INTERNATIONAL TELECOMMUNICATION UNION

CCITT

E.723

THE INTERNATIONAL
TELEGRAPH AND TELEPHONE
CONSULTATIVE COMMITTEE

TELEPHONE NETWORK AND ISDN

QUALITY OF SERVICE, NETWORK MANAGEMENT AND TRAFFIC ENGINEERING

GRADE-OF-SERVICE PAREMETERS FOR SIGNALLING SYSTEM No. 7 NETWORKS

Recommendation E.723

Geneva, 1992

FOREWORD

The CCITT (the International Telegraph and Telephone Consultative Committee) is a permanent organ of the International Telecommunication Union (ITU). CCITT is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The Plenary Assembly of CCITT which meets every four years, establishes the topics for study and approves Recommendations prepared by its Study Groups. The approval of Recommendations by the members of CCITT between Plenary Assemblies is covered by the procedure laid down in CCITT Resolution No. 2 (Melbourne, 1988).

Recommendation E.723 was prepared by Study Group II and was approved under the Resolution No. 2 procedure on the 16 of June 1992.

CCITT NOTES

1) In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication Administration and a recognized private operating agency.

2) A list of abbreviations used in this Recommendation can be found in Annex A.

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Recommendation E.723

GRADE-OF-SERVICE PARAMETERS FOR SIGNALLING SYSTEM No. 7 NETWORKS

1. Scope and objectives

Based on the reference connections for ISDN circuit switched services and the grade-of-service (GOS) parameter values contained in Recommendation E.721, this Recommendation provides appropriate reference connections for the S.S. No. 7 network and identifies the signalling network GOS parameters and their target values. Further, the Recommendation also provides guidelines for partitioning/allocating the signalling network end-to-end GOS to the basic components of the S.S. No. 7 network. The reference connection and GOS parameters and values for source transaction type services requiring data base lookup are also included.

2 Reference connections for S.S. No. 7 networks

Reference connections for ISDN circuit switched service are contained in Table I/E.721 in terms of the number of switching nodes in local, toll or international connections.

In the control plane, several configurations of signalling links and signal transfer points (STPs)[1)] between the signalling points (SPs) associated with two adjacent nodes in the E.721 connections are possible. For example, the relations shown in Figure I/E.723 may commonly exist.

The configurations, on the following page, are consistent with Recommendation Q.709 and represent the basic segments of the S.S. No. 7 network. In this Recommendation therefore, the S.S. No. 7 end-to-end delay objectives are allocated per user plane circuit group (basic S.S. No. 7 network segment). Individual Administrations may choose the signalling network configuration and the resulting sub-division of delay objectives to signalling link-sets and STPs within a national network.

The reference connections for the S.S. No. 7 network (i.e. the number of STPs) corresponding to Recommendation E.721, are shown in Table I/E.723.

The signalling network configuration used as the reference connection for a transaction type service requiring a single data base lookup is shown in Figure 2/E.723. Reference connections for more complicated intelligent network (IN) calls is for further study.

3 GOS parameters for S.S. No. 7 network

3.1 Two delay GOS parameters for ISDN circuit switched services that depend on the performance of the S.S. No. 7 network include the post-selection delay and the answer signal delay. The target values (mean) for these are specified in Recommendation E.721 for local, toll and international reference connections under normal load (Table 2/E.721).

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1) Throughout this Recommendation the STP designation is used to denote either Message Transfer Part (MTP) processing capability or MTP and Signalling Connecfion Control Part (SCCP) processing capability. The MTP and SCCP protocols are defined in the Q.700-Series Recommendations.

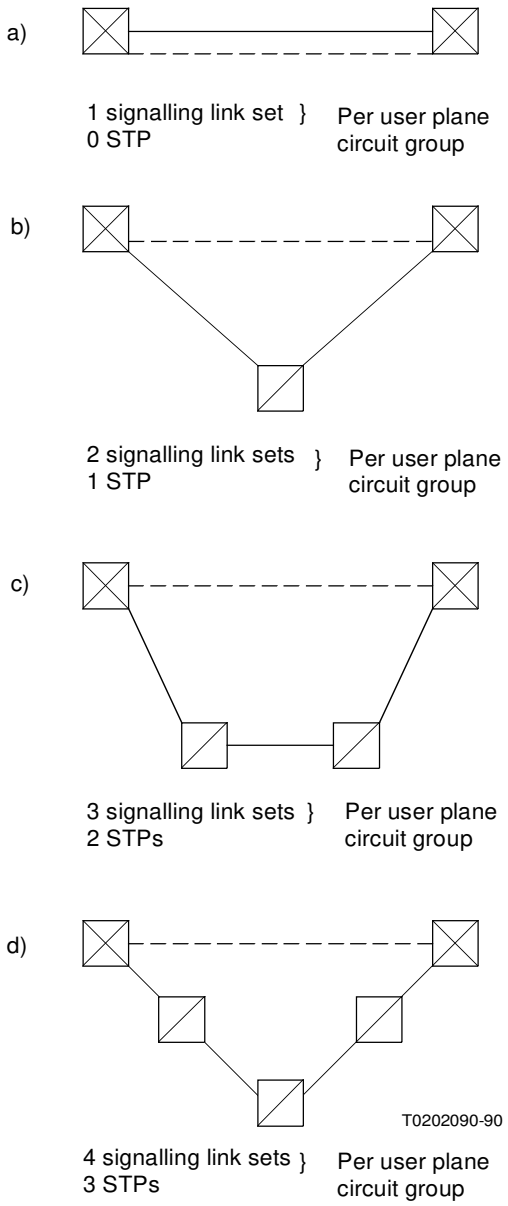

FIGURE 1/E.723

TABLE 1/E.723

Reference connections for the S.S. No. 7 network corresponding to the user plane reference connection for ISDN circuit switched services in Recommendation E.721

