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**Integrated Services Digital Network (ISDN);
Videotelephony teleservice
Service description**

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Network Aspects (NA) Technical Committee of the European Telecommunications Standards Institute (ETSI).

In accordance with CCITT Recommendation I.130 [1], the following three level structure is used to describe the supplementary telecommunications services as provided by European public telecommunications operators under the pan-European Integrated Services Digital Network (ISDN):

- Stage 1: is an overall service description, from the user's standpoint;
- Stage 2: identifies the functional capabilities and information flows needed to support the service described in stage 1; and
- Stage 3: defines the signalling system protocols and switching functions needed to implement the service described in stage 1.

This ETS details the stage 1 aspects (overall service description) for the videotelephony teleservice. The stage 2 and stage 3 aspects are detailed in ETS 300 266 (1994) and ETS 300 267 (1994), respectively.

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1 Scope

This standard defines the stage one of the videotelephony teleservice 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 standard defines the interworking requirements of private ISDNs with the public ISDN.

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

This standard 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 standard.

The values of the general attributes are outside the scope of this standard.

The videotelephony teleservice is a real-time audiovisual teleservice in which speech and moving pictures are interchanged by means of one or two 64 kbit/s circuit-mode connections in the ISDN. The picture information transmitted is sufficient for adequate representation of fluid movements of a person displayed in head and shoulders view.

This standard is applicable to the stage two and stage three standards for the videotelephony teleservice. The terms "stage two" and "stage three" are 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, or as a capability or possibility), this shall be reflected in the text of the relevant stage two and stage three standards.

Furthermore, conformance to this standard is met by conforming to the stage three standard with the field of application appropriate to the equipment being implemented and by conforming to the standards on the end-to-end characteristics with the field of application appropriate to the equipment being implemented. Therefore, no method of testing is provided for this standard.

2 Normative references

This standard 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 standard 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 characterization 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 G.711 (1988): "Pulse code modulation (PCM) of voice frequencies".
- [5] CCITT Recommendation G.722: "7 kHz audio-coding within 64 kbit/s".
- [6] ETS 300 111 (1992): "Integrated Services Digital Network (ISDN); Telephony 3,1 kHz teleservice Service description".

- [7] CCITT Recommendation I.220 (1988): "Common dynamic description of basic telecommunication services".
- [8] CCITT Recommendation E.164 (1991): "Numbering plan for the ISDN era".
- [9] CCITT Recommendation I.140 (1988): "Attribute technique for the characterisation of telecommunication services supported by an ISDN and network capabilities of an ISDN".
- [10] CCITT Recommendation I.221 (1988): "Common specific characteristics of services".
- [11] prETS 300 142: "Integrated Services Digital Network (ISDN) and other digital telecommunications networks; Audiovisual teleservices Video codec for audiovisual services at $p * 64$ kbit/s".
- [12] prETS 300 143: "Integrated Services Digital Network (ISDN) and other digital communications networks; Audiovisual teleservices System for establishing communication between audiovisual terminals using digital channels up to 2 048 kbit/s".
- [13] prETS 300 144: "Integrated Services Digital Network (ISDN) and other digital telecommunications networks; Audiovisual teleservices Frame structure for a 64 to 1 920 kbit/s channels in audiovisual service".
- [14] prETS 300 145: "Integrated Services Digital Network (ISDN) and other digital telecommunications networks; Audiovisual teleservices Narrowband audiovisual telephone systems".
- [15] CCITT Recommendation G.728 (1992): "Coding of speech at 16 kbit/s using low-delay code-excited linear prediction".
- [16] prI-ETS 300 302-1: "Integrated Services Digital Network (ISDN); Videotelephony teleservice Part 1: Electroacoustic characteristics for handset terminals when using Pulse Code Modulation (PCM) encoding".

5 Description

The videotelephony teleservice is a real-time audiovisual teleservice in which speech and moving pictures are interchanged by means of one or two 64 kbit/s circuit-mode connections in the ISDN.

The videotelephony teleservice comprises two cases:

- case I: videotelephony based on using one circuit-mode 64 kbit/s connection; and
- case II: videotelephony based on using two circuit-mode 64 kbit/s connections.

The videotelephony teleservice is characterised by the transmission of moving pictures simultaneously with speech.

