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OF ITU

# DRAFT H.310

(5 May, 1995)

## LINE TRANSMISSION OF NON-TELEPHONE SIGNALS

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## BROADBAND AUDIOVISUAL COMMUNICATION SYSTEMS AND TERMINALS

## DRAFT ITU-T Recommendation H.310

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# FOREWORD

The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the International Telecommunication Union. The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, established the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

ITU-T Recommendation H.310 was prepared by the ITU-T Study Group 15 (199x-199x) and was approved by the WTSC (Place, Month xx-xx, 199x).

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NOTES

1 In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

# CONTENTS

# BROADBAND AUDIOVISUAL COMMUNICATION SYSTEMS AND TERMINALS

*(Place, 199x)*

## 1. Scope

This Draft Recommendation covers the technical requirements for the systems and terminals of broadband audiovisual communication services defined in H.200/AV.100-Series Recommendations.

The video and audio coding and other technical aspects that are applicable to more than one distinct services are covered in H.200/AV.200-Series Recommendations.

## 2. Definitions

## 3. Applications

Two classes of terminals are defined in this Recommendation: Bidirectional and Unidirectional (receive-only and transmit only). Each class of terminals is further divided into different terminal types as explained later. The definition of several H.310 terminal types is intended for the support of the following applications

- Conversational services
- Retrieval services
- Messaging services
- Distribution services with user individual presentation control
- Distribution services without user individual presentation control

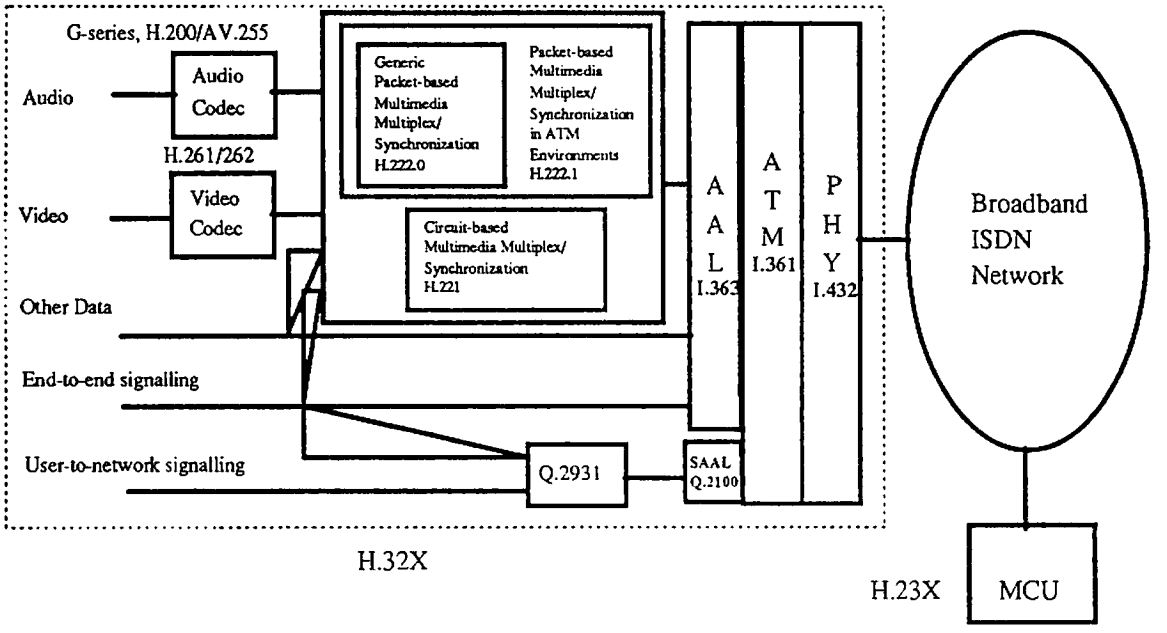
## 4. System Description

### 4.1 System Configuration

Figure 1/H.310 shows a generic broadband audiovisual communication system. It consists of terminal equipment, network, multipoint control unit (MCU) and the constituent elements of the terminal equipment. The corresponding Recommendations/Draft Recommendations are also identified.