	Connection type		
	Local	Toll	International
Number (n) of switching nodes in user plane from Rec. E.721	n = 4	n = 7	n = 10
Number of STPs in S.S. No. 7 reference connection corresponding to the switching nodes in the user plane	3	8[a)]	12[b)]

a) The number of STPs in the reference connection is obtained by assuming that one STP exists between each pair of signalling points (exchanges), and that two additional STPs exist somewhere in the reference connection. A variety of arrangements of STPs within the reference connection having the same number of STPs are possible.

b) In addition to a), one additional STP exists somewhere in the international part of the reference connection. It is also assumed that one of the signalling links is via satellite.

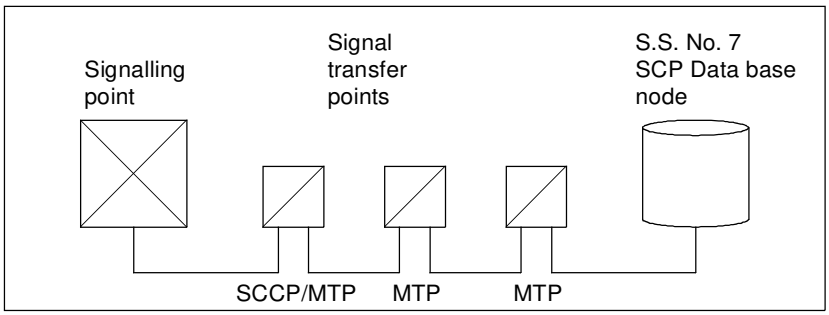

FIGURE 2/E.723

Reference connection for transaction type service using S.S. No. 7 network

For specifying the end-to-end GOS in a S.S. No. 7 network, the delay incurred by the most processing intensive message (i.e. the initial address message (IAM)) in traversing the network is considered the most important GOS parameter.

This delay is defined as the time interval from the instant that the first bit of the IAM message leaves the signalling terminal until the last bit enters the terminating signalling terminal plus an allowance to account for the ISDN User Part (ISUP) and MTP processing times and queuing delays of the S.S. No. 7 sub-system of the originating and terminating signalling terminals. The originating and terminating signalling terminals may be integrated with the originating and terminating exchanges.

The second end-to-end GOS parameter of interest is the delay incurred by the answer message (ANM). This delay is almost identical (slightly shorter) than the answer signal delay of Recommendation E.721.

This delay is defined as the time interval from the instant that the first bit of the ANM message leaves the originating signalling terminal until the last bit enters the terminating signalling terminal plus an allowance to account for the ISUP and MTP processing times and queueing delays of the S.S. No. 7 sub-system of the originating and terminating signalling terminals.

3.2 The objective value for the total delay for IAM can be derived from Table 2/E.721 by subtracting the objective for answer signal delay from post-selection delay (since the address complete delay is comparable to answer signal delay) and subtracting additional time to reflect some processing time at the originating and terminating exchanges and access delays.

The values for the mean end-to-end IAM delay are shown in Table 2/E.723.

TABLE 2/E.723

Mean values for IAM end-to-end delay for reference connections

Connection type	Mean delay (normal load)
Local	0.9 seconds
Toll	2.3 seconds
International	4.0 seconds

The ANM delay objective value is specified the same as answer signal delay from Recommendation E.721.

The values for the mean ANM delay are shown in Table 3/E.723.

TABLE 3/E.723

Mean values for the ANM delay for reference connections

Connection type	Mean delay (normal load)
Local	0.75 seconds
Toll	1.50 seconds
International	2.50 seconds

3.3 The objective value for the mean round trip delay for SCP access, not including the application processing at the SCP or the SP, is 0.8 seconds.

4 Partitioning GOS for signalling message delays

The partitioning of the IAM and ANM delays into national and international portions is based on the network model specified in Table I/E.723. The allocation to network portions is done by considering the ratio of signalling links and STPs and the associated delays in the international part of the reference connection of Table I/E.723 to the total connection.

The total IAM delay of 4.0 seconds and ANM delay of 2.5 seconds should be partitioned between the national and international portions of the S.S. No. 7 network as shown in Table 4/E.723.

TABLE 4/E.723

Partitioning of IAM and ANM delays into national and international portions

	Total delay	International delay	National delay[a)]
IAM	4.0	1.5	2.5
ANM	2.5	1.0	1.5

a) The national portion must be allocated to the originating call portion and terminating call portion. In general, this allocation should be equal unless bilaterally agreed otherwise.

5 Recommendation history

Recommendation E.723 - First issue 1992.

ANNEX A

(to Recommendation E.723)

Alphabetical list of abbreviations used in this Recommendation

ANM	Answer message
GOS	Grade-of-service
IAM	Initial address message
IN	Intelligent network
ISUP	ISDN user part
MTP	Message transfer part
SCCP	Signalling connection control part
SCP	Service control point
SP	Signalling point
STP	Signal transfer point