INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Q.2931

Amendment 4
(12/1999)

SERIES Q: SWITCHING AND SIGNALLING

Broadband ISDN – B-ISDN application protocols for access signalling

---

Digital Subscriber Signalling System No. 2 – User-Network Interface (UNI) Layer 3 specification for basic call/connection control

Amendment 4

ITU-T Recommendation Q.2931 – Amendment 4

(Formerly CCITT Recommendation)

ITU-T Q-SERIES RECOMMENDATIONS

SWITCHING AND SIGNALLING

SIGNALLING IN THE INTERNATIONAL MANUAL SERVICE	Q.1–Q.3
INTERNATIONAL AUTOMATIC AND SEMI-AUTOMATIC WORKING	Q.4–Q.59
FUNCTIONS AND INFORMATION FLOWS FOR SERVICES IN THE ISDN	Q.60–Q.99
CLAUSES APPLICABLE TO ITU-T STANDARD SYSTEMS	Q.100–Q.119
SPECIFICATIONS OF SIGNALLING SYSTEMS No. 4 AND No. 5	Q.120–Q.249
SPECIFICATIONS OF SIGNALLING SYSTEM No. 6	Q.250–Q.309
SPECIFICATIONS OF SIGNALLING SYSTEM R1	Q.310–Q.399
SPECIFICATIONS OF SIGNALLING SYSTEM R2	Q.400–Q.499
DIGITAL EXCHANGES	Q.500–Q.599
INTERWORKING OF SIGNALLING SYSTEMS	Q.600–Q.699
SPECIFICATIONS OF SIGNALLING SYSTEM No. 7	Q.700–Q.849
DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 1	Q.850–Q.999
PUBLIC LAND MOBILE NETWORK	Q.1000–Q.1099
INTERWORKING WITH SATELLITE MOBILE SYSTEMS	Q.1100–Q.1199
INTELLIGENT NETWORK	Q.1200–Q.1699
SIGNALLING REQUIREMENTS AND PROTOCOLS FOR IMT-2000	Q.1700–Q.1799
BROADBAND ISDN	Q.2000–Q.2999
General aspects	Q.2000–Q.2099
Signalling ATM adaptation layer (SAAL)	Q.2100–Q.2199
Signalling network protocols	Q.2200–Q.2299
Common aspects of B-ISDN application protocols for access signalling and network signalling and interworking	Q.2600–Q.2699
B-ISDN application protocols for the network signalling	Q.2700–Q.2899
B-ISDN application protocols for access signalling	**Q.2900–Q.2999**

For further details, please refer to the list of ITU-T Recommendations.

ITU-T Recommendation Q.2931

Digital Subscriber Signalling System No. 2 – User-Network Interface (UNI) Layer 3 specification for basic call/connection control

AMENDMENT 4

Summary

ITU-T Recommendation Q.2931 provides basic call and connection control for point-to-point connections in a B-ISDN. This amendment to ITU-T Recommendation Q.2931 has been prepared to reflect changes, clarifications and additions to the basic call/connection control messages and procedures of DSS2. The changes are based on errors and inconsistencies identified in ITU-T Recommendation Q.2931 since its first publication in 1995. This amendment is designed to be compatible with implementations conforming to ITU-T Recommendation Q.2931 (02/95) and Amendments 1, 2 and 3 to ITU-T Q.2931.

Source

Amendment 4 to ITU-T Recommendation Q.2931 was prepared by ITU-T Study Group 11 (1997-2000) and approved under the WTSC Resolution 1 procedure on 3 December 1999.

FOREWORD

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

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

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSC Resolution 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.

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

Introduction

This amendment to ITU-T Recommendation Q.2931 has been prepared to reflect changes, clarifications and additions to the basic call/connection control messages and procedures of DSS2. The changes are based on errors and inconsistencies identified in ITU-T Recommendation Q.2931 since its first publication in 1995. This amendment is designed to be compatible with implementations conforming to ITU-T Recommendation Q.2931 (02/95) and Amendments 1, 2 and 3 to ITU-T Q.2931.

ITU-T Recommendation Q.2931

Digital Subscriber Signalling System No. 2 – User-Network Interface (UNI) Layer 3 specification for basic call/connection control

AMENDMENT 4

Replace and add the following existing or new subclauses and annexes with the text presented in this amendment according to the following table of contents:

1) Revised subclause 1.3.11/Q.2931 Scope/UNI ATM addressing

2) Revised subclause 1.3.12/Q.2931 Scope/End-to-end compatibility parameter ind

3) Revised subclause 3.1/Q.2931 Messages for B-ISDN call and connection control

4) Revised subclause 3.1.1/Q.2931 Alerting message

5) Revised subclause 3.1.3/Q.2931 Connect message

6) Revised subclause 3.1.7/Q.2931 Setup message

7) New subclause 3.1.11/Q.2931 Connection available message

8) Revised subclause 3.2/Q.2931 Messages related to support of n-b services

9) Revised subclause 3.2.1/Q.2931 Alerting message

10) Revised subclause 3.2.3/Q.2931 Connect message

11) Revised subclause 3.2.7/Q.2931 Setup message

12) Revised Table 4-2/Q.2931 Message types

13) Revised Table 4-3/Q.2931 Information element identifiers

14) Revised subclause 4.5.6/Q.2931 ATM traffic descriptor IE

15) Revised subclause 4.5.8/Q.2931 Broadband high layer information IE

16) Revised subclause 4.5.9/Q.2931 Broadband low layer information IE

17) Revised subclause 4.5.11/Q.2931 Called party number IE

18) Revised subclause 4.5.12/Q.2931 Called party sub-address IE

19) Revised subclause 4.5.13/Q.2931 Calling party number IE

20) Revised subclause 4.5.14/Q.2931 Calling party sub-address IE

21) Revised subclause 4.5.17/Q.2931 End-to-end transit delay IE

22) Revised subclause 4.5.22/Q.2931 Transit network selection IE

23) Revised subclause 4.5.23/Q.2931 Notification indicator IE

24) New subclause 4.5.25/Q.2931 Broadband report type IE

25) Revised subclause 4.6/Q.2931 Support of 64 kbit/s based ISDN

26) Revised subclause 5.1.3/Q.2931 QoS and traffic parameters selection procedures

27) Revised subclause 5.2.3/Q.2931 Connection identifier allocation/selection procedures

28) Revised subclause 5.2.4/Q.2931 QoS and traffic parameter selection procedures

29) Revised subclause 5.6.3/Q.2931 Call reference error procedures

30) Revised subclause 5.6.8/Q.2931 Information element error procedures

31) Revised subclause 5.7.2/Q.2931 Information element error procedures

32) New subclause 6.3.6/Q.2931 Mapping of clearing messages

33) Revised subclause 6.4.5/Q.2931 Mapping of cause information

34) New subclause 6.4.6/Q.2931 Mapping of clearing messages

35) Revised subclause 6.6.2/Q.2931 Notification of interworking at terminating interface

36) New subclause 6.8/Q.2931 Indication of using recovered clock for transmission

37) Revised Annex C/Q.2931 B-LLI negotiation

38) Revised Annex E/Q.2931 Mapping of and interworking with N-ISDN

39) Revised Annex F/Q.2931 AAL parameters indication and negotiation

40) Revised Annex J.3/Q.2931 References

41) Revised Annex K/Q.2931 Handling of end-to-end transit delay IE

42) New Annex M/Q.2931 Indication of using recovered clock for transmission

43) New Annex N/Q.2931 End-to-end completion indication procedures

44) Revised Appendix I/Q.2931 Guidelines for the use of Instruction indicators

The differences from ITU-T Recommendation Q.2931 (02/95) and Amendments 1, 2 and 3 to Q.2931 are marked to emphasize the compatibility of this amendment with the original publication of this ITU-T Recommendation.

1) Revised subclause 1.3.11/Q.2931 Scope/UNI ATM addressing

1.3.11 Support of public UNI ATM addressing

The Release 1 Signalling protocol specified in this ITU-T Recommendation supports a number of ATM address formats to be used across the Public UNI to unambiguously identify the endpoints in an ATM connection (see ITU-T Recommendation E.191).

2) Revised subclause 1.3.12/Q.2931 Scope/End-to-end compatibility parameter ind.

1.3.12 Support of end-to-end compatibility parameter identification

On a per-connection basis, the following end-to-end compatibility parameters can be specified:

1) The AAL type (e.g. Types 1, 2, 3/4, or 5).
2) The method of protocol multiplexing (e.g. LLC vs. VC) and AAL parameter.
3) For VC-based multiplexing, the protocol which is encapsulated (e.g. any of the list of known routed protocols or bridged protocols).
4) Protocols above the network layer.

3) Revised subclause 3.1/Q.2931 Messages for B-ISDN call and connection control

3.1 Messages for B-ISDN call and connection control

Table 3-1 summarizes the messages for B-ISDN call or connection control.

Table 3-1/Q.2931 – Messages for B-ISDN call and connection control

Message	Reference
Call establishment messages:	
ALERTING	3.1.1
CALL PROCEEDING	3.1.2
CONNECT	3.1.3
CONNECT ACKNOWLEDGE	3.1.4
CONNECTION AVAILABLE	3.1.11
SETUP	3.1.7
Call clearing messages:	
RELEASE	3.1.5
RELEASE COMPLETE	3.1.6
Miscellaneous messages:	
NOTIFY	3.1.10
STATUS	3.1.8
STATUS ENQUIRY	3.1.9

4) Revised subclause 3.1.1/Q.2931 Alerting message

3.1.1 Alerting

This message is sent by the called user to the network and by the network to the calling user to indicate that the called user alerting has been initiated. See Table 3-2.

Table 3-2/Q.2931 – ALERTING message content

Message type: ALERTING Significance: Global Direction: Both				
Information element	**Reference**	**Direction**	**Type**	**Length**
Protocol discriminator	4.2	Both	M	1
Call reference	4.3	Both	M	4
Message type	4.4	Both	M	2
Message length	4.4	Both	M	2
Connection identifier	4.5	Both	O (Note 1)	4-9
Notification indicator	4.5	Both	O (Note 2)	4-*
Broadband report type	4.5	Both	O (Note 3)	5
NOTE 1 – When Annex H is implemented, mandatory in the network-to-user direction if this message is the first message in response to a SETUP message. Mandatory in the user-to-network direction if this message is the first message in response to a SETUP message, unless the user accepts the connection identifier indicated in the SETUP message. NOTE 2 – This indicator may be present whenever notification is delivered. NOTE 3 – Included in the user-to-network direction when the called user wants to convey a broadband service-related notification to the calling user. Included in the network-to-user direction if the called user included a broadband report type information element in the ALERTING message.				

5) Revised subclause 3.1.3/Q.2931 Connect message

3.1.3 Connect

This message is sent by the called user to the network and by the network to the calling user to indicate call acceptance by the called user. See Table 3-4.

Table 3-4/Q.2931 – CONNECT message content

Message type: CONNECT Significance: Global Direction: Both				
Information element	**Reference**	**Direction**	**Type**	**Length**
Protocol discriminator	4.2	Both	M	1
Call reference	4.3	Both	M	4
Message type	4.4	Both	M	2
Message length	4.4	Both	M	2
AAL parameters	4.5	Both	O (Note 1)	4-21
Broadband low layer information	4.5	Both	O (Note 2)	4-17

Table 3-4/Q.2931 – CONNECT message content *(concluded)*

Message type: CONNECT
Significance: Global
Direction: Both

Information element	Reference	Direction	Type	Length
Connection identifier	4.5	Both	O (Note 3)	4-9
End-to-end transit delay	4.5	Both	O (Note 4)	4-7~~10~~
Notification indicator	4.5	Both	O (Note 5)	4-*
OAM traffic descriptor	4.5	Both	O (Note 6)	4-6
Broadband report type	4.5	Both	O (Note 7)	5

NOTE 1 – Included in the user-to-network direction when the called user wants to pass ATM adaptation layer parameters information to the calling user, and the ATM adaptation layer parameters information element was present in the SETUP message. Included in the network-to-user direction if the called user included an ATM adaptation layer parameters information element in the CONNECT message. See Annex F.

NOTE 2 – Included in the user-to-network when the answering user wants to return low layer information to the calling user. Included in the network-to-user direction if the user awarded the call included a broadband low layer information information element in the CONNECT message. Optionally included for broadband low layer information negotiation, but some networks may not transport this information element to the calling user (see Annex C).

NOTE 3 – When Annex H is implemented, mandatory in the network-to-user direction if this message is the first message in response to a SETUP message. Mandatory in the user-to-network direction if this message is the first message in response to a SETUP message, unless the user accepts the connection identifier indicated in the SETUP message.

NOTE 4 – May be ~~I~~included in the user-to-network direction when the ~~responding~~ called user received the end-to-end transit delay information element in the SETUP message. Shall be ~~I~~included in the network-to-user direction if the ~~responding~~ calling user included the end-to-end transit delay information element in the SETUP ~~CONNECT~~ message.

NOTE 5 – This indicator may be present whenever notification is delivered.

NOTE 6 – Included in the user-to-network direction when the responding user received the OAM traffic descriptor information element in the SETUP message. Included in the network-to-user direction if the responding user included the OAM traffic descriptor information element in the CONNECT message.

NOTE 7 – Included in the user-to-network direction when the called user wants to convey a broadband service-related notification to the calling user. Included in the network-to-user direction if the called user included a broadband report type information element in the CONNECT message. This information element may appear twice in the message.

6) Revised subclause 3.1.7/Q.2931 Setup message

3.1.7 Set-up

This message is sent by the calling user to the network and by the network to the called user to initiate B-ISDN call and connection establishment. See Table 3-8.

Table 3-8/Q.2931 – SETUP message content

Message type: SETUP
Significance: Global
Direction: Both

Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2	Both	M	1
Call reference	4.3	Both	M	4
Message type	4.4	Both	M	2
Message length	4.4	Both	M	2
Broadband repeat indicator	4.5	Both	O (Note 15)	4-5
AAL parameters	4.5	Both	O (Note 1)	4-21
ATM traffic descriptor	4.5	Both	M	12-20
Broadband bearer capability	4.5	Both	M	6-7
Broadband high layer information	4.5	Both	O (Note 2)	4-13
Broadband repeat indicator	4.5	Both	O (Note 3)	4-5
Broadband low layer information	4.5	Both	O (Note 4)	4-17
Called party number	4.5	Both	O (Note 5)	4-*
Called party sub-address	4.5	Both	O (Note 6)	4-25
Calling party number	4.5	Both	O (Note 7)	4-*
Calling party sub-address	4.5	Both	O (Note 8)	4-25
Connection identifier	4.5	Both	O (Note 9)	4-9
End-to-end transit delay	4.5	Both	O (Note 10)	4-11~~0~~
Notification indicator	4.5	Both	O (Note 11)	4-*
OAM traffic descriptor	4.5	Both	O (Note 12)	4-6
QOS parameter	4.5	Both	M	6
Broadband sending complete	4.5	Both	O (Note 13)	4-5
Transit network selection	4.5	u → n	O (Note 14)	4-*
Broadband report type	4.5	Both	O (Note 16)	5

NOTE 1 – Included in the user-to-network direction when the calling user wants to pass AAL information to the called user. Included in the network-to-user direction if the calling user included an AAL parameter information element in the SETUP message. One or two AAL parameters information elements may be included, in decreasing order of priority, i.e. highest priority first, if the AAL parameters type selection and negotiation procedures are used. See Annex F.

NOTE 2 – Included in the user-to-network direction when the calling user wants to pass broadband high layer information to the called user. Included in the network-to-user direction if the calling user included a broadband high layer information information element in the SETUP message.

NOTE 3 – Included when two or more broadband low layer information information elements are included for low layer information negotiation. The broadband repeat indicator information element is included immediately before the first broadband low layer information information element.

NOTE 4 – Included in the user-to-network direction when the calling user wants to pass broadband low layer compatibility information to the called user. Included in the network-to-user direction if the calling user included a broadband low layer information information element in the SETUP message. Two or three information elements may be included in descending order of priority, i.e. highest priority first, if the broadband low layer information negotiation procedures are used. See Annex C.

Table 3-8/Q.2931 – SETUP message content *(concluded)*

NOTE 5 – The called party number information element is included by the user to convey called party number information to the network. The called party number information element is included by the network when called party number information is conveyed to the user.

NOTE 6 – Included in the user-to-network direction when the calling user wants to indicate the called party sub-address. Included in the network-to-user direction if the calling user included a called party sub-address information element in the SETUP message.

NOTE 7 – May be included by the calling user or the network to identify the calling user.

NOTE 8 – Included in the user-to-network direction when the calling user wants to indicate the calling party sub-address. Included in the network-to-user direction if the calling user included a calling party sub-address information element in the SETUP message.

NOTE 9 – Included in the user-to-network direction when a user wants to indicate a virtual channel. Included in the network-to-user direction when the network wants to indicate a virtual channel. If not included, its absence is interpreted as any virtual channel is acceptable. This information element may only be absent when using the non-associated signalling procedure.

NOTE 10 – Included in the user-to-network direction when the calling user wants to specify end-to-end transit delay requirements for this call and/or the cumulative transit delay expected for the transmission of user data from the calling user to the network boundary. When included, an end-to-end transit delay information element will be delivered to the called user. Included in the network-to-user direction if end-to-end transit delay information is to be delivered to the called user. See Annex K.

NOTE 11 – This indicator may be present whenever notification is delivered.

NOTE 12 – Included by the calling user to indicate additional information related to the OAM F5 end-to-end information flow. The absence of the OAM traffic descriptor information element does not in itself mean that no OAM flow will be used within this call.

NOTE 13 – It is mandatory for the user to include the broadband sending complete information element when *en bloc* sending procedures are used; its interpretation by the network is optional. It is mandatory for the network to include the broadband sending complete information element when *en bloc* receiving procedures are used. If the broadband sending complete information element is not included, missing mandatory information element error procedures need not be applied.

NOTE 14 – Included by the calling user to select a particular transit network (see Annex D). This information element may appear four times in the message.

NOTE 15 – Included when two AAL parameters information elements are included for AAL parameters type selection and negotiation. The broadband repeat indicator information element is included immediately before the first AAL parameters information element.

NOTE 16 – Included in the user-to-network direction when the calling user wants to convey a broadband service-related notification to the called user. Included in the network-to-user direction if the calling user included a broadband report type information element in the SETUP message. This information element may appear twice in the message.

7) New subclause 3.1.11/Q.2931 Connection available message

3.1.11 Connection available

This message is sent by the calling user to the network and by the network to the called user to confirm the availability of a connection. See Table 3-24.

Table 3-24/Q.2931 – CONNECTION AVAILABLE message content

Message type: CONNECTION AVAILABLE Significance: Global Direction: Both				
Information element	**Reference**	**Direction**	**Type**	**Length**
Protocol discriminator	4.2	Both	M	1
Call reference	4.3	Both	M	4
Message type	4.4	Both	M	2
Message length	4.4	Both	M	2
Notification indicator	4.5	Both	O (Note 1)	4-*
Broadband report type	4.5	Both	O (Note 2)	5
NOTE 1 – See Note 11 in Table 3-8. NOTE 2 – Included in the user-to-network direction when the calling user wants to convey a broadband service-related notification to the called user. Included in the network-to-user direction if the calling user included a broadband report type information element in the CONNECTION AVAILABLE message.				

8) Revised subclause 3.2/Q.2931 Messages related to support of n-b services

3.2 Additional or modified messages related for the support of 64 kbit/s based ISDN circuit-mode services

Table 3-12 summarizes the messages for B-ISDN call or connection control for the support of 64 kbit/s based ISDN circuit-mode services.

Table 3-12/Q.2931 – Messages related to interworking requirements

Message	Reference
Call establishment messages:	
ALERTING	3.2.1
CALL PROCEEDING	3.2.2
CONNECT	3.2.3
CONNECT ACKNOWLEDGE	3.1.4
CONNECTION AVAILABLE	3.1.11
PROGRESS	3.2.5
SETUP	3.2.7
SETUP ACKNOWLEDGE	3.2.8
Call clearing messages:	
RELEASE	3.2.6
RELEASE COMPLETE	3.1.6
Miscellaneous messages:	
NOTIFY	3.1.10
INFORMATION	3.2.4
STATUS	3.1.8
STATUS ENQUIRY	3.1.9

9) Revised subclause 3.2.1/Q.2931 Alerting message

3.2.1 Alerting

This message is sent by the called user to the network and by the network to the calling user to indicate that called user alerting has been initiated. See Table 3-13.

Table 3-13/Q.2931 – ALERTING message content

Message type: ALERTING
Significance: Global
Direction: Both

Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2	Both	M	1
Call reference	4.3	Both	M	4
Message type	4.4	Both	M	2
Message length	4.4	Both	M	2
Connection identifier	4.5	u → n	O (Note 1)	4-9
Narrow-band bearer capability	4.6	Both	O (Note 2)	4-14
Narrow-band high layer compatibility	4.6	Both	O (Note 3)	4-7
Notification indicator	4.5	Both	O (Note 4)	4-*
Progress indicator	4.6	Both	O (Note 5)	4-6
Broadband report type	4.5	Both	O (Note 6)	5

NOTE 1 – Mandatory in the user-to-network direction if this message is the first message in response to a SETUP message, unless the user accepts the connection identifier indicated in the SETUP message.

NOTE 2 – The narrow-band bearer capability information element is included when procedures for bearer capability selection are used as defined in 5.11/Q.931. When present, progress description No. 5, "interworking has occurred and has resulted in a telecommunication service change" shall also be present.

NOTE 3 – The narrow-band high layer compatibility information element is included when the procedures of 5.12/Q.931 for high layer compatibility selection apply. When present, progress description No. 5, "interworking has occurred and has resulted in a telecommunication service change" shall also be present.

NOTE 4 – This indicator may be present whenever notification is delivered.

NOTE 5 – Included in the event of interworking. Included in the network-to-user direction in connection with the provision of in-band information/patterns. Included in the user-to-network direction in connection with the provision of in-band information/patterns if Annex K/Q.931 is implemented or in accordance with the procedures of 5.11.3/Q.931 and 5.12.3/Q.931. This information element may appear twice in the message.

