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SERIES Q: SWITCHING AND SIGNALLING

Interworking of Signalling Systems – Interworking between
Digital Subscriber Signalling System No. 1 and Signalling
System No. 7

**Interworking between ISDN access and
non-ISDN access over ISDN User Part of
Signalling System No. 7**

ITU-T Recommendation Q.699

(Previously CCITT Recommendation)

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ITU-T RECOMMENDATION Q.699

INTERWORKING BETWEEN ISDN ACCESS AND NON-ISDN ACCESS OVER ISDN USER PART OF SIGNALLING SYSTEM No. 7

Summary

This Recommendation defines the interworking between different types of access (ISDN and non-ISDN) and the ISDN User Part functions and protocol of Signalling System No. 7.

Source

ITU-T Recommendation Q.699 was revised by ITU-T Study Group 11 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 12th September 1997.

FOREWORD

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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.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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

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Recommendation Q.699

INTERWORKING BETWEEN ISDN ACCESS AND NON-ISDN ACCESS OVER ISDN USER PART OF SIGNALLING SYSTEM No. 7

(revised in 1997)

1 General

1.1 Scope

This Recommendation describes the interworking between different types of access (ISDN and non-ISDN) and the ISDN User Part functions and protocol of Signalling System No. 7 [1], [2], [3], [4]. The non-ISDN access defined in this Recommendation means the analogue line access except the PABX access.

The interworking between the above signalling protocols occurs in an exchange with ISDN local exchange functionality and is specified in the context of a typical call in a pure ISDN or mixed ISDN/non-ISDN environment.

1.2 References

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

- [1] ITU-T Recommendation Q.761 (1993), *Functional description of the ISDN User Part of Signalling System No. 7.*
- [2] ITU-T Recommendation Q.762 (1993), *General function of messages and signals of the ISDN User Part of Signalling System No. 7.*
- [3] ITU-T Recommendation Q.763 (1993), *Formats and codes of the ISDN User Part of Signalling System No. 7.*
- [4] ITU-T Recommendation Q.764 (1993), *ISDN User Part signalling procedures.*
- [5] ITU-T Recommendation Q.850 (1993), *Use of cause and location in the digital subscriber Signalling System No. 1 and the Signalling System No. 7 ISDN user part.*
- [6] ITU-T Recommendation Q.931 (1993), *ISDN user-network interface layer 3 specification for basic call control.*
- [7] ITU-T Recommendation Q.932 (1993), *Generic procedures for the control of ISDN supplementary services.*
- [8] ITU-T Recommendation Q.731 (1993), *Stage 3 description for number identification supplementary services using Signalling System No. 7:*
 - Q.731.3, *Calling line identification presentation (CLIP).*
 - Q.731.4, *Calling line identification restriction (CLIR).*
 - Q.731.5, *Connected line identification presentation (COLP).*

- Q.731.6, *Connected line identification restriction (COLR)*.
- [9] ITU-T Recommendation Q.732 (1993), *Stage 3 description for the call offering supplementary services using Signalling System No. 7:*
- Q.732.2, *Call forwarding busy*.
- Q.732.3, *Call forwarding no reply*.
- Q.732.4, *Call forwarding unconditional*.
- Q.732.5, *Call deflection*.
- [10] ITU-T Recommendation Q.733 (1993), *Stage 3 description for call completion Supplementary Services using Signalling System No. 7:*
- Q.733.2, *Call Hold (CH)*.
- Q.733.4, *Terminal Portability (TP)*.
- [11] ITU-T Recommendation Q.734, *Stage 3 description for multiparty supplementary services using Signalling System No. 7:*
- Q.734.1 (1993), *Conference calling*.
- Q.734.2 (1996), *Three-party service*.
- [12] ITU-T Recommendation Q.735 (1993), *Stage 3 description for community of interest supplementary services using Signalling System No. 7:*
- Q.735.1, *Closed user group (CUG)*.
- Q.735.2, *Multi-level precedence and preemption*.
- [13] ITU-T Recommendation Q.737 (1993), *Stage 3 description for additional information transfer Supplementary Services using Signalling System No. 7:*
- Q.737.1, *User-to-user signalling (UUS)*.
- [14] ITU-T Recommendation Q.951 (1993), *Stage 3 description for number identification supplementary services using DSS I:*
- Q.951.3, *Calling line identification presentation (CLIP)*.
- Q.951.4, *Calling line identification restriction (CLIR)*.
- Q.951.5, *Connected line identification presentation (COLP)*.
- Q.951.6, *Connected line identification restriction (COLR)*.
- [15] ITU-T Recommendation Q.952 (1993), *Stage 3 description for call offering supplementary services using DSS I – Diversion supplementary services*.
- [16] ITU-T Recommendation Q.953 (1993), *Stage 3 description for call completion supplementary services using DSS I:*
- Q.953.2, *Call hold.4*
- [17] ITU-T Recommendation Q.954, *Stage 3 description for multiparty supplementary services using DSS I:*
- Q.954.1 (1993), *Conference calling*.
- Q.954.2 (1995), *Three-party service*.

- [18] ITU-T Recommendation Q.955 (1993), *Stage 3 description for community of interest supplementary services using DSS 1*.
Q.955.3, *Multi-level Precedence and Preemption (MLPP)*.
- [19] ITU-T Recommendation Q.957 (1993), *Stage 3 description for additional information transfer supplementary services using DSS 1*:
Q.957.1, *User-to-User Signalling (UUS)*.

1.3 Methodology

The procedures and elements of information that are not carried over the international interface (i.e. are defined for national use) are not described in this Recommendation, except for the interworking cases of the calling party number, connected number and redirection number when the national number can be used.

The elements of information (parameters, information element and messages) that are of local significance only, i.e. are not mapped onto elements of information in the other signalling system, are not mentioned.

Moreover, only the parameters and indicators being a matter of interworking are described. Hence, no information is given concerning e.g. the satellite indicator, the continuity check indicator, the echo control device indicator, the propagation delay counter parameter.

In the same way, information to be sent in case of local fallback or local rejection of Supplementary Services are not relevant to interworking and therefore are not mentioned.

ISUP segmentation

Some ISUP messages may indicate that they are followed by a Segmentation Message (SGM). The actions described in this Recommendation on receipt of such messages take place only after the completion of the segmentation procedure specified in 2.1.12/Q.764 [4].

When it is said in the text that a parameter is received in an ISUP message, in case of segmentation it could be received in the segmentation message (SGM) as well.

ISUP messages which can be segmented and ISUP parameters which can be conveyed in a segmentation message (SGM) are described in 2.1.12/Q.764 [4].

DSS 1 segmentation

When it is said in the text that a specific DSS 1 message is received, in case of segmentation the content of this message is received in SEGMENT messages.

The actions described in this Recommendation then take place only after the completion of the DSS 1 segmentation procedure specified in Annex H/Q.931 [6].

Handling of the cause and location fields

When a cause parameter or information element has to be sent by the exchange, only the cause value is given in the text; the location indication is coded according to [5].

When a progress indicator information element has to be sent by the exchange, only the progress description is given in the text; the location indication is coded according to [5].

The handling of the diagnostic received in a cause parameter or in a cause information element is described in [5].

Services interactions

Impacts of services interactions on interworking are not described.

1.4 Symbols and abbreviations

The ISUP messages are written in small letters, the DSS 1 messages in capital letters.

This Recommendation uses the following abbreviations:

3PTY	Three-Party Service
ACM	Address Complete Message
ANM	Answer Message
ATP	Access Transport Parameter
BC	Bearer Capability information element
CGB	Circuit Group Blocking message
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
COLP	Connected Line Identification Presentation
COLR	Connected Line Identification Restriction
CON	Connect message
CPG	Call Progress message
CUG	Closed User Group
CW	Call Waiting
DDI	Direct-Dialling-In
DSS 1	Digital Subscriber Signalling System No. 1
FAA	Facility Accepted message
FAR	Facility Request message
FRJ	Facility Reject message
GRS	Circuit Group Reset message
HLC	High Layer Compatibility information element
HOLD	Call HOLD
i.e.	information element
IAM	Initial Address Message
ind.	indicator
ISDN	Integrated Service Digital Network
ISUP	ISDN User Part
MLPP	Multi-Level Precedence and Preemption
MSN	Multiple Subscriber Number
p.i.	progress indicator information element

REL	Release message
RES	Resume message
RSC	Reset Circuit message
SAM	Subsequent Address Message
SGM	Segmentation Message
SUB	Sub-addressing
SUS	Suspend message
TMR	Transmission Medium Requirement parameter
TMU	Transmission Medium Used parameter
TP	Terminal Portability
USI	User Service Information parameter
USR	User-to-user information message
UUS	User-to-User signalling

2 Outgoing call

2.1 Interworking from DSS 1 to ISUP

2.1.1 Basic call

2.1.1.1 Sending of the Initial Address Message (IAM)

When the exchange has received from the calling user in a SETUP message (possibly followed by INFORMATION messages) enough information to determine that the call is to be routed to another exchange, it shall select a suitable, free, inter-exchange circuit and send an Initial Address Message (IAM).

The coding of the Initial Address Message (IAM) according to the SETUP message is described hereafter.

NOTE – The coding of the Initial Address Message (IAM) sent by a forwarding exchange is described in 2.5.2.5/Q.732 [9]. The parameters used in such a case are not mentioned hereafter.

MANDATORY PARAMETERS

Forward call indicators

bit	A	National/international call indicator
	0	<i>call to be treated as a national call</i>

This bit can be set to "1" for international calls.

bit	D	Interworking indicator
	0	<i>no interworking encountered (No. 7 signalling all the way)</i>
bit	F	ISDN User Part indicator
	1	<i>ISDN User Part used all the way</i>

bits	HG	ISDN User Part preference indicator
	1 0	<i>ISDN User Part required all the way</i> if required by the invoked telematic teleservices or Supplementary Services or by Recommendation E.172
	0 0	<i>ISDN User Part preferred all the way otherwise</i>
bit	I	ISDN access indicator
	1	<i>originating access ISDN</i>

Calling party's category

Coded according to internal data of the originating exchange.

Transmission medium requirement

If only one bearer capability information element is present in the SETUP message, the transmission medium requirement parameter is coded as described in Table 1.

**Table 1/Q.699 – Coding of the transmission medium requirement parameter (TMR)
One BC received**

SETUP→		IAM→
Bearer capability information element		Transmission medium requirement parameter
Information transfer capability	Information transfer rate	
<i>Speech</i>	Value non-significant	<i>Speech</i>
<i>3.1 kHz audio</i>	Value non-significant	<i>3.1 kHz audio</i>
<i>Restricted digital information</i>	For further studies	For further studies
<i>Unrestricted digital information</i> or <i>Unrestricted digital information with tones/announcements</i>	<i>64 kbit/s unrestricted</i>	<i>64 kbit/s unrestricted</i>
	<i>2 × 64 kbit/s unrestricted</i>	<i>2 × 64 kbit/s</i>
	<i>384 kbit/s unrestricted</i>	<i>384 kbit/s</i>
	<i>1536 kbit/s unrestricted</i>	<i>1536 kbit/s</i>
	<i>1920 kbit/s unrestricted</i>	<i>1920 kbit/s</i>
	<i>Multirate: 6 × 64 kbit/s</i>	<i>384 kbit/s</i>
	<i>Multirate: 24 × 64 kbit/s</i>	<i>1536 kbit/s</i>
	<i>Multirate: 30 × 64 kbit/s</i>	<i>1920 kbit/s</i>
<i>Video</i>	For further studies	For further studies

If two bearer capability information elements are present in the SETUP message, and:

- if fallback occurs in the originating exchange when there is no circuit available being capable of satisfying the connection type requirements, the transmission medium requirement parameter is coded according to the first BC received (BC 1) as described in Table 1;
- if no fallback occurs in the originating exchange, the transmission medium requirement parameter is coded according to the second BC received (BC 2) as described in Table 2.

**Table 2/Q.699 – Coding of the transmission medium requirement parameter (TMR)
Two BC received**

SETUP→	IAM→
Content	Transmission medium requirement parameter
Two BC received (Note): BC 1 (<i>speech or 3.1 kHz audio</i>) BC 2 (<i>unrestricted digital information with tones and announcements</i>)	<i>64 kbit/s preferred</i>
NOTE – BC 1 is the bearer capability information element received in first position in the SETUP message, BC 2 in second position. Bearer capability information elements shall be received in ascending order of priority as described in 5.11.1.1/Q.931 [6].	

Called party number

- Nature of address indicator:
According to the type of number field in the called party number information element and internal data of the originating exchange.
- Internal network number indicator:
1 *routing to internal network number not allowed*
- Numbering plan indicator:
001 *ISDN (telephony) numbering plan (Recommendation E.164)*
- Address signal:
According to the called number information received in the SETUP or INFORMATION messages.

NOTE – The transport of the called party information in the keypad facility information element is network specific and therefore is not described here.

OPTIONAL PARAMETERS

Calling party number

See 2.1.2.3 and 2.1.2.4.

Optional forward call indicators

- bits BA Closed user group call indicator:
 See 2.1.2.
- bit H Connected line identity request indicator:
 See 2.1.2.

Closed user group interlock code

See 2.1.2.

Connection request

See 2.1.2.

User-to-user information

See 2.1.2.

Access transport

Table 3/Q.699 – Contents of the access transport parameter

SETUP→	IAM→
Content	Access transport parameter
Progress indicator	Progress indicator
High layer compatibility (Note)	High layer compatibility
Low layer compatibility	Low layer compatibility

NOTE – If two high layer compatibility information elements are received, they are transferred in the same order as received in the SETUP message in the access transport parameter of the initial address message.

It may carry other information elements as well (as the called party subaddress). See 2.1.2.

User service information

Table 4/Q.699 – Coding of the user service information parameter (USI)

SETUP→	IAM→
Content	User service information parameter
One BC received: BC	BC (Note 2)
Two BC received (Note 1): BC 1 (<i>speech or 3.1 kHz audio</i>) BC 2 (<i>unrestricted digital information with tones and announcements</i>)	BC 1 (Note 2)

NOTE 1 – BC 1 is the bearer capability information element received in first position in the SETUP message, BC 2 in second position. Bearer capability information elements shall be received in ascending order of priority as described in 5.11.1.1/Q.931 [6].

NOTE 2 – Octet 1 (information element identifier) and 2 (length) of the bearer capability information element are not included.

User-to-user indicators

See 2.1.2.

Generic number

See 2.1.2.

User service information prime

This parameter is present only if two bearer capability information elements are received and if no fallback occurs in the originating exchange. It is coded as follows:

Table 5/Q.699 – Coding of the user service information prime parameter (USI prime)

SETUP→	IAM→
Content	User service information prime parameter
Two BC received (Note 1): BC 1 (<i>speech or 3.1 kHz audio</i>) BC 2 (<i>unrestricted digital information with tones and announcements</i>)	BC 2 (Note 2)
NOTE 1 – BC 1 is the bearer capability information element received in first position in the SETUP message, BC 2 in second position. Bearer capability information elements shall be received in ascending order of priority as described in 5.11.1.1/Q.931 [6].	
NOTE 2 – Octets 1 (information element identifier) and 2 (length) of the bearer capability information element are not included.	

User teleservice information

Table 6/Q.699 – Coding of the user teleservice information parameter (UTI)

SETUP→	IAM→
Content	User teleservice information parameter
One HLC received: HLC	HLC (Note 2)
Two HLC received (Note 1): HLC 1 HLC 2	HLC 2 (Note 2)
NOTE 1 – HLC 1 is the high layer compatibility information element received in first position in the SETUP message, HLC 2 in second position. High layer compatibility information elements shall be received in ascending order of priority as described in 5.12.1.1/Q.931 [6].	
NOTE 2 – Octets 1 (information element identifier) and 2 (length) of the high layer compatibility information element are not included.	

Generic notification

See 2.1.2.

Transmission medium requirement prime

This parameter is present only if two bearer capability information elements are received and if no fallback occurs in the originating exchange. It is coded as follows.

Table 7/Q.699 – Coding of the transmission medium requirement prime parameter (TMR prime)

SETUP→	IAM→
Content	Transmission medium requirement prime parameter
Two BC received: BC 1 (<i>speech</i>) BC 2 (<i>unrestricted digital information with tones and announcements</i>)	<i>Speech</i>
Two BC received: BC 1 (<i>3.1 kHz audio</i>) BC 2 (<i>unrestricted digital information with tones and announcements</i>)	<i>3.1 kHz audio</i>

MLPP precedence

See 2.1.2.

2.1.1.2 Sending of the Subsequent Address Message (SAM)

If the initial address message has already been sent, and if the originating exchange has not determined that the called number information received was complete, the receipt of an INFORMATION message containing additional digits causes the sending of a Subsequent Address Message (SAM).

2.1.1.3 Receipt of the Address Complete Message (ACM)

2.1.1.3.1 ACM with a cause parameter

Table 8/Q.699 – Receipt of ACM with a cause parameter

←DISCONNECT	←ACM
Cause information element (Note 1) Progress indicator No. 8 (Note 2)	Cause parameter Optional backward call indicators parameter In-band information ind. <i>In-band info...</i>
NOTE 1 – If the cause value received in the Address Complete Message (ACM) is unknown in DSS 1, the unspecified cause value of the class is sent.	
NOTE 2 – The progress indicator No. 8 (<i>in-band information or an appropriate pattern is now available</i>) is only sent if the BC received in the SETUP message is coded <i>speech</i> , <i>3.1 kHz audio</i> or <i>unrestricted digital information with tones/announcements</i> .	

2.1.1.3.2 ACM without the cause parameter

Upon receiving an address complete message, the exchange shall send a message across the user-network interface to the calling user, as described in Table 9.

Table 9/Q.699 – Message sent to the DSS 1 upon receipt of ACM

←Message sent to the DSS 1	←ACM
	Backward call indicators parameter Called party's status indicator
CALL PROCEEDING when not been sent before (Note 1), otherwise: – PROGRESS if a progress indicator information element is to be sent (Note 2) – No message if no progress indicator information element is to be sent (Note 2)	00 <i>No indication</i>
ALERTING	01 <i>Subscriber free</i>
NOTE 1 – The receipt from the network of an Address Complete Message (ACM) without the <i>subscriber free</i> indication is interpreted by the network as a sending complete indication, in the case where the network couldn't determine it before.	
NOTE 2 – The sending of a progress indicator information element is described below.	

The backward message sent to the calling user (ALERTING, CALL PROCEEDING or PROGRESS message) is coded as follows.

Bearer capability

If the transmission medium used parameter or the bearer capability information element in the access transport parameter are present in the Address Complete Message (ACM) received, see handling of fallback information at the end of this subclause.

Progress indicator

Progress indicator information elements possibly present in the access transport parameter of the Address Complete Message (ACM) are transferred into the message sent to the calling user.

In addition, progress indicator information elements are created by the originating exchange according to the coding of the Address Complete Message (ACM). Table 10 shows the sending criteria of each value.

In case of fallback, a progress indicator No. 5 (*interworking has occurred and has resulted in a telecommunication service change*) is sent as well. See Tables 11 and 12.

Every message sent to the access (ALERTING, CALL PROCEEDING or PROGRESS) may contain two progress indicator information elements. When more than two progress indicator information elements are to be sent, the supplementary progress indicator information elements are sent in a PROGRESS message.

Table 10/Q.699 – Sending criteria of the progress indicator information elements created by the originating exchange

←Message sent to the DSS 1 (See Table 9)	←ACM
Progress indicator information element	Content
No. 1 <i>(Call is not end-to-end ISDN: further progress information may be available in-band)</i>	Backward call indicators parameter ISDN User Part indicator 0 <i>ISDN User Part not used all the way</i>
No. 2 <i>(Destination address is non-ISDN)</i>	Backward call indicators parameter ISDN User Part indicator 1 <i>ISDN User Part used all the way</i> ISDN access indicator 0 <i>Terminating access non-ISDN</i>
No. 8 (Note) <i>(In-band information or appropriate pattern now available)</i>	Optional backward call indicators parameter In-band information indicator 1 <i>In-band info...</i>
NOTE – The progress indicator No. 8 (<i>in-band information or an appropriate pattern is now available</i>) is only sent if the BC received in the SETUP message is coded <i>speech, 3.1 kHz audio or unrestricted digital information with tones/announcements</i> .	

High layer compatibility

If a high layer compatibility information element is present in the access transport parameter of the Address Complete Message (ACM), see handling of fallback information at the end of this subclause.

Notification indicator

See 2.1.2.

Redirecting number

See 2.1.2.

Redirection number

See 2.1.2.

Facility

See 2.1.2.

User-user

This information element cannot be included in the CALL PROCEEDING message.

See 2.1.2.

Handling of fallback information

If the Transmission Medium Used parameter (TMU) is present in the Address Complete Message (ACM), and if no progress indicator No. 1 (*call is not end-to-end ISDN*) or No. 2 (*destination address is non-ISDN*) has to be sent, the Table 11 is applicable.

Table 11/Q.699 – Sending of BC fallback information

←Message sent to DSS 1	←ACM
BC = <i>Speech</i> p.i. No. 5	TMU <i>Speech</i> ATP No BC
BC = <i>3.1 kHz audio</i> p.i. No. 5	TMU <i>3.1 kHz audio</i> ATP No BC
BC received in the ATP (<i>speech</i> or <i>3.1 kHz audio</i>) p.i. No. 5	TMU <i>Speech</i> or <i>3.1 kHz audio</i> ATP BC (<i>speech</i> or <i>3.1 kHz audio</i>)

If a high layer compatibility information element is present in the access transport parameter of the Address Complete Message (ACM), and if no progress indicator No. 1 (*call is not end-to-end ISDN*) or No. 2 (*destination address is non-ISDN*) has to be sent, Table 12 is applicable.

Table 12/Q.699 – Sending of HLC fallback information

←Message sent to DSS 1	←ACM
Content	Access transport parameter
HLC Progress indicator No. 5	HLC Progress indicator No. 5
NOTE – If procedures of BC fallback and HLC fallback both require the sending of the progress indicator No. 5, only one progress indicator No. 5 is sent.	

2.1.1.4 Receipt of the Call Progress message (CPG)

2.1.1.4.1 CPG with a cause parameter

Table 13/Q.699 – Receipt of CPG with a cause parameter

←DISCONNECT	←CPG
Cause information element (Note 1)	Cause parameter
Progress indicator No. 8 (Note 2)	Event information parameter Event indicator <i>In-band info...</i> or Optional backward call indicators parameter In-band information ind. <i>In-band info...</i>
NOTE 1 – If the cause value received in the Call Progress Message (CPG) is unknown in DSS 1, the unspecified cause value of the class is sent. NOTE 2 – The progress indicator No. 8 (<i>in-band information or an appropriate pattern is now available</i>) is only sent if the BC received in the SETUP message is coded <i>speech, 3.1 kHz audio</i> or <i>unrestricted digital information with tones/announcements</i> .	

2.1.1.4.2 CPG without the cause parameter

Upon receiving a Call Progress message (CPG), the exchange shall send a message across the user-network interface to the calling user, as described in Table 14.

Table 14/Q.699 – Message sent to the DSS 1 upon receipt of CPG

←Message sent to the DSS 1	←CPG
	Event information parameter Event indicator
ALERTING when not been sent before, otherwise: – PROGRESS if a progress indicator information element is to be sent (Note) – No message if no progress indicator information element is to be sent (Note)	000 0001 (<i>alerting</i>)
– PROGRESS if a progress indicator information element is to be sent (Note) – No message if no progress indicator information element is to be sent (Note)	000 0010 (<i>progress</i>) or 000 0011 (<i>in-band information or an appropriate pattern is now available</i>)
NOTE – The sending of a progress indicator information element is described below.	

The backward message sent to the calling user (ALERTING or PROGRESS message) is coded as follows.

Bearer capability

If the transmission medium used parameter or the bearer capability information element in the access transport parameter are present in the Call Progress message (CPG) received, see handling of fallback information at the end of this subclause.

Progress indicator

Progress indicator information elements possibly present in the access transport parameter of the Call Progress Message (CPG) are transferred into the message sent to the calling user.

In addition, progress indicator information elements are created by the originating exchange according to the coding of the Call Progress Message (CPG). Table 15 shows the sending criteria of each value.

In case of fallback, a progress indicator No. 5 (*interworking has occurred and has resulted in a telecommunication service change*) is sent as well. See Tables 11 and 12.

Every message sent to the access (ALERTING or PROGRESS) may contain two progress indicator information elements. When more than two progress indicator information elements are to be sent, the supplementary progress indicator information elements are sent in a PROGRESS message.

Table 15/Q.699 – Sending criteria of the progress indicator information elements created by the originating exchange

←Message sent to the DSS 1 (See Table 9)	←CPG
Progress indicator information element	Content (Note 2)
No. 1 <i>(Call is not end-to-end ISDN: further progress information may be available in-band)</i>	Backward call indicators parameter ISDN User Part indicator 0 <i>ISDN User Part not used all the way</i>
No. 2 <i>(Destination address is non-ISDN)</i>	Backward call indicators parameter ISDN User Part indicator 1 <i>ISDN User Part used all the way</i> ISDN access indicator 0 <i>Terminating access non-ISDN</i>
No. 4 <i>(Call has returned to the ISDN)</i>	Backward call indicators parameter ISDN User Part indicator 1 <i>ISDN User Part used all the way</i> ISDN access indicator 1 <i>Terminating access ISDN whereas the last indication received was "0", Terminating access non-ISDN</i>
No. 8 (Note 1) <i>(In-band information or appropriate pattern now available)</i>	Event information parameter Event indicator 000 0011 <i>In-band info ...</i>
No. 8 (Note 1) <i>(In-band information or appropriate pattern now available)</i>	Optional backward call indicators parameter In-band information indicator 1 <i>In-band info ...</i>
NOTE 1 – The progress indicator No. 8 (<i>in-band information or an appropriate pattern is now available</i>) is only sent if the BC received in the SETUP message is coded <i>speech, 3.1 kHz audio</i> or <i>unrestricted digital information with tones and announcements</i> .	
NOTE 2 – The mapping of the contents in the CPG message is only relevant if the information received in the message is different compared to earlier received information, e.g. in the ACM message or a CPG message received prior to this message.	

High layer compatibility

If a high layer compatibility information element is present in the access transport parameter of the Call Progress message (CPG), see handling of fallback information at the end of this subclause.

Notification indicator

See 2.1.2.

Redirecting number

See 2.1.2.

Redirection number

See 2.1.2.

Facility

See 2.1.2.

User-user

See 2.1.2.

Handling of fallback information

See 2.1.1.3.2.

2.1.1.5 Receipt of the Answer Message (ANM)

Upon receipt of an Answer Message (ANM), the exchange shall send a CONNECT message across the user-network interface to the calling user.

The CONNECT message is coded as follows.

Bearer capability

See handling of fallback information at the end of this subclause.

Progress indicator

Progress indicator information elements possibly present in the access transport parameter of the Answer Message (ANM) are transferred into the CONNECT message sent to the calling user.

In addition, progress indicator information elements are created by the originating exchange according to the coding of the backward call indicators parameter possibly received in the Answer Message (ANM). Table 16 shows the sending criteria of each value.

In case of fallback, a progress indicator No. 5 (*interworking has occurred and has resulted in a telecommunication service change*) is sent as well. See Tables 17 and 18.

The CONNECT message sent to the access may contain two progress indicator information elements.

When more than two progress indicator information elements are to be sent, the supplementary progress indicator information elements are sent in a PROGRESS message.

Table 16/Q.699 – Sending criteria of the progress indicator information elements created by the originating exchange

←CONNECT	←ANM
Progress indicator information element	Content
No. 1 <i>(Call is not end-to-end ISDN: further progress information may be available in-band)</i>	Backward call indicators parameter ISDN User Part indicator 0 <i>ISDN User Part not used all the way</i>
No. 2 <i>(Destination address is non-ISDN)</i>	Backward call indicators parameter ISDN User Part indicator 1 <i>ISDN User Part used all the way</i> ISDN access indicator 0 <i>terminating access non-ISDN</i>
No. 4 <i>(Call has returned to the ISDN)</i>	Backward call indicators parameter ISDN User Part indicator 1 <i>ISDN User Part used all the way</i> ISDN access indicator 1 <i>terminating access ISDN whereas the last indication received was "0" terminating access non-ISDN</i>

High layer compatibility

If a high layer compatibility information element is present in the access transport parameter of the call Answer Message (ANM), see handling of fallback information at the end of this subclause.

Low layer compatibility

The low layer compatibility possibly present in the access transport parameter of the Answer Message (ANM) is passed on unchanged.

Notification indicator

See 2.1.2.

Redirecting number

See 2.1.2.

Redirection number

See 2.1.2.

Facility

See 2.1.2.

User-user

See 2.1.2.

Connected number

See 2.1.2.

Connected subaddress

See 2.1.2.

Handling of fallback information

If the Transmission Medium Used parameter (TMU) is present in the Answer Message (ANM), or if a bearer capability information element is present in the access transport parameter of the Answer Message, and if no progress indicator No. 1 (*call is not end-to-end ISDN*) or No. 2 (*destination address is non-ISDN*) has to be sent, Table 17 is applicable.

Table 17/Q.699 – Sending of BC fallback information

←CONNECT	←ANM
BC (Unrestricted digital information with tones and announcements)	No TMU ATP BC (unrestricted digital information with tones and announcements)
BC = Speech p.i. No. 5	TMU Speech ATP No BC
BC = 3.1 kHz audio p.i. No. 5	TMU 3.1 kHz audio ATP No BC
BC received in the ATP (speech or 3.1 kHz audio)	TMU Speech or 3.1 kHz audio ATP BC (speech or 3.1 kHz audio)
BC received in the ATP (speech or 3.1 kHz audio) p.i. No. 5	TMU Speech or 3.1 kHz audio ATP BC (speech or 3.1 kHz audio) p.i. No. 5

If a high layer compatibility information element is present in the access transport parameter of the Answer Message (ANM), and if no progress indicator No. 1 (*call is not end-to-end ISDN*) or No. 2 (*destination address is non-ISDN*) has to be sent, Table 18 is applicable.

Table 18/Q.699 – Sending of HLC fallback information

←CONNECT	←ANM
Content	Access transport parameter
HLC	HLC
HLC Progress indicator No. 5	HLC Progress indicator No. 5
no HLC	no HLC

NOTE – If procedures of BC fallback and HLC fallback both require the sending of the progress indicator No. 5, only one progress indicator No. 5 is sent.

2.1.1.6 Receipt of the Connect message (CON)

Upon receiving a Connect message (CON), the exchange shall send a CONNECT message across the user-network interface to the calling user.

The CONNECT message is coded as follows.

Bearer capability

See handling of fallback information at the end of this subclause.

Progress indicator

Progress indicator information elements possibly present in the access transport parameter of the Connect message (CON) are transferred into the CONNECT message sent to the calling user.

In case of fallback, a progress indicator No. 5 (*interworking has occurred and has resulted in a telecommunication service change*) is sent as well: see Tables 17 and 18.

The CONNECT message sent to the access may contain two progress indicator information elements.

High layer compatibility

If a high layer compatibility information element is present in the access transport parameter of the call Connect message (CON), see handling of fallback information at the end of this subclause.

