ITU-T The leader on DSL standards

SHDSL

G.991.2, Single-pair high-speed digital subscriber line (SHDSL) transceivers

Duplex operation over one copper pair. Optional multi-pair operation for extended reach or higher net data rates. Net data rate of 192 kbit/s to 2.312 Mbit/s. Optional extensions allow net data rates up to 5.696 Mbit/s.
Line code: Trellis Coded Pulse Amplitude Modulation (TC-PAM)

ADSL

G.992.1, Asymmetric digital subscriber line transceivers (ADSL)

One copper pair. Net data rate ranging up to a minimum of 6 Mbit/s downstream and 640 kbit/s upstream. Optional support of higher net data rates.
Line code: Discrete MultiTone (DMT)

G.992.3, Asymmetric digital subscriber line transceivers 2 (ADSL2)

One copper pair. Net data rate ranging up to a minimum of 8 Mbit/s downstream and 800 kbit/s upstream. Optional support of higher net data rates.
Line code: Discrete MultiTone (DMT)

G.992.5, Asymmetrical Digital Subscriber Line (ADSL) transceivers – Extended bandwidth ADSL2 (ADSL2plus)

One copper pair. Net data rate ranging up to a minimum of 16 Mbit/s downstream and 800 kbit/s upstream. Optional support of higher net data rates.
Line code: Discrete MultiTone (DMT)

VDSL

G.993.2, Very high speed digital subscriber line transceivers 2 (VDSL2)

One copper pair. It permits the transmission of asymmetric and symmetric aggregate data rates of up to 200 Mbit/s.
Note: This is the aggregate or total data rate, e.g. 100 Mbit/s downstream and 100 Mbit/s upstream. This would only be achieved over around 200 to 300 metres under ideal conditions. Asymmetric operation would be the more usual arrangement for home use.
Line code: Discrete MultiTone (DMT)

Handshake

G.994.1, Handshake procedures for digital subscriber line (DSL) transceivers

Provides a flexible mechanism for DSL transceivers to exchange capabilities and to select a common mode of operation. It includes parameters relating to service and application requirements as well as parameters pertinent to various DSL transceivers.

Bonding

G.998.1, ATM-based multi-pair bonding

Describes a method for bonding of multiple digital subscriber lines (DSL) to transport ATM streams. The specifications of this Recommendation provide a complete description of startup, operational and contingency modes of operation which allow for interoperability between vendors.

G.998.2, Ethernet-based multi-pair bonding

Describes a method for bonding of multiple digital subscriber lines (DSL) for Ethernet transport. This Recommendation can support SHDSL, VDSL and ADSL transport as well as future DSL technologies as they emerge.

G.998.3, Multi-pair bonding using time-division inverse multiplexing

Describes a method for bonding of multiple digital subscriber lines (DSL) using Time-Division Inverse Multiplexing (TDIM). This Recommendation provides a specification of the TDIM protocol in sufficient detail, to allow development and testing of interoperable implementations for both transmitter and receiver. It includes a multi-pair synchronization frame format, Bonding Communication Channel (BCC), byte-oriented dispatching, hitless addition and removal of pairs, fast removal of pair upon pair failure, using IEEE 802.3ah handshake for pair discovery, parameter negotiation and setup, and an optional FEC and interleaver.

Related Recommendations

G.995.1 – Overview of (DSL) Recommendations
G.996.1 – Test procedures for (DSL) transceivers
G.997.1 – Physical layer management for (DSL) transceivers
G.9954.x – Home networking transceivers

DSL means

- **Support for a wide range of services**
  - IP-based services
  - Audio/video services
  - ATM-based services
  - Frame relay services
  - N-ISDN and B-ISDN
  - 64 kbit/s-based voice and data services
- **Exploiting existing infrastructure**
  Provides cost-effective transport of high-speed digital signals over existing copper wire infrastructure
- **Advanced technology**
  Modulation techniques such as:
  - DMT (Discrete MultiTone)
  - QAM (Quadrature Amplitude Modulation)
  - TC-PAM (Trellis Coded Pulse Amplitude Modulation)
  - Handshake procedures

For more information on ongoing DSL Recommendation activities, please check the ITU-T Study Groups website at: http://www.itu.int/ITU-T

