

## **Information technology - Generic cabling systems -- Part 4: Homes**

Information technology - Generic cabling systems --  
Part 4: Homes

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 50173-4:2007 sisaldab Euroopa standardi EN 50173-4:2007 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 25.07.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 50173-4:2007 consists of the English text of the European standard EN 50173-4:2007.</p> <p>This document is endorsed on 25.07.2007 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
--	---

<p><b>Käsitlusala:</b></p> <p>This European standard specifies generic cabling in homes, installed to support one or more of the following groups of applications and based upon balanced and coaxial cabling as appropriate: 1) Information and Communications Technologies (ICT); 2) Broadcast and Communications Technologies (BCT); 3) Commands, Controls and Communications in Buildings (CCCB).</p>	<p><b>Scope:</b></p> <p>This European standard specifies generic cabling in homes, installed to support one or more of the following groups of applications and based upon balanced and coaxial cabling as appropriate: 1) Information and Communications Technologies (ICT); 2) Broadcast and Communications Technologies (BCT); 3) Commands, Controls and Communications in Buildings (CCCB).</p>
---	---

ICS 33.040.50

Võtmesõnad:

English version

**Information technology -  
Generic cabling systems -  
Part 4: Homes**

Technologies de l'information -  
Systèmes de câblage générique -  
Partie 4: Locaux d'habitation

Informationstechnik -  
Anwendungsneutrale  
Kommunikationskabelanlagen -  
Teil 4: Wohnungen

This European Standard was approved by CENELEC on 2007-04-11. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

**CENELEC**

European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

## Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 215, *Electrotechnical aspects of telecommunication equipment*, in cooperation with the Technical Committee CENELEC TC 209, *Cable networks for television signals, sound signals and interactive services*.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50173-4 on 2007-04-11.

The following dates were fixed:

- latest date by which the EN has to be implemented  
at national level by publication of an identical  
national standard or by endorsement (dop) 2008-05-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 2010-05-01

The European Standards EN 50173:1995 and EN 50173-1:2002 have been developed to enable the application-independent cabling to support ICT applications in office premises. Their basic principles, however, are applicable to other types of applications and in other types of premises.

TC 215 has decided to establish relevant European Standards which address the specific requirements of these premises. In order to point out the commonalities of these cabling design standards, these EN are published as individual parts of the series EN 50173, thus also acknowledging that standards users recognize the designation “EN 50173” as a synonym for generic cabling design.

At the time of publication of this European Standard, series EN 50173 comprises the following standards:

EN 50173-1	Information technology – Generic cabling systems – Part 1: General requirements
EN 50173-2	Information technology – Generic cabling systems – Part 2: Office premises
EN 50173-3	Information technology – Generic cabling systems – Part 3: Industrial premises
EN 50173-4	Information technology – Generic cabling systems – Part 4: Homes
EN 50173-5	Information technology – Generic cabling systems – Part 5: Data centres

This standard, EN 50173-4, is based upon but is not identical to ISO/IEC 15018:2004, Information technology - Generic cabling for homes.

## Contents

<b>Introduction .....</b>	<b>6</b>
<b>1 Scope and conformance .....</b>	<b>10</b>
1.1 Scope .....	10
1.2 Conformance .....	10
<b>2 Normative references .....</b>	<b>11</b>
<b>3 Definitions and abbreviations .....</b>	<b>12</b>
3.1 Definitions .....	12
3.2 Abbreviations .....	13
<b>4 Structure of the generic cabling system to support ICT and/or BCT applications in homes .....</b>	<b>14</b>
4.1 General .....	14
4.2 Functional elements .....	14
4.3 General structure and hierarchy for ICT and BCT cabling .....	14
4.4 Cabling subsystems for ICT and BCT applications .....	16
4.5 Accommodation of functional elements .....	16
4.6 Interfaces .....	17
4.7 Dimensioning and configuring .....	19
<b>5 Cabling structure to support CCCB applications in homes .....</b>	<b>23</b>
5.1 General .....	23
5.2 Functional elements .....	23
5.3 Cabling structure for CCCB applications .....	23
5.4 Cabling subsystems for CCCB applications .....	25
5.5 Accommodation of functional elements .....	25
5.6 Interfaces .....	25
5.7 Dimensioning and configuring .....	27
<b>6 Channel performance in homes .....</b>	<b>29</b>
6.1 General .....	29
6.2 Environmental performance .....	29
6.3 Transmission performance .....	29
<b>7 Reference implementations in homes .....</b>	<b>33</b>
7.1 General .....	33
7.2 Dimensions for ICT and BCT channels .....	34
7.3 Dimensions for CCCB channels .....	35

