



**3G-324M Video Telephony
Activity Group**

Test Cases - Compliance

Version 3.11
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History

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3.7.1	11-18-2005	Albert Wong	Updated test cases and formats in consideration with GCF test cases requirement. Tsahi Levent-Levi updated Default Endpoint Settings section. Peter Ghesquiere updated TCs 201~213. Albert Wong revisited TCs 205, reviewed preconditions and references of all test cases and added feature mapping table.
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3.7.3	12-05-2005	Albert Wong	Updated Default Endpoint Settings from internal review.
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3.7.6	01-19-2006	Albert Wong	Reviewed document according to further feedback from GCF on 01-16-2006. Appended objective to TC212 as suggested. Appended Abbreviation section. Expanded Add-On Features with unsupported feature postfix in TestCase Number section. Revised Feature Mapping Table with new Feature Supported column and splitting of non-mandatory baseline TCs from mandatory baseline TCs. Revised Expected Behaviour logic for GCF selected TC 201, 202, 203, 204, 208, 209, 210, 211, 214, plus other TC 63, 64, 206, 207, 212, 213.
3.7.7	02-05-2006	Albert Wong	Updated TC 71 according to conditions from conditional approval votes. Added missing TC 204 & 214 to Feature Mapping Table for Test Reference Tool. Minor editorial corrections. Added missing reference of TC 204 & 214 to feature mapping table for test reference tool.

<i>Version</i>	<i>Date</i>	<i>Name</i>	<i>Reason</i>
3.7.8	02-12-2006	Albert Wong	Depreciated the need of sequence number in Terminal Setup table for test cases not requiring this criterion. Also reviewed Terminal Setup table for depreciating non-mandatory features. Appended all genericVideoCapability and genericAudioCapability with their corresponding codec names. Appended also receiveAndTransmit capability as an option for UEUT settings for all test cases concerned.
3.7.9	02-14-2006	Albert Wong	Further reviewed document with Nokia, Motorola and Ericsson to take Nokia's comment on improving Terminal Settings Table by indicating default settings to UEUT to TC 201~214 with necessary content updates.
3.7.10	02-15-2006	Albert Wong	Consolidated further comments from Mikko Bertin on TC 71. Updated Feature Mapping Table accordingly.
3.8	02-22-2006	Albert Wong	Approved by voting.
3.8.1	10-18-2006	Albert Wong	Updated TC 204 according to received comments from GCF. Updated document test cases presentation format and style. Added test cases postfixes for MPEG4-Video and MONA.
3.9	12-08-2006	Albert Wong	Approved by AG voting with voting comments on general editorial updates. Performed further spell checking.
3.9.1	05-29-2007	Albert Wong	Updated Introduction on terminal A being test reference tool. Changed TC postfix for MONA. Made some formatting updates.
3.9.2	08-13-2007	Albert Wong	Updated clauses 1.6 and 1.1.2 for clarification of handling AL-SDU CRC errors and "error free" test condition. Filled in all TBA by Ixia to TC 63~65.
3.9.3	09-04-2007	Oren Libis	"Mobile Level" Term was replaced with "Multiplex Level" term.
3.10	09-12-2007	Albert Wong	Approved by AG voting with voting comments on general editorial updates.
3.10.1	01-18-2008	Albert Wong	Added H.264 as optional codec in TC 201, 202, 203, 204, 205, 212 and 214 as proposed by Nokia.
3.10.2	04-15-2008	Albert Wong	Included Mux levels 0 & 1 test case guideline to Clause 1.7 from Oren Libis. Minor editorial format review.
3.11	05-14-2008	Albert Wong	Approved by AG voting.

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1 Introduction

This document describes the Test cases for 3G-324M Videotelephony interoperability tests for terminal compliance testing purpose. The optional tests section might be enhanced by additional tests of the testing parties as only the most probable test cases are described here.

For interoperability oriented test cases, please refer to the document “Test Cases – Interoperability”.

1.1 How to Read the TestCases

Test Number: Identifies each of the Test Cases by its unique number. a/b in the test case description means that the test has to be repeated with changed terminal settings. "a" refers to Terminal A; "b" refers to Terminal B. Therefore, for example when party A is to test case 2a it sets the settings according to Terminal A, and party B is to set test case 2b with settings of Terminal B. In case that party A tests 2b then it sets the settings of Terminal B. Of course party B will set 2a with settings of Terminal A.

Priority: Indicates if the test case is mandatory or optional if not indicated by a document section.

Objective: Provides background information description about the test case.

Reference: Indicates corresponding section of recommendation or specification for the test case.

Terminal A/B Setup: Specifies the settings for the named test case. Parameters highlighted in *blue* indicate either derivation from default settings and/or settings required to conduct the test case.

Terminal A: Settings for Terminal A (both testing parties should agree on role before the tests start); If standard settings are named the testing party should select the preferred settings for use; Furthermore both testing parties can agree on a selected set of settings for test. For simplicity, *parameters not specified can take the default settings of Default Endpoint Settings* or Terminal A itself. If settings are not configurable, the terminal adopts the default values.

Terminal B: Settings for Terminal B (both testing parties should agree on role before the tests start)

Terminal A & B: Settings for Terminal B is the same as Terminal A.

Note that Terminal A shall be referred to as a Test Reference Tool where applicable.

Scenario: (optional) Provides diagram to illustrate the testing scenario such as logical channel conflict handling scenario.

Scenario: (optional) Provides diagram to illustrate the testing scenario such as logical channel conflict handling scenario.

Precondition: Specifies preliminary settings and environment required before conducting the test case.

Procedure: Describes how to conduct the test case.

Expected Behavior: Defines the Pass Criteria including the different steps to perform a "pass" test case. Sub results to be performed successfully are listed. Verification of the correct behaviour may be visual, together with the aid of logging facilities available from the testing terminals. If the subject of terminal origin is not mentioned in any step, it is implied as Terminal A. Step numbers in Expected Behaviour are grouped and matched with the step numbers in Procedure.

At the end, Order is specified to indicate the order of steps in sequence, some of which can be in random order. For example, “Order: 1, 2-5, 6” indicates that from steps 2 to 5, they can occur in any order. However, step 1, group of steps 2 to 5, step 6 shall be in order.

Pass Criteria: Highlights the Pass Criteria of the test case.

Test Reference Tool: (optional) Specifies the conditions for using a test reference tool to perform the test case to verify a UEUT. This field is applicable to non-interoperability test cases only. The conditions include indication of which terminal settings refer to a test reference tool and which

terminal settings refer to a UEUT. The conditions also choose all of the terminal setting options and the test case options.

Note that Terminal A shall be referred to as a Test Reference Tool.

Note: (optional) Provides additional information about the test case such as relevance to other test cases.

Comments: (optional) Provides editorial comments about the test case. This field may be highlighted in red.

1.1.1 Defining Test Cases

When defining a test case, all of the above fields shall be included except those that indicate “optional”. When there is no information to be provided to a non-optional field, the field shall be filled with “None”.

By the time the Test Case document is updated, some fields may not have been updated and are marked with TBA. These fields are expected to be filled in in later versions of this test case document.

1.1.2 Additional Testing Conditions

All test cases are expected to be conducted in error free or near error free environment. The BER shall be below 10^{-6} .

Optionally all test cases marked with a [BER] setting shall also be performed under erroneous conditions, either applying equally distributed bit errors at different bit error rates ($10^{-5} \leq \text{BER} \leq 10^{-3}$) or using WCDMA bit error patterns.

[] These brackets mark optional settings.

{ } Curly brackets mark a set of possible settings separated by | signs. One of the settings has to be selected.

|| means a logical “OR” connection.

Special settings (e.g. under Procedure, Test Reference Tool) or steps (e.g. under Expected Behavior) to fulfill a “pass” test case are marked in blue. To illustrate with Expected Behavior, the criteria marked in blue are mandatory to fulfill a ‘pass’ test case while other criteria in normal font style and color are not mandatory to fulfill a ‘pass’ test case.

1.2 Abbreviations and Definitions

BOLC	Bidirectional Open Logical Channels (Open+Ack required channels)
CFO	ControlFieldOctets (for AL3)
CLC	Close Logical Channels (Close+Ack all open channels)
IOP	InterOperability
IOT	InterOperability Test
LC	Logical Channel
LS	H.223 Level Setup
MES	Multiplex Entry Send
MO	Mobile Originated equipment
MSD	Master/Slave Determination (Request+Ack)
MT	Mobile Terminated equipment
MuxEntry	Exchange+Ack of all Multiplex Entries
OLC	Open Logical Channels (Open+Ack required channels)

P2P	Peer to peer
RC	Repeat Count
SN	Sequence Number
SVP	Simple Visual Profile (for MPEG4-Video)
TC	TestCase
TCS	Terminal Capability Set (Request+Ack)
UCF	Until Closing Flag
UE	User Equipment (including all 3G-324M compliant terminals)
UEUT	User Equipment Under Test
VT	Video Telephony
VTSTO	Video Temporal/ Spatial Trade Off

1.3 Default Endpoint Settings

Two types of default endpoint settings are defined, which are Default Test Terminal Settings and Default Test Tool Settings. Default Test Terminal Settings are for UEUTs, which are not expected to change configurations. Default Test Tool Settings are for test reference tools, which are capable of varying a wide range of terminal configurations.

1.3.1 Default Test Terminal Settings

The default test terminal (UEUT) settings are defined as below:

- Muxlevel 2 (H.223 Annex B)
- Audio OLC: AMR, AdaptationLayerType.al2WithoutSequenceNumbers, default terminal encoding rate
- Video OLC: H.263, AdaptationLayerType.al2WithSequenceNumbers, default terminal encoding rate

Since such terminals can be closed system, a number of the settings above may not be changeable. In this situation, the manufacturer's configuration for those unchangeable settings of the terminal is adopted.

1.3.2 Default Test Tool Settings

The default endpoint settings are defined as below:

- Muxlevel: 2 (H.223 Annex B)
- Audio OLC: AMR, AdaptationLayerType.al2WithoutSequenceNumbers, default terminal encoding rate 4.75kbps
- Video OLC: H.263, AdaptationLayerType.al2WithSequenceNumbers, default terminal encoding rate 56kbps
- Initial SRP command frame sequence number: 0
- Number of available H.245 messages per SRP command frame: maximum possible
- Number of CCSRL segmentation: minimum possible
- Initial T401 timeout: 1600ms
- Maximum MUX-PDU size: maximum limit of the multiplex level used

1.3.2.1 Default Terminal Capability Set

A default set of capabilities needs to be used.

Below is the minimal set of capabilities that needs to be used in a Terminal Capability Set message:

```

protocolIdentifier = itu-t recommendation h 245 0 6
multiplexCapability
  h223Capability
    transportWithI-frames = 0
    videoWithAL1 = 0
    videoWithAL2 = 1
    videoWithAL3 = 1
    audioWithAL1 = 0
    audioWithAL2 = 1
    audioWithAL3 = 0
    dataWithAL1 = 0
    dataWithAL2 = 0
    dataWithAL3 = 0
    maximumA12SDUSize = 1024
    maximumA13SDUSize = 1024
    maximumDelayJitter = 10
    h223MultiplexTableCapability
      basic
    maxMUXPDUSizeCapability = 1
    nsrpSupport = 1
    mobileOperationTransmitCapability
      modeChangeCapability = 0
      h223AnnexA = 1
      h223AnnexADoubleFlag = 1
      h223AnnexB = 1
      h223AnnexBwithHeader = 1
capabilityTable
  *
    capabilityTableEntryNumber = n1
    capability
      receiveAudioCapability
        genericAudioCapability
          capabilityIdentifier
            standard = itu-t recommendation h 245 1 1 1
          maxBitRate = 122
          collapsing
            *
              parameterIdentifier
                standard = 0
              parameterValue
                unsignedMin = 1
            *
          capabilityTableEntryNumber = n2
          capability
            receiveVideoCapability
              h263VideoCapability
                sqcifMPI = 2
                qcifMPI = 2
                maxBitRate = 560
                unrestrictedVector = 0
                arithmeticCoding = 0
                advancedPrediction = 0

```

```

                                pbFrames = 0
                                temporalSpatialTradeOffCapability = 0
capabilityDescriptors
    *
        capabilityDescriptorNumber = 0
        simultaneousCapabilities
            *
                * = n1
            *
                * = n2

```

where $1 \leq n1, n2 \leq 65535$.

