INTERNATIONAL TELECOMMUNICATION UNION

CCITT

THE INTERNATIONAL
TELEGRAPH AND TELEPHONE
CONSULTATIVE COMMITTEE

BLUE BOOK

VOLUME II – FASCICLE II.2

TELEPHONE NETWORK AND ISDN – OPERATION, NUMBERING, ROUTING AND MOBILE SERVICE

RECOMMENDATIONS E.100-E.333

IXTH PLENARY ASSEMBLY
MELBOURNE, 14-25 NOVEMBER 1988

Geneva 1989

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ISBN 92-61-03261-3

Printed in Switzerland

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APPLICABLE AFTER THE NINTH PLENARY ASSEMBLY (1988)

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International operation

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1 *Fascicle II.2*

1.1 The following Recommendations and Supplement did not appear in Fascicle II.2 of the *Red Book*, and are new Recommendations developed during the 1985-1988 Study Period:

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1.2 The following Recommendations in Fascicle II.2 of the *Red Book* were revised, in many cases extensively, during the 1985-1988 Study Period:

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1.3 The text of the following Recommendation and Supplement no longer appears in the *Blue Book*; however, a reference to this text contained in Fascicle II.2 of the *Red Book* is given in the current edition:

E.125 Supplement No. 5

[1)] This Recommendation has been totally modified from the equivalently numbered Recommendation contained in the *Red Book*.

2.1 The following Recommendations and Supplement did not appear in Fascicle II.3 of the *Red Book*, and are new Recommendations developed during the 1985-1988 Study Period:

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Supplement No. 6

2.2 The following Recommendations which appeared in Fascicle II.3 of the *Red Book* were revised, in many cases extensively, during the 1985-1988 Study Period:

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E.800 (formerly Rec. G.106)
E.810 (formerly Rec. G.107)
E.830 (formerly Rec. G.108)
E.845 (formerly Rec. G.180)
E.850 (formerly Rec. G.181)

2.3 The following Supplements, which appeared in Fascicle II.3 of the *Red Book*, have been deleted from the *Blue Book*:

Supplements

No. 6[2)]
No. 8 (updated and converted to Rec. 301, Fascicule II.2)

NOTES

1 The Questions entrusted to each Study Group for the Study Period 1989-1992 can be found in Contribution No. 1 to that Study Group.

2 In this fascicle, the expression "Administration" is used for shortness to indicate both a telecommunication Administration and a recognized private operating agency.

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2) This Supplement has been superseded by information contained in Recommendations E.411 and Q.297.

PART I

Recommendations E.100 to E.216

INTERNATIONAL OPERATION

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SECTION 1

DEFINITIONS

Recommendation E.100 [1]

DEFINITIONS OF TERMS USED IN INTERNATIONAL TELEPHONE OPERATION

1 telephone call

F: communication téléphonique

S: comunicación telefónica

The interconnection of two telephone stations.

2 call request

F: demande de communication

S: petición de comunicación

The first application made by the caller for a telephone call is called the call request.

In automatic service, the operation of the dial (or key-set) by the caller to obtain a call with his correspondent is comparable to the call request.

3 telephone message

F: conversation téléphonique

S: conferencia telefónica

An effective call over a connection established between the calling and the called stations.

4 telephone circuit (international or trunk circuits)

F: circuit téléphonique (international ou interurbain)

S: circuito telefónico (internacional o interurbano)

4.1 The whole of the facilities whereby a direct connection is made between two exchanges (manual or automatic) is called a telephone circuit.

4.2 A circuit is called an international circuit when it directly connects two international exchanges in two different countries.

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[1] The word "international" is applied to any relation between countries whether those countries are in the same continent or not.

4.3 The term *trunk circuit* is reserved for the designation of exclusively national circuits.

Note – The above definitions relate solely to the use of the terms in operational procedures, no matter how the circuits are actually made up.

5 international exchange

F: centre international

S: central internacional

The exchange (at the end of an international telephone circuit) which switches a call destined to or originating from another country.

Administrations shall designate the exchanges in the territory they serve which are to be regarded as international exchanges.

6 international transit exchange

F: centre de transit international

S: central de tránsito internacional

An international exchange chosen to establish telephone calls between two countries other than its own is called an international transit exchange.

7 preparation operating

F: exploitation avec préparation

S: explotación con preparación

In preparation operating, after the request is recorded by an operator in the outgoing international exchange another operator in the exchange sets up the call. After the requests have been put in order at the exchange, the controlling operator sees to it that the calling station is connected on the international circuit without loss of time.

A distinction is made between:

1) **advance preparation operating**

Advance preparation operating requires preparation at both the outgoing and incoming international exchanges.

2) **outgoing preparation operating**

Outgoing preparation operating requires preparation at the outgoing international exchange only.

8 demand operating

F: exploitation en service rapide

S: explotación en servicio rápido

In demand operating (manual or semiautomatic), after the request has been recorded in the outgoing international exchange, an immediate attempt to set up the call is made by the operator at this exchange who took the request.

A distinction is made between:

1) **manual demand operating**

There are two operating methods:

a) **indirect manual demand operating**

In this method of operating, the operator at the incoming international exchange always acts as an interpreter between the operator in the outgoing international exchange and the called party.

b) **direct manual demand operating**

In this method of operating, the operator in the outgoing international exchange speaks with the called party direct.

2) **semiautomatic demand operating**

In this method of operating, the operator in the outgoing international exchange controls the automatic switching operations to obtain either the called station, or an operator in the incoming or transit international exchange (or an operator in a manual exchange in the country of destination).

9 automatic service

F: service automatique

S: servicio automático

In the automatic service, the calling subscriber himself dials (or operates the key-set) the number necessary for connection with the called station.

10 routes

F: voies d'acheminement

S: rutas

The routes followed by international telephone traffic are designated by agreement between Administrations. A distinction is made between:

- primary routes,
- secondary routes,

primary routes: The circuits normally used in a given relation.

secondary routes: The circuits to be used when the primary routes are congested, or when the transmission on the primary routes is not sufficiently good, or it is outside the normal hours of service on the primary routes.

The secondary route(s) may pass through the same countries as the primary routes or through different countries.

11 controlling exchange

F: centre directeur

S: central directora

11.1 The exchange which is responsible for setting up calls and decides the order in which they are to be connected is called the controlling exchange.

11.2 The Administrations concerned shall agree among themselves to esignate the controlling exchange.

11.3 As a general rule, they shall select for this purpose:

1) when a single international circuit is used, the international exchange operating that circuit on the calling party side;

2) when two or more international circuits are used:
   a) either the international exchange which has access to the first international circuit on the calling party side, or
   b) the international transit exchange designated by joint agreement of the Administrations concerned.

Note – It may be that the international circuits are not operated exclusively by operators at the international exchange where they end; operators at other international or national exchanges may also have access to them by means of an automatic transit device. In such circumstances these international or national exchanges must be treated as though they were a controlling exchange, as far as setting up calls is concerned.

12 controlling operator

F: opératrice directrice

S: operadora directora

The controlling operator is the outgoing operator in the controlling exchange who operates the international circuit. The controlling position is the position used by the controlling operator.

Note – However, it may happen that the outgoing international circuit is also operated by an operator in an international or even a national exchange. If this is so, the latter operator is considered as controlling operator.

13 successive phases of a call

F: phases successives d'une communication

S: fases sucesivas de una comunicación

The characteristic instants in the successive phases of the setting-up of an international telephone call in the manual or semiautomatic service are distinguished as follows:

t_0 the caller has placed his request;

t_1 the controlling operator has received all of the call details;

t_2 the controlling operator has made the first attempt to set up the call (this instant corresponds practically to the seizure of the international circuit);

t_3 the called number has replied or the caller has been informed why the call cannot be connected;

t_4 the called person (or called extension) has been obtained or the caller has been informed why the call cannot be connected (the instant is only significant for personal calls);

t_5 the end of the conversation, generally when the caller replaces the receiver;

t_6 disconnection, normally when the international circuit is released by the operator.

Note – In automatic service it is in general difficult to define all the characteristic instants specified above, either because it is impossible to distinguish between them with accuracy or because of differences between the switching systems used. It is, however, possible to define the *total setting-up time* (see definitions 17).

14 duration of a call (conversation time)

F: durée de la conversation

S: duración de conferencia

The interval between the instant the call is actually established between the calling and the called stations and the instant the calling station gives the clearing signal (or the instant when, although the caller has not replaced his receiver, the call is:

- in manual or semiautomatic service, officially cleared down by an operator,
- in fully automatic service, cleared down after some slight delay by the action of the called subscriber's clear-back signal).

The time interval between:

a) $t_5 - t_3$ is the duration of a station call;

b) $t_5 - t_4$ is the duration of a personal call.

15 chargeable duration – charged duration

F: durée taxable – durée taxée

S: duración tasable – duración tasada

15.1 The time interval on which the charge for a call is based is called the chargeable duration.

15.2 The chargeable duration is equal to the duration of the call reduced in manual or semiautomatic service, if necessary, to make allowance for any interruptions or other difficulties which might have occurred during the call.

15.3 The duration of a call for which the charge is paid by the calling subscriber (or the called subscriber in the case of a collect call) in the case of manual or semiautomatic operation, is the chargeable duration rounded upwards to the next whole minute.

16 holding time of an international circuit

F: durée d'occupation du circuit international

S: duración de ocupación de un circuito internacional

The time interval $t_6 - t_2$ during which the circuit is used is the holding time of the international circuit.

This interval includes in particular the call duration, the operating time and the time taken to exchange service information.

Note – The term "operating time" is meant to cover the time taken both by operators and switching equipment.

17 answering time of operators; request transmission time; delay time; setting-up times of an international call

F: délai de réponse des opératrices; délai de transmission de la demande; délai d'attente; délai d'établissement d'une communication internationale

S: demora en contestar de las operadoras; tiempo de transmisión de la petición; demora; tiempo de establecimiento de una comunicación internacional

17.1 At the outgoing international exchange, the *answering time of operators* is the interval between the end of the transmission of the calling signal and its answer by an operator at the distant international exchange.

At the incoming international exchange, the *answering time of operators* is the interval between the appearance of a calling signal on a position or group of positions at that exchange and its answer by an operator.

17.2 The request transmission time is the time interval $(t_1 - t_0)$ taken in passing the call request to the controlling operator.

17.3 The time interval $(t_2 - t_1)$ is the delay to which the call is subject at the controlling exchange.

The caller is generally informed of this delay.

17.4 The setting-up time of a station call is the time interval $(t_3 - t_1)$. The total setting-up time of a personal call is the time interval $(t_4 - t_1)$. These times include any delay at the outgoing international exchange.

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SECTION 2

GENERAL PROVISIONS CONCERNING ADMINISTRATIONS

Recommendation E.110

ORGANIZATION OF THE INTERNATIONAL TELEPHONE NETWORK

1 Administrations shall agree among themselves upon the operating methods best suited to the needs of the international relations which concern them, taking into account the conditions and the possibilities of operation.

2 When there is preparation operating, international traffic should be decentralized, whenever circumstances justify it, by the creation of international exchanges in adequate numbers in the centre of the areas to be covered by the service to reduce waiting times and any lengthening of routes.

3 In the direct or indirect manual demand operating, it would be well to concentrate international traffic in a few international exchanges where major groups of international circuits end, so that international circuits may be more efficiently used, and in view, too, of the linguistic knowledge demanded of international operators.

4 With semiautomatic and automatic service, it would also be well to concentrate international traffic in a few international exchanges because of:

- the high cost of the technical equipment required in incoming and outgoing international exchanges for this service;
- the linguistic knowledge required of operators, in the case of semiautomatic international service; and
- the need to provide automatic transit in certain exchanges (international routing plan).

However, it would be advisable, when the traffic justifies it, to provide certain international exchanges or national manual exchanges in a country with direct-access circuits to an international automatic exchange so that the operators in these exchanges can set up international semiautomatic calls in automatic relations without the intervention of an operator from the international exchange.

Recommendation E.111

EXTENSION OF INTERNATIONAL TELEPHONE SERVICES

Application of that provision of the *Telephone Regulations* [1] which states that Administrations shall endeavour to extend international telephone services to the whole of their territories might sometimes entail the establishment of calls leaving something to be desired from the point of view of transmission quality. It is therefore desirable:

1) to take no decision to create or extend a new relation unless such means are available as would provide satisfactory service;

2) to make the opening or extension of the relation dependent on the passing of satisfactory test calls.

Reference

[1] *Final Acts of The World Administrative Telegraph and Telephone Conference (Geneva, 1973) – Telegraph Regulations – Telephone Regulations*, ITU, Geneva, 1973.

Recommendation E.112

ARRANGEMENTS TO BE MADE FOR CONTROLLING THE TELEPHONE SERVICES BETWEEN TWO COUNTRIES

Administrations shall agree among themselves upon the operating methods best suited to the needs of the international relations which concern them, taking into account the conditions and the possibilities of operation.

In controlling the organization of the telephone service in a given relation, Administrations might forego the conclusion of formal agreements signed by the heads of Administrations, as there is no need for such agreements in relations where the provisions of the *Telephone Regulations* [1] are mutually and fully accepted. On the following major points agreement can be reached by correspondence:

- *Date on which the relation is to be opened.*
- *Means used to provide the connection:*
  - direct (transit) circuit;
  - passage through a transit exchange;
  - transit country or countries concerned.
- *Classes of call admitted* (List the classes of call and other media of communication, i.e., phototelegraph calls, programme transmissions and television transmissions).
- *Information:* Specify the provisions adopted to permit the exchange of lists of the principal local networks with all the information necessary for routing and accounting of calls.
- *Charging and accounting.*

Reference

[1] *Final Acts of The World Administrative Telegraph and Telephone Conference (Geneva, 1973) – Telegraph Regulations – Telephone Regulations*, ITU, Geneva, 1973.

Recommendation E.113

VALIDATION PROCEDURES FOR AN AUTOMATED INTERNATIONAL TELEPHONE CREDIT CARD SYSTEM

Preamble

Work is progressing to develop an automated international telephone credit card system as defined in Recommendation E.118.

The expanded use and the increased number of credit cards require card-issuing Administrations (or authorized agents) to implement adequate security against fraudulent use.

Therefore, a critical facet in the provision of such a system is the ability to ensure the validity of the card and its authorized use in a uniform manner. The purpose of this Recommendation is to define the procedures for the validation process between Administrations. This validation process makes no attempt to specify any equipment, facilities and data transmission techniques.

It should be recognized that the procedures for validation of telephone credit cards between Administrations will vary, based on such factors as the capabilities of the credit card systems and the manner in which the card is presented. Flexibility in this process must be maintained in order to maximize participation of Administrations where automated interfaces may not exist or may not be uniformly available. Where such automated interfaces exist, a defined uniform implementation is desirable.

1 Methods of validation

There are several methods to test the validity of credit cards. These may be divided into two general categories – full validation and limited validation.

Full validation requires checking the card number against the card issuer's data base, as well as real-time communication between the call originating and card-issuing Administrations. Full validation is more thorough than other methods and is practical for automated or semi-automated credit card systems.

Limited validation may involve one or more techniques, such as a special character, a code, or a check against a partial data base, as determined by the card-issuing Administration and outlined in a service agreement. Limited validation methods minimize the need for communication between Administrations.

This Recommendation, however, deals only with full validation.

2 Automated validation procedures

2.1 *Validation information flow*

The information from the card and/or the user is presented to a terminal having access to an Administration's telephone credit card system. That system should then communicate with the card user to validate the card and authorize its use.

The validation information flow comprises three messages:

- authorization request,
- request response,
- call disposition.

The *authorization request* is a message from the call-originating Administration to the card-issuing Administration which provides details of an attempt to use a telephone credit card. This allows the card issuer to query its own internal systems to respond to the call-originating Administration. The card-issuing Administration should then communicate with the call-originating Administration to provide either a positive or negative response (with a specific indication as to why the authorization should not be granted) to the *authorization request.* This message is defined herein as the *request response.* Feedback should then be given to the user of the card as to the status of the call attempt to the extent possible within the capabilities of the particular Administration's telephone system. A third message denoted as the *call disposition* would be sent, subject to agreements between Administrations and card issuers, by the call-originating Administration to the card-issuing Administration in a timely manner after completion of a call or call attempt. It would contain information to allow a more complete estimate of call activity.

Sections 2.2, 2.3 and 2.4 describe the functional components of the *authorization request*, the *request response*, and the *call disposition* messages respectively.

Table 1/E.113 provides a summary of the functional components and indicates the components which are required and those which are optional.

2.2 *Authorization request*

The following describes the basic component of a request from the call-originating Administration to the card-issuing Administration to validate a credit card and authorize its use.

2.2.1 *Message type identifier (required)*

A message type identifier should be included in this message. It is provided by the call-originating Administration to identify this message to the card-issuing Administration as the *authorization request.*

TABLE 1/E.113

Validation information component summary (Note 1)

Component	Messages		
	Authorization request	Request response	Call disposition (Note 4)
Message type identifier	R	R	R
Message reference identifier	R	R	R
Primary account number	R	R	R
Originating Administration identifier	R	–	–
Expiry date	R (Note 2)	–	–
PIN	R (Note 3)	–	–
Calling telephone number	O	–	–
Called telephone number	O	–	–
Time and date stamp	O	–	–
Response code	–	R	–
Customer sub-account number	–	O	–
Restriction indicator	–	O	–
Specified number(s)	–	O	–
Call disposition code	–	–	R
Call start time	–	–	R
Call end time	–	–	R
Estimated call charge	–	–	O

R Required
O Optional

Note 1 – Optional items are subject to agreements between Administrations.

Note 2 – Required if encoded on the card.

Note 3 – Required if implemented by the card issuer.

Note 4 – This entire message is optional and is subject to agreements between Administrations (see § 2.4).

2.2.2 *Message reference identifier (required)*

A message reference identifier should be included in this message. Its purpose is to uniquely relate this message to a specific validation transaction.

2.2.3 *Primary account number (required)*

The primary account number (19 visible characters – maximum) of the card as defined in Recommendation E.118 should be included in this message as it was obtained from the card or the user. Part of the primary account number, the issuer identification number, can be used by the call-originating Administration to identify the card-issuing Administration.

2.2.4 *Originating Administration identifier (required)*

The call-originating Administration identifier should be included in this message and can be used by the card-issuing Administration to identify the Administration accepting the telephone credit card. The call-originating Administration identifier should contain the issuer identification number of the originating Administration.

2.2.5 *Expiry date (required)*

The expiry date of the card, if one is specified, should be included in this message. The inclusion of this information should not relieve the originating Administration, within the capabilities of its local credit card system, from ensuring that the card has not expired.

2.2.6 *Personal identification number (PIN) (required)*

The use of a PIN is left to the discretion of the card issuer. This information can be used by the card issuer to identify the user and, as applicable, authorize the use of the card. If present, the personal identification number, whether presented by the user or encoded on the card, should be included in this message and preferably be encrypted. The length of the PIN is left to the discretion of the card-issuing Administration.

2.2.7 *Calling telephone number (optional)*

The full international calling telephone number, when available, should be included in this message. The use of this information is subject to agreements between Administrations. This information is necessary for some Administrations to manage the restricted use of some cards as well as for card-issuing Administrations to ensure that the proper agreements exist to bill, collect, and settle for, the call.

2.2.8 *Called telephone number (optional)*

The full international called telephone number should be included in this message. The use of this information is subject to agreements between Administrations. This information is necessary for some Administrations to manage the restricted use of some cards as well as for card-issuing Administrations to ensure that the proper agreements exist to bill, collect, and settle the call.

2.2.9 *Time and date stamp (optional)*

A time and date stamp should be included in this message. This information should contain the month, day, hour, minute and second in Coordinated Universal Time (UTC), that the *authorization request* is entered into the system.

2.3 *Request response*

The following describes the basic components of the response from the card-issuing Administration to an *authorization request.*

2.3.1 *Message type identifier (required)*

A message type identifier should be included in this message. It is provided by the card-issuing Administration to identify this message to the call-originating Administration as the *request response.*

2.3.2 *Message reference identifier (required)*

A message reference identifier should be included in this message. Its purpose is uniquely to relate this message to a specific validation transaction.

2.3.3 *Primary account number (required)*

The primary account number as described in § 2.2.3 should be included in this message. It is provided here for closure between the *authorization request* and the *request response.*

2.3.4 *Response code (required)*

The response code should be included in this message to indicate the result of the *authorization request.* Specific definitions and their corresponding codes are left for further study. Possible conditions for responses may include:

- Service approved
- Service approved on a limited basis: see §§ 2.3.6 and 2.3.7
- Service denied: credit threshold exceeded or due to non-payment
- Service denied: invalid account number or invalid account number/PIN combination
- Service denied: incorrect PIN (subsequent attempts to re-enter may be allowable)
- Service denied: allowable PIN tries exceeded (each card-issuing Administration may set limit; e.g., 3 tries)
- Service denied: expired card
- Service denied: restricted account number or account number/PIN combination
- Service denied: call not permitted from station (i.e., no agreement between card-issuing Administration and call-originating Administration)
- Service denied: card-issuing Administration validation database is unavailable
- Service denied: validation attempt on wrong card issuer
- Error in message format (i.e., message garbled)
- Message type not processable due to missing or incomplete information.

Use of, and action on, particular response codes are subject to agreements between concerned Administrations. For some of the above response conditions, separate retry thresholds should be defined.

Any feedback provided to the card user should not assist a fraudulent user in subsequent attempts at unauthorized use of the credit card.

2.3.5 *Customer sub-account number (optional)*

The customer sub-account number is used to provide the card holder with telecommunications expense control where multiple PIN numbers are associated with a single primary account number. This information is intended to be stored for subsequent inclusion in the billing record so that the billed customer may properly allocate expenses.

2.3.6 *Restriction indicator (optional)*

The restriction indicator tells the call-originating Administration that the card being used is restricted and provides the nature of the restriction. The use of this item is subject to agreement between Administrations and is provided as a supplement to the response code described above to manage restricted cards.

2.3.7 *Specified number(s) (optional)*

A card holder may be restricted to using the card to call only one or more specified numbers. If the called number is not related to the card's account number, this component would pass that restricted number(s) to the call-originating Administration. The use of this component is subject to agreement between Administrations and is provided as a supplement to the response code described above to manage restricted cards.

2.4 *Call disposition (optional)*

The following describes the basic components of a response from the call-originating Administration to the card-issuing Administration to track usage of the card against the customer's credit limit and gather other statistics, to meet operational needs.

The main purpose of this additional message is to provide, on a timely basis, better control over potential fraudulent use of the credit card. It is not meant as a substitute for billing and settlement mechanisms which may be defined by other Recommendations.

2.4.1 *Message type identifier (required)*

A message type identifier should be included in this message. It is provided by the call-originating Administration to identify this message to the card-issuing Administration as the *call disposition.*

2.4.2 *Message reference identifier (required)*

A message reference identifier should be included in this message. Its purpose is uniquely to relate this message to a specific validation transaction.

2.4.3 *Primary account number (required)*

The primary account number as described in § 2.2.3 above should be included in this message. It is provided here for closure between the *authorization request* and the *call disposition.*

2.4.4 *Call disposition code (required)*

The call disposition code should be included in this message. Specific codes need to be defined to indicate whether the call is completed or not completed. Further study is required.

2.4.5 *Call start time (required)*

The date and time at which the call started should be included in this message. If the call disposition code indicates that this call failed, this item of information should indicate the date and time of such failure. The information should contain the month, day, hour and minute in Coordinated Universal Time (UTC).

2.4.6 *Call end time (required)*

The date and time at which the call ended should be included in this message. This information should contain the month, day, hour and minute in UTC.

2.4.7 *Estimated call charge (optional)*

The estimated call charge should be included in this message.

Recommendation E.114

SUPPLY OF LISTS OF SUBSCRIBERS (DIRECTORIES AND OTHER MEANS)

1 Each Administration shall supply by mutual agreement and free of charge to the Administrations with which a telephone service exists a sufficient number of copies of its lists of subscribers for official use.

2 A subscriber wishing to obtain a telephone directory of another country must apply to his own Administration. If an application for one of its telephone directories is received directly by an Administration from a subscriber in a foreign country, the receiving Administration shall inform the subscriber that such requests should be addressed to his own Administration.

3 An Administration which has supplied telephone directories of its own country to another Administration for distribution to subscribers shall indicate the sale price of the directories plus any postal charges (in principle expressed in gold francs) for the use of the receiving Administration.

4 Accounting concerning the supply of such directories for subscribers' use shall be conducted according to the usual procedure followed between Administrations (see Recommendation D.170 [1]), unless Administrations, by mutual agreement, elect to forego such accounting.

Reference

[1] CCITT Recommendation *Monthly telephone accounts*, Rec. D.170.

COMPUTERIZED INFORMATION SERVICE FOR TELEPHONE SUBSCRIBER NUMBERS IN FOREIGN COUNTRIES (DIRECTORY ASSISTANCE), RESERVED FOR OPERATORS

1 Preamble

The method to be followed in providing the customers and operators in one country with information on the national significant telephone numbers (as specified in Recommendation E.160) of subscribers in another country depends on the way the information service is organized in the country of destination, distance between the countries, operating procedures, etc.

2 Methods of obtaining information

The operator in the country of origin dealing with international inquiries should be able to obtain information, depending on the organization of the inquiry service in each country, by one of the following methods:

a) from telephone directories;

b) from other information systems sent by the country of destination and kept up-to-date (e.g., microfiches);

c) by calling the information service operator in the country of destination:
   - outgoing operators in the originating country should, where language and other conditions permit, have direct access to the appropriate foreign information centre(s) which hold, or are able to obtain from other centres up-to-date information;
   - where language and other conditions do not permit the outgoing operator to have direct access to the appropriate foreign information centre, the outgoing operator should call the operator in the international exchange of the country of destination;
   - where access to a number of information centres is possible, provision should be made for access to a centralized international information centre or assistance operator in case the originating operator encounters language or other difficulties;

d) by having access to foreign information service computers:
   - either via a national computer using appropriate procedures;
   - or, in special circumstances, via direct access using dedicated or switched connections.

3 General principles applicable to the various methods of obtaining information

In any relation, Administrations should abide by the following general principles:

a) Inquiries from customers concerning foreign subscribers' numbers should normally be addressed to operators in the country of origin who will obtain the required information; it may be useful to keep the customer on line while this information is being sought.

b) In order to give operators in the country of origin ready access to the international telephone inquiry service in other countries, it is desirable that Administrations, in conformity with Recommendation E.149, provide common routing codes or abbreviated access numbers to the foreign computerized or manual telephone inquiry services.

c) Technical arrangements should, as far as practicable, prevent access by a subscriber of one country to an operator of the telephone information service of another country. Administrations should not communicate access numbers of telephone information services in foreign countries to their subscribers (except in cases covered in Recommendation E.128).

d) Exceptionally, however, subscribers in one country may be permitted to have access to the information service in another country subject to bilateral agreement between the Administrations concerned.

e) An international system should be able to provide:
   - for the desired correspondent: his international number;
   - for the locality in which this correspondent resides: the country code and the trunk code.

f) No secret numbers should be issued.

4 Principles for the organization of an interconnected computerized international information service

For the organization of an interconnected computerized international information service, Administrations should abide by the following principles:

a) The international system should be so designed that national systems can be used; each Administration should adapt its system to the international system by means of the appropriate interface procedures.

b) The operator should be able to supply the fullest search data possible, in order to avoid a situation in which the number of subscribers matching the search criteria exceeds the maximum capacity of a single response message.

c) To overcome language difficulties, the questions put to a remote system containing the file to be consulted should be formulated in the language used in the country concerned. This means that the language problems raised by certain inquiry and response features should be resolved by the country making the inquiry.

d) Where, in a given country, the files have been allocated to different computers integrated in a single system, access to the system from a foreign country should be possible via a designated computer.

e) Formats for inquiry and response procedures should be standardized.

f) A question should give rise to only one response message with no dialogue between computers. The response message may cover several subscribers where such subscribers match the search characteristics introduced in the system. The maximum number of subscribers mentioned in a response message depends both on the maximum capacity prescribed for the type of message in question and on the limitations imposed by national systems. Any dialogue concerning all the information provided should be prepared at the national level.

g) With regard to the management of messages, there is no relationship between the inquiry and the response; where for any reason the response to a particular question has not been obtained, the inquiry must be reiterated by the requesting country and on its initiative.

h) To realise the interconnection of computers of different countries, the network procedures described in Annex A should be used. For the highest levels (above level 3), the procedures will be the subject of further study.

i) The structure and coding of the Entry and Reply formats will use the notation defined in Recommendations X.208 and 209, and are described in Annex B.

5 Description of the standards used for inquiry and response

When operator access is given via a national computer to foreign information service computers, unless modified by bilateral agreement, the following *minimum* standards should apply to the inquiry and response process, to permit maximum flexibility in the national information service and compatibility with the international information service.

5.1 *Input information*

5.1.1 The operator should request information using the details supplied by the caller, according to the following format:

- country, locality (geographical area), surname, first name(s) or initial(s), trade or residential address (street name and number), supplementary data (according to bilateral agreement).

5.1.2 Country code, locality (or geographical area) and surname are minimum requirements.

5.1.3 The foreign system should reply to every question asked. If the foreign computer indicates that the information supplied is insufficient, the question should be repeated with more selective information.

5.1.4 Certain specified conditions, i.e. the number is not available (secret number, no listing, etc.) or further information has to be obtained, may be indicated by a standardized coded response.

5.2 *Output information*

The output from the foreign computer system should give the following information as available in the data base, in order to identify the accuracy of the telephone number:

- surname, first name(s) or initial(s), address, locality, country code, national significant number.

5.3 *Alphabet to be used*

5.3.1 The Latin alphabet should be employed for inquiries and responses in communication between computers. The systems must in general be able to use the following characters[1]:

- 26 capital letters A - Z
- 10 figures 0 - 9
- space, full stop

according to International Telegraph Alphabet No. 2 (Recommendation S.1 [1]).

5.3.2 Special signs associated with letters are not transmitted.

5.4 *Description of standardized inquiry and response messages*

The standard formats for inquiry and response shown in Figure 1/E.115 should be used[1].

5.4.1 *Inquiry format*

The question contains the following information:

a) *Message heading*

1) obligatory
   - message code identifying a request to the international inquiry service;
   - codes identifying the countries of origin and destination; these codes normally consist of the country code (see Recommendation E.163);
   - code of the originating terminal. This code should not be used by the receiving country but should be repeated in identical fashion in the response format.

2) optional
   - areas reproduced identically in the response:
     i) date and time of the origin of the inquiry:
        Format: YYMMDDHHMMSS
     ii) message number given by the local country.

b) *Data*

1) basic data
   - locality

     The name of the locality should be introduced according to its exact[2] spelling. Special signs should be replaced by spaces and each space must be introduced as a space.

     Abbreviations are not permitted, except for the words "Sint", "Saint", "Sankt", "San", . . ., which are abbreviated by the letter "S" followed by a space.

     The mandatory minimum number of characters to be input should be fixed by each country and be mentioned in an operator's manual. The system of the outgoing country should check whether this minimum is respected. When the name is completely input, it should be followed by a full stop.

---

[1] The use of punctuation marks will be studied at a later stage.

[2] The problem of exact native spelling is subject to further study.

Message heading					Data						
Message indicator	International indicators	Originating terminal code	Date and time	Message number	Locality	Surname or trade name of subscriber	Name of street or address	Number of premises	First name	Additional data	
										Code	Definition of code

a) Format of the inquiry

Message heading					Data I											Data 2-n
Message indicators	International indicators	Originating terminal code	Date and time	Message number	Message code	International prefix	Trunk code	Telephone number of subscriber requested	Locality	Surname or trade name of subscriber	First name of subscriber	Name of street or address	Number of premises	Supplementary data	Subscriber message	Each item is the same as in Data I

b) Format of the reply (total length: maximum 3000 bytes)

FIGURE 1/E.115

Standard formats for inquiry and response

– surname or trade name of subscriber

The subscriber's surname should be input according to its exact spelling.

Special signs, including the full stop, should be replaced by spaces and each space must be introduced as a space. Abbreviations should not be allowed. The mandatory minimum number of characters to be input should be fixed by each country and be mentioned in the operator's manual.

The system of the outgoing country should check whether this minimum is respected. When the surname is completely input, it should be followed by a full stop. When the subscriber's surname or trade name is replaced by initials, the characters composing the acronym should be introduced successively without being separated by special signs or spaces.

Numbers forming part of names or acronyms should be introduced as numbers.

2) additional data (for making the search easier)

– name of street or address

The name of the street should be input according to its exact spelling, the complete name of the street being retained. Special signs, including the full stop, should be replaced by spaces and each space must be input as a space.

The words "Sint", "Saint", "Sankt", "San", ... should be abbreviated by the letter "S" followed by a space. The mandatory minimum number of characters to be input should be fixed by each country and be mentioned in the operator's manual. The system of the outgoing country should check whether this minimum is respected. If the name is completely input, it should be followed by a full stop. Numbers forming part of the name of the street should be introduced as numbers.

– number of premises

The numerical part of the house number should precede the alphabetical part without separation. Non-significant zeros should be omitted.

– subscriber's first name

Entire first names, initials or a combination of first names and initials should always be separated by spaces.

– supplementary data

This data will not be introduced without there first being a bilateral agreement; it must be preceded by a 2-character code.

The following codes have been defined:

00 = the heading in the guide (e.g., schools)

01 = profession code

02 = instruction for a selective search

03 = the country or province

04 = the category to which the required subscriber number belongs: business, residential or public service.

On the basis of the above data, the computer of destination searches in its files.

5.4.2 *Structure of the inquiry*

ENTRY message

1010 0000 Directory message (telephone)
LENGTH

1010 0000 Telephone (entry)
LENGTH

0011 0000 Entry
LENGTH

0110 0000 Part 1
LENGTH

1000 0000 Message indicators
LENGTH
Message indicators

1000 0001 International indicators
LENGTH
International indicators

1000 0010 Originating Terminal code
LENGTH
Originating terminal code

1000 0011 Date and Time (optional)
LENGTH
Date and time

1000 0100 Message number (optional)
LENGTH
Message number

0110 0001 Part 2
LENGTH

1000 0000 Locality
LENGTH
Locality

1000 0001 Subscriber name
LENGTH
Subscriber Name

1000 0010 Street name (optional)
LENGTH
Street Name

1000 0011 House number (optional)
LENGTH
House Number

1000 0100 First name (optional)
LENGTH
First Name

1000 0101 Heading (optional)
LENGTH
Heading

1000 0110 Profession (optional)
LENGTH
Profession

1000 0111 Supplementary information for search (optional)
LENGTH
Supplementary information for search

1000 1000 Country/Province (optional)
LENGTH
Country or province

1000 1001 Category (optional)
LENGTH
Category

5.4.3 *Response format*

The response contains the following information:

a) *Message heading*

1) obligatory
- message code identifying an answer to the international inquiry service;
- codes identifying both the answering country and the requesting country; these codes normally consist of the country code (see Recommendation E.163);
- code of the originating terminal.

2) optional
- areas generated by the country of the input message:
  i) date and time
  ii) message number.

b) *Message code and international prefix*

- message code

  Always included and common in all answer messages. The coded message must be converted to text by the calling country.

  The following codes have been defined:

  00 = one or some subscribers have been found

  01 = locality insufficiently defined; no subscriber number is forthcoming

  02 = street name insufficiently defined; no subscriber number is forthcoming

  03 = no subscriber has been found

  04 = fault or congestion; no subscriber number is forthcoming

  05 = the number of subscribers who correspond to the selection criteria exceeds the maximum capacity for the message. Re-enter the question with more precise information. No subscriber number is forthcoming.

  06 = partial fault or congestion. The list of subscriber numbers who correspond to the selection criteria is not complete.

  07 = the number of subscribers who correspond to the selection criteria exceeds the maximum capacity of the message. The list of subscriber numbers answering to the selection criteria is not complete. Re-enter eventually the question using more precise indicators.

  08 = insufficient search elements have been entered. Re-enter the question with more information. No subscriber number is forthcoming.

- international prefix (in accordance with the CCITT Recommendations) – 3 characters:

  i) aligned from the left (if necessary, supplemented by spaces).

c) *Data I*

- trunk code (in accordance with the CCITT Recommendations) – 5 characters
- zone number: aligned from the left (if necessary, supplemented by spaces);
- zeros if no subscriber has been found or if a subscriber's number is not to be disclosed;
- subscriber's number (in accordance with the CCITT Recommendation) – 8 characters:

  i) aligned from the left (if necessary, supplemented by spaces),

  ii) zeros if no subscriber has been found or if a subscriber's number is not to be disclosed;

- locality, subscriber's surname or trade name, first name, address, number of premises, supplementary data:
- data concerning the subscriber found. If no subscriber has been found, the zone of the corresponding data in the question format;
- subscriber message:

  The coded message which must be converted into text by the calling country.

  The following codes have been defined:

  00 = no comment

  01 = subscriber changed address

  02 = refer to distant operator.

d) *"Data 2-n"*

- contains the continuation of the selection if other subscribers have been selected. Each supplementary selection uses the same form as in the layout "*data I*".

5.4.4 *Structure of the response*

REPLY message

1010 0000 Directory message (telephone)
LENGTH

1010 0001 Telephone (reply)
LENGTH

0011 0000 Reply
LENGTH

0110 0011 Part 1
LENGTH
- 1000 0000 Message indicators
  LENGTH
  Message indicators
- 1000 0001 International indicators
  LENGTH
  International indicators
- 1000 0010 Originating terminal code
  LENGTH
  Originating terminal code
- 1000 0011 Date and time (optional)
  LENGTH
  Date and Time
- 1000 0100 Message number (optional)
  LENGTH
  Message number

0110 0100 Part 2
LENGTH
- 1000 0000 Message code
  LENGTH
  Message code
- 1000 0001 International prefix
  LENGTH
  International prefix

0110 0101 Part 3 (optional)
LENGTH
- 0011 0001 Selection
  LENGTH
  - 1000 0000 Trunk code
    LENGTH
    Trunk code
  - 1000 0001 Telephone number
    LENGTH
    Telephone number
  - 1000 0010 Locality
    LENGTH
    Locality
  - 1000 0011 Subscriber name
    LENGTH
    Subscriber name
  - 1000 0100 First name (optional)
    LENGTH
    First Name
  - 1000 0101 Street name
    LENGTH
    Street name
  - 1000 0110 House number
    LENGTH
    House number
  - 1000 0111 Supplementary data (optional)
    LENGTH
    Supplementary data
  - 1000 1000 Subscriber message (optional)
    LENGTH
    Subscriber message
  - 0011 0001 Selection
    LENGTH
    - 1000 0000 Trunk code
      LENGTH
      Trunk code

5.4.5 The different parts of the inquiry formulated by the operator of the country of origin should be converted by the national computer into the international standard format. The different parts of the response transmitted in the international standard format should be converted by the computer of the country which made the request into its national format.

6 Charges

Note – As specified in Article 106 of the *Instructions for the International Telephone Service* [2], no charge is made for obtaining information in accordance with Article 51 of the *Instructions*, even when this requires the use of an international circuit.

However, some Administrations may reserve the possibility of applying certain charges in the future. The amounts charged would remain a national arrangement.

ANNEX A

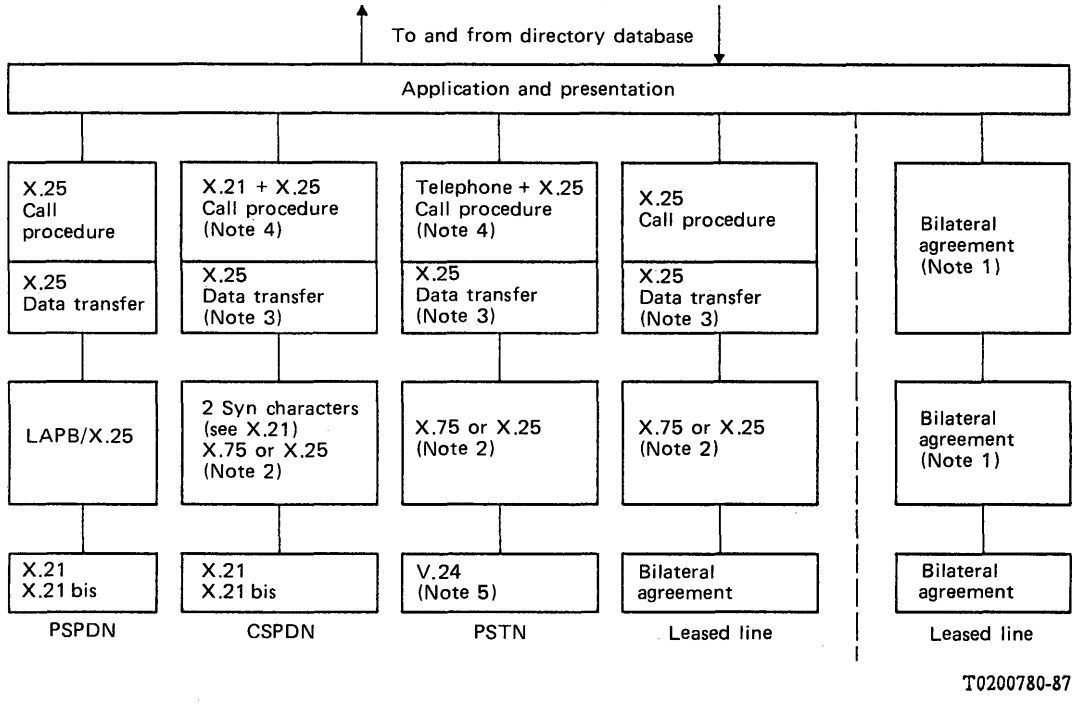
(to Recommendation E.115)

Directory services interconnect bearer services

A.1 *Introduction*

The interconnection of International Directory Databases should be network independent.

The general structure for the arrangement of the physical link (OSI layer 1), link access (OSI layer 2) and network layer (OSI layer 3) are as outlined in Figure A-1/E.115. Where Administrations have provided similar equipment, interconnection may be arranged by bilateral agreement to suit local requirements. This method of interconnection is solely the matter of the Administrations concerned.



Note 1 – Where Administrations have provided similar equipments, they may be interconnected to suit bilateral arrangements.

Note 2 – The link procedures are in accordance with Recommendation X.75 for single link operation.

Note 3 – The X.25 network layer is introduced to ensure a common procedure at layer 3 for all types of network connection.

Note 4 – The network connection is established by a two-stage selection; the first using normal telephone network procedures and the second using X.25 call control procedures.

Note 5 – For automatic calling and/or answering, Recommendation V.25 may be applicable. Full duplex operation using modems in accordance with Recommendation V.32 is preferred.

FIGURE A-1/E.115

A.2 *Identification*

The types of bearer services considered applicable for directory inquiry interconnect are:

i) packet switched public data network (PSPDN);

ii) circuit switched public data network (CSPDN);

iii) public switched telephone network (PSTN);

iv) Administration leased line (point-to-point).

With possible evolution to ISDN, Signalling System No. 7 includes message transfer part and message handling systems.

A.3 *Network interconnection*

The choice of network to be used for the interconnection of computer-based directory systems should be agreed bilaterally. However, to achieve commonality across all types of networks, the link, data transfer and call procedures, as specified in the appropriate Recommendations, should be used.

ANNEX B

(to Recommendation E.115)

Formal definitions of directory messages

```
Directory Message :: = CHOICE {Telephone [1], Other [0]}
  Telephone :: = CHOICE {Entry [0], Reply [1]}
    Entry :: = SEQUENCE {Part 1, Part 2}
      Part 1 :: = [APPLICATION 0] IMPLICIT SET{
                  MessageIndicators [0] IMPLICIT IA5String,
                  InternationalIndicators [1] IMPLICIT IA5String,
                  OriginatingTerminalCode [2] IMPLICIT IA5String,
                  DateAndTime [3] IMPLICIT IA5String OPTIONAL,
                  MessageNumber [4] IMPLICIT IA5String OPTIONAL}
      Part 2 :: = [APPLICATION 1] IMPLICIT SET{
                  Locality [0] IMPLICIT IA5String,
                  SubscriberName [1] IMPLICIT IA5String,
                  StreetName [2] IMPLICIT IA5String OPTIONAL,
                  HouseNumber [3] IMPLICIT IA5String OPTIONAL,
                  FirstName [4] IMPLICIT IA5String OPTIONAL,
                  Heading [5] IMPLICIT IA5String OPTIONAL,
                  Profession [6] IMPLICIT IA5String OPTIONAL,
                  SupplementaryInfoForSearch [7] IMPLICIT IA5String OPTIONAL,
                  CountryOrProvince [8] IMPLICIT IA5String OPTIONAL,
                  Category [9] IMPLICIT IA5String OPTIONAL}

Reply :: = SEQUENCE {Part 1, Part 2, Part 3 OPTIONAL}
      Part 1 :: = [APPLICATION 3] IMPLICIT SET{
                  MessageIndicators [0] IMPLICIT IA5String,
                  InternationalIndicators [1] IMPLICIT IA5String,
                  OriginatingTerminalCode [2] IMPLICIT IA5String,
                  DateAndTime [3] IMPLICIT IA5String OPTIONAL,
                  MessageNumber [4] IMPLICIT IA5String OPTIONAL}
      Part 2 :: = [APPLICATION 4] IMPLICIT SET{
                  MessageCode [0] IMPLICIT IA5String,
                  InternationalPrefix [1] IMPLICIT IA5String
      Part 3 :: = [APPLICATION 5] IMPLICIT SET of Selection
```

```
Selection :: = IMPLICIT SET{
        TrunkCode [0] IMPLICIT IA5String,
        TelephoneNumber [1] IMPLICIT IA5String,
        Locality [2] IMPLICIT IA5String,
        SubscriberName [3] IMPLICIT IA5String,
        FirstName [4] IMPLICIT IA5String OPTIONAL,
        StreetName [5] IMPLICIT IA5String,
        HouseNumber [6] IMPLICIT IA5String,
        SupplementaryData [7] IMPLICIT IA5String OPTIONAL,
        SubscriberMessage [8] IMPLICIT IA5String OPTIONAL}
```

References

[1] CCITT Recommendation *International telegraph alphabet No. 2 (ITA2)* Rec. S.1.

[2] CCITT *Instructions for the International Telephone Service* (1st October 1985), ITU, Geneva, 1985.

Recommendation E.116

INTERNATIONAL TELEPHONE CREDIT CARDS FOR USE IN A NON-AUTOMATED ENVIRONMENT

Preamble

This Recommendation concerns only credit card usage in a non-automated environment with the assistance of an operator. The automated international telephone credit card system is described in Recommendation E.118.

1 Credit cards may be issued by Administrations to allow a credit card customer to make telephone calls in the international service at the appropriate charges for each call and have the charges billed to his account in the country which issued the credit card.

The international credit card system should normally be used for calls to the country of the card issuer unless it has been decided otherwise by bilateral agreement between Administrations.

2 The use of credit cards may be allowed for station and personal calls (including data and conference calls).

Station calls paid with credit cards may be subject to a special flat-rate charge to be fixed by the billing Administration.

Personal calls paid with credit cards are subject to a special flat-rate charge to be fixed by the billing Administration.

3 If the holder of a credit card is to derive the maximum benefit from it, he should not be required to show the card at a telephone office; he should be able to make his calls over the telephone, simply quoting the card number to the operator. The number on the card should provide sufficient guarantee of the card's validity.

4 There would be certain advantages in standardizing the general format and numbering scheme together with usage procedures for credit cards used in the international service. This would facilitate the recognition of such cards in hotels, etc., and the handling of calls. It is a matter for national decision whether separate cards are issued for the national and the international telephone services, or whether one card will serve both purposes.

5 Credit cards issued for use in the international service (whether or not they are used for the national service as well) should, as far as practicable, conform with the following specifications:

5.1 *Size*

The credit card should be designed to be carried conveniently on one's person. Current ISO standards define the dimensions of financial transaction cards to be 85.60 mm × 53.98 mm (3.370 × 2.125 inches) and the CCITT considers that telephone credit cards issued by Administrations should have similar dimensions.

5.2 *Information content*

The information on an international telephone credit card should clearly include:

1) the name of the issuing Administration and, where appropriate, the country of issue;
2) the card number (on a combined national/international card, the national number, if different, should be appropriately designated),

and optionally includes:

3) the card holder's name and signature;
4) the date of expiry;
5) instructions on how the card should be used. (Some Administrations may prefer to issue instructions separately.)

5.3 *Numbering system*

The numbering of the card to be issued by Administrations shall be as described in Recommendation E.118, § 3.2.

5.4 *Issuer identifier number assignment and registration procedure*

a) The procedure for the assignment of specific issuer identifier numbers is described in Recommendation E.118, § 3.3.

b) An illustrative registration form can be found in Figure 2/E.118.

5.5 *Transition process*

Guidelines for Administrations to make the transition from the old to the new numbering scheme are contained in Annex A.

ANNEX A

(to Recommendation E.116)

Transition process to the new account number structure

A.1 *Background*

Generally, in today's environment, telephone credit card systems are implemented in a non-automated fashion with the customer typically presenting an international account number verbally to an operator.

Recommendation E.118, pertaining to an automated international telephone credit card system, requires a change in the structure of the account number.

It is not expected that all Administrations, or even a majority of them, will implement automated telephone credit card systems in the near future. Those Administrations planning to implement automated systems will need to continue to accept non-automated cards. Conversely, Administrations continuing to provide non-automated card service will need to accept the new automated card numbering structure.

Therefore, to facilitate both needs, a change in the account number structure for non-automated cards is necessary; the account number structure contained in Recommendation E.118 is usable in both automated and non-automated environments.

Because of the cost of issuing international telephone credit cards, Administrations will continue to use the current validity code until transitioning to the account number structure as defined in Recommendation E.118.

For background information, the old numbering system, as extracted from Recommendation E.116 from the VIIIth Plenary Assembly *Red Book*, is shown below:

"**Numbering system**

For international purposes the credit card will be composed of two parts:

- the first part will consist of a code to indicate the country of issue followed by a letter denoting the 5-year period of validity;
- the second part will consist of the credit card number assigned by the issuing Administration.

Administrations may incorporate a simple validation check within the credit card number which could be changed when new cards are issued."

A.2 *The plan*

The following transition plan will accommodate a range of implementation schedules by Administrations: The use of the current validity code will be extended until December 31, 1993 to allow all Administrations to make the transition to the new account number structure without requiring an interim reissue of credit cards.

Pending appropriate service agreements, Administrations should be prepared to accept the new account number format as early as January 1, 1989.

The transition to the new account number structure shall be completed by 31 December 1993. During the transition period, Administrations should expect to accept credit cards containing account numbers conforming to both numbering schemes. At this time all Administrations will be expected to have reissued cards using the new account number structure. See Figure A-1/E.116.

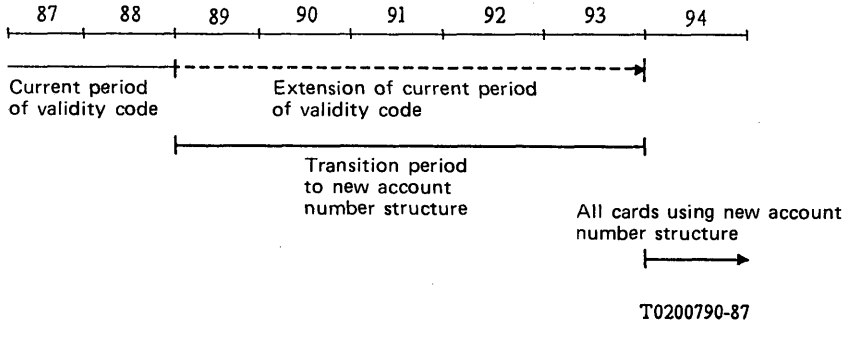


FIGURE A-1/E.116

Transition plan for account number structure defined in Recommendation E.118

Recommendation E.117

PROVISIONS CONCERNING THE DEVICE SUBSTITUTING A SUBSCRIBER IN HIS ABSENCE

1 Precautions will have to be taken by the Administrations to warn callers of the presence on the called subscriber's line of a device substituting him in his absence:

a) Devices of this type should be indicated in the telephone directories by means of a special sign ⌀.

b) Administrations should invite the owners or renters of such equipment to mention the fact on their letterheads by means of a printed indication.

2 To facilitate the disposal of international traffic on a device of this type, the Administrations should, when consenting to this equipment, insist that it complies with the essential conditions set out in the following Annex.

ANNEX A

(to Recommendation E.117)

Basic specifications for recording apparatus substituting the called subscriber

A.1 *Operating conditions*

A.1.1 *Delay in answering*

The ringing current from the telephone exchange should be permitted to operate the telephone bell for at least 3 seconds but for not more than 10 seconds before the call is answered by the apparatus. This will enable the call to be answered in the normal way in those countries which wish to provide for such a facility. The timing of this interval (3 to 10 seconds) should be independent of the periodicity or the duration of the ringing current.

A.1.2 *Normal conditions for metering and supervision*

In answering a call the apparatus should loop the subscriber's line and should also give the normal conditions for control of metering and for supervision as with a normal subscriber's installation. The disconnection of the apparatus shall break the loop on the subscriber's line.

A.1.3 *Announcement of the presence of the apparatus*

A.1.3.1 The presence of the apparatus should be indicated to the calling party by means of a verbal announcement following, in principle, immediately on the closing of the loop on the subscriber's line.

A.1.3.2 This verbal announcement should include, in particular, the following:

- first, that it is a recording apparatus;
- the subscriber's name or business style;
- the subscriber's number and particulars of the locality (e.g., Genève, St. Moritz, etc.);
- clear instructions as to the functioning of the apparatus (whether a message may be recorded, and if so, the moment when the message may be recorded and the maximum duration of a recording).

A.2 *Signalling conditions*

A.2.1 *Avoidance of interference from signalling frequencies*

The correct functioning of the apparatus should not depend upon (nor be affected to any extent by) the sending or receiving of signalling frequencies used in the telephone system or specially generated in the apparatus.

A.2.2 *Avoidance of interference with national signalling systems by the tones transmitted by the apparatus*

To avoid interference with the national signalling system of a country by the tones transmitted by the apparatus over the network of that country, it is recommended that:

- the transmission of tones should be in short pulses and not a continuous transmission;
- the tones should not be composed of a single frequency, but should be a mixture of at least two frequencies, so that the guard circuit of the signal receiver of the corresponding country, where there would be a risk of interference, may operate. For this purpose, the choice of the following frequency-combinations should be avoided:

2040 and 2400 Hz	1200 and 1600 Hz	500 and 20 Hz
600 and 750 Hz		1000 and 20 Hz

A.3 *Transmission conditions*

Any recording apparatus which takes the place of the called subscriber should give a level and quality of speech comparable to that given when the station is used by a person.

AUTOMATED INTERNATIONAL TELEPHONE CREDIT CARD SYSTEM

Preamble

The Automated International Telephone Credit Card System and its use throughout the world will provide advantages, conveniences and economic benefits to both users and Administrations.

This is based on a recognition of:

1) the need by Administrations for a reduction in the requirement for operator assistance, adequate security against fraudulent use and facilitated billing procedures, when telephone calls are made at public facilities;
2) the current and anticipated capabilities of credit cards which could provide increased security and new or enhanced services to users;
3) the growing use of more sophisticated credit cards for a variety of services and transactions.

As a result, Administrations are encouraged to prepare for, and introduce, automated international telephone credit card system using the guidance provided in this Recommendation.

The use of the pre-paid or debit card in the national network is a national matter and is not covered by this Recommendation.

Sections 1 through 6 of this Recommendation deal with major attributes of the automated credit card system which may be used by an Administration to establish its own system. Section 7 deals particularly with conditions necessary for international compatibility.

1 Types of credit cards which may be used

1.1 The types of cards which may be used are differentiated in two ways: the organization which issues them and the technology used.

1.2 The automated telephone credit card issued by Administrations and credit cards issued by banks, commercial credit card companies and other organizations can be used so far as the Administration concerned permits such use.

1.3 The IC type card (a card containing a microprocessor and memory in an IC chip) and cards using the magnetic stripe technology may be used if they are equipped with the necessary characteristics for the system.

2 Service agreements to be concluded between the Administrations and credit card issuers (other Administrations, credit card companies, banks, etc.)

The Administration concludes the necessary agreements with credit card issuers (other Administrations, credit card companies, banks, etc.) in order that cards issued by those bodies can be used in the Administration's Automated Telephone Credit Card System. The following are the principal items to be covered in the agreement:

a) payment of the telephone charge to the Administration by credit card issuers;
b) service charges (commission) due to credit card issuers;
c) responsibility on fraudulent use of cards and uncollectibles;
d) exchange of information among Administrations and credit card issuers;
e) validation procedures.

3 Specifications of cards

3.1 *International standards*

For maximum flexibility, convenience of use and economic benefits, the IC and magnetic stripe cards to be issued by Administrations should conform to the relevant ISO standards concerning materials, recording techniques, physical dimensions and the type and format of embossed information.

These are:

ISO/7810 Identification cards – Physical characteristics

ISO/7811/1 Identification cards – Recording technique – Part 1: Embossing

ISO/7811/2 Identification cards – Recording technique – Part 2: Magnetic stripe

ISO/7811/3 Identification cards – Recording technique – Part 3: Location of embossed characters on ID-1 cards

ISO/7811/4 Identification cards – Recording technique – Part 4: Location of read-only magnetic tracks – Tracks 1 and 2

ISO/7811/5 Identification cards – Recording technique – Part 5: Location of read-write magnetic track – Track 3

ISO/7813 Identification cards – Financial transaction cards

Note – The standard for the IC card is to be established by ISO TC 97/SC 17/WG 4.

3.2 *Numbering system*

The numbering of the card to be issued by Administrations shall be as follows based on ISO/7812 (Identification card-numbering system and registration procedure for issuer identifiers).

The maximum length of the visible card number (primary account number) should be 19 characters and is composed of the following sub-parts (see Figure 1/E.118):

- major industry identifier (MII),
- country code,
- issuer identifier number,
- individual account identification number,
- check digit. In addition to the check digit, Administrations may incorporate another validation check device in some location on the card which could be changed when new cards are issued.

Note – Major industry and issuer identifier numbers of the form 66xxxx have already been assigned to some Administrations as a transitional measure. Credit cards of this type are also fully compatible with ISO standards.

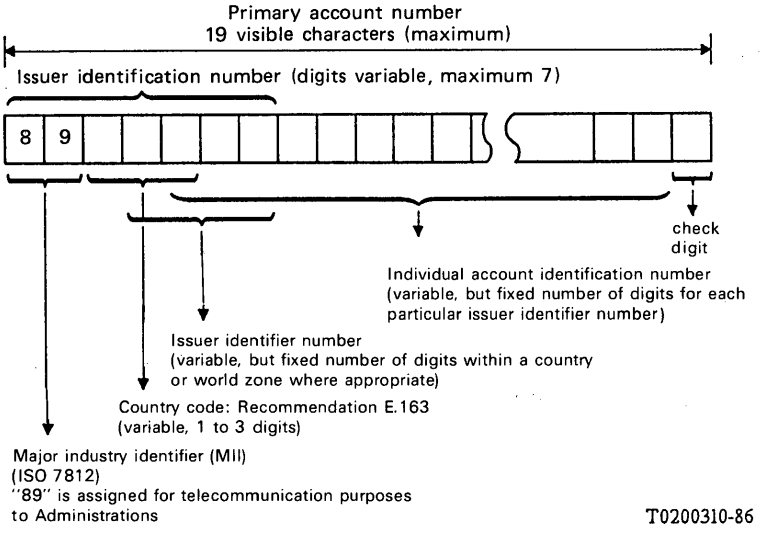


FIGURE 1/E.118

Credit card numbering system

3.3 *Issuer identifier number assignment and registration procedure*

a) The assignment of specific issuer identifier numbers should be the responsibility of a country or group of countries as appropriate.

b) These issuer identifier numbers are normally used to distinguish among multiple issuers within a country. However, these numbers may also be used to distinguish individual countries sharing the same country code (as defined in Recommendation E.163) or, if appropriate, to distinguish both countries and issuers.

c) A central registration authority should be established within ITU for the registration and/or cancellation of issuer identifier numbers for telecommunication Administrations. An illustrative registration form is contained in Figure 2/E.118.

d) The ITU should inform its members and coordinate registration information with the ISO as appropriate.

4 Functions of the system

In addition to the card, equipment to be used in the automated credit card system will include a terminal and may also involve supplementary processors, switching and other network components.

Equipment used in this system involves both memory and processing, either completely at the terminal itself, partly at the terminal and partly at another location, or completely at another location.

The major functions of the system are as follows:

4.1 *Card acceptance and reading*

The system should be able to accept, read and, if required, write information on one or more types of cards (IC, magnetic stripe, etc.) intended for use in the system.

4.2 *Card and user validation*

The system should be able to determine whether a card or billing number is valid and ideally whether the user is the actual owner of the card or billing number.

4.3 *Acceptance of other information*

The system should be able to accept other discretionary information supplied by the user or the card including for example call destination, other options and personal identification, etc. over and above the ISO Standard visible 19 characters.

4.4 *Information transfer*

The system should accept user information for immediate or later transfer to other system equipment, perhaps in a different order from which the information was input.

4.5 *Call records*

The system should record accurate and complete call data (including validation indication) required for billing and administrative purposes. A means for protecting and transferring these records to other administrative areas for further processing is also required.

4.6 *User feedback*

The system should, to the extent feasible, provide enough guidance and error feedback to the user via the terminal, thereby making the system easier and more convenient to use.

4.7 *Information security*

The system should, to the extent feasible, protect user information from disclosure to unauthorized parties.

4.8 *Maintenance*

The system should be practical to maintain and repair. This might involve self-diagnostics, automatic trouble reporting and remote software modifications.

4.9 *Card release*

The card should be released upon call completion or at some earlier point in the process.

5 Basic procedures for use of the card

5.1 *Validation of the card and identification of the card holder*

A user presents the card to the terminal for automatic validation of the card. The user may also present personal identification information, for example, PIN (Personal Identification Number), so that the system or the card can verify it and confirm the authorized use of the card.

5.2 *Call request*

After validation of the card and identification of the card holder, the user enters the desired number and other information if required.

5.3 *Call requests at terminals other than the fully automated telephone*

To increase the usefulness of the credit card, it is desirable to be able to use the card at telephones not associated with the automated system. This requires the user to enter billing and identification information (which may or may not necessarily include personal identification information) by other means such as by voice to an operator, manually entering the digits, or using a portable signalling unit. This information is then validated before the call is allowed to proceed. Some Administrations already have such capabilities. When automated international credit cards are used in a non-automated environment with the assistance of an operator, Recommendation E.116 will apply.

6 Operational procedures for charging, billing and collection of the charge [1)]

6.1 *Timing of calls and handling of call records*

The chargeable duration or the chargeable number of units of calls may be measured by timing devices either at the terminal or at another location.

The chargeable duration or the chargeable number of units of a call together with other records of the call described in § 6.2 should be transferred to the management system such as the Billing and Collection Centre for further processing of such data.

6.2 *Billing information*

Information required for billing might include the following:

a) the card number [2)]
b) chargeable duration or chargeable number of units,
c) calling and called numbers, including country codes when appropriate,
d) time of day (hour and minutes), date (day, month, year),
e) validation indicator,
f) other information.

---

1) Tariff and accounting principles are contained in the appropriate "D" series Recommendations.

2) The PIN (or secret code) should not be provided, nor should it appear in the billing information.

6.3 *Billing and collection of the telephone charge*

To collect the charges of calls made by credit card holders, the bills and/or billing information are sent to the credit card issuers (including foreign Administrations) according to the service agreement described in § 2. However, the provision of billing information to the card issuers is subject to national regulations.

If the calls are made with a credit card issued by the Administrations operating the system, the bill will go directly into the Administration's customer billing system.

7 Use of the card in countries other than the country of origin[3)]

7.1 *Reasons for such use*

For maximum convenience, advantage, security and economic benefits in terms of customer satisfaction, operating expense reduction and utilization of the international network, Administrations should admit and encourage the use of foreign cards to the greatest extent feasible.

7.2 *Bilateral service agreements*

Administrations, in order to admit the use of foreign cards with their system, should negotiate bilateral agreements with foreign Administrations (or card issuing bodies) as outlined in § 2.

Administrations wishing to conclude service agreements with foreign card issuers, should carefully select the foreign cards to be used in their system to ensure, among other things, that:

a) there is technical compatibility,

b) card validation and user verification will not be a problem,

c) there will be no problem in the collection of the telephone charge,

d) appropriate procedures are available for lost or stolen cards,

e) cards causing problems will not be honoured.

7.3 *Information to foreign card issuers and customer instruction*

Administrations should keep foreign Administrations or credit card company correspondents fully informed of operating conditions, requirements, restrictions, problems etc. in order that the foreign card issuing body can provide cardholders with customer instructional information to minimize confusion, encourage usage and assist users of cards in other countries.

7.4 *Allowable calls*

For reasons outlined in § 7.1, no limitation should be set on the destination of calls to be made using foreign cards. For example, calls to third countries, calls within a country or calls back to the card issuing country should be permitted.

7.5 *Billing and collection of charges from foreign card issuers*

The Series D Recommendations will cover billing and collection of charges, and until new Recommendations are developed or existing Recommendations are modified, bilateral service agreements between Administrations should apply.

[3)] Tariff and accounting principles are contained in the appropriate "D" series Recommendations.

Registration form
to be returned to:

GENERAL SECRETARIAT
OF THE INTERNATIONAL
TELECOMMUNICATION UNION

PLACE DES NATIONS
1211 GENÈVE 20
SUISSE

Registration for issuer identification number for the international telephone credit card system issued by the telecommunications Administrations [a]

This registration is submitted in accordance with International Standard ISO 7812. *Identification cards – Numbering system and registration procedure for issuer identifiers.*

A. TO BE COMPLETED BY APPLICANT (Card issuer)

Name or organization		
Address to be registered (maximum two lines, 30 characters per line)		
Principal contact in organization		
Telephone number +	Telex number	Telefax number + GR . . .
Address for correspondence		
Effective date of usage or cancellation		
Date	Signature	

B. TO BE COMPLETED BY THE TELECOMMUNICATIONS ADMINISTRATION [a] OR DULY AUTHORIZED COORDINATING ORGANIZATION

1) Major industry identifier (MII): 89
2) Country code (CC): _____
(according to CCITT Recommendation E.163, Annex A)
3) Action requested (check appropriate box)
Registration ☐ or Cancellation ☐
4) Issuer identifier number: _____
(according to CCITT Recommendation E.118)

[a] and/or Recognized Private Operating Agency (RPOA).

FIGURE 2/E.118

Illustrative registration form

C. TO BE COMPLETED BY THE APPROVING ORGANIZATION

Name of approving organization	
Date	Signature

D. TO BE COMPLETED BY ITU (CENTRAL REGISTRATION AUTHORITY)

Issuer identification number registered or cancelled 8 9 ⌴ ⌴ ⌴ ⌴ ⌴	
Date	Signature

FIGURE 2/E.118 *(cont.)*

Illustrative registration form

Recommendation E.119

INSTRUCTION OF STAFF OPERATING INTERNATIONAL POSITIONS

The professional instruction of operating and supervising staff is of the greatest importance in ensuring the efficient use of circuits in the international telephone service; to this end, it is extremely desirable to improve supervisors' and operators' knowledge of the language of other countries and to enable them to become informed about the customs of the subscribers, the organization of the service and the manipulation of equipment at the other end of the circuit.

It is therefore recommended:

1) that, during the training of these operators, they should be provided with some information about methods and operating procedures used in the countries with which they might be connected;
2) that there should be frequent exchanges of supervisors and operators between the telephone exchanges of different countries.

SECTION 3

GENERAL PROVISIONS CONCERNING USERS

Recommendation E.120

INSTRUCTIONS FOR USERS OF THE INTERNATIONAL TELEPHONE SERVICE[1)]

Preamble

This Recommendation outlines the principles and guidelines for Administrations in the preparation of user instructions.

The growth of the worldwide telephone network emphasizes the urgency to improve customer performance when using telecommunications services. The absence of clear and up-to-date information and instructions for users of the worldwide telephone service can only result in a low degree of customer satisfaction and unnecessarily high costs to Administrations. Consequently, Administrations are urged to promote, through the use of this Recommendation, progress towards the adoption of the guidelines which follow.

1 General principles

1.1 Up-to-date comprehensive instructions should be made readily available to users of the public telephone service, by Administrations.

1.2 The objective of such instructions is to allow customers to complete calls themselves to the maximum extent possible and reduce errors in the use of the international network, thus:

- assisting the user and providing greater satisfaction on his part,
- effecting significant cost savings by Administrations through more efficient use of the network.

1.3 On this basis, the full availability of current instructions should be considered as equally important as the overall planning, provisioning, operating and maintaining processes, the costs of which are a normal and inherent part of the supplying of good telecommunications service.

1.4 Established instructions provided by Administrations should be evaluated on a regular and continuing basis with a view to their improvement. Observations of service quality, studies of customer calling difficulties, questionnaires, customer comments, laboratory experiments, and any other means which may be available or practicable should be considered the normal tools for furnishing good instructions.

[1)] Other Recommendations which should be considered in this respect are: E.115, E.121, E.122, E.123, E.126, E.127, E.128, E.160, E.161.

1.5.1 The introduction of new services shall include clear and easy to use instructions for use by the customer. These instructions constitute a normal part of the introduction of these services.

1.5.2 Every effort should be made to test the effectiveness of instructions before issue and then to promote and promulgate on an international basis those proven to be most effective in practice, with due regard to the needs of different countries.

1.5.3 Design of instructions should play a key role in the development of proposed new services, from the customer point of view, rather than being considered belatedly in operational and hardware decision making and manufacture.

1.5.4 Optimal instructional practices as proved in service might be made available to all interested Administrations in order to improve customer performance and effect significant cost savings.

2 Instructions

2.1 The most common means of providing a range of instructions and information to customers for the effective use of the telephone service is through the medium of printed *public telephone directories* issued on a general basis by Administrations.

2.2 In addition, these printed instructions should normally be placed in public places for use by customers, such as public telephone booths and post offices.

2.3 Further instructions for specific purposes may be issued to users, for example:

- dialling instruction booklets,
- dialling code booklets,
- operating procedure booklets (for supplementary services),
- personal telephone directories,
- other telephone guide books (multilingual), pamphlets or cards of a specialized nature.

2.4 Access to spoken instructions can be provided through the provision of operators or recorded announcement machines dedicated to this activity; one aim should be to reduce to the greatest extent customer references to the operator assistance service.

2.5 Specialized instruction can with advantage be given through the medium of inclusion in school curriculums, radio broadcast and television transmissions, other printed media and special public presentations for the purpose of improving customer performance.

3 Public telephone directories

3.1 *Public telephone directories* are published regularly by Administrations as the most common means of informing customers of service numbers which are generally available for public use, instructions on use of the service, and easy to find current customer telephone number listings. It is recognized that the layout of directories is governed by considerations which may vary from country to country; however, it is desirable that such lists of subscribers should be capable of ready consultation by the Administrations and/or subscribers of other countries. To this end, similarity in sequence and presentation of directory information should be regarded as a desirable international objective to be achieved within the constraints of language differences.

3.2 Such information can be conveyed by words, pictograms and internationally standardized symbols, the basic need being to impart clear information to the caller (see Recommendation E.121). It would be very useful, in order to encourage the use of the international telephone service, if directories (especially those supplied to other Administrations and/or to subscribers of other countries) were composed in roman characters, particularly those relating to the names and addresses of subscribers.

3.3 Public telephone directories may cover a single numbering plan area, or several numbering plan areas on an exchange or geographical basis or portions thereof based on a community of interest and are issued free of charge to subscribers in these areas.

3.4 They may be published as a single volume or as groups of volumes, keeping in mind the need for brevity and simplicity, regular editing and up-to-date publication, consistency between volumes, for maximum readability and ease of use by the customer. Each volume of the lists of subscribers could usefully contain a recapitulatory list of the subdivisions mentioned in the volume, or an equivalent chart.

3.5 Language difference on the part of residents and foreign visitors is an important factor to be considered in the publication of public telephone directories. Multilingual information, when included, should be well presented so that those who have partial knowledge of, or no language of the country are not deterred from using the service.

3.6 To avoid difficulties in the interpretation of instructions due to language differences, the harmonization of the General Information pages in the telephone directory must be continued. In these pages, instructions are clearly and concisely given by means of recommended symbols and pictograms and by graphical representation of the operational procedures of the telephone service (see Recommendation E.126).

3.7 Moreover, with a view to reducing the difficulties experienced by foreign visitors in consulting the first pages of the telephone directory, some of these pages should contain a summary of the essential information in different foreign languages with references to the full text of the instructions given in the "General Information pages" in the national language (see Recommendation E.127).

3.8 Public telephone directories should be subdivided into at least two basic parts easily recognizable, for example by means of different coloured pages (for example, pink for instructional pages and white for customer telephone number listings). Page edge-marking or intercover publicity are other alternatives.

3.8.1 Call guide instructions for users should consist, for example, of the following, in order of priority:

- index;
- emergency call numbers (police, fire, ambulance, language service, etc.);
- service department codes and operator assistance numbers;
- how to dial;
- local dialling instructions with lists of exchange or geographic place names, codes, maps of area coverage and applicable charges if any;
- national long-distance dialling instructions, with lists of place names, long-distance prefixes, area codes, maps and details of call charges;
- international long-distance dialling instructions, with international prefixes, country codes, area codes and details of call charges, etc.;
- how to use the directory;
- general information which the Administration may feel useful or important to the user;
- examples drawn from Recommendation E.123 to illustrate the standard national and international notation for telephone numbers, to facilitate understanding of the composition of international numbers;
- numbers of the administrative services of Administrations, their addresses and enquiry points;
- list of codes and telephone numbers of the telephone services which are available, together with recommended symbols to assist foreign visitors.

3.8.2 *Customer listings*

- Alphabetical lists in black print on white pages of subscribers (surname, given names or initials and postal address) either by numbering plan, exchange or geographical area (or combinations thereof) with an appropriate identification in heavier type at the beginning of the list and at the top of each page and/or column.

– Listings belonging to another directory area including those of other countries should be easily distinguishable, and show the appropriate information in order that a call can be completed.

– Alphabetical lists may be split where desired, into residence and business listings.

3.8.3 The instructional pages should precede the customer listings.

3.8.4 Where there is a need for more than one language in a country, colours or other means of differentiation may be used as appropriate in the instructional pages.

3.9 The same directory may contain sections other than the alphabetical list of subscribers, but these sections may equally be published as a separate volume or volumes, for example:

3.9.1 *Classified listings* (Yellow pages)

– a classified business trade and professional section in alphabetical order, followed by names in alphabetical order under the respective headings, together with address and telephone number.

3.9.2 *Services promotion* (Green pages)

– a section or filler pages to allow the Administration to illustrate services it wishes to sell, or makes available free of charge, and provide instructions for specialized instruments which may be connected to the network, in addition to other information (e.g. postal or telegraph information, PBXs, telex or data services). Photographs, recommended pictograms and symbols could be used, particularly to help foreign visitors to take advantage of the services.

3.9.3 Optional classified listings and service promotion sections should follow the instructional pages and customer listings so as not to negate the basic nature of the latter, from the users' point of view.

3.10 It is desirable that the effectiveness of the existing public telephone directories should be tested periodically in order to improve customer performance in the use of the network.

3.11 The front cover or the first pages of each book of a directory, or each section of a directory, should preferably be used to emphasize important information such as emergency numbers although these may be also listed elsewhere.

3.12 Other information deemed important by Administrations, for example national laws or regulations, billing information, etc. might be placed on the back pages or spare pages due to the binding process. These pages might also be used for personal notation of telephone numbers to increase the value of the directory from the users' point of view.

3.13 Administrations may wish to consider the use of staff dedicated to the improvement of directory listings, resolution of particular listing problems and which can ensure a source of additional revenue (e.g. additional listings).

3.14 Recommendation E.114 outlines the conditions for supplying lists of subscribers (by directories and other means) to other Administrations.

4 Public telephone booths

4.1 Public telephone booths should preferably be identified externally with the applicable internationally approved symbols, particularly at locations frequented by tourists.

4.2 In addition, they should be equipped with public telephone directories relative to the areas in which they are located and associated calling instruction booklets as appropriate.

4.3 Public telephone booths should, as necessary, prominently display notices listing exchanges which can be reached without dialling the full national number. Lists of dialling codes, particularly those most frequently used should also be displayed to reduce enquiries to operators to the minimum.

4.4 Public telephone booths should display relevant pictograms and symbols to instruct customers on how to place national and international calls, to obtain assistance from operators, or to place calls to emergency numbers (fire, police, etc.). (See Recommendation E.121.)

4.5 Administrations should preferably display instructional information in more than one language and give careful consideration to the use of several languages for maximum assistance, particularly in call offices and transport terminals where foreign visitors can be expected and so help reduce costly operating assistance services.

Harmonization of the human factor aspects of payphones may be an efficient means not only of ensuring the correct use of payphones in the international telephone service but also of obviating the need for different instructions to foreign visitors, which may become virtually superfluous in the future.

4.6 Similarly, instructional information regarding other services provided by the Administration may be posted.

5 Instructional information for specific purposes

5.1 Considering the scope, size and normal availability of public telephone directories, the ease and need of travel by users, the increasing use and reliability of telecommunications and the lack of knowledge on the part of foreign visitors, then personalized instructional information should be made available.

5.2 This generally takes the form of personal *pocket information* issued to new customers, either residence or business, heavy users, or generally available upon request. Such information includes:

- dialling instruction booklets,
- dialling code booklets,
- operating procedure booklets,
- personal telephone directories,
- other telephone guide books, pamphlets or cards.

5.3 Administrations should consider making appropriate information available to foreign visitors and to their customers who plan to visit other countries or who otherwise have a need. This might be arranged and exchanged on a bilateral basis for mutual benefit.

5.4 Careful attention should be directed to publishing instructions in more than one language to ensure as wide a use as possible. The use of appropriate pictograms and symbols of the recommended design would assist the customer in unfamiliar situations (see Recommendation E.121).

5.5 Dialling instruction booklets are published to facilitate the placing of national calls and international calls. Ideally, instructions for both should be in the same booklet and should be essentially the same as provided in public telephone directories.

Since the characteristics of payphones at present differ from one country to another, detailed instructions should be provided for identifying payphones, for making national and international calls correctly from them and for correctly paying for the calls.

5.6 Dialling code booklets should similarly list the appropriate codes for national and international calls, in separate sections of the same booklet.

5.7 Operating procedure booklets may be essentially the same as dialling code booklets but include appropriate control procedures for special services which the customer may want to use, preferably of an internationally standardized nature.

5.8 Special cards or specialized leaflets may also be made available to illustrate, for example:

- dialling codes or instructions for foreign visitors on how to make national and international calls;
- tones which may be encountered in dialling national or international calls, illustrated by pictograms or internationally standardized symbols;
- use of particular services that are available or whose proper use should be encouraged;
- practical or helpful hints to foreign visitors regarding any aspect of the service;
- guidance to travellers telephoning home from abroad (see Supplement No. 6 at the end of this fascicle).

5.9 The above-mentioned leaflets and Supplement No. 6 should so far as possible be combined, provided that this arrangement is convenient for users (see Recommendation E.128).

5.10 Personal telephone directories can be particularly useful to users for their notation of particular or frequently called numbers. Administrations could consider the inclusion of a minimal amount of key instructional information.

5.11 Administrations are encouraged to establish and maintain close liaison with other countries' tourist boards to ensure that current information about its services is available to prospective visitors in suitably translated form.

6 Instructions by operators or recorded announcements

6.1 Correct dialling instructions can be given to customers as required in the process of placing a call, by special intercept operators or recorded announcements dedicated to that type of instruction.

6.2 This may be given in more than one language, or the customer directed to an appropriate language operator for assistance. Inferred is special training on the part of the operators.

6.3 Recorded announcement machines may be employed on a public basis, where feasible, to which users could be encouraged to call for instructional information (e.g. demonstration of foreign tones or announcements, etc.).

6.4 To aid in a clearer understanding of the world's telephone system, a verbal announcement used within the various networks should preferably be interleaved with the special information tone (SIT).

Note – This tone is internationally standardized and designed to invite a calling subscriber to get in touch with an operator in his country when he cannot understand a message aurally received.

6.5 It is paramount that if recorded announcements are used, the words should be chosen with extreme care to avoid customer confusion.

7 Specialized instructions

7.1 Administrations may choose to employ specialized instructions in a formal manner through other media for example:

- educational programmes in elementary or more advanced school curriculums,
- educational programmes and aids for teachers,
- radio broadcasts or television transmissions of instructional information, exclusive of advertising,
- presentation of instructions through newspapers or magazines,

- film presentations to private groups, or to larger public groups in cinemas,
- presentations at local, national or international exhibitions,
- special inserts with customer accounts,
- special leaflets for restricted or wide distribution,
- special classes on customers', or Administration, premises (e.g. PBX or Centrex users, etc.),
- change of number postcards and letterhead stickers for individual subscriber use, etc.

For the training of future users, who may become an increasingly important part of worldwide telecommunications customers, some of the above items may be applicable.

7.2 Some such programmes may be more effective than others and while efficacy may be difficult to determine, evaluation is an important aspect towards optimum instruction at least cost.

Recommendation E.121

PICTOGRAMS AND SYMBOLS TO ASSIST USERS OF THE TELEPHONE SERVICE

1 General definitions and guidelines

1.1 *Definitions*

pictograms and symbols convey information in pictorial form. They are widely used in the telecommunication field to denote specific types of equipment and services and to instruct people in the use of such equipment and services.

A pictogram is a simplified pictorial representation. It is commonly used to guide people and tell the person *how* to achieve a certain goal. It consists of more or less realistic elements. Pictograms should be self-explanatory.

A symbol is an abstract pictorial representation; it commonly stands for something and tells a person *what* he is faced with. It is not necessarily realistic and often requires a learning process in order to be understood.

There is not always a sharp distinction between pictograms and symbols. Pictorial representations can be placed on a continuum with on the one end realistic pictograms which can be readily understood and on the other end abstract symbols which are difficult to understand without prior learning.

1.2 *Pictograms and symbols as an alternative to written text*

Advantages of pictograms and symbols as compared with written text are:

- independence of language;
- greater efficiency in denoting direction and other special attributes;
- greater spatial compactness;
- faster visual perception;
- more eye-catching.

Disadvantages of pictograms and symbols as compared with written text are:

- less efficiency in conveying detailed information;
- greater risk of incorrect interpretation;
- for abstract symbols, the need of some prior learning in order to be correctly understood.

Pictorial representation of an abstract concept should only be used instead of written text if the user can be assumed to have adequate opportunity for learning (for instance through frequent usage).

To prevent incorrect interpretation, pictograms or symbols may be accompanied by supplementary text. This is especially advisable if correct interpretation could be of vital importance to the user. An additional and important advantage of supplementary text is that it facilitates the learning of symbols and pictograms.

1.3 *Guidelines for design*

The idea for a pictorial design for a particular application should, whenever possible, be based on the user's mental picture of that application.

Realistic pictograms are more self-explanatory and require less learning than abstract symbols. Hence, whenever possible, the designer should aim at realistic representation.

To achieve fast visual recognition, a pictogram or symbol should be as simple as possible and it should be easily distinguishable from other currently used pictograms and symbols.

The design of a consistent set of symbols should be guided by a few unambiguous rules about the meaning of pictorial elements within a particular application and the relationship between these elements (see, for example, § 2.5.3). The set should not be larger than strictly necessary; a maximum of three different elements is recommended.

The design of pictograms and symbols should meet the technical requirements of their application. If they are to be displayed on the individual keys of a keyboard or on a VDU screen, their design should allow this without essential modification. In both these cases they should be easily recognizable from a distance of 50 cm.

1.4 *Guidelines for testing*

To find the most suitable symbol or pictogram for a particular application, it is advisable that a number of different designs be generated and submitted for testing.

The method of testing a pictogram or symbol should depend on its intended application. If the application offers little or no opportunity for learning, the test should determine the degree of correct recognition without prior learning. If the application allows prior learning, the test should determine how many trials are needed to arrive at a previously determined criterion of correct recognition. If a pictogram or symbol is to be used in conjunction with other pictograms or symbols, it should be tested within the context of these other symbols of pictograms (see, for an example, Annex A).

1.5 *Standardization*

Great advantages accrue when the meaning of symbols and pictograms becomes common knowledge. It follows that standardization is desirable, especially when such standardization can be in conformity with existing standards produced by other standards organizations.

1.6 *Design specifications*

The styling, size, colour and position of each recommended symbol or pictogram is left to the discretion of the Administration. Each symbol or pictogram should, however, bear a close perceptual similarity to those shown in this Recommendation.

Figure titles for Figures 1/E.121 through 4/E.121 and 7/E.121 give those pictorial elements which are considered essential. Symbols may be contained within a suitable frame or border.

2 Specific recommendations

2.1 *Symbol for telephone*

A symbol for telephone may be used:

a) in place of the word telephone;

b) as an adjunct to a telephone number;

c) to indicate a place where telephone calls can be made;

d) to refer to the telephone service in general.

When such a symbol is used, it should be a representation of a telephone handset. The symbol given here (Figure 1/E.121) is similar to the one cited in [1] and those commonly found on road traffic signs and in railway stations.

