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bearer services provided by the B-channel of the user access - basic and primary rate

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Contents

Foreword

This European Telecommunication Standard (ETS) has been produced by the Network Aspects (NA) Technical Committee of the European Telecommunications Standards Institute (ETSI). It describes the stage one requirements of the ISDN Packet Mode Bearer Service (PMBS) provided on the B-channel of the user access. Services using the D-channel are covered in ETS 300 049.

The requirements described in this ETS are applicable only to those services within Europe and are based upon CCITT Recommendation I.232 [8].

The service description corresponds to case B (B-channel) of ETS 300 007 [7] (the European equivalent to CCITT Recommendation I.462/X.31 case B).

The requirements for stage three of this service are contained in ETS 300 007 [7].

Annexes A and B are normative. Annex C is informative.

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1 Scope

This European Telecommunication Standard (ETS) defines the stage one of the Packet Mode Bearer Service (PMBS) provided by the B-channel of the user access 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 ETS makes use of ETS 300 007 [7], which is a stage 3 ETS, in order to provide a description of the procedures. This mechanism would not normally be used in a stage 1 standard.

This ETS does not define details of the interworking requirements of private ISDNs with the public ISDN.

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

This ETS 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 ETS.

The ISDN Virtual Call (VC) and Permanent Virtual Circuit (PVC) bearer service category provide the unrestricted transfer (without alteration) of user information in a packetised manner over a virtual circuit between reference points via the basic and primary rate access. Each of the reference points can be either an S or coincident S and T reference point.

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

ISDN VC and PVC bearer service category is described in CCITT Recommendation I.232 [8].

This ETS is applicable to the stage three standards for the ISDN PMBS. The term "stage three" is 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, as a capability or possibility), this shall be reflected in the text of the relevant stage three standards.

Furthermore, conformance to this ETS 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 ETS.

2 Normative references

This ETS 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 ETS 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.112 (1988): "Vocabulary of terms for ISDNs".

[3]   CCITT Recommendation I.210 (1988): "Principles of telecommunication services supported by an ISDN and the means to describe them".

[4]   CCITT Recommendation X.25 (1988): "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".

[5]   ETS 300 125 (1991): "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".

[6]   CCITT Recommendation X.1 (1988): "International user classes of service in public data networks and Integrated Service Digital Networks (ISDNs)".

[7]   ETS 300 007 (1991): "Integrated Services Digital Network (ISDN); Support of packet-mode terminal equipment by an ISDN".

[8]   CCITT Recommendation I.232 (1988): "Packet mode bearer services categories".

[9]   CCITT Recommendation E.164 (1988): "Numbering plan for the ISDN era".

3   Definitions

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

Integrated Services Digital Network (ISDN): See CCITT Recommendation I.112 [2], § 2.3, definition 308.

service; telecommunication service: See CCITT Recommendation I.112 [2], § 2.2, definition 201.

supplementary service: See CCITT Recommendation I.210 [3], § 2.4.

virtual call: See CCITT Recommendation X.25 [4], § 3.

permanent virtual circuit: See CCITT Recommendation X.25 [4], § 3.

service profile: See CCITT Recommendation X.25 [4].

packet handler: See ETS 300 007 [7].

semipermanent: See ETS 300 007 [7], Clause 7.

party number: As ISDN number, a number conforming to the numbering plan and structure specified in CCITT Recommendation E.164 [9]

party subaddress: See CCITT Recommendation E.164 [9], § 11.2.

4   Description

This service is described for both the point-to-multipoint and point-to-point configurations. This covers the passive bus and NT2 access arrangements.

These packet mode bearer services allow users (e.g. terminals) in a point-to-point communication configuration to communicate via the ISDN using CCITT Recommendation X.25 [4] encoding, by means of procedures over a B-channel in both directions continuously and simultaneously, for the duration of a call as described in ETS 300 007 [7]. This shall be performed by means of procedures over a B-channel in both directions continuously and simultaneously, for the duration of a call as described in ETS 300 125 [5] (CCITT Recommendations I.462/X.31). User class 30 as described in CCITT Recommendation X.1 [6] is supported.

