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Integrated Services Digital Network (ISDN); Basic access - safety and protection Part 5: Interface I_b - protection

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Contents

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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) basic access interface.

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

ETS 300 047: "Integrated Services Digital Network (ISDN); Basic access - safety and protection".

ETS 300 047-1 (Part 1): General.

ETS 300 047-2 (Part 2): Interface I_a - safety.

ETS 300 047-3 (Part 3): Interface I_a - protection.

ETS 300 047-4 (Part 4): Interface I_b - safety.

ETS 300 047-5 (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 [3], which contains references and test circuits that are common to all parts of this ETS.

The corresponding standard for ISDN primary rate access is ETS 300 046 ("Integrated Services Digital Network (ISDN); Primary rate access - safety and protection, Parts 1 to 5").

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1 Scope

See Clause 1 of ETS 300 047-1 [3].

This part of the ETS covers the protection requirements for interface I_b of NT2.

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 incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 41003 [1] 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] EN 41003 (1991): "Particular electrical safety requirements for equipment to be connected to telecommunication network".

[2] EN 60950 (1988, including amendments 1 and 2): "Safety of information technology equipment including electrically operated business machines".

[3] ETS 300 047-1: "Integrated Services Digital Network (ISDN); Basic access - safety and protection - Part 1: General".

[4] ETS 300 046-4: "Integrated Services Digital Network (ISDN); Primary rate access - safety and protection - Part 4: Interface I_b - safety".

[5] IEC 801-2 (1991): "Electromagnetic compatibility for industrial-process measurement and control equipment - Part 2: Electrostatic discharge requirements".

[6] ETS 300 012 (1992): "Integrated Services Digital Network (ISDN); Basic user-network interface, Layer 1 specification and test principles".

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 300 047-1 [3] apply.

However, for the purposes of this part of the ETS, the Equipment Under Test (EUT) is a Network Termination (NT).

3.2 Abbreviations

For the purpose of this part of the ETS, the abbreviations given in subclause 3.2 of ETS 300 047-1 [3] apply.

4 Reference configuration

See Clause 4 of ETS 300 047-1 [3].

5 Protection requirements and tests

5.1 General

Clause 5 assigns test voltages and currents and specifies test circuits and conditions to which a NT2 shall comply.

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

5.2 Test conditions and circuit configurations

See Clause 5 of ETS 300 047-1 [3].

For the purpose of this part of the ETS, interface I_a, if any, shall be treated as an auxiliary interface (see Clause 5 of ETS 300 047-1 [3]).

5.3 Compliance criteria

See subclause 3.1 of ETS 300 047-1 [3].

5.4 Test generators and networks

In the figures of this part of the ETS, the required surge generators, coupling networks and terminating networks are shown in outline. The figure numbers in those outlines refer to the figures in the annexes to ETS 300 047-1 [3], as follows:

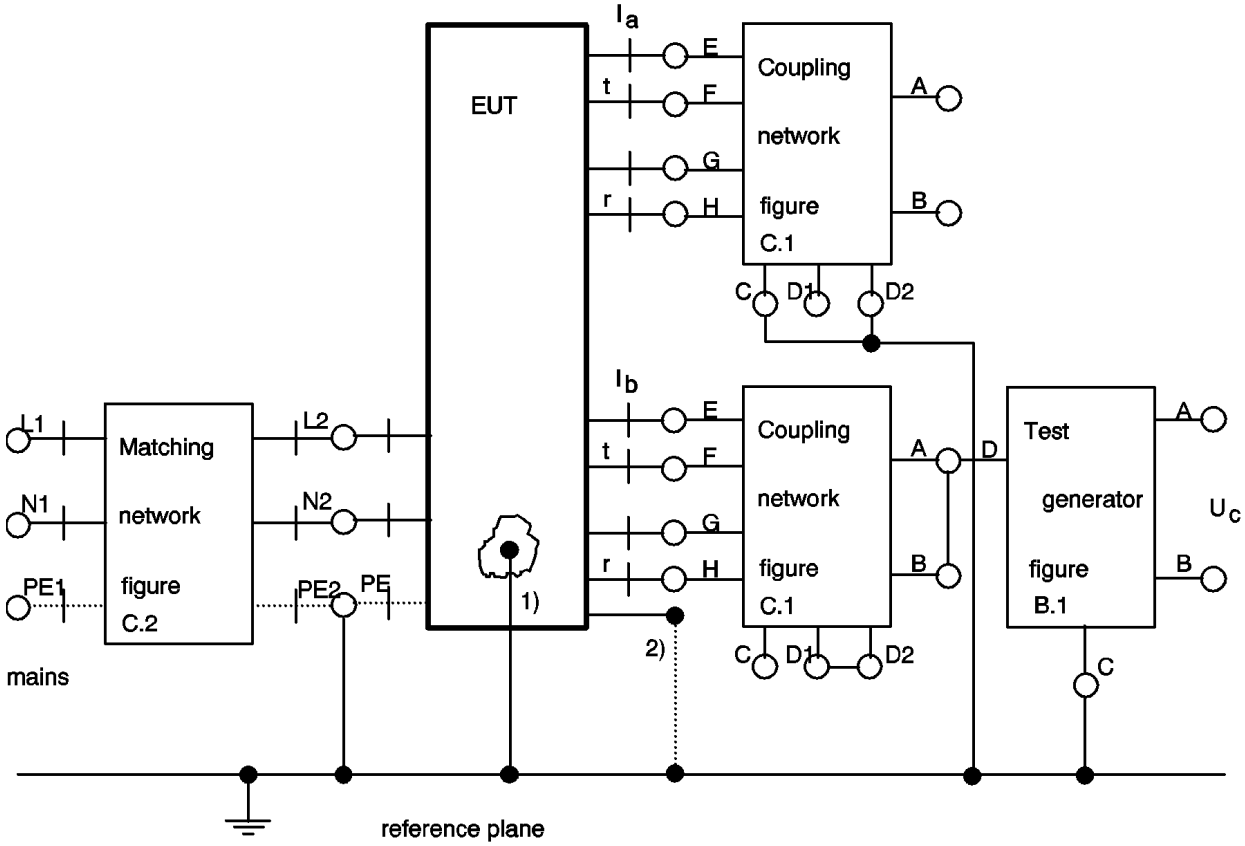
- Annex B (normative): Test generators;
- Annex C (normative): Coupling networks;
- Annex D (normative): Terminating network.

