



SLOVENSKI STANDARD
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HYfa]bUg_UcdfYa UfH9LÈ'8][]tUbc`ca fYy'Y'n`]bH[f]fUb]a]'gHcf]hj Ua]'fLg8 BLÈ
9bcHUnU_UbUg_c`nXfi yYj Ub'Y'f7 5I LÈ'Dcghcd_]]b'df[_`'f]hj YbY'nU H'j Y

Terminal Equipment (TE); Integrated Services Digital Network (ISDN); B-Channel Aggregation Unit (CAU); Procedures and terminal requirements

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EN 300 481 V1.2.2 (1997-12)

European Standard (Telecommunications series)

**Terminal Equipment (TE);
Integrated Services Digital Network (ISDN);
B-Channel Aggregation Unit (CAU);
Procedures and terminal requirements**

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European Telecommunications Standards Institute

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Terminal Equipment (TE).

National transposition dates	
Date of adoption of this EN:	5 December 1997
Date of latest announcement of this EN (doa):	31 March 1997
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 September 1998
Date of withdrawal of any conflicting National Standard (dow):	30 September 1998

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1 Scope

The present document defines protocols for the synchronization and aggregation of multiple Integrated Services Digital Network (ISDN) channels at 64 kbit/s, these channels having a differential delay in the range of one second and with or without octet integrity structure. It also addresses the case of interworking with a digital network restricted to a rate of 56 kbit/s. It is applicable to a wide range of user data transport up to 63 channels using ISO/IEC 13871 [1], but special provision is made for audiovisual systems according to ETS 300 144 [2], up to 24 channels; the aggregation may be network-based or associated with Customer Premises Equipment. The available operating modes (B1, B2, B3, H2) provide options with/without transmission-management overhead and user-data rates at or less than the exact multiples of 64/56 kbit/s.

The number of aggregated channels may be varied dynamically during a session. Procedures are given for dealing with faults, including loss of channels and slip.

Call control is outside the scope of the present document.

2 Normative references

References may be made to:

- a) specific versions of publications (identified by date of publication, edition number, version number, etc.), in which case, subsequent revisions to the referenced document do not apply; or
- b) all versions up to and including the identified version (identified by "up to and including" before the version identity); or
- c) all versions subsequent to and including the identified version (identified by "onwards" following the version identity); or
- d) publications without mention of a specific version, in which case the latest version applies.

A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [1] ISO/IEC 13871: "Information Technology - Telecommunications and information exchange between systems - Private telecommunications networks - Digital channel aggregation".
- [2] ETS 300 144: "Integrated Services Digital Network (ISDN); Audiovisual services; Frame structure for a 64 kbit/s to 1 920 kbit/s channel and associated syntax for inband signalling".
- [3] ETS 300 143: "Integrated Services Digital Network (ISDN); Audiovisual services; Inband signalling procedures for audiovisual terminals using digital channels up to 2 048 kbit/s".
- [4] ITU-T Recommendation H.320 (1993): "Narrow-band visual telephone systems and terminal equipment".
- [5] ETS 300 145: "Integrated Services Digital Network (ISDN); Audiovisual services; Videotelephone systems and terminal equipment operating on one or two 64 kbit/s channels".
- [6] ITU-T Recommendation H.242 (1993): "System for establishing communication between audiovisual terminals using digital channels up to 2 Mbit/s".
- [7] ITU-T Recommendation H.221 (1993): "Frame structure for a 64 to 1 920 kbit/s channel in audiovisual teleservices".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following definitions apply:

called end: The Channel Aggregation Unit (CAU) or Multiple Channel Equipment (MCE) which accepts the first 64/56 kbit/s channel connection request of the whole session, resulting in the establishment of the "initial channel". If during fault-recovery procedures the initial channel is transferred to another connection, this does not affect the definition (see note 1).

calling end: The CAU or MCE which requests the first 64/56 kbit/s channel connection of the whole session, resulting in the establishment of the "initial channel". If during fault-recovery procedures the initial channel is transferred to another connection, this does not affect the definition (see note 1).