NOTE 6 – Included in the user-to-network direction when the called user wants to convey a broadband service-related notification to the calling user. Included in the network-to-user direction if the called user included a broadband report type information element in the ALERTING message.

10) Revised subclause 3.2.3/Q.2931 Connect message

3.2.3 Connect

This message is sent by the called user to the network and by the network to the calling user to indicate call acceptance by the called user. See Table 3-15.

Table 3-15/Q.2931 – CONNECT message content

Message type: CONNECT
Significance: Global
Direction: Both

Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2	Both	M	1
Call reference	4.3	Both	M	4
Message type	4.4	Both	M	2
Message length	4.4	Both	M	2
AAL parameters	4.5	Both	O (Note 1)	4-21
Connection identifier	4.5	u → n	O (Note 2)	4-9
End-to-end transit delay	4.5	Both	O (Note 3)	4-7~~13~~
Narrow-band bearer capability	4.6	Both	O (Note 4)	4-14
Narrow-band high layer compatibility	4.6	Both	O (Note 5)	4-7
Narrow-band low layer compatibility	4.6	Both	O (Note 6)	4-20
Notification indicator	4.5	Both	O (Note 7)	4-*
OAM traffic descriptor	4.5	Both	O (Note 8)	4-6
Progress indicator	4.6	Both	O (Note 9)	4-6~~8~~
Broadband report type	4.5	Both	O (Note 10)	5

NOTE 1 – Included in the user-to-network direction when the called user wants to pass ATM adaptation layer parameters information to the calling user, and the ATM adaptation layer parameters information element was present in the SETUP message. Included in the network-to-user direction if the called user included an ATM adaptation layer parameters information element in the CONNECT message. See Annex F.

NOTE 2 – Mandatory in the user-to-network if this message is the first message in response to a SETUP message, unless the user accepts the connection identifier indicated in the SETUP message.

NOTE 3 – May be ~~I~~included in the user-to-network direction when the ~~responding~~ called user received the end-to-end transit delay information element in the SETUP message. Shall be ~~I~~included in the network-to-user direction if the ~~responding~~ calling user included the end-to-end transit delay information element in the SETUP~~CONNECT~~ message~~, as described in the procedures for bearer capability selection defined in 5.11/Q.931.~~

NOTE 4 – The narrow-band bearer capability information element can be included when procedures for bearer capability selection are used as defined in 5.11/Q.931.

NOTE 5 – The narrow-band high layer compatibility information element is included when the procedures of 5.12/Q.931 for high layer compatibility selection apply.

NOTE 6 – Included in the user-to-network direction when the answering user wants to return narrow-band low layer compatibility information to the calling user. Included in the network-to-user direction if the user awarded the call included a narrow-band low layer compatibility information element in the CONNECT message. Optionally included for low layer compatibility negotiation to the calling user (see Annex M/Q.931 – Blue Book).

NOTE 7 – This indicator may be present whenever notification is delivered.

NOTE 8 – Included in the user-to-network direction when the responding user received the OAM traffic descriptor information element in the SETUP message. Included in the network-to-user direction if the responding user included the OAM traffic descriptor information element in the CONNECT message.

Table 3-15/Q.2931 – CONNECT message content *(concluded)*

NOTE 9 – Included in the event of interworking or in connection with the provision of in-band information/patterns. This information element may appear twice in the message.
NOTE 10 – Included in the user-to-network direction when the called user wants to convey a broadband service-related notification to the calling user. Included in the network-to-user direction if the called user included a broadband report type information element in the CONNECT message. This information element may appear twice in the message.

11) Revised subclause 3.2.7/Q.2931 Setup message

3.2.7 Set-up

This message is sent by the calling user to the network and by the network to the called user to initiate a call in B-ISDN for a 64 kbit/s based circuit-mode ISDN service. See Table 3-19.

Table 3-19/Q.2931 – SETUP message content

Message type: SETUP
Significance: Global
Direction: Both

Information element	Reference	Direction	Type	Length
Protocol discriminator	4.2	Both	M	1
Call reference	4.3	Both	M	4
Message type	4.4	Both	M	2
Message length	4.4	Both	M	2
Broadband repeat indicator	4.5	Both	O (Note 18)	4-5
AAL parameters	4.5	Both	O (Note 1)	4-21
ATM traffic descriptor	4.5	Both	M	12-20
Broadband bearer capability	4.5	Both	M	6-7
Called party number	4.5	Both	O (Note 2)	4-*
Called party sub-address	4.5	Both	O (Note 3)	4-25
Calling party number	4.5	Both	O (Note 4)	4-*
Calling party sub-address	4.5	Both	O (Note 5)	4-25
Connection identifier	4.5	Both	O (Note 6)	4-9
End-to-end transit delay	4.5	Both	O (Note 7)	4-11~~0~~
Broadband repeat indicator	4.5	Both	O (Note 8)	4-5
Narrow-band bearer capability	4.6	Both	O (Note 9)	4-14
Narrow-band high layer compatibility	4.6	Both	O (Note 10)	4-7
Broadband repeat indicator	4.5	Both	O (Note 11)	4-5
Narrow-band low layer compatibility	4.6	Both	O (Note 12)	4-20
Notification indicator	4.5	Both	O (Note 13)	4-*
OAM traffic descriptor	4.5	Both	O (Note 14)	4-6
Progress indicator	4.6	Both	O (Note 15)	4-6
QOS parameter	4.5	Both	M	6

Table 3-19/Q.2931 – SETUP message content *(continued)*

Message type: SETUP

Significance: Global

Direction: Both

Information element	Reference	Direction	Type	Length
Broadband sending complete	4.5	Both	O (Note 16)	4-5
Transit network selection	4.5	u → n	O (Note 17)	4-*
Broadband report type	4.5	Both	O (Note 19)	5

NOTE 1 – Included in the user-to-network direction when the calling user wants to pass AAL information to the called user. Included in the network-to-user direction if the calling user included an AAL parameter information element in the SETUP message. One or two AAL parameters information elements may be included, in decreasing order of priority, i.e. highest priority first, if the AAL parameters type selection and negotiation procedures are used. See Annex F.

NOTE 2 – The called party number information element is included by the user to convey called party number information to the network. The called party number information element is included by the network when called party number information is conveyed to the user.

NOTE 3 – Included in the user-to-network direction when the calling user wants to indicate the called party sub-address. Included in the network-to-user direction if the calling user included a called party sub-address information element in the SETUP message.

NOTE 4 – May be included by the calling user or the network to identify the calling user.

NOTE 5 – Included in the user-to-network direction when the calling user wants to indicate the calling party sub-address. Included in the network-to-user direction if the calling user included a calling party sub-address information element in the SETUP message.

NOTE 6 – Included in the user-to-network direction when a user wants to indicate a virtual channel. Included in the network-to-user direction when the network wants to indicate a virtual channel. If not included, its absence is interpreted as any virtual channel is acceptable. This information element may only be absent when using the non-associated signalling procedure.

NOTE 7 – Included in the user-to-network direction when the calling user wants to specify end-to-end transit delay requirements for this call and/or the cumulative transit delay expected for the transmission of user data from the calling user to the network boundary. When included, an end-to-end transit delay information element will be delivered to the called user. Included in the network-to-user direction if end-to-end transit delay information is to be delivered to the called user (see Annex K).

NOTE 8 – The Broadband repeat indicator information element is included immediately before the first narrow-band bearer capability information element when the narrow-band bearer capability negotiation procedure is used (see Annex L/Q.931).

NOTE 9 – Mandatory for N-ISDN services (see clause 6). May be repeated if the narrow-band bearer capability negotiation procedure is used (see Annex L/Q.931). For narrow-band bearer capability negotiation, three narrow-band bearer capability information elements may be included in descending order of priority, i.e. highest priority first. Although support of multiple narrow-band bearer capability information elements may not be supported on all networks, on networks that do support it, and through suitable subscription arrangements, three narrow-band bearer capability information elements may be included (see 5.11/Q.931). When they are not preceded by a broadband repeat indicator information element, they are included in ascending order of priority.

Table 3-19/Q.2931 – SETUP message content *(concluded)*

NOTE 10 – Included in the user-to-network direction when the calling user wants to pass high layer compatibility information to the called user. Included in the network-to-user direction if the calling user included a narrow-band high layer compatibility information element in the SETUP message. Although support of multiple narrow-band high layer compatibility information elements may not be supported on all networks, on networks that do support it, and through suitable subscription arrangements, two narrow-band high layer compatibility information elements may be included (see 5.12/Q.931). They are not preceded by a broadband repeat indicator information element, they are included in ascending order of priority.

NOTE 11 – The broadband repeat indicator is included when two or more narrow-band low layer compatibility information element are included for low layer compatibility negotiation.

NOTE 12 – Included in the user-to-network direction when the calling user wants to pass narrow-band low layer compatibility information to the called user. Included in the network-to-user direction if the calling user included a narrow-band low layer compatibility information element in the SETUP message. Two, three or four information elements may be included in descending order of priority, i.e. highest priority first, if the low layer compatibility negotiation procedures are used (see Annex J/Q.931).

NOTE 13 – This indicator may be present whenever notification is delivered.

NOTE 14 – Included by the calling user to indicate additional information related to the OAM F5 end-to-end information flow. The absence of the OAM traffic descriptor information element does not in itself mean that no OAM flow will be used within this call. This assumes there is an end-to-end B-ISDN connection.

NOTE 15 – Included in the event of interworking or in connection with the provision of in-band information/patterns. This information element may appear twice in the message.

NOTE 16 – It is mandatory for the user to include the broadband sending complete information element when *en bloc* sending procedures are used; its interpretation by the network is optional. It is mandatory for the network to include the broadband sending complete information element when *en bloc* receiving procedures are used. If the broadband sending complete information element is not included, missing mandatory information element error procedures need not be applied.

NOTE 17 – Included by the calling user to select a particular transit network (see Annex D). This information may appear up to four times in the message.

NOTE 18 – Included when two AAL parameters information elements are included for AAL parameters type selection and negotiation. The broadband repeat indicator information element is included immediately before the first AAL parameters information element.

NOTE 19 – Included in the user-to-network direction when the calling user wants to convey a broadband service-related notification to the called user. Included in the network-to-user direction if the calling user included a broadband report type information element in the SETUP message. This information element may appear twice in the message.

12) Revised Table 4-2/Q.2931 Message types

Table 4-2/Q.2931 – Message types (including message compatibility instruction indicator)

Message type (octet 1)

Bits 8 7 6 5 4 3 2 1	
0 0 0 0 0 0 0 0	escape to nationally specific message type (see Note 1)
0 0 0 – – – – –	Call establishment message:
0 0 0 0 1	– ALERTING
0 0 0 1 0	– CALL PROCEEDING
0 0 1 1 1	– CONNECT
0 1 1 1 1	– CONNECT ACKNOWLEDGE
0 0 0 1 1	– PROGRESS
0 0 1 0 1	– SETUP
0 1 1 0 1	– SETUP ACKNOWLEDGE
1 0 0 0 1 0 1 1	– CONNECTION AVAILABLE
0 1 0 – – – – –	Call clearing messages:
0 1 1 0 1	– RELEASE
1 1 0 1 0	– RELEASE COMPLETE
0 0 1 1 0	– RESTART
0 1 1 1 0	– RESTART ACKNOWLEDGE
0 1 1 – – – –	– Miscellaneous messages:
1 1 0 1 1	– INFORMATION
0 1 1 1 0	– NOTIFY
1 1 1 0 1	– STATUS
1 0 1 0 1	– STATUS ENQUIRY
1 1 1 1 1 1 1 1 1	reserved for extension mechanism when all other message type values are exhausted (see Note 2)

NOTE 1 – When used, the message type (excluding the message compatibility instruction indicator) is defined in octet 10 of the message, and the contents follows in the subsequent octets, both according to the national specification.

NOTE 2 – In this case, the message type (excluding the message compatibility instruction indicator) is defined in octet 10 of the message, and the contents follows in the subsequent octets.

Flag (octet 2)

Bits 5	
0	message instruction field not significant (= regular error handling procedures apply)
1	follow explicit instructions (these supersede the regular error handling procedures)

Message action indicator (octet 2)

Bits 2 1	
0 0	clear call
0 1	discard and ignore (Note 3)
1 0	discard and report status
1 1	reserved

NOTE 3 – For the meaning of "ignore", see Annex J.

13) Revised Table 4-3/Q.2931 Information element identifiers

Table 4-3/Q.2931 – General information element format – Information element identifiers

Bits 8 7 6 5 4 3 2 1	
0 1 1 1 0 0 0 0	Called party number
0 1 1 1 0 0 0 1	Called party sub-address
0 1 1 1 1 0 0 0	Transit network selection
0 1 1 1 1 0 0 1	Restart indicator
0 1 1 1 1 1 0 0	Narrow-band low layer compatibility
0 1 1 1 1 1 0 1	Narrow-band high layer compatibility
0 1 1 0 0 0 0 0	Broadband locking shift
0 1 1 0 0 0 0 1	Broadband non-locking shift
0 1 1 0 0 0 1 0	Broadband sending complete
0 1 1 0 0 0 1 1	Broadband repeat indicator
0 1 1 0 1 1 0 0	Calling party number
0 1 1 0 1 1 0 1	Calling party sub-address
0 1 0 1 1 0 0 0	ATM adaptation layer parameters
0 1 0 1 1 0 0 1	ATM traffic descriptor
0 1 0 1 1 0 1 0	Connection identifier
0 1 0 1 1 0 1 1	OAM traffic descriptor
0 1 0 1 1 1 0 0	Quality of Service parameter
0 1 0 1 1 1 1 0	Broadband bearer capability
0 1 0 1 1 1 1 1	Broadband Low Layer Information (B-LLI)
0 1 0 1 1 1 0 1	Broadband High Layer Information (B-HLI)
0 1 0 0 0 0 1 0	End-to-end transit delay
0 0 1 0 0 1 1 1	Notification indicator
0 0 0 1 0 1 0 0	Call state
0 0 0 1 1 1 1 0	Progress indicator
0 0 0 0 0 1 0 0	Narrow-band bearer capability
0 0 0 0 1 0 0 0	Cause
1 0 0 0 1 0 0 1	Broadband report type

14) Revised subclause 4.5.6/Q.2931 ATM traffic descriptor IE

4.5.6 ATM traffic descriptor

The purpose of the ATM traffic descriptor information element is to specify the set of traffic parameters which, together, specify a traffic control capability.

In Release 1, the ATM peak cell rate (see Recommendation I.371) values are indicated by the ATM traffic descriptor. The ATM peak cell rate values (indicated in the ATM traffic descriptor information element) specify the sum of both the user plane information rate and all end-to-end user originated OAM F5 flow.

If the user intends to use end-to-end OAM F5 flow messages, the peak cell rate for the reverse direction of a unidirectional connection should not be indicated with the value "0".

The peak cell rate is described using subfield identifiers followed by a pure 3 octet integer representation of the cells per second.

The ATM traffic descriptor information element is coded as shown in Figure 4-13 and Table 4-7. The maximum length of this information element is 20 octets.

8	7	6	5	4	3	2	1	Octets
ATM traffic descriptor information element identifier								
0	1	0	1	1	0	0	1	1
ext. 1	Coding standard		IE instruction field: Flag	Res.	IE action ind.			2
Length of ATM traffic descriptor information contents								3
								4
Forward peak cell rate identifier (CLP = 0)								
1	0	0	0	0	0	1	0	5* (Note 1)
Forward peak cell rate (for CLP = 0)								5.1*
								5.2*
								5.3*
Backward peak cell rate identifier (CLP = 0)								
1	0	0	0	0	0	1	1	6* (Note 1)
Backward peak cell rate (for CLP = 0)								6.1*
								6.2*
								6.3*
Forward peak cell rate identifier (CLP = 0 + 1)								
1	0	0	0	0	1	0	0	7 (Note 2)
Forward peak cell rate (for CLP = 0 + 1)								7.1
								7.2
								7.3
Backward peak cell rate identifier (CLP = 0 + 1)								
1	0	0	0	0	1	0	1	8 (Note 2)
Backward peak cell rate (for CLP = 0 + 1)								8.1
								8.2
								8.3

NOTE 1 – If peak cell rate for CLP = 0 is present, the network resource allocation shall assume that the difference between the indicated peak cell rate for CLP = 0 + 1 and the peak cell rate for CLP = 0 may be used for CLP = 1.

NOTE 2 – If only peak cell rate for CLP = 0 + 1 is specified, the network resource allocation shall assume that the entire peak cell rate can be used for CLP = 0.

Figure 4-13/Q.2931 – ATM traffic descriptor information element

Table 4-7/Q.2931 – ATM traffic descriptor information element

Forward/backward peak cell rate (octets i.1-i.3, where i may have the values 5, 6, 7, or 8)
A code expressing in pure 3-octet integer representation the number of cells per second, with bit 8 of the first octet being the most significant bit, and bit 1 of the third octet being the least significant bit.
The "forward" direction is defined as that from the calling user to the called user.
The "backward" direction is the reverse, i.e. from the called user to the calling user (see Annex J).

15) Revised subclause 4.5.8/Q.2931 Broadband high layer information IE

4.5.8 Broadband High Layer Information

The purpose of the broadband high layer information information element is to identify high layer protocols at the user plane and to provide a means which should be used for compatibility checking by an addressed entity (e.g. a remote user, an interworking unit or a high layer function network node addressed by the calling user). The broadband high layer information information element is transferred transparently by a B-ISDN between the call originating entity (e.g. the calling user) and the addressed entity.

The broadband high layer information information element is coded as shown in Figure 4-15 and in Table 4-9. The maximum length of this information element is 13 octets.

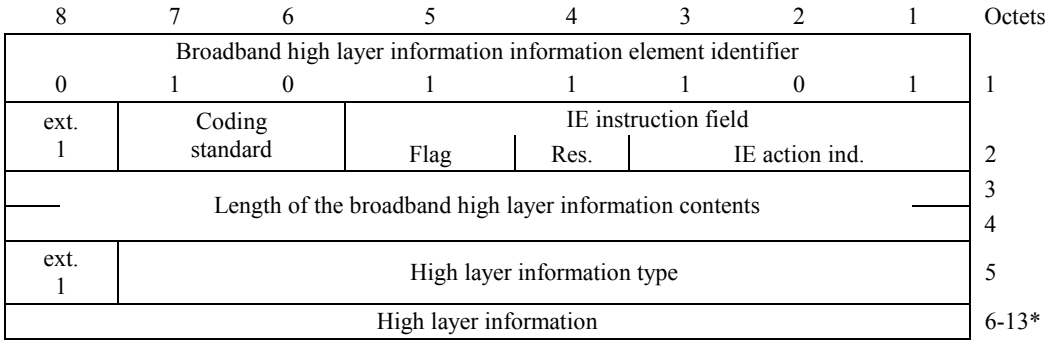


Figure 4-15/Q.2931 – Broadband high layer information

Table 4-9/Q.2931 – Broadband high layer information

High layer information type (octet 5)

Bits 7 6 5 4 3 2 1	
0 0 0 0 0 0 0	ISO/IEC (Note 1)
0 0 0 0 0 0 1	user-specific (Note 2)
0 0 0 0 0 1 1	vendor-specific application identifier (Note 3)
0 0 0 0 1 0 0	reference to ITU-T ~~SG 1~~ B-ISDN teleservice Recommendation (Note 4)

Other values reserved.

NOTE 1 – This codepoint is reserved for use as specified in ISO/IEC standards.

NOTE 2 – The exact coding of octets 6-13, when this higher layer information type is used, is user-defined. The use of this codepoint requires bilateral agreement between the two end users.

NOTE 3 – When this high layer information type is used, octets 6-12 are coded as follows: octets 6-8 contain a globally-administered Organizationally Unique Identifier (OUI) (as specified in IEEE 802-1990; section 5.1 [78]); ~~octet 0 of the OUI is mapped to octet 6 of the broadband high layer information, and so on; the LSB of the OUI is mapped to bit 8 of the B-HLI, the MSB of the OUI is mapped to bit 1 of the B-HLI; bit 7 of octet 6 is always set to "0";~~ octets 9-12 contain an application identifier which is administered by the vendor identified by the OUI.

Octet 13 is not used for this high layer information type.

NOTE 4 – Codepoints for these ITU-T Recommendations will be indicated in octet 6. The specific codepoints will be added at the time when ITU-T ~~SG 1~~ has completed the corresponding Recommendations.

High layer information (octets 6-13)

The content of these octets depends on the high layer information type.

16) Revised subclause 4.5.9/Q.2931 Broadband low layer information IE

4.5.9 Broadband Low Layer Information

The purpose of the broadband low layer information information element is to identify low layer protocols at the user plane and to provide a means which should be used for compatibility checking by an addressed entity (e.g. a remote user or an interworking unit or a high layer function network node addressed by the calling user). The broadband low layer information information element is transferred transparently by a B-ISDN between the call originating entity (e.g. the calling user) and the addressed entity.

For broadband low layer information negotiation (see Annex C), the broadband low layer information information element is also passed transparently from the addressed entity to the originating entity.

The broadband low layer information information element is coded as shown in Figure 4-16 and in Table 4-10. The maximum length of this information element is 17 octets.

Octet group 5 (layer 1 id.), 6 (layer 2 id.) and 7 (layer 3 id.) of the broadband low layer information element are not position independent, but, if present at all, shall be sent in the order as specified in Figure 4-16.

