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SERIES T: TERMINALS FOR TELEMATIC SERVICES

Conformance testing requirements for Recommendations of the T.170-series

ITU-T T-series Recommendations – Supplement 1

Supplement 1 to ITU-T T-series Recommendations

Conformance testing requirements for Recommendations of the T.170-series

Summary

The primary purpose of conformance testing is to increase the probability that different implementations are able to interwork. This supplement provides guidelines on the conformance testing for Recommendations of the T.170-series using DAVIC specifications, as the conformance testing information contained in the DAVIC specifications is not sufficient in all cases. This supplement relies on the testing architecture and terminology based on ISO/IEC 9646 conformance testing. Besides conformance testing, which cannot guarantee interworking, interoperability testing is necessary where a product's capability of working with others to achieve a common task is checked. Interoperability testing is outside the scope of this supplement.

FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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CONTENTS

Supplement 1 to ITU-T T-series Recommendations

Conformance testing requirements for Recommendations
of the T.170-series

1   Scope

This supplement provides guidelines on the conformance testing of DAVIC specifications. The information on conformance testing contained in the DAVIC specification is not sufficient in all cases. This supplement will complement this information. This supplement will summarize and provide additional information on conformance requirements of separate standards referred to in the DAVIC specifications and will provide additional information on how to test the conformance requirements by proposing the means of testing and test cases.

This supplement relies on the testing architecture and terminology based on ISO/IEC 9646 conformance testing. The primary purpose of conformance testing is to increase the probability that different implementations are able to interwork. Besides conformance testing, which cannot guarantee interworking, interoperability testing is necessary where a product's capability of working with others to achieve a common task is checked. Interoperability testing is outside the scope of this supplement.

The DAVIC 1.0 specifications define reference points at various levels. For the purpose of this supplement, the P1 Partition level DAVIC System Reference Model is most appropriate. For this supplement, only the reference points A9 and A1 are taken into account as they are already specified within DAVIC 1.0 and are also implemented in DAM. This implies that the conformance testing in this supplement will be applied to the Server and the STU respectively.

The following protocols and transfer syntax's are relevant for the reference points A1 and A9:

*   ISO/IEC MHEG-5;

*   ISO/IEC DSM-CC;

*   OMG IIOP;

*   ATM protocols;

*   ISO/IEC MPEG-2 TS;

*   standards for physical layers.

This supplement does not specify conformance requirements and test cases in detail for lower layer protocols like TCP/IP, ATM signalling, MPEG-2 TS, etc. as these requirements are already specified in the relevant standards, products have already been tested and interworking has already been demonstrated.

2   References

–   ITU-T Recommendation H.262 (2000) | ISO/IEC 13818-2:2000, *Information technology – Generic coding of moving pictures and associated audio information: Video*.

–   ITU-T Recommendation I.430 (1995), *Basic user-network interface – Layer 1 specification*.

–   ITU-T Recommendation T.172 (1998), *MHEG-5 – Support for base-level interactive applications*.

        ISO/IEC 13522-5:1997, *Information technology – Coding of multimedia and hypermedia information – Part 5: Support for base-level interactive applications*.

–   ITU-T Recommendation T.176 (1998), *Application programming interface (API) for digital storage media command and control (DSM-CC).*

–   ITU-T Recommendation X.290 (1995), *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – General concepts.*

ISO/IEC 9646-1:1994, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 1: General concepts.*

–   ITU-T Recommendation X.291 (1995), *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – Abstract test suite specification.*

ISO/IEC 9646-2:1994, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 2: Abstract Test Suite specification.*

–   ITU-T Recommendation X.292 (2002), *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – The Tree and Tabular Combined Notation (TTCN).*

ISO/IEC 9646-3:1998, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 3: The Tree and Tabular Combined Notation (TTCN).*

–   ITU-T Recommendation X.293 (1995), *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – Test realization.*

ISO/IEC 9646-4:1994, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 4: Test realization.*

–   ITU-T Recommendation X.294 (1995), *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – Requirements on test laboratories and clients for the conformance assessment process.*

ISO/IEC 9646-5:1994, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 5: Requirements on test laboratories and clients for the conformance assessment process.*

–   ITU-T Recommendation X.295 (1995), *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – Protocol profile test specification.*

ISO/IEC 9646-6:1994, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 6: Protocol profile test specification.*

–   ITU-T Recommendation X.296 (1995), *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – Implementation conformance statements.*

ISO/IEC 9646-7:1995, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 7: Implementation Conformance Statements.*

–   ITU-T Recommendation X.724 (1996) | ISO/IEC 10165-6:1997, *Information technology – Open Systems Interconnection – Structure of management information: Requirements and guidelines for implementation conformance statement proformas associated with OSI management.*

– ISO/IEC 11172-2:1993, *Information technology – Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s – Part 2: Video.*

– ISO/IEC 13818-6:1998, *Information technology – Generic coding of moving pictures and associated audio information – Part 6: Extensions for DSM-CC.*

– DAVIC 1.0, Part 12: *Dynamics, reference points, and interfaces.*

– DAVIC 1.0, Part 3: *Service Provider System architecture and interfaces.*

– DAVIC 1.0, Part 4: *Delivery system architecture and interfaces.*

– DAVIC 1.0, Part 5: *Service Consumer System architecture and interfaces.*

– DAVIC 1.0, Part 7: *High-layer and Mid-layer protocols.*

– DAVIC 1.0, Part 8: *Lower-layer protocols and physical interfaces.*

– DAVIC 1.0, Part 9: *Information representation.*

– ETSI ETR 211 ed.2 (1997), *Digital Video Broadcasting (DVB); Guidelines on implementation and usage of Service Information (SI).*

– ETSI EN 300 429 V1.2.1 (1998), *Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for cable systems.*

– ETSI ETR 328 ed.1 (1996), *Transmission and Multiplexing (TM); Asymmetric Digital Subscriber Line (ADSL); Requirements and performance.*

– ANSI T1.413-1998, *Network to customer installation interfaces – Asymmetric Digital Subscriber Line (ADSL) Metallic Interface.*

– ETSI EN 300 421 V1.1.2 (1997), *Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for 11/12 GHz satellite services.*

– OMG CORBA 2.0 (1995), *The Common Object Request Broker: Architecture and Specification.*

3   Abbreviations and acronyms

This supplement uses the following abbreviations:

ADSL   Asymmetric Digital Subscriber Line

ATM   Asynchronous Transfer Mode

ATS   Abstract Test Suite

BER   Basic Encoding Rules

CLUT   Colour Lookup Table

DAM   DAVIC Accompanying Measures

DSM-CC   Digital Storage Media – Command and Control

DVB   Digital Video Broadcasting

ESC   End-Service Consumer

ESP   End-Service Provider

GIOP   Generic Inter-ORB Protocol

HTML   Hypertext Markup Language

ICMP   Internet Control Message Protocol

ICS	Implementation Conformance Statement
IDL	Interface Definition Language
IOP	Inter-ORB Protocol
ISDN	Integrated Services Digital Network
IUT	Implementation Under Test
IXIT	Implementation Extra Information For Testing
LT	Lower Tester
MIB	Management Information Base
MOT	Means of Testing
MPEG	Moving Picture Experts Group
MTU	Maximum Transfer Unit
NRC	Network Related Control
NTSC	National Television System Committee (TV standard)
OMG	Object Management Group
ORB	Object Request Broker
PCO	Point of Control and Observation
PHY	PHYsical layer
PICS	Protocol Implementation Conformance Statement
PMD	Physical Medium Dependent
PSTN	Public Switched Telephone Network
QoS	Quality of Service
RL	Requirements List
RPC	Remote Procedure Call
SDH	Synchronous Digital Hierarchy
SI	Service Information
SM	Session Manager
SNMP	Simple Network Management Protocol
SRC	Service Related Control
SRM	Session and Resource Manager
STU	Set Top Unit
SUT	System Under Test
TBA	To Be Added
TS	Transport Stream
TV	Television
U-N	User-to-Network
UNO	Universal Networked Object
UT	Upper Tester

U-U   User-to-User

VoD   Video on Demand

4   Testing methodologies

ITU-T Recs X.29x series | ISO/IEC 9646 is a multi-part Standard that specifies a general methodology for testing the conformance of products to OSI specifications, when such products are claimed to implement those specifications.

Testing refers to the process of examining a product, a process or a service in accordance with a specified method in order to establish one or more characteristics. There are different types of testing. To ensure that standards are implemented, the most important type of testing is conformance testing where a products conformance with standards is checked.

Conformance testing applies to testing conformance to the specification of OSI protocols (e.g., DSM-CC), OSI protocol profiles and the specification of a transfer syntax (e.g., ASN.1) used in combination with a specific OSI protocol. For some specifications (e.g., MHEG-5), it is necessary to have a testing methodology that can verify implementation support at the semantic as well as the data stream or syntax level. Implementation conformance testing is based on the concept of measuring an implementation's ability to generate and/or receive a representative set of test cases.

ISO/IEC 9646 is applicable to the different phases of the conformance testing process, which are mainly:

- the specification of an Abstract Test Suite (ATS) for particular OSI protocols and profiles of these protocols;
- realization of a Means of Testing (MOT);
- the conformance assessment process on the basis of an Implementation Conformance Statement (ICS) resulting in the production of a System Conformance Test Report (SCTR) and one or more Protocol Conformance Test Reports (PCTR).

This supplement does not specify a complete abstract test suite for conformance testing of STU, SRM and server, which would exceed the available resources. However, a set of test procedures will be produced on the basis of the DAVIC specifications.

This supplement will give guidance on the means of testing and provide the necessary Implementation Conformance Statement (ICS) and Requirements Lists (RLs), if not already defined by the relevant base standard or profile. The notation used is described in Annex A. ETS DE/TE-01057-2 has been used as a starting point for this supplement.

5   Conformance testing of set-top box

A DAVIC 1.0 conformant set-top box is described by the following SCS proforma. This proforma makes references to other PICS, information objects ICS and RL of this supplement. Due to the high number of referenced specifications and standards, this supplement deviates from ITU-T Rec. X.296 | ISO/IEC 9646-7 in that it does not specify a single RL and neither does it profile specific ICS. Instead, it specifies an RL and profiles specific ICSs for each base specification or standard, where necessary.

Table 1 – Protocol identification table

Protocols name	Specification/ Standard reference	PICS/RL reference	Supplement reference
DSM-CC User-User	ISO/IEC 13818-6, clause 5	DSM-CC U-U PICS and RL	Tables 13, 14 and 15
DSM-CC User-Network	ISO/IEC 13818-6, clauses 3 and 4	DSM-CC U-N PICS and RL	Tables 16, 17, 18 and 19
Network access protocols (Note)	(see Table 20)		Table 20
NOTE – All relevant protocols are listed in the referenced table.			

Table 2 – Information object identification

Information object name	Specification/ Standard reference	PICS/RL/profile specific ICS reference	Supplement reference
MHEG-5	ISO/IEC 13522-5	MHEG-5 PICS and RL, profile specific ICS of MHEG-5	Tables 3, 4 and 5
Characters	ISO/IEC 8859-1	Subset of ISO/IEC 8859-1 as defined in HTML 2.0	Table 7
Text	HTML 2.0	HTML2 information object ICS	Table 8
Language information	ISO 639, part 2		
Service information	ETS 300 468	profile specific ICS of service information	Table 9
Compressed audio	ISO/IEC 11172-3 (MPEG-1 Audio)	MPEG-1 compressed audio Information object ICS and RL	Table 10
Linear audio	AIFF-C		Clause 5.2.5
Compressed Video	ISO/IEC 13818-2 (MPEG-2 Video)	MPEG-2 information object ICS and RL	Table 11
Still Picture	ISO/IEC 13818-1 (MPEG-2 Systems with MPEG-2 Video Intra frame)		
Graphics	DAVIC 1.0, part 9	Graphics information Object ICS	Table 12

5.1   Testing of MHEG-5

5.1.1   Definition of information object ICS proforma and RL

The editions of the base standards referenced by this supplement (ISO/IEC 13522-5, ISO/IEC 13818-6) do not presently contain information object ICS proformas. Therefore, the RLs contained within this supplement have been derived by making assumptions about the content of the relevant information object ICS proformas, as if they already existed. Such assumptions have been made by inspection of the text of the referenced base standards.

The following Requirement Lists for an MHEG-5 implementation aim at supporting DAVIC 1.0 applications domains, which have been derived from the MHEG-5 base standard (ISO/IEC 13522-5) and from the DAVIC 1.0 specifications.

The Profile RL should specify only the restrictions (e.g., an optional parameter for the base standard becomes mandatory for the profile) or the changes of status that the profile static capabilities have with respect to the base standard.

However, for the sake of completeness, and also because no ICS exists for the base standard, all the MHEG-5 Object classes are shown. The differences will be highlighted with shaded rows.

**Table 3 – Major capabilities of an MHEG-5 implementation
for DAVIC 1.0 application domains**

MHEG-5 information object ICS					DAVIC 1.0 profile RL	
Item number	Item description	Conditions for status	Status	ISO/IEC 13522-5 reference	DAVIC 1.0 reference	Status
Mc 1	MHEG-5 object classes and hierarchy		m	2	Part 05 clause 8	m
Mc 2	Attributes		m	2	Part 05 clause 8	m
Mc 3	Events		m	2	Part 05 clause 8	m
Mc 4	Internal behaviours		m	2	Part 05 clause 8	m
Mc 5	MHEG-5 actions		m	2	Part 05 clause 8	m
Mc 6	ASN.1/BER octet representation of MHEG-5 objects		m	1.4.1	Part 05 clause 8	m
Mc 7	RTE main mechanisms		m	3	Part 05 clause 8	m

All the major capabilities are mandatory both for the base standard and for DAVIC; the exceptions are shown in Table 4, which details the capabilities.

