INTERNATIONAL TELECOMMUNICATION UNION

CCITT

THE INTERNATIONAL
TELEGRAPH AND TELEPHONE
CONSULTATIVE COMMITTEE

E.820

(10/92)

TELEPHONE NETWORK AND ISDN

QUALITY OF SERVICE, NETWORK MANAGEMENT AND TRAFFIC ENGINEERING

CALL MODELS FOR SERVEABILITY AND SERVICE INTEGRITY PERFORMANCE

Recommendation E.820

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.820 was revised by Study Group II and was approved under the Resolution No. 2 procedure on the 30th of October 1992.

CCITT NOTE

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

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Recommendation E.820

CALL MODELS FOR SERVEABILITY AND SERVICE INTEGRITY PERFORMANCE

(revised 1992)

Introduction

This Recommendation is one of a set of closely related Recommendations concerned with accessibility and retainability of the telephone service, as listed below.

The CCITT,

considering

(a) that there is a desire to establish overall objectives for the Quality of Service as perceived by the users;

(b) that such objectives can then be used as a basis for the design, planning, operation and maintenance of telecommunication networks and their components parts;

(c) that a model is necessary in order to relate the various serveability and integrity measures to the different call phases;

(d) that Recommendation E.800 contains terms and definitions for the Quality of Service, reliability and availability performances and related characteristics of the service and network,

recommends

that the call models given in this Recommendation shall be used by Administrations to design, plan, operate and maintain their networks, taking into account the objectives given in Recommendations:

E.845 Connection accessibility objectives;

E.850 Connection retainability objectives.

Note – Refer also to Recommendation E.830: Models for allocation and evaluation of serveability and service integrity.

1 Call models for serveability and integrity performance

The simplified models given in § 3 illustrate the main phases of different types of calls. It also interrelates these phases to the service-related performance concepts and their principle measures as well as to the main causes of failure in the establishment and retention of such a call and its subsequent billing.

The models also indicate where, in this series of phases, user actions or mistakes may influence the call.

2 Comments to the models and their applications

2.1 *Contributions to causes of call failure*

It is generally recognized that the various parts of a national or international network may be of different importance to the successful completion of the various phases of a call. For example, the network accessibility is mainly determined by the telephone set, the subscriber line and the local exchange; the connection accessibility by the exchanges, transmission network and signalling network used; the billing integrity is dependant on the charging facilities used by the network parts that constitute the connection and the equipment for processing the billing information, etc. In some Administrations, the telephone set is not considered as a part of the network and in that case it is not included in the concepts of network performance.

2.2 *Time aspects of measures*

Depending on the intended application of the measures indicated in the call models, it may be appropriate to express these measures by the distribution. Consequently the distribution may be estimated taking appropriate sampling intervals, over a sufficiently long observation time, in order to get enough data for covering rare situations.

2.3 *Space aspects of averages*

The measures as indicated in call models could be applied to calls between particular destinations as traffic weighted averages over a number of destinations, etc. However it should be noted that several averages may mask the user perception, particularly when there is a large spread among the different directions. In this case, better information is given by the distribution of measures over the different directions.

Each relevant Recommendation should clearly specify which alternative(s) to use.

3 Call models

3.1 *Call models for services supported by telephone network*

3.1.1 *Telephone call*

See Figure 1/E.820.

3.1.2 *Facsimile call*

See Figure 2/E.820.

3.1.3 *Data call*

For further study.

3.2 *Call models for services supported by ISDN*

3.2.1 *Circuit switched "overlap sending"*

See Figure 3/E.820.

3.2.2 *Circuit switched "en bloc sending"*

See Figure 4/E.820.