>   NOTE: In case of access via TA, the following user classes are supported at the R-reference point: 8-13 (see CCITT Recommendation X.1 [6])

5   Procedures

5.1   Provision and withdrawal

This service shall be either provided by prior arrangement with the service provider or be available on a general basis.

The user can have subscription to a specific CCITT Recommendation X.25 [4] profile (essential for PVC operation); or standard profile as described in Annex A.

5.2   Normal procedures

5.2.1   Activation, deactivation and registration

Not applicable.

5.2.2   Invocation and operation

VC and PVC procedures can be invoked and operated by a given terminal concurrently.

5.2.2.1   Virtual call procedures

If a B-channel has already been established between the terminal and the Packet Handler (PH) then CCITT Recommendation X.25 [4] packet layer calls may be made over an active Link Access Procedure-Balanced (LAPB) data link. If no such B-channel connection exists then channel establishment procedures are needed to provide a communication path between the terminal and the PH.

5.2.2.1.1   Layer 1 Activation and channel establishment

Layer 1 shall be permanently active or activated on demand by the Data Terminal Equipment (DTE) or the PH. The procedures for layer 1 activation depend on methods for layer 2 activation; see following sections. For Primary Rate Access (PRA), layer 1 is permanently active.

A B-channel connection to the Packet Handler (PH) is either permanent or shall be established on demand. In the latter case detailed procedures for channel establishment by the terminal or by the network are to be found in ETS 300 007 [7] using ETS 300 102-1 signalling procedures.

5.2.2.1.2   Layer 2 activation (B-channel)

Two different methods of layer 2 activation can be identified:

5.2.2.1.2.1   Method 1 - Semi-permanent layer 2

A CCITT Recommendation X.25 [4] LAPB link is activated at subscription time. The network shall keep the data link in the activated state. A permanent B-channel connection is required to the PH.

5.2.2.1.2.2   Method 2 - On demand layer 2

A LAPB link is activated, in accordance with CCITT Recommendation X.25 [4], over the B-channel. Its activation is initiated either by the TA/TE1 or the network.

5.2.2.1.3   Terminal selection and identification

For certain applications the subscription to the Multiple Subscriber Number (MSN) or Direct Dialling In (DDI) supplementary service is necessary for the purpose of terminal selection.

For certain applications for outgoing calls the calling party number and/or calling party subaddress shall be sent to the network by the calling user during call set-up and used by the network as a network option for terminal identification or selection of the user's profile.

Public networks conforming to this ETS do not provide channel negotiation.

Successive incoming calls to the same ISDN number shall be directly multiplexed on an already established B-channel, irrespective of information contained in the CCITT Recommendation X.25 [4] called address extension facility field.

>   NOTE: In the case of no notification class, the PH could make use of this information to identify
>   a specific B-channel (see Annex G to CCITT Recommendation X.25 [4]). This would be
>   a non-standard use of a facility intended to support the Open Systems Interconection
>   (OSI) network service and would remain a network option.

5.2.2.1.4   Call establishment

ETS 300 007 [7] procedures using ETS 300 102-1 signalling may be used to notify the user of incoming calls when conditional notification is applicable. Networks will provide at least one of the two notification classes defined in ETS 300 007 [7] no notification class and conditional notification class. These classes may be provided on a subscription basis.

CCITT Recommendation X.25 [4] packet layer call establishment procedures are operated on an active LAPB link.

>   NOTE: There is only one LAPB link active per B-channel.

5.2.2.1.5   Data transfer

CCITT Recommendation X.25 [4] packet layer data transfer procedures apply.

5.2.2.1.6   Terminating the call

CCITT Recommendation X.25 [4] packet layer call clearing procedures apply.

5.2.2.1.7   Layer 2 deactivation

The terminal/network should deactivate the LAPB link after clearing the last VC unless layer 2 is semi-permanent or follow-on calls are expected.

