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INTERNATIONAL STANDARD

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**Digital living network alliance (DLNA) home networked device interoperability guidelines –
Part 5: Device Profiles**

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IEC 62481-5

INTERNATIONAL STANDARD

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Digital living network alliance (DLNA) home networked device interoperability guidelines –
Part 5: Device Profiles

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DIGITAL LIVING NETWORK ALLIANCE (DLNA) HOME NETWORKED DEVICE INTEROPERABILITY GUIDELINES –

Part 5: Device Profiles

FOREWORD

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International Standard IEC 62481-5 has been prepared under technical area 8: Multimedia home systems and applications for end-user network, IEC technical committee 100: Audio, video and multimedia systems and equipment.

This second edition cancels and replaces the first edition published in 2013. This edition constitutes a technical revision.

This edition includes the following changes with respect to the previous edition:

a) removal of CVP-NA-1;

b) addition of CVP-2.

The text of this International Standard is based on the following documents:

CDV	Report on voting
100/2734/CDV	100/2884/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of IEC 62481 series, published under the general title *Digital Living Network Alliance (DLNA) home networked device interoperability guidelines*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Consumers are acquiring, viewing, and managing an increasing amount of digital media (photos, music, and video) on devices in the consumer electronics (CE), mobile, and Personal Computer (PC) domains. As such, they want to conveniently enjoy the content, regardless of the source, across different devices and locations in the home. The digital home vision integrates the Internet, mobile, and broadcast networks through a seamless, interoperable network, which will provide a unique opportunity for manufacturers and consumers alike. In order to cater for this need, a common set of industry design guidelines is needed that allows vendors to participate in a growing marketplace, leading to more innovation, simplicity, and value for consumers. This document serves that purpose and provides vendors with the information needed to build interoperable networked platforms and devices for the digital home.

DIGITAL LIVING NETWORK ALLIANCE (DLNA) HOME NETWORKED DEVICE INTEROPERABILITY GUIDELINES –

Part 5: Device Profiles

1 Scope

This part of IEC 62481 (the DLNA guidelines) specifies guidelines that define various DLNA Device Profiles. A Device Profile is a collection of DLNA capabilities and features within a DLNA device. A device is compliant with a Device Profile when it conforms to all the guidelines listed for that Device Profile.

In practice, Device Profiles reference existing optional or recommended DLNA guidelines that enable certain features, and make those DLNA guidelines mandatory within the context of a Device Profile. A Device Profile can also provide some additional guidelines that complement or modify existing DLNA guidelines for a feature.

A particular type of the DLNA Device Profile is the Commercial Video Profile (CVP). A CVP Device Profile is an extension of the DLNA guidelines that allows content from service providers and multichannel video programming distributers to be distributed on the DLNA network. DLNA Commercial Video Profiles (CVPs) are defined as Device Profiles that consistently enable commercial content that enters the home network through a gateway device via an interface to a commercial content service provider. Since different regions of the world have different requirements for commercial content, multiple CVPs are defined.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62481-1-1:2017, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 1-1: Architecture and protocols*

IEC 62481-1-2:2017, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 1-2: Architecture and protocols – Extended Digital Media Renderer*

IEC 62481-2:2017, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 2: DNLA media formats*

IEC 62481-3:2017, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 3: Link protection*

IEC 62481-6-1:2017, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 6-1: Remote user interface – HTML5*

IEC 62481-7:2017, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 7: Authentication*

IEC 62481-8:2017, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 8: Diagnostics*

IEC 62481-9:2017, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 9: HTTP adaptive delivery*

IEC 62481-10:2017, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 10: Low power mode*

DTLA CVP-2, *DTLA CVP-2 Volume 1 Specification, Digital Transmission Licensing Administrator (DTLA)*
http://www.dtcp.com/specifications.aspx

W3C HTML5 Specification, *A vocabulary and associated APIs for HTML and XHTML*
http://dev.w3.org/html5/spec

W3C SELECTORS, *Cascading Style Sheets Selectors Level 3, W3C*
http://www.w3.org/TR/selectors/

W3C NAMESPACES, *Cascading Style Sheets Namespaces Module, W3C*
www.w3.org/TR/css3-namespace/

W3C SELECTORS-API, *Cascading Style Sheets Selectors API Level 1, W3C*
http://www.w3.org/TR/selectors-api/

3   Terms, definitions, abbreviated terms and conventions

For the purposes of this document, the terms and definitions given in IEC 62481-1-1:2017 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1   Terms and definitions

3.1.1
CVP-2 Certificate
certificate that is either a DTCP CVP-2 Certificate or an X.509 CVP-2 Certificate

3.1.2
Device Profile
collection of DLNA capabilities and features within a DLNA device

Note 1 to entry: A device is compliant with a Device Profile when it implements all the guidelines listed for that Device Profile.

3.1.3
(DMP DMR)
DMP Device Class and DMR Device Class that is co-located

3.1.4
DTCP CVP-2 Certificate
DTCP certificate issued by DTLA to DLNA CVP-2 certified devices (client or server)

Note 1 to entry: DTLA requirements regarding these certificates are provided in DTLA CVP-2.

3.1.5
X.509 CVP-2 Certificate
DLNA-approved X.509 certificate issued to a server for authentication by CVP-2 Clients

Note 1 to entry: X.509 CVP-2 Certificates are certificate issued by a Certificate Authority approved by the DLNA Board of Directors (e.g. DTLA) to a DLNA CVP-2 certified server device in the home or to a server in the cloud that complies with the best Internet and DLNA practices (e.g. Authentication Server, RUI-H Transport Server). DLNA maintains a list of approved sources of X.509 CVP-2 Certificates.

3.1.6
CVP
Commercial Video Profiles
DLNA Device Profile that allows commercial content acquired through a commercial video provider's gateway device to be played on the DLNA network

3.2 Abbreviated terms

EAS   Emergency Alert System

3.3 Conventions

In IEC 62481-1-1:2017 and this document, a number of terms, conditions, mechanisms, sequences, parameters, events, states, or similar terms are printed with the first letter of each word in uppercase and the rest in lowercase (e.g. Device Profile). Any lowercase uses of these words have the normal technical English meanings.

4 Networking architecture, device models and guideline conventions

4.1 DLNA home networking architecture

See Clause 4 of IEC 62481-1-1:2017 for a full description of the DLNA home networking architecture.

4.2 DLNA device model

See Clause 5 of IEC 62481-1-1:2017 for a full description of the DLNA device model.

4.3 Document conventions

See Clause 6 of IEC 62481-1-1:2017 for a full description of the DLNA document conventions.

5 DLNA Device Profile guidelines

5.1 Overview

This clause describes the format of the guidelines for DLNA Device Profiles. Applicability of a referenced guideline to a specific Device Class is defined both by the attribute table of the guideline that references it, as well as by the "applicable Device Classes" column of the Device Profile definition in the table at the top of each Device Profile clause.

CVP-2 architecture, system usages and deployment scenarios is described in Annex A, and the CVP-2 client implementer's guide is in Annex C.

5.2 Defined Device Profiles

Each Device Profile begins with a table that briefly describes it.

This table also indicates which DLNA Device Classes the Device Profile applies to. Although a guideline, as defined, could apply to additional Device Classes, the defined Device Profile only

provides for the guideline's applicability to the Device Classes listed in conjunction with the Device Profile.