3.2.3 *Virtual call "Packet Terminal"*

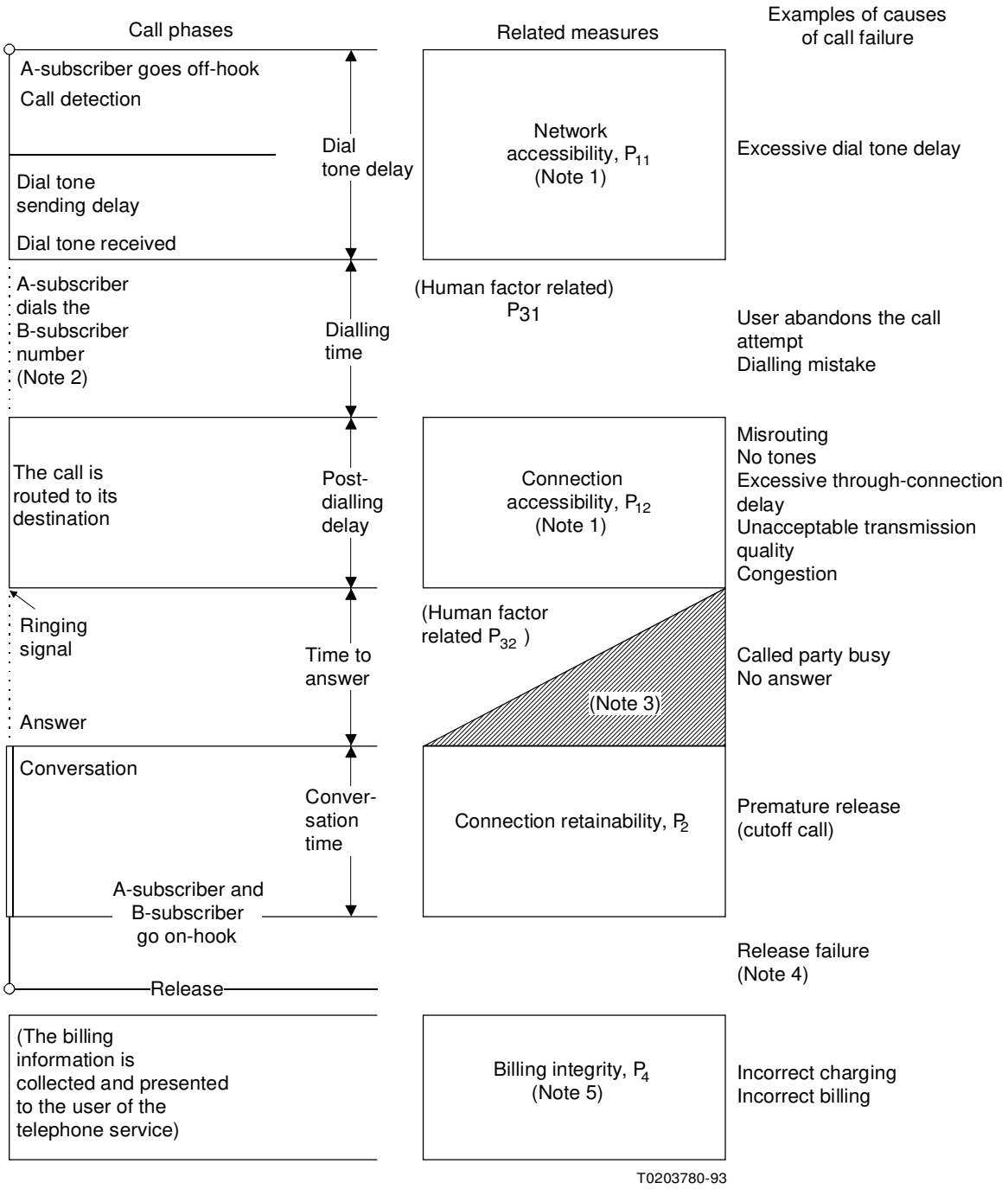
See Figure 5/E.820.

3.2.4 *Virtual call "non Packet Terminal"*

See Figure 6/E.820.

3.2.5 *Telex*

See Figure 7/E.820.



Note 1 – Network accessibility and connection accessibility combine into service accessibility.

Note 2 – The routing of the call may start before all digits have been received.