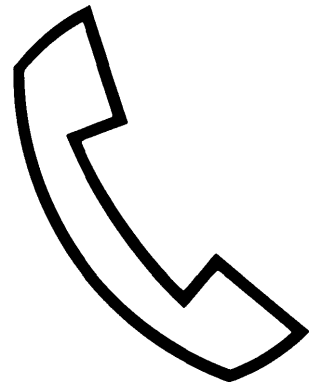


FIGURE 1/E.121

Symbol for telephone: telephone handset in upper left-lower right orientation, with the microphone directed upwards

2.2 *Symbol for information*

A symbol for information can be used in telephone directories, in lists of relevant telephone numbers shown in telephone booths, in other places where information via the telephone can be given, or in printed information for foreign visitors. It may also be used in association with several telephone (service) numbers. It may be used to draw attention to:

a) general telephone service information;

b) information about national or international telephone numbers;

c) assistance in foreign languages;

d) information about hotels, theatres, etc.

When such a symbol is used, it should consist of the letter i (lower case) as shown in Figure 2/E.121. The symbol may be contained within a suitable frame or border. Since this symbol is a general reference, it should be associated with appropriate words or other symbols to show the nature of the information provided at the corresponding telephone number. For example, the symbol "telephone" for general telephone inquiry and the words "English", "Deutsch", "Français" for assistance in foreign languages.

FIGURE 2/E.121

Symbol for information (lower case letter "i")

2.3 *Symbols for emergency numbers*

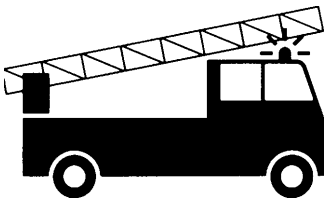
In some countries a general emergency number is available to be dialled in all emergency situations. In other countries different telephone numbers are used for each emergency service such as fire brigade, ambulance or police. Where a symbol is used to indicate the general emergency number, that symbol should be "SOS" as shown in Figure 3/E.121. Where no general emergency number exists, the symbol may be used to draw attention to the list of emergency numbers.

SOS

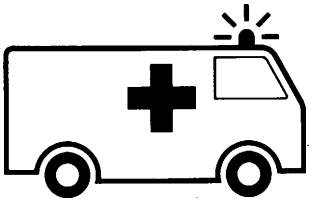
FIGURE 3/E.121

Symbol for general emergency number (the letters "SOS" in uppercase)

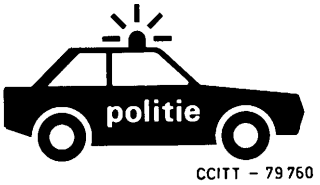
The symbols shown in Figure 4/E.121 may be used in cases where different symbols are required, possibly in combination with Figure 3/E.121.



Symbol for fire brigade: side view of a fire engine, showing a flashing light and a ladder



Symbol for ambulance: side view of an ambulance, showing a flashing light and a cross (Note 1)



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Symbol for police: side view of a police car, showing a flashing light and the word police in the national language (Note 2)

Note 1 – The cross may be replaced by a crescent in some countries. A *red* cross and a *red* crescent are reserved symbols of the International Committee of the Red Cross, and should not be used unless special arrangements are made with the International Committee of the Red Cross.

Note 2 – Shown here is an example in the Dutch language. If for typographical reasons, printing of the word for "police" in the national language is not feasible, this may be omitted.

FIGURE 4/E.121

Symbols for emergency services

Administrations may judge it necessary to test these symbols in the context of other, nationally used, symbols. Annex A provides a method for such a test.

The three symbols in Figure 4/E.121 were selected by means of an international experiment performed in eight countries. Altogether, 364 subjects participated in this experiment. The results of this experiment show a remarkable consistency in the results from the eight countries.

2.4 *Graphical representation of audible tones*

2.4.1 A graphical representation of audible tones in instructions is recognized as a means, in addition to a verbal description, that could aid telephone users to interpret them correctly during the process of setting up a call. The definition of principles for a graphical representation which would guarantee the maximum aid to users has been studied during the Study Period 1977-1980. Certain experiments designed by Working Party II/2 have been carried out with the participation of the following countries: Australia, Canada, Denmark, the Netherlands, Nigeria, Norway, Sweden and the United Kingdom.

2.4.2 An additional study has been done during the Study Period 1981-1984 in the United Kingdom. This study supported results of earlier studies.

2.4.3 Audible tones known to exist at the present time in various national networks can be characterized by the following factors:

- temporal structure,
- pitch,
- tone quality or timbre (subjectively felt by the users and related to the spectral complexity),
- loudness.

These four factors should be graphically represented according to the following principles:

2.4.3.1 *Temporal structure*

This factor should be represented by appropriate blank intervals along a horizontal time axis.

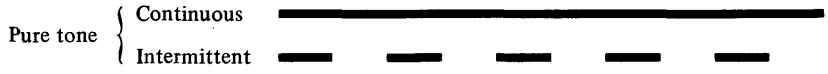
For example:

2.4.3.2 *Pitch variation in a tone*

This factor should be represented by the vertical displacement of a linear element above the time axis.

2.4.3.3 *Tone quality*

Pure tones (sinusoidal waves) should be represented by linear elements on a horizontal axis.



If non-pure tones consist of two frequencies, the optimal representation depends on the frequency difference between the tones. This frequency difference may be greater than the critical bandwidth (consonant tone-pairs) or smaller (dissonant tone-pairs) [2]; for consonant tone-pairs, the optimal representation is two parallel linear elements; for dissonant tone-pairs, a wavy line is optimal.

If the frequency difference between the two tones is near the critical bandwidth, neither of the representations may be satisfactory.

2.4.3.4 *Loudness variation in the tone*

This factor should be represented by variation in the thickness of a linear element.

2.4.4 Intermittent tones should normally be represented by at least 2 full cycles.

2.4.5 The same time scale should be used in the representation of all tones in the same figure.

2.5 *Symbols for supplementary services*

2.5.1 Symbols may be used to designate telephone subscriber services. They may appear on subscriber equipment, e.g. on the tops of push-buttons by which these services are operated. They may also be used in instructional material[1]. A symbol has the advantage – contrary to a name or an abbreviated name – of being independent of language. For users familiar with a certain language, the full name or a mnemonic code may be more easily understood.

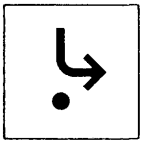
2.5.2 Figure 5/E.121 shows symbols for twelve supplementary services. The names of the services and their descriptions are those used in the experiments in which the symbols were evaluated (see Annex B). They are chosen in such a way that they explain the operation of the services in clear and simple terms. Where applicable, the corresponding names as they appear in Supplement No. 1 are added in parentheses, together with the relevant paragraph numbers.

2.5.3 The set of symbols recommended here is open to future expansion, if symbols for more services should be required.

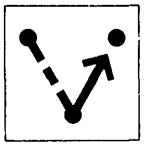
The majority of the standardized symbols are based on the following guiding principles:

- a point represents a subscriber's station;
- a line between points represents a connection between subscribers;
- a dashed line represents a connection on the hold;
- an arrow represents a call:
  outgoing calls .... an arrow away from the user ↑
  incoming calls .... an arrow toward the user ↓
  calls passing by .... an arrow passing by the user →

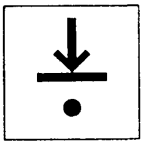
Example: Basic diversion ("Incoming call passes by")



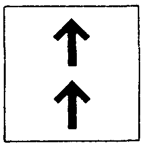
Example: Enquiry call ("First party on hold whilst calling another party")



- a bar (or "barrier") represents a "stop" for a call;
  Example: Incoming calls barred



- a repeated action is represented by repeated symbol elements;
  Example: Repeat last call



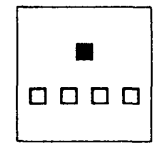
- ringing is represented by stylized sound waves outgoing from a point;
  Example: No reply diversion

[1] At the time these symbols were developed and tested, the procedures by which subscriber services are operated were not yet standardized. This may lead to the undesirable situation that the same symbol is used for different procedural implementations of a service. Efforts have therefore to be made to standardize the operational procedures for supplementary services.

The number of symbols combining these elements is limited. Therefore, for some of the standardized symbols, additional elements have had to be applied:

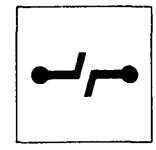
– a keystroke is represented by a square;

Example: Short code dialling ("One keystroke instead of many")



– A disconnection is represented by an interrupted line.

Example: Disconnect



2.5.4 If manufacturers or Administrations consider using symbols which are not yet recommended, they are advised to contact the CCITT Secretariat, which will in turn contact the Special Rapporteur for the relevant Question.

2.5.5 The symbols presented in Figure 5/E.121 may also be displayed on a CRT as long as they appear closely similar to their presentation on paper. On a commonly available CRT screen, this can be achieved by using a minimum of 60 × 50 or 60 × 60 pixels per symbol.

2.6 *Pictographic instructions for payphones*

A sequence of pictograms is an effective means of instructing users of payphones, especially if certain users, e.g. foreign visitors, are not familiar with the equipment or operating procedures. Various studies on the design of pictographic instructions for payphones have led to the following guidelines:

2.6.1 If it is likely that certain users will be unfamiliar with the equipment (e.g. foreign visitors), realistic drawings showing the equipment sufficiently to locate the different parts would be helpful; where it is likely that users will be familiar with the equipment, or that locating the different elements is not a problem, less representative pictograms may be acceptable.

2.6.2 Movement (or certain actions) should be indicated by arrows. These could be provided in a different colour from the rest of the pictogram, for greater conspicuousness.

2.6.3 Movement, or actions, in a sequence of pictographic instructions, should be labelled by numbers 1, 2, 3, etc. in the appropriate order.

Pictograms can be arranged in a horizontal strip (as illustrated in Figure 6/E.121) or in a vertical column, or (provided that the numbering is clear), in a block.

2.6.4 Pictograms should be placed where they will most easily be seen by the user and, wherever possible, should be fastened to the body of the equipment. Ideally, new payphones should be designed with a space on the front specifically to accommodate the pictograms, and the larger the space allowed, the better.

2.6.5 New pictogram designs should be tested in realistic conditions on a sample of the user population before being implemented generally.

2.7 *Symbol for facsimile*

A symbol for facsimile may be used:

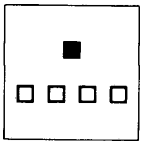
a) in place of the word facsimile;

b) to indicate a place where a facsimile service can be used;

c) to refer to the facsimile service in general;

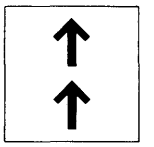
d) as an adjunct to the facsimile number of a subscriber (see also Recommendation E.123, § 7).

When such a symbol is used, it should consist of the word FAX in capital letters as indicated in Figure 7/E.121.



Short code dialling

You only need to dial a simple code (e.g. a number from 1-9) in place of the complete telephone number when calling commonly used numbers (abbreviated dialling services, § 2.1)



Repeat last call

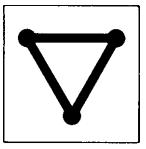
The last number that you dialled is called again (e.g. if it was previously engaged). This service can be repeated (e.g. if still engaged) (number repetition service, § 2.26)

Basic diversion

All calls made to your telephone will be diverted to another telephone (do not disturb service, § 1.2)

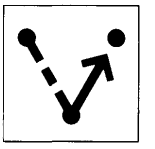
No-reply diversion

If you do not answer your telephone, the call will be diverted to another telephone (absent subscriber service, § 1.1)



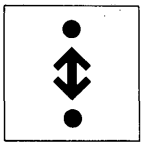
Three party call

Allows you to set up a telephone conference between yourself and two other parties (three party services, § 1.15)



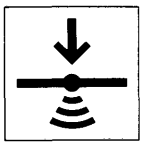
Enquiry call

Allows you to "hold" someone you are talking to while you make another call (three party service, § 1.15)



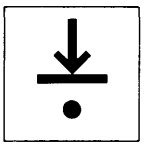
Call-back

If a party you have called is engaged, the call will automatically be made again as soon as he is free (completion of calls to busy subscribers service, § 1.12)



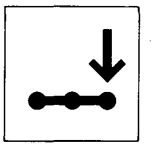
Call waiting

If you are speaking to another party, further calls to your telephone will cause a signal to inform you that someone is trying to reach you (call waiting services, § 2.23)



Incoming calls barred

Any call made to your telephone will be stopped (incoming calls barring, § 1.10)

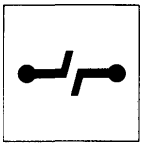


Call pick-up

You may use your own telephone to answer calls made to another telephone in the same "group" (e.g. a colleague's telephone) (PBX line-hunting service, § 2.6)

General cancel

Cancels any of the services you have previously activated (e.g. to cancel "incoming calls barred")



Disconnect

Allows you to finish a call and make a new one without replacing the handset

Note – Paragraph numbers refer to Supplement No. 1.

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FIGURE 5/E.121

Symbols for supplementary services

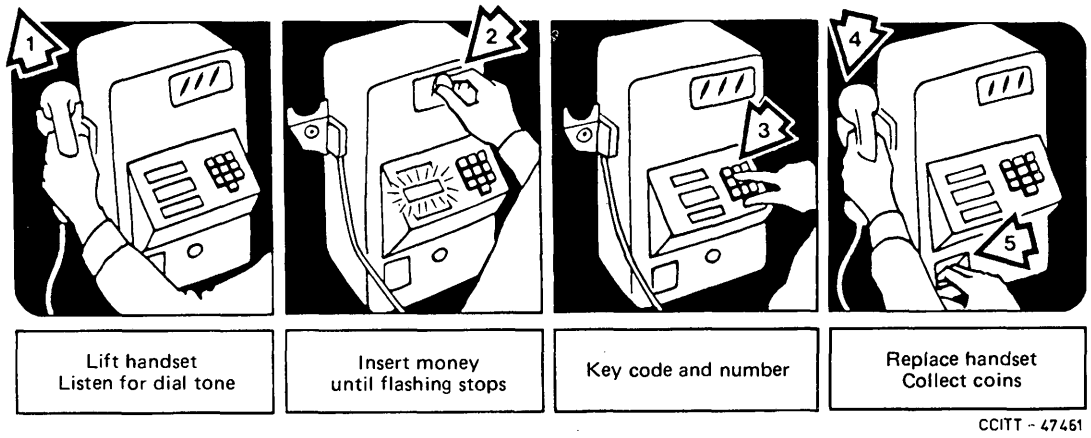

FIGURE 6/E.121

Example of pictographic instructions

FAX

FIGURE 7/E.121

Symbol for facsimile [upper case letters (FAX)]

2.8 *Symbol of access for the physically handicapped*

A symbol of access for the physically handicapped may be used to indicate that a public telecommunication facility such as a telephone booth is accessible to a handicapped person, particularly one using a wheelchair.

The symbol to be used for this purpose is the symbol in Figure 8/E.121. This symbol has been adopted for international standardization in a resolution of the 1978 assembly of Rehabilitation International. For specific regulations regarding the design and application of this symbol, it is recommended that Administrations contact their national member organization of Rehabilitation International or the central office of Rehabilitation International, 25 East Street, New York, 10010, USA.

FIGURE 8/E.121

Symbol of access for the handicapped

2.9 *Symbol for special facilities for the deaf and hard of hearing*

A symbol for special facilities for the deaf and hard of hearing may be used to indicate that a telecommunication facility such as a public telephone has been specially adapted for the deaf and/or hard of hearing. Such special facilities may consist either of amplification or of textual presentation.

The symbol to be used for these purposes is the symbol in Figure 9/E.121. This symbol was adopted by the World Federation of the Deaf during their meeting in 1980. For specific regulations regarding the design and applications of this symbol, it is recommended that Administrations contact their national member organization of the World Federation of the Deaf or the General Secretariat of this organization at 120 Via Gregorio VII, 00165 Rome, Italy.

FIGURE 9/E.121

Symbol for special facilities for the deaf and hard of hearing

ANNEX A

(to Recommendation E.121)

Procedure for supplementary context experiment for further evaluation of auxiliary symbols for SOS services

A.1 Recommended emergency symbols may further be tested in a so-called "context" experiment. Such a context experiment could be carried out by countries who wish to use emergency symbols in conjunction with other national pictograms and/or symbols. The purpose of a context experiment would be to estimate whether this joint presentation of a set of different symbols would lead to confusion errors, either:

- because an SOS service would be selected when another service indicated by a national symbol was intended, or
- because another service indicated by a national symbol was selected when one of the SOS services was intended.

This annex gives a broad outline of the procedure that could be followed to carry out such an experiment. It involves a simple paper-and-pencil task in which subjects have to select an appropriate symbol out of a set of others.

A.2 *Subjects*

At least 40 subjects should be used. They should be more or less representative of the public at large and they should not be professionally connected with telecommunications or visual design activities.

A.3 *Selection of symbols*

The set of symbols to be investigated should include the three SOS symbols as well as all other symbols which may be used to indicate other telephone numbers.

A.4 *Experimental task*

The subject's task is to match each symbol to its particular service by selecting an appropriate telephone number. For this purpose, he is presented with a set of papers. On each paper, the whole set of symbols with matching telephone numbers is presented. The sequence in which the symbols are presented on a page is randomly varied between pages. At the bottom of each page appear two questions to be answered:

1) If I wanted to contact the POST OFFICE I would dial .....
(Fill in the appropriate telephone number.)

2) I am VERY CERTAIN / RATHER CERTAIN / UNCERTAIN that my answer is correct.
(Circle one of the three alternatives.)

A.5 *Treatment of the data*

The frequency of correct responses and the accompanying certainty ratings are computed for each symbol. If errors are substantial, it is useful to carry out a more detailed analysis to make clear which symbols are confused with each other. For purposes of evaluating the SOS symbols, it is only necessary to look at the confusion between SOS symbols and for each individual SOS symbol.

ANNEX B

(to Recommendation E.121)

During the Study Period 1981-1984, two experimental studies were conducted in order to develop an appropriate set of symbols. In either one study or both studies, the following Administrations and manufacturers took part: AT&T, USA; Bell-Northern Research, Canada; British Telecom, UK; Bundespost, FRG; Chile; France; ITT, UK; KTAS, Denmark; The Netherlands; NTT, Japan; Sweden; Uruguay.

In the first study, in which 570 subjects from nine Administrations participated, a first selection was made from a set of 29 symbols for 12 common services. After a second experiment, including 585 subjects from eight Administrations, a final selection was made.

In the latter study, it was shown that these symbols, if not recognized immediately, can be learned in a few trials.

References

[1] IEC Publication 417 (1973) 5090-a.

[2] ZWICKER (E.) *et al.*: Critical bandwidth in loudness summation, *Journal of the Acoustical Society of America*, Vol. 29, pp. 548-557 (1957).

Recommendation E.122

MEASURES TO REDUCE CUSTOMER DIFFICULTIES IN THE INTERNATIONAL TELEPHONE SERVICE

1 General

A common problem in customer dialling in the international automatic telephone service is the erroneous dialling of the trunk prefix of the country of destination. In the international service, this trunk prefix must not be dialled. The following measures have been tried and have proven very effective; they are recommended to reduce this problem.

2 Recorded announcement

2.1 It is recommended that, at International Switching Centres (ISCs) where the trunk prefix can be detected, the call should be blocked and automatically routed to a recorded announcement which would instruct the customer to dial the call again without dialling the trunk prefix (see also Recommendation E.182, § A.2.8).

2.2 An example of such an announcement is: "Please do not dial a zero after the country code when calling this country. Please hang up and try your call again".

2.3 The call is blocked and the announcement given from either the outgoing ISC[1] or the incoming ISC[1]. The announcement should be in the language of either the originating or terminating country. It is not known whether the language of the originating or of the terminating country is most acceptable to the customers[2].

2.4 When applying this method at an outgoing ISC, care must be exercised in selecting the countries to which this measure is applied, as the trunk prefix which is to be blocked might be a valid trunk code for some countries. The employment of this measure should be preceded by a review of the pertinent information including national numbering plans and tests, as well as operator access codes, and by an explanation to the other Administrations involved of the plan to block calls having an erroneous trunk prefix.

3 Customer instructions

3.1 To avoid premature abandonment of attempted calls, customers should be advised to wait longer than usual for a call to be established.

3.2 It is recommended that when Administrations prepare dialling instructions for their customers they emphasize that the trunk prefix should not be dialled in the international automatic telephone service.

This is necessary when the destination country conventionally writes its telephone numbers such that the trunk prefix appears with the trunk code (in parentheses). To compose a comprehensible and accurate statement can prove difficult: suitable forms are given below.

3.2.1 The first form is suitable for explanation. It could be accompanied by numerical examples of complete international telephone numbers:

"The trunk prefix zero that precedes the national trunk code in several countries should be omitted after the country code in international dialling. For example, to call Amsterdam (020) from another country, you dial 20 after the country code for the Netherlands, which is 31. Some countries have a different trunk prefix that should be omitted in international dialling. For example, in Finland the trunk prefix is 9, while the trunk code for Helsinki is 0; to call Helsinki (90) from another country, you dial 0 after the country code for Finland, which is 358."

"Other countries do not normally include their trunk prefix with the trunk code when writing telephone numbers: in such cases you should not omit the first digits in international calling."

An example of the use of this statement is given in Recommendation E.126, Annex A.

3.2.2 The second form may be more suitable in some contexts:

"In many countries, a special prefix (often a zero) is normally printed in telephone numbers with the trunk code, because it must always be dialled for long-distance calls within that country. This prefix must *not* be dialled when making international calls to such countries. If your international call is not *successful*, you should check to see if the first digit of the (apparent) trunk code is a prefix that must not be dialled."

3.3 It is believed that widespread use of the notation given in Recommendation E.123 for national and international telephone numbers would lead to a reduction in the incidence of erroneous dialling of the foreign national trunk prefix, and of other errors, in international dialling. Administrations should encourage the use of this notation.

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[1] The exact source of the announcements would be any suitable place, although it is preferable in traffic terms to use a source as close to the call origin as possible.

[2] In using the language of the originating country at an incoming international switching centre, Administrations should beware of using an inappropriate language in cases where calls are routed through a transit country.

NOTATION FOR NATIONAL AND INTERNATIONAL TELEPHONE NUMBERS

1 General

The statements below apply specifically to the printing of national and international telephone numbers on letterheads, business cards, bills, etc. Regard has been given to the printing of existing telephone directories. The standard notation for printing telephone numbers on letterheads, directories, etc., helps to reduce subscriber difficulties and errors [1].

1.1 The international number should be printed below the national number, with corresponding digits lined up one under the other to facilitate understanding of the composition of the international number as shown in the examples in §§ 1.3 and 1.4 below.

1.2 The words "National" and "International" in the appropriate language should be placed to the left of the national and international numbers, and these should be separated by a horizontal line.

1.3 Either the symbol for telephone given in Recommendation E.121 or the word "Telephone" in the appropriate language should be placed to the left of (or above) the national and international numbers (to avoid confusion with other letterhead numbers). The + (plus) signifies the international prefix (see § 4.1).

Example: Telephone

National	(0607) 123 4567
International	+22 607 123 4567

(Additional examples are shown in § 6 below.)

1.4 Because the countries of World Numbering Zone 1 (North America) have the country code 1, the same number as is used for the trunk prefix, and because dialling between these countries is the same as long-distance dialling within them, subscriber difficulties are avoided by using an alternative notation that has been found superior for use within these countries and equally good for subscribers in other countries dialling to Zone 1. This is to substitute for "National" on the upper line the phrase "Within N. Amer. zone".

Example: Telephone

Within N. Amer. zone	(302) 123 4567
International	+1 302 123 4567

1.5 If it is desirable to write only the international number, it should be written in the form:

Telephone International +22 607 123 4567

1.6 To show an extension number of a PABX without direct in-dialling, the nationally used word or abbreviation for "extension" should be written immediately after the telephone numbers and on the same line as the word "telephone", followed by the extension number itself.

Example 1: Telephone

Within N. Amer. zone	(302) 123 4567
International	+1 302 123 4567

ext. 876

Example 2: Telephone International +22 607 123 4567 ext. 876

In this way, the extension number is separated from the digits to be dialled and, where it must be typed onto a letterhead, for example, it need be typed only once.

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[1] It is also desirable that the printing of other information on letterheads, etc., such as telex and telegraph numbers and postal codes should not cause subscriber confusion with the telephone number.

1.7 It is often necessary to draw the attention of subscribers to the need to omit the foreign national trunk prefix when dialling an international call. This need occurs when the destination country conventionally writes its telephone numbers such that the trunk prefix appears with the trunk code (in parentheses). To compose a comprehensible and accurate statement can prove difficult: suitable forms are given in Recommendation E.122, § 3.2.

1.8 Grouping the digits of a telephone number is advisable for reasons of memorizing, oral presentation, and printing.

2 Classes of symbols

2.1 There are four classes of symbols in national or international numbers. No symbol should be used in more than one class, nor should any symbol within a class have more than one meaning.

2.2 These classes are:

- diallable symbols (in French: *symboles servant à la composition du numéro*);
- procedural symbols (in French: *symboles opératoires*);
- information symbols (in French: *symboles d'information*);
- spacing symbols (in French: *symboles d'espacement*).

3 Diallable symbols

A *diallable* symbol is a symbol which is to be dialled and appears on a telephone set to designate either a finger hole of a dial or a push button of a keyset[2]. These symbols can be digits, letters, or other signs. Some desirable properties to be considered when selecting diallable symbols are listed in Annex A.

4 Procedural symbols

A *procedural* symbol is a symbol which tells the subscriber how to dial. Such symbols should not appear in a finger hole or on a push button because they are not to be dialled.

4.1 *International prefix symbol*

The *international prefix symbol* should be + (plus) and should precede the country code in the international number. It serves to remind the subscriber to dial the international prefix which differs from country to country and also serves to identify the number following as the international telephone number.

4.2 *Use of parentheses*

The symbol ( ) (parentheses) should be used to indicate that the digits within the ( ) are not always dialled.

The ( ) should enclose:

- the trunk prefix and trunk code in a national number[3],
- the trunk code when the trunk prefix is not in universal use within a country.

This is done to remind the user not to dial the enclosed digits for calls within the same numbering area.

The ( ) should not be used in an international number.

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[2] Specific recommendations on the symbol for buttons 11 to 16 of a telephone keyset are contained in Recommendation E.161, § 3.

[3] It should be noted that certain Administrations, for national purposes, use a hyphen between the trunk code and subscriber number as a substitute for the symbol ( ) parentheses in national numbers.

4.3 *Multiple numbers reached through automatic search*

For a subscriber with multiple numbers reached through automatic search from the main number, only the main number should be printed, without any symbol to denote the existence of the multiple numbers. This avoids encouraging subscribers to dial other numbers in a group immediately after finding the main number busy, a problem that is particularly important when only calls to the main number are capable of triggering automatic search.

4.4 *Multiple numbers without automatic search*

For a subscriber with multiple numbers who does not have automatic search, the symbol / (oblique stroke, solidus, or slant) may be used to separate the alternative numbers.

Example A: (0607) 123 4567 / 123 7272 / 627 1876
(0607) 123 4567 / 393 9844 / 564 1692
+22 607 123 4567 / 393 9844

To avoid dialling confusion in Example A, it is especially important that there be a space on either side of the symbol /.

When it is desired to abbreviate the alternative numbers and they are consecutive, only the last digit should be shown for the alternative numbers.

Example B: (0607) 123 4567/8/9

To avoid dialling confusion in Example B, it is especially important that there be *no* space on either side of the symbol /.

The general use of / is to indicate a choice when dialling. It may therefore also be used to indicate a choice of prefix codes as, for example, the choice of dialling personal or station calls.

4.5 *In-dialling*

In the national and international number no symbol should be used to show that a subscriber number is an in-dialling number of a PBX. Where it is desired to indicate the existence of in-dialling within a PBX and to indicate the in-dialling access code the following format is recommended:

(0607) 123 ....
(0607) 1 23 4...

The number of dots (periods) is equal to the number of digits in the extension number of the PBX. The spacing between numbers and dots should conform to national standards.

On letterheads, subscribers could insert their own in-dialling numbers in the dotted spaces. Presentation of the main listed number should conform to § 1.3 above.

4.6 *Symbol to indicate the existence of an additional dial tone* [4]

Some Administrations use one or more additional dial tone responses as procedural elements, after the calling customer obtains access to the public network. Where a symbol is needed to indicate the existence of an additional dial tone, that symbol should be the graphical representation of a full cycle of a sine wave, or a close approximation to such a representation. It should be placed at the point in the number where it is expected to occur, and it should be preceded and followed by a space to avoid confusion with a hyphen used as a spacing symbol (§ 6.1). Its meaning is to tell the user to wait for the additional dial tone.

Example
Handwritten character: ~
Typewriter character "tilde": ~

[4] In many countries, a horizontal line element (-), e.g. a hyphen in North America or a dash in some European countries, is used in national telephone numbers as a spacing character. Therefore, such an element is not available to designate an additional dial tone. Some Administrations, e.g. the Netherlands Administration, on the other hand, uses the dash to indicate an additional dial tone and foresee a continuation of this use for some time.

5 Information symbols

An information symbol is a symbol associated with the subscriber number describing special features of the subscriber telephone service, e.g., the symbol ⌕, where used, indicates that the subscriber has an answering device attached to his telephone [reference should be made to Recommendation E.117, §§ 1a) and 1b)].

5.1 Such symbols are not to be dialled and therefore should not appear in a finger hole or on a push button, nor can such symbols be procedural in instructing the subscriber how to dial.

5.2 Information symbols should be associated with the word "Telephone". To avoid confusion in dialling, they should not appear either as prefixes or suffixes to the telephone number.

Example: Telephone (0607) 123 4567 ⌕ or Telephone ⌕ (0607) 123 4567

See also the example below[5].

6 Spacing symbols

Spacing symbols are symbols which are used solely to separate parts of a telephone number from each other. They cannot be diallable, procedural or information symbols.

6.1 Grouping of digits in a telephone number[5] should be accomplished by means of spaces[6] unless an agreed upon explicit symbol (e.g. hyphen) is necessary for procedural purposes. Only spaces should be used in an international number.

6.2 In the international number, spacing shall occur between the country code and the trunk code and between the trunk code and the subscriber number.

6.3 The major separation among digits in a telephone number (national or international) should occur between trunk code and subscriber number. This separation should therefore always be wider than any other separation within the number. This requirement is automatically met in the notation recommended, as in the examples.[5]

7 Facsimile number notation

The printed format for facsimile numbers should follow the conventions set forth for voice telephone numbers except that facsimile numbers should be clearly labeled with the upper-case letters FAX printed to the left of the numbers as illustrated here:

FAX	National	(06) 65 43 21
	International	+49 6 65 43 21

The recommended appearance of the printed facsimile symbol (FAX) is specified in Recommendation E.121.

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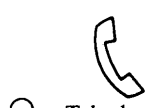
[5] Some commonly used existing groupings are:



	National	(0211) 5432
	International	+39 211 5432
⌕ Telephone	National	(071) 78 901
	International	+41 71 78 901
Telephone	National	(06) 65 43 21
	International	+49 6 65 43 21

[6] Administrations using dots or hyphens as separators nationally may require time to determine the consequences of discontinuing their use.

ANNEX A

(to Recommendation E.123)

Desirable properties of diallable symbols

This annex lists some desirable properties to be considered by the CCITT when this body standardizes new diallable symbols. There are a large number of properties which are desirable for such symbols, and those indicated below seem particularly relevant. However, their relative importance has not been evaluated, and it is recognized that it may not always be possible to fulfil all these conditions when selecting symbols.

The properties of diallable symbols should be:

A.1 *Distinct from other diallable symbols*

As used here, "distinct" refers to dissimilarity from other symbols compared with them visually, or aurally. The dissimilarity should be evident in low probability of confusion with other symbols under degraded perceptual conditions.

A.1.1 The symbols should be visually distinct in their designated form as well as in typewritten, handwritten, or printed form, including variations which might occur in each.

A.1.2 The symbols should be aurally distinct in naming them in at least the official languages of the ITU.

A.2 *Widely known name*

The name of the symbol should be as widely known as possible and be constant over as wide a range of population as possible.

A.3 *Reproducible*

The symbol should be easily reproducible in handwritten and typewritten form.

A.4 *CCITT-ISO compatible*

The symbol should be one which is given as a member of the CCITT Alphabet No. 5 and the ISO (International Organization for Standardization) standard code for information interchange.

A.5 *Made up of a single character*

The symbol should not be composed of more than one individually valid symbol; nor should more than one key operation on a typewriter, for example, be required to produce it.

A.6 *Abstract*

The symbol should not already have intrinsic meaning resulting from other specialized usage.

A.7 *Immediately recognizable as a diallable character*

The symbol should not be one which is used for procedural or information purposes.

DISCOURAGEMENT OF FRIVOLOUS INTERNATIONAL CALLING TO UNASSIGNED OR VACANT NUMBERS ANSWERED BY RECORDED ANNOUNCEMENTS WITHOUT CHARGE

1 Preamble

It sometimes happens that there is a severe outbreak of international calling to telephone numbers that answer with recorded announcements without charge. It seems that some subscribers make such calls merely for free amusement. Frivolous calling can occur unnoticed by an Administration unless it is deliberately looked for, and serious degradation of quality of service can result.

This Recommendation concerns prevention and abatement of frivolous international calling.

2 Monitoring

Administrations should be alert to changes in the rate of call completion, or in the rate of calls completed without charge, or in any other direct or indirect measures that could indicate the growth of a significant amount of frivolous calling [1]. Direct investigation may be necessary to confirm the existence of this problem.

3 Prevention [2]

The following practices in one country may reduce the likelihood of becoming the destination for frivolous calls from another country:

- limiting the number of cycles of an annonouncement;
- disconnecting when the limit is reached;
- offering no lengthy information without charge.

4 Abatement

4.1 When frivolous calls can be identified as originating from the network of a particular Administration, the Administrations concerned should arrange bilaterally to implement the most appropriate prevention and abatement measures for the particular case. This bilateral arrangement may include measures not recommended for general application.

4.2 In general, vacant subscriber number announcements should not be replaced by non-standard tones to reduce frivolous calling because the use of unfamiliar tones might cause increased repeat attempts by serious callers. Where particular numbers have been identified as the targets of frivolous callers, replacing announcements by tones for a limited period should not degrade the service for serious callers. For this purpose only, a special information tone is recommended.

4.3 When frivolous calling has been identified as causing quality of service problems, it is desirable to detect the calls and direct them to an appropriate announcement as close to the calling subscriber as practicable. The administrative and technical difficulties of updating such arrangements for changes in many different numbering plans make the incoming international switching centre the practical limit in most cases. By bilateral agreement, however, frivolous calls might be blocked at the outgoing international switching centre instead.

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[1] The problem was first discovered in Japan after KDD noticed a large number of calls lasting longer than one minute without an answer signal being returned.

[2] Where the signalling systems permit, the use of a backward unallocated-number signal will allow an appropriate tone or announcement to be returned to the caller according to Recommendation E.181, § 2.

4.4 In accordance with Recommendation E.231, no charge should be made for calls to subscribers whose service has been suspended, cancelled or transferred. When calls to certain of these out-of-use numbers have been identified as predominantly frivolous, the provisions of Recommendation E.231 may be temporarily ignored for only the particular numbers involved, until the problem is abated[3], and subject to the agreement of the Administrations concerned. Calls to these numbers would then have an answer signal returned and would be charged[4]. Calls to unassigned numbers may be handled similarly. This measure would be immediately effective when frivolous calls originate from payphones.

Recommendation E.125

INQUIRIES AMONG USERS OF THE INTERNATIONAL TELEPHONE SERVICE

One method of measuring telephone service quality is to conduct inquiries among users to ascertain their opinions of and actual experience with, various aspects of the service they use. These inquiries are have been developed and printed in previous editions of the CCITT Book. These are:

a) questionnaire for national subscribers dialling international calls;

b) questionnaire for visitors from other countries dialling national or international calls.

The complete text of these questionnaires, as well as guidelines for their use, may be found in the CCITT *Red Book*, Volume II, Fascicle II.2, ITU, Geneva, 1985.

Recommendation E.126

HARMONIZATION OF THE GENERAL INFORMATION PAGES OF THE TELEPHONE DIRECTORIES PUBLISHED BY ADMINISTRATIONS

1 General

1.1 It is recognized that users should normally have recourse to the General Information pages of telephone directories when looking for the information they need to obtain the required telephone services and to apply the operating procedures correctly.

1.2 In addition, appropriate information in the General Information pages of telephone directories may promote the development of national and international telephone traffic and the utilization of services by the national users.

1.3 Obviously foreign visitors too need to consult the General Information pages of the telephone directories of each country they visit and a similar presentation of the information in the various countries will make their research easier.

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[3] Administrations should take care not to apply this measure to non-frivolous telephone calls.

[4] Some exchanges may require the addition of a function to handle such calls in this manner.

1.4 Administrations should therefore see that the composition of the General Information pages of telephone directories is harmonized along the lines indicated below, with a view to making available to all users of the telephone service a uniform source of information which is satisfactory and easy to consult.

2 Guidelines

To obtain the required harmonization, Administrations should set out the General Information pages of their telephone directories along the lines indicated below:

2.1 The General Information pages of telephone directories published in various countries should contain similar indications so as to facilitate consultation and the search for information by foreign users.

2.2 The data listed in Annex A should always be included in the General Information pages of the telephone directories published by Administrations.

2.3 Each item of information should be presented, as far as possible, in the order of priority indicated in Annex A.

2.4 The graphical presentation of information should be suggestive and attractive to users (for example, through use of letters and colours, and an appropriate arrangement in the opening pages of the directory). The examples given in Annex A are illustrative only and no particular format is recommended.

2.5 For the sake of efficiency and to achieve the desired purpose, especially for foreign visitors, care should be taken:

- to present the information in brief, concise and clear texts, expressed in simple language;
- to use recognized and specific terms;
- to group all the information concerning a particular subject in a logical manner;
- to present the operating procedures in schematic form, using symbols to explain the different sequences and not lengthy descriptive texts, and using examples;
- to use the standardized symbols to identify important numbers and services (symbols of national interest may be used until such standardization is achieved) (see Recommendation E.121);
- to use representative charts to facilitate the application of operating procedures.

2.6 The last group of General Information pages should be devoted specifically to foreign visitors; they should therefore be printed in the most appropriate foreign languages and contain in a shortened form most of the information and instructions necessary for the correct exploitation of the telephone service (see Recommendation E.127).

2.7 National trunk codes should be given either in the telephone directory or in a separate publication.

2.8 The national and the international prefixes and a list of country codes for all accessible countries should be given in the General Information pages. A sample of foreign trunk codes may also be listed in these pages; a more complete list may be provided in a separate publication not necessarily published at the same time as the telephone directories, and not necessarily distributed to all subscribers.

2.9 The validity and usefulness of the information and instructions given in the General Information pages and in the separate "Guide" should be checked every time the telephone directories are reprinted.

2.10 Every Administration should be free to compose its telephone directories in the way it considers most appropriate from the national point of view, both with regard to form and content, and taking due account of production costs. However, the type of information to be included in the General Information pages, their sequence and order of priority, should be in conformity with this Recommendation, with a view to obtaining the harmonization required.

ANNEX A

(to Recommendation E.126)

List of data to be included in the General Information pages of telephone directories

Table A-1/E-126 gives the data and its priority for inclusion in the General Information pages.

TABLE A-1/E.126

Priority	Data
1	*Index and emergency services* – Various subjects dealt with in the opening pages – Call numbers of safety services
2	*Important and useful numbers, hours of service and charges, if any* Public utility services – Water – Gas – Post and telephone – Railways – Etc. Auxiliary services – Information – Breakdowns – Telegrams – Etc. Optional services – Alarm call – Speaking clock – Weather – Etc.
3	*Instructions for using the telephone* – Operating procedure – Tones
4	*Procedures for obtaining different types of call* (Symbolized representation and use of charts where possible.) Types of call – Local – Trunk – International (continental and intercontinental) Trunk and international prefixes and codes (shown in the directory and/or in a separate guide) Charging for calls Time zones
5	*Instructions for using the directory and explanation of symbols and abbreviations*
6	*Public telephone* Offices Booths Telephones made available for public use

TABLE A-1/E.126 *(cont.)*

Priority	Data
7	*Maps*
8	*Other information* Specific information – Recommended presentation of national and international numbers General information – Commercial and miscellaneous product service – Subscription and invoicing – List of directories and how to obtain them – Administration: addresses and telephone numbers
9	*Pages intended for foreign visitors*

Priority 1

Index

Emergency services

Important and useful numbers
- Public utility services
- Auxiliary services

Instructions for using the telephone
- Operational procedure and tones

Procedures for obtaining different types of calls
- Automatic service
- Codes
- Operator service
- Charging for calls
- Time zones

Instructions for using the directory and explanation of symbols and abbreviations

Public telephone
- Offices
- Booths
- Telephones made available for public use

Maps

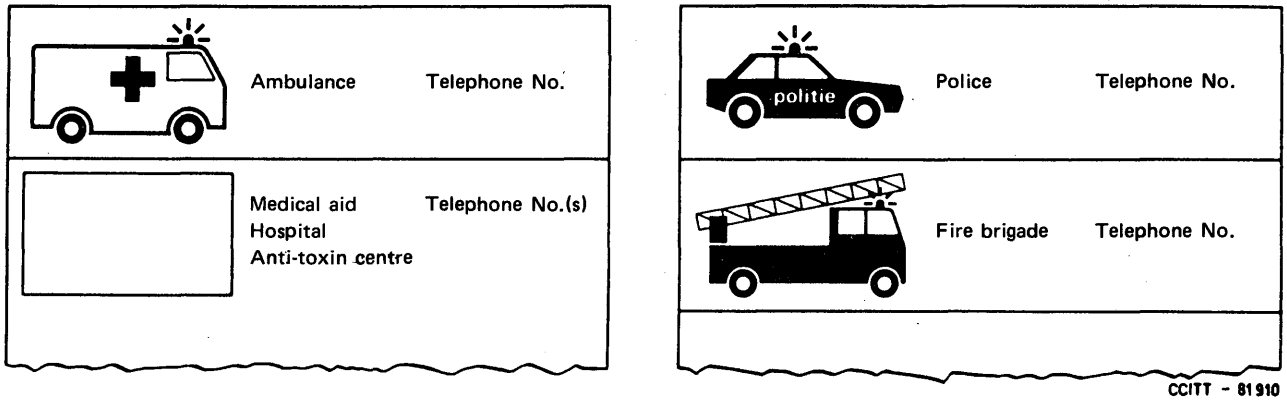
Other information
- Recommended presentation of national and international numbers
- Commercial and miscellaneous product service
- Subscription and invoicing
- List of directories and how to obtain them
- Administration: addresses and telephone numbers

Pages intended for foreign visitors

Emergency services

SOS Telephone No. Description

Safety services



Diagram

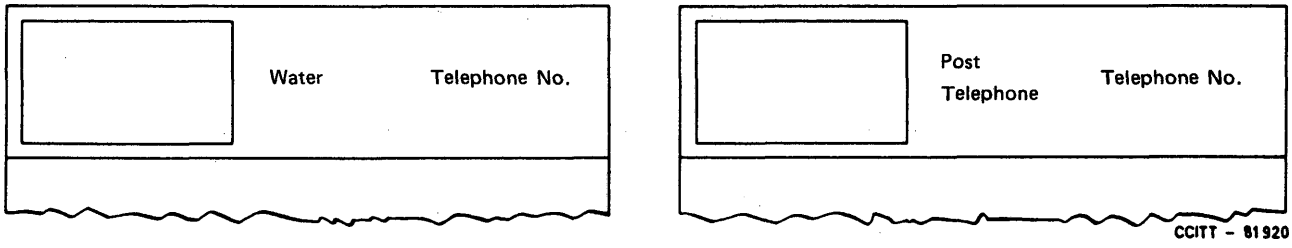
Symbol (colour)	Title Sub-title Details	Telephone No.(s)

Note – The symbols are taken from Recommendation E.121.

Priority 2

Important and useful numbers

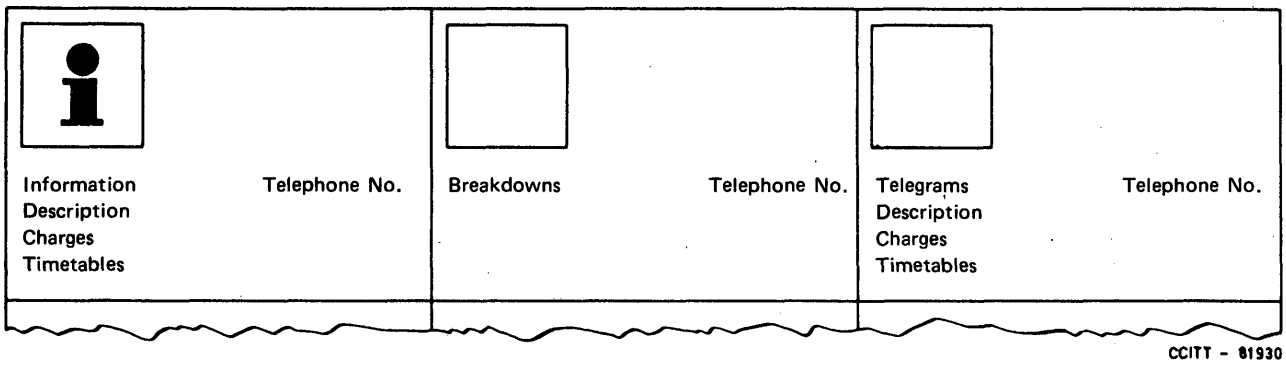
Public utility services



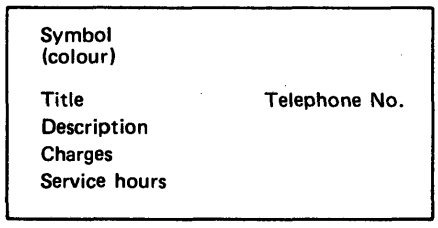
Diagram

Symbol (colour)	Title Sub-title Details	Telephone No.(s)

Note – The services are given as an example.



Diagram



Note – The symbol is taken from Recommendation E.121.

Priority 3

Instructions for using the telephone

Operating procedure and tones

– Make sure of the number of your correspondent or of the service required by consulting the telephone directory or your own address book.
– When you lift the receiver, the dialling tone you will hear will be as follows:

– After dialling the number, you will hear either the ringing tone, which is as follows:

or the busy tone, which is as follows:

– Others: to be described as necessary.

Note – The tones are given as an example. For the graphical representation of tones, see Recommendation E.121.

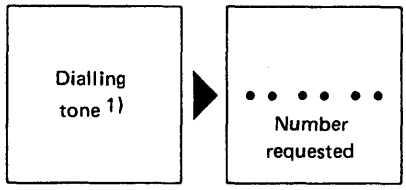
Priority 4

Procedures for obtaining different types of calls

Representational charts: left to the discretion of each country

Automatic service

– Local calls, i.e. within a district



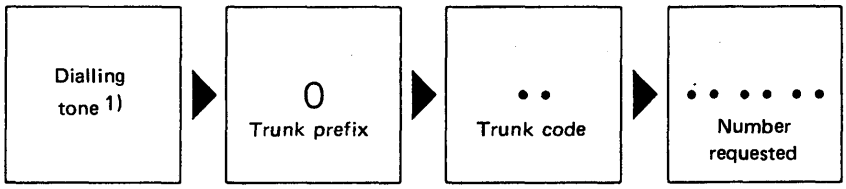
Information Telephone No.

(Administration may provide an example)

– Trunk calls, i.e. between two districts

Prefix : 0

Information Telephone No.

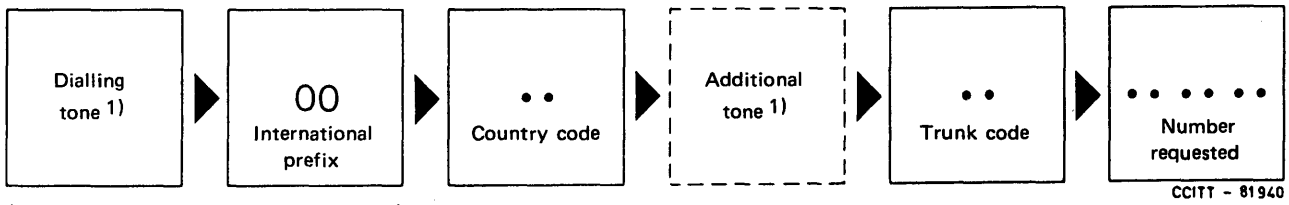


(Administration may provide an example)

– International calls, i.e. between two countries

Information Telephone No.

Prefix : 00



(Administration may provide an example)

1) For graphical representation of tones, see Recommendation E.121.

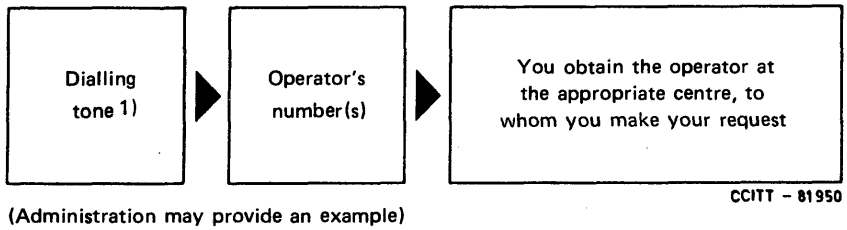
Codes

The "Guide to Codes" gives the trunk codes for all national districts and the various country codes, possibly followed by frequently used foreign trunk codes.

Operator service

- Local calls
- Trunk calls
- International calls

Information Telephone No.



(Administration may provide an example)

1) For graphical representation of tones, see Recommendation E.121.

Charging for calls (The publication of this information is left to the discretion of each country)

- Local calls (automatic and via the operator)
- Trunk calls (automatic and via the operator)
- Charging periods
- International calls (automatic and via the operator)

Time zones (The publication of this information is left to the discretion of each country)

Priority 5

Instructions for using the directory and explanation of symbols and abbreviations

(The publication of this information is left to the discretion of each country)

Priority 6

Public telephone

Offices

Information concerning:

- the services provided
- the charges applied
- other subjects, at the discretion of each country

Booths

Possible calls and charges

Telephones made available for public use

Permitted calls and charges

Priority 7

Maps

Maps may be used to indicate which areas are covered by the telephone directory and which directories cover adjacent areas.

(The publication of this information is left to the discretion of each country.)

Other information

Specific information

– Recommended presentation of national and international numbers

In personal or business relations, every subscriber should communicate to his correspondents:

– his national number, with the trunk prefix, for receiving trunk calls, and

– his international number, for receiving international calls, preferably in accordance with the following grouping method:

Telephone	National	(06) 78 21 91
	International	+39 6 78 21 91

corresponding for example, to subscriber number 78 21 91 in Rome (6), Italy (39). The symbol "+" represents the international prefix of the country of departure.

Warning – The trunk prefix zero that precedes the national trunk code in several countries should be omitted after the country code in international dialling. For example, to call Amsterdam (020) from another country, you dial 20 after the country code for the Netherlands, which is 31. Some countries have a different trunk prefix that should be omitted in international dialling. For example, in Finland the trunk prefix is 9, while the trunk code for Helsinki is 0; to call Helsinki (90) from another country, you dial 0 after the country code for Finland which is 358.

Other countries do not normally include their trunk prefix with the trunk code when writing telephone numbers: in such cases you should not omit the first digits in international calling.

General information (left to the discretion of each country)

– Commercial and miscellaneous product service

Description:

Information Tel. No.

– Subscription and invoicing

Information concerning:

a) categories of subscribers
b) contributions to installation, removal and replacement costs
c) periodic rentals
d) conditions of subscription
e) data entered on periodic invoice
f) methods of paying invoices
g) conditions for delayed payment

Information Tel. No.

– List of directories and how to obtain them

a) list of volumes covering various districts
b) conditions of sale of volumes
c) address of sales centre

– Administration: address and telephone numbers

Priority 9

Pages intended for foreign visitors

Description

One or more pages in one or more languages containing the necessary information to enable foreign visitors to obtain correct access to basic and vitally important services. The information should cover the following points:

- general
- emergency services
- operating procedure
- tones
- national calls
- international calls
- reference for finding code numbers
- directory enquiries service
- charging periods
- telephone offices, telephone booths and telephones made available for public use: operating details and special tones.

Recommendation E.127

PAGES IN THE TELEPHONE DIRECTORY INTENDED FOR FOREIGN VISITORS

1 General considerations

1.1 The number of people travelling abroad on business, for tourism or for any other reason is steadily increasing; in general such persons move about a great deal and thus have to contend with the problems this involves.

1.2 To satisfy their needs, foreign visitors have to make frequent use of the telephone; consequently Administrations strive to provide them with the essential instructions on how to use the telephone service for domestic and international calls.

1.3 In the interest of both users and Administrations, clear and easily understandable official information should be available wherever the telephone service may be used.

1.4 The telephone directory is the main official vehicle for the circulation of correct, up-to-date information on the use of the telephone.

1.5 To facilitate consultation of the General Information pages in the telephone directory by foreign visitors, one needs to include one or more pages in one or more languages to assist them during the consultation process.

1.6 Administrations should therefore ensure, if there is a need, that there are pages in the telephone directory specifically intended for foreign visitors and that they are standardized on the basis of the following basic provisions.

2 Basic provisions

To provide the greatest possible assistance in the use of the telephone service, Administrations should apply the following basic provisions:

2.1 Instructions enabling foreign visitors to use the most common basic services and information concerning domestic and international calls and the rates charged should appear in one or more appropriate foreign languages and be assembled on one or more pages inserted at the end of the General Information pages in telephone directories.

2.2 The pages included specifically for foreign visitors should contain a summary of the principal information and instructions requested for correct operation of the telephone service and also a number of references to the more complete General Information pages in the telephone directory, which foreign visitors will have no difficulty in consulting if their contents are standardized as is desirable (see Recommendation E.126).

2.3 The pages in the telephone directory intended for foreign visitors should cover the main points listed below, developed on the basis of criteria adopted for the directory itself.

2.3.1 *Introduction*

2.3.2 *Regular information*

- numbers of the emergency services
- prefixes (national and international)
- dialling codes of countries connected by the international automatic service (with references to the General Information pages or to a separate publication supplementing the telephone directory)
- principal tones (with graphic representation): "dialling tone", "ringing tone" and "engaged tone", with mention to other tones, if necessary
- Telephone Directory Information and trunk codes within the country and abroad.

2.3.3 *Operating instructions for outgoing calls*

- local
- trunk
- international (automatic or through the operator) from:
  a) ordinary telephones
  b) payphones
  c) public telephone offices.

Note – A reference to the operating instructions (if there are any) in schematic form (see, for example, Recommendation E.126, Annex A) in the General Information pages would be useful.

2.3.4 *Payphones*

- identification
- characteristics of the system (signals, credit, coin return) and picture of currency and token used for payphones.

2.3.5 *Public telephone offices*

- identification
- service hours
- operator services.

2.3.6 *References to the General Information pages relating to:*

- domestic and international telephone charges
- full rate and reduced rate periods
- time zones
- Administrations or Recognized Private Operating Agencies: addresses and telephone numbers.

LEAFLET TO BE DISTRIBUTED TO FOREIGN VISITORS

1 General

1.1 The ever increasing number of people travelling to foreign countries generally need to use the telephone either to communicate with their own country or with people in the country they are visiting.

1.2 These people make many of their calls from payphones and public telephone offices, where normally they can find appropriate instructions for the use of the telephone service; others who make their calls from hotels or private telephones may encounter difficulties for lack of information.

1.3 To obtain more detailed information, foreign visitors may consult telephone directories containing General Information pages (see Recommendation E.126) and "Pages intended for foreign visitors", prepared in one or more languages to facilitate consultation (see Recommendation E.127).

1.4 In addition, a leaflet containing general information and instructions for the use of the telephone is printed and distributed to foreign visitors, either by the Administration of the country of origin on departure or by the Administration of the foreign country on arrival. Cooperation between Administrations is necessary to ensure that information contained in leaflets is accurate, and also to prevent possible duplication of leaflets.

1.5 Administrations should therefore ensure that the leaflets to be distributed to foreign visitors have the widest possible application and, in principle, are drafted in a uniform manner on the basis of the following guidelines. However, each Administration can prepare its own leaflet to be distributed either at home or in any other country, with the content it considers most appropriate from the national point of view.

2 Guidelines

The leaflets to be prepared for foreign visitors should have the following features:

2.1 *Structure*

The leaflet should be of assistance to foreign visitors who wish to use payphones connected to the trunk service and the international automatic service or who apply to public telephone offices, besides being assisted by hotel operators.

2.2 *Title*

"Telephone Information".

2.3 *Format*

It should be of a convenient size (e.g. A4 format where this standard is utilized), folded in three to form six small-size pages.

The exact design of the cover need not be identical between countries to permit designers some freedom of interpretation, but should include the standard title and some indication of the country to which the leaflet applies, a prominant representation of the telephone symbol (see Figure 1/E.121), an illustration of the payphone widely used in the country, and some reference to the public telephone service.

Note – A model of the leaflet in the required format and with the particulars it should contain is given in Annex A.

2.4 *Contents*

- Introduction
- General information:
  a) SOS – emergency numbers
  b) Prefixes (national and international)
  c) Destination codes of countries which can be reached by fully automatic means
  d) Main tones with graphical representation
  e) Information about reduced rates, if any
  f) Telephone directory information and trunk codes.
- Payphones:
  a) How to find them
  b) How to use them
  c) System characteristics (signals, credit, return of coins) and pictures of currency and token used for payphones.
- Public telephone offices:
  a) How to find them
  b) Hours of service
  c) Operator services
- Hotel and private telephones:
  a) How to call
  b) Surcharge
- Supplementary notes:
  a) Reference to the "Pages intended for foreign visitors" (that is, the last of the front pages of the telephone directory)
  b) Reference to the "Trunk code publication"
  c) Time differences: time zones (front pages)

Note – An example of the text in general form is given in Annex B.

2.5 *Layout*

It should be pleasing to the eye, in order to attract the reader's attention, printed in black and white and in colour, with clearly legible characters and also boldface type to display the most significant information, with graphic representation of tones and with pictograms and standardized symbols if these appear frequently in the text. Sentences should be short, concise and simply formed of words in current use.

2.6 *Production and distribution*

- Preferably, the version produced by each country concerned in the appropriate language, should be available at the places of arrival of foreign visitors, at public telephone offices, travel agencies, etc.
- Optionally, the version produced by each country may be made available at the places of departure of travellers, at travel agencies, airports, railway station ticket offices, etc.

The choice of the method should be made on the basis of consultation between the two countries concerned.

2.7 *Validity*

This should be clearly indicated with reference to the last updating, and should be checked according to changes in contents and distribution.

ANNEX A
(to Recommendation E.128)

Model of leaflet to be distributed to foreign visitors

Page No. 5

List of countries (in alphabetical order) which the customer can dial direct, with relative country codes and time difference (+ ahead, – behind) compared with standard local time.

Examples:

– 1	France	33
	Germany	49
– 1	Great Britain	44
+ 1	Greece	30
+ 8	Japan	81
– 6	U.S.A. (New York)	1
....	other countries	

6

List of countries (continuation)

Telephone numbers

Name	Country code	Area code	Telephone number

1

TELEPHONE INFORMATION

Picture, in colour, of the most advanced payphone widely introduced at national level.

Picture in colour of the telephone symbol.

Administration/Recognized Private Operating Agency.

Date of validity.

TELEPHONE INFORMATION

Introduction

Information

Payphones

Public telephone offices

Hotel and private telephones

Supplementary notes

ANNEX B

(to Recommendation E.128)

Sample text of leaflet to be distributed to foreign visitors

TELEPHONE INFORMATION

Foreword

If you are abroad on a holiday or on a business trip and have to get in touch with your family or with your friends or business connections, you can do so in the most practical and economical way by dialling your calls directly from a payphone. In this way you would have no language problem.

If you want to benefit from special telephone facilities or if you are short of the proper coins or of tokens, you can go to a public telephone office where the personnel will advise you and help you to call any country in the world.

The aims of this leaflet are to alleviate any anxiety you may have about foreign languages, and to enable you to use the telephone services without difficulty.

Information

SOS – for emergency calls dial: . . .

National prefix: . . .

International prefix: . . .

Country codes that can be directly dialled (see pages 5 and 6 of the leaflet).

Tones: dial tone
ringing tone
busy tone

(For graphical representation of tones see Recommendation E.121.)

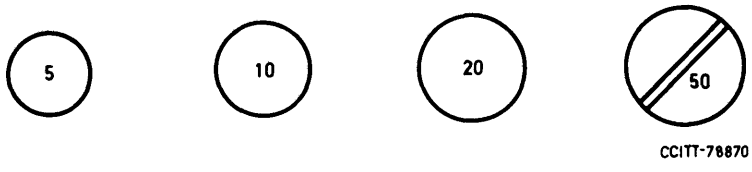
For directory inquiry service and telephone codes dial: . . .

Reduced rates.

Payphones

Payphones can be found in telephone street kiosks and, as a rule, wherever a sign with a telephone symbol is exhibited.

Payphones work with coins (to be specified) or with telephone tokens (value to be specified); the most modern payphone operates with a "telephone card" and is located mostly in the airports and main railway stations. The coins and the telephone token are pictured here below:



Procedures for international calls

- Insert enough coins or tokens into the payphone to make up a small credit.
- Lift the receiver and wait for the dial tone.
- Dial the international prefix followed by the country code, then the trunk code (without trunk prefix) and finally the subscriber telephone number.

  Example

  To call subscriber 12345 in Bristol (trunk prefix with trunk code is 0272) in Great Britain (country code 44) you should dial: + 44 272 12345.

Note 1 – It may be useful for you to jot down all the digits in the right sequence before dialling.

Note 2 – The trunk prefix before the trunk code must not be dialled in international dialling.

– Insert other coins or tokens to prolong duration of the call as soon as you hear the special tone advising you that your credit in the phone box has almost expired.

Once your call is finished:

– replace the handset;

– press the proper button on the phone box to recover the unused coins and/or tokens.

Public telephone offices

The addresses and office hours of the public telephone offices are shown at the top of the subscribers' list in the telephone directory of each locality. Public telephone offices can generally be identified by the street sign exhibited outside the building. They are attended by trained personnel who can help you to obtain your call when operator assistance is needed (personal, collect or credit card calls, when such facilities are admitted).

Hotels and private telephones

When calling from a hotel you may be able to call direct after dialling a code for access to the public network (this information should be provided in your hotel room). In other cases you may have to rely upon the services of the hotel operator. A surcharge will normally be imposed by the hotel for any calls you make. It is advisable to check what surcharge the hotel will impose before making your call.

All services that are normally available from payphones can also be used when calling from a private telephone. However, in some parts of the country several telephones share a single line, in which case the telephone line will not be available to all users at all times.

Supplementary notes

More information can be found in the "Pages intended for foreign visitors" which are the last of the front pages of the telephone directory. A list of national trunk codes and another of the main localities of foreign countries appears in the "Trunk Code Publication".

To decide whether an international call can be made at a certain time, it may be convenient to consult the "Time zone chart of the world" in order to check the corresponding time at the place of destination. This information is given in the front pages of the telephone directory.

Phone Home!

You will feel that you are there.

Recommendation E.130

CHOICE OF THE MOST USEFUL AND DESIRABLE SUPPLEMENTARY TELEPHONE SERVICES

1 General

The best choice of a supplementary service to be introduced depends basically on the individual situation of a country. This Recommendation only gives guidelines which should be carefully appraised by the respective Administration.

It is suggested that a choice might be made from services which are defined in the list of Supplementary Services (see Supplement No. 1 at the end of this fascicle). Supplement No. 1 aims to provide only outline information about the supplementary services included, in order to give Administrations a broad idea of the nature of these services. § 1 of the Supplement deals with those services considered to have international implications and seeks to specify these implications for each of the services concerned. § 2 of the Supplement deals with those services not considered to have international implications. Appendix I to the Supplement deals with those services not considered as supplementary.

The experience gained with these services by Administrations which have already introduced the relevant service is given in the form of remarks and market data within this list.

2 Items to be considered in choosing the most useful and acceptable supplementary service

2.1 *Marketability*

2.1.1 *Strength of customer's needs*

- How intense is customer's need for the service?
- Does the service really solve the customer's problem?

2.1.2 *Expected market size*

- How many users can be expected?
- Are substitute products or services available?
- Will there be a market restriction caused by competition?

2.1.3 *Customer's acceptance from the "human factors" point of view*

- Intelligibility of the context of the service.
- Procedures affecting easy understanding, easy handling and easy memorizing.

2.1.4 *Customer's price sensitivity*

- Expected limit of charges to be applied for the individual service or for the most common package of services, to be used by the average subscriber. (A reference might be the monthly rate of charges applied on normal telephone service.)

2.1.5 *Cost/benefit ratio from the Administration's point of view*

2.2 *Provisioning aspects*

2.2.1 *Technical requirements*

- Will the present network be affected by traffic overload caused by the new service?

2.2.2 *Regulatory consequences*

- Conflicts within present regulations.
- Problems concerning privacy protection.

2.2.3 *Charging aspects*

- Charging mode (e.g. per use or rental).

2.2.4 *International implications*

3 Basic realisation aspects

Three different technical solutions may be envisaged to make supplementary services available to subscribers:

1) additional or modified software and/or hardware of public networks (excluding terminals),
2) installation of special telephone terminals,
3) the combination of solutions 1 and 2.

As a guideline, the following aspects may be considered:

- Some services can only be realized by solution No. 1 or 3. In those cases solution No. 3 will offer a better quality of service to subscribers because of the possibility of improved handling. Such an improvement might be achieved by applying dedicated push-buttons, visual indication elements, user guidance by pictograms and symbols, text displays, etc.
- If there is only a traditional electromechanical system available, solution No. 2 may be the only economic way to realize some supplementary services (e.g. abbreviated dialling, number repetition).

- If the available system and the type of service allows free choice between the three solutions, the following aspects apply:
  - solution No. 1 gives full flexibility in adapting services to subscriber needs;
  - solution No. 3 may improve the handling;
  - solution No. 2 bears the same advantages to the user as solution No. 3 and does not require special system features.

Recommendation E.131

SUBSCRIBER CONTROL PROCEDURES FOR SUPPLEMENTARY TELEPHONE SERVICES

1 General

1.1 Many Administrations are planning to introduce supplementary telephone services which are likely to be viable only if controlled by the user (a list of possible supplementary telephone services is given in Supplement No. 1 at the end of this fascicle). It is therefore necessary to consider means of providing users with procedures by which such control can be achieved. The purpose of this Recommendation is to prevent an undesirable proliferation, in various countries, of subscriber control procedures for such services. Descriptions are given below of three control procedures schemes now in use or in various stages of evolution. Guidelines are offered to Administrations planning to offer subscriber controlled supplementary services. Reference is made to Annex A for a glossary of terms used in this Recommendation.

1.2 It is recognized that not all aspects of all supplementary services will affect the international telephone service, but a degree of international coordination is considered necessary because:

a) the same or similar supplementary services will exist on national and international networks; it is desirable to have similar control procedures for both applications;

b) a supplementary service which is only national now may be international in the future; in that case changes in control procedures might be impossible or expensive;

c) subscribers who travel or move will be less inconvenienced if control procedures for supplementary services do not change from one country to another;

d) compatibility between control procedures for telephone services and simple parallel end-to-end data transmission is highly desirable, because the same telephone instrument is used in both cases;

e) standardized control procedures make possible lower equipment and customer instruction costs.

1.3 Access to individual services requires that the supplementary service numbering plan have a sufficient capacity to meet all reasonable future needs; control of the services requires the ability to define functional requirements to the system.

The introduction of push-button telephones providing signals in addition to the normal decimal range (0-9) offers a means of providing the necessary function signals. Since the 12-button instrument is likely to be used by most subscribers, only two additional non-numerical signals will be available for control purposes. Study therefore has been directed towards evolving schemes for control procedures which are acceptable both from the human factors and technical aspects and do not require more than two non-numerical signals.

1.4 The same push-button telephone set that is used in dedicated telephone networks may be used as a subscriber instrument in service integrated networks. It is desirable that in this case the control procedures for a given supplementary telephone service still apply.

Where the normal 12-button telephone set is also used for services other than telephony, e.g. for data, video-telephone, etc., the control procedures used for these services should be compatible with the control procedures used for supplementary telephone services.

2 Schemes for control procedures

Recognizing that:

- the CCITT has not as yet recommended a unique scheme of subscriber control procedures for supplementary telephone services;
- the CCITT is still studying such control procedures;
- further proliferation of schemes is undesirable because this would result in subscriber confusion, less efficient use of the telephone network and might make it more difficult to work towards an optimum scheme;

it is recommended that:

- Administrations contemplating the introduction of services which require new control procedures join actively with the ongoing study;
- Administrations wishing to adopt a scheme of subscriber control procedures should apply one of those detailed below to the maximum extent feasible rather than establish a new scheme.

3 Description and analysis of code schemes for supplementary telephone services

3.1 *General*

3.1.1 Three code schemes for supplementary telephone services, currently in use or under study will be briefly described and analyzed. They are:

1) AT&T code scheme (USA);
2) CEPT code scheme (Europe);
3) NTT code scheme (Japan).

3.1.2 It is intended that Recommendation E.131 should be reviewed when experience of the three code schemes is available. It may then be possible to determine if one of them, or perhaps a fourth which incorporates the best features of all three, is to be preferred.

3.1.3 These schemes are still evolving and are liable to changes in details as study progresses or experience is gained. The information presented is an outline only and presents the position at a point in time when the Recommendation is published. Administrations considering the implementation of supplementary services requiring control procedures should approach the appropriate Administration or authority to seek detailed and up-to-date information.

3.2 *Description of the code schemes*

3.2.1 The information sent by the subscriber to the exchange for the control of a service is made up of a number of basic functional elements, some or all of which may appear explicitly in a particular message. These basic functional elements are (see the glossary in Annex A):

1) mode or type of communication identification,
2) access to supplementary services,
3) service identification,
4) function identification,
5) supplementary information,
6) block separation,
7) message suffix.

3.2.2 The mode or type of communication identification element is unlikely to be used for telephone services and allocation of codes for this purpose within these schemes is tentative. This element is therefore excluded from consideration for the present.

3.2.3 The main differences between the three code schemes are in the methods used to encode the various functional elements and the order in which they must be presented. In all code schemes a separate code is used for the dialling of abbreviated numbers.

3.2.4 For each of the three code schemes, Table 1/E.131 gives the format of the information sent by the subscriber to the exchange:

i) without supplementary information,
ii) with one block of supplementary information,
iii) for the dialling of abbreviated numbers.

In the Table 1/E.131, the digits below each message identify the functional elements as listed in § 3.2.1 above.

TABLE 1/E.131

AT&T							
i)	Information	* or 11	NN				
	Element No.	2	3 and 4				
ii)	Information	* or 11	NN	SDT	SI	(#)	
	Element No.	2 and 4	3 and 4		5	7	
iii)	Abbreviated dialling	N(N)	(#)				
CEPT							
i)	Information	* or #	NN(N)	#			
	Element No.	2 and 4	3	7			
ii)	Information	* or #	NN(N)	* φ	SI	#	
	Element No.	2 and 4	3	6	5	7	
iii)	Abbreviated dialling	N(N)	#				
	or	* *	N(N)				
NTT							
i)	Information	1 or #	NN	(SDT N)	(#)		
	Element No.	2	3	4	7		
ii)	Information	1 or #	NN	(SDT N)	(*)	SI	(#)
	Element No.	2	3	4	6	5	7
iii)	Abbreviated dialling	*	NN				

For φ, see § 3.2.5 (element 6, CEPT).

The symbols used in Table 1/E.131 are as follows:

N = a digit;

SI = supplementary information;

SDT = second dial tone;

(...) = not always used. For detailed explanations, see § 3.2.5 below;

* = "star" button of telephone set as defined in Recommendation E.161;

\# = "square" button of telephone set as defined in Recommendation E.161.

3.2.5 In the three code schemes the basic functional elements are realized in the following way:

Access to supplementary services (element 2)

AT&T: access prefix *. (Customers are permitted to dial the digits 11 in place of *.)

CEPT: service code prefix * or #.

NTT: prefix digit 1 for services available from both dial and push-button telephones, prefix # for services available from push-button telephones only.

Service identification (element 3)

AT&T: a two-digit service code that is also used to indicate the function: codes 72-79.

CEPT: two-digit (or exceptionally, three digit) service codes beginning with 1-9 and 0 are reserved for CEPT allocation in both PABX and public exchange fields.

NTT: two-digit service codes.

Function identification (element 4)

AT&T: the function is expressed in the service code, different functions for the same service use consecutive codes.

CEPT: service code prefix ✳ : activation and registration;
service code prefix # : deactivation and erasure.

NTT: a numerical function code that is only required for certain services. (If a function code is needed, the subscriber is informed by means of a dial tone).

0 = deactivation,

1 = activation,

2 = registration.

Block separation (element 6)

AT&T: no block separation required.

CEPT: the standard CEPT control procedure will assume the use of a block separator ✳ after the service code and between blocks of supplementary information. As a national option, the deletion of the block separator after the service code is allowed; however, if in this case the subscriber dials a block separator after the service code, the exchange should accept the message.

NTT: the block separator ✳ may be used between the function code and the first block of supplementary information, and between successive blocks of supplementary information for push-button telephones only.

Message suffix (element 7)

AT&T: the message suffix # may be replaced by a time-out.

CEPT: the message suffix # is mandatory.

NTT: the message suffix # is used for push-button telephones only.

Abbreviated dialling

AT&T: abbreviated numbers: 2-9 and 20-49 available.

CEPT: N(N) # abbreviated numbers: 0-9 and 00-99 available;
✳✳N(N) abbreviated numbers: 0-9 or 00-99 available.

NTT: abbreviated numbers: 00-99 available.

3.3 *Features of each of the code schemes*

The features of each of the code schemes compared with one or both of the other two are given below.

3.3.1 *AT&T code scheme*

1) The ✳ symbol is used for access to supplementary services.
2) Control procedures from rotary dial and push-button telephones are compatible.
3) The messages sent by the subscriber to the exchange are short.
4) Some two-digit codes have been reserved so as to permit three-digit (or longer) service codes to be introduced in the future without changes in the existing service codes.
5) The message suffix is not essential.
6) One, two and more digit abbreviated numbers are possible without the need to use different initial digits.

3.3.2 *CEPT code scheme*

1) When only prefixes are used, the telephone numbering plan is not influenced by the code scheme for supplementary services.
2) When only prefixes are used, exchange logic is simplified.
3) When only prefixes are used, the use of similar control procedures in PABXs and the public network is facilitated.

4) The abbreviated dialling numbering plan is divorced from the service code numbering plan and does not impose restrictions on it.

5) The service code remains the same irrespective of the function required.

6) Each important function is defined by a unique prefix.

7) Other prefixes are available for new service functions.

8) A mandatory message suffix avoids the need for time-out, fixed message length or complex programming.

9) When the message suffix method for abbreviated dialling is used, one, two and more digit abbreviated numbers are possible without the need to use different initial digits.

3.3.3 *NTT code scheme*

1) The use of a prefix simplifies exchange logic.

2) The use of a prefix facilitates the use of similar control procedures in PABXs and the public network.

3) Other prefixes are available for future use.

4) A measure of compatibility between the control procedures from rotary dial and push-button telephones is possible.

5) The abbreviated dialling numbering plan is divorced from the service code numbering plan and does not impose restrictions on it.

6) The service code remains the same irrespective of the function required.

7) Each important function is defined by a unique function code.

8) Ten function codes are available.

9) Allocating a function code after a service code makes it possible to separate basic switching functions from supplementary service processing functions. This facilitates the application of new services to an existing old-type exchange.

10) The control procedures are similar to the control procedures in the NTT end-to-end communication services.

11) The function code can be deleted if not required.

ANNEX A

(to Recommendation E.131)

Glossary of terms

This glossary gives the meanings currently allocated to various terms to facilitate the study and evaluation of control procedures. They are subject to review as the code schemes evolve.

A.1 **supplementary telephone service**

F: service téléphonique supplémentaire

S: servicio telefónico suplementario

Any service provided by the telephone network in addition to the fundamental telephone service.

A.2 **control procedure**

F: procédure de commande

S: procedimiento de control

A method in which information is exchanged in a predetermined forward order and backward order between subscriber and exchange to effect control of a service.

A.3 **command**

F: commande

S: instrucción (de control)

A single specific manipulation at the subscriber set causing transmission of a signal which specifically indicates the manipulation to the exchange. For certain control procedures either one single command or a succession of commands are required.

A.4 **character**

F: caractère

S: carácter

A single specific symbol, number or letter used to designate the diallable signal caused by a command.

A.5 **message**

F: message

S: mensaje

A defined entity of information from the subscriber to the exchange pertaining to a call or a control operation for a service sent in one sequence over the signalling medium. A message may consist of one or more characters transmitted in one or more blocks.

A.6 **code**

F: code

S: código

One character or a sequence of characters forming a part, or the whole, of a message with a specific meaning.

A.7 **mode or type of communication identification**

F: identification du type ou du mode de la communication

S: identificación del tipo o del modo de la comunicación

Information used to give an instruction to the switching equipment to select the required network or mode of communication, for example in the use of a multifunction terminal (video-telephone, 48 kbit/s wideband switched-network service, etc.).

A.8 **access to supplementary services**

F: accès aux services supplémentaires

S: acceso a servicios suplementarios

Information used to instruct the switching equipment that the associated information relates to a supplementary service.

A.9 **service identification**

F: identification de service

S: identificación de servicio

Information designating a supplementary service.

A.10 **function identification**

F: identification de fonction

S: identificación de función

Information indicating the type or types of process to be applied to the service.

A.11 **block separation**

F: séparation des blocs

S: separación de bloques

Information indicating that the next character is the first character of a block of supplementary information.

A.12 **supplementary information**

F: information supplémentaire

S: información suplementaria

Any information, except the mode or type of communication identification, access to supplementary services, service identification, function identification, block separation and message suffix, which is required to be sent by the subscriber to the exchange for the performance of a control operation. The supplementary information may consist of one or more blocks.

A.13 **service code**

F: code de service

S: código de servicio

A numerical code designating a supplementary service.

A.14 **service code prefix**

F: préfixe de code de service

S: prefijo de código de servicio

A non-numerical code preceding the service code and indicating the type or types of process to be applied to the service.

A.15 **function code**

F: code de fonction

S: código de función

A code indicating the type or types of process to be applied to the service.

A.16 **block separator**

F: séparateur de blocs

S: separador de bloques

The character indicating that the next character is the first of a block of supplementary information.

A.17 **message suffix**

F: suffixe de message

S: sufijo de mensaje

The character indicating the end of the message.

A.18 **abbreviated number**

F: numéro abrégé

S: número abreviado

The numerical code sent by a caller using the Abbreviated Dialling Service which identifies the telephone number of the party to whom he wishes to be connected.

A.19 **abbreviated dialling prefix**

F: préfixe de numérotation abrégée

S: prefijo de marcación abreviada

The non-numerical code indicating that the information following is an abbreviated number.

ANNEX B

(to Recommendation E.131)

During the Study Period 1977-80, an international laboratory experiment comparing subscriber performance using two of the recommended code schemes and a previous code scheme of AT&T, which was defined in Volume II.2 of the *Orange Book*, was carried out under the auspices of Working Party II/2 (Human Factors). The experiment was conducted in five countries, Canada, Japan, Sweden, the United Kingdom and the United States of America. In the experiment, a sample of subscribers were brought into the laboratory and asked to carry out a number of tasks involving the use of three supplementary services. These tasks were carried out using a pushbutton telephone connected to a simulated telephone exchange. A different group of subscribers was tested using each of the code schemes. Errors committed while carrying out the tasks and the time required to complete them were recorded.

The results of this experiment revealed that there are no large differences in subscriber performance using the three code schemes. The experimental results did, however, reveal rather large differences among tasks. Those tasks that required entry of supplementary information blocks produced higher error rates. This suggests that guidance announcements may be required to help subscribers at each step in complex control procedures. However, it should be pointed out that prior to carrying out the tasks only a brief explanation of the required manipulations was given. It would be desirable for experienced users to be able to override guidance announcements by dialling. One particular task, ordering an alarm call, produced quite high error rates in the entry of the time of day. These errors resulted from the use of a 24 hours clock format for entry of this information. This result suggests that a specific positive recorded announcement with supplementary information may be required to give the subscriber feedback on this point.

Recommendation E.132

STANDARDIZATION OF ELEMENTS OF CONTROL PROCEDURES FOR SUPPLEMENTARY TELEPHONE SERVICES

1 General

1.1 CCITT Recommendation E.131 describes, in the form of code schemes, three subscriber control procedures for supplementary telephone services. In order to avoid undesirable proliferation of different types of control procedures, it recommends that Administrations wishing to make supplementary telephone services available to their subscribers should choose one of the three code schemes.

1.2 Each of the three code schemes requires the subscriber to send information to the telecommunication system to which he is connected, in a set format and in response to feedback from the system. Certain component parts of the information sent to the system, such as the message suffix, block separators, tone signals and the like, may be considered to be the necessary *elements* involved in the successful operation of supplementary services.

1.3 In order to minimize confusion to foreign visitors, and maximize the benefits that accrue from using elements of known meaning, it is desirable to standardize the usage of elements of codes schemes whenever possible, in particular those elements common to all three code schemes.

2 Specific recommendation

2.1 *Message suffix*

It is recommended that the element known as "message suffix" [1] should be indicated by the symbol # [2].

The function of the element is to enable the subscriber to signal to the system that he has input all the information he intends to send at that time.

This Recommendation does not prohibit the use of the square symbol for other purposes.

2.2 *Supplementary information*

For various services it is required that the subscriber sends supplementary information to the telephone exchange for the performance of a control operation. The interpretation of the contents of the supplementary information blocks "year", "month", "day" and "time" are specified below. This information can be used in various services, such as alarm call service, do not disturb service, absent subscriber service, agenda service.

The sequence of the information blocks within a control procedure is not yet specified.

2.2.1 *Year information block*

It is recommended to accept 2 or 4 digits as valid input for the year information block.

If 2 digits are keyed in, this should be interpreted as a year within the next 100 years.

2.2.2 *Month information block*

It is recommended to accept 1 through 12 and 01 through 12 as valid input.

If no year information block is specified, the month is to be interpreted as the month within the next 12 months.

2.2.3 *Day information block*

It is recommended to accept 1 through 28, 29, 30 or 31 and 01 through 28, 29, 30 or 31 as valid input.

If no month information block is specified, the day information block is to be interpreted as the first day within the next 31 days.

2.2.4 *Time information block*

Either the 24 hours or 12 hours clock format may be used. The information block may contain 1, 2, 3 or 4 digits. To indicate *a.m.* or *p.m.* in the 12 hours format an extra digit may be used. If 1 or 2 digits are keyed in, the information is interpreted as hours with zero minutes.

One single zero, two zeros and a leading zero are accepted as valid input; the number 24 and higher is not accepted.

If 3 or 4 digits are keyed in, the last two digits are interpreted as minutes. The last two digits may not be 60 or higher. Leading zeros are accepted.

When neither month nor day is specified in another information block, the time is interpreted as a time within the next 24 hours.

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[1] As defined in Recommendation E.131, Annex A.

[2] As defined in Recommendation E.161.

OPERATING PROCEDURES FOR CARDPHONES

1 Preamble

Cardphones are payphones that accept cards as a means of payment. Many Administrations have deployed cardphones that accept a variety of card types and technologies. (For further definition of CCITT-recommended credit card types, see Recommendation E.118 on the automated international telephone credit card system.) Cardphones provide an attractive alternative to users through added convenience and payment options. The service also provides benefits to Administrations both economic and operational.

Prolifertation of cardphone terminals and technologies may result in a multiplicity of customer operating procedures. The purpose of this Recommendation is to offer guidelines that will:

1) facilitate customer convenience,
2) ensure ease of use through a common sequence,
3) standardize operating procedures to aid Administrations achieve lower equipment costs and customer instruction costs,
4) increase revenues for Administrations.

2 Operating sequence

This section defines the sequence of actions in setting up a call using a cardphone. Under each step there may be further points of recommendation or preference, or additional comments.

2.1 *Step 1: lift handset*

Comment:

For a loud speaking telephone, step 1 is the action equivalent to going off-hook.

2.2 *Step 2: await signal to pay*

Preferred:

It is preferred to have the dial tone precede payment, but acceptable for it to follow Step 3.

Comment:

The signal may be the dial tone, some other signal or both, e.g. display announcement.

2.3 *Step 3: present means of payment*

Recommended:

If a cardphone also allows payment by coins, initial payment should be in Step 3.

When a prepaid card is used the remaining value of the card should be displayed before use.

When a card is successfully read and is verified as satisfactory, the customer should be given confirmation.

When a card is determined to be invalid, the user should be so informed, e.g. tone, display or announcement.

If further information, such as a personal identification number (PIN), is required, it should follow after the card is read.

Comment:

A card may or may not be retained by the terminal during some or all of a call set-up and connection.

The procedure for dealing with an apparently invalid card is not within CCITT areas of responsibility.

