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DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 1 NETWORK LAYER

DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 1 (DSS 1) – TYPICAL DSS 1 SERVICE INDICATOR CODINGS FOR ISDN TELECOMMUNICATIONS SERVICES

ITU-T Recommendation Q.939

(Previously "CCITT Recommendation")

FOREWORD

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

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

ITU-T Recommendation Q.939 was prepared by the ITU-T Study Group XI (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

NOTES

1 As a consequence of a reform process within the International Telecommunication Union (ITU), the CCITT ceased to exist as of 28 February 1993. In its place, the ITU Telecommunication Standardization Sector (ITU-T) was created as of 1 March 1993. Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.

In order not to delay publication of this Recommendation, no change has been made in the text to references containing the acronyms "CCITT, CCIR or IFRB" or their associated entities such as Plenary Assembly, Secretariat, etc. Future editions of this Recommendation will contain the proper terminology related to the new ITU structure.

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

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Recommendation Q.939

DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 1 (DSS 1) – TYPICAL DSS 1 SERVICE INDICATOR CODINGS FOR ISDN TELECOMMUNICATIONS SERVICES

(Helsinki, 1993)

1 Introduction

This Recommendation specifies the coding of the information elements Bearer capability (BC), High layer compatibility (HLC) and Low layer compatibility (LLC) to be used by terminals supporting the ISDN telecommunications services identified in the I.200-Series Recommendations and operating in the demand mode. It is based on Recommendation Q.931 including its relevant Annexes (B and I) and on Recommendation Q.933.

For each service it is specified which field values the calling user is requested to send and which field values the called user could expect to receive in a pure ISDN environment (see clauses 6 and 7). Interworking situations with the public switched telephone network (PSTN) are also covered where appropriate (see clause 8). A later version of this Recommendation may include interworking scenarios with the CSPDN and the PSPDN.

Unless otherwise stated, the use of the term terminal (TE) in this Recommendation refers to customer's terminal apparatus which may be a TE1 (Terminal Equipment Type 1), a TA (Terminal Adaptor) together with a TE2 (Terminal Equipment Type 2) or an NT2 (Network Termination Type 2) as defined in Recommendation I.411.

The terms "terminal" and "user" are used interchangeably.

The exact bit patterns correlated with the named field values can be found in the following subclauses of Recommendation Q.931:

- in 4.5.5 as for the Bearer capability information element;
- in 4.5.17 as for the High layer compatibility information element; and
- in 4.5.19 as for the Low layer compatibility information element.

For the frame mode bearer services the exact bit patterns can be found in 4.5.5/Q.933 (BC) and 4.5.21/Q.933 (LLC).

Generally, the information elements BC, HLC and LLC serve the following purposes:

At the calling side, the network shall check that the bearer service requested by the calling user in the Bearer capability information element matches with the bearer service provided to that user by the network (Annex B/Q.931).

At the called side, the called user performs network-to-user compatibility checking based on the content of the BC-information element, and user-to-user compatibility checking based on the content of the BC-, HLC- and LLC-information elements (see Annex B/Q.931).

2 Scope and objective

This Recommendation provides supplementary information on the usage of the compatibility information elements for individual telecommunications services. It considers the telecommunications services as they are specified for public ISDNs. It does not specify additional codings of the compatibility information elements (BC, HLC and LLC) which might be required to support the request and provision of telecommunications services by private networks.

The list of services currently covered in this Recommendation is given in clause 3. The list may require to be enhanced when new services will be defined and/or when the functionality of networks and terminal equipment has progressed.

Since some bearer services can be used to support various user applications, additional information on such applications is specified:

– in 7.1 for the circuit-mode 64 kbit/s unrestricted 8 kHz structured bearer service, and

– in 7.2 for the circuit-mode 64 kbit/s 8 kHz structured 3.1 kHz audio bearer service.

The specific objective of this Recommendation is to provide guidance on the correct usage of Q.931 codepoints to the different CCITT Study Groups dealing with services, ISDN terminals and terminal adaptors. The Recommendation shall help to assure interoperability of terminals supporting the same telecommunications service and shall enable terminals to operate on different public ISDNs.

The typical codings specified in clause 6 should be supported by all users and networks supporting the corresponding telecommunications service. Other variants of these codings may be supported in addition, however, these variants might not provide for worldwide interoperability.

The codings given in clause 7 are not exhaustive. They illustrate typical user applications involving bit rate adaption schemes where CCITT standardized interfaces are used.

3 List of telecommunications services and specific user applications covered by codings

The following telecommunications services are covered in clause 6:

1) *Circuit-mode bearer services categories*

   – Circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for speech information transfer (digital telephony)

   – Circuit-mode 64 kbit/s unrestricted 8 kHz structured bearer service category

   – Circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for 3.1 kHz audio information transfer

2) *Packet-mode bearer service categories*

   – Virtual call bearer service (case B of Recommendation X.31)

      i) Access through the B-channel

      ii) Access through the D-channel

   – Frame mode bearer services

      i) Circuit-switched access to remote frame handler (case A of Recommendation Q.933)

      ii) Frame relay virtual call bearer service (case A and case B of Recommendation Q.933)

3) *Teleservices*

   – Telephony teleservice (3.1 kHz bandwidth)

   – Teletex service

   – Telefax group 4 service

   – ISDN syntax-based Videotex service

   – Facsimile group 2/3 service

The following specific user applications of some bearer services are covered in clause 7:

a) Specific user applications of the circuit-mode 64 kbit/s unrestricted 8 kHz structured bearer service:

   1) Support of terminal adaptors V.110 and X.30

      – Synchronous mode of operation

      – Asynchronous mode of operation

   2) Support of terminal adaptors V.120

3) Support of X.25 terminal equipment allowing access to PSPDN via AU (case A of Recommendation X.31)

– Rate adaption using X.31 HDLC flag stuffing

– Rate adaption corresponding to Recommendations V.110 and X.30.

b) Specific user applications of the circuit-mode 64 kbit/s 8 kHz structured 3.1 kHz audio bearer service:

1) Voice-band data via modem

4 General principles applicable to all services

For all services the following principles apply:

1) The LLC information element is transferred transparently through an ISDN between the calling entity and the addressed entity. However, dependent on the charging principles applied, some networks may perform checks on the length of the LLC information elements.

2) The HLC information element is transferred transparently through an ISDN between the calling entity and the addressed entity. However, some networks may check its content, e.g. to associate a supplementary service to a teleservice.

3) Where bearer services are specified, the HLC information element will normally not be present unless they are used to support high layer applications.

4) The codings shown consider the general case. In special terminal arrangements the user may need to rely on address information only. In these cases the supplementary services DDI or MSN shall be used.

5) A TE2 together with a TA are assumed to provide the same functionality as a TE1. Therefore, a TA connected to a coincident S and T reference point will not generate and send a progress indicator value #1 when setting up a connection. Consequently, a TA, e.g. adapting a two-wire analogue PSTN user-network interface to the ISDN user-network interface will generate the BC and, if appropriate, the HLC and LLC information elements in accordance with the type of equipment it serves at the R reference point, viz.