Low layer compatibility

The low layer compatibility possibly present in the access transport parameter of the Connect message (CON) is passed on unchanged.

Notification indicator

See 2.1.2.

Redirecting number

See 2.1.2.

Redirection number

See 2.1.2.

Facility

See 2.1.2.

User-user

See 2.1.2.

Connected number

See 2.1.2.

Connected subaddress

See 2.1.2.

Handling of fallback information

See 2.1.1.5.

2.1.1.7 Receipt of the release message (REL)

Table 19/Q.699 – Receipt of the Release message (REL)

←DISCONNECT	←REL
Cause information element	Cause parameter
Cause value No. x (Notes 1 and 2)	Cause value No. x
NOTE 1 – If the cause value received in the Release message (REL) is unknown in DSS 1, the unspecified cause value of the class is sent. NOTE 2 – Some supplementary services, such as CUG or UUS supplementary services, require the mapping of some causes values; see 2.1.2.	

The handling of the other parameters is described in 2.1.2.

The receipt of the release message (REL) during the user suspend/resume procedure is described in 2.1.2.

2.1.1.8 Sending of the Release message (REL)

Table 20/Q.699 – Call clearing from the user

DISCONNECT, RELEASE RELEASE COMPLETE→	REL→
Cause information element	Cause parameter
Cause value No. x	Cause value No. x (Notes 1 and 2)
NOTE 1 – If the cause value received in the DSS 1 message is unknown in ISUP, the unspecified cause value of the class is sent. NOTE 2 – Some supplementary services, such as CUG or UUS supplementary services, require the mapping of some cause values; see 2.1.2.	

2.1.1.9 Receipt of Reset Circuit message (RSC), Circuit Group Reset message (GRS) or Circuit Group Blocking message (CGB) with the indication *hardware failure oriented*

Table 21 shows the message sent to the calling user upon receipt of either a RSC message, GRS message or CGB message with the indication *hardware failure oriented*, when at least one backward message relating to the call has already been received.

Table 21/Q.699 – Receipt of RSC, GRS or CGB messages

←DISCONNECT	←Message received from ISUP
Cause information element	
Cause value No. 31 <i>Normal, unspecified</i>	Reset Circuit message (RSC)
Cause value No. 31 <i>Normal, unspecified</i>	Circuit Group Reset message (GRS)
Cause value No. 31 <i>Normal, unspecified</i>	Circuit Group Blocking message (CGB) with the type indicator of the circuit group supervision message type indicator parameter coded "01" (<i>hardware failure oriented</i>)

2.1.1.10 DSS 1 data link reset and data link failure procedures

The data link reset and data link failure procedures are respectively described in 5.8.8/Q.931 and 5.8.9/Q.931 [6].

Table 22/Q.699 – DSS 1 data link reset and data link failure procedures

←DISCONNECT	Trigger event	REL→
Cause information element		Cause parameter
Cause value No. 41 <i>(temporary failure)</i>	Data link reset in overlap sending state	Cause value No. 41 <i>(temporary failure)</i>
(Note)	Data link failure in an other state than active state	Cause value No. 27 <i>(destination out of order)</i>
(Note)	Failure of the data link reestablishment procedure after a data link failure in active state	Cause value No. 27 <i>(destination out of order)</i>
NOTE – The call is cleared internally. No DISCONNECT message is sent on the access.		

2.1.1.11 Receipt of the Suspend message (SUS) network initiated

The actions taken on the ISUP side upon receipt of the Suspend message (SUS) are described in 2.4.1/Q.764 [4].

No action is taken on the DSS 1 side.

2.1.1.12 Receipt of the Resume message (RES) network initiated

The actions taken on the ISUP side upon receipt of the Resume message (RES) are described in 2.4.1/Q.764 [4].

No action is taken on the DSS 1 side.

2.1.1.13 Release by the exchange

Table 23/Q.699 – Release from the originating exchange

←DISCONNECT	Trigger event	REL→
Cause information element		Cause parameter
Cause value No. 28 <i>Invalid number format (address incomplete)</i>	Determination that the called number information received is incomplete, after an IAM message has already been sent	Cause value No. 28 <i>Invalid number format (address incomplete)</i>
Cause value No. 31 <i>normal, unspecified</i>	Failure of the automatic repeat attempt procedure	No action
Cause value No. 16 <i>normal call clearing</i>	T6 expiry (Note 1)	Cause value No. 102 <i>recovery on timer expiry</i>
Cause value No. 97 or No. 99	Call release due to the ISUP compatibility procedure	Cause value No. 97 or No. 99
Same cause value as in the REL message (Note 2)	Other cases of failure on the ISUP side	Cause value coded according to [4]
Cause value coded according to [6]	Other cases of failure on the DSS 1 side	Same cause value as in the DISCONNECT message (Note 3)
<p>NOTE 1 – T6: awaiting resume message (RES) timer. T6 start, stop, and expiry are described in 2.4/Q.764 and Annex A/Q.764 [4].</p> <p>NOTE 2 – If the cause value sent in the REL message is unknown in DSS 1, the unspecified cause value of the class is sent.</p> <p>NOTE 3 – If the cause value sent in the DISCONNECT message is unknown in ISUP, the unspecified cause value of the class is sent.</p>		

2.1.2 Supplementary Services

2.1.2.1 Direct-Dialling-In (DDI)

There is no interworking requirement relating to the direct-dialling-in supplementary service.

2.1.2.2 Multiple Subscriber Number (MSN)

There is no interworking requirement relating to the multiple subscriber number supplementary service.

2.1.2.3 Calling Line Identification Presentation (CLIP)

The mapping shown in 2.1.2.3.1 forms part of basic call.

2.1.2.3.1 Special arrangement applies

Table 24/Q.699 – CLIP – Special arrangement applies

SETUP→		IAM→			
Calling party number i.e.		Coding of the calling party number and generic number parameters			
Type of number	Numbering plan identification	Address signals	Numbering plan indicator	Nature of address indicator	Screening indicator
No or invalid (Note 1) calling party number information element		Calling party number parameter			
		Default number	001 <i>ISDN numbering plan</i>	000 0011 <i>National number</i>	11 <i>Network provided</i>
		No generic number parameter indicating <i>additional calling party number</i> is sent			
<i>National number</i>	<i>ISDN/telephony numbering plan</i> or <i>Unknown</i>	Calling party number parameter			
		Default number	001 <i>ISDN numbering plan</i>	000 0011 <i>National number</i>	11 <i>Network provided</i>
		Generic number parameter (Note 2)			
		Number provided by the user	001 <i>ISDN numbering plan</i>	000 0011 <i>National number</i>	00 <i>User provided, not verified</i>
<i>International number</i>	<i>ISDN/telephony numbering plan</i> or <i>Unknown</i>	Calling party number parameter			
		Default number	001 <i>ISDN numbering plan</i>	000 0011 <i>National number</i>	11 <i>Network provided</i>
		Generic number parameter (Note 2)			
		Number provided by the user	001 <i>ISDN numbering plan</i>	000 0100 <i>International number</i>	00 <i>User provided, not verified</i>
NOTE 1 – Validity conditions of the calling party number information element are defined in 3.5.2.1/Q.951 [14].					
NOTE 2 – The generic number parameter contains the number qualifier indicator coded "00000110" (<i>additional calling party number</i>).					

The address presentation restricted indicator of the calling party number and generic number parameters shall be set according to the CLIR supplementary service.

The calling party number incomplete indicator of the calling party number and the generic number parameters shall be set to "0" (*complete*).

Calling party subaddress

If provided, the calling party subaddress is transported transparently in the access transport parameter.

2.1.2.3.2 Special arrangement does not apply

Table 25/Q.699 – CLIP – Special arrangement does not apply

SETUP→			IAM→			
Calling party number information element			Coding of the calling party number and generic number parameters			
Type of number	Numbering plan identification	Number digits	Address signals	Numbering plan indicator	Nature of address indicator	Screening indicator
No or invalid (Note) calling party number information element			Calling party number parameter			
			Default number	001 <i>ISDN numbering plan</i>	000 0011 <i>National number</i>	11 <i>Network provided</i>
			No generic number parameter indicating <i>additional calling party number</i> is sent			
Failure of the screening function			Calling party number parameter			
			Default number	001 <i>ISDN numbering plan</i>	000 0011 <i>National number</i>	11 <i>Network provided</i>
			No generic number parameter indicating <i>additional calling party number</i> is sent			
<i>Subscriber number</i> or <i>National number</i> or <i>International number</i>			Calling party number parameter			
			Number provided by the user	001 <i>ISDN numbering plan</i>	000 0011 <i>National number</i> , or 000 0100 <i>International Number</i>	01 <i>User provided, verified and passed</i>
			No generic number parameter indicating <i>additional calling party number</i> is sent			
<i>Unknown</i> or <i>Unknown</i>			Calling party number parameter			
			Completion of the number provided by the user	001 <i>ISDN numbering plan</i>	000 0011 <i>National number</i>	01 <i>User provided, verified and passed</i>
			No generic number parameter indicating <i>additional calling party number</i> is sent			
NOTE – Validity conditions of the calling party number information element are defined in 3.5.2.1/Q.951 [14].						

The address presentation restricted indicator of the calling party number parameter shall be set according to the CLIR supplementary service.

The calling party number incomplete indicator of the calling party number parameters shall be set to "0" (*complete*).

Calling party subaddress

If provided, the calling party subaddress is transported transparently in the access transport parameter.

2.1.2.4 Calling Line Identification Restriction (CLIR)

The address presentation restricted indicator of the calling party number and of the generic number parameters is coded as described in Table 26.

NOTE – If the calling user has not subscribed the CLIR supplementary service, the address presentation restricted indicator of the calling party number parameter is set to *presentation allowed* (see 4.10/Q.951 [14]).

Table 26/Q.699 – Coding of the address presentation restricted indicator of the calling party number and generic number parameters

Internal data		SETUP→	IAM→
Permanent mode	Temporary mode default setting	Calling party number information element	Calling party number/ generic number parameter
		Presentation indicator	Address presentation restricted indicator
Yes	Value non-significant	Value non-significant	Presentation restricted
No	Restricted	Presentation restricted	Presentation restricted
		Absent	Presentation restricted
		Presentation allowed	Presentation allowed
	Allowed	Presentation allowed	Presentation allowed
		Absent	Presentation allowed
		Presentation restricted	Presentation restricted

2.1.2.5 Connected Line Identification Presentation (COLP)

If the calling user is provided with the COLP supplementary service, the connected line identity request indicator of the optional forward call indicators parameter in the Initial Address Message (IAM) is coded to *requested*.

If the calling user is provided with the COLP supplementary service, only one connected number information element is sent in the CONNECT message.

Table 27/Q.699 – COLP information sent to the calling user

←CONNECT	←ANM/CON	
COLP information sent to the calling user	Connected number parameter	Generic number parameter with number qualifier set to <i>additional connected number</i>
	Address presentation restricted indicator	
Connected number i.e. (see Table 28)	<i>Presentation allowed</i>	Absent
Connected number i.e. (see Table 28)	<i>Presentation allowed</i>	Present
<p style="text-align: center;">Connected number i.e.</p> <p>Option 1:</p> <p>Type of number <i>As received</i></p> <p>Numbering plan <i>As received</i></p> <p>Presentation ind. <i>Presentation restricted</i></p> <p>Screening ind. <i>As received</i></p> <p>Number digits <i>No digit</i></p> <p>Option 2:</p> <p>Type of number <i>Unknown</i></p> <p>Numbering plan <i>Unknown</i></p> <p>Presentation ind. <i>Presentation restricted</i></p> <p>Screening ind. <i>Network provided</i></p> <p>Number digits <i>No digit</i></p>	<i>Presentation restricted</i> (Note)	Value non-significant
<p style="text-align: center;">Connected number i.e.</p> <p>Type of number <i>Unknown</i></p> <p>Numbering plan <i>Unknown</i></p> <p>Presentation ind. <i>Not available due to interworking</i></p> <p>Screening ind. <i>Network provided</i></p> <p>Number digits <i>No digit</i></p>	<i>Address not available</i> or No connected number parameter	Value non-significant
<p>NOTE – As a national option, the presentation restriction indication received in the connected number parameter can be overridden for specific calling access' categories. In such a case, the same actions are taken as if <i>presentation allowed</i> was received, except for the presentation restriction indication which is passed transparently into the connected number information element.</p>		

Table 28/Q.699 – Coding of the connected number information element according to the connected number parameter

←CONNECT	←ANM/CON
Connected number i.e.	Connected number parameter
Type of number (Note) <i>National number</i> <i>International number</i>	Nature of address indicator <i>National number</i> <i>International number</i>
Numbering plan identification <i>ISDN/Telephony numbering plan</i>	Numbering plan indicator <i>ISDN/Telephony numbering plan</i>
Presentation indicator <i>Presentation allowed</i>	Address presentation restricted indicator <i>Presentation allowed</i>
Screening indicator <i>User provided, verified and passed</i> <i>Network provided</i>	Screening indicator <i>User provided, verified and passed</i> <i>Network provided</i>
Number digits	Address signals
NOTE – As a network option, the type of number may be coded <i>unknown</i> when a prefix is added to the number.	

Table 29/Q.699 – Coding of the connected number information element according to the generic number parameter

←CONNECT	←ANM/CON
Connected number i.e.	Generic number parameter with number qualifier set to <i>additional connected number</i>
Type of number (Note) <i>National number</i> <i>International number</i>	Nature of address indicator <i>National number</i> <i>International number</i>
Numbering plan identification <i>ISDN/Telephony numbering plan</i>	Numbering plan indicator <i>ISDN/Telephony numbering plan</i>
Presentation indicator <i>Presentation allowed</i>	Address presentation restricted indicator <i>Presentation allowed</i>
Screening indicator <i>User provided, not verified</i>	Screening indicator <i>User provided, not verified</i>
Number digits	Address signals
NOTE – As a network option, the type of number may be coded <i>unknown</i> when a prefix is added to the number.	

Connected subaddress

Table 30/Q.699 – Sending of the connected subaddress

←CONNECT	←ANM/CON	
Content	Access transport parameter	Address presentation restricted indicator of the connected number parameter
Connected subaddress information element	Connected subaddress information element	<i>Presentation allowed</i>
No connected subaddress information element	Connected subaddress information element	<i>Presentation restricted (Note)</i> or <i>Address not available</i> or No connected number parameter

NOTE – As a national option, the presentation restriction indication received in the connected number parameter can be overridden for specific calling access' categories. In such a case, the same actions are taken as if *presentation allowed* was received.

2.1.2.6 Connected line identification restriction (COLR)

See Table 27.

2.1.2.7 Sub-addressing (SUB)

The mapping shown in the subclause below forms part of basic call.

The called party subaddress information element received from the access in the SETUP message is transferred transparently in the access transport parameter of the IAM.

2.1.2.8 Call diversion

Hereafter are only described the handling of notification received from a public or private network at the originating exchange. The actions taken in the forwarding exchange are described in Recommendations Q.732 [9] and Q.952 [15].

2.1.2.8.1 Interworking at the calling user's exchange

2.1.2.8.1.1 Reception of a "call diversion may occur" notification

According to [9], the Address Complete Message (ACM), or the Call Progress Message (CPG) may be received with the optional backward call indicators parameter including the call diversion may occur indicator set to "call diversion may occur". No specific interworking action is required: see 2.1.1.

2.1.2.8.1.2 Reception of a "call is diverting" notification

According to [9], the Address Complete message (ACM) or the Call Progress message (CPG) may be received with:

- the call diversion information parameter;
- the generic notification indicators parameter coded *call is diverting*; and
- the redirection number parameter.

At least the call diversion information and generic notification indicators parameters should be available in the Address Complete (ACM) or Call Progress (CPG) message.

First diversion

The number information contained in the redirection number parameter is stored.

A notification of diversion is sent to the calling user as shown in Table 31.

Table 31/Q.699 – First diversion: notification of diversion sent to the calling user

←DSS 1 message (Note)	←ACM/CPG	
	Call diversion information parameter	Generic notification indicator parameter
Notification indicator information element	Notification subscription option	
<i>Call is diverting</i>	<i>Presentation allowed with redirection number</i> or <i>Presentation allowed without redirection number</i>	<i>Call is diverting</i>
Not sent	<i>Unknown</i> or <i>Presentation not allowed</i>	

NOTE – The determination of the DSS 1 message sent upon the Address Complete (ACM) or Call Progress (CPG) message is described in 2.1.1. If no message is to be sent, the notification indicator information element is sent in a NOTIFY message.

Subsequent diversion

The number information contained in the redirection number parameter is stored (i.e. the latest received diverted-to number replaces the one received previously).

If it has been previously determined, according to [15], that notification of diversion is not allowed, no specific interworking action is required towards the calling user: see 2.1.1.

If it has been previously determined, according to [15], that notification of diversion is allowed, Table 32 is applicable.

Table 32/Q.699 – Subsequent diversion: notification of diversion sent to the calling user

←DSS 1 message (Note 1)	←CPG	
	Call diversion information parameter	Generic notification indicator parameter
Notification indicator i.e.	Redirecting reason	Notification subscription option
No notification sent		<i>Unknown</i> or <i>Presentation not allowed</i>
<i>Call is diverting</i>	<i>Deflection during alerting</i> or <i>No reply</i>	<i>Presentation allowed with redirection number</i> or <i>Presentation allowed without redirection number</i>
No notification sent	Other reason	
<p>NOTE 1 – The determination of the DSS 1 message sent upon Call Progress message (CPG) is described in 2.1.1. If no message is to be sent, the notification indicator information element is sent in a NOTIFY message.</p> <p>NOTE 2 – The latest received diverted-to number replaces the one received previously.</p>		

2.1.2.8.1.3 Reception of the redirection number restriction parameter

If a backward message (ACM, CPG, ANM or CON) is received containing the redirection number restriction parameter:

- if it has been determined, according to [15], that the notification of diverted-to number is not allowed, no specific interworking action are required: see 2.1.1;
- if it has been determined, according to [15], that the notification of diverted-to number is allowed, a redirection number information element is sent to the calling user as shown in Table 33.

Table 33/Q.699 – Notification of the diverted-to number

←DSS 1 message (Note 1)	Redirection number parameter stored in the originating exchange	←ACM, CPG, ANM or CON
Redirection number information element		Presentation restriction parameter
Type of number According to the nature of address indicator (Note 2) Numbering plan identification <i>ISDN (telephony) numbering plan</i> Presentation indicator <i>Presentation allowed</i> Number digits Digits received in the address signal	Nature of address indicator <i>National number, or International number</i> Numbering plan indicator <i>ISDN (telephony) numbering plan</i> Address signal	<i>Presentation allowed</i>
Type of number <i>Unknown</i> Numbering plan identification <i>Unknown</i> Presentation indicator <i>Presentation restricted</i> Number digits Not included	Nature of address indicator <i>National number, or International number</i> Numbering plan indicator <i>ISDN (telephony) numbering plan</i> Address signal	<i>Presentation restricted</i>
Type of number <i>Unknown</i> Numbering plan identification <i>Unknown</i> Presentation indicator <i>Number not available due to interworking</i> Number digits Not included	No redirection number stored	Value non-significant
NOTE 1 – The determination of the DSS 1 message sent upon the ISUP backward message is described in 2.1.1. If no message is to be sent, the redirection number information element is sent in a NOTIFY message.		
NOTE 2 – As a network option, the type of number may be coded <i>unknown</i> .		

2.1.2.8.2 Interworking at the exchange where a diverted call is presented from a private ISDN

For further study.

2.1.2.9 Call Waiting (CW)

Table 34/Q.699 – Mapping of ACM, CPG for CW procedure in ISDN access

←ALERTING/PROGRESS/NOTIFY (Note)	←ACM, CPG
Notification indicator information element	Generic notification indicator parameter
Notification description	Notification indicator
110 0000 <i>Call is a waiting call</i>	110 0000 <i>Call is a waiting call</i>
NOTE – The criteria of sending of ALERTING or PROGRESS is defined in 2.1.1. If neither ALERTING or PROGRESS has to be sent, a NOTIFY message is sent.	

2.1.2.10 Call Hold (HOLD)

2.1.2.10.1 Notification received from the network

Table 35/Q.699 – Receipt of HOLD notification from the network

←NOTIFY or FACILITY	←CPG
Notification indicator information element	Generic notification indicator parameter
Notification description	Notification indicator
111 1001 <i>Remote hold</i>	111 1001 <i>Remote hold</i>
111 1010 <i>Remote retrieval</i>	111 1010 <i>Remote retrieval</i>

2.1.2.10.2 Invocation at coincident S and T reference point

Table 36/Q.699 – HOLD invocation

Message received from the DSS 1 →	CPG→	
	Generic notification indicator parameter	Event information parameter
	Notification indicator	Event indicator
HOLD	111 1001 <i>Remote hold</i>	000 0010 <i>Progress</i>
RETRIEVE	111 1010 <i>Remote retrieval</i>	000 0010 <i>Progress</i>

2.1.2.10.3 Notification received at T reference point

A HOLD notification may be received at T reference point in the active phase of the call.

Table 37/Q.699 – Receipt of a HOLD notification from a private network

NOTIFY→	CPG→	
Notification indicator information element	Generic notification indicator parameter	Event information parameter
Notification description	Notification indicator	Event indicator
111 1001 <i>Remote hold</i>	111 1001 <i>Remote hold</i>	000 0010 <i>Progress</i>
111 1010 <i>Remote retrieval</i>	111 1010 <i>Remote retrieval</i>	000 0010 <i>Progress</i>

2.1.2.11 Terminal Portability (TP)

2.1.2.11.1 Notification received from the network

Table 38/Q.699 – Receipt of TP notification from the network

←NOTIFY	← Message received from the ISUP
Notification indicator i.e. Notification description	
000 0000 <i>User suspended</i>	SUS message Suspend/resume indicator <i>ISDN subscriber initiated</i>
000 0001 <i>User resumed</i>	RES message Suspend/resume indicator <i>ISDN subscriber initiated</i>
000 0000 <i>User suspended</i>	CPG message Generic notification indicator <i>User suspended</i>
000 0001 <i>User resumed</i>	CPG message Generic notification indicator <i>User resumed</i>

2.1.2.11.2 Invocation at coincident S and T reference point

Table 39/Q.699 – TP invocation

Message received from the DSS 1 →	Message sent to the ISUP →
SUSPEND	SUS message Suspend/resume indicator <i>ISDN subscriber initiated</i>
RESUME	RES message Suspend/resume indicator <i>ISDN subscriber initiated</i>

The action taken on the access side upon receipt of SUSPEND and RESUME messages are described in 5.6/Q.931 and Figure A.6/Q.931.

The actions taken on the ISUP side upon sending of the Suspend (SUS) and Resume (RES) messages are described in 4.5.2.1/Q.733 [10].

Upon the T2 or T307 expiry (Note), a Release message (REL) is sent with the cause value No. 102, *recovery on timer expiry*. No action is taken on the DSS 1 side.

NOTE – T2 start, stop, and expiry are described in 4.5.2.1/Q.733 [10] and Annex A/Q.764 [4]. T307 start, stop and expiry are described in 5.6/Q.931.

2.1.2.11.3 Notification received at T reference point

A TP notification may be received at T reference point from a point-to-point data link in the active phase of the call.

Table 40/Q.699 – Receipt of a TP notification from a private network

NOTIFY→	CPG→	
Notification indicator information element	Generic notification indicator parameter	Event information parameter
Notification description	Notification indicator	Event indicator
000 0000 <i>User suspended</i>	000 0000 <i>User suspended</i>	000 0010 <i>Progress</i>
000 0001 <i>User resumed</i>	000 0001 <i>User resumed</i>	000 0010 <i>Progress</i>

2.1.2.12 Conference calling (CONF)

2.1.2.12.1 Notification received from the network

Table 41/Q.699 – Conference calling notification

←NOTIFY	←CPG
Notification indicator information element	Generic notification indicator parameter
Notification description	Notification indicator
100 0010 <i>Conference established</i>	100 0010 <i>Conference established</i>
100 0011 <i>Conference disconnected</i>	100 0011 <i>Conference disconnected</i>
100 0100 <i>Other party added</i>	100 0100 <i>Other party added</i>
100 0101 <i>Isolated</i>	100 0101 <i>Isolated</i>
100 0110 <i>Reattached</i>	100 0110 <i>Reattached</i>
100 0111 <i>Other party isolated</i>	100 0111 <i>Other party isolated</i>
100 1000 <i>Other party reattached</i>	100 1000 <i>Other party reattached</i>
100 1001 <i>Other party split</i>	100 1001 <i>Other party split</i>
100 1010 <i>Other party disconnected</i>	100 1010 <i>Other party disconnected</i>
100 1011 <i>Conference floating</i>	100 1011 <i>Conference floating</i>

2.1.2.12.2 Invocation at coincident S and T reference point

Table 42/Q.699 – Conference calling

Procedure	Message received from served user →	Message sent to B →	Message sent to all other remote users →
Beginning the conference from an active call (with B)	FACILITY Facility i.e. BeginCONF-Inv Call reference i.e. Call reference of existing call	CPG Generic notification indicator parameter <i>Conference established</i>	Not applicable
Adding a remote user (B)	FACILITY Facility i.e. AddCONF-Inv Call reference i.e. Call reference of call to be added	CPG Generic notification indicator parameter <i>Conference established</i>	CPG Generic notification indicator parameter <i>Other party added</i>
Isolate a remote user (B)	FACILITY Facility i.e. IsolateCONF-Inv	CPG Generic notification indicator parameter <i>Isolated</i>	CPG Generic notification indicator parameter <i>Other party isolated</i>
Reattach a remote user (B)	FACILITY Facility i.e. ReattachCONF-Inv	CPG Generic notification indicator parameter <i>Reattached</i>	CPG Generic notification indicator parameter <i>Other party reattached</i>
Splitting a remote user (B)	SETUP (Note) Facility i.e. SplitCONF-Inv	CPG Generic notification indicator parameter <i>Conference disconnected</i>	CPG Generic notification indicator parameter <i>Other party split</i>
Disconnect a remote user (B)	FACILITY Facility i.e. DropCONF-Inv	REL	CPG Generic notification indicator parameter <i>Other party disconnected</i>
Terminate the conference	FACILITY Facility i.e. EndCONF-Inv	REL	

Table 42/Q.699 – Conference calling (concluded)

Procedure	Message received from served user →	Message sent to B →	Message sent to all other remote users →
Disconnect the served user	FACILITY Facility i.e. FloatCONF-Inv	CPG Generic notification indicator parameter <i>Conference floating</i>	
Call clearing by served user	DISCONNECT	If the conditions for floating are met: CPG Generic notification indicator parameter <i>Conference floating</i> If the conditions for floating are not met: REL	
NOTE – This SETUP message does not contain any called party information but contains a bearer capability information element (see 1.5.2.6.1/Q.954 [17]).			

Table 43/Q.699 – Conference calling: a remote user clears

Procedure	Message sent to served user ←	Message received from B ←
Remote user clears	FACILITY Facility i.e. PartyDisc-Inv	REL

2.1.2.12.3 Notification received at T reference point

Table 44/Q.699 – Receipt of a conference calling notification from a private network

NOTIFY→	CPG→	
Notification indicator information element	Generic notification indicator parameter	Event information parameter
Notification description	Notification indicator	Event indicator
100 0010 <i>Conference established</i>	100 0010 <i>Conference established</i>	000 0010 <i>Progress</i>
100 0011 <i>Conference disconnected</i>	100 0011 <i>Conference disconnected</i>	000 0010 <i>Progress</i>
100 0100 <i>Other party added</i>	100 0100 <i>Other party added</i>	000 0010 <i>Progress</i>
100 0101 <i>Isolated</i>	100 0101 <i>Isolated</i>	000 0010 <i>Progress</i>
100 0110 <i>Reattached</i>	100 0110 <i>Reattached</i>	000 0010 <i>Progress</i>
100 0111 <i>Other party isolated</i>	100 0111 <i>Other party isolated</i>	000 0010 <i>Progress</i>
100 1000 <i>Other party reattached</i>	100 1000 <i>Other party reattached</i>	000 0010 <i>Progress</i>
100 1001 <i>Other party split</i>	100 1001 <i>Other party split</i>	000 0010 <i>Progress</i>
100 1010 <i>Other party disconnected</i>	100 1010 <i>Other party disconnected</i>	000 0010 <i>Progress</i>
100 1011 <i>Conference floating</i>	100 1011 <i>Conference floating</i>	000 0010 <i>Progress</i>

2.1.2.13 Three-party (3PTY)

2.1.2.13.1 Notification received from the network

Table 45/Q.699 – 3PTY notification

←NOTIFY	←CPG
Notification indicator information element	Generic notification indicator parameter
Notification description	Notification indicator
100 0010 <i>Conference established</i>	100 0010 <i>Conference established</i>
100 0011 <i>Conference disconnected</i>	100 0011 <i>Conference disconnected</i>
111 1001 <i>Remote hold</i>	111 1011 <i>Remote hold</i>

If the call progress message (CPG) contains two generic notification indicator parameters, one with the notification indicator coded *conference disconnected*, the other with the notification indicator coded *remote hold*,

- either a NOTIFY message is sent containing:
 - a notification indicator information element with the notification description *conference disconnected*; and
 - a notification indicator information element with the notification description *remote hold*;
- or
 - a NOTIFY message is sent containing a notification indicator information element with the notification description *conference disconnected*; and
 - a subsequent NOTIFY message is sent containing a notification indicator information element with the notification description *remote hold*.

2.1.2.13.2 Invocation at coincident S and T reference point

Table 46/Q.699 – Three-party (3PTY)

Procedure	Message received from served user →	Call A-B: Active-held connection message sent to B →	Call A-C: Active-idle connection message sent to C →
Beginning the 3PTY	FACILITY→ Facility i.e. Begin3PTY-Inv Call reference i.e. Call reference of call A-B	CPG→ Generic notification indicator parameter <i>Conference established</i>	CPG→ Generic notification indicator parameter <i>Conference established</i>
Creation of a private communication with B	FACILITY→ Facility i.e. End3PTY-Inv Call reference i.e. Call reference of call A-B	CPG→ Generic notification indicator parameter <i>Remote hold</i>	CPG→ Generic notification indicator parameter <i>Conference disconnected</i>
	HOLD→ Call reference i.e. Call reference of call A-C	No message sent	CPG→ Generic notification indicator parameter <i>remote hold</i>
	RETRIEVE→ Call reference i.e. Call reference of call A-B	CPG→ Generic notification indicator parameter <i>Conference disconnected</i>	No message sent

Table 46/Q.699 – Three-party (3PTY) (concluded)

Procedure	Message received from served user →	Call A-B: Active-held connection message sent to B →	Call A-C: Active-idle connection message sent to C →
Creation of a private communication with C	FACILITY→ Facility i.e. End3PTY-Inv Call reference i.e. Call reference of call A-C	CPG→ Generic notification indicator parameter <i>Conference disconnected</i> Generic notification indicator parameter <i>Remote hold</i>	CPG→ Generic notification indicator parameter <i>Conference disconnected</i>
Disconnect the remote user B	DISCONNECT→ Call reference i.e. Call reference of call A-B	REL→	CPG→ Generic notification indicator parameter <i>Conference disconnected</i>
Disconnect the remote user C	DISCONNECT→ Call reference i.e. Call reference of call A-C	CPG→ Generic notification indicator parameter <i>Remote hold</i>	REL→
	RETRIEVE→ Call reference i.e. Call reference of call A-B	CPG→ Generic notification indicator parameter <i>Conference disconnected</i>	Not applicable

Table 47 describes the actions taken when user B or user C disconnects.

