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**Integrated Services Digital Network (ISDN);
Circuit-mode 64 kbit/s unrestricted 8 kHz
structured bearer service category
Service description**

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Network Aspects (NA) Technical Committee of the European Telecommunications Standards Institute (ETSI).

In accordance with CCITT Recommendation I.130 [1], the following three level structure is used to describe the supplementary telecommunications services as provided by European public telecommunications operators under the pan-European Integrated Services Digital Network (ISDN):

- Stage 1: is an overall service description, from the user's standpoint;
- Stage 2: identifies the functional capabilities and information flows needed to support the service described in stage 1; and
- Stage 3: defines the signalling system protocols and switching functions needed to implement the service described in stage 1.

This ETS details the stage 1 aspects (overall service description) for the circuit-mode 64 kbit/s unrestricted 8 kHz structured bearer service category. The stage 2 and stage 3 aspects are detailed in a general form in CCITT Recommendation Q.71 (an ETSI version is under development) and ETS 300 102 (1990), respectively.

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1 Scope

This standard defines the stage one of the circuit-mode 64 kbit/s unrestricted 8 kHz structured bearer service category for the pan-European Integrated Services Digital Network (ISDN) as provided by European public telecommunications operators. Stage one is an overall service description from the user's point of view (see CCITT Recommendation I.130 [1]), but does not deal with the details of the human interface itself.

This standard defines the interworking requirements of private ISDNs with the public ISDN.

In addition this standard specifies the base functionality where the service is provided to the user via a private ISDN.

This standard does not specify the additional requirements where the service is provided to the user via a telecommunications network that is not an ISDN but does include interworking requirements of other networks with the public ISDN.

Charging principles are outside the scope of this standard.

The values of the general attributes are outside the scope of this standard.

The circuit-mode 64 kbit/s unrestricted 8 kHz structured bearer service category provides unrestricted information transfer between reference points. Each of these reference points can be either an S or coincident S and T reference points (see CCITT Recommendation I.411 [2]).

NOTE: Network operators can also provide information transfer with the same attributes where the reference point is T.

This standard is applicable to the stage two and stage three standards for the ISDN circuit-mode 64 kbit/s unrestricted 8 kHz structured bearer service category. The terms "stage two" and "stage three" are also defined in CCITT Recommendation I.130 [1]. Where the text indicates the status of a requirement (i.e. as strict command or prohibition, as authorisation leaving freedom, or as a capability or possibility), this shall be reflected in the text of the relevant stage two and stage three standards.

Furthermore, conformance to this standard is met by conforming to the stage three standards with the field of application appropriate to the equipment being implemented. Therefore no method of testing is provided for this standard.

2 Normative references

This standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to, or revisions of any of these publications apply to this standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] CCITT Recommendation I.130 (1988): "Method for the characterisation of telecommunication services supported by an ISDN and network capabilities of an ISDN".
- [2] CCITT Recommendation I.411 (1988): "ISDN user-network interfaces - Reference configurations".
- [3] CCITT Recommendation I.112 (1988): "Vocabulary of terms for ISDNs".

- [4] CCITT Recommendation I.210 (1988): "Principles of telecommunication services supported by an ISDN and the means to describe them".
- [5] CCITT Recommendation E.164 (1988): "Numbering plan for the ISDN era".
- [6] CCITT Recommendation I.221 (1988): "Common specific characteristics of services".
- [7] CCITT Recommendation I.220 (1988): "Common dynamic description of basic telecommunication services".
- [8] CCITT Recommendation I.140 (1988): "Attribute technique for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".
- [9] ETS 300 007 (1991): "Integrated Services Digital Network (ISDN); Support of packet mode terminal equipment by an ISDN".
- [10] ETS 300 103 (1990): "Integrated Services Digital Network (ISDN); Support of CCITT Recommendation X.21, X.21 bis and X.20 bis based Data Terminal Equipments (DTEs) by an ISDN Synchronous and asynchronous terminal adaptation functions".

3 Definitions

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

Integrated Services Digital Network (ISDN): see CCITT Recommendation I.112 [3], § 2.3, definition 308.

Service; telecommunications service: see CCITT Recommendation I.112 [3], § 2.2, definition 201.

Bearer service: see CCITT Recommendation I.112 [3], § 2.2, definition 202.

Supplementary service: see CCITT Recommendation I.210 [4], § 2.4.

ISDN number: a number conforming to the numbering plan and structure specified in CCITT Recommendation E.164 [5].

Network determined user busy: see CCITT Recommendation I.221 [6], § 3.1.4.

User determined user busy: see CCITT Recommendation I.221 [6], § 3.1.4.

Retention timer: this timer specifies the amount of time that the network retains all of the information supplied by the calling user when the call encounters busy or is terminated. Implementation of this timer is a network option. The value of this timer shall be greater than 15 seconds.

