

**Access Network Transport  
Standards Overview  
December 2014 Q 1/15 Meeting**

**Contact persons for the project updating:**

**Study Group 15 Counsellor**  
**Mr. Greg Jones**  
**International Telecommunication**  
**Union (ITU)**  
**Place des Nations**  
**1211 Geneva 20**  
**Switzerland**  
**Tel.: +41 22 730 5515**  
**Fax: +41 22 730 5853**  
**E-mail: [greg.jones@itu.int](mailto:greg.jones@itu.int)**

**Study Group 15 Chairman**  
**Dr. Stephen J. Trowbridge**  
**Alcatel-Lucent**  
**5280 Centennial Trail**  
**Boulder, Colorado 80303-1262**  
**USA**  
**Tel: +1 720 945 6885**  
**E-mail:**  
**[Steve.Trowbridge@alcatel-lucent.com](mailto:Steve.Trowbridge@alcatel-lucent.com)**

**Question 1/15 Rapporteur**  
**Mr. Jean-Marie Fromenteau**  
**Corning Incorporated**  
**Corning Optical Fiber**  
**Corning, NY 14831**  
**USA**  
**Tel: +49 9561 42 74 20**  
**Fax: +49 9561 42 74 21**  
**E-mail:**  
**[fromentejm@corning.com](mailto:fromentejm@corning.com)**

Access Network Transport is an ITU-T Project dealing with studies and Recommendations on the Access Network.

## ACCESS NETWORK TRANSPORT STANDARDS OVERVIEW

Issue 25, December 2014

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## ACCESS NETWORK TRANSPORT STANDARDS OVERVIEW

ISSUE 25, DECEMBER 2014

### Introduction

In today's global communications world the traditional boundaries in network access between Telecommunication Network Operators, Private Network Providers, Satellite and Cable TV Networks and Information Technologies cease to exist.

Within the ITU-T, the study and development of Recommendations related to transport in the access network is being carried out in a number of different Study Groups, e.g. SG 9, 13, 15. Moreover, ITU-R and other standards bodies, forums and consortia are also active in this area.

Recognizing that without a strong coordination effort there is the danger of duplication of work as well as the development of incompatible and non-interoperable standards, the WTSC 96 designated Study Group 15 as **Lead Study Group on Access Network Transport (ANT) - reaffirmed at the WTSA-12** - with the mandate to

- study the appropriate core Questions (Question 1, 2 and 4/15)
- define and maintain an overall (standards) framework, in collaboration with other SGs and standards bodies
- coordinate, assign and prioritize the studies done by the Study Groups (recognizing their mandates) to ensure the development of consistent, complete and timely Recommendations.

Study Group 15 entrusted WP 1/15 (Network Access), under Question 1/15, with the task to manage and carry out the Lead Study Group activities on Access Network Transport.

### 1. Scope

This document defines an ANT on the background of the Recs. G.902 and GII Y.100 series and provides an overview of the existing ANT related standards released and/or prepared by the ITU and other standardization bodies.

The main purpose of **the Standards Overview** is to identify

- Which standards exist
- Topics/standards under study/development
- Lack of standards
- Duplication and/or overlap
- Market needs
- Priorities.

The presentation of the standards overview consists of block diagrams, identifying the key elements of access network transport, and notation of the relevant standards, a corresponding matrix table, including the various standards organizations, and a listing of the standards identified, including their titles and issue dates\*.

\*Note: The column “Issue dates” in the list of Recommendations (Annex 2) will be superfluous as soon as a suitable Web presentation containing links to the actual documents is developed.

## 2. References

G.902 (ITU-T)

[ETSI EG 202 306](#)

GII. Y.100 Recs. series (ITU-T)

ANT Standards Work Plan (Issue 23)

## 3. Definitions

The basic documents for the following definitions are G.902 (ITU-T) and ETSI EG 202 306.

### Access Network Transport (ANT):

Based on definitions specified in G.902 the Access Network (AN) provides transport bearer capabilities for the provision of telecommunications services inside of the AN between a service node interface (SNI) providing customer access to a service node and each of the associated interfaces towards the Customer Premises Network(s) which are being grouped as XNI interfaces (this would include ISDN UNIs). An AN implementation comprises transmission media and access network element (NE) entities.

The XNI interface, following the intent of GII Recs. Y.100 series, is defined as “the interface between the user domain and the network domain at which the access network transport functions apply”.

Following the intent of GII Recs. Y.100 series, the Distribution Interface (DI) is defined as the interface inside the access network domain at which the access network transport functions apply.

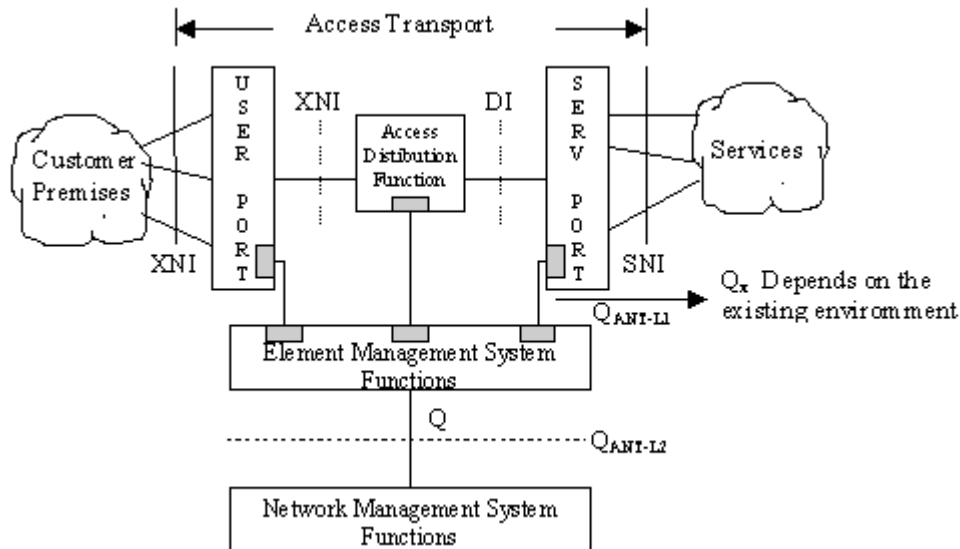


FIGURE 1 - ACCESS NETWORK TRANSPORT FUNCTIONAL MODEL

An access network element can be configured and managed through a  $Q_x$  interface that may be implemented at the  $q$  reference point. This  $q$  reference point is the access point for management

information, configuration control, performance monitoring and maintenance as defined in ITU-T Rec. M.3010.

In principle there are no restrictions on the types and number of SNIs and XNIs that an Access Network may implement. The Access Network does not interpret (user) signaling and does not include Customer Premises Networks and/or terminal equipment respectively.

Note: The boxes in Figure 1 represent functions at the interfaces and do not necessarily imply actual equipment at the interface.

#### **4. Abbreviations**

The list of ANT related abbreviations is included into the Annex 3.

#### **5. Access Network Transport Reference Model**

Logical and physical representations of the Access Network Transport Reference Model (ANT RM) are presented in Figure 2. This Reference Models are based on the generic GII AN Reference Model and the basic model presented in G.902 (ITU-T) and ETSI EG 202 306 (ETSI - revised ETR 306). The logical representation shows the mutual relations of different ANs and relation to the other parts of the network and/or CPN respectively. The wide varieties of interfaces, architectures, applications, etc. for the ANT can be best understood through scenarios that could be found in Annex 1. The physical representation of the ANT RM includes those entities which provide the required transport bearer capabilities between a Service Node Interface (SNI) and each of the associated Customer Network Interfaces (XNIs). An Access Network may be configured and managed via a Q interface. Access network internal Distribution Interface DI represents the internal interfaces within the AN between the access NEs and in special cases could be presented as interface between two ANs.

#### **6. Access Network Transport functionality**

The ANT functions are dedicated from the G.902 where AN functions are divided into 5 groups:

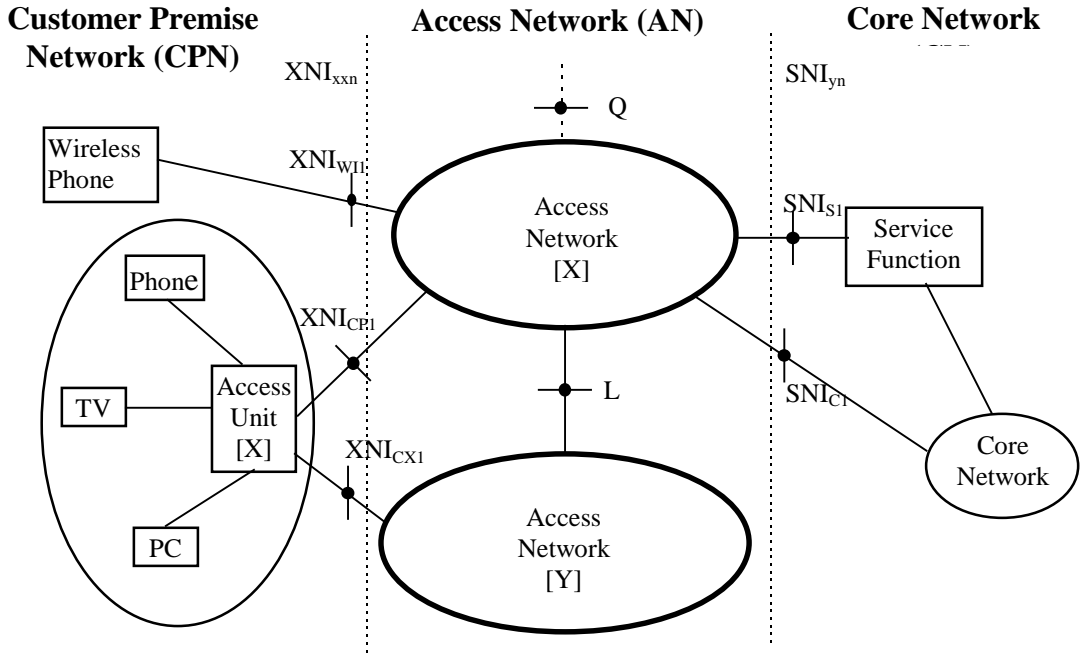
- User port functions
- Service port functions
- Core functions
- Transport functions
- AN-system management functions

With respect to this classification the following functions to the access network entities represented in the Access Network Transport Reference Model (ANT RM) are applied:

Service Port – service port, core and transport functions

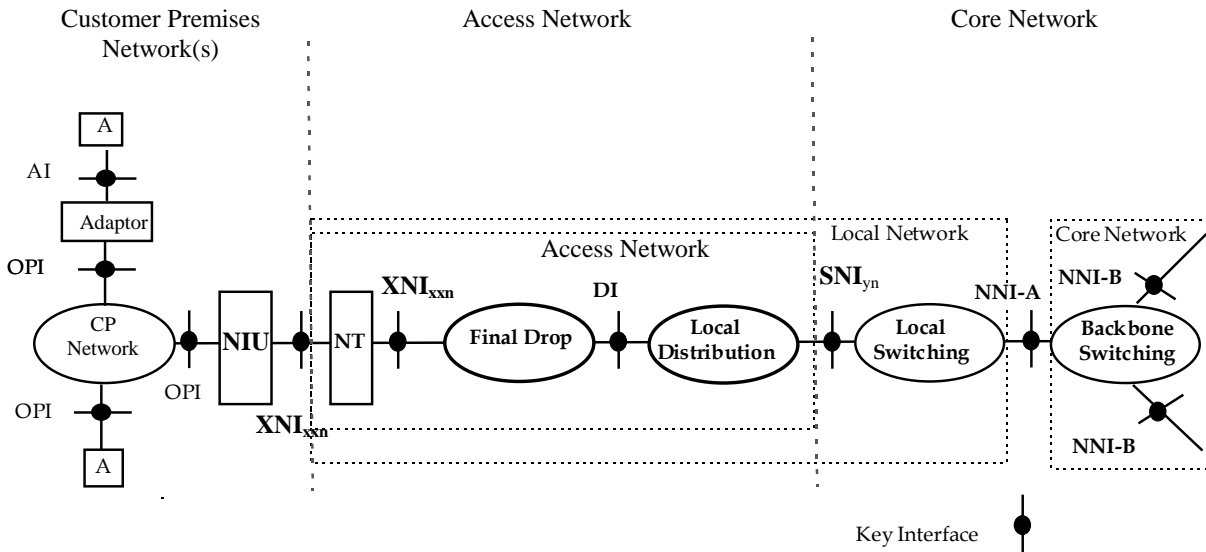
User Port – user port, core and transport functions

Access Distribution Function – core and transport functions



Note: Logical reference point “L” is physically represented as access network Distribution Interface DI.

**a: Logical representation**



Note: The NT term is used for generic Network Termination for various services. For some services/configurations, the NT might be property of the customer and therefore integrated in the CPN; nevertheless it terminates the Access Network from a functional/physical point of view.

**b: Physical representation**

FIGURE 2 - ACCESS NETWORK TRANSPORT REFERENCE MODEL

## 7. Access Network Transport Interfaces

An Access Network as specified in G.902 is bounded by the customer premises network interfaces (XNIs) on the customer side, the service node interfaces (SNIs) at the core network side and a placement of the management Q interface. In addition to these interfaces, and with respect to the ANT functional model and ANT RM, there is an access network Distribution Interface DI specified representing the internal interfaces within the AN between the access NEs.

These interfaces could be deeper determined via following designation:

- $SNI_{Sn}$  : between Service Function and Access Network (n- seq. number)
- $SNI_{Cn}$  : between Core Network and Access Network ( n- seq. number)
- $XNI_{XYn}$  : between Access Network and CPN (x: type of access technology / y: medium)
- $L_n$ : between Access Networks (special case of DI)
- $Q_n$ : between Access Network and Management Agent/Network
- $DIn$ : between Access Network Network Elements (refer to Scenario 4 as an example)

The following basic physical interfaces are identified (others may be added):

### SNI Interfaces

#### *Narrowband (up to 2MBit/s including)*

- 2Mbit/s (according to ITU-T G.703)
- ISDN PRA  $V_{2M}$  (according to ETS 300 012)
- ISDN BA
- 64kbit/s and  $n \times 64kbit/s$  (according to ITU-T G.703/V.24/X.21/V.35 and V.36)
- POTS (a,b) with U2 signalization (Z interface according to ITU-T Q.512)
- 2W ALL (according to ITU-T Q.552)
- 4W ALL (according to ITU-T Q.553)
- Power Line interfaces (under study by ETSI TC PLT)

#### *Broadband (above 2Mbit/s)*

- Ethernet 10 Base T (according to IEEE 802.3)
- ATMF 25.6 (according to ATMF af-phy-0040.000)
- 34 Mbit/s (according to ITU-T G.703)
- Ethernet 100 Base T ( IEEE 802.3)
- 140 Mbit/s (according to ITU-T G.703)
- STM-1 155 Mbit/s (according to ITU-T G.703 and/or G.957)
- STM-4 622 Mbit/s (according to ITU-T G.957)
- STM-16 2.5 Gbit/s (according to ITU-T G.957)
- audio/video (under study)



- DWDM (under study)
- Power Line interfaces (under study)
- Ethernet 1000BaseT (“Gigabit Ethernet” 1000 Mbits/s according to IEEE 802.3)
- Ethernet 10GBaseT (“10 Gigabit Ethernet” 10,000 Mbits/s according to IEEE 802.3)
- Passive Optical Network (“BPON” and “GPON” according to ITU-T G.983 series and G.984 series or IEEE 802.3 1G-EPON or 10G-EPON)
- Coaxial (“HiNoC” 100Mbits/s/channel according to J.195.1, J.195.2 and J.195.3)

## **XNI Interfaces**

### ***Narrowband (up to 2MBit/s including)***

- 2Mbit/s (according to ITU-T G.703)
- ISDN PA  $U_{2M} / S_{2M}$  (according to ETS 300 012)
- ISDN BA  $U_{k0} / S_0$  (according to ETS 300 012)
- 64kbit/s and  $n \times 64kbit/s$  (according to ITU-T G.703/V.24/X.21/V.35 and V.36)
- POTS (a,b) with U2 signalization (Z interface according to ITU-T Q.512)
- 2W ALL (according to ITU-T Q.552)
- 4W ALL (according to ITU-T Q.553)
- Radio interfaces (under study)
- Power Line interfaces (under study by ETSI TC PLT)
- IMT-2000 (Rec. ITU-R M.1457)
- IMT-Advanced (Rec. ITU-R M.2012)

### ***Broadband (above 2Mbit/s)***

- Ethernet 10 Base T (according to IEEE 802.3)
- ATMF 25.6 (according to ATMF af-phy-0040.000)
- 34 Mbit/s (according to ITU-T G.703)
- Ethernet 100 Base T (according to IEEE 802.3)
- 140 Mbit/s (according to ITU-T G.703)
- sSTM-0 (ITU-T I.432.4)
- STM-1 155 Mbit/s (according to ITU-T G.703 and/or G.957)
- audio/video (under study)
- DWDM (under study)
- Radio interfaces (under study)
- Power Line interfaces (under study by ETSI TC PLT)
- IMT-2000 (Rec. ITU-R M.1457)

- IMT-Advanced (Rec. ITU-R M.2012)
- IMT-2000 and IMT-Advanced enhancements (Recs. ITU-R M.1457 and M.2012)
- Ethernet 1000BaseT (“Gigabit Ethernet” 1000 Mbits/s according to IEEE 802.3)
- Ethernet 10GBaseT (“10 Gigabit Ethernet” 10,000 Mbits/s according to IEEE 802.3)
- Passive Optical Network (“BPON” and “GPON” according to ITU-T G.983 series and G.984 series or IEEE 802.3 1G-EPON or 10G-EPON)
- RLANs (Recommendation ITU-R M.1450)
- Broadband wireless access systems (Recommendation ITU-R M.1801)
- [HiNoC1.0 \(100Mbits/s/channel over coaxial network according to J.195.1, J.195.2 and J.195.3\)](#)
- [HiNoC2.0 \(1000Mbits/s/channel over coaxial network, under study\)](#)
- [C-DOCSIS \(800Mbits/s downstream and 160Mbits/s upstream, under study\)](#)

## DI

### *Narrowband (up to 2MBit/s including)*

- ISDN BA  $U_{k0}$  (according to ETS 300 012)
- ISDN PRA  $U_{k2}$
- $n \times 64$  kbit/s (according to ITU-T G.703)
- $n \times 64$  kbit/s HDSL (according to ITU-T G.991.1)
- 2Mbit/s (according to ITU-T G.703)
- 2Mbit/s HDSL (according to ITU-T G.991.1)
- asymmetrical DSL 1,5 Mbit/s down 600 kbit/s up (according to ITU-T G.992.2)
- Power Line interfaces (under study by ETSI TC PLT)

### *Broadband (above 2Mbit/s)*

- asymmetrical DSL 8 Mbit/s down 800 kbit/s up (according to ITU-T G.992.1)
- 34 Mbit/s (according to ITU-T G.703)
- 140 Mbit/s (according to ITU-T G.703)
- STM-1 155 Mbit/s (according to ITU-T G.703 and/or G.957)
- STM-4 622 Mbit/s (according to ITU-T G.957)
- STM-16 2,5 Gbit/s (according to ITU-T G.957)
- DWDM (under study)
- Radio interfaces (under study)
- Power Line interface (under study by ETSI TC PLT)
- [HiNoC1.0 \(100Mbits/s/channel over coaxial network according to J.195.1, J.195.2 and J.195.3\)](#)
- [HiNoC2.0 \(1000Mbits/s/channel over coaxial network, under study\)](#)

- C-DOCSIS (800Mbits/s downstream and 160Mbits/s upstream, under study)

### Management interfaces

- F interface ( for interconnection between ANT NE and local terminal and/ or for interconnection of management system to the remote terminal )
- Q interface (for connection of ANT NE and the management system)

## 8. Access Network Transport Transmission characteristic

under study

## 9. Access Network Elements functionality

under study

## 10. Access Network Transport Scenarios

Based on the scenario methodologies developed for GII, a series of seven scenarios have been developed for ANT (see Annex 1):

1. Provision of Voice/Data/Video Service over existing infrastructure
2. Provision of Voice/Data/Video Services over Cable Networks using B-ISDN
3. The use of ADSL or VDSL to provide video/data bandwidth over copper pairs
4. **Fibre** Access Scenario
5. Wireless Access
6. Access using satellites
7. Example of Internet Access
8. Power Line Transmission (PLT)

The scenarios, depicted in Annex 1, are used as references for correlation with the matrix of ANT-related standards (Annex 2) for quick retrieval of specific applications (XNI, CATV, etc.). Table 1 shows the analysis of the seven scenarios in terms of 1) the services, 2) the core network, 3) the access network, 4) the customer premises network, and 5) the information flow. The underlined characteristics inside the bold boundaries indicate the differentiating attributes from other scenarios.

From this table, it is clearly demonstrated that the main attributes which differentiate scenario 1 through 6 are the transport technologies used in the Access Network, i.e., Cable television (scenarios 1 and 2), ADSL/HDSL, Fibre, Radio, and Satellite, respectively. In scenario 1a) the DSB and terrestrial broadcasting are also included as a means of video distribution.

Scenarios 1 and 2 are different in that, in the former, the core network uses the existing infrastructure, i.e. PSTN/N-ISDN, while in the latter the core network is B-ISDN.

Scenario 7 is illustrative of the Internet access, which is somewhat different from the others scenarios which provide voice/data and video.

TABLE 1

**Access Network Transport (ANT) Scenarios**

The bold boundaries indicate differentiating attributes

Note: Scenario 8, Power Line Transmission (PLT) has to be added as soon as details are available

Acronyms (e.g., ADSL, VDSL) refer in general to the family of related implementations, not a particular standard

|                         | <b>Scenario 1</b>   | <b>Scenario 2</b>  | <b>Scenario 3</b>                 | <b>Scenario 4</b>                     | <b>Scenario 5</b>  | <b>Scenario 6</b>                                | <b>Scenario 7</b>   |
|-------------------------|---|--|-----------------------------------|---------------------------------------|--|--|---|
| <b>Services</b>         | a) <u>Voice/Data</u> over telecom network and <u>Video</u> over cable, radio & DSB<br>b) <u>Voice/Data/Video</u> over 2way cable    | a) Voice/Data over telecom network and Video over cable<br>b) Voice/Data/Video over 2way cable | Voice/Data & Video over ADSL/VDSL | Voice/Data & Video over Fibre Network | a) Wireless Phone Voice/Data over telecom network and Video over cable<br>b) Voice/Data/Video over Radio<br>c) DAB and DVB | B-ISDN, Internet and Mobile Phone via Satellite  | a) Data over <u>Internet</u> Voice/Video and/or Data over <u>Internet</u> |
| <b>Core Network</b>     | <u>Existing Infrastructure</u> (PSTN/N-ISDN) or NGN (Rec. Y-2012)   | <u>B-ISDN</u> or NGN (Rec. Y-2012)   | B-ISDN or NGN (Rec. Y-2012)       | B-ISDN or NGN (Rec. Y-2012)           | N-ISDN or B-ISDN or NGN (Rec. Y-2012)  | B-ISDN or Existing (N-ISDN) or NGN (Rec. Y-2012) | a) POTS/FR/ATM<br>b) ATM Backbone or NGN (Rec. Y-2012)                    |
| <b>Access network</b>   | a) 1-way <u>Cable Distribution Network</u><br>b) 2-way <u>Cable Distribution Network</u><br>c) DSB/terrestrial broadcasting in 1 a) |  | <u>ADSL/VDSL</u>                  | <u>Fibre</u> (Fibre to the curb/home) | <u>Radio/Wireless</u> for Voice/Data<br>Cable for a) Video   | Satellite  | a)ADSL/VDSL<br>b) PSTN/ISDN, HFC, PON<br>c) Fixed wireless Access         |
| <b>CPN</b>              | Access Unit TV, PC, Phone   |  | Access Unit TV, PC, Phone         | Access Unit TV, PC, Phone             | Access Unit TV, PC, Phone, wireless Phone  | Access Unit TV, PC, Phone                        | Access Unit TV, PC, Phone   |
| <b>Information Flow</b> | a) Video Distribution over 1-way cable network, return via PSTN/ISDN  |  |                                   |                                       | 2-way wireless   | 2-way satellite                                  |   |

### 11. Overview of existing standards and activity

In order determine the standardization needs for ANT, a matrix of ANT-related standards was developed from known public lists inputs from other ITU Study Groups, other standards development organizations (SDOs), Forums & consortia. The matrix is organized, as seen in the sample format of Figure 3, by Standards body and then by designation. This enables quick location of specific standards. Each standard is categorized by marking its type according to the code in Figure 3 and further refined by identifying each scenario from Annex 1 associated with the particular standard. This structure enables a user of this plan a straight forward way to obtain a listing of standards relevant to a particular topic (e.g. user interface for CATV access). The current matrix is reported in Annex 2. The matrix will be updated through liaison to ITU-T, ITU-R, and standards organizations outside the ITU. It is planned to eventually replace this manual method for presenting the matrix of standards with a web-based approach where a user could click on a portion of a scenario and immediately obtain a list of relevant standards (or discover that relevant standards did not exist).

#### Organization of ANT Relevant Standards by Type and Scenario Reference

Classification: G= General; O= Overview; A= Architecture; Q= Network Management Access  
 Medium: F= Fiber; C= COAX; P= Twisted pair; A= Wireless  
 Interface: J= User/Access Network; H= Service Node/Access Network;  
 B= Direct Server/Access Network; W= User/Wireless Access Network

| Stds. Body | Number     | Title               | Scen. Ref. | Classification |   |   |   | Medium |   |   |   | Interfaces |   |   |   | Public. Date |
|------------|------------|---------------------|------------|----------------|---|---|---|--------|---|---|---|------------|---|---|---|--------------|
|            |            |                     |            | G              | O | A | Q | F      | C | P | A | J          | H | B | W |              |
| ITU        | G.1xx      | Equip. Transmission |            |                |   |   |   |        |   |   |   |            |   |   |   |              |
| ”          |            |                     |            |                |   |   |   |        |   |   |   |            |   |   |   |              |
| ”          |            |                     |            |                |   |   |   |        |   |   |   |            |   |   |   |              |
| ETSI       | TS 300 xxx | Equip. transmission |            |                |   |   |   |        |   |   |   |            |   |   |   |              |
| ”          |            |                     |            |                |   |   |   |        |   |   |   |            |   |   |   |              |
| DAVI       |            |                     |            |                |   |   |   |        |   |   |   |            |   |   |   |              |

FIGURE 3

Sample format for standards matrix

The following classes are used in “classification”.

G: The document contains transmission related specifications.

O: The document contains an overview over transmission related items specified in a set of Recommendations or Standards.

A: Documents containing reference models are classified as architectural.

Q: Documents containing OAM requirements as Information models, management interfaces etc..

## **Annex 1, Reference Scenarios for Correlation of Standards**

### **A1.1 Purpose of the scenarios**

The scenarios are intended to:

- a) facilitate the identification of key interface points in a scenario;
- b) facilitate classification of interfaces by an appropriate taxonomy scheme;
- c) facilitate identification of services that can be carried across such interfaces;
- d) facilitate classification of services by an appropriate taxonomy scheme;
- e) facilitate identification of end points for service delivery;
- f) facilitate investigation of interplay between all components;
- g) facilitate identification of access network transport technologies
- h) be generic enough to facilitate scenario development across all technologies and Standards Development Organization (SDO) areas.

NOTE 1 - The set of examples contained within this Annex is not intended to be exhaustive.

NOTE 2 - Other physical implementations may be equally valid.

The following assumptions apply:

- The scenario technique is also applicable to application requirements as well as network requirements.
- Application requirements can be included in the scenarios.
- An interface occurs between any point where two components need to communicate.
- The scenarios currently contained in this document are primarily oriented towards provision of voice, data and video services.

### **A1.2 Reference Model**

The generic Reference Model valid for all scenarios is shown in the Clause 5 of this document.

### **A1.3 Components**

- Service Function: such as Video Server and Video Service Provider for video service
- Core Network: such as Telecommunication Network, PSTN, N-ISDN, B-ISDN
- Access Network: such as CATV Network, ADSL/VDSL, Fibre Network, RITL, Satellite
- CPN (Customer Premise Network): such as Access Unit, TV, PC, Phone, Wireless Phone

#### **A1.3.1 XNI Interface specification**

The following XNI<sub>XXn</sub> were identified in the scenarios:

- XNI<sub>CPn</sub> For copper interfaces (e.g. UNI for ISDN)
- XNI<sub>CXn</sub> For Coax interfaces (e.g. CATV)
- XNI<sub>SAn</sub> For Satellite interfaces (e.g. ptp or broadcast )

- XNI<sub>WIn</sub> For wireless interfaces (e.g. RITL)
- XNI<sub>OPn</sub> For Optical (Passive) interfaces (e.g. BPON)
- XNI<sub>LAn</sub> For LAN interfaces (e.g. 10-BASE-T)
- XNI<sub>PLT</sub> For Power Line Transmission interfaces

### **A1.3.2 The scenarios**

- 1) Provision of Voice/Data/Video Service over existing infrastructure
- 2) Provision of Voice/Data/Video Services over Cable Networks using B-ISDN
- 3) The use of ADSL or VDSL to provide video bandwidth over copper pairs
- 4) Fibre Access Scenario, Fiber In The Loop
- 5) Wireless Access
- 6) Access using satellites
- 7) Example of Internet Access
- 8) Power Line Transmission (PLT)

The following table provides a quick reference and alignment between this document naming and Y.120 and relevant standards.



| <b>Interface type</b> | <b>Y.120 (Note 4)</b>     | <b>Description</b>      | <b>Applicable recommendations (examples)</b>                  | <b>Remarks</b> |
|-----------------------|---------------------------|-------------------------|---|----------------|
| SNI <sub>C1</sub>     | H-<br>ISDN/PSTN/BISDN     | ISDN/PSTN/BISDN         | ETS 300 012/ ITU-T Q.512/G.967                                |                |
| SNI <sub>C2</sub>     | H-CATV                    | CATV                    | IEEE 802.14   |                |
| SNI <sub>C3</sub>     | H-ADSL                    | ADSL                    | G.992.1, G.992.2, G.992.3, G.992.5                            |                |
| SNI <sub>C4</sub>     | H-VDSL                    | VDSL                    | G.993.1   |                |
| SNI <sub>C5</sub>     | H-FTTH                    | FTTH                    | G.982, G.983, ETSI TS 101 272, IEEE 802.3 1G-EPON or 10G-EPON |                |
| SNI <sub>C6</sub>     | H-FTTC                    | FTTC                    | G.982, G.983, ETSI TS 101 272, IEEE 802.3 1G-EPON or 10G-EPON |                |
| SNI <sub>C7</sub>     | H-WIRELESS                | WIRELESS                |   | note 1         |
| SNI <sub>C8</sub>     | H-GATEWAY                 | GATEWAY                 |   | note 1         |
| SNI <sub>S1</sub>     | B-VIDEO                   | VIDEO                   |   | note 1         |
| SNI <sub>S2</sub>     | B-Internet                | Internet                |   | note 1         |
| XNI <sub>CP1</sub>    | J-ISDN/PSTN/BISDN         | ISDN/PSTN/BISDN         | ETS 300 012/ ITU-T Q.512/I.414                                |                |
| XNI <sub>CP2</sub>    | J-ADSL                    | ADSL                    | G.992.1, G.992.2  |                |
| XNI <sub>CP3</sub>    | J-VDSL                    | VDSL                    | G.993.1   |                |
| XNI <sub>CP4</sub>    | J-Implementation          | Implementation specific | DTR/TM-04070  | note 3         |
| XNI <sub>CP5</sub>    | J-GATEWAY                 | GATEWAY                 |   | note 1         |
| XNI <sub>CX1</sub>    | J-CATV                    | CATV                    | IEEE 802.14   |                |
| XNI <sub>CX2</sub>    | J-HFC                     | HFC                     |   | note 1         |
| XNI <sub>LA1</sub>    | J-LAN                     | LAN                     | IEEE 802.3  |                |
| XNI <sub>SA1</sub>    | J-Satellite               | Satellite               |   | note 1         |
| XNI <sub>SA2</sub>    | J-TERRESTRIAL             | TERRESTRIAL             |   | note 1         |
| XNI <sub>WI1</sub>    | J-WIRELESS (Phone)        | WIRELESS (Phone)        | ITU R M.1457, M.1801, M.2012                                  |                |
| XNI <sub>WI2</sub>    | J-WIRELESS (Multimedia)   | WIRELESS (Multimedia)   | ITU R M.1457, M.1801, M.2012                                  |                |
| XNI <sub>WI3</sub>    | J-WIRELESS (Sat to Phone) | WIRELESS (Sat to Phone) | ITU R M.1850  |                |
| XNI <sub>WI4</sub>    | J-WIRELESS (Sat to Car)   | WIRELESS (Sat to Car)   | ITU R M.1850  |                |
| XNI <sub>OP1</sub>    | J-OPTICAL                 | OPTICAL                 |   | note 1         |

Note 1: No standards on these interfaces.

Note 2: No standards or cordless/cellular standards.

Note 3: XNI<sub>CP4</sub> is introduced to indicate that on this XNI a range of implementations may apply

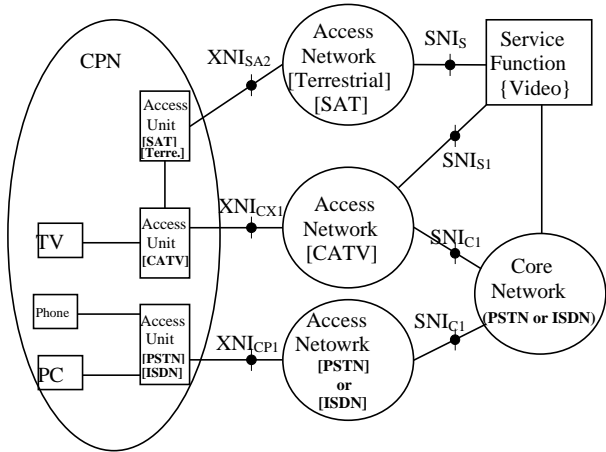
Note 4: The reference to Y.120 was introduced for clarity. It should be deleted when this draft will reach its stable stage.

Note 5: XNI for PLT to be added as far as details are specified

**A1.6 Scenario 1 - Provision of Voice/Data/Video Service over existing infrastructure**

**A1.6.1 - Provision of Voice/Data/Video services over existing infrastructure**

Logical representation:



**Components**

- Service Function: Video Service Provider
  - Core network: PSTN or ISDN
  - Access Network: Cable Distribution Network, SAT
  - CPN: TV, PC, Tel Terminal,
  - Access Unit for PSTN or ISDN, CATV, SAT
- Access Network for PSTN or ISDN is needed.