Equipment connected to the R interface	BC-/HLC-/LLC-codepoints used, at the S/T interface		
	BC	HLC	LLC
Analogue telephone	Speech	Telephony	–
Facsimile group 2/3 equipment	3.1 kHz audio	Facsimile group 2/3	–
Voice-band data equipment via modem	3.1 kHz audio	–	Modem type

Conventions applied for the presentation of the codings:

1) Octets 1 and 2 of the compatibility information elements, indicating the information element identifier and length respectively, are omitted from the considerations and therefore not shown in the examples.

2) A dash instead of a field value indicates:

a) at the calling side: This field is not included in the information element;
b) at the called side: This field is not present.

3) Field values in brackets ( ) may or may not be included at the calling side and therefore not be present at the called side.

5 Impact of interworking situations

5.1 Incoming calls from non-ISDNs

In the case of interworking with non-ISDNs, HLC and LLC information elements may be absent, and this interworking is shown with the presence of the Progress indicator information element. When this occurs, the terminal should accept the incoming call according to Annex B/Q.931, i.e. it should regard the compatibility as successful if it is compatible with the included information, which as a minimum will be the Bearer capability information element.

5.2 BC and LLC application guidelines

In many cases, the same low layer information (e.g. the user rate and the rate adaption technique applied) can be coded in either the BC or the LLC information element. However, the provision of information in the one or the other information element has consequences with respect to the selection or the denial of a network provided interworking function.

The following guidelines exist for the application of Bearer capability (BC) and Low layer compatibility (LLC) information elements according to Annex I/Q.931:

- *Type I* – Information used only at the destination end to allow decision regarding terminal compatibility. This information, if required, shall be coded into octets (3a and) 5 to 7 of the LLC information element.
- *Type II* – Information to permit the network to select the bearer service. This information shall be coded into:
  - Octets 3 and 4 of the BC information element for circuit-mode traffic.
  - Octets 3 and 4, 6 and 7 of the BC information element for packet-mode traffic.
- *Type III* – Information used by the addressed user to determine terminal compatibility and used by the network to facilitate interworking with other ISDNs or other dedicated networks. This information is encoded into octet 5 (including octets 5a-5d if appropriate) of the BC information element.

These types of information can be used as follows:

- *Case 1* – If the originating user wishes to transfer information end-to-end to ensure end user compatibility without invoking network Inter-Working (IW), then type I information together with type II information shall apply.
- *Case 2* – If the originating user either requires network IW or is willing to accept network IW, should it be necessary in order to complete the call, then type III information together with type II information shall apply.

Consequently, if interworking with a PSTN or a CSPDN is supported by the network by providing the appropriate functions (i.e. data extraction, modem pool) at the interworking unit, then those calls carrying the rate adaption information in the LLC information element may not be successfully completed. These calls will instead be successful, when the rate adaption information is included in the BC information element.

Terminals shall have the capability to determine compatibility independent of whether the compatibility information is coded in the BC information element (as type III information) or in the LLC information element (as type I information).

6 Request and recognition of a basic telecommunications service in an ISDN environment

The codings given in this clause assume that a pure ISDN environment exists and no network provided interworking function is selected.

Therefore, the particular user rate as well as the rate adaption technique applied are specified in the LLC information element, thus permitting compatibility decision by the destination terminal.

6.1 Request and recognition of a circuit-mode bearer service

6.1.1 Circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for speech information transfer

6.1.1.1 Request by a calling terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Speech
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	Rec. G.711, A-law or μ-law (Note)
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–
NOTE – Either one or the other layer 1 protocol is supported by the network.		

b) *HLC Information Element Coding*

This information element is not included.

c) *LLC Information Element Coding*

This information element is not required. If present, its content shall be identical to the BC information element.

6.1.1.2 Compatibility at the called terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Speech
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	Rec. G.711, A-law or μ-law (Note)
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–
NOTE – Either one or the other layer 1 protocol is supported by the network.		

b) *HLC Information Element Coding*

Terminals supporting circuit-mode 64 kbit/s 8 kHz structured speech bearer service shall be able to accept incoming calls from terminals which include the HLC information element [see 6.3.1.2 b)]. If an HLC information element for telephony is received and the terminal supports HLC analysis, it shall consider the compatibility check to be successful if the HLC information element is coded as specified in 6.3.1.2 b).

If an HLC information element is not received, the call shall be accepted if the compatibility checks on the BC and LLC information element (if present) are successful.

c) *LLC Information Element Coding*

This information element is normally absent. If present, it may be used for compatibility checking or be ignored by the terminal. If any conflict from duplication of the information in the BC and LLC information elements is detected, the conflict shall be resolved in favour of the BC, i.e. the conflicting information in the LLC information element shall be ignored.

6.1.2 Circuit-mode 64 kbit/s unrestricted 8 kHz structured bearer service category

More specific user applications of this bearer service can be found in clause 7.

Interworking with networks using restricted digital information transfer is covered in 6.1.2.3.

6.1.2.1 Request by a calling terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	–
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

b) *HLC Information Element Coding*

This information element is optional. If present, it shall be encoded in accordance with 4.5/Q.931.

c) *LLC Information Element Coding*

This information element is optional. If present, it shall be encoded in accordance with 4.5/Q.931.

6.1.2.2 Compatibility at the called terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	–
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

b) *HLC Information Element Coding*

This information element is present if provided by the calling user. If present, it is checked for terminal compatibility according to Annex B/Q.931.

c) *LLC Information Element Coding*

This information element is present if provided by the calling user. If present, it is checked for terminal compatibility according to Annex B/Q.931 and for parameter negotiation according to Annex J/Q.931.

6.1.2.3 ISDN connections involving restricted 64 kbit/s transfer capability

6.1.2.3.1 Request by a calling terminal connected to a network supporting 64 kbit/s unrestricted digital information transfer

The coding shown in this section assumes that the calling user is aware of the interworking situation.

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	Rate adaption V.110 and X.30
5a	Synchronous/asynchronous	Synchronous
	Negotiation	Not possible
	User rate	56 kbit/s Rec. V.6
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

b) *HLC Information Element Coding*

This information element is optional. If present, it shall be encoded in accordance with 4.5/Q.931.

c) *LLC Information Element Coding*

This information element is optional. If present, it shall be encoded in accordance with 4.5/Q.931.

6.1.2.3.2 Compatibility at the called terminal equipment connected to a network supporting 64 kbit/s unrestricted digital information transfer

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	Rate adaption V.110 and X.30
5a	Synchronous/asynchronous	Synchronous
	Negotiation	Not possible
	User rate	56 kbit/s Rec. V.6
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

b) *HLC Information Element Coding*

This information element is present if provided by the calling user. If present, it is checked for terminal compatibility according to Annex B/Q.931.

c) *LLC Information Element Coding*

This information element is present if provided by the calling user. If present, it is checked for terminal compatibility according to Annex B/Q.931 and for parameter negotiation according to Annex J/Q.931.

6.1.2.3.3 Request by a calling terminal connected to a network supporting 64 kbit/s restricted digital information transfer

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Restricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	–
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

b) *HLC Information Element Coding*

This information element is optional. If present, it shall be encoded in accordance with 4.5/Q.931.

c) *LLC Information Element Coding*

This information element is optional. If present, it shall be encoded in accordance with 4.5/Q.931.

6.1.2.3.4 Compatibility at the called terminal equipment connected to a network using restricted digital information transfer

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Restricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	–
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

b) *HLC Information Element Coding*

This information element is present if provided by the calling user. If present, it is checked for terminal compatibility according to Annex B/Q.931.

c) *LLC Information Element Coding*

This information element is present if provided by the calling user. If present, it is checked for terminal compatibility according to Annex B/Q.931 and for parameter negotiation according to Annex J/Q.931.

