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8 [[]HJbc`ca fYy`Y`n`]bhY[f]fUb]a]`g]c]f]h] Ua]`f]G8 BŁĚ`5 j X]c]]ni UbY`g]c]f]h] Y`Ě
G]fi _]h] fU`c_]]]f]c] `nU_`UbUY`g` \]]f]c]g]h]a]`c]X`* (` _]V]h]g]`Xc`%- &\$` _]V]h]g]`]b`d]f]d]UXU`c` c
g` _]UXb`c`n]U]n]b]c]f]U`d]U]g]c]j bc` _]fa]`Y]b`Y`

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

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**Frame structure for a 64 kbit/s to 1 920 kbit/s channel
and associated syntax for inband signalling**

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Terminal Equipment (TE) Technical Committee of the European Telecommunications Standards Institute (ETSI).

The attention of the user of this ETS is drawn to the possibility that compliance may require the use of technology covered by patent or similar rights.

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1 Scope

This ETS specifies the frame structure and the syntax for end-to-end inband signalling for audiovisual services and end-to-end data communication between equipment using single or multiple digital channels (B, H0, H11 or H12) up to 1 920 kbit/s when connected by the pan-European Integrated Services Digital Network (ISDN). Digital audiovisual services are provided by a transmission system in which the relevant signals are multiplexed onto a digital path. This frame structure allows the best use of the total transmission capacity for the various data flows as audio, video, user data, telematic information and special applications. Additionally, signals for the proper functioning of the system are included.

This ETS allows the synchronisation of multiple 64 kbit/s or 384 kbit/s connections and the control of the multiplexing of audio, video, data and other signals within the synchronised multiconnection structure in the case of multimedia services, such as videoconference.

It provides the means to transmit end-to-end inband signalling according to the procedures described in ETS 300 143 [2].

This ETS is applicable to terminals or other equipment (e.g. Multipoint Conference Units) supporting audiovisual applications.

A separate ETS is under preparation (DE/TE-04120) which specifies the method of testing required to identify conformance to 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 apply.

- [1] ITU-T Recommendation H.261 (1993): "Video codec for audiovisual services at p x 64 Kbit/s".
<https://standards.iteh.ai/catalog/standards/sist/d5048667-68ef-438b-88a2-700260034a0/sist-ets-300-144-e1-2003>
- [2] 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".
- [3] ETS 300 145: "Integrated Services Digital Network (ISDN): Audiovisual Services; Videotelephone Systems and Terminal Equipment Operating on one or Two 64 kbit/s Channels".
- [4] CCITT Recommendation G.711 (1988): "Pulse code modulation (PCM) of voice frequencies".
- [5] CCITT Recommendation G.722 (1988): "7 kHz audio-coding within 64 kbit/s".
- [6] CCITT Recommendation G.725 (1988): "System aspects for the use of the 7 kHz audio codec within 64 kbit/s".
- [7] CCITT Recommendation G.728 (1992): "Coding of speech at 16 kbit/s using low-delay code-excited linear prediction".
- [8] CCITT Recommendation H.200 (1988): "Framework for recommendations for audiovisual services".
- [9] CCITT Recommendation T.50 (1992): "International Alphabet No. 5".
- [10] ITU-T Recommendation T.81 (1993): "Information technology - Digital compression and coding of continuous-tone still images - Requirements and guidelines".

- [11] CCITT Recommendation H.221 (1992): "Frame structure for a 64 to 1 920 kbit/s channel in audiovisual teleservices".
- [12] CCITT Recommendation H.243 (1992): "Procedures for establishing communication between three or more audiovisual terminals using digital channels up to 2 Mbit/s".
- [13] ISO/IEC 11172 (1993): "Information technology - Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s".
- [14] CCITT Recommendation T.35 (1991): "Procedure for the allocation of CCITT defined codes for non-standard facilities".

3 Definitions

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

A-bit: Indicates the loss of frame or multiframe alignment.