{Editor: It might be useful to insert the H.310 Protocol Reference Model in here. This model can possibly replace Figure 1/H.310.}

**Figure 1/H.310: Broadband audiovisual communication system and terminal configuration**




## 4.2 Communication Mode

Bidirectional and unidirectional (receive-only and transmit-only) audiovisual terminals are defined by this Recommendation[1]. The capabilities of H.310 terminals are classified into five attributes: Video Codec Capabilities (VCC), Audio Codec Capabilities (ACC), Network Adaptation Capabilities (NAC), Control & Indication Capabilities (CIC), and Other Data Capabilities (ODC). A communication mode is defined as a combination of these capabilities that are employed by a terminal at an instance of audiovisual communication. Since a communication session may be asymmetric for many applications in the broadband environment, these attributes are specified separately for the transmit end (TE) and the receive end (RE).

### 4.2.1 Video Codec Capabilities (VCC)

Both H.261 and H.262 video capabilities are considered in this Recommendation. All H.310 *bidirectional* terminals support ITU-T Recommendation H.261 with both the Common Intermediate Format (CIF) and Quarter CIF (QCIF) picture resolutions. This enables the interworking between H.310 and a wide range of existing and future H.320/H.321 terminals. In addition, *all* H.310 terminals must be capable of decoding any coded video bitstream which is in conformance with Recommendation H.262 Main Profile (MP) at Mail Level (ML). H.262 MP at High Level (MP@HL) and MP at High-1440 Level (MP@H14L) are supported by some H.310 terminals. Therefore, in addition to supporting the H.261 (CIF and QCIF) video coding modes, all H.310 bidirectional terminals support at least one of the following video standards[2]:

- H.262 MP@ML

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[1] Throughout this recommendation, the term *receive-only* (or *transmit-only*) refers to a unidirectional transmission of the audio and video signals. The term is not necessarily applicable, however, to other data types such as in-band signaling, out-of-band signaling, or other control data which can be received *and* transmitted by a unidirectional terminal.

[2] Note that supporting MP@H14L or MP@HL implies the support of MP@ML. Similarly, although not shown above, H.262 Simple Profile at Mail Level (SP@ML) will always be supported by all H.310 terminals.

- H.262 MP@H14L
- H.262 MP@HL

Similarly, all H.310 unidirectional terminals support at least one of the following video standards[3]:
- H.262 MP@ML
- H.262 MP@H14L
- H.262 MP@HL

### 4.2.2 Audio Codec Capabilities (ACC)

Three types of audio coding standards are considered here: ITU-T G-series (G.711, G.722, and G.728), ISO/IEC 1172-3 (MPEG-1 audio), and ISO/IEC 13818-3 (MPEG-2 audio).
All *bidirectional* H.310 terminals must support ITU-T Recommendations G.711, G.722, and G.728[4]. This enables existing and future H.320/H.321 terminals to interwork with H.310 terminals. In addition, *all* H.310 terminals should be capable of decoding any audio bitstream which is in conformance with the ISO/IEC 11172-3 (MPEG-1 audio) standard[5]. The support of the ISO/IEC 13818-3 audio standard (MPEG-2 audio) is optional for some H.310 terminals[6].

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[3] Note that unidirectional H.310 terminals are not required to support any of the H.261 video coding modes.

[4] {Editor: This is based on the Norway agreement. It is clear that the support for G.711 is mandatory for all H.310 bidirectional terminals. However, the mandatory support of G.722 and G.728 by these terminals may still an open issue.}

[5] {Editor: Although the support for MPEG-1 and G-series audio standards was shown (in the previous version of H.310) for all H.310 terminals, it is not clear if this reflects the Experts Group consensus. For example, unidirectional terminals may not require the support of any of the G-series standards. At the same time, it might be reasonable to have the G-series standard as the only mandatory audio mode for basic bidirectional terminals, while leaving the support of MPEG audio as optional.}

[6] {Editor: We may need to specify the audio capabilities with finer resolution (e.g., different layers and bitrates of the MPEG-1 and MPEG-2 audio modes).}

### 4.2.3 Control & Indication Capabilities (CIC)

C&I signals are grouped into five categories of C&I information. These five categories and their communications channels are described in Table 1/H.310.

