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**Road vehicles — Media Oriented  
Systems Transport (MOST) —**

**Part 15:  
Lean application layer conformance  
test plan**

*Véhicules routiers — Système de transport axé sur les médias —*

*Partie 15: Plan d'essais de conformité de la couche d'application allégée*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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](http://www.iso.org/iso/foreword.html).

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

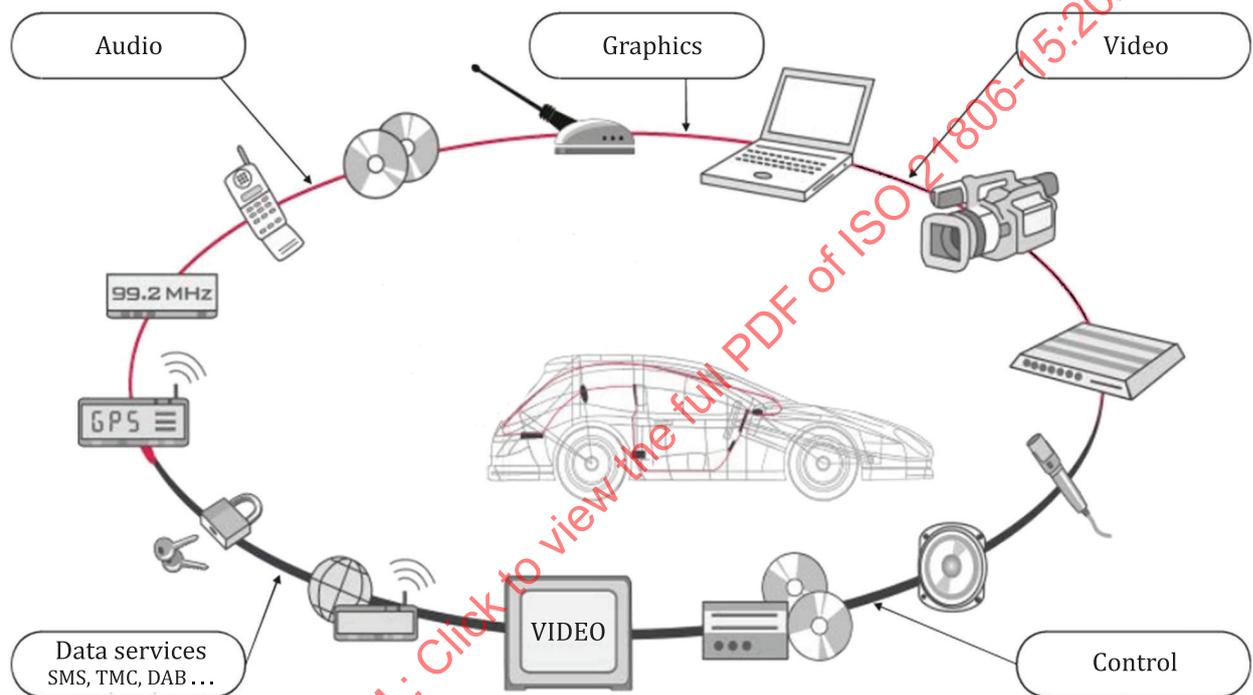
A list of all parts in the ISO 21806 series can be found on the ISO website.

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](http://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<sup>1)</sup> 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<sup>[2]</sup>.

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.

## ISO 21806-15:2021(E)

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<sup>[1]</sup> and ISO/IEC 10731<sup>[2]</sup> 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.