The definition of a Device Profile in Table 1 (the applicable Device Classes and the Device Profile name) is a normative definition of that Device Profile. The Device Classes that a guideline applies to within the context of a Device Profile are the intersection of the Device Classes the guideline applies to (from its attribute table) and the Device Classes that the Device Profile applies to (from its introductory table). See 7.1 in IEC 62481-1-1:2017 for guideline and attribute table layout descriptions.

6 CVP-2 guidelines

6.1 Device profile definition

Table 1 – CVP-2 device profile definition

Device Profile	Applicable Device Classes and Capabilities
Name: CVP-2_Client **Description:** This is a CVP-2 Client Device Profile that defines a full set of functionality required for a rendering endpoint device to access commercial content available to DLNA devices in North America and Europe. This does not limit the Device Profile's applicability to other regions and other devices.	• (DMP DMR) or XDMR +RUIHPL+ +DIAGE+ +LPC+
Name: CVP-2_Server **Description:** This is a CVP-2 Server Device Profile that defines a full set of functionality required for a serving endpoint device to make commercial content available to DLNA devices in North America and Europe. This does not limit the Device Profile's applicability to other regions and other devices.	• DMS +RUIHSRC+ +DIAGE+ +LPE+

6.2 Media Format Profiles guidelines

6.2.1 Media Format Profiles

6.2.1.1

[GUIDELINE] A CVP-2 Client shall conform to all the guidelines for the Media Format Profiles specified in Table 2 for the regions supported by the device. A CVP-2 Client shall also conform to the guidelines for the required Media Format Profiles for the rendering endpoints of HND Device Category for the regions supported by the device as defined in IEC 62481-2:2017.

**Table 2 – Mandatory Media Format Profiles for
North America and Europe**

	North America	Europe
Mandatory Media Format Profiles	MPEG_TS_NA_ISO AVC_TS_NA_ISO AVC_TS_NA_T MPEG_TS_HD_NA_T	AVC_MP4_BL_CIF15_AAC_520 AVC_TS_EU_ISO AVC_MP4_EU

[ATTRIBUTES]

M	A	(DMP DMR) XDMR +RUIHPL+	n/a	n/a	IEC 62481-2:2017	S3ETP	

[COMMENT] This guideline mandates the region-specific Media Format Profiles for a CVP-2 Client. A CVP-2 Client indicates support for regions through registration during certification. The Mandatory Media Format Profiles for registered regions, as defined in IEC 62481-2:2017, for

individual Device Class or Device Capability of the CVP-2 Client Device Profile are accounted for by this guideline.

6.2.1.2

[GUIDELINE] A CVP-2 Client that indicates support for 3-D media shall conform to the guidelines associated with the following 3-D Media Format Profiles: MPEG_TS_3DFC_ISO, AVC_TS_3DFC_ISO and AVC_TS_HD_3D_AC3_ISO, as defined in IEC 62481-2:2017.

[ATTRIBUTES]

| M | A | (DMP DMR) XDMR +RUIHPL+ | n/a | n/a | IEC 62481-2:20 17 | C3ACY | |

[COMMENT] A CVP-2 Client indicates support for 3-D media through registration during certification.

6.2.1.3

[GUIDELINE] A CVP-2 Server that indicates support for 3-D media shall conform to all the guidelines for at least one of the following 3-D Media Format Profiles: MPEG_TS_3DFC_ISO, AVC_TS_3DFC_ISO, and AVC_TS_HD_3D_AC3_ISO, as defined in IEC 62481-2:2017.

[ATTRIBUTES]

| M | A | DMS +RUIHSRC+ | n/a | n/a | IEC 62481-2:20 17 | OTL9F | |

[COMMENT] A CVP-2 Server indicates support for 3-D media through registration during certification.

6.2.1.4

[GUIDELINE] A CVP-2 Client shall implement the following Media Format Profiles:

- DASH_AVC_MP4_HD;
- DASH_AVC_TS_HD_ISO.

[ATTRIBUTES]

| M | A | (DMP DMR), XDMR, +RUIHPL+ | n/a | n/a | IEC 62481-2:20 17 | AQJTJ | N |

[COMMENT] This guideline adds a requirement to support the HD versions of the Media Format Profiles that are mandatory in IEC 62481-9:2017.

6.2.1.5

[GUIDELINE] The set of Mandatory Media Format Profiles allowed by IEC 62481-1-1:2017 GUN F8SCI, GUN 6RDIF, GUN 377QS and GUN Y62MY shall include the Media Format Profiles defined by Table 2, Table 4, and IEC 62481-9:2017 GUN HVUON and GUN SVI6B.

[ATTRIBUTES]

M	A	DMS +RUIHSRC+	n/a	n/a	IEC 62481-1-1:2017 IEC 62481-9:2017	48WE7	N

[COMMENT]   This guideline extends the set of Mandatory Media Format Profiles used by a CVP-2 Server for purposes of the requirements of IEC 62481-1-1.

6.3   Architecture and protocol guidelines

6.3.1   Baseline client

6.3.1.1

[GUIDELINE]   A CVP-2 Client shall conform to all the guidelines for the (DMP DMR) Device Classes or XDMR Device Class.

[ATTRIBUTES]

M	A	(DMP DMR) XDMR	n/a	n/a	IEC 62481-1-1:2017 IEC 62481-1-2:2017	UC6AZ	

[COMMENT]   This is the baseline client device guideline common to CVP-NA-1 and CVP-EU-1 (DMP DMR) Device Classes.

6.3.1.2

[GUIDELINE]   A CVP-2 Client shall conform to all the guidelines for the +RUIHPL+ Device Capability as defined in IEC 62481-6-1:2017.

[ATTRIBUTES]

M	A	+RUIHPL+	n/a	n/a	IEC 62481-6-1:2017	HRGXR	

6.3.1.3

[GUIDELINE]   A CVP-2 Client shall support all the guidelines for Playspeed scan operations (a.k.a trick modes), as modified by Table 3.

Table 3 – Updates to existing general HTTP media transport
for streaming transfer guidelines

Requirement updated (replace "should" with "shall")	Location in IEC 62481-1-1:2017	GUN
MT HTTP Streaming Fast Forward Scan Media Operation	11.4.3.45.3	TYB9P
MT HTTP Streaming Slow Forward Scan Media Operation	11.4.3.46.3	3W8KS
MT HTTP Streaming Fast Backward Scan Media Operation	11.4.3.47.3	ZHSFA
MT HTTP Streaming Slow Backward Scan Media Operation	11.4.3.48.3	2DQOQ

[ATTRIBUTES]

M	R	(DMP DMR) XDMR +RUIHPL+	n/a	n/a	IEC 62481-1-1: 2017	3LQVT	

[COMMENT] This guideline mandates Playspeed trick modes on the CVP-2 Client.

