

Technical and physical requirements for house installation for the provision of public telephone service and Internet access via a copper or fibre-optic connection

Documentation of the house installation

Only the German version counts for reference!

Version	Date	Person	Adjustments / comments
2.0	01.01.2024	Swisscom	Adaption to GV24

Responsible: Swisscom
Published by: Swisscom

Created on: 01.01.2024

Author: Swisscom
To:

Content

1	Introduction	3
1.1	Background	3
1.2	Object, purpose and delimitation	3
1.3	Scope	3
1.4	Terms and abbreviations	3
1.5	Referenced documents	4
2	The requirements for house installation	4
2.1	Definition of the installation areas of the three connection types	4
2.2	General	5
2.3	House installation with copper access network	6
2.3.1	Specification for copper cable	6
2.3.2	DSL socket DD with copper access network a prerequisite for Internet access	6
2.4	House installation with fibre-optic access network	8
2.4.1	Specifications for the fibre-optic access network and house installation	8
2.4.2	Socket for optical fibres OTO (Optical Telecommunication Outlet)	8
2.5	Network termination unit [NTE] for public telephony and Internet access services	8
2.6	Connection scenarios at the NTP	9
3	Annex: Examples of a DSL socket DD	10
4	Annex: Examples of the 4-way OTO (max 4 fibres)	12

1 Introduction

1.1 Background

The Ordinance on Telecommunications Services (OTS) [3] – Articles 16 and 17 in particular – serves as the basis for this document.

1.2 Object, purpose and delimitation

This document sets out the technical and physical requirements for house installation when it comes to providing public telephone service and Internet access via a copper or fibre-optic connection as part of basic service provision (as per the specifications outlined in the technical and administrative regulations [4]; see also Figure 1).

The document is targeted at house/homeowners, planners and installation experts for in-house/home communications systems.

Swisscom's responsibility for the provision of telecommunications installations (here the physical basic service connection) ends at the building entry point (BEP) or the network separation point (NSP). Swisscom is under no obligation to provide the house installation. However, the house installation has an impact on transmission quality and hence on the services available at the network termination point (NTP) provided by Swisscom as part of basic service provision. The house installation must meet the relevant requirements in order to ensure effective provision and compliance with the Swiss Federal Office of Communications (OFCOM) quality requirements placed on the basic services available at the NTP.

Swisscom is not responsible for the power supply to the devices in the house installation, nor for the emergency supply in case of power failure.

1.3 Scope

The requirements apply to the public telephone service and the Internet access included in universal service provision via the Base-T Ethernet interface in accordance with IEEE 802.3 [1] and wireless LAN in accordance with IEEE 802.11 [2]. Electromagnetic compatibility (EMC) and electrical safety do not form part of the scope of this document.

1.4 Terms and abbreviations

OFCOM	Federal Office of Communications
BEP	Building entry point = network separation point [NSP]
DD	DSL digital socket
DSL	Digital subscriber line
TE	Terminal equipment = end device = Endgerät [EG]
EMC	Electromagnetic compatibility
OTS	Ordinance on Telecommunications Services
FTTH	Fiber To The Home
GV	Universal service provision (Grundversorgung)

NTP	Network termination point
NTE	Network termination equipment = Netzabschlussgerät [NAG]
OTO	Optical telecommunications outlet (socket for 4 optical fibres)
VDSL	Very high-speed Digital Subscriber Line

1.5 Referenced documents

- [1] IEEE 802.3-2005 IEEE Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications.
- [2] IEEE 802.11-2020 IEEE Standard for Information Technology--Telecommunications and Information Exchange between Systems - Local and Metropolitan Area Networks--Specific Requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications
- [3] OFCOM – SR 784.101.1 Ordinance of 9 March 2007 on Telecommunications Services (OTS); as of 1 September 2023
- [4] OFCOM – SR 784.101.113/1.6 Technische und administrative Vorschriften (TAV) betreffend die Eigenschaften von Schnittstellen der Grundversorgung (Technical and administrative regulations regarding the characteristics of the universal service interfaces); as of 15 March 2023
- [5] OFCOM Technical Guidelines concerning FTTH In-House Installations. Physical Media of Layer 1, Edition 3.0; as of 5 March 2012
- [6] Swisscom Handbuch FTTH Realisation – Inhouse Neu-/Umbauten (FTTH realisation – In-house new constructions/conversions manual)
- [7] Swisscom Interface properties of the broadband interface; Version 2, 01.01.2024

2 The requirements for house installation

2.1 Definition of the installation areas of the three connection types

The Building Entry point BEP is the point of transition of the access network into the house installation on the customer's premises (see Figure 1). The access network, including the BEP, is the responsibility of Swisscom or of a cooperation partner. It is also the property of Swisscom or of a cooperation partner.