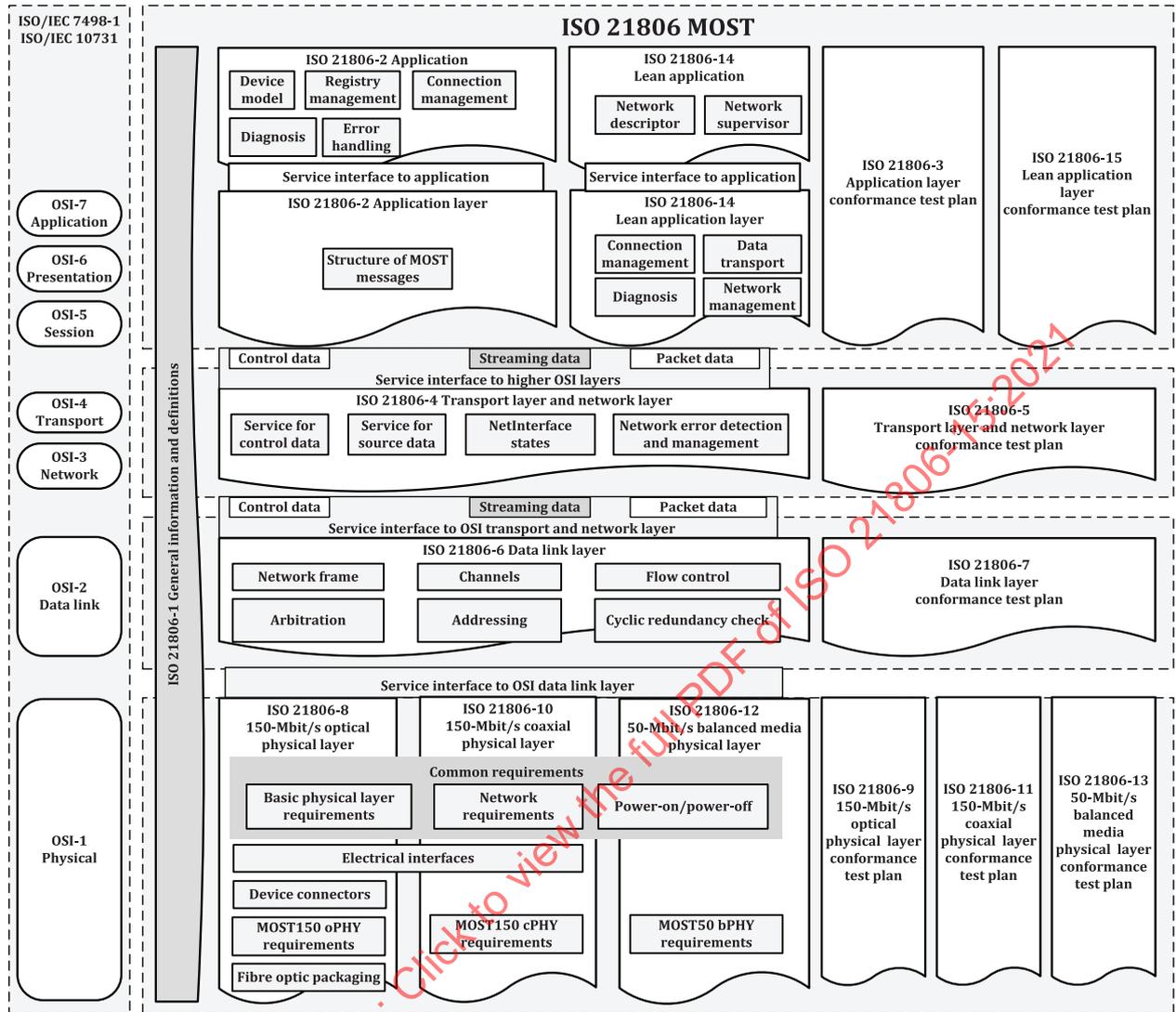


Figure 2 — The ISO 21806 series reference according to the OSI model

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# Road vehicles — Media Oriented Systems Transport (MOST) —

## Part 15: Lean application layer conformance test plan

### 1 Scope

This document specifies the conformance test plan (CTP) for the lean application layer for MOST, a synchronous time-division-multiplexing network, as specified in ISO 21806-14.

This document specifies conformance test cases (CTCs) for root nodes and remote nodes in the following categories:

- network startup;
- network shutdown;
- network events;
- node discovery;
- connection management.

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

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

ISO 21806-14:2021, *Road vehicles — Media Oriented Systems Transport (MOST) — Part 14: Lean application layer*

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

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 21806-1, ISO 21806-4, ISO 21806-14, ISO/IEC 9646-1 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/>

## 4 Symbols and abbreviated terms

### 4.1 Symbols

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### 4.2 Abbreviated terms

CTC	conformance test case
CTP	conformance test plan
IUT	implementation under test
LT	lower tester
NCE	network change event
OSI	Open Systems Interconnection
UT	upper tester

## 5 Conventions

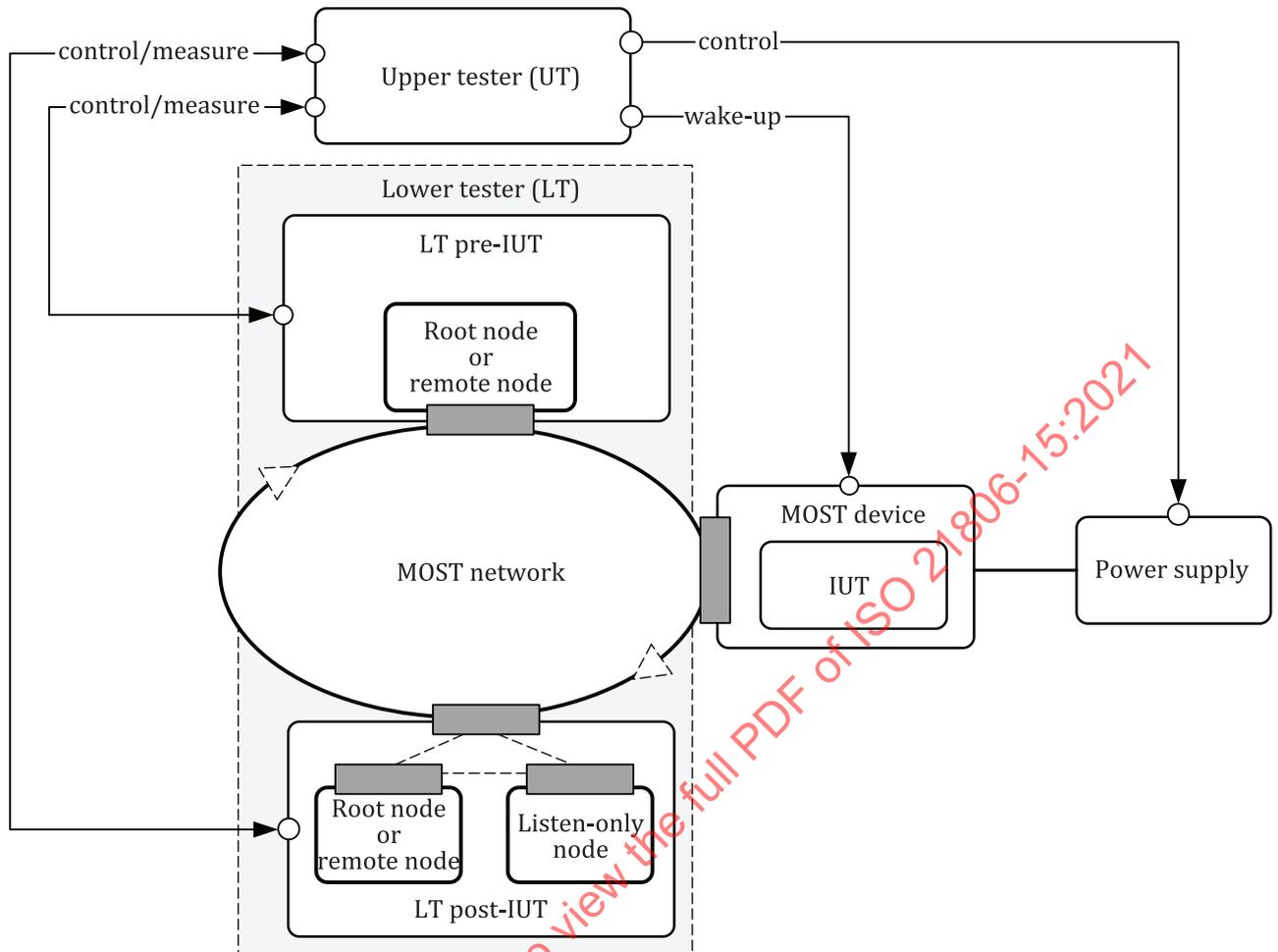
This document is based on OSI service conventions as specified in ISO/IEC 10731<sup>[3]</sup> and ISO/IEC 9646-1 for conformance test system set-up.