<b>8</b>	<b>Cable requirements in homes.....</b>	<b>36</b>
8.1	General .....	36
8.2	Balanced cables .....	36
8.3	Coaxial cables .....	36
<b>9</b>	<b>Connecting hardware requirements in homes .....</b>	<b>37</b>
9.1	General requirements .....	37
9.2	ICT connecting hardware .....	37
9.3	BCT connecting hardware .....	37
9.4	CCCB connecting hardware .....	38
<b>10</b>	<b>Requirements for cords and jumpers .....</b>	<b>38</b>
<b>Annex A</b>	<b>(normative) Link performance limits .....</b>	<b>39</b>
<b>Annex B</b>	<b>(informative) Applications and Associated Cabling .....</b>	<b>40</b>
<b>Annex C</b>	<b>(informative) Application-specific BCT outlets and baluns .....</b>	<b>42</b>
<b>Annex D</b>	<b>(informative) Application-specific networks for audio/video applications .....</b>	<b>43</b>
<b>Bibliography</b>	<b>.....</b>	<b>44</b>

### Figures

Figure 1 - Schematic relationship between the EN 50173 series and other relevant standards .....	7
Figure 2 – Schematic of generic cabling within homes .....	9
Figure 3 - Structure of the generic cabling system in homes.....	15
Figure 4 - Hierarchical structure of a generic cabling system in support of ICT and BCT applications .....	15
Figure 5 - Equipment and test interfaces in support of ICT and BCT applications .....	17
Figure 6 - Channels and permanent links within the home.....	18
Figure 7 - Examples of interconnection of home and network access cabling.....	20
Figure 8 – Interconnection of home cabling .....	22
Figure 9 - Structure of the generic cabling system in support of CCCB applications .....	24
Figure 10 - Hierarchical structure of a generic cabling system in support of CCCB applications .....	24
Figure 11 - Equipment and test interfaces in support of CCCB applications .....	26
Figure 12 - Channels and permanent links for CCCB cabling .....	27
Figure 13 - Reference implementations for ICT and BCT channels (HD/SHD - TO/BO) .....	34
Figure 14 - Reference implementations for CCCB channels with HD or SHD .....	35
Figure 15 - Reference implementations for CCCB channels with HD and SHD .....	35
Figure 16 - Conductor assignment of EN 61169-2 (Type 9,52) and EN 61169-24 (Type F) .....	38

## Tables

Table 1 - Contextual relationship between EN 50173 series and other standards relevant for information technology cabling systems .....	8
Table 2 - Maximum channel lengths for reference implementations of ICT and BCT channels .....	19
Table 3 - Different channels and their potential use .....	30
Table 4 - BCT channel levels .....	32
Table 5 - Channel length equations .....	33
Table B.1 - Grouping of applications and cabling .....	40
Table B.2 - Characteristics of ICT, BCT and CCCB Cabling .....	41

This document is a preview generated by EVS

## Introduction

This European Standard specifies generic cabling in homes, installed to support one or more of the following groups of applications and based upon balanced and coaxial cabling as appropriate:

- Information and Communications Technologies (ICT);
- Broadcast and Communications Technologies (BCT);
- Commands, Controls and Communications in Buildings (CCCB).

Other cabling media, used for the above applications, are not covered in this standard.

Backbone cabling connecting individual homes within single premises is built according to the relevant standard (EN 50173-1, EN 50083 series).

Generic cabling realised according to this standard:

- i) allows deployment of a wide range of applications without changes to the fixed cabling infrastructure;
- ii) provides a platform to support moves, adds and changes of connectivity.

