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Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Circuit-mode multi-rate bearer services — Service description, functional capabilities and information flows

Technologies de l'information — Télécommunications et échange d'information entre systèmes — Réseau privé avec intégration de services — Services porteurs multidébits en mode circuit — Description du service, capacités fonctionnelles et débit d'informations

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 11584 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 6, *Telecommunications and information exchange between systems*.

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Introduction

This International Standard is one of a series of ISO standards describing the service specification functional model and information flows applicable to Private Integrated Services Network. The series uses the ISDN concepts as developed by ITU-T (formerly CCITT) and is also within the framework of standards for Open Systems Interconnection as defined by ISO.

This particular International Standard defines the service specification for circuit mode multi-rate bearer service.

The circuit-mode multi-rate bearer services for Private Integrated Services Network (PISN), specified in this International Standard complement, and are compatible with the corresponding services for public ISDN as specified by ITU-T (formerly CCITT). Specifications of the equivalent services are to be found in Rec. I.220, I.230, I.231.

This International Standard contains the stage 1 and stage 2 specifications of the circuit-mode multi-rate bearer services.

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Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit-mode multi-rate bearer services - Service description, functional capabilities and information flows

Section 1: General

1 Scope

This International Standard specifies service description and control aspects of the multi-rate circuit-mode basic services which may be supported by Private Integrated Services Network (PISN).

One of the purposes of the stage 1 and stage 2 specifications is to guide and constrain the work on signalling protocols at stage 3. Therefore, this International Standard is concerned mainly with the control aspects of services.

A stage 3 standard shall be in conformance with this International Standard, if the signalling protocols and equipment behavior specified in the stage 3 standard are capable of being used in a PISN which supports any or all of the basic services specified in this International Standard.

This International Standard encompasses Circuit-Mode Multi-rate Unrestricted 8 kHz Structured Bearer Service.

Negotiation of services at call establishment time, interworking using channel aggregation (Nx64kbit/s) and change of service during a call are outside the scope of this International Standard.

2 Conformance

In order to conform to this International Standard, a stage 3 standard shall specify signalling protocols and equipment behavior that are capable of being used in a PISN which supports the bearer service specified in this International Standard. This means that to claim conformance a Stage 3 standard is required to be adequate for the support of those aspects of stage 1 (section 2) and stage 2 (section 3) which are relevant to the interface or equipment to which the Stage 3 standard applies.

3 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

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ISO/IEC 11574: 1994, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit-mode 64 kbit/s bearer services - Service description, functional capabilities and information flows.*

ISO/IEC 11579-1: 1994, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Part1: Reference configuration for PISN Exchanges (PINX).*

CCITT Rec. I.112(1988), *Vocabulary of terms for ISDNs (Blue Book).*

CCITT Rec.I.140(1988), *Attribute technique for the characterization of telecommunication services s upported by an ISDN and network capabilities of an ISDN (Blue Book).*

CCITT Rec. I.210 (1988), *Principles of telecommunication services supported by an ISDN and the means to describe them (Blue Book).*

CCITT Rec. I.230 (1988), *Definition of bearer service categories (Blue Book).*

CCITT Rec. I.231 (1988), *Circuit-mode bearer service categories (Blue Book).*

CCITT Rec.I.412 (1988), *ISDN user-network interfaces interface structure and access capabilities (Blue Book).*

4 Definitions

For the purposes of this International Standard, the following definitions apply.

4.1 External Definitions

This International Standard uses the following terms defined in other documents.

- Access channel and rate (CCITT Rec. I.140)
- Access protocol (CCITT Rec. I.140)
- Basic service (CCITT Rec..I.210)
- B channel (CCITT Rec..I.412)
- Bearer service (CCITT Rec.I.230)
- Call (ISO/IEC 11574)
- Channel (rate) (CCITT Rec.I 140)
- Communication configuration (CCITT Rec.I 140)
- Contiguous / Non-contiguous (CCITT Rec.I.231)
- Establishment of connection (CCITT Rec I.140)
- Information transfer (mode / rate / capability) (CCITT Rec.I 140)
- Point-to-point (services) (CCITT Rec.I.140)
- Private Integrated Services Network(PISN) (ISO/IEC 11579-1)
- Service (CCITT Rec.I.112)
- Signalling (CCITT Rec.I.112)
- Structure (CCITT Rec.I 140)
- Supplementary Service (CCITT Rec.I.210)
- Symmetry (CCITT Rec I 140)

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- Unrestricted (digital information) (CCITT Rec.I.140)
- User (ISO/IEC 11574)

4.2 Time Slot Sequence Integrity

A situation where the order in which units of data are inserted into the n B-channels at one user access is reflected in the order in which those units of data are received from the corresponding n B-channels at the other user access.

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Section 2: Service Description, Stage 1

5 Circuit-mode multi-rate unrestricted 8 kHz structured bearer service

5.1 Descriptions

The circuit-mode multi-rate bearer service allows PISN users to request on a demand basis unrestricted information transfer rates at integer multiples of 64 kbit/s without alteration between PISN users.

This bearer service extends the circuit-mode bearer service based on 64 kbit/s by supporting higher information transfer rates.