Table 47/Q.699 – Three-party (3PTY): user B or user C disconnects

Messages sent to or received from served user	Call A-B: Active-held connection messages sent to B or received from B	Call A-C: Active-idle connection message sent to C or received from C	Procedure
←DISCONNECT Call reference i.e. Call reference of call A-B	←REL	CPG→ Generic notification indicator parameter <i>Conference disconnected</i>	User B disconnects
←DISCONNECT Call reference i.e. Call reference of call A-C	CPG→ Generic notification indicator parameter <i>Remote hold</i>	←REL	
RETRIEVE→ Call reference i.e. Call reference of call A-B	CPG→ Generic notification indicator parameter <i>Conference disconnected</i>	Not applicable	

2.1.2.13.3 Notification received at T reference point

Table 48/Q.699 – Receipt of a 3PTY notification from a private network

NOTIFY→	CPG→	
Notification indicator information element	Generic notification indicator parameter	Event information parameter
Notification description	Notification indicator	Event indicator
100 0010 <i>Conference established</i>	100 0010 <i>Conference established</i>	000 0010 <i>Progress</i>
100 0011 <i>Conference disconnected</i>	100 0011 <i>Conference disconnected</i>	000 0010 <i>Progress</i>
111 1001 <i>Remote hold</i>	111 1011 <i>Remote hold</i>	000 0010 <i>Progress</i>

2.1.2.14 Closed User Group (CUG)

CUG checks at the originating exchange and determination of the type of call request in correlation with the CUG information received from the calling user in the SETUP message and the CUG attributes of the calling user are described in Table 1-1/Q.955 [18].

The coding of the ISUP CUG parameter (closed user group call indicator of the optional forward call indicators parameter, CUG interlock code parameter) and of the ISDN User Part indicator of the forward call indicators parameter are described in 1.5.2.1.1/Q.735 [12].

A rejection indication may be received in a Release message (REL).

Table 49/Q.699 – Receipt of a rejection indication

←DISCONNECT		←REL
Cause information element	Return error component	Cause parameter
<p style="text-align: center;"><i>Implicit request:</i></p> <p>Cause value No. 29 <i>Facility rejected</i></p>	No return error component	Cause value No. 55 <i>Incoming calls barred within CUG</i>
<p style="text-align: center;"><i>Explicit request:</i></p> <p>Cause value No. 29 <i>Facility rejected</i></p>	Return error value #19 <i>incomingCallsBarredWithinCUG</i>	
<p style="text-align: center;"><i>Implicit request or not CUG request:</i></p> <p>Cause value No. 87 <i>User not member of CUG</i></p>	No return error component	Cause value No. 87 <i>User not member of CUG</i>
<p style="text-align: center;"><i>Explicit request:</i></p> <p>Cause value No. 29 <i>Facility rejected</i></p>	Return error value #20 <i>userNotMemberOfCUG</i>	
<p style="text-align: center;"><i>Implicit request:</i></p> <p>Cause value No. 87 <i>User not member of CUG</i></p>	No return error component	Cause value No. 29 <i>Facility rejected</i> Diagnostic with the name of the closed user group interlock parameter
<p style="text-align: center;"><i>Explicit request:</i></p> <p>Cause value No. 29 <i>Facility rejected</i></p>	Return error value #20 <i>userNotMemberOfCUG</i>	
<p>Normal handling of the cause value See 2.1.1</p>	No return error component	Other cause value
<p>Normal handling of the cause value See 2.1.1</p>	Return error value #8 <i>basicServiceNotProvided</i>	
NOTE – This table provides examples of mapping.		

2.1.2.15 User-to-User Signalling (UUS)

2.1.2.15.1 Service 1 (UUS1) implicit

Service 1 may be requested implicitly by the presence of the user-user information element in the SETUP message which is mapped into the user-to-user information parameter of the initial address message.

Table 50/Q.699 – Implicit UUS1 transfer

DSS 1 messages	ISUP messages
SETUP →	IAM →
User-user information element	User-to-user information parameter
PROGRESS, ALERTING, CONNECT, DISCONNECT ←	ACM, CPG, ANM, CON, REL, SGM ←
User-user information element	User-to-user information parameter
DISCONNECT, RELEASE, RELEASE COMPLETE →	REL →
User-user information element	User-to-user information parameter
<p>NOTE 1 – If there is no user-user information element in the SETUP message, the exchange should discard the user-to-user information possibly received afterwards from the access or from the ISUP side.</p> <p>NOTE 2 – In case of service 1 rejection, no specific notification is sent to the calling user.</p> <p>If a backward message (ACM, CPG, ANM) indicates that interworking has occurred with a called analogue user or a non-ISDN signalling system, a progress indicator information element is sent as described in 2.1.1.</p>	

2.1.2.15.2 Service 1 (UUS1) explicit

Table 51/Q.699 – Explicit UUS1 invocation

SETUP→	IAM→
Content	Content
Facility information element UserUserService invoke component <i>Service 1 preferred</i>	User-to-user indicators parameter Type <i>Request</i> Service 1 <i>Request, not essential</i> Service 2 <i>No information (Note 1)</i> Service 3 <i>No information (Note 1)</i>
	Forward call indicators parameter ISDN User Part preference indicator <i>ISDN User Part preferred all the way</i>
User-user information element (Note 2)	User-to-user information parameter
Facility information element UserUserService invoke component <i>Service 1 required</i>	User-to-user indicators parameter Type <i>Request</i> Service 1 <i>Request, essential</i> Service 2 <i>No information (Note 1)</i> Service 3 <i>No information (Note 1)</i>
	Forward call indicators parameter ISDN User Part preference indicator <i>ISDN User Part required all the way</i>
User-user information element (Note 2)	User-to-user information parameter
NOTE 1 – These indicators may be coded in a different way if service 2 (respectively service 3) information has to be transported: see Tables 56 and 61.	
NOTE 2 – The user-user information element is optional for the invocation. When absent, the user-to-user parameter is not included in the Initial Address Message (IAM).	

Service 1 acceptance shall be received in the first backward message containing either an alerting, connecting or disconnecting indication. See Table 52.

Table 52/Q.699 – Explicit UUS1 acceptance

←ALERTING, CONNECT, DISCONNECT	←ACM, CPG, ANM, CON, REL
Facility information element UserUserService return result component	User-to-user indicators parameter Type Response Service 1 <i>Provided</i>

When acceptance of service 1 has been received, user-user information may be exchanged in all the call control messages. See Table 53.

Table 53/Q.699 – Explicit UUS1 transfer

DSS 1 messages	ISUP messages
PROGRESS, ALERTING, CONNECT, DISCONNECT (Note) ←	ACM, CPG, ANM, CON, REL, SGM ←
User-user information element	User-to-user information parameter
DISCONNECT, RELEASE, RELEASE COMPLETE →	REL →
User-user information element	User-to-user information parameter
NOTE – The corresponding between ISUP and DSS 1 messages is described in 2.1.1. In case Tables 9 (ACM) or 14 (CPG) do not indicate any message, the user-user information element is included in a PROGRESS message.	

Service 1 rejection

Only the cases of rejection determined upon receipt of an ISUP message are described below. Rejection initiated by the originating exchange when it cannot support the service or when the calling user has not subscribed the service is not relevant to the interworking and is described in 1.5.2.1.4.2/Q.957 [19].

Table 54 describes the handling of a rejection indication received from the network when the service 1 was requested as required.

Table 55 describes the handling of a rejection indication received from the network when the service 1 was requested as preferred.

Table 54/Q.699 – UUS1 rejection: service requested as "required"

DSS 1 messages	ISUP messages
←DISCONNECT	←REL
Cause information element Value As received	Cause parameter Value No. 29 (<i>facility rejected</i>)
Facility information element UserUserService return error component <i>rejectedByNetwork</i>	Diagnostic <i>UUI indicators parameter's name</i>
←DISCONNECT	←REL
Cause information element Value No. 69 (<i>requested facility not implemented</i>)	Cause parameter Value No. 69 (<i>requested facility not implemented</i>)
Facility information element UserUserService return error component <i>rejectedByUser</i>	Diagnostic <i>UUI indicators parameter's name</i>
←DISCONNECT (Note)	←ANM, CON, or REL prior active phase
Cause information element Value No. 69 (<i>requested facility not implemented</i>)	No rejection or acceptance indication is received in the ANM, CON or REL message and
Facility information element UserUserService return error component <i>rejectedByUser</i>	No rejection or acceptance indication has already been received in a previous backward message (ACM or CPG)
NOTE – In case of receipt of an Answer Message (ANM) or a Connect message (CON), a Release message (REL) with the cause value No. 31 (<i>normal, unspecified</i>) is sent to the remote exchange.	

Table 55/Q.699 – UUS1 rejection: service requested as "preferred"

DSS 1 messages	ISUP messages
CALL PROCEEDING, ALERTING, PROGRESS, CONNECT, or DISCONNECT (Note 1) ←	ACM, CPG, ANM, CON, or REL prior active phase ←
Facility information element UserUserService return error component <i>rejectedByUser</i> (Note 2)	User-to-user indicators parameter Type <i>Response</i> Service 1 <i>Not provided</i>
←CONNECT, DISCONNECT (Note 1)	←ANM, CON, or REL prior active phase
Facility information element UserUserService return error component <i>rejectedByUser</i>	No rejection or acceptance indication is received in the ANM, CON or REL message and No rejection or acceptance indication has already been received in a previous backward message (ACM or CPG)
NOTE 1 – The correspondence between the ISUP message received and the DSS 1 message sent to the calling user is described in 2.1.1. NOTE 2 – Since it is not possible to know if the rejection is due to the network or to the remote user, the default value <i>rejectedByUser</i> is used.	

2.1.2.15.3 Service 2

Table 56/Q.699 – UUS2 invocation

SETUP→	IAM→
Content	Content
Facility information element UserUserService invoke component <i>Service 2 preferred</i>	User-to-user indicators parameter Type <i>Request</i> Service 1 <i>No information (Note)</i> Service 2 <i>Request, not essential</i> Service 3 <i>No information (Note)</i>
	Forward call indicators parameter ISDN User Part preference indicator <i>ISDN User Part preferred all the way</i>
Facility information element UserUserService invoke component <i>Service 2 required</i>	User-to-user indicators parameter Type <i>Request</i> Service 1 <i>No information (Note)</i> Service 2 <i>Request, essential</i> Service 3 <i>No information (Note)</i>
	Forward call indicators parameter ISDN User Part preference indicator <i>ISDN User Part required all the way</i>
NOTE – These indicators may be coded in a different way if service 1 (respectively service 3) information has to be transported: see Tables 51 and 61.	

Service 2 acceptance is indicated in the alerting information received from the remote user.

Table 57/Q.699 – UUS2 acceptance

←ALERTING	←ACM, CPG
Facility information element UserUserService return result component	User-to-user indicators parameter Type <i>Response</i> Service 2 <i>Provided</i>

When acceptance of service 2 has been received, user-user information may be exchanged during the alerting phase of the call. See Table 58.

Table 58/Q.699 – UUS2 transfer

DSS 1 messages	ISUP messages
USER INFORMATION→	USR→
User-user information element More data information element	User-to-user information parameter Access transport parameter More data information element
←USER INFORMATION	←USR
User-user information element More data information element	User-to-user information parameter Access transport parameter More data information element

Service 2 rejection

Only the cases of rejection determined upon receipt of an ISUP message are described below. Rejection initiated by the originating exchange when it cannot support the service or when the calling user has not subscribed to the service is not relevant to the interworking and is described in 1.5.2.2.4.2/Q.957 [19].

Table 59 describes the handling of a rejection indication received from the network when the service 2 was requested as required.

Table 60 describes the handling of a rejection indication received from the network when the service 2 was requested as preferred.

Table 59/Q.699 – UUS2 rejection: service requested as "required"

DSS 1 messages	ISUP messages
←DISCONNECT	←REL
Cause information element Value As received Facility information element UserUserService return error component <i>rejectedByNetwork</i>	Cause parameter Value No. 29 (<i>facility rejected</i>) Diagnostic <i>UUI indicators parameter's name</i>
←DISCONNECT	←REL
Cause information element Value No. 69 (<i>requested facility not implemented</i>) Facility information element UserUserService return error component <i>rejectedByNetwork</i>	Cause parameter Value No. 88 (<i>incompatible destination</i>) Diagnostic <i>UUI indicators parameter's name</i>
←DISCONNECT	←REL
Cause information element Value No. 69 (<i>requested facility not implemented</i>) Facility information element UserUserService return error component <i>rejectedByUser</i>	Cause parameter Value No. 69 (<i>requested facility not implemented</i>) Diagnostic <i>UUI indicators parameter's name</i>
←DISCONNECT (Note)	←ACM, CPG with an alerting indication or REL prior active phase
Cause information element Value No. 69 (<i>requested facility not implemented</i>) Facility information element UserUserService return error component <i>rejectedByUser</i>	No rejection or acceptance indication is received in the ACM, CPG or REL message and No rejection or acceptance indication has already been received in a previous backward message (ACM or CPG)
NOTE – In case of receipt of an Address Complete Message (ACM) or a Call Progress message (CPG), a Release message (REL) with the cause value No. 31 (<i>normal, unspecified</i>) is sent to the remote exchange.	

Table 60/Q.699 – UUS2 rejection: service requested as "preferred"

DSS 1 messages	ISUP messages
←ALERTING, DISCONNECT (Note 1)	←ACM, CPG with an alerting indication or REL prior active phase
Facility information element UserUserService return error component <i>rejectedByUser</i> (Note 2)	User-to-user indicators parameter Type <i>Response</i> Service 2 <i>Not provided</i>
←ALERTING or DISCONNECT (Note 1)	←ACM, CPG with an alerting indication or REL prior active phase
Facility information element UserUserService return error component <i>rejectedByUser</i>	No rejection or acceptance indication is received in the ACM, CPG or REL message and No rejection or acceptance indication has already been received in a previous backward message (ACM or CPG)
NOTE 1 – The correspondence between the ISUP message received and the DSS 1 message sent to the calling user is described in 2.1.1.	
NOTE 2 – Since it is not possible to know if the rejection is due to the network or to the remote user, the default value <i>rejectedByUser</i> is used.	

2.1.2.15.4 Service 3

Table 61/Q.699 – UUS3 invocation

SETUP→	IAM→
Content	Content
Facility information element UserUserService invoke component <i>Service 3 preferred</i>	User-to-user indicators parameter Type <i>Request</i> Service 1 <i>No information (Note)</i> Service 2 <i>No information (Note)</i> Service 3 <i>Request, essential</i>
	Forward call indicators parameter ISDN user part preference indicator <i>ISDN User Part preferred all the way</i>
Facility information element UserUserService invoke component <i>Service 3 required</i>	User-to-user indicators parameter Type <i>Request</i> Service 1 <i>No information (Note)</i> Service 2 <i>No information (Note)</i> Service 3 <i>Request, essential</i>
	Forward call indicators parameter ISDN user part preference indicator <i>ISDN user part required all the way</i>
NOTE – These indicators may be coded in a different way if service 1 (respectively service 2) information have to be transported: see Tables 51 and 56	

Service 3 acceptance is indicated in the connecting information received from the remote user.

Table 62/Q.699 – UUS3 acceptance

←CONNECT	←ANM, CON
Facility information element UserUserService return result component	User-to-user indicators parameter Type <i>Response</i> Service 3 <i>Provided</i>

Service 3 may be activated in the active phase by either the calling user (see Tables 63 and 66) or the called user (see Tables 65 and 66).

Table 63/Q.699 – UUS3 activation received from the calling user in active phase

FACILITY →	Facility request message (FAR) →
Facility information element UserUserService invoke component <i>Service 3 preferred</i>	User-to-user indicators parameter Type <i>Request</i> Service 3 <i>Request, not essential</i>

Table 64/Q.699 – UUS3 acceptance received from the called user in active phase

←FACILITY	←Facility accepted message (FAA)
Facility information element UserUserService return result component	User-to-user indicators parameter Type <i>Response</i> Service 1 <i>No information</i> Service 2 <i>No information</i> Service 3 <i>Provided</i>

Table 65/Q.699 – UUS3 activation received from the called user in active phase

←FACILITY	←Facility request message (FAR)
Facility information element UserUserService invoke component <i>Service 3 preferred</i>	User-to-user indicators parameter Type <i>Request</i> Service 1 <i>No information</i> Service 2 <i>No information</i> Service 3 <i>Request, not essential</i>

Table 66/Q.699 – UUS3 acceptance received from the calling user in active phase

FACILITY→	Facility accepted message (FAA)→
Facility information element UserUserService return result component	User-to-user indicators parameter Type <i>Response</i> Service 3 <i>Provided</i>

When acceptance of service 3 has been received, user-user information may be exchanged during the active phase of the call: see Table 67.

Table 67/Q.699 – UUS3 transfer

DSS 1 messages	ISUP messages
USER INFORMATION→	User-to-user information (USR)→
User-user information element More data information element	User-to-user information parameter Access transport parameter More data information element
←USER INFORMATION	←User-to-user information (USR)
User-user information element More data information element	User-to-user information parameter Access transport parameter More data information element

Service 3 rejection

Only the cases of rejection determined upon receipt of an ISUP message are described below. Rejection initiated by the originating exchange when it cannot support the service or when the calling user has not subscribed the service is not relevant to the interworking and is described in 1.5.2.3.6/Q.957 [19].

Rejection of service 3 requested during call establishment.

Table 68 describes the handling of a rejection indication received from the network when the service 3 was requested as required.

Table 69 describes the handling of a rejection indication received from the network when the service 3 was requested as preferred.

Table 68/Q.699 – UUS3 rejection: service requested as "required" during call establishment

DSS 1 messages	ISUP messages
←DISCONNECT	←REL
Cause information element Value As received Facility information element UserUserService return error component <i>rejectedByNetwork</i>	Cause parameter Value No. 29 (<i>facility rejected</i>) Diagnostic <i>UII indicators parameter's name</i>
←DISCONNECT	←REL
Cause information element Value No. 69 (<i>requested facility not implemented</i>) Facility information element UserUserService return error component <i>rejectedByUser</i>	Cause parameter Value No. 69 (<i>requested facility not implemented</i>) Diagnostic <i>UII indicators parameter's name</i>
←DISCONNECT (Note)	←ANM or CON, or REL prior active phase
Cause information element Value No. 69 (<i>requested facility not implemented</i>) Facility information element UserUserService return error component <i>rejectedByUser</i>	No rejection or acceptance indication is received in the ANM, CON or REL message and No rejection or acceptance indication has already been received in a previous backward message (ACM or CPG)
NOTE – In case of receipt of an Answer Message (ANM) or a connect message (CON), a Release message (REL) with the cause value No. 31 (<i>normal, unspecified</i>) is sent to the remote exchange.	

Table 69/Q.699 – UUS3 rejection: service requested as "preferred" during call establishment

DSS 1 messages	ISUP messages
←CONNECT, DISCONNECT (Note 1)	←ANM, CON or REL prior active phase
Facility information element UserUserService return error component <i>rejectedByUser</i> (Note 2)	User-to-user indicators parameter Type <i>Response</i> Service 1 <i>Not provided</i>
←CONNECT, DISCONNECT (Note 1)	←ANM, CON, or REL prior active phase
Facility information element UserUserService return error component <i>rejectedByUser</i>	No rejection or acceptance indication is received in the ANM, CON or REL message and No rejection or acceptance indication has already been received in a previous backward message (ACM or CPG)
NOTE 1 – The correspondence between the ISUP message received and the DSS 1 message sent to the calling user is described in 2.1.1.	
NOTE 2 – Since it is not possible to know if the rejection is due to the network or to the remote user, the default value <i>rejectedByUser</i> is used.	

Rejection of service 3 requested after call establishment

Table 70/Q.699 – Rejection of UUS3 requested by the calling user after call establishment

DSS 1 messages	ISUP messages
←FACILITY	←FRJ (Note 1)
Facility information element UserUserService return error component <i>rejectedByUser</i> (Note 2)	User-to-user indicators parameter Type <i>Response</i> Service 3 <i>Not provided</i>
NOTE 1 – FRJ: Facility reject message	
NOTE 2 – Since it is not possible to know if the rejection is due to the network or to the remote user, the default value <i>rejectedByUser</i> is used.	

Table 71/Q.699 – Rejection of UUS3 requested by the called user after call establishment

DSS 1 messages	ISUP messages
FACILITY→	FRJ (Note 1)→
Facility information element UserUserService return error component <i>rejectedByUser</i>	User-to-user indicators parameter Type <i>Response</i> Service 1 <i>No information</i> Service 2 <i>No information</i> Service 3 <i>Not provided</i> Cause parameter Value No. 69 (<i>requested facility not implemented</i>)
T1 expiry (Note 2)	FRJ (Note 1)→
	User-to-user indicators parameter Type <i>Response</i> Service 1 <i>No information</i> Service 2 <i>No information</i> Service 3 <i>Not provided</i> Cause parameter Value No. 69 (<i>requested facility not implemented</i>)
NOTE 1 – FRJ: Facility reject message.	
NOTE 2 – T1 start and normal stop are described in 1.5.2.3/Q.957 [19].	

2.2 Interworking from non-ISDN access to ISUP

2.2.1 Basic call

2.2.1.1 Sending of the Initial Address Message (IAM)

When the exchange has received enough information from the calling user in the Address signals to determine that the call is to be routed to another exchange after detection of the off-hook condition, it shall select a suitable, free, inter-exchange circuit and send an initial address message.

The coding of the Initial Address Message (IAM) is described hereafter.

NOTE – The coding of the initial address message (IAM) sent by a forwarding exchange is described in 2.5.2.5/Q.732 [9]. The parameters used in such a case are not mentioned hereafter.

2.2.1.1.1 Coding of the Initial Address Message (IAM)

MANDATORY PARAMETERS

Forward call indicators

bit A National/international call indicator
0 *call to be treated as a national call*

This bit can be set to "1" for international calls.

bit D Interworking indicator
0 *no interworking encountered (No. 7 signalling all the way)*

bit F ISDN user part indicator
1 *ISDN user part used all the way*

bits HG ISDN user part preference indicator
1 0 *ISDN user part required all the way*
0 0 *ISDN user part preferred all the way if required by the invoked supplementary services or by Recommendation E.172*
0 1 *ISDN user part not required otherwise*

bit I ISDN access indicator
0 *originating access non-ISDN*

Calling party's category

Coded according to internal data of the originating exchange.

Transmission medium requirement

This parameter is coded *3.1 kHz audio*.

Called party number

- Nature of address indicator:
 - According to the internal data of the originating exchange.
- Internal network number indicator:
 - 1 *routing to internal network number not allowed*
- Numbering plan indicator:
 - 001 *ISDN (telephony) numbering plan (Recommendation E.164)*

2.2.1.2 Receipt of the Address Complete Message (ACM)

Upon receiving the Address Complete Message (ACM), no mapping is taken on the non-ISDN side.

In particular, upon receiving the address complete message, in case that certain tone and announcement can be generated from the destination exchange for example for a changed number announcement, the exchange may send an appropriate signal, e.g. Clear-back signal, to the calling user depending on the condition of the access type.

2.2.1.3 Receipt of the Call Progress message (CPG)

Upon receiving the Call Progress message (CPG), no mapping is taken on the non-ISDN side.

2.2.1.4 Receipt of the Answer Message (ANM)

Upon receiving the Answer Message (ANM) in the exchange, it may be mapped into an appropriate signal, e.g. Answer signal on the non-ISDN side.

2.2.1.5 Receipt of the Connect message (CON)

Upon receiving the Connect Message (CON) in the exchange, it may be mapped into an appropriate signal, e.g. Answer signal, on the non-ISDN side.

2.2.1.6 Receipt of the Release message (REL)

Upon receiving the Release Message (REL) in the exchange, it may be mapped into an appropriate backward signal, e.g. Clear-backward signal, on the non-ISDN side.

2.2.1.7 Sending of the Release message (REL)

If the exchange detects the on-hook condition or receives an appropriate signal to indicate release procedures, e.g. Clear-forward signal, it shall send a Release message (REL).

MANDATORY PARAMETERS

Cause indicators

Coded to No. 16.

2.2.1.8 Receipt of the Suspend message (SUS) network initiated

The actions taken on the ISUP side upon receipt of the Suspend message (SUS) are described in 2.4.1/Q.764 [4].

No action taken on the non-ISDN side.

2.2.1.9 Receipt of the Resume message (RES) network initiated

The actions taken on the ISUP side upon receipt of the Resume message (RES) are described in 2.4.1/Q.764 [4].

No action is taken on the non-ISDN side.

2.2.1.10 Release by the exchange

Table 72/Q.699 – Release from the originating exchange

Trigger event	REL→
	Cause parameter
Determination that the called number information received is incomplete, after an IAM message has already been sent	Cause value No. 28 <i>Invalid number format (address incomplete)</i>
Failure of the automatic repeat attempt procedure	No action
T6 expiry (Note)	Cause value No. 102 <i>recovery on timer expiry</i>
Call release due to the ISUP compatibility procedure	Cause value No. 97 or No. 99
Other cases of failure on the ISUP side	Cause value coded according to [4]
NOTE – T6: awaiting resume message (RES) timer. T6 start, stop, and expiry are described in 2.4/Q.764 and Annex A/Q.764 [4].	

2.2.2 Supplementary services

For further study.

3 Incoming call

3.1 Interworking from ISUP to DSS 1

3.1.1 Basic call

3.1.1.1 Sending of the SETUP message

The call information are received in the Initial Address Message (IAM), possibly followed by one or several Subsequent Address Messages (SAM) (See 3.1.1.2).

If the continuity check indicator of the nature of connection indicators is coded 01, *continuity check required on this circuit*, or 10, *continuity check required on a previous circuit*, the setting up of the call must be prevented until the receipt of the result of the continuity check procedure.

When the exchange has received all the information required to go on with the call, and performed the various checks to determine that the call is allowed, a SETUP message is sent to the called user.

The information elements carried in the access transport parameter of the Initial Address Message (IAM) are taken into account whatever the order of receipt, except when two high layer compatibility information elements are received: the order of these two information elements is then significant.

The sending of some information elements (like the calling party number, the calling or called party subaddress) may depend on other checks: see 3.1.2.

Only the information elements involved in the interworking are described hereafter.

The information elements used for the supplementary services are described in 3.1.2.

Bearer capability

Table 73/Q.699 – Coding of the Bearer Capability information element (BC)

IAM→	SETUP→
Content	Bearer capability information element
No USI present TMR <i>3.1 kHz audio</i>	Coding standard <i>CCITT standardized coding</i> Information transfer capability <i>3.1 kHz audio</i> Transfer mode <i>Circuit mode</i> Information transfer rate <i>64 kbit/s</i>
No USI present TMR <i>64 kbit/s unrestricted</i>	Coding standard <i>CCITT standardized coding</i> Information transfer capability <i>Unrestricted digital information</i> Transfer mode <i>Circuit mode</i> Information transfer rate <i>64 kbit/s</i>
USI present No USI prime	BC = USI (Note 1)
USI <i>Speech, or 3.1 kHz audio</i> USI prime <i>Unrestricted digital information with tones and announcements</i>	BC 1 = USI (Notes 1 and 2) BC 2 = USI' (Notes 1 and 2)
NOTE 1 – Octet 1 (information element identifier) and octet 2 (length) are recreated.	
NOTE 2 – BC 1 is the bearer capability information element sent in first position in the SETUP message, BC 2 in second position. Bearer capability information elements shall be sent in ascending order of priority as described in 5.11.2.1/Q.931 [6].	

Facility

See 3.1.2.

Sending complete

This information element is included, in case of *en bloc* sending used, to indicate that the SETUP message contains all the information required by the called user to process the call.

Progress indicator

Table 74/Q.699 – Coding of the progress indicator information element

IAM→			SETUP→
Forward call indicators parameter		Access transport parameter	Progress indicator information element
ISDN User Part indicator	ISDN access indicator		
0 (ISDN User Part not used all the way)	Value non-significant	Value non-significant	No. 1
1 (ISDN User Part used all the way)	0 (originating access non-ISDN)	Value non-significant	No. 3
1 (ISDN User Part used all the way)	1 (originating access ISDN)	p.i. No. x	No. x

Calling party number

See 3.1.2.

Calling party subaddress

See 3.1.2.

Called party number

See 3.1.2.1 and 3.1.2.2.

Called party subaddress

See 3.1.2.

Low layer compatibility

If the low layer compatibility information element is present in the access transport parameter of the Initial Address Message (IAM), it is passed on unchanged in the SETUP message.

High layer compatibility

If the high layer compatibility information element is present in the access transport parameter of the Initial Address Message (IAM), it is passed on unchanged in the SETUP message.

If two high layer compatibility information elements are received in the access transport parameter of the Initial Address Message (IAM), they are passed on unchanged in the same order in the SETUP message (the meaning of HLC order is described in 5.12.3.2/Q.931 [6]).

User-user

See 3.1.2.

3.1.1.2 Receipt of the Subsequent Address Message (SAM)

If *en bloc* sending is used on the DSS 1 side, the SETUP message shall contain all the information required by the called user to process the call (See 3.1.1.1).

If overlap sending is used, and if the SETUP message has already be sent and the SETUP ACKNOWLEDGE message received, an INFORMATION message is sent upon receipt of each Subsequent Address Message (SAM).

3.1.1.3 Sending of the Address Complete Message (ACM)

The following cases are possible trigger conditions of sending the address complete message (ACM):

- a) The destination exchange has determined independently of access indications that the complete called party number has been received.
- b) Overlap receiving is used on the DSS 1 side and a CALL PROCEEDING is received.
- c) *En bloc* receiving is used on the DSS 1 side and a Progress indicator information element (except with value No. 8, *in-band information or an appropriate pattern is now available*, No. 3, *originating address is non-ISDN*, or No. 4, *call has returned to the ISDN*) is received in a CALL PROCEEDING message or in a PROGRESS message.
- d) The first ALERTING message is received.
- e) It has been determined, in case of call failure, that a special in-band tone or announcement has to be returned to the calling party from the destination exchange.

On *speech* or *3.1 kHz* calls, the awaiting answer indication (e.g. ring tone) is sent to the calling party upon receipt of the first ALERTING message.

NOTE 1 – In all cases, it is assumed that no Address Complete Message (ACM) has already been sent.

NOTE 2 – The case of the sending of the Address Complete Message (ACM) when the call is forwarded is not described hereafter: see 3.1.2.