1.3.2.2 Default Multiplex Entry Table

Entry 1: { LCN ch1, RC UCF }

Entry 2: { LCN ch2, RC UCF }

Entry 3: { LCN ch1, RC 13 }, { LC ch2, RC UCF }

where $1 \leq ch1, ch2 \leq 65535$.

Note: The specification of Entry 3 for audio entry size is based on the specification of audio channel to use AL2 without sequence number.

1.4 Test Terminals Setup Capabilities

A test terminal shall be capable of modifying its behavior through different settings and codec preferences in the Terminal Capability Set (TCS) if supported and Muxlevel setups. The different settings are explained in the following for the two groups of tests.

1.4.1 Mandatory Tests

- {Muxlevel 0 | Muxlevel 1 (H.223 Annex A) | Muxlevel 2 (H.223 Annex B)}
- Audio OLC: AdaptationLayerType.{al2WithoutSequenceNumbers | al2WithSequenceNumbers}
- Video OLC: bidir OLC, AdaptationLayerType.al3.controlFieldOctets={0 | 1 | 2}

1.4.2 Optional Tests

- {Muxlevel 0 | Muxlevel 1 (H.223 Annex A) | Muxlevel 2 (H.223 Annex B) | Muxlevel 3a (H.223 Annex C) | Muxlevel 3b (H.223 Annex D)}.
- {SRP | NSRP | WNSRP}.
- TCS: videoWithAL3={true | false}.
- TCS: AudioCapability=genericAudioCapability (AMR) and g7231.
- TCS: VideoCapability=h263VideoCapability and genericVideoCapability (MPEG4 SVP@L0).
- TCS: different order in preference of Video Codecs within alternativeCapabilitySet.
- Audio OLC: selection of different audio codecs (TestCase 26 - 39)
- Video OLC: preference of opening Video OLC as bidir or unidir channel.
- Video OLC/ Encoding + Sending: selection of different flavors of video codecs (TestCase 26 - 39)

1.4.3 Additional Information

- Although it is common that terminals commonly use AL2 for video, according to [26.911], AL2 for video is only recommended and AL3 remains mandatory as in [H.324].

1.5 Test Case Number Representation

Test case number representation shall be used for test score sheet reporting purpose.

1.5.1 Test Case Number

Each Test Case is represented by a unique number.

If a new test case needs to be added for feature grouping purpose in between two existing test cases with consecutive test case numbers, a hyphen with a number is added to the test case number, e.g. TestCase 29-1 is inserted in between TestCase 29 and TestCase 30.

Cancelled Test Case number will not be reused for tests different from the original context. Cancelled test cases numbers are 19, 20, 21, 22, 23, 85 and 86. These numbers shall not be reused for defining new test cases.

If the terminal settings are identical for both Terminal A and Terminal B, the unique number itself is sufficient to represent the Test Case, e.g. TestCase 1.

When the terminal settings are different, the test case number should be added with a postfix letter 'a' or 'b' according to the terminal settings used, e.g. TestCase 2a and TestCase 2b.

1.5.2 Add-On Features

When additional features are added to the test case, further postfix alphabetic letter representing the features are added. For example, test cases with simulated error condition added are represented as TestCase 7e, TestCase 2ae, TestCase 2be.

The following lists some postfix alphabetical letters for terminal settings representation that may be used for the test case:

- 'a' Terminal A settings
- 'b' Terminal B settings
- 'd' Local or peer terminal uses default terminal settings.
- 'u' Expected Behaviour shall follow the path for testing feature not supported by local or peer terminal. If this postfix is not specified, Expected Behaviour shall follow the default path for testing feature supported by both local and peer terminals. If 'a' or 'b' is not indicated with 'u', this refers to UEUT not supporting the testing feature.

The following lists other postfix alphabetical letters for optional add-on features and conditions that may be used for both testing terminals for the test case. Features should be added in the order listed below:

- 'w' WNSRP applied
- 'm' Using MPEG4-Video
- 'k' MONA enabled
- 'e' Simulated error condition (random noise) applied

If only one terminal uses the optional add-on feature, letter 'a' or 'b' should be appended after the feature letter, e.g. TestCase 2bwa and TestCase 2wb indicate only the peer terminal enables WNSRP.

If one of the testing terminals cannot configure its terminal settings, a letter 'd' is used to represent this. If peer terminal cannot modify its terminal settings, the letter 'd' is appended immediately after the test case number, or 'a' or 'b' if used, e.g. TestCase 1d, TestCase 2ad, TestCase 2bd. If local

terminal cannot modify its terminal settings, letter 'd' is inserted twice immediately after the test case number, or once before 'a' or 'b' if used, e.g. TestCase 1dd, TestCase 2da, TestCase 2db.

If a feature defined in a test case cannot be enabled, a letter 'n' is inserted before the feature letter, e.g. TestCase 81nwb indicates the peer terminal does not enable WNSRP.

As a general rule, existing test cases should be used instead of appending feature letters, e.g. TestCase 82a should be used instead of TestCase 81nwb.

1.6 How to Use Test Cases

This test case document can be used according to the need of a company. It forms the basis for all kinds of 3G-324M interoperability test events hosted by IMTC and IMTC 3G-324M AG. It may be adopted by external parties according to their needs.

It is recommended all mandatory test cases should be conducted for every test event. All optional test cases are tested by priority as agreed by the two testing parties.

Test cases are regarded as successful when both testing terminals follow the testing procedure and the expected behaviour is observed.

When a CRC error or a parity check error is detected in a MUX-PDU, the MUX-PDU is discarded. The outcome of the test case is not affected unless otherwise specified.

All test results are recorded into test score sheet.

1.7 Guidelines

Some of the test cases in this document require additional guidelines.

These guidelines are needed in case confusion or a misunderstanding of a recommendation exists regarding the execution of a test case.

1.7.1 Using Multiplex Levels 0 and 1

According to the ITU-T H.324M recommendation and the 3GPP TS 26.111 specification, Multiplex Level 0 (H.223) and Multiplex Level 1 (H.223 Annex A) shall be supported by all terminals.

However, in reality, both Multiplex Levels have not been observed in deployed devices and are hardly used. As according to the 3GPP TS 26.111 recommendation for using Multiplex Level 2, the likelihood of a 3G terminal using a Multiplex Level other than Multiplex Level 2 (H.223 Annex B) or higher currently is low. Therefore, IMTC 3G-324M AG recommends test cases that use Multiplex Level 0 and 1 as optional. This recommendation is in view of the demand of exercising the test cases and does not override the specifications as defined in the relevant standards concerned.

2 Additional Terminal Compliance Tests

2.1 *Mandatory Tests*

No mandatory test case is defined for compliance.

2.2 *Optional Tests*

Purpose:

Test of additional optional H.245 signaling for enhancing terminal compliance.

TestCase 63 – Dynamic reopening of OLC with different video codec (receiveVideoCapability only at both terminals)

Priority:

Optional TC.

Objective:

The intention of this test case is to ensure that, even if a UEUT receives a request to close its incoming video channel followed by a request to dynamically open a new incoming video channel using a different codec, the UEUT will continue to operate normally, and is able to acknowledge the incoming requests and transition to decoding the new incoming video.

Reference:

[H.324] 6.5.2, [H.245] 5.3, B.3.1, B.3.5

Terminal A Setup:

Entity	Settings
H.223	Muxlevel 2 (H.223 Annex B)
TCS	H.223 capabilities: videoWithAL3=true <i>videoWithAL2=true</i> audiowithAL2=true Audio capabilities: genericAudioCapability (AMR) { receive } [g7231 { receive }] Video capabilities: <i>h263VideoCapability { receive }</i> <i>genericVideoCapability (MPEG4) { receive }</i>
MasterSlave	<i>Master</i>
OLC Audio	AMR [g7231]
OLC Video	<i>unidir 1st alternativeCapabilitySet of Terminal B</i> <i>AdaptationLayerType.al2WithSequenceNumbers</i>
[BER]	optional: bit error injection

Terminal B Setup:

Entity	Settings
H.223	Muxlevel 2 (H.223 Annex B)
TCS	H.223 capabilities: videoWithAL3=true <i>videoWithAL2=true</i> audiowithAL2=true Audio capabilities: genericAudioCapability (AMR) { receive } [g7231 { receive }] Video capabilities: <i>h263VideoCapability { receive }</i> <i>genericVideoCapability (MPEG4) { receive }</i>
MasterSlave	<i>Slave</i>
OLC Audio	AMR [g7231]
OLC Video	<i>unidir 1st alternativeCapabilitySet of Terminal A</i> <i>AdaptationLayerType.al2WithSequenceNumbers</i>
[BER]	optional: bit error injection

Precondition:

1. Terminal A and Terminal B have to support at least two different video codecs

Procedure:

1. Configure terminal(s) according to Default Endpoint Settings (clause 1.3) and Terminal Setup.
2. Establish call session.
3. *Validate expected behaviour checkpoints 5-7, and 10-14.*
4. Terminate call session.

Expected Behavior:

1. Level setup on Muxlevel 2.
2. RespMsg_terminalCapabilitySetAck received.
3. RespMsg_masterSlaveDeterminationAck received.
4. RespMsg_openLogicalChannelAck for Audio received.
5. *unidir ReqMsg_OpenLogicalChannel for Terminal A's 1st alternativeCapabilitySet Video received at Terminal A is accepted with RespMsg_openLogicalChannelAck.*
6. *unidir ReqMsg_OpenLogicalChannel for Terminal B's 1st alternativeCapabilitySet Video received at Terminal B is accepted with RespMsg_openLogicalChannelAck.*
7. *RespMsg_openLogicalChannelAck (Master, Slave) for Video received.*
8. RespMsg_multiplexEntrySendAck for all mux table entries.
9. Encoding + Sending/Reception + Decoding of Video / Audio.
10. *ReqMsg_CloseLogicalChannel for Video with reason=reopen send from Terminal A.*
11. *On reception of ReqMsg_CloseLogicalChannel at Terminal B it sends RespMsg_CloseLogicalChannelAck.*

12. *Terminal A stops sending Video on RespMsg_CloseLogicalChannelAck*
13. *unidir ReqMsg_OpenLogicalChannel for Terminal B's 2nd alternativeCapabilitySet Video received at Terminal B is accepted with RespMsg_openLogicalChannelAck.*
14. *Encoding + Sending/Reception + Decoding of Video*
15. CmdMsg_endSessionCommand sent.

Order: 1; 2-3, 4-9, 10, 11-12, 13, 14, 15

Pass Criteria:

The UEUT must demonstrate the above expected behaviour as defined in steps 5 ~ 7 and 10 ~ 14 to fulfill the objective of this test thereby passing the test; any other outcome shall be considered as failing the test. All the other steps described in the expected behaviour section are provided to assist with the conduct of the test; the outcomes of which do not need to be declared.

TestCase 64 –**Dynamic reopening of OLC with different video codec
(receiveAndTransmitVideoCapability is signaled in TCS by Terminal A)****Priority:**

Optional TC.

Objective:

The intention of this test case is to ensure that, even if a UEUT receives a request to close its incoming video channel followed by a request to dynamically open a new incoming video channel using a different codec, the UEUT will continue to operate normally, and is able to acknowledge the incoming requests and transition to decoding the new incoming video.