6.1.3 Circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for 3.1 kHz audio information transfer

More specific user applications of this bearer service can be found in clause 7.

6.1.3.1 Request by a calling terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	3.1 kHz audio
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	Rec. G.711, A-law or μ-law (Note)
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–
NOTE – Either one or the other layer 1 protocol is supported by the network.		

b) *HLC Information Element Coding*

This information element is optional. If present, it shall be encoded in accordance with 4.5/Q.931.

c) *LLC Information Element Coding*

This information element is optional. If present, it shall be encoded in accordance with 4.5/Q.931.

6.1.3.2 Compatibility at the called terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	3.1 kHz audio
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	Rec. G.711, A-law or μ-law (Note)
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–
NOTE – Either one or the other layer 1 protocol is supported by the network.		

b) *HLC Information Element Coding*

This information element is present if provided by the calling user. If present, it is checked for terminal compatibility according to Annex B/Q.931.

c) *LLC Information Element Coding*

This information element is present if provided by the calling user. If present, it is checked for terminal compatibility according to Annex B/Q.931 and for parameter negotiation according to Annex J/Q.931.

6.1.4 Circuit-mode 64 kbit/s 8 kHz structured multi-use bearer service category

For further study.

6.1.5 Circuit-mode multi-rate bearer service for an ISDN interface

For further study.

6.2 Packet-mode bearer services categories

6.2.1 Virtual call bearer services [support of X.25 terminal equipment allowing access to the ISDN virtual circuit service (case B of Recommendation X.31)]

The coding examples given below assume that a new access connection is required between the TE and the packet handler function.

6.2.1.1 Access through the B-channel

6.2.1.1.1 Request by a calling terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Packet mode
	Information transfer rate	00000: packet
5	User information layer 1 protocol	–
6	User information layer 2 protocol	X.25 link layer
7	User information layer 3 protocol	X.25 packet layer

b) *HLC Information Element Coding*

This information element is not included.

c) *LLC Information Element Coding*

This information element is not included.

6.2.1.1.2 Compatibility at the called terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Packet mode
	Information transfer rate	00000: packet
5	User information layer 1 protocol	–
6	User information layer 2 protocol	X.25 link layer
7	User information layer 3 protocol	X.25 packet layer

b) *HLC Information Element Coding*

The HLC information element is not present.

c) *LLC Information Element Coding*

The LLC information element is not present.

6.2.1.2 Access through the D-channel

6.2.1.2.1 Request by a calling terminal equipment

The calling terminal accesses a packet handler (PH)-function by establishing a link layer connection (SAPI = 16) to that function which can then be used to support packet communications according to X.25 packet layer procedures. Consequently, Q.931 procedures are not required to provide D-channel access.

6.2.1.2.2 Compatibility at the called terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Packet mode
	Information transfer rate	00000: packet
5	User information layer 1 protocol	–
6	User information layer 2 protocol	Rec. Q.921
7	User information layer 3 protocol	X.25 packet layer

b) *HLC Information Element Coding*

The HLC information element is not present.

c) *LLC Information Element Coding*

The LLC information element is not present.

6.2.2 Frame mode bearer services

6.2.2.1 Circuit-switched access to remote frame handler (case A of Recommendation Q.933)

6.2.2.1.1 Request by a calling terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	–
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

b) *HLC Information Element Coding*

The HLC information element is not included.

c) *LLC Information Element Coding*

This information element is optional. When provided, it must be coded in accordance with 4.5/Q.931 and only octet 6 is valid.

6.2.2.1.2 Compatibility at the called terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	–
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

b) *HLC Information Element Coding*

The HLC information element is not present.

c) *LLC Information Element Coding*

This information element is optional. When provided, it must be coded in accordance with 4.5/Q.931 and only octet 6 is valid.

6.2.2.2 Frame relay virtual call bearer service (case A and case B of Recommendation Q.933)

The codings given below assume that a new frame relay connection is required between the TE and the remote frame handler.

6.2.2.2.1 Request by a calling terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Frame mode
	Information transfer rate	00000: (reserved)
5	User information layer 1 protocol	–
6	User information layer 2 protocol	Core aspects of frame mode (Annex A/Q.922)
7	User information layer 3 protocol	–

b) *HLC Information Element Coding*

The HLC information element is not required. If present, it shall be encoded in accordance with 4.5/Q.931.

c) *LLC Information Element Coding*

This information element is not required. If present, it shall be encoded in accordance with 4.5/Q.931.

6.2.2.2.2 Compatibility at the called terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Frame mode
	Information transfer rate	00000: (reserved)
5	User information layer 1 protocol	–
6	User information layer 2 protocol	Core aspects of frame mode (Annex A/Q.922)
7	User information layer 3 protocol	–

b) *HLC Information Element Coding*

This information element is present if provided by the calling user. If present, it is checked for terminal compatibility according to Annex B/Q.931.

c) *LLC Information Element Coding*

This information element is present if provided by the calling user. If present, it is checked for terminal compatibility according to Annex B/Q.931 and for parameter negotiation according to Annex J/Q.931.

6.3 Request and recognition of a teleservice

6.3.1 Telephony teleservice (3.1 kHz bandwidth)

6.3.1.1 Request by a calling terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Speech
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	Rec. G.711, A-law or μ-law (Note)
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–
NOTE – Either one or the other layer 1 protocol is supported by the network.		

b) *HLC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Interpretation	First high layer characteristics identification to be used in the call
	Presentation method of protocol profile	High layer protocol profile
4	High layer characteristics identification	Telephony
4a	Extended high layer characteristics identification	–

c) *LLC Information Element Coding*

The LLC information element is not required. If present, its content shall be identical to the BC information element.

6.3.1.2 Compatibility at the called terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Speech
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	Rec. G.711, A-law or μ-law (Note)
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–
NOTE – Either one or the other layer 1 protocol is supported by the network.		

b) *HLC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Interpretation	First high layer characteristics identification to be used in the call
	Presentation method of protocol profile	High layer protocol profile
4	High layer characteristics identification	Telephony
4a	Extended high layer characteristics identification	–

The HLC Information element may or may not be present. If present, it must be coded as depicted.

c) *LLC Information Element Coding*

The LLC information element is normally absent. If present, it may be used for compatibility checking or be ignored by the terminal. If any conflict from duplication of the information in the BC and LLC information elements is detected, the conflict shall be resolved in favour of the BC, i.e. the conflicting information in the LLC information element shall be ignored.

6.3.2 Teletex service (using circuit-mode bearer capability)

6.3.2.1 Request by a calling terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	–
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

b) *HLC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Interpretation	First high layer characteristics identification to be used in the call
	Presentation method of protocol profile	High layer protocol profile
4	High layer characteristics identification	(Note 1)
4a	Extended high layer characteristics identification	–

NOTES

1 The calling terminal shall select the filed value according to its capabilities and according to the type of document to be transferred:

- Teletex service, basic mode of operation (Recommendation F.200) (Note 2); or
- Teletex service, basic and mixed mode of operation (Recommendation F.230) and facsimile Group 4 service classes II and III (Recommendation F.184) (Note 3); or
- Teletex service, basic and processable mode of operation (Recommendation F.220) (Note 4).

