



INTERNATIONAL TELECOMMUNICATION UNION

# ITU-T

**S.3**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

## TELEGRAPHY

### ALPHABETICAL TELEGRAPH TERMINAL EQUIPMENT

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### TRANSMISSION CHARACTERISTICS OF THE LOCAL END WITH ITS TERMINATION (ITA2)

### ITU-T Recommendation S.3

(Extract from the *Blue Book*)

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## NOTES

1 ITU-T Recommendation S.3 was published in Fascicle VII.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.

## Recommendation S.3

### TRANSMISSION CHARACTERISTICS OF THE LOCAL END WITH ITS TERMINATION (ITA2)

*(based on former Recommendations S.3, S.3bis and S.3ter, Geneva, 1976, 1980 and Malaga-Torremolinos, 1984 and on Recommendation S.31, Geneva 1972; amended at Geneva, 1976 and at Melbourne, 1988)*

The CCITT,

*considering*

(a) that this Recommendation defines the characteristics from a transmission point of view of start-stop terminal equipment working at rates up to 300 bauds;

(b) that this Recommendation applies – except where otherwise specified – to start-stop apparatus in general: i.e. it applies to teleprinters, data terminal equipment, multiplexer tributaries, etc.;

(c) that user classes of service 1 and 2 in Recommendation X.1 [1] should be taken into account;

(d) that some equipment (using telegraph modems in accordance with Recommendation R.20 [2], or single current working, for instance) cannot be separated during operation from its supply and repeater devices; hence the measurements under operating conditions must apply to the local end with its termination [3];

(e) that the characteristics laid down below are those that should be evident in service conditions on local ends with their terminations that are likely to be connected to the international network. It should be noted however that in the case of d.c. transmission (including DCEs at the point of interconnection between the DCE and the DTE) they apply to such local ends with their terminations only if the influence of the line in the local end produces negligible distortion. In the case of equipment incorporating telegraph modems the modem-to-modem distortion as given in Recommendation R.20 [2] must be included.

*unanimously declares the view:*

#### 1 General characteristics

1.1 The nominal modulation rate should be chosen from Table 1/S.3.

1.2 The difference between the real mean modulating rate of signals when in service and the nominal modulation rate should not exceed  $\pm 0.1\%$ .

*Note* – There is early equipment in service at rates up to 100 bauds with difference of  $\pm 0.75\%$ .

1.3 The nominal duration of the transmitting cycle should be chosen from Table 1/S.3. For 50 and 75-baud working, the stop element should be at least 1.4 units (preferably 1.5). For higher rates, the stop element should not be less than its nominal length.

1.4 The receiver must be able to translate correctly in service the signals coming from a source that appears to give stop elements equal to or greater than

1.0 unit at 50 or 75 bauds

1.2 unit at 100 or 200 bauds (when using nominally 7.5 unit characters)

1.0 unit at 110 baud

1.0 unit at 200 and 300 bauds (when using nominally 11 unit characters)

0.8 unit at 100, 150, 200 or 300 bauds (when using nominally 10 unit characters)

0.8 unit at 134.5 bauds (when using nominally 9 unit characters)

TABLE 1/S.3

Modulation rate (baud)	Character structure	
	Character length (units)	Stop element (units)
50	7.5	1.5
75	7.5	1.5
100	7.5	1.5
100	10	1
110	11	2
134.5	9	1
150	10	1
200	7.5	1.5
200	10	1
200	11	2
300	10	1
300	11	2

## 2 Transmitter characteristics

### 2.1 Transmit distortion

2.1.1 The transmit distortion with a d.c. interface should not exceed:

- a) 5% for equipment working at rates up to 100 bauds.

*Note* – A figure of 3% is recommended for new equipment.

- b) 3% for equipment working at rates between 110 and 300 bauds.

2.1.2 The transmit distortion with a scvf interface, measured at the in-station modem, should not exceed:

Rate (baud)	50	75	100	110	134.5	150	200	300
Distortion (%)	10*	11*	12*	10	11	12	14	18

*Note 1* – This is derived from the sum of the assumed transmit distortion at a d.c. interface and the modem-to-modem distortion given in Recommendation R.20. (\*New equipment, having an assumed distortion of 3% at the d.c. interface will have a correspondingly lower figure for the resultant transmit distortion from the in-station modem.)

*Note 2* – A higher modem-to-modem (R.20) distortion applies in the case of frequency error, so that a correspondingly higher resultant transmit distortion from the in-station modem will be obtained.

2.2 In all cases “distortion” should be taken as gross start-stop distortion [4], using the appropriate alphabet.

It is recommended that the measurement should be made with a start-stop distortion measuring set, for a period in accordance with Recommendation R.5 [5].

### 3 Receiver characteristics

#### 3.1 Receive Margin

3.1.1 The receive margin with a d.c. interface should not be less than 40%.

3.1.2 The receive margin with a scvf interface, as measured at the in-station modem, should not be less than:

Rate (baud)	50	75	100	110	134.5	150	200	300
Marging (%)	35	34	33	33	32	31	29	25

*Note 1* – This is derived from the assumed terminal margin at a d.c. interface of 40% and the modem-to-modem distortion as given in Recommendation R.20.

*Note 2* – A higher modem-to-modem (R.20) distortion applies in the case of frequency error so that a correspondingly lower resultant marging at the in-station modem will be obtained.

3.2 In all cases “marging” should be taken as effective net margin [6], using the appropriate alphabet.

It is recommended that the measurement should be made under the following conditions, in service:

- character structure appropriate to the equipment under test chosen from Table 1/S.3;
- use of one of the standardized texts in Recommendation R.52 [7];
- test with the appropriate degree of start element distortion, long and short;
- reading the margin when one error per test sentence is obtained (the marging is the lesser of two values of the degree of distortion obtained from the two measurements).

*Note* – It will be up to Administrations using some other measuring method to work out for their own use figures to give equivalent results to those which would have been obtained by the recommended method.

#### References

- [1] CCITT Recommendation *International user classes of service in public data networks and integrated services digital networks (ISDNs)*, Rec. X.1.
- [2] CCITT Recommendation *Telegraph modem for subscriber lines*, Rec. R.20.
- [3] CCITT Recommendation *Definition of essential technical terms relating to apparatus for alphabetic telegraphy*, Rec. S.140, Definition, No. 26 local end (with its termination).
- [4] CCITT Recommendation *Definitions of essential technical terms in the field of telegraph transmission*, Rec. R.140, Definition, No. 33.09, degree of gross start-stop distortion.
- [5] CCITT Recommendation *Observation conditions recommended for routine distortion measurements on international telegraph circuits*, Rec. R.5.
- [6] CCITT Recommendation *Definitions of essential technical terms relating to apparatus for alphabetic telegraphy*, Rec. S.140, Definitions, Nos. 59 and 60, margin and effective margin (of a given apparatus).
- [7] CCITT Recommendation *Standardization of international texts for the measurement of the margin of start-stop equipment*, Rec. R.52.