6.3.1.4

[GUIDELINE] A CVP-2 Client shall support DLNA Link Protection and conform to all the guidelines for Link Protection (see IEC 62481-3:2017) for the Link Protected Media Format Profiles listed in Table 4

Table 4 – Link Protected Mandatory Media Format Profiles for North America and Europe

	North America	Europe
Mandatory Media Format Profiles	• DTCP_MPEG_TS_SD_NA DTCP_MPEG_TS_SD_NA_ISO DTCP_MPEG_TS_SD_NA_T DTCP_MPEG_TS_NA_ISO DTCP_MPEG_TS_HD_NA_T DTCP_AVC_TS_NA_ISO DTCP_AVC_TS_NA_T DTCP_MPEG_PS_NTSC	• DTCP_MPEG_TS_SD_EU_T DTCP_MPEG_TS_SD_EU DTCP_MPEG_TS_SD_EU_ISO DTCP_AVC_MP4_EU DTCP_AVC_MP4_BL_CIF15_AAC_520 DTCP_AVC_TS_EU_ISO DTCP_AVC_MP4_MP_SD DTCP_MPEG_PS_PAL

[ATTRIBUTES]

M	R	(DMP DMR) XDMR +RUIHPL+	n/a	n/a	IEC 62481-3:2017	BGTUT	C

[COMMENT] This guideline explicitly requires the CVP-2 Client to support DLNA Link Protection.

6.3.1.5

[GUIDELINE] A CVP-2 Client that uses DLNA Link Protection shall support all the guidelines for Playspeed scan operations, as modified by Table 5.

Table 5 – Updates to existing general HTTP media transport for streaming transfer guidelines with DLNA Link Protection

Requirement updated (replace "should" with "shall")	Location in IEC 62481-3:2017	GUN
MT HTTP Streaming Fast Forward Scan Media Operation	7.6.4.4.2.3	SW9IL
MT HTTP Streaming Slow Forward Scan Media Operation	7.6.4.4.2.5	2U6TN
MT HTTP Streaming Fast Backward Scan Media Operation	7.6.4.4.2.7	YFQO6
MT HTTP Streaming Slow Backward Scan Media Operation	7.6.4.4.2.9	FFN2S

[ATTRIBUTES]

M	R	(DMP DMR) XDMR +RUIHPL+	n/a	n/a	IEC 62481-1-1: 2017 IEC 62481-3:2017	RTCIY	

6.3.1.6

[GUIDELINE]   A CVP-2 Client shall conform to all the guidelines for DLNAQOS, as modified by Table 6.

Table 6 – Updates to existing QoS guidelines

Requirement updated (replace "should" with "shall")	Location in IEC 62481-1-1:2017	GUN
NC Devices: DLNAQOS support	8.4.2.4.1	6YK2S

[ATTRIBUTES]

M	R	(DMP DMR) XDMR	n/a		n/a	IEC 62481-1-1: 2017	2C8TL	

[COMMENT]   This guideline explicitly requires the CVP-2 Client to conform to all mandatory elements of DLNAQOS. Network interfaces on the device needs to be conformant with all requirements labelled for a particular interface type in 7.2.4 of IEC 62481-1-1:2017, Networking and Connectivity: QoS requirements. This includes tolerance of tags (VLAN and DSCP) and, when tagging traffic, tagging both VLAN and DSCP using values as defined by the DLNA guidelines. The values used cannot exceed the allowed maximum classifications for any given traffic type.

6.3.1.7

[GUIDELINE]   The RUI-H Pull Controller Device Capability of a CVP-2 Client shall conform to all the guidelines for the Client Authentication Device Option as defined in IEC 62481-7:2017.

[ATTRIBUTES]

M	A	+RUIHPL+		n/a		n/a	IEC 62481-7:20 17	NO7RQ	

[COMMENT]   See Annex B for the CVP-2 authentication examples.

6.3.1.8

[GUIDELINE]   A CVP-2 Client shall conform to all the guidelines for the +DIAGE+ Device Capability as defined in IEC 62481-8:2017.

[ATTRIBUTES]

M	A	(DMP DMR) XDMR	n/a		n/a	IEC 62481-8:20 17	DPLC5	

6.3.1.9

[GUIDELINE]   A CVP-2 Client shall conform to all the guidelines for the +LPC+ Device Capability as defined in IEC 62481-10:2017.

[ATTRIBUTES]

M	A	(DMP DMR) XDMR	n/a	n/a	IEC 62481-10:2017	XOLUC	

6.3.1.10

[GUIDELINE] A (DMP DMR) or XDMR Device Class and the +RUIHPL+ Device Capability of a CVP-2 Client shall conform to all the corresponding guidelines identified in the DLNA HTTP Adaptive Delivery Device Option for Rendering Endpoint as defined in IEC 62481-9:2017.

[ATTRIBUTES]

M	A	(DMP DMR) XDMR +RUIHPL+	n/a	n/a	IEC 62481-9:2017	BMXCH	

6.3.2 Baseline server

6.3.2.1

[GUIDELINE] A CVP-2 Server shall conform to all the guidelines for DMS as defined in IEC 62481-1-1:2017.

[ATTRIBUTES]

M	A	DMS	n/a	n/a	IEC 62481-1-1:2017	SYZI2	

6.3.2.2

[GUIDELINE] A CVP-2 Server shall support the PlaySpeed.dlna.org HTTP header and conform to the guidelines for Playspeed scan operations as defined in Guideline 11.4.3.53 (MT HTTP PlaySpeed.dlna.org header) in IEC 62481-1-1:2017.

[ATTRIBUTES]

M	R	DMS +RUIHSRC+	n/a	n/a	IEC 62481-1-1:2017	Y5SDT	

[COMMENT] This guideline explicitly requires the CVP-2 Server to support the PlaySpeed.dlna.org HTTP header.

6.3.2.3

[GUIDELINE] A CVP-2 Server shall support DLNA Link Protection and conform to all the guidelines for Link Protection (IEC 62481-3:2017 for at least one of the Link Protected Mandatory Media Format Profiles as defined in Table 4 for each supported region).

[ATTRIBUTES]

M	A	DMS +RUIHSRC+	n/a	n/a	IEC 62481-3:2017	I5NV3	C

[COMMENT] This explicitly requires the CVP-2 Server to support DLNA Link Protection. A CVP-2 Server indicates support for its supported region(s) through registration during certification.

6.3.2.4

[GUIDELINE] A CVP-2 Server shall conform to the guidelines for +RUIHSRC+ as defined in IEC 62481-6-1:2017.

[ATTRIBUTES]

M	A	+RUIHSRC+	n/a	n/a	IEC 62481-6-1: 2017	83POS	

6.3.2.5

[GUIDELINE] The RUI-H Source Device Capability of a CVP-2 Server shall conform to all the guidelines for the Server Authentication Device Option as defined in IEC 62481-7:2017.

[ATTRIBUTES]

M	A	+RUIHSRC+	n/a	n/a	IEC 62481-7:20 17	RSBRU	

6.3.2.6

[GUIDELINE] A CVP-2 Server shall conform to all the guidelines for the +DIAGE+ Device Capability as defined in IEC 62481-8:2017.

[ATTRIBUTES]

M	A	+DIAGE+	n/a	n/a	IEC 62481-8:20 17	2JMJP	

6.3.2.7

[GUIDELINE] A CVP-2 Server shall conform to all the guidelines for the +LPE+ Device Capability as defined in IEC 62481-10:2017.

