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DIGITAL SYSTEMS AND NETWORKS

Access networks – In premises networks

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**Implementation of the generic mechanism in the  
IEEE 1905.1a-2014 standard to include  
applicable ITU-T Recommendations**

Recommendation ITU-T G.9979



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# Recommendation ITU-T G.9979

## Implementation of the generic mechanism in the IEEE 1905.1a-2014 standard to include applicable ITU-T Recommendations

### Summary

Recommendation ITU-T G.9979 specifies the necessary details for including network transceivers defined in ITU-T Recommendations as supported home networking technologies under the abstraction layer defined by IEEE 1905 technology.

### History

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### Keywords

G.DPM, G.hn, G.vlc, IEEE 1905, xDSL.

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\* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

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# Recommendation ITU-T G.9979

## Implementation of the generic mechanism in the IEEE 1905.1a-2014 standard to include applicable ITU-T Recommendations

### 1 Scope

This Recommendation makes use of the generic extension mechanism defined in the [IEEE 1905.1a 2014] standard to include [ITU-T G.9960], [ITU-T G.9961], [ITU-T G.9962], [ITU-T G.9963] and [ITU-T G.9964] (referred to hereafter as [ITU-T G.996x]) and [ITU-T G.9954] transceivers [ITU-T G.991.1], [ITU-T G.991.2], [ITU-T G.992.1], [ITU-T G.992.2], [ITU-T G.992.3], [ITU-T G.992.4], [ITU-T G.992.5], [ITU-T G.993.1], [ITU-T G.993.2], [ITU-T G.993.5] and [ITU-T G.9701] (referred to hereafter as ITU-T xDSL) and [ITU-T G.9991] (referred to hereafter as ITU-T G.9991) as supported networking technologies under the abstraction layer defined by 1905 technology (see [IEEE 1905.11a 2014]).

The [IEEE 1905.1] standard defines an abstraction layer for multiple networking technologies, which presents a common virtual interface (the 1905 MAC SAP) to upper layers for the underlying networking technologies below the relevant 1905.1 Interface SAP(s).

As indicated in clause 1.1 of the [IEEE 1905.1] standard, 1905 is extensible to work with network technologies not included in the original standard. This Recommendation makes use of the generic extension mechanism described in [IEEE 1905.1a] to specify an extension to the [IEEE 1905.1] standard that introduces the ITU-T network technologies as additional underlying network interfaces for the 1905 abstraction layer.

### 2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T G.991.1] Recommendation ITU-T G.991.1 (1998), *High bit rate digital subscriber line (HDSL) transceivers*.
- [ITU-T G.991.2] Recommendation ITU-T G.991.2 (2003), *Single-pair high-speed digital subscriber line (SHDSL) transceivers*.
- [ITU-T G.992.1] Recommendation ITU-T G.992.1 (1999), *Asymmetric digital subscriber line (ADSL) transceivers*.
- [ITU-T G.992.3] Recommendation ITU-T G.922.3 (1999), *Asymmetric digital subscriber line transceivers 2 (ADSL2)*.
- [ITU-T G.992.5] Recommendation ITU-T G.922.5 (1999), *Asymmetric Asymmetric digital subscriber line 2 transceivers (ADSL2) – Extended bandwidth ADSL2 (ADSL2plus)*.
- [ITU-T G.993.1] Recommendation ITU-T G.923.1 (2004), *Very high speed digital subscriber line transceivers (VDSL)*.
- [ITU-T G.993.2] Recommendation ITU-T G.993.2 (2015), *Very high speed digital subscriber line transceivers 2 (VDSL2)*.

- [ITU-T G.993.5] Recommendation ITU-T G.993.5 (2015), *Self-FEXT cancellation (vectoring) for use with VDSL2 transceivers.*
- [ITU-T G.9700] Recommendation ITU-T G.9700 (2014), *Fast access to subscriber terminals (G.fast) – Power spectral density specification.*
- [ITU-T G.9701] Recommendation ITU-T G.9701 (2014), *Fast access to subscriber terminals (G.fast) – Physical layer specification.*
- [ITU-T G.9954] Recommendation ITU-T G.9954 (2007), *Home networking transceivers – Enhanced physical, media access, and link layer specifications.*
- [ITU-T G.9960] Recommendation ITU-T G.9960 (2018), *Unified high-speed wire-line based home networking transceivers – System architecture and physical layer specification.*
- [ITU-T G.9961] Recommendation ITU-T G.9961 (2018), *Unified high-speed wire-line based home networking transceivers – Data link layer specification.*
- [ITU-T G.9962] Recommendation ITU-T G.9962 (2018), *Unified high-speed wire-line based home networking transceivers – management specification.*
- [ITU-T G.9963] Recommendation ITU-T G.9963 (2018), *Unified high-speed wire-line based home networking transceivers – Multiple input/multiple output specification.*
- [ITU-T G.9964] Recommendation ITU-T G.9964 (2011), *Unified high-speed wire-line based home networking transceivers – Power spectral density specification.*
- [ITU-T G.9972] Recommendation ITU-T G.9972 (2010), *Coexistence mechanism for wireline home networking transceivers.*
- [ITU-T G.9977] Recommendation ITU-T G.9977 (2016), *Mitigation of interference between DSL and PLC.*
- [ITU-T G.9991] Recommendation ITU-T G.9991 (2019), *High speed indoor visible light communication transceiver – System architecture, physical layer and data link layer specification.*
- [IEEE 1905.1 2013] IEEE Standard 1905.1 (2013), *IEEE Standard for a Convergent Digital Home Network for Heterogeneous Technologies.*
- [IEEE 1905.1a 2014] IEEE Standard 1905.1a (2014), *IEEE Standard for a Convergent Digital Home Network for Heterogeneous Technologies, Amendment 1: Support of new MAC/PHYs and enhancements.*
- [ISO/IEC 8859-1] ISO/IEC 8859-1:1998, *Information technology – 8-bit single-byte coded graphic character sets – Part 1: Latin alphabet No. 1.*

### 3 Definitions

#### 3.1 Terms defined elsewhere

None.

#### 3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

**3.2.1 1905 abstraction layer:** Layer defined in [IEEE 1905.1a 2014] that provides a common interface to underlying home network interfaces.

