INTERNATIONAL TELECOMMUNICATION UNION

ITU-T
Q.2971

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

(10/95)

**B-ISDN APPLICATION PROTOCOLS
FOR ACCESS SIGNALLING**

**BROADBAND INTEGRATED SERVICES
DIGITAL NETWORK (B-ISDN) –
DIGITAL SUBSCRIBER SIGNALLING
SYSTEM No. 2 (DSS 2) – USER-NETWORK
INTERFACE LAYER 3 SPECIFICATION
FOR POINT-TO-MULTIPOINT
CALL/CONNECTION CONTROL**

ITU-T Recommendation Q.2971

(Previously "CCITT Recommendation")

FOREWORD

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

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

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation Q.2971 was prepared by ITU-T Study Group 11 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 17th of October 1995.

_____

NOTE

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

CONTENTS

SUMMARY

This Recommendation defines the operation of the Digital Subscriber Signalling System No. 2 (DSS 2) for the support of point-to-multipoint switched virtual channel connections, between a root and multiple leaves, at the T_B or at the coincident S_B and T_B reference point of the User-to-Network Interface of the Broadband Integrated Services Digital Network (B-ISDN).

The procedures provide the capability to add or remove parties under the control of the root. In addition, a leaf party may initiate its withdrawal from the call.

Recommendation Q.2971

BROADBAND INTEGRATED SERVICES DIGITAL NETWORK (B-ISDN) – DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 2 (DSS 2) – USER-NETWORK INTERFACE LAYER 3 SPECIFICATION FOR POINT-TO-MULTIPOINT CALL/CONNECTION CONTROL

(Geneva, 1995)

1   Scope

This Recommendation specifies the signalling protocol for the establishing, maintaining and clearing of point-to-multipoint virtual channel calls/connections by means of the Digital Subscriber Signalling System No. 2 (DSS 2) at the T_B reference point or coincident S_B and T_B reference point (as defined in Recommendation I.413) of the Broadband Integrated Services Digital Network (B-ISDN).

In addition, this Recommendation specifies the protocol requirements at the T_B reference point where the service is provided to the user via a private B-ISDN.

This Recommendation specifies the signalling protocol to establish and clear point-to-multipoint calls/connections with unidirectional information transfer from the calling user (root) to all called users (leaves). The signalling protocol to establish and clear point-to-multipoint calls/connections with bidirectional information transport is outside the scope of this Recommendation.

The capability described in this Recommendation is applicable to all connection oriented telecommunication services that are based on single point-to-multipoint virtual channel calls/connections with unidirectional information transport.

This Recommendation is applicable to equipment, supporting point-to-multipoint calls/connections, to be attached at either side of a T_B reference point or coincident S_B and T_B reference point when used as an access to the public B-ISDN.

2   References

The following 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 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 references listed below. A list of currently valid ITU-T Recommendations is regularly published.

[1]   ITU-T Recommendation Q.2931 (1995), *Broadband Integrated Services Digital Network (B-ISDN) – Digital Subscriber Signalling System No. 2 (DSS 2) – User-Network Interface (UNI) layer 3 specification for basic call/connection control.*

[2]   ITU-T Recommendation Q.2130 (1994), *B-ISDN signalling ATM adaptation layer – Service Specific Coordination Function for the support of signalling at the User-Network Interface (SSCF at UNI).*

[3]   ITU-T Recommendation I.327 (1993), *B-ISDN functional architecture.*

[4]   ITU-T Recommendation I.413 (1993), *B-ISDN user-network interface.*

[5]   ITU-T Recommendation I.610 (1993), *B-ISDN operation and maintenance principles and functions.*

[6]   ITU-T Recommendation Q.2610 (1995), *Broadband Integrated Services Digital Network (B-ISDN) usage of cause and location in B-ISDN User Part and DSS 2.*

[7]   ITU-T Recommendation Q.2951 (1995), *Stage 3 description for number identification supplementary services using B-ISDN Digital Subscriber Signalling System No. 2 (DSS 2) – Basic call.*

[8]   ITU-T Recommendation Q.2957 (1995), *Stage 3 description for additional information transfer supplementary services using B-ISDN Digital Subscriber Signalling System No. 2 (DSS 2) – Basic call.*

[9]   ITU-T Recommendation Q.2961 (1995), *Broadband Integrated Services Digital Network (B-ISDN) – Digital Subscriber Signalling System No. 2 (DSS 2) – Additional traffic parameters.*

3   Definitions

For the purposes of this Recommendation, the following definitions apply:

3.1   party state: States for each party in the call (see 7.2.1) which are known by the layer 3 entity.

3.2   link state: States on both sides of the interface which coincide with the call states defined in clause 2/Q.2931, i.e. the states of the Q.2931 protocol handlers on both sides of the UNI and identified by their respective Call reference.

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

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

3.5   add party queue: To facilitate the description of the point-to-multipoint protocol the concept of an add party queue is introduced. At an interface, this queue will hold add party requests prior to the transmission of the add party request across the interface. This is a logical construct and should not constrain any implementation.

3.6   party state timer: Timers used in this Recommendation for the add party process. These timers are listed in clause 13.

3.7   endpoint reference: The identifier for each party of a point-to-multipoint call which are known by the layer 3 entity.

4   Abbreviations

For the purposes of this Recommendation, the following abbreviations are used:

AAL   ATM Adaptation Layer

ATM   Asynchronous Transfer Mode

B-ISDN   Broadband Integrated Services Digital Network

CRF   Connection Related Function (see Recommendation I.327)

DSS 2   Digital Subscriber Signalling System No. 2

OAM   Operation And Maintenance

QOS   Quality Of Service

SDL   Specification and Description Language

TE   Terminal Equipment (see Recommendation I.327)

UNI   User-Network Interface

5 Description

5.1 Application to interface structure

The layer 3 procedures apply to the interface structures defined in Recommendation I.413[4]. They use the functions and services provided by layer 2. The layer 3 procedures request the services of layer 2 and receive information from layer 2 using the primitives defined in Recommendation Q.2130. These primitives are used to illustrate the communication between the protocol layers and are not intended to specify or constrain implementations.

5.2 Capabilities supported by this Recommendation

This Recommendation builds upon the capabilities in Recommendation Q.2931 for DSS 2 (see 1.5/Q.2931). The additional capability supported by the signalling protocol specified in this Recommendation is the support of point-to-multipoint unidirectional switched channel connections.

A point-to-multipoint virtual channel connection is a collection of associated ATM virtual channel links that connect two or more endpoints. This capability only supports unidirectional transport from the root to the leaves. Parties can be added and removed during the lifetime of the connection.

5.3 General overview

This Recommendation presents the procedures, messages and information elements needed for supporting calls containing one point-to-multipoint connection.

The point-to-multipoint connection is set up by first requesting the establishment of a connection between the root and one leaf, indicating point-to-multipoint in the Broadband bearer capability information element. After this setup has progressed to alerting or active state, additional leaves can be added to the connection by add party requests from the root.

A leaf may be added or dropped from the call at any time while the call is in the active state. A new leaf can be added via the root issuing an add party request, as described above. A leaf can be dropped from the call by either the root or by the leaf.

Multiple add party requests pending at the same time are allowed (e.g. the root node does not need to wait for a response related to one add party request before issuing the next one).

Multiple drop party requests pending at the same time are allowed (i.e. the root does not need to wait for a response related to one drop party request before issuing the next one).

Each add party or drop party request is exclusively related to one party.

If, as a result of a drop party procedure, there are no leaf parties remaining in the call, the entire call is released.

6 Operational requirements

6.1 Provision and withdrawal

Some service providers may require prior service arrangement to be a root. No prior arrangement with the service provider is required to be a leaf.

6.2 Requirements on the originating network side

See 6.1 above.

6.3 Requirements on the destination network side

See 6.1 above.

7 Primitive definitions and state definitions

7.1 Primitive definitions

Clause 8/Q.2931 shall apply.

7.2 State definitions

This subclause defines an additional set of states called party states. These party states are used in addition to the basic call states (see clause 2/Q.2931) for a point-to-multipoint call.

7.2.1 B-ISDN party states

The party states which may exist on the user or network side of the user-network interface are defined in this subclause. At an interface involved in a point-to-multipoint call there will be two types of states associated with this call:

1) States on both sides of the interface which coincide with the call states defined in clause 2/Q.2931, i.e. the states of the Q.2931 protocol handlers on both sides of the UNI and identified by their respective call reference.

   These states will henceforward be called the *link states* of the point-to-multipoint call at that interface.

2) States for each party in the call which are known by the layer 3 entity. These parties are identified by their endpoint reference.

   These states will henceforward be called the *party states* of the party associated with the call.

   NOTE – In each network there will be:

   For each signalling endpoint involved in the point-to-multipoint call, one link state.

   For each party associated with the point-to-multipoint call, one incoming party state and one outgoing party state is maintained for each leaf reached through the network. Additionally, an endpoint reference value is associated with each reachable party, where this value (if not equal to 0) may be remapped by the network such that a different value is used on the incoming link from that used on the outgoing link heading towards the associated party.

The party states which may exist on the user side or the network side of the user-network interface are:

Null (P0)

The party does not exist, no endpoint reference value has been allocated.

Add Party Initiated (P1)

A SETUP or an ADD PARTY message has been sent to the other side of the interface for this party for the call.

Add Party Received (P2)

A SETUP or an ADD PARTY message has been received from the other side of the interface for this party for the call.

Party Alerting Delivered (P3)

An ALERTING or a PARTY ALERTING message has been sent to the other side of the interface for this party for the call.

Party Alerting Received (P4)

An ALERTING or a PARTY ALERTING message has been received from the other side of the interface for this party for the call.

Drop Party Initiated (P5)

A DROP PARTY message has been sent for this party of the call.

Drop Party Received (P6)

A DROP PARTY message has been received for this party of the call.

Active (P7)

On the user side of the UNI, when the user has received a CONNECT, CONNECT ACKNOWLEDGE or ADD PARTY ACKNOWLEDGE message identifying this party, or sent an ADD PARTY ACKNOWLEDGE.

On the network side of the UNI, when the network has sent a CONNECT, CONNECT ACKNOWLEDGE or ADD PARTY ACKNOWLEDGE message identifying this party, or when the network has received an ADD PARTY ACKNOWLEDGE message identifying this party.

These states apply to both sides of the interface.

In the root, party states of each party are maintained along with the link state for the outgoing link. A leaf terminal which never expects to terminate more than one party of a point-to-multipoint call need only maintain the link states (see 9.2.1).

8   Coding requirements

8.1   Messages

This clause provides an overview of the message structure, which highlights the functional definition and information content (i.e. semantics) of each message. Each definition includes:

    1)   A brief description of the message direction and use, including whether the message has:

        a)   local significance, i.e. relevant only in the originating or terminating access;

        b)   access significance, i.e. relevant in the originating and terminating access, but not in the network;

        c)   dual significance, i.e. relevant in either the originating or terminating access and in the network; or

        d)   global significance, i.e. relevant in the originating and terminating access and in the network.

    2)   A table listing the codeset 0 information elements. For each information element, the table indicates:

        a)   the reference of this Recommendation describing the information element;

        b)   the direction in which it may be sent; i.e. user-to-network ("u → n"), network-to-user ("n → u"), or both;

            NOTE – The user-network terminology in this clause refers to the interface structures between B-ISDN terminal equipment and B-ISDN public network (TE-Local CRF), and between B-ISDN customer network and B-ISDN public network (customer network-Local CRF); the terms TE, customer network and Local CRF are being used as defined in Recommendation I.327.

        c)   whether inclusion is mandatory ("M") or optional ("O"), with a reference to notes explaining the circumstances under which the information element shall be included; and

        d)   the length of the information element (or permissible range of lengths), in octets, where "*" denotes an undefined maximum length, which may be network or service dependent.

    3)   Further explanatory notes, as necessary.

8.1.1   Modification of messages in Q.2931

Table 8-1 lists the existing Q.2931 messages that have had their contents modified to support point-to-multipoint call or connection control.

TABLE 8-1/Q.2971

Modified Q.2931 messages

Message	Reference
ALERTING	8.1.1.1
CALL PROCEEDING	8.1.1.2
CONNECT	8.1.1.3
SETUP	8.1.1.4
STATUS	8.1.1.5
STATUS ENQUIRY	8.1.1.6
NOTIFY	8.1.1.7

8.1.1.1 ALERTING

This message is sent by the called user to the network or by the network to the calling user to indicate that called user alerting has been initiated. See Table 8-2 for additions to the structure of this message shown in Table 3-2/Q.2931.

TABLE 8-2/Q.2971

ALERTING message additional content

Message type: ALERTING

Significance: global

Direction: both

Information element	Reference	Direction	Type	Length
Endpoint reference	8.2.1	Both	O (Note)	4-7

NOTE – Mandatory if the Endpoint reference information element was included in the SETUP message. If the network receives this message with the Endpoint reference information element missing, the network shall apply the procedures of either 9.2 or 10.2.1, as appropriate.

8.1.1.2 CALL PROCEEDING

This message is sent by the called user to the network or by the network to the calling user to indicate that the requested call establishment has been initiated and no more call establishment information will be accepted. See Table 8-3 for additions to the structure of this message shown in Table 3-3/Q.2931.

TABLE 8-3/Q.2971

CALL PROCEEDING message additional content

Message type: CALL PROCEEDING

Significance: local

Direction: both

Information element	Reference	Direction	Type	Length
Endpoint reference	8.2.1	Both	O (Note)	4-7

NOTE – Mandatory if the Endpoint reference information element was included in the SETUP message. If the network receives this message with the Endpoint reference information element missing, the network shall apply the procedures of either 9.2 or 10.2.1, as appropriate.

8.1.1.3 CONNECT

This message is sent by the called user to the network and by the network to the calling user to indicate call acceptance by the called user. See Table 8-4 for additions to the structure of this message shown in Table 3-2/Q.2931 and in 1.8.1/Q.2961.

TABLE 8-4/Q.2971

CONNECT message additional content

Message type: CONNECT

Significance: global

Direction: both

Information element	Reference	Direction	Type	Length
Endpoint reference	8.2.1	Both	O (Note)	4-7

NOTE – Mandatory if the Endpoint reference information element was included in the SETUP message. If the network receives this message with the Endpoint reference information element missing, the network shall apply the procedures of either 9.2 or 10.2.1, as appropriate.

8.1.1.4 SETUP

This message is sent by the calling user to the network and by the network to the called user to initiate B-ISDN call and connection establishment. See Table 8-5 for additions to the structure of this message shown in Table 3-8/Q.2931 and in 1.8.1/Q.2961.

TABLE 8-5/Q.2971

SETUP message additional content

Message type: SETUP

Significance: global

Direction: both

Information element	Reference	Direction	Type	Length
Endpoint reference	8.2.1	Both	O (Note)	4-7

NOTE – Not used for point-to-point call establishment. This information element shall be included in SETUP messages involved in point-to-multipoint call establishment. In the network to user direction, the instruction indicator shall be coded to indicate "*Discard information element and Proceed*". When this information element is present, the OAM traffic descriptor information element shall not be present.

8.1.1.5 STATUS

This message is sent by the user or the network in response to a STATUS ENQUIRY message or at any time to report certain error conditions as listed in clause 9. See Table 8-6 for additions to the structure of this message shown in Table 3-9/Q.2931.

TABLE 8-6/Q.2971

STATUS message additional content

Message type: STATUS

Significance: local

Direction: both

Information element	Reference	Direction	Type	Length
Endpoint reference	8.2.1	Both	O (Note 1)	4-7
Endpoint state	8.2.2	Both	O (Note 2)	4-5

NOTES

1   Included when responding to a status enquiry about a party state or at any time to report certain error conditions in the point-to-multipoint procedures.

2   Included when the Endpoint reference information element is included.

8.1.1.6   STATUS ENQUIRY

This message is sent by the user or the network at any time to solicit a STATUS message from the peer layer 3 entity. Sending a STATUS message in response to a STATUS ENQUIRY message is mandatory. See Table 8-7 for additions to the structure of this message shown in Table 3-10/Q.2931.

TABLE 8-7/Q.2971

STATUS ENQUIRY message additional content

Message type: STATUS ENQUIRY

Significance: local

Direction: both

Information element	Reference	Direction	Type	Length
Endpoint reference	8.2.1	Both	O (Note)	4-7

NOTE – Included when enquiring about a party state in the point-to-multipoint procedures.

8.1.1.7   NOTIFY

This message is sent by the user or the network to indicate information pertaining to a call/connection. See Table 8-8 for additions to the structure of this message shown in Table 3-10/Q.2931.

TABLE 8-8/Q.2971

NOTIFY message additional content

Message type: NOTIFY

Significance: access

Direction: both

Information element	Reference	Direction	Type	Length
Endpoint reference	8.2.1	Both	O (Note)	4-7

NOTE – Included to identify the party from which the notification was provided.

8.1.2 Messages for point-to-multipoint call and connection control

See Table 8-9.