5.5 Overvoltage surge simulation at interface I_b

5.5.1 Common mode test

The test shall be carried out with connection point 2) connected to the reference plane as shown in figure 1. Except where "bonding" is declared by the manufacturer (see subclause 5.3 of ETS 300 046-4 [4]) the test shall be repeated with connection point 2) disconnected from the reference plane.

Test circuit: figure 1.
Maximum test voltage Uc: 1 kV.
Pulse Form: 1,2/50 µs.
Number of pulses: 10, with alternating polarity.
Compliance criterion: A.



1) User-accessible part or metal foil.
2) Connection point for interface cable shield (if any).

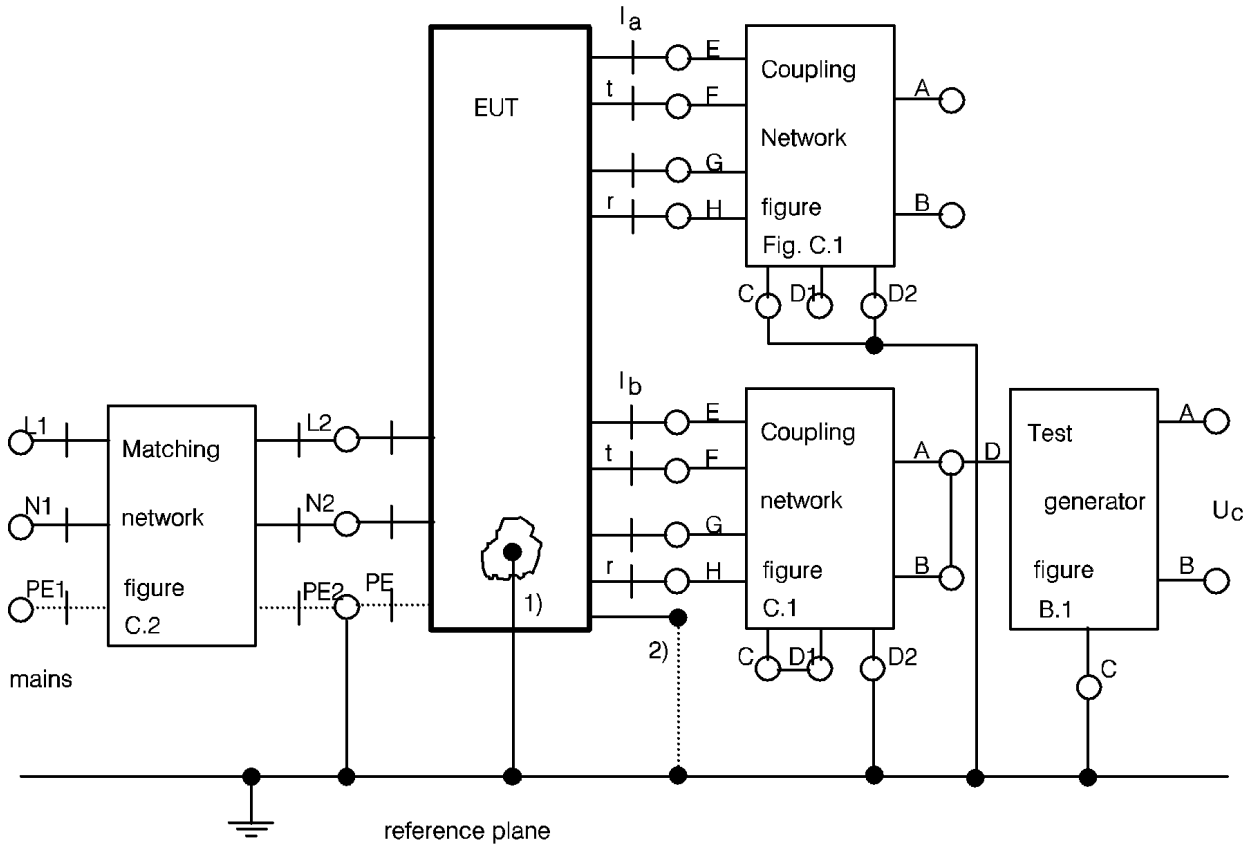
Figure 1: Test circuit for overvoltage simulation; common mode

5.5.2 Transverse mode test between transmit and receive pairs

The test shall be carried out with connection point 2) connected to the reference plane as shown. Except where "bonding" is declared by the manufacturer (see subclause 5.3 of ETS 300 046-4 [4]) the test shall be repeated with connection point 2) disconnected from the reference plane.