Physical representation

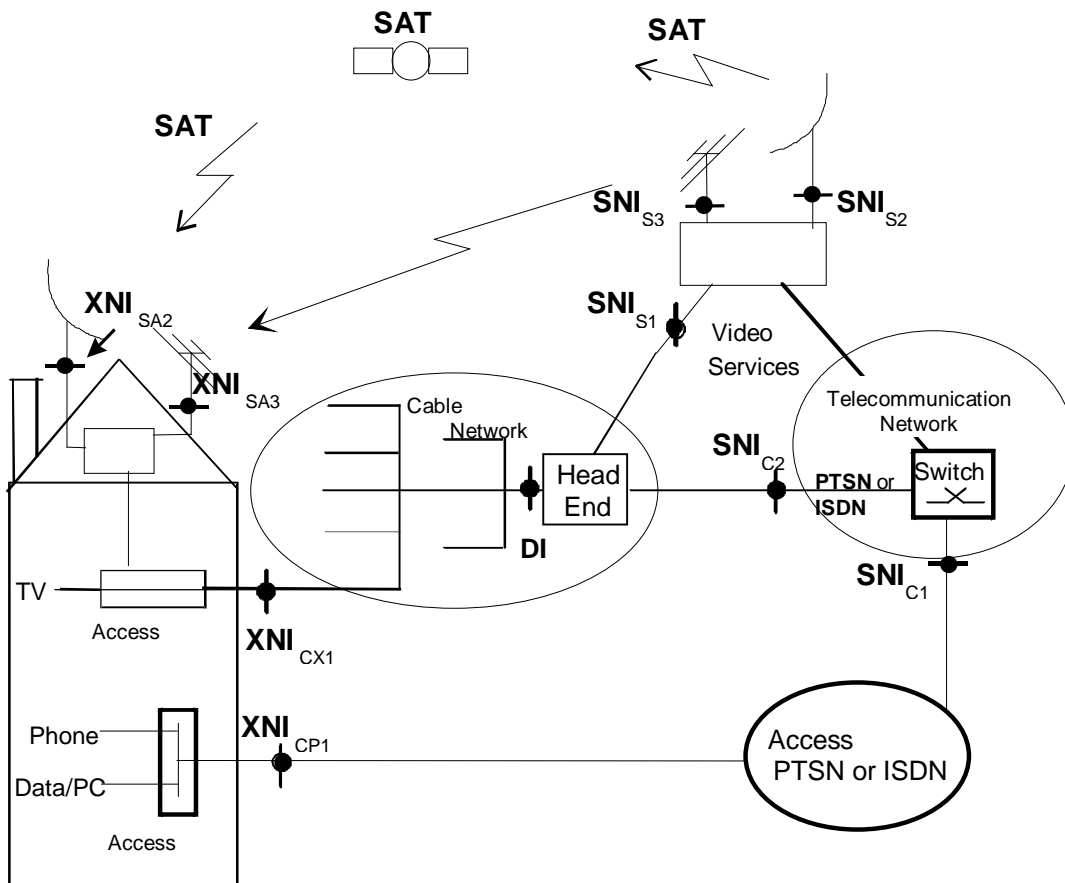


FIGURE 1a

**Provision of Voice/Data/Video services over existing infrastructure**

**Flow information for Figure 1a)**

In Figure 1a) the downstream channel for delivery of video is achieved from the Video Server to the customer premise either:

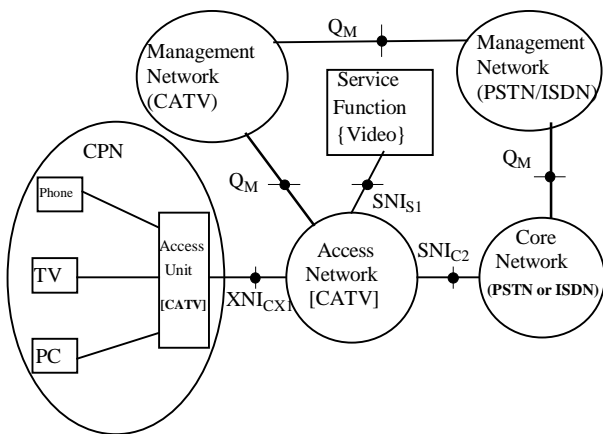
- a) directly via the satellite or terrestrial broadcast facilities, or
- b) via the SNI<sub>S1</sub> interface between the Video Server and the head end of the cable distribution network one-way.

Upstream information required for interactive video services is achieved from the customer premise (depending on whether the phone or PC is used) either:

- a) via XNI<sub>CP1</sub> and SNI<sub>C2</sub>, or
- b) via XNI<sub>CP1</sub> and SNI<sub>C1</sub>.

**A1.6.2 Provision of Voice/Data Service over 2-way Cable networks using PSTN or ISDN**

Logical representation



**Components**

- Service Function: Video Service Provider
- Core network: PSTN or ISDN
- Access Network: Cable Distribution Network
- CPN: TV, PC, Tel Terminal Access Unit for CATV

Physical representation

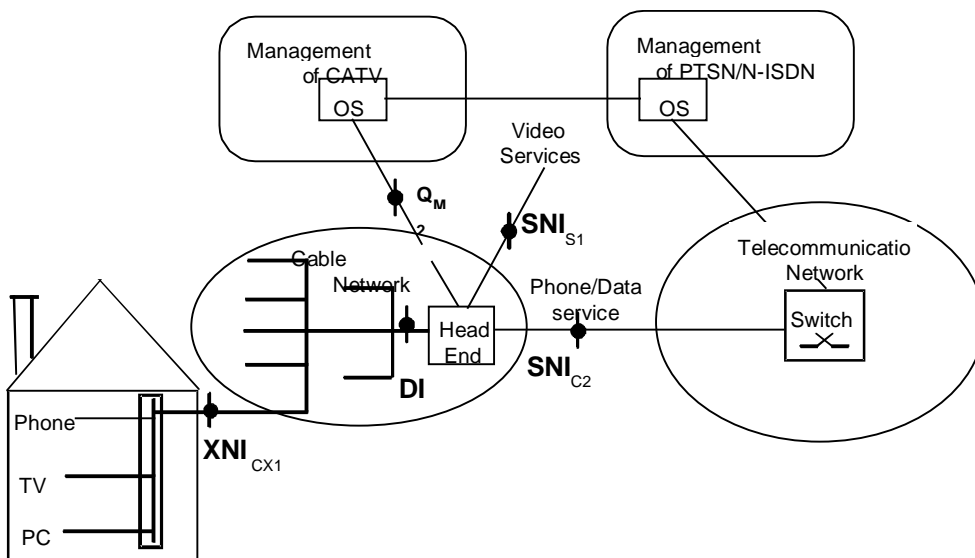


FIGURE 1b

**Provision of Voice/Data Service over 2-way Cable networks using PSTN or ISDN**

## **with network management interfaces**

### **Flow information for Figure 1b)**

The primary purpose of this figure is to illustrate that the upstream information for interactive video services is achieved via the two-way cable distribution network from  $XNI_{CX1}$  to the head end. Additionally the normal two-way phone and data service are also achieved over the cable distribution network via the  $SNI_{C2}$  interface to the telecommunications network.

However, in the case where broadcast facilities are also available as in 1a), downstream information could be provided by these broadcast facilities with upstream via the cable distribution network. The head end may include switching, in which case SS No. 7 may also be a candidate for control/signalling transported on the appropriate transmission system

The main object of ITU-T standardization activity in scenarios 1 and 2 may be focused on clarifying the functional requirements of the head end system as a generic access node of GII and specifying the interface between the core network and the head end system, studying the ATM over HFC system.

### **Network Management Interfaces**

Management interfaces are shown in Figure 1b) as an example. Such interfaces could be shown in other scenarios. The designations M1 etc. are based on MFA forum terminology.

#### **$Q_{Mx}$ interface**

$Q_{Mx}$  is needed for the OAM information flows between CATV head end and the local exchange (LEX) of the N-ISDN/PSTN. The  $Q_{Mx}$  interface may be regarded as part of the  $SNI_{C2}$  interface. The details of the  $Mx$  interface are for further study.

#### **M2 interface**

The  $Q_{M2}$  interface is required between the CATV head end and the OS (Operations System) of the CATV network. The Q interface may be a candidate for the M2 interface.

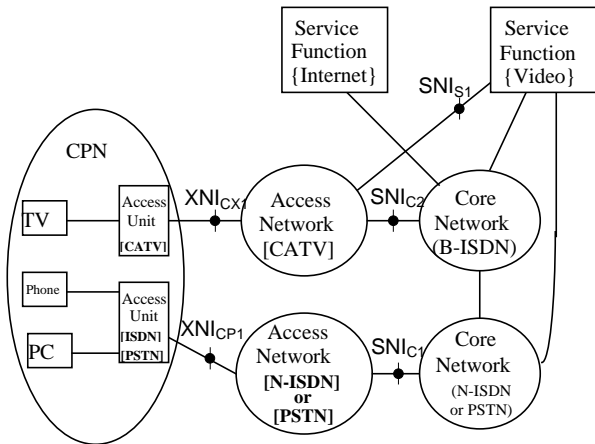
#### **M3 interface**

The M3 interface is required between the two OSs of the N-ISDN/PSTN and the CATV network. In the case where the CATV and N-ISDN/PSTN networks, then the Q interface may be applied. If the two networks belong to different operators then the X-interface can be a candidate for the M3 interface.

**A1.7 Scenario 2 - Provision of Voice/Data/Video Services over Cable Networks using B-ISDN**

**A1.7.1 Provision of Voice/Data/Video Services over one-way Cable Networks using B-ISDN with independent control channel**

Logical representation:



**Components**

- Service Function: Video Server, Video Service Delivery Point, IP Router
  - Core network: N-ISDN or PSTN, B-ISDN
  - Access Network: Cable Distribution Network
  - CPN: TV, PC, Tel Terminal
- Access Unit for N-ISDN or PSTN, CATV

– Access Network for PSTN or ISDN is needed.

Physical representation

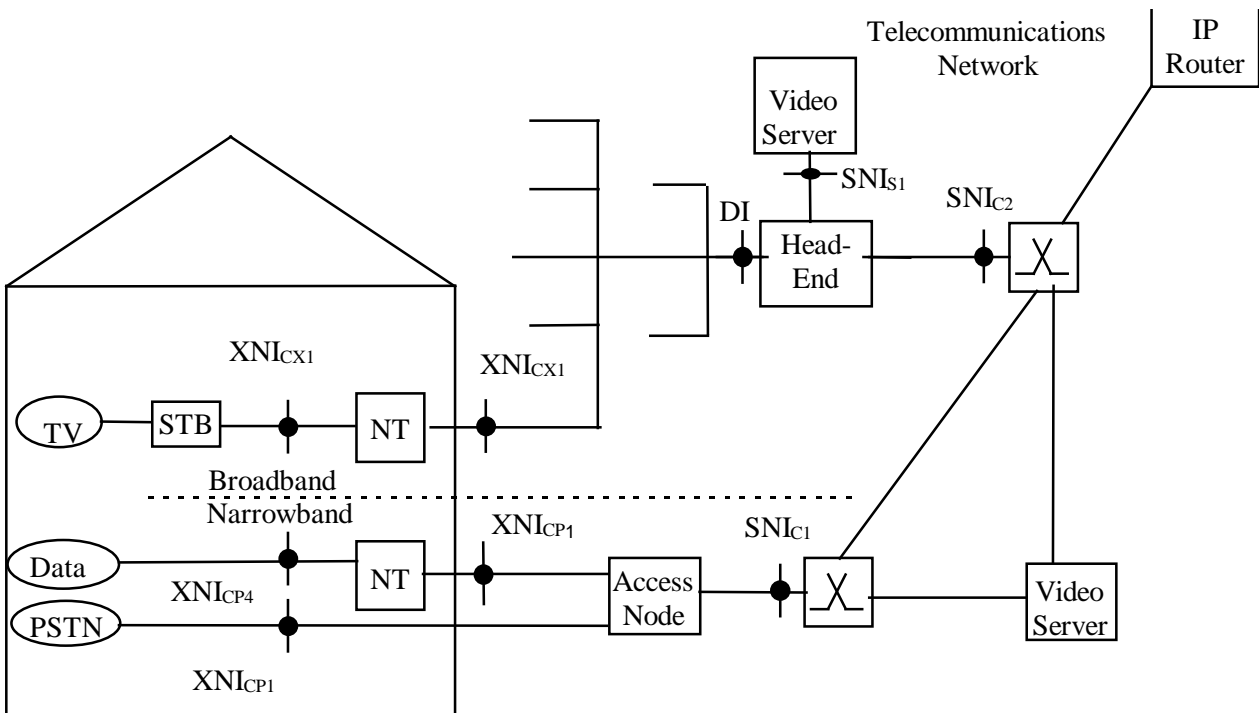


FIGURE 2a

**Provision of Voice/Data/Video Services over one-way Cable Networks using B-ISDN with independent control channel**

**Flow information for Figure 2a)**

Video services can be delivered to the customer's premise:

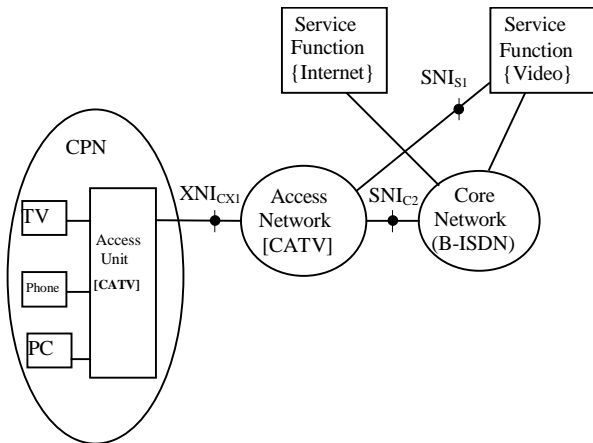
- a) from B<sub>VIDEO</sub> via XN<sub>ICX1</sub>, or
- b) from the video servers via SNI<sub>C2</sub> to the head end and then via XN<sub>ICX1</sub>.

Control information for video services may be exchanged:

- a) via XN<sub>ICP2</sub> and SNI<sub>C1</sub> to the video server through the core network
- b) via XN<sub>ICP1</sub> to the video server, and/or head end via SNI<sub>C2</sub>.

### A1.7.2 Provision of Voice/Data/Video Services over two-way Cable Networks using B-ISDN

Logical representation:



#### Components

- Service Function: Video Server, IP Router
- Core network: B-ISDN
- Access Network: Cable Distribution Network
- CPN: TV, PC, Tel Terminal Access Unit for CATV

Physical representation

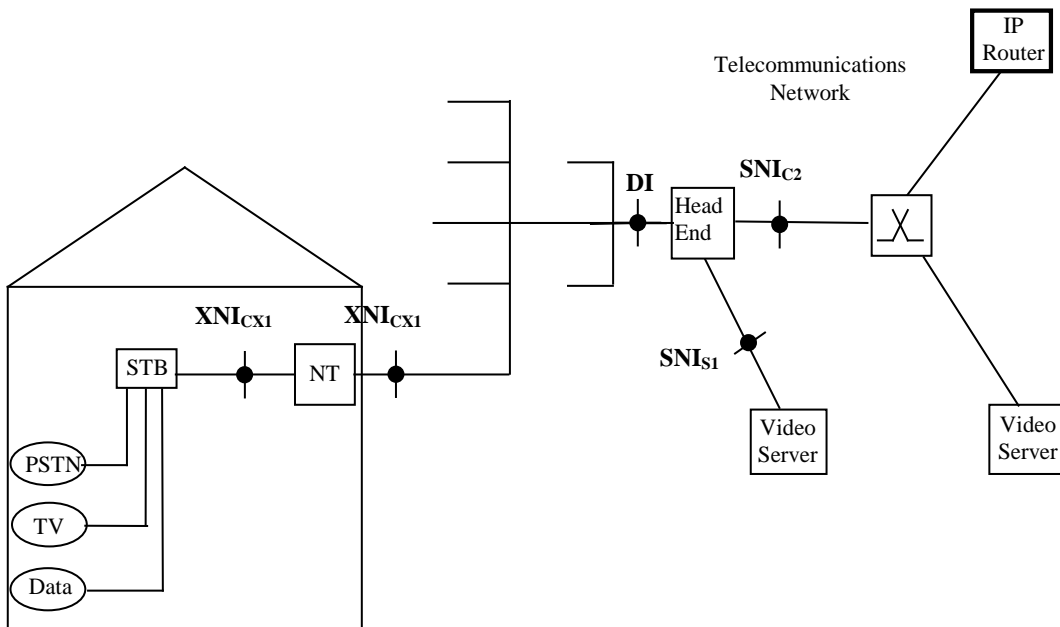


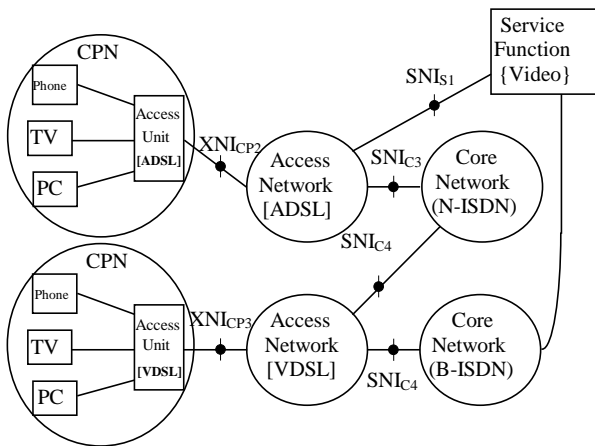
FIGURE 2b

### Provision of Voice/Data/Video Services over two-way Cable Networks using B-ISDN

Figure 2b shows a similar configuration to Figure 1b, except that B-ISDN is considered. In this scenario, video service can be delivered to the customer premise either via the SNI<sub>S1</sub> or SNI<sub>C2</sub> interfaces.

### A1.8 Scenario 3 - The use of ADSL or VDSL to provide video bandwidth over copper pairs

Logical representation:



#### Components

- Service Function: Video Server
- Core network: B-ISDN
- Access Network: ADSL, VDSL
- CPN: TV, PC, Tel Terminal Access Unit for ADSL, VDSL

Physical representation

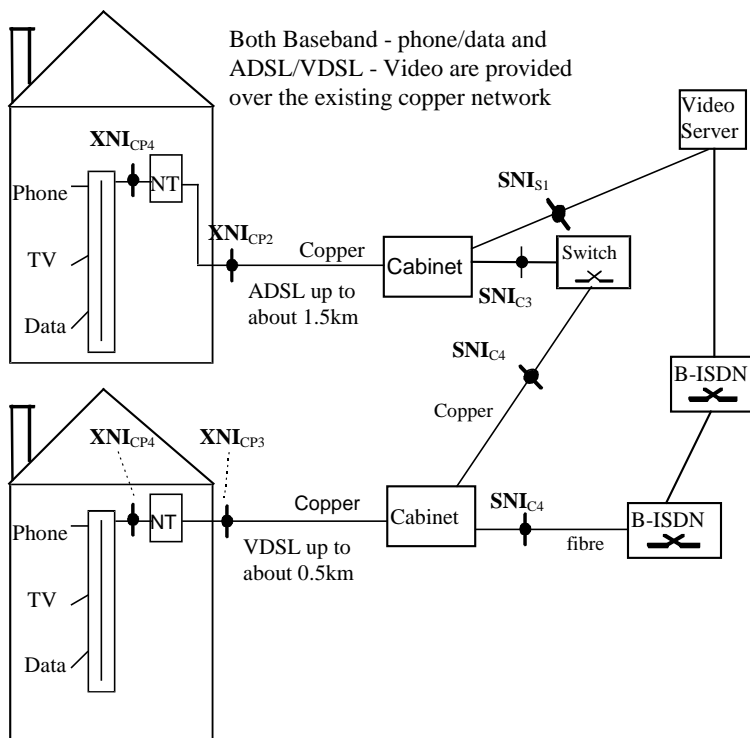


FIGURE 3

#### Provision of video over copper pairs

Techniques have been developed for transmitting relatively high bandwidths (1.5 - 50 MHz) over the existing copper local network, but this works only for relatively short distances. Standardized asymmetrical digital subscriber loop (ADSL) systems have downstream (to the subscriber) bit rates up to 8.192 Mbit/s and upstream rates up to 640 kbit/s. For 2 Mbit/s downstream rate, the range



may be as far as 5 km depending on cable gauge, with a reduction of range with increase of bit rate. Very high rate DSL (VDSL) is being developed for the range 25 to 50 Mbit/s (downstream), but for much shorter distances (50-500 m). In this case fibre is used as transport to a convenient cross-connect in the local network, before conversion to copper for the remainder of the connection.

**Flow information for Figure 3**

Video services can be delivered to the customer's premise:

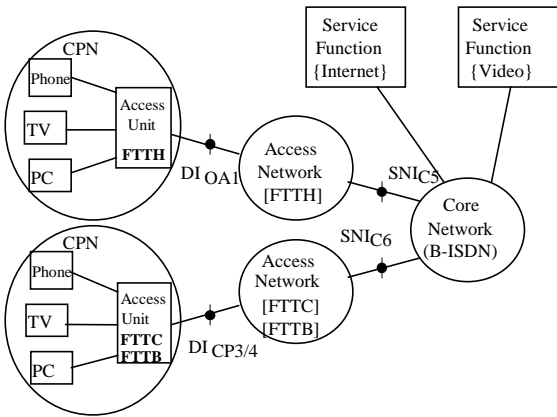
- a) from the video server via SNI<sub>S1</sub> and XNIC<sub>P2</sub>;
- b) from the video servers via SNI<sub>S1</sub>, SNI<sub>C3</sub> and SNI<sub>C4</sub> to the cabinet and then via XNIC<sub>P3</sub>, or
- c) from the video server via the core network and SNI<sub>C4</sub> to the cabinet and then via XNIC<sub>P3</sub>.

Control information for video services may be exchanged:

- a) via XNIC<sub>P2</sub> to the video server via SNI<sub>S1</sub>;
- b) via XNIC<sub>P3</sub>, SNI<sub>C3</sub>, SNI<sub>C3</sub> and SNI<sub>S1</sub> to the video server, or
- c) via XNIC<sub>P3</sub>, SNI<sub>C3</sub> and the core network to the video server.

### A1.9 Scenario 4 - Fibre Access

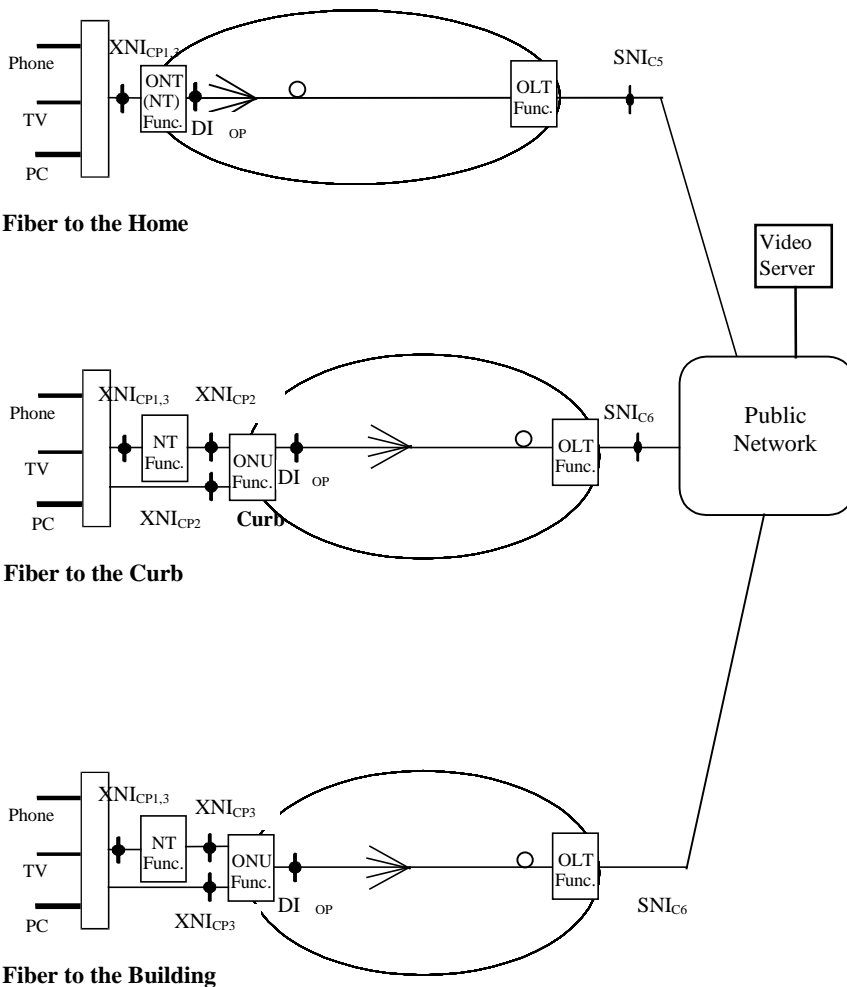
Logical representation:



#### Components

- Service Function: Video Server, IP Router
- Core network: B-ISDN
- Access Network: FTTH, FTTC
- CPN: TV, PC, Tel Terminal Access Unit for FTTH, FTTC

Physical representation



**Fiber to the Home**

**Fiber to the Curb**

**Fiber to the Building**

## FIGURE 4 - FIBRE ACCESS SCENARIO

### **Flow information for Figure 4**

Video services can be delivered to the customer's premise:

- a) from AVIDEO via SNIc5 and XNIOp1, or
- b) from AVIDEO via SNIc6 and XNICP3/4.

Control information for video services may be exchanged:

- a) via XNIOA1, SNIc5 and the core network to the video server;
- Two) via XNICP3/4, SNIc6 and the core network to the video server.

**A1.10 Scenario 5 - Wireless Access**

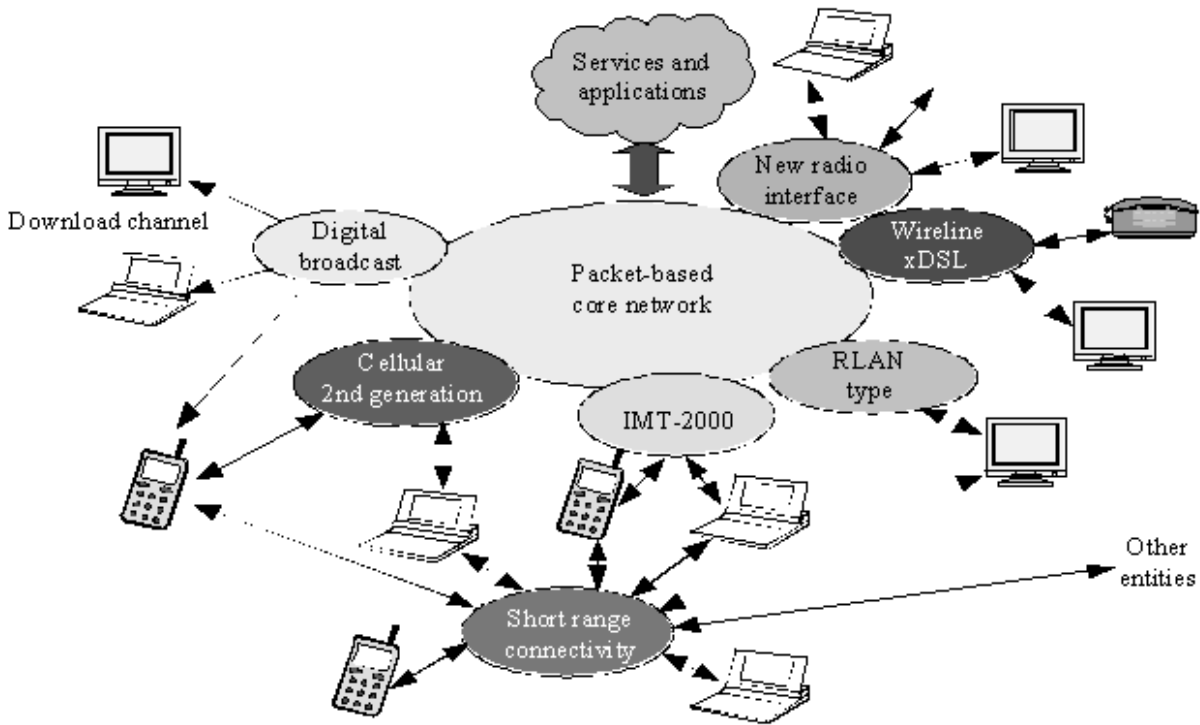


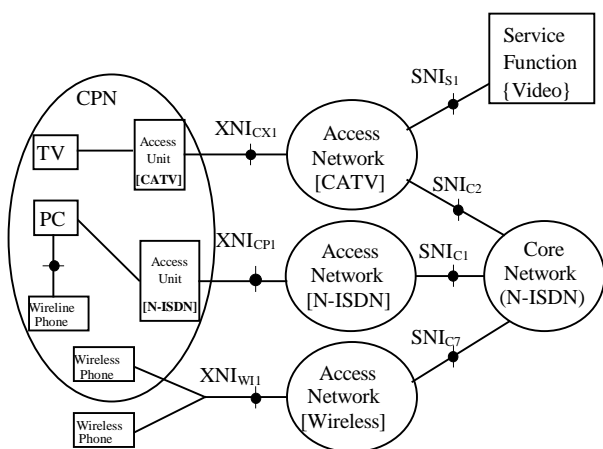
FIGURE 5a

**Wireless access networks overview**

Figure 5a was contributed as Figure 4 from Rec. ITU-R M.1645 demonstrating a variety of wireless access technologies are shown to demonstrate the role of wireless technology in access network, both in relationship to the core network and other access technologies.

**A1.10.1 Short-term provision of radio services**

Logical representation:



Physical representation

**Components**

- Service Function: Video Services
  - Core network: N-ISDN
  - Access Network: Cable Distribution Network, Wireless Network
  - CPN: TV, PC, Tel, Wireless Terminal Access Unit for CATV, N-ISDN
- Access Network for PSTN or ISDN is needed.

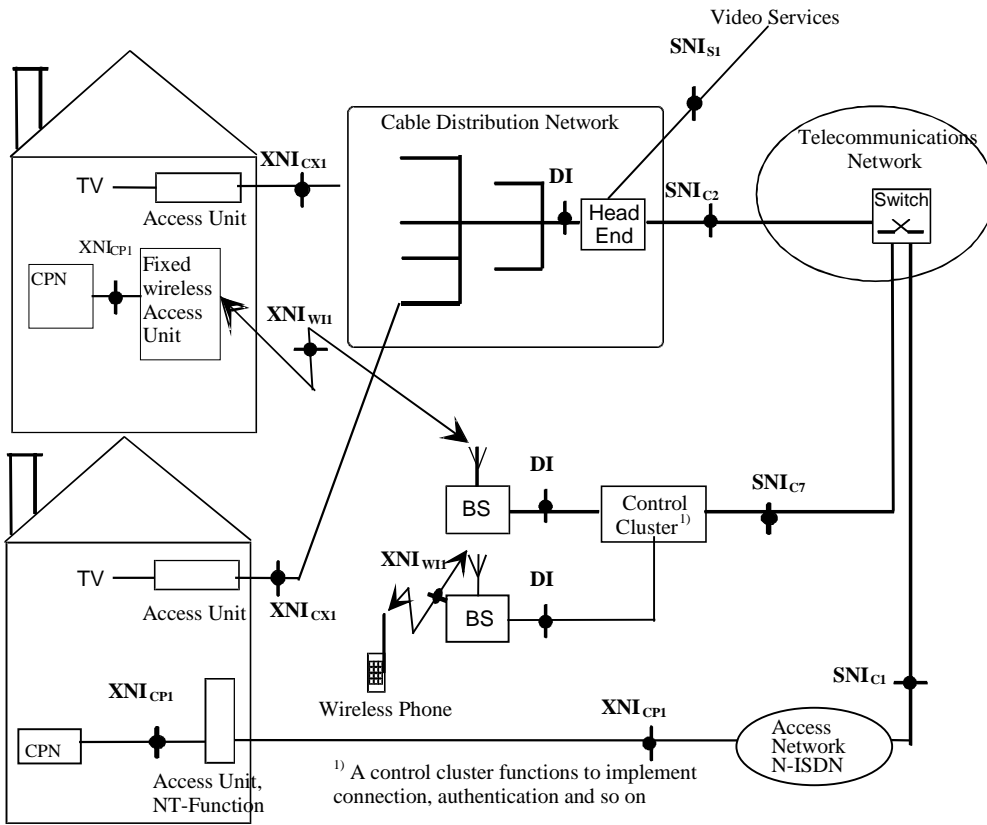


FIGURE 5b

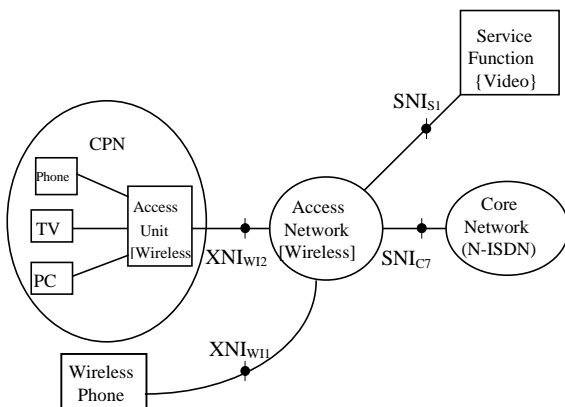
**Short-term provision of radio services**

Voice/data are provided to the end user through the access facilities of the local network operator. Those facilities can be either wireless through a public residential base station or wireline (in the latter case it is still possible that the user has a terminal phone if a home wireless equipment e.g. a domestic cordless equipment is attached to the wireline access). Video services are provided through the residential cable network (see "XNI<sub>CX1</sub>" reference point).

As in scenario 1a, the end user can interact with the head end (i.e. to select a particular movie e.g. for VOD-like services) by sending appropriate control data via "XNI<sub>CP1</sub>" reference point. The public switch interprets these commands, eventually prompts the user and instructs the head end via the "SNI<sub>C2</sub>" reference point. The advantage of this approach is the re-use of existing infrastructure (i.e. both wireline and wireless transport and control level capabilities).

