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SERIES Q: SWITCHING AND SIGNALLING

Broadband ISDN – B-ISDN application protocols for the  
network signalling

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**B-ISDN User Part – Network Node Interface  
specification for point-to-multipoint  
call/connection control**

ITU-T Recommendation Q.2722.1

(Previously CCITT Recommendation)

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## **ITU-T RECOMMENDATION Q.2722.1**

### **B-ISDN USER PART – NETWORK NODE INTERFACE SPECIFICATION FOR POINT-TO-MULTIPOINT CALL/CONNECTION CONTROL**

#### **Summary**

This Recommendation specifies the extensions to the Broadband ISDN User Part to support point-to-multipoint call control.

#### **Source**

ITU-T Recommendation Q.2722.1 was prepared by ITU-T Study Group 11 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 9th of July 1996.

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## Recommendation Q.2722.1

### B-ISDN USER PART – NETWORK NODE INTERFACE SPECIFICATION FOR POINT-TO-MULTIPOINT CALL/CONNECTION CONTROL

(Geneva, 1996)

## 1 Overview

### 1.1 Scope

This Recommendation describes the basic B-ISDN User Part signalling procedures for the set-up and clear-down of national and international B-ISDN CS-2.1 point-to-multipoint network connections.

The action to be taken at six exchange types are described:

- originating exchange;
- intermediate national exchange;
- outgoing international exchange;
- intermediate international exchange;
- incoming international exchange;
- destination exchange.

Actions common for all exchange types are described only once. Different, or additional actions required for specific types are described in separate subclauses applicable to this type of exchange.

This Recommendation is based on the basic B-ISDN User Part signalling procedures specified in Recommendation Q.2764.

This Recommendation specifies the procedures for establishing, maintaining, and clearing of network point-to-multipoint connections at the B-ISDN network-node interface.

To support new capabilities in B-ISUP beyond Capability Set 2, additional messages, parameters and/or modification of existing parameters will be used.

This Recommendation specifies the following interactions:

- interactions of point-to-multipoint features and Capability Set 1 supplementary services;
- interaction with a leaf party that does not support multipoint procedures;
- interaction with a leaf party that is not a broadband user;
- interaction of a CS-2.1 to CS-1 node and CS-1 to CS-2.1 case.

### 1.2 Normative references

The following ITU-T Recommendations, and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

- ITU-T Recommendation I.610 (1995), *B-ISDN operation and maintenance principles and functions*.

- ITU-T Recommendation Q.2650 (1995), *Interworking between Signalling System No. 7 Broadband ISDN User Part (B-ISUP) and Digital Subscriber Signalling System No. 2 (DSS 2)*.
- ITU-T Recommendation Q.2721.1 (1996), *B-ISDN User Part – Overview of the B-ISDN network node interface signalling Capability Set 2, step 1*.
- ITU-T Recommendation Q.2763 (1995), *Signalling System No. 7 B-ISDN User Part (B-ISUP) – Formats and codes*.
- ITU-T Recommendation Q.2764 (1995), *Signalling System No. 7 B-ISDN User Part (B-ISUP) – Basic call procedures*.
- ITU-T Recommendation Q.2931 (1995), *Digital Subscriber Signalling System No. 2 – User-Network Interface (UNI) layer 3 specification for basic call/connection control*.
- ITU-T Recommendation Q.2971 (1995), *Digital Subscriber Signalling System No. 2 – User-network interface layer 3 specification for point-to-multipoint call/connection control*.

### **1.3 Definitions and abbreviations**

This Recommendation defines the following terms.

#### **1.3.1 Definitions**

**1.3.1.1 root:** The source of the point-to-multipoint connection.

**1.3.1.2 leaf:** One of the destinations of the point-to-multipoint connection.

#### **1.3.2 Abbreviations**

This Recommendation uses the following abbreviations.

ATM	Asynchronous Transfer Mode
B-ISDN	Broadband Integrated Services Digital Network
CLI	Connection Link Identifier

### **1.4 Capabilities supported by this Recommendation**

The following capabilities shall be supported by this Recommendation:

- i) Establishment of a call/connection containing one point-to-multipoint network connection requested by the root party of the network connection.
- ii) Addition of one new party, requested by the root party of the network connection.
- iii) Drop of a leaf party from an existing call/connection, requested by the root party.
- iv) Drop of a leaf party from an existing call/connection, requested by the party itself.
- v) Release of the call/connection, requested by the root party.

The capabilities above shall not be combined with narrow-band emulation services.

Only unidirectional (forward), single connection point-to-multipoint call/connections are supported.

Only *en bloc* address signalling is applicable for point-to-multipoint call/connections.

## 2 Call control, application process functions

### 2.1 Introduction

This Recommendation describes the protocol architecture model that is used as a basis for the description.

#### 2.1.1 Primitive interface

The point-to-multipoint call control functions in the application process use the services provided by the SACF primitive interface. These are listed in Table 2-1.

The primitives on this interface, in many cases, correspond with B-ISUP messages, this is also indicated in Table 2-1.

**Table 2-1/Q.2722.1 – Call control primitives between AP and SACF**

Primitive name	Types	Corresponding B-ISUP message(s)
Set_Up	Request/Indication	Initial Address
Address_Complete	Request/Indication	Address Complete
Incoming_Resources_Accepted	Request/Indication	IAM Acknowledge
Incoming_Resources_Rejected	Request/Indication	IAM Reject
Release	Request/Indication/Response/ Confirmation	Release, Release Complete
Answer	Request/Indication	Answer
Progress	Request/Indication	Call Progress
Segment (National use)	Request/Indication	Segmentation
Error	Indication	-

Tables 2-2 to 2-10 (see 2.9) list the mandatory and optional contents for these primitives for the set-up and release of basic call/connections.

#### 2.1.2 Assignment procedure of VPCI/VCI and bandwidth for point-to-multipoint network connections

See 2.1.2/Q.2764.

##### 2.1.2.1 Management of VPCI/VCI value and bandwidth of each VPC

See 2.1.2.1/Q.2764.

##### 2.1.2.2 Assignment procedure of VPCI/VCI and bandwidth

See 2.1.2.2/Q.2764.

##### 2.1.2.3 Abnormal conditions

See 2.1.2.3/Q.2764.

### 2.2 Successful call/connection set-up

This clause describes the successful procedures for point-to-multipoint calls where user plane information is multicasted unidirectional from one root party to a set of leaf parties. These

procedures are activated on receipt of a call request from the B-ISDN access indicating "point-to-multipoint" in the user plane configuration field of the broadband bearer capability parameter.

## **2.2.1 Forward address signalling – *en bloc***

Subclause 2.2.1.1 specifies the signalling procedures for the set-up of the first leaf party of the point-to-multipoint call initiated by the root party. Subclause 2.2.1.2 specifies the signalling procedures for the addition of one new leaf party and for the attachment of the party to the point-to-multipoint (type 2) network connection. This can only be requested by the root party.

### **2.2.1.1 Forward address signalling – *en bloc* – Establishment of a call/connection**

#### **2.2.1.1.1 Actions required at the originating exchange**

##### a) *Virtual channel selection – Assigning exchange*

When the originating exchange has received the complete information from the root party of the point-to-multipoint connection and has determined that the call/connection is to be routed to another exchange, route and virtual channel selection shall take place.

Appropriate routing information is either stored at the originating exchange or at a remote database.

The selection of the route shall depend on the called party number, broadband bearer capability, ATM cell rate, and the outcome of the assignment procedure, see 2.1.2.2 a)/Q.2764. Additionally, if the maximum end-to-end transit delay parameter is present, this is used together with the propagation delay counter. The selection process may be performed at the exchange, or with the assistance of the remote database. The exchange shall create:

- an instance of the outgoing connection link object;
- an instance of the B-ISUP AE and issue the Set\_Up request primitive to it.

The origination connection link identifier parameter, set to identify the outgoing connection link object instance, shall be included in the Set\_Up request primitive.

The information used to determine the routing of the call/connection by the originating exchange shall be included in the Set\_Up request primitive to enable the correct routing at intermediate exchanges. The Set\_Up request primitive implicitly confirms that performance parameter objectives have been met. It indicates the reservation of ATM connection elements.

##### b) *Virtual channel selection – Non-assigning exchange*

As for the assigning exchange except that the assignment procedure is according to 2.1.2.2 b)/Q.2764.

##### c) *Address information sending sequence*

The sending sequence of address information on international call/connections shall be the country code followed by the national (significant) number. On national connections, the address information may be the subscriber number or the national (significant) number as required by the Administration concerned.

The end of pulsing (ST) signal shall always be sent by the outgoing exchange.

d) *Set\_Up request primitive – issued by the assigning exchange*

The Set\_Up request primitive shall contain all the information required to route the call/connection to the destination exchange, and to connect the call/connection to the leaf party.

The originating exchange shall include in the Set\_Up request primitive the mandatory parameters listed in Table 2-2, and the connection element identifier parameter.

The Set\_Up request primitive can also transport parameters from the access transparently to the destination, these are AAL parameters, broadband bearer capability, broadband low layer information, broadband high layer information and progress indicator.

The OAM traffic descriptor parameter shall not be present since OAM flows are not supported for point-to-multipoint connections (see Recommendation I.610).

If the call request from the access contains a broadband bearer capability indicating "point-to-multipoint" in the user plane connection configuration field and contains an OAM traffic descriptor parameter, it shall be treated as an unexpected parameter and shall be discarded.

If the call request from the access contains a broadband bearer capability indicating "point-to-multipoint" in the user plane connection configuration field and contains an ATM traffic descriptor information element containing any backward cell rate field which specifies a non-zero value, the call/connection shall be rejected with cause #73, "unsupported combination of traffic parameters".

The endpoint reference information element received from the access shall be mapped into the leaf party type parameter. If the endpoint reference information element has the value 0, then the leaf party type parameter shall be set to "First endpoint of type 2 connection", else it shall be set to "Subsequent endpoint of type 2 connection".

NOTE – The endpoint reference information element value can be different from 0, because the first leaf party can belong to the same B-NT2 as the root of the connection.

Since a point-to-multipoint connection is established, the broadband bearer capability parameter shall indicate "point-to-multipoint" in the user plane connection configuration field. The ATM cell rate and broadband bearer capability parameters shall be stored at the requesting serving node or associated database so that identical copies of these parameters can be sent in the subsequent Initial Address messages for the addition of leaf parties.

After issuing the Set\_Up request primitive, a response is awaited, i.e. the Incoming\_Resources\_Accepted indication primitive or Incoming\_Resources\_Rejected indication primitive.

e) *Set\_Up request primitive – issued by the non-assigning exchange*

With regard to the issuing of the Set\_Up request primitive by the non-assigning exchange, the same procedures as for the assigning exchange are applicable, with the exception that the connection element identifier shall not be included in the Set\_Up request primitive.

f) *Completion of transmission path*

See 2.2.1.1 f)/Q.2764.

## **2.2.1.1.2 Actions required at an intermediate national exchange**

### **2.2.1.1.2.1 Incoming side of the exchange**

#### a) *Assigning exchange*

After having received a Set\_Up indication primitive, an incoming connection link object instance shall be created. An assigning exchange shall perform the assignment procedure for VPCI/VCI and bandwidth as described in Section 2.1.2.2 b)/Q.2764. If this is successful the Incoming\_Resources\_Accepted request primitive shall be issued immediately. The Incoming\_Resources\_Accepted request primitive shall include the mandatory parameters listed in Table 2-4, including the origination connection link identifier and connection element identifier parameters.

#### b) *Non-assigning exchange*

After having received a Set\_Up Indication primitive an incoming connection link object instance shall be created. A non-assigning exchange shall issue the Incoming\_Resources\_Accepted request primitive immediately. The Incoming\_Resources\_Accepted request primitive shall include the mandatory parameters listed in Table 2-4, without the connection element identifier parameter but containing the assigned origination connection link identifier parameter.

### **2.2.1.1.2.2 Other actions at the exchange**

#### a) *Virtual channel selection*

After issuing the Incoming\_Resources\_Accepted request primitive, an intermediate national exchange shall analyse the called party number and the other routing information (see 2.2.1.1.1) to determine the routing of the call/connection. If the intermediate national exchange can route the call/connection, it shall:

- create an instance of the outgoing connection link object;
- create an instance of the B-ISUP AE and issue a Set\_Up request primitive to it;
- establish a logical association between the incoming and outgoing AEs used for this call/connection establishment.

The exchange shall follow the assignment procedure for VPCI/VCI and bandwidth as described in 2.1.2.2.

#### b) *Parameters in the Set\_Up request primitive issued by the assigning exchange*

Signalling information is passed on transparently, except when specified otherwise (i.e. propagation delay).

The exchange shall include in the Set\_Up request primitive the mandatory parameters included in Table 2-2, containing the origination connection link identifier and the connection element identifier parameters.

After issuing the Set\_Up request primitive, a response, i.e. the Incoming\_Resources\_Accepted indication primitive or Incoming\_Resources\_Rejected indication primitive is awaited.

#### c) *Set\_Up request primitive – issued by the non-assigning exchange*

With regard to the issuing of the Set\_Up request primitive by the non-assigning exchange, the same procedures as for the assigning exchange are applicable, with the exception that the connection element identifier shall not be included in the Set\_Up request primitive.

- d) *Completion of transmission path*  
See 2.2.1.2.2 d)/Q.2764.

### **2.2.1.1.3 Actions required at an outgoing international exchange**

#### **2.2.1.1.3.1 Incoming side of the exchange**

See 2.2.1.1.2.1.

#### **2.2.1.1.3.2 Other actions at the exchange**

- a) *Virtual channel selection*  
See 2.2.1.1.2.2 a).

- b) *Parameters in the Set\_Up request primitive – issued by the assigning exchange*  
See 2.2.1.1.2.2 b), with the following additions:

The most significant digits in the called party number may be amended or omitted (country code is removed at the last exchange before the incoming international exchange).

If a location number parameter is received, the nature of address indicator is checked. If the nature of address indicator is set to "international number" then the parameter is passed on unchanged, otherwise the number is modified to the international number format and the nature of address is set to "international number" before being passed.

The outgoing international gateway exchange shall include the origination ISC point code parameter in the Set\_Up request primitive. This information is used for statistical purposes, e.g. accumulation of the number of incoming call/connections on an originating international switching centre basis.

- c) *Parameters in the Set\_Up request primitive – issued by the non-assigning exchange*  
See 2.2.1.1.2.2 c) with the addition in item b) above.

- d) *Completion of transmission path*  
See 2.2.1.1.2.2 d).

### **2.2.1.1.4 Actions required at an intermediate international exchange**

#### **2.2.1.1.4.1 Incoming side of the exchange**

See 2.2.1.1.2.1.

#### **2.2.1.1.4.2 Other actions at the exchange**

- a) *Virtual channel selection*  
See 2.2.1.1.2.2 a).

- b) *Parameters in the Set\_Up request primitive – issued by the assigning exchange*  
See 2.2.1.1.2.2 b), with the following addition:

The most significant digits in the called party number may be amended or omitted (country code is removed at the last exchange before the incoming international exchange).

- c) *Parameters in the Set\_Up request primitive – issued by the non-assigning exchange*  
See 2.2.1.1.2.2 c), with the addition in item b) above.

- d) *Completion of transmission path*  
See 2.2.1.1.2.2 d).

### **2.2.1.1.5 Actions required at an incoming international exchange**

#### **2.2.1.1.5.1 Incoming side of the exchange**

See 2.2.1.1.2.1.

#### **2.2.1.1.5.2 Other actions at the exchange**

- a) *Virtual channel selection*  
See 2.2.1.1.2.2 a).
- b) *Parameters in the Set\_Up request primitive – issued by the assigning exchange*  
See 2.2.1.1.2.2 b) with the following additions:  
The incoming international gateway exchange shall delete the origination ISC point code parameter from the Set\_Up indication primitive and set up a call/connection to the national network. This information is used for statistical purposes, e.g. accumulation of the number of incoming call/connections on an originating international switching centre basis.
- c) *Parameters in the Set\_Up request primitive – issued by the non-assigning exchange*  
See 2.2.1.1.2.2 c) with the addition in item b) above.
- d) *Completion of transmission path*  
See 2.2.1.1.2.2 d).

### **2.2.1.1.6 Actions required at the destination exchange**

After issuing the Incoming\_Resources\_Accepted request primitive (see 2.2.1.1.2.1), the destination exchange shall analyse the called party number to determine to which party the call/connection shall be connected. It shall also check the leaf party's access condition and perform various checks to verify whether the connection is allowed or not. These checks shall include correspondence of compatibility checks, e.g. checks associated with supplementary services.

If the connection is allowed, the destination exchange shall proceed to offer the call/connection to the leaf party.

If the Set\_Up indication primitive contains information from the access carried in the parameters mentioned in 2.2.1.1.1, it is transferred unaltered in the indication sent to the called user, as specified in clause 5.

### **2.2.1.2 Forward address signalling – en bloc – Addition of one new leaf party**

#### **2.2.1.2.1 Actions required at the originating exchange**

- a) *Virtual channel selection – Assigning exchange*  
Route and virtual channel selection shall take place when the originating exchange has received the complete information for the addition of a new leaf party to the existing point-to-multipoint network connection and has determined that the call/connection is to be routed to another exchange. Appropriate routing information is either stored at the originating exchange or at the remote database. The selection of the route shall depend on the called party number, broadband bearer capability, ATM cell rate, and the outcome of the assignment procedure, see 2.1.2.2 a)/Q.2764. The ATM cell rate and broadband bearer

capability parameters shall be retrieved from the stored call information parameters, received when the first party of the point-to-multipoint connection was established. Additionally, if the maximum end-to-end transit delay parameter is present, this parameter is used together with the propagation delay counter.

It shall also be determined whether or not the call/connection is to be routed to another exchange with already selected connection link establishments for that network connection, and if this other exchange is CS-1 (see 2.8.4).

In case 1 where the network connection branches to another exchange without already having a connection link established for this point-to-multipoint connection and in case of interworking with CS-1 (see 2.8.4) the procedures defined in 2.2.1.1.1 a) shall apply.

In case 2 where the network connection is routed to another exchange to which there already is a connection link established for this point-to-multipoint connection, the existing outgoing connection link object instance shall be used. An instance of the B-ISUP AE shall be created and the Set\_Up request primitive shall be issued to it. No VPCI/VCI and bandwidth assignment procedures shall take place. The destination connection link identifier parameter associated with the outgoing connection link object instance shall be included in the Set\_Up request primitive.

In the case where the destination connection link identifier value associated with the outgoing connection link object instance is not yet known, the Incoming\_Resources\_Accepted indication primitive shall be awaited first. Subsequently, procedures used for case 2 shall apply.

b) *Virtual channel selection – non-assigning exchange*

As for the assigning exchange except that the assignment procedure, if required, is according to 2.1.2.2 b)/Q.2764.

c) *Address information sending sequence*

See 2.2.1.1.1 c).

d) *Set\_Up request primitive – issued by the assigning exchange*

In case 1 the Set\_Up request primitive shall contain the mandatory parameters of Table 2-2, the origination connection link identifier and the connection element identifier parameter.

In case 2 the Set\_Up request primitive shall contain the mandatory parameters of Table 2-2, the destination connection link identifier and shall not contain the connection element identifier parameters.

The Set\_Up request primitive shall include the stored values of broadband bearer capability and ATM cell rate parameters as used for the initial Set\_Up request primitive.

The AAL parameter, the broadband low layer information parameter and the broadband high layer information parameters shall only be passed in the Set\_Up request primitive if provided by the access protocol from the calling user. This information shall not be retrieved from stored data.

The Set\_Up request primitive shall include the leaf party type parameter set to "Subsequent endpoint of type 2 connection".

For the treatment of parameters received from the access protocol related to supplementary services, see 2.8.1.