Test circuit: figure 2.
Maximum test voltage Uc: 250 V.
Pulse Form: 1,2/50 µs.
Number of pulses: 10, with alternating polarity.
Compliance criterion: A.

The test shall be repeated with "t" and "r" interchanged.



1) User-accessible part or metal foil.
2) Connection point for interface cable shield (if any).

Figure 2: Test circuit for overvoltage simulation; transverse mode between pairs

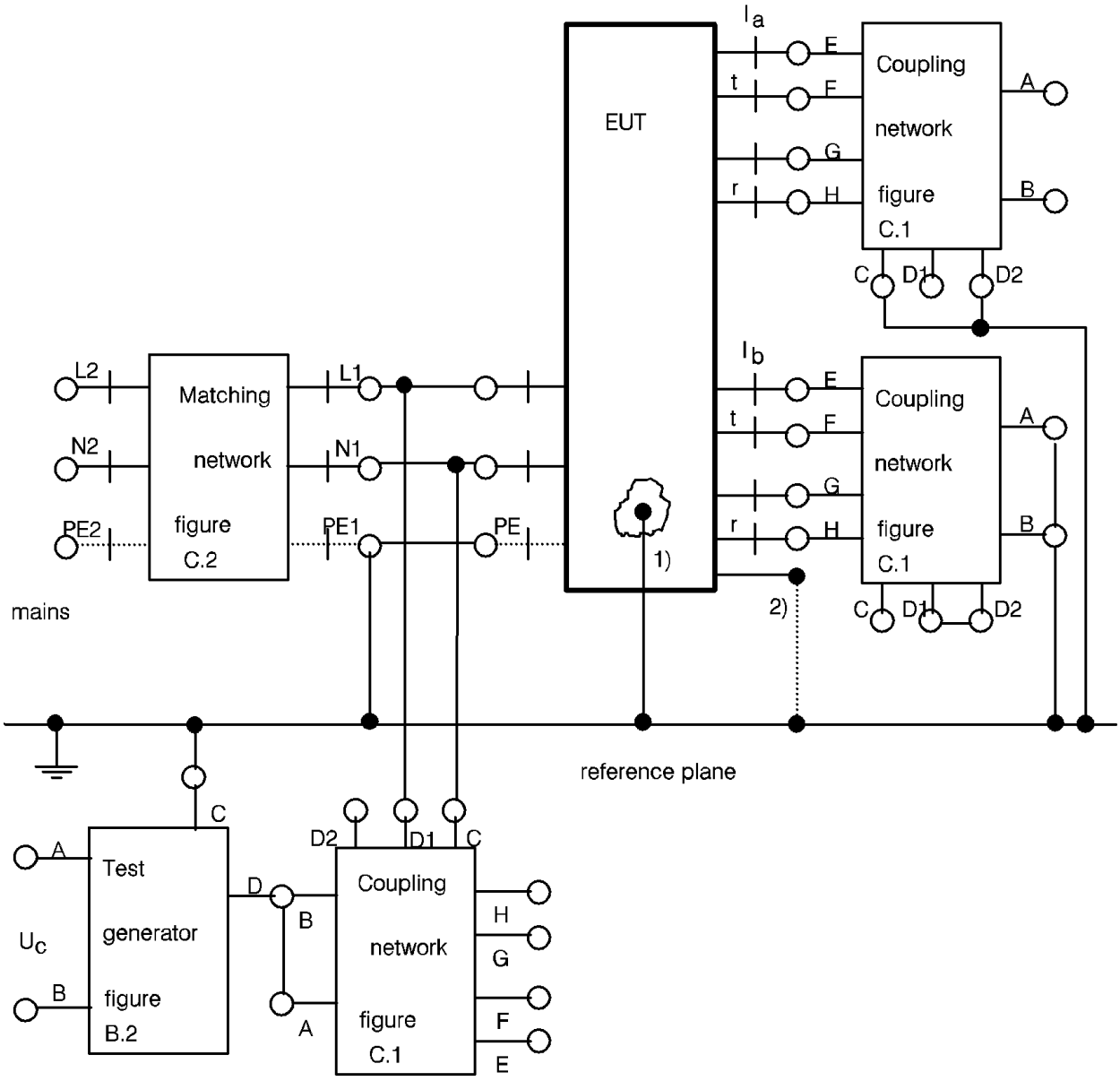
5.6 Mains overvoltage simulation

NOTE: The test conditions and parameters in subclause 5.6 are based on CCITT Recommendation K.22, HD 384 and IEC 664 (see Clause 2 of ETS 300 047-1 [3].

5.6.1 Common mode test

The test shall be carried out with connection point 2) connected to the reference plane as shown. Except where "bonding" is declared by the manufacturer (see subclause 5.3 of ETS 300 046-4 [4]) the test shall be repeated with connection point 2) disconnected from the reference plane.

