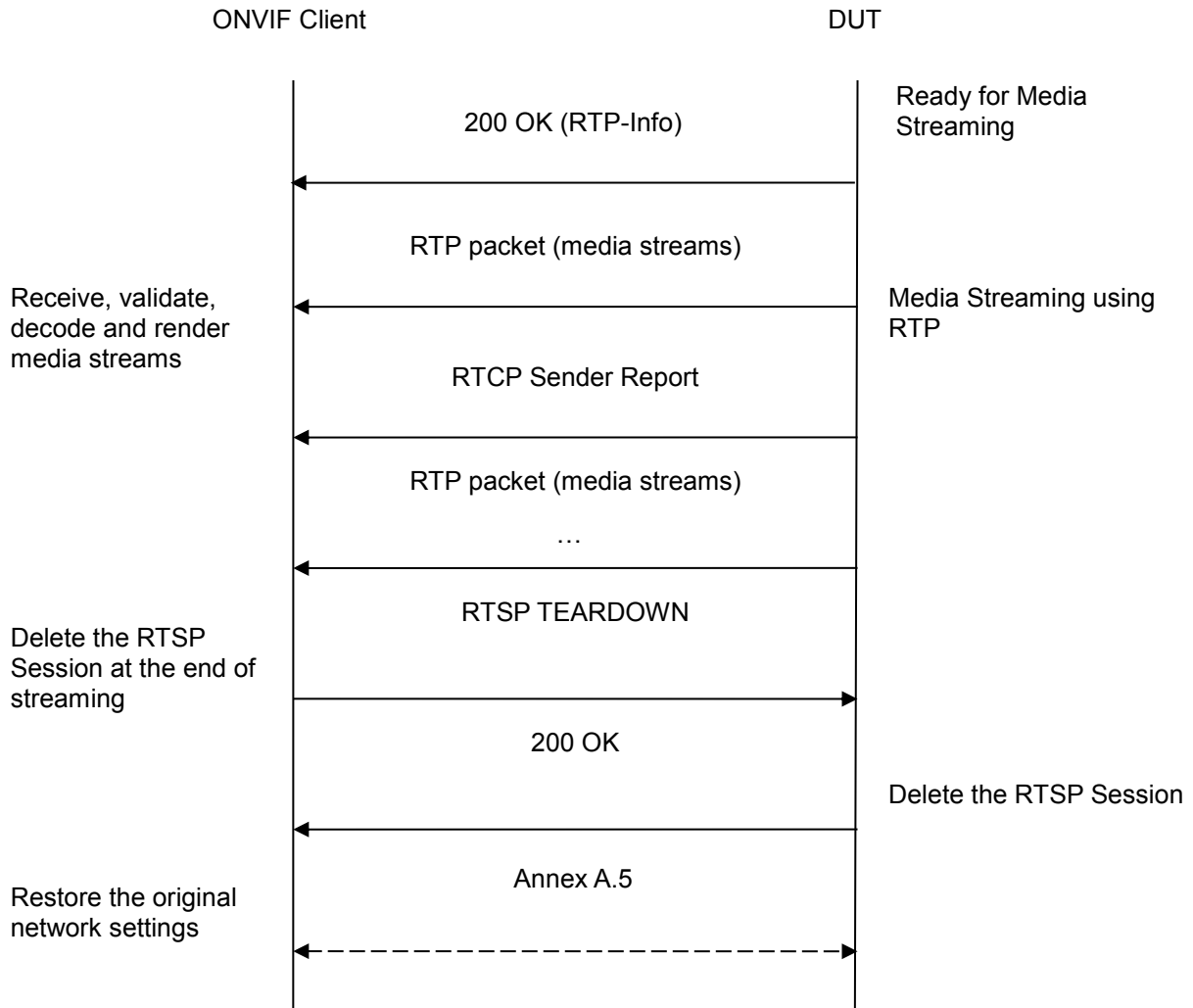
Test Purpose: To verify H.264 media streaming based on RTP/RTSP/TCP using RTSP tunnel for IPv6.

Pre-Requisite: Media2 Service is supported by DUT. Media2_H.264 feature is supported by DUT. A media profile with H.264 video encoder configuration. IPv6 is turned on for network interface. The DUT is configured with Manual IPv6 or LinkLocal IPv6 address.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client turns on IPv6 network interface by following the procedure mentioned in Annex A.4.
4. ONVIF Client selects a media profile with H264 video encoding support by following the procedure mentioned in Annex A.6
5. ONVIF Client invokes SetVideoEncoderConfigurationRequest (Encoding = "H.264", Resolution = ["Width", "Height"], Quality = q1, GovLength = g1 and empty Multicast). The parameter of Profile is set the highest value that DUT supports as the order is High/Extended/Main/Baseline. These values will be taken from the GetVideoEncoderConfigurationOptions response in A.6.

6. DUT modifies video encoder configuration and responds with SetVideoEncoderConfigurationResponse message indicating success.
7. ONVIF Client invokes GetStreamUriRequest message (Profile Token, Protocol="RTSP") to retrieve media stream URI for the selected media profile.
8. DUT sends RTSP URI in the GetStreamUriResponse message.
9. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
10. ONVIF Client invokes RTSP DESCRIBE request.
11. DUT sends 200 OK message and SDP information.
12. ONVIF Client invokes RTSP SETUP request with transport parameter as 'RTP/TCP' along with 'interleaved' parameter.
13. DUT sends 200 OK message and the media stream information.
14. ONVIF Client invokes RTSP PLAY request.
15. DUT sends 200 OK message and starts media streaming.
16. DUT interleaves RTP and RTCP packets, send them over RTSP control connection.
17. DUT validates the received RTP and RTCP packets, decodes and renders them.
18. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
19. DUT sends 200 OK Response and terminates the RTSP Session.
20. ONVIF Client will restore the original settings by following the procedure mentioned in Annex A.5A.5.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

DUT did not have valid media profile.

DUT did not send SetVideoEncoderConfigurationResponse message.

DUT did not send GetStreamUriResponse message.

DUT did not send RTSP URI in the GetStreamUriResponse message.

DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

DUT did not send RTP and RTCP packets as per [RFC 2326] section 10.12.

RTSP Session is terminated by DUT during media streaming.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.1.8 MEDIA2 STREAMING – H.264 (RTP-Multicast, IPv4)

Test Label: Real Time Viewing DUT H.264 Media2 Streaming Using RTP-Multicast Transport for IPv4.

Test Case ID: RTSS-1-5-8

ONVIF Core Specification Coverage: RTP data transfer via UDP, RTP, RTCP, Stream control, RTSP

Command Under Test: None

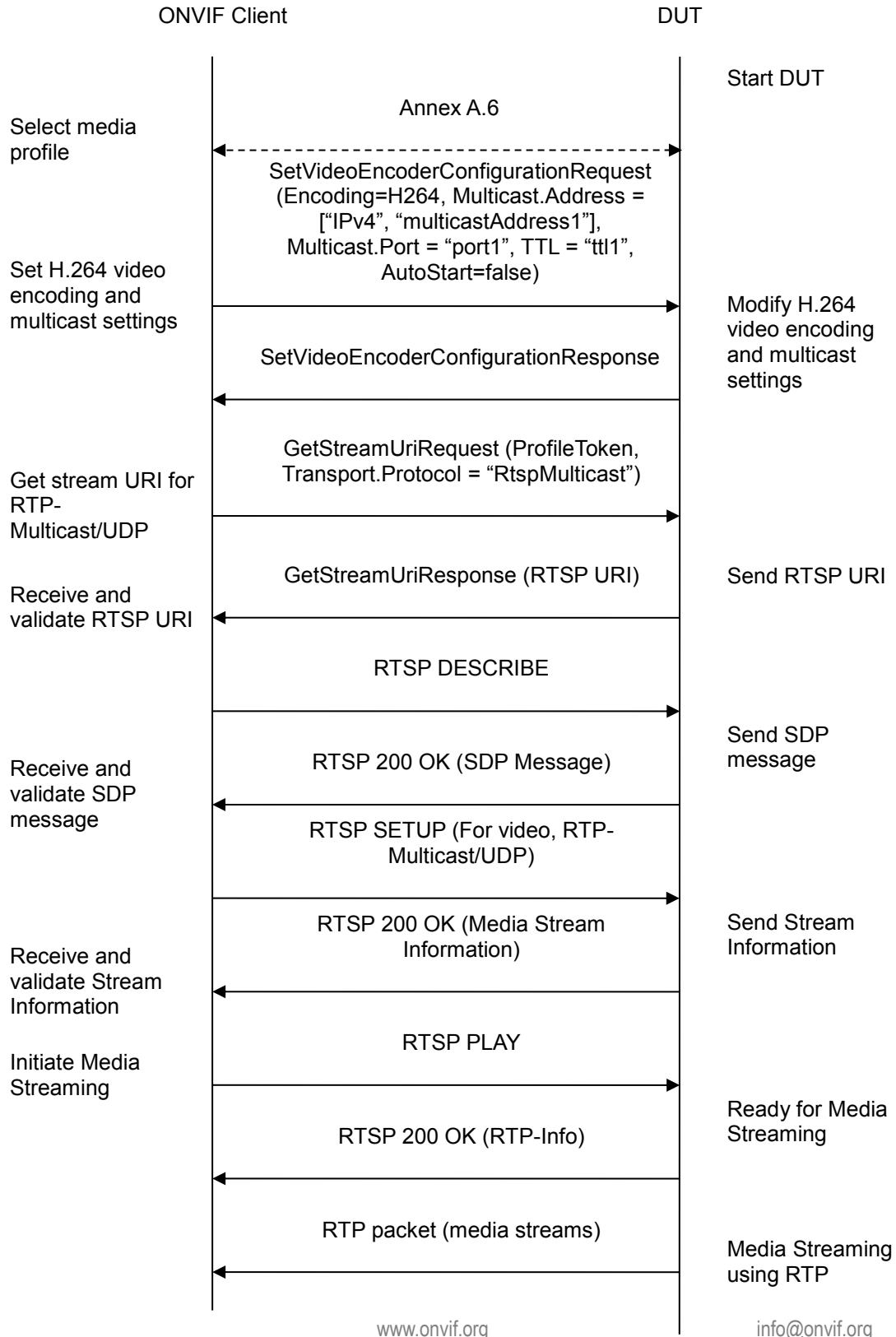
WSDL Reference: None

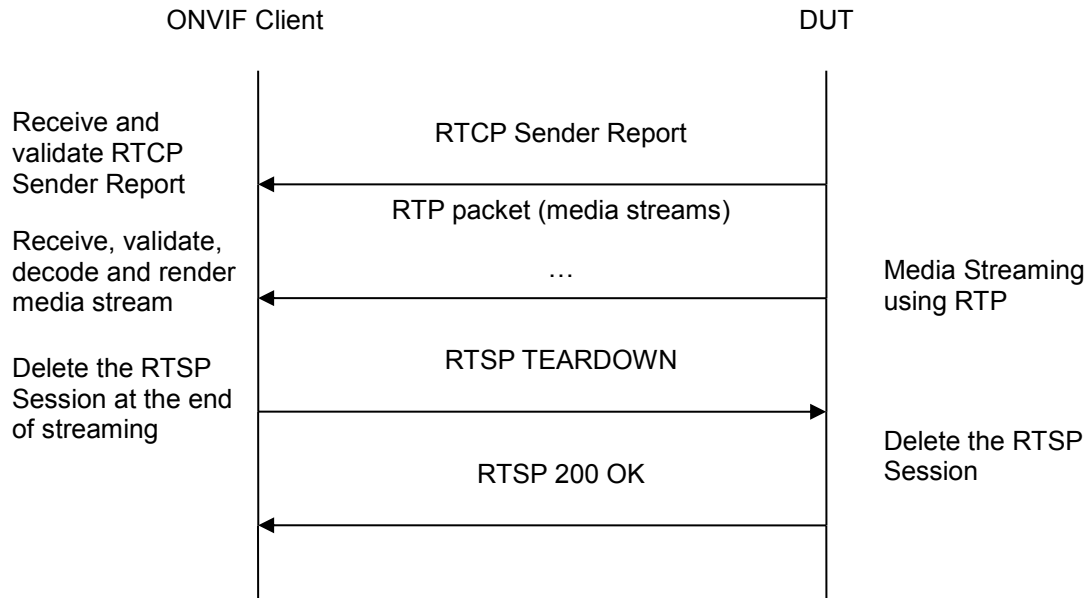
Test Propose: To verify H.264 media streaming based on RTP-Multicast/UDP Transport for IPv4.

Pre-Requisite: Media2 Service is supported by DUT. Media2_H.264 feature is supported by DUT. Real-time streaming supported by DUT. A media profile with H.264 video encoder configuration exists. RTP-Multicast transport protocol is supported by DUT.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client selects a media profile with H264 video encoding support by following the procedure mentioned in Annex A.6
4. ONVIF Client invokes SetVideoEncoderConfigurationRequest (Encoding = "H.264", Resolution = ["Width", "Height"], Quality = q1, GovLength = g1 and Multicast.Address = ["IPv4", "multicastAddress1"], Multicast.Port = "port1", TTL = "ttl1", AutoStart=false). The parameter of Profile is set the highest value that DUT supports as the order is High/Extended/Main/Baseline. These values will be taken from the GetVideoEncoderConfigurationOptions response in A.6.
5. DUT modifies video encoder configuration and responds with SetVideoEncoderConfigurationResponse message indicating success.
6. ONVIF Client invokes GetStreamUriRequest message (Profile Token, Protocol="RtspMulticast") to retrieve media stream URI for the selected media profile.
7. DUT sends RTSP URI in the GetStreamUriResponse message.
8. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
9. ONVIF Client invokes RTSP DESCRIBE request.
10. The DUT sends 200 OK message and SDP information.
11. ONVIF Client invokes RTSP SETUP request with transport parameter **RTP-Multicast/UDP**.
12. The DUT sends 200 OK message and the media stream information.

13. ONVIF Client invokes RTSP PLAY request.
14. The DUT sends 200 OK message and starts media streaming.
15. The DUT sends H.264 RTP multicast media stream to multicast IPv4 address over UDP.
16. The DUT sends RTCP sender report to ONVIF Client.
17. ONVIF Client validates the received RTP and RTCP packets, decodes and renders them.
18. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
19. The DUT sends 200 OK Response and terminates the RTSP Session.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

The DUT did not have valid media profile.

The DUT did not send SetVideoEncoderConfigurationResponse message.

The DUT did not send GetStreamUriResponse message.

The DUT did not send valid GetStreamUriResponse message.

DUT did not send RTSP URI in the GetStreamUriResponse message.

The DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

The DUT did not send valid RTP header in one or more media streams.

The DUT did not send RTCP sender report correctly.

The DUT did not send H.264 RTP multicast media streaming for corresponding multicast IP.

Note: See Annex A.1 for Invalid RTP header definition.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.1.9 MEDIA2 STREAMING – H.264 (RTP-Multicast, IPv6)

Test Label: Real Time Viewing DUT H.264 Media Streaming Using RTP-Multicast Transport for IPv6.

Test Case ID: RTSS-1-5-9

ONVIF Core Specification Coverage: RTP data transfer via UDP, RTP, RTCP, Stream control, RTSP

Command Under Test: None

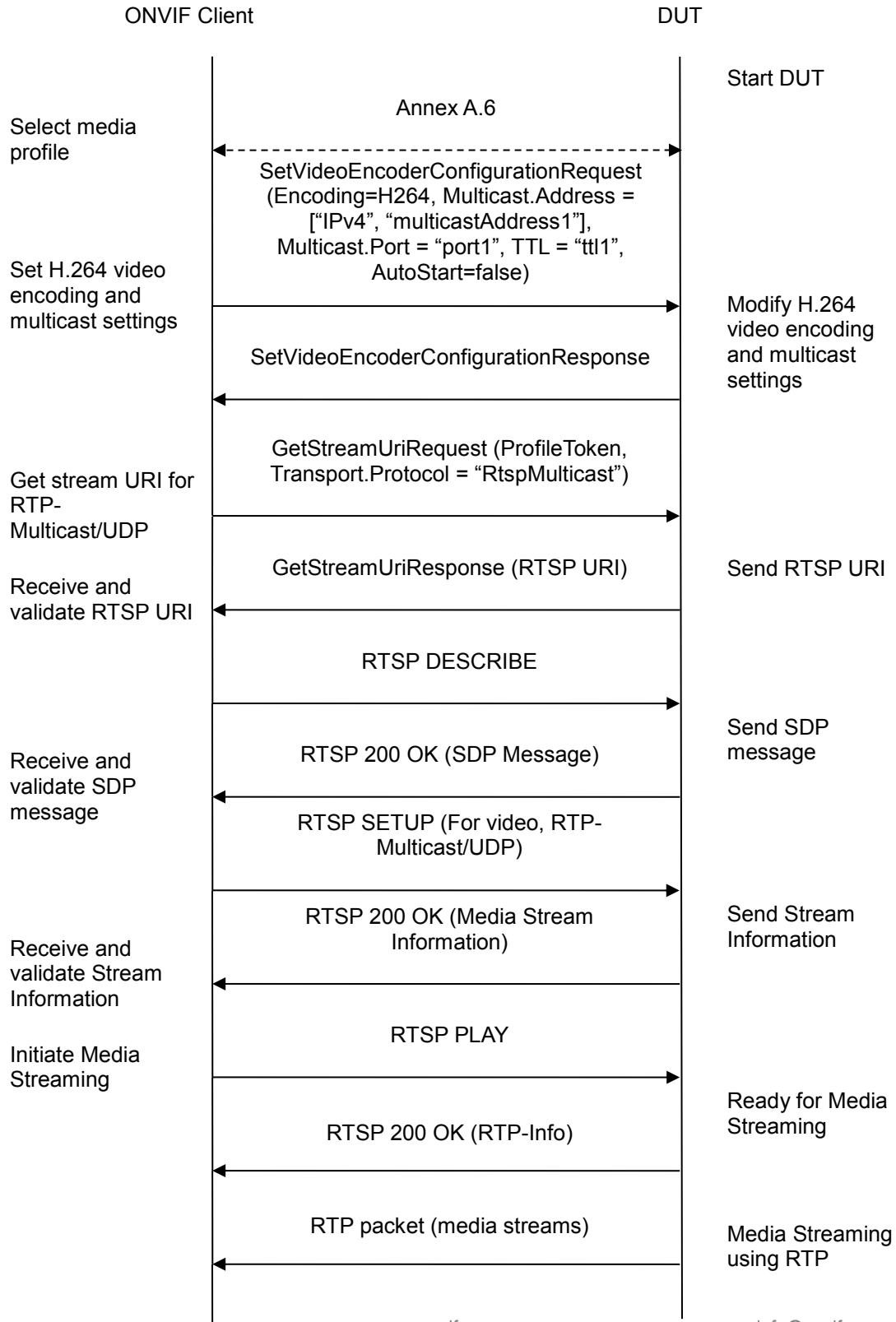
WSDL Reference: None

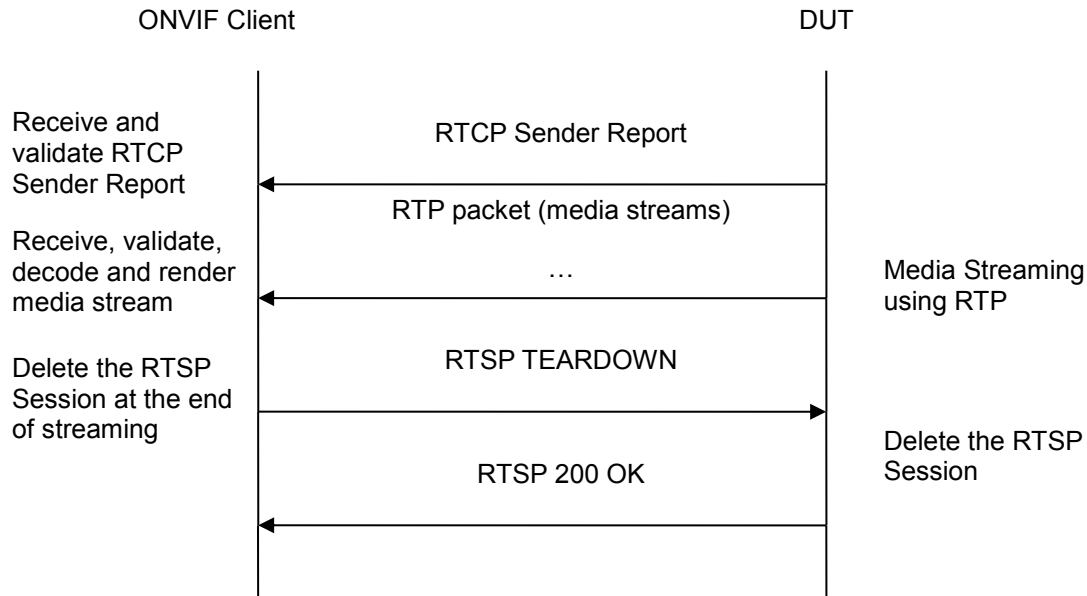
Test Propose: To verify H.264 media streaming based on RTP-Multicast Transport for IPv6.

