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Road vehicles — Media Oriented Systems Transport (MOST) —

Part 7: Data link layer conformance test plan

Véhicules routiers — Système de transport axé sur les médias —

Partie 7: Plan d'essais de conformité de la couche de liaison de données

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Foreword

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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[1)] 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.

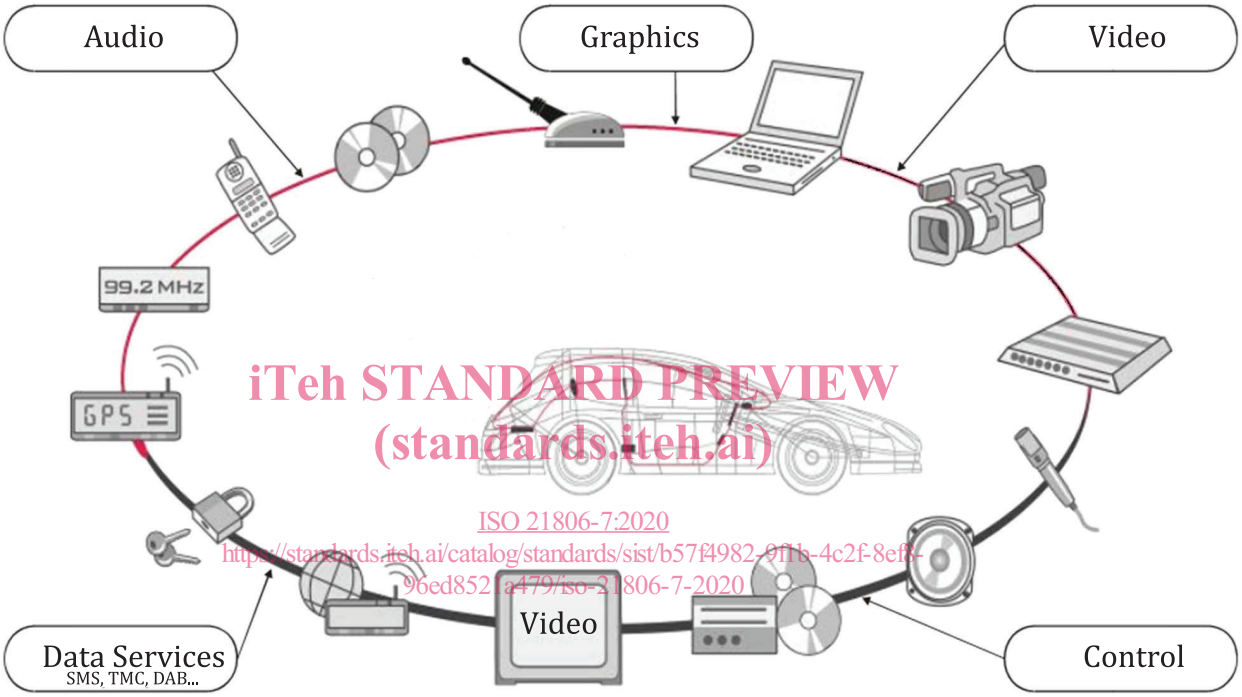

Figure 1 — MOST network example

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[2].

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.

1) 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.

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 (https://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.

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[3], which structures communication systems into seven layers as shown in Figure 2. Stream transmission applications use a direct stream data interface (transparent) to the data link layer.

