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INTEGRATED SERVICES DIGITAL NETWORK (ISDN)

SERVICE CAPABILITIES

TELESERVICES SUPPORTED BY AN ISDN

TELEPHONY 7 kHz TELESERVICE

ITU-T Recommendation I.241.7

(Previously "CCITT Recommendation")

FOREWORD

The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the International Telecommunication Union. The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, established the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

ITU-T Recommendation I.241.7 was prepared by the ITU-T Study Group I (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

NOTES

1 As a consequence of a reform process within the International Telecommunication Union (ITU), the CCITT ceased to exist as of 28 February 1993. In its place, the ITU Telecommunication Standardization Sector (ITU-T) was created as of 1 March 1993. Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.

In order not to delay publication of this Recommendation, no change has been made in the text to references containing the acronyms "CCITT, CCIR or IFRB" or their associated entities such as Plenary Assembly, Secretariat, etc. Future editions of this Recommendation will contain the proper terminology related to the new ITU structure.

2 In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Recommendation I.241.7

TELEPHONY 7 kHz TELESERVICE

(Helsinki, 1993)

1 Definition

The **telephony 7 kHz teleservice for an ISDN interface** is a symmetrical, bi-directional real time teleservice which allows users to interchange high quality speech or sounds using the circuit-mode 64 kbit/s 8 kHz structured multi-use bearer service category.

2 Description

2.1 General description

The telephony 7 kHz teleservice is defined as a fully standardized ISDN teleservice following the principles given in Recommendation I.210.

The telephony 7 kHz teleservice enables a user to communicate with high quality speech or by interchanging sounds with higher quality than that provided by 3.1 kHz telephony.

The communication is bi-directional, with both directions continuously and simultaneously active during the speech phase, with a frequency range from 50 to 7000 Hz.

User information is transferred over the B-channel, signalling is provided over the D-channel. Tones and announcements are provided by the network using B-channel coding in Recommendation G.711.

It is possible to use 7 kHz terminals to communicate with other ISDN telephone or videophone terminals. A 7 kHz terminal is capable of supporting 3.1 kHz telephony. It is also possible to use 7 kHz terminals to communicate with terminals connected to the PSTN. Fall-back procedures whereby a calling user can communicate with a called user having a 3.1 kHz terminal, or with users on the PSTN, are as described in Recommendation I.231.9.

The telephony 7 kHz teleservice allows the communication between

- two user (e.g. terminals) in a point-to-point configuration via the ISDN over a B-channel;
- three or more users in a multipoint configuration as invoked by some supplementary services.

The maximum delay for the user information is the same as it is specified for the general telephone network (400 ms).

2.2 Specific terminology

For the purposes of this Recommendation, the following definitions apply.

7 kHz terminal: A terminal that supports the telephony 7 kHz teleservice.

3.1 kHz terminal: A terminal that supports 3.1 kHz telephony.

Videophone terminal: A terminal that supports videotelephony.

fall-back: A mechanism performed either by the network or by the calling terminal that allows 7 kHz terminals to establish calls to 3.1 kHz terminals.

retention timer: This timer specifies the amount of time that the network retains the call information of the original call upon encountering busy or being released. This timer is a network provider option. The value for this timer is greater than 15 seconds.

3 Procedures

3.1 Provision and withdrawal

3.1.1 The telephony 7 kHz teleservice may be provided after prior arrangement with the service provider.

3.1.2 As a service provider option, the telephony 7 kHz teleservice can be offered with several subscription options which apply separately to each ISDN number, all or group of ISDN numbers on the interface. For each subscription option, only one value can be selected.

Subscription options for the interface are summarized below:

Subscription option	Value
Maximum number of information channels available at the called user	– *m*, with *m* is not greater than the number of information channels on the interface
Maximum number of total calls present at the called user	– *n*, with *n* is not greater than the number of information channels on the interface

The called user can be an ISDN number or group of ISDN numbers on the interface.

NOTE – More than one ISDN number can be associated with the service/interface as a part of a supplementary service such as the Multiple Subscriber Number supplementary service. In case of one ISDN number, the option given above 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 network provider option, separate values may be specified for incoming and for outgoing calls for either or both of the limits.

3.2 Normal procedures

All user-network signalling is over the D-channel.

3.2.1 Originating the call (call set-up)

The telephony 7 kHz teleservice is originated by the originating user activating the terminal, performing the service selection (if applicable from the originating terminal) and terminating the customer selection. During the call set-up stage, the originating user is given appropriate indications which refer to the state of the call.

The following procedures given the procedures for the control of a call when the calling user does not indicate that fall-back is permitted. Refer to Recommendation I.231.9 for the call control procedures in the case where fall-back is permitted.

A service selection is required on a multi-service terminal.

Indications during call set-up may include an indication that the network is ready to receive the network address information (proceed indication) and an indication that the call is progressing through the network. It is possible to have audible indications which may be accompanied by other indications.

Audio tones provided to the user are as for 3.1 kHz telephony.

