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Télécommunication

NET 1

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**Approval requirements for data terminal equipment
to connect to circuit switched public
data networks and leased circuits
using CCITT Recommendation X.21 interface**

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NORMES EUROPEENNES DE TELECOMMUNICATION

It is recognised, in the field of telecommunications within Europe, that there is a need to create common European standards for telecommunications equipment.

Such harmonisation would among other things facilitate cooperation between telecommunications equipment manufacturers and public telecommunications network operators, create a marketplace which naturally transcends that of national frontiers, enhance the efficiency of business and other communication across Europe to bring economic benefits, and help translate the vision of a united Europe into a working reality.

In 1985 an initiative by the Conference of European Posts and Telecommunications Administrations (CEPT) resulted in the drafting of a Memorandum of Understanding (MoU) agreeing to the mutual recognition of results of tests of conformity to a technical specification which would be known as a Norme Européenne de Télécommunication (or NET). A list of signatories to the MoU is shown at the end of this introductory text. The signatories represent telecommunications Administrations in most countries in Western Europe, including EEC and EFTA administrations.

In 1991, in view of the transition from the Directive 86/361/EEC (on the initial stage of the mutual recognition of type approval for telecommunications terminal equipment) to the Directive 91/263/EEC (on the approximation of the laws of the Member States concerning telecommunications terminal equipment, including the mutual recognition of their conformity) a new Memorandum of Understanding on Common Technical Regulations (CTRs) for telecommunications terminal equipment was agreed by the same signatories of the 1985 MoU. The 1991 MoU also contains provisions for the continuation of the mutual recognition of tests results against NETs.

1 NETs

1.1 Guiding principles under which a NET is written are the need to ensure essential requirements are met. These include:

- user safety insofar as this requirement is not covered by other legal instruments (e.g. Directive 73/23/EEC)
- safety of employees of public telecommunications network operators insofar as this requirement is not covered by other legal instruments (e.g. Directive 73/23/EEC)
- protection of public telecommunications networks from harm
- interworking of terminal equipment, in justified cases

1.2 Each NET constitutes part of a series of NETs prepared in response to the MoU.

1.3 A NET details the requirements, and a specification of interface tests for conformance to those requirements, which a defined type of telecommunication terminal equipment is required to satisfy in order to obtain authorisation for connection of the equipment to a defined European telecommunications network. The NET also includes, where appropriate, requirements made necessary in a given State by historical network peculiarities.

1.4 The existence of a NET will make it possible for an accredited laboratory in a country whose Administration has signed the MoU, to carry out tests, specified in the NET, on terminal equipment submitted to it, and to issue a test report. On the basis of the report, a competent body may then issue a certificate of conformity to the NET. There may of course be cases where the laboratory itself is the competent certification authority. This certificate is then recognised as valid in all the other signatory countries, avoiding the need for the equipment to have to undergo the same tests over again each time approval is applied for in any of those countries.

1.5 The common reference point which a NET represents thus offers the opportunity of substantially reducing the complexity, length and cost of approval formalities. The operators of public networks are required to make reference to relevant NETs in public supply contracts. Manufacturers are thereby enabled to compete on a more equal technical basis in the supply of terminal equipment covered by NETs.

2 Types of NET

The majority of NETs falls into one of the two categories: access NETs and terminal NETs.

(a) Access NET

Details of the technical characteristics (electrical, mechanical and access control protocol), to be offered by terminal equipment at the interface to a specific public telecommunications network are covered in an "access NET".

The objective of an access NET is to ensure no disturbance occurs to the network and to ensure interworking between network and terminal equipment so that calls can be routed successfully through the network (but without any guarantee of terminal to terminal operation). Indeed, since an access NET may have to serve a number of terminal NETs and applications which have not even been envisaged at present, it is important for the content not to include anything which is particular to a specific terminal or otherwise inhibiting to new developments.

(b) Terminal NET

The objective of a terminal NET is to ensure the end-to-end compatibility of a defined telecommunication service. The terminal NET should include any requirements which must be added to the corresponding access NET(s) to ensure end-to-end communication.

3 Date of Application

The date of application of a NET is that date at which the NET is recognised as being applicable, in the signatory Administrations, for the purposes of type approval.

4 Transition Period

4.1 The transition period commences at the date of application. The transition period is a period of flexibility during which there will be coexistence between the NET and any national requirements which relate to the Scope.

After the expiry of the transition period the only applicable standard within the Scope for type approval purposes will be that of the particular NET.

The end of the transition period is fixed by TRAC as an objective for all signatory countries of the MoU. In some cases, however, for example when a new network has to be set up, all network operators may not be in a position to meet the objective. In such cases, the end of the transition period will be a date which is individual to the given country and Administrations will publish the projected date by which the end of the transition period can be achieved.

4.2 The following notes are offered as guidance on conformance testing of telecommunications equipment during the transition period:

During the transition period, new telecommunications equipment offered by manufacturers under the Scope of this NET may be tested at a certified laboratory located within the signatory countries, either under this NET or under the existing national requirements, at the choice of the manufacturer. Testing under the NET rather than under the old requirements might offer the manufacturer the opportunity of a larger marketplace in which to sell the equipment.

The transition period is also an opportunity for the public network operators to update their network. However, a national approval authority would have the facility of refusing the approval of terminal equipment, for which a certificate of conformance to a NET had been issued, if the network were not yet compatible with the terminal equipment to be connected.

4.3 The following note is offered as guidance on the supply and connection of telecommunications equipment that has already been approved either before application of this NET or during the transition period.

After the application date of this NET, that is, during and after the transition period, the supply and connection of equipment already approved to earlier standards may continue unless the national authority terminates the validity of approvals to earlier standards for whatever reason.

Figure 1 is a diagrammatic representation of the above points.

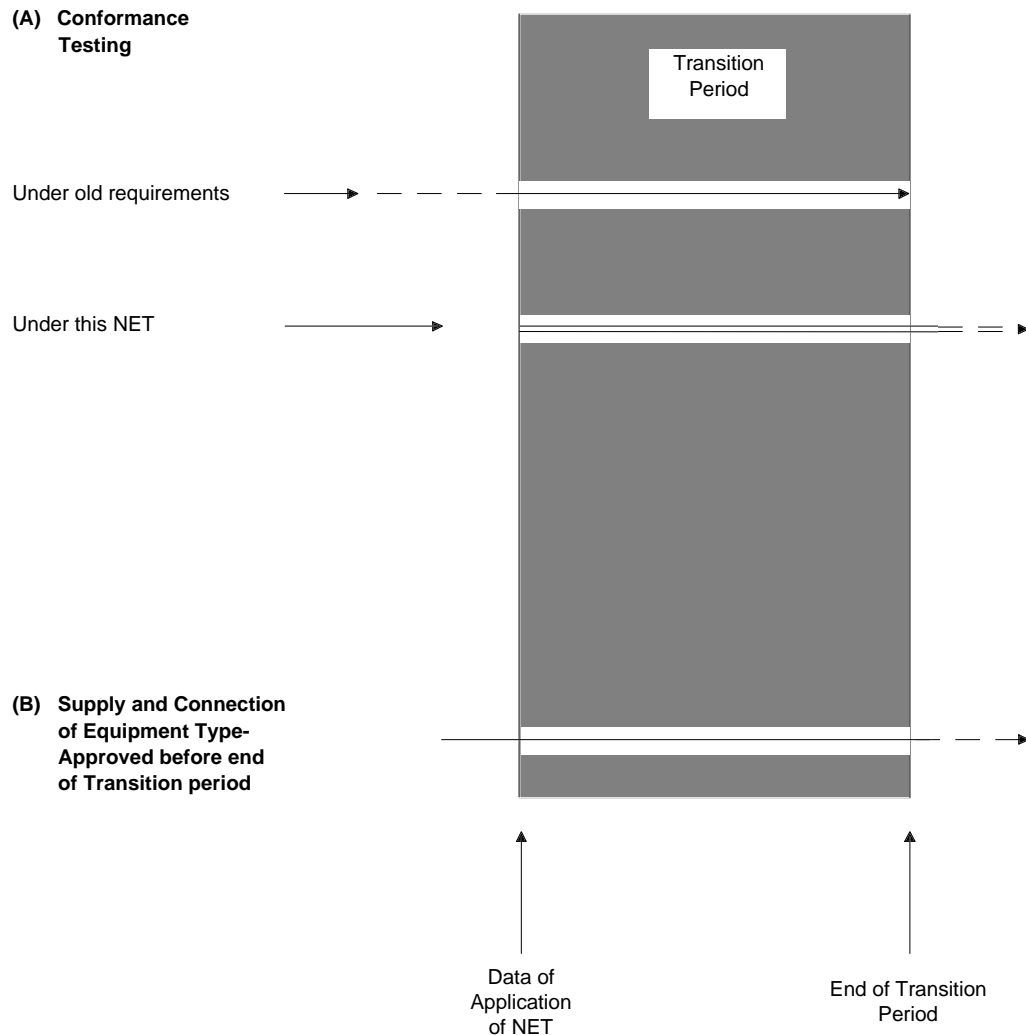


Figure 1

5 Approval Procedures

Details of national type approval procedures are not contained within NETs, but are decided by national Administrations.

6 Requirements to be satisfied

The scope statement defines which types of equipment must meet the requirements of each NET. In addition, equipment may also have to satisfy the requirements in other NETs (as defined in their scope statements) or, in the absence of harmonised NETs, one or more published national standards. In the absence of any requirements in other NETs or in published national standards, no additional tests may be sought by any approval authority in the countries whose Administration has signed the MoU.

7 Legal basis of this introductory text

This introductory text is provided for guidance, and to aid interpretation. The legal basis varies from country to country. This NET must be seen in the context of the 1985 MoU and of the 1991 MoU.

8 Signatories of the MOU

Austria	Italy
Belgium	Luxembourg
Bulgaria	Netherlands
Denmark	Norway
Finland	Portugal
France	Spain
F.R. Germany	Sweden
Greece	Switzerland
Iceland	United Kingdom
Ireland	

9 Amendments to a NET

There may in the future be a need for amendments to a NET. Any amendments to a NET, or suspension or withdrawal of a NET, will be decided by the Technical Recommendations Application Committee (TRAC) and notified through appropriate channels including publication in the EC Official Journal.

Errors detected within the text of a NET, or difficulties experienced with the application of a NET, should be reported to the following address:

The Director,
Office of the Secretariat,
European Telecommunications Standards Institute,
BP 52,
F - 06569 Valbonne Cedex

The comments will be considered and acted upon by TRAC under an approved modifications procedure. Public consultation will take place in respect of all but the most urgent modifications to this NET.

10 This NET (NET 1)

10.1 Adoption

The content of NET 1 was adopted by a meeting of the Technical Recommendations Application Committee (TRAC), on the basis of a CEPT Recommendation, on the 9th March 1988 in Cambridge, United Kingdom. This edition (2nd edition) includes all amendments adopted by TRAC since that date.