The BEP corresponds to the building entry point as per the OTS (see Article 17[3]).

The Network termination point NTP corresponds to the network termination point as per the OTS (see Article 16 [3]).

The Network termination unit NTE features an Ethernet interface and a Wireless LAN interface. It corresponds to the NTE [NAG] as per the Technical and administrative regulations [4].

The NTP for the public telephone service via IP and for Internet access is the Base-T Ethernet interface [1] and the Wireless LAN interface [2] (only Internet access) at the outlet of the NTE.

The house installation starts at the BEP, leads to the DD (copper) or OTO (fibre-optics) and ends at the NTP. The connection is always a point-to-point connection.

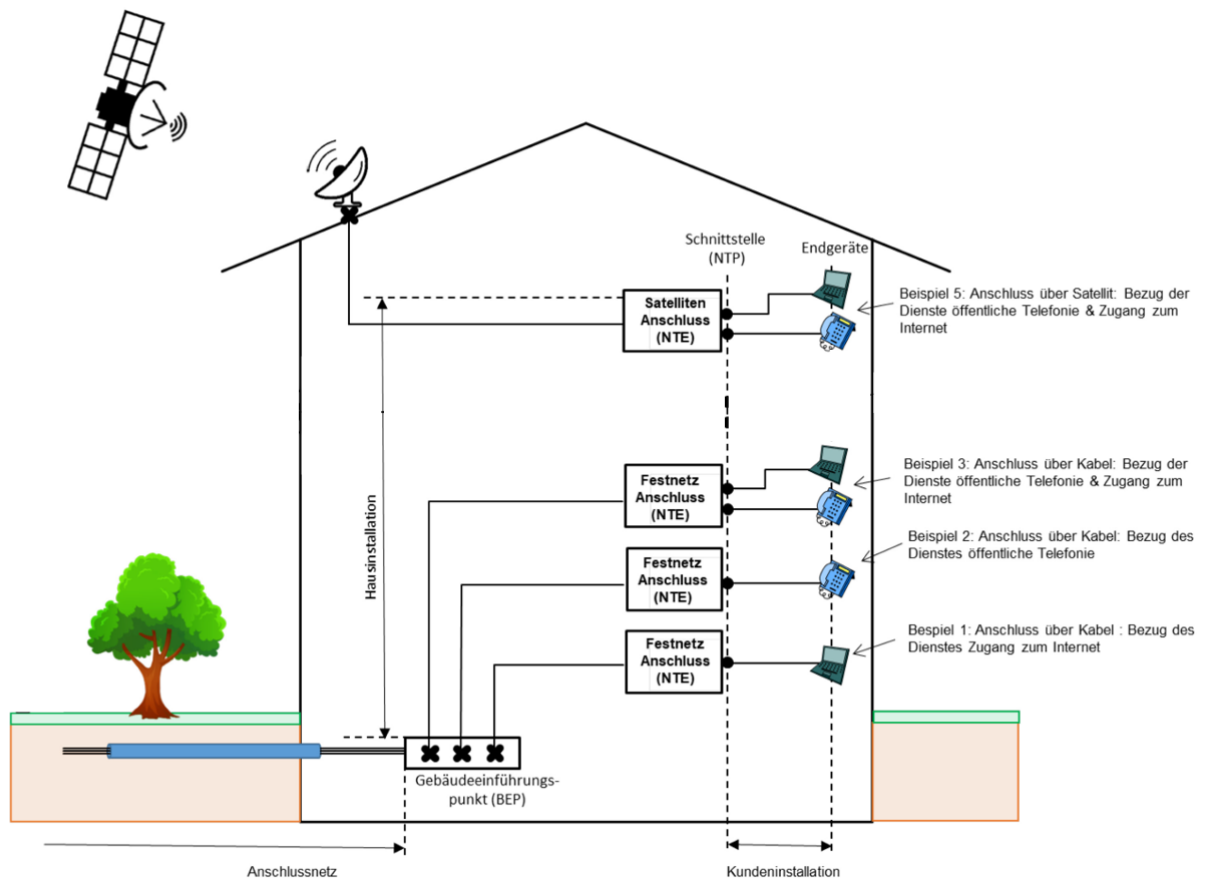


Figure 1: Definition of the installation areas [4]

2.2 General

Swisscom or a cooperation partner connects a building at the BEP, generally with either copper or FTTH (the technology of the access network).

