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**INTERIM
EUROPEAN
TELECOMMUNICATION
STANDARD**

I-ETS 300 400

March 1995

Source: ETSI TC-TE

Reference: DI/TE-04115

ICS: 33.080

Key words: ISDN, telephony, payphone

**Integrated Services Digital Network (ISDN);
Telephony terminals;
Payphones**

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Foreword

This Interim European Telecommunication Standard (I-ETS) was produced by the Terminal Equipment Technical Committee (TC-TE) of the European Telecommunications Standards Institute (ETSI).

An ETSI standard may be given I-ETS status as it is regarded either as a provisional solution ahead of a more advanced standard, or because it is immature and requires a "trial period". The life of an I-ETS is limited, at first, to three years after which it can be converted into an European Telecommunication Standard (ETS), have its life extended for a further two years, be replaced by a new version of the I-ETS or be withdrawn.

This I-ETS describes the required technical characteristics of Integrated Services Digital Network (ISDN) 3,1 kHz payphone terminals as described in clause 1 (Scope).

Terminal equipment may be subject to mandatory standards such as NET 3 (CTR3 in preparation) and CTR 8.

Proposed announcement date	
Date of latest announcement of this I-ETS (doa):	30 June 1995

Introduction

A payphone service may be provided in a number of ways ranging from a simple self-contained terminal to a complex arrangement of terminal and central processing equipment which interact with one another. A number of methods of payment are possible, ranging from coins or tokens, through to various types of prepayment cards, credit cards and "smart" cards.

In general, the complexity of the apparatus required is determined by the facilities offered, the reliability required and the level of assurance that the service provider requires in the validation of the payment.

This I-ETS is intended to specify the requirements of that set of functions of a payphone terminal that are necessary to support the range of facilities that may be required in such a variety of terminal apparatus.

Some types of payphones may be subject to National or European legislation requiring the mandatory provision of certain facilities. Examples are the provision of inductive coupling or the provision of a printer.

This I-ETS does not specify requirements for operation in any particular environments.

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1 Scope

This I-ETS specifies technical characteristics (electrical, mechanical, logical and acoustic) for a payphone terminal using the 3,1 kHz telephony service which can be connected to an ISDN basic access at the coincident S and T reference point at an interface to a public telecommunications network presented as an ISDN basic access point.

The requirements of this I-ETS are additional to those of the standards for connection to the ISDN basic access and of any other standards to which the terminal equipment is subject.

This I-ETS is applicable to terminal equipment of the functional group defined as Terminal Equipment Type 1 (TE1) in CCITT Recommendation I.411 which supports the 3,1 kHz telephony teleservice.

This I-ETS specifies all the functions necessary to provide real-time two-way speech conversation. Where a function is indicated as optional, it need not be provided, but where such a function is provided, the terminal needs to conform to the requirements and tests specified in this I-ETS.

Annex B (informative) contains details of facilities that may be provided on a payphone, whilst the provision of none of these facilities is mandatory, some levels of payphone service cannot be implemented unless certain facilities are present.

2 Normative references

This I-ETS incorporates by dated or undated references, 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 I-ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] I-ETS 300 245-1: "Integrated Services Digital Network (ISDN) - Technical characteristics of telephony terminals - Part 1: General".
- [2] I-ETS 300 245-2: "Integrated Services Digital Network (ISDN) - Technical characteristics of telephony terminals - Part 2: PCM A-law handset telephony".
- [3] ETS 300 381: "Telephony for hearing impaired people - Inductive coupling of telephone earphones to hearing aids, performance requirements and testing methods".
- [4] EN 726-4: "Requirements for IC cards and terminals for telecommunication use - Part 4: Application independent card related terminal requirements".
- [5] ISO 4909 (1987): "Bank cards - Magnetic stripe data content for track 3".
- [6] ISO 7810 (1985): "Identification cards - Physical characteristics".
- [7] ISO 7811, Parts 1 to 5 (1985): "Identification cards - Recording technique".
- [8] ISO 7813 (1990): "Identification cards - Financial transaction cards".
- [9] prEN 1038: "IC card applications for telecommunications - Part 1 - IC Card Payphone".
- [10] ETS 300 153: "Integrated Services Digital Network (ISDN) - Attachment requirements for terminal equipment to connect to an ISDN using ISDN basic access (Candidate NET 3, Part 1)".
- [11] ITU-T Recommendation P.57 (1993): "Artificial ears".
- [12] IEC Publication 651: "Sound level meters".

