

**Access and Terminals (AT);
Digital access to the public telecommunications network;
Publication of interface specification
under Directive 1999/5/EC;
Guidelines for describing digital interfaces**



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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Access and Terminals (AT).

Introduction

Directive 1999/5/EC [1] introduces a fundamental change in the area of terminal equipment interworking with the public telephone network. Formerly there were specifications that applied to terminal equipment ensuring, to varying degrees of confidence, interworking with and via different networks. Under Directive 1999/5/EC [1] an obligation is placed on PNOs and PSPs to publish specifications of network interfaces they provide. Article 4.2 of the Directive states:

"...Member States shall ensure that such operators publish accurate and adequate technical specifications of such interfaces before services provided through those interfaces are made publicly available, and regularly publish any updated specifications. The specifications shall be in sufficient detail to permit the design of telecommunications terminal equipment capable of utilizing all services provided through the corresponding interface. The specifications shall include, inter alia, all the information necessary to allow manufacturers to carry out, at their choice, the relevant tests for the essential requirements applicable to the telecommunications terminal equipment. Member States shall ensure that those specifications are made readily available by the operators."

This document provides guidance on the content of such publications for the area of digital wired access to the public telecommunications network in order to meet this requirement. This document has been produced at the request of AHGC to assist in their output to the Commission.

1 Scope

The present document assists the public network operators and public service providers in producing publications that describe their public interfaces in accordance with article 4.2 of Directive 1999/5/EC [1].

The present document lists the characteristics of a non-radio digital interface to the public telecommunications network which could be necessary for a description of that interface but does not give guidance on the style of presentation of interface publications.

Indirect access to services and networks are also covered in the present document.

The process of publication is not covered in the present document.

This document is applicable to interface specifications for new, modified and existing interfaces.

2 References

For the purposes of this Technical Report (TR) the following references apply:

- [1] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio and equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive).
- [2] ETSI TR 101 092 (V1.1.1): "Network Aspects (NA); Report on Carrier Selection".
- [3] ITU-T Recommendation X.200 / ISO/IEC 7498-1 (1994): "Information technology - Open Systems Interconnection - Basic Reference Model".
- [4] Guidance for public network operators when publishing interfaces, and nras/member states when supervising such publication (Commission Guide 3).
- [5] Guidance on interface publication by public telecommunications network operators (Commission Guide 2).
- [6] ETSI EG 201 212 (V1.2.1): "Electrical safety; Classification of interfaces for equipment to be connected to telecommunication networks".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

direct access: access for terminal equipment to services provided by a PNO or PSP exclusively via the infrastructure of that PNO or PSP

indirect access: access for terminal equipment to services provided by a PNO or PSP via the infrastructure of another PNO or PSP

leased line: connection between two or more points that does not require the terminal to provide the network with information in order for the connection to be established

network termination point: point at which the network operator describes the characteristics of service provided and beyond which their responsibility for the service ceases

public network operator: network operator that is licensed to provide public telecommunications services

public service provider: provider of telecommunications services (for example voice mail) to the public that may not also be a public network operator

public telecommunications network: telecommunications network used to provide publicly available telecommunications services

standard interconnect: "interconnection" means the physical and logical linking of telecommunications systems used by the same or a different organization in order to allow the users of one organization to communicate with users of the same or another organization or to access services provided by another organization irrespective of whether services are provided by the parties involved or other parties who have access to the systems

structured: digital service offering in which the number of bits to a frame, the meaning of bits within certain frames, etc. is defined and agreed with the network operator

switched: connection normally between any two points that requires the terminal to provide the network with information in order for the connection to be established

unbundled local loop: means by which others can make use of the copper wires owned by a network operator, that are provided to deliver services to customers

unstructured: digital service offering in which the structure and content of the bit stream is not subject to any agreement with the network operator