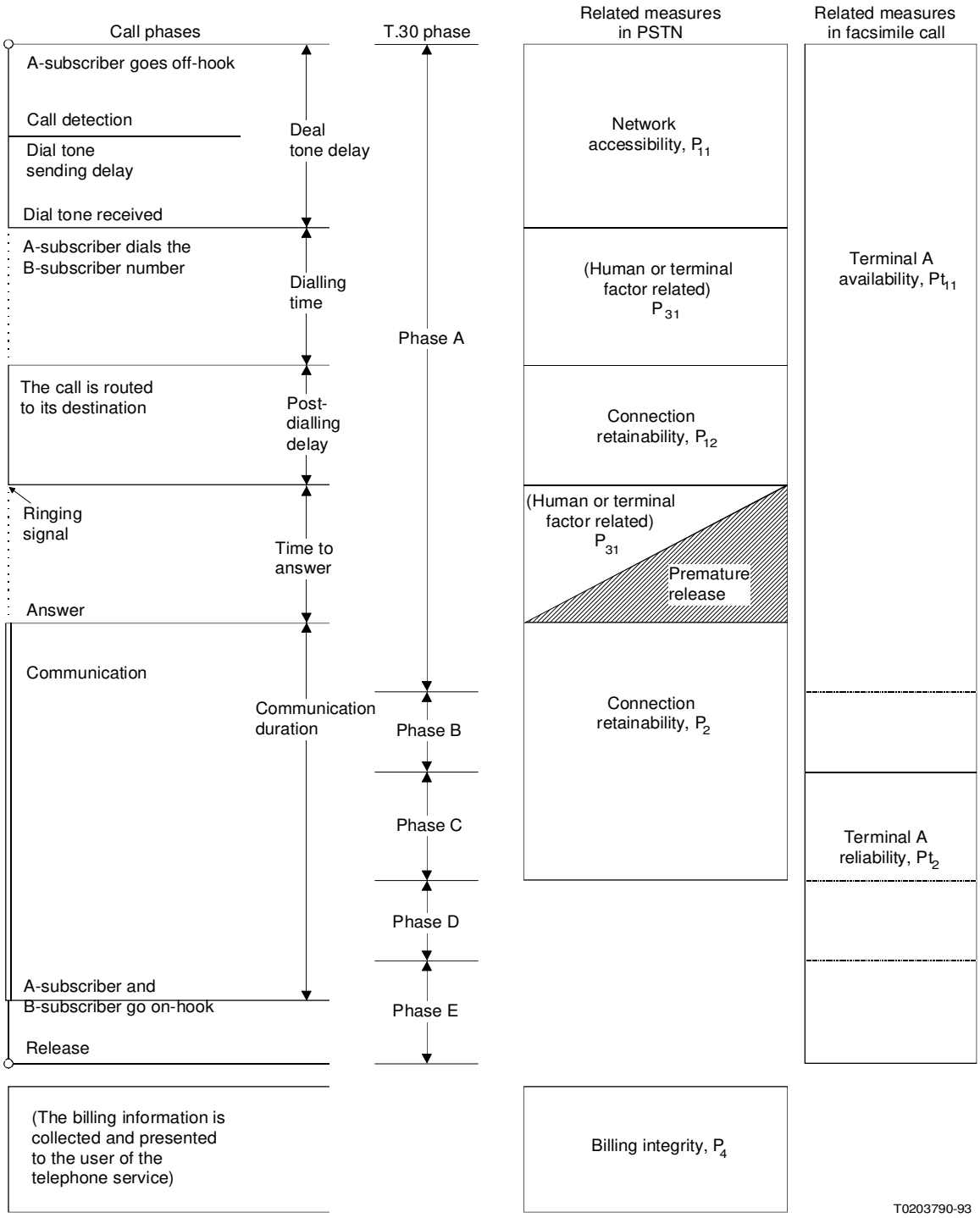
Note 3 – The shaded area shows that a premature release can occur during the time to answer.

Note 4 – The release of a call is not a separate phase in this model. A release failure may result in network inaccessibility for a new call.

Note 5 – The billing integrity has been shown for completeness, but is not a part of serveability performance.

FIGURE 1/E.820

Model of the serveability performance on a basic call in the telephone network



Note 1 – The billing integrity has been shown for completeness but is not a part of serveability performance.