## 6 Conformance test plan (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](#) shows the test set-up.



**Figure 3 — Test set-up**

The UT can configure the LT pre-IUT as root node or remote node. The UT can configure the LT post-IUT as root node or remote node or disconnect the corresponding interface. The LT post-IUT contains a listen-only node to monitor the network status, communication and streaming. The root node operates as TimingMaster. A remote node operates as TimingSlave.

The UT is able to provide the remote nodes in the LT pre-IUT and the LT post-IUT with a signature.

Every CTC contains a description of the experimental set-up that 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.

## 6.2 Conformance test plan organization

The CTCs are independent of one another. Each CTC checks the behaviour of the IUT for requirements stated in ISO 21806-14.

## 7 Conformance test plan (CTP) general information

### 7.1 Timer naming

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 21806-14. To obtain the timer name, for minimum

and maximum, “\_min” and “\_max” are appended, respectively. [Table 1](#) shows a timer naming definition example for  $t_{Hello}$ .

**Table 1 — Timer naming example**

Name	Minimum value name	Typical value name	Maximum value name	Unit	Purpose
$t_{Hello}$	$t_{Hello\_min}$	$t_{Hello}$	$t_{Hello\_max}$	ms	Cycle time for <code>Hello_Get</code> broadcasts by the lean network services.

## 7.2 Deadlock prevention

This document specifies the timeouts  $t_{DeadLockShort}$ ,  $t_{DeadLockMid}$ , and  $t_{DeadLockLong}$  to prevent deadlock situations during conformance testing. These are the default values:

- $t_{DeadLockShort}$ : 1 s;
- $t_{DeadLockMid}$ : 20 s;
- $t_{DeadLockLong}$ : 5 min.

These timeouts are only relevant for conformance testing and may be extended.

## 7.3 Addresses of nodes in the lower tester

By default, the LT shall use the un-initialised logical node address as specified in ISO 21806-14:2021, Clause 8.

## 7.4 Device manufacturer information list

The device manufacturer list contains:

- the signature,
- the network descriptor (if the IUT is a root node),
- the network startup trigger (if the IUT is a root node),
- timer  $t_{Hello}$ , and
- timer  $t_{RD}$ .

There are parameters that can be provided by proprietary extensions to the network descriptor and the order might differ between manufacturers. Therefore, complete commands should be provided, in the order they are transported on the network.

## 7.5 States of the node that contains the IUT

[Table 2](#) specifies how the NetInterface state `s_NetInterface_Normal_Operation` is effectuated and detected in the node that contains the IUT.

**Table 2 — Effectuate and detect `s_NetInterface_Normal_Operation`**

Effectuate state	Detect state
If the LT contains the root node, it shall switch on the MOST output. If the LT does not contain the root node, the UT shall provide the IUT with a network startup trigger.	Lock flag

[Table 3](#) specifies how the NetInterface state `s_NetInterface_Off` is effectuated and detected in the node that contains the IUT.

**Table 3 — Effectuate and detect `s_NetInterface_Off`**

Effectuate state	Detect state
The LT shall switch off the MOST output.	No network activity

## 7.6 Violation of prerequisites of the CTC

If the node that contains the IUT does not meet the prerequisites of the CTC (such as network activity or lock), the CTC results in "IUT not ok: the IUT does not meet the prerequisites".

## 8 CTC specification for root nodes

### 8.1 CTC\_15.1-1 – Network startup test for root node

[Table 4](#) specifies the CTC\_15.1-1 – Network startup test for root node.