In principle, the same technology must be used in the house installation as in the access network.

End-to-end connections with no change of technology from Swisscom to the basic service connection in the end customer's house/home/apartment are a prerequisite for meeting the quality requirements imposed by OFCOM on the basic services available at the NTP.

The copper line or optical fibre must be available exclusively for the corresponding connection (no use of other frequency bands/wavelengths on the same line). This excludes other connections/services from Swisscom.

2.3 House installation with copper access network

2.3.1 Specification for copper cable

The applicable values for house installation are:

DC resistance of wires $\leq 10 \Omega/100 \text{ m}$ at 20°C

Wave attenuation $\leq 1 \text{ dB}/100 \text{ m}$ at 40 kHz

For house installation, twisted cable with a conductor diameter of at least 0.5 mm is required per access line. The maximum line length from the BEP to the DD must not exceed 100 m (see Figure 1, $l_1 \leq 100 \text{ m}$). U72 type cable or Cat5 type cable pairs, with a wave impedance of 100 to 135Ω (+/- 15%), are recommended. I83 cables that are already installed may continue to be used, but I83 cables should no longer be used for new installations.

Larger diameters and/or better cable types (twisted and shielded) are advantageous (for better electromagnetic interference immunity and transmission properties).

2.3.2 DSL socket DD with copper access network a prerequisite for Internet access

In order to ensure that the basic service Internet access can be provided in the necessary quality at the wired network interface (copper), the house installation must be executed in such a way (as per Figure 2) that the DSL signal is routed straight from the BEP to the NTE without being influenced by branch lines (sub-branches for other sockets, poor contacts, etc.; bridge taps). Installation of the DSL socket DD ensures optimal signal routing within the house installation.

In residential units with structured cabling, the DD should be mounted in the home distributor (central communication cabinet). If the NTE (router) is to be set up at a different location for better distribution of radio signals, the signals of the DD can be extended to the new location with an 8-pin twisted-pair connection (RJ45 Ethernet cable, at least of type Cat5e).

In the case of retrofits and in new buildings without structured cabling, the DD should be mounted in the living room.