## Table 1/H.310: Categories of C&I Signals

| C&I type | Signals | Channel |
|---|---|---|
| 1) Video Frame Synchronous | • Split-screen indication<br>• Document camera indication<br>• Freeze Picture Release indication<br>• Closed Caption<br>• etc. | • Per ITU-T Rec. H.222.1 |
| 2) Capability Exchange | As described in H.245 | • Per ITU-T Rec. H.222.1 |
| 3) Video Frame Asynchronous | • Loop back<br>• Video source indication<br>• Audio source muted indication<br>• Numbers, characters<br>• etc. | • Per ITU-T Rec. H.222.1 |
| 4) DSM-CC | As described in MPEG-2 Part 6: DSM-CC Extension | • Per ITU-T Rec. H.222.1 and ISO/IEC 13818-6 |
| 5) Mode Switching | PSM/PSI | • Per ITU-T Rec. H.222.1 |

{Editor: C&I signal type 1 and 3, i.e., Video Frame Synchronous Signal and Video Frame Asynchronous Signal, are mostly specified in H.230 except Closed Caption.}

{Editor: It was discussed that the support of multipoint conference signals should be mandatory for certain types of terminals. This is for further study and may result in the definition of additional categories of C&I signals.}

### 4.2.4 Other Data Capabilities (ODC)

The support of user and other data signals (e.g., T.120) by the different types of H.310 terminals is under study. These data can be multiplexed with other audiovisual information by using either the H.222.1 or ATM layer multiplexing functions.

{Editor: It might be useful to show or reference the T.120 protocol stack here. Also the possible data transfer rates to be supported by H.310 terminals need to be addressed.}

### 4.2.5 Network Adaptation Capabilities (NAC)

A possible value of this attribute is a combination of the multimedia multiplex and synchronization mechanism, ATM Adaptation Layer, transfer rate, for both CBR and VBR, and ATM Virtual Connection (VC) capabilities supported by the different types of H.310 terminals.

#### 4.2.5.1 Multimedia Multiplex and Synchronization

Multiplexing of audio, video, data, and control signals in H.310 terminals is accomplished using the multimedia multiplex protocols and procedures defined in Recommendations H.221 and H.222.1[7]. All bidirectional H.310 terminals will support ITU-T Recommendation H.221 for interworking with H.320 and H.321 terminals. Unidirectional H.310 terminals, however, are not required to support the H.221 multiplexing capability.

All H.310 terminals (unidirectional and bidirectional) support ITU-T Recommendation H.222.0 for the multiplexing and synchronization of H.262 video, G-series[8] or MPEG audio, data, and other control (e.g., H.245 messages[9]) signals. Both Program Stream and Transport Stream based multiplexing are considered here[10]. In additional to supporting H.222.0 multiplexing and synchronization capabilities, H.310 terminals will also support H.222.1 specific functions[11].

#### 4.2.5.2 ATM Adaptation Layer

The different types of signals supported by H.310 terminals require different ATM adaptation layer functions. Below, the H.310 AAL capabilities for the multimedia multiplexed (i.e., H.221 and H.222.1), in-band control and indication (i.e., H.245), and data signals are outlined.

##### 4.2.5.2.1 AAL for H.221/H.222 Multiplexed Audiovisual Signals

AAL Segmentation-And-Reassembly (SAR) and Convergence Sublayer (CS) functions are supported by H.310 terminals. Both AAL types 1 and 5 are used for the transfer of Constant Bitrate (CBR) signals over ATM networks. AAL-1 and AAL-5 based unidirectional H.310 terminal types[12] are defined in this recommendation[13].

For the AAL-5 unidirectional terminal type, only SAR and Common Part CS (CPCS) functions are supported as defined in Recommendation I.363. The rules and protocols used for the mapping of H.222.1 Program Stream and Transport Stream packets into the AAL-5 Protocol Data Unit (PDU) is specified in

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[7] ITU-T Recommendation H.222.1 specifies both H.222.0 (MPEG-2 system) and H.222.1 specific functions (e.g., error protection, jitter removal, etc.) not defined by H.222.0.

