SLOVENSKI STANDARD

SIST ETS 300 103:1996

01-december-1996

Digitalno omrežje z integriranimi storitvami (ISDN) - Podpora ISDN za podatkovne terminalske opreme (DTE), ki temelje na priporočilih CCITT X.21, X.21 bis in X.20 bis - Funkcije sinhronih in asinhronih terminalskih prilagodilnikov

Integrated Services Digital Network (ISDN); Support of CCITT Recommendation X.21, X.21 bis and X.20 bis based Data Terminal Equipments (DTEs) by an ISDN Synchronous and asynchronous terminal adaptation functions

Ta slovenski standard je istoveten z: **ETS 300 103 Edition 1**

ICS:

33.080	Digitalno omrežje z integriranimi storitvami (ISDN)	Integrated Services Digital Network (ISDN)

SIST ETS 300 103:1996 **en**

EUROPEAN TELECOMMUNICATION STANDARD

ETS 300 103

December 1990

Source: ETSI TC-SPS

Reference: T/S 46-40 [CD]

ICS: 33.080

Key words: ISDN, DTE, Terminal adaption

Integrated Services Digital Network (ISDN); Support of CCITT Recommendation X.21, X.21 bis and X.20 bis based Data Terminal Equipments (DTEs) by an ISDN; Synchronous and asynchronous terminal adaption functions

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Foreword

This European Telecommunications Standard (ETS) was produced by the Signalling, Protocols and Switching (SPS) Technical Committee of the European Telecommunications Standards Institute (ETSI) and was adopted, having passed through the ETSI standards approval procedure.

This standard is based on the following considerations:

(a) the Integrated Services Digital Network (ISDN) will offer the universal interfaces to connect subscriber terminals according to the reference configurations described in CCITT Recommendation I.411;

(b) during the evolution of ISDN, however, there will exist for a considerable period DTEs conforming to CCITT Recommendations X.21, X.21bis and X.20bis which have to be connected to the ISDN;

(c) D-channel signalling protocol is described in ETS 300 125 and ETS 300 102-1;

(d) the X.21bis DTEs are an evolution of V-series DTEs, which also provide interworking capability with X.21 DTEs over PDN services, and which use the network provided signal element timing and may have specific call control features to comply with the X.21 calling protocol;

(e) the X.20bis based DTEs are an evolution of V-series DTEs, which are operating in the asynchronous mode and which may have call control features to comply with the X.20 calling protocol;

(f) this Standard is an application of CCITT Recommendations X.30 and V.110.

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Scope

(1) The scope of this standard covers the connection of X.21 and X.21bis based terminals of user classes of service 3 to 7 and 19 to the ISDN operating in accordance with circuit-switched or leased circuit services;

(2) The scope of this standard also covers the connection of X.20bis based Terminals of CCITT user classes of service 1 and 2, and 19200 bit/s and of asynchronous data rates of 600, 1200, 2400, 3600, 4800, 7200, 9600, 12000, 14400 to the ISDN operating in accordance with circuit-switched or leased circuit services;

(3) The reference configurations of paragraph 1 of this Standard shall apply;

(4) The terminal adaptor (TA) functions to support X.21, X.21bis and X.20bis based DTEs, including

- bit rate adaption functions,
- call establishment functions,
- mapping functions,
- ready for data alignment,

shall be performed as outlined in section 2.

(5) The scope of this standard only covers the bit rate conversion, which is caused by the connection of existing terminals to the ISDN user/network interface, but does not cover the requirements on bit rate conversion caused by the inter-operation of terminals with different bit rates (ISDN/CSPN interworking);

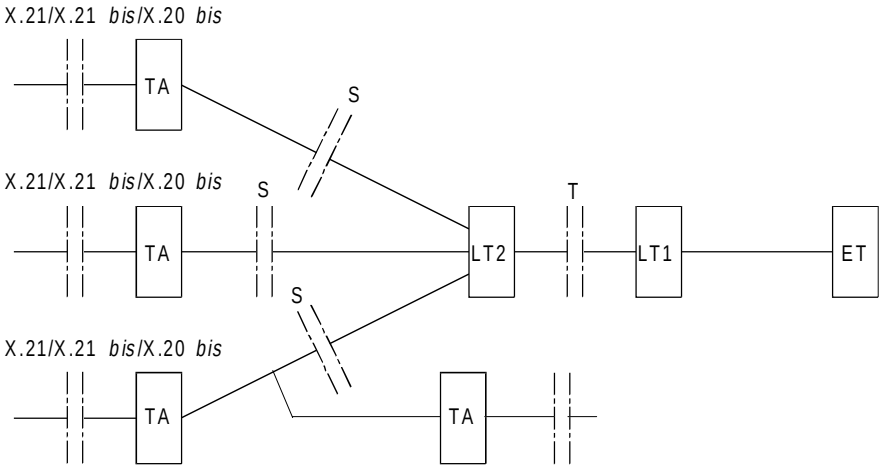
(6) This standard does not specify a particular implementation but specifies how the functions must be implemented when they are supported by a particular Terminal Adaptor equipment.