**Table 4 — CTC\_15.1-1 — Network startup test for root node**

Item	Content
<b>CTC # - Title</b>	CTC_15.1-1 – Network startup test for root node
<b>Purpose</b>	This CTC verifies that the root node is able to perform a network startup. This CTC applies to all MOST devices that contain the root node.
<b>Reference</b>	ISO 21806-14:2021: — 11.2.1; — 13.1: REQ 7.22 AL – Lean network services perform startup and shutdown.
<b>Prerequisite</b>	---
<b>Set-up</b>	— The LT pre-IUT shall be a remote node. — The LT post-IUT shall be a listen-only node.
<b>Step</b>	1. The UT shall trigger a wake-up event in the IUT. 2. The UT shall determine the presence of network activity, using the LT post-IUT.
<b>Iteration</b>	Not applicable
<b>Expected response</b>	Step 2: IUT ok: the IUT performs a network startup. Step 2: IUT not ok: the IUT does not perform a network startup.
<b>Remark</b>	---

### 8.2 CTC\_15.2-1 – Network shutdown test for root node

[Table 5](#) specifies the CTC\_15.2-1 – Network shutdown test for root node.

**Table 5 — CTC\_15.2-1 — Network shutdown test for root node**

Item	Content
<b>CTC # - Title</b>	CTC_15.2-1 – Network shutdown test for root node
<b>Purpose</b>	This CTC verifies that the root node is able to perform a network shutdown. This CTC applies to all MOST devices that contain the root node.

**Table 5 (continued)**

Item	Content
<b>Reference</b>	ISO 21806-14:2021: — 11.2.1; — 13.1: REQ 7.22 AL – Lean network services performs startup and shutdown.
<b>Prerequisite</b>	The UT shall effectuate <code>s_NetInterface_Normal_Operation</code> in the IUT.
<b>Set-up</b>	— The LT pre-IUT shall be a remote node. — The LT post-IUT shall be a listen-only node.
<b>Step</b>	1. The UT shall trigger a network shutdown in the IUT. 2. The UT shall determine the presence of the shutdown flag, using the LT post-IUT. 3. The UT shall determine the disappearance of network activity, using the LT post-IUT.
<b>Iteration</b>	Not applicable
<b>Expected response</b>	Step 3: IUT ok: the IUT performs a network shutdown. Step 3: IUT not ok (1): the IUT does not perform a network shutdown. Step 2: IUT not ok (2): the IUT does not set the shutdown flag.
<b>Remark</b>	---

**8.3 CTC\_15.3-1 – Unlock robustness test for root node**

Table 6 specifies the CTC\_15.3-1 – Unlock robustness test for root node.

**Table 6 — CTC\_15.3-1 — Unlock robustness test for root node**

Content	Content
<b>CTC # - Title</b>	CTC_15.3-1 – Unlock robustness test for root node
<b>Purpose</b>	This CTC verifies that the root node remains in <code>s_NetInterface_Normal_Operation</code> during a series of unlocks without critical unlock, see ISO 21806-6 <sup>[4]</sup> . This CTC applies to all MOST devices that contain the root node.
<b>Reference</b>	ISO 21806-14:2021, 13.2.3
<b>Prerequisite</b>	The UT shall effectuate <code>s_NetInterface_Normal_Operation</code> in the IUT.
<b>Set-up</b>	— The LT pre-IUT shall be a remote node. — The LT post-IUT shall be a listen-only node.
<b>Step</b>	1. The UT shall generate a series of unlocks without critical unlock, using the LT pre-IUT. 2. The UT shall determine the presence of network activity, using the LT post-IUT.
<b>Iteration</b>	Not applicable
<b>Expected response</b>	Step 2: IUT ok: the IUT remains in <code>s_NetInterface_Normal_Operation</code> . Step 2: IUT not ok: the IUT switches off the MOST output.
<b>Remark</b>	---

**8.4 CTC\_15.4-1 – Critical unlock test for root node**

Table 7 specifies the CTC\_15.4-1 – Critical unlock test for root node.

**Table 7 — CTC\_15.4-1 — Critical unlock test for root node**

Item	Content
<b>CTC # - Title</b>	CTC_15.4-1 – Critical unlock test for root node

Table 7 (continued)

Item	Content
<b>Purpose</b>	This CTC verifies that the root node reacts to a critical unlock by shutting down the network. This CTC applies to all MOST devices that contain the root node.
<b>Reference</b>	ISO 21806-14:2021, 13.2.3
<b>Prerequisite</b>	The UT shall effectuate <code>s_NetInterface_Normal_Operation</code> in the IUT.
<b>Set-up</b>	— The LT pre-IUT shall be a remote node. — The LT post-IUT shall be a listen-only node.
<b>Step</b>	1. The UT shall generate a critical unlock, using the LT pre-IUT. 2. The UT shall determine the presence of the shutdown flag, using the LT post-IUT. 3. The UT shall determine the disappearance of network activity, using the LT post-IUT. 4. The UT, using the LT post-IUT, shall determine whether a startup attempt is made.
<b>Iteration</b>	Not applicable
<b>Expected response</b>	Step 3: IUT ok: the IUT sets the shutdown flag and switches off the MOST output. Step 3: IUT not ok (1): the IUT does not switch off the MOST output. Step 3: IUT not ok (2): the IUT switches off the MOST output without setting the shutdown flag. Step 4: IUT not ok (3): the IUT does not attempt to restart the network.
<b>Remark</b>	---

### 8.5 CTC\_15.5-1 – SSO test for root node

Table 8 specifies the CTC\_15.5-1 – SSO test for root node.

