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Road vehicles — Media oriented systems transport (MOST) framework —

Part 3:
Application layer conformance test plan

Véhicules routiers — Environnement du système axé sur les médias —

Partie 3: Plan d'essais de conformance de la couche d'application

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, Road vehicles, Subcommittee SC 31, Data communication.

A list of all parts in the ISO 21806 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The Media Oriented Systems Transport (MOST) communication technology was initially developed at the end of the 1990s in order to support complex audio applications in cars. The MOST Cooperation was founded in 1998 with the goal to develop and enable the technology for the automotive industry. Today, MOST enables the transport of high Quality of Service (QoS) audio and video together with packet data and real-time control to support modern automotive multimedia and similar applications. MOST is a function-oriented communication technology to network a variety of multimedia devices comprising one or more MOST nodes.

Figure 1 shows a MOST network example.

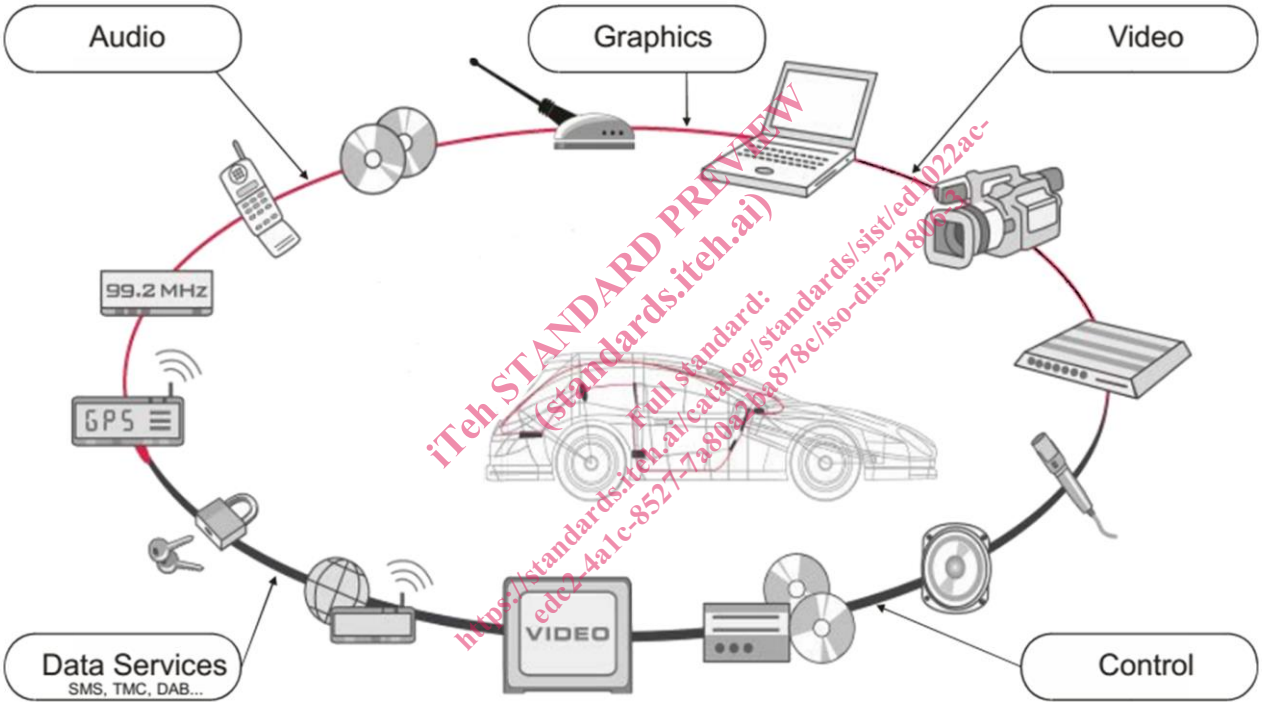


Figure 1 — MOST network example

The MOST communication technology provides

— synchronous and isochronous streaming,

— small overhead for administrative communication control,

— a functional and hierarchical system model,

— API standardization through a function block (FBlock) framework,

— free partitioning of functionality to real devices,

— service discovery and notification, and

— flexibly scalable automotive-ready Ethernet communication according to ISO/IEC/IEEE 8802-3.