**3.2.2 1905 device:** A device with one or more interfaces abstracted by a 1905 abstraction layer.



## **4 Abbreviations and acronyms**

This Recommendation uses the following abbreviations and acronyms:

AL	Abstraction Layer
ALME	Abstraction Layer Management entity
CL	Convergence Layer
DLL	Data Link Layer
DSL	Digital Subscriber Line
HLE	High Level Entity
HNT	Home Networking Transceiver
LLC	Logical Link Control
MAC	Medium Access Control
PHY	Physical
PMD	Physical Media Dependent
PMS	Physical Media Specific
PW	Password
SAP	Service Access Point
SME	Station Management Entity
TC	Transmission Convergence
TLV	Type Length Value
XML	extensible Markup Language

## **5 Conventions**

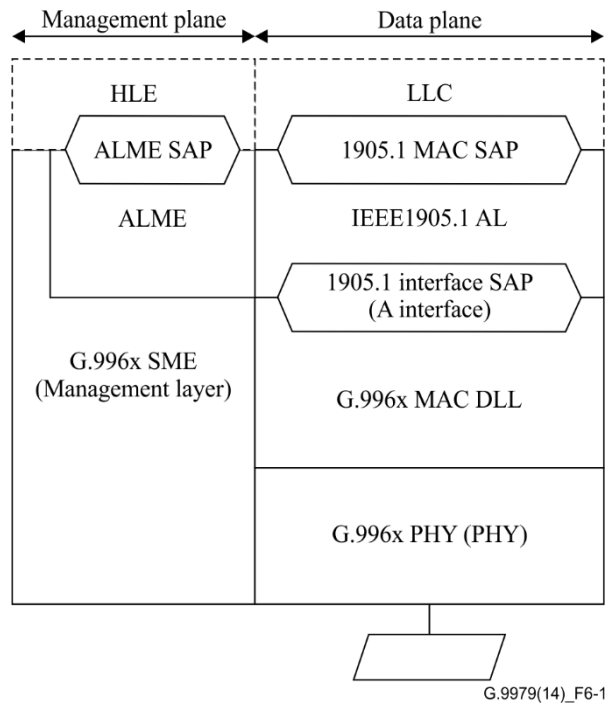
This Recommendation uses [ITU-T G.996x] as shorthand to refer to Recommendations [ITU-T G.9960], [ITU-T G.9961], [ITU-T G.9962], [ITU-T G.9963] and [ITU-T G.9964].

## **6 ITU-T interface description for 1905.1 devices**

### **6.1 ITU-T interfaces in 1905 reference model**

#### **6.1.1 ITU-T G.996x interface in 1905 reference model**

Figure 6-1 shows the position of the ITU-T G.996x interface in the [IEEE 1905] reference model. ITU-T G.996x interfaces shall be connected to 1905 AL through the A interface.



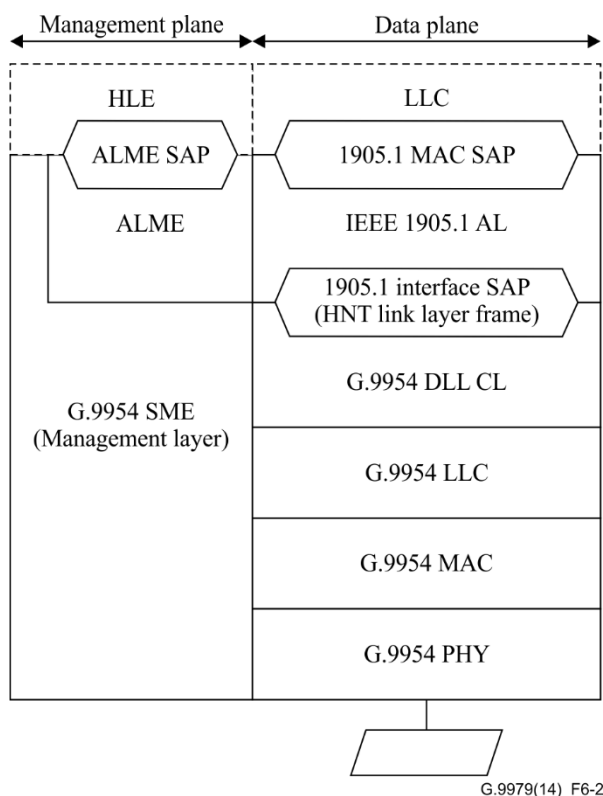
**Figure 6-1 – G.996x interface position in 1905 reference model**

In this reference model, the following equivalences are shown:

- The 1905 interface SAP in 1905 (InterfaceSAPReference parameter of Table 8-1) corresponds to the A interface of ITU-T G.996x (see clause 8.1.2 of [ITU-T G.9961]).
- The SME entity in 1905 (SMEReference parameter of Table 8-1) corresponds to G.996x management layer (see [ITU-T G.9962]).

### 6.1.2 ITU-T G.9954 interface in 1905 reference model

Figure 6-2 shows the position of the ITU-T G.9954 interface in the [IEEE 1905] reference model.



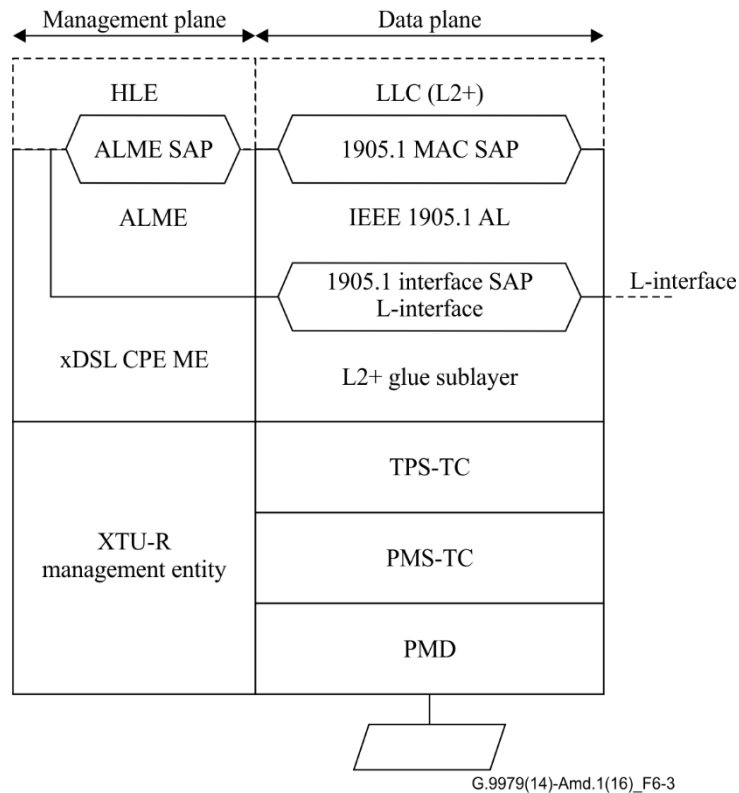
**Figure 6-2 – G.9954 interface position in IEEE 1905 reference model**

In this reference model, the following equivalences are shown:

- The 1905 Interface SAP in 1905 (InterfaceSAPReference parameter of Table 8-1) corresponds to the HNT Link layer frame of [ITU-T G.9954] (see clause 11 of [ITU-T G.9954]).
- The SME entity in 1905 (SMEReference parameter of Table 8-1) corresponds to ITU-T G.996x management layer (see clause 5.3.2.4 of [ITU-T G.9954]).

### 6.1.3 xDSL interface in 1905 reference model

Figure 6-3 shows the position of the xDSL interface in the [IEEE 1905] reference model.