TABLE 8-9/Q.2971

Messages used with ATM point-to-multipoint call and connection control

Message	Reference
ADD PARTY	8.1.2.1
ADD PARTY ACKNOWLEDGE	8.1.2.2
PARTY ALERTING	8.1.2.3
ADD PARTY REJECT	8.1.2.4
DROP PARTY	8.1.2.5
DROP PARTY ACKNOWLEDGE	8.1.2.6

8.1.2.1 ADD PARTY

This message is sent from the user to the network to request the addition of a party to an existing connection (see clause 9). At the interface between a customer network and a public B-ISDN, it is sent in the network-to-user direction to request the addition of a party to an existing connection (see clause 10). See Table 8-10.

8.1.2.2 ADD PARTY ACKNOWLEDGE

This message is sent from the network to the user to acknowledge that the ADD PARTY request was successful. At the interface between a customer network and a public B-ISDN, it is sent in the user to network direction to acknowledge that the ADD PARTY request was successful. See Table 8-11.

8.1.2.3 PARTY ALERTING

This message is sent from the network to the user to indicate that the called party alerting has been initiated. At the interface between a customer network and a public B-ISDN, it is sent in the user to network direction to indicate that the called party alerting has been initiated. See Table 8-12.

8.1.2.4 ADD PARTY REJECT

This message is sent from the network to the user to acknowledge that the ADD PARTY request was not successful. At the interface between a customer network and a public B-ISDN, it is sent in the user-to-network direction to acknowledge that the ADD PARTY request was not successful. See Table 8-13.

8.1.2.5 DROP PARTY

This message is sent by the root to the network or by the network to the root to drop a party from an existing point-to-multipoint connection. At the interface between a customer network and a public B-ISDN, it is sent in both directions to drop a party from an existing point-to-multipoint connection. See Table 8-14.

8.1.2.6 DROP PARTY ACKNOWLEDGE

This message is sent by the root to the network or by the network to the root in response to a DROP PARTY message to indicate that the party was dropped from the connection. At the interface between a customer network and a public B-ISDN, it is sent in both directions in response to a DROP PARTY message to indicate that the party was dropped from the connection. See Table 8-15.

8.2 Information elements

The information element and coding rules of 4.1/Q.2931, 4.2/Q.2931, 4.3/Q.2931, 4.4/Q.2931, 4.5/Q.2931 and 1.8.2/Q.2961 shall apply with the extension listed below.

TABLE 8-10/Q.2971

ADD PARTY message contents

Message type: ADD PARTY

Significance: global

Direction: both

Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	8.2.3	Both	M	2
Message length	4.4/Q.2931	Both	M	2
AAL parameters	4.5/Q.2931	Both	O (Note 1)	4-21
Broadband high layer information	4.5/Q.2931	Both	O (Note 2)	4-13
Broadband low layer information	4.5/Q.2931	Both	O (Note 3)	4-17
Called party number	4.5/Q.2931	Both	M	4-*
Called party subaddress	4.5/Q.2931	Both	O (Note 4)	4-25
Calling party number	4.5/Q.2931	Both	O (Note 5)	4-*
Calling party subaddress	4.5/Q.2931	Both	O (Note 6)	4-25
Broadband sending complete	4.5/Q.2931	Both	O (Note 7)	4-5
Transit network selection	4.5/Q.2931	u → n	O (Note 8)	4-*
Endpoint reference	8.2.1	Both	M	7
Notification indicator	4.5/Q.2931	Both	O (Note 9)	4-*
End-to-end transit delay	4.5/Q.2931	Both	O (Note 10)	4-10

NOTES

1   Included in the user-to-network direction when the calling user wants to pass ATM adaptation layer parameters information to the called user. Included in the network-to-user direction if the calling user included an AAL parameters information element in the ADD PARTY message. Must be the same as in the initial SETUP of the call, but is not checked by the network.

2   Included in the user-to-network direction when the calling user wants to pass Broadband high layer information to the called user. Included in the network-to-user direction if the calling user included a Broadband high layer information information element in the ADD PARTY message. Must be the same as in the initial SETUP of the call, but is not checked by the network.

3   Included in the user-to-network direction when the calling user wants to pass Broadband low layer information to the called user. Included in the network-to-user direction if the calling user included a Broadband low layer information information element in the ADD PARTY message. Must be the same as the one negotiated during the initial SETUP of the call, but is not checked by the network. Only one Broadband low layer information information element is permitted in the ADD PARTY message.

4   Included in the user-to-network direction when the calling user wants to indicate the called party subaddress. Included in the network-to-user direction if the calling user included a Called party subaddress information element in the ADD PARTY message.

5   May be included by the calling user, or by the network to identify the calling user.

6   Included in the user-to-network direction when the calling user wants to indicate the calling party subaddress. Included in the network-to-user direction if the calling user included a Calling party subaddress information element in the ADD PARTY message.

7   Even if this information element is absent, the *en bloc* sending/receiving procedure shall be followed.

8   Included by the calling user to select a particular transit network (see Annex B).

9   This indicator may be present whenever notification is delivered. The Notification indicator information element may be repeated in this message. The maximum length and the number of repetitions allowed is a network option.

10   Included in the user-to-network direction when the calling user wants to specify end-to-end transit delay requirements for this party and/or the cumulative transit delay expected for the transmission of user data from the calling user to the network boundary. When included, an End-to-end transit delay information element will be delivered to the called user. Included in the network-to-user direction if End-to-end transit delay information element is to be delivered to the called user (see Annex E).

TABLE 8-11/Q.2971

ADD PARTY ACKNOWLEDGE message contents

Message type: ADD PARTY ACKNOWLEDGE				
Significance: global				
Direction: both				
Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	8.2.3	Both	M	2
Message length	4.4/Q.2931	Both	M	2
Endpoint reference	8.2.1	Both	M	7
AAL parameters	4.5/Q.2931	Both	O (Note 1)	4-21
Broadband low layer information	4.5/Q.2931	Both	O (Note 2)	4-17
Notification indicator	4.5/Q.2931	Both	O (Note 3)	4-*
End-to-end transit delay	4.5/Q.2931	Both	O (Note 4)	4-10

NOTES

1   It is included when the called party (leaf) provided this information element in a CONNECT message (see Note 1 to Table 3-4/Q.2931). This information element should only be present when interworking with DSS 2 equipment that does not support the procedures in this Recommendation (see 9.2.1).

2   It is included when the called party (leaf) provided this information element in a CONNECT message (see Note 2 to Table 3-4/Q.2931). This information element should only be present when interworking with DSS 2 equipment that does not support the procedures in this Recommendation (see 9.2.1).

3   This indicator may be present whenever notification is delivered. The Notification indicator information element may be repeated in this message. The maximum length and the number of repetitions allowed is a network option.

4   Included in the user-to-network direction when the responding user received the End-to-end transit delay information element in the SETUP or ADD PARTY message. Included in the network-to-user direction if the responding user included the End-to-end transit delay information element in the CONNECT or ADD PARTY ACKNOWLEDGE message.

8.2.1   Endpoint reference

The purpose of the Endpoint reference information element is to identify the individual endpoints of a point-to-multipoint call to which the particular message applies and can be used to indicate that the first party cannot negotiate (see 9.1.1). The endpoint reference identifier value zero shall only be used as follows: to identify the first party of a point-to-multipoint call. When endpoint reference value of zero is used it indicates that the first party can negotiate (see 9.1.1). A non-zero value is always used to identify subsequent parties of a point-to-multipoint call. A non-zero value also indicates that the called party cannot negotiate. See Figure 8-1.

TABLE 8-12/Q.2971

PARTY ALERTING message contents

Message type: PARTY ALERTING

Significance: global

Direction: both

Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	8.2.3	Both	M	2
Message length	4.4/Q.2931	Both	M	2
Endpoint reference	8.2.1	Both	M	7
Notification indicator	4.5/Q.2931	Both	O (Note)	4-*

NOTE – This indicator may be present whenever notification is delivered. The Notification indicator information element may be repeated in this message. The maximum length and the number of repetitions allowed is a network option.

TABLE 8-13/Q.2971

ADD PARTY REJECT message contents

Message type: ADD PARTY REJECT

Significance: global

Direction: both

Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	8.2.3	Both	M	2
Message length	4.4/Q.2931	Both	M	2
Cause	4.5/Q.2931	Both	M	6-34
Endpoint reference	8.2.1	Both	M	7

TABLE 8-14/Q.2971

DROP PARTY message contents

Message type: DROP PARTY				
Significance: global				
Direction: both				
Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	8.2.3	Both	M	2
Message length	4.4/Q.2931	Both	M	2
Cause	4.5/Q.2931	Both	M	6-34
Endpoint reference	8.2.1	Both	M	7
Notification indicator	4.5/Q.2931	Both	O (Note)	4-*
NOTE – This indicator may be present whenever notification is delivered. The Notification indicator information element may be repeated in this message. The maximum length and the number of repetitions allowed is a network option.				

TABLE 8-15/Q.2971

DROP PARTY ACKNOWLEDGE message contents

Message type: DROP PARTY ACKNOWLEDGE				
Significance: local				
Direction: both				
Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	8.2.3	Both	M	2
Message length	4.4/Q.2931	Both	M	2
Cause	4.5/Q.2931	Both	O (Note)	4-34
Endpoint reference	4.8/Q.2931	Both	M	7
NOTE – Mandatory in the first party dropping message including when the DROP PARTY ACKNOWLEDGE is sent as a result of an error handling condition. This information element may appear twice in this message.				

Bits								Octets
8	7	6	5	4	3	2	1	
Endpoint reference								
0	1	0	1	0	1	0	0	1
Information element identifier								
1 ext.	Coding standard		Flag	Res.	IE instruction field			2
					IE Action Ind.			
Length of endpoint reference contents								3
Length of endpoint reference contents (continued)								4
Endpoint reference type								5
0/1 Endpoint reference flag	Endpoint reference identifier value							6
Endpoint reference identifier value (continued)								6.1

FIGURE 8-1/Q.2971

Endpoint reference information element

Endpoint reference type (octet 5):

Bits 8 7 6 5 4 3 2 1	Meaning
0 0 0 0 0 0 0 0	Locally defined integer

All other values are reserved.

Endpoint reference flag (octet 6):

Bit 8	Meaning
0	The message is sent from the side that originated the Endpoint reference
1	The message is sent to the side that originated the Endpoint reference

Endpoint reference identifier value (octet 6, 6.1).

The endpoint reference identifier is a 15-bit integer (coded in binary) to uniquely identify an endpoint.

8.2.2 Endpoint state

The purpose of the Endpoint state information element is to indicate the state of an endpoint of a point-to-multipoint connection. See Figure 8-2.
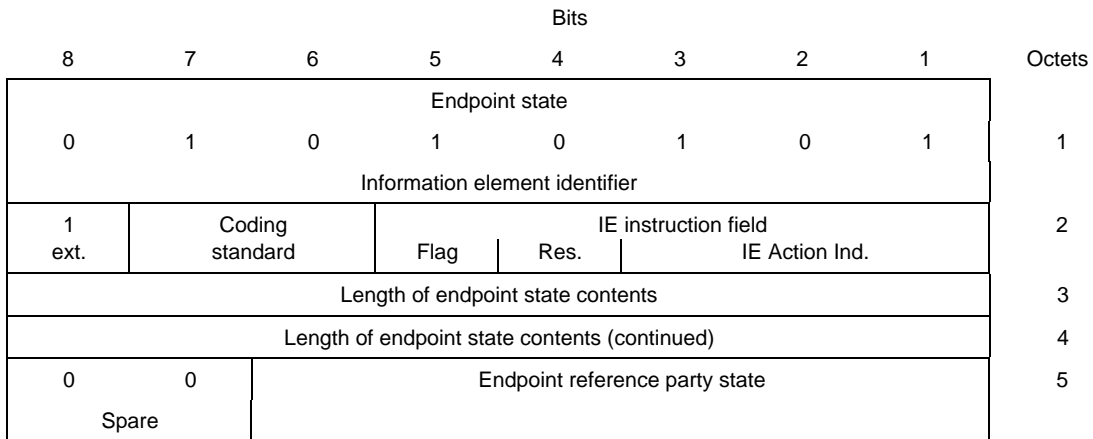
```
                                    Bits
    8         7         6         5         4         3         2         1      Octets
  ┌─────────────────────────────────────────────────────────────────────────┐
  │                          Endpoint state                                   │
  │   0         1         0         1         0         1         0         1  │   1
  │                    Information element identifier                          │
  ├────────┬──────────────────┬─────────────────────────────────────────────┤
  │   1    │     Coding       │                IE instruction field          │   2
  │  ext.  │    standard      │  Flag   │   Res.  │          IE Action Ind.   │
  ├────────┴──────────────────┴─────────┴─────────┴───────────────────────────┤
  │                  Length of endpoint state contents                        │   3
  ├───────────────────────────────────────────────────────────────────────────┤
  │             Length of endpoint state contents (continued)                 │   4
  ├──────────────────┬────────────────────────────────────────────────────────┤
  │   0         0    │            Endpoint reference party state               │   5
  │      Spare       │                                                         │
  └──────────────────┴────────────────────────────────────────────────────────┘
```

FIGURE 8-2/Q.2971

Endpoint state information element

Endpoint reference party state (octet 5):

Bits 6 5 4 3 2 1	Meaning
0 0 0 0 0 0	Null
0 0 0 0 0 1	Add Party Initiated
0 0 0 1 0 0	Party Alerting Delivered
0 0 0 1 1 0	Add Party Received
0 0 0 1 1 1	Party Alerting Received
0 0 1 0 1 1	Drop Party Initiated
0 0 1 1 0 0	Drop Party Received
0 0 1 0 1 0	Active

All other values are reserved.

8.2.3   New message type code points

Table 8-16 shows message type (octet 1) code points for the messages in 8.1.2. These are in addition to the values shown in Table 4-2/Q.2931, Part 1 of 2.

TABLE 8-16/Q.2971

Additional multiparty message types

```
– Message type (octet 1)

Bits

8 7 6 5 4 3 2 1

1 0 0 0 0 0 0 0      ADD PARTY

1 0 0 0 0 0 0 1      ADD PARTY ACKNOWLEDGE

1 0 0 0 0 1 0 1      PARTY ALERTING

1 0 0 0 0 0 1 0      ADD PARTY REJECT

1 0 0 0 0 0 1 1      DROP PARTY

1 0 0 0 0 1 0 0      DROP PARTY ACKNOWLEDGE
```

8.2.4   New cause values for the Cause information element

The cause values defined in 3.2/Q.2610 are applicable. In addition, the following cause values are applicable:

Cause No.	Definition	Diagnostics	Application	Reference
32	Too many pending add party requests	Not applicable	DSS 2	10.2.2.1
73	Unsupported combination of traffic parameters	Not applicable	DSS 2	9.1.1

9   Signalling procedures at the coincident S_B and T_B reference point

This clause describes procedures for point-to-multipoint calls. The signalling virtual channel used is the same as the one assigned for point-to-point calls. This Recommendation supports point-to-multipoint calls where user plane information is multicasted unidirectionally from one calling user to a set of called users. In this Recommendation the root initiates the joining of all parties to the call. These procedures shall only apply when the SETUP message contains a Broadband bearer capability information element indicating "point-to-multipoint" in the user plane connection configuration field.

9.1   Adding a party at the originating interface

9.1.1   Setup of the first party

The setup of the first party of a point-to-multipoint call is always initiated by the root and follows the procedures of Recommendation Q.2931 for call setup as described in 5.1/Q.2931 and 1.9.1/Q.2961 for point-to-point calls; in particular only messages of Recommendation Q.2931 and no messages specific to point-to-multipoint control, such as ADD PARTY will be used. The link state transitions shall be as described in clause 5/Q.2931.

The following additions apply:

The SETUP message sent by the root shall contain the Endpoint reference information element and the Broadband bearer capability information element with the indication of "point-to-multipoint" in the user plane connection configuration field. The OAM traffic descriptor information element shall not be present since OAM flows are not supported for a point-to-multipoint connection (see Recommendation I.610).

To allow the first party of the call to negotiate (see Annex C/Q.2931 and Annex F/Q.2931), the user shall set the endpoint reference value to zero in the SETUP message and not send any ADD PARTY messages until the call is in the active link state (i.e. until after the completion of negotiation). The network shall not enforce this restriction on ADD PARTY messages.

After the user has sent a SETUP message to the network, the user shall enter the Add Party Initiated party state. Upon reception of the SETUP message, the network shall enter the Add Party Received party state. After the network has sent an ALERTING message to the user, the network shall enter the Party Alerting Delivered party state. Upon reception of an ALERTING message, the user shall enter the Party Alerting Received party state.

For the first party, party state timer T399 shall not be started. Timer T397 (if implemented) shall be started when the user receives an ALERTING message. In this case, timer T301 (if implemented) shall not be started. Timer T398 shall be started if a DROP PARTY message is sent for the first party.

If an ALERTING, CALL PROCEEDING or CONNECT message is received by the user in response to a SETUP message for a point-to-multipoint call with a missing Endpoint reference information element or with an Endpoint reference information element with content error, then the mandatory information element error procedures of 5.6.7/Q.2931 shall apply.

Upon sending a CALL PROCEEDING message or upon receiving a CONNECT ACKNOWLEDGE message, the network shall not change party state. Upon receiving a CALL PROCEEDING message or upon sending a CONNECT ACKNOWLEDGE message, the user shall not change party state.

If the SETUP message contains a Broadband bearer capability information element indicating "point-to-multipoint" in the user plane connection configuration field and contains an ATM traffic descriptor information element containing any backward cell rate fields which specify a non-zero value, the network shall reject the setup request with cause #73, "unsupported combination of traffic parameters".