Pre-Requirement: Media2 Service is supported by DUT. Media2_H.264 feature is supported by DUT. RTP-Multicast transport protocol is supported by DUT.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client selects a media profile with H264 video encoding support by following the procedure mentioned in Annex A.6
4. ONVIF Client invokes SetVideoEncoderConfigurationRequest (Encoding = "H.264", Resolution = ["Width", "Height"], Quality = q1, GovLength = g1 and Multicast.Address = ["IPv6", "multicastAddress1"], Multicast.Port = "port1", TTL = "ttl1", AutoStart=false). The parameter of Profile is set the highest value that DUT supports as the order is High/Extended/Main/Baseline. These values will be taken from the GetVideoEncoderConfigurationOptions response in A.6.
5. DUT modifies video encoder configuration and responds with SetVideoEncoderConfigurationResponse message indicating success.
6. ONVIF Client invokes GetStreamUriRequest message (Profile Token, Protocol="RtspMulticast") to retrieve media stream URI for the selected media profile.
7. DUT sends RTSP URI in the GetStreamUriResponse message.
8. ONVIF Client invokes RTSP DESCRIBE request.
9. The DUT sends 200 OK message and SDP information.
10. ONVIF Client invokes RTSP SETUP request with transport parameter **RTP-Multicast/UDP**.
11. The DUT sends 200 OK message and the media stream information.
12. ONVIF Client invokes RTSP PLAY request.

13. The DUT sends 200 OK message and starts media streaming.
14. The DUT sends H.264 RTP multicast media stream to multicast IPv6 address over UDP.
15. The DUT sends RTCP sender report to ONVIF Client.
16. ONVIF Client validates the received RTP and RTCP packets, decodes and renders them.
17. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
18. The DUT sends 200 OK Response and terminates the RTSP Session.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

The DUT did not have valid media profile.

The DUT did not send SetVideoEncoderConfigurationResponse message.

The DUT did not send GetStreamUriResponse message.

The DUT did not send valid GetStreamUriResponse message.

DUT did not send RTSP URI in the GetStreamUriResponse message.

The DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

The DUT did not send valid RTP header in one or more media streams.

The DUT did not send RTCP sender report correctly.

The DUT did not send H.264 RTP multicast media streaming for corresponding multicast IP.

Note: See Annex A.1 for Invalid RTP header definition.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.2 Audio Streaming

4.2.1 MEDIA2 STREAMING – G.711 (RTP-Unicast/UDP)

Test Label: Real Time Viewing DUT G.711 Media2 Streaming Using RTP-Unicast/UDP Transport.

Test Case ID: RTSS-2-3-1

ONVIF Core Specification Coverage: None

Command Under Test: None

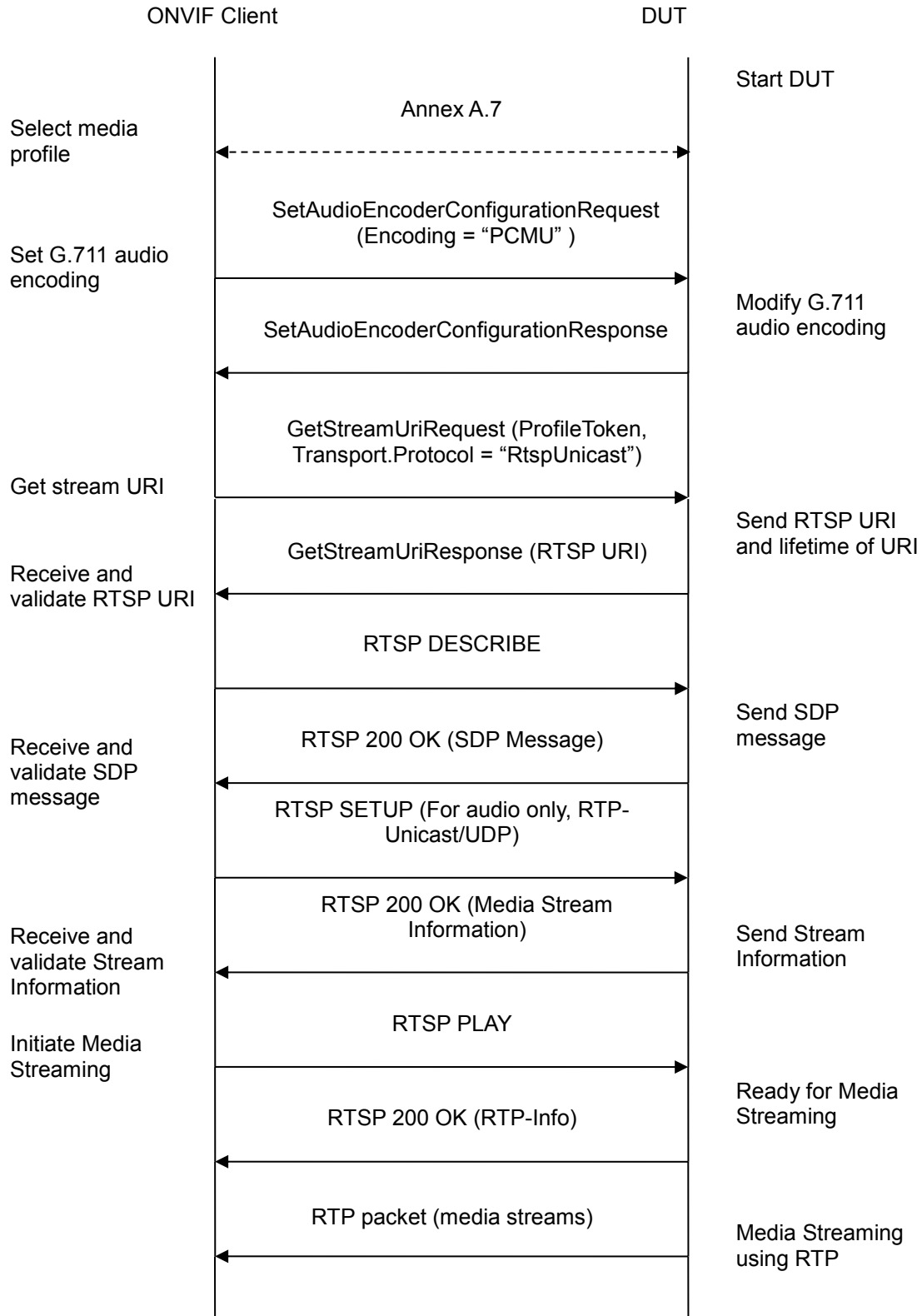
WSDL Reference: None

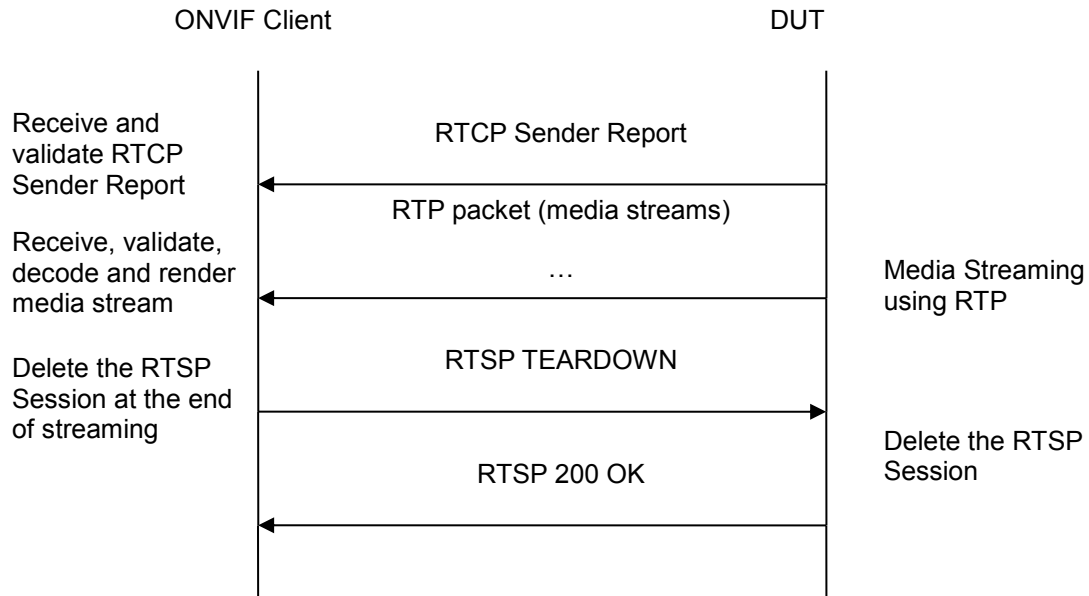
Test Propose: To verify G.711 media streaming based on RTP-Unicast/UDP Transport.

Pre-Requisite: Media2 Service is supported by DUT. Media2_G.711 is supported by DUT.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client selects a media profile with “PCMU” (G.711) encoding support using Annex A.7
4. ONVIF Client invokes SetAudioEncoderConfigurationRequest message (Encoding = “PCMU”, Bitrate = r1, SampleRate = r2) to set G.711 encoding.
5. Verify the SetAudioEncoderConfigurationResponse message from the DUT.
6. ONVIF Client invokes GetStreamUriRequest message (ProfileToken, Transport.Protocol = “RtspUnicast”) to retrieve media stream URI for the selected media profile.
7. The DUT sends the GetStreamUriResponse message with RTSP URI.
8. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
9. ONVIF Client invokes RTSP DESCRIBE request.
10. The DUT sends 200 OK message and SDP information.
11. ONVIF Client invokes RTSP SETUP request with transport parameter RtspUnicast/UDP.
12. The DUT sends 200 OK message and the media stream information.
13. ONVIF Client invokes RTSP PLAY request.
14. The DUT sends 200 OK message and starts media streaming.

15. The DUT sends G.711 RTP media stream to ONVIF Client over UDP.
16. The DUT sends RTCP sender report to ONVIF Client.
17. ONVIF Client validates the received RTP and RTCP packets, decodes and renders them.
18. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
19. The DUT sends 200 OK Response and terminates the RTSP Session.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

The DUT did not have valid media profile.

The DUT did not send SetAudioEncoderConfigurationResponse message.

The DUT did not send GetStreamUriResponse message.

The DUT did not send valid GetStreamUriResponse message.

The DUT did not send valid RTSP URI.

The DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

The DUT did not send valid RTP header in one or more media streams.

The DUT did not send RTCP sender report correctly.

The DUT did not send G.711 RTP media streaming to ONVIF Client.

The DUT sent not only G.711 RTP media streaming to ONVIF Client.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.2.2 MEDIA2 STREAMING – G.711 (RTP-Unicast/RTSP/HTTP/TCP)

Test Label: Real Time Viewing DUT G.711 Media2 Streaming Using RTP-Unicast/RTSP/HTTP/TCP Transport.

Test Case ID: RTSS-2-3-2

ONVIF Core Specification Coverage: None

Command Under Test: None

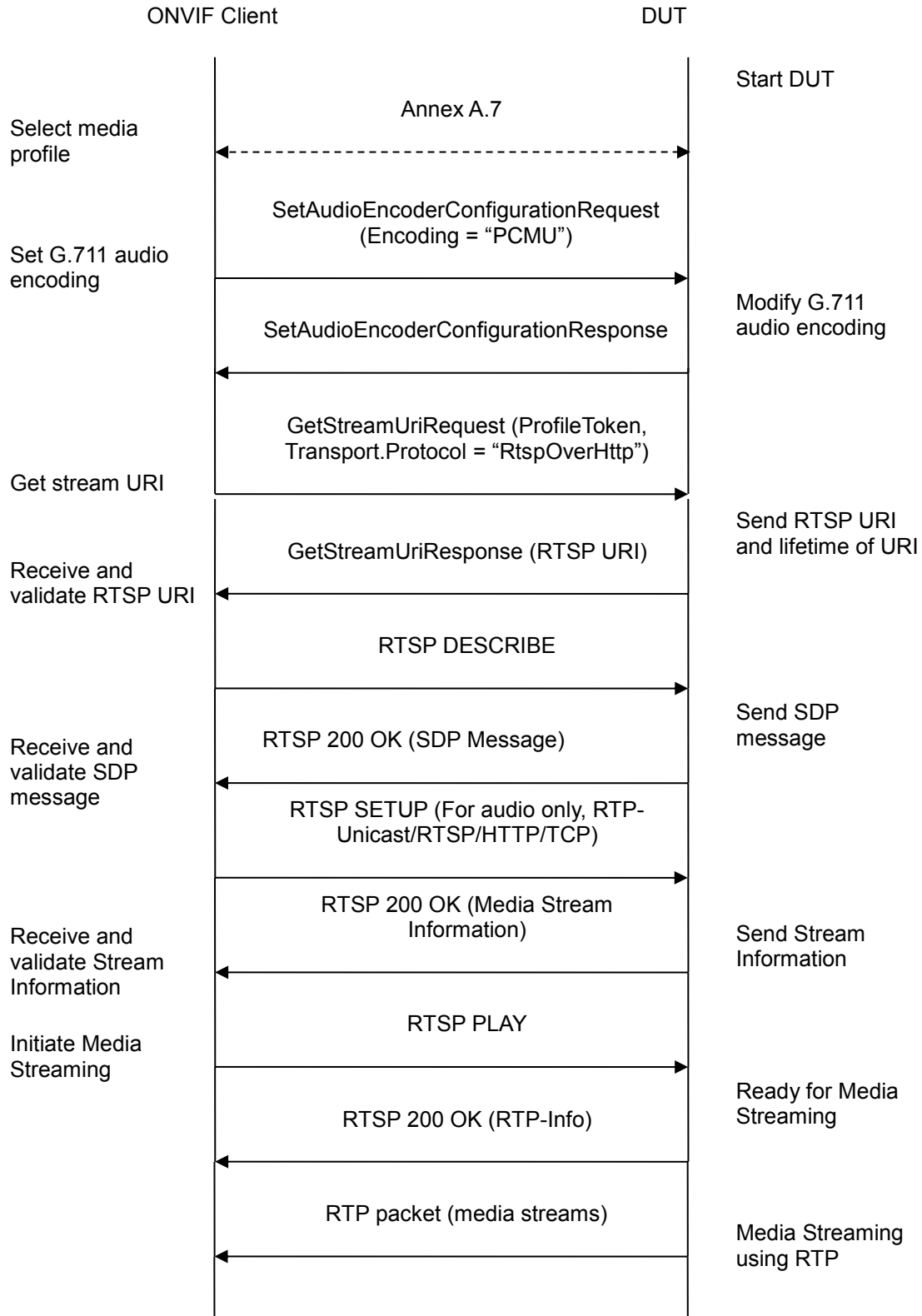
WSDL Reference: None

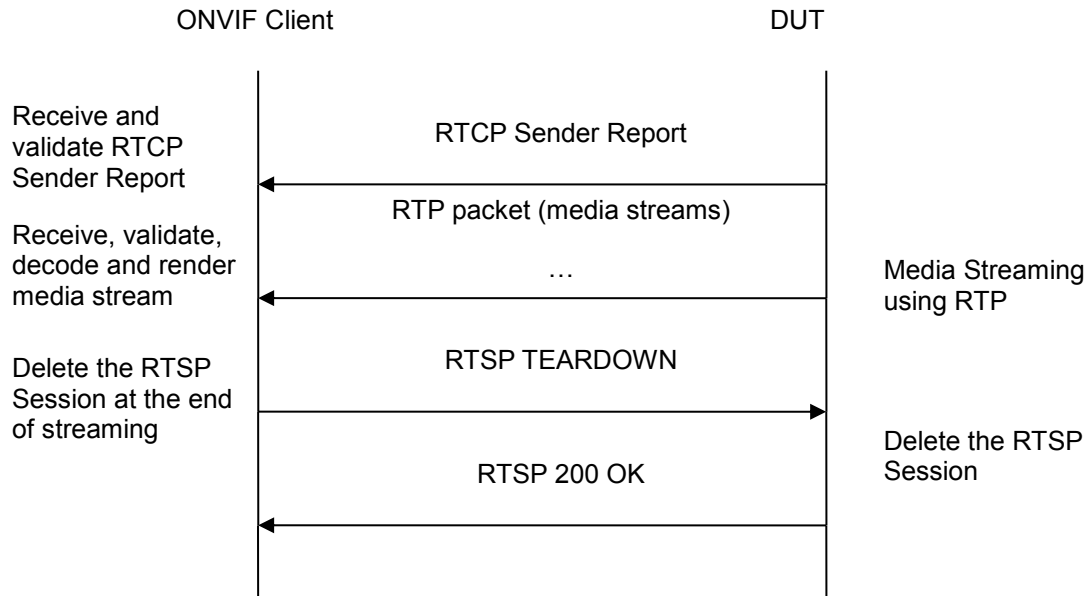
Test Propose: To verify G.711 media streaming based on RTP-Unicast/RTSP/HTTP/TCP Transport.

Pre-Requisite: Media2 Service is supported by DUT. Media2_G.711 is supported by DUT.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client selects a media profile with “PCMU” (G.711) encoding support using Annex A.7
4. ONVIF Client invokes SetAudioEncoderConfigurationRequest message (Encoding = “PCMU”, Bitrate = r1, SampleRate = r2) to set G.711 encoding.
5. Verify the SetAudioEncoderConfigurationResponse message from the DUT.
6. ONVIF Client invokes GetStreamUriRequest message (ProfileToken, Transport.Protocol = “RtspOverHttp”) to retrieve media stream URI for the selected media profile.
7. The DUT sends the GetStreamUriResponse message with RTSP URI.
8. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
9. ONVIF Client invokes RTSP DESCRIBE request.
10. The DUT sends 200 OK message and SDP information.
11. ONVIF Client invokes RTSP SETUP request with transport parameter **RTP-Unicast/RTSP/HTTP/TCP**.
12. The DUT sends 200 OK message and the media stream information.
13. ONVIF Client invokes RTSP PLAY request.
14. The DUT sends 200 OK message and starts media streaming.

15. The DUT sends G.711 RTP media stream to ONVIF Client over HTTP.
16. The DUT sends RTCP sender report to ONVIF Client.
17. ONVIF Client validates the received RTP and RTCP packets, decodes and renders them.
18. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
19. The DUT sends 200 OK Response and terminates the RTSP Session.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

The DUT did not have valid media profile.

The DUT did not send SetAudioEncoderConfigurationResponse message.

The DUT did not send GetStreamUriResponse message.

The DUT did not send valid GetStreamUriResponse message.

The DUT did not send valid RTSP URI

The DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

The DUT did not send valid RTP header in one or more media streams.

The DUT did not send RTCP sender report correctly.

The DUT did not send G.711 RTP media streaming to ONVIF Client.

The DUT sent not only G.711 RTP media streaming to ONVIF Client.

Note: See Annex A.1 for Invalid RTP header definition.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.2.3 MEDIA2 STREAMING – G.711 (RTP/RTSP/TCP)

Test Label: Real Time Viewing DUT G.711 Media2 Streaming Using RTP/RTSP/TCP Transport.

Test Case ID: RTSS-2-3-3

ONVIF Core Specification Coverage: None

Command Under Test: None

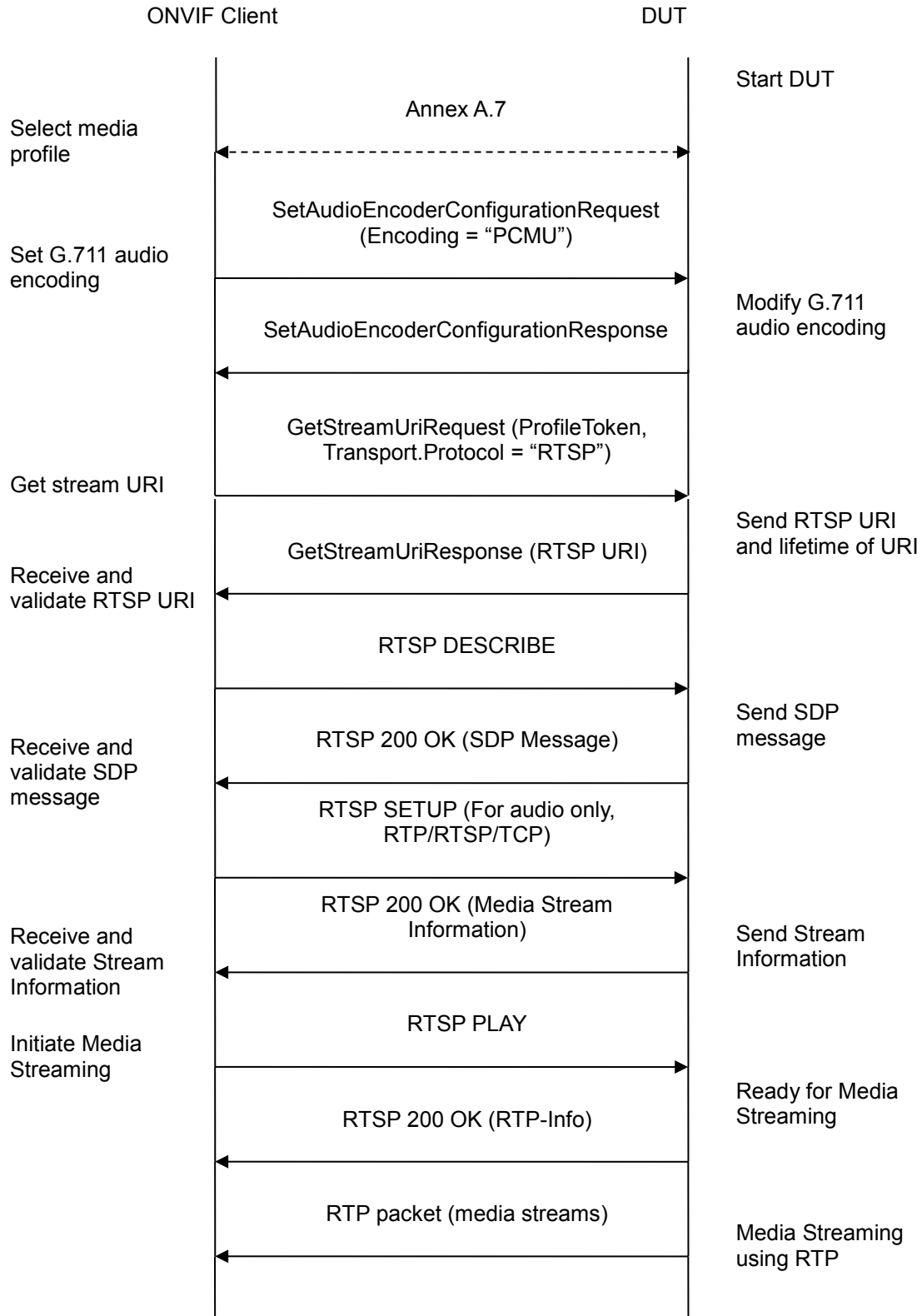
WSDL Reference: None

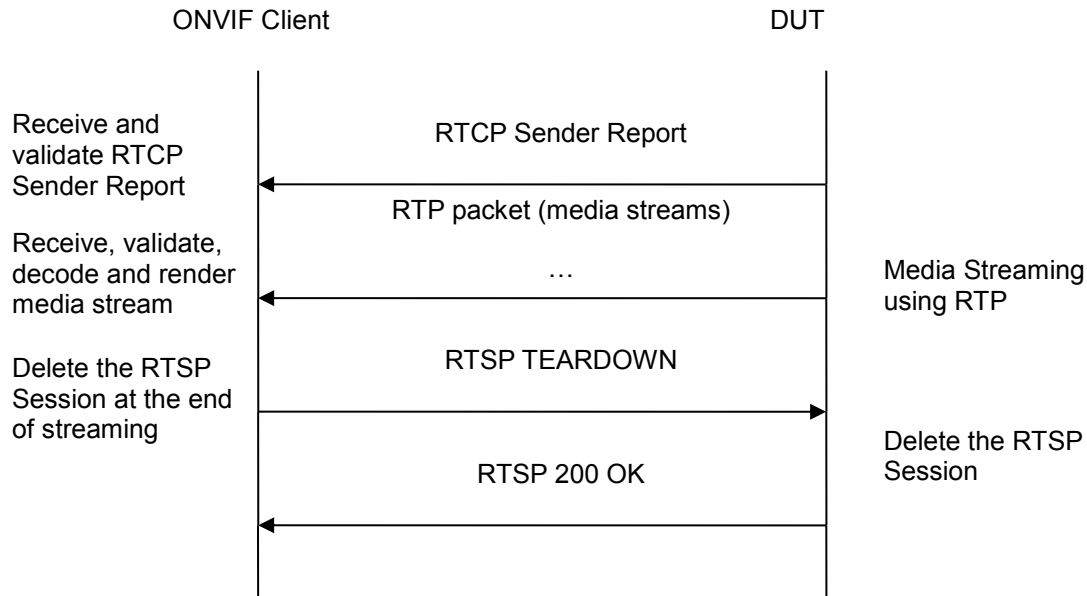
Test Propose: To verify G.711 media streaming based on RTP/RTSP/TCP Transport.