1 Reference configurations

Figures 1 and 2 show examples of possible configurations and are included simply as an aid to describing the TA functions.

1.1 Customer access configuration

For the connection of X.21, X.21bis and X.20bis based DTEs to the ISDN, figure 1 shows a possible reference configuration.



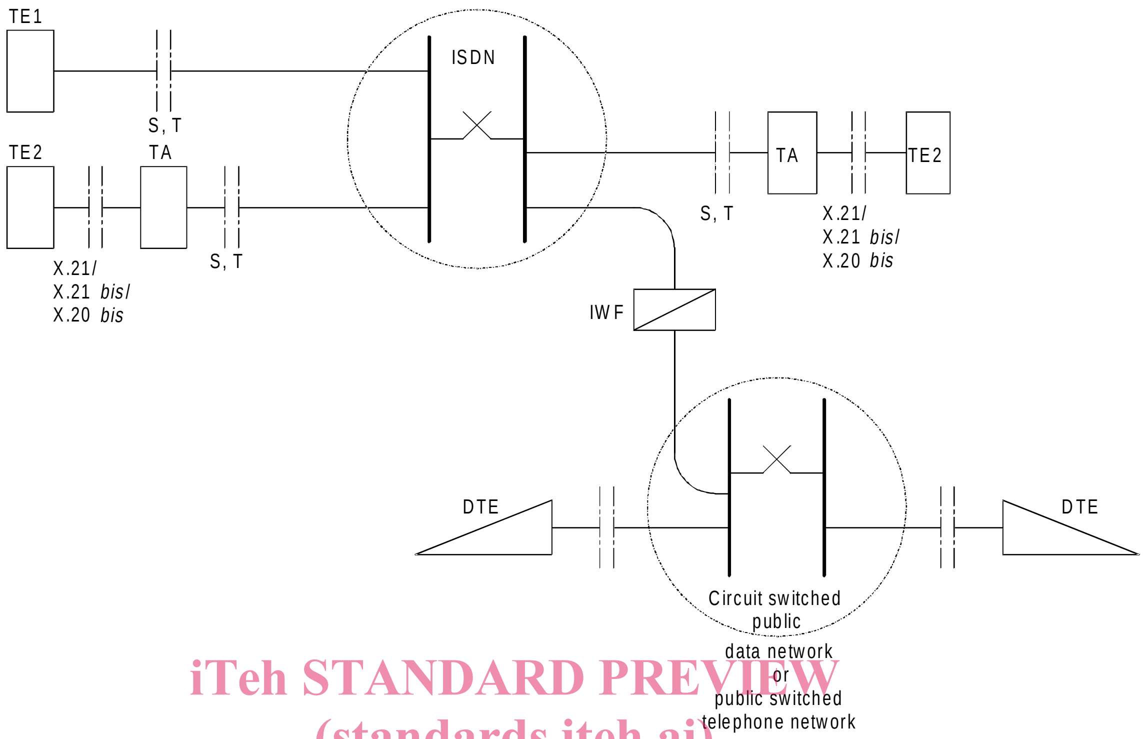
TA: Terminal adaptor
NT: Network termination
ET: Exchange termination

NOTE: The D-channel signalling protocol may operate in a point-to-multipoint fashion as described in ETS 300 102-1.

Figure 1: Customer access configuration example

1.2 Network configuration

The specification of terminal adaption functions takes account of the network configuration and the end-to-end connection types shown in figure 2 in which the associated terminal equipment TE1 and TE2 may be involved. The TA functions are described in section 2.



IWF: Interworking Functions

Figure 2: Network interworking configuration example
(The IWF are outside the scope of this standard)

The terminals TE1 and TE2 are physically and logically connected to the ISDN where the call is handled.

The TA performs the necessary bit rate adaption, the signalling conversion from X.21 signalling to the D-channel signalling and vice-versa (X.21 mapping) and ready for data alignment. Interworking with dedicated networks, e.g. a CSPDN, will be provided on the basis of trunk lines interconnection by using interworking functions (IWF).