Pictorial schematic

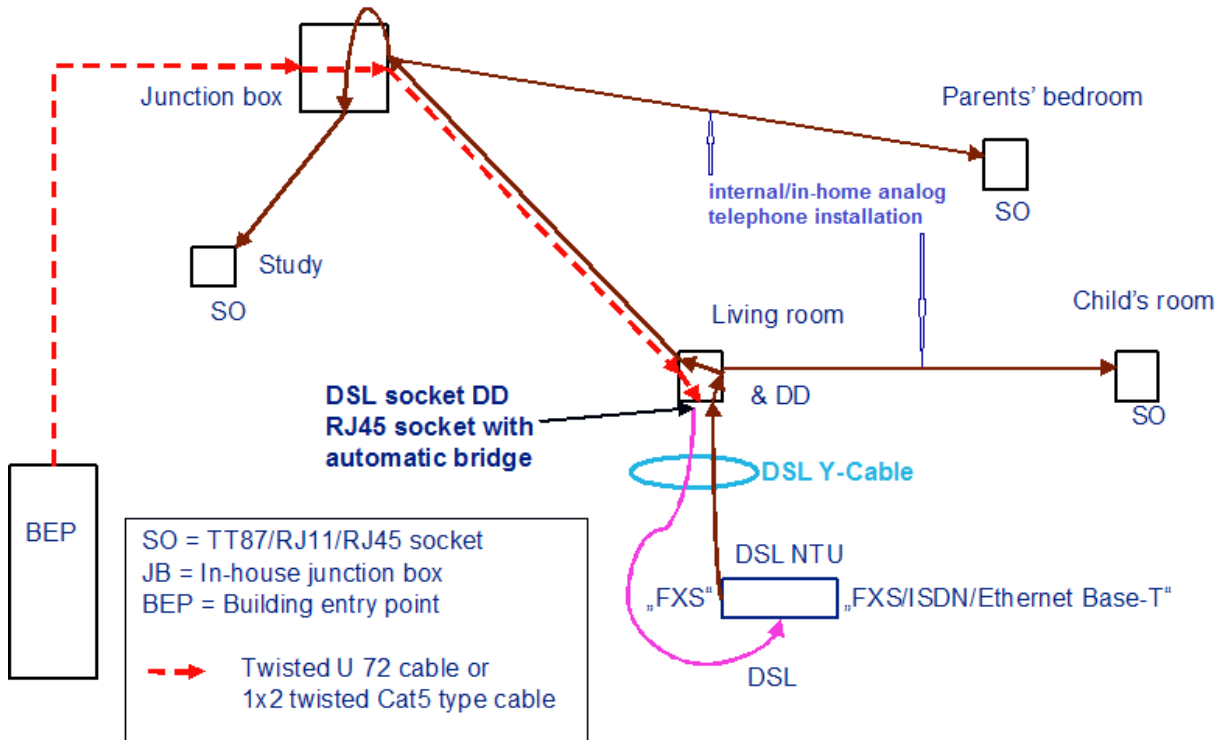


Figure 2: Pictorial schematic of the DSL socket DD

Interface	Pin Number							
	1	2	3	4	5	6	7	8
a/b from BEP	-	-	-	a	b	-	-	-
InHouse a/b	-	-	a	-	-	b	-	-

Tabelle 1: Pin configuration for the RJ45 DSL socket DD

The DSL socket DD (RJ45 socket) contains an automatic bridge, which, in the absence of the DSL NTE RJ45 jack, connects pin 3 to 4 and pin 5 to 6. With a view to ensuring that the function is clearly labelled, it is recommended that at least the front of this RJ45 socket should be coloured purple (Pantone 268) (the blue colour [Pantone 285C] used previously should no longer be used but continues to be permitted).

2.4 House installation with fibre-optic access network

2.4.1 Specifications for the fibre-optic access network and house installation

The technical documents from OFCOM concerning FTTH can be found on the Internet under “OFCOM – FTTH working groups”, and contain all of the specifications necessary for the access network and house installation.

Reference can also be made to the Swisscom document entitled “Handbuch FTTH Realisation – Inhouse Neu-/Umbauten” (FTTH realisation – In-house new constructions/conversions manual) [6].

Compliance with the OFCOM „Technische Richtlinien betreffend FTTH-Installationen in Gebäuden. Physikalische Medien der Schicht 1”; version 3.0 (PDF, 670 kB, 05.03.2012) (Technical guidelines concerning FTTH in-house installations. Physical media of layer 1) [5] is a prerequisite for the provision of basic services.

2.4.2 Socket for optical fibres OTO (Optical Telecommunication Outlet)

In residential units with structured cabling, the OTO should be mounted in the home’s distributor (central communication cabinet). If the NTE (router) is to be set up at a different location for better distribution of radio signals, the optical signals of the OTO can be extended to the new location with an “Optical Extension Kit”.

In the case of retrofits and in new buildings without structured cabling, the OTO should be mounted in the living room.

2.5 Network termination unit [NTE] for public telephony and Internet access services

For the basic services of public telephony and Internet access, an NTE that supports at least the scope of these basic services is provided by Swisscom at the end of the house installation as part of its obligation to provide basic services. This NTE is the property of Swisscom.

Alternatively, an NTE can be purchased from Swisscom or on the market for public telephony service via IP and for Internet access via the Base-T Ethernet interface or the wireless LAN interface.

The list of NTEs available on the market that have been tested by Swisscom can be found at www.swisscom.com -> Wholesale -> “Broadband Connectivity Service”.

For proof of the functional capability of the basic services at the NTE or for problem diagnosis, however, a Swisscom NTE must always be used.

2.6 Connection scenarios at the NTP

For the public telephony service can be used via the Base-T Ethernet interface.

The Internet access service is offered via the Base-T Ethernet interface in accordance with IEEE 802.3 [1] or the wireless LAN interface in accordance with IEEE 802.11 [2]. The document entitled “Interface properties of the broadband interface” [7] serves as a basis in this regard.