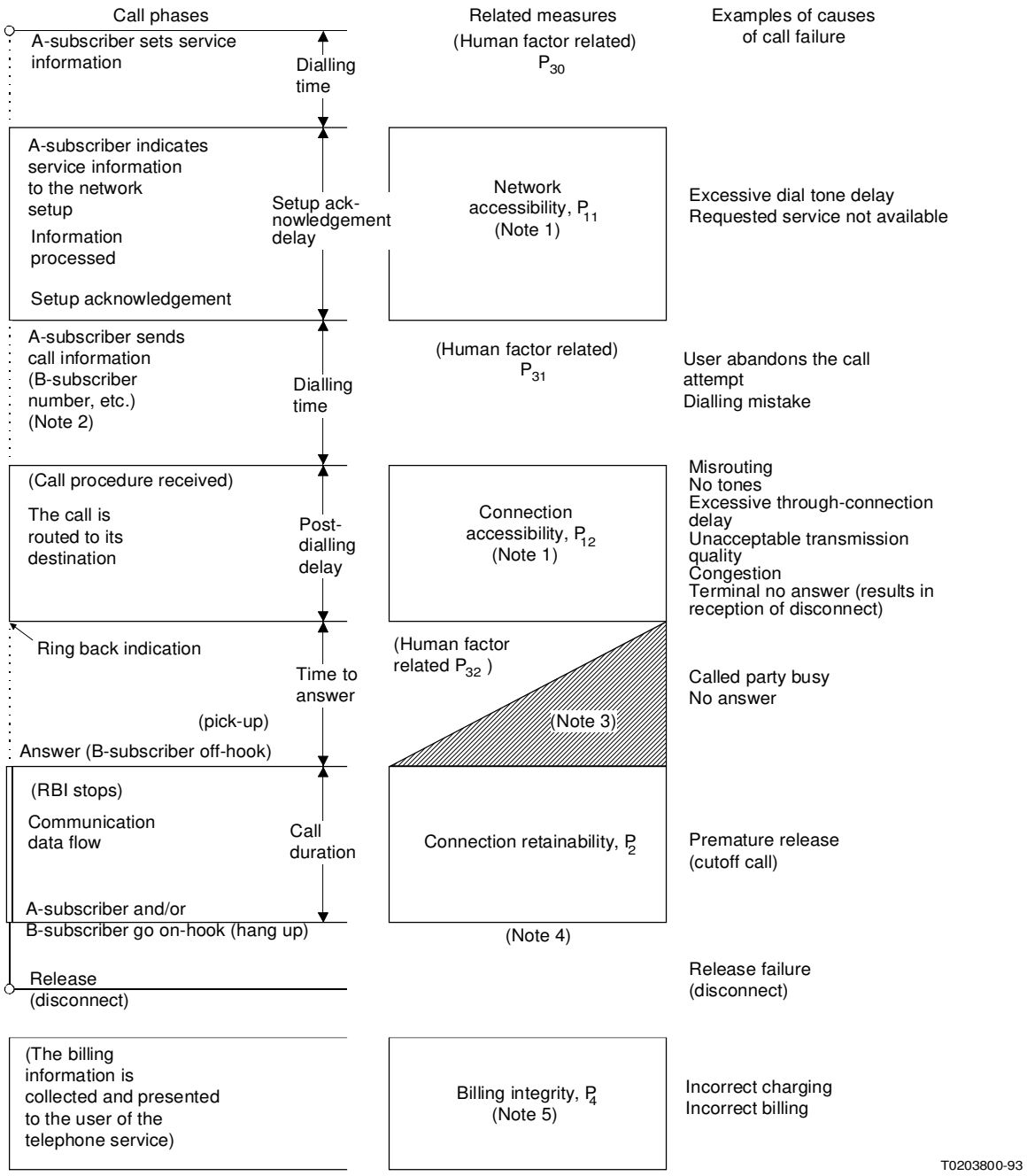
Note 2 – Terminal availability contains the factor in Phase A and B in Recommendation T.30.

Note 3 – Terminal reliability contains the factor in Phase C, D and E in Recommendation T.30.

Note 4 – The duration may depend on the network conditions.

FIGURE 2/E.820

Model of the serveability performance on a basic facsimile call



Note 1 – Network accessibility and connection accessibility combine into service accessibility.

Note 2 – The routing of the call may start before all digits have been received (overlap).