**Figure 6-3 – xDSL interface position in IEEE 1905 reference model**

In this reference model, the following equivalences are shown:

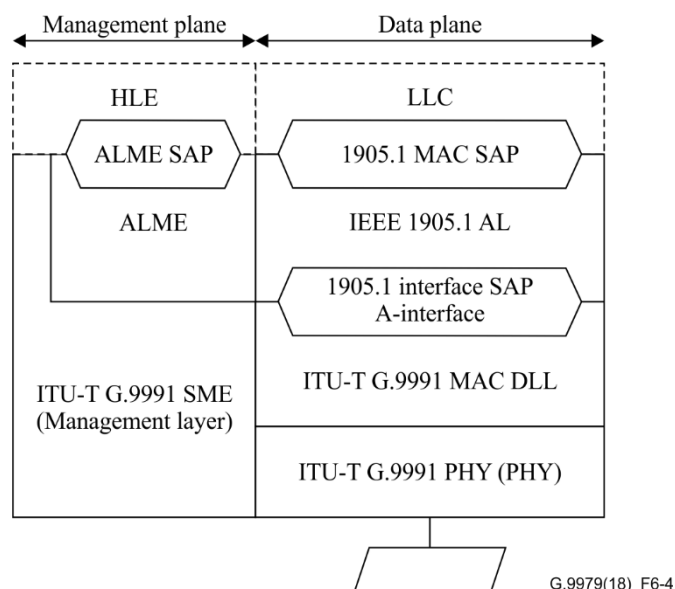
- the 1905 Interface SAP in [IEEE 1905.1] (InterfaceSAPReference parameter of Table 8-1) is embedded in the L2+ function of xDSL CPE and corresponds to the *L* interface of xDSL CPE. The L-interface is logical and facilitates exchange of the primitives defined by this Recommendation.

The SME entity inside [IEEE 1905.1] (SMEReference parameter of Table 8-1) corresponds to xDSL CPE high-layer management entity (xDSL CPE ME).

#### **6.1.4 ITU-T G.9911 interface in 1905 reference model**

Figure 6-4 shows the position of the ITU-T G.9991 interface in the IEEE 1905 reference model.

ITU-T G.9991 interfaces shall be connected to 1905 AL through the A interface.



**Figure 6-4 – ITU-T G.9991 interface position in 1905 reference model**

In this reference model, the following equivalences are shown:

- The 1905 interface SAP in 1905 (InterfaceSAPReference parameter of Table 8-1) corresponds to the A interface of ITU-T G.9991 (see clause 6.2.1 of [ITU-T G.9991]).
- The SME entity in 1905 (SMEReference parameter of Table 8-1) corresponds to ITU-T G.9991 management layer (see clause 12 of [ITU-T G.9991]).

## 6.2 ITU-T security mechanisms in 1905 networks

### 6.2.1 Overview

[IEEE 1905.1a 2014] defines a 1905.1 network key that shall be used as starting point to generate the encryption keys of each of the underlying technologies of a 1905 node.

Clauses 6.2.2, 6.2.3 and 6.2.4 describe the mechanisms to derive the technology specific encryption keys for [ITU-T G.996x], [ITU-T G.9954], xDSL and ITU-T G.9991 technologies, respectively.

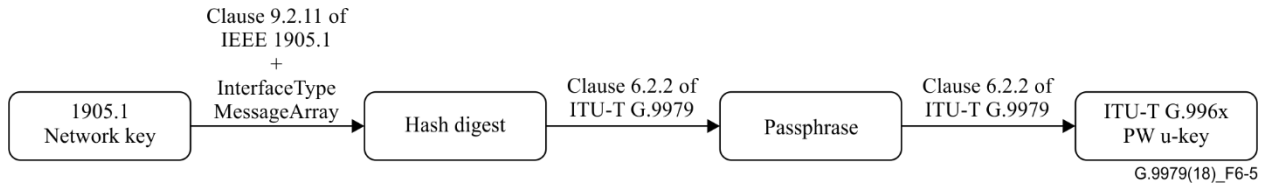
### 6.2.2 G.996x u-key derivation

Figure 6-5 shows the ITU-T G.996x passphrase derivation.

The 1905 interface underlying network technology u-key for [ITU-T G.996x] (node password (PW), see Table 9-7 of [ITU-T G.9961]) shall be derived from the 1905.1 network key (see clause 9.2.1.1 of [IEEE 1905.1a 2014]) as described below.

The calculation of the hash digest (see clause 9.2.1.1 of [IEEE 1905.1a 2014]) shall use as message\_array the value of the parameter InterfaceTypeMessageArray of Table 8-1.

Computing the  $4 \times n$  least significant bits hash digest (see clause 9.2.1.1 of [IEEE 1905.1a 2014]) creates the n-character long passphrase expressed in hexadecimal using lowercase ASCII characters. The PW u-key is a 96-bit binary chain created by converting the passphrase into its 8-bit binary equivalent following [ISO 8859-1]. The length n of the passphrase is 12:



**Figure 6-5 – ITU-T G.996x passphrase derivation**

NOTE – The byte ordering of the hash digest is big endian and bit ordering is shown if Figure 6-1 of [IEEE 1905.1a 2014].

### 6.2.3 ITU-T G.9954 u-key derivation

No u-key derivation is needed for ITU-T G.9954 interfaces as underlying network technology does not offer encryption.

### 6.2.4 xDSL u-key derivation

No u-key derivation is needed for xDSL interfaces as underlying network technology does not offer encryption.

### 6.2.5 ITU-T G.9991u-key derivation

The procedure to be applied for the generation of ITU-T G.9991 PW u-key is the same as the one described in clause 6.2.2 for the generation of G.996x PW u-key.

## 7 ITU-T interface Generic PHY device information type TLV

A 1905 device including an ITU-T interface shall populate the identified fields of the generic Phy device information type TLV tlvValue field (see Table 6-29 of [IEEE 1905.1a 2014]) with the information provided in Table 7-1.

**Table 7-1 – Identified fields of the Generic PHY device information type TLV field for ITU-T interfaces**

Field	Value (Note 1)
1905 AL MAC address of the device	MAC address of the IEEE 1905 AL of the device implementing the ITU interface (Note 2)
MAC address of the local interface	MAC address assigned to the ITU interface. If the ITU interface has no specific MAC address the AL MAC address may be used (Note 2)
OUI of the Generic PHY networking technology of the local interface	00:19:A7
Variant index of the Generic PHY networking technology of the local interface	See Table 7-2
Variant name	See Table 7-2
Number of octets in ensuing URL field	39
Number of octets in ensuing media-specific information field	Length of the media-specific information, including all the Media-specific TLVs included in the media-specific information of the Variant (5 octets, see Table 8-2 and Table 8-3)

**Table 7-1 – Identified fields of the Generic PHY device information type TLV field for ITU-T interfaces**

Field	Value (Note 1)
URL to Generic PHY XML Description represented by the OUI. This URL shall be publicly available	<a href="http://handle.itu.int/11.1002/3000/1706">http://handle.itu.int/11.1002/3000/1706</a> (Note 3)
Media-specific information of the variant	See Table 8-2 and Table 8-3
NOTE 1 – The format of the different values provided by this table shall follow the corresponding formats in Table 6-29 of [IEEE 1905.1a 2014].	
NOTE 2 – If the device does not have an AL MAC address, it may use the MAC address of the management layer of the device.	
NOTE 3 – Represented as a string of UTF-8 coded characters (without the quotation marks).	