2 This coding shall be used by terminals supporting basic operation only.

3 This coding shall be used by terminals which want to operate in the mixed mode of operation. The same codepoint may be used by terminals which want to operate facsimile G4, classes II or III.

4 This coding shall be used by terminals which want to operate in the processable mode of operation.

c) *LLC Information Element Coding*

Octet	Information element field		Field value
3	Coding standard		CCITT standardized coding
	Information transfer capability		Unrestricted digital information
3a	Negotiation indicator		(Set according to the capability of the TE)
4	Transfer mode		Circuit mode
	Information transfer rate		64 kbit/s
Layer 1			
5		User information layer 1 protocol	–
5a		Synchron/asynchron	–
		Negotiation	
		User rate	
5b		Intermediate rate	–
		NIC on Tx	
		NIC on Rx	
		Flow control on Tx	
		Flow control on Rx	
		Rate adaption header	
		Multiframe support	
		Mode of operation	
		Logical link identifier negotiation	
		Assignor/assignee	
		In-band/outband negotiation	
5c		Number of stop bits	–
		Number of data bits	
		Parity	
5d		Duplex mode	–
		Modem type	
6	User information layer 2 protocol		ISO/IEC 7776 DTE-DTE operation (Note 1)
6a-6b	Optional layer 2 protocol information		(Set according to the capability of the terminal) (Note 3)
7	User information layer 3 protocol		ISO/IEC 8208 (Note 2)
7a-7c	Optional layer 3 protocol information		(Set according to the capability of the terminal) (Note 3)

NOTES

1 This codepoint is also used when the protocol defined in Recommendation X.75 modified by the application rules specified in Recommendation T.90 is applied.

2 Additional application rules as specified in Recommendation T.90 have to be fulfilled.

3 The extension octets 6a-6b and 7a-7c may also be used to negotiate protocol options or parameters.

6.3.2.2 Compatibility at the called terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	–
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

b) *HLC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Interpretation	First high layer characteristics identification to be used in the call
	Presentation method of protocol profile	High layer protocol profile
4	High layer characteristics identification	(Note)
4a	Extended high layer characteristics identification	–
NOTE – The called terminal holds a list of field values describing its receiving capabilities. It will accept calls with HLC codings corresponding to any one in the list.		

c) *LLC Information Element Coding* (Note 1)

Octet	Information element field		Field value
3	Coding standard		CCITT standardized coding
	Information transfer capability		Unrestricted digital information
3a	Negotiation indicator		(Check according to the capability of the TE)
4	Transfer mode		Circuit mode
	Information transfer rate		64 kbit/s
Layer 1			
5		User information layer 1 protocol	–
5a		Synchron/asynchron	–
		Negotiation	
		User rate	
5b		Intermediate rate	–
		NIC on Tx	
		NIC on Rx	
		Flow control on Tx	
		Flow control on Rx	
		Rate adaption header	
		Multiframe support	
		Mode of operation	
		Logical link identifier negotiation	
		Assignor/assignee	
		In-band/outband negotiation	
5c		Number of stop bits	–
		Number of data bits	
		Parity	
5d		Duplex mode	–
		Modem type	
6	User information layer 2 protocol		ISO/IEC 7776 DTE-DTE operation
6a-6b	Optional layer 2 protocol information		(Check according to the capability of the terminal) (Note 2)
7	User information layer 3 protocol		ISO/IEC 8208
7a-7c	Optional layer 3 protocol information		(Check according to the capability of the terminal) (Note 2)

NOTES

1 A terminating terminal should check whether an LLC information element is included in the SETUP message or not. If the LLC information element is omitted, the default values will be assumed, i.e. ISO/IEC 7776 DTE-DTE operation as layer 2 protocol and ISO/IEC 8208 as layer 3 protocol (see also Notes 1 and 2 against the LLC information element in 6.3.2.1.)

2 The extension octets 6a-6b and 7a-7c may also be used to negotiate protocol options or parameters.

6.3.3 Telefax G4 service (using circuit-mode bearer capability)

6.3.3.1 Request by a calling terminal equipment

a) *BC Information Element Coding* (Note)

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	–
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–
NOTE – If interworking with a network using restricted digital information transfer capability occurs, the BC information element shall be coded as depicted in 6.1.2.3.1.		

b) *HLC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Interpretation	First high layer characteristics identification to be used in the call
	Presentation method of protocol profile	High layer protocol profile
4	High layer characteristics identification	Group 4 class I facsimile
4a	Extended high layer characteristics identification	–

c) *LLC Information Element Coding*

Octet	Information element field		Field value
3	Coding standard		CCITT standardized coding
	Information transfer capability		Unrestricted digital information
3a	Negotiation indicator		(Set according to the capability of the TE)
4	Transfer mode		Circuit mode
	Information transfer rate		64 kbit/s
Layer 1			
5		User information layer 1 protocol	–
5a		Synchron/asynchron	–
		Negotiation	
		User rate	
5b		Intermediate rate	–
		NIC on Tx	
		NIC on Rx	
		Flow control on Tx	
		Flow control on Rx	
		Rate adaption header	
		Multiframe support	
		Mode of operation	
		Logical link identifier negotiation	
		Assignor/assignee	
		In-band/outband negotiation	
5c		Number of stop bits	–
		Number of data bits	
		Parity	
5d		Duplex mode	–
		Modem type	
6	User information layer 2 protocol		ISO/IEC 7776 DTE-DTE operation (Note 1)
6a-6b	Optional layer 2 protocol information		(Set according to the capability of the terminal) (Note 3)
7	User information layer 3 protocol		ISO/IEC 8208 (Note 2)
7a-7c	Optional layer 3 protocol information		(Set according to the capability of the terminal) (Note 3)

NOTES

1 This codepoint is also used when the protocol defined in Recommendation X.75 modified by application rules specified in Recommendation T.90 is applied.

2 Additional application rules as specified in Recommendation T.90 have to be fulfilled.

3 The extension octets 6a-6b and 7a-7c may also be used to negotiate protocol options or parameters.

6.3.3.2 Compatibility at the called terminal equipment

a) *BC Information Element Coding* (Note)

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	–
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–
NOTE – If interworking with a network using restricted digital information transfer occured, the coding will be according to 6.1.2.3.2.		

b) *HLC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Interpretation	First high layer characteristics identification to be used in the call
	Presentation method of protocol profile	High layer protocol profile
4	High layer characteristics identification	(Note)
4a	Extended high layer characteristics identification	–
NOTE – The called terminal holds a list of field values describing its receiving capabilities. It will accept calls with HLC codings corresponding to any one in the list. Intercommunication between basic mode and mixed mode Teletex terminals and classes I, II and Ill group 4 facsimile terminals is shown in Table 2/T.90.		

c) *LLC Information Element Coding* (Note 1)

Octet	Information element field		Field value
3	Coding standard		CCITT standardized coding
	Information transfer capability		Unrestricted digital information
3a	Negotiation indicator		(Check according to the capability of the TE)
4	Transfer mode		Circuit mode
	Information transfer rate		64 kbit/s
Layer 1			
5		User information layer 1 protocol	–
5a		Synchron/asynchron	–
		Negotiation	
		User rate	
5b		Intermediate rate	–
		NIC on Tx	
		NIC on Rx	
		Flow control on Tx	
		Flow control on Rx	
		Rate adaption header	
		Multiframe support	
		Mode of operation	
		Logical link identifier negotiation	
		Assignor/assignee	
		In-band/outband negotiation	
5c		Number of stop bits	–
		Number of data bits	
		Parity	
5d		Duplex mode	–
		Modem type	
6	User information layer 2 protocol		ISO/IEC 7776 DTE-DTE operation
6a-6b	Optional layer 2 protocol information		(Check according to the capability of the terminal) (Note 2)
7	User information layer 3 protocol		ISO/IEC 8208
7a-7c	Optional layer 3 protocol information		(Check according to the capability of the terminal) (Note 2)

NOTES

1 A terminating terminal should check whether a LLC information element is included in the SETUP message or not. If the LLC information element is omitted, the default values will be assumed, i.e. ISO/IEC 7776 DTE-DTE operation as layer 2 protocol and ISO/IEC 8208 as layer 3 protocol (see also Notes 1 and 2 against the LLC information element in 6.3.2.1).