Table 8 — CTC\_15.5-1 — SSO test for root node

Item	Content
<b>CTC # - Title</b>	CTC_15.5-1 – SSO test for root node
<b>Purpose</b>	This CTC verifies that the root node reacts to an SSO. This CTC applies to all MOST devices that contain the root node.
<b>Reference</b>	ISO 21806-14:2021: 13.2.2; — 13.2.2: REQ 7.26 AL – Root node reacts on SSO.
<b>Prerequisite</b>	The UT shall effectuate <code>s_NetInterface_Normal_Operation</code> in the IUT.
<b>Set-up</b>	— The LT pre-IUT shall be a remote node. — The LT post-IUT shall be a listen-only node.
<b>Step</b>	1. The UT shall generate an SSO, using the LT pre-IUT. 2. The UT shall determine the presence of the shutdown flag, using the LT post-IUT. 3. The UT shall determine the disappearance of network activity, using the LT post-IUT. 4. The UT, using the LT post-IUT, shall determine whether a startup attempt is made.
<b>Iteration</b>	Not applicable

**Table 8** (continued)

Item	Content
<b>Expected response</b>	<p>Step 4: IUT ok: the IUT sets the shutdown flag, switches off the MOST output, and performs a startup attempt.</p> <p>Step 3: IUT not ok (1): the IUT does not switch off the MOST output.</p> <p>Step 3: IUT not ok (2): the IUT switches off the MOST output without setting the shutdown flag.</p> <p>Step 4: IUT not ok (3): the IUT does not attempt to restart the network.</p>
<b>Remark</b>	---

### 8.6 CTC\_15.6-1 – Valid signature test for root node

Table 9 specifies the CTC\_15.6-1 – Valid signature test for root node.

**Table 9 — CTC\_15.6-1 — Valid signature test for root node**

Item	Content
<b>CTC # - Title</b>	CTC_15.6-1 – Valid signature test for root node
<b>Purpose</b>	<p>This CTC verifies that the root node responds with <code>Welcome_StartResult</code> after receiving a valid signature in <code>Hello_Status</code>.</p> <p>This CTC applies to all MOST devices that contain the root node.</p>
<b>Reference</b>	<p>ISO 21806-14:2021:</p> <ul style="list-style-type: none"> <li>— 13.3.3;</li> <li>— 13.3.3: REQ 7.38 AL – Lean network services send <code>Init_Start</code>;</li> <li>— 13.3.3: REQ 7.39 AL – Lean network services broadcast <code>Hello_Get</code>.</li> </ul>
<b>Prerequisite</b>	The UT shall effectuate <code>s_NetInterface_Normal_Operation</code> in the IUT.
<b>Set-up</b>	<ul style="list-style-type: none"> <li>— The LT pre-IUT shall be a remote node.</li> <li>— The LT post-IUT shall be a listen-only node.</li> </ul>
<b>Step</b>	<ol style="list-style-type: none"> <li>1. The UT, using the LT post-IUT, shall wait for <code>Init_Start</code> sent to the blocking broadcast address.</li> <li>2. The UT, using the LT post-IUT, shall wait for <code>Hello_Get</code> sent to the blocking broadcast address.</li> <li>3. The UT shall verify that the source address of the <code>Hello_Get</code> message is a valid logical node address.</li> <li>4. The UT shall send <code>Hello_Status</code> with a valid signature to the IUT, using the LT pre-IUT.</li> <li>5. The UT, using the LT post-IUT, shall wait for <code>Welcome_StartResult</code> sent to the node position address that is contained in the signature of the LT pre-IUT.</li> </ol>
<b>Iteration</b>	Not applicable
<b>Expected response</b>	<p>Step 5: IUT ok: the IUT sends <code>Welcome_StartResult</code> to the node position address of the LT pre-IUT.</p> <p>Step 1: IUT not ok (1): the IUT does not send <code>Init_Start</code>.</p> <p>Step 2: IUT not ok (2): the IUT does not send <code>Hello_Get</code>.</p> <p>Step 3: IUT not ok (3): the IUT does not send <code>Hello_Get</code> with a valid source address.</p> <p>Step 5: IUT not ok (4): the IUT does not send <code>Welcome_StartResult</code>.</p> <p>Step 5: IUT not ok (5): the IUT does not send <code>Welcome_StartResult</code> to the node position address of the LT pre-IUT.</p>

Table 9 (continued)

Item	Content
Remark	---

### 8.7 CTC\_15.7-1 – Unknown signature test for root node

Table 10 specifies the CTC\_15.7-1 – Unknown signature test for root node.