[ATTRIBUTES]

M	A	+LPE+	n/a	n/a	IEC 62481-10:2 017	NYX8F	

6.3.2.8

[GUIDELINE] If a CVP-2 Server supports HTTP Adaptive Delivery, then it shall conform to all the guidelines as defined in IEC 62481-9:2017.

[ATTRIBUTES]

M	A	DMS +RUIHSRC+	n/a	n/a	IEC 62481-9:20 17	3KNJQ	

[COMMENT] This guideline applies the same HTTP Adaptive guidelines to both DMS and the +RUIHSRC+ Device Capability. A CVP-2 Server indicates support for HTTP Adaptive Delivery through registration during certification.

6.3.2.9

[GUIDELINE] The DMS of a CVP-2 Server shall support the getAvailableSeekRange.dlna.org HTTP header field and availableSeekRange.dlna.org HTTP header field when operating under Full Random Access Data Availability model, as described in (GUN 58A3H, GUN OEEJH) IEC 62481-6-1:2017 for a +RUIHSRC+ Device Capability when providing MPEG-2 Media Format Content.

[ATTRIBUTES]

M	A	DMS	n/a	n/a	IEC 62481-6-1: 2017	P8UDK	N

[COMMENT] In the HTML5 RUI guidelines +RUIHSRC+ capabilities are mandated to support the availableSeekRange.dlna.org header so that clients can detect the duration of FRADA content. This guideline extends that mandatory guideline to include the DMS of a CVP-2 server.

6.3.3 Device discovery and control

6.3.3.1

[GUIDELINE] A CVP-2 Client shall use the <dlna:X_DLNACAP> element in the device description document and include in the comma-separated list of Capability ID values all the Device Profiles implemented. The valid Capability ID value for Device Profile is the Device Profile "Name:" string for a CVP-2 Client as defined in Table 1.

[ATTRIBUTES]

M	A	DMR XDMR	n/a	n/a	IEC 62481-1-1: 2017	QQOS9	

[COMMENT] UPnP AV MediaRenderer devices use the <dlna:X_DLNACAP> element to indicate to control points the Device Profiles they implement. For example "CVP-2_Client" would be included for a CVP-2 Client device. See Guideline 9.2.35.1 (GUN WJUQC) in IEC 62481-1-1:2017 for the formal syntax of the <dlna:X_DLNACAP> element. Sample description is given below:

```
<dlna:X_DLNACAP xmlns:dlna="urn:schemas-dlna-org:device-1-0">
CVP-NA-1, CVP-2_Client
</dlna:X_DLNACAP>
```

6.3.3.2

[GUIDELINE] A CVP-2 Server shall use the <dlna:X_DLNACAP> element in the device description document and include in the comma-separated list of Capability ID values all the Device Profiles implemented. The valid Capability ID value for Device Profile is the Device Profile "Name:" string for a CVP-2 Server as defined in Table 1.

[ATTRIBUTES]

M	A	DMS +RUIHSRC+	n/a	n/a	IEC 62481-1-1: 2017	OYLCY	

[COMMENT] An UPnP AV MediaRenderer devices use the <dlna:X_DLNACAP> element to indicate to control points the Device Profiles they implement. For example "CVP-2_Server" would be included for a CVP-2 Server device. See Guideline 9.2.35.1 (GUN WJUQC) in IEC 62481-1-1:2017 for the formal syntax of the <dlna:X_DLNACAP> element. Sample description is given below:

```
<dlna:X_DLNACAP xmlns:dlna="urn:schemas-dlna-org:device-1-0">
CVP-EU-1, CVP-2_Server
</dlna:X_DLNACAP>
```

6.3.4   HTML5 remote UI

6.3.4.1

[GUIDELINE] RUI-H User Agent of a CVP-2 client shall implement the [FULLSCREEN] reference as defined in W3C HTML5 Specification.

[ATTRIBUTES]

M	A	+RUIHPL+	n/a	n/a	W3C HTML5 Specification	36HRD	

6.3.4.2

[GUIDELINE] The RUI-H Pull Controller Device Capability of a CVP-2 Client shall conform to the normative text in the following CSS Level 3 modules: Selectors Level 3 W3C SELECTORS, CSS Namespaces W3C NAMESPACES, and Selectors API Level 1 W3C SELECTORS-API.

[ATTRIBUTES]

M	A	+RUIHPL+	n/a	n/a	W3C SELECTORS W3C NAMESPACES W3C SELECTORS-API	PH6PZ	

6.3.4.3

[GUIDELINE] When a CVP-2 Client displays information about a RUI-H UI listing from a RemoteUIServer Service, it shall implement the following rules:

– if the UI listing has an <iconList> element, display one icon from the list;

– else if the RemoteUIServerDevice device description has an <iconList> element, display one icon from the list;

– else no icon is displayed for the UI Listing.

[ATTRIBUTES]

M	A	+RUIHPL+	n/a	n/a	IEC 62481-6-1: 2017	UTAQT	

6.3.4.4

[GUIDELINE] When a CVP-2 Client displays information about a RUI-H UI listing from a RemoteUIServer Service, it shall implement the following rules:

• if the UI listing has a <description> element, display the description;

• else, display the <friendlyName> element from the RemoteUIServerDevice device description.

[ATTRIBUTES]

M	A	+RUIHPL+	n/a	n/a	IEC 62481-6-1: 2017	72VN9	

6.3.4.5

[GUIDELINE] The GetCompatibleUIs action from a RemoteUIServer Service of a CVP-2 Server shall provide at least one URL that establishes an HTTPS connection to the RUI-H Transport Server.

[ATTRIBUTES]

M	A	+RUIHSRC+	n/a	n/a	IEC 62481-6-1: 2017	9XDT6	E

[COMMENT] This simplifies the client architecture by establishing a chain of trust with the RUI-H content servers at launch. A CVP-2 Client can expect that HTTPS URLs published by the RemoteUIServer Service will support Server Authentication using a CVP-2 Certificate so that the CVP-2 Client can validate the server's certificate and determine at launch time that it is initiating a CVP-2 session. The trust established based on the CVP-2 Certificate has the same scope (lifetime) as the HTML5 Session Storage object created in that session.

6.3.4.6

[GUIDELINE] The RUI-H Source of a CVP-2 Server shall use its CVP-2 Certificate for establishment of the initial HTTPS connections with the +RUIHPL+ Device Capability of a CVP-2 Client.

[ATTRIBUTES]

M	A	+RUIHSRC+	n/a	n/a	DTLA CVP-2	LVPBB	E

[COMMENT] When the +RUIHPL+ initially connects with the +RUIHSRC+, the +RUIHPL+ will be able to validate the CVP-2 Certificate and set the session for that ORIGIN as defined in [W3C HTML5 Specification] to be from a CVP-2 Server. Any subsequent resources fetched that are part of the same session can be from any non CVP-2 HTTPS servers (i.e. the servers may not have a CVP-2 Certificate).

6.3.4.7

[GUIDELINE] User modifications to the settings of a RUI-H User Agent shall not modify the behaviour of the device as specified in the CVP-2 Device Profile, such that the RUI-H content from a RUI-H Transport Server using HTTPS and the presentation of the content, including the AV content, are not altered except for critical settings that are allowed for user control of accessibility, security, diagnostics, key mappings, privacy and parental control.