3 Annex: Examples of a DSL socket DD

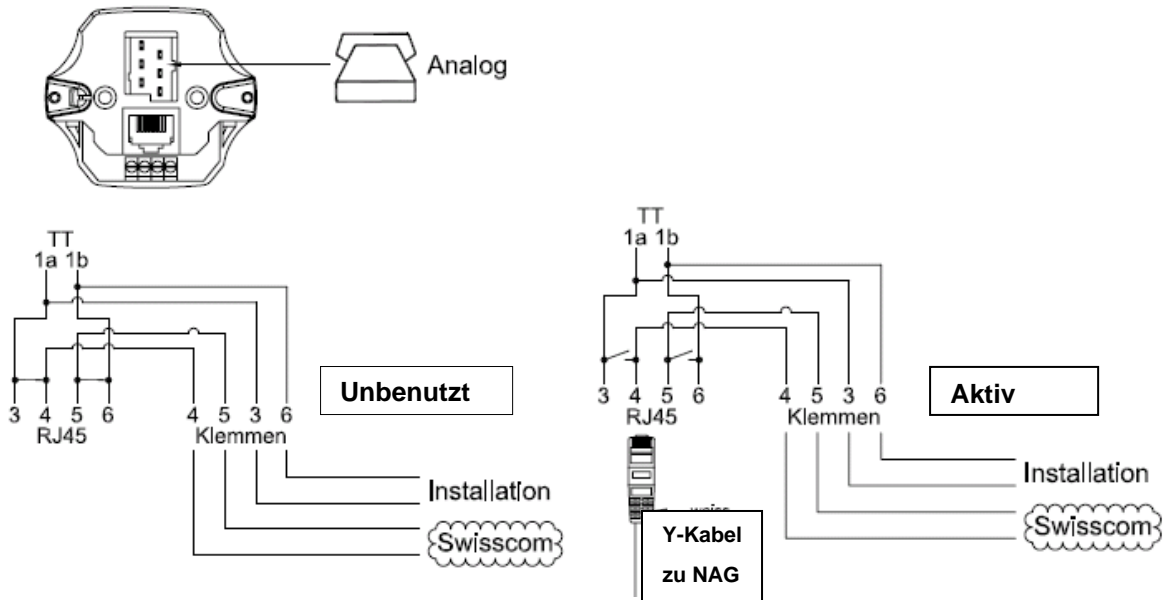
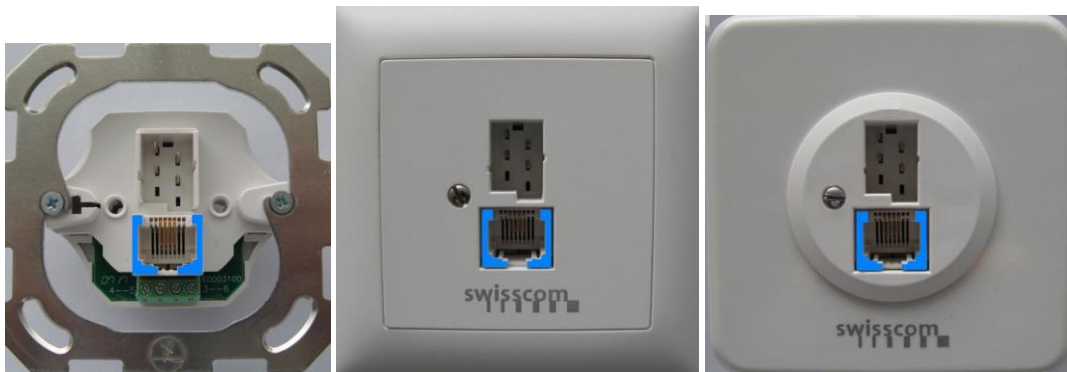