### A1.10.2 Wireless Access Network

Logical representation:



#### Components

- Service Function: Voice, data and Video Services
- Core network: N-ISDN or B-ISDN
- Access Network: Wireless Network
- CPN: TV, PC, Tel, Wireless Terminal Access Unit for FWA

Physical representation

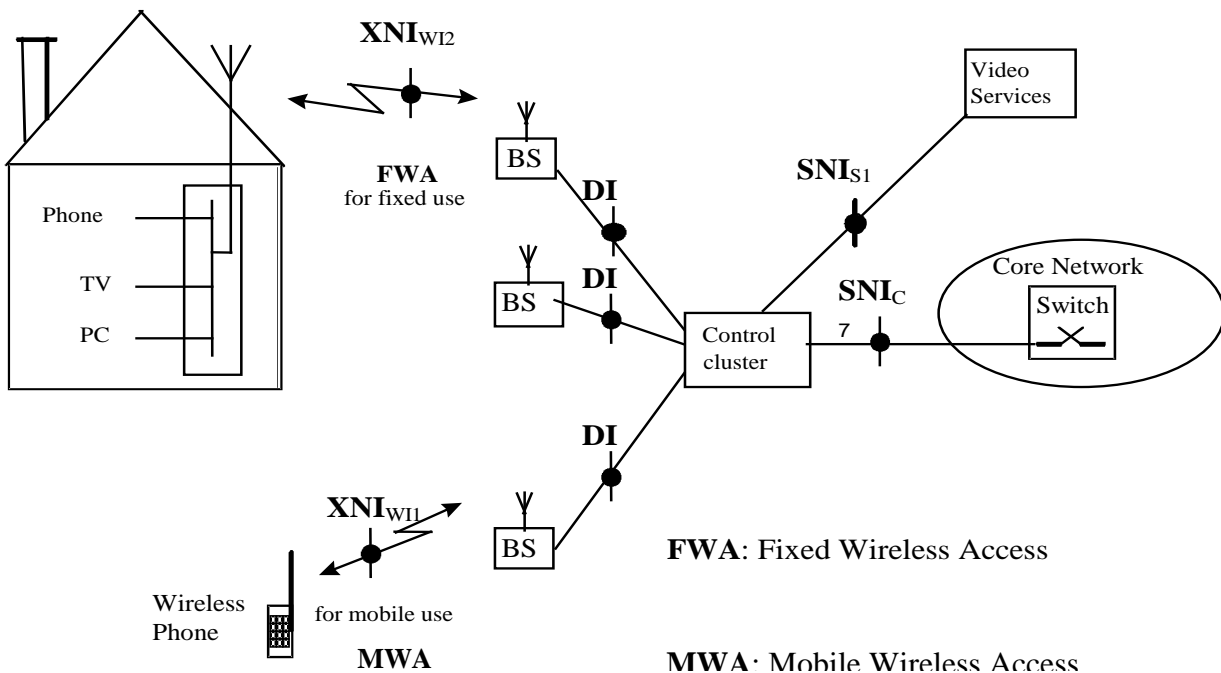


FIGURE 5c - WIRELESS ACCESS NETWORK

Figure 5b shows the configuration of the access to core network by using the radio in the access

network. As shown in this figure, voice/data and video services may be provided via the radio in the access network, which adopts the mobile wireless access (MWA) (e.g. IMT-2000) and the fixed wireless access (FWA) technologies efficiently and feasibly in both rural and urban areas.

Video services can be delivered to the customer's premise:

- a) from  $SNI_{S1}$  to the Control Cluster and then via  $XNI_{WH1/2}$

### **A1.11 Scenario 6 - Access using satellites**

The following scenario describes B-ISDN, Internet and mobile communications services which are supported by satellite networks and the pathways by which they can be delivered to the customer premise. In this diagram, satellite radio-frequency links are indicated by dotted lines and terrestrial links (fibre, coaxial cable, wireless, etc.) by solid lines.

Video and broadcast services via satellite are not part of this scenario.

#### **B-ISDN**

Satellite networks capable of supporting B-ISDN can deliver full asynchronous transfer mode services either directly to a customer premise earth station ("access unit") or via a gateway earth station which is not customer equipment. The same satellite system can carry B-ISDN traffic to and from a terrestrial carrier network through such a gateway. These paths are represented by the set of reference points  $L_A$ ,  $XNI_{SA1}$ ,  $SNI_{C8}$  and  $XNI_{CP5}$ . Depending on the characteristics of the satellite network, key interfaces may be present at points  $SNI_{C8}$ ,  $XNI_{CP5}$ . These interfaces maintain end-to-end ATM quality of service parameters between the satellite and terrestrial carrier networks or between the satellite network and the Customer Premise network (CPN).

#### **Internet**

In the case of the Internet backbone satellite network, the Internet service provider uses the satellite network to deliver Internet traffic either directly to the customer premise or to a shared gateway. This service is represented by reference points  $L_B$ ,  $XNI_S$  and  $XNI_{SA1}$ . Since certain TCP/IP flow and congestion control protocols can perform relatively poorly over high-delay links, key interfaces may be present at reference points  $L_B$ ,  $XNI_{SA1}$  and (possibly)  $XNI_{CP1}$  to provide optimal TCP/IP interworking between the satellite and terrestrial network pathways.

#### **Mobile-Satellite Services**

Mobile-satellite systems provide voice, fax and low-rate data services to the customer. Several service pathways are indicated by reference points  $XNI_{WB3}$ ,  $L_F$ ,  $SNI_{C8}$ ,  $XNI_{CP5}$ ,  $XNI_{CO1}$ , and  $XNI_{SA}$ . In this case, traffic to and from the mobile user appliances flows into the mobile-satellite service network ( $XNI_{WB3}$ ,  $XNI_{WH1}$ ). From there it can be delivered to customer premises via several possible paths (for example, through  $XNI_{SA1}$ , or  $L_F$  -  $SNI_{C8}$  -  $XNI_{CP1}$ ). The speech compression techniques typically used in mobile services may indicate a need for key interfaces between the mobile appliance and the fixed appliance in order to maintain voice quality of service. Candidate reference points for this type of interface are  $XNI_{SA1}$ ,  $XNI_{CP5}$ ,  $SNI_{C8}$  and/or  $XNI_{SA1}$ .

It should be noted that several combinations of these services can be supported by this scenario (e.g. mobile Internet); however, for purposes of brevity they are not discussed here.

**A1.11.1 Network Configuration**

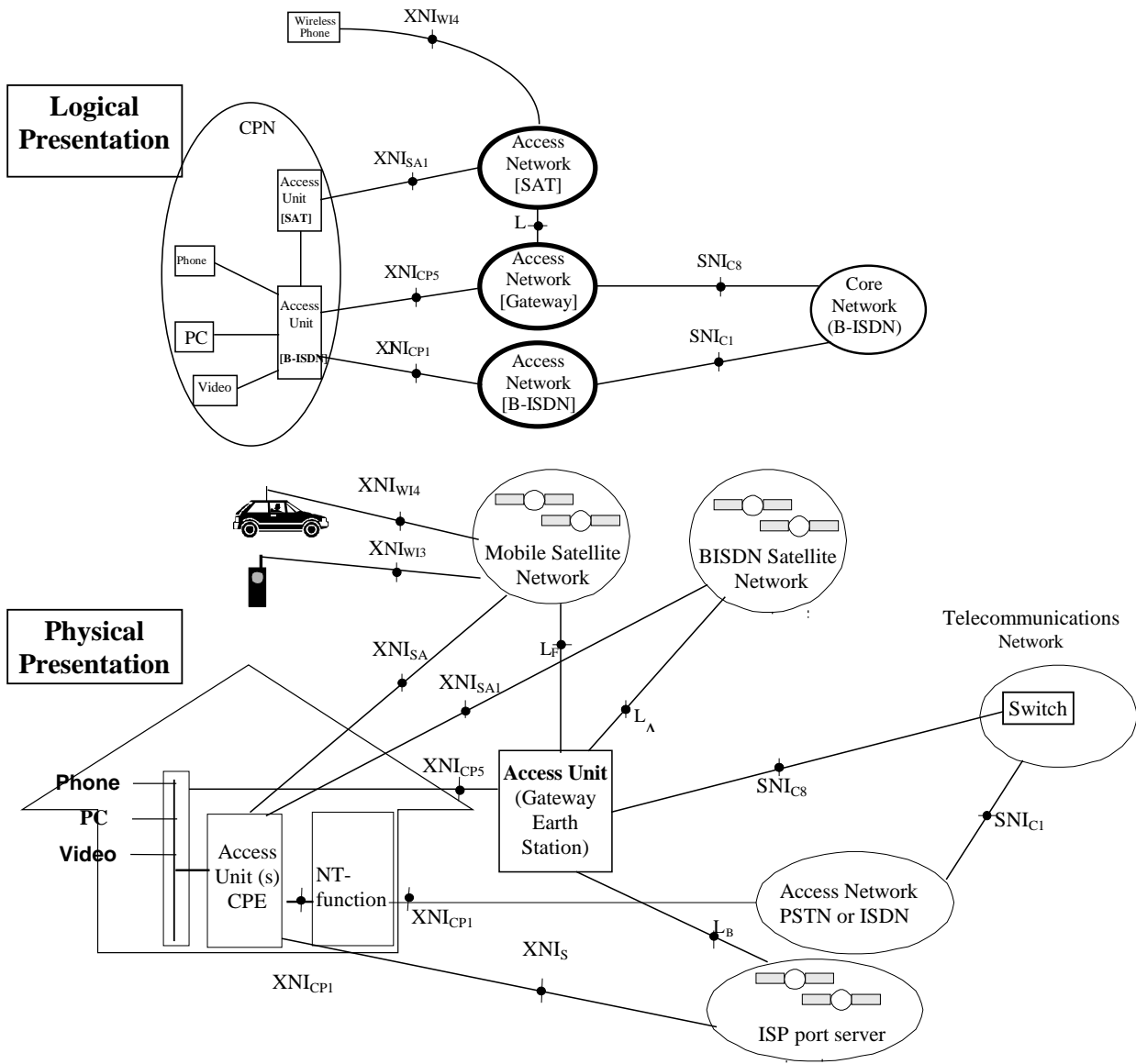


FIGURE 6

**Access Network Transport - Access using satellites scenario**

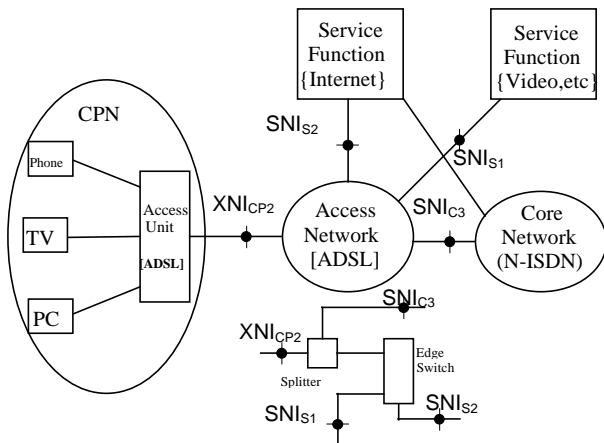


### A1.12 Scenario 7 - Example of Internet Access

The Internet requires individual, two-way and preferably high-speed connections. The scenario below shows fast access to the Internet (case 1) and internetworking between the Internet and a high-speed ATM network as backbone (case 2).

#### Description

Logical representation:

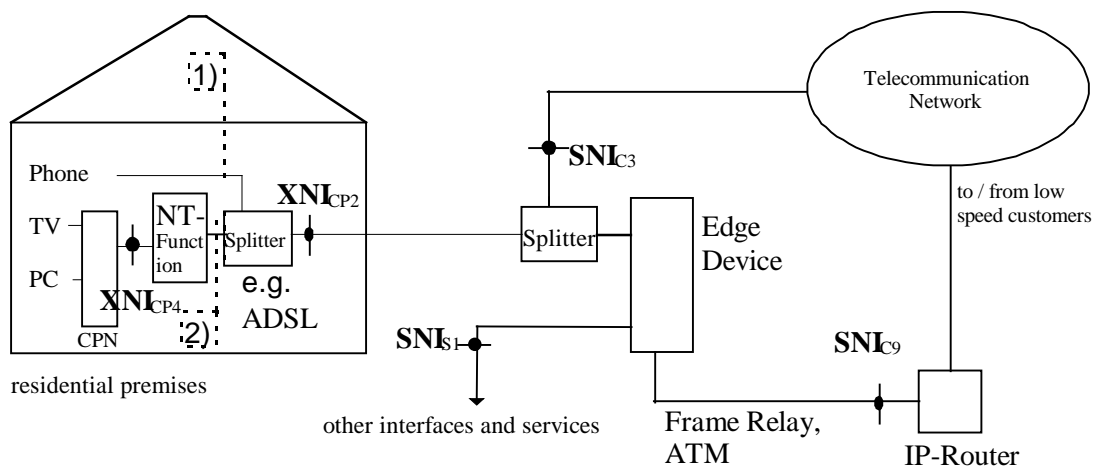


#### Components

- Service Function: Video on Demand, POP/ IP-Router
- Core network: N-ISDN, POTS, ATM, Frame Relay
- Access Network: ADSL
- CPN: TV, PC, Tel Terminal  
Access Unit for ADSL

**Case 1:** The broadband data traffic from the Internet point of presence (POP) comes through high-speed ATM or Frame Relay connections to an edge device; it is transmitted to residential (or business) premises via e.g. high-speed ADSL (asymmetric digital subscriber line) connections. Analogue telephone traffic from the exchange of the local network is combined and separated at both ends of the ADSL link. Alternatively, transmission to the residence may be by satellite link in which case legacy analog telephony is not part of the signal. Note that satellite internet access is often only provided in one direction, to the subscriber (i.e. “downstream”) and that upstream return signals are often carried by a different network, e.g. the public phone network.

### Physical representation



- 1) This interface transports analogue POTS-signals
- 2) This interface transports data component of the ADSL-Signal

Note 1: This presentation shows the configuration using ADSL in the Access Network as an example, other implementations might lead to a slightly different configuration.

Note 2: The use of a splitter may not be required in many implementations.

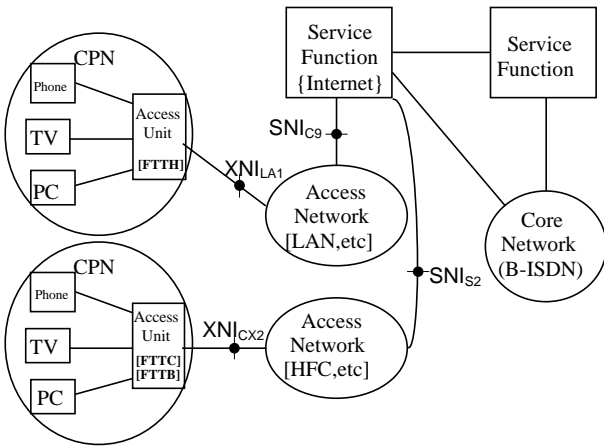
FIGURE 7a FOR CASE 1

### Fast Internet access

**Case 2:** ATM is a prime candidate to provide the high bandwidth and quality of service that the Internet needs. The internetworking between the Internet and an ATM network as a backbone is demonstrated.

Voice, video and/or data from residential or business premises are forwarded to the Internet point of presence (POP), a router which connects via interface  $A_{INTERNET}$  to the ATM backbone. Before the information can be transmitted further across the ATM backbone, a virtual connection between the ATM end devices has to be established. A support function hereby falls to what is called a "service node" in the scenario, offering for example route server functions. A service node may also provide various functions such as address resolution, configuration and coordination, processing of broadcasts, multicasts and lost packets.

Logical representation:



**Components**

- Service Function: Service Node, POP/ IP-Router
- Core network: B-ISDN Backbone, Internet
- Access Network: LAN, PON, PBX, PSTN/ISDN, HFC
- CPN: TV, PC, Tel Terminal  
 Access Unit for many services

Physical representation

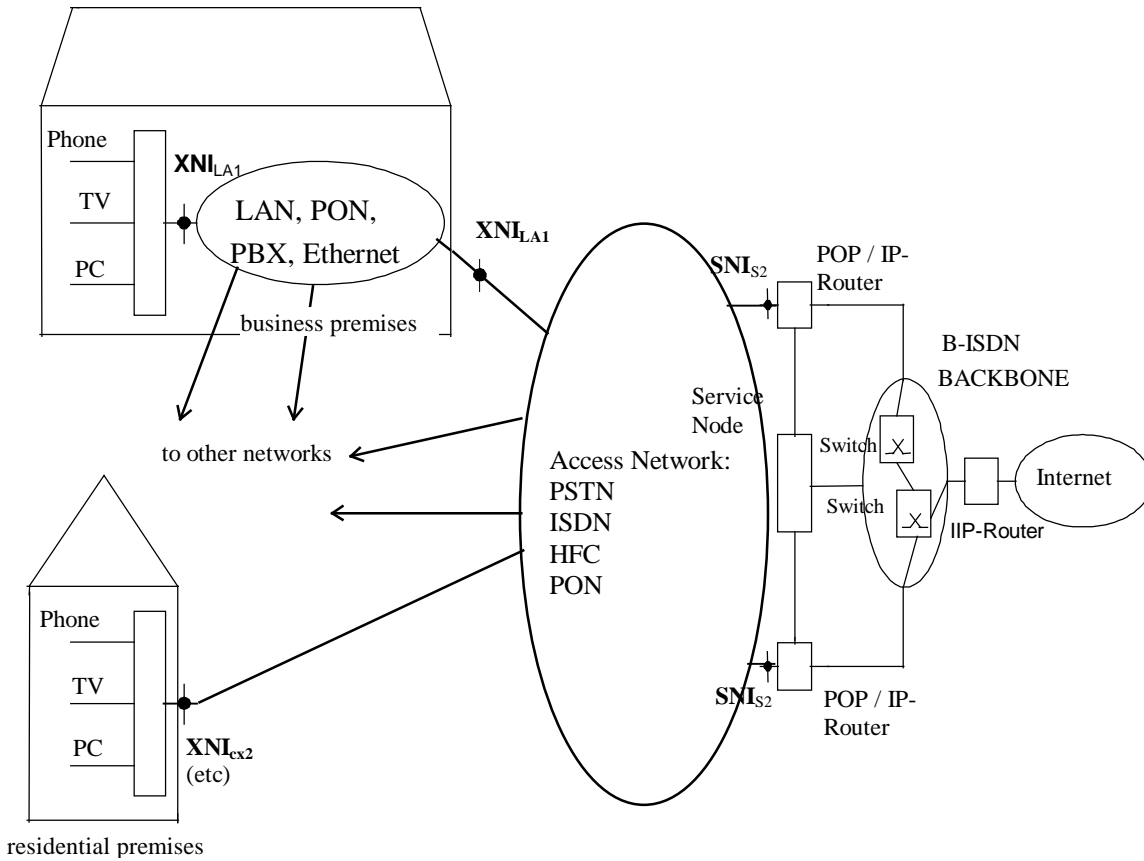


FIGURE 7b FOR CASE 2

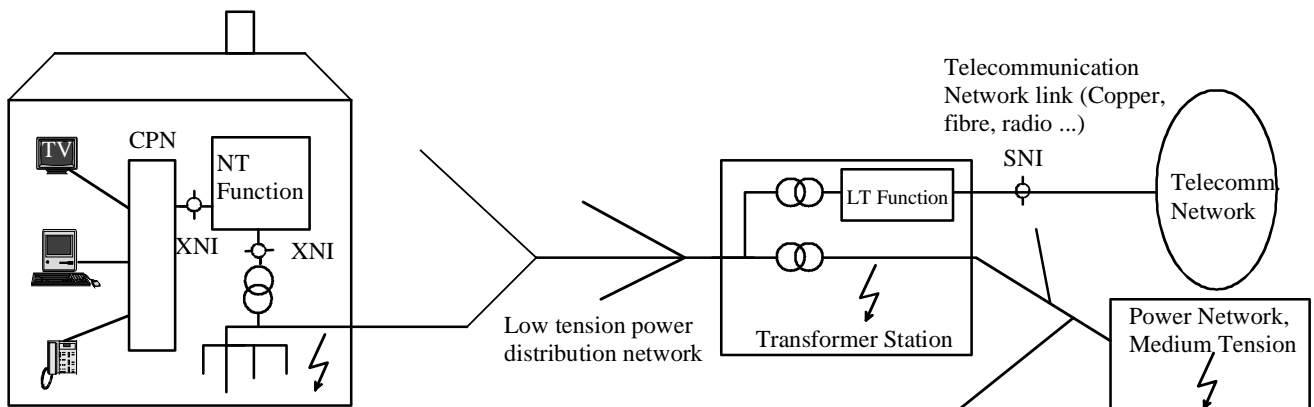
**Internetworking between the Internet and B-ISDN Network**

### A1.13 Scenario 8 - Power Line Transmission (PLT)

#### Introduction

PLT (Power Line Transmission) is deploying worldwide. There are Standardization activities within ETSI as well as in a Forum (PLT-Forum) and other groups. Contributions proposing activities in ITU-T (SG15 WP1/Q.4) to develop related Recommendations have been submitted.

This Scenario may serve as a placeholder. Details will be added as soon as they are specified.



**Figure 8, Power Line Transmission**

#### Interfaces:

XNI, Customer side of the NT: POTS, ISDN, S2M (to be completed)

XNI, Network side of the NT: Power Line, HF modulated with digital data signals, to be standardized

SNI: POTS, ISDN, S2M (to be completed) multiplexed in digital data signals transported over Copper, Fibre, Radio ...(to be standardized)



| Stds Body     | Number         | Title   | Scen. Ref.                | Classification |   |   |   | Medium |   |        |   | Interface        |   |   |   | Pub Date/<br>Prop. Rev. |
|---------------|----------------|---|---------------------------|----------------|---|---|---|--------|---|--------|---|------------------|---|---|---|-------------------------|
|               |                |   |                           | G              | O | A | Q | F      | C | P      | A | J                | H | B | W |                         |
| ATIS Comm. T1 | T1.117-1991    | Digital Hierarchy Optical Interface Specifications (short reach)  | 4                         |                |   |   |   | X      |   |        |   |                  | X |   |   | 1991                    |
| ATIS Comm. T1 | T1.401.01-1994 | Interface Between Carriers and customer Installations - Analog Voicegrade Switched Access Lines Using Loop-Start and Ground-Start Signaling with Line-Side Answer supervision Feature | 2a,b                      |                |   |   |   |        |   |        |   | X                |   |   |   | 1994                    |
| ATIS Comm. T1 | T1.401.02-1995 | Interface between Carriers and Customer Installations - Analog Voicegrade Switched Access Lines with Distinctive Alerting Features  | 2a,b                      |                |   |   |   |        |   |        |   | X                |   |   |   | 1995                    |
| ATIS Comm. T1 | T1.403-1994    | Carrier to Customer Installation, DS1 Metallic Interface  | All                       |                |   |   |   |        | X | X      |   | X                |   |   |   | 1994                    |
| ATIS Comm. T1 | T1.404-1994    | Network-to-Customer Installation - DS3 metallic interface specification.  | 3<br>4<br>5a<br>6<br>7a/b |                |   |   |   |        |   |        |   | X<br>X<br>X<br>X |   | X |   | 1994                    |
| ATIS Comm. T1 | T1.404a-1995   | Network-to-Customer Installation - DS3 metallic interface specification. ( <i>Supplement</i> )  | All                       |                |   |   |   |        | X | X      |   | X                |   |   |   | 1995                    |
| ATIS Comm. T1 | T1.408-1990    | ISDN Primary Rate - Customer Installation Metallic Interfaces, Layer 1 Specification  | 1 .. 3                    |                |   |   |   |        | X | X      |   | X                |   |   |   | 1990                    |
| ATIS Comm. T1 | T1.413         | Asymmetric Digital Subscriber Line (ADSL) Transceivers  | 3<br>5a,b<br>6<br>7a      |                |   |   |   |        |   | X<br>X |   | X                |   |   | X | 1998                    |



| Stds Body     | Number          | Title  | Scen. Ref.      | Classification |   |   |   | Medium |   |   |   | Interface |   |        |   | Pub Date/<br>Prop. Rev. |
|---------------|-----------------|--|-----------------|----------------|---|---|---|--------|---|---|---|-----------|---|--------|---|-------------------------|
|               |                 |  |                 | G              | O | A | Q | F      | C | P | A | J         | H | B      | W |                         |
| ATIS Comm. T1 | T1E1/97-104R2a  | Draft Proposed American National Standard - Interface Between Networks and Customer Installation - Rate Adaptive Digital Subscriber Line (RADSL) Metallic Interface                          | 4<br>6<br>7a    |                |   |   |   |        |   | X |   |           |   | X<br>X |   |                         |
| ATMF          | af-nm-0019.000  | Customer Network Management (CNM) for ATM Public Network Service   | 7               | X              |   |   | X |        |   |   |   |           |   |        |   | Oct, 1994               |
| ATMF          | af-phy-0015.000 | ATM Physical Medium Dependent Interface Specification for 155 Mb/s over Twisted Pair Cable   | 7               | X              |   |   |   |        |   | X |   |           |   |        |   | Sep, 1994               |
| ATMF          | af-phy-0016.000 | DS1 Physical Layer Specification   | All             | X              |   |   |   |        |   |   |   |           |   |        |   | Sep, 1994               |
| ATMF          | af-phy-0029.000 | 6,312 Kbps UNI Specification   | 2 .. 4, 7       | X              |   |   |   | X      | X | X |   | X         |   |        |   | June, 1995              |
| ATMF          | af-phy-0034.000 | E3 UNI   | 2 .. 4, 7       | X              |   |   |   | X      | X | X |   | X         |   |        |   | Aug, 1995               |
| ATMF          | af-phy-0040.000 | Physical Layer Interface Specification for 25.6 Mbit/s over Twisted Pair Cable   | 3<br>7a         |                |   |   |   |        |   |   |   | X<br>X    |   |        |   | Nov 1995                |
| ATMF          | af-phy-0046.000 | 622.08 Mbps Physical Layer   | 4               | X              |   |   |   | X      |   |   |   |           |   |        |   | Jan, 1996               |
| ATMF          | af-phy-0047.000 | 155.52 Mbps Physical Layer Specification for Category 3 UTP (See also UNI 3.1, af-uni-0010.002)  | 2 .. 3, 7       | X              |   |   |   |        |   | X |   | X         |   |        |   | Nov 1995                |
| ATMF          | af-phy-0054.000 | DS3 Physical Layer Interface Specification   | 3, 4, 5a, 6, 7a | X              |   |   |   | X      | X | X |   | X         | X |        |   | Jan-96                  |
| ATMF          | af-phy-0062.000 | 155 Mbps over MMF Short Wave Length Lasers, Addendum to UNI 3.1  | 4               |                |   |   |   | X      |   |   |   | X         |   |        |   | July, 1996              |
| ATMF          | af-phy-0063.000 | WIRE (PMD to TC layers)  | 1 .. 3, 7       |                |   |   |   |        |   | X |   |           |   |        |   | July, 1996              |
| ATMF          | af-phy-0064.000 | E-1 Physical Layer Interface Specification   | 2 .. 4, 7       |                |   |   |   | X      | X | X |   | X         |   |        |   | Sep, 1996               |
| ATMF          | af-phy-0079.001 | 155 Mb/s Plastic Optical Fiber and Hard Polymer Clad Fiber PMD Specification Version 1.1   | 4, 7            | X              |   |   |   | X      |   |   |   | X         |   |        |   | Jan, 1999               |
| ATMF          | af-phy-0110.000 | Physical Layer High Density Glass Optical Fiber Annex  | 4, 7            | X              |   |   |   | X      |   |   |   | X         |   |        |   | Jan, 1999               |
| ATMF          | af-uni-010.000  | ATM User-Network Interface Specification V2.0  | 7               |                |   |   |   |        |   |   |   | X         |   |        |   | Jun, 1993               |
| ATMF          | af-uni-0010.002 | Issued as part of UNI 3.1:<br>44.736 DS3 Mbps Physical Layer<br>100 Mbps Multimode Fiber Interface-Physical Layer<br>155.52 Mbps SONET STS-3c - Physical Layer<br>155.52 Mbps Physical Layer | 4               |                |   |   |   | X      |   |   |   | X         |   |        |   | DRAFT May 1994          |



| Stds Body | Number                     | Title   | Scen. Ref. | Classification |   |   |   | Medium |   |   |   | Interface |   |   |   | Pub Date/<br>Prop. Rev.                                      |
|-----------|----------------------------|---|------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---|--|
|           |                            |   |            | G              | O | A | Q | F      | C | P | A | J         | H | B | W |  |
| ATMF      | af-uni-010.001             | ATM User-Network Interface Specification V3.0   | 7          |                |   |   |   |        |   |   |   | X         |   |   |   | Sep, 1993  |
| CEPT      | ERC/REC 12-05 E            | HARMONISED RADIO FREQUENCY CHANNEL ARRANGEMENTS FOR DIGITAL TERRESTRIAL FIXED SYSTEMS OPERATING IN THE BAND 10.0 - 10.68 GHz  | 5a,b       |                |   |   |   |        |   |   |   | X         |   |   |   | Rome 1996,<br>revised June 2007                              |
| CEPT      | ERC/REC 12-08 E            | HARMONISED RADIO FREQUENCY CHANNEL ARRANGEMENTS AND BLOCK ALLOCATIONS FOR LOW, MEDIUM AND HIGH CAPACITY SYSTEMS IN THE BAND 3600 MHz TO 4200 MHz  | 5a,b       |                |   |   |   |        |   |   |   | X         |   |   |   | Podebrady 1997, Saariselkä<br>Mai 1998                       |
| CEPT      | ERC/REC13-04 E             | PREFERRED FREQUENCY BANDS FOR FIXED WIRELESS ACCESS IN THE FREQUENCY RANGE BETWEEN 3 AND 29.5 GHz   | 5a,b       |                |   |   |   |        |   |   |   | X         |   |   |   | Tallin 1998  |
| CEPT      | ERC/REC 14-03 E            | HARMONISED RADIO FREQUENCY CHANNEL ARRANGEMENTS FOR LOW AND MEDIUM CAPACITY SYSTEMS IN THE BAND 3400 MHz TO 3600 MHz  | 5a,b       |                |   |   |   |        |   |   |   | X         |   |   |   | Turku 1996,<br>Podebrady 1997                                |
| CEPT      | ECC/REC/(04)05             | Guidelines for accommodation and assignment of Multipoint Fixed Wireless systems in frequency bands 3.4-3-6 GHz and 3.6-3-8 GHz   | 5a,b       |                |   |   |   |        |   |   |   | X         |   |   |   | Edition 160206   |
| CEPT      | ECC/REC/(11)01             | Guidelines for assignment of frequency blocks for Fixed Wireless Systems in the bands 24.5-26.5 GHz, 27.5-29.5 GHz and 31.8-33.4 GHz.<br><br>Note! This Recommendation replaced ECC Recommendations (04)06, (01)03 and (00)05 | 5a,b       |                |   |   |   |        |   |   |   | X         |   |   |   | January 2011   |
| CEPT      | Recommendation T/R 13-01 E | Preferred channel arrangements for fixed services in the frequency range 1 – 2.3 GHz  | 5a,b       |                |   |   |   |        |   |   |   | X         |   |   |   | Montreux 1993,<br>Revised<br>Rottach-Egern,<br>February 2010 |

| Stds Body | Number   | Title   | Scen. Ref.             | Classification   |   |                  |   | Medium |   |   |   | Interface        |   |             |   | Pub Date/<br>Prop. Rev.                    |
|-----------|--|---|------------------------|------------------|---|------------------|---|--------|---|---|---|------------------|---|-------------|---|--|
|           |  |   |                        | G                | O | A                | Q | F      | C | P | A | J                | H | B           | W |  |
| CEPT      | Recommandation T/R 13-02 (Montreux 1993, amended Tromsø, May 2010) | Preferred channel arrangements for fixed service systems in the frequency range 22.0-29.5 GHz   | 5a,b                   |                  |   |                  |   |        |   |   |   | X                |   |             |   | Montreux 1993, amended Tromsø, May 2010    |
| DAVIC     | 1.0 Part 02  | System reference model and scenarios.   | 2a,b<br>3              | X<br>X           |   | X<br>X           |   |        |   |   |   |                  |   |             |   |  |
| DAVIC     | 1.0 Part 04  | Delivery System Architecture and Interfaces.  | 2a,b<br>3<br>5a,b<br>6 | X<br>X<br>X<br>X |   | X<br>X<br>X<br>X |   |        |   |   |   |                  |   |             |   |  |
| DAVIC     | 1.0 Part 08  | Lower layer protocols and physical interfaces   | 3b<br>5a,b<br>6<br>7a/ |                  |   |                  |   |        |   |   |   | X<br>X<br>X<br>X |   | X<br>X<br>X |   | March-96                                   |
| DAVIC     | 1.0, Part 4  | Delivery System Architecture and Interfaces. (Includes TV distribution, NVOD, VOD and teleshopping)   | 2a,b                   |                  |   | X                |   |        |   |   |   | X                |   | X           |   | Sept-95                                    |
| DAVIC     | 1.1 Part 08  | Lower layer protocols and physical interfaces. (Includes:<br>- Short-range baseband asymmetrical PHY on copper and coax.<br>- Passband unidirectional PHY on coax.<br>- Passband bi-directional PHY on coax<br>- Downstream Physical Interface Specification.<br>- Upstream Physical Interface Specification) | 2a,b<br>4<br>6<br>7a/b |                  |   |                  |   |        |   |   |   | X<br>X<br>X<br>X |   | X<br>X<br>X |   | March-96                                   |
| DAVIC     | 1.2 Part 08  | Long range baseband asymmetrical PHY on copper  | 3                      |                  |   |                  |   |        |   |   | X |                  | X |             |   | March-96                                   |
| ETSI DVB  | ETSI EN 300 421 DVB: DTVB 1110 Rev.7                               | Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for 11/12 GHz satellite services   | 6                      | X                |   |                  |   |        |   |   |   | X                |   |             |   | ETSI: V1.1.2, (8/97)<br>DVB: SB 3(93)<br>9 |

| Stds Body | Number                                      | Title  | Scen. Ref. | Classification |   |   |   | Medium |   |   |   | Interface |   |   |   | Pub Date/<br>Prop. Rev.                                 |
|-----------|---|--|------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---|---|
|           |   |  |            | G              | O | A | Q | F      | C | P | A | J         | H | B | W |   |
| ETSI DVB  | ETSI EN 300 744<br>DVB: TM 1545,<br>Rev5    | Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for digital terrestrial television  |            | X              |   |   |   |        |   |   |   |           |   |   |   | ETSI: V1.6.1<br>(1/2009)                                |
| ETSI DVB  | ETSI EN 301 192<br>TM 1872, Rev. 7          | Digital Video Broadcasting (DVB); Specification for data broadcasting  |            |                |   |   |   |        |   |   |   |           |   |   |   | ETSI: V1-5.1<br>(2009-11)<br>V1.6.1 expected<br>xx/2014 |
| ETSI DVB  | ETSI ETS 300 801<br>DVB: TM 1582 Rev.<br>5  | Digital Video Broadcasting (DVB); Interaction channel through Public Switched Telecommunications Network (PSTN)/ Integrated Services Digital Networks (ISDN) |            |                |   |   |   |        |   |   |   |           |   |   |   | ETSI: Edition 1<br>(8/97)<br>DVB:SB14<br>(96)10         |
| ETSI DVB  | ETSI ETS 300 802<br>DVB: TM 1594,<br>Rev. 5 | Digital Video Broadcasting (DVB); Network-independent protocols for DVB interactive services   |            |                |   |   |   |        |   |   |   |           |   |   |   | ETSI: Edition 1<br>(11/97)<br>DVB: SB14<br>(96)44       |
| ETSI DVB  | ETSI TS 101 224<br>DVB: TM 1969,<br>Rev. 4  | Digital Video Broadcasting (DVB); Home Access Network (HAN) with an active Network Termination (NT)  |            |                |   |   |   |        |   |   |   |           |   |   |   | ETSI: V1.1.1<br>7/98<br>DVB: SB21<br>(98)24             |
| EIA/TIA   | EIA/TIA-547                                 | Network channel Terminal Equipment for DS1 Service   | All        |                |   |   |   |        |   |   |   | X         |   |   |   | March-89  |
| EIA/TIA   | Project 4254                                | Telephone Network Transmission Model for Evaluating ADSL Systems, (ADSL and Lite)  |            |                |   |   |   |        |   |   |   |           |   |   |   |   |
| EIA/TIA   | Project 4255                                | Test Procedures for Evaluating ADSL System Performance, (ADSL and Lite)  |            |                |   |   |   |        |   |   |   |           |   |   |   |   |
| ETSI      | EG 202 306<br>ETSI Guide                    | Transmission and Multiplexing (TM); Access networks for residential customers  | All        |                |   | X |   |        |   |   |   |           |   |   |   | V 1.2.1<br>1998-05                                      |



