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**Integrated Services Digital Network (ISDN);
Primary rate access - safety and protection
Part 2: Interface I_a - safety**

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Contents

Foreword	5
1 Scope	7
2 Normative references	7
3 Definitions and abbreviations	7
3.1 Definitions	7
3.2 Abbreviations	7
4 Reference configurations	8
5 Safety requirements and tests.....	8
5.1 General	8
5.2 Test conditions.....	8
5.3 Touch current.....	8
5.3.1 Equipment without auxiliary interfaces	8
Annex A (normative): Connection of PE conductor for equipment with multiple interfaces	12
History.....	13

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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) in collaboration with members of the Business Telecommunications (BT) and Transmission and Multiplexing (TM) Technical Committees.

This ETS aims to meet the urgent requirements of network operators and equipment manufacturers who are designing equipment to operate with the Integrated Services Digital Network (ISDN) primary rate access interface.

This is the second part of a multi-part ETS which comprises the following:

ETS 300 046: "Integrated Services Digital Network (ISDN); Primary rate access - safety and protection":

ETS 300 046-1 (Part 1): General.

ETS 300 046-2 (Part 2): Interface I_a - safety.

ETS 300 046-3 (Part 3): Interface I_a - protection.

ETS 300 046-4 (Part 4): Interface I_b - safety.

ETS 300 046-5 (Part 5): Interface I_b - protection.

Parts 2 to 5 of this ETS each cover one aspect of a specific equipment interface and are to be used in conjunction with Part 1 [1], which contains references and test circuits that are common to all parts of this ETS.

The corresponding ETS for ISDN basic access is ETS 300 047 ("Integrated Services Digital Network (ISDN); Basic access - safety and protection, Parts 1 to 5").

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1 Scope

See Clause 1 of ETS 300 046-1 [1].

This part of the ETS covers the safety requirements for interface I_a.

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 applies.

EN 41003 [3] and EN 60950 [2] contain Special National Conditions and National A-deviations for some countries. Where these deviations apply to provisions that are referred to in this ETS, they shall apply to equipment, complying with this ETS, intended for use in those countries.

- [1] ETS 300 046-1 (1992): "Integrated Services Digital Network (ISDN); Primary rate access - safety and protection, Part 1: General".
- [2] EN 60950 (1988 - including amendments 1 and 2): "Safety of information technology equipment including electrically operated business machines".
- [3] EN 41003 (1991): "Particular electrical safety requirements for equipment to be connected to telecommunication networks".
- [4] HD 384-5-54 (IEC 364-5-54): "Electrical installations of buildings - Earthing arrangements and protective conductors".
- [5] prHD 384-7-707 S1 (IEC 364-7-707): "Electrical installations of buildings - Earthing requirements for the installation of data processing equipment".

NOTE : For the purposes of this ETS, the latest European equivalents of the IEC version (in particular where modifications are, or have been, taking place) means that the relevant EN/HD applies.

3 Definitions and abbreviations

3.1 Definitions

For the purpose of this part of the ETS, the definitions given in subclause 3.1 of ETS 300 046-1 [1] apply.

However, for the purpose of this part of the ETS the Equipment Under Test (EUT) is a Terminal Equipment (TE).

3.2 Abbreviations

For the purpose of this part of the ETS, the abbreviations given in subclause 3.2 of ETS 300 046-1 [1] apply.

4 Reference configurations

See Clause 4 of ETS 300 046-1 [1].

5 Safety requirements and tests

5.1 General

This Clause contains requirements for aspects of safety associated with connection to the ISDN primary rate access user network interface with which the EUT shall comply. The requirements are based on EN 60950 [2] and EN 41003 [3].

Interface I_a shall comply with the requirements for accessible parts of an Safety Extra Low Voltage (SELV) circuit, however only two methods of separation from excessive voltages are permitted.

These methods are:

- a) double or reinforced insulation according to subclause 2.3.4 of EN 60950 [2]; and
- b) basic insulation plus protective earth screen according to subclause 2.3.5 of EN 60950 [2].

Subclauses 4.4.2 and 4.5 of EN 41003 [3] do not apply to interface I_a .

The transmit and receive pairs of interface I_a are indicated in the figures by "t" and "r" respectively.