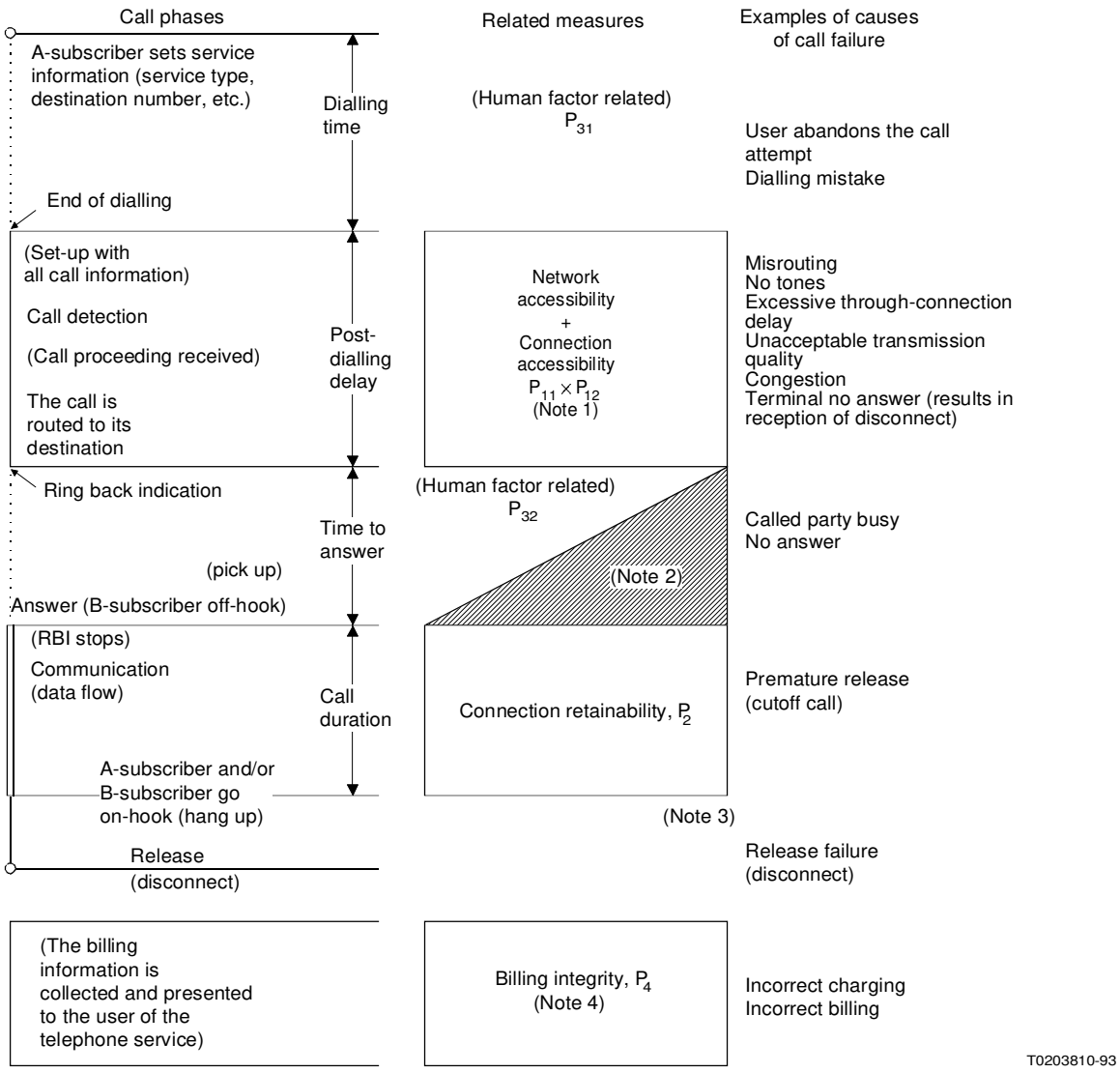
Note 3 – The shaded area shows that a premature release can occur during the time to answer.

Note 4 – The release of a call is not a separate phase in this model. A release failure may result in network inaccessibility for a new call.

Note 5 – The billing integrity has been shown for completeness, but is not a part of serveability performance.

FIGURE 3/E.820

Model for serveability performance on a basic circuit-switched call in ISDN based on "overlap sending"



Note 1 – Network accessibility and connection accessibility combine into service accessibility.