The speech quality of the videotelephony teleservice shall comply with the requirements contained in I-ETS 300 302-1 [16].

The videotelephony teleservice shall allow the communication between:

- two users in a point-to-point configuration; and
- as a service provider option, three or more users in a multipoint configuration as invoked by some supplementary services.

Videotelephone terminals shall be capable of supporting the telephony 3,1 kHz teleservice.

User information shall be transferred over the B-channel, signalling shall be provided over the D-channel.

The network provides tones and/or announcements to support this teleservice. Tones and/or announcements can be used to indicate the progress (or lack of progress) of a call. The application and meaning of the tones and announcements is a national matter and outside the scope of this standard.

6 Procedures

6.1 Provision and withdrawal

The videotelephony teleservice shall either be provided after prior arrangement with the service provider, or shall be generally available.

NOTE: As a service provider option, the videotelephony teleservice can be offered with several subscription options which apply separately to each ISDN number, or groups of ISDN numbers on the interface. For each subscription option, only one value can be selected.

It should be noted that in this context an interface may consist of a group of physical interfaces.

Subscription options for the interface are summarised in table 1.

Table 1: Subscription options for the interface

Subscription option	Value
Maximum number of information channels available	m, where m is not greater than the number of information channels on the interface
Maximum number of total calls present	n, where n is not greater than the number of information channels on the interface

The user can be identified by an ISDN number or a group of ISDN numbers, or globally for all ISDN numbers on the interface.

More than one ISDN number can be associated with the interface only as part of a supplementary service such as the multiple subscriber number supplementary service. In the case of one ISDN number, the option given in table 1 for the number of calls can only exceed the number of information channels in association with a supplementary service (e.g. the call waiting supplementary service). As a service provider option, separate values may be specified for incoming and for outgoing calls for either or both of the limits.

The videotelephony teleservice shall be withdrawn by the service provider upon the request of the subscriber, or for service provider reasons.

6.2 Normal procedures

For case I of the videotelephony teleservice, communication is by means of a single 64 kbit/s connection and so only a single call shall be established. The procedures are given in subclause 6.2.1.

For case II of the videotelephony teleservice, communication is by means of two 64 kbit/s connections and so two calls shall be established. For establishment of the first call, the procedures of subclause 6.2.1 shall apply. The second call shall be established using the procedures given in subclause 6.2.1, provided that the first call has already been established.

The procedures for originating and terminating the videotelephony teleservice using case I, or case II shall appear, from the user's point of view, to be a single operation, similar to that for the telephony teleservices.

NOTE: As a terminal option, call 2 can be established/terminated independently of call 1, as long as call 1 is maintained.

The network shall provide out of band indications to indicate call progress. Network generated tones and/or announcements shall be provided for the videotelephony teleservice.

A user can control whether or not his/her picture is transmitted to the remote user.

6.2.1 Originating the call (call establishment)

The videotelephony teleservice is originated by the originating user activating the terminal, performing service selection, if applicable for the originating terminal, and terminating selection. During this process, the originating user is given the appropriate indications as to the state of the call.

The end-to-end paths are framed according to ETS 300 144 [13]. The in-band protocol shall be established according to ETS 300 143 [12].

Call 1 shall be established before initiating call 2.

NOTE 1: Call 1 is devoted to multimedia information transfer (e.g. speech, video and data). The transmission audio mode on the end-to-end digital path is defined according to ETS 300 144 [13], using the procedures defined in ETS 300 143 [12].

Audio tones provided to the user during call 1 establishment shall be as for the telephony 3,1 kHz teleservice, given in ETS 300 111 [6].

Call 2 can only be originated by the calling user's terminal after the connection has been established on call 1 and after the end-to-end mode initialisation procedure is completed according to ETS 300 145 [14].

Call 2 shall be associated to an automatic answer at the called interface.

NOTE 2: When the second connection has been established, the end-to-end alignment procedure occurs and the relative delay between the two connections is adjusted until complete synchronisation is achieved according to ETS 300 144 [13].

NOTE 3: Call 2 is devoted to video information transfer.

6.2.2 Indications during call establishment

At the called side, call 1 and call 2 shall be accepted after successful checking of compatibility information by the terminal(s) addressed.

