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# ITU-T

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STANDARDIZATION SECTOR  
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# E.439

(03/2000)

**SERIES E: OVERALL NETWORK OPERATION,  
TELEPHONE SERVICE, SERVICE OPERATION AND  
HUMAN FACTORS**

**Quality of service, network management and traffic  
engineering – Network management – Checking the  
quality of the international telephone service**

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**Test call measurement to assess N-ISDN  
64 kbit/s circuit-switched bearer service UDI in  
operation**

**ITU-T Recommendation E.439**

(Formerly CCITT Recommendation)

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## **ITU-T RECOMMENDATION E.439**

### **TEST CALL MEASUREMENT TO ASSESS N-ISDN 64 kbit/s CIRCUIT-SWITCHED BEARER SERVICE UDI IN OPERATION**

#### **Summary**

This Recommendation presents an overview of the operational measurements, defined in Recommendation E.438, that can be performed by test calls and used to assess the performance of N-ISDN 64 kbit/s circuit-switched UDI bearer services. Correspondent measurements (excluding transmission quality measures), performed by exchanges on live traffic, are specified in Recommendation M.3650. These Recommendations should be used by administrations and by ROAs for monitoring and improvement analysis of ISDN services and networks in operations. The measured values can be used both to set guaranteed performance levels in Service Level Agreement with the customers and Service Quality Agreements with other administrations, and to verify, analyse and improve the performance level currently achieved.

#### **Source**

ITU-T Recommendation E.439 was prepared by ITU-T Study Group 2 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on 13 March 2000.

## FOREWORD

ITU (International Telecommunication Union) is the United Nations Specialized Agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the 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.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

## NOTE

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

ITU-T Recommendation E.439 (03/2000)

## INTELLECTUAL PROPERTY RIGHTS

The ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. The ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, the ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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## Introduction

ISDN traffic is growing, particularly for access to Internet and to broadband networks, and for videocommunication services. Standard measurements, as close as possible to those used for PSTN, are needed to monitor the level of performance achieved.

This Recommendation describes practical definitions and methods to be used in operation for measuring the performance of ISDN CSCT 64 kbit/s UDI bearer service on a per-call basis through test call generation. The standard NP/QOS measures and the related definitions and considerations are described in ITU-T Recommendation E.438. Similar measures taken in operation for real traffic are described in ITU-T Recommendation M.3650.

The list of operational measures and the NP/QOS parameters enabling assessment, by the three performance serveability criteria, of the three communication functions of an ISDN call, are described in clause 7. Remarks on performance of multiple channel calls for ISDN are made in 7.2. Specific considerations on ISDN calls using primary rate interface accesses are made in clause 8. Calculation methods and procedures to derive the NP/QOS statistical parameters from the NP measures obtained on a per-call basis are provided in Annex A. In Annex B, data collection principles and statistical calculation procedures for the same parameters are described. Annex C references statistical procedures to estimate the confidence interval for the performance parameters and compliance testing to verify their acceptability level.

## Recommendation E.439

# TEST CALL MEASUREMENT TO ASSESS N-ISDN 64 kbit/s CIRCUIT-SWITCHED BEARER SERVICE UDI IN OPERATION

## 1 Introduction

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## 2 Scope

This Recommendation describes methods for assessing in operation the serveability performance of setup, information transfer and disengagement phases of 64 kbit/s circuit-switched ISDN connections and networks by means of test calls. Methods are given for determining the values of derived performance parameters from the primary measurements. The parameters themselves are, for the most part, defined in other Recommendations in the E-, G-, I-, M- and O-series.

The methods described in this Recommendation are applicable only to the unrestricted digital bearer service accessed via basic rate and primary rate ISDN<sup>1,2,3,4</sup>. QOS estimation of teleservices using 64 kbit/s UDI requires the definition of appropriate performance parameters that take account of the effects of terminal equipment on QOS: this is for future study. In some cases, a compromise is necessary between the formal definition of a parameter and the means of measuring it. Where such compromises are required, this Recommendation takes the pragmatic view that a performance parameter is of little value if it cannot be operationally measured and its formal definition has been

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- <sup>1</sup> This includes both 64 kbit/s services and  $n \times 64$  kbit/s services.
  - <sup>2</sup> The inclusion of parameters for assessing the information transfer phase of 3.1 kHz audio and the speech bearer services are for further study. Therefore, the performance of mixed connections ISDN ↔ PSTN are not presently considered.
  - <sup>3</sup> This Recommendation does not consider Dedicated Circuit Connection Type (DCCT) and Packet Switched Connection Type (PSCT).
  - <sup>4</sup> Packet switched ISDN services, teleservices and supplementary services are not within the scope of this Recommendation at present.

adjusted accordingly. Additionally, not all parameters reflect the way in which a user might view the QOS of service and the parameters and measurements method described herein are for network assessment only. The mapping of the measurement made with this Recommendation into parameters reflecting the customer view is beyond the scope of this Recommendation and is left to individual ROAs.

### 3 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

- [1] ITU-T Recommendation E.438 (2000), *Performance parameters and measurement methods to assess N-ISDN 64 kbit/s circuit switched bearer service UDI in operation.*
- [2] ITU-T Recommendation M.3650 (1997), *Network performance measurements of ISDN calls.*
- [3] ITU-T Recommendation E.721 (1999), *Network grade of service parameters and target values for circuit-switched services in the evolving ISDN.*
- [4] ITU-T Recommendation I.350 (1993), *General aspects of quality of service and network performance in digital networks, including ISDNs.*
- [5] ITU-T Recommendation I.352 (1993), *Network performance objectives for connection processing delays in an ISDN.*
- [6] ITU-T Recommendation I.353 (1996), *Reference events for defining ISDN and B-ISDN performance parameters.*
- [7] ITU-T Recommendation I.355 (1995), *ISDN 64 kbit/s connection type availability performance.*
- [8] ITU-T Recommendation G.114 (1988), *Mean one-way propagation time.*
- [9] ITU-T Recommendation G.821 (1996), *Error performance of an international digital connection operating at a bit rate below the primary rate and forming part of an integrated services digital network.*
- [10] ITU-T Recommendation O.152 (1992), *Error performance measuring equipment for bit rates of 64 kbit/s and  $N \times 64$  kbit/s.*
- [11] ITU-T Recommendation E.846 (1993), *Accessibility for 64 kbit/s circuit-switched international end-to-end ISDN connection types.*
- [12] ITU-T Recommendation E.800 (1994), *Terms and definitions related to quality of service and network performance including dependability.*
- [13] ITU-T Recommendation E.820 (1992), *Call models for serviceability and service integrity performance.*
- [14] ITU-T Recommendation E.425 (1998), *Internal automatic observations.*
- [15] ITU-T Recommendation I.430 (1995), *Basic user-network interface – Layer 1 specification.*
- [16] ITU-T Recommendation Q.921 (1997), *ISDN user-network interface – Data link layer specification.*