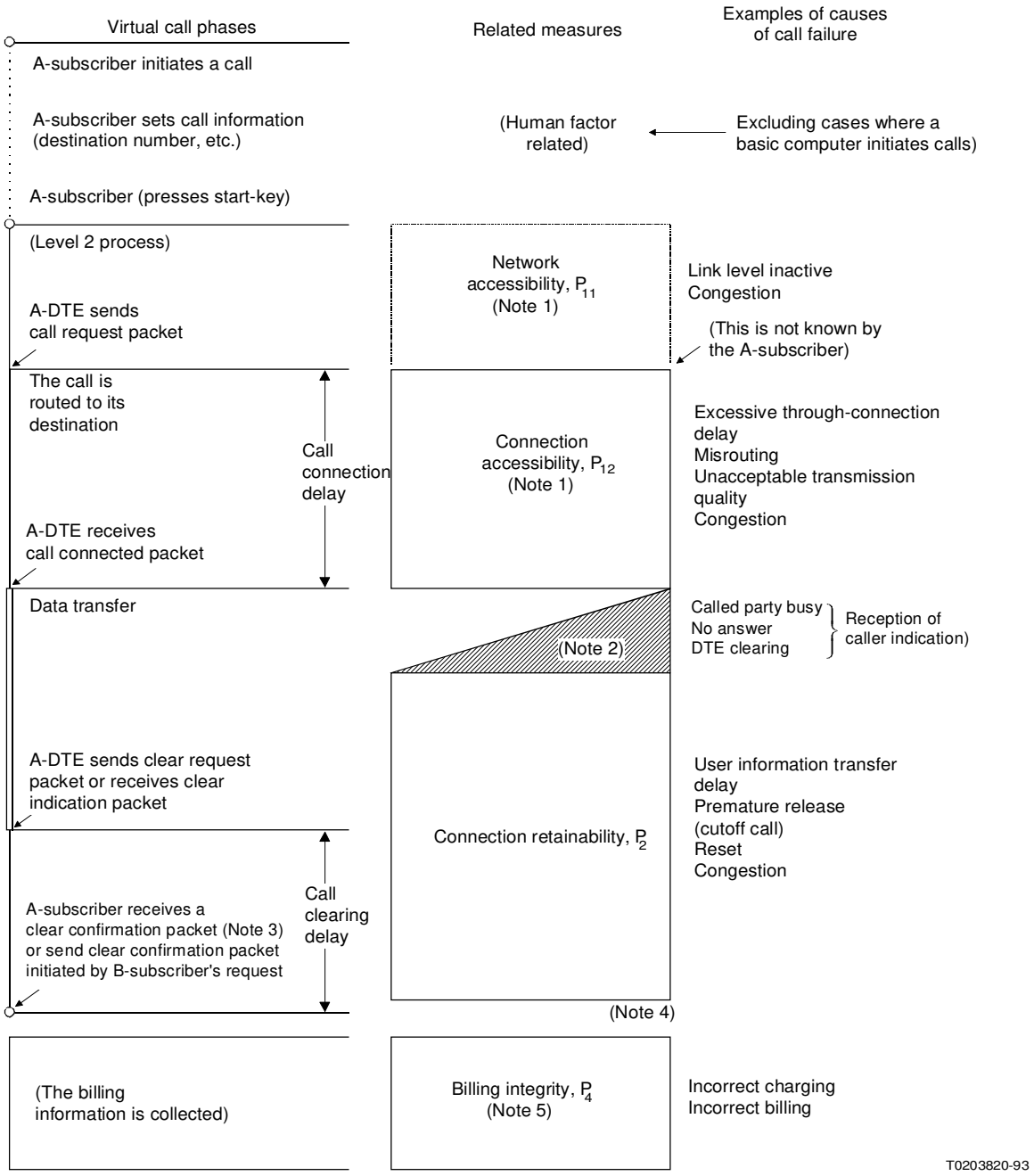
Note 2 – The shaded area shows that a premature release can occur during the time to answer.

Note 3 – The release of a call is not a separate phase in this model. A release failure may result in network inaccessibility for a new call.

Note 4 – The billing integrity has been shown for completeness, but is not a part of serveability performance.

FIGURE 4/E.820

Model for serveability performance on a basic circuit-switched call in ISDN based on "*en bloc* sending"



Note 1 – Network accessibility and connection accessibility combine into service accessibility.

Note 2 – The shaded area shows that a premature release can occur during the time to await Call Connected packet.