Table 4 – Subsidiary capabilities for MHEG-5

MHEG-5 information object ICS					DAVIC 1.0 profile RL	
Item number	Item description	Conditions for status	Status	ISO/IEC 13522-5 reference	DAVIC 1.0 reference	Status
	MHEG-5 object classes					
Sc 1	Root class		m	2.2	Part 05 clause 8	m
Sc 2	Group class		m	2.3	Part 05 clause 8	m
Sc 3	Application class		m	2.4	Part 05 clause 8	m
Sc 4	Scene class		m	2.5	Part 05 clause 8	m
Sc 5	Ingredient class		m	2.6	Part 05 clause 8	m
Sc 6	Link class		m	2.7	Part 05 clause 8	m
Sc 7	Procedure class		m	2.8	Part 05 clause 8	m
Sc 8	Palette class		m	2.9	Part 09 clause 6.9	x
Sc 9	Font class		m	2.10	Part 09 clause 6.1	x
Sc 10	CursorShape class		m	2.11	Part 05 clause 8	o
Sc 11	Variable class		m	2.12	Part 05 clause 8	m
Sc 12	Presentable class		m	2.13	Part 05 clause 8	m
Sc 13	TokenManager class		m	2.14	Part 05 clause 8	m
Sc 14	TokenGroup class		m	2.15	Part 05 clause 8	m
Sc 15	TemplateGroup class		m	2.16	Part 05 clause 8	m
Sc 16	List class		m	2.17	Part 05 clause 8	m
Sc 17	Visible class		m	2.18	Part 05 clause 8	m
Sc 18	Bitmap class		m	2.19	Part 05 clause 8	m

Table 4 – Subsidiary capabilities for MHEG-5

	MHEG-5 information object ICS				DAVIC 1.0 profile RL	
Item number	Item description	Conditions for status	Status	ISO/IEC 13522-5 reference	DAVIC 1.0 reference	Status
Sc 19	LineArt class		m	2.20	Part 05 clause 8	m
Sc 20	Rectangle class		m	2.21	Part 05 clause 8	m
Sc 21	Text class		m	2.22	Part 05 clause 8	m
Sc 22	Stream class		m	2.23	Part 05 clause 8	m
Sc 23	Audio class		m	2.24	Part 05 clause 8	m
Sc 24	Video class		m	2.25	Part 05 clause 8	m
Sc 25	RTGraphics class		m	2.26	Part 05 clause 8	m
Sc 26	Interactible class		m	2.27	Part 05 clause 8	m
Sc 27	Slider class		m	2.28	Part 05 clause 8	m
Sc 28	EntryField class		m	2.29	Part 05 clause 8	m
Sc 29	HyperText class		m	2.30	Part 05 clause 8	m
Sc 30	Button class		m	2.31	Part 05 clause 8	m
Sc 31	Hotspot class		m	2.32	Part 05 clause 8	m
Sc 32	PushButton class		m	2.33	Part 05 clause 8	m
Sc 33	SwitchButton class		m	2.34	Part 05 clause 8	m
Sc 34	Action class		m	2.35	Part 05 clause 8	m
	Attributes					
Sc 35	MovingCursor external attribute of the Scene class		o	2.5.1.2	Part 05 clause 8	o
	Events					
Sc 36	CursorEnter event of the Interactible class	c1: IF Moving Cursor is implemented THEN m ELSE n/a	c1	2.27.2	Part 05 clause 8	c1
Sc 37	CursorLeave event of the Interactible class		c1	2.27.2	Part 05 clause 8	c1
	Internal behaviours					
	MHEG-5 actions					
Sc 38	StorePersistent action of the Application class		o	2.4.4	Part 05 clause 8	o
Sc 39	ReadPersistent action of the Application class		o	2.4.4	Part 05 clause 8	o
Sc 40	Spawn action of the Application class		o	2.4.4	Part 05 clause 8	o
Sc 41	Open Connection action of the Application class		o	2.4.4	Part 05 clause 8	o
Sc 42	Close Connection action of the Application class		o	2.4.4	Part 05 clause 8	o
Sc 43	ScaleBitmap action of the Bitmap class		o	2.19.4	Part 05 clause 8	o

Table 4 – Subsidiary capabilities for MHEG-5

	MHEG-5 information object ICS				DAVIC 1.0 profile RL	
Item number	Item description	Conditions for status	Status	ISO/IEC 13522-5 reference	DAVIC 1.0 reference	Status
Sc 44	SetSpeed action of the Stream class in broadcast environments	c2: IF broadcast environment THEN o ELSE m ?	o	2.23.4	Part 05 clause 8	c2
Sc 45	ScaleVideo action of the Video class		o	2.25.4	Part 05 clause 8	o
	RTE main mechanisms					
Sc 46	Caching of MHEG-5 objects or related content data		o	2.2.1.2	Part 05 clause 8	o
Sc 47	Referencing MHEG-5 objects		m	3.1	Part 05 clause 8	m
Sc 48	Attaching to Namespaces		m	3.2	Part 05 clause 8	m
Sc 49	Remote Procedure Calls (through Procedure objects)		m	3.2	Part 05 clause 8	m
Sc 50	Handling events		m	3.3	Part 05 clause 8	m
Sc 51	Rendering Visibles		m	3.4	Part 05 clause 8	m

As can be seen from Table 4, most of the required capabilities are transferred unaltered from the base MHEG-5 standard to the DAVIC 1.0 profile.

The DAVIC 1.0 profile does not support the Palette and Font classes (Sc8 and Sc9) and does not need to implement the CursorShape class (Sc10). These are mandatory capabilities in the base standard.

It is to be noted that this is contrary to the rules for Profile RLs defined in ITU-T Rec. X.296 | ISO/IEC 9646-7, for which, if a capability is mandatory in the base standard, it remains mandatory in the profile. In this sense, DAVIC MHEG-5 is not in itself a conformant profile.

Capabilities Sc38,39,40,46 (StorePersistent, ReadPersistent, Spawn action, Caching) are defined optional by MHEG-5 and DAVIC does not explicitly mention them, therefore they remain optional.

Capabilities Sc35,43,45 (MovingCursor, Scale Bitmap, Scale Video) are defined optional by both MHEG-5 and DAVIC.

Capabilities Sc36,37 (CursorEnter, CursorLeave) are mandatory in MHEG-5 and DAVIC if, and only if, the RTE implements the Free Moving Cursor.

Capability Sc44 (SetSpeed action) is declared optional by MHEG-5 in a general sense and by DAVIC for broadcast environments; it is not clear for the other environments.

5.1.2   Profile specific ICS proforma

This is the profile specific Implementation Conformance Statement (ICS) proforma for an MHEG-5 implementation aimed at supporting DAVIC 1.0 application domains.

The profile specific ICS proforma defines extra requirements on some parameters or capabilities, which are not included in the base standard.

In this case, the main extra requirements are related to the MHEG-5 instances specification (items 1 to 7), which the MHEG-5 standard does not define and leaves to the application domain.

Items 8 to 12 are relevant to optional capabilities and are not explicitly defined in the base standard.

It should be specified by the implementor if the capability implemented is conformant or not to the DAVIC 1.0 specific profile.

Table 5 – Profile specific ICS proforma of MHEG-5

	DAVIC 1.0 profile specific ICS proforma for MHEG-5						
Item number	**Item description**	**Conditions for status**	**Status**	**DAVIC 1.0 reference**	**Support**		
					N/A	**Yes**	**No**
1	User input events specification		m	Part 05 clause 9.1	[ ]	[ ]	[ ]
2	Connection management parameters specification		m	Part 05 clause 9.2	[ ]	[ ]	[ ]
3	Remote Procedure Call specification		m	Part 05 clause 9.3	[ ]	[ ]	[ ]
4	Persistent Storage Namespace specification		m	Part 05 clause 9.4	[ ]	[ ]	[ ]
5	Content Data encoding specification		m	Part 09 clause 7	[ ]	[ ]	[ ]
6	Stream Events and Normal Play Time mapping specification (DSM-CC U-U to MHEG-5 mapping)		m	Part 05 clause 10.1	[ ]	[ ]	[ ]
7	Namespace mapping specification (DSM-CC U-U to MHEG-5 mapping)		m	Part 05 clause 10.2	[ ]	[ ]	[ ]
8	Rendering more than one Video Object at the same time		o	Part 05 clause 8	[ ]	[ ]	[ ]
9	Rendering more than MPEG-1 and one AIFF encoded Audio objects at the same time		o	Part 05 clause 8	[ ]	[ ]	[ ]
10	Mapping of the SceneCoordinateSystem and SceneAspectRatio attributes of the Scene Class to the dimensions of the physical display screen		o	Part 05 clause 8	[ ]	[ ]	[ ]
11	Values other than 720x576, 704x576, 640x576, 544x576, 480x576, 352x576, 352x288, 720x480, 704x480, 640x480, 544x480, 480x480, 352x480 and 352x240 for the SceneCoordinateSystem external attribute of the Scene Class		o	Part 05 clause 8	[ ]	[ ]	[ ]
12	Values other than 4/3 and 16/9 for the AspectRatio external attribute of the Scene Class		o	Part 05 clause 8	[ ]	[ ]	[ ]

For the detailed user events, parameters, content data type, etc. allowed by DAVIC for each of the items mentioned, it is better to refer to DAVIC 1.0 part 05 clause 9 and part 9 clause 7 directly.

Answer "Yes" means item (fully) implemented.

Answer "No" means that one or more of the values/parameters/capabilities included in the item is not implemented.

Answer "N/A" means no-Yes-or-Noanswer-required, because the item has a not-applicable (n/a) or out-of-scope (i) status.

5.1.3 Guidance on test method

For testing of MHEG-5, only the distributed test method of ITU-T Recs X.29x series | ISO/IEC 9646 is applicable. The upper interface of the MHEG-5 implementation is a human user. The MHEG-5 implementation has to prove that it is capable of processing the final-form

interchange syntax for MHEG-5 objects and presenting correctly all effects of MHEG-5 actions and the internal behaviours of MHEG-5 classes (data stream and syntax testing).

Although verifying test results for this test method cannot be done automatically and is not as accurate as protocol testing, it is the only method that provides confidence that the implementation is conformant to the specifications.
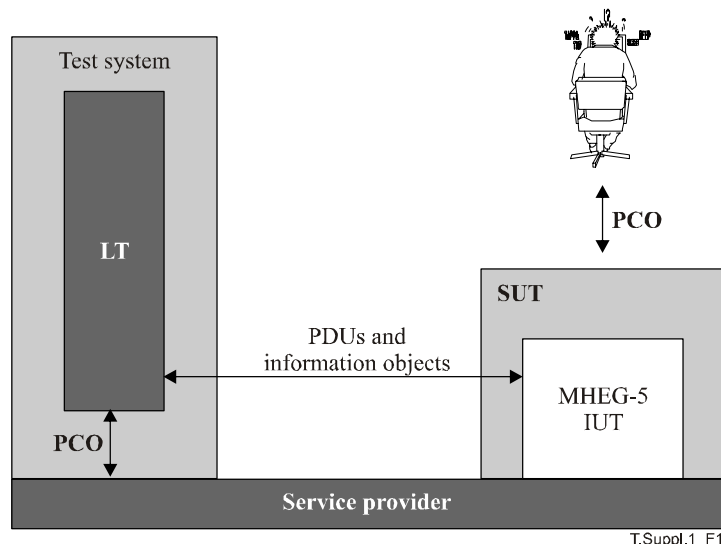
Figure 1 – Test method for MHEG-5

5.1.3.1 Data stream conformance testing

The data stream conformance is determined by verifying that the data stream syntax conforms to the ASN.1 (Abstract Syntax Notation One, ITU-T Recs X.68x series | ISO/IEC 8824) rules, and that the data stream is encoded according to the BER (Basic Encoding Rules, ITU-T Recs X.69x series | ISO/IEC 8825) rules.

5.1.3.2 Behavioural conformance testing

This clause does not describe a complete abstract test suite (ATS) for MHEG-5 DAVIC 1.0 profile. It describes only some possible examples of behavioural test cases on a higher level, not specifying all parameters, precondition and postconditions necessary for a complete test case. The aim is to give guidance on how to specify a complete abstract test case.

The test cases are built on the requirements of the relevant ICS proforma and RL. The contents of a test case follows the structure of abstract test cases as described in ITU-T Recs X.29x series | ISO/IEC 9646.

A test application consisting of a collection of MHEG-5 objects is supposed to be provided in the form of a conformant data stream to the Engine Implementation to be tested.

A sequence of possible user input events (Control inputs from the PCO) is indicated.

A suitable test scenario can be imagined for VoD applications, in which the user accesses a first scene, browses through a number of films (represented by text, or still pictures), selects one and plays it, adjusting different parameters to his preference.

The behaviour of the implementation should allow a user at the PCO to observe directly or indirectly the full range of static and dynamic capabilities implied by the DAVIC profile.

5.1.4 Definition of a set of test cases

A limited set of test cases will be specified (not a complete ATS). The test cases will be built on the requirements of the relevant ICS proforma and RL. The contents of a test case follows the structure of abstract test cases as described in ITU-T Recs X.29x series | ISO/IEC 9646.

5.1.4.1 MHEG-5 engine activation

Test purpose:

> Launching of the application and presentation of the first scene.

Test objects:

> Application object
>
> First scene object
>
> Objects contained in the first scene (e.g., BitMap Objects, PushButtons Objects for selection, ...)

External test events sequence:

> The user selects the MHEG-5 application and launches it.

Preconditions:

> MHEG-5 engine idle.
>
> *AvailabilityStatus* internal attribute of application object = False.
>
> *RunningStatus* internal attribute of application object = False.
>
> *AvailabilityStatus* internal attribute of first scene object = False.

Postconditions:

> MHEG-5 engine active.
>
> Application and First Scene Objects Activated (*RunningStatus* internal Attributes set to True).

Conformant test result at PCO:

> The first scene of the application is presented to the user.

5.1.4.2 User interaction with film playing

Test purpose:

> Evaluate the behaviour of the engine under user interaction.

Test objects:

> Film scene object including:
>
> - Stream object representing a film, with *InitiallyActive* attribute set to True for all stream components (Video, Audio, RTGraphics);
> - Button objects for stream control (Play, Pause, Stop);
> - optional slider object for volume control;
> - optional text objects for titles.

External test events sequence:

1) occurrence of UserInput event "Select" (*UserInputEventTag*=15 of *InputEventRegister* # 1 exchanged attribute of the film scene object) on the "Pause" SwitchButton (it triggers the *IsSelected* event).