After having issued the Set\_Up request primitive, a response is awaited, i.e. the Incoming\_Resources\_Accepted indication primitive or Incoming\_Resources\_Rejected indication primitive.

e) *Set\_Up request primitive – issued by the non-assigning exchange*

With regard to issuing the Set\_Up request primitive by the non-assigning exchange, the same procedures as for the assigning exchange are applicable, with the exception that the connection element identifier shall not be included in the Set\_Up request primitive.

f) *Completion of transmission path*

On receipt of the first answer indication primitive, the transmission path towards the related party shall be through-connected in the forward direction.

In case 1 the receipt of further answer indication primitives shall through-connect the related party(ies) accordingly and a cell replication function shall be invoked.

In case 2 no additional action is performed on receipt of further answer indication primitives.

### **2.2.1.2.2 Actions required at an intermediate national exchange**

#### **2.2.1.2.2.1 Incoming side of the exchange**

If the received Set\_Up indication primitive contains the destination connection link identifier parameter, the associated incoming connection link object instance already exists for the incoming point-to-multipoint connection.

Where an incoming connection link object instance does not exist, the procedures shall continue as in 2.2.1.1.2.1.

Where an incoming connection link object instance already exists (this implies an already existing virtual channel), the following procedures shall apply for both the assigning and non-assigning exchanges:

After receiving a Set\_Up indication primitive, the Incoming\_Resources\_Accepted request primitive shall be issued immediately. The Incoming\_Resources\_Accepted request primitive shall include the mandatory parameters listed in Table 2-4 and shall not contain the connection element identifier parameter.

#### **2.2.1.2.2.2 Other actions at the exchange**

After having issued the Incoming\_Resources\_Accepted request primitive, an intermediate national exchange shall analyse the called party number and the other routing information (see 2.2.1.1.1) to determine the routing of the call/connection.

Where the additional party/connection branches to another exchange not currently the far end for any of the existing outgoing connection links, the procedures shall continue as in 2.2.1.1.2.2 and in case of interworking with CS-1 (see 2.8.4).

Where the additional party/connection is routed to an exchange that is already the far end of an existing outgoing connection link for this point-to-multipoint call/connection, the following procedures shall apply:

- a) The exchange shall:
- create an instance of the B-ISUP AE and issue a Set\_Up request primitive to it;
  - establish a logical association between the incoming and outgoing AEs used for this call/connection establishment.

The exchange shall not perform the assignment procedure for VPCI/VCI and bandwidth, the connection element identifier (VPCI/VCI) used for the new party shall correspond to the stored outgoing connection link. In case the destination connection link identifier is not yet known at the exchange, the *Incoming\_Resources\_Accepted* indication primitive, in response to the first *Set\_Up* request primitive that was associated with the outgoing connection link object instance, shall be awaited first.

- b) *Set\_Up* request primitive issued by the assigning exchange

Signalling information is passed transparently, except when specified otherwise (i.e. propagation delay).

The exchange shall include the destination connection link identifier parameter and shall not include the connection element identifier parameter.

After having issued the *Set\_Up* request primitive, a response awaited, i.e. the *Incoming\_Resources\_Accepted* indication primitive or *Incoming\_Resources\_Rejected* indication primitive.

- c) *Set\_Up* request primitive issued by the non-assigning exchange

With regard to issuing the *Set\_Up* request primitive by the non-assigning exchange, the same procedures as for the assigning exchange are applicable.

- d) Completion of transmission path

For the case 1 completion of the transmission shall follow the procedures defined in 2.2.1.1.2.2 d), furthermore a cell replication function shall be invoked.

### **2.2.1.2.3 Actions required at an outgoing international exchange**

#### **2.2.1.2.3.1 Incoming side of the exchange**

See 2.2.1.2.2.1.

#### **2.2.1.2.3.2 Other actions at the exchange**

- a) *Virtual channel selection*

See 2.2.1.2.2.2 a).

- b) *Parameters in the Set\_Up request primitive – issued by the assigning exchange*

See 2.2.1.2.2.2 b), with the following additions:

The most significant digits in the called party number may be amended or omitted (country code is removed at the last exchange before the incoming international exchange).

If a location number parameter is received, the nature of address indicator is checked. If the nature of address indicator is set to "international number" then the parameter is passed unchanged; Otherwise the number is modified to the international number format and the nature of address is set to "international number" before being passed.

The outgoing international gateway exchange shall include the origination ISC point code parameter in the *Set\_Up* request primitive. This information is used for statistical purposes, e.g. accumulation of the number of incoming call/connections on an originating international switching centre basis.

- c) *Parameters in the Set\_Up request primitive – issued by the non-assigning exchange*

See 2.2.1.2.2.2 c) with the addition in item b) above.

- d) *Completion of transmission path*  
See 2.2.1.2.2.2 d).

#### **2.2.1.2.4 Actions required at an intermediate international exchange**

##### **2.2.1.2.4.1 Incoming side of the exchange**

See 2.2.1.2.2.1.

##### **2.2.1.2.4.2 Other actions at the exchange**

- a) *Virtual channel selection*  
See 2.2.1.2.2.2 a).
- b) *Parameters in the Set\_Up request primitive – issued by the assigning exchange*  
See 2.2.1.2.2.2 b), with the following addition:  
The most significant digits in the called party number may be amended or omitted (country code is removed at the last exchange before the incoming international exchange).
- c) *Parameters in the Set\_Up request primitive – issued by the non-assigning exchange*  
See 2.2.1.2.2.2 c), with the addition in item b) above.
- d) *Completion of transmission path*  
See 2.2.1.2.2.2 d).

#### **2.2.1.2.5 Actions required at an incoming international exchange**

##### **2.2.1.2.5.1 Incoming side of the exchange**

See 2.2.1.2.2.1.

##### **2.2.1.2.5.2 Other actions at the exchange**

- a) *Virtual channel selection*  
See 2.2.1.2.2.2 a).
- b) *Parameters in the Set\_Up request primitive – issued by the assigning exchange*  
See 2.2.1.2.2.2 b) with the following additions:  
The incoming international gateway exchange shall delete the origination ISC point code parameter from the Set\_Up indication primitive and set up a call/connection to the national network. This information is used for statistical purposes, e.g. accumulation of the number of incoming call/connections on an originating international switching centre basis.
- c) *Parameters in the Set\_Up request primitive – issued by the non-assigning exchange*  
See 2.2.1.2.2.2 c) with the addition in item b) above.
- d) *Completion of transmission path*  
See 2.2.1.2.2.2 d).

#### **2.2.1.2.6 Actions required at the destination exchange**

See 2.2.1.1.6.

## **2.2.2 Forward address signalling – overlap operation**

This procedure is not supported. Therefore any received subsequent address indication primitive shall be discarded by the incoming connection link object instance.

## **2.2.3 Address\_Complete request primitive**

### **2.2.3.1 Actions required at the destination exchange**

An Address\_Complete request primitive shall be sent from the destination exchange as soon as it has been determined that the complete called party number has been received, and to convey indications on the called party's status. The called line status indicator will be set appropriately.

- a) If an indication that the address is complete or no status indication has been received from the ISDN access prior to the destination exchange determining that the complete called party number has been received, the indicators in the Address\_Complete request primitive will be set as follows:
  - called party's status: "No indication"  
In this case the indication that the destination user is being alerted is transferred in a progress primitive (see 2.2.4).
- b) The destination exchange concludes from the receipt of an indication from the ISDN access that the complete called party number has been received. In this case the indicators in the Address\_Complete request primitive will be set as follows:
  - called party's status: "alerting".

The address complete request primitive can transport transparently information from the access to the origin in the progress indicator parameter. The Address\_Complete request primitive shall include the mandatory parameters listed in Table 2-3.

If an answer indication is received immediately from the called ISDN access, the answer request primitive may be issued without having previously issued an Address\_Complete request primitive.

### **2.2.3.2 Actions required at an intermediate national exchange**

Upon receipt of an Address\_Complete indication primitive, an intermediate national exchange will issue the corresponding Address\_Complete request primitive to the associated incoming AEI.

If this is a national controlling exchange, the following is applicable in addition:

- If an Address Complete indication primitive is received the await answer timer is started.
- If the await answer timer expires, the new leaf party shall be dropped according to 2.4.1 and 2.4.4 using cause "No answer from user (user alerted)".

### **2.2.3.3 Actions required at an outgoing international exchange**

See 2.2.3.2. Additional actions are:

- On receipt of the Address\_Complete indication primitive the await answer timer is started.
- If the await answer timer expires, the new leaf party shall be dropped according to 2.4.1 and 2.4.4 using cause "No answer from user (user alerted)".

### **2.2.3.4 Actions required at an intermediate international exchange**

See 2.2.3.2.

### **2.2.3.5 Actions required at an incoming international exchange**

See 2.2.3.2.

### **2.2.3.6 Actions required at the originating exchange**

- a) On receipt of an Address\_Complete indication primitive with the called party's status indicator set to "alerting", an alerting indication is passed to the calling party.
- b) On receipt of the Address\_Complete indication primitive the "Awaiting Answer" timer is started. If timer "Await Answer" expires, the new leaf party shall be dropped according to 2.4.1 and 2.4.4 using cause "No answer from user (user alerted)".
- c) If the address complete indication primitive contains information from the access carried in the parameters mentioned in 2.2.3.1, it is transferred unaltered in the indication to the calling user.

### **2.2.3.7 Through connection and the awaiting answer indication at the destination exchange**

The sending of the awaiting answer indication shall not be applicable.

The through connection of the virtual connection at answer, at other exchange types, is covered in 2.2.5.

### **2.2.3.8 Access delivery indication**

See 2.2.3.8/Q.2764.

## **2.2.4 Progress (basic call)**

The progress request primitive is sent only after the Address\_Complete indication primitive. The progress request primitive is sent from an exchange in the backward direction to indicate that an event has occurred during call/connection set-up that should be relayed to the calling party.

### **2.2.4.1 Actions required at the destination exchange**

The progress request primitive is sent from the destination exchange if the Address\_Complete request primitive has been sent and subsequently:

- an indication is received that the leaf party is being alerted. The progress request primitive contains a called party's indicators parameter with the called party's status set to "alerting".

NOTE – A progress indication cannot be received from the leaf party; therefore, the transport of this progress indication in the progress request primitive containing a progress indicator parameter shall not be supported.

The progress request primitive shall include the mandatory parameters listed in Table 2-9.

### **2.2.4.2 Actions required at an intermediate exchange**

On receipt of a progress indication primitive, an intermediate exchange will issue the corresponding progress request primitive.

### **2.2.4.3 Actions required at the originating exchange**

On receipt of a progress indication primitive at the originating exchange, no state change occurs, and the appropriate indication is sent to the calling user.

If the progress indication primitive contains information from the access carried in the parameters mentioned in 2.2.4.1, it is transferred unaltered in the indication to the calling user.

## **2.2.5 Answer primitive**

### **2.2.5.1 Actions required at the destination exchange**

When the leaf party answers, the destination exchange shall:

- allocate the requested quality of service;  
NOTE – A more detailed description has to be provided, for further study.
- issue an answer request primitive. The answer request primitive shall include the mandatory parameters listed in Table 2-8.

Through connection: see 2.2.3.7.

The answer request primitive can be issued without having issued a previous Address\_Complete request, e.g. in the case of an automatic answering terminal.

The answer request primitive can transport information from the access to the origin in the following parameters: AAL parameter and broadband low layer information parameter.

### **2.2.5.2 Actions required at an intermediate national exchange**

Upon receipt of an answer indication primitive, the intermediate national exchange through connects the virtual connection in the forward direction if not already connected and issues the corresponding answer request primitive towards the preceding exchange.

If this is a national controlling exchange, and the answer indication is received subsequent to an address complete indication, timer "Await Answer" is stopped.

### **2.2.5.3 Actions required at an outgoing international exchange**

See 2.2.5.2. Additionally if the answer indication is received subsequent to an address complete indication, timer "Await Answer" is stopped.

### **2.2.5.4 Actions required at an intermediate or incoming international exchange**

See 2.2.5.2.

### **2.2.5.5 Actions required at the originating exchange**

When the originating exchange receives an answer indication primitive indicating the required leaf party establishment has been completed, the "Awaiting Answer" timer is stopped, (if the answer indication is received subsequent to an address complete indication). The virtual connection is connected through in the forward direction, if not already connected, and a connect indication is sent to the calling subscriber.

If the answer indication primitive contains information from the access carried in the parameters mentioned in 2.2.5.1, it is transferred unaltered in the indication to the calling user.

## **2.2.6 Transit network selection (national option)**

If transit network selection information is included in the set-up or add party information from the calling party or is provided on a subscription basis, this information is carried in the transit network selection parameter. It is used for routing the call/connection, e.g. to a specific B-ISDN.

## 2.2.7 Storage and release of information

Two cases for the storage of call/connection information shall be foreseen:

- The requesting serving exchange of the connection shall store the broadband bearer capability and ATM cell rate parameters contained in the first Set\_Up primitive sent (originating exchange). This call information shall be stored so that identical copies of these parameters can be sent in the subsequent initial address messages.
- Each exchange of the connection shall store the information contained in the Set\_Up primitive sent (originating exchange) or received (intermediate or destination exchange) during the call/connection set-up. The information to be stored includes all parameters in the Set\_Up primitive. The Set\_Up primitive information can be released from memory:
  - a) in the originating or intermediate exchange, when the Address\_Complete or Answer indication primitive has been received;
  - b) in the destination exchange, when the Address\_Complete or answer request primitive has been sent;
  - c) in all exchanges, when the call/connection is released earlier and no automatic repeat attempt is to be attempted.

## 2.2.8 Simple segmentation (national option)

See 2.2.9/Q.2764.

## 2.3 Unsuccessful call/connection set-up

### 2.3.1 Lack of resources at the incoming side

If at any time the call/connection establishment to the first leaf party or the establishment of a new connection link (leg) for the addition of a new leaf party cannot be completed due to lack of resources at the incoming side (e.g. SIDs, CLIDs, VPCI/VCI or bandwidth), the exchange shall issue an Incoming\_Resources\_Rejected request primitive towards the preceding exchange. The Incoming\_Resources\_Rejected primitive shall contain the mandatory parameters listed in Table 2-5. Cause value "resource unavailable – unspecified" is included, if no SIDs or CLIDs were available, cause value "No VPCI/VCI available" in case no VPCI/VCI is available, and cause value "user cell rate not available" in the case of lack of bandwidth. The incoming signalling association (AEI) and the incoming connection link object instance (provided it does not control any additional B-ISUP AEIs) are deleted.

If at any time the addition of one new leaf party to an already existing connection link cannot be completed due to lack of resources at the incoming side (e.g. SIDs), the exchange shall issue an Incoming\_Resources\_Rejected request primitive towards the preceding exchange. The Incoming\_Resources\_Rejected primitive shall contain the mandatory parameters listed in Table 2-5. Cause value "resource unavailable – unspecified" is included, if no SIDs were available.

### 2.3.2 Lack of resources at the outgoing side

If at any time the call/connection establishment to the first leaf party or the establishment of a new connection link (leg) cannot be completed due to lack of resources at the outgoing side (e.g. SIDs, CLIDs or bandwidth), or if the maximum end-to-end transit delay is exceeded, the exchange shall immediately start to drop the leaf party and shall issue a release request primitive towards the preceding exchange. The release primitive shall contain the mandatory parameters listed in Table 2-6. Cause value "resource unavailable – unspecified" is included, if no SIDs or CLIDs were available, or if the maximum end-to-end transit delay is exceeded, cause value "no VPCI/VCI

available" in the case of lack of VPCI/VCI, and cause value "user cell rate not available" in the case of lack of bandwidth. Procedures continue as in 2.4.

If at any time the addition of a new leaf party to an already existing connection link cannot be completed due to lack of resources at the outgoing side (e.g. SIDs) or if the maximum end-to-end transit delay is exceeded, the exchange will immediately start to drop the leaf party and issue a release request primitive towards the preceding exchange. The release primitive shall contain the mandatory parameters listed in Table 2-6. Cause value "resource unavailable – unspecified" is included, if no SIDs were available, or if the maximum end-to-end transit delay is exceeded. Procedures continue as in 2.4.

### **2.3.3 Actions at an exchange receiving an Incoming\_Resources\_Rejected primitive**

If during the call/connection establishment to the first leaf party or the establishment of a new connection link (leg) for the addition of a new leaf party an exchange receives an Incoming\_Resources\_Rejected indication primitive it shall release the VPCI/VCI (if applicable) and the bandwidth, and shall terminate the outgoing signalling association, i.e. the associated outgoing connection link object instance and the corresponding AEI are deleted. When one or more Set\_Up request primitives corresponding to the parties to be added to the point-to-multipoint call/connection are waiting the reception of the peer connection link identifier value, one of these Set\_Up request primitives shall be issued containing the origination connection link identifier referring to this outgoing connection link object instance. The exchange may attempt to re-route the call/connection.

If during the addition of a new leaf party to an already existing connection link an exchange receives an Incoming\_Resources\_Rejected indication primitive the signalling association is terminated, i.e. the associated AEI is deleted. The exchange shall provide the capability to re-route the call/connection.

If all attempts to re-route the call/connection have failed the exchange shall:

- a) at an intermediate exchange issue a release request primitive with the received cause value towards the preceding exchange. Procedures continue as in 2.4;
- b) at an originating exchange send an indication to the calling user.

### **2.3.4 Actions at an exchange receiving a release message**

If during the call/connection establishment of a point-to-multipoint network connection, an exchange receives a release indication primitive from the succeeding exchange after the Incoming\_Resources\_Accepted indication and before the Address\_Complete indication the exchange shall release the VPCI/VCI (if applicable) and the bandwidth, and shall issue a release response primitive. The outgoing signalling association is terminated, i.e. the associated outgoing connection link object instance and the corresponding AEI are deleted:

- a) if it is the controlling exchange (i.e. the exchange controlling the call), the exchange may attempt to re-route the call/connection;
- b) if it is not the controlling exchange or if all attempts to re-route the call/connection have failed:
  - 1) an intermediate exchange will issue a release request primitive with the received cause value towards the preceding exchange. Procedures continue as in 2.4.3;
  - 2) an originating exchange will send an indication to the calling user.

If during the addition of one new leaf party and attachment to the point-to-multipoint network connection, an exchange receives a release indication primitive from the succeeding exchange after the `Incoming_Resources_Accepted` indication and before the `Address_Complete` indication the exchange shall take the following actions:

- if there are no other AEIs associated with the concerning outgoing connection link object instance the associated VPCI/VCI and the corresponding bandwidth shall be made available for new traffic;
- issue a release response primitive;
- the signalling association is terminated, i.e. the associated AEI is deleted;
- when the last remaining AEI associated with the outgoing connection link object instance is deleted, the corresponding outgoing connection link object instance shall be deleted;
- when the last remaining outgoing connection link object instance associated with a call/connection instance is deleted, the call/connection shall be deleted;
  - a) if it is the controlling exchange (i.e. the exchange controlling the call), the exchange may attempt to re-route the call/connection;
  - b) if it is not the controlling exchange or if all attempts to re-route the call/connection have failed:
    - 1) an intermediate exchange will issue a release request primitive in order to drop the leaf party with the received cause value towards the preceding exchange. Procedures continue as in 2.4.3;
    - 2) an originating exchange will send an indication to the calling user.

### **2.3.5 Address incomplete**

The determination that the proper number of digits has not been received can be made at once if the end of pulsing signal is received.

If the end of pulsing has not been received, the release request primitive with cause "address incomplete" will be sent towards the preceding exchange. Procedures continue as in 2.4.

## **2.4 Normal call/connection release**

### **2.4.1 General**

The following release procedures are applicable:

- Release of a call/connection requested by the root party: the *en bloc* release procedures as specified in 2.4.5 shall always apply.
- Drop of a leaf party from an existing call/connection when requested by the root party.
- Drop of a leaf party from an existing call/connection when requested by the party itself.
- A B-NT2 causing multiple leaf parties to be dropped, initiated at the  $T_B$  reference point with a single RELEASE message.