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AHGC	Ad hoc group C, one of the groups set up by the European Commission to preliminarily study the implementation of Directive 99/5/EC [1], group C was given the task of studying the operator's obligation to publish interface specifications under article 4.2 of the Directive
CSC	Carrier Selection Code
EMC	ElectroMagnetic Compatibility
ISDN	Integrated Services Digital Network
NTP	Network Termination Point
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
PNO	Public Network Operator
PSP	Public Service Provider
TCAM	Telecommunication Conformity Assessment and Market Surveillance Committee
TE	Terminal Equipment
ULL	Unbundled Local Loop

4 Guidance to PNOs on Intellectual Property Rights (IPR)

Publication of an interface specification does not exclude the application of Intellectual Property Rights associated with it. Therefore the specification should contain clear details of any IPR of which the PNO is aware.

5 Applicability of parameters to interface types.

Annex A contains an extract from the final report of Ad-Hoc Group C as presented to TCAM in July 1999 by the European Commission. (The group C report was used by the Commission in deriving guidance documents on interface publication [4], [5]).

From Annex A the following can be deduced:

- 1) For interfaces based on the Open Systems Interconnection Model - parameters for layers 1, 2 and 3 will need to be considered as appropriate. Some parameters within any specific layer may not be relevant for all types of interface. In the case of tele-services some parameters in higher levels may also need to be described.
- 2) For other types of interfaces similar levels of detail will need to be provided, Networks should be defined where possible by reference to ETSI deliverables or other International Standards. Where networks are generally based on an International or ETSI standard but differ in some way the preferred manner of declaring the interface is to declare the source standard and then indicate where the interface is different (provide a "delta" document).
- 3) Whilst the provision of a PICS and PIXIT taken from the source standard may be desirable, the provision of the network interface description in this format is not mandatory. However, if the PICS and PIXIT are not used, the format used should provide at least an equivalent level of clarity, removal of ambiguity and ease of use. This allows commonality between network interfaces to be assessed.

The parameters described in the present document are applicable to various types of non-radio digital access to the public telecommunications network. Direct access to public telecommunications networks is described in table 1. Indirect access to public telecommunications networks is also considered, the most common scenarios are described in table 2.

In all the scenarios in tables 1 and 2, for direct access, the interface at the NTP, has to be published. In the scenarios in table 2, for indirect access, the additional details also have to be published where these are required for terminal design and are not contained in the direct access interface publication.

Not all of the characteristics described in clause 6 of the present document are applicable to every network interface. Guidance on applicability may be found in annex B.

Table 1: Methods of direct access to PNO

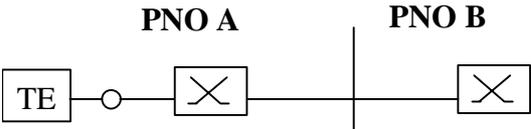
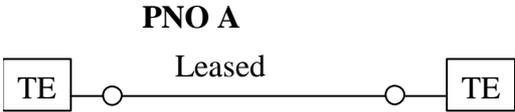
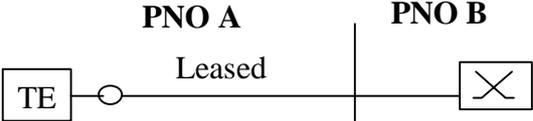
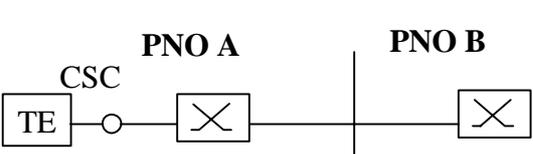
Scenario	Who Publishes	Comments
<p>Scenario 1.</p> 	<p>Network Operator A Only publishes specifications relating to Network A.</p>	<p>Standard Interconnect.</p>
<p>Scenario 2.</p> 	<p>Network Operator A publishes specification.</p>	<p>Standard Interconnect.</p>