MOST is a synchronous time-division-multiplexing (TDM) network that transports different data types on separate channels at low latency. MOST supports different bit rates and physical layers. The network clock is provided with a continuous data signal.

Within the synchronous base data signal, the content of multiple streaming connections and control data is transported. For streaming data connections, bandwidth is reserved to avoid interruptions, collisions, or delays in the transport of the data stream.

MOST specifies mechanisms for sending anisochronous, packet-based data in addition to control data and streaming data. The transmission of packet-based data is separated from the transmission of control data and streaming data. None of them interfere with each other.

A MOST network consists of devices that are connected to one common control channel and packet channel.

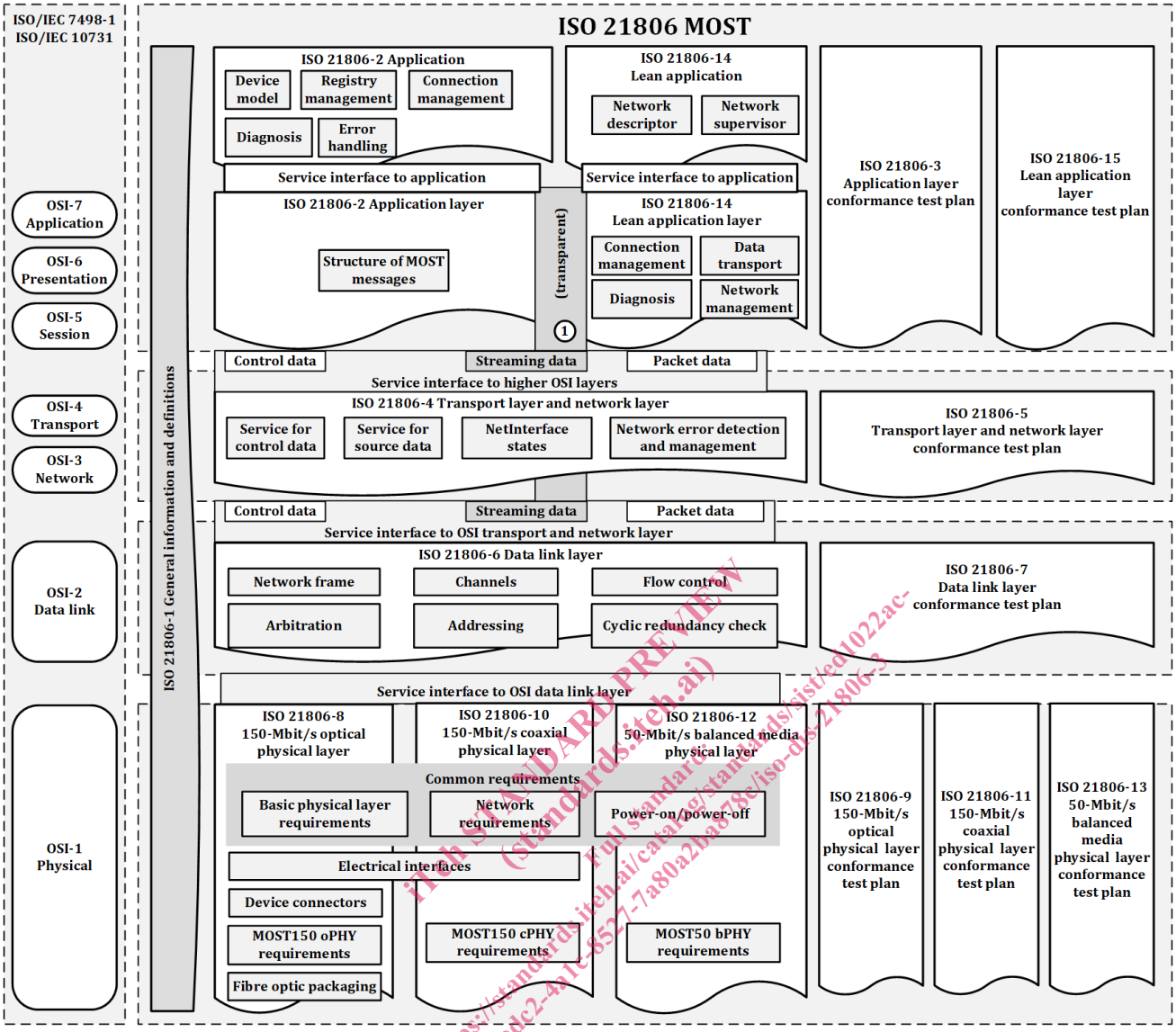
In summary, MOST is a network that has mechanisms to transport the various signals and data streams that occur in multimedia and infotainment systems.