DSL

DIGITAL SUBSCRIBER LINE

Your fast access to today's and future services

05.2008 tsbpromo@itu.int

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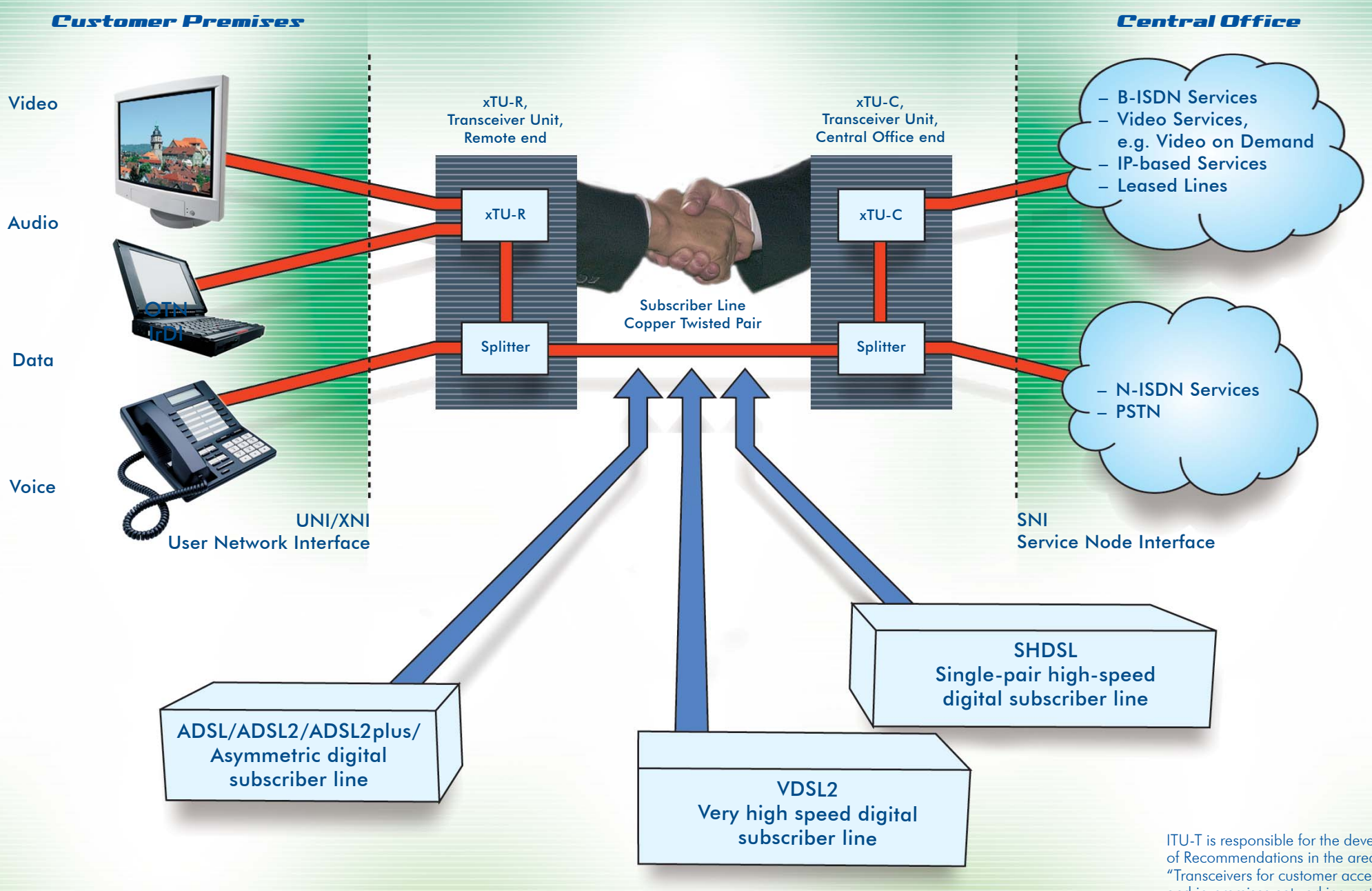

ITU-T is responsible for the development of Recommendations in the area of "Transceivers for customer access and in-premises networking systems on metallic conductors".