



INTERNATIONAL TELECOMMUNICATION UNION

# ITU-T

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

## Q.48

**GENERAL RECOMMENDATIONS ON TELEPHONE  
SWITCHING AND SIGNALLING**

**INTERNATIONAL AUTOMATIC AND  
SEMI-AUTOMATIC WORKING**

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**DEMAND ASSIGNMENT SIGNALLING  
SYSTEMS**

**ITU-T Recommendation Q.48**

(Extract from the *Blue Book*)

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## NOTES

1 ITU-T Recommendation Q.48 was published in Fascicle VI.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 Q.48

### DEMAND ASSIGNMENT SIGNALLING SYSTEMS<sup>1)</sup>

**1** The term "demand assignment" (abbreviated as DA) should be taken as meaning that the assignment is on a per-call basis.

*Note* - Satellite circuits with demand assigned multiple access are those circuits which may be set up by assignment of a satellite link to operate between specified earth stations when the actual demand arises.

The origin, destination, or both of the satellite link can be varied. The link is assigned to set up the required telephone circuit according to the call.

This defines the following concepts:

- 1) variable destination satellite link;
- 2) variable origin satellite link;
- 3) fully variable satellite link (the origin and destination of which may both be varied).

The Recommendation covers, when applicable, fully variable and variable destination types of DA systems.

**2** The DA signalling system shall be capable of interworking with all currently standardized CCITT signalling systems and shall have the capacity to carry all the telephony signals currently provided by these CCITT signalling systems and shall in addition provide reserve capacity.

Any currently standardized CCITT signalling system shall be able to be applied to any access link. Different CCITT signalling systems may be applied to the various access links at the same time.

**3** Account should be taken of the fact that particular earth stations may have special signalling requirements to suit the CTs using these earth stations (e.g. joint use of an earth station by a number of CTs, long distances between CT and earth station, CTs with access to more than one earth station).

**4** The DA signalling system shall be an integrated signalling system used both for:

- a) signalling for setting up the DA speech circuit; and
- b) transfer of the information flow for telephony.

**5** The DA signalling system shall be capable of transmitting address information in both the *en bloc* and the

overlap mode of operation. The transmission of address information by the outgoing DA system terminal should be such as to result in minimum delay to these signals in the DA system.

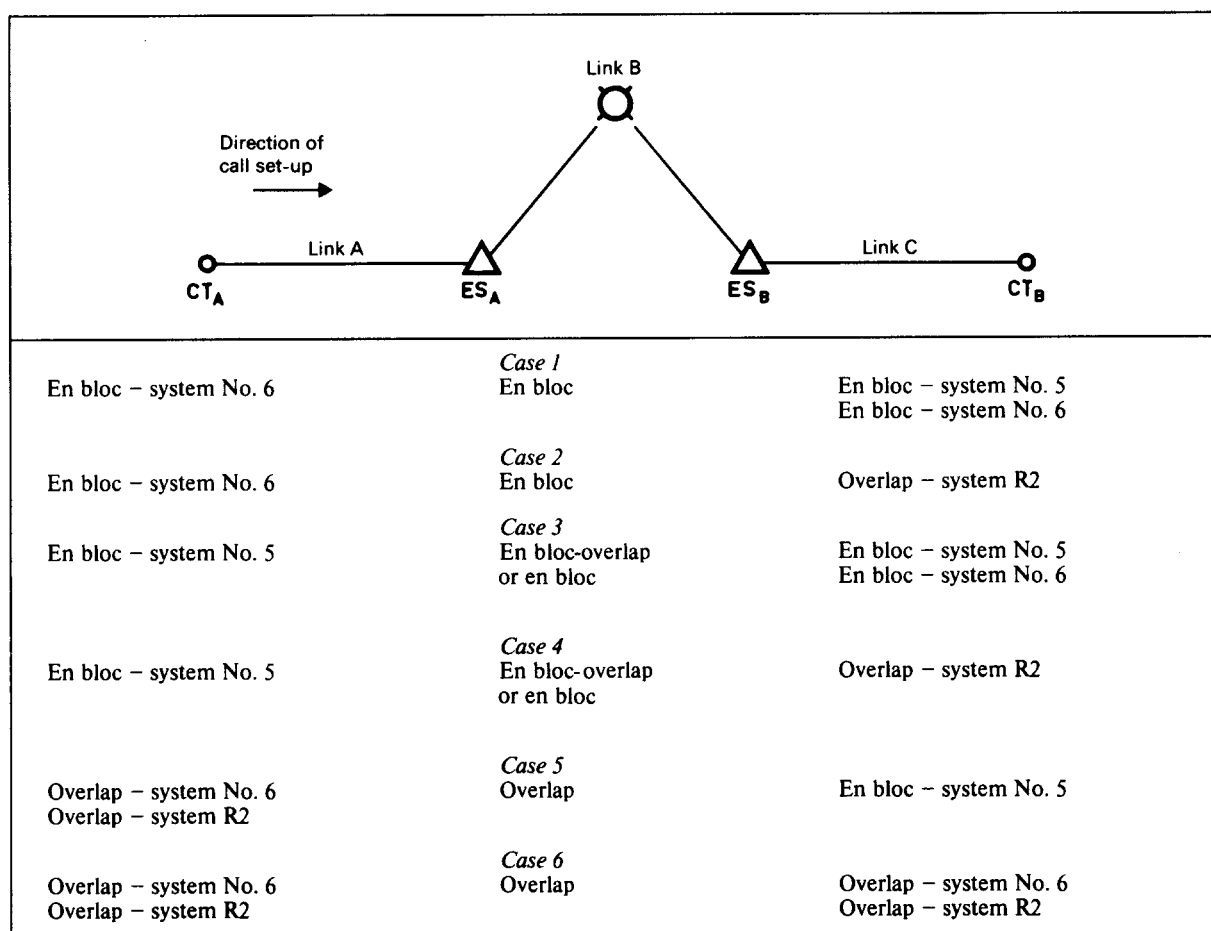
The manner of transmitting signals over the DA signalling system shall be independent of the type of signalling system to be encountered in the access link at the far end.