MANDATORY PARAMETERS

Backward call indicators

bits	DC	Called party's status indicator
	0 1	<i>subscriber free</i> if the ALERTING message has been received.
	0 0	<i>no indication</i> otherwise
bits	FE	Called party's category indicator
	0 0	<i>no indication</i> if the user's characteristics (internal data) have not been analysed, or
	0 1	<i>ordinary subscriber</i> , or
	1 0	<i>payphone</i> according to the user's characteristics
bit	I	Interworking indicator
	0	<i>no interworking encountered</i>
bit	K	ISDN user part indicator
	1	<i>ISDN user part used all the way</i>
bit	M	ISDN access indicator
	1	<i>terminating access ISDN</i>

OPTIONAL PARAMETERS

Optional backward call indicators

bit	A	In-band information indicator
	1	<i>in-band information or an appropriate pattern is now available</i> if it has been determined, in case of call failure, that a special in-band tone or announcement has to be returned to the calling party from the destination exchange.,
	0	<i>no indication</i> otherwise.
bit	B	Call diversion may occur indicator See 3.1.2.
bit	D	MLPP user indicator See 3.1.2.

User-to-user indicators

See 3.1.2.

User-to-user information

See 3.1.2.

Access transport

This parameter carries the progress indicator information element possibly received from the called user (except the value No. 8).

It may carry other information element as well: see 3.1.2 and Tables 75 and 76.

Generic notification indicator

See 3.1.2.

Transmission medium used

See handling of fallback information at the end of this subclause.

Access delivery information

If a SETUP message has been sent to the called user, this parameter is coded *Set-up message generated*. Otherwise, it is not included in the address complete message.

Redirection number

See 3.1.2.

Call diversion information

See 3.1.2.

Redirection number restriction parameter

See 3.1.2.

Handling of fallback information (only applicable at T reference point)

When the terminating exchange has knowledge that the fallback capability was requested in the Initial Address Message (IAM), and if no progress indicator No. 1 or No. 2 has been received from the DSS 1 side, Tables 75 and 76 are applicable.

Table 75/Q.699 – Handling of BC fallback information

←ACM		←Message received from the access
Transmission medium used parameter	Access transport parameter	Content
Value received in the TMR prime of the IAM message (<i>speech or 3.1 kHz audio</i>)	BC low (<i>speech or 3.1 kHz audio</i>) p.i. No. 5	BC low (<i>speech or 3.1 kHz audio</i>) p.i. No. 5

Table 76/Q.699 – Handling of HLC fallback information

←ACM	←Message received from the access
Access transport parameter	Content
HLC Progress indicator No. 5	HLC Progress indicator No. 5

3.1.1.4 Sending of the Call Progress message (CPG)

If the Address Complete Message (ACM) has already been sent, the following cases are possible trigger conditions of sending the Call Progress message (CPG):

- a) It has been determined that an in-band tone or announcement has to be returned to the calling party from the destination exchange.
- b) Receipt of a progress indicator information element in a CALL PROCEEDING message (except with value No. 8, *in-band information or an appropriate pattern is now available*, No. 3, *originating address is non-ISDN*, or No. 4, *call has returned to the ISDN*) or in a PROGRESS message (except with value No. 8, *in-band information or an appropriate pattern is now available* or No. 3 *originating address is non-ISDN*).
- c) Receipt of the first ALERTING message.

NOTE – The case of the sending of the Call Progress message (CPG) when the call is forwarded is not described hereafter: see 3.1.2.

MANDATORY PARAMETERS

Event information

bits	G-A	Event indicator
	0000001	<i>alerting</i> in case c (see Note);
	0000010	<i>progress</i> in case b;
	0000011	<i>in-band information or an appropriate pattern is now available</i> in case a (see Note).

OPTIONAL PARAMETERS

Other parameters

The other parameters may have already been sent in a previous backward message. In this case they are not repeated unless new information are now available.

The coding of these parameters is described in 3.1.1.3.

NOTE – If cases a and c occur simultaneously, the event indicator of the event information parameter is coded *alerting* and the in-band information indicator of the optional backward call indicators parameter *in-band information or an appropriate pattern is now available* (for further study).

3.1.1.5 Sending of the Answer Message (ANM)

Upon receipt of the first CONNECT message, if the address complete message has already been sent, the destination exchange shall:

- stop the sending of the awaiting indication (if any);
- send the Answer Message (ANM) to the preceding exchange.

The Answer Message (ANM) is coded as follows:

OPTIONAL PARAMETERS

Connected number

See 3.1.2.

Generic number

See 3.1.2.

Access transport

Table 77/Q.699 – Contents of the access transport parameter

←ANM	←Message received from the access
Access transport	Information elements
Progress indicator	Progress indicator
Low layer compatibility	Low layer compatibility

It may carry other information elements as well: See 3.1.2 and Tables 78, 79, 80 and 81.

Transmission medium used

This parameter is only present in case where fallback occurs (see the end of this subclause).

Other parameters

The other parameters may have already been sent in a previous backward message. In this case they are not repeated unless new information are now available.

The coding of these parameters is described in 3.1.1.3.

Handling of fallback information

When the terminating exchange has knowledge that the fallback capability was requested in the Initial Address Message (IAM), and if no progress indicator No. 1 or No. 2 has been received from the DSS 1 side, Tables 78 to 81 are applicable.

Coincident S and T reference point

**Table 78/Q.699 – Handling of BC fallback information
Coincident S and T reference point**

←ANM		←CONNECT
Transmission medium used parameter	Access transport parameter	Content
No TMU	BC <i>(unrestricted digital information with tones and announcements)</i>	BC <i>(unrestricted digital information with tones and announcements)</i>
Value received in the TMR prime of the IAM message <i>(speech or 3.1 kHz audio)</i>	BC <i>(speech or 3.1 kHz audio)</i>	BC <i>(speech or 3.1 kHz audio)</i>
Value received in the TMR prime of the IAM message <i>(speech or 3.1 kHz audio)</i>	BC received in the USI of the IAM message <i>(speech or 3.1 kHz audio)</i>	No BC

**Table 79/Q.699 – Handling of HLC fallback information
Coincident S and T reference point**

←ANM	←CONNECT
Access transport parameter	Content
HLC	HLC
HLC received in first position in the ATP of the IAM message	No HLC

T reference point

**Table 80/Q.699 – Handling of BC fallback information
T reference point**

←ANM		←CONNECT
Transmission medium used parameter	Access transport parameter	Content
No TMU	BC (unrestricted digital information with tones and announcements)	BC (unrestricted digital information with tones and announcements)
Value received in the TMR prime of the IAM message (speech or 3.1 kHz audio)	BC (speech or 3.1 kHz audio)	BC (speech or 3.1 kHz audio)
Value received in the TMR prime of the IAM message (speech or 3.1 kHz audio)	BC (speech or 3.1 kHz audio) p.i. No. 5	BC (speech or 3.1 kHz audio) p.i. No. 5
Value received in the TMR prime of the IAM message (speech or 3.1 kHz audio)	BC received in the USI of the IAM message (speech or 3.1 kHz audio) p.i. No. 5	No BC (Note)
NOTE – In this case, the fallback information coded in the transmission medium used and access transport parameters are not repeated if already sent in a previous backward message.		

**Table 81/Q.699 – Handling of HLC fallback information
T reference point**

←ANM	←CONNECT
Access transport parameter	Content
HLC	HLC
HLC Progress indicator No. 5	HLC Progress indicator No. 5
No HLC	No HLC

3.1.1.6 Sending of the Connect message (CON)

Upon receipt of the first CONNECT message, if the Address Complete Message (ACM) has not yet been sent, the destination exchange shall send the Connect message (CON) to the preceding exchange.

The Connect message (CON) is coded as follows.

MANDATORY PARAMETERS

Backward call indicators

See 3.1.1.3.

OPTIONAL PARAMETERS

Optional backward call indicators

See 3.1.1.3.

Connected number

See 3.1.2.

Access transport

Table 82/Q.699 – Contents of the access transport parameter

←CON	←CONNECT
Access transport parameter	Information elements
Progress indicator	Progress indicator
Low layer compatibility	Low layer compatibility

It may carry other information elements as well: see 3.1.2 and Tables 83, 84, 85 and 86.

Access delivery information

bit A Access delivery indicator
0 *SETUP message generated*

Generic number

See 3.1.2.

Generic notification indicator

See 3.1.2.

Transmission medium used

This parameter is only present in case where fallback occurs (see the end of this subclause).

User-to-user indicators

See 3.1.2.

User-to-user information

See 3.1.2.

Handling of fallback information

When the terminating exchange has knowledge that the fallback capability was requested in the Initial Address Message (IAM), and if no progress indicator No. 1 or No. 2 has been received from the DSS 1 side, Tables 83 to 86 are applicable.

Coincident S and T reference point

**Table 83/Q.699 – Handling of BC fallback information
Coincident S and T reference point**

←CON		←CONNECT
Transmission medium used parameter	Access transport parameter	Content
No TMU	BC <i>(unrestricted digital information with tones and announcements)</i>	BC <i>(unrestricted digital information with tones and announcements)</i>
Value received in the TMR prime of the IAM message <i>(speech or 3.1 kHz audio)</i>	BC <i>(speech or 3.1 kHz audio)</i>	BC <i>(speech or 3.1 kHz audio)</i>
Value received in the TMR prime of the IAM message <i>(speech, or 3.1 kHz audio)</i>	BC received in the USI of the IAM message <i>(speech or 3.1 kHz audio)</i>	No BC

**Table 84/Q.699 – Handling of HLC fallback information
Coincident S and T reference point**

←CON	←CONNECT
Access transport parameter	Content
HLC	HLC
HLC received in first position in the ATP of the IAM message	No HLC

T reference point

**Table 85/Q.699 – Handling of BC fallback information
T reference point**

←CON		←CONNECT
Transmission medium used parameter	Access transport parameter	Content
No TMU	BC <i>(unrestricted digital information with tones and announcements)</i>	BC <i>(unrestricted digital information with tones and announcements)</i>
Value received in the TMR prime of the IAM message <i>(speech or 3.1 kHz audio)</i>	BC <i>(speech or 3.1 kHz audio)</i>	BC <i>(speech or 3.1 kHz audio)</i>
Value received in the TMR prime of the IAM message <i>(speech or 3.1 kHz audio)</i>	BC <i>(speech or 3.1 kHz audio)</i> p.i. No. 5	BC <i>(speech or 3.1 kHz audio)</i> p.i. No. 5
Value received in the TMR prime of the IAM message <i>(speech or 3.1 kHz audio)</i>	BC received in the USI of the IAM message <i>(speech or 3.1 kHz audio)</i> p.i. No. 5	No BC

**Table 86/Q.699 – Handling of HLC fallback information
T reference point**

←CON	←CONNECT
Access transport parameter	Content
HLC	HLC
HLC Progress indicator No. 5	HLC Progress indicator No. 5
No HLC	No HLC

3.1.1.7 Receipt of the Release message (REL)

Table 87/Q.699 – Receipt of the Release message (REL)

REL→	DISCONNECT or RELEASE→ (Note 1)
Cause parameter	Cause information element
Cause value No. x	Cause value No. x (Notes 2 and 3)
<p>NOTE 1 – The RELEASE message is sent at coincident S and T reference point if the Release message (REL) is received during the call establishment as described in 5.3.2/Q.931 [6]. In the other cases, DISCONNECT is sent.</p> <p>NOTE 2 – If the cause value received in the Release message (REL) is unknown in DSS 1, the unspecified cause value of the class is sent.</p> <p>NOTE 3 – Some supplementary services, such as CUG or UUS supplementary services, require the mapping of some cause values: see 3.1.2.</p>	

The handling of the other parameters is described in 3.1.2.

The receipt of the Release message (REL) during the user suspend/resume procedure is described in 3.1.2.

3.1.1.8 Sending of the Release message (REL)

Table 88/Q.699 – Call clearing during call establishment

←REL	←DISCONNECT RELEASE RELEASE COMPLETE (Note 1)
Cause parameter	Cause information element
Cause value No. x (Notes 2 and 3)	Cause value No. x
<p>NOTE 1 – In case of coincident S and T reference point, 5.2.5.3/Q.931 describes how these messages are taken into account when they are received during call establishment.</p> <p>NOTE 2 – If the cause value received in the DSS 1 message is unknown in ISUP, the unspecified cause value of the class is sent.</p> <p>NOTE 3 – Some supplementary services, such as CUG or UUS supplementary services, require the mapping of some cause values: see 3.1.2.</p>	

The Release message (REL) contains the access delivery information parameter coded to *Set-up message generated* if this information has not been sent before.

The handling of the other parameters possibly present in the Release message (REL) is described in 3.1.2.

3.1.1.9 Receipt of the Reset Circuit message (RSC), Circuit Group Reset message (GRS) or Circuit Group Blocking message (CGB) with the indication *hardware failure oriented*

Table 89/Q.699 – Receipt of RSC, GRS or CGB messages

Message received from ISUP→	DISCONNECT→
	Cause information element
Reset Circuit message (RSC)	Cause value No. 31 <i>Normal, unspecified</i>
Circuit Group Reset message (GRS)	Cause value No. 31 <i>Normal, unspecified</i>
Circuit Group Blocking message (CGB) with the type indicator of the circuit group supervision message type indicator parameter coded "01" (<i>hardware failure oriented</i>)	Cause value No. 31 <i>Normal, unspecified</i>

3.1.1.10 DSS 1 Data link reset and Data link failure procedures

The data link reset and data link failure procedures are respectively described in 5.8.8/Q.931 and 5.8.9/Q.931 [6].

Table 90/Q.699 – DSS 1 Data link reset and Data link failure procedures

←REL	Trigger event	DISCONNECT→
Cause parameter		Cause information element
Cause value No. 41 <i>(temporary failure)</i>	Data link reset in overlap receiving state	Cause value No. 41 <i>(temporary failure)</i>
Cause value No. 27 <i>(destination out of order)</i>	Data link failure in an other state than active state	(Note)
Cause value No. 27 <i>(destination out of order)</i>	Failure of the data link reestablishment procedure after a data link failure in active state	(Note)
NOTE – The call is cleared internally. No DISCONNECT message is sent on the access.		

3.1.1.11 Release by the exchange

Table 91/Q.699 – Release from the destination exchange

←Message sent to the ISUP	Trigger event	Message sent to the DSS 1 →	
		Point-to-point data link	Broadcast data link
REL Cause value No. 18 <i>No user responding</i>	No response to the SETUP message (T303 expiry)	DISCONNECT Cause value No. 102 <i>Recovery on timer expiry</i>	No action
REL Cause value No. 18 <i>No user responding</i>	No ALERTING, CONNECT or DISCONNECT after CALL PROCEEDING (T310 expiry)	DISCONNECT Cause value No. 102 <i>Recovery on timer expiry</i>	RELEASE Cause value No. 102 <i>Recovery on timer expiry</i>
REL Cause value No. 19 No answer from user (user alerted)	No CONNECT or DISCONNECT after ALERTING (T301 expiry)	DISCONNECT Cause value No. 102 <i>Recovery on timer expiry</i>	RELEASE Cause value No. 102 <i>Recovery on timer expiry</i>
REL Cause value No. 31 <i>Normal, unspecified</i>	Unsuccessful termination of the B-channel selection procedure	RELEASE Cause 6 <i>Channel unacceptable</i>	
REL Cause value No. 97 or No. 99	Call release due to the ISUP compatibility procedure	DISCONNECT Cause value No. 97 or No. 99	
REL Cause value coded according to [4]	Other cases of failure on the ISUP side	DISCONNECT Same cause value as in the REL message (Note 1)	
REL Same cause value as in the DISCONNECT message (Note 2)	other cases of failure on the DSS 1 side	DISCONNECT Cause value coded according to [6]	
NOTE 1 – If the cause value sent in the REL message is unknown in DSS 1, the unspecified cause value of the class is sent.			
NOTE 2 – If the cause value sent in the DISCONNECT message is unknown in ISUP, the unspecified cause value of the class is sent.			

If the SETUP message has been sent, the Release message (REL) contains the access delivery information parameter coded to *Set-up message generated* if this information has not been sent before.

The handling of the other parameters possibly present in the Release message (REL) is described in 3.1.2.

3.1.2 Supplementary Services

3.1.2.1 Direct-Dialling-In (DDI)

There is no specific interworking requirement relating to the direct-dialling-in supplementary service.

The coding of the called party number information element is described in Recommendation Q.951.1.

3.1.2.2 Multiple Subscriber Number (MSN)

There is no specific interworking requirement relating to the multiple subscriber number supplementary service.

The coding of the called party number information element is described in Recommendation Q.951.2.

3.1.2.3 Calling Line Identification Presentation (CLIP)

If the called user has subscribed to the CLIP service, one or two calling party number information elements are sent in the SETUP message.

Table 92/Q.699 – CLIP information sent to the called user

IAM→		SETUP→
Calling party number parameter Address presentation restricted indicator	Generic number parameter with number qualifier set to <i>additional calling party number</i>	CLIP information sent to the calling user
<i>Presentation allowed</i>	Absent	Calling party number i.e. (see Table 94)
<i>Presentation allowed</i>	Present	Calling party number i.e. (Note 1) (see Table 94) Calling party number i.e. (Note 1) (see Table 93)
<i>Presentation restricted</i> (Note 2)	Value non-significant	Calling party number i.e. Option 1: Type of number As received Numbering plan As received Presentation ind. <i>Presentation restricted</i> Screening ind. As received Number digits No digit Option 2: Type of number <i>Unknown</i> Numbering plan <i>Unknown</i> Presentation ind. <i>Presentation restricted</i> Screening ind. <i>Network provided</i> Number digits No digit
<i>Address not available</i> or No calling party number parameter	Value non-significant	Calling party number i.e. Type of number <i>Unknown</i> Numbering plan <i>Unknown</i> Presentation ind. <i>Not available due to interworking</i> Screening ind. <i>Network provided</i> Number digits No digit

NOTE 1 – If the two calling party number delivery option does not apply:

- only one calling party number information element is sent on DSS 1 side. The generic number is used (see Table 94).

If the two calling party number delivery option applies:

- two calling party number information elements are sent on DSS 1 side: one coded according to the generic number parameter (see Table 94), one according to the calling party number parameter (see Table 93). The order in which the calling party number information elements appear in the SETUP message is a network option.

NOTE 2 – As a national option, the presentation restriction indication received in the calling party number parameter can be overridden for specific calling access' categories. In such a case, the same actions are taken as if *presentation allowed* was received, except for the presentation restriction indication which is passed transparently into the calling party number information element.

Table 93/Q.699 – Coding of the calling party number information element according to the calling party number parameter

IAM→	SETUP→
Calling party number parameter	Calling party number i.e.
Nature of address indicator <i>National number</i> <i>International number</i>	Type of number (Note) <i>National number</i> <i>International number</i>
Numbering plan indicator <i>ISDN/Telephony numbering plan</i>	Numbering plan identification <i>ISDN/Telephony numbering plan</i>
Address presentation restricted indicator <i>Presentation allowed</i> <i>Presentation restricted</i>	Presentation indicator <i>Presentation allowed</i> <i>Presentation restricted</i>
Screening indicator <i>User provided, verified and passed</i> <i>Network provided</i>	Screening indicator <i>User provided, verified and passed</i> <i>Network provided</i>
Address signals	Number digits
NOTE – As a network option, the type of number may be coded <i>unknown</i> when a prefix is added to the number.	

Table 94/Q.699 – Coding of the calling party number information element according to the generic number parameter

IAM→	SETUP→
Generic number parameter with number qualifier set to <i>additional calling party number</i>	Calling party number i. e.
Nature of address indicator <i>National number</i> <i>International number</i>	Type of number (Note) <i>National number</i> <i>International number</i>
Numbering plan indicator <i>ISDN/Telephony numbering plan</i>	Numbering plan identification <i>ISDN/Telephony numbering plan</i>
Address presentation restricted indicator <i>Presentation allowed</i> <i>Presentation restricted</i>	Presentation indicator <i>Presentation allowed</i> <i>Presentation restricted</i>
Screening indicator <i>User provided, not verified</i>	Screening indicator <i>User provided, not verified</i>
Address signals	Number digits
NOTE – As a network option, the type of number may be coded <i>unknown</i> when a prefix is added to the number.	

Calling party sub-address

Table 95/Q.699 – Sending of the calling party subaddress

IAM→		SETUP→
Address presentation restricted indicator of the Calling party number parameter	Access transport parameter	Content
<i>Presentation allowed</i>	Calling party subaddress information element	Calling party subaddress information element
<i>Presentation restricted</i> (Note) or <i>Address not available</i> or No calling party number parameter	Calling party subaddress information element	No calling party subaddress information element
NOTE – As a national option, the presentation restriction indication received in the calling party number parameter can be overrid for specific calling access' categories. In such a case, the same actions are taken as if <i>presentation allowed</i> was received.		

3.1.2.4 Calling Line Identification Restriction (CLIR)

See Table 92.

3.1.2.5 Connected Line Identification Presentation (COLP)

If the connected line identity request indicator of the optional forward call indicators parameter in the Initial Address Message (IAM) is received coded to *requested*, then the connected number and possibly the generic number parameter and the connected sub-address are sent in the answer or connect message as described in Tables 96 and 97.

3.1.2.5.1 Special arrangement applies

Table 96/Q.699 – COLP – Special arrangement applies

←ANM, CON				←CONNECT	
Coding of the connected number and generic number parameters				Connected number i.e.	
Address signals	Numbering plan indicator	Nature of address indicator	Screening indicator	Numbering plan identification	Type of number
Connected number parameter				No or invalid (Note 1) connected number information element	
Default number	001 <i>ISDN numbering plan</i>	000 0011 <i>National number</i>	11 <i>Network provided</i>		
No generic number parameter indicating <i>additional connected number</i> is sent				<i>ISDN/telephony numbering plan</i> or <i>Unknown</i>	
Connected number parameter					
Default number	001 <i>ISDN numbering plan</i>	000 0011 <i>National number</i>	11 <i>Network provided</i>		
Generic number parameter (Note 2)					
Number provided by the user	001 <i>ISDN numbering plan</i>	000 0011 <i>National number</i>	00 <i>User provided, not verified</i>	<i>ISDN/telephony numbering plan</i> or <i>international number</i>	
Connected number parameter					
Default number	001 <i>ISDN numbering plan</i>	000 0011 <i>National number</i>	11 <i>Network provided</i>		
Generic number parameter (Note 2)					
Number provided by the user	001 <i>ISDN numbering plan</i>	000 0100 <i>International number</i>	00 <i>User provided, not verified</i>		
NOTE 1 – Validity conditions of the connected number information element are defined in 5.5.2.3/Q.951 [14].					
NOTE 2 – The generic number parameter contains the number qualifier indicator coded "0000 0101" (<i>additional connected number</i>).					

The address presentation restricted indicator of the connected number and generic number parameters shall be set according to the COLR supplementary service.

The number incomplete indicator of the generic number parameter shall be set to "0" (*complete*).

Connected subaddress

If provided, the connected subaddress is transported transparently in the access transport parameter of the answer or connect message.

3.1.2.5.2 Special arrangement does not apply

Table 97/Q.699 – COLP – Special arrangement does not apply

←ANM, CON				←CONNECT		
Coding of the connected number and generic number parameters				Connected number information element		
Address signals	Numbering plan indicator	Nature of address indicator	Screening indicator	Type of number	Numbering plan identification	Number digits
Connected number parameter				No or invalid (Note) connected number information element		
Default number	001 <i>ISDN numbering plan</i>	000 0011 <i>National number</i>	11 <i>Network provided</i>			
No generic number parameter indicating <i>additional connected number</i> is sent						
Connected number parameter				Failure of the screening function		
Default number	001 <i>ISDN numbering plan</i>	000 0011 <i>National number</i>	11 <i>Network provided</i>			
No generic number parameter indicating <i>additional connected number</i> is sent						
Connected number parameter				<i>Subscriber number</i>	<i>ISDN/telephony numbering plan</i> or <i>Unknown</i>	Correct complete number
Number provided by the user	001 <i>ISDN numbering plan</i>	As received	01 <i>User provided, verified and passed</i>			
No generic number parameter indicating <i>additional connected number</i> is sent						
Connected number parameter				<i>International number</i>	<i>ISDN/telephony numbering plan</i> or <i>Unknown</i>	Incomplete number
Completion of the number provided by the user	001 <i>ISDN numbering plan</i>	000 0011 <i>National number</i>	01 <i>User provided, verified and passed</i>			
No generic number parameter indicating <i>additional connected number</i> is sent						
NOTE – Validity conditions of the connected number information element are defined in section 5.5.2.3/Q.951 [14].						

The address presentation restricted indicator of the connected number parameter shall be set according to the COLR supplementary service.

Connected subaddress

If provided, the connected subaddress is transported transparently in the access transport parameter of the Answer (ANM) or Connect (CON) message.

3.1.2.6 Connected Line Identification Restriction (COLR)

The address presentation restricted indicator of the connected number and of the generic number is coded as described in Table 98.

NOTE – If the called user has not subscribed to the COLR supplementary service, the address presentation restricted indicator of the connected number parameter is set to *presentation allowed* (see 6.10/Q.951 [14]).

Table 98/Q.699 – Coding of the address presentation restricted indicator of the connected number and generic number parameters

←ANM/CON	←CONNECT	Internal data	
Connected number/ generic number parameter	Connected number information element	Temporary mode default setting	Permanent mode
Address presentation restricted indicator	Presentation indicator		
Presentation restricted	Value non-significant	Value non-significant	Yes
Presentation restricted	Presentation restricted	Restricted	No
Presentation restricted	Absent		
Presentation allowed	Presentation allowed		
Presentation allowed	Presentation allowed	Allowed	
Presentation allowed	Absent		
Presentation restricted	Presentation restricted		

3.1.2.7 Sub-addressing (SUB)

The called party subaddress information element received in the access transport parameter of the Initial Address Message (IAM) is transferred transparently in the SETUP message.

3.1.2.8 Call diversion

3.1.2.8.1 Interworking at the exchange where a call is diverted within or beyond the private ISDN

For further study.

3.1.2.8.2 Interworking at the coincident S and T reference point where a diverted call is presented

For further study.

3.1.2.8.3 Interworking at the exchange where a diverted call is presented to a private ISDN

For further study.

3.1.2.8.4 Interworking at the exchange where partial rerouting is requested from a private ISDN

For further study.

3.1.2.9 Call Waiting (CW)

3.1.2.9.1 Procedure at coincident S and T reference point

If the call is presented with indication *no channel* in the information channel selection field of the channel identification information element in the SETUP message, and depending on the subscription options offered by the network, a notification is sent in the network upon receipt of the alerting indication.

Table 99/Q.699 – Sending of CW notification

←ACM, CPG	←ALERTING
Generic notification indicator parameter	
Notification indicator	
110 0000 <i>Call is a waiting call</i>	

3.1.2.9.2 Notification received at T reference point

A CW notification may be received at T reference point in the ALERTING message.

Table 100/Q.699 – Receipt of a CW notification from a private network

←ACM, CPG (Note)	←ALERTING/PROGRESS/NOTIFY
Generic notification indicator parameter	Notification indicator information element
Notification indicator	Notification description
110 0000 <i>Call is a waiting call</i>	110 0000 <i>Call is a waiting call</i>
NOTE – In case of receipt of ALERTING or PROGRESS, ACM or CPG is sent as described in 3.1.1. In case of receipt of NOTIFY, CPG is sent with the event indicator coded <i>progress</i> .	

3.1.2.10 Call Hold (HOLD)

3.1.2.10.1 Notification received from the network

Table 101/Q.699 – HOLD notification

CPG→	NOTIFY or FACILITY→
Generic notification indicator parameter	Notification indicator information element
Notification indicator	Notification description
111 1001 <i>Remote hold</i>	111 1001 <i>Remote hold</i>
111 1010 <i>Remote retrieval</i>	111 1010 <i>Remote retrieval</i>

3.1.2.10.2 Invocation at coincident S and T reference point

Table 102/Q.699 – HOLD invocation

←CPG		Message received from the DSS 1
Event information parameter	Generic notification indicator parameter	
Event indicator	Notification indicator	←
000 0010 <i>Progress</i>	111 1001 <i>Remote hold</i>	HOLD
000 0010 <i>Progress</i>	111 1010 <i>Remote retrieval</i>	RETRIEVE

3.1.2.10.3 Notification received at T reference point

A HOLD notification may be received at T reference point in the active phase of the call.

Table 103/Q.699 – Receipt of a HOLD notification from a private network

←CPG		←NOTIFY
Event information parameter	Generic notification indicator parameter	Notification indicator information element
Event indicator	Notification indicator	Notification description
000 0010 <i>Progress</i>	111 1001 <i>Remote hold</i>	111 1001 <i>Remote hold</i>
000 0010 <i>Progress</i>	111 1010 <i>Remote retrieval</i>	111 1010 <i>Remote retrieval</i>

3.1.2.11 Terminal Portability (TP)

3.1.2.11.1 Notification received from the network

Table 104/Q.699 – TP notification

Message received from the ISUP →	NOTIFY→ Notification indicator i. e. Notification description
SUS message Suspend/resume indicator <i>ISDN subscriber initiated</i>	000 0000 <i>User suspended</i>
RES message Suspend/resume indicator <i>ISDN subscriber initiated</i>	000 0001 <i>User resumed</i>
CPG message Generic notification indicator <i>User suspended</i>	000 0000 <i>User suspended</i>
CPG message Generic notification indicator <i>User resumed</i>	000 0001 <i>User resumed</i>

3.1.2.11.2 Invocation at coincident S and T reference point

Table 105/Q.699 – TP invocation

Message sent to the ISUP ←	Message received from the DSS 1 ←
SUS message Suspend/resume indicator <i>ISDN subscriber initiated</i>	SUSPEND
RES message Suspend/resume indicator <i>ISDN subscriber initiated</i>	RESUME

The actions taken on the access side upon receipt of the SUSPEND and RESUME messages are described in 5.6/Q.931 and Figure A.6/Q.931.

The actions taken on the ISUP side upon sending of the Suspend (SUS) and Resume (RES) messages are described in 4.5.2.1/Q.733 [10].

Upon the T2 expiry (Note), a Release message (REL) is sent with the cause value No. 102, *recovery on timer expiry*. No action is taken on the DSS 1 side.

NOTE – T2 start, stop, and expiry are described in 4.5.2.1/Q.733 [10] and Annex A/Q.764 [4]. T307 start, stop and expiry are described in 5.6/Q.931.

3.1.2.11.3 Notification received at T reference point

A TP notification may be received at T reference point in the active phase of the call.