**Table 7-2 – ITU-T technology variant information**

Variant index (Note 1)	Variant name (Note 2)	Variant description (Note 2)
00 <sub>16</sub>	"ITU-T G.996x Powerline"	"Recommendation [ITU-T G.996x] (powerline) specifies the system architecture and physical (PHY) layer for wireline-based home networking transceivers capable of operating over premises wiring"
01 <sub>16</sub>	"ITU-T G.996x Phoneline"	"Recommendation [ITU-T G.996x] (phoneline) specifies the system architecture and physical (PHY) layer for wireline-based home networking transceivers capable of operating over premises wiring"
02 <sub>16</sub>	"ITU-T G.996x Coax baseband"	"Recommendation [ITU-T G.996x] (coax baseband) specifies the system architecture and physical (PHY) layer for wireline-based home networking transceivers capable of operating over premises wiring"
03 <sub>16</sub>	"ITU-T G.996x Coax RF"	"Recommendation [ITU-T G.996x] (coax RF) specifies the system architecture and physical (PHY) layer for wireline-based home networking transceivers capable of operating over premises wiring"
04 <sub>16</sub>	"ITU-T G.996x POF"	"Recommendation [ITU-T G.996x] (POF) specifies the system architecture and physical (PHY) layer for wireline-based home networking transceivers capable of operating over premises wiring"
10 <sub>16</sub>	"ITU-T G.9954 Phoneline"	"Recommendation [ITU-T G.9954] (phoneline) specifies the system architecture and physical (PHY) layer for wireline-based home networking transceivers capable of operating over premises wiring"
11 <sub>16</sub>	"ITU-T G.9954 Coax"	"Recommendation [ITU-T G.9954] (coax) specifies the system architecture and physical (PHY) layer for wireline-based home networking transceivers capable of operating over premises wiring"

**Table 7-2 – ITU-T technology variant information**

<b>Variant index (Note 1)</b>	<b>Variant name (Note 2)</b>	<b>Variant description (Note 2)</b>
20 <sub>16</sub>	"ITU-T HDSL"	"Recommendation [ITU-T G.991.1] specifies the system architecture and physical layer for high bit rate digital subscriber line (HDSL) transceivers"
21 <sub>16</sub>	"ITU-T SHDSL"	"Recommendation [ITU-T G.991.2] specifies the system architecture and physical layer for single-pair high-speed digital subscriber line (SHDSL) transceivers"
30 <sub>16</sub>	"ITU-T ADSL"	"Recommendation [ITU-T G.992.1] specifies the system architecture and physical layer for asymmetric digital subscriber line (ADSL) transceivers"
31 <sub>16</sub>	"ITU-T ADSL2"	"Recommendation [ITU-T G.992.3] specifies the system architecture and physical layer for asymmetric digital subscriber line transceivers 2 (ADSL2)"
32 <sub>16</sub>	"ITU-T ADSL2PLUS"	"Recommendation [ITU-T G.992.5] specifies the system architecture and physical layer for asymmetric digital subscriber line 2 transceivers (ADSL2) – Extended bandwidth ADSL2 (ADSL2plus)"
40 <sub>16</sub>	"ITU-T VDSL"	"Recommendation [ITU-T G.993.1] specifies the system architecture and physical layer for very high speed digital subscriber line transceivers (VDSL)"
41 <sub>16</sub>	"ITU-T VDSL2"	"Recommendation [ITU-T G.993.2] specifies the system architecture and physical layer for very high speed digital subscriber line transceivers 2 (VDSL2)"
42 <sub>16</sub>	"ITU-T vectored VDSL2"	"Recommendation [ITU-T G.993.5] specifies the system architecture and physical layer for very high speed digital subscriber line transceivers 2 (VDSL2 with Self-FEXT cancellation)"
50 <sub>16</sub>	"ITU-T G.fast"	"Recommendations [ITU-T G.9970] and [ITU-T G.9701] specify the system architecture and physical layer for fast access to subscriber terminals (G.fast) – Physical layer specification"
60 <sub>16</sub>	"ITU-T G.9991"	"Recommendation [ITU-T G.9991] specifies the system architecture, physical layer and data link layer for high speed indoor visible light communication transceiver"
NOTE 1 – All other values are reserved by ITU-T.		
NOTE 2 – Text within quotation marks represents a UTF-8 string that shall be used verbatim (without the quotation marks) in the XML.		

## **8 ITU-T interface technology description**

### **8.1 Description of generic PHY XML fields**

Table 8-1 provides a description of ITU-T generic PHY XML fields.



**Table 8-1 – Description of ITU-T generic Phy XML fields**

Field	Sub-field	Value (Note)			
		G.996x	G.9954	xDSL	VLC
OrgName		"ITU"	"ITU"	"ITU"	"ITU"
OrgUrl		<a href="http://www.itu.int">"http://www.itu.int"</a>	<a href="http://www.itu.int">"http://www.itu.int"</a>	<a href="http://www.itu.int">"http://www.itu.int"</a>	<a href="http://www.itu.int">"http://www.itu.int"</a>
Oui		"00:19:A7"	"00:19:A7"	"00:19:A7"	"00:19:A7"
Networking echnologyva riant	GenericPhyIndex	See Table 7-2	See Table 7-2	See Table 7-2	See Table 7-2
	VariantName	See Table 7-2	See Table 7-2	See Table 7-2	See Table 7-2
	VariantUrl	<a href="http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15">"http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15"</a>	<a href="http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15">"http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15"</a>	<a href="http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15">"http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15"</a>	<a href="http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15">"http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15"</a>
	Variant Description	See Table 7-2	See Table 7-2	See Table 7-2	See Table 7-2
	InterfaceSAPName	"A interface"	"HNT Link layer frame"	"L-interface"	"A interface"
	InterfaceSAPReference	"Clause 6.1 of [ITU-T G.9979]"	"Clause 6.1 of [ITU-T G.9979]"	"Clause 6.1 of [ITU-T G.9979]"	"Clause 6.1 of [ITU-T G.9979]"
	SMEName	"Management layer"	"Management layer"	"Management layer"	"Management layer"
	SMEReference	"Clause 6.1 of [ITU-T G.9979]"	"Clause 6.1 of [ITU-T G.9979]"	"Clause 6.1 of [ITU-T G.9979]"	"Clause 6.1 of [ITU-T G.9979]"
	IEEE8021Bridging	"True"	"True"	"False"	"True"
	MediaSpecificInformation	"TLV structure – see Table 8-2 of [ITU-T G.9979]"	"TLV structure – see Table 8-2 of [ITU-T G.9979]"	"TLV structure – see Table 8-2 of [ITU-T G.9979]"	"TLV structure – see Table 8-2 of [ITU-T G.9979]"
InterfaceTypeMessageArray	"1905 easily creates interoperable Hybrid networks with deployed [ITU-T G.996x]"	"1905 easily creates interoperable Hybrid networks with deployed [ITU-T G.9954]"	"1905 easily creates interoperable Hybrid networks with deployed [ITU-T xDSL]"	"1905 easily creates interoperable Hybrid networks with deployed [ITU-T G.9991]"	

