



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

V.50

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

**DATA COMMUNICATION
OVER THE TELEPHONE NETWORK**

**STANDARD LIMITS FOR TRANSMISSION
QUALITY OF DATA TRANSMISSION**

ITU-T Recommendation V.50

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation V.50 was published in Fascicle VIII.1 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.

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Recommendation V.50

STANDARD LIMITS FOR TRANSMISSION QUALITY OF DATA TRANSMISSION

(Mar del Plata, 1968)

One of the most important factors affecting data transmission quality - similarly to telegraph transmission quality - is the distortion in time of the significant instants (known as "telegraph distortion" [1]; the degree of signal distortion must be kept within certain limits, the ultimate objective being that the degree of distortion on received signals should be compatible with the margin of the receiving equipment.

This distortion on received signals arises from the composition of:

- a) the sending distortion;
- b) the distortion introduced by the transmission channel.

Hence, limits must be fixed for the degree of sending distortion and for the degree of distortion due to the transmission channel.

The limits contemplated for the transmission channel are specified in Recommendation V.53; these limits, which are not yet final, are recalled below:

Channel with modem V.21: 20-25%

Channels with modem V.23:

600 bauds - leased circuits:	20-30%
1200 bauds - leased circuits:	25-35%
600 bauds - switched circuit:	25-30%
1200 bauds - switched circuit:	30-35%

(when this mode of operation is possible)

These figures are expressed provisionally in maximum degrees of individual distortion and apply to the circuit including the modems. The limits for the degree of sending distortion must be fixed so that a reasonable margin is left for the receiving equipment, making allowance for the distortion introduced by the circuit.

In view of the foregoing, the CCITT *unanimously issues the recommendation that:*

- 1 with regard to the *quality of transmission signals* (signals at point A - Figure 1/V.51), it is preferable, given the wide range of possible modulation rates, to adopt a single standard for each type of modem.
- 2 when a Recommendation V.21 modem is used, the duration of a unit element should be at least 90% of the duration of the unit element at 200 bauds [i.e. $(1/200) \times (90/100)$ second, or 4.5 milliseconds].
- 3 when a Recommendation V.23 modem is used, the duration of a unit element should be at least 95% of the duration of the unit element either at 1200 bauds [$(1/1200) \times (95/100)$ second, or 0.791 millisecond] or at 600 bauds [$(1/600) \times (95/100)$ second, or 1.583 millisecond].
- 4 if a system sends signals of which the sending distortion is systematically well below the limits specified above for the category concerned, the permissible margin for receivers of that system may be reduced.
- 5 the values indicated above could be revised when a more accurate plan for transmission quality has been drawn up.

Note - The receive margin limits will be studied in liaison with the ISO.

Reference

- [1] CCITT Definition: *Telegraph distortion*, Volume I, Fascicle I.3 (Terms and Definitions).