[ATTRIBUTES]

M	A	+RUIHPL+	n/a	n/a	W3C HTML5 Specification	LJ8CK	N

[COMMENT] For instance, Emergency Alert System (EAS) and video service are not allowed to be altered. The purpose of the exceptions for accessibility, security, privacy, and parental

controls in this guideline is to allow for more stringent protections enabled through consumer device settings.

6.3.4.8

[GUIDELINE]   RUI-H User Agent of a CVP-2 Client shall implement and conform to the Content Security Policy (CSP) reference as defined by W3C HTML5 Specification

[ATTRIBUTES]

M	A	+RUIHPL+	n/a	n/a	W3C HTML5 Specification	ON9GP	N

[COMMENT]   This guideline addresses the fact that W3C HTML5 Specification does not mandate support for CSP. CSP defines a mechanism that service providers can use to mitigate a large class of content injection vulnerabilities, including cross-site scripting (XSS). This guideline ensures that this important mechanism is available for use by service providers and other web applications accessed by a RUI-H User Agent.

6.3.4.9

[GUIDELINE]   If a RUI-H User Agent of a CVP-2 Client allows installation of third-party extensions or add-ons that permits the injection of third-party content (of any form) into a Web page, then the RUI-H User Agent shall apply CSP policy directives to the third party content when those policy directives are sourced from a RUI-H Transport Server using HTTPS.

[ATTRIBUTES]

M	A	+RUIHPL+	n/a	n/a	W3C HTML5 Specification	EZJNY	N

[COMMENT]   This guideline ensures that service provider or web application CSP policies are not ignored by a RUI-H User Agent when processing potential content injection by third-party extensions or add-ons. In particular, this guideline mitigates vulnerabilities that may be introduced through malfunctioning or malicious third-party extensions or add-ons. For valid cases of user add-ons and extensions to support user control of accessibility, security, diagnostics, key mappings, privacy and parental control, the user and/or client manufacturer will need to inform the service providers so that these extensions can be unblocked in the CSP policy.

6.3.4.10

[GUIDELINE]   When applying CSP to a third-party extension or add-on, the RUI-H User Agent shall not report policy violations unless the violated policy directive was specified in a Content-Security-Policy-Report-Only header.

[ATTRIBUTES]

M	A	+RUIHPL+	n/a	n/a	W3C HTML5 Specification	X2EXH	N

6.3.5   Authentication

6.3.5.1

[GUIDELINE]   The RUI-H Pull Controller Device Capability of a CVP-2 Client shall implement DTCP Method using a DTCP CVP-2 Certificate for Client Authentication as defined in IEC 62481-7:2017.

[ATTRIBUTES]

M	A	+RUIHPL+	n/a	n/a	IEC 62481-7:20 17 DTLA CVP-2	TML2O	E

[COMMENT]   A CVP-2 Server can use the C2 bit, as defined in DTLA CVP-2, to distinguish a DTCP CVP-2 Certificate from a generic DTCP Certificate.

6.3.5.2

[GUIDELINE]   The RUI-H Source Device Capability of a CVP-2 Server shall use a CVP-2 Certificate for server authentication as defined in IEC 62481-7:2017.

[ATTRIBUTES]

M	A	+RUIHSRC+	n/a	n/a	IEC 62481-7:201 7 DTLA CVP-2	425MN	A

6.3.5.3

[GUIDELINE]   If the RUI-H Pull Controller Device Capability of a CVP-2 Client supports Server Authentication, it shall implement the X.509 Method for Server Authentication as defined in IEC 62481-7:2017.

[ATTRIBUTES]

M	A	+RUIHPL+	n/a	n/a	IEC 62481-7:20 17	SEFTW	E

[COMMENT]   A CVP-2 Client that supports Server Authentication is expected to be able to authenticate servers that use X.509 CVP-2 Certificates from any of the approved sources.

6.3.5.4

[GUIDELINE]   If the RUI-H Pull Controller Device Capability of a CVP-2 Client supports Server Authentication, it shall implement the DTCP Method for Server Authentication as defined in IEC 62481-7:2017.

[ATTRIBUTES]

M	A	+RUIHPL+	n/a	n/a	IEC 62481-7:20 17	ZEZZX	E

6.3.6   3-D media rendering

6.3.6.1

[GUIDELINE]   If a CVP-2 Client supports rendering of DLNA 3D Media Format Profiles, it shall conform to all the guidelines for 3-D media rendering as defined in IEC 62481-1-1:2017.

[ATTRIBUTES]

M	A	(DMP DMR) XDMR +RUIHPL+	n/a	n/a	IEC 62481-1-1: 2017	L5M4W	

6.3.6.2

[GUIDELINE]   The RUI-H Pull Controller Device Capability of a CVP-2 Client shall not wait for confirmation from the user before switching from 3D media to 2D media.

[ATTRIBUTES]

M	A	+RUIHPL+	n/a	n/a	IEC 62481-1-1: 2017	WYLUI	

[COMMENT]   This ensures, for example, that a RUI-H application selection of EAS is not pre-empted by the RUI-H User Agent.

Annex A
(informative)

CVP-2 architecture, system usages and deployment scenarios

A.1 CVP-2 device architecture

Figure A.1 displays the architecture of a CVP-2 device.
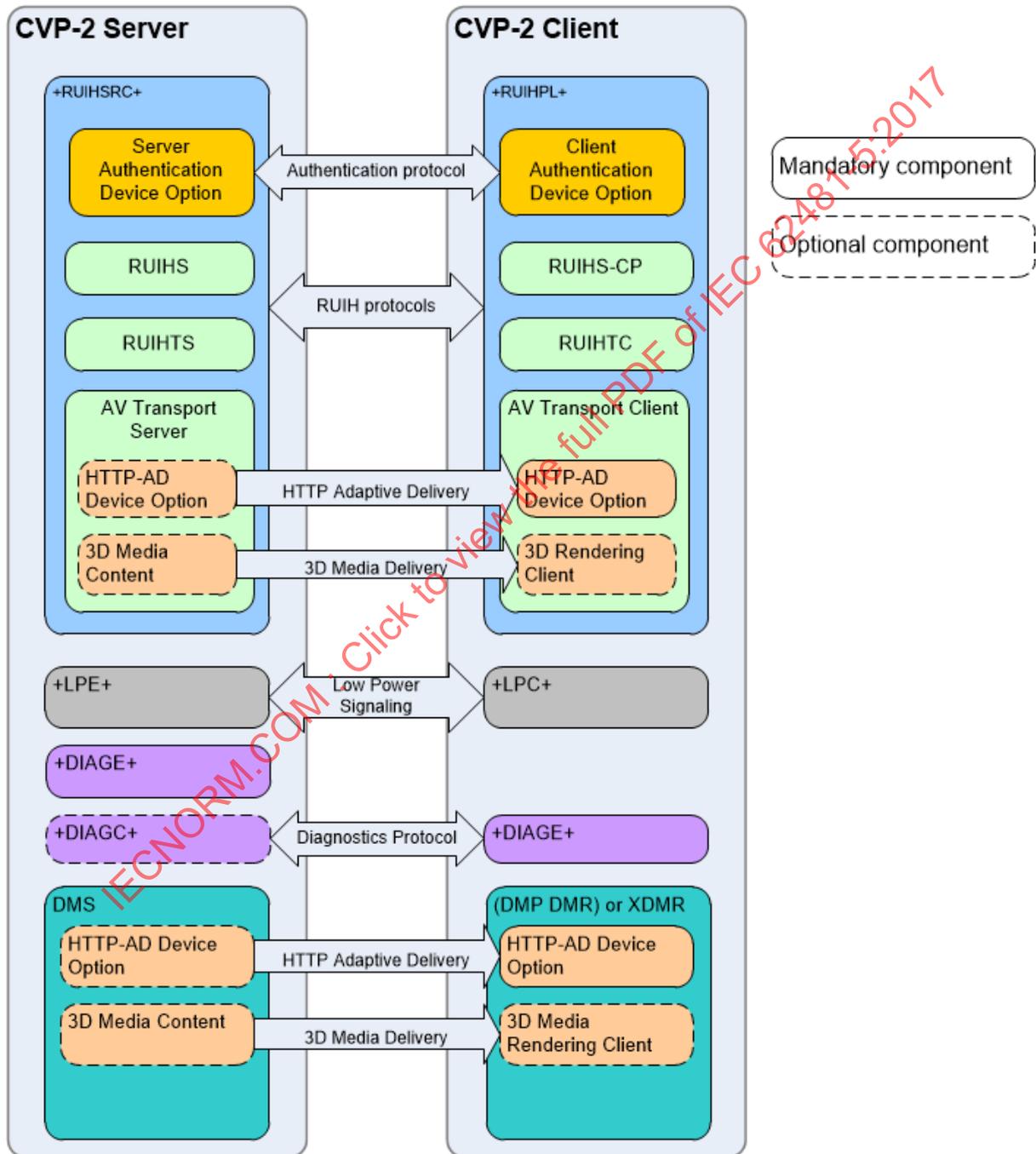
Figure A.1 – CVP-2 device architecture