2.4 *Step 4: dial number*

Recommended:

After verification, the required number can be dialled.

If the terminal has a display, it should not display the PIN or other personal access digits.

Preferred:

Step 4 may precede Step 3, but the order given here is preferred.

2.5 *Step 5: conversation or failure of call attempt*

Recommended:

If the card is about to expire, the customer should be given a warning (e.g. tone, display) and reasonable time (minimum 10 seconds) to either terminate the call or to insert an appropriate means of payment.

2.6 *Step 6: termination*

Recommended:

Replacing the handset terminates the call.

Comment:

Where technically possible, when a credit card is used, the call value or cost could be displayed.

If the cardphone has a "next call" feature, its operation terminates a current call without the need to present a means of payment again. The remaining value of a prepaid card should be displayed.

2.7 *Step 7: retrieval of card*

Recommended:

If a card is retained by a terminal during a call, the terminal should automatically eject the card when the handset is replaced. In the case of special equipment, going on-hook is the equivalent step.

Preferred:

If a card leaves the user's hand during the payment procedure, a method of reminding the user to remove the card should be provided.

Comment:

A prepaid card should carry some indication of the remaining value on the card itself.

Note – A tabular summary and an SDL description of the procedure are contained in Annex A. The SDL diagram is provided as reference for further study and is not a complete description of the operating procedures. For example, differences in the status found in the tabular summary, i.e. under the headings "Recommended", "Preferred" and "Comment", are not stated in the SDL diagram.

3 Glossary of terms

prepaid card

A card carrying a set amount of unit or monetary value that can be used for telephone purposes. The card is decremented based on use and can be either thrown away or re-valued, depending on the technological attributes of the card.

ANNEX A

(to Recommendation E.133)

Human factors cardphone operating procedures tabular summary

Steps	User action	User options	System reaction	System options	Status
1	Lift handset	With loud speaking telephone, going off hook is equivalent			Comment
2	Await signal to pay		Dial tone should precede payment		Preferred
				This step may follow step 3	Comment
				Signal may be dial tone, display or other	Comment
3	Present means of payment	If used as coin phone, payment should be made at this step			Recommended
			Remaining value of prepaid card should be displayed to the customer		Recommended
			Customer should be given confirmation of successful card read		Recommended
				If PIN is required it should be input after the card is read	Recommended
				Card may or may not be retained during part or all of call	Comment
				Reaction to invalid card handling procedures is up to Administrations	Comment
4	Dial number			If PIN or personal access digits are required, they should not be displayed	Recommended
				Step 4 may precede step 3 but the order given here is preferred (e.g. restricted use cards)	Preferred

Steps	User action	User options	System reaction	System options	Status
5	Conversation or failure of call attempt	Customer should be given an opportunity to prolong the call	The system should give a warning and options in case of expiring means of payment		Recommended
6	Termination	Customer may be given the option of a next call feature	Replaced handset terminates call	Next call feature allows for sequence calling without presenting means of payment again	Recommended Comment
			The value remaining on the prepaid card should be displayed		Recommended
			Customer could be shown value or cost of credit card call		Comment
7	Retrieval of card		If card is retained, terminal should automatically eject card at call completion		Recommended
			Customer should be reminded if card not removed from terminal at call completion		Preferred
			A prepaid card should carry some indication of the remaining value on the card itself		Comment

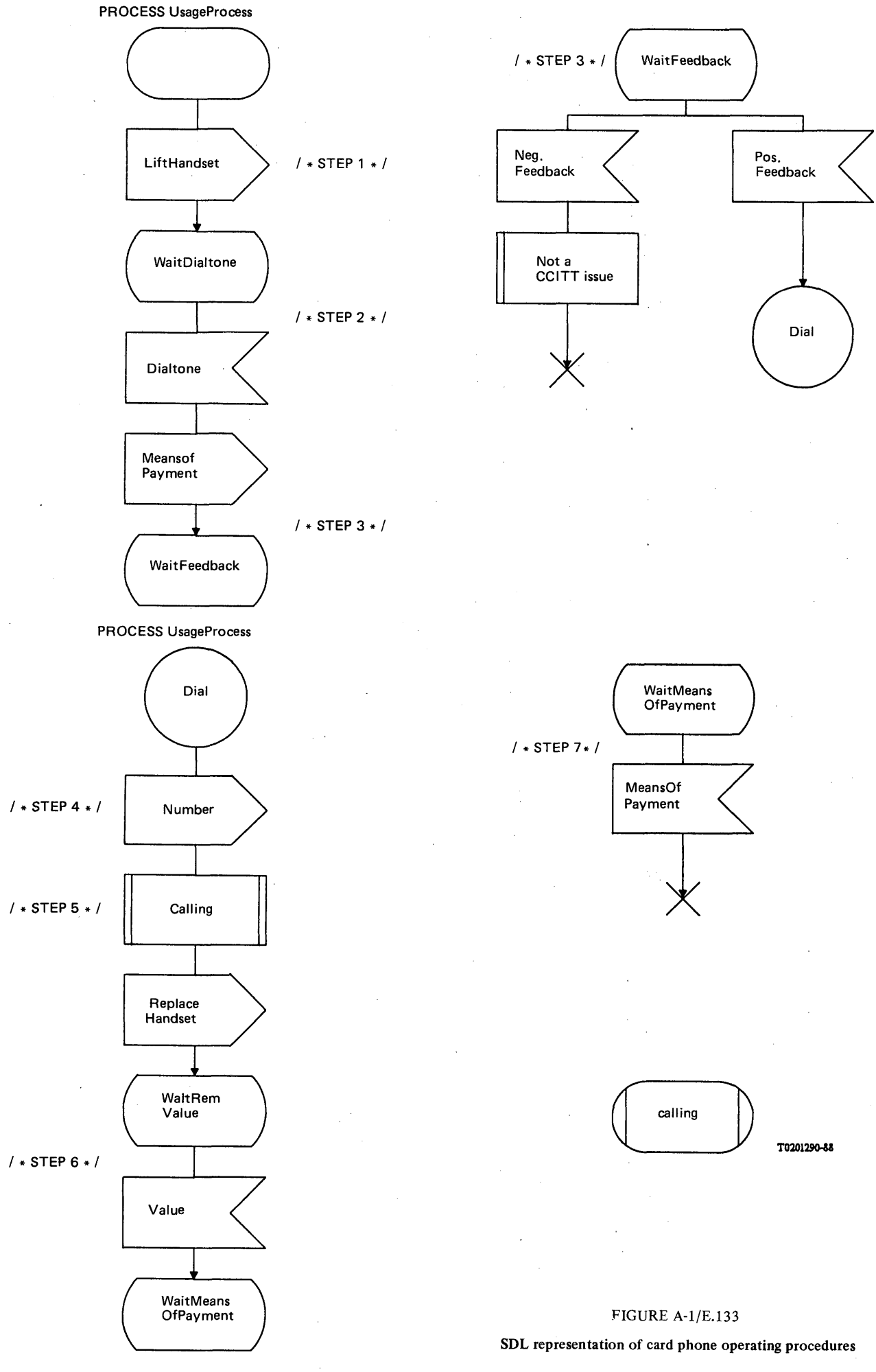

FIGURE A-1/E.133

SDL representation of card phone operating procedures

SECTION 4

OPERATION OF INTERNATIONAL TELEPHONE SERVICES

Recommendation E.140 [1]

PRINCIPLES FOR THE OPERATION OF INTERNATIONAL TELEPHONE SERVICES [2]

The following principles should be respected as far as possible by the Administrations in the operation of international telephone services. These principles allow for the fact that certain relations depend exclusively on manually operated radiotelephone circuits. Detailed rules for the application of these principles are to be found in the *Instructions for the International Telephone Service* [8].

1 Classes of calls and facilities offered to users

1.1 *Classes of calls*

The following classes of calls are accepted in the international telephone service:

- distress (emergency) calls;
- government calls;
- service calls;
- private calls.

1.2 *Facilities offered to users*

The following facilities [3] may be accepted in the international telephone service:

a) without specific agreement between Administrations:
   - requests for information;

b) with agreement between the Administrations concerned:
   - station calls;
   - personal calls;
   - collect calls;
   - credit card calls;
   - conference calls;
   - data transmission calls.

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[1] The provisions of this Recommendation were contained in the Recommendations cited in [1] and [2].

[2] See also Recommendations D.100 [3], D.101 [4], D.150 [5], D.151 [6] and D.170 [7].

[3] In relations established on radio links the Administrations concerned may agree to accept subscription calls as a facility, i.e. calls normally exchanged regularly between the same stations, at the same time agreed upon in advance, for the same duration and which have been booked for a specified period. By agreement between the Administrations concerned, reduced charges may be made for subscription calls.

1.3 A station call is a call to a specified telephone number.

1.4 A personal call is a call between the number of a caller who may give his name (or the number of an extension) and some specific person (or extension); the person required must be adequately described (by name, position, address, etc.).

If the Administration of destination admits such a possibility a messenger may be sent if the person desired could not be obtained at a telephone station and, in particular, if he or she is not a telephone subscriber.

2 Call requests

2.1 When making a request for a call which cannot be complied with immediately and subject to the provisions on the validity of call requests contained in § 2.3 below, the caller, in making his request, may specify:

a) that the call should not be set up until after a particular time, stated by him; or

b) that the call should not be set up during a given period; or

c) that the request should be cancelled at a particular time.

Note – Except where otherwise provided for in certain relations, these facilities are not admitted if the operating methods used include the setting up of calls without delay.

2.2 For any request which cannot be complied with immediately, the caller shall be free, subject to the provisions relating to the validity of call requests contained in § 2.3 below, to alter his request for a call as long as he has not been told that the call was on the point of being put through.

2.3 *Validity of call requests*

2.3.1 Requests for calls shall remain valid until 0800 (local time at the exchange of origin) of the day indicated below if not cancelled by the caller or refused by the addressee, when all the exchanges concerned are permanently open, and at the daily closing time when they are not permanently open:

i) for station calls, the day following the day on which the request was made;

ii) for personal and conference calls, the second day following the day on which the request was made.

2.3.2 This period, however, may be prolonged by not more than 8 hours:

i) when traffic routing difficulties have prevented the setting up of the call;

ii) when justified by time differences between the two corresponding exchanges.

2.3.3 In relations operated by radio circuits working on a part-time basis only, requests for calls may, by agreement between the Administrations concerned, remain valid as long as they have not been complied with, or refused by the addressee, or cancelled by the caller.

3 Setting-up of calls

3.1 In each international telephone relation, the Administrations concerned arrange by common agreement the primary route(s) and, if possible, one or more secondary routes taking into account such factors as hours of service, volume of traffic, accounting rates between Administrations, etc.

3.2 The primary route, which may follow more than one itinerary, is that which should normally be used for routing telephone traffic in a given relation.

3.3 The secondary routes are used, in particular, when there is congestion on the primary route or when transmission on this route is not of sufficiently good quality or when the call is outside the normal hours of service on the route. In advance preparation operating, if a call, after being prepared over a secondary route because the primary route was not available, cannot be put through at the first attempt, it should be completed on the secondary route. The call may, however, be transferred to the primary route, in case of necessity, when that route is no longer congested.

3.4 The collection rate in a given relation is the same, whether the primary or secondary route is used.

4 Chargeable duration of international calls

In principle, the outgoing operator is responsible for fixing the chargeable duration of the call; however, in advance preparation operating, and by agreement between the Administrations concerned, this chargeable duration may be fixed by the operator in the controlling international transit exchange.

For collect or credit card calls, the operator at the incoming exchange may, by agreement between the Administrations concerned, be responsible for fixing the chargeable duration.

References

[1] CCITT Recommendation *Operation of intercontinental telephone service (initial system)*, White Book, Vol. II-A, Rec. E.142, ITU, Geneva, 1969.

[2] CCITT Recommendation *Operation of intercontinental telephone service (new system)*, White Book, Vol. II-A, Rec. E.143, ITU, Geneva, 1969.

[3] CCITT Recommendation *Charging for international calls in manual or semiautomatic operating*, Rec. D.100.

[4] CCITT Recommendation *Charging in automatic international telephone service*, Rec. D.101.

[5] CCITT Recommendation *New system for accounting in international telephony*, Rec. D.150.

[6] CCITT Recommendation *Old system for accounting in international telephony*, Rec. D.151.

[7] CCITT Recommendation *Monthly telephone accounts*, Rec. D.170.

[8] CCITT, *Instructions for the international telephone service* (1 October 1985), ITU, Geneva, 1985.

Recommendation E.141

INSTRUCTIONS FOR THE INTERNATIONAL TELEPHONE SERVICE

It has been noted that the rapid and reliable setting-up of international telephone calls demands perfect coordination of the operations effected by the operators involved; consequently, it is highly desirable to unify the rules for the utilization of circuits; unity can be obtained only by respecting the same operating rules.

It is therefore recommended that Administrations should apply the *Instructions for the International Telephone Service* [1].

The *Instructions* must be observed both in the continental telephone service and in the intercontinental telephone service. However, by agreement between the Administrations concerned, special provisions may be applied to relations established on radio links (see Recommendation E.140).

The provisions of the *Instructions* concerning the charging of calls relate solely to the collection charges made to users, as defined in Recommendation D.150, Annex A, point A.10.

These *Instructions* should be regarded as an integral part of the present Recommendation, although they are contained in a separate publication.

Instructions consist of provisions from one or several CCITT Recommendations dealing with practical operating procedures for the handling of telecommunication traffic (e.g. acceptance, transmission, accounting.)

It is normally foreseen that a date be set for the entry into force of an amended Instruction.

Note – It is recalled that the text of Recommendation E.141 is also reproduced in the "Instructions for the International Telephone Service".

References

[1] CCITT, *Instructions for the international telephone service (1 October 1985)*, ITU, Geneva, 1985.

Recommendation E.142

TIME-TO-ANSWER BY OPERATORS

1 Quick answering by operators to calls made over international circuits is essential for a rapid and satisfactory telephone service and for the efficient use of such circuits.

2 To this end, a sufficient number of operators should be provided, and they should cooperate with one another, so that the answering time does not exceed 5 seconds for 80% of calls.

3 These provisions apply to both the manual and semiautomatic service for incoming operators, assistance operators, and delay operators.

4 In semiautomatic operating, the time-to-answer for incoming operators, that is:

- incoming operators (code 11 or a specific number in the case of traffic with certain countries),
- delay operators (code 12 or a specific number in the case of traffic with certain countries),

should, accordingly, be the time-to-answer shown in this Recommendation.

5 In semiautomatic operating, the time-to-answer by assistance operators should be shorter than the time-to-answer by incoming operators. To this end, operators playing the double role of assistance and incoming operators should give priority to answering assistance calls.

Recommendation E.143

DEMAND OPERATING OF INTERNATIONAL CIRCUITS

In general, it is desirable in relations with manual operating to employ demand operating whenever possible.

Administrations concerned should make every effort (by ensuring that there are sufficient circuits, installations, personnel) to use demand operating.

In relations operated with preparation (outgoing or advance preparation) of calls, the Administrations concerned should make every effort to reduce delay as much as possible.

Recommendation E.144 [1)]

ADVANTAGES OF SEMIAUTOMATIC INTERNATIONAL SERVICE

For the following reasons the attention of Administrations is drawn to the advantages of semiautomatic operating from the point of view of economy and the quality of service:

1) the introduction of semiautomatic operating at the incoming exchange can result in large economies in personnel;
2) the number of faults due to the equipment used for the international semiautomatic operating is very small;
3) the *efficiency* (ratio of chargeable time to total holding time) of semiautomatic circuits is very high compared with the efficiency of manual circuits operated on a demand basis;

1) See also Recommendation Q.5 [1].

4) the quality of the service given to users owing to the reduction in the time of setting up a call is improving considerably;

5) any type of call, station calls in particular, can be set up without difficulty over semiautomatic circuits and the use of as many semiautomatic circuits as possible is therefore recommended for an international relation.

References

[1] CCITT Recommendation *Advantages of semiautomatic service in the international telephone service*, Rec. Q.5.

Recommendation E.145 [1]

ADVANTAGES OF INTERNATIONAL AUTOMATIC SERVICE

For the following reasons, the attention of Administrations is drawn to the additional advantages resulting from the introduction of international automatic service:

1) The advantages of semiautomatic operating mentioned in Recommendation E.144 apply equally well to automatic service in respect of reliability, circuit efficiency and the satisfaction given to users.

2) The advantages of automatic service are even greater as regards staff economy, since outgoing operators are dispensed with.

3) The changeover from semiautomatic to automatic service may be done without any major modification of the international circuits or of the switching equipment at transit and incoming exchanges.

4) The above advantages have been widely confirmed by experience on a large number of international relations.

5) Such experience has also shown that, when a relation changes from demand operating (manual or semiautomatic) to automatic service, there is considerable increase in traffic.

6) The introduction of an international automatic service follows logically on the introduction of a national automatic service.

References

[1] CCITT Recommendation *Advantages of international automatic working*, Rec. Q.6.

Recommendation E.146

DIVISION OF CIRCUITS INTO OUTGOING AND INCOMING CIRCUITS

From the operating point of view the assignment of the circuits of a relation into incoming and outgoing groups is such as to facilitate the work of the operators.

Recommendation E.147

MANUALLY OPERATED INTERNATIONAL TRANSIT TRAFFIC

1 Direct circuits should be provided across transit countries whenever traffic justifies such a course; in this respect attention should be paid, for example, to the difficulties inherent in the use of an intermediate exchange for transit calls with manual operation.

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[1] See also Recommendation Q.6 [1].

2 In the absence of permanent direct routes, it is helpful to provide temporary direct circuits whenever a temporary traffic flow so justifies. As far as possible, such temporary direct circuits should not be set up via the operator's positions.

3 Whenever permanent or temporary direct circuits cannot be set up, the greatest possible degree of standardization in *the operating methods used in transit exchanges* is desirable. The following instructions will then be applied.

3.1 If the two international circuits use manual demand operating, all the international transit exchange has to do is to make arrangements to set up the transit calls in accordance with the requests made by the outgoing international exchange, which means the controlling exchange.

3.2 When, on the other hand, preparation operating is in force on either of the two international circuits, the international transit exchange becomes the controlling exchange, and

3.2.1 the controlling operator at the international transit exchange is the operator serving the most congested route. If there is no delay on the circuits to be interconnected, or if this delay is equal in both directions, the controlling operator shall be designated by the international transit exchange;

3.2.2 the controlling operator shall determine the time when a transit call is set up according to its class and priority and the time when the call request is received by the international transit exchange;

3.2.3 the controlling operator shall warn her two counterparts in the international exchanges of the time when it is expected to set up the transit call or calls in question, so that the operators in these exchanges may prepare the required circuits.

3.3 In the exceptional case when the call requires more than two international circuits, the Administrations concerned shall agree among themselves on the controlling exchange.

Recommendation E.148

ROUTING OF TRAFFIC BY AUTOMATIC TRANSIT EXCHANGES

In the two cases mentioned hereafter it may be advantageous from a general economic point of view (taking into account the loss probability and cost) to route traffic by automatic transit exchanges:

Case 1

Where there is a light traffic load between two countries, it may be desirable to route this traffic through an automatic transit exchange, rather than to provide a small group of direct circuits.

The considerations normally apply to the case where the introduction of semiautomatic operation is considered, but they should be equally valid for traffic which terminates on a manual international trunk exchange, reached through an automatic transit exchange.

Note – The purely economic point of view from which these conclusions are drawn excludes all other considerations, particularly the following:

a) It is necessary that the transit exchanges through which it is desired to route the traffic should be prepared to accept the transit traffic which would be offered to them and Administrations involved should design their circuit groups to satisfy the requirements of Part II of Fascicle II.3 in so far as loss probability is concerned.

b) The provision of direct circuits may be preferred to a routing entirely via a transit centre for other reasons, e.g. the provision of broadcast programme circuits, control circuits for these transmissions, voice-frequency telegraph circuits, etc.

Case 2

In certain cases, particularly where the traffic between two countries is heavy, and when, for instance, it may lead to the deferment of a new installation, it may be advantageous to route a certain proportion of the additional traffic (peak traffic) by way of a transit automatic centre.

PRESENTATION OF ROUTING DATA

1 When semiautomatic or automatic service is initially introduced between two countries it is recommended that a routing document be prepared by each Administration and an adequate number of copies exchanged. This routing document should be prepared as a booklet of A5 size (14.8 × 21.0 cm), and be divided into three sections.

It seems important to keep the information up to date by exchanging data of the following types:

a) Major routing changes involving existing routes and/or offices for which data have been previously supplied. Such information should be made available at least three months prior to the effective date of the change. In this respect, the importance of notification will be governed by the volume and characteristics of the traffic affected.

b) Other routing changes in a country's networks which were not sufficiently important to be handled as described in a) above. This information should be supplied annually or more frequently when circumstances justify this course.

When forwarding routing changes under a) and b), forms on the model of Tables A or B in Section 2 of the routing document should be used, indicating whether the change is a revision or a new edition. In principle, a complete reprinting of the routing document is desirable from time to time. However, the frequency of production of a revised set of routing information should be left to the discretion of the issuing Administration. It is recommended that a revised set should be brought out not less frequently than once in five years.

Where an Administration finds it impracticable to provide all of the routing data in the manner recommended above, it is desirable that it adhere to this Recommendation to the maximum extent possible.

2 Information to be entered on the routing document

2.1 *Section 1 – Explanatory notes*

2.1.1 The issuing Administration should include the following items:

2.1.1.1 The numbering plan arrangements should be explained briefly, and the trunk prefix (if any) used in the national network should be quoted. Any useful information about the total number of digits in the national numbering system should be supplied.

2.1.1.2 The country code.

2.1.1.3 Language digits according to the availability of language assistance on incoming calls.

2.1.1.4 Name(s) of international exchange(s) used for incoming traffic. In specifying the name of the international exchange it should be indicated if it serves for continental and/or intercontinental traffic. If there is more than one exchange, an explanation should be given as to which part of the national network each exchange serves by quoting the digit(s) of the trunk code which are necessary for this purpose. Where there is no uniform system for all incoming traffic to a country, the explanatory notes should make clear the specific instructions proper to each outgoing country.

2.1.1.5 It should be explained how subscribers in other localities than those listed in Section 2 can be reached (for instance by code 11).

2.1.1.6 A table showing how to reach special services such as:

- supervisor,
- delay operator,
- transit calls,
- calls to/from ships,
- phototelegraph calls,
- collect calls,
- requests for information,
- personal calls for which word has been left at the called station.

2.1.1.7 If functions described in § 2.1.1.6 are performed on a decentralized basis, routing data will be indicated in Section 2, Tables A and B. It should be observed that if the outgoing operator does not speak any of the languages indicated, she should direct her call to the appropriate incoming international operator.

2.1.1.8 A table of public holidays when general business and financial institutions may be closed.

2.1.1.9 It is recommended that a specific address be provided by each Administration to receive routing information and to handle questions regarding internal routing arrangements and inquiries about entries in the routing document.

2.2 *Section 2 – Instructions for preparing and using routing tables*

The routing information considered appropriate for distribution to other Administrations should be set out in a standard form for ease of interpretation and in sufficient detail to enable the controlling operator to set up a connection without recourse to the incoming international operator on more than 5% of the calls.

It is in the interests of Administrations to ensure that adequate and accurate information is available to controlling operators in order that operating costs at both outgoing and incoming exchanges may be kept to the lowest figure commensurate with the cost of production and maintenance of the routing information.

It is recommended that the routing information should be produced in either of the forms shown below, i.e. Table A or Table B.

TABLE A

(of the routing document)

Name of locality	Routing code to reach subscribers	Routing code to reach operators	Directory
1	2	3	4

How to fill in Table A:

Column 1 – Name of locality

This is the name of the community, e.g., city, town or village, which subscribers generally use to designate where their telephone service is provided.

Column 2 – Routing code to reach subscribers

The routing code (trunk code) used to reach telephones in the locality.

Column 3 – Routing code to reach operators

The routing code combined with a standardized operator code (see § 2.1.1.7 in explanatory notes) which permits reaching an operator performing a specific function for the locality.

Language indicator

In column 3, insert, using a letter code, the language(s) spoken by the local operators. If the language(s) are spoken by all operators serving the localities listed in column 1, an explanatory note keyed to column 3 would suffice for indicating the common language(s). An explanation of the code should be annexed.

Column 4 – Directory

Where applicable the reference number or letter which indicates the particular directory volume or section where the telephone numbers for the locality may be found.

TABLE B

(of the routing document)

Name of locality	Routing code to reach subscribers	Routing code to reach operators for			Directory
		Completing calls and verifying station conditions	Verifying station conditions only	Requests for information	
1	2	3a	3b	3c	4

How to fill in Table B:

Columns 1, 2 and 4

See under Table A.

Column 3a

This column should contain the complete code that enables a controlling operator to gain access to an incoming operator who is in a position to extend the connection to the called number and verify the station conditions.

Column 3b

This column should contain the complete code that enables a controlling operator to gain access to an operator who can verify the conditions on a called station, e.g., that the number is of a working line, that there is no reply or that the line is engaged.

Column 3c

This column should contain the complete code that enables a controlling operator to obtain the subscriber number of a person in the locality in question.

As it is important that the controlling operator should know that she will be able to understand the called operator, an indicator should be used, as described in the § "language indicator of Table A". If separate routing codes are necessary to give access to operators speaking specific languages at the incoming exchange, these should be shown with the appropriate indication against each code. A routing code in column 3a should not be repeated in column 3b.

The country where uniform information is available throughout its territory for access to its operators handling:

a) the completion of inward calls and verifying station conditions,

b) verification of station conditions only, and

c) local telephone number information,

ordinarily would use Table A. The method of access to these particular services would be indicated in Section 1 above and need not be repeated against the individual items in the routing schedule.

In the case where a country provides differing access points beyond its international exchange for any or all of the three categories a), b) and c) mentioned above, it would use Table B. The specific routing information to give access to the available point should be shown in sub-columns of column 3, headed respectively 3a, 3b and 3c. Where no facility exists for a particular locality there should be no entry of any kind, thus indicating the need for the controlling operator to call the international incoming operator.

It is in the interest of Administrations to incorporate this information in the routing document not only for the controlling operator but also for maintenance (e.g. fault report) and for proper application of Recommendation E.422 [1] (e.g. dialling of wrong trunk code).

Furthermore, this information can be used to prevent calls with improper routing codes from seizing the international circuits.

It is recommended that the information be given in the form shown in Table C.

TABLE C

(of the routing document)

Routing code	First digits after routing code	Number of digits after routing code	Identification of section or area
1	2	3	4

How to fill in Table C:

Column 1

Routing code (trunk code) used to reach telephones in the section or area.

Column 2

First digits to be dialled after the routing code (not required when the number of digits after the routing code is constant).

Column 3

Number of digits after the routing code [not required when the national (significant) number has a fixed length].

Column 4

Name of the section or area.

References

[1] CCITT Recommendation *Observations on international outgoing telephone calls for quality of service*, Rec. E.422.

PUBLICATION OF A "LIST OF INTERNATIONAL TELEPHONE ROUTES"

1 A *List of International Telephone Routes* is published annually. It shows for the various services:

- the primary routes,
- the secondary routes.

The *List* is revised annually to reflect the situation on 1 January of every year.

2 The main purpose of the *List of International Telephone Routes* is to provide the fullest possible information to Administrations about the routings available for their international telephone traffic.

3 The basis on which the *List of International Telephone Routes* is compiled is described in Annex A.

ANNEX A

(to Recommendation E.150)

A.1 This *List* comprises the following five parts:

I. Europe and countries of the Mediterranean Basin [1)]

II. Africa (including the countries in that continent listed in Part I)

III. America

IV. Asia (including the countries in that continent listed in Part I) and Oceania

V. Intercontinental routes (direct links).

A.2 In the first four parts, the *List* indicates primary and secondary routes for the various relations. The *List* is divided into two columns:

- column A lists the international telephone relations;
- column B shows primary routes and, where applicable, secondary routes for each relation.

A.3 Primary routes are indicated by the digit 1 and secondary routes by the digit 2. Where there are several routes per category, these are differentiated by an additional digit (1.1, 2.1, etc.).

A.4 Direct routes are designated by the word "direct" followed by the letters "/a" or "/m" indicating the mode of operation of the circuits (a = automatic [2)] and m = manual). In the case of transit, only the name of the first transit centre used is indicated, followed by "/a" or "/m" according to whether transit is automatic or manual. With regard to Part I of the *List*, it would be advisable to indicate whether a satellite is concerned by using the abbreviation "SAT". If appropriate, the provisions in the third paragraph of § A.6 will also apply.

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1) Countries in the Mediterranean Basin are countries not belonging to Europe but bordering the Mediterranean Sea.

2) I.e. using one of the signalling systems recommended by the CCITT (Systems R2, No. 4, No. 5, No. 6 or No. 7), whether the service offered to users is fully automatic or semiautomatic. When, on a relation normally served by automatic circuits, a small number of manual circuits still exists, only the symbol "/a" should be used.

Example 1

International telephone relations	*Primary and secondary routes*
A	B
Denmark (including the Faroes)	
Albania	Rome/m
Germany (Fed. Rep. of)	direct/a
Austria	direct/a
.....	
Bulgaria	1.1. Praha/m 1.2. Warszawa/m
.....	
Iceland	1.1. direct/a/F 1.2 direct/a/SAT
.....	
Portugal	1.1. direct/a 1.2. Paris/a
.....	
USSR	1. direct/m 2.1. Warszawa/m 2.2. Helsinki/m

A.5 With regard to Parts II to V of the *List*, the type of link is described by means of the following abbreviations:

- F telephone line (overhead wires, land and submarine cables, radio-relay systems, tropospheric systems),
- RT radiotelephone link,
- SAT satellite link, and
- SP satellite link set up via the SPADE system.

Example 2

A	B
Congo	
Algeria	1. direct/m/RT 2. Paris/m/RT
.....	
Gabon	direct/m/F

A.6 In Part VI (intercontinental routes) only *direct* links between countries in different continents are mentioned, i.e. connecting two countries directly without passing through a (manual or automatic) transit centre in another country; such links may be cable, satellite (including the use of SPADE) or radiotelephone.

The abbreviations referred to in §§ A.4 and A.5 above are used to describe the mode of operation (manual or automatic) and the type of link.

When differently constituted direct links (e.g. a submarine cable and a satellite link) exist in a relation between the same terminal telephone centres, they should be shown separately[3].

If certain direct links are utilized in common by a number of countries according to special agreements, these direct links may be mentioned in a footnote for each country concerned.

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[3] *Note* – When a direct link is made up of two different types of section (e.g. a submarine cable and a satellite section), the type of link should be shown as follows: F + SAT.

Example 3

Intercontinental routes (direct links):

Relations between (country)	*Terminal telephone centres*
A	B
Denmark	
Argentina	København-Buenos Aires/a/SP *)
Brazil	København-Rio de Janeiro/a/SAT København-Rio de Janeiro/a/SP *)
Canada	København-Montreal/a/F København-Montreal/a/SAT København-Toronto/a/F

*) SPADE relations between the Nordic countries (Denmark, Finland, Norway and Sweden) and countries in other continents are provided via the common Nordic earth station (Tanum) and the international automatic transit centre in København (Denmark).

A.7 The mention of the name of a country or an area in this *List* does not imply, on the part of the ITU, any position with respect to the political status of such a country or area.

Recommendation E.151

CONDITIONS OF OPERATION AND SETTING UP OF CONFERENCE CALLS [1), 2)]

Conference calls may be accepted in the international service by agreement between the Administrations concerned, subject to the following conditions:

1 Types of conference calls

Conference calls are normally of two types:

- bidirectional calls in which each participant can listen and speak whenever he wishes to intervene in the conversation;
- unidirectional calls in which only one of the participants can speak, the other participants being able only to listen.

However, a conference call may consist of a combination of both types of call defined above.

2 Operating conditions

2.1 The technical equipment shall in every case be such that good quality of service is guaranteed for conference calls.

Administrations wishing to offer this service shall equip at least one of their international exchanges with facilities for handling:

- bidirectional conference calls with about 10 participants;
- unidirectional conference calls with about 20 participants.

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1) *Important note* – The denomination "conference calls" without further clarification or addition has been chosen to designate communications between several subscribers in different countries, known before the Vth Plenary Assembly of the CCITT (1972) as "multiple calls" or as "conference (multiple) calls".

2) The tariff and accounting provisions applicable to conference calls are contained in Recommendation D.110.

The CCITT will keep an up-to-date list of the international exchanges so equipped, with information in each case as to the maximum possible number of bidirectional or unidirectional connections. This list will also supply the names of countries which, although not possessing the appropriate equipment, agree to the setting-up of conference calls via a foreign exchange. This list shall be distributed to all Administrations.

2.2 The use of satellite circuits and of loudspeakers for conference calls is allowed provided that they are in conformity with the CCITT Recommendations in that respect.

It is recommended that several satellite circuits should not be used to set up conference calls, even though this type of circuit is being more and more widely used in both international and national links.

2.3 Conference calls may be set up by semiautomatic or manual working, according to the facilities available in the Administrations concerned.

3 Conditions for setting up a call by semiautomatic or manual working

3.1 In setting up a conference call, two diagrams may be used:

a) The operator of the country in which the originator is located connects all the called subscribers to the appropriate equipment. Each foreign participant will therefore be connected by an international circuit and the connection diagram will thus take the form of a single-star network.

b) The operator in the country in which the originator is located asks the operator in one or more foreign international exchanges with the appropriate equipment to call the called subscribers and to connect them, through that equipment, to the equipment of the international exchange of the Administration in the country of origin. In this way, several interconnected star networks will be created.

The choice of the diagram to be used for setting up each conference call shall be left to the operator in the controlling exchange (operator in the international outgoing exchange which has the appropriate equipment).

It should be noted that there are significant operating advantages in the single star network, in terms of setting up, charging and supervision of the call.

3.2 All or some of the communications making up conference calls may be set up either with specified stations or individuals (or with additional stations).

3.3 Conference calls may be granted priorities in each relation concerned for all or some of the calls involved, in accordance with the provisions cited in [1]. These calls shall normally take their turn, depending on their class and the priority with which they were requested. Nevertheless, in view of their special nature, efforts should be made to set them up as near as possible to the time specified by the originator, due regard being paid to the availability of circuits and special equipment.

3.4 Administrations which accept collect or credit card facilities for telephone calls may extend these facilities to conference calls.

In the case of a collect call, the subscriber in question shall be consulted before the call is set up in order to ascertain whether he agrees to pay the charge for the call.

4 Assessment of the chargeable duration of calls

4.1 In determining the chargeable duration of an international conference call, the basic principles outlined in Recommendation E.230 shall be applied. It should moreover be noted that:

4.1.1 the chargeable duration shall begin when all participants have been connected to the originator of the call;

4.1.2 the chargeable duration shall end when the originator gives the clearing signal;

4.1.3 if, by prior agreement, the originator of the call asks for the withdrawal or introduction of one or more participants during the call, the original call shall be regarded as terminated. In the case of withdrawal, the end of the original call coincides with the start of the next call. In the case of an addition, the start of the next call coincides with the moment when the new participant(s) is/are connected to the others;

4.1.4 no charge shall be levied when a call cannot be set up.

Note – Some Administrations offer the facility of setting up conference calls, treated as personal calls or station calls, with the introduction or withdrawal of participants, on request, during the call. The introduction of such a service is a national affair and is not contrary to the provisions of the present Recommendation, provided that the bridging equipment for conference calls is used solely in the country of origin and that the call with each of the participants situated outside the country of origin appears in the international accounts as a separate international call of the appropriate type between the country of origin and the country of each of the participants. In this case, the provisions of § 4.1.3 above do not apply.

References

[1] CCITT, *Instructions for the international telephone service* (1 October 1985) Articles 48 and 49, ITU, Geneva, 1985.

Recommendation E.152

INTERNATIONAL FREEPHONE SERVICE (IFS)

1 Preamble

This Recommendation deals in particular with provisions for the implementation, operation, management and tarification of the international automatic freephone service. An operator-assisted freephone service may also exist on a domestic basis in some countries [1].

2 Definition

The **international freephone service (IFS)** enables a subscriber, in one country, to be allocated, through his own Administration, one or more special telephone numbers in one or more countries which allow users in this or these countries to call the subscriber free of charge. All service and call charges are paid by the subscriber to the service. In the short term, some countries may not be able to provide IFS completely free to the caller.

2.1 *Possible applications*

In most of its applications, IFS may be considered as a marketing tool able to help companies in one country to improve their business effectiveness in other countries.

These applications may include a wide range of activities as, for instance, direct sales, customer service, emergency lines, various kinds of reservations, testing new markets, communications with agents and employees, sorting leads for sales force and credit checking.

Through the use of the service, companies can derive the benefits of increased sales, customer satisfaction, reduced operating costs, increased profitability and competitive advantage.

3 Management

Under this heading are mentioned the guidelines for the practical day-to-day administrative procedures concerning service ordering, maintenance and data collection.

For the sake of clarity Administration A is the Administration which has the subscriber (Administration of destination of calls) and which is responsible for all relations with the subscriber. Administration B is the Administration responsible for the establishment of the freephone number in its country.

Each Administration should appoint a contact person responsible for all general matters relating to IFS.

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[1] The so-called "Country Direct" or "International Operator Direct Calling" (IODC) which is operated in some international relations is considered in another Recommendation.

3.1 *Service ordering*

3.1.1 *General procedure*

Administration A will originate the service order on behalf of the customer. The service order is converted to the format as illustrated in Annex A and sent via telefax (see Annex B), or mutually agreed telecommunications to Administration B. Administration B will verify the information on the Service Order Form (SOF) and programme the work necessary to activate the service on the date requested by the customer.

Each Administration should indicate one contact point for the exchange of service orders.

3.1.2 *Interval preceding service initiation*

The Administrations should endeavour whenever possible to complete all stages of service provision within ten working days after the service order form is issued. The term "working days" should be defined bilaterally.

Steps:

1: Day 1 Request by Administration A for a freephone number

2: Day 2 Number assigned and Administration A advised

3: Day 3 Service order form issued (SOF)

4: Day 4 SOF reviewed and processed

5: Day 7 Service activation

6: Day 8 Testing

7: Day 10 Testing completed/Customer due date

Steps 1 and 2 may be optional.

3.1.3 *Pre-service order issuing requirements*

Administration A may have reason prior to the issue of a service order to request a freephone number assignment (for customer who wants a specific number and/or to verify the period of notice required for service initiation). A list of up to ten customer-preferred freephone numbers (within the range available) can be submitted. If the specified number and alternatives are not available, Administration B will allocate the next spare number and notify Administration A. Administration A can then request additional numbers if required.

This process will be accomplished by using the form in Annex B, or a similar one.

In normal circumstances Administration B will advise Administration A of the freephone number allocated within two days of receiving the request.

Administration B guarantees the reservation of a freephone number for two months. After this period Administration B reserves the right to cancel the reservation if another customer has made a request for it.

If no SOF is received after a number has been reserved for more than two months, Administration B may cancel the reservation. In all cases, Administration B should promptly notify Administration A about the cancellation of any reserved numbers.

3.1.4 *Preparation of service order form*

The form in Annex A which is detailed below will be used as the SOF by Administrations A and B. (Administrations may bilaterally agree to identify mandatory components of the SOF, such as "SOF Type", and so on.)

a) *Coordination number:* a reference number to identify the order.

b) *Date transmitted*

c) *SOF type:*

- *New:* a new service involving a new freephone number is established.
- *Change:* an existing service requires modification.
- *Disconnect:* an existing service is completely disconnected.
- *Suspend:* Administration B will disconnect service but hold the freephone number for 60 days.

d) *Pending SOF supplement:*

- *No.:* Indicate sequentially e.g., 001, 002, etc. The coordination number should be the same as that of the original SOF.
- *Modify:* To be used when information on the original SOF needs to be changed. The "Remarks" section should be used to indicate the exact information being modified.
- *Due date change:* To be used when the customer of Administration A cannot accept service on the original due date. It is important that Administration B does *not* activate the service when it cannot actually be used, or it becomes necessary, for any reason, to change the due date.
- *Cancel SOF:* This should be received prior to the due date and will cancel the SOF and all supplements pending. The cancel SOF should contain all the information on the original SOF.

e) *Administration A order number:* Administration A's service request number.

f) *Customer due date:* Typically up to ten working days may be required by Administration B for service initiation. Service will be considered to officially commence at the time and date that Administration A specified in the SOF. Note that service activation will take place three working days prior to the due date.

g) *Freephone number:* This should be filled in when a freephone number has been pre-assigned. If a customer will accept the next available freephone number, this area should be left blank.

h) *Activation time:* This should only be used where coordination of work is required to maintain an uninterrupted service to the customer (e.g., customer moves at specified time involving a change in terminating telephone number).

i) *Routing number:* Administration A's number for routing of incoming IFS calls.

j) *Subscriber access capabilities:* Indicate quantity of terminating lines. (Used for network management purposes, see § 5.4.)

k) *Administration B use only*

l) *Directory assistance:* Indicate "yes" if the customer of Administration A is to be included in the directory assistance system of Administration B.

m) *Directory listing:* If Administration B offers inclusions in telephone directories for foreign IFS subscribers, the desired listing should be indicated by Administration A in accordance with Administration B's format requirements, as typically shown below:

Format:

- use digits for number designations,
- use an ampersand (&) rather than "and",
- do not use punctuation,
- up to 50 alphanumeric characters.

n) *Additional directory listings:* If Administration B, directly or through an agency, offers additional listings in alphabetical and/or classified directories, Administration A should indicate whether its customer is interested in arranging for any additional listings.

Note – For items l-n, the details of how these are to be accomplished should be arranged for bilaterally.

o) *Remarks:* Enter any information pertinent to this order, e.g. notify immediately of assigned freephone number.

p) *Originator:* Name of Administration A's coordinator and contact number(s).

3.1.5 *Freephone number assignment*

The policy for freephone number assignment can be summarized as follows:

- The numbers will be those specified by Administration B.
- Customer requested numbers may be assigned if available.
- Reserved numbers are intended for the freephone subscriber's communication service, and are not to be resold or traded (for a fee). Any attempt to do so will result in Administration B reclaiming those numbers for reassignment.
- Administration B will not charge any additional fee for a customer requested number.
- Freephone subscribers have no legal claim to or propriety interest in any number and should be notified accordingly by Administration A.

- Freephone subscribers are not to promote their number unit before the customer due date.
- When an existing service is disconnected, Administration B number re-assignment policy will be followed.
- Administration B's should have the right to make a final decision on any freephone number issued.

3.1.6 *Directory assistance/listings*

Directory assistance in country B can be obtained at the option of the subscriber of Administration A. If subscribers wish to have their freephone number included in the directory assistance system, this must be specified in the SOF.

Details about listings should be subject to bilateral agreement.

3.1.7 *Access capabilities/line definition*

Administration A will indicate the actual number of access lines at the disposal of its subscriber. This may be used for network management purposes.

3.1.8 *Service authorization*

Both Administrations will activate the service a few days prior to the customer due date. This will allow proper testing and verification of the service before the customer defined due date.

3.1.9 *Pre-service testing*

Administration A will verify operation of the subsriber's access number and will perform pre-service testing during the days preceding the SOF due date.

Administration B will test the service on the day before the due date at the latest.

3.1.10 *Service order control*

As the originator and interface with the subscriber, Administration A should have overall control responsibilities to assure satisfactory completion of the service order and initiation of service.

3.1.11 *Abusive customers*

Administration B will notify Administration A of any unusual or abusive use of freephone calling by their subscribers. Administration A should attempt to correct the situation as quickly as possible (e.g., convince the subscriber to solve the problem).

In extreme cases, Administration B may wish to terminate service to a subscriber who has shown an inability or lack of desire to control his international freephone service.

Administration B will consult the Administration A prior to taking any action.

3.2 *Operating practices*

3.2.1 *Operations centres*

All problems should be reported to the operation centre appointed for each Administration. These centers do the pre-service testing, troubleshooting and service performance tracking.

3.2.2 *Pre-service testing*

Each new international freephone number will be tested through the subscriber number prior to the customer due date. On the customer due date, the routing number will be released to the customer, and a final call will be made from the originating country to the subscriber's access to finish the testing.

3.2.3 *Trouble situations*

Trouble in either the inbound or outbound service is reported to the operations centre.

For trouble in the inbound service, a simulated incoming international call is set up. If the call completes to the subscriber, the trouble is referred to Administration B for testing and resolution. If the call does not complete, the trouble is corrected as soon as possible.

For outbound calls, a test call will be made on the outbound side of the international switch. If the call does not complete, the trouble will be referred to Administration A for further testing.

3.3 *Data collection*

3.3.1 *Originating country performance data collection*

Statistical data from the freephone exchange will be utilized to provide a traffic figure for all outgoing calls.

Available data will be specified by bilateral agreement.

3.3.2 *Exchange of customer performance data*

There will be no charge for the exchange of such information between Administrations. If the reports are supplied to the subscriber, Administration A will decide on the charge and will not reimburse Administration B.

4 Customer's features

In principle, the basic IFS is operated as described under § 2 above. As an Administration option, subscribers may be offered wider possibilities for their business activities.

Some of the more possible features are described below.

4.1 *Universal freephone number*

This feature allows a customer to be allocated one special freephone number that is the same throughout the world while calls to this number, if required, can be routed to different destination accesses depending on the country or point of origin. For various reasons most countries currently have to allocate a restricted part of the national freephone numbering range for IFS. However, it may be possible to allocate the same numbering range for IFS within the national freephone range in each country, at least for the last digits of the freephone number. IFS subscribers should have the right to choose their freephone number from such a numbering range.

Annex C gives numbering ranges which can, as an example, be reserved for customers requesting universal freephone numbers (it is recognized however that several Administrations cannot in the short term apply this numbering scheme).

4.2 *Announcement for callers*

To inform the caller as an option (see § 5.2.2) of the unique character of the freephone number, an announcement may be given to him after assessing a freephone number. The announcement for IFS should be different from the announcement for IODC.

4.3 *Geographical zone call routing*

In general, the IFS number is related to a national terminal point (destination access) of the subscriber, so it is only possible to reach one such point from the whole of the originating country. In order to cover regional marketing districts within a country, it should be possible to choose smaller geographic areas of the country as points of origin for IFS calls.

4.3.1 *Module construction system of geographic service areas*

To enable this feature, the country has to be divided into geographic service areas, based on a module construction system, which follow traditional borders such as counties, linguistic areas, economic or political districts, or networks. Customers of the IFS must specify a destination access for all (or just a few) of these modules (geographic service areas), so that each module (service area) is related to one destination access. Depending on the geographic origin of the call, it will be routed to the predefined destination access of the IFS subscriber. Independent of the geographic origin, the caller always uses the same freephone number.

4.4 *Time-dependent call routing*

This feature enables IFS subscribers to route their traffic to alternate destination accesses at specified times of the day or days of the week. The destination access may vary depending on:

- time (hour – minute),
- day of the week (Su – Mo – Tu – Th – Fr – Sa),
- date (day – month – year).

4.4.1 *Timetable call routing*

The different applications of standard and daylight savings times by countries should be coordinated by the Administration providing the diversion capability.

4.4.2 *Date-dependent call routing*

Subscribers may require temporary changes in their periodic seven-day cycle for public holidays or business vacations. Therefore, the subscriber may request the date depending call routing. This is a specified routing that is different from that which would normally be scheduled for this specific date.

4.4.3 *Variable (follow-me) call routing*

Subscribers may also require temporary changes in their periodic seven-day cycle for special events or campaigns. The traffic will be routed to these alternative destination accesses by activation of the subscriber. This follow-me feature is intended for non-periodic routing changes.

4.4.4 *Activation of the follow-me number*

The subscriber may either activate the follow-me number by contacting the Administration's operational entity who will enter the proper request into the system on behalf of the subscriber, or the subscriber may interact with the system directly. In both cases, the traffic will then be routed to the alternative access instead of the destination access of the periodic routing program. It should be possible to also schedule the request for activation of the follow-me number in advance.

4.5 *Call completion on busy (traffic-dependent) call routing*

The aim of this feature is to have all calls completed in the most effective way when encountering an occupied number. This prevents ineffective seizure of network facilities, since all calls which encounter busy are stopped at, or close to, the origin. Therefore it is desirable to record the local seizure of the subscriber destination access on a real-time basis. Three subfeatures, depending on the amount/number of seizures within a specific period of time, are possible:

4.5.1 *Diversion of calls to alternative destination accesses*

This subfeature provides the capability to have call enquiries that encounter of busy after being translated to the corresponding destination access, to be routed to an alternative destination access of the subscriber. A series of alternative destination accesses may be defined. If none of these alternative accesses is available, the call will be routed to a recorded announcement or held in a queue.

4.5.2 *Queuing of calls*

This subfeature provides the capability to have call enquiries that encounter busy after being translated to all of the corresponding destination accesses, to be held in a queue until an access to the subscriber becomes available. The caller will receive a corresponding announcement. If one access is available, the call will be taken out of the queue on the FIFO principle (first in-first out) and routed to this access.

4.5.3 *Recorded announcement*

This subfeature provides the capability to route a call that cannot be completed to the subscriber access to a recorded announcement. This announcement can be customized or standard. Depending on the reason for non-successful call completion, different announcements can be defined:

- busy: announcement for normal traffic condition;
- overload: announcement for explosive traffic conditions.

4.6 *Subscriber statistics*

This feature provides the capability to give more information about the usage and seizure of the access to the subscriber than does his monthly bill.

4.6.1 *Real time information*

This information is given to the subscriber during the local call, e.g., on his equipment display. For example:

- freephone indicator showing if the incoming call is a freephone call which has to be paid by the subscriber;
- subscriber number of the caller;
- point of origin of the call;
- billing information of the local call.

Other information should be given to the subscriber via a visual display such as:

- usage of the access lines;
- number of calls in the queue of the network;
- accounting (billing) information of the last accounting period;
- number of seizures/call attempts: 15-minute cycle for the last 24 hours;
- number of successful calls: 1-hour cycle for the last 7-day cycle.

4.6.2 *Analysis by the Administration*

Data and information are postprocessed by the Administration and given to the subscriber as listings on a periodic (e.g., monthly) basis.

a) *List of calls*

All seizures within the specified period of time are registered and listed:

- beginning of seizure/call with date and time,
- subscriber number of the caller,
- point of origin of the call,
- call response time of the subscriber,
- duration of the call.

b) *Call attempt profile*

All call attempts within a specific period (e.g., 5-minute, 15-minute, 60-minute periods) are registered, sorted according to their origin, and listed.

4.7 *Directory assistance/listing service*

Directory ASSISTANCE in the country of origin can be obtained as an option for the IFS subscriber.

Directory LISTING in the country of origin can also be obtained as an option of the IFS subscriber. Because of the unique character of freephone numbers, special pages (e.g., green pages) should be created and published in each regional listing.

To comply with the goal of a unique symbol for the IFS, the manner of writing a freephone number in listings or advertisings should be the same within participating countries.

Details are to be defined by the Human Factors Group in the CCITT.

5 Operational and technical provisions

5.1 *General description*

Subscribers who are prepared to pay charges for incoming calls may take out one or several IFS subscriptions with their Administration on the basis of the following items:

- a specific IFS number,
- available options.

5.1.1 *IFS number*

This is the number to be dialled by callers abroad allowing them to call the IFS subscriber of Administration A. The assignment of this number will be a national matter in Administration B. In addition to the following requirements, the IFS routing number should support the identification of the specific destination Administration. It consists of:

5.1.1.1 *Characteristic, prefix for IFS: the IFS access code*

The access code has the following functions:

- it gives the service a unique identity,
- it inhibits charging of outgoing calls,
- it informs the caller of the free-of-charge character of the calling procedure,
- it routes the call towards a special exchange that can handle the IFS service.

5.1.1.2 *Subscriber's freephone number*

This number is allocated by the Administration of the subscriber's country (Administration A) from a given series proposed by the Administration of the country of origin of calls (Administration B). If the subscriber wishes IFS to be provided in several countries, he should be allocated a particular IFS number for each of them but, in the long term, the IFS number could be independent of the country of origin of calls (for common numbering range, see Annex C).

5.2 *Operational requirements*

In practice, the operational requirements mentioned below may be met in different parts of the total network involved with the provision of the service and much will depend on the way the service capability is implemented by an Administration.

5.2.1 *The country of destination* (Administration A) should endeavour:

- to establish the billing procedure for its IFS subscribers autonomously,
- to collect statistical data for international accounting procedures in each relation,
- to prevent fraud or duplicate collection attempts,
- to carry out traffic observations.

5.2.2 *The country of origin* (Administration B) should endeavour:

- to ensure the free-of-charge character of the call for the caller,
- to prevent fraud attempts,
- to monitor the network to avoid a massive number of calls (counter for limiting the number of calls),
- to carry out traffic observations,
- to allow calls to be placed from any public or private telephone station,
- to allow or forbid any call routing from a given access area, and
- as an option, to inform the caller of the IFS service by means of an announcement.

5.3 *Technical requirements*

It is desirable that potential capacities and service options should be similar in both directions for a given relation. However, Administrations will be free to incorporate features and functions that do not require changes or other support by other IFS Administrations, independent of when the other Administrations are able to provide the same feature.

5.3.1 *The country of origin* (Administration B) should endeavour:

a) to screen the IFS calls for validity;

b) to forbid charging of outgoing calls;

c) to route calls where applicable towards a special exchange devoted to IFS which should verify the validity of the IFS number and translate it into the routing number indicated by the destination Administration.

Administration B will be required to translate the dialled number into the format required by Administration A. This will normally be in the form of a routing number which will be used by Administration A to identify the called subscriber. This routing code should be kept confidential.

The structure of the routing number could consist of:

- the country code of the country of destination,
- the incoming IFS code for the country of destination,
- the country code (or prefix) of the country of origin,
- the specific number of the called subscriber;

d) to route the call after translation of the incoming number towards an outgoing international exchange;

e) to proceed with an efficient management of the network to allow regular traffic flow;

f) to prevent fraud.

Where a terminating Administration does not have terminating call processing (terminal billing) capabilities, the translation may be to a normal PSTN (public switched telephone network) number. The call will be delivered as a normal IDD (international direct dialling) call.

5.3.2 *The country of destination* (Administration A) should endeavour:

a) to identify the incoming IFS routing number for special handling as follows:
- validity verification of the received number,
- translation into the domestic number of the IFS subscriber,
- routing of the call on the domestic network,
- recording of call data for international billing and accounting purposes, and as an option,
- providing an announcement to inform the called subscriber of the type of call received,

b) to proceed with an efficient management of the network to avoid a massive number of calls;

c) to prevent fraud.

5.4 *Network management*

CCITT rules concerning the International Telephone Routing Plan also apply to IFS calls.

Moreover, Administrations should plan to provide network management facilities in their toll-free networks equivalent to that provided in their normal networks.

Advanced network management facilities may be required as IFS grows, to ensure that congestion resulting from heavy calling to one number does not adversely affect the IFS service or other mainstream services.

6 Quality of service

The quality of IFS should be a basic requirement in order to meet customer needs and achieve a satisfactory market growth.

Basic aspects to be ensured are listed below:

a) Telephone quality should be the same as for regular international telephone service.

b) Connection retention should be ensured; unwanted interruptions or excessive breaks of communication should not occur.

c) Calls should be set up in the shortest possible time in accordance with Recommendations of the E.400 Series.

d) Service activation should be provided in the shortest possible time; a period of 10 working days seems to be the goal.

e) Maintenance procedures should be set up in order to ensure an average time-to-repair as short as possible.

f) Clear billing information should be provided, on request, to the customer.

g) Service observation should be carried out in a planned manner in order to be sure that service quality requirements are guaranteed to the users (refer to Recommendations of the E.400 Series).

ANNEX A

(to Recommendation E.152)

Service order form for IFS

FROM	TO	COORDINATION No.
Administration A	Administration B	CC –
		. . . . .
		Date transmitted:
		. . . .
		Day Month Year

SOF type (mark one with an x)	New	Change	Disconnect	Suspend

Pending SOF supplement	No.	Modify (mark an x if yes)		Due date change (mark an x if yes)		Cancel SOF (mark an x if yes)	

Administration A . . . . . Customer due date: . . . .
Day Month Year

Service request number

Freephone number: . . . . . Activation time: . . . . . .

Routing number: . . . . . Access capabilities: . . . . . .

Administration B

Directory assistance of Administration B: Customer of Administration A to be included?	Yes	No
Directory listings of Administration B: Customer of Administration A to be included?	Yes	No
Additional listings: Do you wish to be contacted?	Yes	No

Listing: . . . . . .

. . . . . .

Customer name and address: . . . . . .

. . . . . .

Remarks: . . . . . .

. . . . . .

Coordinator: . . . . . Telephone No.: . . . . . .

ANNEX B

(to Recommendation E.152)

Fascimile message form

Date: ....
Day Month Year

FROM: Name: . . . . . .

Location: . . . . . .

(Administration A) Facsimile No.: . . . . . .

Contact/Information Tel. No.: . . . . . .

TO: Name: . . . . . .

Location: . . . . . .

(Administration B) Facsimile No.: . . . . . .

Contact/Information Tel. No.: . . . . . .

FREEPHONE NUMBER ASSIGNMENT REQUEST

Customer name: . . . . . .

1. . . . . .

2. . . . . .

3. . . . . .

Remarks: . . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

ANNEX C

(to Recommendation E.152)

Example of international freephone numbering range

Countries	Access code
A	066
B	11
CH	046 05
D	0130
DK	0430/0434 [a]
E	900-OX
F	19 05 90
GB	0 800 89
GR	
I	1678
IRL	
L	
N	050
NL	06
S	020 XX
SF	9800

0000-0999	for IODC
1000-1099	for freephone service
2100-2199	
3200-3299	
4300-4399	
5400-5499	
6500-6599	
7600-7699	
8700-8799	
9900-9999	

J	
CDN	1 800 XXX
US	1 800 XXX

[a] From May 1989: 800

SECTION 5

NUMBERING PLAN OF THE INTERNATIONAL TELEPHONE SERVICE

Recommendation E.160

DEFINITIONS RELATING TO NATIONAL AND INTERNATIONAL NUMBERING PLANS

1 prefix

F: préfixe

S: prefijo

A prefix is an indicator consisting of one or more digits, that allows the selection of different types of number formats (e.g., local, national or international), transit networks and/or the service.

Prefixes are not part of the number and are not signalled over internetwork or international boundaries.

Note – When prefixes are used, they are always entered by the user or automatic calling equipment.

2 international prefix

F: préfixe international

S: prefijo internacional

The combination of digits to be dialled by a calling subscriber making a call to a subscriber in another country to obtain access to the automatic outgoing international equipment.

Example:

00 in Switzerland.

Note 1 – In some countries two or more international prefixes may be used:

- to reach different groups of countries;
- to obtain different classes of call (e.g., station call or personal call).

In the first case the use of two or more international prefixes allows the use of different groups of switching equipment and the use of *abbreviated* dialling (i.e., shorter country codes) for the calls to a defined group of countries (see the definition, *country code* in § 5).

Note 2 – Where several countries are included in one integrated numbering plan, the international prefix is not used on a call from one of these countries to another.

3 national (trunk) prefix

F: préfixe (interurbain) national

S: prefijo (interurbano) nacional

A digit or combination of digits to be dialled by a calling subscriber, making a call to a subscriber in his own country but outside his own numbering area. It provides access to the automatic outgoing trunk equipment.

Examples:

0 in Belgium, Italy, Japan, Netherlands, Switzerland, United Kingdom;
1 and 0 in Canada and in the USA;
9 in Finland and Spain;
16 in France.

Note – In the case where several countries are included in one integrated numbering plan, the national (trunk) prefix is also used for calls from one of these countries to another.

4 escape code

F: code d'échappement

S: código de escape

An escape code is an indicator consisting of one or more digits which is defined in a given numbering plan and is used to indicate that the digits that follow are from a specific numbering plan which is different from the given numbering plan.

For example, escape codes are currently used within the X.121 numbering plan to interwork with E.164 (ISDN) and F.69 (Telex) numbering plans.

An escape code can be carried forward through the originating network and can be carried across internetwork and international boundaries. Therefore the digits used for escape codes should be standardized.

5 country code

F: indicatif de pays

S: indicativo de país

The combination of one, two or three digits characterizing the called country.

Examples:

7 USSR;
54 Argentina;
591 Bolivia.

Note 1 – In the case where a country uses different international prefixes, abbreviated dialling can be used. In this case, for calls to one country of a defined group of countries, a regional country code, composed of fewer digits than the normal country code, may be used.

Examples:

For traffic between Latin American countries, the following regional country codes might be used:

1 Argentina;
2 Brazil;
3 Chile, etc.

Note 2 – In the case where several countries are included in one integrated numbering plan, no country code need be dialled for the traffic from one of these countries to another. For access by other countries, these countries:

- may be included under one common country code, or
- may have separate country codes,

always keeping in mind the necessity to avoid exceeding the recommended maximum number of digits in the international number.

6 trunk code

F: indicatif interurbain

S: indicativo interurbano

A digit or combination of digits [not including the national (trunk) prefix] characterizing the called numbering area within a country (or group of countries included in one integrated numbering plan).

The trunk code has to be dialled before the called subscriber's number where the calling and called subscribers are in different numbering areas.

The trunk code varies from one country to another and is composed of:

a) Either a *regional code* indicating the geographical zone to which the called subscriber belongs and within which subscribers can call one another by their subscriber numbers.

Examples:

In France:

Paris area (Departments of Seine, Yvelines, Seine-et-Marne, Oise, etc.): trunk code 1,

Nice area (Department of Alpes-Maritimes): trunk code 93;

In Belgium:

Bruxelles area: trunk code 2,

Namur area: trunk code 81;

In the Federal Republic of Germany and the Netherlands:

the geographical area defined above corresponds in general to the local network:

Düsseldorf local network: trunk code 211,

Amsterdam local network: trunk code 20;

In the United Kingdom:

this definition applies to certain networks such as that of London, for which the trunk code is 1;

In Canada and the USA:

the geographical area defined above corresponds to a *Numbering Plan Area* (NPA):

Montréal area: NPA code 514,

New York City area: NPA code 212;

b) Or a *numbering area code* followed by an exchange code when the directory entry of the called subscriber does not include the exchange code;

Examples:

In certain areas of the United Kingdom:

Truro (group centre): trunk code 872,

Perranporth (in the Truro group): trunk code 872 57.

7 subscriber number [1)]

F: numéro d'abonné

S: número de abonado

The number to be dialled or called to reach a subscriber in the same local network or numbering area.

This number is the one usually listed in the directory against the name of the subscriber.

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1) Care should be taken not to use the term "local number" instead of "subscriber number".

8 national (significant) number

F: numéro national (significatif)

S: número nacional (significativo)

The number to be dialled following the national (trunk) prefix to obtain a subscriber in the same country (or group of countries included in one integrated numbering plan) but outside the same local network or numbering area.

The national (significant) number consists of the trunk code followed by the subscriber number.

It should be noted that, in some countries, it is customary to consider *for national purposes* that the national (trunk) prefix is included in the national number [which is then not the national (significant) number]. A careful distinction must therefore be made between such national definition or practice and the CCITT definition, which is internationally valid. In order to avoid misunderstanding, the CCITT definition includes the word "significant" between brackets, reading as follows: "national (significant) number".

Examples:

Subscriber	*National (significant) number*
123 45 67 in Bruxelles	2 123 45 67
12 34 56 in Düsseldorf	211 12 34 56
870 12 34 in Montréal	514 870 12 34
12 34 in Perranporth	872 57 12 34
248 45 67 in London	1 248 45 67

Note – Where several countries are included in one integrated numbering plan, only the national (significant) number is to be dialled after the national (trunk) prefix on calls from one of these countries to another.

9 international number

F: numéro international

S: número internacional

The number to be dialled following the international prefix to obtain a subscriber in another country.

The international number consists of the country code of the required country followed by the national (significant) number of the called subscriber.

Examples:

Subscriber	*International number*
123 45 67 in Bruxelles	32 2 123 45 67
12 34 56 in Düsseldorf	49 211 12 34 56
870 12 34 in Montréal	1 514 870 12 34
12 34 in Perranporth	44 872 57 12 34
248 45 67 in London	44 1 248 45 67

Note – Where several countries are included in one integrated numbering plan, the international number is not used on calls from one of these countries to another. (See the note to Definition No. 8.)

10 national destination code (NDC)

F: indicatif national de destination (IND)

S: indicativo nacional de destino (IND)

A code field, within the E.164 numbering plan, which combined with the subscriber's number (SN) will constitute the national (significant) number of the international ISDN number. The NDC will have a network and/or trunk code selection function.

The NDC can be a decimal digit or a combination of decimal digits (not including any prefix) characterizing a numbering area within a country (or group of countries included in one integrated numbering plan).

The NDC has to be inserted before the called subscriber's number when the calling and called parties are located in different number areas.

NDC assignments are a national responsibility and therefore the NDC structure varies from one country to another. It may take a trunk code format or serve for selection of a destination network.

The NDC can in some instances, provide a combination of both the above functions.

11 destination network (DN) code

F: indicatif de réseau de destination (RD)

S: indicativo de red de destino (RD)

An optional code field within the E.164 numbering plan which identifies the destination network serving the destination subscriber. It performs the destination network selection function of the NDC. In some instances it can be combined with a trunk code to form the NDC. The DN code can be a decimal digit or a combination of decimal digits (not including any prefix).

Recommendation E.161

ARRANGEMENT OF FIGURES, LETTERS AND SYMBOLS ON TELEPHONES AND OTHER DEVICES THAT CAN BE USED FOR GAINING ACCESS TO A TELEPHONE NETWORK

1 Use of figures and letters in telephone numbers

1.1 For the automatic international service, it is preferable that the national numbering plan should not involve the use of letters (associated with figures). The use of letters in national number plans may, however, be necessary for national reasons. For example, countries using letters in their subscriber numbers will naturally use them in their national numbering.

1.2 For the automatic international service to countries using letters in telephone numbers, it would be helpful, in a country where letters are not used:

a) to include in the directory a table for converting into figures the letter codes of exhanges in countries with which an automatic service is available;

b) to supply, at the time of opening this automatic service, a booklet of instructions containing the conversion table to the main subscribers to the international service.

1.3 It would also be desirable, in countries with letters in the telephone numbers, that subscribers with considerable international traffic should be asked to show on their letterheads, below their national telephone number, the international number with figures only. (See Recommendation E.123.)

2 Rotary dials (see Figure 1/E.161)

2.1 For countries which have not yet adopted any specific type of dial, the figures on the dial should be arranged in the following order: 1, 2, 3, . . ., 0.

2.2 The dial shown in Figure 1/E.161 uses the arrangement of letters and figures employed by some European Administrations. It may be convenient that the dials or pushbotton sets used by international operators for semiautomatic operating in Europe have this arrangement of letters and figures.

Note - On the North American dials and keysets, the digit 0 is not associated with letters O and Q but with the word *operator*, the letter O being associated with digit 6.

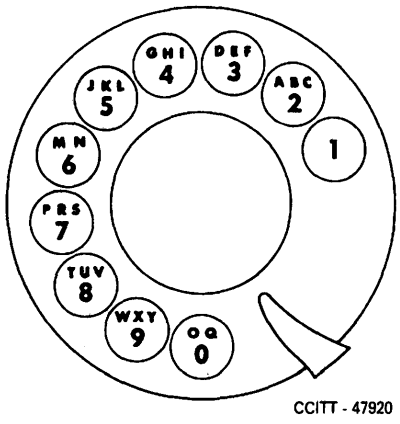

FIGURE 1/E.161

Rotary dial

3 Pushbuttons or keys

3.1 *10 pushbuttons*

3.1.1 *Arrangement and numbering*

The standard arrangement and numbering for pushbuttons corresponding to the digits 1 to 0 is as shown below:

1 2 3

4 5 6

7 8 9

0

Extensive research has shown that this arrangement leads to shorter entry times and lower error rates than other arrangements [1].

Where a need exists within an Administration for a 2 × 5 array or a 5 × 2 array for use on special telephone apparatus, the arrays should be as shown below:

1 2 3 4 5

6 7 8 9 0

1 2

3 4

5 6

7 8

9 0

Note – User dialling performance on these special arrays is slightly inferior to that on the standard array given above.

[1] An annotated list of literature references is available in the article cited in [1].

In view of the fact that purely numerical numbering plans are now recommended and that the association of letters to digits is not the same in different countries[2], it is not desirable to standardize letter symbols for the pushbuttons corresponding to each of the digits. In cases where a mixed letter-and-digit dialling system is still in use in a country, the letters associated with the figures in the dialling system of the country concerned may, of course, be included on the corresponding pushbuttons of this country's telephone sets (see Figure 2/E.161).

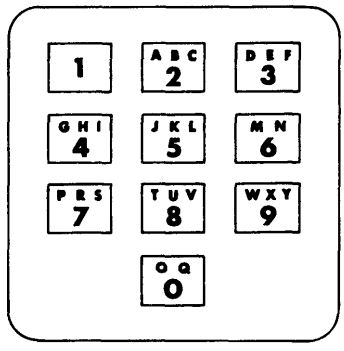

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FIGURE 2/E.161

10-pushbutton set

The preferred and recommended arrangement for the keys of a separate numeric keypad on a multi-functional terminal used both for the entry of telephone number information and data is the standard arrangement shown at the beginning of this section.

Exceptionally, for devices intended to be used principally for data entry but which may sometimes be used to enter telephone number information, the arrangment whereby the first and the third row of the standard CCITT arrangement are interchanged may be used[3].

Also exceptionally, telephone number information may be input from the row of numeric keys,

1 2 3 4 5 6 7 8 9 0

of an alpha-numeric keyboard.

3.1.2 *Symbols*

The symbols for these buttons are the digits 1 to 0 as indicated in the arrangements of § 3.1.1 above. These buttons are to be known as button 1, button 2, etc.

3.2 *12 pushbuttons*

3.2.1 *Arrangement*

For 12 pushbuttons the standard arrangement shown in § 3.1.1 above is extended by two additional buttons, one to the left and the other to the right of the button 0, thus making a pattern of four horizontal rows of three buttons each forming a 4 × 3 array.

Two buttons may also be added to the 5 × 2 array shown in § 3.1.1 above. These should be located below and in line with buttons 9 and 0, thus making a 6 × 2 array.

---

[2] Thus, for example, on the North American dials and keysets, the digit 0 is not associated with letter O and Q but with the word *operator*, the letter O being associated with the digit 6.

[3] The corresponding ISO standard can be found in ISO Draft Proposal 9995, entitled: "Keyboard Layouts for Text and Office Systems".

3.2.2 *Symbols*

On the 4 × 3 array, the symbol on the button which is immediately to the left of the button 0 (on the 6 × 2 array, the corresponding button is located below 9, and on the 2 × 6 array to the right of button 5) and which, according to Recommendation Q.23, is used to transmit the frequency pair 941 Hz, should have a shape easily identified as the general shape shown in Figure 3/E.161.

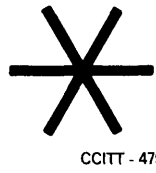

FIGURE 3/E.161

The symbol will be known as the *star* or the equivalent term in other languages.

On the 4 × 3 array, the symbol on the button which is immediately to the right of the button 0 (in the 6 × 2 array, the corresponding button is located below the button 0) and which, according to Recommendation Q.23, is used to transmit the frequency pair 941 Hz and 1477 Hz, should conform in shape to the specifications given in Figures 4/E.161 or 5/E.161. This symbol shall consist of four lines of equal length (b), forming two pairs of parallel lines. One pair is horizontal while the other is vertical or inclined to the right at an angle α of 80 ° as shown in Figure 5/E.161. It will be seen that two pairs of parallel lines overlap. The ratio a/b, where a is the overlap, shall be between 0.08 and 0.18.

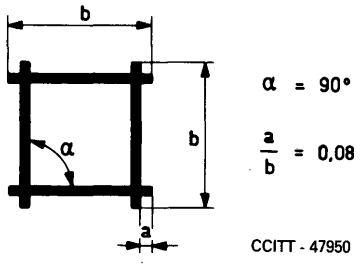

FIGURE 4/E.161

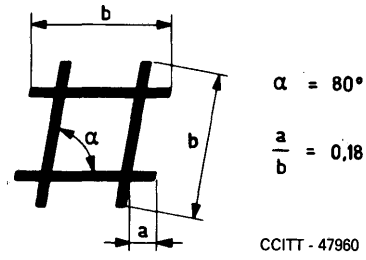

FIGURE 5/E.161

The preferred values are:

– in Europe[4)]

  $\alpha = 90\,°$ with $a/b = 0.08$

– in North America[4)]

  $\alpha = 80\,°$ with a/b close to the upper limit of 0.18.

The symbol will be known as the *square* or the most commonly used equivalent term in other languages[5)].

[4)] No information is available at the present time as to which of these values would be preferred in other continents.

[5)] In some countries an alternative term (e.g., "number sign") may be necessary for this purpose, unless further investigation indicates that "square" is suitable for the customer.

The additional buttons with these symbols will be placed as shown below:

Standard 4 × 3 array	6 × 2 array	2 × 6 array
1 2 3	1 2	1 2 3 4 5 *
4 5 6	3 4	6 7 8 9 0 #
7 8 9	5 6	
* 0 #	7 8	
	9 0	
	* #	

3.3 *Dual mode and engraving*

Dual mode and engraving of the buttons * and # are acceptable on telephones and on multi-functional terminals.

3.4 *Design of symbols*

Symbol size and the line thickness should be appropriate to provide optimal recognition.

3.5 *Use of colours*

The question of standardization of pushbutton and symbol colour for international purposes is still not settled. In the meantime, colours different from the digit buttons and symbols should not be used.

3.6 *Position of figures, letters and symbols on push-button sets*

In all push-button dials, the figures, letters and symbols should be unambiguously associated with the corresponding buttons, preferably, if adequate space is available, by being on the faces of the buttons themselves.

4 Additional pushbuttons for use on telephones

4.1 *General*

For purposes other than dialling, additional pushbuttons may be required on a telephone. For example, a telephone may have a pushbutton to recall during an active call, control logic (e.g., a register) or an operator, or to effect the transfer of an active call to another station. To prevent subscriber confusion it may be desirable that the symbols used on those pushbuttons which have identical functions be standardized.

4.2 *Specific recommendations*

4.2.1 *Register recall pushbutton*

For the recall of a register during an active call the following methods are possible:

- a switchhook flash,
- a depression of one of the pushbuttons of the normal 10 or 12 button array,
- a depression of another pushbutton specially provided for this purpose – the register recall pushbutton.

From the human factors viewpoint the depression of a pushbutton for register recall seems to be preferable to the use of a switchhook flash.

If a special register recall pushbutton is used, this pushbutton should be designated with the symbol R (capital) on or next to the pushbutton. The pushbutton should be clearly distinguishable and spatially separated from the standard 12-pushbutton array.

This symbol is recommended because:

a) it symbolizes the term "Recall" in a number of languages;

b) studies have shown that it is subject to minimal auditory and visual confusion;

c) it avoids the difficulties inherent in specific technical terms for any lay subscribers.

The exact position, shape and colour of the button should not be standardized at the present time. Such standardization would inhibit design innovation and be unnecessarily restrictive.

Note – Description of a 16-pushbutton layout has been deleted from this Recommendation owing to lack of use of this arrangement. Reference to 16 pushbutton sets can be found in the CCITT *Red Book*, Fascicle II.2, Recommendation E.161, § 3.3 and Annex A.

Reference

[1] *The layout of digits on push-button telephones* – a review of the literature. *TELE*, No. 1, 1982 (copies available at the Library of the Swedish Telecommunication Headquarters, S-12386 FARSTA).

Recommendation E.163 [1]

NUMBERING PLAN FOR THE INTERNATIONAL TELEPHONE SERVICE

Introduction

This Recommendation describes the numbering plan for the International Telephone Service. Recommendation E.164 describes the numbering plan for the ISDN era. It is for each Administration to choose the method of application from the two Recommendations which would provide the optimum approach to meeting their future national numbering plan needs. Evolution between the plans is for further study. However, for new equipment, it is recommended that E.164 be adopted.

1 National numbering plan

1.1 Each telephone Administration should give the most careful consideration to the preparation of a *national numbering plan*[2] for its own network. This plan should be designed so that a subscriber is always called by the same number in the trunk service. It should be applicable to all incoming international calls.

Administrations are strongly urged to advise the ITU or CCITT of national numbering plan changes well in advance of the event, so that this information can be published in the ITU *Operational Bulletin.*

1.2 *Number analysis*

1.2.1 The national numbering plan of a country should be such that an analysis of a minimum number of digits of the national (significant) number (see definitions in Recommendation E.160):

a) gives routing that reflects economic and other appropriate network factors;

b) indicates the charging area in those countries where there are several.

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[1] This Recommendation is also included in the Series Q Recommendations under the number Q.11.

[2] See the CCITT manual cited in [1] for a comprehensive study of national numbering plans from the national point of view.

1.2.2 In the case of a country with a two- or three-digit country code, not more than two digits of the national (significant) number need be analyzed for these purposes.

In the case of a country with a one-digit country code, not more than the three digits of the national (significant) number need be analyzed for these purposes.

1.2.3 In the case where an integrated numbering plan covers a group of countries, the digit analysis specified in § 1.2.2 should also determine the country of destination.

1.2.4 For the requirements relating to frontier traffic, see Recommendation D.390 R [2].

2 Limitation of the number of digits to be dialled by subscribers

2.1 *International number*

The CCITT recommended in 1964 that the number of digits to be dialled by subscribers in the automatic international service should not be more than 12 (excluding the international prefix). It is emphasized that this is the maximum number of digits and Administrations are invited to do their utmost to limit the digits to be dialled to the smallest possible number.

2.2 *National (significant) number*

Noting that:

a) the international number (excluding the international prefix) consists of the country code followed by the national (significant) number;

b) the smallest possible number of digits to be dialled in the automatic international service is achieved by limiting the number of digits of the country code and/or of the national (significant) number;

c) in some countries where telephony is already developed to an advanced stage, the national numbering plans in force enable the number of digits of the international number to be limited to less than 12;

d) some other countries which drew up their national numbering plans some time before 1964 have taken steps to ensure that the number of digits of the international number will not exceed 12 and may even be less;

the CCITT recommends that the number of digits of the national (significant) number should be equal to a maximum of $12 - n$, where n is the number of digits of the country code.

3 Digit capacity of international registers

The CCITT considers it advisable to recommend that the digit capacity of registers dealing with international traffic should allow for future conditions that may arise, but not possible to specify at the present time. In this regard, registers dealing with international traffic should have a digit capacity, or a capacity that can be expanded, to cater for more than the maximum 12-digit international number envisaged at present. The increase in the number of digits above 12 is left as a matter of decision to be taken by individual Administrations. However, for new applications a minimum digit capacity of 15 digits is recommended (see Recommendation E.164). Administrations are recommended, when making such a decision, to take account of the new applications likely to be introduced in the international service, and which are now being studied by the CCITT.

4 Prefixes and codes

4.1 *International prefix*[3)]

It is recommended by the CCITT that the Administrations of countries that have not yet introduced automatic international operation, or Administrations that are, for various reasons, revising their numbering plans should adopt an international prefix (a code for access to the international automatic network) composed of the two digits 00.

[3)] See definitions in Recommendation E.160.

The reasons for this recommendation are:

- to provide a maximum degree of standardization such that dialling is made as easy as possible for a person travelling in different countries (many countries already use the code 00),
- to minimize the number of digits to be dialled in automatic international operation,
- to simplify, for a future time when the use of the international prefix might have become a universal international standard, the format for writing an international telephone number.

4.2 *Country code*[4),5)]

4.2.1 Country codes will be used:

- in semi-automatic operation, to route calls to the required country when the calls are transit calls or when, on the outgoing positions, there is common dialling access to all the outgoing routes;
- in automatic operation.

4.2.2 A list of country codes was prepared by the CCITT within the framework of a worldwide automatic telephone numbering plan.

This list was set up according to the following principles:

a) The number of digits of the country code is one, two or three according to the foreseeable telephonic and demographic development of the country concerned.

b) The nine digits from 1 to 9 have been allocated as the country code or as the first digit of the country code. These digits define *world numbering zones.*

c) In the case of Europe, owing to the large number of countries requiring two-digit codes, the two digits 3 and 4 have been allocated as the first digit of the country codes.

4.2.3 The list of country codes already assigned is given in Annex A.

4.3 *Assignment of country codes*

4.3.1 The existing world numbering plan should be maintained and codes presently assigned should not be changed, unless consolidation of an existing numbered area yields an advantage in terms of code usage.

4.3.2 All spare country codes will be assigned on a 3-digit basis, as detailed in Annex B. The list of spare country codes for the international semiautomatic and automatic service is given in Annex C.

4.3.3 In the case where all the country codes in a world numbering zone have been assigned and an additional code is required in that zone, a spare country code from another world numbering zone can be used in accordance with the following rules:

4.3.3.1 Preference should be given to the assignment of a spare country code from an adjacent world numbering zone.

4.3.3.2 If spare codes are not available from an adjacent world numbering zone, assignments will be made from the zones with the most spare codes.

4.4 *Codes for new international services*

The introduction of some international services requires the allocation of a country code. In such cases, the assignment of a country code will be determined by the rules detailed in Annex B.

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4) See definitions in Recommendation E.160.

5) A "country code" may be assigned either to an individual country or to a geographical area.

4.5 *Trunk prefix*[6)]

4.5.1 The *national (significant) number* (see definition 8 of Recommendation E.160) does not include the trunk prefix. Accordingly, in the international service, the trunk prefix of the country of destination must not be dialled.

It should be noted that, in some countries, it is customary to consider *for national purposes* that the trunk prefix is included in the national number [which is then not the national (significant) number]. A careful distinction must therefore be made between such national definition or practice and the CCITT definition, which is internationally valid. In order to avoid misunderstanding, the CCITT definition includes the word "significant" between brackets, reading as follows: "national (significant) number".

4.5.2 It is recommended by the CCITT that the Administrations of countries that have not yet adopted a trunk prefix for access to their national automatic trunk network should adopt a prefix composed of a single digit, preferably 0. Irrespective of what digit is adopted as a trunk prefix, this digit should be precluded from being used also as a first digit of the trunk codes.

The reasons for this recommendation are:

- to provide the maximum degree of standardization of the trunk prefixes used in different countries, so that dialling is made as easy as possible for a person travelling from one country to another,
- to minimize the number of digits to be dialled in the automatic national service,
- to reduce user problems which arise because of the requirement, in automatic international operation, that the trunk prefix of the country of destination must not be dialled.

4.5.3 In the automatic international service, following the international prefix and country code of the called country, the caller should dial the national (significant) number of the called subscriber (i.e. without dialling the trunk prefix).

4.5.4 The use and printing of symbols and separators in national and international telephone numbers is detailed in Recommendation E.123.

4.6 *Use of zero as an escape code*

The use of the digit "0" (zero) as an escape code for numbering plan interworking is described in Recommendation E.166.

ANNEX A

(to Recommendation E.163)

List of country codes incorporating amendments proposed by the World Plan Committee, 1988

World numbering ZONE 1

Anguilla	1 a)	Bermuda	1 a)
Canada	1 a)	Bahamas (Commonwealth of the)	1 a)
United States of America, including		Dominican Republic	1 a)
Puerto Rico and the Virgin Islands	1 a)	Grenada	1 a)
Jamaica	1 a)	Montserrat	1 a)
Barbados	1 a)	Saint Kitts and Nevis	1 a)
Antigua and Barbuda	1 a)	Saint Lucia	1 a)
Cayman Islands	1 a)	Saint Vincent and the Grenadines	1 a)
British Virgin Islands	1 a)	Turks and Caicos (Islands)	1 a)

a) Integrated numbering area.

6) See definitions in Recommendation E.160.

World numbering ZONE 2

Egypt (Arab Republic of)	20
Morocco (Kingdom of)	21 [a]
Algeria (People's Democratic Republic of)	21 [a]
Tunisia	21 [a]
Libya (Socialist People's Libyan Arab Jamahiriya)	21 [a]
Gambia (Republic of the)	220
Senegal (Republic of)	221
Mauritania (Islamic Republic of)	222
Mali (Republic of)	223
Guinea (Republic of)	224
Côte d'Ivoire (Republic of)	225
Burkina Faso	226
Niger (Republic of the)	227
Togolese Republic	228
Benin (People's Republic of)	229
Mauritius	230
Liberia (Republic of)	231
Sierra Leone	232
Ghana	233
Nigeria (Federal Republic of)	234
Chad (Republic of)	235
Central African Republic	236
Cameroon (Republic of)	237
Cape Verde (Republic of)	238
Sao Tome and Principe Democratic Republic of)	239
Equatorial Guinea (Republic of)	240
Gabonese Republic	241
Congo (People's Republic of the)	242
Zaire (Republic of)	243
Angola (People's Republic of)	244
Guinea-Bissau (Republic of)	245
Diego Garcia	246
Ascension	247
Seychelles (Republic of)	248
Sudan (Republic of the)	249
Rwandese Republic	250
Ethiopia	251
Somali Democratic Republic	252
Djibouti (Republic of)	253
Kenya (Republic of)	254
Tanzania (United Republic of)	255
Uganda (Republic of)	256
Burundi (Republic of)	257
Mozambique (People's Republic of)	258
Zanzibar (Tanzania)	259
Zambia (Republic of)	260
Madagascar (Democratic Republic of)	261
Reunion (French Department of)	262
Zimbabwe (Republic of)	263
Namibia	264
Malawi	265
Lesotho (Kingdom of)	266
Botswana (Republic of)	267
Swaziland (Kingdom of)	268
Comoros (Islamic Federal Republic of the)	269
South Africa (Republic of)	27
San Marino (Republic of)	295
Trinidad and Tobago	296
Aruba	297
Faroe Islands (Denmark)	298
Greenland (Denmark)	299

Spare codes

280, 281, 282, 283, 284, 285, 286, 287, 288, 289
290, 291, 292, 293, 294,

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[a] *Integrated numbering area with subdivisions:*
- Morocco: 210, 211, 212 (212 in service);
- Algeria: 213, 214, 215;
- Tunisia: 216, 217;
- Libya: 218, 219.