Test circuit: figure 3.
Maximum test voltage Uc: 2,5 kV.
Pulse form: 10/700 µs.
Number of pulses: 10, with alternating polarity.
Compliance criterion: A.



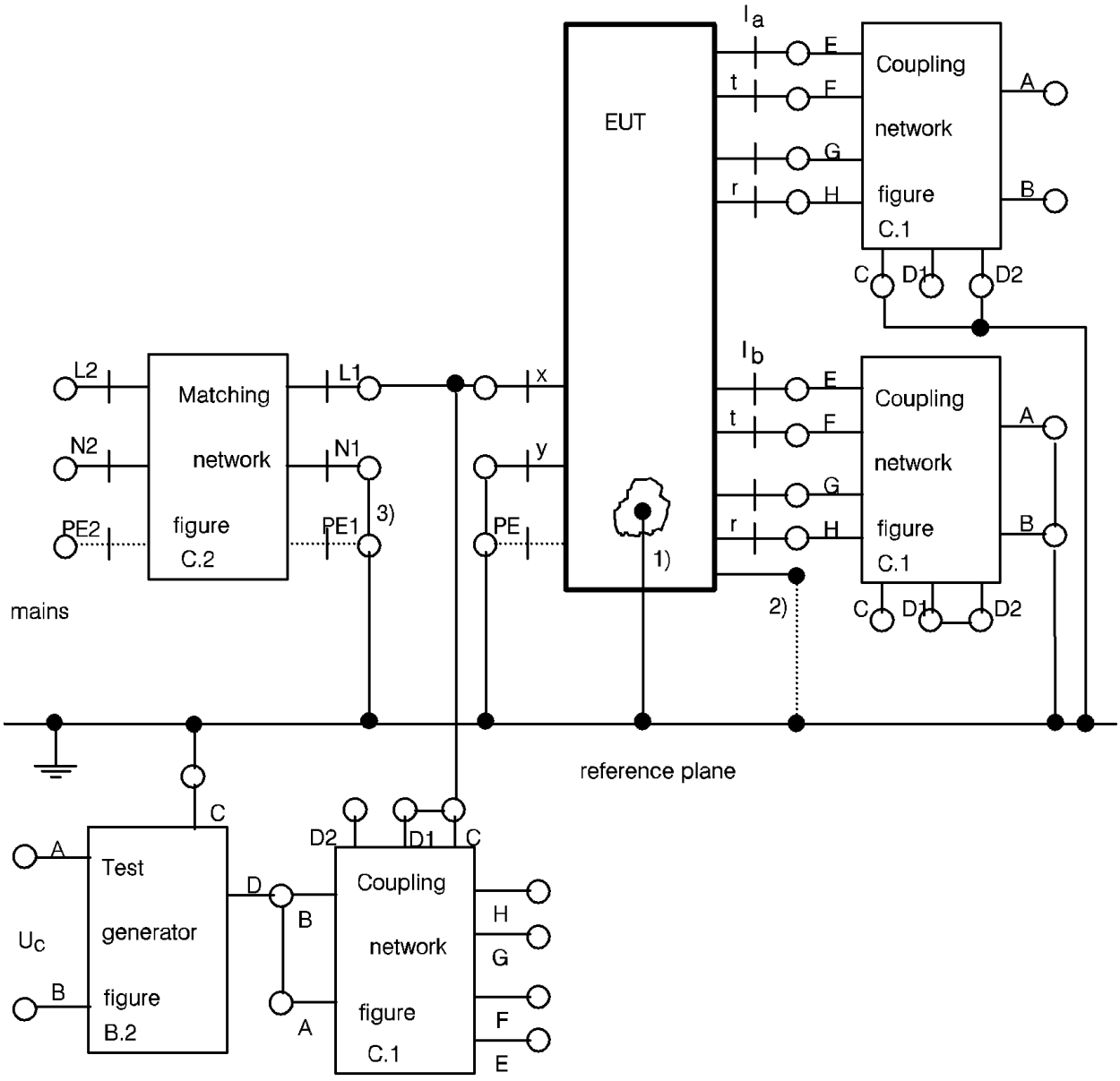
1) User-accessible part or metal foil.
2) Connection point for interface cable shield (if any).

Figure 3: Test circuit for mains overvoltage simulation; common mode

5.6.2 Transverse mode test

The test shall be carried out with connection point 2) connected to the reference plane as shown. Except where "bonding" is declared by the manufacturer (see subclause 5.3 of ETS 300 046-4 [4]) the test shall be repeated with connection point 2) disconnected from the reference plane.

Test circuit: figure 4.
Maximum test voltage: 2,5 kV.
Pulse form: 10/700 µs.
Number of pulses: 10, with alternating polarity.
Compliance criteria: A.



The test shall be repeated with x and y interchanged.

1) User-accessible part or metal foil.
2) Connection point for interface cable shield (if any).
3) See Clause 5 of ETS 300 047-1 [3].

Figure 4: Test circuit for mains overvoltage simulation; transverse mode

5.7 Impulse transfer

Two mechanisms for overvoltage transfer are measured by the tests in subclause 5.7:

- transfer of overvoltage from one interface (e.g. mains or auxiliary interface) to interface I_b;
- conversion of common mode voltage at interface I_b to transverse mode at the same interface.

