



INTERNATIONAL TELECOMMUNICATION UNION

**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**X.51 *bis***

**PUBLIC DATA NETWORKS**

**TRANSMISSION, SIGNALLING AND SWITCHING**

---

**FUNDAMENTAL PARAMETERS OF A 48-kbit/s  
USER DATA SIGNALLING RATE  
TRANSMISSION SCHEME FOR THE  
INTERNATIONAL INTERFACE BETWEEN  
SYNCHRONOUS DATA NETWORKS USING  
10-bit ENVELOPE STRUCTURE**

**ITU-T Recommendation X.51 *bis***

(Extract from the *Blue Book*)

---

## NOTES

1 ITU-T Recommendation X.51 *bis* was published in Fascicle VIII.3 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2 In this Recommendation, the expression “Administration” is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

**Recommendation X.51 bis**

**FUNDAMENTAL PARAMETERS OF A 48-kbit/s USER DATA SIGNALLING RATE TRANSMISSION SCHEME FOR THE INTERNATIONAL INTERFACE BETWEEN SYNCHRONOUS DATA NETWORKS USING 10-bit ENVELOPE STRUCTURE**

(Geneva, 1980)

The CCITT,

*considering*

that there is a requirement for a 48-kbit/s user data signalling rate transmission scheme for the interworking between two networks where both use 10-bit envelope structure,

*unanimously declares the view*

that the following fundamental parameters shall be used in the transmission scheme to carry the 48-kbit/s user data signalling rate between networks using the 10-bit envelope structure.

**1 Transmission scheme**

1.1 The gross bit rate of 64 kbit/s should be standardized for international links.

1.2 The signal elements of the 48-kbit/s channel shall be assembled in 10-bit envelopes, in which bit 1 is a status bit, bit 2 is an envelope alignment bit, and bits 3-10 are user data information bits as in Figure 1/X.51 bis.

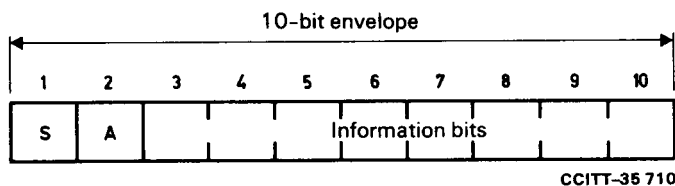
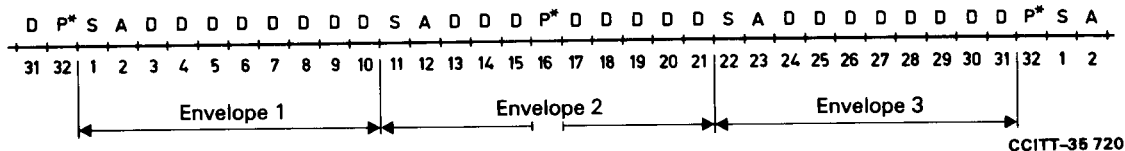


FIGURE 1/X.51 bis

1.3 The basic transmission scheme consists of consecutive 10-bit envelopes interleaved with padding bits occurring every 16th bit. Looking at a group of 32 consecutive bits of the 64-kbit/s bit stream containing 3 envelopes with 24 user data bits D, and numbering the bits starting with the S bit of envelope 1, the padding bits P shall be inserted in the bit positions 16 and 32 as in Figure 2/X.51 bis.



\* Padding bits

FIGURE 2/X.51 bis

1.4 The padding bits shall carry a simple framing pattern that shall be used to identify the envelopes, within the 64-kbit/s stream.

A tentative proposal for such a simple framing pattern would be the following:

- i) the padding bit in the position 16 of Figure 2/X.51 *bis* is set to binary 0;
- ii) the padding bit in the position 32 of Figure 2/X.51 *bis* is set to binary 1.

*Note* - Other more complex framing patterns, which allow the use of padding bits for such functions as, for example, housekeeping signalling or justification in the national network, are for further study.

1.5 The framing strategy is for further study.

1.6 The use of the framing pattern to monitor the error rate in the transmission path, which will be optional, is for further study.

1.7 The envelope alignment bit shall carry a pattern of alternating binary 0 and binary 1 in consecutive envelopes, i.e. the pattern on the A bits in Figure 2/X.51 *bis* can be either 010 or 101.

*Note* - Other patterns on the A bits, e.g. "all zeros" or "all ones" could be used for alarm signals from the distant end and this is for further study.

1.8 The use of the status bit should comply with Recommendations X.21 and X.21 *bis*, together with Recommendation X.71 for connections using decentralized signalling, and with Recommendation X.60 for connections using common channel signalling.