10.2 Scope

This NET (NET 1) details the requirements, and a specification of the interface tests for conformance to those requirements, of DTEs employing CCITT X.21 interfaces to circuit switched public data networks. The legal definition of the scope of this NET is provided in the section entitled "Scope" in the body of the NET.

10.3 Date of Application

This NET applies from 1 July 1988 within those States represented in the list of Signatories, subject to the Transition Period.

10.4 Transition Period for this NET

This NET has been subject to a transition period of two years from the date of application, which expired on 30 June 1990. Thus, the only applicable standard for type approval purposes within the Scope is this NET.

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1 Scope

This NET contains requirements for the type approval of data terminal equipment employing CCITT Recommendation X.21 [1] interface to circuit switched public data networks and leased circuits. The requirements are intended to ensure that the service available to other users of public telecommunications systems is not interfered with, nor that any public system will be adversely affected. Safety requirements are included for protection of personnel operating the public telecommunications systems.

This NET is applicable only if the relevant user classes of service are being provided by the Administration concerned. It does not impose any obligation on Administrations to provide any particular user class of service.

Annexes (and their Appendices) to this specification are an integral part of this specification.

1.1 Although the title and scope of the NET appear to limit the application to cover only data terminal equipments, such equipment may cover applications other than data (for example, voice in Italy, voice and video in France, and public telephony service in U.K). Similarly, the apparent limitation to cover access only to public data networks does not preclude access to digital networks supporting both data and telephony services, as in the U.K.

1.2 The application of this scope Clause is limited by statements in Clause 6. It is the intention to consider optional features and optional facilities for inclusion in a future issue of this NET. In the meantime, where a network service includes such optional elements and a terminal equipment is designed to make use of them, published national requirements may apply (and may require additional tests).

1.3 The implications, if any, of the use of terminal adaptors to provide the CCITT Recommendation X.21 [1] service interface has not been considered in the drafting of this NET.

2 References

- [1] CCITT Recommendation X.21 (1984): "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for synchronous operation on public data networks".
- [2] CCITT Recommendation V.10 (1984): "Electrical characteristics for unbalanced double-current interchange circuits for general use with integrated circuit equipment in the field of data communications".
- [3] CCITT Recommendation V.11 (1984): "Electrical characteristics for balanced double-current interchange circuits for general use with integrated circuit equipment in the field of data communications".
- [4] CCITT Recommendation X.1 (1984): "International user classes of service in public data networks and integrated services digital networks (ISDNs)".
- [5] CCITT Recommendation X.26 (1984): "Electrical characteristics for unbalanced double-current interchange circuits for general use with integrated circuit equipment in the field of data communications".
- [6] CCITT Recommendation X.27 (1984): "Electrical characteristics for balanced double-current interchange circuits for general use with integrated circuit equipment in the field of data communications".
- [7] CEPT Recommendation T/CD 01-12 (1983): "Specification of engineering requirements for 3 types of Plug-in DCE operating with a user data signalling rate of 2400 bit/s".
- [8] CEPT Recommendation T/CD 01-14 (1983): "Specification of equipment practice for data transmission equipment".
- [9] ISO 3166 (1981): "Codes for the representation of names of countries".

- [10] EN 41003 (1991): "Particular electrical safety requirements for equipment to be connected to a telecommunication network".
- [11] EN 60950 (1988): "Safety of information technology equipment, including electrically operated business machines".

NOTE: Where any of the above references any other standard or Recommendation, the applicable version of that standard or Recommendation is the one current at the date of issue given above.

3 Abbreviations

ATL	Accredited Test Laboratory
CSP	Call progress signal
CSPDN	Circuit Switched Public Data Network
CSS	Circuit Switched Service
DCE	Data Circuit Terminating Equipment
DTE	Data Terminal Equipment
LCS	Leased Circuit Service
n/a	not applicable
PTP	Point-to-Point

4 Definitions

The definitions are as given in the CCITT series of Recommendations.

5 General Requirements

5.1 Procedures

The procedures for having a DTE approved for connection to CSPDN and leased circuits require that conformance of a typical example of the DTE to a set of requirements is demonstrated.

5.2 Safety Requirements

The equipment shall comply with subclause 4.1 of EN 41003 [10]. The X.21 [X.25] DTE-DCE interface circuitry shall be as defined and specified in EN 60950 [11] for accessible parts of Safety Extra Low Voltage (SELV) circuits. Subclauses 4.4.2 and 4.5 of EN 41003 [10] shall not apply to this interface (for information see ETR 012).

If there are any Telecommunication Network Voltage (TNV) circuits in the equipment, they shall be as defined and specified in EN 41003 [10].

During testing, all modes of operation that might affect the result of a test shall be simulated.

5.3 Electro magnetic compatibility (EMC) Requirements

Until such time as an appropriate European EMC document is agreed to be fully appropriate for CCITT Recommendation X.21 [1] attachment and is ratified, the national EMC requirements of the country in which permission to connect the DTE is sought shall apply. The source of national information may be found in the CEPT Yearbook on information on certification, approval and testing laboratories for Telecommunications Terminal Equipment.

5.4 Testing Conditions

5.4.1 Environment for tests

All tests shall be performed at:

- an ambient temperature in the range 15°C to 35°C;
- a relative humidity in the range 25% to 75%;
- an air pressure in range 86 kPa to 106 kPa,

except that tests shall not be performed outside the operating limits for the DTE as stated by the applicant.

5.4.2 Power Supply Limitations

For apparatus that is directly powered from the mains supply all tests shall be carried out within $\pm 5\%$ of the normal operating voltage.

If apparatus is powered by other means and those means are not supplied as part of apparatus, e.g.: batteries, stabilized a.c. supplies, d.c., etc., all tests shall be carried out within the power supply limit declared by the supplier. If the power supply is a.c. the tests shall be conducted within $\pm 4\%$ of the stated frequency as declared by the supplier.

5.4.3 Test Equipment Requirements

Unless otherwise specified, test equipment used to measure voltage shall have a minimum resistance of 5 Mohm. Current measurements shall be made using a current measuring device of resistance no greater than 1 ohm.

5.4.4 Accuracy of test measurements

Unless otherwise specified, all voltage current and resistance measurements specified in the tests shall be made with a tolerance of $\pm 1\%$.

5.4.5 Tolerances on test components

Unless otherwise specified, values assigned to test components shall be within $\pm 1\%$ of nominal value. All resistors specified shall be non-reactive.

6 Network Interface Requirements

The requirements are defined as the minimum set of requirements derived from CCITT Recommendation X.21 [1] in accordance with table 1 (NET 1):

- A) For the specific uses of CCITT Recommendation X.21 [1] shown in Table 1 (NET 1). These include circuit switched service and leased circuits for point-to-point connection for the user classes of services defined in CCITT Recommendation X.1 [4], namely, user classes 3 to 7 and 30. However, not all applicable user classes and services are available in all countries. Multipoint service is not included in the minimum set.
- B) Not including optional features defined in CCITT Recommendation X.21 [1] unless shown otherwise in table 1 (NET 1).

These requirements are as defined in CCITT Recommendation X.21 [1]. Additional information applicable to the stated minimum requirements is given in table 1 (NET 1) in the form of notes referred to in columns 2) and 3) against specified paragraph in X.21 [1]. National requirements applicable to the minimum set as indicated in table 1 (NET 1), column 4) are contained in Annex A.

All other optional features and optional facilities (not included in the minimum set) that are implemented should be implemented in accordance with CCITT Recommendation X.21 [1] and other applicable NETs, and with the relevant national requirements which are not specified in this NET.

NOTE: Where the DTE supports services specified in other NETs, additional requirements (for example at the application layer) may apply and will be found in the specific terminal NET.

TABLE 1 (NET 1): Information additional to CCITT Recommendation X.21 defining the minimum set of requirements

Paragraph in X.21 (1)	Applicable for		See also national requirements [9] in Annex A (4)
	CSS PTP (2)	LCS PTP (3)	
1.1	1)	1)	
2.1	2)	2)	AT, DE, FR
2.2	2)	2)	AT, DE, DK, FI, FR, GB, IT, NO, SE
2.5.1.3	3)	3)	
2.6.1	X	X	IT
3.2	4)	n/a	
4	5)	n/a	
4.1.1	X	n/a	AT, GB
4.1.3	6)	n/a	FR, GB, IT
4.1.6.1	7)	n/a	
4.1.8	X	n/a	AT, DE, FR, GB
4.1.9	8)	n/a	GB
4.5	9)	n/a	
5.1	X	n/a	FR
5.2	n/a	X	FR
6	X	n/a	FR
7	10)	10)	AT, DE, DK, FI, FR, GB, IT, NO, SE
Annex C	11)	n/a	GB
Annex D	X	n/a	IT
Annex E	X	n/a	AT, DE, FI, FR, GB, IT, NO, SE
Annex F	X	n/a	IT
Annex H	X	n/a	

X = Applicable subject to modifications as indicated in column 4.
 n/a = Not applicable.

Notes to table 1 (NET 1):

- 1) Not all applicable user classes as described in CCITT Recommendation X.1 [4] are available in all countries. User class exceptions are included as national entries in Annex A.
- 2) In some countries plug-in DCEs in accordance with CEPT Recommendation T/CD 01-12 [7] and CEPT Recommendation T/CD 01-14 [8] can be provided. National Requirements will then apply for the electrical and mechanical characteristics.
- 3) Optional DTE feature.
- 4) The parity bit is mandatory to transmitted characters. It is an optional DTE feature to detect parity errors in received characters.
- 5) At least one of the following must be implemented.
 - 5.1 Outgoing calls (address call and/or direct call if provided by the network).
 - 5.2 Incoming Calls.
- 6) Implementation of state 4 is optional unless specified otherwise in a national requirements annex.
- 7) Manual answering mode is not permitted.
- 8) If the state 10 A/10 B is entered the information presented may be ignored.
- 9) Facility registration/cancellation is optional.
- 10) Loop control is optional and not implemented in all networks.
- 11) The time limits implemented by the DTE shall not be less than the minimum time limits specified in CCITT Recommendation X.21 [1] Table C-1/X.21. It is recommended that the maximum value of these time limits does not exceed the specified minimum value by more than 20%. However, a DTE with all time limits set to the equivalent of the longest time-limit value specified in Annex C/X.21 will still be deemed acceptable. The preferred actions in the last column of Table C1, CCITT Recommendation X.21 [1] are also mandatory with the addition that on expiry of timer T1 a DTE CLEAR REQUEST is also allowed. When CPS 01 is received, timer T3B shall apply.

7 Conformance Testing

Except where stated otherwise, the tests shall be carried out at the lowest and highest signalling rates stated by the applicant. The applicant shall state the lowest and highest signalling rates relevant to:

- a) Leased line operation, if applicable;
- b) Circuit switched operation, if applicable;

for which approval is sought.

The tests for national requirements are not described in Clause 8. These tests are included in an appropriate Appendix to Annex A.