This European Standard, EN 50173-4, has been prepared to reflect the demands of generic cabling within homes and provides for each group of applications (ICT, BCT and CCCB):

- a) users with an application-independent generic cabling system;
- b) users with a flexible cabling scheme such that changes are both easy and economical;
- c) building professionals (for example, architects) with guidance for the design and dimensioning of home cabling according to the end-user needs or requirements (expressed or assumed);
- d) industry and applications standardisation bodies (e.g. ITU-T, ISO/IEC JTC 1/SC 6, ISO/IEC JTC 1/SC 25/WG1, IEC/TC 100, CLC/TC 205, CLC/TC 209, ETSI) with a cabling system that supports current products and provides a basis for future product development in application standardization;
- e) users, designers, and manufacturers of application-specific cabling systems with advice on interfacing to this generic cabling;
- f) suppliers of cabling components and installers of cabling with relevant requirements;
- g) service providers with a distribution system for their services.

This European Standard specifies multi-vendor cabling, and is related to:

- the associated standard covering general requirements for generic cabling within premises (EN 50173-1);
- standards for cabling components developed by Technical Committees of CENELEC and/or IEC;
- standards for the quality assurance and installation of information technology cabling (series EN 50174) and testing of installed cabling (EN 50346);
- applications developed by the technical bodies of IEC (including the subcommittees of ISO/IEC JTC 1), CENELEC and study groups of ITU-T.

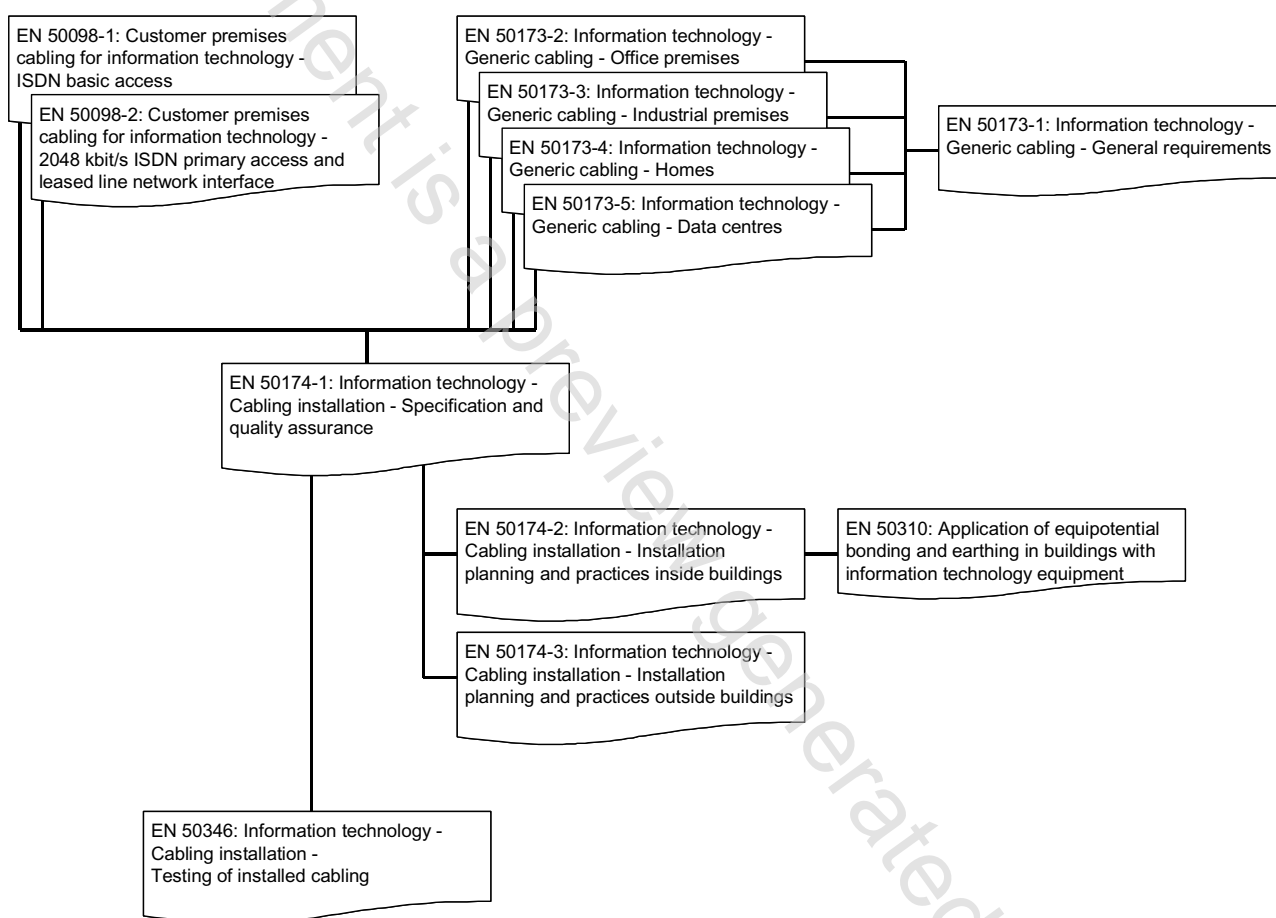
A number of ICT, BCT and CCCB applications have been analysed to determine the requirements for a generic cabling (see EN 50173-1:2007, Annex F) and to specify the minimum performance of channels given in Clause 6. These requirements, together with the logical and physical models described in Clauses 4 and 5, have been used to develop the transmission requirements for cabling components and to stipulate their arrangement into generic cabling systems.