**Table 8-1 – Description of ITU-T Generic Phy XML fields**

Field	Sub-field	Value (Note)			
		G.996x	G.9954	xDSL	VLC
	UKeyDerivation	"Clause 6.2 of [ITU-T G.9979]"	"Clause 6.2 of [ITU-T G.9979]"	"Clause 6.2 of [ITU-T G.9979]"	"Clause 6.2 of [ITU-T G.9979]"
	TestVectors	"Clause 9 of [ITU-T G.9979]"	"None"	"None"	"None"
	Coexistence Protocols	"ITU-T G.9972"	"None"	"None"	"None"

NOTE – Text within quotation marks represents a UTF-8 string that shall be used verbatim (without the quotation marks) in the XML.

Table 8-2 provides a description of ITU-T media specific information fields.

**Table 8-2 – Description of ITU-T media specific information fields**

Field	Octet	Bits	Description
NumMediaSpecificFields	0	[7:0]	Number of Media-Specific fields (N) that are included for this technology variant (Note 1). If no MediaSpecificFields are required for the technology variant, N equals 0 (00 <sub>16</sub> ).
MediaSpecificField[0]	Variable	Variable	First MediaSpecificField. It shall be formatted following Table 8-2.1. This field does not exist if N=0
...	...	...	...
MediaSpecificField[N-1]	Variable	Variable	Last MediaSpecificField. It shall be formatted following Table 8-2.1. This field does not exist if N=0

NOTE 1 – The MediaSpecificFields that may be included in the ITU-T media specific information fields depend on the Technology Variant (see Table 8-3).

**Table 8-2.1 – Description of a MediaSpecificField**

Field	Octet	Bits	Description
MediaSpecificFieldType	0	[7:0]	Media-Specific field Type. The format of this field is described in Table 8-3
MediaSpecificFieldLength	1	[7:0]	Length of the MediaSpecificFieldValue field for the type indicated by the MediaSpecificFieldType field, represented as an 8-bit unsigned integer (see Table 8-3).
MediaSpecificFieldValue	Variable	Variable	Value of the type indicated by the MediaSpecificFieldType field (see Table 8-3).

Table 8-3 provides a list of media specific fields.

**Table 8-3 – List of media-specific fields**

MediaSpecificField Type (Note)	Technology variant indices for which this media-specific field is valid	MediaSpecificField Name	MediaSpecificFieldLength Value (bytes)	MediaSpecificFieldValue field
00 <sub>16</sub>	00 <sub>16</sub> to 04 <sub>16</sub> ; 60 <sub>16</sub>	DNI	2	See clause 8.6.8.2.1 of [ITU-T G.9961]

NOTE – All other values are reserved by ITU-T.