Table 2: Methods of indirect access to PNO

<p>Scenario 3.</p>  <p style="text-align: center;">PNO A PNO B</p>	<p>Network Operator B (PNO A will need to supply PNO B with technical information on local access network used by PNO B)</p>	<p>Unbundled Local Loop (ULL).</p>
<p>Scenario 4.</p>  <p style="text-align: center;">PNO A PNO B</p>	<p>Network Operator B (and Network Operator A in the case where the user has a direct contract with PNO A for the leased line)</p>	<p>PNO A provides lease line connection between TE and PNO B.</p>
<p>Scenario 5.</p>  <p style="text-align: center;">PNO A PNO B</p>	<p>Network Operator A and Network Operator B. For PNO A it is likely to be the same interface specification as in Scenario 1. For PNO B, only the information above and beyond information already provided by PNO A needs to be published e.g. second dial tone, Call Party Answer signal</p>	<p>Indirect Access (where CSC is the carrier selection code as described in TR 101 092 V1.1.1 [2]). Carrier preselection is also covered in scenario 4 except that no carrier selection codes will be dialled by the customer</p>
<p>Key</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Terminal Equipment</p> </div> <div style="text-align: center;">  <p>Switch</p> </div> </div> <div style="display: flex; justify-content: center; align-items: center; margin-top: 10px;"> <div style="text-align: center; margin-right: 20px;">  <p>NTP</p> </div> </div>		

NOTE: The PNO indicates the body responsible for the Network. It is assumed that PNO B can also be the PSP.

6 Characteristics to be specified

6.1 General

Article 4.2 of Directive 1999/5/EC [1] obliges Member States to ensure that Network Operators provide a detailed technical description of their interfaces. Sufficient information must be published to allow manufacturers to test: that their equipment conforms to the interface specification, including the relevant essential requirements; manufacture the design; and place the terminal equipment on the market.

In order that the manufacturer can advise customers about the suitability of the terminal equipment for specific Public Network Operator Services, the description of the interface should either include or reference details of the services the PNO provides using that interface.

PNOs should include any information concerning inter-working with the network that the PNO is aware would be relevant to the design and operation of appropriate terminal equipment.

Where the value of any particular parameter will be significantly affected by the method of measurement, then the method of measurement should also be stated.

Interfaces should be defined where possible by reference to publicly available standards indicating which options have been implemented, where applicable. Where a published PICS proforma exists, consideration should be given to using the PICS proforma as a means of publication of the relevant interface specification, or appropriate part of the interface specification. Where a published PICS proforma does exist and it is decided not to use it, then the network operator should present information in a sufficient level of detail to allow a reader to clearly and unambiguously understand the implementation of all optional and conditional requirements identified in the published PICS proforma.

Whilst the provision of PICS and PIXITs may be desirable, the provision of the network description in this format is not mandatory.

Where networks are generally based on a publicly available standard but differ in some way, the preferred manner of declaring the interface is to declare the source standard, indicate the options that have been implemented and indicate the differences by the use of a "delta" document.

NOTE: There is no requirement for the contents of an existing specification to be reproduced in the interface publication. In line with guidance given in the present document on reference to standards, it is recommended that the interface refers out to the published specification and/or provides details of where the specification may be obtained.

Where a terminal equipment standard exists that would help a terminal designer to achieve a satisfactory design, this standard may be referenced as additional information. Publication should be made using ETSI terminology where possible.

6.2 Safety

The safety status of the network interface should be described according the classifications detailed in EG 201 212 [6].

6.3 EMC

It would be helpful for the operator to provide any available information that would assist terminal suppliers to determine their EMC strategy.

6.4 Physical characteristics

6.4.1 Connection method

The mechanical characteristics of the network connection point should be described in sufficient detail as to allow a terminal manufacturer to design or select a connector or an adapter capable of reliably connecting the terminal at the NTP.

6.4.2 Connection pin assignment and wiring arrangements

Full details of connector pin assignment should be provided where plug/socket connectors are used at the NTP. Where the NTP is of the hardwired variety, details of cable type and connection arrangements should be provided.

6.4.3 Sizing constraints

Any characteristic that may limit the number of terminals that can be connected to the PTN interface should be specified. Examples of such characteristics are maximum power consumption and maximum bus loading.