The power feeding circuit pair of interface I_a is indicated in the figures by "p".

If there are any Telecommunication Network Voltage (TNV) circuits in the EUT they shall comply with EN 41003 [3] in all respects.

5.2 Test conditions

See Clause 5 of ETS 300 046-1 [1].

In the figures of this part of the ETS, the required surge/test generators, coupling networks and the touch current measuring device are shown in outline. The figure numbers in those outlines refer to the figures in annexes to ETS 300 046-1 [1], as follows:

- Annex C (normative): Coupling networks;
- Annex E (normative): Measuring device for touch current.

5.3 Touch current

The tests shall be carried out under the following conditions:

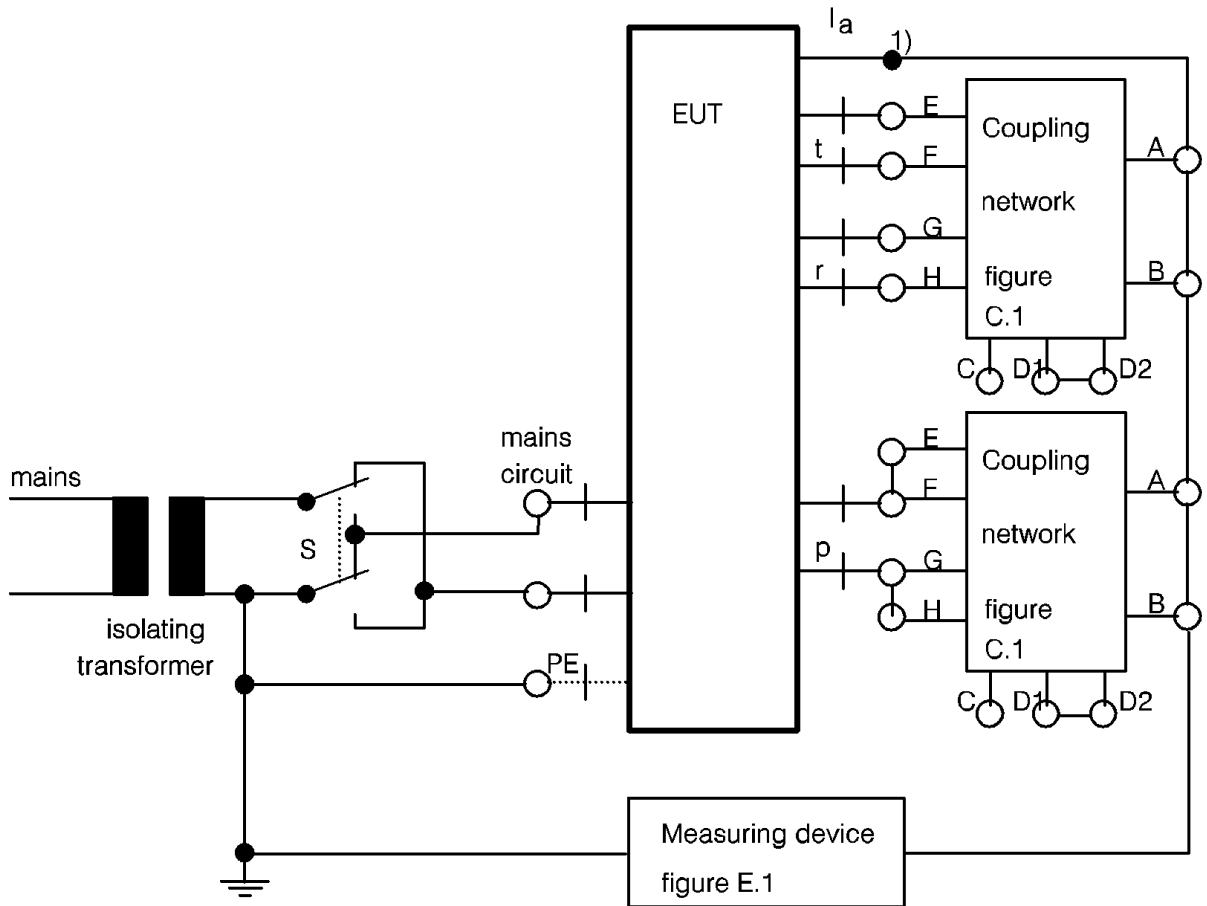
- if connection point 1) is connected to the protective earth conductor it shall not be connected to the measuring device as shown in figures 1 and 2.
- if the power feeding pair "p" is connected to the protective earth conductor it shall not be connected to the coupling network as shown in figures 1 and 2.