The following principles shall apply:

i) The non-voice services within the ISDN should basically not diverge from what is being developed in X-Series of CCITT Recommendations. This refers to the various aspects concerning quality of service, user facilities, call progress signals (see e.g. X.2 and X.96). However existing features would be enhanced and additional features would also be developed if account were taken of the new ISDN customer capabilities (e.g. multiterminal arrangements, user rate at 64 kbit/s, simultaneous multimedia access as well as the possible solution for compatibility checking).

ii) Integration of X.21 based services into the ISDN is applicable to user classes of service 3 to 7 and 19. Integration of X.20bis based services into the ISDN is applicable to user classes of service 1 and 2, and other asynchronous user bit rates.

iii) Terminals TE1 and TE2 connected to an ISDN are using the ISDN numbering scheme (see CCITT Recommendation E.164).

1.3 Interworking situation

Bearing in mind that this ETS defines the functions performed by X.21 terminal adaptors (TA X.21), X.21bis terminal adaptors (TA X.21bis) and X.20bis terminal adaptors (TA X.20bis), the following cases of interworking between these terminal adaptors and between these terminal adaptors and DTEs connected to CSPDN and PSTN may appear :

a) For user class of service 3 to 7:

(1) TA X.21 TA X.21
(2) TA X.21 TA X.21bis
(3) TA X.21bis TA X.21bis
(4) TA X.21 DTE X.21
(5) TA X.21 DTE X.21bis
(6) TA X.21 V-series DTE
(7) TA X.21bis DTE X.21
(8) TA X.21bis DTE X.21bis
(9) TA X.21bis V-series DTE

b) For user class of service 19:

(10) TA X.21 TA X.21
(11) TA X.21 TA X.21bis
(12) TA X.21bis TA X.21bis
(13) TA X.21 TE1 (S/T reference point)
(14) TA X.21bis TE1 (S/T reference point)

c) For user classes of service 1 and 2, and other asynchronous user bit rates.

(15) TA X.20bis TA X.20bis
(16) TA X.20bis DTE X.20bis
(17) TA X.20bis V-series DTE

NOTE 1: This ETS is intended to cover all TA-functions necessary to allow interworking as listed above. Currently, this ETS covers all TA-functions necessary to allow interworking between DTEs connected to ISDN and to CSPDN with the following exceptions:

1) for X.21bis and X.20bis only, the call set-up procedure with direct call has been explicitly covered, but other interface arrangements of X.21bis and X.20bis are not precluded,

2) for X.21bis, the half duplex mode of operation is not specified.

This applies to all the cases listed above, where at least one X.21bis or X.20bis terminal is involved. Alignment with the functions provided by the interworking units may be necessary when the relevant Recommendations are available.

NOTE 2: With the interworking cases 1-17 mentioned above, the functions provided by TA X.21bis, TA X.20bis and the functions provided by TA V.110 should be compatible.

2 Terminal adaption functions

The adaption functions to support X.21, X.21bis and X.20bis based DTEs can be subdivided into three areas, namely:

- bit rate adaption function;
- mapping functions of X.21 to related D-channel call control signalling procedures ;
- ready for data alignment.

Separate TAs may be provided either for each CCITT Recommendation X.1 user class of service or for a group of user classes of service. A universal TA may be provided for all user classes of service 3 to 7 or 19 or 1, 2, or other asynchronous user bit rates. Within this ETS only such functions are described which refer to single rate TAs.

2.1 Adaption function for DTEs conforming to X.1 user classes of service 3 to 6

2.1.1 Bit rate adaption functions

2.1.1.1 General approach

The bit rate adaption functions within the TA are shown in figure 3. The function RA1 adapts the X.1 user rate to the next higher rate expressed by 2k times 8 kbit/s (where k = 0 or 1). RA2 performs a second conversion to 64 kbit/s.

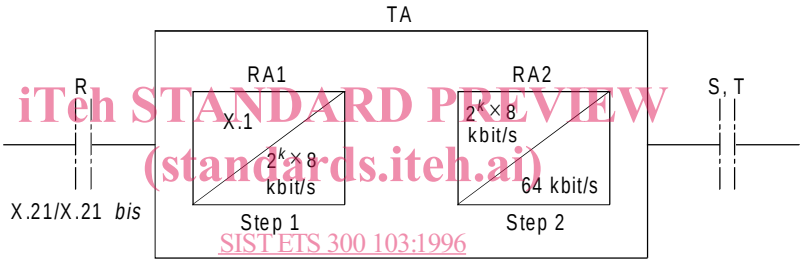


Figure 3: TA bit rate adaption functions

2.1.1.2 First step of rate adaption (RA1) of X.1 rates to the intermediate rates of 8/16 kbit/s

2.1.1.2.1 Frame structure

The conversion of X.1 rates for user classes 3, 4 and 5 to 8 kbit/s, and for user class 6 to 16 kbit/s, shall be implemented by means of the 40-bit frame structure shown in figure 4.