6.5 Electrical Characteristics

6.5.1 Signal characteristics

Details of the electrical characteristics of the interface such as the range of transmission rates, the range of signal power accepted and delivered by the interface, pulse mask, line code, impedance, timing limitations, etc. should be provided.

6.5.2 Synchronization

Where the service provides a network source of synchronization or requires synchronization to the network for it to function, sufficient information should be provided to enable the designer to produce a terminal that can synchronize with the network.

6.5.3 Power feed conditions

Where power is provided over the interface, full details of the power arrangements should be given.

6.6 Optical signal Characteristics

6.6.1 Signal Characteristics

Details of the optical characteristics of the interface such as the range of transmission rates, the range of signal power accepted and delivered by the interface, pulse mask, line code, timing limitations, etc. should be provided.

6.6.2 Synchronization

Where the service provides a network source of synchronization or requires synchronization to the network for it to function, sufficient information should be provided to enable the designer to produce a terminal that can synchronize with the network.

6.7 Basic Coding Structure

Details should include items such as state machine, bit stuffing, priority mechanisms and alarm reporting, etc.

6.8 Protocol elements and procedures for signalling

Where the Public Telecommunications Network uses a layered protocol architecture, the functions and characteristics of each layer that involves interaction between the terminal equipment and the Public Telecommunications Network should be specified.

As an example, for interfaces based on the Open Systems Interconnection Model [3] - characteristics of layers 1, 2 and 3 will need to be considered, although some characteristics within any specific layer may not be relevant for all types of interface. Where interaction between the terminal and the network is required above layer 3, characteristics of these higher layers will also need to be provided. A similar level of detail will need to be provided for interfaces not based on the ISO 7 layer model.

The PTN interface specification should include a list of all the telecommunication services provided through the PTN interface.

Protocol elements and procedures for establishing, maintaining, modifying and terminating communications should be detailed as well as the methodology for dealing with any unrecognized protocol data units or data elements.

Protocol elements might be code, frame format and size, messages, information elements, timers, window size, etc.

Details should be provided not only of the options that have been provided, but also any that have not.

6.9 Additional features

Not all interfaces will support all the following features.

6.9.1 Voice services

The coding algorithm used to digitize the speech should be detailed.

6.9.2 Charging information

Where charging information is applied or supplied by the network at the NTP, this should be specified.

Examples of charging information might be: - start and/or end time, duration, charge rate, charge volume, etc.

6.9.3 "Supplementary" services and optional user facilities

Elements and procedures for the control of supplementary services and optional user facilities, where provided, should be detailed.

6.9.4 Presentation aspects

Any information related to specific text character presentation by the terminals during communication should be provided. This clause has particular relevance for Telex systems.

Annex A: Extract from Ad-hoc Group C Report

Part 3 - Guidelines for Public Network Operators when publishing interfaces, and NRAs/Member States when supervising such publication.