If the SETUP message contains a Broadband bearer capability information element indicating "point-to-multipoint" in the user plane connection configuration field and does not contain an Endpoint reference information element, the network shall reject the setup request with cause #96, "mandatory information element is missing", and include the Endpoint reference information element identifier in the diagnostic field.

9.1.2 Adding a party

In order to initiate the addition of a party, the root shall send an ADD PARTY message, start timer T399 and enter the Add Party Initiated party state. The user shall send an ADD PARTY message only if the link is in the Active or Call Delivered link state.

The ADD PARTY message shall have the same call reference value as specified in the initial setup of the call to which the party is to be added.

9.1.3 Add party received

Upon receiving the ADD PARTY message, the network enters the Add Party Received party state. If the network can determine that access to the requested service is authorized and available, the network shall progress the call. If the network determines that the call information received from the user is invalid (e.g. invalid number), then the network shall send an ADD PARTY REJECT message following the procedures of 9.3.2. The cause used in rejection is specified below:

#1   "*unassigned (unallocated) number*";

#3   "*no route to destination*";

#22   "*number changed*";

#28   "*invalid number format (address incomplete)*".

Similarly, if the network determines that a requested service is not authorized, not implemented or is not available, the network shall send an ADD PARTY REJECT message with one of the following causes following the procedures of 9.3.2:

#37   "*user cell rate not available*";

#47   "*resource unavailable, unspecified*";

#49   "*quality of service unavailable*";

#58   "*bearer capability not presently available*".

9.1.4 Party alerting

If the network receives an indication that called party alerting has been initiated, the network shall send a PARTY ALERTING message across the user-network interface to the root and enter the Party Alerting Delivered party state for that party.

If the user receives a PARTY ALERTING message, the user shall stop timer T399, start timer T397 (if implemented) and enter the Party Alerting Received party state. The user may begin an internally-generated alerting indication.

9.1.5 Add party failure

Upon expiry of timer T397 (if implemented), the user shall initiate party dropping with cause #102, "*recovery on timer expiry*", according to the procedures of 9.3.3.2.

If timer T399 expires, the user shall initiate party dropping with cause #102, "*recovery on timer expiry*" and follow the procedures of 9.3.3.2.

9.1.6 Add party connected

Upon receiving an indication that the add party request has been accepted, the network shall send an ADD PARTY ACKNOWLEDGE or CONNECT message across the user-network interface to the root and enter the Active party state for that party. The CONNECT message shall be used if the call is in the Call Delivered link state and the ADD PARTY ACKNOWLEDGE message shall be used in the Active link state.

If the network sends a CONNECT or ADD PARTY ACKNOWLEDGE message, and the network can determine that the called user included AAL parameters or Broadband low layer information information element in the CONNECT message at the destination interface, the network shall include this information element in the CONNECT or ADD PARTY ACKNOWLEDGE sent to the calling user independent of whether the endpoint reference value is zero or non-zero. This message indicates to the root that an additional party has been added to the original connection and stops a possible indication of local alerting.

On receipt of the ADD PARTY ACKNOWLEDGE or CONNECT message, the root shall enter the Active party state, and stop timer T399 (if running) or timer T397 (if implemented and running).

> NOTE – If there is an AAL parameters or Broadband low layer information information element in the ADD PARTY ACKNOWLEDGE message from the network, the treatment of it is left to the root party.

9.1.7 Add party rejection

Upon receiving an indication that the network or the called user is unable to accept the call, the network shall drop the party following the procedures of 9.3.2 and 9.3.4 with the cause provided by the network or the called user.

9.1.8 Transit network selection

When a Transit network selection information element is present, the add party request shall be processed according to Annex B.

9.2 Add party establishment at the destination interface

At the destination interface, addition of a party is always initiated by the network. The user and the network shall follow the procedures of 5.2/Q.2931 and 1.9.2/Q.2961 with the following additions.

The network shall indicate the arrival of an add party request at the user-network interface by transferring a SETUP message across the interface. The SETUP message shall contain the Endpoint reference information element and a Broadband bearer capability information element indicating "point-to-multipoint" in the user plane connection configuration field. The instruction indicator in the Endpoint reference information element shall be coded to "discard information element and proceed". The Endpoint reference shall have a value of zero if the endpoint reference value at the originating interface was zero. The usage of an endpoint reference value of zero applies only to the first party of a point-to-multipoint call when the root has allowed negotiation (see 9.1.1). In any other case, the endpoint reference value shall be non-zero. A non-zero endpoint reference value means the user shall not negotiate (see Annex C/Q.2931 and Annex F/Q.2931). The network shall not enforce this restriction and shall transparently transport information related to negotiation (i.e. the AAL parameters and the Broadband low layer information information elements) towards the root

user. The network shall include AAL parameters and the Broadband low layer information element in the SETUP message when the originating user included these information elements in the SETUP or ADD PARTY message for this party. If the AAL parameters or the Broadband low layer information element are included in the CONNECT message from the called party, the network shall pass these information elements towards the calling user independent of whether the endpoint reference value for the party is zero or non-zero.

For a party in a call, the Call reference and Endpoint reference information elements, in those messages that contain these information elements and are exchanged across the user-network interface, shall contain the same call reference and endpoint reference values specified in the SETUP message delivered by the network.

If a CALL PROCEEDING, ALERTING or CONNECT message is the first message the network receives in response to the SETUP message and it does not contain an Endpoint reference information element, this shall not be treated as an error and the procedures of 9.2.1 shall be followed.

If a CALL PROCEEDING, ALERTING or CONNECT message is received with an Endpoint reference information element with content error (e.g. incorrect endpoint reference value or flag), then this shall be treated as a mandatory information element content error and the procedures of 9.5.7 shall apply.

If the first message in response to the SETUP message is received with a correct Endpoint reference information element and a subsequent ALERTING or CONNECT message is received with either no Endpoint reference information element or with an Endpoint reference information element with content error, then this shall be treated as a mandatory information element error and the procedures of 9.5.7 shall apply.

Upon the transmission of the SETUP message, the network shall enter the Add Party Initiated party state. When receiving a SETUP message, with the user plane connection configuration field in the Broadband bearer capability information element set to "point-to-multipoint", the user shall enter the Add Party Received party state.

Upon the transmission of the ALERTING message, the user shall enter the Party Alerting Delivered party state. Upon reception of the ALERTING message, the network shall enter the Party Alerting Received party state.

Upon reception of a CONNECT message, the network shall enter the Active party state. Upon reception of the CONNECT ACKNOWLEDGE message, the user shall enter the Active party state.

Upon sending a CALL PROCEEDING message or a CONNECT message, the user shall not change party state. Upon receiving a CALL PROCEEDING message or upon sending a CONNECT ACKNOWLEDGE message, the network shall not change party state.

The user and the network shall not start party timers.

At the terminating interface, the ADD PARTY, ADD PARTY ACKNOWLEDGE, ADD PARTY REJECT, PARTY ALERTING, DROP PARTY and DROP PARTY ACKNOWLEDGE messages shall not be used.

At the terminating interface, the receipt of an ADD PARTY, ADD PARTY ACKNOWLEDGE, ADD PARTY REJECT, PARTY ALERTING, DROP PARTY or DROP PARTY ACKNOWLEDGE message shall be treated as an unrecognized or unexpected message.

9.2.1   Leaf does not support multipoint procedures

To be a leaf of a point-to-multipoint connection, it is not necessary for a destination user to support the signalling procedures in this Recommendation provided the user does support the procedures in clause 5/Q.2931.

In order to support such users, the following procedures shall apply when the destination network receives a CALL PROCEEDING, ALERTING or CONNECT message as the first message in response to the SETUP message and it does not contain an Endpoint reference information element:

- The network shall not treat as an error this or any subsequent messages that are received without the Endpoint reference information element.

- The network, in subsequent messages to the user for this call, shall either not include the Endpoint reference or Endpoint state information element or shall code the IE instruction field in these information elements to "discard information element and proceed".

- If the destination provides a Broadband low layer information information element in the CONNECT message, it shall be delivered to the root in a CONNECT or ADD PARTY ACKNOWLEDGE message, as appropriate, provided the network supports the delivery of the Broadband low layer information information element (see Annex C/Q.2931).

- If the destination provides an AAL parameters information element in the CONNECT message, it shall be delivered to the root in a CONNECT or ADD PARTY ACKNOWLEDGE message, as appropriate.

- If the network receives a subsequent message with an Endpoint reference information element, the presence of the Endpoint reference information element shall not be regarded as an error.

    NOTE – The absence of the Endpoint reference information element at the destination interface does not affect the inclusion of the Endpoint reference information element in messages at the originating interface.

9.3   Party dropping

9.3.1   Terminology

Terminology is defined in 5.4.1/Q.2931.

9.3.2   Exception conditions

Under normal conditions, dropping a party is initiated when the user or the network sends either a DROP PARTY or RELEASE message and follows the procedures defined in 9.3.3 and 9.3.4. The only exceptions to the above rule are as follows:

   a)   in response to a SETUP message, provided no other response to the SETUP message has previously been sent, the call clearing procedures of 5.4.2/Q.2931 shall apply;

   b)   in response to an ADD PARTY message, provided no other response to the ADD PARTY message has previously been sent, the network procedure to drop the party shall be to send an ADD PARTY REJECT message and enter the Null party state. In addition, after sending the ADD PARTY REJECT message, if there are no remaining parties in the Active, Party Alerting Delivered, or Add Party Received party state, then the network shall send a RELEASE message to the user. The cause used in the RELEASE message is #31, "*normal unspecified*".

9.3.3   Party dropping initiated by the user

9.3.3.1   Leaf initiated party dropping

In order to drop itself, the leaf shall send a RELEASE or RELEASE COMPLETE message according to the procedures of 5.4.3/Q.2931 and shall enter the Null party state.

9.3.3.2   Root initiated party dropping

Apart from the exceptions identified in 9.3.2 and 9.5, the root shall initiate party dropping by sending a DROP PARTY or RELEASE message.

A DROP PARTY message is used by the root to initiate party dropping when:

- the party is in the Active, Party Alerting Received or Add Party Initiated party state; and

- there are one or more other parties to the call on this interface in the Add Party Initiated, Party Alerting Received or Active party state.

After sending a DROP PARTY message, the root shall start timer T398 (the value of timer T398 is specified in clause 13) and enter the Drop Party Initiated party state.

On receipt of this message, the network shall enter the Drop Party Received party state and:

- when one or more parties associated with the call are in the Active, Party Alerting Delivered, or Add Party Received party state, the network shall initiate procedures for dropping the party along the path to the remote user, send a DROP PARTY ACKNOWLEDGE message to the user and enter the Null party state; or

- when all other parties associated with the call are in the Null, Drop Party Initiated, or Drop Party Received party state, the network shall enter the Null party state, initiate procedures for dropping the party along the path to the remote user and send a RELEASE message to the user with cause #31, "*normal, unspecified*".

    NOTE 1 – The DROP PARTY ACKNOWLEDGE message has only local significance and does not imply an acknowledgement of dropping from the remote user.

On receipt of the DROP PARTY ACKNOWLEDGE message, the user shall stop timer T398 and return to the Null party state. If all parties on the call for the layer 3 entity are in the Null, Drop Party Initiated or Drop Party Received party state, the user shall release the call by sending a RELEASE message with cause #31, "*normal unspecified*".

If timer T398 expires:

- if one or more parties associated with the call are in the Active, Add Party Initiated or Party Alerting Received party state, the user shall send a DROP PARTY ACKNOWLEDGE message to the network with the cause number originally contained in the DROP PARTY message and enter the Null party state. In addition, the user may indicate a second Cause information element with cause #102, "*recovery on timer expiry*". Equipment may use implementation-dependent recovery procedures, such as initiating status enquiry procedures, to verify that the party has been dropped; or

- if all parties associated with the call are in the Null, Drop Party Received, or Drop Party Initiated party state, the user shall send a RELEASE message to the network with the cause number originally contained in the DROP PARTY message. In addition, the user may indicate a second Cause information element with cause #102, "*recovery on timer expiry*".

The RELEASE message is sent if all other parties belonging to the same call are in the Null party state, Drop Party Initiated party state or Drop Party Received party state. When a RELEASE message is sent, the normal clearing procedures of 5.4/Q.2931 shall be used and all parties (for this call) are dropped (i.e. enter the Null party state and stop all party state timers).

When the network receives a RELEASE message:

- any party in the Drop Party Initiated or Drop Party Received party state shall enter the Null party state; and

- all other parties shall be dropped towards the remote user with the cause contained in the RELEASE message or cause #31, "*normal unspecified*", if no cause was included in the RELEASE message.

  NOTE 2 – After sending a RELEASE message, and while in the Release Request link state, the user shall, on the receipt of an ADD PARTY message, follow the error handling procedures of 9.5.4.

9.3.4   Party dropping initiated by the network

9.3.4.1   At the leaf interface

The network shall initiate party dropping at the leaf interface with a RELEASE message according to the procedures of 5.4.4/Q.2931.

9.3.4.2   At the root interface

Apart from the exception conditions identified in 9.3.2 and 9.5, the network shall initiate dropping a party at the root interface by sending a DROP PARTY or RELEASE message.

A DROP PARTY message is used to initiate party dropping when:

- the party is in the Active or Party Alerting Delivered party states; and

- there are one or more other parties to the call on this interface in the Add Party Received, Party Alerting Delivered or Active party state.

After sending a DROP PARTY message, the network shall start timer T398 and enter the Drop Party Initiated party state.

On receipt of this message, the user shall enter the Drop Party Received party state and:

- when all other parties associated with the call are in the Null, Drop Party Initiated or Drop Party Received party state, the user shall enter the Null party state and send a RELEASE message with cause #31, "*normal, unspecified*"; or

- when any other parties associated with the call are in the Active, Add Party Initiated or Party Alerting Received party state, the user shall send a DROP PARTY ACKNOWLEDGE message and enter the Null party state.

On receipt of the DROP PARTY ACKNOWLEDGE message, the network shall stop timer T398 and return to the Null party state. If all parties associated with the call are in the Null, Drop Party Initiated or Drop Party Received party state, the network shall send a RELEASE message to the user with cause #31, "*normal, unspecified*".

If timer T398 expires:

- if one or more parties associated with the call are in the Active, Party Alerting Delivered or Add Party Received party state, the network shall send a DROP PARTY ACKNOWLEDGE message to the user with the cause number originally contained in the DROP PARTY message, and enter the Null party state. In addition, the network may indicate a second Cause information element with cause #102, "*recovery on timer expiry*". Equipment may use implementation-dependent recovery procedures, such as initiating status enquiry procedures, to verify that the party has been dropped; or

- if all parties associated with the call are in the Null, Drop Party Initiated or Drop Party Received party state, the network shall send a RELEASE message to the user with the cause number originally contained in the DROP PARTY message. In addition, the network may indicate a second Cause information element with cause #102, "*recovery on timer expiry*".

The RELEASE message is used if all other parties belonging to the same call are in the Null, Drop Party Received or Drop Party Initiated party state. When a RELEASE message is used, the normal clearing procedures of 5.4/Q.2931 shall be used and all parties (for this call) are dropped (i.e. enter the Null party state and stop all party state timers). When the user receives a RELEASE message, all parties (for this call) shall enter the Null party state.

NOTE – After sending a RELEASE message, and while in the Release Indication link state, the network shall, on the receipt of an ADD PARTY message, follow the error handling procedures of 9.5.4.

9.3.5   Drop collision

Upon receiving a DROP PARTY or ADD PARTY REJECT message while in the Drop Party Initiated party state, and while there are one or more parties associated with the call in the Active, Add Party Initiated, Party Alerting Received, Party Alerting Delivered or Add Party Received party state, the recipient shall stop timer T398 and enter the Null party state.

Similarly, upon receiving a DROP PARTY or ADD PARTY REJECT message while in the Drop Party Initiated party state, and while all parties associated with the call are in the Null, Drop Party Initiated or Drop Party Received party state, the recipient shall stop timer T398, disconnect the bearer virtual channel, and send a RELEASE message.

With point-to-multipoint connections another type of drop collision occurs when dropping messages (i.e. DROP PARTY, DROP PARTY ACKNOWLEDGE or ADD PARTY REJECT) pertaining to the last two parties on an interface cross. In this case, each entity receiving such a message shall initiate link clearing procedures by returning a RELEASE message and following the clearing procedures in 5.4/Q.2931.

It is possible for a DROP PARTY ACKNOWLEDGE message to cross with a RELEASE message. Accordingly, the network shall ignore DROP PARTY ACKNOWLEDGE messages while in the Release Indication link state and the user shall ignore DROP PARTY ACKNOWLEDGE message while in the Release Request link state.

9.3.6   Dropping of all parties

All parties of a call can be dropped by the root by sending a RELEASE message to the network. The network shall respond to the RELEASE message as specified in 9.3.3.

In order to initiate the dropping of all parties, while in the Active or Call Delivered link state, the network shall first send an ADD PARTY REJECT message for each party in the Add Party Received party state and then shall send a RELEASE message. The user shall respond to the RELEASE message as specified in 9.3.4. In any other link state, the network shall use the call/connection clearing procedures of 5.4/Q.2931 to clear the call and drop all the parties.