| Stds Body             | Number                    | Title  | Scen. Ref.                | Classification |   |   |   | Medium |   |   |   | Interface |                  |   |   | Pub Date/<br>Prop. Rev. |
|-----------------------|---------------------------|--|---------------------------|----------------|---|---|---|--------|---|---|---|-----------|------------------|---|---|-------------------------|
|                       |                           |  |                           | G              | O | A | Q | F      | C | P | A | J         | H                | B | W |                         |
| ETSI<br>TM            | TS 101 272                | Transmission and Multiplexing (TM); Optical Access Networks (OANs) for evolving services; ATM Passive Optical Networks (PONs) and the transport of ATM over digital subscriber lines   | 2a,b<br>5a,b<br>6<br>7a/b |                | X |   |   |        |   |   |   |           |                  |   |   | V1.1.1<br>(1998-06)     |
| ETSI<br>ATM<br>TM4    | EN 302 217-3              | Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 3: Equipment operating in frequency bands where both frequency coordinated or uncoordinated deployment might be applied; Harmonized EN covering the essential requirements of article 3.2 of R&TTE Directive | 5a,b                      | X              |   |   |   |        |   |   | X |           | X                |   | X | V2.2.1<br>(04/2014)     |
| ETSI<br>ATM<br>TM4    | EN 302 217-2-2<br>V 1.4.1 | Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 2-2: Digital systems operating in frequency bands where frequency co-ordination is applied; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive                          | 5a,b                      | X              |   |   |   |        |   |   | X |           | X                |   | X | V2.2.1<br>(04/2014)     |
| ETSI<br>DECT          | EN 300 444                | Digital Enhanced Cordless Telecommunications (DECT); Generic Access Profile (GAP)  | 2a,b                      | X              |   |   |   |        |   |   |   |           |                  |   |   | V2.4.1<br>(07/2013)     |
| ETSI<br>JTC<br>B'Cast | EN 300 798                | Digital Audio Broadcasting (DAB); Distribution interfaces; Digital baseband I/Q interface  | 5a?                       |                |   |   |   |        |   |   |   |           | X                |   |   | V1.1.1<br>(03/1998)     |
| ETSI                  | EN 301 005-1              | V interfaces at the digital Service Node (SN); Interfaces at the VB5.1 reference point for the support of broadband or combined narrowband and broadband Access Networks (ANs); Part 1: Interface specification  | 2a,b<br>4<br>6<br>7a/b    |                |   |   |   |        |   |   |   |           | X<br>X<br>X<br>X |   |   | V1.1.4<br>(05/1998)     |
| ETSI<br>ATM<br>TM4    | EN 302 326-2              | Fixed Radio Systems; Multipoint Equipment and Antennas; Part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive for Digital Multipoint Radio Equipment   | 5a,b                      | X              |   | X |   |        |   |   | X |           | X                |   | X | V1.2.2<br>(2007-06)     |

| Stds Body             | Number     | Title   | Scen. Ref.                | Classification |   |             |   | Medium           |   |             |        | Interface |   |   |   | Pub Date/<br>Prop. Rev. |
|-----------------------|------------|---|---------------------------|----------------|---|-------------|---|------------------|---|-------------|--------|-----------|---|---|---|-------------------------|
|                       |            |   |                           | G              | O | A           | Q | F                | C | P           | A      | J         | H | B | W |                         |
| CENEL<br>EC/TC<br>209 | EN 50083-x | Cable networks for television signals, sound signals and interactive services - x = Parts 1-11                  | 5a,b                      |                |   |             |   |                  |   |             |        | X         |   |   |   |                         |
| ETSI<br>DECT          | ETR 056    | Digital European Cordless Telecommunications (DECT); System description document                                | 5a, b                     | X              |   |             |   |                  |   |             |        |           |   |   |   | Edition 1<br>(07/1993)  |
| ETSI<br>ATTM<br>TM6   | ETR 080    | Transmission and Multiplexing (TM); ISDN basic rate access; Digital transmission system on metallic local lines | 2a<br>4<br>5a<br>7a       |                |   |             |   |                  |   | X<br>X<br>X |        |           |   | X |   | Edition 2<br>(11/1996)  |
| ETSI                  | ETR 085    | Transmission and Multiplexing (TM); Generic functional architecture of transport network                        | 2a,b5a,b<br>7a/b          |                |   | X<br>X<br>X |   |                  |   |             |        |           |   |   |   | Edition 1<br>(06/1993)  |
| ETSI                  | ETR 139    | Radio Equipment and Systems (RES); Radio in the Local Loop  | 5a,b                      |                |   | X           |   |                  |   |             |        |           |   |   |   | Edition 1<br>(11/1994)  |
| ETSI                  | ETR 248    | Transmission and Multiplexing (TM); Use of single mode fibre in the access network                              | 4<br>5a<br>6<br>7b        | X<br>X<br>X    |   |             |   | X<br>X<br>X<br>X |   |             |        |           |   |   |   | Edition 1<br>(01/1996)  |
| ETSI                  | ETR 326    | Transmission and Multiplexing (TM); Broadband Integrated Services Digital Network (B-ISDN) access               | 2a,b<br>5a,b<br>6<br>7a,b |                | X | X           |   |                  |   |             | X<br>X |           |   |   |   | Edition 1<br>(11/1996)  |

| Stds Body | Number                   | Title   | Scen. Ref.                 | Classification |   |   |   | Medium |   |   |                  | Interface   |   |   |   | Pub Date/<br>Prop. Rev.   |
|-----------|--------------------------|---|----------------------------|----------------|---|---|---|--------|---|---|------------------|-------------|---|---|---|---|
|           |                          |   |                            | G              | O | A | Q | F      | C | P | A                | J           | H | B | W |   |
| ETSI      | ES 203 021 Parts 1,2 & 3 | Access and Terminals (AT);Harmonized basic attachment requirements for Terminals for connection to analogue interfaces of the Telephone Networks;Update of the technical contents of TBR 021, EN 301 437, TBR 015, TBR 017;<br>Part 1: General aspects ,<br>Part 2: Basic transmission and protection of the network from harm<br>Part 3: Basic Interworking with the Public Telephone Networks | 2a<br>4<br>5a<br>6<br>7a/b |                |   |   |   |        |   |   | X<br>X<br>X<br>X |             |   |   |   | Part 1: V2.1.1 (08/2005)<br>Part 2: V2.1.2(01/2006 )<br>Part 3: V.2.1.2 (01/2006) |
| ETSI      | ETS 300 001              | General technical requirements for equipment connected to an analogue subscriber interface in the PSTN  | 2a<br>4<br>5a<br>6<br>7a/b |                |   |   |   |        |   |   | X<br>X<br>X<br>X |             |   |   |   |   |
| ETSI      | ETS 300 011-1            | Integrated Services Digital Network (ISDN); primary rate user-network interface; Part 1: Layer 1 specification  | 4<br>5a                    |                |   |   |   |        |   |   |                  | X<br>X      |   |   |   |   |
| ETSI      | ETS 300 012-1            | Integrated Services Digital Network (ISDN); basic rate user-network interface; Part 1:Layer 1 specification   | 2a<br>4<br>5a              |                |   |   |   |        |   |   |                  | X<br>X<br>X |   |   |   |   |
| ETSI      | ETS 300 147              | Synchronous Digital Hierarchy (SDH); Multiplexing structure   | 4                          | X              | X | X |   | X      |   |   |                  |             |   |   |   |   |
| ETSI      | ETS 300 166              | Physical and electrical characteristics of hierarchical digital interfaces for equipment using the 2048 kbit/s  | 5a,b                       | X              |   |   |   |        |   |   |                  |             |   |   |   |   |
| ETSI DECT | EN 300 175-1             | Digital European Cordless Telecommunications (DECT) Common Interface (CI); Part 1: Overview   | 5a,b                       |                | X |   |   |        |   |   |                  |             |   |   |   | V2.5.1 (08/2013)  |
| ETSI DECT | EN 300 175-2             | Digital European Cordless Telecommunications (DECT); Common Interface (CI); Part 2: Physical layer (PHL)  | 5a,b                       |                |   |   |   |        |   |   |                  | X           |   |   |   | V2.5.1 (08/2013)  |

| Stds Body    | Number        | Title   | Scen. Ref.           | Classification |   |   |   | Medium |   |   |                  | Interface |                  |   |   | Pub Date/<br>Prop. Rev. |                     |
|--------------|---------------|---|----------------------|----------------|---|---|---|--------|---|---|------------------|-----------|------------------|---|---|-------------------------|---------------------|
|              |               |   |                      | G              | O | A | Q | F      | C | P | A                | J         | H                | B | W |                         |                     |
| ETSI DECT    | ETS 300 175-3 | Digital European Cordless Telecommunications (DECT); Common Interface (CI); Part 3: Medium access control (MAC) layer   | 5a,b                 |                |   |   |   |        |   |   |                  |           | X                |   |   |                         | V2.5.1<br>(08/2013) |
| ETSI TM1     | ETS 300 232   | Optical interfaces for equipments and systems relating to the Synchronous Digital Hierarchy   | 5a                   | X              |   |   |   |        |   |   |                  |           |                  |   |   |                         |                     |
| ETSI TM3     | ETS 300 233   | Integrated Services Digital Network (ISDN); Access digital section for ISDN primary rate  | 4<br>5a,b<br>6       | X<br>X<br>X    |   |   |   |        |   |   |                  |           |                  |   |   |                         |                     |
| ETSI TISPA N | ETS 300 288   | Business Telecommunications (BTC); 64 kbit/s digital unrestricted leased line with octet integrity (D64U); Network interface presentation                                   | 2a<br>4<br>5a<br>6   |                |   |   |   |        |   |   |                  |           | X<br>X<br>X<br>X |   |   |                         |                     |
| ETSI TISPA N | ETS 300 289   | 64 kbit/s digital unrestricted leased line with octet integrity (D64U)  | 2a<br>4<br>5a<br>6   |                |   |   |   |        |   |   |                  |           | X<br>X<br>X<br>X |   |   |                         |                     |
| ETSI TISPA N | ETS 300 290   | Business Telecommunications (BTC); 64 kbit/s digital unrestricted leased line with octet integrity (D64U) terminal equipment interface                                      | 1 .. 6               |                |   |   |   |        |   |   | X                |           | X                |   |   |                         | 1/94                |
| ETSI TM3     | ETS 300 297   | Access digital section for ISDN basic access  | 2a<br>4<br>5a<br>6   |                |   |   |   |        |   |   | X<br>X<br>X<br>X |           |                  |   |   |                         |                     |
| ETSI TM3     | ETS 300 299   | Broadband Integrated Services Digital Network (B-ISDN); Cell based user network access; Physical layer interfaces for B-ISDN applications                                   | 2b<br>4<br>5a,b<br>6 |                |   |   |   |        |   |   |                  |           | X<br>X<br>X<br>X |   |   |                         |                     |
| ETSI TM3     | ETS 300 300   | Broadband Integrated Services Digital Network (B-ISDN); Synchronous Digital Hierarchy (SDH) based user network interface; Physical layer interfaces for B-ISDN applications | 2b<br>4<br>5a,b<br>6 |                |   |   |   |        |   |   |                  |           | X<br>X<br>X<br>X |   |   |                         |                     |



| Stds Body       | Number          | Title  | Scen. Ref.     | Classification |   |   |   | Medium |   |   |   | Interface |             |   |   | Pub Date/<br>Prop. Rev. |
|-----------------|-----------------|--|----------------|----------------|---|---|---|--------|---|---|---|-----------|-------------|---|---|-------------------------|
|                 |                 |  |                | G              | O | A | Q | F      | C | P | A | J         | H           | B | W |                         |
| ETSI TISPA N    | ETS 300 324-1   | Signalling Protocols and Switching (SPS); V interfaces at the digital Local Exchange (LE); V5.1 interface for the support of Access Network (AN); Part 1: V5.1 interface specification | 4<br>5a,b<br>6 |                |   |   |   |        |   |   |   |           | X<br>X<br>X |   |   |                         |
| ETSI TISPA N    | ETS 300 347-1   | Signalling Protocols and Switching (SPS); V interfaces at the digital Local Exchange (LE); V5.2 interface for the support of Access Network (AN); Part 1: V5.2 interface specification | 4<br>5a,b<br>6 |                |   |   |   |        |   |   |   |           | X<br>X<br>X |   |   |                         |
| ETSI TM1        | ETS 300 417-2-1 | Generic requirements of transport functionality of equipment;  | 2a,b           | X              |   |   |   |        |   |   |   |           |             |   |   |                         |
| ETSI TM1        | ETS 300 417-2-1 | Generic requirements of transport functionality of equipment;  | All            | X              |   |   |   |        |   |   |   |           |             |   |   |                         |
| ETSI TM1        | ETS 300 417-3-1 | Generic requirements of transport functionality of equipment;  | 2a,b           | X              |   |   |   |        |   |   |   |           |             |   |   |                         |
| ETSI TM1        | ETS 300 417-4-1 | Generic requirements of transport functionality of equipment;  | 2a,b           | X              |   |   |   |        |   |   |   |           |             |   |   |                         |
| ETSI TM1        | ETS 300 417-6-1 | Generic requirements of transport functionality of equipment; Part 6-1: Synchronization layer functions  | 2a,b           | X              |   |   |   |        |   |   |   |           |             |   |   |                         |
| ETSI            | ETS 300 418     | Business Telecommunications (BTC); 2 048 kbit/s digital unrestricted leased line with octet integrity (D2 048U and D2 048S); Network interface presentation                            | 4<br>5a<br>6   |                |   |   |   |        |   |   |   |           | X<br>X<br>X |   |   |                         |
| ETSI            | ETS 300 419     | 2 048 kbit/s digital structured leased lines (D2048S); Connection characteristics  | 4<br>5a<br>6   |                |   |   |   |        |   |   |   |           | X<br>X<br>X |   |   |                         |
| ETSI            | ETS 300 420     | Business Telecommunications (BTC); 2048 kbit/s digital structured leased lines (D2048S); Terminal equipment interface  | All            |                |   |   |   |        |   | X |   | X         |             |   |   | 11/95                   |
| ETSI JTC B'Cast | ETS 300 421     | Digital Broadcasting Systems for Television, Sound and Data Services; Framing structure, channel coding and modulation for 11/12 GHz satellite services                                | 6              | X              |   | X |   |        |   |   | X |           | X           |   |   |                         |



| Stds Body      | Number      | Title  | Scen. Ref.                   | Classification |   |   |   | Medium           |   |   |   | Interface |                  |   |   | Pub Date/<br>Prop. Rev. |  |
|----------------|-------------|--|------------------------------|----------------|---|---|---|------------------|---|---|---|-----------|------------------|---|---|-------------------------|--|
|                |             |  |                              | G              | O | A | Q | F                | C | P | A | J         | H                | B | W |                         |  |
| ETSI           | ETS 300 573 | European digital cellular telecommunications system (Phase 2); Physical layer on the radio path General description (GSM05.01)   | 5a,b                         |                |   |   |   |                  |   |   |   | X         |                  |   |   |                         |  |
| ETSI TM1       | ETS 300 681 | Optical Distribution Network (ODN) for Optical Access Network (OAN)  | 4<br>5a<br>6<br>7a/b         |                |   |   |   | X<br>X<br>X<br>X |   |   |   |           |                  |   |   |                         |  |
| ETSI           | ETS 300 686 | 34 Mbit/s and 140 Mbit/s digital leased lines (D34U, D34S, D140U, D140S)   | 4<br>5a<br>6                 |                |   |   |   | X<br>X           |   |   |   |           | X                |   |   |                         |  |
| ETSI           | ETS 300 687 | 34 Mbit/s digital leased lines (D34U and D34S); Connection characteristics   | 4<br>6                       |                |   |   |   |                  |   |   |   |           | X<br>X           |   |   |                         |  |
| ETSI           | ETS 300 688 | 140 Mbit/s digital leased lines (D140U and D140S); Connection characteristics.   | 4<br>6                       |                |   |   |   |                  |   |   |   |           | X<br>X           |   |   |                         |  |
| ETSI           | ETS 300 701 | Digital European Cordless Telecommunications (DECT); Data Services Profile (DSP); Generic frame relay service with mobility (service types A and B, class 2)   | 4<br>5a,b                    |                |   |   |   |                  |   |   |   |           | X<br>X           |   |   |                         | Historical ;<br>Edition 1<br>(10/1996) |
| ETSI TM3       | ETS 300 742 | "Physical layer user network interface for 2 Mbit/s ATM signals".  | 2b<br>4<br>5a,b<br>6<br>7a,b |                |   |   |   |                  |   |   |   |           | X<br>X<br>X<br>X |   |   | X                       |  |
| ETSI TM3       | ETS 300 766 | Business Telecommunications (BTC); Multiple 64 kbit/s digital unrestricted leased lines with octet integrity presented at a structured 2 048 kbit/s interface at either or both ends (D64M); Connection characteristics and network interface presentation | 4<br>5a<br>6                 |                |   |   |   |                  |   |   |   |           | X<br>X<br>X      |   |   |                         |  |
| ETSI JTC BCast | ETS 300 813 | DVB Interfaces to Plesiochronous Digital Hierarchy (PDH) networks  |                              |                |   |   |   |                  |   |   |   |           | X                |   |   |                         |  |

| Stds Body            | Number        | Title   | Scen. Ref.                   | Classification |   |   |   | Medium      |   |   |   | Interface        |   |   |   | Pub Date/<br>Prop. Rev. |
|----------------------|---------------|---|------------------------------|----------------|---|---|---|-------------|---|---|---|------------------|---|---|---|-------------------------|
|                      |               |   |                              | G              | O | A | Q | F           | C | P | A | J                | H | B | W |                         |
| ETSI<br>JTC<br>BCast | ETS 300 814   | DVB Interfaces to Synchronous Digital Hierarchy (SDH) networks  |                              |                |   |   |   |             |   |   |   | X                | X | X |   |                         |
| ETSI<br>TM           | ETS 300 681   | Transmission and Multiplexing (TM); Optical Distribution Network (ODN) for OAN  | 4<br>5a<br>7a/b              |                |   |   |   | X<br>X<br>X |   |   |   |                  |   |   |   |                         |
| ETSI<br>TM3          | I-ETS 300 811 | Transmission and Multiplexing (TM); Broadband Integrated Services Digital Network (B-ISDN); Transmission Convergence (TC) and Physical Media Dependent(PMD) sublayers for the SB reference point at a bit-rate of 25,6 Mbit/s over twisted pair cable | 2b<br>4<br>5a,b<br>6<br>7a,b |                |   |   |   |             |   |   | X | X<br>X<br>X<br>X |   | X |   |                         |
| ETSI                 | TBR 024       | Business Telecommunications; 34 Mbit/s digital unstructured and structured leased lines (D34U and D34S); Attachment requirements for terminal equipment interface.  | 4<br>6                       |                |   |   |   |             |   |   |   | X<br>X           |   |   |   | 10/96                   |
| ETSI                 | TBR 025       | Business Telecommunications; 140 Mbit/s digital unstructured and structured leased lines (D140U and D140S); Attachment requirements for terminal equipment interface  | 4<br>6                       |                |   |   |   |             |   |   |   | X<br>X           |   |   |   | 10/96                   |
| ETSI                 | TBR 001       | Attachment requirements for terminal equipment to be connected to circuit switched data networks and leased circuits  | 5a<br>6                      | X              |   |   |   |             |   |   |   | X                |   |   |   |                         |
| ETSI                 | TBR 012       | Open Network Provision (ONP) technical requirements; 2 048 kbit/s digital unstructured leased line (D2048U)   | 5a<br>6                      | X              |   |   |   |             |   |   |   | X                |   |   |   |                         |
| ETSI                 | TBR 013       | 2 048 kbit/s digital structured leased lines (D2048S); Attachment requirements for terminal equipment interface   | 5a<br>6                      | X              |   |   |   |             |   |   |   | X                |   |   |   | 1/96                    |
| ETSI                 | TBR 014       | 64 kbit/s digital unrestricted leased line with octet integrity (D64U)  | 5a<br>6                      | X              |   |   |   |             |   |   |   | X                |   |   |   |                         |

| Stds Body      | Number                | Title   | Scen. Ref.              | Classification |   |   |   | Medium |   |   |   | Interface |   |   |   | Pub Date/<br>Prop. Rev. |
|----------------|-----------------------|---|-------------------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---|-------------------------|
|                |                       |   |                         | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |
| ETSI DECT      | TBR 006               | Digital European Cordless Telecommunications (DECT); General terminal attachment requirements   | 4<br>5a,b               |                |   |   |   |        |   |   |   | X         |   |   | X | Edition 3<br>(06/1996)  |
| ETSI DECT      | TBR 10                | Digital European Cordless Telecommunications (DECT); General terminal attachment requirements; Telephony applications   | 4<br>5a,b               |                |   |   |   |        |   |   |   | X         |   |   | X | Edition 3<br>(07/1999)  |
| ETSI           | TBR 022               | Radio Equipment and Systems (RES); Attachment requirements for terminal equipment for Digital Enhanced Cordless Telecommunications (DECT) Generic Access Profile (GAP) applications | 4<br>5a,b               |                |   |   |   |        |   |   |   | X         |   |   | X | Edition 1<br>(01/1997)  |
| ETSI           | TCRTR 012             | ONP study on possible new interfaces at the network side of the NT1   | 2a<br>5a,b<br>6<br>7a/b | X              |   |   |   |        |   |   |   |           |   |   |   |                         |
| ETSI ATTM TM4  | TR 101 036-1          | Fixed Radio Systems; Generic wordings for standards on DFRS (Digital Fixed Radio Systems) characteristics; Part 1: General aspects and point-to-point equipment parameters          | 5                       | X              |   |   |   |        |   |   | X |           |   |   |   | V1.3.1<br>(08/2002)     |
| ETSI JTC Bcast | TR 101 190            | DVB; Implementation guidelines for DVB terrestrial services; Transmission aspects   | 5b                      |                |   |   |   |        |   |   | X |           |   |   |   |                         |
| ETSI JTC Bcast | TR 101 200            | DVB; A guideline for the use of DVB specifications and standards  | 2a,b<br>5a,<br>5b       |                |   |   |   | X      | X | X |   |           |   |   |   |                         |
| ETSI           | TR 101 201            | DVB; Interaction channel for SMATV distribution systems; Guidelines for versions based on satellite and coaxial sections  | 2a,b<br>5a,b            |                |   |   |   | X      | X | X | X |           |   |   |   |                         |
| ETSI ATTM TM4  | TR 101 274<br>V 1.1 1 | Transmission and Multiplexing (TM); Digital Radio Relay Systems (DRRS); Point-to-multipoint DRRS in the access network; Overview of different access techniques                     | 5a,b                    |                |   | X |   |        |   |   |   | X         |   |   |   | V1.1.1<br>(1998-06)     |

| Stds Body           | Number          | Title   | Scen. Ref.        | Classification |   |   |   | Medium |   |   |   | Interface |   |   |   | Pub Date/<br>Prop. Rev. |  |
|---------------------|-----------------|---|-------------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---|-------------------------|--|
|                     |                 |   |                   | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |  |
| ETSI<br>ATTM<br>TM6 | TS 101 270-1/-2 | Transmission and Multiplexing (TM); Access transmission systems on metallic access cables; Very High Speed Digital Subscriber Line (VDSL); Part 1: Functional requirements, Part 2: Transceiver specification   | 3<br>6            |                |   | X |   |        |   |   |   |           | X |   |   |                         | Part 1: V1.4.1<br>10/99 (10/2005)<br>Part 2: V1.2.1<br>(07/2003) |
| ETSI<br>ATTM<br>TM6 | TS 101 388      | Access Terminals Transmission and Multiplexing (ATTM); Access transmission systems on metallic access cables; Asymmetric Digital Subscriber Line (ADSL) - European specific requirements [ITU-T Recommendation G.992.1 modified]  | 3<br>4<br>6<br>7a |                |   |   |   |        |   | X |   |           |   |   |   |                         | V1.4.1<br>(08/2007)  |
| ETSI<br>ATTM<br>TM6 | TS 101 524      | Access, Terminals, Transmission and Multiplexing (ATTM); Access transmission system on metallic access cables; Symmetrical single pair high bit rate Digital Subscriber Line (SDSL); [ITU-T Recommendation G.991.2 (2005), modified]<br><br>Note: the originally two parts are merged to one (11/2000 ) | 3<br>4<br>6<br>7a |                |   |   |   |        |   | X |   |           |   |   |   |                         | V1.5.1<br>(08/2010)  |
| ETSI<br>ATTM<br>TM4 | TS 101 974      | Transmission and Multiplexing (TM); Digital Radio Relay Systems (DRRS); Radio specific SDH functionalities for transmission of sub-STM-0  | 5a,b              |                |   |   | X |        |   |   |   | X         |   |   |   |                         | V1.1.1<br>(2001-08)  |
| ETSI<br>ATTM<br>TM4 | ETS 300 635     | Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH); Radio specific functional blocks for transmission of M x STM-N   | 5a,b              |                | X |   |   |        |   |   |   | X         |   | X |   |                         | Edition 1<br>(1996-10)   |
| ETSI<br>ATTM<br>TM4 | ETS 300 785     | Transmission and Multiplexing (TM); Synchronous Digital Hierarchy (SDH); Radio specific functional blocks for transmission of M x sub-STM-1   | 5a,b              |                | X |   |   |        |   |   |   | X         |   | X |   |                         | Edition 1<br>(1998-02)   |

| Stds Body          | Number                         | Title   | Scen. Ref.                | Classification |   |   |   | Medium           |   |   |   | Interface |   |                  |   | Pub Date/<br>Prop. Rev. |
|--------------------|--------------------------------|---|---------------------------|----------------|---|---|---|------------------|---|---|---|-----------|---|------------------|---|-------------------------|
|                    |                                |   |                           | G              | O | A | Q | F                | C | P | A | J         | H | B                | W |                         |
| ETSI<br>ATM<br>TM4 | TR 101 016                     | Transmission and Multiplexing (TM); Digital Radio Relay Systems (DRRS);<br>Comparison and verification of performance prediction models   | 5a,b                      |                | X |   |   |                  |   |   |   | X         |   |                  |   | V1.1.1<br>(1997-02)     |
| ETSI<br>ATM<br>TM4 | TR 101 853                     | Fixed Radio Systems; Point-to-point and Point-to-multipoint equipment; Rules for the co-existence of point-to-point and point-to-multipoint systems using different access methods in the same frequency band | 5a,b                      |                | X |   |   |                  |   |   |   | X         |   |                  |   | V1.1.1<br>(2000-10)     |
| FCC                | Title 47: Telecom.,<br>Part 68 | Connection of Terminal Equipment to the Telephone Network   | 2a,b                      | X              |   |   |   |                  |   |   |   |           |   |                  |   |                         |
| IEEE               | 802.3ah-2004                   | Ethernet in the First Mile  | 2a, b<br>4<br>5a, b<br>7b |                |   |   |   | X<br>X<br>X<br>X |   |   |   |           |   | X<br>X<br>X<br>X |   | June 2004               |
| IEEE               | 802.3av-2009                   | 10Gb/s Ethernet Passive Optical Network   | 4<br>7b                   |                |   |   |   | X<br>X           |   |   |   |           |   | X<br>X           |   | September 2009          |
| IEEE               | 802.3bk-2013                   | IEEE Standard for Ethernet Amendment 1: Physical Layer Specifications and Management Parameters for Extended Ethernet Passive Optical Networks  | 4<br>7b                   |                |   |   |   | X<br>X           |   |   |   |           |   | X<br>X           |   | August 2013             |
| IEEE               | 802.16-2012                    | Broadband Wireless Metropolitan Area Networks (MANs)<br>Air Interface for Fixed Broadband Wireless Access Systems   | 5b,5a                     | X              |   |   |   |                  |   |   |   | X         |   |                  | X | 2012                    |
| ISO                | 8877                           | ISDN interface connector at S and T reference points and pin assignments  | 2a,b                      |                |   |   |   |                  |   |   |   |           | X |                  |   |                         |
| ITU-R              | F.757-3                        | Basic system requirements and performance objectives for fixed wireless access using mobile-derived technologies offering basic telephony service and data communication service                              | 5a, b                     | X              |   |   |   |                  |   |   |   | X         |   |                  |   | 02/03                   |
| ITU-R              | F.757-4                        | Basic system requirements and performance objectives for fixed wireless access using mobile   | 5a, b                     | X              |   |   |   |                  |   |   |   | X         |   |                  |   | 04/2011                 |
| ITU-R              | F.1332-1                       | Radio-frequency signal transport through optical fibres   | 5a, b                     | X              |   |   |   | X                |   |   |   | X         |   |                  |   | 05/99                   |

| Stds Body | Number            | Title   | Scen. Ref.      | Classification |   |   |   | Medium |   |   |   | Interface |   |   |   | Pub Date/<br>Prop. Rev. |
|-----------|-------------------|---|-----------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---|-------------------------|
|           |                   |   |                 | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |
| ITU-R     | F.1399-1          | Vocabulary of terms for wireless access   | 5a, b           | X              |   |   |   |        |   |   |   | X         |   |   |   | 05/01                   |
| ITU-R     | F.1400            | Performance and availability objectives for FWA to PSTN   | 5a, b           | X              |   |   |   |        |   |   |   | X         |   |   |   | 05/99                   |
| ITU-R     | F.1401-1          | Considerations for the identification of possible frequency bands for fixed wireless access and related sharing studies.                        | 5a, b           | X              |   |   |   |        |   |   |   | X         |   |   |   | 01/04                   |
| ITU-R     | F.1490-1          | Generic requirements for fixed wireless access (FWA) systems  | 5a, b           | X              |   |   |   |        |   |   |   | X         |   |   |   | 09/2007                 |
| ITU-R     | F.1499            | Radio transmission systems for fixed broadband wireless access (BWA) based on cable modem standard  | 5a, b           | X              |   | X |   |        |   |   |   | X         |   |   |   | 05/00                   |
| ITU-R     | F.1569            | Technical and operational characteristics for the fixed service using high altitude platform stations in the band 27.5-28.5 and 31.0-31.3 GHz   | 1<br>5a, b<br>6 | X              |   |   |   |        |   |   |   | X         |   |   |   | 05/02                   |
| ITU-R     | F.1704            | Characteristics of multipoint-to-multipoint fixed wireless systems with meshed network topology operating in frequency bands above about 17 GHz | 5a, b           | X              |   | X |   |        |   |   |   | X         |   |   |   | 01/05                   |
| ITU-R     | F.1763-1          | Radio interface standards for broadband wireless access systems in the fixed service operating below 66 GHz                                     | 5a, b           | X              |   |   |   |        |   |   |   | X         |   |   | X | 02/2014                 |
| ITU-R     | F.2058 (Report)   | Design techniques applicable to broadband fixed wireless access systems conveying Internet protocol packets or asynchronous transfer mode cells | 5a, b           | X              |   |   |   |        |   |   |   | X         |   |   |   | 2006                    |
| ITU-R     | F.2086-1 (Report) | Technical and operational requirements for broadband wireless access in the fixed service   | 5a, b           | X              |   |   |   |        |   |   |   | X         |   |   |   | 2010                    |
| ITU-R     | F.2106-1 (Report) | Fixed Service applications using free-space optical links   | 5a, b           | X              |   |   |   |        |   |   |   | X         |   |   |   | 2010                    |
| ITU-R     | F.2107-1 (Report) | Characteristics and applications of fixed wireless systems operating in the 57 GHz to 130 GHz bands   | 5a, b           | X              |   |   |   |        |   |   |   | X         |   |   |   | 2012                    |
| ITU-R     | F.2060 (Report)   | Fixed Service use in the IMT-2000 transport network   | 5a, b           | X              |   | X |   |        |   |   |   | X         |   |   |   | 2005                    |
| ITU-R     | M.687-2           | International Mobile Telecommunications-2000 (IMT-2000)   | 5a,b            | X              |   | X |   |        |   |   |   | X         |   |   | X | 02-1997                 |
| ITU-R     | M.1034-1          | Requirements for the radio interfaces for IMT-2000  | 5a,b            |                |   | X |   |        |   |   |   | X         |   |   | X | 02-1997                 |



| Stds Body | Number    | Title  | Scen. Ref. | Classification |   |   |   | Medium |   |   |   | Interface |   |   |   | Pub Date/<br>Prop. Rev. |         |
|-----------|-----------|--|------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---|-------------------------|---------|
|           |           |  |            | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |         |
| ITU-R     | M.1457-11 | Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-2000 (IMT 2000)   | 5a,b       |                |   |   |   |        |   |   |   | X         | X |   |   |                         | 02/2013 |
| ITU-R     | M.1797    | Vocabulary of terms for the land mobile service  | 5a, b      | X              |   |   |   |        |   |   |   |           |   |   |   |                         | 2007    |
| ITU-R     | M.1801-2  | Radio interface standards for broadband wireless access systems, including mobile and nomadic applications, in the mobile service operating below 6 GHz  | 5a, b      |                | X | X |   |        |   |   |   | X         |   |   |   | X                       | 02/2013 |
| ITU-R     | M.1850-2  | Detailed specifications of the radio interfaces for the satellite component of International Mobile Telecommunications-2000 (IMT-2000).  | 6          | X              |   |   |   |        |   |   |   | X         | X |   |   |                         | 09/2014 |
| ITU-R     | M.2012-1  | Detailed specifications of the radio interfaces of International Mobile Telecommunications-Advanced (IMT-Advanced)   | 5a,b       |                |   |   |   |        |   |   |   | X         | X |   |   |                         | 02/2014 |
| ITU-R     | M.2047-0  | Detailed specifications of the satellite radio interfaces of International Mobile Telecommunications-Advanced (IMT-Advanced)   | 6          | X              |   |   |   |        |   |   |   | X         | X |   |   |                         | 12/2013 |
| ITU-R     | S.579     | Availability objectives for a hypothetical reference circuit and a hypothetical reference digital path when used for telephony using pulse code modulation, or as part of an integrated services digital network hypothetical reference connection, in the fixed satellite service |            | X              |   |   |   |        |   |   |   | X         | X | X | X |                         | 2001    |
| ITU-R     | S.614     | Allowable error performance for a hypothetical reference digital path in the fixed-satellite service operating below 15 GHz when forming part of an international connection in an integrated services digital network   |            | X              |   |   |   |        |   |   |   | X         | X | X | X |                         | 1994    |
| ITU-R     | S.1062    | Allowable error performance for a hypothetical reference digital path operating at or above the primary rate   |            | X              |   |   |   |        |   |   |   | X         | X | X | X |                         | 1999    |
| ITU-R     | S.1420    | Performance for broadband integrated services digital network asynchronous transfer mode via satellite   |            | X              |   |   |   |        |   |   |   | X         | X | X | X |                         | 1999    |