Reference:

[H.324] 6.5.2, [H.245] 5.3, B.2.2.3, B.3.1, B.3.5

Terminal A Setup:

Entity	Settings
H.223	Muxlevel 2 (H.223 Annex B)
TCS	H.223 capabilities: videoWithAL3=true <i>videoWithAL2=true</i> audiowithAL2=true Audio capabilities: genericAudioCapability (AMR) { receive } [g7231 { receive }] Video capabilities: <i>h263VideoCapability { receiveAndTransmit }</i> <i>genericVideoCapability (MPEG4) { receiveAndTransmit }</i>
MasterSlave	<i>Master</i>
OLC Audio	AMR [g7231]
OLC Video	<i>unidir 1st alternativeCapabilitySet of Terminal A</i> <i>AdaptationLayerType.al2WithSequenceNumbers</i>
[BER]	optional: bit error injection

Terminal B Setup:

Entity	Settings
H.223	Muxlevel 2 (H.223 Annex B)
TCS	H.223 capabilities: videoWithAL3=true <i>videoWithAL2=true</i> audiowithAL2=true Audio capabilities: genericAudioCapability (AMR) { receive receiveAndTransmit } [g7231 { receive receiveAndTransmit }] Video capabilities: <i>h263VideoCapability { receive receiveAndTransmit }</i> <i>genericVideoCapability (MPEG4) { receive receiveAndTransmit }</i>
MasterSlave	<i>Slave</i>
OLC Audio	AMR [g7231]
OLC Video	<i>unidir 1st alternativeCapabilitySet of Terminal A</i> <i>AdaptationLayerType.al2WithSequenceNumbers</i>
[BER]	optional: bit error injection

Precondition:

1. *Terminal A and Terminal B support at least two different video codecs*

Procedure:

1. Configure terminal(s) according to Default Endpoint Settings (clause 1.3) and Terminal Setup.
2. Establish call session.
3. *Validate expected behaviour checkpoints 5-7, and 10-14.*
4. Terminate call session.

Expected Behavior:

1. Level setup on Muxlevel 2.
2. RespMsg_terminalCapabilitySetAck received.
3. RespMsg_masterSlaveDeterminationAck received.
4. RespMsg_openLogicalChannelAck for Audio received.
5. *unidir ReqMsg_OpenLogicalChannel for Terminal A's 1st alternativeCapabilitySet Video received at Terminal A is accepted with RespMsg_openLogicalChannelAck.*
6. *unidir ReqMsg_OpenLogicalChannel for Terminal A's 1st alternativeCapabilitySet Video received at Terminal B is accepted with RespMsg_openLogicalChannelAck.*
7. *RespMsg_openLogicalChannelAck (Master, Slave) for Video received.*
8. RespMsg_multiplexEntrySendAck for all mux table entries.
9. Encoding + Sending/Reception + Decoding of Video / Audio.
10. *ReqMsg_CloseLogicalChannel for Video with reason=reopen send from Terminal A.*

11. *On reception of ReqMsg_CloseLogicalChannel at Terminal B it sends RespMsg_CloseLogicalChannelAck.*
12. *Terminal A stops sending Video on RespMsg_CloseLogicalChannelAck from Terminal B.*
13. *unidir ReqMsg_OpenLogicalChannel for Terminal A's 2nd alternativeCapabilitySet Video received at Terminal B is accepted with RespMsg_openLogicalChannelAck.*
14. *Encoding + Sending/Reception + Decoding of Video*
15. CmdMsg_endSessionCommand sent.

Order: 1, 2-3, 4-9, 10, 11-12, 13, 14, 15

Pass Criteria:

The UEUT must demonstrate the above expected behaviour as defined in steps 5 ~ 7 and 10 ~ 14 to fulfill the objective of this test thereby passing the test; any other outcome shall be considered as failing the test. All the other steps described in the expected behaviour section are provided to assist with the conduct of the test; the outcomes of which do not need to be declared.

TestCase 65 –

Opening of OLC with more than one capabilityDescriptors signaled in TCS by Terminal A in descending order of capabilityDescriptorNumbers, receiveAndTransmitAudioCapability and receiveAndTransmitVideoCapability at both terminals.

Priority:

Optional TC.

Objective:

The intention of this test case is to ensure that, even if a UEUT receives a request to open audio and video channels selected from its second preference capability descriptor set, it is able to acknowledge the incoming requests and demonstrate encoding and transmission/reception and decoding of audio and video.

Reference:

[H.245] B.2.2.2

Terminal A Setup:

Entity	Settings
H.223	Muxlevel 2 (H.223 Annex B)
TCS	H.223 capabilities: <i>videoWithAL3=true</i> <i>videoWithAL2=true</i> <i>audiowithAL2=true</i> Audio capabilities: <i>genericAudioCapability (AMR) { receiveAndTransmit }</i> <i>g7231 { receiveAndTransmit }</i> Video capabilities: <i>h263VideoCapability { receiveAndTransmit }</i> <i>genericVideoCapability (MPEG4) { receiveAndTransmit }</i> Capability descriptors: <i>Number 1 (1st):</i> <i>1 – h263</i> <i>2 – g7231</i> <i>Number 0 (2nd):</i> <i>1 – genericVideo (MPEG4)</i> <i>2 – genericAudio (AMR)</i>
MasterSlave	<i>Master</i>
OLC Audio	<i>AMR (1st signaled Cap of Terminal A in second capabilityDescriptor)</i>
OLC Video	<i>unidir MPEG4 (1st signaled Cap of Terminal A in second capabilityDescriptor)</i> <i>AdaptationLayerType.al2WithSequenceNumbers</i>
[BER]	optional: bit error injection

Terminal B Setup:

Entity	Settings
H.223	Muxlevel 2 (H.223 Annex B)
TCS	<p>H.223 capabilities: videoWithAL3=true <i>videoWithAL2=true</i> audiowithAL2=true</p> <p>Audio capabilities: <i>genericAudioCapability (AMR) { receiveAndTransmit }</i> <i>g7231 { receiveAndTransmit }</i></p> <p>Video capabilities: <i>h263VideoCapability { receiveAndTransmit }</i> <i>genericVideoCapability (MPEG4) { receiveAndTransmit }</i></p> <p>Capability descriptors: Number 0 (2nd): 1 – <i>genericVideo (MPEG4)</i> 2 – <i>genericAudio (AMR)</i> Number 1 (1st): 1 – <i>h263</i> 2 – <i>g7231</i></p>
MasterSlave	<i>Slave</i>
OLC Audio	<i>AMR (1st signaled Cap of Terminal A in second capabilityDescriptor)</i>
OLC Video	<i>unidir MPEG4 (1st signaled Cap of Terminal A in second capabilityDescriptor)</i> <i>AdaptationLayerType.al2WithSequenceNumbers</i>
[BER]	optional: bit error injection

Precondition:

None

Procedure:

1. Configure terminal(s) according to Default Endpoint Settings (clause 1.3) and Terminal Setup.
2. Establish call session.
3. *Validate expected behaviour checkpoints 4-8.*
4. Terminate call session.

Expected Behavior:

1. Level setup on Muxlevel 2.
2. RespMsg_terminalCapabilitySetAck received.
3. RespMsg_masterSlaveDeterminationAck received.
4. *ReqMsg_OpenLogicalChannel for Terminal A's 1st alternativeCapabilitySet Audio in capabilityDescriptor=0 (2nd set) received at Terminal A is accepted with RespMsg_openLogicalChannelAck.*
5. *ReqMsg_OpenLogicalChannel for Terminal A's 1st alternativeCapabilitySet Audio in capabilityDescriptor=0 (2nd set) received at Terminal B is accepted with RespMsg_openLogicalChannelAck.*

6. *unidir ReqMsg_OpenLogicalChannel for Terminal A's 1st alternativeCapabilitySet Video in capabilityDescriptor=0 (2nd set) received at Terminal A is accepted with RespMsg_openLogicalChannelAck.*
7. *unidir ReqMsg_OpenLogicalChannel for Terminal A's 1st alternativeCapabilitySet Video in capabilityDescriptor=0 (2nd set) received at Terminal B is accepted with RespMsg_openLogicalChannelAck.*
8. *RespMsg_openLogicalChannelAck (Master, Slave) for Video received.*
9. RespMsg_multiplexEntrySendAck for all mux table entries.
10. Encoding + Sending/Reception + Decoding of Video / Audio.
11. CmdMsg_endSessionCommand sent.

Order: 1, 2-3, 4-10, 11

Pass Criteria:

The UEUT must demonstrate the above expected behaviour as defined in steps 4 ~ 8 to fulfill the objective of this test thereby passing the test; any other outcome shall be considered as failing the test. All the other steps described in the expected behaviour section are provided to assist with the conduct of the test; the outcomes of which do not need to be declared.

TestCase 70 –**All Combinations and Variants from Test Cases 51 until before 70**

Here all open combinations (mainly Video codec variations in TCS and alternativeCapabilitySet) shall be subject for tests. Terminal Setups shall be modified in terms of codec signaling and codec selection for OLC procedures.

TestCase 71 – Master slave OLC conflict for symmetric codec

Priority:

Optional TC.

Objective:

To verify Terminal B continues to operate normally when it encounters a master slave OLC conflict for symmetric codecs. The intention of this test case is to make sure even if a terminal requests open logical channel in an unpopular way, the call session establishment does not fail. Note that Terminal A in this test case is behaving badly i.e. it selects a video codec against its own preferences. That kind of behavior should be avoided in actual implementations.

Reference:

[H.324] 6.5.2, [H.245] B.2.2.3, B.3.3, C.4.1.3, C.5.1.3

Terminal A Setup:

Entity	Settings
H.223	Muxlevel 2 (H.223 Annex B)
TCS	H.223 capabilities: videoWithAL3=true <i>videoWithAL2=true</i> audiowithAL2=true Audio capabilities: genericAudioCapability (AMR) { receive } [g7231 { receive }] Video capabilities: <i>genericVideoCapability (MPEG4) { receiveAndTransmit }</i> <i>h263VideoCapability { receiveAndTransmit }</i> Capability descriptors: <i>Number 0 (1st):</i> <i>1 – genericAudio, [g7231]</i> <i>2 – genericVideo, h263</i>
MasterSlave	<i>Master</i>
OLC Audio	AMR [g7231]
OLC Video	<i>unidir 2nd alternativeCapabilitySet Video of Terminal A and</i> <i>AdaptationLayerType.al2WithSequenceNumbers</i>
[BER]	optional: bit error injection

Terminal B Setup:

Entity	Settings
H.223	Terminal default
TCS	H.223 capabilities: Terminal default with inclusion of <i>videoWithAL2=true</i> Audio capabilities: Terminal default Video capabilities: Terminal default with inclusion of <i>genericVideoCapability (MPEG4) { receive receiveAndTransmit }</i>
MasterSlave	<i>Slave</i>
OLC Audio	AMR [g7231]
OLC Video	<i>unidir 1st alternativeCapabilitySet Video of Terminal A and AdaptationLayerType.al2 with default terminal settings for sequence numbers</i>
[BER]	optional: bit error injection

Scenario:

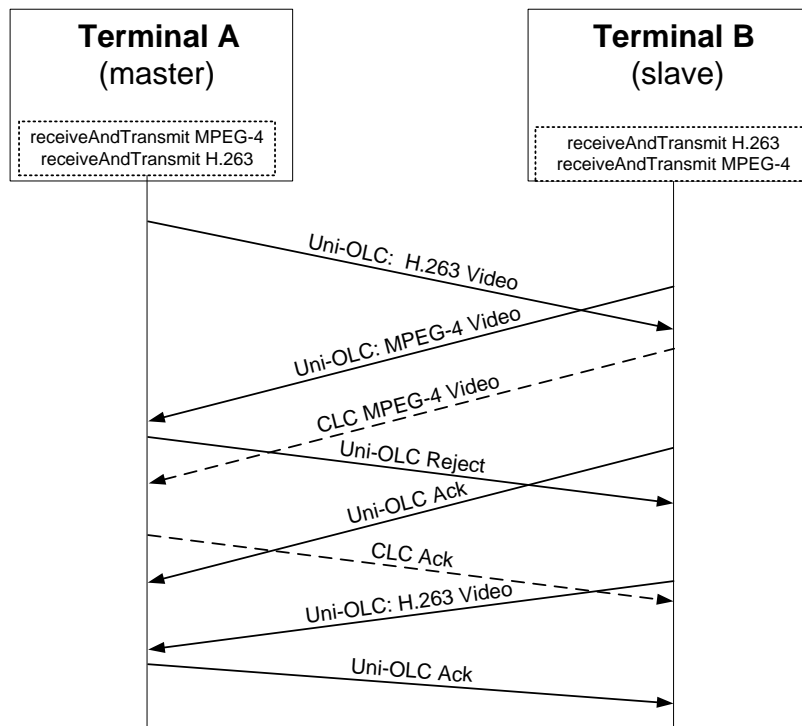


Figure: TestCase 71 – Conflict Scenario

Precondition:

1. Terminal B supports MPEG4-Video.
2. Terminal B supports video over AL2.
3. Terminal B supports starting unidirectional OLC video over AL2.
4. Terminal A supports starting video same as its 2nd preferred alternativeCapabilitySet Video.

