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**Integrated Services Digital Network (ISDN);
Circuit-mode 64 kbit/s 8 kHz structured bearer
service category usable for 3,1 kHz audio
information transfer
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 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 8 kHz structured bearer service category usable for 3,1 kHz audio information transfer. The stage 2 and 3 aspects are detailed in a general form in documents CCITT Recommendation Q.71 (an ETSI version is currently under development) and ETS 300 102 (1990), respectively.

The circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for 3,1 kHz audio information transfer corresponds to the service which is currently offered in the Public Switched Telephone Network (PSTN). This bearer service category provides for the transfer of speech and of 3,1 kHz bandwidth audio information such as voice band data via modems, facsimile groups 1, 2 and 3 information.

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1 Scope

This standard defines the stage one of the circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for 3,1 kHz audio information transfer 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 8 kHz structured bearer service category usable for 3,1 kHz audio information transfer corresponds to the service which is currently offered in the Public Switched Telephone Network (PSTN). This bearer service category provides for the transfer of speech and of 3,1 kHz bandwidth audio information such as voice band data via modems, facsimile groups 1, 2 and 3 information.

The digital signal at the coincident S and T reference point (see CCITT Recommendation I.411 [2]) conforms to CCITT Recommendation G. 711 [3] (A-law).

The circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for 3,1 kHz audio information transfer is intended to support speech and 3,1 kHz bandwidth audio information transfer between reference points. Each of these reference points can be either an S or coincident S and T reference points.

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 8 kHz structured bearer service category usable for 3,1 kHz audio information transfer. 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 G.711 (1988): "Pulse code modulation (PCM) of voice frequencies".
- [4] CCITT Recommendation I.112 (1988): "Vocabulary of terms for ISDNs".
- [5] CCITT Recommendation I.210 (1988): "Principles of telecommunication services supported by an ISDN and the means to describe them".
- [6] CCITT Recommendation I.220 (1988): "Common dynamic description of basic telecommunication services".
- [7] CCITT Recommendation E.164 (1988): "Numbering plan for the ISDN era".
- [8] CCITT Recommendation I.221 (1988): "Common specific characteristics of services".
- [9] CCITT Recommendation I.140 (1988): "Attribute technique for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

3 Definitions

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

Integrated Services Digital Network (ISDN): see CCITT Recommendation I.112 [4], § 2.3, definition 308.

Service; telecommunications service: see CCITT Recommendation I.112 [4], § 2.2, definition 201.

Bearer service: see CCITT Recommendation I.112 [4], § 2.2, definition 202.

Supplementary service: see CCITT Recommendation I.210 [5], § 2.4.

ISDN number: a number conforming to the numbering plan and structure specified in CCITT Recommendation E.164 [7].

Network determined user busy: see CCITT Recommendation I.221 [8], § 3.1.4.

User determined user busy: see CCITT Recommendation I.221 [8], § 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
PSTN	Public Switched Telephone Network
PTNX	Private Telecommunication Network Exchange

5 Description

This bearer service category shall provide for the transfer of speech and 3,1 kHz bandwidth audio information such as voice band data via modems, facsimile groups 1, 2 and 3 information.

User information is provided over a B channel, signalling is provided over the D channel.

NOTE 1: The maximum modem bit-rate that can be used by users in applications of this bearer service category depends on the modulation standard employed by the user and on the transmission performance within, or between, different administrations. The extent of support is a network, or bilaterally agreed, matter.

Connections provided for these services shall offer the transfer capability for the information indicated above.

NOTE 2: This means that the network may include speech processing techniques provided that they are appropriately modified, or functionally removed prior to non-speech information transfer. The control of echo control devices, speech processing devices, etc. shall be made by use of a 2 100 Hz (disabling) in-band tone. Bit integrity cannot be assured. The network may use analogue transmission.

All CCITT Recommendations for the transfer of speech information in the network shall apply to this bearer service category.

This circuit mode bearer service category shall allow:

- two users (e.g. terminals, Private Telecommunication Network Exchanges (PTNXs)) in a point-to-point configuration to communicate in both directions via the ISDN using 3,1 kHz audio information encoding into 64 kbit/s digital signals over the B channel for the duration of a call;
- three or more users in a multipoint configuration as invoked by some supplementary services.

The network provides tones and/or announcements to support this bearer service category. Tones and/or announcements can be used to indicate the progress (or lack of progress) of a call. The application and meaning of the tones and announcements is a national matter and outside the scope of this standard.

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 provider 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

Procedures in this subclause are applicable to the demand 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.

Network generated in-band tones and/or announcements shall be provided for this bearer service category.

6.2.1 Originating the call (call establishment)

The call is originated by the user requesting from the network the required bearer service category, with this request including 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 may 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 signals supporting speech or 3,1 kHz audio information in both directions.

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 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 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 where 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 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, as 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

7.1 Interworking with non-ISDNs

Interworking shall be required between the ISDN and the PSTN for this bearer service category.

Calls from the PSTN shall be presented to users in the ISDN using this bearer service category.

Calls using this service can be terminated in the PSTN and the calling user shall be given an indication that interworking has occurred.

7.2 Interworking with private ISDNs

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

8 Interaction with other 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 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 [9], Annex A, § A.1.1.

The values of the attributes are defined in CCITT Recommendation I.140 [9], 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	- 3,1 kHz audio (NOTES 1, 2)
Structure	- 8 kHz integrity
Establishment of communication	- demand - reserved - permanent
Symmetry	- bidirectional symmetric
Communication configuration	- point-to-point - multipoint
NOTE 1:	3,1 kHz audio shall be encoded according to CCITT Recommendation G.711 [3], A-law.
NOTE 2:	When crossing an international boundary between administrations which employ different encoding laws, the network applying μ -law shall perform the necessary A-law to μ -law conversion (see CCITT Recommendation G.711 [3]).

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 - CCITT Recommendation G.711 [3] 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 [6].

Annex A (informative): Bibliography

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

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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