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**SIST-TP CLC/TR 50510:2021**

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**Nadomešča:**

**SIST-TP CLC/TR 50510:2013**

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**Dostop prek optičnih vlaken do končnega uporabnika - Napotki za gradnjo optičnega omrežja FTTX**

Fibre optic access to end-user - A guideline to building of FTTX fibre optic network

Lichtwellenleiterzugang zum Endkunden - Leitfaden für die Erstellung von FTTx-Lichtwellenleiternetzen

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Accès à l'utilisateur par fibres optiques - Lignes directrices relatives à la construction d'un réseau en fibres optiques de type FttX

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Druga oprema za optična vlakna

Other fibre optic equipment

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**Fibre optic access to end-user - A guideline to building of FTTX  
fibre optic network**

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type FttX

Lichtwellenleiterzugang zum Endkunden - Leitfaden für die  
Erstellung von FTTx-Lichtwellenleiternetzen

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**CLC/TR 50510:2021 (E)****European foreword**

This document (CLC/TR 50510:2021) has been prepared by CLC/TC 86A, "Optical fibres and optical fibre cables".

This document supersedes CLC/TR 50510:2012.

CLC/TR 50510:2021 includes the following significant technical changes with respect to CLC/TR 50510:2012:

- a) Complete restructuring of the document.
- b) Addition of information on new PON systems and on overhead cables installations.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

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## 1 Scope

This document is a revision of CLC/TR 50510 Ed2 published in 2012. At the time that Ed2 was published, no comprehensive document on fibre access networks was available, and few FTTX networks had been deployed. Since then, massive deployments have occurred in most European countries, even if a lot more remains to be rolled out, and guides are now available from organizations such as FTTH council Europe.

This new edition of CLC/TR 50510 takes lessons from the experience gained all along those deployments and, and refers to existing documents where relevant. It addresses the impacts of the new generation of communication systems on the access networks and components. More specifically, it provides guidelines towards the IEC and CLC standards relating to the access networks and their technologies.

Like the first and second edition, this one addresses FTTX networks in general and includes:

- FTTC = Fibre to the Curb, meaning to the street (to a cabinet);
- FTTB = Fibre to the Building, normally into the basement;
- FTTH/P = Fibre to the Home/Premise, meaning to a building in a residential area.

It is as well of relevance for:

- FTTE = Fibre to the Enterprise,
- FTTA = Fibre to the Antenna.

This document is subdivided into five main clauses:

- **Network Structure and Nodes:** introduces the telecommunications infrastructures and provides an overview of the basic structure for the FTTX network
- **FTTX Communication System:** introduces the next generation communication systems that will be run on the FTTX networks
- **FTTX passive network products and system solutions:** describes system implementations for FTTX including requirements on products and installation techniques
- **Network design:** provides guidance on how to create a network and gives an overview of applicable network topologies.
- **Planning:** provides basic information in relation to various installation practises and the planning relevant to those practises

Valuable information is also available in the annexes.

## 2 Normative references

There are no normative references in this document.

## 3 Terms, definitions and abbreviations

### 3.1 Terms and definitions

No terms and definitions are listed in this document.

**CLC/TR 50510:2021 (E)****3.2 Abbreviations**

AAL	Ambient Assisted Living, also known as Active Assisted Living
ADSL	Asymmetric Digital Subscriber Line
APC	Angled Physical Contact
APON	Asynchronous transfer mode Passive Optical Network (ITU-T G.983)
ATM	Asynchronous Transfer Mode
BPON	Broadband Passive Optical Network (ITU-T G.983)
CAPEX	CApital EXpenditures (investments)
CATV	CAble TeleVision
CE	Commission Européenne
CENELEC	Comité Européen de Normalization en Electronique et en éLECTrotechnique
CEN	Comité Européen de Normalization
CLC	CENELEC
CPD	Construction Product Directive
CPR	Construction Product Regulation
CWDM	Coarse Wavelength Division Multiplexing
DOCSIS	Data Over Cable Service Interface Specification
DP	Distribution Point
DWDM	Dense Wavelength Division Multiplexing
EQF	Equipment Frame (for transmission equipment)
EPON	Ethernet Passive Optical Network (IEEE 802.3ah)
ETSI	European Telecommunications Standards Institute
EU	European Union
FCCN	Fibre Cross Connect Node
FCP	Fibre concentration point
FDF	Fibre Distribution Field
FMS	Fibre Management System
FMSC	Fibre Management System Closure
FTTB	Fibre To The Building
FTTC	Fibre To The Curb
FTTH	Fibre To The Home