2) occurrence of UserInput event "Select" (*UserInputEventTag*=15 of *InputEventRegister* # 1 exchanged attribute of the film scene object) on the "Pause" SwitchButton (it triggers the *IsDeselected* event).

3) occurrence of UserInput event "Select" (*UserInputEventTag*=15 of *InputEventRegister* # 1 exchanged attribute of the film scene object) on the "Stop" PushButton (it triggers the *IsSelected* event).

4) ......

Preconditions:

• Film scene selected.

Postconditions:

• Film scene activated.

Conformant test results at PCO:

• Before step 1 the film scene is activated (presented to the user) and the film starts playing (Video, Audio, RTGraphics running).

• After step 1 the film is paused.

• After step 2 the film resumes playing.

• After step 3 the film is stopped.

• After step 4 ....

5.1.4.3 *ContentHook* attribute of content data

(This example tests one of the parameters defined in the profile specific proforma.)

Test purpose:

Evaluate if the engine is able to correctly handle the *ContentHook* attributes defined in DAVIC 1.0. part 9 clause 7.

Test objects:

Scene object including:

• Stream object 1 including Video, Audio and RTGraphics objects of the types defined in DAVIC 1.0 part 9 clause 7, with *ContentHook* attributes set correctly.

• Bitmaps 1 and text objects 1 of the types defined in DAVIC 1.0 part 9 clause 7, with *ContentHook* attributes set correctly.

• Stream object 2 including Video, Audio and RTGraphics objects of the types defined in DAVIC 1.0 part 9 clause 7, with *ContentHook* attributes set incorrectly.

• Bitmaps 2 and text objects 2 of the types defined in DAVIC 1.0 part 9 clause 7, with *ContentHook* attributes set incorrectly.

• PushButton objects representing the content (Stream, Bitmap,Text) to be presented.

• Button objects for stream control (Play, Pause, Stop).

External test events sequence:

1) The user selects the stream object 1.

2) The user selects the bitmaps and text objects 1.

3) The user quits the previous selections.

4) The user selects the stream object 2.

5) The user selects the bitmaps and text objects 2.

Preconditions:

- Scene selected.

Postconditions:

- None.

Conformant test results at PCO:

- Before step 1 the scene is activated and the buttons representing the content objects are presented.
- After step 1 the stream is activated and the stream components are presented.
- After step 2 the bitmaps and the text objects are presented.
- After step 4 the stream object is activated, but no stream component (Video, Audio, RTGraphics) is recognized by the engine and presented.
- After step 5 the bitmaps and text objects are activated, but no content is recognized by the engine and presented.

5.2 Testing of data syntaxes

DAVIC 1.0 allows different monomedia components. Table 6 indicates which coding formats are supported by an STU.

Table 6 – ICS table for data syntaxes supported in DAVIC 1.0

DAVIC 1.0 features					
Item	Does the implementation support	Reference	Conditions for status	Status	Support
MC 1	Characters	Subset of ISO/IEC 8859-1 as defined in HTML 2.0		m	
MC 2	Text	HTML 2.0		m	
MC 3	Language information	ISO 639, part 2		m	
MC 4	Service information	ETS 300 468		m	
MC 5	Compressed audio	ISO/IEC 11172-3 (MPEG-1 Audio)		m	
MC 6	Linear audio	AIFF-C		m	
MC 7	Compressed Video	ISO/IEC 13818-2 (MPEG-2 Video)		m	
MC 8	Still Picture	ISO/IEC 13818-1 (MPEG-2 Systems with MPEG-2 Video Intra frame)		m	
MC 9	Graphics	DAVIC 1.0, part 9		m	

NOTE – DAVIC 1.0 does not define which monomedia components (except characters) must be supported by a DAVIC compliant STU.

5.2.1 Profile specific ICS of character information

Table 7 – Profile specific ICS table for character information

DAVIC 1.0 profile specific ICS proforma for text information							
Item number	Item description	Conditions for status	Status	DAVIC 1.0 reference	Support		
					N/A	Yes	No
1	Display of 40 of ISO/IEC 8859-1 characters per line in a monospace format and at least 24 lines per screen		m	Part 09 clause 6.1	[ ]	[ ]	[ ]

5.2.2 Information objects ICS and RL for text information

The following ICS proforma only contains those items of HTML 2 that are relevant for DAVIC 1.0. All those PICS proforma items that are not relevant to DAVIC 1.0 are not mentioned.

Table 8 – Information object ICS and RL for text information

	HTML 2 information object ICS				DAVIC 1.0 profile RL		
Item number	Item description	Conditions for status	Status	RFC 1866 reference	DAVIC 1.0 reference	Status	Attribute allow
El	Text encoded as full <HTML> document		m	5.1	Part 09 clause 6.2	o.1	
E2	Text encoded as stand-alone <BODY> element		o	5.3	Part 09 clause 6.2	o.1	
E3	Title of document <TITLE>	if E1 if not E1	m n/a	5.2.1	Part 09 clause 6.2	m	
E4	Manual paragraph break <P>		m	5.5.1	Part 09 clause 6.2	m	
E5	Emphasis <EM>		m	5.7.1.3	Part 09 clause 6.2	m	
E6	Strong emphasis <STRONG>		m	5.7.1.6	Part 09 clause 6.2	m	
E7	Bold <B>		m	5.7.2.1	Part 09 clause 6.2	m	
E8	Anchor <A>		m	5.7.3	Part 09 clause 6.2	m	HREF
E9	Line break 		m	5.8	Part 09 clause 6.2	m	
E10	Document character set and encoding schema		m	ISO/IEC 8859-1	Part 09 clause 6.2	m	
o.1 Support of at least one of these options is required.							

5.2.3 Profile specific ICS of service information

Table 9 – Profile specific ICS table of service information

	DAVIC 1.0 profile specific ICS proforma, text information						
Item number	Item description	Conditions for status	Status	DAVIC 1.0 reference	Support		
					N/A	Yes	No
1	Support of Unicode (ISO/IEC 10646-1) for character encoding		m	Part 09 clause 6.4	[ ]	[ ]	[ ]
2	Definition of a service type value for NTSC		m	Part 09 clause 6.4	[ ]	[ ]	[ ]
3	Use of service information shall adhere to the SI implementation guidelines in ETSI ETR 211		m	Part 09 clause 6.4	[ ]	[ ]	[ ]

5.2.4 Information objects ICS and RL for compressed audio

Contrary to the other ICS proforma of this supplement, the following ICS proforma only contains those items that are relevant for this profile. All those PICS proforma items that are not relevant to this profile are not mentioned.

Table 10 – Information object ICS and RL for compressed audio

MPEG-1 compressed audio information object ICS					DAVIC 1.0 profile RL	
Item number	Item description	Conditions for status	Status	ISO/IEC 11172-3 reference	DAVIC 1.0 reference	Status
C1	MPEG-1 Layer I encoding		m	2.4.1.5	Part 9	m
C2	MPEG-1 Layer II encoding		m	2.4.1.6	Part 9	m
C3	Sampling rate		m	2.4.2.3	Part 9 (Note)	m
C4	Permitted bit rate for Layer I		m	2.4.2.3	Part 9	m
C5	Permitted bit rate for layer II		m	2.4.2.3	Part 9	m
C6	Emphasis		m	C.1.5.4.3.4	Part 9	m
C7	crc_check		m	2.4.3.1	Part 9	m
NOTE – The following sampling rates are allowed: 32, 44.1, 48.						

5.2.5 Conformance statement on linear audio (AIFF-C)

Linear audio shall be coded using Audio Interchange File Format (AIFF-C) file in a more restricted format. For DAVIC 1.0, the form chunk, format version chunk, extended common chunk, and the sound data chunk shall each appear once only and in the order shown in DAVIC 1.0 part 9, Table 6-2. Any private chunks shall appear after the required chunks and are not restricted.

5.2.6 Information objects ICS and RL for compressed video

Video information shall be coded using MPEG-1 (ISO/IEC 11172-2) Video or MPEG-2 Video (ITU-T Rec. H.262 | ISO/IEC 13818-2).

The ITU-T Rec. H.262 | ISO/IEC 13818-2 MPEG-2 video standard contains several options which are partly restricted by the DAVIC specifications. The definition of the Requirements List is based upon the information contained in Part 9 of DAVIC 1.0. Only those items of MPEG-2 are mentioned that are relevant for DAVIC 1.0.

Table 11 – Information object ICS and RL for compressed video

MPEG-2 base standard features					Profile features	
Item	Does the implementation support...	Conditions for status	Status	ISO/IEC 13818-2 reference	DAVIC reference	Status
Mc 1	Main profile				Part 9	m
Mc 1	profile_and_level_indication '0100 1000'			8.4.1	Part 9	o.1
Mc 2	profile_and_level_indication '0nnn 0nnn'			8.4.1	Part 9	o.1
Mc 3	Frame rate 29.97			6.3.3	Part 9	o.2
Mc 4	Frame rate 25			6.3.3	Part 9	o.2
Mc 5	Frame rate 23.976			6.3.3	Part 9	o.2
Mc 6	Source aspect ratio of 4:3			D2.3	Part 9	o.3
Mc 7	Source aspect ratio of 16:9			D2.3	Part 9	o.3
Mc 8	Vertical component of each pan vector included in compression = 0				Part 9	m

Table 11 – Information object ICS and RL for compressed video

	MPEG-2 base standard features				Profile features	
Item	Does the implementation support...	Conditions for status	Status	ISO/IEC 13818-2 reference	DAVIC reference	Status
Mc 9	Compressed video indicating the operation used to downsample the chrominance information from 4:2:2 to 4:2:0 in the parameter chroma type			D3	Part 9	m
Mc 10	Full screen luminance resolution from Table 6-4 (of DAVIC 1.0 part 9)				Part 9	m
o.1 Support of at least one of these options is required. o.2 Support of at least one of these options is required. o.3 Support of at least one of these options is required.						

5.2.7   Information objects ICS for graphics

The definition of the Requirements List shall be based upon the information contained in Part 9 of DAVIC 1.0.

Table 12 – Information object ICS for graphics

Major capabilities				
Item	Does the implementation support...	Conditions for status	Status	DAVIC reference
Mc 1	RGB16 format		m	Part 9
Mc 1	CLUT8 format		m	Part 9
Mc 2	CLUT4 format		m	Part 9
Mc 3	CLUT2 format		m	Part 9
Mc 4	Extensibility			Part 9
Mc 5	No error correction			Part 9
Mc 6	Specifying horizontal and vertical sizes in units of pixels			Part 9
Mc 7	Specifying coded pixel aspect ratio as in clause 6.9.1 (of DAVIC 1.0 part 9)			Part 9
Mc 8	Indicating in the syntax of scaling preference in case the coded pixel aspect ratio and display pixel aspect ratio differ as in clause 6.9.1 (of DAVIC 1.0 part 9)			Part 9
Mc 9	Transparency		m	Part 9
Mc 10	Translucency for CLUT8, CLUT4 and CLUT2		m	Part 9
Mc 11	Translucency value of 50%		m	Part 9
Mc 12	Full resolution		o.1	Part 9
Mc 13	Half resolution		o.1	Part 9
Mc 14	Self-contained graphical objects		m	Part 9
Mc 15	Network byte ordering		m	Part 9
o.1 Support of at least one of these options is required.				

5.3 Testing of DSM-CC U-U

5.3.1 Definition of PICS proforma and RL

The editions of the base standards referenced by this supplement (ISO/IEC 13818-6) do not presently contain PICS proformas. Therefore, the RLs contained within this supplement have been derived by making assumptions about the content of the relevant information object ICS proformas, as if they already existed. Such assumptions have been made by inspection of the text of the referenced base standards.

The DSM-CC standard contains several options which are partly restricted by the DAVIC specifications. These restrictions will result in the description of a Requirement List. The definition of the Requirements List is based upon the information contained in Parts 7 and 12 of DAVIC 1.0. Furthermore, the definition of a Requirements List takes into account that MHEG-5 is used above DSM-CC U-U.

5.3.1.1 Roles

Table 13 – PICS and RL table for DSM-CC U-U role (Terminal)

	DSM-CC U-U PICS				DAVIC 1.0 profile RL	
Item	Role Does the implementation support...	Conditions for status	Status	ISO/IEC 13818-6 reference	DAVIC reference	Status
R1	The client role		o.1		Part 7	m
R2	The network role		o.1			x
R3	The server role		o.1			x
o.1 Support of one, and only one, of these options is required.						

5.3.1.2 Major capabilities of the client role

If the client role (predicate R1) is not supported, the tables in this and subsequent subclauses are then not applicable.