World numbering ZONES 3 and 4

Greece	30
Netherlands (Kingdom of the)	31
Belgium	32
France	33 [a]
Monaco	33 [a]
Spain	34
Gibraltar	350
Portugal	351
Luxembourg	352
Ireland	353
Iceland	354
Albania (Socialist People's Republic of)	355
Malta (Republic of)	356
Cyprus (Republic of)	357
Finland	358
Bulgaria (People's Republic of)	359
Hungarian People's Republic	36
German Democratic Republic	37
Yugoslavia (Socialist Federal Republic of)	38
Italy	39
Romania (Socialist Republic of)	40
Switzerland (Confederation of)	41[a]
Liechtenstein (Principality of)	41[a]
Czechoslovak Socialist Republic	42
Austria	43
United Kingdom of Great Britain and Northern Ireland	44
Denmark	45
Sweden	46
Norway	47
Poland (People's Republic of)	48
Germany (Federal Republic of)	49

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[a] Integrated numbering plan.

World numbering ZONE 5

Falkland Islands (Malvinas)	500
Belize	501
Guatemala (Republic of)	502
El Salvador (Republic of)	503
Honduras (Republic of)	504
Nicaragua	505
Costa Rica	506
Panama (Republic of)	507
St. Pierre and Miquelon (French Department of)	508
Haiti (Republic of)	509
Peru	51
Mexico	52
Cuba	53
Argentine Republic	54
Brazil (Federative Republic of)	55
Chile	56
Colombia (Republic of)	57
Venezuela (Republic of)	58
Guadeloupe (French Department of)	590
Bolivia (Republic of)	591
Guyana	592
Ecuador	593
Guiana (French Department of)	594
Paraguay (Republic of)	595
Martinique (French Department of)	596
Suriname (Republic of)	597
Uruguay (Eastern Republic of)	598
Netherlands Antilles	599

World numbering ZONE 6

Malaysia	60
Australia	61
Indonesia (Republic of)	62
Philippines (Republic of the)	63
New Zealand	64
Singapore (Republic of)	65
Thailand	66
Mariana Islands	670
Guam	671
Australian External Territories	672
Brunei Darussalam	673
Nauru (Republic of)	674
Papua New Guinea	675
Tonga (Kingdom of)	676
Solomon Islands	677
Vanuatu (Republic of)	678
Fiji	679
Palau	680
Wallis and Futuna Islands	681
Cook Islands	682
Niue Island	683
American Samoa	684
Western Samoa (Independent State of)	685
Kiribati (Republic of)	686
New Caledonia and Dependencies	687
Tuvalu	688
French Polynesia	689
Tokelan	690
F.S. of Micronesia	691
Marshall Islands	692

Spare codes 693, 694, 695, 696, 697, 698, 699

World numbering ZONE 7

Union of Soviet Socialist Republics 7

World numbering ZONE 8

Japan	81
Korea (Republic of)	82
Viet Nam (Socialist Republic of)	84
Democratic People's Republic of Korea	850
Hong-Kong	852
Macao	853
Democratic Kampuchea	855
Lao People's Democratic Republic	856
China (People's Republic of)	86 [a]
Maritime Mobile Service	87 [b]
Bangladesh (People's Republic of)	880 [c]

Spare codes 800, 801, 802, 803, 804, 805, 806, 807, 808, 809
830, 831, 832, 833, 834, 835, 836, 837, 838, 839
851, 854, 857, 858, 859
890, 891, 892, 893, 894, 895, 896, 897, 898, 899

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a) Within this national code, the Telecommunications Administration of the People's Republic of China has notified that the code 866 has been allocated to the province of Taiwan. (Reference: Notification No. 1157 of 10 December 1980.)

b) The country code 87 is reserved for the Maritime Mobile Service. The following three digit country codes are assigned: 871 INMARSAT (Atlantic), 872 INMARSAT (Pacific), 873 INMARSAT (Indian Ocean).

c) The remaining combinations in series 88 will not be allocated until the stock of spare 3-digit codes for the region is exhausted.

Turkey	90	Saudi Arabia (Kingdom of)	966
India (Republic of)	91	Yemen Arab Republic	967
Pakistan (Islamic Republic of)	92	Oman (Sultanate of)	968
Afghanistan (Democratic Republic of)	93	Yemen (People's Democratic Republic of)	969
Sri Lanka (Democratic Socialist Republic of)	94	United Arab Emirates [a]	971
Burma (Socialist Republic of the Union of)	95	Israel (State of)	972
Maldives (Republic of)	960	Bahrain (State of)	973
Lebanon	961	Qatar (State of)	974
Jordan (Hashemite Kingdom of)	962	Kingdom of Bhutan	975
Syrian Arab Republic	963	Mongolian People's Republic	976
Iraq (Republic of)	964	Nepal	977
Kuwait (State of)	965	Iran	98

Spare codes 970, 978, 979
990, 991, 992, 993, 994, 995, 996, 997, 998, 999

[a] E.A.U: Abu Dhabi, Ajman, Dubai, Fujeirah, Ras Al Khaimah, Sharjah, Umm Al Qaiwain.

ANNEX B

(to Recommendation E.163)

Rules for the assignment of spare country codes

The rules listed in this annex are provided as a basis for the most effective utilization of the spare country codes.

B.1 Single isolated 3-digit codes should be assigned prior to the assignment of any 3-digit code which is part of a series of more than two consecutive 3-digit codes.

B.2 The assignment of spare codes of a zone, both within that zone and also to another zone, will take place as follows:

a) When assigning a code to a country in the same zone:

start with the lowest numbered 3-digit codes in ascending order, e.g. 670, 680, ...

b) When assigning a code to a country in another zone:

start with the highest numbered 3-digit codes in descending order, e.g. 688, 685, ...

c) Within code 87 reserved for the Maritime Mobile Service a third digit will be assigned to codes used for maritime satellite ocean area systems, with the restriction that codes 878 and 879 may not be touched because they are reserved for national purposes.

B.3 Country codes for new international services or for the automation of some existing services should be taken from the world numbering zone with the most spare codes.

ANNEX C

(to Recommendation E.163)

List of spare country codes for the international semiautomatic and automatic service

Spare codes

280, 281, 282, 283, 284, 285, 286, 287, 288, 289
290, 291, 292, 293, 294,
693, 694, 695, 696, 697, 698, 699
800, 801, 802, 803, 804, 805, 806, 807, 808, 809
830, 831, 832, 833, 834, 835, 836, 837, 838, 839
851, 854, 857, 858, 859
890, 891, 892, 893, 894, 895, 896, 897, 898, 899
970, 978, 979
990, 991, 992, 993, 994, 995, 996, 997, 998, 999

References

[1] CCITT manual *National telephone networks for the automatic service*, ITU, Geneva, 1964, 1968, 1978.

[2] CCITT Recommendation *Accounting system in the international automatic telephone service*, Rec. D.390 R.

Recommendation E.164 [1)]

NUMBERING PLAN FOR THE ISDN ERA

1 Introduction

The rapid advances in telecommunications technology coupled with increased diversification of customer demands served by a number of different types of dedicated public switched networks (telephone, telex, data, etc.) have created a need to provide a uniform customer access and network structure. Such a structure is called the Integrated Services Digital Network (ISDN). Implementation of ISDNs have begun in a number of countries and eventually these will carry all existing and new services.

To facilitate ISDN evolution internationally, this Recommendation defines the numbering arrangements for an ISDN. The timetable for implementation of this numbering plan is described in Recommendation E.165.

2 Definitions

Within the integrated service environment, the terms used for all networks and services must be compatible and consistent. A list of terms and their definitions relating to numbering are contained in Recommendation E.160.

[1)] This Recommendation appears in the Series I Recommendations as Recommendation I.331 (Fascicle III.8).

3 ISDN numbering plan principles

3.1 *General*

The ISDN numbering and addressing principles are described in Recommendation I.330. The ISDN numbering plan will be based on and evolve from the existing numbering plans applicable to national and international public telephone networks.

In view of the evolutionary nature of ISDN, the international numbering plan should provide for substantial capacity to accommodate future network requirements.

Where multiple destinations (i.e., RPOAs/networks) serve the called party's geographic area, the national ISDN numbering arrangement in the country[2] of destination shall provide for discrimination between these RPOAs/networks. The procedure for discrimination between multiple transit-RPOAs/networks is not considered to be a destination address requirement and shall therefore be excluded from the ISDN numbering arrangements.

Before the ISDN numbering arrangement attains global penetration, it must allow for interworking between the ISDN and other public networks. Such arrangements are discussed in Recommendation E.166. Interworking with private networks shall also be taken into account. The definition of private networks and the methods of interworking are for further study and will be covered in future Series E Recommendations.

The 10 digit decimal character set 0-9 is used throughout the ISDN numbering plan format including subscriber number, national (significant) number and the country code.

Prefixes and other information concerned with identifying selection procedures or network service parameters (such as quality of service or transit delay) do not form part of the ISDN number.

The ISDN numbering plan shall include an unambiguous identification of a particular country[2]. In addition, the ISDN number will identify networks and/or ISDNs within these countries[2], if required. In doing so, it shall retain the integrity of the telephone country code as defined in Recommendations E.160 and E.163.

3.2 *Structure of the international ISDN number*

The international ISDN number is composed of a variable length of decimal digits arranged in specific code fields. The international ISDN number code fields are the country code (CC) and the national (significant) number.

The country code (CC) is used to select the destination country[2] and varies in length as outlined in Recommendation E.163.

The national (significant) number N(S)N is used to select the destination subscriber. In selecting the destination subscriber, however, it may be necessary to select a destination network. To accomplish this selection, the national (significant) number N(S)N code field comprises a national destination code (NDC)[3] followed by the subscribers number (SN).

The NDC field will be variable in length depending upon the requirements of the destination country. Each NDC may have one of the following structures:

a) a Destination Network (DN) code, which can be used to select a destination network serving the destination subscribers;

b) a Trunk Code (TC), the format of which is defined in Recommendation E.160;

c) any combination of Destination Network (DN) code and Trunk Code (TC).

The NDCs of an Administration may consist of any of the above structures.

Note – The sequences DN-TC and TC-DN are a national matter. This is a subject for further study.

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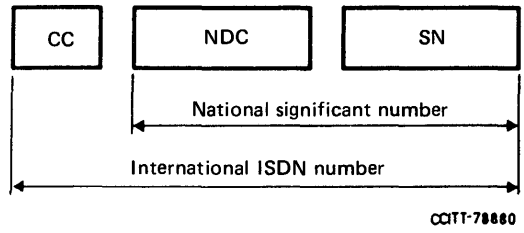
[2] Country or geographical area.

[3] See definitions in Recommendation E.160.

The subscriber's number (SN) varies in length depending on the requirements of the destination country[4] and is in accordance with Recommendation E.160.

Figure 1/E.164 shows the number structure.

Where appropriate, identification of an ISDN within the destination country[4] shall be through the use of a national destination code (NDC) incorporated in the ISDN number.



CC Country code as defined by Recommendation E.163
NDC National destination code
SN Subscriber number

Note – National and international prefixes are excluded as they are not considered to be part of the international ISDN number.

FIGURE 1/E.164

Number structure

3.3 *Number length*

The international number may be of variable length. The maximum number length shall be 15 digits. However, some Administrations may wish to increase their register capacity to 16 or 17 digits. The decision on register capacity is left as a matter to be taken by individual Administrations.

The length does not include prefixes, language digit, address delimiters (e.g., end of pulsing signals, etc.) since these items are not considered as part of the international ISDN number.

3.4 *Number analysis*

In order to determine:

- the country[4] of destination,
- the most appropriate network routing,
- the proper charging,

the originating country[4] must analyse a number of digits of the international number. The national destination code (NDC) increases the potential requirement for number analysis because it provides for a combination of either a trunk code (TC) and/or a network identification function. Careful consideration should be given to the preparation of the national destination code (NDC) assignments.

On international calls the number analysis performed at the originating country[4] need not be more than the country code and:

- three digits of the NSN in the case of a country with a three digit country code,
- four digits of the NSN in the case of a country with a two digit country code,
- five digits of the NSN in the case of a country with a one digit country code.

(Translation beyond this requirement could be arranged by bilateral agreement if required, e.g., countries assigned a 1 digit country code may require analysis of up to 6 digits beyond the country code.)

[4] Country or geographical area.

4 Number allocation principles

The assignment of country codes is administered by the CCITT, while NSN (NDC plus SN) code assignments are a national responsibility.

ISDN subscriber numbers may be allocated from the range of subscriber numbers available in the local ISDN exchange. These will be assigned to customers who subscribe only to the telephone service, customers with one or more data services and customers with a mixture of telephony and data services.

Subscribers equipped with basic access (the definition of ISDN basic access is given in the Series I Recommendations) should normally be allocated one unique number.

5 Network identification

In countries[5] served by more than one ISDN and/or Public Switched Telephone Network (PSTN) the network identification of each is a national matter.

Network identification within the national (significant) number shall be such that:

- in a country[5] all destination ISDN and PSTN networks shall operate under a single Recommendation E.163 country code,
- the international number maximum length of 15 digits shall not be exceeded, nor shall it be necessary for the number of digits for number analysis to exceed that specified in § 3.4,
- provision of network identification is not mandatory for countries using a single integrated numbering plan arrangement for their ISDNs and PSTNs.

6 Service identification

The ISDN number by itself will not identify the particular nature of the service, type of connection or quality of service required. An indication of parameters describing the service required by the calling terminal will be included in a service identifier in the signalling information. This service identifier is not considered to be part of the numbering plan.

7 Calling/called line identity[6]

Calling/called line identity (CLI/CDLI) is address information which is passed across the network to provide supplementary services such as calling (or called) line identification presentation. The format of the CLI and CDLI for international calls should be the full international number, i.e., Country Code (CC), National Destination Code (NDC) and Subscriber Number (SN). No other information, such as prefixes or symbols (e.g. "+"), should be included, although a subaddress may be associated with the CLI/CDLI.

8 Dialling procedures

The subscriber dialling procedures for local, national and international calls shall be in accordance with Recommendation E.163. However, subscribers' control procedures for supplementary services will be as defined in Recommendation E.131 or in separate Recommendations for each service.

ISDN subscribers will always be called by the same subscriber number irrespective of where in the network the call originates. For calls in the same numbering area or local network the subscriber number alone is dialled. For national calls between numbering areas or local networks the subscriber number may be preceded by the national prefix and the national destination code.

The addressing procedures for calls using sub-addressing are described in § 11.

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[5] Country or geographical area.

[6] This termiminology needs further study.

9 Prefixes

The use of prefixes shall be in accordance with Recommendations E.160, E.163 and E.166. Where necessary, prefixes can also be used for network and service selection.

10 Escape code

The use of the digit "0" as an escape code for numbering plan interworking is described in Recommendation E.166.

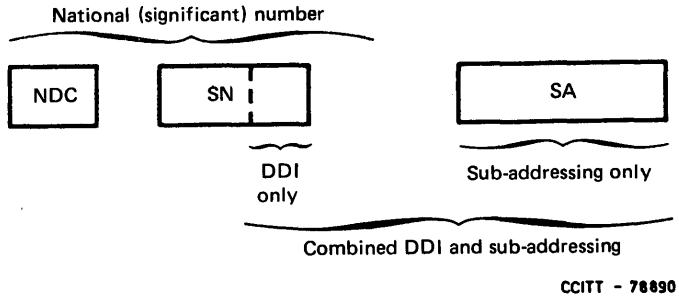
11 Address information

Identification within a subscriber's installation of a point beyond that defined by the ISDN number requires the transfer of address information from the public network to the subscriber's equipment. The following methods apply:

11.1 *Direct dialling-in*

With direct-dialling-in (DDI) the last few digits forming the end of the ISDN subscriber number are transferred to the called subscriber's installation (see Figure 2/E.164). The number of digits used varies and depends upon the requirements of the called subscriber's equipment and the capacity of the numbering plan used.

ISDN subscriber numbers used for DDI may be those published in the public directory.



NDC National destination code
SN Subscriber number
SA Sub-address

FIGURE 2/E.164

11.2 *Sub-addressing (network address extension)*

Sub-addressing provides a separate additional addressing capacity outside the ISDN numbering plan but constitutes an intrinsic part of the ISDN addressing capabilities. As shown in Figure 2/E.164, up to 20 octets (or 40 digits) may follow the ISDN number and form the ISDN sub-address, which is transferred to the equipment at the subscriber's premises.

When required, the sub-address is sent by the calling party within the call set-up procedure and is passed transparently through the network as a separate entity from both the ISDN number and user-to-user information. Sub-address information is not required to be processed within the public network.

Sub-addressing procedures are the subject of a separate Recommendation.

11.3 *Combination of sub-addressing and direct dialling-in*

Sub-addressing may be used separately or in combination with DDI (see Figure 2/E.164).

11.4 *Address delimiters*

DDI address information may contain an "end of address" (e.g., ST) delimiter. In the case of sub-addressing, an "end of subscriber number/beginning of sub-address" delimiter and the "end of address" delimiter are required.

(The use of an address delimiter at the end of an ISDN address is for further study.)

Recommendation E.165

TIMETABLE FOR COORDINATED IMPLEMENTATION OF THE FULL CAPABILITY OF THE NUMBERING PLAN FOR THE ISDN ERA (RECOMMENDATION E.164)

1 Introduction

Recommendation I.330 describes ISDN numbering and addressing principles, while Recommendation E.164 describes the numbering plan for the ISDN era. Recommendation E.164 also identifies the need for interworking arrangements between ISDN and present dedicated networks.

This Recommendation sets a specific time (Time *T*), after which all ISDNs and PSTNs can use the full capability of Recommendation E.164, "Numbering plan for the ISDN era", and identifies the numbering requirements on ISDNs and on dedicated networks intending to interwork with ISDNs, before and after Time *T*.

Among the significant principles which form the basis for this Recommendation, the following are considered especially useful for ready reference:

- An E.163/E.164 telephony subscriber may become an ISDN subscriber without a number change.
- Numbers according to Recommendation E.164 apply to both PSTN and ISDN subscribers in the ISDN era. A mixture of PSTN and ISDN terminations on the same exchange is allowed.
- E.164 numbering arrangements may be used to distinguish between ISDN and PSTN subscribers. This is not necessary but is allowed, provided that possible effects on routing and digit analysis remain within the limits of Recommendation E.164.

2 Application and evolution of Time *T*

ISDNs are expected to interwork with dedicated networks. However, due to the different addressing capabilities between the ISDN and existing numbering plans, some temporary constraints need to be imposed on the number length and digit analysis required to access the user network interfaces of the ISDNs before Time *T*.

2.1 *Numbering constraints before Time T*

2.1.1 *ISDNs interworking with dedicated networks*

To allow numbering plan interworking with dedicated networks before Time *T*, an ISDN will not assign international E.164 numbers longer than 12 digits to its user network interfaces capable of receiving calls from dedicated networks.

In addition, for ISDNs and PSTNs, digit analysis as defined in Recommendation E.163 will apply.

2.1.2 *ISDNs which do not interwork with dedicated networks*

These ISDNs are allowed to assign numbers to user network interfaces according to the full capability of the numbering plan for the ISDN era.

Digit analysis according to Recommendation E.164 may be required to access user network interfaces connected to these networks.

2.2 *Evolution after Time t*

After Time *T*, ISDNs and PSTNs can make use of the full capability of E.164 numbers to identify their user network interfaces and terminals respectively. In addition, for routing purposes, the ISDNs and PSTNs conforming to Recommendation E.164 must be capable of analysing the ISDN international number to the extent required in that Recommendation.

Note – Digit analysis for other dedicated networks is for further study.

3 Date of Time *T*

The date for Time *T* has been set for 31 December 1996 at 23h59m Coordinated Universal Time UTC).

4 Network requirements at Time *T*

ISDNs and PSTNs supporting number length and digit analysis as described in Recommendation E.164 are said to be "E.164-conforming" networks.

All ISDNs must be E.164-conforming networks. Functions associated with E-164-conforming networks are:

a) for calls originated within such a network, provision for carrying E.164 numbers of up to 15 digits to interfacing networks;

b) comparable treatment for transit calls;

c) capability for conducting digit analysis for ISDNs and PSTNs as indicated in Recommendation E.164;

d) screening to ensure that, taking into account agreements between the networks concerned, no transit calls are offered to non-conforming networks incapable of handling number lengths as defined in Recommendation E.164;

e) provision of interim procedures, such as two-stage selection, for internal network sources, e.g., local exchanges, not equipped to handle 15 digits, so that all internal network sources can originate calls to all E.164 addresses.

Note 1 – Other requirements on conforming networks are for further study. Non-conforming networks may seek bilateral agreements with conforming networks, or adopt intra-network procedures to provide means by which subscribers of the non-conforming networks may originate calls to subscribers connected to ISDNs and PSTNs requiring a number length or analysis in excess of the capabilities of the non-conforming network.

Note 2 – Limitations of non-conforming networks and interworking procedures are for further study.

Recommendation E.166

NUMBERING PLAN INTERWORKING IN THE ISDN ERA

1 Introduction

1.1 Numbering plan interworking is a fundamental requirement for successful completion of calls routed between networks using different numbering plans, e.g., calls routed between an ISDN using the Recommendation E.164 numbering plan and a public data network (PDN) using the X.121 numbering plan.

1.2 This Recommendation is one of a set of CCITT Recommendations that address numbering plan interworking procedures for calls between terminals connected to an ISDN and terminals connected to a dedicated network. The term "dedicated network" in the context of this Recommendation includes: public switched telephone network (PSTN), packet switched public data network (PSPDN), circuit switched public data network (CSPDN) and telex network.

1.3 This Recommendation is related to and is compatible with the following Recommendations:

- Rec. E.160: Definitions relating to national and international numbering plans
- Rec. E.163: Numbering plan for the international telephone service
- Rec. E.164: Numbering plan for the ISDN era
- Rec. E.165: Timetable for coordinated implementation of the full capability of the numbering plan for the ISDN era
- Rec. F.69: Plan for telex destination codes
- Rec. I.330: ISDN numbering and addressing principles
- Rec. I.332: Numbering principles for interworking between ISDNs and dedicated networks with different numbering plans
- Rec. Q.931: ISDN user-network interface layer 3 specification
- Rec. Q.761-Q.764: Signalling System No. 7 – ISDN User Part
- Rec. U.202: Requirements to be met in providing telex service within the ISDN
- Rec. X.121: International numbering plan for public data networks
- Rec. X.122: Numbering plan interworking between a packet switched public data network (PSPDN) and an integrated services digital network (ISDN) or public switched telephone network (PSTN) in the short-term

2 Scope

2.1 The scope and application of this Recommendation includes the following numbering plan interworking and address signalling scenarios indicated in Figure 1/E.166, i.e., interworking for calls from an ISDN terminal to:

a) an ISDN terminal on another ISDN to provide an ISDN service as defined in the I-200 Series of Recommendations;

b) a voice terminal on a PSTN, for voice services;

c) a data terminal on a PSTN, for voice-band data services;

d) a data terminal on a PSPDN, for packet switched data services;

e) a data terminal on a CSPDN, for circuit switched data services;

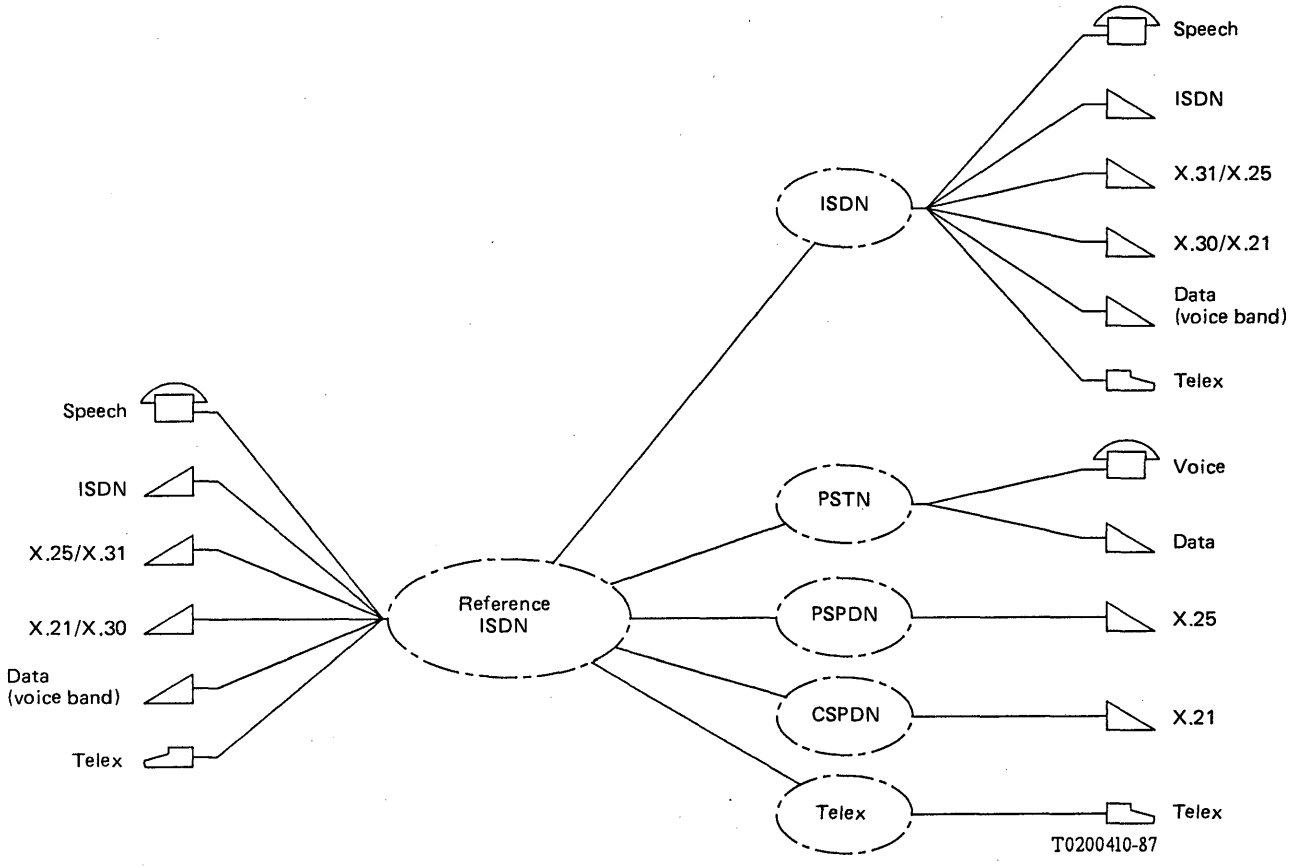
f) a telex terminal on a telex network, for telex services defined in Recommendation F.60.

2.2 The term "ISDN terminal" is used here in a generic sense, i.e., an integrated terminal that can support one or more services as per the I-200 Series Recommendations using the Q.931 protocol, and may include the services provided by the dedicated networks under cases b) to f) above. This functionality may be provided by using appropriate existing terminals with terminal adaptors (TA) supporting requisite protocols, e.g., an X.25 terminal with a TA supporting protocol defined by Recommendation X.31/I.462 for packet switched data services.

2.3 The following interworking cases need to be considered, based on the terminal/TA combinations on the originating and destination networks:

a) calls from a speech terminal on ISDN to:
   - a speech terminal on another ISDN,
   - a voice terminal on a PSTN.

b) calls from an X.25 terminal on an ISDN to:
   - an X.25 terminal on another ISDN,
   - an X.25 terminal on a PSPDN,
   - an X.25 terminal on a PSTN,
   - an X.25 terminal on a CSPDN,
   - a telex terminal on a telex network.



Note 1 – Interworking scenarios that involve transit networks are not shown in this Figure.
Note 2 – Some of the cases in this Figure do not involve numbering plan interworking.
Note 3 – Non-ISDN terminals access ISDN through appropriate terminal adapters.

FIGURE 1/E.166

Scenarios for interworking with ISDNs

c) calls from an X.21 terminal on an ISDN to:
   - an X.21 terminal on another ISDN,
   - an X.21 terminal on a CSPDN.

d) calls from a voice-band data terminal on an ISDN to:
   - a voice-band data terminal on another ISDN,
   - a voice-band data terminal on a PSTN.

e) calls from a telex terminal on an ISDN to:
   - a telex terminal on a telex network.

2.4 The primary focus of this Recommendation is to specify the numbering plan interworking and/or address signalling methods for:

- calls originated in an ISDN for terminals on another ISDN, or terminals on a dedicated network, and
- calls originated in a PSTN for terminals on an ISDN.

This Recommendation complements other CCITT Recommendations (e.g., Recommendation X.122) which focus on numbering plan interworking for calls originated from terminals on dedicated networks (other than PSTN) and which are intended for compatible terminals on an ISDN.

2.5 For the purposes of this Recommendation, ISDNs can, where appropriate, be assumed to provide both ISDN and PSTN access. In this case, the originating ISDN will generally be unable to differentiate between the two types of access in the terminating network based on the called E.164 number.

It is the responsibility of the terminating network to establish appropriate bilateral arrangements to ensure successful interworking to serve both its ISDN and PSTN customers.

3 Interworking arrangements

3.1 To allow an ISDN subscriber to set up calls intended for completion on other networks, the following two basic methods are available:

3.1.1 *Single stage method*

Interworking by using single stage dialling (or equivalent) is achieved by an arrangement where the calling party accesses a different type of network by selecting a numbering plan indicator, e.g., NPI (numbering plan identifier in Recommendation Q.931) or an escape code consisting of one or more digits (see Recommendation E.160 for definition of escape code), which determines the type of destination network (i.e., its numbering plan). The NPI and/or escape code is then followed by the address of the called terminal on the destination network. The originating network provides the necessary intelligence to route the call to the appropriate interworking function (IWF), to ensure delivery of the call to the destination network.

3.1.2 *Two-stage method*

The two-stage selection method of interworking is an arrangement wherein the first stage of selection establishes a connection from the calling subscriber's terminal to an IWF associated with a point-of-presence of, or gateway to, the desired destination network or an appropriate transit network. To gain access to the IWF, the calling subscriber uses selection procedures assigned to the IWF within the originating network, i.e., the IWF is assigned a number from the numbering plan of the originating network.

When the first connection has been established, the IWF sends a response to the calling terminal. Upon receipt of this response, the calling subscriber is required to input, as a second stage of selection, the address information of the called terminal in the destination network. This second called address information is passed transparently through the originating network and the IWF to the receiving equipment on the destination network. Having received the second address, conforming to the numbering plan of the destination network, the destination network will establish a connection from the IWF to the called terminal, thus completing the connection from the originating terminal to the destination terminal.

3.2 The choice of the numbering plan interworking arrangement should ensure that the impact on the user is minimized and there is no requirement for complex selection procedures. Single-stage methods are therefore recommended for numbering plan interworking between ISDN and dedicated networks. Solutions adopted to achieve this interworking arrangement for short-term and long-term applications are covered in subsequent sections. The short-term and long-term are time frames related to Time T as specified in Recommendation E.165.

3.3 Special situations in which two-stage interworking arrangements may apply and corresponding partitioning of responsibilities between originating, transit and destination networks are for further study.

3.4 It is recognized that some Administrations may not be able to offer interworking capability for international traffic. Bilateral arrangements may therefore be required to provide interworking capability. Because of administrative difficulties, interworking should not be performed across the international boundary, unless no other interworking possibilities exist.

3.5 Some networks may select other interworking arrangements, such as operator assistance, to complete the call. The need to standardize such interworking arrangements is for further study.

4 Interworking evolution

4.1 The recommended long-term numbering plan interworking solution is based on the NPI/TON field in the ISDN call set-up message as defined in Recommendation Q.931. The NPI element is the numbering plan identifier (e.g., Recommendation E.164/E.163, X.121, F.69), whereas the TON indicates the type of number (e.g., local, national, international). This NPI/TON field will be carried as part of the call set-up message to the originating exchange, which will use this information to route the call. The NPI element will also be available within the network as part of the address message in S.S. No. 7 ISUP.

4.2 The network capabilities in terms of digit storage, digit analysis and signalling protocols to implement the NPI-based interworking solutions on a global basis will not be available in the short term. Thus, a single-stage method for numbering plan interworking in the short term, and a timetable for planned evolution to the NPI/TON-based, long-term solution have been proposed (see Recommendation E.165).

4.3 The short-term, single-stage interworking arrangements will use prefixes and escape codes to indicate the type of number and numbering plan of the destination network, respectively. Definitions of prefixes and escape codes are contained in Recommendation E.160. As indicated in Recommendation E.160, prefixes are not part of the number and are not signalled over internetwork or international boundaries so that they are not subject to international standards. Escape codes, however, may be carried forward through the originating network and across internetwork and international boundaries. Therefore, the values of escape codes need to be standardized.

Table A-1/E.166 summarizes the escape codes recommended by CCITT for numbering plan interworking. Note that escape codes for interworking between ISDNs and PSTNs are not required because the PSTN numbering plan (Recommendation E.163) is a subset of the numbering plan for the ISDN era. (Recommendation E.164).

There may be cases when a standardized escape code is numerically equal to a prefix already in use in the network. In such cases, an optional network-specific digit(s) other than the standardized escape code may be used, and the translation from the optional-network-specific digit(s) to the standardized escape code is performed by the network.

To facilitate short-term interworking (using escape codes) between ISDNs and existing dedicated networks, Recommendation E.165 specifies that the international numbers assigned to ISDN user-network interfaces will be restricted to a maximum of twelve digits till Time *T*. Time *T* is specified in Recommendation E.165. After time *T*, ISDNs can implement the full capability of the ISDN numbering plan (Recommendation E.164). Recommendation E.165, and the date specified for time *T*, provide guidelines for evolution towards full ISDN numbering and numbering plan interworking capabilities.

4.4 The numbering plan interworking solutions in this Recommendation are categorized as short-term (pre-Time *T*, using escape codes) and long-term (post- Time *T*, using NPI/TON). It is however envisaged that, based on their individual network evolution plans, some Administrations will implement the NPI/TON-based interworking solutions prior to Time *T*. Introduction of NPI/TON-based interworking in a given network prior to Time *T* should not impose any specific requirements on networks not supporting NPI/TON for interworking, unless bilaterally agreed.

4.5 The man-machine interface procedures used with ISDN terminals to indicate the appropriate NPI and TON are for further study.

5 Representative interworking scenarios

5.1 This section provides single-stage interworking solutions for a number of representative interworking scenarios. The scenarios presented are not exhaustive.

5.2 It is assumed that all ISDNs and ISDN terminals will support the NPI/TON feature from their inception and that a NPI/TON equivalent feature will be available in PDNs by Time *T*, if not earlier.

5.3 The interworking scenarios presented in this section assume that the called and calling numbers represent international number formats in the appropriate numbering plans. Partitioning of the international number for local and national calls and the associated prefixes are a national matter and are not indicated in the interworking solutions.

5.4 The interworking cases addressed in Figures 2/E.166 to 11/E.166 are indicated by the boxes with numbers in the matrix of Table 1/E.166, where the numbers in the boxes refer to the appropriate Figures (2/E.166 to 11/E.166). Other numbering plan interworking scenarios are for further study.

TABLE 1/E.166

Matrix of interworking cases and the figures in which they are shown

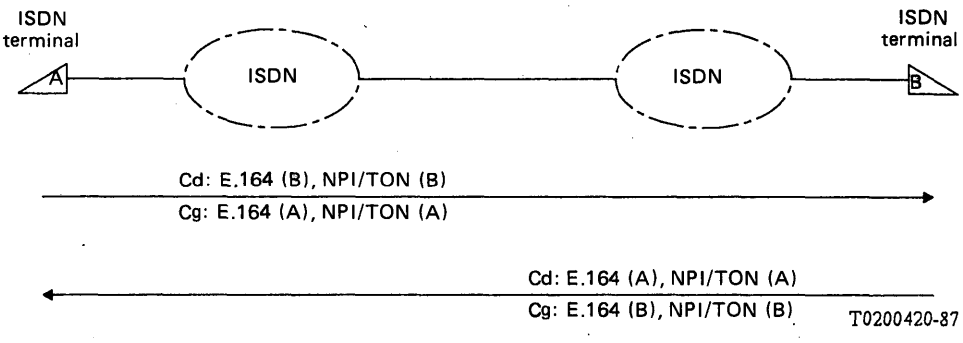
Networks	Terminals	ISDN				
		ISDN	V Series	Rec. X.25	Rec. X.21	Telex
ISDN	ISDN	2				
	V Series					
	Rec. X.25			6, 10		
	Rec. X.21					
	Telex					
PSTN	Voice	3				
	V Series		4			
	Rec. X.25			5		
PSPDN	Rec. X.25			7, 11		
CSPDN	Rec. X.21				8	
Telex	Telex					9

5.5 The following abbreviations are used in Figures 2/E.166 to 11/E.166 which contain short-term and long-term interworking solutions for representative configurations:

Cd Called number
Cg Calling number
IWF Interworking function
PH Packet handler
M Modem
NPI/TON Numbering plan identifier/Type of number feature as defined in Recommendation Q.931
CRP Call request packet in Recommendation X.25
TA Terminal adapter

Note – As stated in Recommendation X.25, presence of the calling number, i.e., address (Cg) in the call request packet (CRP) is not mandatory. However, even when it is given by the calling terminal, this does not preclude the network from checking and possibly modifying this information, e.g., for security reasons.

5.6 Interworking solutions in the reverse direction, i.e., dedicated networks to ISDN, are also indicated in Figures 2/E.166 to 11/E.166. However, except for PSTN to ISDN calls, these may also be the subject of complementary CCITT Recommendations (e.g., Recommendation X.122).

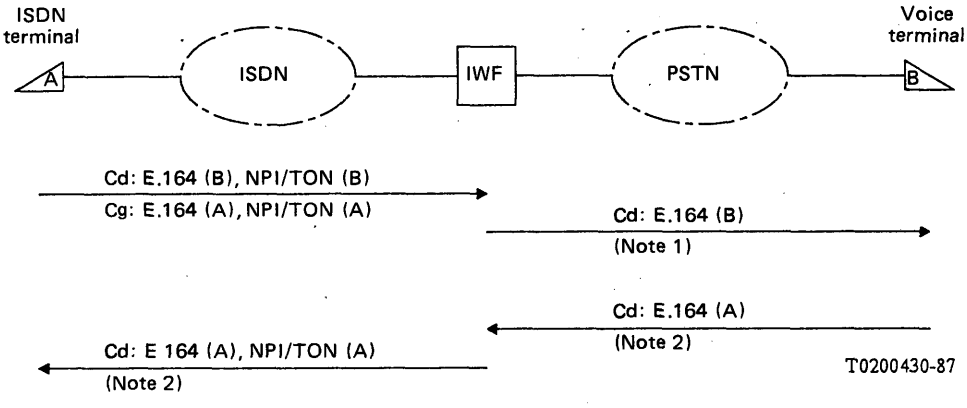


Note 1 – This scenario represents the case of generic ISDN terminals which support NPI/TON features defined in Recommendation Q.931 and are capable of supporting all ISDN services per I-Series Recommendations.

Note 2 – In the short term, the NPI/TON capabilities are not available in the X.25 protocol used to handle packet mode calls. Work is in progress to provide NPI/TON in X.25.

FIGURE 2/E.166

Address signalling between ISDNs (except short-term packet mode)



Note 1 – The PSTN terminal (B) may not receive the calling party (A) number.

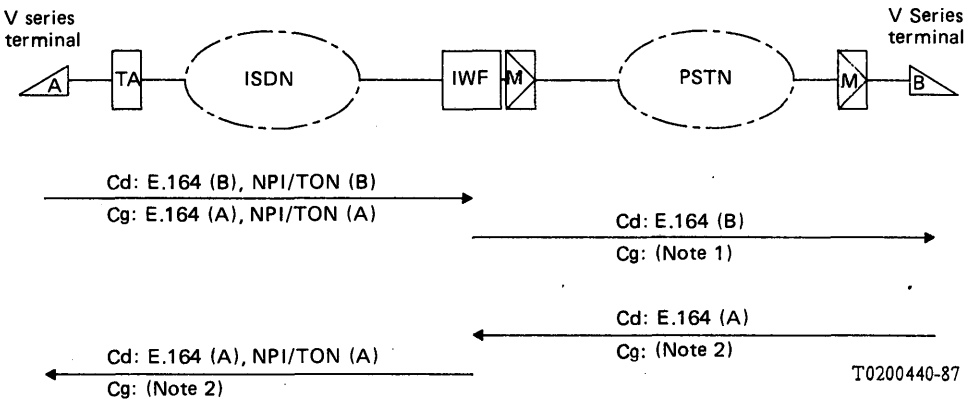
Note 2 – For calls originated on the PSTN, calling number (B) may not be passed to the ISDN.

Note 3 – Since E.163 numbers are a subset of E.164 numbers, only E.164 numbers are indicated.

Note 4 – In the short-term, the length of the E.164 numbers will be restricted to 12 digits as per Recommendation E.165.

FIGURE 3/E.166

Address signalling between ISDN and PSTN for voice service (short-term and long-term)



Note 1 – The PSTN terminal (B) may receive the calling party (A) number if appropriate signalling and terminal functionality is available.

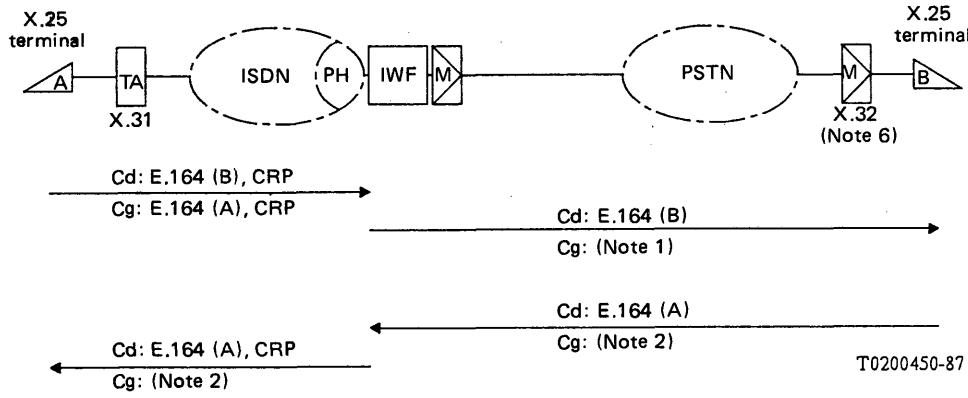
Note 2 – For calls originated on the PSTN, the calling number (B) may not be provided to the called terminal (A).

Note 3 – Since E.163 numbers are a subset of E.164 numbers, only E.164 numbers are indicated.

Note 4 – Modem selection procedures are not part of this Recommendation.

FIGURE 4/E.166

Address signalling between ISDN and PSTN for voice band data services (short-term and long-term)



Note 1 – The PSTN terminal (B) may receive the calling party (A) number if appropriate signalling and terminal functionality is available.

Note 2 – For calls originated in the PSTN, the calling number (B) may not be provided to the called terminal (A).

Note 3 – Since E.163 numbers are a subset of E.164 numbers, only E.164 numbers are indicated.

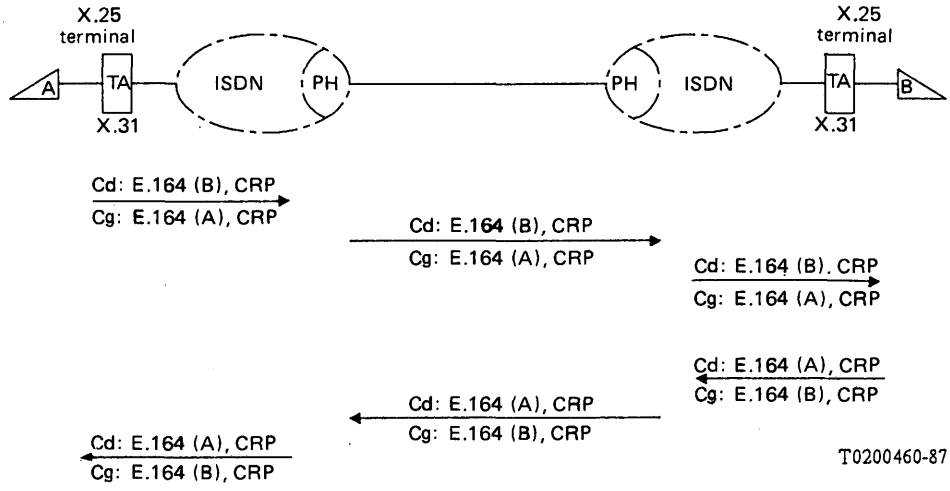
Note 4 – Under X.31 procedures, the TA will establish the connection to the PH prior to receiving the CRP which is passed transparently to the PH, and which will carry the E.164 (B) number.

Note 5 – Modem selection procedures are not part of this Recommendation.

Note 6 – Use of X.32 type procedures for PSTN access to ISDN for X.25 terminals is for urgent further study (see also Annex B).

FIGURE 5/E.166

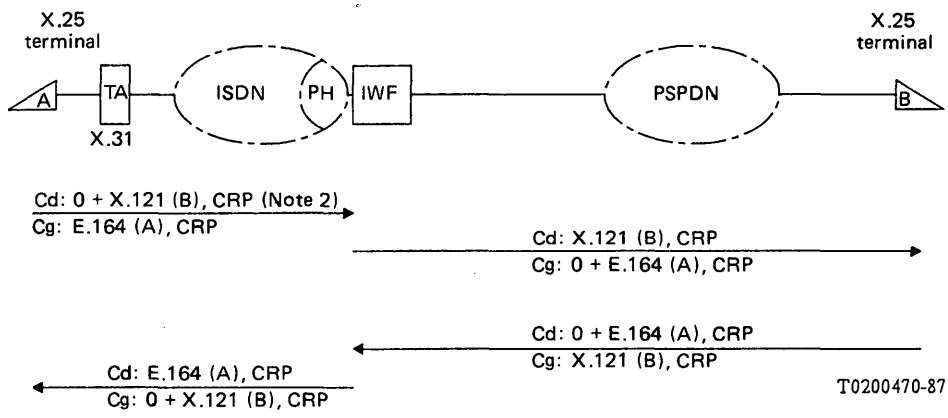
Address signalling between ISDN and PSTN for packet data services (short-term)



Note – Under X.31 procedures, the X.25 call request packet (CRP) will carry the called and calling numbers.

FIGURE 6/E.166

Address signalling between ISDNs for packet data service (short-term)



Note 1 – The PH is required to remove and insert escape code digit(s) as appropriate.

Note 2 – Optional network-specific digit(s) which represent the same functionality as the internationally agreed escape code (digit 0) may be used. Translation from prefix to escape code '0' must be performed by the originating network (PH) prior to advancing the call. The choice of these optional network-specific digit(s) is a national matter.

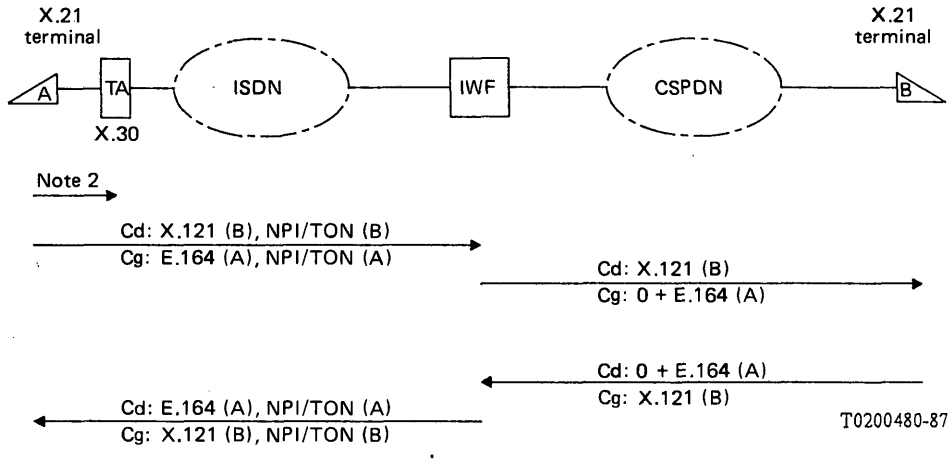
Note 3 – The X.25 CRP will carry the E.164 (A) address.

Note 4 – Under some implementations (refer to Recommendation X.121) escape code digit 9 may also be used.

Note 5 – The ISDN customer may be able to utilise a variety of services offered by the PSPDN by dialling an X.121 number. In some situations the X.121 number may mean 9/0 + E.164 number (see Annex B).

FIGURE 7/E.166

Numbering plan interworking between ISDN and PSPDN for packet data services (short-term)



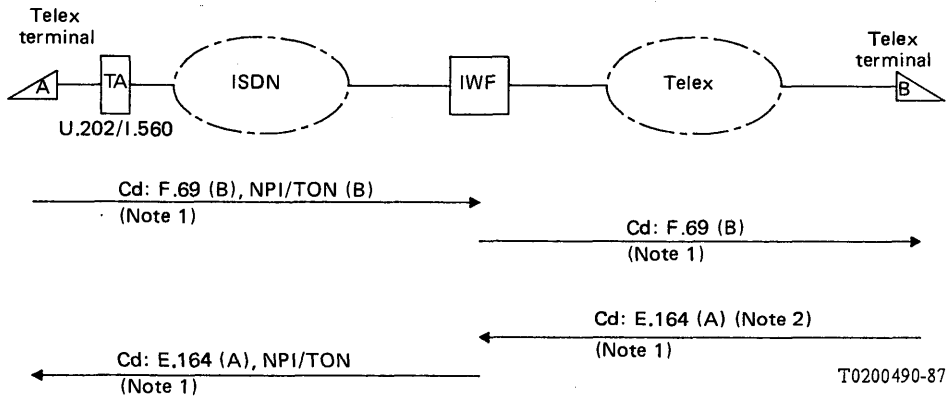
Note 1 – It is understood that the signalling protocol mapping function implemented in the X.30 TA will support the NPI/TON feature as defined in Recommendation Q.931.

Note 2 – The X.30 TA provides mapping from the X.21/X.21 *bis* protocol to the D-channel protocol.

Note 3 – The numbering plan interworking procedures from the CSPDN to the ISDN in this configuration require further study and confirmation.

FIGURE 8/E.166

Numbering plan interworking between ISDN and CSPDN for circuit switched data services (short-term and long-term)



Note 1 – After the connection has been established, the calling party information may be transferred through the exchange of answerback codes as per Recommendation F.60.

Note 2 – The use of a prefix or escape code from F.69 to E.164 requires further study. Two-stage selection may apply in the interim period.

Note 3 – Numbering plan interworking procedures for this configuration require further study and confirmation.

FIGURE 9/E.166

Numbering plan interworking between ISDN and telex networks for telex service (short-term)

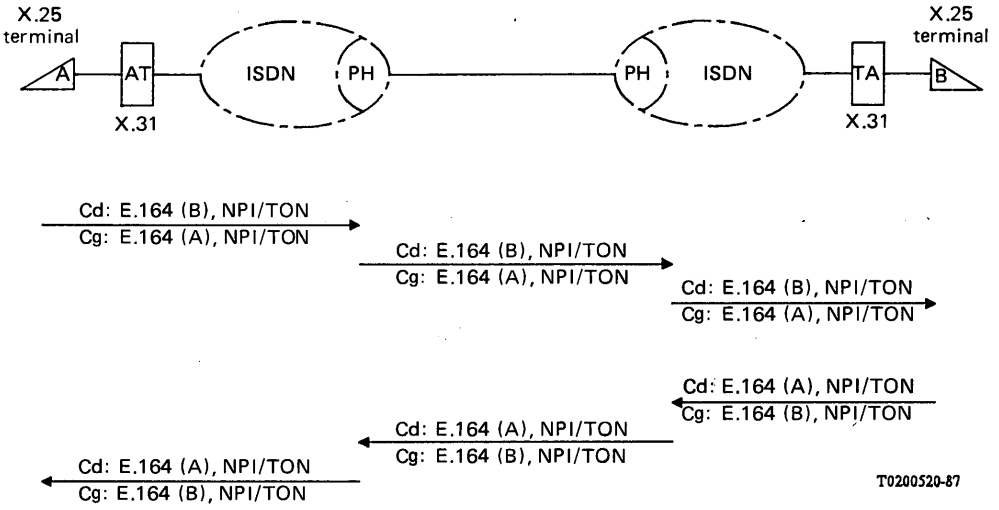


FIGURE 10/E.166

Address signalling between ISDNs for packet data service (long-term)

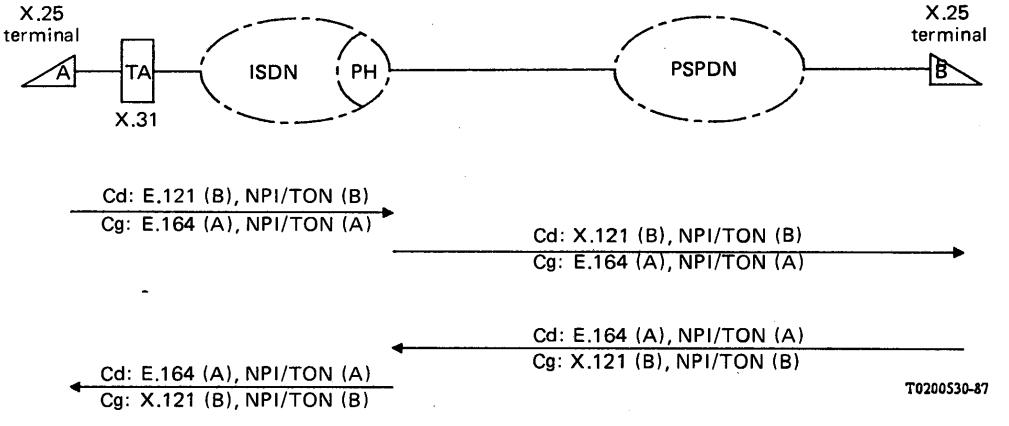


FIGURE 11/E.166

Numbering plan interworking between ISDN and PSPDN for packet data services (long-term)

5.7 The location of the IWF and PH symbols in the diagrams does not imply a fixed position in the network or place any limitations on their functionalities.

ANNEX A

(to Recommendation E.166)

Escape codes for numbering plan interworking

Table A-1/E.166 summarizes the escape codes that are recommended for interworking between different CCITT-defined numbering plans referred to in this Recommendation.

TABLE A-1/E.166

Recommended escape codes for numbering plan interworking

From	To	Escape code	Remarks
ISDN (Rec. E.164)	PSPDN (Rec. X.121)	'0'	Note 1
ISDN (Rec. E.164)	CSPDN (Rec. X.121)	–	Need for an escape code is for further study
PDN (Rec. X.121)	ISDN (Rec. E.164)	'0'	Note 2
Telex (Rec. F.69)	ISDN (Rec. E.164)	–	Need for an escape code is for further study

Note 1 – Use of escape code digit '0' for ISDN to PSPDN numbering plan interworking is restricted to packet data calls originated from an X.25 DTE on an ISDN using an X.31 TA and are a short-term (up to time *T* defined in Recommendation E.165) measure.

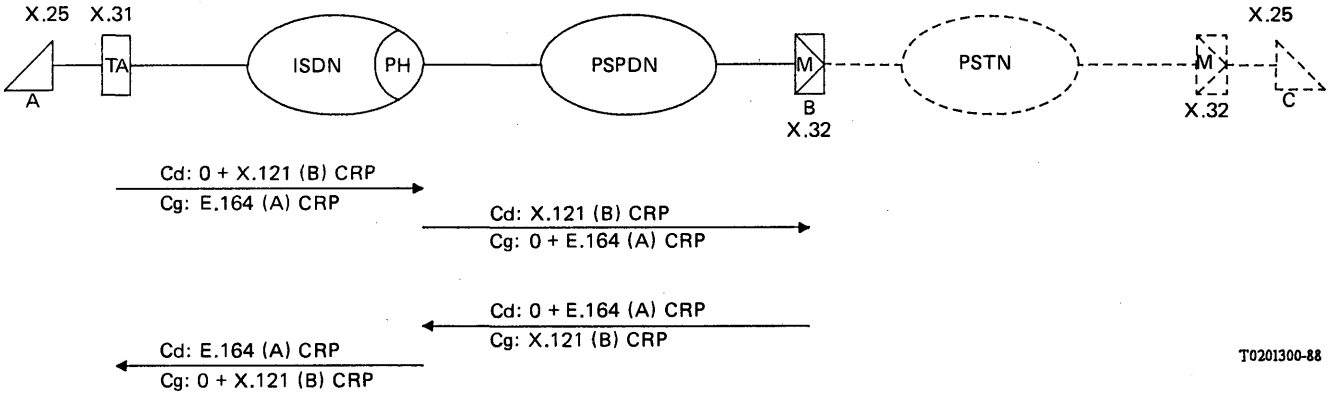
Note 2 – Under certain implementation, escape code digit '9' may also be used (see Recommendation X.121).

ANNEX B

(to Recommendation E.166)

Additional short-term numbering plan interworking scenarios for packet-data services

The following scenarios may be used in special circumstances in the short term:



Note 1 – Meaning of abbreviations are given in § 5.5.

Note 2 – Refer to Recommendations X.122 and X.32 for further details.

Note 3 – The PH is required to remove and insert escape code digit(s) as appropriate.

Note 4 – Optional network-specific digit(s) which represent the same functionality as the internationally agreed escape code (digit 0) may be used. Translation to escape digit '0' must be performed by the originating network (PH) prior to advancing the call. The choice of the optional network-specific digit(s) is a national matter.

Note 5 – X.25 CRP will carry the E.164 (A) address.

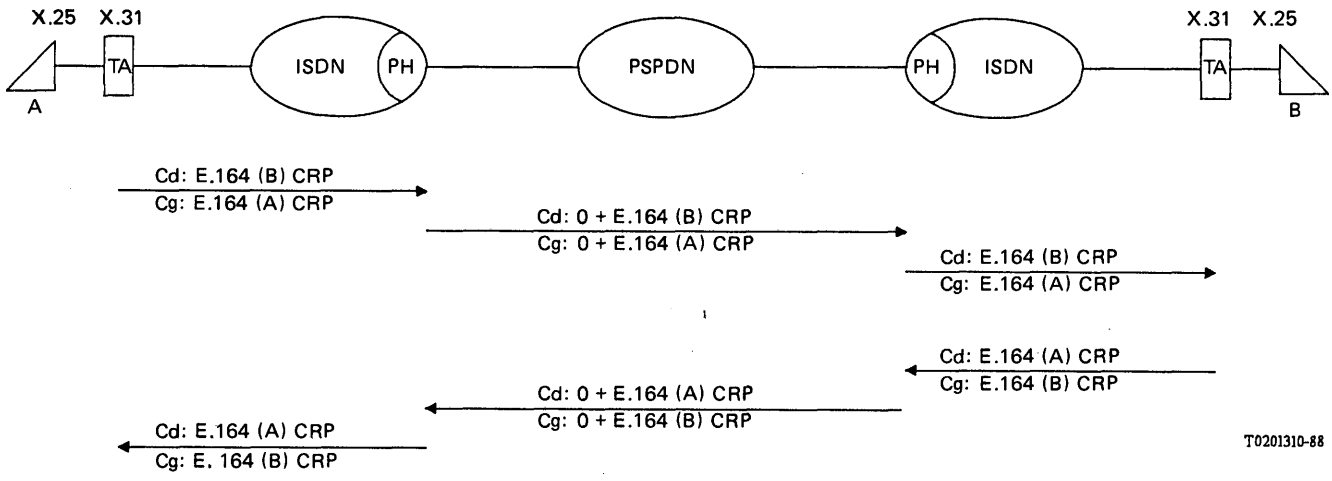
Note 6 – Under some implementations, for PSPDN to ISDN calls, escape code 9 may also be used (refer to Rec. X.121).

Note 7 – Currently, there are no CCITT procedures (similar to X.32) for direct ISDN-PSTN interworking for packet-mode services. Such procedures are for urgent further study.

Note 8 – In the case of this Figure, the ISDN customer may be able to utilize services offered by the PSPDN. In some implementations the X.121 number may mean 9/0 + E.164 (C) number.

FIGURE B-1/E.166

Numbering plan interworking between ISDN and PSPDN for packet data services when the PSPDN destination is a modem serving a PSTN subscriber (short-term)



Note 1 – Meaning of abbreviations are given in § 5.5.

Note 2 – The ISDN PHs are required to insert and remove escape code digits as appropriate.

FIGURE B-2/E.166

Numbering plan interworking between two ISDNs with a PSPDN as a transit network for packet data services (short-term)

Recommendation E.167

ISDN NETWORK IDENTIFICATION CODES

1 General

This Recommendation presents the interim structure for the ISDN Network Identification Code (INIC) that is used to identify an ISDN network in Closed User Group (CUGs) and in certain X.75 utilities. The interim INIC does not form any part of an E.164 number.

The structure of a permanent INIC has not been agreed, and is for urgent further study.

2 Usage

2.1 *Closed user groups*

The format of the Interlock Code (IC) in Signalling System No. 7 is based on the format defined in Recommendation X.180 concerning closed user group utilities and used in Recommendation X.75, i. e., a 32 bit code divided into two parts. Part A is 16 bits and is coded to identify a 4 digit number, and Part B is coded as a 16 bit equivalent of a decimal number.

Part A will consist of an interim INIC [or a Data Network Identification Code (DNIC)] to identify the individual ISDN (or PDN) that is responsible for administering the closed user group (CUG). Part A of the IC contains space for a string of 4 decimal digits. The interim INIC thus is a string of 4 digits beginning with a digit that distinguishes interim INICs from any DNIC.

2.2 *X.75 utilities*

The interim INIC can be used to identify an ISDN in the TNIC (Transit Network Identification Code) and CNIC (Clearing Network Identification Code) CUG utilities of the X.75 protocol.

3 Format of the interim ISDN network identification code

3.1 *Definition*

The **interim INIC** is a string of 4 digits. Each different string of digits may be used to identify an individual ISDN. The first digit I distinguishes the INIC from a DNIC. This digit is followed by the country code from the E.163/E.164 numbering plan which has a length of one, two or three digits (see Recommendation E.163). The E.163/E.164 country code is followed by enough additional digits, X, to make the total length of the INIC 4 digits. The format is shown in Table 1/E.167.

TABLE 1/E.167

Format of the interim INIC

I is the initial digit, C is a digit of the country code
and X is an additional digit

Country code	INIC Format
One digit	ICXX
Two digits	ICCX
Three digits	ICCC

3.2 *Digit I*

The digit I may be 0 or 9. The use of the digits 8 and 1 as the digit I requires further study.

3.3 *Additional digits*

Each additional digit is a digit in the range 0 to 9.

3.4 *Other formats*

The formats 00XX and 90XX could provide for 200 additional INICs not associated with specific country codes. These are for further study.

3.5 *Administration*

Each unique combination of digit I, country code, and additional digit(s) can identify a different ISDN, or part of an ISDN.

The Administration to which the country code has been assigned is responsible for administering the digit I and the additional digit(s).

Within each country, it is suggested that the INICs beginning with the digit I = 0 be assigned first, followed by INICs beginning with the digit I = 9.

3.6 *Duration of the interim definition*

The interim INIC is for immediate use. Its use will continue until a permanent definition has been agreed to, and a period beyond that to allow a transition to the use of the permanent definition.

4 Further usage

While other uses of the interim INIC are possible, proponents of such use are strongly urged to consider that their implementation should be easily adaptable to the permanent format of the INIC.

5 Format of the permanent ISDN network identification code

The definition of the permanent format of the INIC is for urgent further study.

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SECTION 6

INTERNATIONAL ROUTING PLAN

Recommendation E.170

TRAFFIC ROUTING

1 Introduction

1.1 *Objective of traffic routing*

The objective of routing is to establish a successful connection between any two exchanges in the network. The function of traffic routing is the selection of a particular circuit group, for a given call attempt or traffic stream, at an exchange in the network. Thus, the selection of individual circuits within a circuit group is not considered in this Recommendation. The choice of a circuit group may be affected by information on the availability of downstream elements of the network.

1.2 *Scope of Recommendation*

This Recommendation takes account of the range of new traffic routing and control techniques which are provided by stored program controlled (SPC) exchanges and common channel signalling systems.

Additional routing information is contained in Recommendation E.171 (International telephone routing plan) and Recommendation E.172 (Call routing in the ISDN era).

Failure or overload conditions may require temporary changes to routing patterns or algorithms. This is considered to be a network management action and is described in the E.400 Series Recommendations.

1.3 *Network topology*

1.3.1 *Network elements*

A network comprises a number of nodes (switching centres) interconnected by circuit groups (engineering routes). There may be several direct circuit groups between a pair of nodes and these may be unidirectional or bothway. Figure 1/E.170 illustrates a number of possible situations.

A direct route consists of one or more circuit groups connecting adjacent nodes. An indirect route is a series of circuit groups connecting two nodes providing an end-to-end connection via other nodes.

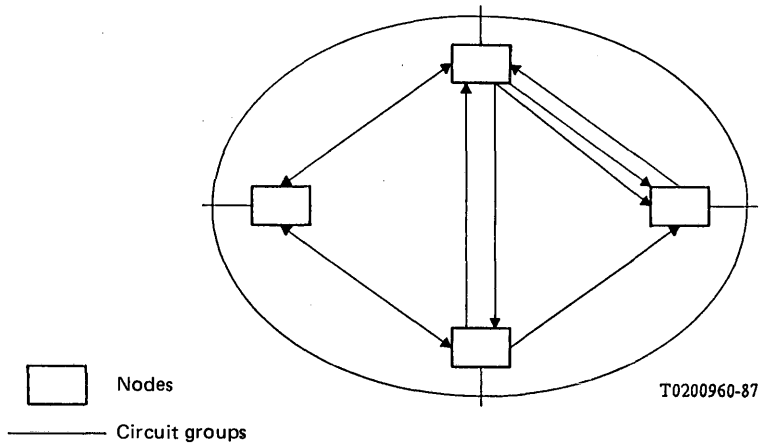


FIGURE 1/E.170

1.3.2 *Network architecture*

Within national networks it is often appropriate to adopt a hierarchy of switching units (e.g. local, area, trunk, regional trunk, international) with each level of the hierarchy performing different functions. For the international network, there is no recommended hierarchy for international switching centres (ISCs) with Administrations being free to determine the most suitable utilization of their individual ISCs. (Recommendation E.171 refers.)

2 Logic of routing

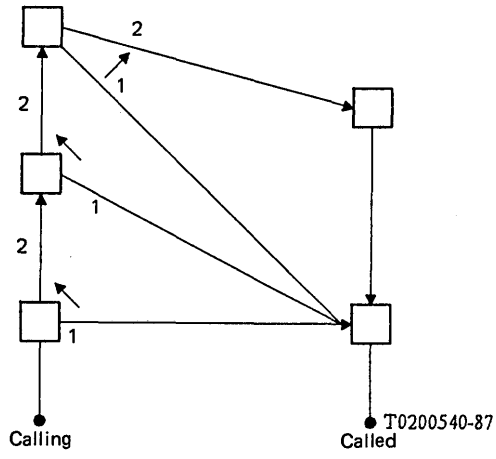
2.1 *Routing structure*

It is important to note that the concept of hierarchical routing need not be directly related to the concept of a hierarchy of switching centres (as described above).

A routing structure is hierarchical if, for all streams, all calls offered to a given route, at a specific node, overflow to the same set of routes irrespective of the routes already tested. The routes in the set will always be tested in the same sequence although some routes may not be available for certain call types. The last choice route is final in the sense that no traffic streams using this route may overflow further.

A routing structure is non-hierarchical if it violates the above-mentioned definition (e.g., mutual overflow between circuit groups originating at the same exchange).

A example of hierarchical routing in a non-hierarchical network of exchanges is illustrated in Figure 2/E.170.



Note – All nodes are of equal status.

FIGURE 2/E.170

2.2 *Routing scheme*

The routing scheme defines how a set of routes is made available for calls between a pair of nodes.

Fixed: The set of routes in the routing pattern is always the same.

Dynamic: The set of routes in the routing pattern varies.

2.2.1 *Fixed routing scheme*

Routing patterns in the networks may be fixed, in that changes to the route choices for a given type of call attempt require manual intervention. Changes then represent a "permanent" change to the routing scheme (e.g., the introduction of new routes require a change to a fixed routing scheme).

2.2.2 *Dynamic routing schemes*

Routing schemes may also incorporate frequent automatic variations. Such changes may be time and/or state dependent.

The updating of routing patterns may take place periodically or aperiodically, predetermined or depending on the state of the network.

Time-dependent routing:

Routing patterns will be altered at fixed times during the day (or week) to allow changing traffic demands to be provided for. It is important to note that these changes are pre-planned and will be implemented consistently over a long time period.

State-dependent routing:

Routing patterns will vary automatically according to the state of the network. Such routing schemes are said to be adaptive.

In order to support this type of routing scheme, it is necessary to collect information about the status of the network. For example, each exchange may compile records of successful calls or outgoing trunk group occupancies. This information may be distributed through the network to other exchanges or passed to a centralized database.

Based on this network status information, routing decisions will be made either in each exchange or at a central processor serving all exchanges. See Figure 3/E.170.

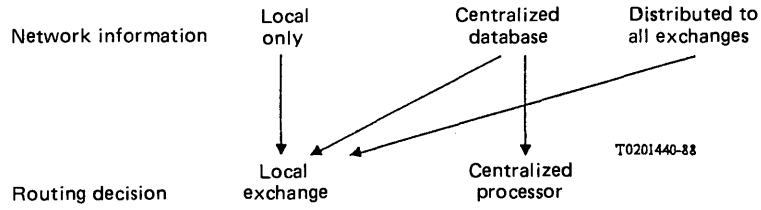


FIGURE 3/E.170

2.3 *Route selection*

Route selection is the action to actually select a definite route for a specific call.

Sequential: The routes in a set are always tested in sequence and the first available route is chosen.

Non-sequential: The routes in a set are tested in no specific order.

The decision to select a route can be based on the state of the outgoing circuit group or the states of the series of circuit groups in the route. In either case, it can also be based on the incoming path of entry, class of service, or type of call to be routed. One example of the above is selective trunk reservation.

3 Call control procedures

Call control procedures define the entire set of interactive signals necessary to establish, maintain and release a connection between exchanges. Described below are two main types of call control procedures:

3.1 *Progressive call control*

Progressive call control uses link-by-link signalling to pass supervisory controls sequentially from one exchange to the next. This type of call control can be either irreversible or reversible. In the irreversible case, call control is always passed downstream towards the destination exchange. Call control is reversible when it can be passed backwards (maximum one node), towards the originating exchange, using automatic rerouting or crankback possibilities.

3.2 *Originating call control*

Originating call control requires that the originating exchange maintain control of the call set-up until a connection between the originating and terminating exchanges has been completed.

4 Applications

4.1 *Automatic alternative routing*

A particular type of progressive (irreversible) routing is automatic alternative routing (AAR). When an exchange has the option of using more than one route to the next exchange, an alternative routing scheme can be employed.

Two main types are available:

- when there is a choice of direct circuit groups between the two exchanges;
- when there is a choice of direct and indirect routes between the two exchanges.

Alternative routing takes place when all appropriate circuits in a group are busy. Several circuit groups may be tested sequentially. The testing order will be fixed or time-dependent.

4.2 *Automatic rerouting (crankback)*

Automatic rerouting (ARR) takes place upon receipt of a signal at A from a downstream exchange B, indicating that a call once routed to B encountered an "all circuits busy" state on circuit groups out of that exchange. This application is also referred to as crankback.

In the example of Figure 4/E.170, a call from A to D is routed via C because the circuit group BD is congested.

With ARR, care must be taken to avoid circular routings which return the call to the point at which blocking occurred.

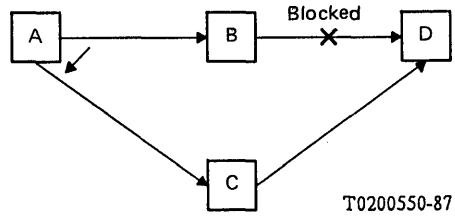
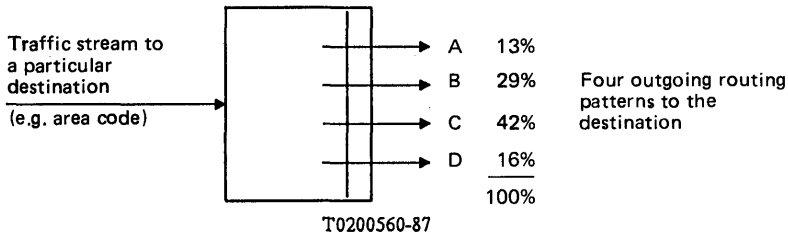


FIGURE 4/E.170

4.3 *Load sharing*

All routing schemes result in the sharing of traffic load between network elements. Routing schemes can however be developed to ensure that call attempts are offered to route choices according to a preplanned distribution.

Figure 5/E.170 illustrates this application of load sharing which can be made available as a software function of SPC exchanges. The system works by distributing the call attempts to a particular destination in a fixed ratio between the specified outgoing routing patterns.



Note – Each outgoing routing pattern (A, B, C, D) may include alternative routing options.

FIGURE 5/E.170

4.4 *Dynamic routing*

4.4.1 *Example of state-dependent routing*

A centralized routing processor is employed to select optimum routing patterns on the basis of the actual occupancy levels of the circuit groups and exchanges in the network which are monitored on a periodical basis (e.g., 10 s), see Figure 6/E.170. In addition, qualitative traffic parameters may also be taken into consideration in the determination of the optimal routing pattern.

This routing technique inherently incorporates fundamental principles of network management in determining routing patterns. These include:

- avoiding occupied circuit groups,
- not using overloaded exchanges for transit,
- in overload circumstances, restriction of routing direct connections.

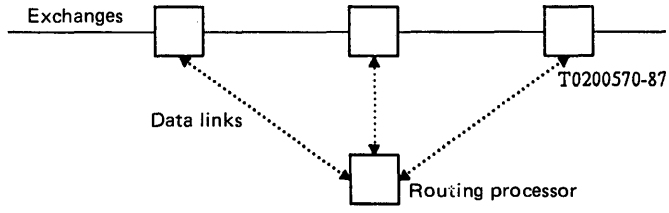
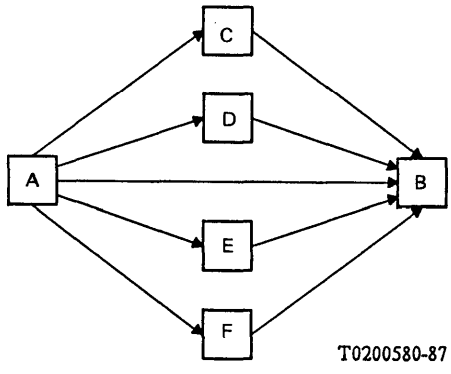


FIGURE 6/E.170

4.4.2 *Example of time-dependent routing*

For each originating and terminating exchange pair, a particular route pattern is planned depending on the time of day and day of week, see Figure 7/E.120. A weekday, for example, can be divided into different time periods, with each time period resulting in different route patterns being defined to route traffic streams between the same pair of exchanges.

This type of routing takes advantage of idle circuit capacity in other possible routes between the originating and terminating exchanges which may exist due to non-coincident busy periods. Crankback may be utilized to identify downstream blocking on the second link of each two-link alternative path.



Time period	A to B Route pattern
1	AB, ACB, ADB
2	AB, AEB, AFB

FIGURE 7/E.170

INTERNATIONAL TELEPHONE ROUTING PLAN

1 Introduction

1.1 This plan describes an international telephone routing plan designed to enable Administrations to select routings for their traffic which will result in a satisfactory connection between any two telephone stations in the world. The Plan relates to automatic and semi-automatic telephone traffic from fixed and mobile (both land and maritime) stations. The Plan is necessary to allow the objective to be achieved with maximum economy by the most efficient use of costly circuits and switching centres while safeguarding the grade of service and quality of transmission.

1.2 The Plan is one of the basic CCITT Recommendations which influence many other Recommendations, for example the transmission plan (Recommendation G.101).

1.3 In practice the large majority of international telephone traffic is routed on direct circuits (i.e., no intermediate switching point) between International Switching Centres (ISCs). It should be noted that it is the rules governing the routing of connections consisting of a number of circuits in tandem that this Recommendation primarily addresses. These connections have an importance in the network because:

- they are used as alternate routes to carry overflow traffic in busy periods to increase network efficiency,
- they can provide a degree of service protection in the event of failures of other routes,
- they can facilitate network management when associated with ISCs having temporary alternative routing capabilities.

1.4 This Plan replaces the previous one established in 1964 and it can be applied to all existing switching equipment and signalling systems and is intended to be flexible enough to incorporate new switching and signalling developments.

Nevertheless, it is recognized that the Plan, which is complementary to the plan contained in Recommendation E.172, will have to be reviewed and revised to take account of developments in telecommunications.

1.5 The Plan accomplishes its basic purposes unconstrained by, and requiring no changes to, the numbering plan, the rules for charging the calling subscriber and the rules for the apportionment of charges (international accounting).

2 Principles

2.1 The Plan preserves the freedom of Administrations:

a) to route their originating traffic directly or via any transit Administration they choose;

b) to offer transit capabilities to as wide a range of destinations as possible in accordance with the guidelines which it provides.

2.2 The Plan provides guidance on possible international routings. Any routing chosen must be subject to agreements between the Administrations involved before implementation.

The freedom of Administrations to choose the routing of their terminal and transit traffic may be limited by technical, commercial and administrative considerations including:

- the capability of precisely measuring traffic volumes for accounting purposes,
- the need to maximize route profitability,
- the desirability of simplicity in international accounting.

2.3 The governing features of this Plan are:

a) it is not hierarchical;

b) Administrations are free to offer whatever transit capabilities they wish, providing they conform to this Recommendation;

c) direct traffic should be routed over final (fully provided) or high usage circuit groups;

d) no more than 4 international circuits in tandem should be involved between the originating and terminating ISCs;

e) advantage should be taken of the non-coincidence of international traffic by the use of alternative routings to effect circuit economies and provide route diversity (Recommendation E.523);

f) the routing of transit switched traffic should be planned to avoid the possibility of circular routings;

g) when a circuit group has both terrestrial and satellite circuits the choice of routing should be governed by:
   - the guidance given in Recommendation G.114,
   - the number of satellite circuits likely to be utilized in the overall connection,
   - the circuit which provides the better transmission and overall service quality [1];

h) the inclusion of two or more satellite circuits in the same connection should be avoided in all but exceptional cases. Annex A contains details on the effects of satellite communications.

   Recommendation Q.14 defines the means to control the number of satellite links in an international telephone connection;

i) both originating and transit traffic should be routed over the minimum number of international circuits in tandem unless this is in conflict with one of the above-mentioned features.

3 Number of circuits in tandem

3.1 *International circuits*

For reasons of transmission quality as well as the minimization of post-dialling and answer signal delays and the avoidance of signalling time-outs, it is desirable to limit the number of circuits in tandem in an overall connection (Recommendations G.101 and G.114, § 1). Recommendation Q.7 gives signalling considerations on tandem routings.

In this Plan the number of international circuits in a connection is limited to a maximum of 4. (See § 3.3.2 for a special case with multiple ISCs within the area of one Administration.)

3.2 *National circuits*

Limitations in the national section of the international connection are given in Recommendation G.101, § 3.1.

Many Administrations have fulfilled the requirements of Recommendation G.101, § 3.1 by establishing a national routing plan based on a theoretical final route structure with low-loss-probability circuit groups between switching centres of different categories.

The actual structure in many cases involves direct routes which bypass the theoretical final route or part of it, the structure being rather similar to the former international routing plan.

Note – The former international routing plan was last published in the Orange Book, Volume II.2, Recommendation E.171.

3.3 *Multiple ISCs in a country*

3.3.1 *In the originating or terminating country*

Administrations may find it advantageous for technical or economic reasons, or for the protection of service, to use multiple originating and/or terminating ISCs. In some cases, this could result in a routing for a call which includes a circuit between two ISCs in the originating or terminating country. Such circuits may be regarded as national circuits in applying this Plan, and as such should be included in the national link allocation, see Recommendation E.172.

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[1] When there are circuits between ISCs using different geographical routes with different transmission means, preference should be given to those circuits which provide better transmission quality as long as this is not conflicting with any other part of this Recommendation.

3.3.2 *In a transit country*

Some Administrations may find it desirable to route transit traffic between two ISCs in their own country. In this case the allowable number of international circuits in tandem may be increased from 4 to 5 (this is the only exception to § 3.1 above).

4 Routing techniques

With advanced SPC exchanges and enhanced signalling systems new routing techniques are emerging (see Recommendation E.170). These techniques can be used nationally as found necessary by individual Administrations or bilaterally between Administrations.

5 Basic routing rules

5.1 *Originating traffic*

5.1.1 Originating traffic at an ISC may be offered to any route, taking into account all factors in this Plan, and the following guiding principles, to ensure good overall service quality for the call connection:

a) an originating ISC should first select the direct route to the destination, if it is available;

b) if the direct route is unavailable (because all circuits are busy or because no direct route is provided) then the originating ISC may select the route to any transit ISC which conforms to the principles in § 4.2 below. An agreement should first be reached between the originating, terminating and transit Administrations involved, for the use of this transit route.

5.1.2 A circuit group may be designed as a high usage circuit group (see Recommendation E.522) or as a final circuit group (see Recommendations E.520 or E.521).

5.1.3 Examples of some possible routings are given in Annex B.

5.2 *Transit traffic*

5.2.1 *Two and three international circuits in tandem*

An Administration offering transit capabilities may do so without special arrangements or restrictions to all destinations served by:

a) direct circuit groups, or

b) switching via an additional transit ISC that has a direct final circuit group to the destination, or

c) a combination of a) and b).

Examples of two and three international circuits in tandem are given in b) to e) of Figure B-1/E.171.

5.2.2 *Four international circuits in tandem*

If an Administration has provided a routing for its originating traffic that involves a maximum of 3 international circuits in tandem to a destination, it may offer this capability to other Administrations for transit traffic. In this case, these other Administrations must not themselves offer transit capabilities to the same destination as this would exceed 4 international circuits in tandem.

Examples of 4 international circuits in tandem are given in f) and g) of Figure B-1/E.171.

5.2.3 A circuit group may be designed as a high usage circuit group (see Recommendation E.522) or as a final circuit group (see Recommendations E.520 or E.521).

5.2.4 *Special arrangements*

Some Administrations may route transit traffic differently from their own originating traffic to a given destination. These routings will in some cases involve offering transit traffic to direct routes, but not to overflow routes via alternative transit ISCs. On the other hand, originating traffic offered to the same direct routes is given access to overflow routes.

This arrangement may be used for:

a) limiting the number of international circuits in tandem for transit calls, yet allowing originating calls up to the maximum of 4 international circuits in tandem.

b) preventing transit traffic from overflowing from direct routes, to minimize subsequent transit charges.

c) minimizing transmission propagation delay for transit calls.

In such cases, care must be exercised to avoid grade of service problems. Consideration should be given to:

i) the analysis of 24-hour traffic profiles;

ii) the exchange of network status information between Administrations.

In implementing such arrangements, Administrations offering transit capability should provide the necessary information on traffic profiles and network status capabilities. Originating Administrations should evaluate such information taking into account transmission costs, and call completion factors. (See Recommendations E.522 and E.523.)

Examples of some routings involving special arrangements are given in a) and b) of Figure B-2/E.171.

6 List of international transit capabilities

6.1 To aid in the application of transit routings, a list of international transit capabilities via an Administration is desirable.

6.2 Each Administration that wishes to offer transit capabilities should develop and distribute its own list.

6.3 Annex C details the essential information that should be contained in a list of international transit capabilities plus additional information that might also be distributed by Administrations offering transit capabilities or might be requested by Administrations seeking transit routings.

ANNEX A

(to Recommendation E.171)

The effects of satellite communication

A.1 The use of geostationary satellite circuits does not call for any alteration in the basic principles and rules of this Plan. However, because of the mean propagation time on satellite circuits, the precautions specified in Recommendation G.114 must be observed.

A.2 At originating ISCs, calls which are to be transit switched at another ISC and likely to use a satellite circuit elsewhere in the connection should be routed using terrestrial circuits from the originating ISC, if available.

A.3 At ISCs arrangements should be made to guard against the inclusion of two or more satellite circuits in the same connection in all but exceptional cases. (See § A.6 below.)