After initiating call 1, the calling user shall receive an acknowledgement that the network is able to process the call. The called user shall receive an indication of the arrival of an incoming videotelephony call. The calling user shall also be given an indication that the call is being offered to the called user, when an indication is received by the network that the called user is being informed of this call.

The acceptance of call 1 by the called user (answer) shall cause the indication to be removed, and the bidirectional communication path to be provided.

After initiating call 2, the calling terminal shall receive an acknowledgement that the network is able to process the call. The called terminal shall receive an indication of the arrival of an incoming videotelephony call.

The acceptance of call 2 by the called terminal (answer) shall cause the bidirectional communication path to be provided.

6.2.3 Terminating the call

A request to terminate the videotelephony teleservice can be generated by either of the users. If one user terminates the call, the other user shall be given an appropriate indication. For case II, both call 1 and call 2 shall be terminated.

6.2.4 Change of communication mode

Depending on the terminal capabilities, it shall be possible to change between different communication modes according to ETS 300 145 [14].

6.3 Exceptional procedures

6.3.1 Situations at the calling user side

When the network receives an improper service request from a user, the network shall give that user the appropriate failure indication and the call establishment shall be ceased.

A user inputting an invalid ISDN number shall be given an appropriate failure indication by the network and the call establishment shall be ceased.

When the network receives an incorrect ISDN number from a user the network shall give that user the appropriate indication and the call establishment shall be ceased.

Users can input network address information subsequent to the service request (i.e. overlap sending). In this case, if the user fails to enter address information or subsequent parts of the address within network determined intervals, the network shall give that user the appropriate indication and the call establishment shall be ceased.

6.3.2 Situations at the called user side

A calling user attempting to establish a call to a user who is identified by the network to be busy (either network determined user busy or user determined user busy) shall be given the appropriate indication by the network.

A user attempting to establish a call to a user whose terminal equipment fails to respond shall be given the appropriate indication by the network and the call establishment shall be ceased.

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 establish the connection within a defined period of time, the calling user attempting to establish the call shall be given the appropriate failure indication by the network and the call establishment shall be ceased.

6.3.3 Situations due to network conditions

A user attempting to establish a call, but meeting problems due to network conditions (e.g. congestion) shall be given the appropriate indication by the network.

6.3.4 Retention of call information

If a user attempts to establish a call, but meets problems due to network conditions (e.g. congestion) or called user state (e.g. network determined user busy or user determined user busy) then, according to a network option, the network shall retain all the information supplied by the calling user for the duration of the retention timer.

7 Intercommunication and interworking considerations

Intercommunication of videotelephone terminals with 3,1 kHz and 7 kHz ISDN terminals, and interworking with the PSTN shall be provided.

The videotelephony teleservice shall include voice encoding according to CCITT Recommendation G.711 [4]. It may include additional speech encoding, according to CCITT Recommendations G.722 [5] and/or G.728 [15], as an optional feature (see ETS 300 145 [14]).

NOTE 1: Where the videotelephone terminal does not support the 7 kHz capability, intercommunication with 7 kHz terminals will result in a 3,1 kHz speech communication mode.

The user of a videotelephone terminal shall be able to establish calls to 3,1 kHz and 7 kHz terminals (if the 7 kHz capability is supported) connected to the ISDN and to telephone terminals connected to the PSTN.

Videotelephone terminals shall be able to accept calls from 3,1 kHz and 7 kHz terminals (if 7 kHz capability is supported) connected to the ISDN and from telephone terminals connected to the PSTN.

NOTE 2: As a terminal option, videotelephone terminals may be pre-programmed to accept incoming videotelephony calls only. This function may be requested by users possessing, e.g. both a videotelephone terminal and a 3,1 kHz terminal connected to the same access arrangement.

7.1 Fall-back procedures

7.1.1 Fall-back to the telephony 3,1 kHz teleservice

7.1.1.1 Procedures

Fall-back to telephony 3,1 kHz teleservice shall be an inherent feature of the videotelephony teleservice and shall be provided as a default procedure. However, if the calling user indicates that fall-back is not allowed when originating a call, fall-back procedures shall not apply.

NOTE 1: This situation may lead to an unsuccessful call attempt due to called user terminal capabilities.