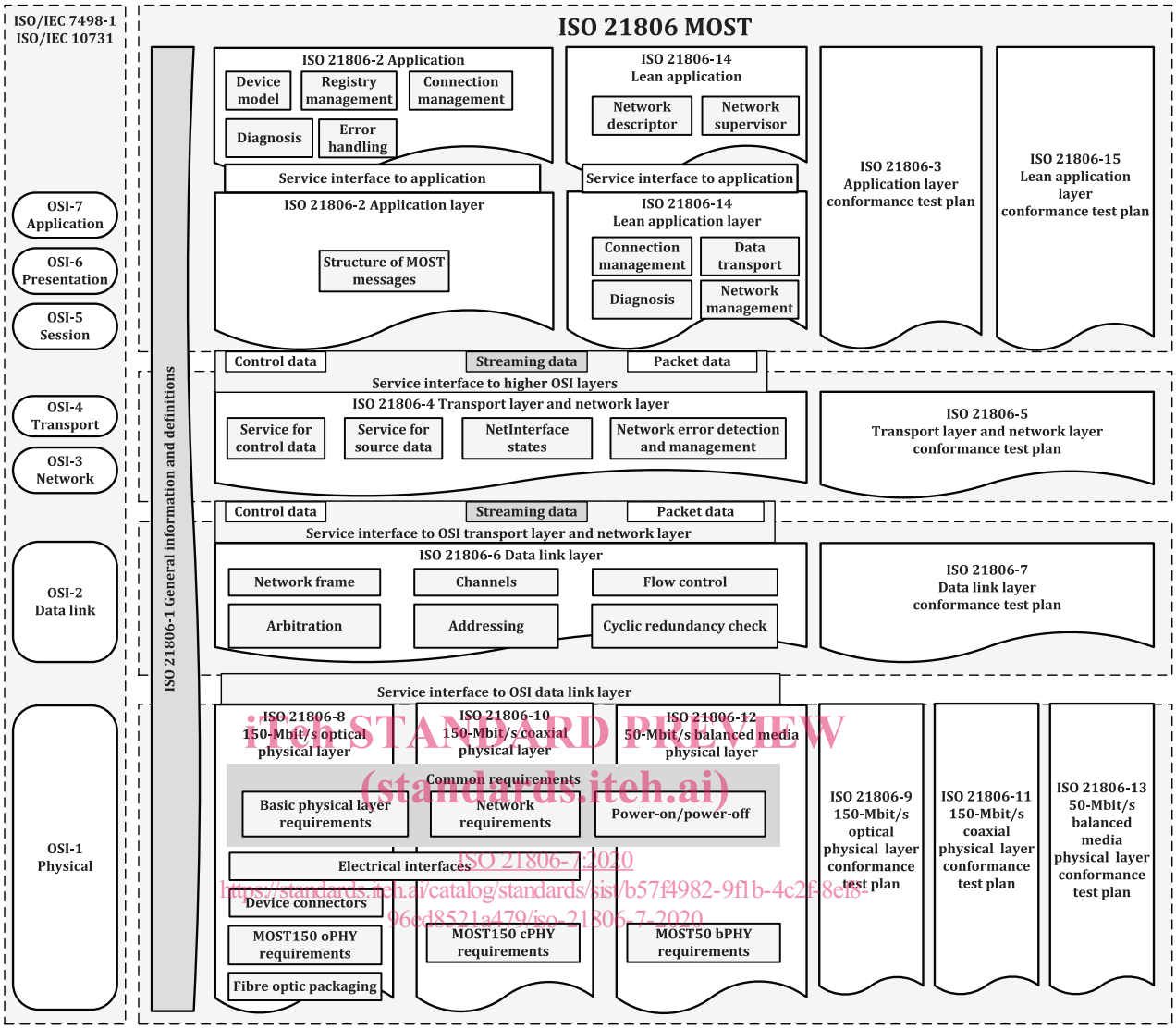

Figure 2 — The ISO 21806 series reference according to the OSI model

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Road vehicles — Media Oriented Systems Transport (MOST) —

Part 7: Data link layer conformance test plan

1 Scope

This document specifies the conformance test plan (CTP) for the data link layer for MOST, a synchronous time-division-multiplexing network, as specified in ISO 21806-6.

This document specifies conformance test cases (CTCs) in the following categories:

— network frames;

— allocation channel;

— protected system channel;

— timestamp channel;

— flow control;

— cyclic redundancy check;

— arbitration;

— default packet channel.

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 21806-6, *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 21806-6, ISO/IEC 9646-1, and the following apply.

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

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

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

3.1
REPEAT
pseudo code command for an iteration

3.2
REPEAT END
pseudo code command for ending an iteration

4 Symbols and abbreviated terms

4.1 Symbols

---	empty cell/undefined
N_{PBC}	packet bandwidth control
N_{TNBPF}	total number of bytes per frame

4.2 Abbreviated terms

For the purposes of this document, the abbreviated terms given in ISO 21806-1, ISO 21806-6, and the following apply.

CACK	CRC acknowledge
CTC	conformance test case
CTP	conformance test plan
IUT	implementation under test
LSb	least significant bit
LT	lower tester
MSb	most significant bit
OSI	Open Systems Interconnection
PACK	pre-emptive acknowledge
SOAF	start of allocation frame
UT	upper tester

5 Conventions

This document is based on OSI service conventions as specified in ISO/IEC 10731[3] and ISO/IEC 9646-1 for conformance test system set-up.

6 CTP overview

6.1 Test set-up

All CTCs are based on the same test set-up with an upper tester (UT) and a lower tester (LT). The LT contains the lower tester pre-IUT (LT pre-IUT) and the lower tester post-IUT (LT post-IUT).

Figure 3 specifies the test set-up.

