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SERIES I: INTEGRATED SERVICES DIGITAL
NETWORK

ISDN user-network interfaces – Layer 1
Recommendations

**B-ISDN user-network interface – Physical layer
specification: 25 600 kbit/s operation**

ITU-T Recommendation I.432.5

(Previously CCITT Recommendation)

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ITU-T RECOMMENDATION I.432.5**B-ISDN USER-NETWORK INTERFACE – PHYSICAL LAYER
SPECIFICATION: 25 600 kbit/s OPERATION****Summary**

This Recommendation covers physical layer characteristics for transporting Asynchronous Transfer Mode (ATM) cells at a nominal bit rate of 25 600 kbit/s over 100 ohm UTP, 120 ohm, and 150 ohm STP twisted pair cables at the S_B reference point of the B-ISDN User Network Interface (UNI). The maximum distance is approximately 100 m. This Recommendation may be used to take advantage of existing building wiring.

Functionality is presented in terms of Physical Media Dependent (PMD) and Transmission Convergence (TC) sublayers, using a cell-based format.

This Recommendation is part of the I.432-Series Recommendations, and includes references to Recommendation I.432.1 [3] on general characteristics, and Recommendation I.432.2 [4] on transmission convergence sublayer aspects.

Source

ITU-T Recommendation I.432.5 was prepared by ITU-T Study Group 13 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 20th of June 1997.

FOREWORD

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In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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Recommendation I.432.5**B-ISDN USER-NETWORK INTERFACE – PHYSICAL LAYER
SPECIFICATION: 25 600 kbit/s OPERATION***(Geneva, 1997)***1 Introduction****1.1 Scope**

This Recommendation covers physical layer characteristics for transporting Asynchronous Transfer Mode (ATM) cells at a nominal bit rate of 25 600 kbit/s over 100 ohm UTP, 120 ohm, and 150 ohm STP twisted pair cables at the S_B reference point of the B-ISDN User Network Interface (UNI). The maximum distance is approximately 100 m. This Recommendation may be used to take advantage of existing building wiring.

The physical layer functionality is divided into a Physical Media Dependent (PMD) sublayer and a Transmission Convergence (TC) sublayer. The PMD sublayer provides the definitions for the transmitter, the receiver, timing recovery, media interface connector and the transmission media. The TC sublayer defines the line coding, scrambling, data framing and synchronization (see Table 1).

Table 1/I.432.5 – Functions of the TC and PMD sublayers

Transmission Convergence (TC) sublayer	HEC generation/verification Cell scrambling/descrambling Line coding/decoding Cell delineation Cell rate decoupling
Physical Media Dependent (PMD) sublayer	Bit timing Physical media Connectors

The term "bit rate" used throughout this Recommendation refers to the logical information rate, before line coding. The term "line symbol rate" will be used when referring to the rate after line coding (25 600 kbit/s bit rate results in a 32 Mbaud line symbol rate after 4B5B encoding).

1.2 Reference configuration

The reference point S_B of the B-ISDN customer access is defined in Recommendations I.413 [2], I.414 [6], and I.432.1 [3].

2 Physical media characteristics at the S_B reference point for 25 600 kbit/s physical layer interface**2.1 Transmission link requirements****2.1.1 Line and bit rates**

The nominal line symbol rate is 32 Mbaud. Due to the use of the 4B5B block code, the bit rate is 25 600 kbit/s.

The transmitter at the customer side should use a free-running transmitter clock that operates at the nominal bit rate within a tolerance of ± 100 ppm.

2.1.2 Bit rate symmetry

Interfaces are symmetric; i.e. the bit rates are the same in both transmit and receive directions.

2.1.3 Bit Error Ratio (BER)

The active input interface should operate at a BER not to exceed 10^{-10} when presented with a transmitter described in 2.2 and transmitting through the channel reference model described in 2.4 in the presence of the worst-case crosstalk noise given in 2.4.