8	7	6	5	4	3	2	1	Octets
Broadband low layer information information element identifier								
0	1	0	1	1	1	1	1	1
ext. 1	Coding standard		IE instruction field					
			Flag	Res.	IE action ind.			2
Length of the broadband high layer information contents								3 4
ext. 1	Layer 1 id. 0 1		User information layer 1 protocol					5*
ext. 0/1	Layer 2 id. 1 0		User information layer 2 protocol					6*
ext. 0/1	Mode		Spare 0 0 0			Q.933 use		6a* (Note 1)
ext. 0/1	Window size (k)							6b* (Note 1)
ext. 0/1	User specified layer 2 protocol information							6a* (Note 2)
ext. 0/1	Layer 3 id. 1 1		User information layer 3 protocol					7*
ext. 0/1	Mode		Spare 0 0 0 0 0					7a* (Note 3)
ext. 0/1	Spare 0 0 0		Default packet size					7b* (Note 3)
ext. 1	Packet window size							7c* (Note 3)
ext. 1	User specified layer 3 protocol information							7a* (Note 4)
~~Additional layer 3 protocol information~~								~~7.1* (Note 5)~~
~~(cont.)~~								~~7.2* (Note 5)~~
~~(cont.)~~								~~7.3* (Note 5)~~
~~(cont.)~~								~~7.4* (Note 5)~~
~~(cont.)~~								~~7.5* (Note 5)~~
~~(cont.)~~								~~7.6* (Note 5)~~
~~(cont.)~~								~~7.7* (Note 5)~~
~~(cont.)~~								~~7.8* (Note 5)~~
ext. 0/1	Terminal capability		Terminal type					7a* (Note 6)
ext. 1	Spare 0	Forward multiplexing capability			Backward multiplexing capability			7b* (Note 6)
ext. 0	ITU-T Rec. X.263 | ISO/IEC TR 9577 Initial Protocol Identifier (IPI) (bits 8-2)							7.a* (Note 5)
ext. 1	IPI (bit 1)	Spare 0	0	0	0	0	0	7.b* (Note 5)
ext. 1	SNAP id. 0 0		Spare 0	0	0	0	0	8* (Note 7)
IEEE Sub-Network Access Protocol (SNAP) Identifier								8.1*
								8.2*
								8.3*
								8.4*
								8.5*

NOTE 1 – This octet may be present only if octet 6 indicates certain HDLC acknowledged-mode elements of procedure as indicated in Table 4-10.

NOTE 2 – This octet may be present only if octet 6 indicates user-specified layer 2 protocol.

NOTE 3 – This octet may be present only if octet 7 indicates a layer 3 protocol based on ITU-T Recommendation X.25, ISO/IEC 8208 or ITU-T X.223 and ISO/IEC 8878 as indicated in Table 4-10.

NOTE 4 – This octet may be present only if octet 7 indicates user-specified layer 3 protocol.

NOTE 5 – This~~ese~~ octet~~s~~ may be present only if octet 7 indicates ITU-T Rec. X.263 | ISO/IEC TR 9577.

NOTE 6 – This octet may be present only if octet 7 indicates ITU-T Rec. H.310.

NOTE 7 – This octet group shall be present only if octet 7 indicates ITU-T Rec. X.263 | ISO/IEC TR 9577 and octets 7a and 7b indicate IEEE SNAP, i.e. coded as "10000000".

Figure 4-16/Q.2931 – Broadband low layer information element

Table 4-10/Q.2931 ~~(sheet 1 of 3)~~ – Broadband low layer information element

User information layer 1 protocol (octet 5)

All values are reserved.

User information layer 2 protocol (octet 6)

Bits

5 4 3 2 1	
0 0 0 0 1	Basic mode ISO 1745
0 0 0 1 0	ITU-T Recommendation Q.921 (ITU-T Rec. I.441)
0 0 1 1 0	ITU-T Recommendation X.25, link layer (Notes 1 and 4)
0 0 1 1 1	ITU-T Recommendation X.25, multilink (Note 4)
0 1 0 0 0	extended LAPB; for half-duplex operation (ITU-T Rec. T.71)
0 1 0 0 1	HDLC ARM (ISO/IEC 4335) (Note 4)
0 1 0 1 0	HDLC NRM (ISO/IEC 4335) (Note 4)
0 1 0 1 1	HDLC ABM (ISO/IEC 4335) (Note 4)
0 1 1 0 0	LAN logical link control (ISO/IEC 8802-2)
0 1 1 0 1	ITU-T Recommendation X.75. Single Link Procedure (SLP) (Note 4)
0 1 1 1 0	ITU-T Recommendation Q.922 (Note 4)
1 0 0 0 0	user-specified (Note 2)
1 0 0 0 1	ISO/IEC 7776 DTE-DTE operation (Notes 3 and 4)

All other values are reserved.

NOTE 1 – This Recommendation is compatible with ISO/IEC 7776 DTE-DCE operation.

NOTE 2 – When this coding is included, octet 6a will include user coding for the user-specified layer 2 protocol.

NOTE 3 – This standard is compatible with ITU-T Recommendation X.75 modified by the application rules defined in ITU-T Recommendation T.90.

NOTE 4 – When this coding is included, octets 6a and 6b with ITU-T encoding may be included.

Octet 6a for ITU-T codings

Mode of operation (octet 6a)

Bits

7 6	
0 1	normal mode of operation
1 0	extended mode of operation

All other values are reserved.

Q.933 use (octet 6a)

Bits

2 1	
0 0	for use when the coding defined in Recommendation Q.933 is not used

All other values are reserved.

Octet 6a for user protocol

User-specified layer 2 protocol information (octet 6a)

The use and coding of octet 6a is according to user defined requirements.

Window size (k) (octet 6b)

Bits 7 to 1 are coded as a binary coding of k parameter value in the range from 1 to 127.

Table 4-10/Q.2931 ~~(sheet 1 of 3)~~ – Broadband low layer information element *(continued)*

User information layer 3 protocol (octet 7)

Bits 5 4 3 2 1	
0 0 1 1 0	ITU-T Recommendation X.25, packet layer (Note 6)
0 0 1 1 1	ISO/IEC 8208 (X.25 packet level protocol for data terminal equipment) (Note 6)
0 1 0 0 0	ITU-T Rec. X.223 and ISO/IEC 8878 (use of ISO/IEC 8208 and ITU-T X.25 to provide the OSI-CONS) (Note 6)
0 1 0 0 1	ITU-T Rec. X.233 | ISO/IEC 8473-1 (OSI connectionless mode protocol)
0 1 0 1 0	ITU-T Recommendation T.70 [40] minimum network layer
0 1 0 1 1	ITU-T X.263 | ISO/IEC TR 9577 (Note 7)
0 1 1 0 0	ITU-T Recommendation H.310
0 1 1 0 1	ITU-T Recommendation H.321
1 0 0 0 0	user-specified (Note 5)

All other values are reserved.

NOTE 5 – When this coding is included, octet 7a will include user coding for the user-specified layer 3 protocol.

NOTE 6 – When this coding is included, octets 7a, 7b and 7c with ITU-T encoding may be included.

NOTE 7 – This coding shall only be used if there is no ITU-T standardized coding for the layer 3 protocol being used, and an X.263 | ISO/IEC TR 9577 or IEEE SNAP coding applies for that protocol. If extension octets (7.a, 7.b, 8.1-8.5~~7.1-7.8~~) are included, they will identify the layer 3 protocol identification according to ITU-T Rec. X.263 | ISO/IEC TR 9577 (e.g. see Annexes C and D of ITU-T Rec. X.263 | ISO/IEC TR 9577); otherwise, the Network Layer Protocol Identification (NLPID) carried on a connection, as defined in ITU-T Rec. X.263 | ISO/IEC TR 9577, is supported.

Octet 7a for ITU-T codings

Mode of operation (octet 7a)

Bits 7 6	
0 1	normal packet-sequence numbering
1 0	extended packet-sequence numbering

All other values are reserved.

Octet 7a for user protocol

User-specified layer 3 protocol information (octet 7a)

The use and coding of octet 7a is according on user defined requirements.

Terminal type (bits 4-1 octet 7a)

Bits 4 3 2 1	
0 0 0 1	Receive only
0 0 1 0	Send only
0 0 1 1	Receive and send

Terminal capability (bits 7-5 octet 7a)

Bits 7 6 5	
0 0 0	No indication
0 0 1	Terminal is capable of supporting only AAL type 1
0 1 0	Terminal is capable of supporting only AAL type 5
0 1 1	Terminal is capable of supporting both AAL type 1 and AAL type 5

Table 4-10/Q.2931 ~~(sheet 1 of 3)~~ – Broadband low layer information element *(continued)*

Forward multiplexing capability (bits 6-4 octet 7b)

Bits 6 5 4	
0 0 0	No multiplexing
0 0 1	Transport stream (TS)
0 1 0	Transport stream with forward error correction
0 1 1	Program stream (PS)
1 0 0	Program stream with forward error correction
1 0 1	ITU-T Recommendation H.221

Backward multiplexing capability (bits 3-1 octet 7b)

Bits 3 2 1	
0 0 0	No multiplexing
0 0 1	Transport stream (TS)
0 1 0	Program stream with backward error correction
0 1 1	Program stream (PS)
1 0 0	Flux de programme avec correction d'erreur directe vers l'arrière
1 0 1	ITU-T Recommendation H.221

NOTE 8 – The allowable combination of codepoints for the multiplexing capability and terminal type fields may be restricted. These restrictions are provided within the terminal protocol specification.

Default packet size (octet 7b)

Bits 4 3 2 1	
0 1 0 0	default packet size 16 octets
0 1 0 1	default packet size 32 octets
0 1 1 0	default packet size 64 octets
0 1 1 1	default packet size 128 octets
1 0 0 0	default packet size 256 octets
1 0 0 1	default packet size 512 octets
1 0 1 0	default packet size 1024 octets
1 0 1 1	default packet size 2048 octets
1 1 0 0	default packet size 4096 octets

All other values are reserved.

Packet window size (octet 7c)

Bits 7 to 1 are coded as a binary coding of packet window size value in the range from 1 to 127.

~~Additonal layer 3 protocol information (octets 7.1-7.8 for ISO/IEC TR 9577: as specified in ISO/IEC TR 9577.~~

Table 4-10/Q.2931 ~~(sheet 1 of 3)~~ – Broadband low layer information element *(concluded)*

ITU-T Rec. X.263 | ISO/IEC TR 9577 Initial Protocol Identifier (IPI) (Bits 7-1 of octet 7.a and bit 7 of octet 7.b, when octet 7, bits 5-1 = 01011):
This octet indicates the X.263 | ISO/IEC TR 9577 Initial Protocol Identifier (IPI) for the protocol to be carried in the user plane. Bit 1 of the IPI is mapped to bit 7 of octet 7.b and bits 8 to 2 of the IPI are mapped to bits 7 to 1 of octet 7.a.
IEEE Sub-Network Access Protocol (SNAP) Identifier Organizationally Unique Identifier (OUI) (octets 8.1, 8.2, 8.3, 8.4 and 8.5) when octet 7.a, bits 7-1 = 1000000 and octet 7.b, bit 8 = 0)
If the 8 bits in octets 7.a and 7.b are coded as "10000000", indicating "IEEE SNAP" (see Annex D of ITU-T Rec. X.263 | ISO/IEC TR 9577), octets 8.1-8.5 shall contain a 40-bit IEEE SNAP Identifier. The first 24 bits of the IEEE SNAP Identifier correspond to an Organizationally Unique Identifier (OUI), the remaining 16 bits being a locally administered Protocol Identifier (PID).

17) Revised subclause 4.5.11/Q.2931 Called party number IE

4.5.11 Called party number

The purpose of the called party number information element is to identify the called party of a call.

The called party number information element is coded as shown in Figure 4-18 and Table 4-12.

The maximum length of this information element is network dependent.

8	7	6	5	4	3	2	1	Octets
Called party number information element identifier								
0	1	1	1	0	0	0	0	1
ext. 1	Coding standard		IE instruction field					
			Flag	Res.	IE action ind.			2
Length of called party number contents								3
								4
ext. 1	Type of number			Addressing/numbering plan identification				5
0	Address/number digits (IA5 characters)							6 etc. (Note 1)
~~NSAP address octets~~ATM end system address octets								6 etc. (Note 2)

NOTE 1 – The number digits appear in multiple octet 6's in the same order in which they would be entered, that is, the number digit which would be entered first is located in the first octet 6. Digits are coded in IA5 characters. Bit 8 is set to 0. This format applies to all numbering plans except those with addressing/numbering plan identifier set to "ATM end system address", or when the default numbering plan indicated by an "unknown" addressing/numbering plan identifier is "ATM end system address".

NOTE 2 – If the use of ATM end system address~~NSAP addressing~~ is indicated in the addressing/numbering plan identification, the address is coded as described in ITU-T Recommendation E.191~~X.213 | ISO/IEC 8348~~.

Figure 4-18/Q.2931 – Called party number information element

Table 4-12/Q.2931 – Called party number information element

Type of number (octet 5)

Bits 7 6 5	
0 0 0	unknown (Note 2)
0 0 1	international number (Notes 1, 3 and 6)
0 1 0	national number (Notes 1, 3 and 6)
0 1 1	network specific number (Notes 4 and 6)
1 0 0	subscriber number (Notes 1, 3 and 6)
1 1 0	Abbreviated number (Note 5)
1 1 1	reserved for extension

All other values are reserved.

NOTE 1 – For the definition of international, national and subscriber number, see ITU-T Recommendation I.330.

NOTE 2 – The type of number "unknown" is used when ATM end system address~~NSAP addressing~~ is indicated in the addressing/numbering plan identification or when the user or the network indicates the type of number using the number digits field. In the latter case, the number digits field is organized according to the network dialling plan; e.g. prefix digits might be present; in addition, escape digits may also be present.

NOTE 3 – Prefix digits shall not be included.

NOTE 4 – The type of number "network specific number" is used to indicate administration/service number specific to the serving network, e.g. used to access an operator.

NOTE 5 – The support of this code is network dependent. The number provided in this information element presents a shorthand representation of the complete number in the specified numbering plan as supported by the network.

NOTE 6 – The use of these codepoints applies only when the ISDN numbering plan (ITU-T Rec. E.164) is being used, either by explicit indication or because it is the default numbering plan of the network indicated by the numbering plan identification equal to "unknown".

Addressing/numbering plan identification (octet 5) (Note 11)

Bits 4 3 2 1	
0 0 0 0	unknown (Note 7)
0 0 0 1	ISDN numbering plan (ITU-T Recommendation E.164) (Note 13)
0 0 1 0	ATM end system address ~~NSAP addressing (ISO/IEC 8348)~~ (Notes 8 and 9)
0 0 1 1	Data numbering plan (ITU-T Recommendation X.121) (Note 12)
1 0 0 1	private numbering plan (Notes 8 and 10)
1 1 1 1	reserved for extension

All other values are reserved.

NOTE 7 – The numbering plan identification "unknown" indicates the default numbering plan of the network. In the absence of bilateral agreement, or alternative specification in other Recommendations, the default numbering plan of the network shall be "ISDN numbering plan (ITU-T Recommendation E.164)".

NOTE 8 – This codepoint is used to indicate an ATM end system address (E.164A or any other format defined in ITU-T Recommendation E.191).~~The use of this codepoint is a network option and requires bilateral agreement/arrangements between the network operator and the user, subject to both network and user supporting the identified numbering plan.~~

NOTE 9 – If this codepoint is used, the type of number is coded as "unknown".

Table 4-12/Q.2931 – Called party number information element *(concluded)*

NOTE 10 – If this codepoint is used, the type of number used is outside the scope of this ITU-T Recommendation.

NOTE 11 – The use of any particular numbering plan is outside the scope of this ITU-T Recommendation. At the access to public B-ISDNs, ITU-T Recommendation E.191 defines the use of particular numbering plans, and usage of the numbering plan identifier shall be consistent with the numbering plan used. ~~All networks and users shall support the ISDN numbering plan. For the use of other numbering plans, see the Notes on the relevant numbering plan identification value.~~

Address/number digits (octets 6, etc.), used unless an alternative is specified

This field is coded with IA5 characters, according to the formats specified in the appropriate numbering/dialling plan.

ATM end system address octets ~~*NSAP address octets*~~ *(octets 6, etc.* ~~*for NSAP addressing*~~*)*

If the use of ATM end system address ~~NSAP addressing~~ is indicated in the addressing/numbering plan identification, the address is coded as described in ITU-T Recommendation E.191 ~~ISO/IEC 8348~~.

NOTE 12 – When used, the Type of number field shall be coded International number.

NOTE 13 – This codepoint is used to indicate an E.164N address (E.164N address is defined in ITU-T Recommendation E.191).

18) Revised subclause 4.5.12/Q.2931 Called party sub-address IE

4.5.12 Called party sub-address

The purpose of the called party sub-address information element is to identify the sub-address of the called party of a call. For the definition of sub-address, see ITU-T Recommendation I.330.

The called party sub-address is coded as shown in Figure 4-19 and Table 4-13.

The maximum length of this information element is 25 octets.

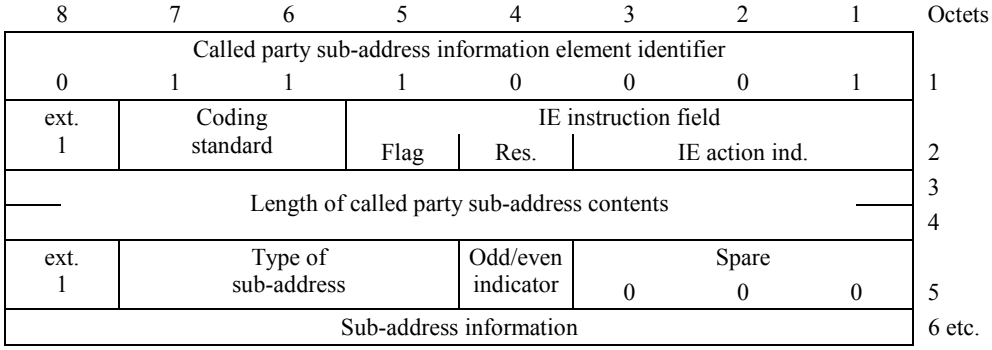


Figure 4-19/Q.2931 – Called party sub-address information element

Table 4-13/Q.2931 – Called party sub-address information element

Type of sub-address (octet 5)

Bits
7 6 5
0 0 0 NSAP (ITU-T Rec. X.213 | ISO/IEC 8348)
0 0 1 ~~user-specified~~ ATM end system address
0 1 0 user-specified

All other values are reserved.

Odd/even indicator (octet 5) (Note 1)

Bit
4
0 Even number of address signals
1 Odd number of address signals

Sub-address information (octet 6, etc.)

The NSAP X.213 | ISO/IEC 8348 address shall be formatted as specified by octet 6 which contains the Authority and Format Identifier (AFI). The encoding is made according to the "preferred binary encoding" as defined in ITU-T Rec. X.213 | ISO/IEC 8348 except when used for terminal selection (Note ~~3~~2).

For the definition of this type of sub-address, see ITU-T Recommendation I.334.

For the "ATM end system address", this field is encoded as defined in clause 9/E.191. The encoding is made according to the "preferred binary encoding" as defined in ITU-T Rec. X.213 | ISO/IEC 8348. ~~For the "user-specified ATM endsystem address", this field is encoded according to the user specification, subject to a maximum length of 20 octets (Note 4).~~

For user-specified sub-address, this field is encoded according to the user specification, subject to a maximum length of 20 octets. When interworking with X.25 networks BCD coding should be applied.

NOTE 1 – The odd/even indicator is used when the type of sub-address is "user-specified" and the coding is BCD.

~~NOTE 2 – It is recommended that users apply the NSAP sub-address type since this sub-address type allows the use of decimal, binary and IA5 characters in a standardized manner.~~

NOTE ~~3~~2 – It is recommended that users apply the Local IDI format (the AFI field is coded 50 in BCD) when the sub-address is used for terminal selection. In this case, the IA5 character syntax using only digits 0 to 9 shall be used for the DSP. Each character is coded in one octet according to ITU-T T.50 and ISO/IEC 646, with zero parity in the most significant position.

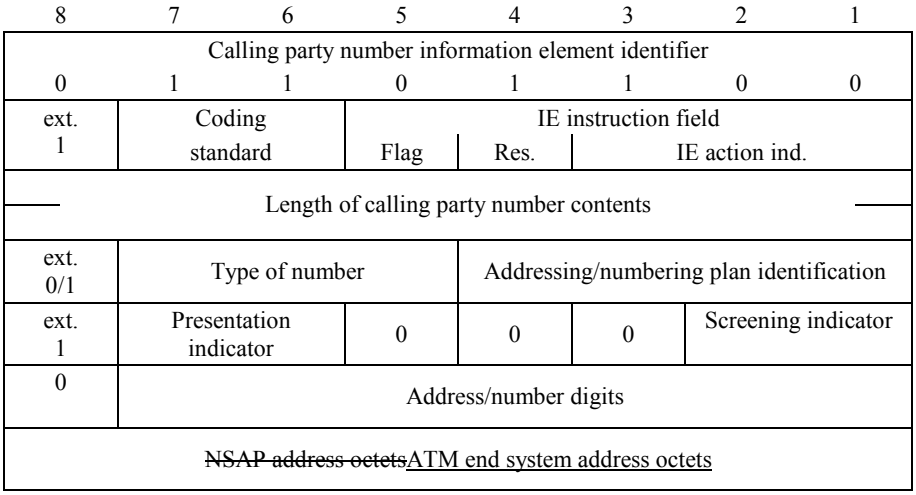
~~NOTE 4 – The "user-specified ATM endsystem address" can be used between two ATM terminal equipments when the NSAP codepoint is not appropriate.~~

19) Revised subclause 4.5.13/Q.2931 Calling party number IE

4.5.13 Calling party number

The purpose of the calling party number information element is to identify the origin of a call.

The calling party number information element is coded as shown in Figure 4-20 and Table 4-14. The maximum length of this information element is network dependent.



NOTE 1 – The number digits appear in multiple octet 6's in the same order in which they would be entered, that is, the number digit which would be entered first is located in the first octet 6. Digits are coded in IA5 characters. Bit 8 is set to 0. This format applies to all numbering plans except those with addressing/numbering plan identifier set to "ATM end system address", or when the default numbering plan indicated by an "unknown" addressing/numbering plan identifier is "ATM end system address".

NOTE 2 – If the use of ATM end system ~~NSAP addressing~~ address is indicated in the addressing/numbering plan identification, the address is coded as described in ITU-T Recommendation E.191~~Rec. X.213 | ISO/IEC 8348~~.

