

**T** ELENOR

**S**PECIFICATION

Specification no.: OA 105

Edition: 6.1

In force from: 01.01 2006

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**Requirements for equipment to be  
connected to the local loop in the  
access network of Telenor.  
Equipment providing ADSL and PSTN  
or ISDN Basic Access services, full  
unbundled access (service type E<sub>AF</sub>)**

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**Document ID** : TNO-FX-PT-I&P/OA105/3110 2005

**Archive no.** :

**Index words** : Access network, local loop, LLUB, equipment requirements, ADSL

**Abstract** : Requirements for the equipment of an Operator leasing copper pairs in the access network of Telenor in order to provide ADSL services

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## 1 Scope

This specification gives requirements for equipment owned by Operator and intended for connection to local loop in the access network of Telenor. The requirements apply for equipment supplying ADSL and PSTN or ISDN Basic Access (BA) services on one copper pair.

The Operator is responsible that the equipment is in conformance to this specification.

For equipment to be installed in Telelosji the formulary ‘Statement of Compliance’ in annex 2 shall be completed and forwarded to Telenor.

## 2 References

This specification incorporates by dated or undated references, provisions from other publications/standards. These normative references are cited at the appropriate places in the text and the references are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this specification only when incorporated in it by amendment or revision. For undated references, including amendments, the last edition of the document referred to applies.

### 2.1 Normative references

- [1] ITU-T G.992.1: “*Asymmetric Digital Subscriber Line (ADSL) transceivers*”
- [2] ITU-T G.992.3: “*Asymmetric Digital Subscriber Line (ADSL) transceivers – 2 (ADSL2)*”
- [3] ITU-T G.992.5: “*Asymmetric Digital Subscriber Line (ADSL) transceivers – Extended bandwidth ADSL2 (ADSL 2plus)*”
- [4] ETSI TS 101952-1-4 V1.1.1 (2002-11) “*Access network xDSL transmission filters; Part 1: ADSL splitters for European deployment; Sub-par 4: Specification of ADSL over “ISDN or POTS” universal splitters*”
- [5] Telenor Specification OA 101 (2006-01): “*Requirements for equipment to be connected to the local loop in the access network of Telenor. Equipment providing PSTN services, full unbundled access (service type A<sub>AF</sub>)*”
- [6] Telenor Specification OA 102 (2006-01): “*Requirements for equipment to be connected to the local loop in the access network of Telenor. Equipment providing ISDN Basic Access services or 160 kbit/s digital transmission, full unbundled access (service type B<sub>AF</sub>)*”
- [7] Telenor Specification OA 100: “*General requirements for equipment to be connected to the local loop in the access network of Telenor and/or material and equipment to be installed and operated in Telelosji*”

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## 2.2 Informative references

- [8] Telenor Nett Specification A59 (2001-05): “Access to copper pairs in the access network of Telenor. Specification of the network side of the user-network interface”

## 3 Definitions and abbreviations

Telelosji	Colocation at the premises of Telenor
Operatøraksess	Operators’ access to the access network of Telenor
ADSL	Asymmetric Digital Subscriber Line
DMT	Discrete Multi-Tone
MDF	Main Distribution Frame
NTP	Network Termination Point
NTU	Network Termination Unit

## 4 Application

This specification applies to ADSL equipment placed in the vicinity of the MDF of Telenor, and ADSL equipment at the subscriber’s premises (NTU), as shown in figure 1. A one pair transmission system shall be used. The ADSL system may be designed to allow for simultaneous transmission of PSTN or ISDN Basic Access (BA) services on the same pair. However, it is optional for the Operator whether he wants to deliver these services or not.

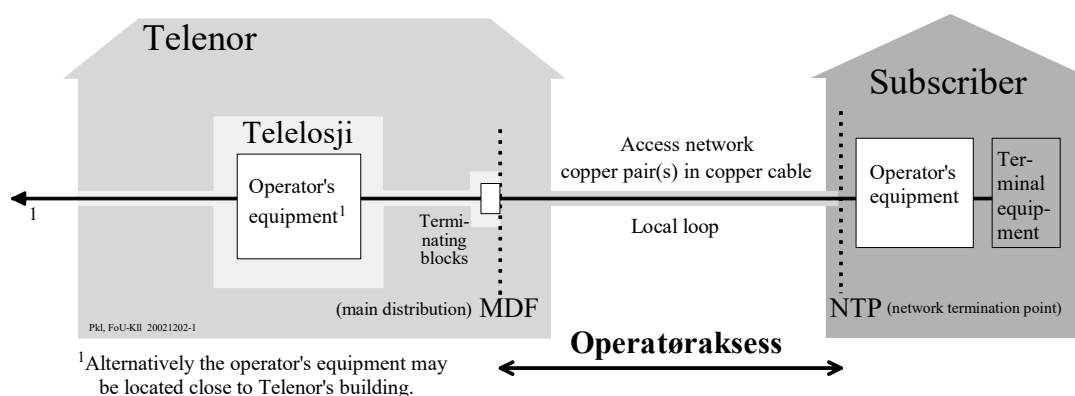


Figure 1 Configuration of the access network.