The ISO Standards Maintenance Portal (http://standards.iso.org/iso/) provides references to MOST specifications implemented in today's road vehicles because easy access via hyperlinks to these specifications is necessary. It references documents that are normative or informative for the MOST versions 4V0, 3V1, 3V0, and 2V5.

MOST® is the Registered Trademark of Microchip Technology Inc. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO.

The ISO 21806 series has been established in order to specify requirements and recommendations for implementing the MOST communication technology into multimedia devices and to provide conformance test plans for implementing related test tools and test procedures.

To achieve this, the ISO 21806 series is based on the Open Systems Interconnection (OSI) Basic Reference Model in accordance with ISO/IEC 7498-1 [1] and ISO/IEC 10731 [2], which structures communication systems into seven layers as shown in Figure 2.



Key

1 Stream transmission application uses a direct stream data interface (transparent) to the data link layer

Figure 2 — ISO 21806 documents reference according to the OSI model

Road vehicles — Media oriented systems transport (MOST) framework —

Part 3: Application layer conformance test plan

1 Scope

This document specifies the conformance test plan (CTP), which covers the MOST device conformance tests for the application layer and includes the conformance tests (CTs) of the

— device model,

— data and basic data types,

— registry management,

— connection management,

— error management, and

— diagnosis.

Interoperability testing is not in the scope of this document.

2 Normative references

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

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

ISO 21806-1, *Road vehicles – Media Oriented Systems Transport (MOST) – Part 1: General information and definitions*

ISO 21806-2, *Road vehicles – Media Oriented Systems Transport (MOST) – Part 2: Application layer*

ISO 21806-4, *Road vehicles – Media Oriented Systems Transport (MOST) – Part 4: Transport layer and network layer*

ISO 21806-6, *Road vehicles – Media Oriented Systems Transport (MOST) – Part 6: Data link layer*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 21806-1, ISO 21806-2, ISO 21806-4, ISO/IEC 9646-1, and the following apply.

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

— IEC Electropedia: available at http://www.electropedia.org/;

— ISO Online browsing platform: available at http://www.iso.org/obp.

4 Symbols and abbreviated terms

For the purposes of this document, the abbreviated terms given in ISO 21806-1, ISO 21806-2, ISO 21806-4, and the following apply.

CT	conformance test
CTC	conformance test case
CTP	conformance test plan
CR	central registry
DR	decentral registry
IUT	implementation under test
LT	lower tester
MSC	Message Sequence Chart
NCE	network change event
OSI	Open Systems Interconnection
UT	upper tester

5 Conformance

This document is based on the conventions discussed in the OSI service conventions as specified in ISO/IEC 10731.

6 CTP overview

6.1 Test set-up

All CTCs use the same test set-up with two testers, an upper tester (UT) and a lower tester (LT), which contains the lower tester pre-IUT (LT pre-IUT) and the lower tester post-IUT (LT post-IUT).

Figure 3 shows the test set-up.