Pre-Requisite: Media2 Service is supported by DUT. Media2_G.711 is supported by DUT.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client selects a media profile with “PCMU” (G.711) encoding support using Annex A.7
4. ONVIF Client invokes SetAudioEncoderConfigurationRequest message (Encoding = “PCMU”, Bitrate = r1, SampleRate = r2) to set G.711 encoding.
5. Verify the SetAudioEncoderConfigurationResponse message from the DUT.
6. ONVIF Client invokes GetStreamUriRequest message (ProfileToken, Transport.Protocol = “RTSP”) to retrieve media stream URI for the selected media profile.
7. The DUT sends the GetStreamUriResponse message with RTSP URI.
8. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
9. ONVIF Client invokes RTSP DESCRIBE request.
10. The DUT sends 200 OK message and SDP information.
11. ONVIF Client invokes RTSP SETUP request with transport parameter **RTP/RTSP/TCP**.
12. The DUT sends 200 OK message and the media stream information.
13. ONVIF Client invokes RTSP PLAY request.
14. The DUT sends 200 OK message and starts media streaming.

15. The DUT sends G.711 RTP media stream to ONVIF Client over RTSP.
16. The DUT sends RTCP sender report to ONVIF Client.
17. ONVIF Client validates the received RTP and RTCP packets, decodes and renders them.
18. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
19. The DUT sends 200 OK Response and terminates the RTSP Session.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

The DUT did not have valid media profile.

The DUT did not send SetAudioEncoderConfigurationResponse message.

The DUT did not send GetStreamUriResponse message.

The DUT did not send valid GetStreamUriResponse message.

The DUT did not send valid RTSP URI.

The DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

The DUT did not send valid RTP header in one or more media streams.

The DUT did not send RTCP sender report correctly.

The DUT did not send G.711 RTP media streaming to ONVIF Client.

The DUT sent not only G.711 RTP media streaming to ONVIF Client.

Note: See Annex A.1 for Invalid RTP header definition.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.2.4 MEDIA2 STREAMING – G.711 (RTP-Unicast/UDP, IPv6)

Test Label: Real Time Viewing DUT G.711 Media2 Streaming Using RTP-Unicast/UDP Transport for IPv6.

Test Case ID: DRAFT-RTSS-2-3-4

ONVIF Core Specification Coverage: None

Command Under Test: None

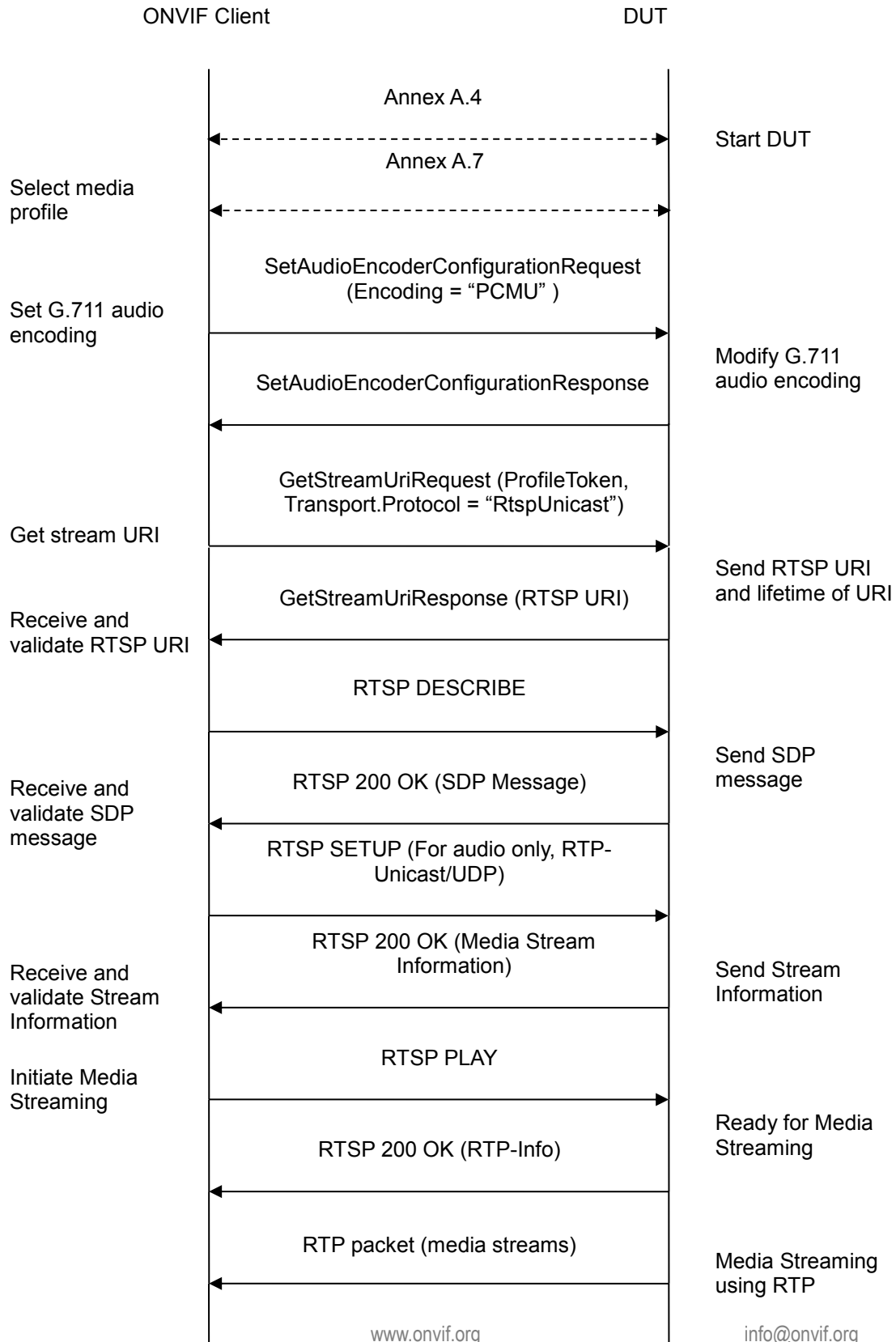
WSDL Reference: None

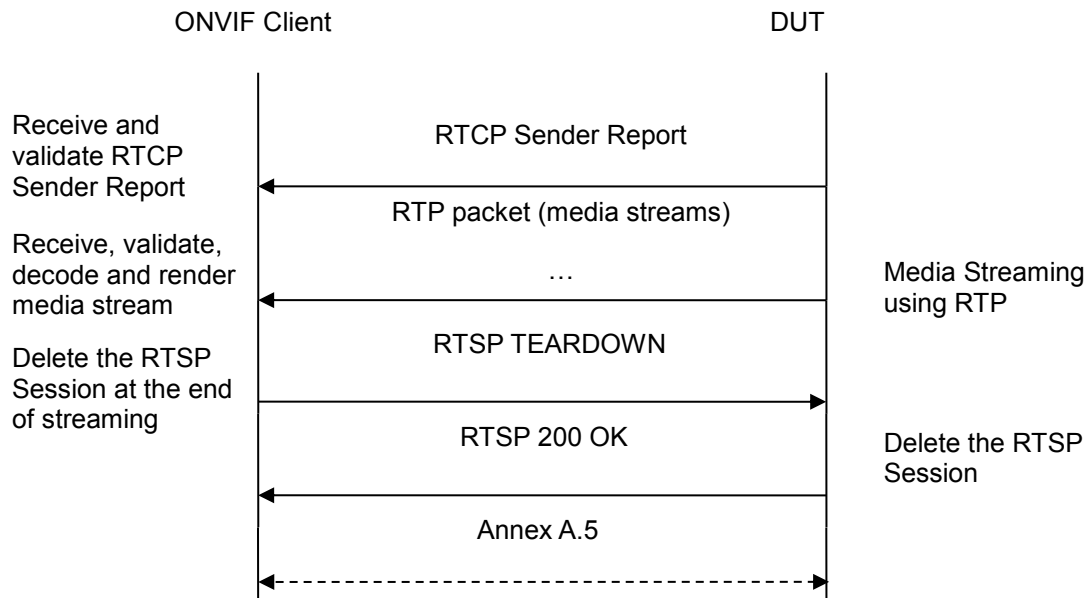
Test Propose: To verify G.711 media streaming based on RTP-Unicast/UDP Transport for IPv6.

Pre-Requirement: Media2 Service is supported by DUT. Media2_G.711 is supported by DUT. IPv6 is turned on for network interface. The DUT is configured with Manual IPv6 or LinkLocal IPv6 address.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client turns on IPv6 network interface by following the procedure mentioned in Annex A.4.
4. ONVIF Client selects a media profile with G.711 encoding support using Annex A.7
5. ONVIF Client invokes SetAudioEncoderConfigurationRequest message with (Encoding = "PCMU", Bitrate = r1, SampleRate = r2) to set G.711 encoding.
6. Verify the SetAudioEncoderConfigurationResponse message from the DUT.
7. ONVIF Client invokes GetStreamUriRequest message (ProfileToken, Transport.Protocol = "RtspUnicast") to retrieve media stream URI for the selected media profile.
8. The DUT sends the GetStreamUriResponse message with RTSP URI.
9. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
10. ONVIF Client invokes RTSP DESCRIBE request.
11. The DUT sends 200 OK message and SDP information.
12. ONVIF Client invokes RTSP SETUP request with transport parameter **RTP-Unicast/UDP**.
13. The DUT sends 200 OK message and the media stream information.
14. ONVIF Client invokes RTSP PLAY request.

15. The DUT sends 200 OK message and starts media streaming.
16. The DUT sends G.711 RTP media stream to ONVIF Client over UDP.
17. The DUT sends RTCP sender report to ONVIF Client.
18. ONVIF Client validates the received RTP and RTCP packets, decodes and renders them.
19. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
20. The DUT sends 200 OK Response and terminates the RTSP Session..
21. ONVIF Client will restore the original settings by following the procedure mentioned in Annex A.5.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

The DUT did not send AudioEncoderConfiguration which supports G.711 encoding in the GetCompatibleAudioEncoderConfigurationsResponse message.

The DUT did not send SetAudioEncoderConfigurationResponse message.

The DUT did not send GetStreamUriResponse message.

The DUT did not send valid GetStreamUriResponse message.

The DUT did not send valid RTSP URI.

The DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

The DUT did not send valid RTP header in one or more media streams.

The DUT did not send RTCP sender report correctly.

The DUT did not send G.711 RTP media streaming to ONVIF Client.

The DUT sent not only G.711 RTP media streaming to ONVIF Client.

Note: See Annex A.1 for Invalid RTP header definition.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.2.5 MEDIA2 STREAMING – G.711 (RTP-Unicast/RTSP/HTTP/TCP, IPv6)

Test Label: Real Time Viewing DUT G.711 Media2 Streaming Using RTP-Unicast/RTSP/HTTP/TCP Transport for IPv6.

Test Case ID: DRAFT-RTSS-2-3-5

ONVIF Core Specification Coverage: None

Command Under Test: None

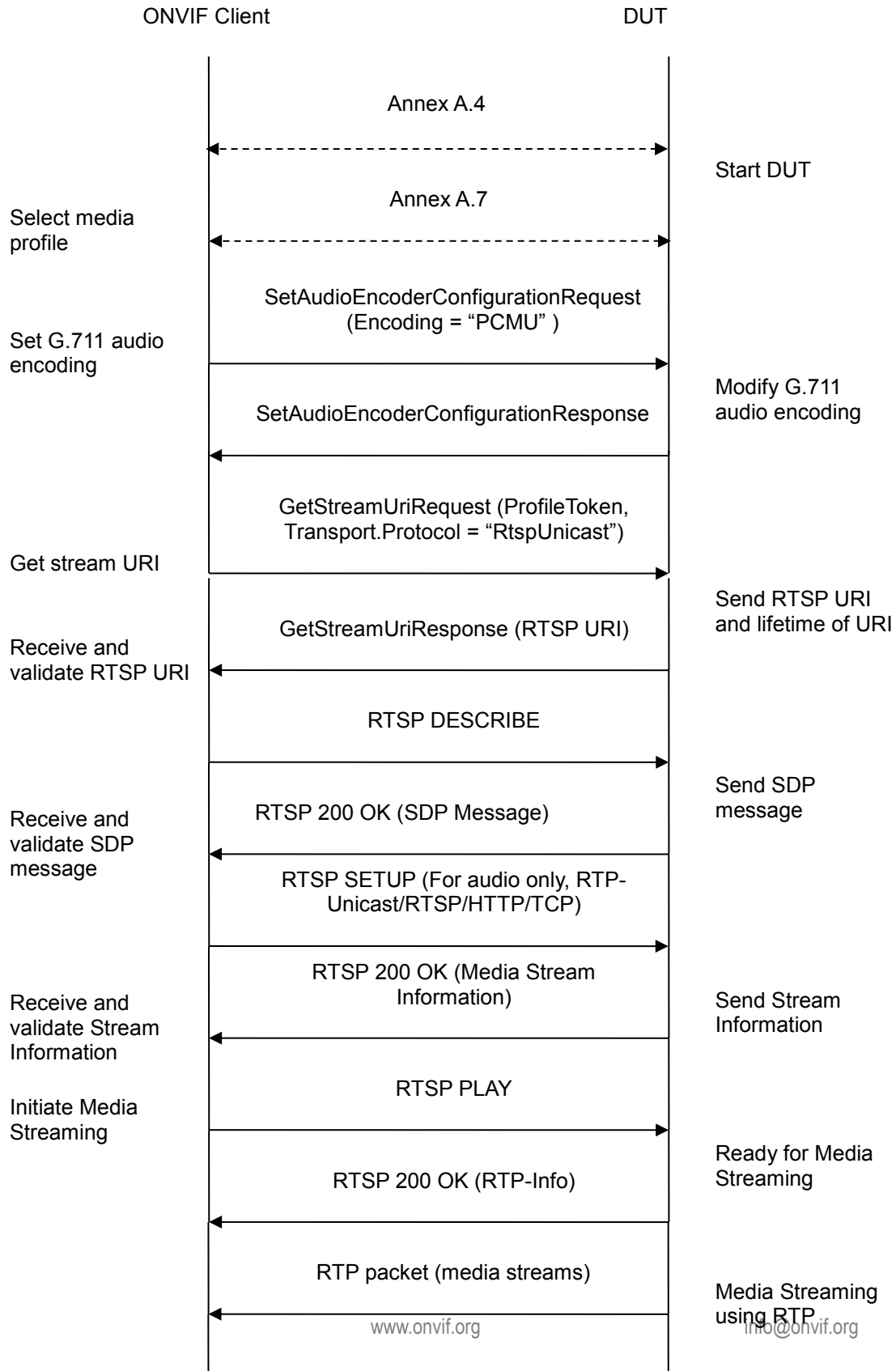
WSDL Reference: None

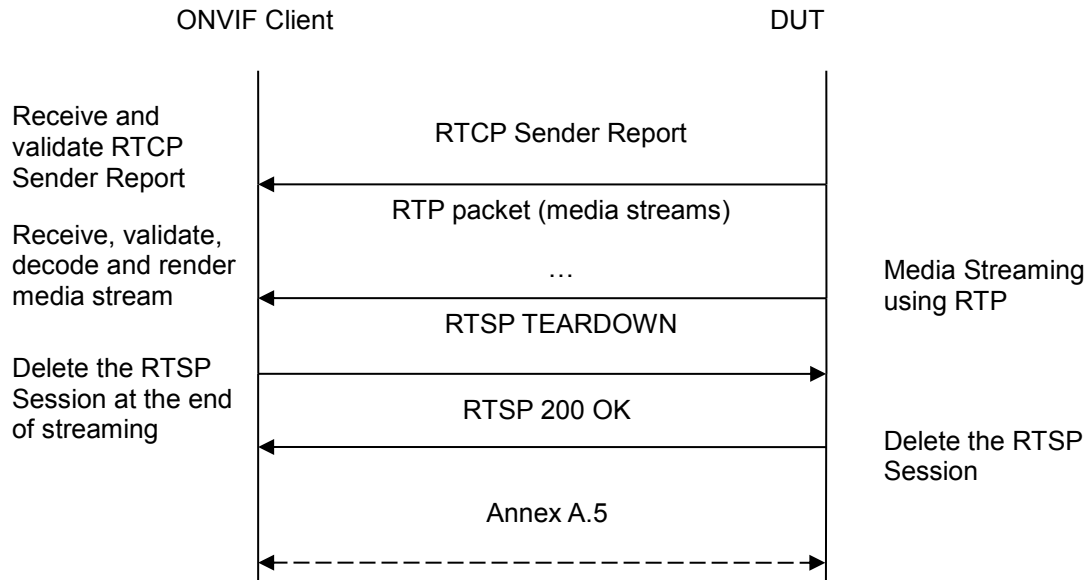
Test Propose: To verify G.711 media streaming based on RTP-Unicast/RTSP/HTTP/TCP Transport for IPv6.

Pre-Requisite: Media2 Service is supported by DUT. Media2_G.711 is supported by DUT. IPv6 is turned on for network interface. The DUT is configured with Manual IPv6 or LinkLocal IPv6 address.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client turns on IPv6 network interface by following the procedure mentioned in Annex A.4.
4. ONVIF Client selects a media profile with G.711 encoding support using Annex A.7
5. ONVIF Client invokes SetAudioEncoderConfigurationRequest message with (Encoding = "PCMU", Bitrate = r1, SampleRate = r2) to set G.711 encoding.
6. Verify the SetAudioEncoderConfigurationResponse message from the DUT.
7. ONVIF Client invokes GetStreamUriRequest message (ProfileToken, Transport.Protocol = "RtspOverHttp") to retrieve media stream URI for the selected media profile.
8. The DUT sends the GetStreamUriResponse message with RTSP URI.
9. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
10. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
11. ONVIF Client invokes RTSP DESCRIBE request.
12. The DUT sends 200 OK message and SDP information.
13. ONVIF Client invokes RTSP SETUP request with transport parameter **RTP-Unicast/RTSP/HTTP/TCP**.

14. The DUT sends 200 OK message and the media stream information.
15. ONVIF Client invokes RTSP PLAY request.
16. The DUT sends 200 OK message and starts media streaming.
17. The DUT sends G.711 RTP media stream to ONVIF Client over HTTP.
18. The DUT sends RTCP sender report to ONVIF Client.
19. ONVIF Client validates the received RTP and RTCP packets, decodes and renders them.
20. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
21. The DUT sends 200 OK Response and terminates the RTSP Session.
22. ONVIF Client will restore the original settings by following the procedure mentioned in Annex A.5.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

The DUT did not have valid media profile.

The DUT did not send SetAudioEncoderConfigurationResponse message.

The DUT did not send GetStreamUriResponse message.

The DUT did not send valid GetStreamUriResponse message.

The DUT did not send valid RTSP URI.

The DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

The DUT did not send valid RTP header in one or more media streams.

The DUT did not send RTCP sender report correctly.

The DUT did not send G.711 RTP media streaming to ONVIF Client.

The DUT sent not only G.711 RTP media streaming to ONVIF Client.

Note: See Annex A.1 for Invalid RTP header definition.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.2.6 MEDIA2 STREAMING – G.711 (RTP/RTSP/TCP, IPv6)

Test Label: Real Time Viewing DUT G.711 Media Streaming Using RTP/RTSP/TCP Transport for IPv6.

Test Case ID: DRAFT-RTSS-2-3-6

ONVIF Core Specification Coverage: None

Command Under Test: None

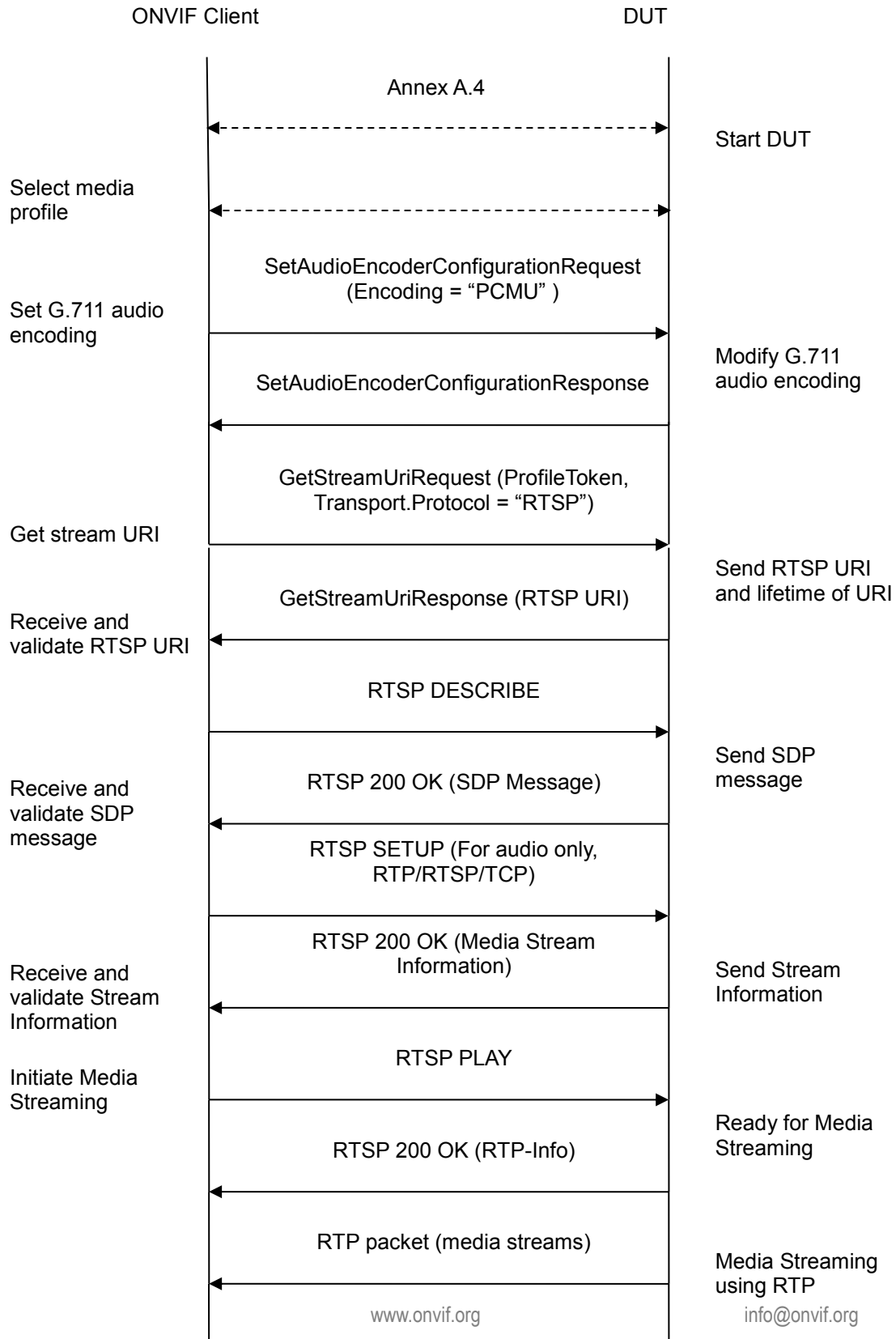
WSDL Reference: None

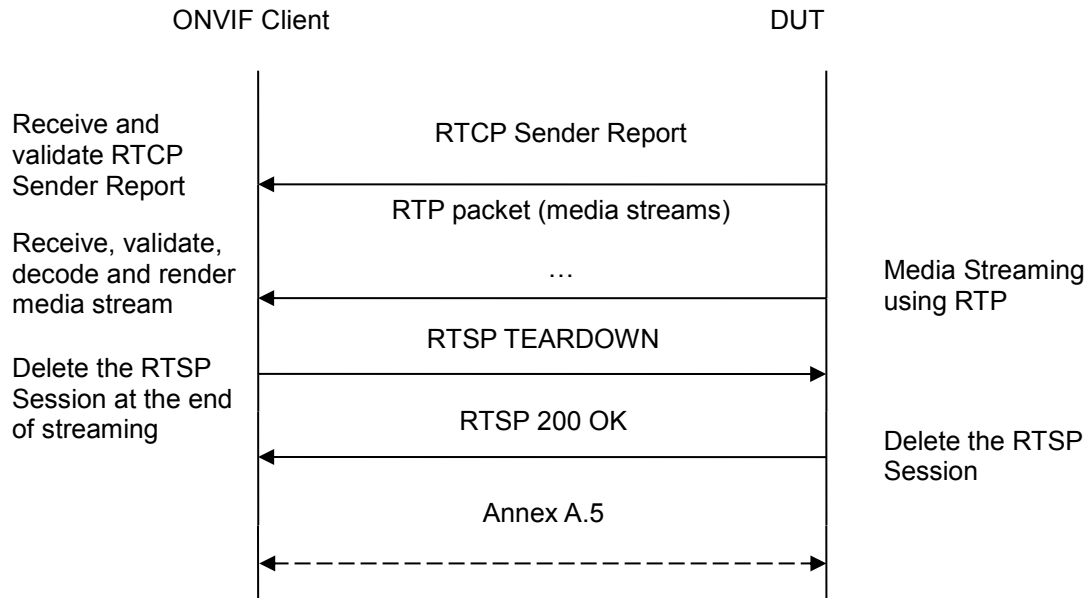
Test Propose: To verify G.711 media streaming based on RTP/RTSP/TCP Transport for IPv6.

Pre-Requisite: Media2 Service is supported by DUT. Media2_G.711 is supported by DUT. IPv6 is turned on for network interface. The DUT is configured with Manual IPv6 or LinkLocal IPv6 address.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client turns on IPv6 network interface by following the procedure mentioned in Annex A.4.
4. ONVIF Client selects a media profile with G.711 encoding support using Annex A.7
5. ONVIF Client invokes `SetAudioEncoderConfigurationRequest` message with (Encoding = "PCMU", Bitrate = r1, SampleRate = r2) to set G.711 encoding.
6. Verify the `SetAudioEncoderConfigurationResponse` message from the DUT.
7. ONVIF Client invokes `GetStreamUriRequest` message (ProfileToken, Transport.Protocol = "RTSP") to retrieve media stream URI for the selected media profile.
8. The DUT sends the `GetStreamUriResponse` message with RTSP URI.
9. ONVIF Client invokes RTSP DESCRIBE request.
10. The DUT sends 200 OK message and SDP information.
11. ONVIF Client invokes RTSP SETUP request with transport parameter **RTP/RTSP/TCP**.
12. The DUT sends 200 OK message and the media stream information.
13. ONVIF Client invokes RTSP PLAY request.
14. The DUT sends 200 OK message and starts media streaming.

15. The DUT sends G.711 RTP media stream to ONVIF Client over RTSP.
16. The DUT sends RTCP sender report to ONVIF Client.
17. ONVIF Client validates the received RTP and RTCP packets, decodes and renders them.
18. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
19. The DUT sends 200 OK Response and terminates the RTSP Session.
20. ONVIF Client will restore the original settings by following the procedure mentioned in Annex A.5.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

The DUT did not have valid media profile.

The DUT did not send SetAudioEncoderConfigurationResponse message.

The DUT did not send GetStreamUriResponse message.

The DUT did not send valid GetStreamUriResponse message.

The DUT did not send valid RTSP URI.

The DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

The DUT did not send valid RTP header in one or more media streams.

The DUT did not send RTCP sender report correctly.

The DUT did not send G.711 RTP media streaming to ONVIF Client.

The DUT sent not only G.711 RTP media streaming to ONVIF Client.

Note: See Annex A.1 for Invalid RTP header definition.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.2.7 MEDIA2 STREAMING – G.711 (RTP-Multicast, IPv4)

Test Label: Real Time Viewing DUT G.711 Media2 Streaming Using RTP-Multicast Transport for IPv4.

Test Case ID: RTSS-2-3-7

ONVIF Core Specification Coverage: None

Command Under Test: None

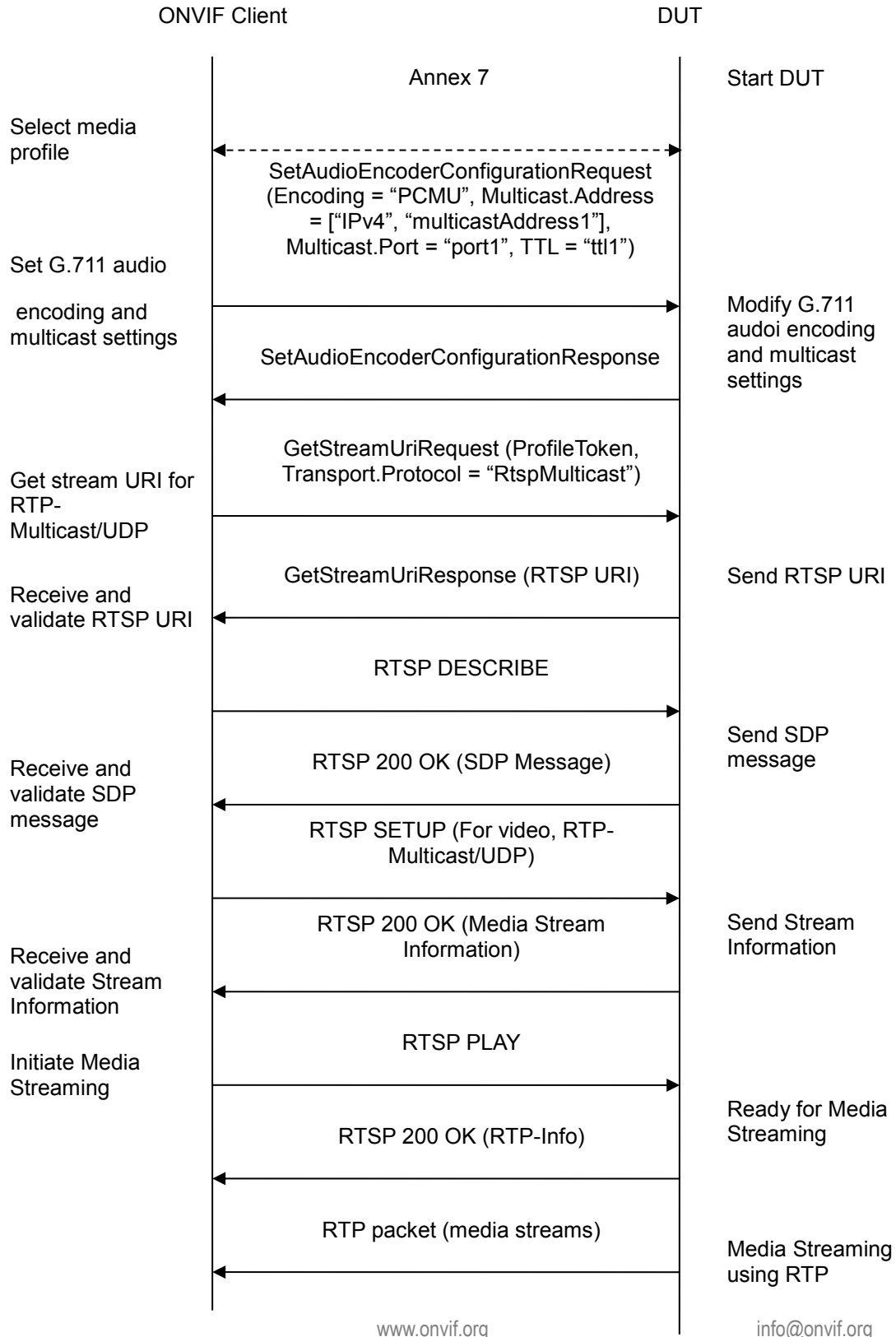
WSDL Reference: None

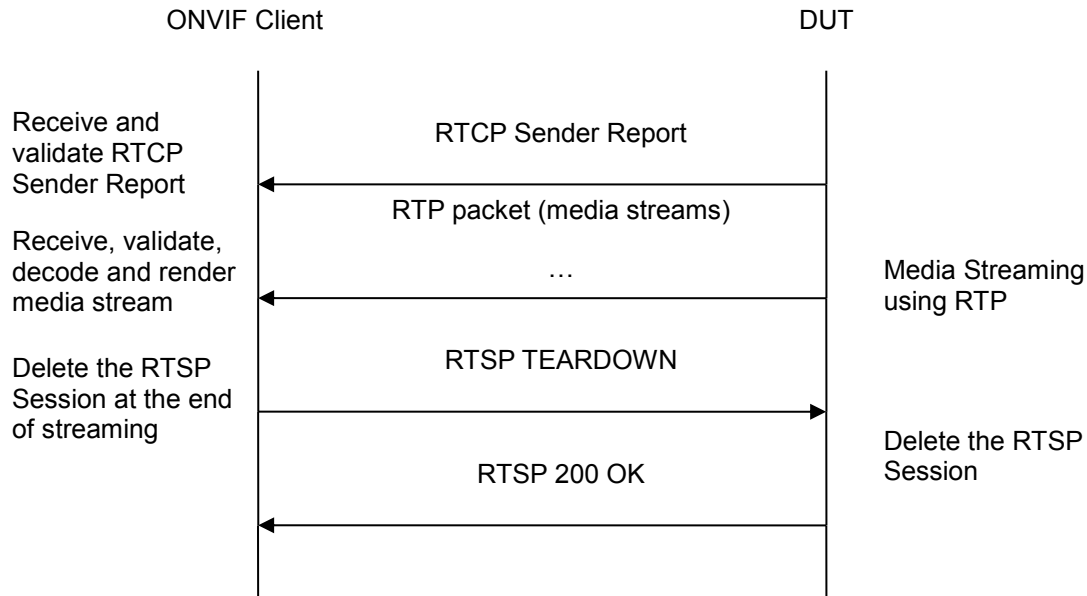
Test Propose: To verify G.711 media streaming based on RTP-Multicast/UDP Transport for IPv4.

Pre-Requirement: Media2 Service is supported by DUT. Media2_G.711 feature is supported by DUT. Real-time streaming supported by DUT. RTP-Multicast transport protocol is supported by DUT.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client selects a media profile with "PCMU" (G.711) encoding support using Annex A.7
4. ONVIF Client invokes SetAudioEncoderConfigurationRequest message (Encoding = "PCMU", Bitrate = r1, SampleRate = r2, Multicast.Address = ["IPv4", "multicastAddress1"], Multicast.Port = "port1", TTL = "ttl1") to set G.711 encoding and Multicast settings.
5. Verify the SetAudioEncoderConfigurationResponse message from the DUT.
6. ONVIF Client invokes GetStreamUriRequest message (Profile Token, Protocol="RtspMulticast") to retrieve media stream URI for the selected media profile.
7. DUT sends RTSP URI in the GetStreamUriResponse message.
8. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
9. ONVIF Client invokes RTSP DESCRIBE request.
10. The DUT sends 200 OK message and SDP information.
11. ONVIF Client invokes RTSP SETUP request with transport parameter **RTP-Multicast/UDP**.
12. The DUT sends 200 OK message and the media stream information.
13. ONVIF Client invokes RTSP PLAY request.
14. The DUT sends 200 OK message and starts media streaming.

15. The DUT sends H.264 RTP multicast media stream to multicast IPv4 address over UDP.
16. The DUT sends RTCP sender report to ONVIF Client.
17. ONVIF Client validates the received RTP and RTCP packets, decodes and renders them.
18. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
19. The DUT sends 200 OK Response and terminates the RTSP Session.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

The DUT did not have valid media profile.

The DUT did not send SetAudioEncoderConfigurationResponse message.

The DUT did not send GetStreamUriResponse message.

The DUT did not send valid GetStreamUriResponse message.

The DUT did not send valid RTSP URI.

The DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

The DUT did not send valid RTP header in one or more media streams.

The DUT did not send RTCP sender report correctly.

The DUT did not send G.711 RTP media streaming to ONVIF Client.

The DUT sent not only G.711 RTP media streaming to ONVIF Client.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.2.8 MEDIA2 STREAMING – G.711 (RTP-Multicast, IPv6)

Test Label: Real Time Viewing DUT G.711 Media2 Streaming Using RTP-Multicast Transport for IPv6.

Test Case ID: RTSS-2-3-7

ONVIF Core Specification Coverage: None

Command Under Test: None

WSDL Reference: None

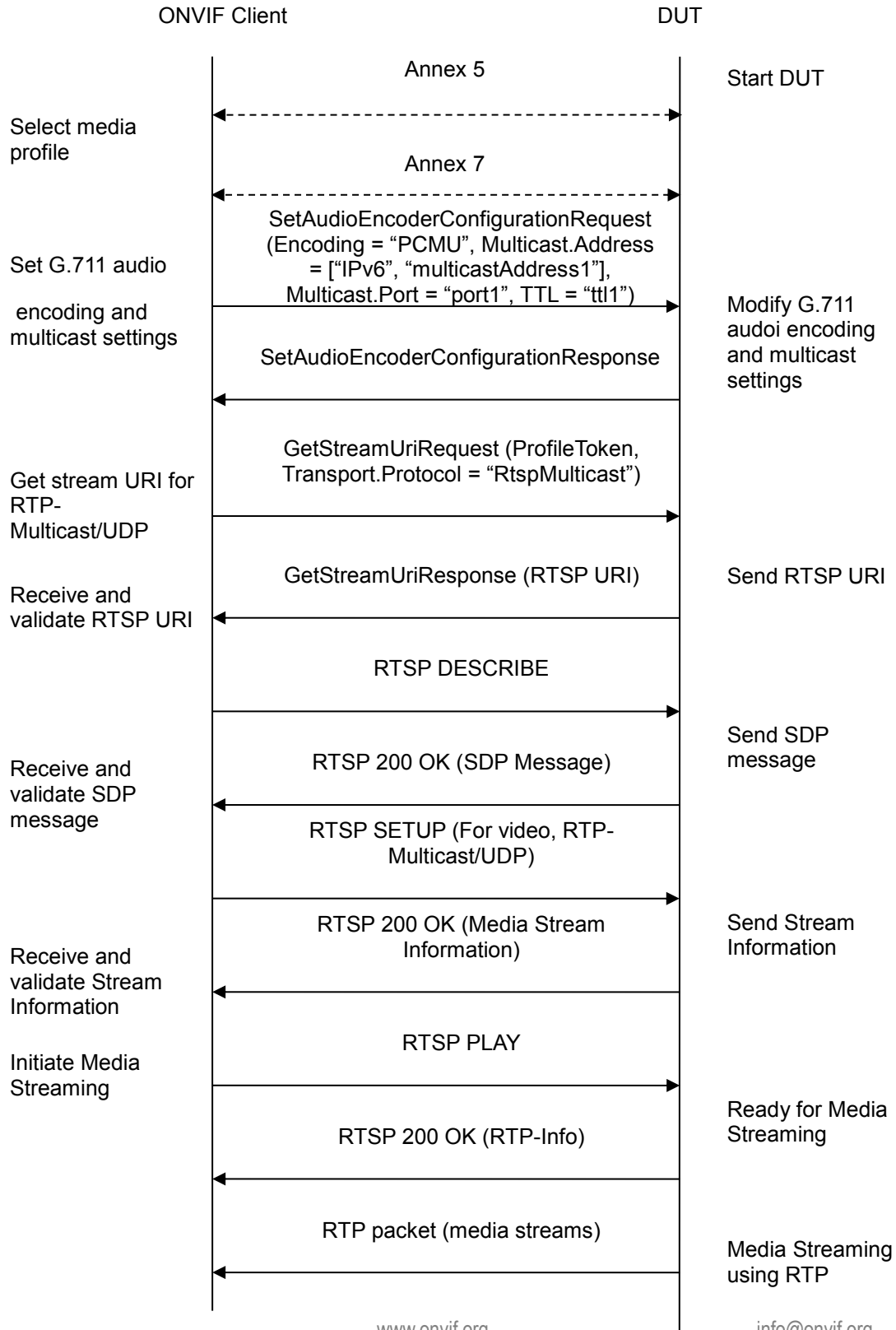
Test Propose: To verify G.711 media streaming based on RTP-Multicast/UDP Transport for IPv6.