## 8.2 ITU-T interface XML technology description

```
<?xml version="1.0" encoding="utf-8"?>
<GenericPhyInfo xsi:schemaLocation="urn:schemas-ieee-org:ieee1905:GenericPhyInfo 19051a-GenericPhyInfo-140225a.xsd"
xmlns="urn:schemas-ieee-org:ieee1905:GenericPhyInfo" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <GenericPhy>
    <OrgName>ITU</OrgName>
    <OrgUrl>http://www.itu.int/</OrgUrl>
    <Oui>00:19:A7</Oui>
    <NetworkTechnologyVariant>
      <GenericPhyIndex>00</GenericPhyIndex>
      <VariantName>ITU-T G.996x Powerline</VariantName>
      <VariantUrl>http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15</VariantUrl>
      <Description>Recommendation ITU-T G.996x (Powerline) specifies the system architecture and physical (PHY) layer for wireline-
based home networking transceivers capable of operating over premises wiring.</Description>
      <InterfaceSAPName>A interface</InterfaceSAPName>
      <InterfaceSAPReference>Clause 6.1 of ITU-T G.9979</InterfaceSAPReference>
      <SMENAME>Management Layer</SMENAME>
      <SMEReference>Clause 6.1 of ITU-T G.9979</SMEReference>
    </NetworkTechnologyVariant>
  </GenericPhy>
</GenericPhyInfo>
```

```

<IEEE8021Bridging>True</IEEE8021Bridging>
<MediaSpecificInformation>TLV structure - see Table 8-2 of ITU-T G.9979</MediaSpecificInformation>
<InterfaceTypeMessageArray>1905 easily creates interoperable Hybrid networks with deployed ITU-T G.996x
</InterfaceTypeMessageArray>
<UKeyDerivation>Clause 6.2 of ITU-T G.9979</UKeyDerivation>
<TestVectors>Clause 9 of ITU-T G.9979</TestVectors>
<CoexistenceProtocols>G.9972</CoexistenceProtocols>
</NetworkTechnologyVariant>
<NetworkTechnologyVariant>
<GenericPhyIndex>01</GenericPhyIndex>
<VariantName>ITU-T G.996x Phoneline</VariantName>
<VariantUrl>http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15</VariantUrl>
<Description>Recommendation ITU-T G.996x (Phoneline) specifies the system architecture and physical (PHY) layer for wireline-
based home networking transceivers capable of operating over premises wiring.</Description>
<InterfaceSAPName>A interface</InterfaceSAPName>
<InterfaceSAPReference>Clause 6.1 of ITU-T G.9979</InterfaceSAPReference>
<SMENName>Management Layer</SMENName>
<SMEReference>Clause 6.1 of ITU-T G.9979</SMEReference>
<IEEE8021Bridging>True</IEEE8021Bridging>
<MediaSpecificInformation>TLV structure - see Table 8-2 of ITU-T G.9979</MediaSpecificInformation>
<InterfaceTypeMessageArray>1905 easily creates interoperable Hybrid networks with deployed ITU-T G.996x
</InterfaceTypeMessageArray>
<UKeyDerivation>Clause 6.2 of ITU-T G.9979</UKeyDerivation>
<TestVectors>Clause 9 of ITU-T G.9979</TestVectors>
<CoexistenceProtocols>G.9972</CoexistenceProtocols>
</NetworkTechnologyVariant>
<NetworkTechnologyVariant>
<GenericPhyIndex>02</GenericPhyIndex>
<VariantName>ITU-T G.996x Coax Baseband</VariantName>
<VariantUrl>http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15</VariantUrl>
<Description>Recommendation ITU-T G.996x (Coax baseband) specifies the system architecture and physical (PHY) layer for wireline-
based home networking transceivers capable of operating over premises wiring.</Description>
<InterfaceSAPName>A interface</InterfaceSAPName>
<InterfaceSAPReference>Clause 6.1 of ITU-T G.9979</InterfaceSAPReference>
<SMENName>Management Layer</SMENName>
<SMEReference>Clause 6.1 of ITU-T G.9979</SMEReference>
<IEEE8021Bridging>True</IEEE8021Bridging>
<MediaSpecificInformation>TLV structure - see Table 8-2 of ITU-T G.9979</MediaSpecificInformation>
<InterfaceTypeMessageArray>1905 easily creates interoperable Hybrid networks with deployed ITU-T G.996x
</InterfaceTypeMessageArray>
<UKeyDerivation>Clause 6.2 of ITU-T G.9979</UKeyDerivation>
<TestVectors>Clause 9 of ITU-T G.9979</TestVectors>
<CoexistenceProtocols>G.9972</CoexistenceProtocols>
</NetworkTechnologyVariant>
<NetworkTechnologyVariant>
<GenericPhyIndex>03</GenericPhyIndex>
<VariantName>ITU-T G.996x Coax RF</VariantName>
<VariantUrl>http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15</VariantUrl>
<Description>Recommendation ITU-T G.996x (Coax RF) specifies the system architecture and physical (PHY) layer for wireline-based
home networking transceivers capable of operating over premises wiring.</Description>
<InterfaceSAPName>A interface</InterfaceSAPName>
<InterfaceSAPReference>Clause 6.1 of ITU-T G.9979</InterfaceSAPReference>
<SMENName>Management Layer</SMENName>
<SMEReference>Clause 6.1 of ITU-T G.9979</SMEReference>
<IEEE8021Bridging>True</IEEE8021Bridging>
<MediaSpecificInformation>TLV structure - see Table 8-2 of ITU-T G.9979</MediaSpecificInformation>
<InterfaceTypeMessageArray>1905 easily creates interoperable Hybrid networks with deployed ITU-T G.996x
</InterfaceTypeMessageArray>
<UKeyDerivation>Clause 6.2 of ITU-T G.9979</UKeyDerivation>
<TestVectors>Clause 9 of ITU-T G.9979</TestVectors>
<CoexistenceProtocols>G.9972</CoexistenceProtocols>
</NetworkTechnologyVariant>
<NetworkTechnologyVariant>
<GenericPhyIndex>04</GenericPhyIndex>
<VariantName>ITU-T G.996x Plastic Optical Fiber (POF)</VariantName>
<VariantUrl>http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15</VariantUrl>
<Description>Recommendation ITU-T G.996x (POF) specifies the system architecture and physical (PHY) layer for wireline-based
home networking transceivers capable of operating over premises wiring.</Description>
<InterfaceSAPName>A interface</InterfaceSAPName>
<InterfaceSAPReference>Clause 6.1 of ITU-T G.9979</InterfaceSAPReference>
<SMENName>Management Layer</SMENName>
<SMEReference>Clause 6.1 of ITU-T G.9979</SMEReference>
<IEEE8021Bridging>True</IEEE8021Bridging>
<MediaSpecificInformation>TLV structure - see Table 8-2 of ITU-T G.9979</MediaSpecificInformation>
<InterfaceTypeMessageArray>1905 easily creates interoperable Hybrid networks with deployed ITU-T G.996x
</InterfaceTypeMessageArray>
<UKeyDerivation>Clause 6.2 of ITU-T G.9979</UKeyDerivation>
<TestVectors>Clause 9 of ITU-T G.9979</TestVectors>
<CoexistenceProtocols>G.9972</CoexistenceProtocols>
</NetworkTechnologyVariant>
<NetworkTechnologyVariant>
<GenericPhyIndex>10</GenericPhyIndex>
<VariantName>ITU-T G.9954 (Phoneline)</VariantName>
<VariantUrl>http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15</VariantUrl>
<Description>Recommendation ITU-T G.9954 (Phoneline) specifies the system architecture and physical (PHY) layer for wireline-
based home networking transceivers capable of operating over premises wiring.</Description>
<InterfaceSAPName>HNT Link layer frame</InterfaceSAPName>
<InterfaceSAPReference>Clause 6.1 of ITU-T G.9979</InterfaceSAPReference>
<SMENName>Management Layer</SMENName>
<SMEReference>Clause 6.1 of ITU-T G.9979</SMEReference>
<IEEE8021Bridging>True</IEEE8021Bridging>
<MediaSpecificInformation>TLV structure - see Table 8-2 of ITU-T G.9979</MediaSpecificInformation>
<InterfaceTypeMessageArray>1905 easily creates interoperable Hybrid networks with deployed ITU-T G.9954
</InterfaceTypeMessageArray>
<UKeyDerivation>Clause 6.2 of ITU-T G.9979</UKeyDerivation>
<TestVectors>Clause 9 of ITU-T G.9979</TestVectors>
<CoexistenceProtocols>None</CoexistenceProtocols>
</NetworkTechnologyVariant>
<NetworkTechnologyVariant>
<GenericPhyIndex>11</GenericPhyIndex>
<VariantName>ITU-T G.9954 (Coax)</VariantName>
<VariantUrl>http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15</VariantUrl>
<Description>Recommendation ITU-T G.9954 (coax) specifies the system architecture and physical (PHY) layer for wireline-based
home networking transceivers capable of operating over premises wiring.</Description>
<InterfaceSAPName>HNT Link layer frame</InterfaceSAPName>
<InterfaceSAPReference>Clause 6.1 of ITU-T G.9979</InterfaceSAPReference>
<SMENName>Management Layer</SMENName>