The following tests are performed at the DCE end of the DTE-DCE cable supplied by the applicant.

8 Conformance test suites

Not all the following tests are applicable for call-only and answer-only terminals and for leased line operation.

The tests are applicable to call-only or answer-only terminals unless specified otherwise.

For leased line operation only the tests of 8.1.1, 8.1.2, and 8.1.3 are applicable.

In this Clause all notes are to be read as an integral part of this NET.

NOTE: It may be necessary in certain instances for the tester to send specified bit patterns to the DTE to ensure that a particular state is maintained. The applicant shall inform the accredited test laboratory of such cases and specify the nature of the bit patterns to be sent.

8.1 Basic Interconnection tests

8.1.1 Electrical Characteristics

The tests of subclauses 8.1.1.1 and 8.1.1.2 are only carried out at the highest signalling rate as stated by the applicant in accordance with Clause 7.

Verification of the electrical characteristics shall be based either on:

- a) the tests described in 8.1.1.1 and 8.1.1.2 below, as appropriate, or
- b) alternatively, by agreement between the applicant and the accredited test laboratory, by submission by the applicant to the accredited test laboratory of a declaration of conformance including circuit diagrams, component specifications and other relevant information. The accredited laboratory shall, on the basis of the evidence accompanying the declaration, be responsible for satisfying itself that the declaration gives assurance of conformity not less than that achieved by method a) above.

The method to be adopted shall be by agreement with the applicant and the accredited test laboratory.

Where, for the purposes of test, two or more circuits are identically implemented, the test need only be carried out on one of them.

Where, for a particular DTE, a particular generator output state is not relevant for a specific interchange circuit, there is no requirement for that generator output state to be tested in respect of that interchange circuit.

Where CCITT Recommendation V.10 [2] or V.11 [3] requires the DTE to generate a certain bit pattern for the purposes of test, this pattern may be substituted by DTE generated data and control signals.

8.1.1.1 Tests for DTE Declared by the Applicant as Conforming with CCITT Recommendation X.26 [5] (V.10) [2]

8.1.1.1.1 Generator characteristics

1) Static reference measurements

For each generator to be tested, the following tests shall be carried out in accordance with the static reference measurement methods illustrated in figure 4/V.10 [2]:

- a) Open circuit measurement, as described in § 5.2.1 of CCITT Recommendation V.10 [2].
- b) Test termination measurement, as described in § 5.2.2 of CCITT Recommendation V.10 [2].
- c) Short circuit measurement, as described in § 5.2.3 of CCITT Recommendation V.10 [2].
- d) Power off measurement, as described in § 5.2.4 of CCITT Recommendation V.10 [2].

2) Dynamic rise time measurements

For each generator to be tested, the rise-time measurement (and only the rise-time measurement) described in § 5.3 of CCITT Recommendation V.10 [2] shall be carried out, except that there is no requirement to test that the transition shall be monotonic. There is no requirement to make this measurement in the case of generators for which one of the binary states is not relevant.

8.1.1.1.2 Receiver characteristics

The receiver input voltage - current measurements, as described in § 6.2 of CCITT Recommendation V.10 [2] , and as illustrated in figure 6/V.10 [2], shall be carried out for each receiver to be tested.

8.1.1.2 Tests for DTE Declared by the Applicant as Conforming with CCITT Recommendation X.27 [6] (V.11) [3]

8.1.1.2.1 Generator characteristics

1) Static reference measurements

For each generator to be tested, the following tests shall be carried out in accordance with the static reference measurement methods illustrated in figure 4/V.11 [3]:

- a) Open Circuit measurement, as described in § 5.2.1 of CCITT Recommendation V.11 [3].
- b) Test termination measurement, as described in § 5.2.2 of CCITT Recommendation V.11 [3].
- c) Short circuit measurement, as described in § 5.2.3 of CCITT Recommendation V.11 [3].
- d) Power off measurement, as described in § 5.2.4 of CCITT Recommendation V.11 [3].

2) Dynamic rise time measurements

For each generator to be tested, the rise-time measurement (and only the rise-time measurement) described in the first paragraph of § 5.3 of CCITT Recommendation V.11 [3] shall be carried out, except that there is no requirement to test that the transition shall be monotonic.

There is no requirement to make this measurement in the case of generators for which one of the binary states is not relevant.

8.1.1.2.2 Receiver characteristics

Each receiver to be tested shall be tested for input voltage - current characteristics as follows:

- a) For receivers for which the applicant has stated that an "optional cable termination resistance", as described in § 6.1 of CCITT Recommendation V.11 [3], is not present, the receiver input voltage - current measurement shall be performed in accordance with § 6.2 of CCITT Recommendation V.11 [3].
- b) For receivers for which the applicant has stated that an "optional cable termination resistance", as described in § 6.1 of CCITT Recommendation V.11 [3], is present, the receiver input voltage -

current measurement shall be performed, with this termination resistance present, but otherwise using the method described in § 6.2 of CCITT Recommendation V.11 [3], modified as detailed below:

- the input voltage applied shall range between - 6 volts and + 6 volts;
 - the resultant input current measured shall lie within the range defined by figure 1 of this document.
- c) For receivers for which the applicant has stated that an "optional cable termination resistance", as described in § 6.1 of CCITT Recommendation V.11 [3], may or may not be present, by means of a configuration option, the tests of both a) and b) above shall be performed, with the termination resistance not present and present respectively.

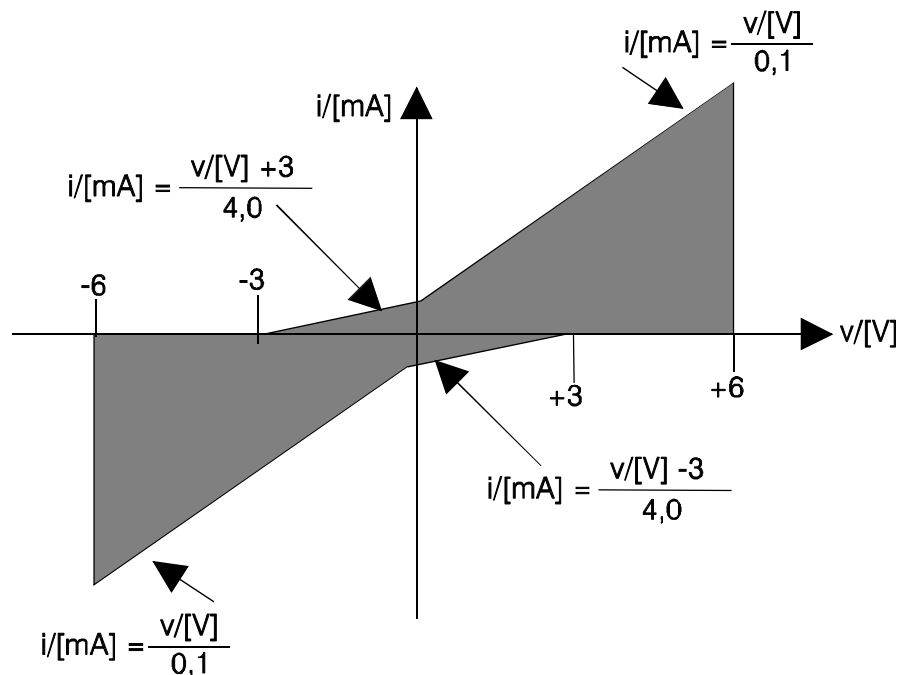


Figure 1

8.1.2 Mechanical Characteristics

Implicit test when connecting DTE to tester.

NOTE: In order to carry out this "implicit test", it is necessary for the applicant to provide, for the purposes of test, a cable to connect the DTE to a DCE, which is representative of cables which are intended to be used or supplied with the apparatus.

8.1.3 Functional Characteristics

No test.

8.1.4 Physical link control conditions

No tests.

NOTE: Verification of the alignment of call control characters is made in procedural tests.

8.2 Behaviour tests

Each test shall be initiated with both DCE and DTE in the READY state (state 1) unless specified otherwise. The applicant shall provide sufficient information to ensure that the DTE READY state can be set when required.

NOTE 1: Since an CCITT Recommendation X.21 [1] DTE is permitted to initiate a DTE CLEAR REQUEST at any time, it should be noted that, when performing the following tests, the initiation of a DTE CLEAR REQUEST unsolicited by the test being performed could cause the test to be failed, even though the action of the DTE is permitted by CCITT Recommendation X.21 [1] itself.

NOTE 2: Some DTEs may not be able to maintain state 1 for an indefinite period of time.

8.2.1 Procedural tests

The tests of 8.2.1.1 and 8.2.1.2 are applicable to apparatus which is capable of both initiating and accepting a call. A call-only terminal shall only be tested in accordance with 8.2.1.1 and an answer-only terminal shall only be tested in accordance with 8.2.1.2.

8.2.1.1 Call set up - calling side

Initial conditions:

- The DTE and tester are placed in the READY state.
- The DTE is stimulated to initiate a call request.

Where the DTE is capable of initiating both direct calls and addressed calls, as described in § 4.4 of CCITT Recommendation X.21 [1], the tests of 8.2.1.1.1 and 8.2.1.1.2 shall be performed only once with the DTE initiating addressed calls. In these tests state 4 will be bypassed if direct call is invoked.

8.2.1.1.1 Valid events - valid state suites.

Answering the call request from DTE, the tester emulates a successful call set up in conformance with CCITT Recommendation X.21 [1] protocol, with the following state sequences:

1) Without CPS block or DCE provided information block:

- a) 1-2-3-4-5-11-12
- b) 1-2-3-4-5-12
- c) 1-2-3-4-5-6A-11-12
- d) 1-2-3-4-5-6A-12

2) With a CPS block (One CPS from group 0 in state 7):

- a) 1-2-3-4-5-6A-7-6A-11-12
- b) 1-2-3-4-5-6A-7-11-12
- c) 1-2-3-4-5-6A-7-12

3) With a DCE provided information block (Dummy line identification in state 10A):

- a) 1-2-3-4-5-6A-10A-11-12
- b) 1-2-3-4-5-6A-10A-12
- c) 1-2-3-4-5-6A-10A-6A-11-12
- d) 1-2-3-4-5-6A-10A-6A-12

4) Call collision:

1-2-15-3-4-5-11-12

8.2.1.1.2 Valid syntax in exchanged information

For the purposes of the following test, the DTE shall not be deemed to be non conformant if after receiving a CPS relating to an unsuccessful call the DTE clears the call before receiving the Clear Indication from the DCE.

1) The tester emulates an unsuccessful call set up in conformance with CCITT Recommendation X.21 [1] protocol with the following CPS: 21/22/23/43/52/61;

NOTE: The CP-signals were chosen from the applicable groups as being the most representative of those that would be encountered in practice.

and the following state sequences:

- a) 1-2-3-4-5-6A-7(CPS)-19-20-21-1;
 - b) 1-2-3-4-5-6A-7(CPS)-6A-19-20-21-1.
- 2) The tester emulates an unsuccessful call set up in conformance with CCITT Recommendation X.21 [1] protocol with CPS of group 0 followed by CPS 21/52/61 and the following suites:
- a) 1-2-3-4-5-6A-7(One CPS from group 0)-6A-7(CPS 21/52/61)-6A-19-20-21-1;
 - b) 1-2-3-4-5-6A-7(One CPS from group 0)-6A-7(CPS 21/52/61)-19-20-21-1.