Table 14 – PICS and RL table for DSM-CC U-U major capabilities (Terminal)

	DSM-CC U-U PICS				DAVIC 1.0 profile RL	
Item	Major capabilities Does the implementation support...	Conditions for status	Status	ISO/IEC 13818-6 reference	DAVIC reference	Status
Mc 1	User-to-user procedures		o	5	Part 7 – 7.1	m
Mc 2	User compatibility		o	6	Part 7	m
Mc 3	Stream descriptors		o	6	Part 7	m
Mc 4	Normal play time, stream mode and stream events		o	8	Part 7	m

5.3.1.3   Subsidiary capabilities related to user-to-user procedures

Table 15 – PICS and RL table for DSM-CC U-U subsidiary capabilities (Terminal)

	DSM-CC U-U PICS				**DAVIC 1.0 profile RL**	
Item	**Subsidiary capabilities Does the implementation support...**	**Conditions for status**	**Status**	**ISO/IEC 13818-6 reference**	**DAVIC reference**	**Status**
	User-to-user system environment & application portability interface					
Sc 1	Client-related aspects of the user-to-user system environment & application portability interface, including common types, exceptions, access control and DSM library functions		O.1	5.2, 5.4, 5.7	Part 7	m
	Application runtime procedures					
Sc 2.1	Remote procedure call mechanism based on UNO		O.2	5.3	Part 7 – 7.3.1	m
Sc 2.2	Other remote procedure call mechanism		O.2	5.3	Part 7 – 7.3.1	x
Sc 3	Recommended format for service context lists			5.6.4	Part 7	m
Sc 4.1	Interoperable Object Reference format		m	5.3.4	Part 7 – 7.3.1	m
Sc 4.2	IIOP profile body		m	5.6.3	Part 7 – 7.3.1	m
Sc 4.3	Tagged profiles for other RPC mechanisms	Sc 2.2 NOT Sc 2	O N/A	5.6.3	Part 7 – 7.3.1	x
Sc 5.1	Processing of additional protocol profile body for composite resources		M	5.6.3, 5.3.2.1	Part 7	m
Sc 5.2	Resource to connection association (connection binder)		M	5.3.3.1	Part 7	m
Sc 5.3	Inclusion of a preferred association tag in requests		O	5.3.3.1		i
Sc 6.1	Client-related aspects of the user-to-network assumptions and requirements		M	5.3.4	Part 7	m
Sc 6.2	Security authentication prior to DSM ServiceGateway Attach		O	5.3.4.1.1		i
Sc 6.3	DownLoadInfoRequest in association with ClientSessionSetupRequest		O	5.3.4.1.1, 5.3.4.1.2		i
Sc 6.4	Session suspension/resumption		O	5.3.4.1.1, 5.3.4.1.2	Part 7	m
	Core client-service interfaces					
Sc 7.1	Base interface, including base IsA		M	5.5.1	Part 7	m
Sc 7.2	DSM base close		M	5.5.1.2	Part 7	m
Sc 7.3	DSM base destroy		M	5.5.1.3	Part 7	x
Sc 8	Access interface		M	5.5.2, 5.5.2.1	Part 7	m
Sc 9.1	Directory interface		M	5.5.3, 5.5.3.1	Part 7	m

Table 15 – PICS and RL table for DSM-CC U-U subsidiary capabilities (Terminal)

	DSM-CC U-U PICS				DAVIC 1.0 profile RL	
Item	**Subsidiary capabilities Does the implementation support...**	**Conditions for status**	**Status**	**ISO/IEC 13818-6 reference**	**DAVIC reference**	**Status**
Sc 9.2	DSM Directory list		M	5.5.3.3	Part 7	m
Sc 9.3	DSM Directory resolve		M	5.5.3.4	Part 7	m
Sc 9.4	DSM Directory bind		O	5.5.3.5		x
Sc 9.5	DSM Directory bind_context		O	5.5.3.6		x
Sc 9.6	DSM Directory rebind		O	5.5.3.7		x
Sc 9.7	DSM Directory rebind_context		O	5.5.3.8		x
Sc 9.8	DSM Directory unbind		O	5.5.3.9		x
Sc 9.9	DSM Directory new_context		O	5.5.3.10		x
Sc 9.10	DSM Directory bind_new_context		O	5.5.3.11		x
Sc 9.11	DSM Directory destroy		O	5.5.3.12		x
Sc 9.12	DSM Directory open		O	5.5.3.13	Part 7	m
Sc 9.13	DSM Directory close		O	5.5.3.14	Part 7	m
Sc 9.14	DSM Directory get		O	5.5.3.15	Part 7	m
Sc 9.15	DSM Directory put		O	5.5.3.16	Part 7	m
Sc 10.1	Stream interface		O	5.5.4, 5.5.4.1, 5.5.4.2, 5.5.4.3	Part 7	m
Sc 10.2	Complete stream interface state machine	Sc 10.1 NOT Sc 10.1	O.3 N/A	5.5.4.4	Part 7	m
Sc 10.3	Simple stream interface state machine	Sc 10.1 NOT Sc 10.1	O.3 N/A	5.5.4.4		x
Sc 10.4	DSM stream pause	Sc 10.1 NOT Sc 10.1	M N/A	5.5.4.5	Part 7	m
Sc 10.5	DSM stream resume	Sc 10.1 NOT Sc 10.1	M N/A	5.5.4.6	Part 7	m
Sc 10.6	DSM stream status	Sc 10.1 NOT Sc 10.1	O N/A	5.5.4.7	Part 7	o
Sc 10.7	DSM stream reset	Sc 10.1 NOT Sc 10.1	M N/A	5.5.4.8	Part 7	m
Sc 10.8	DSM stream jump	Sc 10.2 NOT Sc 10.2	M N/A	5.5.4.9	Part 7	m
Sc 10.9	DSM stream play	Sc 10.2 NOT Sc 10.2	M N/A	5.5.4.10	Part 7	m
Sc 10.10	DSM stream next	Sc 10.2 NOT Sc 10.2	M N/A	5.5.4.11	Part 7	m
Sc 11.1	Event interface	Sc 10.1 NOT Sc 10.1	O N/A	5.6.9	Part 7 – 7.3.7.2	m
Sc 11.2	DSM event subscribe	Sc 11.1 NOT Sc 11.1	M N/A	5.6.9.3	Part 7 – 7.3.7.2	m
Sc 11.3	DSM event unsubscribe	Sc 11.1 NOT Sc 11.1	M N/A	5.6.9.4	Part 7 – 7.3.7.2	m

Table 15 – PICS and RL table for DSM-CC U-U subsidiary capabilities (Terminal)

	DSM-CC U-U PICS				**DAVIC 1.0 profile RL**	
Item	**Subsidiary capabilities Does the implementation support...**	**Conditions for status**	**Status**	**ISO/IEC 13818-6 reference**	**DAVIC reference**	**Status**
Sc 12.1	File interface		M	5.5.5, 5.5.5.1, 5.5.5.2	Part 7	m
Sc 12.2	DSM file read		M	5.5.5.3	Part 7	m
Sc 12.3	DSM file write		O	5.5.5.4	Part 7	m
Sc 13.1	DSM ServiceGateway attach	DSM-CC U-N NOT DSM-CC U-N (Note)	I M	5.5.6.3	Part 7	i
Sc 13.2	DSM ServiceGateway detach	DSM-CC U-N NOT DSM-CC U-N (Note)	I M	5.5.6.4	Part 7	i
Sc 13.3	DSM ServiceGateway suspend		M	5.5.6.3	Part 7	m
Sc 13.4	DSM ServiceGateway resume		M	5.5.6.4	Part 7	m
	Extended client-service interfaces					
Sc 14	Extended interfaces		O	5.6		i
O.1 Support of at least one of these options is required. O.2 Support of at least one of these options is required. O.3 Support of at least one of these options is required. NOTE – DSM-CC U-N: If DSM-CC U-N is supported as Session Protocol. NOT DSM-CC U-N: If DSM-CC U-N is not supported as Session Protocol.						

5.3.2   Guidance on test method

When testing the DSM-CC protocol on the client (STU) side, it is only possible to test if the client creates syntactically correct requests and is capable of correctly receiving the responses (e.g., the client is capable of sending a further request after receiving a response).

It is not recommended to verify if the responses were correctly processed by the STU as the observation and control of the responses is indirect. Effects of responses can only be observed by the application (in this case MHEG-5).

Therefore, it is recommended mainly to test the correct creation of DSM-CC requests, and to check that the IUT does not break down when receiving responses. For this reason, the remote test method shall be applied to test DSM-CC U-U which is illustrated in Figure 2:

T.Suppl.1_F2
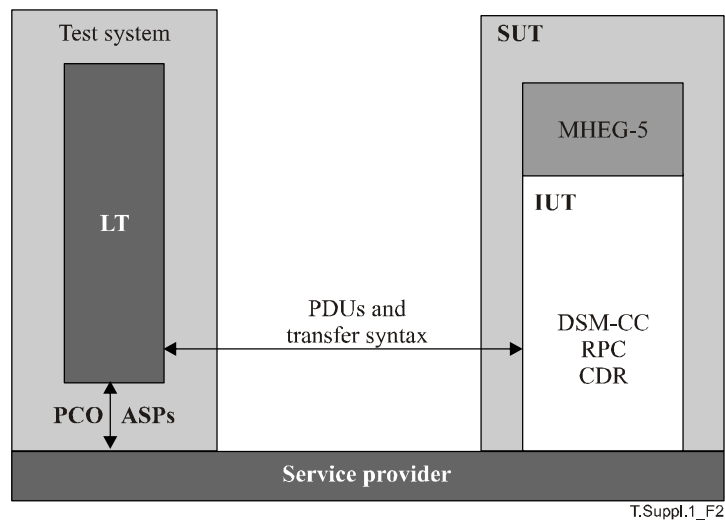
Figure 2 – Test method for DSM-CC U-U

5.3.3 Definition of a set of test cases

Examples of test cases are specified (not a complete ATS). The test cases are built on the requirements of the relevant ICS proforma and RL. The contents test cases follow the structure of abstract test cases as described in ITU-T Recs X.29x series | ISO/IEC 9646.

5.3.3.1 DSM-CC U-U resolve operations: Service gateway attach

Test purpose:

> This test verifies the capability of IUT to access remote objects on the server.

Test sequence:

> The IUT makes a call to access the server subsystem using a service gateway attach on its application interface.

> This will result in the establishment of a network session using DSM-CC U-N messages ClientSessionSetupRequest and ClientSessionSetupResponse as in DSM-CC U-N test described in 5.4. Test sequence is the same as already described in this clause.

Precondition:

> IUT is in idle state.

Postcondition:

> Session is established and other DSM-CC U-U messages can be sent.

5.3.3.2 DSM-CC U-U Resolve operations: Directory resolve

Test purpose:

> This test verifies the capability of IUT to request to the server addressing information which uniquely identifies objects (e.g., applications).

Test sequence:

> The IUT makes a call to the connected server subsystem using a "Directory Resolve" contained the application name.

> The LT checks the validity of the RPC format and, if it does not find any inconsistency, sends a "Resolve Reply" to the IUT containing the application object reference.

Precondition:

> A session is already established with the LT. The application name is known by the IUT.

Postcondition:

> The object reference associated with the application name is returned.

5.4 Testing of DSM-CC U-N

5.4.1 Definition of PICS proforma and RL

The editions of the base standards referenced by this supplement (ISO/IEC 13818-6) do not presently contain information object ICS proformas. Therefore, the RLs contained within this Supplement have been derived by making assumptions about the content of the relevant information object ICS proformas, as if they already existed. Such assumptions have been made by inspection of the text of the referenced base standards.

The DSM-CC U-N standard contains several options which are partly restricted by the DAVIC specifications which will be described in a RL. The definition of the Requirements List shall be based upon the information contained in Parts 7 and 12 of DAVIC 1.0.

5.4.1.1 Roles

Table 16 – PICS and RL table for DSM-CC U-N role (Terminal)

DSM-CC U-N PICS					DAVIC 1.0 profile RL	
Item	Role Does the implementation support...	Conditions for status	Status	ISO/IEC 13818-6 reference	DAVIC reference	Status
R1	The client role		O.1			m
R2	The network role		O.1			x
R3	The server role		O.1			x
O.1	Support of one, and only one, of these options is required.					

5.4.1.2 Major capabilities of the client role

If the client role (predicate R1) is not supported, the tables in this and subsequent subclauses are then not applicable.

Table 17 – PICS and RL table for DSM-CC U-N major capabilities (Terminal)

DSM-CC U-N PICS					DAVIC 1.0 profile RL	
Item	Role Does the implementation support...	Conditions for status	Status	ISO/IEC 13818-6 reference	DAVIC reference	Status
Mc 1	User-to-network configuration procedures		O	3	Part 12 – 10.1	m
Mc 2	User-to-network session control procedures		O	4	Part 7 – 8.3.1	m

5.4.1.3 PDU support for DSM-CC user-to-network

Table 18 – PICS and RL table for DSM-CC U-N PDU support (Terminal)

	DSM-CC U-N PICS				DAVIC 1.0 profile RL	
Item	Protocol data units Does the implementation support...	Conditions for status	Status	ISO/IEC 13818-6 reference	DAVIC reference	Status
	User-to-network configuration group					
Pdu1	UNConfigRequest		o	3.2	Part 7 – 8.4	m
Pdu2	UNConfigIndication		o	3.3	Part 7 – 8.4	m
Pdu3	UNConfigResponse		o	3.4	Part 7 – 8.4	m
Pdu4	UNConfigConfirm		o	3.5	Part 7 – 8.4	m
	User-to-network core group					
Pdu5	ClientSessionSetUpRequest		m	4.2.3	Part 7 – 8.3	m
Pdu6	ClientSessionSetUpIndication		m	4.2.4	Part 7 – 8.3	i
Pdu7	ClientSessionSetUpResponse		m	4.2.5	Part 7 – 8.3	i
Pdu8	ClientSessionSetUpConfirm		m	4.2.6	Part 7 – 8.3	m
Pdu9	ServerSessionSetUpRequest		m	4.2.29	Part 7 – 8.3	i
Pdu10	ServerSessionSetUpIndication		m	4.2.30	Part 7 – 8.3	i
Pdu11	ServerSessionSetUpResponse		m	4.2.31	Part 7 – 8.3	i
Pdu12	ServerSessionSetUpConfirm		m	4.2.32	Part 7 – 8.3	i
Pdu13	ClientReleaseRequest		m	4.2.7	Part 7 – 8.3	m
Pdu14	ClientReleaseIndication		m	4.2.8	Part 7 – 8.3	m
Pdu15	ClientReleaseResponse		m	4.2.9	Part 7 – 8.3	m
Pdu16	ClientReleaseConfirm		m	4.2.10	Part 7 – 8.3	m
Pdu17	ServerReleaseRequest		m	4.2.38	Part 7 – 8.3	i
Pdu18	ServerReleaseIndication		m	4.2.39	Part 7 – 8.3	i
Pdu19	ServerReleaseResponse		m	4.2.40	Part 7 – 8.3	i
Pdu20	ServerReleaseConfirm		m	4.2.41	Part 7 – 8.3	i
Pdu21	ClientAddResourceIndication		m	4.2.11	Part 7 – 8.3	m
Pdu22	ClientAddResourceResponse		m	4.2.12	Part 7 – 8.3	m
Pdu23	ServerAddResourceRequest		m	4.2.42	Part 7 – 8.3	i
Pdu24	ServerAddResourceConfirm		m	4.2.43	Part 7 – 8.3	i
Pdu25	ClientDeleteResourceIndication		m	4.2.13	Part 7 – 8.3	m
Pdu26	ClientDeleteResourceResponse		m	4.2.14	Part 7 – 8.3	m
Pdu27	ServerDeleteResourceRequest		m	4.2.44	Part 7 – 8.3	i
Pdu28	ServerDeleteResourceConfirm		m	4.2.45	Part 7 – 8.3	i
Pdu29	ClientStatusRequest		m	4.2.17	Part 7 – 8.3	o
Pdu30	ClientStatusIndication		m	4.2.18	Part 7 – 8.3	o
Pdu31	ClientStatusResponse		m	4.2.19	Part 7 – 8.3	o
Pdu32	ClientStatusConfirm		m	4.2.20	Part 7 – 8.3	o
Pdu33	ServerStatusRequest		m	4.2.48	Part 7 – 8.3	i
Pdu34	ServerStatusIndication		m	4.2.49	Part 7 – 8.3	i
Pdu35	ServerStatusResponse		m	4.2.50	Part 7 – 8.3	i