5.2.2.1.8 Layer 1 deactivation and channel release

After clearing the last VC the terminal/network should release the established B-channel (ETS 300 007 [7] procedures), unless it is semi-permanent, or follow-on calls are expected.

Layer 1 should be deactivated (from the network side only) if it is not needed by other services. However, it shall remain active for semi-permanent layer 2. Layer 1 is permanently active for PRA.

5.2.2.2 Permanent virtual circuit procedures

5.2.2.2.1 Layer 1 activation and channel establishment

Layer 1 shall be permanently active. The B-channel shall be established at subscription time. In addition some networks may offer PVCs by using on demand connections. In this case the user shall be identified by a specific CCITT Recommendation E.164 [9] number (MSN/DDI) and has a customised service profile. Furthermore, the user shall be responsible for initiating (and maintaining) the B-channel. The no notification class according to ETS 300 007 [7], subclause 4.2.3.1.b applies for VCs on these B-channels.

5.2.2.2.2 Layer 2 activation

Layer 2 shall be permanently active.

5.2.2.2.3 Terminal selection and identification

Fixed at subscription time.

5.2.2.2.4 Call establishment

Not applicable.

5.2.2.2.5 Data transfer

CCITT Recommendation X.25 [4] packet layer data transfer procedures apply.

5.2.2.2.6 Terminating the call

Not applicable.

5.2.2.2.7 Layer 2 deactivation

Layer 2 shall be permanently active.

5.2.2.2.8 Layer 1 deactivation and channel release

Layer 1 shall be permanently active. The B-channel shall be permanently established.

5.2.3 Interrogation and Editing

Not applicable.

5.3 Exceptional procedures

5.3.1 Activation, deactivation and registration

Not applicable.

5.3.2 Invocation and operation

5.3.2.1 Virtual call

Control of the User-Packet Handler B-channel.

In the case of calling/called user error, user state or network conditions such as the temporary unavailability of the PH, appropriate failure indications shall be signalled from the network to the user and the B-channel establishment or established B-channel shall be terminated.

The B-channel should not be released by the user until all CCITT Recommendation X.25 [4] virtual calls have been cleared. In the event of the user releasing the B-channel whilst existing CCITT Recommendation X.25 [4] calls are still in progress, the CCITT Recommendation X.25 [4] calls shall be cleared by the network and appropriate indications given to the user.

Control of CCITT Recommendation X.25 [4] calls.

In the case of the CCITT Recommendation X.25 [4] call(s), then the procedures of CCITT Recommendation X.25 [4] shall apply.

5.3.2.2 Permanent virtual circuit

Control of the User-Packet Handler B-channel.

For the on-demand option, in the case of calling/called user error, user state or network conditions such as the temporary unavailability of the PH, appropriate failure indications shall be signalled from the network to the user and the B-channel establishment or established B-channel shall be terminated.

The B-channel should not be released by the user. In the event of the B-channel being released the user shall re-establish the B-channel.

Control of the PVC.

In the case of the PVC, then the procedures of CCITT Recommendation X.25 [4] shall apply.

5.3.3 Interrogation and editing

Not applicable.

6 Network capabilities for charging

Charging principles are outside the scope of this standard.

7 Interworking

7.1 Interworking between Public Networks

Full interworking shall be ensured between this service and:

- existing Packet Switched Public Data Network (PSPDN) services;

- other ISDN VC and PVC services.

This interworking shall be ensured without any service restriction. However, degradation to some quality of service parameters, e.g. call set-up time, may be experienced in some cases.

7.2 Interworking between Private and Public ISDNs

This stage 1 description applies to B channels which have been extended into a private ISDN whereby the private ISDN may or may not provide packet handling functions.

8 Interaction with supplementary services

Not applicable.

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

9 Attributes and values of attributes (including the provision of individual bearer services)

9.1 Attributes and values

Information transfer attributes

1) Information transfer mode.

