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SERIES I: INTEGRATED SERVICES DIGITAL NETWORK

Service capabilities – Bearer services supported by an ISDN

Circuit-mode bearer service categories:

Circuit-mode 384 kbit/s unrestricted, 8 kHz structured bearer service

ITU-T Recommendation I.231.6

(Previously "CCITT Recommendation")

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FOREWORD

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

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

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation I.231.6 was revised by ITU-T Study Group 1 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 19th of July 1996.

NOTE

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.231.6

CIRCUIT-MODE BEARER SERVICE CATEGORIES: CIRCUIT-MODE 384 kbit/s UNRESTRICTED, 8 kHz STRUCTURED BEARER SERVICE

(revised in 1996)

1 Definition

This bearer service category provides the unrestricted transfer of 384 kbit/s user information over an H_0-channel at the S/T reference point. Transfer of OAM (Operations, Administration and Maintenance) information for reserved and permanent services may be provided over a D-channel in the same or in another interface structure.

NOTE – Time Slot Sequence Integrity (TSSI) should be guaranteed between S/T reference points.

2 Description

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 384 kbit/s digital signals over the H_0-channel, in both directions continuously;
- three or more users in a multipoint configuration (refer to Recommendation I.254 for the supplementary service description).

2.2 Specific terminology

2.2.1 **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 minimum value of this timer shall be 15 seconds.

3 Procedures

3.1 Provision/withdrawal

Provision of this service will be by pre-arrangement with Administrations.

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.

Subscription option	Value
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.

3.2 Normal procedures

All user-network signalling is done on the D-channel.

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

The call is originated by the user requesting from the network 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*

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).

Once established, the H_0-channel is then available for the transmission of 384 kbit/s digital signals in both directions continuously, without alteration by the network. No restriction is placed by the network on the content of the digital signals.

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.

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 calling 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 situation due to called user state and/or network conditions*

A calling 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.

3.4 Alternative procedures

3.4.1 Reserved service procedures

A reserved communication service provides a long duration connection, typically (but not exclusively) in excess of one month, between users, that is analogous to a private leased circuit but affording the users a degree of control over connection establishment and termination not available on private leased circuits.

3.4.1.1 Connection establishment and termination

Connection establishment and termination is by a combination of administrative procedures and signalling between the network and the user. Connection establishment and termination is as follows.

3.4.1.1.1 Normal reserved service procedures

a) *Connection establishment*

The user requests the service by service subscription as an administrative process. The subscription includes information identifying both users, the required bearer service, the time (T1) that the connection is to be established and, optionally, the time (T2) that the connection is to be terminated, or the duration for which the connection is to remain established (T3).

At time (T1), the network-to-network component of the connection between the two interfaces is activated and a notification is sent to each user. Either user can now activate the user-to-network components of the connection by signalling on the D-channel.

Optionally, the subscriber may modify the time for which the reserved communication service connection is active (T3), as an administrative process between the subscriber and the service provider.

b) *Indications during connection establishment*

Both users receive indications of the establishment of the network-to-network component of the connection. Indications during the establishment of the user-to-network components of the connection will be according to basic call procedures and the supplementary services subscribed to by the users.

c) *Connection termination*

At time T2 the network will initiate termination of the connection by signalling to each user on the D-channel.

Optionally, prior to time T2, the connection may be terminated by either or both of the users by indicating this to the network by signalling on the D-channel.

d) *Temporary deactivation and reactivation*

Prior to time T2, one user may temporarily deactivate the user-to-network component of the connection by indicating this to the network by means of signalling on the D-channel. A connection deactivated by these means may subsequently, but prior to time T2, be reactivated by a request to the network by means of signalling on the D-channel. Network-to-network components of the connection remain established during this procedure.

In a point-to-point configuration, the reserved service connection is not available while in the deactivated state.

Temporary deactivation and reactivation may be achieved using the HOLD supplementary service.

e) *Programmed cyclical activation and deactivation*

Optionally, reserved communication services between pre-defined users may be activated and deactivated on a cyclical basis, at pre-defined times, and on pre-defined days. The number of programmed reserved communication connection activation/deactivation to be provided per user per day, and degree of flexibility to be provided in the activation/deactivation programme are beyond the scope of this Recommendation.