Bit-rate allocation signal: Bit position within the frame structure to transmit, e.g. commands, control and indication signals, capabilities.

Capability marker: The first code in a capability set.

Capability set: A sequence of capability codes started by the capability marker code.

Control and indication: End-to-end signalling between terminals consisting of control which causes a state change in the receiver and indication which provides information as to the functioning of the system.

E-bit: Indication as to whether the most recent Cyclic Redundancy Check (CRC) block, received in the incoming direction, contained errors or not.

ECS-channel: Optional 800 bit/s channel for use in encryption.

I-channel: The initial or only B channel, or TS1 of initial or only H0 channel, or TS1 of H11, H12 channels.

Mode: A term used to denote transmission of user information signals with a particular set of parameters.

Mode 0F: Applies only to the initial channel: there is frame structure in the Service Channel (SC), and audio is confined to the sub-channels 1 to 7 ¹⁾; the audio is encoded in the same way as in CCITT Recommendation G.711 [4] either in A-law or μ -law unless this law is also specified in brackets thus: Mode-0F(A), Mode-0F(μ), except that the Least Significant Bit (LSB) ²⁾ is not transmitted.

Mode 0U: Applies only to the initial channel; there is no frame structure, and audio is encoded according to CCITT Recommendation G.711 [4] ³⁾, either in A-law or m-law unless this law is also specified in brackets thus: Mode-0U(A), Mode-0U(u).

Multipoint Conference Unit: A piece of equipment located in a node of the network or in a terminal connects several terminals and, according to certain criterions, processes audiovisual signals and distributes them to the connected terminals.

Service Channel: The eighth sub-channel of a 64 kbit/s channel, or the seventh sub-channel when communicating in restricted mode.

1) When in "restricted network" operation the number of bits per audio sample is reduced by one.
 2) When in "restricted network" operation, the LSB is not the bit 8, but the bit 7.
 3) When in "restricted network" operation the number of bits per audio sample is reduced by one.

Restricted network: A network consisting of multiples of 64 kbit/s links, but where only multiples of 56 kbit/s are usable for the terminals.

4 Symbols and abbreviations

For the purposes of this ETS, the following symbols and abbreviations apply:

BAS	Bit-rate Allocation Signal
C&I	Control and Indication
cap-mark	capability marker
cap-set	capability set
CIF	Common Intermediate Format (picture format defined in ITU-T Recommendation H.261 [1])
CRC4	Cyclic Redundancy Check 4-bit
ECS	Encryption Control Signal
FAS	Frame Alignment Signal
FAW	Frame Alignment Word
H-MLP	High speed Multi Layer Protocol ⁴⁾
H0	384 kbit/s channel
H11	1 536 kbit/s channel
H12	1 920 kbit/s channel
HSD	High Speed Data
ISDN	Integrated Services Digital Network
ITU-T	International Telecommunications Union - Telecommunication Standardization Sector
LCA	Loopback Command "Audio loop request"
LCD	Loopback Command "Digital loop request"
LCO	Loopback Command "Loop Off request"
LCV	Loopback Command "Video loop request"
LSB	Least Significant Bit
LSD	Low Speed Data
MBE	Multiple Byte Extension
MCU	Multipoint Control Unit
MLP	Multi Layer Protocol ⁵⁾
MSB	Most Significant Bit
QCIF	Quarter Common Intermediate Format (picture format defined in ITU-T Recommendation H.261 [1])
SBE	Single Byte Extension
SC	Service Channel
SMF	Sub-Multiframe
TEA	Terminal Equipment Alarm
TS	Time Slot
TS1	Time Slot 1
VCF	Video Command "Freeze-picture request"
VCU	Video Command "fast-Update request"

⁴⁾ MLP protocols are under discussion in the ITU-TS.

⁵⁾ MLP protocols are under discussion in the CCITT.