Avoidance of two or more satellite circuits is made more feasible when the signalling systems used have signals indicating whether the connection already includes a satellite circuit. (See Recommendation Q.7.)

In those cases when the signalling system does not provide the necessary information, bilateral agreement should be sought between the Administrations involved to establish a special circuit group on which traffic can be routed that has already one or more satellite circuits in the connections. (See Figure A-1/E.171.)

A.4 The use of national satellite circuits for international originating and terminating connections should be avoided to the extent possible.

A.5 Connections (originating, terminating or transit) to and from the international maritime mobile satellite service should not, so far as possible, comprise other satellite circuits. In the shore-to-ship direction the country codes allocated to the maritime mobile satellite service should be analysed in order to apply this provision.

A.6 There will be cases when the above provisions cannot be fully applied. These are:

a) routing to and from Administrations with exclusive or almost exclusive use of satellite circuits for international service;

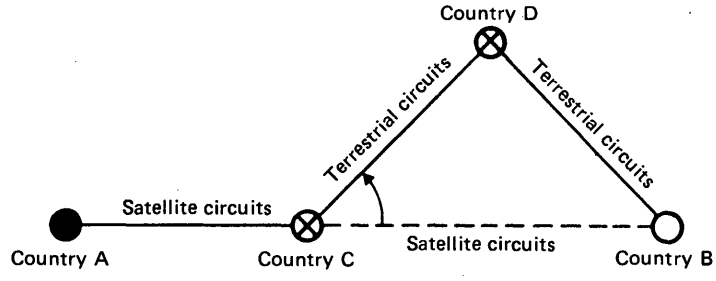
b) routings containing more than one international circuit in tandem in which the signalling systems used on one or more of the circuits in the connection does not provide nature of circuit indicators, or when no agreement can be reached with respect to the special circuit group;

c) when no other reliable means of communication is available; then two or more satellite circuits in one connection may be used.

Note – When it is unavoidable to use more than one satellite circuit in an international connection, attention to echo control as indicated in Notes 2 and 3 of Recommendation G.114 should be exercised.

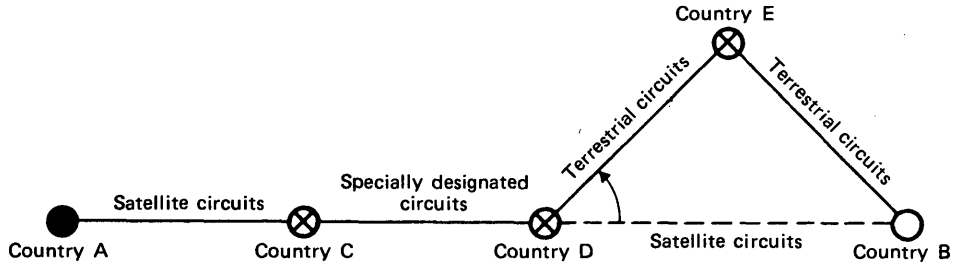
A.7 Control methods for echo suppressors[2] are given in Recommendation Q.115.

A.8 The use of demand assigned satellite systems in international telephony (e.g., SPADE) is governed by the same general and special considerations given above. The entirety of a demand assigned system and its access circuits may be regarded as a single international circuit for transmission purposes and as a transit ISC for routing purposes.



Note – Circuit group Country C to Country B is high usage for traffic originating at C but is not accessed for transit traffic from circuit group Country A to Country C in order to avoid two international satellite circuits in tandem.

a)



Note – Circuit group Country C to Country D is specially designated by the Administration involved to be treated as if it comprised satellite circuits. Circuit group Country D to Country B is high usage for traffic originating at D but is not accessed for transit traffic from the specially designated circuit group Country C to Country D.

b)

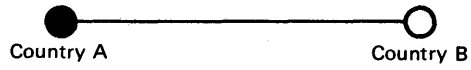
FIGURE A-1/E.171

[2] Echo cancellers are also now in use.

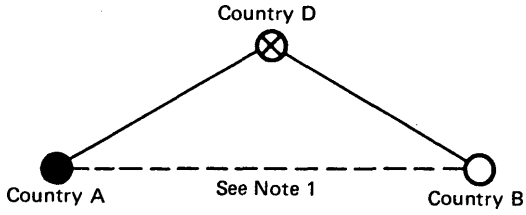
ANNEX B

(to Recommendation E.171)

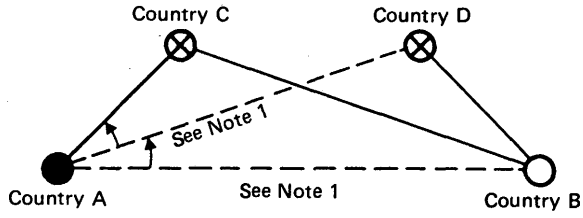
Examples of possible routings and special arrangements



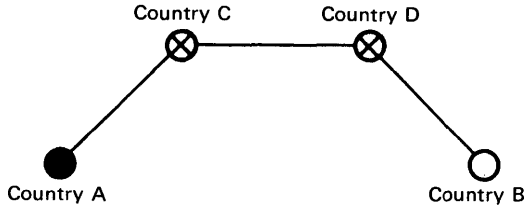
a) Direct connection



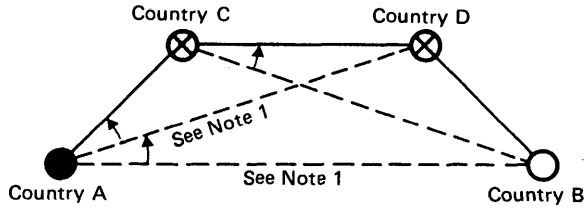
b) Two international circuits in tandem – Example 1



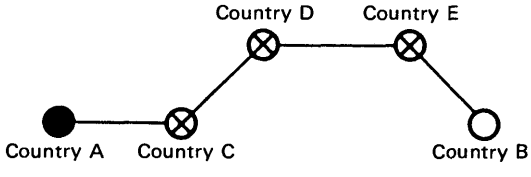
c) Two international circuits in tandem – Example 2



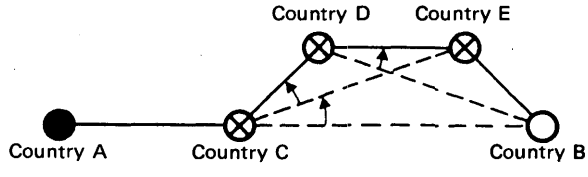
d) Three international circuits in tandem – Example 1



e) Three international circuits in tandem – Example 2



f) Four international circuits in tandem – Example 1



g) Four international circuits in tandem – Example 2

CCITT-57960

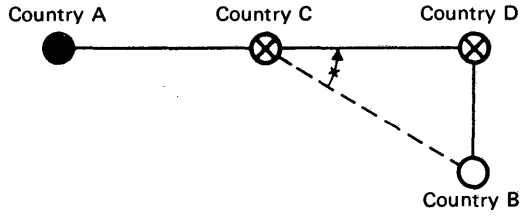
Note 1 – These circuit groups illustrate the choices available to the originating Administration under § 5.1.

Note 2 – For explanation of legends, see Figure B-2/E.171.

Note 3 – For Figure *a)* see § 5.1.1 a); for Figures *b), c), d), e)* see § § 5.1.1, 5.2.1 b) and 5.2.1 c); for Figures *f), g)* see § § 5.1.1 and 5.2.2.

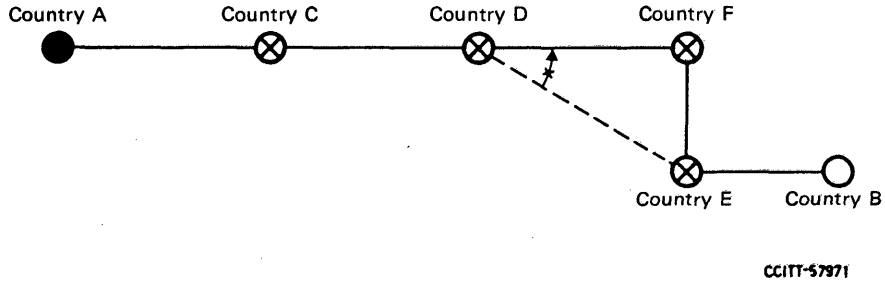
FIGURE B-1/E.171

Example of some routings possible under the International Telephone Routing Plan



Note – Country C routes its originating traffic to Country B via a direct route with overflow to an alternative route via a transit ISC in Country D. In order to minimize transit charges Country C may bar overflow from the direct route for transit traffic. In establishing this arrangement for Country A, Countries C and A should review the traffic levels and 24 hour profiles to ensure that the transit traffic experiences adequate grade of service.

a)



Note – This example uses the same principle as *a)* for the purpose of limiting the number of circuits in tandem for transit traffic to 4. This arrangement may be applied at any of the transit ISCs.

b)

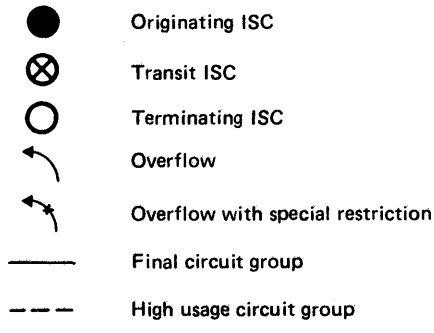


FIGURE B-2/E.171

Examples of some special arrangements (see § 5.2.4)

ANNEX C

(to Recommendation E.171)

List of international transit capabilities

C.1 *Essential information on international transit capabilities*

C.1.1 *Use*

Every Administration offering transit capabilities should compile and distribute a list including at least the information shown below in order to enable other Administrations to make a first choice of possible transit routings.

C.1.2 *Suggested format*

See Figure C-1/E.171.

Administration _____ Date _____

Address for inquiries _____

_____

Destination	Transit ISC	Route type	Terrestrial possible	Special restrictions

FIGURE C-1/E.171

C.1.3 *Instructions for completing the list*

Item A – Administration or RPOA

Enter the name of the Administration or recognized private operating agency responsible for preparing this list.

Item B – Date of Information

Enter the date for which the information below applies.

Item C – Address for Inquiries

Enter the name, address, telex and telephone number of the organizational unit or individual who will respond to enquiries concerning transit capabilities.

Column 1 – Destination country or Administration

Enter the name of the destination country or Administration. These destinations should be listed alphabetically within each World Zone grouping. Only those destinations for which this ISC can carry automatic transit traffic should be listed in this column. All destinations for which transit capabilities are being offered should be listed.

Column 2 – Transit ISCs

Enter the name or location that identifies the international switching centre(s) that has automatic transit access to the destinations in column 1. For multiple transit ISCs within the same Administration list each ISC in sequence.

Column 3 – Route Type

Enter whether the transit route to the destination is either:

DIR – If "direct" to the terminating ISC.

IND – If "indirectly" first routed via a further transit ISC. The name of the further transit ISC should also be entered.

ALT – If either the "DIR" or "IND" route automatically overflows to an "alternative" transit ISC. The name of the alternative transit ISC should also be entered.

Column 4 – Terrestrial possible

Enter YES if at least some transit calls to this destination can obtain an all terrestrial route beyond the transit ISC.

Enter NO if all transit calls to this destination will use a satellite circuit in the route beyond the transit ISC.

Column 5 – Special restrictions

Enter YES if the transit traffic is subject to overflow restrictions (see § 5.2.4) that might affect the grade of service achieved.

Enter NO if no such restrictions apply.

C.2 *Additional information on international transit capabilities*

C.2.1 *Use*

The information shown below is of value in comparing and selecting possible transit routes. Administrations offering transit capabilities might choose to compile and distribute some or all of these items with their basic list of international transit capabilities. Alternatively Administrations selecting a transit route may use the items shown below as a basis for enquiries.

C.2.2 *Format*

No particular format is suggested for this information. However, it is recommended that both transit and originating Administrations use the terminology and definitions given below.

If changes are planned in any of the items the change should be indicated together with the effective date.

C.2.3 *Details of additional items*

Traffic profile

Under this item the busy hour traffic on the circuit group used beyond the transit ISC should be given together with an indication of the traffic variations during the day. Preferably the variations should be presented in the form of hourly traffic distributions as shown in Recommendation E.523.

Transit charges

Under this item details of the applicable transit charges should be given.

Grade of service

The grade of service normally experienced to the destination should be given. This may be supplemented by time of day variations. If overflow restrictions for transit traffic apply, the information must include at least the hours during which the grade of service is 1% or better.

Circuit quantities

The total circuit quantities available and subtotals for each type of transmission medium should be given.

If indirect routing is used this information should be given for the circuit groups to the next transit ISC.

Signalling

The signalling systems used for the onward routing from the transit ISC should be listed.

Restoration

This item should outline the restoration policy in the case of a major transmission facility outage in the onward routing.

Echo Control

This item should list the echo control capabilities at the transit ISC.

Prevention of two or more satellite circuits in tandem

This item should explain the capabilities at the transit ISC for preventing the connection of two satellite circuits in tandem.

Where indirect routing is used, this item should also identify whether a specially designated circuit group has been agreed to allow prevention of two satellite circuits in the same connection at a subsequent ISC.

Recommendation E.172

CALL ROUTING IN THE ISDN ERA

1 Introduction and scope

National ISDNs are progressively being introduced, thus a demand for international interconnection is emerging. It is inevitable that different national variants of ISDN will be introduced which will require interworking across the international boundary.

This Recommendation establishes a routing plan for calls both within and between PSTNs and ISDNs. It is therefore complementary to Recommendation E.171, the international telephone routing plan.

The ISDN routing principles are contained in Recommendation I.335 which includes a mapping between ISDN bearer services and the one or more ISDN connection types that will support them. The main purpose of this Recommendation is to provide a mapping between these connection types and the real network components (e.g. transmission links, signalling systems) needed to support the call, and to indicate how information to be used for routing is conveyed in the relevant signalling system parameter fields.

The impact of routing the packet mode bearer service over the ISDN is for further study.

2 Service, network and signalling aspects of the ISDN

The concepts and principles of an ISDN are described in Recommendation I.120. The services supported by an ISDN are given in the I.200 Series of Recommendations. The network capabilities to support these services are defined in the I.300 Series of Recommendations. ISDN signalling protocols are defined in Recommendations Q.931 (access) and Q.761-Q.764 [Signalling System (S.S.) No. 7, ISDN User Part].

3 Network structure

In the ISDN era, it is suggested that:

a) the network structure should be non-hierarchical;

b) for call routing purposes the network can be subdivided into national and international connection elements, the national element being subdivided into local and trunk elements if appropriate;

c) Administrations should be free to change their own call routing arrangements providing they are still within the guidelines outlined in this plan;

d) the routing concepts outlined in Recommendation E.170 can apply in any network element (e.g. local, national or international) but only by agreement should they be used across a connection element boundary.

The network structure for ISDN has been taken from Recommendation G.801 which provides a hypothetical reference connection for the digital environment. From this Recommendation the maximum allocation is established as shown in Table 1/E.172.

The limiting case on all routing configurations will be when an international extension is required. It is assumed that all special and manual nodes will be taken from the national link and node budget allocation.

TABLE 1/E.172

National element		International element		National element	
Nodes	Links	Nodes	Links	Nodes	Links
4	4	5	4	4	4

4 Routing configuration

In the ISDN various routing configurations will emerge for access:

- between two customers on the ISDN/PSTN;
- between a customer and the operator service;
- between the ISDN/PSTN and other dedicated networks (see also Recommendation E.166);
- between the ISDN/PSTN and special nodes and services.

5 Information analysis

The type of information that requires analysis for call routing purposes will vary depending on the progress of the call through the network. Consequently this will place different requirements on the network nodes as shown in Table 2/E.172.

TABLE 2/E.172

Information for call routing	Information to be taken into account at (Note 1):			
	Originating exchange	National transit exchange	International exchange (ISC)	Terminating exchange
a) Calling customer	X			
b) Incoming route		X	X	
c) Called number (including Q.931 NPI/TON information if present)	X	X	X	X
d) Destination network	X	X	X	
e) Basic telecommunication service request	X			
f) Supplementary service request	X (Note 2)			X
g) User service information (USI)	Generated	(Note 3)	(Note 3)	Terminated
h) Transmission medium requirement (TMR)	Generated	X	X	Terminated
i) ISUP preference indicator	Generated	X	X	Terminated
j) Environment of the connection	X			X
k) Network management conditions	X	X	X	
l) Transit RPOA selection if permitted by operating agreements	X	X		
m) Connection history	Generated	X	X	Terminated
n) Time of day	X	X	X	

ISUP ISDN User Part
NPI Numbering plan identifier
RPOA Recognized private operating agency
TON Type of number

Note 1 – This table identifies the data normally used to route calls in many fundamental circumstances. The use of data not marked with a cross is not precluded at any routing stage in special circumstances.

Note 2 – The supplementary service request is used to set the value of the ISUP preference indicator.

Note 3 – Depending on the network operator's policy, it may be necessary to examine the USI in the originating network, in order to set correctly the TMR at the outgoing gateway exchange.

All the functions listed in Table 2/E.172 need not be available at all network nodes, but a minimum set will be required to ensure efficient and effective routing. (This requires further study.) Call charging and accounting considerations are also for further study.

a) *Calling customer*

Depending on the customer's contract with the Administration, a map of authorized and unauthorized service requests will require interrogation before the outgoing route is seized.

b) *Incoming route*

As with the calling customer, some incoming routes may require special treatment (e.g., not allow access to all outgoing routes).

c) *Called number*

Access may be barred to a particular customer, under either administrative or network management control, by analysis of the called number.

d) *Destination network*

Access may be barred to a particular network, under either administrative or network management control, by analysis of the called number.

e) *Basic telecommunications service request*

The Basic telecommunication service request, i.e. bearer service (e.g. 64 kbit/s unrestricted) or teleservice (e.g., Teletex) is contained in the Q.931 SETUP message at the originating exchange. It must be analysed in order to set the TMR and ISUP preference indicators in S.S. No. 7 ISUP – see items h) and i) below.

f) *Supplementary service request*

Both ISDN and PSTN service may invoke various supplementary services which may require analysis before the outgoing route is selected. The services can be split into those supported by both the ISDN and PSTN and those only supported by the ISDN. Within each of these two groups, some supplementary services may be realized as a function of the originating exchange (e.g., short code dialling) while others will require cooperation on an end basis across the network (e.g., closed user group). The provision of the latter supplementary services can influence call routing in terms of the signalling capability required.

g) *User services information (USI)*

The USI is the encoding of the Q.931 bearer capability (BC) into S.S. No. 7 ISUP. It may be used in conjunction with the transmission medium requirements parameters – see item h) below.

h) *Transmission medium requirement (TMR)*

The TMR is a parameter in S.S. No. 7 ISUP which indicates the transmission medium required to support the telecommunication service requested. The value of the TMR will therefore depend on the bearer service or teleservice requested.

For calls between networks, the TMR should be set to the minimum transmission resource required to support the call, and must be carried unchanged within the international network. Within the originating network, the TMR may be modified, according to the network operator's policy. In these cases, the outgoing gateway exchange (e.g., outgoing ISC) must examine the USI field containing the bearer capability (BC), in order to set the TMR to reflect the service requested.

TMR values for some key ISDN services, to be used across international and internetwork boundaries, are given in Annex A.

i) *ISUP (ISDN User Part) preference indicator (Reference Recommendations Q.762, § 2.47, and Q.763, § 3.20)*

This is an indicator contained within the "forward call indicators" parameter field of ISUP, sent in the forward direction indicating whether or not the ISUP is required, preferred or not required in all parts of the network connection. This information is derived at the originating exchange from the bearer service or teleservice request and supplementary service request contained in the Q.931 SETUP message. The setting and interpretation of the ISUP preference indicator is described in § 6.

j) *Environment of the connection*

This embraces the three secondary attributes of the requested bearer service that may influence the routing process, namely:

i) the establishment of communication (demand, reserved, permanent);

ii) the configuration of the communication (point-to-point, multipoint, broadcast);

iii) the symmetry (symmetric, asymmetric).

These secondary attributes are contained in the Q.931 BC information element and are directly transposed by the originating exchange into the ISUP "user service information" parameter field (Reference Recommendation Q.763, § 3.33).

Note – Each of these three secondary attributes may require special arrangements that may be necessary to establish, for example, point-to-multipoint, or asymmetric calls.

The impact of the environment of the connection parameter on TMR for future studies is for further study.

k) *Network management conditions*

There may be cases where under network management control the routing will require modification to maintain quality of service, and as such the exchange must be capable of providing this facility.

l) *Transit RPOA selection*

The subject of transit RPOA selection is for further study.

m) *Connection history*

In order to ensure that the number of links, the number of satellite hops and any other network limiting functions are not exceeded in a connection, a connection history should be available for interrogation prior to route selection. This is provided in ISUP by the "nature of connection indicators" parameter field. (Reference Recommendations Q.762, § 2.67, 2.35, 2.39, and Q.763, § 3.24). This field is generated at the originating exchange and modified at a subsequent transit exchange each time a relevant parameter (e.g., number of satellite links) is affected as a result of the transmission path chosen. The field has three indicators:

– satellite indicator,

– continuity check indicator,

– echo control device indicator.

Code points for the number of sections with echo control devices, and indicators for the digital circuit multiplication equipment (DCME) and A/μ-law converters are not included since these should be taken into account in accordance with the hypothetical digital reference connection (HDRC) at the exchange routing data planning stage. This is for further study.

n) *Time of day*

Because of varying traffic distributions during a 24-hour period, it may be advantageous to change the call routing arrangements dependent on time of day.

6 Signalling capability

6.1 *General*

The signalling capability required on a connection is indicated by the ISUP preference indicator, described in § 5, i). There are three possible values of the indicator:

- ISUP required,
- ISUP preferred,
- ISUP not required.

ISUP signalling may be required or preferred on a connection for a number of reasons, e.g.,

- to carry an indication of the information transfer capability required,
- to pass Higher Layer Compatibility (HLC) Information in order to support telematic teleservices such as Teletex,
- to support certain supplementary services.

6.2 *Setting the ISUP preference indicator*

The criteria for setting the ISUP preference indicator to required, preferred or not required are shown in Annex B.

6.3 *Interpretation of the ISUP preference indicator*

The different values of the ISUP preference indicator should be interpreted at intermediate switching nodes as follows:

6.3.1 *ISUP required*

Only signalling systems having at least the signalling capabilities of ISUP shall be used. If no such signalling system is available then the call should be failed. However, if another ISDN signalling system is available nationally, then this may be selected provided that it can support the service requested.

6.3.2 *ISUP preferred*

A signalling system that has at least the signalling capabilities of ISUP should be used if available.

If it is not available because no ISUP route exists to the destination network, then a signalling system having lower capabilities, e.g., R2, shall be used and the call continued.

If it is not available because the existing ISUP route is congested or has failed then the call should be rejected, unless the information transfer capability required is speech or 3.1 kHz audio, in which case an alternative signalling system should be used and the call continued.

6.3.3 *ISUP not required*

Any signalling system may be used, with no preferential selection.

Table 3/E.172 summarises these interpretations of the ISUP preference indicator.

TABLE 3/E.172

Information transfer capability	ISUP preference indicator	ISUP route not provided	ISUP route busy/failed
64 kbit/s unrestricted	ISUP required	R (Note 1)	R (Note 1)
	ISUP preferred	√ (Notes 2, 3)	R (Note 1)
	ISUP not required	Not applicable	
Speech 3.1 kHz audio	ISUP required	R (Note 1)	R (Note 1)
	ISUP preferred	√ (Note 3)	√ (Note 3)
	ISUP not required	√	√

A check mark (√) indicates that a signalling system having a lower capability than ISUP can be selected, provided that the bearer capability requirements can be met.

An (R) indicates that the call should be rejected.

Note 1 – If another ISDN signalling system is available nationally then this may be selected, provided that it can support the service requested.

Note 2 – If a non-ISUP route is selected then it must be possible to convey the information transfer capability indication by other means, e.g., path of entry or *J* bit in TUP.

Note 3 – Loss of ISDN supplementary services.

7 Network capability

In order to establish if a connection can be made, it is necessary for the network node to consider the items outlined in § 5 together with the network elements (see Table 4/E.172).

TABLE 4/E.172

	Service	Aspects of network capabilities											
		Transmission									Switching		
	Information transfer capability	Analogue	Digital 24 circuits	Digital 32 circuits	A-u conversion	ADPCM (Note 7)	CME/DSI	Analog satellite	Digital satellite (Note 4)	Links (Note 8)	Echo control	Analog	Digital
PSTN *)	Voice	√	√	√	√	√	√	(Note 4)	√	√	√	√	√
	Voice band data (Note 5)	√	√	√	√	√	(Note 2)	(Note 4)	√	√	No (Note 9)	√	√
ISDN	64 kbit/s unrestricted	No	√ (Note 1)	√	No	No	No	No	√	√	No	No	√
	Speech (Note 6)	√	√	√	√	√	√	(Note 4)	√	√	√	√	√
	3.1 kHz audio (Note 5)	√	√	√	√	(Note 5)	(Note 2)	(Note 4)	√	√	No (Note 10)	√	√
	Alternate speech/ 64 kbit/s unrestricted (see § 9)	No	√ (Note 1)	√	FS	No	No	No	√	√	FS	No	√
	384 kbit/s unrestricted	No	√ (Note 1)	√	No	No	No	No	√	√	No	No	√ (Note 3)
	1536 kbit/s unrestricted	No	√ (Note 1)	No	No	No	No	No	√	√	No	No	√ (Note 3)
	1920 kbit/s unrestricted	No	No	√	No	No	No	No	√	√	No	No	√ (Note 3)

*) See Note 11.

FS Further study

CME Circuit multiplication equipment

DSI Digital speech interpolation

Note 1 – Provided the transmission line code is bit sequence independent. Otherwise only 64 kbit/s restricted is possible.

Note 2 – DSI/CME could be included in a connection element selection for a voice-band data call. However, the constant activity of voice-band data would cause permanent trunk/channel assignment for the duration of the call, thereby reducing the potential DSI gain.

Note 3 – Switching at these bit rates is for further study.

Note 4 – For voice/speech calls, only single satellite hops are permitted (see Recommendation E.171). For data calls in the ISDN, the subject is for further study.

Note 5 – The maximum modem bit rate that can be supported depends on the transmission performance within or between Administrations. The extent of this support is a bilaterally agreed matter. The network may include signal processing techniques, provided they are appropriately modified or functionally removed prior to information transfer.

Note 6 – Does not guarantee the support of voice-band data.

Note 7 – Currently only 32 kbit/s ADPCM in accordance with Recommendation G.721.

Note 8 – For the number of links in the total connection, see § 3 of this Recommendation, and for satellite links see Recommendation E.171.

Note 9 – Echo control equipment is disabled by the "user" (e.g., modem tone).

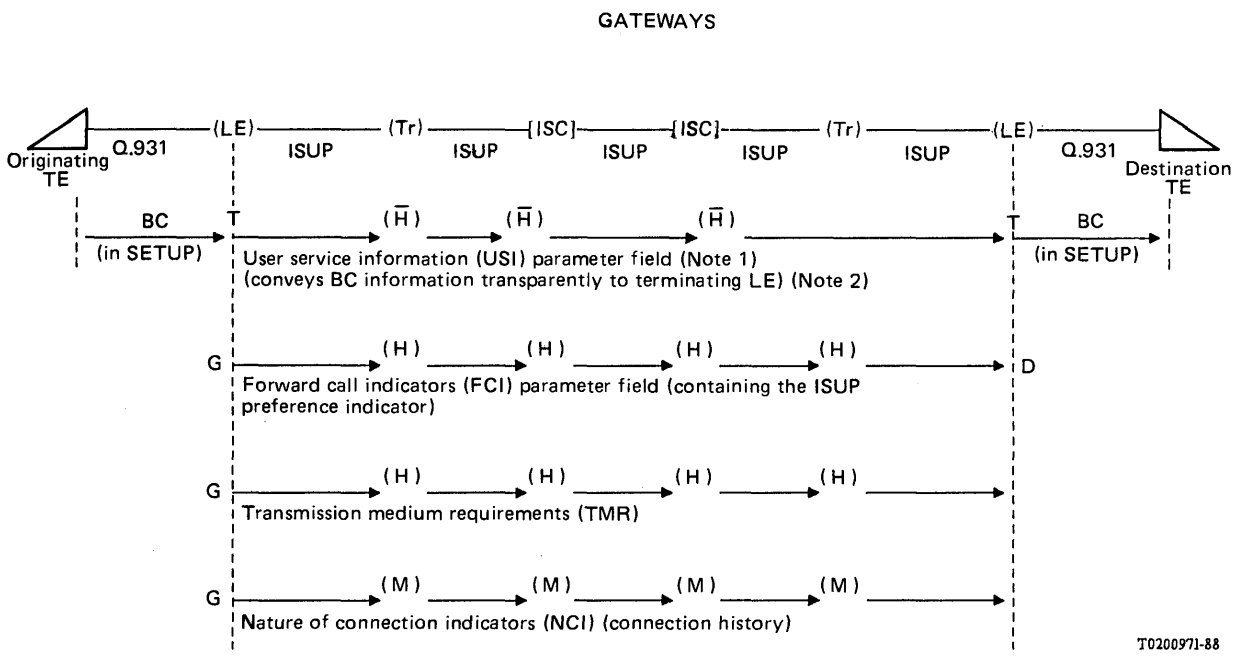
Note 10 – The echo control equipment can be disabled either by the "user" or the "exchange". This is for further study.

Note 11 – Within national networks it is sometimes possible to provide digital end-to-end connectivity, this is also possible across international boundaries subject to bilateral agreement.

Note 12 – 2 × 64 kbit/s service is for further study.

8 Routing process using S.S. No. 7 ISUP parameter fields

The route selection and subsequent circuit selection will depend on the outcome of the analysis of the above information. In some cases this analysis will require the call to be rejected; in others it may be necessary to select dedicated routes. The actual route selection process using S.S. No. 7 ISUP is shown in Figure 1/E.172.



T: Transposed
G: Generated
D: Discarded
(H): Handled for routing purposes, but not modified
(H̄): Normally not handled for routing purposes
(M): Handled for routing purposes and modified as necessary
TMR: The TMR value is derived from the BC value at the originating LE.
It effectively indicates the value of the information transfer capability.
FCI: The forward call indicators parameter field indicates whether ISUP is not required/preferred/required.
NCI: The nature of connection indicators field indicates the call "history" (e.g., satellites, etc.)
USI: The user service information parameter field conveys all the BC information transparently to terminating LE.

Note 1 – Depending on the policy of the originating network operator, it may be necessary to examine the USI in the originating network, in order to correctly set the TMR at the outgoing gateway exchange. This would be true in cases in which TMR is modified within the originating network or if USI is used for routing in the originating networks.

Note 2 – For calls, where BC = speech 3.1 kHz, between A- and μ-law networks, the BC would be modified (by the μ-law international gateway) accordingly.

FIGURE 1/E.172

Route selection process using the S.S. No. 7 ISUP parameter fields (Recommendation Q.763)

9 Change of service during a call

Recommendation I.211 identifies one bearer service (as defined in § 2.1.5 of that Recommendation) for which the value of the information transfer capability attribute can alternate between speech and 64 kbit/s unrestricted. When the user requests this bearer service, the initial value of this alterable attribute value must be identified in the Q.931 signalling messages during call set-up. During the call, the user will also use signalling messages to request a change in absolute value of this attribute when it is actually desired; and the network will confirm the request for change (see Recommendation Q.763, § 3.4).

The capability for change of service during a call can be implemented relatively easily when no echo control or A-μ law conversion is present in the connection, e.g., intra-Europe. However, the implementation of the network capability to support change of service during a call is for further study in the following areas:

- disablement/bypass/introduction of echo control,
- disablement/bypass/introduction of A-μ law conversion,
- disablement/bypass/introduction of CME/DSI equipment.

10 Path selection

This is for further study.

11 Summary

This Recommendation describes call routing in the ISDN era in terms of both network design and the route selection process.

For network design, Table 1/E.172 shows the number of links allowed, while Table 4/E.172 should be used to determine which real network components may comprise the links, depending on the ISDN services they are required to support.

For route selection, Table 2/E.172 shows the types of information which may be analyzed at various stages of the call routing process. Of these, two of the most significant for ISDN calls are the S.S. No. 7 ISUP parameters – transmission medium requirement (TMR) and ISUP preference indicator. To further illustrate the use of these parameters, Annex C shows a hypothetical network with examples of route selection for different types of call.

ANNEX A

(to Recommendation E.172)

Transmission medium requirement (TMR) values

As outlined in § 5 h), for calls between networks, the TMR should be set to the minimum transmission resource required to support the call. This Annex gives TMR values for ISDN services, to be used across international and internetwork boundaries.

A.1 *Bearer services*

Service	*TMR value*
Speech	Speech
3.1 kHz Audio	3.1 kHz Audio
64 kbit/s unrestricted	64 kbit/s unrestricted
Alternate speech, 64 kbit/s unrestricted	
a) Initial mode = speech	Speech, 64 kbit/s unrestricted
b) Initial mode = 64 kbit/s unrestricted	64 kbit/s unrestricted, Speech

A.2 *Teleservices*

Service	*TMR value*
Telephony	Speech
Telefax (Group 4)	64 kbit/s unrestricted
Teletex	64 kbit/s unrestricted
Videotex	For further study
Video telephony	For further study
Interworking from PSTN	

A.3 When interworking from a PSTN, the TMR should normally be set to 3.1 kHz audio. However, it is recognized that in some interworking cases this may be inappropriate (see Recommendation I.335). The routing impact of interworking between networks is for further study.

A.4 Other services are for further study.

ANNEX B

(to Recommendation E.172)

Setting the ISUP preference indicator

The ISUP preference indicator should be set at the originating exchange according to the following criteria, by analysis of the bearer service or teleservice request and supplementary service request contained in the Q.931 SETUP message, as indicated in § 5, i).

B.1 *Bearer service or teleservice request*

- If the BC is 64 kbit/s unrestricted and a telematic teleservice (e.g., Teletex) is requested, then the indicator should be set to ISUP "required". This is to ensure that Higher Layer Compatibility (HLC) information can be passed across the network for terminal compatibility checking (Recommendations I.210 and I.212 refer). (See Note.)

- For the bearer services speech and 3.1 kHz audio, the supplementary service request will determine the value of the ISUP preference indicator. (See below.)

- For calls originating from the PSTN, the indicator should be set to ISUP "not required".

Note – For telematic teleservices, ISUP "required" is suggested to ensure terminal compatibility with other telematic terminals. ISUP "required" calls, however, cannot interwork with dedicated networks. For cases in which such interworking is desired, networks may set the ISUP preference indicator to ISUP "preferred".

B.2 *Supplementary service request*

- For all supplementary services, invoked at initial call request, except for those shown below, the indicator should be set to ISUP "preferred".
- For the following supplementary services, invoked at initial call request, the indicator must be set to ISUP "required":
  a) closed User Group (CUG), see Note 1,
  b) reverse charging,
  c) completion of Calls to Busy Subscribers (CCBS), see Note 2.
- In order to allow supplementary services invoked after initial call request to succeed, all calls from ISDN callers should be set to ISUP "preferred", as a minimum.

Note 1 – Non-CUG calls, from subscribers with CUG with outgoing access, should be set to ISUP Preferred.

Note 2 – For the CCBS Supplementary service, the call resulting from acceptance of the CCBS recall may need the ISUP Preference Indicator to be set to ISUP Required; this is for further study.

It is recognised that this list of criteria is not exhaustive and furher study is required on the impact of other supplementary services on the setting of the ISUP preference Indicator.

ANNEX C

(to Recommendation E.172)

Use of S.S. No. 7 ISUP parameters for route selection

In the following examples, calls are offered to Exchange A on the incoming 64 kbit/s PCM route using S.S. No. 7 ISUP signalling (see Figure C-1/E.172).

Example 1 – Telephony call with supplementary service to Exchange B

ISUP parameters

- TMR = SPEECH
- ISUP preference indicator = ISUP PREFERRED

Routing

- First choice: Route 1
- Second choice: Route 2 (but supplementary service may not be provided)

Example 2 – Telephony call with CUG without outgoing access to Exchange B

ISUP parameters

- TMR = SPEECH
- ISUP preference indicator = ISUP REQUIRED

Routing

- Route 1 only

Example 3 – Teleservice Group 4 facsimile call to Exchange C

ISUP parameters

- TMR = 64 kbit/s unrestricted
- ISUP preference indicator = ISUP REQUIRED

Routing

- Route 1 to Exchange B then Route 4 to Exchange C, provided that:
  a) all echo control and ADPCM devices are disabled, and
  b) if Route 4 is a national variant of S.S. No. 7 ISUP, it can support the service request.

Example 4 – Voice-band data call to Exchange C

ISUP parameters

- TMR = 3.1 kHz AUDIO
- ISUP Preference Indicator = ISUP NOT REQUIRED

Routing[1)]

- Either:
  a) Route 3,
  or
  b) Route 1 to Exchange B then Route 4 to Exchange C,
  or
  c) Route 2 to Exchange B then Route 4 to Exchange C.

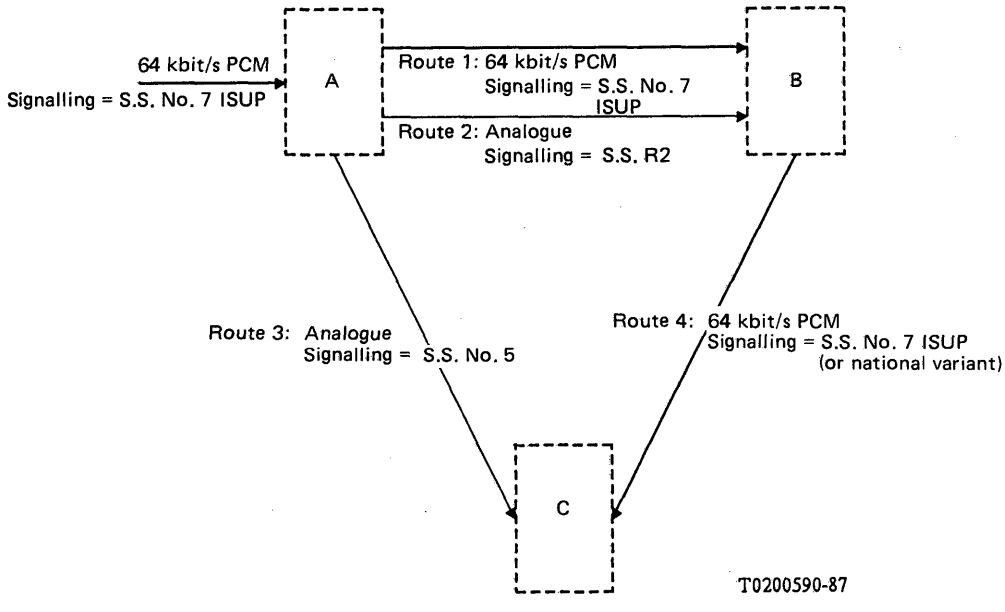


FIGURE C-1/E.172

Use of S.S. No. 7 ISUP parameters for route selection

[1)] In this example, it is necessary to remove echo control and ADPCM devices from all routes used. This may preclude the use of Route 2 if the 3.1 kHz audio requirement is not indicated to Exchange B.

MODELS FOR INTERNATIONAL NETWORK PLANNING

1 Introduction

Network planning plays an important role in the overall responsibility to provide telecommunications and due consideration has to be given to a number of relevant factors, e.g. technical, economic and operational. International planning involves, by definition, a number of Administrations which may have different national objectives and may operate under different economic constraints. It is apparent, therefore, that these differences must be reconciled if cooperative planning is to be achieved. This Recommendation describes a possible method for concerned Administrations to organize a procedure to implement this cooperative network planning process.

2 Basic purpose of an international network planning model

Network planning involves a number of defined planning activities such as forecasting, routing, circuit number calculation and other relevant traffic engineering issues, all of which are interactive in the planning process. The basic purpose of an international network planning model should be to organize all these activities in implementing an orderly overall planning process. The model should assist Administrations in making timely decisions on questions concerning facility selection, circuit routing, etc. This would enable Administrations to perform efficient long-term planning and thus avoid being restricted to a limited number of planning options which, while optimum in the short term, may lead to an expensive network in the long run.

Where such a model produces results consistent with the national objectives of the Administrations involved, it will provide a valuable aid to network planning. Nevertheless, it must be recognized that no model can be appropriate in all cases and final decisions on network plans can only be made on the basis of the preferences of the interested parties.

3 General layout of an international network planning model

Annex A gives a possible method on how to organize the international planning process. The method is presented in the form of a flowchart with a number of interactive "planning steps". Each step includes one or more activities, which may require separate consideration. To further assist Administrations in the implementation of the planning process, reference is given below to the most relevant CCITT Recommendations and/or other documentation which should be taken into account.

- Recommendation E.170: Traffic routing (steps II, III).
- Recommendation E.171: International routing plan (steps II, III).
- Recommendation E.501: Estimation of traffic offered to international circuit groups (step III).
- Recommendation E.506: Forecasting international telephone traffic (step II).
- Recommendation E.510: Determination of the number of circuits in manual operation (step III).
- Recommendation E.520: Number of circuits to be provided in automatic and/or semiautomatic operation, without overflow facilities (step III).
- Recommendation E.521: Calculation of the number of circuits in a group carrying overflow traffic (step III).
- Recommendation E.522: Number of circuits in a high-usage group (step III).
- Recommendation E.540 – E.543 on grade of service (step III).
- Series D Recommendations: Accounting rules (step II).
- Supplement No. 4 to Series E Recommendations: Use of computers for network planning and circuit group dimensioning (step I).
- GAS 3 Manual: *General Network Planning*, Chapter II: General survey of network planning concepts (step I).
- *Ibid*, Chapter VIII: Economic aspects of network planning (steps I, II, III, IV).
- *Ibid*, Chapter IX: Forecasting for network plans (step II).
- *Ibid*, Chapter X: Network dimensioning and optimization (steps I, II, III).
- *Ibid*, Chapter XI: Computer aids to network planning (step I).

ANNEX A

(to Recommendation E.175)

Flowchart of the international planning process

Step I – Agree on study methods

A meeting of the interested parties is required to agree on the methods by which the planning study is to be conducted. These methods could include such factors as:

- manual or computer model study;
- type of computer model;
- study period;
- cost of capital;
- method of financial comparison (e.g. present value);
- other economic parameters;
- types of input information required;
- form of results to be provided.

Step II – Gather required input information

The interested parties should then obtain the input information agreed to in Step I for their respective Administrations. This information could include items such as:

- traffic forecasts (bilateral);
- administration preferences:
  a) routing,
  b) diversity,
  c) satellite/cable mix,
  d) restoration;
- ownership in existing facilities;
- facility exhaust dates;
- new facilities;
  a) capacity,
  b) costs,
  c) availability,
- quality of service requirements.

Step III – Route traffic on proposed network

If a manual process is being used, the routing of traffic could then be performed by a study group selected by the interested parties. These traffic loads on the various facilities in the network would then be used in the selection of the appropriate facilities (Step IV) that would either be loaded (in the case of existing facilities), or that would have to be constructed in the study period.

In the case of a computer modelling process, the Steps III and IV could either be separate or merged, depending on the model chosen.

In either case of manual or computer processing, some iteration of Steps III and IV is usually required in the process, i.e., the loading of circuits on the various links of the network depends on the costs of these facilities, while the facilities selected (and therefore their costs) depend on the number of circuits loaded on them.

Step IV – Select new facilities

The selection process used by the study group should reflect the operational, technical and commercial requirements of the interested parties. Facilities should be dimensioned so as to result in the lowest practical network cost consistent with the preferences of the individual parties. Also (as stated in Step III) it is possible that the facilities chosen could result in costings that could make the rerouting of circuits advantageous.

Steps III and IV should be repeated as necessary to obtain consistent results between routing and facility selection.

Step V – Allocate costs by potential participants

Network costs should then be broken down by potential participants. These costs should be broken into:

- capital costs by facility;
- maintenance costs by facility;
- extension costs;
- satellite space segment related costs.

Special participant reports could be required as determined in Step I.

Step VI – Check results with potential participants

At this point, the special study group should present results to the potential participants. If results are agreeable to this body, then the process could proceed. If, however, the results are not agreeable, then the process should return to Step II to reflect the problems and concerns of the participants. It is possible that more than one alternative network solution may be requested by the participants.

Step VII – Obtain agreement on final plan

If the results in Step VI are agreeable to the potential participants, then the process can continue to the signing of commitments for any new facilities required by the study.

Step VIII – Implement early period facilities

The process of providing the facilities required in the early part of the study period can then begin, leaving the new construction required in the later study period for further reconsideration as conditions warrant.

Step IX – Restudy area as conditions warrant

The network plan should be restudied periodically as new information becomes available. This could include changes in economic conditions, traffic forecasts, costs, new technologies, or political conditions.

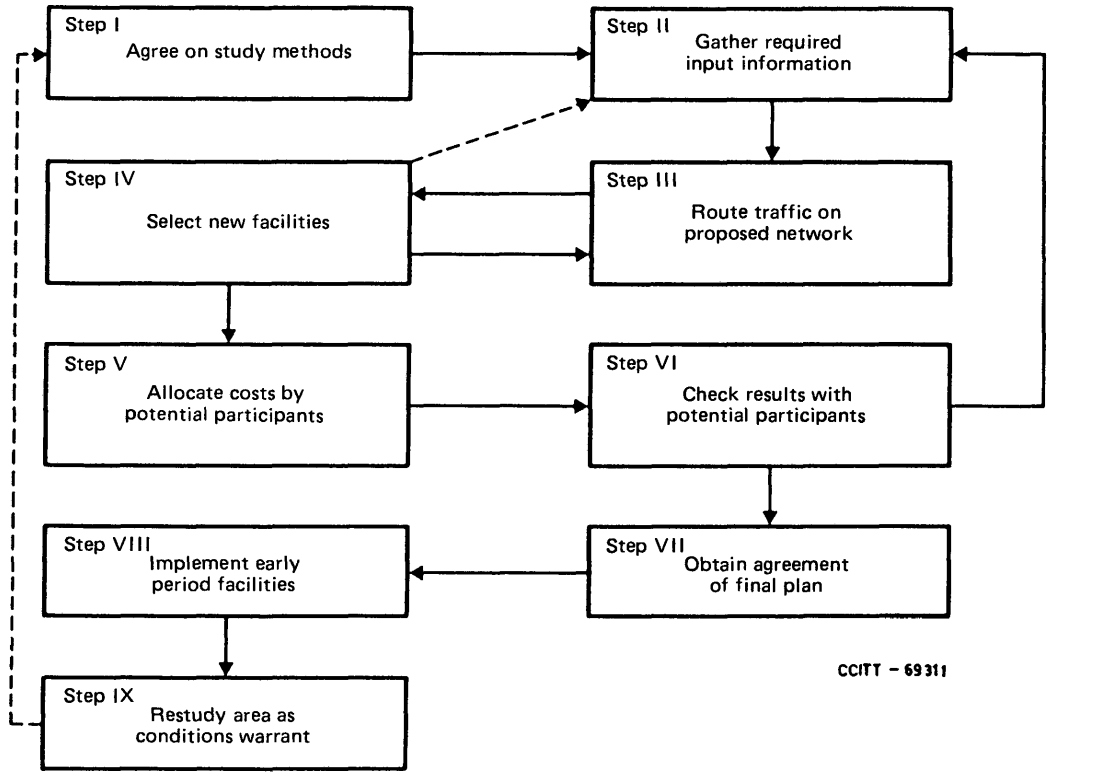


FIGURE A-1/E.175

Flowchart of the international planning process

SECTION 7

TONES FOR USE IN NATIONAL SIGNALLING SYSTEMS

Recommendation E.180 [1]

TECHNICAL CHARACTERISTICS OF TONES [2] FOR THE TELEPHONE SERVICE

1 General

Administrations are reminded of the advantages of standardizing audible tones as far as possible so that subscribers and operators may quickly recognize any tone transmitted of whatever origin [3].

Guidance on the application of tones and recorded announcements in various situations is given in Recommendation E.182.

In considering the degree of standardization, the CCITT took account of the nature of the various tones already in use. It was also considered that Administrations introducing new tones would find it helpful to know the preferred limits of cadence frequency and level.

Limits for tone cadences and frequencies are set forth below, all working tolerances being included in the limits.

Besides the limits applying to specifications, limits have been laid down for application to existing exchanges.

These latter limits are herein called *accepted* limits, while those for new equipment are called *recommended* limits.

The present Recommendation covers the case where audible tones are applied within the network. However, the same frequencies and cadences are to be applied if, in the ISDN, the audible tones are generated at the terminal equipment.

2 Electrical levels for tones

For international purposes, the levels of the ringing tone, the busy tone, the congestion tone, the special information tone and the warning tone have to be defined at a zero relative level point at the incoming (in the traffic direction) end of the international circuit.

The level of tones so defined must have a nominal value of -10 dBm0. The recommended limits should be not more than -5 dBm0 nor less than -15 dBm0 measured with continuous tone.

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[1] This Recommendation is also included in the Series Q Recommendations under the number Q.35 (Fascicle VI.1)

[2] See Supplement No. 2 at the end of this fascicle for particular values of tone cadences and frequencies in actual use.

[3] Recommendation E.181 specifies the information which could be given to users to facilitate recognition of foreign tones.

For the special information tone, a difference in level of 3 dB is tolerable between any two of the three frequencies which make up the tone.

For the power level of the dial tone the point of reference is the local exchange, where the subscriber line is connected. In the existing networks the absolute power at the 2-wire access in the direction towards the subscriber station is normally in the range of -10 dBm $\pm$ 5 dB. However, with respect to interference with multifrequency pushbutton (MFPB) receivers dial tone levels higher than -10 dBm should be avoided.

Note – The relative level of local exchanges in an analogue network is not fixed. For digital local exchanges the relative levels are given in Recommendation Q.517. A preferred level range of digital tone generators is -8 dBm0 to -3 dBm0 corresponding with the above level range at the output of local exchanges.

3 Acoustical levels for tones

When tones are generated by a source within a network, e.g., by a telephone exchange, the power level as perceived by the user will be influenced by the characteristics of the subscriber's line and the equipment between the source and the user's ear.

Furthermore, tones can be generated within the user's equipment, triggered by signals from the exchange. In these circumstances it is necessary to define the tone level in terms of the preferred range of sound pressure levels as heard by the listener.

Research has shown that the preferred listening level for information tones is substantially independent of room noise, circuit noise and tone cadence, but does vary over a range of tone frequencies. Figure 1/E.180 shows the recommended sound pressure levels, with upper and lower limits of the recommended range, over a range of tone frequencies, based on these experiments.

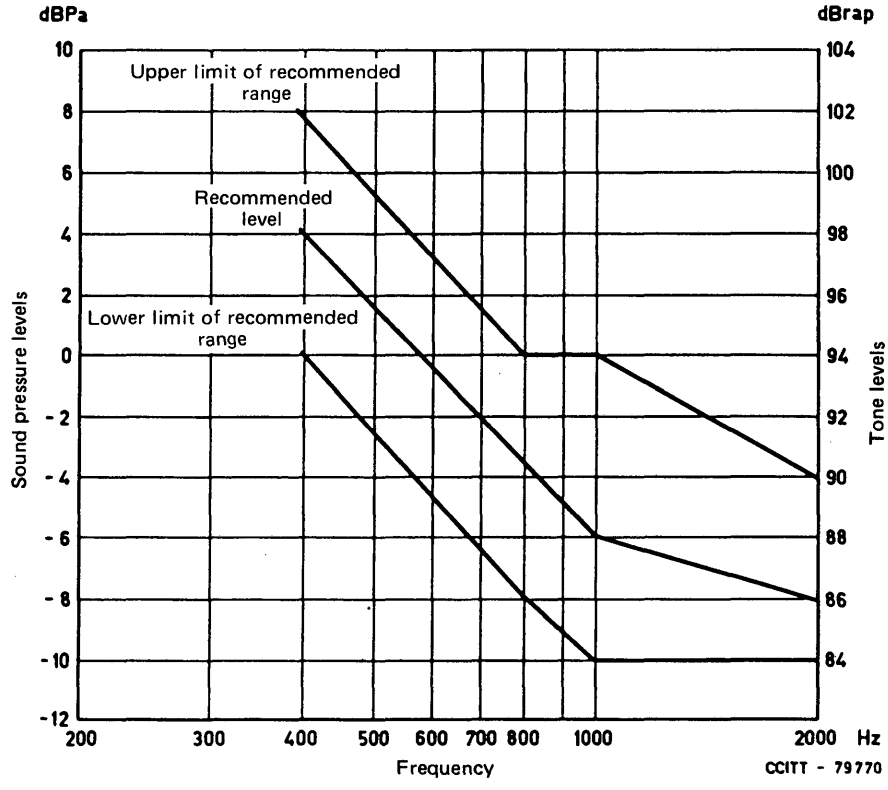


FIGURE 1/E.180

Recommended listening level limits for tones

It is emphasized that there is no one-to-one relationship between electrical and acoustical power levels. What acoustic level will result from a given electrical level is dependent on various parameters such as the characteristics of the user's equipment.

It should be noted that the recommended sound pressure levels apply only to the most common situation of a user listening via a telephone handset, held reasonably close to the ear so that normal "ear coupling loss" values apply.

When using a loudspeaking telephone or a headset, the preferred sound pressure level is generally lower than the recommended levels.

4 Dial tone

4.1 It is recommended that dial tone should be a continuous tone.

4.2 It is recommended that dial tone should be:

- *either* a single frequency tone in the range 400-450 Hz,
- *or* a combined tone composed of up to three frequencies, with at least one frequency in each of the ranges 340-425 Hz and 400-450 Hz. The difference between any two frequencies should be at least 25 Hz.

4.3 Recognizing the local nature of "normal" use of dial tone, as well as the technical and economic consequences and consequences on customer habits of changes in dial tone, the full range of existing dial tones, including non-continuous tones as in Supplement No. 2 at the end of this fascicle, are considered acceptable. However, when adopting a new single frequency dial tone, Administrations are recommended to use 425 Hz.

4.4 Where digital tone generation is applied, the frequencies for dial tone should be the same as those recommended for analogue generated tones (see Annex A).

4.5 In order to prevent interference of harmonics or spurious components of the dial tone with the frequencies recommended for pushbutton telephone sets in Recommendation Q.23 and the MFPB signal reception specified in Recommendation Q.24, the maximum permissible power level of harmonics or quantizing noise of the dial tone has to be limited in a suitable way, depending on the specific characteristics of the implementations of the dial tone generator and the MFPB receivers within the same exchange. Examples of such limitations for the dial tone generator are given in Annex B.

Note – In cases of digital generation of the dial tone, the quantizing noise is composed of a number of spectral lines which depend on the number of samples in the generating pattern. In order to reduce the amplitude of the quantizing components, the number of samples should be chosen sufficiently high, thus spreading the quantizing distortion power more evenly over the whole spectrum.

5 Ringing tone

5.1 Ringing tone is a slow period tone, in which the tone period is shorter than the silent period.

The *recommended* limits for the tone period (including tolerances) are from 0.67 to 1.5 seconds. For existing exchanges, the *accepted* upper limit for the tone period is 2.5 seconds.

The *recommended* limits for the silent period separating two tone periods are 3 to 5 seconds. For existing exchanges, the *accepted* upper limit is 6 seconds.

The first tone period should start as soon as possible after the called subscriber's line has been found.

Figure 2/E.180 shows the recommended and accepted limits for the ringing tone periods.

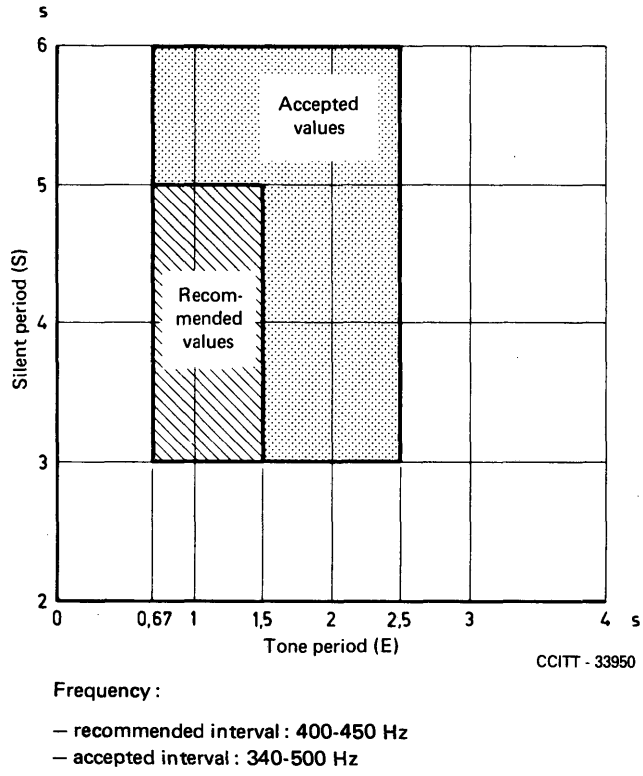


FIGURE 2/E.180

Ringing tone

5.2 The ringing tone cadence should be similar to the cadence used for applying ringing current to the called subscriber's telephone set, but these two cadences need not be synchronized. The electrical parameters of the ringing current must be evaluated by the Administration concerned to prevent shock hazard.

5.3 The recommended frequency for the ringing tone is between 400 and 450 Hz. The accepted frequency should be not less than 340 Hz, nor more than 500 Hz. Frequencies between 450 and 500 Hz in the accepted frequency range should, however, be avoided. Administrations adopting a new single frequency ringing tone are recommended to use 425 Hz.

The ringing tone frequency may be modulated by a frequency between 16 and 100 Hz, but such modulation is not recommended for new equipment. If the accepted frequency is more than 475 Hz, no modulation by a lower frequency is allowed.

5.4 Where digital tone generation is applied, the frequency for ringing tone should be the same as that recommended for analogue generated tones (see Annex A).

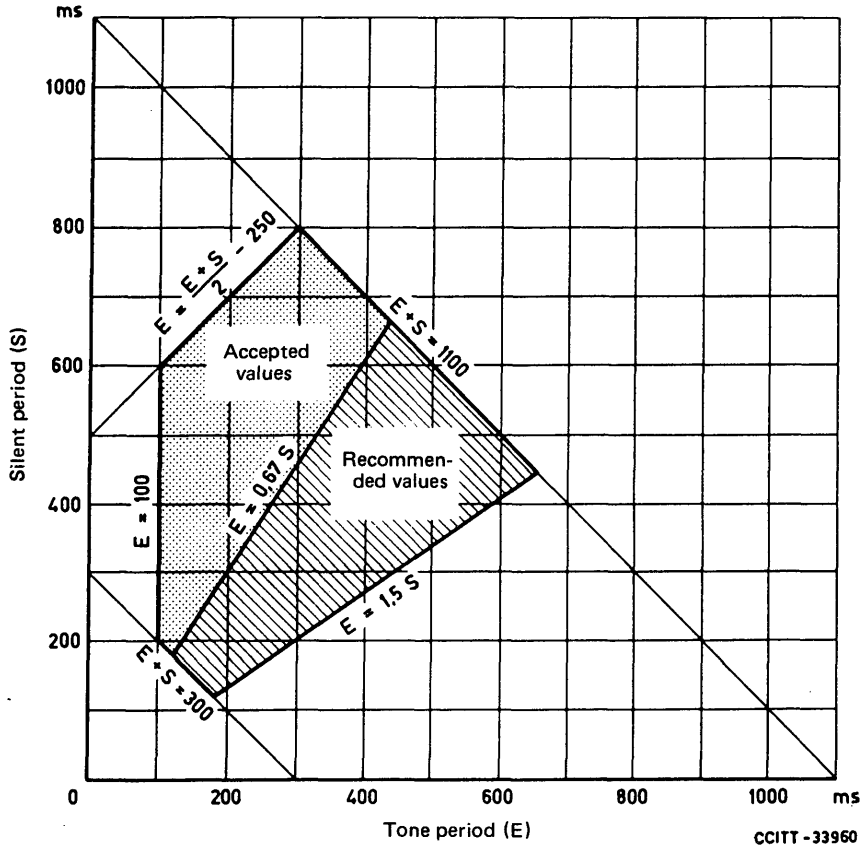
6 Busy tone and congestion tone

6.1 The (subscriber) busy tone and the (equipment or circuit group) congestion tone are *quick* period tones in which the tone period is theoretically equal to the silent period. The total duration of a complete cycle (tone period E + silent period S) should be between 300 and 1100 milliseconds.

The ratio E/S of the tone period to the silent period should be between 0.67 and 1.5 (*recommended* values).

For existing exchanges, or for tones to be used in a special way, it is *accepted* that the tone period may be up to 500 milliseconds shorter than the silent period ($E \geqslant S - 500$ milliseconds). In no circumstances should the tone period be shorter than 100 milliseconds.

Figure 3/E.180 shows the recommended and the accepted areas for the busy tone and the congestion tone periods.



Frequency:

- recommended interval: 400-450 Hz
- accepted interval: 340-500 Hz

FIGURE 3/E.180

(Subscriber) busy tone and (equipment or circuit group) congestion tone

6.2 The busy tone (of the called subscriber) and the congestion tone (of switching equipment or circuit groups) can be identical or almost identical, providing that this does not create any serious problems for the network and does not cause the subscriber to become confused. However, a distinction between these two tones is desirable:

- to allow Administrations to assess the quality of service,
- for the convenience of experienced subscribers.

6.3 Where a distinct congestion tone is used, it is recommended that:

a) the same *frequency* should be used for the busy tone and the congestion tone;

b) the busy tone should have a slower cadence than the congestion tone, but both cadences should be within the limits mentioned in § 5.1 above.

6.4 The *recommended* frequency for the busy tone and for the congestion tone must be between 400 and 450 Hz. The *accepted* frequency must not be less than 340 nor more than 500 Hz. Frequencies between 450 and 500 Hz in the accepted frequency range should, however, be avoided. Administrations adopting a new single frequency for busy and congestion tones are recommended to use 425 Hz.

6.5 Where digital tone generation is applied, the frequency for busy and congestion tones should be the same as that recommended for analogue generated tones (see Annex A).

7 Special information tone

7.1 The special information tone is provided for all cases in which neither the busy nor the congestion tone can give the required information to the calling subscriber in the case of call failure. There are three ways in which it may be used:

a) when in special cases no provision is made for recourse either to a recorded announcement or to an operator, the equipment at the point which the calls have reached must:

1) *either* connect the special information tone to the call,

2) *or* preferably, if technically available, send an appropriate backward signal such that connection to the special information tone will be made by equipment which is nearer to the caller;

b) when the call is connected to a recorded voice machine; the tone is then given during the silent intervals between transmissions of the announcement;

c) under arrangements made at manual positions serving lines which have been abnormally routed so that by operating a key the operators may send the special information signal when, for example, the calling subscriber fails to understand the operator.

When the special information tone is applied with or without a recorded announcement, it should be recognized that customers may refer to an operator if they fail to understand the meaning of the recorded announcement and/or the special information tone.

7.2 The special information tone has a tone period theoretically equal in length to the silent period.

Tone period – The tone period consists of three successive tone signals, each lasting for 330 ± 70 milliseconds. Between these tone signals there may be a gap of up to 30 milliseconds.

Silent period – This lasts for 1000 ± 250 milliseconds.

7.3 The frequencies used for the three tone signals are: 950 ± 50 Hz; 1400 ± 50 Hz; 1800 ± 50 Hz, sent in that order.

8 Warning tone to indicate that a conversation is being recorded

Where a conversation is being recorded at a subscriber's station, it is recommended that the Administration require the use of a warning tone to indicate that the conversation is being recorded. When such a tone is applied, it is recommended that:

a) it consists of a 350-500 ms pulse every 15 ± 3 seconds of recording time, and

b) the frequency of the tone should be 1400 Hz ± 1.5%.

9 Payphone recognition tone

9.1 Where Administrations see the necessity of application of a payphone recognition tone in order to allow operators to recognise that a call originates at a payphone station or that the called number belongs to a payphone station it is recommended to use a payphone recognition tone.

The application of the tone will depend on the operational requirements of individual Administrations, e.g., in some cases the tone will only be required on an incoming call to the payphone, whilst in others there may be a requirement for the tone to be present on originating calls and throughout the period of the call.

9.2 The tone is a combination of two frequencies f_1 and f_2 in the range:

f_1: 1100-1750 Hz

f_2: 750-1450 Hz

with the ratio: f_1/f_2 = 1.2 to 1.5

and with a cadence (frequency sequence) as follows:

f_1 on 200 ms, silence 200 ms, f_2 on 200 ms, silence 2 s (one cycle is therefore 2.6 s).

9.3 *Duration and level*

9.3.1 A principal purpose of the payphone recognition tone in international telephony is to identify a called station as a payphone where the possibility exists of attempted fraud on a collect call. For this purpose the tone must be produced as soon as a payphone answers a call, it must be clearly audible to an operator, and it must cease before it can seriously interfere with conversation.

When the tone is used on an incoming call to payphone, it should have, in addition to those characteristics defined in § 9.2, a duration of 5 complete cycles (13 s).

9.3.2 If the tone is used to identify payphones which are originating calls, its duration is not specified.

9.3.3 The specification in § 9.3.1 applies only to the first five cycles of the tone when the payphone is the receiving station.

For use throughout a call or during conversation, the level and duration of the tone have to meet two contradictory requirements:

- the public exchange operator should be able to detect and recognise the tone in the presence of the highest expected levels of speech;
- the tone should not interfere unduly with normal conversation.

Experience of customer reaction to the tone requires that the time during which the tone is applied should be as short as possible, subject to operational requirements. Similarly the level of the tone should be as low as possible and significantly lower than the recommended levels for other tones (e.g., −20 dBm at the payphone output). The duration of the tone and the level at which it is applied are interdependent factors, the shorter the duration the higher the level and vice versa. (Further studies on the recommended levels and duration will be carried out.)

10 Call waiting tone

10.1 The call waiting tone is used to advise a subscriber who is engaged on a call that another subscriber is attempting to call.

10.2 The tone is intended to be sufficiently alerting to succeed in its purpose without interfering with existing conversation.

10.3 The *recommend* specification of the tone is one or more cycles defined by a frequency f in the range:

f: 400 to 450 Hz

and with a cadence (frequency sequence) as follows:

a) f on 300 to 500 ms, silence 8 to 10 s (f = 300 ms is preferable to the longer tone since the ongoing conversation would be interrupted for a briefer interval); or

b) f on 100 to 200 ms, silence 100 to 200 ms, f on 100 to 200 ms (the total to be no more than 500 ms); 8 to 10 s silence.

Other tones may be *acceptable.*

10.4 The second and subsequent cycles may be at a lower level than the initial one.

10.5 Where the tone continues for more than one cycle, it should preferably cease when it is no longer possible to accept the waiting call.

11 Caller waiting tone

11.1 This tone advises a caller that a called station, though busy, has a call waiting service active.

11.2 It is intended that, if this tone is not correctly interpreted by subscribers, it be misinterpreted as the ringing tone.

11.3 To dissuade a caller from waiting indefinitely, the tone may cease 30 seconds[4] after it starts and may be replaced by busy tone, or an Administration may decide to disconnect the calling station.

11.4 The caller waiting tone consists of a ringing tone followed, after a silent interval of 0 to 200 ms, by one of the following:

a) the tone defined in § 10.3 a)

b) the pair of tones defined in § 10.3 b)

c) another call waiting tone in use by an Administration, provided that it can be appended to each sounded part of the ringing tone.

11.5 The caller waiting tone, as defined in § 11.4, should be distinguishably different from the ringing tone when directly compared with it.

12 Machine recognition of tones

The CCITT appreciates the value of machine recognition of tones for the purpose of service observations, maintenance, testing or for the collection of statistics where equivalent electrical signals do not exist. However, the CCITT considered, at Mar del Plata in 1968, that such machine recognition should not be a substitute for electrical signals. Where machine recognition of audible tones is to be introduced, the tone frequencies and cadences must be within close limits of precision.

For dial tone, ringing tone, busy and congestion tones a working frequency tolerance of ± 1% should be met.

Note – The figure of 1% is taken as a compromise out of several national specifications which vary between ± 0.5% and ± 1.5%. (See also Supplement No. 3.)

ANNEX A

(to Recommendation E.180)

Digital generation of tones

The practice of several Administrations and equipment designers for digital generation of tones is known to deviate largely:

- in the frequency chosen within the recommended range;
- in the power level which varies with the national application;
- in the mechanism of generation of tones and signal frequencies where, in part, the same equipment is used.

Therefore, it was found difficult to standardize on a fixed number of samples with a coded bit-stream, which represents one frequency with one distinct power level.

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[4] The specification of this time needs further study.

On the other hand there is no necessity for standardizing digital generated tones in a more stringent way than analogue generated tones for the following reasons:

- It is to the interest of Administrations that subscribers should not be confused by hearing different tones for the same purpose within their national networks. Consequently the practice already in use for analogue generated tones should be maintained for reasons associated with the human factor.
- The advantages that can be achieved by standardizing the code words for the tones in order to allow automatic recognition of tones by monitoring the bit stream seem to be so small that they do not justify a stringent restriction on all possible methods for digital generation of any frequency allocated with any level.
- For a long period of time a mixture of analogue and digital networks will exist. Thus, machine recognition of tones will have to be performed also with analogue receivers.

However, when Administrations have full freedom to make new decisions about tones in future networks, especially with respect to an all-digital network, they may consider a preferred solution for the digital generation of dial tone, busy tone, congestion tone and ringing tone having a uniform frequency of 425 Hz, as recommended by CCITT.

ANNEX B

(to Recommendation E.180)

Examples for limitation of spurious components of the dial tone with respect to interference with the frequencies recommended for pushbutton telephone sets in Recommendation Q.23

B.1 *Method A* (used by ATT)

The total distortion power should be at least 33 dB less than the dial tone power, and the distortion power in any 100 Hz band above 500 Hz should be at least 40 dB less than the dial tone power.

B.2 *Method B* (used by the Federal Republic of Germany)

In the frequency range from 500 to 2000 Hz [i.e., the range of multifrequency pushbutton (MFPB) frequencies] the distortion power in any 100 Hz band should be at least 40 dB below the dial tone power. In addition, in the frequency range above 2000 Hz up to 4000 Hz the total distortion power should be at least 25 dB below the dial tone power.

Recommendation E.181 [1]

CUSTOMER RECOGNITION OF FOREIGN TONES

1 In order to facilitate recognition of foreign ringing and busy tones by a subscriber dialling an automatic international call, the information given to subscribers should:

1) emphasize that a slow repetition rate of the tone means "ringing" whereas a rapid repetition rate means "busy";
2) indicate that in some countries the ringing tone may be heard as a sequence of two short tones, pause, two more short tones, pause, and so on.

In addition, it may be useful for the purpose of educating subscribers:

- to provide auditory samples of such tones by tape recording or other means, or
- to include detailed descriptions of tones in directories.

[1] This Recommendation is also included in the Series Q Recommendations under the number Q.36.

2 Modern international signalling systems are capable of exchanging signals corresponding to indications normally given to subscribers by means of audible tones (busy, congestion, ringing, etc.). Administrations are encouraged to arrange their networks so that these information signals can be sent between countries in order that they can be recognized and converted into tones or announcements as near to the calling subscriber as practical. This procedure could significantly reduce the language problems arising from the growing use of recorded announcements.

Note – This Recommendation is complementary to Recommendation E.180 on the standardization of tones in the international telephone network. Whilst standardization is of primary importance, telephone users need information to assist them in recognizing foreign tones until such time as standardization is complete.

This is the purpose of § 1 of the present Recommendation which, as extensive human factor experiments show, should greatly reduce subscriber confusion.

The measure mentioned in § 2 does not eliminate the need for tone standardization as well, but can reduce customer difficulties in cases where standardization may be impractical for a long period but sophisticated exchanges arrangements are available.

Recommendation E.182

APPLICATION OF TONES AND RECORDED ANNOUNCEMENTS IN TELEPHONE SERVICES

Introduction

1 This Recommendation gives the responses that telephone networks should provide to subscribers in the operation of both basic and supplementary telephone services. Three levels of response may be given:

- preferred responses based solely upon subscriber requirements;
- accepted responses to be used where technical or economic reasons inhibit the use of preferred responses;
- exceptional responses to be used where severe technical or economic constraints prevent the use of preferred or accepted responses.

2 It has not been possible in some cases to state a universally applicable preference between recorded announcements and tones. The factors influencing such a choice vary widely between Administrations in their relative importance. Some features which make recorded announcements attractive are:

- They can reduce the level of calls to operators thus saving considerable expense.
- From a human factors point of view the use of an excessive number of different tones can be confusing to the user. Recorded announcements give an opportunity to present a far greater spectrum of information.
- They can impart more detailed and specific information than tones.
- They can have less chance of being misunderstood than tones in situations encountered infrequently.

Nevertheless recorded announcements have certain drawbacks also:

- They require more time to convey simple information than a tone indication would.
- They are meaningless to people who do not understand the language used. This fact may make their application in multilingual countries impractical.
- Technical and economic constraints might inhibit their use in some networks.
- Subscribers might not always listen long enough to distinguish between different announcements.

3 In this Recommendation, where no preference is stated between alternative responses, individual Administrations should evaluate the situation in their own networks taking the above factors into account. Additional CCITT studies will be undertaken to better evaluate the relative merits of tones and recorded announcements.

4 A list of tones and announcements used as indications to telephone subscribers is given in Annex A.

The CCITT,

considering

(a) that subscribers set up telephone calls and control supplementary telephone services by means of an interchange of information between the subscriber and the telephone system;

(b) that information sent by the subscriber to the exchange is standardized in several CCITT Recommendations, e.g., Recommendation E.163 for country codes;

(c) that information from the telephone system to the subscriber can be sent in the form of tones or recorded announcements;

(d) that the technical characteristics of the dial tone, the ringing tone, the busy tone, the congestion tone, the special information tone and the warning tone are specified in Recommendation E.180 and that the specification of other tones is studied by the CCITT;

(e) that a certain tone or recorded announcement should unambiguously indicate the desired subscriber action without requiring subscriber knowledge of the operation of the telephone system;

(f) that a standardized application of tones and recorded announcements will improve subscriber performance and will lead to a more efficient use of the telephone network;

(g) that for normal telephone calls and supplementary telephone services an identical application of tones and recorded announcements is desirable;

(h) that it is easy to implement standardization of the application of tones and recorded announcements for new supplementary telephone services, but this is more difficult for existing telephone systems and should be regarded as a long-term objective;

(i) that to avoid abuse of the transfer charge service it is desirable that an operator should be advised when connecting calls to a payphone;

(j) that only tones and announcements are covered in this Recommendation although it can be seen that in some cases a visual indication may be an alternative;

recommends

(1) that this Recommendation shall apply to all telephone services and telephone networks. PABXs should, with certain indicated exceptions, use the same tones as the network in the country in which it is located;

(2) that all tones and recorded announcements should be given as soon as the information received by the telephone network is sufficient to decide which tone or recorded announcement applies, unless there is an established subscriber need for the indication to be given later;

(3) that when a subscriber should wait for a network reaction, no tones or announcement should be given. This condition applies during, e.g., dial-tone delay and post-dialling delay. Exceptionally when a post-dialling delay on an outgoing international automatic call occurs that is likely to cause a subscriber to abandon the call, an appropriate announcement or a *comfort tone* may be used if it has been shown to reduce premature abandonment;

(4) that when a subscriber should start dialling, a *dial tone* should be given. At PABXs this tone may be different from that at the public exchange and in this case the tone is named *PABX internal dial tone*;

(5) that when a subscriber should start dialling and a special condition applies to his line, a *special dial tone* may be given. This condition applies, for example, during activated diversion of calls to another number;

(6) that, except for PABXs and supplementary services, a second dial tone should not be used and a second application of dial tone should also be avoided;

(7) that when a subscriber should wait until the called party answers and no special condition applies to the line, a *ringing tone* should be given;

(8) that when the called number is busy and no special condition applies to the called line, a *busy tone* should be given to the calling subscriber;

(9) that when a special condition of either "call waiting" or "call diversion" applies to a called line, the calling subscriber may be informed about the special condition. The responses should therefore be either a *specific recorded announcement* or *caller waiting tone* or *ringing tone.* In PABXs a *special ringing tone* may be used for the "call waiting" service.

In the case of "call diversion", if an announcement is given, it is necessary to give the announcement before the call is diverted. This especially applies if additional call charges have to be paid by the calling party.

(10) that a subscriber should be informed when the network has accepted a control order for a supplementary service, e.g., activation, deactivation, registration, erasure. The responses to be given should be either a *specific recorded announcement*, e.g., "alarm call booked for 7.18", a *general positive recorded announcement*, e.g. "order executed" or a *positive indication tone*;

(11) that a subscriber – after having applied a valid *interrogation order* for a supplementary service – should be informed by the network whether the service is activated or not (status check) or, if the information dialled is identical to the stored information (data check) or, specifically what information is stored (data request).

If a status check or data check applies, the responses to be given should be:

- either a *positive* or *negative general recorded announcement* e.g., "service (not) active" or "information dialled (not) identical to information stored",
- or an appropriate *positive indication tone*,
- or an appropriate *negative indication tone.*

If a data request applies, the response should be a *specific recorded announcement* e.g. "alarm call booked for 7.18, 9.30 and 12.35" or "no alarm call booked".

(12) that a busy subscriber, having the service "call waiting" activated, should be informed that an incoming call is waiting. The response is *call waiting tone*;

(13) that when the called number cannot be reached or a control order for activation, registration, deactivation, interrogation, or erasure for a supplementary service cannot be executed by the network in one attempt, due to "short-term system nonavailability" but a repeated attempt within a short time may be successful, a *congestion tone* should be given. This condition applies, for example, if short-term congestion of switching equipment, circuits or memory storage capacity occurs;

(14) that when the called number cannot be reached or a control order for a supplementary service cannot be executed in one attempt due to "recognized long-term nonavailability" and a repeated attempt would have no or small probability of success for a longer period of time (e.g., a few hours), the preferred response is a *specific recorded announcement*, e.g., "the called number is not obtainable because of a network fault, please call again after (1) hour". Alternatively, a *general recorded announcement* or *special information tone* may be used.

This condition applies when:

- a number is out of order for technical reasons;
- where switching equipment or circuits or memory storage capacity will not be available for at least a few hours.

(15) that when the called number cannot be reached in one attempt because of an unresolved condition of the called number due to administrative reasons, the preferred response is a *specific recorded announcement* e.g., "the number has been changed, the new number is 12345". Alternatively, *a general recorded announcement* or *special information tone* may be used.

This condition applies when:

- a number is out of order for administrative reasons;
- a number is not yet connected;
- a number has changed.

(16) that when the information dialled by the subscriber, for set-up of an ordinary telephone call or to order a supplementary service, is not valid or cannot be accepted by the network from that particular line and the subscriber should check his information and/or his instructions before making a new attempt:

- the preferred response is a *specific recorded announcement*, e.g., "In international dialling to this country the trunk prefix 0 should be deleted";
- the accepted response is a general negative announcement, e.g., "You have dialled incorrect information, please consult your instructions". For PABXs a *negative indication tone* may be used;
- the exceptional response is a special information tone.

This condition applies when the number dialled:

- is non-existing,
- is barred for calls from a particular line,
- contains an incorrect prefix,
- is a control order for a service which is not provided to the particular line.

(17) that when it is desirable to inform the subscriber to continue dialling during the ordering of a supplementary service in the conversational mode, the response to be given should be either a *specific recorded announcement* followed by the appropriate dial tone, or a *second dial tone*;

(18) that an indication should be given when a payphone user is required to make a payment during a call. The response to be given should be either a *specific recorded announcement* or a *pay tone*;

(19) that an indication should be given to a public network operator when handling a call from or to a payphone, and that where a tone is used:

- the preferred response is *payphone recognition tone.*

(20) that when a subscriber is asked to speak so as to be recorded by a recording machine, a tone should be given to inform him when to begin to speak; the response to be used is the *record tone*;

(21) that when the privacy of a conversation on a call cannot be ensured, e.g., because of the intrusion of an operator, the preferred response is the *intrusion tone* given to both subscribers;

(22) that when the privacy of a conversation on a call cannot be ensured, e.g., because of the presence of a recording machine, the preferred response is the *warning tone*;

(23) that all the above-mentioned tones should be different.

ANNEX A

(to Recommendation E.182)

List of tones and announcements used as indications to telephone subscribers

Note – This annex is provided to explain the terms in Recommendation E.182 and some related terms. It is not a definitive list and additional refinement will be undertaken as part of future studies.

A.1 *Basic terms*

A.1.1 **audible indication**

F: indication audible

S: indicación audible

An audible indication is understood to be a sound composed of frequencies within the range 300-3400 Hz which is used to inform the user about the state of a telephone call or supplementary service.

A.1.2 **tone**

F: tonalité

S: tono

A tone is an audible indication comprising a small number of discrete frequencies, but excluding speech.

A.1.3 **recorded announcement**

F: annonce enregistrée

S: anuncio grabado

An audible indication in the form of speech.

A.1.4 **call information**

F: information d'appel

S: información de llamada

Call information includes normal address information, control codes for supplementary services, and other information dialled or keyed by the subscriber.

A.2 *Tones*

A.2.1 **dial tone**

F: tonalité de numérotation

S: tono de invitación a marcar

A tone advising that the exchange is ready to receive call information and inviting the user to start sending call information.

A.2.2 **PABX internal dial tone**

F: tonalité interne de numérotation des commutateurs privés

S: tono de invitación a marcar interno de centralitas privadas automáticas conectadas a la red pública (tono de marcar interno de centralita privada automática, CPA)

A tone advising that the PABX is ready to receive call information and inviting the user to start sending call information.

A.2.3 **special dial tone**

F: tonalité spéciale de numérotation

S: tono especial de invitación a marcar

A tone advising that the exchange is ready to receive call information and inviting the user to start sending call information, at the same time reminding the user that special conditions apply to the termination from which the call is being made.

A.2.4 **second dial tone**

F: seconde tonalité de numérotation

S: segundo tono de invitación a marcar

A tone advising the caller that the network has accepted the call information already sent and asking the caller to provide more information.

A.2.5 **ringing tone**

F: tonalité de retour d'appel

S: tono de llamada

A tone advising the caller that a connection has been made and that a calling signal is being applied to a telephone number or service point.

A.2.6 **busy tone**

F: tonalité d'occupation

S: tono de ocupado

A tone advising the caller that the telephone number is busy.

A.2.7 **congestion tone**

F: tonalité d'encombrement

S: tono de congestión

A tone advising the caller that the groups of lines or switching equipment necessary for the setting-up of the required call or for the use of a specific service are temporarily engaged.

A.2.8 **special information tone**

F: tonalité spéciale d'information

S: tono especial de información

A tone advising the caller that the called number cannot be reached for reasons other than "subscriber busy" or "congestion".

The tone may also be used in conjunction with recorded announcements to signify that what the caller is about to hear is a recording. It should always be used to precede all call failure announcements.

A.2.9 **warning tone**

F: tonalité d'avertissement

S: tono de aviso

A tone warning participants in a call that privacy of a conversation cannot be ensured where a recording machine is being used.

A.2.10 **intrusion tone**

F: tonalité d'intrusion

S: tono de intervención

A tone advising participants during a call that the privacy of the conversation has been breached, e.g. by the intervention of an operator.

A.2.11 **call waiting tone**

F: tonalité d'appel en attente

S: tono de indicación de llamada en espera

A tone advising the user of the call waiting supplementary service who is engaged on a call that someone is attempting to call his number.

A.2.12 **pay tone**

F: tonalité de paiement

S: tono de pago

A tone advising users of a payphone that a payment is required.

A.2.13 **payphone recognition tone**

F: tonalité d'identification de publiphone

S: tono de identificación de teléfono de previo pago

A tone advising a public exchange operator that the termination to or from which connection is sought is identified as a payphone.

A.2.14 **comfort tone**

F: tonalité de file d'attente

S: tono de paciencia

A tone advising that the call is being processed and that the caller should wait.

A.2.15 **tone on hold**

F: tonalité de garde

S: tono de retención

A tone used to reassure a calling subscriber who has been placed on "hold" by a subscriber with PBX or other facilities.

A.2.16 **record tone**

F: tonalité d'enregistrement

S: tono de grabación

A tone generated by automatic answering equipment to inform the calling subscriber when to begin a message which will be recorded.

A.2.17 **caller waiting tone**

F: tonalité de demandeur en attente

S: tono de indicación de llamada en espera para el llamande

A tone advising a caller that a called station, though busy, has a call waiting service active.

A.2.18 **positive indication tone**

F: tonalité d'indication positive

S: tono de indicación positivo

A tone telling a subscriber controlling a supplementary service that the control procedure has been successfully completed and accepted.

A.2.19 **negative indication tone**

F: tonalité d'indication negative

S: tono de indicación negativo

A tone advising a subscriber that the request for service cannot be accepted.

A.3 *Recorded announcements*

A.3.1 **general recorded announcement**

F: annonce enregistrée générale

S: anuncio grabado general

A recorded announcement giving general information about a call attempt or control order.

A.3.2 **general positive recorded announcement**

F: annonce enregistrée générale positive

S: anuncio grabado general positivo

A recorded announcement given to the user of a supplementary service to advise that the request has been accepted.