If the calling user has not indicated that fall-back is not allowed, then the following procedure shall apply:

- the network shall offer the call to the called user at all videotelephone and 3,1 kHz terminals. The called user can accept the call either as a videotelephony or 3,1 kHz telephony call at any terminal where the call is offered;
- the calling user shall be informed of the resultant telecommunications service i.e. the videotelephony or 3,1 kHz telephony teleservice;
- if no terminal accepts the call, this shall be indicated to the calling user.

NOTE 2: Echo cancellation will be disabled for videotelephony calls. If fall-back occurs, re-enabling of echo cancellers is necessary. However, some networks may not support the corresponding signalling mechanisms.

NOTE 3: When fall-back is not implemented by the network, fall-back may be performed end-to-end by the calling videotelephone terminal, by originating a new 3,1 kHz telephony call.

If the calling user has not indicated that fall-back is not allowed and the network does not support the fall-back procedure, the telephony 3,1 kHz teleservice shall be provided to the calling user.

7.1.1.2 Interworking with non-ISDNs

If the calling user has not indicated that fall-back is not allowed and interworking with the PSTN occurs, the telephony 3,1 kHz teleservice shall be provided. The calling user shall be informed of this situation.

If fall-back is not allowed for the call, the communication shall not be established.

7.1.2 Fall-back to the telephony 7 kHz teleservice

In the case where the calling user has not indicated that fall-back is not allowed, i.e. fall-back to telephony 3,1 kHz teleservice is allowed, the call can be accepted by the called user on a 7 kHz telephone terminal.

The calling user shall be informed of the resultant telecommunications service, i.e. the telephony 7 kHz teleservice.

Depending on the capabilities of the calling videotelephone terminal, the communication can be either a 7 kHz telephony communication or a 3,1 kHz telephony communication.

7.2 Interworking with private ISDNs

If the calling user has not indicated that fall-back is not allowed and the calling user is connected to a private ISDN which supports the videotelephony teleservice, then, in situations where fall-back applies, the fall-back procedures shall be performed by the private ISDN.

The result of call presentation (the videotelephony teleservice, the telephony 7 kHz teleservice or the telephony 3,1 kHz teleservice) within the private ISDN shall be indicated to the public ISDN.

In the case where the private ISDN does not support the fall-back procedures, then the telephony 3,1 kHz teleservice shall be provided. The calling user shall receive an indication from the public ISDN that fall-back to the telephony 3,1 kHz teleservice has occurred.

8 Applicability of supplementary services

Each supplementary service description identifies the applicability with the videotelephony teleservice.

If the in-band communication is interrupted by the network as a result of one user invoking a supplementary service (e.g. the call hold supplementary service, or the terminal portability supplementary service) then the network shall provide an appropriate indication (e.g. all ones or idle signal) in the B-channel.

Prior to invoking supplementary services which interrupt the in-band signalling communication (e.g. the call hold supplementary service), the in-band communication shall revert to mode 0, as described in ETS 300 145 [14].

Applicability of supplementary services is described in Annex B.

9 Static description of the service using attributes

The attributes are defined in CCITT Recommendation I.140 [9], Annex A, § A.1.1.

The values of the attributes are defined in CCITT Recommendation I.140 [9], Annex A, § A.2.

For case I of the videotelephony teleservice, the attribute tables identified by with "call 1" apply. For case II of the videotelephony teleservice, the attribute tables identified by "call 1" and "call 2" apply to call 1 and call 2 respectively.

9.1 Low layer attributes

9.1.1 Information transfer attributes

The information transfer attributes of this teleservice are specified in tables 2 and 3.

Table 2: Values for information transfer attributes

Attribute	Possible values
Information transfer mode	- circuit
Information transfer rate	- 64 kbit/s
Information transfer capability	- unrestricted digital information with tones and announcements - speech (see NOTE 1)
Structure	- 8 kHz integrity
Establishment of communication	- demand
Symmetry	- bidirectional symmetric
Configuration of communication	- point-to-point - multipoint (see NOTE 2)
NOTE 1:	In the case where fall-back to the telephony 3,1 kHz teleservice applies, the information transfer capability shall be speech.
NOTE 2:	As a service provider option.