[13] CCITT Recommendation P.56 (1988): "Objective measurement of active speech level".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this I-ETS, the following definitions apply, together with the relevant definitions given in I-ETS 300 245-1 [1], I-ETS 300 245-2 [2] and in CCITT Recommendations P.10 and G.701.

application: A set of security mechanisms, files, data, protocols (excluding transmission protocols) which are located and used in the Integrated Circuit (IC) card (card application) and outside of the IC card (external application).

cardphone: A payphone that accepts cards as a means of payment.

charge card: A form of credit card issued by a telecommunications service provider.

credit card: A card which permits payment to be made at a date after receiving a service.

designated terminal: A terminal that is permitted to draw power from power source 1 under restricted power conditions as specified in CCITT Recommendation I.430.

follow-on call: A facility whereby a call may be cleared whilst retaining any payment as credit for a following call.

Integrated Circuit Card (IC Card): A card containing a microprocessor, that can be considered as a set of files that can, e.g. be read, written, or executed (sometimes known as a "smart" card).

payphone: Terminal apparatus permitting access to the telephony teleservice after the validation of suitable payment. Outgoing calls to certain services may be permitted without payment. Calls to certain services may be barred.

payphone service: A service offered by means of special equipment, which permits access to telecommunications services after the validation of suitable payment. The service may be offered by a self-contained terminal or by interaction between a terminal and other apparatus accessed over the network.

prepayment card: A card providing payment for a service by means of a stored value paid for in advance.

3.2 Abbreviations

For the purposes of this I-ETS, the following abbreviations apply, together with relevant abbreviations given in I-ETS 300 245-1 [1], I-ETS 300 245-2 [2] and CCITT Recommendations P.10 and G.701.

CHV	Card Holder Verification
CTR	Common Technical Regulation
IC	Integrated Circuit
ISDN	Integrated Services Digital Network
LRGP	Loudness Rating Guard-ring Position
NET	Norme Européene de Télécommunications
PCM	Pulse Code Modulation
RLR	Receive Loudness Rating
TE1	Terminal Equipment Type 1
TEUT	Terminal Equipment Under Test

4 Network access

4.1 General

The terminal shall comply with I-ETS 300 245-1 [1].

4.2 Designation

A payphone shall be capable of being a designated terminal. As an option, a switching function may be provided to remove the designation.

Compliance shall be checked by inspection.

4.3 Emergency calls

The terminal shall permit calls to the public emergency services without the necessity for payment to be proffered.

Compliance shall be checked by attempting a call to the appropriate number(s) without proffering payment.

5 Telephony functions

5.1 General

The telephony functions of the terminal shall comply with I-ETS 300 245-1 [1] and I-ETS 300 245-2 [2].

5.2 Suppression of transmission

When it is intended to suppress speech transmission (e.g. before validation of payment or after expiry of credit), the sending sensitivity/frequency response should be attenuated by at least 60 dB.

Compliance may be checked by a selective measurement of the sending sensitivity/frequency response using the test method specified for sending sensitivity/frequency response specified in I-ETS 300 245-2 [2].

5.3 Inductive coupling

As an option, a facility may be provided to couple inductively the speech signal to a hearing aid. Such coupling, if provided, shall comply with ETS 300 381 [3].

NOTE: The provision of such a facility may be mandatory in some countries.

6 Message functions

6.1 General

Messages of various kinds are generally necessary in a payphone to give guidance and feedback to the user. Such messages may be internally generated in response to a number of possible stimuli. Examples include some internal logical condition or a signal derived from a key or other control device. Messages may also be generated in response to a message received from an IC card, a message from the network received over the D-channel, or a message from the payphone service provider received over a B- or D-channel.