5.7.1 Impulse transfer from mains (common mode and transverse mode)

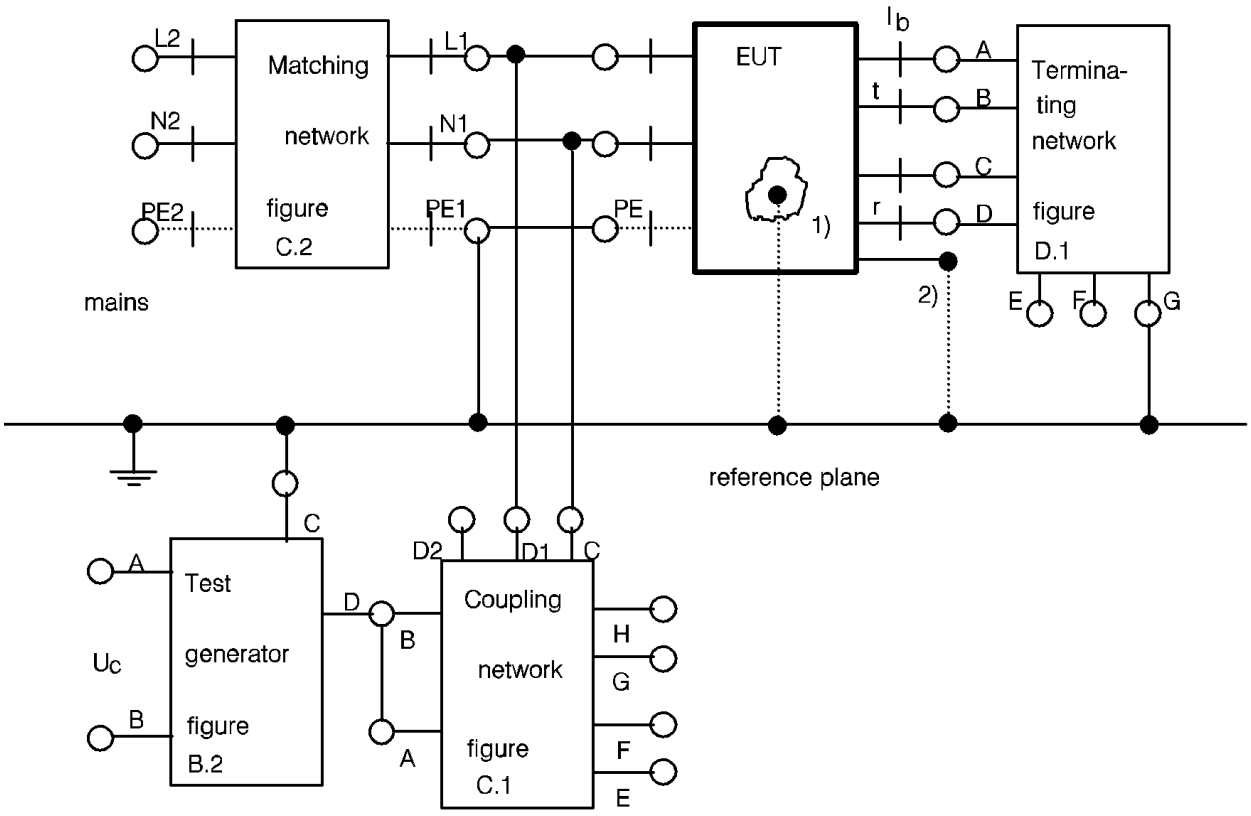
Except where "bonding" is declared by the manufacturer (see subclause 5.3 of ETS 300 047-4) the test shall be carried out with no connection of connection point 1) to the reference plane.

The test shall be carried out with connection point 2) connected to the reference plane as shown. Except where "bonding" is declared by the manufacturer (see subclause 5.3 of ETS 300 047-4) the test shall be repeated with connection point 2) disconnected from the reference plane.

For the test in transverse mode (figure 6) the tests shall be repeated with x and y interchanged.