Table 3: Values for information transfer attributes for call 2

Attribute	Possible values
Information transfer mode	- circuit
Information transfer rate	- 64 kbit/s
Information transfer capability	- unrestricted digital information
Structure	- 8 kHz integrity
Establishment of communication	- demand
Symmetry	- bidirectional symmetric
Configuration of communication	- point-to-point - multipoint (see NOTE)
NOTE: As a service provider option.	

9.1.2 Access attributes

The access attributes of this teleservice are specified in tables 4 and 5.

Table 4: Values of access attributes for call 1

Attribute	Possible values
Access channel and rate	User information - B (64 kbit/s) Signalling - D (16 kbit/s or 64 kbit/s)
Signalling access protocol, information	User information - ETS 300 011, ETS 300 012, ETS 300 142 [11], ETS 300 143 [12], ETS 300 144 [13], CCITT Recommendations G.711 [4], G.722 [5] (NOTE), G.728 [15] (NOTE) Signalling - ETS 300 011, ETS 300 012, ETS 300 125, ETS 300 102, ETS 300 267
NOTE: Optional feature of the videotelephone terminal.	

Table 5: Values of access attributes for call 2

Attribute	Possible values
Access channel and rate	User information - B (64 kbit/s) Signalling - D (16 kbit/s or 64 kbit/s)
Signalling access protocol, information	User information - ETS 300 011, ETS 300 012, ETS 300 142 [11], ETS 300 143 [12], ETS 300 144 [13], Signalling - ETS 300 011, ETS 300 012, ETS 300 125, ETS 300 102, ETS 300 267

9.2 High layer attributes

For call 1

Type of user information: speech, video, data.

Layer 6 protocol functions: CCITT Recommendations G.711 [4], G.722 [5] (NOTE), G.728 [15] (NOTE), ETS 300 142 [11].

Other attributes are not applicable.

NOTE: Optional feature of the videotelephone terminal.

For call 2

Type of user information: video, data.

Layer 6 protocol functions: ETS 300 142 [11].

Other attributes are not applicable.

9.3 General attributes

This standard does not provide values for general attributes.

NOTE: The overall effect on quality by the delays introduced by video codecs and transmission facilities needs to be taken into account. Therefore, more than one satellite hop should be avoided.

10 Dynamic description

The dynamic description for this teleservice on-demand basis shall be as specified in CCITT Recommendation I.220 [7].

Annex A (informative): Bibliography

- ETS 300 011: "Integrated Services Digital Network (ISDN); Primary rate user-network interface Layer 1 specification and test principles".
- ETS 300 012: "Integrated Services Digital Network (ISDN); Basic user-network interface Layer 1 specification and test principles".
- ETS 300 102: "Integrated Services Digital Network (ISDN); User-network interface layer 3 Specifications for basic call control".
- ETS 300 125: "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".
- ETS 300 267: "Integrated Services Digital Network (ISDN); Telephony 7 kHz and videotelephony teleservices Digital Subscriber Signalling System No. one (DSS1)".

Annex B (informative): Applicability of supplementary services to the videotelephony teleservice

B.1 Introduction

The applicability of ISDN supplementary services to the videotelephony teleservice takes into account the involvement of two separate calls, call 1 and call 2, and subsequently two connections for achieving a complete videotelephone communication according to this standard.

From the user's point of view, supplementary services are considered as applicable to a videotelephony communication, considered as a whole, even if two separate calls are established by the public ISDN, although the user may be aware that there are two calls handled in the network.

NOTE: As a consequence, all necessary functions should be specified in the videotelephony terminals in order to provide a single procedure at the user-to-terminal interface.

B.2 Principles adopted

- 1) The same addressing information should be used for call 1 and call 2. It is the responsibility of the user to allocate distinguishable addresses to videotelephone terminals (e.g. the subaddressing supplementary service and the multiple subscriber number supplementary service).
- 2) The network has no knowledge of the link between the two calls.
- 3) A call 2 received by a given terminal while call 1 has not been established will be rejected by the called terminal.

NOTE: The called terminal has to check that call 2 has been originated by the same user (e.g. same originating identities).

B.3 Applicability of individual supplementary services

The applicability of individual supplementary services to the videotelephony teleservice is outside the scope of this standard.

History

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