A.2   System usages

A.2.1   General

This clause lists DLNA system usages supported by CVP-2.

A.2.2   AV system usages

CVP-2 supports following AV system usages defined in IEC 62481-1-1:2017:

- 2-box Model;
- 3-box Model.

These AV system usages include the support for HTTP Adaptive Delivery IEC 62481-9:2017 and 3-D Media Format Profile.

A.2.3   RUI-H with AV system usage

CVP-2 supports

- 2-box RUI-H with AV system usage for in-home only scenario as shown in Figure A.2 and in-home + cloud scenario as shown in Figure A.3

as defined in IEC 62481-6-1:2017. The usage includes the support for HTTP Adaptive Delivery and 3-D Media Format Profile.

A.2.4   Other system usages

Other system usages supported by CVP-2 include:

- Diagnostics system usages IEC 62481-8:2017;
- Low-Power system usages IEC 62481-10:2017.

A.3 CVP-2 in-home only deployment scenario
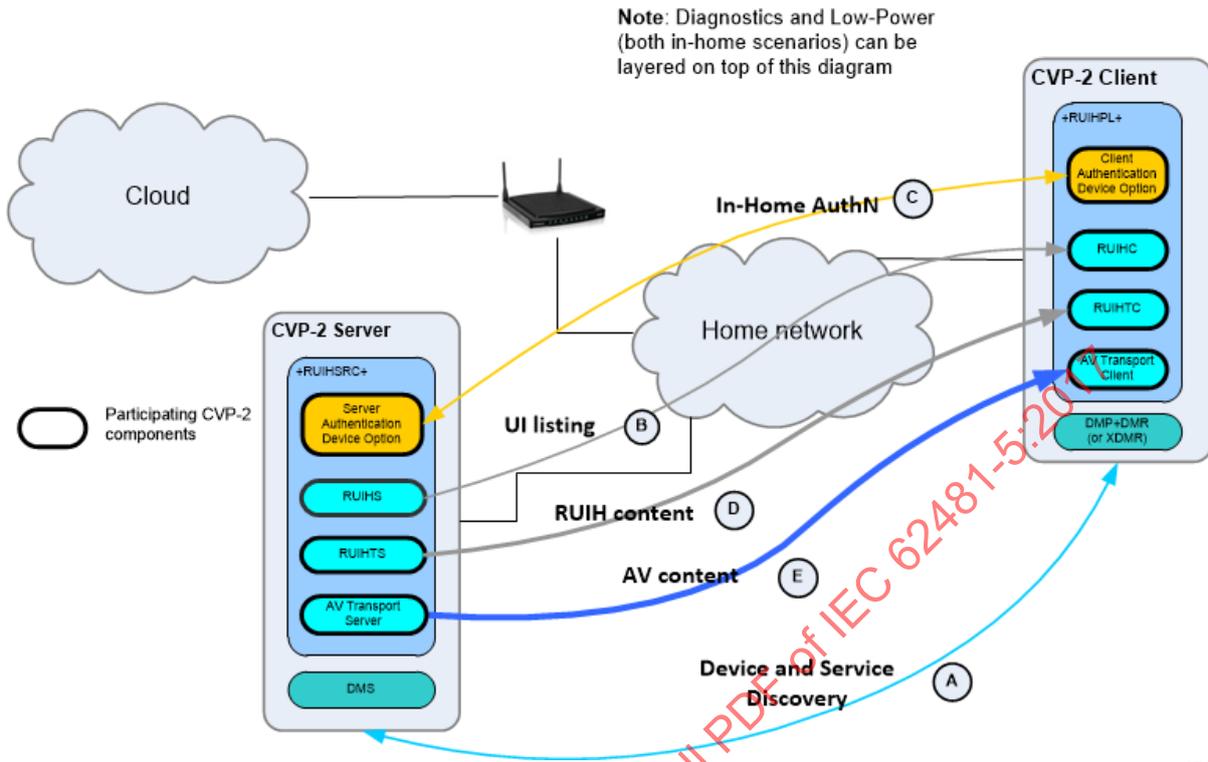
Figure A.2 – CVP-2 in-home only system scenario
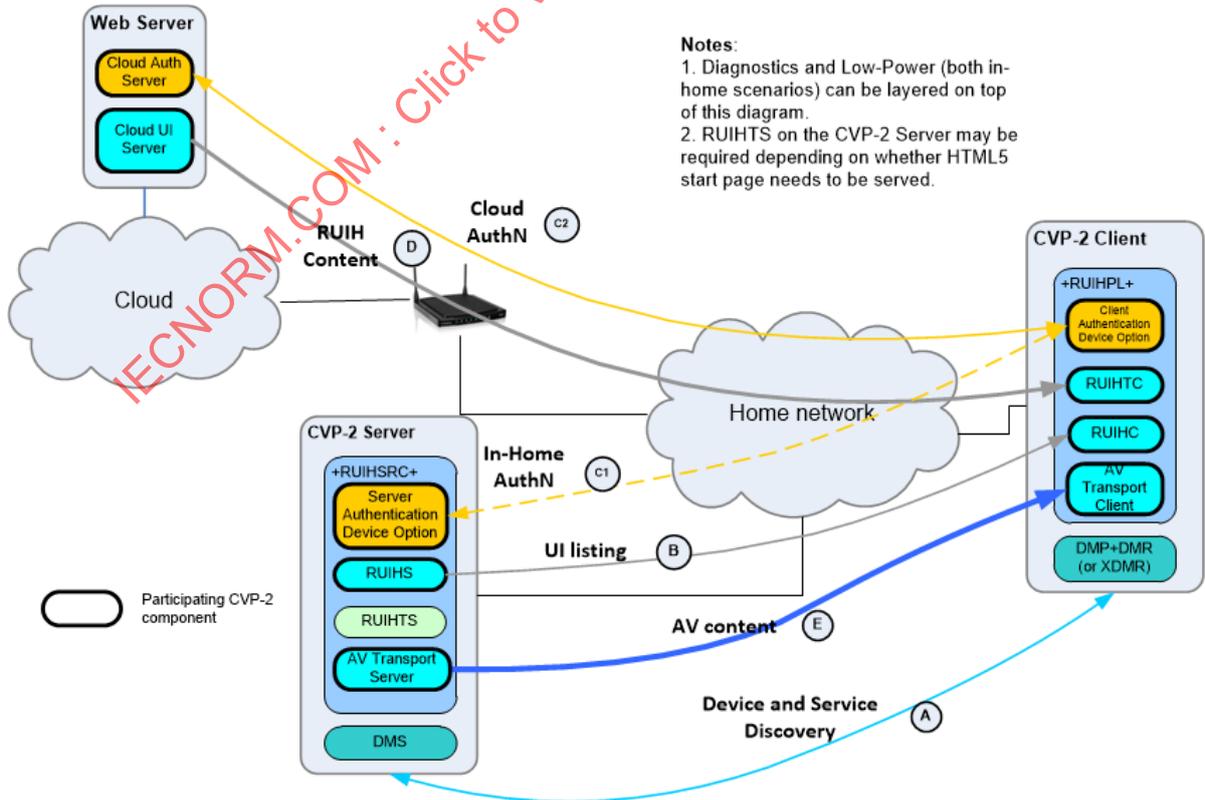
A.4 CVP-2 in-home + cloud deployment scenario