[8] {Editor: The multiplexing and synchronization of G-series audio bitstreams using the H.222.0 PS and TS is under study}

[9] It is important to note that the multiplexing of H.245 and other control signals and data (e.g., T.120) with the audiovisual information may be accomplished at the ATM Service Access Point (SAP). The H.245 and T.120 protocol stacks for H.310 terminals is under study.

[10] {Editor: The level of support of the PS and TS by the different types of H.310 terminals is still an open issue. Several options exist for resolving this issue and simplifying the number of possible H.310 terminal types. For example, the group may want to consider of having the TS as a mandatory mode for all unidirectional H.310 terminals. The support of the PS would be optional for these terminals. Similar decision can be made regarding bidirectional terminals.}

[11] {Editor: H.222.1 jitter removal and error protection functions are under study. The level of support of these functions by H.310 terminals may vary from one type to another, and may depend on a particular communication mode of a given terminal type. For example, the support of a Forward Error Correction (FEC) capability (which is yet to be defined) might be mandatory for certain types of H.310 terminals but not for others.}

[12] An AAL-1 based unidirectional terminal is not required to support AAL-5 functions. Similarly, an AAL-5 based unidirectional terminal is not required to support AAL-1 functions.

[13] {Editor: Note that the current definition of unidirectional terminals implies that an AAL-1 based transmit-only terminal can not communicate with an AAL-5 based receive terminal, and vice versa. Some of this interworking issues can be resolved by allowing for the support of the other AAL as an option for a given type of terminal.}

Recommendation H.222.1[14]. For the AAL-1 unidirectional terminal scenario, the support of AAL-1 functions is under study[15].
Bidirectional H.310 terminals must support the adaptation of H.221 multiplexed audiovisual data using the AAL-1 SAR and CS[16] functions supported in H.321 terminals. This will enable the interworking between H.310 and H.321 terminals. In addition, the transmit-end of bidirectional H.310 terminals must support the adaptation of H.222.1[17] multiplexed bitstreams into *either* the SAR layer of AAL type 1 *or* the CPCS of AAL type 5. On the other hand, the receive-end of bidirectional H.310 terminals must be capable of supporting the SAR functions of AAL type 1 *and*[18] the SAR and CPCS functions of AAL type 5. By supporting these requirements, all bidirectional H.310 terminals will be capable of interworking using the H.222.1 multiplexing scheme[19].
The definition of AAL functions and capabilities for the adaptation of Variable Bitrate (VBR) audiovisual signals is under study.

#### 4.2.5.2.2 AAL for In-band Control and Indication Signals

Control and indication signals transmitted via H.245 messages can be multiplexed with other audiovisual elementary streams using either the H.222.1 multiplex layer or the ATM layer. The mapping of H.245 messages over ATM is accomplished through a protocol stack the complete definition of which is still under study. The AAL-5 CPCS and SAR sublayers occupy the corresponding AAL layers of the H.245 protocol stack.

#### 4.2.5.2.3 AAL for Data

Similar to the H.245 case, data signals can be multiplexed with other audiovisual elementary streams using either the H.222.1 multiplex layer or the ATM layer. The mapping of data (e.g., T.120) over ATM in H.310 terminals is accomplished through a protocol stack the complete definition of which is still under study. The AAL-5 CPCS and SAR sublayers occupy the corresponding AAL layers of the data protocol stack.

#### 4.2.5.2.4 AAL for Q.2931 Call Management

H.310 terminals support the Q.2931 protocol stack for performing out-of-band call management and signaling functions. In addition to the Q.2130 (SSCS.UNI) and Q.2110 (SSCOP) layers, the AAL-5 CPCS and SAR sublayers represent an integrated part of the Q.2932 protocol stack.

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[14] {Editor: Should H.310 show how H.222.0 packets are mapped into the AAL-5 CPCS sublayer? It might be useful to show a diagram in the main body or in an appendix.}

[15] The definition of AAL-1 functions for unidirectional (AAL-1 based) H.310 terminals may follow the development of proposed Recommendation J.82 which is under study by ITU-T SG-9.