Table 106/Q.699 – Receipt of a TP notification from a private network

←CPG		←NOTIFY
Event information parameter	Generic notification indicator parameter	Notification indicator information element
Event indicator	Notification indicator	Notification description
000 0010 <i>Progress</i>	000 0000 <i>User suspended</i>	000 0000 <i>User suspended</i>
000 0010 <i>Progress</i>	000 0001 <i>User resumed</i>	000 0001 <i>User resumed</i>

3.1.2.12 Conference calling (CONF)

3.1.2.12.1 Notification received from the network

Table 107/Q.699 – Conference calling notification

CPG→	NOTIFY→
Generic notification indicator parameter	Notification indicator information element
Notification indicator	Notification description
100 0010 <i>Conference established</i>	100 0010 <i>Conference established</i>
100 0011 <i>Conference disconnected</i>	100 0011 <i>Conference disconnected</i>
100 0100 <i>Other party added</i>	100 0100 <i>Other party added</i>
100 0101 <i>Isolated</i>	100 0101 <i>Isolated</i>
100 0110 <i>Reattached</i>	100 0110 <i>Reattached</i>
100 0111 <i>Other party isolated</i>	100 0111 <i>Other party isolated</i>
100 1000 <i>Other party reattached</i>	100 1000 <i>Other party reattached</i>
100 1001 <i>Other party split</i>	100 1001 <i>Other party split</i>
100 1010 <i>Other party disconnected</i>	100 1010 <i>Other party disconnected</i>
100 1011 <i>Conference floating</i>	100 1011 <i>Conference floating</i>

3.1.2.12.2 Invocation at coincident S and T reference point

Table 108/Q.699 – Conference calling

Message sent to all other remote users ←	Message sent to B ←	Message received from served user ←	Procedure
Not applicable	CPG Generic notification indicator parameter <i>Conference established</i>	FACILITY Facility i.e. BeginCONF-Inv Call reference i.e. Call reference of existing call	Beginning the conference from an active call (with B)
CPG Generic notification indicator parameter <i>Other party added</i>	CPG Generic notification indicator parameter <i>Conference established</i>	FACILITY Facility i.e. AddCONF-Inv Call reference i.e. call reference of call to be added	Adding a remote user (B)
CPG Generic notification indicator parameter <i>Other party isolated</i>	CPG Generic notification indicator parameter <i>Isolated</i>	FACILITY Facility i.e. IsolateCONF-Inv	Isolate a remote user (B)
CPG Generic notification indicator parameter <i>Other party reattached</i>	CPG Generic notification indicator parameter <i>Reattached</i>	FACILITY Facility i.e. ReattachCONF-Inv	Reattach a remote user (B)
CPG Generic notification indicator parameter <i>Other party split</i>	CPG Generic notification indicator parameter <i>Conference disconnected</i>	SETUP (Note) Facility i.e. SplitCONF-Inv	Splitting a remote user (B)
CPG Generic notification indicator parameter <i>Other party disconnected</i>	REL	FACILITY Facility i.e. DropCONF-Inv	Disconnect a remote user (B)

Table 108/Q.699 – Conference calling (concluded)

Message sent to all other remote users ←	Message sent to B ←	Message received from served user ←	Procedure
	REL	FACILITY Facility i.e. EndCONF-Inv	Terminate the conference
	CPG Generic notification indicator parameter <i>Conference floating</i>	FACILITY Facility i.e. FloatCONF-Inv	Disconnect the served user
	If the conditions for floating are met: CPG Generic notification indicator parameter <i>Conference floating</i>	DISCONNECT	Call clearing by served user
	If the conditions for floating are not met: REL		
NOTE – This SETUP message does not contain any called party information but contains a bearer capability information element (see 1.5.2.6.1/Q.954 [17]).			

Table 109/Q.699 – Conference calling: a remote user clears

Message received from B →	Message sent to served user →	Procedure
REL	FACILITY Facility i.e. PartyDisc-Inv	Remote user clears

3.1.2.12.3 Notification received at T reference point

Table 110/Q.699 – Receipt of a conference calling notification from a private network

←CPG		←NOTIFY
Event information parameter	Generic notification indicator parameter	Notification indicator information element
Event indicator	Notification indicator	Notification description
000 0010 <i>Progress</i>	100 0010 <i>Conference established</i>	100 0010 <i>Conference established</i>
000 0010 <i>Progress</i>	100 0011 <i>Conference disconnected</i>	100 0011 <i>Conference disconnected</i>
000 0010 <i>Progress</i>	100 0100 <i>Other party added</i>	100 0100 <i>Other party added</i>
000 0010 <i>Progress</i>	100 0101 <i>Isolated</i>	100 0101 <i>Isolated</i>
000 0010 <i>Progress</i>	100 0110 <i>Reattached</i>	100 0110 <i>Reattached</i>
000 0010 <i>Progress</i>	100 0111 <i>Other party isolated</i>	100 0111 <i>Other party isolated</i>
000 0010 <i>Progress</i>	100 1000 <i>Other party reattached</i>	100 1000 <i>Other party reattached</i>
000 0010 <i>Progress</i>	100 1001 <i>Other party split</i>	100 1001 <i>Other party split</i>
000 0010 <i>Progress</i>	100 1010 <i>Other party disconnected</i>	100 1010 <i>Other party disconnected</i>
000 0010 <i>Progress</i>	100 1011 <i>Conference floating</i>	100 1011 <i>Conference floating</i>

3.1.2.13 Three-party (3PTY)

3.1.2.13.1 Notification received from the network

Table 111/Q.699 – 3PTY notification

CPG→	NOTIFY→
Generic notification indicator parameter	Notification indicator information element
Notification indicator	Notification description
100 0010 <i>Conference established</i>	100 0010 <i>Conference established</i>
100 0011 <i>Conference disconnected</i>	100 0011 <i>Conference disconnected</i>
111 1001 <i>Remote hold</i>	111 1001 <i>Remote hold</i>

If the Call Progress Message (CPG) contains two generic notification indicator parameters, one with the notification indicator coded *conference disconnected*, the other with the notification indicator coded *remote hold*,

- either a NOTIFY message is sent containing:
 - a notification indicator information element with the notification description *conference disconnected*; and
 - a Notification indicator information element with the notification description *remote hold*;
- or
 - a NOTIFY message is sent containing a notification indicator information element with the notification description *conference disconnected*; and
 - a subsequent NOTIFY message is sent containing a notification indicator information element with the notification description *remote hold*.

3.1.2.13.2 Invocation at coincident S and T reference point

Table 112/Q.699 – Three-Party (3PTY)

Call A-B: Active-held connection message sent to B ←	Call A-C: Active-idle connection message sent to C ←	Message received from served user ←	Procedure
←CPG Generic notification indicator parameter <i>Conference established</i>	←CPG Generic notification indicator parameter <i>Conference established</i>	←FACILITY Facility i.e. Begin3PTY-Inv Call reference i.e. Call reference of call A-B	Beginning the 3PTY
←CPG Generic notification indicator parameter <i>Remote hold</i>	←CPG Generic notification indicator parameter <i>Conference disconnected</i>	←FACILITY Facility i.e. End3PTY-Inv Call reference i.e. Call reference of call A-B	Creation of a private communication with B
No message sent	←CPG Generic notification indicator parameter <i>Remote hold</i>	←HOLD Call reference i.e. Call reference of call A-C	
←CPG Generic notification indicator parameter <i>Conference disconnected</i>	No message sent	←RETRIEVE Call reference i.e. Call reference of call A-B	

Table 112/Q.699 – Three-Party (3PTY) (concluded)

Call A-B: Active-held connection message sent to B ←	Call A-C: Active-idle connection message sent to C ←	Message received from served user ←	Procedure
←CPG Generic notification indicator parameter <i>Conference disconnected</i> Generic notification indicator parameter <i>Remote hold</i>	←CPG Generic notification indicator parameter <i>Conference disconnected</i>	←FACILITY Facility i.e. End3PTY-Inv Call reference i.e. Call reference of call A-C	Creation of a private communication with C
←REL	←CPG Generic notification indicator parameter <i>Conference disconnected</i>	←DISCONNECT Call reference i.e. Call reference of call A-B	Disconnect the remote user B
←CPG Generic notification indicator parameter <i>Remote hold</i>	←REL	←DISCONNECT Call reference i.e. Call reference of call A-C	Disconnect the remote user C
←CPG Generic notification indicator parameter <i>Conference disconnected</i>	Not applicable	←RETRIEVE Call reference i.e. Call reference of call A-B	

Table 113 describes the actions taken when user B or user C disconnects.

Table 113/Q.699 – Three-party (3PTY): user B or user C disconnects

Procedure	Call A-C: Active-idle connection message sent to C or received from C	Call A-B: Active-held connection messages sent to B or received from B	Messages sent to or received from served user
User B disconnects	←CPG Generic notification indicator parameter <i>Conference disconnected</i>	REL→	DISCONNECT→ Call reference i.e. Call reference of call A-B
User C disconnects	REL→	←CPG Generic notification indicator parameter <i>Remote hold</i>	DISCONNECT→ Call reference i.e. Call reference of call A-C
	Not applicable	←CPG Generic notification indicator parameter <i>Conference disconnected</i>	←RETRIEVE Call reference i.e. Call reference of call A-B

Upon receipt from a remote user of a Release message (REL), that call is released according to normal call release procedure and a Call Progress message (CPG) is sent through the network to the other remote user with the event information parameter coded *progress* and the generic notification indicator coded *conference disconnected*.

3.1.2.13.3 Notification received at T reference point

Table 114/Q.699 – Receipt of a 3PTY notification from a private network

←CPG		←NOTIFY
Generic notification indicator parameter	Event information parameter	Notification indicator information element
Notification indicator	Event indicator	Notification description
100 0010 <i>Conference established</i>	000 0010 <i>Progress</i>	100 0010 <i>Conference established</i>
100 0011 <i>Conference disconnected</i>	000 0010 <i>Progress</i>	100 0011 <i>Conference disconnected</i>
111 1001 <i>Remote hold</i>	000 0010 <i>Progress</i>	111 1001 <i>Remote hold</i>

3.1.2.14 Closed User Group (CUG)

CUG checks at the destination exchange and determination of the type of call request in correlation with the CUG information received in the Initial Address Message (IAM) message and the CUG attributes of the called user are described in Table 1-4/Q.735 [12].

The coding of the facility information element sent in the SETUP message is described in 1.5.2/Q.955 [18].

A rejection indication may be received in a DSS 1 call clearing message prior alerting phase.

Table 115/Q.699 – Receipt of a rejection indication

←REL	←DISCONNECT, RELEASE or RELEASE COMPLETE	
Cause parameter	Return error component	Cause information element
Cause value No. 87 <i>User not member of CUG</i>	Return error value #20 <i>userNotMemberOfCUG</i>	Any basic call cause value
Cause value No. 87 <i>User not member of CUG</i>	Return error value #16 <i>invalidOrUnregisteredCUG Index</i>	Any basic call cause value
Cause value No. 87 <i>User not member of CUG</i>	Return error value #17 <i>requestedBasicServiceViolatesCUGCon straints</i>	Any basic call cause value
As received from DSS 1	Return error value #21 <i>inconsistencyInDesignatedFacilityAnd SubscriberClass</i>	Any basic call cause value
Cause value No. 55 <i>Incoming calls barred within CUG</i>	Return error value #19 <i>incomingCallsBarredWithinCUG</i>	Any basic call cause value
As received from DSS 1	Return error value #8 <i>basicServiceNotProvided</i>	Any basic call cause value
As received from DSS 1	None	Any basic call cause value
NOTE – This table provides examples of mapping.		

3.1.2.15 User-to-User Signalling (UUS)

3.1.2.15.1 Service 1 (UUS1) implicit

Service 1 may be requested implicitly by the presence of the user-to-user information parameter of the Initial Address Message (IAM) which is mapped into the user-user information element in the SETUP message.

If service 1 is requested:

Table 116/Q.699 – Implicit UUS1 transfer

ISUP messages	DSS 1 messages
ACM, CPG, ANM, CON, REL, SGM (Note) ←	ALERTING, CONNECT, DISCONNECT, RELEASE, RELEASE COMPLETE ←
User-to-user information parameter	User-user information element
REL →	DISCONNECT →
User-to-user information parameter	User-user information element
NOTE – The correspondences between ISUP and DSS 1 messages are described in 3.1.1.	

If there is no user-user information element in the SETUP message, the exchange should discard the user-to-user information possibly received afterwards from the access or from the ISUP side.

3.1.2.15.2 Service 1 (UUS1) explicit

Table 117/Q.699 – Explicit UUS1 invocation

IAM→	SETUP→
Content	Content
User-to-user indicators parameter Type <i>Request</i> Service 1 <i>Request, not essential</i>	Facility information element UserUserService invoke component <i>Service 1 preferred</i>
User-to-user information parameter (Note)	User-user information element
User-to-user indicators parameter Type <i>Request</i> Service 1 <i>Request, essential</i>	Facility information element UserUserService invoke component <i>Service 1 required</i>
User-to-user information parameter (Note)	User-user information element
NOTE – The user-user information element is optional for the invocation. When absent, the user-to-user parameter is not included in the SETUP message.	

Table 118/Q.699 – Explicit UUS1 acceptance

←Corresponding message (ACM, CPG, ANM, CON or REL)	←First backward message (ALERTING, CONNECT, or release message)
User-to-user indicators parameter Type <i>Response</i> Service 1 <i>Provided</i> Service 2 <i>No information</i> (Note) Service 3 <i>No information</i> (Note)	Facility information element UserUserService return result component
NOTE – These indicators may be coded in a different way if service 2 (respectively service 3) information have to be transported: see Tables 122, 124, 126 and 132.	

In case of acceptance of service, user-user information may be exchanged in all the call control messages: see Table 119.

Table 119/Q.699 – Explicit UUS1 transfer

ISUP messages	DSS 1 messages
ACM, CPG, ANM, CON, REL, SGM (Note) ←	ALERTING, CONNECT, DISCONNECT, RELEASE, RELEASE COMPLETE ←
User-to-user information parameter	User-user information element
REL →	DISCONNECT →
User-to-user information parameter	User-user information element
NOTE – The correspondences between ISUP and DSS 1 messages are described in 3.1.1.	

Service 1 rejection

Table 120/Q.699 – UUS1 rejection

ISUP messages	DSS 1 messages
←REL	←DISCONNECT or RELEASE COMPLETE
Cause parameter Value No. 69 (<i>requested facility not implemented</i>) Diagnostic <i>UUI indicators parameter's name</i>	Cause information element Value No. 69 (<i>requested facility not implemented</i>) Facility information element UserUserService return error component <i>rejectedByUser</i>
←REL	DISCONNECT, RELEASE or RELEASE COMPLETE Prior active state ←
Cause parameter Value As received User-to-user indicators parameter Type <i>Response</i> Service 1 <i>Not provided</i> Service 2 <i>No information</i> (Note 1) Service 3 <i>No information</i> (Note 1)	Cause information element Value Other than No. 69 (<i>requested facility not implemented</i>) Facility information element UserUserService return error component <i>rejectedByUser</i>
←ACM, CPG, ANM, or CON (Note 2)	←ALERTING or CONNECT (Note 3)
User-to-user indicators parameter Type <i>Response</i> Service 1 <i>Not provided</i> Service 2 <i>No information</i> (Note 1) Service 3 <i>No information</i> (Note 1)	Facility information element UserUserService return error component <i>rejectedByUser</i>
NOTE 1 – This field may be coded in a different way if a service 2 (respectively service 3) acceptance or rejection indication have to be carried: see Tables 122, 124, 126 and 132. NOTE 2 – The correspondence between the DSS 1 message received from the called user and the DSS 1 message sent is described in 3.1.1 NOTE 3 – In case of call contention, only the indication possibly received in the CONNECT message is taken into account.	

3.1.2.15.3 Service 2

Table 121/Q.699 – UUS2 invocation

IAM→	SETUP→
Content	Content
User-to-user indicators parameter Type <i>Request</i> Service 2 <i>Request, not essential</i>	Facility information element UserUserService invoke component <i>Service 2 preferred</i>
User-to-user indicators parameter Type <i>Request</i> Service 2 <i>Request, essential</i>	Facility information element UserUserService invoke component <i>Service 2 required</i>

Service 2 acceptance is indicated in the alerting information received from the remote user.

Table 122/Q.699 – UUS2 acceptance

←ACM, CPG	←ALERTING
User-to-user indicators parameter Type <i>Response</i> Service 1 <i>No information (Note)</i> Service 2 <i>Provided</i> Service 3 <i>No information (Note)</i>	Facility information element UserUserService return result component
NOTE – These indicators may be coded in a different way if service 1 (respectively service 3) information have to be transported: see Tables 118, 120, 126, 132.	

When acceptance of Service 2 has been received, user-user information may be exchanged during the alerting phase of the call: see Table 123.

Table 123/Q.699 – UUS2 transfer

ISUP messages	DSS 1 messages
USR→	USER INFORMATION→
User-to-user information parameter Access transport parameter More data information element	User-user information element More data information element
←USR	←USER INFORMATION
User-to-user information parameter Access transport parameter More data information element	User-user information element More data information element

Service 2 rejection

Table 124/Q.699 – UUS2 rejection

ISUP messages	DSS 1 messages
←REL	←DISCONNECT or RELEASE COMPLETE
Cause parameter Value No. 69 (<i>requested facility not implemented</i>) Diagnostic <i>UUI indicators parameter's name</i>	Cause information element Value No. 69 (<i>requested facility not implemented</i>) Facility information element UserUserService return error component <i>rejectedByUser</i>
←REL	DISCONNECT, RELEASE or RELEASE COMPLETE Prior active state ←
Cause parameter Value As received User-to-user indicators parameter Type <i>Response</i> Service 1 <i>No information</i> (Note 1) Service 2 <i>Not provided</i> Service 3 <i>No information</i> (Note 1)	Cause information element Value Other than No. 69 (<i>requested facility not implemented</i>) Facility information element UserUserService return error component <i>rejectedByUser</i>
←ACM or CPG (Note 2)	←ALERTING
User-to-user indicators parameter Type <i>Response</i> Service 1 <i>No information</i> (Note 1) Service 2 <i>Not provided</i> Service 3 <i>No information</i> (Note 1)	Facility information element UserUserService return error component <i>rejectedByUser</i>

Table 124/Q.699 – UUS2 rejection (concluded)

ISUP messages	DSS 1 messages
<p style="text-align: center;">Service 2 required ←REL</p> <p>Cause parameter Value No. 88 (<i>destination incompatible</i>) Diagnostic <i>UUI indicators parameter's name</i></p>	<p>Point-to-multipoint arrangement</p>
<p style="text-align: center;">Service 2 preferred ←ACM or CPG (Note 3)</p> <p>User-to-user indicators parameter Type <i>Response</i> Service 1 <i>No information</i> (Note 1) Service 2 <i>Not provided</i> Service 3 <i>No information</i> (Note 1)</p>	
<p>NOTE 1 – This field may be coded in a different way if a service 1 (respectively service 3) acceptance or rejection indication have to be carried: see Tables 118, 120, 126 and 132.</p> <p>NOTE 2 – The mapping of an ALERTING message into an Address Complete (ACM) or a Call Progress (CPG) message is described in 3.1.1.</p> <p>NOTE 3 – Message sent upon receipt of the first ALERTING message from the called user.</p>	

3.1.2.15.4 Service 3

Service 3 may be invoked during the call establishment.

Table 125/Q.699 – UUS3 invocation during the call establishment

IAM→	SETUP→
<p>User-to-user indicators parameter Type <i>Request</i> Service 3 <i>Request, not essential</i></p>	<p>Facility information element UserUserService invoke component <i>Service 3 preferred</i></p>
<p>User-to-user indicators parameter Type <i>Request</i> Service 3 <i>Request, essential</i></p>	<p>Facility information element UserUserService invoke component <i>Service 3 required</i></p>

Service 3 acceptance is indicated in the connecting information received from the remote user.

Table 126/Q.699 – UUS3 acceptance

←-ANM, CON	←-CONNECT
User-to-user indicators parameter Type <i>Response</i> Service 1 <i>No information</i> (Note) Service 2 <i>No information</i> (Note) Service 3 <i>Provided</i>	Facility information element UserUserService return result component
NOTE – These indicators may be coded in a different way if service 1 (respectively service 2) information have to be transported: see Tables 118, 120, 122, 124.	

If not already done before, service 3 may be invoked by either the calling user (see Tables 127 and 128) or the called user (see Tables 129 and 130).

Table 127/Q.699 – UUS3 invocation received from the calling user in active phase

Facility request message (FAR) →	FACILITY →
User-to-user indicators parameter Type <i>Request</i> Service 3 <i>Request, not essential</i>	Facility information element UserUserService invoke component <i>Service 3 preferred</i>

Table 128/Q.699 – UUS3 acceptance received from the called user in active phase

Facility accepted message (FAA) ←	FACILITY ←
User-to-user indicators parameter Type <i>Response</i> Service 1 <i>No information</i> Service 2 <i>No information</i> Service 3 <i>Provided</i>	Facility information element UserUserService return result component

Table 129/Q.699 – UUS3 invocation received from the called user in active phase

Facility request message (FAR) ←	FACILITY ←
User-to-user indicators parameter Type <i>Request</i> Service 1 <i>No information</i> Service 2 <i>No information</i> Service 3 <i>Request, not essential</i>	Facility information element UserUserService invoke component <i>Service 3 preferred</i>

Table 130/Q.699 – UUS3 acceptance received from the calling user in active phase

Facility accepted message (FAA) →	FACILITY →
User-to-user indicators parameter Type <i>Response</i> Service 3 <i>Provided</i>	Facility information element UserUserService return result component

When acceptance of service 3 has been received, user-user information may be exchanged during the active phase of the call: see Table 131.

Table 131/Q.699 – UUS3 transfer

ISUP messages	DSS 1 messages
User-to-User information (USR)→	USER INFORMATION→
User-to-user information parameter Access transport parameter More data information element	User-user information element More data information element
←User-to-User information (USR)	←USER INFORMATION
User-to-user information parameter Access transport parameter More data information element	User-user information element More data information element

Service 3 rejection

Rejection of service 3 requested during call establishment

Table 132/Q.699 – Rejection of service 3 requested during call establishment

ISUP messages	DSS 1 messages
←REL	←DISCONNECT or RELEASE COMPLETE
Cause parameter Value No. 69 (<i>requested facility not implemented</i>) Diagnostic <i>UUI indicators parameter's name</i>	Cause information element Value No. 69 (<i>requested facility not implemented</i>) Facility information element UserUserService return error component <i>rejectedByUser</i>
←REL	DISCONNECT, RELEASE or RELEASE COMPLETE prior active state ←
Cause parameter Value As received User-to-user indicators parameter Type <i>Response</i> Service 1 <i>No information</i> (Note 1) Service 2 <i>No information</i> (Note 1) Service 3 <i>Not provided</i>	Cause information element Value other than No. 69 (<i>requested facility not implemented</i>) Facility information element UserUserService return error component <i>rejectedByUser</i>
←ANM or CON (Note 2)	←CONNECT
User-To-User Indicators Parameter Type <i>Response</i> Service 1 <i>No Information</i> (Note 1) Service 2 <i>No Information</i> (Note 1) Service 3 <i>Not Provided</i>	Facility information element UserUserService return error component <i>rejectedByUser</i>
NOTE 1 – This field may be coded in a different way if a service 1 (respectively service 2) acceptance or rejection indication have to be carried: see Tables 118, 120, 122 and 124. NOTE 2 – The mapping of a CONNECT message into an Answer (ANM) or a Connect (CON) message is described in 3.1.1.	

Rejection of service 3 requested after call establishment

Table 133/Q.699 – Rejection of service 3 requested by the calling user after call establishment

ISUP messages	DSS 1 messages
←FRJ	←FACILITY
User-to-user indicators parameter Type <i>Response</i> Service 1 <i>No information</i> Service 2 <i>No information</i> Service 3 <i>Not provided</i> Cause parameter Value <i>No. 69 (requested facility not implemented)</i>	Facility information element UserUserService return error component <i>rejectedByUser</i>
←FRJ	T1 expiry (Note)
User-to-user indicators parameter Type <i>Response</i> Service 1 <i>No information</i> Service 2 <i>No information</i> Service 3 <i>Not provided</i> Cause parameter Value <i>No. 69 (requested facility not implemented)</i>	
FRJ Facility reject message NOTE – T1 start and normal stop are described in 1.5.2.3/Q.957 [19].	

Table 134/Q.699 – Rejection of UUS3 requested by the called user after call establishment

ISUP messages	DSS 1 messages
FRJ→	FACILITY→
User-to-user indicators parameter Type <i>Response</i> Service 3 <i>Not provided</i>	Facility information element UserUserService return error component <i>rejectedByUser (Note)</i>
FRJ Facility reject message NOTE – Since it is not possible to know if the rejection is due to the network or to the remote user, the default value <i>RejectedByUser</i> is used.	

3.2 Interworking from ISUP to non-ISDN access

3.2.1 Basic call

3.2.1.1 Sending of the ringing

The call information are received in the Initial Address Message (IAM), possibly followed by one or several Subsequent Address Messages (SAM) (See 3.1.1.2).

If the continuity check indicator of the nature of connection indicators is coded 01, *continuity check required on this circuit*, or 10, *continuity check required on a previous circuit*, the setting up of the call must be prevented until the receipt of the result of the continuity check procedure.

When the exchange has received all the information required to go on with the call, and performed the various checks to determine that the call is allowed, the call set-up indication, e.g. ringing, is passed to the called user.

3.2.1.2 Receipt of the Subsequent Address Message (SAM)

The call set-up indication upon receiving the Subsequent Address Message (SAM) is shown in 3.2.1.1.

3.2.1.3 Sending of the Address Complete Message (ACM)

The following cases are possible trigger conditions of sending the Address Complete Message (ACM):

- a) The destination exchange has determined independently of line conditions that the complete called party number has been received.
- b) The destination exchange has determined that the subscriber is free.
- c) It has been determined, in case of call failure, that a special in-band tone or announcement has to be returned to the calling party from the destination exchange.

MANDATORY PARAMETERS

Backward call indicators

bits	DC	Called party's status indicator
	0 1	<i>subscriber free</i> if the exchange recognizes that the access line condition is free
	0 0	<i>no indication</i> otherwise
bits	FE	Called party's category indicator
	0 0	<i>no indication</i> if the user's characteristics (internal data) have not been analysed, or
	0 1	<i>ordinary subscriber</i> , or
	1 0	<i>payphone</i> according to the user's characteristics
bit	I	Interworking indicator
	0	<i>no interworking encountered</i>
bit	K	ISDN user part indicator
	1	<i>ISDN user part used all the way</i>
bit	M	ISDN access indicator
	1	<i>terminating access non-ISDN</i>

OPTIONAL PARAMETERS

Optional backward call indicators

bit	A	In-band information indicator
	1	<i>in-band information or an appropriate pattern is now available</i> if it has been determined, in case of call failure, that a special in-band tone or announcement has to be returned to the calling party from the destination exchange
	0	<i>no indication</i> otherwise

3.2.1.4 Sending of the Call progress message (CPG)

If the Address Complete Message (ACM) has already been sent, the following cases are possible trigger conditions of sending the Call Progress Message (CPG):

- a) the destination exchange has determined that the subscriber is free;
- b) it has been determined that an in-band tone or announcement has to be returned to the calling party from the destination exchange.

MANDATORY PARAMETERS

Event information

bits	G-A	Event indicator
	0000001	<i>alerting</i>
	0000011	<i>in-band information or an appropriate pattern is now available</i> in case b.

OPTIONAL PARAMETERS

Other parameters

The other parameters may have already been sent in a previous backward message. In this case they are not repeated unless new information are now available.

The coding of these parameters is described in 3.2.1.3.

3.2.1.5 Sending of the Answer Message (ANM)

If the exchange detects the off-hook condition on the non-ISDN side, it shall send an Answer Message (ANM).

3.2.1.6 Receipt of the Release message (REL)

Upon receiving the Release message (REL) in the exchange, it may be mapped into an appropriate forward signal, e.g. Clear-forward signal, on the non-ISDN side.

3.2.1.7 Sending of the Suspend message (SUS) network initiated

The action taken on the ISUP side upon receipt of the on-hook condition are described in 2.4.1/Q.764 [4].

3.2.1.8 Sending of the Resume message (RES) network initiated

The action taken on the ISUP side upon receipt of the off-hook condition are described in 2.4.1/Q.764 [4].

3.2.1.9 Release by the exchange

Table 135/Q.699 – Release from the destination exchange

Message sent to the ISUP ←	Trigger event
REL Cause value No. 97 or No. 99	Call release due to the ISUP compatibility procedure
REL Cause value coded according to [4]	Other cases of failure on the ISUP side
REL Cause value coded according to [4] (Note)	Other cases of failure on the non-ISDN side (Note)
NOTE – The destination exchange has determined line conditions, e.g. subscriber busy, during call set-up.	

3.2.2 Supplementary services

For further study.

ANNEX A

Interworking scenarios between subscriber access types interworking over SS 7 ISUP

A.1 General

A.1.1 Scope

This annex defines some typical interworking scenarios between certain subscriber access types interworking over the Signalling System No. 7 ISDN User Part (ISUP).

A.1.2 Methodology

Call flow or "arrow" diagrams are provided to show the temporal relationships between signalling messages during execution of a call control procedure. The general format of an arrow diagram is shown in Figure A.1.

The main part of the Recommendation takes precedence over this annex.

A.1.3 Symbols and abbreviations

The vertical boxes represent three exchanges: originating, intermediate and destination.

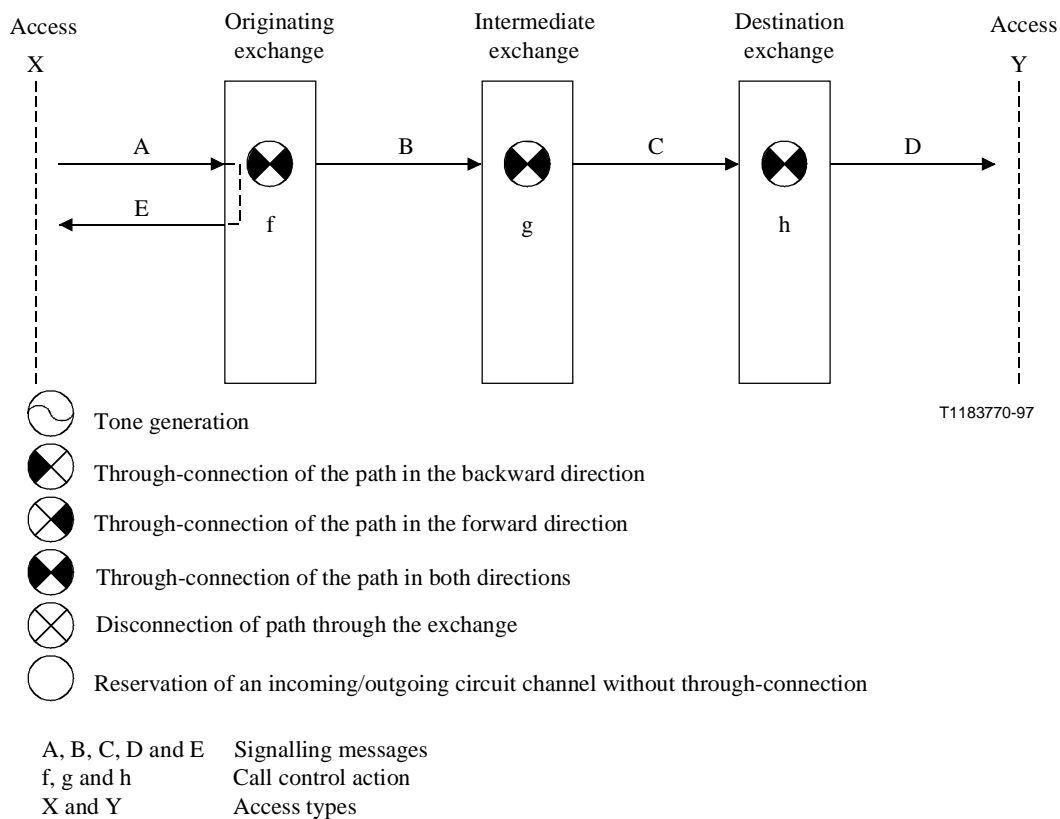
The vertical dashed lines represent the access interface. Each access interface supports a single access type: ISDN or non-ISDN.