Figure 1 and Table 1 show the schematic and contextual relationships between the standards produced by TC 215 for information technology cabling, namely

- 1) this and other parts of the EN 50173 series;
- 2) application dependent cabling design (e.g. EN 50098 series);
- 3) installation (EN 50174 series);
- 4) testing of installed cabling (EN 50346);
- 5) equipotential bonding requirements (EN 50310).

Figure 2 indicates the multi-layer approach specified in this standard in order to deliver ICT, BCT and CCCB applications within homes.



NOTE For the purposes of the standards in the EN 50173 and EN 50174 series the term "information technology" includes ICT, BCT and CCCB applications.

**Figure 1 - Schematic relationship between the EN 50173 series and other relevant standards**

**Table 1 - Contextual relationship between EN 50173 series and other standards relevant for information technology cabling systems**

Building design phase	Generic cabling design phase	Specification phase	Installation phase	Operation phase
<b>EN 50310</b>  5.2: Common bonding network (CBN) within a building  6.3: AC distribution system and bonding of the protective conductor (TN-S)	<b>EN 50173 series except EN 50173-4</b>  4: Structure 5: Channel performance 7: Cable requirements 8: Connecting hardware requirements 9: Requirements for cords and jumpers A: Link performance limits  <b>and</b> <b>EN 50173-4</b>  4 and 5: Structure 6: Channel performance 8: Cable requirements 9: Connecting hardware requirements 10: Requirements for cords and jumpers A: Link performance limits	<b>EN 50174-1</b>  4 Requirements for installers  5: Requirements for premises owners		<b>EN 50174-1</b>  5: Requirements for premises owners
		<b>Planning phase</b>		
		<b>EN 50174-2</b>  5: Requirements for planning installations of information technology cabling 6: Segregation of metallic information technology and mains power cabling 7: Additional considerations  <b>and</b> <b>EN 50174-3</b>  <b>and</b> <b>(for equipotential bonding)</b> <b>EN 50310</b>  5.2: Common bonding network (CBN) within a building  6.3: AC distribution system and bonding of the protective conductor (TN-S)		
		<b>and</b> <b>EN 50174-3</b>  <b>and</b> <b>(for equipotential bonding)</b> <b>EN 50310</b>  5.2: Common bonding network (CBN) within a building  6.3: AC distribution system and bonding of the protective conductor (TN-S)	<b>EN 50174-2</b>  4: Requirements for installers of information technology cabling  6: Segregation of metallic information technology and mains power cabling  <b>and</b> <b>EN 50174-3</b>  <b>and</b> <b>(for equipotential bonding)</b> <b>EN 50310</b>  5.2: Common bonding network (CBN) within a building  6.3: AC distribution system and bonding of the protective conductor (TN-S)  <b>and</b> <b>EN 50346</b>  4: General requirements 5: Test parameters for balanced cabling 6: Test parameters for optical fibre cabling	