Table 18 – PICS and RL table for DSM-CC U-N PDU support (Terminal)

	DSM-CC U-N PICS				DAVIC 1.0 profile RL	
Item	Protocol data units Does the implementation support...	Conditions for status	Status	ISO/IEC 13818-6 reference	DAVIC reference	Status
Pdu36	ServerStatusConfirm		m	4.2.51	Part 7 – 8.3	i
Pdu37	ClientResetRequest		m	4.2.21	Part 7 – 8.3	i
Pdu38	ClientResetIndication		m	4.2.22	Part 7 – 8.3	i
Pdu39	ClientResetResponse		m	4.2.23	Part 7 – 8.3	i
Pdu40	ClientResetConfirm		m	4.2.24	Part 7 – 8.3	i
Pdu41	ClientProceedingIndication		o	4.2.25	Part 7 – 8.3	m
Pdu42	ServerResetRequest		o	4.2.33	Part 7 – 8.3	i
Pdu43	ServerResetIndication		o	4.2.34	Part 7 – 8.3	i
Pdu44	ServerResetResponse		o	4.2.35	Part 7 – 8.3	i
Pdu45	ServerResetConfirm		o	4.2.36	Part 7 – 8.3	i
Pdu46	ClientConnectRequest		o	4.2.26	Part 7 – 8.3	i
Pdu47	ServerConnectIndication		o	4.2.37	Part 7 – 8.3	i
	User-to-network extended group					
Pdu48	ServerSessionTransferRequest		o	4.2.52	Part 7 – 8.3	i
Pdu49	ServerSessionTransferConfirm		o	4.2.53	Part 7 – 8.3	i
Pdu50	ClientSessionTransferIndication		o	4.2.27	Part 7 – 8.3	i
Pdu51	ClientSessionTransferResponse		o	4.2.28	Part 7 – 8.3	i
Pdu52	ClientPassThruRequest		o	4.2.15	Part 7 – 8.3	i
Pdu53	ClientPassThruIndication		o	4.2.16	Part 7 – 8.3	i
Pdu54	ServerPassThruRequest		o	4.2.46	Part 7 – 8.3	i
Pdu55	ServerPassThruIndication		o	4.2.47	Part 7 – 8.3	i

5.4.1.4 Parameter support

Table 19 – PICS and RL table for DSM-CC U-N parameter support (Terminal)

	Base standard features				Profile features	
Item	Parameter	Status	Syntax	ISO/IEC 13818-6 reference	Status	Allow values
	ClientSessionSetUpRequest					
Par1	sessionId	m	INTEGER	4.2.3	m	assign. by STU
Par2	clientId	m	INTEGER	4.2.3	m	STU E.164 NSAP
Par3	serverId	m	INTEGER	4.2.3	m	
Par4	UserData	o	UserData	4.2.3	m	limited to 400 B
	ClientSessionSetUpConfirm					
Par5	sessionId	m	INTEGER	4.2.4	m	
Par6	serverId	m	INTEGER	4.2.4	m	
Par6	response	m	response	4.2.4	m	
Par7	ResourceCount	m	INTEGER	4.2.4	m	

Table 19 – PICS and RL table for DSM-CC U-N parameter support (Terminal)

	Base standard features				Profile features	
Item	Parameter	Status	Syntax	ISO/IEC 13818-6 reference	Status	Allow values
Par8	ResourceDescriptor	m	Resource-Descriptor	4.2.4	m	DAVIC, part 7 Table 8-2
Par9	UserData	o	UserData	4.2.4	o	
	ClientReleaseRequest					
Par10	sessionId	m	INTEGER	4.2.7	m	
Par11	reason	m	reason	4.2.7	m	
Par12	UserData	o	UserData	4.2.7	m	Input param. of DSMService-GatewayDetach
	ClientReleaseIndication					
Par13	sessionId	m	INTEGER	4.2.9	m	
Par14	reason	m	reason	4.2.9	m	
Par15	UserData	o	UserData	4.2.9	o	
	ClientReleaseResponse					
Par16	sessionId	m	INTEGER	4.2.10	m	
Par17	response	m	response	4.2.10	m	
Par18	UserData	o	UserData	4.2.10	o	
	ClientReleaseConfirm					
Par19	sessionId	m	INTEGER	4.2.8	m	
Par20	response	m	response	4.2.8	m	
Par21	UserData	o	UserData	4.2.8	o	
	ClientAddResourceIndication					
Par22	sessionId	m	INTEGER	4.2.11	m	
Par23	response	m	response	4.2.11	m	
Par24	ResourceCount	m	INTEGER	4.2.11	m	
Par25	ResourceDescriptor	m	Resource-Descriptor	4.2.11	m	DAVIC, part 7 Table 8-2
Par26	UserData()	o	UserData	4.2.11	m	
	ClientAddResourceResponse					
Par27	sessionId	m	INTEGER	4.2.12	m	
Par28	ResourceCount	m	INTEGER	4.2.12	m	
Par29	ResourceDescriptor	m	Resource-Descriptor	4.2.12	m	DAVIC, part 7 Table 8-2
Par30	UserData()	o	UserData	4.2.12	m	
	ClientDeleteResourceIndication					
Par31	sessionId	m	INTEGER	4.2.13	m	
Par32	reason	m	reason	4.2.13	m	
Par33	ResourceCount	m	INTEGER	4.2.13	m	
Par34	ResourceDescriptor		Resource-Descriptor	4.2.13	m	
Par35	UserData()	o	UserData	4.2.13	m	

Table 19 – PICS and RL table for DSM-CC U-N parameter support (Terminal)

	Base standard features				Profile features	
Item	**Parameter**	**Status**	**Syntax**	**ISO/IEC 13818-6 reference**	**Status**	**Allow values**
	ClientDeleteResourceResponse					
Par36	sessionId	m	INTEGER	4.2.14	m	
Par37	response	m	Response	4.2.14	m	
Par38	UserData()	o	UserData	4.2.14	m	
	ClientStatusRequest					
Par39	reason	m	reason	4.2.17	m	
Par40	StatusType	m	StatusType	4.2.17	m	
Par41	StatusCount	m	INTEGER	4.2.17	m	
Par42	StatusByte	m	StatusByte	4.2.17	m	
	ClientStatusIndication					
Par43	reason	m	reason	4.2.19	m	
Par44	StatusType	m	StatusType	4.2.19	m	
Par45	StatusCount	m	INTEGER	4.2.19	m	
Par46	StatusByte	m	StatusByte	4.2.19	m	
	ClientStatusResponse					
Par47	response	m	response	4.2.20	m	
Par48	StatusType	m	StatusType	4.2.20	m	
Par49	StatusCount	m	INTEGER	4.2.20	m	
Par50	StatusByte	m	StatusByte	4.2.20	m	
	ClientStatusConfirm					
Par51	response	m	response	4.2.18	m	
Par52	StatusType	m	StatusType	4.2.18	m	
Par53	StatusCount	m	INTEGER	4.2.18	m	
Par54	StatusByte	m	StatusByte	4.2.18	m	
	ClientSessionProceedingIndication					
Par55	reason	m	reason	4.2.25	m	Sent on Sid.tProceed expiring before sending CliSesSetConfirm

5.4.2 Guidance on test method

The test method of the DSM-CC U-N commands should focus mainly on the dynamic conformance requirements (e.g., use and format of PDU, state transitions, etc.). For testing the DSM-CC U-N commands, the remote test method is most appropriate, as described in Figure 3:

T.Suppl.1_F3
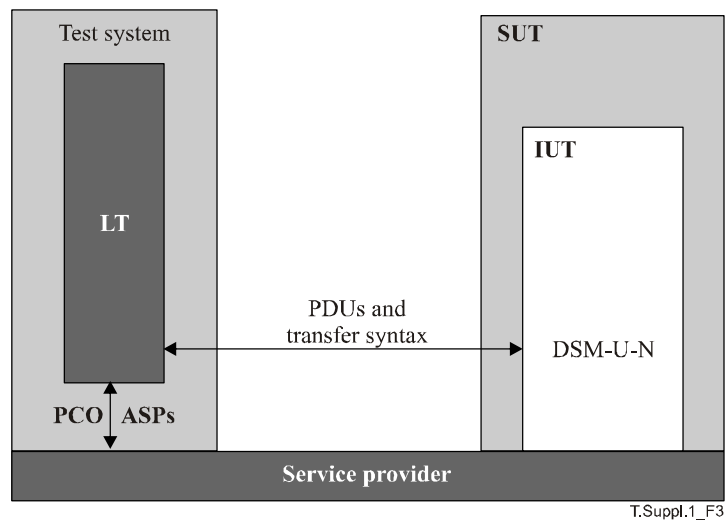
Figure 3 – Test method for DSM-CC U-N

5.4.3 Definition of a set of test cases

Examples of test cases have been specified (not a complete ATS). The test cases are to be built on the requirements of the relevant ICS proforma and RL.

The content of a test case follows the structure of abstract test cases described in ITU-T Recs X.29x series | ISO/IEC 9646. The test cases mainly test the dynamic conformance requirements of the DSM-CC U-N protocol.

5.4.3.1 DSM-CC U-N session set up

Test purpose:

> This test verifies the capability of IUT to request the set-up of a session and to accept a server-initiated resource add request.

Test sequence:

> The IUT request the set-up of a session sending a message of "ClientSessionSetUpRequest".
>
> The LT checks the validity of all fields of the PDU and, if it does not find any inconsistency, sends a message of "ClientSessionSetUpConfirm".
>
> The LT sends a message of "ClientAddResourceIndication" and waits for "ClientAddResourceResponse" message from the IUT.
>
> The LT checks the validity of all fields of the PDU.

Precondition:

> IUT is in Idle state.

Postcondition:

> Session is established, DSM-CC U-U commands can be sent.

5.4.3.2 DSM-CC U-N tear down

Test purpose:

> This test verifies the capability of IUT to accept a server-initiated resource delete request and finally to request session release.

Test sequence:

> The LT sends a message of "ClientDeleteResourceIndication".
>
> The LT waits for "ClientDeleteResourceResponse" and checks the validity of all fields of the PDU.
>
> The IUT request the clear of the session sending a message of "ClientReleaseRequest".
>
> The LT checks the validity of all fields of the PDU and, if it does not find any inconsistency, sends a message of "ClientReleaseConfirm".

Precondition:

> A session has already been established.

Postcondition:

> IUT is in Idle state.

5.5 Testing of network access

DAVIC allows several types of delivery systems to be used. A delivery system can usually be divided into core and access network. In satellite networks, the reference points are not necessarily the same.

5.5.1 Core network

Testing of the core network is not within the scope of this supplement. However, the following general functions of the core network may have an influence on the conformance testing:

- Reliable transfer of information between entities like content providers, service providers and access networks. The access network takes care of the distribution to the end-user;
- Switching functionality to provide connections between entities;
- Network-related control functions for addressing and to establish and release connections;
- Network management functions for network configurations, performance and fault monitoring, billing and accounting purposes, etc.;
- Within DAVIC it is assumed that the multiplexing and switching technique in the core network is ATM.

5.5.2 Access network

The access network is defined as a collection of equipment and infrastructures performing the following functions, which should be tested:

- transmission, multiplexing, concentration and broadcasting of service/application information flows between the end users of a given area and the rest of the delivery system (core network and servers);
- relevant control and management functions;
- transport of other services (telephony, analogue TV, N-ISDN services, etc.);
- the access network consists of the Access Node (AN), the Network Termination (NT) and the distribution network in between them, see Figure 4. The access network may have multiplexing and cross-connecting functionality but has no switching functionality.

Access network

A4   A3   Distribution   A2   A1
      AN   network   NT

T.Suppl.1_F4
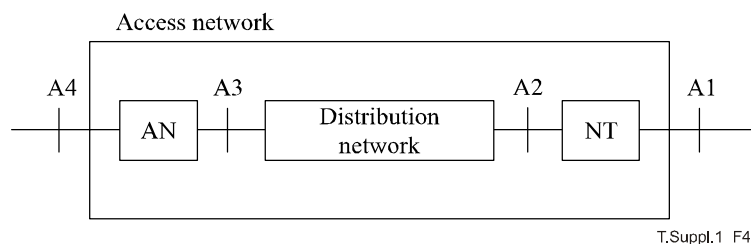
Figure 4 – The generic model of the access network (Terminal)

With respect to the access network, DAVIC 1.0 is only concerned with the interfaces and protocols at the A4 and A1 reference points, i.e., at the edges of the access networks. Reference points A2 and A3 are considered less critical and are left to future versions of the DAVIC specification and thus are not subject to be tested for conformance in this version of this supplement.

5.5.3   Satellite delivery system

Satellite delivery systems, in the scope of DAVIC delivery systems, may be applied for the delivery of content to the access network or, alternatively, for delivery directly to the end user premises. In the first case, the satellite delivery system acts like part of the core network; in the second case, the satellite delivery system acts like an access network.

In the DAVIC reference model, satellite delivery systems could serve as a specialized core network that would deliver content to many access networks over a wide geographic range. The access nodes receive signals from satellites and distribute these signals via the access network. In this particular instance, the downstream signals have to conform to the definition at the A4 reference point.

Satellite delivery systems can also be used as specialized access networks, where subscribers have satellite dishes on their houses. The satellite dish is connected to the set-top box via the in-house network. In this particular instance, the downstream signals have to comply to the signals defined at the A1 reference point.