[16] In H.321 terminals, only the Structure Data Transfer (SDT) mode function of the AAL-1 CS is supported. Therefore, and similar to H.321, H.310 terminals are *not* required to support other AAL-1 CS functions such as the Synchronous Residual Time Stamp (SRTS) or any of the cell-loss recovery interleaving methods.

[17] Similar to the unidirectional terminal case, the rules and protocols used for the mapping of H.222.1 Program Stream and Transport Stream packets into the AAL-5 Protocol Data Unit (PDU) and AAL-1 SAR payload is specified in Recommendation H.222.1.

[18] This represents the input received from the SG-15 WP1/15 meetings held in Geneva, February 7-15, 1995.

[19] {Editor: Although the support of both AAL-1 and AAL-5 functions at the receive-end of bidirectional H.310 terminals provide a good level of flexibility for interworking purposes, these is still a concern regarding the complexity of supporting both AAL's. Before making a final decision, this issue should be addressed by the group in order to achieve a set of viable H.310 solutions.}

#### 4.2.5.2.5 ATM Virtual Connection

H.310 terminals may support single or multiple ATM VC's for the transfer of H.221 (in the H.321 mode) or H.222.1[20] multiplexed audiovisual signals. Additional VC's might be required for the transfer of Control and Indication H.245 messages or user data (e.g., T.120). The minimum number of VC's that the different types of H.310 terminals will support is under study[21].

### 4.2.5.3 Transfer Rate

H.310 terminals are capable of supporting a wide range of possible transfer rates. The transfer rate capabilities of H.310 terminals are defined at the different service access points within the terminal protocol reference models as explained below.

#### 4.2.5.3.1 Elementary Stream Bitrates

{Editor: The specification of video, audio, and data rates for both unidirectional and bidirectional H.310 terminals should be outlined here.}

#### 4.2.5.3.2 Multimedia Multiplex H.221/H.222.1 Transfer Rates

Bidirectional H.310 terminals must support the B, 2B, and H0 narrow-band ISDN transfer rates of H.320/H.321 terminals. Other H.320/H.321 rates (e.g., H11 and H12) are optional. This will enable the interworking of H.310 terminals with a wide range of H.320/H.321 terminals.

Both unidirectional and bidirectional H.310 terminals will support Constant Bitrate (CBR) transfer rates of n x 64 Kbps, where n ranges from 1 to (217-1), for the transmission and reception of H.222.1 multiplexed audiovisual signals.

{Editor: The specification of other CBR and VBR transfer rates is under study.}

#### 4.2.5.3.3 ATM Cell Rate

{Editor: Do we need to specify the transfer rates at the ATM layer SAP?}

### 4.2.6 Hierarchy Of Communication Modes

For further study.

{Editor: Not all the combinations of terminal capabilities are possible. A "profile" approach would simplify the architecture of H.310 terminals and facilitate the procedures of establishing a common mode of operation for a audiovisual communication session.}

## 4.3 Terminal Type

All H.310 terminal types can be classified into two classes: A and B. The major difference between the two classes is their level of support for the H.262 video coding mode. Type A terminals support H.262 Main Profile at Main Level (MP@ML), while type B terminals support MP at High and High-1440 Levels (MP@HL and MP@H14L). Each class is further divided into three main terminal types: Receive-

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[20] The support of only a single VC is possible when the multiplexing of all audiovisual elementary streams, user data, and control (e.g., H.245 messages) is accomplished using the H.222.1 multiplexing and synchronization functions. This capability, however, is under study.

[21] {Editor: It is important to note that bidirectional H.310 terminals may have to support, at minimum, two VC's for the transfer of 2B channels in the H.321 mode. This transfer mode is required for interworking with current and future H.320/H.321 terminals.}

Only-Terminal (ROT), Sending-Only-Terminal (SOT), and bidirectional Receive-And-Send Terminal (RAST). Each of these terminal types support different mandatory and optional H.310 capabilities outlined above. Tables 2 and 3 summarize the different capabilities supported by H.310 class A and B terminal types. Both Mandatory (M) and Optional (O) capabilities are shown in the tables.