5 Description

This ETS provides for dynamically subdividing an overall transmission channel of 64 kbit/s to 1 920 kbit/s into lower rates suitable for audio, video, data and telematic purposes. The overall transmission channel is derived by synchronising and ordering transmissions over/from 1 to 6 B-connections, from 1 to 5 H0-connections, or an H11 or H12 connection. The first connection established is the initial connection and carries the initial channel in each direction. The additional connections carry additional channels.

The total rate of transmitted information is called the "transfer rate"; it is possible to fix the transfer rate at less than the capacity of the overall transmission channel (values listed in Clause 10).

A single 64 kbit/s channel is structured into octets transmitted at 8 kHz. Each bit position of the octets may be regarded as a sub-channel of 8 kbit/s (see table 1). The eighth sub-channel is called the Service Channel (SC), consisting of several parts as described in subclauses 5.1 to 5.4 below.

An H0, H11 or H12 channel may be regarded as consisting of a number of 64 kbit/s Time Slots (TS) (see table 2). The lowest numbered time-slot is structured exactly as described for a single 64 kbit/s channel, while the other TS have no such structure. In the case of multiple B or H0 channels, all channels have a frame structure; that in the initial channel controls most functions across the overall transmission, while the frame structure in the additional channels is used for synchronisation, channel numbering and related controls.

The term "I-channel" is applied to the initial or only B-channel, to TS1 of initial or only H0 channel, and to TS1 of H11, H12 channels.

Table 1: Frame structure of a single 64 kbit/s channel (B-channel)

Bit number								Octet number
1	2	3	4	5	6	7	8 (SC)	
S	S	S	S	S	S	S	FAS	1
u	u	u	u	u	u	u	:	8
b	b	b	b	b	b	b	BAS	9
-	-	-	-	-	-	-	:	16
c	c	c	c	c	c	c	ECS	17
h	h	h	h	h	h	h	:	24
a	a	a	a	a	a	a	Sub-	25
n	n	n	n	n	n	n	chan-	.
n	n	n	n	n	n	n	nel	.
e	e	e	e	e	e	e	#	.
l	l	l	l	l	l	l	#	.
#	#	#	#	#	#	#	#	8
1	2	3	4	5	6	7	8	80