8.2.1.1.3 Invalid events

No tests.

8.2.1.1.4 DTE Behaviour verifications

1) Addressed call

The following test is only applicable for DTEs capable of initiating addressed calls.

The DTE is stimulated to make an outgoing addressed call.

The tester monitors the DTE t and c circuits to ensure that:

- During the transition from READY (state 1) to CALL REQUEST (state 2), the transition to t = 0 (or c = ON) occurs within a maximum of 7 bit intervals of the transition to c = ON (or t = 0).
- The tester responds to the Call Request within 3 s by signalling PROCEED TO SELECT and then monitors the DTE t and c circuits to ensure that:
 - The Selection Signal Sequence is preceded by at least 2 SYN characters.
 - The Address Characters are International Alphabet No. 5 characters, in the range permitted by Annex D of CCITT Recommendation X.21 [1], with odd parity, and accurately represent the intended address.
 - The selection sequence is terminated by + character.
 - The only padding characters are SYN characters.
 - Selection signals are sent such that the expiry of any of the DCE timeouts T11, T12, T13 does not occur.
 - The C circuit remains in the ON condition for the duration of the selection sequence.
 - The DTE WAITING signal (t = 1, c = ON) is immediately generated after the + terminating character without SYN character between.
 - State transition shall not include spurious bit patterns.
 - Character alignment is preserved.

2) Direct Call

The following test is only applicable for DTEs capable of initiating direct calls.

The DTE is stimulated to make an outgoing direct call.

The tester monitors the DTE t and c circuits to ensure that:

- During the transition from READY (state 1) to CALL REQUEST (state 2), the transition to t = 0 (or c = ON) occurs within a maximum of 7 bit intervals of the transition to c = ON (or t = 0).
- The tester responds to the Call Request within 3 s by signalling PROCEED TO SELECT and then monitors the DTE t and c circuits to ensure that:
 - The DTE WAITING signal (t = 1, c = ON) is generated after receiving proceed to select.

The DTE waiting signal is sent such that the expiry of the DCE time out T12 does not occur.

8.2.1.2 Call set up - Called side

Initial conditions:

- The DTE and tester are placed in the READY state.
- The tester emulates an Incoming Call.

8.2.1.2.1 Valid events - valid state sequences

The tester initiates the Incoming Call and then emulates a successful call set up in accordance with CCITT Recommendation X.21 [1] protocol with the following state sequences, except that for DTEs employing only Enhanced Sub-addressing references to state 9 shall be replaced by reference to the following sequence of states "9B-10C-6C-25-6D-9C" where either or both of states 25 and 6D may be bypassed.

8.2.1.2.2 Invalid Events

The following test is only applicable to DTEs not requiring the use of the B circuit.

The tester initiates an Incoming call with no SYN character before "BEL".

- The tester then monitors the DTE t and c circuits to ensure that the DTE continues to signal DTE READY.
- The tester then initiates a correct Incoming call that the DTE must correctly recognise and which is followed by a successful call set up.

NOTE: The tester must not have circuit B in use for this test.

8.2.1.3 Clearing

8.2.1.3.1 Valid events

Initial conditions:

The DTE and tester are placed in DATA TRANSFER state (the NOTE of Clause 8).

1) Clearing by the DTE:

The following test is only applicable to DTEs which are capable of initiating a DTE CLEAR REQUEST.

- The DTE is stimulated to clear the call.
- The tester emulates a valid call clearing with the state sequence: 16-17-21-1.
- Within 2 seconds of receipt of the DTE CLEAR REQUEST (state 16), the tester signals DCE CLEAR CONFIRMATION (state 17) followed by DCE READY (state 21).
- The tester monitors the DTE t and c circuit to ensure that the DTE responds to DCE READY by signalling, within 100 ms, DTE READY (transition from state 21 to state 1).

NOTE : The applicant shall inform the accredited test laboratory how the DTE may be stimulated to clear the call.

2) Clearing by the tester:

- The tester signals DCE CLEAR INDICATION and emulates a valid call clearing with the state sequence: 19-20-21-1.
- The tester monitors the DTE t and c circuits to ensure that the DTE signals DTE CLEAR CONFIRMATION within 500 ms of the tester signalling DCE CLEAR INDICATION.

- The tester within 2 s of receiving DTE CLEAR CONFIRMATION signals DCE READY (state 21) and monitors the DTE t and c circuits to ensure that the DTE signals DTE READY within 100 ms (state 21 to state 1).

8.2.1.3.2 Clearing in each state

Test 1 is not applicable for answer-only terminal and test 2 is not applicable for call-only terminal.

- 1) The DTE is stimulated to initiate a call Request.

- In each state of the call set up except states 3 and 8, the tester signals DCE CLEAR INDICATION and monitors the DTE t and c circuits as in test 8.2.1.3.1, test 2.

- 2) This test is repeated except that the call is initiated by the tester.

8.2.1.3.3 Invalid events

No test.

8.2.1.3.4 Inopportune events

These verifications are made in the time out tests.

8.2.1.4 Data transfer

No test.

8.2.2 Quiescent states

Initial conditions:

The DTE and tester are placed in the READY state.

The test of 8.2.2.1.1 is only applicable for a DTE which can be placed in the Uncontrolled Not Ready State.

8.2.2.1 Valid events

8.2.2.1.1 The DTE is placed in the Uncontrolled Not Ready State

- The tester monitors the DTE t and c circuits to ensure that the DTE signals (t = 0, c = OFF).
- The DTE is put again in normal conditions.
- The tester monitors the DTE t and c circuits to ensure that the DTE signals again DTE READY (state 1).
- After a period of 24 bit intervals, the tester signals an Incoming call. The DTE must signal CALL ACCEPTED within 500 ms.

8.2.3 Time outs

NOTE 1: Certain of the time out tests require the DTE to be placed in the DATA TRANSFER state. During these tests, a result may be that the DTE clears the call before sufficient time has elapsed to complete a test. In such cases, the applicant shall inform the accredited test laboratory how such premature clearing may, where possible, be prevented. If any such premature clearing cannot be prevented a DTE shall not be deemed to have failed to conform.

NOTE 2: Attention is drawn to note ¹¹⁾ of table 1 of this document.

Tests 8.2.3.1, 8.2.3.2, 8.2.3.3 and 8.2.3.4 are not applicable to answer-only terminal.

Test 8.2.3.5 is not applicable to call-only terminal.

8.2.3.1 Time out T1

The DTE is stimulated to initiate a call Request.

8.2.3.1.1 The tester does not respond and ensures that after time T1 the DTE signals (t = 1, c = OFF) (state 1) or (t = 0, c = OFF) (state 16).

- The test is repeated but the tester responds by signalling PROCEED TO SELECT (state 3) (r = +, i = OFF), after 2,5 s of receiving the CALL REQUEST signal from the DTE.
- The tester then ensures that the DTE transmits the SELECTION SIGNAL SEQUENCE or, if Direct Call is invoked, transmits DTE WAITING (state 5).

8.2.3.2 Time out T2

The DTE is stimulated to initiate a Call Request.

- The tester responds within 3 seconds by signalling PROCEED TO SELECT.
- After receiving the END OF SELECTION character or, if Direct Call is invoked, DTE WAITING the tester continues signalling DCE WAITING and ensures that after time T2 the DTE signals DTE CLEAR REQUEST (state 16).

8.2.3.3 Time out T3A

The tester and the DTE are placed in the DTE WAITING state.

- The tester signals non-clearing DCE PROVIDED INFORMATION (as declared by the applicant, e.g. Dummy line identification), then signals DCE WAITING, and ensures that after time T3A the DTE signals DTE CLEAR REQUEST.
- The test is repeated but the tester:
 - signals non-clearing DCE PROVIDED INFORMATION (as declared by the applicant);
 - signals DCE WAITING for 5,5 s;
 - signals non-clearing DCE PROVIDED INFORMATION (as declared by the applicant);
 - signals DCE WAITING for 5,5 s;
 - signals READY FOR DATA/DATA TRANSFER; and
 - ensures that the DTE signals READY FOR DATA/DATA TRANSFER.

The tester emulates an unsuccessful call set up. This is done by following the CCITT Recommendation X.21 [1] protocol up to and including state 6A. Then the tester signals DCE PROVIDED INFORMATION, but with the terminating + character absent. The tester monitors the DTE t and c circuits to ensure that the DTE either signals DTE CLEAR REQUEST or stays signalling (t = 1, c = ON) until the end of T2 or T3A.

8.2.3.4 Time out T3B

The tester and the DTE are placed in the DTE WAITING state, and the tester signals DCE WAITING followed by the applicable CPS (01).

The tester signals DCE WAITING (state 6A) and ensures that after time T3B the DTE signals DTE CLEAR REQUEST.

The test is repeated but after sending the CPS in group 0, the tester:

- signals DCE WAITING for 59 s;
- sends a CPS (01);

- signals DCE WAITING for 59 s;
- signals READY FOR DATA/DATA TRANSFER;
- ensures that the DTE signals READY FOR DATA/DATA TRANSFER.

8.2.3.5 Time out T4B

The tester signals an Incoming call for a period greater than time T4B after detection of CALL ACCEPTED, and monitors the DTE t and c circuits to ensure after T4B the DTE signals DTE CLEAR REQUEST.

- The test is repeated but the tester:
 - signals DCE WAITING for 5,5 s;
 - signals DCE PROVIDED INFORMATION (e.g. Dummy line identification);
 - signals DCE WAITING for 5.5 s;
 - signals READY FOR DATA/DATA TRANSFER; and
 - ensures that the DTE signals READY FOR DATA/DATA TRANSFER.

8.2.3.6 Time out T5

The following test is only applicable to DTEs which are capable of initiating a DTE CLEAR REQUEST.

The tester and DTE are placed in the DATA TRANSFER state (see also the NOTE of Clause 8).

- The DTE is stimulated to initiate a DTE CLEAR REQUEST (see also the NOTE of 8.2.1.3.1).
 - a) The tester does not confirm the DTE clear request and stays in the DATA TRANSFER state with ($r = 1$, $i = ON$) and then monitors the t and c circuits to ensure that the DTE signals DTE READY when timeout T5 has expired.
 - b) The tester does not confirm the DTE clear request and stays in the DATA TRANSFER state with ($r = 0$, $i = ON$) and then monitors the t and c circuits to ensure that the DTE signals DTE READY when timeout T5 has expired.
 - c) The tester responds by continuously signalling DCE CLEAR CONFIRMATION.

The tester monitors the DTE t and c circuits to ensure that the DTE signals DTE READY when timeout T5 has expired.