Table 10 — CTC\_15.7-1 — Unknown signature test for root node

Item	Content
<b>CTC # - Title</b>	CTC_15.7-1 – Unknown signature test for root node
<b>Purpose</b>	This CTC verifies that the root node does not respond with <code>Welcome_StartResult</code> after receiving an unknown signature in <code>Hello_Status</code> . This CTC applies to all MOST devices that contain the root node.
<b>Reference</b>	ISO 21806-14:2021: — 13.3.3; — 13.3.4; — 13.3.3: REQ 7.38 AL – Lean network services send <code>Init_Start</code> ; — 13.3.3: REQ 7.39 AL – Lean network services broadcast <code>Hello_Get</code> ; — 13.3.4: REQ 7.45 AL – Lean network services send <code>Welcome_StartResult</code> .
<b>Prerequisite</b>	The UT shall effectuate <code>s_NetInterface_Normal_Operation</code> in the IUT.
<b>Set-up</b>	— The LT pre-IUT shall be a remote node. — The LT post-IUT shall be a listen-only node.
<b>Step</b>	1. The UT, using the LT post-IUT, shall wait for <code>Init_Start</code> sent to the blocking broadcast address. 2. The UT, using the LT post-IUT, shall wait for <code>Hello_Get</code> sent to the blocking broadcast address. 3. The UT shall verify that the source address of the <code>Hello_Get</code> message is a valid logical node address. 4. The UT, using the LT pre-IUT, shall send <code>Hello_Status</code> with a signature that is not contained in the network descriptor to the IUT. 5. The UT, using the LT post-IUT, shall verify that the IUT does not send <code>Welcome_StartResult</code> .
<b>Iteration</b>	Not applicable
<b>Expected response</b>	Step 5: IUT ok: the IUT does not send <code>Welcome_StartResult</code> . Step 1: IUT not ok (1): the IUT does not send <code>Init_Start</code> . Step 2: IUT not ok (2): the IUT does not send <code>Hello_Get</code> . Step 3: IUT not ok (3): the IUT does not send <code>Hello_Get</code> with a valid source address. Step 5: IUT not ok (4): the IUT sends <code>Welcome_StartResult</code> .
Remark	---

### 8.8 CTC\_15.8-1 – NCE test for root node

Table 11 specifies the CTC\_15.8-1 – NCE test for root node.

**Table 11 — CTC\_15.8-1 — NCE test for root node**

Item	Content
<b>CTC # - Title</b>	CTC_15.8-1 - NCE test for root node
<b>Purpose</b>	This CTC verifies that the root node detects an NCE and sends Hello_Get. This CTC applies to all MOST devices that contain the root node.
<b>Reference</b>	ISO 21806-14:2021: — 15.2; — 15.2.2: REQ 7.91 AL - Lean network services stop $t_{Hello}$ on NCE.
<b>Prerequisite</b>	The UT shall effectuate s_NetInterface_Normal_Operation in the IUT. The bypass of the LT pre-IUT shall be open.
<b>Set-up</b>	— The LT pre-IUT shall be a remote node. — The LT post-IUT shall be a remote node.
<b>Step</b>	1. The UT shall close the bypass of the LT pre-IUT. 2. The UT, using the LT post-IUT, shall verify that the IUT sends Hello_Get.
<b>Iteration</b>	Not applicable
<b>Expected response</b>	Step 2: IUT ok: the IUT sends Hello_Get. Step 2: IUT not ok: the IUT does not send Hello_Get.
<b>Remark</b>	---

**8.9 CTC\_15.9-1 - Timer  $t_{Hello}$  test for root node**

Table 12 specifies the CTC\_15.9-1 - Timer  $t_{Hello}$  test for root node.

**Table 12 — CTC\_15.9-1 — Timer  $t_{Hello}$  test for root node**

Item	Content
<b>CTC # - Title</b>	CTC_15.9-1 - Timer $t_{Hello}$ test for root node
<b>Purpose</b>	This CTC verifies that the root node sends Hello_Get periodically. The period is determined by $t_{Hello}$ . This CTC applies to all MOST devices that contain the root node.
<b>Reference</b>	ISO 21806-14:2021: — 15.2; — 15.2.3: REQ 7.92 AL - Lean network services sends Hello_Get when $t_{Hello}$ expires.
<b>Prerequisite</b>	The UT shall effectuate s_NetInterface_Normal_Operation in the IUT.
<b>Set-up</b>	— The LT pre-IUT shall be a remote node. — The LT post-IUT shall be a listen-only node.
<b>Step</b>	1. The UT shall wait for Hello_Get. 2. The UT shall start timer $t_{Hello}$ . 3. The UT shall wait for timer $t_{Hello}$ to expire. 4. The UT, using the LT post-IUT, shall verify that the IUT sends Hello_Get.
<b>Iteration</b>	Not applicable
<b>Expected response</b>	Step 4: IUT ok: the IUT sends Hello_Get. Step 4: IUT not ok: the IUT does not send Hello_Get.
<b>Remark</b>	---

### 8.10 CTC\_15.10-1 - Duplicate signature test for root node

Table 13 specifies the CTC\_15.10-1 – Duplicate signature test for root node.

**Table 13 — CTC\_15.10-1 — Duplicate signature test for root node**

Item	Content
<b>CTC # - Title</b>	CTC_15.10-1 – Duplicate signature test for root node
<b>Purpose</b>	This CTC verifies that the root node handles the presence of two remote nodes with identical signatures correctly. This CTC applies to all MOST devices that contain the root node.
<b>Reference</b>	ISO 21806-14:2021: — 13.3.5; — 13.3.5: REQ 7.51 AL – Lean network services send <code>Signature_Get</code> .
<b>Prerequisite</b>	The UT shall effectuate <code>s_NetInterface_Normal_Operation</code> in the IUT. The bypass of the LT pre-IUT shall be open. The LT post-IUT shall already be added to the network.
<b>Set-up</b>	— The LT pre-IUT shall be a remote node. — The LT post-IUT shall be a remote node.
<b>Step</b>	1. The UT shall close the bypass of the LT pre-IUT; 2. The UT shall respond to <code>Hello_Get</code> with <code>Hello_Status</code> , using the signature of the LT post-IUT, which is already added to the network. 3. The UT, using the LT post-IUT, shall respond to <code>Signature_Get</code> with <code>Signature_Status</code> , using its signature. 4. The UT, using the LT post-IUT, shall verify that the IUT does not attempt to communicate with the LT pre-IUT.
<b>Iteration</b>	Not applicable
<b>Expected response</b>	Step 4: IUT ok: the IUT ignores the remote node that provides a duplicate signature. Step 4: IUT not ok: the IUT attempts to communicate with the remote node that provides a duplicate signature.
<b>Remark</b>	---