Solid horizontal arrows represent signalling messages and indicate their direction of propagation, i.e. to or from the incoming or outgoing exchange. The interaction of messages shown along the vertical represent increasing time in the downward direction. All events on the same vertical line are related, e.g. an incoming message causes voice-path connections and triggers an outgoing message. Events on different vertical lines are not related unless connected by dashed lines. A dashed line indicates that an incoming message may trigger an event at a later time.

Wavy horizontal arrows (~>) represent tones or announcements sent in-band (Note).

Timers are represented as vertical arrows.

For call control the following symbols are used within the vertical boxes to indicate the relationship between the incoming and outgoing messages and the call control action taken.



Message A in access X causes call control action f in the originating exchange, ISUP message B, call control action g in the intermediate exchange, ISUP message C, call control action h in the destination exchange and message D in access Y. Message A may trigger message E in access X.

NOTE – For simplicity, normal ring-back tones are not shown.

Figure A.1/Q.699 – Example of a call flow or "arrow" diagram

A.2 Interworking of ISDN accesses over ISUP

Subclauses A.2.1 through A.2.4 contain information relevant to ISDN basic call control functions as defined in Recommendations Q.930, Q.931, Q.763 and Q.764. The call flow diagrams are divided into functional subclauses:

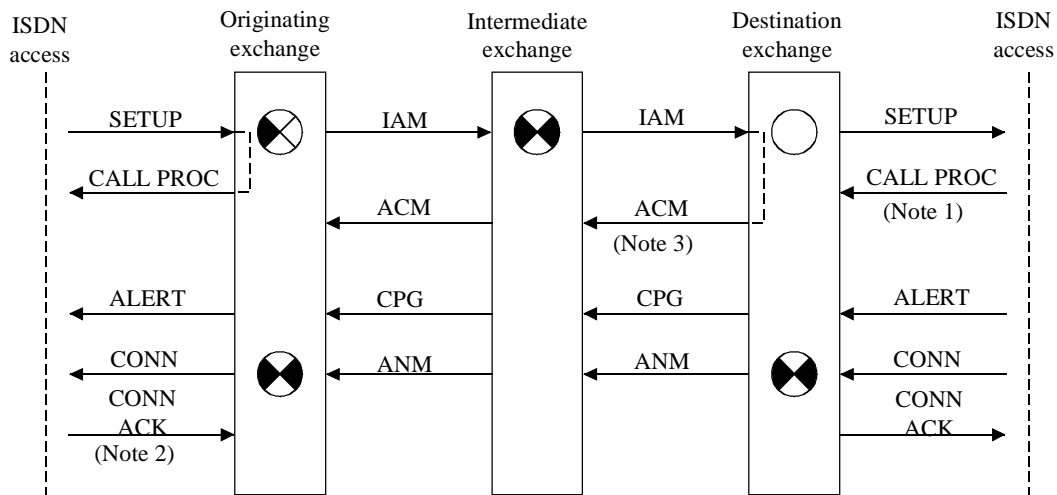
- successful call set-up procedures;
- unsuccessful call set-up procedures;
- release procedures;
- suspend/resume procedures;
- simple message segmentation procedures.

A.2.1 Successful call set-up procedures/call flow diagrams for basic call control

A.2.1.1 *En bloc*, non-automatic answering terminal sending of address complete independent of access

See 2.1/Q.764 and 5.1/Q.931.

Figure A.2 shows the sequence of messages for successful call set-up where *en bloc* address signalling is used, the ACM is sent by the network independent of access indications, and the called party is not an automatic answering terminal. If continuity check occurs in the network, the SETUP message in the destination exchange is not passed until continuity is verified.



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NOTE 1 – This message may be sent by the user to achieve symmetrical working or to avoid timer expire response to SETUP (see /Q.931 5.2.5.1).

NOTE 2 – This message may be sent by the user to achieve symmetrical working (see 1.8/Q.931).

NOTE 3 – The method of ACM generation independent of access is termed the *Early ACM*. The ACM is independently generated at the destination exchange with the following parameters: called party status = no indication; ISDN access indicator = ISDN access; ISUP used all the way = yes; interworking encountered = no.

Figure A.2/Q.699 – *En bloc*, non-automatic answering terminal, sending of ACM independent of access

For detailed message and parameter mappings, refer to:

- IAM message – subclauses 2.1.1.1 and 3.1.1.1;
- CPG message – subclauses 2.1.1.4 and 3.1.1.4;
- ANM message – subclauses 2.1.1.5 and 3.1.1.5.

A.2.1.2 *En bloc*, automatic answering terminal sending of address complete independent of access

See 2.1/Q.764 and 5.1/Q.931.

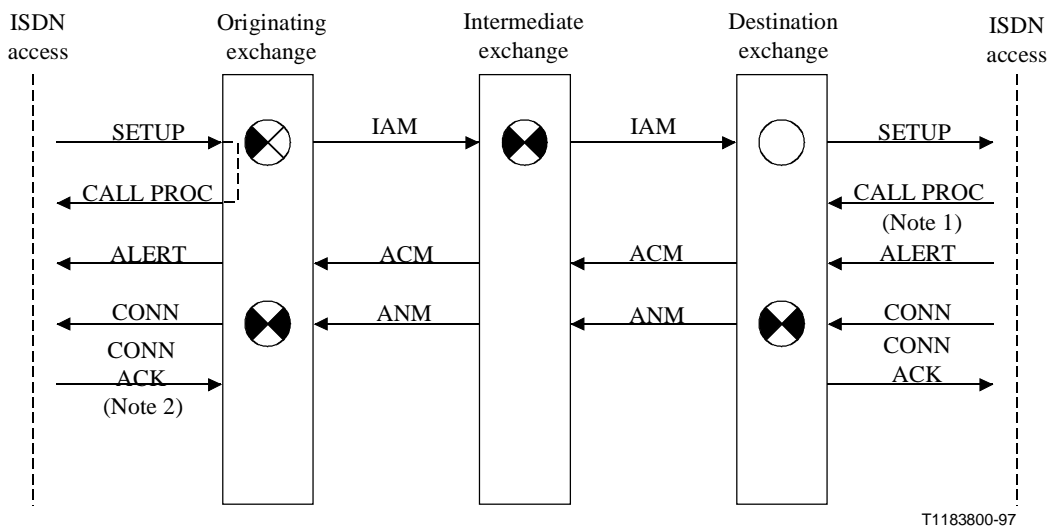
Figure A.3 shows the sequence of messages for successful call set-up where *en-bloc* address signalling is used, the ACM is sent independent of access indications, and the called party is an automatic answer terminal (fast-connect scenario). If continuity check occurs in the network, the SETUP message in the destination exchange is not passed until continuity is verified.

A.2.1.3 *En bloc*, non-automatic answering terminal

See 2.1/Q.764 and 5.1/Q.931.

Figure A.4 shows the sequence of messages for successful call set-up where *en bloc* address signalling is used, the ACM is delayed until receipt of alerting information from the access (Note), and the called party is not an automatic answering terminal. If continuity check occurs in the network, the SETUP message in the destination exchange is not passed until continuity is verified.

NOTE – Termed *Late ACM*.



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NOTE 1 – This message may be sent by the user to achieve symmetrical working or to avoid timer expire response to SETUP (see 5.2.5.1/Q.931).

NOTE 2 – This message may be sent by the user to achieve symmetrical working (see 5.1.8/Q.931).

Figure A.4/Q.699 – *En bloc*, non-automatic answering terminal

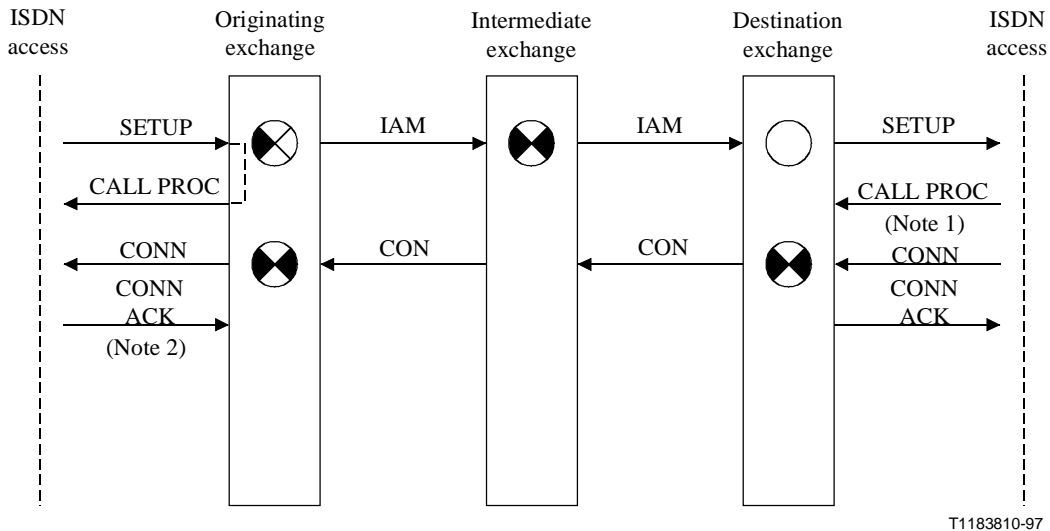
For detailed message and parameter mappings, refer to:

- IAM message – subclauses 2.1.1.1 and 3.1.1.1;
- ACM message – subclauses 2.1.1.3 and 3.1.1.3;
- ANM message – subclauses 2.1.1.5 and 3.1.1.5.

A.2.1.4 *En bloc*, automatic answering terminal

See 2.1/Q.764 and 5.1/Q.931.

Figure A.5 shows successful call set-up with *en bloc* address signalling, and the address complete indication delayed until receipt of connect indication from an automatic answering terminal. In this case the address complete indication and connect indication are combined in the CONNECT message in the network. If continuity check occurs in the network, the SETUP message in the destination exchange is not passed until continuity is verified.



NOTE 1 – This message may be sent by the symmetrical working or to avoid timer expire response to SETUP (see 5.2.5.1/Q.931).

NOTE 2 – This message may be sent by the user to achieve symmetrical working (see 5.1.8/Q.931).

Figure A.5/Q.699 – *En bloc*, automatic answering terminal

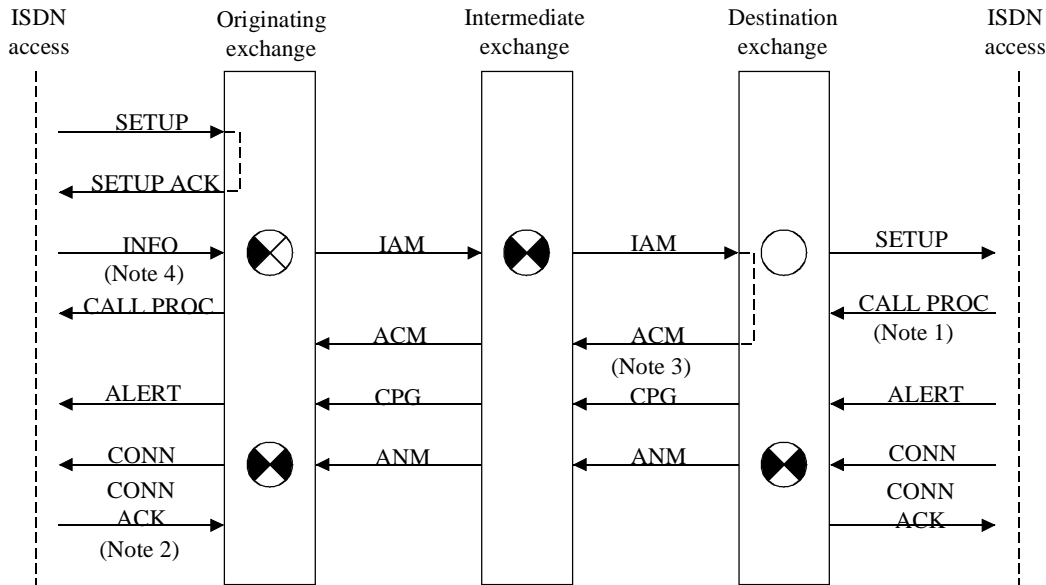
For detailed message and parameter mappings, refer to:

- IAM message – subclauses 2.1.1.1 and 3.1.1.1;
- CON message – subclauses 2.1.1.6 and 3.1.1.6.

A.2.1.5 Overlap addressing, originating access only, non-automatic answering terminal

See 2.1/Q.764 and 5.1/Q.931.

Figure A.6 shows the sequence of messages when overlap addressing is used between the calling party and the originating exchange, and *en bloc* addressing is used within the network with closed numbering plan. An independent ACM and non-automatic answering terminal is assumed in this case. Variations are possible as in Figures 3 to 6. If continuity check occurs in the network, the SETUP message in the destination exchange is not passed until continuity is verified.



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NOTE 1 – This message may be sent by the user to achieve symmetrical working or to avoid timer expire response to SETUP (see 5.2.5.1/Q.931).

NOTE 2 – This message may be sent by the user to achieve symmetrical working (see 5.1.8/Q.931).

NOTE 3 – The ACM is independently generated at the destination exchange with the following parameters: called party status = no indication; ISDN access indicator = ISDN access; ISUP used all the way = yes; interworking encountered = no.

NOTE 4 – The number of INFORMATION messages shown is for example only. In practice the number may be zero or more: if zero, the IAM and CALL PROCEEDING messages may be originated on expiry of timer T302 (see 5.1.5.2/Q.931).

Figure A.6/Q.699 – Overlap addressing, originating access only, non-automatic answering terminal

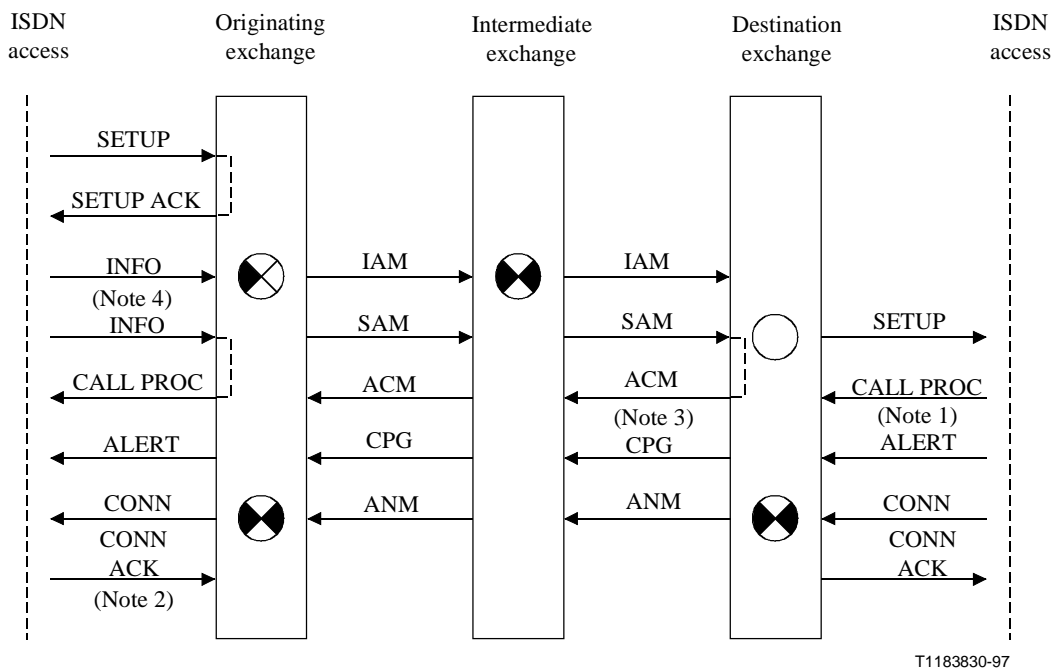
For detailed message and parameter mappings, refer to:

- IAM message – subclauses 2.1.1.1 and 3.1.1.1;
- CPG message – subclauses 2.1.1.4 and 3.1.1.4;
- ANM message – subclauses 2.1.1.5 and 3.1.1.5.

A.2.1.6 Overlap addressing, originating access and network, non-automatic answering terminal

See 2.1/Q.764 and 5.1/Q.931.

Figure A.7 shows the sequence of messages when overlap addressing is used at the originating access and within the network. In this case the ACM through the network informs the originating exchange that enough address information has been received, and the exchange can therefore indicate call proceeding to the calling party. If continuity check occurs in the network, the SETUP message in the destination exchange is not passed until continuity is verified.



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NOTE 1 – This message may be sent by the user to achieve symmetrical working or to avoid timer expire response to SETUP (see 5.2.5.1/Q.931).

NOTE 2 – This message may be sent by the user to achieve symmetrical working (see 5.1.8/Q.931).

NOTE 3 – The ACM is independently generated at the destination exchange with the following parameters: called party status = no indication; ISDN access indicator = ISDN access; ISUP used all the way = yes; interworking encountered = no.

NOTE 4 – The number of INFORMATION messages shown is for example only. In practice the number may be zero or more: if zero, the IAM and CALL PROCEEDING messages may be originated on expiry of timer T302 (see 5.1.5.2/Q.931).

Figure A.7/Q.699 – Overlap addressing, originating access and in network, non-automatic answering terminal

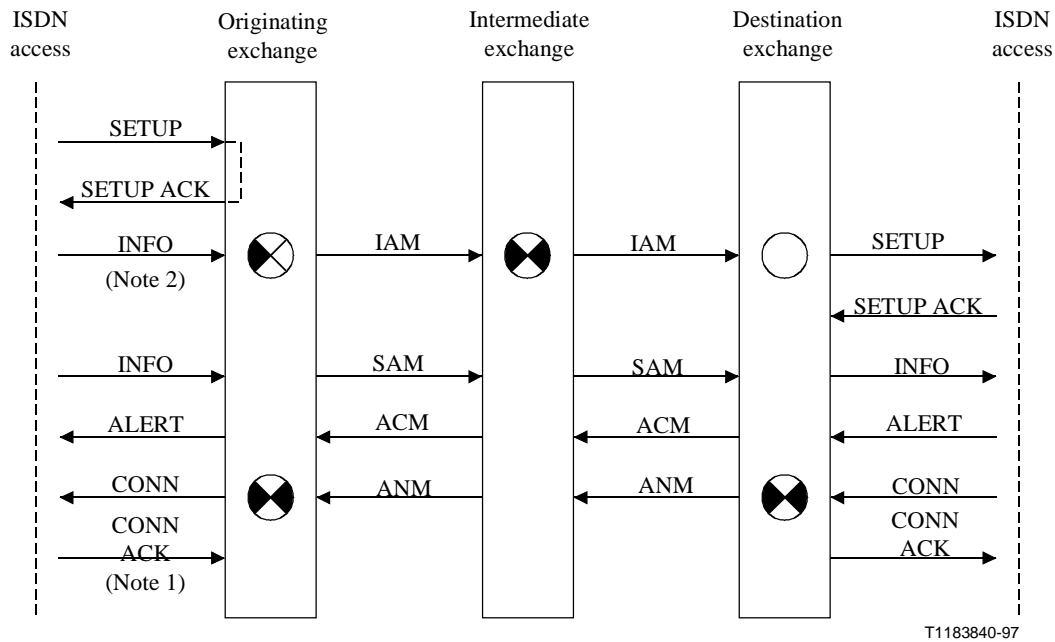
For detailed message and parameter mappings, refer to:

- CPG message – subclauses 2.1.1.4 and 3.1.1.4;
- ANM message – subclauses 2.1.1.5 and 3.1.1.5.

A.2.1.7 Overlap addressing, both accesses and network address complete cannot be determined by number analysis

See 2.1/Q.764 and 5.1/Q.931.

In Figure A.8 overlap addressing is used at both accesses and in the network. An example is a call made to an ISDN PABX, where determination of address complete may only be made as a result of an indication, e.g. alerting, from the called access. In this case, the ALERTING message from the called access allows the sending of an ACM in the network, which, since it carries the "subscriber free" indication, is mapped to ALERTING at the calling access. If continuity check occurs in the network, the SETUP message in the destination exchange is not passed until continuity is verified.



NOTE 1 – This message may be sent by the user to achieve symmetrical working (see 5.1.8/Q.931).

NOTE 2 – The number of INFORMATION messages shown is for example only. In practice the number may be zero or more: if zero, the IAM and CALL PROCEEDING messages may be originated on expiry of timer T302 (see 5.1.5.2/Q.931).

Figure A.8/Q.699 – Overlap addressing, both accesses and within network, address complete cannot be determined by number analysis

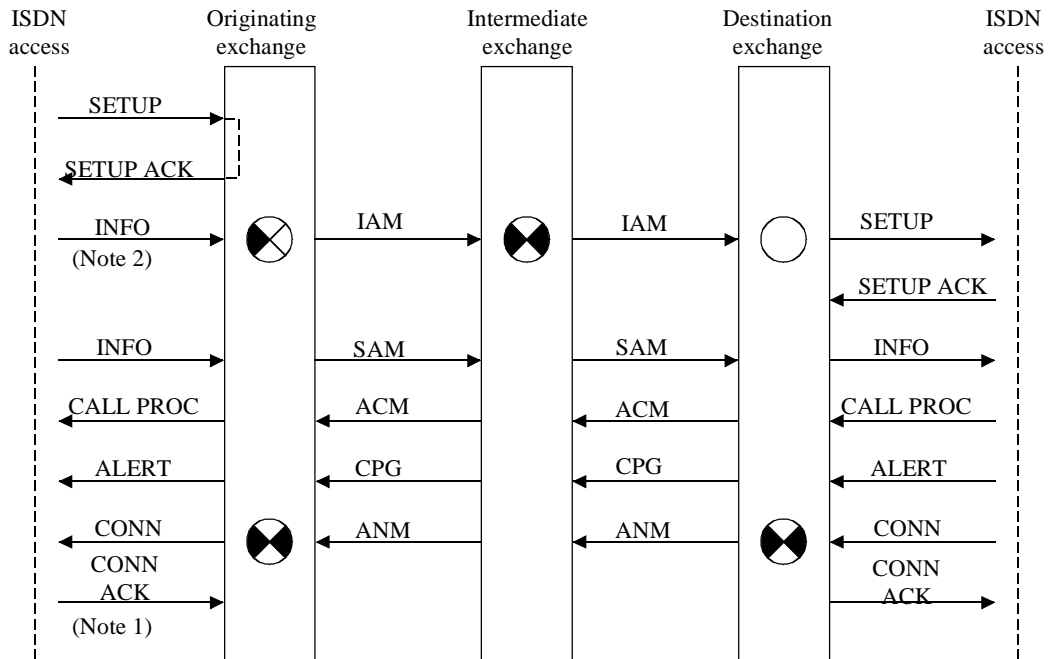
For detailed message and parameter mappings, refer to:

- IAM message – subclauses 2.1.1.1 and 3.1.1.1;
- ACM message – subclauses 2.1.1.3 and 3.1.1.3;
- ANM message – subclauses 2.1.1.5 and 3.1.1.5.

A.2.1.8 Overlap addressing, both accesses and within network transfer of address complete indication via call proceeding

See 2.1/Q.764 and 5.1/Q.931.

Figure A.9 shows the case where the indication that complete address information has been received is transferred by the terminating access. If continuity check occurs in the network, the SETUP message in the destination exchange is not passed until continuity is verified.



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NOTE 1 – This message may be sent by the user to achieve symmetrical working (see 5.1.8/Q.931).

NOTE 2 – The number of INFORMATION messages shown is for example only. In practice the number may be zero or more: if zero, the IAM and CALL PROCEEDING messages may be originated on expiry of timer T302 (see 5.1.5.2/Q.931).

Figure A.9/Q.699 – Overlap addressing, both access and within network, transfer of address complete indication via call proceeding (option a: call proceeding mapped to address complete)

For detailed message and parameter mappings, refer to:

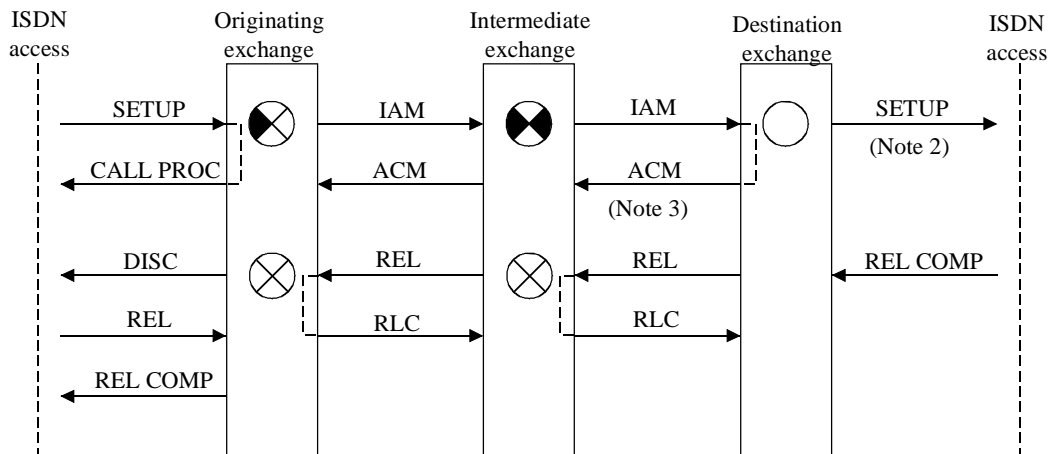
- IAM message – subclauses 2.1.1.1 and 3.1.1.1;
- ACM message – subclauses 2.1.1.3 and 3.1.1.3;
- CPG message – subclauses 2.1.1.4 and 3.1.1.4;
- ANM message – subclauses 2.1.1.5 and 3.1.1.5.

A.2.2 Unsuccessful call set-up procedures/call flow diagrams for basic call control

A.2.2.1 Point-to-point data link sending of address complete independent of access

See 2.2/Q.764 and 5.3/Q.931.

Figure A.10 shows the unsuccessful call set-up procedure where in-band tones/announcements are not provided (e.g. 64 kbit/s unrestricted bearer service). The RELEASE COMPLETE message at the destination exchange is mapped into the REL. At the originating exchange the REL is mapped into the DISCONNECT message. If continuity check occurs in the network, the SETUP message in the destination exchange is not passed until continuity is verified.



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NOTE 1 – This procedure is applicable in those cases where in-band tone/announcements are not provided, e.g. 64 kbit/s unrestricted bearer service.

NOTE 2 – This message is delivered by a point-to-point data link.

NOTE 3 – If *Early ACM* is used, the ACM is independently generated with the following parameters: called party status = no indication; ISDN access indicator = ISDN access; ISUP used all the way = yes; interworking encountered = no.

Figure A.10/Q.699 – Unsuccessful call set-up, point-to-point data link, ACM generated independent of access (Note 1)

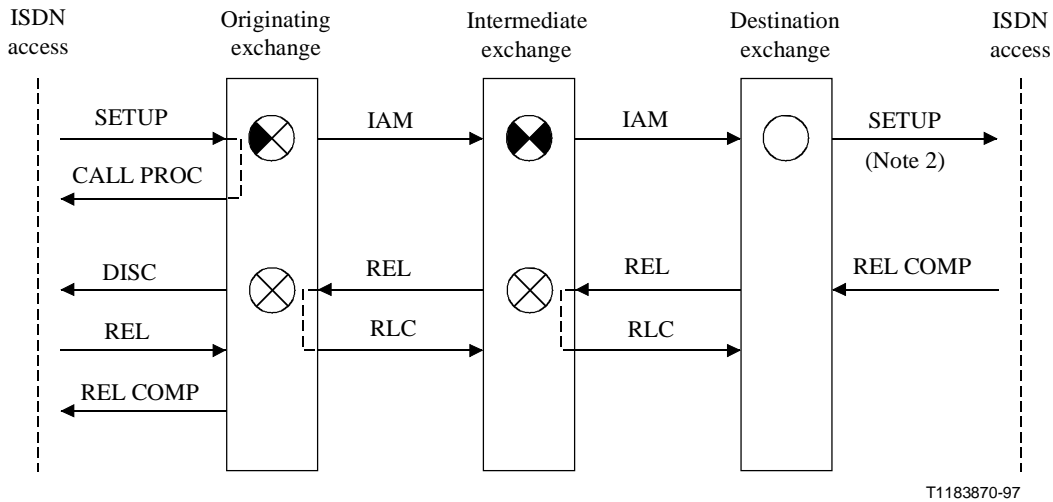
For detailed message and parameter mappings, refer to:

- IAM message – subclauses 2.1.1.1 and 3.1.1.1;
- REL message – subclauses 2.1.1.7 and 3.1.1.8.

A.2.2.2 Point-to-point data link

See 2.2/Q.764 and 5.3/Q.931.

Figure A.11 shows the unsuccessful call set-up procedure, where in-band tones/announcements are not provided (e.g. 64 kbit/s unrestricted bearer service). The RELEASE COMPLETE message at the destination exchange is mapped into the REL. At the originating exchange the REL is mapped into the DISCONNECT message. If continuity check occurs in the network, the SETUP message in the destination exchange is not passed until continuity is verified.



NOTE 1 – This procedure is applicable in those cases where in-band tone/announcements are not provided, e.g. 64 kbit/s unrestricted bearer service.

NOTE 2 – This message is delivered by a point-to-point data link.

Figure A.11/Q.699 – Unsuccessful call set-up, point-to-point data link (Note 1)

For detailed message and parameter mappings, refer to:

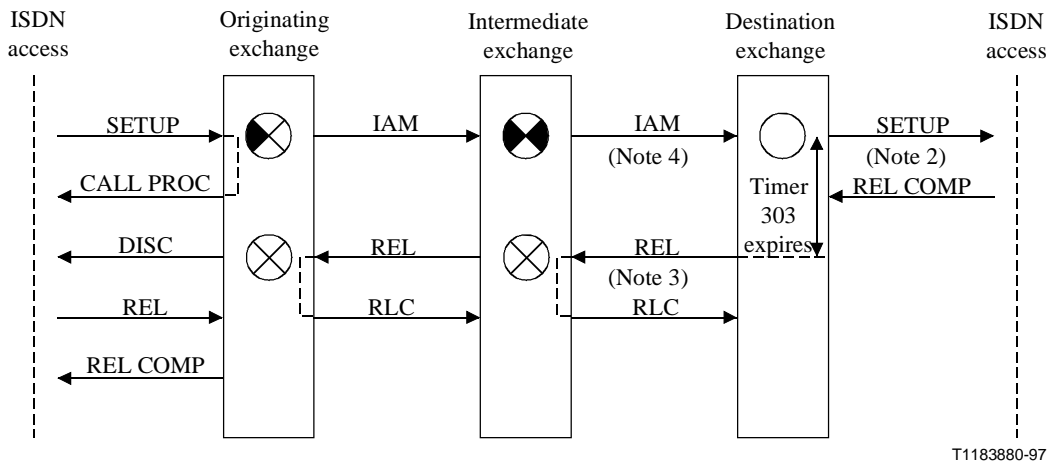
- IAM message – subclauses 2.1.1.1 and 3.1.1.1;
- REL message – subclauses 2.1.1.7 and 3.1.1.8.