Figure 4-20/Q.2931 – Calling party number information element

Table 4-14/Q.2931 – Calling party number information element

Type of number (octet 5)

Bits 7 6 5	
0 0 0	unknown (Note 2)
0 0 1	international number (Notes 1, 3 and 6)
0 1 0	national number (Notes 1, 3 and 6)
0 1 1	network specific number (Notes 4 and 6)
1 0 0	subscriber number (Notes 1, 3 and 6)
1 1 0	abbreviated number (Note 5)
1 1 1	reserved for extension

All other values are reserved.

NOTE 1 – For the definition of international, national and subscriber number, see ITU-T Recommendation I.330.

NOTE 2 – The type of number "unknown" is used when ATM end system address ~~NSAP addressing~~ is indicated in the addressing/numbering plan identification or when the user or the network indicates the type of number using the number digits field. In the latter case, the number digits field is organized according to the network dialling plan; e.g. prefix digits might be present; in addition, escape digits may also be present.

NOTE 3 – Prefix digits shall not be included.

NOTE 4 – The type of number "network specific number" is used to indicate administration/service number specific to the serving network, e.g. used to access an operator.

NOTE 5 – The support of this code is network dependent. The number provided in this information element presents a shorthand representation of the complete number in the specified numbering plan as supported by the network.

NOTE 6 – The use of these codepoints applies only when the ISDN numbering plan (ITU-T Recommendation E.164) is being used, either by explicit indication or because it is the default numbering plan of the network indicated by the numbering plan identification equal to "unknown".

Addressing/numbering plan identification (octet 5) (Note 11)

Bits 4 3 2 1	
0 0 0 0	unknown (Note 7)
0 0 0 1	ISDN numbering plan (ITU-T Recommendation E.164) (Note 14)
0 0 1 0	ATM end system address ~~NSAP addressing (ISO/IEC 8348)~~ (Notes 8 and 9)
0 0 1 1	Data numbering plan (ITU-T Recommendation X.121) (Note 15)
1 0 0 1	private numbering plan (Notes 8 and 10)
1 1 1 1	reserved for extension

All other values are reserved.

NOTE 7 – The numbering plan identification "unknown" indicates the default numbering plan of the network. In the absence of bilateral agreement, or alternative specification in other Recommendations, the default numbering plan of the network shall be "ISDN numbering plan (ITU-T Recommendation E.164)".

Table 4-14/Q.2931 – Calling party number information element *(concluded)*

NOTE 8 – This codepoint is used to indicate an ATM end system address (E.164A or any other format defined in ITU-T Recommendation E.191).~~The use of this codepoint requires bilateral agreement between the network and the user, supporting the identified numbering plan.~~

NOTE 9 – If this codepoint is used, the type of number is coded as "unknown".

NOTE 10 – If this codepoint is used, the type of number used is outside the scope of this ITU-T Recommendation.

NOTE 11 – The use of any particular numbering plan is outside the scope of this ITU-T Recommendation. At the access to public B-ISDNs, ITU-T Recommendation E.191 defines the use of particular numbering plans, and usage of the numbering plan identifier shall be consistent with the numbering plan used.~~All networks and users shall support the ISDN numbering plan. For the use of other numbering plans, see the Notes on the relevant numbering plan identification value.~~

Presentation indicator (octet 5a) (Note 12)

Bits 7 6	
0 0	presentation allowed
0 1	presentation restricted
1 0	number not available
1 1	reserved

NOTE 12 – At the originating user-network interface, the presentation indicator is used for indicating the intention of the calling user for the presentation of the calling party number to the called user. This may also be requested on a subscription basis. If octet 5a is omitted, and the network does not support subscription information for the calling party number information restrictions, the value "00 – presentation allowed" is assumed.

Screening indicator (octet 5a) (Note 13)

Bits 2 1	
0 0	user-provided, not screened
0 1	user-provided, verified and passed
1 0	user-provided, verified and failed
1 1	network provided

NOTE 13 – If octet 5a is omitted, "00 – User provided, not screened" is assumed.

Address/number digits (octets 6, etc.), used unless an alternative is specified

This field is coded with IA5 characters, according to the formats specified in the appropriate numbering/dialling plan.

ATM end system address octets~~NSAP address octets~~ (octets 6, etc. for ATM end system address ~~NSAP addressing~~)

If the use of ATM end system address ~~NSAP addressing~~ is indicated in the addressing/numbering plan identification, the address is coded as described in clause 9/E.191, ~~Rec. X.213 | ISO/IEC 8348~~(for details, see also the description of sub-address information in Table 4-15).

NOTE 14 – This codepoint is used to indicate an E.164N address (E.164N address is defined in ITU-T Recommendation E.191).

NOTE 15 – When used, the type of number field shall be coded International Number.

20) Revised subclause 4.5.14/Q.2931 Calling party sub-address IE

4.5.14 Calling party sub-address

The purpose of the calling party sub-address is to identify a sub-address associated with the origin of a call. For the definition of sub-address, see ITU-T Recommendation I.330.

The calling party sub-address information element is coded as shown in Figure 4-21 and Table 4-15.

The maximum length of this information element is 25 octets.

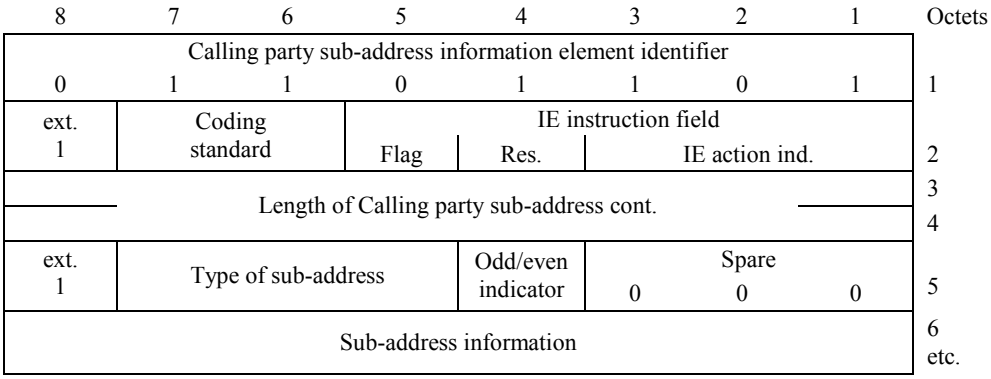


Figure 4-21/Q.2931 – Calling party sub-address information element

Table 4-15/Q.2931 – Calling party sub-address information element

Type of sub-address (octet 5)

Bits
7 6 5
0 0 0 NSAP (ITU-T Rec. X.213 | ISO/IEC 8348)
0 0 1 ~~user-specified~~ ATM end system address
0 1 0 user-specified

All other values are reserved.

Odd/even indicator (octet 5)

Bit
4
0 Even number of address signals (Note 1)
1 Odd number of address signals (Note 1)

Sub-address information (octet 6, etc.)

The NSAP ITU-T Rec. X.213 | ISO/IEC 8348 address, shall be formatted as specified by octet 6 which contains the Authority and Format Identifier (AFI). The encoding is made according to the "preferred binary encoding" as defined in ITU-T Rec. X.213 | ISO/IEC 8348 except when used for terminal selection (Note ~~3~~2). For the definition of this type of sub-address, see ITU-T Recommendation I.334.

For the ATM end system address, this field is encoded as defined in clause 9/E.191. The encoding is made according to the "preferred binary encoding" as defined in ITU-T Rec. X.213 | ISO/IEC 8348. ~~For the "user-specified ATM endsystem address", this field is encoded according to the user specification, subject to a maximum length of 20 octets (Note 4).~~

For user specified sub-address, this field is encoded according to the user specification, subject to a maximum length of 20 octets. When interworking with X.25 networks, BCD coding should be applied.

Table 4-15/Q.2931 – Calling party sub-address information element *(concluded)*

NOTE 1 – The odd/even indicator is used when the type of sub-address is "user-specified" and the coding is BCD.

~~NOTE 2 – It is recommended that users apply the NSAP sub-address type since this sub-address type allows the use of decimal, binary and IA5 characters in a standardized manner.~~

NOTE ~~3~~2 – It is recommended that users apply the Local IDI format (the AFI field is coded 50 in BCD) when the sub-address is used for terminal selection. In this case, the IA5 character syntax using only digits 0 to 9 shall be used for the DSP. Each character is coded in one octet according to ITU-T T.50 and ISO/IEC 646, with zero parity in the most significant position.

~~NOTE 4 – The "user-specified ATM endsystem address" can be used between two ATM terminal equipments when the NSAP codepoint is not appropriate.~~

21) Revised subclause 4.5.17/Q.2931 End-to-end transit delay IE

4.5.17 End-to-end transit delay

See subclause 8.2.1/Q.2965.2.

~~The purpose of the end-to-end transit delay information element is to indicate the nominal maximum end-to-end transit delay acceptable on a per-call basis, and to indicate the cumulative transit delay to be expected for a virtual channel connection.~~

~~Transit delay is the end-to-end one-way transit delay of user data transferred during the data transfer phase on the user plane, between the calling user and the called user. It includes:~~

- ~~the total processing time in the end user systems (e.g. processing time, AAL handling delay, ATM cell assembly delay, and possibly any additional processing delay); and~~
- ~~the network transfer delay (e.g. propagation delay, ATM layer transfer delay, possibly any additional processing delay in the network).~~

~~The cumulative transit delay value indicated by the calling user in the SETUP message (if present) includes the cumulative transit delay from the calling user to the network boundary.~~

~~The cumulative transit delay value indicated by the network in the SETUP message sent to the called user is the sum of the value which was indicated at the originating UNI and the expected transfer delay accumulated within the network. It does not include further transfer delay on the way from the network boundary to the called user.~~

~~The cumulative transit delay value which is transferred over both UNIs in the CONNECT message is the expected total end-to-end transit delay value for user data transfer over the related virtual channel connection as provided for a given call.~~

~~The maximum end-to-end transit delay value may be indicated by the calling user to specify end-to-end transit delay requirements for this call. This field is included by the network in the SETUP message to indicate that the calling user has specified end-to-end transit delay requirements for this call.~~

~~The procedures which are applicable are described in Annex K.~~

~~The maximum end-to-end transit delay is not included in the CONNECT message.~~

~~The end-to-end transit delay is coded as shown in Figure 4-23 and Table 4-17.~~

~~The maximum length of this information element is 10 octets.~~

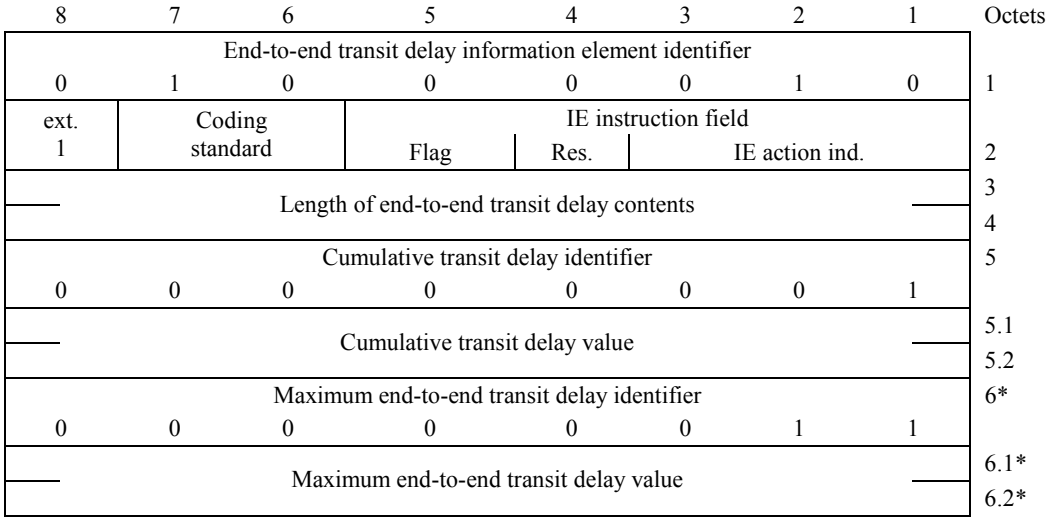


Figure 4-23/Q.2931 – End-to-end transit delay information element

~~**Table 4-17/Q.2931 – End-to-end transit delay information element**~~

~~– Cumulative transit delay value (octets 5.1 and 5.2)~~

~~The cumulative transit delay value is binary encoded in milliseconds. The coding rules for integer values described in 4.5.1 apply.~~

~~The cumulative transit delay value occupies 16 bits total.~~

~~– Maximum end-to-end transit delay value (octets 6.1 and 6.2)~~

~~The maximum end-to-end transit delay value is binary encoded in milliseconds. The coding rules for integer values described in 4.5.1 apply.~~

~~The maximum end-to-end transit delay value occupies 16 bits total.~~

~~The value "1111 1111 1111 1111", however, is not to be interpreted as a maximum end-to-end transfer delay value. This codepoint indicates: "any end-to-end transit delay value acceptable; deliver cumulative end-to-end transit delay value to the called user".~~

22) Revised subclause 4.5.22/Q.2931 Transit network selection IE

4.5.22 Transit network selection

The purpose of the transit network selection information element is to identify one requested transit network. The transit network selection information element may be repeated in a message to select a sequence of transit networks through which a call must pass. See Annex D.

The transit network selection information element is coded as shown in Figure 4-28 and Table 4-21. The maximum length of this information element is network dependent.

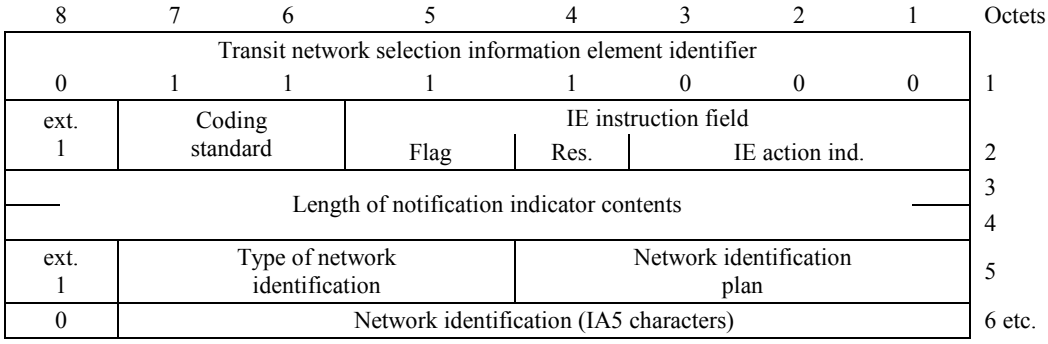


Figure 4-28/Q.2931 – Transit network selection information element

Table 4-21/Q.2931 – Transit network selection information element

Type of network identification (octet 5)

Bits
7 6 5
0 0 0 user-specified
0 1 0 national network identification (Note 1)
0 1 1 international network identification

All other values are reserved.

NOTE 1 – In the case that type of network identification is coded as 010, "national network identification", "national network identification plan (octet 5)" is coded according to national specification.

Network identification plan (octet 5)

Bits
4 3 2 1
0 0 0 0 unknown
0 0 0 1 carrier identification code (Note 2)
0 0 1 1 data network identification code (ITU-T Recommendation X.121)

All other values are reserved.

NOTE 2 – Carrier identification codes may be an appropriate method of identifying the network serving the remote user.

Network identification (octet 6)

These IA5 characters are organized according to the network identification plan specified in octet 5.

23) Revised subclause 4.5.23/Q.2931 Notification indicator IE

4.5.23 Notification indicator

~~The purpose of the notification indicator information element~~Notification indicator information ~~element~~Notification indicator information element is to indicate information pertaining to a call. This information element carries various information of significance to either the call or connection. It may be generated by either user or network entities and is destined for the used application within the ATM end system. It is carried transparently by intervening network entities and interworking units, without modification or semantic inspection.

It is used for a single indication of information, and carries information of a non-critical nature to the receiving entity.

The notification indicator information element is coded as shown in Figure 4-29.

The maximum length of this information element is application dependent consistent with the maximum length of the message.

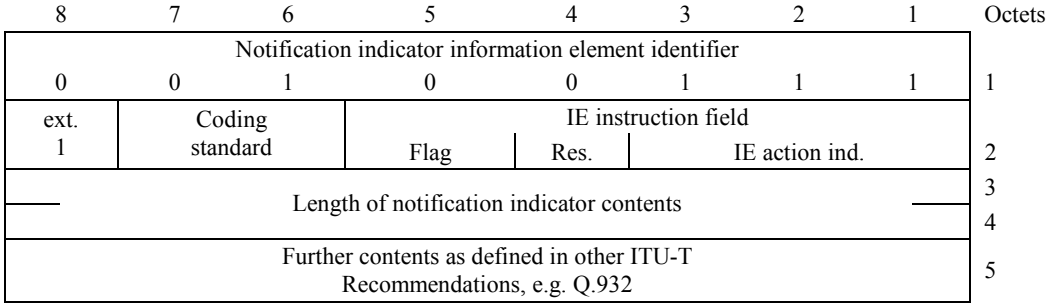


Figure 4-29/Q.2931 – Notification indicator information element

24) New subclause 4.5.25/Q.2931 Broadband report type IE

4.5.25 Broadband report type

This information element carries various information of significance to the connection either within addressed ATM end systems, or within interworking units between the ATM network and another network infrastructure. It is carried transparently by intervening network entities without modification or semantic inspection.

It may either be used for a single indication of information from one connection signalling entity to another, or by the use of two related values, form the basis of a confirmed indication and response from one connection to another.

The broadband report type information element is coded as shown in Figure 4-35 and Table 4-23. The maximum length of this information element is 5 octets.

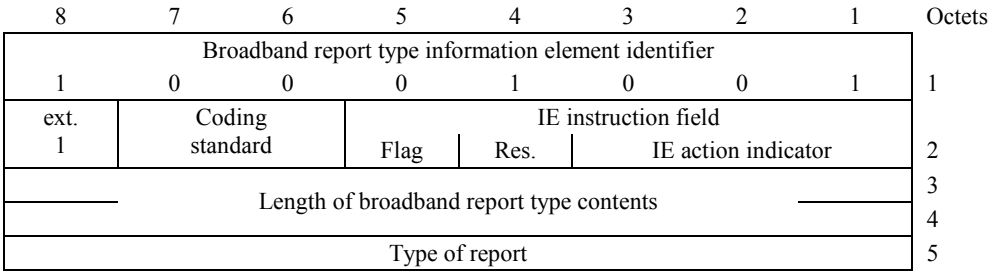


Figure 4-35/Q.2931 – Broadband report type information element

Table 4-23/Q.2931 – Broadband report type information element

Type of report (octet 5)

Bits 8 7 6 5 4 3 2 1	
0 0 0 0 0 0 0 0	reserved
0 0 0 0 0 0 0 1	modification confirmation (Note 1)
0 0 0 0 0 0 1 0	adaptive clock of the receiver used for transmit (TX) clock (Note 2)
0 0 0 0 0 0 1 1	reserved
0 0 0 0 0 1 0 0	end-to-end connection completion capability available (Note 3)
0 0 0 0 0 1 0 1	end-to-end connection completion indication requested (Note 3)
0 0 0 0 0 1 1 1	end-to-end connection completed (Note 3)
0 0 0 0 1 1 1 1 to 1 1 1 1 1 1 1 1	reserved

NOTE 1 – Indicates the addressed user in connection modification requires confirmation of success of the modification (according to ITU-T Recommendation Q.2963.1). Implementations not supporting the capability of ITU-T Q.2963.1 should treat this codepoint as reserved.

NOTE 2 – See Annex M, indication of using recovered clock for transmission.

NOTE 3 – See Annex N, end-to-end completion indication procedures.

25) Revised subclause 4.6/Q.2931 Support of 64 kbit/s based ISDN

4.6 Information elements for the support of 64 kbit/s based ISDN circuit-mode services

4.6.1 Coding rules

The information elements described in 4.6 use the general information element format as described in Figure 4-8. The coding of these information elements follows the coding rules of this ITU-T Recommendation and those of ITU-T Recommendation Q.931.

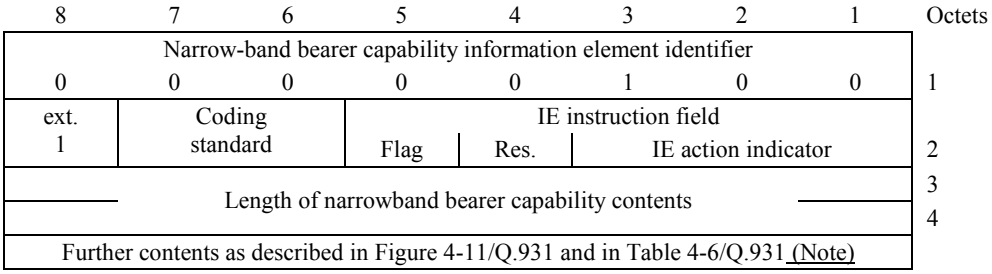
4.6.2 Narrow-band bearer capability

The purpose of the narrow-band bearer capability information element is to indicate a requested circuit-mode N-ISDN bearer service to be provided by the network. It contains only information that may be used by the network (see Annex I/Q.931). The use of the narrow-band bearer capability information element in relation to compatibility checking is described in Annex B/Q.931.

The narrow-band bearer capability is transferred transparently through the B-ISDN.

The narrow-band bearer capability information element is coded as shown in Figure 4-31.

No default narrow-band bearer capability may be assumed by the absence of this information element.



NOTE – The coding rules of ITU-T Q.931 shall apply.

Figure 4-31/Q.2931 – Narrowband bearer capability information element

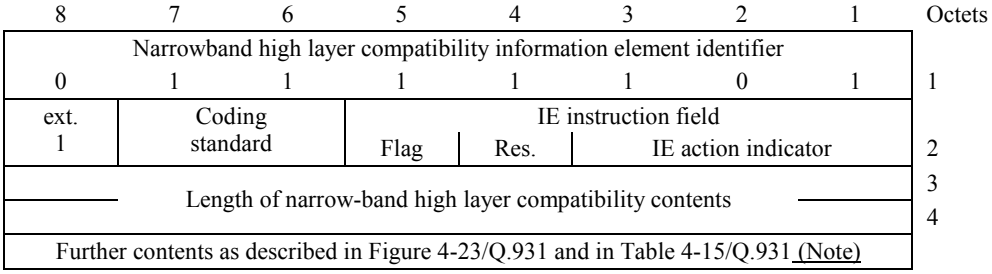
4.6.3 Narrow-band high layer compatibility

The purpose of the narrow-band high layer compatibility information element is to provide a means which should be used by the remote user for compatibility checking. See Annex B/Q.931.