| Stds Body | Number | Title   | Scen. Ref.            | Classification |   |             |   | Medium           |             |             |        | Interface |                  |   |   | Pub Date/<br>Prop. Rev. |
|-----------|--------|---|-----------------------|----------------|---|-------------|---|------------------|-------------|-------------|--------|-----------|------------------|---|---|-------------------------|
|           |        |   |                       | G              | O | A           | Q | F                | C           | P           | A      | J         | H                | B | W |                         |
| ITU-T     | G.957  | Optical interfaces for equipments and systems relating to the synchronous digital hierarchy                                     | 4<br>5a<br>6          |                |   |             |   | X<br>X<br>X      |             |             |        |           |                  |   |   | 7/95<br>6/99            |
| ITU-T     | G.958  | Digital line systems based on the synchronous digital hierarchy for use on optical fibre cables                                 | 4<br>5a<br>6<br>7b    |                |   |             |   | X<br>X<br>X<br>X |             |             |        |           |                  |   |   | 11/94                   |
| ITU-T     | G.960  | Digital section for ISDN basic rate access  | 2a<br>4<br>5a,b<br>7b |                |   | X<br>X<br>X |   | X<br>X<br>X      | X<br>X<br>X | X<br>X<br>X |        |           |                  |   |   |                         |
| ITU-T     | G.961  | Digital transmission system on metallic local lines for ISDN basic rate access  | 2a<br>4<br>5a,b       |                |   | X<br>X<br>X |   |                  |             | X<br>X<br>X |        |           |                  |   |   | 3/93                    |
| ITU-T     | G.962  | Access digital section for ISDN primary rate access at 2 048 kbit/s   | 4<br>5a,b             |                |   | X<br>X      |   | X<br>X           | X<br>X      | X<br>X      | X<br>X |           |                  |   |   |                         |
| ITU-T     | G.963  | Access digital section for ISDN primary rate at 1544 kbit/s   | 4<br>5a,b             |                |   | X<br>X      |   | X<br>X           | X<br>X      | X<br>X      | X<br>X |           |                  |   |   | 3/93                    |
| ITU-T     | G.964  | V interfaces at the digital local exchange (LE) -V5.1 interface (based on 2 048 kbit/s) for the support of access network (AN)  | 2a<br>4<br>5a,b<br>6  |                |   |             |   |                  |             |             |        |           | X<br>X<br>X<br>X |   |   |                         |
| ITU-T     | G.965  | V interfaces at the digital local exchange (LE) -V5.2 interface (based on 2 048 kbit/s) for the support of access network (AN)" | 2a<br>4<br>5a,b<br>6  |                |   |             |   |                  |             |             |        |           | X<br>X<br>X<br>X |   |   |                         |
| ITU-T     | G.966  | Access Digital Section for B-ISDN (G.96x)   | 2a,b<br>5a<br>5b<br>6 |                |   | X           |   | X<br>X<br>X      | X<br>X<br>X | X           | X<br>X |           |                  |   |   | approved<br>2/1999      |

| Stds Body | Number  | Title   | Scen. Ref.                       | Classification |   |   |   | Medium           |   |   |   | Interface |                       |                  |   | Pub Date/<br>Prop. Rev.                  |
|-----------|---------|---|----------------------------------|----------------|---|---|---|------------------|---|---|---|-----------|-----------------------|------------------|---|--|
|           |         |   |                                  | G              | O | A | Q | F                | C | P | A | J         | H                     | B                | W |  |
| ITU-T     | G.967.1 | V interfaces at the digital Service Node (SN); Interfaces at the VB5.1 reference point for the support of broadband or combined narrowband and broadband Access Networks (G.VB51) | 2a,b<br>4<br>5a,b<br>6<br>7a,b   |                |   |   |   |                  |   |   |   |           | X<br>X<br>X<br>X      |                  | X | Draft                                    |
| ITU-T     | G.967.2 | V interfaces at the digital Service Node (SN); Interfaces at VB5.2 reference point for the support of broadband or combined narrowband and broadband Access Networks (G.VB52)     |                                  |                |   |   |   |                  |   |   |   |           | X<br>X<br>X<br>X      |                  | X | approved<br>2/1999                       |
| ITU-T     | G.967.3 | V-Interfaces at the service node (SN)- Protocol implementation conformance statements for Interfaces at VB5 reference points  | 2a,b<br>4<br>5a,b<br>6<br>7a,b   |                |   |   |   |                  |   |   |   |           | X<br>X<br>X<br>X<br>X |                  |   | will be<br>determined<br>9/1999          |
| ITU-T     | G.981   | PDH optical line systems for the local network  | 4<br>5a<br>6                     |                |   |   |   | X<br>X<br>X      |   |   |   |           |                       |                  |   | 1/94                                     |
| ITU-T     | G.982   | Optical access networks to support services up to the ISDN primary rate or equivalent bit rates   | 4<br>5a<br>6<br>7b               |                |   |   |   | X<br>X<br>X<br>X |   |   |   |           |                       |                  |   |  |
| ITU-T     | G.983.1 | Broadband optical access system based on Passive Optical Networks (PON)   | 2a, b<br>4<br>5a, b<br>6<br>7a,b |                |   |   |   | X<br>X<br>X<br>X |   |   |   |           |                       | X<br>X<br>X<br>X |   | January 2005<br><br>Erratum 1<br>03/2006 |

| Stds Body | Number                 | Title  | Scen. Ref.                       | Classification |   |   |   | Medium                |   |   |   | Interface |   |                       |                                       | Pub Date/<br>Prop. Rev. |
|-----------|------------------------|--|----------------------------------|----------------|---|---|---|-----------------------|---|---|---|-----------|---|-----------------------|---------------------------------------|-------------------------|
|           |                        |  |                                  | G              | O | A | Q | F                     | C | P | A | J         | H | B                     | W                                     |                         |
| ITU-T     | G.983.1<br>Amendment 1 | Broadband optical access systems based on Passive Optical Networks (PON)<br>Amendment 1: PICS for OLT and ONU  | 2a, b<br>4<br>5a, b<br>6<br>7a,b |                |   |   |   | X<br>X<br>X<br>X<br>X |   |   |   |           |   | X<br>X<br>X<br>X<br>X | 05/ 2005                              |                         |
| ITU-T     | G.983.3                | A broadband optical access system with increased service capability by wavelength allocation   | 2a, b<br>4<br>5a, b<br>6<br>7a,b |                |   |   |   | X<br>X<br>X<br>X<br>X |   |   |   |           |   | X<br>X<br>X<br>X<br>X | 03/2001                               |                         |
| ITU-T     | G.983.3 Amendment 1    | A broadband optical access system with increased service capability by wavelength allocation<br>Amendment 1  | 2a, b<br>4<br>5a, b<br>6<br>7a,b |                |   |   |   | X<br>X<br>X<br>X<br>X |   |   |   |           |   | X<br>X<br>X<br>X<br>X | 06/ 2002                              |                         |
| ITU-T     | G.983.3 Amendment 2    | A broadband optical access system with increased service capability by wavelength allocation<br>Amendment 2  | 2a, b<br>4<br>5a, b<br>6<br>7a,b |                |   |   |   | X<br>X<br>X<br>X<br>X |   |   |   |           |   | X<br>X<br>X<br>X<br>X | 07/ 2005                              |                         |
| ITU-T     | G.983.4                | A broadband optical access system with increased service capability using dynamic bandwidth assignment   | 2a, b<br>4<br>5a, b<br>6<br>7a,b |                |   |   |   | X<br>X<br>X<br>X<br>X |   |   |   |           |   | X<br>X<br>X<br>X<br>X | 11/2001<br><br>Corrigendum<br>01/2005 |                         |
| ITU-T     | G.983.4<br>Amendment 1 | A broadband optical access system with increased service capability using dynamic bandwidth assignment<br>Amendment 1: New Annex A – Performance monitoring parameters | 2a, b<br>4<br>5a, b<br>6<br>7a,b |                |   |   |   | X<br>X<br>X<br>X<br>X |   |   |   |           |   | X<br>X<br>X<br>X<br>X | 12/2003                               |                         |

| Stds Body | Number                 | Title   | Scen. Ref.                     | Classification |   |   |   | Medium                |   |   |   | Interface |   |                       |   | Pub Date/<br>Prop. Rev. |
|-----------|------------------------|---|--------------------------------|----------------|---|---|---|-----------------------|---|---|---|-----------|---|-----------------------|---|-------------------------|
|           |                        |   |                                | G              | O | A | Q | F                     | C | P | A | J         | H | B                     | W |                         |
| ITU-T     | G.983.5                | A Broadband Optical Access System with Enhanced Survivability   | 2a, b<br>4<br>5a, b<br>6<br>7b |                |   |   |   | X<br>X<br>X<br>X<br>X |   |   |   |           |   | X<br>X<br>X<br>X<br>X |   | 6 January 2002          |
| ITU-T     | G.984.1                | Gigabit-capable passive optical networks (GPON): General characteristics  | 4<br>7b                        |                |   |   |   | X<br>X                |   |   |   |           |   | X<br>X                |   | 03/2008                 |
| ITU-T     | G.984.1<br>Amendment 1 | Gigabit-capable passive optical networks (GPON): General characteristics<br>Amendment 1   | 4<br>7b                        |                |   |   |   | X<br>X                |   |   |   |           |   | X<br>X                |   | 10/2009                 |
| ITU-T     | G.984.1<br>Amendment 2 | Gigabit-capable passive optical networks (GPON): General characteristics<br>Amendment 2   | 4<br>7b                        |                |   |   |   | X<br>X                |   |   |   |           |   | X<br>X                |   | 04/2012                 |
| ITU-T     | G.984.2                | Gigabit-capable Passive Optical Networks (GPON): Physical Media Dependent (PMD) layer specification   | 4<br>7b                        |                |   |   |   | X<br>X                |   |   |   |           |   | X<br>X                |   | 16 March 2003           |
| ITU-T     | G.984.2<br>Amendment 1 | Gigabit-capable Passive Optical Networks (G-PON): Physical Media Dependent (PMD) layer specification<br>Amendment 1: New Appendix III – Industry best practice for 2.488 Gbit/s downstream, 1.244 Gbit/s upstream G-PON | 4<br>7b                        |                |   |   |   | X<br>X                |   |   |   |           |   | X<br>X                |   | 02/2006                 |
| ITU-T     | G.984.2<br>Amendment 2 | Gigabit-capable Passive Optical Networks (G-PON): Physical Media Dependent (PMD) layer specification<br>Amendment 2   | 4<br>7b                        |                |   |   |   | X<br>X                |   |   |   |           |   | X<br>X                |   | 03/2008                 |

| Stds Body | Number                 | Title   | Scen. Ref. | Classification |   |   |   | Medium |   |   |   | Interface |   |        |         | Pub Date/<br>Prop. Rev.   |
|-----------|------------------------|---|------------|----------------|---|---|---|--------|---|---|---|-----------|---|--------|---------|---|
|           |                        |   |            | G              | O | A | Q | F      | C | P | A | J         | H | B      | W       |   |
| ITU-T     | G.984.3<br>Edition 3   | Gigabit-capable Passive Optical Networks (GPON):<br>Transmission convergence layer specification  | 4<br>7b    |                |   |   |   | X<br>X |   |   |   |           |   | X<br>X |         | 01/2014<br><br>Supersedes ed.<br>02/2004,<br>03/2008 and all<br>related<br>amendments |
| ITU-T     | G.984.4                | Gigabit-capable Passive Optical Networks (GPON):<br>ONT management and control interface specification  | 4<br>7b    |                |   |   |   | X<br>X |   |   |   |           |   | X<br>X |         | 02/2008<br><br>Erratum<br>08/2009<br>Corrigendum 1<br>03/2010                         |
| ITU-T     | G.984.4<br>Amendment 1 | Gigabit-capable Passive Optical Networks (GPON):<br>ONT management and control interface specification<br>Amendment 1   | 4<br>7b    |                |   |   |   | X<br>X |   |   |   |           |   | X<br>X |         | 06/2009   |
| ITU-T     | G.984.4<br>Amendment 2 | Gigabit-capable passive optical networks (G-PON):<br>ONT management and control interface specification<br>Amendment 2: Changes and extensions to the<br>OMCI, editorial clarifications and corrections | 4<br>7b    |                |   |   |   | X<br>X |   |   |   |           |   | X<br>X |         | 11/2009   |
| ITU-T     | G.984.4<br>Amendment 3 | Gigabit-capable passive optical networks (G-PON):<br>ONT management and control interface specification<br>Amendment 3: Clarification of scope of application   | 4<br>7b    |                |   |   |   | X<br>X |   |   |   |           |   | X<br>X |         | 07/2010   |
| ITU-T     | G.Imp984.4             | G.984.4 Implementer's Guide<br>Second Revision  | 4<br>7b    |                |   |   |   | X<br>X |   |   |   |           |   | X<br>X |         | 10/2009   |
| ITU-T     | G.984.5                | Gigabit-capable Passive Optical Networks (G-PON):<br>Enhancement band   | 4<br>7b    |                |   |   |   | X<br>X |   |   |   |           |   | X<br>X |         | 09/2007   |
| ITU-T     | G.984.5<br>Edition 2   | Gigabit-capable Passive Optical Networks (G-PON):<br>Enhancement band   | 4<br>7b    |                |   |   |   | X<br>X |   |   |   |           |   | X<br>X | 4<br>7b | 05/2014   |



| Stds Body | Number              | Title  | Scen. Ref. | Classification |   |   |   | Medium |   |   |   | Interface |   |   |        | Pub Date/<br>Prop. Rev.               |
|-----------|---------------------|--|------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|--------|---------------------------------------|
|           |                     |  |            | G              | O | A | Q | F      | C | P | A | J         | H | B | W      |                                       |
| ITU-T     | G.984.6             | Gigabit-capable passive optical networks (GPON): Reach extension   | 4<br>7b    |                |   |   |   | X<br>X |   |   |   |           |   |   | X<br>X | 03/2008                               |
| ITU-T     | G.984.6 Amendment 1 | Gigabit-capable passive optical networks (GPON): Reach extension<br>Amendment 1: Wavelength-converting, continuous mode, and 1:N-protected range extenders | 4<br>7b    |                |   |   |   | X<br>X |   |   |   |           |   |   | X<br>X | 11/2009                               |
| ITU-T     | G.984.6 Amendment 2 | Gigabit-capable passive optical networks (G-PON): Reach extension<br>Amendment 2   | 4<br>7b    |                |   |   |   | X<br>X |   |   |   |           |   |   | X<br>X | 05/2012                               |
| ITU-T     | G.984.7             | Gigabit-capable passive optical networks (GPON): Long reach  | 4<br>7b    |                |   |   |   | X<br>X |   |   |   |           |   |   | X<br>X | 07/2010                               |
| ITU-T     | G.985               | 100 Mbit/s point-to-point Ethernet based optical access system   | 4          |                |   |   |   | X      |   |   |   |           |   |   | X      | 03/2003<br><br>Corrigendum<br>01/2005 |
| ITU-T     | G.985 Amendment 1   | 100 Mbit/s point-to-point Ethernet based optical access system<br>Amendment 1: Silent start function of optical network terminals                          | 4          |                |   |   |   | X      |   |   |   |           |   |   | X      | 01/2009                               |
| ITU-T     | G.986               | 1 Gbit/s point-to-point Ethernet-based optical access system   | 4          |                |   |   |   | X      |   |   |   |           |   |   | X      | 01/2010                               |
| ITU-T     | G.987               | 10-Gigabit-capable passive optical network (XG-PON) systems: Definitions, abbreviations and acronyms   | 4<br>7b    |                |   |   |   | X<br>X |   |   |   |           |   |   | X<br>X | 06/2012                               |
| ITU-T     | G.987.1             | 10-Gigabit-capable passive optical networks (XG-PON): General requirements   | 4<br>7b    |                |   |   |   | X<br>X |   |   |   |           |   |   | X<br>X | 01/2010                               |
| ITU-T     | G.987.1 Amendment 1 | 10-Gigabit-capable passive optical networks (XG-PON): General requirements<br>Amendment 1  | 4<br>7b    |                |   |   |   | X<br>X |   |   |   |           |   |   | X<br>X | 04/2012                               |

| Stds Body | Number                 | Title   | Scen. Ref.              | Classification |   |   |   | Medium |   |                  |   | Interface |   |        |   | Pub Date/<br>Prop. Rev.   |
|-----------|------------------------|---|-------------------------|----------------|---|---|---|--------|---|------------------|---|-----------|---|--------|---|---|
|           |                        |   |                         | G              | O | A | Q | F      | C | P                | A | J         | H | B      | W |   |
| ITU-T     | G.987.2                | 10-Gigabit-capable passive optical networks (XG-PON): Physical media dependent (PMD) layer specification                | 4<br>7b                 |                |   |   |   | X<br>X |   |                  |   |           |   | X<br>X |   | 10/2010   |
| ITU-T     | G.987.2<br>Amendment 1 | 10-Gigabit-capable passive optical networks (XG-PON): Physical media dependent (PMD) layer specification<br>Amendment 1 | 4<br>7b                 |                |   |   |   | X<br>X |   |                  |   |           |   | X<br>X |   | 02/2012   |
| ITU-T     | G.987.3<br>Edition 2   | 10-Gigabit-capable passive optical networks (XG-PON): Transmission convergence (TC) layer specification                 | 4<br>7b                 |                |   |   |   | X<br>X |   |                  |   |           |   | X<br>X |   | 01/2014<br><br>supersedes<br>ed.1 10/2010<br>and amendment<br>1 06/2012 |
| ITU-T     | G.987.4                | 10 Gigabit-capable passive optical networks (XG-PON): Reach extension   | 4<br>7b                 |                |   |   |   | X<br>X |   |                  |   |           |   | X<br>X |   | 06/2012   |
| ITU-T     | G.989.1                | 40-Gigabit-capable passive optical networks (NG-PON2): General requirements   | 4<br>7b                 |                |   |   |   | X<br>X |   |                  |   |           |   | X<br>X |   | 03/2013   |
| ITU-T     | G.989.2                | 40-Gigabit-capable passive optical networks 2 (NG-PON2): Physical media dependent (PMD) layer specification             | 4<br>7b                 |                |   |   |   | X<br>X |   |                  |   |           |   | X<br>X |   | DRAFT<br>2014<br>Consented  |
| ITU-T     | G.9801                 | Ethernet passive optical networks using OMCI  | 4<br>7b                 |                |   |   |   | X<br>X |   |                  |   |           |   | X<br>X |   | 08/2013   |
| ITU-T     | G.991.1                | High bit rate Digital Subscriber Line (HDSL) transceivers   | 3<br>4<br>5a<br>6<br>7a |                |   |   |   |        |   | X<br>X<br>X<br>X |   | X         |   |        |   | 10/1998   |

| Stds Body | Number                 | Title   | Scen. Ref. | Classification |   |   |   | Medium |   |   |   | Interface |   |   |                                     | Pub Date/<br>Prop. Rev.             |
|-----------|------------------------|---|------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|-------------------------------------|-------------------------------------|
|           |                        |   |            | G              | O | A | Q | F      | C | P | A | J         | H | B | W                                   |                                     |
| ITU-T     | G.991.2                | Single-pair high-speed digital subscriber line (SHDSL) transceivers   | 3          |                |   |   |   |        |   | X |   | X         |   |   |                                     | 12/2003<br><br>Erratum 1<br>04/2005 |
|           |                        |   | 4          |                |   |   |   |        | X |   |   |           |   |   |                                     |                                     |
|           |                        |   | 5a         |                |   |   |   |        | X |   |   |           |   |   |                                     |                                     |
|           |                        |   | 6          |                |   |   |   |        |   |   |   | X         |   |   |                                     |                                     |
|           |                        |   | 7a         |                |   |   |   |        |   |   | X |           |   | X |                                     |                                     |
| ITU-T     | G.991.2<br>Amendment 1 | Single-pair high-speed digital subscriber line (SHDSL) transceivers<br>Amendment 1  | 3          |                |   |   |   |        |   | X |   | X         |   |   | 07/2004                             |                                     |
|           |                        |   | 4          |                |   |   |   |        | X |   |   |           |   |   |                                     |                                     |
|           |                        |   | 5a         |                |   |   |   |        | X |   |   |           |   |   |                                     |                                     |
|           |                        |   | 6          |                |   |   |   |        |   |   |   | X         |   |   |                                     |                                     |
|           |                        |   | 7a         |                |   |   |   |        |   |   | X |           |   | X |                                     |                                     |
| ITU-T     | G.991.2<br>Amendment 2 | Single-pair high-speed digital subscriber line (SHDSL) transceivers<br>Amendment 2  | 3          |                |   |   |   |        |   | X |   | X         |   |   | 02/2005<br><br>Erratum 1<br>11/2005 |                                     |
|           |                        |   | 4          |                |   |   |   |        | X |   |   |           |   |   |                                     |                                     |
|           |                        |   | 5a         |                |   |   |   |        | X |   |   |           |   |   |                                     |                                     |
|           |                        |   | 6          |                |   |   |   |        |   |   |   | X         |   |   |                                     |                                     |
|           |                        |   | 7a         |                |   |   |   |        |   |   | X |           |   | X |                                     |                                     |
| ITU-T     | G.991.2<br>Amendment 3 | Single-pair high-speed digital subscriber line (SHDSL) transceivers<br>Amendment 3  | 3          |                |   |   |   |        |   | X |   | X         |   |   | 09/2005                             |                                     |
|           |                        |   | 4          |                |   |   |   |        | X |   |   |           |   |   |                                     |                                     |
|           |                        |   | 5a         |                |   |   |   |        | X |   |   |           |   |   |                                     |                                     |
|           |                        |   | 6          |                |   |   |   |        |   |   |   | X         |   |   |                                     |                                     |
|           |                        |   | 7a         |                |   |   |   |        |   |   | X |           |   | X |                                     |                                     |
| ITU-T     | G.992.1                | Asymmetric digital subscriber line (ADSL) transceivers  | 3          |                |   |   |   |        |   | X |   | X         |   |   | 06/1999<br>Corrigendum1<br>11/2001  |                                     |
|           |                        |   | 7a         |                |   |   |   |        |   |   | X |           |   |   |                                     |                                     |
| ITU-T     | G.992.1<br>Amendment 1 | Asymmetric digital subscriber line (ADSL) transceivers<br>Amendment 1: Revised Annex C, new Annex I<br>and new Appendix V   | 3          |                |   |   |   |        |   | X |   | X         |   |   | 03/2003                             |                                     |
|           |                        |   | 7a         |                |   |   |   |        |   | X |   |           |   |   |                                     |                                     |
| ITU-T     | G.992.1<br>Annex H     | Asymmetric digital subscriber line (ADSL) transceivers<br>Annex H: Specific requirements for a<br>synchronized symmetrical DSL (SSDSL) system<br>operating in the same cable binder as ISDN as<br>defined in ITU-T G.961 Appendix III | 3          |                |   |   |   |        |   | X |   | X         |   |   | 10/2000                             |                                     |
|           |                        |   | 7a         |                |   |   |   |        |   | X |   |           |   |   |                                     |                                     |

| Stds Body | Number              | Title  | Scen. Ref.   | Classification |   |   |   | Medium |   |   |             | Interface |   |   |   | Pub Date/<br>Prop. Rev. |  |
|-----------|---------------------|--|--------------|----------------|---|---|---|--------|---|---|-------------|-----------|---|---|---|-------------------------|--|
|           |                     |  |              | G              | O | A | Q | F      | C | P | A           | J         | H | B | W |                         |  |
| ITU-T     | G.992.2             | Splitterless asymmetric digital subscriber line (ADSL) transceivers  | 3<br>4<br>7a |                |   |   |   |        |   |   | X<br>X<br>X |           | X |   |   |                         | 06/1999  |
| ITU-T     | G.992.2 Amendment 1 | Splitterless asymmetric digital subscriber line (ADSL) transceivers<br>Amendment 1: Revised Annex C  | 3<br>4<br>7a |                |   |   |   |        |   |   | X<br>X<br>X |           | X |   |   |                         | 03/2003  |
| ITU-T     | G.992.2 Amendment 2 | Splitterless asymmetric digital subscriber line (ADSL) transceivers<br>Amendment 2: New Appendix IV – Example overlapped PSD masks for use in a TCM-ISDN crosstalk environment | 3<br>4<br>7a |                |   |   |   |        |   |   | X<br>X<br>X |           | X |   |   |                         | 10/2003  |
| ITU-T     | G.992.3             | Asymmetric digital subscriber line transceivers 2 (ADSL2)  | 3<br>7a      |                |   |   |   |        |   |   | X<br>X      |           |   |   |   |                         | 04/2009<br><br>Corrigendum 1<br>11/2009<br>Corrigendum 2<br>06/2011<br>Corrigendum3<br>08/2013 |
| ITU-T     | G.992.3 Amendment 1 | Asymmetric digital subscriber line transceivers 2 (ADSL2)<br>Amendment 1: Channel initialization policies  | 3<br>7a      |                |   |   |   |        |   |   | X<br>X      |           |   |   |   |                         | 03/2010  |
| ITU-T     | G.992.3 Amendment 2 | Asymmetric digital subscriber line transceivers 2 (ADSL2)<br>Amendment 2: Retrain on eoc protocol timeout  | 3<br>7a      |                |   |   |   |        |   |   | X<br>X      |           |   |   |   |                         | 07/2010  |
| ITU-T     | G.992.3 Amendment 3 | Asymmetric digital subscriber line transceivers 2 (ADSL2)<br>Amendment 3: Scale factor for downstream transmitter referred virtual noise, and corrigenda                       | 3<br>7a      |                |   |   |   |        |   |   | X<br>X      |           |   |   |   |                         | 11/2010  |

| Stds Body | Number              | Title  | Scen. Ref.              | Classification |   |   |   | Medium |   |   |   | Interface |   |   |   | Pub Date/<br>Prop. Rev.  |
|-----------|---------------------|--|-------------------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---|--|
|           |                     |  |                         | G              | O | A | Q | F      | C | P | A | J         | H | B | W |  |
| ITU-T     | G.992.3 Amendment 4 | Asymmetric digital subscriber line transceivers 2 (ADSL2) Amendment 4                              | 3<br>7a                 |                |   |   |   |        |   | X |   |           |   |   |   | 10/2011  |
| ITU-T     | G.992.3 Amendment 5 | Asymmetric digital subscriber line transceivers 2 (ADSL2) Amendment 5: Accuracy of test parameters | 3<br>7a                 |                |   |   |   |        |   | X |   |           |   |   |   | 10/2012  |
| ITU-T     | G.992.4             | Splitterless asymmetric digital subscriber line transceivers 2 (splitterless ADSL2)                | 3<br>4<br>7a            |                |   |   |   |        |   | X |   | X         |   |   |   | 07/2002  |
| ITU-T     | G.992.5             | Asymmetric digital subscriber line 2 transceivers (ADSL2)– Extended bandwidth ADSL2 (ADSL2plus)    | 3<br>7a                 |                |   |   |   |        |   | X |   |           |   |   |   | 01/2009<br><br>Corrigendum 1<br>11/2010  |
| ITU-T     | G.993.1             | Very high speed digital subscriber line transceivers   | 3<br>4<br>5a<br>6<br>7a |                |   |   |   |        |   | X |   | X         |   |   |   | 06/2004  |
| ITU-T     | G.993.2             | Very high speed digital subscriber line transceivers 2 (VDSL2)                                     | 3<br>4<br>5a<br>6<br>7a |                |   |   |   |        |   | X |   | X         |   |   |   | 12/2011<br>Includes Amd 1<br>04/2012<br><br>Erratum 1<br>09/2012<br>Corrigendum 1<br>06/2012 |

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|-----------|------------------------|--|------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---|-------------------------|
|           |                        |  |            | G              | O | A | Q | F      | C | P | A | J         | H | B | W   |                         |
| ITU-T     | G.993.2<br>Amendment 2 | Very high speed digital subscriber line transceivers 2 (VDSL2)<br>Amendment 2  | 3          |                |   |   |   |        |   | X |   | X         |   |   | 12/2012   |                         |
|           |                        |  | 4          |                |   |   |   |        | X |   |   |           |   |   |   |                         |
|           |                        |  | 5a         |                |   |   |   |        | X |   |   |           |   |   |   |                         |
|           |                        |  | 6          |                |   |   |   |        |   |   |   | X         |   |   |   |                         |
|           |                        |  | 7a         |                |   |   |   |        |   |   | X |           |   | X |   |                         |
| ITU-T     | G.993.2<br>Amendment 3 | Very high speed digital subscriber line transceivers 2 (VDSL2)<br>Amendment 3  | 3          |                |   |   |   |        |   | X |   | X         |   |   | 14/2013   |                         |
|           |                        |  | 4          |                |   |   |   |        | X |   |   |           |   |   |   |                         |
|           |                        |  | 5a         |                |   |   |   |        | X |   |   |           |   |   |   |                         |
|           |                        |  | 6          |                |   |   |   |        |   |   |   | X         |   |   |   |                         |
|           |                        |  | 7a         |                |   |   |   |        |   |   | X |           |   | X |   |                         |
| ITU-T     | G.993.2<br>Amendment 4 | Very high speed digital subscriber line transceivers 2 (VDSL2)<br>Amendment 4  | 3          |                |   |   |   |        |   | X |   | X         |   |   | 08/2013   |                         |
|           |                        |  | 4          |                |   |   |   |        | X |   |   |           |   |   |   |                         |
|           |                        |  | 5a         |                |   |   |   |        | X |   |   |           |   |   |   |                         |
|           |                        |  | 6          |                |   |   |   |        |   |   |   | X         |   |   |   |                         |
|           |                        |  | 7a         |                |   |   |   |        |   |   | X |           |   | X |   |                         |
| ITU-T     | G.993.2<br>Amendment 5 | Very high speed digital subscriber line transceivers 2 (VDSL2)<br>Amendment 5: Short reach VDSL2 with reduced power and enhanced data rate | 3          |                |   |   |   |        |   | X |   | X         |   |   | 01/2014   |                         |
|           |                        |  | 4          |                |   |   |   |        | X |   |   |           |   |   |   |                         |
|           |                        |  | 5a         |                |   |   |   |        | X |   |   |           |   |   |   |                         |
|           |                        |  | 6          |                |   |   |   |        |   |   |   | X         |   |   |   |                         |
|           |                        |  | 7a         |                |   |   |   |        |   |   | X |           |   | X |   |                         |
| ITU-T     | G.993.5                | Self-FEXT cancellation (vectoring) for use with VDSL2 transceivers   | 3          |                |   |   |   |        |   | X |   | X         |   |   | 04/2010<br><br>Corrigendum 1<br>06/2011<br>Corrigendum 2<br>10/2012 |                         |
|           |                        |  | 4          |                |   |   |   |        | X |   |   |           |   |   |   |                         |
|           |                        |  | 5a         |                |   |   |   |        | X |   |   |           |   |   |   |                         |
|           |                        |  | 6          |                |   |   |   |        |   |   |   | X         |   |   |   |                         |
|           |                        |  | 7a         |                |   |   |   |        |   |   | X |           |   | X |   |                         |

| Stds Body | Number                 | Title  | Scen. Ref. | Classification |   |   |   | Medium |   |   |   | Interface |   |   |         | Pub Date/<br>Prop. Rev. |
|-----------|------------------------|--|------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---------|-------------------------|
|           |                        |  |            | G              | O | A | Q | F      | C | P | A | J         | H | B | W       |                         |
| ITU-T     | G.993.5<br>Amendment 1 | Self-FEXT cancellation (vectoring) for use with VDSL2 transceivers<br>Amendment 1  | 3          |                |   |   |   |        |   | X |   | X         |   |   | 12/2011 |                         |
|           |                        |  | 4          |                |   |   |   |        | X |   |   |           |   |   |         |                         |
|           |                        |  | 5a         |                |   |   |   |        | X |   |   |           |   |   |         |                         |
|           |                        |  | 6          |                |   |   |   |        |   |   |   | X         |   |   |         |                         |
|           |                        |  | 7a         |                |   |   |   |        |   |   | X |           |   | X |         |                         |
| ITU-T     | G.993.5<br>Amendment 2 | Self-FEXT cancellation (vectoring) for use with VDSL2 transceivers<br>Amendment 2  | 3          |                |   |   |   |        |   | X |   | X         |   |   | 10/2012 |                         |
|           |                        |  | 4          |                |   |   |   |        | X |   |   |           |   |   |         |                         |
|           |                        |  | 5a         |                |   |   |   |        | X |   |   |           |   |   |         |                         |
|           |                        |  | 6          |                |   |   |   |        |   |   |   | X         |   |   |         |                         |
|           |                        |  | 7a         |                |   |   |   |        |   |   | X |           |   | X |         |                         |
| ITU-T     | G.993.5<br>Amendment 3 | Self-FEXT cancellation (vectoring) for use with VDSL2 transceivers<br>Amendment 3  | 3          |                |   |   |   |        |   | X |   | X         |   |   | 04/2013 |                         |
|           |                        |  | 4          |                |   |   |   |        | X |   |   |           |   |   |         |                         |
|           |                        |  | 5a         |                |   |   |   |        | X |   |   |           |   |   |         |                         |
|           |                        |  | 6          |                |   |   |   |        |   |   |   | X         |   |   |         |                         |
|           |                        |  | 7a         |                |   |   |   |        |   |   | X |           |   | X |         |                         |
| ITU-T     | G.993.5<br>Amendment 4 | Self-FEXT cancellation (vectoring) for use with VDSL2 transceivers<br>Amendment 4  | 3          |                |   |   |   |        |   | X |   | X         |   |   | 08/2013 |                         |
|           |                        |  | 4          |                |   |   |   |        | X |   |   |           |   |   |         |                         |
|           |                        |  | 5a         |                |   |   |   |        | X |   |   |           |   |   |         |                         |
|           |                        |  | 6          |                |   |   |   |        |   |   |   | X         |   |   |         |                         |
|           |                        |  | 7a         |                |   |   |   |        |   |   | X |           |   | X |         |                         |
| ITU-T     | G.993.5<br>Amendment 5 | Self-FEXT cancellation (vectoring) for use with VDSL2 transceivers<br>Amendment 5: Exchange of transceiver IDs during initialization | 3          |                |   |   |   |        |   | X |   | X         |   |   | 04/2014 |                         |
|           |                        |  | 4          |                |   |   |   |        | X |   |   |           |   |   |         |                         |
|           |                        |  | 5a         |                |   |   |   |        | X |   |   |           |   |   |         |                         |
|           |                        |  | 6          |                |   |   |   |        |   |   |   | X         |   |   |         |                         |
|           |                        |  | 7a         |                |   |   |   |        |   |   | X |           |   | X |         |                         |
| ITU-T     | G.994.1                | Handshake procedures for digital subscriber line transceivers  | 3          |                |   |   |   |        |   | X |   | X         |   |   | 06/2012 |                         |
|           |                        |  | 4          |                |   |   |   |        | X |   |   |           |   |   |         |                         |
|           |                        |  | 7a         |                |   |   |   |        | X |   |   |           |   |   |         |                         |
| ITU-T     | G.994.1<br>Amendment 1 | Handshake procedures for digital subscriber line transceivers<br>Amendment 1   | 3          |                |   |   |   |        |   | X |   | X         |   |   | 10/2012 |                         |
|           |                        |  | 4          |                |   |   |   |        | X |   |   |           |   |   |         |                         |
|           |                        |  | 7a         |                |   |   |   |        | X |   |   |           |   |   |         |                         |

| Stds Body | Number                 | Title   | Scen. Ref.   | Classification |   |   |   | Medium |   |             |   | Interface |   |   |   | Pub Date/<br>Prop. Rev.                       |
|-----------|------------------------|---|--------------|----------------|---|---|---|--------|---|-------------|---|-----------|---|---|---|---|
|           |                        |   |              | G              | O | A | Q | F      | C | P           | A | J         | H | B | W |   |
| ITU-T     | G.994.1<br>Amendment 2 | Handshake procedures for digital subscriber line transceivers<br>Amendment 2 – Extended duration of new functionality O-P-VECTOR 1            | 3<br>4<br>7a |                |   |   |   |        |   | X<br>X<br>X |   | X         |   |   |   | 08/2013                                       |
| ITU-T     | G.994.1<br>Amendment 3 | Handshake procedures for digital subscriber line transceivers<br>Amendment 3: Codepoints for G.998.4 extensions and exchange of transfer ID   | 3<br>4<br>7a |                |   |   |   |        |   | X<br>X<br>X |   | X         |   |   |   | 01/2014                                       |
| ITU-T     | G.994.1<br>Amendment 4 | Handshake procedures for digital subscriber line transceivers: Amendment 4 - Additional codepoints for the support of G.fast                  | 3<br>4<br>7a |                |   |   |   |        |   | X<br>X<br>X |   | X         |   |   |   | DRAFT<br>2014                                 |
| ITU-T     | G.996.1                | Test procedures for digital subscriber line (DSL) transceivers  | 3<br>7a      |                |   |   |   |        |   | X<br>X      |   | X         |   |   |   | 02/2001<br><br>Erratum 1<br>01/2003           |
| ITU-T     | G.996.1<br>Amendment 1 | Test procedures for digital subscriber line (DSL) transceivers<br>Amendment 1: New Annex B  | 3<br>7a      |                |   |   |   |        |   | X<br>X      |   | X         |   |   |   | 03/2003                                       |
| ITU-T     | G.996.2                | Single-ended line testing for digital subscriber lines (DSL)  | 3<br>7a      |                |   |   |   |        |   | X<br>X      |   | X         |   |   |   | 05/2009<br>Includes<br>Amendment 1<br>10/2009 |
| ITU-T     | G.996.2<br>Amendment 2 | Single-ended line testing for digital subscriber lines (DSL)<br>Amendment 2   | 3<br>7a      |                |   |   |   |        |   | X<br>X      |   | X         |   |   |   | 04/2012                                       |
| ITU-T     | G.996.2<br>Amendment 3 | Single-ended line testing for digital subscriber lines (DSL)<br>Amendment 3: Definition of accuracy values for MELT-PMD and MELT-P in Annex E | 3<br>7a      |                |   |   |   |        |   | X<br>X      |   | X         |   |   |   | 03/2013                                       |