Channel Aggregation Unit (CAU): A device having both multiple 64 kbit/s accesses and a single access at a higher bitrate. Reference in the present document to "CAU" or "aggregator" means equipment conforming to the present document.

compatibility bits: Bit 8 of the first sixteen octets in every time slot of a single channel except time slot 1.

external setting: Term used to express operations outside the scope of the present document which determine the behaviour of a CAU as to choice of option or timing of its action.

H.221: See subclause 3.1, H.221 frame structure, H.221 framing

H.221 frame structure, H.221 framing: Frame structure according to ITU-T Recommendation H.221 [7], as set out in ETS 300 144 [2].

H.244 aggregation: Terminal-Aggregator Communication

H.320 terminal: A terminal that conforms to ITU-T Recommendation H.320 [4] (see note 2).

ISO aggregation: No Terminal-Aggregator Communication

mode H2: Modes of aggregation by the method given in clauses 7 and 8 of the present document.

modes B1, B2, B3: Modes of aggregation by the method of ISO/IEC 13871 [1], see subclause 4.2.

Multiple Channel Equipment (MCE): A terminal or other unit (such as a Local Area Network (LAN) gateway) directly attached to an ISDN (through one or more ISDN accesses, whether basic accesses or primary rate access(es)).

No Terminal-Aggregator Communication Case (ISO Aggregation Case): No in-band management communication between Single Channel Equipment (SCE) and CAU takes place - the single channel is only a clear path for the data which will be wholly transmitted to the remote party; any communication between the terminal and the CAU is by means not specified in the present document (see clause 8).

redundant command: A Bit Allocation Signal (BAS) command which repeats, unchanged, a previously transmitted mode value which is still in force.

Single Channel Equipment (SCE): A terminal or other unit (such as a LAN interface) having a single serial bi-directional digital interface.

H.244 aggregation case: In-band communication between SCE and CAU takes place using ITU-T Recommendation H.221 BAS codes (see clauses 7 and 8 of the present document).

user information: The application data streams passing (in both directions) between CAU and SCE (see note 3).

NOTE 1: The significance of "calling" and "called" end-points is mentioned in subclause 7.1.3.

NOTE 2: ETS 300 145 [5] is the ETSI equivalent to ITU-T Recommendation H. 320 [4]. The scope of ETS 300 145 [5] is, however, restricted to systems supporting 1B or 2B access.

NOTE 3: In the audiovisual cases, the application data stream includes the ITU-T Recommendation H.221 [7] frame structure.

3.2 Symbols

For the purposes of the present document, the following symbols apply:

NOTE: For readability, the capability and command values listed in ETS 300 144 [2] are referred to in the present document by their names rather than codepoint byte values; the use of {*name*} for capabilities and [*name*] for commands serves to distinguish between these.

N	an integer, applied to 64/56 kbit/s channels to define a parallel (un-aggregated) bitstream of rate $N \times 64$ kbit/s.
n	an integer, applied to 64 kbit/s to define a serial (or otherwise aggregated) bitstream of rate $n \times 64$ kbit/s.
N_a	the number of active 64/56 kbit/s channels between CAU and MCE or between two CAUs.
N_m	the maximum number of 64/56 kbit/s channels which can be accepted by a CAU transmitting the value $\{N_m \times B\}$.
N'_m	used to denote the incoming value of N_m from the remote CAU, or equivalent from an MCE.
N_d	the number of connections requested by the calling end, the lower of N_m and N'_m .
$\{N \times 64k\}$	capabilities in the series $\{1B\}$, $\{2B\}$, $\{3B\}$ corresponding to $N=1, 2, 3, \dots$, (applies to Mode H2 only).
$\{n \times 64k\}$	capabilities in the series $\{64k\}$, $\{128k\}$, $\{192k\}$ corresponding to $n=1, 2, 3, \dots$.
n_m	such that $\{n_m \times 64k\}$ is the highest transfer-rate capability incoming from the SCE for which the continuous series of rate capabilities $\{(n_m-1) \times 64k\}$, $\{(n_m-2) \times 64k\}$, $\{2 \times 64k\}$ is also present in the capability set (capset).
$[N \times 64]$	Multiple-channel commands (as defined in ETS 300 144 [2]).
$[n \times 64k]$	Single channel commands (as defined in ETS 300 144 [2]).
[capex]	command issued by a CAU (see subclause 6.3.6.3) to an SCE to stimulate a capability exchange.
[AggIN]*	a double Single Byte Extension (SBE) symbol indicating the number n as determined by the process of subclause 6.3.4.2; see the procedure described in clause 7 (see ETS 300 144 [2]).
{null}	capability having no significance other than as a filler; only ever transmitted by a CAU, and therefore it identifies the capset as having last come from, or been forwarded by, a CAU; SCE ignores any number of these in an incoming capset (see ETS 300 144 [2]).
{SM-comp}	capability to transmit and receive user information without using any compatibility bits, setting these to 1 (see ETS 300 144 [2]).
[SM-comp]	user information is not contained in the compatibility bits (and is not sent in the compatibility bits in the reverse direction either). See ETS 300 144 [2].
Σ	Audible signal (to be defined), which would be recognized by a human user as a call progress tone (he would not hang up).