The release procedure is a confirmed operation; whereby the release request/indication initiates release of the call/connection and/or drop of a party and the response/confirmation signifies completion of the release. A set of common procedures are used in the network irrespective of whether they are initiated by the root party, the leaf party or the network.

The following actions will be performed by any exchange receiving a release indication primitive:

- if there are no other AEIs associated with the concerned incoming/outgoing connection link object instance, the associated VPCI/VCI and the corresponding bandwidth shall be made available for new traffic;
- the appropriate release response primitive is returned;
- the signalling association is terminated, i.e. the associated AEI is deleted;
- when the last remaining AEI associated with an incoming or outgoing connection link object instance is deleted, the corresponding incoming or outgoing connection link object instance shall be deleted;
- when the last remaining incoming or outgoing connection link instances associated with a call/connection instance is deleted, the call/connection instance shall be deleted.

An exchange that has initiated the release procedure by issuing a release request primitive shall perform the following actions on receipt of the release confirmation primitive:

- if there are no other AEIs associated with the concerned incoming/outgoing connection link object instances, the associated VPCI/VCI and the corresponding bandwidth shall be made available for new traffic;
- the signalling association is terminated, i.e. the associated AEI is deleted;
- when the last remaining AEI associated with an incoming or outgoing connection link object instance is deleted, the corresponding incoming or outgoing connection link object instance shall be deleted;
- when the last remaining incoming or outgoing connection link instances associated with a call/connection instance is deleted, the call/connection instance shall be deleted.

The following subclause describe additional required actions.

#### **2.4.2 Drop of a leaf party requested by a root party**

##### *a) Actions required at the originating exchange*

On receipt of a request from the access protocol to drop a leaf party from the root party, the originating exchange immediately starts the release. A release request primitive is issued towards the succeeding exchange via the outgoing AEI corresponding to the remote leaf party to be dropped. The release request primitive shall not contain the destination connection link identifier parameter.

In case of premature drop by the root party, the exchange shall immediately release the resources towards the root party, but shall delay the release of the connection towards the succeeding exchange until receipt of the `Incoming_Resources_Accepted` primitive.

##### *b) Actions at an intermediate exchange*

On receipt of the release indication primitive, an intermediate exchange will issue a release request primitive towards the succeeding exchange via the associated outgoing AEI. The release towards the succeeding exchange shall not occur until after the receipt of the `Incoming_Resources_Accepted` primitive.

##### *c) Actions required at the destination exchange*

If there is no remaining party at the interface, the exchange shall immediately release the resources towards the leaf party.

##### *d) Collision of release primitives*

In the case when two points in the connection initiate the drop of the same leaf party, a release indication primitive may be received at an exchange from a succeeding or preceding

exchange after the drop is initiated. In this case, the exchange shall return a release response primitive towards the exchange from which the concerned release request primitive was received. The release response primitive shall be issued, when the switch resources have been released.

### **2.4.3 Drop of a leaf party requested by the party itself**

#### a) *Actions required at the leaf party serving (destination) exchange*

On receipt of a request from the access protocol to drop a leaf party, the leaf party serving exchange immediately starts the release. A release request primitive is issued towards the preceding exchange via the associated incoming AEI, corresponding to the leaf party to be dropped.

#### b) *Actions at an intermediate exchange*

On receipt of the release indication primitive, an intermediate exchange will issue a release request primitive towards the preceding exchange via the associated incoming AEI.

#### c) *Actions required at the originating exchange*

The exchange shall notify the originating party that the leaf party has dropped.

#### d) *Collision of release primitives*

See 2.4.2 d).

### **2.4.4 Drop of a leaf party initiated by the network**

The procedures in 2.4.2 and 2.4.3 apply, except that they can be initiated at any exchange.

### **2.4.5 En bloc release of call/connection requested by the root party**

#### **2.4.5.1 Normal operation**

##### a) *Actions required at the originating exchange*

On receipt of a request from the access protocol to release the call/connection by the root party, the exchange shall immediately start the release. For each associated outgoing connection link object instance, a release request primitive is issued towards the succeeding exchange containing the relevant destination connection link identifier parameter to one of the controlled B-ISUP AEIs. The selection of the B-ISUP AEI is implementation dependant. The transmission path shall be disconnected.

When the release confirmation primitive related to an outgoing connection link object is received:

- all the associated B-ISUP AEIs shall be deleted;
- the associated VPCI/VCI and the corresponding bandwidth shall be made available for new traffic, when the last remaining B-ISUP AEI associated with the outgoing connection link object instance has been deleted;
- the outgoing connection link object instance shall be deleted.

In case of premature release by the calling party, the exchange shall:

- immediately release the resources towards the root party;
- immediately release the connection links towards the succeeding exchanges for which one of the incoming resources accepted primitive has been received;
- delay the release of the connection links towards the succeeding exchange on which no incoming resources accepted primitive has been received until receipt of one of the incoming resources accepted primitives.

In general the Release request primitive shall only be issued via a B-ISUP AEI for which an Incoming Resources Accepted primitive has been received.

b) *Actions at an intermediate exchange*

i) Incoming side of the exchange

On receipt of the release indication primitive from an incoming B-ISUP AEI containing a destination connection link identifier parameter, an intermediate exchange:

- shall make the associated VPCI/VCI and corresponding bandwidth available for new traffic;
- shall delete all the other B-ISUP AEIs associated with the incoming connection link object instance;
- shall return a release response primitive to the preceding exchange, when all the other B-ISUP AEIs associated with the incoming connection link object instance have been deleted;
- when a release response primitive has been returned, the last remaining B-ISUP AEI and the incoming connection link object instance shall be deleted.

ii) Other action at the exchange

See item a) above.

c) *Actions required at the destination exchange*

i) Incoming side of the exchange

See item b) i) above.

ii) Other actions at the exchange

The destination exchange shall immediately release the resources towards the leaf parties.

d) *Collision of release primitives*

i) Outgoing side of an exchange

After sending the release request primitive with the destination connection link identifier parameter, a release indication primitive may be received. In this case, the exchange shall return a release response primitive towards the B-ISUP AEI from which the concerned release indication primitive was received. The release response primitive shall be issued when the transmission path is disconnected.

ii) Incoming side of an exchange

**2.4.6 A B-NT2 causing multiple leaf parties to be dropped, initiated at the T<sub>B</sub> reference point with a single RELEASE message**

When multiple leaf parties are dropped at the destination T<sub>B</sub> reference point with a single RELEASE message requested by the B-NT2, then individual REL messages shall be sent between exchanges and drop party messages to the originating interface.

**2.5 Suspend, resume (network initiated)**

This capability shall not be supported.

**2.6 Propagation delay determination**

The propagation delay determination procedures as defined in 2.6/Q.2764 shall be applied for each leaf party establishment.

## 2.7 Error indication primitive

The error indication primitive can be received as a result of various protocol errors detected by the ASEs.

For the call/connection establishment of a point-to-multipoint network connection requested by the party who is the root of the network connection, the following errors and their corresponding actions are identified:

- a) Timer "Await Address Complete" expiry, detected by CC ASE: if this error occurs the call/connection should be released, in both the forward and backward directions, using cause "Address Incomplete".
- b) Unexpected message received while awaiting the IAM acknowledge message, detected by BCC ASE: this will initiate an automatic repeat attempt. The existing outgoing signalling association is terminated, i.e. the associated connection link object instance and corresponding AEI are deleted. (Reset initiated by the maintenance application process.)
- c) Unexpected message received while awaiting the address complete message, detected by CC ASE: this shall initiate an automatic repeat attempt. The existing outgoing signalling association is terminated, i.e. the associated connection link object instance and corresponding AEI are deleted. (Reset initiated by the maintenance application process.)
- d) Timer "Await IAM Acknowledge" expiry, detected by BCC ASE: if this error occurs the VPCI/VCI and the bandwidth shall be removed from service, and the signalling association is terminated, i.e. the associated connection link object instance and corresponding AEI are deleted. (Reset initiated by the maintenance application process.)
- e) Unexpected release complete message received after the reception, or sending, of the IAM Acknowledge message, detected by BCC ASE: this will initiate the release of the call/connection, using cause value "protocol error – unspecified".

For the addition of one new leaf party and attachment to the point-to-multipoint network connection, the following errors and their corresponding actions are identified:

- a) Timer "Await Address Complete" expiry, detected by CC ASE: if this error occurs the leaf party shall be dropped by sending a release request primitive, in both the forward and backward directions, using cause "Address Incomplete".
- b) Unexpected message received while awaiting the IAM Acknowledge message, detected by BCC ASE: this will initiate an automatic repeat attempt and the following actions are performed:
  - the signalling association is terminated, i.e. the associated AEI is deleted;
  - when the last remaining AEI associated with the outgoing connection link object instance is deleted, the corresponding outgoing connection link object instance shall be deleted;
  - a reset is initiated by the maintenance application process.
- c) Unexpected message received while awaiting the address complete message, detected by CC ASE: this shall initiate an automatic repeat attempt and the following actions shall be performed:
  - if there are no other AEIs associated with the concerning outgoing connection link object instance, the associated VPCI/VCI and the corresponding bandwidth shall be made available for new traffic;
  - issue a release request primitive;
  - the signalling association is terminated, i.e. the associated AEI is deleted;

- when the last remaining AEI associated with the outgoing connection link object instance is deleted, the corresponding outgoing connection link object instance shall be deleted;
  - when the last remaining outgoing connection link object instance associated with a call/connection instance is deleted, the call/connection shall be deleted;
  - a reset is initiated by the maintenance application process.
- d) Timer "Await IAM Acknowledge" expiry, detected by BCC ASE: if this error occurs, the following actions shall be performed:
- if there are no other AEIs associated with the concerning outgoing connection link object instance, the associated VPCI/VCI and the corresponding bandwidth shall be removed from service by the assigning exchange;
  - the signalling association is terminated, i.e. the associated AEI is deleted;
  - when the last remaining AEI associated with the outgoing connection link object instance is deleted, the corresponding outgoing connection link object instance shall be deleted;
  - when the last remaining outgoing connection link object instance associated with a call/connection instance is deleted, the call/connection shall be deleted;
  - a reset is initiated by the maintenance application process.
- e) Unexpected release complete message received after the reception, or sending, of the IAM Acknowledge message, detected by BCC ASE: this shall initiate the drop of the called leaf, using cause value "protocol error – unspecified".

For a drop of a leaf party requested by the root party, the following errors and their corresponding actions are identified:

- Timer "Await release Complete" expiry, detected by BCC ASE: if this error occurs, the following actions are performed:
  - if there are no other AEIs associated with the concerning outgoing connection link object instance, the associated VPCI/VCI and the corresponding bandwidth shall be removed from service by the assigning exchange;
  - the signalling association is terminated, i.e. the associated AEI is deleted;
  - when the last remaining AEI associated with the outgoing connection link object instance is deleted, the corresponding outgoing connection link object instance shall be deleted;
  - when the last remaining outgoing connection link object instance associated with a call/connection instance is deleted, the call/connection shall be deleted;
  - a reset is initiated by the maintenance application process.

For a drop of a leaf party requested by the party itself, the following errors and their corresponding actions are identified:

- Timer "Await release Complete" expiry, detected by BCC ASE: if this error occurs the following actions are performed:
  - if there are no other AEIs associated with the concerning outgoing connection link object instance the associated VPCI/VCI and the corresponding bandwidth shall be removed from service by the assignment exchange;
  - the signalling association is terminated, i.e. the associated AEI is deleted;

- when the last remaining AEI associated with the outgoing connection link object instance is deleted, the corresponding outgoing connection link object instance shall be deleted;
- when the last remaining outgoing connection link object instance associated with a call/connection instance is deleted, the call/connection shall be deleted;
- a reset is initiated by the maintenance application process.

For the release of call/connection by the root party, the following errors and their corresponding actions are identified:

- Timer "Await release Complete" expiry, detected by BCC ASE: if this error occurs the VPCI/VCI and the bandwidth shall be removed from service, and the signalling associations shall be terminated, i.e. the associated connection link object instance and corresponding AEIs are deleted. (Reset initiated by the maintenance application process.)

If an error indication primitive is received indicating any other error has occurred, it is discarded with no action.

## **2.8 Interaction**

### **2.8.1 Interaction of point-to-multipoint features and Capability Set 1 supplementary services**

#### **2.8.1.1 Direct-dialling-in supplementary service**

The direct-dialling-in supplementary service shall have no impact on the NNI protocol, however the B-ISUP protocol shall carry the called party number in order to support the direct-dialling-in supplementary service.

#### **2.8.1.2 Multiple subscriber number supplementary service**

The multiple subscriber number supplementary service shall have no impact on the NNI protocol, however the B-ISUP protocol shall carry the called party number in order to support the multiple subscriber number supplementary service.

#### **2.8.1.3 Calling line identification presentation and restriction supplementary services**

The procedures specified provide for the inclusion of an calling line identity in the initial address message for each additional party to be added to the existing network connection, therefore no additional procedures are required. The evaluation, screening and restriction requirements of the calling line identity have to be performed independently for each additional party.

#### **2.8.1.4 Connected line identification presentation and restriction supplementary services**

The procedures specified provide for the inclusion of each additional party to be added by the use of the initial address message and the answer message, point-to-point procedures already provide for the inclusion of the connected line identity in the answer message, therefore no additional procedures are required.

#### **2.8.1.5 Subaddressing supplementary service**

The subaddressing supplementary service shall have no impact on the NNI protocol, however the B-ISUP protocol shall carry the called party subaddress in order to support the subaddressing supplementary service.

### **2.8.1.6 User-to-user supplementary service**

The procedures specified provide for the inclusion of the user-to-user information in the initial address, segmentation, address complete or release messages and the user-to-user indicators in the address complete, segmentation or answer messages for each party to be added or dropped to/from the existing network connection, therefore no additional procedures are required.

### **2.8.2 Interaction with a leaf party that does not support multipoint procedures**

It is not required that the leaf party of a point-to-multipoint network connection supports the procedures defined in Recommendation Q.2971, however connections shall be supported to leaf parties who support the procedures defined in clause 5/Q.2931.

The NNI protocol shall support such users and shall apply the following procedures when the destination exchange receives an interworking primitive as a result of receiving at the UNI protocol a CALL PROCEEDING, ALERTING or CONNECT message as the first response to the SETUP message and it does not contain an endpoint reference information element:

- The network shall deliver the broadband low layer information element in the answer primitive towards the root serving node provided the network supports the delivery of the broadband low layer information parameter.
- The network shall deliver the AAL parameter in the answer primitive towards the root serving node.

### **2.8.3 Interaction with a leaf party that is not a broadband user**

The network shall not support the connection establishment to a user which is not a broadband user. When an exchange has received the complete call information for the establishment of a point-to-multipoint network connection to a remote party or the addition of a remote party to an existing network connection and has determined that the call/connection has to be routed to a non-broadband ISDN user than this establishment shall be released in accordance with the normal call/connection release procedures specified in 2.4.

### **2.8.4 Interaction of a CS-2.1 node with a CS-1 node**

If a new connection link (leg) is established to a CS-1 node, the CS-1 node shall establish the point-to-multipoint call/connection as if it is a point-to-point call/connection. Therefore the CS-1 exchange is instructed to discard the origination connection link identifier and to pass on the leaf party type.

NOTE – If a broadband bearer capability parameter with the "point-to-multipoint" field in the user plane connection configuration field is received in the CS-1 exchange, the broadband bearer capability parameter is passed unchanged.

Since the CS-1 exchange will not include an origination connection link identifier in the IAA, the application process functions of the CS-2.1 exchange will receive an Incoming\_Resources\_Accepted indication primitive without this parameter. Therefore the CS-2.1 exchange is in a position to know that the succeeding exchange is not capable to support point-to-multipoint functions, e.g. cell replication, creation of an connection link object instance. This knowledge is stored in the application process for the lifetime of the call/connection in order to use it for the handling of subsequent add party requests. The CS-2.1 shall not delete the connection link object instance because it has an associated AEI with it and is controlling the VPCI/VCI resource. For the continuation of the call set-up on the outgoing side of the CS-2.1 exchange, the procedures as specified for the normal CS-2.1 call set-up shall be applied.

For subsequent requests to add new parties branching to the same CS-1 exchange, on the outgoing side of the CS-2.1 exchange the add party procedures for C-2.1 as specified in 2.2.1.2.1 a) case 1 for handling at the origination exchanges and 2.2.1.1.2.2 for intermediate exchanges shall be applied (in

a case where no outgoing connection link object instance exists). For each add party establishment towards an CS-1 exchange a connection link object instance and associated AEI shall be created. Furthermore the replication function shall be invoked.

The release procedures as specified in 2.4 apply also for the interaction with a CS-1 node. The *en bloc* release handled by the CS-2.1 exchange towards the CS-1 exchange is performed by sending individual release requests for each outgoing connection link object instance since no more than one AEI per connection link object instance is present.

For a point-to-multipoint call/connection that is routed from a CS-2.1 exchange to a CS-1 exchange and on to a CS-2.1 exchange, the second CS-2.1 exchange shall receive a set-up request primitive containing a broadband bearer capability indicating point-to-multipoint, but no originating connection link identifier parameter. This shall be handled by the second CS-2.1 exchange as a point-to-point call.

## 2.9 Primitive contents

Tables 2-2 to 2-10 list the mandatory and optional contents for the SACF call control service primitives for the set-up and release of basic call/connections.

Mandatory/Optional (M/O) indications are provided.

For primitives generated by the application process, these tables indicate which parameters must be generated.

For primitives received by the application process: if the primitive does not contain a parameter indicated as mandatory the primitive is discarded and maintenance application process is notified of the error. (Reset initiated by the maintenance application process.) Any other parameter which is not listed and which is not tagged as an unrecognized parameter by the UI ASE shall be discarded, unless explicitly specified otherwise.

**Table 2-2/Q.2722.1 – Parameters for Set\_Up request/indication primitive**

<b>Set_Up request/indication</b>	
<b>Parameter</b>	<b>Mandatory/Optional</b>
Message Compatibility Information	M
AAL Parameters	O
ATM Cell Rate	M
Broadband Bearer Capability	M
Broadband Low Layer Information	O
Broadband High Layer Information	O
Called Party Number	M
Calling Party's Category	M
Connection Element Identifier	O
Location Number	O
Maximum End-to-End Transit Delay	O
National/international Call Indicator	O
Origination ISC Point Code	O (Note 2)
Progress Indicator	O

**Table 2-2/Q.2722.1 – Parameters for Set\_Up request/indication primitive (concluded)**

<b>Set_Up request/indication</b>	
<b>Parameter</b>	<b>Mandatory/Optional</b>
Propagation Delay Counter	M
Segmentation Indicator	O (national use)
Transit Network Selection	O (national use)
Origination Connection Link Identifier	(Note 3)
Destination Connection Link Identifier	(Note 4)
Leaf Party Type	M
Exchange type (Note 1)	M
<p>NOTE 1 – The exchange type parameter takes the appropriate value from the list in 1.1. It is passed to the AE so that the protocol can be varied depending on the role that the exchange is performing for this call/connection. Unlike the other parameters it does not relate to a protocol information element. This parameter is only present in the request primitive.</p> <p>NOTE 2 – This parameter is mandatory when the Set_Up request is issued at an outgoing international exchange.</p> <p>NOTE 3 – This parameter is mandatory for the establishment of a new connection link.</p> <p>NOTE 4 – This parameter is mandatory for the addition of a new leaf to an existing connection.</p>	

**Table 2-3/Q.2722.1 – Parameters for Address\_Complete request/indication primitive**

<b>Address_Complete request/indication</b>	
<b>Parameter</b>	<b>Mandatory/Optional</b>
Message Compatibility Information	M
Access Delivery	O
Called Party's Indicators	M
Cause Indicators	O
Charge Indicator	O
Progress Indicator	O
Segmentation Indicator	O (national use)

**Table 2-4/Q.2722.1 – Parameters for Incoming\_Resources\_Accepted request/indication primitive**

<b>Incoming_Resources_Accepted request/indication</b>	
<b>Parameter</b>	<b>Mandatory/Optional</b>
Message Compatibility Information	M
Connection Element Identifier	O
Origination Connection Link Identifier	(Note)
NOTE – This parameter is mandatory for the establishment of a new connection link.	