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|-----------|------------------------|--|------------|----------------|---|---|---|--------|---|--------|---|-----------|---|---|---|---------------------------------|
|           |                        |  |            | G              | O | A | Q | F      | C | P      | A | J         | H | B | W |                                 |
| ITU-T     | G.996.2<br>Amendment 4 | Single-ended line testing for digital subscriber lines (DSL)<br>Amendment 4: Updates to Annex E                                  | 3<br>7a    |                |   |   |   |        |   | X<br>X |   | X         |   |   |   | 08/2013                         |
| ITU-T     | G.998.1                | ATM-based multi-pair bonding   | 3<br>7a    |                |   |   |   |        |   | X<br>X |   | X         |   |   |   | 01/2005                         |
| ITU-T     | G.998.1<br>Amendment 1 | ATM-based multi-pair bonding<br>Amendment 1  | 3<br>7a    |                |   |   |   |        |   | X<br>X |   | X         |   |   |   | 08/2013                         |
| ITU-T     | G.998.2                | Ethernet-based multi-pair bonding  | 3<br>7a    |                |   |   |   |        |   | X<br>X |   | X         |   |   |   | 01/2005                         |
| ITU-T     | G.998.2<br>Amendment 1 | Ethernet-based multi-pair bonding<br>Amendment 1   | 3<br>7a    |                |   |   |   |        |   | X<br>X |   | X         |   |   |   | 12/2006                         |
| ITU-T     | G.998.2<br>Amendment 2 | Ethernet-based multi-pair bonding<br>Amendment 2   | 3<br>7a    |                |   |   |   |        |   | X<br>X |   | X         |   |   |   | 12/2007                         |
| ITU-T     | G.998.2<br>Amendment 3 | Ethernet-based multi-pair bonding<br>Amendment 3 – Intentional temporary shutdown of some bonded lines                           | 3<br>7a    |                |   |   |   |        |   | X<br>X |   | X         |   |   |   | 08/2013                         |
| ITU-T     | G.998.3                | Multi-pair bonding using time-division inverse multiplexing  | 3<br>7a    |                |   |   |   |        |   | X<br>X |   | X         |   |   |   | 01/2005<br>Erratum 1<br>08/2005 |
| ITU-T     | G.998.3<br>Amendment 1 | Multi-pair bonding using time-division inverse multiplexing<br>Amendment 1 – Intentional temporary shutdown of some bonded lines | 3<br>7a    |                |   |   |   |        |   | X<br>X |   | X         |   |   |   | 08/2013                         |

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|-----------|------------------------|---|------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---|---|
|           |                        |   |            | G              | O | A | Q | F      | C | P | A | J         | H | B | W |   |
| ITU-T     | G.998.4                | Improved impulse noise protection for DSL transceivers  | 3<br>7a    |                |   |   |   |        |   | X |   | X         |   |   |   | 06/2010<br>Includes<br>Corrigendum1<br>Corrigendum 2<br>04/2011<br>Corrigendum 3<br>12/2011<br>Corrigendum 4<br>06/2012<br>Corrigendum 5<br>03/2013 |
| ITU-T     | G.998.4<br>Amendment 1 | Improved impulse noise protection for DSL Transceivers<br>Amendment 1   | 3<br>7a    |                |   |   |   |        |   | X |   | X         |   |   |   | 06/2011   |
| ITU-T     | G.998.4<br>Amendment 2 | Improved impulse noise protection for DSL Transceivers<br>Amendment 2   | 3<br>7a    |                |   |   |   |        |   | X |   | X         |   |   |   | 04/2012   |
| ITU-T     | G.998.4<br>Amendment 3 | Improved impulse noise protection for DSL transceivers<br>Amendment 3: Extended memory for enhanced bit rates with retransmission   | 3<br>7a    |                |   |   |   |        |   | X |   | X         |   |   |   | 01/2014   |
| ITU-T     | G.999.1                | Interface between the link layer and the physical layer for digital subscriber line (DSL) transceivers  | 3<br>7a    |                |   |   |   |        |   | X |   | X         |   |   |   | 10/2009<br><br>Corrigendum1<br>04/2010  |
| ITU-T     | G.999.1<br>Amendment 1 | Interface between the link layer and the physical layer for digital subscriber line (DSL) transceivers<br>Amendment 1: Extension for flow control on the PHY-to-LINK data stream over gamma reference point | 3<br>7a    |                |   |   |   |        |   | X |   | X         |   |   |   | 04/2014   |
| ITU-T     | G.9700                 | Fast access to subscriber terminals (FAST) – Power spectral density specification   | 3<br>7a    |                |   |   |   |        |   | X |   | X         |   |   |   | 04/2014   |

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|-----------|--------|---|----------------------|----------------|------------------|-------------|---|--------|---|---|---|------------------|---|---|---|----------------------------|
|           |        |   |                      | G              | O                | A           | Q | F      | C | P | A | J                | H | B | W |                            |
| ITU-T     | G.9701 | Fast Access to Subscriber Terminals (G.fast) - Physical layer specification.  | 3<br>7a              |                |                  |             |   |        |   | X |   | X                |   |   |   | DRAFT<br>2014<br>Consented |
| ITU-T     | I.361  | B-ISDN ATM Layer Specification.   | 2a,b<br>3<br>7a,b    | X<br>X<br>X    |                  |             |   |        |   |   |   |                  |   |   |   | 3/93                       |
| ITU-T     | I.410  | General aspects and principles relating to Recommendations on ISDN user-network interfaces Blue Book Fascicle III.8 | 2a,b<br>4<br>5a,b    |                | X<br>X<br>X      |             |   |        |   |   |   | X<br>X<br>X      |   |   |   | 10/84                      |
| ITU-T     | I.411  | ISDN User-Network Interfaces - Reference Configurations   | 2a<br>4<br>5a,b      |                | X<br>X<br>X      |             |   |        |   |   |   | X<br>X<br>X      |   |   |   |                            |
| ITU-T     | I.412  | ISDN user-network interfaces - Interface structures and access capabilities Blue Book Fascicle III.8                | 2a<br>4<br>5a,b      |                | X<br>X<br>X      |             |   |        |   |   |   | X<br>X<br>X      |   |   |   | 11/88                      |
| ITU-T     | I.413  | ISDN User-Network Interfaces - B-ISDN User-Network Interface  | 2b<br>3<br>4<br>5a,b |                | X<br>X<br>X<br>X |             |   |        |   |   |   | X<br>X<br>X<br>X |   |   |   |                            |
| ITU-T     | I.414  | ISDN User-Network Interfaces - Overview of recommendations on layer 1 for ISDN and B-ISDN customer access           | 2a,b<br>5a,b<br>6    |                | X<br>X<br>X      | X<br>X<br>X |   |        |   |   |   |                  |   |   |   |                            |
| ITU-T     | I.420  | Basic user-network interface Blue Book Fascicle III.8   | 2a,b<br>5a,b         |                | X<br>X           |             |   |        |   |   |   |                  |   |   |   | 10/84                      |
| ITU-T     | I.421  | Primary rate user-network interface Blue Book Fascicle III.8  | 5a,b                 |                | X                |             |   |        |   |   |   |                  |   |   |   | 10/84                      |
| ITU-T     | I.430  | Basic user-network interface - Layer 1 specification  | 2a<br>4<br>5a,b      |                |                  |             |   |        |   |   |   | X<br>X<br>X      |   |   |   |                            |



| Stds Body | Number               | Title   | Scen. Ref.       | Classification |   |   |   | Medium |   |   |   | Interface |   |   |   | Pub Date/<br>Prop. Rev. |
|-----------|----------------------|---|------------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---|-------------------------|
|           |                      |   |                  | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |
| ITU-T     | I.464                | Multiplexing, rate adaption and support of existing interfaces for restricted 64 kbit/s transfer capability         | 1, 5             | X              |   |   |   |        |   | X |   |           |   |   |   | 10/91                   |
| ITU-T     | I.761                | Inverse multiplexing for ATM (IMA)  |                  |                |   |   |   |        |   |   |   | X         |   |   |   | Approved 2000           |
| ITU-T     | I.150                | B-ISDN asynchronous transfer mode functional characteristics  |                  | X              |   |   |   |        |   |   |   |           |   |   |   | 11/95                   |
| ITU-T     | I.480                | 1+1 protection switching for cell based physical layer  |                  |                |   |   |   |        |   |   |   |           |   |   |   | Approved 2000           |
| ITU-T     | I.571                | Connection of VSAT based Private networks to the public ISDN  | 6                | X              |   |   |   |        |   |   |   |           |   |   |   | 8/96                    |
| ITU-T     | I.572                | VSAT interconnection with the PSTN  | 6                | X              |   |   |   |        |   |   |   |           |   |   |   | 3/00                    |
| ITU-T     | I.762, former I.frac | Mapping over fractional physical links  | all              | X              |   |   |   |        |   |   |   |           |   |   |   | approved 2000           |
| ITU-T     | I.apf                | Requirements to feeding power to access equipment   |                  |                |   |   |   |        |   |   |   |           |   |   |   | Consent 2002            |
| ITU-T     | I.aps                | Analoge phone set to be used in very short reach applications   |                  |                |   |   |   |        |   |   |   |           |   |   |   | Consent expected 5/2001 |
| ITU-T     | J.84                 | Distribution of digital multi-programme signals for television, sound and data services through SMATV               | 1a,b<br>2a,b     |                |   |   |   |        | X |   |   |           |   |   |   | 3/01                    |
| ITU-T     | J.87                 | Use of hybrid cable television links for the secondary distribution of television into the user's premises          | 1<br>2<br>5<br>6 |                |   |   |   | X      | X |   |   | X         |   |   |   | 3/98                    |
| ITU-T     | J.93                 | Requirements for conditional access in the secondary distribution of digital television on cable television systems | 1a,b<br>2a,      | X              |   |   |   |        |   |   |   |           |   |   |   | 3/98                    |
| ITU-T     | J.112                | Transmission systems for interactive cable television services  | 1b, 2b,<br>7     | X              |   |   |   | X      | X | X |   | X         | X |   |   | April 2003              |
| ITU-T     | J.113                | Digital video broadcasting interaction channel through the PSTN/ISDN  | 1a<br>2a         |                |   |   |   | X      | X | X |   |           |   |   |   | 3/98                    |
| ITU-T     | J.118                | Access systems for interactive services in SMATV  | 2b<br>5a,b       |                |   |   |   |        |   |   |   | X         | X |   |   | 5/00                    |
| ITU-T     | J.122                | Second Generation Transmission Systems for Interactive Cable Television Services – IP Cable Modems                  | 1b, 2b,<br>7     | X              |   |   |   | X      | X |   |   | X         | X |   |   | December 2007           |

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|-----------|-----------------|--|------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---|-------------------------|
|           |                 |  |            | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |
| ITU-T     | J.126           | Embedded Cable Modem device specification  | 1b, 2b, 7  | X              |   |   |   | X      | X |   |   | X         | X |   |   | December 2007           |
| ITU-T     | J.128           | Set-top Gateway specification for transmission systems for interactive cable television services   | 1b, 2b, 7  | X              |   |   | X | X      | X |   |   | X         |   |   |   | 2005                    |
| ITU-T     | J.132           | Transport of MPEG-2 signals in SDH networks  | All        |                |   |   |   |        |   |   |   |           |   |   |   | 3/98                    |
| ITU-T     | J.150           | Transmission of digital multi-programme signals for television, sound and data services through multichannel, multipoint distribution systems (MMDS) | 5b         |                |   |   |   |        |   |   |   | X         |   |   |   | 3/98                    |
| ITU-T     | J.160(J.arch)   | Architectural framework for the delivery of time-critical services over cable television networks using cable modems                                 | 1b, 7      |                | X | X |   | X      | X |   |   | X         | X |   |   | 11/2005                 |
| ITU-T     | J.161(J.acr)    | Audio/Video Codecs   | 1b, 7      | X              |   |   |   | X      | X |   |   | X         | X |   |   | Approved 03/01          |
| ITU-T     | J.162 (J.ncs)   | Network-Based Call Signaling   | 1b, 7      | X              |   |   |   | X      | X |   |   | X         | X |   |   | Approved 03/01          |
| ITU-T     | J.163(J.dqos)   | Dynamic Quality-of-Service   | 1b, 7      | X              |   |   |   | X      | X |   |   | X         | X |   |   | Approved 03/01          |
| ITU-T     | J.164(J.em)     | Event Messages   | 1b, 7      | X              |   |   |   | X      | X |   |   | X         | X |   |   | Approved 03/01          |
| ITU-T     | J.165(J.istp)   | Internet Signaling Transport Protocol (ISTP)   | 1b, 7      | X              |   |   |   | X      | X |   |   | X         | X |   |   | Consent<br>Dec 2001     |
| ITU-T     | J.166(J.mibfrw) | MIBs Framework   | 1b, 7      |                |   |   | X | X      | X |   |   | X         | X |   |   | Approved 03/01          |
| ITU-T     | J.167(J.mtadpv) | MTA Device Provisioning  | 1b, 7      |                |   |   | X | X      | X |   |   | X         | X |   |   | Approved 03/01          |
| ITU-T     | J.168(J.mtamib) | MTA MIB  | 1b, 7      |                |   |   | X | X      | X |   |   | X         | X |   |   | Approved 03/01          |
| ITU-T     | J.169(J.ncsmib) | BNCS MI  | 1b, 7      |                |   |   | X | X      | X |   |   | X         | X |   |   | Approved 03/01          |
| ITU-T     | J.170(          | IPCablecom security specification  | 1b, 7      | X              |   |   |   | X      | X |   |   | X         | X |   |   | Published<br>11/2005    |
| ITU-T     | J.171(J.tgcp)   | PSTN Gateway Call Signaling  | 1b, 7      | X              |   |   |   | X      | X |   |   | X         | X |   |   | Approved 03/01          |
| ITU-T     | J.175 (J.as)    | Audio Server Protocol  | 1b, 7      | X              |   |   |   | X      | X |   |   | X         | X |   |   | Consent<br>June 2002    |
| ITU-T     | J.176 (J.memmb) | IPCablecom Management Event Mechanism MIB  | 1b, 7      | X              |   |   |   | X      | X |   |   | X         | X |   |   | Consent<br>June 2002    |
| ITU-T     | J.184(J.oob)    | Digital Broadband Delivery System:<br>Out Of Band Transport  | 1b         | X              |   |   |   | X      | X |   |   | X         | X |   |   | Approved 03/01          |

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|           |  |  |            | G              | O | A | Q | F      | C | P | A | J         | H | B | W |   |
| ITU-T     | J.185                                    | Transmission equipment for transferring multi-channel television signals over optical access networks by frequency modulation conversion | 1a, 4      |                |   | X |   | X      | X |   |   |           | X |   |   | 06/2012   |
| ITU-T     | J.186                                    | Transmission equipment for multi-channel television signals over optical access networks by sub-carrier multiplexing (SCM)               |            |                |   | X |   | X      | X |   |   |           | X |   |   | 6/2008  |
| ITU-T     | J.190                                    | Home Network Architecture that supports IP-based and proprietary protocol-based multimedia services                                      | 1b, 7      |                | X | X |   | X      | X | X | X | X         |   |   |   | 7/2007  |
| ITU-T     | J.191                                    | IP Feature Package to Enhance Cable Modems   | 1b, 2b, 7  | X              |   |   | X | X      | X |   |   | X         |   |   |   | March 2004  |
| ITU-T     | J.192                                    | A Residential Gateway to support the delivery of cable data services   | 1b, 2b, 7  | X              |   |   | X | X      | X |   |   | X         |   |   |   | 11/2005   |
| ITU-T     | J.195.1<br>(J.HiNoC-req)                 | Functional Requirements of high speed transmission over coaxial network connected with Fiber To The Building                             | 1b, 2b, 7  | X              | X | X |   |        | X |   |   | X         | X |   |   | <a href="#">03/2013AAP Consent Jan 2013</a>       |
| ITU-T     | <a href="#">J.195.2</a><br>(J.HiNoC-phy) | PHY layer specification of high performance network over coax  | 1b, 2b, 7  |                |   | X |   |        | X |   |   | X         | X |   |   | <a href="#">10/2014draft Rec. for progressing</a> |
| ITU-T     | <a href="#">J.195.3</a><br>(J.HiNoC-mac) | MAC layer specification of high performance network over coax  | 1b, 2b, 7  |                |   | X |   |        | X |   |   | X         | X |   |   | <a href="#">10/2014draft Rec. for progressing</a> |
| ITU-T     | J.197                                    | High level requirements for a Digital Rights Management (DRM) bridge from a cable access network to a home network                       | 1b, 2b, 7  | X              |   |   | X | X      | X |   |   | X         |   |   |   | 11/2005   |
| ITU-T     | J.210                                    | Downstream RF Interface for Cable Modem Termination Systems  | 1b, 2b, 7  | X              |   |   |   | X      | X |   |   |           | X |   |   | October 2006                                      |
| ITU-T     | J.211                                    | Timing Interface for Cable Modem Termination Systems   | 1b, 2b, 7  | X              |   |   |   | X      | X |   |   |           | X |   |   | October 2006                                      |
| ITU-T     | J.212                                    | Downstream External PHY Interface for Modular Cable Modem Termination Systems  | 1b, 2b, 7  | X              |   |   |   | X      | X |   |   |           | X |   |   | October 2006                                      |
| ITU-T     | J.222.0                                  | Overview of third-generation transmission systems for interactive cable television services - IP cable modems                            | 1b, 2b, 7  |                | X |   |   | X      | X |   |   | X         | X |   |   | 12/2007   |







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|           |        |  |            | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |
| ITU-T     | V.90   | A digital modem and analogue modem pair for use on the public switched telephone network (PSTN) at data signaling rates up to 56 000 bit/s downstream and up to 36 600 bits/s upstream | 1,2        | X              |   |   |   |        |   | X |   |           |   |   |   | Publication<br>1998     |
| ITU-T     | V.91   | A digital modem operating at data signaling rates of up to 64 000 bit/s on a 4-wire circuit switched connection and on leased point-to-point 4-wire digital circuits                   | 1,2        | X              |   |   |   |        |   | X |   |           |   |   |   | approval 1999           |
| ITU-T     | V.92   | DATA COMMUNICATION OVER THE TELEPHONE NETWORK<br>Simultaneous transmission of data and other signals<br>Enhancements to Recommendation V.90  | 1,2        | X              |   |   |   |        |   | X |   |           |   |   |   | 11/2000                 |



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|           |                 |  |                              | G                | O | A                | Q           | F      | C | P | A | J         | H | B | W |                         |
| ETSI      | DEN/SPS-03054-2 | V interfaces at the digital Service node; PSTN and ISDN delivery over an ISDN-BA transmission system Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification | 2a<br>5a                     |                  |   |                  |             |        |   |   |   |           | X |   |   |                         |
| ETSI      | EN 302 326-3    | Fixed Radio Systems; Multipoint Equipment and Antennas; Part 3: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive for Multipoint Radio Antennas    | 5a,b                         |                  |   | X                |             |        |   |   | X |           |   |   |   | V1.3.1<br>(02/2008)     |
| ETSI      | DEN/TMN-00004   | V interfaces at the digital Service Node (SN); Management interfaces associated with the VB5.1 reference point; Part 1: Interface specification  | 2a,b<br>4<br>5a<br>6<br>7a/b |                  |   | X<br>X<br>X<br>X | X<br>X<br>X |        |   |   |   |           |   |   |   |                         |
| ETSI      | DEN/TMN-00012   | Transmission and Multiplexing (TM); Management of generalized Access Networks (ANs)  | 2a,b<br>5a,b<br>6<br>7a/b    |                  |   | X<br>X<br>X      | X<br>X<br>X |        |   |   |   |           |   |   |   |                         |
| ETSI      | DES/TMN-00025   | Transmission and Multiplexing (TM); Service provisioning ensemble of access networks   | 2a,b<br>5a,b<br>6<br>7a/b    | X<br>X<br>X<br>X |   |                  |             |        |   |   |   |           |   |   |   |                         |
| ETSI      | DTR/SMG-103320  | UMTS; Security principles for the UMTS (UMTS 33.20)  | 5a,b                         | X                |   |                  |             |        |   |   |   |           |   |   |   |                         |
| ETSI      | DTR/TMN-00015   | Transmission and Multiplexing (TM); Operation And Maintenance (OAM) of Optical Access Networks (OANs); Test and performance fragment   | 5a,b<br>6<br>7a/b            |                  | X |                  | X<br>X      |        |   |   |   |           |   |   |   | Q or G or Both?         |
| ETSI      | DTR/TMN-00020   | Transmission and Multiplexing (TM); Operation And Maintenance (OAM) of Optical Access Networks (OANs); Transmission fragment (element view)  | 5a,b<br>6<br>7a/b            |                  | X |                  | X<br>X      |        |   |   |   |           |   |   |   | Q or G or Both?         |

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|-----------|---------------|--|---------------------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---|-------------------------|-----------------|
|           |               |  |                           | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |                 |
| ETSI      | DTR/TMN-00021 | Operations and Maintenance (O&M) of Optical Access Networks (OANs); Ensembles applicable to OANs                     | 5a,b<br>6<br>7a/b         |                |   |   | X |        |   |   |   |           |   |   |   |                         | Q or G or Both? |
| ETSI      | DTR/TMN-00023 | Management of the Access Network (AN)  | 2a,b<br>5a,b<br>6<br>7a/b |                | X |   |   |        |   |   |   |           |   |   |   |                         |                 |
| ETSI      | ETR 063       | Business Telecommunications (BT); A survey of analogue accesses to the PSTN not covered by Final Draft prETS 300 001 | 2a,b                      | X              |   |   |   |        |   |   |   |           |   |   |   |                         | 5/93            |
| ETSI      | ETR 114       | Functional architecture of Synchronous Digital Hierarchy (SDH) Transport networks                                    | 5a                        |                |   | X |   |        |   |   |   |           |   |   |   |                         |                 |
| ETSI      | ETR 178       | Digital European Cordless Telecommunications (DECT); A high level guide to DECT standardization                      | 5a,b                      |                | X |   |   |        |   |   |   |           |   |   |   |                         |                 |
| ETSI      | ETR 185       | Digital European Cordless Telecommunications (DECT); Data services profile (DSP); Profile overview                   | 5a,b                      |                | X |   |   |        |   |   |   |           |   |   |   |                         |                 |
| ETSI      | ETR 240       | Transmission and Multiplexing (TM); Operations and maintenance of Optical Access Networks                            | 5a<br>6                   | X<br>X         |   |   | X |        |   |   |   |           |   |   |   |                         |                 |
| ETSI      | ETR 241       | Functional architecture of 2 Mbit/s based Plesiochronous Digital Hierarchy (PDH) transport networks                  | 5a,b                      |                |   | X |   |        |   |   |   |           |   |   |   |                         |                 |
| ETSI      | ETR 242       | Signalling Protocols and Switching (SPS); Open Network Provision (ONP) standardization for access to the local loop  | 2a,b<br>4<br>5a,b<br>6    |                | X |   |   |        |   |   |   |           | X | X | X | X                       |                 |

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|-----------|---------------|--|------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---|-------------------------|--|--|
|           |               |  |            | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |  |  |
| ETSI      | ETR 257       | Signalling Protocols and Switching (SPS); V interfaces at the digital Service Node (SN); Identification of the applicability of existing protocol specifications for a VB5 reference point in an access arrangement with Access Networks | 2a,b       |                |   |   |   |        |   |   |   |           | X |   |   |                         |  |  |
|           |               |  | 4          | X              |   |   |   |        |   |   |   |           |   | X |   |                         |  |  |
|           |               |  | 5a         |                |   |   |   |        |   |   |   |           |   |   | X |                         |  |  |
|           |               |  | 6          | X              |   |   |   |        |   |   |   |           |   |   | X |                         |  |  |
| ETSI      | ETR 268       | Physical aspects of long-haul optical systems for 10 Gbit/s capacity   | 4          |                |   |   |   | X      |   |   |   |           |   |   |   |                         |  |  |
|           |               |  | 5a         |                |   |   |   | X      |   |   |   |           |   |   |   |                         |  |  |
|           |               |  | 7b         |                |   |   |   | X      |   |   |   |           |   |   |   |                         |  |  |
| ETSI      | ETR 276       | Open Network Provision (ONP) leased lines; Standardization requirements for Synchronous Digital Hierarchy (SDH) leased lines   | 5a?        | X              |   |   |   |        |   |   |   |           |   |   |   |                         |  |  |
| ETSI      | ETR 308       | Radio Equipment and Systems (RES); Services, facilities and configurations for the DECT Radio local loop Access Profile (RAP)  | 5a,b       |                |   | X |   |        |   |   |   |           |   |   |   |                         |  |  |
| ETSI      | ETR 310       | Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT); Traffic capacity and spectrum requirements for multi-system and multi-service DECT applications co-existing in a common frequency band           | 5a,b       |                |   |   |   |        |   |   |   | X         |   |   |   |                         |  |  |
| ETSI      | ETR 312       | Scenarios and considerations for the introduction of UMTS  | 5a,b       | X              |   |   |   |        |   |   |   |           |   |   |   |                         |  |  |
| ETSI      | ETS 300 010-2 | Synchronous cross connection equipment 64 kbit/s and n x 64 kbit/s   | 5a         | X              |   |   |   |        |   |   |   |           |   |   |   |                         |  |  |
| ETSI      | ETS 300 102-1 | User-network interface layer 3 Specifications for basic call control   | 2a         |                |   |   |   |        |   |   |   |           | X |   |   |                         |  |  |
|           |               |  | 4          |                |   |   |   |        |   |   |   |           | X |   |   |                         |  |  |
|           |               |  | 5a         |                |   |   |   |        |   |   |   |           | X |   |   |                         |  |  |



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|-----------|-----------------|---|----------------|----------------|---|---|-------------|--------|---|---|---|-----------|---|---|---|-------------------------|
|           |                 |   |                | G              | O | A | Q           | F      | C | P | A | J         | H | B | W |                         |
| ETSI      | ETS 300 377-1   | Signalling Protocols and Switching (SPS); Q3 interface at the Local Exchange (LE) for configuration management of V5 interfaces and associated customer profiles; Part 1: Q3 interface specification  | 4<br>5a,b<br>6 |                |   |   | X<br>X<br>X |        |   |   |   |           |   |   |   |                         |
| ETSI      | ETS 300 378-1   | Signalling Protocols and Switching (SPS); Q3 interface at the Access Network (AN) for fault and performance management of V5 interfaces and associated user ports; Part 1: Q3 interface specification   | 4<br>5a,b<br>6 |                |   |   | X<br>X<br>X |        |   |   |   |           |   |   |   |                         |
| ETSI      | ETS 300 379-1   | Signalling Protocols and Switching (SPS); Q3 interface at the Local Exchange (LE) for fault and performance management of V5 interfaces and associated customer profiles; Part 1: Q3 interface specification  | 4<br>5a,b<br>6 |                |   |   | X<br>X<br>X |        |   |   |   |           |   |   |   |                         |
| ETSI      | ETS 300 417-2-2 | Generic requirements of transport functionality of equipment; Part 2-2: Synchronous Digital Hierarchy (SDH) and   |                | X              |   |   |             |        |   |   |   |           |   |   |   |                         |
| ETSI      | ETS 300 417-3-2 | Generic requirements of transport functionality of equipment;   | 2a,b           | X              |   |   |             |        |   |   |   |           |   |   |   |                         |
| ETSI      | ETS 300 434     | Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) and Integrated Services Digital Network (ISDN) inter-working for end system configuration; Part 1: Inter-working specification   | 4<br>5a,b      |                |   |   |             |        |   |   |   | X<br>X    |   |   |   |                         |
| ETSI      | ETS 300 443-1   | Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2) protocol; B-ISDN user network interface layer 3 specification for basic call/bearer control; Part 1: Protocol specification. ( ITU-T Recommendation Q.2931 (1995) modified) | 2b             |                |   |   |             |        |   |   |   | X         |   |   |   | 4/96                    |



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|-----------|---------------|---|----------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---|-------------------------|--|
|           |               |   |                | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |  |
| ETSI      | ETS 300 461-2 | Flexible Multiplexer (FM) equipment; Part 2: Management and control functions   | 1 .. 4,<br>7   |                | X |   | X |        |   |   |   |           |   |   |   |                         |  |
| ETSI      | ETS 300 468   | Digital Broadcasting Systems for Television, Sound and Data Services; Specification for Service Information (SI) in Digital Video Broadcasting (DVB) Systems  | 2a<br>5a       |                |   |   |   | X      | X | X | X |           |   |   |   |                         |  |
| ETSI      | ETS 300 471   | Land mobile service; Access protocol, occupation rules and corresponding technical characteristics of radio equipment for the transmission of data on shared channels                                 | 5a,b?          | X              |   |   |   |        |   |   |   |           |   |   |   |                         |  |
| ETSI      | ETS 300 473   | Digital Broadcasting Systems for Television, Sound and Data Services; Satellite Master Antenna Television (SMATV) distribution systems  | 5a             |                |   |   |   | X      | X |   |   |           |   |   |   |                         |  |
| ETSI      | ETS 300 651   | Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) Data Services Profile (DSP); Generic data link service; Service Type C, Class 2                                | 4<br>5a,b      |                |   |   |   |        |   |   |   | X         | X |   |   |                         |  |
| ETSI      | ETS 300 744   | "Digital Broadcasting Systems for Television, Sound and Data Services; Framing Structure, Channel Coding and Modulation for Digital Terrestrial Television". (Based on DVB Technical Module TM1 354). | 2a?<br>4<br>5b |                |   | X | X |        |   |   |   |           |   |   |   |                         |  |
| ETSI      | ETS 300 748   | "Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for Multipoint Video Distribution Systems (MVDS) at 10 GHz and above".  | 5b             |                |   |   |   |        |   |   |   | X         |   |   |   |                         |  |





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|-----------|-----------------|--|------------------------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---|----------------------|
|           |                 |  |                              | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                      |
| ETSI      | NET 003         | Attachment requirements for terminal equipment to connect to an ISDN using ISDN basic access   | 2a<br>4<br>5a,b              | X              |   |   |   |        |   |   |   |           |   |   |   |                      |
| ETSI      | NET 004         | General technical requirements for equipment to be connected to an analogue subscriber interface in the PSTN   | 2a<br>4<br>5a,b<br>6<br>7a/b | X              |   |   |   |        |   |   |   |           |   |   |   |                      |
| ETSI      | NET 005         | Attachment requirements for terminal equipment to connect to an ISDN using ISDN primary rate access  | 4<br>5a,b                    | X              |   |   |   |        |   |   |   |           |   |   |   |                      |
| ETSI      | prEN 301 192    | Digital Video Broadcasting (DVB); DVB specification for data broadcasting“   | 2b<br>5a<br>5b               |                |   |   |   | X      | X | X |   | X         |   |   |   |                      |
| ETSI      | prETS 300 443-2 | Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2) protocol; B-ISDN user network interface layer 3 specification for basic call/bearer control; Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification         | 2b                           |                |   |   |   |        |   |   |   | X         |   |   |   | 2/97                 |
| ETSI      | prETS 300 771-1 | Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2) protocol; B-ISDN user-network interface layer 3 specification for point-to-multipoint call/bearer control: Part 1: Protocol specification. (ITU-T Recommendation Q.2971 (1995) modified) | 2b                           |                |   |   |   |        |   |   |   | X         |   |   |   | 10/96                |