Procedure:

1. Configure terminal(s) according to Default Endpoint Settings (clause 1.3) and Terminal Setup.
2. Establish a call session.
3. *Validate the call was successfully established, and Terminal B receives and decodes incoming audio and video.*
4. Terminate the call.

Expected Behavior:

2.
 - a. Level setup on Muxlevel { 2 | 1 | 0 } (The lower level of Terminal A and Terminal B selected).
 - b. RespMsg_terminalCapabilitySetAck received.
 - c. RespMsg_masterSlaveDeterminationAck received.
 - d. RespMsg_openLogicalChannelAck for Audio received.
 - e. *unidir ReqMsg_OpenLogicalChannel for Video (with Terminal A's 1st alternativeCapabilitySet for video) received at Terminal A is rejected with reason RespMsg_OpenLogicalChannelReject.cause=masterSlaveConflict as Terminal A has already started opening video channel with a different codec and cannot handle different codecs in different directions simultaneously..*
 - f. *unidir ReqMsg_OpenLogicalChannel for Video received at Terminal B is accepted with RespMsg_openLogicalChannelAck.*
 - g. *Optionally, ReqMsg_CloseLogicalChannel received at Terminal A. If received, Terminal A sends RespMsg_CloseLogicalChannelAck.*
 - h. *On reception of RespMsg_OpenLogicalChannelReject, Terminal B re-proposes a unidir ReqMsg_OpenLogicalChannel for Video (with Terminal A's 2nd alternativeCapabilitySet for video)*
 - i. *RespMsg_openLogicalChannelAck (Master, Slave) for Video received.*
 - j. RespMsg_multiplexEntrySendAck for all mux table entries.
3. Encoding + Sending/Reception + Decoding of Video / Audio.
4. CmdMsg_endSessionCommand sent.

Order: 2a, 2b-2c, 2d-3, 4

Pass Criteria:

The UEUT must demonstrate the above expected behaviour as defined in steps 2e ~ 2i and 3 to fulfill the objective of this test thereby passing the test; any other outcome shall be considered as failing the test. All the other steps described in the expected behaviour section are provided to assist with the conduct of the test; the outcomes of which do not need to be declared.

Test Reference Tool:

- Terminal A refers to a Test Reference Tool. Terminal B refers to UEUT.

- videoWithAL2 shall be set to true.
- Terminal A will initially attempt to transmit video over AL2 when supported by Terminal B
- All other optional settings within [] bracket shall be ignored.

TestCase 201 – Terminal Capability Set contains transmit information only

Priority:

Optional TC.

Objective:

To verify Terminal B continues to operate normally when it receives a Terminal Capability Set message containing transmit information only.

Reference:

[H.324] 6.5.1, [H.245] B.2.2, B.3.1

Terminal A Setup:

Entity	Settings
H.223	Muxlevel 2 (H.223 Annex B)
TCS	H.223 capabilities: videoWithAL3=true [videoWithAL2=true false] audiowithAL2=true Audio capabilities: <i>genericAudioCapability (AMR) { transmit }</i> <i>[g7231 { transmit }]</i> Video capabilities: <i>h263VideoCapability { transmit }</i> <i>genericVideoCapability (MPEG4) { transmit }</i> <i>genericVideoCapability (H.264) { transmit }</i>
MasterSlave	-
OLC Audio	AMR [g7231]
OLC Video	bidir [unidir] h263VideoCapability [MPEG4] [H.264]
[BER]	optional: bit error injection

Terminal B Setup:

Entity	Settings
H.223	Terminal default
TCS	H.223 capabilities: Terminal default Audio capabilities: Terminal default Video capabilities: Terminal default
MasterSlave	-
OLC Audio	AMR [g7231]
OLC Video	bidir [unidir] h263VideoCapability [MPEG4] [H.264]
[BER]	optional: bit error injection

Precondition:

1. Terminal A supports transmit media capability settings.

Procedure:

1. Configure terminal(s) according to Default Endpoint Settings (clause 1.3) and Terminal Setup.
2. Establish a call session.
3. *Validate the call was successfully established, and Terminal B receives and decodes incoming audio and video.*
4. Terminate the call.

Expected Behavior:

2.
 - a. Level setup on Muxlevel { 2 | 1 | 0 } (The lower level of Terminal A and Terminal B selected)
 - b. RespMsg_terminalCapabilitySetAck received.
 - c. RespMsg_masterSlaveDeterminationAck received
 - d. RespMsg_openLogicalChannelAck for Audio received
 - e. RespMsg_openLogicalChannelAck (Master, Slave unidir) || IndMsg_openLogicalChannelConfirm (Slave bidir) for Video received
 - f. RespMsg_multiplexEntrySendAck for all mux table entries
3. *Reception + Decoding of Video / Audio at Terminal B*
4. CmdMsg_endSessionCommand sent

Order: 2a, 2b-2c, 2d-3, 4

Pass Criteria:

The UEUT must demonstrate the above expected behaviour as defined in step 3 to fulfill the objective of this test thereby passing the test; any other outcome shall be considered as failing the test. All the other steps described in the expected behaviour section are provided to assist with the conduct of the test; the outcomes of which do not need to be declared.

Test Reference Tool:

- Terminal A refers to a Test Reference Tool. Terminal B refers to UEUT.
- videoWithAL2 shall be set to true.
- Terminal A will initially attempt to transmit video over AL2 when supported by Terminal B
- All other optional settings within [] bracket shall be ignored.

TestCase 202 – Terminal Capability Set contains no capability

Priority:

Optional TC.

Objective:

To verify Terminal B continues to operate normally when it receives a Terminal Capability Set message which does not contain any capability entry.

Reference:

[H.324] 6.5.1, [H.245] B.2.2, B.3.1

Terminal A Setup:

Entity	Settings
H.223	Muxlevel 2 (H.223 Annex B)
TCS	H.223 capabilities: videoWithAL3=true [videoWithAL2=true false] audiowithAL2=true Other capabilities: <i>[UserInputCapability { receiveAndTransmit }]</i>
MasterSlave	-
OLC Audio	AMR [g7231]
OLC Video	bidir [unidir] h263VideoCapability [MPEG4] [H.264]
[BER]	optional: bit error injection

Terminal B Setup:

Entity	Settings
H.223	Terminal default
TCS	H.223 capabilities: Terminal default Audio capabilities: Terminal default Video capabilities: Terminal default
MasterSlave	-
OLC Audio	AMR [g7231]
OLC Video	bidir [unidir] h263VideoCapability [MPEG4] [H.264]
[BER]	optional: bit error injection

Precondition:

1. Terminal A supports no media capability settings.

Procedure:

1. Configure terminal(s) according to Default Endpoint Settings (clause 1.3) and Terminal Setup.

2. Establish a call session.
3. *Validate the call was successfully established, and Terminal B receives and decodes incoming audio and video.*
4. Terminate the call.

Expected Behavior:

2.
 - a. Level setup on Muxlevel { 2 | 1 | 0 } (The lower level of Terminal A and Terminal B selected)
 - b. RespMsg_terminalCapabilitySetAck received.
 - c. RespMsg_masterSlaveDeterminationAck received
 - d. RespMsg_openLogicalChannelAck for Audio received at Terminal A
 - e. RespMsg_openLogicalChannelAck (Master, Slave unidir)
||IndMsg_openLogicalChannelConfirm (Slave bidir) for Video received at Terminal A
 - f. RespMsg_multiplexEntrySendAck for all mux table entries at Terminal A
 3. *Reception + Decoding of Video / Audio at Terminal B*
 4. CmdMsg_endSessionCommand sent
- Order: 2a, 2b-2c, 2d-3, 4

Pass Criteria:

The UEUT must demonstrate the above expected behaviour as defined in step3 to fulfill the objective of this test thereby passing the test; any other outcome shall be considered as failing the test. All the other steps described in the expected behaviour section are provided to assist with the conduct of the test; the outcomes of which do not need to be declared.

Test Reference Tool:

- Terminal A refers to a Test Reference Tool. Terminal B refers to UEUT.
- videoWithAL2 shall be set to true.
- Terminal A will initially attempt to transmit video over AL2 when supported by Terminal B
- All other optional settings within [] bracket shall be ignored.

TestCase 203 – Enhanced Multiplex Table Capability

Priority:

Optional TC.

Objective:

To verify Terminal B continues to operate normally when it receives a Terminal Capability Set message with h223MultiplexTableCapability set to 'enhanced'.

Reference:

[H.245] B.2.2.4, [H.223] 6.4.1.1

Terminal A Setup:

Entity	Settings
H.223	Muxlevel 2 (H.223 Annex B)
TCS	H.223 capabilities: videoWithAL3=true [videoWithAL2=true false] audiowithAL2=true <i>h223MultiplexTableCapability=enhanced</i> Audio capabilities: genericAudioCapability (AMR) { receive } [g7231 { receive }] Video capabilities: h263VideoCapability { receive } [genericVideoCapability (MPEG4) { receive }] [genericVideoCapability (H.264) { receive }]
MasterSlave	-
OLC Audio	AMR [g7231]
OLC Video	bidir [unidir] h263VideoCapability [MPEG4] [H.264]
[BER]	optional: bit error injection

Terminal B Setup:

Entity	Settings
H.223	Terminal default
TCS	H.223 capabilities: Terminal default Audio capabilities: Terminal default Video capabilities: Terminal default
MasterSlave	-
OLC Audio	AMR [g7231]
OLC Video	bidir [unidir] h263VideoCapability [MPEG4] [H.264]
[BER]	optional: bit error injection

Precondition:

1. Terminal A supports enhanced multiplex table settings.

Procedure:

1. Configure terminal(s) according to Default Endpoint Settings (clause 1.3) and Terminal Setup.
2. Establish a call session.
3. *Validate the call was successfully established, and Terminal B receives and decodes incoming audio and video.*

4. Terminate the call.

Expected Behavior:

2.
 - a. Level setup on Muxlevel { 2 | 1 | 0 } (The lower level of Terminal A and Terminal B selected)
 - b. RespMsg_terminalCapabilitySetAck received
 - c. RespMsg_masterSlaveDeterminationAck received
 - d. RespMsg_openLogicalChannelAck for Audio received
 - e. RespMsg_openLogicalChannelAck (Master, Slave unidir)
||IndMsg_openLogicalChannelConfirm (Slave bidir) for Video received
 - f. RespMsg_multiplexEntrySendAck for all mux table entries
3. Encoding + Sending/Reception + Decoding of Video/Audio
4. CmdMsg_endSessionCommand sent

Order: 2a, 2b-2c, 2d-3, 4

Pass Criteria:

The UEUT must demonstrate the above expected behaviour as defined in step 3 to fulfill the objective of this test thereby passing the test; any other outcome shall be considered as failing the test. All the other steps described in the expected behaviour section are provided to assist with the conduct of the test; the outcomes of which do not need to be declared.