{Editor: As seen from the Tables, there are a large number of issues are still Under Study (US).}

## Table 2/H.310: Main Level (A) H.310 Terminal Types

| Terminal Type | Audiovisual and Data Capabilities | | | | | | Network Adaptation Capabilities | | | | | | | | User-User and User-Net Signaling | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Video | | Audio[22] | | Data[23] | | Multimed. Multiplex[24] | | AAL | | ATM VC[25] | | Transfer Rate | | UU (H.245/ DSM-CC UU) | | UN (Q.2931/ DSM-CC UN) | |
| | M | O | M | O | M | O | M | O | M | O | M | O | M | O | M | O | M | O |
| A ROT (AAL-1) | H.262 MP@ML | H.262 MP@HL H.262MP@H14L | MPEG-1 | MPEG-2 | US | US | H.222 TS | H.222 PS H.222.1 NJ | AAL-1 | AAL-5 | one | > one | US | US | US | US | US | US |
| A ROT (AAL-5) | H.262 MP@ML | H.262 MP@HL H.262 MP@H14L | MPEG-1 | MPEG-2 | US | US | H.222 TS | H.222 PS H.222.1 NJ | AAL-5 | AAL-1 | one | > one | US | US | US | US | US | US |
| A SOT (AAL-1) | H.262 MP@ML | H.262 MP@HL H.262MP@H14L | MPEG-1 | MPEG-2 | US | US | H.222 TS | H.222 PS H.222.1 NJ | AAL-1 | AAL-5 | one | > one | US | US | US | US | US | US |
| A SOT (AAL-5) | H.262 MP@ML | H.262 MP@HL H.262MP@H14L | MPEG-1 | MPEG-2 | US | US | H.222 TS | H.222 PS H.222.1 NJ | AAL-5 | AAL-1 | one | > one | US | US | US | US | US | US |
| A RAST | H.261 (CIF/QCIF) H.262 MP@ML | H.262 MP@HL H.262MP@H14L | G.711 G.722 G.728 MPEG-1 | MPEG-2 | US | T.120 | H.221 H.222 TS | H.222 PS H.222.1 NJ | AAL-1 and AAL-5 at the receive-end | AAL-1 or AAL-5 at the transmit end | two | > two | US | US | H.242 H.245 | US | Q.2931 | US |

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22 {Editor: The support of MPEG-1, MPEG-2, and G-series audio by the different types of H.310 terminals require further study. Therefore, it is quite possible that the entries in both the mandatory and optional columns may change.}

23 {Editor: It is not clear if ROT and SOT terminal types would need the functions provided by a standard data protocol such as T.120. Should we consider other data types that might be suitable for these types of terminals?}

24 Other H.222.1 functions that are currently under study might be added to this column.

25 This capability represents the minimum number of VCs supported by H.310 terminals. Similar to the audio capabilities, these minimum numbers of VCs may change. The numbers shown in the Table correspond to the VCs carrying audiovisual signals. Other VCs might be required to support the transfer of other data types (e.g., H.245 messages or T.120 data).

this is required ?

## Table 2/H.310: High Level (B) H.310 Terminal Types

| Terminal Type | Audiovisual and Data Capabilities | | | | | | Network Adaptation Capabilities | | | | | | | | User-User and User-Net Signaling | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Video | | Audio | | Data | | Multimed. Multiplex | | AAL | | ATM VC | | Transfer Rate | | UU (H.245/ DSM-CC UU) | | UN (Q.2931/ DSM-CC UN) | |
| | M | O | M | O | M | O | M | O | M | O | M | O | M | O | M | O | M | O |
| B ROT (AAL-1) | H.262 MP@ML<br>H.262 MP@HL<br>H.262MP@H14L | US | MPEG-1<br>MPEG-2 | US | US | US | H.222 TS | H.222 PS<br>H.222.1 NJ | AAL-1 | AAL-5 | one | > one | US | US | US | US | US | US |
| B ROT (AAL-5) | H.262 MP@ML<br>H.262 MP@HL<br>H.262MP@H14L | US | MPEG-1<br>MPEG-2 | US | US | US | H.222 TS | H.222 PS<br>H.222.1 NJ | AAL-5 | AAL-1 | one | > one | US | US | US | US | US | US |
| B SOT (AAL-1) | H.262 MP@ML<br>H.262 MP@HL<br>H.262MP@H14L | US | MPEG-1<br>MPEG-2 | US | US | US | H.222 TS | H.222 PS<br>H.222.1 NJ | AAL-1 | AAL-5 | one | > one | US | US | US | US | US | US |
| B SOT (AAL-5) | H.262 MP@ML<br>H.262 MP@HL<br>H.262MP@H14L | US | MPEG-1<br>MPEG-2 | US | US | US | H.222 TS | H.222 PS<br>H.222.1 NJ | AAL-5 | AAL-1 | one | > one | US | US | US | US | US | US |
| B RAST | H.261 (CIF/QCIF)<br>H.262 MP@ML<br>H.262 MP@HL<br>H.262MP@H14L | US | G.711<br>G.722<br>G.728<br>MPEG-1<br>MPEG-2 | US | US | T.120 | H.221<br>H.222 TS | H.222 PS<br>H.222.1 NJ | AAL-1 and AAL-5 at the receive-end | AAL-1 or AAL-5 at the transmit end | two | > two | US | US | H.242<br>H.245 | US | Q.2931 | US |