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AV	Audiovisual
BAS	Bit Allocation Signal
capex	capability exchange
capset	Capability set
CAU	Channel Aggregation Unit
FAS	Frame Alignment Signal
ISDN	Integrated Services Digital Network
LAN	Local Area Network
MBE	Multi Byte Extension
MC (side)	Multiple Channel (side, of a CAU)
MC	Multiple Channel
MCE	Multiple Channel Equipment
NII	Network Indicate Incompatible - aggregators
SBE	Single Byte Extension
SC (side)	Single Channel (side, of a CAU)

SCE	Single Channel Equipment
SM-comp	Single Multiple compatibility
UD	Unspecified Data

4 General

4.1 Application of the present document

On the single channel connections, which may be very short if the terminal and Channel Aggregation Unit (CAU) are co-located, or much longer if a telecommunications link is involved, two options are covered by the present document:

- no in-band management communication on the single channel, this being only a clear path for the data which will be wholly transmitted to the remote party; any communication between the terminal and the CAU is by means not specified in the present document; this is referred to as the "ISO Aggregation" case - No Terminal-Aggregator Communication;
- in-band communication as specified in the present document, using the Bit Allocation Signal (BAS) codes defined in ETS 300 144 [2] and the procedures of ETS 300 143 [3]; this is referred to as the "H.244 Aggregation" case - Terminal-Aggregator Communication. This corresponds to the use of Mode H2 (see subclause 4.2, figure 8 and associated text).

4.1.1 Intercommunication of audiovisual equipments

For audiovisual terminals conforming to ETS 300 144 [2] and ETS 300 143 [3], the present document provides for synchronization and aggregation of up to 24 channels of 64/56 kbit/s, each being with or without octet integrity and relative transmission delay in the range ± 1 second.

Provision is made for the following intercommunication Cases A to C.

4.1.1.1 Case A <https://standards.iteh.ai/catalog/standards/sist/06bdf6c7-cfd8-4362-8eb0-8ef1a7a4ec4e/sist-en-300-481-v1-2-2-2003>

For interconnection of a Single Channel Equipment (SCE) and a Multiple Channel Equipment (MCE) audiovisual end-point, both conforming to ETS 300 144 [2] and ETS 300 143 [3], only the H.244 Aggregation approach can be followed (see figure 1); this involves only one CAU, which may be within the network or close to the single channel end-point.

