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**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**I.231.2**

**INTEGRATED SERVICES DIGITAL NETWORK (ISDN)  
SERVICE CAPABILITIES – BEARER SERVICES  
SUPPORTED BY AN ISDN**

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**CIRCUIT-MODE BEARER SERVICE  
CATEGORIES – CIRCUIT-MODE 64 kbit/s,  
8 kHz STRUCTURED BEARER SERVICE  
USABLE FOR SPEECH INFORMATION  
TRANSFER**

**ITU-T Recommendation I.231.2**

(Extract from the *Blue Book*)

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## NOTES

1 ITU-T Recommendation I.231.2 was published in Fascicle III.7 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

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

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## Recommendation I.231.2

### **CIRCUIT-MODE BEARER SERVICE CATEGORIES – CIRCUIT-MODE 64 kbit/s, 8 kHz STRUCTURED BEARER SERVICE USABLE FOR SPEECH INFORMATION TRANSFER**

(Melbourne, 1988)

#### **2 I.231.2 - Circuit-mode 64 kbit/s, 8 kHz structured bearer service category usable for speech information transfer**

##### 2.1 *Definition*

This bearer service category is intended to support speech.

The digital signal at the S/T reference point shall conform to Recommendation G.711 (A-law or  $\mu$ -law). The network may use processing techniques appropriate for speech such as analogue transmission, echo cancellation and low bit-rate voice encoding. Hence, bit integrity is not assured. This bearer service is not intended to support modem derived voice-band data.

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

##### 2.2 *Description*

###### 2.2.1 *General description*

This circuit-mode bearer service category allows:

- two users (e.g. terminals, PABXs) in a point-to-point configuration to communicate via the ISDN using speech encoding into 64 kbit/s digital signals over the B-channel, in both directions continuously and simultaneously for the duration of a call;
- three or more users in a multipoint configuration (refer to Recommendation I.254 for the supplementary service description for Three-Party Service and Conference Calling).

Tones and/or announcements to indicate the progress or otherwise of a call, are provided by the network.

###### 2.2.2 *Specific terminology*

Retention timer: this timer specifies the amount of time that the network retains the call information of the original call upon encountering busy or being released. It is a network provider option. The value for this timer is greater than 15 seconds.

##### 2.3 *Procedures*

###### 2.3.1 *Provision/withdrawal*

2.3.1.1 Provision of this service will be by pre-arrangement with the Administration.

2.3.1.2 This bearer service is 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. Subscription options for the interface are summarized below:

<i>Subscription option</i>	<i>Value</i>
Maximum number of information channels available at user B	- $m$ , where $m$ is not greater than the number of information channels on the interface
Maximum number of total calls present at user B	- $n$ , where $n$ is not greater than the number of information channels on the interface

User B can be an ISDN number or group of ISDN numbers on the interface.

*Note* - More than one ISDN number can be associated with the service/interface only as a part of a supplementary service such as multiple subscriber number. In the case of one ISDN number, the option given above for the number of calls can only exceed the number of information channels in association with a supplementary service (e.g. call waiting). As a network provider option, separate values may be specified for incoming and for outgoing calls for either or both of the limits.

### 2.3.2 *Normal procedures*

Out-of-band messages shall always be provided to indicate call progress, etc. However, network-generated in-band tones and announcements shall always be provided for this bearer service category.

#### a) *Originating the service (call set-up)*

The call is originated by the user requesting the required bearer service; the request includes a number identifying the called user. Other information, as required, for the bearer service and for use by the network in supplementary services provided to the called user (e.g. calling line identity) may also be included. This request may be given to the network either *en bloc*, containing all the required information, or not *en bloc*.

#### b) *Indications during call set-up*

All indications entail signalling messages and shall include, where appropriate, in-band tones or announcements.

After initiating a call the calling user will receive an acknowledgement that the network is able to process the call. The called user will receive an indication of the arrival of an incoming call of this bearer service.

The calling user shall also be given an indication that the incoming call is being offered to the called user, when an indication is received by the network that the called user is being informed of this call. When the call reaches the called user and the connection is established, an indication of this is 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. connected line identity). The relationship of a connected user with a called user requires further study.

Once established, the B-channel is then available for the transmission of speech signals in both directions continuously and simultaneously

#### c) *Terminating the call*

The call may be terminated by either or both of the users by indicating this to the network. If one user terminates the call, an appropriate indication is sent to the other user.

### 2.3.3 *Exceptional procedures*

#### a) *Failure situations due to user error*

- i) A user inputting a network-identifiable, improper service request will be given an appropriate failure indication by the network and the call set-up will be ceased.
- ii) A user inputting a non-valid network number will be given an appropriate failure indication by the network and the call set-up will be ceased.