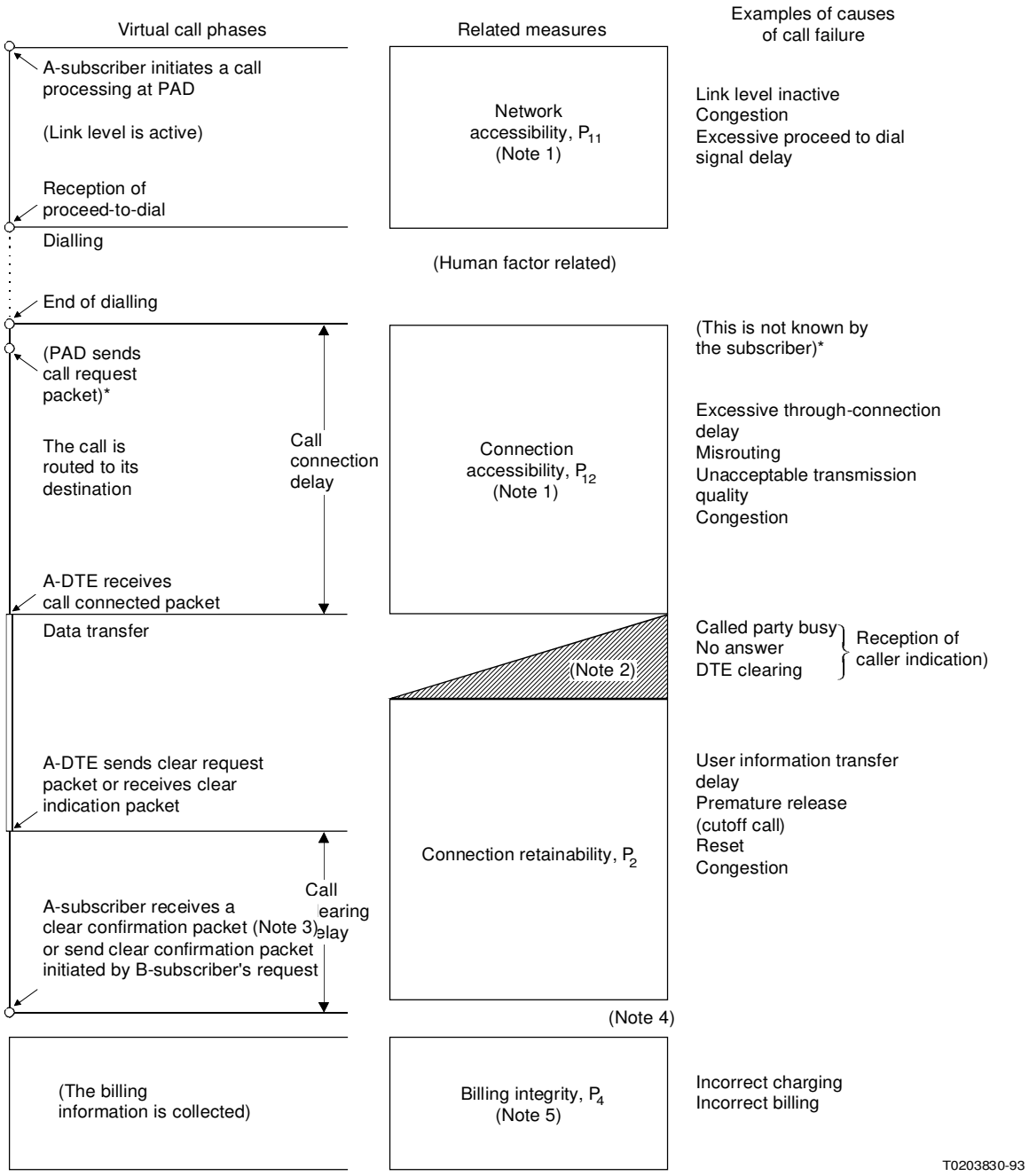
Note 3 – This packet has two meanings, local and end-to-end.

Note 4 – The relase of a call is not a separate phase in this model. A release failure may result in network inaccessibility for a new call.

Note 5 – The billing integrity has been shown for completeness, but is not a part of serveability performance.

FIGURE 5/E.820

Model for serveability performance on a virtual call (packet terminal)



PAD Packet assembly/disassembly

Note 1 – Network accessibility and connection accessibility combined into service accessibility.

Note 2 – The shaded extension shows that a premature release can occur during the time to await call connected packet.