The narrow-band high layer compatibility information element is coded as shown in Figure 4-32.

The maximum length of this information element is 7 octets.

NOTE – The narrow-band high layer compatibility information element is transported transparently by a B-ISDN between a call originating entity, e.g. a calling user and the addressed entity; a remote user or a high layer function network node addressed by the call originating entity. However, if explicitly requested by the user (at subscription time), a network which provides some capabilities to realize teleservices may interpret this information to provide a particular service.



NOTE – The coding rules of ITU-T Q.931 shall apply.

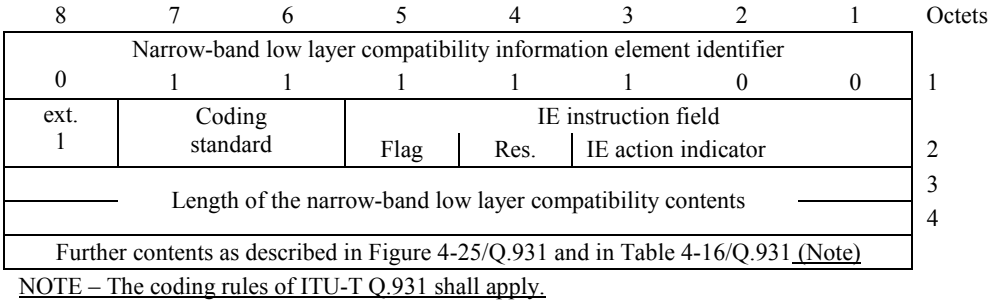
Figure 4-32/Q.2931 – Narrow-band high layer compatibility information element

4.6.4 Narrow-band low layer compatibility

The purpose of the narrow-band low layer compatibility information element is to provide a means which should be used for compatibility checking by an addressed entity (e.g. a remote user or an interworking unit or a high layer function network node addressed by the calling user). The low layer compatibility information element is transferred transparently by a B-ISDN between the call originating entity (e.g. the calling user) and the addressed entity.

For narrow-band low layer compatibility negotiation (see Annex J/Q.931), the narrow-band low layer compatibility information element is also passed transparently from the addressed entity to the originating entity.

The narrow-band low layer compatibility information element is coded as shown in Figure 4-33. The maximum length of this information element is 20 octets.



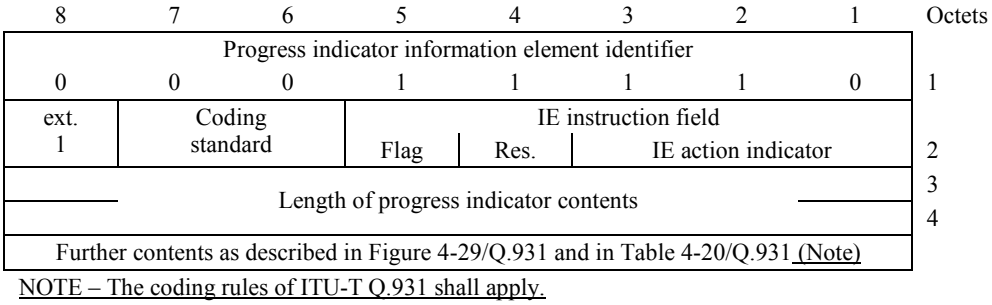
NOTE – The coding rules of ITU-T Q.931 shall apply.

Figure 4-33/Q.2931 – Narrow-band low layer compatibility information element

4.6.5 Progress indicator

The purpose of the progress indicator information element is to describe an event which has occurred during the life of a call. The information element may occur twice in a message.

The progress indicator information element is coded as shown in Figure 4-34. The maximum length of this information element is 6 octets.



NOTE – The coding rules of ITU-T Q.931 shall apply.

Figure 4-34/Q.2931 – Progress indicator information element

26) Revised subclause 5.1.3/Q.2931 QoS and traffic parameters selection procedures

5.1.3 QoS and traffic parameters selection procedures

For the handling of traffic parameters in conjunction with QoS class, see 9.1/Q.2965.1. For the handling of the end-to-end transit delay, see ITU-T Recommendation Q.2965.2.

The user shall indicate the requested peak cell rate in the ATM traffic descriptor information element.

If the network is able to provide the requested ATM traffic descriptor, the network shall progress the call to the called user. If the network is not able to provide the requested ATM traffic descriptor, the network shall reject the call, returning a RELEASE COMPLETE message with cause No. 37, "user cell rate unavailable".

27) Revised subclause 5.2.3/Q.2931 Connection identifier allocation/selection procedures

5.2.3 Connection identifier (VPCI/VCI) allocation/selection – Destination

Two cases exist:

1) *associated signalling*

   The layer 3 signalling entity exclusively controls the VCs in the VPC which carries its signalling VC.

2) *non-associated signalling*

   The layer 3 signalling entity controls the VCs in the VPC which carries its signalling VC and may control VCs in other VPCs.

The network and user shall support the non-associated signalling procedures and may as an option support the associated signalling procedures. ~~A subscription option is necessary if the network supports both non-associated and associated signalling.~~ The associated signalling procedures are used only by bilateral agreement between the user and the network.

When the ~~network~~ user receives a Connection identifier information element with the VP-associated signalling field (see Table 4-16) coded with a value not supported by the ~~network~~user, the call shall be rejected with cause No. 36, "VPCI/VCI assignment failure".

5.2.3.1 Associated signalling

For associated signalling, the network indicates a VC in the VPC carrying the signalling VC. The VPC carrying the signalling VC is implicitly indicated.

In the Connection identifier information element, the VP-associated signalling field is coded as "VP-associated signalling" in the Connection identifier information element and one of the following values is indicated in the preferred/exclusive field:

a) "exclusive VPCI; any VCI"; or

b) "exclusive VPCI; exclusive VCI".

In case a), the user selects any available VCI within the VPC carrying the signalling VC. The selected VCI value is indicated in the Connection identifier information element in the first message returned by the user in response to the SETUP message (e.g. CALL PROCEEDING message). The VP-associated signalling field is coded as "VP-associated signalling". The preferred/exclusive field is coded as "exclusive VPCI; exclusive VCI".

In case b), if the indicated VCI within the VPC carrying the signalling VC is available, the user selects it for the call. If the Connection identifier information element is not present in the first response message, the connection identifier in the SETUP message shall be assumed.

In case a), if no VCI is available, a RELEASE COMPLETE message with cause No. 45, "no VPCI/VCI available", is sent by the user.

In case b), if the indicated VCI is not available, a RELEASE COMPLETE message with the cause No. 35, "requested VPCI/VCI not available", is sent by the user.

5.2.3.2 Non-associated signalling

For non-associated signalling, the network shall indicate one of the following in the SETUP message:

a) "exclusive VPCI; any VCI";

b) "exclusive VPCI; exclusive VCI"; or

c) no indication is included (i.e. the Connection identifier information element is not included in the SETUP message).

In cases a) and b), if the indicated VPCI is available, the user selects it for the call. In case a), the user selects any available VCI in the VPCI. In case b), if the indicated VCI is available within the VPCI, the user selects it for the call. In case c), the user selects any available VPCI and VCI.

In cases a) and c), the selected VPCI/VCI value is indicated in the Connection identifier information element in the first message returned by the user in response to the SETUP message (e.g. CALL PROCEEDING message). The VP-associated signalling field is coded as "explicit indication of VPCI". The preferred/exclusive field is coded as "exclusive VPCI; exclusive VCI".

In case b), if the Connection identifier information element is not present in the first response message, the connection identifier in the SETUP message shall be assumed.

In cases a) and b), if the specified VPCI is not available, a RELEASE COMPLETE message with cause No. 35, "requested VPCI/VCI not available", is sent by the user.

In case a), if no VCI is available, a RELEASE COMPLETE message with cause No. 45, "no VPCI/VCI available", is sent by the user.

In case b), if the VCI in the indicated VPCI is not available, a RELEASE COMPLETE message with cause No. 35, "requested VPCI/VCI not available", is sent by the user.

In case c), if the user is not able to allocate a VCI in any VPCI, a RELEASE COMPLETE message with cause No. 45, "no VPCI/VCI available", is sent by the user.

In case a), if the VPCI value in the first response message is not the VPCI value indicated by the network, a RELEASE message with cause No. 36, "VPCI/VCI assignment failure", shall be sent to the user.

In case b), if the VPCI and VCI values in the first response message are not the VPCI and VCI values indicated by the network, a RELEASE message with cause No. 36, "VPCI/VCI assignment failure", shall be sent to the user.

28) Revised subclause 5.2.4/Q.2931 QoS and traffic parameter selection procedures

5.2.4 QoS and traffic parameter selection procedures

For the handling of traffic parameters in conjunction with QoS class, see 9.2/Q.2965.1. For the handling of the end-to-end transit delay, see ITU-T Recommendation Q.2965.2.

~~The cumulative end-to-end transit delay is indicated in the end-to-end transit delay information element. If the user is not able to accept the indicated end-to-end transit delay, the user shall reject the call, returning a RELEASE COMPLETE message with cause No. 49, "Quality of Service unavailable.~~

The network shall indicate the peak cell rate in the ATM traffic descriptor information element.

If the user is not able to provide the requested ATM traffic descriptor, the user shall reject the call, returning a RELEASE COMPLETE message with cause No. 47, "resources unavailable, unspecified".

29) Revised subclause 5.6.3/Q.2931 Call reference error procedures

5.6.3 Call reference error

5.6.3.1 Invalid call reference format

If the Call reference information element octet 1, bits 5 through 8 do not equal 0000, then the message shall be ignored.

If the Call reference information element octet 1, bits 1 through 4 indicate a length other than 3 octets (see 4.3), then the message shall be ignored.

5.6.3.2 Call reference procedural errors

a) Whenever any message except SETUP, RELEASE COMPLETE, STATUS ENQUIRY, or STATUS, is received specifying a call reference which is not recognized as relating to an active call or to a call in progress, the receiver shall initiate clearing by sending a RELEASE COMPLETE message with cause No. 81, "invalid call reference value", specifying the call reference in the received message and shall remain in the Null state.

b) When a RELEASE COMPLETE message is received specifying a call reference which is not recognized as relating to an active call or to a call in progress, no action should be taken.

c) When a SETUP message is received specifying a call reference which is not recognized as relating to an active call or to a call in progress, and with a call reference flag incorrectly set to "1", this message shall be ignored.

d) When a SETUP message is received specifying a call reference which is recognized as relating to an active call or to a call in progress, this SETUP message shall be ignored.

e) When any message except RESTART, RESTART ACKNOWLEDGE, or STATUS is received using the global call reference, no action should be taken on this message and a STATUS message using the global call reference with a call state indicating the current state associated with the global call reference and cause No. 81, "invalid call reference value", shall be returned.

NOTE – The current state to be indicated is the one associated to the restart state machine relating to the global call reference value (including the flag) of the unexpected message received.

f) When a STATUS message is received specifying a call reference which is not recognized as relating to an active call or to a call in progress, the procedures of 5.6.12 shall apply.

g) When a STATUS ENQUIRY message is received specifying a call reference which is not recognized as relating to an active call or to a call in progress, the procedures of 5.6.11 shall apply.

h) When a RESTART message is received specifying the global call reference with a call reference flag incorrectly set to "1" or a RESTART ACKNOWLEDGE message is received specifying the global call reference with a call reference flag incorrectly set to "0", no action should be taken on this message and a STATUS message with a call state indicating the current state associated with the global call reference and cause No. 81, "invalid call reference value", shall be returned.

30) Revised subclause 5.6.8/Q.2931 Information element error procedures

5.6.8 Non-mandatory information element errors

The error procedures in this subclause apply only if the flag (bit 5) in the instruction field is set to "IE instruction field not significant". If it is set to "follow explicit instruction", the procedures in 5.7 take precedence.

The following subclauses identify actions on information elements not recognized as mandatory.

5.6.8.1 Unrecognized information element

When a message is received that has one or more unrecognized information elements, then the receiving entity shall proceed as follows.

Action shall be taken on the message and those information elements which are recognized and have valid content. Unrecognized information elements shall be discarded and ignored. When the received message is other than RELEASE or RELEASE COMPLETE, a STATUS message may be returned containing one Cause information element. The STATUS message indicates the call state of the receiver after taking action on the message. The Cause information element shall contain cause No. 99, "information element non-existent or not implemented", and the diagnostic field, if present, shall contain the information element identifier for each information element which was unrecognized. Subsequent actions are determined by the sender of the unrecognized information elements.

If a clearing message contains one or more unrecognized information elements, the error is reported to the local user in the following manner:

a) when a RELEASE message is received which has one or more unrecognized information elements, a RELEASE COMPLETE message with cause No. 99, "information element non-existent or not implemented", shall be returned. The Cause information element diagnostic field, if present, shall contain the information element identifier for each information element which was unrecognized;

b) when a RELEASE COMPLETE message is received which has one or more unrecognized information elements, no action shall be taken on the unrecognized information.

NOTE – The diagnostic(s) of cause No. 99 facilitates the decision in selecting an appropriate recovery procedure at the reception of a STATUS message. Therefore, it is recommended to provide cause No. 99 with diagnostic(s) if a layer 3 entity expects the peer to take an appropriate action at the receipt of a STATUS message, although inclusion of diagnostic(s) is optional.

5.6.8.2 Non-mandatory information element content error

When a message other than RELEASE or RELEASE COMPLETE is received which has one or more non-mandatory information elements with invalid content, action shall be taken on the message and those information elements which are recognized and have valid content. Information elements with content error shall be discarded and ignored. A STATUS message may be returned containing one Cause information element. The STATUS message indicates the call state of the receiver after taking action on the message. The Cause information element shall contain cause No. 100, "invalid information element contents", and the diagnostic field, if present, shall contain the information element identifier for each information element which has invalid contents.

If a clearing message is received with one or more invalid non-mandatory information elements, it shall be handled as follows:

– If it is a RELEASE message, a RELEASE COMPLETE message with cause No. 100, "invalid information element contents" shall be returned. The cause information element diagnostic field, if included, shall contain the information element identifier for each invalid information element received.

– If it is a RELEASE COMPLETE message, no action shall be taken on the invalid information elements.

Information elements with a length exceeding the maximum length (given in clause 3) will be treated as an information element with content error. But for access information elements (see Annex J), cause No. 43, "access information discarded" is used instead of cause No. 100, "invalid information element contents".

5.6.8.3 Unexpected recognized information element

When a message is received with a recognized information element that is not defined to be contained in that message, the receiving entity shall (except as noted below) treat the information element as an unrecognized information element and follow the procedures defined in 5.6.8.1.

NOTE – Some implementations may choose to process unexpected recognized information elements when the procedure for processing the information element is independent of the message in which it is received.

31) Revised subclause 5.7.2/Q.2931 Information element error procedures

5.7.2 Information element errors

These procedures only apply to call reference values other than the dummy call reference value.

When a message other than a RELEASE or RELEASE COMPLETE message is received which has one or more unexpected information elements, unrecognized information elements or information elements with unrecognized contents, the receiving entity shall examine the information element action indicator, and follow the procedures described in a), b), c), d) or e) below as appropriate.

When a RELEASE message is received with one or more information elements in error, a RELEASE COMPLETE message with cause No. 99, "information element non-existent or not implemented" or with cause No. 100, "invalid information element contents", shall be returned.

When a RELEASE COMPLETE message is received with one or more information elements in error, no action shall be taken on the information elements in error. The message shall be processed as if received without the information elements in error.

If more than one information element is received in error, only one response shall be given. The response shall be according to the handling of the action indicator field according to the following order of priority: "clear call" (highest priority), "discard message and report status", "discard message, and ignore", "discard information element, proceed, and report status", "discard information element and proceed".

a) Action indicator field = clear call

   If the action indicator field is equal to "clear call", the call shall be cleared according to the procedures defined in 5.4 except that the Cause information element shall contain cause No. 99, "information element non-existent or not implemented" or cause No. 100, "invalid information element contents".

b) If the action indicator field = discard message and report status

   The message shall be ignored and a STATUS message shall be sent with a cause No. 99 "information element non-existent or not implemented" or cause No. 100 "invalid information element contents".

c) If the action indicator field = "discard message"

   The message shall be ignored.

d) Action indicator field = discard information element, proceed and report status

   If the message contains sufficient information to proceed, the following shall apply:

   if the action indicator field specifies "discard information element, proceed and report status", the information element shall be discarded, the handling of the message shall proceed and a STATUS message shall be returned indicating the call state of the receiver after taking action on the message and containing cause No. 99, "information element non-existent or not implemented" or cause No. 100, "invalid information element contents".

e) Action indicator field = discard information element and proceed

   If the action indicator field is equal to "discard information element and proceed", the information element shall be ignored and the message shall be processed as if the information element was not received. No STATUS message shall be sent.

f) Action indicator field = undefined (reserved) value

The receiver shall handle the information element as if the action indicator field had been set to "discard information element, proceed, and report status".

If a message with the global call reference is received which contains one or more unrecognized or invalid information elements with the instruction indicator set to "clear call", no RELEASE message shall be returned (since the clearing procedures are not applicable to the global call reference value).

32) New subclause 6.3.6/Q.2931 Mapping of clearing messages

6.3.6 Mapping of clearing messages

The DISCONNECT message of Q.931 is mapped to the RELEASE message of Q.2931.

33) Revised subclause 6.4.5/Q.2931 Mapping of cause information

6.4.5 Cause information

For the mapping of the DSS2 Cause information element to the DSS1 Cause information element, the following rules shall apply:

a) Any broadband specific cause value where there is no equivalent value in the DSS1 protocol is mapped to the unspecified value of the same class, e.g. the DSS2 cause values:

– 35 – 36 – 37 – 45	Requested VPCI/VCI not available VPCI/VCI assignment failure User cell rate not available and No VPCI/VCI available	Are mapped to ~~the~~ DSS1 cause value 47: Resource unavailable, unspecified
– 73 ~~– 93~~	Unsupported combination of traffic parameters ~~AAL parameters cannot be supported~~	Is~~Are~~ mapped to ~~the~~ DSS1 cause value 79: Service or option not implemented, unspecified
– 93	AAL parameters cannot be supported	Is mapped to DSS1 cause value 95: Invalid message, unspecified

b) Any cause value and diagnostic used in both DSS2 and DSS1 protocol is not changed by the TA or IWF.

c) If any cause value used in the DSS2 protocol is received by the TA or IWF for which a diagnostic field may be present (e.g. cause value 82) while the same cause value of the DSS1 protocol does not allow for a diagnostic field, then the TA or IWF shall discard the diagnostic field and leave the cause value unchanged.

d) In addition to the actions described in items a) to c), the DSS2 Cause information element is changed in the same manner as the other DSS2 information elements, i.e. the second octet is discarded and the length indication is adjusted.

34) New subclause 6.4.6/Q.2931 Mapping of clearing messages

6.4.6 Mapping of clearing messages

The RELEASE message of Q.2931 is mapped to the DISCONNECT message of Q.931.

35) Revised subclause 6.6.2/Q.2931 Notification of interworking at terminating interface

6.6.2 Notification of interworking at the terminating interface

If the Progress indicator information element is included in a call control message, the procedures as described in 5.2 apply. If the Progress indicator information element is included in the PROGRESS message, no state change will occur but the network shall stop any supervisory timers except network timers T301, T304~~, T312~~ and T322 if the progress description is No. 1, No. 2 or, optionally, No. 4.

36) New subclause 6.8/Q.2931 Indication of using recovered clock for transmission

6.8 Indication of using recovered clock for transmission

See Annex M/Q.2931.

37) Revised Annex C/Q.2931 B-LLI negotiation

ANNEX C

Broadband low layer information negotiation

This annex describes additional procedures for the use of the Broadband Low Layer Information (B-LLI) information element by the user.

C.1 General

The purpose of the B-LLI information element is to provide a means which should be used for compatibility checking by an addressed entity (e.g. a remote user or an interworking unit or high layer function network node addressed by the calling user). The B-LLI information element is transferred transparently by a B-ISDN between the call originating entity (e.g. the calling user) and the addressed entity.

The user information protocol fields of the B-LLI information element indicate the low layer protocols (i.e. layer 3 and layer 2 protocols above the AAL) used between endpoints (users). This information is not interpreted by the B-ISDN and therefore the bearer capability provided by the B-ISDN is not affected by this information. The addressed entity may modify the low layer attributes by the negotiation described below if that can be supported by the bearer capability actually provided by the B-ISDN.

The Broadband low layer information information element is coded according to 4.5.9.

C.2 Low layer compatibility notification to the called user

When the calling user wishes to notify the called user of its low layer protocols above the ATM adaptation layer (i.e. as identified in octets 6 and 7 of the B-LLI information element) to be used during the call, then the calling user shall include a B-LLI information element in the SETUP message; this element is conveyed by the network and delivered to the called user. However, if the network is unable to convey this information element, it shall act as described in 5.6.8.1 (unrecognized information element).

C.3 B-LLI negotiation between users

The B-LLI supports the indication of certain parameters of acknowledged mode HDLC elements of procedures. If they are included, parameter(s) may be negotiated. In this case, the called user accepting the call may include a B-LLI information element in the CONNECT message. This element will be conveyed transparently by the network and delivered to the calling user in the CONNECT message. If the calling user cannot support the parameters in the CONNECT message, the calling user shall initiate call clearing procedures as described in 5.4.3.

NOTE – The lower layer protocol parameters which may be negotiated by this capability are: layer 2 mode (octet 6a), window size (octet 6b), user-specified layer 2 information (octet 6a), layer 3 mode (octet 7a), default packet size (octet 7b), and packet window size (octet 7c).

If, for any reason, the network is unable to convey this information element, it shall act as described in 5.6.8.1 (unrecognized information element) except that the cause value No. 43, "access information discarded" shall be used in the STATUS message.