4 Symbols and abbreviations

ISDN	Integrated Services Digital Network
IWF	Interworking Function
PSTN	Public Switched Telephone Network
PTNX	Private Telecommunication Network Exchange

5 Description

This bearer service category shall provide unrestricted information transfer, therefore it can be used to support various user applications. Examples include:

- EXAMPLE 1: File transfer.
- EXAMPLE 2: Multiple subrate information streams multiplexed into 64 kbit/s by the user.
- EXAMPLE 3: Transparent access to public data network (case A of ETS 300 007 [9]).
- EXAMPLE 4: Speech (see NOTE).
- EXAMPLE 5: 3,1 kHz audio (see NOTE).

User information shall be transferred over a B channel; signalling shall be provided over a D channel.

NOTE: Whilst speech and 3,1 kHz audio have been given as one application for this bearer service category, it is recognised that it is the responsibility of the customers to ensure that a compatible encoding scheme is in operation. Customers should also recognise that no network provision can be made for the control of such items as echo and loss, as the network is unaware of the application in use.

This circuit mode bearer service category shall allow communication in both directions between:

- two users (e.g. terminals, Private Telecommunication Network Exchanges (PTNXs)) in a point-to-point configuration via the ISDN using 64 kbit/s digital signals over the B channel;
- three or more users in a multipoint configuration as invoked by some supplementary services.

Within this bearer service category the following service variants are distinguished with respect to establishment of communications:

- on demand;
- reserved;
- permanent.

6 Procedures

6.1 Provision and withdrawal

Provision of this bearer service category shall be by prior arrangement with the network operator.

NOTE: As a network option this bearer service category can be offered with several subscription options which apply separately to each ISDN number or group of ISDN numbers on the interface. For each subscription option, only one value can be selected.

It should be noted that in this context an interface may consist of a group of physical interfaces.

Subscription options for the interface are summarised in table 1.

The user can be identified by an ISDN number or group of ISDN numbers on the interface.

More than one ISDN number can be associated with the interface only as part of a supplementary service such as the multiple subscriber number supplementary service. In the case of one ISDN number, the option given in table 1 for the number of calls can only exceed the number of information channels in association with a supplementary service (e.g. the call waiting supplementary service).

As a network option, separate values may be specified for incoming and for outgoing calls for either or both of the limits.

Table 1: Subscription options for the interface

Subscription option	Values
Maximum number of information channels available	- m, where m is not greater than the number of information channels on the interface.
Maximum number of total calls present	- n, where n is not greater than the number of information channels on the interface.

6.2 Normal procedures

The procedures in this subclause are applicable to the demand service variant of this bearer service category.

No invocation procedures are required for the reserved and permanent variants of this service. Registration, activation and deactivation procedures for these variants are outside the scope of this standard.

The network shall provide out-of-band indications to indicate call progress.

6.2.1 Originating the call (call establishment)

A call is originated by a served user requesting from the network the required bearer service category. This request shall include an ISDN number identifying the called user. Other information, as required, for use by the network in the supplementary services provided to the called user (e.g. the calling line identification presentation supplementary service) may also be included.

The identity of the called user can be given to the network either en-bloc, containing all the required information, or not en-bloc.

6.2.2 Indications during call establishment

After initiating a call the calling user shall receive an acknowledgement that the network can process the call. The called user shall receive an indication of the arrival of an incoming call of this bearer service category.

When an indication is received by the network that the called user is being informed of the call, the calling user shall also be given an indication that the incoming call is being offered to the called user.

When the connection is established, an indication of this shall be sent to the calling user. The called user may also provide other information for use by the network in supplementary services provided to other users (e.g. the connected line identification presentation supplementary service).

Once the connection is established, the B channel shall then be available for the transmission of 64 kbit/s digital signals in both directions without alteration by the network. No restriction is placed by the network on the content of the digital signals (see NOTE in Clause 5).

6.2.3 Terminating the call

The call may be terminated by either of the users by indicating this to the network. If one user terminates the call, and the other user has not yet terminated the call, an appropriate indication shall be sent to the other user.

6.3 Exceptional procedures

6.3.1 Situations at the calling user side

When the network receives an improper service request from a user, the network shall give that user the appropriate indication and the call establishment shall be ceased.

A user inputting an invalid ISDN number shall be given the appropriate failure indication by the network and the call establishment shall be ceased.

When the network receives an incorrect ISDN number from a user the network shall give that user the appropriate indication and the call establishment shall be ceased.

Users can input network address information subsequent to the service request (i.e. overlap sending). In this case, if the user fails to enter address information or subsequent parts of the address within network determined time intervals, the network shall give that user the appropriate indication and the call establishment shall be ceased.

6.3.2 Situations at the called user side

A calling user attempting to establish a call to a user who is identified by the network to be busy (either network determined user busy or user determined user busy) shall be given the appropriate indication by the network.

A user attempting to establish a call to a user whose terminal equipment fails to respond shall be given the appropriate indication by the network and the call establishment shall be ceased.