This circuit-mode bearer service allows two PISN users to communicate in a point-to-point configuration via the PISN using nx64 kbit/s digital signals, in both directions continuously and simultaneously for the duration of a call.

5.2 Network capabilities for charging

This is outside the scope of this International Standard.

5.3 Static Description: Service Attributes

5.3.1 Dominant information transfer attributes

The dominant information transfer attributes for this service are:

1) Information transfer mode: Circuit;

2) Information transfer rate: 128, 192, ...1920 kbit/s (Note 1);

3) Information transfer capability: Unrestricted digital information;

4) Structure: Time slot sequence integrity.

Note - The support of individual transfer rates is an implementation option.

5.3.2 Secondary information transfer attributes

The secondary Information transfer attribute possibilities for this service are:

5) Establishment of communication: Demand (Note1);

6) Symmetry: Bidirectional symmetric (Note 2);

7) Communication configuration: Point-to-point (Note 3).

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Notes

1. Only demand services are specified in this International Standard.

2. Only bidirectional symmetric services are specified in this International Standard.

3. Only point-to-point services are specified in this International Standard. Multi-point configurations can be achieved using conference call supplementary services.

5.3.3 Access attributes

8) Access channel: two or more B-channels

9) Access protocol: Not defined.

Note - The access attributes refer only to the user information not the signalling information.

6 Procedures for multi-rate bearer service within a PISN

The procedures of this clause shall apply when the users concerned are users of a PISN.

6.1 Provision of services

As a PISN option, multi-rate bearer service available in a PISN can be generally available, or can be available by specific arrangement for an individual PISN user. These services can be offered with an option. An example is:

PISN option	Value
Assignment of time-slots	- Contiguous - Non-contiguous

Note - This option is applied for both the calling and the called user side.

6.2 Normal procedures

6.2.1 Call establishment at the calling user

The call is originated by the PISN user requesting this service. With the request, the originating user supplies Destination number identifying the called PISN user, the information transfer rate needed (e.g. 128, 192, ..) which will remain the same for the whole duration of the call. Other information as required, (e.g. Originating Number) may also be included. This request may be given to the network either en bloc, containing all the required information, or not en bloc (i.e. in overlap sending).

The assignment of nx64 kbit/s channels at an access has a local meaning only. In particular, contiguous channel assignment at one interface does not mean that channels will be assigned contiguously within the network or at the terminating interface. The B-channels selected shall belong to a single interface.

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After initiating a call, the calling user will receive an indication that the network is processing the request; an indication when the called user has been informed of the call and an indication when the connection has been established.

6.2.2 Call establishment at the called user

The called user will receive an indication of the arrival of a call for this bearer service, including the information transfer rate and will inform the network of the acceptance or rejection of the call.

The assignment of nx64 kbit/s channels at an access has a local meaning only. In particular, contiguous channel assignment at one interface does not mean that channels will be assigned contiguously within the network or at the originating interface. The B-channels selected shall belong to a single interface.

The called user may also provide other information for use by the network to other users (e.g. connected line identity).

6.2.3 Connection

Once the connection is established between the calling and called users, the allocated time slot(s)/channel(s) is/are available for the transmission in both directions continuously and simultaneously at the information transfer rate specified at call set-up until the call is terminated.

6.2.4 Terminating the call service (call release)

A call may be terminated by either or both users indicating this to the network.If one user or both users terminate the call, network will send an appropriate indication to the other user.

6.3 Exceptional procedures/unsuccessful outcome

The exceptional procedures handle the following conditions:

a) Failure situations due to user error

1)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.

2)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

1) A calling user attempting to establish a call to a user who is identified by the network to be busy (e.g. insufficient B-channel available) will be given an appropriate failure indication by the network.

2) 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.

3) 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.

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4) On a call to a user whose access cannot support the specified information transfer rate (e.g. it exceeds the subscription option for the maximum number of information channels available at user B), 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

1) 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.

2) The inability of the network to guarantee time-slot sequence integrity will result in a 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.

e) Exceptional procedures for dealing with the situation in which the network or the user cannot continue to support the information transfer rate requested at call set-up are outside the scope of this standard.

7 Interworking

7.1 Interworking requirements

Interworking is required between the PISN and ISDN or non-ISDN network offering this service. This service will interwork with the following bearer services.

Multi-rate bearer service	Bearer service
128 kbit/s (n= 2)	2x64 kbit/s unrestricted - see CCITT Rec. I.231.5 (Note)
384 kbit/s (n= 6)	384 kbit/s unrestricted - see CCITT Rec. I.231.6
1536 kbit/s (n=24)	1536 kbit/s unrestricted - see CCITT Rec. I.231.7
1920 kbit/s (n=30)	1920 kbit/s unrestricted - see CCITT Rec. I.231.8

This interworking may require mapping of the (non) contiguous channels used for the multi-rate bearer service onto contiguous information channels in order to offer the call to the destination user.

Note - Interworking in this case is allowable only in the direction from the multi-rate bearer service to the 2x64 kbit/s bearer service due to differential time delay requirement.