9.4   Restart procedure

In addition to the procedures of 5.5/Q.2931, when the virtual channel is restarted, the user and network shall drop all parties associated with the virtual channel. The network shall initiate normal drop party procedures toward the remote user(s) for all parties associated with the call.

9.5 Handling of error conditions

This subclause discusses error handling that specifically applies to adding or dropping parties in a point-to-multipoint call. The normal error procedures of 5.6/Q.2931 and 5.7/Q.2931 also apply.

Subclauses 9.5.1 through 9.5.8 are listed in order of precedence. The precedence of 5.6.1/Q.2931 through 5.6.8/Q.2931 is defined by normative reference from 9.5.1 through 9.5.8 of this Recommendation.

9.5.1 Protocol discriminator error

Refer to 5.6.1/Q.2931.

9.5.2 Message too short

Refer to 5.6.2/Q.2931.

9.5.3 Call reference and endpoint reference errors

9.5.3.1 Call reference procedural errors

Whenever an ADD PARTY, ADD PARTY ACKNOWLEDGE, PARTY ALERTING, ADD PARTY REJECT, DROP PARTY or DROP PARTY ACKNOWLEDGE message is received while in the Null link state, the receiver shall send a RELEASE COMPLETE message with cause #81, "*invalid call reference value*", specifying the Call reference in the received message, and shall remain in the Null link state.

9.5.3.2 Endpoint reference error

The following subclauses in this subclause assume that there are no call reference errors and only the Endpoint reference is in error.

9.5.3.2.1 Missing Endpoint reference

When an ADD PARTY, PARTY ALERTING or ADD PARTY ACKNOWLEDGE message is received without an Endpoint reference information element, then the receiving entity shall take one of the actions listed below, where these actions are listed in order of priority, i.e. the first applicable action shall be taken.

   a)   if there are other information elements that are unrecognized or that have content errors, that have IE instruction field with the flag set to "follow explicit instructions" and indicating "*clear call*", then the receiving entity shall clear the call following the procedures specified in 9.3 with cause #99, "*information element non-existent or not implemented*" or with cause #100, "*invalid information element contents*", as appropriate;

   b)   if there are other information elements that are unrecognized or that have content errors that have IE instruction field with the flag set to "follow explicit instructions" and indicating "*discard message and report status*", a STATUS message shall be returned with cause #99, "*information element non-existent or not implemented*" or with cause #100, "*invalid information element contents*" and procedures of 5.6.7.2/Q.2931 followed. In this case, no Endpoint reference information element and no Endpoint state information element shall be contained in the STATUS message. No other action shall be taken on this message;

   c)   if there are other information elements that are unrecognized or that have content errors that have IE instruction field with the flag set to "follow explicit instructions" and indicating "*discard message*", the message shall be ignored;

   d)   if not a) to c) above, a STATUS message is returned with cause #96, "*mandatory information element is missing*", and procedures of 5.6.7.2/Q.2931 shall be followed. In this case, no Endpoint reference information element and no Endpoint state information element shall be contained in the STATUS message. No other action shall be taken on this message.

When an ADD PARTY REJECT, DROP PARTY or DROP PARTY ACKNOWLEDGE message is received without an Endpoint reference information element, then the receiving entity shall clear the call with cause #96, "*mandatory information element is missing*", following the procedures of 9.3.

9.5.3.2.2 Invalid endpoint reference format

When an ADD PARTY, PARTY ALERTING or ADD PARTY ACKNOWLEDGE message is received with an Endpoint reference information element which is not properly formatted (i.e. incorrect length, type or flag), then the receiving entity shall take one of the actions listed below, where these actions are listed in order of priority, i.e. the first applicable action shall be taken. When an ADD PARTY message is received with an Endpoint reference information element with the flag set to "1", this shall be treated as an Endpoint reference information element which is not properly formatted.

a) if the IE instruction field has the flag set to "follow explicit instructions" and indicates "*clear the call*", the call shall be cleared following the procedures specified in 9.3 with cause #100, "*invalid information element contents*";

b) if there are other information elements that are unrecognized or that have content errors, that have IE instruction field with the flag set to "follow explicit instructions" and indicating "*clear call*", then the receiving entity shall clear the call following the procedures specified in 9.3 with cause #99, "*information element non-existent or not implemented*" or with cause #100, "*invalid information element contents*", as appropriate;

c) if the IE instruction field in the Endpoint reference information element or in another information element that is unrecognized or that has content errors has the flag set to "follow explicit instructions" and indicates "*discard message and report status*", a STATUS message shall be returned with cause #99, "*information element non-existent or not implemented*" or with cause #100, "*invalid information element contents*" and procedures of 5.6.7.2/Q.2931 followed. In this case, no Endpoint reference information element and no Endpoint state information element shall be contained in the STATUS message. No other action shall be taken on this message;

d) if the IE instruction field in the Endpoint reference information element or in another information element that is unrecognized or that has content errors has the flag set to "follow explicit instructions" and indicates "*discard message*", the message shall be ignored;

e) if not a) to d) above, a STATUS message is returned with cause #100, "*invalid information element contents*" and procedures of 5.6.7.2/Q.2931 shall be followed. In this case, no Endpoint reference information element and no Endpoint state information element shall be contained in the STATUS message. No other action shall be taken on this message.

When an ADD PARTY REJECT, DROP PARTY or DROP PARTY ACKNOWLEDGE message is received with an Endpoint reference information element which is not properly formatted, then the receiving entity shall clear the call with cause #100, "*invalid information element contents*", following the procedures of 9.3.

When any other message is received with an Endpoint reference information element which is not properly formatted (i.e. incorrect length, type or flag), then the action taken shall be as specified in 9.5.8. When a SETUP message is received with an Endpoint reference information element with the flag set to "1", this shall be treated as an Endpoint reference information element which is not properly formatted.

9.5.3.2.3 Endpoint reference procedural errors

a) Whenever any message except SETUP, STATUS, STATUS ENQUIRY, ADD PARTY, ADD PARTY REJECT or DROP PARTY ACKNOWLEDGE is received for a party in the Null party state, the recipient shall send a DROP PARTY ACKNOWLEDGE message with cause #89, "*invalid endpoint reference value*" and shall remain in the Null party state.

b) When a DROP PARTY ACKNOWLEDGE or ADD PARTY REJECT message is received for a party in the Null party state, no action shall be taken.

c) When an ADD PARTY message is received while not in the Null or Add Party Received party state, the receiving entity shall send a STATUS message containing the Call state information element, the associated Endpoint reference and Endpoint state information elements and values and cause value #101, "*message not compatible with call state*".

d) When an ADD PARTY message is received while in the Add Party Received party state, the recipient shall ignore the ADD PARTY message.

e)   When a CALL PROCEEDING, ALERTING or CONNECT message is received for a party in the Null party state, the receiver shall send a RELEASE message with cause #89, "*invalid endpoint reference value*".

f)   If a STATUS message is received for a party in the Null party state, the procedures of 9.5.12 shall apply.

g)   If a STATUS ENQUIRY message is received for a party in the Null party state, the procedures of 9.5.11 shall apply.

9.5.4   Message type or message sequence errors

The error handling rules in this subclause shall apply only if the flag in the message compatibility field instruction indicator is set to "message instruction field not significant". If it is set to "follow explicit instructions", the procedures in 5.7.1/Q.2931 shall apply with the exception that:

- when a STATUS message is returned, the endpoint state and Endpoint reference information elements shall be included when a valid Endpoint reference information element was included in the received message; and

- when call clearing occurs, all parties shall be dropped following the procedures of 9.3.6 with the cause specified in Recommendation Q.2931.

Procedures specified in 5.6.4/Q.2931 apply with the following additions.

- when a STATUS message is returned, the endpoint state and Endpoint reference information elements shall be included when a valid Endpoint reference information element was included in the received message.

When the network or user receives an unexpected RELEASE COMPLETE message, the procedures for handling the party states shall be the same as specified in 9.3.3 and subclause 9.3.4 on receipt of a RELEASE message with the exception that cause #111, "*protocol error, unspecified*" is used if no cause is specified in the RELEASE COMPLETE message.

Whenever the network receives an unexpected DROP PARTY ACKNOWLEDGE message, while in the Active or Call Delivered link state, the network shall initiate normal party dropping procedures toward the remote user with the cause indicated by the user or, if not included, cause #111, "*protocol error, unspecified*", stop all party state timers, and enter the Null party state. Whenever the user receives an unexpected DROP PARTY ACKNOWLEDGE message, while in the Active or Call Delivered link state, the user shall stop all party state timers and enter the Null party state. If no parties remain in the Active, Add Party Initiated, Party Alerting Received, Party Alerting Delivered or Add Party Received party state on the call for the layer 3 entity when either side receives the DROP PARTY ACKNOWLEDGE message, then the side receiving the DROP PARTY ACKNOWLEDGE shall disconnect the bearer virtual channel and send a RELEASE message.

The receipt of a ADD PARTY, ADD PARTY ACKNOWLEDGE, ADD PARTY REJECT, PARTY ALERTING or DROP PARTY message in any link state other than the Active or Call Delivered link state is an unexpected message and the procedures of 5.6.4/Q.2931 shall apply, with the exception that when a STATUS message is returned the message shall contain the Endpoint reference and the Endpoint state information elements when the Endpoint reference information element was included in the received message.

The receipt of a DROP PARTY ACKNOWLEDGE message in any link state other than the Active, Call Delivered, Release Indication, or Release Request link state is an unexpected message and the procedures of 5.6.4/Q.2931 shall apply, with the exception that when a STATUS message is returned the message shall contain the Endpoint reference and the Endpoint state information elements when the Endpoint reference information element was included in the received message.

9.5.5   Message length errors

Refer to 5.6.5/Q.2931.

9.5.6   General information element errors

Refer to 5.6.6/Q.2931.

9.5.7 Mandatory information element error

The procedures of 5.6.7/Q.2931 apply, with the following additions listed in this subclause:

- when a STATUS message is returned, the message shall contain the Endpoint reference and the Endpoint state information elements when the Endpoint reference information element was included in the received message;

- when call clearing occurs all parties shall be dropped using the procedures of 9.3.6 with the cause specified in 5.6.7/Q.2931.

9.5.7.1 Mandatory information element missing

When an ADD PARTY message is received which has one or more mandatory information elements missing, the receiver of this message shall send an ADD PARTY REJECT message with cause #96, "*mandatory information element is missing*" following the procedures of 9.3.2.

When a DROP PARTY message is received with the Cause information element missing, the actions taken shall be the same as if a DROP PARTY message with cause #31, "*normal, unspecified*" was received (see 9.3), with the exception that the DROP PARTY ACKNOWLEDGE or RELEASE message, as appropriate, sent on the local interface contains cause #96, "*mandatory information element is missing*".

When a DROP PARTY ACKNOWLEDGE or ADD PARTY REJECT message is received with a Cause information element missing, the recipient shall process the message as if it was received with cause #31, "*normal, unspecified*".

9.5.7.2 Mandatory information element content error

The procedure in this subclause applies only when the flag of the IE instruction indicator is set to "IE instruction field not significant".

When an ADD PARTY message is received which has one or more mandatory information elements with invalid content, an ADD PARTY REJECT or RELEASE message, as appropriate, with cause #100, "*invalid information element contents*" shall be returned following the procedures of 9.3.2 or of 5.4/Q.2931, respectively.

When a DROP PARTY message is received with invalid content of the Cause information element, the actions taken shall be the same as if a DROP PARTY message with cause #31, "*normal, unspecified*", was received (see 9.3), with the exception that the DROP PARTY ACKNOWLEDGE or RELEASE message, as appropriate, sent on the local interface contains cause #100, "*invalid information element contents*".

When a DROP PARTY ACKNOWLEDGE message is received with invalid content of the Cause information element, the recipient shall process the DROP PARTY ACKNOWLEDGE message as if it was received with cause #31, "*normal, unspecified*".

When an ADD PARTY REJECT message is received with invalid content of the Cause information element, the recipient shall process the ADD PARTY REJECT message as if it was received with cause #31, "*normal, unspecified*".

9.5.8 Non-mandatory information element errors

The procedures of 5.6.8/Q.2931 apply, with the following additions in this subclause:

- when a STATUS message is returned, the message shall contain the Endpoint reference and the Endpoint state information elements when the Endpoint reference information element was included in the received message;

- when call clearing occurs, all parties shall be dropped using the procedures of 9.3.6 with the cause specified in Recommendation Q.2931.

9.5.8.1 Unrecognized information element

If a DROP PARTY, DROP PARTY ACKNOWLEDGE or ADD PARTY REJECT message contains one or more unrecognized information elements for which:

a) none of the unrecognized information elements have an IE instruction indicator that has the flag set to "follow explicit instructions" and indicates "*discard message and report status*", "*discard message*" or "*clear call*"; and

b) one or more of the unrecognized information elements have an IE instruction indicator that either have the flag set to "IE instruction field not significant" or have an IE instruction field that indicates "*discard information element, proceed, and report status*";

then, either:

    a) if the received message is a DROP PARTY message, the recipient shall send a DROP PARTY ACKNOWLEDGE or RELEASE message, as appropriate (see 9.3), with cause #99, "*information element non-existent or not implemented*". The diagnostic field of the Cause information element, if present, shall contain the information element identifier for each information element which was unrecognized, subject to the length constraint of the Cause information element; or

    b) if the received message is a DROP PARTY ACKNOWLEDGE or ADD PARTY REJECT message, no action shall be taken on the unrecognized information.

    NOTE – The diagnostic(s) of cause #99 facilitates the decision in selecting an appropriate recovery procedure at the reception of a STATUS message. Therefore, it is recommended to provide cause #99 with diagnostic(s) if a layer 3 entity expects the peer to take an appropriate action at the receipt of a STATUS message, although inclusion of diagnostic(s) is optional.

9.5.9 Signalling AAL connection reset

Whenever, the user or network receives an indication of a Signalling AAL reset (see clause 8/Q.2931) by means of the AAL-ESTABLISH.indication primitive, the following procedures apply in addition to the procedures of 5.6.9/Q.2931:

    a) while in a Drop Party Initiated or Drop Party Received party state, no action shall be taken;

    b) while in an Add Party Initiated, Party Alerting Received, Party Alerting Delivered or Add Party Received party state, the party state shall be maintained and optionally the status enquiry procedure of 9.5.11 may be invoked;

    c) while in the Active party state, the party state shall be maintained and the entity shall invoke the status enquiry procedures described in 9.5.11.

When the status enquiry procedure is invoked for one or more parties of a call, then the status enquiry procedures specified in 5.6.9/Q.2931 shall not be invoked in addition.

9.5.10 Signalling AAL connection release

Whenever the network layer entity is notified by its Signalling AAL entity via the AAL-RELEASE.indication primitive that there is a Signalling AAL malfunction, the following procedure shall apply in addition to the procedures of 5.6.10/Q.2931:

    a) a party in any party state other than the Active party state shall be dropped internally;

    b) when informed of signalling AAL re-establishment by means of the AAL-ESTABLISH.confirm primitive, the status enquiry procedures of 9.5.11 shall be used to verify the call state of the peer entity per each party;

    c) when the network clears a call due expiry of timer T309, the network shall drop all parties associated with the call for the layer 3 entity. The network shall initiate normal drop party procedures, with cause #27, "*destination out of order*", towards the remote user(s) for all parties associated with call.

    NOTE – Where multiple parties are in party states other than the Null party state, then according to the procedures of 9.5.11, each status enquiry procedure should be invoked in sequence on completion of the preceding status enquiry procedure.

9.5.11 Status enquiry procedure

The procedures of 5.6.11/Q.2931 shall apply with the following extensions. When verifying a party state, the user or network shall send a STATUS ENQUIRY message with the Endpoint reference of the party state to be checked. When verifying just the call state, the procedures of 5.6.11/Q.2931 shall apply.

Upon receipt of a STATUS ENQUIRY message which includes an Endpoint reference information element, the receiver shall respond with a STATUS message, reporting the current party state (the current party state of an active party or a party in progress, or the Null party state if the Endpoint reference does not relate to an active party or a party in progress), the link state and cause #30, "*response to status enquiry*". Receipt of the STATUS ENQUIRY message shall not result in a party state change.

Upon receipt of a STATUS ENQUIRY message without an Endpoint reference information element, the procedures of 5.6.11/Q.2931 shall apply.

The sending or receipt of the STATUS message in such a situation shall not directly affect the party state of either the sender or receiver. The side having received the STATUS message shall inspect the Cause information element. If a STATUS message is received that contains cause #30, "*response to status enquiry*", timer T322 shall be stopped and the appropriate action taken, based on the information in that STATUS message, relative to the current link state and party state of the receiver.

9.5.12   Receiving a STATUS message

On receipt of a STATUS message reporting an incompatible link state, the procedures of 5.6.12/Q.2931 shall apply. The additional procedures of this subclause shall apply only upon receipt of a STATUS message reporting either a compatible link state or reporting an incompatible link state that the receiving entity recovers from by using procedures that are an implementation-dependent option. On receipt of such a STATUS message reporting an incompatible party state, the receiving entity shall:

  a) drop the party by sending the appropriate dropping message with cause #101, "*message not compatible with call state*"; or

  b) take other actions which attempt to recover from a mismatch and which are an implementation option.