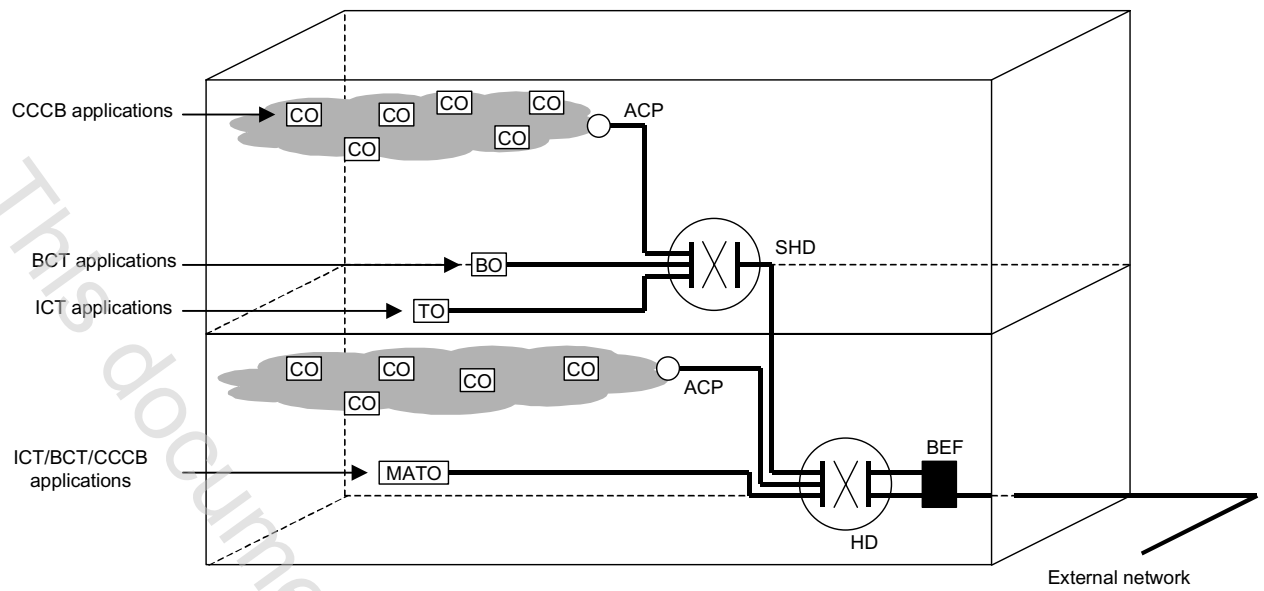


Figure 2 – Schematic of generic cabling within homes

## 1 Scope and conformance

### 1.1 Scope

This European Standard specifies generic cabling in homes, installed to support one or more of the following groups of applications and based upon balanced and coaxial cabling as appropriate:

- 1) Information and Communications Technologies (ICT);
- 2) Broadcast and Communications Technologies (BCT);
- 3) Commands, Controls and Communications in Buildings (CCCB).

A home may contain one or more buildings or may be within a building that contains more than one home.

This European Standard is based upon and references the requirements of EN 50173-1. In addition to the requirements of EN 50173-1, this European Standard specifies the following aspects of generic home cabling:

- a) structure and topology;
- b) minimum configuration;
- c) performance requirements for permanent links and channels<sup>1)</sup>;
- d) density and location of connection points;
- e) interfaces to application-specific equipment and external networks;
- f) coexistence with other building services.

Safety (electrical safety and protection, optical power, fire, etc.) and electromagnetic compatibility (EMC) requirements are outside the scope of this European Standard and are covered by other standards and regulations. However, information given in this European Standard may be of assistance in meeting these standards and regulations.

NOTE 1 National regulations and local codes may preclude carrying certain services on the cabling specified in this standard.

NOTE 2 Test requirements in this standard are for system designers.

NOTE 3 The installation tests should be decided between supplier and customer or according to the relevant installation guide.

NOTE 4 Audio/video applications are traditionally supported by application-specific cabling implemented with cabling systems based on EN 50083 (see Annex D). Such cabling systems may co-exist with generic cabling specified by this European Standard.

### 1.2 Conformance

For a cabling system to conform to this European Standard:

- a) the cabling shall support ICT applications;
- b) the structure and configuration of cabling in support of ICT and BCT applications shall conform to the requirements of Clause 4;
- c) the structure and configuration of cabling in support of CCCB applications shall conform to the requirements of Clause 5;
- d) the interfaces to the cabling at the Multi-Application Telecommunications Outlet (MATO), Telecommunications Outlet (TO) and the Broadcast Outlet (BO) shall conform to the requirements of Clause 9 with respect to mating interfaces and performance;
- e) connecting hardware at other places in the cabling structure shall meet the performance requirements specified in Clause 9;

---

<sup>1)</sup> This term, as defined in EN 50173-1, refers to the passive cabling between the interfaces described in Clauses 4 and 5. Differing definitions of the term "channel" as given in other standards are not applicable in this European Standard.