5.3.1 Equipment without auxiliary interfaces

Test circuit: figure 1.

Test criterion: the weighted touch current measured across any single interface I_a shall not exceed 0,25 mA.

The switch S shall be operated to find the higher result.



1) connection point for interface cable shield.

Figure 1: Touch current test circuit for equipment without auxiliary interfaces

For the purpose of this subclause, any interfaces I_a other than the one on test shall be treated as auxiliary interfaces.

NOTE: An NT2 is often a complex installation with numerous and varied interfaces. Each interface can carry a touch current of up to 0,25 mA. With multiple interfaces, touch currents can sum up at a common point, such as a common power source or a common connection point for several interface cable shields. The following methods have been identified for avoiding an excessive touch current at any one interface:

- separating all interfaces from each other so that no summing of touch current can occur;
- bonding of common power or shield connection points to earth.

The requirements that follow depend on which method is chosen by the manufacturer.

For test purposes, the manufacturer shall declare which of the following methods shall be used to limit touch current:

- separation of interface I_a from all auxiliary interfaces;
- bonding of common power or shield connection points to an earth potential reference.

All pins, other than earthed pins, of each individual auxiliary interface shall be connected together in a manner appropriate to that interface, and then connected to the current limiting capacitor. Where it would be inappropriate to connect pins directly to each other, they shall be connected to individual capacitors which are in turn connected together; the total capacitance of such capacitors in parallel shall be the required 3,3 nF.

Test circuit: figure 2.

Test circuit switch S1: operated to find the higher result.

Test circuit switch S2: see test criterion.

Test criterion: the weighted touch current I_t measured across any single interface I_a shall be as follows:

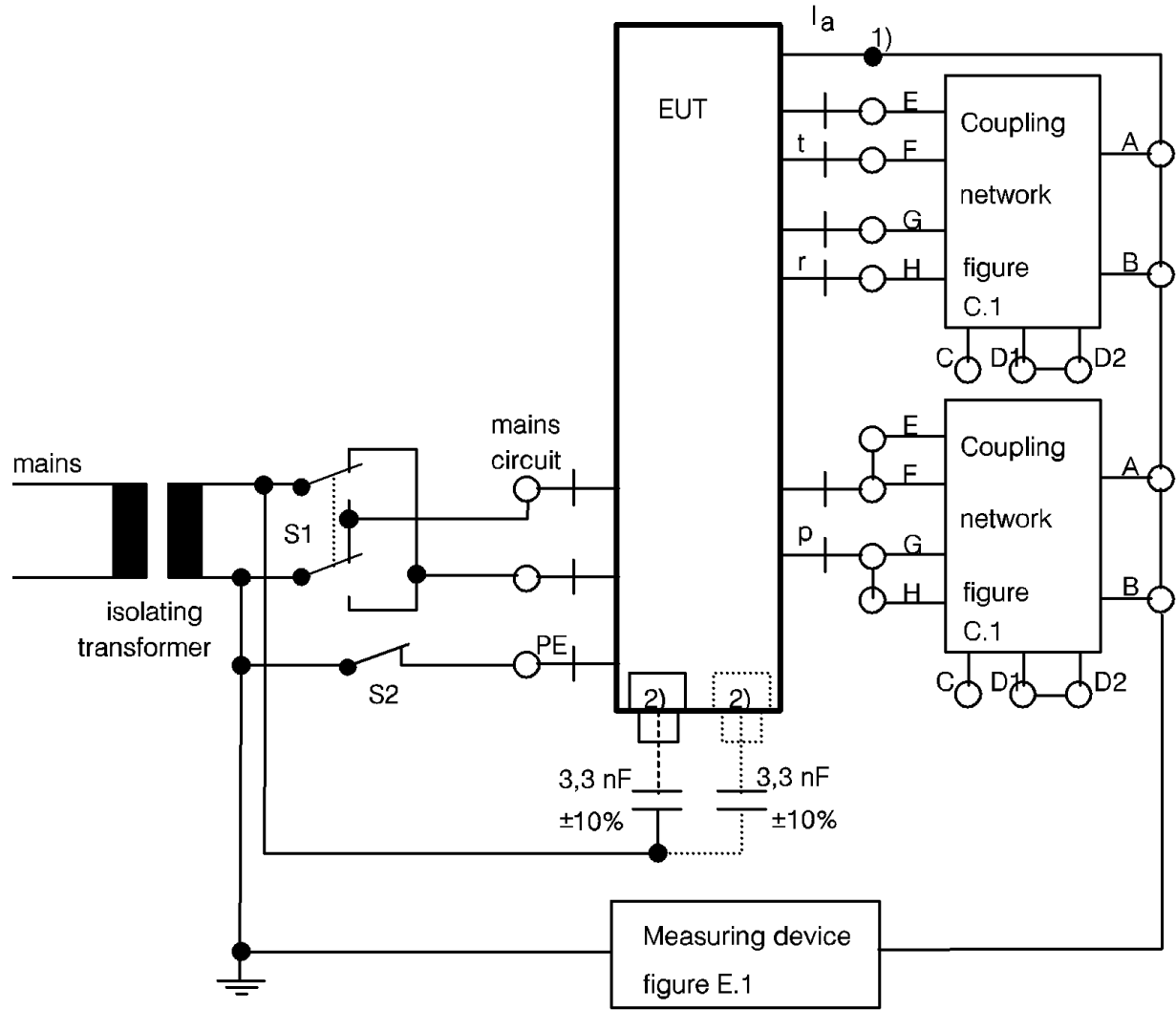
- if "separation" is declared,
 - 0,25 mA with S2 closed;
 - 0,25 mA with S2 open;
- if "bonding" is declared,
 - 0,25 mA with S2 closed;
 - any value with S2 open, but see table 1.