Except for the following rules, the determination of which party states are incompatible is left as an implementation decision:

  a) If a STATUS message indicating any party state except the Null party state is received in the Null party state, then the receiving entity shall send a DROP PARTY ACKNOWLEDGE message with cause #101, "*message not compatible with call state*" and remain in the Null party state.

  b) If a STATUS message indicating any party state except the Null party state is received in the Drop Party Initiated party state, no action shall be taken.

  c) If a STATUS message indicating the Null party state is received in any party state except the Null party state, the receiver shall internally drop the party and enter the Null party state. If no other party of the call is in the Active, Add Party Initiated, Party Alerting Received, Party Alerting Delivered or Add Party Received party states, call clearing will be initiated with a RELEASE message.

When in the Null party state, the receiver of a STATUS message indicating the Null party state shall take no action other than to discard the message and shall remain in the Null party state.

A STATUS message may be received indicating a compatible party state but containing one of the following causes:

#96   "*mandatory information element is missing*";

#97   "*message type non-existent or not implemented*";

#99   "*information element non-existent or not implemented*"; *or*

#100   "*invalid information element contents*".

In this case, the actions to be taken are an implementation option. If other procedures are not defined, the receiver shall drop the party with the appropriate procedure defined in 9.3, using the cause specified in the received STATUS message.

9.6   Notification procedure

The procedures of 5.9/Q.2931 shall apply with the following extensions:

When a NOTIFY message is to be sent towards the root, by the destination user or by the originating network, that is related to a specific leaf, then the Endpoint reference information element shall be included.

When the network forwards a notification provided by the root in a NOTIFY message, the network shall deliver it to all the leaves. However, delivery to leaves not in the Active or Party Alerting Delivered party state is not assured.

10 Procedures at the T_B reference point for interworking with private B-ISDNs

This clause specifies procedures in addition to those of clause 9 required at the T_B reference point for interworking with private B-ISDNs.

10.1 Adding a party at the originating interface

The procedures of 9.1 apply with the exception that the term root should be interpreted as the originating user.

10.2 Add party establishment at the destination interface

The network will indicate the arrival of an add party request at the user-network interface by transferring a SETUP (see 10.2.1) or ADD PARTY (see 10.2.2) message across the interface.

10.2.1 Setup of the initial party at the destination interface

The procedures of 9.2 shall apply with the following additions:

- on the receipt of an ALERTING message, the network shall start timer T397 and shall not start timer T301;

- if a CALL PROCEEDING, ALERTING or CONNECT message is the first message the network receives in response to the SETUP message and it does not contain an Endpoint reference information element, this shall not be treated as an error and the procedures of 9.2.1 shall be followed for the initial party and for subsequent parties a SETUP message shall be used following the procedures of 9.2 (instead of the procedures of 10.2.2);

- upon the expiry of timer T310 or upon the second expiry of timer T303, the network shall initiate normal party drop procedures toward the root for all pending add party requests in the add party queue, with cause #18, "*no user responding*".

10.2.2 Adding a party

10.2.2.1 Incoming add party request

Upon reception of an add party request, and if resources for adding a party are available, the network shall transfer an ADD PARTY message across the UNI, start timer T399 and enter the Add Party Initiated party state. The network shall transfer the ADD PARTY message only if the link is in the Active, or Call Received link state. If resources are unavailable, the add party request shall be dropped toward the calling user with cause #47, "*resource unavailable, unspecified*".

Upon receipt of an ADD PARTY message, the user shall enter the Add Party Received party state.

If there is one and only one party in the Add Party Initiated party state and the call is not in the Active or Call Received link state, additional add party requests shall be queued by the network on the add party queue until the link state becomes Call Received, Active, Null, Release Indication or Release Request. At this point the queued add party requests are treated as if they had just arrived. If the network is unable to queue any additional add party requests, the network shall initiate add party reject towards the calling user with cause #32, "*too many pending add party requests*".

10.2.2.2 Address and compatibility check

There are no requirements.

10.2.2.3 QOS and traffic parameter selection procedures

If the user is not able to support the add party request with the ATM traffic parameters or QOS class specified in the call/connection set-up request, the user shall reject the add party request by returning an ADD PARTY REJECT message according to the procedures of 10.3.2 with cause #47, "*resources unavailable, unspecified*" or cause #49, "*quality of service unavailable*", respectively.

The cumulative end-to-end transit delay is indicated in the End-to-end transit delay information element. If the user is not able to accept the indicated end-to-end transit delay, the user shall reject the add party request, returning an ADD PARTY REJECT message with cause #49, "*quality of service unavailable*".

10.2.2.4 Call/connection confirmation

10.2.2.4.1 Response to an add party request

In response to an add party request, the user may respond with either a PARTY ALERTING, ADD PARTY ACKNOWLEDGE, ADD PARTY REJECT or CONNECT message, as appropriate.

Upon receiving an indication that the add party request has been accepted by the ATM endpoint, the user (e.g. private ATM switch) shall send an ADD PARTY ACKNOWLEDGE or CONNECT message and enter the Active party state. The CONNECT message shall be used if the call is in the Call Received link state and the ADD PARTY ACKNOWLEDGE message shall be used in the Active and Connect Request link states.

Upon receiving an indication that called party alerting has been initiated for the add, the user (e.g. private ATM switch) shall send a PARTY ALERTING message and enter the Party Alerting Delivered party state.

Upon receiving an indication that the add party request has been rejected (e.g. because of user busy), the user (e.g. private ATM switch) shall send an ADD PARTY REJECT message with an appropriate cause, enter the Null party state and follow the procedures of 10.3.2.

10.2.2.4.2 Receipt of party alerting

When the network receives a PARTY ALERTING message from a user, the network shall stop timer T399, start timer T397, enter the Party Alerting Received party state and send a corresponding PARTY ALERTING message towards the calling user (root).

10.2.2.5 Called user rejection of incoming call establishment

If an ADD PARTY REJECT or DROP PARTY message is received while in the Add Party Initiated or Party Alerting Received party states, the network shall drop the party following the procedures of 10.3.2 and 10.3.3.

10.2.2.6 Call failure

If timer T399 expires (i.e. the network has not yet received any response to the transmitted ADD PARTY message), then the network shall initiate party dropping procedures towards the calling user with cause #18, "*no user responding*" and if there are no remaining parties in the Active, Party Alerting Received or Add Party Initiated party states, then the network shall send a RELEASE message to the called user. The cause used in the RELEASE message is #31, "*normal unspecified*".

If timer T397 expires (i.e. the network has received an ALERTING or PARTY ALERTING message for the party but has not yet received a CONNECT, RELEASE, ADD PARTY ACKNOWLEDGE, or DROP PARTY message for the party), then the network shall initiate party dropping towards the calling user with cause #19, "*no answer from user (user alerted)*", and shall initiate dropping of the party at the destination interface with cause #102, "*recovery on timer expiry*" according to the procedures of 10.3.4.

10.2.3 Call/connection accept

A user indicates acceptance of an incoming add party request by sending an ADD PARTY ACKNOWLEDGE or CONNECT message to the network. The CONNECT message shall be used if the call is in the Call Received link state and the ADD PARTY ACKNOWLEDGE message shall be used in the Active and Connect Request link states.

Upon sending an ADD PARTY ACKNOWLEDGE message, the user shall enter the Active party state.

Upon receipt of a CONNECT ACKNOWLEDGE message, while in the Connect Request link state, the user shall enter the Active party state.

If an add party request can be accepted and no user alerting is required, an ADD PARTY ACKNOWLEDGE or CONNECT message is sent without a previous PARTY ALERTING message.

10.2.4 Active indication

On receipt of the ADD PARTY ACKNOWLEDGE or CONNECT message, the network shall stop timer T399 or T397, enter the Active party state, and initiate procedures to send an ADD PARTY ACKNOWLEDGE message towards the calling user.

10.3 Party dropping

10.3.1 Terminology

Terminology is defined in 5.4.1/Q.2931.

10.3.2 Exception conditions

Under normal conditions, dropping a party is initiated when the user or the network sends either a DROP PARTY or RELEASE message and follows the procedures defined in 10.3.3 and 10.3.4. The only exceptions to the above rule are as follows:

a) in response to a SETUP message, provided no other response to the SETUP message has previously been sent, the call clearing procedures of 5.4.2/Q.2931 shall apply;

b) in response to an ADD PARTY message, provided no other response to the ADD PARTY message has previously been sent, the procedure to reject the add party request shall be to send an ADD PARTY REJECT message and enter the Null party state. In addition, after sending the ADD PARTY REJECT message, if there are no remaining parties in the Active, Party Alerting Delivered, or Add Party Received party state, then a RELEASE message shall be sent. The cause used in the RELEASE message is #31, "*normal, unspecified*".

10.3.3 Party dropping initiated by the user

Apart from the exceptions identified in 10.3.2 and 10.5, in order to drop a party, the user shall send a DROP PARTY or RELEASE message.

A DROP PARTY message is used to initiate party dropping when:

- the party is in the Active, Party Alerting Received, Party Alerting Delivered or Add Party Initiated party state; and

- there are one or more other parties to the call on this interface in the Add Party Initiated, Add Party Received, Party Alerting Received, Party Alerting Delivered or Active party state.

After sending a DROP PARTY message, the user shall start timer T398 (the value of timer T398 is specified in clause 13), and enter the Drop Party Initiated party state.

On receipt of the DROP PARTY message, the network shall enter the Drop Party Received party state and:

- when any other party associated with the call is in the Active, Add Party Initiated, Party Alerting Received, Party Alerting Delivered or Add Party Received party state, the network shall initiate procedures for dropping the party along the path to the remote user, send a DROP PARTY ACKNOWLEDGE message to the user, and enter the Null party state; or

- when all other parties associated with the call are in the Null, Drop Party Initiated, or Drop Party Received party state, the network shall enter the Null party state for that party, initiate procedures for dropping the party along the path to the remote user, and send a RELEASE message to the user with cause #31, "*normal, unspecified*".

   NOTE 1 – The DROP PARTY ACKNOWLEDGE message has only local significance and does not imply an acknowledgement of dropping from the remote user.

On receipt of the DROP PARTY ACKNOWLEDGE message, the user shall stop timer T398 and return to the Null party state. If all parties associated with the call are in the Null, Drop Party Initiated or Drop Party Received party state, the user shall send a RELEASE message with cause #31, "*normal, unspecified*".

If timer T398 expires:

- if one or more parties associated with the call are in the Active, Add Party Initiated, Party Alerting Delivered, Party Alerting Received or Add Party Received party state, the user shall send a DROP PARTY ACKNOWLEDGE message to the network with the cause number originally contained in the DROP PARTY message and enter the Null party state. In addition, the user may indicate a second cause information element with Cause #102, "*recovery on timer expiry*". Equipment may use implementation-dependent recovery procedures, such as initiating status enquiry procedures, to verify that the party has been dropped; or

- if all parties associated with the call are in the Null, Drop Party Received or Drop Party Initiated party state, the user shall send a RELEASE message to the network with the cause number originally contained in the DROP PARTY message. In addition, the user may indicate a second Cause information element with cause #102, "*recovery on timer expiry*".

The RELEASE message is sent if all other parties belonging to the same call which are controlled by the same layer 3 signalling entity are in the Null party state, a Drop Party Initiated party state or a Drop Party Received party state. When a RELEASE message is sent, the normal clearing procedures of 5.4/Q.2931 shall be used and all parties (for this call) are dropped (i.e. enter the Null party state and stop all party state timers).

When the network receives a RELEASE message:

- any party in the Drop Party Initiated or Drop Party Received party state shall enter the Null party state;

- any party in the Add Party Received, Party Alerting Received, Party Alerting Delivered, or Active party state shall be dropped towards the remote user with the cause contained in the RELEASE message or cause #31, "*normal unspecified*" if no cause was included in the RELEASE message;

- parties in the Add Party Initiated party state shall be placed on the add party queue; and

- if there are queued add party requests on the add party queue, the network shall transmit one of the add party requests as a SETUP message with a new call reference value and the same information element values as the previous call according to the procedures of 10.2.1. After the network receives an ALERTING message or has sent a CONNECT ACKNOWLEDGE message in response to a CONNECT message for this SETUP message, the network shall transmit ADD PARTY messages using this new call reference value for the remaining add party requests on the add party queue**.**

    NOTE 2 – After sending a RELEASE message and while in the Release Request link state, the user shall, on the receipt of an ADD PARTY message, follow the error handling procedures of 10.5.

10.3.4   Party dropping initiated by the network

Apart from the exception conditions identified in 10.3.2 and 10.5, in order to drop a party, the network shall send a DROP PARTY or RELEASE message.

A DROP PARTY message is used to initiate party dropping when:

- the party is in the Active, Party Alerting Delivered, Party Alerting Received or Add Party Initiated party states; and

- there are other parties to the call on this interface in the Add Party Initiated, Add Party Received, Party Alerting Delivered, Party Alerting Received or Active party state.

After sending a DROP PARTY message, the network shall start timer T398 and enter the Drop Party Initiated party state.

On receipt of the DROP PARTY message, the user shall enter the Drop Party Received party state and:

- when all other parties associated with the call are in the Null, Drop Party Initiated or Drop Party Received party state, the user shall enter the Null party state and send a RELEASE message to the network with cause #31, "*normal, unspecified*"; or

- when any other parties associated with the call are in the Active, Add Party Initiated, Party Alerting Delivered, Party Alerting Received or Add Party Received party state, the user shall send a DROP PARTY ACKNOWLEDGE message and enter the Null party state.

On receipt of the DROP PARTY ACKNOWLEDGE message, the network shall stop timer T398 and return to the Null party state. If all parties associated with the call are in the Null, Drop Party Initiated or Drop Party Received party state, the network shall send a RELEASE message to the user with cause #31, "*normal, unspecified*".

If timer T398 expires:

- if one or more parties associated with the call are in the Active, Add Party Initiated, Party Alerting Received, Party Alerting Delivered or Add Party Received party state, the network shall send a DROP PARTY ACKNOWLEDGE message to the user with the cause number originally contained in the DROP PARTY message and enter the Null party state. In addition, the network may indicate a second Cause information element with cause #102, "*recovery on timer expiry*". Equipment may use implementation-dependent recovery procedures, such as initiating status enquiry procedures, to verify that the party has been dropped;

- if all parties associated with the call are in the Null, Drop Party Initiated or Drop Party Received party state, the network shall send a RELEASE message to the user with the cause number originally contained in the DROP PARTY message. In addition, the network may indicate a second Cause information element with cause #102, "*recovery on timer expiry*".

The RELEASE message is used if all other parties belonging to the same call which are controlled by the same layer 3 signalling entity are in the Null, Drop Party Received, or Drop Party Initiated party state. When a RELEASE message is used, the normal clearing procedures of 5.4/Q.2931 shall be used and all parties (for this call) are dropped (i.e. enter the Null party state and stop all party state timers).

When the user receives a RELEASE message:

- any party in the Drop Party Initiated or Drop Party Received party state shall enter the Null party state;

- any party in the Add Party Received, Party Alerting Delivered, Party Alerting Received, or Active party states shall enter the Null party state; and

- as an option, the user may internally drop all parties in the Add Party Initiated party state and on the add party queue. Alternatively, the user may place parties in the Add Party Initiated party state on the add party queue and transmit one of the add party requests on the add party queue as a SETUP message with a new call reference value and the same information element values as the previous call according to the procedures of 10.1. After the user receives an ALERTING or CONNECT message for this SETUP message, the user may transmit ADD PARTY messages using this new call reference value for the remaining add party requests on the add party queue.

NOTE – After sending a RELEASE message, and while in the Release Indication link state, the network shall, on the receipt of an ADD PARTY message, follow the error handling procedures of 10.5.

10.3.5   Drop collision

Upon receiving a DROP PARTY or ADD PARTY REJECT message while in the Drop Party Initiated party state and while there are one or more parties associated with the call in the Active, Add Party Initiated, Party Alerting Received, Party Alerting Delivered or Add Party Received party state, the recipient shall stop timer T398 and enter the Null party state.

Similarly, upon receiving a DROP PARTY or ADD PARTY REJECT message while in the Drop Party Initiated party state, and while all parties associated with the call are in the Null, Drop Party Initiated or Drop Party Received party state, the recipient shall stop timer T398, disconnect the bearer virtual channel and send a RELEASE message.

With point-to-multipoint connections, another type of drop collision occurs when dropping messages (i.e. DROP PARTY, DROP PARTY ACKNOWLEDGE or ADD PARTY REJECT) pertaining to the last two parties on an interface cross. In this case, each entity receiving such a message shall initiate link clearing procedures by returning a RELEASE message and following the clearing procedures in 5.4/Q.2931.

It is possible for a DROP PARTY ACKNOWLEDGE message to cross with a RELEASE message. Accordingly, the network shall ignore DROP PARTY ACKNOWLEDGE messages while in the Release Indication link state and the user shall ignore DROP PARTY ACKNOWLEDGE messages while in the Release Request link state.

10.3.6 Dropping of all parties

The originating user can drop all parties of a call on the originating interface by sending a RELEASE message to the network. The network shall respond to the RELEASE message as specified in 10.3.3.

The destination network can drop all parties of a call on a destination interface by sending a RELEASE message to the user. The user shall respond to the RELEASE message as specified in 10.3.4.