Test Reference Tool:

- Terminal A refers to a Test Reference Tool. Terminal B refers to UEUT.
- videoWithAL2 shall be set to true.
- Terminal A will initially attempt to transmit video over AL2 when supported by Terminal B
- All other optional settings within [] bracket shall be ignored.

TestCase 204 – Maximum AL2SDU/AL3SDU Size Capability

Priority:

Optional TC.

Objective:

To verify Terminal B transmit AL2 or AL3 SDUs which do not exceed the size specified in the received Terminal Capability Set

Reference:

[H.245] B.2.2.4

Terminal A Setup:

Entity	Settings
H.223	Muxlevel 2 (H.223 Annex B)
TCS	H.223 capabilities: VideoWithAL3=true <i>videoWithAL2=false//true</i> audiowithAL2=true <i>maximumAl2SDUSize=256// maximumAl3SDUSize=256</i> Audio capabilities: genericAudioCapability (AMR) { receive } [g7231 { receive }] Video capabilities: h263VideoCapability { receive } [genericVideoCapability (MPEG4) { receive }] [genericVideoCapability (H.264) { receive }]
MasterSlave	-
OLC Audio	AMR [g7231]
OLC Video	bidir [unidir] h263VideoCapability [MPEG4] [H.264]
[BER]	optional: bit error injection

Terminal B Setup:

Entity	Settings
H.223	Terminal default
TCS	H.223 capabilities: Terminal default Audio capabilities: Terminal default Video capabilities: Terminal default
MasterSlave	-
OLC Audio	AMR [g7231]
OLC Video	bidir [unidir] h263VideoCapability [MPEG4] [H.264]
[BER]	optional: bit error injection

Precondition:

1. Terminal A supports setting received maximum AL2-SDU size and AL3-SDU size capability.

Procedure:

1. Configure terminal(s) according to Default Endpoint Settings (clause 1.3) and Terminal Setup.
2. Establish a call session.
3. *Validate the call was successfully established, and Terminal B receives and decodes incoming audio and video.*
4. *Verify at Terminal A, that the received AL2SDU and AL3SDU sizes do not exceed the size specified in Terminal A's Capability Set.*
5. Terminate the call.

Expected Behavior:

2.
 - a. Level setup on Muxlevel { 2 | 1 | 0 } (The lower level of Terminal A and Terminal B selected)
 - b. RespMsg_terminalCapabilitySetAck received
 - c. RespMsg_masterSlaveDeterminationAck received
 - d. RespMsg_openLogicalChannelAck for Audio received
 - e. RespMsg_openLogicalChannelAck (Master, Slave unidir) || IndMsg_openLogicalChannelConfirm (Slave bidir) for Video received
 - f. RespMsg_multiplexEntrySendAck for all mux table entries
3. Encoding + Sending/Reception + Decoding of Video/Audio
4. *Received SDUs at Terminal A do not exceed maximumAl2SDUSize || maximumAl3SDUSize defined in TCS*
5. CmdMsg_endSessionCommand sent

Order: 2a, 2b-2c, 2d-3, 4, 5

Pass Criteria:

The UEUT must demonstrate the above expected behaviour as defined in steps 3 ~ 4 to fulfill the objective of this test thereby passing the test; any other outcome shall be considered as failing the test. All the other steps described in the expected behaviour section are provided to assist with the conduct of the test; the outcomes of which do not need to be declared.

Test Reference Tool:

- Terminal A refers to a Test Reference Tool. Terminal B refers to UEUT.
- videoWithAL2 shall be set to true.
- Terminal A will initially attempt to transmit video over AL3 when supported by Terminal B
- All other optional settings within [] bracket shall be ignored.

TestCase 205 – MaxH223MUXPDUsSize command

Priority:

Optional TC.

Objective:

To verify Terminal B transmits MUX-PDUs which do not exceed the sizes specified in the received Terminal Capability Set.

Reference:

[H.245] B.2.2.4, B.13.5

Terminal A Setup:

Entity	Settings
H.223	Muxlevel 2 (H.223 Annex B)
TCS	H.223 capabilities: videoWithAL3=true [videoWithAL2=true false] audiowithAL2=true Audio capabilities: genericAudioCapability (AMR) { receive } [g7231 { receive }] Video capabilities: h263VideoCapability { receive } [genericVideoCapability (MPEG4) { receive }] [genericVideoCapability (H.264) { receive }]
MasterSlave	-
OLC Audio	AMR [g7231]
OLC Video	bidir [unidir] h263VideoCapability [MPEG4] [H.264]
[BER]	optional: bit error injection

Terminal B Setup:

Entity	Settings
H.223	Terminal default
TCS	H.223 capabilities: Terminal default with inclusion of [maxMUXPDUsSizeCapability] Audio capabilities: Terminal default Video capabilities: Terminal default
MasterSlave	-
OLC Audio	AMR [g7231]
OLC Video	bidir [unidir] h263VideoCapability [MPEG4] [H.264]
[BER]	optional: bit error injection

Precondition:

1. Terminal A supports sending maxH223MUXPDUsize command.
2. Terminal B supports maximum MUX-PDU size capability.

Procedure:

1. Configure terminal(s) according to Default Endpoint Settings (clause 1.3) and Terminal Setup.
2. Establish a call session.
3. *Validate the call was successfully established, and Terminal B receives and decodes incoming audio and video.*
4. *Verify at Terminal A, that the received MUX-PDUs do not exceed the size specified in Terminal A's Capability Set.*
5. Terminate the call.

Expected Behavior:

2.
 - a. Level setup on Muxlevel { 2 | 1 | 0 } (The lower level of Terminal A and Terminal B selected)
 - b. RespMsg_terminalCapabilitySetAck received
 - c. RespMsg_masterSlaveDeterminationAck received
 - d. RespMsg_openLogicalChannelAck for Audio received
 - e. RespMsg_openLogicalChannelAck (Master, Slave unidir)
||IndMsg_openLogicalChannelConfirm (Slave bidir) for Video received
 - f. RespMsg_multiplexEntrySendAck for all mux table entries
3. Encoding + Sending/Reception + Decoding of Video/Audio
4.
 - a. *Terminal A sends MiscCmdMsg_maxH223MUXPDUsize with a value of 80. In case this optional feature is not supported at Terminal B IndMsg_FunctionNotSupported might be returned.*
 - b. *Received MUX-PDUs at Terminal A do not exceed the value specified in maxH223MUXPDUsize. Terminal B should continue to operate normally in the case this optional feature is not supported at Terminal B.*
5. CmdMsg_endSessionCommand sent

Order: 2a, 2b-2c, 2d-3, 4a, 4b, 5

Pass Criteria:

The UEUT must demonstrate the above expected behaviour as defined in steps 3 ~ 4b to fulfill the objective of this test thereby passing the test; any other outcome shall be considered as failing the test. All the other steps described in the expected behaviour section are provided to assist with the conduct of the test; the outcomes of which do not need to be declared.

Test Reference Tool:

- Terminal A refers to a Test Reference Tool. Terminal B refers to UEUT.
- videoWithAL2 shall be set to true.
- Terminal A will initially attempt to transmit video over AL2 when supported by Terminal B.
- All other optional settings within [] bracket shall be ignored.

TestCase 206 – Multiplex Entry Send before Open Logical Channel

Priority:

Optional TC.

Objective:

To verify Terminal B continues to operate normally when it receives Multiplex Entry Send messages before receiving Open Logical Channel messages.

Reference:

[H.324] 7.4

Terminal A Setup:

Same as “TestCase 7 – Session Setup – Default Configuration” in “Test Cases – Interoperability” document.

Terminal B Setup:

Same as “TestCase 7 – Session Setup – Default Configuration” in “Test Cases – Interoperability” document.

Precondition:

1. Terminal A supports sending multiplex entry send before open logical channel.

Procedure:

1. Configure terminal(s) according to Default Endpoint Settings (clause 1.3).
2. Establish a call session.
3. *Validate the call was successfully established, and Terminal B receives and decodes incoming audio and video.*
4. *Validate expected behaviour checkpoints 2d-2e.*
5. Terminate the call.

Expected Behavior:

2.
 - a. Level setup on Muxlevel { 3 [with H.223 Annex B optional header] | 2 [with H.223 Annex B optional header] | 1 | 0 } (The lower level of Terminal A and Terminal B selected)
 - b. RespMsg_terminalCapabilitySetAck received.
 - c. RespMsg_masterSlaveDeterminationAck received
 - d. *Send RespMsg_multiplexEntrySend for all mux table entries*
 - e. *RespMsg_multiplexEntrySendAck for all mux table entries*
 - f. RespMsg_openLogicalChannelAck for Audio received
 - g. RespMsg_openLogicalChannelAck (Master, Slave unidir) ||IndMsg_openLogicalChannelConfirm (Slave bidir) for Video received
3. Encoding + Sending/Reception + Decoding of Video / Audio
5. CmdMsg_endSessionCommand sent

Order: 2a, 2b-2c, 2d-3, 5

Pass Criteria:

The UEUT must demonstrate the above expected behaviour as defined in steps 2d ~ 2e and 3 to fulfill the objective of this test thereby passing the test; any other outcome shall be considered as failing the test. All the other steps described in the expected behaviour section are provided to assist with the conduct of the test; the outcomes of which do not need to be declared.

Test Reference Tool:

- Terminal A refers to a Test Reference Tool. Terminal B refers to UEUT.
- videoWithAL2 shall be set to true.
- Terminal A will initially attempt to transmit video over AL2 when supported by Terminal B
- All other optional settings within [] bracket shall be ignored.

TestCase 207 – Request Terminal Capability Set

Priority:

Optional TC.

Objective:

To verify Terminal B continues to operate normally when it receives a SendTerminalCapabilitySet command.

Reference:

[H.245] B.13.1

Terminal A Setup:

Same as “TestCase 7 – Session Setup – Default Configuration” in “Test Cases – Interoperability” document.

Terminal B Setup:

Same as “TestCase 7 – Session Setup – Default Configuration” in “Test Cases – Interoperability” document.

Precondition:

1. Terminal A supports sending SendTerminalCapabilitySet command message.

Procedure:

1. Configure terminal(s) according to Default Endpoint Settings (clause 1.3).
2. Establish a call session.
3. *Validate the call was successfully established, and Terminal B receives and decodes incoming audio and video.*
4. *Validate expected behaviour checkpoints 4a-4c.*
5. Terminate the call.

Expected Behavior:

2.
 - a. Level setup on Muxlevel { 3 [with H.223 Annex B optional header] | 2 [with H.223 Annex B optional header] | 1 | 0 } (The lower level of Terminal A and Terminal B selected)
 - b. RespMsg_terminalCapabilitySetAck received.
 - c. RespMsg_masterSlaveDeterminationAck received
 - d. RespMsg_openLogicalChannelAck for Audio received
 - e. RespMsg_openLogicalChannelAck (Master, Slave unidir) ||IndMsg_openLogicalChannelConfirm (Slave bidir) for Video received
 - f. RespMsg_multiplexEntrySendAck for all mux table entries
3. Encoding + Sending/Reception + Decoding of Video / Audio

For feature supported by Terminal B:

4.
 - a. *Terminal A send CmdMsg_sendTerminalCapabilitySet.*
 - b. *Terminal B send ReqMsg_terminalCapabilitySet.*

c. RespMsg_terminalCapabilitySetAck received at Terminal B.

