All drawings contained in this Recommendation have been done in Autocad.

**Recommendation Q.725**

xe ""§SIGNALLING PERFORMANCE IN THE TELEPHONE APPLICATION

# 1 Introduction

This Recommendation gives the requirements of the telephone application of Signalling System No. 7.

In Recommendation Q.706, the Message Transfer Part performance is described. The Message Transfer Part is the basis of the telephone application of Signalling System No. 7 and provision of a signalling network to serve the telephone service must take account of the performance of the Message Transfer Part and the requirements of the telephone application. For example, taking account of the message transfer times detailed in Recommendation Q.706 and the requirements for message transfer times between two telephone exchanges, a figure may be derived for the total permissible number of signalling links in signalling relations in tandem for a particular call.

# 2 xe ""§Unsuccessful calls due to signalling malfunction

The proportion of calls that are unsuccessful due to signalling malfunction should be less than 1 in 105.

By means of error detection (see Recommendation Q.703) as well as transmission fault indication (see Recommendations G.732 [1] and G.733 [2]), it is ensured that, overall, not more than one error in 108 of all signal units transmitted is accepted and will cause false operation.

Unsuccessful calls may be caused by undetected errors, loss of messages or messages delivered out of sequence (during emergency situations within the signalling network) and may result in:

– incomplete call set–up,

– misrouted calls (e.g. connection of wrong numbers),

– calls routed correctly but mishandled (e.g. false clearing).

# 3 xe ""§Unavailability of a signalling route set

The overall unavailability of a signalling route set causing the unavailability of a signalling relation should not exceed a total of 10 minutes per year.

*Note* – The availability of a signalling route set within a signalling network may be enhanced by replication of signalling links, signalling paths and signalling routes.

## 4 xe ""§Labelling potential

The label of the Telephone User Part of Signalling System No. 7 provides the potential to identify 16 384 signalling points and up to 4096 speech circuits for each signalling relation.

## 5 xe ""§Cross–office transfer time

5.1 *Functional reference points and transfer time components*
Figure 1/Q.725 - CCITT 35600

### 5.2 *Definitions*

a) **cross–office transfer time, Tcu**

*Tcu* is the period which starts when the last bit of the signal unit leaves the incoming signalling data link and ends when the last bit of the signal unit enters the outgoing signalling data link for the first time. It also includes the queueing delay in the absence of disturbances but not the additional queueing delay caused by retransmission.

b) **user handling time, Thu**

*Thu* is the period which starts when the last bit of the message has entered the Telephone User Part and ends when the last bit of the derived message has left the Telephone User Part.

### 5.3 *Queueing delay*

The formulae for the queueing delays are described in Recommendation Q.706, § 4.2.

The telephone traffic model assumed is given in Table 1/Q.725, from which the proportion of signal messages may be obtained as shown in Table 2/Q.725. Using Table 2/Q.725, examples of queueing delays are calculated as shown in Figures 2/Q.725 to 5/Q.725, where one call attempt per second per 64 kbit/s signalling data link may yield 0.00577 Erlang of the traffic loading of each channel.

### 5.4 *Estimates for message transfer time*

The figures in Table 3/Q.725 are related to a signalling bit rate of 64 kbit/s.

### 5.5 *Effect of retransmission*

As a consequence of correction by retransmission, not more than one in 104 signals should be delayed more than 300 ms as a long–term average. This requirement refers to each

signalling link.

This requirement is laid down in order to ensure satisfactory answer delays.

TABLE 1/Q.725

| **Traffic model** | | |
|---|---|---|
| Sending procedure | | |
| | “En bloc” | |
| | Overlap | |
| Type of call | | |
| | AW | |
| | SB | |
| | CC | |
| | AB | |
| | AW | |
| | SB | |
| | CC | |
| | AB | |

Percent calls

30

10

5

5

30

10

5

5

Length (bits)

12–digit IAM

176

1

1

1

0

6–digit IAM

152

1
1
1
1

3–digit SAM

128

1
1
0
1

Messages per call

1–digit SAM

112

3

3

0

0

Address complete

112

1

1

0

0

1

1

0

0

Others

112

3,5

2

3

0

3,5

2

3

2

AW Answered

SB Subscriber busy and not answered

CC Circuit congestion

AB Abortive

*Note* – The assumptions used in this model are chosen for illustrative purposes, and should not be considered to be typical.

TABLE 2/Q.725

**Proportion of messages**

| Length (bits) | |
|---|---|
| 176 | |
| 152 | |
| 128 | |
| 112 | |
| 104 | |
| Total | |

| Messages per call in both directions | |
|---|---|
| 0.45 | |
| 0.5 | |
| 0.45 | |
| 2.0 | |
| 2.9 | |
| 6.3 | |

| Percent | |
|---|---|
| 7.1 | |
| 7.9 | |
| 7.1 | |
| 31.7 | |
| 46.0 | |

100

Mean message length (*Tm*)

117.2 bits

k1

1.032

k2

1.107

k3

1.239

Figure 2/Q.725 - CCITT 41210

Figure 3/Q.725 - CCITT 41200

Figure 4/Q.725 - T1115651-88

Figure 5/Q.725 - T 1109931-88

TABLE 3/Q.725

Message type

Exchange call

Cross–office transfer time
*Tcu* (ms) a)

attempt loading

Mean

95%

Simple (e.g. answer)

| |
|---|
| Normal |
| +15% |
| +30% |
| |
| 110 |
| 165 |
| 275 |
| |
| 220 |
| 330 |
| 550 |

Processing intensive
(e.g. IAM)

| |
|---|
| Normal |
| +15% |
| +30% |
| |
| 180 |
| 270 |
| 450 |
| |
| 360 |
| 540 |
| 900 |

a) Provisional values.

**References**


[1] CCITT Recommendation *Characteristics of primary PCM multiplex equipment operating at 2048 kbit/s*, Rec. G.732.

[2] CCITT Recommendation *Characteristics of primary PCM multiplex equipment operating at 1544 kbit/s*, Rec. G.733.