   Packet.

2) Information transfer rate.

   > NOTE: B-channel information transfer rate is 64 kbit/s. However, the throughput achieved depends on several conditions such as window size, characteristics of the destination DTE and network conditions.

3) Information transfer capability.

   Unrestricted.

4) Structure.

   Service data unit integrity.

5) Establishment of communication.

   Demand - Permanent.

6)   Symmetry.

       Bi-directional symmetric.

7)   Communication configuration.

       Point-to-point.

Access attributes

8)   Access channel.

       B-channel.

9)   Access protocol.

       a)   Access protocol layer 1:

              -      ETS 300 011 or ETS 300 012 (CCITT Recommendations I.430 or I.431).

       b)   ISDN signalling access protocol layer 2

              -      ETS 300 125 [5], (CCITT Recommendations I.441/Q.921).

       c)   ISDN signalling access protocol layer 3

              -      ETS 300 102, (CCITT Recommendation I.451/Q.931).

       d)   ISDN PMBS protocol layer 2

              -      CCITT Recommendation X.25 [4] LAPB (B-channel).

       e)   ISDN PMBS signalling protocol layer 3

              -      CCITT Recommendation X.25 [4] Packet Layer Protocol (PLP) (B-channel).

       f)   ISDN PMBS Information transfer protocol layer 3

              -      CCITT Recommendation X.25 [4] PLP (B-channel).

General attributes

10)   Supplementary services and user facilities provided.

       -      MSN, DDI, Sub-addressing.

       NOTE: Only used in conditional notification for the first call to a DTE.

       -      Standard CCITT Recommendation X.2 facilities are offered, see Annex B (normative).

9.2   Provision of individual bearer services

a)   overall provision: Additional (A).

b)   variations of secondary attributes:

Table 1: Variations of secondary attributes

Information Transfer rate	Establishment of communication	Symmetry	Communication configuration	Provision
See attribute 2)	Demand	Bi-directional Symmetric	point-to-point	A
See attribute 2)	Permanent	Bi-directional Symmetric	point-to-point	A

Annex A (normative): Standard service profile

The following service profile is defined to be applicable to users who have not subscribed to a different specific service profile. Support of the OSI network layer service is a general requirement of this standard service profile:

- single link procedure, modulo 8;

- standard basic packet sequence numbering (modulo 8);

- incoming/outgoing calls allowed;

- two-way logical channels: 2;

- default maximum packet length: 128 octets;

- default window size: 2;

- fast select acceptance facility;

- default throughput class: A (9600 bits/s);

- throughput class negotiation facility available;

- transit delay negotiation allowed;

- CCITT-specified DTE facilities to support the OSI Network Service (see Annex G to CCITT Recommendation X.25 [4]).

    NOTE 1:   Type of address and numbering plan identifier will be available in the future (at the latest by time T).

    NOTE 2:   No other facilities available.