The originating network, while in the Active or Call Delivered link state, or the destination user, while in the Call Received, Connect Request or Active link state may drop all parties on the local interface by first sending an ADD PARTY REJECT message for each party in the Add Party Received party state and then sending a RELEASE message. The user or network shall respond to the RELEASE message as specified in 10.3.4 or 10.3.3, respectively. In any other link state, the originating network and destination user shall use the call/connection clearing procedures of 5.4/Q.2931 to clear the call and drop all parties.

10.4 Restart procedure

The procedures of 9.4 shall apply with the following addition.

When a call is cleared due to the restart procedure, all parties associated with the call shall be dropped. The network shall initiate normal drop party procedures, with cause #41, "*temporary failure*", towards the remote user(s) for all parties associated with call, including those for which there is a pending add party request in the add party queue.

10.5 Handling of error conditions

The procedures of 9.5 shall apply with the following exceptions and additions:

- References to the party dropping procedures of 9.3 shall be replaced by the corresponding procedures of 10.3.

- Whenever the network receives an unexpected DROP PARTY ACKNOWLEDGE message, while in the Active, Connect Request, Call Received or Call Delivered link state, the network shall initiate normal party dropping procedures toward the remote user with the cause indicated by the user or, if not included, cause #111, "*protocol error, unspecified*", stop all party state timers, and enter the Null party state. Whenever the user receives an unexpected DROP PARTY ACKNOWLEDGE message, while in the Active, Connect Request, Call Received or Call Delivered link state, the user shall stop all party state timers and enter the Null party state. If no parties remain in the Active, Add Party Initiated, Party Alerting Received, Party Alerting Delivered or Add Party Received party state on the call for the layer 3 entity when either side receives the DROP PARTY ACKNOWLEDGE message, then the side receiving the DROP PARTY ACKNOWLEDGE shall disconnect the bearer virtual channel and send a RELEASE message.

- The receipt of an ADD PARTY, ADD PARTY ACKNOWLEDGE or PARTY ALERTING message in any link state other than the Active, Connect Request, Call Received or Call Delivered link state is an unexpected message and the procedures of 5.6.4/Q.2931 shall apply, with the exception that when a STATUS message is returned the message shall contain the Endpoint reference and the Endpoint state information elements when the Endpoint reference information element was included in the received message.

- The receipt of a DROP PARTY ACKNOWLEDGE message in any link state other than the Active, Connect Request, Call Received, Release Request, Release Indication, or Call Delivered link state is an unexpected message and the procedures of 5.6.4/Q.2931 shall apply, with the exception that when a STATUS message is returned the message shall contain the Endpoint reference and the Endpoint state information elements when the Endpoint reference information element was included in the received message.

- The procedures of 5.6.10/Q.2931 shall apply as modified by 9.5.10 and with the following additional modification:

  - When a call not in the active link state is cleared as a result of the Q.2931 entity being notified of its Signalling AAL connection release by means of the AAL-RELEASE.indication primitive, the network shall drop all parties associated with the call for the layer 3 entity, including those parties on the add party request queue. The network shall initiate normal drop party procedures for these parties, with cause #27, "*destination out of order*", towards the remote user(s).

10.6 Notification procedures

The procedures of 9.6 shall apply.

11 Interworking with other networks

Currently no interworking with other networks is specified.

12 Interactions with supplementary services

See Annexes C and D for the interactions with supplementary services.

13 Parameter values

The description of the timers in the following tables provides the default values of the timers and a brief summary of their use. The precise detail is specified in clauses 9 and 10.

13.1 Timers at the user side

The timers specified in Table 13-1 are used on the user side.

TABLE 13-1/Q.2971

Timers in the user side defined in clauses 9 and 10

Timer number	Default time-out value	Party state of call	Cause for start	Normal stop	At the first expiry	At the second expiry	Implemen-tation
T397	Minimum of 3 minutes (Note 1)	Party Alerting Received party state	ALERTING or ADD PARTY ALERTING received	ADD PARTY ACKNOWLEDGE received	Drop the Party (DROP PARTY or RELEASE) (see 10.2.2.6)	Timer is not restarted	Only mandatory if Annex A supported
T398	4 seconds	Drop Party Initiated party state	DROP PARTY sent	DROP PARTY ACKNOWLEDGE or RELEASE received	Send DROP PARTY ACKNOWL-EDGE or RELEASE (see 9.3.3)	Timer is not restarted	Mandatory
T399	34-124 seconds (Note 2)	Add Party Initiated party state	ADD PARTY sent	ADD PARTY ACKNOWLEDGE, PARTY ALERTING or ADD PARTY REJECT received	Send DROP PARTY or RELEASE (see 9.1.6)	Timer is not restarted	Mandatory

NOTES

1   This timer should have the same value as T301 (see clause 7/Q.2931).

2   This should have the same value as the sum of T303 and T310 (see clause 7/Q.2931).

13.2 Timers at the network side

The timers specified in Table 13-2 are used on the network side.

TABLE 13-2/Q.2971

Timers in the network side defined in clauses 9 and 10

Timer number	Default time-out value	Party state of call	Cause for start	Normal stop	At the first expiry	At the second expiry	Implemen-tation
T397	Minimum of 3 minutes (Note 1)	Party Alerting Received party state	ALERTING or ADD PARTY ALERTING received	ADD PARTY ACKNOWLEDGE received	Drop the Party (DROP PARTY or RELEASE) (see 10.2.2.6)	Timer is not restarted	Mandatory
T398	4 seconds	Drop Party Initiated party state	DROP PARTY sent	DROP PARTY ACKNOWLEDGE or RELEASE received	Send DROP PARTY ACKNOWL-EDGE or RELEASE (see 9.3.4)	Timer is not restarted	Mandatory
T399	14 seconds (Note 2)	Add Party Initiated party state	ADD PARTY sent	ADD PARTY ACKNOWLEDGE, PARTY ALERTING or ADD PARTY REJECT received	Send DROP PARTY or RELEASE (see 10.2.2.6)	Timer is not restarted	Mandatory

NOTES

1   This timer should have the same value as T301 (see clause 7/Q.2931).

2   This should have the same value as the sum of T303 and T310 (see clause 7/Q.2931).

14 Dynamic description (SDLs)

Detailed Specification and Description Language (SDL) diagrams for the procedures specified in clauses 9 and 10 are contained in the SDL diagrams appearing in Annex F. When there is an ambiguity in the narrative text, the SDL diagrams should be used to resolve the conflict. Where the text and the SDL are in disagreement, the text should be used as the prime source.

The terminology and acronyms of Annex A/Q.2931 shall apply in the SDLs in this clause. These SDLs extend the SDLs defined in Annex A/Q.2931 and should be read in conjunction with the SDLs in Annex A/Q.2931. Any inconsistency between these SDLs and the SDLs of Annex A/Q.2931 for a point-to-point call are unintentional and in such cases the SDLs of Annex A/Q.2931 should take precedence.

Annex A

Extensions for symmetric call operation

(This annex forms an integral part of this Recommendation)

The procedures in this annex extend the symmetric call operation procedures in Annex H/Q.2931 to point-to-multipoint connections. The following optional procedures are needed for the procedures in this Recommendation to be symmetric:

–   User endpoints implement the network side timer T397 along with the corresponding network side procedures for actions taken upon expiration of the timer.

Annex B

Transit network selection

(This annex forms an integral part of this Recommendation)

The procedures in this annex extend the procedures of Annex D/Q.2931 to support transit network selection in an add party request via an ADD PARTY message. The following additions to Annex D/Q.2931 apply:

    1)   The procedures for handling the SETUP message apply to the ADD PARTY message.

    2)   Reference to call clearing should be to party dropping and 9.3.

Annex C

Amendments to Recommendation Q.2951 to support calls/connections using the procedures of Recommendation Q.2971

(This annex forms an integral part of this Recommendation)

This annex contains the necessary amendments to Recommendation Q.2951 to allow these supplementary services to be used in association with point-to-multipoint calls/connections. The amendments contained in this annex will ultimately be incorporated in Recommendation Q.2951, and this annex deleted. The references, definitions and abbreviations are as defined in Recommendation Q.2951.

Amendment to Recommendation Q.2951 subclause 1.2

Add to the end of subclause 1.2:

"[7]   ITU-T Recommendation Q.2971 (1995), *Broadband Integrated Services Digital Network (B-ISDN) – Digital Subscriber Signalling System No. 2 (DSS 2) – User-network interface layer 3 specification for point-to-multipoint call/connection control.*"

Amendment to Recommendation Q.2951 subclause 1.6.4

Add to the 1st paragraph of subclause 1.6.4:

"The use of overlap receiving procedures are not applicable for point-to-multipoint calls/connections. For point-to-multipoint calls/connections, Recommendation Q.2971 [7] and subclauses 10.2.1 and 10.2.2.1 are applicable."

Amendment to Recommendation Q.2951 subclause 1.7

Add to the end of subclause 1.7, 1st paragraph:

"For point-to-multipoint calls/connection the states associated with point-to-multipoint call control according to Recommendation Q.2971 [7] are also applicable."

Amendment to Recommendation Q.2951 subclause 1.10.1

Amend the title of subclause 1.10.1 to:

"DDI number delivery for point-to-point calls"

Addition of new Recommendation Q.2951 subclause 1.10.2

"1.10.2   DDI number delivery for point-to-multipoint calls/connections

1.10.2.1   Setup of the initial party at the destination interface

1.10.2.1.1   Normal operation

The DDI number is delivered from network to the called user according to the procedures of Recommendation Q.2971 [7] subclause 10.2.1. The coding of the numbering plan identification field and the type of number field are as defined in subclause 1.10.1.1 of this Recommendation.

1.10.2.1.2   Exceptional procedures

No exceptional procedures are required.

1.10.2.2   Adding a party

1.10.2.2.1   Normal operation

The DDI number is delivered from the network to the called user according to the procedures of Recommendation Q.2971 [7] subclause 10.2.2.1. The coding of the numbering plan identifier field and the type of number field are as defined in subclause 1.10.1.1 of this Recommendation.

1.10.2.1.2   Exceptional procedures

No exceptional procedures are required."

Amendment to Recommendation Q.2951 subclause 2.2

Add to the end of subclause 2.2:

"[7]   ITU-T Recommendation Q.2971 (1995), *Broadband Integrated Services Digital Network (B-ISDN) – Digital Subscriber Signalling System No. 2 (DSS 2) – User-network interface layer 3 specification for point-to-multipoint call/connection control.*"

Amendment to Recommendation Q.2951 subclause 2.6.2

Add to the end of subclause 2.6.2, 1st paragraph:

"For point-to-multipoint calls/connections, Recommendation Q.2971 [7] subclauses 9.1.1 and 9.1.2 are applicable."

Add to the end of subclause 2.6.2, 2nd paragraph:

"For an add party request on point-to-multipoint calls the basic or supplementary service profile determined from the original call request shall apply, and shall not be altered by the use of a different multiple subscriber number."

Amendment to Recommendation Q.2951 subclause 2.6.4

Add to the end of subclause 2.6.4 the following paragraph:

"For point-to-multipoint calls/connections, Recommendation Q.2971 [7] subclause 9.2 is applicable."

Amendment to Recommendation Q.2951 subclause 2.7

Add to the end of subclause 2.7 the following paragraph:

"For point-to-multipoint calls/connection the states associated with point-to-multipoint call control according to Recommendation Q.2971 [7] are also applicable."

Amendment to Recommendation Q.2951 subclause 3.2

Add to the end of subclause 3.2:

"[7]   ITU-T Recommendation Q.2971 (1995), *Broadband Integrated Services Digital Network (B-ISDN) – Digital Subscriber Signalling System No. 2 (DSS 2) – User-network interface layer 3 specification for point-to-multipoint call/connection control.*"

Amendment to Recommendation Q.2951 subclause 3.6.2

Add to the end of subclause 3.6.2 the following paragraph:

"For point-to-multipoint calls/connections, information pertaining to the CLIP supplementary service shall also be inserted in the ADD PARTY or SETUP message sent as part of basic call procedures according to clauses 9 and 10 of Recommendation Q.2971 [7]."

Amendment to Recommendation Q.2951 subclause 3.7

Amend the 1st paragraph of subclause 3.7 as follows:

"For point-to-point calls/connections, all information pertaining to the CLIP supplementary service is inserted in the SETUP message. For point-to-multipoint calls/connections, information pertaining to the CLIP supplementary service is also inserted in the ADD PARTY message. Subclauses 4.5.13 and 4.5.14 of Recommendation Q.2931 give the coding for the Calling party number and Calling party subaddress information elements which are required to support this service. The purpose of the Calling party number information element is to identify the origin of a call. The purpose of the Calling party subaddress information element is to identify a subaddress associated with the origin of the call."

Amendment to Recommendation Q.2951 subclause 3.9.2.1.1.2

Amend the 2nd paragraph of subclause 3.9.2.1.1.2 as follows:

"When a SETUP or, for point-to-multipoint calls/connections, an ADD PARTY message is received from the calling user, the network shall check to see if the Calling party number and Calling party subaddress information elements are included."

Amend the 8th paragraph of subclause 3.9.2.1.1.2 as follows:

"If the SETUP or ADD PARTY message does not contain the Calling party number information element, the network shall use a default number associated with the calling user. The network shall set the screening indicator to *network provided*."

Amend the 10th and 11th paragraphs of subclause 3.9.2.1.1.2 as follows:

"The information determined by the procedures above shall be forwarded to the destination local exchange in association with the basic call requester, for point-to-multipoint calls, as an add party request.

The presentation indicator, as determined by the procedures of the CLIR supplementary service (see clause 4), shall be forwarded to the destination local exchange, in association with the basic call request or, for point-to-multipoint calls, as an add party request."

Amendment to Recommendation Q.2951 subclause 3.9.2.1.1.3

Amend the 2nd paragraph of subclause 3.9.2.1.1.3 as follows:

"When a SETUP or, for point-to-multipoint calls/connections, an ADD PARTY message is received from the calling user, the network shall check to see if the Calling party number and Calling party subaddress information elements are included."

Amend the 8th and 9th paragraphs of subclause 3.9.2.1.1.3 as follows:

"The information determined by the procedures above shall be forwarded to the destination local exchange in association with the basic call requester, for point-to-multipoint calls, as an add party request.

The presentation indicator, as determined by the procedures of the CLIR supplementary service (see clause 4) shall be forwarded to the destination local exchange in association with the basic call requester, for point-to-multipoint calls, as an add party request."

Amendment to Recommendation Q.2951 subclause 3.9.2.3

Amend the title of subclause 3.9.2.3 to:

"Actions at the destination local exchange on call establishment, or establishment of a leaf"

Amendment to Recommendation Q.2951 subclause 3.10

Add a new final paragraph to subclause 3.10:

"In addition to the procedures in subclause 3.9.2.3 for actions at the destination local exchange on call establishment, or establishment of a leaf, the following procedure applies for the establishment of an additional party on the same access. The procedures of subclause 3.9.2.3 shall apply, with the exception that where subclause 3.9.2.3 indicates that the SETUP message is used, the ADD PARTY message shall be used."

Amendment to Recommendation Q.2951 subclause 3.12.4

Add a new final paragraph to subclause 3.12.4:

"Where the CLIP supplementary service is applied for additional parties in a point-to-multipoint call/connection, the restriction shall be the restriction indicated, or determined as a result of, the add party request for that party."

Amendment to Recommendation Q.2951 subclause 3.12.7

Add a new final paragraph to subclause 3.12.7:

"Upon addition of new party to a point-to-multipoint call/connection, if the ISDN number indicated by the MSN user terminal is not subscribed to for the interface, or if no numbering information is indicated, a default number or a number unavailable indication is provided to the user of the CLIP supplementary service."

Amendment to Recommendation Q.2951 Annex A to clause 3

Amend the title to subclause A.2 to:

"Additional procedures at the destination network side on call establishment, or establishment of a leaf"

New subclause to Recommendation Q.2951 Annex A to clause 3

Add a new subclause to Annex A and renumber the subsequent subclauses:

"A.3   Additional procedures at the destination network side on adding an additional party when interworking with a private B-ISDN

In addition to the procedures in subclause A.2 for actions at the destination local exchange on call establishment, or establishment of a leaf, the following procedure applies for the establishment of an additional party on the same access. The procedures of subclause A.2 shall apply, with the exception that where subclause A.2 indicates that the SETUP message is used, the ADD PARTY message shall be used."

Amendment to Recommendation Q.2951 subclause 4.2

Add to the end of subclause 4.2:

"[8]   ITU-T Recommendation Q.2971 (1995), *Broadband Integrated Services Digital Network (B-ISDN) – Digital Subscriber Signalling System No. 2 (DSS 2) – User-network interface layer 3 specification for point-to-multipoint call/connection control.*"

Amendment to Recommendation Q.2951 subclause 4.6.2

Add to the end of subclause 4.6.2, 1st paragraph:

"For point-to-multipoint calls/connections, information pertaining to CLIR shall also be inserted in the ADD PARTY message sent as part of basic call procedures according to clauses 9 and 10 of Recommendation Q.2971 [8]."

Amendment to Recommendation Q.2951 subclause 4.9.1

Add the following paragraph following the current paragraph:

"For add party requests on point-to-multipoint call/connections, if the calling user wishes to override the default setting in the network, the ADD PARTY message sent by the user shall contain the Calling party number information element with the presentation indicator set appropriately."