5. CmdMsg_endSessionCommand sent

Order: 2a, 2b-2c, 2d-3, 4a, 4b, 4c, 5

For feature not supported by Terminal B (u):

4.

*a. Terminal A send CmdMsg_sendTerminalCapabilitySet.
Terminal B responds with IndMsg_FunctionNotSupported*

5. CmdMsg_endSessionCommand sent

Order: 2a, 2b-2c, 2d-3, 4a, 5

Pass Criteria:

The UEUT must demonstrate the above expected behaviour as defined in steps 3 ~ 4c to fulfill the objective of this test thereby passing the test; any other outcome shall be considered as failing the test. All the other steps described in the expected behaviour section are provided to assist with the conduct of the test; the outcomes of which do not need to be declared.

TestCase 208 – Non-Sequential Combination of Multiplex Entries

Priority:

Optional TC.

Objective:

To verify Terminal B continues to operate normally when it receives Multiplex Table Entry Numbers in non sequential order.

Reference:

[H.245] B.4.1

Terminal A Setup:

Same as “TestCase 7 – Session Setup – Default Configuration” in “Test Cases – Interoperability” document.

Terminal B Setup:

Same as “TestCase 7 – Session Setup – Default Configuration” in “Test Cases – Interoperability” document.

Precondition:

1. Terminal A supports non-sequential combination of multiplex entries.

Procedure:

1. Configure terminal(s) according to Default Endpoint Settings (clause 1.3).
2. Establish a call session.
3. *Validate the call was successfully established, and Terminal B receives and decodes incoming audio and video.*
4. *Validate expected behaviour checkpoints 2f.*
5. Terminate the call.

Expected Behavior:

2.
 - a. Level setup on Muxlevel { 3 [with H.223 Annex B optional header] | 2 [with H.223 Annex B optional header] | 1 | 0 } (The lower level of Terminal A and Terminal B selected)
 - b. RespMsg_terminalCapabilitySetAck received.
 - c. RespMsg_masterSlaveDeterminationAck received
 - d. RespMsg_openLogicalChannelAck for Audio received
 - e. RespMsg_openLogicalChannelAck (Master, Slave unidir)
||IndMsg_openLogicalChannelConfirm (Slave bidir) for Video received
 - f. *Send MultiplexEntrySend message with multiplex table entry's listed in reverse order*
 - g. RespMsg_multiplexEntrySendAck for all mux table entries
3. Encoding + Sending/Reception + Decoding of Video / Audio
5. CmdMsg_endSessionCommand sent

Order: 2a, 2b-2c, 2d-3, 5

Pass Criteria:

The UEUT must demonstrate the above expected behaviour as defined in steps 2f and 3 to fulfill the objective of this test thereby passing the test; any other outcome shall be considered as failing the test. All the other steps described in the expected behaviour section are provided to assist with the conduct of the test; the outcomes of which do not need to be declared.

Test Reference Tool:

- Terminal A refers to a Test Reference Tool. Terminal B refers to UEUT.
- videoWithAL2 shall be set to true.
- Terminal A will initially attempt to transmit video over AL2 when supported by Terminal B
- All other optional settings within [] bracket shall be ignored.

TestCase 209 – Send each multiplex table entry separately

Priority:

Optional TC.

Objective:

To verify Terminal B continues to operate normally when it receives Multiplex Table Entry in separate Multiplex Table Send messages.

Reference:

[H.245] C.7

Terminal A Setup:

Same as “TestCase 7 – Session Setup – Default Configuration” in “Test Cases – Interoperability” document.

Terminal B Setup:

Same as “TestCase 7 – Session Setup – Default Configuration” in “Test Cases – Interoperability” document.

Precondition:

1. Terminal A supports sending each multiplex table entry separately.

Procedure:

1. Configure terminal(s) according to Default Endpoint Settings (clause 1.3).
2. Establish a call session.
3. *Validate the call was successfully established, and Terminal B receives and decodes incoming audio and video.*
4. *Validate expected behaviour checkpoints 2f.*
5. Terminate the call.

Expected Behavior:

2.
 - a. Level setup on Muxlevel { 3 [with H.223 Annex B optional header] | 2 [with H.223 Annex B optional header] | 1 | 0 } (The lower level of Terminal A and Terminal B selected)
 - b. RespMsg_terminalCapabilitySetAck received
 - c. RespMsg_masterSlaveDeterminationAck received
 - d. RespMsg_openLogicalChannelAck for Audio received
 - e. RespMsg_openLogicalChannelAck (Master, Slave unidir)
||IndMsg_openLogicalChannelConfirm (Slave bidir) for Video received
 - f. *Send each multiplexTableEntry in a separate MultiplexEntrySend message*
 - g. RespMsg_multiplexEntrySendAck for all mux table entries
3. Encoding + Sending/Reception + Decoding of Video/Audio
5. CmdMsg_endSessionCommand sent

Order: 2a, 2b-2c, 2d-3, 5

Pass Criteria:

The UEUT must demonstrate the above expected behaviour as defined in steps 2f and 3 to fulfill the objective of this test thereby passing the test; any other outcome shall be considered as failing the test. All the other steps described in the expected behaviour section are provided to assist with the conduct of the test; the outcomes of which do not need to be declared.

Test Reference Tool:

- Terminal A refers to a Test Reference Tool. Terminal B refers to UEUT.
- videoWithAL2 shall be set to true.
- Terminal A will initially attempt to transmit video over AL2 when supported by Terminal B
- All other optional settings within [] bracket shall be ignored.

TestCase 210 – Send NSRP Ack before next SRP Frame in NSRP mode

Priority:

Optional TC.

Objective:

To verify Terminal B does not send the subsequent NSRP frame before receiving an NSRP Ack for the previous NSRP frame

Reference:

[H.324] A.2.3

Terminal A Setup:

Same as “TestCase 7 – Session Setup – Default Configuration” in “Test Cases – Interoperability” document.

Terminal B Setup:

Same as “TestCase 7 – Session Setup – Default Configuration” in “Test Cases – Interoperability” document.

Precondition:

1. Terminal A supports delaying sending NSRP Acks by 2 seconds.

Procedure:

1. Configure terminal(s) according to Default Endpoint Settings (clause 1.3).
2. *Configure Terminal A to wait 2 seconds before sending and NSRP Acks.*
3. Establish a call session.
4. *Validate the call was successfully established, and Terminal B receives and decodes incoming audio and video.*
5. *Validate expected behaviour checkpoints 3b-3k.*
6. Terminate the call.

Expected Behavior:

3.
 - a. Level setup on Muxlevel { 3 [with H.223 Annex B optional header] | 2 [with H.223 Annex B optional header] | 1 | 0 } (The lower level of Terminal A and Terminal B selected)
 - b. *SRP Frame #1 received at Terminal A*
 - c. *Delay sending NSRP Ack #1 by 2 seconds and verify Terminal B does not send the next SRP Frame, until after the NSRP Ack is sent from Terminal A*
 - d. *SRP Frame #2 received at Terminal A*
 - e. *Delay sending NSRP Ack #2 by 2 seconds and verify Terminal B does not send the next SRP Frame, until after the NSRP Ack is sent from Terminal A*
 - f. *SRP Frame #3 received at Terminal A*
 - g. *Delay sending NSRP Ack #3 by 2 seconds and verify Terminal B does not send the next SRP Frame, until after the NSRP Ack is sent from Terminal A*
 - h. *SRP Frame #4 received at Terminal A*

- i. Delay sending NSRP Ack #4 by 2 seconds and verify Terminal B does not send the next SRP Frame, until after the NSRP Ack is sent from Terminal A*
 - j. SRP Frame #5 received at Terminal A*
 - k. Delay sending NSRP Ack #5 by 2 seconds and verify Terminal B does not send the next SRP Frame, until after the NSRP Ack is sent from Terminal A*
4. Encoding + Sending/Reception + Decoding of Video/Audio
6. CmdMsg_endSessionCommand sent
- Order: 3a, 3b, 3c, 3d, 3e, 3f, 3g, 3h, 3i, 3j, 3k, 4, 6

Pass Criteria:

The UEUT must demonstrate the above expected behaviour as defined in steps 3b ~ 4 to fulfill the objective of this test thereby passing the test; any other outcome shall be considered as failing the test. All the other steps described in the expected behaviour section are provided to assist with the conduct of the test; the outcomes of which do not need to be declared.

Test Reference Tool:

- Terminal A refers to a Test Reference Tool. Terminal B refers to UEUT.
- videoWithAL2 shall be set to true.
- Terminal A will initially attempt to transmit video over AL2 when supported by Terminal B
- All other optional settings within [] bracket shall be ignored.

TestCase 211 – Resend previous SRP frame closely before next SRP Frame in NSRP mode

Priority:

Optional TC.

Objective:

To verify Terminal B continues to operate normally when it receives the previous NSRP frame just before the subsequent NSRP frame.

Reference:

[H.324] A.2.3

Terminal A Setup:

Same as “TestCase 7 – Session Setup – Default Configuration” in “Test Cases – Interoperability” document.

Terminal B Setup:

Same as “TestCase 7 – Session Setup – Default Configuration” in “Test Cases – Interoperability” document.

Precondition:

1. Terminal A supports resending previous SRP frame immediately before sending subsequent SRP frame.

Procedure:

1. Configure terminal(s) according to Default Endpoint Settings (clause 1.3).
2. *Configure Terminal A to resend previous SRP frame immediately (≤ 1 millisecond) before sending the next SRP Frame.*
3. Establish a call session.
4. *Validate the call was successfully established, and Terminal B receives and decodes incoming audio and video.*
5. *Validate expected behaviour checkpoints 3b-3k.*
6. Terminate the call.

Expected Behavior:

3.
 - a. Level setup on Muxlevel { 3 [with H.223 Annex B optional header] | 2 [with H.223 Annex B optional header] | 1 | 0 } (The lower level of Terminal A and Terminal B selected)
 - b. *NSRP Ack #1 received at Terminal A*
 - c. *Resend SRP Frame #1 immediately (≤ 1 ms) before sending SRP Frame #2*
 - d. *NSRP Ack #2 received at Terminal A*
 - e. *Resend SRP Frame #2 immediately (≤ 1 ms) before sending SRP Frame #3*
 - f. *NSRP Ack #3 received at Terminal A*
 - g. *Resend SRP Frame #3 immediately (≤ 1 ms) before sending SRP Frame #4*
 - h. *NSRP Ack #4 received at Terminal A*
 - i. *Resend SRP Frame #4 immediately (≤ 1 ms) before sending SRP Frame #5*

j. NSRP Ack #5 received at Terminal A

k. Resend SRP Frame #5 immediately (≤ 1 ms) before sending SRP Frame #6

4. Encoding + Sending/Reception + Decoding of Video/Audio

6. CmdMsg_endSessionCommand sent

Order: 3a, 3b, 3c, 3d, 3e, 3f, 3g, 3h, 3i, 3j, 3k, 4, 6

Pass Criteria:

The UEUT must demonstrate the above expected behaviour as defined in steps 3b ~ 4 to fulfill the objective of this test thereby passing the test; any other outcome shall be considered as failing the test. All the other steps described in the expected behaviour section are provided to assist with the conduct of the test; the outcomes of which do not need to be declared.

Test Reference Tool:

- Terminal A refers to a Test Reference Tool. Terminal B refers to UEUT.
- videoWithAL2 shall be set to true.
- Terminal A will initially attempt to transmit video over AL2 when supported by Terminal B
- All other optional settings within [] bracket shall be ignored.

TestCase 212 – Terminal Capability Set contains multiple capability entries

Priority:

Optional TC.