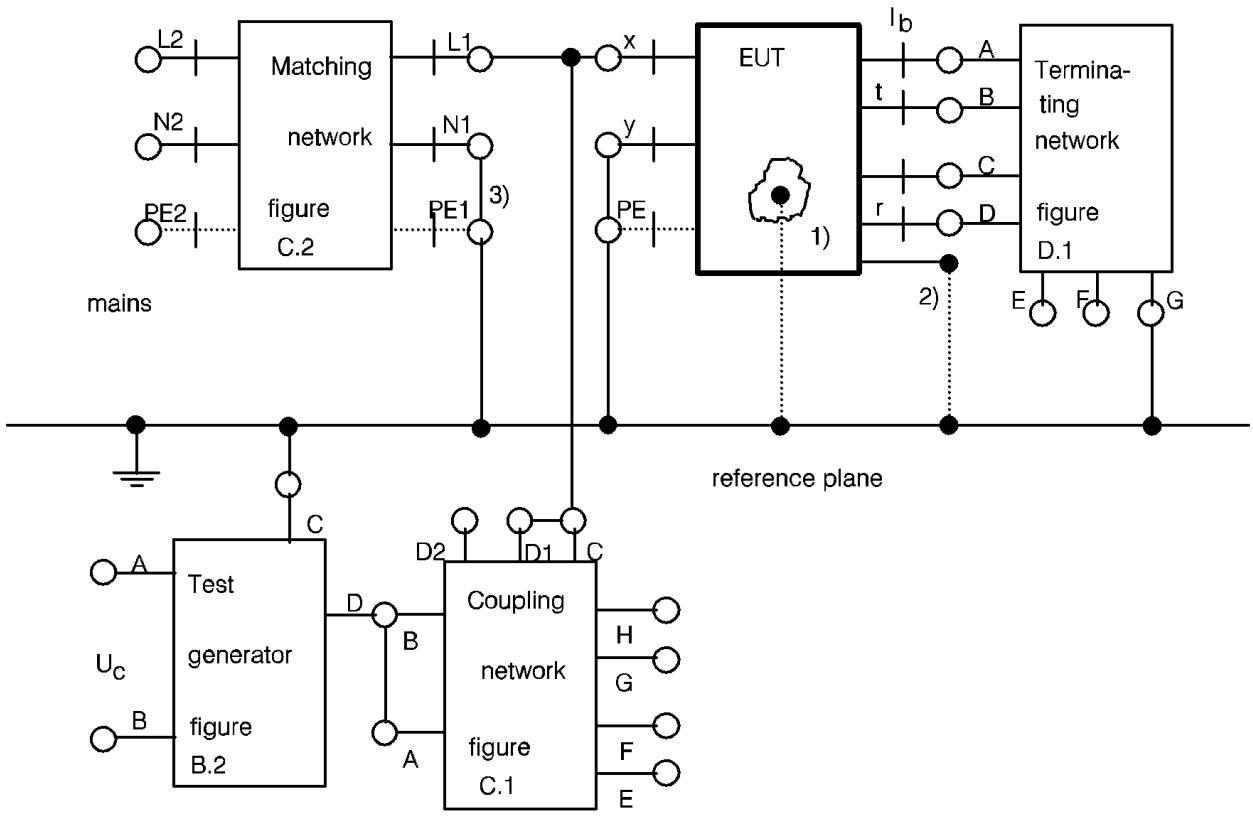
Test circuit: figures 5 and 6.
Test voltage Uc: 2,5 kV.
Pulse form: 10/700 µs.
Number of applications: two; one for each polarity.
Compliance criteria: at the terminating network, figure D.1.
the voltage between:

- E and G shall not exceed 1 kV peak;
- F and G shall not exceed 1 kV peak;
- E and F shall not exceed 250 V peak.



1) User-accessible part or metal foil.
2) Connection point for interface cable shield (if any).

Figure 5: Test circuit for impulse transfer from mains; common mode



1) User-accessible part or metal foil.
2) Connection point for interface cable shield (if any).
3) See Clause 5 of ETS 300 047-1 [3].

Figure 6: Test circuit for impulse transfer from mains; transverse mode

5.7.2 Impulse transfer from auxiliary interfaces

If "bonding" is declared by the manufacturer (see subclause 5.3 of ETS 300 047-4) this test is unnecessary and shall not be carried out.

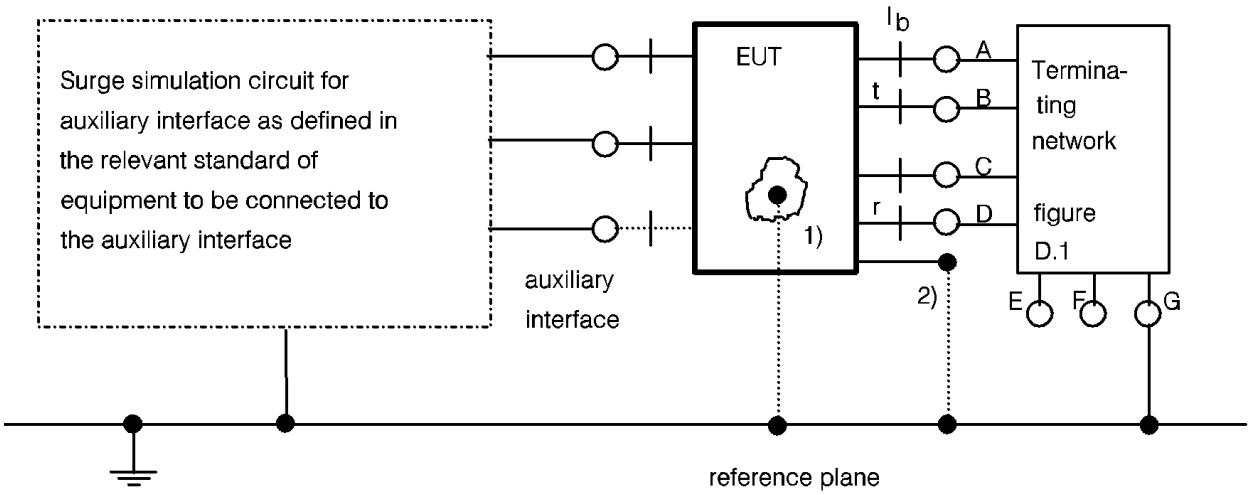
For the purpose of this test, any interfaces I_b other than the one under test shall be treated as auxiliary interfaces.

The test shall be applied to each type of construction of auxiliary interface, but only where the interface has a specified maximum withstand test voltage greater than 250 V in common or transverse mode.

