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**TELEPHONE NETWORK AND ISDN**

**QUALITY OF SERVICE, NETWORK MANAGEMENT  
AND TRAFFIC ENGINEERING**

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**GRADE OF SERVICE (GOS) MONITORING**

**ITU-T Recommendation E.493**

(Previously "CCITT Recommendation")

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## FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The ITU-T 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 World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation E.493 was prepared by ITU-T Study Group 2 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 19th of February 1996.

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## NOTE

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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## SUMMARY

This Recommendation provides the methods for monitoring GOS parameters in fixed and mobile telecommunications networks. GOS monitoring is considered for all traffic related GOS parameters defined in ITU-T Recommendations.

The GOS monitoring methodology is based on the principle that the measurements that are available are those that a network operator can obtain on a continuous basis using measurements taken at network elements. All measurements are defined so that a network element can provide the data without requiring coordination or communication with any other network element. An implication of this principle is that for all GOS parameters that involve multiple networks, each network's contribution to the GOS parameter is monitored and the overall GOS parameter is monitored only if it is possible from measurements taken within a single network.

## Recommendation E.493

## GRADE OF SERVICE (GOS) MONITORING

(Geneva, 1996)

## 1 Scope

This Recommendation covers the monitoring of traffic related Grade of Service (GOS) parameters in fixed and mobile telecommunications networks. The services considered are circuit-switched services, packet-switched services, Intelligent Network (IN)-based services and Broadband ISDN (B-ISDN)-based services.

Many of the GOS parameters defined are end-to-end in nature and to directly measure the parameter, the measurement equipment would have to be at the customer location (e.g. for post-selection delay and end-to-end blocking), or measurements would have to be taken between two locations [e.g. answer signal delay would be measured between two customer locations, Initial Address Message (IAM) delay would be measured between two local exchange switches]. This Recommendation does not consider measurements of that type. End-to-end or customer-based measurement usually involves temporary installations of monitoring equipment, and is not done on a continuous basis. Quality of Service (QOS) monitoring is frequently done in this way.

The type of GOS monitoring considered in this Recommendation is of a type that a network operator can do on a continuous basis using measurements taken at the network elements. Monitoring with specialized measurement equipment that connects to the network at one or more places is not considered. All measurements are defined so that a network element can collect the data without requiring coordination or communication (for the purpose of taking measurements) with any other network element. That is, each network element acts autonomously with regard to taking measurements.

The implication of this restriction on how measurements are taken is that the defined GOS parameters are not measured directly, but rather, each network's contribution to the defined parameter is measured. In order for network operators to assess how well their networks are meeting objectives, an allocation for each network needs to be made of the target values for the defined GOS parameters. This Recommendation does not cover how to do this allocation. The allocation will depend on how a specific network interconnects with other networks for different services. It is up to the network operators to work out these allocations with their interconnection partners. Recommendation E.721 provides the reference connection models used in determining the target GOS parameter values given there, and those reference connections should be considered in making allocations of target values to separate networks.

## 2 References

The following CCITT and ITU-T Recommendations provide the definitions and target values for the GOS parameters considered in this Recommendation:

- CCITT Recommendation E.543 (1988), *Grades of service in digital international telephone exchanges*.
- CCITT Recommendation E.721 (1991), *Network grade of service parameters and target values for circuit-switched services in the evolving ISDN*.
- CCITT Recommendation E.723 (1992), *Grade-of-service parameters for Signalling System No. 7 networks*.
- ITU-T Recommendation E.724 (1996), *GOS parameters and target GOS objectives for IN services*.
- ITU-T Recommendation E.771 (1993), *Network grade of service parameters and target values for circuit-switched land mobile services*.
- ITU-T Recommendation E.774<sup>1)</sup>, *Network grade of service parameters and target values for maritime and aeronautical mobile services*.

<sup>1)</sup> Presently at the stage of draft.