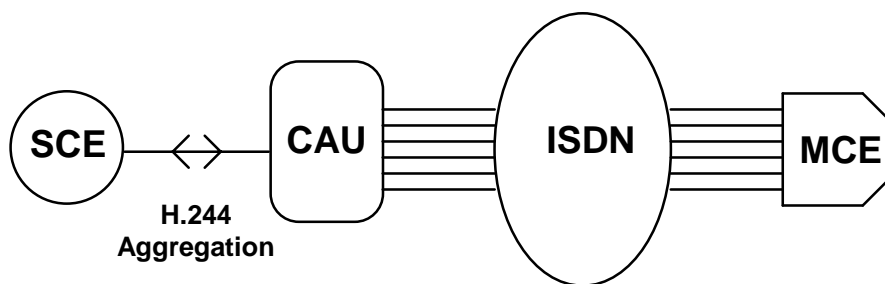


Figure 1: Case A

4.1.1.2 Case B

This case provides for interconnection between two single channel audiovisual end-points which see the aggregated link purely as a clear data channel; each has a CAU associated with it, but there is no in-band control communication between the end-point and its associated CAU (see figure 2); this is the ISO Aggregation approach. The system is exactly the same as for unspecified data applications (see subclause 4.1.2); the CAU-ISDN-CAU combination provides a clear channel at one of the transfer rates specified in ETS 300 144 [2], and, therefore, shall use Mode B1 or B3 (see subclause 4.2).

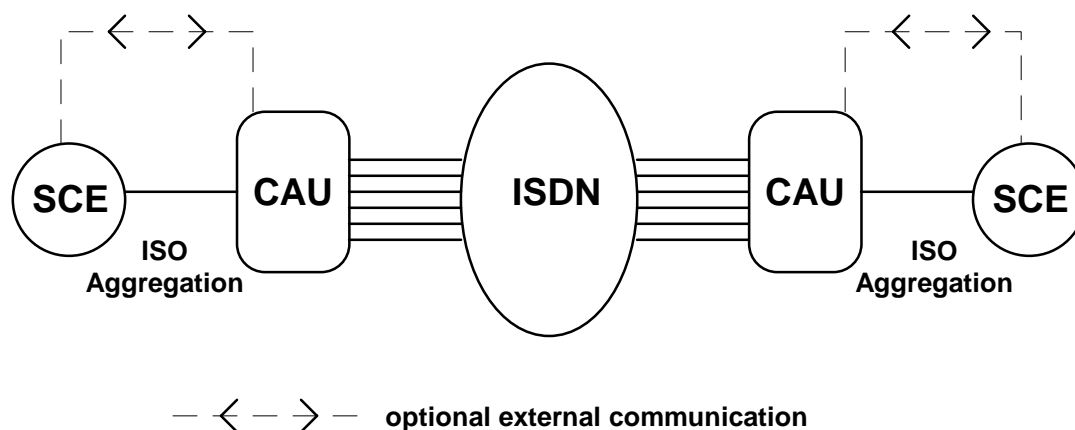


Figure 2: Cases B and D

4.1.1.3 Case C

This provides for the interconnection of two single channel end-points both conforming to ETS 300 144 [2] and ETS 300 143 [3] and capable of the operation described in clauses 7 to 8, the H.244 Aggregation approach (see figure 3); this involves two CAUs, which may be within the network or close to the single-channel end-points.

NOTE: H.244 Aggregation cannot be used at one end and ISO Aggregation at the other, see clause 5.



Figure 3: Case C

4.1.2 Intercommunication of non-audiovisual equipments - Case D

The present document provides for synchronization and aggregation of up to 63 channels of 64/56 kbit/s, each being with or without octet integrity and relative transmission delay in the range \pm one second. It is applicable to a wide range of user information transport, including LAN-LAN interconnect, private circuit back-up, and other "unspecified data" applications. No in-band control communication takes place on the single channel side. The equipment sees the aggregated link purely as a clear data channel, and the structure or content of the data streams is of no concern to the aggregating equipment.

The ISO Aggregation approach is appropriate (see figure 2); the CAU-ISDN-CAU combination provides a clear channel at one of the transfer rates specified in ISO/IEC 13871 [1] using Mode B1, B2 or B3 (see subclause 4.2).

4.2 Definition of the modes of transmission on the Multiple Channel (MC) side

The four modes of transmission are defined below, the accompanying figures being given by way of example for the case of about 192 kbit/s on the Single Channel (SC) side.

Mode B1: the user information occupies an integral number of 64/56 kbit/s channels (usually the N available and aligned channels); only unframed signals are transmitted (see figure 4), alignment of the channels has previously been