The test shall be carried out with connection point 2) connected to the reference plane as shown and repeated with connection point 2) disconnected from the reference plane.

Test circuit:	figure 7.
Test voltage Uc:	as specified in relevant standard.
Pulse form:	as specified in relevant standard.
Number of applications:	two; one for each polarity.
Compliance criteria:	at the terminating network, figure D.1.
	the voltage between:
	- E and G shall not exceed 1 kV peak;
	- F and G shall not exceed 1 kV peak;
	- E and F shall not exceed 250 V peak.

In the absence of a relevant standard, Uc and the pulse form shall be determined and declared by the manufacturer of the EUT. Guidance can be found in ETR 012 ("Terminal Equipment (TE); Safety categories and protection levels at various interfaces for telecommunication equipment in customer premises").



1) User-accessible part or metal foil.
2) Connection point for interface cable shield (if any).

Figure 7: Test circuit for impulse transfer from auxiliary interface

5.7.3 Conversion of common mode voltage to transverse mode

The test shall be carried out with connection point 2) connected to the reference plane as shown. Except where "bonding" is declared by the manufacturer (see subclause 5.3 of ETS 300 046-2) the test shall be repeated with connection point 2) disconnected from the reference plane.

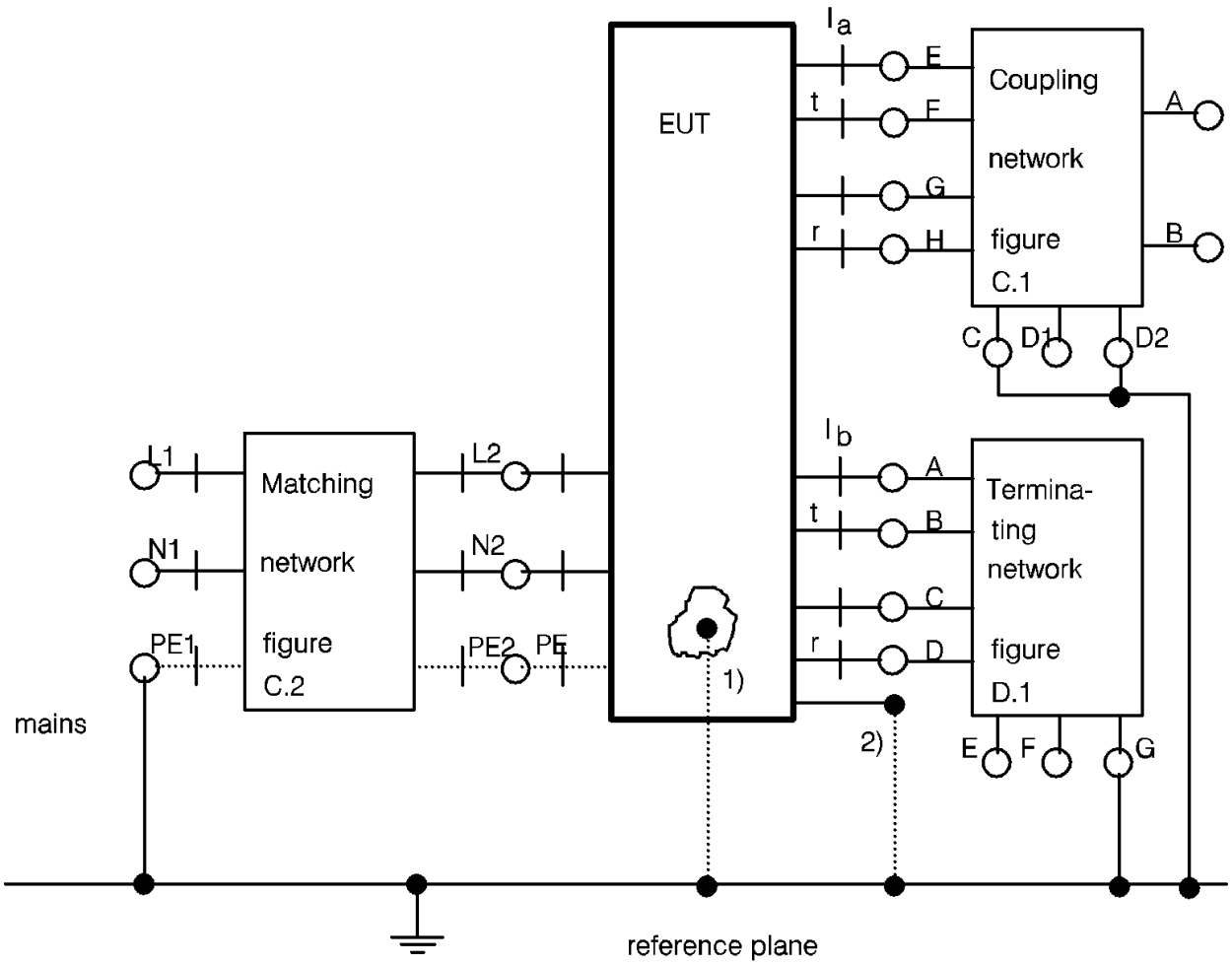
Test circuit:	figure 1.
Test voltage:	1 kV peak.
Pulse form:	1,2/50 µs.
Number of pulses:	two; one for each polarity.
Compliance criterion:	at the coupling network, figure C.1, the voltage between C and D1 + D2, disregarding the dc component, shall not exceed 250 V peak.