## 5 General requirements

All installed equipment operating in Telelosji or used for Operatøraksess shall fulfil requirements stated in Telenor Specification OA 100 [7] related to:

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- safety
- environmental conditions
- documentation.

## **6 Transmission system**

The transmission system shall be based on DMT coding as specified in ITU-T Rec. G.992.3 [2] and G.992.5 [3].

*Note! The requirements in this specification are established to ensure the transmission quality and electrical compatibility within the copper cable. This specification does not exclude technical implementations related to modes of operation (Annex B, Annex J etc.) as far as all electrical requirements in this specification are obeyed and fulfilled.*

### **6.1 Combined ADSL and PSTN/ISDN basic access**

The discrete multi-tones (DMT) numbered from 0 to 28 shall not be used in either transmission direction. These tones correspond to a frequency band from 0 to 120 750 Hz.

If PSTN services (service type A) are present on the same cable pair, the requirements given in Telenor Specification OA 101 [5] apply. The requirements apply at the interface between the splitter and the copper cable of Telenor. The splitter shall comply with the requirements given in 7.1.5.

If ISDN Basic Access or 160 kbit/s digital transmission services (service type B) are present on the same cable pair, the requirements given in Telenor Specification OA 102 [6] apply. The requirements apply at the interface between the exchange/NT1 (U interface) and the splitter. The splitter shall comply with the requirements given in 7.1.5.

### **6.2 ADSL operated in “All digital mode” (Annex J)**

In “All digital mode” it is possible to use the discrete multi-tones from 4,3125 kHz to 276 kHz for the upstream direction as specified in ITU-T Rec. G.992.3 [2] and G.992.5 [3].

## **7 Electrical characteristics**

The ADSL modem may operate in different modes.

For ADSL modem designed to operate in combination with base band transmission of PSTN or ISDN basic access, the requirements in 7.1 and its subclauses strictly apply.

For ADSL modem designed to operate in “All digital mode”, the requirements in 7.2 and its subclauses strictly apply.

### **7.1 Combined ADSL and PSTN/ISDN basic access**

#### **7.1.1 Remote feeding**

Remote feeding of the ADSL equipment at the subscriber’s premises is not allowed.

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## 7.1.2 Downstream transmit spectral mask

The downstream transmit spectral mask shall be in accordance with ITU-T Rec. G.992.3 [2] or G.992.5 [3], Annex B.1.3.

The transmit spectral mask for ADSL modems designed strictly according to ITU-T Rec. G.992.1 [1], may deviate in the frequency range 3,1 MHz to 12 MHz, however within this frequency range the power spectral density shall not exceed the limits in Figure B.1 in ITU-T Rec. G.992.1 [1].

The aggregate transmit power shall be in accordance with ITU-T Rec. G.992.3 [2] or G.992.5 [3], Annex B.1.3.2.

## 7.1.3 Upstream transmit spectral mask

The upstream transmit spectral mask shall be in accordance with ITU-T Rec. G.992.3 [2] or G.992.5 [3], Annex B.2.2.

The transmit spectral mask for ADSL modems designed strictly according to ITU-T Rec. G.992.1 [1], may deviate in the frequency range 276 kHz to 12 MHz, however within this frequency range the power spectral density shall not exceed the limits in figure B.4 in ITU-T Rec. G.992.1 [1].

The aggregate transmit power shall be in accordance with ITU-T Rec. G.992.3 [2] or G.992.5 [3], Annex B.2.2.2.

## 7.1.4 Unbalance about earth, transmitter/receiver

The unbalance about earth, measured as longitudinal conversion loss (LCL), shall not be less than 40 dB in the frequency range 120 kHz to 2,2 MHz.

## 7.1.5 Requirements for universal splitter, PSTN/ISDN basic access

The splitter shall be in accordance with ETSI TS 101952-1-4 clauses 1 to 6.11.1 [4].

*Note! The value of the two impedances,  $Z_{ISDN}$  and  $Z_L$ , referenced in ETSI TS 101952-1-4 [4] clauses 5.2.2 and 5.2.3 shall have a provisional value of 135 ohms under tests.*

## 7.2 ADSL operated in "All digital mode" (Annex J)

### 7.2.1 Remote feeding

Remote feeding of the ADSL equipment at the subscriber's premises is not allowed.