## 4.4 H.310 Call Phases

The following figure presents the H.310 call phases of normal channel and sub-channel setup and release procedures.

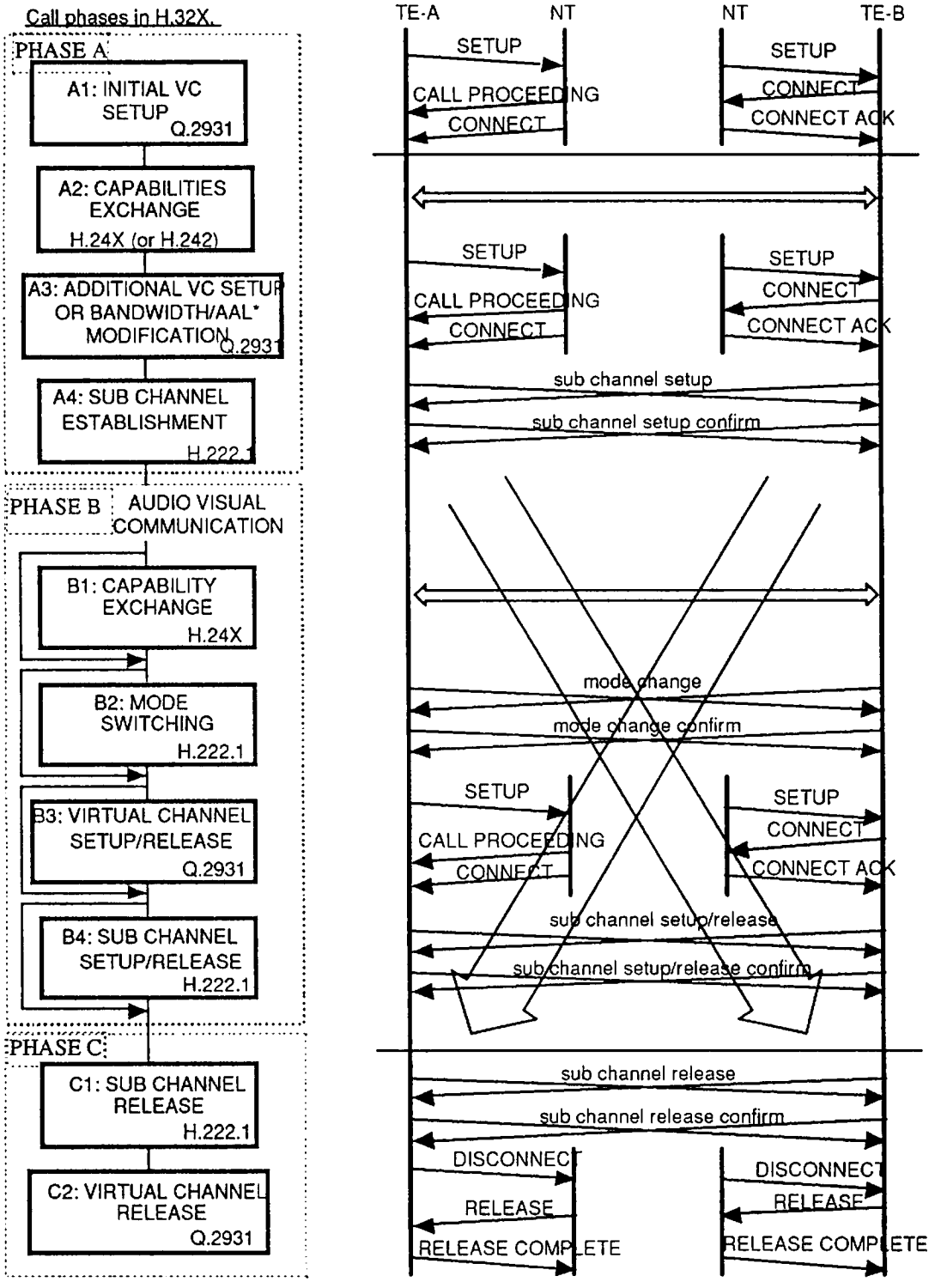
- A normal call of H.310 terminals consists of three phases:
- Phase A: Channel Setup
- Phase B: Audiovisual information Exchange
- Phase C: Channel Teardown