- f) the performance of channels shall conform to the requirements of Clause 6. This shall be achieved by one of the following:
- a channel design and implementation ensuring that the prescribed channel performance Class of Clause 6 is met;
  - attachment of appropriate components to a link design meeting the prescribed performance Class of Annex A. Channel performance shall be assured where a channel is created by adding more than one cord to either end of a link meeting the requirements of Annex A;
  - using the reference implementations of Clause 7 and compatible cabling components conforming to the requirements of Clauses 8, 9 and 10 based upon a statistical approach of performance modelling.
- g) local regulations concerning safety shall be met.

In addition the following requirements of the EN 50174 series of standards shall be met:

- h) installation specification and quality planning to address:
- the test parameters to be measured;
  - the sampling levels to be applied;
  - the treatment of channels or links which fail to meet requirements or for which test results lie within the relevant measurement accuracy;
- i) administration;
- j) installation.

Test methods to verify conformance with the channel and link requirements of Clause 6 and Annex A respectively are specified in EN 50346. Neither this standard nor EN 50174-1 specifies the test and sampling levels to be adopted.

Specifications marked "ffs" (for further study) in this standard as well as in EN 50173-1 are preliminary and are not required for conformance to this European Standard.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50083-7, *Cable networks for television signals, sound signals and interactive services - Part 7: System performance*

NOTE EN 50083-7 will be superseded by EN 60728-1 (in preparation).

EN 50173-1:2007, *Information technology – Generic cabling systems – Part 1: General requirements*

EN 50174-1, *Information technology – Cabling installation – Part 1: Specification and quality assurance*

EN 50174-2, *Information technology – Cabling installation – Part 2: Installation planning and practices inside buildings*

EN 50174-3, *Information technology – Cabling installation – Part 3: Installation planning and practices outside buildings*

EN 60603-7-7, *Connectors for electronic equipment – Part 7-7: Detail specification for 8-way, shielded, free and fixed connectors, for data transmission with frequencies up to 600 MHz (IEC 60603-7-7:2006)*

EN 61076-3-104, *Connectors for electronic equipment – Product requirements - Part 3-104: Detail specification for 8-way, shielded free and fixed connectors, for data transmissions with frequencies up to 1 000 MHz (IEC 61076-3-104:2006)*

EN 61076-3-106:2006, *Connectors for electronic equipment - Product requirements - Part 3-106: Rectangular connectors - Detail specification for protective housings for use with 8-way shielded and unshielded connectors for industrial environments incorporating the IEC 60603-7 series interface (IEC 61076-3-106:2006)*

EN 61169-2, *Radio-frequency connectors – Part 2: Sectional specification – Radio frequency coaxial connectors of type 9,52 (IEC 61169-2:2001)*

EN 61169-24, *Radio-frequency connectors – Part 24: Sectional specification – Radio frequency coaxial connectors with screw coupling, typically for use in 75 ohm cable distribution systems (type F) (IEC 61169-24:2001)*

### 3 Definitions and abbreviations

#### 3.1 Definitions

For the purposes of this European Standard, the following definitions apply in addition to those of EN 50173-1.

##### 3.1.1

##### **application outlet**

a point at which equipment is connected to the generic cabling in support of ICT and/or BCT application

##### 3.1.2

##### **area connection point (ACP)**

a point at which CCCB coverage area cabling is connected to area feeder cabling

##### 3.1.3

##### **area feeder cable**

CCCB cable connecting the home distributor (or secondary home distributor, if present) to the area connection point

##### 3.1.4

##### **broadcast outlet (BO)**

fixed connecting device where the BCT home cable terminates

NOTE The broadcast outlet provides an interface to the terminal equipment cabling for BCT applications

##### 3.1.5

##### **connector sharing**

the ability of a connector to simultaneously accept multiple plugs in one socket such as 4 one-pair plugs in one 4 pair socket while maintaining the required performance; this may also be achieved by means of an external adapter

##### 3.1.6

##### **coverage area**

area served by an area connection point

##### 3.1.7

##### **home**

a physical structure used as a dwelling place, such as a house or an apartment

NOTE This may be an individual building, part of a larger building or more than one building.

##### 3.1.8

##### **home distributor (HD)**

the distributor within a home where cables terminate