If the calling user rejects the B-LLI information element contents in the CONNECT message, the calling user shall initiate clearing with cause No. 100, "invalid information element contents".

C.4 Alternate requested values

If the calling user wishes to indicate alternative values of B-LLI parameters (e.g. alternative protocol suites or protocol parameters), the B-LLI information element is repeated in the SETUP message. Up to three B-LLI information elements may be included in a SETUP message. The first B-LLI information element in the message is preceded by the Broadband repeat indicator information element specifying "priority list for selecting one possibility (descending order of priority)". The order of appearance of the B-LLI information elements indicates the order of preference of end-to-end low layer parameters.

If the network or called user does not support repeating of the B-LLI information element, and therefore discards the Broadband repeat indicator information element and the subsequent B-LLI information elements, only the first B-LLI information element is used in the negotiation. In addition, if the network discards the B-LLI information element, it shall send a STATUS message with cause value No. 43, "access information discarded".

The called user indicates a single choice from among the options offered in the SETUP message by including the B-LLI information element in the CONNECT message. Absence of a B-LLI information element in the CONNECT message indicates acceptance of the first B-LLI information element in the SETUP message.

If the calling user rejects the B-LLI information element contents in the CONNECT message, the calling user shall initiate clearing with cause No. 100, "invalid information element contents".

38) Revised Annex E/Q.2931 Mapping of and interworking with N-ISDN

ANNEX E

Mapping functions to support 64 kbit/s based circuit-mode ISDN services in B-ISDN and interworking between N-ISDN and B-ISDN (DSS1/DSS2)

E.1 Introduction

This annex specifies the functions to be performed by an Interworking Function (IWF) installed between the B-ISDN and the N-ISDN. As regards the mapping function, only the interworking between the access protocols involved is covered. Interworking scenarios including the B-ISUP and the N-ISUP protocols are out of the scope of this annex.

The communication scenario is described in Annex A/I.580 [58], scenario B. It should be noted that the functions and the mapping described in this subclause also apply to a Terminal Adapter (TA) at the UNI connecting a N-ISDN terminal to a B-ISDN network.

Interworking functions between N-ISDN and B-ISDN are only provided for circuit-mode 64 kbit/s based N-ISDN services. Interworking functions to support packet and frame mode bearer services are not in the scope of this ITU-T Recommendation.

For the interworking functions between N-ISDN and B-ISDN, the following principles shall apply:

A) *Interworking B-ISDN → N-ISDN*

1) If a B-ISDN specific service is requested at the DSS2 side of the IWF, the call shall be rejected by the IWF.
2) If a N-ISDN service is requested at the DSS2 side of the IWF but the bearer class in the B-BC information element does not indicate BCOB-A, then the call shall be rejected by the IWF. The same applies when the ATM traffic descriptor and/or the AAL parameters information elements do not specify values in accordance with E.4.
3) In the direction from DSS2 to DSS1, the IWF places the information elements to be transferred to the N-ISDN side into the ascending order required by ITU-T Recommendation Q.931.

B) *Interworking N-ISDN → B-ISDN*

1) If the IWF receives a request for a N-ISDN service at its DSS1 side, it will select an ATM user cell rate for the B-ISDN side which is able to carry the 64 kbit/s (or n × 64 kbit/s) bit rate of the N-ISDN service.
2) If the IWF receives a request for a N-ISDN service at its DSS1 side, it will select Bearer Class A (CBR, CO, end-to-end timing required), and AAL type 1 or the AAL for voice as default values for the B-ISDN side. The value for the field "susceptibility to clipping" in the B-BC information element is set to "susceptible to clipping".

E.2 Mapping functions for the direction DSS2 → DSS1

The mapping functions performed by the IWF for the direction from DSS2 to DSS1 are illustrated by the examples given below. These examples are not exhaustive. The same mapping principles also apply for other circuit-switched N-ISDN services.

The IWF will relay the content of the N-BC, N-LLC and N-HLC information elements transparently to the N-ISDN. No further processing is required, except for the changes needed to accommodate the different coding rules. The B-BC, ATM traffic descriptor, QoS parameter, end-to-end transit delay, OAM traffic descriptor and AAL parameters information elements are discarded.

E.2.1 A B-ISDN user requests the 3.1 kHz audio N-ISDN bearer service

See Table E.1.

Table E.1/Q.2931 – Mapping performed by the IWF for the 3.1 kHz audio bearer service (direction DSS2 → DSS1)

DSS2: Emulation of the N-ISDN bearer service 3.1 kHz audio	DSS1: 3.1 kHz audio bearer service
N-BC: – 3.1 kHz audio – Circuit mode – 64 kbit/s – ITU-T Rec. G.711, A- or μ-law	BC: – 3.1 kHz audio – Circuit mode – 64 kbit/s – ITU-T Rec. G.711, A- or μ-law
N-HLC: Optional	HLC: Present, if provided
N-LLC: Optional	LLC: Present, if provided
B-BC: – BCOB-A – Susceptible to clipping	–
ATM traffic descriptor: Equal to 64 kbit/s	–
Quality of Service: ~~Unspecified~~ No specific QoS class explicitly requested	–
AAL parameters: ~~AAL for voice~~See E.4	–
End-to-end transit delay: See 4.5.17 (optional)	–
OAM traffic descriptor: See 4.5.24 (optional)	–

E.2.2 A B-ISDN user requests the N-ISDN unrestricted digital information bearer service

See Table E.2.

Table E.2/Q.2931 – Mapping performed by the IWF for the unrestricted digital information bearer service (direction DSS2 → DSS1)

DSS2: Emulation of the N-ISDN unrestricted digital information bearer service	DSS1: Unrestricted digital information bearer service
N-BC: – Unrestricted digital information – Circuit mode – 64 kbit/s	BC: – Unrestricted digital information – Circuit mode – 64 kbit/s
N-HLC: Optional	HLC: Present, if provided
N-LLC: Optional	LLC: Present, if provided
B-BC: – BCOB-A – Susceptible to clipping	–
ATM traffic descriptor: Equal to 64 kbit/s	–
Quality of Service: ~~Unspecified~~ No QoS class explicitly requested	–
AAL parameters: AAL type 1	–
End-to-end transit delay: See 4.5.17 (optional)	–
OAM traffic descriptor: See 4.5.24 (optional)	–

E.2.3 A B-ISDN user requests the N-ISDN telephony teleservice

See Table E.3.

Table E.3/Q.2931 – Mapping performed by the IWF for the N-ISDN telephony teleservice (direction DSS2 → DSS1)

DSS2: Emulation of the N-ISDN telephony teleservice	DSS1: Telephony teleservice
N-BC: – Speech – Circuit mode – 64 kbit/s – ITU-T Rec. G.711, A- or μ-law	BC: – Speech – Circuit mode – 64 kbit/s – ITU-T Rec. G.711, A- or μ-law
N-HLC: Telephony	HLC: Telephony
N-LLC: Optional	LLC: Present, if provided
B-BC: – BCOB-A – Susceptible to clipping	–
ATM traffic descriptor: Equal to 64 kbit/s	–
Quality of Service: ~~Unspecified~~ No QoS class explicitly requested	–
AAL parameters: ~~AAL for voice~~ see E.4	–
End-to-end transit delay: See 4.5.17 (optional)	–
OAM traffic descriptor: See 4.5.24 (optional)	–

E.2.4 A B-ISDN user requests the N-ISDN videotelephony teleservice based on the unrestricted digital information with tones/announcements bearer capability

See Table E.4.

Table E.4/Q.2931 – Mapping performed by the IWF for the videotelephony teleservice (direction DSS2 → DSS1)

DSS2: Emulation of the N-ISDN videotelephony teleservice	DSS1: Videotelephony teleservice
N-BC: – Unrestricted digital information with tones/announcements – Circuit mode – 64 kbit/s – ITU-T Recommendations H.221 and H.242	BC: – Unrestricted digital information with tones/announcements – Circuit mode – 64 kbit/s – ITU-T Recommendations H.221 and H.242
N-HLC: Videotelephony (ITU-T Recommendation F.721)	HLC: Videotelephony (ITU-T Recommendation F.721)
N-LLC: Optional	LLC: Present, if provided
B-BC: – BCOB-A – Susceptible to clipping	–
ATM traffic descriptor: Equal to 64 kbit/s	–
Quality of Service: ~~Unspecified~~ No QoS class explicitly requested	–

Table E.4/Q.2931 – Mapping performed by the IWF for the videotelephony teleservice (direction DSS2 → DSS1) *(concluded)*

AAL parameters: See E.4	–
End-to-end transit delay: See 4.5.17 (optional)	–
OAM traffic descriptor: See 4.5.24 (optional)	–

E.3 Mapping functions for the direction DSS1 → DSS2

The mapping functions performed by the IWF for the direction from DSS1 to DSS2 are illustrated by the examples given below. These examples are not exhaustive. The same principles also apply to other circuit-switched ISDN services.

The IWF will relay the content of the BC, LLC and HLC information elements transparently to the B-ISDN. No further processing is required, except for the changes needed to accommodate the different coding rules. The B-BC, ATM traffic descriptor, QoS parameter, and AAL parameters information elements are generated by the IWF, using default values specified in E.4 and the information provided by the DSS1 information elements.

The "susceptibility to clipping" field of the B-BC information element in DSS2 is always set to "susceptible to clipping".

E.3.1 A N-ISDN user requests the 3.1 kHz audio bearer service

See Table E.5.

Table E.5/Q.2931 – Mapping performed by the IWF for the 3.1 kHz audio bearer service (direction DSS1 → DSS2)

DSS1: 3.1 kHz audio bearer service	DSS2: Emulation of the N-ISDN 3.1 kHz audio bearer service
BC: – 3.1 kHz audio – Circuit mode – 64 kbit/s – ITU-T Rec. G.711, A- or μ-law	N-BC: – 3.1 kHz audio – Circuit mode – 64 kbit/s – ITU-T Rec. G.711, A- or μ-law
HLC: Optional	N-HLC: Present, if provided
LLC: Optional	N-LLC: Present, if provided
–	B-BC: See E.4
–	ATM traffic descriptor: See E.4
–	Quality of Service: See E.4
–	AAL parameters: See E.4

E.3.2 A N-ISDN user requests the unrestricted digital information bearer service

See Table E.6.

Table E.6/Q.2931 – Mapping performed by the IWF for the unrestricted digital information bearer service (direction DSS1 → DSS2)

DSS1: Unrestricted digital information bearer service	DSS2: Emulation of the N-ISDN unrestricted digital information bearer service
BC: – Unrestricted digital information – Circuit mode – 64 kbit/s	N-BC: – Unrestricted digital information – Circuit mode – 64 kbit/s
HLC: Optional	N-HLC: Present, if provided
LLC: Optional	N-LLC: Present, if provided
–	B-BC: See E.4
–	ATM traffic descriptor: See E.4
–	Quality of Service: See E.4
–	AAL parameters: See E.4

E.3.3 A N-ISDN user requests the telephony teleservice

See Table E.7.

Table E.7/Q.2931 – Mapping performed by the IWF for the telephony teleservice (direction DSS1 → DSS2)

DSS1: Telephony teleservice	DSS2: Emulation of the N-ISDN telephony teleservice
BC: – Speech – Circuit mode – 64 kbit/s – ITU-T Rec. G.711, A- or μ-law	N-BC: – Speech – Circuit mode – 64 kbit/s – ITU-T Rec. G.711, A- or μ-law
HLC: Telephony	N-HLC: Telephony
LLC: Optional	N-LLC: Present, if provided
–	B-BC: See E.4
–	ATM traffic descriptor: See E.4
–	Quality of Service: See E.4
–	AAL parameters: See E.4

E.3.4 A N-ISDN user requests the videotelephony teleservice based on the unrestricted digital information with tones/announcements bearer capability

See Table E.8.

Table E.8/Q.2931 – Mapping performed by the IWF for the videotelephony teleservice (direction DSS1 → DSS2)

DSS1: Videotelephony teleservice	DSS2: Emulation of the N-ISDN videotelephony teleservice
BC: – Unrestricted digital information with tones/announcements – Circuit mode – 64 kbit/s – ITU-T Recommendations H.221 and H.242	N-BC: – Unrestricted digital information with tones/announcements – Circuit mode – 64 kbit/s – ITU-T Recommendations H.221 and H.242
HLC: Videotelephony (ITU-T Recommendation F.721)	N-HLC: Videotelephony (ITU-T Recommendation F.721)
LLC: Optional	N-LLC: Present, if provided
–	B-BC: See E.4
–	ATM traffic descriptor: See E.4
–	Quality of Service: See E.4
–	AAL parameters: See E.4

E.4 Codepoint values of information elements to support 64 kbit/s based circuit-mode ISDN services in B-ISDN

E.4.1 Introduction

This subclause provides the codepoint values of B-ISDN specific information elements to support 64 kbit/s based circuit-mode ISDN services in B-ISDN. The codepoints shall be used by terminal equipment connected to the B-ISDN if it requests a N-ISDN service and by an IWF for generation of the appropriate B-ISDN codepoints.

E.4.2 Codepoints of information elements used for emulated N-ISDN services

E.4.2.1 Broadband bearer capability

Octet	Information element field	Field value
5	Bearer class	BCOB-A
6	Susceptibility to clipping	Susceptible to clipping
	User plane connection configuration	Point-to-point

E.4.2.2 ATM traffic descriptor

E.4.2.2.1 ATM traffic descriptor for N-BC information transfer capabilities of unrestricted digital information and restricted digital information

Octet	Information element field	Field value if no OAM cells are used (Note 1)	Field value if 1 OAM cells/s is used (Note 2)	Field value with maximal OAM support (Note 3)
7.1 7.2 7.3	Forward peak cell rate (CLP = 0 + 1)	0000 0000 0000 0000 1010 1011 (171 cells/s)	0000 0000 0000 0000 1010 1100 (172 cells/s)	0000 0000 0000 0000 1010 1111 (175 cells/s)
8.1 8.2 8.3	Backward peak cell rate (CLP = 0 + 1)	0000 0000 0000 0000 1010 1011 (171 cells/s)	0000 0000 0000 0000 1010 1100 (172 cells/s)	0000 0000 0000 0000 1010 1111 (175 cells/s)

NOTE 1 – These values are based on an AAL for voice (i.e. AAL type 1 with a payload of 47 octets per cell ~~(i.e. no partially filled cell)~~) for user information and no cell rate allocation for OAM cells.

NOTE 2 – These values are based on an AAL for voice (i.e. AAL type 1 with a payload of 47 octets per cell ~~(i.e. no partially filled cell)~~) for user information and on 1 cell/s Allocation for OAM cells.

NOTE 3 – These values are based on an AAL for voice (i.e. AAL type 1 with a payload of 47 octets per cell ~~(i.e. no partially filled cell)~~) for user information and the following cell rate allocation for OAM: two per cent of the user cell rate and an additional 1 cell/s.

E.4.2.2.2 ATM traffic descriptor for N-BC information transfer capabilities of speech and 3.1 kHz audio

The field values used for these information transfer capabilities are for further study (see ITU-T Recommendation I.580 [58]).

E.4.2.3 QoS parameter

Octet	Information element field	Field value
5	QoS-class forward	~~Unspecified~~ No QoS class explicitly requested
6	QoS-class backward	~~Unspecified~~ No QoS class explicitly requested

E.4.2.4 AAL parameters

E.4.2.4.1 AAL parameters for N-BC information transfer capabilities of unrestricted digital information and restricted digital information

Octet	Information element field	Field value
5	AAL-Type	0000 0001 (AAL Type 1)
6.1	Subtype	0000 0010 (circuit transport)
7.1	CBR Rate	0000 0001 (64 kbit/s)
9.1	Source Clock Frequency	0000 0000 (Null) (Note)
10.1	Error Correction method	0000 0000 (Null) (Note)
11.1/11.2	Structured data transfer block size	0000 0000 0000 0001 (block size of 1) ~~0000 0000 0000 0000 (block size of 1)~~
12.1	Partially filled cells method	0000 0000 (Null) (Note)
NOTE – These fields may also be absent which is equivalent to the null coding.		

E.4.2.4.2 AAL parameters for N-BC information transfer capabilities of speech and 3.1 kHz audio

Octet	Information element field	Field value
5	AAL-Type	0000 0000 (AAL for voice)

E.4.2.4.3 AAL parameters for N-BC information transfer capabilities of unrestricted digital information with tones/announcements

The field values used for this information transfer capability are for further study.

39) Revised Annex F/Q.2931 AAL parameters indication and negotiation

ANNEX F

ATM adaptation layer parameters indication and negotiation

This annex describes procedures for the use of the ATM adaptation layer parameters information element by endpoint equipment.

F.1 General

The purpose of the ATM adaptation layer parameters information element is to provide a means which may be used for conveying information related to the ATM adaptation layer between endpoints. The ATM adaptation layer parameters information element is transferred transparently between ATM endpoints by the network.

F.2 ATM adaptation layer parameter indication in the SETUP message

When the calling endpoint wishes to indicate to the called endpoint the AAL common part parameters and service specific part to be used during the call, the calling endpoint shall include an ATM adaptation layer parameters information element in the SETUP message. This information element is conveyed by the network and delivered to the called user.

The ATM adaptation layer parameters information element may include the following parameters for different AAL connection types:

a) *For AAL Connection type 1*
   - Subtype;
   - CBR Rate;
   - Source Clock Frequency Recovery Method;
   - Error Correction;
   - Structured Data Transfer Block size;
   - Partially Filled Cells Indicator.

b) *For AAL connection type 2*
   - Maximum CPS-SDU size;
   - SSCS type and related parameters.

c) *For AAL Connection type 3/4*
   - Forward Maximum CPCS-SDU size;
   - Backward Maximum CPCS-SDU size;

– MID range;
– SSCS Type.

d) *For AAL Connection type 5*
– Forward Maximum CPCS-SDU size;
– Backward Maximum CPCS-SDU size;
– SSCS Type.

e) *User-defined AAL*
– User-defined AAL information (4 octets).

NOTE – For AAL connection types 3/4 and 5, the forward maximum CPCS-SDU size and backward maximum CPCS-SDU size parameters shall either both be present or both be absent in the ATM adaptation layer parameters information element. For unidirectional ATM virtual connections, the backward maximum CPCS-SDU size shall be set to "0".

If the called endpoint receives an ATM adaptation layer parameters information element in the SETUP message which contains the forward or backward maximum CPCS-SDU size but not both, the called endpoint should clear the call with cause No. 100, "invalid information element contents".

F.3 Maximum CPCS-SDU size negotiation

When the called user has received an ATM adaptation layer parameters information element in a SETUP message and the AAL type is either AAL 3/4 or AAL 5, the ATM adaptation layer parameters information element shall be included in the CONNECT message. The ATM adaptation layer parameters information element shall include the forward maximum CPCS-SDU size, indicating the size of the largest CPCS-SDU that the called user is able to receive, and the backward maximum CPCS-SDU size, indicating the size of the largest CPCS-SDU that it will transmit. The values for the forward and backward maximum CPCS-SDU size indicated in the CONNECT message shall not be greater than the values indicated by the calling user in the SETUP message. The ATM adaptation layer parameters information element will be conveyed to the calling user.

NOTE – For unidirectional ATM virtual connections, the backward maximum CPCS-SDU size shall be set to "0".

If the called user does not include the CPCS-SDU size in the CONNECT message, the calling user shall assume that the called user accepts the values of the forward and backward maximum CPCS-SDU size indicated by the calling user in the SETUP message.

If the calling party cannot use the forward or backward maximum CPCS-SDU size indicated in the CONNECT message (i.e. because the value negotiated by the called party is unacceptably small), then the call shall be cleared with cause No. 93, "AAL parameters cannot be supported".

If the calling endpoint receives an ATM adaptation layer parameters information element in the CONNECT message which:

a) contains octet groups other than the forward and backward maximum CPCS-SDU size and/or MID range;

b) contains a maximum CPCS-SDU size which is greater than the maximum CPCS-SDU size which was sent in the SETUP message; or

c) is missing either the forward or backward maximum CPCS-SDU size;

the calling endpoint ~~should~~ shall clear the call with cause No. 100, "invalid information element contents".

F.4 MID range negotiation

When the called user receives the ATM adaptation layer parameters information element in the SETUP message which indicates AAL type 3/4, the called user shall check the MID range value. If the called user cannot support the indicated MID range but it can support a smaller range, the called user includes an ATM adaptation layer parameters information element in the CONNECT message containing the MID range that it can support.

The calling user will either accept the MID range contained in the CONNECT message or will clear the call with cause No. 93, "AAL parameters cannot be supported".

If the called user does not include the MID range in the CONNECT message, the calling user shall assume that the called user accepts the MID range indicated by the calling user in the SETUP message.

If the calling endpoint receives an ATM adaptation layer parameters information element in the CONNECT message which:

a) contains octet groups other than the forward and backward maximum CPCS-SDU size and/or MID range; or

b) contains a MID range which is greater than the MID range which was sent in the SETUP message;

the calling endpoint ~~should~~ shall clear the call with cause No. 100, "invalid information element contents".

F.5 Use of forward and backward maximum CPCS-SDU size by the AAL 3/4 or 5 entity in the user plane

The values of forward and backward maximum CPCS-SDU size resulting from AAL parameters negotiation shall be used by the AAL entities in the user plane. The AAL entity in the calling user equipment shall not send a CPCS-SDU size larger than the indicated value specified in the forward maximum CPCS-SDU size parameter, and may allocate its internal resources based on the value indicated in the backward maximum CPCS-SDU size parameter. Similarly, the AAL entity in the called user equipment shall not send a CPCS-SDU size larger than the indicated value specified in the backward maximum CPCS-SDU size parameter, and may allocate its internal resources based on the value indicated in the forward maximum CPCS-SDU size parameter.

F.6 Use of maximum CPS-SDU size by the AAL2 entity in the user plane

The value for the maximum CPS-SDU size is either 45 octets (the default) or 64 octets and are not negotiated.

If the called user does not include the CPS-SDU size in the CONNECT message, the calling user shall assume that the called user accepts the default value of 45 octets for both the forward and backward maximum CPS-SDU size indicated by the calling user in the SETUP message.