Measurement of BER is normally performed out-of-service. In-service measurements based upon different parameters, e.g. block errors, background block errors, etc., are under study.

2.1.4 Transmission link timing

Figure 1 illustrates the conceptual components of the TC/PMD and the timing source.

The TC/PMD uses a local crystal oscillator or a distributed low jitter timing reference that supports a nominal transmission rate of 25 600 kbit/s.

2.1.5 Free running timing configurations

The recommended approach is to use point-to-point timing where the transmit clock on each end of a link is independent, as depicted in Figure 2. Under these conditions, the pulse waveform templates of 2.2.2 bound the acceptable pulse shapes to be found on any link.

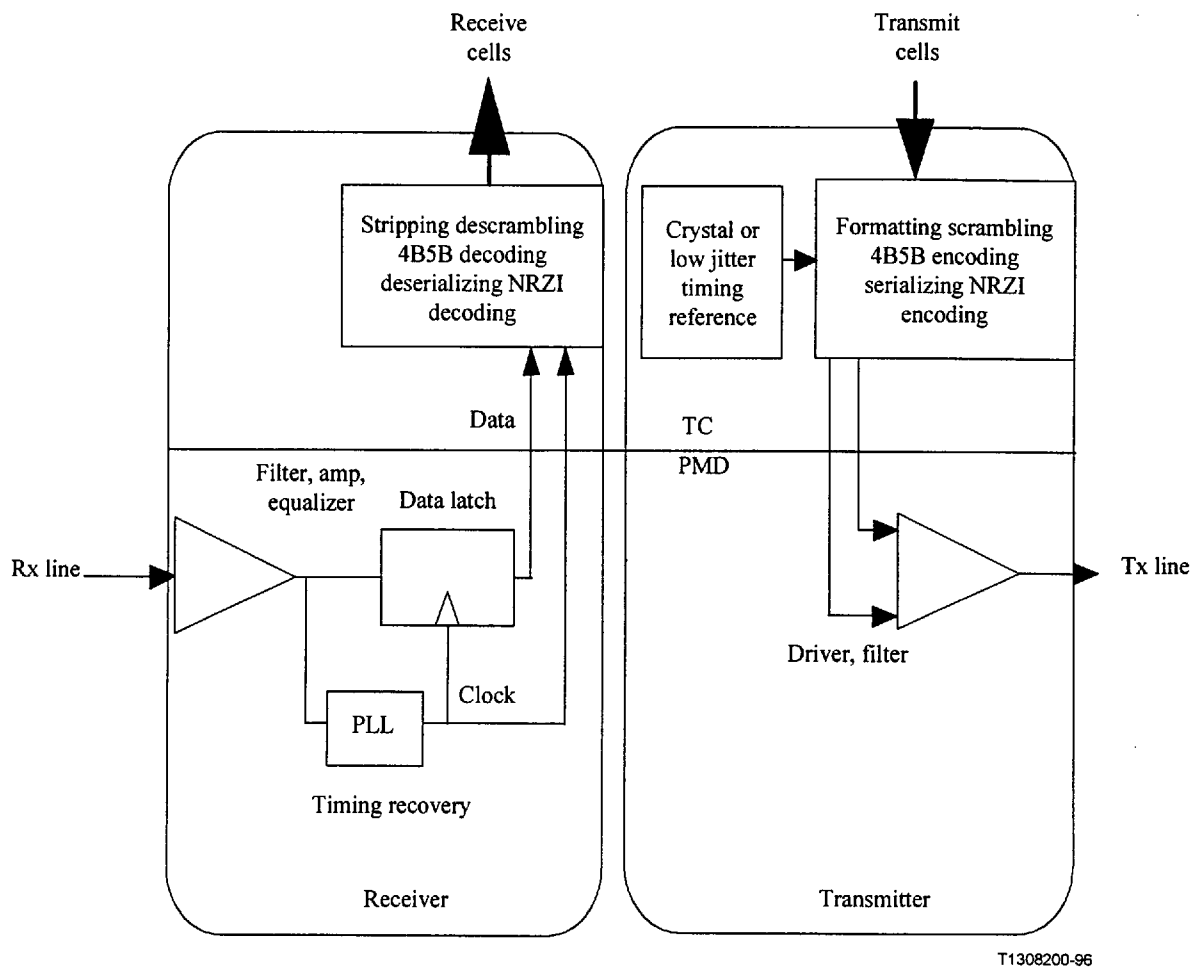


Figure 1/I.432.5 – Illustration of example TC/PMD components and transmitter timing

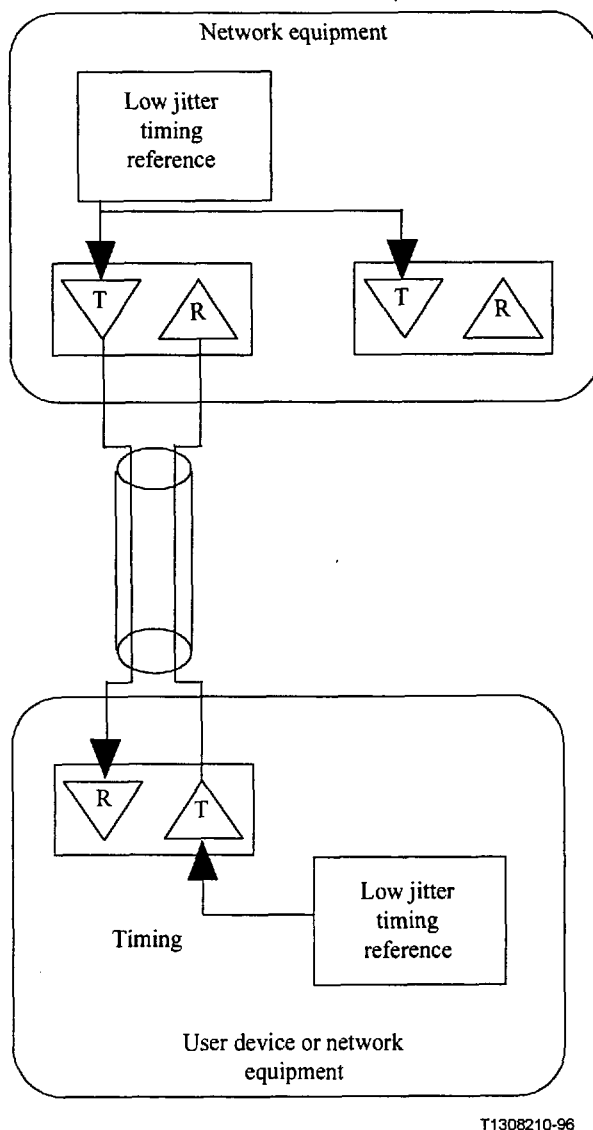


Figure 2/I.432.5 – User device - network equipment timing configurations

2.2 Transmitter requirements

These recommendations place requirements on the transmitted signal. Measurement to these parameters will require that a means exists to send unscrambled, unencoded data streams at the line symbol rate through the transmitter circuitry.

For all transmitter measurements, the transmitter should be terminated in a 100 ohm resistive load for 100 ohm UTP Recommendations.

The transmitter should be terminated in a 150 ohm resistive load for 150 ohm STP Recommendations.

The transmitter should be terminated in a 120 ohm resistive load for 120 ohm recommendations.

Unless stated separately, the parameters given below apply to all of the 100, 120, and 150 ohm measurements.

2.2.1 Transmitter zero-crossing distortion

Duty cycle distortion is intended to measure the static, non-data-dependent distortion in the data edge zero-crossings typically caused by asymmetrical propagation or rise/fall times of transmitter logic or