2 The extension octets 6a-6b and 7a-7c may also be used to negotiate protocol options or parameters.

6.3.4 ISDN syntax-based Videotex service

6.3.4.1 Request by a calling terminal equipment

a) *BC Information Element Coding*

Octect	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	–
6	User information layer 2 prototol	–
7	User information layer 3 protocol	–

b) *HLC Information Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Interpretation	First high layer characteristics identification to be used in the call
	Presentation method of protocol profile	High layer protocol profile
4	High layer characteristics identification	ISDN syntax-based Videotex (Rec. F.300 and T.102)
4a	Extended high layer characteristics identification	–

c) *LLC Information Element Coding*

Octect	Information element field		Field value
3	Coding standard		CCITT standardized coding
	Information transfer capability		Unrestricted digital information
3a	Negotiation indicator		(Set according to the capability of the TE)
4	Transfer mode		Circuit mode
	Information transfer rate		64 kbit/s
Layer 1			
5		User information layer 1 protocol	–
5a		Synchron/asynchron	–
		Negotiation	
		User rate	
5b		Intermediate rate	–
		NIC on Tx	
		NIC on Rx	
		Flow control on Tx	
		Flow control on Rx	
		Rate adaption header	
		Multiframe support	
		Mode of operation	
		Logical link identifier negotiation	
		Assignor/assignee	
		In-band/outband negotiation	
5c		Number of stop bits	–
		Number of data bits	
		Parity	
5d		Duplex mode	–
		Modem type	
6	User information layer 2 protocol		ISO/IEC 7776 DTE-DTE operation (Note 1)
6a-6b	Optional layer 2 protocol information		(Set according to the capability of the terminal) (Note 3)
7	User information layer 3 protocol		ISO/IEC 8208 (Note 2)
7a-7c	Optional layer 3 protocol information		(Set according to the capability of the terminal) (Note 3)

NOTES

1 This codepoint is also used when the protocol defined in Recommendation X.75 modified by the application rules specified in Recommendation T.90 is applied.

2 Additional application rules as specified in Recommendation T.90 have to be fulfilled.

3 The extension octets 6a-6b and 7a-7c may also be used to negotiate protocol options or parameters.

6.3.4.2 Compatibility at the called terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	–
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

b) *HLC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Interpretation	First high layer characteristics identification to be used in the call
	Presentation method of protocol profile	High layer protocol profile
4	High layer characteristics identification	ISDN syntax-based Videotex (Rec. F.300 and T.102)
4a	Extended high layer characteristics identification	–

c) *LLC Information Element Coding* (Note 1)

Octet	Information element field		Field value
3	Coding standard		CCITT standardized coding
	Information transfer capability		Unrestricted digital information
3a	Negotiation indicator		(Check according to the capability of the TE)
4	Transfer mode		Circuit mode
	Information transfer rate		64 kbit/s
Layer 1			
5		User information layer 1 protocol	–
5a		Synchron/asynchron	–
		Negotiation	
		User rate	
5b		Intermediate rate	–
		NIC on Tx	
		NIC on Rx	
		Flow control on Tx	
		Flow control on Rx	
		Rate adaption header	
		Multiframe support	
		Mode of operation	
		Logical link identifier negotiation	
		Assignor/assignee	
		In-band/outband negotiation	
5c		Number of stop bits	–
		Number of data bits	
		Parity	
5d		Duplex mode	–
		Modem type	
6	User information layer 2 protocol		ISO/IEC 7776 DTE-DTE operation
6a-6b	Optional layer 2 protocol information		(Check according to the capability of the terminal) (Note 2)
7	User information layer 3 protocol		ISO/IEC 8208
7a-7c	Optional layer 3 protocol information		(Check according to the capability of the terminal) (Note 2)

NOTES

1 A terminating terminal should check whether a LLC information element is included in the SETUP message or not. If the LLC information element is omitted, the default values will be assumed, i.e. ISO/IEC 7776 DTE-DTE operation as layer 2 protocol and ISO/IEC 8208 as layer 3 protocol (see also Notes 1 and 2 against the LLC information element in 6.3.2.1).

2 The extension octets 6a-6b and 7a-7c may also be used to negotiate protocol options or parameters.

6.3.5 ISDN Videotelephony teleservice

For further study.

6.3.6 Facsimile group 2/3 service

This service is not defined by CCITT as an ISDN service on its own right. But as it has some similarities with other ISDN services, it has been included in this subclause.

6.3.6.1 Request by a calling terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	3.1 kHz audio
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	Rec. G.711, A-law or μ-law (Note)
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–
NOTE – Either one or the other layer 1 protocol is supported by the network.		

b) *HLC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Interpretation	First high layer characteristics identification to be used in the call
	Presentation method of protocol profile	High layer protocol profile
4	High layer characteristics identification	Facsimile group 2/3
4a	Extended high layer characteristics identification	–

c) *LLC Information Element Coding*

The LLC information element is not included.

6.3.6.2 Compatibility at the called terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	3.1 kHz audio
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	Rec. G.711, A-law or μ-law (Note)
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–
NOTE – Either one or the other layer 1 protocol is supported by the network.		

b) *HLC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Interpretation	First high layer characteristics identification to be used in the call
	Presentation method of protocol profile	High layer protocol profile
4	High layer characteristics identification	Facsimile group 2/3
4a	Extended high layer characteristics identification	–
NOTE – The HLC information element may be absent. If present, octet 4 must be coded FACSIMILE GROUP 2/3. If not present, there must be a progress indicator. If there is no HLC information element and no progress indicator, the call shall be rejected.		

c) *LLC Information Element Coding*

The LLC information element is normally not present. If present, it shall be ignored by the terminal.

7 Codings applicable to specific user applications

7.1 Specific user applications of the circuit-mode 64 kbit/s unrestricted 8 kHz structured bearer service

The codings presented in this clause are typical applications of this bearer service. They are not exhaustive. Further applications are possible.

Furthermore, it is assumed that a pure ISDN environment exists and no network provided interworking function is selected. Therefore, the particular user rate as well as the rate adaption technique applied are specified in the LLC information element, thus permitting compatibility decision only by the destination terminal.