**Table 2-5/Q.2722.1 – Parameters for Incoming\_Resources\_Rejected request/indication primitive**

<b>Incoming_Resources_Rejected request/indication</b>	
<b>Parameter</b>	<b>Mandatory/Optional</b>
Message Compatibility Information	M
Automatic Congestion Level	O
Cause Indicators	M

**Table 2-6/Q.2722.1 – Parameters for release request/indication primitive**

<b>Release request/indication</b>	
<b>Parameter</b>	<b>Mandatory/Optional</b>
Message Compatibility Information	M
Access Delivery	O
Automatic Congestion Level	O
Cause Indicators	M
Progress Indicator	O
Destination Connection Link Identifier	(Note)
Segmentation Indicator	O (national use)
NOTE – This parameter is mandatory for the <i>en bloc</i> release of call/connection requested by the root party.	

**Table 2-7/Q.2722.1 – Parameters for release response/confirmation primitive**

<b>Release response/confirmation</b>	
<b>Parameter</b>	<b>Mandatory/Optional</b>
Message Compatibility Information	M
Cause Indicator	O

**Table 2-8/Q.2722.1 – Parameters for answer request/indication primitive**

<b>Answer request/indication</b>	
<b>Parameter</b>	<b>Mandatory/Optional</b>
Message Compatibility Information	M
Access Delivery	O
AAL Parameters	O
Broadband Low Layer Information	O
Call History Information	O
Charge Indicator	O
Progress Indicator	O
Segmentation Indicator	O (national use)

**Table 2-9/Q.2722.1 – Parameters for progress request/indication primitive**

<b>Progress request/indication</b>	
<b>Parameter</b>	<b>Mandatory/Optional</b>
Message Compatibility Information	M
Access Delivery	O
Called Party's Indicators	O
Cause Indicators	O
Charge Indicator	O
Progress Indicator	O
Segmentation Indicator	O (national use)

**Table 2-10/Q.2722.1 – Parameters for segment request/indication primitive**

<b>Segment request/indication</b>	
<b>Parameter</b>	<b>Mandatory/Optional</b>
Message Compatibility Information	M
Broadband High Layer Information	O
Broadband Low Layer Information	O
Progress Indicator	O

### **3 Maintenance control, application process functions**

The procedures as defined in clause 3/Q.2764 apply also to point-to-multipoint, except the reset and blocking functions for which the specification is provided in this clause.

### 3.1 Reset

The reset procedure is used to return signalling identifiers and connection elements (virtual channel links/path connections) to the idle condition. The procedure is invoked under abnormal conditions; when the current status of the signalling identifiers (SIDs) or the connection element identifiers (CEIs) are unknown or ambiguous. For example, a switching system that has suffered memory mutilation will not know the status of signalling identifiers (SIDs) and virtual channel connections, e.g. idle, busy incoming, busy outgoing, etc., the identifiers and virtual channel links/path connections (and any associated bandwidth) between the two adjacent nodes should therefore be reset to the idle condition. The resources are therefore made available for new traffic.

In order to indicate what resource is to be reset, the Reset\_Resource request contains a Resource Identifier parameter. If the resource indicator is set to "remote SID" the resource value will indicate the local SID reference at the sending node (the remote reference at the receiving node). If the resource indicator is set to "local SID" then the resource value will indicate the remote SID reference at the sending node (the local reference at the receiving node). If the resource indicator is set to "CEI VPCI", or "CEI VPCI/VCI" the resource value will indicate the virtual channel link/path connection common to both the sending and receiving nodes.

The reset procedure shall be initiated for:

- a) signalling anomalies detected by the B-ISUP signalling system. The following anomalies are detected by the protocol procedures, reported to the exchange management functions, and thus initiate the reset procedure:
  - 1) Unexpected message received while awaiting the IAM acknowledge message, (detected by BCC ASE). Action: Reset remote SID.
  - 2) Unexpected message received while awaiting the address complete message, (detected by CC ASE). Action: Reset local SID.
  - 3) Timer "Await Release Complete" expiry, (detected by BCC ASE) in case of a drop party operation if there are no other AEIs associated with the corresponding connection link object instance. Action: Reset VPCI/VCI.
  - 4) Timer "Await Release Complete" expiry, (detected by BCC ASE) in case of an *en bloc* release operation. Action: Reset VPCI/VCI.
  - 5) Unexpected message received relating to an unallocated SID, (detected by BCC ASE). Action: Reset remote SID.
  - 6) Timer "Await IAM Acknowledge" expiry, (detected by BCC ASE) in case of the establishment of the call/connection to the first leaf party. Action:  
Assigning exchange: Reset VPCI/VCI and remove the VPCI/VCI and bandwidth from service.  
Non-assigning exchange: Reset remote SID.
  - 7) Timer "Await IAM Acknowledge" expiry, (detected by BCC ASE) in case of an add party operation if there are no other AEIs associated with the corresponding connection link object instance. Action:  
Assigning exchange: Reset VPCI/VCI and remove the VPCI/VCI and bandwidth from service.  
Non-assigning exchange: Reset remote SID.

- 8) Call control application process detects a missing mandatory parameter in a received primitive. Action: Reset local SID.
  - 9) Timer "Await Release Complete" expiry, (detected by BCC ASE) in case of a drop party operation if there are other AEIs associated with the corresponding connection link object instance. Action: Reset local SID.
  - 10) Timer "Await IAM Acknowledge" expiry, (detected by BCC ASE) in case of an add party operation if there are other AEIs associated with the corresponding connection link object instance. Action: Reset remote SID.
- b) maintenance action due to memory mutilation, e.g. losing of the association information between a signalling ID and a connection element identifier; and
  - c) maintenance action involving start-up and restart of an exchange and/or a signalling system: reset of each affected VPCI.

### 3.1.1 Actions at reset initiating exchange

To initiate reset a Reset\_Resource request primitive is issued. The primitive shall contain the resource identifier.

On issuing the Reset\_Resource request primitive the exchange shall (if applicable) stop sending ATM cells on the connection.

On issuing the Reset\_Resource request primitive the exchange shall start timer "Repeat Reset".

On receiving the Reset\_Resource confirmation primitive the exchange shall stop timer "Repeat Reset".

On receiving the Reset\_Resource confirmation primitive, the affected exchange shall perform the following actions depending on the type of reset and the number of AEIs associated with the connection link object instance:

- a) Reset SID and if other AEIs are associated with the connection link object instance the referenced SID shall be put in the "idle" state.
- b) Reset SID and if no other AEI is associated with the connection link object instance, the referenced SID and the connection link identifier associated with the connection link object instance are put in the "idle" state. Additionally the related VCI is placed in the "idle" state and all associated bandwidth on the virtual path is put to the "available" state (i.e. send indication to resource control mechanism) at the assigning exchange.
- c) Reset CEI: VPCI/VCI: The connection link identifier and all signalling identifiers associated with the connection link object instance for the referenced VPCI/VCI are put in the "idle" state. Additionally the related VCI is placed in the "idle" state and all associated bandwidth on the virtual path is put to the "available" state (i.e. send indication to resource control mechanism) at the assigning exchange.
- d) Reset CEI: VPCI: All connection link identifiers and all signalling identifiers associated with the connection link object instances related to the referenced VPCI are put in the "idle" state. Additionally all related VCIs are placed in the "idle" state and all associated bandwidth on the virtual path is put to the "available" state (i.e. send indication to resource control mechanism) at the assigning exchange.

The virtual path blocking conditions are affected by reset of CEI: VPCI as follows:

- a) Any local blocking condition related to the reset VPCI is removed when the Reset\_Resource confirmation primitive is received.
- b) Any remote blocking condition related to the reset VPCI is removed when the Reset\_Resource confirmation primitive is received, unless a Block\_Resource indication has been received, since the sending of the Reset\_Resource, relating to the concerned VPCI; in which case the remote blocking condition is (re-)instated.

The blocking conditions are unaffected by other types of reset.

The exchange shall notify the maintenance system of the outcome of the procedure.

### **3.1.2 Actions at reset responding exchange**

On receiving a Reset\_Resource indication primitive, the receiving (unaffected) exchange shall:

- a) If it is the incoming or outgoing exchange on a connection in any call/connection state, the exchange shall accept the message as a request to idle resources it controls. It responds by sending a Reset\_Resource response primitive after the indicated resources have been made available for new traffic. The specific actions depend on the type of reset and on the number of AEs associated with the incoming or outgoing connection link object instance [see 3.1.1 items a) to d)].
- b) If the received resource (SID, VPCI/VCI, VPCI) is not allocated (idle condition), accept the primitive as a release request and therefore respond by sending a Reset\_Resource response.
- c) Interconnected virtual path/channel links and/or associated resources at the other side of the exchange shall be released according to 2.4.4 except in the case of call/connections and add party operations that are currently awaiting the Incoming\_Resources\_Accepted indication: in this case an automatic repeat attempt is applicable.
- d) If the primitive is received after having sent a Reset\_Resource request primitive, respond by a Reset\_Resource response primitive. The associated identifiers and the bandwidth if applicable should be made available for service as specified in item a) above.
- e) If the Resource indicator is set to "CEI: VPCI" and if the affected virtual path is in a locally blocked state, the Reset\_Resource indication shall be accepted as specified in item a) above. The affected virtual path is returned to the locally blocked state. A Block\_Resource request with a Resource indicator set to "CEI: VPCI" indicating the affected virtual path shall be sent. A Reset\_Resource response shall be issued following the Block\_Resource request primitive.
- f) If the resource indicator is set to "CEI: VPCI" and if the affected virtual path is in a remotely blocked state, the remotely blocked state shall be removed.

### **3.1.3 Abnormal reset procedures**

- a) If a Reset\_Resource confirmation is received which is not a correct response to a sent Reset\_Resource request, it is discarded.
- b) If a Reset\_Resource indication is received requesting reset of a resource (e.g. connection element identifier) that is not controlled by the B-ISDN User Part, it is discarded.
- c) If an error indication primitive is received indicating that timer "Await Reset Acknowledgement" has expired in the MC ASE, and if timer "Repeat Reset" has not yet expired for the first time, the Reset procedure is repeated as described in 3.1.1.

If timer "Repeat Reset" expires the "Repeat Reset" timer shall be started again, and the reset procedure is repeated as described in 3.1.1. The maintenance system shall be informed on the first expiry of timer "Repeat Reset", and this procedure shall continue until the Reset\_Resource confirmation primitive is received, or until maintenance intervention occurs.

### 3.2 Blocking and unblocking of virtual paths

Blocking and unblocking procedures are as specified in 3.3/Q.2764.

If an add party request for a blocked virtual path is received, this blocked path shall not be further selected and alternative routing may be done using another virtual path.

## 4 B-ISDN User Part messages and parameters

### 4.1 Parameter name codes

The parameter name codes are given in Table 4-1 together with references to the subclause in which they are described.

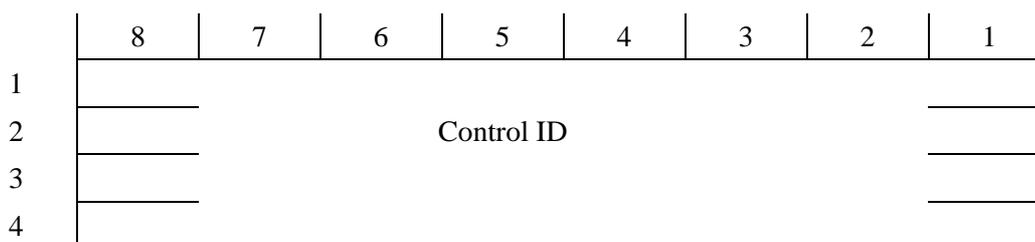
**Table 4-1/Q.2722.1 – Parameter codes**

Parameter name	Reference	Code
Leaf Party Type	4.3	01010110
Destination Connection Link Identifier	4.2.1	01010100
Origination Connection Link Identifier	4.2.2	01010101

### 4.2 Parameter format and coding

#### 4.2.1 Destination connection link identifier

The format of the destination connection link identifier parameter field is shown as in Figure 4-1:



**Figure 4-1/Q.2722.1 – Destination connection link identifier parameter field**

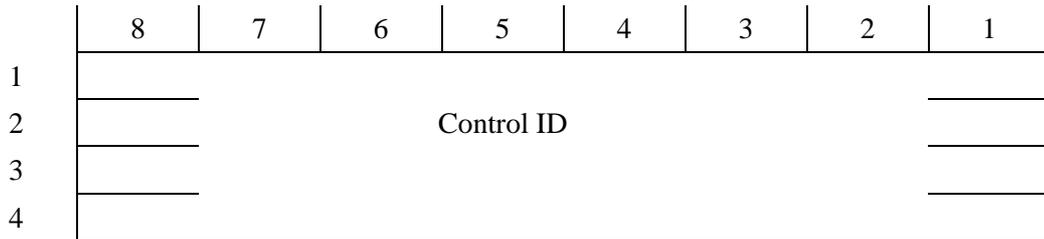
The following codes are used in the subfields of the destination connection link identifier parameter field:

– *Control ID*

A bit string representing the identification of the connection link association.

### 4.2.2 Origination connection link identifier

The format of the origination connection link identifier parameter field is shown as in Figure 4-2:



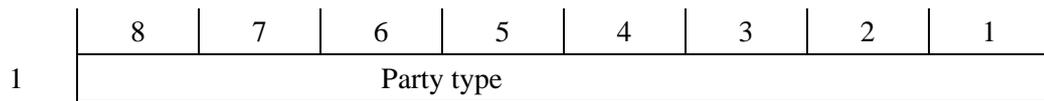
**Figure 4-2/Q.2722.1 – Origination connection link identifier parameter field**

The following codes are used in the subfields of the origination connection link identifier parameter field:

- *Control ID*  
A bit string representing the identification of the connection link association.

### 4.3 Leaf party type

The format of the leaf party type identifier parameter field is shown as in Figure 4-3:



**Figure 4-3/Q.2722.1 – Leaf party type**

The following codes are used in the subfields of the leaf party type identifier parameter field:

- *Party type*  
00000000 First endpoint of type 2 connection  
00000001 Subsequent endpoint of type 2 connection.

## 5 Interworking of DSS 2 and B-ISUP for point-to-multipoint call/connections

### 5.1 General

For the description of the interworking of DSS 2 and B-ISUP for point-to-multipoint calls/connections, the following principles are applied:

- The specification is done by means of mapping tables for the messages and information elements/parameters.  
Only the information element/parameter mappings which are additional to Recommendation Q.2650 are described. For information elements/parameters which are specified by Recommendations Q.2971 and Q.2722.1 for use in conjunction with point-to-multipoint and which are already defined in Recommendations Q.2931 and Q.2763/Q.2764, the mapping of Recommendation Q.2650 is applicable.
- Procedure specifications shall be limited to pure interworking. This means that the procedural semantic to trigger a specific mapping is not relevant in the interworking specification since this is specified in the protocol Recommendations.

- Protocol issues which do have only significance within either DSS 2 or B-ISUP, i.e. which do not lead to a direct mapping are not described in this Recommendation since this is covered in the relevant protocol Recommendations.
- The mapping is driven by message type and purely local conditions (call configuration states) in the exchange where the mapping is done (no direct relevance of states at the distant exchange, only via the B-ISUP).
- In order to de-couple the pure interworking specification from the global scenario description and to cater for individual access characteristics mappings are described separately for originating and terminating sides.
- End-to-end scenarios shall be provided as examples and for better understanding; however, they are not exhaustive and also naturally repeat procedural description which is already specified in the protocol Recommendations. In case of any differences the protocol Recommendations take precedence over the interworking scenarios.
- Interworking for supplementary services is done along the same principles as for the basic call (i.e. describing only additions to Recommendation Q.2650, modification of procedures and interactions for supplementary services are specified in Recommendations Q.2971 and Q.2722.1).

### 5.1.1 Architectural overview

The following figures illustrate how the various associations and object instances interact within a point-to-multipoint call.

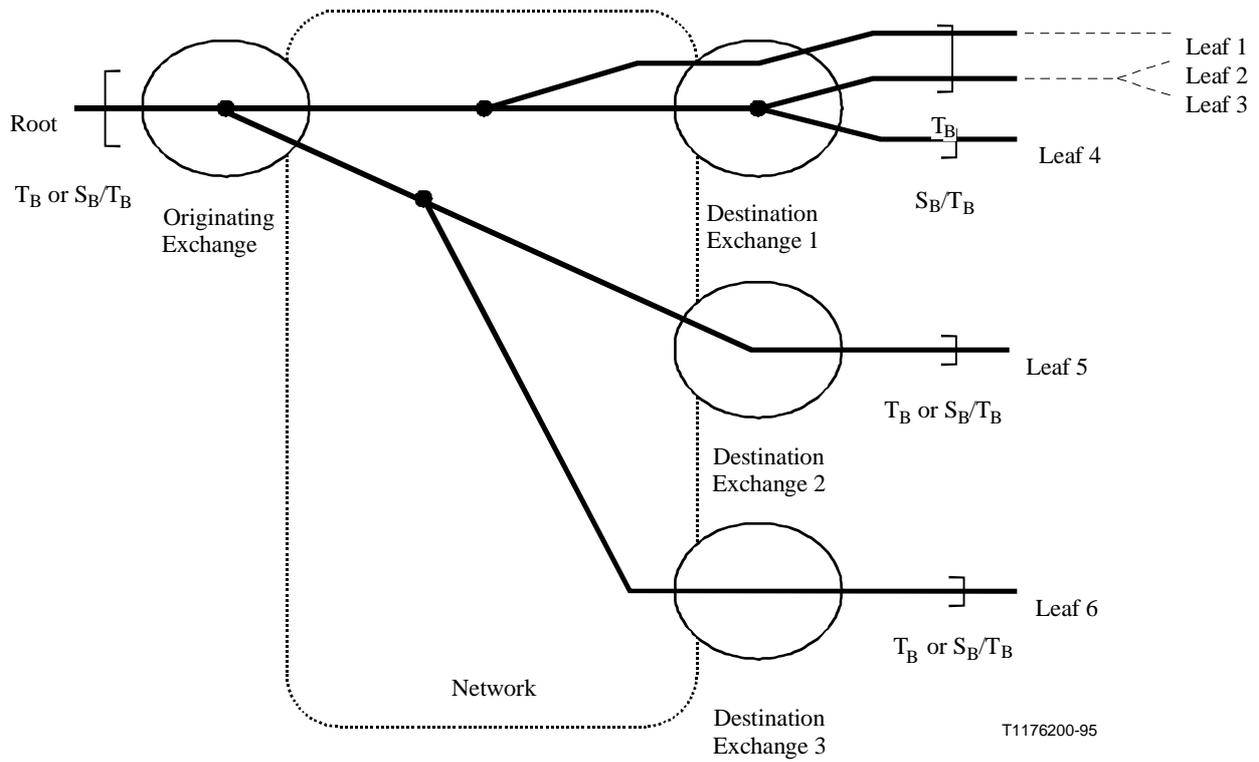
For example a point-to-multipoint call with 6-leaf parties is shown in Figure 5-1:

- Leaf 2 and Leaf 3 are located within a private network.
- Leaf 4 is located at a coincident  $S_B/T_B$  reference point type of access.
- Leaf 1 is located at the same access as Leaf 2 and Leaf 3, however, the connection branch encountered blocking.
- Leaf 5 and Leaf 6 are located at other destination exchanges as Leaves 1-4.