#### b) *Failure situations due to called user state*

- i) 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) will be given an appropriate failure indication by the network.
- ii) A user attempting to establish a call to a user whose terminal equipment fails to respond will be given an appropriate failure indication by the network and the call set-up will be ceased.
- iii) 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 answer within a defined period of time, the calling user attempting to establish the call will be given an appropriate failure indication by the network and the call-set up will be ceased.

#### c) *Failure situations due to network conditions*

A user attempting to establish a call but meeting call failure situations due to network conditions (e.g., congestion) will be given an appropriate failure indication by the network.

#### d) *Failure situations due to called user state and/or network conditions*

A user attempting to establish a call but meeting call failure situations due to network conditions (e.g. congestion) or called user state (e.g. busy) can have service data retained for a specified period of time, i.e. retention timer.

### 2.3.4 *Alternative procedures*

#### 2.3.4.1 *Reserved service procedures*

For further study.

#### 2.3.4.2 *Permanent service procedures*

For further study.

### 2.4 *Network capabilities for charging*

This Recommendation does not cover charging principles. Future Recommendations in the D-Series are expected to contain that information.

#### 2.4.1 *Demand service charging*

It shall be possible to charge the subscriber accurately for the demand service.

#### 2.4.2 *Reserved service charging*

It shall be possible to charge the subscriber accurately for the reserved service.

#### 2.4.3 *Permanent service charging*

It shall be possible to charge the subscriber accurately for the permanent service.

### 2.5 *Interworking requirements*

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

2.6 *Interaction with supplementary services*

Not applicable. Each supplementary service description identifies the applicability with this bearer service category.

2.7 *Attributes and values of attributes of the circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for speech information transfer*

*Information transfer attributes*

1. Information transfer mode: circuit
2. Information transfer rate: 64 kbit/s
3. Information transfer capability: speech (encoded according to Recommendation G.711 A-law,  $\mu$ -law) (Note 1)
4. Structure: 8 kHz integrity
5. Establishment of communication: demand/reserved/permanent
6. Symmetry: bidirectional symmetric/unidirectional
7. Communication configuration: point-to-point/multipoint

*Access attributes*

8. Access channel: B for user information,  
D for signalling (Note 2)
9. Access protocol: I-Series for D-channel, Rec. G.711 for B-channel

*General attributes*

10. Supplementary services provided - Refer to Recommendation I.250
  11. Quality of Service
  12. Interworking possibilities
  13. Operation and commercial aspects
- } for further study (may be different from I.231.1)

*Note 1* - When crossing an international boundary between Administrations which employ different encoding laws, the network shall perform the necessary A- $\mu$  law conversion (see Recommendation G.711).

*Note 2* - For reserved/permanent service the operational administrative and maintenance (OAM) messages related to these services may be conveyed over the D-channel.

2.8 *Provision of individual circuit-mode 64 kbit/s, 8 kHz structured bearer services usable for speech information transfer*

a) Overall provision<sup>1)</sup> : E

*Note* - Some networks will offer this service in a manner identical to the 3.1 kHz audio service.

b) Variations of secondary attributes:

<i>Establishment of communication</i>			<i>Symmetry</i>	<i>Communication of configuration</i>	<i>Provision<sup>1)</sup></i>
I.231.2/1	demand	}	bidirectional	pt-pt	E
I.231.2/2	reserved			pt-pt	A
I.231.2/3	permanent			pt-pt	E
I.231.2/4	demand	}	unidirectional	pt-pt	A
I.231.2/5	reserved			pt-pt	A
I.231.2/6	permanent			pt-pt	A
I.231.2/7	demand	}	bidirectional	multipt	A
I.231.2/8	reserved			multipt	A
I.231.2/9	permanent			multipt	A
I.231.2/10	demand	}	unidirectional	multipt	A
I.231.2/11	reserved			multipt	A
I.231.2/12	permanent			multipt	A

c) Access

Signalling and OAM (Note 1)		User information		Provision
Channel and rate	Protocols	Channel and rate	Protocols	
D(16)	I.451 (Note 2)	B(64)	G.711	E
D(64)	I.451 (Note 2)	B(64)	G.711	E

*Note 1* - Definition of protocols for OAM is for further study.

*Note 2* - Demand services only. Further study for reserved and permanent services.

2.9 *Dynamic description*

The dynamic description for this service on a demand basis is identical for a number of circuit mode services and is therefore collectively given in Recommendation I.220.

<sup>1)</sup> The definition of E (essential) and A (additional) can be found in Recommendation I.230.