7.1.1 Support of terminal adaptors V.110 and X.30

7.1.1.1 Synchronous mode of operation

7.1.1.1.1 Request by a calling terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	–
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

b) *HLC Information Element Coding* (Note)

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Interpretation	First high layer characteristics identification to be used in the call
	Presentation method of protocol profile	High layer protocol profile
4	High layer characteristics identification	Set according to the teleservice supported by the terminal
4a	Extended high layer characteristics identification	–
NOTE – The HLC information element shall only be included if a terminal supporting a teleservice is connected to the TA (e.g. a Teletex terminal).		

c) *LLC Information Element Coding*

Octet	Information element field		Field value
3	Coding standard		CCITT standardized coding
	Information transfer capability		Unrestricted digital information
3a	Negotiation indicator		(Set according to the capability of the TA)
4	Transfer mode		Circuit mode
	Information transfer rate		64 kbit/s
Layer 1			
5		User information layer 1 protocol	CCITT standardized rate adaption V.110 and X.30
5a		Synchron/asynchron	Synchronous
		Negotiation	(Set according to the capability of the TA)
		User rate	User rate at reference point R
5b (Note 1)		Intermediate rate	(Set according to the user rate)
		NIC on Tx	(Set by the user according to the capability of the TA)
		NIC on Rx	
		Flow control on Tx	(Irrelevant, set to 0)
		Flow control on Rx	
		Rate adaption header	–
		Multiframe support	
		Mode of operation	
		Logical link identifier negotiation	
		Assignor/assignee	
		In-band/outband negotiation	
5c		Number of stop bits	–
		Number of data bits	
		Parity	
5d		Duplex mode	(Note 2)
		Modem type	(Irrelevant)
6	User information layer 2 protocol		(Set according to user layer 2 protocol)
6a-6b	Optional layer 2 protocol information		–
7	User information layer 3 protocol		(Set according to user layer 3 protocol)
7a-7c	Optional layer 3 protocol information		–

NOTES

1 Terminal adaptors X.30 supporting user class of service 19 (64 kbit/s) will not include octet 5b.

2 Where a TA wishes to indicate the mode of operation (half or full duplex), then octet 5d will be present with the modem type being not relevant. In this case, octet 5c must be present but is irrelevant.

7.1.1.1.2 Compatibility at the called terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	–
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

b) *HLC Information Element Coding* (Note)

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Interpretation	First high layer characteristics identification to be used in the call
	Presentation method of protocol profile	High layer protocol profile
4	High layer characteristics identification	Check according to the teleservice supported by the terminal
4a	Extended high layer characteristics identification	–
NOTE – Depending on the type of terminal connected to the calling TA, the HLC information element may be present (e.g. a Teletex terminal).		

c) *LLC Information Element Coding*

Octet	Information element field		Field value
3	Coding standard		CCITT standardized coding
	Information transfer capability		Unrestricted digital information
3a	Negotiation indicator		(Check according to the capability of the TA)
4	Transfer mode		Circuit mode
	Information transfer rate		64 kbit/s
Layer 1			
5		User information layer 1 protocol	CCITT standardized rate adaption V.110 and X.30
5a		Synchron/asynchron	Synchronous
		Negotiation	(Check according to the capability of the TA)
		User rate	Check this value according to the user rate at reference point R
5b (Note)		Intermediate rate	(Check according to the capability of the TA)
		NIC on Tx	(Check according to the capability of the TA)
		NIC on Rx	
		Flow control on Tx	Ignore
		Flow control on Rx	
		Rate adaption header	–
		Multiframe support	
		Mode of operation	
		Logical link identifier negotiation	
		Assignor/assignee	
		In-band/outband negotiation	
5c		Number of stop bits	–
		Number of data bits	
		Parity	
5d		Duplex mode	(Check according to the capability of the TE2 supported)
		Modem type	Ignore
6	User information layer 2 protocol		(Check according to user layer 2 protocol supported by the terminal)
6a-6b	Optional layer 2 protocol information		–
7	User information layer 3 protocol		(Check according to user layer 3 protocol supported by the terminal)
7a-7c	Optional layer 3 protocol information		–

NOTE – In case of terminal adaptors X.30 supporting user class of service 19 (64 kbit/s) octet 5b will not be present. The field values in brackets may or may not be checked by the receiving terminal adaptor.

7.1.1.2 Asynchronous mode of operation

7.1.1.2.1 Request by a calling terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	–
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

b) *HLC Information Element Coding* (Note)

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Interpretation	First high layer characteristics identification to be used in the call
	Presentation method of protocol profile	High layer protocol profile
4	High layer characteristics identification	Set according to the teleservice supported by the terminal
4a	Extended high layer characteristics identification	–
NOTE – The HLC information element shall only be included if a terminal supporting a teleservice is connected to the TA (e.g. a Teletex terminal).		

c) *LLC Information Element Coding*

Octet	Information element field		Field value
3	Coding standard		CCITT standardized coding
	Information transfer capability		Unrestricted digital information
3a	Negotiation indicator		(Set according to the capability of the TA)
4	Transfer mode		Circuit mode
	Information transfer rate		64 kbit/s
Layer 1			
5		User information layer 1 protocol	CCITT standardized rate adaption V.110 and X.30
5a		Synchron/asynchron	Asynchronous
		Negotiation	(Set according to the capability of the TA)
		User rate	User rate at reference point R
5b		Intermediate rate	(Set according to the user rate)
		NIC on Tx	Irrelevant, set to "0"
		NIC on Rx	Irrelevant, set to "0"
		Flow control on Tx	(Set according to the capability of the TA)
		Flow control on Rx	
		Rate adaption header	–
		Multiframe support	
		Mode of operation	
		Logical link identifier negotiation	
		Assignor/assignee	
		In-band/outband negotiation	
5c		Number of stop bits	(Set according to the capability of the TA)
		Number of data bits	
		Parity	
5d		Duplex mode	(Set according to user's requirements)
		Modem type	Irrelevant
6	User information layer 2 protocol		(Set according to user layer 2 protocol)
6a-6b	Optional layer 2 protocol information		–
7	User information layer 3 protocol		(Set according to user layer 3 protocol)
7a-7c	Optional layer 3 protocol information		–

7.1.1.2.2 Compatiblity at the called terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	–
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

b) *HLC Information Element Coding* (Note)

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Interpretation	First high layer characteristics identification to be used in the call
	Presentation method of protocol profile	High layer protocol profile
4	High layer characteristics identification	Check according to the teleservice supported by the terminal
4a	Extended high layer characteristics identification	–
NOTE – Depending on the type of terminal connected to the calling TA, the HLC information element may be present (e.g. a Teletex terminal).		

c) *LLC Information Element Coding*

Octet	Information element field		Field value
3	Coding standard		CCITT standardized coding
	Information transfer capability		Unrestricted digital information
3a	Negotiation indicator		(Check according to the capability of the TA)
4	Transfer mode		Circuit mode
	Information transfer rate		64 kbit/s
Layer 1			
5		User information layer 1 protocol	CCITT standardized rate adaption V.110 and X.30
5a		Synchron/asynchron	Asynchronous
		Negotiation	(Check according to the capability of the TA) (Note)
		User rate	Check according to the user rate at reference point R (Note)
5b		Intermediate rate	(Check according to the capability of the TA) (Note)
		NIC on Tx	Ignore
		NIC on Rx	
		Flow control on Tx	(Check according to the capability of the TA) (Note)
		Flow control on Rx	
		Rate adaption header	–
		Multiframe support	
		Mode of operation	
		Logical link identifier negotiation	
		Assignor/assignee	
		In-band/outband negotiation	
5c		Number of stop bits	(Check according to the capability of the TA)
		Number of data bits	
		Parity	
5d		Duplex mode	(Check according to the capability of the TE2 supported)
		Modem type	Ignore
6	User information layer 2 protocol		(Check according to user layer 2 protocol)
6a-6b	Optional layer 2 protocol information		–
7	User information layer 3 protocol		(Check according to user layer 3 protocol)
7a-7c	Optional layer 3 protocol information		–

NOTE – The following cases may occur:

1) If there is a match of the fields “user rate”, “intermediate rate” and “flow control”, then there will be no in-band parameter exchange required.

2 If these field values do not match, then call acceptability is dependent on in-band negotiation results according to Recommendation V.110.

The field values in brackets may or may not be checked by the receiving terminal adaptor.

7.1.2 Support of terminal adaptors V.120

7.1.2.1 Request by a calling terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	(Note)
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

NOTE – In the case of a TA V.120 connected to a network supporting 64 kbit/s unrestricted digital information transfer but requesting a call to a network with restricted information transfer capability, the coding shall be as follows:

– octet 5	(User information layer 1 protocol):	CCITT standardized rate adaption V.110 and X.30
– octet 5a	(Synchronous/asynchronous):	Synchronous
	(Negotiation):	Negotiation not possible
	(User rate):	56 kbit/s

b) *HLC Information Element Coding*

The HLC information element is not required.

c) *LLC Information Element Coding*

Octet	Informatioin element field		Field value sensitive mode/bit transparent mode
3	Coding standard		CCITT standardized coding
	Information transfer capability		Unrestricted digital information
3a	Negotiation indicator		–
4	Transfer mode		Circuit mode
	Information transfer rate		64 kbit/s
Layer 1			
5		User information layer 1 protocol	CCITT standardized rate adaption V.120
5a		Synchron/asynchron	Set according to the user protocol at reference point R
		Negotiation	In-band negotiation not possible
		User rate	Set according to the user rate at reference point R
		Intermediate rate	–
		NIC on Tx	
		NIC on Rx	
		Flow control on Tx	
		Flow control on Rx	

7.1.2.2 Compatibility at the called terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	(Note)
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

NOTE – In the case of a TA V.120 connected to a network supporting 64 kbit/s unrestricted digital information transfer but requesting a call to a network with restricted information transfer capability, the coding shall be as follows:

– octet 5 (User information layer 1 protocol): CCITT standardized rate adaption V.110 and X.30

– octet 5a (Synchronous/asynchronous): Synchronous

(Negotiation): Negotiation not possible

(User rate): 56 kbit/s

b) *HLC Information Element Coding*

The HLC information element is normally absent. If present, it is checked for terminal compatibility according to Annex B/Q.931.

c) *LLC Information Element Coding*

Octet	Information element field		Field value sensitive mode/bit transparent mode
3	Coding standard		CCITT standardized coding
	Information transfer capability		Unrestricted digital information
3a	Negotiation indicator		–
4	Transfer mode		Circuit mode
	Information transfer rate		64 kbit/s
4a	Structure, configuration, establishment		–
4b	Symmetry, information transfer rate (destination → origination)		–
Layer 1			
5		User information layer 1 protocol	CCITT standardized rate adaption V.120
5a		Synchron/asynchron	Check according to the user protocol applied at reference point R
		Negotiation	Ignore
		User rate	(Check according to the user rate applied at reference point R)
		Intermediate rate	
		NIC on Tx	
		NIC on Rx	–

7.1.3 Support of X.25 terminal equipment allowing access to PSPDN via AU (case A of Recommendation X.31)

7.1.3.1 Rate adaption using X.31 HDLC flag stuffing

7.1.3.1.1 Request by a calling terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	–
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

b) *HLC Information Element Coding*

The HLC information element is not included.

c) *LLC Information Element Coding*

Octet	Information element field		Field value
3	Coding standard		CCITT standardized coding
	Information transfer capability		Unrestricted digital information
3a	Negotiation indicator		
4	Transfer mode		Circuit mode
	Information transfer rate		64 kbit/s
Layer 1			
5		User information layer 1 protocol	(CCITT standardized rate adaption X.31 HDLC flag stuffing) (Note)
5a		Synchron/asynchron	–
		Negotiation	
		User rate	
5b		Intermediate rate	–
		NIC on Tx	
		NIC on Rx	
		Flow control on Tx	
		Flow control on Rx	
		Rate adaption header	
		Multiframe support	
		Mode of operation	
		Logical link identifier negotiation	
		Assignor/assignee	
		In-band/outband negotiation	
5c		Number of stop bits	–
		Number of data bits	
		Parity	
5d		Duplex mode	–
		Modem type	
6	User information layer 2 protocol		Rec. X.25, link layer
6a-6b	Optional layer 2 protocol information		–
7	User information layer 3 protocol		Rec. X.25, packet layer
7a-7c	Optional layer 3 protocol information		–
NOTE –The absence of octet 5 indicates that HDLC flag stuffing applies.			

7.1.3.1.2 Compatibility at the called terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	–
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

b) *HLC Information Element Coding*

This information element is not present.

c) *LLC Information Element Coding*

Octet	Information element field		Field value
3	Coding standard		CCITT standardized coding
	Information transfer capability		Unrestricted digital information
3a	Negotiation indicator		–
4	Transfer mode		Circuit mode
	Information transfer rate		64 kbit/s
Layer 1			
5		User information layer 1 protocol	(CCITT standardized rate adaption X.31 HDLC flag stuffing) (Note)
5a		Synchron/asynchron	–
		Negotiation	
		User rate	
5b		Intermediate rate	–
		NIC on Tx	
		NIC on Rx	
		Flow control on Tx	
		Flow control on Rx	
		Rate adaption header	
		Multi frame support	
		Mode of operation	
		Logical link identifier negotiation	
		Assignor/assignee	
		In-band/outband negotiation	
5c		Number of stop bits	–
		Number of data bits	
		Parity	
5d		Duplex mode	–
		Modem type	
6	User information layer 2 protocol		Rec. X.25, link layer
6a-6b	Optional layer 2 protocol information		–
7	User information layer 3 protocol		Rec. X.25, packet layer
7a-7c	Optional layer 3 protocol information		–
NOTE – The absence of octet 5 indicates that HDLC flag stuffing applies.			

7.1.3.2 Rate adaption corresponding to Recommendations V.110 and X.30

7.1.3.2.1 Request by a calling terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	–
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

b) *HLC Information Element Coding*

The HLC information element is not included.

c) *LLC Information Element Coding*

Octet	Information element field		Field value
3	Coding standard		CCITT standardized coding
	Information transfer capability		Unrestricted digital information
3a	Negotiation indicator		–
4	Transfer mode		Circuit mode
	Information transfer rate		64 kbit/s
Layer 1			
5		User information layer 1 protocol	CCITT standardized rate adaption V.110 and X.30
5a		Synchron/asynchron	Synchronous
		Negotiation	In-band negotiation not possible
		User rate	User rate at reference point R
5b (Note)		Intermediate rate	(Set corresponding to user rate at R)
		NIC on Tx	(Set according to the capability of the TA)
		NIC on Rx	(Set according to the capability of the TA)
		Flow control on Tx	–
		Flow control on Rx	
		Rate adaption header	
		Multiframe support	
		Mode of operation	
		Logical link identifier negotiation	
		Assignor/assignee	
		In-band/outband negotiation	
5c		Number of stop bits	–
		Number of data bits	
		Parity	
5d		Duplex mode	–
		Modem type	
6	User information layer 2 protocol		Rec. X.25, link layer
6a-6b	Optional layer 2 protocol information		–
7	User information layer 3 protocol		Rec. X.25, packet layer
7a-7c	Optional layer 3 protocol information		–
NOTE – Octet 5b may be present. If present, only the NIC bits are relevant.			