Other information which may be required for use by the network in supplementary services provided to the called user (e.g. calling line identification) may also be included.

The call request may be given to the network either *en-bloc*, containing all the required information or, not *en-bloc*.

3.2.2 Indications during call set-up and call acceptance (answer)

After initiating a call the calling user receives an acknowledgement that the network is able to process the call. The called user receives an indication of the arrival of an incoming telephony 7 kHz call. The calling user is also 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. When the call reaches the called user and the connection is established, an indication is sent to the calling user.

The acceptance of the 7 kHz call by the terminating customer (answer), causes the indications to be removed and bi-directional communication paths to be provided. The call is turned into the "speech phase".

The called user may also provide other information, for use by the network in supplementary services provided to the other user (e.g. connected line identity).

3.2.3 Terminating the service (call release)

A request to terminate the telephony 7 kHz teleservice may be generated by either of the users. If one user terminates the service, the other user is given an appropriate indication.

3.2.4 Change of communication mode

As a consequence of end-to-end integrity on the telephony 7 kHz teleservice, 3.1 kHz telephone calls and videophone calls, it is possible to establish the B-channel protocols given in Recommendation G.725.

Depending on the terminal capabilities it may be possible to change between the following communication modes:

- 3.1 kHz speech (see Recommendation G.711);
- 7 kHz speech (see Recommendation G.722);
- different videotelephony communication modes.

NOTE – The user may be required to establish additional calls in some cases.

3.3 Exceptional procedures

3.3.1 Failure situations due to user error

i) A user inputting an improper service request is given an appropriate failure indication by the network and the call set-up is ceased.

ii) A user inputting a non-valid network number is given an appropriate failure indication by the network and the call set-up is ceased.

3.3.2 Failure situations due to called user state

i) A calling user attempting to establish a call to a user who is identified by the network to be busy (either NDUB or UDUB) is given an appropriate failure indication by the network and the call set-up is ceased.

ii) A user attempting to establish a call to a user where the terminal equipment fails to respond is given an appropriate failure indication by the network and the call set-up is ceased.

iii) 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 answer within a defined period of time, the calling user attempting to establish the call is given an appropriate failure indication by the network and the call set-up is ceased.

3.3.3 Failure situations due to network conditions

i) A user attempting to establish a call but meeting failure situations due to network conditions (e.g. congestion) is given an appropriate failure indication by the network.

3.3.4 Failure situations due to called user state and/or network conditions

i) A user attempting to establish a call but meeting call failure situations due to network conditions (e.g. congestion) or called user state (e.g. network determined user busy or user determined user busy) can have call information retained for the duration of the retention timer.

4 Charging capabilities

This Recommendation does not cover charging principles.

5 Interworking requirements

Interworking is required between a non-ISDN network and the ISDN network offering these services.

When setting up a call, a user can request that the call fall back in case of interworking with the PSTN, or on calls to 3.1 kHz terminals.

i) The user of a 7 kHz terminal is able to establish calls to 3.1 kHz or videophone terminals connected to the ISDN and to terminals connected to the PSTN.

ii) A 7 kHz terminal is able to accept calls from 3.1 kHz or videophone terminals connected to the ISDN and from PSTN telephone terminals.

If interworking or intercommunication occurs the user will get an appropriate notification.

Fall-back procedures are described in Recommendation I.231.9.

6 Attribute/Values

6.1 Low layer attributes

1)	Information transfer mode:	circuit;
2)	Information transfer rate:	64 kbit/s;
3)	Information transfer capability:	7 kHz (audio)/speech (fall-back);
4)	Structure:	8 kHz integrity;
5)	Establishment of communication:	on demand;
6)	Symmetry:	bi-directional symmetric;
7)	Communication configuration:	point-to-point, multipoint.

6.2 Access attributes

8)	Access channel (and rate):	B (64) for user information, D (16) for signalling;
9.1)	Signalling access protocol layer 1:	I.430/I.431;
9.2)	Information access protocol layer 1:	I.430/I.431; T/TE 12-06 (G.725; H.221), G.711;
9.3)	Signalling access protocol layer 2:	I.440/I.441;
9.4)	Information access protocol layer 2:	not applicable;
9.5)	Signalling access protocol layer 3:	I.450/I.451;
9.6)	Information access protocol layer 3:	not applicable.

6.3 High layer attributes

10) Type of user information: 7 kHz speech, 7 kHz sound;

11) Layer 4 protocol functions: not applicable;

12) Layer 5 protocol functions: not applicable;

13) Layer 6 protocol functions: G.722/G.725;

14) Layer 7 protocol functions: not applicable.

6.4 General attributes

15) Supplementary low layer and high layer attributes (supplementary services):

All supplementary services are applicable to the telephony 7 kHz teleservice.

16) User-oriented Quality of Service:

The maximum delay for the user information is the same as it is specified for the general telephone network (400 ms).

17) Interworking possibilities:

- 3.1 kHz ISDN telephony;
- 3.1 kHz PSTN telephony;
- videotelephony.