### 8.11 CTC\_15.11-1 - Remote node reset test for root node

Table 14 specifies the CTC\_15.11-1 – Remote node reset test for root node.

**Table 14 — CTC\_15.11-1 — Remote node reset test for root node**

Item	Content
<b>CTC # - Title</b>	CTC_15.11-1 – Remote node reset test for root node
<b>Purpose</b>	This CTC verifies that the root node handles the reset of a remote node correctly. This CTC applies to all MOST devices that contain the root node.
<b>Reference</b>	ISO 21806-14:2021: — 13.3.5; — 13.3.5: REQ 7.51 AL – Lean network services send <code>Signature_Get</code> .
<b>Prerequisite</b>	The UT shall effectuate <code>s_NetInterface_Normal_Operation</code> in the IUT. The LT pre-IUT shall already be added to the network.

Table 14 (continued)

Item	Content
<b>Set-up</b>	<ul style="list-style-type: none"> <li>— The LT pre-IUT shall be a remote node.</li> <li>— The LT post-IUT shall be a listen-only node.</li> </ul>
<b>Step</b>	<ol style="list-style-type: none"> <li>1. The UT shall initialize the LT pre-IUT.</li> <li>2. The UT, using the LT pre-IUT, shall respond to <code>Hello_Get</code> with <code>Hello_Status</code>, using the signature of the LT pre-IUT.</li> <li>3. The UT, using the LT post-IUT, shall verify that the IUT sends <code>Signature_Get</code>; the UT shall not respond.</li> <li>4. The UT, using the LT pre-IUT, shall respond to <code>Welcome_StartResult</code> with <code>Welcome_Result</code>, using the signature of the LT pre-IUT.</li> </ol>
<b>Iteration</b>	Not applicable
<b>Expected response</b>	<p>Step 4: IUT ok: the IUT adds the remote node to the network after a reset.</p> <p>Step 3: IUT not ok (1): the IUT does not send <code>Signature_Get</code>.</p> <p>Step 4: IUT not ok (2): the IUT does not send <code>Welcome_StartResult</code>.</p>
<b>Remark</b>	---

8.12 CTC\_15.12-1 – Connection management test for root node

Table 15 specifies the CTC\_15.12-1 – Connection management test for root node.

Table 15 — CTC\_15.12-1 — Connection management test for root node

Item	Content
<b>CTC # - Title</b>	CTC_15.12-1 – Connection management test for root node
<b>Purpose</b>	<p>This CTC verifies that the root node performs connection management correctly.</p> <p>This CTC applies to all MOST devices that contain the root node.</p>
<b>Reference</b>	<p>ISO 21806-14:2021:</p> <ul style="list-style-type: none"> <li>— 13.4.1;</li> <li>— 13.4.1: REQ 7.54 AL – Connection management creates connections, couplings, and paths.</li> </ul>
<b>Prerequisite</b>	<p>The UT shall effectuate <code>s_NetInterface_Normal_Operation</code> in the IUT.</p> <p>The LT pre-IUT and the LT post-IUT shall already be added to the network.</p> <p>The LT pre-IUT and the LT post-IUT shall be set up to match corresponding entries in the network descriptor.</p>
<b>Set-up</b>	<ul style="list-style-type: none"> <li>— The LT pre-IUT shall be a remote node.</li> <li>— The LT post-IUT shall be a remote node.</li> </ul>
<b>Step</b>	<ol style="list-style-type: none"> <li>1. The UT shall respond to <code>RemoteNodeSync_StartResult</code> with <code>RemoteNodeSync_Result</code>.</li> <li>2. The UT shall respond to <code>NetworkSocketCreate_StartResult</code> with <code>NetworkSocketCreate_Result</code>.</li> <li>3. The UT shall respond to <code>StreamingSocketCreate_StartResult</code> with <code>StreamingSocketCreate_Result</code>.</li> <li>4. The UT shall respond to <code>CouplingCreate_StartResult</code> with <code>CouplingCreate_Result</code>.</li> <li>5. The UT shall verify that the requested sockets and couplings are valid and match the network descriptor.</li> </ol>
<b>Iteration</b>	Not applicable

Table 15 (continued)

Item	Content
<b>Expected response</b>	<p>Step 5: IUT ok: the IUT performs connection management as expected.</p> <p>Step 5: IUT not ok (1): the IUT requests network sockets that are not contained in the network descriptor.</p> <p>Step 5: IUT not ok (2): the IUT requests streaming sockets that are not contained in the network descriptor.</p> <p>Step 5: IUT not ok (3): the IUT requests couplings that are not contained in the network descriptor.</p> <p>Step 4: IUT not ok (4): the IUT requests couplings before creating the necessary sockets.</p>
<b>Remark</b>	---

### 8.13 CTC\_15.13-1 – Welcome\_Error reaction test for root node

Table 16 specifies the CTC\_15.13-1 – Welcome\_Error reaction test for root node.