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|           |                                 |  |            | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |
| IEEE      | 802-14-94/002R3                 | Cable-TV functional requirements and evaluation criteria (IEEE P 802.14)   | 2a,b       | X              |   |   |   |        |   |   |   |           |   |   |   |                         |
| IEEE      | 1904.1-2013                     | Standard for Service Interoperability in Ethernet Passive Optical Networks   | 4          | X              |   |   |   | X      |   |   |   |           | X | X |   | 2013                    |
| IEEE      | 1904.1-Conformance              | Standard for Conformance Test Procedures for Service Interoperability in Ethernet Passive Optical Networks   | 4          | X              |   |   |   | X      |   |   |   |           | X | X |   | 2013                    |
| ISO/IEC   | 12139-1                         | Information technology — Telecommunications and information exchange between systems — Power Line Communication(PLC) – High speed PLC Media Access Control(MAC) and Physical Layer(PHY)                          | 8          | X              |   | X | X |        |   |   |   | X         | X |   |   | May 2009                |
| ITU-R     | <a href="#">M.1036-4</a>        | Frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications-2000 (IMT-2000) in the bands 806-960 MHz, 1 710-2 025 MHz, 2 110-2 200 MHz and 2 500-2 690 MHz | 5a,b       | X              |   |   |   |        |   |   | X |           |   |   |   | 03/2012                 |
| ITU-R     | <a href="#">M.1167</a>          | Framework for the satellite component of International Mobile Telecommunications-2000 (IMT-2000)   | 5a,b       | X              |   |   |   |        |   |   | X |           |   |   |   | 10-1995                 |
| ITU-R     | <a href="#">M.1224-1</a>        | Vocabulary of terms for IMT-2000   | 5a,b       | X              |   |   |   |        |   |   | X |           |   |   | X | 03/2012                 |
| ITU-R     | <a href="#">M.1225</a>          | Guidelines for evaluation of radio transmission technologies for IMT-2000  | 5a,b       | X              |   |   |   |        |   |   | X |           |   |   |   | 02-1997                 |
| ITU-R     | <a href="#">M.1311</a>          | Framework for modularity and radio commonality within IMT-2000   | 5a,b       |                | X |   |   |        |   |   | X |           |   |   | X | 10-1997                 |
| ITU-R     | <a href="#">M.1390</a>          | Methodology for the Calculation of IMT-2000 Terrestrial Spectrum Requirements  | 5a,b       | X              |   | X |   |        |   |   | X |           |   |   |   | 01-1999                 |
| ITU-R     | <a href="#">M.1391-1</a>        | Methodology for the Calculation of IMT-2000 Satellite Spectrum Requirements  | 5a,b       | X              |   | X |   |        |   |   | X |           |   |   |   | 03-2006                 |
| ITU-R     | <a href="#">M.818-2</a>         | Satellite operation within IMT-2000  | 5a,b       | X              |   |   |   |        |   |   | X |           |   |   |   | 06-2003                 |
| ITU-R     | <a href="#">M.2023</a> (Report) | Spectrum Requirements for IMT-2000   | 5a,b       | X              |   |   |   |        |   |   | X |           |   |   |   | 2000                    |

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|           |          |  |                 | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |
| ITU-R     | TERM     | Technical and Operational Requirements for Mobile Stations and Mobile Earth Stations of IMT-2000 Systems   | 5a,b            |                |   | X | X |        |   |   | X |           |   |   |   | 2001                    |
| ITU-R     | X4/8-9   | Performance and availability requirements and objectives for fixed wireless access (FWA) to PSTN   | 5a,b            | X              |   |   |   |        |   |   | X |           |   |   |   |                         |
| ITU-R     | F.757-3  | Basic system requirements and performance objectives for fixed wireless access using mobile-derived technologies offering basic telephony service and data communication service | 5a, b           | X              |   |   |   |        |   |   | X |           |   |   |   | 02/03                   |
| ITU-R     | F.1332-1 | Radio-frequency signal transport through optical fibres  | 5a,b            | X              |   |   |   | X      |   |   | X |           |   |   |   | 05/99                   |
| ITU-R     | F.1399-1 | Vocabulary of terms for wireless access  | 5a, b           | X              |   |   |   |        |   |   | X |           |   |   |   | 05/01                   |
| ITU-R     | F.1400   | Performance and availability objectives for FWA to PSTN  | 5a,b            | X              |   |   |   |        |   |   | X |           |   |   |   | 05/99                   |
| ITU-R     | F.1401-1 | Considerations for the identification of possible frequency bands for fixed wireless access and related sharing studies.   | 5a,b            | X              |   |   |   |        |   |   | X |           |   |   |   | 01/04                   |
| ITU-R     | F.1402   | Frequency sharing criteria between land mobile wireless access systems and FWA using the same equipment type as mobile wireless access system                                    | 5a,b            | X              |   |   |   |        |   |   | X |           |   |   |   | 05/99                   |
| ITU-R     | F.1490   | Generic requirements for fixed wireless access (FWA) systems   | 5a,b            | X              |   |   |   |        |   |   | X |           |   |   |   | 05/00                   |
| ITU-R     | F.1499   | Radio transmission systems for fixed broadband wireless access (BWA) based on cable modem standard   | 5a,b            | X              |   | X |   |        |   |   | X |           |   |   |   | 05/00                   |
| ITU-R     | F.1500   | Preferred characteristics of systems in the fixed service using high altitude platforms operating in the bands 47.2-47.5 GHz and 47.9-48.2 GHz                                   | 1<br>5a, b<br>6 | X              |   |   |   |        |   |   | X |           |   |   |   | 05/00                   |
| ITU-R     | F.1569   | Technical and operational characteristics for the fixed service using high altitude platform stations in the band 27.5-28.5 and 31.0-31.3 GHz                                    | 1<br>5a, b<br>6 | X              |   |   |   |        |   |   | X |           |   |   |   | 05/02                   |

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|-----------|-------------------------|---|---------------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---|-------------------------|---------|
|           |                         |   |                     | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |         |
| ITU-R     | F.1704                  | Characteristics of multipoint-to-multipoint fixed wireless systems with meshed network topology operating in frequency bands above about 17 GHz | 5a,b                | X              |   | X |   |        |   |   |   | X         |   |   |   |                         | 01/05   |
| ITU-R     | F.1763                  | Radio interface standards for broadband wireless access systems in the fixed service operating below 66 GHz                                     | 5a,b                | X              |   |   |   |        |   |   |   | X         |   |   |   | X                       | 04/06   |
| ITU-R     | F.2058 (Report)         | Design techniques applicable to broadband fixed wireless access systems conveying Internet protocol packets or asynchronous transfer mode cells | 5a, b               | X              |   |   |   |        |   |   |   | X         |   |   |   |                         | 2006    |
| ITU-R     | F.2086 (Report)         | Technical and operational requirements for broadband wireless access in the fixed service   | 5a, b               | X              |   |   |   |        |   |   |   | X         |   |   |   |                         | 2006    |
| ITU-R     | F.2106-1 (Report)       | Fixed Service applications using free-space optical links   | 5a, b               | X              |   |   |   |        |   |   |   | X         |   |   |   |                         | 2010    |
| ITU-R     | F.2107-1 (Report)       | Characteristics and applications of fixed wireless systems operating in the 57 GHz to 130 GHz bands   | 5a, b               | X              |   |   |   |        |   |   |   | X         |   |   |   |                         | 2012    |
| ITU-R     | J.114                   | Interaction channel using digital enhanced cordless telecommunications  | all except 3 and 7a | X              |   |   |   | X      | X | X | X | X         | X |   |   |                         | 9/99    |
| ITU-R     | J.115                   | Interaction channel using the global system for mobile communications   | all except 3 and 7a | X              |   |   |   | X      | X | X | X | X         | X |   |   |                         | 9/99    |
| ITU-R     | J.116                   | Interaction channel for local multipoint distribution system  | all except 3 and 7a | X              |   |   |   | X      | X | X | X | X         | X |   |   |                         | 999     |
| ITU-R     | <a href="#">M.819-2</a> | International Mobile Telecommunications-2000 (IMT-2000) for developing countries  |                     | X              |   |   |   |        |   |   |   | X         |   |   |   |                         | 02-1997 |
| ITU-R     | <a href="#">M.1033</a>  | Technical and operational characteristics of cordless telephones and cordless telecommunication systems   | 5a,b                |                | X |   |   |        |   |   |   | X         |   |   |   | X                       | 1997    |



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|           |                                 |  |            | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |           |
| ITU-R     | <a href="#">M.1073.2</a>        | Digital cellular land mobile telecommunication systems   | 5a,b       |                | X |   |   |        |   |   |   | X         |   |   |   | X                       | June 2005 |
| ITU-R     | <a href="#">M.1079-2</a>        | Performance and quality of service requirements for International Mobile Telecommunications-2000 (IMT-2000)  | 5a,b       | X              |   |   |   |        |   |   |   |           |   |   |   |                         | 06-2003   |
| ITU-R     | <a href="#">M.1450-5</a>        | Characteristics of broadband RLANs   | 5a,b       |                | X | X |   |        |   |   |   | X         |   |   |   | X                       | 04/2014   |
| ITU-R     | <a href="#">M.1454</a>          | E.i.r.p. density limit and operational restrictions for RLANs or other wireless access transmitters in order to ensure the protection of feeder links of NGSO systems in the MSS in the frequency band 5 150-5 250 MHz                   | 5a,b       |                |   |   | X |        |   |   |   | X         |   |   |   | X                       | 2000      |
| ITU-R     | <a href="#">M.1579</a>          | Global circulation of IMT-2000 terminals   | 5a,b       |                |   | X | X |        |   |   |   | X         |   |   |   |                         | 07-2002   |
| ITU-R     | <a href="#">M.1651</a>          | A method for assessing the required spectrum for broadband NWA systems including RLANs using the 5 GHz band  | 5a,b       | X              |   |   |   |        |   |   |   | X         |   |   |   | X                       | 2003      |
| ITU-R     | <a href="#">M.1652-1</a>        | Dynamic Frequency Selection (DFS) in Wireless Access Systems (WAS) including Radio Local Area Networks (RLAN) for the purpose of protecting the radio determination service in the 5 GHz band  | 5a,b       |                |   |   | X |        |   |   |   | X         |   |   |   | X                       | 05/2011   |
| ITU-R     | <a href="#">M.1653</a>          | Operational and deployment requirements for WAS including RLANs in the MS to facilitate sharing between these systems and systems in the EESS (active) and the SRS (active) in the band 5 470-5 570 MHz within the 5 460-5 725 MHz range | 5a,b       |                |   |   | X |        |   |   |   | X         |   |   |   | X                       | 2003      |
| ITU-R     | <a href="#">M.1768</a>          | Methodology for calculation of spectrum requirements for the future development of the terrestrial component of IMT-2000 and systems beyond IMT-2000   | 5a,b       | X              |   | X |   |        |   |   |   | X         |   |   |   |                         | 03-2006   |
| ITU-R     | <a href="#">M.2034</a> (Report) | Impact of radar detection requirements of dynamic frequency selection on 5 GHz wireless access system receivers  | 5a,b       |                |   |   | X |        |   |   |   | X         |   |   |   | X                       | 2003      |

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|           |                                 |   |            | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |         |
| ITU-R     | <a href="#">M.2072</a> (Report) | World mobile telecommunication market forecast (ex- <a href="#">Doc. 8/94</a> )   | 5a,b       | X              |   |   |   |        |   |   |   | X         |   |   |   | X                       | 2006    |
| ITU-R     | <a href="#">M.2074</a> (Report) | Radio aspects for the terrestrial component of IMT-2000 and systems beyond IMT-2000(ex- <a href="#">Doc. 8/115(Rev.1)</a> )     | 5a,b       | X              |   |   |   |        |   |   |   | X         |   |   |   | X                       | 2006    |
| ITU-R     | S.1806                          | Availability objectives for hypothetical reference digital paths in the fixed-satellite service operating below 15 GHz – 2008   |            | X              |   |   |   |        |   |   |   | X         | X | X | X |                         | 08/2008 |
| ITU-R     | S.1897                          | Cross-layer QoS provisioning in IP-based hybrid satellite-terrestrial networks – 201  |            | X              |   |   |   |        |   |   |   | X         | X | X | X |                         | 01/2012 |
| ITU-T     | G.107                           | The E-model: a computational model for use in transmission planning   | All        |                |   |   | X |        |   |   |   |           |   |   |   |                         | 4/2009  |
| ITU-T     | G.108 A2                        | Application of the E-model  | All        |                |   |   | X |        |   |   |   |           |   |   |   |                         | 3/2004  |
| ITU-T     | G.108.1                         | Guidance for assessing conversational speech transmission quality effects not covered by the E-model                            | All        |                |   |   | X |        |   |   |   |           |   |   |   |                         | 5/2000  |
| ITU-T     | G.108.2                         | Transmission planning aspects of echo cancellers  | All        |                |   |   | X |        |   |   |   |           |   |   |   |                         | 3/2007  |
| ITU-T     | G.109                           | Definitions of categories of speech transmission quality  | All        |                |   |   | X |        |   |   |   |           |   |   |   |                         | 01/2007 |
| ITU-T     | G.114                           | One-way transmission time   | ?          |                |   |   |   |        |   |   |   |           |   |   |   |                         | 5/2003  |
| ITU-T     | G.131                           | Talker echo and its control   | ?          |                |   |   |   |        |   |   |   |           |   |   |   |                         | 11/2003 |
| ITU-T     | G.174                           | Transmission Performance Objectives for Terrestrial Digital Wireless Systems Using Portable Terminals to Access the PSTN        | 5a,b       |                |   |   |   |        |   |   |   | X         | X |   |   |                         | 6/94    |
| ITU-T     | G.601                           | Terminology for cables  | 2a,b       | X              |   |   |   |        |   |   |   |           |   |   |   |                         | 11/1988 |
| ITU-T     | G.602                           | Reliability and availability of analogue cable transmission systems and associated equipments                                   | 2a,b       | X              |   |   |   |        |   |   |   |           |   |   |   |                         | 11/1988 |
| ITU-T     | G.611                           | Characteristics of symmetric cable pairs for analogue transmission  | 2a<br>7a,b |                |   |   |   |        |   |   | X | X         |   |   | X |                         | 11/1988 |
| ITU-T     | G.612                           | Characteristics of symmetric cable pairs designed for the transmission of systems with bit rates of the order of 6 to 34 Mbit/s | 7a,b       |                |   |   |   |        |   |   | X |           |   | X |   |                         | 11/1988 |



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|           |                        |   |                | G              | O | A | Q | F      | C | P           | A | J         | H | B | W |  |
| ITU-T     | G.650.3<br>Amendment 1 | Test methods for installed single-mode optical fibre cable links<br>Amendment 1   | 4<br>5a        |                |   |   |   | X      |   |             |   |           |   |   |   | 02/2011                                  |
| ITU-T     | G.651.1                | Characteristics of a 50/125 µm multimode graded index optical fibre cable for the optical access network  | 4<br>5a<br>7b  |                |   |   |   | X      |   |             |   |           |   |   |   | 07/2007                                  |
| ITU-T     | G.651.1<br>Amendment 1 | Characteristics of a 50/125 µm multimode graded index optical fibre cable for the optical access network<br>Amendment 1: New Appendix I – Historical perspective on the evolution of the specification of multimode optical fibre cable | 4<br>5a<br>7b  |                |   |   |   | X      |   |             |   |           |   |   |   | 12/2008                                  |
| ITU-T     | G.652                  | Characteristics of a single-mode optical fibre and cable  | 4<br>5a<br>7b  |                |   |   |   | X      |   |             |   |           |   |   |   | 11/2009                                  |
| ITU-T     | G.657                  | Characteristics of a bending-loss insensitive single-mode optical fibre and cable for the access network  | 4<br>5a<br>7b  |                |   |   |   | X      |   |             |   |           |   |   |   | 10/2012                                  |
| ITU-T     | G.701                  | Vocabulary of digital transmission and multiplexing, and pulse code modulation (PCM) terms  | 2a,b<br>5a,b   | X              |   |   |   |        |   |             |   |           |   |   |   | 3/93                                     |
| ITU-T     | G.704                  | Synchronous frame structures used at 1544, 6312, 2048, 8488 and 44 736 kbit/s hierarchical levels   | 5a,b           | X              |   |   |   |        |   |             |   |           |   |   |   | 7/95                                     |
| ITU-T     | G.705                  | CHARACTERISTICS OF PLESIOCHRONOUS DIGITAL HIERARCHY (PDH) EQUIPMENT FUNCTIONAL BLOCKS   | 1a,<br>2a<br>4 | X<br>X<br>X    |   |   |   |        |   | X<br>X<br>X |   | X<br>X    |   |   |   | Determined<br>4/2000<br>Approval<br>WTSA |

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|           |         |   |                                | G              | O | A | Q                | F      | C | P | A | J         | H | B | W |                         |                 |
| ITU-T     | G.706   | Frame alignment and cyclic redundancy check (CRC) procedures relating to basic frame structures defined in Recommendation G.704 | 5a,b                           | X              |   |   |                  |        |   |   |   |           |   |   |   |                         | 4/91            |
| ITU-T     | G.772   | Protected monitoring points provided on digital transmission systems  |                                | X              |   |   |                  |        |   |   |   |           |   |   |   |                         | 3/93            |
| ITU-T     | G.773   | Protocol suites for Q-interfaces for management of transmission systems   | 2a,b<br>4<br>5a,b<br>6<br>7a,b |                |   |   | X<br>X<br>X<br>X |        |   |   |   |           |   |   |   |                         | 3/93            |
| ITU-T     | G.774   | Synchronous digital hierarchy (SDH) management information model for the network element view                                   | 4<br>5a,b<br>6                 |                |   |   | X<br>X<br>X      |        |   |   |   |           |   |   |   |                         | 9/92<br>4/2000  |
| ITU-T     | G.774.1 | Synchronous Digital Hierarchy (SDH) performance monitoring for the network element view   | 4<br>5a,b<br>6                 |                |   |   | X<br>X<br>X      |        |   |   |   |           |   |   |   |                         | 11/94<br>4/2000 |
| ITU-T     | G.774.2 | Synchronous digital hierarchy (SDH) configuration of the payload structure for the network element view                         | 4<br>5a,b<br>6                 |                |   |   | X<br>X<br>X      |        |   |   |   |           |   |   |   |                         | 11/94<br>4/2000 |
| ITU-T     | G.774.3 | Synchronous digital hierarchy (SDH) management of multiplex-section protection for the network element view                     | 4<br>5a,b<br>6                 |                |   |   | X<br>X<br>X      |        |   |   |   |           |   |   |   |                         | 11/94<br>4/2000 |
| ITU-T     | G.774.4 | Synchronous digital hierarchy (SDH) management of the subnetwork connection protection for the network element view             | 4<br>5a,b<br>6                 |                |   |   | X<br>X<br>X      |        |   |   |   |           |   |   |   |                         | 7/95<br>4/2000  |

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|-----------|---------|--|----------------|----------------|---|---|-------------|--------|---|---|---|-----------|---|---|---|-------------------------|-----------------------|
|           |         |  |                | G              | O | A | Q           | F      | C | P | A | J         | H | B | W |                         |                       |
| ITU-T     | G.774.5 | Synchronous Digital Hierarchy (SDH) management of connection supervision functionality (HCS/LCS) for the network element view          | 4<br>5a,b<br>6 |                |   |   | X<br>X<br>X |        |   |   |   |           |   |   |   |                         | 7/95<br>4/2000        |
| ITU-T     | G.780   | Vocabulary of terms for synchronous digital hierarchy (SDH) networks and equipment   | 5a             | X              |   |   |             |        |   |   |   |           |   |   |   |                         | 11/94<br>6/99         |
| ITU-T     | G.784   | Synchronous digital hierarchy (SDH) management   | 5a             | X              |   |   |             |        |   |   |   |           |   |   |   |                         | 1/94<br>6/99          |
| ITU-T     | G.810   | Definitions and terminology for synchronization networks   | 2a,b<br>5a,b   | X<br>X         |   |   |             |        |   |   |   |           |   |   |   |                         | 8/96                  |
| ITU-T     | G.821   | Error performance of 64 kbit/s international digital connections   | 3              | X              |   |   |             |        |   |   |   |           |   |   |   |                         |                       |
| ITU-T     | G.823   | The control of jitter and wander within digital networks which are based on the 2048 kbit/s hierarchy                                  | 5a,b           | X              |   |   |             |        |   |   |   |           |   |   |   |                         | 3/93                  |
| ITU-T     | G.824   | The control of jitter and wander within digital networks which are based on the 1544 kbit/s hierarchy                                  | 5a,b           | X              |   |   |             |        |   |   |   |           |   |   |   |                         | 3/93                  |
| ITU-T     | G.825   | The control of jitter and wander within digital networks which are based on the synchronous digital hierarchy (SDH)                    | 5a             | X              |   |   |             |        |   |   |   |           |   |   |   |                         | 3/93                  |
| ITU-T     | G.826   | Error performance for int'l digital connections greater than/equal to primary rate   | 3<br>5a,b      | X<br>X         |   |   |             |        |   |   |   |           |   |   |   |                         |                       |
| ITU-T     | G.827   | Availability parameters and objectives for path elements of international constant bit-rate digital paths at or above the primary rate | 5a,b           | X              |   |   |             |        |   |   |   |           |   |   |   |                         | 8/96                  |
| ITU-T     | G.829   | Error performance of SDH sections  | 5a             | X              |   |   |             |        |   |   |   |           |   |   |   |                         |                       |
| ITU-T     | G.841   | Types and characteristics of SDH network protection architectures  | 4              |                | X |   |             | X      |   |   |   |           |   |   |   |                         | 4/97<br>revision 2002 |

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|           |                        |  |            | G              | O | A | Q | F      | C | P | A | J         | H | B | W      |                         |                                     |
| ITU-T     | G.861                  | Principles and guidelines for the integration of satellite and radio systems in SDH transport networks               | 5b         |                |   | X |   |        |   |   |   |           |   |   |        |                         | 8/96<br>6/99                        |
| ITU-T     | G.901                  | General considerations on digital sections and digital line systems<br>Blue Book Fascicle III.5                      | 5a,b       | X              |   |   |   |        |   |   |   |           |   |   |        |                         | 11/88                               |
| ITU-T     | G.911                  | Parameters and calculation methodologies for reliability and availability of fibre optic systems                     | 4          | X              |   |   |   | X      |   |   |   |           |   |   |        |                         | 3/93<br>1997                        |
| ITU-T     | G.983.2                | ONT management and control interface specification for B-PON   | 4<br>7b    |                |   |   | X | X<br>X |   |   |   |           |   |   | X<br>X |                         | 07/2005<br><br>Erratum 1<br>06/2002 |
| ITU-T     | G.983.2<br>Amendment 1 | ONT management and control interface specification for B-PON<br>Amendment 1: Omnibus improvements for OMCI           | 4<br>7b    |                |   |   | X | X<br>X |   |   |   |           |   |   | X<br>X |                         | 03/2006                             |
| ITU-T     | G.983.2<br>Amendment 2 | ONT management and control interface specification for B-PON<br>Amendment 2  | 4<br>7b    |                |   |   | X | X<br>X |   |   |   |           |   |   | X<br>X |                         | 01/2007                             |
| ITU-T     | G.988                  | ONU management and control interface (OMCI) specification  | 4<br>7b    |                |   |   |   | X<br>X |   |   |   |           |   |   | X<br>X |                         | 10/2012                             |
| ITU-T     | G.988<br>Amendment 1   | ONU management and control interface (OMCI) Specification<br>Amendment 1: Maintenance                                | 4<br>7b    |                |   |   |   | X<br>X |   |   |   |           |   |   | X<br>X |                         | 05/2014                             |
| ITU-T     | G.Imp983.2             | Implementers' Guide for ITU-T Rec. G.983.2 (07/2005)<br>ONT management and control interface specification for B-PON | 4<br>7b    |                |   |   | X | X<br>X |   |   |   |           |   |   | X<br>X |                         | 02/2006                             |

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|           |                     |  |                        | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                      |
| ITU-T     | G.997.1             | Physical layer management for digital subscriber line transceivers             | 3<br>4<br>7a           |                |   |   | X |        |   | X |   | X         |   |   |   | 06/2012              |
| ITU-T     | G.997.1 Amendment 1 | Physical layer management for digital subscriber line transceivers Amendment 1 | 3<br>4<br>7a           |                |   |   | X |        |   | X |   | X         |   |   |   | 12/2012              |
| ITU-T     | G.997.1 Amendment 2 | Physical layer management for digital subscriber line transceivers Amendment 2 | 3<br>4<br>7a           |                |   |   | X |        |   | X |   | X         |   |   |   | 04/2013              |
| ITU-T     | G.997.1 Amendment 3 | Physical layer management for digital subscriber line transceivers Amendment 3 | 3<br>4<br>7a           |                |   |   | X |        |   | X |   | X         |   |   |   | 08/2013              |
| ITU-T     | G.8011.1/Y.1307.1   | Ethernet Private Line Service  |                        | X              |   |   |   | X      | X | X | X | X         |   |   |   | Consented 4/04       |
| ITU-T     | G.8012/Y.1308       | Ethernet UNI And Ethernet Over Transport NNI                                   |                        |                |   |   | X | X      | X | X | X | X         |   |   |   | Consented 4/04       |
| ITU-T     | H.310               | Broadband audiovisual communication systems and terminals                      | 4                      |                | X |   |   | X      |   |   |   | X         |   |   |   | 09/1998              |
| ITU-T     | H.320               | Narrow-band visual telephone systems and terminal equipment                    | 2b                     |                | X |   |   | X      |   | X |   | X         |   |   |   | 03/2004              |
| ITU-T     | H.323               | Packet-based multimedia communications systems                                 | 1b, 2b, 3, 4, 5b, 6, 7 |                | X |   |   | X      | X | X | X | X         |   |   |   | 07/2003              |
| ITU-T     | H.324               | Terminal for low bit-rate multimedia communication                             | 1b, 5b                 |                | X |   |   |        |   | X |   | X         |   |   |   | 03/2002              |
| ITU-T     | H.610               | Full-Service VDSL - System architecture and customer premises equipment        | 3                      |                | X |   |   |        |   | X |   | X         |   |   |   | 07/2003              |





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|           |               |  |                        | G                | O | A | Q | F      | C | P | A | J         | H | B | W |                         |
| ITU-T     | I.450 (Q.930) | ISDN user-network interface layer 3 - General aspects                            | 2a                     | X                |   |   |   |        |   |   |   |           |   |   |   | 3/93                    |
| ITU-T     | I.451 (Q.931) | ISDN user-network interface layer 3 specification for basic call control         | 2a                     | X                |   |   |   |        |   |   |   |           |   |   |   | 3/93                    |
| ITU-T     | I.4xx         | Accommodation of radio systems for interworking with fixed network               | 5a,b                   |                  |   |   | X |        |   |   |   | X         |   |   |   | TBD                     |
| ITU-T     | I.5xw         | Network Interworking between IMT-2000 and other types of Networks                | 5a,b                   |                  |   |   | X |        |   |   |   | X         |   |   |   | 1996                    |
| ITU-T     | I.571         | Connection of VSAT based Private networks to the public ISDN                     | 6                      | X                |   |   |   |        |   |   |   |           |   |   |   | 8/96                    |
| ITU-T     | I.572         | VSAT interconnection with the PSTN   | 6                      | X                |   |   |   |        |   |   |   |           |   |   |   | 3/00                    |
| ITU-T     | I.610         | B-ISDN operation and maintenance principles and functions                        | 2a,b<br>3<br>5a,b<br>6 | X<br>X<br>X<br>X |   |   |   |        |   |   |   |           |   |   |   |                         |
| ITU-T     | I.ps          | ATM protection switching,,   | 2b<br>5a,b             | X<br>X           |   |   |   |        |   |   |   |           |   |   |   |                         |
| ITU-T     | J.1           | Terminology for new services in television and sound programme transmission      | 1a,b<br>2a,b           | X<br>X           |   |   |   |        |   |   |   |           |   |   |   |                         |
| ITU-T     | J.111         | Network independent protocols for interactive services                           | all                    | X                |   |   |   |        |   |   |   |           |   |   |   | 1998                    |
| ITU-T     | J.125         | Link privacy for cable modem implementations                                     | 1b, 2b,<br>7           |                  |   |   | X | X      |   |   |   | X         |   |   | X | 12/2007                 |
| ITU-T     | J.197         | High level requirements for a digital rights management bridge to a Home Network | 1b, 2b,<br>7           |                  |   |   | X |        | X | X |   |           |   |   |   | November 2005           |
| ITU-T     | J.94          | Service information for digital broadcasting in cable television systems         | all                    |                  |   |   |   |        | X |   |   |           |   |   |   | Determined<br>1998      |
| ITU-T     | J.213         | Layer 2 Virtual Private Networks for IP Cable Modem Systems”                     | 1b, 2b,<br>7           |                  |   |   | X |        | X |   |   |           |   |   | X | October 2006            |

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|           |           |   |                  | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |
| ITU-T     | J.214     | Cable modem TDM emulation interface   | 1b, 2b, 7        | X              |   |   | X |        | X |   |   | X         |   |   |   | 7/2007                  |
| ITU-T     | J.218     | Cable modem IPv4 and IPv6 eRouter specification   | 1b, 2b, 7        | X              |   |   | X |        | X |   |   | X         |   |   |   | 7/2007                  |
| ITU-T     | J.222.3   | Third-generation transmission systems for interactive cable television services - IP cable modems: Security services                | 1b, 2b, 7        | X              |   |   |   | X      | X |   |   | X         | X |   |   | 11/2007                 |
| ITU-T     | J.700 rev | IPTV service requirements and framework for secondary distribution  | 1, 4, 7          | X              |   | X |   | X      | X |   |   | X         | X |   |   | AAP consent Oct, 2009   |
| ITU-T     | K.15      | Protection of remote-feeding systems and line repeaters against lightning and interference from neighboring electricity lines       | 1a,2a, 3,5a,6, 7 | X              |   |   |   |        |   | X |   |           |   |   |   | 12/72                   |
| ITU-T     | K.17      | Tests on power-fed repeaters using solid-state devices in order to check the arrangements for protection from external interference | 1a,2a, 3,5a,6, 7 | X              |   |   |   |        | X |   |   |           |   |   |   | 11/88                   |
| ITU-T     | K.22      | Overvoltage resistibility of equipment connected to an ISDN T/S bus   | 1a,2a, 3,5a,6, 7 | X              |   |   |   |        |   | X |   |           |   |   |   | 5/95                    |
| ITU-T     | K.23      | Types of induced noise and description of noise voltage parameters for ISDN basic user networks                                     | 1a,2a, 5a,6,7    | X              |   |   |   |        |   | X |   |           |   |   |   | 11/88                   |
| ITU-T     | K.25      | Protection of optical fibre cables  | 4                | X              |   |   |   | X      |   |   |   |           |   |   |   | 5/96                    |
| ITU-T     | K.27      | Bonding configurations and earthing inside a telecommunication building<br>Q4/5 states that this is valid for UNI and NNI           | all              | X              |   |   |   |        |   |   |   |           |   |   |   | 05/96<br>under revision |
| ITU-T     | K.31      | Bonding configurations and earthing of telecommunication installations inside a subscriber's building                               | all              | X              |   |   |   | X      | X | X | X |           |   |   |   | 3/93                    |

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|           |              |  |                | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |
| ITU-T     | K.32         | Immunity requirements and test methods for electrostatic discharge to telecommunication equipment - Generic EMC Recommendation             | all            | X              |   |   |   | X      | X | X | X |           |   |   |   | 5/95                    |
| ITU-T     | K.34         | Classification of electromagnetic environmental conditions for telecommunications equipment - Fast transient and radio frequency phenomena | all            | X              |   |   |   | X      | X | X | X |           |   |   |   | 5/96                    |
| ITU-T     | K.35         | Bonding configurations and earthing at remote electronic sites   | all            | X              |   |   |   | X      | X | X | X |           |   |   |   | 5/96                    |
| ITU-T     | K.38         | Radiated emission test procedure for physically large systems  | all            | X              |   |   |   | X      | X | X | X |           |   |   |   | 10/96                   |
| ITU-T     | K.43         | Immunity requirements for telecommunication equipment  | all            |                |   |   |   |        |   |   |   |           |   |   |   | 5/98                    |
| ITU-T     | K.50 (K.sov) | Safe limits of operating voltages and currents for telecommunication systems powered over the network                                      | 1a,2a,3,5a,6,7 | X              |   |   |   |        |   | X |   |           |   |   |   | determined 1999         |
| ITU-T     | K.51         | Safety criteria for telecommunication equipment  | all            | X              |   |   |   |        |   |   |   |           |   |   |   | determined 1999         |
| ITU-T     | K.coax       | Risk assessment and protection of coaxial cables distribution network against lightning  | 1a,1b,2a,2b,5a | X              |   |   |   |        | X |   |   |           |   |   |   | (2000)                  |
| ITU-T     | K.pf         | Product family EMC requirements for each telecommunication network equipment   | all            | X              |   |   |   | X      | X | X | X |           |   |   |   | (2000)                  |
| ITU-T     | K.ran        | Resistibility of access network transmission equipment to overvoltages and overcurrents  | all            | X              |   |   |   | X      | X | X | X |           |   |   |   | (2000)                  |
| ITU-T     | K.res        | Resistibility of telecommunication equipment to overvoltages and overcurrents  | all            | X              |   |   |   | X      | X | X | X |           |   |   |   | (2000)                  |
| ITU-T     | L.10         | Optical fibre cables for duct and tunnel application   | 1,2,3,4,7      | X              |   |   |   | X      |   |   |   | X         | X | X | X | December 2002           |

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|           |        |   |               | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |
| ITU-T     | L.12   | Optical fibre joints  | 1,2,3,4<br>7  | X              |   |   |   | X      |   |   |   | X         | X | X | X | May 2000                |
| ITU-T     | L.13   | Performance requirements for passive optical nodes:<br>Sealed closures for outdoor environments             | 1,2,3,4<br>,7 |                | X |   |   | X      |   |   |   | X         | X | X | X | April 2003              |
| ITU-T     | L.15   | Optical local distribution networks - Factors to be considered for their construction                       | 1,2,3,4<br>7  |                |   | X |   | X      |   |   |   | X         |   |   |   | March 1993              |
| ITU-T     | L.17   | Implementation of connecting customers into the public switched telephone network (PSTN) via optical fibres | 1,2,3,4<br>7  |                |   | X |   | X      |   |   |   | X         |   |   |   | June 1995               |
| ITU-T     | L.19   | Multi-pair copper network cable supporting shared multiple services such as POTS, ISDN and xDSL             | 1,2,3,4<br>7  |                |   | X |   |        |   | X |   | X         |   |   |   | November 2003           |
| ITU-T     | L.25   | Optical fibre cable network maintenance   | 1,2,3,4<br>7  |                |   |   | X | X      |   |   |   | X         | X | X | X | October 1996            |
| ITU-T     | L.26   | Optical fibre cables for aerial application   | 1,2,3,4<br>7  | X              |   |   |   | X      |   |   |   | X         | X | X | X | December 2002           |
| ITU-T     | L.31   | Optical fibre attenuators   | 1,2,3,4<br>7  | X              |   |   |   | X      |   |   |   | X         | X | X | X | October 1996            |
| ITU-T     | L.35   | Installation of optical fibre cables in the access network  | 1,2,3,4<br>7  | X              |   |   |   | X      |   |   |   | X         |   |   |   | October 1998            |
| ITU-T     | L.36   | Single mode fibre optic connectors  | 1,2,3,4<br>7  | X              |   |   |   | X      |   |   |   | X         | X | X | X | October 1998            |