In order to allow any interactivity for satellite delivery systems, a return path has to be specified.

5.5.4   Network and service related control

Two levels of control are associated with the delivery system. The highest level represents the required control functions at the level of the principal service, the lower level of control is associated with the communication service supporting the principal service and represented by the core network functions.

The two levels of control functions are represented by two functional blocks: Service Related Control (SRC) and Network Related Control (NRC) whose functions are described in this clause.

Service related control and management and network related control and management functions interact with directories (databases) containing information on users (subscribers, end-users), ESPs, service brokers, STUs.

Functions such as user registration/cancellation perform modifications on these databases, while functions such as user authentication make use of data contained therein.

Coordination is required between service and network control in order to relate the session with the underlying calls/connection (exchange of QoS parameters, network address, etc. will be part of the protocol).

5.5.4.1   Network related control

Network related control functions include connection establishment and termination, information routing and resource allocation.

Signalling interfaces are used to control the operation of the network with respect to connection handling. It is aimed to use existing and future interfaces that are standardized by bodies such as ITU-T and ATM Forum. Moreover, the connection control signalling specification must be service independent.

Functions which are part of the network related control are:

- Call and connection control which is the capability of the network to establish, maintain and release calls together with the related connections.

- Resource allocation which is the capability to define the elements to be used for the connection set-up according to the requests of the session related control and to their availability.

- Routing which is the capability to find a path through the network from one end-point to another end-point where sufficient resources can be allocated.

- STU identification which is the ability of the NRC to identify the STU (e.g., serial number) or part of the STU characteristics (STU profile, make or capabilities), to use the acceptable dialogue protocol between the NRC and the STU.

- STU authentication which is, logically subsequent to identification, a security issue, to ensure that the STU is a certified equipment, authorized to enter the DAVIC system and does not cause any damage to its behaviour. Depending on the implementation, this phase may be separated or performed together with the identification.

- Network related control protocols may be terminated both in the access network and in the core network and in the STU or server; network related control information flows are named S4 flows.

Four S4 flows are identified:

- ESP to core network; (ITU-T Rec. Q.2931 for call/connection control).

- Access network to STU; (ITU-T Rec. Q.2931 or DSM-CC U-N for call/connection control in the access network).

- Access network to core network; (ITU-T Rec. Q.2931 and VB5 BCC if concentration in the access network is provided).

- STU to core network; (ITU-T Rec. Q.2931 for call/connection control).

5.5.4.2   Service related control

The following functions are part of the service related control specification:

- STU download: For some applications, for example when basic gateway navigation is included, there is a need to download programmes and data to the STU. This function controls this process and maintains any necessary service-related information.

- Navigation: This function allows the user to select brokering gateways, or ESPs and related DAVIC services.

- Address resolution: This function provides translation between a logical name and a network address.

- Security services: There are several functions required here, including authorization and authentication.

- Session control: This function is the processing required to set up, maintain and release sessions. It assigns session identifiers and maintains the relationships to the supporting network resources, such as calls and connections.

Service related control protocols are terminated both in the delivery systems and in the STU or server. Service related control information flows are named S3 flows. At the moment, two S3 flows are defined:

- ESP to delivery system;
- ESC to delivery system.

5.5.5 Test items for network conformance

The areas where conformance should be tested for are presented in Table 20.

Table 20 – Test items for network conformance (Terminal)

Network features					DAVIC 1.0 choices	
Item	Role	Conditions for status	Status	Reference	DAVIC 1.0 reference	Status
Nc 1	Core network				Part 4	m
Nc 1.1	ATM/SDH			ITU-T Rec. G.652 ITU-T Rec. G.957 ITU-T Rec. G.707 ITU-T Rec. G.708 ITU-T Rec. G.709 ITU-T Rec. I.413 ITU-T Rec. I.432	Part 8	m
Nc 2	Access network				Part 8	m
Nc 2.1	Low-speed symmetrical PHY on the PSTN			ITU-T Rec. V.22 *bis* ITU-T Rec. V.32 ITU-T Rec. V.32 *bis* ITU-T Rec. V.34	Part 8 clause 7.1	O
Nc 2.2	Low-speed symmetrical PHY on the ISDN			ITU-T Rec. I.430	Part 8 clause 7.2	O
Nc 2.3	Long-range baseband asymmetrical PHY on copper			ETSI TM3, ANSI ADSL	Part 8 clause 7.3	O.1
Nc 2.4	Medium-range baseband asymmetrical PHY on copper			New work in ANSI T1E1.4 & ETSI TM3	Part 8 clause 7.4	O.1
Nc 2.5	Short-range baseband asymmetrical PHY on copper and coax				Part 8 clause 7.5	O.1
Nc 2.5.1	Physical Medium Dependent (PMD) sublayer specification				Part 8 clause 7.5.1	m
Nc 2.5.2	Transmission Convergence (TC) PHY sublayer specification				Part 8 clause 7.5.2	m
Nc 2.6	Passband unidirectional PHY on coax				Part 8 clause 7.6	
Nc 2.6.1	Encoding/decoding process		M	ETSI EN 300 429-4	Part 8 clause 7.6.1	m
Nc 2.6.2	MPEG-2 transport stream				Part 8 clause 7.6.2	m
Nc 2.6.3	Asynchronous Transfer Mode (ATM) stream				Part 8 clause 7.6.3	m

Table 20 – Test items for network conformance (Terminal)

Network features					DAVIC 1.0 choices	
Item	**Role**	**Conditions for status**	**Status**	**Reference**	**DAVIC 1.0 reference**	**Status**
Nc 2.6.4	Framing structure when carrying MPEG2-TS		M	ETSI EN 300 429-6	Part 8 clause 7.6.4	O.2
Nc 2.6.5	Framing structure when carrying ATM				Part 8 clause 7.6.5	O.2
Nc 2.6.6	High Reliability Marker (HRM)				Part 8 clause 7.6.6	m
Nc 2.6.7	Channel coding		m	ETSI EN 300 429-7	Part 8 clause 7.6.7	m
Nc 2.6.8	Byte to symbol mapping		m	ETSI EN 300 429-8	Part 8 clause 7.6.8	m
Nc 2.6.9	Quadrature Amplitude Modulation (QAM)		m	ETSI EN 300 429-9	Part 8 clause 7.6.9	m
Nc 2.6.10	Baseband filter characteristics		m	ETSI EN 300 429 Annex A	Part 8 clause 7.6.10	m
Nc 2.6.11	Information bit rate		O	ETSI EN 300 429 Annex B	Part 8 clause 7.6.11	m
Nc 2.6.12	Coaxial cable impedance				Part 8 clause 7.6.12	m
Nc 2.6.13	Media interface connector				Part 8 clause 7.6.13	m
Nc 2.7	Passband bidirectional PHY on coax				Part 8 clause 7.7	
Nc 2.7.1	Downstream physical interface				Part 8 clause 7.7.1	m
Nc 2.7.2	Upstream physical interface				Part 8 clause 7.7.2	m
Nc 2.7.3	Media access control functionality				Part 8 clause 7.7.3	m
Nc 2.8	Passband unidirectional PHY on satellite			ETSI EN 300 421 plus DAVIC specific deltas	Part 8 clause 7.8	O.1
Nc 2.8.1	Satellite downstream transmission				Part 8 clause 7.8.1	m
Nc 2.8.1.1	Framing structure, channel coding and modulation		m	ETSI EN 300 421-4	Part 8 clause 7.8.1.1	m
Nc 2.8.1.2	High reliability marker				Part 8 clause 7.8.1.2	m
Nc 2.8.1.3	Interleaving for applications in the downlink frequency range 2 to 6 GHz				Part 8 clause 7.8.1.3	m
Nc 2.8.2	Interworking of satellite and coax transmission				Part 8 clause 7.8.2	O
Nc 2.9	Baseband symmetrical PHY on copper			ATM Forum	Part 8 clause 7.9	O.1
Nc 2.10	Baseband symmetrical PHY on fiber			ITU-T Rec. I.432	Part 8 clause 7.10	O.1
Nc 3	Network-interface-unit to set-top-unit Interface				Part 8 clause 8	O
Nc 3.1	Functional description of the A0 interface	c1: IF NC 3 implemented then m, else i			Part 8 clause 8.1	C1

Table 20 – Test items for network conformance (Terminal)

Network features					DAVIC 1.0 choices	
Item	Role	Conditions for status	Status	Reference	DAVIC 1.0 reference	Status
Nc 3.2	Capability levels for A0	c1: IF NC 3 implemented then m, else i			Part 8 clause 8.2	C1
Nc 3.2.1	A0 logical connections – Level "A"	c1: IF NC 3 implemented then m, else i			Part 8 clause 8.2.1	C1
Nc 3.2.2	A0 logical connections – Level B	c1: IF NC 3 implemented then m, else i			Part 8 clause 8.2.3	C1

6 Conformance testing of server

A DAVIC 1.0 conformant server is described by the following SCS proforma. This proforma makes references to other PICS, information objects ICS and RL of this supplement. Due to the high number of referenced specifications and standards, this supplement deviates from ITU-T Rec. X.296 | ISO/IEC 9646-7 in a way that it does not specify a single reference. Instead, it specifies an RL for each base specification or standard, where necessary.

Protocols name	Specification/ Standard reference	PICS/RL reference	Supplement reference
DSM-CC user-user	ISO/IEC 13818-6, clause 5	DSM-CC U-U PICS and RL	Table 21, Table 22, Table 23
DSM-CC user-network	ISO/IEC 13818-6, clauses 3 and 4	DSM-CC U-N PICS and RL	Table 24, Table 25, Table 26, Table 27
Network access protocols (Note)	(see Table 28)		Table 28
NOTE – All relevant protocols are listed in the referenced table.			

6.1 Testing of DSM-CC U-U

6.1.1 Definition of PICS proforma and RL

The client and server conformance requirements of DSM-CC U-U are different. Therefore, a different ICS and RL has to be specified. The same criteria as for the client side have to be taken into account (see relevant clause for set-top box).

The definition of the Requirements List is based upon the information contained in Parts 7 and 12 of DAVIC 1.0. Furthermore, the definition of a requirements list takes into account that MHEG-5 is used above DSM-CC U-U.

6.1.1.1 Roles

Table 21 – PICS and RL for DSM-CC U-U server role

	DSM-CC U-U PICS				DAVIC 1.0 profile RL	
Item	Role Does the implementation support...	Conditions for status	Status	ISO/IEC 13818-6 reference	DAVIC reference	Status
R1	The client role		O.1		Part 7	x
R2	The network role		O.1			x
R3	The server role		O.1		Part 7	m
O.1 Support of one, and only one, of these options is required.						

6.1.1.2 Major capabilities of the server role

If the server role (predicate R1) is not supported, the tables in this and subsequent subclauses are then not applicable.

Table 22 – PICS and RL for DSM-CC U-U major capabilities (Server)

	DSM-CC U-U PICS				DAVIC 1.0 profile RL	
Item	Role Does the implementation support...	Conditions for status	Status	ISO/IEC 13818-6 reference	DAVIC reference	Status
Mc 1	User-to-network procedures		O	5	Part 7 – 7.1	m
Mc 2	User compatibility		O	6	Part 7	m
Mc 3	Normal play time, stream mode and stream events		O	8	Part 7	m

6.1.1.3 Subsidiary capabilities related to user-to-user procedures

Table 23 – PICS and RL for DSM-CC U-U subsidiary capabilities (Server)

	DSM-CC U-U PICS				DAVIC 1.0 profile RL	
Item	Role Does the implementation support...	Conditions for status	Status	ISO/IEC 13818-6 reference	DAVIC reference	Status
	User-to-user system environment & application portability interface					
Sc 1	Client-related aspects of the user-to-user system environment & application portability interface, including common types, exceptions, access control and DSM library functions		O.1	5.2, 5.4, 5.7	Part 7	m
	Application runtime procedures					
Sc 2.1	Remote procedure call mechanism based on UNO		O.2	5.3.2	Part 7 – 7.3.1	m
Sc 2.2	Other remote procedure call mechanism		O.2	5.3.2	Part 7 – 7.3.1	x
Sc 3	Recommended format for service context lists			5.3.2.1	Part 7	m

Table 23 – PICS and RL for DSM-CC U-U subsidiary capabilities (Server)

		DSM-CC U-U PICS			DAVIC 1.0 profile RL	
Item	Role Does the implementation support...	Conditions for status	Status	ISO/IEC 13818-6 reference	DAVIC reference	Status
Sc 4.1	Interoperable object reference format		m	5.3.3	Part 7 – 7.3.1	m
Sc 4.2	IIOP profile body		m	5.3.3	Part 7 – 7.3.1	m
Sc 4.3	Tagged profiles for other RPC mechanisms	Sc 2.2 NOT Sc 2	O N/A	5.3.3	Part 7 – 7.3.1	x
Sc 5.1	Processing of additional protocol profile body for composite resources		M	5.3.3, 5.3.2.1	Part 7	m
Sc 5.2	Resource to connection association (connection binder)		M	5.3.3.1	Part 7	m
Sc 5.3	Inclusion of a preferred association tag in requests		O	5.3.3.1		i
Sc 6.1	Client-related aspects of the user-to-network assumptions and requirements		M	5.3.4	Part 7	m
Sc 6.2	Security authentication prior to DSM ServiceGateway attach		O	5.3.4.1.1		i
Sc 6.3	DownLoadInfoRequest in association with ClientSessionSetupRequest		O	5.3.4.1.1, 5.3.4.1.2		i
Sc 6.4	session suspension/resumption		O	5.3.4.1.1, 5.3.4.1.2	Part 7	m
	Core client-service interfaces					
Sc 7.1	Base interface, including base IsA		M	5.5.1	Part 7	m
Sc 7.2	DSM base close		M	5.5.1.2	Part 7	m
Sc 7.3	DSM base destroy		M	5.5.1.3	Part 7	m
Sc 8	Access interface		M	5.5.2, 5.5.2.1	Part 7	m
Sc 9.1	Directory interface		M	5.5.3, 5.5.3.1	Part 7	m
Sc 9.2	DSM Directory list		M	5.5.3.3	Part 7	m
Sc 9.3	DSM Directory resolve		M	5.5.3.4	Part 7	m
Sc 9.4	DSM Directory bind		M	5.5.3.5	Part 7	m
Sc 9.5	DSM Directory bind_context		M	5.5.3.6	Part 7	m
Sc 9.6	DSM Directory rebind		M	5.5.3.7	Part 7	m
Sc 9.7	DSM Directory rebind_context		M	5.5.3.8	Part 7	m
Sc 9.8	DSM Directory unbind		M	5.5.3.9	Part 7	m
Sc 9.9	DSM Directory new_context		M	5.5.3.10	Part 7	m
Sc 9.10	DSM Directory bind_new_context		M	5.5.3.11	Part 7	m
Sc 9.11	DSM Directory destroy		M	5.5.3.12	Part 7	m
Sc 9.12	DSM Directory open		M	5.5.3.13	Part 7	m
Sc 9.13	DSM Directory close		M	5.5.3.14	Part 7	m
Sc 9.14	DSM Directory get		M	5.5.3.15	Part 7	m