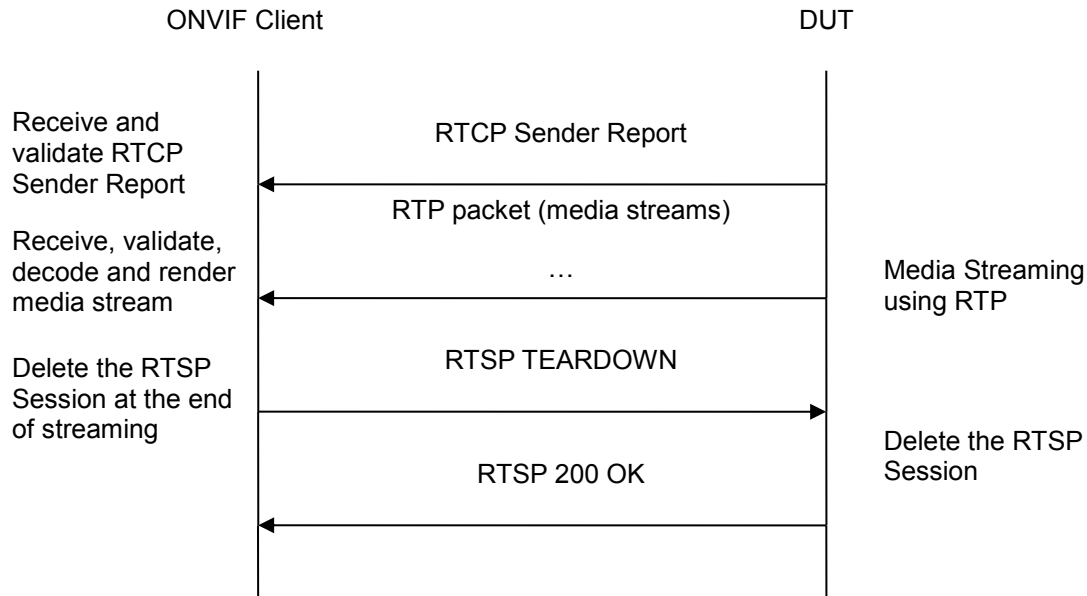


Pre-Requisite: Media2 Service is supported by DUT. Media2_G.711 feature is supported by DUT. Real-time streaming supported by DUT. RTP-Multicast transport protocol is supported by DUT. IPv6 is turned on for network interface. The DUT is configured with Manual IPv6 or LinkLocal IPv6 address.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client turns on IPv6 network interface by following the procedure mentioned in Annex A.4.
4. ONVIF Client selects a media profile with “PCMU” (G.711) encoding support using Annex A.7
5. ONVIF Client invokes SetAudioEncoderConfigurationRequest message (Encoding = “PCMU”, Bitrate = r1, SampleRate = r2, Multicast.Address = [“IPv6”, “multicastAddress1”], Multicast.Port = “port1”, TTL = “ttl1”) to set G.711 encoding and Multicast settings.
6. Verify the SetAudioEncoderConfigurationResponse message from the DUT.
7. ONVIF Client invokes GetStreamUriRequest message (Profile Token, Protocol=“RtspMulticast”) to retrieve media stream URI for the selected media profile.
8. DUT sends RTSP URI in the GetStreamUriResponse message.
9. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
10. ONVIF Client invokes RTSP DESCRIBE request.
11. The DUT sends 200 OK message and SDP information.
12. ONVIF Client invokes RTSP SETUP request with transport parameter **RTP-Multicast/UDP**.
13. The DUT sends 200 OK message and the media stream information.

14. ONVIF Client invokes RTSP PLAY request.
15. The DUT sends 200 OK message and starts media streaming.
16. The DUT sends H.264 RTP multicast media stream to multicast IPv4 address over UDP.
17. The DUT sends RTCP sender report to ONVIF Client.
18. ONVIF Client validates the received RTP and RTCP packets, decodes and renders them.
19. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
20. The DUT sends 200 OK Response and terminates the RTSP Session.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

The DUT did not have valid media profile.

The DUT did not send SetAudioEncoderConfigurationResponse message.

The DUT did not send GetStreamUriResponse message.

The DUT did not send valid GetStreamUriResponse message.

The DUT did not send valid RTSP URI.

The DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

The DUT did not send valid RTP header in one or more media streams.

The DUT did not send RTCP sender report correctly.

The DUT did not send G.711 RTP media streaming to ONVIF Client.

The DUT sent not only G.711 RTP media streaming to ONVIF Client.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.2.9 MEDIA2 STREAMING – AAC (RTP-Unicast/UDP)

Test Label: Real Time Viewing DUT AAC Media2 Streaming Using RTP-Unicast/UDP Transport.

Test Case ID: RTSS-2-3-7

ONVIF Core Specification Coverage: None

Command Under Test: None

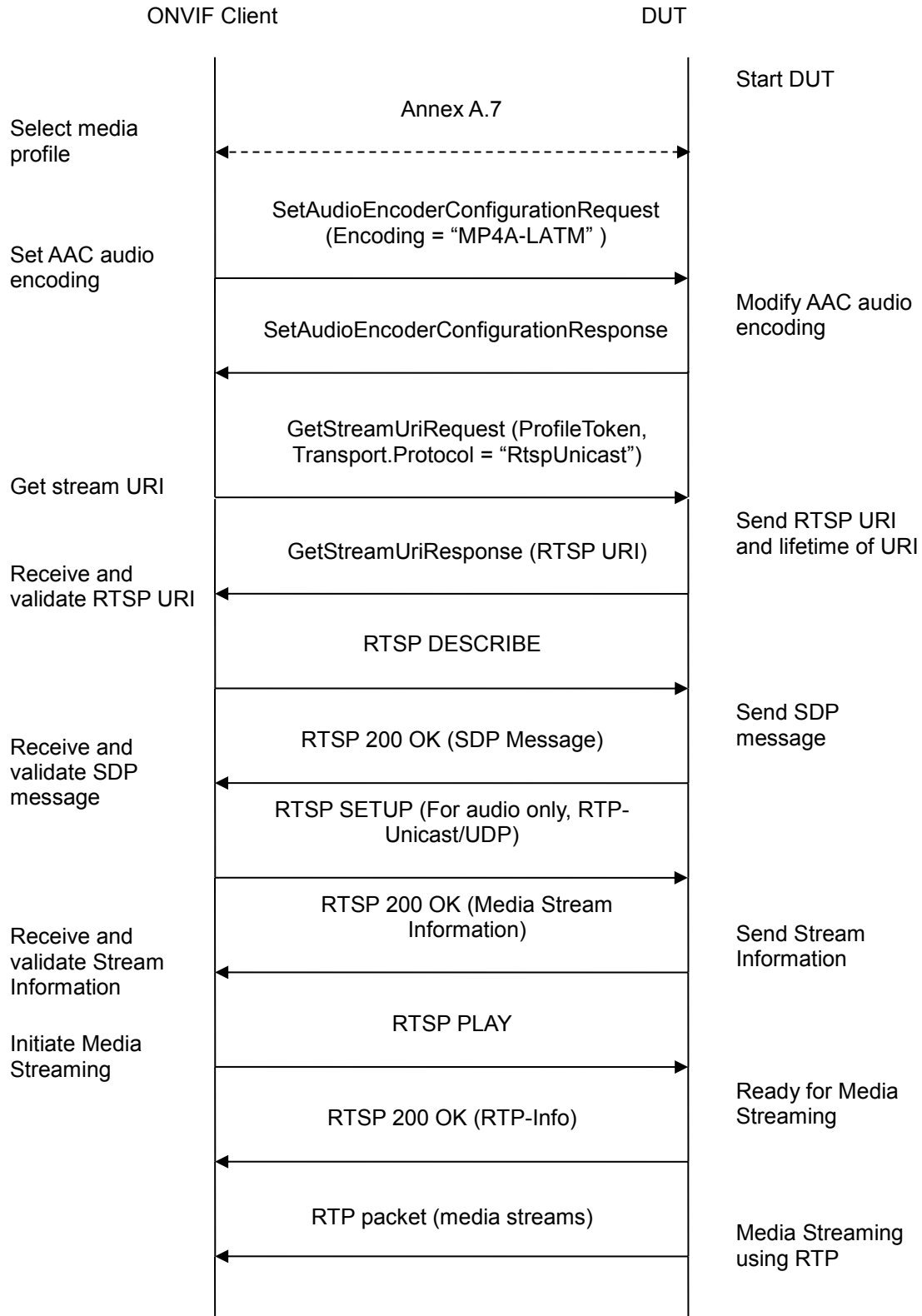
WSDL Reference: None

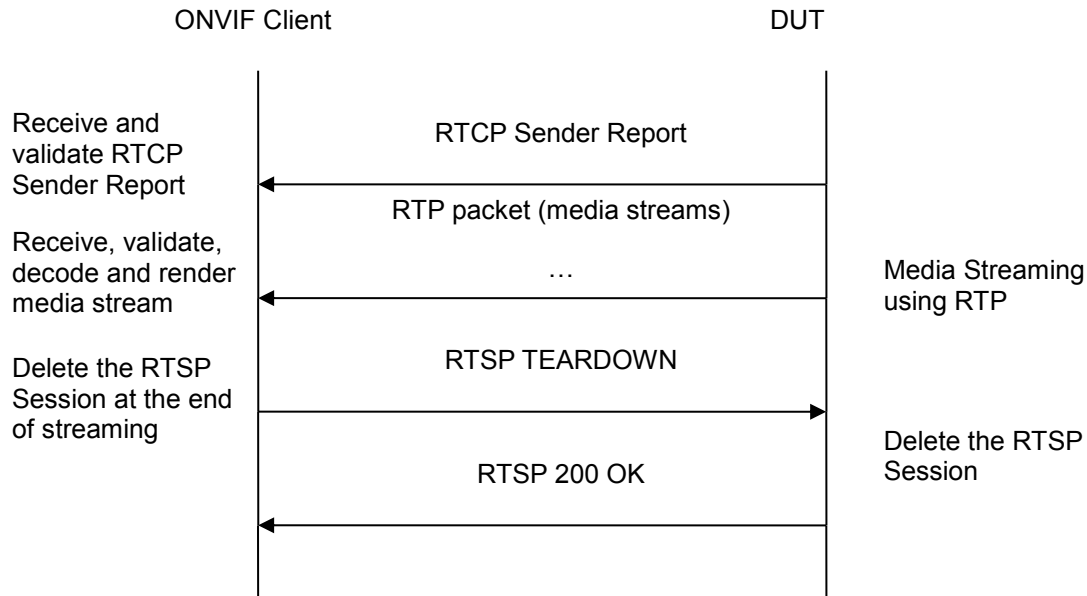
Test Propose: To verify AAC media streaming based on RTP-Unicast/UDP Transport.

Pre-Requisite: Media2 Service is supported by DUT. Media2_AAC is supported by DUT.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client selects a media profile with “MP4A-LATM” (AAC) encoding support using Annex A.7
4. ONVIF Client invokes SetAudioEncoderConfigurationRequest message (Encoding = “MP4A-LATM”, Bitrate = r1, SampleRate = r2) to set AAC encoding.
5. Verify the SetAudioEncoderConfigurationResponse message from the DUT.
6. ONVIF Client invokes GetStreamUriRequest message (ProfileToken, Transport.Protocol = “RtspUnicast”) to retrieve media stream URI for the selected media profile.
7. The DUT sends the GetStreamUriResponse message with RTSP URI.
8. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
9. ONVIF Client invokes RTSP DESCRIBE request.
10. The DUT sends 200 OK message and SDP information.
11. ONVIF Client invokes RTSP SETUP request with transport parameter RtspUnicast/UDP.
12. The DUT sends 200 OK message and the media stream information.
13. ONVIF Client invokes RTSP PLAY request.
14. The DUT sends 200 OK message and starts media streaming.

15. The DUT sends AAC RTP media stream to ONVIF Client over UDP.
16. The DUT sends RTCP sender report to ONVIF Client.
17. ONVIF Client validates the received RTP and RTCP packets, decodes and renders them.
18. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
19. The DUT sends 200 OK Response and terminates the RTSP Session.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

The DUT did not have valid media profile.

The DUT did not send SetAudioEncoderConfigurationResponse message.

The DUT did not send GetStreamUriResponse message.

The DUT did not send valid GetStreamUriResponse message.

The DUT did not send valid RTSP URI.

The DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

The DUT did not send valid RTP header in one or more media streams.

The DUT did not send RTCP sender report correctly.

The DUT did not send AAC RTP media streaming to ONVIF Client.

The DUT sent not only AAC RTP media streaming to ONVIF Client.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.2.10 MEDIA2 STREAMING – AAC (RTP-Unicast/RTSP/HTTP/TCP)

Test Label: Real Time Viewing DUT AAC Media2 Streaming Using RTP-Unicast/RTSP/HTTP/TCP Transport.

Test Case ID: RTSS-2-3-8

ONVIF Core Specification Coverage: None

Command Under Test: None

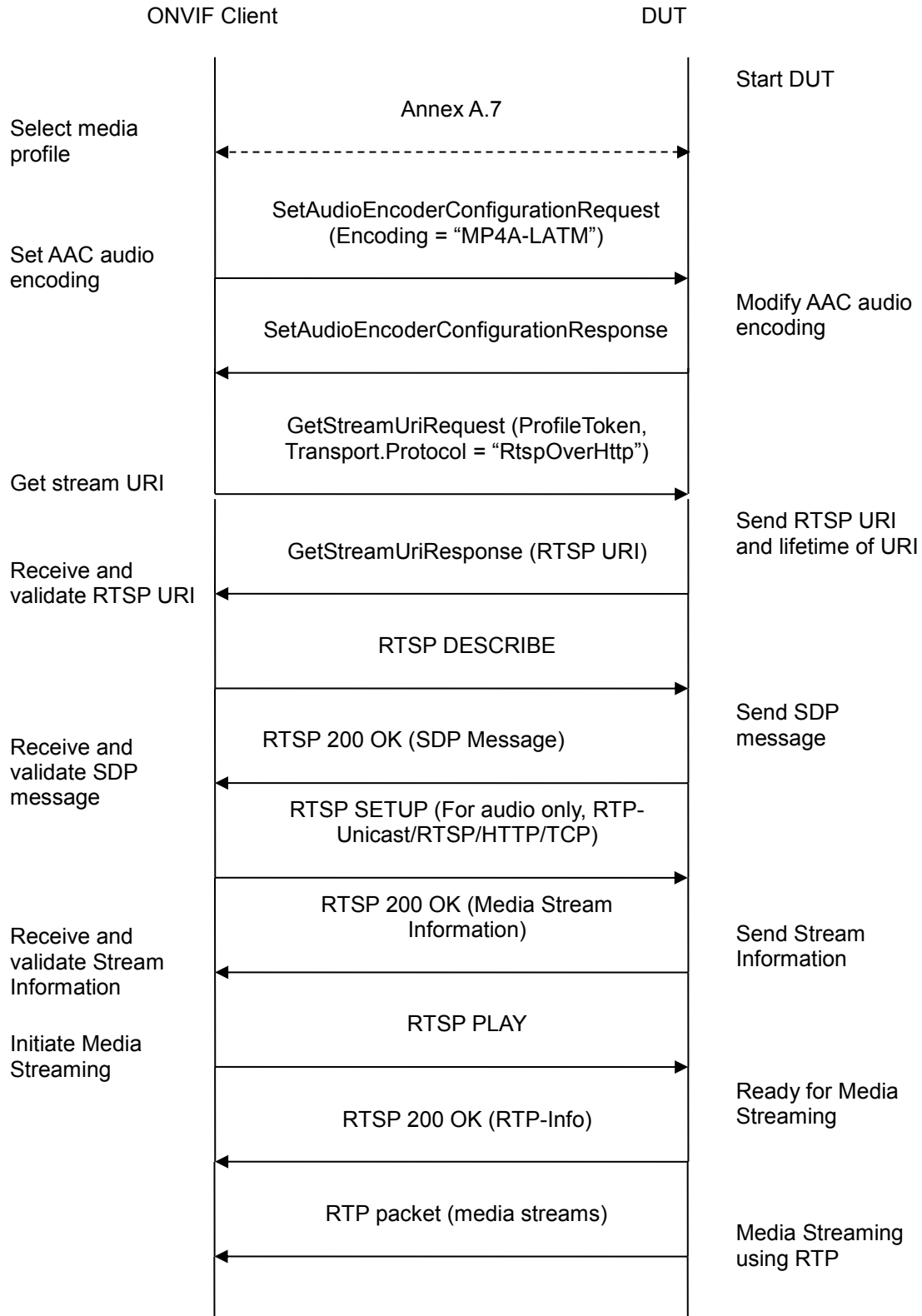
WSDL Reference: None

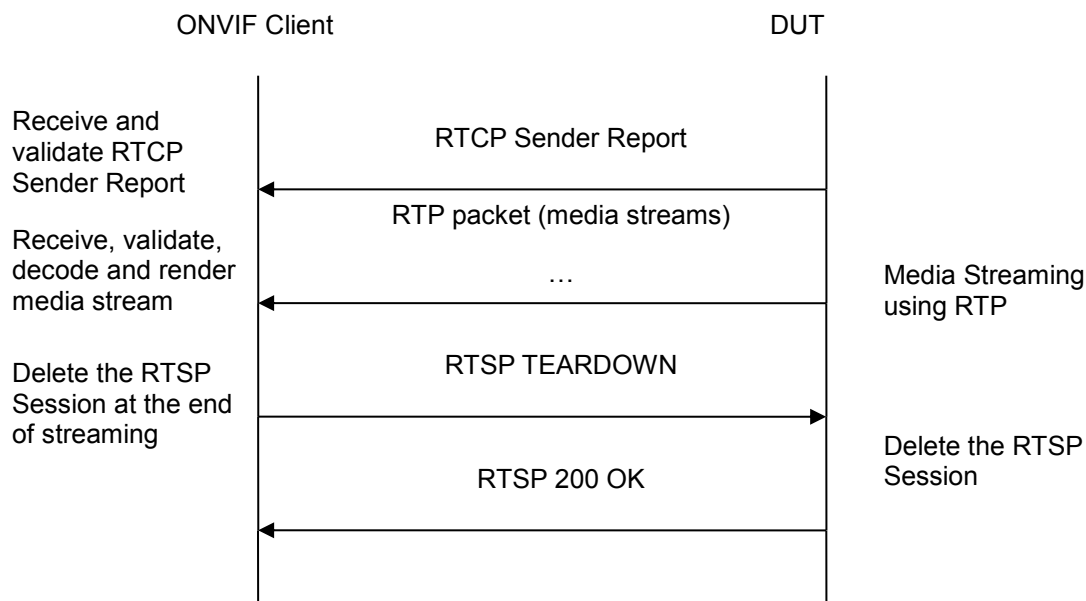
Test Propose: To verify AAC media streaming based on RTP-Unicast/RTSP/HTTP/TCP Transport.

Pre-Requisite: Media2 Service is supported by DUT. Media2_AAC is supported by DUT.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

20. Start an ONVIF Client.
21. Start the DUT.
22. ONVIF Client selects a media profile with “MP4A-LATM” (AAC) encoding support using Annex A.7
23. ONVIF Client invokes SetAudioEncoderConfigurationRequest message (Encoding = “MP4A-LATM”, Bitrate = r1, SampleRate = r2) to set AAC encoding.
24. Verify the SetAudioEncoderConfigurationResponse message from the DUT.
25. ONVIF Client invokes GetStreamUriRequest message (ProfileToken, Transport.Protocol = “RtspOverHttp”) to retrieve media stream URI for the selected media profile.
26. The DUT sends the GetStreamUriResponse message with RTSP URI.
27. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
28. ONVIF Client invokes RTSP DESCRIBE request.
29. The DUT sends 200 OK message and SDP information.
30. ONVIF Client invokes RTSP SETUP request with transport parameter **RTP-Unicast/RTSP/HTTP/TCP**.
31. The DUT sends 200 OK message and the media stream information.
32. ONVIF Client invokes RTSP PLAY request.

33. The DUT sends 200 OK message and starts media streaming.
34. The DUT sends AAC RTP media stream to ONVIF Client over HTTP.
35. The DUT sends RTCP sender report to ONVIF Client.
36. ONVIF Client validates the received RTP and RTCP packets, decodes and renders them.
37. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
38. The DUT sends 200 OK Response and terminates the RTSP Session.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

The DUT did not have valid media profile.

The DUT did not send SetAudioEncoderConfigurationResponse message.

The DUT did not send GetStreamUriResponse message.

The DUT did not send valid GetStreamUriResponse message.

The DUT did not send valid RTSP URI

The DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

The DUT did not send valid RTP header in one or more media streams.

The DUT did not send RTCP sender report correctly.

The DUT did not send AAC RTP media streaming to ONVIF Client.

The DUT sent not only AAC RTP media streaming to ONVIF Client.

Note: See Annex A.1 for Invalid RTP header definition.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.2.11 MEDIA2 STREAMING – AAC (RTP/RTSP/TCP)

Test Label: Real Time Viewing DUT AAC Media2 Streaming Using RTP/RTSP/TCP Transport.