Accordingly, the interworking arrangements described in Table 1/Q.48 are recommended. (For definitions of "*en bloc*" and "*en bloc* overlap" see the definitions in Recommendation Q.151 [2].)

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<sup>1)</sup> See also the reference cited in [1].

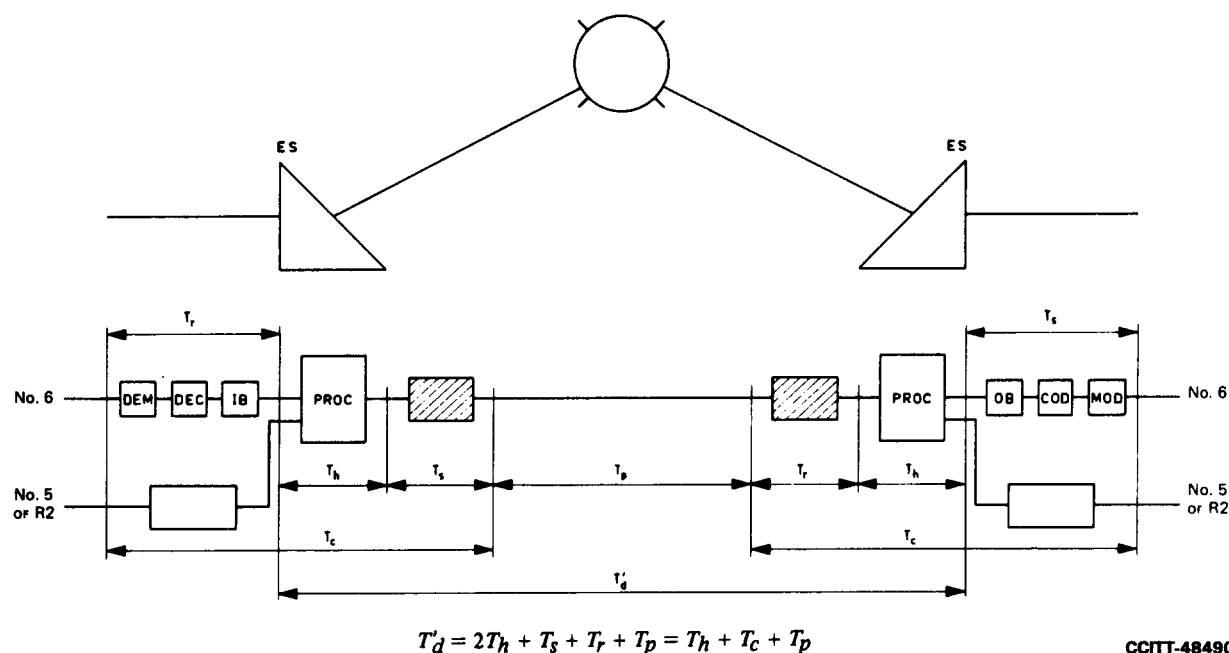
TABLE 1/Q.48  
Interworking arrangements for DA signalling systems