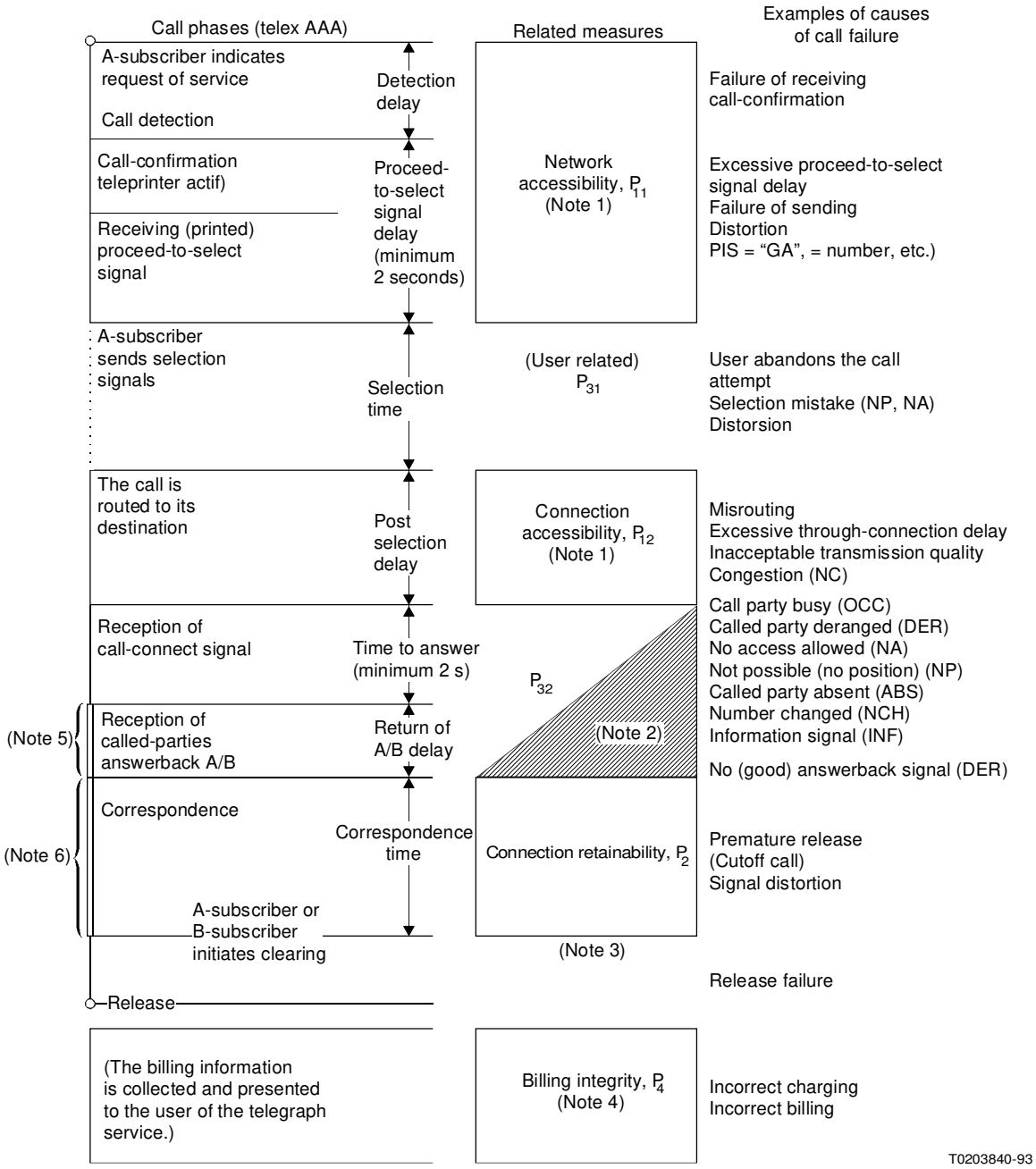
Note 3 – This packet has two meanings, local and end-to-end.

Note 4 – The release of a call is not a separate phase in this model. A release failure may result in network inaccessibility for a new call.

Note 5 – The billing integrity has been shown for completeness, but is not a part of serveability performance.

FIGURE 6/E.820

Model for serveability performance on a virtual call (non-packet asynchronous terminal)



Note 1 – Network accessibility and connection accessibility combine into service accessibility.

Note 2 – The shaded area shows that a premature release can occur during the time to answer.

Note 3 – The release of a call is not a separate phase in this model. A release failure may result in network inaccessibility for a new call.

Note 4 – The billing integrity has been shown for completeness, but is not a part of serveability performance.

Note 5 – Six seconds ± 1 second, charge free.

Note 6 – Chargeable time.

FIGURE 7/E.820

Model for serveability performance on a basic telex-message (telex-subscribers connected to a type AAA exchange)