If the equipment is to be permanently earthed in accordance with Annex A, bullet point A.5, of this part of the ETS, the test with S2 open shall not be carried out.

If "bonding" is declared, the manufacturer shall specify in the installation instructions the necessary minimum quality of connection to protective earth, depending on the measured value of I_t (see also Annex A) and according to table 1.

Table 1: Quality of connection to protective earth

$I_{t\text{mA}}$	Minimum quality of the connection to protective earth
$\leq 0,25$	No minimum. See Annex A, bullet point A.2
$> 0,25 \leq 3,5$	In accordance with Annex A, bullet point A.3
$> 0,25 \leq 10$	In accordance with Annex A, bullet point A.4
> 10	In accordance with Annex A, bullet point A.5



- 1) Connection point for interface cable shield.
- 2) Auxiliary interfaces.

Figure 2: Touch current test circuit for equipment having auxiliary interfaces

Annex A (normative): Connection of PE conductor for equipment with multiple interfaces

- A.1 If "bonding" is declared by the manufacturer (see subclause 5.3.2) a minimum quality of connection to protective earth (PE) may be necessary.

Four levels of quality, one of which has to be specified in the manufacturer's installation instructions, are given in A.2 to A.5. Which of the four levels is the minimum level for a particular equipment depends on the value of weighted touch current I_t measured during the tests in subclause 5.3.2 (see table 1). A higher quality of connection than that specified is acceptable.

- A.2 No installation requirements need to be specified for compliance with this ETS. However, protective earthing requirements may apply for other purposes.

- A.3 Connection via the PE conductor of the power supply cord according to EN 60950 [2];

or

fixed connection via a separate PE conductor according to HD 384-5-54 (IEC 364-5-54) [4].

- A.4 Connection via the PE conductor of the power supply cord of pluggable equipment type B or permanently connected equipment as defined in EN 60950 [2];

or

fixed connection via a separate PE conductor according to HD 384-5-54 (IEC 364-5-54) [4].

- A.5 Permanent connection according to EN 60950 [2], HD 384-5-54 (IEC 364-5-54) [4] and prHD 384-7-707 S1 (IEC 364-7-707) [5];

or

fixed connection via a separate PE conductor according to HD 384-5-54 (IEC 364-5-54) [4] and prHD 384-7-707 S1 (IEC 364-7-707) [5].

History

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