Figure 3: Example of a DSL socket DD



Figures 4–6: Examples of market products and options

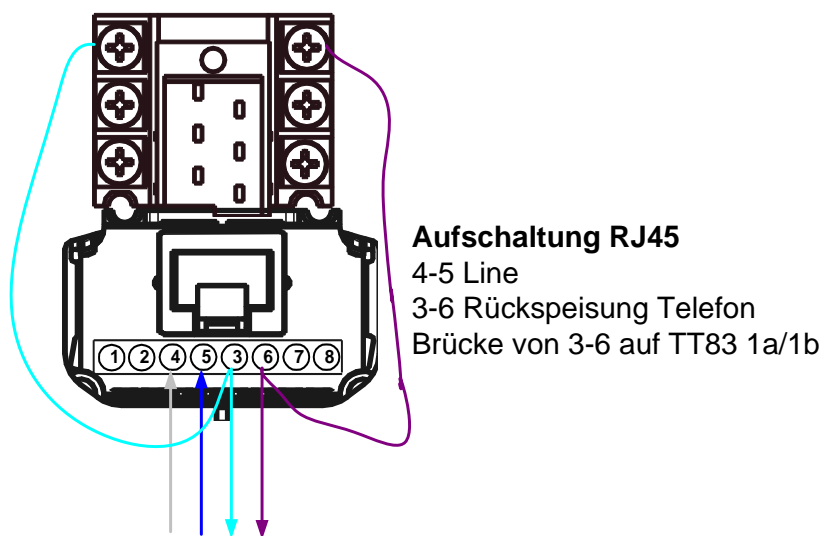
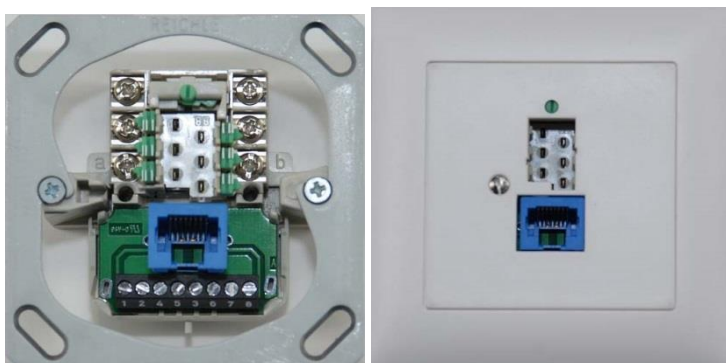
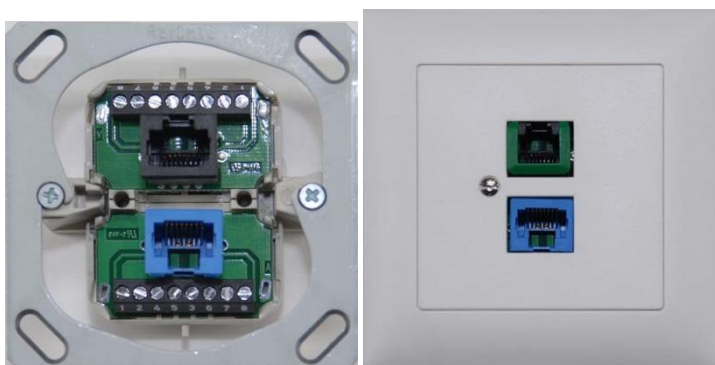


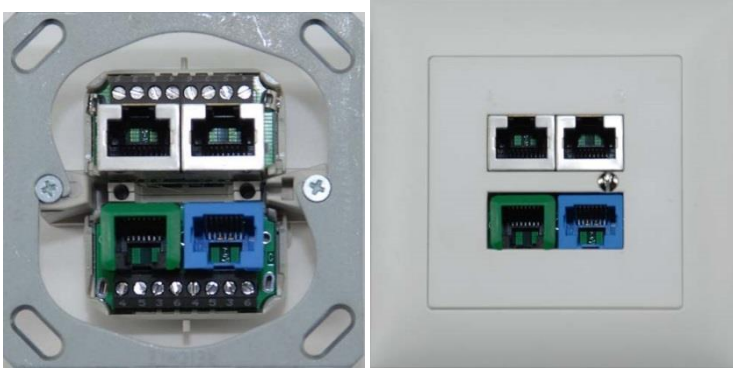
Figure 7: Example of connection diagram for a DSL socket DD



DSL socket DD with RJ45 socket and TT83 for in-home analogue telephone connection



DSL socket DD with its RJ45 socket and a RJ45 (with RJ11 reduction) for in-home analogue telephone connection



DSL socket DD with RJ45 socket and a RJ45 (with RJ11 reduction) for in-home analogue telephone connection and 2 × RJ45 for Fast Ethernet connection

Figures 8–13: Examples of market products and options



Figure 14: Example of Y cable, signals for the DSL socket DD (pin 4 and 5; pin 3 and 6) for NTE: DSL and FXS

4 Annex: Examples of the 4-way OTO (max 4 fibres)



Figures 15–17: Examples of market products and options (hybrid OTO with DD and telephone)