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FTTX	FTT(X stands for B, C, H, etc.): Generic term for FTTB, FTTC, FTTH, etc.
FRNC	Flame Retardant Non Chloric (halogen free)
FWA	Fixed Wireless Access
GB	Giga Byte
Gbit/s	Giga bits per second
GPON	Gigabit capable Passive Optical Network (ITU-T G.984)
HDPE	High Density PolyEthylene
HFFR-LS	Halogen Free Flame Retardant Low Smoke
IEEE	Institute of Electrical and Electronics Engineers
IL	Insertion Loss
IP	Internet Protocol
ISO	International Organization for Standardization
ITU	International Telecommunication Union
ITU-R	International Telecommunication Union - Radio-communications
ITU-T	International Telecommunication Union - Telecommunications
LC	Little Connector
LFH	Low Fire Hazard
LI	Local Interface
LSZH	Low Smoke Zero Halogen
Mbit/s	Mega bits per second
MDU	Multi Dwelling Unit
MMF	Multimode Fibre
NG-PON	Next-Generation Passive Optical Network
ODF	Optical Distribution Frame
OLT	Optical Line Terminal
ONT	Optical Network Terminal
OPGW	Optical Ground Wire
OTDR	Optical Time Domain Reflectometry
P2P	Point to Point
P2MP	Point to Multiple Points
PE	PolyEthylene

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Plenum	Horizontal cabling (system)
PMD	Polarization Mode Dispersion
PMF	Patch cable Management Frame
PON	Passive Optical Network
POP	Point of Presence
PPF	Patch Panel Frame
PtP	Point to Point
PVC	Polyvinylchloride
Riser	Vertical cabling (system)
RL	Return Loss
RoW	Right of Way
SC	Standard Connector
SDP	Small Distribution Point
SDU	Single Dwelling Unit
SMF	Single Mode Fibre
S/N	Signal to Noise
TC	Technical Committee
TR	Technical Report
UPS	Uninterruptible Power System
VDSL	Very high bitrate Digital Subscriber Line
WDM	Wavelength Division Multiplexing
WLAN	Wireless local area network
XG-PON	10 (X stands 10) Gigabit Passive Optical Network
XGS-PON	10 (X stands 10) Gigabit Symmetrical Passive Optical Network

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## 4 Network structure and nodes

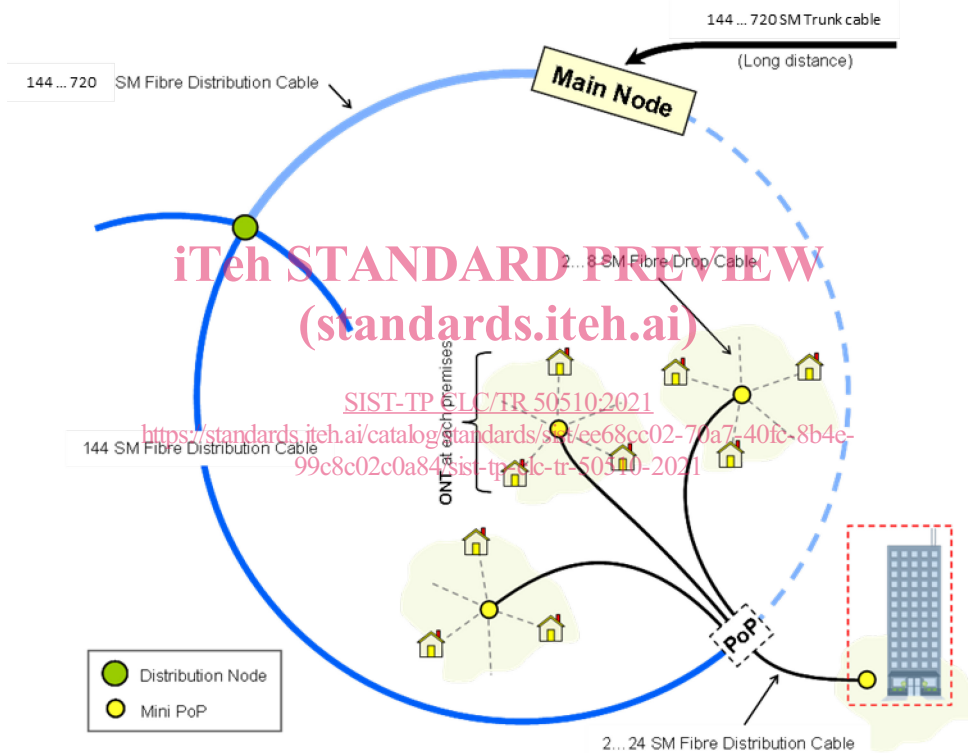
### 4.1 General

This clause provides an overview of a FTTX network and provides a foundation for terminology and references made in subsequent clauses.

### 4.2 Access network

The following two pictures are basic illustrations of P2P (point-to-point) and PON (passive optical networks, point-to-multi-points) access networks. P2P is in general passive, where one fibre from the central office is routed directly to the customer and does not use splitters. With PON one fibre from the central office is shared among a number of customers (usually 32, 64 or 128) by the use of one or several passive splitters located within the network.

The pictures are examples from different countries in Europe.



**Figure 1 — Example for a Point-to-Point Access Network**

NOTE 1 A Point of Presence (PoP) is an artificial demarcation point or interface point between communicating entities. An Internet Point of Presence typically houses servers, routers, network switches, multiplexers, and other network interface equipment.

NOTE 2 The dashed line in Figure 1 and Figure 2 is an optional cable to provide protection switchover for ring applications.