Messages may be presented to the user as an audible signal in the form of a tone or a spoken message, as a visual display in the form of a symbol or as an alpha numeric message, or even in a tactile manner in the form of braille or other language for the visually handicapped.

6.2 Provision of messages

The provision of messages is optional. Where a message is provided, it shall be consistent with its stimulus.

Compliance shall be checked by inspection.

6.3 Message content

6.3.1 General

It is preferable that there should be a set of basic messages associated as necessary with specified signals received by the payphone, from, for example, the network or an IC card.

It should be possible to suppress the display of user related data.

Typical messages may include, for example:

- insert payment;
- insert your card;
- remove your card;
- enter your number;
- try again;
- emergency calls only.

6.3.2 Language

At least two languages shall be supported, one of which should be English. Means of language selection are described in EN 726-4 [4].

6.4 Audio messages

6.4.1 Speech messages

Speech messages originated by the payphone shall be presented at a level of $-14 \text{ dBPa} \pm 6 \text{ dB}$ long term rms while active when the Receive Loudness Rating (RLR) is at the nominal value.

Compliance shall be checked by the test described in annex A, subclause A.1.5.

6.4.2 Tones

Tones originated by the payphone shall be presented at a level of $-5 \text{ dBPa} \pm 4 \text{ dBPa}$ when the Receive Loudness Rating (RLR) is at the nominal value.

Compliance shall be checked by the test described in annex A, subclause A.1.5.

7 Keypad functions

7.1 Network addressing

Any control information transmitted over the D-channel as a result of a key operation shall be consistent with the marking on the key.

Compliance shall be checked by inspection.

7.2 Interworking with payment card

Any signal appearing at a payment card interface as a result of a key operation shall be consistent with the marking on the key.

Compliance shall be checked by inspection.

8 Payment methods

8.1 General

A payphone shall support at least one method of payment. Payment methods are optional (e.g. coins, tokens, coded cards), and the validity of such payment may be verified by any means acceptable to the payphone service provider.

8.2 Coins/Tokens

8.2.1 Repayment

Payphones which provide a coin/token operated prepayment facility shall return any coins/tokens proffered which have not been used as payment for the call upon call clearing initiated by the payphone, unless a follow-on call facility has been activated.

Compliance shall be checked by the test described in annex A, subclause A.1.6.

8.2.2 Expiry of credit

A warning shall be given to the user before the expiry of any credit.

Compliance shall be checked by inspection.

8.3 Prepayment cards

8.3.1 Return of card

Any card with credit remaining shall be returned to the user at the end of a call unless a follow-on call facility has been activated.

Compliance shall be checked by the test described in annex A, subclause A.1.7.

NOTE: A means of alerting should be provided to warn the user to retrieve the card.

8.3.2 Expiry of credit

A warning shall be given to the user before the expiry of any credit on the card.

Compliance shall be checked by inspection.

8.4 Credit and charge cards

8.4.1 Magnetic stripe card interface

For a payphone that accepts magnetic stripe credit and charge cards, the card/payphone interface shall be compatible with the characteristics specified in ISO 4909 [5], ISO 7810 [6], ISO 7811 [7] and ISO 7813 [8] as applicable.

8.4.2 Return of card

The card shall be returned to the user, at the latest when the call is cleared by the payphone unless a follow-on call facility has been activated.

Compliance shall be checked by the test described in annex A, subclause A.1.8.

NOTE: A means of alerting should be provided to warn the user to retrieve the card.

8.5 IC cards

8.5.1 General

A payphone that accepts IC cards shall meet the requirements of prEN 1038 [9].

8.5.2 Return of card

The card shall be returned to the user, at the latest when the call is cleared by the payphone unless a follow-on call facility has been activated.

Compliance shall be checked by the test described in annex A, subclause A.1.9.

NOTE: A means of alerting should be provided to warn the user to retrieve the card.

8.5.3 Electronic signals and transmission protocols

A payphone that accepts IC cards shall meet the requirements for the electronic signals and the asynchronous/synchronous transmission protocols across the card/payphone interface that are described in clause 5 of EN 726-4 [4].