8.2.3.7 Time out T6

The tester and DTE are placed in the DATA TRANSFER state (the NOTE of Clause 8).

- The tester signals DCE CLEAR INDICATION and ensures that the DTE responds by DTE CLEAR CONFIRMATION.
- The tester continues signalling ($r = 0$, $i = OFF$) for a period of greater than time T6 after the detection of DTE CLEAR CONFIRMATION.
- The tester monitors the DTE t and c circuits to ensure that the DTE signals DTE READY after time T6.

8.2.4 Loops

Except where stated otherwise, the tests shall be carried out at the lowest and highest signalling rates stated by the applicant.

Where, for the purposes of test, two or more circuits are identically implemented, the test need only be carried out on one of them.

Where, for a particular DTE, a particular generator output state is not relevant for a specific interchange circuit, there is no requirement for that generator output state to be tested in respect of that interchange circuit.

Where the CCITT Recommendations requires the DTE to generate a certain bit pattern for the purposes of test, this pattern may be substituted by DTE generated data and control signals.

8.3 Capability tests

8.3.1 Facility tests

No tests.

Annex A: National Network Requirements concerning CCITT Recommendation X.21 [1]

Annex A1: National Network Requirements for Austria

2.2 The interface connector shall be equipped with screws M3.

4.1.1, 4.1.8 and table F-1/X.21 [1].

In case of unsuccessful calling (state 13 not reached) the DTE must not produce more than 8 attempts of calling within periods of:

- 1 minute: in cases of receiving call progress signals of group 2 or 6,
- 8 minutes: in all other cases (without respect to the reason of unsuccessful calling).

Every attempt must be followed by a break of at least 5 seconds between clearing and new attempt.

Only unsuccessful calls with the same selection signals and direct calls are to be counted in that manner.

DTE must be implemented such that producing repetitions of unlimited number is excluded.

Table C-1/X.21 [1].

When CPS 04 is received time limit T3B shall apply.

NOTE: With reference to table 1 (NET 1) provided user classes of service (CCITT Recommendation X.1 [4]) are 4, 5 and 6.)

Annex A2: National Network Requirements for Denmark

The following additional requirements apply for CCITT Recommendation X.21 [1] terminals connected to CSPDN in Denmark.

2.2 Latching blocks are not supported. The thread of the connector is M3 for stand alone DTEs.

Table C-1/X.21 [1].

When receiving CPS 04 T3B shall apply.

NOTE 1: No approval test is needed for attachment to the Danish network.

NOTE 2: In order to achieve high performance applications additional detailed technical and commercial information is needed. Such information is available through the Administrations operating in Denmark.

Annex A3: National Network Requirements for Finland

The following additional requirements apply for connection to the Finnish Circuit Switched Data Network.

2.2 M3 threads are used and latching blocks are not supported.

Table C-1/X.21 [1]. Table F-1/X.21 [1].

When receiving CPS 04 timer T3B shall apply.

NOTE: For optimal performance of the DTE some additional information can be found in the specification for connection to the Finnish Circuit Switched Data Network.

Annex A4: National Network Requirements for France

The national variants are listed below, referring to CCITT Recommendation X.21 [1] items. Only a minimum set of functionalities is taken into account; optional features and facilities shall be in accordance with relevant national requirements (see the relevant specification for connection to the networks).

I The RTC 64 network

Only items related to PTP circuit switched service are applicable.

2.1.2 The electrical characteristics shall comply with CCITT Recommendation X.27 [6] with implementation of the cable termination.

4.1.3 At the calling side, the selection signal sequence (state 4) is mandatory and 4.4.

4.1.8 After 6 unsuccessful calls to the same called numbers the DTE is forbidden to make a new attempt (without manual operation).

Each new attempt shall be tried within a time interval of 1 to 12 minutes.

The DTE may retry a new serial of 6 unsuccessful calls each hour, if 2 clearings were not due to a long term condition.

5.1 When circuit c is turned OFF during data transfer, for a period of at least 24 bit intervals, the DCE clears the call. Therefore the DTE shall maintain ON the circuit c during all transfer phases.

II The TELECOM 1 network

2.1.2, 4.1.8, 5.1 id RTC 64

5.2 DTE using the service of reservation.

The DTE is able to maintain the DTE ready state even if the DCE is in the not ready state before the beginning of a reserved vacation.

Annex C In case of 64 kbit/s data rate, T4B time limit is 10 s.

NOTE: Indications to the DTE implementers.

The RTC 64 network

4.1.8 When the unsuccessful call parameters can be changed by the user, the hardware and/or software shall maintain the modifications within the requested ranges specified in the previous paragraph.

6 In some cases of clearing from the called side, the DCE remains signalling ($r = 0$, $i = \text{OFF}$) during some seconds at the called side.

Annex F DTE is not required to recognise all CPS.

The Telecom I network

4.1.8 When the unsuccessful call parameters can be changed by the user, the hardware and/or software shall maintain the modifications within the requested ranges specified in the previous paragraph.

5.2 Service of reservation is provided on a leased CCITT Recommendation X.21 [1] connection.

Signalling at beginning of reserved vacation:

Outside of a reserved vacation the DCE signals DCE Not Ready. On starting the establishment of a reserved vacation, the DCE shall find DTE in the DTE ready state. The DCE then signals DCE ready between 50 and 100 ms (state 1). Transitions to states 13 R and 13 happen.

Signalling during a reserved vacation:

The entering of the DTE not ready conditions is not accepted by the network. The DCE signals DCE not ready at the end of the reserved vacation.

The DTE claiming to support the service of reservation shall fit this behaviour.

Annex F DTE is not required to recognise all CPS.

Annex A5: National Network Requirements for Federal Republic of Germany

1) National network requirements with reference to table 1 (NET 1)

CCITT Recommendation X. 21 [1], 2.2 Mechanical characteristics

The interface connector shall be equipped with screws M.3. No test is required.

CCITT Recommendation X.21 [1], 4.1.8 Call progress signal (state 7).

a) Conditions for call re-attempts

After reception of a CPS of group 2 or 6 a call re-attempt with the same address may be performed up to 7 times with a minimum delay of 5 s between the call re-attempts. Such sequences of 8 call attempts may be repeated after a delay of 30 s. The test is described in the appendix to this Annex as test case 1.

After reception of a CPS of group 4, 5 or 7 a call re-attempt with the same address may be performed once with a minimum delay of 5 s. Such sequences of 2 call attempt may be repeated after a delay of 60 s. The test case is described in the appendix to this Annex as test case 1.

b) Conditions for T3B after reception of CPS 04 and/or 01

After reception of the CPS 04 or CPS 01 the timer T3B (60 s) shall apply. The test case is described in the appendix to this Annex as test case 2.

2) Service concerned

For the Federal Republic of Germany, NET 1 is applicable for connection to the following services.

Terminals which conform with the NET 1 and if appropriate with the requirements stated in this Annex can access the following services.

2.1 Circuit switched services

Table A5.1: DATEX-L

Service	Data signalling rate	Service provider
DATEX-L	2 400 bit/s	Deutsche Bundespost Telekom
DATEX-L	4 800 bit/s	Deutsche Bundespost Telekom
DATEX-L	9 600 bit/s	Deutsche Bundespost Telekom

2.2 Leased circuit services

Table A5.2: Direktrufanschlüsse der Gruppe A

Service	Data signalling rate	Service provider
DirAs	1 200 bit/s	Deutsche Bundespost Telekom
DirAs	2 400 bit/s	Deutsche Bundespost Telekom
DirAs	4 800 bit/s	Deutsche Bundespost Telekom
DirAs	9 600 bit/s	Deutsche Bundespost Telekom
DirAs	19 200 bit/s	Deutsche Bundespost Telekom
DirAs	64 000 bit/s	Deutsche Bundespost Telekom

Table A5.3: Internationale digitale Mietleitungen

Service	Data signalling rate	Service provider
IML	56 000 bit/s	Deutsche Bundespost Telekom
IML	64 000 bit/s	Deutsche Bundespost Telekom

Table A5.4: Internationale digitale Festverbindungen

Service	Data signalling rate	Service provider
IFV	9 600 bit/s	Deutsche Bundespost Telekom
IFV	56 000 bit/s	Deutsche Bundespost Telekom
IFV	64 000 bit/s	Deutsche Bundespost Telekom

3) National network requirements on implemented options

In accordance with Clause 6 of this NET, all implemented options such as "proceed with call information" shall conform with CCITT Recommendation X.21 [1]. The specification of the approval requirements and the test requirements are not covered by this NET.

Additional information on the services provided and the national approval requirements for options are obtainable by writing to:

Deutsche Bundespost Telekom
Fernmeldetechnisches Zentralamt
Kundenberatung für Datendienste

Postfach 10 00 03
D-6100 Darmstadt 1

Annex A6: National Network Requirements for Italy

2.2 Latching block is not provided.

2.6.1 The DTE shall interpret a fault condition using both circuits r and i as r = 0 and i = OFF, DCE NOT READY.

4.1.3 DCE requirements: the first 2 digits of signal sequence shall start within 12 seconds of proceed to select being received and shall be completed within 36 seconds.

NOTES:

2.1.1 User class of service 3 not provided over CSPDN.

2.1.2 For the time being not supported over CSPDN.

4.1.6.2.1 Not supported.

4.1.9.1 Provided.

4.6.1.2 Only one address block at a time.

4.6.1.3 Not provided.

4.6.3 There is not any updated version.

Annex C Timers T.7 and T.13 not implemented
T.3B = 120 sec T.14B = 120 sec
T.12 = 12 sec
T.20, T.21, T.22 and T.23 are not implemented (loop timers).

Annex D See comments to the paragraphs 4.6.1.2 - 4.6.1.3 - 4.6.3.

Annex E Not supported.

Annex F Table F-1/X.21 [1] Call progress signals 02, 47, 49, 81, 82, 83, not generated; Call progress signal 45 is used without indicator.

Annex H The network supplies the data and time signal sequence.

Annex A7: National Network Requirements for Norway

2.2 Latching blocks are not supported.

Table C-1/X.21 [1], Table F-1/X.21 [1].

If CPS 04 is received DTE timer T3B must be used.

Annex A8: National Network Requirements for Sweden

The following additional requirements apply for connection to the Swedish Circuit Switched Data Network.

2.2 The thread of the connector is normally UNC 4-40, however, on request M3 thread can be offered. Latching blocks are not supported.

Table C-1/X.21 [1], Table F-1/X.21 [1].

When receiving CPS 04 timer T3B shall apply.

NOTE: For optimal performance of the DTE some additional information can be found in the specification for connection to the Swedish Circuit Switched Data Network.

Annex A9: National Requirements for the United Kingdom

Part 1: Additional United Kingdom Requirements for Minimum Set X.21 [1] Operation

This part of the United Kingdom National Annex gives those requirements additional to the requirements in the main part of this NET necessary for a DTE implementing only the minimum set of CCITT Recommendation X.21 [1] features to be approved for connection to a public telecommunications network via an CCITT Recommendation X.21 [1] interface within the United Kingdom.