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- 6 The DA signalling system shall send out address digits from ES<sub>B</sub> to CT<sub>B</sub> in the correct order, that is, the order of dialling.
- 7 Means shall be provided for preventing spillover of signals between successive calls, which use the same satellite channel through the DA signalling system.
- 8 The DA signalling system should be capable, for the sequence *re-answer signal-clear back signal* of correctly extending to CT<sub>A</sub> from ES<sub>A</sub>, the last state representing the final position of the called party's switch hook.
- 9 The message structure of the demand assignment signalling system should be such that one message will contain all the information necessary for one event (e.g. answer signal for one particular circuit). Single unit and multi-unit messages should be catered for. Each signal unit should contain both information and check bits.
- 10 All time-outs for both normal and abnormal conditions in the DA signalling system should be designed according to the recommendations concerning the relevant CCITT signalling systems.
- 11 Signal transfer time through the DA signalling system should be fast. While no firm time requirements in regard to the various components of signal transfer time have been established, design objectives in terms of average and 95% level values for the signal transfer time ( $T_d$ ) for answer signals, other one-unit messages and the initial address message are given. These figures are to be viewed as reasonable objectives and not as firm requirements.
- 11.1 *Signal transfer time in the DA signalling system*

A signal transfer time in the DA signalling system is specified. This signal transfer time is called  $T'_d$  in the diagram of Figure 1/Q.48.



$T'_d$  = Signal transfer time in DA signalling system.  
(For other symbols, see Recommendation Q.252 [3].)

To facilitate the calculation of the total signal transfer time of the DA system, it is assumed that the time  $T_r$  as well as  $T_s$  respectively of the terrestrial and satellite transmission links are equal

**FIGURE 1/Q.48**  
**Functional signal transfer time diagram**

The value  $T_d = T'_d - T_p$  should be used as the design objective for the DA signalling system. The values of  $T_d$  calculated for the design of the system are shown in Table 2/Q.48.

*Note* - These figures have to be interpreted as reasonable estimates and not as firm requirements.

**TABLE 2/Q.48**  
**Values of signal transfer times for design of a DA signalling system**

Design objectives for  $T_d$

$$T_d = T'_d - T_p$$

	Type of message	Answer	Other one-unit message	IAM of 5 SU
$T_d$ in ms	AV	52	85	145
	95% level	85	175	235

For calculation use the following relations:

$$T_d = 2 T_h + T_s + T_r = T_c + T_h \quad (11-1)$$

$$T_{d \text{ av}} = T_{c \text{ av}} + T_{h \text{ av}} \quad (11-2)$$

$$T_{d 95\%} = T_{d \text{ av}} + \sqrt{(\Delta T_c)^2 + (\Delta T_h)^2} \quad (11-3)$$

where

$$\Delta T_c = T_{c 95\%} - T_{c \text{ av}} \quad (11-4)$$

$$\Delta T_h = T_{h 95\%} - T_{h \text{ av}} \quad (11-5)$$

For basis of calculation see [4].

## 12 Dependability requirements

The requirements specified for System No. 6 (see [5]) are recommended as the objectives for the DA signalling system.

### 12.1 *Signal transfer dependability* (see [6])

"b) Signal units of any type which give rise to wrongly accepted signals due to undetected errors and causing false operation (e.g. false clear-back signal):

not more than one error in  $10^8$  of all signal units transmitted, and

c) As in item b) but causing serious false operation (e.g., false metering or false clearing of a connection):

not more than one error in  $10^{10}$  of all signal units transmitted."

### 12.2 *Error correction by retransmission* (see [7])

Although the bit error rate in the DA signalling system has not been determined, the design of the system should be made such that a design objective "not more than one in  $10^4$  signal units carrying telephone information is allowed to be delayed as a consequence of error correction by retransmission."

### 12.3 *Interruption of the signalling service* (see [8])

System No. 6 requirements are:

- interruption of duration between 2 seconds and 2 minutes: not more than once a year;
- interruption of duration exceeding 2 minutes: not more than once in 10 years.

Since the speech circuits and the signalling channel in the DA system normally will be interrupted simultaneously, it is understood that the above figures are related to the signalling equipment and not to the transmission media common to both the signalling channel and the speech circuits.

## References

- [1] *Signalling for demand assignment satellite systems*, Green Book, Vol. VI-4, Supplement No. 8, ITU, Geneva, 1973.
- [2] CCITT Recommendation *Signal code for register signalling*, Vol. VI, Rec. Q.151.
- [3] CCITT Recommendation *Signal transfer time definitions*, Vol. VI, Rec. Q.252.
- [4] CCITT Recommendation *Signal transfer time requirements*, Vol. VI, Rec. Q.287, Annex A.
- [5] CCITT Recommendation *Service dependability*, Vol. VI, Rec. Q.276, § 6.6.1.
- [6] *Ibid.*, § 6.6.1, b) and c).
- [7] *Ibid.*, § 6.6.1, a).
- [8] *Ibid.*, § 6.6.1, d).