9 Power fail requirements

9.1 Emergency calls

9.1.1 Designated terminal

A designated terminal shall under all conditions be capable of providing as a minimum the functions necessary to support telephony 3,1 kHz teleservice, a real-time 2-way speech conversation and calls to the emergency services without the need to proffer payment.

Compliance shall be checked by placing the terminal under restricted power conditions, by removing all sources of local power and attempting a call to an emergency service number.

9.1.2 Other terminals

A payphone that is not a designated terminal shall automatically give a "not available" indication when unable to make calls.

Compliance shall be checked by removing all sources of local power (including power source 1).

9.2 Payment retention

The payphone shall not falsely retain payment due to any power failure.

Compliance shall be checked by removing all sources of local power (including power source 1).

Annex A (normative): Test specifications

A.1 General conditions for testing

A.1.1 Test environment

The test environment is described in ETS 300 153 [10], clause 4.

A.1.2 Test equipment interface

The interface on the test equipment connected to the terminal under test shall be capable of providing the signalling and supervision necessary for the terminal to be working in all test modes. The connection of the test equipment to the terminal under test at the coincident S and T reference point shall be in accordance with ETS 300 153 [10], clause 4.

A.1.3 Test equipment requirements

artificial ear: The default artificial ear is the ITU-T Recommendation P.57 [11] type 1 artificial ear.

When measuring low acoustic impedance receivers the ITU-T Recommendation P.57 [11], type 3.2 artificial ear shall be used. The low leakage option shall be adopted. Sound pressure measurements shall be referred to the Ear Reference Point (ERP) by the correction characteristic specified in ITU-T Recommendation P.57 [11].

sound level meter: The sound level measurement equipment shall conform to IEC Publication 651 [12], type 1. The "I" detector characteristic shall be used.

speech voltmeter: The speech voltmeter shall conform to CCITT Recommendation P.56 [13].

A.1.4 Alternative test methods

The requirements of this I-ETS were written on the basis of the standard test methods described in this annex. For some parameters, it is recognised that alternative test methods may exist. It shall be the responsibility of the test house to ensure that any alternative method used is equivalent to that described in this annex.

A.1.5 Audio message level

A.1.5.1 Speech messages

The handset is mounted at the Loudness Rating Guard-ring Position (LRGP) and the earpiece is sealed to the knife-edge of the artificial ear.

The Terminal Equipment Under Test (TEUT) is caused to generate a message and the speech level in the artificial ear shall be determined using a speech voltmeter using method B of CCITT Recommendation P.56 [13].

A.1.5.2 Tones

The handset shall be mounted in the Loudness Rating Guard-ring Position (LRGP) and the ear piece shall be sealed to the knife-edge of an artificial ear.

The sound pressure shall be measured by connecting the sound level meter to the artificial ear.

A.1.6 Return of coins or tokens

A call shall be set up using suitable coins or tokens as means of payment, and the call shall be cleared down whilst coins or tokens remain unused.

Unused coins or tokens shall be returned to the user.

A.1.7 Return of prepayment card

A call shall be set up using a suitable prepayment card as means of payment, and the call shall be cleared down before the credit on the card is fully used.

The card shall be returned to the user.

A.1.8 Return of credit card

A call shall be set up using a suitable credit card as means of payment, and the call shall be cleared down.

The card shall have been returned to the user by the completion of this operation.

A.1.9 Return of IC card

A call shall be set up using a suitable IC card as means of payment, and the call shall be cleared down.

The card shall have been returned to the user by the completion of this operation.

Annex B (informative): Payphone facilities

This annex contains descriptions of some possible payphone facilities that can be provided using the functions specified in the body of this I-ETS.

Whilst the provision of none of these facilities is mandatory, some levels of payphone service cannot be implemented unless certain facilities are present.

In general this will be a matter for agreement between the supplier and the payphone service provider, but the provision of certain facilities in regulated payphones may be subject to legislation.