Paragraph numbers refer to the relevant Clause(s) in CCITT Recommendation X.21 (1984) [1] unless stated otherwise.

2.2 DTE shall be provided for the purpose of tests, either with an integral connection cable of any length as supplied to the user or an attached cable of 2,5 m \pm 0,25 m in length (or such other length that may be agreed with the ATL), terminated in a connector in accordance with ISO 4903.

Connecting cables for those instances, where the DTE is supplied without an integral connecting cable or where an extension cable is used in addition to the integral cable, may be subject to separate approval requirements or to an installation Code of Practice.

These requirements are applicable to both leased line and circuit switched applications.

The DCE provides M3 threaded bushes for connector retention, latching blocks are not provided.

2.3 The provision of either or both of the "C" and "I" interchange circuits is not mandatory for connection to the British Telecom Kilostream service at 56 kbits/s and 64 kbits/s. However, where either or both of these interchange circuits are provided, they shall be in accordance with the requirements of this NET.

4.1.1 Repeat Attempts - Auto-calling DTE only
and
4.1.8

NOTE: The following requirements for repeat attempts are under review in the United Kingdom. The United Kingdom would be sympathetic towards considering harmonised requirements.

For an auto-calling DTE incorporating an automatic repeat attempt facility the following requirements shall apply.

i) When a Call Request is part of a repeat attempt sequence invoked by the intention to set up a connection in respect of the same directory number without direct user intervention between call attempts of that sequence, the number of repeat call attempts and the minimum durations between these call attempts shall comply with the call pattern or patterns nominated by the supplier from those given in Table A9-1 (NET 1).

NOTE 1: No requirements are specified for the minimum duration between call attempts where the initiation of a call attempt is under the direct control of the user.

For call patterns A and B given in Table A9-1 (NET 1), there shall be not more than one sequence of the nominated pattern to the same directory number within a period of 2 hours from the commencement of the initial call attempt.

NOTE 2: No limitation is specified for the period between invocation of one repeat attempt sequence and the invocation of a subsequent repeat attempt sequence where invocation of the subsequent repeat attempt sequence is under direct control of the user.

Call pattern D shall be nominated only where the DTE is capable of recognising Call Progress Signal 61 - Network Congestion. The DTE shall not be capable of operating in accordance with call pattern D unless it has received and recognised Call Progress Signal 61.

In any one repeat attempt sequence the DTE shall not be capable of operating in a combination of call patterns, A, B and C.

If call pattern D is entered on receipt and recognition of Call Progress Signal 61 via one of the call patterns A, B or C:

- a) the 5 sec minimum duration specified for call pattern D in Table A9-1 (NET 1) shall not be used; and
- b) the DTE shall revert to the remainder of the originating call pattern on receipt of a Call Progress Signal other than 61.

NOTE 3: It is recommended that, if all repeat attempts in call patterns A or B, or a large number of repeat call attempts in call patterns C or D, are unsuccessful, the DTE should not enter a subsequent sequence of call patterns A or B or continue indefinitely call patterns C or D, but should alert the user so that a check of the directory number may be made. Where possible the DTE should record data on unsuccessful call attempts to assist the user in investigating their cause.

ii) Where a number of terminals share a single exchange connection no terminal shall be engaged on more than one repeat attempt sequence at any one time.

iii) **Information Required for Testing Purposes**
 Where the DTE is capable of making an automatic repeat attempt sequence, the supplier shall state which call pattern (or patterns) from Table A9-1 (NET1) is (are) applicable.

NOTE 4: The DTE may be capable of being configured to operate in more than one of the call patterns given in Table A9-1 (NET 1).

NOTE 5: The actual durations between call attempts configured into the DTE submitted for approval need to be stated.

TABLE A9-1 (NET 1): Repeat attempts - number of attempts and durations between attempts

Call attempt	Minimum duration between call attempts for call pattern			
	A	B	C	D
Initial Attempt				
1st Repeat Attempt	5 s	5 s	5 s	5 s
2nd Repeat Attempt	1 min	2 min	10 min	3 min
3rd Repeat Attempt	1 min	2 min	10 min	3 min
4th Repeat Attempt	1 min	2 min	10 min	3 min
5th Repeat Attempt	End of sequence (see NOTE A)	2 min	10 min	3 min
6th Repeat Attempt		2 min	10 min	3 min
7th Repeat Attempt		End of sequence (See NOTE A)	10 min	3 min
nth Repeat (see NOTE B)			10 min	3 min
NOTE A:	The maximum number of calls for repeat attempt call pattern A is 5 and for call pattern B is 7.			
NOTE B:	No limit is specified for the value of n.			
NOTE C:	The durations given in Table A9-1 are measured from CLEAR CONFIRMATION to the next CALL REQUEST.			

4.1.3 and Annex D

The United Kingdom network also permits the use of the "*" and "#" characters in the Address Block and portion of the Selection sequence.

4.1.6.1 Manual answering is not permitted within the minimum set CCITT Recommendation X.21 [1] circuit switched service offered by the United Kingdom, therefore implementation of timer T3B is not mandatory for DTE intended for connection to the United Kingdom circuit switched service.

4.1.9 The United Kingdom network only provides the following DCE Provided Information messages:

- Calling Line Identification;
- Called Line Identification;
- Dummy Line Identification;
- Closed User Group (CUG) Indicator (i.e. /81/CUG Index+).

Therefore, whilst a DTE intended for connection to the United Kingdom network may be capable of recognising other DCE Provided Information messages it shall not require the receipt of other DCE Provided Information messages for its correct operation but shall operate correctly if such messages are received.

This requirement is only applicable to circuit switched applications.

Annex C The United Kingdom does not implement Charge Information; therefore there are no requirements for timer T7.

Annex F The United Kingdom network does not implement the following Call Progress Signals: 00,01,02,03,04,05,23,47,49,51,72,81,82 and 83.

Therefore, whilst a DTE intended for connection to the United Kingdom network may be capable of recognising such Call Progress Signals it shall not require the receipt of any of these Call Progress Signals for its correct operation but shall operate correctly if such a signal is received.

This requirement is only applicable to circuit switched applications.

United Kingdom National safety requirements

The United Kingdom National safety requirements are contained in the appropriate Clauses of British Standard (BS) 6301:1987 and in the other documents therein referred to.

Copies of the above British Standard may be obtained from:

- The Sales Department
- British Standards Institution
- Linford Wood
- MILTON KEYNES
- MK14 6LE
- England

Additional information on digital circuits within the United Kingdom

Additional information on the characteristics of British Telecommunications plc digital circuits are obtainable by writing to:

- British Telecommunications plc
- Corporate Relations Department
- British Telecom Centre
- Newgate Street
- LONDON
- EC1A 7AJ
- England

Additional information on the characteristics of kingston-upon-Hull digital circuits are obtainable by writing to:

Kingston-upon-Hull Telephone Department
Telephone House
Carr Lane
KINGSTON-UPON-HULL
HU1 3RE
England

For the attention of:

The Technical Support Unit
Transmission and Private Circuits Section
(Reference B.12)

Additional information on the characteristics of Mercury Communications Limited digital circuits are obtainable by writing to:

Mercury Communications Limited
Ninety Long Acre
LONDON
WC2E 9NP
England

For the attention of: Sales Support Engineering

Part 2: Requirements for Additional Features and Facilities Available with the X.21 [1] Minimum Set Within the United Kingdom

This part of the United Kingdom National Annex to this NET gives the DTE requirements for those features and facilities implemented within the United Kingdom that are applicable to data terminal equipment and which are additional to the features for the minimum set as specified in the main part of this NET and the preceding part(s) of this Annex. Part 3 contains the requirements for DTE that implement features applicable to a PSTN telephony capability (including DTEs which implement some or all of these features in data mode).

It should be noted that implementation of these features by a DTE is optional and for approval for connection to a public telecommunications network within the United Kingdom a DTE need only implement the features specified in the main part of this NET as modified by Part 1 of this National Annex. However, if these additional features are implemented by the DTE, then the relevant requirements, as specified below, shall apply.

NOTE 1: Not all features or facilities mentioned in this Annex may be offered by all Public Telecommunications Operators within the United Kingdom.

Paragraph numbers refer to the relevant Clause in CCITT Recommendation X.21 (1984) [1] unless otherwise stated.

1.1 Available Data Rates

DTE which implement any or all the following data rates, which are in addition to the CCITT Recommendation X.1 [4] classes 3 to 7 and 30, may also be approved for connection within the United Kingdom.

1 200 bit/s
8 000 bit/s
19 200 bit/s
56 000 bit/s (leased circuit service only)

The requirements for DTE implementing any of the above data rates are the same as those specified in the main part of this NET as modified by Part 1 of this national Annex except that approval testing shall be performed at the above rate(s) if such rates are implemented.

This requirement is applicable to both leased line and circuit switched applications except where shown.

Part 3: Additional requirements for DTE implementing features applicable to a PSTN telephony capability (including DTE which implement some or all of these features in data mode).

A9.1 Introduction

A9.1.1 This part of the United Kingdom National Annex details the approval requirements for a DTE containing a PSTN telephony capability. The requirements are also applicable to data-only DTE, and combined data and telephony DTE when in data mode, that implement some or all of the corresponding features. The features include the implementation of Facility Request Codes and the reception of Service Indicator Codes (SICs) using the CCITT Recommendation X.21 (1984) [1] enhanced sub-addressing sequence.

A9.1.2 It should be noted that implementation of these features by a DTE is mandatory for a DTE incorporating a PSTN telephony capability and optional for a data-only DTE. For approval for connection to a public telecommunications network within the United Kingdom a data-only DTE need only implement the minimum set of features specified in the main part of this NET as modified by the preceding parts of this Annex. However, if these additional features are implemented by a data-only DTE the requirements specified below shall apply.

A9.1.3 The requirements contained in this part of the United Kingdom National Annex are only applicable to circuit switched applications. Paragraph A9.7 defines the requirements for telephony terminals additional to those for call control.

A9.1.4 Paragraph numbers in the left hand margin of indented Clauses refer to the relevant Clause in CCITT Recommendation X.21 (1984) [1] unless stated otherwise.

A9.1.5 References made to BNF in the following text refer to the Backus Normal Form of syntactic description. See Annex D of CCITT Recommendation X.21 (1984) [1].

A9.2 Outgoing calls with a facility request sent as part of the selection sequence

The DTE shall transmit the Selection Sequence containing a Facility Request block in accordance with this NET as modified by the requirements specified below.

4.1.3 Annex D and Annex G

A9.2.1 The syntax of the Selection sequence shall be in accordance with the BNF for the Selection sequence containing a Facility Request block as described in CCITT Recommendation X.21 (1984) [1] Annex D with the following exceptions:

A9.2.1.1 An Address block shall always be sent with a Facility Request block;

A9.2.1.2 The DTE shall not send a Facility Registration/Cancellation block;

A9.2.1.3 The contents of a Facility Request block shall be in accordance with A9.2.2.