On a call to a user whose terminal equipment has responded that the called user is being informed of the call, but has failed to establish the connection within a defined period of time, the calling user attempting to establish the call shall be given the appropriate failure indication by the network and the call establishment shall be ceased.

6.3.3 Situations due to network conditions

A user attempting to establish a call but meeting problems due to network conditions (e.g. congestion) shall be given the appropriate indication by the network.

6.3.4 Retention of call information

If a user attempts to establish a call but meets problems due to network conditions (e.g. congestion) or called user state (e.g. network determined user busy or user determined user busy) then, according to a network option, the network shall retain all of the information supplied by the calling user for the duration of the retention timer.

7 Intercommunication considerations

During an interim period some networks outside Europe may only support restricted 64 kbit/s digital information transfer capability, i.e. information transfer capability solely restricted by the requirement that the all-zero octet is not allowed. For interworking the rules given in Appendix I of CCITT Recommendation I.520 should apply. The interworking functions shall be provided in the network with restricted 64 kbit/s capability. The ISDN with 64 kbit/s transfer capabilities will not be affected by this interworking, other than by conveying the appropriate signalling message to and from the ISDN terminal.

7.1 Interworking with non-ISDNs

In advance of the provision of the ISDN, similar services supported by 64 kbit/s connectivity will be available to customers on what may be described as "digital public switched telephone networks", "pre-ISDNs", "pilot ISDNs" or "extended Integrated Digital Networks". Interworking with ISDN customers shall be required. To reflect this as a broad guideline, network operators shall ensure these networks have the necessary functionality at the interworking point to provide service connectivity with the ISDN.

NOTE: A terminal according to ETS 300 103 [10] connected to the ISDN via a terminal adaptor and using the circuit mode 64 kbit/s unrestricted 8 kHz structured bearer service category requires the use of an Interworking Function (IWF) (including a modem) in the network for calls to Public Switched Telephone Network (PSTN) users. To effect the connection, a 64 kbit/s connection would need to be used to the IWF and a PSTN connection of 3,1 kHz bandwidth will be used to the PSTN user from the IWF. These functions can also be provided for incoming calls. The provision of this IWF is a network option, and if provided, the selection of modem types to be offered is also a network option.

7.2 Interworking with private ISDNs

The situation where the communicating users are attached to a private ISDN and a public ISDN is detailed in Clauses 5 and 6.

8 Interaction with supplementary services

Each supplementary service description identifies the applicability to this bearer service category.

If the in-band communication is interrupted by the network as a result of one user invoking a supplementary service (e.g. the call hold supplementary service, or the terminal portability supplementary service) then the network shall provide an appropriate indication (e.g. all ones or the idle signal) in the B channel.

NOTE: Users are advised to halt the end-to-end in-band information transfer prior to invoking such supplementary services.

9 Static description of the service using attributes

The attributes are defined in CCITT Recommendation I.140 [8], Annex A, § A.1.1.

The values of the attributes are defined in CCITT Recommendation I.140 [8], Annex A, § A.2.

9.1 Low layer attributes

9.1.1 Information transfer attributes

The information transfer attributes of this bearer service category are specified in table 2.

Table 2: Values of information transfer attributes

Attribute	Possible values
Information transfer mode	- circuit
Information transfer rate	- 64 kbit/s
Information transfer capability	- unrestricted
Structure	- 8 kHz integrity
Establishment of communication	- demand - reserved - permanent
Symmetry	- bidirectional symmetric
Communication configuration	- point-to-point - multipoint

9.1.2 Access attributes

The access attributes of this bearer service category are specified in table 3.

Table 3: Values of access attributes

Attribute	Possible values
Access channel and rate	User information - B (64 kbit/s) Signalling - D (16 kbit/s or 64 kbit/s)
Signalling access protocol, information access protocol	User information - Not applicable Signalling (NOTE) - ETS 300 125 , ETS 300 102
NOTE:	For reserved or permanent establishment of connections, the operational, administrative and maintenance messages related to this bearer service category may be conveyed over the D channel.

9.2 High layer attributes

Not applicable.

9.3 General attributes

This standard does not provide values for general attributes.

10 Dynamic description

The dynamic description for this bearer service category on a demand basis shall be as specified in CCITT Recommendation I.220 [7].

Annex A (informative): Bibliography

The following documents are used for information purposes from within this standard.

- CCITT Recommendation I.520: "General arrangements for network interworking between ISDNs".
- CCITT Recommendation Q.71 (1988): "ISDN 64 kbit/s circuit mode switched bearer services".
- ETS 300 102 (1990): "Integrated Services Digital Network (ISDN); User-network interface layer 3; Specifications for basic call control".
- ETS 300 125 (1990): "Integrated Services Digital Network (ISDN); User-network interface data link layer specification; Application of CCITT Recommendations Q.920/I.440 and Q.921/I.441".

History

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