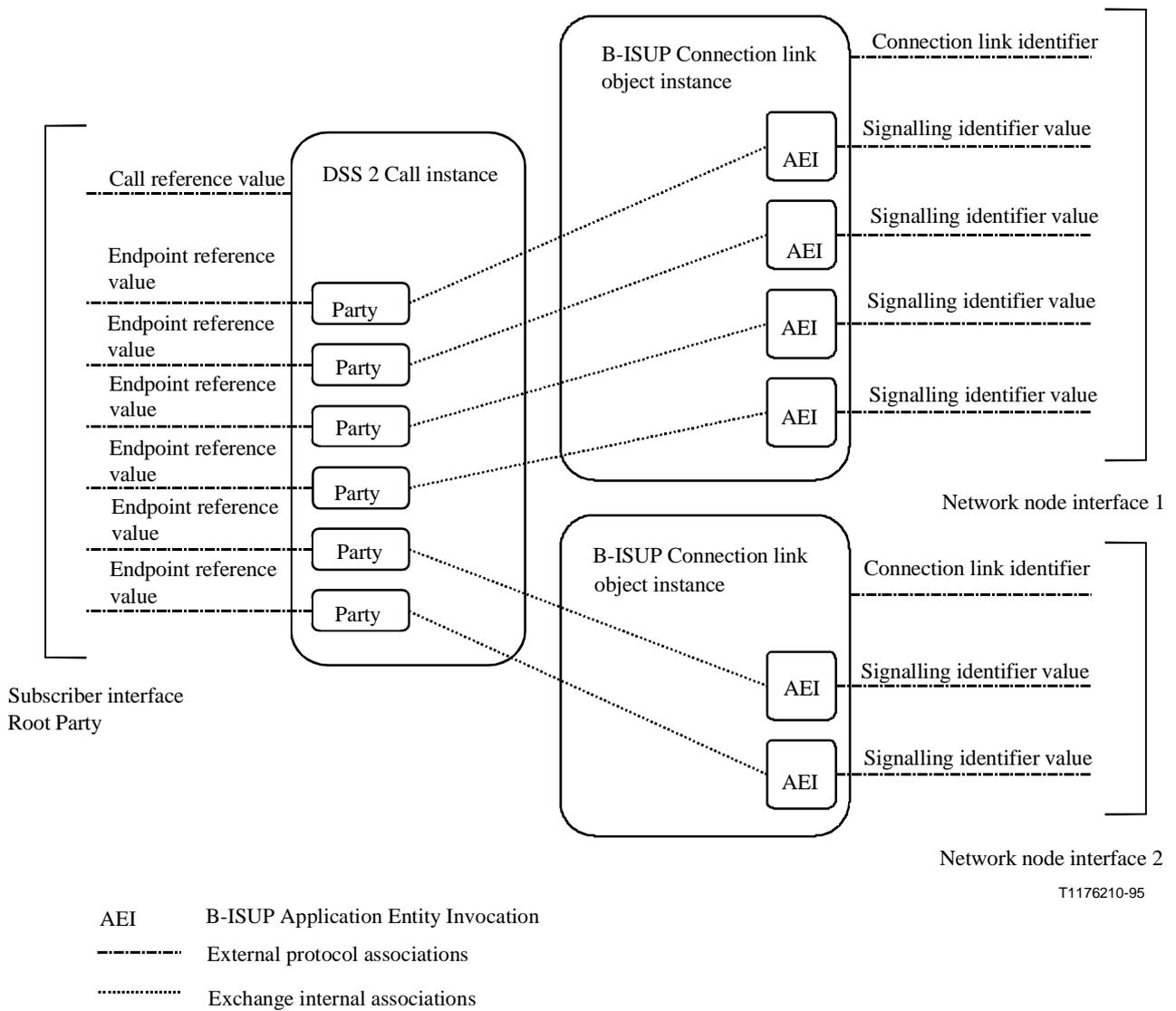
Figure 5-1 also gives the user plane (ATM connection) configuration for this example.

Figures 5-2 and 5-3 show the control plane configurations at the originating and the destination exchange.

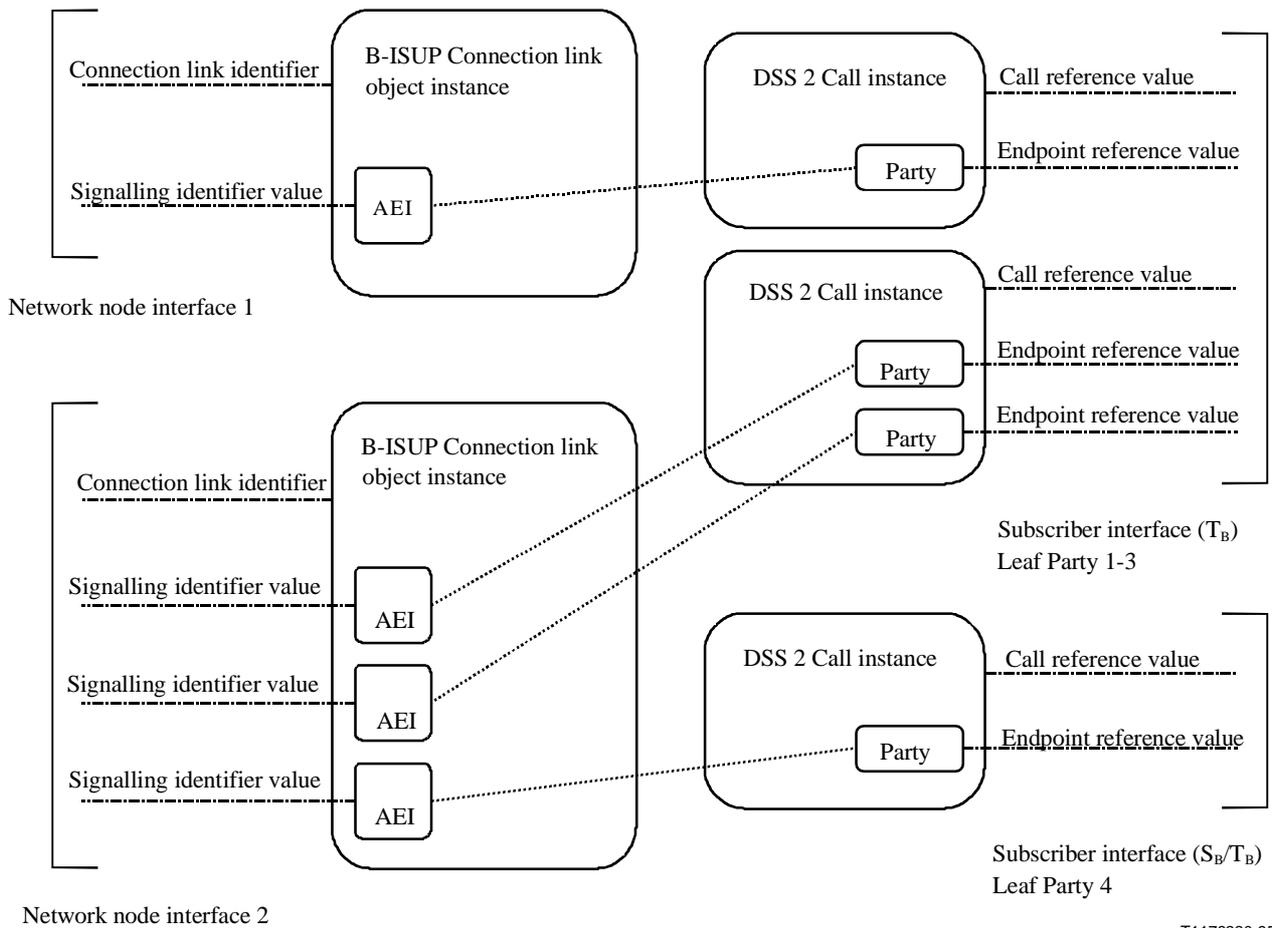
A B-ISUP connection link object instance has a one-to-one relation to a connection branch/VC connection link at ATM layer.



**Figure 5-1/Q.2722.1 – Example for the user plane configuration (ATM connection) of a point-to-multipoint call**



**Figure 5-2/Q.2722.1 – Representation of a point-to-multipoint call within the originating exchange (control plane)**



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- AEI            B-ISUP Application Entity Invocation
- External protocol associations
- .....        Exchange internal associations

**Figure 5-3/Q.2722.1 – Representation of a point-to-multipoint call within the destination exchange 1 (control plane)**

## 5.2 Originating exchange

The tables always show the DSS 2 messages (originating user/network) at the left column and the B-ISUP messages (public network) at the right column.

### 5.2.1 Sending of IAM

The mapping of parameters/information elements to support supplementary services is described in Recommendation Q.2650, subclauses 7.1.1 (DDI), 7.2.1 (MSN), 7.3.1 (CLIP/CLIR), 7.4.1 (COLP/COLR), 7.5.1 (SUB) and 7.6.1 (UUS1).

These mappings apply in addition to the tables below and are valid also for the mapping of ADD PARTY to IAM.

### 5.2.1.1 Receipt of SETUP

SETUP (Note 1)	IAM
	Origination connection link identifier (Note 2)
Broadband bearer capability: user plane configuration = "point-to-multipoint"	Broadband bearer capability
	Leaf party type (Note 3)
Endpoint reference (Note 4)	
<p>NOTE 1 – In case the SETUP contains a N-BC information element the set-up request is rejected.</p> <p>NOTE 2 – A new outgoing B-ISUP connection link object instance and a new outgoing B-ISUP AEI are created.</p> <p>An exchange internal association has to be created between the DSS 2 call instance and the B-ISUP connection link object instance (Call reference value &lt;-&gt; Connection link identifier value).</p> <p>NOTE 3 – If the endpoint reference value is zero then the leaf party type is set to "first endpoint of type 2 connection" or else it is set to "subsequent endpoint of type 2 connection".</p> <p>NOTE 4 – An exchange internal association has to be created between the DSS 2 party/endpoint and the related outgoing B-ISUP Application Entity Invocation (AEI) [Endpoint reference value &lt;-&gt; Signalling identifier value (SID)].</p>	

### 5.2.1.2 Receipt of ADD PARTY

ADD PARTY	IAM
	Either (Note 1) origination connection link identifier (Note 2); or Destination connection link identifier (Note 3)
	ATM cell rate (Note 4)
	Broadband bearer capability (Note 4)
AAL parameters	AAL parameters
Broadband high layer information	Broadband high layer information
Broadband low layer information	Broadband low layer information
Called party number	Called party number
Broadband sending complete	ST (carried in called party number)
	Leaf party type (Note 5)
Endpoint reference (Note 6)	
End-to-end transit delay	Propagation delay counter and maximum end-to-end transit delay (Note 7)

NOTE 1 – The choice depends on the routing result (see 2.2.1.2). In both cases a new outgoing B-ISUP AEI is created.

NOTE 2 – The originating connection link identifier is included if a new outgoing B-ISUP connection link object instance is created (i.e. a new virtual channel link is created for that party).

An exchange internal association has to be created between the DSS 2 call instance and this B-ISUP connection link object instance (Call reference value <-> Connection link identifier value).

Furthermore, the exchange has to invoke a cell replication function in the user plane.

NOTE 3 – The destination connection link identifier is included if an existing outgoing B-ISUP connection link object instance is used (i.e. an existing virtual channel link is shared with previous parties).

NOTE 4 – Those parameters are retrieved from the stored call information (see 2.2.7).

NOTE 5 – The leaf party type parameter is set to "subsequent endpoint of type 2 connection".

NOTE 6 – An exchange internal association has to be created between the DSS 2 party/endpoint and the related outgoing B-ISUP AEI [Endpoint reference value <-> Signalling identifier value (SID)].

NOTE 7 – The cumulative end-to-end transit delay subfield of the end-to-end transit delay information element is mapped to the propagation delay counter. The maximum end-to-end transit delay subfield is mapped to the maximum end-to-end transit delay parameter in the network. At the destination exchange, the propagation delay counter value is mapped back to the cumulative end-to-end transit delay subfield only if a maximum end-to-end transit delay parameter is present.

## 5.2.2 Receipt of ACM

The mapping of parameters/information elements to support supplementary services is described in 7.6.2/Q.2650 (UUS1).

These mappings apply in addition to the tables below and are valid also for the mapping of ACM to PARTY ALERTING.

### 5.2.2.1 Sending of ALERTING

This mapping applies if there is only one outgoing B-ISUP AEI associated with the call.

ALERTING	ACM
Endpoint reference (Note)	
NOTE – The endpoint reference has to be set to the value which has been associated with the SID of the outgoing B-ISUP AEI.	

### 5.2.2.2 Sending of PARTY ALERTING

This mapping applies if there are more than one outgoing B-ISUP AEIs associated with the call.

PARTY ALERTING	ACM
	Called party's indicators: called party status = "alerting"
Endpoint reference (Note)	
NOTE – The endpoint reference has to be set to the value which has been associated with the SID of the outgoing B-ISUP AEI.	

### 5.2.3 Receipt of CPG

The mapping of parameters/information elements to support supplementary services is described in 7.6.2/Q.2650 (UUS1).

These mappings apply in addition to the tables below and are valid also for the mapping of CPG to PARTY ALERTING.

#### 5.2.3.1 Sending of ALERTING

This mapping applies if there is only one outgoing B-ISUP AEI associated with the call.

ALERTING	CPG
Endpoint reference (Note)	
NOTE – The endpoint reference has to be set to the value which has been associated with the SID of the outgoing B-ISUP AEI.	

#### 5.2.3.2 Sending of PARTY ALERTING

This mapping applies if there are more than one outgoing B-ISUP AEIs associated with the call.

PARTY ALERTING	CPG
	Called party's indicators: called party status = "alerting"
Endpoint reference (Note)	
NOTE – The endpoint reference has to be set to the value which has been associated with the SID of the outgoing B-ISUP AEI.	

### 5.2.4 Receipt of ANM

The mapping of parameters/information elements to support supplementary services is described in 7.6.2/Q.2650 (UUS1).

These mappings apply in addition to the tables below and are valid also for the mapping of ANM to ADD PARTY ACKNOWLEDGE.

### 5.2.4.1 Sending of CONNECT

This mapping applies if there is only one outgoing B-ISUP AEI associated with the call.

CONNECT	ANM
Endpoint reference (Note)	
NOTE – The endpoint reference has to be set to the value which has been associated with the SID of the outgoing B-ISUP AEI.	

### 5.2.4.2 Sending of ADD PARTY ACKNOWLEDGE

This mapping applies if there are more than one outgoing B-ISUP AEIs associated with the call.

ADD PARTY ACKNOWLEDGE	ANM
AAL parameters	AAL parameters
Broadband low layer information	Broadband low layer information
Endpoint reference (Note 1)	
End-to-end transit delay	Call history information (Note 2)
NOTE 1 – The endpoint reference has to be set to the value which has been associated with the SID of the outgoing B-ISUP AEI.	
NOTE 2 – If applicable, the cumulative end-to-end transit delay from the called party is mapped to the call history information parameter at the destination exchange, and is mapped back to the cumulative end-to-end transit delay at the originating exchange.	

### 5.2.5 Receipt of REL

The mapping of parameters/information elements to support supplementary services is described in 7.6.2/Q.2650 (UUS1).

These mappings apply in addition to the tables below and are valid also for the mapping of REL to DROP PARTY and ADD PARTY REJECT.

#### 5.2.5.1 Sending of RELEASE

This mapping applies if there is only one outgoing B-ISUP AEI associated with the call.

RELEASE	REL
Cause	Cause indicators

#### 5.2.5.2 Sending of DROP PARTY

This mapping applies if there are more than one outgoing B-ISUP AEIs associated with the call and the party concerned is in the Party Alerting Delivered or Active state (PN3, PN7).

DROP PARTY	REL
Cause	Cause indicators
Endpoint reference (Note)	
NOTE – The endpoint reference has to be set to the value which has been associated with the SID of the outgoing B-ISUP AEI.	

### 5.2.5.3 Sending of ADD PARTY REJECT

This mapping applies if there are more than one outgoing B-ISUP AEIs associated with the call and the party concerned is in the add party received state (PN2).

ADD PARTY REJECT	REL
Cause	Cause indicators
Endpoint reference (Note)	
NOTE – The endpoint reference has to be set to the value which has been associated with the SID of the outgoing B-ISUP AEI.	

### 5.2.6 Sending of REL

The mapping of parameters/information elements to support supplementary services is described in 7.6.2/Q.2650 (UUS1).

These mappings apply in addition to the tables below and are valid also for the mapping of DROP PARTY to REL.

#### 5.2.6.1 Receipt of RELEASE

RELEASE	REL (Note)
Cause	Cause indicators
	Destination connection link identifier
NOTE – The B-ISUP message is repeated for all outgoing connection link object instances which are associated with the call (see <i>en bloc</i> release procedure of Recommendation Q.2722.1).	

If the RELEASE message contains a User-user information element, the information is also copied together with each REL message.

#### 5.2.6.2 Receipt of DROP PARTY

DROP PARTY	REL
Cause	Cause indicators
Endpoint reference (Note)	
NOTE – The endpoint reference has to be set to the value which has been associated with the SID of the outgoing B-ISUP AEI.	

## 5.3 Destination exchange

The tables always show the B-ISUP messages (public network) at the left column and the DSS 2 messages (destination user/network) at the right column.

### 5.3.1 Interworking with DSS 2 access supporting coincident S<sub>B</sub>/T<sub>B</sub> reference point procedures

The mapping of parameters/information elements to support supplementary services is described in Recommendation Q.2650, subclauses 7.1.1 (DDI), 7.2.1 (MSN), 7.3.1 (CLIP/CLIR), 7.4.1 (COLP/COLR), 7.5.1 (SUB) and 7.6.1 (UUS1).

### 5.3.1.1 Receipt of IAM

#### 5.3.1.1.1 Sending of SETUP

IAM	SETUP
Either Origination connection link identifier (Note 1); or Destination connection link identifier (Note 2); or (no identifier included) (Note 3)	
Leaf party type	
	Endpoint reference (Note 4)
<p>NOTE 1 – In this case a new incoming B-ISUP connection link object instance, a new incoming B-ISUP AEI and at the access a new DSS 2 call instance is created. The following exchange internal associations have to be created:</p> <ul style="list-style-type: none"> <li>– Incoming B-ISUP connection link object instance &lt;-&gt; DSS 2 call instance (i.e. Connection link identifier value &lt;-&gt; Call reference value).</li> <li>– Incoming B-ISUP AEI &lt;-&gt; DSS 2 party/endpoint (i.e. Signalling identifier value &lt;-&gt; Endpoint reference value).</li> </ul> <p>NOTE 2 – If the destination connection link identifier is included this means that an incoming B-ISUP connection link object instance (and at least one associated DSS 2 call instance) already exists.</p> <p>Further processing is as follows:</p> <p>A new DSS 2 call instance is created and the following exchange internal associations have to be created:</p> <ul style="list-style-type: none"> <li>– Incoming B-ISUP connection link object instance &lt;-&gt; DSS 2 Call instance (i.e. Connection link identifier value &lt;-&gt; Call reference value).</li> <li>– Incoming B-ISUP AEI &lt;-&gt; DSS 2 party/endpoint (i.e. Signalling identifier value &lt;-&gt; Endpoint reference value).</li> </ul> <p>Furthermore, the exchange has to invoke a cell replication function in the user plane.</p> <p>NOTE 3 – If no connection link identifier is included the interworking proceeds as for Note 1. This may occur due to interworking with transit nodes in the network which do not support the Q.2722.1 procedures.</p> <p>NOTE 4 – The value of the endpoint reference has to be set to zero if the leaf party type is set to "First endpoint of type 2 connection" otherwise it is locally assigned.</p>	

### 5.3.1.2 Sending of ACM

#### 5.3.1.2.1 Receipt of ALERTING

The mapping as in 5.3.2.2.1 applies.

The inclusion of the endpoint reference is optional in some cases (see Recommendation Q.2971).

### 5.3.1.3 Sending of CPG

#### 5.3.1.3.1 Receipt of ALERTING

The mapping as in 5.3.2.3.1 applies.

The inclusion of the endpoint reference is optional in some cases (see Recommendation Q.2971).