Table 23 – PICS and RL for DSM-CC U-U subsidiary capabilities (Server)

	DSM-CC U-U PICS				DAVIC 1.0 profile RL	
Item	**Role** **Does the implementation support...**	**Conditions for status**	**Status**	**ISO/IEC 13818-6 reference**	**DAVIC reference**	**Status**
Sc 9.15	DSM Directory put		M	5.5.3.16	Part 7	m
Sc 10.1	Stream interface		M	5.5.4, 5.5.4.1, 5.5.4.2, 5.5.4.3	Part 7	m
Sc 10.2	Complete stream interface state machine	Sc 10.1 NOT Sc 10.1	O.3 N/A	5.5.4.4	Part 7	m
Sc 10.3	Simple stream interface state machine	Sc 10.1 NOT Sc 10.1	O.3 N/A	5.5.4.4		x
Sc 10.4	DSM stream pause	Sc 10.1 NOT Sc 10.1	M N/A	5.5.4.5	Part 7	m
Sc 10.5	DSM stream resume	Sc 10.1 NOT Sc 10.1	M N/A	5.5.4.6	Part 7	m
Sc 10.6	DSM stream status	Sc 10.1 NOT Sc 10.1	O N/A	5.5.4.7	Part 7	o
Sc 10.7	DSM stream reset	Sc 10.1 NOT Sc 10.1	M N/A	5.5.4.8	Part 7	m
Sc 10.8	DSM stream jump	Sc 10.2 NOT Sc 10.2	M N/A	5.5.4.9	Part 7	m
Sc 10.9	DSM stream play	Sc 10.2 NOT Sc 10.2	M N/A	5.5.4.10	Part 7	m
Sc 10.10	DSM stream next	Sc 10.2 NOT Sc 10.2	M N/A	5.5.4.11	Part 7	m
Sc 11.1	Event interface	Sc 10.1 NOT Sc 10.1	O N/A	5.6.9	Part 7 – 7.3.7.2	m
Sc 11.2	DSM event subscribe	Sc 11.1 NOT Sc 11.1	M N/A	5.6.9.3	Part 7 – 7.3.7.2	m
Sc 11.3	DSM event unsubscribe	Sc 11.1 NOT Sc 11.1	M N/A	5.6.9.4	Part 7 – 7.3.7.2	m
Sc 12.1	File interface		M	5.5.5, 5.5.5.1, 5.5.5.2	Part 7	m
Sc 12.2	DSM file read		M	5.5.5.3	Part 7	m
Sc 12.3	DSM file write		M	5.5.5.4	Part 7	m
Sc 13.1	ServiceGateway interface		M	5.5.6, 5.5.6.1, 5.5.6.2	Part 7	m
Sc 13.2	DSM ServiceGateway attach		M	5.5.6.3	Part 7	m
Sc 13.3	DSM ServiceGateway detach		M	5.5.6.4	Part 7	m
	Extended client-service interfaces					
Sc 14	Extended interfaces		O	5.6		i
O.1 Support of at least one of these options is required.						
O.2 Support of at least one of these options is required.						
O.3 Support of at least one of these options is required.						

6.1.2 Definition of a set of test cases

Please refer to 5.3.3.

6.1.3 Guidance on test method

As opposed to the STU, the conformance testing of the server implementation will check if the server is able to correctly process DSM-CC requests and react with the corresponding DSM-CC responses. The dynamic behaviour of the protocol shall also prove that the server is capable of processing several requests (synchronously and asynchronously) without breaking down. The test method shall be the same as for the STU.

6.2 Testing of DSM-CC U-N

6.2.1 Definition of PICS proforma and RL

Currently, there is no specification for a PICS for DSM-CC U-N.

The DSM-CC U-N standard contains several options which are partly restricted by the DAVIC specifications which will be described in an RL. The definition of the Requirements List shall be based upon the information contained in Parts 7 and 12 of DAVIC 1.0.

6.2.1.1 Roles

Table 24 – PICS and RL table for DSM-CC U-N server role

	DSM-CC U-N PICS				DAVIC 1.0 profile RL	
Item	**Role Does the implementation support...**	**Conditions for status**	**Status**	**ISO/IEC 13818-6 reference**	**DAVIC reference**	**Status**
R1	The client role		O.1			x
R2	The network role		O.1			x
R3	The server role		O.1			m
O.1	Support of one, and only one, of these options is required.					

6.2.1.2 Major capabilities of the server role

If the server role (predicate R3) is not supported, the tables in this and subsequent subclauses (Table 25 onwards) are then not applicable.

Table 25 – PICS and RL table for DSM-CC U-N major capabilities (Server)

	DSM-CC U-N PICS				DAVIC 1.0 profile RL	
Item	**Role Does the implementation support...**	**Conditions for status**	**Status**	**ISO/IEC 13818-6 reference**	**DAVIC reference**	**Status**
Mc 1	User-to-network configuration procedures		O	3		o
Mc 2	User-to-network session control procedures		O	4		m

6.2.1.3 PDU support for DSM-CC user-to-network

Table 26 – PICS and RL table for DSM-CC U-N PDU support (Server)

	DSM-CC U-N PICS				DAVIC 1.0 profile RL	
Item	Protocol data units Does the implementation support...	Conditions for status	Status	ISO/IEC 13818-6 reference	DAVIC reference	Status
	User-to-network configuration group					
Pdu1	UNConfigRequest		o	3.2	Part 7 – 8.4	o
Pdu2	UNConfigIndication		o	3.3	Part 7 – 8.4	o
Pdu3	UNConfigResponse		o	3.4	Part 7 – 8.4	o
Pdu4	UNConfigConfirm		o	3.5	Part 7 – 8.4	o
	User-to-network core group					
Pdu5	ClientSessionSetUpRequest		m	4.2.3	Part 7 – 8.3	i
Pdu6	ClientSessionSetUpIndication		m	4.2.4	Part 7 – 8.3	i
Pdu7	ClientSessionSetUpResponse		m	4.2.5	Part 7 – 8.3	i
Pdu8	ClientSessionSetUpConfirm		m	4.2.6	Part 7 – 8.3	i
Pdu9	ServerSessionSetUpRequest		m	4.2.29	Part 7 – 8.3	i
Pdu10	ServerSessionSetUpIndication		m	4.2.30	Part 7 – 8.3	m
Pdu11	ServerSessionSetUpResponse		m	4.2.31	Part 7 – 8.3	m
Pdu12	ServerSessionSetUpConfirm		m	4.2.32	Part 7 – 8.3	i
Pdu13	ClientReleaseRequest		m	4.2.7	Part 7 – 8.3	i
Pdu14	ClientReleaseIndication		m	4.2.8	Part 7 – 8.3	i
Pdu15	ClientReleaseResponse		m	4.2.9	Part 7 – 8.3	i
Pdu16	ClientReleaseConfirm		m	4.2.10	Part 7 – 8.3	i
Pdu17	ServerReleaseRequest		m	4.2.38	Part 7 – 8.3	m
Pdu18	ServerReleaseIndication		m	4.2.39	Part 7 – 8.3	m
Pdu19	ServerReleaseResponse		m	4.2.40	Part 7 – 8.3	m
Pdu20	ServerReleaseConfirm		m	4.2.41	Part 7 – 8.3	m
Pdu21	ClientAddResourceIndication		m	4.2.11	Part 7 – 8.3	i
Pdu22	ClientAddResourceResponse		m	4.2.12	Part 7 – 8.3	i
Pdu23	ServerAddResourceRequest		m	4.2.42	Part 7 – 8.3	m
Pdu24	ServerAddResourceConfirm		m	4.2.43	Part 7 – 8.3	m
Pdu25	ClientDeleteResourceIndication		m	4.2.13	Part 7 – 8.3	i
Pdu26	ClientDeleteResourceResponse		m	4.2.14	Part 7 – 8.3	i
Pdu27	ServerDeleteResourceRequest		m	4.2.44	Part 7 – 8.3	m
Pdu28	ServerDeleteResourceConfirm		m	4.2.45	Part 7 – 8.3	m
Pdu29	ClientStatusRequest		m	4.2.17	Part 7 – 8.3	i
Pdu30	ClientStatusIndication		m	4.2.18	Part 7 – 8.3	i
Pdu31	ClientStatusResponse		m	4.2.19	Part 7 – 8.3	i
Pdu32	ClientStatusConfirm		m	4.2.20	Part 7 – 8.3	i
Pdu33	ServerStatusRequest		m	4.2.48	Part 7 – 8.3	o
Pdu34	ServerStatusIndication		m	4.2.49	Part 7 – 8.3	o
Pdu35	ServerStatusResponse		m	4.2.50	Part 7 – 8.3	o

Table 26 – PICS and RL table for DSM-CC U-N PDU support (Server)

	DSM-CC U-N PICS				DAVIC 1.0 profile RL	
Item	Protocol data units Does the implementation support...	Conditions for status	Status	ISO/IEC 13818-6 reference	DAVIC reference	Status
Pdu36	ServerStatusConfirm		m	4.2.51	Part 7 – 8.3	o
Pdu37	ClientResetRequest		m	4.2.21	Part 7 – 8.3	i
Pdu38	ClientResetIndication		m	4.2.22	Part 7 – 8.3	i
Pdu39	ClientResetResponse		m	4.2.23	Part 7 – 8.3	i
Pdu40	ClientResetConfirm		m	4.2.24	Part 7 – 8.3	i
Pdu41	ClientProceedingIndication		o	4.2.25	Part 7 – 8.3	i
Pdu42	ServerResetRequest		o	4.2.33	Part 7 – 8.3	i
Pdu43	ServerResetIndication		o	4.2.34	Part 7 – 8.3	i
Pdu44	ServerResetResponse		o	4.2.35	Part 7 – 8.3	i
Pdu45	ServerResetConfirm		o	4.2.36	Part 7 – 8.3	i
Pdu46	ClientConnectRequest		o	4.2.26	Part 7 – 8.3	i
Pdu47	ServerConnectIndication		o	4.2.37	Part 7 – 8.3	i
	User-to-network extended group					
Pdu48	ServerSessionTransferRequest		o	4.2.52	Part 7 – 8.3	i
Pdu49	ServerSessionTransferConfirm		o	4.2.53	Part 7 – 8.3	i
Pdu50	ClientSessionTransferIndication		o	4.2.27	Part 7 – 8.3	i
Pdu51	ClientSessionTransferResponse		o	4.2.28	Part 7 – 8.3	i
Pdu52	ClientPassThruRequest		o	4.2.15	Part 7 – 8.3	i
Pdu53	ClientPassThruIndication		o	4.2.16	Part 7 – 8.3	i
Pdu54	ServerPassThruRequest		o	4.2.46	Part 7 – 8.3	i
Pdu55	ServerPassThruIndication		o	4.2.47	Part 7 – 8.3	i

6.2.1.4 Parameter support

Table 27 – PICS and RL table for DSM-CC U-N parameter support (Server)

	DSM-CC U-N PICS				DAVIC 1.0 profile RL	
Item	Parameter	Status	Syntax	ISO/IEC 13818-6 reference	Status	Allow values
	ServerSessionSetUpIndication					
Par1	sessionId	m	INTEGER		m	
Par2	clientId	m	INTEGER		m	STU E.164 NSAP
Par3	serverId	m	INTEGER		m	
Par4	forwardCount	m	INTEGER		m	
Par5	forwardServerId	m	INTEGER		m	
Par6	UserData	o	UserData		m	limited to 400 B

Table 27 – PICS and RL table for DSM-CC U-N parameter support (Server)

Item	Parameter	Status	Syntax	ISO/IEC 13818-6 reference	Status	Allow values
	DSM-CC U-N PICS				**DAVIC 1.0 profile RL**	
	ServerSessionSetUpResponse					
Par7	sessionId	m	INTEGER		m	
Par8	serverId	m	INTEGER		m	
Par9	response	m	response		m	
Par10	nextServerId	m	INTEGER		m	
Par11	forwardCount	m	INTEGER		m	
Par12	forwardServerId	m	INTEGER		m	
Par13	UserData	o	UserData		o	
	ServerReleaseRequest					
Par14	sessionId	m	INTEGER		m	
Par15	reason	m	reason		m	
Par16	UserData	o	UserData		o	
	ServerReleaseIndication					
Par17	sessionId	m	INTEGER		m	
Par18	reason	m	reason		m	
Par19	UserData	o	UserData		o	
	ServerReleaseResponse					
Par20	sessionId	m	INTEGER		m	
Par21	response	m	response		m	
Par22	UserData	o	UserData		m	input to DSM-Service-Gateway-Detach
	ServerReleaseConfirm					
Par23	sessionId	m	INTEGER		m	
Par24	response	m	response		m	
Par25	UserData	o	UserData		o	
	ServerAddResourceRequest					
Par26	sessionId	m	INTEGER		m	
Par27	ResourceCount	m	INTEGER		m	
Par28	ResourceDescriptor	m	Resource-Descriptor		m	DAVIC, part 7 Table 8-9
Par29	UserData()	o	UserData		C1	
	ServerAddResourceConfirm					
Par30	sessionId	m	INTEGER		m	
Par31	response	m	response		m	
Par32	ResourceCount	m	INTEGER		m	
Par33	ResourceDescriptor	m	Resource-Descriptor		m	DAVIC, part 7 Table 8-9
Par34	UserData()	o	UserData		o	

Table 27 – PICS and RL table for DSM-CC U-N parameter support (Server)

	DSM-CC U-N PICS				DAVIC 1.0 profile RL	
Item	Parameter	Status	Syntax	ISO/IEC 13818-6 reference	Status	Allow values
	ServerDeleteResource Request					
Par35	sessionId	m	INTEGER		m	
Par36	reason	m	reason		m	
Par37	ResourceCount	m	INTEGER		m	
Par38	ResourceNum		Resource-Num		m	S2 resources can be deleted if other are successfully added
Par39	UserData()	o	UserData		o	
	ServerDeleteResource Confirm					
Par40	sessionId	m	INTEGER		m	
Par41	response	m	Response		m	
Par42	UserData()	o	UserData		o	
	ServerStatusRequest					
Par43	reason	m	reason		m	
Par44	StatusType	m	StatusType		m	
Par45	StatusCount	m	INTEGER		m	
Par46	StatusByte	m	StatusByte		m	
Par47	reason	m	reason		m	
Par48	StatusType	m	StatusType		m	
Par49	StatusCount	m	INTEGER		m	
Par50	StatusByte	m	StatusByte		m	
	ServerStatusResponse					
Par51	response	m	response		m	
Par52	StatusType	m	StatusType		m	
Par53	StatusCount	m	INTEGER		m	
Par54	StatusByte	m	StatusByte		m	
	ServerStatusConfirm					
Par55	response	m	response		m	
Par56	StatusType	m	StatusType		m	
Par57	StatusCount	m	INTEGER		m	
Par58	StatusByte	m	StatusByte		m	

C1:   If session already established then O, else x.