5.8 Electrostatic Discharge (ESD)

For this test IEC 801-2 [5] shall be applied. Severity level 2 shall be used for contact discharge (4 kV charging voltage) and severity level 4 are used for air discharge (15 kV charging voltage). Except where "bonding" is declared by the manufacturer (see 5.3 of ETS 300 047-4) the test shall be carried out with no connection of connection point 1) to the reference plane.

The test shall be carried out with connection point 2) connected to the reference plane as shown. Except where "bonding" is declared by the manufacturer (see subclause 5.3 of ETS 300 046-2) the test shall be repeated with connection point 2) disconnected from the reference plane.

Test circuit: figure 8.
Compliance criterion: A.



1) User-accessible part or metal foil.
2) Connection point for interface cable shield (if any).

Figure 8: ESD test circuit

5.9 Miswiring resistibility test.

Short circuit and overload protection for power sources are specified in ETS 300 012 [6].

The following test shall be applied to simulate direct contact from the mains to interface I_b.

The live conductor of the test generator shall be connected to the receive pair and the transmit pair in turn.

At the NT2 one lead of each other type of interface shall be connected to the reference plane, as shown.

Test circuit: figure 9.
Test voltage: 230 V r.m.s. 50 Hz.
Test duration: 15 minutes.
Compliance criterion: B.

1) User-accessible part or metal foil.

Figure 9: Test circuit for direct contact from mains to interface

Annex A (normative): Enhanced requirements for "extra-strength equipment"

A.1 The following additional test shall be carried out.

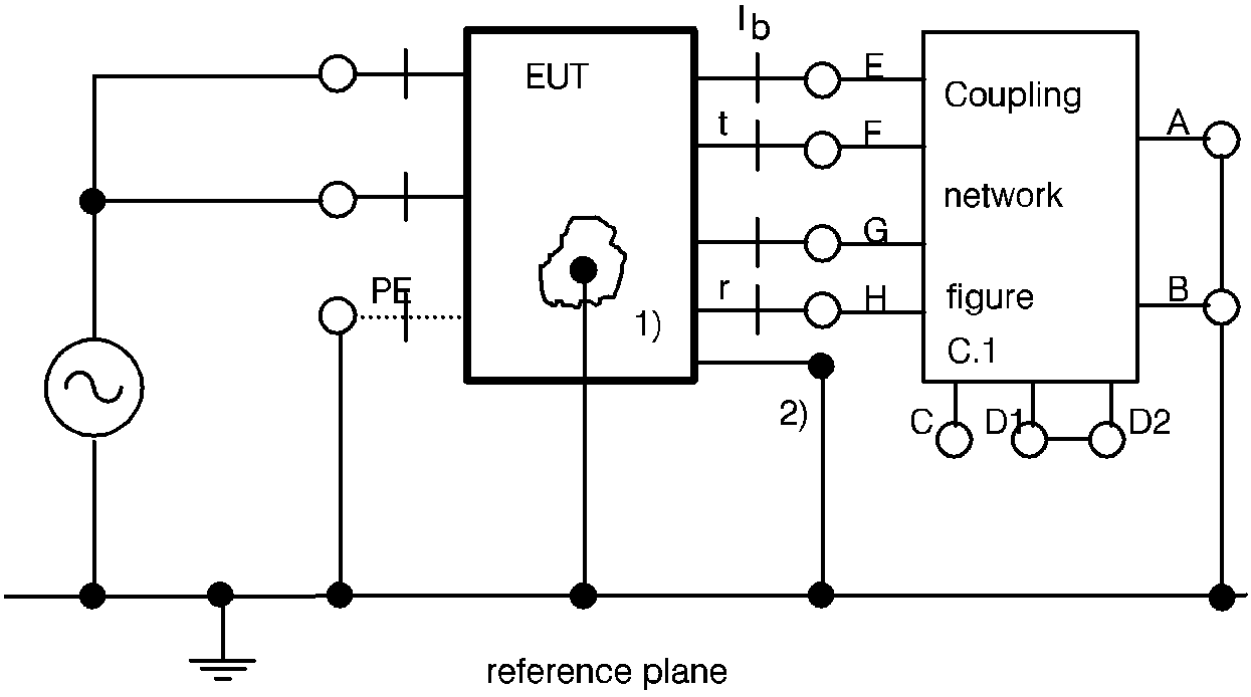
Test circuit: figure A.1.
Test voltage: 6 kV r.m.s., 50Hz.
Duration: 1 s.
Compliance criterion: A.

A.2 For tests according to subclause 5.6.1 the following parameters apply:

Test circuit: figure 5.
Maximum test voltage Uc: 10 kV.
Pulse form: 10/700 µs.
Number of pulses: 10, with alternating polarity.
Compliance criterion: A.

A.3 For tests according to subclause 5.5.1 the following parameters apply:

Test circuits: figures 1 and 2.
Maximum test voltage Uc: 2,5 kV.
Pulse form: 1,2/50 µs.
Number of pulses: 10, with alternating polarity.
Compliance criterion: A.



1) User-accessible part or metal foil.
2) Connection point for interface cable shield (if any).

Figure A.1: 50 Hz test circuit for extra-strength equipment

History

Document history	
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