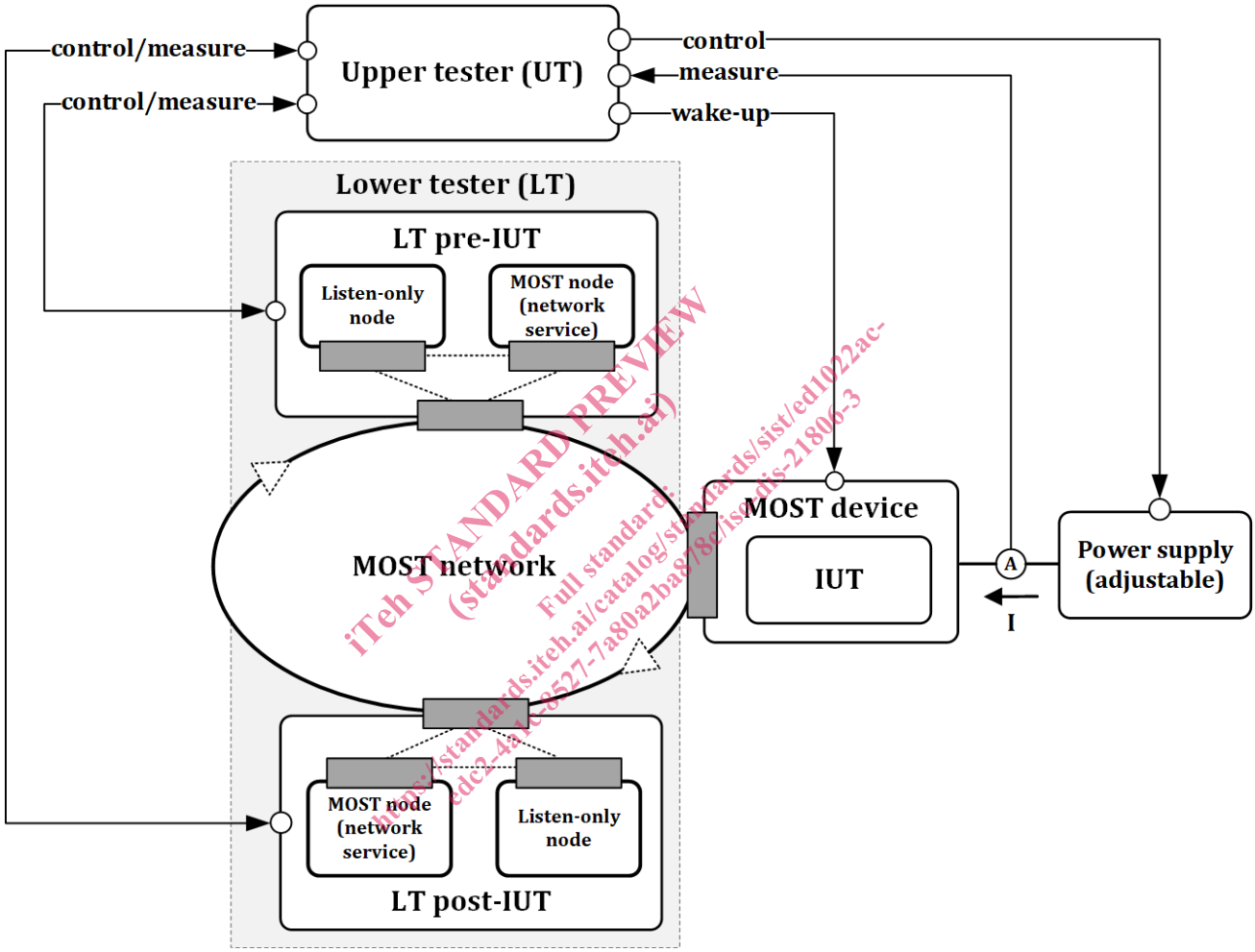


Figure 3 — Test set-up

The LT pre-IUT and the LT post-IUT each include the network service and the lower layers of a MOST node. They also contain a listen-only node in front of the MOST node to log the whole communication. The MOST node is able to operate as TimingMaster or TimingSlave; alternatively, it can be physically disconnected from the MOST network. If it is disconnected, the associated LT pre-IUT or LT post-IUT serves as listen-only node.