Test Case ID: RTSS-2-3-9

ONVIF Core Specification Coverage: None

Command Under Test: None

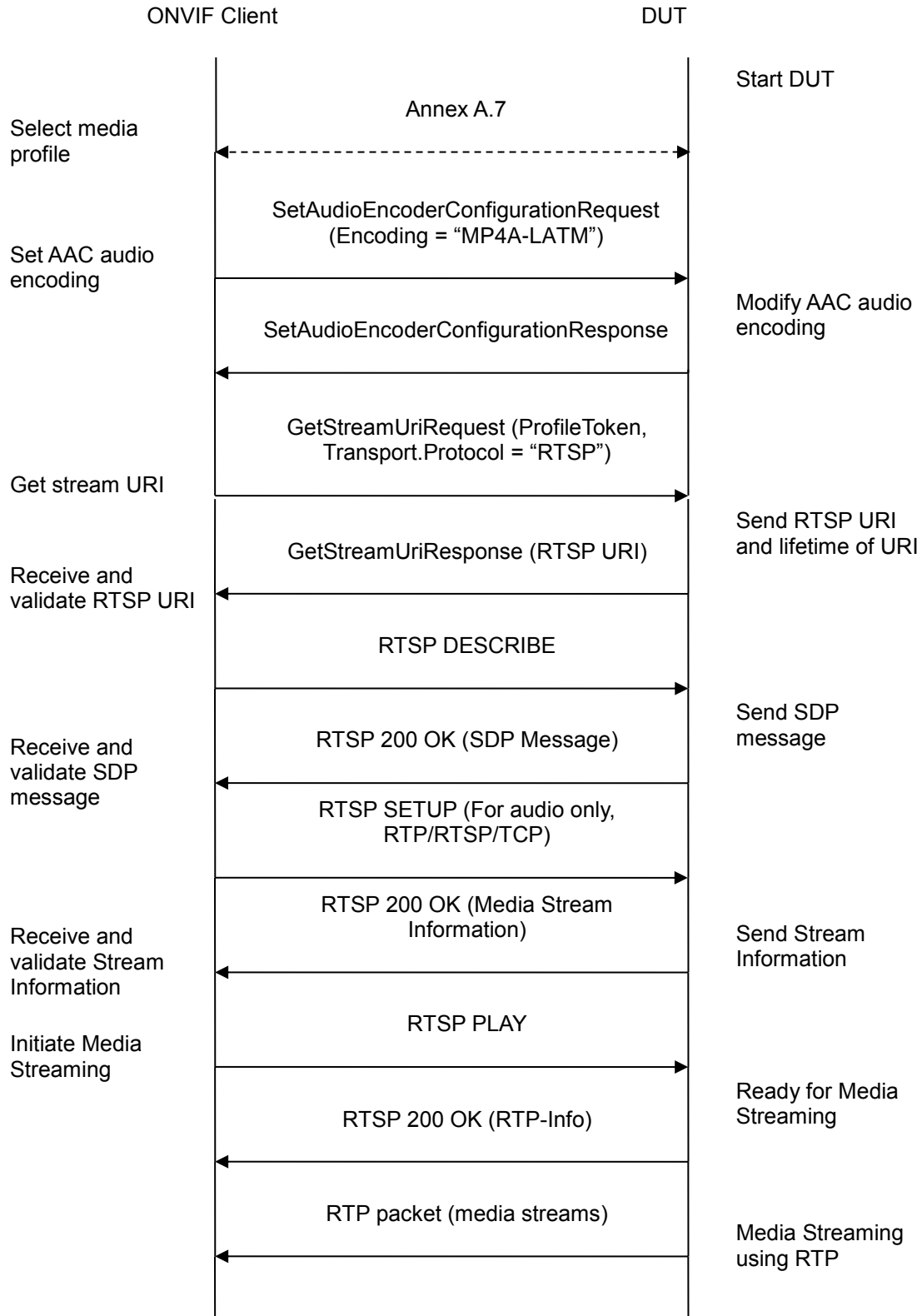
WSDL Reference: None

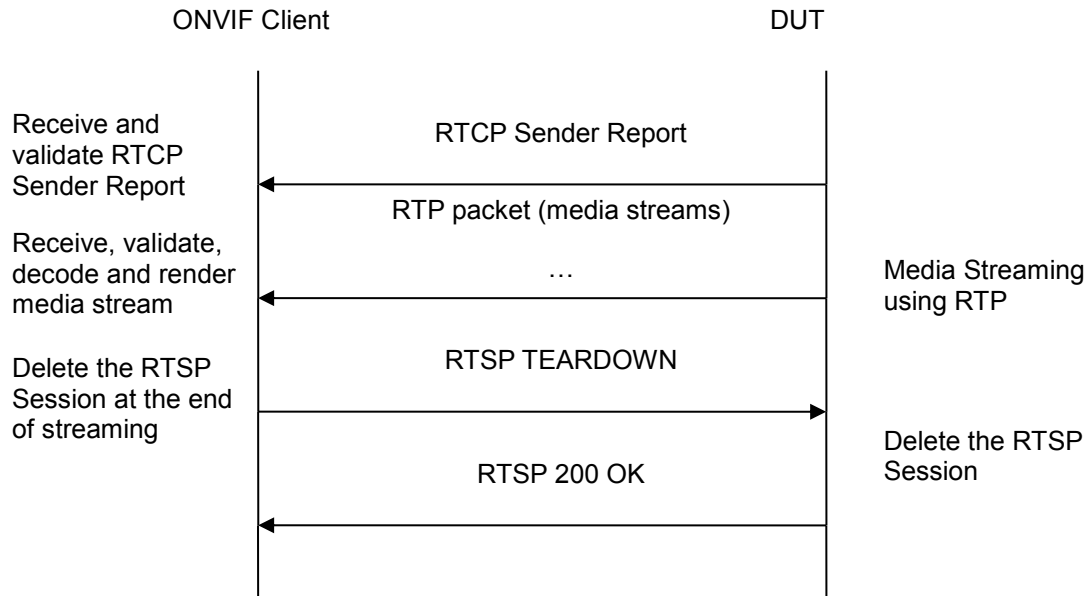
Test Propose: To verify AAC media streaming based on RTP/RTSP/TCP Transport.

Pre-Requisite: Media2 Service is supported by DUT. Media2_AAC is supported by DUT.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

39. Start an ONVIF Client.
40. Start the DUT.
41. ONVIF Client selects a media profile with “MP4A-LATM” (AAC) encoding support using Annex A.7
42. ONVIF Client invokes SetAudioEncoderConfigurationRequest message (Encoding = “MP4A-LATM”, Bitrate = r1, SampleRate = r2) to set AAC encoding.
43. Verify the SetAudioEncoderConfigurationResponse message from the DUT.
44. ONVIF Client invokes GetStreamUriRequest message (ProfileToken, Transport.Protocol = “RTSP”) to retrieve media stream URI for the selected media profile.
45. The DUT sends the GetStreamUriResponse message with RTSP URI.
46. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
47. ONVIF Client invokes RTSP DESCRIBE request.
48. The DUT sends 200 OK message and SDP information.
49. ONVIF Client invokes RTSP SETUP request with transport parameter **RTP/RTSP/TCP**.
50. The DUT sends 200 OK message and the media stream information.
51. ONVIF Client invokes RTSP PLAY request.
52. The DUT sends 200 OK message and starts media streaming.

53. The DUT sends AAC RTP media stream to ONVIF Client over RTSP.
54. The DUT sends RTCP sender report to ONVIF Client.
55. ONVIF Client validates the received RTP and RTCP packets, decodes and renders them.
56. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
57. The DUT sends 200 OK Response and terminates the RTSP Session.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

The DUT did not have valid media profile.

The DUT did not send SetAudioEncoderConfigurationResponse message.

The DUT did not send GetStreamUriResponse message.

The DUT did not send valid GetStreamUriResponse message.

The DUT did not send valid RTSP URI.

The DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

The DUT did not send valid RTP header in one or more media streams.

The DUT did not send RTCP sender report correctly.

The DUT did not send AAC RTP media streaming to ONVIF Client.

The DUT sent not only AAC RTP media streaming to ONVIF Client.

Note: See Annex A.1 for Invalid RTP header definition.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.2.12 MEDIA2 STREAMING – AAC (RTP-Unicast/UDP, IPv6)

Test Label: Real Time Viewing DUT AAC Media2 Streaming Using RTP-Unicast/UDP Transport for IPv6.

Test Case ID: DRAFT-RTSS-2-3-10

ONVIF Core Specification Coverage: None

Command Under Test: None

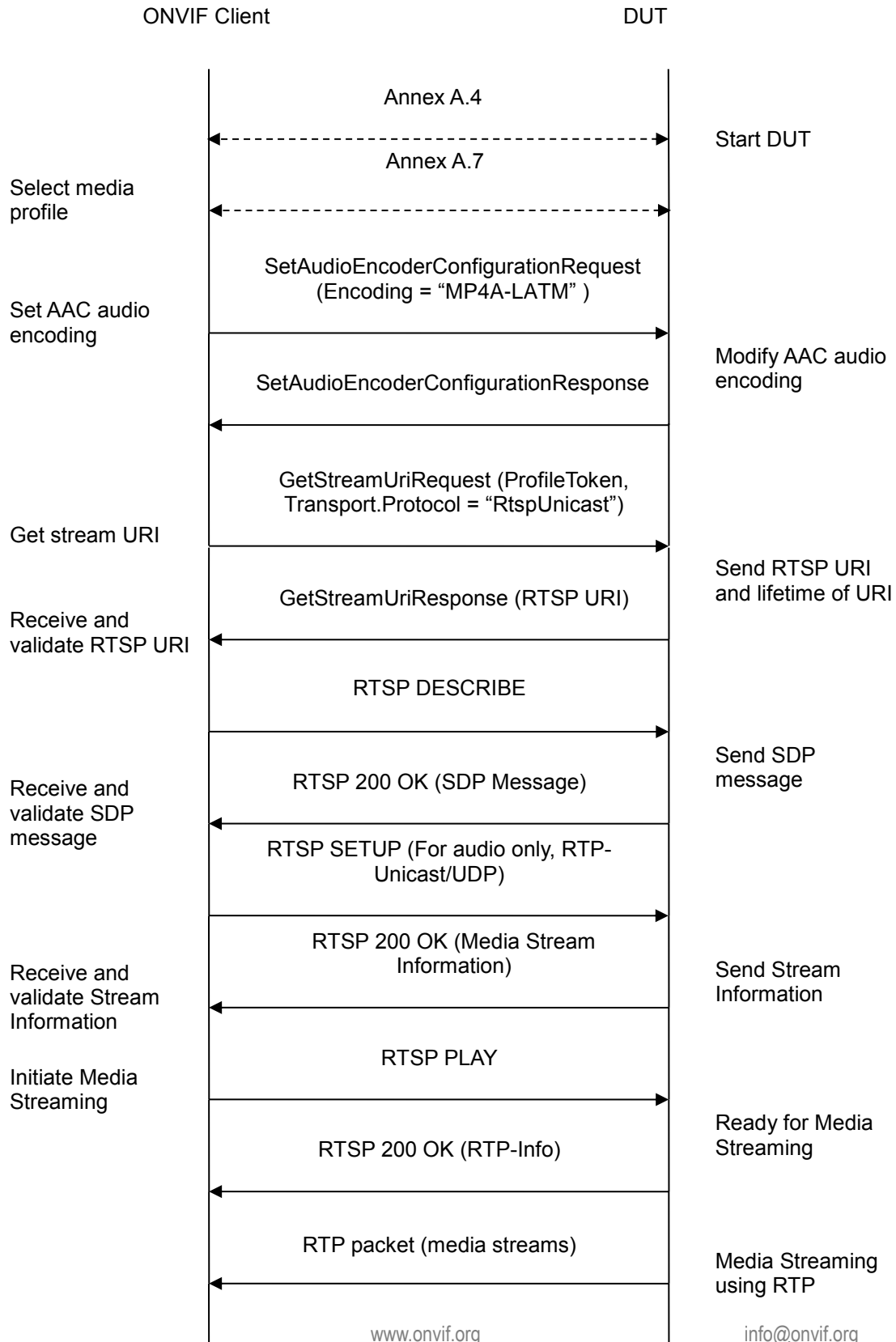
WSDL Reference: None

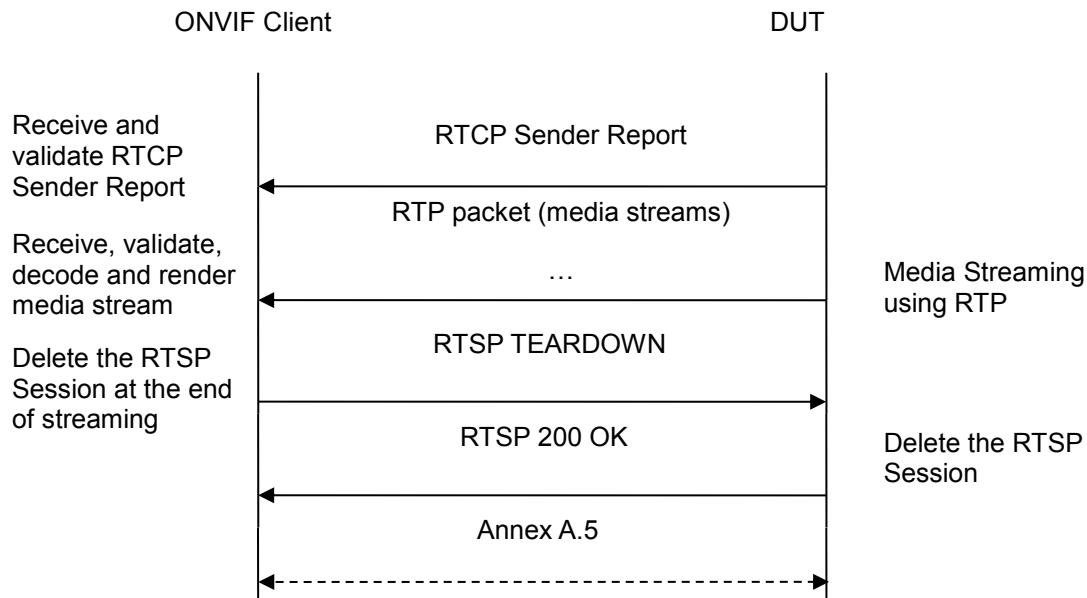
Test Propose: To verify AAC media streaming based on RTP-Unicast/UDP Transport for IPv6.

Pre-Requirement: Media2 Service is supported by DUT. Media2_AAC is supported by DUT. IPv6 is turned on for network interface. The DUT is configured with Manual IPv6 or LinkLocal IPv6 address.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

58. Start an ONVIF Client.
59. Start the DUT.
60. ONVIF Client turns on IPv6 network interface by following the procedure mentioned in Annex A.4.
61. ONVIF Client selects a media profile with AAC encoding support using Annex A.7
62. ONVIF Client invokes SetAudioEncoderConfigurationRequest message with (Encoding = "MP4A-LATM", Bitrate = r1, SampleRate = r2) to set AAC encoding.
63. Verify the SetAudioEncoderConfigurationResponse message from the DUT.
64. ONVIF Client invokes GetStreamUriRequest message (ProfileToken, Transport.Protocol = "RtspUnicast") to retrieve media stream URI for the selected media profile.
65. The DUT sends the GetStreamUriResponse message with RTSP URI.
66. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
67. ONVIF Client invokes RTSP DESCRIBE request.
68. The DUT sends 200 OK message and SDP information.
69. ONVIF Client invokes RTSP SETUP request with transport parameter **RTP-Unicast/UDP**.
70. The DUT sends 200 OK message and the media stream information.
71. ONVIF Client invokes RTSP PLAY request.

72. The DUT sends 200 OK message and starts media streaming.
73. The DUT sends AAC RTP media stream to ONVIF Client over UDP.
74. The DUT sends RTCP sender report to ONVIF Client.
75. ONVIF Client validates the received RTP and RTCP packets, decodes and renders them.
76. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
77. The DUT sends 200 OK Response and terminates the RTSP Session..
78. ONVIF Client will restore the original settings by following the procedure mentioned in Annex A.5.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

The DUT did not send AudioEncoderConfiguration which supports AAC encoding in the GetCompatibleAudioEncoderConfigurationsResponse message.

The DUT did not send SetAudioEncoderConfigurationResponse message.

The DUT did not send GetStreamUriResponse message.

The DUT did not send valid GetStreamUriResponse message.

The DUT did not send valid RTSP URI.

The DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

The DUT did not send valid RTP header in one or more media streams.

The DUT did not send RTCP sender report correctly.

The DUT did not send AAC RTP media streaming to ONVIF Client.

The DUT sent not only AAC RTP media streaming to ONVIF Client.

Note: See Annex A.1 for Invalid RTP header definition.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.2.13 MEDIA2 STREAMING – AAC (RTP-Unicast/RTSP/HTTP/TCP, IPv6)

Test Label: Real Time Viewing DUT AAC Media2 Streaming Using RTP-Unicast/RTSP/HTTP/TCP Transport for IPv6.

Test Case ID: DRAFT-RTSS-2-3-11

ONVIF Core Specification Coverage: None

Command Under Test: None

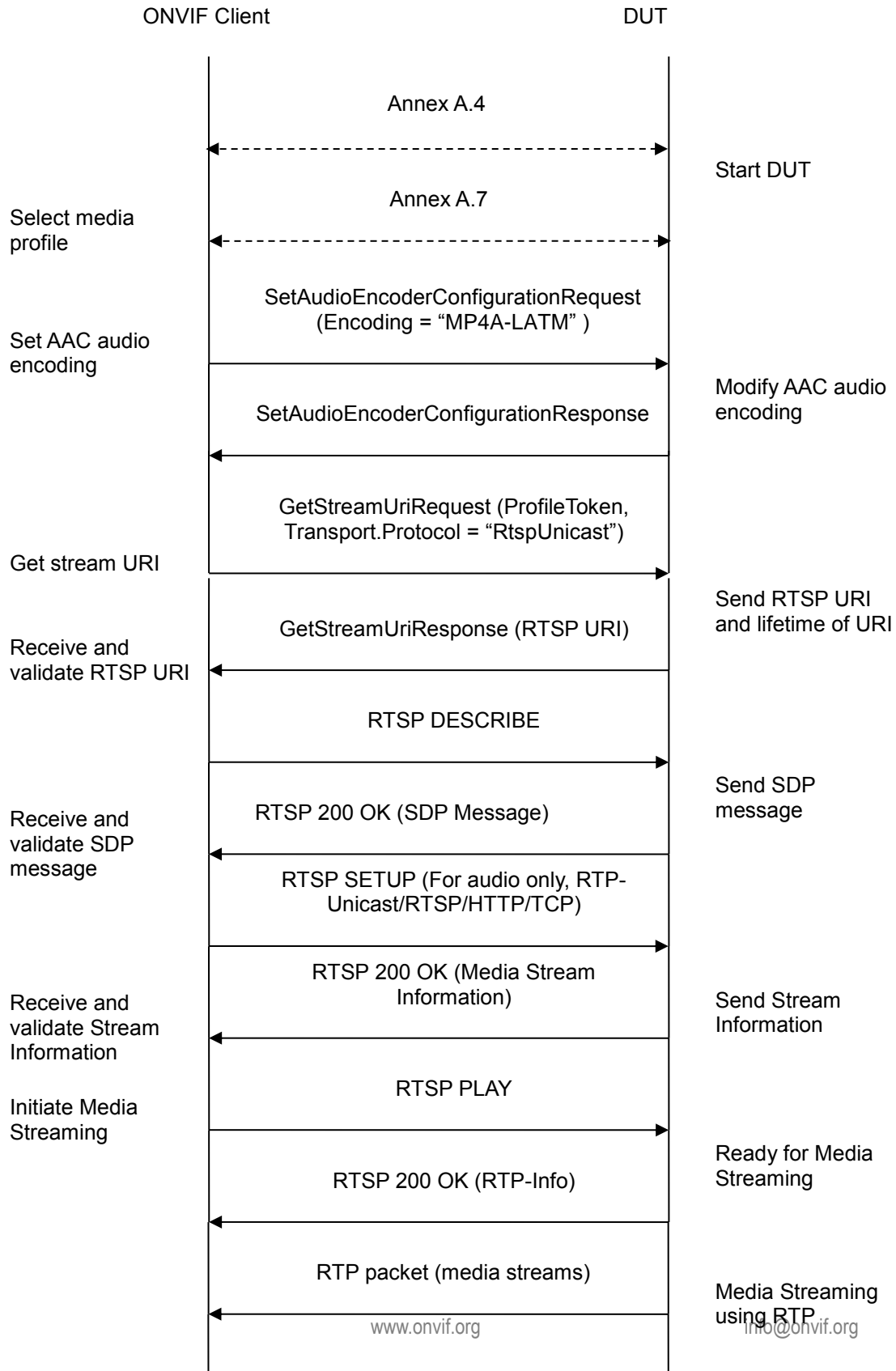
WSDL Reference: None

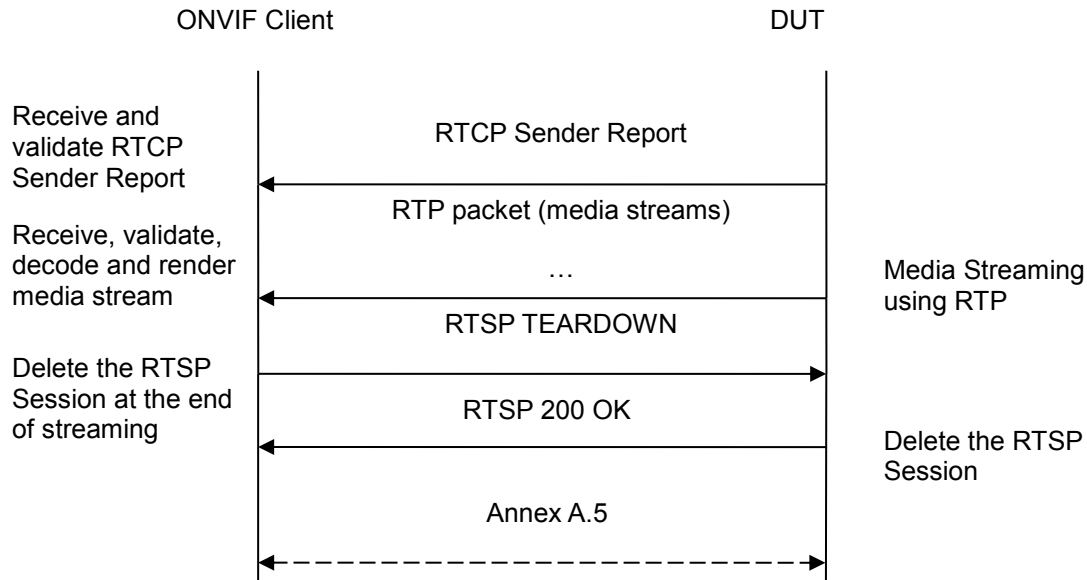
Test Propose: To verify AAC media streaming based on RTP-Unicast/RTSP/HTTP/TCP Transport for IPv6.