### 5.3.1.4 Sending of ANM

#### 5.3.1.4.1 Receipt of CONNECT

The mapping as in 5.3.2.4.1 applies.

The inclusion of the endpoint reference is optional in some cases (see Recommendation Q.2971).

### 5.3.1.5 Sending of REL

#### 5.3.1.5.1 Receipt of RELEASE

The mapping as in 5.3.2.5.1 applies.

#### 5.3.1.5.2 Receipt of RELEASE COMPLETE

The mapping as in 5.3.2.5.2 applies.

### 5.3.1.6 Receipt of REL

#### 5.3.1.6.1 Sending of RELEASE

The mapping as in 5.3.2.5.2 applies.

## 5.3.2 Interworking with DSS 2 access supporting T<sub>B</sub> reference point procedures

### 5.3.2.1 Receipt of IAM

The mapping of parameters/information elements to support supplementary services is described in Recommendation Q.2650, subclauses 7.1.1 (DDI), 7.2.1 (MSN), 7.3.1 (CLIP/CLIR), 7.4.1 (COLP/COLR), 7.5.1 (SUB) and 7.6.1 (UUS1).

These mappings apply in addition to the tables below and are valid also for the mapping of IAM to ADD PARTY.

#### 5.3.2.1.1 Sending of SETUP

See 5.3.1.1.1.

This mapping only applies if the new party is to be added at a subscriber access with no DSS 2 call instance yet associated to the incoming B-ISUP connection link instance.

#### 5.3.2.1.2 Sending of ADD PARTY

This mapping applies if the new party is to be added at a subscriber access with already a DSS 2 call instance associated to the incoming B-ISUP connection link object instance which already exists.

A new incoming B-ISUP AEI is created.

IAM	ADD PARTY
Destination connection link identifier	
ATM cell rate	
Broadband bearer capability	
AAL parameters	AAL parameters
Broadband high layer information	Broadband high layer information
Broadband low layer information (Note 1)	Broadband low layer information
Called party number	Called party number

<b>IAM</b>	<b>ADD PARTY</b>
ST (carried in Called party number)	
Leaf party type (Note 2)	
	Endpoint reference (Note 3)
Propagation delay counter; and Maximum end-to-end transit delay (Note 4)	End-to-end transit delay
<p>NOTE 1 – The broadband low layer information element may be repeated up to four times. If it is repeated, all instances are mapped into a single broadband low layer information parameter in the network. The repeat indicator information element is mapped to the repeat indicator subfield of the parameter.</p> <p>NOTE 2 – The leaf party type parameter is set to "Subsequent endpoint of type 2 connection".</p> <p>NOTE 3 – An exchange internal association has to be created between the DSS 2 party/endpoint and the related outgoing B-ISUP AEI [Endpoint reference value &lt;-&gt; Signalling identifier value (SID)]. The value of the endpoint reference is locally assigned and non-zero.</p> <p>NOTE 4 – The cumulative end-to-end transit delay subfield of the end-to-end transit delay information element is mapped to the propagation delay counter. The maximum end-to-end transit delay subfield is mapped to the maximum end-to-end transit delay parameter in the network. At the destination exchange, the propagation delay counter value is mapped back to the cumulative end-to-end transit delay subfield only if a maximum end-to-end transit delay parameter is present.</p>	

### 5.3.2.2 Sending of ACM

The conditions in which ALERTING or PARTY ALERTING apply are specified in Recommendation Q.2971.

The mapping of parameters/information elements to support supplementary services is described in 7.6.1/Q.2650 (UUS1).

These mappings apply in addition to the tables below and are valid also for the mapping of PARTY ALERTING to ACM.

#### 5.3.2.2.1 Receipt of ALERTING

<b>ACM</b>	<b>ALERTING</b>
	Endpoint reference (Note)
<p>NOTE – The party (endpoint reference value) has an exchange internal association with the incoming B-ISUP AEI (i.e. indirectly identifies the AEI where the B-ISUP message has to be sent).</p>	

#### 5.3.2.2.2 Receipt of PARTY ALERTING

<b>ACM</b>	<b>PARTY ALERTING</b>
Called party's indicators: called party status = "alerting"	
	Endpoint reference (Note)
<p>NOTE – The party (endpoint reference value) has an exchange internal association with the incoming B-ISUP AEI (i.e. indirectly identifies the AEI where the B-ISUP message has to be sent).</p>	

### 5.3.2.3 Sending of CPG

The conditions in which ALERTING, PARTY ALERTING or NOTIFY apply are specified in Recommendation Q.2971.

The mapping of parameters/information elements to support supplementary services is described in 7.6.1/Q.2650 (UUS1).

These mappings apply in addition to the tables below and are valid also for the mapping of PARTY ALERTING to CPG.

#### 5.3.2.3.1 Receipt of ALERTING

CPG	ALERTING
	Endpoint reference (Note)
NOTE – The party (endpoint reference value) has an exchange internal association with the incoming B-ISUP AEI (i.e. indirectly identifies the AEI where the B-ISUP message has to be sent).	

#### 5.3.2.3.2 Receipt of PARTY ALERTING

CPG	PARTY ALERTING
Called party's indicators: called party status = "alerting"	
	Endpoint reference (Note)
NOTE – The party (endpoint reference value) has an exchange internal association with the incoming B-ISUP AEI (i.e. indirectly identifies the AEI where the B-ISUP message has to be sent).	

### 5.3.2.4 Sending of ANM

The conditions in which CONNECT or ADD PARTY ACKNOWLEDGE apply are specified in Recommendation Q.2971.

The mapping of parameters/information elements to support supplementary services is described in 7.6.1/Q.2650 (UUS1).

These mappings apply in addition to the tables below and are valid also for the mapping of ADD PARTY ACKNOWLEDGE to ANM.

#### 5.3.2.4.1 Receipt of CONNECT

ANM	CONNECT
	Endpoint reference (Note)
NOTE – The endpoint reference value has an exchange internal association with the incoming B-ISUP AEI (i.e. indirectly identifies the AEI where the B-ISUP message has to be sent).	

### 5.3.2.4.2 Receipt of ADD PARTY ACKNOWLEDGE

ANM	ADD PARTY ACKNOWLEDGE
AAL parameters	AAL parameters
Broadband low layer information	Broadband low layer information
	Endpoint reference (Note 1)
Call history information (Note 2)	End-to-end transit delay
<p>NOTE 1 – The party (endpoint reference value) has an exchange internal association with the incoming B-ISUP AEI (i.e. indirectly identifies the AEI where the B-ISUP message has to be sent).</p> <p>NOTE 2 – If applicable, the cumulative end-to-end transit delay from the called party is mapped to the call history information parameter at the destination exchange, and is mapped back to the cumulative end-to-end transit delay at the originating exchange.</p>	

### 5.3.2.5 Sending of REL

The conditions in which RELEASE, RELEASE COMPLETE, DROP PARTY or ADD PARTY REJECT apply are specified in Recommendation Q.2971.

The mapping of parameters/information elements to support supplementary services is described in 7.6.1/Q.2650 (UUS1).

These mappings apply in addition to the tables below and are valid also for the mapping of DROP PARTY and ADD PARTY REJECT to REL.

#### 5.3.2.5.1 Receipt of RELEASE

REL (Note)	RELEASE
Cause indicators	Cause
<p>NOTE – The B-ISUP message is repeated for all incoming B-ISUP AEIs which are associated with the DSS 2 call instance.</p> <p>A User-user information element contained in the RELEASE message is only mapped if a single leaf party exists/remains at the DSS 2 call instance, i.e. if there is no other party in the Party Alerting Received or Active State (PN4 and PN7).</p>	

#### 5.3.2.5.2 Receipt of RELEASE COMPLETE

REL (Note)	RELEASE COMPLETE
Cause indicators	Cause
<p>NOTE – The B-ISUP message is repeated for all incoming B-ISUP AEIs which are associated with the DSS 2 call instance.</p> <p>A User-user information element contained in the RELEASE COMPLETE message is only mapped if a single leaf party exists/remains at the DSS 2 call instance, i.e. if there is no other party in the Party Alerting Received or Active State (PN4 and PN7).</p>	

### 5.3.2.5.3 Receipt of DROP PARTY

REL	DROP PARTY
Cause indicators	Cause
	Endpoint reference (Note)
NOTE – The B-ISUP REL message is sent via the incoming B-ISUP AEI which is associated with the party (endpoint reference value) which drops off the point-to-multipoint connection.	

### 5.3.2.5.4 Receipt of ADD PARTY REJECT

REL	ADD PARTY REJECT
Cause indicators	Cause
	Endpoint reference (Note)
NOTE – The B-ISUP REL message is sent via the incoming B-ISUP AEI which is associated with the party (endpoint reference value) which rejects the add party operation.	

### 5.3.2.6 Receipt of REL

The mapping of parameters/information elements to support supplementary services is described in 7.6.1/Q.2650 (UUS1).

These mappings apply in addition to the tables below and are valid also for the mapping of REL to DROP PARTY.

#### 5.3.2.6.1 Sending of RELEASE

This mapping applies if the destination connection link identifier is included in the REL message or for the case where only one party exists within an associated call instance at the access.

REL	RELEASE
Cause indicators	Cause
Destination connection link identifier (Note 1); or (no identifier included) (Note 2)	
NOTE 1 – All parties associated with the incoming B-ISUP connection link object instance will be dropped (i.e. a RELEASE message is sent on each associated access).	
NOTE 2 – This applies for the case where only one party exists within an associated call instance at the access.	

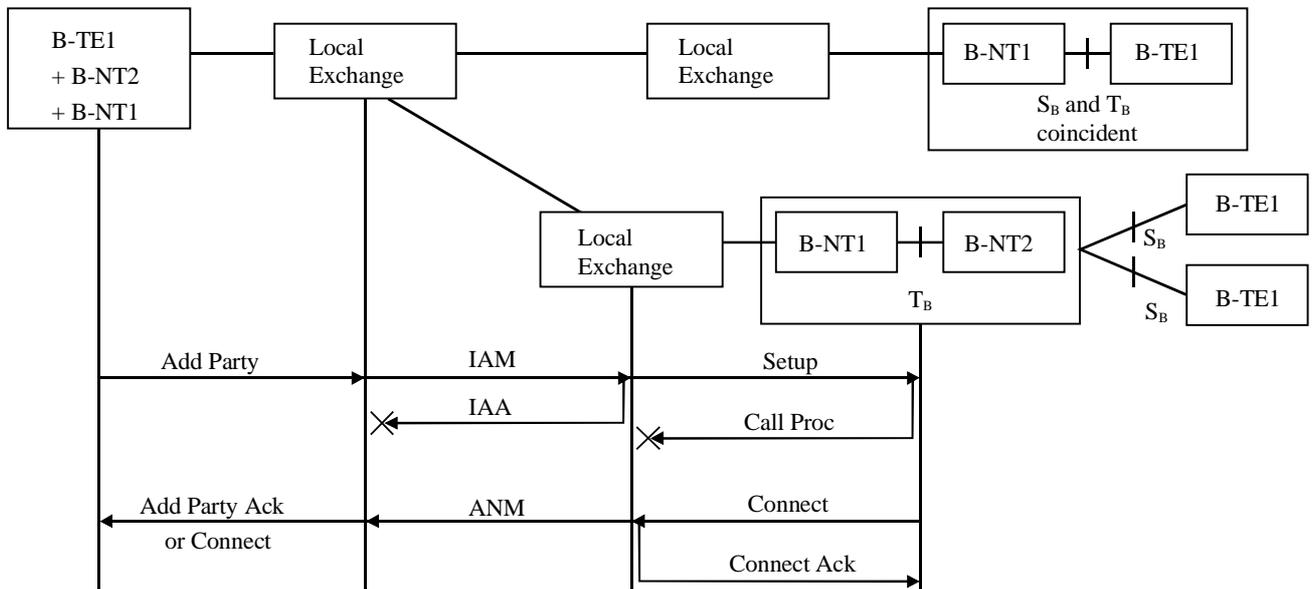
#### 5.3.2.6.2 Sending of DROP PARTY

This mapping applies if the destination connection link identifier is not included in the REL message and more than one party exists within an associated call instance at the access.

REL	DROP PARTY
Cause indicators	Cause
	Endpoint reference (Note)
NOTE – The party identified by the endpoint reference value is dropped. The party (endpoint reference value) has an exchange internal association with the incoming B-ISUP AEI (i.e. indirectly identifies the AEI where the B-ISUP message has to be sent).	

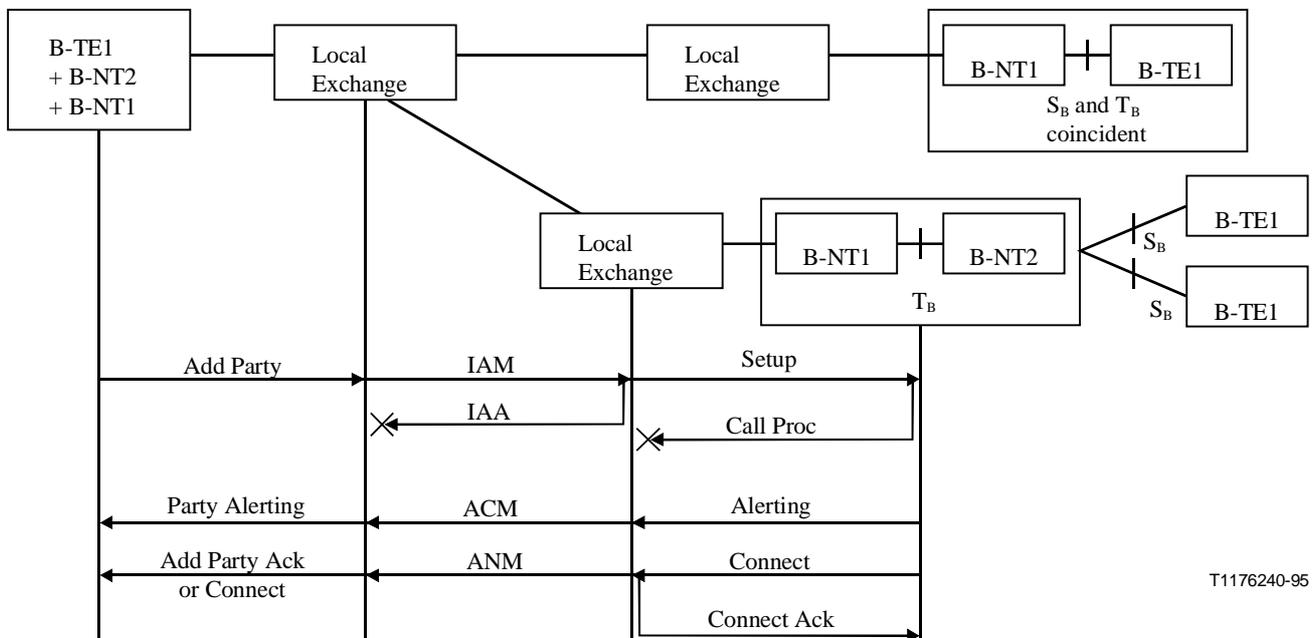
## 5.4 Typical scenarios

See Figures 5-4 to 5-12.



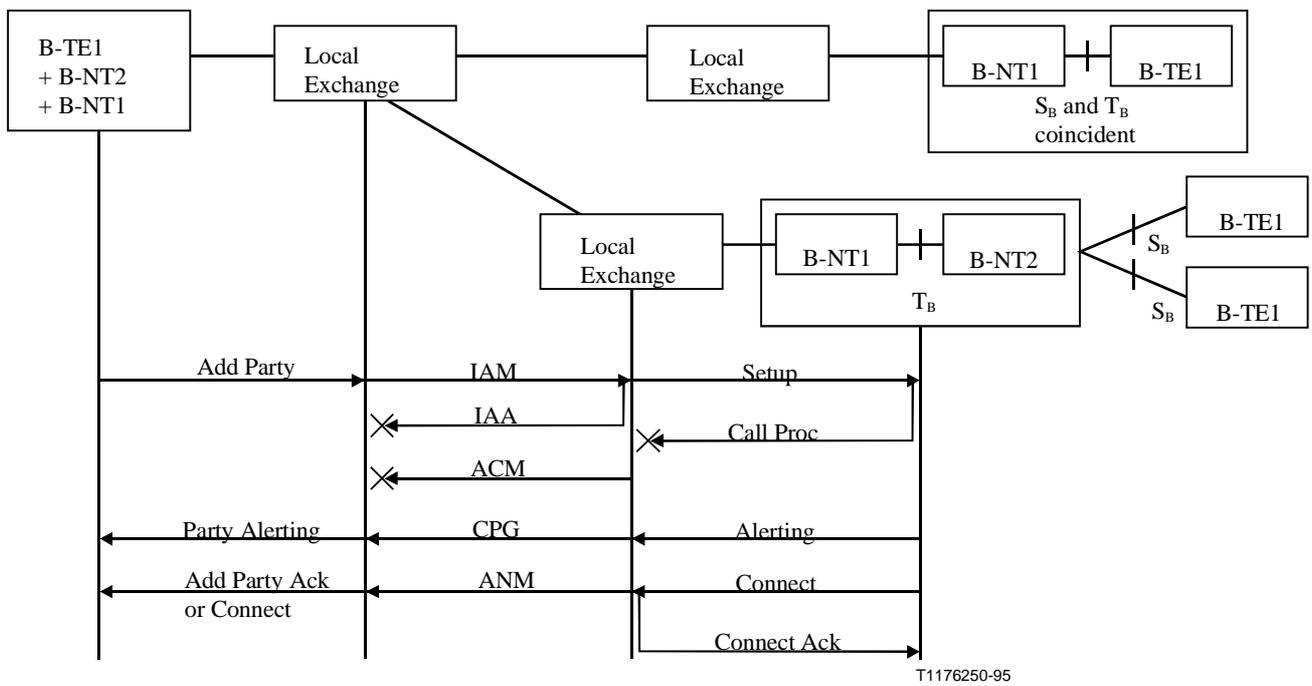
T1176230-95

**Figure 5-4/Q.2722.1 – Adding a subsequent party at a  $T_B$  reference point as an initial leaf party: No alerting message and no ACM are returned**