Phase A is further divided into four(4) subphases. An initial virtual channel is set up using Q.2931 messages in A1. This initial VC will be used for H.24X and the default audiovisual communication mode *{Editor: Default mode is to be defined}*. Some basic terminal capabilities, including Terminal Type, Basic Multiplex Capability, and Session ID, are also exchanged end-to-end using B-LLI Layer 2 Information Element. *{Editor: The exact coding is subject to SG11 and will be included here.}* In Phase A2, further terminal capabilities are exchange using H.24X. Upon the completion of terminal capability exchange, both end points will use Q.2931 in A3 to either set up additional VCs or modify the characteristics of the initial VC according to the agreement resulted from the capability exchange in A2. When all the necessary VCs are set up, terminals use procedures in H.222.1 to further set up sub-channels, which are basically identifiable MPEG-2 elementary streams.

When all the channels and sub-channels are properly set up, terminals enter Phase B for their intended audiovisual communication mode. During Phase B, there may be additional capability exchange (B1). If there is a need to change the characteristics of the communication session, terminals will use Q.2931 to add, drop, or modify the VCs in B3, or use H.222.1 to add, drop, or modify the MPEG-2 elementary streams in B4. Actual communication mode is controlled in B2 by the mode switching procedures specified in H.222.1.

At the completion of an audiovisual communication session, terminals enter Phase C to terminate all the sub-channels using H.222.1 and VCs using Q.2931.

## Figure 2/H.310: H.310 Call Phases - Normal Procedure




* {Editor: It is not clear if AAL can be modified after a call is established.}
{Editor: The right-hand side shows an example of call flow and is only for informative purpose *only.}*

## 5. Multipoint Communication

{Editor: Help is needed here!}

## 6. Equipment Requirements

For further study.

{Editor: this section will contain information related to the equipment requirements for interworking, such as audio level setting.}

## 7. Error Resilience

For further study.

{Editor: this section will contain information related to the error resilience of the system. Contributions are welcome.}

### 7.1 Video Layer

For further study.

### 7.2 Multimedia Multiplex Layer

For further study.

## 8. Intercommunications

### 8.1 Intercommunication Between Different Terminal Types

For further study.

### 8.2 Intercommunication With N-ISDN Terminals

Bidirectional H.310 terminals must be able to interact with H.320/H.32 terminals. In an intercommunication session with an H.320/H.321 terminal, bidirectional H.310 terminals function as H.321 terminals. Support of B, 2B, and H0 communication modes of H.320 in bidirectional H.310 terminals are mandatory. Other communication modes (e.g., H11 and H12) are optional.

### 8.3 Intercommunication With Telephony

For further study.

### 8.4 Intercommunication With Audiovisual Terminals Connected To Other Networks

For further study.

- H.32Z for LANs

{Editor: A figure similar to "Figure 7/H.321: H.321-H.32Z Interworking" will be included to illustrated the intercommunication between H.310 and H.32Z}

END