Example

"Your order has been executed."

A.3.3 **general negative recorded announcement**

F: annonce enregistrée générale negative

S: anuncio grabado general negativo

A recorded announcement given to the user of a supplementary service to advise that the request cannot be executed or that the call cannot be completed.

Examples

"Your order cannot be executed."
"Your call cannot be completed at this time."
"Please try again."

A.3.4 **specific recorded announcement**

F: annonce enregistrée spécifique

S: anuncio grabado específico

A recorded announcement giving specific information about a call attempt or control order.

A.3.5 **specific positive recorded announcement without supplementary information**

F: annonce enregistrée spécifique positive sans information supplémentaire

S: anuncio grabado específio positivo sin información suplementaria

A recorded announcement indicating to the user that the request for a particular supplementary service has been accepted.

Example

"The call barring service is now in operation."

A.3.6 **specific negative recorded announcement without supplementary information**

F: annonce enregistrée spécifique négative sans information supplémentaire

S: anuncio grabado específico negativo sin información suplementaria

A recorded announcement indicating to the user that the request for a particular supplementary service cannot be executed or that the call cannot be completed.

Examples

"Your order for call transfer cannot be executed."

"The called number is not obtainable because of a network fault."

A.3.7 **specific positive recorded announcement with supplementary information**

F: annonce enregistrée spécifique positive avec information supplémentaire

S: anuncio grabado específico positivo con información suplementaria

A recorded announcement complete with the supplementary information received indicating to the user that a certain condition is being established.

Example

"An alarm call is booked for 06.30."

Recommendation E.183

GUIDING PRINCIPLES FOR TELEPHONE ANNOUNCEMENTS

1 Introduction

Recorded announcements are of great value in the setting up of a call or supplementary service.

Administrations will need to use an announcement system which makes the announcements in real time and which permits the inclusion of specific information relating to a particular call or situation. This can be done by storing words or parts of words which can be appropriately assembled to make up the required announcements. These are called "concatenated-word" announcements.

Another approach is to use truly synthetic speech (synthesis-by-rule), generated in real time, to produce announcements as required. This avoids the need to store representations of utterances by a natural speaker, and has the advantage of total flexibility in the announcement that can be produced.

2 Content of announcements

2.1 Announcements should not commence with a significant word.

2.2 Ideally only one piece of information should be conveyed in an instructional announcement, but for practical purposes a maximum of three is recommended.

2.3 Repetition of important items of information is advisable. Announcements such as acknowledgement messages and error messages should be produced twice. However, guidance announcements which ask for input from the user should normally be produced only once.

2.4 Announcements should be phrased in a polite manner.

2.5 Announcements should be concise. This requirement is especially important for guidance announcements.

2.6 In many languages, simple affirmative sentences are most easily understood and should be used where possible, rather than negative and passive sentences. The use of negatives can sometimes be helpful, however, when emphasizing a point (e.g., as in "Do not . . .").

2.7 If applicable, the order in which procedural guidance is presented should correspond to the order in which actions are required to be executed (e.g., "Please press the # button and then replace the receiver", rather than "Before replacing the receiver, please press the # button).

2.8 If an action and its consequence are described, the consequence should be stated first, then the action (e.g., "To receive this message, please press the # button", rather than "Please press the # button to receive the message").

2.9 Where necessary, announcements should be given in more than one language.

2.10 Jargon should be avoided.

2.11 When several words or phrases could be used to convey the same idea (e.g., handset/receiver, hang-up/clear-down, etc.), one should be selected and used throughout.

3 Timing of announcements

3.1 Announcements should start at the beginning for each customer receiving them.

3.2 The speech rate should not exceed normal conversation speed. For example, normal speech rate for the English language is 150 to 200 words or 300 to 500 syllables per minute.

3.3 Attention should be given to the distribution of pauses within announcements, in order to allow listeners to digest items of information.

3.4 If an announcement is repeated once, the pause between the original announcement and its repetition should be about 2 seconds. Where announcements are required to be repeated more than once the pause between announcements may be extended (for instance 5 to 10 seconds).

3.5 The use of pauses within telephone numbers or items of information that have to be remembered or written down is recommended (for instance 500 to 1000 msec within a digit sequence).

Telephone numbers should be grouped with groups of two to four digits according to the custom.

4 Speech quality

4.1 Announcements should not sound as if they have finished when they have not, nor should they sound as if they continue when they have finished.

4.2 The speech quality of announcements should be assessed by listeners' subjective judgements from the user's end. The quality should refer to the whole system, including effects of transmission. A measuring method that can be used is the listening opinion test described in Volume V, Supplement 2.

5 Tones after announcements

5.1 After guidance announcements which ask for input from the user an indication to proceed should be given (in some cases dial tone will be appropriate).

5.2 When the user is required to replace the receiver following an announcement, congestion tone may be used.

6 Concatenated-word announcements

Problems which are peculiar to concatenated-word speech are described in the following paragraphs:

6.1 *Fluency problems*

The fluency of an announcement is influenced by the duration of the stored speech segment (for instance 1/16 second), and by the location of words within a segment or segments. Fluency may also be influenced by the insertion of additional silent segments between segments of speech. An iterative procedure of vocabulary editing and listening to the results until it is judged acceptable is recommended. Human factor tests need to be included in the iterative procedure. Experiments should be held with the typical users.

6.2 *Intonation problems*

Problems arise because speech is required to sound natural. Ideally only one version of each word would be assembled from segments held in store, as this would be the easiest and cheapest method of providing a range of announcements. However, the intonation pattern of a word may need to vary depending on the position of the word within a sentence.

For example:

a) "All calls to XXXX are being *diverted*".
   The stress on the word "diverted" falls towards the end of the word.

b) "Your call to Dr. Smith is being "diverted" to Dr. Jones".
   The pitch of the word "diverted" is neutral.

6.3 *Presentation of numerical information*

Numerical information, and in particular telephone numbers, can be more easily remembered if spoken in a familiar manner. This may necessitate different rules for different countries, and may be influenced by such things as numbering plan and custom. (For example, a 3 or 4 digit area code separated by a pause from a 5 or 6 digit local number. The number 7230 could be spoken as "seven, two, three, oh" or "seventy-two, thirty" or "seven, two, three, zero").

In many languages, three intonation patterns are required for telephone numbers, a neutral pattern for the body of the number, a continuant pattern for the end of an intermediate block (rising pitch), and a terminator for the end of the number (falling pitch). Number strings are more easily remembered if spoken with a rhythm based on the perceptual centres of utterances (e.g., digits), rather than with one based on the start of the utterance period.

The final determinant of what is required in a particular case depends upon the iterative procedure of listening, editing and judging previously mentioned.

6.4 *Update problems*

Problems may arise when an announcement has to be changed such that a word or words have to be either rerecorded or recorded for the first time. There may be difficulty in obtaining the original speaker, and even if the original speaker is available the voice may differ from the original recording, either temporarily (e.g., by a head cold) or permanently (e.g., through ageing). This can mean that the entire vocabulary has to be recorded again, or alternatively an announcement of degraded quality may be accepted as an expedient solution. Wherever possible, problems of this sort should be anticipated, and recordings made of a larger vocabulary than is to be used immediately.

7 Tones and announcements for use in telephone services

The problems associated with "concatenated-word" systems outlined above are avoided by the use of truly synthetic speech generated by rule. These rules translate a specification of what utterance is to be generated into acoustic output. If appropriate rules are found, this method can potentially generate high quality speech, and such features as speed of delivery, duration of pauses, and stress and pitch changes can be readily specified. One approach to the development of such systems starts with the use of natural speech analysis as the source for generating rule parameters, and leads on to the derivation of general rules to convert any message into speech output.

Rule-generated synthetic speech is currently on the threshold of full functional equivalence with that produced by waveform storage methods, such as word concatenation. However, even highly intelligible synthetic speech sounds unnatural and it may not be as acceptable to users as "concatenated-words" announcements, at least in the immediate future.

8 Preferred listening levels for announcements

The preferred listening level is -10 dBPa $\pm$ 5 dB measured at the customer's ear.

Recommendation E.184

INDICATIONS TO USERS OF ISDN TERMINALS

1 Introduction

1.1 Recommendations E.180 to E.184 deal with tones and other indications to users of the telephone service. This Recommendation covers the related but perhaps different requirements of the ISDN.

1.2 A person's ability to learn, distinguish between, and remember different tones representing abstract conditions is limited (to about four to six tones). Users are frequently confused by unfamiliar tones encountered through travel or international communication. Section 2 of this Recommendation advises against the use of new tones in order to avoid introducing user difficulties.

1.3 Where indications originate from a network (as proposed to a distant terminal), two situations may exist between the origin of the indications and the user of an ISDN terminal:

a) ISDN signalling is used throughout

b) In-band signalling is used in some parts of the connection.

1.4 Considering that information is sent to an ISDN terminal on a D-channel, and that the terminal may transform it into perceptible form, choices exist as to[1] the most appropriate way of passing indications on to the user (e.g., by means of a display or by tones).

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[1] The desirability of translating various ISDN indications, the situations governing such choices, and the relationships of these to terminal capability (particularly display capability), are subjects for further study.

2 Indications in an all-ISDN communication path

2.1 It is recommended that no new tone (i.e., tones not in use in the PSTN) be generated by an ISDN terminal.

2.2 Tones are recommended where an auditory method other than "speech" or announcements is chosen as the method for a terminal to translate received D-channel ISDN information for a user. Such tones should be those used in the PSTN in the country where the terminal is situated (Recommendation E.180).

2.3 It is recommended that where a terminal translates ISDN signalling to tones, such tones should be used with meanings analogous to their meanings in the PSTN.

2.4 It is recommended that the use of tones should be restricted to indicating the functions equivalent to the tones used in the PSTN and listed in Recommendation E.182, § A.2. In some cases, notably dial tone, ringing tone, and busy tone, these tones may be the best indicators even when other methods can be provided by a terminal.

3 Indications when ISDN is interworking with another network

Given that no tone recognition is likely to be provided by any network element for translating a tone into an ISDN signal for relaying to a terminal, it is recommended that any audible indication arising from a non-ISDN network be passed through an auditory channel to the ISDN terminal.

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SECTION 8

MARITIME MOBILE SERVICE

Recommendation E.200 [1]

OPERATIONAL PROVISIONS FOR THE MARITIME MOBILE SERVICE

Introductory Notes

1 Pursuant to Resolutions Nos. Mar2 – 22 and Mar2 – 23 and Recommendation Mar2 – 18 of the *World Administrative Maritime Radio Conference* [1], the CCITT drew up Recommendations E.200/F.110 and D.90 concerning operational and accounting provisions for the Maritime Mobile Service. Having accepted the conclusions of the CCITT studies, the *World Administrative Radio Conference* [2], adopted texts dealing with the basic principles on operating and accounting procedures, leaving the detailed application of these principles to be covered by CCITT Recommendations.

2 Article 66 (No. 5085) of the *Radio Regulations* [3] specifies that the provisions of the *Telegraph Regulations* [4] and the *Telephone Regulations* [4], taking into account CCITT Recommendations, shall apply to radiocommunications in so far as the relevant provisions of the *Radio Regulations* do not provide otherwise.

3 Since, in accordance with Article 69 of the *Radio Regulations*, Article 66 entered into force on 1 January 1981, the provisions of this Recommendation were applicable from that date.

4 References commencing with the letters J, K, L and M concern provisions in Divisions J, K, L and M respectively of Recommendation D.90 entitled *Charging, accounting and refunds in the Maritime Mobile Service.*

5 For the purpose of this Recommendation the term *Maritime Mobile Service* should be understood to embrace the Maritime Mobile-Satellite Service as well as the MF, HF, VHF and UHF radio media, unless specifically stated otherwise.

6 Throughout this Recommendation the term *Administration* means that recognized private operating agency/agencies are included. However, where this term is used in respect of notification by Administrations to the General Secretariat of the ITU, this applies only to recognized private operating agencies that have been authorized by Administrations to carry out such notification.

7 For the purpose of this Recommendation, the terms *mobile station* and *land station* should be considered as analogous to *ship station* and *coast station* respectively used in the *Radio Regulations.*

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[1] This Recommendation is also included in the Series F Recommendations under the number F.110.

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GENERAL

1 Definitions

A1 1.1 The **controlling operator** is the first land-based operator handling the radiotelegram, radiotelex call or radiotelephone call in the direction from mobile station.

A2 1.2 *Accounting authority identification code*

For the meaning of this term see J2 in Recommendation D.90.

A3 to A20 not allocated

2 Order of priority

A21 2.1 The order of priority for communications,[2] in the maritime mobile service shall be as follows, except where impracticable in a fully automated system in which, nevertheless, communications described in A22 shall receive priority.

A22 a) Distress calls, distress messages and distress traffic;

A23 b) Communications preceded by the urgency signal;

A24 c) Communications preceded by the safety signal;

A25 d) Communications relating to radio direction-finding;

A26 e) Communications relating to the navigation and safe movement of aircraft engaged in search and rescue operations;

A27 f) Communications relating to the navigation, movements and needs of ships, and weather observations messages destined for an official meteorological service;

A28 g) Radiotelegrams relative to the application of the United Nations Charter (**ETATPRIORITE**);

A29 h) Government radiotelegrams with priority (**ETATPRIORITE**) and government calls for which priority has been expressly requested;

A30 i) Ordinary private radiotelegrams and **RCT** radiotelegrams for which priority has been requested.

A30 *bis* j) Service communications relating to the working of the telecommunication service or to communications previously exchanged;

A31 k) Government communications other than those shown in A29, ordinary private communications and RCT radiotelegrams;

A32 l) Radiomaritime letters.

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[2] The term *communications* as used in A21 to A32 means radiotelegrams, radiotelephone calls and radiotelex calls.

RADIOTELEGRAMS

1 Preparation and handing-in of radiotelegrams

1.1 *Plain language*

B1 1.1.1 Groups of letters and figures from the *International Code of Signals* are considered as plain language in radiotelegrams.

1.2 *Indication of station of origin*

B2 1.2.1 When, because of duplication of names, the name of a station is followed by its call sign, the latter shall be joined to the name of the station by a fraction bar.

Examples: **OREGON/OZOC** (not **OREGONOZOC**);

ROSE/DDOR (not **ROSEDDOR**).

B3 1.2.2 When a land station retransmits a radiotelegram received from a mobile station, it shall transmit, as office of origin, the name of the mobile station in which the radiotelegram originated as this name appears in the appropriate list of stations, followed by its own name. Where appropriate, B2 shall also apply.

B4 1.2.3 In order to avoid any confusion with a telegraph office or a fixed station of the same name, the land station may, if desirable, complete the indication of the name of the mobile station of origin by the word **SHIP** or **AIRCRAFT**, placed before the station of origin.

1.3 *Use of accounting authority identification codes by mobile stations*

B5 1.3.1 The mobile station operator should, as a standard operating procedure, give the *accounting authority identification code* (AAIC) at the end of the preamble line. If the AAIC is missing, the land station operator should request **QRC?**

1.4 *Time of handing-in*

B6 1.4.1 In the transmission of radiotelegrams originating in a mobile station, the date and time of handing-in at this station are given by two groups of figures in the preamble line, the first indicating the day of the month (1 to 31) and the second consisting of a group of figures (0001 to 2400) indicating the hours and the minutes.

B7 1.4.2 The time of handing-in is indicated in Coordinated Universal Time (UTC).

Note – For practical operating purposes, UTC may be considered as equivalent to Greenwich Mean Time (GMT).

1.5 *Address*

B8 1.5.1 The address of radiotelegrams destined for mobile stations must be as complete as possible and must include:

B9 a) the name or the designation of the addressee, with supplementary particulars, if necessary;

B10 b) the name of the mobile station followed, when necessary, by its call sign, the latter joined by a fraction bar to the name of the station as shown in the *List of Ship Stations* [5];

B11 c) the name of the land station through which the radiotelegram is to be forwarded, as it appears in the appropriate list of stations.

B12 1.5.2 If the mobile station does not appear in the *List of Ship Stations* [5], the sender should, if possible, indicate the nationality and route followed by the mobile station.

B13 1.5.3 However, the name and call sign required under B10 may be replaced, at the risk of the sender, by particulars of the passage made by such mobile station, indicated by the names of the ports or airports of departure and of destination, or by any equivalent indication.

B14 1.5.4 Mobile stations may add to the name of the office of destination:

- the name of the territorial subdivision; and/or
- the destination or country.

if it is doubtful whether, without such addition, the radiotelegram could be correctly routed without difficulty.

B15 1.5.5 The controlling operator retains or deletes the particulars in B14 or further amends the name of the office of destination as is necessary or sufficient for forwarding the radiotelegram to its proper destination.

2 Counting of words

B16 2.1 The word count of the office of origin is decisive in the case of radiotelegrams destined for mobile stations, and that of the controlling operator is decisive in the case of radiotelegrams originating in mobile stations.[3)]

B17 2.2 If two land stations participate in the handling of a radiotelegram, the decision of the controlling operator accepting the radiotelegram from the originating mobile station will prevail and will be valid for international accounting.

3 Routing of radiotelegrams

B18 3.1 Radiotelegrams should be routed via the land station that is considered most suitable in relation to the mobile station concerned.

B19 3.2 However, to expedite or to facilitate the routing of radiotelegrams to a land station, a mobile station may transmit them to another mobile station. The latter shall dispose of such radiotelegrams in the same manner as if they originated with itself (see B39 to B42).

B20 3.3 If the sender of a radiotelegram handed in at a mobile station has indicated the land station to which he desires his radiotelegram to be sent, the mobile station shall, in order to effect this transmission to the land station indicated, wait, if necessary until the conditions specified in B18 and B19 are fulfilled.

B21 3.4 In order to facilitate disposal of traffic, and subject to such restrictions as individual Administrations may impose, land stations may, in exceptional circumstances and with discretion, without incurring additional charges, exchange radiotelegrams and service messages relating thereto.

4 Transmission of radiotelegrams

4.1 *Routine repetition*

B21A 4.1.1 Routine repeptition means the repetition of isolated figures and mixed groups containing figures in the address and text parts. Any such repetition should be given after the text part and be preceded by the code **COL**.

B21B 4.1.2 In view of Recommendation F.1, routine repetition is not compulsory. It is used at the discretion of the sending station where the transmission conditions warrant it.

B21C 4.1.3 Where a mobile station gives a routine repetition, the land station shall use the repeated groups to check the received address and text parts, but should not retransmit the routine operation.

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3) Refer also to K26 in Recommendation D.90.

4.2 *Doubtful reception*

B22 4.2.1 In the mobile service, when communication becomes difficult, the two stations in communication should make every effort to complete the radiotelegram in course of transmission. The receiving station may request not more than two repetitions of a radiotelegram of which the reception is doubtful.

B23 4.2.2 If this triple transmission is ineffective, the radiotelegram is kept on hand in case a favourable opportunity for completing its transmission occurs.

B24 4.2.3 If the transmitting station considers that it will not be possible to re-establish communications with the receiving station within twenty-four hours, it proceeds as follows:

B25 4.2.4 If the transmitting station is a mobile station, it immediately informs the sender of the reason for the non-transmission of his radiotelegram. The sender may then request:

B26 a) that the radiotelegram be transmitted through another land station or through other mobile stations; or

B27 b) that the radiotelegram be held until it can be transmitted without additional charge; or

B28 c) that the radiotelegram be cancelled.

B29 4.2.5 If the transmitting station is a land station, it applies the provisions of B43 to B54 to the radiotelegram.

B30 4.2.6 When a mobile station subsequently transmits a radiotelegram thus held to the land station that incompletely received it, this new transmission must bear the service instruction **AMPLIATION** at the end of the preamble line of the radiotelegram.

B31 4.2.7 However, if the radiotelegram is transmitted to another land station subject to the same Administration, the new transmission must bear, at the end of the preamble line, the service instruction **AMPLIATION VIA ...** (insert here the call sign of the land station to which the radiotelegram was transmitted in the first instance) and the Administration in question may claim only the charges relating to a single transmission.

B32 4.2.8 The other land station, which thus forwards the radiotelegram, may claim from the mobile station of origin any additional charges resulting from the transmission of the radiotelegram between itself and the office of destination.

B33 4.2.9 When the land station designated in the address as the station by which the radiotelegram is to be forwarded cannot reach the destination mobile station and has reason to believe that such mobile station is within the service area of another land station of the Administration to which it is itself subject, it may, if no additional charge is incurred thereby, forward the radiotelegram to this other land station.

B34 4.2.10 A station of the mobile service that has received a radiotelegram and has been unable to acknowledge its receipt in the usual way, must take the first favourable opportunity to give such acknowledgement.

B35 4.2.11 When the acknowledgement of receipt of a radiotelegram transmitted between a mobile station and a land station cannot be given direct, it is forwarded through another mobile or land station by service advice if the latter is able to communicate with the station that has transmitted the radiotelegram in question. In any case, no additional charge shall result.

4.3 *Long-distance radiocommunications*

B36 4.3.1 Administrations reserve the right to organize a long-distance radiocommunication service between land stations and mobile stations, with deferred acknowledgement of receipt or without any acknowledgement of receipt.

B37 4.3.2 Each Administration designates the land station or stations participating in the long-distance radio service. An indication to this effect shall appear in the *List of Coast Stations* [6].

B38 4.3.3 When there is doubt about the accuracy of any part of a radiotelegram transmitted under either of the systems mentioned in B36, the indication *doubtful reception* is entered on the copy delivered to the addressee, and the doubtful words or groups of words are underlined. If words are missing, blanks are left in the places where these words should be.

4.4 *Routine retransmission by mobile stations*

B39 4.4.1 When a land station cannot reach the mobile station for which a radiotelegram is destined, the land station may, in order to forward the radiotelegram to its destination, have recourse to the help of another mobile station provided that the latter consents. The radiotelegram is then transmitted to this other mobile station. The help of the latter is given free of charge.

B40 4.4.2 The same provision is also applicable to traffic from mobile stations to land stations, when necessary.

B41 4.4.4 The station assisting in the free retransmission in accordance with B39 and B40 must enter the service abbreviation **QSP** ... (name or call sign of the mobile station) at the end of the preamble line of the radiotelegram.

B42 4.4.4 In order that a radiotelegram thus forwarded may be considered as having reached its destination, the station that has made use of this indirect route must have obtained the regular acknowledgement of receipt, either direct or by an indirect route, from the mobile station for which the radiotelegram was destined or from the land station to which it was to be forwarded, as the case may be.

4.5 *Period of retention of radiotelegrams at land stations*

B43 4.5.1 When it has not been possible for a land station to transmit a radiotelegram to a mobile station by the morning of the fifth day (not including the day of handing-in), the land station treats the radiotelegram as undelivered and notifies the sender accordingly.

B44 4.5.2 The sender of a radiotelegram destined for a mobile station may specify the number of days during which the land station may hold the radiotelegram. In that case, the service indication **Jx** (**x** days), specifying the number of days (ten at the most) exclusive of the day of handing-in of the radiotelegram, shall be shown before the address. When it has not been possible for a land station to transmit a radiotelegram bearing the service indication **Jx** within the prescribed period, the land station treats the radiotelegram as undelivered and informs the sender accordingly.

B45 4.5.3 (Spare)

B46 4.5.4 The periods mentioned in B43 and B44 shall be ignored if the land station is sure that the mobile station will soon come within its service area.

B47 4.5.5 On the other hand, the lapse of those periods is not awaited when the land station is sure that the mobile station, being in course of a voyage, either has definitely left its service area or will not enter it.

B48 4.5.6 If there is reason to believe that no other land station of the Administration to which it is subject is or will be in touch with it, the land station cancels the radiotelegram as far as concerns the section between itself and the mobile station and informs the office of origin, which notifies the sender.

B49 4.5.7 In the contrary case, the land station forwards the radiotelegram to the land station believed to be in touch with the mobile station, provided, however, that no additional charge results therefrom.

B50 4.5.8 The land station that carries out the redirection alters the address of the radiotelegram by placing after the name of the mobile station that of the new land station charged with the transmission and adding at the end of the preamble line the service instruction **REDIRECTED FROM ... RADIO**, which must be transmitted throughout the course of the radiotelegram.

B51 4.5.9 If, within the limits of the requisite period of retention of radiotelegrams, the land station that has redirected a radiotelegram to another land station is subsequently in a position to transmit the radiotelegram direct to the destination mobile station, it does so by inserting the service instruction **AMPLIATION** at the end of the preamble line.

B52 4.5.10 It shall then transmit to the land station to which the radiotelegram had been redirected a service advice informing the latter of the transmission of the said radiotelegram.

B53 4.5.11 When a radiotelegram cannot be transmitted to a mobile station owing to the arrival of the latter in a port near the land station, the latter station may, according to circumstances, forward the radiotelegram to the mobile station by other means of communication, at the same time informing the office of origin by service advice of the delivery.

B54 4.5.12 (Spare)

5 Advice of nondelivery

B55 5.1 When, for any reason, a radiotelegram originating in a mobile station and destined for a place on land cannot be delivered to the addressee, an advice of non-delivery is addressed to the land station or the telegraph office that received the radiotelegram.

B56 5.2 After checking the address, the land station forwards the advice, when possible, to the mobile station, if necessary by way of another land station of the same country or of a neighbouring country, as far as existing conditions or special agreements permit.

B57 5.3 When a radiotelegram received at a mobile station cannot be delivered, that station so informs the office or mobile station of origin by a service advice.

B58 5.4 In the case of a radiotelegram originating on land, this service advice is sent, whenever possible, to the land station through which the radiotelegram passed, or, if necessary, to another land station of the same country or of a neighbouring country, as far as existing conditions or special arrangements permit.

B59 5.5 In such cases the name or call sign of the station from which the radiotelegram was received is quoted.

6 Radiomaritime letters

B60 6.1 Each Administration may organize a service of radiomaritime letters between mobile stations and its land stations.

B61 6.2 Such correspondence is transmitted by radio between the mobile and the land stations.

B62 6.3 They may be forwarded on the land section:

B63 a) wholly or partly by post (ordinary or airmail);

B64 b) exceptionally by telegraph, in which case delivery is subject to the periods of delay fixed for letter telegrams.

B65 6.4 Radio retransmission of radiomaritime letters is not permitted in the mobile service.

B66 6.5 Radiomaritime letters shall be addressed only to places in the country in which the land station is situated, unless it is indicated in the *List of Coast Stations* [6] that the station concerned will accept such traffic for onward transmission by post to places in other countries.

B67 6.6 Radiomaritime letters bear the service indication **SLT**. This indication precedes the address.

B68 6.7 Except as otherwise provided in B60 to B70, radiomaritime letters may be accepted, taking into account CCITT Recommendations relating to letter telegrams, if the telegram service is used to convey radiomaritime letters.

B69 6.8 The address must enable delivery to be effected without enquiry or requests for information. Registered or abbreviated addresses are admitted when, exceptionally, radiomaritime letters are forwarded telegraphically on the land section.

B70 6.9 Radiomaritime letters rank, for radio transmission, after ordinary radiotelegrams on hand. Those that have not been transmitted within 24 hours of handing-in are sent concurrently with ordinary radiotelegrams.

7 Special services

B71 7.1 Telegrams with special services are admitted, provided that the Administrations concerned accept them.

B72 7.2 Refer to Recommendation F.1, A266 to A274 for the provisions concerning special services that may be applied for telegrams.

8 Special conditions relating to the Maritime Mobile-Satellite Service

B73 8.1 In the Maritime Mobile-Satellite Service the transmission of radiotelegrams should normally be permitted by radiotelex only.

B74 8.2 The radiotelegram service in B73 should be arranged in such a way that automatic retransmission is possible.

RADIOTELEX

1 General

1.1 *Routing of calls*

C1 1.1.1 A radiotelex call should be set up via the land station that is considered most suitable in relation to the mobile station concerned.

C2 1.1.2 For radiotelex calls in the direction land station to mobile station, the caller should give the geographical position if possible and may also indicate the land station to be used. Such requests should be respected as far as is practicable.

C3 1.1.3 For radiotelex calls in the direction mobile station to land station, the mobile station shall call the land station it desires to use. The land station shall either handle the call itself or advise the mobile station to use another land station that is more suitable to the mobile station.

1.2 *Information to be supplied, as necessary, by the calling party*

C4 1.2.1 Calls to a mobile station:

a) telex number and/or answer-back code of the calling subscriber;

b) telex number of the mobile station;

c) name or call sign of the mobile station;

d) telex number and/or name of the land station to be used, or the approximate geographical position of the mobile station.

C5 1.2.2 Calls from a mobile station:

a) telex number of the mobile station;

b) the *accounting authority identification code (AAIC)* in the single-operator or manual service (see Annex A to Recommendation D.90);

c) destination country and/or network;

d) called subscriber's telex number and/or answer-back code.

1.3 *Call duration*

C6 1.3.1 The chargeable duration of a call will be fixed at the end of the call:

a) in the direction from mobile station by the controlling operator;

b) in the direction to mobile stations:

- by the land station operator in manual and single-operator service;
- by the operator of the international position of the outgoing country in the semiautomatic service.

C7 1.3.2 If two land stations participate in the handling of the call, the opinion of the land station that has accepted the call from the originating mobile station shall prevail.

C8 1.3.3 When, through any fault of the service, difficulty is experienced in the course of a call, the chargeable duration shall be reduced automatically or manually to the total time during which transmission conditions were satisfactory, taking into account CCITT Recommendations (F.60 and F.61).

1.4 *Validity of requests*

C9 1.4.1 If it becomes obvious that the required mobile station cannot be reached by the land station, the caller should be informed as soon as possible in order to have the opportunity to have the call cancelled if required. In any event, the caller should be informed no later than in the morning of the second day following the day on which the call request was made.

C10 1.4.2 In an automatic service any information concerning the failure to set up a call shall be sent back to the calling subscriber. The standardized expressions and abbreviations will be used to account for this failure. The period of validity for store and forward calls in the automatic service shall be as in Recommendation F.72.

1.5 *Exchange of radiotelegrams by radiotelex*

C11 1.5.1 Stations of the Maritime Mobile Service that are equipped for radiotelex may transmit and receive radiotelegrams by means of radiotelex.

C12 1.5.2 Stations of the Maritime Mobile-Satellite Service should normally transmit and receive radiotelegrams by means of radiotelex only.

2 Traffic from mobile stations

2.1 *Automatic service*

C13 2.1.1 Whenever possible, automatic procedures should be used; i.e. the calling subscriber should contact the called subscriber directly without the aid of an operator.

C14 2.1.2 After connection with the desired land station is established, the mobile station should select directly the appropriate telex destination code (Recommendation F.69) and the number of the subscriber of an Administration's telex network.

2.2 *Single-operator service*

C15 2.2.1 The land station operator selects the called subscriber directly via the automatic telex network if automatic procedures (C13) are not possible.

2.3 *Semiautomatic service*

C16 2.3.1 The telex operator of the international exchange of the land station country selects the called subscriber directly if automatic procedures (C13) or single-operator procedures (C15) cannot be applied.

2.4 *Manual service*

C17 2.4.1 The land station operator applies manual procedures if automatic (C13), single-operator (C15) or semiautomatic (C16) procedures are not possible.

2.5 *Store-and-forward service*

C17A 2.5.1 The mobile station transmits the message to the land station using automatic procedures, and the land station retransmits the message over the designated land network.

C17B 2.5.2 The manual, semi-automatic and automatic procedures for store-and-forward in the terrestrial telex network, as laid down in Recommendations F.72, U.80 and U.81, should be taken into account.

2.6 *Procedures*

C18 2.6.1 The manual, semiautomatic and automatic procedures for the terrestrial telex network, as laid down in Recommendations F.60 and F.61, should be taken into account.

3 Traffic to mobile stations

3.1 *Automatic procedure (direct access by the calling subscriber to the called subscriber)*

C19 3.1.1 Whenever possible automatic procedures should be used; i.e., the calling subscriber should contact the called subscriber directly without the aid of an operator.

C20 3.1.2 The subscriber of an Administration's telex network should select the appropriate address code, including the mobile station number, and if necessary the ocean area number, to connect him through a land station with which his Administration has established routing of maritime traffic for the ocean area desired.

C21 3.1.3 If the subscriber, for some technical reason, cannot establish contact with the mobile station directly, semiautomatic (C35) or single-operator (C24) procedures should be used.

C22 3.1.4 On international telex links a destination code will be used in accordance with Recommendation F.69, unless otherwise agreed bilaterally.

C23 3.1.5 Once a call has been established (indicated by an exchange of answer-backs), the subscriber should start a new line before sending his message (Recommendation F.60, § A.2.2 refers).

3.2 *Single-operator procedure (direct access by the calling subscriber to a foreign land station)*

3.2.1 *Booking*

C24 3.2.1.1 If automatic working (C19) is not possible the subscriber selects the foreign land station in question using automatic direct selection and submits the call details to the land station operator.

C25 3.2.1.2 Where an Administration permits its subscribers to book a call directly with a land station in another country, the charges set by the land station must be levied by the calling subscriber's Administration.

C26 3.2.1.3 In addition to the information in C4, the calling subscriber must designate his national telex network.

C27 3.2.1.4 As an alternative to C25 and C26, land stations may accept direct calls from foreign subscribers provided that the calling subscriber supplies the name and address of a party in the land station's country that will take responsibility for the payment of charges.

C28 3.2.1.5 The procedures described in C25 and C27 may only be applied when an appropriate bilateral agreement exists between the two Administrations concerned. If such an agreement does not exist, the land station should refuse such calls to avoid accounting difficulties.

C29 3.2.1.6 In C24 and C27 above, the call to the foreign land station will be charged as an ordinary international telex call for its entire duration, regardless of whether it merely serves the purpose of booking the radiotelex call or whether the land station can extend the connection to the mobile station without having to recall the originating subscriber.

3.2.2 *Setting-up*

C30 3.2.2.1 When demand operation cannot be used, the caller will be disconnected until the mobile station is available. The land station operator then recalls the caller using automatic direct selection; the land station's country being considered as the outgoing country for the call.

C31 3.2.2.2 In case C30, the land station includes in the bill:

a) the landline charge;

b) the land station charge.

C32 3.2.2.3 When demand operation has been used, the bill made out by the land station operator includes only:

– the land station charge.

C33 3.2.2.4 All information regarding collection of charges for single-operator calls (see C15) should be submitted by the land station Administration on a regular basis to be determined by the Administrations involved.

C34 3.2.2.5 The methods to be used in collecting the charges are described in Recommendation D.90.

3.3 *Semiautomatic procedure (access by the calling subscriber to his international exchange for the establishment of a direct connection)*

C35 3.3.1 If automatic (C19) or single-operator (C24) procedures are not possible, the telex operator of the international exchange of the outgoing country receives the booking and selects the mobile station directly. The procedures of Recommendation F.60, § 3.3 shall be applied.

3.4 *Manual procedure*

3.4.1 *Booking*

C36 3.4.1.1 If automatic (C19), single-operator (C24) or semiautomatic (C35) procedures are not possible, the subscriber should make his booking at the international telex centre of the outgoing country or network.

C37 3.4.1.2 If conditions permit, the international telex position should select the foreign land station in question directly. Otherwise the international telex position of the land station country should be selected to give the necessary assistance to obtain contact with the land station in question.

3.4.2 *Setting-up*

C38 3.4.2.1 The land station operator obtains the caller directly or with the assistance of his own international telex position, which selects the caller. Otherwise he selects his own international telex position in order to be connected to the international telex position of the outgoing country, which then selects the caller.

C39 3.4.2.2 Within 24 hours of the call's termination, the land station shall pass the following information to the international telex centre of the origin country, where it is recorded for charging and accounting purposes:

a) the calling subscriber's telex number;

b) the mobile station's call sign;

c) the chargeable duration of the call;

d) the land station charge to be collected.

3.5 *Store-and-forward*

C39A 3.5.1 The subscriber uses two-stage selection, calling the land station desired and storing the message for retransmission to the mobile station.

4 Radiomaritime telex letter

4.1 *Definition*

C40 4.1.1 **radiomaritime telex letter**: A message sent by telex direct from a mobile station to a selected land station or to a selected public telegraph office for delivery by mail or any other appropriate means.

4.2 *Operational procedures*

C41 4.2.1 A ship subscriber will select the access code allocated for the radiomaritime telex letter service, or the access code allocated for the fully automatic telex service (see Recommendation F.126) followed, if appropriate, by the telex number of the telegraph office.

C42 4.2.2 The ship operator shall supply the following information:

a) telex number of the mobile station (as provided in Recommendation F.125),

b) AAIC,

c) addressee's name and address,

d) words "RADIOMARITIME TELEX LETTER".

RADIOTELEPHONE

1 General

1.1 *Language to be used*

D1 1.1.1 Where applicable and where language difficulties exist, the abbreviations and signals in Appendix 14 of the *Radio Regulations* [3] and the *Phonetic Alphabet and Figure Code* in Appendix 24 of the *Radio Regulations* should be used in radiotelephone communications between land stations and mobile stations.

1.2 *Priority*

D2 1.2.1 Apart from the general order of priority shown in A21 to A32, radiotelephone calls shall have precedence, so far as possible, over other telephone calls of the same class.

1.3 *Routing of calls*

D3 1.3.1 A radiotelephone call should be set up via the land station that is considered most suitable in relation to the mobile station concerned.

D4 1.3.2 For radiotelephone calls in the direction land station to mobile station, the caller should give the geographical position if possible and may also indicate the land station to be used. Such requests should be respected as far as is practicable.

D5 1.3.3 For radiotelephone calls in the direction mobile station to land station, the mobile station shall call the land station it desires to use. The land station shall either handle the call itself or advise the mobile station to use another land station that is more suitable to the mobile station.

1.4 *Information to be supplied by the calling party*

D6 1.4.1 Calls to a mobile station:

a) complete telephone number of the calling subscriber;

b) appropriate identification of the mobile station;

c) name of the land station to be used or the approximate geographical position of the mobile station;

d) name of the called party, if applicable. All calls to mobile stations in the maritime mobile service are treated as personal calls, with the possible exception of the Maritime Mobile-Satellite Service.

D7 1.4.2 Calls from a mobile station:

a) appropriate identification of the mobile station;

b) the *accounting authority identification code (AAIC)* in the single-operator or manual service (see Annex A to Recommendation D.90);

c) the information specified in Article 60 of the *Instructions for the International Telephone Service* [7].

1.5 *Call duration*

D8 1.5.1 The chargeable duration of a call will be fixed at the end of the call:

a) in the direction from the mobile stations by the controlling operator;

b) in the direction to mobile stations;

- by the land station operator in manual and single-operator service;
- by the operator of the international centre of the outgoing country in the semiautomatic service.

D9 1.5.2 If two land stations participate in the handling of the call, the opinion of the land station that has accepted the call from the originating mobile station shall prevail.

D10 1.5.3 When, through any fault of the service, difficulty is experienced in the course of a call, the chargeable duration shall be reduced automatically or manually to the total time during which transmission conditions were satisfactory, taking into account CCITT Recommendations.

1.6 *Validity of requests*

D11 1.6.1 If not cancelled by the caller or refused by the addressee, requests for calls from land to mobile stations:

a) in the VHF and MF bands shall remain valid until 0800 local time on the day following the day on which the request was made;

b) in the HF band shall remain valid until 0800 local time on the second day following the day on which the request was made.

D12 1.6.2 However, if it becomes obvious that the required mobile station is outside the coverage area of the land station, the caller shall be informed as soon as possible in order to have the call cancelled.

D13 1.6.3 All requests for calls from mobile stations to land shall be cancelled where the call is not immediately attended to or on completion of the successive attempts provided for by the rules of each Administration, unless there has been an express request to the contrary by the calling mobile station, which shall be able to determine the waiting period for listening in on the land station frequency with a view to making a further attempt to set up the call.

1.7 *Exchange of radiotelegrams by radiotelephony*

D14 1.7.1 Stations of the Maritime Mobile Service that are equipped for radiotelephony may transmit and receive radiotelegrams by means of radiotelephony. Stations of the Maritime Mobile-Satellite Service should normally transmit and receive radiotelegrams by means of radiotelex only.

2 Traffic from mobile stations

2.1 *Automatic service*

D15 2.1.1 Whenever possible, automatic procedures should be used; i.e. the calling subscriber should contact the called subscriber directly without the aid of an operator.

D16 2.1.2 After connection with the desired land station is established, the mobile station should select directly the appropriate telephone country code (Recommendation E.163) and the number of the subscriber of an Administration's telephone network.

2.2 *Single-operator service*

D17 2.2.1 The land station operator selects the called subscriber directly via the automatic telephone networks if automatic working (D15) is not possible.

2.3 *Semiautomatic service*

D18 2.3.1 The telephone operator of the international exchange of the land station country selects the called subscriber directly if automatic (D15) or single-operator (D17) procedures cannot be applied.

2.4 *Manual service*

D19 2.4.1 The land station operator applies manual procedures if automatic (D15), single-operator (D17) or semiautomatic (D18) working is not possible.

2.5 *Store-and-forward service*

D19A 2.5.1 The mobile station transmits the message to the land station using automatic procedures, and the land station retransmits the message over the designated land network.

D19B 2.5.2 The manual, semi-automatic and automatic procedures for store-and-forward in the terrestrial telex network, as laid down in Recommendations F.72, U.80 and U.81, should be taken into account.

2.6 *Procedures*

D20 2.6.1 The automatic, semiautomatic and manual procedures for the terrestrial telephone network, as laid down in Recommendation E.141 and the *Instructions for the International Telephone Service* [7] should be taken into account.

3 Traffic to mobile stations

3.1. *Automatic procedure (direct access by the calling subscriber to the called subscriber)*

D21 3.1.1 Whenever possible, automatic procedures should be used; i.e. the calling subscriber should contact the called subscriber directly without the aid of an operator.

D22 3.1.2 The subscriber of an Administration's telephone network should select the appropriate address code, including the mobile station number and if necessary the ocean area number, to connect him through a land station with which his Administration has established routing of maritime traffic for the ocean area desired.

D23 3.1.3 If the subscriber, for some technical reason, cannot establish contact with the mobile station directly, single-operator (D24) procedures should be used.

3.2 *Single-operator procedure (direct access by the calling subscriber to a foreign land station)*

3.2.1 *Booking*

D24 3.2.1.1 If automatic procedures cannot be applied, the subscriber selects the foreign land station in question using automatic direct selection. The land station operator records the call details.

D25 3.2.1.2 Where an Administration permits its subscribers to book a call directly with a land station in another country, the charges set by the land station must be levied by the calling subscriber's Administration.

D26 3.2.1.3 In addition to the information in D6, the calling subscriber must designate his country and national telephone number.

D27 3.2.1.4 As an alternative to D24 and D25, land stations may accept direct calls from foreign subscribers provided that the calling subscriber supplies the name and address of a party in the land station's country that will take responsibility for the payment of charges.

D28 3.2.1.5 The procedures described in D25 and D27 may only be applied when an appropriate bilateral agreement exists between the two Administrations concerned. If such an agreement does not exist, the land station should refuse such calls to avoid accounting difficulties.

D29 3.2.1.6 In D24 and D27 above, the call to the foreign land station will be charged as an ordinary international telephone call for its entire duration, regardless of whether it merely serves the purpose of booking the radiotelephone call or whether the land station can extend the connection to the mobile station without having to recall the originating subscriber.

3.2.2 *Setting-up*

D30 3.2.2.1 When demand operation cannot be used, the caller will be disconnected until the mobile station is available. The land station operator then recalls the caller using automatic direct selection, the land station country being considered as the outgoing country for the call.

D31 3.2.2.2 In case D30, the land station includes in the bill:

a) the landline charge;

b) the land station charge.

D32 3.2.2.3 When demand operation has been used, the bill made out by the land station operator includes only:

– the land station charge.

D33 3.2.2.4 All information regarding collection of charges for single-operator calls (see D17) should be submitted by the land station Administration on a regular basis to be determined by the Administrations involved.

D34 3.2.2.5 The methods to be used in collecting the charges are described in Recommendation D.90.

3.3 *Semiautomatic procedure (access by the calling subscriber to his international exchange for the establishment of a direct connection)*

D35 3.3.1 If automatic (D21) or single-operator (D24) procedures are not possible, the telephone operator of the international exchange of the outgoing country receives the booking and selects the mobile station directly. Normal international semiautomatic telephone procedures shall be applied.

3.4 *Manual procedure*

3.4.1 *Booking*

D36 3.4.1.1 If automatic (D21), single-operator (D24) or semiautomatic (D35) procedures cannot be applied, the subscriber should make his booking at the international centre of the outgoing country.

D37 3.4.1.2 If conditions permit, the international position should select the foreign land station in question directly. Otherwise the international position of the land station country should be selected to give the necessary assistance to obtain contact with the land station in question.

3.4.2 *Setting-up*

D38 3.4.2.1 The land station operator obtains the caller directly or with the assistance of his own international telephone centre, which selects the caller. Otherwise he selects his own international telephone centre in order to be connected to the international telephone centre of the outgoing country, which then selects the caller.

D39 3.4.2.2 After the call's termination, the land station shall pass the following information to the international telephone centre of the country of origin, where it is recorded for charging and accounting purposes:

a) the calling subscriber's telephone number;

b) the mobile station's name and/or call sign;

c) the chargeable duration of the call;

d) the land station charge to be collected.

D40 3.4.2.3 Otherwise all information regarding collection of charges should be submitted to the caller's Administration on a regular basis to be determined by the Administrations involved.

3.5 *Store-and-forward*

D40A 3.5.1 The station uses two-stage selection, calling the land station desired and storing the message for retransmission to the mobile station.

DIVISION E

RADIOTELEXOGRAM

1 General

1.1 *Definition*

E1 1.1.1 A radiotelexogram is a message sent by telex direct from a subscriber to a foreign land station for transmission to a mobile station or a message sent from a mobile station to a land station for transmission by telex direct to a foreign subscriber (see Note in E.5).

1.2 *Provision of service*

E2 1.2.1 Operating, charging and accounting procedures should be subject to bilateral agreement between the Administrations concerned. If such an agreement does not exist, the land station should refuse such radiotelexograms in the shore-to-ship direction.

E3 1.2.2 Alternatively, land stations may accept radiotelexograms from foreign subscribers provided that the calling subscriber supplies the name and address of a party in the land station country that will take responsibility for the payment of charges.

1.3 *Validity of requests*

E4 1.3.1 If it becomes obvious that the required mobile station is outside the coverage area of the land station, the caller shall be informed as soon as possible in order to have the radiotelexogram cancelled.

2 Operational procedures

E5 2.1 The transmission of radiotelexograms should be in accordance with Divisions B and C as appropriate except as specified below or where varied through bilateral agreement.

Note – A radiotelexogram is different from a radiotelex call. In particular, a radiotelexogram is normally transmitted between the mobile station and the land station as a radiotelegram by Morse telegraphy or by radiotelephony.

E6 2.2 *Information to be supplied to the land station, as necessary, by the calling party*

E7 2.2.1 *Radiotelexogram to a mobile station*

a) telex number and/or answerback code of the calling subscriber;
b) the national telex network to which the subscriber belongs;
c) the date and time of origin;
d) the word RADIOTELEXOGRAM;
e) name or designation of the addressee with supplementary particulars if necessary;
f) the name of the mobile station followed, when necessary, by its call sign or where this is not known, the particulars of the passage made by the mobile station;
g) any specific delivery instructions.

E8 2.2.2 *Radiotelexogram from a mobile station*

a) name and/or call sign of the mobile station;
b) identification of the accounting authority;
c) the date and time of origin;
d) the word RADIOTELEXOGRAM;
e) destination country and/or network;
f) called subscriber's telex number and answerback code.

References

[1] *Final Acts of the World Administrative Maritime Radio Conference*, ITU, Geneva, 1974.

[2] *Final Acts of the World Administrative Radio Conference (WARC)*, ITU, Geneva, 1979.

[3] *Radio Regulations*, ITU, Geneva, 1982.

[4] *Final Acts of the World Administrative Telegraph and Telephone Conference, Telegraph Regulations, Telephone Regulations*, ITU, Geneva, 1973.

[5] *List of ship stations*, ITU, Geneva, 1987.

[6] *List of coast stations*, ITU, Geneva, 1986.

[7] *Instructions for the international telephone service, (1st October 1985)*, ITU, Geneva, 1985.

Recommendation E.210 [1)]

SHIP STATION IDENTIFICATION FOR VHF/UHF AND MARITIME MOBILE-SATELLITE SERVICES

1 Introduction

1.1 The purpose of this Recommendation is to specify a method by which an internationally unique ship station identification may be assigned to all the ships participating in the Maritime Mobile Services.

1.2 *Terminology*

The following terms are used in this Recommendation:

1.2.1 **Maritime Mobile (Terrestrial) Service**

F: service mobile maritime (de Terre)

S: servicio móvil marítimo (terrenal)

Conventional Maritime Mobile Services such as the HF Maritime Service, the MF Maritime Service and the VHF Maritime Service (as defined in the *Radio Regulations* [1]).

Maritime Mobile-Satellite Service

F: service mobile maritime par satellite

S: servicio móvil marítimo por satélite

As defined in the *Radio Regulations* [1].

1.2.2 **coast station**

F: station côtière

S: estación costera

A land station in the Maritime Mobile Service.

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1) This Recommendation is also included in the F and Q Series as Recommendations F.120 and Q.11 *ter* respectively.

coast earth station

F: station terrienne côtière

S: estación terrena costera

An earth station in the Fixed-Satellite Service or, in some cases, in the Maritime Mobile-Satellite Service, located at a specified fixed point on land to provide a feeder link for the Maritime Mobile-Satellite Service.

Note – In this Recommendation the term coast station is also intended to include, for simplicity, coast earth station.

1.2.3 **ship station identity**

F: identité de la station de navire

S: identidad de estación de barco

The ship's identification X_1, X_2 ... X_k identifying the ship uniquely. The ship station identity may be transmitted on the radio path.

ship station number

F: numéro de station de navire

S: número de estación de barco

The number that identifies a ship for access from a public network and forms part of the international number to be dialled or keyed by a public network subscriber.

Note 1 – The formats of the ship station number are defined in other Series E and F Recommendations:

- Recommendation E.215 for telephone and ISDN numbering in the Maritime Mobile-Satellite Service;
- Recommendation F.125 for telex numbering in the Maritime Mobile-Satellite Service;
- numbering plans for maritime mobile (terrestrial) systems for further study.

Note 2 – In this Recommendation the term ship station is intended to also include, for simplicity, ship earth station.

1.2.4 **coast station identity**

F: identité de la station côtière

S: identidad de estación costera

The coast station identification X_1, X_2 ... X_k transmitted on the radio path.

Note – In this Recommendation the term coast station identity is intended to also include, for simplicity, coast earth station identity.

1.3 *Basic considerations*

The considerations that form the basis of this ship station identification system are:

a) that every ship shall have a unique ship station identity;

b) that the same unique ship station identity should be used in both VHF/UHF and Maritime Mobile-Satellite Systems;

c) that the same unique ship station identity should be used for all telecommunication services;

d) that it is desirable that the ship station number and the ship station identity are related in a simple and unambiguous manner;

e) that the capacity of the ship station identification system shall be sufficient to admit all ships wanting, or required, to participate in the various Maritime Mobile Services at present and in the foreseeable future;

f) that the ship identity system shall be a numerical system, and should use the full range of decimal digits;

g) that two or three of the digits, $X_1X_2X_3$, of the ship station identity shall indicate the ship's nationality.

2 Ship station identification

Ship station identity is established as nine digits.

$$X_1X_2X_3X_4X_5X_6X_7X_8X_9$$

The initial three digits define the nationality of the ship as indicated in the following sections.

Since the whole or a part of the ship station identity is used in the ship station number, certain restrictions may be imposed on the allocation of ship station identities for the Maritime Mobile-Satellite Service. Such restrictions are identified in Recommendations E.215 and F.125. The use of the ship station identity in maritime mobile (terrestrial) systems is for further study.

3 Assignment of ship station identification

3.1 *Assignment of blocks of numbers*

Blocks of numbers should be assigned to countries so that individual Administrations may systematically assign ship station identities within those blocks.

3.2 *Identification of ship's geographical region*

The first digit of each ship station identity is intended to identify the geographical region to which the nationality (registry) of the ship relates. Only the digits 2 through 7 are used for this purpose to identify easily the world's regions as follows:

2 – Europe

3 – North America

4 – Asia (except Southeast Asia)

5 – Oceania and Southeast Asia

6 – Africa

7 – South America.

Arrangements may therefore be made to systematically assign a ship station identity to each ship as soon as national blocks are allocated. The digits zero (0) and one (1) are allocated for other purposes as indicated in Table 1/E.210.

The digits eight (8) and nine (9) are not used for identification of geographical regions. However, for maritime VHF/UHF systems, the digits 8 and 9 may be used to expand network access as shown in § 8.2. The allocation of the first digit of the ship station identity is summarized in Table 1/E.210.

3.3 *Identification of ship's nationality*

Since blocks of the ship station identities would be systematically assigned by country, a ship's nationality can be determined by analysing the first three digits of its ship station identity.

The digits to be analysed are called Maritime Identification Digits (MID). Examples of the maritime identification digits for ships are given in Table 2/E.210.

4 Assignment of maritime identification digits

Each MID represents a discrete capacity assigned according to a plan that relates assigned capacity to ship population. A plan has been developed by the World Administrative Radio Conference for the Mobile Services (MOB-83) [2] and is contained in Appendix 43 to the Radio Regulations. The Radio Regulations make provision for the allocation of additional MID for a specific country when necessary.

TABLE 1/E.210

Allocations of first digit (X_1) in the ship station identity

First digit (X_1) of ship station identity	Use
0	Group call/coast station identiy
1	Reserved for future expansion
2	Europe
3	North America
4	Asia (except South East Asia)
5	Oceania and South East Asia
6	Africa
7	South America
8	See § 8.2
9	See § 8.2

TABLE 2/E.210

Country	Maritime identifications Digits (MID)	Ship station identity
P	231	from 231 000 000 to 231 999 999
Q	233, 234	from 233 000 000 to 234 999 999
R	236, 237, 238	from 236 000 000 to 238 999 999
S	240 to 249	from 240 000 000 to 249 999 999

5 Group calls

$X_1 = 0$, $X_2 = 1$ to 9 and $X_1 = 0$, $X_2 = 0$, $X_3 = 0$, $X_4 = 0$ to 9 are assigned to indicate a group call to a group of ships having a community of interest. Such calls may be barred in the public switched network and/or at the coast stations. Control of group calls may also be achieved by the use of special group service access to the coast stations. The group call numbering scheme used in the INMARSAT system is given in Annex B to Recommendation E.215.

6 Coast station identity

$X_1 = 0$, $X_2 = 0$, $X_3 = 1$ to 9 are assigned to indicate coast station identities in maritime mobile (terrestrial) systems.

7 Future expansion of the ship station identification system

$X_1 = 1$ as in the format 1 XXXXXXXX has been reserved for future expansion.

Note – $X_1 = 1$ is used in the INMARSAT standard A system for identification of ship earth stations (see Recommendations E.215 and F.125).

8 Considerations related to ship station identity assignments

8.1 The ship station identity, or part of it, will be included in the ship station number. The way in which this is done for *INMARSAT mobile numbers* is described in Recommendations E.215 and F.125.

In order to distinguish between *INMARSAT mobile numbers* consisting of 9 and 12 digits (if they coexist), the digit X_7 of the *ship station identity* must take the fixed value 0. This constraint is *not valid* when only 12 digit numbers exist in the future (see Recommendation E.215).

The relationship between the nine-digit ship station identity and the part of it which is used in the ship station number is illustrated in Table 3/E.210. If the part of the identity used in the number is shorter than nine digits, then the corresponding identity is obtained by adding trailing zeros to form nine-digit ship station identities. This principle must be observed when allocating ship station identities for ships in the Maritime Mobile-Satellite Service (see Recommendations E.215 and F.125).

TABLE 3/E.210

Part of ship station identity used in ship station number	Digits on the automatic network	Ship stations identity	Digits in the ship station identity
MID $X_4X_5X_6$	6	MID $X_4X_5X_6$ 000	9
MID $X_4X_5X_6X_7$	7	MID $X_4X_5X_6X_7$ 00	9
MID $X_4X_5X_6X_7X_8$	8	MID $X_4X_5X_6X_7X_8$ 0	9
MID $X_4X_5X_6X_7X_8X_9$	9	MID $X_4X_5X_6X_7X_8X_9$	9

8.2 Numbering plans for the maritime mobile (terrestrial) services are for further study. The principle of § 8.1 is likely to apply for these services also.

For maritime mobile (terrestrial) services, additional ship station numbering techniques may be used to expand network access to more ship stations on a regional and national basis as follows:

Ship station number (or part thereof)	*Ship station identity*
8Y $X_4X_5X_6X_7$	$M_yI_yD_y$ $X_4X_5X_6X_7$ 00
9 $X_4X_5X_6X_7X_8$	$M_nI_nD_n$ $X_4X_5X_6X_7X_8$ 0

In this arrangement, the digits 8Y may be 80 to 89 to define as many as ten foreign MIDs (shown as $M_yI_yD_y$) to permit automatic calling of ships of particular nationalities. The coast station would be required to translate a given 8Y to a particular foreign MID. The digit 9 may be used to indicate the maritime identification digits for ships of the same nationality as the network and the coast station. The coast station would be required to translate 9 to one particular national MID (shown as $M_nI_nD_n$).

Reference

[1] *Radio Regulations*, ITU, Geneva, 1982.

[2] *Final Acts of the World Administrative Radio Conference for the Mobile Services* (MOB-83), ITU, Geneva, 1983.

SELECTION PROCEDURES FOR VHF/UHF MARITIME MOBILE SERVICES

1 General

The purpose of this Recommendation is to define selection procedures for VHF/UHF maritime mobile services. The number plan used in these selection procedures is not based upon the use of a T digit as defined in Recommendation E.215. The use of a T digit in VHF/UHF maritime mobile services is for further study.

VHF/UHF maritime mobile services are more localized than maritime mobile-satellite services. National procedures will be adopted to provide access to the VHF/UHF maritime mobile services.

2 Procedures for shore-to-ship calls

Individual Administrations will wish to automate their maritime services in their own timescales and to suit their own service requirements and network limitations. However, any scheme adopted by an Administration should be compatible with other schemes and should not inhibit progression towards a worldwide maritime service. In view of the restrictions imposed by national networks on shore originated calls, three levels of operation have been identified to ensure that future evolution of the service can take place.

2.1 *Level 1: Manual or single-operator service operation*

2.1.1 Some Administrations will operate the VHF/UHF service on a manual or single-operator basis (a single-operator service is one in which the coast station operator in one country corresponds with subscribers of another country or vice versa).

2.1.2 It will be necessary to ensure that the facilities are compatible with essential functions, e.g., distress, in any automatic scheme. Additional equipment could be required to cater for new ship calling arrangements and use of a worldwide numbering scheme.

2.2 *Level 2: Minimum automation*

2.2.1 The caller controls access to the relevant coast station and forwards the number of the required ship, i.e. there is no intelligent system in the network able to indicate the location of the ship. Hence, the customer is required to identify the location of the ship.

2.2.2 The level of automation requires a minimum of equipment, the required functions mainly consisting of interfacing with the network, call control, signalling over the radio channels and operational control of the radio channels. There would be a requirement to permit coexistence of the manual service and the automatic service.

2.2.3 An example of such a numbering sequence is given below. Access to coast stations is provided by dedicated number combinations taken from the national numbering plan.

Pi	International prefix
I_1 I_2	1 or 2 digit country code
N_1 N_2	Code to identify VHF/UHF service
S_1 S_2	Code to identify coast station
MIDXXX	Ship station number.

The number of digits in the code N_1 N_2 S_1 S_2 will vary from one country to another, but the maximum international significant number length of 12 digits must be taken into account. In the example given, a subscriber in one country is calling a ship off the coast of another country. If the ship was off the coast of the subscriber's own country, the national prefix would be dialled instead of the international prefix and country code.

2.3 *Level 3: Automatic national ship location*

2.3.1 The caller controls the access to a particular country (or part of a country or a group of countries) and dials the number of the required ship i.e. an intelligent system is contained in the network so that it can indicate the location of the ship. The network is then responsible for routing the call on the basis of a known ship's location. All ships participating within the relevant area must report their location to a coast station, preferably on an automatic basis.

2.3.2 Equipment additional to level 2 of operation would be necessary, particularly in relation to the network's responsibility for locating the ship.

2.3.3 A numbering sequence suitable for this level of operation is:

Pi	International prefix
$I_1\ I_2\ I_3$	1, 2 or 3 digit country code
$N_1\ N_2\ N_3$	Code(s) to identify VHF/UHF service
MIDXXX	Ship station number.

The code(s) $N_1\ N_2\ N_3$ will vary in length from one country to another. The example given concerns a subscriber in one country calling a ship off the coast of another country. If the ship was off the coast of the subscriber's own country, the national prefix would be dialled instead of the international prefix and country code.

3 Implementation of automatic schemes in national networks – Shore-originated calls

There are variations of the numbering schemes given in §§ 2.2 and 2.3. Some examples of these variations are given below.

3.1 *Two-stage selection*

3.1.1 Some countries may find it necessary to use a two-stage selection technique. A subscriber would dial a coast station or maritime centre and would be offered a second stage of dialling to facilitate the insertion of the ship station number. Numbering sequences for provision of access to the coast station or maritime centre would be the same as for an ordinary telephone call in that country. The second stage of dialling could be associated with multi-frequency push button equipment already available or specifically provided for subscribers requiring maritime service calls.

3.1.2 If the first stage of dialling is used to provide access to a particular coast station, the scheme would be associated with level 2 of operation. If the first stage of dialling is used to provide access to a maritime centre that is able to locate the ship, then levels 2 or 3 of operation would be appropriate.

3.2 *Digit insertion [(1 + 6) arrangement]*

3.2.1 When ship station numbers become seven digits in length (stage 2 of the numbering plan), some countries will be unable to transmit the full seven digits through their national networks. As the first digit of an MID (Maritime Identification Digits) indicates the zone (continent) in which a country is located, a technique may be adopted on a zonal (continental) basis in which the first digit of the MID is not dialled by the subscriber. The digit would then be inserted at the coast station (and/or maritime centre), on the assumption that the MID is allocated to a country in the same zone as the coast station (and/or maritime centre).

3.2.2 Access to ships registered in countries outside the zone in which the coast station is located would be given on a manual basis by countries operating the 1 + 6 system.

3.2.3 The digit insertion technique can be associated with levels 2 and 3 of operation.

3.3 *National numbering and conversion arrangement*

3.3.1 Some countries may find it necessary temporarily to allocate ship's numbers compatible with their national numbering plans. An example of such a technique is given below.

3.3.2 When a ship enters the service area of a VHF/UHF coast station, the ship station's identity would be forwarded by the coast station to its parent Maritime Centre. The Maritime Centre would then assign, temporarily, a national telephone number which would correspond to the ship station identity of the ship. This pair of numbers would be stored at the Maritime Centre and the coast station.

3.3.3 A shore-based subscriber calling this ship would access the Maritime Centre and use the ship station number to obtain the corresponding temporary national telephone number. Once this is available, the call could be completed automatically from the Maritime Centre. Alternatively, the call could be completed by the caller either on a manual, semiautomatic or automatic basis as appropriate.

3.3.4 The temporary national telephone number would be used for routing the call to the serving VHF/UHF coast station. At that point the corresponding ship station identity, which would be stored at the coast station, would be sent over the radio path to extend the connection to the ship.

3.4 *VHF/UHF system using 87S*

This scheme can be used in national networks where the subscriber does not need to know the location of the ship. The national subscriber would dial the international prefix of the country, the maritime international code (87), a digit to identify the VHF/UHF service and the ship station number (which in this case is the same as the ship station identity). This method can be used by the subscribers belonging to a national network to reach ships which are in the coverage area of the coast stations of that national network. As long as no internationally coordinated location registration of ships is implemented, a subscriber in another country would follow the procedure described in § 2.3.

4 Procedures for ship-to-shore calls

Ship-originated calls are less restricted than shore-originated call by national network limitations and no levels of operation are required. The prefixes defined in Annex A to Recommendation E.216 will be used. Table A-1/E.216 is applicable to both the Maritime Mobile-Satellite Service and Maritime Mobile VHF/UHF Service. Application of the prefix scheme will be similar to the satellite service as shown in Recommendation E.216.

To standardize dialling procedures for VHF/UHF ship-originated calls, international dialling procedures will be adopted and automatic coast stations throughout the world will act upon such numbering sequences. To allow for ships that rarely leave the coast of a particular country, another technique has been identified whereby national dialling procedures can also be used. Whether or not to adopt this technique would be decided by each Administration.

4.1 *Calling a terrestrial subscriber*

4.1.1 A shipboard subscriber will dial the prefix 00 followed by the required international number, whether or not the coast station is located in the required subscriber's country. Hence, the numbering sequence will be of the form:

00	Prefix for automatic call
$I_1\ I_2\ I_3$	1, 2 or 3 digit country code
N_1-N_n	National (significant) number.

4.1.2 Where national procedures are used, a shipboard subscriber will dial the prefix 0 followed by the required number belonging to the country of the coast station through which the call is being connected. Hence, the numbering sequence would be of the form:

0	Prefix for automatic call of the coast station country
N_1-N_n	National (significant) number.

4.2 *Calling an operator*

4.2.1 A shipboard subscriber will dial an operator prefix, the second digit identifying the type of operator required.

4.2.2 The table below illustrates the principle involved:

Prefix		Optional Digits	Type of operator
Digit 1	*Digit 2*		
1	1	$I_1\ I_2\ I_3$	International outgoing operator
1	2	$I_1\ I_2\ I_3$	International information service
1	3		National operator
1	4		National information service

The use of the optional digits is the same as described in Recommendation E.216.

4.2.3 Each Administration may decide which operators to provide, where they are to be located and how the call would be routed. If a request is received from a ship for a type of operator that the Administration does not provide, then the call will be routed to another operator convenient for that Administration.

5 Procedures for ship-to-ship calls (via coast station)

5.1 If the two ships are not off the coast of the same country, the shipboard subscriber will dial the prefix 00 and the appropriate procedure outlined in §§ 2.2 and 3.3 will be followed.

5.2 If the ships are off the coast of the same country, then the coast station would act upon the above procedure, but the national procedure of dialling the prefix 0 followed by the national number of the ship could be adopted.

6 Future evolution

The development of these selection procedures, in order to accommodate the ability of the ISDN/PSTN to support 15 digits (Recommendations E.164 and E.165), and the possible use of a T digit as defined in Recommendation E.215, is for further study.

Recommendation E.212

IDENTIFICATION PLAN FOR LAND MOBILE STATIONS

1 Introduction

The purpose of this Recommendation is to define a future international identification plan for land mobile stations in internationally harmonized public land mobile networks (PLMNs), and to establish the principles for allocation of international mobile station identities (IMSI) to stations in such networks.

Note – The term "mobile station", as used in this Recommendation, includes both card operated mobile stations and mobile stations which are not card operated. In a card operated station, the IMSI may be contained in the card. In stations which are not card operated, the IMSI is contained in the physical mobile station equipment.

In order to enable land mobile stations to roam among public land mobile networks located in different countries, an international identification plan is required for unique international identification of such stations. It is desirable that the allocation of international mobile station identities should be made independently of the numbering plans used for accessing mobile stations from the different public networks. This will enable Administrations to develop their own national numbering plans for land mobile stations for different services without the need for coordinating them with other countries.

Note – The word "country" in this Recommendation is also used with the meaning of geographical area.

2 Design considerations

The design considerations that form the basis for the international identification plan for land mobile stations are as follows:

2.1 Public land mobile communication services may be provided internationally.

2.2 There could be a number of public land mobile networks (PLMNs) in a country.

2.3 When a number of PLMNs exist in one country, it should not be mandatory to integrate the identification plans of the various networks.

2.4 The identification plan shall permit the identification of the country as well as the PLMN in which the mobile station is registered.

2.5 The number of digits used to identify a PLMN within a country and a specific mobile station of that PLMN is a national matter; however, see § 4.2.2.

2.6 The identification plan should provide for substantial spare capacity to accommodate future requirements.

2.7 The identification plan need not be directly related to the numbering plans in use for different services.

2.8 The identification plan should, if necessary, enable the international mobile station identity to be used for:

a) determination of the PLMN in which a foreign land mobile station is registered;

b) mobile station identification when information about a specific land mobile station is to be exchanged between PLMNs;

c) mobile station identification on the radio control path for registering a mobile station in a foreign PLMN;

d) mobile station identification for all signalling on the radio control path;

e) mobile station identification for charging and billing of foreign land mobile stations.

f) subscription management, e.g., for retrieving, providing, changing and updating subscription data for a specific mobile station.

3 Definitions

The following terms are related to this Recommendation:

3.1 **mobile country code (MCC)**

The part of the mobile station identification uniquely identifying the country of domicile of the mobile station.

3.2 **mobile network code (MNC)**

A digit or a combination of digits in the national part of the mobile station identification uniquely identifying the home PLMN of the mobile station.

3.3 **mobile station identification number (MSIN)**

The part of the mobile station identification following the mobile network code uniquely identifying the mobile station within a PLMN.

3.4 **national mobile station identity (NMSI)**

The mobile station identification uniquely identifying the mobile station nationally.

The NMSI consists of the MNC followed by the MSIN.

3.5 **international mobile station identity (IMSI)**

The mobile station identification uniquely identifying the mobile station internationally.

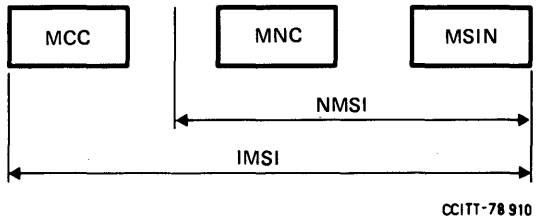
The IMSI consists of the MCC followed by the NMSI.

3.6 A comprehensive list of terms related to land mobile systems is given in Recommendation Q.70.

4 Identification plan principles

4.1 *Structure of the mobile station identity*

According to the definitions given in § 3, the international mobile station identity is structured as given in Figure 1/E.212.



MCC Mobile country code
MNC Mobile network code
MSIN Mobile station identification number
NMSI National mobile station identity
IMSI International mobile station identity

FIGURE 1/E.212

4.2 *Identity allocation principles*

4.2.1 Only numerical characters (0-9) shall be used.

4.2.2 Since the international mobile station identity is not used for dialling and routing purposes through the public switched telephone network (PSTN), public switched data networks (PDNs), integrated services digital network (ISDN), etc., its length will not be influenced by any numbering constraints of these networks. However, Administrations should endeavour to keep the International Mobile Station Identity as short as possible; it shall under no circumstances exceed 15 digits.

4.2.3 The mobile country code (MCC) consists of 3 digits.

The allocation of MCCs is to be administered by the CCITT and is given in Annex A. Further MCCs may be allocated, if required. The first digits 0, 1, 8 and 9 are reserved for future use.

4.2.4 The national mobile station identity is to be assigned by each Administration.

4.2.5 The allocation of mobile network codes should be such that not more than 6 digits of the international mobile station identity have to be analysed in a foreign PLMN for information transfer.

4.2.6 Only one international mobile station identity shall be assigned to each mobile station independent of the number and type of services which terminate in the mobile station.

ANNEX A

(to Recommendation E.212)

List of mobile country or geographical area codes

Note – The countries or geographical areas shown in this annex include those that already have code assignments in the case of other public telecommunication networks.

Zone 2

Code	*Country or Geographical Area*
202	Greece
204	Netherlands (Kingdom of the)
206	Belgium
208	France
212	Monaco
214	Spain
216	Hungarian People's Republic
218	German Democratic Republic
220	Yugoslavia (Socialist Federal Republic of)
222	Italy
226	Romania (Socialist Republic of)
228	Switzerland (Confederation of)
230	Czechoslovak Socialist Republic
232	Austria
234	United Kingdom of Great Britain and Northern Ireland
235	United Kingdom of Great Britain and Northern Ireland
238	Denmark
240	Sweden
242	Norway
244	Finland
250	Union of Soviet Socialist Republics
260	Poland (People's Republic of)
262	Germany (Federal Republic of)
266	Gibraltar
268	Portugal
270	Luxembourg
272	Ireland
274	Iceland
276	Albania (Socialist People's Republic of)
278	Malta (Republic of)
280	Cyprus (Republic of)
284	Bulgaria (People's Republic of)
286	Turkey
288	Faroe Islands
290	Greenland
292	San Marino (Republic of)

Zone 2, Spare Codes: 64

Zone 3

Code	*Country or Geographical Area*
302	Canada
308	St. Pierre and Miquelon (French Dept. of)
310	United States of America
311	United States of America
312	United States of America
313	United States of America
314	United States of America
315	United States of America
316	United States of America
330	Puerto Rico
332	Virgin Islands (USA)
334	Mexico
338	Jamaica
340	French Antilles
342	Barbados
344	Antigua and Barbuda
346	Cayman Islands
348	British Virgin Islands
350	Bermuda
352	Grenada
354	Montserrat
356	St. Kitts and Nevis
358	St. Lucia
360	St. Vincent and the Grenadines
362	Netherlands Antilles
364	Bahamas (Commonwealth of the)
366	Dominica (Commonwealth of the)
368	Cuba
370	Dominican Republic
372	Haiti (Republic of)
374	Trinidad and Tobago
376	Turks and Caicos Islands

Zone 3, Spare Codes: 68

Zone 4

Code	*Country or Geographical Area*
404	India (Republic of)
410	Pakistan (Islamic Republic of)
412	Afghanistan (Democratic Republic of)
413	Sri Lanka (Democratic Socialist Republic of)
414	Burma (Socialist Republic of the Union of)
415	Lebanon
416	Jordan (Hashemite Kingdom of)
417	Syrian Arab Republic
418	Iraq (Republic of)
419	Kuwait (State of)
420	Saudi Arabia (Kingdom of)
421	Yemen Arab Republic
422	Oman (Sultanate of)

Code	*Country or Geographical Area*
423	Yemen (People's Democratic Republic of)
424	United Arab Emirates
425	Israel (State of)
426	Bahrain (State of)
427	Qatar (State of)
428	Mongolian People's Republic
429	Nepal
430	United Arab Emirates (Abu Dhabi)
431	United Arab Emirates (Dubai)
432	Iran (Islamic Republic of)
440	Japan
441	Japan
450	Korea (Republic of)
452	Viet Nam (Socialist Republic of)
454	Hong-Kong
455	Macao
456	Democratic Kampuchea
457	Lao People's Democratic Republic
460	China (People's Republic of)
467	Democratic People's Republic of Korea
470	Bangladesh (People's Republic of)
472	Maldives (Republic of)

Zone 4, Spare Codes: 65

Zone 5

Code	*Country or Geographical Area*
502	Malaysia
505	Australia
510	Indonesia (Republic of)
515	Philippines (Republic of the)
520	Thailand
525	Singapore (Republic of)
528	Brunei Darussalam
530	New Zealand
535	Guam
536	Nauru (Republic of)
537	Papua New Guinea
539	Tonga (Kingdom of)
540	Solomon Islands
541	Vanuatu
542	Fiji
543	Wallis and Futuna Islands
544	American Samoa
545	Kiribati (Republic of)
546	New Caledonia and Dependencies
547	French Polynesia
548	Cook Islands
549	Western Samoa

Zone 5, Spare Codes: 78

Code	*Country or Geographical Area*
602	Egypt (Arab Republic of)
603	Algeria (People's Democratic Republic of)
604	Morocco (Kingdom of)
605	Tunisia
606	Libya (Socialist People's Libyan Arab Jamahiriya)
607	Gambia (Republic of the)
608	Senegal (Republic of)
609	Mauritania (Islamic Republic of)
610	Mali (Republic of)
611	Guinea (Republic of)
612	Côte d'Ivoire (Republic of)
613	Burkina Faso
614	Niger (Republic of the)
615	Togolese Republic
616	Benin (People's Republic of)
617	Mauritius
618	Liberia (Republic of)
619	Sierra Leone
620	Ghana
621	Nigeria (Federal Republic of)
622	Chad (Republic of the)
623	Central African Republic
624	Cameroon (Republic of)
625	Cape Verde (Republic of)
626	Sao Tome and Principe (Democratic Republic of)
627	Equatorial Guinea (Republic of)
628	Gabonese Republic
629	Congo (People's Republic of the)
630	Zaire (Republic of)
631	Angola (People's Republic of)
632	Guinea-Bissau (Republic of)
633	Seychelles (Republic of)
634	Sudan (Republic of the)
635	Rwandese Republic
636	Ethiopia
637	Somali Democratic Republic
638	Djibouti (Republic of)
639	Kenya (Republic of)
640	Tanzania (United Republic of)
641	Uganda (Republic of)
642	Burundi (Republic of)
643	Mozambique (People's Republic of)
645	Zambia (Republic of)
646	Madagascar (Democratic Republic of)
647	Reunion (French Department of)
648	Zimbabwe (Republic of)
649	Namibia
650	Malawi
651	Lesotho (Kingdom of)
652	Botswana (Republic of)
653	Swaziland (Kingdom of)
654	Comoros (Islamic Federal Republic of the)
655	South Africa (Republic of)

Zone 6, Spare Codes: 47

Code	*Country or Geographical Area*
702	Belize
704	Guatemala (Republic of)
706	El Salvador (Republic of)
708	Honduras (Republic of)
710	Nicaragua
712	Costa Rica
714	Panama (Republic of)
716	Peru
722	Argentine Republic
724	Brazil (Federative Republic of)
730	Chile
732	Colombia (Republic of)
734	Venezuela (Republic of)
736	Bolivia (Republic of)
738	Guyana
740	Ecuador
742	Guiana (French Department of)
744	Paraguay (Republic of)
746	Suriname (Republic of)
748	Uruguay (Eastern Republic of)

Zone 7, Spare Codes: 80

Recommendation E.213

TELEPHONE AND ISDN NUMBERING PLAN FOR LAND MOBILE STATIONS IN PUBLIC LAND MOBILE NETWORKS (PLMN)

1 Basic requirements

1.1 It should in principle be possible for any subscriber of the international telephone network or ISDN to call any subscriber of a public land mobile network.

Note – Other constraints may exist (e.g., charging constraints) so that this condition cannot be met in practice.

1.2 The numbering should be composed in such a way as to allow standard telephone or ISDN charging and accounting principles to be used.

1.3 It should be possible for each Administration to develop its own independent numbering plan for mobile stations.

1.4 The numbering plan should not prohibit the development of interconnected public land mobile networks to form service areas as defined in Recommendation Q.70.

1.5 It should be possible to change the international mobile station identity (see Recommendation E.212) without changing the telephone or ISDN number allocated to the station and vice versa.

1.6 It should be possible, in principle, for mobile subscribers to roam without constraints among PLMNs.

1.7 The numbering plan should take into account human factors such as the compatibility with user dialling procedures for the most predominant network in each country, i.e. the public switched telephone network (PSTN), and the compatibility between adjacent countries as well.

1.8 Different numbers may be allocated for interconnection with other types of networks than the PSTN [e.g., PDNs] in order to meet specific numbering requirements within these networks.

2 National (significant) mobile number

The national (significant) mobile number could have the following form depending upon the way in which the land mobile numbering plan is integrated with the telephone numbering or ISDN plan:

i) The land mobile numbering plan might be fully integrated with the telephone numbering or ISDN plan. In this case the mobile stations will be allocated a *subscriber number* as defined in Recommendation E.160, § 5. The *national* (significant)*mobile number* then consists of the *trunk code* or *national destination code* allocated to the numbering area corresponding to the home area of the mobile station followed by the *subscriber number* allocated to it.

ii) The public land mobile network might be regarded as a separate numbering area within the telephone network or the ISDN. In this case the national (significant) mobile number will consist of the *trunk code* or *national destination code* allocated to the PLMN and the *subscriber number* within the PLMN.

3 Mobile station roaming number

3.1 The *mobile station roaming number* is a number allocated to a land mobile station for the purpose of rerouting calls to that station when it has roamed out of the area covered by the PLMN [maritime switching centre MSC)] in which the station is permanently registered.

3.2 The composition of the mobile station roaming number may vary depending upon where the mobile station is temporarily located and depending upon the method by which it is allocated.

3.3 One acceptable method for allocating mobile station roaming numbers is for the foreign PLMN (i.e. the network in which the mobile station is currently located) to allocate a temporary national (significant) mobile number to the visiting mobile station within its own numbering plan. The mobile station roaming number would thus have the following composition:

(country code of the country in which the foreign PLMN is located)[1] + (temporary national (significant) mobile number).

The mobile station roaming number is transferred to the home PLMN of the mobile station.

Note – A second method has been identified where the foreign PLMN uses a separate numbering plan for visiting mobile stations where the number used is composed of a prefix indicating a foreign station followed by the country code of the country in which the station is permanently registered and the national (significant) mobile number in its home network.

The home PLMN of the mobile station must in this case inform the foreign PLMN about the mobile station roaming number.

The possible use of this method requires further study considering that it may impose a requirement for digit capacity greater than 12 digits for the PSTN or 15 digits for the ISDN.

3.4 It may be advantageous (but it is not obligatory) for the roaming number to be kept secret from both the fixed and/or mobile subscriber. In this situation, the number would only be used within PLMNs and the PSTN/ISDN for rerouting of calls to a mobile station that had registered with a visited PLMN. The number would then not be used for direct routing of a call from a fixed (or mobile) subscriber to the mobile station.

3.5 This approach would allow the reallocation to another mobile station of the roaming number as soon as the station to which the roaming number had been originally allocated had left the visited PLMN. It will of course be desirable for a call to the roaming number, originating from an ordinary subscriber, to be rejected by the visited PLMN. In order to achieve this rejection the necessary signalling facilities and mechanisms at the mobile switching centres will need to be provided.

3.6 The implementation of the above approach, of barring the roaming number to fixed and/or mobile subscribers, should be a matter of bilateral agreement.

4 Number analysis

In respect to routing, charging and accounting, the requirements on number analysis given in Recommendation E.163 for the PSTN and Recommendation E.164 for the ISDN should also be met for calls to mobile stations.

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[1] May not be required in all cases, e.g. the two PLMNs are located in the same country or in an area with an integrated numbering plan.

STRUCTURE OF THE LAND MOBILE GLOBAL TITLE FOR THE SIGNALLING CONNECTION CONTROL PART (SCCP)

1 Introduction

In order to permit land mobile stations to roam, there is a need to transfer information, e.g. the mobile station roaming number between Public Land Mobile Networks (PLMNs). This transfer of information can be accomplished by the use of Transaction Capabilities (TC) and the SCCP of Signalling System No. 7.

When a land mobile station roams to a foreign PLMN, it registers with a Visited Location Register (VLR) within that PLMN. The only information available to the VLR to address the mobile's Home Location Register (HLR) is its International Mobile Station Identity (IMSI).

The purpose of this Recommendation therefore is to define the structure of the mobile global title used in SCCP addressing to the public land mobile service, and to establish the relationship between the mobile global title and the international mobile station identity as defined in Recommendation E.212.

2 Considerations

The considerations which form the basis of the Mobile Global Title (MGT) for the land mobile service are as follows:

2.1 The MGT shall be derived from the international mobile station identity in a simplified manner.

2.2 There could be a number of PLMNs in a country.

2.3 The MGT shall permit the identification of the country as well as the PLMN in which the mobile station is registered.

2.4 The MGT should, as an option, permit the identification of the home location register (HLR) of the mobile station.

2.5 The length of the MGT should be minimized.

2.6 The MGT should enable the fixed network exchanges to utilize existing routing information in order to identify the PLMN.

2.7 Recommendations E.163, E.164, E.165, E.212 and E.213 are applicable.

3 Global title principles

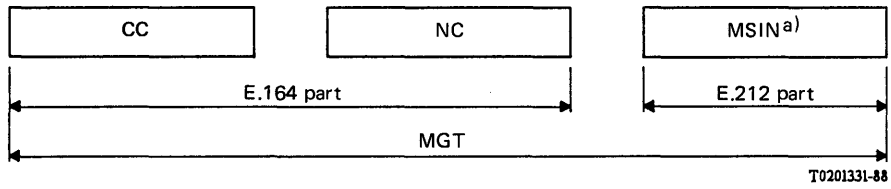
3.1 *Structure of the mobile global title*

The mobile global title is of variable length and composed of decimal digits arranged in two specific parts. These specific parts are the E.164 and the E.212 part.

The E.164 part is used to identify the country and the PLMN, or PLMN and HLR, where the mobile station is registered. To accomplish this, the E.164 part comprises a Country Code (CC), as defined in Recommendation E.163, and a Network Code (NC) which can be the National Destination Code (NDC), as defined in Recommendation E.164, or the NDC and some additional E.164 digits. The NC would identify the PLMN or HLR within the PLMN. The number of E.164 digits required for identification may vary from network to network, and must be established by bilateral agreement.

The E.212 part is used to identify the mobile station or mobile station and HLR and is composed of the mobile station identification number as defined in Recommendation E.212.

Figure 1/E.214 shows the structure of the mobile global title.