Figure A.3 – CVP-2 in-home + cloud system scenario

Annex B
(informative)

CVP-2 authentication examples

This annex includes the following examples for implementing authentication:

1) CVP-2 usage scenario without in-home CVP-2 Server Authentication shown in Figure B.1;

2) TLS-SD exchange for CVP-2 usage scenario without in-home CVP-2 Server Authentication shown in Figure B.2;

3) CVP-2 usage scenario with in-home CVP-2 Server Authentication shown in Figure B.3;

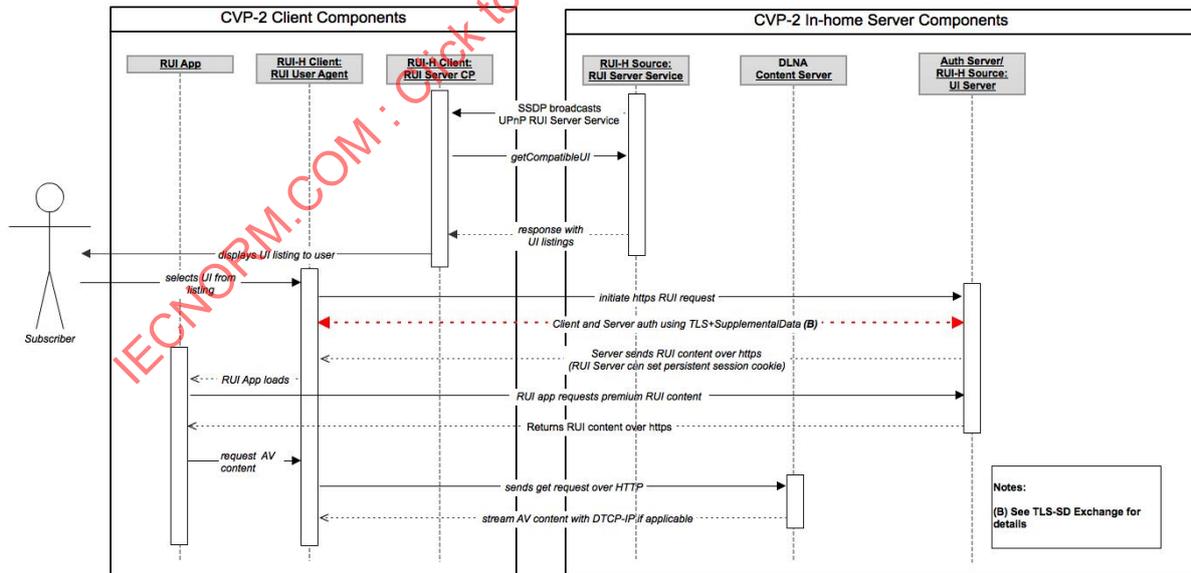4) TLS-SD exchange for CVP-2 usage scenario with in-home CVP-2 Server Authentication shown in Figure B.4.
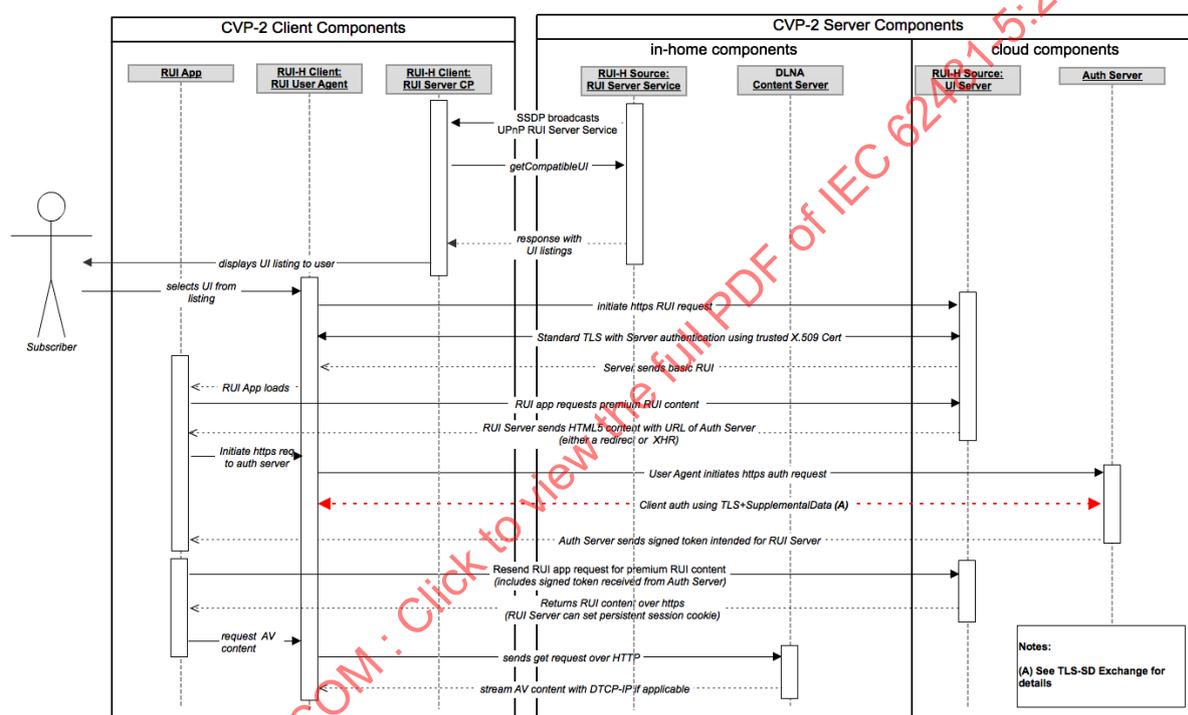
Figure B.1 – CVP-2 usage scenario (no in-home CVP-2 Server Authentication)