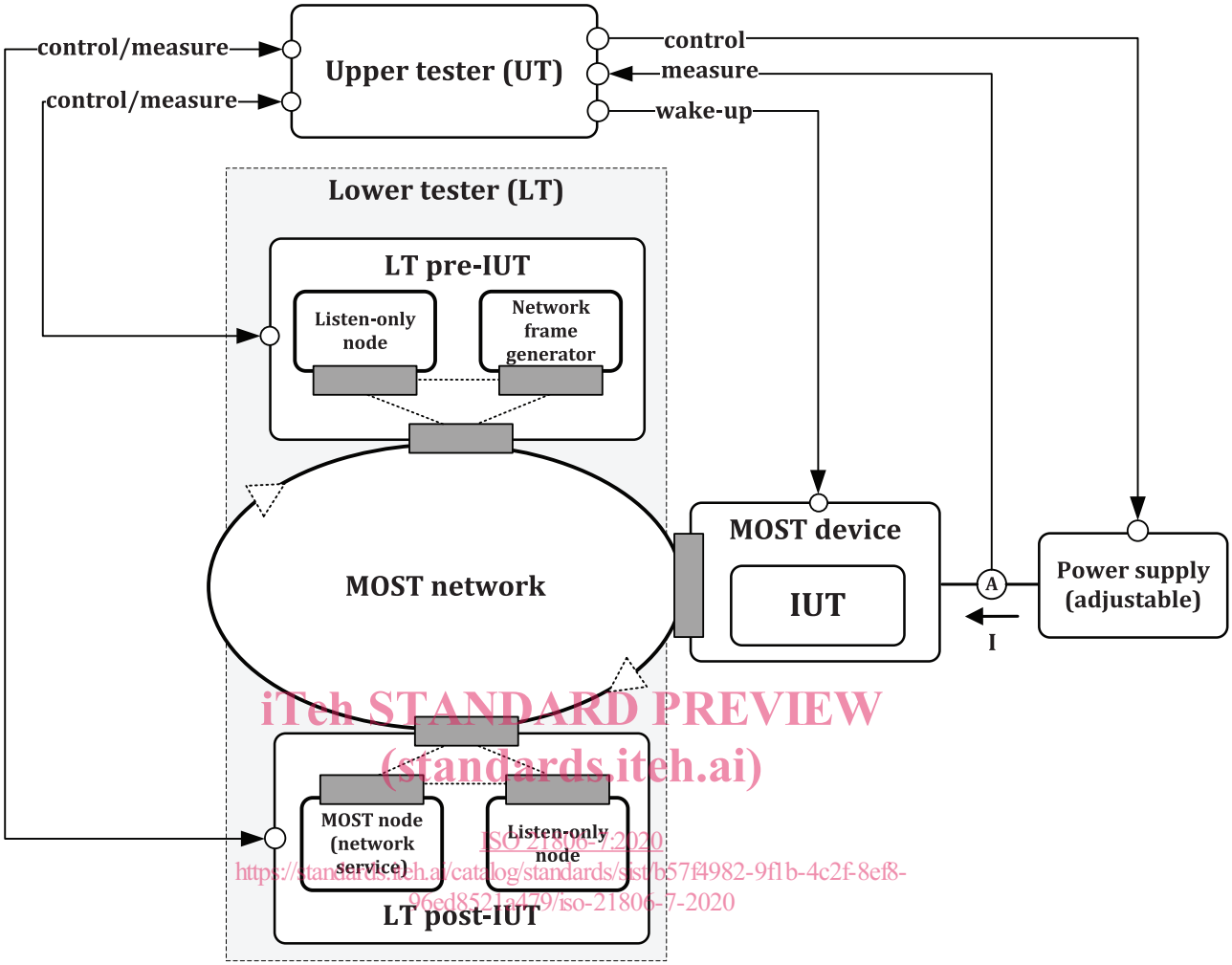


Figure 3 — Test set-up

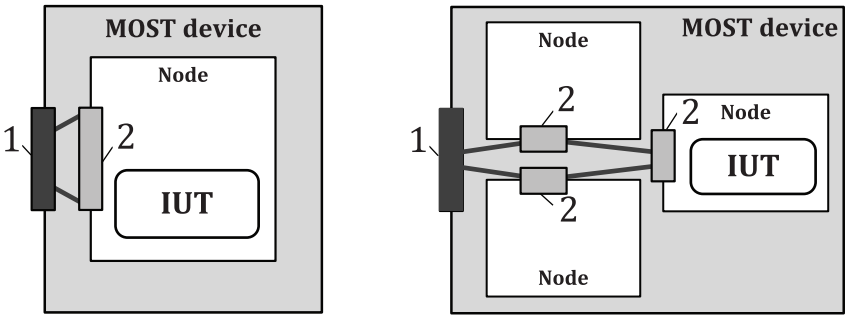
Every CTC specifies the roles of the LT pre-IUT and the LT post-IUT.

During testing of the MOST device that implements the IUT, avoid over-temperature 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 enters `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 related to the external MOST physical interface.

Figure 4 shows a MOST device with one node and a MOST device with three 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

CTCs are independent of one another. Each CTC checks the behaviour of the IUT for requirements stated in ISO 21806-6. Within CTCs, which require variations of individual parameters, each specified value of the parameter is iterated.

7 CTP general information

The following network frame elements require no initiative by the IUT and are observable in the MOST network during black box testing:

a) network frame indicators:

- PREAMBLE;
- START;
- END.

b) system flags;

c) node counter;

d) visible nodes value;

e) packet bandwidth control (N_{PBC});

f) network frame data bytes:

- control frame PACK and CACK;
- packet frame PACK and CACK;
- Ethernet frame PACK and CACK.

g) allocation frame:

- SOAF;
- allocation-defend frame;
- arbitration-result frame.