A9.2.2 The contents of a Facility Request block shall comprise of a facility request signal either as described in A9.2.2.1 or A9.2.2.2 or both.

A9.2.2.1 Facility Request Signal for Closed User Group

The Facility request code "1" shall be sent by the DTE followed by a facility parameter (CUG Index) in the range 00 to 99. The facility request code shall be separated from the facility parameter by the / character, e.g.: 1/XX

NOTE: This procedure is in accordance with CCITT Recommendation X.21 [1], Annex G.

A9.2.2.2 Facility Request Signal for Service Indicator Codes

The facility request code "9" shall be sent by the DTE followed by a facility parameter comprising two or four IA5 characters which depict the required SIC. The facility request code shall be separated from the facility parameter by the / character, e.g.: 9/XX or 9/XXXX

The user of this facility parameter (SIC) shall be in accordance with the requirements of paragraph A9.4 and Table A9-2 (NET 1).

NOTE 1: CCITT Recommendation X.21 [1], Annex G allows the use of facility request code "9" for national purposes.

Where both facility request signals are sent in the same Selection sequence they shall be separated from each other by a comma (,).

NOTE 2: Either facility request signal may be sent first.

A9.2.3 The Facility Request Block shall be terminated by the "-" character.

A9.3 Incoming calls making use of the enhanced sub-addressing sequence to receive service indicator codes.

4.1.6.2.2 and Annex H

The DTE shall respond to the receipt of an INCOMING CALL indication within 500 ms by signalling PROCEED WITH CALL INFORMATION, t = continuous IA5 character 2/10 ("*") (preceded by two or more contiguous 1/6 ("SYN") characters), with c = OFF. The DTE shall maintain this condition until the events of A9.3.2 or A9.3.3. The SIC in the form of CALL INFORMATION will be sent to the DTE as shown below:

<Call Information Block> : : = /9/SIC+

The DTE will subsequently receive DCE WAITING.

A9.3.2 If, from the information received in the CALL INFORMATION sequence, the DTE determines that it is able to accept the call, see paragraph A9.4, it shall signal either CALL ACCEPTED (t = 1, c = ON) or DTE PROVIDED INFORMATION (t = IA5, c = OFF) followed by CALL ACCEPTED within 20 s in the case of a data call or, in the case of a telephony call, when the call is answered, see note. Responding with DTE PROVIDED INFORMATION is mandatory in the case of a telephony call. The format and content of the DTE PROVIDED INFORMATION shall be in accordance with paragraph A9.5.

NOTE: If a telephony call is not answered within 3 minutes the call will be cleared by the DCE.

From this point on the DTE shall follow the normal sequence for an incoming call as specified in the main part of this NET, but see paragraph A9.6.2 and paragraph A9.7 for telephony calls.

A9.3.3 If, from the information received in the CALL INFORMATION sequence, the DTE determines that it is unable to accept the call, see paragraph A9.4, it shall initiate the DTE Clearing sequence in accordance with the main part of this NET.

NOTE: This sequence is based on paragraph 4.1.6.2.2 of CCITT Recommendation X.21 (1984) [1].

A9.4 DTE requirements for the use of service indicator codes

A9.4.1 Outgoing Calls

A9.4.1.1 The content of an SIC sent by a DTE shall comply with one of the codings shown in Table A9-2. No other codings shall be sent.

A9.4.1.2 A DTE shall only transmit a SIC which matches that DTE's declared capability as described in Table A9-2 - Part 1 and Part 2. For example, a DTE initiating a telephony call shall transmit the SIC pertaining to telephony. A DTE initiating a data call shall not transmit the telephony SIC.

A9.4.1.3 A DTE may have more than one of the capabilities shown in Table A9-2 (NET 1) and therefore may transmit different SICs on successive outgoing calls as long as the requirements of A9.4.1.2 are met.

A9.4.2 Incoming Calls

A9.4.2.1 A DTE shall only accept an incoming call when the SIC received matches the DTE's declared capability as described in Table A9-2 (NET 1) - Part 1 and Part 2. For example, a DTE without a public telephony capability shall not accept an incoming call where the SIC indicates telephony.

A9.4.2.2 Where a DTE does have a public telephony capability but the incoming SIC indicates a data call, the call shall be rejected unless the DTE also has the appropriate data capability.

A9.4.2.3 A DTE with telephony capability shall not enable its transmission path when the incoming SIC indicates data.

A9.4.2.4 A DTE may have more than one of the capabilities shown in Table A9-2 (NET 1) and therefore may accept calls with different SICs on successive calls as long as the requirements of A9.4.2.1, A9.4.2.2 and A9.4.2.3 are met.

A9.5 DTE provided information

Annex F The DTE PROVIDED INFORMATION shall take the form : +01+

A9.6 Timings and Time-outs

Annex C

A9.6.1 For data calls the time limits and time-outs when using the features specified in this Annex shall be as defined in CCITT Recommendation X.21 (1984) [1], Annex C.

Annex C

A9.6.2 For telephony calls the time limits and time-outs shall be as defined in CCITT Recommendation X.21 (1984) [1] Annex C except as shown below.

A9.6.2.1 On completion of the DTE PROVIDED INFORMATION sequence the DTE shall commence a 2 second time-out during which period the DTE shall signal DTE WAITING, t = 1, c = OFF. When the 2 second time-out matures, and if no DCE CLEAR INDICATION has been received in the meantime, the DTE shall commence Call Arrival Indication, i.e. ringing, and the DTE shall continue to signal DTE WAITING. If a DCE CLEAR INDICATION is received before expiry of the 2 second time-out, Call Arrival Indication shall not be started, the time-out shall be cancelled and the DTE shall respond as described in the NET for clearing sequences.

A9.7 Requirements for telephony terminals other than the call control requirements contained in this Annex.

3.1 In the United Kingdom circuit switched service byte timing is only available when using the 64 kbit/s data rate and during states 12 and 13. Therefore a DTE intended for connection to the United Kingdom network shall not require byte timing at any other rate or during any other state.

This requirement is only applicable to circuit switched applications.

The requirements for transmission and other allied requirements for CCITT Recommendation X.21 [1] digital telephony terminals, including the correct implementation of byte timing, will be contained in a national standard which is currently being drafted.

TABLE A9-2 (NET 1): Service indicator codes

NOTE: The SIC codings given in the following Table do not have general application to other network interfaces within the United Kingdom.

Part 1 - SICs With 2 characters - Mandatory Use

SIC Code (IA5 Char)	Meaning	Notes
00 10 12	Telephony (64 kbit/s A-law) (the requirements for the use of this SIC are given in 1 below) Category II Call (64 kbit/s A-law) (the requirements for the use of this SIC are given in 1 below) Category I Call (64 kbit/s A-law) (the requirements for the use of this SIC are given in 2 below)	
1 2	<p>1 When initiating a telephony call the terminal shall send either the Telephony SIC (00) or the Category II SIC (10). These two SICs shall not be used in association with a non-telephony call. When either of these two SICs are received by a terminal on an incoming call the terminal shall treat the call as a telephony call. A terminal without telephony capability shall not accept an incoming call containing either or these two SICs.</p> <p>2 The category I SIC (12) shall not be used on outgoing calls. If the category I SIC is received on an incoming call the terminal shall treat the call as a telephony call. A terminal without telephony capability shall not accept an incoming call containing this SIC.</p>	

Part 2 - SICs With 4 Characters

1st and 2nd Characters - Mandatory Use

SIC Code (IA5 Char)	Meaning	Notes
A0	64 kbit/s Data	
A2	48 kbit/s Data	
A4	19 200 bit/s Data	
A8	9 600 bit/s Data	
A9	8 000 bit/s Data	
AB	4 800 bit/s Data	
AD	2 400 bit/s Data	
AE	1 200 bit/s Data	
AF	600 bit/s Data	
B0	300 bit/s Data	NOTE 4
B1	200 bit/s Data	NOTE 4
B2	150 bit/s Data	NOTE 4
B3	134,5 bit/s Data	NOTE 4
B4	110 bit/s Data	NOTE 4
B5	100 bit/s Data	NOTE 4
B6	75 bit/s Data	NOTE 4
B7	50 bit/s Data	NOTE 4
B8	75/1 200 bit/s Data	NOTES 4 and 5
B9	1 200/75 bit/s Data	NOTES 4 and 6
<p>NOTE 4: For use only with an external terminal adaptor capable of performing the ECMA RAO rate adaption function for asynchronous devices. NOTE 5: 75 bit/s in the calling to called direction, 1 200 bit/s in the other direction. NOTE 6: 1 200 bit/s in the calling to called direction, 75 bit/s in the other direction.</p>		

Part 3

3rd SIC Character - Recommended Use

SIC Code (IA5 Char)	Meaning	Notes
0	Clock locked to transmission, unformatted, no byte timing	NOTE 7
	or No flow control on TA, number of data bits unspecified	NOTE 8
1	Clock locked to transmission, unformatted, byte timing	NOTE 7
	or No flow control on TA, 5 data bits	NOTE 8
2	Clock locked to transmission, formatted X.25, no byte timing	NOTE 7
	or No flow control on TA, 7 data bits	NOTE 8
3	Clock locked to transmission, formatted X.25, byte timing	NOTE 7
	or No flow control on TA, 8 data bits	NOTE 8
4	Bits E4/E5/E6 indicate phase, unformatted, no byte timing	NOTE 7
	or TA has ESRA flow control, number of data bits unspecified	NOTE 8
5	Bits E4/E5/E6 indicate phase, unformatted, byte timing	NOTE 7
	or TA has ESRA flow control, 5 data bits	NOTE 8
6	Bits E4/E5/E6 indicate phase, formatted X.25, no byte timing	NOTE 7
	or TA has ESRA flow control, 7 data bits	NOTE 8
7	Bits E4/E5/E6 indicate phase, formatted X.25, byte timing	NOTE 7
	or TA has ESRA flow control, 8 data bits	NOTE 8
NOTE 7:	Synchronous Data Identity - adopts this meaning when the 4th SIC character is 4 or C, see next page.	
NOTE 8:	Asynchronous Data Identity - adopts this meaning when the 4th SIC character is 5, D, 6, E, 7 or F, see next page.	

4th SIC Character - Recommended Use

SIC Code (IA5 Char)	Meaning	Notes
0	Multi-sampled asynchronous, full duplex	NOTE 9
8	Multi-sampled asynchronous, half duplex	NOTE 9
4	Synchronous, full duplex	
C	Synchronous, half duplex	
5	Asynchronous, full duplex, 1 stop bit	NOTE 10
D	Asynchronous, half duplex, 1 stop bit	NOTE 10
6	Asynchronous, full duplex, 1,5 stop bits	NOTE 10
E	Asynchronous, half duplex, 2 stop bits	NOTE 10
7	Asynchronous, full duplex, 2 stop bits	NOTE 10
F	Asynchronous, half duplex, 2 stop bits	NOTE 10
NOTE 9: For use only where the 3rd SIC Character is 0. NOTE 10: For use only with an external terminal adaptor (TA) capable of performing the ECMA RAO rate adaption function.		

