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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



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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.

Source

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FOREWORD

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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 9646-3:1994, *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 Standards 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	Interactable 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 Interactable 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 Interactable 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.

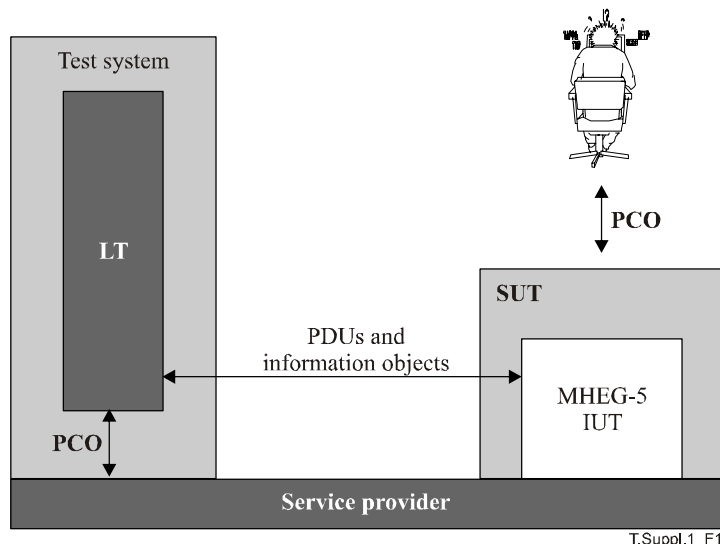


Figure 1 – Test method for MHEG-5

5.1.3.2 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.

5.1.3.3 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.