7.2 Interactions with supplementary services

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

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8 Dynamic Description

The dynamic description of this service on a demand basis is given in ISO/IEC 11574 with Figure 1 of this International Standard replacing sheet 1 of Figure 3 of ISO/IEC 11574.

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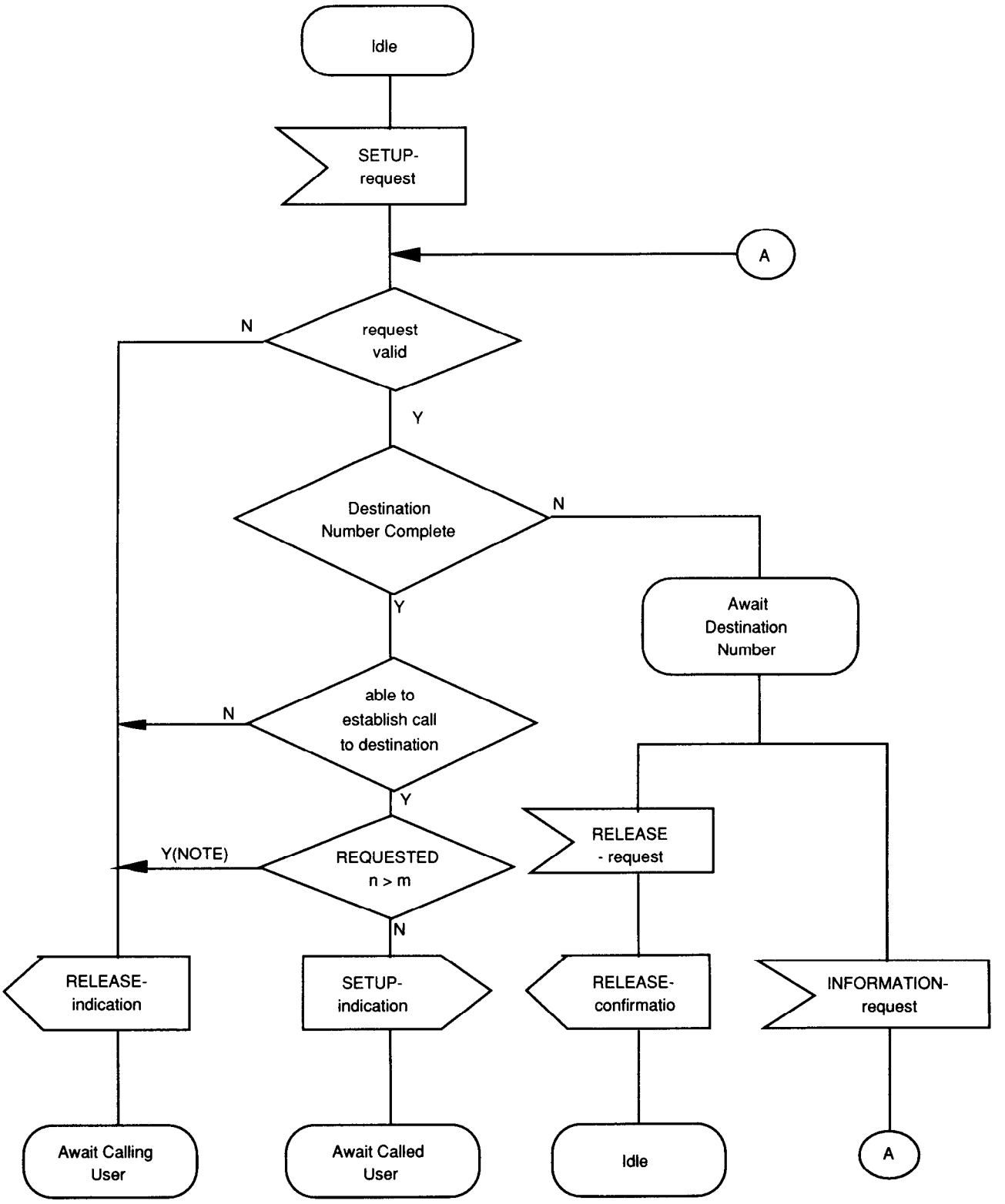

NOTE - The requested value of "n" is greater than the value of called user's subscription option for the maximum number of information channels available at called user.

Figure 1

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Section 3: Functional Capabilities and Information Flows, Stage 2

The stage 2 description, Functional Capabilities and Information Flows for multi-rate bearer service, is identical to the contents of ISO/IEC 11574 except for the following items.

1. Inband-tones and announcements are not applied to the multi-rate bearer service.

2. The following table is to be added to table 2 of ISO/IEC 11574.

Table 2a) - Additional connection types for Multi-Rate bearer service

CT Connection Type - Circuit Mode Bearer: Multi-rate unrestricted	 - M information transfer capacity: multiples of 64kbit/s unrestricted - m High layer compatibility - o Low layer compatibility - o Information transfer mode:(circuit) - m Information transfer rate: (multiple of 64kbit/s) - m Establishment (note 2) - o Symmetry (note 2) - o Configuration (note 2) - o Low layer information layer 1 info - o layer 2 info - o layer 3 info - o	- 0 Low layer compatibility - o

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