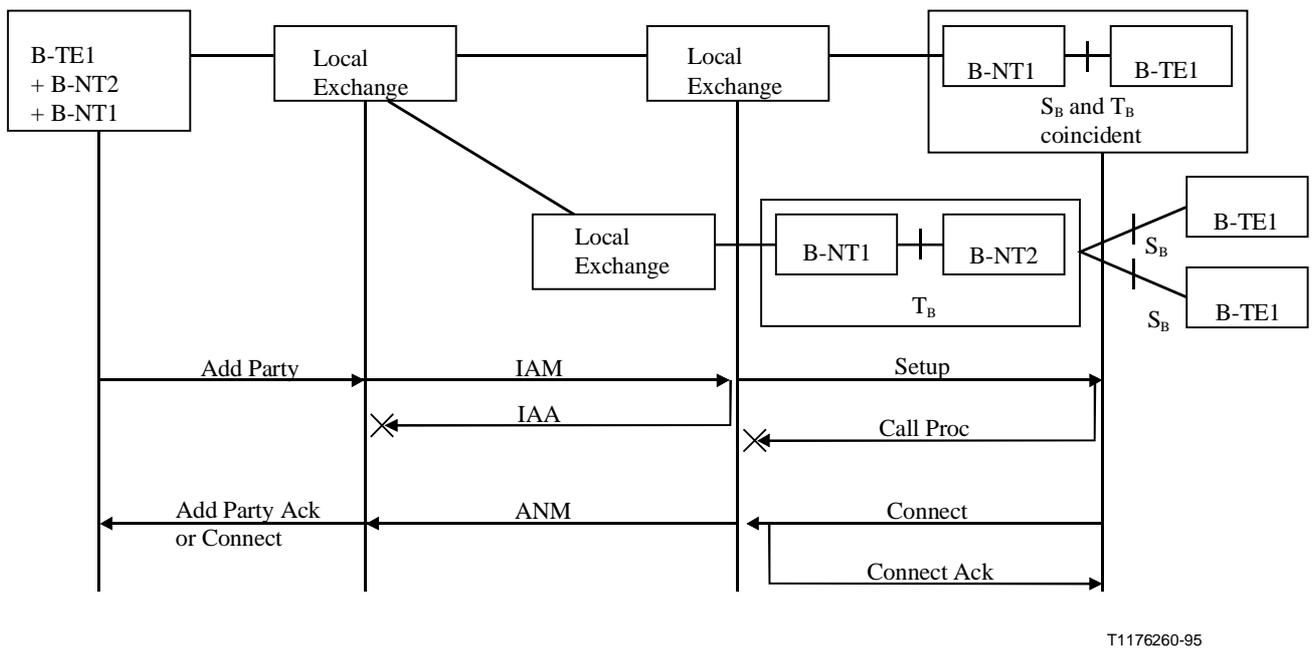


T1176240-95

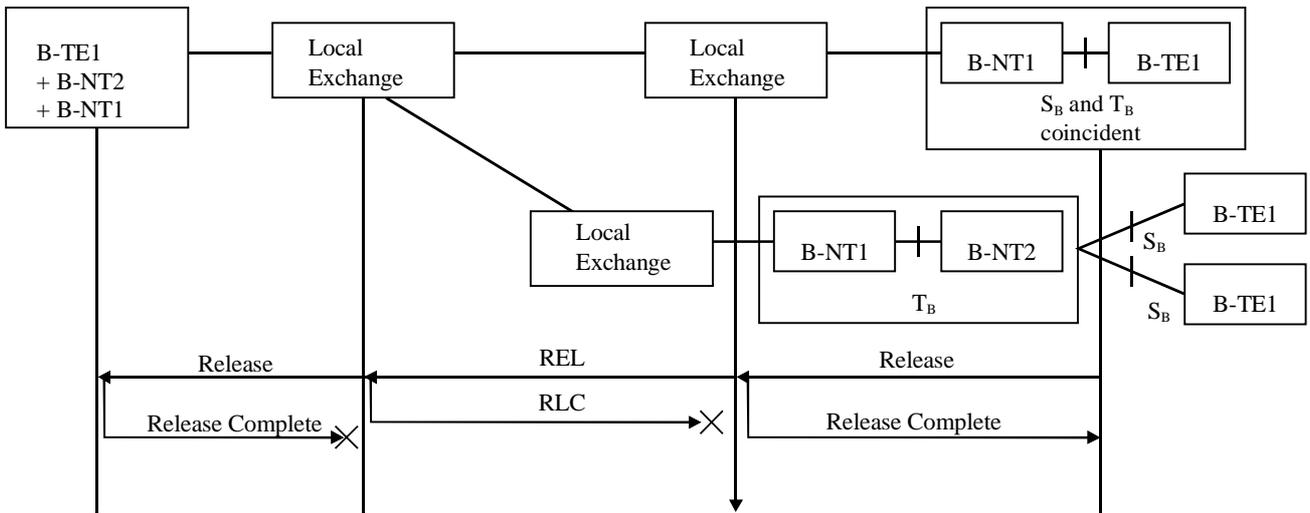
**Figure 5-5/Q.2722.1 – Adding a subsequent party at a  $T_B$  reference point as an initial leaf party: Alerting message and ACM**



**Figure 5-6/Q.2722.1 – Adding a subsequent party at a  $T_B$  reference point as an initial leaf party: Alerting message mapped onto CPG**

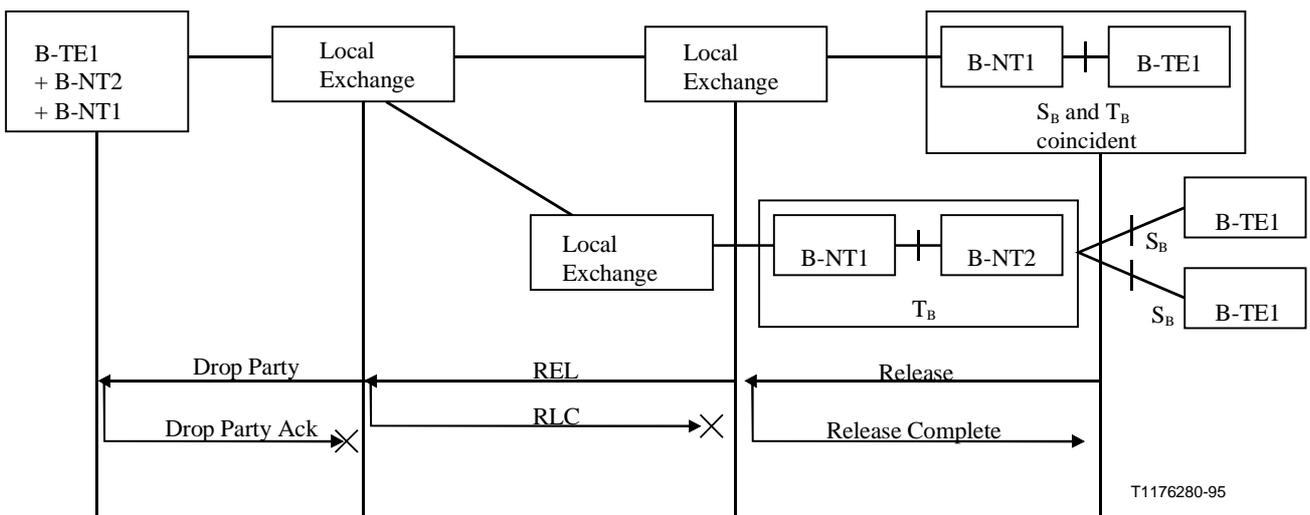


**Figure 5-7/Q.2722.1 – Adding a unique leaf at a coincident  $S_B$  and  $T_B$  reference point: No alerting message and no ACM are returned**



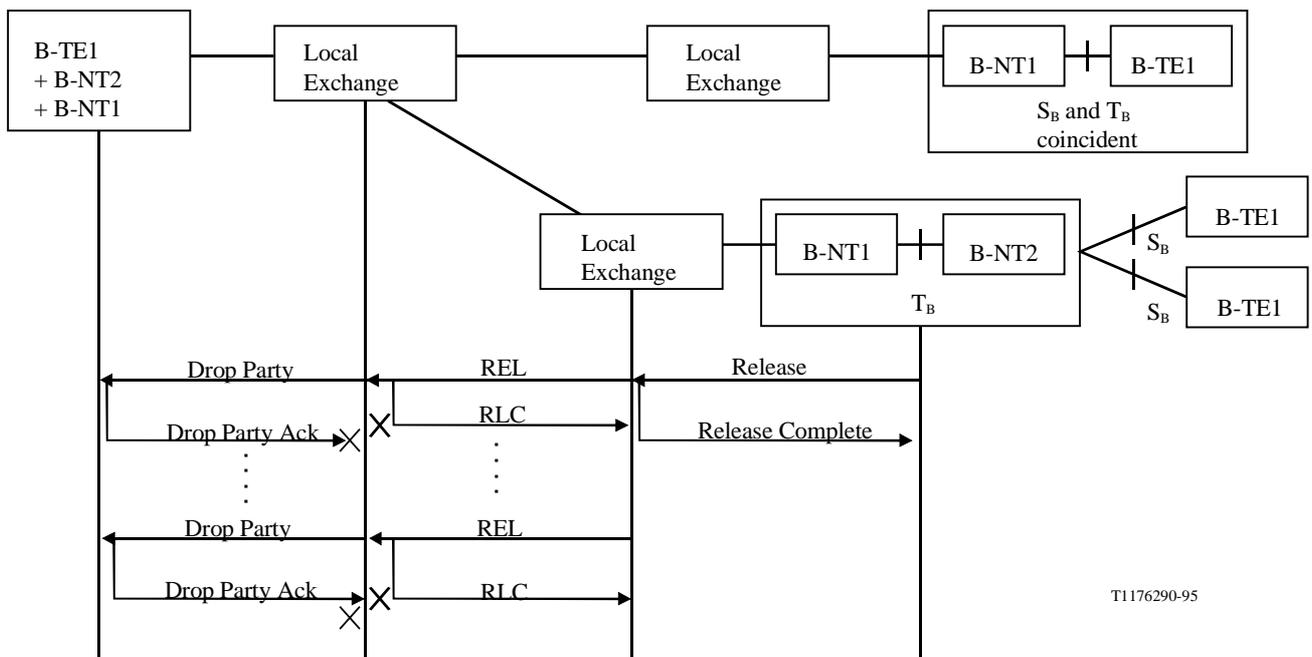
T1176270-95

**Figure 5-8/Q.2722.1 – Leaf party initiating dropping at a coincident S<sub>B</sub> and T<sub>B</sub> reference point: Last party in the call/connection**

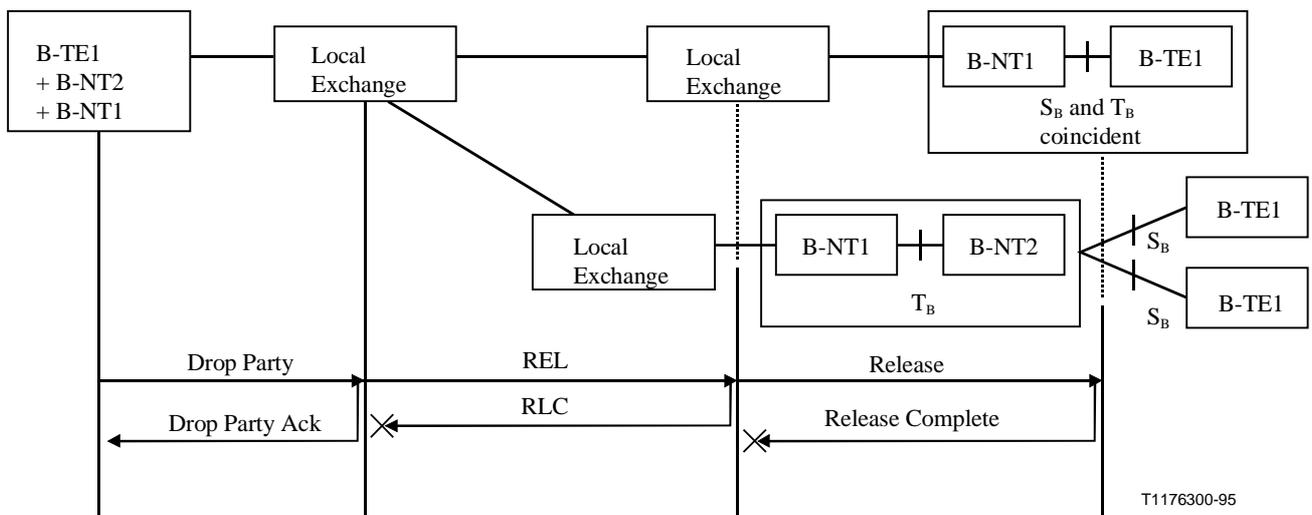


T1176280-95

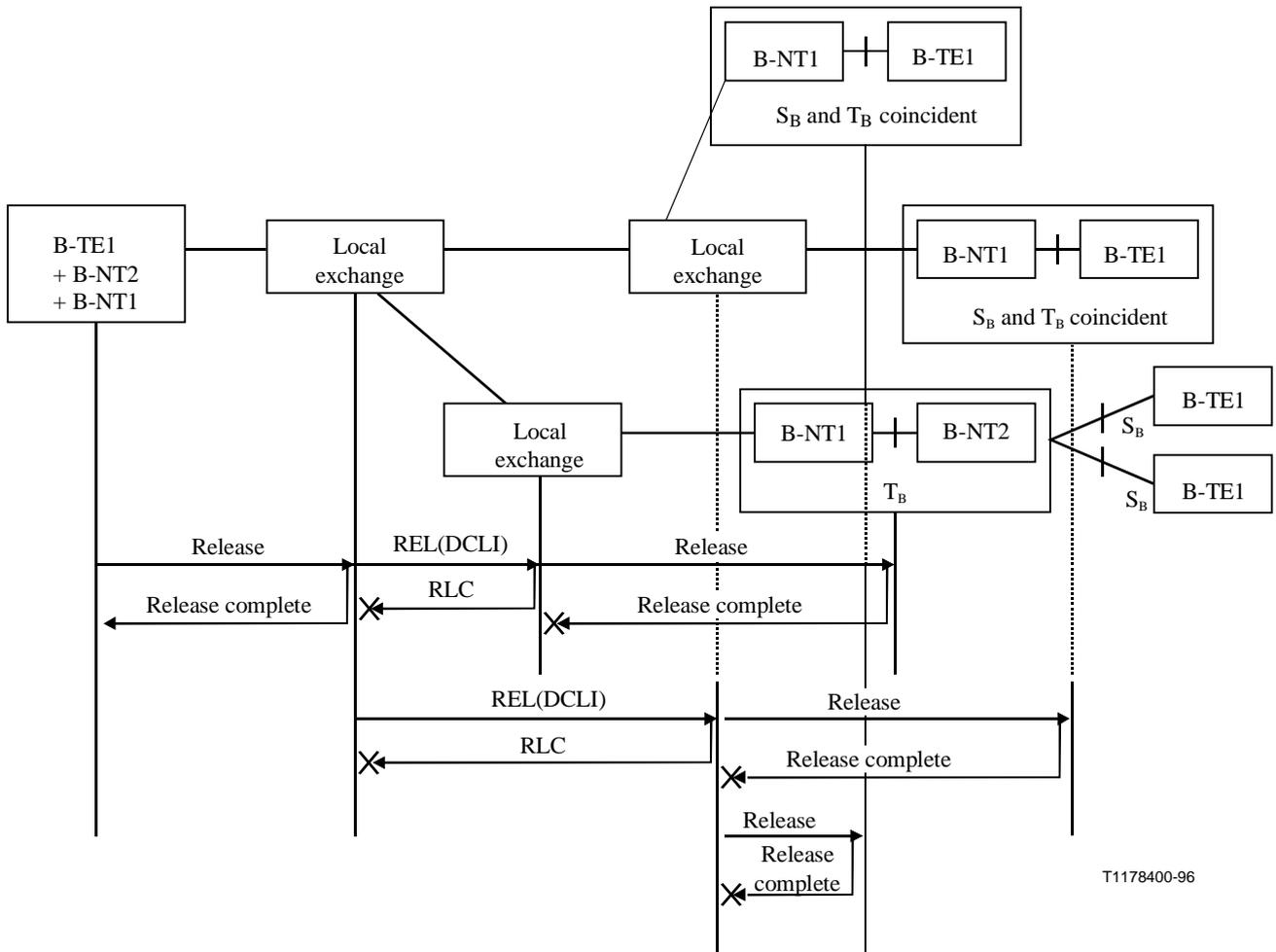
**Figure 5-9/Q.2722.1 – Leaf party initiating dropping at a coincident S<sub>B</sub> and T<sub>B</sub> reference point: Not the last party in the call/connection**



**Figure 5-10/Q.2722.1 – B-NT2 causing multiple leaf parties to be dropped, initiated at a T<sub>B</sub> reference point: with a single RELEASE message**



**Figure 5-11/Q.2722.1 – Root party initiating dropping at a coincident S<sub>B</sub> and T<sub>B</sub> reference point: Not for the last party in the call/connection**



T1178400-96

NOTE – This is an *en bloc* release.

**Figure 5-12/Q.2722.1 – Root party initiating call/connection release**

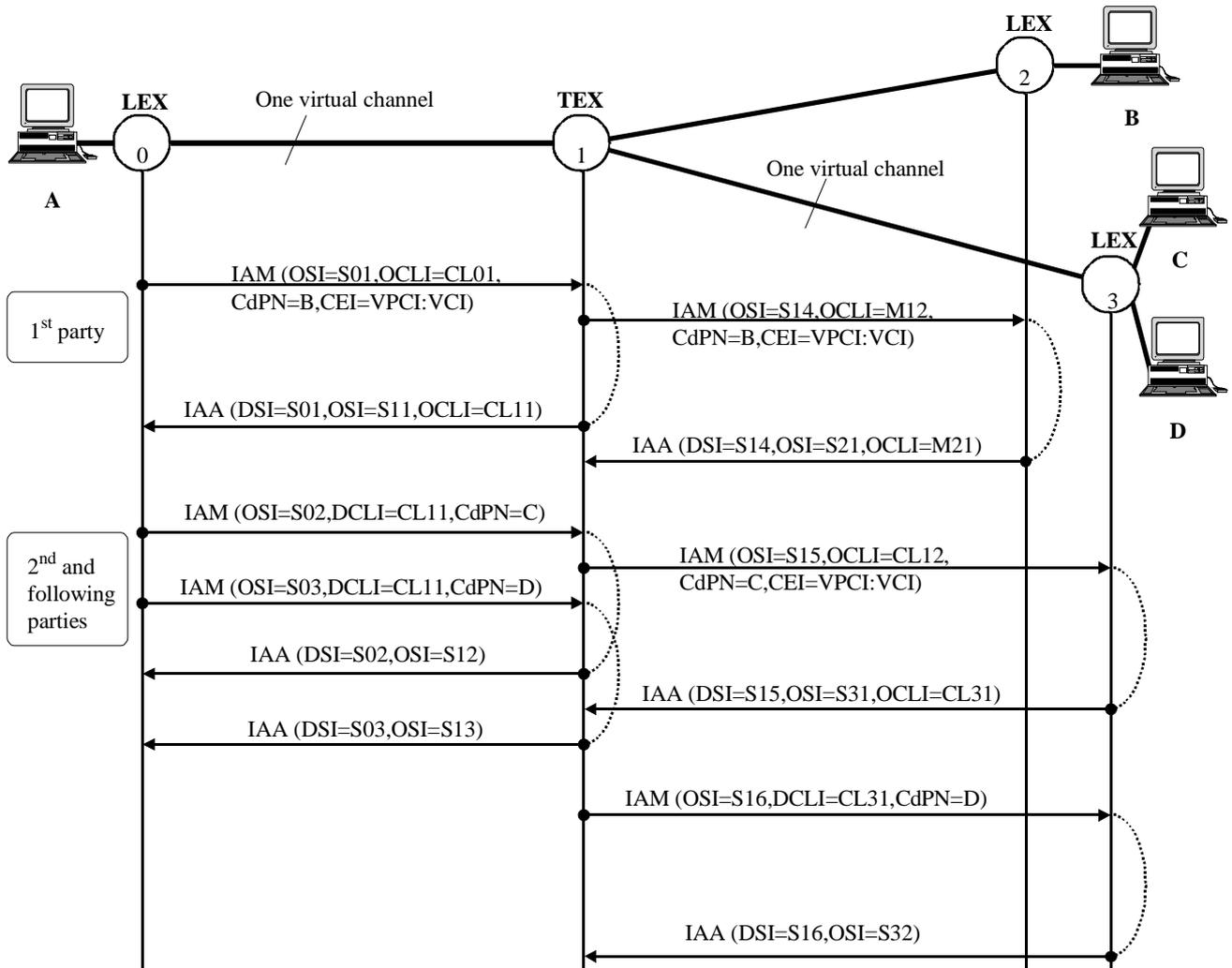
## ANNEX A

### Message sequence flows

#### Abbreviations

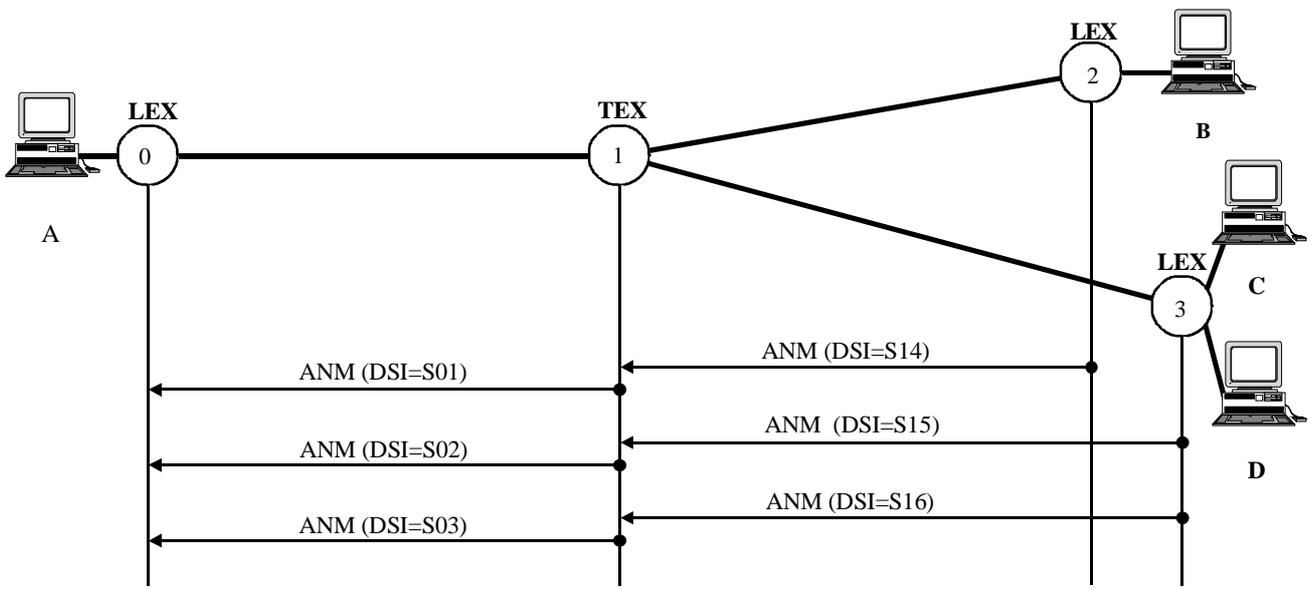
A, B, C, D	Address of party A, B, C, D
CdPN	Called Party Number
CEI	Connection Element ID
CLn	Connection Link ID value
DCLI	Destination Connection Link ID
DSI	Destination Signalling ID
LEX	Local Exchange
MPt	Multipoint
OCLI	Origination Connection Link ID
OSI	Origination Signalling ID
Pt	Point