Table 16 — CTC\_15.13-1 — Welcome\_Error reaction test for root node

Item	Content
<b>CTC # - Title</b>	CTC_15.13-1 – Welcome_Error reaction test for root node
<b>Purpose</b>	<p>This CTC verifies that the root node does not send <code>Init_Start</code> when a remote node responds to <code>Welcome_StartResult</code> with <code>Welcome_Error</code>.</p> <p>This CTC applies to all MOST devices that contain the root node.</p>
<b>Reference</b>	<p>ISO 21806-14:2021:</p> <ul style="list-style-type: none"> <li>— 13.3.4;</li> <li>— 13.3.4: REQ 7.45 AL – Learn network services send <code>Welcome_StartResult</code>.</li> </ul>
<b>Prerequisite</b>	The UT shall effectuate <code>s_NetInterface_Normal_Operation</code> in the IUT.
<b>Set-up</b>	<ul style="list-style-type: none"> <li>— The LT pre-IUT shall be a remote node.</li> <li>— The LT post-IUT shall be a listen-only node.</li> </ul>
<b>Step</b>	<ol style="list-style-type: none"> <li>1. The UT, using the LT post-IUT, shall wait for <code>Init_Start</code> sent to the blocking broadcast address.</li> <li>2. The UT, using the LT post-IUT, shall wait for <code>Hello_Get</code> sent to the blocking broadcast address.</li> <li>3. The UT, using the LT pre-IUT, shall send <code>Hello_Status</code> with a valid signature to the IUT.</li> <li>4. The UT, using the LT post-IUT, shall wait for <code>Welcome_StartResult</code> sent to the node position address that is contained in the signature of the LT pre-IUT.</li> <li>5. The UT, using the LT pre-IUT, shall send <code>Welcome_Error</code> to the IUT.</li> <li>6. The UT, using the LT post-IUT, shall wait for <code>Hello_Get</code> sent to the blocking broadcast address.</li> <li>7. The UT, using the LT pre-IUT, shall send <code>Hello_Status</code> with a valid signature to the IUT.</li> <li>8. The UT, using the LT post-IUT, shall wait for <code>Welcome_StartResult</code> sent to the node position address that is contained in the signature of the LT pre-IUT.</li> </ol>
<b>Iteration</b>	Not applicable
<b>Expected response</b>	<p>Step 8: IUT ok: the IUT does not react with <code>Init_Start</code> after <code>Welcome_Error</code>.</p> <p>Step 6: IUT not ok: the IUT sends <code>Init_Start</code> to the node position address of the LT pre-IUT.</p>
<b>Remark</b>	---

## 9 CTC specification for remote nodes

### 9.1 CTC\_15.1-2 – Network startup test for remote node

Table 17 specifies the CTC\_15.1-2 – Network startup test for remote node.

**Table 17 — CTC\_15.1-2 — Network startup test for remote node**

Item	Content
<b>CTC # - Title</b>	CTC_15.1-2 – Network startup test for remote node
<b>Purpose</b>	This CTC verifies that a remote node is able to participate in a network startup. This CTC applies to all MOST devices that contain a remote node.
<b>Reference</b>	ISO 21806-14:2021, 13.1
<b>Prerequisite</b>	--
<b>Set-up</b>	— The LT pre-IUT shall be the root node. — The LT post-IUT shall be a listen-only node.
<b>Step</b>	1. The UT, using the LT pre-IUT, shall trigger a wake-up event. 2. The UT, using the LT post-IUT, shall determine the presence of network activity. 3. The UT, using the LT post-IUT, shall determine that the node counter value is correct.
<b>Iteration</b>	Not applicable
<b>Expected re- sponse</b>	Step 3: IUT ok: the IUT participates in the network startup. Step 2: IUT not ok (1): the IUT does not switch on the MOST output. Step 3: IUT not ok (2): the IUT does not open the bypass.
<b>Remark</b>	---

### 9.2 CTC\_15.2-2 – Network shutdown test for remote node

Table 18 specifies the CTC\_15.2-2 – Network shutdown test for remote node.

**Table 18 — CTC\_15.2-2 — Network shutdown test for remote node**

Item	Content
<b>CTC # - Title</b>	CTC_15.2-2 – Network shutdown test for remote node
<b>Purpose</b>	This CTC verifies that the remote node is able to participate in a network shutdown. This CTC applies to all MOST devices that contain a remote node.
<b>Reference</b>	ISO 21806-14:2021, 13.2.2
<b>Prerequisite</b>	The UT shall effectuate <code>s_NetInterface_Normal_Operation</code> in the IUT.
<b>Set-up</b>	— The LT pre-IUT shall be the root node. — The LT post-IUT shall be a listen-only node.
<b>Step</b>	1. The UT, using the LT pre-IUT, shall execute a network shutdown. 2. The UT, using the LT post-IUT, shall determine the disappearance of network activity.
<b>Iteration</b>	Not applicable
<b>Expected re- sponse</b>	Step 2: IUT ok: the IUT switches off the MOST output. Step 2: IUT not ok: the IUT does not switch off the MOST output.
<b>Remark</b>	The root node sets the shutdown flag when it starts executing the shutdown.