```

```

    <SMEReference>Clause 6.1 of ITU-T G.9979</SMEReference>
    <IEEE8021Bridging>True</IEEE8021Bridging>
    <MediaSpecificInformation>TLV structure - see Table 8-2 of ITU-T G.9979</MediaSpecificInformation>
    <InterfaceTypeMessageArray>1905 easily creates interoperable Hybrid networks with deployed ITU-T G.9954
</InterfaceTypeMessageArray>
    <UKeyDerivation>Clause 6.2 of ITU-T G.9979</UKeyDerivation>
    <TestVectors>Clause 9 of ITU-T G.9979</TestVectors>
    <CoexistenceProtocols>None</CoexistenceProtocols>
  </NetworkTechnologyVariant>
</NetworkTechnologyVariant>
  <GenericPhyIndex>20</GenericPhyIndex>
  <VariantName>ITU-T HDSL</VariantName>
  <VariantUrl>http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15</VariantUrl>
  <Description>Recommendation ITU-T G.991.1 specifies the system architecture and physical layer for high bit rate digital
subscriber line (HDSL) transceivers</Description>
  <InterfaceSAPName>L-interface</InterfaceSAPName>
  <InterfaceSAPReference>Clause 6.1 of ITU-T G.9979</InterfaceSAPReference>
  <SMEName>Management Layer</SMEName>
  <SMEReference>Clause 6.1 of ITU-T G.9979</SMEReference>
  <IEEE8021Bridging>False</IEEE8021Bridging>
  <MediaSpecificInformation>TLV structure - see Table 8-2 of ITU-T G.9979</MediaSpecificInformation>
  <InterfaceTypeMessageArray>1905 easily creates interoperable Hybrid networks with deployed ITU-T
xDSL</InterfaceTypeMessageArray>
  <UKeyDerivation>Clause 6.2 of ITU-T G.9979</UKeyDerivation>
  <TestVectors>None</TestVectors>
  <CoexistenceProtocols>None</CoexistenceProtocols>
</NetworkTechnologyVariant>
</NetworkTechnologyVariant>
  <GenericPhyIndex>21</GenericPhyIndex>
  <VariantName>ITU-T SHDSL</VariantName>
  <VariantUrl>http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15</VariantUrl>
  <Description>Recommendation ITU-T G.991.2 specifies the system architecture and physical layer for single-pair high-speed digital
subscriber line (SHDSL) transceivers</Description>
  <InterfaceSAPName>L-interface</InterfaceSAPName>
  <InterfaceSAPReference>Clause 6.1 of ITU-T G.9979</InterfaceSAPReference>
  <SMEName>Management Layer</SMEName>
  <SMEReference>Clause 6.1 of ITU-T G.9979</SMEReference>
  <IEEE8021Bridging>False</IEEE8021Bridging>
  <MediaSpecificInformation>TLV structure - see Table 8-2 of ITU-T G.9979</MediaSpecificInformation>
  <InterfaceTypeMessageArray>1905 easily creates interoperable Hybrid networks with deployed ITU-T
xDSL</InterfaceTypeMessageArray>
  <UKeyDerivation>Clause 6.2 of ITU-T G.9979</UKeyDerivation>
  <TestVectors>None</TestVectors>
  <CoexistenceProtocols>None</CoexistenceProtocols>
</NetworkTechnologyVariant>
</NetworkTechnologyVariant>
  <GenericPhyIndex>30</GenericPhyIndex>
  <VariantName>ITU-T ADSL</VariantName>
  <VariantUrl>http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15</VariantUrl>
  <Description>Recommendation ITU-T G.992.1 specifies the system architecture and physical layer for asymmetric digital subscriber
line (ADSL) transceivers</Description>
  <InterfaceSAPName>L-interface</InterfaceSAPName>
  <InterfaceSAPReference>Clause 6.1 of ITU-T G.9979</InterfaceSAPReference>
  <SMEName>Management Layer</SMEName>
  <SMEReference>Clause 6.1 of ITU-T G.9979</SMEReference>
  <IEEE8021Bridging>False</IEEE8021Bridging>
  <MediaSpecificInformation>TLV structure - see Table 8-2 of ITU-T G.9979</MediaSpecificInformation>
  <InterfaceTypeMessageArray>1905 easily creates interoperable Hybrid networks with deployed ITU-T
xDSL</InterfaceTypeMessageArray>
  <UKeyDerivation>Clause 6.2 of ITU-T G.9979</UKeyDerivation>
  <TestVectors>None</TestVectors>
  <CoexistenceProtocols>None</CoexistenceProtocols>
</NetworkTechnologyVariant>
</NetworkTechnologyVariant>
  <GenericPhyIndex>31</GenericPhyIndex>
  <VariantName>ITU-T ADSL2</VariantName>
  <VariantUrl>http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15</VariantUrl>
  <Description>Recommendation ITU-T G.992.3 specifies the system architecture and physical layer for asymmetric digital subscriber
line transceivers 2 (ADSL2)</Description>
  <InterfaceSAPName>L-interface</InterfaceSAPName>
  <InterfaceSAPReference>Clause 6.1 of ITU-T G.9979</InterfaceSAPReference>
  <SMEName>Management Layer</SMEName>
  <SMEReference>Clause 6.1 of ITU-T G.9979</SMEReference>
  <IEEE8021Bridging>False</IEEE8021Bridging>
  <MediaSpecificInformation>TLV structure - see Table 8-2 of ITU-T G.9979</MediaSpecificInformation>
  <InterfaceTypeMessageArray>1905 easily creates interoperable Hybrid networks with deployed ITU-T
xDSL</InterfaceTypeMessageArray>
  <UKeyDerivation>Clause 6.2 of ITU-T G.9979</UKeyDerivation>
  <TestVectors>None</TestVectors>
  <CoexistenceProtocols>None</CoexistenceProtocols>
</NetworkTechnologyVariant>
</NetworkTechnologyVariant>
  <GenericPhyIndex>32</GenericPhyIndex>
  <VariantName>ITU-T ADSL2+</VariantName>
  <VariantUrl>http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15</VariantUrl>
  <Description>Recommendation ITU-T G.992.5 specifies the system architecture and physical layer for asymmetric digital subscriber
line 2 transceivers (ADSL2) - Extended bandwidth ADSL2 (ADSL2plus)</Description>
  <InterfaceSAPName>L-interface</InterfaceSAPName>
  <InterfaceSAPReference>Clause 6.1 of ITU-T G.9979</InterfaceSAPReference>
  <SMEName>Management Layer</SMEName>
  <SMEReference>Clause 6.1 of ITU-T G.9979</SMEReference>
  <IEEE8021Bridging>False</IEEE8021Bridging>
  <MediaSpecificInformation>TLV structure - see Table 8-2 of ITU-T G.9979</MediaSpecificInformation>
  <InterfaceTypeMessageArray>1905 easily creates interoperable Hybrid networks with deployed ITU-T
xDSL</InterfaceTypeMessageArray>
  <UKeyDerivation>Clause 6.2 of ITU-T G.9979</UKeyDerivation>
  <TestVectors>None</TestVectors>
  <CoexistenceProtocols>None</CoexistenceProtocols>
</NetworkTechnologyVariant>
</NetworkTechnologyVariant>
  <GenericPhyIndex>40</GenericPhyIndex>
  <VariantName>ITU-T VDSL</VariantName>
  <VariantUrl>http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15</VariantUrl>
  <Description>Recommendation ITU-T G.993.1 specifies the system architecture and physical layer for very high speed digital
subscriber line transceivers (VDSL)</Description>
  <InterfaceSAPName>L-interface</InterfaceSAPName>
  <InterfaceSAPReference>Clause 6.1 of ITU-T G.9979</InterfaceSAPReference>