### 7.2.2 Downstream transmit spectral mask

The downstream transmit spectral mask shall be in accordance with ITU-T Rec. G.992.3 [2] or G.992.5 [3], Annex J.1.3.

The aggregate transmit power shall be in accordance with ITU-T Rec. G.992.3 [2] or G.992.5 [3], Annex J.1.3.2.

### 7.2.3 Upstream transmit spectral mask

The upstream transmit spectral mask shall be in accordance with ITU-T Rec. G.992.3 [2] or G.992.5 [3], Annex J.2.2 and in accordance with Table J3/G.992.3 [2], last row (ADLU-64) or

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Table J3/G.992.5 [3], last row (ADLU-64).

The aggregate transmit power shall be in accordance with ITU-T Rec. G.992.3 [2] or G.992.5 [3], Annex J.2.2.2.

#### **7.2.4 Unbalance about earth, transmitter/receiver**

The unbalance about earth, measured as longitudinal conversion loss (LCL), shall not be less than 40 dB in the frequency range 1,0 kHz to 2,2 MHz.

#### **7.2.5 Requirements for universal splitter, PSTN/ISDN basic access**

The use of a splitter is not recommended.

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Annex 1

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## Annex 1: Document history

<b>Edition</b>	<b>Published</b>	<b>Comments</b>
1.0	00.03.27	Produced by Stein Hagen/NT.SX
2.0	01.11.01	Kjell E. Sterten, TTS-NL-I-P
3.0	01.02.02	Kjell E. Sterten, TTS-NL-I-P
4.0	31.12.02	Jon Weberg, NL-I-AN
5.0	01.01 2004	Kjell E. Sterten, TN-NL-U-T
5.1	01.01 2005	Heidi Eide, TN-SMP
6.0	01.03 2005	Kjell E. Sterten, TN-NL-U-T
6.1	31.10 2005	Kjell E. Sterten, TNO-FX-PT-I&P



## STATEMENT OF COMPLIANCE

**TELENOR  
Specification OA 105**

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**Annex 2**

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Date:

Operator:

System identification (vendor, model, type):

Connection to the access network of Telenor: Yes (direct) .....  Indirect (aux. equip.).....

The given information is valid. Date/Signature:

\_\_\_\_\_ (sign.)

FC = Fully compliant    NC = Non-compliance

Clause no.	Description	Statement of Compliance		Remarks and additional information	For internal use
		FC	NC		
<b>1</b>	<b>Scope</b>	<input type="checkbox"/>	<input type="checkbox"/>		
<b>2</b>	<b>References</b>				
2.1	Normative references	<input type="checkbox"/>	<input type="checkbox"/>		
2.2	Informative references	<input type="checkbox"/>	<input type="checkbox"/>		
<b>3</b>	<b>Definitions and abbreviations</b>	<input type="checkbox"/>	<input type="checkbox"/>		
<b>4</b>	<b>Application</b>	<input type="checkbox"/>	<input type="checkbox"/>		
<b>5</b>	<b>General requirements</b>	<input type="checkbox"/>	<input type="checkbox"/>		
<b>6</b>	<b>Transmission system</b>	<input type="checkbox"/>	<input type="checkbox"/>		
6.1	Combined ADSL and PSTN/ISDN basic access	<input type="checkbox"/>	<input type="checkbox"/>		
6.2	ADSL operated in "All digital mode" (Annex J)	<input type="checkbox"/>	<input type="checkbox"/>		
<b>7</b>	<b>Electrical characteristics</b>	<input type="checkbox"/>	<input type="checkbox"/>		
7.1	Combined ADSL and PSTN/ISDN basic access				
7.1.1	Power feeding	<input type="checkbox"/>	<input type="checkbox"/>		
7.1.2	Downstream transmit spectral mask	<input type="checkbox"/>	<input type="checkbox"/>		
7.1.3	Upstream transmit spectral mask	<input type="checkbox"/>	<input type="checkbox"/>		
7.1.4	Unbalance about earth, transmitter/receiver	<input type="checkbox"/>	<input type="checkbox"/>		
7.1.5	Requirements for universal splitter, PSTN /ISDN basic access (integrated or external)	<input type="checkbox"/>	<input type="checkbox"/>		
7.2	ADSL operated in "All digital mode" (Annex J)				
7.2.1	Remote feeding	<input type="checkbox"/>	<input type="checkbox"/>		
7.2.2	Downstream transmit spectral mask	<input type="checkbox"/>	<input type="checkbox"/>		
7.2.3	Upstream transmit spectral mask	<input type="checkbox"/>	<input type="checkbox"/>		
7.2.4	Unbalance about earth, transmitter/receiver	<input type="checkbox"/>	<input type="checkbox"/>		
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