Pre-Requisite: Media2 Service is supported by DUT. Media2_AAC is supported by DUT. IPv6 is turned on for network interface. The DUT is configured with Manual IPv6 or LinkLocal IPv6 address.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

79. Start an ONVIF Client.
80. Start the DUT.
81. ONVIF Client turns on IPv6 network interface by following the procedure mentioned in Annex A.4.
82. ONVIF Client selects a media profile with AAC encoding support using Annex A.7
83. ONVIF Client invokes SetAudioEncoderConfigurationRequest message with (Encoding = "MP4A-LATM", Bitrate = r1, SampleRate = r2) to set AAC encoding.
84. Verify the SetAudioEncoderConfigurationResponse message from the DUT.
85. ONVIF Client invokes GetStreamUriRequest message (ProfileToken, Transport.Protocol = "RtspOverHttp") to retrieve media stream URI for the selected media profile.
86. The DUT sends the GetStreamUriResponse message with RTSP URI.
87. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
88. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
89. ONVIF Client invokes RTSP DESCRIBE request.
90. The DUT sends 200 OK message and SDP information.
91. ONVIF Client invokes RTSP SETUP request with transport parameter **RTP-Unicast/RTSP/HTTP/TCP**.

92. The DUT sends 200 OK message and the media stream information.
93. ONVIF Client invokes RTSP PLAY request.
94. The DUT sends 200 OK message and starts media streaming.
95. The DUT sends AAC RTP media stream to ONVIF Client over HTTP.
96. The DUT sends RTCP sender report to ONVIF Client.
97. ONVIF Client validates the received RTP and RTCP packets, decodes and renders them.
98. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
99. The DUT sends 200 OK Response and terminates the RTSP Session.
100. ONVIF Client will restore the original settings by following the procedure mentioned in Annex A.5.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

The DUT did not have valid media profile.

The DUT did not send SetAudioEncoderConfigurationResponse message.

The DUT did not send GetStreamUriResponse message.

The DUT did not send valid GetStreamUriResponse message.

The DUT did not send valid RTSP URI.

The DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

The DUT did not send valid RTP header in one or more media streams.

The DUT did not send RTCP sender report correctly.

The DUT did not send AAC RTP media streaming to ONVIF Client.

The DUT sent not only AAC RTP media streaming to ONVIF Client.

Note: See Annex A.1 for Invalid RTP header definition.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.2.14 MEDIA2 STREAMING – AAC (RTP/RTSP/TCP, IPv6)

Test Label: Real Time Viewing DUT AAC Media Streaming Using RTP/RTSP/TCP Transport for IPv6.

Test Case ID: DRAFT-RTSS-2-3-12

ONVIF Core Specification Coverage: None

Command Under Test: None

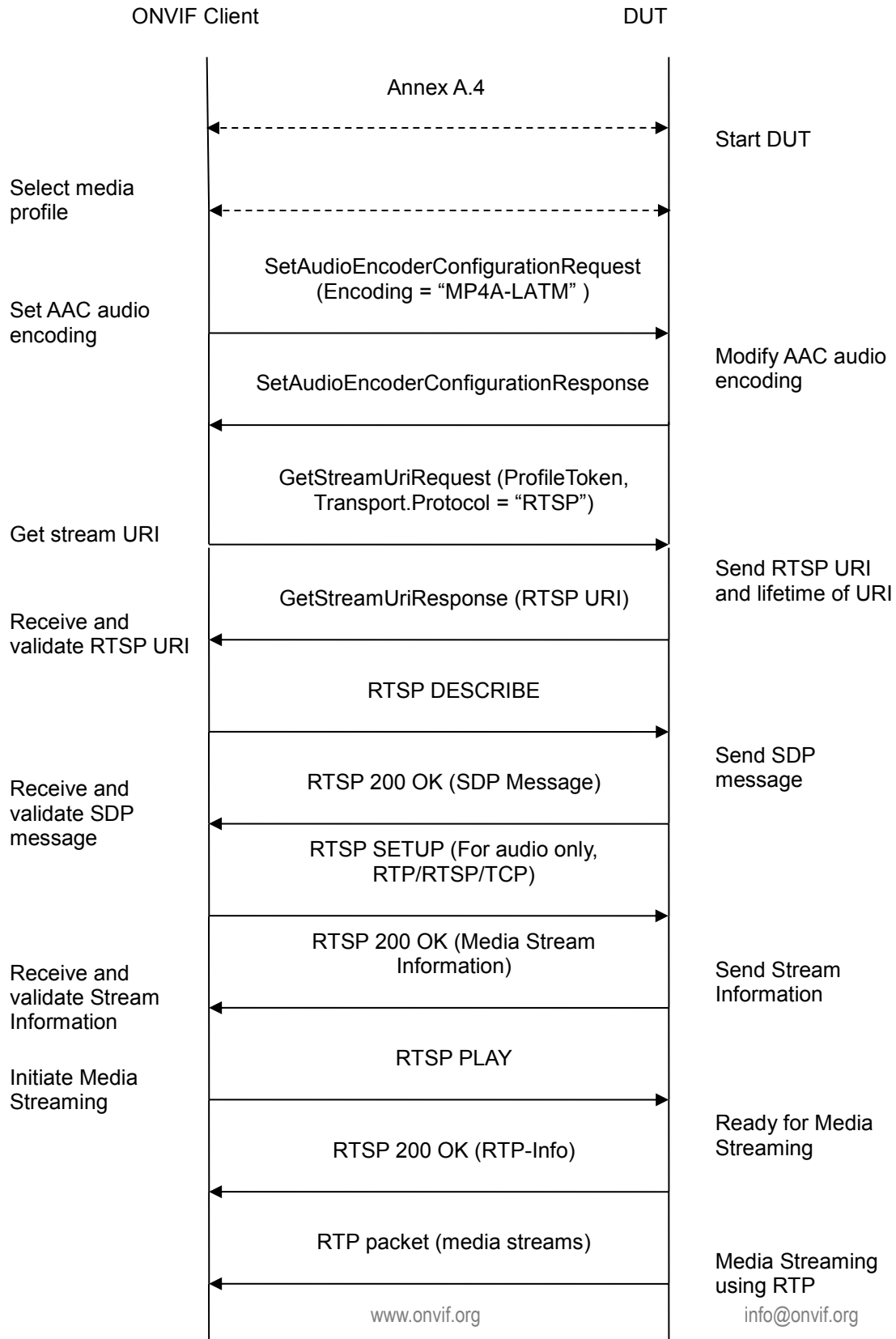
WSDL Reference: None

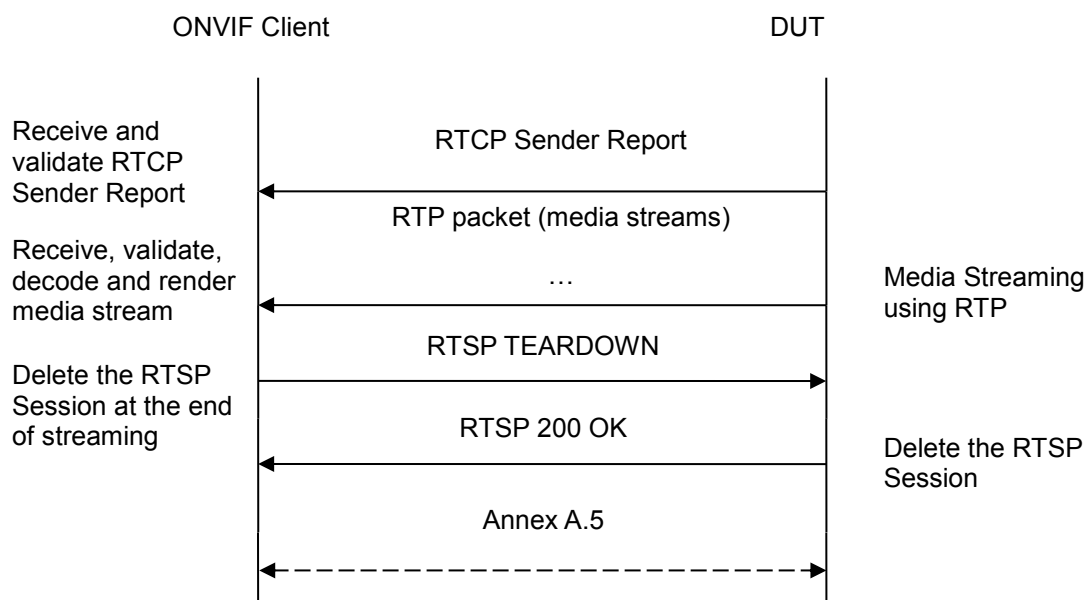
Test Propose: To verify AAC media streaming based on RTP/RTSP/TCP Transport for IPv6.

Pre-Requisite: Media2 Service is supported by DUT. Media2_AAC is supported by DUT. IPv6 is turned on for network interface. The DUT is configured with Manual IPv6 or LinkLocal IPv6 address.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

101. Start an ONVIF Client.
102. Start the DUT.
103. ONVIF Client turns on IPv6 network interface by following the procedure mentioned in Annex A.4.
104. ONVIF Client selects a media profile with AAC encoding support using Annex A.7
105. ONVIF Client invokes SetAudioEncoderConfigurationRequest message with (Encoding = "MP4A-LATM", Bitrate = r1, SampleRate = r2) to set AAC encoding.
106. Verify the SetAudioEncoderConfigurationResponse message from the DUT.
107. ONVIF Client invokes GetStreamUriRequest message (ProfileToken, Transport.Protocol = "RTSP") to retrieve media stream URI for the selected media profile.
108. The DUT sends the GetStreamUriResponse message with RTSP URI.
109. ONVIF Client invokes RTSP DESCRIBE request.
110. The DUT sends 200 OK message and SDP information.
111. ONVIF Client invokes RTSP SETUP request with transport parameter **RTP/RTSP/TCP**.
112. The DUT sends 200 OK message and the media stream information.
113. ONVIF Client invokes RTSP PLAY request.
114. The DUT sends 200 OK message and starts media streaming.

115. The DUT sends AAC RTP media stream to ONVIF Client over RTSP.
116. The DUT sends RTCP sender report to ONVIF Client.
117. ONVIF Client validates the received RTP and RTCP packets, decodes and renders them.
118. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
119. The DUT sends 200 OK Response and terminates the RTSP Session.
120. ONVIF Client will restore the original settings by following the procedure mentioned in Annex A.5.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

The DUT did not have valid media profile.

The DUT did not send SetAudioEncoderConfigurationResponse message.

The DUT did not send GetStreamUriResponse message.

The DUT did not send valid GetStreamUriResponse message.

The DUT did not send valid RTSP URI.

The DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

The DUT did not send valid RTP header in one or more media streams.

The DUT did not send RTCP sender report correctly.

The DUT did not send AAC RTP media streaming to ONVIF Client.

The DUT sent not only AAC RTP media streaming to ONVIF Client.

Note: See Annex A.1 for Invalid RTP header definition.

Note: See Annex A.3 for Name and Token Parameters Length limitations.

4.2.15 MEDIA2 STREAMING – AAC (RTP-Multicast, IPv4)

Test Label: Real Time Viewing DUT AAC Media2 Streaming Using RTP-Multicast Transport for IPv4.

Test Case ID: RTSS-2-3-13



ONVIF Core Specification Coverage: None

Command Under Test: None

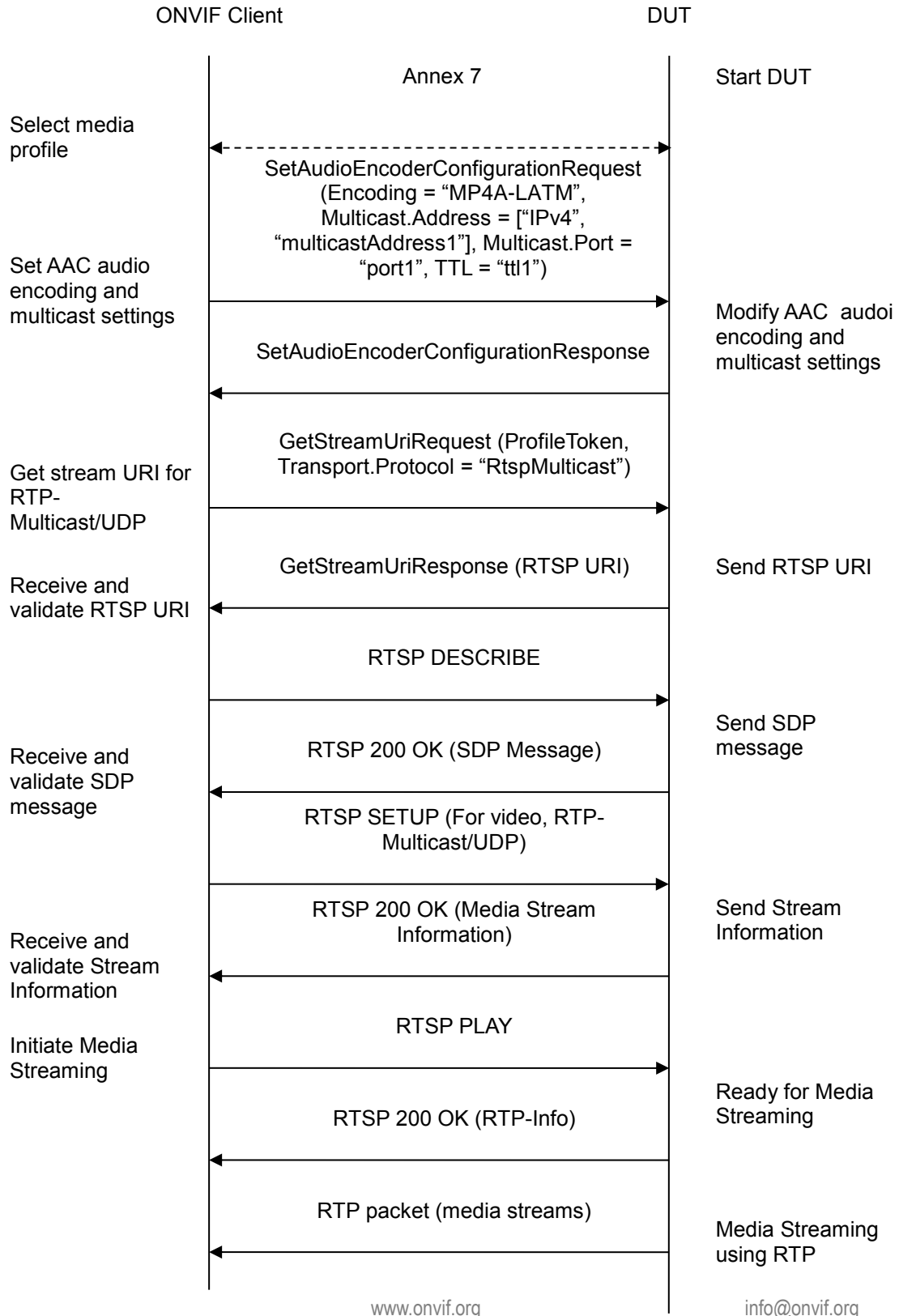
WSDL Reference: None

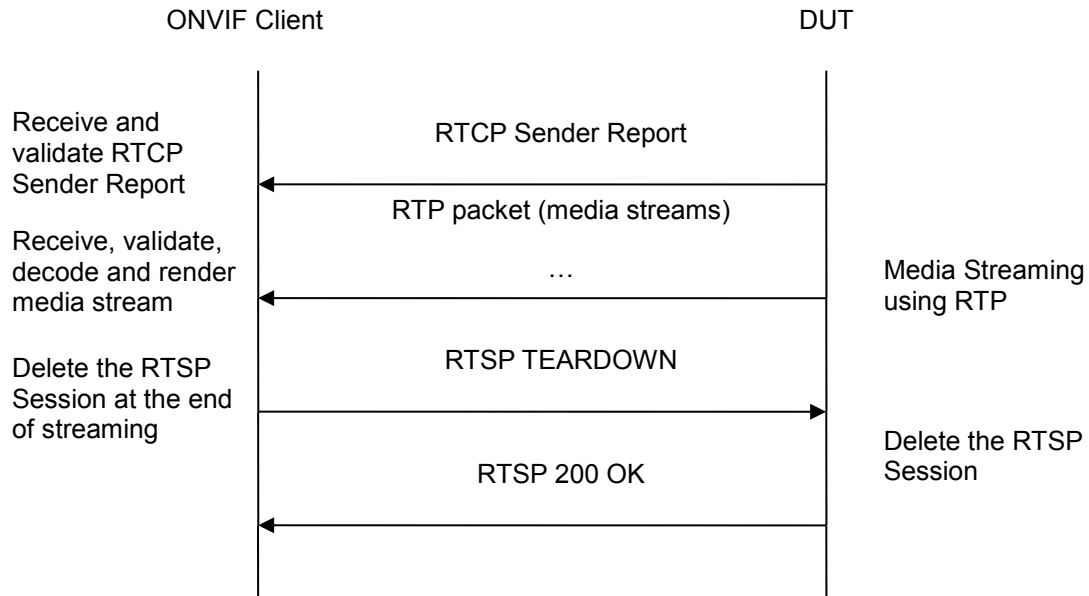
Test Propose: To verify AAC media streaming based on RTP-Multicast/UDP Transport for IPv4.

Pre-Requirement: Media2 Service is supported by DUT. Media2_AAC feature is supported by DUT. Real-time streaming supported by DUT. RTP-Multicast transport protocol is supported by DUT.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

121. Start an ONVIF Client.
122. Start the DUT.
123. ONVIF Client selects a media profile with “MP4A-LATM” (AAC) encoding support using Annex A.7
124. ONVIF Client invokes SetAudioEncoderConfigurationRequest message (Encoding = “MP4A-LATM”, Bitrate = r1, SampleRate = r2) to set AAC encoding.
125. Verify the SetAudioEncoderConfigurationResponse message from the DUT.
126. ONVIF Client invokes GetStreamUriRequest message (Profile Token, Protocol=“RtspMulticast”) to retrieve media stream URI for the selected media profile.
127. DUT sends RTSP URI in the GetStreamUriResponse message.
128. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
129. ONVIF Client invokes RTSP DESCRIBE request.
130. The DUT sends 200 OK message and SDP information.
131. ONVIF Client invokes RTSP SETUP request with transport parameter **RTP-Multicast/UDP**.
132. The DUT sends 200 OK message and the media stream information.
133. ONVIF Client invokes RTSP PLAY request.

134. The DUT sends 200 OK message and starts media streaming.
135. The DUT sends H.264 RTP multicast media stream to multicast IPv4 address over UDP.
136. The DUT sends RTCP sender report to ONVIF Client.
137. ONVIF Client validates the received RTP and RTCP packets, decodes and renders them.
138. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
139. The DUT sends 200 OK Response and terminates the RTSP Session.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

The DUT did not have valid media profile.

The DUT did not send SetAudioEncoderConfigurationResponse message.

The DUT did not send GetStreamUriResponse message.

The DUT did not send valid GetStreamUriResponse message.

The DUT did not send valid RTSP URI.

The DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

The DUT did not send valid RTP header in one or more media streams.

The DUT did not send RTCP sender report correctly.

The DUT did not send MP4A-LATM RTP media streaming to ONVIF Client.

The DUT sent not only MP4A-LATM RTP media streaming to ONVIF Client.

Note: **See Annex A.3 for Name and Token Parameters Length limitations.**

4.2.16 MEDIA2 STREAMING – AAC (RTP-Multicast, IPv6)

Test Label: Real Time Viewing DUT AAC Media2 Streaming Using RTP-Multicast Transport for IPv6.