5.1 Frame Alignment Signal (FAS)

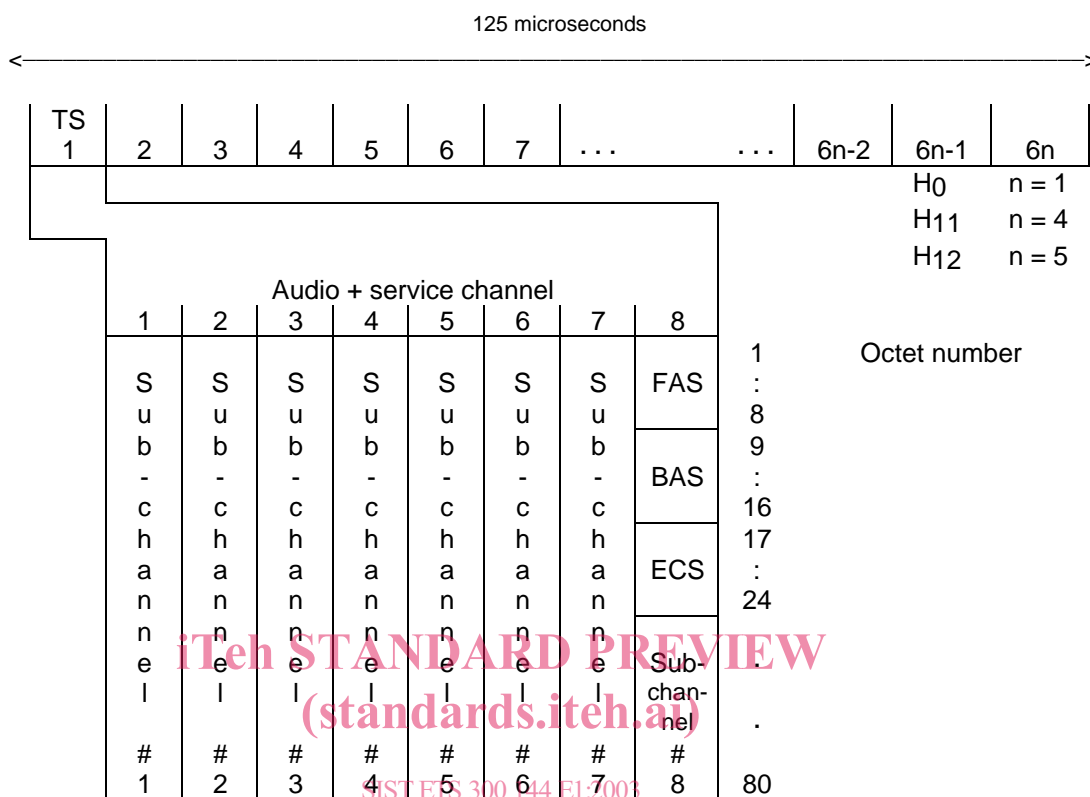
This signal structures the I-channel and other framed 64 kbit/s channels into frames of 80 octets each and multiframes of 16 frames each. Each multiframe is divided into eight 2-frame sub-multiframes. The term "Frame Alignment Signal" (FAS) refers to the bits 1-8 of the SC in each frame. In addition to framing and multiframing information, control and alarm information may be inserted in the FAS, as well as error check information to monitor end-to-end error performance and to check frame alignment validity. Other time-slots in H0, H11 or H12 connections are aligned to the first.

The bits are transmitted to line in order, bit 1 first and Octet 1 first.

FAS shall be transmitted in the Least Significant Bit (LSB) of the octet (called "bit 8") within each 125 microsecond, e.g. in an ISDN basic or primary rate interface (see also tables 1 and 2 and subclause 6.6). It should be noted that, where interworking between the audiovisual terminal and the telephone is required, transmission using the network timing is essential; a transmitting terminal shall always use octet timing, if this can be obtained from the network.

In the receiver side, FAS shall be sought in all bit positions. If the received FAS position conflicts with the network octet timing, the FAS position is given priority. This may happen when the receiver utilises network octet timing while the transmitter does not, as in a terminal using codecs with separate ISDN terminal adaptor, or when interworking between 64 kbit/s and 56 kbit/s terminals takes place.

Table 2: Frame structure of higher-rate single channels (H₀, H₁₁, H₁₂ channels)



5.2 Bit-rate Allocation Signal (BAS)

Bits 9 to 16 of the SC in each frame are referred to as the BAS. This signal allows the transmission of codewords to describe the capability of a terminal to structure the capacity of the channel or synchronised multiple channels in various ways, and to command a receiver to demultiplex and make use of the constituent signals in such structures. This signal is also used for controls and indications.

NOTE: For some countries having 56 kbit/s channels, the net available bit rates are 8 kbit/s fewer. Interworking between a 64 kbit/s terminal and a 56 kbit/s terminal is established according to the frame structure in subclause 6.6.

5.3 Encryption Control Signal (ECS) channel (optional)

The ECS channel is optional and can be used in single B or H₀ channels as well as H₁₁ and H₁₂ channels, or in the initial channel of multiple-channel calls.

When switched on, the ECS channel occupies the bits 17 to 24 of the SC, a rate of 800 bit/s, and any video or variable data channel which would otherwise occupy these bits is accordingly reduced in rate by 800 bit/s.

5.4 Remaining capacity

The remaining capacity may convey a variety of signals within the framework of a multimedia service, under the control of the BAS. It is carried in bits 1 to 8 of each octet in the case of a single 64 kbit/s connection, and it includes the rest of the SC. The facilities provided can be found in the list given in subclause 8.2.