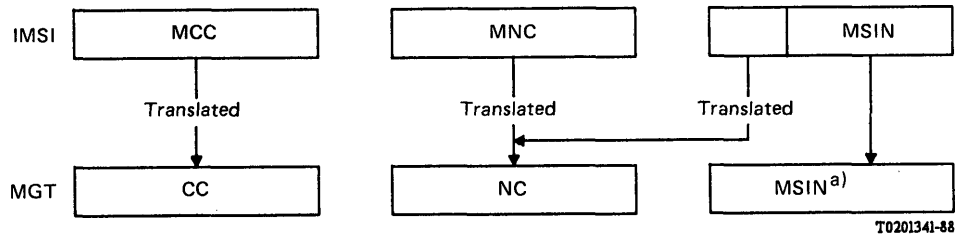
CC Country code as defined in Recommendation E.163
NC Network code
MGT Mobile globale title
MSIN Mobile station identification number as defined in Recommendation E.212

a) The MSIN may be truncated to conform to the maximum length permitted as given in § 3.3.

FIGURE 1/E.214

3.2 *Derivation of the mobile global title from the international mobile station identity (IMSI)*

The MGT is derived from the IMSI (Recommendation E.212) in the manner shown in Figure 2/E.214.



MCC Mobile country code
MNC Mobile network code

a) The MSIN may be truncated to conform to the maximum length permitted as given in § 3.3.

FIGURE 2/E.214

Within the MGT the CC is derived directly from the MCC and the NC is derived either directly from the MNC, or from the MNC and some initial digits of the MSIN. The MSIN is mapped directly into the MGT, up to its maximum length.

3.3 *Length of mobile global title*

The Mobile global title will be of variable length but with a maximum of 15 digits. Therefore, if necessary, the least significant digits of the MSIN will be omitted in order to conform with the maximum length of the MGT.

3.4 *Analysis of the mobile global title*

In order to permit fixed network nodes to utilize existing resources, digit analysis in the originating country will conform to Recommendation E.164. See also Recommendation E.165.

Further analysis beyond this requirement shall be by bilateral agreement.

The analysis of the E.212 part of the mobile global title in the destination fixed network is a national matter.

Recommendation E.215

TELEPHONE/ISDN NUMBERING PLAN FOR THE MOBILE-SATELLITE SERVICES OF INMARSAT

TABLE OF CONTENTS

1 Introduction

1.1 *Purpose*

The purpose of this Recommendation is to specify a telephone/ISDN numbering plan for mobile earth stations in systems operated by the International Maritime Satellite Organization (INMARSAT). Such systems may include maritime and aeronautical satellite systems. In the future the range of mobile satellite systems may also include satellite systems for other applications.

1.2 *Terminology*

The telex numbering plan for INMARSAT is contained in Recommendation F.125. Recommendations E.215 and F.125 are designed to be as similar as possible.

The following terms are used in this Recommendation.

1.2.1 **ship station identity**

As defined in the Radio Regulations, Appendix 43. See also Recommendation E.210.

1.2.2 **INMARSAT mobile international number**

The number following the international prefix which identifies terminal equipment connected to an *INMARSAT* mobile earth station for access from a public network.

1.2.3 **INMARSAT mobile number**

The part of the *INMARSAT* mobile international number which follows a country code allocated to the INMARSAT system.

1.2.4 *Other definitions*

For definition of terms such as maritime mobile-satellite service, aeronautical mobile-satellite service, ship earth station, etc., see the Radio Regulations.

1.2.5 *On-board identification digits*

These digits are the part of the mobile earth station number used for identifying:

- a specific terminal equipment on board;
- a specific mobile earth station.

1.3 *Basic considerations*

The considerations which form the basis of the numbering plan are:

1.3.1 that it shall be possible to identify an *INMARSAT* mobile earth station uniquely from the *INMARSAT mobile number*;

1.3.2 that the *INMARSAT mobile number* should have a format where the same number could be used for access from all types of public networks;

1.3.3 that the number of three-digit country codes required for supporting future INMARSAT requirements should be as few as possible;

1.3.4 that different routings could be used for calls to mobile earth stations designed to different INMARSAT system standards;

1.3.5 that Administrations and INMARSAT could apply different charging and accounting rates to different INMARSAT system standards;

1.3.6 that the numbering plan should provide capacity for on-board identification or direct access to a specific terminal equipment connected to a mobile earth station, e.g. on board a ship;

1.3.7 that the numbering plan should support access to multi-channel mobile earth stations;

1.3.8 that the new mobile earth station numbering plan should incorporate numbering plan(s) already in use for the INMARSAT Standard-A system;

1.3.9 that the length of the *INMARSAT mobile international number* should comply with Recommendation E.164 (E.163) and will initially be limited to 12 digits (see also Recommendation E.165);

1.3.10 that, for maritime satellite applications, the ship earth station numbering plan should support access to several ship earth stations in the same ship within one *ship station identity*;

1.3.11 that the radio regulations make provision for the allocation of additional MIDs for a specific country when necessary.

2 Format of INMARSAT mobile international number

The general format of the *INMARSAT mobile international number* is:

$$CCC\ T\ X_1 \ldots X_k$$

where CCC is a three-digit country code allocated to INMARSAT and $T\ X_1 \ldots X_k$ is the *INMARSAT mobile number.* The format of the *mobile earth station number* is given in § 4.

3 Telephone/ISDN country codes for INMARSAT applications

Telephone/ISDN country codes for INMARSAT applications are given in Table 1/E.215.

TABLE 1/E.215

Telephone/ISDN country codes for INMARSAT applications

Country code	Application
871	Atlantic Ocean Region, INMARSAT
872	Pacific Ocean Region, INMARSAT
873	Indian Ocean Region, INMARSAT

4 Format of INMARSAT mobile number

4.1 *General format*

The general format of the *INMARSAT mobile number* is

$$T\ X_1X_2 \ldots X_k$$

where the digit T is used for discrimination between different INMARSAT systems.

The formats used for the various INMARSAT systems are defined below. The values of the T digits are summarized in Table 2/E.215.

The T digits represent a limited resource and a new T digit should therefore only be allocated when necessary for technical or operational reasons.

The CCITT Secretariat would be responsible for co-ordinating the allocation of new T digits with the competent Study Groups.

TABLE 2/E.215

Value of T digit for various applications

T digit	Application
0	Group call in INMARSAT Standard-A, see § 4.2.2
1	Ordinary call in INMARSAT Standard-A, see § 4.2.1
2	Reserved for future use
3	Ordinary call in INMARSAT Standard-B, see § 4.3
4	Ordinary call in INMARSAT Standard-C, see § 4.4
5	Ordinary call in INMARSAT aeronautical system, see § 4.5
6	Reserved for future use
7	Reserved for future use
8	Expedient access to special service terminations in INMARSAT Standard-A, see § 4.2.3
9	Reserved for future expansion, see § 4.6

4.2 *Formats for INMARSAT Standard-A system*

4.2.1 *Ordinary calls*

The number format used for ordinary calls to ship earth stations in the INMARSAT Standard-A system is as follows:

$$1\ X_1X_2X_3X_4X_5X_6 \text{ (7 digits)}$$

where 1 corresponds to the T digit and the digits $X_1X_2X_3X_4X_5X_6$ are allocated to ships by INMARSAT.

The length of the *INMARSAT mobile number* will be 7 digits, making the length of the *INMARSAT mobile international number* equal to 10 digits.

4.2.2 *Group calls*

For group calls, the *INMARSAT mobile number* takes the following format:

$$0\ X_1X_2X_3X_4X_5X_6X_7X_8 \text{ (9 digits)}$$

where 0 corresponds to the T digit and X_1 through X_8 takes values as shown in Annex B.

The length of the *INMARSAT mobile number* will be 9 digits making the length of the *INMARSAT mobile international number* equal to 12 digits.

4.2.3 *Access to special service terminations on board the ship*

In order to handle automatic data and facsimile calls in the INMARSAT Standard-A system, the following format is proposed (see also Recommendation E.216):

$$8\ Y\ 1\ X_1X_2X_3X_4X_5X_6 \text{ (9 digits)}$$

where 8 corresponds to the T digit, the digits X_1 through X_6 take the same value as in § 4.2.1 and the digit Y determines the service termination. Table 3/E.215 lists the values of digit Y for various applications.

TABLE 3/E.215

Values of digit Y for various applications

Y digit	Application
0	Reserved for future use
1	Facsimile, group 3
2 (Note)	Virtual call packet mode data service, Recommendation X.25
3 through 9	Reserved for future use

Note – The number 8 2 1 $X_1X_2X_3X_4X_5X_6$ is not available for subscriber dialling in the PSTN or ISDN. The number will be used by interworking units between packet switched public data networks and the PSTN in order to forward data calls to mobile ship earth stations.

Note 1 – The *INMARSAT mobile international number* will then have the following format:

CCC 8 Y 1 $X_1X_2X_3X_4X_5X_6$ (12 digits)

Note 2 – The digits Y 1, etc. need not be analyzed in the international network for routing or charging purposes.

4.3 *Formats for INMARSAT Standard-B system*

4.3.1 *Ordinary calls*

For ordinary calls to ship earth stations in the INMARSAT Standard-B system, the format shall be initially:

3 $M_1I_2D_3X_4X_5X_6Z_1Z_2$ (9 digits)

where 3 corresponds to the T digit and the digits $M_1I_2D_3X_4X_5X_6$ are the first 6 digits of the *ship station identity* MIDXXX000 (see Annex A). The digits Z_1Z_2 may be used for identifying terminal equipment connected to a ship earth station, for discriminating between channels of multi-channel ship earth stations and for discriminating between several ship earth stations on the same ship.

The length of the *INMARSAT mobile number* will be 9 digits, making the length of the *INMARSAT mobile international number* equal to 12 digits.

Special requirements on the allocation of the digits Z_1Z_2 are given in Annex C.

The number format:

3 $X_1X_2X_3X_4X_5X_6Z_1Z_2$ (9 digits)

where the digit X_1 may take the values 8 or 9 is reserved for future INMARSAT applications.

The length of the *INMARSAT mobile number* will be 9 digits making the length of the *INMARSAT mobile international number* equal to 12 digits.

4.3.2 *Group calls*

For group calls the *INMARSAT mobile number* takes the following format:

3 0 $X_1X_2X_3X_4X_5X_6X_7$

where the digits $0X_1$ through X_7 take values as shown in § B.2.3.

The length of the *INMARSAT mobile number* will be 9 digits making the length of the *INMARSAT mobile international number* equal to 12 digits.

4.3.3 *Future extension of the number*

The *INMARSAT mobile number* may be extended to 12 digits when the number capacity of the international network is increased (see Recommendation E.165). This is for further study. Annex C proposes a method by which this expansion can be made in order to allow two number lengths to coexist on the same T digit.

4.4 *Format for INMARSAT Standard-C system*

4.4.1 *Ordinary calls*

For ordinary calls to ship earth stations in the INMARSAT Standard-C system, the format shall be initially:

$$4\ M_1I_2D_3X_4X_5X_6X_7X_8 \text{ (9 digits)}$$

where 4 corresponds to the T digit and where at least the digits $M_1I_2D_3X_4X_5X_6$ are part of the *ship station identity.* The digits X_7X_8 may also be part of the *ship station identity* or be used for discrimination between several ship earth stations on the same ship. In the latter case, X_7X_8 becomes Z_1 and Z_2 and the principle of Annex C should be followed.

The number format:

$$4\ X_1X_2X_3X_4X_5X_6X_7X_8 \text{ (9 digits)}$$

where the digit X_1 takes the values 8 or 9 is reserved for INMARSAT applications.

The length of the *INMARSAT mobile number* will be 9 digits, making the length of the *INMARSAT mobile international number* equal to 12 digits.

4.4.2 *Group calls*

For group calls, the *INMARSAT mobile number* takes the following format:

$$4\ 0X_1X_2X_3X_4X_5X_6X_7$$

where the digits $0X_1$ through X_7 take values as shown in § B.2.3.

The length of the *INMARSAT mobile number* will be 9 digits making the length of the *INMARSAT mobile international number* equal to 12 digits.

The group call facilities in the Standard-C system are described in Supplement No. 3 of Fascicle II.4.

4.4.3 *Future extension of the number*

For maritime satellite applications, the *INMARSAT mobile numbers* used in the INMARSAT Standard-C system may be extended to 12 digits when the numbering capacity of the international network is increased (see Recommendation E.165) in a way similar to those of the Standard-B system (see § 4.3.3). This is for further study.

4.5 *Format for INMARSAT aeronautical system*

The general format of numbers in the INMARASAT aeronautical system is as follows:

$$5\ X_1X_2X_3X_4X_5X_6X_7X_8 \text{ (9 digits)}$$

where 5 corresponds to the T digit.

The format of the digits X_1 through X_8 is still to be determined.

The length of the *INMARSAT mobile number* will be 9 digits, making the length of the *INMARSAT mobile international number* equal to 12 digits.

4.6 *Future INMARSAT standard systems*

T digits should be allocated for each new INMARSAT standard system in the future. If an earlier system is taken out of service, T digits allocated for that system may be reallocated to new systems.

If the capacity provided by the T digits of Table 2/E.215 is not sufficient, then further capacity may be made available by using T = 9 followed by an additional digit (U) as follows:

$$9\ U\ X_1X_2 \ldots X_k$$

where the digits $X_1 \ldots X_k$ identifies the mobile earth station and any extension connected to it. The digit U is used to identify new INMARSAT systems or for technical and operational reasons.

The CCITT Secretariat would be responsible for co-ordinating the allocation of new U digits with the competent Study Groups.

5 Digit analysis

If different routing and/or accounting applies to different INMARSAT standard systems, then the digits CCCT need to be analyzed at international exchanges.

If the routing capacity is increased by using T = 9 (see § 4.6), then the digits CCC9U need to be analyzed.

The above requirements on number analysis are in compliance with Recommendations E.164 (E.163). See also Recommendation E.165.

The digits Y 1, etc., following CCC 8 (see § 4.2.3) need not be analyzed in the international network for routing or charging purposes.

6 Presentation of INMARSAT mobile numbers in directories

6.1 *General*

INMARSAT mobile numbers may be published in separate directories or in separate sections of general directories.

In directories, only the *INMARSAT mobile numbers*, as specified in § 4.1, shall be listed. The country code to be used and instruction for the subscribers should be contained in general parts of the directories.

The use of digits 8 Y in the format for the INMARSAT Standard-A system in § 4.2.3 should also be explained in the general parts of the directories. This information should also include indications as to whether or not these numbers are accepted for calls to one or more ocean areas.

The subject on directories for mobile satellite services requires further studies.

ANNEX A

(to Recommendation E.215)

Use of ship station identification for maritime applications of systems operated by INMARSAT

A1 *General*

Appendix 43 of the Radio Regulations defines an international identification plan for ships participating in the maritime mobile services. The ship station identity consists of nine digits and is composed as follows:

$$M_1I_2D_3X_4X_5X_6X_7X_8X_9$$

where the digits $M_1I_2D_3$ determine the ship's nationality.

For ships participating in systems operated by INMARSAT, the main part of this Recommendation specifies a format of the *INMARSAT mobile number* as follows:

$$T\ X_1X_2 \ldots X_k$$

The purpose of the digit T is explained in § 4.

For maritime applications, the number can be regarded as being composed of three blocks as follows:

T	$X_1X_2 \ldots X_n$	$X_{n+1} \ldots X_k$
Block 1	Block 2	Block 3

where the digit in block 1 is the digit T, the digits in block 2 are related to the ship station identity as explained below and block 3 contains digits which are used for other purposes (e.g. on-board identification). In some INMARSAT systems, block 3 may be empty.

Note 1 – For the INMARSAT Standard-A system, INMARSAT applies a ship numbering plan which is not related to the ship station identification plan of the Radio Regulations. In this numbering plan the digit T takes the fixed value T = 1.

Note 2 – For INMARSAT Standard-B and C systems, the digit X_1 may take either of the values 8 or 9 for future applications. In this case, the digits in block 2 are not related to the ship station identification plan.

A.2 *Constraints on ship station identification and numbering*

A.2.1 The present number capacity of the PSTN requires that the *INMARSAT mobile number* consist of 9 or fewer digits. When the number capacity of the PSTN/ISDN is increased to 15 digits, then the *INMARSAT mobile number* can consist of up to 12 digits.

Since the same *INMARSAT mobile number* should be used for telex and data transmission services, further constraints may be put on the number length.

A.2.2 The new numbering plan must cater for capabilities as follows:

- provision of a reasonable on-board identification capacity for calls to ship board terminal equipment connected to the ship earth station;
- possibility of several ship earth stations on the same ship where all ship earth stations have a number associated with the unique ship station identity of the ship;
- capability of supporting multi-channel ship earth stations.

These capabilities may require digits in block 3 of the *INMARSAT mobile number*, thus reducing the available space for block 2.

A.3 *Application of ship station identity*

A.3.1 *Digit capacity in block 2*

The INMARSAT Standard-A system can only support 6 digits in block 2 because of the addressing capacity on the radio path.

The addressing capacity of INMARSAT Standard-B and C systems on the radio path can cater for up to 9 digits in block 2. However, the limited digit capacity of the terrestrial networks puts the following initial constraints on the number of digits in block 2:

- for the INMARSAT Standard-B system, the initial digit capacity in block 2 is 6 digits to allow sufficient capacity in block 3 for supporting the capabilities listed in § A.2.2 above. In the future (see Recommendation E.165) the capacity of block 2 may be extended to 8 or 9 digits;
- for the INMARSAT Standard-C system, the initial digital capacity in block 2 is 6 digits to allow sufficient capacity in block 3 for supporting the possibility of identifying several terminal equipments connected to a ship earth station and of several ship earth stations on the same ship. In the future, the capacity of block 2 may be extended to 7 or more digits.

A.3.2 *Mapping between the ship station identity and the digits in block 2*

The mapping between the ship station identity and the digits in block 2 is shown in Table A-1/E.215.

TABLE A-1/E.215

Mapping between ship station identity and digits in block 2 of the mobile station number

Ship station identity			XXX XXX 000	XXX XXX 0X0	XXX XXX 0XX
Block 2 mapping	Size of block 2	6 digits	XXX XXX	Mapping not possible	Mapping not possible
		9 digits	XXX XXX 000	XXX XXX 0X0	XXX XXX 0XX

X = any digit between zero (0) and nine (9).

0 = zero (0).

For ship earth stations, the ship station identity is thus derived from the digits in block 2 by adding 0s at the end until the identity consists of 9 digits.

In order to distinguish between *INMARSAT mobile numbers* consisting of 9 and 12 digits (if they coexist), the digit x_7 of the ship station identify (see Recommendation E.210) must take the fixed value 0. This constraint is *not valid* when only 12 digit numbers exist in the future (see also Annex C).

The digit T in block 1 determines the type of ship earth station and, implicitly, the number of digits in block 2. The relationship is shown in Table A-2/E.215. Further details of the number structure is given in the main part of the Recommendation.

A.3.3 *Ships equipped with several INMARSAT standard systems*

The ship station identity for such ships is the one derived from the ship earth station standard having the smallest size of block 2. This applies only if the numbering systems for the ship earth station standards are related to the ship station identification plan.

TABLE A-2/E.215

Relationship between the digit T and the format of the ship station identity in 12 digit INMARSAT mobile international number

Value of digit T	INMARSAT standard system	Number of digits in block 2	Format of ship station identity
0	A	(Note 1)	(Note 1)
1	A	6	(Note 2)
2	Reserved	–	–
3	B	6	XXX XXX 000
4	C	6	XXX XXX 000
5	Aeronautical	(Note 3)	(Note 3)
6	Reserved	–	–
7	Reserved	–	–
8	A	(Note 4)	(Note 4)
9	Future expansion	Further study	Further study

Note 1 – Group call address. See Annex B for format of group call addresses.

Note 2 – The *INMARSAT mobile number* is not related to the ship station identification plan of Appendix 43, Radio Regulations.

Note 3 – The numbering plan for the Aeronautical Satellite Service is not related to the ship station identification plan of Appendix 43, Radio Regulations.

Note 4 – See § 4.2.3 for the use of this T digit.

ANNEX B

(to Recommendation E.215)

Group call numbering scheme for the INMARSAT system

B.1 *Categories for group call services*

At present, four different categories of group call service have been envisaged within the maritime mobile-satellite service.

B.1.1 *National group calls*

The category is defined to address all ships of the same nationality.

B.1.2 *Fleet group calls*

This category is defined to address all ships within one fleet.

B.1.3 *Selected group calls*

This category is defined to address a number of ships having a community of interest irrespective of nationalities or fleets, and forming a predefined group.

B.1.4 *Area group calls*

This category is defined to address all ships of any nationality located within a predetermined geographical area.

B.2 *Group call formats*

B.2.1 The general group call format is $TX_1X_2X_3X_4X_5X_6X_7X_8$ where the digits $TX_1X_2X_3X_4X_5X_6X_7X_8$ take the values in § B.2.2 for INMARSAT Standard-A and the values in § B.2.3 for other INMARSAT standards.

B.2.2 The group call numbering schemes for the INMARSAT Standard-A system will use eight decimal digits X_1 .. X_8 following the T digit, with T = 0, allocated as follows:

$M_2I_3D_40_50_60_70_80_9$	National group call
$M_2I_3D_4F_5F_6F_7F_8F_9$	Fleet group call
$0_20_3S_4S_5S_6S_7S_8S_9$	Selected group call
$0_20_30_4A_5A_6A_7A_8A_9$	Area group call

where $M_2 \neq 0$ $M_2 \neq 1$ $F_5 \neq 0$ $S_4 \neq 0$.

For T = 1 or 8, the group call number is not valid.

B.2.3 For INMARSAT standards other than Standard-A, the format of the digits $X_1 \ldots X_8$ is as follows:

0MID $0_50_60_70_8$	National group calls
0MID $F_5F_6F_7F_8$	Fleet group calls
000 $S_4S_5S_6S_7S_8$	Selected group calls
0000 $A_5A_6A_7A_8$	Area group calls

The T digit takes the value allocated for the particular standard in accordance with Table 2/E.215.

Hence, for a fleet group call to a Standard B ship earth station, the format would be:

3 0 MID $F_5F_6F_7F_8$

and for a fleet group call to a Standard-C ship earth station, the format would be:

4 0 MID $F_5F_6F_7F_8$

B.2.4 The MIDs in national and fleet group numbers are those allocated in Table 1 of Appendix 43, Radio Regulations [1].

B.2.5 In accordance with § 4 of the above-mentioned Appendix, the particular MID reflects only the country allocating the group call identity and therefore does not prevent group calls to fleets containing more than one ship nationality. Allocation of selected group numbers should be avoided when the same group could equally well be assigned a fleet group number.

B.2.6 National group numbers and fleet group numbers should be allocated by countries. Selected group numbers and area group numbers as applicable to the INMARSAT system should be allocated by INMARSAT; allocation of such numbers may require cooperation with other organizations.

B.2.7 A country having assigned a national group or fleet group number should notify the Director-General of INMARSAT if those numbers are going to be used within the INMARSAT system.

ANNEX C

(to Recommendation E.215)

Structure of the on-board identification digits in the INMARSAT numbering plan

C.1 *Introduction*

Within the numbering scheme, two digits Z_1Z_2 have been allocated (see §§ 4.3.1 and 4.4.1) to on-board identification. The purpose of these digits is to provide means for identifying different ship earth stations on the same ship, and different instruments, e.g. telephone instrument and a facsimile machine, connected to the same ship earth station.

Also, the present length of the *INMARSAT mobile international number* is limited to 12 digits. After 1996 it will be possible to increase the number length to 15 digits (see Recommendation E.165).

It is considered that the above aspects can be met by careful selection of the significance and values of Z_1Z_2.

C.2 *Proposed structure*

As outlined earlier, it is necessary for Z_1Z_2 to achieve two identification roles, i.e. station and instrument. It is considered that this can be accomplished by allocating Z_1 to multi-ship earth station identification and Z_2 to multi-instrument identification.

This structure would permit the uniform allocation of numbers to be achieved and would allow the growth of ship earth stations to be independent of the growth of instruments on any one ship earth station.

Further, in order to allow the future expansion of the numbering length, it is proposed that Z_1 should *never* be equal to 0 (zero) and the eighth digit of a 12-digit ship earth station number should always be equal to 0 (zero) as long as these two number lengths coexist for the same value of T digit.

i.e.: T MID $XXXZ_1Z_2$ (9 digits with $Z_1 \neq 0$)
T MID $XXX0XXZ_1Z_2$ (12 digits)

The above approach would then allow the unambiguous identification of 9-digit and 12-digit ship earth station numbers on the same T digit.

Note – The above constraint on the eighth digit is not required in the future when only 12 digit numbers exist in the INMARSAT system.

C.3 *Allocation*

Therefore, from the above, a ship with one ship earth station and one instrument Z_1Z_2 would equal 10. If another instrument were added, then Z_1Z_2 would equal 11 for this instrument.

If a ship had two earth stations of the same standard and one instrument attached to each, then the values of Z_1Z_2 would be 10 for one station, and 20 for the second station. If a second instrument were added to the second station, then the value of Z_1Z_2 would be 21 for this instrument.

Should it be necessary to allocate more than ten instruments per ship earth station, then another value of Z_1 would be allocated to the earth station, e.g. for the tenth instrument Z_1Z_2 would be equal to 19 and for the eleventh instrument 20 would be allocated or the next free value Z_1.

Table C-1/E.215 gives some illustrations of the above allocations.

TABLE C-1/E.215

Examples of Z_1 Z_2 allocation for ship earth stations with the same T digit

Ship earth station	Instrument	Z_1	Z_2
Multi-ship earth stations			
X	Telephone	1	0
Y	Telephone	2	0
Multi-ship earth stations and multi-instruments			
X	Telephone	1	0
	Facsimile	1	1
Y	Telephone	2	0
Z	Telephone	3	0
	Facsimile	3	1
	Telephone	3	2
	Telephone	3	3
X	Telephone	1	0
	Telephone	1	1
	Facsimile	1	2
	Telephone	1	9
	Telephone	3	0
Y	Telephone	2	0
	Facsimile	2	1
Z	Telephone	4	0

Reference

[1] *Radio Regulations*, Appendix 43, ITU, Geneva, 1982, revised in 1985, 1986 and 1988.

Recommendation E.216

SELECTION PROCEDURES FOR THE INMARSAT MOBILE-SATELLITE TELEPHONE AND ISDN SERVICES

1 Introduction

1.1 *Purpose*

The purpose of this Recommendation is to standardize:

a) the selection procedures for subscribers in the public switched telephone network or ISDN calling a ship earth station in the INMARSAT systems;

b) the procedures for calling a subscriber, an operator or a special service termination in the public switched telephone network or ISDN from a ship earth station.

This Recommendation applies to INMARSAT Standard-A, B and C systems. Selection procedures for the INMARSAT Aeronautical system is for further study.

1.2 *Related CCITT Recommendations*

E.215 (Numbering plan for the mobile-satellite services of INMARSAT).

E.210 (Ship identification for VHF/UMF and maritime-mobile satellite services).

E.160 (Definitions relating to national and international numbering plans).

E.163 (Numbering plan for the international telephone service).

E.164 (Numbering plans for the ISDN era).

E.165 (Timetable for coordinated implementation of the full capability of the Numbering Plan for the ISDN era (Recommendation E.164)).

E.171 (International telephone routing plan).

E.172 (Call routing in the ISDN era).

Q.1101 (General principles for interworking between INMARSAT Standard-A system and the telephone network).

Q.1112 (Procedures for interworking between INMARSAT Standard-B system and the international public networks).

F.125 (Telex numbering plan for the mobile-satellite service of INMARSAT).

F.126 (Selection procedures for INMARSAT mobile-satellite telex service).

F.127 (Operational procedures for interworking between the telex service and the service offered by INMARSAT Standard-C).

2 Number structures

2.1 Maritime mobile-satellite services are international in nature and international procedures will be adopted to provide access to these services. For some purposes, a maritime mobile-satellite system can be regarded as analogous to a national network and the ship earth stations as subscribers within that network.

For automatic shore-originated calls, international selection procedures will be adopted using an international prefix number, the three digit country code 87S and a mobile earth station number where the digit S indicates the ocean region. The telephone/ISDN numbering plan for ship earth stations in the INMARSAT System is given in Recommendation E.215.

2.2 For automatic ship-originated calls international selection procedures will be used, including a standardized prefix, i.e. all ships in all ocean areas will use the same prefix to identify an automatic international call.

In addition, prefixes will be adopted to identify other functions for the satellite system. Annex A lists the allocation of the prefixes. Additional prefixes may be required and these can be added, using the spare decimal numeric combinations.

It is desirable to have one set of prefixes for all services. The prefixes listed in Annex A can be used where applicable for telex and data services and, if necessary, additional prefixes for these services may be assigned by the competent Study Group. Close cooperation between the competent Study Groups will be necessary when assigning new prefixes.

The use of some prefixes could be barred to some customers.

2.3 The prefixes will be sent over the radio path to the coast earth station but would not be used outside the satellite system. Hence, a prefix sent to the coast earth station would not be used in the international network.

2.4 The service associated with each prefix is defined in Annex B.

3 Procedures for shore-to-ship calls

3.1 *General selection sequence*

A shore based subscriber calling a ship in the INMARSAT system will select a numbering sequence as follows:

Pi	International prefix
87S	Country code
$TX_1X_2 \ldots X_n$	*INMARSAT mobile number.*

3.2 *Selection of S digit*

The numbering sequence requires the subscriber to know the satellite coverage area in which the ship is located. The values of the S digit are given in Recommendation E.215.

3.3 *INMARSAT mobile number*

The *INMARSAT mobile number* $TX_1X_2 \ldots X_n$ takes one of the formats defined in Recommendation E.215. The various possibilities are summarized in Table 1/E.216 and are further outlined below.

TABLEAU 1/E.216

Formats of INMARSAT mobile numbers

Format	Application
1 $X_1X_2X_3X_4X_5X_6$	Ordinary call to INMARSAT Standard A ship earth station
811 $X_1X_2X_3X_4X_5X_6$	Facsimile call to INMARSAT Standard A ship earth station which is equipped for automatic receipt of facsimile calls
3 $M_1I_2D_3X_4X_5X_6Z_1Z_2$	Ordinary call to INMARSAT Standard B ship earth station
4 $M_1I_2D_3X_4X_5X_6X_7X_8$	Ordinary call to INMARSAT Standard C ship earth station
5 $X_1X_2X_3X_4X_5X_6X_7X_8$	Call to INMARSAT aeronautical aircraft earth station

3.3.1 *INMARSAT Standard-A system*

For an ordinary call to an INMARSAT Standard-A ship earth station the formats of the *INMARSAT mobile number* is:

$$1\ X_1X_2X_3X_4X_5X_6$$

where the digits $X_1X_2X_3X_4X_5X_6$ identify a specific ship earth station. If there is more than one ship earth station at the ship, each will have its own unique *INMARSAT mobile number.*

Identification of different terminal equipment connected to a ship earth station is not possible in the INMARSAT Standard-A system. However, provisions can be made for calls to specific service terminations on the ship, e.g. a facsimile equipment. If signals for providing such information are available within the signalling systems used between the switching centre of call origin (i.e. the local national switching centre) and the coast earth station, they should be automatically inserted by that switching centre. In this case the numbering sequence would be as defined above, irrespective of the service termination on the ship. If some part of the connection does not have this capability, the required termination may be indicated by the following numbering sequence:

Pi	International prefix
87S	Country code
8Y	Service termination
$1\ X_1X_2X_3X_4X_5X_6$	*INMARSAT mobile number.*

Values of the digit Y for the various service terminations are given in Table 3/E.215. Y = 1 is allocated to the facsimile service and Y = 2 is allocated to packet mode data transmission services using the protocol of Recommendation X.25. Of these, only Y = 1 will be available for selection by telephone subscribers.

As other service termination requirements are identified by INMARSAT, the CCITT will make additional allocations. It should be noted that the digits 8Y cannot be used for discrimination between several terminals of the same kind connected to a ship earth station. It should be further noted that the digits 8Y should not be selected for ordinary telephone calls.

3.3.2 *INMARSAT Standard-B system*

The *INMARSAT mobile number* takes the following format for ship earth stations in the INMARSAT Standard-B system:

$$3\ M_1I_2D_3X_4X_5X_6Z_1Z_2$$

The on board identification digits Z_1Z_2 are used for:

- identifying terminal equipment connected to a ship earth station;
- discrimination between several ship earth stations on the ship;
- discrimination between channels of multi-channel ship earth stations;
- combination of the above.

See also Annex C to Recommendation E.215.

3.3.3 *INMARSAT Standard-C system*

The *INMARSAT mobile number* takes the following format:

$$4\ M_1I_2D_3X_4X_5X_6Z_1Z_2$$

The digits Z_1Z_2 can be used for on board identification as follows:

- identifying terminal equipment connected to a ship earth station;
- discrimination between several ship earth stations on the ship;
- combination of the above.

3.3.4 *INMARSAT Aeronautical system*

The format of the *INMARSAT mobile number,* $5\ X_1X_2X_3X_4X_5X_6X_7X_8$, is still to be determined.

4 Procedures for ship-to-shore calls

4.1 *General*

It should be possible to provide all information required for establishing a call from user terminals connected to the ship earth station. Such information may include:

a) called party address including any prefix,

b) desired coast earth station,

c) selection of a specific RPOA (for further study),

d) bearer service/teleservice characteristics, including supplementary service requests.

The information in a) is required for all calls. The information in b), c) and d) may be required on some calls, e.g. if the user requests a specific routing of the call or if specific service characteristics are to be applied.

4.2 *Calling a terrestrial subscriber*

4.2.1 A shipboard user will select the prefix 00 followed by the full international telephone or ISDN number required, whether or not the coast earth station is located in the called subscriber's country. Hence, the numbering sequence selected by a ship board subscriber will be of the form:

00	Prefix for automatic call
$I_1\ I_2\ I_3$	1, 2 or 3 digit country code
$N_1 \ldots N_n$	National (significant) number.

4.2.2 It is also possible to select specific services associated with the call by use of other prefixes than 00, e.g. 34 (person-to-person call), 35 (collect call), 36 (credit card call) and 37 (time and charges requested at end of call). The selection sequence will then be:

P_1P_2	Prefix
$I_1I_2I_3$	1, 2, or 3 digit country code
$N_1 \ldots N_n$	National (significant) number.

4.2.3 The ship earth station will permit the choice of a coast earth station identity through which the call is to be routed. Convenient land-line routings (e.g. use of the coast earth station nearest the destination country) could be encouraged by tariff considerations.

4.2.4 In INMARSAT systems the shipboard user may also select a specified RPOA for routing the call, when a choice between several RPOAs is available at the coast earth station. This selection is provided by information which may not be part of the selection sequence. (For further study.)

4.2.5 In INMARSAT Standard-B systems the user may chose among several service options. If some service characteristics are user selectable, it should be possible to make the selection from the user terminal. Standardization of selection procedures for supplementary services is for futher study.

4.3 *Calling an operator*

4.3.1 A shipboard user will select an operator prefix, the second digit identifying the type of operator required.

4.3.2 Table 2/E.216 illustrates the principle involved for two types of operator.

Some Administrations may wish to operate a system whereby shipboard users insert after the operator prefix a country code (I_1, I_2, I_3). The insertion of the country code will allow the call to be routed to a relevant operator. If an Administration operating such a system receives an operator prefix without the optional digits, then the call must still be connected to an appropriate operator. Similarly, if an Administration not operating such a system receives an operator prefix followed by optional digits, then the optional digits should be ignored and the call connected to the operator denoted by the prefix alone.

TABLE 2/E.216

Prefix		Optional digits	Type of operator
Digit 1	Digit 2		
1	1	$I_1\ I_2\ I_3$	International outgoing operator
1	2	$I_1\ I_2\ I_3$	International information service

4.3.3 Each Administration may decide which operators to provide, where they are to be located and how the call would be routed. If a request is received from a ship for a type of operator that the Administration does not provide, then the call will be routed to an operator convenient for that Administration.

4.4 *Other prefixes given in Annex A*

Each Administration may decide which services to provide and how the call would be routed. If a request is received from a ship for a service that the Administration does not provide, then the call will be routed to a location convenient for that Administration.

The general selection sequence could be as shown in Table 3/E.216.

The actual sequence may be decided by the Administration or INMARSAT.

TABLE 3/E.216

Prefix		Optional country code	Other optional digits	Type of service
Digit 1	Digit 2			
3	2	$I_1\ I_2\ I_3$	–	Medical advice
3	8	–	–	Medical assistance
2	3	–	$X_1\ X_2$	Short code selection

5 Procedures for ship-to-ship calls

5.1 Selection procedures for ship-to-ship calls will be similar to those for ship-to-shore calls, using the maritime country code 87S. The numbering sequence selected by the shipboard user will be of the form:

00 Prefix for automatic call

87S Country code

$TX_1X_2 \ldots X_n$ *INMARSAT mobile number.*

This format will be used whether or not the ships are in the same ocean area.

5.2 Each Administration operating a coast earth station may decide whether to switch ship-to-ship traffic within an ocean area at the coast earth station or at an international switching centre.

6 Instructions for telephone subscribers

The general principles laid down in Recommendation E.120 apply also to the maritime mobile-satellite service. The instructions should contain the full selection procedures with some emphasis put on the selection of the S digit in the country code.

7 Instructions for users at ship earth stations

It would be beneficial if coast earth station operators and/or INMARSAT provided user manuals defining the system capabilities and services offered. The manuals should contain information such as:

- general instructions for use of the INMARSAT services;
- location of coast earth stations;
- facilities provided and services supported by each coast earth station;
- selection procedures for setting up automatic calls;
- selection procedures for operator assisted calls for each coast earth station;
- selection procedures for setting up calls to the services listed in Annex A for each coast earth station;
- other instructions which INMARSAT may consider useful or important to users.

ANNEX A

(to Recommendation E.216)

Allocation of telephone prefixes, telex access codes and data transmission prefixes

A.1 Administrations should make application for the allocation of new prefixes and access codes to the CCITT Secretariat. The application should contain a definition for the service, termination or facility to be accessed.

The CCITT Secretariat would be responsible for coordinating the allocation of new prefixes and access codes with the competent Study Groups. The allocation of new prefixes and access codes should be done in such a way as to ensure that equivalent services carried by means of telephone, telex or data circuits are given the same prefix.

The prefixes and access codes to be used for automatic calling should be as follows:

Telephone – For international calls the prefix should be 00 followed by the international telephone number of the called subscriber. As an option for national calls the prefix 0 followed by the national (significant) number of the called subscriber could be used.

Note – In the maritime satellite service only the international format is preferred.

Telex – For international calls the access code should be 00 followed by the international telex number of the called subscriber. As an option for national calls the access code should be 0 followed by the national telex number of the called subscriber could be used.

Note – In the maritime satellite service only the international format is preferred.

Data transmission – For data calls through a public data network the format should always consist of the prefix 0 followed by the international data number of the called subscriber (see Recommendation X.350, § 5.2.1).

A.2 Table A-1/E.216 contains a list of prefixes and access codes allocated up to the present time for access to special destinations, services or facilities.

TABLE A-1/E.216 (Note 1)

Allocation of telephone prefixes, telex access codes and data transmission prefixes

Category	Prefix or access code		Applications (Notes 2 and 3)	Telephone	Telex	Data
	Digit 1	Digit 2				
Operator	1	0	Spare	–	–	–
	1	1	International outgoing operator	A	A	NA
	1	2	International information service	A	A	FS
	1	3	National operator	A	A	NA
	1	4	National information service	A	A	FS
	1	5	Radiotelegram service	FS	A	NA
	1	6	Spare	–	–	–
	1	7	Booking of telephone calls (Note 4)	A	A	NA
	1	8	Spare	–	–	–
	1	9	Spare	–	–	–
Automatic facilities	2	0	Access to maritime PAD (Note 5)	A	NA	NA
	2	1	Store-and-forward (international)	NA	A	NA
	2	2	Store-and-forward (national)	NA	A	NA
	2	3	Abbreviated dialling (short code selection)	A	A	NA
	2	4	Telex letter service	NA	A	NA
	2	5	Access to PSPDN	(Note 8)	NA	(Note 8)
	2	6	Spare	–	–	–
	2	7		–	–	–
	2	8		–	–	–
	2	9		–	–	–
Specialized assistance (Note 6)	3	0	Spare	–	–	–
	3	1	Maritime enquiries	A	A	A
	3	2	Medical advice	A	A	A
	3	3	Technical assistance	A	A	A
	3	4	Person-to-person call	A	NA	NA
	3	5	Collect calls	A	NA	NA
	3	6	Credit card calls	A	A	NA
	3	7	Time and charges requested at end of call	A	A	NA
	3	8	Medical assistance	A	A	A
	3	9	Maritime assistance	A	A	A
Ship reporting	4	0	Spare	–	–	–
	4	1	Meteorological reports	A	A	A
	4	2	Navigational hazards and warnings	A	A	A
	4	3	Ship position reports	A	A	A
	4	4	Spare	–	–	–
	4	5		–	–	–
	4	6		–	–	–
	4	7		–	–	–
	4	8		–	–	–
	4	9		–	–	–

TABLE A-1/E.216 *(cont.)*

Category	Prefix or access code		Applications (Notes 2 and 3)	Telephone	Telex	Data
	Digit 1	Digit 2				
Information retrieval	5	0	Spare	–	–	–
	5	1	Meteorological forecasts	FS	FS	FS
	5	2	Navigational warnings	FS	FS	FS
	5	3	Videotex (international)	FS	NA	FS
	5	4	Videotex (national)	FS	NA	FS
	5	5	News (international)	FS	FS	FS
	5	6	News (national)	FS	FS	FS
	5	7	Spare	–	–	–
	5	8		–	–	–
	5	9		–	–	–
Specialized use (Note 7)	6		Administration specialized use, e.g. leased lines	A	A	FS
	7		Spare	–	–	–
	8		Spare	–	–	–
Test	9	0	Spare	–	–	–
	9	1	Automatic test line	A	A	FS
	9	2	Commissioning tests	A	A	A
	9	3	Spare	–	–	–
	9	4	Spare	–	–	–
	9	5	Operational coordination	A	A	A
	9	6	Spare	–	–	–
	9	7		–	–	–
	9	8		–	–	–
	9	9		–	–	–

Note 1 – The same table is contained in Recommendations F.126 and X.350.

Note 2 – The entries in the columns under Telephone, Telex and Data have the following meanings:

A = Applicable for access by this service
NA = Not applicable for access by this service
FS = For further study.

Note 3 – The prefix or access code may be followed by an optional telephone country code, data country code (or data network identification code) or telex destination code, or other optional digits.

Note 4 – Via some coast earth stations it would be possible to book telephone calls using the telex service.

Note 5 – PAD = Packet Assembly/Disassembly facility. The prefix 20 should be followed by two digits indicating the required data rate (see Recommendation X.351).

Note 6 – The prefixes 34, 35, 36 and 37 may be followed by the international number of the called subscriber.

Note 7 – Digits following digit 6 will be allocated on a national basis.

Note 8 – The prefix is used for access to maritime satellite data switching exchanges (MSDSEs) (see Recommendation X.350) for virtual call data services (Recommendation X.25) by means of telephone circuits in the INMARSAT system.

A.3 The facilities are defined in Annex B.

ANNEX B

(to Recommendation E.216)

Application of telephone prefixes, data transmission prefixes and telex access codes – Definitions and descriptions

Services and facilities normally provided by the telephone data or telex networks are otherwise defined in CCITT Recommendations and do not require any further definitions. This annex provides definitions and descriptions of some of the special facilities of Annex A.

Note 1 – The same annex is contained in Recommendation F.126.

Note 2 – In this annex the term prefix is used to designate telephone prefix, telex access code and data transmission prefix.

B.1 *Operator*

B.1.1 **international outgoing operator (prefix 11)**

Prefix 11 will connect the caller to an international operator position. The prefix may be followed by a country code. If so, the procedure for servicing the call is described in § 4.3.

B.1.2 **international information service (prefix 12)**

Prefix 12 will connect the caller to the international information service. The prefix may be followed by a country code. If so, the procedure for servicing the call is described in § 4.3.

B.1.3 **national operator (prefix 13)**

Prefix 13 will connect the caller to a national or international operator position in the country where the coast earth station is located. The type of operator to be used is decided by the Administration.

Note – Prefix 13 may not be offered on all coast earth stations.

B.1.4 **national information service (prefix 14)**

Prefix 14 will connect the caller to a national or international operator position. The type of information service to be used is decided by the Administration.

Note – Prefix 14 may not be offered on all coast earth stations.

B.1.5 **radiotelegram service (prefix 15)**

Prefix 15 will connect the caller to the radio telegram service position. The transmission of radio telegram should normally be made by radio telex only. The radio telegram service in this case should be arranged in such a way that automatic retransmission is possible.

B.1.6 **booking of telephone calls (prefix 17)**

Prefix 17 will allow the caller to book a telephone call via the telex service.

This telex message will be routed to the relevant international (or national) telephone operator.

B.2 *Automatic facilities*

B.2.1 **access to maritime PAD (prefix 20)**

Prefix 20 is used for gaining access to a packet assembly/disassembly (PAD) facility in a packet switched public data network. The PAD is accessed via telephone circuits in the INMARSAT system. The prefix is followed by two additional digits indicating the required data rate (see Recommendation X.351).

B.2.2 **store-and-forward (international) (prefix 21)**

Prefix 21 is used for gaining access to a store-and-forward unit (SFU) for international calls.

B.2.3 **store-and-forward (national) (prefix 22)**

Prefix 22 is used for gaining access to a store-and-forward unit (SFU) for national calls.

B.2.4 **abbreviated dialling (short-code selection) (prefix 23)**

Abbreviated dialling (short-code selection) will allow the caller to make a connection by selecting a short special number (e.g. 2 or 3 digits) instead of a full international (or national) number.

B.2.5 **telex letter service (prefix 24)**

Prefix 24 is used for directly transmitting a message originated from a ship earth station (SES) to a selected telegraph office for delivery by mail or any appropriate means.

B.2.6 **access to PSPDN (prefix 25)**

Prefix 25 is used for obtaining access via INMARSAT telephone circuits to a maritime satellite data switching exchange (MSDSE) (see Recommendation X.350) for virtual call data services (Recommendation X.25). The prefix is followed by additional digits indicating data rate or other parameters associated with the call.

B.3 *Specialized assistance*

B.3.1 **maritime enquiries (prefix 31)**

Prefix 31 may be used for special enquiries such as ship location, authorization, all telegrams, etc.

B.3.2 **medical advice (prefix 32)**

Prefix 32 provides connection to national medical facilities (hospital, etc.) for obtaining medical advice or consultation. The prefix may be followed by a country code.

B.3.3 **technical assistance (prefix 33)**

For the maritime satellite service, prefix 33 provides connection to the technical personnel of the coast earth station in case difficulties are experienced in establishing communication.

For other maritime systems, further study is required.

B.3.4 **person-to-person call (prefix 34)**

Prefix 34 should be used when the call is for a specific person at the called number. An operator will intervene in the call, and should be provided with the details of the person to be called. The prefix may be followed by the number of the called party.

B.3.5 **collect calls (prefix 35)**

Prefix 35 should be used for calls, charges for which will be billed to the called party. The telephone operator will intervene in the call and should be provided with the information pertinent to the call. The prefix may be followed by the number of the called party.

B.3.6 **credit card calls (prefix 36)**

Arrangements can be made with the Administration of certain coast stations or coast earth stations for payments for communication services to be made by a credit card. The arrangement is valid only for the services of the station with which it is made.

An operator will intervene in the call and should be provided with details of the credit card. The prefix may be followed by the number of the called party.

B.3.7 **time and charges requested at end of call (prefix 37)**

Prefix 37 provides, upon completion of the call, either automatic printout of charging information, or connection to an operator who will supply charging information on the call. The prefix is followed by the number of the called party.

B.3.8 **medical assistance (prefix 38)**

If the condition of an ill or injured person aboard ship requires his urgent delivery ashore or the delivery of a doctor aboard ship, prefix 38 provides connection to the appropriate national authority responsible for this kind of activity.

B.3.9 **maritime assistance (prefix 39)**

Prefix 39 provides connection to the appropriate national authority in case maritime assistance is required (e.g. tow, oil pollution).

B.4 *Ship reporting*

B.4.1 **meteorological reports (prefix 41)**

Prefix 41 provides connection to the meteorological office for transmission of ship weather reports.

B.4.2 **navigational reports from ships (prefix 42)**

Prefix 42 provides connection to a navigational office for transmission of information from ship on any hazards which could endanger safety of navigation (e.g. wrecks, derelicts, floating obstructions, defective radiobeacons or light vessels, icebergs, floating mines, etc.).

B.4.3 **ship position reports (prefix 43)**

Prefix 43 provides connection to an appropriate national or international centre collecting ship movement information for search and rescue (or other) purposes.

B.5 *Information retrieval services (prefixes 5x)*

Further study is required.

B.6 *Specialized use*

Further study is required.

B.7 *(Reserved for future use.)*

B.8 *(Reserved for future use.)*

B.9 *Test*

B.9.1 **automatic test line (prefix 91)**

Prefix 91 provides automatic test of the ship earth station in telex and telephony mode. In the maritime satellite service the coast earth station will automatically transmit a "QUICK BROWN FOX" test message for telex and provide a loop-around test line connection in accordance with Recommendation O.11 for telephony. Test lines for data transmission are for further study.

B.9.2 **commissioning tests (prefix 92)**

Prefix 92 is used in the maritime satellite service for conducting commissioning tests of ship earth stations.

B.9.3 **operational coordination (prefix 95)**

Prefix 95 is used in the maritime satellite service for operational communications between management and maintenance elements of the system.

PART II

Recommendations E.230 to E.277

OPERATIONAL PROVISIONS RELATING TO CHARGING AND ACCOUNTING IN THE INTERNATIONAL TELEPHONE SERVICE

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SECTION 1

CHARGING (DETERMINATION OF COLLECTION CHARGES) IN THE INTERNATIONAL TELEPHONE SERVICE

Recommendation E.230

CHARGEABLE DURATION OF CALLS

1 International operators should allow no tolerance in their assessment of the chargeable duration of calls.

2 Metering devices controlled by operators should be rapid in action and have the utmost accuracy.

3 In the automatic service (and, in the case of station calls, in the manual and semiautomatic service) the chargeable duration should begin from the receipt of the answer signal from the called station (see the definitions in Recommendation E.100), since the existence of an unchargeable call period, however short, might lead to misuse of the service for the transmission of short messages without payment.

The chargeable duration ends when the caller gives the clear-forward signal or, if the caller has not replaced the receiver, when the call is cleared down by an operator in the performance of her duties in manual or semiautomatic working, or as a result of a clearing signal from the called party when an exchange clears the connection. In the latter case, the chargeable duration ends with some slight delay following receipt of the clearing signal from the called party.

4 It is unnecessary to inform the person making an international call of the exact moment at which the charging begins.

5 An Administration should not give its operators instructions to advise subscribers of successive charging periods unless a prior agreement to this effect has been reached with the other Administrations.

6 Nevertheless, if some Administrations consider it desirable to indicate to callers the expiry of each charging period, an automatic device, or one controlled by the operator at the originating international exchange, can be used for this purpose, on condition that this indication is regarded merely as an advice which is not binding on the Administration as regards charging.

Recommendation E.231

CHARGING IN AUTOMATIC SERVICE FOR CALLS TERMINATING ON SPECIAL SERVICES FOR SUSPENDED, CANCELLED OR TRANSFERRED SUBSCRIBERS

It is desirable for calls terminating on special services for suspended, cancelled or transferred subscribers in the international automatic service to receive the same treatment in different countries.

The CCITT considers that no charge should be made for these calls.

Note – As far as all the signalling systems involved in a given connection for any of the possible relations allow the transmission of the "no-charge" information, the answer signal should not be withheld. Nevertheless such a situation will not exist on a worldwide basis for a long period to come. Therefore it is appropriate, for the time being, to suppress the sending of the answer signal on the international circuits for calls towards these special services. It should also be noted that according to Recommendation Q.118, such calls will be cleared upon expiry of a certain fixed time-out.

Recommendation E.232

CHARGING FOR CALLS TO SUBSCRIBER'S STATION CONNECTED EITHER TO THE ABSENT SUBSCRIBER'S SERVICE OR TO A DEVICE SUBSTITUTING A SUBSCRIBER IN HIS ABSENCE

1 When a subscriber's line is connected to the absent subscriber's service or to a device which answers the telephone in the subscriber's absence (and may possibly record a message or exchange data) the absent subscriber's service or the device is assumed to be equivalent to a person answering for the subscriber at the latter's express wish. The call shall therefore be set up and charged in the normal manner.

1.1 *Station calls*

For station calls, charging takes effect on receipt of an answer:

- from the absent subscriber's service, or
- from a device substituting a subscriber in his absence.

1.2 *Personal calls*

The caller is informed that the line is connected to the absent subscriber's service or to a device substituting the called party in his absence. If he accepts the call he is charged on the basis of duration and the special charge for a personal call is levied. If he does not accept the call, no charge is levied.

2 This Recommendation applies to manual, semiautomatic and automatic services.

SECTION 2

PROCEDURES FOR REMUNERATION OF ADMINISTRATIONS FOR FACILITIES MADE AVAILABLE

Recommendation E.250

NEW SYSTEM FOR ACCOUNTING IN INTERNATIONAL TELEPHONY

The complete text of this Recommendation is contained in Recommendation D.150.

Recommendation E.251

OLD SYSTEM FOR ACCOUNTING IN INTERNATIONAL TELEPHONY

The complete text of this Recommendation is contained in Recommendation D.151.

Recommendation E.252

MODE OF APPLICATION OF THE FLAT-RATE PRICE PROCEDURE SET FORTH IN RECOMMENDATIONS D.67 AND D.150 FOR REMUNERATION OF FACILITIES MADE AVAILABLE TO THE ADMINISTRATIONS OF OTHER COUNTRIES

The complete text of this Recommendation is contained in Recommendation D.160.

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SECTION 3

MEASURING AND RECORDING CALL DURATIONS FOR ACCOUNTING PURPOSES

Recommendation E.260

BASIC TECHNICAL PROBLEMS CONCERNING THE MEASUREMENT AND RECORDING OF CALL DURATIONS

1 Recording call duration

1.1 Technically *call duration* is the interval that elapses between:

- the moment when the clear condition is detected at the point where the recording of the call duration takes place, and
- the moment when the clear condition (clear forward signal) is detected at the same point.

It follows that the apparatus used to record call duration of automatic calls must be capable of detecting the two moments mentioned above and of measuring the interval between them.

1.2 When an Administration using a simplified signalling system has recourse to recording holding times for the establishment of international accounts, it is necessary to have a conversion factor making it possible to obtain the call duration from the holding time. The determination of this conversion factor requires fairly close observation. The ratio of holding time to call duration may not be the same for all the circuits of a single group, so that a fairly large number of circuits must be observed in order to find a reliable conversion factor. Moreover, the holding time also depends on the availability of switching equipment in the incoming country, as well as the reaction of subscribers when they hear ringing tone, busy tone, etc.; the holding time for a given call duration may thus be extremely variable [1].

2 Discrimination between automatic and semiautomatic calls

Since different accounting procedures are used for automatic and semiautomatic calls, the recording apparatus must be capable of distinguishing between these two types of calls and must record the call duration of automatic calls only.

Discrimination can be effected by one of the following methods:

a) by connecting the measuring apparatus to a point in the exchange through which only automatic traffic is routed;

b) by recording call durations only for calls containing the *discriminating* digit 0 used in automatic working (see the Recommendation Q.104 cited in [2]).

Method b) may be particularly useful when both automatic and semiautomatic calls originate at exchanges within the national network and are routed to the outgoing international exchange over a common group of circuits.

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[1] In Recommendation D.150, § 4.1.4 [1] holding time is not recommended because of the wide variations between chargeable time and holding time in different relations and in different call types, which makes the use of holding time inappropriate for remunerating Administrations of countries of destination.

3 Omission of international transit traffic from the records of call duration

All records of call duration will be taken in the outgoing country and will relate to calls originating in that country. It will therefore be necessary, in an international exchange which routes both terminal and international transit traffic, to exclude the call duration of international transit calls passing through the exchange.

It will be difficult to discriminate between originated calls and transit calls on the outgoing international circuits and it may therefore be necessary to segregate this traffic within the exchange and connect the recording apparatus at a point in the exchange where transit traffic is not encountered.

4 Discrimination according to destination

4.1 The records of call durations obtained by the recording apparatus must be related to particular countries of destination and, if required, to the charging areas of the country of destination; the recording apparatus should therefore be capable of identifying the destination of a call and of associating the measured call duration with this destination.

Note – For drawing up international accounts (apart from frontier relations) it is not necessary to know the origin of the call or the charging zone from which it comes. The differences in shares resulting from different outgoing charging zones in a given country are kept by that country.

4.2 *Incoming country constituting a single charging zone*

Where the recording apparatus is connected to a circuit group carrying only terminal traffic, no discrimination is required. Where, however, a circuit group carries traffic to more than one country, discrimination between these countries must be effected from an examination of the international code for the country and/or the type of seizing signal (terminal or transit) which is sent over the international circuits.

4.3 *Incoming country consisting of several charging zones*

If the accounting procedure agreed between two countries demands the production of separate records of call durations for calls made to each charging zone in an incoming country, the recording apparatus must be arranged to discriminate between the calls to the different charging zones according to the first one or first two digits of the called station's national (significant) number[2] (see Recommendation E.163).

4.4 *Special frontier arrangements*

To take account of the special system of charging for frontier relations (reduced charges between neighbouring frontier zones), special steps will have to be taken to discriminate between automatic calls in frontier relations and other automatic calls. This discrimination will be made every time that frontier traffic is routed wholly or partly (overflow) by long-distance international circuits having devices for measuring call duration.

This discrimination will in general necessitate:

a) further analysis of the national (significant) number of the called subscriber than the one which is quoted in Recommendation E.163, and

b) the determination of the origin of the call, since frontier charges depend on the distance between the outgoing and the incoming frontier zones.

5 Discrimination according to route and destination

In general there will be little difficulty in determining the route taken by a call on leaving the outgoing international exchange. If the recording apparatus is connected to the international circuits, then of course the recordings obtained will be appropriate to the route in question. If, however, the recording apparatus is connected to a point in the exchange remote from the outgoing circuits and the call to a particular country has the choice of more than one route, then information in respect of the actual route taken by the call must be supplied to the recording apparatus.

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[2] See the definition of the national (significant) number in Recommendation E.160.

6 Distribution of traffic in an international exchangefor the purpose ofmeasuring call durations

By way of example, Figure 1/E.260 is given hereafter showing how traffic should be distributed in an international exchange so as to take account of the provisions above.

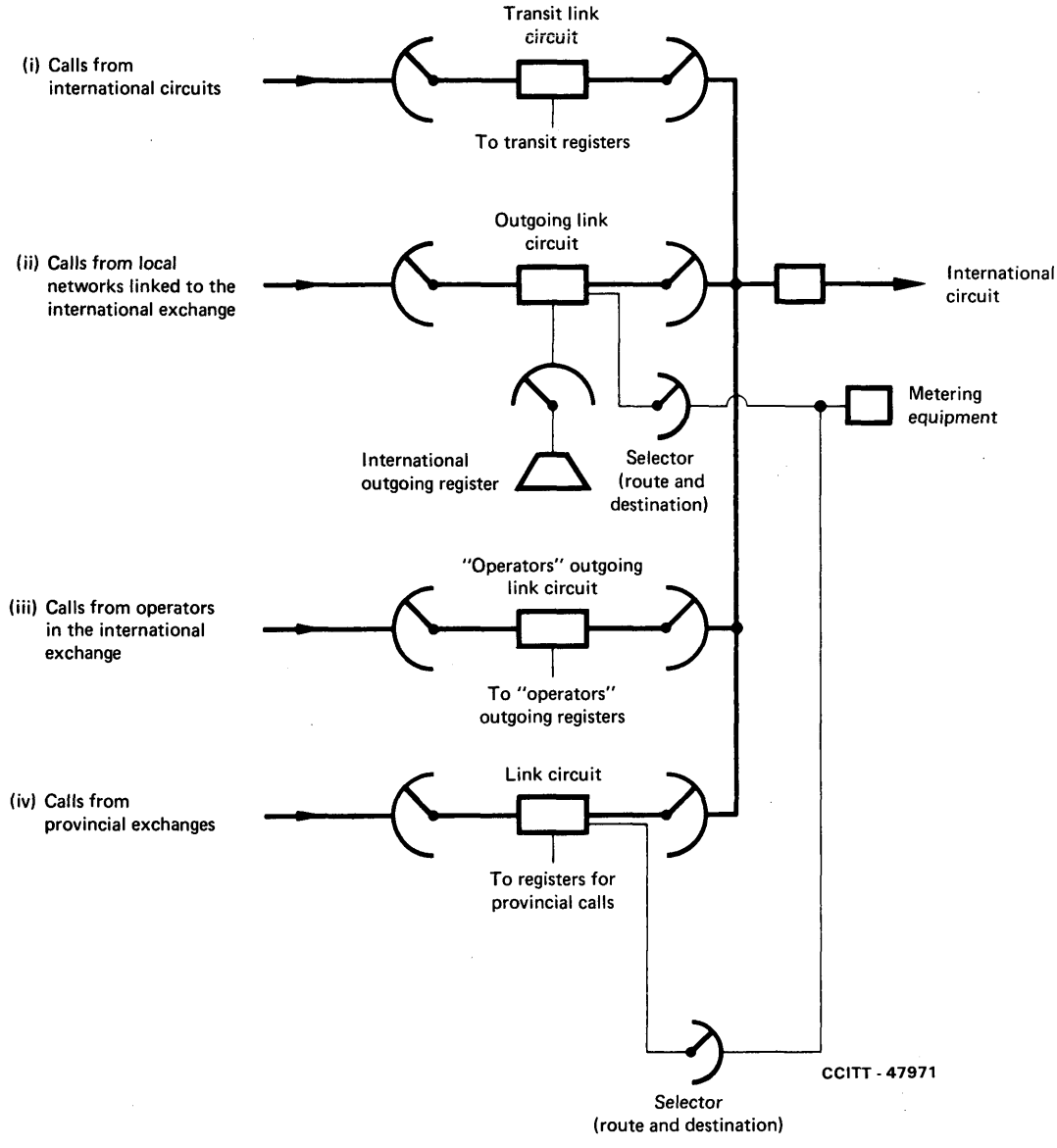

FIGURE 1/E.260

Diagram giving an example of traffic distribution in an international exchange

The traffic passing through the international exchange is divided into the following four groups, as shown on the figure:

i) international transit traffic;

ii) automatic traffic (originated locally);

iii) semiautomatic traffic (originated locally);

iv) combined automatic and semiautomatic traffic from provincial exchanges.

These groups would employ independent groups of link circuits and registers. Only group ii) and possibly group iv) would be involved in measuring call duration.

The following auxiliary equipment is envisaged:

a) for each link circuit in groups ii) and iv), a selecting device capable of dealing with every possible combination of route/country or *charging zone* destination;

b) for each link circuit in group iv), a device to take care of the discrimination between semiautomatic and automatic traffic;

c) for registers in groups ii) and iv), equipment for analyzing country codes and if necessary an appropriate number of digits of the national (significant) number of the called subscriber in order to discriminate between charging zones (see Recommendation E.163, § 1.2);

d) for registers in group iv), a device to recognize the discriminating digit 0 used for automatic working;

e) a means of recording the call duration for each combination of route/country or charging zone destination.

References

[1] CCITT Recommendation *New system for accounting in international telephony*, Rec. D.150, § 4.1.4.

[2] CCITT Recommendation *Language digit or discrimination digit*, Rec. Q.104, § 1.4.2.

Recommendation E.261

DEVICES FOR MEASURING AND RECORDING CALL DURATIONS

There are three main methods used for measuring call duration:

1 Use of apparatus of the type which meters the quantity of electricity (ampere-hour meter or coulomb-meter)

This type of meter is permanently connected to the circuits or equipment under observation; for the measurements in question, the current strength in the meter is at all times proportional to the number of circuits or units of equipment in the speech position. With this type of apparatus the accuracy of the measurements depends on:

a) errors in the meter (shunt included) itself; in any case, in the absence of special arrangements, the accuracy of the latter is not so good for intensities which are only a small fraction of the nominal intensity for which the apparatus is designed;

b) the accuracy and possibly the variations with time of the resistors inserted in the circuits to be observed;

c) the ohmic resistance of the connections between the measuring equipment and the circuits to be observed;

d) voltage variations in the supply battery used.

Obviously, the longer the period of observation, the greater are the chances that partial compensations will occur between the various causes of error. With such apparatus it seems unlikely that more than a 2% accuracy of measurements can be obtained for measurements made over an adequate period of time which includes hours of varying load; measurements made only at times when there is very little traffic might involve a considerably greater error.

2 Use of pulse-counting meters

With this method, the circuits or equipment under observation are connected, for the duration of a call, to pulse-counting meters which receive pulses from a common timing mechanism at suitable intervals, for example every six seconds. The call duration is deduced from the meter readings.

3 Use of a device for periodically scanning circuits or equipment

These devices can be based on either the conventional type of equipment (relays, crossbar switch, etc.) or some form of electronic equipment.

4 Degree of accuracy of methods 2 and 3

With the two last-named methods, the degree of accuracy of measurements depends on:

- the average call duration and the statistical distribution of call durations;
- the number of calls observed;
- the interval between the sending of pulses (method 2) or the scanning interval (method 3).

It is also possible to assess mathematically, as a function of these factors, the anticipated degree of accuracy. Errors may also arise from the operation of the meter in method 3, or from accidental variations in the pulsing or scanning interval.

There is no doubt that if the number of calls observed is sufficiently high it is possible, using these methods and without reducing the pulse-sending interval or the scanning interval to such a small value that operation difficulties would arise with classic-type apparatus, to obtain greater accuracy than could be obtained with the method described in § 1 above.

5 Fault indication

It is recommended that provision should be made for indicating faults in the measuring and recording device. There are two possibilities:

a) to design the measuring and recording apparatus so that there is a permanent check on its operation, with an alarm system to indicate faults;

b) to provide special equipment to make a routine check of the operation of the measuring equipment.

6 Equipment design

The design of equipment for measuring and recording call durations is left to Administrations. Some information will be found in Annex A.

ANNEX A

(to Recommendation E.261)

Measuring call duration

A.1 The technique to be adopted for recording call durations of automatic traffic will depend on the accounting arrangements agreed between Administrations and particularly on whether recordings are to be made:

- by country of destination alone;
- by route and country of destination;
- by route, country of destination and charging zone.

In all cases it will be necessary to discriminate between automatic and semiautomatic traffic and possibly transit traffic.

A.2 Assuming that it is possible to identify automatic calls on the outgoing international circuit and that the circuits carry only terminal traffic, the measurement of call durations could be effected by connecting a measuring and recording device to each international circuit. The disadvantage of this scheme is the large number of recorders to be provided and read daily.

A single recorder could be made to serve a group of international circuits by arranging for the recorder to be connected to each circuit of a group in turn, say every six seconds, and for the recorder to operate each time that an international circuit in the answered condition is encountered. The recorder would then show the total call duration of the circuit group.

A.3 Where transit routings are involved and the recordings are required on the basis of route and country of destination, separate totals of call durations will be required for each country served by the route in question. In other words, it will be necessary to determine the destination of each call and record the call duration on the appropriate recorder.

This may be found to be a complicated process and it may be more convenient to connect the recorder at a point remote from the international circuit, for example at the register access relay set, where information in respect of the destination and routing of the call can be obtained from the outgoing international register. Figure A-1/E.261 illustrates an arrangement in which the selector A is positioned under the control of the register to connect the appropriate route and destination recorder to the register access relay set.

The recorder could be an ampere-hour meter or it could consist of a meter and a selector arranged to scan all the register access relay sets which have been connected to this particular route and destination recorder.

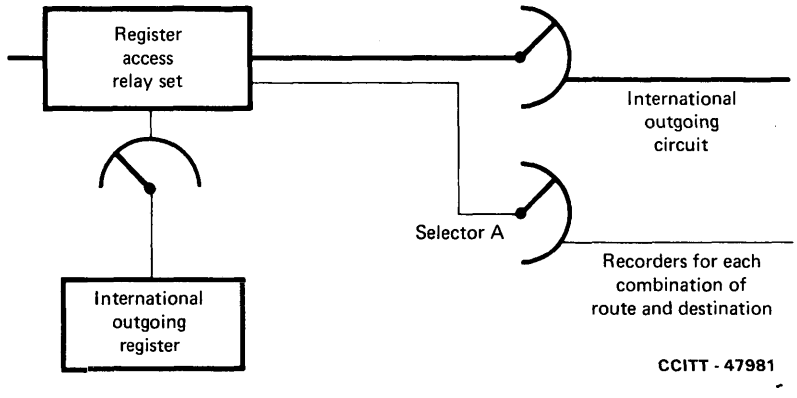

FIGURE A-1/E.261

A.4 A similar arrangement to Figure A-1/E.261 can be employed where recordings are required on the basis of route, country of destination and charging zone. The additional complications introduced in determining the charging zone mainly concern the outgoing register but it should be noted that a greater number of separate call duration recorders will then be needed.

A.5 The number of recorders or separate records of call durations is equal to the summation, for all destinations, of the product of number of routes by number of charging zones for each country of destination. The capacity of selector A in Figure A-1/E.261 must be sufficient to permit access to any recorder and the economics of this scheme will be determined by the number of separate recordings required and the total volume of international traffic originated at the exchange concerned.

A.6 For a large number of separate recordings, Administrations might consider whether it would be cheaper to use electronic methods for recording call durations. In this connection Administrations might take into account the possible future introduction of cheap rates which could double the number of separate records required.

SECTION 4

ESTABLISHMENT AND EXCHANGE OF INTERNATIONAL ACCOUNTS

Recommendation E.270

MONTHLY TELEPHONE AND TELEX ACCOUNTS

The complete text of this Recommendation is contained in Recommendation D.170.

Recommendation E.275

TRANSMISSION IN ENCODED FORM OF MONTHLY INTERNATIONAL ACCOUNTING INFORMATION

The complete text of this Recommendation is contained in Recommendation D.190.

Recommendation E.276

TRANSMISSION IN ENCODED FORM OF TELEPHONE REVERSED CHARGE BILLING AND ACCOUNTING INFORMATION

The complete text of this Recommendation is contained in Recommendation D.176.

Recommendation E.277

CONVENTIONAL TRANSMISSION OF INFORMATION NECESSARY FOR THE COLLECTION OF CHARGES AND THE ACCOUNTING REGARDING COLLECT AND CREDIT CARD CALLS

The complete text of this Recommendation is contained in Recommendation D.174.

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PARTE III

Recommendations E.300 to E.323

UTILIZATION OF THE INTERNATIONAL TELEPHONE NETWORK FOR NON-TELEPHONY APPLICATIONS

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SECTION 1

GENERAL

Recommendation E.300

SPECIAL USES OF CIRCUITS NORMALLY EMPLOYED FOR AUTOMATIC TELEPHONE TRAFFIC

The CCITT

considering

(a) that special services exist which occasionally require the provision of telephone circuits for uses such as:

- reserve circuits for VF telegraphy,
- circuits for phototelegraph transmissions,
- control circuits for programme transmissions,
- leased circuits (other than permanent full-time leases);

(b) that the international telephone service is becoming more and more automatic, and that only a few manual circuits will be kept to form a reserve network;

(c) that it is therefore necessary to provide automatic circuits for special uses other than telephony;

(d) that telephone circuits assigned for special uses must, when needed, be made available to the special services as rapidly as possible;

(e) that it must be guaranteed that, after the circuits have been used for a special purpose, they will be returned to the telephone service without delay;

(f) that the switching of circuits for special purposes should not disturb the operation of telephone service.

recommends

that the following provisions be observed:

1 In an international telephone relation, the number of automatic circuits assigned for special purposes should be in reasonable proportion to the total number of circuits, so that their occupation will not hamper the flow of automatic telephone traffic.

2 Circuits to be used for special purposes should be passed at the outgoing and incoming ends through transfer panels on which the wanted circuit is disconnected manually from the telephone equipment and connected to the terminal of the special service concerned.

Alternatively, circuits assigned for special uses should be fitted, in the telephone equipment, with a device for automatic switching to the transfer panel of the special service, the operation being commanded by the latter. (This method is preferable because with the first method a telephone call could be interrupted if proper care is not exercised.)

3 The switching operations should take place under the control of the outgoing international maintenance centre (IMC). The IMC may delay or limit the provision of telephone circuits for other purposes, particularly when restrictions are imposed on the telephone traffic.

4 The following arrangements should be followed when special connections are set up and cleared:

a) The occupation of a telephone circuit for a special purpose should be marked on the transfer panel at the outgoing end; conversely, if such a circuit is in fact engaged, it must be marked busy in the telephone switching equipment.

b) A circuit assigned to a special use may not be taken for the service in question if a telephone call is in progress. However, arrangements should be made to ensure that the circuit cannot be engaged by another telephone call when the call is over *(preliminary blocking)*.

c) The circuits in a group of telephone circuits that are reserved for special uses should be last-choice circuits, to reduce the risk of finding them busy when required.

d) When a circuit is free, the supervisor in charge of the transfer panel at the outgoing end takes the necessary steps to withdraw the circuit from the telephone service. The responsible supervisor at the incoming end is then asked to make the necessary operations if the telephone equipment is not disconnectable by remote control.

e) While awaiting notification from the incoming end of completion of transfer to the special service, the outgoing supervisor tests the connection before making it available for its new functions.

f) The same procedure is followed at the outgoing end when the circuit is restored to the telephone service. To prevent a subsequent telephone call from being ineffective, care must be taken to clear the special call at the incoming end first.

5 Bookings of leased circuits or order lines for programme transmissions are arranged in advance and are not urgent. The delays required by the connection of two circuits in tandem when a connection is operated entirely in automatic transit give rise to no particular difficulties.

6 Where telegraph systems are concerned, the primary requirement is rapid replacement of the faulty VF bearer circuit. In view of the delay which would occur in employing two separate links to form a reserve circuit, it appears that in relations in which automatic transit switching is the normal method of operation, a direct circuit should be retained.

Such a direct circuit could be manual or automatic. An automatic circuit would normally be used to carry the telephone traffic. It should be noted that this will then be used as a first-choice route and will thus carry the heaviest load. The risk of finding it busy, when needed, will therefore be at its maximum.

In such circumstances, preliminary blocking of the wanted circuit should be effected (see § 4b) above). As long as the equipment is unable to perform this operation it will be preferable to keep one manual direct circuit.

7 The delay in establishing phototelegraph calls via an international phototelegraph position transit centre (transit IPP) is not so critical. In this case, application of Recommendation E.320 will speed up the placing of two circuits end to end at the transit centre to establish the connection, and it will not be necessary to keep direct circuits in relations where automatic switching is the method normally used for telephone calls in transit.

8 The same circuit should not be assigned to more than one special service, so that the various transfer panels for such services may be placed separate from one another should the terminal country so wish.

Recommendation E.301

IMPACT OF NON-VOICE APPLICATIONS ON THE TELEPHONE NETWORK

1 Introduction

The present telephone network is capable of providing a bearer service for a range of non-voice service applications. These include:

- data (analogue coded),
- facsimile,
- phototelegraphy,
- VF telegraphy.

VF telegraphy is not carried on the public switched telephone network (PSTN). Furthermore, phototelegraphy calls use telephone circuits removed from normal service, as set out in Recommendation E.320. For calls on the PSTN therefore, only data and facsimile services are considered below.

Special considerations may need to be given to the suitability of the telephone network to carry these services because of their particular characteristics which differ from those of voice traffic in the following ways:

a) the transmission of these services is characterized by a continuous power loading, compared to the syllabic bursts found in speech;

b) non-voice traffic often has a 24-hour traffic profile different from voice traffic, but similar to other non-voice services such as telex;

c) call holding times are often significantly shorter than voice traffic.

While ISDN will be based on the concepts developed for the telephone network and may evolve by progressively incorporating additional functions and network features, the transition from existing networks to comprehensive ISDNs may require a period of time. On the understanding that non-voice application on the present telephone network demonstrates the provision of pre-ISDN bearer services, this Recommendation provides an analysis of some of the problems which may be encountered in the existing telephone network during the PSTN to ISDN transition period and suggests a number of solutions for these problems.

2 Signalling and transmission considerations

2.1 *Signalling*

Non-voice service signals can interfere with telephone circuit signalling systems and vice versa.

Data or facsimile signals can interfere with signalling systems which use in-band line signalling such as Signalling Systems No. 4, No. 5 and R1. Thus such non-voice calls should use the standardized systems set out in the Series V and T Recommendations since these are designed to prevent interference with the standard signalling systems, either by avoiding the particular signalling frequencies or by operating the guard circuit of the signalling receiver.

Despite the safeguards mentioned above, it may sometimes happen that the signalling receiver is momentarily operated by the carried service signal. In this case the splitting device in the signalling receiver will operate and cause a short discontinuity in the received service signal.

2.2 *Transmission*

2.2.1 *Interference to transmission systems*

If the proportion of non-voice calls is large, it can increase the overall power loading in a transmission assembly (group or supergroup). This can cause distortion in the group of signals and/or the operation of power limiters which can adversely affect other calls or services in the same transmission assembly.

In order to economize on the provision of international voice channels, some international transmission systems may be fitted with speech interpolation systems, such as TASI (time assignments speech interpolation). Circuit gains are realized by exploiting the silent period normally existing during speech conversations. Continuous non-voice service signals will cause the continuous operation of the speech detectors and give rise to permanent association of the telephone circuit to the transmission channel. This in turn increases the probability of noticeable speech clipping and in severe cases the occurrence of freeze-out where no channel is available. Thus the quality of speech on parallel voice calls can be affected, resulting in a need to reduce the gain advantage of the speech interpolation system.

Information on speech interpolation systems can be found in Supplement No. 2 of Fascicle VI.1.

2.2.2 *Interference by transmission systems*

It may be the case that ordinary speech channels do not provide an adequate transmission path for some types of non-voice service, resulting in an unacceptable error performance, or in the worst case not allowing any service at all.

Echo suppressors will not allow the transmission of duplex data unless the tone-disabling signal is first applied and immediately followed by the service signal.

Some types of transmission systems do not support higher speed data transmission. In particular, adaptive differential pulse code modulation (ADPCM) specified in Recommendation G.721 uses a 32 kbit/s coding technique for the speech channel and may not support higher data speeds, e.g. 9600 bit/s.

2.3 *Potential solutions*

If the transmission of non-voice services on the telephone network is found to cause problems due to the above issue, the Administrations concerned should take the following actions:

2.3.1 It should be established for each bilateral relationship what commercial and regulatory arrangements exist which recognize the need to provide for non-voice services within prescribed quality of service parameters.

2.3.2 If it is decided by the Administrations concerned that certain services must be supported, then two approaches can be taken:

a) only transmission systems allowing reliable performance for non-voice services are used;

b) separate routings are established for the whole or part of the networks, where unreliable transmission would otherwise occur.

2.3.3 In case b) above, it is necessary to know when subscribers are initiating non-voice calls. There are three methods for achieving this:

i) the subscriber line is known to be one originating only non-voice calls, e.g. it is a facsimile terminal;

ii) the subscriber sends some form of service indication to the network, identifying a non-voice call request (e.g. Recommendation E.131);

iii) the subscriber dials or selects a particular prefix before the international (or national) number requesting a non-voice service call.

If these indications are directly available at the exchange where the separate routing is selected, then path selection need only combine this indication with the dialled digits. In other cases it is necessary for a suitable signalling system to be employed to carry this indication forward to the special selection point. This may be done using signalling systems including special call categories. In particular, a call category "data call" is provided in Signalling Systems R2, No. 6 and No. 7, also No. 5 by bilateral agreement. The separate routing may be continued throughout the network using either "path of entry" indications at the exchanges concerned or the special call category signals within the signalling system. Such special arrangements for non-voice calls may have an impact on charging rates.

3 Traffic profiles

On international routes the peaks of voice and non-voice traffic may occur at different times due to, for example, different time zones. Some typical traffic profiles are described in Annex A. This difference has implications when calculating the gain of speech interpolation systems such as TASI and DSI (digital speech interpolation). The gain is basically the ratio of the number of telephone circuits, 8those connected with the telephone switching system), to the number of bearer circuits (those connected to the transmission facilities).

The number of required telephone circuits is designed to meet the busy-hour traffic volume, and the number of required bearer circuits is calculated from the total number of circuits required for voice and non-voice traffic. As a result, there is a possibility that the peak time of required telephone circuits and bearer circuits may appear at different hours.

Therefore the number of required telephone circuits with speech interpolation systems and bearer circuits needs to be dimensioned considering the 24-hour traffic profiles of both voice and non-voice.

4 Special provisions for end-to-end digital connectivity

4.1 Within IDNs it is possible to transport data on an end-to-end basis using the digital bit stream rather than analogue modulated signals. When ISDN features are implemented, the requirements of both voice and non-voice services will be met. Interim arrangements may exist before the ISDN however, that allow the provision of end-to-end digital connectivity for transmission of digital data.

Compared to the call set-up principles for voice calls, the following arrangements need to be applied:

i) only compatible digital circuits must be selected, e.g. all circuits use transparent 64 kbit/s transmission;

ii) all digital speech processing (DSI) systems (e.g., CME, DSI, ADPCM) must be disabled or bypassed in the data transmission phase;

iii) any μ-law to A-law convertors must be disabled or bypassed in the data transmission phase;

iv) all echo suppressors or cancellors must be disabled or bypassed in the data transmission phase;

v) digital transmission attenuation pads must not be used;

vi) network and access signalling may be either in-band or out-of-band;

vii) Recommendation E.164 numbering plan [1] applies.

4.2 Details for these arrangements are for further study. In order that these arrangements may be provided from the originating network to the destination network, the signalling system applied should have the capability to convey such non-voice service requests; for example, in the case of TUP of the Signalling System No. 7, at least such as additional function must be implemented among Administrations concerned in order to convey the customer request for "unrestricted bearer capability" to the transit and destination networks. It should be also noted that terminal compatibility cannot be negotiated between the originating terminal and destination terminal within the capability of TUP. In this case, therefore, the subscriber can only communicate with the destination number which, he knows in advance, is accommodating a compatible non-voice terminal.

[1] Recommendation E.164 encompasses E.163.

ANNEX A

(to Recommendation E.301)

Teletraffic characteristics of non-voice traffic

A.1 *Mean call duration*

There can be a significant difference in call duration between voice and non-voice traffic. For example, the mean call duration of non-voice traffic is three minutes in most cases, while the average call holding time for voice traffic can range between 6-9 minutes.

A.2 *24-hour traffic profile*

The 24-hour non-voice traffic profiles measured are in general alignment with business activities. The traffic peak appears at the end of office hours in the originating country, which is similar to the profiles of telex and record-type telecommunication services in non-attended mode of operation. The calculated profiles according to the hour(s) of time difference (i.e., R = 0, 1, 2, . . ., 12) are shown in Figure A-1/E.301, together with the examples of measured 24-hour profile of the mixed voice and non-voice traffic in Figure A-2/E.301. In cases where the countries have a significant time difference, the both-way traffic (sum of outgoing and incoming traffic) has two traffic peaks, corresponding to the end of the business hours in each country.

Voice communication is only possible when calling and called parties are present at both ends and therefore, generally align with the schedule of human activities. Thus, peak hours of voice and non-voice traffic may differ. In Figure A-2/E.301, countries A and B have similar peak hours for both traffic streams while country C has two peaks, one (earlier) for voice and the other for non-voice. This can contribute to flattening the traffic profile thus making more efficient use of the circuit group. It should also be noted that non-voice traffic may sharpen the peak of the profile in case of short overlapping of business hours between two countries. This may affect the dimensioning of the network and require additional circuits to cover only a short period of time.

It is therefore important that countries measure and understand the traffic on their routes so that efficient dimensioning of the network can be undertaken.