If the calling party cannot use the forward or backward maximum CPS-SDU size indicated in the CONNECT message (i.e. because the value in the calling user SETUP message indicated 64 octets), then the call shall be cleared with cause No. 93, "AAL parameters cannot be supported".

F.7 AAL type selection and negotiation procedures

The AAL type selection and negotiation procedure is optional, but may be a mandatory requirement for the provision of certain services or applications.

If the calling user wishes to indicate an alternative AAL type, the AAL parameters information element is repeated in the SETUP message. Up to two AAL parameters information elements may be included in a SETUP message, in descending order of priority so that the order of appearance of the AAL parameters information elements indicates the order of preference of the AAL type.

The called user indicates a single choice of AAL type among the choices offered in the SETUP message by including the AAL parameters information element in the CONNECT message. The absence of an AAL parameters information element in the CONNECT message implicitly indicates the acceptance of the type of AAL as identified in the first AAL parameters information element that was included in the SETUP message. The called user may also negotiate parameter values of the selected AAL type by using the procedures in F.2 to F.5.

If the network or called user does not support repeated AAL parameters information elements, and therefore discards the second AAL parameters information element (following the first that shall always be recognized and accepted), only the first AAL parameters information element is used in the negotiation.

If the calling user rejects the AAL parameters information element contents in the CONNECT message, the calling user shall initiate clearing with cause No. 100, "invalid information element contents".

40) Revised Annex J.3/Q.2931 References

J.3 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] CCITT Recommendation E.164 (1991), *Numbering plan for the ISDN era*.

[2] ITU-T Recommendation F.811 (1996), *Broadband connection-oriented bearer service*.

[3] CCITT Recommendation G.711 (1988), *Pulse Code Modulation (PCM) of voice frequencies*.

~~[4] Recommendation G.721, *32 kbit/s Adaptive Differential Pulse Code Modulation (ADPCM).*~~

[5] CCITT Recommendation G.722 (1988), *7 kHz audio-coding within 64 kbit/s*.

[6] ITU-T Recommendation H.221 (1999), *Frame structure for a 64 to 1920 kbit/s channel in audiovisual teleservices*.

~~[7] Recommendation H.230, *Frame-synchronous control and indication signals for audiovisual systems.*~~

[8] ITU-T Recommendation H.242 (1999), *System for establishing communication between audiovisual terminals using digital channels up to 2 Mbit/s*.

[9] CCITT Recommendation I.230 (1988), *Definition of bearer service categories*.

[10] CCITT Recommendation I.240 (1988), *Definition of teleservices*.

[11] ITU-T Recommendation I.311 (1996), *B-ISDN general network aspects*.

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

[13] CCITT Recommendation I.330 (1988), *ISDN numbering and addressing principles*.

[14] CCITT Recommendation I.334 (1988), *Principles relating ISDN numbers/sub-addresses to the OSI reference model network layer addresses*.

[15] ITU-T Recommendation I.361 (1999), *B-ISDN ATM layer specification*.

~~[16] Recommendation I.362, *B-ISDN ATM Adaptation Layer (AAL) functional description*.~~

~~[17] Recommendation I.363, *B-ISDN ATM Adaptation Layer (AAL) specification*.~~

[18] ITU-T Recommendation I.371 (2000), *Traffic control and congestion control in B-ISDN*.

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

~~[20] Recommendation I.460, *Multiplexing, rate adaption and support of existing interfaces*.~~

[21] ITU-T Recommendation I.500 (1993), *General structure of the ISDN interworking Recommendations*.

[22] CCITT Recommendation I.610 (1991), *OAM principles of the B-ISDN access*.

[23] ISO 1745:1975, *Information processing – Basic mode control procedures for data communication systems*.

[24] ISO/IEC 4335:1993, *Information technology – Telecommunications and information exchange between systems – High-level Data Link Control (HDLC) procedures – Elements of procedures*.

[25] ISO/IEC 7776:1995, *Information technology – Telecommunications and information exchange between systems – High-level data link control procedures – Description of the X.25 LAPB compatible DTE data link procedures*.

[26] ISO/IEC 8208:2000, *Information technology – Data communications – X.25 Packet Layer Protocol For Data Terminal Equipment*.

[27] ISO/IEC 8473 (All parts), *Information technology – Protocol for providing the connectionless-mode network service*.

[28] ISO/IEC 8802-2:1998, *Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Part 2: Logical link control*.

[29] ITU-T Recommendation X.263 (1998) | ISO/IEC TR 9577:1999, *Information technology – ~~Telecommunications and information exchange between systems –~~ Protocol identification in the Network layer*.

[30] ITU-T Recommendation Q.2610~~850~~ (1999), *Usage of cause and location in B-ISDN user part and DSS2*.

[31] ITU-T Recommendation Q.921 (1997), *ISDN user-network interface – Data link layer specification*.

[32] CCITT Recommendation Q.922 (1992), *ISDN data link layer specification for frame mode bearer services*.

[33] ITU-T Recommendation Q.931 (1998), *ISDN user-network interface layer 3 specification for basic call control*.

[34] ITU-T Recommendation Q.933 (1995), *Digital Subscriber Signalling System No. 1 (DSS1) – Signalling specification for frame mode basic call control*.

~~[35] Recommendation Q.2010, *Broadband integrated services digital network overview signalling capability set 1, relase 1.*~~

[36] ITU-T Recommendation Q.2120 (1995), *B-ISDN meta-signalling protocol*.

[37] ITU-T Recommendation Q.2650 (1999), *Interworking between Signalling System No. 7 broadband ISDN user part (B-ISUP) and Digital Subscriber Signalling System No. 2 (DSS2)*.

[38] ITU-T Recommendation Q.2100 (1994), *B-ISDN Signalling ATM Adaptation Layer (SAAL) – Overview description*.

[39] CCITT Recommendation T.50 (1992), *Information technology – 7-bit coded character set for information interchange*.

ISO/IEC 646:1991, *Information technology – ISO 7-bit coded character set for information interchange.*

[40] ITU-T Recommendation T.70 (1993), *Network-independent basic transport service for the telematic services*.

[41] CCITT Recommendation T.71 (1988), *Link Access Protocol Balanced (LAPB) extended for half-duplex physical level facility*.

[42] CCITT Recommendation T.90 (1992), *Characteristics and protocols for terminals for telematic services in ISDN*.

~~[43] Recommendation V.110/X.30, *Support of Data Terminal Equipments (DTEs) with V-Series type interfaces by an integrated services digital network.*~~

~~[44] Recommendation V.120, *Support by an ISDN of data terminal equipment with V-Series type interfaces with provision for statistical multiplexing*.~~

[45] ITU-T Recommendation X.25 (1996), *Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit*.

~~[46] Recommendation X.31, *Support of packet mode terminal equipment by an ISDN*.~~

[47] ITU-T Recommendation X.75 (1996), *Packet-switched signalling system between public networks providing data transmission services*.

[48] ITU-T Recommendation X.121 (1996), *International number plan for public data networks*.

[49] CCITT Recommendation X.200 (1988), *Reference model of Open Systems Interconnection for CCITT applications*.

[50] ITU-T Recommendation X.213 (1995) | ISO/IEC 8348:1996, *Information technology – Open Systems Interconnection – Network service definition.*

[51] ITU-T Recommendation X.223 (1993), *Use of X.25 to provide the OSI connection-mode network service for ITU-T applications*.

ISO/IEC 8878:1992, *Information technology – Telecommunications and information exchange between systems – Use of X.25 to provide the OSI Connection-mode Network*

[52] ITU-T Recommendation Q.2110 (1994), *B-ISDN ATM adaptation layer – Service Specific Connection Oriented Protocol (SSCOP)*.

[53] ITU-T Recommendation Q.2130 (1994), *B-ISDN signalling ATM adaptation layer – Service specific coordination function for support of signalling at the user-to-network interface (SSCF at UNI)*.

~~[54] Recommendation Q.2761, *Broadband Integrated Services Digital Network (B-ISDN) Functional description of the B-ISDN user part (B-ISUP) of Signalling System No. 7.*~~

~~[55] Recommendation Q.2762, *Broadband Integrated Services Digital Network (B-ISDN) General functions of messages and signals of the B-ISDN user part B-ISUP of Signalling System No. 7.*~~

[56] ITU-T Recommendation Q.2763 (1999), *Signalling System No. 7 B-ISDN user part (B-ISUP) – Formats and codes*.

~~[57] Recommendation Q.2764, *Broadband Integrated Services Digital Network (B-ISDN) – Signalling System No. 7 B-ISDN user part (B-ISUP) – Basic call procedures*.~~

[58] ITU-T Recommendation I.580 (1995), *General arrangements for interworking between B-ISDN and 64 kbit/s based ISDN*.

[59] ITU-T Recommendation E.191 (2000), *B-ISDN numbering and addressing*.

[60] ITU-T Recommendation I.356 (2000), *B-ISDN ATM Layer cell transfer performance*.

[61] ITU-T Recommendation I.363.1 (1996), *B-ISDN ATM Adaptation Layer (AAL) Specification: Type 1 AAL*.

[62] ITU-T Recommendation I.363.2 (1997), *B-ISDN ATM Adaptation Layer (AAL) Specification: Type 2 AAL*.

[63] ITU-T Recommendation I.363.3 (1996), *B-ISDN ATM Adaptation Layer (AAL) Specification: Type 3/4 AAL*.

[64] ITU-T Recommendation I.363.5 (1996), *B-ISDN ATM Adaptation Layer (AAL) Specification: Type 5 AAL*.

[65] ITU-T Recommendation I.365.1 (1993), *B-ISDN ATM adaptation layer sublayers: Frame relaying service specific convergence sublayer (FR-SSCS)*.

[66] ITU-T Recommendation I.365.2 (1995), *B-ISDN ATM adaptation layer sublayers: Service-specific coordination function to provide the connection-oriented network service*.

[67] ITU-T Recommendation I.365.3 (1995), *B-ISDN ATM adaptation layer sublayers: Service-specific coordination function to provide the connection-oriented transport service*.

[68] ITU-T Recommendation I.365.4 (1996), *B-ISDN ATM adaptation layer sublayers: Service-specific coordination function for HDLC applications*.

[69] ITU-T Recommendation I.366.1 (1998), *Segmentation and Reassembly Service Specific Convergence Sublayer for the AAL Type 2*.

[70] ITU-T Recommendation I.366.2 (1999), *AAL type 2 service specific convergence sublayer for trunking*.

[71] CCITT Recommendation Q.320 (1988), *Signal code for register signalling*.

[72] CCITT Recommendation Q.322 (1988), *Multifrequency signal sender*.

[73] CCITT Recommendation Q.323 (1988), *Multifrequency signal receiving equipment*.

[74] CCITT Recommendation Q.441 (1988), *Signalling code*.

[75] ITU-T Recommendation Q.2961.2 (1997), *Digital subscriber signalling system No. 2 – Additional traffic parameters: Support of ATM transfer capability in the broadcast bearer capability information element*.

[76] ITU-T Recommendation Q.2965.1 (1999), *Digital subscriber signalling system No. 2: Support of Quality of Service classes*.

[77] ITU-T Recommendation Q.2965.2 (1999), *Digital subscriber signalling system No. 2: Signalling of individual QoS parameters*.

[78] IEEE Std 802-1990, *IEEE Standards for Local and Metropolitan Area Networks: Overview and Architecture*.

[79] ITU-T Recommendation H.310 (1998), *Broadband audiovisual communication systems and terminals*.

[80] ITU-T Recommendation H.321 (1998), *Adaptation of H.320 visual telephone terminals to B-ISDN environments*.

[81] ITU-T Recommendation Q.932 (1998), *Digital subscriber signalling system No. 1 – Generic procedures for the control of ISDN supplementary services*.

[82] ITU-T Recommendation Q.2963.1 (1999), *Digital subscriber signalling system No. 2 – Connection modification: Peak cell rate modification by the connection owner*.

[83] CCITT Recommendation F.721 (1992), *Videotelephony teleservice for ISDN*.

41) Revised Annex K/Q.2931 Handling of end-to-end transit delay IE

ANNEX K

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

For the handling of the end-to-end transit delay information element, see ITU-T Recommendation Q.2965.2.

~~**K.1 General**~~

~~This annex describes the use of the End-to-end transit delay information element.~~

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

~~The purpose of the End-to-end transit delay information element is to indicate the maximum end-to-end transit delay acceptable for a call, and to indicate the cumulative transit delay to be expected for a virtual channel connection.~~

~~The calling user may indicate a maximum end-to-end transit delay value to specify end-to-end transit delay requirements for a given call or indicate that any end-to-end transit delay is acceptable.~~

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

~~NOTE 1 – The handling of this information within the network is described in the B-ISUP Recommendations [54], [55], [56], [57]. These Recommendations state that the cumulative transit delay value is updated sequentially along the route of the call to determine the end-to-end transit delay to be expected for the call. The B-ISUP clears the call if the maximum end-to-end transit delay requirement cannot be met.~~

~~The network shall include an End-to-end transit delay information element in the SETUP message which is sent to the called user if the calling user included an End-to-end transit delay information element in the SETUP message.~~

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

~~NOTE 2 – This is particularly important if the transmission line between the network boundary and the called terminal equipment causes substantial further delay (e.g. a satellite link).~~

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

~~If the called user accepts the call, it is recommended that the called user includes an End-to-end transit delay information element in the CONNECT message specifying the final cumulative transit delay value for the call.~~

NOTE 3 – The B-ISUP Recommendations state that the cumulative transit delay value which the network receives in the CONNECT message will be passed transparently to the calling user.

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

K.2 Handling of the End-to-end transit delay information element in the SETUP message at the originating UNI

The inclusion of the End-to-end transit delay information element in the SETUP message by the calling user is optional.

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

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

K.3 Handling of the End-to-end transit delay information element in the SETUP message at the destination UNI

The network shall include an End-to-end transit delay information element if the calling user included an End-to-end transit delay information element in the SETUP message. Both the cumulative transit delay subfield and the maximum end-to-end transit delay subfield shall be present.

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

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

K.5 Handling of the End-to-end transit delay information element in the CONNECT message at the destination UNI

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

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

K.6 Handling of the End-to-end transit delay information element in the CONNECT message at the originating UNI

The network shall include an End-to-end transit delay information element in the CONNECT message sent to the calling user if the called user included an End-to-end transit delay information element in the CONNECT message. No maximum end-to-end transit delay subfield shall be included.

42) New Annex M/Q.2931 Indication of using recovered clock for transmission

ANNEX M

Indication of using the recovered clock for transmission

M.1 Introduction

This annex describes how indication of the intention of using recovered clock for transmission can be provided. This is an end-to-end (user-to-user) feature and does not require any participation from the network beyond forwarding the messages and information element from one user to the other.

M.2 Coding requirements

M.2.1 Messages

Indication of using the recovered clock for transmission requires the use of the SETUP, ALERTING and CONNECT messages. The SETUP, ALERTING and CONNECT messages need to include the Broadband report type information element to support this capability.

M.2.2 Information elements

M.2.2.1 Broadband report type

See 4.5.25 for the coding of the Broadband report type information element.

The following report type is used by the clock recovery function of the receiver used for transmit (Tx) clock indication operation:

– *Recovered clock of the receiver used for transmit (Tx) clock*

This value is used by a ~~the one~~ user to indicate to the remote user ~~to indicate~~ his intention to use the recovered clock for transmission. It is included in the SETUP, ALERTING or CONNECT message.

The type of report (octet 5) shall be coded as the following:

Bits	Meaning
8 7 6 5 4 3 2 1	
0 0 0 0 0 0 1 0	Recovered clock of the receiver used for transmit (TX) clock

M.3 Call/connection control procedures

M.3.1 Activation/deactivation/registration

Not applicable.

M.3.2 Invocation and operation

M.3.2.1 Requirement on the user at the coincident Sb/Tb reference point originating a call

If a user at the coincident Sb/Tb reference point originating a call does not have access to a network clock, and has the capability to support recovered timing recovery, it shall signal its intention to use the recovered clock for transmission by using type of report "Recovered clock of the receiver used for transmit (Tx) clock" in a broadband report type information element in the SETUP message. If a user at the coincident Sb/Tb reference point originating a call is performing adaptive timing recovery and receives a type of report "Adaptive clock of the receiver used for transmit (Tx) clock" in a

Broadband report type information element in any message, it shall revert to the use of an independent clock source.

M.3.2.2 Requirement on the user at the coincident Sb/Tb reference point receiving a call

If a user at the coincident Sb/Tb reference point receiving a call receives a type of report "Recovered clock of the receiver used for transmit (Tx) clock" in a Broadband report type information element in any message, it shall not perform timing recovery. If a user at the coincident Sb/Tb reference point receiving a call satisfies the following requirements, it shall perform timing recovery and signal its intention to use the recovered clock for transmission by using type of report "Recovered clock of the receiver used for transmit (Tx) clock" in a Broadband report type information element in the ALERTING or CONNECT message sent in response to the SETUP message:

- it does not have access to a network clock; and
- it has the capability to support timing recovery; and
- it does not receive a type of report "Recovered clock of the receiver used for transmit (Tx) clock" in a Broadband report type information element in any message.

M.3.2.3 Exceptional procedures

There are no exceptional procedures.

43) New Annex N/Q.2931 End-to-end completion indication procedures

ANNEX N

End-to-end connection completion indication

N.1 Introduction

This annex describes how indication of end-to-end connection completion can be provided to the called user. End-to-end connection indication is an end-to-end (user-to-user) feature and does not require any participation from the network beyond forwarding the messages and information element from one user to the other.

N.2 Coding requirements

N.2.1 Messages

End-to-end connection completion indication requires the use of the SETUP, CONNECT, and CONNECTION AVAILABLE messages. The SETUP, CONNECT, and CONNECTION AVAILABLE messages need to include the Broadband report type information elements to support end-to-end connection completion indication.

N.2.2 Information elements

N.2.2.1 Broadband report type

See 4.5.25 for the coding of the Broadband report type information element.

The following report types are used in the connection completion indication operation:

– *End-to-end connection completion capability available*

  This value is used by the calling user to indicate to the called user that an indication of end-to-end connection completion can be provided for completion of the call. It is included in the SETUP message.

– *End-to-end connection completion indication requested*

This value is used by the called user to indicate to the calling user that an indication of end-to-end connection completion is desired for completion of the call. It is included in the CONNECT message.

– *End-to-end connection completed*

This value is used by the calling user to indicate to the called user that the end-to-end connection is completed and that information transfer can begin. It is included in a CONNECTION AVAILABLE message.

The type of report (octet 5) shall be coded as the following:

Bits	Meaning
8 7 6 5 4 3 2 1	
0 0 0 0 0 1 0 0	End-to-end connection completion capability available
0 0 0 0 0 1 0 1	End-to-end connection completion indication requested
0 0 0 0 0 1 1 0	End-to-end connection completed

N.3 Call/connection control procedures for connection completion indication

N.3.1 Activation/deactivation/registration

Not applicable.

N.3.2 Invocation and operation

N.3.2.1 Normal operation

The procedures for end-to-end connection completion indication are based on the delivery of Broadband report type information elements among the two users of a call/connection. The network, when it supports connection completion indication, shall forward the indications to the other user involved in the call.

N.3.2.2 Actions at the destination interface

A called user wishing to request an end-to-end connection completion indication during call establishment shall include the Broadband report type information element in the CONNECT message, with the type of report coded as "End-to-end connection completion indication requested". The called user may do this whether or not the incoming SETUP message contained an end-to-end connection completion capability indication (see N.3.2.3). Upon sending the CONNECT message, in addition to starting timer T313, the user shall start timer T333 and enter the Connect Request state.

The called user shall wait for the receipt of a CONNECTION AVAILABLE message, with the indication description coded as "End-to-end connection completed" before sending information. Upon receipt of this indication, the called user shall stop timer T333.

N.3.2.3 Actions at the originating interface

If the calling user is able to support connection completion indication if requested by the called user, it may optionally indicate this by including a Broadband report type information element in the SETUP message with the type of report coded to "End-to-end connection completion capability available".

Upon receiving an indication that the call has been accepted, if the network determines that end-to-end connection completion indication has been requested, the network shall include the Broadband report type information element with the type of report coded as "end-to-end connection

completion indication requested" in the CONNECT message, start timer T334, send the CONNECT message to the calling user and enter the Active state.

If, as part of call establishment, a calling user receives a Broadband report type information element in the CONNECT message, with the type of report coded as "End-to-end connection completion indication requested", the user shall interpret it as a request to send an indication that the end-to-end connection is completed. Following the sending of the CONNECT ACKNOWLEDGE message, the calling user shall send a CONNECTION AVAILABLE message, and include a Broadband report type information element with the type of report coded as "End-to-end connection completed".

If a CONNECTION AVAILABLE message is received by the network in the Active state while timer T334 is running, the network shall stop timer T334 and forward the message to the other user involved in the call.

The network shall not take any action on the expiry of timer T334.

The network shall not take any action on receipt of a CONNECTION AVAILABLE message in the Active state if timer T334 is not running. The CONNECTION AVAILABLE message shall be discarded.

N.3.2.4 Exceptional procedures

N.3.2.4.1 Actions at the destination interface

The actions to be taken when timer T333 expires are implementation-dependent, e.g. the call could resume and information transfer could begin, or the call could be cleared according to normal procedures.

If the called user receives a CONNECTION AVAILABLE message with the type of report coded as "End-to-end connection completed" while timer T333 is not running, the CONNECTION AVAILABLE message shall be ignored.

N.3.2.4.2 Actions at the originating interface

There is no exceptional procedure identified at the originating interface.

N.4 List of timers

The following network-side and user-side timers have been identified in the procedures for invocation and operation (see Tables N.1 and N.2):

Table N.1/Q.2931 – Timer in the user side defined in N.4

Timer number	Default time-out value	State of call	Cause for start	Normal stop	At the first expiry	At the second expiry	Implementation
T333	10 s	Connect Request	Sending of "End-to-end connection completion indication requested" in CONNECT message	Receipt of "End-to-end connection completed" in CONNECTION AVAILABLE message	Implementation dependent (see N.3.2.4.1)	Not applicable	Mandatory if end-to-end completion indication is requested

Table N.2/Q.2931 – Timer in the network side defined in N.4

Timer number	Default time-out value	State of call	Cause for start	Normal stop	At the first expiry	At the second expiry	Implementation
T334	1 s	Active	CONNECT sent with end-to-end connection completion indication request	CONNECTION AVAILABLE received	No action	Not applicable	Mandatory if end-to-end completion indication is requested

N.5 SDL diagrams

The terminology and acronyms of Annex A shall apply in the SDLs in this subclause. These SDL diagrams extend the ones defined in Annex A and should be read in conjunction with the SDL diagrams in Annex A.