Objective:

To verify Terminal B continues to operate normally when it receives a Terminal Capability Set message which includes multiple (over 3 for each audio and video) capability entries.

The original purpose of the test is to check a very common cause of VT IOT issues with respect to optional / unsupported parameters of Terminal Capability Set (according to the definitions of Capability Exchange in H.245 Annex A). However, this test case only focuses on capability entries; therefore it is very strongly recommended that UE vendors confirm that the UEUT disregards all parameters (or as many as possible) of the Terminal Capability Set parameters that are specified optional (according to the definitions of Capability Exchange in H.245 Annex A) and unsupported by UEUT, to ensure, in so far as it is possible, that VT connectivity is unaffected in these circumstances.

Reference:

[H.245] B.2.2, B.2.2.5

Terminal A Setup:

Entity	Settings
H.223	Muxlevel 2 (H.223 Annex B)
TCS	<p>H.223 capabilities: videoWithAL3=true [videoWithAL2=true false] audiowithAL2=true</p> <p>Audio capabilities: genericAudioCapability (AMR) { receive } <i>g7231 { receive }</i> <i>g711Ulaw64k { receive }</i> <i>g711Alaw64k { receive }</i></p> <p>Video capabilities: <i>h263VideoCapability { receive }</i> <i>sqcifMPI_isPresent=true</i> <i>qcifMPI_isPresent=true</i> <i>cifMPI_isPresent=true</i> <i>genericVideoCapability (MPEG4) { receive }</i> <i>h261VideoCapability { receive }</i> <i>qcifMPI_isPresent=true</i> <i>cifMPI_isPresent=true</i> <i>genericVideoCapability (H.264) { receive }</i></p> <p>Other capabilities: <i>NonStandardCapability={0.0.8.245.3.3.3}</i> <i>data=123456789</i></p>
MasterSlave	-
OLC Audio	AMR [g7231]
OLC Video	bidir [unidir] h263VideoCapability [MPEG4] [H.264]
[BER]	optional: bit error injection

Terminal B Setup:

Entity	Settings
H.223	Terminal default
TCS	H.223 capabilities: Terminal default Audio capabilities: Terminal default Video capabilities: Terminal default
MasterSlave	-
OLC Audio	AMR [g7231]
OLC Video	bidir [unidir] h263VideoCapability [MPEG4] [H.264]
[BER]	optional: bit error injection

Precondition:

1. Terminal A supports inclusion of multiple capability entries for its local terminal capability set request.

Procedure:

1. Configure terminal(s) according to Default Endpoint Settings (clause 1.3).
2. *Configure Terminal A to include all the information elements (parameters) which can be set in the terminal capability set message to verify Terminal B will ignore the parameters which it does not support.*
3. Establish a call session.
4. *Validate the call was successfully established, and Terminal B receives and decodes incoming audio and video.*
5. Terminate the call.

Expected Behavior:

3.
 - a. Level setup on Muxlevel { 2 | 1 | 0 } (The lower level of Terminal A and Terminal B selected)
 - b. RespMsg_terminalCapabilitySetAck received
 - c. RespMsg_masterSlaveDeterminationAck received
 - d. RespMsg_openLogicalChannelAck for Audio received
 - e. RespMsg_openLogicalChannelAck (Master, Slave unidir) || IndMsg_openLogicalChannelConfirm (Slave bidir) for Video received
 - f. RespMsg_multiplexEntrySendAck for all mux table entries
4. Encoding + Sending/Reception + Decoding of Video/Audio
5. CmdMsg_endSessionCommand sent

Order: 3a, 3b-3c, 3d-4, 5

Pass Criteria:

The UEUT must demonstrate the above expected behaviour as defined in step 4 to fulfill the objective of this test thereby passing the test; any other outcome shall be considered as failing the test. All the other steps described in the expected behaviour section are provided to assist with the conduct of the test; the outcomes of which do not need to be declared.

Test Reference Tool:

- Terminal A refers to a Test Reference Tool. Terminal B refers to UEUT.
- videoWithAL2 shall be set to true.
- Terminal A will initially attempt to transmit video over AL2 when supported by Terminal B
- All other optional settings within [] bracket shall be ignored.

TestCase 213 – Multiple video packets per AL-SDU

Priority:

Optional TC.

Objective:

To verify Terminal B continues to operate normally when it receives an AL-SDU including multiple video packets.

Reference:

[26.111] 6.6.1, [H.324] 6.6.1

Terminal A Setup:

Same as “TestCase 7 – Session Setup – Default Configuration” in “Test Cases – Interoperability” document.

Terminal B Setup:

Same as “TestCase 7 – Session Setup – Default Configuration” in “Test Cases – Interoperability” document.

Precondition:

1. Terminal A supports sending multiple video packets per AL-SDU.

Procedure:

1. Configure terminal(s) according to Default Endpoint Settings (clause 1.3).
2. *Configure Terminal A to send AL-SDUs containing multiple video packets.*
3. Establish a call session.
4. *Validate the call was successfully established, and Terminal B receives and decodes incoming audio and video.*
5. *Validate expected behaviour checkpoints 4.*
6. Terminate the call.

Expected Behavior:

3.
 - a. Level setup on Muxlevel { 3 [with H.223 Annex B optional header] | 2 [with H.223 Annex B optional header] | 1 | 0 } (The lower level of Terminal A and Terminal B selected)
 - b. RespMsg_terminalCapabilitySetAck received
 - c. RespMsg_masterSlaveDeterminationAck received
 - d. RespMsg_openLogicalChannelAck for Audio received
 - e. RespMsg_openLogicalChannelAck (Master, Slave unidir) ||IndMsg_openLogicalChannelConfirm (Slave bidir) for Video received
 - f. RespMsg_multiplexEntrySendAck for all mux table entries
4. *Encoding + Sending/Reception + Decoding multiple video packets per AL-SDU*
6. CmdMsg_endSessionCommand sent

Order: 3a, 3b-3c, 3d-4, 6

Pass Criteria:

The UEUT must demonstrate the above expected behaviour as defined in step 4 to fulfill the objective of this test thereby passing the test; any other outcome shall be considered as failing the test. All the other steps described in the expected behaviour section are provided to assist with the conduct of the test; the outcomes of which do not need to be declared.

Test Reference Tool:

- Terminal A refers to a Test Reference Tool. Terminal B refers to UEUT.
- videoWithAL2 shall be set to true.
- Terminal A will initially attempt to transmit video over AL2 when supported by Terminal B
- All other optional settings within [] bracket shall be ignored.

Note:

Multiple video packets in a single SDU are considered to be:

In H.263: A picture start code (PSC) and one or more GOB headers (GBSC) in a single SDU, OR, multiple GOB headers in a single SDU.

In MPEG4: A Video Object Plane (VOP) header and one or more video_packet_headers in a single SDU, OR, multiple video_packet_headers in a single SDU.

Note: In the AL-SDU, macro block information separates PSC, GOB headers VOP header and video_packet_header, as required by the appropriate video coding standard.

TestCase 214 – Send two multiplex table entries individually for audio and video separately

Priority:

Optional TC.

Objective:

To verify Terminal B continues to operate normally when it receives Multiplex Table Entry in two separate Multiplex Table Send messages and one Multiplex Table Entry represents for only audio channel and another one represents for only video channel.

Reference:

[H.245] C.7

Terminal A Setup:

Entity	Settings
H.223	Muxlevel 2 (H.223 Annex B)
TCS	H.223 capabilities: videoWithAL3=true [videoWithAL2=true false] audiowithAL2=true Audio capabilities: genericAudioCapability (AMR) { receive } [g7231 { receive }] Video capabilities: h263VideoCapability { receive } [genericVideoCapability (MPEG4) { receive }] [genericVideoCapability (H.264) { receive }]
MasterSlave	-
OLC Audio	AMR [g7231] (LC1)
OLC Video	bidir [unidir] h263VideoCapability [MPEG4] [H.264] (LC2)
MES	{LC1, RC UCF} {LC2, RC UCF}
[BER]	optional: bit error injection

Terminal B Setup:

Entity	Settings
H.223	Terminal default
TCS	H.223 capabilities: Terminal default Audio capabilities: Terminal default Video capabilities: Terminal default
MasterSlave	-
OLC Audio	AMR [g7231]
OLC Video	bidir [unidir] h263VideoCapability [MPEG4] [H.264]
[BER]	optional: bit error injection

Precondition:

1. Terminal A supports sending each multiplex table entry separately.
2. Terminal A supports setting a specific set of multiplex table entries such that one Multiplex Table Entry represents for only audio channel and another one represents for only video channel.

Procedure:

1. Configure terminal(s) according to Default Endpoint Settings (clause 1.3).
2. Establish a call session.
3. *Validate the call was successfully established, and Terminal B receives and decodes incoming audio and video.*
4. *Validate expected behaviour checkpoints 2f.*
5. Terminate the call.

Expected Behavior:

2.
 - a. Level setup on Muxlevel { 2 | 1 | 0 } (The lower level of Terminal A and Terminal B selected)
 - b. RespMsg_terminalCapabilitySetAck received
 - c. RespMsg_masterSlaveDeterminationAck received
 - d. RespMsg_openLogicalChannelAck for Audio received
 - e. RespMsg_openLogicalChannelAck (Master, Slave unidir) || IndMsg_openLogicalChannelConfirm (Slave bidir) for Video received
 - f. *Send each multiplexTableEntry in a separate MultiplexEntrySend message*
 - g. RespMsg_multiplexEntrySendAck for all mux table entries
3. Encoding + Sending/Reception + Decoding of Video/Audio
5. CmdMsg_endSessionCommand sent

Order: 2a, 2b-2c, 2d-3, 5

Pass Criteria:

The UEUT must demonstrate the above expected behaviour as defined in steps 2f and 3 to fulfill the objective of this test thereby passing the test; any other outcome shall be considered as failing the test. All the other steps described in the expected behaviour section are provided to assist with the conduct of the test; the outcomes of which do not need to be declared.

Test Reference Tool:

- Terminal A refers to a Test Reference Tool. Terminal B refers to UEUT.
- videoWithAL2 shall be set to true.
- Terminal A will initially attempt to transmit video over AL2 when supported by Terminal B
- All other optional settings within [] bracket shall be ignored.