Amendment of Recommendation Q.2951, subclause 4.9.2

Change the title of subclause 4.9.2 to:

"Actions at the originating local exchange on call establishment"

Inclusion of new subclause in Recommendation Q.2951

Include the following new subclause 4.9.3 and renumber the existing subclause 4.9.3 as subclause 4.9.4:

"4.9.3   Actions at the originating local exchange for an add party request

The procedures of subclause 4.9.3 shall apply, with the exception that where subclause 4.9.3 indicates that the SETUP message is received, the requirements result from the reception of the ADD PARTY message."

Amendment to Recommendation Q.2951 subclause 4.12.3

Add a new final paragraph to subclause 4.12.3:

"Where the CLIP supplementary service is applied for additional parties in a point-to-multipoint call/connection, the restriction shall be the restriction indicated, or determined as a result of, the add party request for that party."

Amendment to Recommendation Q.2951 subclause 5.2

Add to the end of subclause 5.2:

"[8] ITU-T Recommendation Q.2971 (1995), *Broadband Integrated Services Digital Network (B-ISDN) – Digital Subscriber Signalling System No. 2 (DSS 2) – User-network interface layer 3 specification for point-to-multipoint call/connection control.*"

Amendment to Recommendation Q.2951 subclause 5.6.4

Add to the end of subclause 5.6.4, 1st paragraph:

"For point-to-multipoint calls/connections, information pertaining to COLP shall also be inserted in the ADD PARTY ACKNOWLEDGE message sent as part of basic call procedures according to clauses 9 and 10 of Recommendation Q.2971 [8]."

Amendment to Recommendation Q.2951 subclause 5.8

Amend the 1st paragraph of subclause 5.8 as follows:

"For point-to-point calls/connections, the Connected number and Connected subaddress information element are inserted in the CONNECT message. For point-to-multipoint calls/connections, the Connected number and Connected subaddress information element are also inserted in the ADD PARTY ACKNOWLEDGE message."

Add a new Table 5-2/Q.2951:

TABLE 5-2/Q.2951

ADD PARTY ACKNOWLEDGE message content

Message type: ADD PARTY ACKNOWLEDGE Significance: global Direction: both				
Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	8.2.3/Q.2971	Both	M	2
Message length	4.4/Q.2931	Both	M	2
Connected number	5.8.1/Q.2951	Both	O	4-*
Connected subaddress	5.8.1/Q.2951	Both	O	4-25
Other information elements as described in subclause 8.1/Q.2971 [8].				

Amendment to Recommendation Q.2951 subclause 5.9.2.1

Amend the title of subclause 5.9.2.1 to:

"Actions at the originating local exchange on call establishment"

Inclusion of new subclause in Recommendation Q.2951

Include a new subclause 5.9.2.2 and renumber the subsequent subclauses as follows:

"5.9.2.2 Actions at the originating local exchange on adding a party to a point-to-multipoint call/connection

The procedures of subclause 5.9.2.1 shall apply, with the exception that where subclause 5.9.2.1 indicates that the CONNECT message is received, the ADD PARTY ACKNOWLEDGE message shall be received."

Amendment to Recommendation Q.2951 subclause 5.9.2.3.1.2

Amend the 3rd paragraph of subclause 5.9.2.3.1.2 as follows:

"When a CONNECT or, for point-to-multipoint calls/connections, an ADD PARTY ACKNOWLEDGE message is received from the connected user, the network shall check to see if the Connected number and Connected subaddress information elements are included."

Amend the 9th paragraph of subclause 5.9.2.3.1.2 as follows:

"If the CONNECT or ADD PARTY ACKNOWLEDGE message does not contain the Connected number information element, the network shall use a default number associated with the connected user. The network shall set the screening indicator to *network provided*."

Amend the 11th and 12th paragraphs of subclause 5.9.2.3.1.2 as follows:

"The information, as determined by the procedures above, shall be forwarded to the originating local exchange in association with the basic call response or, for point-to-multipoint calls, the add party response."

The presentation indicator, as determined by the procedures of the COLR supplementary service (see clause 6), shall be forwarded to the originating local exchange, in association with the basic call response or, for point-to-multipoint calls, the add party response."

Amendment to Recommendation Q.2951 subclause 5.9.2.3.1.3

Amend the 3rd paragraph of subclause 5.9.2.3.1.3 as follows:

"When a CONNECT or, for point-to-multipoint calls/connections, an ADD PARTY ACKNOWLEDGE message is received from the connected user, the network shall check to see if the Connected number and Connected subaddress information elements are included."

Amend the 10th paragraph of subclause 5.9.2.3.1.3 as follows:

"The information, as determined by the procedures above, shall be forwarded to the originating local exchange in association with the basic call response or, for point-to-multipoint calls, the add party response."

Amend the 12th paragraph of subclause 5.9.2.3.1.3 as follows:

"The presentation indicator, as determined by the procedures of the COLR supplementary service (see clause 6), shall be forwarded to the originating local exchange in association with the basic call response or, for point-to-multipoint calls, the add party response."

Amendment to Recommendation Q.2951 subclause 5.12.2

Add a new final paragraph to subclause 5.12.2:

"Where the COLP supplementary service is applied for additional parties in a point-to-multipoint call/connection, the restriction shall be the restriction indicated, or determined as a result of, the add party response for that party."

Amendment to Recommendation Q.2951 subclause 6.2

Add to the end of subclause 6.2:

"[8]   ITU-T Recommendation Q.2971 (1995), *Broadband Integrated Services Digital Network (B-ISDN) – Digital Subscriber Signalling System No. 2 (DSS 2) – User-network interface layer 3 specification for point-to-multipoint call/connection control.*"

Amendment to Recommendation Q.2951 subclause 6.6.4

Amend the 1st paragraph of subclause 6.6.4 as follows:

"For point-to-point calls/connections, all information pertaining to the COLR supplementary service is inserted in the CONNECT message sent as part of the basic call procedures according to clause 5 of Recommendation Q.2931. For point-to-multipoint calls/connections, all information pertaining to the COLR supplementary service is inserted in the CONNECT message or ADD PARTY ACKNOWLEDGE message sent as part of the basic call procedures according to clauses 9 and 10 of Recommendation Q.2971 [8]."

Amendment to Recommendation Q.2951 subclause 6.10

Add the following paragraphs following the current paragraph:

"For point-to-point calls/connections, and for initial party establishment on point-to-multipoint connections, the procedures specified in subclause 6.9 shall be used.

For add party responses at the destination network on point-to-multipoint call/connections, if the connected user wishes to override the default setting in the network, the ADD PARTY ACKNOWLEDGE message sent by the user shall contain the Connected number information element with the presentation indicator set appropriately."

Amendment to Recommendation Q.2951 subclause 6.12.1

Add a new final paragraph to subclause 6.12.1:

"Where the COLP supplementary service is applied for additional parties in a point-to-multipoint call/connection, the restriction shall be the restriction indicated, or determined as a result of, the add party response for that party."

Amendment to Recommendation Q.2951 subclause 8.2

Add to the end of subclause 8.2:

"[7]   ITU-T Recommendation Q.2971 (1995), *Broadband Integrated Services Digital Network (B-ISDN) – Digital Subscriber Signalling System No. 2 (DSS 2) – User-network interface layer 3 specification for point-to-multipoint call/connection control.*"

Amendment to Recommendation Q.2951 subclause 8.5

Add to the 4th paragraph of subclause 8.5:

"For point-to multipoint calls where a party is being added, if a calling user wants to transfer called party subaddress information to the called user, the calling user shall insert the called party subaddress information into the ADD PARTY message as part of the basic service."

Add to the 5th paragraph of subclause 8.5:

"For point-to multipoint calls where a party is being added at the destination T_B reference point, the called party subaddress shall be offered to the served user within the ADD PARTY message, if the called user has subscribed to this supplementary service."

Amendment to Recommendation Q.2951 subclause 8.6.1

Amend the 2nd paragraph of subclause 8.6.1 as follows:

"If the subscription option is required, the user shall subscribe to the SUB supplementary service in order to receive called party subaddress information in incoming SETUP or ADD PARTY messages as appropriate."

Amendment to Recommendation Q.2951 subclause 8.6.2

Add the following text to the 1st paragraph of subclause 8.6.2:

"For point-to-multipoint calls/connections, subclauses 9.1 and 10.1 of Recommendation Q.2971 [7] are applicable."

Amendment to Recommendation Q.2951 subclause 8.6.4

Add the following text to the 1st paragraph of subclause 8.6.4:

"For point-to-multipoint calls/connections, subclauses 9.2 and 10.2 of Recommendation Q.2971 [7] are applicable."

Amendment to Recommendation Q.2951 subclause 8.7

Add to the end of subclause 8.7, 1st paragraph:

"For point-to-multipoint calls/connection, the states associated with point-to-multipoint call control according to Recommendation Q.2971 [7] are also applicable."

Amendment to Recommendation Q.2951 subclause 8.9.1.1

Add the following text to the 1st paragraph of subclause 8.9.1.1:

"For point-to-multipoint calls/connections, subclauses 9.1 and 10.1 of Recommendation Q.2971 [7] are applicable."

Amend the title of subclause 8.9.2 to:

"Actions at the destination local exchange on call establishment, or establishment of a leaf"

Amendment to Recommendation Q.2951 subclause 8.10

Add the following paragraph to the end of subclause 8.10:

"In addition to the procedures in subclause 8.9.2 for actions at the destination local exchange on call establishment, or establishment of a leaf, the following procedure applies for the establishment of an additional party on the same access. The procedures of subclause 8.9.2 shall apply, with the exception that where subclause 8.9.2 indicates that the SETUP message is used, the ADD PARTY message shall be used."

Annex D

Amendments to Recommendation Q.2957 to support calls/connections using the procedures of Recommendation Q.2971

(This annex forms an integral part of this Recommendation)

This annex contains the necessary amendments to Recommendation Q.2957 to allow these supplementary services to be used in association with point-to-multipoint calls/connections. The amendments contained in this annex will ultimately be incorporated in Recommendation Q.2957, and this annex deleted. The references, definitions and abbreviations are as defined in Recommendation Q.2957.

Amendment to Recommendation Q.2957 subclause 1.2

Add to the end of subclause 1.2:

"[8]	ITU-T Recommendation Q.2971 (1995), *Broadband Integrated Services Digital Network (B-ISDN) – Digital Subscriber Signalling System No. 2 (DSS 2) – User-network interface layer 3 specification for point-to-multipoint call/connection control.*"

Amendment to Recommendation Q.2957 subclause 1.5

Add a new second paragraph to subclause 1.5:

"For point-to-multipoint calls, the user-to-user signalling is used to exchange information between either two users (the root and a particular leaf) or between all users (the root and all current leaves)."

Amendments to Recommendation Q.2957 subclause 1.5

Modify the first sentence of subclause 1.5 by appending the following at the end of the sentence:

"and in clauses 9/Q.2971 and 10/Q.2971."

Amendments to Recommendation Q.2957 subclause 1.6.2

Modify the first sentence of subclause 1.6.2 by appending the following after "5.1/Q.2931":

", 9.1/Q.2971, 9.3/Q.2971, 10.1/Q.2971, 10.3/Q.2971,"

Amendments to Recommendation Q.2957 subclause 1.6.3

Modify the first sentence of subclause 1.6.3 by appending the following after "5.2/Q.2931":

", 9.2/Q.2971, 9.3/Q.2971, 10.2/Q.2971, 10.3/Q.2971,"

Amendments to Recommendation Q.2957 subclause 1.7

Add the following sentence at the end of the first paragraph of subclause 1.7:

"In addition, the states associated with point-to-multipoint call/connection control according to Recommendation Q.2971 are applicable."

Amendments to Recommendation Q.2957 subclause 1.8.1

Modify the first sentence of subclause 1.8.1 by appending the following at the end of the first sentence:

"ADD PARTY, ADD PARTY ACKNOWLEDGE, ADD PARTY REJECT, DROP PARTY, DROP PARTY ACKNOWLEDGE, PARTY ALERTING"

Modify the second sentence of subclause 1.8.1 by replacing: "1-6" by "1-12":

Modify Tables 1-1/Q.2957, 1-2/Q.2957, 1-3/Q.2957, 1-4/Q.2957, and 1-5/Q.2957 of subclause 1.8.1 by appending the following to the last line of the tables after "Q.2931":

"and per Recommendation Q.2971."

Insert the following tables to the end of subclause 1.8.1:

The following messages are applicable to the operation of service 1: SETUP, ALERTING, CONNECT, RELEASE, RELEASE COMPLETE.

Tables 1-1/Q.2957 to 1-6/Q.2957 show the message contents for UUS service 1 implicit.

TABLE 1-6/Q.2957

Contents of ADD PARTY message

Message type: ADD PARTY				
Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	8.2.3/Q.2971	Both	M	2
Message length	4.4.2/Q.2931	Both	M	2
User-user	1.8.3	Both	O (Note)	4-133
Other mandatory and optional information elements per Recommendation Q.2971.				
NOTE – Always included for implicit service 1 activation; the length must be at least four octets.				

TABLE 1-7/Q.2957

Contents of ADD PARTY ACKNOWLEDGE message

Message type: ADD PARTY ACKNOWLEDGE				
Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	8.2.3/Q.2971	Both	M	2
Message length	4.4.2/Q.2931	Both	M	2
User-user	1.8.3	Both	O (Note)	4-133
Other mandatory and optional information elements per Recommendation Q.2971.				
NOTE – May be included for service 1 (implicit activation). Not included otherwise.				

TABLE 1-8/Q.2957

Contents of ADD PARTY REJECT message

Message type: ADD PARTY REJECT				
Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	8.2.3/Q.2971	Both	M	2
Message length	4.4.2/Q.2931	Both	M	2
User-user	1.8.3	Both	O (Note)	4-133
Other mandatory and optional information elements per Recommendation Q.2971.				
NOTE – May be included for UUS Service 1 where a RELEASE COMPLETE message is sent by the user to reject an incoming SETUP message. Not included otherwise.				

TABLE 1-9/Q.2957

Contents of DROP PARTY message

Message type: DROP PARTY				
Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	8.2.3/Q.2971	Both	M	2
Message length	4.4.2/Q.2931	Both	M	2
User-user	1.8.3	Both	O (Note)	4-133
Other mandatory and optional information elements per Recommendation Q.2971.				
NOTE – May be included for service 1 (implicit activation). Not included otherwise.				

TABLE 1-10/Q.2957

Contents of DROP PARTY ACKNOWLEDGE message

Message type: DROP PARTY ACKNOWLEDGE				
Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	8.2.3/Q.2971	Both	M	2
Message length	4.4.2/Q.2931	Both	M	2
User-user	1.8.3	Both	O (Note)	4-133
Other mandatory and optional information elements per Recommendation Q.2971.				
NOTE – May be included for UUS Service 1 where a RELEASE COMPLETE message is sent by the user to reject an incoming SETUP message. Not included otherwise.				

TABLE 1-11/Q.2957

Contents of PARTY ALERTING message

Message type: PARTY ALERTING				
Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2/Q.2931	Both	M	1
Call reference	4.3/Q.2931	Both	M	4
Message type	8.2.3/Q.2971	Both	M	2
Message length	4.4.2/Q.2931	Both	M	2
User-user	1.8.3	Both	O (Note)	4-133
Other mandatory and optional information elements per Recommendation Q.2931.				
NOTE – May be included for service 1 (implicit activation).				

Amendments to Recommendation Q.2957 subclause 1.9.1

Modify the second sentence of subclause 1.9.1 by: appending "and Q.2971" after "Q.2931".

Add the following after the second paragraph of subclause 1.9.1:

"For a point-to-multipoint call/connection, the above procedure activates the service for only the first party of the call. For a point-to-multipoint call/connection, on add party request for subsequent parties, the ADD PARTY message sent by the calling user shall contain the service 1 request, i.e. the User-user information element, to activate the service."

Amendments to Recommendation Q.2957 subclause 1.9.2.1

Modify the first sentence of the first paragraph of subclause 1.9.2.1 by:

appending "or ADD PARTY" after "SETUP",

and appending "and subclause 9.1.1/Q.2971" at the end of the sentence.

Modify the second sentence of the first paragraph of subclause 1.9.2.1 by:

appending "and subclause 9.2/Q.2971" at the end of the sentence.

Modify the first sentence of the second paragraph of subclause 1.9.2.1 by:

appending "and subclause 9.2/Q.2971" at the end of the sentence.

Modify the last sentence of the second paragraph of subclause 1.9.2.1 by:

appending "and subclause 9.1/Q.2971" at the end of the sentence.

Amendments to Recommendation Q.2957 subclause 1.9.3.1

Modify the first sentence of the first paragraph of subclause 1.9.3.1 by:

appending "or party dropping phase" after "phase",

appending "and subclause 9.3/Q.2971" after "Q.2931".

Modify the first sentence of the second paragraph of subclause 1.9.3.1 by:

appending "or party dropping message, as appropriate" after "message",

appending "and subclause 9.3/Q.2971" after "Q.2931".

Append the following at the end of subclause 1.9.3.1 before the NOTE:

"A User-user information element may be included in the first message used to initiate normal party dropping (see subclause 9.3/Q.2971).