Q.2931 SDL - Network Side
(Annex N extensions)

Signal Lists

Signal for B-ISDN Calls

Primitives to/from Application Process	
From AP	To AP
Connection-available-req	Connection-available-ind

Primitives to/from Q.2931-N

Signal Lists

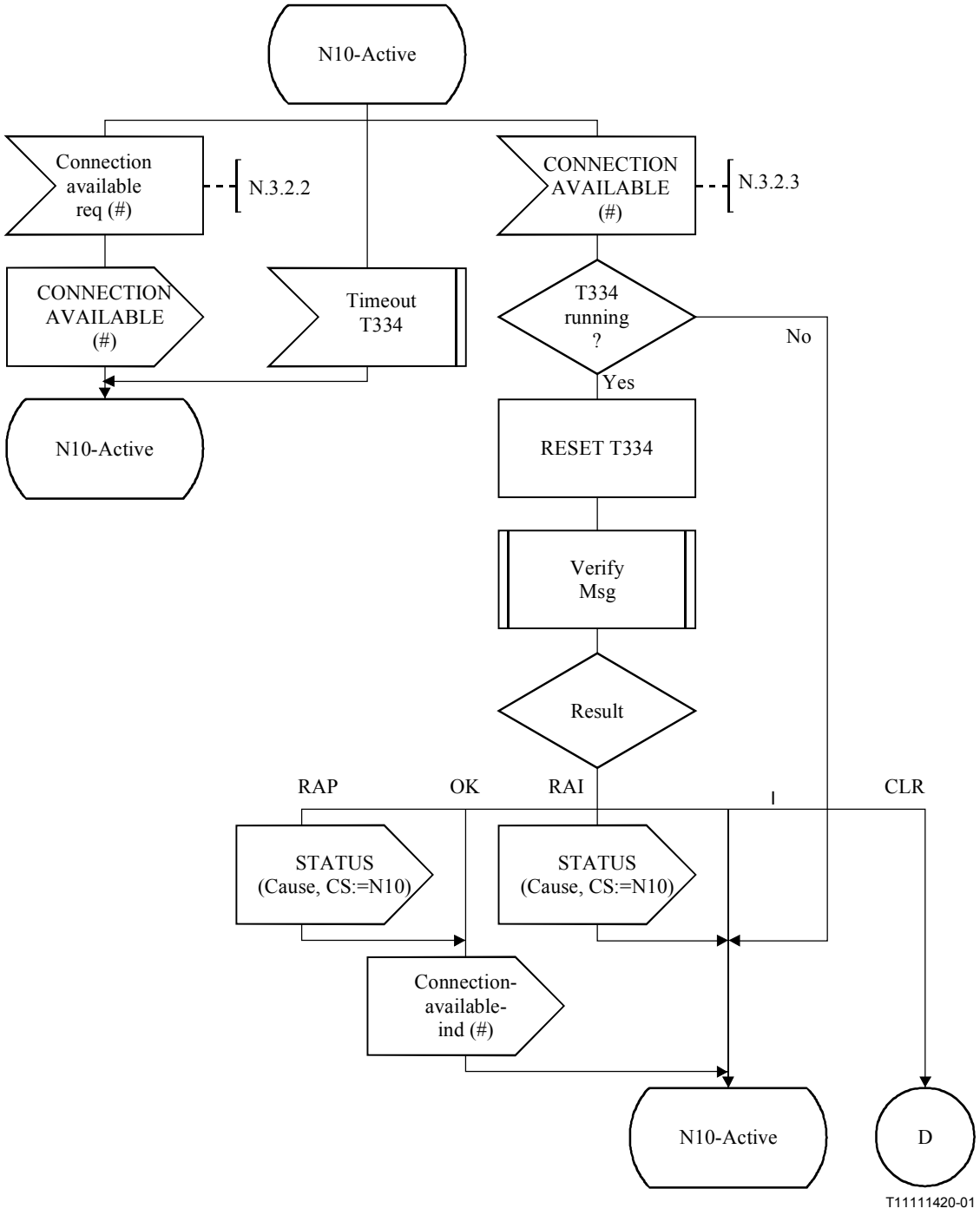
CDtoON	ONtoCD
Connection-available-req	Connection-available-ind

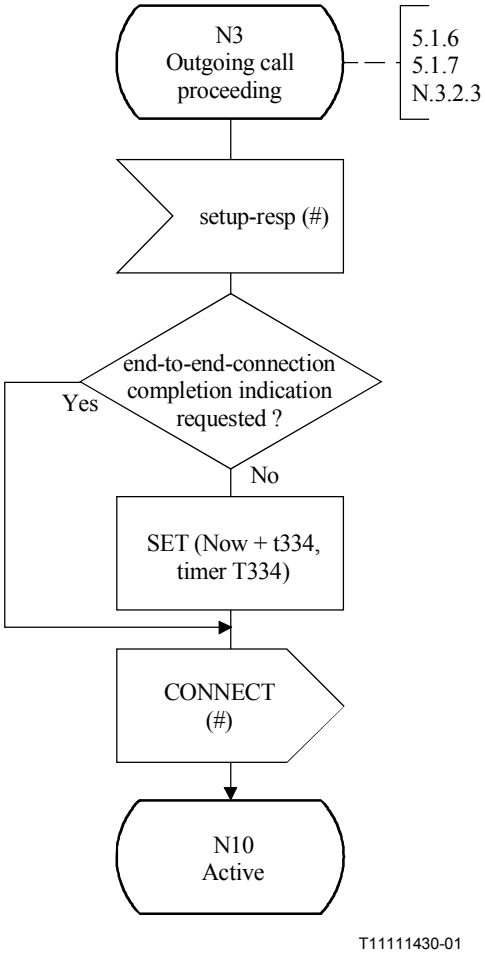
Message to/from Q.2931-N for B-ISDN calls

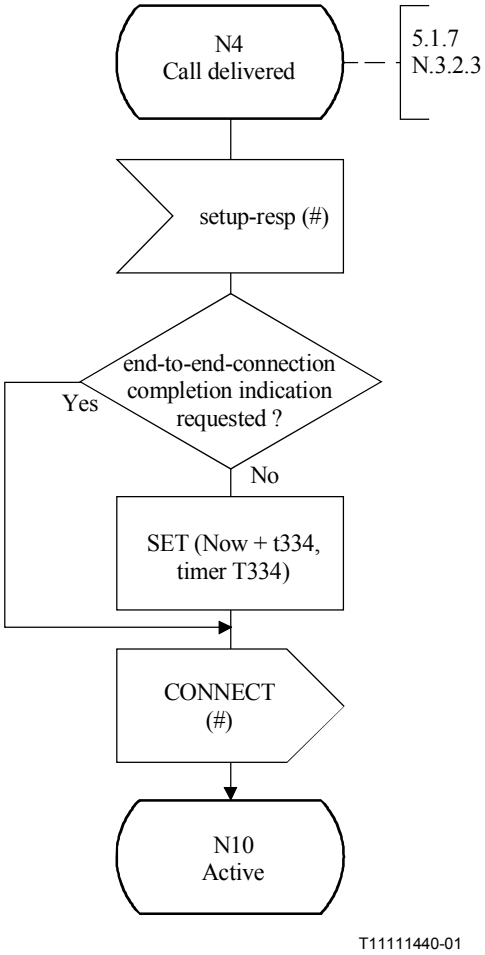
Signal Lists

CDtoON	ONtoCD
CONNECTION-AVAILABLE	CONNECTION AVAILABLE

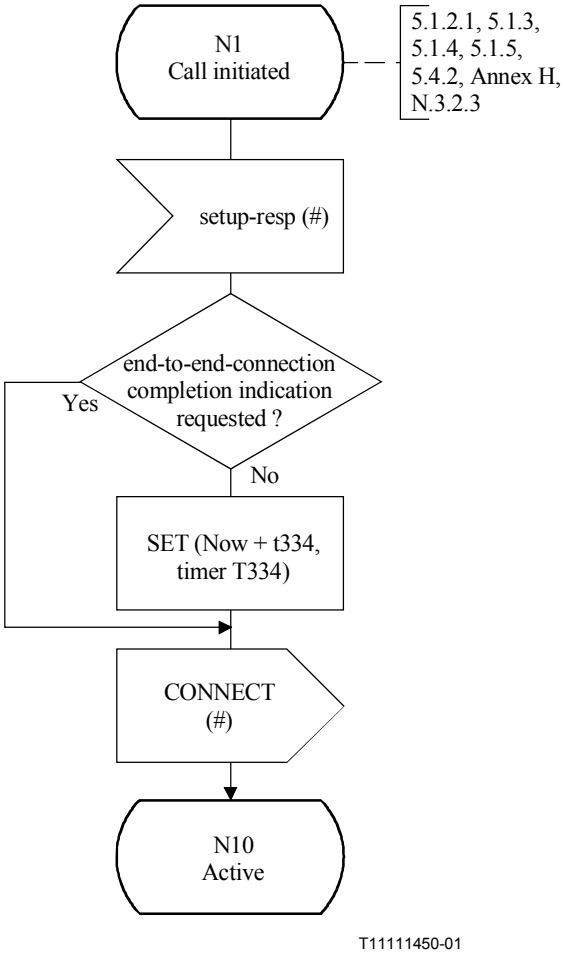
T11105090-99


N10-Active
Connection available req (#)
N.3.2.2
CONNECTION AVAILABLE (#)
N.3.2.3
CONNECTION AVAILABLE (#)
Timeout T334
T334 running ?
No
Yes
N10-Active
RESET T334
Verify Msg
Result
RAP
OK
RAI
I
CLR
STATUS (Cause, CS:=N10)
STATUS (Cause, CS:=N10)
Connection-available-ind (#)
N10-Active
D
T11111420-01

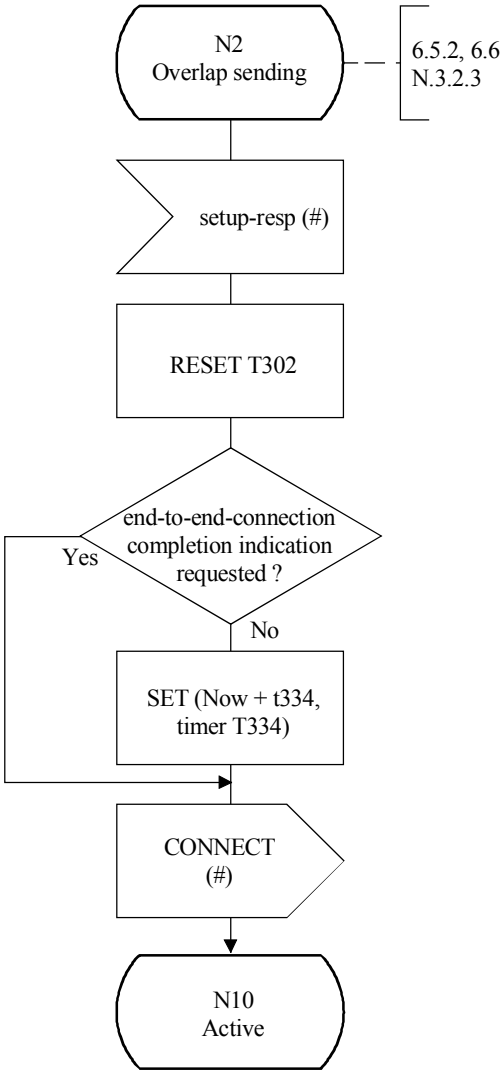

N3
Outgoing call proceeding
5.1.6
5.1.7
N.3.2.3
setup-resp (#)
end-to-end-connection completion indication requested ?
Yes
No
SET (Now + t334, timer T334)
CONNECT (#)
N10
Active
T11111430-01


N4
Call delivered
5.1.7
N.3.2.3
setup-resp (#)
end-to-end-connection completion indication requested ?
Yes
No
SET (Now + t334, timer T334)
CONNECT (#)
N10
Active
T11111440-01

Extensions for symmetrical call operations



Additional procedures related to interworking with N-ISDN



Q.2931 SDL - User Side
(Annex N Extensions)

Signal lists

Signal for B-ISDN Calls

Primitives to/from Application

From AP	To AP
Connection-available-req	Connection-available-ind

Primitives to/from Q.2931-U

Signal Lists

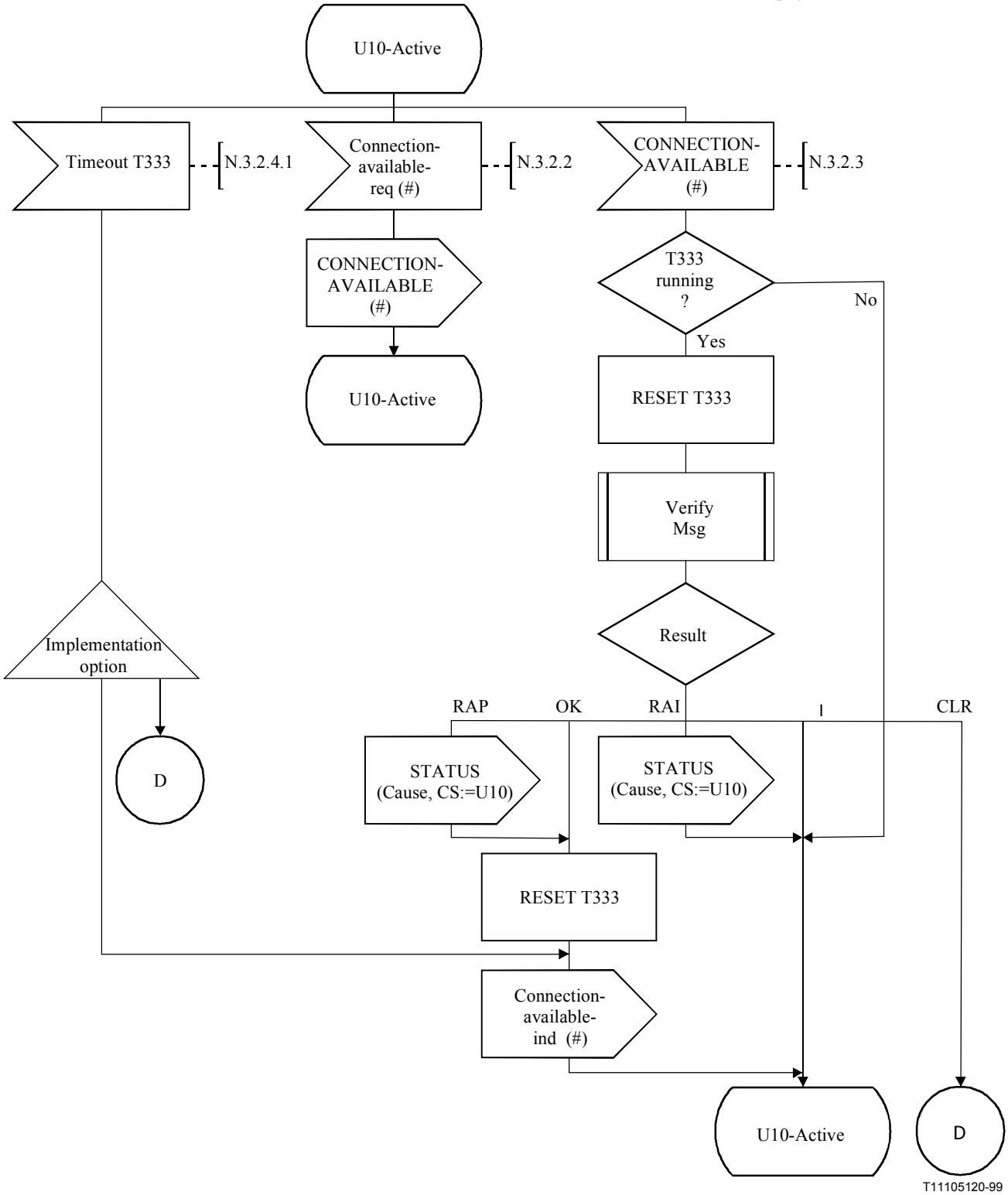
CDtoOU	OUtoCD
Connection-available-req	Connection-available-ind

Message to/from Q.2931-U to B-ISDN calls

Signal Lists

CDtoOU	OUtoCD
CONNECTION-AVAILABLE	CONNECTION-AVAILABLE

T11105110-99


U10-Active
Timeout T333
N.3.2.4.1
Connection-available-req (#)
N.3.2.2
CONNECTION-AVAILABLE (#)
N.3.2.3
CONNECTION-AVAILABLE (#)
U10-Active
T333 running ?
No
Yes
RESET T333
Verify Msg
Result
Implementation option
D
RAP
OK
RAI
I
CLR
STATUS (Cause, CS:=U10)
STATUS (Cause, CS:=U10)
RESET T333
Connection-available-ind (#)
U10-Active
D
T11105120-99

44) Revised Appendix I/Q.2931 Guidelines for the use of Instruction indicators

APPENDIX I

Guidelines for th e use of Instruction indicators

For the current Q.2931 messages and information elements related to B-ISDN basic call/connection control, interworking, and for the global call reference related procedures, the Instruction indicator flag needs not to be set to "Follow explicit instructions". Recommendations for Instruction indicator codings are shown in Tables I.1 and I.2.

For the Q.2931 messages and information elements related to Release 1 supplementary services, the Instruction indicator value to be used will be specified in the respective specification.

For DSS2 messages and information elements which are defined in other Recommendations, the Instruction indicator flag may be set as "Follow explicit instructions". The coding of the Instruction field is defined according to the forward/backward compatibility requirements.

For information elements containing codepoints, which are not defined in this ITU-T Recommendation, the Instruction indicator flag may also be set as "Follow explicit instructions".

The following abbreviations have been used in the tables:

Used Follow explicit instructions

Not used Instruction field not significant

N Network

U User

Table I.1/Q.2931 – Typical use of Instruction indicators for the Q.2931 messages which are related to the basic call control

Message	Flag	Origin	Action indicator
ALERTING	Not used	N&U	Not significant
CALL PROCEEDING	Not used	N&U	Not significant
CONNECT	Not used	N&U	Not significant
CONNECT ACKNOWLEDGE	Not used	N&U	Not significant
CONNECTION AVAILABLE	Used	N&U	Discard message and proceed
INFORMATION	Not used	N&U	Not significant
NOTIFY	Not used	N&U	Not significant
PROGRESS	Not used	N&U	Not significant
SETUP	Not used	N&U	Not significant
SETUP ACKNOWLEDGE	Not used	N&U	Not significant
STATUS	Not used	N&U	Not significant
STATUS ENQUIRY	Not used	N&U	Not significant
RELEASE	Not used	N&U	Not significant
RELEASE COMPLETE	Not used	N&U	Not significant
RESTART	Not used	N&U	Not significant
RESTART ACKNOWLEDGE	Not used	N&U	Not significant

Table I.2/Q.2931 – Typical use of Instruction indicators for the Q.2931 information elements which are related to the basic call control

Information elements	Flag	Origin	Action indicator
Broadband-locking shift	Not used	N&U	Not significant
Broadband-non-locking shift	Not used	N&U	Not significant
ATM adaptation layer parameter	Not used	N&U	Not significant
ATM traffic descriptor	Not used	N&U	Not significant
Broadband bearer capability	Not used	N&U	Not significant
Broadband high layer information	Not used	N&U	Not significant
Broadband low layer information	Not used	N&U	Not significant
Call state	Not used	N&U	Not significant
Called party number	Not used	N&U	Not significant
Called party sub-address	Not used	N&U	Not significant
Calling party number	Not used	N&U	Not significant
Calling party sub-address	Not used	N&U	Not significant
Cause	Not used	N&U	Not significant
Connection identifier	Not used	N&U	Not significant
~~End-to-end transit delay~~	~~Not used~~	~~N&U~~	~~Not significant~~
Quality of Service parameter	Not used	N&U	Not significant
Broadband repeat indicator	Not used	N&U	Not significant
Restart indicator	Not used	N&U	Not significant
Broadband sending complete	Not used	N&U	Not significant
Transit network selection	Not used	N&U	Not significant
Notification indicator	Not used	N&U	Not significant
OAM traffic descriptor	Not used	N&U	Not significant
Narrow-band bearer capability	Not used	N&U	Not significant
Narrow-band high layer compatibility	Not used	N&U	Not significant
Narrow-band low layer compatibility	Not used	N&U	Not significant
Progress indicator	Not used	N&U	Not significant
Broadband report type	Used	N&U	Discard information element and proceed

ITU-T RECOMMENDATIONS SERIES

Series A	Organization of the work of the ITU-T
Series B	Means of expression: definitions, symbols, classification
Series C	General telecommunication statistics
Series D	General tariff principles
Series E	Overall network operation, telephone service, service operation and human factors
Series F	Non-telephone telecommunication services
Series G	Transmission systems and media, digital systems and networks
Series H	Audiovisual and multimedia systems
Series I	Integrated services digital network
Series J	Transmission of television, sound programme and other multimedia signals
Series K	Protection against interference
Series L	Construction, installation and protection of cables and other elements of outside plant
Series M	TMN and network maintenance: international transmission systems, telephone circuits, telegraphy, facsimile and leased circuits
Series N	Maintenance: international sound programme and television transmission circuits
Series O	Specifications of measuring equipment
Series P	Telephone transmission quality, telephone installations, local line networks
Series Q	**Switching and signalling**
Series R	Telegraph transmission
Series S	Telegraph services terminal equipment
Series T	Terminals for telematic services
Series U	Telegraph switching
Series V	Data communication over the telephone network
Series X	Data networks and open system communications
Series Y	Global information infrastructure and Internet protocol aspects
Series Z	Languages and general software aspects for telecommunication systems

Geneva, 2001