3.4.1.1.2 Exceptional reserved service procedures

a) *Failure situations due to user error*

None identified.

b) *Failure situations due to user state*

Normal call procedures apply.

c) *Failure situations due to network conditions*

i) The network, when attempting to establish a call but meeting a call failure situation due to network conditions (e.g. congestion), will periodically (for example at five minute intervals) re-attempt to establish the call for a defined period of time or until the call is established.

ii) Should an established call be prematurely released as a result of a network failure, which is detectable by the network, the network will attempt to re-establish the call to both users' terminals and continue as per c) i) above.

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

None identified.

3.4.1.2 Operation and maintenance support

Operation and maintenance support is covered in the I.600-Series of Recommendations.

3.4.1.3 Quality of service

– *Availability*

NOTE – Grade of service is not applicable to a reserved communication service.

Definitions concerning availability may be found in Recommendations in the E.800-Series.

Definitions concerning the duration of unavailable time for international digital connections forming part of an integrated services digital network may be found in Annex A/G.821 (Recommendation G.821 is cross-referenced in Recommendation I.352).

The procedure for assessment of the service availability performance may be found in Recommendation M.1016.

The service availability performance of reserved services requires further study.

3.4.1.4 Dimensioning of network resources for reserved communication service

Information regarding the dimensioning of network resources for reserved communication services may be found in Recommendation E.731, "Methods for dimensioning resources operating in circuit switched mode".

3.4.1.5 Information transfer capability

The format and content of information conveyed across a reserve communication service is entirely at the discretion of the user(s) subject to any constraints imposed by the requested bearer service or national regulations.

3.4.2 Permanent service procedures

Permanent service procedures operate in the same manner as reserved service procedures except that the duration (T3) is considerably greater.

This is for further study.

4 Network capabilities for charging

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

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

5 Interworking requirements

Interworking between ISDN and private ISDN may be required for this bearer service category.

Interworking between ISDN and B-ISDN may be possible for this bearer service category.

6 Applicability of supplementary services

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

7 Attributes and values of attributes of the circuit-mode 384 kbit/s unrestricted, 8 kHz structured bearer service category

Information transfer attributes

1 Information transfer mode:	circuit
2 Information transfer rate:	384 kbit/s
3 Information transfer capability:	unrestricted
4 Structure:	8 kHz integrity
5 Establishment of communication:	demand/reserved/permanent
6 Symmetry:	bidirectional symmetric/bidirectional asymmetric/unidirectional (Note 1)
7 Communication configuration:	point-to-point/multipoint

Access attributes

8 Access channel:	H_0(384) for user information D(16) or D(64) for signalling and OAM information (Note 2)
9 Access protocol:	I-Series for D-channel

General attributes

10 Supplementary service provided:	Refer to Recommendation I.250
11 Quality of service:	for further study
12 Interworking:	
13 Operation and commercial aspects:	

NOTES

1 Bidirectional-asymmetric services are for further study.

2 The transfer of the Operations, Administration and Maintenance (OAM) information for reserved and permanent services may be provided over a D-channel in the same or in another interface structure.

8 Provision of individual circuit-mode 384 kbit/s unrestricted, 8 kHz structured bearer services

a) Overall provision: A (Note 1)

b) Variations of secondary attributes:

	Establishment of communication	Symmetry	Communication of configuration	Provision (Note 1)
I.231.6/1	demand	bidirectional	pt-pt	A
I.231.6/2	reserved			A
I.231.6/3	permanent			A
I.231.6/4	demand	unidirectional	pt-pt	A
I.231.6/5	reserved			A
I.231.6/6	permanent			A
I.231.6/7	demand	bidirectional	multipt	A
I.231.6/8	reserved			A
I.231.6/9	permanent			A
I.231.6/10	demand	unidirectional	multipt	A
I.231.6/11	reserved			A
I.231.6/12	permanent			A

c) Access:

Signalling and OAM (Note 2)		User information		Provision (Note 1)
Channel and rate	Protocols	Channel and rate	Protocols	
D(16)	I.451 (Note 3)	H_0(384)	user-defined	E
D(64)	I.451 (Note 3)	H_0(384)	user-defined	E

NOTES

1 The definition of E (Essential) and A (Addition) can be found in Recommendation I.230.

2 Definition of protocols for OAM is for further study.

3 Demand services only. Further study for reserved and permanent services.

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.

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