1. Public Network Operators and NRAs should take account of any guidance published by the Commission concerning the publication of interfaces under the R&TTE Directive.
2. Publication is required for each type of public network interface. Such interfaces include not only direct interfaces with terminal equipment (the Network Terminating Point), but also indirect interfaces where the Public Network Operator has a contractual relationship with end-users. (See annex 2 (of the Ad-hoc Group C report) for the different configurations to be considered). In the case of indirect connection, only those details additional to the publication relating to the direct interface need be published, that is, the publication is a 'delta' to the direct interface publication.
3. Specifications of existing interfaces, as well as new and modified interfaces, must be published in accordance with any published guidelines or rules produced by NRAs, national competition authorities or from Europe. The withdrawal of any existing published interface must be notified including, ideally, any phased withdrawal process.
4. NRAs may specify guidelines or rules for appropriate lead-times for publication of existing, new and modified interfaces. These should be the minimum consistent with the need to allow manufacturers to design equipment, or to provide modified equipment in the case of modified interfaces. NRAs ought to take account of the need to promote innovation and competition in markets and should therefore allow shorter lead times where this can be justified.
5. Sufficient detail must be published to allow manufacturers to design, manufacture, test and place equipment on the market, including information concerning any Essential Requirements. The annexed templates [to the Ad-hoc Group C report and others being produced by ETSI] provide details of the expected content of analogue, digital and radio interfaces.
6. Interface publications may be produced using the Public Network Operator's own "house style" so long as the contents of the publication provide the same information as indicated in the templates. Clarity would be improved by cross-referencing to the template clause numbers and by using ETSI terminology wherever possible. There is no requirement to have a separate publication for each customer interface; it is recognized that where customer interfaces are very similar, it may be beneficial to have all of those interfaces in a single document. Similarly, it may be desirable to specify some characteristics which are common to a number of customer interfaces (e.g. tones and announcements) in a separate publication. The criteria for deciding how to document the technical characteristics of the customer interfaces should be based on clarity, removal of ambiguity, maintainability and ease of use for the users of these publications.
7. Publications should contain sufficient information to permit the design of terminal equipment so that it can interwork with the public telecommunications network for the purpose of establishing, modifying, charging for, holding and clearing real or virtual connections and to meet all Essential Requirements. They should also contain details of any supplementary services or enhanced features provided by the network that is important for the design and operation of terminal equipment. The PNO should not exclude any information concerning interworking with the network that it is aware would be relevant to the design and operation of terminal equipment. Sufficient information must be published to allow manufacturers to test that their equipment conforms to the interface specification, including the relevant Essential Requirements. The level of detail should be comparable to that previously provided in TBRs, excluding test specifications unless the test method needs to be declared in order to clarify the meaning of a given parameter.
8. Interface publications should refer to published standards where available and specify any options, additions or modifications selected by the PNO within them. For example, ISDN PICS and PIXIT documents could be used where available. PNOs may refer out to other published company documentation for all or part of their interface publication, as long as such documentation defines the interface from the network rather than the terminal viewpoint. Where such references are made, the PNO should ensure that the same ease of access exists for the referenced document(s) as that applied to the interface publication.

9. The PNO should ensure it does not knowingly publish in breach of any associated IPR and/or copyright. The PNO should at least consult the network equipment supplier. In so far as the PNO is aware of any relevant property rights, it should ensure that the publication contains a clear indication of:
- any IPR and/or copyright asserted over the contents of the publication (including any specifications referred out to);
 - the rights granted and restrictions made to users of the specification; and
 - how details of any licensing requirements associated with such IPR may be obtained.
10. The language of publication is a matter for each Member State. NRAs are encouraged not to place onerous translation requirements on PNOs.
11. Publications should be version controlled with a document history.
12. It is recommended that PNOs should make publications available electronically, i.e. on the World Wide Web. NRAs or other bodies may create hyperlinks to individual publication sites and to similar sites in other Member States. Paper copies should be made available on request, for which the PNO may levy a reasonable charge.
13. NRAs should promote the establishment of a national forum for the discussion of draft and published specifications with Public Network Operators, Public Service Providers, manufacturers and other interested parties, with the purpose of ensuring that publications conform to any relevant guidelines, meet the needs of terminal manufacturers and that the integrity of the network is maintained. Any such forum should take account of any harmonizing guidelines at the European level.
14. NRAs should require PNOs to republish any specifications that are found to be inadequate for their intended purpose. Any such decision should be based on published rules or guidelines or the templates in the level.

NOTE: References on this page to the present document or annexes, refer to the report of Ad-hoc Group C not this ETSI publication.

Annex B: Applicability of clauses to particular interface types

The table below indicates which clauses of the present document are likely to be relevant to particular types of digital interfaces.

Network Interface Type	Leased		Switched
	Unstructured	Structured	
Clause No			
6.1	✓	✓	✓
6.2	✓	✓	✓
6.3	✓	✓	✓
6.4	✓	✓	✓
6.5	✓	✓	✓
6.6	X	✓	✓
6.7	X	X	✓
6.8	X	X	✓

History

Document history		
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