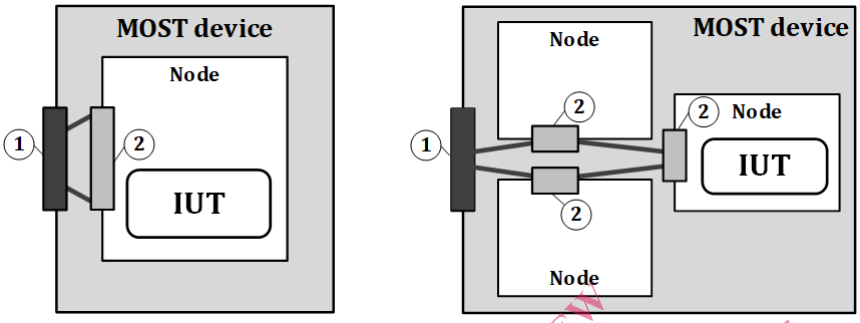
Every CTC contains a description of the experimental set-up that specifies the roles of the LT pre-IUT and the LT post-IUT.

NOTE During testing, avoid over-temperature situations of the MOST device that contains the IUT by following the manufacturer recommendations regarding cooling.

The power supply of the MOST device that contains the IUT is adjustable and the power consumption can be monitored by the UT. This is necessary to determine whether a node has entered s_NetInterface_Sleep.

A MOST device contains one or more nodes, which are connected to an external MOST physical interface. One of the nodes contains the implementation under test (IUT). All tests and timings, specified by the CTP, are always related to the external MOST physical interface.

Figure 4 shows a MOST device with one node and a MOST device with three internal nodes.



Key

1 External MOST physical interface

2 Internal MOST physical interface

Figure 4 — MOST device with one node and MOST device with three nodes

6.2 Conformance test plan organisation

The CTCs are independent of one another. Each CTC checks the behaviour of the IUT for a particular purpose of ISO 21806-2.

CTCs, which require variations of individual parameters, shall be repeated for each value of the parameter.

7 MOST CTP general information

7.1 CT remarks

7.1.1 Timer naming example

For conformance testing of the IUT, the UT and LT need minimum and maximum timers. The names of the timers used by this document are based on ISO 21806-2 and ISO 21806-4. To obtain the timer name, for minimum and maximum, "_min" and "_max" are appended, respectively. Table 1 shows a timer naming definition example for t_{Config}.

Table 1 — Timer naming example

Name	Min value	Typ value	Max value	Unit	Purpose
t_{Config}	t_{Config_min}	t_{Config}	t_{Config_max}	ms	Time before `ev_Init_Error_Shutdown` or delay for RBD result.

7.1.2 Deadlock prevention

To prevent a deadlock during testing, three timeouts are defined by this document:

— $t_{DeadLockShort}$ = 1 s;

— $t_{DeadLockMid}$ = 20 s;

— $t_{DeadLockLong}$ = 5 min.

These timeouts are only relevant for conformance testing.

If extended timeouts of the deadlock timer are necessary, the CTC shall indicate this.

7.1.3 Un-initialised logical node address

This document uses the variable `uninitialised_node_address` to identify the address of an un-initialised node, which is specified in ISO 21806-2.

7.1.4 Addresses of MOST nodes in the LT

By default, the address of a MOST node in the LT is the default logical node address corresponding to the node position.

If the address is in conflict with the address of a node that contains the IUT (e.g., if a supplier uses static addresses in the dynamic address range), the affected MOST node in the LT shall use a valid free address.

7.1.5 Device manufacturer information list

This list contains all information that is provided by the device manufacturer for conformance testing. It also includes remarks and references to corresponding CTCs.