B.1 Application recognition

A facility whereby the terminal reads an IC card and determines whether it can support the application(s) resident on the card, so that it can then proceed according to the rules defined for that application.

If the application that is desired cannot be supported, the card is returned to the user and an appropriate message is displayed.

The provision of such a facility would typically involve the keypad functions (clause 7), the IC card function (subclause 8.5) and the message functions (clause 6).

B.2 Authentication

If two parties wish to communicate, then each party may wish to satisfy itself that the other is genuine. In the case of an IC card, the two parties are the card and the outside world, which includes everything outside the card.

The process of authentication may therefore typically involve the keypad function (clause 7), the message functions (clause 6) and the electronic signal and transmission protocols of the IC card (subclause 8.5.3).

B.3 Card Holder Verification

Card Holder Verification (CHV) enables the user to prove identity by entering a Cardholder Verification code and/or by the input of biometric information.

In the case of a CHV entry, the keypad/keyboard of the terminal or a separate and secure PIN-pad may be used.

The provision of such a facility would typically involve the keypad functions (clause 7), the IC card function (subclause 8.5), possibly the network access function (subclause 4.1) and possibly a biometric reader function (unspecified).

B.4 Charge card calling

A facility which allows a user to make a call from a cardphone and have the charges for the call automatically charged to a service subscriber's account number as defined by information contained on the card.

Such a service utilises procedures defined in CCITT/ITU-T Recommendations E.116, and E.118 and ITU-T Recommendation E.113.

The provision of such a facility would typically involve the keypad functions (clause 7), the credit card function (subclause 8.4), the IC card function (subclause 8.5) and the network access function (subclause 4.1).

B.5 Cost optimization

This facility would allow the terminal to determine the least cost communication route using information resident on an IC card.

Provision of this facility would typically involve the network access function (subclause 4.1), the keypad functions (clause 7) and the electronic signals and transmission protocols of the IC card (subclause 8.5.3).

B.6 Cost of service calculation

A facility whereby the terminal calculates and displays the cost of providing the chosen service or the cost of a call using information derived from the network or from its own internal intelligence.

Such a facility may make use of the ISDN supplementary service of Advice of Charge (ETS 300 178, ETS 300 179, ETS 300 180, ETS 300 181).

Provision of this facility would typically involve the network access function (subclause 4.1), the keypad functions (clause 7) and the message functions (clause 6).

B.7 Data transmission, card/host

This is a facility whereby an IC card can communicate directly with a host computer, e.g. to receive a new application or to update an existing one. This dialogue could be carried on whilst the user is using some other service provided by the terminal.

Signalling could be over any available channel and might involve use of the user signalling bearer service defined in ITU-T Recommendation I.232.3.

Provision of this facility would typically involve the network access function (subclause 4.1), and the electronic and signals transmission protocols (subclause 8.5.3).

B.8 Dialling - fixed addresses

This facility automatically dials a number determined by the card application selected by the user. For an IC card, this should be in accordance with prEN726-6.

Provision of this facility would typically involve the network access function (subclause 4.1), the keypad function (clause 7), and the electronic signal and transmission protocols of the IC card (subclause 8.5.3).

B.9 Dialling - last number repeat

A facility whereby the last number dialled to access the network may be stored automatically. Where the number is stored within an IC card in accordance with prEN726-6, the number may then subsequently be redialled from the terminal or from another IC card terminal.

Provision of this facility would typically involve the network access function (subclause 4.1), the keypad function (clause 7), and the electronic signal and transmission protocols of the IC card (subclause 8.5.3).

B.10 Dialling - prefix conversion

A facility whereby when an IC card of one nationality is inserted into a terminal of a second nationality, and a telephone number is selected from a directory on the card, the appropriate national prefixes are inserted into the dialled number in accordance with prEN726-6.

Provision of this facility would typically involve the network access function (subclause 4.1), the keypad function (clause 7), and the electronic signal and transmission protocols of the IC card (subclause 8.5.3).

B.11 Dialling - short code

A facility whereby a long number stored on an IC card may be dialled by dialling a shorter directory code. The terminal is expected to generate the correct prefixes dependent on the country, area and network accessed.