A.2.2.3 Broadcast data link

See 2.2/Q.764 and 5.3/Q.931.

Figure A.12 shows the unsuccessful call set-up procedure, where in-band tones/announcements are not provided (e.g. 64 kbit/s unrestricted bearer service), in the case where the called party is addressed via a broadcast data link. The returning of the RELEASE COMPLETE message via a broadcast data link is optional. In the case shown, on receipt of the RELEASE COMPLETE message at the destination exchange the cause value is retained, and to allow for the possibility of another terminal accepting the call, the REL is not generated until the expiry of timer T303. If continuity check occurs in the network, the SETUP message in the destination exchange is not passed until continuity is verified.

NOTE – Where the network does not receive any response to the initial SETUP message before the expiry of timer T303, the SETUP message is retransmitted and T303 is restarted. If no further response is received by the network on the second expiry of timer T303, the REL message is generated. At the originating exchange the REL is mapped into the DISCONNECT message.



NOTE 1 – This procedure is applicable in those cases where in-band tone/announcements are not provided, e.g. 64 kbit/s unrestricted bearer service.

NOTE 2 – This message is delivered by a broadcast data link.

NOTE 3 – The REL is not mapped from a message from the destination user. It is generated due to a time-out at the destination exchange. However, the REL does cause a message mapping at the originating exchange.

NOTE 4 – If *Early ACM* is used, an ACM should be sent after the IAM by the destination exchange as shown in Figure A.10

Figure A.12/Q.699 – Unsuccessful call set-up, broadcast data link (Note 1)

For detailed message and parameter mappings, refer to:

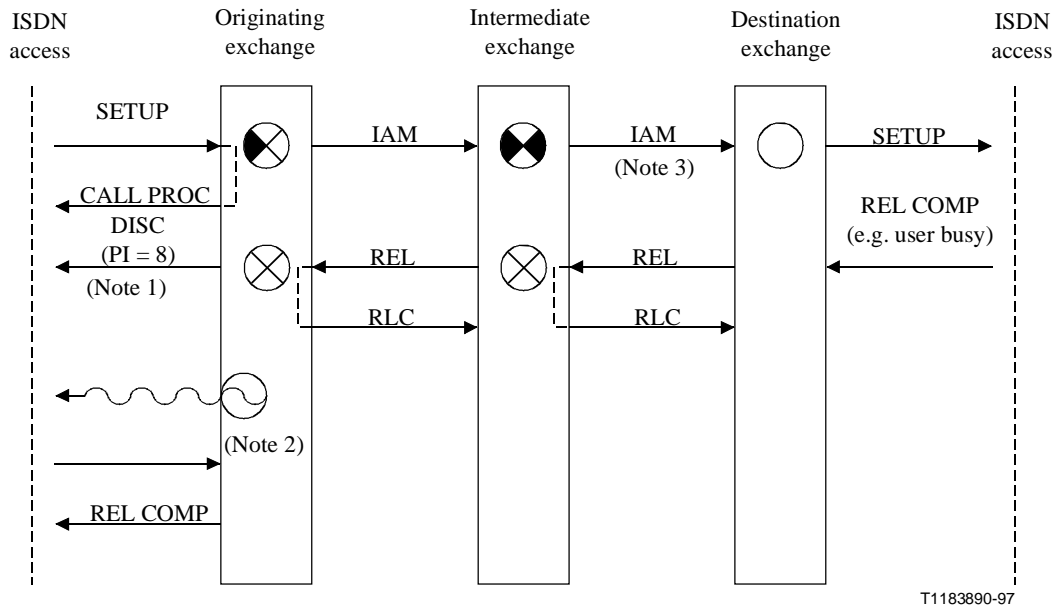
- IAM message – subclauses 2.1.1.1 and 3.1.1.1;
- REL message – subclauses 2.1.1.7 and 3.1.1.13.

A.2.2.4 Tone/announcement applied at the originating exchange

See 2.2/Q.764 and 5.3/Q.931.

Figure A.13 shows the unsuccessful set-up procedure where tones or announcements are generated in the originating exchange towards the ISDN access as a result of receiving a REL message. If continuity check occurs in the network, the SETUP message in the destination exchange is not passed until continuity is verified.

Timer T306 is started after the appropriate toner announcement is sent. Figure A.13 shows the originating ISDN access releasing before timer T306 expires.



NOTE 1 – If tones/announcements are applied, a DISCONNECT message may be sent containing progress indicator No. 8. As an alternative, a PROGRESS message may also be sent containing progress indicator No. 8.

NOTE 2 – Timer T306 is started after tone is sent in the Q.931 protocol block.

NOTE 3 – If *Early ACM* is used, an ACM should be sent after the IAM by the destination exchange as shown in Figure A.10.

Figure A.13/Q.699 – Unsuccessful call set-up tone/announcement applied at originating exchange

For detailed message and parameter mappings, refer to:

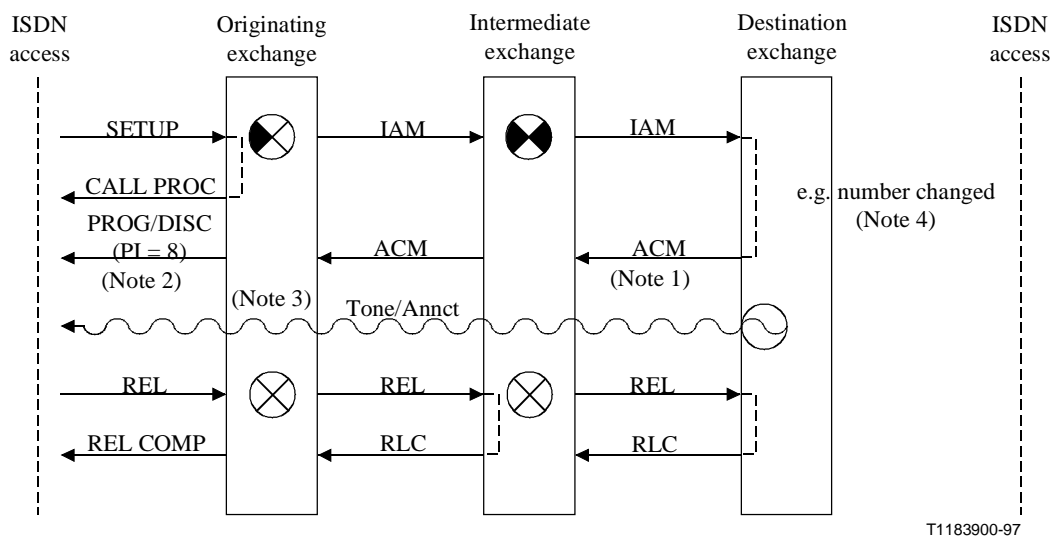
- IAM message – subclauses 2.1.1.1 and 3.1.1.1;
- REL message – subclauses 2.1.1.7 and 3.1.1.8.

A.2.2.5 Tone applied by destination exchange

See 2.2/Q.764 and 5.3/Q.931.

Figure A.14 shows an unsuccessful call where certain tones and announcements can only be generated in the destination exchange (or intermediate exchange) during call establishment. This is a typical case for example for a changed number announcement where the changed number information is only available at the destination exchange. Alternatively a specific announcement may be applied at an intermediate exchange to indicate for example that all circuits to a particular destination are busy. If continuity check occurs in the network, the SETUP message in the destination exchange is not passed until continuity is verified.

The originating exchange sends a DISCONNECT message to the calling user with progress indicator No. 8 thus indicating that in-band information is available. Normal release procedures apply after the in-band information has been connected.



NOTE 1 – The ACM is not mapped from a message from the destination user. It is generated at the destination exchange.

NOTE 2 – If tones/announcements are applied, the DISCONNECT message containing progress indicator No. 8 may be mapped from the ACM message with an appropriate cause indicators parameter. As an alternative, a PROGRESS message may also be sent containing progress indicator No. 8 when the cause indicators parameter is not contained in an ACM message.

NOTE 3 – Timer T306 is started in the Q.931 protocol block.

NOTE 4 – Customized announcements can only be provided by the destination exchange.

Figure A.14/Q.699 – Unsuccessful call set-up tone/announcement applied by destination exchange

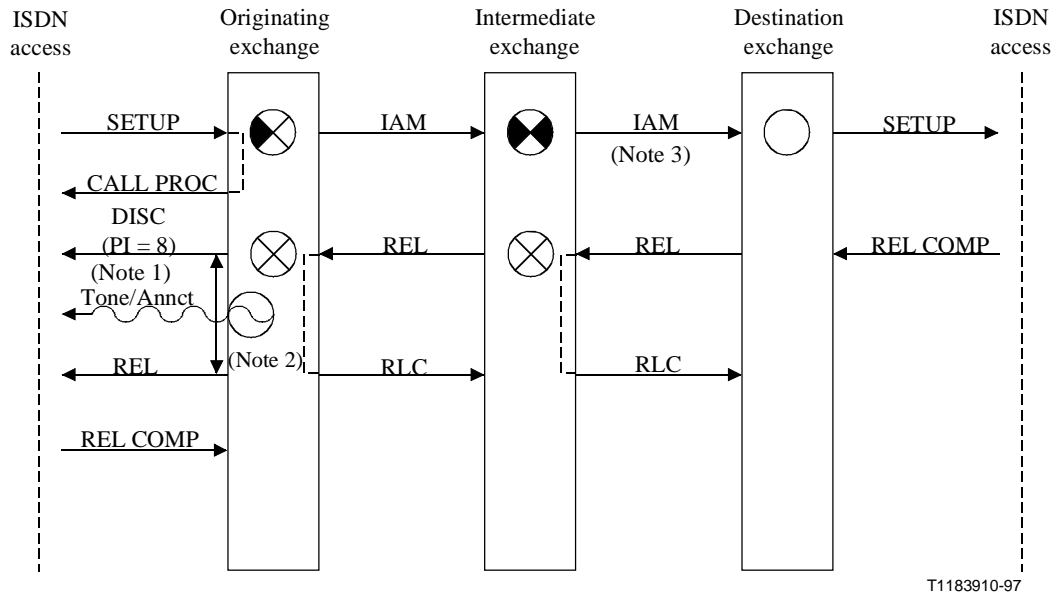
For detailed message and parameter mappings, refer to:

- IAM message – subclauses 2.1.1.1 and 3.1.1.1;
- ACM message – subclauses 2.1.1.3 and 3.1.1.3;
- REL message – subclauses 2.1.1.8 and 3.1.1.7.

A.2.2.6 Originating exchange tone/announcement time-out expires

See 2.2/Q.764 and 5.3/Q.931.

Figure A.15 shows the case of tone time-out expiry at the originating exchange. This is very similar to *tone/announcement applied at the originating exchange* above except that the caller fails to clear the call following the application of the tone. Timer T306 then expires. If continuity check occurs in the network, the SETUP message in the destination exchange is not passed until continuity is verified.



NOTE 1 – If tone/announcements are applied, a DISCONNECT message may be sent containing progress indicator No. 8. As an alternative, a PROGRESS message may also be sent containing progress indicator No. 8.

NOTE 2 – Timer T306 is started in the Q.931 protocol block.

NOTE 3 – If *Early ACM* is used, an ACM should be sent after the IAM by the destination exchange as shown in Figure A.10.

Figure A.15/Q.699 – Unsuccessful call set-up originating exchange tone/announcement time-out expires

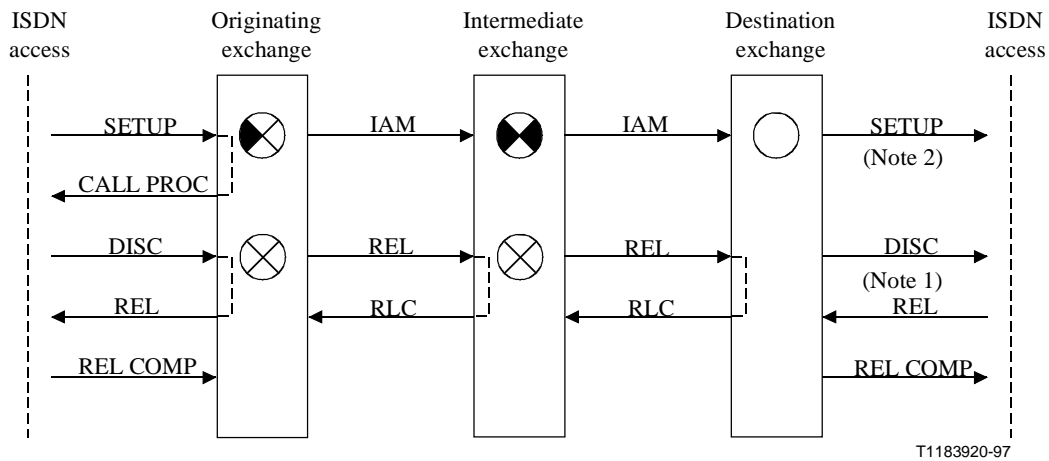
For detailed message and parameter mappings, refer to:

- IAM message – subclauses 2.1.1.1 and 3.1.1.1;
- REL message – subclauses 2.1.1.7 and 3.1.1.8.

A.2.2.7 Premature release – Point-to-point data link

See 2.2/Q.764 and 5.3/Q.931.

Figure A.16 shows a premature release situation where release is received at the destination exchange prior to any terminal response. In this situation a DISCONNECT message is sent to the called user and the normal clearing procedure is initiated.



NOTE 1 – In the case of point-to-multipoint, the DISCONNECT message is not sent. Terminals are released as they respond.

NOTE 2 – Where the destination exchange normally sends *Early ACM*. If the premature REL is received before the ACM is sent, there may be no SETUP message sent.

Figure A.16/Q.699 – Premature release point-to-point data link

For detailed message and parameter mappings, refer to:

- IAM message – subclauses 2.1.1.1 and 3.1.1.1;
- REL message – subclauses 2.1.1.8 and 3.1.1.7.

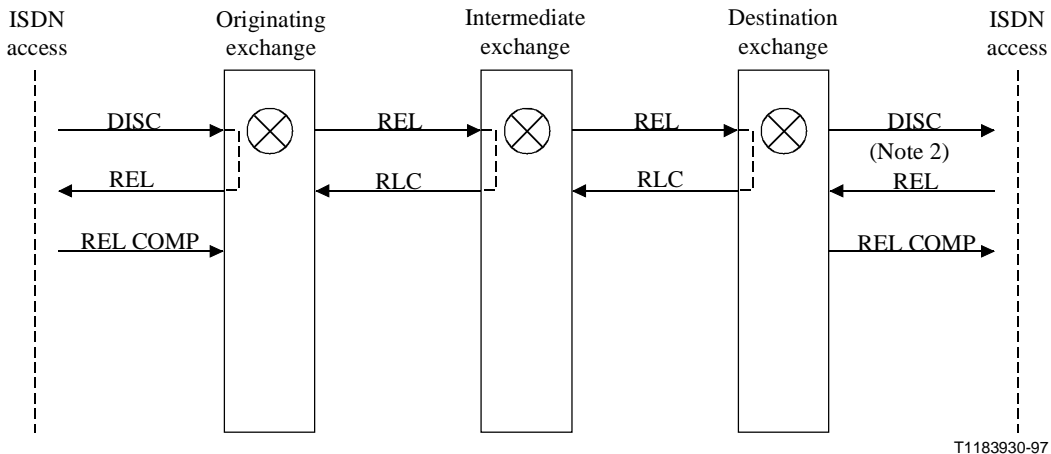
A.2.3 Release procedures/call flow diagrams for basic call control

A.2.3.1 Normal call release procedure without tone provision

See 2.2/Q.764 and 5.3/Q.931.

Figure A.17 shows the normal call release interworking procedure without tone provision. A DISCONNECT message from the originating user is mapped into a REL in the network. At the destination end, a REL message from the network is mapped into a DISCONNECT message sent to the terminating user.

The tone/announcement option is not applied in the destination exchange.



NOTE 1 – This procedure is applicable to those basic services where in-band tone/announcement is not provided, e.g. 64 kbit/s unrestricted bearer service.

NOTE 2 – The DISCONNECT message should not include the progress indicator No. 8.

Figure A.17/Q.699 – Normal call release procedure without tone provision (Note 1)

For detailed message and parameter mappings, refer to:

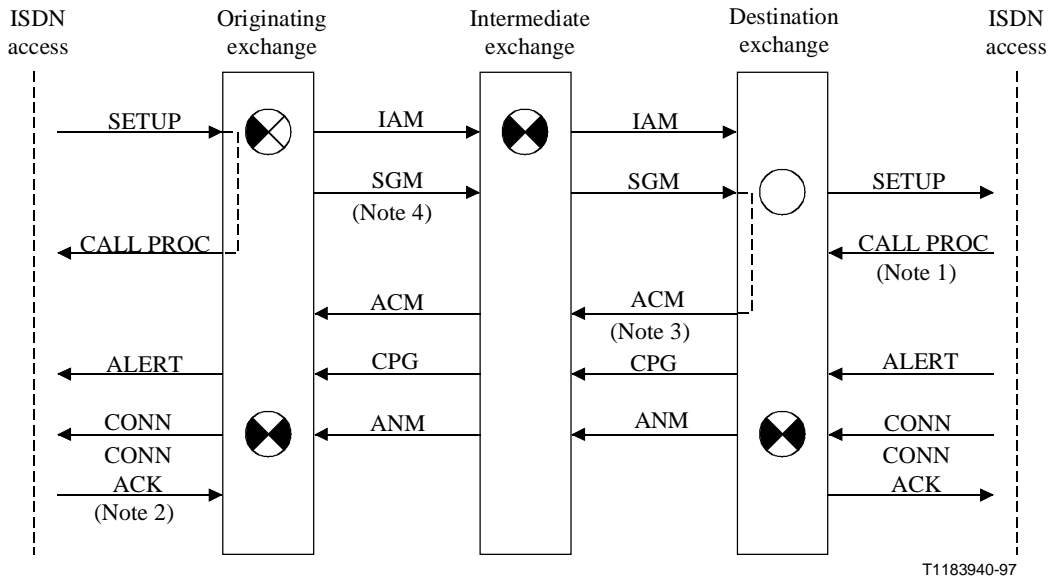
- REL message – subclauses 2.1.1.8 and 3.1.1.7.

A.2.4 Simple segmentation procedures/call flow diagrams for basic call control

A.2.4.1 Simple segmentation procedures in the forward direction

See 2.1.12/Q.764 and 5.1/Q.931.

Figure A.18 indicates the simple segmentation procedures in the forward direction.



NOTE 1 – This message may be sent by the user to achieve symmetrical working or to avoid timer expire response to SETUP (see 5.2.5.1/Q.931).

NOTE 2 – This message may be sent by the user to achieve symmetrical working (see 5.1.8/Q.931).

NOTE 3 – The ACM is independently generated at the destination exchange with the following parameters: called party status = no indication; ISDN access indicator = ISDN access, ISUP used all the way = yes, interworking encountered = no. If *Late* ACM is used, the ACM is delayed until the ALERT is received from the ISDN access. No CPG message is sent.

NOTE 4 – The SGM is independently generated by the originating exchange when the original IAM could have exceeded 272 octets in length. The SGM contains the parameters removed from the IAM that allowed the IAM message length to under 272 octets. For details see 2.1.12/Q.764.

Figure A.18/Q.699 – Simple segmentation in forward direction

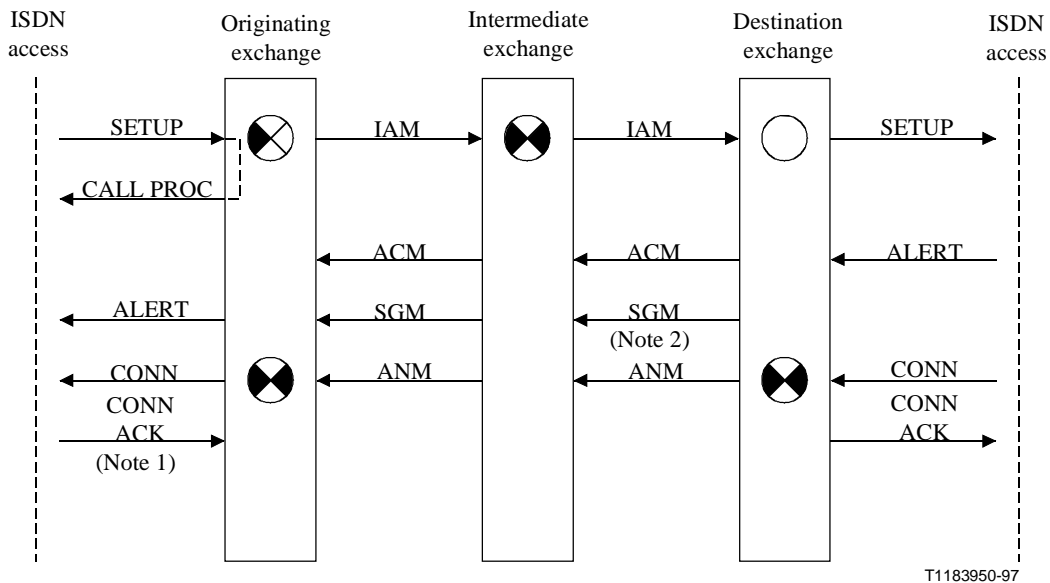
For detailed message and parameter mappings, refer to:

- IAM message – subclause 2.1.1.1;
- ACM message – subclauses 2.1.1.3 and 3.1.1.3;
- CPG message – subclauses 2.1.1.4 and 3.1.1.4;
- ANM message – subclauses 2.1.1.5 and 3.1.1.5.

A.2.4.2 Simple segmentation procedures in the backward direction

See 2.1.12/Q.764 and 5.1/Q.931.

Figure A.19 indicates the simple segmentation procedures in the backward direction.



NOTE 1 – This message may be sent by the user to achieve symmetrical working (see 5.1.8/Q.931).

NOTE 2 – The SGM is independently generated by the destination exchange when the original ACM would have exceeded 272 octets in length. The SGM contains the parameters removed from the ACM that allowed the ACM message length to under 272 octets. For details see 2.1.12/Q.764. Segmentation procedure can be repeated to any backward message containing the optional backward call indicator parameter. If *Late* ACM is used, the ACM is sent with called party status = subscriber free. SGM is sent after ACM. No CPG is sent from the ISDN access.

Figure A.19/Q.699 – Simple segmentation in-backward direction

For detailed message and parameter mappings, refer to:

- IAM message – subclauses 2.1.1.1 and 3.1.1.1;
- ACM message – subclauses 2.1.1.3 and 3.1.1.3;
- ANM message – subclauses 2.1.1.5 and 3.1.1.5.

A.3 Interworking of ISDN access and non-ISDN access over ISUP

The call flow diagrams are divided into functional subclauses:

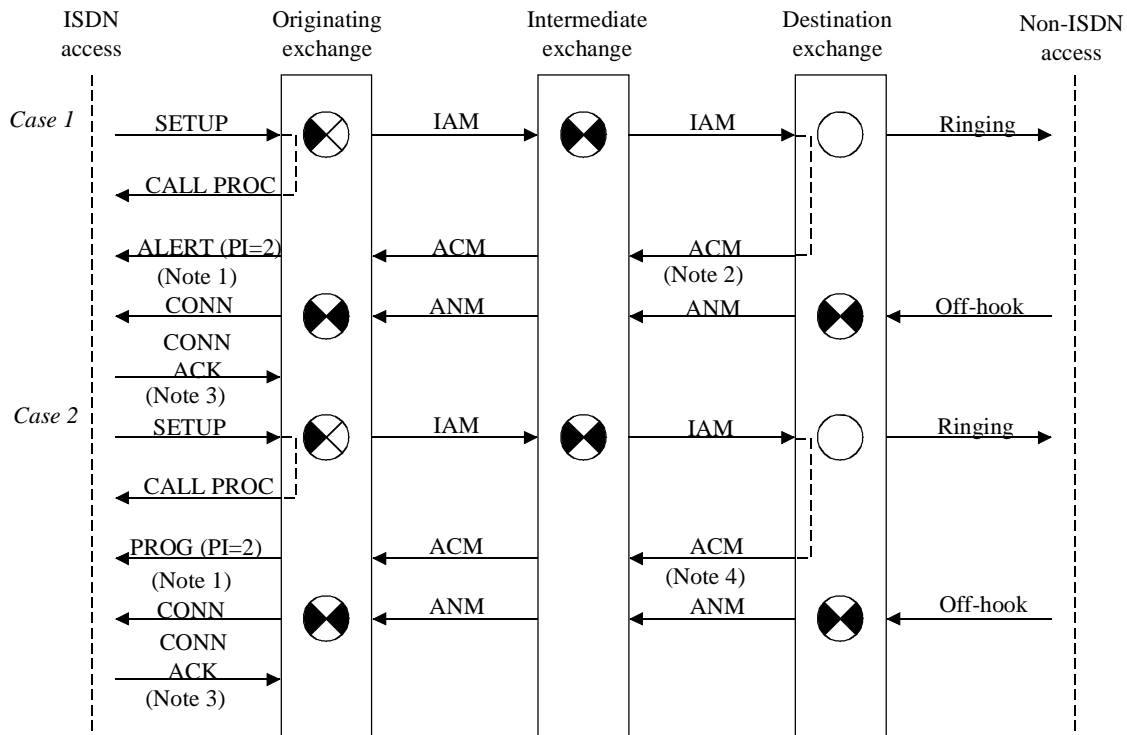
- successful call set-up procedures;
- unsuccessful call set-up procedures;
- release procedures; and
- suspend/resume procedures.

A.3.1 Successful call set-up procedures/call flow diagrams

A.3.1.1 ISDN access to non-ISDN access

See 2.1/Q.764 and 5.1/Q.764.

Figure A.20 shows the sequence of messages for a call from an ISDN access to an non-ISDN access. The arrows between the originating exchange and the non-ISDN access indicate signals that may vary with the access protocol. If continuity check occurs in the network, the ringing from the destination exchange is not passed until continuity is verified.



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NOTE 1 – Progress indicator = No. 2. In addition, originating local exchanges may generate progress indicator No. 8 to accomplish attachment of the B-channel if there is the possibility that terminals do not attach the B-channel on receipt of CALL PROCEEDING or SETUP ACKNOWLEDGE message.

NOTE 2 – The ACM is independently generated at the destination exchange with the following parameters: called party status = subscriber free; ISDN User Part indicator = ISDN User Part used all the way; ISDN access indicator = non-ISDN access.

NOTE 3 – This message may be sent by the user to achieve symmetrical working (see 5.1.8/Q.931).

NOTE 4 – The ACM is independently generated at the destination exchange with the following parameters: called party status = no indication; ISUP used all the way = yes; ISDN access indicator = non-ISDN access. In order to support user-generated in-band information (e.g. from PBX. See 2.1.4.1 1b)/Q.764), the destination exchange may include in the ACM optional backward call indicators = in-band information available and through-connect in the backward direction.

Figure A.20/Q.699 – ISDN access to non-ISDN access

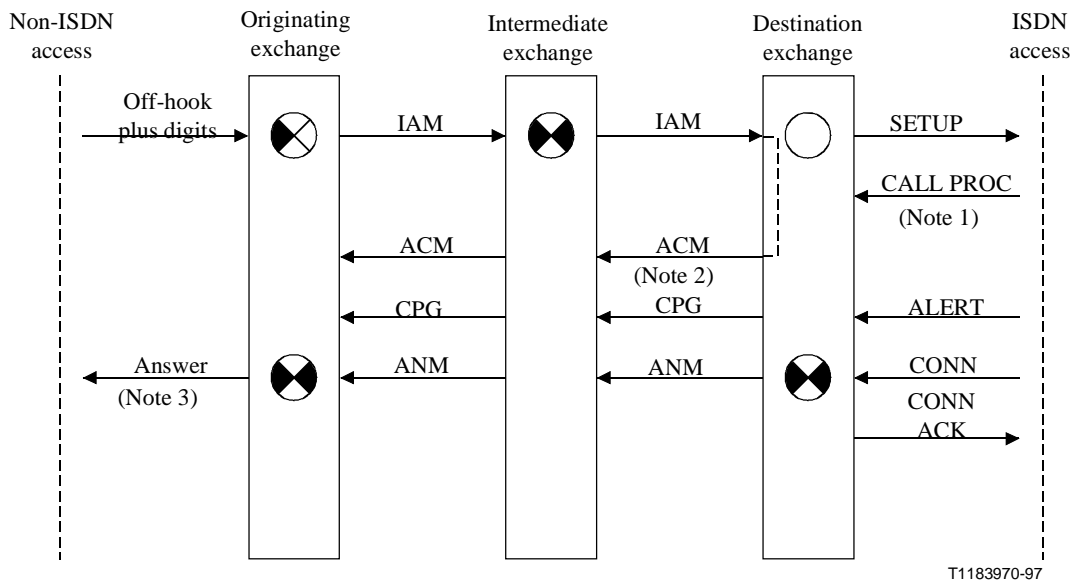
For detailed message and parameter mappings, refer to:

- IAM message – subclauses 2.1.1.1 and 3.2.1.1;
- ANM message – subclauses 2.1.1.5 and 3.2.1.5.

A.3.1.2 Non-ISDN access to ISDN access

See 2.1/Q.764 and 5.1/Q.931.

Figure A.21 shows the sequence of messages for a call from a non-ISDN access to an ISDN access. Again the arrows between the non-ISDN access and originating exchange indicate signals that may vary with the access protocol. Procedures for ACM and ANM may vary as in Figures 3 to 6. Overlap addressing may also be used in this case. Interworking then follows the message flows shown in Figures 8 and 9. If continuity check occurs in the network, the SETUP message in the destination exchange is not passed until continuity is verified.



NOTE 1 – This message may be sent by the user to achieve symmetrical working or to avoid timer expire response to SETUP (see 5.2.5.1/Q.931).

NOTE 2 – The ACM is independently generated at the destination exchange with the following parameters: called party status = no indication; ISDN access indicator = ISDN access, ISUP used all the way = yes; interworking encountered = no.

NOTE 3 – Conditional on type of access.

Figure A.21/Q.699 – Non-ISDN access to ISDN access

For detailed message and parameter mappings, refer to:

- IAM message – subclauses 2.2.1.1 and 3.1.1.1;
- ANM message – subclauses 2.2.1.4 and 3.1.1.5.