The information contained in such an information element is transferred to the remote user in the first party dropping (see subclause 9.3/Q.2971). Such a transfer is only performed if the information is received at the local exchange of the remote user before sending a party dropping or clearing message to that user; otherwise, the information is discarded without sending any notification.

A User-user information element may be included in the first normal party dropping message sent by the called user during call establishment.

If the called user rejects the add party request with a party dropping message containing a User-user information element, the network shall deliver the User-user information element in the party dropping message sent to the calling user."

Amendments to Recommendation Q.2957 subclause 1.9.3.2

Append the following paragraph after the first paragraph of subclause 1.9.3.2:

"The network shall discard the User-user information element if it is received from either user in a DROP PARTY, DROP PARTY ACKNOWLEDGE, or ADD PARTY REJECT message, but a request for UUS was not indicated implicitly in the message delivered to the called user for the add party request. If discard occurs, the network shall take action on the remaining contents of the message received from the user. If the dropping party has sent a DROP PARTY message, the network shall send to the dropping party a DROP PARTY ACKNOWLEDGE message containing cause No. 43 "*access information discarded*". If the dropping party had sent a DROP PARTY ACKNOWLEDGE message, the network shall consider the party dropped; no additional action shall be taken."

Annex E

Handling of the End-to-end transit delay information element

(This annex forms an integral part of this Recommendation)

E.1   General

This annex describes the use of the End-to-end transit delay information element for point-to-multipoint call/connection.

The support of the End-to-end transit delay information element and the procedures described in this annex is mandatory for the network and optional for the user.

The purpose of the End-to-end transit delay information element is to indicate the maximum end-to-end transit delay acceptable for an add party request, and to indicate the cumulative transit delay to be expected from the root to a leaf.

The root may indicate a maximum end-to-end transit delay value to specify end-to-end transit delay requirements for a given party or indicate that any end-to-end transit delay is acceptable for the given party.

The cumulative transit delay expected for the transmission of user data from the calling terminal equipment to the network boundary may be indicated by the root.

The network shall include an End-to-end transit delay information element in the SETUP or ADD PARTY message which is sent to the called party if the root included an End-to-end transit delay information element in the SETUP or ADD PARTY message for the party.

It is recommended that the destination user updates the cumulative transit delay value received from the network.

> NOTE – This is particularly important if the transmission line between the network boundary and the called terminal equipment causes substantial further delay (e.g. a satellite link).

If a maximum end-to-end transit delay value is specified, it is recommended that the called user takes appropriate action (e.g. add party rejection) when the cumulative transit delay value exceeds the specified maximum end-to-end transit delay value.

If the called user accepts the add party request, it is recommended that the called user includes an End-to-end transit delay information element in the CONNECT or ADD PARTY ACKNOWLEDGE message specifying the final cumulative transit delay value.

Further details about the handling of the End-to-end transit delay information element are given below.

E.2   Handling of the End-to-end transit delay information element in the SETUP or ADD PARTY message at the originating UNI

The inclusion of the End-to-end transit delay information element in the SETUP or ADD PARTY message by the root is optional.

If the root includes an End-to-end transit delay information element in the SETUP or ADD PARTY message, both the cumulative transit delay subfield and the maximum end-to-end transit delay subfield shall be present. The user may set the maximum end-to-end transit delay subfield to "*any end-to-end transit delay value acceptable, deliver cumulative end-to-end transit delay value to the called user*" if any end-to-end transit delay is acceptable.

If the network receives an End-to-end transit delay information element which contains only the maximum end-to-end transit delay subfield or only the cumulative transit delay subfield, the network shall handle the End-to-end transit delay information element as a non-mandatory information element with content error.

E.3 Handling of the End-to-end transit delay information element in the SETUP or ADD PARTY message at the destination UNI

The network shall include an End-to-end transit delay information element if the root included an End-to-end transit delay information element in the SETUP or ADD PARTY message for the party. Both the cumulative transit delay subfield and the maximum end-to-end transit delay subfield shall be present.

E.4 Handling of the End-to-end transit delay information element by the called user

It is recommended that the called user updates the cumulative transit delay value received from the network. If the cumulative transit delay value exceeds the maximum end-to-end transit delay value specified by the root, it is also recommended that the called user rejects the add party request with cause No. 49 "*Quality of service not available*".

E.5 Handling of the End-to-end transit delay information element in the CONNECT or ADD PARTY ACKNOWLEDGE message at the destination UNI

If the SETUP or ADD PARTY message sent to the called user included an End-to-end transit delay information element, the called user may include an End-to-end transit delay information element in the CONNECT or ADD PARTY ACKNOWLEDGE message specifying the final cumulative transit delay value for the add party request. No maximum end-to-end transit delay subfield shall be included. If the network receives an End-to-end transit delay information element in the CONNECT or ADD PARTY ACKNOWLEDGE message containing a maximum end-to-end transit delay subfield, this field shall be discarded.

The network does not check the correctness of the cumulative transit delay value provided.

E.6 Handling of the End-to-end transit delay information element in the CONNECT or ADD PARTY ACKNOWLEDGE message at the originating UNI

The network shall include an End-to-end transit delay information element in the CONNECT or ADD PARTY ACKNOWLEDGE message sent to the root if the called user included an End-to-end transit delay information element in the CONNECT or ADD PARTY ACKNOWLEDGE message for the party. No maximum end-to-end transit delay subfield shall be included.
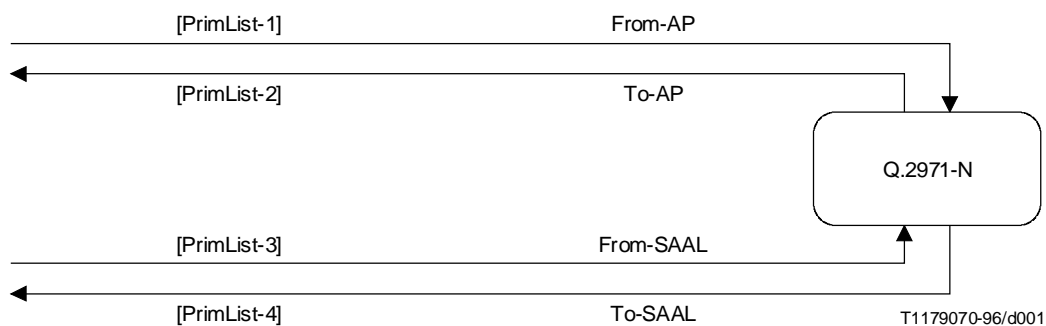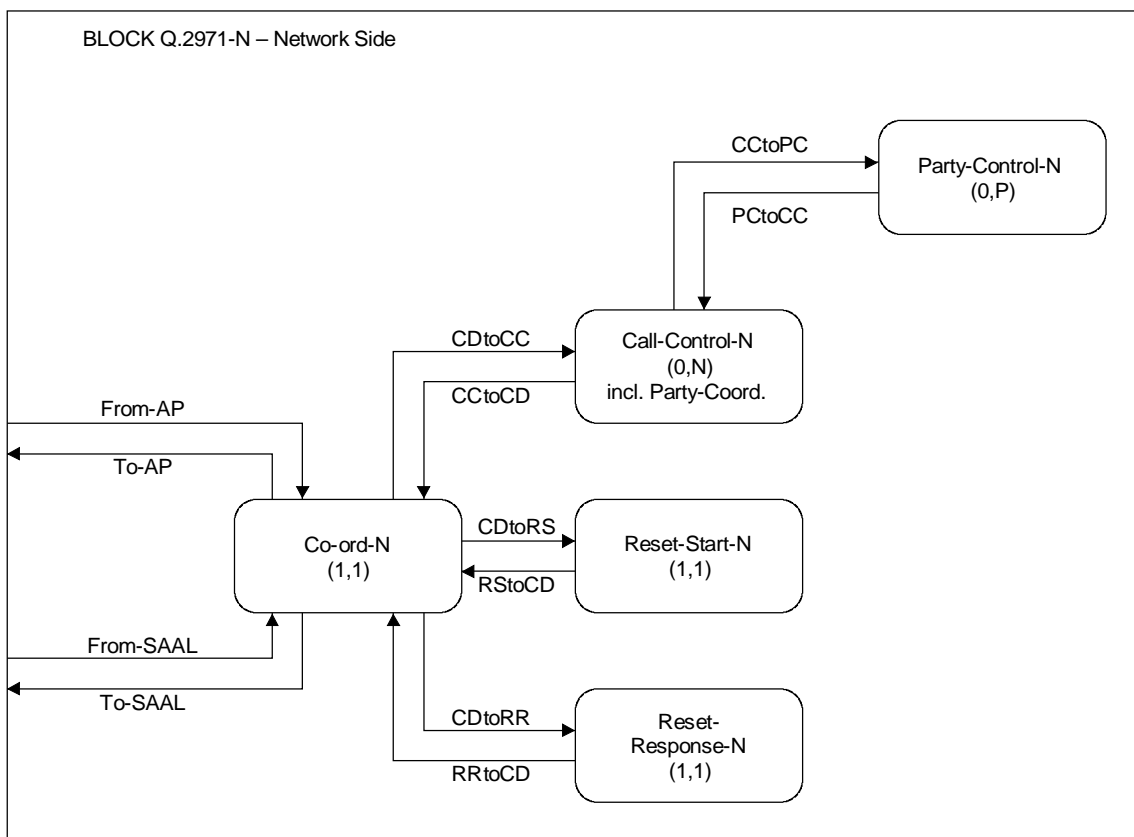
Annex F

SDL Diagrams

(This annex forms an integral part of this Recommendation)
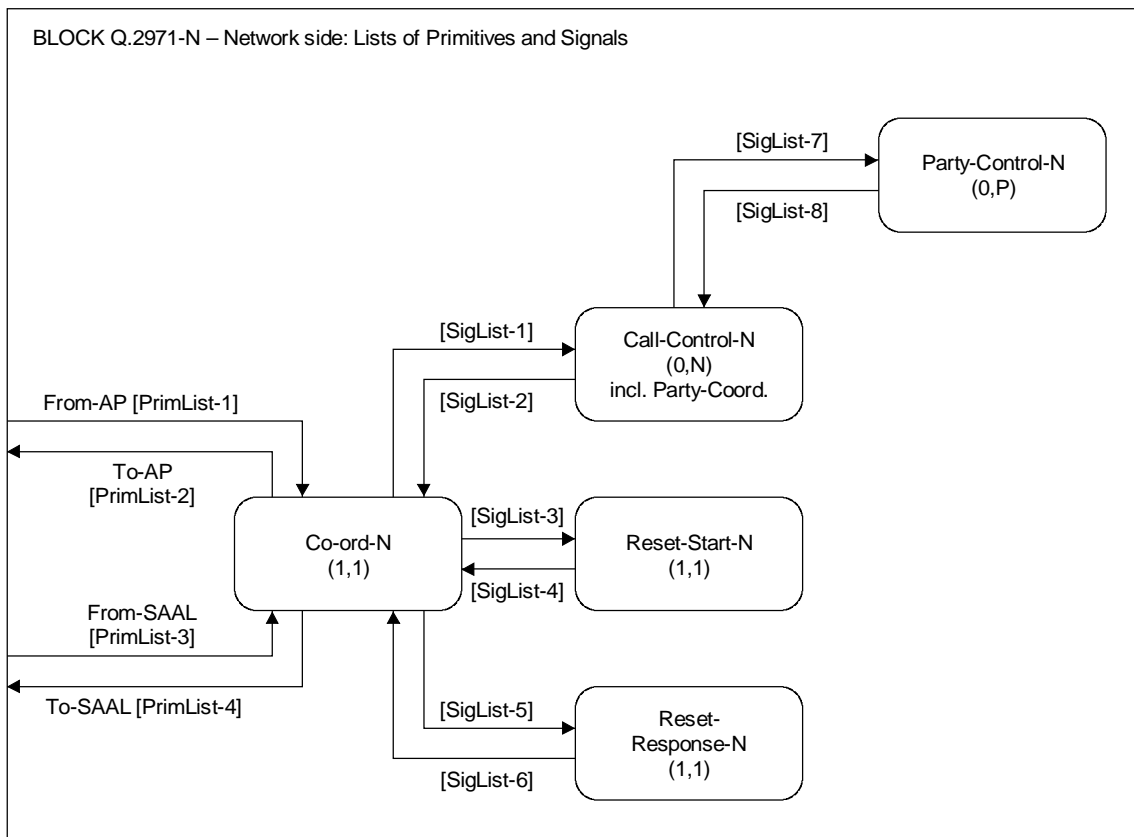
F.1 System Q.2971 – Network side

F.1.1 System diagram – Network side

T1179070-96/d001

AP   Application Process

PrimList List of Primitives
(see Co-ord-N process)

T1175760-95/d002

AP Application Process
CC Call Control
CD Coord. Process
PC Party Control
RR Reset-Response
RS Reset-Start

BLOCK Q.2971-N – Network side: Lists of Primitives and Signals

T1175770-95/d003

AP   Application Process
PrimList   List of Primitives
SigList   List of Signals

F.1.2   Symbols and abbreviations definitions

F.1.2.1   Acronyms

See Annex A/Q.2931 and Annex J/Q.2931.

Additional Acronyms:

AP:=	–	Application Process (in case of process)
	–	Add Party (in case of messages and signals)
CS:=	Call State	
CLP:=	Clear Party	
CLR:=	Clear Call	
ER:=	Endpoint Reference	
ES:=	Endpoint State (=Party State)	
I:=	Ignore	
n:=	no	
PC:=	Party Control	
pmp:=	point-to-multipoint	
pt-pt:=	point-to-point	
RAI:=	Report Status and Ignore	
RAP:=	Report Status and Proceed	
RC:=	RELEASE COMPLETE	

SE:=   Status Enquiry

TOC:=   Type of Call/Connection

y:=   yes

F.1.2.2   List of processes

Co-ord-N   =   Co-ordination function for all DSS 2 calls and for the Reset-Start-N and Reset-Response-N processes.

Call-Control-N   =   Process that performs the call/connection-specific signalling functions, and the coordination function for the party-control-N processes of a call/connection.

Reset-Start-N   =   Process that starts the RESTART procedure on the network side.

Reset-Response-N =   Process that responds to a RESTART message on the network side.

Party-Control-N   =   Process that performs the party-specific signalling functions of a party within a call/connection.

F.1.2.3   Lists of states

F.1.2.3.1   Co-ord-N

– CN0 - AAL Connection Released

– CN1 - AAL Awaiting Establish

– CN2 - AAL Awaiting Release

– CN3 - AAL Connection Established

F.1.2.3.2   Call-Control-N

See clause 2/Q.2931.

F.1.2.3.3   Reset-Start-N

– Rest-N0 - Null

– Rest-N1 - Restart Request

F.1.2.3.4   Reset-Response-N

– Rest-N0 - Null

– Rest-N2 - Restart

F.1.2.3.5   Party-Control-N

– PN0 - Null

– PN1 - Add Party Initiated

– PN2 - Add Party Received

– PN3 - Party Alerting Delivered

– PN4 - Party Alerting Received

– PN5 - Drop Party Initiated

– PN6 - Drop Party Received

– PN7 - Active

F.1.2.4   Lists of primitives

F.1.2.4.1   [PrimList-1] (from AP to Co-ord-N)

See Annex A/Q.2931; in addition:

– Add Party req.

– Add Party Acknowledge req.

– Add Party Reject req.

– Party Alerting req.

–   Drop Party req.

–   Drop Party Acknowledge req.

–   Status Enquiry req.

F.1.2.4.2   [PrimList-2] (from Co-ord-N to AP)

See Annex A/Q.2931; in addition:

–   Add Party ind.

–   Add Party Acknowledge ind.

–   Add Party Reject ind.

–   Party Alerting ind.

–   Drop Party ind.

–   Drop Party Acknowledge ind.

–   Party Status ind.

F.1.2.4.3   [PrimList-3] (from S-AAL to Co-ord-N)

See Annex A/Q.2931.

F.1.2.4.4   [PrimList-4] (from Co-ord-N to S-AAL)

See Annex A/Q.2931.

F.1.2.5   Lists of signals

F.1.2.5.1   [SigList-1] (from Co-ord-N to Call-Control-N)

See Annex A/Q.2931; in addition:

•   Party-related signals corresponding to primitives listed in F.1.2.4.1 above.

•   Additional party-related messages:

–   ADD PARTY

–   ADD PARTY ACKNOWLEDGE

–   ADD PARTY REJECT

–   PARTY ALERTING

–   DROP PARTY

–   DROP PARTY ACKNOWLEDGE

F.1.2.5.2   [SigList-2] (from Call-Control-N to Co-ord-N)

See Annex A/Q.2931; in addition:

•   Party-related signals corresponding to primitives listed in F.1.2.4.2 above.

•   Additional party-related messages as in F.1.2.5.1 above.

F.1.2.5.3   [SigList-3] (from Co-ord-N to Reset-Start-N)

See Annex A/Q.2931.

F.1.2.5.4   [SigList-4] (from Reset-Start-N to Co-ord-N)

See Annex A/Q.2931.

F.1.2.5.5   [SigList-5] (from Co-ord-N to Reset-Response-N)

See Annex A/Q.2931.

F.1.2.5.6   [SigList-6] (from Reset-Response-N to Co-ord-N)

See Annex A/Q.2931.