Test Case ID: RTSS-2-3-14

ONVIF Core Specification Coverage: None

Command Under Test: None

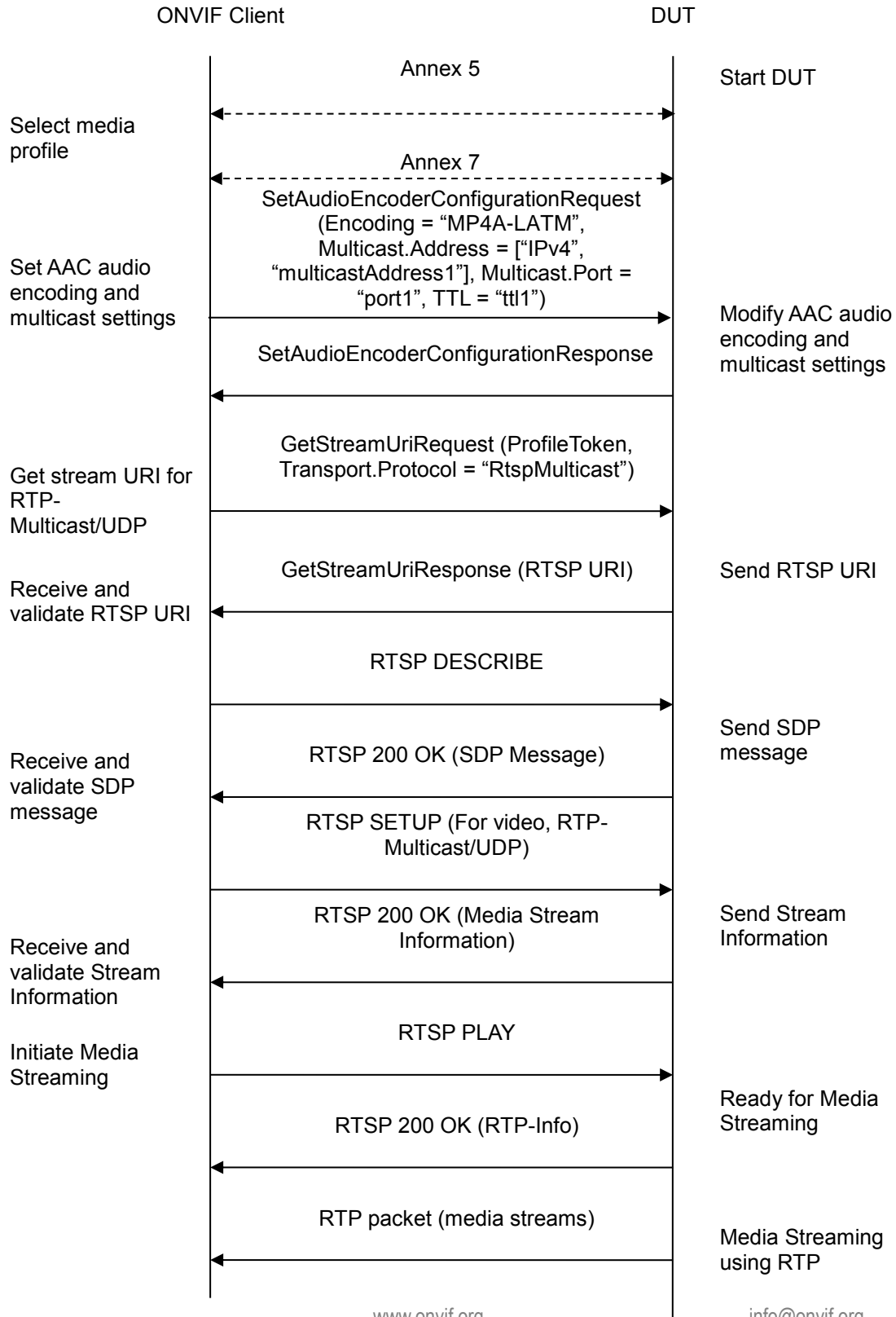
WSDL Reference: None

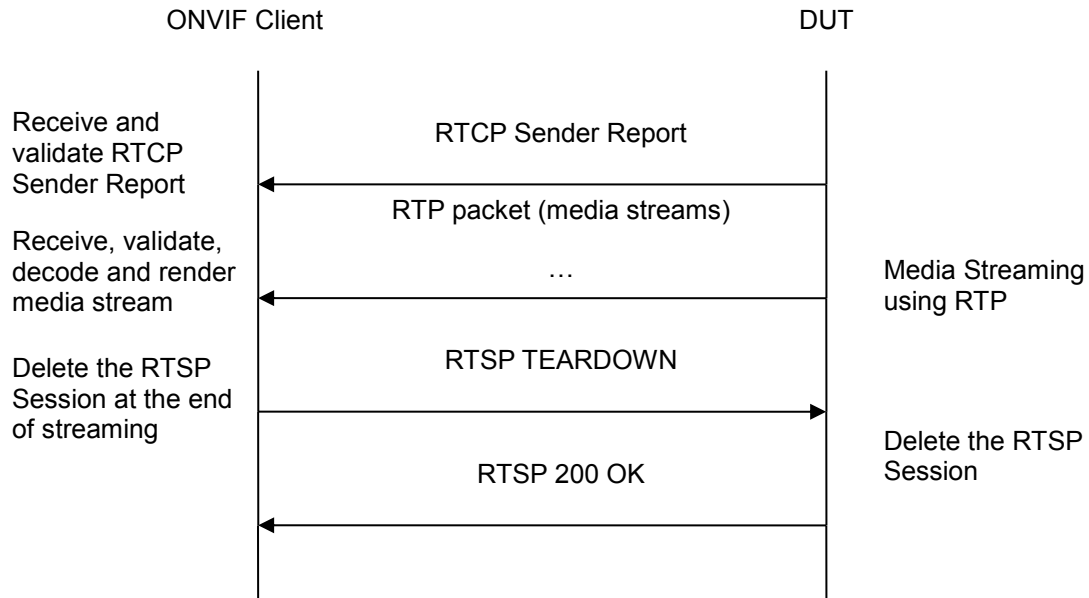
Test Propose: To verify AAC media streaming based on RTP-Multicast/UDP Transport for IPv6.

Pre-Requisite: Media2 Service is supported by DUT. Media2_AAC feature is supported by DUT. Real-time streaming supported by DUT. RTP-Multicast transport protocol is supported by DUT. IPv6 is turned on for network interface. The DUT is configured with Manual IPv6 or LinkLocal IPv6 address.

Test Configuration: ONVIF Client and DUT

Test Sequence:





Test Procedure:

140. Start an ONVIF Client.
141. Start the DUT.
142. ONVIF Client turns on IPv6 network interface by following the procedure mentioned in Annex A.4.
143. ONVIF Client selects a media profile with “MP4A-LATM” (AAC) encoding support using Annex A.7
144. ONVIF Client invokes SetAudioEncoderConfigurationRequest message (Encoding = “MP4A-LATM”, Bitrate = r1, SampleRate = r2) to set AAC encoding.
145. Verify the SetAudioEncoderConfigurationResponse message from the DUT.
146. ONVIF Client invokes GetStreamUriRequest message (Profile Token, Protocol=“RtspMulticast”) to retrieve media stream URI for the selected media profile.
147. DUT sends RTSP URI in the GetStreamUriResponse message.
148. ONVIF Client verifies the RTSP media stream URI provided by the DUT.
149. ONVIF Client invokes RTSP DESCRIBE request.
150. The DUT sends 200 OK message and SDP information.
151. ONVIF Client invokes RTSP SETUP request with transport parameter **RTP-Multicast/UDP**.
152. The DUT sends 200 OK message and the media stream information.

153. ONVIF Client invokes RTSP PLAY request.
154. The DUT sends 200 OK message and starts media streaming.
155. The DUT sends H.264 RTP multicast media stream to multicast IPv4 address over UDP.
156. The DUT sends RTCP sender report to ONVIF Client.
157. ONVIF Client validates the received RTP and RTCP packets, decodes and renders them.
158. ONVIF Client invokes RTSP TEARDOWN control request at the end of media streaming to terminate the RTSP session.
159. The DUT sends 200 OK Response and terminates the RTSP Session.

Test Result:

PASS –

DUT passes all assertions.

FAIL –

The DUT did not have valid media profile.

The DUT did not send SetAudioEncoderConfigurationResponse message.

The DUT did not send GetStreamUriResponse message.

The DUT did not send valid GetStreamUriResponse message.

The DUT did not send valid RTSP URI.

The DUT did not send RTSP 200 OK response for RTSP DESCRIBE, SETUP, PLAY and TEARDOWN requests.

The DUT did not send valid RTP header in one or more media streams.

The DUT did not send RTCP sender report correctly.

The DUT did not send AAC RTP media streaming to ONVIF Client.

The DUT sent not only AAC RTP media streaming to ONVIF Client.

Note: See Annex A.3 for Name and Token Parameters Length limitations.



Audio & Video Streaming

TBD



Notification Streaming Interface

TBD

Audio Backchannel Streaming

TBD

Annex A

This section describes the meaning of the following definitions. These definitions are used in the test case description.

A.1 Invalid RTP Header

A RTP header which is not formed according to the header field format defined in the RFC 3550 Section 5.1 is considered an invalid RTP header.

A.2 I-frame insertion time interval

'I-frame insertion time interval' is the time interval between two consecutive I-frames sent by DUT.

ONVIF Client calculates this value by using the 'GovLength' parameter in the Video encoder configuration. ONVIF Client has to configure 'GovLength' to a large enough value so that there will be a sufficient time difference between two I-frames.

For SetSynchronizationPoint test cases in the "Real Time Streaming" section, ONVIF Client follows this procedure to verify that I-frame is inserted as a result of "SetSynchronizationPointRequest".

ONVIF Client waits for an I-frame before invoking SetSynchronizationPointRequest.

After receiving I-frame, ONVIF Client starts a timer with time out period less than 'I-frame insertion time interval' and immediately invokes SetSynchronizationPointRequest.

ONVIF Client waits for the I-frame and verifies that it receives I-frame before the timeout period.

A.3 Name and Token Parameters

The following limitations on maximum length of Name and Token parameters that shall be used during tests by ONVIF Device Test Tool to prevent faults from DUT:

- Name shall be less than or equal to 64 characters (only readable characters accepted).
- Token shall be less than or equal to 64 characters (only readable characters accepted).

UTF-8 character set shall be used for Name and Token.

Note: These limitations will not be used if ONVIF Device Test Tool reuses values that were received from the DUT.

A.4 Turn on IPv6 network interface

The following algorithm will be used to turn on IPv6 network interface:

1. ONVIF Client will invoke GetNetworkInterfacesRequest message to retrieve the original settings of the DUT.
2. ONVIF Client verifies GetNetworkInterfacesResponse message.
3. If GetNetworkInterfacesResponse message contains NetworkInterfaces.IPv6 and NetworkInterfaces.IPv6.Enabled=true, then ONVIF Client checks NetworkInterfaces.IPv6.Config.DHCP. Otherwise, go to step 10.
4. If NetworkInterfaces.IPv6.Config.DHCP=Off, then ONVIF Client checks NetworkInterfaces.IPv6.Config.Manual element. Otherwise, go to step 7.
5. If NetworkInterfaces.IPv6.Config.Manual element is present and not empty, then ONVIF Client skips other steps and run test using NetworkInterfaces.IPv6.Config.Manual value as device IP. Otherwise, ONVIF Client checks NetworkInterfaces.IPv6.Config.LinkLocal element.
6. If NetworkInterfaces.IPv6.Config.LinkLocal element is present and not empty, then ONVIF Client skips other steps and runs test using NetworkInterfaces.IPv6.Config.LinkLocal value as device IP. Otherwise, ONVIF Client skip other steps and failed test.
7. ONVIF Client will invoke SetNetworkInterfacesRequest message to turn off DHCP IPv6 (InterfaceToken = available network interface, NetworkInterfaces.IPv6.Config.DHCP=Off).
8. ONVIF Client gets current network interfaces via GetNetworkInterfacesRequest message.
9. ONVIF Client verifies GetNetworkInterfacesResponse message and checks that set settings were applied. Repeat steps 5-6.
10. If GetNetworkInterfacesResponse message does not contain NetworkInterfaces.IPv6 or NetworkInterfaces.IPv6.Enabled=false, then ONVIF Client will invoke SetNetworkInterfacesRequest message (InterfaceToken = available network interface, NetworkInterfaces.IPv6.Enabled=true) to turn on IPv6 configuration.

11. The DUT will return SetNetworkInterfacesResponse message.
12. If Reboot is required by DUT, invoke SystemReboot command.
13. ONVIF Client waits for HELLO message from the default network interface.
14. ONVIF Client gets current network interfaces via GetNetworkInterfacesRequest message.
15. ONVIF Client verifies GetNetworkInterfacesResponse message and checks that set settings were applied. Execute steps 4-6.

A.5 Restore Network Settings

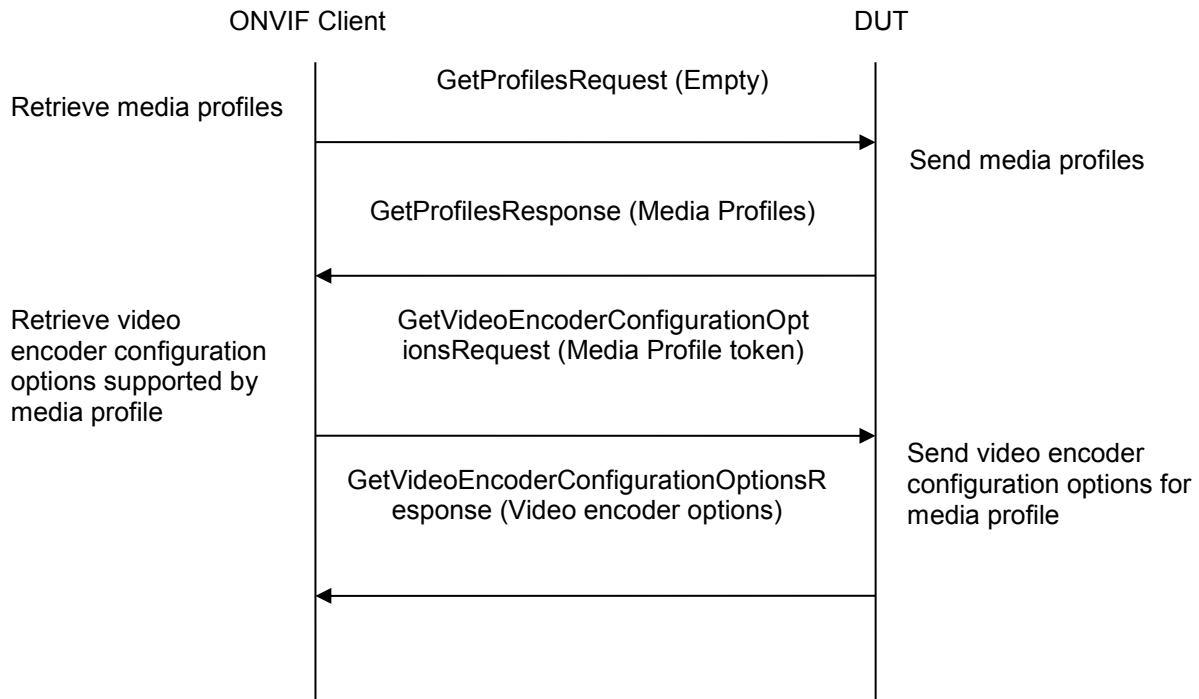
When the default network settings of the DUT are changed during the execution of test cases, ONVIF Client follows the following procedure to restore the original default settings at the end of the test sequence:

1. Restore the default network settings by invoking SetNetworkInterfaces (**Default settings**) command.
2. If Reboot is required by DUT, invoke SystemReboot command.
3. If SystemReboot is invoked, wait for HELLO message from the default network interface.
4. Move to the next test case execution.

A.6 Media2 Service Profile Configuration for Video Streaming

For the execution of real time streaming - video test cases, ONVIF Client has to select the media profile for the required video encoding (**RequiredEncoding1**). ONVIF Client follows the following procedure to find the media profile for Media2 Service:

1. ONVIF Client invokes GetProfilesRequest without parameters to retrieve all media profiles from DUT.
2. The DUT sends GetProfilesResponse with list of media profiles.
3. For each profile in GetProfilesResponse, ONVIF Client saves this profile in **Profile1** variable and runs the following steps:
 - 3.1. ONVIF Client invokes GetVideoEncoderConfigurationOptionsRequest with **Profile1** token as input parameter.
 - 3.2. The DUT sends GetVideoEncoderConfigurationOptionsResponse.
 - 3.3. If GetVideoEncoderConfigurationOptionsResponse contains at least one Option with Encoding = **RequiredEncoding1**, then ONVIF Client stops running the annex and returns the **Profile1** to the test.



A.7 Media2 Service – Media Profile Configuration for Audio Streaming

For the execution of real time streaming – Audio test cases, ONVIF Client has to select the media profile for the required audio encoding (**RequiredEncoding1**).

ONVIF Client follows the following procedure to configure the media profile.

1. ONVIF Client invokes GetProfiles Request with Type = list within two items: “AudioSource” and “AudioEncoder”.
2. DUT sends GetProfilesResponse with the list of media profiles.
3. For each media profile in GetProfilesResponse, ONVIF Client saves this profile in **Profile1** variable and runs the following procedure:
 - 3.1. If **Profile1** Configurations AudioSource configuration is not empty and **Profile1** Configurations AudioEncoder configuration is not empty then go to step 3.1.1. Otherwise go to step 3.2.
 - 3.1.1. ONVIF Client invokes GetAudioEncoderConfigurationOptions with ProfileToken = **Profile1** token as input argument
 - 3.1.2. The DUT sends GetAudioEncoderConfigurationOptionsResponse.
 - 3.1.3. If the GetAudioEncoderConfigurationOptionsResponse contains option with Encoding

= **RequiredEncoding1**, then ONVIF Client stops running the annex and returns the **Profile1** to the test.

3.2. If **Profile1** does not contains audio encode and audio source configurations runs the following steps 3.2.1 - 3.2.3:

3.2.1. ONVIF Client invokes `GetAudioSourceConfigurations` request with `ProfileToken = Profile1` token as input parameter.

3.2.2. The DUT sends `GetAudioSourceConfigurationsResponse` with list of audio source configurations available for given profile.

3.2.3. For each audio source configuration in `GetAudioSourceConfigurationsResponse`, ONVIF Client saves this configuration in **AudioSourceConfiguration1** variable and runs the following steps 3.2.3.1 - 3.2.3.6:

3.2.3.1. ONVIF Client invokes `AddConfiguration` with `ProfileToken = Profile1` token, `Configuration.Type = "AudioSource"` and `Configuration.Token = AudioSourceConfiguration1` token.

3.2.3.2. The DUT sends `AddConfigurationResponse`.

3.2.3.3. ONVIF Client invokes `GetAudioEncoderConfigurationsRequest` with `ProfileToken = Profile1` token to retrieve available audio encoder configurations.

3.2.3.4. The DUT sends `GetAudioEncoderConfigurationsResponse`.

3.2.3.5. For each audio encoder configuration in `GetAudioEncoderConfigurationsResponse`, ONVIF Client saves this configuration in **AudioEncoderConfiguration1** and runs the following steps:

3.2.3.5.1. ONVIF Client invokes `GetAudioEncoderConfigurationOptions` request with `ConfigurationToken = AudioEncoderConfiguration1` token as input parameter.

3.2.3.5.2. The DUT sends `GetAudioEncoderConfigurationOptionsResponse`.

3.2.3.5.3. If `GetAudioEncoderConfigurationOptionsResponse` contains option with `Encoding = RequiredEncoding1` then run the following steps:

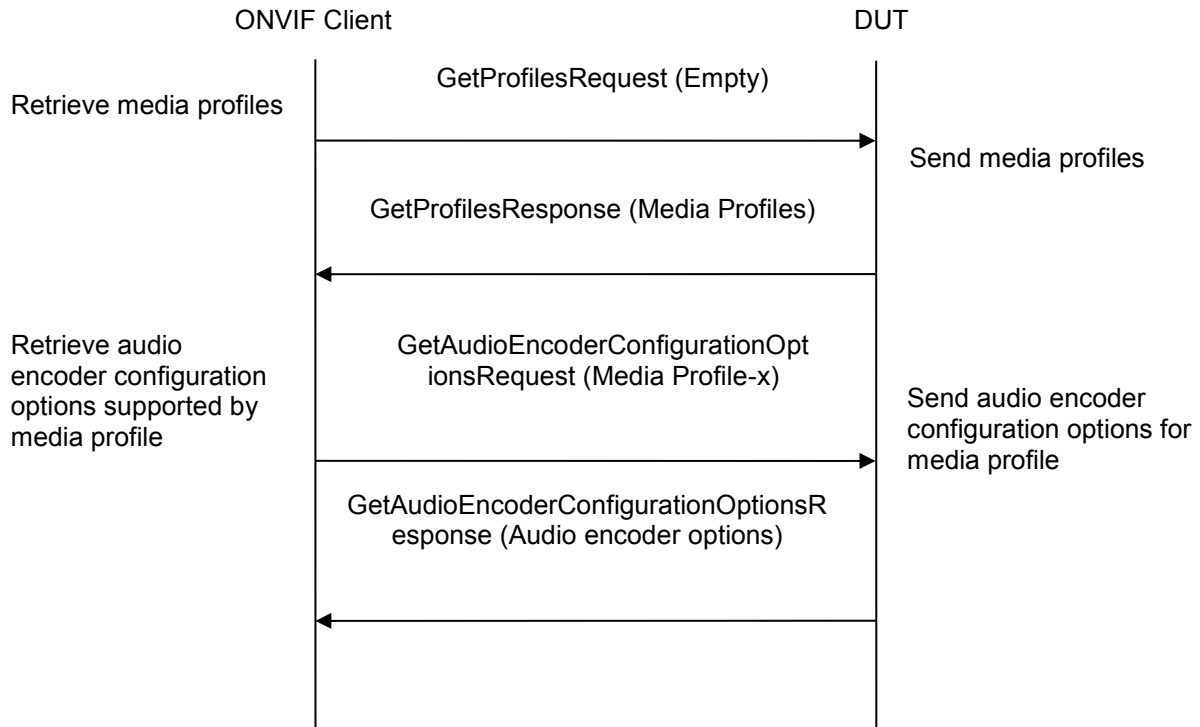
3.2.3.5.3.1. ONVIF Client Invokes `AddConfiguration` with `ProfileToken = Profile1` token, `Configuration.Type = "AudioEncoder"` and `Configuration.Token = AudioEncoderConfiguration1` token.

3.2.3.5.3.2. The DUT sends `AddConfigurationResponse`.

3.2.3.5.3.3. ONVIF Client stops running the annex and returns the **Profile1** to the test.

3.2.3.6. ONVIF Client invokes `RemoveConfiguration Request` with `ProfileToken = Profile1` token and `Configuration.Type = "AudioSource"`

Case 1: Media profile includes audio source and audio encoder configurations:



Case 2: Media profile without audio source and audio encoder configurations:

