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**Integrated Services Digital Network (ISDN);
Application of the BC-, HLC-, LLC- information elements
by terminals supporting ISDN services**

ETSI

European Telecommunications Standards Institute

ETSI Secretariat

Postal address: F-06921 Sophia Antipolis CEDEX - FRANCE

Office address: 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE

X.400: c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

Tel.: +33 92 94 42 00 - Fax: +33 93 65 47 16

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Foreword

ETSI Technical Reports (ETRs) are informative documents resulting from ETSI studies which are not appropriate for European Telecommunication Standard (ETS) or Interim - European Telecommunication Standard (I-ETS) status. An ETR may be used to publish material which is either of an informative nature, relating to the use or application of ETSs or I-ETSs, or which is immature and not yet suitable for formal adoption as an ETS or I-ETS.

This ETR has been produced by the Signalling Protocols & Switching (SPS) Technical Committee of the European Telecommunications Standards Institute (ETSI).

This edition replaces Edition 1 which was published in March 1991.

The main differences between this edition and Edition 1 are:

Subclause 6.3.5: examples for 7 kHz telephony teleservice have been included;

Subclause 6.3.6: examples for ISDN videotelephony teleservice have been included and examples describing the inter-working with non-European ISDNs.

Further modifications, resulting in a third edition, will (most likely) become necessary after ETS 300 102-1 has been upgraded to align with CCITT Recommendation Q.931, issue 2. These modifications will be related to the use of layer 2 protocol applied by telematic terminals for which CCITT have allocated a new codepoint.

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1 Introduction

This document 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 so far specified within ETSI and operating in the demand mode. It is based on ETS 300 102-1 (December 1990) including its relevant annexes (B, H and L). Regarding the examples on the 7 kHz telephony teleservice and the ISDN video telephony teleservice, these are based on ETS DE/SPS 5010.

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 (clauses 6 and 7). Furthermore, interworking with the Public Switched Telephone Network (PSTN) is also covered where appropriate (clause 9). A later version of this document will include interworking scenarios with the CSPDN and the PSPDN.

Unless otherwise stated, the use of the term terminal (TE) in this report refers to customer's terminal apparatus which may be a TE 1 (Terminal Equipment Type 1), a TA (Terminal Adaptor) together with a TE 2 (Terminal Equipment Type 2) or an NT 2 (Network Termination Type 2) as defined in CCITT 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 sections of ETS 300 102-1:

- in subclause 4.5.5 as for the Bearer capability information element,
- in subclause 4.5.16 as for the High layer compatibility information element and
- in subclause 4.5.18 as for the Low layer compatibility information element.

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 (see ETS 300 102-1, Annex B).

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 HLC- and LLC- information elements (see ETS 300 102-1, Annex B).

2 Scope and objective

This Technical Report 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 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 document is given in clause 3. The list may require to be accomplished when new services will be defined and/or when the functionality of the 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 subclause 7.1 for the circuit-mode 64 kbit/s unrestricted 8 kHz structured bearer service and
- in subclause 7.2 for the circuit-mode 64 kbit/s 8 kHz structured 3.1 kHz audio bearer service.

The specific objective of this document is to provide guidance on the correct usage of ETS 300 102-1 codepoints to the different ETSI Technical Committees or Technical Subcommittees dealing with services, ISDN terminals, terminal adaptors and NETs. This document shall help to assure inter-operability of terminals supporting the same telecommunication 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 inter-operability and might not guarantee terminal interchangeability.

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

A Specific clause is devoted to examples showing the interworking of European ISDNs with non-European ISDNs supporting restricted 64 kbit/s transfer capability (clause 8).

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

The following telecommunication services are covered in clause 6 of this document:

- 1 Circuit-mode bearer services categories
 - 1.1 Circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for speech information transfer
 - 1.2 Circuit mode 64 kbit/s unrestricted 8 kHz structured bearer service category
 - 1.3 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
 - 2.1 Virtual call bearer service (case B of Recommendation X.31)
 - 2.1.1 Access through the B-channel
 - 2.1.2 Access through the D-channel
- 3 Teleservices
 - 3.1 Telephony teleservice (3.1 kHz bandwidth)
 - 3.2 Teletex service
 - 3.3 Telefax group 4 service
 - 3.4 ISDN syntax-based videotex service
 - 3.5 7 kHz Telephony teleservice
 - 3.6 ISDN Videotelephony teleservice
 - 3.7 Facsimile group 2/3 service

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

- A) Specific user applications of the circuit-mode 64 kbit/s unrestricted 8 kHz structured bearer service
 - 1 Support of terminal adaptors V.110/X.30
 - 1.1 Synchronous mode of operation
 - 1.2 Asynchronous mode of operation
 - 2 Support of X.25 terminal equipment allowing access to PSPDN via AU (case A of Recommendation X.31)

- 2.1 Rate adaption using X.31 HDLC flag stuffing
 - 2.2 Rate adaption corresponding to CCITT Recs. V.110/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 coding examples 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 TE 2 together with a TA are assumed to provide the same functionality as a TE 1. Therefore, a TA should not generate and send a progress indicator 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		
	<u>BC</u>	<u>HLC</u>	<u>LLC</u>
- 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 coding examples:

- 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 of ETS 300 102-1, 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 L of ETS 300 102-1:

- 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 interworking (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, CSPDN or the pan-European mobile cellular system 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 a "pure" ISDN environment

The examples 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
6	User information layer 2 protocol	-----
7	User information layer 3 protocol	-----

b) HLC Information Element Coding:

This information element shall not be included.

c) LLC Information Element Coding:

This information element is not required.

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
6	User information layer 2 protocol	-----
7	User information layer 3 protocol	-----

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 subclause 6.3.1.2b). 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 subclause 6.3.1.2b.

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 of this document.

Interworking with networks using restricted digital information transfer is covered in clause 8.

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 ETS 300 102-1, subclause 4.5.16.

c) LLC Information Element Coding:

This information element is optional. If present, it shall be encoded in accordance with ETS 300 102-1, subclause 4.5.18.

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 of ETS 300 102-1.

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 of ETS 300 102-1 and for parameter negotiation according to Annex M of ETS 300 102-1.

6.1.3 Circuit-mode 64 kbit/s 8kHz 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 of this document.

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	CCITT Rec. G. 711, A-law
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 ETS 300 102-1, subclause 4.5.16.

c) LLC Information Element Coding:

This information element is optional. If present, it shall be encoded in accordance with ETS 300 102-1, subclause 4.5.18.

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
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 of ETS 300 102-1.

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 of ETS 300 102-1 and for parameter negotiation according to Annex M of ETS 300 102-1.

6.2 Packet mode bearer service 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 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 layer 3 procedures. Consequently, ETS 300 102-1 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.

6.3 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
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	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
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	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
4a	Extended high layer characteristics identification	-----

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

- Teletex service, basic mode of operation (Rec. F. 200) (Note 1); or
- Teletex service, basic and mixed mode of operation (Rec. F.230) and Facsimile service group 4 classes II and III (Rec. F. 184) (Note 2); or
- Teletex service, basic and processable mode of operation (Rec. F.220) (Note 3).

Note 1: This coding shall be used by terminals supporting basic operation only.

Note 2: 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.

Note 3: This coding shall be used by terminals which want to operate in the processable mode of operation.

6.3.2.1 Calling side (continued)

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
4a	Structure, configuration, establishment	-----
4b	Symmetry, information transfer rate (destination → origination)	-----
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	
	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	X.75 SLP (Note 1)
6a	Optional layer 2 protocol information	-----
7	User information layer 3 protocol	ISO 8208 (Note 2)
7a	Optional layer 3 protocol information	-----

Note 1: This codepoint is that from the first issue of ETS 300 102-1. It is under revision in CCITT where a new codepoint, viz '10001 ISO 7776 DTE-DTE operation' is proposed.

Note 2: Additional application rules as specified in ETS T/TE 300 080 have to be fulfilled.

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.

Called side (continued)

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
4a	Structure, configuration, establishment	-----
4b	Symmetry, information transfer rate (destination → origination)	-----
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	
	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	X.75 SLP (Note 2)
6a	Optional layer 2 protocol information	-----
7	User information layer 3 protocol	ISO 8208
7a	Optional layer 3 protocol information	-----

Note 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. X.75 single link procedure as layer 2 protocol and ISO 8208 as layer 3 protocol (See also note 2).

Note 2: This codepoints is that from the first issue of ETS 300 102-1. It is under revision in CCITT where a new codepoint, viz '10001 ISO 7776 DTE-DTE operation' is proposed.

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:

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
	Presentation method of protocol profile	High layer protocol profile
4	High layer characteristics identification	Group 4 Class 1 Facsimile
4a	Extended high layer characteristics identification	-----

Calling side (continued)

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
4a	Structure, configuration, establishment	-----
4b	Symmetry, information transfer rate (destination → origination)	-----
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	
	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	X.75 SLP (Note 1)
6a	Optional layer 2 protocol information	-----
7	User information layer 3 protocol	ISO 8208 (Note 2)
7a	Optional layer 3 protocol information	-----

Note 1: This codepoint is that from the first issue of ETS 300 102-1. It is under revision in CCITT where a new codepoint, viz '10001 ISO 7776 DTE-DTE operation' is proposed.

Note 2: Additional application rules as specified in ETS T/TE 300 080 have to be fulfilled.

6.3.3.2 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	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.

Intercommunication between basic mode and mixed mode Teletex terminals and classes I, II and III Group 4 facsimile terminals is shown in CCITT-Recommendation T.90, Table 2.

Called side (continued)

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
4a	Structure, configuration, establishment	-----
4b	Symmetry, information transfer rate (destination → origination)	-----
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	
	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	X.75 SLP (Note 2)
6a	Optional layer 2 protocol information	-----
7	User information layer 3 protocol	ISO 8208
7a	Optional layer 3 protocol information	-----

Note 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. X.75 single link procedure as layer 2 protocol and ISO 8208 as layer 3 protocol (see also note 2).

Note 2: This codepoint is that from the first issue of ETS 300 102-1. It is under revision in CCITT where a new codepoint, viz '10001 ISO 7776 DTE-DTE operation' is proposed.

6.3.4 ISDN syntax-based videotex service

6.3.4.1 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	Syntax-based videotex (Recs. F.300 and T.102)
4a	Extended high layer characteristics identification	-----

Calling side (continued)

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
4a	Structure, configuration, establishment	-----
4b	Symmetry, information transfer rate (destination → origination)	-----
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	
	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	X.75 SLP (Note 1)
6a	Optional layer 2 protocol information	-----
7	User information layer 3 protocol	ISO 8208 (Note 2)
7a	Optional layer 3 protocol information	-----

Note 1: This codepoint is that from the first issue of ETS 300 102-1. It is under revision in CCITT where a new codepoint, viz '10001 ISO 7776 DTE-DTE operation' is proposed.

Note 2: Additional application rules as specified in ETS T/TE 300 080 have to be fulfilled.

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	Syntax-based videotex (Recs. F.300 and T.102)
4a	Extended high layer characteristics identification	-----

Called side (continued)

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
4a	Structure, configuration, establishment	-----
4b	Symmetry, information transfer rate (destination → origination)	-----
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	
	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	X.75 SLP (Note 2)
6a	Optional layer 2 protocol information	-----
7	User information layer 3 protocol	ISO 8208
7a	Optional layer 3 protocol information	-----

Note 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. X.75 single link procedure as layer 2 protocol and ISO 8208 as layer 3 protocol (see also note 2).

Note 2: This codepoint is that from the first issue of ETS 300 102-1. It is under revision in CCITT where a new codepoint, viz '10001 ISO 7776 DTE-DTE operation' is proposed.

6.3.5 7 kHz Telephony service

The coding examples given in this section assume that bearer capability and high layer compatibility selection are not allowed. Therefore, only the coding typical for the 7 kHz telephony teleservice is shown.

If the calling terminal allows fallback to occur to an alternative bearer capability, then the terminal shall indicate this to the network by means of repeated Bearer capability information elements within the SETUP message. The order of the information elements indicates the priority of the bearer capabilities i.e. the first Bearer capability information element has lowest and the second has highest priority. Therefore, in the case of fallback being allowed to 3.1 kHz telephony teleservice, the first BC information element shall be coded as depicted in subclause 6.3.1. The second BC information element shall be coded as depicted in this example.

6.3.5.1 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	7 kHz audio
4	Transfer mode	circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	Recs. H.221, H.230 and H.242
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	Telephony
4a	Extended high layer characteristics identification	-----

c) LLC information Element Coding:

The LLC information element is not included.

6.3.5.2 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	7 kHz audio (Note)
4	Transfer mode	circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	Recs. H.221, H.230 and H.242
6	User information layer 2 protocol	-----
7	User information layer 3 protocol	-----

Note: A user equipment intended to interoperate with user equipment supporting the 7 kHz telephony application over a 64 kbit/s unrestricted 8 kHz structured bearer service category shall consider the 64 kbit/s bearer capability as being compatible with this particular coding. In this case octet 5 may also be absent.

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 present.

6.3.6 ISDN Videotelephony teleservice

The coding examples given in this section assume that bearer capability and high layer compatibility selection are not allowed. Therefore, only the coding typical for the ISDN Videotelephony teleservice is shown. Furthermore the assumption is made that this service requires two connections. If the videotelephony call requires only 1 connection, then the coding example of the first connection applies.

Editor's Note:

The codepoints used in this subclause are those from draft DE/SPS-5010. They are also under discussion in CCITT. In order to allow for world wide interoperability of videotelephony terminals, compatibility with the final CCITT solution is strongly desirable. This may require the examples in this subclause to be reviewed. In addition, extensions of the examples can become necessary in order to take account of today's network capabilities, i.e., some networks, for a transient period of time, may not allow the codepoints depicted in octets 3 and 5 of the BC information element. In this case, the videotelephony terminals may make use of the unrestricted digital information transfer capability.

Also, interworking with 56 kbit/s networks, if desired, will require additional codings.

6.3.6.1 First connection

If the calling terminal allows fallback to occur to an alternative bearer capability and high layer compatibility, then the terminal shall indicate this to the network by means of repeated Bearer capability and High layer compatibility information elements within the SETUP message.

To indicate that a videotelephony teleservice is required with fallback allowed to telephony 7 kHz or telephony 3.1 kHz, the user shall set:

- the first High layer information element included in the SETUP message to "telephony"; and,
- the second High layer information element as specified in the following example; and,
- the first Bearer capability information element included in the SETUP message to "speech" as specified in subclause 6.3.1; and,
- the second Bearer capability information element as specified in the following example.

6.3.6.1.1 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	7 kHz audio
4	Transfer mode	circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	Recs. H.221, H.230 and H.242
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	Audio visual (Recommendation F.721)
4a	Extended high layer characteristics identification	-----

c) LLC information Element Coding:

The LLC information element is not included.

6.3.6.1.2 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	7 kHz audio
4	Transfer mode	circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	Recs. H.221, H.230 and H.242
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	Audio visual (Recommendation F.721)
4a	Extended high layer characteristics identification	-----

c) LLC information Element Coding:

The LLC information element is not present.

6.3.6.2 Second connection

6.3.6.2.1 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	Recs. H.221, H.230 and H.242
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	Audio visual (Recommendation F.721)
4a	Extended high layer characteristics identification	-----

c) LLC information Element Coding:

The LLC information element is not included.

6.3.6.2.2 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	Recs. H.221, H.230 and H.242
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	Audio visual (Recommendation F.721)
4a	Extended high layer characteristics identification	-----

c) LLC information Element Coding:

The LLC information element is not present.

6.3.7 Facsimile group 2/3 service

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

6.3.7.1 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
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	facsimile group 2/3
4a	Extended high layer characteristics identification	-----

c) LLC Information Element Coding:

The LLC information element is not included.

6.3.7.2 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
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	facsimile group 2/3
4a	Extended high layer characteristics identification	-----

c) LLC Information Element Coding:

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

7 Coding examples applicable to specific user applications

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

The examples 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/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 characteristic 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 tele service supported by the terminal
4a	Extended high layer characteristics identification	-----

Note: The HLC Information element shall only be included if a terminal supporting a tele service is connected to the TA (e. g. a teletex terminal).

Calling side (continued)

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
4a	Structure, configuration, establishment	-----
4b	Symmetry, information transfer rate (destination → origination)	-----
Layer 1		
5	User information layer 1 protocol	CCITT standardized rate adaption V.110/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	-----
	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	Note 2
	Modem type	(irrelevant)
6	User information layer 2 protocol	(set according to user layer 2 protocol)
6a	Optional layer 2 protocol information	-----
7	User information layer 3 protocol	(set according to user layer 3 protocol)
7a	Optional layer 3 protocol information	-----

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

Note 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 characteristic 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).

Called side (continued)

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
4a	Structure, configuration, establishment	-----
4b	Symmetry, information transfer rate (destination → origination)	-----
Layer 1		
5	User information layer 1 protocol	CCITT standardized rate adaption V.110/X.30
5a	Synchron/asynchron	synchronous
	Negotiation	(check according to the capability of the TA)
	User rate	check this value according 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	-----
	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	(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	Optional layer 2 protocol information	-----
7	User information layer 3 protocol	(check according to user layer 3 protocol supported by the terminal)
7a	Optional layer 3 protocol information	-----

Note: In the 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 Support of terminal adapters V.110/X.30 (continued)

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 characteristic 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 tele service supported by the terminal
4a	Extended high layer characteristics identification	-----

Note: The HLC information element shall only be included if a terminal supporting a tele-service is connected to the TA (e.g. a teletex terminal).

Calling side (continued)

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
4a	Structure, configuration, establishment	-----
4b	Symmetry, information transfer rate (destination → origination)	-----
Layer 1		
5	User information layer 1 protocol	CCITT standardized rate adaption V.110/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	
	Multi frame 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	Optional layer 2 protocol information	-----
7	User information layer 3 protocol	(set according to user layer 3 protocol)
7a	Optional layer 3 protocol information	-----

7.1.1 Support of terminal adaptors V.110/X.30 (continued)

7.1.1.2 Asynchronous mode of operation (continued)

7.1.1.2.2 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: (Note)

Octet	Information element field	Field value
3	Coding standard	CCITT standardized coding
	Interpretation	First high layer characteristic 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 tele service 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).

Called side (continued)

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
4a	Structure, configuration, establishment	-----
4b	Symmetry, information transfer rate (destination → origination)	-----
Layer 1		
5	User information layer 1 protocol	CCITT standardized rate adaption V.110/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	-----
	Multi frame 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	Optional layer 2 protocol information	-----
7	User information layer 3 protocol	(check according to user layer 3 protocol)
7a	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 Rec. V.110.

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

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

7.1.2.1 Rate adaption using X.31 HDLC flag stuffing

7.1.2.1.1 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.

Calling side (continued)

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
4a	Structure, configuration, establishment	-----
4b	Symmetry, information transfer rate (destination → origination)	-----
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	
5c	In-band/outband negotiation	-----
	Number of stop bits	
	Number of data bits	
5d	Parity	-----
	Duplex mode	
5d	Modem type	-----
6	User information layer 2 protocol	CCITT-Rec X.25, link layer
6a	Optional layer 2 protocol information	-----
7	User information layer 3 protocol	CCITT-Rec X.25, packet layer
7a	Optional layer 3 protocol information	-----

Note: The absence of octet 5 indicates that HDLC flag stuffing applies.

7.1.2.1 Rate adaption using X.31 HDLC flag stuffing (continued)

7.1.2.1.2 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.

Called side (continued)

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
4a	Structure, configuration, establishment	-----
4b	Symmetry, information transfer rate (destination → origination)	-----
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	CCITT-Rec X. 25, link layer
6a	Optional layer 2 protocol information	-----
7	User information layer 3 protocol	CCITT-Rec X. 25, packet layer
7a	Optional layer 3 protocol information	-----

Note: The absence of octet 5 indicates that HDLC flag stuffing applies.

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

7.1.2.2 Rate adaption corresponding to CCITT Recs. V.110/X.30

7.1.2.2.1 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	unrestritced 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.

Calling side (continued)

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
4a	Structure, configuration, establishment	-----
4b	Symmetry, information transfer rate (destination → origination)	-----
Layer 1		
5	User information layer 1 protocol	CCITT standardized rate adaption V.110/X.30
5a	Synchron/asynchron	synchronous
	Negotiation	in-band negotiation not possible
	User rate	user rate at reference point R
5b	Intermediate rate	(set corresponding to user rate at R)
	NIC on Tx	(set according to the capability of the TA) (Note)
	NIC on Rx	(set according to the capability of the TA) (Note)
	Flow control on Tx	Note
	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	CCITT Rec. X.25, link layer
6a	Optional layer 2 protocol information	-----
7	User information layer 3 protocol	CCITT Rec. X.25, packet layer
7a	Optional layer 3 protocol information	-----

Note: Octet 5b may be present. If present, only the NIC bits are relevant.

7.1.2.2.2 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	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.

Called side (continued)

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
4a	Structure, configuration, establishment	-----
4b	Symmetry, information transfer rate (destination → origination)	-----
Layer 1		
5	User information layer 1 protocol	CCITT standardized rate adaption V.110/X.30
5a	Synchron/asynchron	synchronous
	Negotiation	not possible
	User rate	check user rate at reference point R
5b	Intermediate rate	(check or ignore)
	NIC on Tx	(check according to the capability of the TA) (Note)
	NIC on Rx	(check according to the capability of the TA) (Note)
	Flow control on Tx	Note
	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	CCITT Rec. X.25, link layer
6a	Optional layer 2 protocol information	-----
7	User information layer 3 protocol	CCITT Rec. X.25, packet layer
7a	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 subclause consider a typical application 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	CCITT Rec. G.711, A-law
6	User information layer 2 protocol	-----
7	User information layer 3 protocol	-----

b) HLC Information Element Coding:

The HLC information element is not included.

Calling side (continued)

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
4a	Structure, configuration, establishment	-----
4b	Symmetry, information transfer rate (destination → origination)	-----
Layer 1		
5	User information layer 1 protocol	Rec. G.711, A-law
5a	Synchron/asynchron	(may be set depending on the users's requirements)
	Negotiation	
	User rate	
5b	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	not relevant but cannot be omitted in order to have octet 5d
	Rate adaption header	
	Multi frame 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 users'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	Optional layer 2 protocol information	-----
7	User information layer 3 protocol	(set according to user Layer 3 protocol)
7a	Optional layer 3 protocol information	-----

Note: Depending on the user's requirements, the whole LLC information element 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
6	User information layer 2 protocol	-----
7	User information layer 3 protocol	-----

The presence of a progress indicator indicates that the call originates from the PSTN.

b) HLC Information Element Coding:

The HLC information element is not present.

7.2.1.2 Called side (continued)

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
4a	Structure, configuration, establishment	-----
4b	Symmetry, information transfer rate (destination → origination)	-----
Layer 1		
5	User information layer 1 protocol	Rec. G.711, A-law
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	
	Multi frame 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 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 user layer 2 protocol supported by the terminal)
6a	Optional layer 2 protocol information	-----
7	User information layer 3 protocol	(check according to user layer 3 protocol supported by the terminal)
7a	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 PST N indicated by the presence of a progress indicator, the LLC information element will be absent.

8 Interworking with non-European ISDNs supporting restricted 64 kbit/s transfer capability
8.1 Request by a calling terminal connected to a network supporting 64 kbit/s unrestricted digital information transfer

This example 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/X.30
5a	Synchronous/asynchronous	synchronous
	Negotiation	not possible
	User rate	56 kbit/s Recommendation 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 ETS 300 102-1, subclause 4.5.16.

c) LLC Information Element Coding:

This information element is optional. If present, it shall be encoded in accordance with ETS 300 102-1, subclause 4.5.18.

8.2 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/X.30
5a	Synchronous/asynchronous	synchronous
	Negotiation	not possible
	User rate	56 kbit/s Recommendation 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 of ETS 300 102-1.

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 of ETS 300 102-1 and for parameter negotiation according to Annex M of ETS 300 102-1.

8.3 Request by a calling terminal connected to a non-European 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 ETS 300 102-1, subclause 4.5.16.

c) LLC Information Element Coding:

This information element is optional. If present, it shall be encoded in accordance with ETS 300 102-1, subclause 4.5.18.

8.4 Compatibility at the called terminal equipment connected to a non-European 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 of ETS 300 102-1.

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 of ETS 300 102-1 and for parameter negotiation according to Annex M of ETS 300 102-1.

9 Codings in the case where non-ISDNs are involved

9.1 Calls from PSTN to ISDN

A call originated in the PSTN, supported by conventional signalling prior to arrival at the ISDN interworking point, will belong to one of the three indistinguishable services:

- speech; or,
- voice band data via modem; or,
- facsimile group 2/3 service.

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 conventional 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)
4	Transfer mode	circuit mode
	Information transfer rate	64 kbit/s
5	User information layer 1 protocol	CCITT Rec. G.711, A-law
6	User information layer 2 protocol	-----
7	User information layer 3 protocol	-----

Note: 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.

b) HLC Information Element Coding:

The HLC information element is not present.

c) LLC Information Element Coding:

The LLC information element is not present.

9.2 Calls from PSPDN to ISDN

Examples have yet to be specified.

9.3 Calls from CSPDN to ISDN

Examples have yet to be specified

10 Abbreviations

BC	Bearer Capability
CSPDN	Circuit-Switched Public Data Network
HDLC	High Level Data Link Control
HLC	High Layer Compatibility
ISDN	Integrated Services Digital Network
LLC	Low Layer Compatibility
NET	Norme Européenne de Télécommunication
PH	Packet Handler
PSPDN	Packet Switched Public Data Network
PSTN	Public Switched Telephone Network
SAPI	Service Access Point Identifier
TE	Terminal Equipment

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