Provision of this facility would typically involve the network access function (subclause 4.1), the keypad function (clause 7) and the electronic signal and transmission protocols of the IC card (subclause 8.5.3).

B.12 Remote key pad

B.12.1 Encrypting key pad

Where a keypad used to input a CHV is remote from the terminal, any communication between the keypad and the terminal would need to be encrypted to prevent the CHV from being intercepted on its way to the terminal/card.

Provision of this facility would typically involve the keypad function (clause 7) and the electronic signal and transmission protocols of the IC card (subclause 8.5.3).

B.12.2 PIN-pad identification

This facility enables a terminal to identify that a remote PIN-pad is valid.

Provision of this facility would typically involve communication with the remote keypad using suitable (unspecified) secure protocols.

B.13 Language recognition

This facility allows the terminal to determine from the card the country of origin of the user and to display messages in a preferred language.

Provision of this facility would typically involve the message function (clause 4) and communication with the card (subclause 8.4 or 8.5).

B.14 Unblocking key - terminal support

Where an IC card application has been reversibly blocked, the terminal may unblock the application by presentation of a code (unblocking code) known only to the card and the external world.

Provision of this facility will typically involve network access (subclause 4.1), the message function (clause 6) and the IC card function (subclause 8.5).

B.15 Validity check - black list

The validity of a card may be verified by checking a list of invalid cards currently in circulation. Such a list is known as a "black list".

The provision of this facility will typically involve the network access function (subclause 4.1), the message function (clause 6) and the credit or IC card function (subclauses 8.4 and 8.5).

B.16 Validity check - white list

The validity of a card may be verified by checking a list of valid cards in current circulation. Such a list is known as a "white list".

The provision of this facility will typically involve the network access function (subclause 4.1), the message function (clause 6) and the credit or IC card function (subclauses 8.4 and 8.5).

B.17 Voice encryption

A facility where the voice signals may be encrypted using a code contained in an IC card application.

The provision of this facility will typically involve the network access function (subclause 4.1), the keypad functions (clause 7), the message function (clause 6) and the credit or IC card function (subclauses 8.4 and 8.5).

Annex C (informative): Bibliography

For the purposes of this I-ETS, the following informative references apply.

- 1) ETS 300 178 (1992): "Integrated Services Digital Network (ISDN); Advice of Charge: charging information at call set-up time (AOC-S) supplementary service, Service description".
- 2) ETS 300 179 (1992): "Integrated Services Digital Network (ISDN); Advice of Charge: charging information during the call (AOC-D) supplementary service, Service description".
- 3) ETS 300 180 (1992): "Integrated Services Digital Network (ISDN); Advice of Charge: charging information at the end of the call (AOC-E) supplementary service, Service description".
- 4) ETS 300 181 (1993): "Integrated Services Digital Network (ISDN); Advice of Charge (AOC) supplementary service, Functional capabilities and information flows".
- 5) ITU-T Recommendation E.113 (1993): "Validation procedures for the international telecommunications charge card service".
- 6) CCITT Recommendation E.116 (1992): "The International telecommunication charge card service".
- 7) CCITT Recommendation E.118 (1992): "The international telecommunication charge card".
- 8) ITU-T Recommendation I.232.3 (1993): "User signalling bearer service category".
- 9) EN726-6: "Requirements for IC cards and terminals for telecommunication use - Part 6: Telecommunications features".
- 10) CCITT Recommendation I.411 (1988): "ISDN user-network interfaces - Reference configurations".
- 11) CCITT Recommendation P.10 (1988): "Vocabulary of terms on telephone transmission quality and telephone sets".
- 12) CCITT Recommendation G.701 (1988): "Vocabulary of digital transmission and multiplexing, and pulse code modulation (PCM) terms".
- 13) CCITT Recommendation I.430 (1988): "Basic user-network interface - Layer 1 specification".

History

Document history	
March 1995	First Edition
October 1995	Converted into Adobe Acrobat Portable Document Format (PDF)