Annex B (normative):   User facilities

Table B.1: Optional user facilities

	X.2 (Version 84) Optional user facility	CCITT		Service provided by this ETS	
		VC	PVC	VC	PVC
1	Optional user facilities assigned for an agreed contractual period				
1.1	Extended packet sequence numbering (modulo 128)	A	A	N	N
1.2	Nonstandard default window sizes	A	A	E	E
1.3	Nonstandard default packet sizes 16, 32, 64, 2048, 4096	A	A	N	N
	256	A	A	E	E
	512, 1024	A	A	A	A
1.4	Default throughput class assignment	A	A	E	E
1.5	Flow control parameter negotiation	E	–	E	–
1.6	Throughput class negotiation	E	–	E	–
1.7	Packet retransmission	A	A	N	N
1.8	Incoming calls barred	E	–	E	–
1.9	Outgoing calls barred	E	–	E	–
1.10	One-way logical channel outgoing	E	–	E	–
1.11	One-way logical channel incoming	A	–	E	–
1.12	Closed user group	E	–	E	–
1.13	Closed user group with outgoing access	A	–	E	–
1.14	Closed user group with incoming access	A	–	E	–
1.15	Incoming calls barred within a closed user group	A	–	E	–
1.16	Outgoing calls barred within a closed user group	A	–	E	–
1.17	Bilateral closed user group	A	–	N	–
1.18	Bilateral closed user group within outgoing access	A	–	N	–
1.19	Reverse charging acceptance	A	–	E	–
1.20	Fast select acceptance	E	–	E	–
1.21	Multilink procedure	A	A	A	A
1.22	Charging information	A	–	A	–
1.23	Direct call	FS	–	N	–
1.24	Hunt group	A	–	A	–
1.25	On-line facility registration	A	–	A	–
1.26	D-bit modification	A	A	N	N
1.27	Local charge prevention	A	–	A	–
1.28	Call redirection	A	–	E	–
1.29	Network user identification	A	–	A	–
1.30	Extended frame sequence numbering.	A	A	N	N
1.31	RPOA selection	A	–	N	–
2	Optional user facilities on a per-call basis				
2.1	Closed user group selection	E	–	E	–
2.2	Bilateral closed user group selection	A	–	N	–
2.3	Reverse charging (NOTE 1)	A	–	E	–
2.4	RPOA selection	A	–	N	–
2.5	Flow control parameter negotiation	E	–	E	–
2.6	Fast select	E	–	E	–
2.7	Throughput class negotiation	E	–	E	–
2.8	Abbreviated address calling	FS	–	N	–
2.9	Charging information	A	–	A	–
2.10	Transit delay selection and indication	E	–	E	–
2.11	Call redirection or forwarding to alternate DTE	A	–	A	–
2.12	Called line address modified notification	A	–	E	–
2.13	Network user identification	A	–	A	–
2.14	Closed user group with outgoing access selection	A	–	A	–
3	Additional features				
3.1	Extended interrupt	E	E	E	E
3.2	CCITT-specified DTE facilities	E	–	E	–
4	New facilities from X.2 (Version 88)				
4.1	Call deflection subscription	A	–	A	–
4.2	Call deflection selection	A	–	A	–
4.3	TOA/NPI address subscription	FS	–	NOTE 2	–
4.4	NUI override	A	–	A	–

E = essential for conformance.
A = additional.
N = presently not offered, unlikely to be available on many networks in the future.

NOTE 1:   For the time being, only for national use.

NOTE 2:   Type of address and numbering plan identifier will be available in the future (at the latest by time T).

Annex C (informative): Bibliography

The following informative references are used within this document:

ETS 300 011   "Integrated Services Digital Network (ISDN): Primary rate user-network interface - Layer 1 specification and test principles".

ETS 300 012   "Terminal Equipment (TE): Safety categories and protection levels at various interfaces for telecommunications equipment in customer premises".

ETS 300 102-1   "Integrated Services Digital Network (ISDN): User-network interface -Layer 3 specification for basic call control".

I.430   CCITT Recommendation I.430 (1988): "Basic user-network interface -Layer 1 specification".

I.431   CCITT Recommendation I.431 (1988): "Primary rate user-network interface - Layer 1 specification".

I.441   CCITT Recommendation I.441 (1988): "Integrated Services Digital Network (ISDN) user-network interface, data-link layer specification".

I.451   CCITT Recommendation I.451 (1988): "ISDN user-network interface layer 3 specification for basic call control".

I.462   CCITT Recommendation I.462 (1988): "Support of packet mode terminal equipment by an ISDN".

Q.921   CCITT Recommendation Q.921 (1988): "ISDN user-network interface - Data Link Layer Specification".

Q.931   CCITT Recommendation Q.931 (1988): "ISDN user-network interface layer 3 specification for basic call control".

X.2   CCITT Recommendation X.2 (1988): "International data transmission services and optional user facilities in public data networks and ISDNs".

X.31   CCITT Recommendation X.31 (1988): "Support of packet mode terminal equipment by an ISDN".

History

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