7.1.3.2.2 Compatibility at the called terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	–
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

b) *HLC Information Element Coding*

The HLC information element is not present.

c) *LLC Information Element Coding*

Octet	Information element field		Field value
3	Coding standard		CCITT standardized coding
	Information transfer capability		Unrestricted digital information
3a	Negotiation indicator		–
4	Transfer mode		Circuit mode
	Information transfer rate		64 kbit/s
Layer 1			
5		User information layer 1 protocol	CCITT standardized rate adaption V.110 and X.30
5a		Synchron/asynchron	Synchronous
		Negotiation	In-band negotiation not possible
		User rate	Check user rate at reference point R
5b (Note)		Intermediate rate	(Check or ignore)
		NIC on Tx	(Check according to the capability of the TA)
		NIC on Rx	(Check according to the capability of the TA)
		Flow control on Tx	–
		Flow control on Rx	
		Rate adaption header	
		Multiframe support	
		Mode of operation	
		Logical link identifier negotiation	
		Assignor/assignee	
		In-band/outband negotiation	
5c		Number of stop bits	–
		Number of data bits	
		Parity	
5d		Duplex mode	–
		Modem type	
6	User information layer 2 protocol		Rec. X.25, link layer
6a-6b	Optional layer 2 protocol information		–
7	User information layer 3 protocol		Rec. X.25, packet layer
7a-7c	Optional layer 3 protocol information		–
NOTE – Octet 5b may be present. If present, only the NIC bits are relevant.			

7.2 Specific user applications of the circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for 3.1 kHz audio information transfer

The codings presented in this clause are typical applications of this bearer service. They are not exhaustive. Further applications are possible.

Furthermore, it is assumed that a pure ISDN environment exists and no network provided interworking function is selected. Therefore, the particular terminal characteristics are specified in the LLC information element, thus permitting compatibility decision only by the destination terminal.

7.2.1 Voice-band data via modem

7.2.1.1 Request by a calling terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	3.1 kHz audio
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	Rec. G.711, A-law or μ-law (Note)
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–
NOTE – Either one or the other layer 1 protocol is supported by the network.		

b) *HLC Information Element Coding*

The HLC information element is not included.

c) *LLC Information Element Coding* (Note)

Octet	Information element field		Field value
3	Coding standard		CCITT standardized coding
	Information transfer capability		3.1 kHz audio
3a	Negotiation indicator		–
4	Transfer mode		Circuit mode
	Information transfer rate		64 kbit/s
Layer 1			
5		User information layer 1 protocol	Rec. G.711, A-law or μ–law
5a		Synchron/asynchron	(May be set depending on the user's requirements)
		Negotiation	
		User rate	
5b (Note)		Intermediate rate	Not relevant but cannot be omitted in order to have octet 5d
		NIC on Tx	
		NIC on Rx	
		Flow control on Tx	
		Flow control on Rx	
		Rate adaption header	
		Multiframe support	
		Mode of operation	
		Logical link identifier negotiation	
		Assignor/assignee	
		In-band/outband negotiation	
5c		Number of stop bits	(May be set depending on the user's requirements)
		Number of data bits	
		Parity	
5d		Duplex mode	Set according to the modem type
		Modem type	Set according to the modem type
6	User information layer 2 protocol		(Set according to user layer 2 protocol)
6a-6b	Optional layer 2 protocol information		–
7	User information layer 3 protocol		(Set according to user layer 3 protocol)
7a-7c	Optional layer 3 protocol information		–
NOTE – Depending on the user's requirements, the whole LLC information may be absent.			

7.2.1.2 Compatibility at the called terminal equipment

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	3.1 kHz audio
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	Rec. G.711, A-law or μ-law (Note)
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–
NOTE – Either one or the other layer 1 protocol is supported by the network.		

b) *HLC Information Element Coding*

The HLC information element is not present.

c) *LLC Information Element Coding* (Note)

Octet	Information element field		Field value
3	Coding standard		CCITT standardized coding
	Information transfer capability		3.1 kHz audio
3a	Negotiation indicator		–
4	Transfer mode		Circuit mode
	Information transfer rate		64 kbit/s
Layer 1			
5		User information layer 1 protocol	Rec. G.711, A-law or μ-law (Note)
5a		Synchron/asynchron	(Check according to the capability of the user's equipment)
		Negotiation	
		User rate	
5b		Intermediate rate	Ignore
		NIC on Tx	
		NIC on Rx	
		Flow control on Tx	
		Flow control on Rx	
		Rate adaption header	
		Multiframe support	
		Mode of operation	
		Logical link identifier negotiation	
		Assignor/assignee	
		In-band/outband negotiation	
5c		Number of stop bits	(Check according to the capablity of the user's equipment)
		Number of data bits	
		Parity	
5d		Duplex mode	Check according to the capability of the user's equipment
		Modem type	Check according to the capability of the user's equipment
6	User information layer 2 protocol		(Check according to the user layer 2 protocol supported by the terminal)
6a-6b	Optional layer 2 protocol information		–
7	User information layer 3 protocol		(Check according to the user layer 3 protocol supported by the terminal)
7a-7c	Optional layer 3 protocol information		–
NOTE – The LLC information element should be checked against the capability of the user's equipment. In the case of interworking with the PSTN indicated by the presence of a progress indicator, the LLC information element will be absent.			

8 Codings for calls originating in a PSTN

A call originated from the PSTN and supported by non-ISDN signalling prior to arrival at the ISDN interworking point will belong to one of the two indistinguishable information transfer capabilities:

– speech; or

– 3.1 kHz audio.

At the interworking point, the bearer capability "3.1 kHz audio" shall be assigned to the call.

A progress indicator shall also be applied to mark a non-ISDN call source.

The following example shows the coding of the compatibility information elements in the case where non-ISDN signalling was applied prior to arrival at the ISDN interworking point.

a) *BC Information Element Coding*

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Information transfer capability	3.1 kHz audio (Note 1)
4	Transfer mode	Circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	Rec. G.711, A-law or μ-law (Note 2)
6	User information layer 2 protocol	–
7	User information layer 3 protocol	–

NOTES

1 The field value 3.1 kHz audio is accompanied by a progress indicator. This progress indicator indicates to the ISDN terminal that interworking with the PSTN has occurred.

2 Either one or the other layer 1 protocol is supported by the network.

b) *HLC Information Element Coding*

The HLC information element is not present.

c) *LLC Information Element Coding*

The LLC information element is not present.

9 Abbreviations

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

BC Bearer Capability

HDLC High Level Data Link Control

HLC High Layer Compatibility

ISDN Integrated Services Digital Network

LLC Low Layer Compatibility

PH Packet Handler

PSTN Public Switched Telephone Network

SAPI Service Access Point Identifier

TE Terminal Equipment