TLS-SD DH for authentication of client using DTCP Credential and server using trusted X.509 Cert
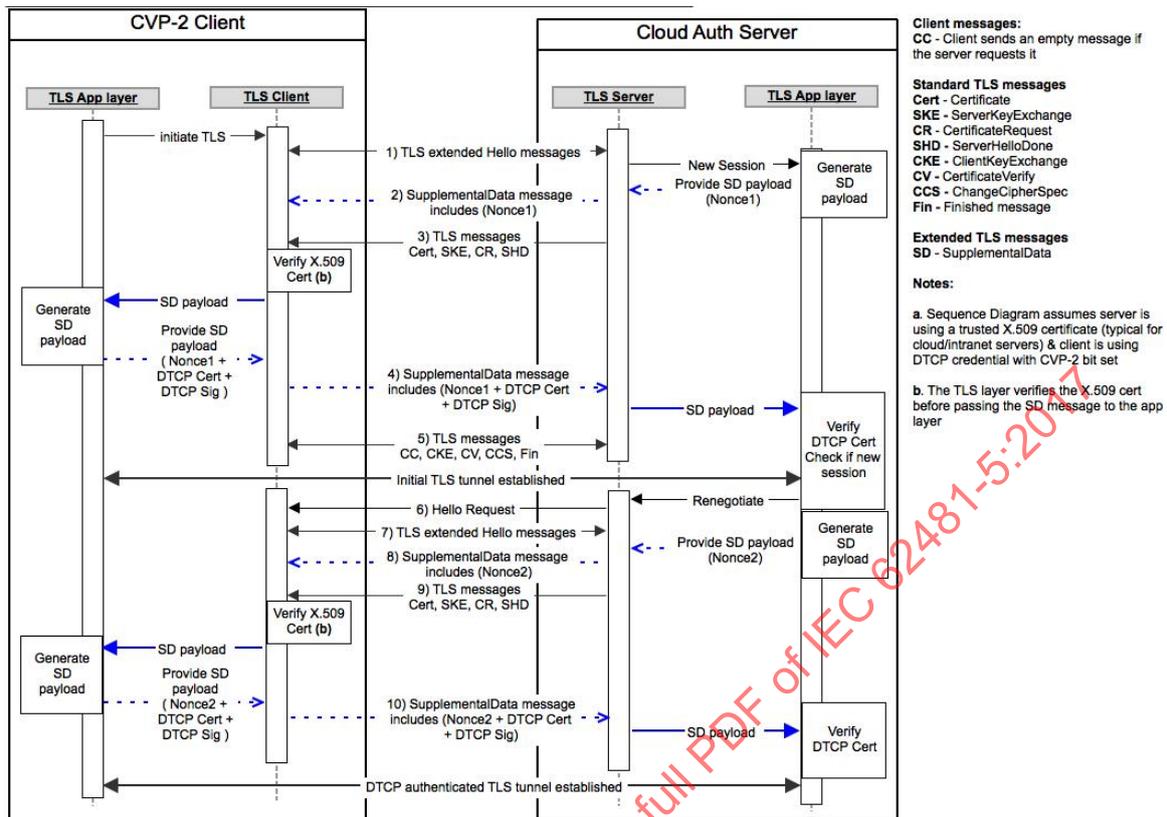
Figure B.2 – TLS-SD exchange (no in-home CVP-2 Server Authentication)

Figure B.3 – CVP-2 usage scenario (in-home CVP-2 Server Authentication)

TLS-SD DH for authentication of client using DTCP CVP-2 Credential and server using DTCP CVP-2 Credentials + self-signed X.509 Cert
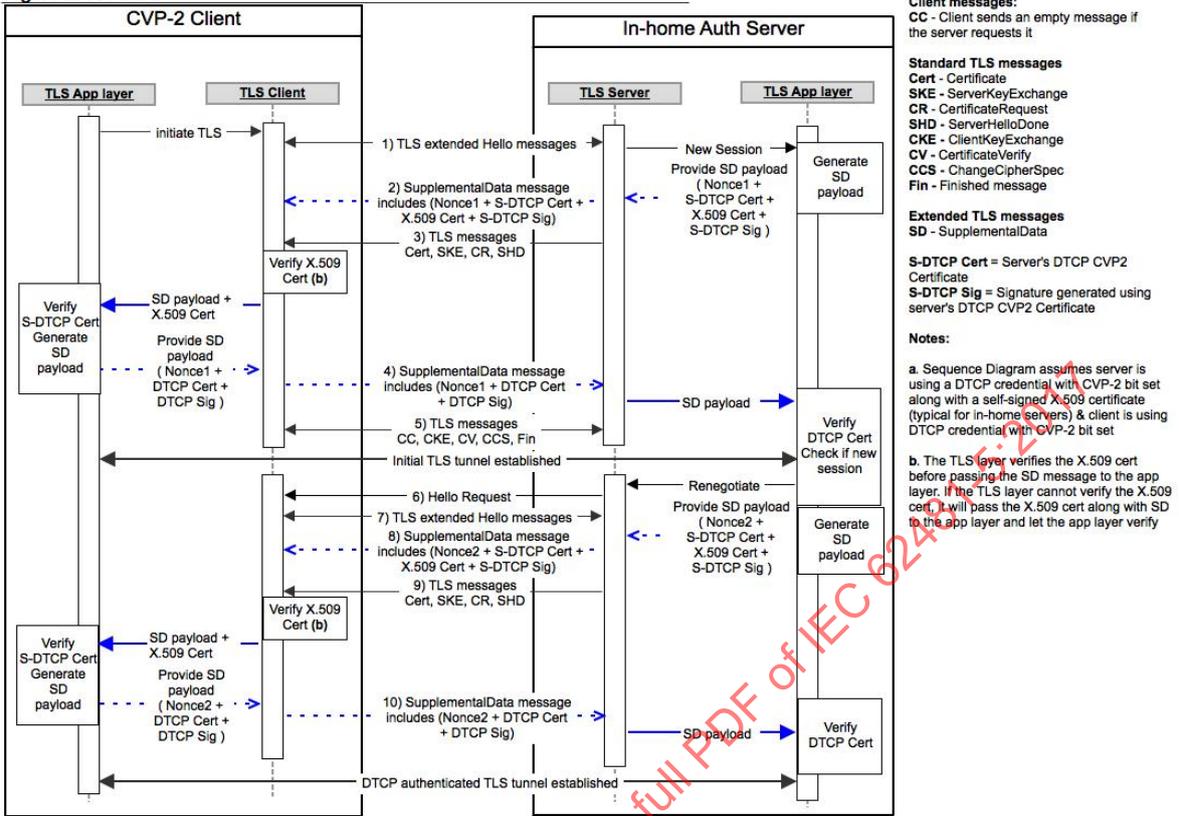

Figure B.4 – TLS-SD exchange (in-home CVP-2 Server Authentication)