Appendix to Annex A: Conformance Test Suites for National Network Requirements

Appendix to Annex A1: Austria

- a) The tester verifies conformance to the additional requirements concerning call repetitions in case of unsuccessful calling by
 - counting the number of produced call repetitions in each period of 1 minute respectively 8 minutes,
 - measuring the break between each clearing and new call attempt in every test of Clause 8 that is comprising unsuccessful calling by the DTE.

- b) The tester verifies conformance to the additional requirement concerning Time-limit T3B by repeating the tests of Clause 8 for Time-limit T3B with CPS 04 in place of CPS 01.

Appendix to Annex A2: Denmark

2.2 No test

Table C-1/X.21 [1], table F-1/X.21 [1].

Test 8.2.3, T3B is performed with the use of CPS 04 instead of CPS 01.

Appendix to Annex A3: Finland

2.2 No test

Table C-1/X.21 [1], table F-1/X.21 [1].

Test 8.2.3, T3B is performed with the use of CPS 04 instead of CPS 01.

Appendix to Annex A4: France

The tester verifies conformance to the additional requirements concerning call repetitions in case of unsuccessful calling.

Appendix to Annex A5: Test Case Description to verify the National Network Requirements for the Federal Republic of Germany

Test case 1

Test purpose: This test verifies whether the IUT conforms with the requirements of call re-attempts when one of the CPS 20, 21, 22, 23, 43, 52 or 61 has been received.

Test procedure: All tests will be performed by using test sequences specified in subclause 8.2.1.1.2. The tester observes the delay between multiple of these sequences.

Test case 2

Test purpose: This test verifies whether the IUT conforms with the requirements of applying 60 s for T3B after reception of CPS 04 and/or CPS 01.

Test procedure: The test procedure as specified in subclause 8.2.3.4 apply. All these tests will be repeated with a sequence of CPS 04 and CPS 01.

Appendix to Annex A6: Italy

No additional tests.

Appendix to Annex A7: Norway

2.2 No test

Table C-1/X.21 [1], table F-1/X.21 [1].

Test 8.2.3, T3B is performed with the use of CPS 04 instead of CPS 01.

Appendix to Annex A8: Sweden

2.2 No test

Table C-1/X.21 [1], table F-1/X.21 [1].

Test 8.2.3, T3B is performed with the use of CPS 04 instead of CPS 01.

Appendix to Annex A9: United Kingdom

PART 1

2.2 No additional tests required, however the ATL shall report that a connecting cable was used during testing.

4.1.1 and 4.1.8

The DTE shall be connected to the tester.

For DTE not capable of recognising CPS 61 the following tests shall be applied:

- The DTE shall then be stimulated to initiate an outgoing call.
- During state 7 the tester shall send a CPS indicating an unsuccessful call followed by a DCE CLEAR INDICATION.
- This process shall be repeated as each fresh call attempt is generated.
- The number of repeat attempts generated in a 4-hour period and their spacings shall be recorded in the test report by the ATL.

For DTE capable of recognising CPS the following tests shall be applied:

- The DTE shall be stimulated to initiate an outgoing call.
- During state 7 the tester shall send CPS 61 to the DTE followed by DCE CLEAR INDICATION.
- The number of repeat attempts generated in a 4-hour period and their spacings shall be recorded in the test report by the ATL.
- The above test sequence shall be repeated but during state 7 on each call attempt the tester shall randomly send a CPS from the range 20,21,43,44 and 61. The CPS sent on each occasion shall be recorded and included in the test report by the ATL.
- The number of repeat attempts generated in a-hour period and their spacings shall be recorded in the test report by the ATL.

4.1.3 and Annex D

The "*" and "#" characters shall be included in the range of permissible characters of test 8.2.1.1.4 and the presence of such characters shall be included in the report by the ATL.

4.1.6.1 Covered by the tests of Clause 8 - no additional tests required.

The ATL shall report specifically if T3B is not implemented.

4.1.9 For information - conformance adequately checked by the tests of Clause 8.

Annex F For information - conformance adequately checked by the tests of Clause 8.

SAFETY

Tests shall be as specified in the relevant Clauses of BS 6301:1987.

PART 2

1.1 The tests of Clause 8 and, where applicable, the tests of this and other Annexes shall be conducted at the data rate(s) declared by the supplier as being implemented by the DTE.

PART 3

AA9.1 Outgoing Calls

4.1.3 and Annex G

The tests contained in § 8.2.1.1.4 1) Address Call are replaced by the following:
The DTE is stimulated to make an outgoing Call.

The tester monitors the DTE t and c circuits to ensure that:

- During the transition from READY (state 1) to CALL REQUEST (state 2), the transition to t = 0 (or c = ON) occurs within a maximum of 7 bit intervals of the transition to c = ON (or t = 0).

The tester responds to the CALL REQUEST within 3 sec by signalling PROCEED TO SELECT and then monitors the DTE t and c circuits to ensure that:

- The Selection Sequence is preceded by at least 2 SYN characters.
- A valid Facility Request Code (according to Annex A9 Part 3) is transmitted on the t circuit.
- The Facility Request Code is separated from the Facility Parameter by means of the "/" character.
- Where the Facility Request Code was "1" the Facility Parameter is in the range 00 to 99.
- Where the Facility Request Code was "9" the Facility Parameter is one of the permitted SIC codings as given in Table A9-2 (NET 1) and the coding sent is an accurate representation of the capability of the DTE as declared by the supplier.
- Where more than one Facility Request Signal is sent they are separated from each other by a comma (,).
- The Facility Request Block is terminated by the "-" character.
- The Address characters are selected from the International Alphabet No.5 and are in the range 0 to 9, * and # (and no others) and accurately represent the address inserted in accordance with the user instructions for the terminal.
- All characters are transmitted with odd parity.
- The Selection Sequence is terminated by the "+" character.
- The only padding characters are "SYN" characters.
- Selection Sequence signals are sent such that the expiry of any of the DCE time-outs T11, T12, and T13 does not occur.
- The C circuit remains in the ON condition for the duration of the Selection Sequence.
- The DTE WAITING signal (t =1, c = ON) is immediately generated after the "+" terminating character without a SYN character in between.
- The state transition does not contain spurious bit patterns.
- Character alignment is preserved.

Where the DTE has more than one declared capability the above tests shall be repeated such that a call attempt is initiated for each of the declared capabilities in turn.

AA9.2 Incoming Calls

4.1.6.2.2 and Annex H

AA9.2.1 The tests of § 8.2.1.2.1 are replaced by the following:

The tester initiates an Incoming Call and then emulates a successful call set-up in conformance with CCITT Recommendation X.21 [1] protocol, with the following state suites:

- i) Without DCE information block:
 - a) 1-8-9B-10C-6C-25-6D-9C-6B-11-12
 - b) 1-8-9B-10C-6C-25-6D-9C-11-12
 - c) 1-8-9B-10C-6C-25-6D-9C-12
 - d) 1-8-9B-10C-6C-25-6D-9C-6B-12

- ii) With a DCE information block (Dummy line identification in state 10B):
 - a) 1-8-9B-10C-6C-25-6D-9C-6B-10B-11-12
 - b) 1-8-9B-10C-6C-25-6D-9C-6B-10B-12
 - c) 1-8-9B-10C-6C-25-6D-9C-6B-10B-6B-11-12
 - d) 1-8-9B-10C-6C-25-6D-9C-6B-10B-6B-12

AA9.2.2 When, during the above sequences, the tester initiates an Incoming Call, the tester shall monitor the DTE t and c circuits to ensure that:

- The DTE responds within 500 ms by signalling t = continuous IA5 character 2/10 ("*") (preceded by 2 or more SYN characters) with C = OFF (state 9B).

The tester shall then send r = /9/SIC + preceded by 2 or more SYN characters with i = OFF, (state 10 C). The SIC shall be encoded using one of the values in Table A9-2 of Annex A9 Part 3 and in accordance with the capability of the DTE as declared by the supplier. The tester shall then monitor the DTE t and c circuits to ensure that:

Annex F In the case of a data call the DTE signals either CALL ACCEPTED (t = 1, c = ON) or DTE PROVIDED INFORMATION (t = +01+, c = OFF) followed within 20 sec by CALL ACCEPTED (t = 1, c = ON), (states 25 and 9C).

Annex F and Annex C

In the case of a telephony call the DTE signals DTE PROVIDED INFORMATION (t = +01+, c = OFF) followed by CALL ACCEPTED when the call is answered (states 25 and 9C). It shall also be verified that Call Arrival Indication commences at least 2 sec after the tester has received DTE PROVIDED INFORMATION and ceases when the call has been answered or cleared.

AA9.2.3 Where the DTE is declared as having more than one capability the tests of AA9.2.2 shall be repeated for each such capability and the tester shall send the SIC appropriate to each of the declared capabilities in turn on successive calls.

AA9.2.4 The tests of AA9.2.2 shall be repeated three times and on each occasion a different SIC shall be used, selected at random from those in Annex A9 Part A9.3 Table A9-2 (NET 1), that do not reflect the capability of the DTE.

The tester shall monitor the DTE t and c circuits to ensure that following the receipt of CALL INFORMATION the DTE signals DTE CLEAR REQUEST (state 16).

NOTE: These tests to check that a DTE rejects a call with an inappropriate SIC need only be conducted using one of the sequences from AA9.2.1 i) or AA9.2.1 ii).

3 Byte Timing

3.1 The tests for the correct use of byte timing will be contained within the UK national standard for CCITT Recommendation X.21 [1] digital telephony.

Annex B: Information to be provided by the supplier to the accredited test laboratory

To assist the accredited test laboratory to arrive at a suitable test suite for any given DTE and also as an aid to an approval authority in its analysis of the test results it is essential that the supplier provides certain information regarding the DTE. As a minimum this information should include:

- a) the countries for which testing to national Annexes is required;
- b) the type of interface applicable to the DTE, i.e. leased line or circuit switched;
- c) the electrical characteristics of the DTE, e.g. CCITT Recommendation X.26 [5] or CCITT Recommendation X.27 [6] including, where applicable, a declaration of conformance with the electrical characteristics together with supporting information;
- d) whether the DTE can support both incoming and outgoing calls or incoming calls only or outgoing calls only;
- e) whether or not the Direct call facility is implemented;
- f) whether or not the Selection Sequence is implemented;
- g) the information required in Clause 8 needed to perform appropriate tests;
- h) a list of extra facilities, if any, supported by the DTE over and above the minimum set of CCITT Recommendation X.21 [1] features, e.g. sub-addressing;
- i) the data rate(s) implemented;
- j) the power supply requirements of the DTE;
- k) the options exercised by the DTE where appropriate;
- l) the DTE operating instructions;
- m) operational environment of the DTE as required by subclause 5.4;
- n) nominal timer values.

History

Document history	
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