3 References

[H.245] Control protocol for multimedia communication, ITU-T, 01-2005

[H.263] Video coding for low bit rate communication, ITU-T, 01-2005

[H.324] Terminal for low bit-rate multimedia communication, ITU-T, 09-2005

[H.223] Multiplexing protocol for low bit rate multimedia communication, ITU-T, 07-2001

[26.111] Codec(s) for circuit switched multimedia telephony service; Modifications to H.324, 3GPP, Rel 6

[26.911] Codec(s) for circuit switched multimedia telephony service; Terminal implementor's guide, 3GPP, Rel 6

4 Test Cases Summary

Additional Terminal Compliance Tests

Optional Tests

TestNumber	Settings	Audio	Video	Terminal A (Master)	Terminal B (Slave)	Expected Behaviour
63 a/b E	Dynamic reopening of OLC with different video codec (receiveVideoCap ability only at both terminals)	AMR over AL2	H.263/MPEG4 SVP@L0	H.223 Level 2; Master	H.223 Level 2; Slave	TCS; MSD; OLC for Audio; OLC for Video (1st signaled Cap of Terminal B) from Terminal A; OLC for Video (1st signaled Cap of Terminal A) from Terminal B; MuxEntry exchange; Encoding + Sending/Reception + Decoding of Video/Audio; CLC Request for Video from Terminal A; Ack of CLC Request; No sending of Video from Terminal A; OLC for Video (2nd signaled Cap of Terminal B) from Terminal A; Encoding + Sending/Reception + Decoding of Video/Audio; EndSessionCmd
64 a/b E	Dynamic reopening of OLC with different video codec (receiveAndTransmitVideoCap ability is signaled in TCS by Terminal A)	AMR over AL2	both H.263 MPEG4 SVP@L0	H.223 Level 2; Master; symmetric video	H.223 Level 2; Slave	TCS; MSD; OLC for Video (1st signaled Cap of Terminal A) from Terminal A; OLC for Video (1st signaled Cap of Terminal A) from Terminal B; MuxEntry exchange; Encoding + Sending/Reception + Decoding of Video/Audio; CLC Request for Video from Terminal A; Ack of CLC Request; No sending of Video from Terminal A; OLC for Video (2nd signaled Cap of Terminal A) from Terminal A; Encoding + Sending/Reception + Decoding of Video/Audio; EndSessionCmd

TestNumber	Settings	Audio	Video	Terminal A (Master)	Terminal B (Slave)	Expected Behaviour
65 a/b E	Opening of OLC with more than one capabilityDescriptors signaled in TCS by Terminal A in descending order of capabilityDescriptorNumbers, receiveAndTransmitAudioCapability and receiveAndTransmitVideoCapability at both terminals. (See figure)	AMR over AL2	MPEG4 SVP@L0	H.223 Level 2; Master; 1st capabilityDescriptors=1 with H.263 and G.723.1; 2nd capabilityDescriptors=0 with MPEG4 and AMR	H.223 Level 2; Slave; 1st capabilityDescriptors=0 with MPEG4 and AMR; 2nd capabilityDescriptors=1 with H.263 and G.723.1	TCS; MSD; OLC for Audio (1st signaled Cap of Terminal A in second capabilityDescriptor) from Terminal A; OLC for Audio (1st signaled Cap of Terminal A in second capabilityDescriptor) from Terminal B; OLC for Video (1st signaled Cap of Terminal A in second capabilityDescriptor) from Terminal A; OLC for Video (1st signaled Cap of Terminal A in second capabilityDescriptor) from Terminal B; MuxEntry exchange; Encoding + Sending/Reception + Decoding of Video/Audio; RequestCLC for Video from Terminal A; Ack of RequestCLC; EndSessionCmd
70 (Starting from 71+ a/b E)	All combinations and variants from Test Cases #51 ~ before #70.	TBD	TBD	TBD	TBD	TBD
71 a/b E	Master slave OLC conflict for symmetric codec (See Figure)	AMR over AL2	Both H.263 and MPEG4 SVP@L0	H.223 Level 2; Master; symmetric H.263; videoWithAL2 preferred	H.223 Level 2; Slave; symmetric MPEG4; videoWithAL2 preferred	TCS; MSD; OLC for Audio; OLC for Video (H.263) from Terminal A accepted by Terminal B, OLC for Video (MPEG4) from Terminal B rejected by Terminal A with masterSlaveConflict, OLC for Video (H.263) from Terminal B accepted by Terminal A, MuxEntry exchange; Encoding + Sending/Reception + Decoding of Video/Audio; Ack of RequestCLC; EndSessionCmd
201 a/b E	Terminal capability set contains transmit information only.	AMR over AL2	H.263 over AL2	H.223 Level 2; transmit only capabilities in TCS	H.223 Level 2; receive capabilities in TCS	TCS; MSD; OLC for Audio from Terminal A to Terminal B; OLC for Video from Terminal A to Terminal B; MuxEntry exchange from Terminal A to Terminal B; Reception + Decoding of Video/Audio at Terminal B; EndSessionCmd
202 a/b E	Terminal capability set contains no capability.	AMR over AL2	H.263 over AL2	H.223 Level 2; no capability in TCS	H.223 Level 2; receive capabilities in TCS	TCS; MSD; OLC for Audio from Terminal A to Terminal B if terminal A supports sending AMR; OLC for Video from Terminal A to Terminal B if terminal A supports sending H.263; MuxEntry exchange from Terminal A to Terminal B if at least Audio or Video channel opens; Reception + Decoding of Video/Audio at Terminal B if Audio/Video channel opens; EndSessionCmd

TestNumber	Settings	Audio	Video	Terminal A (Master)	Terminal B (Slave)	Expected Behaviour
203 a/b E	Enhanced Multiplex Table Capability	AMR over AL2	H.263 over AL2	H.223 Level 2; h223MultiplexTableCapability set to enhanced.	H.223 Level 2.	TCS; MSD; OLC for Audio; OLC for Video; MuxEntry exchange, Terminal B uses enhanced multiplex table configuration if supported; Encoding + Sending/Reception + Decoding of Video/Audio; EndSessionCmd
204 a/b E	Maximum AL2SDU/AL3SDU size capability	AMR over AL2	H.263 over AL2	H.223 Level 2; videoWithAL2 set to false; maximum AL2SDUSize set to 256; maximum AL3SDUSize set to 256.	H.223 Level 2.	TCS; MSD; OLC for Audio; OLC for Video; MuxEntry exchange; Encoding + Sending/Reception + Decoding of Video/Audio; Received AL-SDU size for audio at Terminal A within 256 octets; Received AL-SDU size for video at Terminal A within 256 octets; EndSessionCmd
205 a/b E	MaxH223MUXPDUsize command	AMR over AL2	H.263 over AL2	H.223 Level 2; maxMUXPDUSizeCapability is set in TCS.	H.223 Level 2.	TCS; MSD; OLC for Audio; OLC for Video; MuxEntry exchange; Encoding + Sending/Reception + Decoding of Video/Audio; maxH223MUXPDUsize command with value 80 sent from Terminal B if supported; Received MUX-PDU at Terminal B within 80 octets; EndSessionCmd
206 a/b E	Multiplex entry send before open logical channel	AMR over AL2	H.263 over AL2	H.223 Level 2; MES before OLC.	H.223 Level 2.	TCS; MSD; MuxEntry exchange; OLC for Audio; OLC for Video; Encoding + Sending/Reception + Decoding of Video/Audio; EndSessionCmd
207 a/b E	Request Terminal Capability Set	AMR over AL2	H.263 over AL2	H.223 Level 2; send sendTerminalCapabilitySet command during call.	H.223 Level 2.	TCS; MSD; OLC for Audio; OLC for Video; MuxEntry exchange; Encoding + Sending/Reception + Decoding of Video/Audio; sendTerminalCapabilitySet command sent from Terminal A if supported; TCS from Terminal B; EndSessionCmd
208 a/b E	Non-sequential combination of multiplex entries	AMR over AL2	H.263 over AL2	H.223 Level 2; MTE index list in reverse order.	H.223 Level 2.	TCS; MSD; OLC for Audio; OLC for Video; MuxEntry exchange; Encoding + Sending/Reception + Decoding of Video/Audio; EndSessionCmd
209 a/b E	Send each multiplex table entry separately	AMR over AL2	H.263 over AL2	H.223 Level 2; each MTE index in separate message.	H.223 Level 2.	TCS; MSD; OLC for Audio; OLC for Video; MuxEntry exchange; Encoding + Sending/Reception + Decoding of Video/Audio; EndSessionCmd
210 a/b E	Send NSRP Ack before next SRP frame in NSRP mode	AMR over AL2	H.263 over AL2	H.223 Level 2; each SRP frame is sent 2 seconds after receiving previous NSRP Ack.	H.223 Level 2.	TCS; MSD; OLC for Audio; OLC for Video; MuxEntry exchange; Encoding + Sending/Reception + Decoding of Video/Audio; EndSessionCmd

TestNumber	Settings	Audio	Video	Terminal A (Master)	Terminal B (Slave)	Expected Behaviour
211 a/b E	Resend previous SRP frame closely before next SRP frame in NSRP mode	AMR over AL2	H.263 over AL2	H.223 Level 2; each new SRP frame is sent with resending previous SRP frame immediately before.	H.223 Level 2.	TCS; MSD; OLC for Audio; OLC for Video; MuxEntry exchange; Encoding + Sending/Reception + Decoding of Video/Audio; EndSessionCmd
212 E	Terminal Capability Set contains multiple capability entries	AMR over AL2	H.263 over AL2	H.223 Level 2; TCS with AMR, G.723.1, G.711 audio capabilities, H.263, MPEG4, H.261 video capability, non-standard capability.	H.223 Level 2; TCS with AMR, G.723.1, G.711 audio capabilities, H.263, MPEG4, H.261 video capability, non-standard capability.	TCS; MSD; OLC for Audio; OLC for Video; MuxEntry exchange; Encoding + Sending/Reception + Decoding of Video/Audio; EndSessionCmd
213 E	Terminal Capability Set contains multiple capability entries	AMR over AL2	H.263 over AL2	H.223 Level 2; send multiple video packets per AL-SDU	H.223 Level 2; send multiple video packets per AL-SDU	TCS; MSD; OLC for Audio; OLC for Video; MuxEntry exchange; Encoding + Sending/Reception + Decoding of Video in multiple video packets per AL-SDU/Audio; EndSessionCmd
214 a/b E	Send two multiplex table entries individually for audio and video separately	AMR over AL2	H.263 over AL2	H.223 Level 2; MTE {LC1, RC UCF} in a message; MTE {LC2, RC UCF} in separate message.	H.223 Level 2.	TCS; MSD; OLC for Audio; OLC for Video; MuxEntry exchange; Encoding + Sending/Reception + Decoding of Video/Audio; EndSessionCmd

5 Feature Mapping Table

The following feature mapping table corresponds to a terminal under test (UEUT). Features under Feature column are generated by Test Reference Tool. Mandatory test cases as defined in this document are highlighted in **bold**. Other organizations may enforce execution of the optional test cases according to their requirements no matter whether the UEUT supports optional features expected by the test cases.

Feature	Applicable Test Cases	Feature Supported (✓ Yes / ✗ No)
Baseline (Responding to dynamic reopening of OLC)	64	
Baseline (Responding to dynamic reopening of OLC with asymmetric media capability only)	63	
Baseline (Handling terminal capability set with transmit media capability)	201	
Baseline (Handling terminal capability set with no media capability)	202	
Baseline (Handling enhanced multiplex table capability)	203	
Baseline (Handling maximum AL2SDU/AL3SDU size capability)	204	
Baseline (Handling multiplex entry send before open logical channel)	206	
Baseline (Responding to request terminal capability set)	If feature supported: 207 If feature not supported: 207u	
Baseline (Handling non-sequential multiplex entries)	208	
Baseline (Handling each multiplex table entry in separate message)	209	
Baseline (Handling NSRP Ack closely before next SRP frame)	210	
Baseline (Handling previous SRP frame closely before next SRP frame in NSRP mode)	211	
Baseline (Handling multiple capability entries in terminal capability set)	212	
Baseline (Handling multiple video packets per AL-SDU)	213	
Baseline (Handling two individual multiplex table entries for audio and video separately)	214	
maxMUXPDUSizeCapability	205	
Symmetric media capability with MPEG4 and video over AL2 support	65, 71	

The following feature mapping table corresponds to Test Reference Tool.

Feature	Applicable Test Cases	Feature Supported (✓ Yes / ✗ No)
capabilityTableEntryNumber and capabilityDescriptorNumbers in TCS in descending order	65	
Dynamic OLC with different video codecs	63, 64	
Each multiplex table entry in separate message	209	
Enhanced multiplex table capability	203	
maxH223MUXPDUsize command	205	
Maximum AL2SDU/AL3SDU size capability setting	204	
Multiple capability entries in TCS	212	
Multiple video packets per AL-SDU	213	
MultiplexEntrySend before OpenLogicalChannel	206	
Multiplex entries in reversed order	208	
No media capability	202	
NSRP Acks delayed by 2 seconds	210	
Request Terminal Capability Set	207	
Resend previous SRP frame before sending subsequent SRP frame in NSRP mode.	211	
Two individual multiplex table entries for audio and video in separate message	214	
Symmetric media capability with MPEG4-Video preference with video over AL2 support	71	
Transmit media capability	201	