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|           |        |   |              | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |
| ITU-T     | L.37   | Fibre optic (non-wavelength selective) branching devices  | 1,2,3,4<br>7 | X              |   |   |   | X      |   |   |   | X         | X | X |   | October 1998            |
| ITU-T     | L.40   | Optical fibre outside plant maintenance support, monitoring and testing system                      | 1,2,3,4<br>7 |                |   |   | X | X      |   |   |   | X         | X | X | X | October 2000            |
| ITU-T     | L.41   | Maintenance wavelength on fibres carrying signals   | 1,2,3,4<br>7 |                |   |   | X | X      |   |   |   | X         | X | X | X | May 2000                |
| ITU-T     | L.42   | Extending optical fibre solutions into the access network   | 1,2,3,4<br>7 |                |   | X |   | X      |   |   |   | X         |   |   |   | May 2003                |
| ITU-T     | L.43   | Optical fibre cables for buried application   | 1,2,3,4<br>7 | X              |   |   |   | X      |   |   |   | X         | X | X |   | December 2002           |
| ITU-T     | L.44   | Electric power supply for equipment installed as outside plant                                      | 1,2,3,4<br>7 | X              |   |   |   | X      |   | X |   | X         |   |   |   | October 2000            |
| ITU-T     | L.47   | Access facilities using hybrid fibre/copper networks  | 1,2,3,4<br>7 |                |   | X |   | X      | X |   |   | X         |   |   |   | October 2000            |
| ITU-T     | L.48   | Mini-trench installation technique  | 1,2,3,4<br>7 | X              |   |   |   | X      |   |   |   | X         | X | X |   | March 2003              |
| ITU-T     | L.49   | Micro-trench installation technique   | 1,2,3,4<br>7 | X              |   |   |   | X      |   |   |   | X         | X | X | X | March 2003              |
| ITU-T     | L.50   | Requirements for passive optical nodes: Optical distribution frames for central office environments | 1,2,3,4<br>7 | X              |   |   |   | X      |   |   |   | X         | X | X |   | November 2003           |

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**Interface:** J= User/Access Network; H= Service Node/Access Network; B= Direct Server/Access Network; W= User/Wireless Access Network

| Stds Body | Number | Title   | Scen. Ref.   | Classification |   |   |   | Medium |   |   |   | Interface |   |   |   | Pub Date/<br>Prop. Rev.   |
|-----------|--------|---|--------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---|---------------------------|
|           |        |   |              | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                           |
| ITU-T     | L.51   | Passive node elements for fibre optic networks - General principles and definitions for characterisation and performance evaluation | 1,2,3,4<br>7 |                | X |   |   | X      |   |   |   | X         | X | X | X | April 2003                |
| ITU-T     | L.52   | Deployment of passive optical network (PON)   | 1,2,3,4<br>7 |                |   | X |   | X      |   |   |   | X         |   |   |   | May 2003                  |
| ITU-T     | L.53   | Optical fibre maintenance criteria for access networks  | 1,2,3,4<br>7 |                |   |   | X | X      |   |   |   | X         | X | X |   | May 2003                  |
| ITU-T     | L.57   | Air-assisted installation of optical fibre cables   | 1,2,3,4<br>7 | X              |   |   |   | X      |   |   |   | X         | X | X |   | May 2003                  |
| ITU-T     | L.58   | Optical fibre cables: Special needs for access networks   | 1,2,3,4<br>7 |                | X |   |   | X      |   |   |   | X         |   |   |   | March 2004                |
| ITU-T     | L.59   | Optical fibre cables for indoor application   | 1,2,3,4<br>7 | X              |   |   |   | X      |   |   |   | X         | X | X | X | Consent<br>September 2004 |
| ITU-T     | L.60   | Construction of optical/metallic hybrid cables  | 1,2,3,4<br>7 | X              |   |   |   | X      |   |   |   | X         | X | X | X | September 2004            |
| ITU-T     | L.62   | Practical aspects of unbundling services by multiple operators in copper access networks  | 1,2,3,4<br>7 |                |   |   | X |        |   | X |   | X         |   |   |   | September 2004            |
| ITU-T     | L.63   | Safety procedures for outdoor installations   | 1,2,3,4<br>7 |                | X |   |   | X      | X | X |   | X         | X | X | X | Consent<br>October 2004   |
| ITU-T     | L.65   | Optical fibre distribution of access networks   | 4, 7         |                |   | X |   | X      |   |   |   |           | X |   |   | December 2006             |
| ITU-T     | L.66   | Optical fibre cable maintenance criteria for in-service fibre testing in access networks  | 4, 7         |                | X | X |   | X      |   |   |   |           | X |   |   | May 2007                  |
| ITU-T     | L.67   | Small count optical fibre cables for indoor applications  | 4,7          | X              |   |   |   | X      |   |   |   | X         |   |   |   | October 2006              |

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|-----------|----------------|---|---------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---|-------------------------|
|           |                |   |               | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |
| ITU-T     | L.68           | Optical fibre cable maintenance support, monitoring and testing system for optical fibre cable networks carrying high total optical power | 4,7           | X              |   |   |   | X      |   |   |   | X         | X | X |   | 10/2007                 |
| ITU-T     | L.75           | Test, acceptance and maintenance methods of copper subscriber pairs   | 1, 2, 3, 7    | X              |   |   |   |        |   | X |   | X         |   |   |   | 5/2008                  |
| ITU-T     | L.76           | Copper loop requirements for various technologies including indoor and structured cabling   | 1, 2, 3, 7    | X              |   |   |   |        |   | X |   | X         |   |   |   | 5/2008                  |
| ITU-T     | L.77           | Installation of cables in sewer ducts   | 1, 2, 3, 4, 7 | X              |   |   |   | X      | X | X |   | X         | X | X |   | 5/2008                  |
| ITU-T     | L.78           | Optical fibre cable construction for sewer duct applications  | 4             | X              |   |   |   | X      |   |   |   | X         | X | X |   | 5/2008                  |
| ITU-T     | L.79           | Optical fibre cable elements for microduct blowing-installation application   | 4             | X              |   |   |   | X      |   |   |   | X         | X | X |   | 5/2008                  |
| ITU-T     | M31XX          | IMT-2000 Management Information   | 5a,b          |                |   |   | X |        |   |   |   | X         |   |   |   |                         |
| ITU-T     | M.3210.1       | TMN management services for IMT-2000 security management  | 5ab           |                |   |   | X |        |   |   |   | X         |   |   |   | January 2001            |
| ITU-T     | M.3211.1       | Fault and Performance Management of ISDN Access   |               |                |   |   | X |        |   |   |   |           |   |   |   | May 1996                |
| ITU-T     | M3400 (Revise) | TMN Management Function Sets (IMT-2000 related)   | 5a,b          |                |   |   | X |        |   |   |   | X         |   |   |   |                         |
| ITU-T     | Q.824 series   | Stages 2 and 3 description for Q3 interfaces  |               |                |   |   | X |        |   |   |   |           |   |   |   | October 1995            |
| ITU-T     | Q.831.1        | Access Management for V5  |               |                |   |   | X |        |   |   |   |           | X |   |   | January 2000            |
| ITU-T     | Q.832.1        | VB5.1 Management  |               |                |   |   | X |        |   |   |   |           | X |   |   | June 1998               |
| ITU-T     | Q.832.2        | VB5.2 Management  |               |                |   |   | X |        |   |   |   |           | X |   |   | March 1999              |
| ITU-T     | Q.833.1        | ADSL network element management – CMIP model  |               |                |   |   | X |        |   |   |   |           | X |   |   | January 2001            |
| ITU-T     | Q.833.2        | HFC network management  |               |                |   |   | X |        |   |   |   |           | X |   |   | approval 3/2001         |
| ITU-T     | Q.834.1        | ATM-PON requirements and managed entities for the network and network element views   | 4             |                |   |   | X | X      |   |   |   | X         |   |   |   | June 2004               |



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|-----------|---|---|------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---|---|
|           |   |   |            | G              | O | A | Q | F      | C | P | A | J         | H | B | W |   |
| ITU-T     | Q.834.3                                 | A UML description for management interface requirements for Broadband Passive Optical Networks  | 4          |                |   |   | X | X      |   |   |   | X         |   |   |   | June 2004                                 |
| ITU-T     | Q.834.4<br>Q834.4 cor.1<br>Q834.4 cor.2 | A CORBA interface specifications for Broadband Passive Optical Networks based on UML interface requirements                             | 4          |                |   |   | X | X      |   |   |   | X         |   |   |   | July 2003<br>January 2004<br>January 2004 |
| ITU-T     | Q.837.1                                 | SDH-DLC functional requirements for the network and network element views   | 4          |                |   |   | X | X      |   |   |   | X         |   |   |   | February 2004                             |
| ITU-T     | Q.837.2                                 | Use Case Descriptions and Analysis for SDH-DLC Network Level Management Interface   | 4          |                |   |   | X | X      |   |   |   | X         |   |   |   | May 2008                                  |
| ITU-T     | Q.838.1                                 | Requirements and analysis for the management interface of Ethernet passive optical networks (EPON)                                      | 4          |                |   |   | X | X      |   |   |   | X         |   |   |   | October 2004                              |
| ITU-T     | Q.839.1                                 | Frame Relay management  |            |                |   |   |   |        |   |   |   |           |   |   |   |   |
| ITU-T     | Q.922                                   | ISDN data link layer specification for frame mode bearer services   | 2a         | X              |   |   |   |        |   |   |   |           |   |   |   | 2/92                                      |
| ITU-T     | Y.1001                                  | IP Framework – A framework for convergence of telecommunications network and IP network technologies                                    | all        | X              |   |   |   |        |   |   |   |           |   |   |   | November 2000                             |
| ITU-T     | Y.1231                                  | IP access network architecture  | all        | X              |   |   |   |        |   |   |   |           |   |   |   | November 2000                             |
| ITU-T     | Y.1401                                  | Principles of interworking  | all        | X              |   |   |   |        |   |   |   |           |   |   |   | February 2008                             |
| ITU-T     | Y.1541                                  | Network performance objectives for IP-based services  | all        | X              |   |   |   |        |   |   |   |           |   |   |   | 12/2011                                   |
| ITU-T     | Y.1541<br>Amendment 1                   | Network performance objectives for IP-based services<br>Amendment 1: New Appendix XII –<br>Considerations for low speed access networks | all        | X              |   |   |   |        |   |   |   |           |   |   |   | 12/2013                                   |
| REA       | Bull. 1753F-208                         | Specification for Filled Telephone Cables with Expanded Insulation  | 2a,<br>2b  |                |   |   |   |        | X | X |   |           |   |   |   | June-93                                   |
| REA       | Bull. 345-29. PE-38                     | Specification for Self-Supporting Cable   | 2a,<br>2b  |                |   |   |   |        | X | X |   |           |   |   |   | Feb.-82                                   |

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|--------------|---------------------|--|---------------|----------------|---|---|---|--------|---|---|---|-----------|---|---|---|-------------------------|
|              |                     |  |               | G              | O | A | Q | F      | C | P | A | J         | H | B | W |                         |
| REA          | Bull. 345-67. PE-39 | Specification for Filled Telephone Cables                | 2a,<br>2b     |                |   |   |   |        | X | X |   |           |   |   |   | Jan.-87                 |
| REA          | Bull. 345-86. PE-86 | Specification for Filled Buried Service Wire             | 2a,<br>2b     |                |   |   |   |        | X | X |   |           |   |   |   | Oct.-82                 |
| REA          | Bull. 345-87. PE-87 | Specification for Terminating (TIP) Cables               | 2a,<br>2b     |                |   |   |   |        | X | X |   |           |   |   |   | Dec.-83                 |
| REA,         | Bull. 345-13. PE-22 | Specification for Aerial and Underground Telephone Cable | 2a,<br>2b     |                |   |   |   |        | X | X |   |           |   |   |   | Jan.-83                 |
| REA,         | Bull. 345-36. PE-7  | Specification for Parallel Conductor Drop Wire           | 2a,<br>2b     |                |   |   |   |        | X | X |   |           |   |   |   | Jan.-83                 |

### Annex 3, List of Abbreviations

|         |   |
|---------|---|
| AAL     | ATM Adaptive Layer                                  |
| ADPCM   | Adaptive Differential Pulse Code Modulation         |
| ADSL    | Asymmetric Digital Subscriber Line                  |
| AF      | Adaptation Function                                 |
| AFE     | Analogue Front End                                  |
| AI      | Adaptation-Interface                                |
| AMPS    | Advanced Mobile Phone System                        |
| AN      | Access Network                                      |
| ANAI    | Access Network Architecture and Interfaces          |
| ANI     | Access Network Interface                            |
| AN-SMF  | Access Network System Management Function           |
| ANT     | Access Network Transport                            |
| ANT RM  | Access Network Transport Reference Model            |
| ANT SMF | Access Network Transport System Management Function |
| AP      | Access Point  |
| API     | Application Programming Interface                   |
| ATM     | Asynchronous Transfer Mode                          |
| ATMF    | ATM Forum   |
| ATTM    | Access Terminals, Transmission and Multiplexing     |
| ATU     | ADSL Transceiver Unit                               |
| ATU-C   | ADSL Transceiver Unit – Central Office End          |
| ATU-R   | ADSL Transceiver Unit – Remote End                  |
| AU      | Adaptation Unit                                     |
| B-ISDN  | Broadband ISDN                                      |
| B-ISUP  | Broadband Integrated Service User Part              |
| BA      | Basic Access  |
| BC      | Bearer Channel                                      |
| BM      | Business Management layer                           |
| BRAN    | Broadband Radio Access Networks                     |

|        |  |
|--------|--|
| BS     | Base Station   |
| BSC    | Base Station Controller  |
| BSS    | Base Station System  |
| BTS    | Base Transceiver Station   |
| BWA    | Broadband Wireless Access  |
| CAP    | Carrierless Amplitude Modulation<br>Carrier-less Amplitude and Phase |
| CATV   | Cable Television   |
| CATV   | Community Antenna TV   |
| CBDS   | Connectionless Broadband Data Service                                |
| CD     | Code Division  |
| CDMA   | Code Division Multiple Access  |
| CDPD   | Cellular Digital Packet Data   |
| CE     | Circuit Emulator   |
| CE     | Common Equipment   |
| Cellco | Cellular company   |
| CELP   | Code Excited Linear Prediction                                       |
| CF     | Core Function  |
| CLNAP  | Connectionless Network Access Protocol                               |
| CN     | Core Network   |
| CO     | Central Office   |
| CORBA  | Common Object Request Broker Architecture                            |
| CP     | Customer Premises  |
| CPE    | Customer Premises Equipment  |
| CPN    | Customer Premises Network  |
| CSU    | Channel Service Unit   |
| CT     | Cordless Telephone   |
| CT2    | Cordless Telephone 2nd generation                                    |
| CTM    | Cordless Terminal Mobility   |
| CTR    | Common Technical Regulation  |
| D-AMPS | Digital Advanced Mobile Phone System                                 |
| DAB    | Digital Audio Broadcasting   |
| DCA    | Dynamic Channel Allocation   |

|         |   |
|---------|---|
| DCE     | Data Circuit Terminating Equipment                                    |
| DCME    | Digital Circuit Multiplication Equipment                              |
| DCN     | Data Communication Network  |
| DCS     | Digital Cellular System   |
| DDI     | Drop Distribution Interface   |
| DECT    | Digital Enhanced Cordless Telecommunications                          |
| DI      | Drop Distribution Interface   |
| DLC     | Digital Loop Carrier  |
| DLL     | Digital Local Line  |
| DMT     | Discrete Multitone<br>Discrete Multi-tone Carrier                     |
| DQDB    | Distributed Queue Dual Bus  |
| DRRS    | Digital Radio Relay Systems   |
| DRU     | Dual-mode Radio Unit  |
| DS      | (access) Digital Section  |
| DSB     | Digital Satellite Broadcast   |
| DS-CDMA | Digital System Code Division Multiple Access                          |
| DSL     | Digital Subscriber Line   |
| DSP     | Digital Signal Processing   |
| DSS1    | Digital Subscriber Signaling 1  |
| DSU     | Data Service Unit   |
| DTE     | Data Terminal Equipment   |
| DTMF    | Dual Tone Multi Frequency   |
| DVB     | Digital Video Broadcasting  |
| DXI     | Data exchange Interface   |
| EIA/TIA | Electronic Industry Alliance/Telecommunications Industry Association) |
| EII     | European Information Infrastructure                                   |
| EMS     | Element Management System   |
| ENG/OB  | Electronic News Gathering/Outside Broadcast                           |
| ESF     | Extended Superframe   |
| ET      | Exchange Termination  |
| FCS     | Frame Check Sequence  |
| FDD     | Frequency Division Duplex   |

|                 |   |
|-----------------|---|
| FDDI            | Fiber Distributed Data Interface                                      |
| FDM             | Frequency-Division Multiplexing                                       |
| FDMA            | Frequency Division Multiple Access                                    |
| FDX             | Full – Duplex   |
| FEC             | Forward Error Connection<br>Forward Error Control                     |
| FPLMTS<br>(old) | Future Public Land Mobile Telecommunication System                    |
| FR              | Frame Relay   |
| FSAN            | Full Service Access Networks  |
| FTTB            | Fiber to the Building   |
| FTTC            | Fiber to the Curb   |
| FTTCab          | Fiber to the Cabinet  |
| FTTH            | Fiber to the Home   |
| FWA             | Fixed Wireless Access   |
| GAP             | Generic Access Profile  |
| GII             | Global Information Infrastructure                                     |
| GK              | GateKeeper  |
| GMSK            | Gaussian Minimum Shift Keying   |
| GOS             | Grade of Service  |
| GPS             | Global Positioning System   |
| GSM             | Global System for Mobile communications<br>Global System for Mobility |
| HDLC            | High Level Data Link control  |
| HDSL            | High Speed Digital Subscriber Line                                    |
| HEC             | Header Error Check  |
| HFC             | Hybrid Fiber Coax   |
| HIPERLAN        | High Performance Radio Local Area Network                             |
| HSD             | High Speed Data Channel   |
| HSSI            | High Speed Serial Interface   |
| IAB             | Internet Activity Board   |
| ICG             | Intersector Coordination Group  |
| ICP             | Intelligent Cellular Peripheral                                       |

|         |  |
|---------|--|
| ID code | Vendor identification code                       |
| IDCT    | Inverted Discrete Cosign Transform               |
| IDT     | International Digital Trunk                      |
| IMT     | International Mobile Telecommunication           |
| IN      | Intelligent Network                              |
| INI     | Inter-network Interface                          |
| IP      | Internet Protocol                                |
| IPDC    | IP Device Control                                |
| IPR     | Intellectual Property Rights                     |
| iptel   | Internet Protocol Telephony (IETF Working Group) |
| IRD     | Integrated Receiver Decoders                     |
| ISDN    | Integrated Services Digital Network              |
| ISDN-BA | ISDN basic access                                |
| ISUP    | ISDN User Part                                   |
| LAN     | Local Area Network                               |
| LATA    | Local Access Transport Area                      |
| LD-CELP | Low Delay CELP                                   |
| LE      | Local Exchange                                   |
| LLC     | Logical Link Control                             |
| LMCS    | Local Multipoint Communications System           |
| LMDS    | Local Multipoint Distribution Systems            |
| LOF     | Loss of Frame                                    |
| LS0 – 2 | DUPLEX bearer channel designators                |
| LSD     | Low Speed Data channel                           |
| LT      | Line Termination                                 |
| LTB     | Line Termination Box                             |
| LTU     | Line Termination Unit                            |
| MAC     | Medium Access Control                            |
| MAP     | Mobile Application Part                          |
| MCF     | Message Communication Function                   |
| MCS     | Multi-point Control Services (T.122)             |
| MCU     | Multi-point Control Unit                         |

|                    |  |
|--------------------|--|
| MD <sub>ANT</sub>  | Mediation Device ANT                         |
| MD <sub>SN</sub>   | Mediation Device SN                          |
| MDS                | Multipoint Distribution System               |
| MDSL               | Multi-rate Digital Subscriber Line           |
| MFAF               | MFA Forum                                    |
| MIB                | Management Information Base                  |
| MLP                | Multi-Layer Protocol                         |
| MMDS               | Multichannel Multipoint Distribution Systems |
| MMS                | Multimedia Messaging Service                 |
| MMUSIC             | Multiparty Multimedia Session Control (WG)   |
| MSC                | Mobile-services Switching Centre             |
| MSC                | Mobile Switching Centre                      |
| MSOH               | Multiplexer Section Overhead                 |
| MTM                | Maintenance Trunk Module                     |
| MUNI               | Mid-Range User Network Interface             |
| MVDS               | Multipoint Video Distribution System         |
| MWA                | Mobile Wireless Access                       |
| N-AMPS             | Narrow-Advanced Mobile Phone System          |
| N-ISDN             | Narrowband ISDN                              |
| NE                 | Network Element                              |
| NE                 | Network Element layer                        |
| NEF                | Network Element Function                     |
| NEF <sub>ANT</sub> | Network Element Function ANT                 |
| NEF <sub>SN</sub>  | Network Element Function SN                  |
| NEXT               | Near end crosstalk                           |
| NEM                | Network Element Management layer             |
| NM                 | Network Management layer                     |
| NIU                | Network Interface Unit                       |
| NLPID              | Network Layer Protocol Identifier            |
| NMS                | Network Management System                    |
| NNI                | Network Node Interface                       |
| NNI-A              | Network-to-Network-Interface Type A          |



|               |   |
|---------------|---|
| NNI-B         | Network-to-Network-Interface Type B   |
| NSS           | Network Switching System  |
| NT<br>(NTU)   | Network Terminating Unit<br>Network Termination<br>Network Termination Unit                       |
| NT1           | Network Termination 1   |
| NT2           | Network Termination 2   |
| NWA           | Nomadic Wireless Access   |
| OAM<br>(OA&M) | Operation, Administration and Maintenance, Operation and Maintenance (used in ISDN related Recs.) |
| OAM&P         | Operations, Administration, Maintenance and Provisioning  |
| OAN           | Optical Access Networks   |
| OCP           | Operations Control Point  |
| ODF           | Optical Distribution Frame  |
| ODN           | Optical Distribution Network  |
| OLT           | Optical Line Termination  |
| OMG           | Object Management Group   |
| ON            | Optical Network   |
| ONE           | Optical Network Element   |
| ONP           | Open Network Provision  |
| ONU           | Optical Network Unit  |
| OPI           | On-Premise-Interface  |
| OPTIS         | Overlapped PAM Transmission with Interlocking Spectra   |
| OS            | Operation System  |
| OSF           | Operations System Function  |
| PACS          | Personal Access Communications System   |
| PAI           | Premises-Attachment-Interface   |
| PBX           | Private Branch Exchange   |
| PC            | Personal Computer   |
| PCM           | Pulse Code Modulation   |
| PCME          | Packet Circuit Multiplication Equipment   |
| PCS           | Personal Communications Service   |
| PDH           | Packet Digital Hierarchy  |

|                      |   |
|----------------------|---|
| PDH                  | Plesiochronous Digital Hierarchy                      |
| PDTC                 | Peripheral Digital Trunk Controller                   |
| PHS                  | Personal Handphone System                             |
| PHY                  | Physical Layer  |
| PICS                 | Protocol Implementation Conformance Statement         |
| PINT                 | PSTN Interworking (IETF)                              |
| PIXIT                | Protocol Implementation eXtra Information for Testing |
| PL                   | Path Layer  |
| PLCP                 | Physical Level Convergence Protocol                   |
| PMD                  | Physical Media Dependent (sublayer)                   |
| PMP                  | Point to Multipoint microwave radio                   |
| PMS-TC               | Physical Media Specific – Transmission Convergence    |
| PON                  | Passive Optical Network                               |
| POP                  | Point of Presence                                     |
| POTS                 | Plain Old Telephony Service                           |
| PRA                  | Primary Rate Access                                   |
| PRBS                 | Pseudo-Random Bit Sequence                            |
| PSD                  | Power Spectral Density                                |
| PSTN                 | Public Switched Telephone Network                     |
| PTM                  | Package Trunk Module                                  |
| PTT                  | Postal, Telephone and Telegraph                       |
| q                    | Reference point                                       |
| Q                    | Interface   |
| QAM                  | Quadrature Amplitude Modulation                       |
| Q <sub>ANT</sub> -L1 | ANT Network Management Interface – Level 1            |
| Q <sub>ANT</sub> -L2 | ANT Network Management Interface – Level 2            |
| QOS                  | Quality of Service                                    |
| QPSK                 | Quadrature Phase Shift Keying                         |
| QX                   | Network Management Interface                          |
| RAP                  | Radio local loop Access Profile                       |
| RBB                  | Residential Broadband                                 |
| RDC                  | Remote Device Control                                 |

|         |  |
|---------|--|
| REG     | Regenerator  |
| RF      | Radio Frequency  |
| RFC     | Designation for an Internet Standard                   |
| RITL    | Radio in the Loop                                      |
| RLL     | Radio Local Loop                                       |
| RMS     | Root Mean Squared                                      |
| RSOH    | Regenerator Section Overhead                           |
| RSU     | Remote Switch Unit                                     |
| RT      | Remote Terminal  |
| RTP     | Real Time Transport Protocol                           |
| RTTH    | Radio to the Home                                      |
| SAP     | Service Access Point                                   |
| SAR     | Segmentation and Reassembly                            |
| SAT     | Satellite  |
| SBS     | Selector Bank Subsystem                                |
| SCN     | Switched Circuit Network                               |
| SCR     | Selective Call Rejection                               |
| SD      | Starting Delimiter                                     |
| SDH     | Synchronous Digital Hierarchy                          |
| SDL     | Specification and Description Language                 |
| SDSL    | Symmetrical high bit rate Digital Subscriber Line      |
| SDO     | Standards Development Organization                     |
| SECEDED | single error correction, double error detection (code) |
| SG      | Study Group (ITU, CCITT)                               |
| SLP     | Service Location Protocol                              |
| SM      | Service Module   |
| SMATV   | Satellite Master Antenna TeleVision                    |
| SMDS    | Switched multi-megabit data service                    |
| SMF     | System Management Function                             |
| SMG     | Special Mobile Group                                   |
| SMS     | Short Message Service                                  |
| SN      | Service Node   |

|        |   |
|--------|---|
| SNI    | Service Node Interface  |
| SNMP   | Simple Network Management Protocol  |
| SN-SMF | Service Node System Management Function   |
| SOHO   | Small Office Home Office  |
| SPF    | Service Port Function   |
| SPP    | Service Provisioning Platform   |
| SS7    | Signalling System No.7  |
| SSCOP  | Service Specific Connection-Oriented Protocol   |
| SSCS   | Service Specific Functions sublayer   |
| STC    | ETSI Technical Sub-Committee  |
| STM    | Service Trunk Module  |
| STM    | Synchronous Transfer Mode   |
| STP    | Shielded Twisted Pair   |
| STU    | Set Top Unit  |
| SUD    | Single Use Device   |
| T1/E1  | Primary rate transmission system  |
| T/S    | Interface(s) between ADSL network termination and Customer Installation or home network |
| TA     | Terminal Adopter<br>Terminal Adapter  |
| TAB    | Tape Automated Bonding  |
| TACS   | Total Access Communications System  |
| TBR    | Technical Basis for Regulation (ETSI standard)  |
| TC     | Technical Committee   |
| TC     | Transmission Convergence (sublayer)   |
| TCM    | Time-Compressed Modulation<br>Time Compressed Multiplex                                 |
| TCP    | Termination Connection Point  |
| TCP    | Transmission Control Protocol   |
| TCP/IP | Transmission Control Protocol/ Internet Protocol  |
| TDD    | Time Division Duplex  |
| TDM    | Time Division Multiplex   |
| TDMA   | Time Division Multiple Access   |

|             |  |
|-------------|--|
| TE          | Terminal Equipment   |
| TF          | Transport Function   |
| TFU         | Timing Frequency Unit  |
| TII         | Transport Independent Interface                                |
| TINA        | Telecommunications Information Networking Architecture         |
| TM          | Transmission and Multiplexing                                  |
| TM          | Trunk Module   |
| TM<br>(TML) | Transmission Media Layer                                       |
| TMN         | Telecommunications Management Network                          |
| TV          | Television   |
| UMTS        | Universal Mobile Telecommunications System                     |
| UNI         | User Network Interface   |
| UPC         | Usage Parameter Control  |
| UPF         | User Port Function   |
| UTP         | Unshielded Twisted Pair  |
| VC          | Virtual Channel  |
| VC          | Virtual Container  |
| VDSL        | Very high rate Digital Subscriber Line<br>Very high speed ADSL |
| VLR         | Visitor Location Register                                      |
| VOP         |  |
| VP          | Virtual Path   |
| VPI         | Virtual Path Identifier  |
| VPN         | Virtual Private Network  |
| VSF         | Vestigial SideBand   |
| WBS         | Wireless Base Station  |
| WCTX        | Wireless Centrex   |
| WDM         | Wavelength Division Multiplexing                               |
| WG          | Working Group  |
| WKTS        | Wireless Key Telephone System                                  |
| WL          | Wireless Loop  |
| WLL         | Wireless Local Loop  |

|                  |  |
|------------------|--|
| WPBX             | Wireless Private Branch Exchange   |
| WT               | Wireless Terminal  |
| X                | Interface  |
| xDSL             | Any of the various types of Digital Subscriber Lines (DSL)<br>All the different Digital Subscriber Lines |
| XNI              | Customer to Network Interface<br>Access Network Interface  |
| XTU              | XDSL Transceiver Unit  |
| xTU-C<br>(XTU-C) | xDSL central site terminal unit<br>XDSL Transceiver Unit – Central Office End                            |
| xTU-R<br>(XTU-R) | xDSL remote terminal unit<br>XDSL Transceiver Unit – Remote End  |
| 2B1Q             | 2 Binary 1 Quaternary  |

## **Annex 4, Rearrangement of the list of standards (Annex 2)**

This is the start to make the huge Standardization List in ANNEX 2 more manageable, to concentrate on primary documents and to prepare for the Web presentation.

### **Standards from ITU-T, ETSI and ANSI**

#### **ITU-R Radio Interface Recommendations**

Latest revision: June 2011

| <b>Radio Interface Recommendations</b> |  |                |
|--|--|----------------|
| <b>Rec.</b>                            | <b>Title</b>   | <b>Version</b> |
| ITU-R M.1457-10                        | “Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-2000 (IMT 2000)        | June 2011      |
| ITU-R M.2012                           | Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications Advanced (IMT-Advanced) | January 2012   |

#### **ITU-T xDSL Recommendations**

Latest revision: September 2001

| <b>Transceiver Recommendations</b> |              |                |
|------------------------------------|--------------|----------------|
| <b>Rec.</b>                        | <b>Title</b> | <b>Version</b> |

|   |  |                                |
|---|--|--------------------------------|
| G.991.1   | High bit rate digital subscriber line (HDSL) transceivers  | 10/98                          |
| G.991.2   | Single pair high bitrate digital subscriber line transceivers (SHDSL)<br>(a draft Implementors Guide can be found as TD17(PLEN)Oct/2001) | 02/01<br>prepublished          |
| G.992.1<br><br>Annex H<br><br>current revision<br>g.dmt.bis | Asymmetric digital subscriber line transceivers (ADSL)<br><br>Operating in an ISDN Cable Binder  | 06/99<br>10/00<br>prepublished |
| G.992.2<br>current revision<br>g.lite.bis                   | Splitterless asymmetric digital subscriber line transceivers   | 06/99<br><br>for consent 10/01 |
| G.993.1   | Very high bit rate symmetric digital subscriber line transceivers (VDSL)   | for consent 10/01              |

| <b>Related Recommendations</b> |  |                 |
|--------------------------------|--|-----------------|
| <b>Rec.</b>                    | <b>Title</b>   | <b>Approval</b> |
| G.994.1                        | Handshake procedures for digital subscriber line transceivers (G.hs) | 02/01, prepub.  |



|                                   |  |                   |
|-----------------------------------|--|-------------------|
| G.995.1                           | Overview of digital subscriber line Recommendations.                         | 02/01, prepub.    |
| G996.1 completion as g.test.ter   | Test procedures for digital subscriber line transceivers                     | 02/01, prepub.    |
| G.997.1 completion as g.ploam.bis | Physical layer management for digital subscriber line transceivers           | 6/99              |
| G.989 .1 g.pnt.f                  | Phoneline networking transceivers, foundation                                | consent 2/01      |
| G.998.2 g.pnt.plm                 | Phoneline networking transceivers, Payload format an link layer requirements | for consent 10/01 |
| G.voice                           | Transport of voice over xDSL systems   | draft, 08/01      |

## ETSI-xDSL-Standards

Latest revision: 21st September 2001

| <b>Standards</b> |              |                |                 |
|------------------|--------------|----------------|-----------------|
| <b>Rec.</b>      | <b>Title</b> | <b>Details</b> | <b>Approval</b> |

|   |   |   |                          |
|---|---|---|--------------------------|
| <p>TS 101 135</p>   | <p>Transmission and Multiplexing (TM); High bit-rate Digital Subscriber Line (HDSL) transmission systems on metallic local lines; HDSL core specification and applications for combined ISDN-BA and 2 048 kbit/s transmission</p> | <p>Combined ISDN-BA +2048 kbit/s. 1/2/3 pairs, 2B1Q, CAP (Carrierless Amplitude Modulation in Annex)</p>        | <p>V1.5.3 09/00</p>      |
| <p>TS 101 388<br/>Actual Version 1.2.1, to be approved 9/01: TS 101 388_1.2.1</p> | <p>Asymmetrical digital subscriber line (ADSL) European specific requirements [ANSI T1.413 modified]</p>  | <p>Contains just European topics, test loops, - requirements for n x2048 kbit/s (n=1,2,3)</p>                   | <p>11/98</p>             |
| <p>TS 101 524</p>   | <p>Symmetrical digital subscriber line (SDSL) (combined Part1 and 2)</p>  | <p>Variable payload bitrates (192 kbit/s up to 2 312 kbit/s), PAM</p>   | <p>under publication</p> |
| <p>TS 101 270-1</p>   | <p>Very high speed digital subscriber line, Part 1: functional requirements</p>   | <p>Operation: symmetric: 28 Mbit/s up/down; asymmetric: 23 Mbit/s down, 4 Mbit/s up.</p>                        | <p>10/99 approved</p>    |
| <p>TS 101 270-2</p>   | <p>Very high speed digital subscriber line, Part 2: Transceiver specification</p>   | <p>Single- and multi-carrier modulation described, FDD Frequency division duplex, OAM, act/deactivation ...</p> | <p>02/01</p>             |

|              |   |  |                  |
|--------------|---|--|------------------|
| TS 101 830-1 | Spectral management on metallic access networks, Part 1: Definitions and signal library | Guidance to a common language for Spectral Management specifications | Published, 08/01 |
|--------------|---|--|------------------|

## ANSI-xDSL-Standards

Latest revision: 27th August 2001

| <b>Standards</b> |   |  |                                  |
|------------------|---|--|----------------------------------|
| <b>Standard</b>  | <b>Title</b>  | <b>Details</b>   | <b>Approval</b>                  |
| T1.418           | High bit rate digital subscriber line - 2nd generatoion (HDSL)            | Electrical characteristics of HDSL signals. Single twisted pair, full duplex transmission, payload 1.544 Mbit/s, 16-TCPAM-code | published                        |
| T1.413           | Asymmetric digital subscriber line metallic interface (ADSL)              | downstream 6 144 kbit/s, upstream 640 kbit/s, single twisted pair, DMT (Discrete Multitone)                                    | published                        |
| T1.419           | Splitterless asymmetric digital subscriber line transceivers (ADSL)       | Delta-Doc, normative reference G.992.2 (former g.lite), selects options for system deployment in the US                        | published                        |
| T1.4/2001-009R2  | Very high speed digital subscriber line metallic interface (VDSL), Part 1 | Functional requirements and common specifications  | can't find 009/R3<br>unpublished |
| T1.4/2000-0h11R3 | Very high speed digital subscriber line metallic interface (VDSL), Part 2 | Single carrier modulation  | unpublished                      |
| T1.4/2000-013R4  | Very high speed digital subscriber line metallic interface (VDSL), Part 3 | Multi carrier modulation   | unpublished                      |