6.2.2   Guidance on test method

The same test method shall be applied as in the case of testing the STU DSM-CC U-N implementation.

6.2.3   Definition of a set of test cases

A limited set of test cases is specified (not a complete ATS). The test cases are built on the requirements of the relevant ICS proforma and RL. The contents of a test case shall follow the structure of abstract test cases described in ITU-T Recs X.29x series | ISO/IEC 9646.

The test cases mainly test the dynamic conformance requirements of the DSM-CC U-N protocol.

6.2.3.1 DSM-CC U-N session set-up

Test purpose:

> This test verifies the capability of IUT to accept the set-up of a session and to request additional resources.

Test sequence:

> The LT sends a "ServerSessionSetUpIndication" to the IUT and waits for ServerAddResourcesRequest".
>
> The LT checks the validity of all fields of the PDU and, if it does not find any inconsistency, sends a message of "ServerAddResourceConfirm".
>
> The IUT sends a message of "ServerSessionSetUpResponse".
>
> The LT checks the validity of all fields of the PDU.

Precondition:

> The IUT is in Idle state.

Postcondition:

> Session is established, DSM-CC commands can be sent.

6.2.3.2   DSM-CC U-N session tear down

Test purpose:

> This test verifies the capability of IUT to delete resources already established and finally to accept session release.

Test sequence:

> The IUT sends a message of "ServerDeleteResourceRequest".
>
> The LT checks the validity of all fields of the PDU and, if it does not find any inconsistency, sends a message of "ServerDeleteResourceConfirm".
>
> The LT requests the clearance of the session sending a message of "ServerReleaseIndication" and waits for a message of "ServerReleaseResponse".
>
> The LT checks the validity of all fields of the PDU.

Precondition:

> The session has already been established.

Postcondition:

> The IUT is in Idle state.

6.3 Testing of network access

6.3.1 Test items for network conformance

The areas where conformance should be tested for are presented in Table 28.

Table 28 – PICS and RL table for server network access (Server)

Network features					DAVIC 1.0 profile RL	
Item	Role	Conditions for status	Status	Reference	DAVIC 1.0 reference	Status
Nw 1	Core network				Part 3	m
Nw 1.1	ATM		m		Part 3	m
Nw 2	Access network				Part 3	m
Nw 2.6.1	Encoding/Decoding process		m		Part 3	m
Nw 2.6.2	MPEG-2 transport stream				Part 3	m
Nw 2.6.3	Asynchronous Transfer Mode (ATM) stream				Part 3	m
Nw 2.6.5	ATM framing structure				Part 3	m
Nw 2.6.11	Information bit rate		O		Part 3	m
Nw 2.7.1	Downstream physical interface				Part 3	m
Nw 2.7.2	Upstream physical interface				Part 3	m
Nw 2.7.3	Media access control functionality				Part 3	m
Nw 3	Network-interface-unit to set-top-unit interface				Part 3	m

7 Conformance testing of SRM

7.1 Testing of DSM-CC U-N

The SRM has to support all DSM-CC UN features of the terminal and the server respectively. Therefore, the conformance requirements of DSM-CC U-N for the SRM are the combination of the supported features for the client and the server.

The definition of the Requirements List is based upon the information contained in Parts 7 and 12 of DAVIC 1.0.

7.1.1 Roles

Table 29 – PICS and RL for DSM-CC U-U network role

DSM-CC U-U PICS					DAVIC 1.0 profile RL	
Item	Role Does the implementation support...	Conditions for status	Status	ISO/IEC 13818-6 reference	DAVIC reference	Status
R1	The client role		O.1		Part 7	x
R2	The network role		O.1		Part 7	m
R3	The server role		O.1		Part 7	x
O.1 Support of one, and only one, of these options is required.						

7.1.2   Major capabilities of the network role

If the server role (predicate R2) is not supported, the tables in this and subsequent subclauses are then not applicable.

Table 30 – PICS and RL table for DSM-CC U-N major capabilities (Network)

DSM-CC U-N PICS					DAVIC 1.0 profile RL	
Item	Role Does the implementation support...	Conditions for status	Status	ISO/IEC 13818-6 reference	DAVIC reference	Status
Mc 1	User-to-network configuration procedures		O	3		m
Mc 2	User-to-network session control procedures		O	4		m

7.1.3   PDU support for DSM-CC user-to-network

Table 31 – PDU support for DSM-CC U-N (Network)

DSM-CC U-N PICS					DAVIC 1.0 profile RL	
Item	Protocol data units Does the implementation support...	Conditions for status	Status	ISO/IEC 13818-6 reference	DAVIC reference	Status
	User-to-network configuration group					
Pdu1	UNConfigRequest		o	3.2	Part 7 – 8.4	m
Pdu2	UNConfigIndication		o	3.3	Part 7 – 8.4	m
Pdu3	UNConfigResponse		o	3.4	Part 7 – 8.4	m
Pdu4	UNConfigConfirm		o	3.5	Part 7 – 8.4	m
	User-to-network core group					
Pdu5	ClientSessionSetUpRequest		m	4.2.3	Part 7 – 8.3	m
Pdu6	ClientSessionSetUpIndication		m	4.2.4	Part 7 – 8.3	i
Pdu7	ClientSessionSetUpResponse		m	4.2.5	Part 7 – 8.3	i
Pdu8	ClientSessionSetUpConfirm		m	4.2.6	Part 7 – 8.3	m
Pdu9	ServerSessionSetUpRequest		m	4.2.29	Part 7 – 8.3	i
Pdu10	ServerSessionSetUpIndication		m	4.2.30	Part 7 – 8.3	m
Pdu11	ServerSessionSetUpResponse		m	4.2.31	Part 7 – 8.3	m
Pdu12	ServerSessionSetUpConfirm		m	4.2.32	Part 7 – 8.3	i
Pdu13	ClientReleaseRequest		m	4.2.7	Part 7 – 8.3	m
Pdu14	ClientReleaseIndication		m	4.2.8	Part 7 – 8.3	m
Pdu15	ClientReleaseResponse		m	4.2.9	Part 7 – 8.3	m
Pdu16	ClientReleaseConfirm		m	4.2.10	Part 7 – 8.3	m
Pdu17	ServerReleaseRequest		m	4.2.38	Part 7 – 8.3	m
Pdu18	ServerReleaseIndication		m	4.2.39	Part 7 – 8.3	m
Pdu19	ServerReleaseResponse		m	4.2.40	Part 7 – 8.3	m
Pdu20	ServerReleaseConfirm		m	4.2.41	Part 7 – 8.3	m
Pdu21	ClientAddResourceIndication		m	4.2.11	Part 7 – 8.3	m
Pdu22	ClientAddResourceResponse		m	4.2.12	Part 7 – 8.3	m
Pdu23	ServerAddResourceRequest		m	4.2.42	Part 7 – 8.3	m

Table 31 – PDU support for DSM-CC U-N (Network)

	DSM-CC U-N PICS				DAVIC 1.0 profile RL	
Item	Protocol data units Does the implementation support...	Conditions for status	Status	ISO/IEC 13818-6 reference	DAVIC reference	Status
Pdu24	ServerAddResourceConfirm		m	4.2.43	Part 7 – 8.3	m
Pdu25	ClientDeleteResourceIndication		m	4.2.13	Part 7 – 8.3	m
Pdu26	ClientDeleteResourceResponse		m	4.2.14	Part 7 – 8.3	m
Pdu27	ServerDeleteResourceRequest		m	4.2.44	Part 7 – 8.3	m
Pdu28	ServerDeleteResourceConfirm		m	4.2.45	Part 7 – 8.3	m
Pdu29	ClientStatusRequest		m	4.2.17	Part 7 – 8.3	o
Pdu30	ClientStatusIndication		m	4.2.18	Part 7 – 8.3	o
Pdu31	ClientStatusResponse		m	4.2.19	Part 7 – 8.3	o
Pdu32	ClientStatusConfirm		m	4.2.20	Part 7 – 8.3	o
Pdu33	ServerStatusRequest		m	4.2.48	Part 7 – 8.3	i
Pdu34	ServerStatusIndication		m	4.2.49	Part 7 – 8.3	i
Pdu35	ServerStatusResponse		m	4.2.50	Part 7 – 8.3	i
Pdu36	ServerStatusConfirm		m	4.2.51	Part 7 – 8.3	i
Pdu37	ClientResetRequest		m	4.2.21	Part 7 – 8.3	i
Pdu38	ClientResetIndication		m	4.2.22	Part 7 – 8.3	i
Pdu39	ClientResetResponse		m	4.2.23	Part 7 – 8.3	i
Pdu40	ClientResetConfirm		m	4.2.24	Part 7 – 8.3	i
Pdu41	ClientProceedingIndication		o	4.2.25	Part 7 – 8.3	m
Pdu42	ServerResetRequest		o	4.2.33	Part 7 – 8.3	i
Pdu43	ServerResetIndication		o	4.2.34	Part 7 – 8.3	i
Pdu44	ServerResetResponse		o	4.2.35	Part 7 – 8.3	i
Pdu45	ServerResetConfirm		o	4.2.36	Part 7 – 8.3	i
Pdu46	ClientConnectRequest		o	4.2.26	Part 7 – 8.3	i
Pdu47	ServerConnectIndication		o	4.2.37	Part 7 – 8.3	i
	User-to-network extended group					
Pdu48	ServerSessionTransferRequest		o	4.2.52	Part 7 – 8.3	i
Pdu49	ServerSessionTransferConfirm		o	4.2.53	Part 7 – 8.3	i
Pdu50	ClientSessionTransferIndication		o	4.2.27	Part 7 – 8.3	i
Pdu51	ClientSessionTransferResponse		o	4.2.28	Part 7 – 8.3	i
Pdu52	ClientPassThruRequest		o	4.2.15	Part 7 – 8.3	i
Pdu53	ClientPassThruIndication		o	4.2.16	Part 7 – 8.3	i
Pdu54	ServerPassThruRequest		o	4.2.46	Part 7 – 8.3	i
Pdu55	ServerPassThruIndication		o	4.2.47	Part 7 – 8.3	i

7.1.4   Parameter support

The parameter support is a combination of both terminal and server parameter support. Therefore, both Tables 19 and 27 must be applied to the SRM.

7.2   Testing of network access

See the relevant clauses regarding the terminal and the server.

Annex A

Information on PICS and RL

A.1 Purpose of Requirements Lists

Use of the DAVIC specifications imposes requirements on the implementation that go beyond those of the base standards referred to by this supplement. These result in modifications to the requirements expressed in the PICS proformas for the base standards. The previous clauses specify the modifications (the Requirements List (RL)) that apply to the status of the items affected in each PICS proforma; it modifies the answers that can be provided.

The content of an RL is normally based on the existence of a PICS proforma in each base standard. However, some editions of the base standards referenced by this supplement do not presently contain such proformas. Therefore, the RLs contained within this supplement have been derived by making assumptions about the content of the relevant PICS proformas, as if they already existed. Such assumptions have been made by inspection of the text of the referenced base standards.

A.2 Notation used

The status notation used in this annex is that defined in ITU-T Rec. X.296 | ISO/IEC 9646-7. In summary, the meaning of the notations is as follows:

i or I   Irrelevant or out-of-scope – This capability is outside the scope of this profile and is not subject to conformance testing in this context.

m or M Mandatory – The capability is required to be supported.

n/a   Not applicable – In the given context, it is impossible to use the capability.

o or O   Optional – The capability may be supported or not.

o.i   Qualified optional – For mutually exclusive or selectable options from a set. "i" is an integer that identifies a unique group of related optional items and the logic of their selection, defined below the table.

x or X   eXcluded or prohibited – There is a requirement not to support this capability in this profile.

c or C   Conditional – The requirement on the capability depends on the selection of other optional or conditional items.

The Requirements List in this supplement shall be used to restrict the permitted support answers in the corresponding PICS.

A.3 Categories of PICS proforma items

In the context of profile specifications contained in this supplement, ICS proformas items of the base protocol standards fall into 3 categories. These are:

–   those ICS proforma items where this profile does not restrict the permitted support answer;

–   those ICS proforma items tables where this profile restricts the permitted support answer; and,

–   those ICS proforma items that are not relevant to this profile.

Each category is a subset of the items for a given base standard. In each of the clauses above, the Requirements List contains only those ICS proforma items falling into the second category, with an indication of the modified status of each item.

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