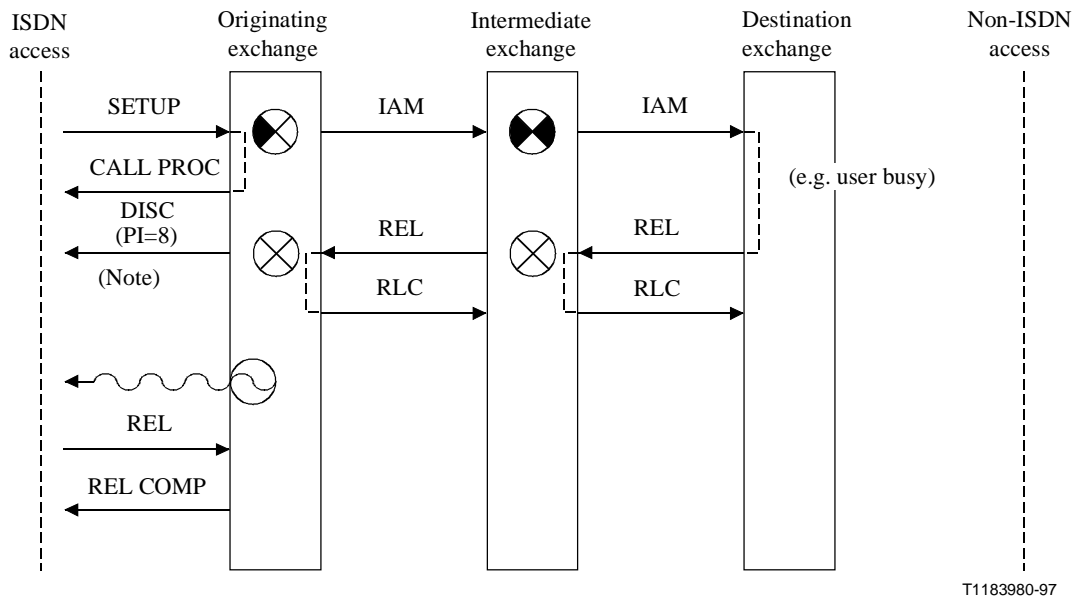
A.3.2 Unsuccessful call set-up procedures/call flow diagrams

A.3.2.1 Tone/announcement applied at the originating exchange

See 2.2/Q.764 and 5.3/Q.931.

Figure A.22 shows the unsuccessful set-up procedure where tones or announcements are generated in the originating exchange towards the ISDN access as a result of receiving a REL.

Timer T306 is started after the appropriate tones or announcement are sent. Figure A.22 shows the originating ISDN access releasing before timer T306 expires.



NOTE – If tones/announcements are applied, a DISCONNECT message may be sent containing progress indicator No. 8. As an alternative, a PROGRESS message may also be sent containing progress indicator No. 8.

Figure A.22/Q.699 – Unsuccessful call set-up tone/announcement applied at originating exchange

For detailed message and parameter mappings, refer to:

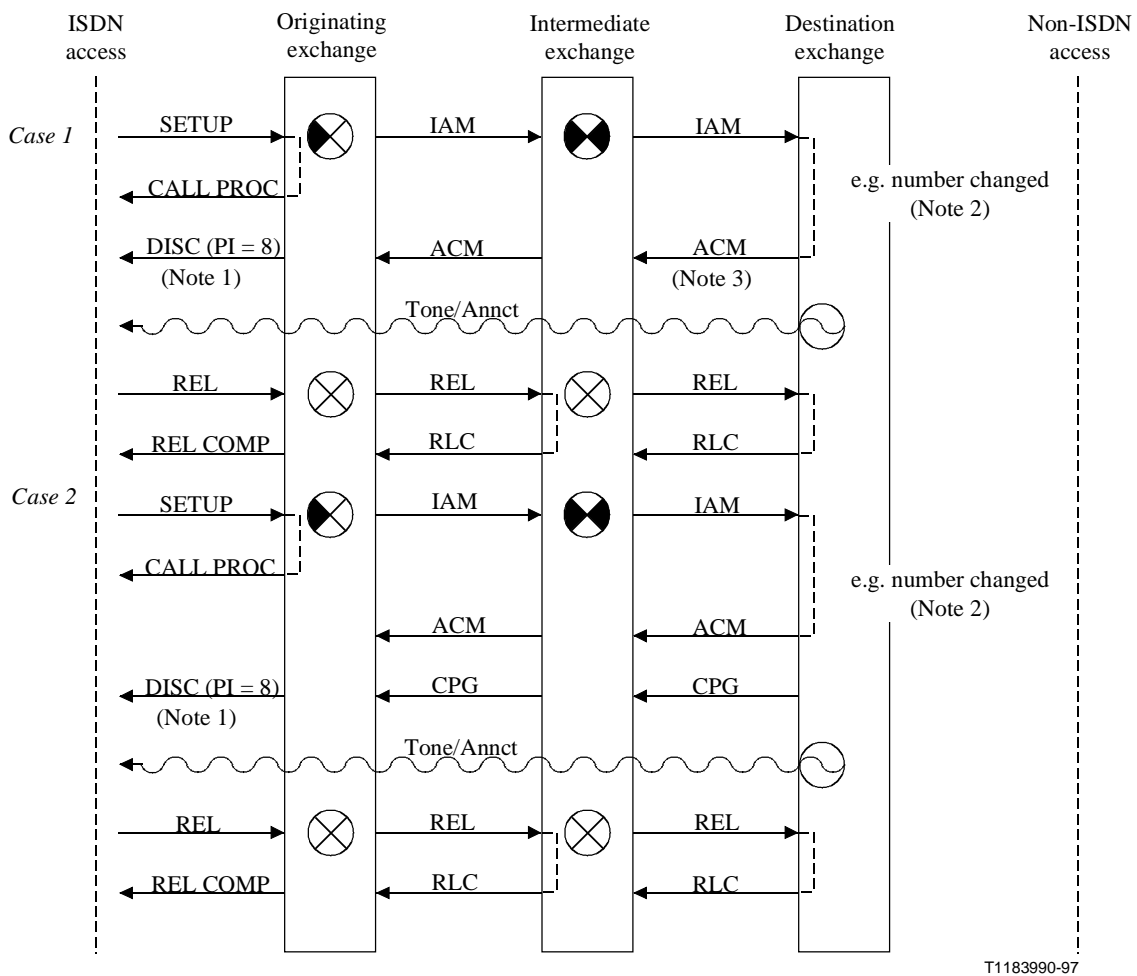
- IAM message – subclause 2.1.1.1;
- REL message – subclauses 2.1.1.7 and 3.2.1.9.

A.3.2.2 Tone or announcement applied by destination exchange

See 2.2/Q.764 and 5.3/Q.931.

Figure A.23 shows an unsuccessful call where certain tones or announcements can only be generated in the destination exchange (or intermediate exchange) during call establishment. This is a typical case for example for a changed number announcement where the changed number information is only available at the destination exchange. Alternatively a specific announcement may be applied at an intermediate exchange to indicate for example that all circuits to a particular destination are busy.

The originating exchange sends a DISCONNECT message to the calling user with progress indicator No. 8 thus indicating that in-band information is available. Normal release procedures apply after the in-band information has been connected.



NOTE 1 – A DISCONNECT message may be sent containing progress indicator No. 8. As an alternative, a PROGRESS message may also be sent containing progress indicator No. 8.

NOTE 2 – Customized announcements can only be provided by this exchange.

NOTE 3 – The ACM is independently generated at the destination exchange with the following parameters: called party status = no indication; ISUP used all the way = yes; ISDN access indicator = non-ISDN access.

Figure A.23/Q.699 – Unsuccessful call set-up tone/announcement applied by destination exchange

For detailed message and parameter mappings, refer to:

- IAM message – subclause 2.1.1.1;
- ACM message – subclauses 2.1.1.3 and 3.2.1.3;
- CPG message – subclauses 2.1.1.4 and 3.2.1.4.

A.3.3 Release procedures/call flow diagrams

A.3.3.1 Normal release for ISDN access to non-ISDN access interworking

See 2.3/Q.764 and 5.3/Q.931.

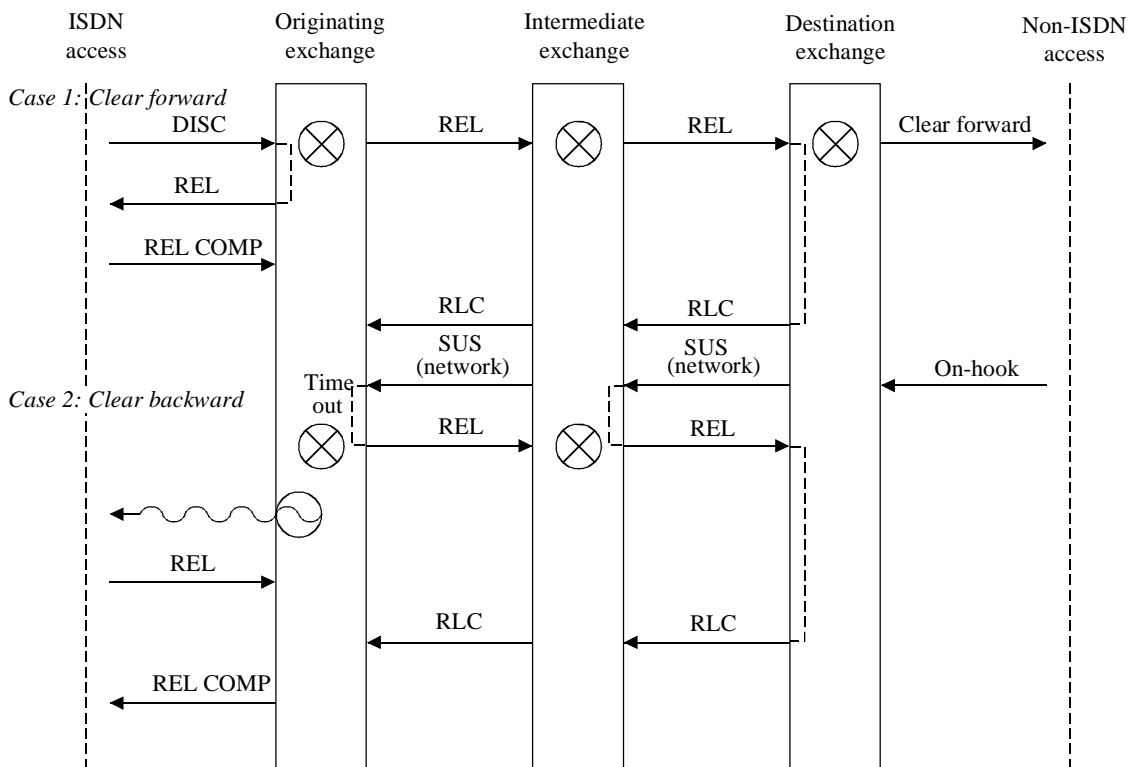
Case 1: Clear forward. This part of Figure A.24 shows the normal call release procedure being initiated from the originating ISDN access by means of a DISCONNECT message.

At the destination exchange, a REL is mapped into an appropriate clear-forward signal to the non-ISDN access.

Case 2: Clear backward. This part of Figure A.24 shows the normal call release procedure being initiated from the terminating non-ISDN access by means of a clear-back signal.

At the destination exchange, the clear-back signal is mapped into a SUS with suspend/resume indicator (network initiated).

The originating ISDN exchange starts the timer. Upon expiry of the timer, if the originating exchange has not received a RES message, the originating exchange initiates clearing by a REL to the preceding exchange.



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Figure A.24/Q.699 – Normal release procedures for ISDN access to non-ISDN access interworking

For detailed message and parameter mappings, refer to:

- REL message – subclauses 2.1.1.8 and 3.2.1.6.

A.3.3.2 Normal release for non-ISDN access to ISDN access interworking

See 2.3/Q.764 and 5.3/Q.931.

Case 1: Clear forward. This part of Figure A.25 shows the normal call release procedure being initiated from the originating non-ISDN access by means of a clear-forward signal.

At the originating exchange, the clear-forward signal is mapped into a REL to the ISDN exchange.

Case 2: Clear backward. This part of Figure A.25 shows the normal call release procedure being initiated from the terminating ISDN access by means of a DISCONNECT message.

At the originating exchange, a REL message is mapped into an appropriate backward signal in non-ISDN access.

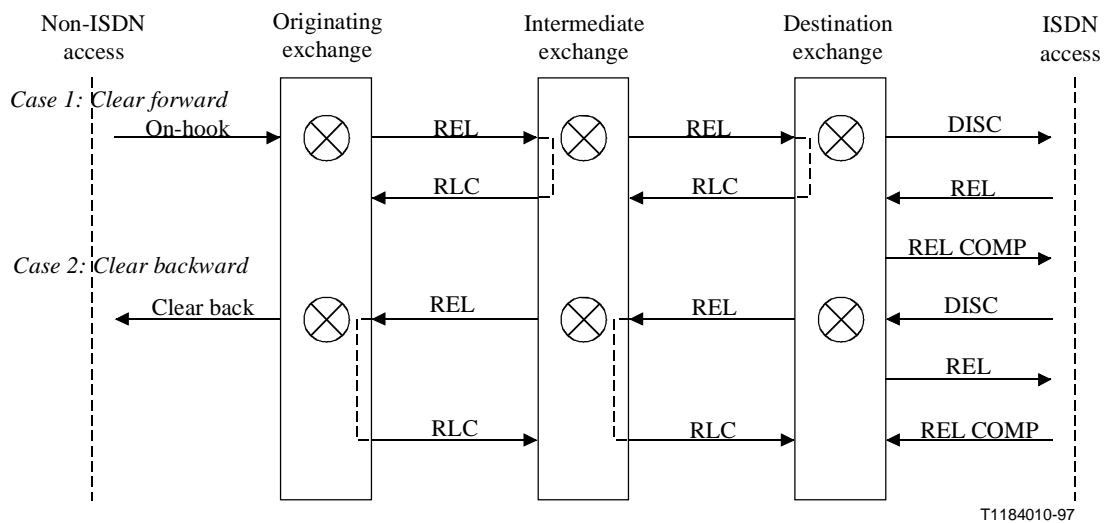


Figure A.25/Q.699 – Normal release procedure for non-ISDN access to ISDN access interworking

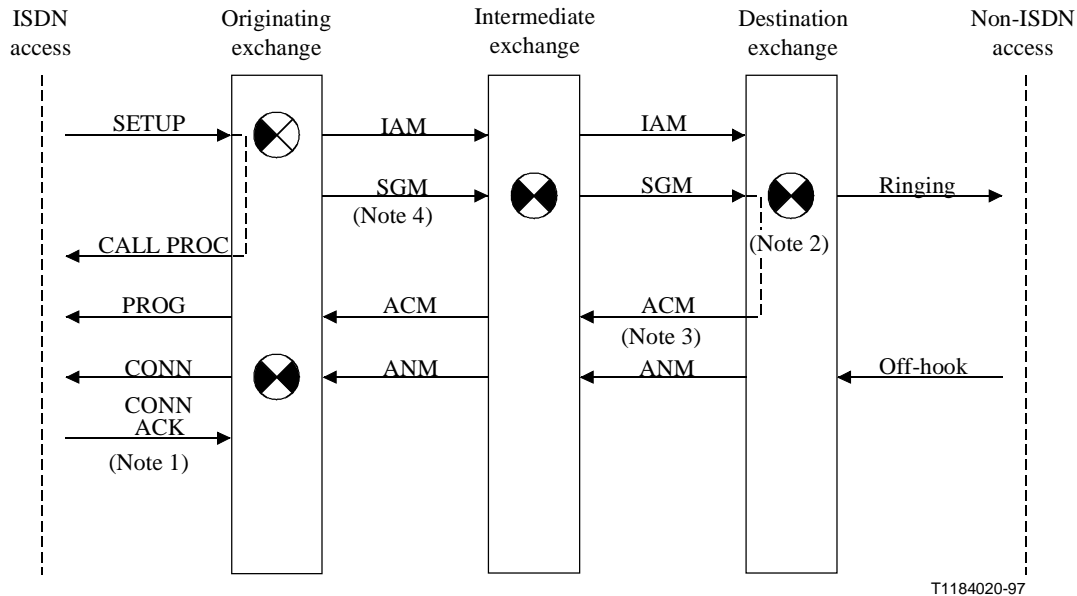
For detailed message and parameter mappings, refer to:

- REL messages – subclauses 2.2.1.6, 2.2.1.7, 3.1.1.7 and 3.1.1.8.

A.3.4 Simple segmentation procedures

See 2.1.12/Q.764 and 5.1/Q.931.

Figure A.26 indicates the simple segmentation procedures in the forward direction. The destination exchange should not set up the call to the non-ISDN access until the SGM is received.



NOTE 1 – This message may be sent by the user to achieve symmetrical working (see 5.1.8/Q.931).

NOTE 2 – Completion of transmission path timing is described in 2.1.9.1/Q.764.

NOTE 3 – The ACM is independently generated at the destination exchange with the following parameters: called party status = no indication; ISDN access indicator = non-ISDN access; ISUP used all the way = yes; interworking encountered = no.

NOTE 4 – The SGM is independently generated by the originating exchange when the original IAM would have exceeded 272 octets in length. The SGM contains the parameters removed from the IAM that allowed the IAM message length to be under 272 octets. For details see 2.1.12/Q.764.

Figure A.26/Q.699 – Simple segmentation

For detailed message and parameter mappings, refer to:

- IAM message – subclauses 2.1.1.1 and 2.2.1.1;
- ANM message – subclauses 2.1.1.5 and 3.2.1.5.

A.4 Interworking of non-ISDN access over ISUP

The call flow diagrams are divided into functional subclauses:

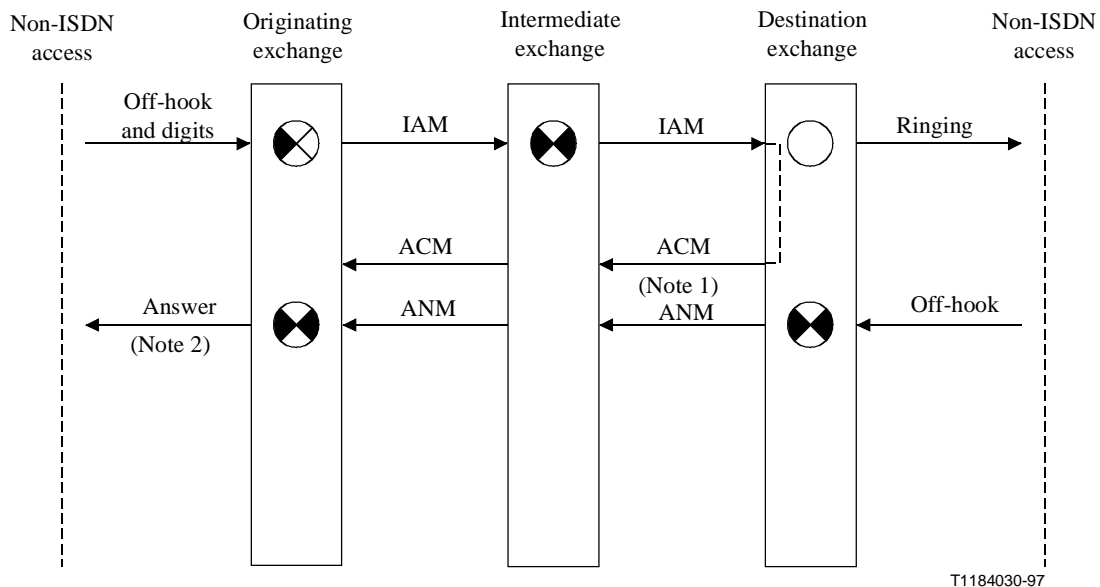
- successful call set-up procedures;
- unsuccessful call set-up procedures;
- release procedures; and
- suspend/resume procedures.

A.4.1 Successful call set-up procedures/call flow diagrams

A.4.1.1 Non-ISDN access to non-ISDN access over ISUP

See 2.1/Q.764.

Figure A.27 shows the sequence of messages for a call from a non-ISDN access to a non-ISDN access. The arrows between the originating exchange and non-ISDN access indicate signals that may vary with the access protocol. If continuity check occurs in the network, the ringing from the destination exchange is not passed until continuity is verified.



NOTE 1 – The ACM is independently generated at the destination exchange with the following parameters: called party status = subscriber free; ISUP used all the way = yes; ISDN access indicator = non-ISDN access.

NOTE 2 – Conditional on type of access.

Figure A.27/Q.699 – Non-ISDN access to non-ISDN access

For detailed message and parameter mappings, refer to:

- IAM message – subclauses 2.2.1.1 and 3.2.1.1;
- ANM message – subclauses 2.2.1.4 and 3.2.1.5.

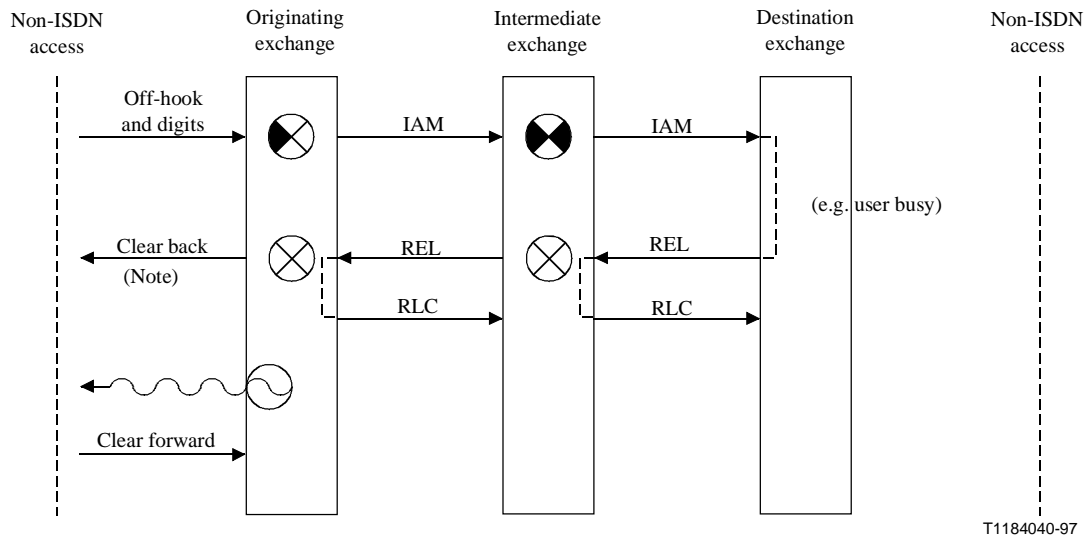
A.4.2 Unsuccessful call set-up procedures/call flow diagrams

A.4.2.1 Tone/announcement applied at the originating exchange

See 2.2/Q.764.

Figure A.28 shows the unsuccessful set-up procedure where tones or announcements are generated in the originating exchange towards the non-ISDN access as a result of receiving a REL. The destination exchange sends a REL after detection of the user busy by the non-ISDN access condition.

Timer T306 is started after the appropriate toner announcement is sent. Figure A.28 shows the originating non-ISDN line access releasing before timer T306 expires.



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NOTE – The originating exchange sends a clear-back signal to the calling user depending on the condition of the type of access.

Figure A.28/Q.699 – Unsuccessful call set-up tone/announcement applied at originating exchange

For detailed message and parameter mappings refer to:

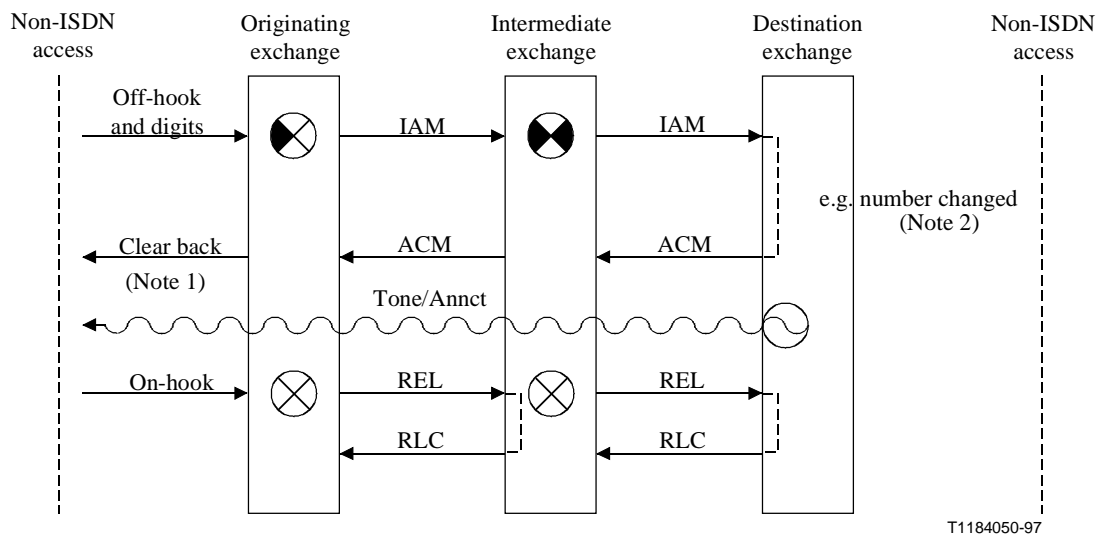
- IAM message – subclauses 2.2.1.1 and 3.2.1.1;
- REL message – subclauses 2.2.1.7 and 3.2.1.9.

A.4.2.2 Tone applied by destination exchange

See 2.2/Q.764.

Figure A.29 shows an unsuccessful call where certain tones and announcements can only be generated in the destination exchange (or intermediate exchange) during call establishment. This is a typical case for example for a changed number announcement where the changed number information is only available at the destination exchange. Alternatively a specific announcement may be applied at an intermediate exchange to indicate for example that all circuits to a particular destination are busy.

The originating exchange sends a clear backward to the calling user. Normal release procedures apply after the in-band information has been connected.



NOTE 1 – The originating exchange sends a clear-back signal to the calling user depending on the condition of the type of access.

NOTE 2 – Customized announcements can only be provided by this exchange.

Figure A.29/Q.699 – Unsuccessful call set-up tone/announcement applied by destination exchange

For detailed message and parameter mappings, refer to:

- IAM message – subclauses 2.2.1.1 and 3.2.1.1;
- REL message – subclauses 2.2.1.7 and 3.2.1.6.

A.4.3 Release procedures/call flow diagrams

A.4.3.1 Normal release for non-ISDN access to non-ISDN access interworking

See 2.3/Q.764.

Case 1: Clear forward. This part of Figure A.30 shows the normal call release procedure being initiated from the originating non-ISDN access by means of a clear-forward signal.

At the originating exchange, the clear-forward signal is mapped into a REL message to the ISDN exchange.

Case 2: Clear backward. This part of Figure A.30 shows the normal call release procedure being initiated from the terminating non-ISDN access by means of a clear-backward message.

At the originating exchange, a REL message is mapped into an appropriate backward signal on the non-ISDN access.

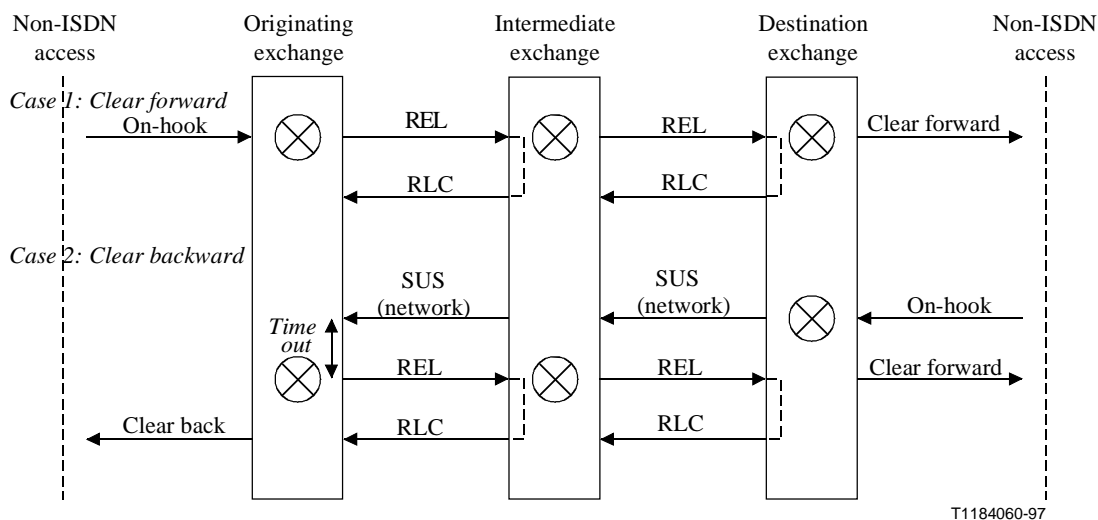


Figure A.30/Q.699 – Normal release procedure for non-ISDN access to non-ISDN access interworking

For detailed message and parameter mappings refer to:

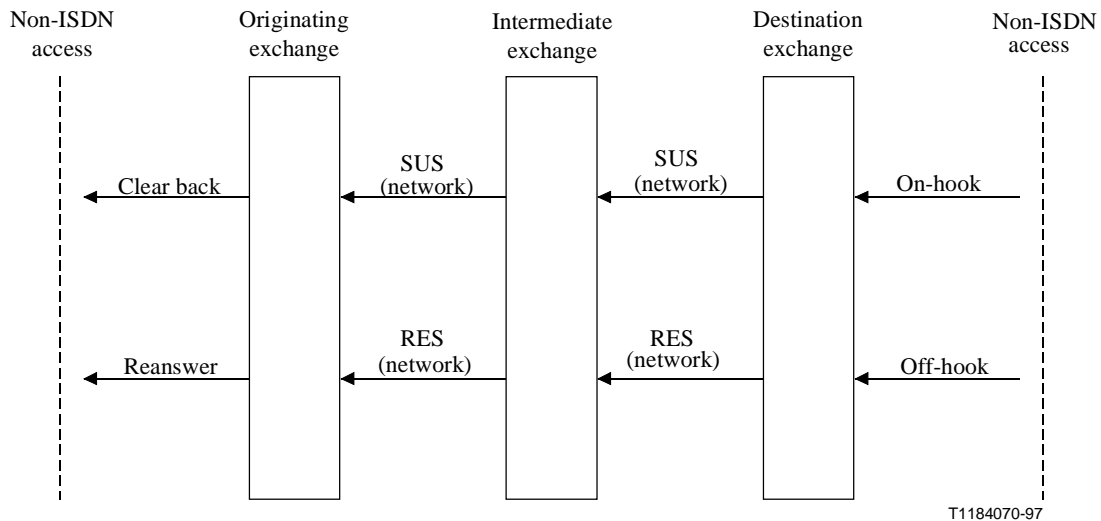
- SUS message – subclauses 2.2.1.7 and 3.2.1.7;
- REL message – subclauses 2.2.1.7, 2.2.1.10 and 3.2.1.6.

A.4.4 Suspend/resume procedures/call flow diagrams

A.4.4.1 Suspend/resume non-ISDN access/non-ISDN access interworking

See 2.4/Q.764.

Figure A.31 illustrates the suspend and resume procedures for non-ISDN access – non-ISDN access interworking.



NOTE – Supervision control in controlling exchange.

Figure A.31/Q.699 – Suspend/resume ISDN access – non-ISDN access interworking

For detailed message and parameter mappings, refer to:

- SUS message – subclauses 2.1.1.8 and 3.2.1.7;
- RES message – subclauses 2.1.1.9 and 3.2.1.8.

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