Sn            Signalling ID value  
 TEX          Transit Exchange  
 VCI          Virtual Channel ID value  
 VPCI        Virtual Path Connection ID value



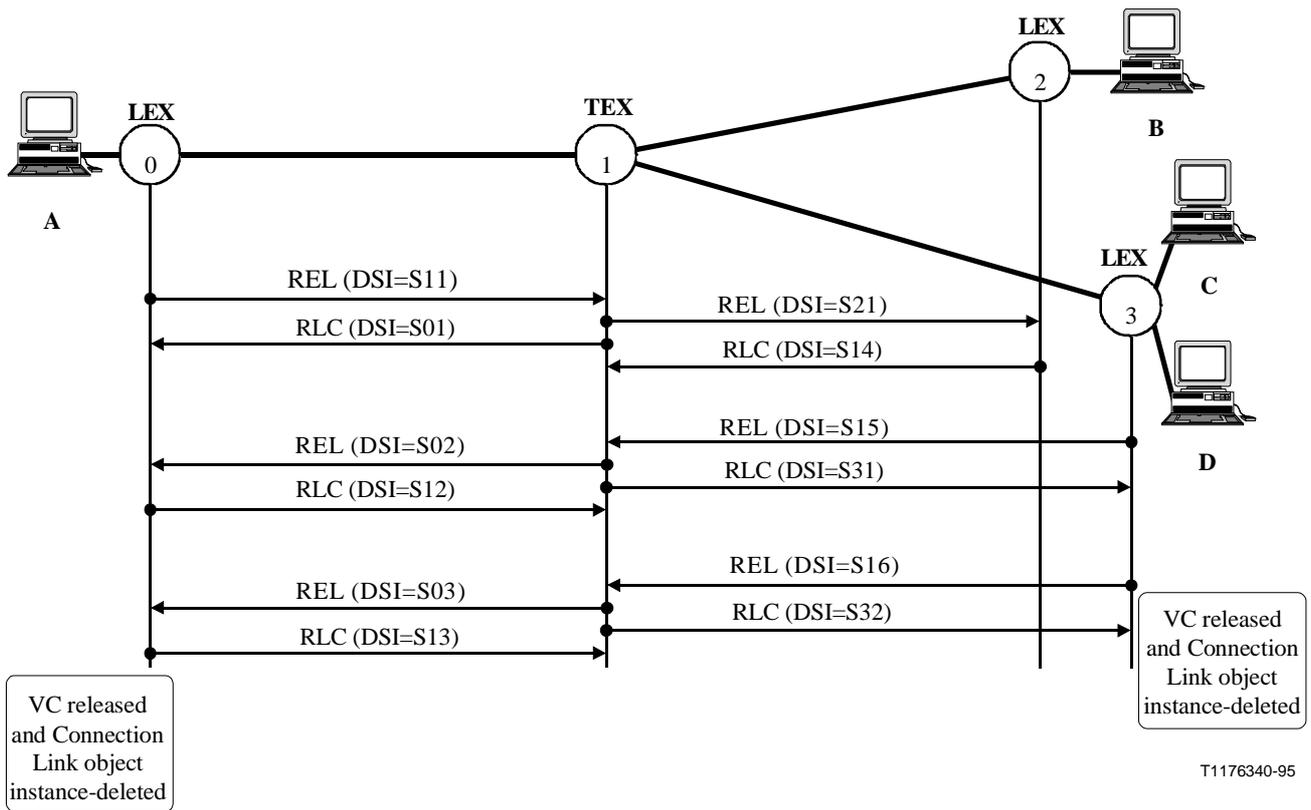
T1178410-96

Figure A.1/Q.2722.1 (sheet 1 of 2) – Set-up of a unidirectional point-to-multipoint call



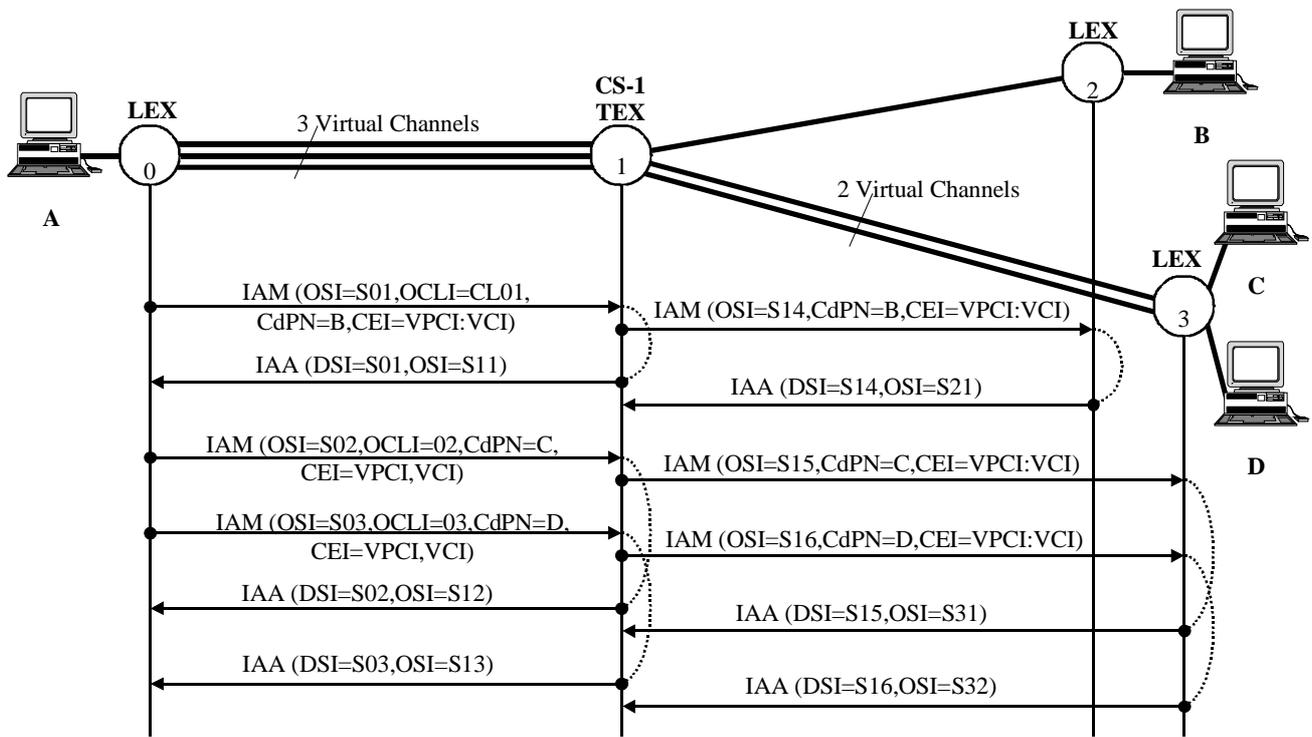
T1176330-95

Figure A.1/Q.2722.1 (sheet 2 of 2) – Set-up of a unidirectional point-to-multipoint call



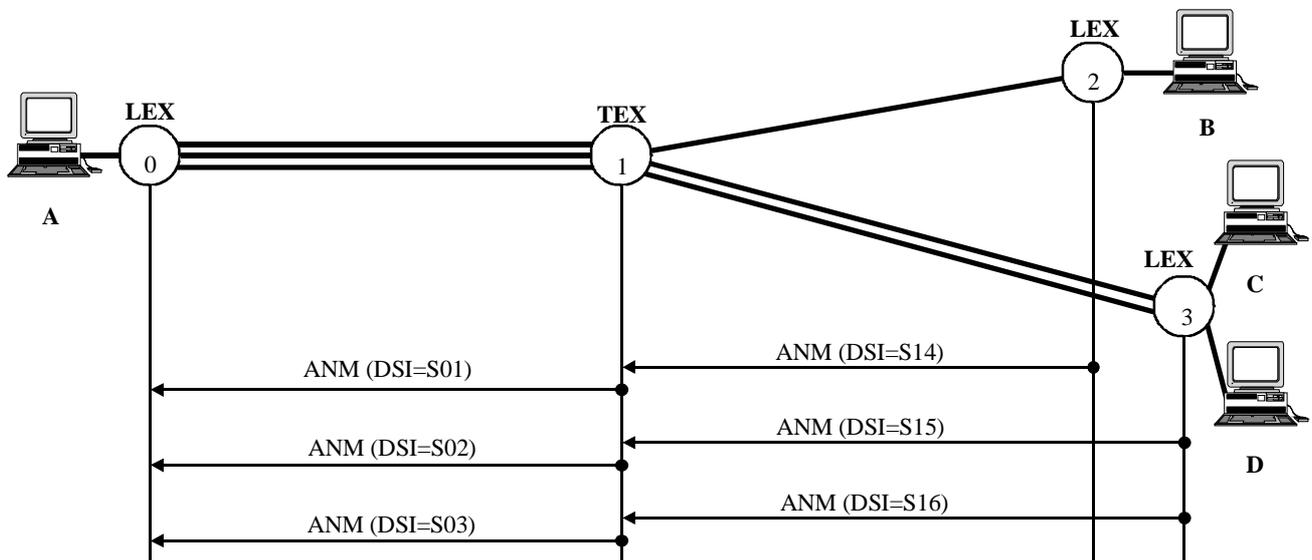
T1176340-95

Figure A.2/Q.2722.1 – Drop of a leaf party



T1176350-95

Figure A.3/Q.2722.1 (sheet 1 of 2) – Set-up of a unidirectional point-to-multipoint call – CS-1 TEX



T1176360-95

Figure A.3/Q.2722.1 (sheet 2 of 2) – Set-up of a unidirectional point-to-multipoint call – CS-1 TEX

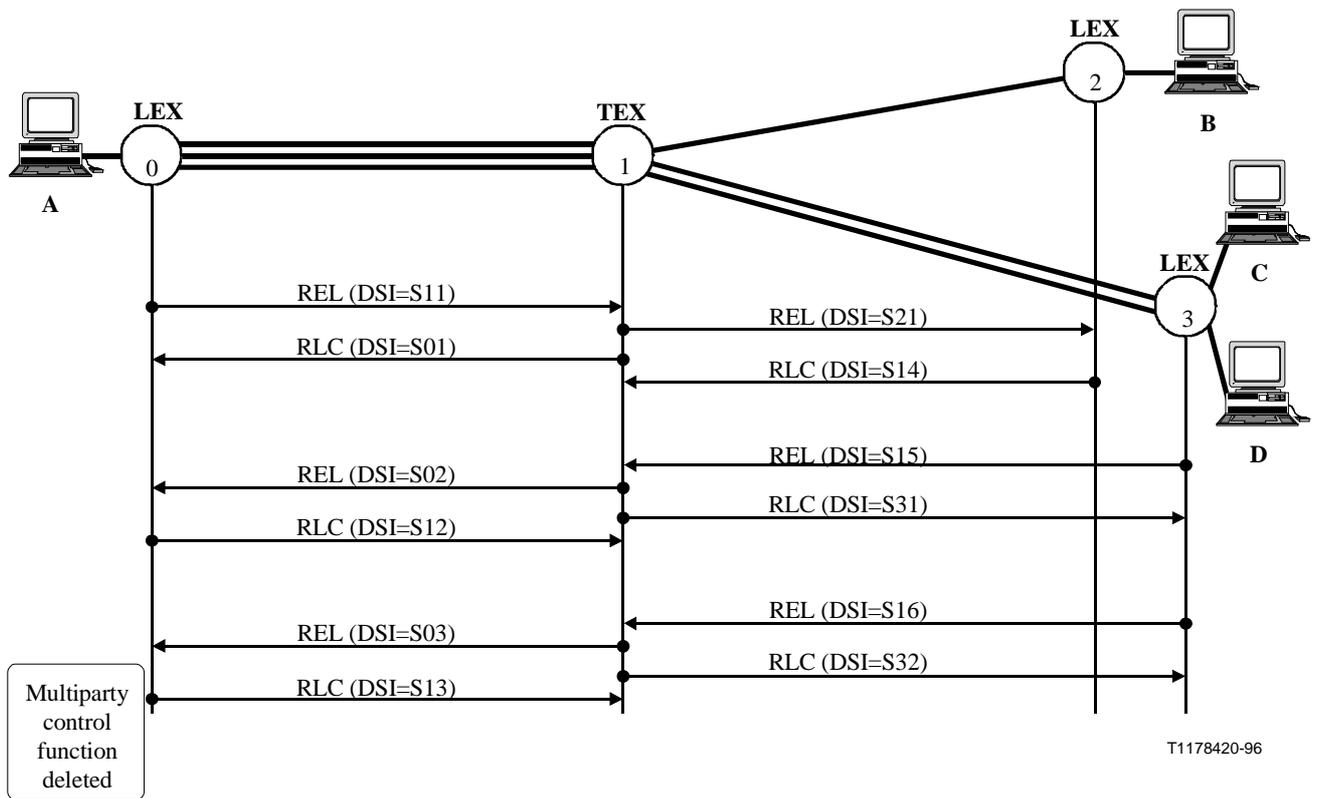


Figure A.4/Q.2722.1 – Release of a unidirectional point-to-multipoint call – CS-1 TEX

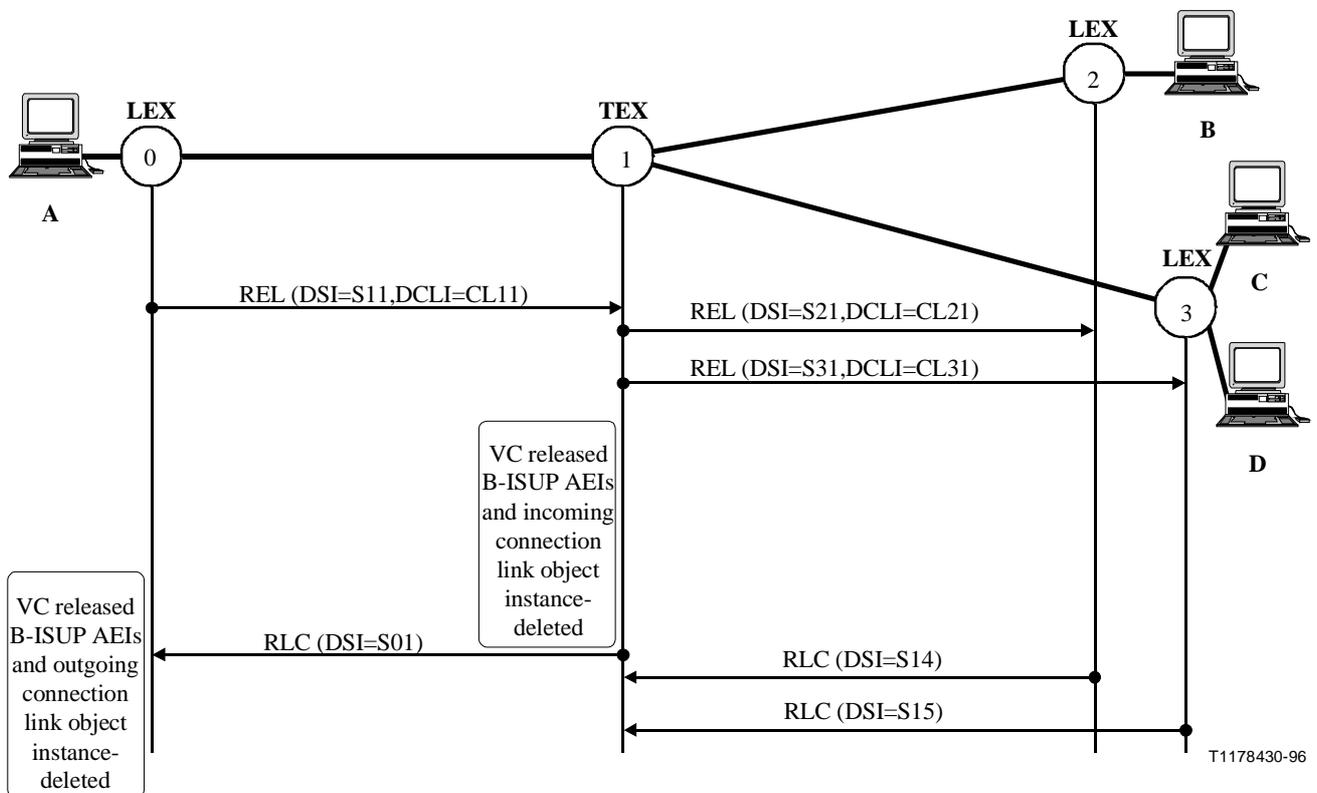


Figure A.5/Q.2722.1 – En bloc release of a multipoint call

## APPENDIX I

### Instruction indicator setting

The following instruction indicators may be set for the destination connection link identifier parameter:

Instruction indicator	Value	Meaning
Pass on not possible	0	Discard parameter
Discard parameter	1	Discard Parameter
Discard message	0	Do not discard message (pass on)
Send notification	0	Do not send notification
Release Call	0	Do not release call
Transit at intermediate exchange	1	End node interpretation
Broadband/narrow-band interworking	10	Release call

The following instruction indicators may be set for the origination connection link identifier parameter:

Instruction indicator	Value	Meaning
Pass on not possible	1	Discard parameter
Discard parameter	1	Discard Parameter
Discard message	0	Do not discard message (pass on)
Send notification	0	Do not send notification
Release Call	0	Do not release call
Transit at intermediate exchange	1	End node interpretation
Broadband/narrow-band interworking	10	Release call

The following instruction indicators may be set for the leaf party type parameter:

Instruction indicator	Value	Meaning
Pass on not possible	1	Discard parameter
Discard parameter	0	Do not discard parameter (pass on)
Discard message	0	Do not discard message (pass on)
Send notification	0	Do not send notification
Release Call	0	Do not release call
Transit at intermediate exchange	1	End node interpretation
Broadband/narrow-band interworking	10	Release call

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