```

```

    <SMEName>Management Layer</SMEName>
    <SMEReference>Clause 6.1 of ITU-T G.9979</SMEReference>
    <IEEE8021Bridging>False</IEEE8021Bridging>
    <MediaSpecificInformation>TLV structure - see Table 8-2 of ITU-T G.9979</MediaSpecificInformation>
    <InterfaceTypeMessageArray>1905 easily creates interoperable Hybrid networks with deployed ITU-T
xDSL</InterfaceTypeMessageArray>
    <UKeyDerivation>Clause 6.2 of ITU-T G.9979</UKeyDerivation>
    <TestVectors>None</TestVectors>
    <CoexistenceProtocols>None</CoexistenceProtocols>
  </NetworkTechnologyVariant>
  <NetworkTechnologyVariant>
    <GenericPhyIndex>41</GenericPhyIndex>
    <VariantName>ITU-T VDSL2</VariantName>
    <VariantUrl>http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15</VariantUrl>
    <Description>Recommendation ITU-T G.993.2 specifies the system architecture and physical layer for very high speed digital
subscriber line transceivers 2 (VDSL2)</Description>
    <InterfaceSAPName>L-interface</InterfaceSAPName>
    <InterfaceSAPReference>Clause 6.1 of ITU-T G.9979</InterfaceSAPReference>
    <SMEName>Management Layer</SMEName>
    <SMEReference>Clause 6.1 of ITU-T G.9979</SMEReference>
    <IEEE8021Bridging>False</IEEE8021Bridging>
    <MediaSpecificInformation>TLV structure - see Table 8-2 of ITU-T G.9979</MediaSpecificInformation>
    <InterfaceTypeMessageArray>1905 easily creates interoperable Hybrid networks with deployed ITU-T
xDSL</InterfaceTypeMessageArray>
    <UKeyDerivation>Clause 6.2 of ITU-T G.9979</UKeyDerivation>
    <TestVectors>None</TestVectors>
    <CoexistenceProtocols>None</CoexistenceProtocols>
  </NetworkTechnologyVariant>
  <NetworkTechnologyVariant>
    <GenericPhyIndex>42</GenericPhyIndex>
    <VariantName>ITU-T vectored VDSL2</VariantName>
    <VariantUrl>http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15</VariantUrl>
    <Description>Recommendation ITU-T G.993.5 specifies the system architecture and physical layer for very high speed digital
subscriber line transceivers 2 (VDSL2)</Description>
    <InterfaceSAPName>L-interface</InterfaceSAPName>
    <InterfaceSAPReference>Clause 6.1 of ITU-T G.9979</InterfaceSAPReference>
    <SMEName>Management Layer</SMEName>
    <SMEReference>Clause 6.1 of ITU-T G.9979</SMEReference>
    <IEEE8021Bridging>False</IEEE8021Bridging>
    <MediaSpecificInformation>TLV structure - see Table 8-2 of ITU-T G.9979</MediaSpecificInformation>
    <InterfaceTypeMessageArray>1905 easily creates interoperable Hybrid networks with deployed ITU-T
xDSL</InterfaceTypeMessageArray>
    <UKeyDerivation>Clause 6.2 of ITU-T G.9979</UKeyDerivation>
    <TestVectors>None</TestVectors>
    <CoexistenceProtocols>None</CoexistenceProtocols>
  </NetworkTechnologyVariant>
  <NetworkTechnologyVariant>
    <GenericPhyIndex>50</GenericPhyIndex>
    <VariantName>ITU-T G.Fast</VariantName>
    <VariantUrl>http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15</VariantUrl>
    <Description>Recommendation ITU-T G.9970/9701 specify the system architecture and physical layer for fast access to subscriber
terminals (G.fast) - Physical layer specification</Description>
    <InterfaceSAPName>L-interface</InterfaceSAPName>
    <InterfaceSAPReference>Clause 6.1 of ITU-T G.9979</InterfaceSAPReference>
    <SMEName>Management Layer</SMEName>
    <SMEReference>Clause 6.1 of ITU-T G.9979</SMEReference>
    <IEEE8021Bridging>False</IEEE8021Bridging>
    <MediaSpecificInformation>TLV structure - see Table 8-2 of ITU-T G.9979</MediaSpecificInformation>
    <InterfaceTypeMessageArray>1905 easily creates interoperable Hybrid networks with deployed ITU-T
xDSL</InterfaceTypeMessageArray>
    <UKeyDerivation>Clause 6.2 of ITU-T G.9979</UKeyDerivation>
    <TestVectors>None</TestVectors>
    <CoexistenceProtocols>None</CoexistenceProtocols>
  </NetworkTechnologyVariant>
  <NetworkTechnologyVariant>
    <GenericPhyIndex>60</GenericPhyIndex>
    <VariantName>ITU-T G.9991</VariantName>
    <VariantUrl>http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=15</VariantUrl>
    <Description> Recommendation ITU-T G.9991 specifies the system architecture, physical layer and data link layer for high speed
indoor visible light communication transceiver.</Description>
    <InterfaceSAPName>A interface</InterfaceSAPName>
    <InterfaceSAPReference>Clause 6.1 of ITU-T G.9979</InterfaceSAPReference>
    <SMEName>Management Layer</SMEName>
    <SMEReference>Clause 6.1 of ITU-T G.9979</SMEReference>
    <IEEE8021Bridging>True</IEEE8021Bridging>
    <MediaSpecificInformation>TLV structure - see Table 8-2 of ITU-T G.9979</MediaSpecificInformation>
    <InterfaceTypeMessageArray>1905 easily creates interoperable Hybrid networks with deployed ITU-T G.9991
</InterfaceTypeMessageArray>
    <UKeyDerivation>Clause 6.2 of ITU-T G.9979</UKeyDerivation>
    <TestVectors>Clause 9 of ITU-T G.9979</TestVectors>
    <CoexistenceProtocols>None</CoexistenceProtocols>
  </NetworkTechnologyVariant>
</GenericPhy>
</GenericPhyInfo>

```

## 9 Test vectors

### 9.1 ITU-T G.996x test vectors

The following test G.996x PW u-keys have been generated following the procedure described in [IEEE 1905.1a 2014] using as input the 1905.1 Network Passphrase and 1905.1 Salt for each of the test vectors.

**Table 9-1 – Test vectors**

Test vector	Test G.996x PW u-key
1	353738376339653765666630
2	663034656532336465343934
3	633631653362646537643635
4	613139303635323138666363
5	663130653138333635363936
6	613461336463616362343035

**9.2 ITU-T G.9991 test vectors**

This clause is for further study.

**10 ITU-T specific schema**

This clause is for further study.

**11 ITU-T vendor specific TLVs**

ITU-T vendor specific TLVs follow the format described in section 6.4.2 of [IEEE 1905.1a 2014]. The format of the ITU-T vendor specific fields shall follow that described in Table 11-1.

**Table 11-1 – ITU-T vendor specific TLVs**

Field	Length	Value range	Description
TLV-Type	1 byte	0B <sub>16</sub>	Vendor specific TLV
TLV-Length	2 bytes	3 + 1 + n	Sum of octets of the: ITU-T OUI (3 octets) + ITU-T TLV subtype (1 octet) + information (n octets)
TLV-Value	3 bytes	0019A7 <sub>16</sub>	ITU-T OUI (the 24-bit globally unique IEEE-SA assigned value for ITU-T)
	1 byte	00 <sub>16</sub> – FF <sub>16</sub>	The ITU-T TLV subtype; the particular subtypes are defined in Table 11-2
	n bytes		message content corresponding to a particular ITU-T TLV subtype defined in Table 11-2

**Table 11-2 – List of ITU-T TLV subtypes and their corresponding payloads**

ITU-T TLV subtype	Message payload
00 <sub>16</sub> to 01 <sub>16</sub>	Reserved by ITU-T for ITU-T G.9977 – See Table A.3 of [ITU-T G.9977]
02 <sub>16</sub> to FF <sub>16</sub>	Reserved by ITU-T







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