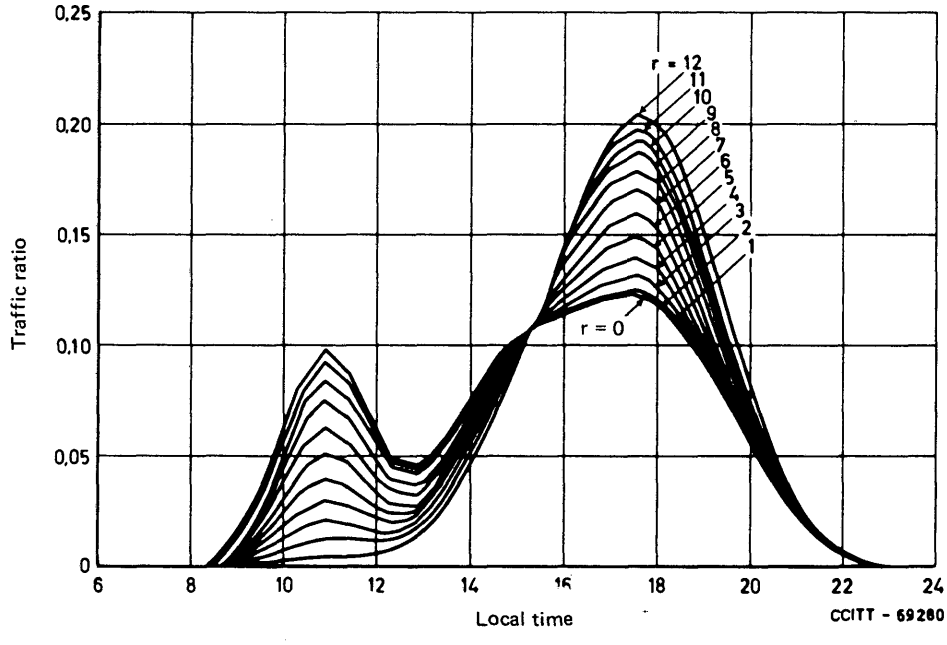
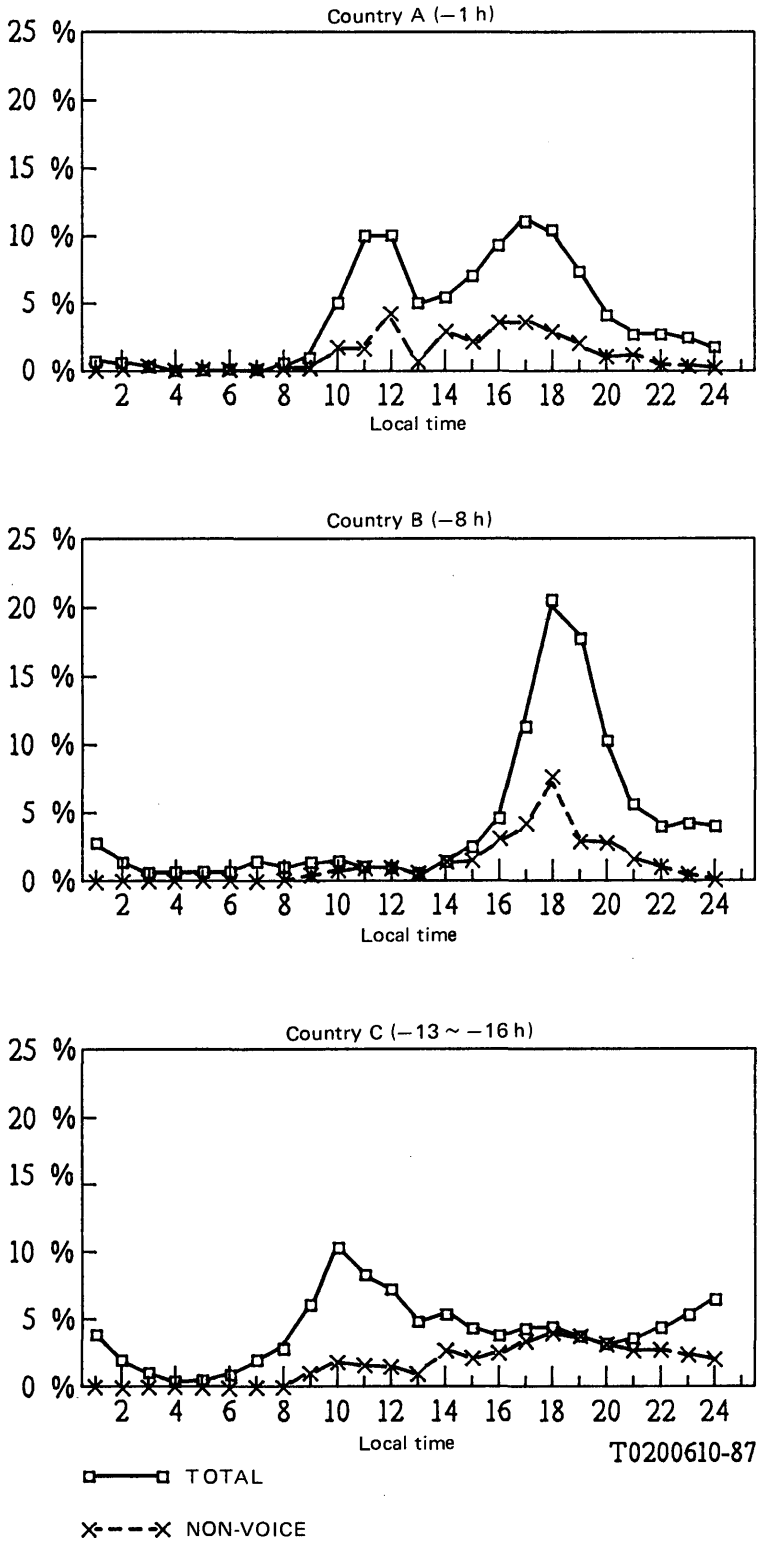


FIGURE A-1/E.301

24-hour traffic profile for telex and record-type telecommunication services (calculated)



Note 1 – The figure shows outgoing traffic from the reference country.

Note 2 – The figure shows traffic volume expressed by concentration ratio.

FIGURE A-2/E.301

24-hour distribution of total telephone traffic and non-voice traffic contained in it (measured)

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SECTION 2

PHOTOTELEGRAPHY

Recommendation E.320

SPEEDING UP THE ESTABLISHMENT AND CLEARING OF PHOTOTELEGRAPH CALLS

When international phototelegraph calls are sent over telephone circuits, the total time of occupation of the circuit often greatly exceeds the duration of the phototelegraph call itself.

It is also important that telephone circuits should be held for as short a time as possible.

The CCITT therefore recommends to Administrations to bear the following directives in mind whenever it is technically practicable:

1 Telephone circuits intended for phototelegraph transmissions should, at terminal repeater stations, pass through panels at the international phototelegraph position (IPP) enabling these circuits to be disconnected from the telephone service equipment and interconnected or connected to phototelegraph stations. Before switching on this circuit, it must be ensured that no telephone calls are in progress[1]. If there are calls, the circuit must be blocked as soon as the telephone call is over *(preliminary blocking)*.

2 The calling phototelegraph position must be ready to call the corresponding phototelegraph position over the telephone circuit as soon as it notes that the chosen circuit has been cleared. The calling signal should automatically disconnect the telephone equipment from the circuit at the called end. The circuit is thus immediately available for the establishment of a phototelegraph call.

3 If the called phototelegraph position has to be obtained through a transit phototelegraph position, the procedure outlined above is applied successively to the two circuits which are to be interconnected.

4 The same signal (see § 2 above) can also be used to invite the incoming, and possibly the transit, IPP to enter the line:

- if there are difficulties, or
- to signal the end of transmission.

Note – The calling frequency f_2 used for phototelegraphy should be different from that used for telephone signalling f_1. In the case of automatic or semiautomatic telephone circuits, frequency 500/20 Hz will be adopted as the signalling f_2 frequency for phototelegraphy.

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[1] At the time agreed upon with the telephone service, if such a previous agreement is considered to be necessary by the telephone operating services.

RULES FOR PHOTOTELEGRAPH COMMUNICATIONS SET UP OVER CIRCUITS NORMALLY USED FOR TELEPHONE TRAFFIC

The complete text of this Recommendation is contained in Recommendation F.82.

PART IV

Recommendations E.330 to E.333

ISDN PROVISIONS CONCERNING USERS

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Recommendation E.330

USER CONTROL OF ISDN-SUPPORTED SERVICES

Introduction

1 This Recommendation describes the general aspects of user control of ISDN-supported services. In particular, access to the services and handling of communication sessions are treated.

A service is defined as in Recommendation I.112, § 2.2.

A communication session is a session between two or more telecommunication parties in which unidirectional or bidirectional communication takes place. This Recommendation primarily concerns sessions where one or more people are involved.

2 This Recommendation does not describe how to proceed in the services themselves; in fact, this Recommendation has been set up to be as service-independent as possible.

2 In stating and recommending user procedures it is important to have global information about terminal capabilities. This Recommendation, however, is drafted as terminal-independent as possible. It contains fundamental principles of user interfaces as far as these are relevant to user access to the ISDN, and does not specify terminal requirements.

The CCITT,

considering

(a) that the ISDN will make available new services for customers and Administrations;

(b) that the changeover from the present networks to the ISDN will be gradual;

(c) that, from a user's point of view, private networks and public networks offer some similar services and also services that one or the other does not provide;

(d) that certain services have specific user procedures and their own methods of presenting information to the user;

(e) that users may benefit from uniformity in user procedures for selecting a service and for starting, switching between, and ending communications;

(f) that information from the telecommunication system to the user can be sent in the form of tones, verbal announcements, or visual indications on a display;

(g) that the use of terminals containing a visual display is becoming more and more common in telecommunication applications;

(h) that the ISDN offer users the possibility of handling two or more connections simultaneously;

(i) that handling connections simultaneously may be difficult for the user;

(j) that information presentation to the user should be based on human factors considerations;

(k) that terminals may be distinguishable into dedicated (service-specific) terminals and terminals with which several teleservices can be offered,

recommends

(1) that the methods with which communication sessions are selected, started, switched between each other and ended, should, where appropriate, make allowance for different levels of user experience;

(2) that, when a similar capability using similar terminals is offered through a private network and a public network, user procedures should be similar;

(3) that, where a terminal supports "higher level"[1] procedures and has the same function keys used for lower-level procedures in other terminals, then these lower-level procedures should still be operable, to achieve the functionality reached by higher-level procedures.

(4) that, on more advanced telecommunication terminals, however, other input mechanisms, having similar functions to those controlled by the function keys mentioned in (3), may replace these function keys;

(5) that, for voice and non-voice services, procedures should be similar for analogous supplementary services when terminals with similar capabilities are used;

(6) that tones, verbal announcements and visual indications, which are used in the existing networks should not be changed in the ISDN as long as their functions remain the same;[2].

(7) that ending a communication session can be accomplished from either end, except for emergency services;

(8) that it is preferred to give information to users at either end of a communication path by means of an auditory or visual indication when the communication is on hold;[3]

(9) that in those cases where starting or switching between communication sessions is not possible or may result in a deterioration of the existing communication session(s), appropriate auditory or visual indication should be given to the user;

(10) that when two or more communication sessions are handled at the same time on the same telecommunication terminal and the user uses a stop procedure valid for all communication sessions, it is preferred to give the user the opportunity to select which session or sessions are to be terminated.

Recommendation E.333

MAN-MACHINE INTERFACE

The text of this Recommendation is contained in Recommendation Z.323. Recommendation Z.323, § 2.5, *User guidance,* contains useful information on help and guidance applicable to the more complex kind of service that may be mediated by an ISDN.

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[1] "Higher level" and "lower level" refer here to the degree to which the capabilities of a terminal facilitate its use. For example, a terminal with only digits and a star and a square (see Recommendation E.161) may be able to achieve the same functions through lower-level procedures as a better equipped terminal with, for example, dedicated function buttons, in addition to its dial, where higher-level, more convenient procedures could be used.

[2] See Recommendation E.184.

[3] Further study is required to determine whether or not a communication session which was put on hold becomes active as soon as the present communication session is ended by the user and, if so, whether this is the communication session which was put on hold first or last. This subject should also be dealt with in the next study period.

PART V

SUPPLEMENTS TO THE SERIES E RECOMMENDATIONS RELATING TO THE OPERATION OF THE INTERNATIONAL SERVICE

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LIST OF POSSIBLE SUPPLEMENTARY TELEPHONE SERVICES WHICH MAY BE OFFERED TO SUBSCRIBERS

The descriptions given here are considered provisional and require further study.

Numbers in parentheses following the designation of most services refer to the CEPT handbook [1] where detailed operational requirements are given.

1 Supplementary services which might have implications for the international service

§§ 1.1 to 1.11 refer to services which might be standardized and which do not require technical studies.

1.1 absent subscriber service (4.1)

F: service des abonnés absents

S: servicio de abonado ausente

1) *Definition*

The possibility for a subscriber who cannot answer his calls, because he is absent, to divert these calls to:

- a manual answering service,
- another subscriber's number or
- an announcement.

2) *Description*

A subscriber who knows he will be absent from his telephone can instruct the exchange to divert his incoming calls to:

- a manual answering service,
- another subscriber's number or
- an announcement giving appropriate information.

Some forms of the service are available to subscribers without a preliminary agreement with the Administration, but other forms require such an agreement. An indication that the service is in operation should be given to the diverting subscriber. Outgoing calls are available normally.

3) *Remarks*

CCITT should undertake studies on:

- indications given to calling and called subscriber;
- additional charges if any when diverting the call to a distant number.

4) *Market data*

Generally considered of medium interest. Terminating equipment providing diversion to announcements in widespread use in some countries.

5) *General operational requirements*

If diverting a call lengthens the post-dialling delay experienced by a caller, it may be necessary to advise the caller that his call is being diverted.

If diverting a call would result in the caller having to pay additional charges, a warning should be given to the caller before the call is diverted.

To minimize complaints from called subscribers and callers for wrongly programmed call transfers, some check should be provided.

Difficulties may arise if a subscriber receiving diverted calls diverts them again to yet another number.

Some subscribers may, instead of using an absent subscriber service, use answering machines on their own premises. Some Administrations may also decide to provide such facilities at the exchange. The degree of sophistication provided may vary considerably. Some may only give a fixed announcement common to all customers using the service, others may allow messages to be recorded. Which type is used and to what extent may vary from one country to another according to the technological or social situation.

A large majority of customers will accept a reply by a recorded announcement as a satisfactory alternative to an operator.

Certain categories of subscribers (e.g. doctors) have special requirements and prefer a service especially adapted to their professional field. This may be a manual answering service provided by the Administration, or by a private agency or special arrangements for diversion to other numbers.

Calls should only be diverted if the resulting standards of transmission are adequate.

When the service is activated the special dial tone may be given to the controlling subscriber.

6) *Charging principles*

1.2 **do not disturb service** (5.1)

F: service "ne pas déranger"

S: servicio "no molestar"

1) *Definition*

The possibility for a subscriber, who does not wish to answer his telephone during a period of time, to divert incoming calls.

2) *Description*

Do not disturb services are used by subscribers that do not wish to be disturbed by incoming calls for a certain period of time. They can request that incoming calls are diverted to an operator, an answering machine in the exchange, or another telephone number.

The diversion can be switched on and off by an operator (manual) or by the subscriber himself (automatic).

3) *Remarks*

4) *Market data*

A little market information is available but it is considered to be of medium interest only. Nevertheless this is a service which should be available to customers.

5) *General operational requirements*

It is in the interest of the Administration if calling subscribers can leave messages and be informed:

- of the reason for call diversion
- when the number can be reached again
- where more information can be obtained.

In this way incoming calls are answered and can be charged and ineffective new attempts are avoided.

Automatic deactivation is desirable because no indication is given to the called subscriber when incoming calls arrive.

Administrations should provide an attractive form of do not disturb service in order to avoid undesirable subscriber forms of the service.

The time during which a do not disturb service can be activated should be limited.

The automatic forms of the service are preferred.

Outgoing calls should normally be possible.

When the service is activated a special dial tone may be given for outgoing calls reminding the service holder of the special condition of his line.

If during a period when the facility is in operation, the renter requires to know whether a message has been left, a special code may be allocated for this purpose, or a password agreed with the exchange may be used.

6) *Charging principles*

Charging principles should be in accordance with Recommendation E.232.

1.3 **diversion if number busy service** (6.3)

F: service de transfert d'appel en cas de numéro occupé

S: servicio de transferencia de llamadas en caso de línea ocupada (transferencia por ocupación)

1) *Definition*

The possibility for a subscriber who cannot receive calls, because his number is busy, to have these calls diverted.

2) *Description*

A subscriber who does not wish incoming calls to his number to be unsuccessful because he is busy speaking, can instruct the exchange to immediately divert his incoming calls to either a manual answering service, or another subscriber's number.

Some forms of service are available to subscribers without prearrangement with the Administration but other forms require prearrangement. The other subscriber's number may be one number, one number of a predetermined group or the first available number in a sequence.

3) *Remarks*

CCITT should undertake studies on:

- indication given to calling and called subscriber;
- additional charges, if any, when diversion is to a distant subscriber number.

4) *Market data*

5) *General operational requirements*

As services permit the completion of calls which would otherwise have met busy conditions, increased revenue and a better use of the available equipment may result.

Services may be of value for a subscriber whose line or lines are occasionally overloaded.

In conventional switching systems it is not possible to change the routing of a call in the switching network itself. It is therefore necessary in those circumstances to divert it from the diverting number. If limitations of transmission or charging justify it, it may be necessary to refuse a diversion request to a nominated number too far from the diverting exchange, and possibly divert the call to the operator, or a recorded announcement.

While a service is activated under subscriber's control it may be desirable to return a warning indication to the diverting termination.

The number to which the incoming call is diverted need not belong to the controlling subscriber.

It may be necessary to advise the caller that his call is being diverted if the post-dialling delay is lengthened by diversion.

From the Administration's point of view use of a service should not be allowed to perpetuate the unsatisfactory situation where a subscriber has basically an inadequate incoming traffic capacity.

An appropriate indication should be returned to the caller if diversion causes call charges greater than those that would have applied if the call had been connected normally to the diverting number.

6) *Charging principles*

1.4 **customer dialled operator assisted call**

F: communication établie par l'abonné et assistée par une opératrice

S: asistencia de operadora en comunicaciones establecidas por el abonado

1) *Definition*

With prior indication from a subscriber, an operator may be associated with an automatically dialled call at the appropriate stage to determine if the wanted person is available.

The subscriber gives this indication as part of his call set-up procedure.

Implementation requires special equipment in the long-distance switching equipment and associated operator positions.

2) *Description*

3) *Remarks*

4) *Market data*

Of low interest to customers. However, some Administrations are introducing this service to increase operator productivity.

5) *General operational requirements*

6) *Charging principles*

1.5 **freephone service** (7.5)

F: service "libre-appel"

S: servicio de cobro revertido automático

1) *Definition*

A subscriber can be allocated a special (freephone) number and the charge for all calls to this number are paid by him instead of by the callers.

2) *Description*

Subscribers who wish to pay for calls made to them can rent a special freephone number. Calls made to this freephone number are routed either to the subscriber's existing telephone number or on to access lines specifically provided for the purpose of receiving freephone calls.

3) *Remarks*

A freephone service can be provided across international boundaries. CCITT recommendations regarding billing and accounting arrangements may be required.

Where an international freephone service is provided i.e. where callers in one country can, by dialling a freephone number in that country, gain access to a destination address (service provider) in another country, international requirements dictate that the called number must return an answer signal over the international network to the freephone network of the originating country.

Many networks are protected by a "time-out" where calls are cleared if the answer signal is not received within a pre-determined time. Depending on the arrangements by which freephone service is provided the "time-out" condition may need to be removed from the part of the network between the caller and the equipment offering the basic freephone facility in his country. Basic freephone facilities can be provided by a freephone exchange or network of exchanges to provide freephone number translation and call routing, absorption of answer billing/accounting information and network management statistics. These facilities may be provided as an integral part of modern digital networks.

Freephone subscribers may place particular value on numbers which are easy to remember. However, this may entail the allocation of hypothetical numbers and the provision of translation facilities which may only prove economic when sited at nodal centres.

4) *Market data*

Already exists in some countries and is becoming increasingly popular.

5) *General operational requirements*

The freephone number format should be consistent with the national number format of the country. The freephone code should be standard for the whole of the country (e.g. 800 in USA) and where possible the same code should be used to provide national and international freephone service.

Network management arrangements should pay particular attention to the need to prevent congestion in the network, particularly in relation to applications involving response to television quiz games or advertising campaigns, etc.

Subscribers should be required to rent adequate access lines to meet demand and minimize ineffective attempts. The freephone service is liable to misuse and subscribers should be warned of this liability and expect to bear any resulting call charges. Regards should be made to the limitation of payphones in the various systems.

6) *Charging principles*

6.1) National charging arrangements will depend on the limitations of the arrangements used to provide the freephone facilities. A single freephone centre may for example use path of entry to determine the area from which the call originated and charge accordingly.

A freephone network may determine charging on the basis of distance between the node at which the freephone call enters the network and the node in which the freephone service is connected. There are other alternatives.

6.2) International charging arrangements require a method of billing a service provider in another country and may also require special accounting arrangements. There are 3 basic methods:

a) The originating Administration provides the destination Administration with the billing information relating to freephone calls to service providers in the destination country. The destination Administration would then bill the service provider for call charges and account the calls as if they were originated in the destination country, (a procedure similar to the billing and accounting of collect calls). A special accounting rate might be required to reimburse the country of origin for the cost of providing the freephone facility.

b) The originating Administration would require the service provider in the destination country to provide a legal representative in the country of origin to which the bill for call charges could be sent. The calls would be accounted as ordinary outgoing international direct dialling (IDD) calls.

c) The originating Administration would send the bill directly to the service provider's address in the destination country. The calls will be accounted as ordinary IDD calls.

1.6 **wide area telephone service** (7.6)

F: service téléphonique à l'intérieur d'une zone déterminée

S: servicio telefónico concertado en grandes zonas

1) *Definition*

For a flat rate charge, a subscriber may make an unlimited number of calls within a prescribed area from a particular telephone termination without the registration of call charges.

2) *Description*

3) *Remarks*

4) *Market data*

Already exists and very popular in some countries. Appears to be of interest also in other countries.

5) *General operational requirements*

6) *Charging principles*

1.7 **automatic transferred debiting of charges** (7.4)

F: service de transfert automatique d'imputation de taxes

S: servicio de transferencia automática de las tasas imputadas

1) *Definition*

The automatic debiting to a subscriber's account of charges for calls made from any telephone by persons nominated by that subscriber and identified by the use of a secret code.

This is similar to the existing credit card service but does not involve an operator. It must be provided for throughout a network.

2) *Description*

3) *Remarks*

For international use there would have to be a study of changes to operating and accounting procedures for manual credit card service.

4) *Market data*

5) *General operational requirements*

6) *Charging principles*

1.8 **radio paging** (10.3)

F: service radioélectrique d'appel unidirectionnel

S: servicio móvil de aviso a personas (servicio de radiobúsqueda)

1) *Definition*

The service provides the subscriber with the facility, by means of portable equipment used in a given area, to receive an alert by radio initiated by any telephone in a public network.

The alert can be accompanied by a spoken message or visual coded display either entered by the caller or generated within the network.

2) *Description*

The mobile receiving equipment of a pocket sized nature has a unique identity enabling it to be selectively called using a common radio channel.

An alert is initiated by a telephone on a public network using a direct dialling number, with or without the requirement to pass additional code digits on completion of the call through the public network. Alerts can be made to one or more receivers using a single number and restricted to predetermined geographical zones in agreement with the renter.

Additional alerts with distinctive tones can be incorporated in a single receiver but individually activated by separate calling numbers.

3) *Remarks*

Under study in Study Group II

CCIR standardized in 1982 a uni-directional signalling system radio-paging code No. 1 to use on the radio channels for alerting receivers and providing text messages.

CCITT should undertake studies on international access to national radio-paging services with particular attention to the indication given to the caller.

4) *Market data*

Already exists in some countries and is becoming increasingly popular.

5) *General operational requirements*

The service should provide access to a radiopager using a normal telephone number and advise the caller that the pager is being automatically called. In the case of a manual service the caller should be advised that the pager will be called and the appropriate voice message or coded display transmitted.

6) *Charging principles*

When used internationally the caller should be charged in accordance with international direct dialling (IDD) service and standard called subscriber answered conditions returned. The subscriber may be charged for having the service. This special charge may be fixed nationally.

1.9 **direct dialling-in** (12.1)

F: sélection directe d'un poste supplémentaire

S: marcación directa de extensiones

1) *Definition*

Calls can be dialled from a telephone line connected to the public network directly to extensions in a PABX.

2) *Description*

Direct Dialling-In (DDI) can be realized when the last digits in the directory number of a PABX correspond to the number series of the extensions within the PABX. These last digits are sent from the exchange to the PABX, which automatically establishes a connection to the extension without assistance of the PABX operator.

3) *Remarks*

The dialled number must not exceed the number of digits of international numbers (Recommendation E.163).

4) *Market data*

Already exists in many countries.

5) *General operational requirements*

A call to a number in the DDI numbering range shall be routed to the appropriate extension at the PABX.

Trunk offering may be required via the DDI route from an operator of the public telephone network to a busy extension line, irrespective of whether the extension line is busy with a call in the PABX or with an external call to or from the public telephone network. The call from the operator of the public telephone network is then to be routed to an appropriate PABX operator or extension.

If a call is made by sending incomplete address information, the connection will be released by time supervision within the public exchange. A corresponding time supervision within the PABX may also be convenient.

Calls to numbers outside a DDI numbering plan within the public exchange and calls to unassigned numbers within an exchange DDI numbering range may immediately be re-routed according to normal public exchange interception rules.

Failures in the PABX causing inability to receive incoming calls should be signalled from the PABX to the public exchange by suitable means. The public exchange should return to callers the same indication as given on a call to a faulty subscribers line.

6) *Charging principles*

Note – Numbers 1.10 to 1.20 (below) refer to services which might be standardized but require further studies in CCITT Study Groups before being handled in Study Group II.

1.10 **incoming call barring** (3.2)

F: service de limitation des appels d'arrivée

S: servicio de prohibición de llamadas entrantes

1) *Definition*

The ability of the Administration or the subscriber to prevent all or certain incoming calls to a telephone line.

No variants identified so far.

2) *Description*

3) *Remarks*

This service can cause multiple repeat attempts and/or unnecessary use of operator services.

CCITT should undertake studies on:

- indications given to the calling subscriber;
- interworking between this service and the absent subscriber service and do not disturb service;
- interexchange signalling if only calls from certain numbers should be barred.

4) *Market data*

5) *General operational requirements*

6) *Charging principles*

1.11 **registration of incoming calls** (4.2)

F: service d'enregistrement de communications d'arrivée

S: servicio de registro de llamadas entrantes

1) *Definition*

The registration of details of all incoming calls to a particular telephone line (e.g. caller's number, time ringing commences, time of answer or time of abandonment, time of release, but excluding the recording of speech).

2) *Description*

3) *Remarks*

CCITT should undertake studies on interexchange signalling allowing sending of different kinds of information.

4) *Market data*

5) *General operational requirements*

Subject to national law and regulations concerning secrecy in telecommunications the service could be provided when required by connection of a device in the exchange to the subscriber's line or by program instruction.

This service could be useful to subscribers (e.g. emergency services) who may require detailed information of incoming calls.

Provision of the service could possibly act as a deterrent to malicious or nuisance callers.

6) *Charging principles*

1.12 **completion of calls to busy subscribers service** (6.1)

F: service d'aboutissement d'appels adressés à des abonnés occupés

S: servicio de compleción de llamadas a abonado ocupado

1) *Definition*

The possibility for a subscriber who reaches a busy number to have the call completed when the line becomes free without generating a second call or waiting on the line.

2) *Description*

The subscriber who has found the called party busy can activate the service during or after the call and wait for establishment of the connection.

When the service is activated, the line of the called party is tested. When this line becomes free the calling party is rung and when he answers the called party is rung. The time during which the line of the called party is tested is limited. If the calling party is found busy the service is deactivated.

The service may be manual, semiautomatic or automatic.

3) *Remarks*

Applications in PBXs and local public exchanges are suitable but, for long-distance and international use, if the service is controlled only from the originating exchange, it may cause difficulties, such as:

- long holding times;
- multiple automatic reattempts.

CCITT should undertake studies on interexchange signalling to overcome the disadvantages mentioned.

4) *Market data*

5) *General operational requirements*

According to the manner of realization of the services, consideration should be given to:

- the length of the time during which the system attempts to set up a call,
- the frequency of the attempts to complete a call in order to avoid congesting the network unnecessarily,
- the recall sequence to ensure that the calling subscriber has answered the recall before the called subscriber is rung.

Special measures may be necessary to ensure that the operation of the service does not interfere with normal outgoing and incoming service on both lines.

Special consideration should be given to the requirements when one or both subscribers are involved in diversion arrangements.

Special consideration should be given to the provision of the services to special categories of subscriber lines, e.g. payphones, PBX lines with DDI, etc.

It appears more convenient to adopt a realization of the service based on a continuous check of the called subscriber's state in order to set up the connection as soon as possible (called party free). This realization is only feasible for subscribers belonging to the same exchange or different exchanges of an SPC type and connected by advanced signalling systems. This condition is not, at present, the general case.

Though provision of the service is likely to be advantageous both from the Administration and the subscriber's point of view, the numerous operational and technical problems associated with the automatic services will make them very difficult to provide in the near future.

When the service is activated the line of the called party is continuously tested. When this line becomes free the calling party is rung and when he answers the called party is rung.

It may be necessary to advise the calling party which call completion is being offered (if, for example, the service has been activated on more than one call).

The number of call completions activated at the same time to the line of a called busy party may be limited, e.g. to one.

6) *Charging principles*

1.13 **automatic transferred charge call** (7.9)

F: service d'appel avec transfert automatique de taxe

S: servicio de transferencia automática de la tasa de la comunicación

1) *Definition*

With prior indication and mutual agreement between the two parties, the automatic debiting to a called subscriber's account of relevant charges for a call made to his telephone number.

No variants have been identified so far.

2) *Description*

3) *Remarks*

CCITT should undertake studies on:

- how the service is established;
- agreement procedures between the calling and the called party (additional interexchange signalling may be required).

4) *Market data*

5) *General operational requirements*

6) *Charging principles*

1.14 **remote call forwarding** (7.11)

F: service de réacheminement des appels

S: servicio de teletransferencia de llamadas

1) *Definition*

The possibility for a subscriber to obtain a telephone number in another area and have all calls to that number automatically forwarded at his cost to a telephone number in his premises.

2) *Description*

A subscriber who wants to receive calls at his premises at low cost for callers in a certain (distant) area can be allocated a telephone number in that area. All calls received by the allocated number are automatically forwarded through the public switched network to a telephone number at the subscriber's premises. The allocated number can be a telephone number in another country and the service will only be available on pre-arrangement with the Administration concerned.

3) *Remarks*

4) *Market data*

5) *General operational requirements*

The provision of the service requires an arrangement between the subscriber and the Administration concerned.

Forwarded calls are treated as normal incoming calls. The calling subscriber may be informed by a recorded announcement that his call will be forwarded without extra cost.

In the case of international use, any promotional activities aimed at customers abroad should be coordinated among Administrations concerned to avoid problems.

Fowarding should be possible to any telephone number except payphones subject to compatibility limitation. Due regard must be given to transmission limitations. It may not be suitable for data transmission.

Sufficient remote call forwarding (RCF) features and facilities are necessary so as not to interfere with or impair any services offered by the telephone company. Call forwarding should not be offered again at the terminating telephone.

The allocated telephone number may appear in its local directory listing associated with the name and address of the terminating location.

6) *Charging principles*

The caller is charged for the call to the allocated number only; the charge related to the forwarded part of the call is applied to the subscriber having the service.

- As the service is only available on pre-arrangement with the Administration, a service provision charge and a recurring rental charge may be applied.
- The charge may be related to the number of lines provided with the service.

1.15 **three party services** (11.1)

F: service comportant un troisième correspondant

S: servicio tripartito

1) *Definition*

The possibility for a busy subscriber to hold the existing call and make a call to a third party. The following arrangements may then be possible: the ability to switch between the two calls, the introduction of a common speech path between the three parties and the connection of the other two parties.

2) *Description*

These services will permit a subscriber to place an existing call into a suspended state and make a call to a third party. When the third party answers, the subscriber may then make use of the following options, as available, in any appropriate order:

- switch from one call to the other as required, secrecy being provided between the two calls;
- introduce a common (three-way) speech path;
- connect the other two parties together.

3) *Remarks*

CCITT should undertake study on:

- transmission limitations;
- charging and accounting when the other two parties enter into communication.

4) *Market data*

Widely used in some countries by business subscribers.

5) *General operational requirements*

With this service the subscriber may be involved in two simultaneous outgoing calls and it will be necessary to provide the ability to register charges accurately under these conditions.

Difficulties may be experienced in recording charges for this service on a meter situated at the subscriber's premises.

If the other parties to a three party service call also have this service available it is possible for subscribers to establish a complex chain of interconnections. It may be necessary to prevent or limit such interconnections.

The hold-for-enquiry mode in its simple form would permit a busy subscriber to make an enquiry call, then release it and return to the original call. However, having the ability to retain both calls, and switch from one to the other as required, will increase considerably the usefulness of this service. Another feature which might prove useful would enable the user to retain the enquiry call but release the original call, i.e. to specify which of the two calls should be released.

It is desirable that the subscribers should be able to revert from three way conversation to the normal "single call" state and subsequently use the three party service again.

All three party services require the register recall feature.

Hold for enquiry

An enquiry call may be made to any subscriber's number, provided such a call is not inhibited by another service.

If Subscriber A should clear whilst either the original call or the enquiry call is in the suspended call path state, calling conditions shall be applied to Subscriber A's terminal. On answer the call shall proceed as if Subscriber A had released the other call and switched to the held call. If Subscriber A does not answer within a specified period the held subscriber shall be advised that Subscriber A has cleared.

Three-way conversation

When Subscriber A is connected by a speech path to Subscriber B or C, the other connection being held, it shall be possible for Subscriber A to establish a 3-way conversation and subsequently revert to the enquiry mode. The options in hold for enquiry shall then be available.

If Subscriber A should clear during a 3-way conversation, then the call paths shall be released. If Subscriber B or C should clear, the connection between A and the other subscriber should revert to that appropriate for a normal call.

Transfer of an established call

When the hold-for-enquiry option only is being employed, it shall be possible for Subscriber A to signal that the transfer of the held call to the subscriber to which he is connected by a call path is required.

Following the procedure described, the elected subscriber only shall receive a recorded announcement informing him that he has been nominated to pay call charges for the transferred call and advising him on the signal to give if he agrees to pay call charges. If he does not agree he should clear. If he agrees, a call path shall be established between B and C, the charges for this call being debited to whichever of these is the elected subscriber, and Subscriber A shall be released.

If a clear condition from the elected subscriber is detected the connections between A, B and C shall be released.

6) *Charging principles*

The subscriber originating a call, whether an original or enquiry call, shall incur the normal charges for that call.

Periods when a subscriber is in the suspended call path state shall be considered as chargeable time.

It shall be possible to impose, in addition to normal call charges as described, a fixed fee debited to Subscriber A on selection of any one of the three options available. The fee shall be determined by:

i) the option selected;

ii) any previous option selected.

In addition to the call fixed fee charges, it should be possible to impose on Subscriber A a periodic charge while hold-for-enquiry or 3-party connection options are in use. It shall be possible to apply different periodic charges to each of these options.

When a call is released, charging for that call shall cease.

Following the call transfer, charges shall be levied against the paying subscriber at the rate applicable to a call set up normally between the 2 subscribers.

1.16 **conference call services** (11.2)

F: service de communication conférence

S: servicio de comunicación pluripartita (o de conferencia múltiple)

1) *Definition*

The service provides the possibility to connect a number of specified subscribers on the same telephone call.

2) *Description*

These services enable a subscriber to establish connections simultaneously with more than one subscriber using a common speech path. The calls may be set up by an operator, or the information for setting up the call may be registered by the Administration, but leaving it to the subscriber either to activate the call or to control it completely. Where the services are fully subscriber controlled, the calls can be set up simultaneously or sequentially.

Conference calls are normally of two types:

- bidirectional calls in which each participant can listen and speak whenever he wishes to intervene in the conversation;
- unidirectional calls in which only one of the participants can speak, the other participants being able only to listen.

However, a conference call may consist of a combination of both types of call defined above.

3) *Remarks*

4) *Market data*

5) *General operational requirements*

There seems to be a need in future switching systems for an automatic service which does not require operator assistance in setting up conference calls. Any such automatic service should provide security facilities to prevent unauthorized access.

The number of participants may be limited for operation and/or transmission or other technical reasons.

There may be a certain demand for connection and disconnection of participants during a conference call in progress.

The customer is used to certain conveniences offered by operator connected conference calls. Control procedures in automatic service should therefore be both clear and simple.

6) *Charging principles*

(See Recommendations E.151 and D.110.)

1.17 **calling number indication** (14.3)

F: service d'indication du numéro du demandeur

S: servicio de indicación del número del abonado que llama

1) *Definition*

A service whereby the calling subscriber's number can be identified by means of a visual or verbal indication at the called terminal.

No variants have been identified so far.

2) *Description*

3) *Remarks*

The service could cause ineffective use of the network (repeat attempts or long holding times) should the called subscriber refuse to answer the call because he is informed of the calling subscriber's number.

The service requires extended interexchange and local network signalling to enable transmission of the calling subscriber's number.

4) *Market data*

1.18 **subscriber's alpha-numerical display** (14.4)

F: service d'affichage alphanumérique de renseignements relatifs aux abonnés

S: servicio de visualización alfanumérica en el aparato telefónico

1) *Definition*

The visual display at a subscriber's telephone terminal of information sent to or received from the public telephone network. This display comprises outgoing and/or incoming information.

No variants have been identified so far.

2) *Description*

3) *Remarks*

Applications regarding outgoing information are suitable.

Regarding incoming information, the same problem applies for this service as for the calling number indication service.

There may also be a need to indicate the calling subscriber's name.

4) *Market data*

1.19 **private number ringing signal**

F: service de signal d'appel d'un numéro particulier

S: servicio de señal de llamada individualizada

1) *Definition*

Each member of a family is given different identification (ID) codes. If the calling party wants a particular member he dials the ID code related to that member. The called member can know he is wanted by a particular kind of ringing signal.

2) *Description*

3) *Remarks*

Requires extended interexchange and possibly local network signalling.

4) *Market data*

1.20 **voice mailbox service (VMS)**

F: service de boite aux lettres téléphonique

S: servicio de buzón telefónico

1) *Definition*

(Under study.)

2) *General Description*

Recent advances in technology have allowed the voice mailbox to evolve and market research has indicated a potential for this type of service.

The renter of a mailbox (subscriber) is provided with a mailbox telephone number which he can publicize to customers, clients, business associates, friends, etc.

Callers are answered by a personalized announcement which can either invite the caller to leave a message or impart information.

As an optional feature of VMS, the mailbox may be programmed to alert a radiopager each time a message is left in the mailbox or to call certain telephone numbers and deliver messages.

The subscriber may retrieve his messages either from a push button phone by dialling the same number as callers and then entering a security code and system command or, by dialling an alternative number (known only to him) from a rotary dial phone.

Retrieval from push button phones allows sophisticated control of message playback and mailbox facilities, e.g. repeat message, retain message, switch pager on/off, switch recording service on/off, change personalized announcement, etc. These facilities can be provided from rotary dial phones if the subscriber has a hand-held tone generator. Otherwise retrieval from rotary dial phones may be limited to simple one-time playback of all messages in the mailbox.

Systems may allow tailoring of individual mailboxes to meet subscribers' needs regarding message length, number of messages stored at any one time, retention period, etc.

The number of simultaneous calls to a subscriber's mailbox is limited only by the capacity of the VMS equipment, e.g. a 32 port system could theoretically be handling 32 simultaneous calls to the same mailbox number.

3) *Remarks*

VMS offers the following benefits:

- elimination of successive reciprocal call attempts in order to establish a single communication;
- elimination of time-zone constraints;
- optional indication on a radiopager whenever a message is left;

- retrieval at the convenience of the subscriber;
- access to people on the move;
- 24-hour service;
- no need to talk to callers directly;
- messages heard in the caller's own voice.

4) *Market data*

Although services may initially have close ties with radiopaging, they are likely to rapidly evolve a separate identity and be sold on the strength of their own intrinsic benefits.

5) *General operational requirements*

(Under study.)

6) *Charging principles*

Initially subsets of a wide range of facilities may be contained in the service offerings at fixed periodic tariffs. The offerings may be elaborated in the light of customer reaction. The tariffs may be increased as additional facilities are opted for and usage sensitive billing may be introduced to account for variations in message length, message holding time, overcalls and computer resource usage.

2 Supplementary services without implications for the international service

2.1 **abbreviated dialling services** (1.1)

F: service de numérotation abrégée

S: servicio de marcación abreviada

1) *Definition*

The possibility for a subscriber to make a call by dialling a short code instead of the full telephone number.

2) *Description*

Subscribers may have certain telephone numbers stored by the telephone network and each of these numbers is given a corresponding abbreviated number. The stored numbers may be local, national and international. When a short code which includes the abbreviated number is dialled, it is converted by the network into the called subscriber's telephone number. The call is then processed as a normal telephone call. Abbreviated dialling may be available on demand or on a subscription basis. The number registration can be done either by the subscriber, or, on request, by the Administration.

3) *Remarks*

Although this service can be provided from the exchange, in many cases it can be provided by sophisticated subscriber terminals.

4) *Market data*

Many Administrations are planning to provide this service.

2.2 **alarm call services** (2.1)

F: service du réveil

S: servicio de despertador

1) *Definition*

The possibility for a user to cause an alarm call or calls to be made to his line at a time or times specified in advance by him, and to hear an appropriate announcement when the call is answered.

2) *Description*

The user can order the network to call his line at times specified by him; upon answer of the call the user will get an appropriate verbal announcement indicating the character of the call.

The alarm call service may be offered on a manual, semiautomatic or automatic basis.

To meet different subscriber needs the services may be offered on either an occasional or regular use basis, viz:

- The occasional alarm call service covers only the 24-hour period immediately following the time at which the call was booked. The subscriber, however, may have the possibility to order more than one alarm call to be made to his line within a 24-hour period.
- The regular alarm call service covers a number of 24-hour periods. The subscriber can order the alarm calls to be made either every day for a specified number of days, or on specified days of the calendar week for a specified number of weeks. The days of a calendar week may be chosen as consecutive days or according to an established order.

The services are available to subscribers without prearrangement with the Administration.

In principle, the manual and the semiautomatic forms of the service offer the same possibilities as the automatic versions. Unlike the automatic forms, however, the manual and the semiautomatic forms would require no special subscriber procedures to meet the subscriber needs in question.

3) *Remarks*

The service is wholly provided within the local exchange.

It is an automation of an existing manual service which has been available for many years.

4) *Market data*

2.3 **automatic booked call** (2.2)

F: service de demande automatique d'une communication

S: servicio de llamadas automáticas prefijadas

1) *Definition*

With prior information from a subscriber, a call may be made automatically from his telephone termination, to a particular number or service (excluding the alarm call service) at a specific date and time.

2) *Description*

3) *Remarks*

Service wholly provided within the local exchange. Will require special memory capacity.

4) *Market data*

2.4 **diary service** (2.3)

F: service de rappel de date

S: servicio de agenda

1) *Definition*

With prior indication from a subscriber, a call is made automatically to his telephone number at a specific date and time, and when an answer condition is detected a recorded message is connected to this telephone termination to remind him of a particular event, e.g. birthday of a relative. Two versions of the series are envisaged:

a) the recorded message is dictated by the subscriber in each case;

b) the recorded message is selected from a variety of pre-stored messages.

2) *Description*

3) *Remarks*

Wholly local exchange based; requires long-term storage of information.

4) *Market data*

2.5 **restriction in the outgoing direction service** (3.1)

F: service de limitation des communications de départ

S: servicio de restricción de llamadas salientes

1) *Definition*

The possibility for a subscriber to prevent all or certain outgoing calls and/or service control operations from his telephone line.

2) *Description*

These services are used by subscribers to prevent unauthorized use of their telephone lines. When the restriction is activated all calls or calls to certain destinations are blocked. Keys or keywords are required for deactivation. Incoming calls are received normally.

The restrictions can be either permanently applied to a line by the Administration on the request of the subscriber, or applied to a line by the subscriber without the assistance of the Administration.

In the case of subscriber control, the subscriber can either just switch the restriction on and off, or select the type of restriction when he activates the service.

3) *Remarks*

Purely local service. Could be provided as PBX features. Emergency calls may be excluded.

4) *Market data*

2.6 **PBX line hunting services** (12.2)

F: service de recherche de ligne libre dans un commutateur privé

S: servicio de captura de linea (lineas de salto)

1) *Definition*

The automatic selection of a free line from a group of lines serving a subscriber, on receipt of a call to that subscriber's general directory number.

2) *Description*

Line hunting may take the following two main forms:

a) sequential search where the search for a free line always starts with the same line and then follows a fixed order;

b) random search where the search for a free line does not start with the same line each time. This covers a range of search procedures, e.g.:

- random start point and then fixed order;
- start point is the last seized line plus one and then fixed order, etc.

The hunting procedures are only initiated when the general directory number (GDN) is called. One line in the group is directly associated with the GDN, the other individual lines in the group may also be allocated normal individual telephone numbers and when these other individual numbers are called, the calls are processed in the normal way, without hunting.

The subscriber may, under certain conditions, have the ability to reduce the number of lines forming the group or, alternatively, inhibit the automatic selection, or switch from random to sequential hunting.

3) *Remarks*

Purely local service.

4) *Market data*

Required by nearly all multi-number group users.

2.7 **subscriber call charge meter** (7.1)

F: service d'indicateur de taxe au domicile de l'abonné

S: servicio de contadores de tasas en el domicilio del abonado

1) *Definition*

Meters at the subscriber's premises showing call charge units debited.

2) *Description*

3) *Remarks*

Provided from local exchange.

4) *Market data*

A service used extensively

2.8 **automatic verbal announcement of charges applied service** (7.2)

F: service d'indication automatique verbale des éléments de taxation

S: servicio de indicación automática verbal de la tasa de la comunicación

1) *Definition*

The possibility for a user to request a verbal announcement of either total or individual call charges.

2) *Description*

A user may request an announcement giving the charge for a call, each call of a series or the total call charges registered against his line. The request may be made before, during or after a call.

3) *Remarks*

Provided from local exchange.

4) *Market data*

Automation of an existing manual service (AD and C) with extensions to cover more than one call. Usage likely to be high.

2.9 **printed record of duration and charge of calls service** (7.3)

F: service d'enregistrement écrit des éléments de taxation

S: servicio de registro impreso de la duración y la tasa de las comunicaciones

1) *Definition*

The possibility for a subscriber to get a specific printed record of called number, duration and charge of calls.

2) *Description*

These services make it possible for the subscriber to get a specific printed record on, for example, charges imposed on him for normal telephone calls and/or possibly supplementary services.

The services imply storage and/or printout of data on a suitable media within the network. The data or part of it will be made available to the subscriber normally in the form of a printed record.

Manual, semiautomatic or automatic services are offered.

Services may either be fully Administration controlled, or partly or fully subscriber controlled.

The category may either be fixed-programmed by the Administration at provision or selected by the subscriber at his activation of the service.

The fully subscriber controlled services imply printout of data for all calls of a certain category or for any particular (outgoing) call chosen by the subscriber. The requests for printout of data for a particular call can be made before, during or after a call.

3) *Remarks*

A service to provide subscribers with itemized billing of all calls. Provided from local exchange.

4) *Market data*

Demand for this service could be significant.

2.10 **automatic credit card service** (7.7)

F: service automatique de cartes de crédit

S: servicio automático con tarjeta de crédito

1) *Definition*

Payment of call charges is made by placing a credit card in a specially adapted telephone or by calling the credit number. A telephone bill will be sent to the credit card holder later.

2) *Description*

3) *Remarks*

This service could create billing problems for Administrations.

4) *Market data*

2.11 **selective accounting** (7.10)

F: service de comptabilité sélective

S: servicio de contabilidad selectiva

1) *Definition*

A number of separate telephone accounts are associated with an exchange termination and the account to which charges for a particular call are to be debited is identified when making the call.

2) *Description*

3) *Remarks*

4) *Market data*

Most likely from business users who need to differentiate on the allocation of costs, e.g. legal professions.

2.12 **customer recorded information service** (8.3)

F: service particulier d'information enregistrée

S: servicio de información grabada por el abonado

1) *Definition*

This service gives to the customer the possibility of distributing information transmitted from recording equipment to calling subscribers.

2) *Description*

3) *Remarks*

Could be provided from local exchange based equipment or terminal equipment at customer's premises.

4) *Market data*

2.13 **public recorded information service** (8.4)

F: service public d'information enregistrée

S: servicio de información pública grabada

1) *Definition*

Recorded information of public interest provided by the telecommunications Administrations, possibly in cooperation with appropriate public or private institutions, is given to subscribers calling the respective service numbers.

2) *Description*

3) *Remarks*

Access to service may well be at the local exchange.

4) *Market data*

2.14 **emergency call service** (9.1)

F: service d'appels d'urgence

S: servicio de llamadas de emergencia

1) *Definition*

A caller is given a fast and easy means of giving information about an emergency situation to the appropriate emergency organization (e.g. fire department, police, ambulance).

2) *Description*

3) *Remarks*

An existing service.

4) *Market data*

High demand.

2.15 **centrex service**

F: service centrex

S: servicio céntrex

1) *Definition*

The provision to subscribers, by means of a specially equipped public telephone exchange, of services normally available only in PABXs (e.g. automatic internal dialling, operators' desk, client access to network, direct dialling-in, transfer of calls).

2) *Description*

3) *Remarks*

4) *Market data*

North America and Japan have shown a high demand.

2.16 **babyphone** (14.6)

F: service d'appels à destination d'un poste dont le combiné est décroché

S: servicio de llamadas a un teléfono descolgado

1) *Definition*

A service providing for a call to be made to a telephone in the "off hook" condition for the purpose of audible supervision at the called subscriber's premises.

2) *Description*

3) *Remarks*

Has local application only.

4) *Market data*

2.17 **transmission of a verbal message** (14.1)

F: service de transmission d'un message verbal

S: servicio de transmisión de un mensaje verbal

1) *Definition*

At the request of a caller (whether a subscriber or not), a short message is transmitted by an operator, either to one or several telephone numbers at a specified time, or to a specified person (whether a subscriber or not) when he calls the operator.

2) *Description*

3) *Remarks*

Could be provided locally or on a national basis.

Has charging and accounting implications.

Could be an automated service.

4) *Market data*

2.18 **universal access number** (14.5)

F: service de numéros universels

S: servicio de números universales

1) *Definition*

A customer with several installations in different parts of the country can be reached from anywhere in the country by dialling one given number. Calls from subscribers on exchanges in predetermined areas of the country will be routed to installations chosen (with certain restrictions) for the area in question by the customer having the service.

2) *Description*

3) *Remarks*

Requires cost/demand study before agreement.

Has numbering problems.

4) *Market data*

2.19 **message relay** (14.7)

F: service de transmission de messages

S: servicio de retransmisión de mensajes (mensaje diferido)

1) *Definition*

A caller, whether a subscriber or not, may dictate a message into recording equipment and require that it is passed to a particular telephone number by the following morning.

2) *Description*

3) *Remarks*

4) *Market data*

2.20 **interruption of a call in progress** (6.7)

F: service d'interruption d'une conversation en cours

S: servicio de llamada preferente

1) *Definition*

Intervention by an operator, interrupting a call in progress, in order to allow another incoming call to be offered.

2) *Description*

3) *Remarks*

Manual "call waiting" service.

4) *Market data*

Low demand.

2.21 **fixed destination call services** (1.2)

F: service d'appels à destination fixe

S: servicio de llamada de línea directa

1) *Definition*

The possibility for a subscriber to set up a call to a predetermined telephone number by lifting the handset only.

2) *Description*

When the subscriber lifts the handset or the lifting condition is given by automatic equipment, the exchange sets up automatically either immediately or after a time-out a connection to a predetermined telephone number. This telephone number may be local, national, international, or the number of an operator service. The *fixed destination call* may be available on demand or on a subscription basis. The number registration can be done either by the subscriber, or, on request, by the Administration.

3) *Remarks*

Beneficial to the aged and handicapped.

4) *Market data*

2.22 **pick-up facility** (10.2)

F: service de prise d'une communication établie

S: servicio de facilidad de telecaptura

1) *Definition*

A subscriber being away from his telephone can pick up a call on his line by dialling his own number and/or possibly a special code from any other telephone, after having been informed by means of a paging system that there is such a call.

2) *Description*

3) *Remarks*

Mainly applies to PABXs or closed user groups.

4) *Market data*

2.23 **call waiting services** (6.4)

F: service d'appels en instance

S: servicios de indicación de llamada en espera

1) *Definition*

A subscriber engaged on an existing call is given an indication that a caller is attempting to obtain connection to his number.

2) *Description*

A subscriber A engaged on an existing call with subscriber B is given an indication that a caller, subscriber C, is attempting to obtain connection. Subscriber A may answer by replacing the handset (acceptance by clearing). Alternatively, he may ignore or reject the indication and continue with the existing call, terminate the existing call and answer subscriber C or hold the existing call and answer subscriber C (acceptance without clearing).

The call waiting indication may be controlled by the called subscriber or the calling subscriber.

3) *Remarks*

A possible variation where the calling rather than the called subscriber controls the service is considered undesirable.

4) *Market data*

Medium interest shown in USA.

2.24 **dual telephone numbers**

F: service de numéros de téléphone doubles

S: servicio de duplicidad de números telefónicos

1) *Definition*

Two telephone numbers are given to one subscriber. One number is known to the public while the other is revealed by the subscriber only to a limited number of persons. When the subscriber applies call diversion or do not disturb services to the first number, the people using the second number will still be connected.

2) *Description*

3) *Remarks*

4) *Market data*

2.25 **voice dialling**

F: service de numérotation par la voix

S: servicio de marcación por la voz

1) *Definition*

Verbal indication of a telephone number or name activates call set-up without the dialling operation.

Could be implemented in the exchange or in subscriber terminal equipment.

2) *Description*

3) *Remarks*

4) *Market data*

2.26 **number repetition service** (6.2)

F: service de répétition de numéro

S: servicio de repetición del último número marcado

1) *Definition*

The possibility for the subscriber to repeat a previously dialled number by dialling a short code.

2) *Description*

The service can be provided in a form where either the subscriber requests the registration of the number if the call cannot be completed, or the number of each outgoing call is registered automatically. The subscriber can repeat this number by dialling a short code.

3) *Remarks*

4) *Market data*

2.27 **lecture call** (11.3)

F: service de communication conférence unilatérale

S: servicio de conferencia múltiple unidireccional

1) *Definition*

A lecture call is an established connection between one caller and two or more parties, in which the speech path is used in a unidirectional way from the caller to the other connected parties. The call may be set up either by an operator, or by an automatic device programmed by the caller from his own telephone.

2) *Description*

3) *Remarks*

4) *Market data*

APPENDIX I

Telephone services, considered as nonsupplementary

(These services appeared in earlier lists of supplementary services)

I.1 **payphone service** (7.8)

F: service publiphone

S: servicio telefónico de previo pago

1) *Definition*

A service offered by means of a special equipment permitting outgoing telephone calls after insertion of adequate coins, tokens or coded cards and, without payment, incoming calls. Outgoing calls to certain services (e.g. emergency service) may be admitted without payment.

2) *Description*

3) *Remarks*

Includes public telephones and private telephones, which may be used in two modes, "private mode" and "coin-box mode".

4) *Market data*

High interest.

I.2 **directory inquiry service** (8.1)

F: service de renseignements concernant les listes d'abonnés

S: servicio de información sobre guías telefónicas

1) *Definition*

Callers can be informed of subscribers' telephone numbers, and, possibly, also of their names and addresses.

2) *Description*

3) *Remarks*

See Question 2/II [3].

4) *Market aspects*

I.3 **general telecommunications information service** (8.2)

F: service de renseignements généraux sur les télécommunications

S: servicio de información general sobre telecomunicaciones

1) *Definition*

A service given by an operator or a machine using the most common languages explaining the telecommunciations services and facilities in a country.

2) *Description*

3) *Remarks*

4) *Market data*

I.4 **interception of calls** (13.1)

F: service d'interception d'appels

S: servicio de interceptación de llamadas

1) *Definition*

Calls which, for reasons such as those listed below, cannot reach the wanted number may be intercepted and diverted to an operator, an answering machine, or a tone to give the caller the appropriate information:

- change of a particular number including indication of new number;
- renumbering of a group of numbers or a change of dialling code;
- wrong information in telephone directory;
- dialling of an unallocated code;
- dialling of a number or numbers allowed by the numbering plan but not yet allocated or no longer in service;
- route(s) out of order;
- route(s) congested;
- subscriber's line temporarily out of order;
- suspension of service owing to nonpayment.

2) *Description*

3) *Remarks*

Indication signals should be standardized to be useful for foreign subscribers.

4) *Market data*

I.5 **priority** (6.5)

F: service de priorité

S: servicio de prioridad

1) *Definition*

In telephone exchanges provision is made to give preferential treatment concerning the order of path or circuit selection to certain calls.

2) *Description*

3) *Remarks*

For exceptional overload conditions, Administrations should control priority arrangements for essential services.

4) *Market data*

I.6 **malicious call identification services** (14.2)

F: service d'identification d'appels malveillants

S: servicio de identificación de llamadas maliciosas

1) *Definition*

At the discretion of the Administration, assistance is given to ascertain the origin of malicious, nuisance or obscene calls.

2) *Description*

After prearrangement with the Administration, a subscriber will be given the possibility to request identification of calls received by him. The service may be provided by manual intervention or automatic means and may be offered on all calls or only certain calls specified by the subscriber. The data received at the identification (calling subscriber's number, identity of the incoming line, time of the incident, etc.) will be made available to the Administration.

3) *Remarks*

Used on an international basis, the service requires agreement among the countries involved. To allow flexible use, the interexchange signalling must allow sending of the calling subscriber's number.

4) *Market data*

5) *General operational requirements*

The use of the services may be restricted due to certain legal requirements which may differ from country to country.

The manual service can normally be provided to a limited extent depending on the existing administrative and technical possibilities.

Modern exchange and signalling systems make it possible to provide automatic services with extended possibilities regarding identification of the caller's number.

The services shall be provided and withdrawn after prearrangement between the subscriber and the Administration in accordance with national legal requirements.

Provision of the service on an international basis requires agreement between the Administrations concerned.

Among the automatic services, those which allow request by the subscriber during a call are preferred.

References

[1] CEPT *Handbook on services and facilities offered to the subscribers in modern telephone systems*

[2] CCITT – Question 16/II, Contribution COM II-No. 1, Study Period 1985-1988, Geneva, 1985.

[3] CCITT – Question 2/II, Contribution COM II-No. 1, Study Period 1985-1988, Geneva, 1985.

VARIOUS TONES USED IN NATIONAL NETWORKS

DIAL TONE

CONTINUOUS — CCITT - 30000

	FREQUENCY (Hz)				
ARGENTINA	450	ISRAEL	400	QATAR	350 + 440
AUSTRALIA	154 [1]	CÔTE D'IVOIRE	425	RAS AL KHAIMAH	25 // 50
AUSTRALIA	425 [6]	JAMAICA	350 + 440	SAINT KITTS AND NEVIS	
AUSTRALIA (PABX)	154 [1]	JAPAN	400	ANGUILLA	25
BAHRAIN	350 / 440	KENYA	33 // 50	S. LUCIA	50//25// 600+120
BELGIUM	450	KOREA (Rep. of)	350 + 440		
BRAZIL	425	KUWAIT	33	S. VINCENT AND THE GRENADINES	50//25
BRITISH VIRGIN ISLANDS	50 // 25	LIBERIA	425	SEYCHELLES	50//25
BURUNDI	150	LUXEMBOURG	425 // 450	SHARJAH	50 , 150
CANADA	600x120// 350 + 440	MALAWI	425	SINGAPORE	400 x 24
		MALDIVES	33	SPAIN	425
CANADA (PABX)	350 + 440	MAURITANIA	425	SPAIN (international)	600
CAYMAN ISLANDS	425//50//25	MEXICO	425	SURINAME	600 x 120
CHILE	400	MONTSERRAT	50	SWAZILAND	25 + 50
CYPRUS	50	MOROCCO	425	SWEDEN	425
DENMARK	425	NAURU	400	SWITZERLAND	425
DJIBOUTI	425	NAURU (PABX)	33	SWITZERLAND (PABX)	500
DOMINICAN REPUBLIC	50	NETHERLANDS	150 + 450	SYRIA	450
EL SALVADOR	425	NETHERLANDS (PABX)	425 [7]//450 [12]	TANZANIA	50
FIJI	33 // 50	VANUATU	33 1/3 // 50	TURKS & CAICOS	350 + 440
FIJI (PABX)	33 1/3	NEW ZEALAND 17)	400	UGANDA	33 // 50
FINLAND	425	NIGERIA	400 // 450	UNITED KINGDOM	50//350+440
FUJEIRAH	25	OMAN	425	UNITED STATES	600 x 120 [23]// 350 + 440
GERMANY (Fed. Rep. of)	425 // 450	PHILIPPINES	600x120//425		
GERMANY (Fed. Rep. of) (SPC)	400 + 425	PHILIPPINES (special)	400 + 425	ZAMBIA	425 // 50
HUNGARY	425	POLAND	400		
INDIA	33//50//400x25	PORTUGAL	400		
IRELAND	33 1/3 // 50				

1 - 0.25 — CCITT - 30098

BELGIUM (SPC)

0.975 - 0.05 — CCITT - 30121

BRAZIL (PABX) 425

0.75 - 0.75 - 0.25 - 0.25 — CCITT - 30173

GERMAN DEMOCRATIC REPUBLIC 425

0.7 - 0.8 - 0.2 - 0.3 — CCITT - 30178

GERMAN DEMOCRATIC REPUBLIC 450 | URUGUAY 450 | YUGOSLAVIA 425

0.6 - 1 - 0.2 - 0.2 — CCITT - 30188

ITALY 425

0.32 - 0.01 — CCITT - 30336

SWEDEN 19) 425

0.25 - 0.25 — CCITT - 30400

JAPAN (PABX) 400

0.2 - 0.2 — CCITT - 30440

PHILIPPINES 400

(3 x 0.2 - 2 x 0.3) - 0.8 — CCITT - 30448

FINLAND (PABX) 425

0.0166 - 0.0166 — CCITT - 30516

DOMINICAN REPUBLIC 33

SECOND DIAL TONE

CONTINUOUS — CCITT - 30000

HUNGARY 3) 850 | NETHERLANDS 425 [7]//450 [8]

0.5 - 0.5 - 0.5 - 0.3 - 0.2 — CCITT - 30204

MOROCCO 660/440/590/740

3 x 0.333 — CCITT - 30004

BELGIUM 900/1020/1140

0.125 - 0125 — CCITT - 30485

JAPAN 17) 400

	FREQUENCY (Hz)				

RINGING TONE

CONTINUOUS					
		IRAQ	400	TANZANIA	CCITT - 30000 400
2 - 4					
BAHAMAS	440/480// 420/20//400	JAMAICA NIGERIA	440 x 480 400 // 450	TURKS & CAICOS UNITED STATES	CCITT - 30050 440 + 480 420 x 40 [23] //
CANADA CAYMAN ISLANDS	440 + 480 425/50	S. LUCIA	420 + 40		440 + 480
1.85 - 4.15					
		ROUMANIA	16 2/3// 450/25		CCITT - 30060
1.66 - 3.33					
CAMEROON FRANCE FRENCH POLYNESIA	425 400 450	CÔTE D'IVOIRE [28] MADAGASCAR	50 425 x 50 25	MOROCCO NEW CALEDONIA	CCITT - 30066 425 425
1.5 - 3					
		SPAIN	425		CCITT - 30070
1.5 - 3.5					
ALGERIA	25//50	DJIBOUTI	425	MAURITANIA	CCITT - 30072 425
1.5 - 4.5					
		JAMAICA	440 + 480		CCITT - 30074
1.2 - 3.7					
		HUNGARY	425		CCITT - 30080
1.2 - 4.4					
		LEBANON	435		CCITT - 30082
1.2 - 5					
		EL SALVADOR	425		CCITT - 30085
1 - 0.4					
		GHANA	450//135		CCITT - 30100
1 - 2					
ARGENTINA CUBA	25 + 450 x16 2/3 420 + 40	JAPAN JAPAN (PABX)	400 x 16 400 x 20	KOREA (Rep. of) TANZANIA	CCITT - 30112 440 + 480 400
1 - 3					
BELGIUM CANADA (PABX) CHILE	450 440 + 480 400	ISRAEL KUWAIT NETHERLANDS	400 400 450 [9]	NORWAY SYRIA UNITED STATES (PABX)	CCITT - 30113 400 // 450 450/50 440 + 480
1 - 4					
BRAZIL BURUNDI CZECHOSLOVAKIA FINLAND GERMAN DEMOCRATIC REPUBLIC GERMANY (FED. REP. OF) GREECE INDONESIA ISRAEL ITALY	425 450 450 425 425 // 450 450 // 425 450 435 // 450 400 // 450 425	JAMAICA LIBERIA LUXEMBOURG MALAWI MEXICO NAURU NETHERLANDS NETHERLANDS (PABX) NORWAY	440 + 480 425 450 425 425 400 425 [7] // 450 [8] // 25 // 450 x 25 [9] 425 [7] // 450 [12] 425	PAKISTAN PHILIPPINES POLAND SHARJAH SURINAME SWITZERLAND SYRIA THAILAND URUGUAY YUGOSLAVIA ZAMBIA	CCITT - 30114 450 425 + 480 400 400 450 425 // 500 425 // 475 400 450 425 425
1 - 5					
AUSTRIA CUBA GERMAN DEMOCRATIC REP.	450 450 425	MOZAMBIQUE PORTUGAL SURINAME	400 400 420 x 40	SWEDEN [19] TUNISIA	CCITT - 30115 425 425
1 - 9					
FINLAND GERMAN DEMOCRATIC REP.	400 // 450 450	LUXEMBOURG SWEDEN	450 425	YUGOSLAVIA [11]	CCITT - 30118 450 x 25
1 - 10					
		PHILIPPINES	450		CCITT - 30117
0.96 - 3.84					
		GERMANY (Fed. Rep. of)	425	LUXEMBOURG	CCITT - 30120 425

	FREQUENCY (Hz)				

RINGING TONE *(cont'd)*

0.8 - 3.2 — CCITT - 30152

U.S.S.R.	425		

0.8 - 7.2 — CCITT - 30160

DENMARK	425		

0.5 - 0.25 - 0.5 - 1.75 — CCITT - 30220

BRITISH VIRGIN ISLANDS	400/450	RAS AL KHAIMAH	400		
CAYMAN ISLANDS	400/450	SAINT KITTS AND NEVIS		S. VINCENT AND THE GRENADINES	400/450
FUJEIRAH	400	ANGUILLA	400/450	SEYCHELLES	400/450
		S. LUCIA	400/450	TURKS & CAICOS	400/450

0.4 - 0.2 — CCITT - 30250

GUINEA	450			SINGAPORE	400 x 24

0.4 - 0.2 - 0.4 - 2 — CCITT - 30290

AUSTRALIA	400 x 17	MALAYSIA	425/50	QATAR		400 + 450
BAHRAIN	440/450	MALAWI	400 // 133	RAS AL KHAIMAH		400/400/500
BOTSWANA	400/450	MALDIVES	133	S. LUCIA		400/450
BRITISH VIRGIN ISLANDS	400/450	MALTA	400 + 450	S. VINCENT AND THE GRENADINES		400/450
CAYMAN ISLANDS	400/450		400 x 25	SEYCHELLES		400/450
CYPRUS	400 x 25		400 x 16 2/3	SHARJAH		400/450/450
FIJI	133x16 2/3// 400x25	MONTSERRAT	400/450	SINGAPORE		400 x 24
		NAURU (PABX)	425 x 25	SOUTH AFRICA		400 x 33 1/3
FIJI (PABX)	400 x 16 2/3	VANUATU	400 x 450 // 133 x 16 2/3	UNITED KINGDOM		400 + 450
INDIA	133//400 x 25					400 x 25
IRELAND	425 x 50	NEW ZEALAND	400 x 33			400 x 16 2/3
JAMAICA	400 // 133	NEW ZEALAND (PABX)	400 x 450	ZAMBIA	27)	133//425
JORDAN	400 + 16 2/3	OMAN	425			
		PAKISTAN	400 + 16 2/3			

0.4 - 0.2 - 0.4 - 2.2 — CCITT - 30292

DOMINICAN REPUBLIC	400/450	QATAR	400 + 450

0.4 - 0.2 - 0.4 - 2.6 — CCITT - 30294

INDIA	400 x 25

0.4 - 0.2 - 0.4 - 4 — CCITT - 30297

SWAZILAND	400

0.25 - 0.5 - 0.25 - 2 — CCITT - 30420

KENYA	133 + 17 // 400 + 17 // 400 + 450	UGANDA	133 + 17 // 400 + 17 // 400 + 450

BUSY TONE

1 - 1 — CCITT - 30110

IRAQ	400

0.8 - 0.8 — CCITT - 30140

DOMINICAN REPUBLIC	400	MONTSERRAT	400	QATAR	400 // 450

0.75 - 0.75 — CCITT - 30175

BRITISH VIRGIN ISLANDS	400	MALAWI	400	S. VINCENT AND THE GRENADINES		400
CAYMAN ISLANDS	400	MALDIVES	400	SEYCHELLES		400
CYPRUS	400	MONTSERRAT	400	SINGAPORE		400
FIJI	400	VANUATU	400	SOUTH AFRICA		400
FUJEIRAH	400	PAKISTAN	400	TANZANIA		400
INDIA	400	RAS AL KHAIMAH	400	TURKS & CAICOS		400
JAMAICA	400	SAINT KITTS AND NEVIS		UGANDA		400
JORDAN	400	ANGUILLA	400	ZAMBIA	27)	400
KENYA	400	S. LUCIA	400			

0.6 - 0.6 — CCITT - 30185

INDIA	400

BUSY TONE *(cont'd)*

	FREQUENCY (Hz)				
0.5 - 0.5					CCITT - 30205
ALGERIA	450	JAPAN 17)	400	PHILIPPINES	600x120//425
BAHAMAS	480/620 420//400	KOREA (Rep. of)	480 + 620	POLAND	400
		KUWAIT	400	PORTUGAL	400
CAMEROON	425	LIBERIA	425	S. LUCIA	600 + 120
CANADA	600 x 120	LUXEMBOURG	425	SHARJAH	400//450
CANADA (PABX)	480 + 620	MADAGASCAR	450	SURINAME	600 x 120
CAYMAN ISLANDS	425	MALAWI	525	SWAZILAND	400
CHILE	400	MAURITANIA	425	SWITZERLAND 16)	425
CUBA	600 + 120	MOROCCO	425	SWITZERLAND (PABX)	500
DJIBOUTI	425	MOZAMBIQUE	400	SYRIA	450
FRANCE	440	NAURU	400	THAILAND	400
FRENCH POLYNESIA	450	NETHERLANDS	425 7)11) // 450 9)	TURKS & CAICOS	480 + 620
GERMANY (Fed. Rep. of)	425	NEW CALEDONIA	425	UNITED STATES	600 x 120 23)// 480 + 620
INDONESIA	435 // 450	NEW ZEALAND	400 17)		
ISRAEL	400	NIGERIA	400	YUGOSLAVIA	425
CÔTE D'IVOIRE	425	NORWAY	425	ZAMBIA	425
JAMAICA	480 + 620	OMAN	425		
0.44 - 0.49					CCITT - 30243
		SYRIA	450		
0.4 - 0.2					CCITT - 30250
		LEBANON	435	PHILIPPINES	450
0.4 - 0.333					CCITT - 30253
		IRELAND	400 // 425	MALAWI	400
0.4 -0.35 - 0.225 - 0.525					CCITT - 30270
		SHARJAH	400		
0.4 - 0.4					CCITT - 30254
		U.S.S.R.	425		
0.4 - 0.675 - 0.13 - 0.17					CCITT - 30277
		PAKISTAN	450		
0.375 - 0.375					CCITT - 30300
AUSTRALIA	400	MALTA	400		
BAHRAIN	400	NAURU (PABX)	425	SHARJAH	400 // 450
BOTSWANA	400	VANUATU	400	TANZANIA	400
DOMINICAN REPUBLIC	400	QATAR	400	UGANDA	400
FIJI (PABX)	400	RAS AL KHAIMAH	400	UNITED KINGDOM	400
KENYA	400	SEYCHELLES	400		
0.35 - 0.65					CCITT - 30310
		MALAYSIA	425		
0.333 - 0.333					CCITT - 30320
		EL SALVADOR	425	THAILAND	450
0.31 - 0.31					CCITT - 30357
		GERMAN DEMOCRATIC REPUBLIC	425		
0.3 - 0.3					CCITT - 30373
CZECHOSLOVAKIA	450	GREECE	450		
FINLAND	425	HUNGARY	425	URUGUAY	450
0.25 - 0.25					CCITT - 30400
ARGENTINA	450	GERMAN DEMOCRATIC REP.	425		
AUSTRIA	450	GHANA	400	SURINAME	450
BRAZIL	425	MEXICO	425	SWEDEN	425
BURUNDI	450	NETHERLANDS	425 10)// 450 8)13)	SWITZERLAND	425
CUBA	450			TUNISIA	425
0.2 - 0.2					CCITT - 30440
GUINEA	450	ITALY	425	SPAIN	425
0.2 - 0.4					CCITT - 30444
		NORWAY	400 // 450	YUGOSLAVIA	425
0.167 - 0.167					CCITT - 30460
		BELGIUM	450	ROMANIA	133 // 450
0.15 - 0.475					CCITT - 30468
GERMAN DEMOCRATIC REPUBLIC	450	GERMANY (Fed. Rep. of)	425 // 450	LUXEMBOURG	450
0.1 - 0.566					CCITT - 30495
		DENMARK	425		

	FREQUENCY (Hz)				

CONGESTION TONE

0.8 - 0.8

					CCITT - 30140
		DOMINICAN REP.	400	MONTSERRAT	400

0.75 - 0.75

						CCITT - 30175
BRITISH VIRGIN ISLANDS	400	SAINT KITTS AND NEVIS				
CAYMAN ISLANDS	400	ANGUILLA	400	SEYCHELLES		400
FUJEIRAH	400	S. LUCIA	400	TURKS & CAICOS		400
RAS AL KHAIMAH	400	S. VINCENT AND THE GRENADINES	400	ZAMBIA	27)	400

0.5 - 0.5

						CCITT - 30205
BELGIUM	450	NEW ZEALAND	4) 900	S. LUCIA		600 + 120
CAYMAN ISLANDS	400	OMAN	425	SHARJAH		400//450
NETHERLANDS	450 9)	PORTUGAL	400	TURKS & CAICOS		480 + 620

0.4 - 0.35 - 0.225 - 0.525

						CCITT - 30270
BAHRAIN	400	QATAR	400			
MALTA 19)	400	SHARJAH	400	UNITED KINGDOM	19)	400

0.4 - 0.4 - 0.2 - 0.6

				CCITT - 30274
	RAS AL KHAIMAH	400		

0.4 - 0.6 - 0.2 - 0.4

					CCITT - 30276
BRITISH VIRGIN ISLANDS	400	MONTSERRAT	400		
CAYMAN ISLANDS	400	S. LUCIA	400	S. VINCENT AND THE GRENADINES	400

0.375 - 0.375

					CCITT - 30300
AUSTRALIA 20)	400	DOMINICAN REP.	400	RAS AL KHAIMAH	400
BAHRAIN	400	NAURU (PABX)	425	SEYCHELLES	400

0.31 - 0.31

				CITT - 30357
	GERMAN DEMOCRATIC REPUBLIC	425		

0.3 - 0.2

				CCITT - 30370
	JAMAICA	480 + 620	KOREA (Rep. of)	480 + 620

0.25 - 0.25

						CCITT - 30400
CANADA	600x120// 480 + 620 21)	LUXEMBOURG	425	PHILIPPINES		600 x 120 // 480 + 620
		MEXICO	425			
CANADA (PABX)	480 + 620	NETHERLANDS	17) 425 7)//450 8)	POLAND		400
CUBA	600 + 120	NEW ZEALAND	4) 17) 400	SINGAPORE		400
GERMAN DEMOCRATIC REPUBLIC	425	NIGERIA	400	UNITED STATES	21)	600x120 23)// 480 + 620
GERMANY (Fed. Rep. of)	425	NORWAY	425	ZAMBIA		425

0.25 - 0.75

				CCITT - 30407
	SWEDEN	425		

0.2 - 0.3

				CCITT - 30443
	JAMAICA	480 + 620		

(3 x 0.2 - 2 x 0,2) - 0,6

				CCITT - 30446
	SPAIN	425		

(3 x 0.2 - 2 x 0,23) - 0,92

				CCITT - 30451
	SYRIA	450		

0.15 - 0.475

				CCITT - 30468
	GERMAN DEMOCRATIC REPUBLIC	450		

RECALL DIAL TONE

CONTINUOUS

						CCITT - 30000
NAURU (PABX)	33	NETHERLANDS	425 7)// 450 12)	SYRIA	7)	450

1 - 2

				CCITT - 30112
	KOREA (Rep. of)	450 // 400		

1 - 4

				CCITT - 30114
	KOREA (Rep. of)	450 // 400		

0.4 - 0.2 - 0.4 - 1.5

				CCITT - 30280
	IRAQ	133		

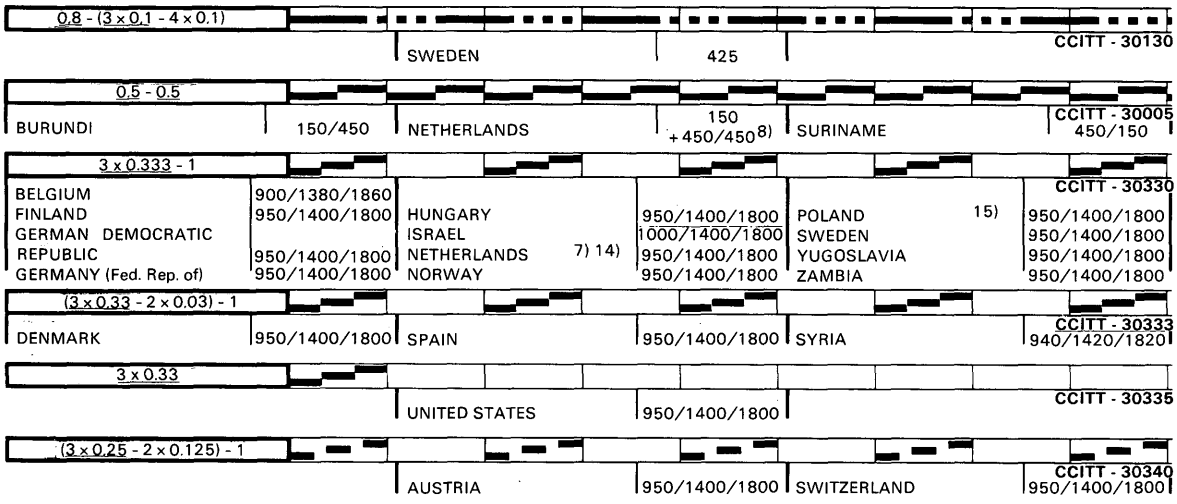
(3 x 0.1 - 3 x 0,1) - CONTINUOUS

				CCITT - 30010
	UNITED STATES	350 + 440		

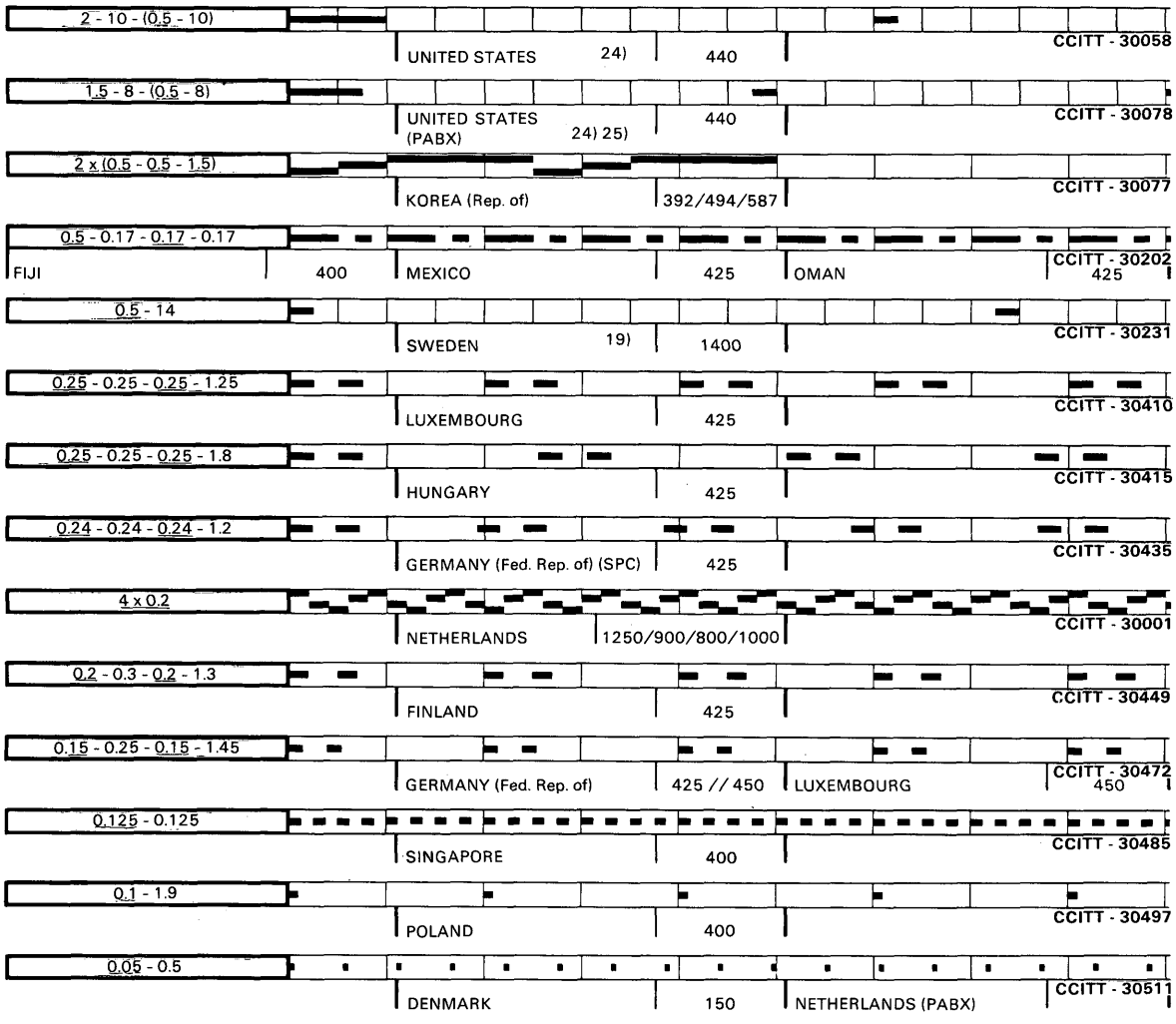
0.1 - 0.1

				CCITT - 30490
	CANADA (PABX)	350 + 440		

SPECIAL INFORMATION TONE



WARNING TONE-OPERATOR INTERVENING



	FREQUENCY (Hz)				

NUMBER UNOBTAINABLE TUNE

CONTINUOUS — CCITT - 30000

BAHRAIN	400	JORDAN	400	SAINT KITTS AND NEVIS	
BOTSWANA	400	KENYA	400	ANGUILLA	400
BRITISH VIRGIN ISLANDS	400	KUWAIT	400	S. LUCIA	400
CAYMAN ISLANDS	400	MALDIVES	400	S. VINCENT AND THE GRENADINES	400
CYPRUS	400	MALTA	400	SEYCHELLES	400
DOMINICAN REPUBLIC	400	MONTSERRAT	400	SHARJAH	400
FUJEIRAH	400	VANUATU	400	TURKS & CAICOS	400
GHANA	400	QATAR	400	UGANDA	400
INDIA	400	RAS AL KHAIMAH	400	UNITED KINGDOM	400

6 - 1 — CCITT - 30020

		IRELAND	400 // 425		

5.5 - 0.5 — CCITT - 30025

		NIGERIA	450		

4.8 - 0.2 — CCITT - 30027

		SWAZILAND	400		

3 - 0.5 — CCITT - 30030

		JAMAICA	400		

2.5 - 0.5 — CCITT - 30045

AUSTRALIA	400	KENYA	400	SOUTH AFRICA	400
FIJI	400	MALAWI	400	TANZANIA	400
FIJI (PABX)	400	MALAYSIA	425	UGANDA	400
INDIA	400	SINGAPORE	400		

0.9 - (2 x 0.25 - 3 x 0.2) — CCITT - 30125

		SYRIA	450		

0.75 - 0.25 - 0.25 - 0.25 — CCITT - 30170

		BRAZIL	425	NAURU	400

0.75 - 0.75 — CCITT - 30175

		ZAMBIA	27)		

0.6 - (3 x 0.2 - 4 x 0.2) — CCITT - 30180

		LIBERIA	425		

0.5 - 0.5 — CCITT - 30205

		PORTUGAL	400	SHARJAH	400//450

0.5 - 1.5 — CCITT - 30210

		GHANA	150 // 450		

0.5 - 4.5 — CCITT - 30214

		GHANA	150 // 450		

0.4 - (2 x 0.12 - 3 x 0.12) — CCITT - 30240

		CUBA	520		

0.362 - (6 x 0.092 - 7 x 0.11) — CCITT - 30306

		ROMANIA	450		

(3 x 0.33 - 2 x 0.03) - 1 — CCITT - 30333

		DENMARK	950/1400/ 1800		

0.3 - (3 x 0.1 - 4 x 0.1) — CCITT - 30360

		THAILAND	400		

0.3 - 0.2 — CCITT - 30370

		S. LUCIA	600 + 120	TURKS & CAICOS	480 + 620

0.25 - 0.25 — CCITT - 30400

		PHILIPPINES	600 x 120	ZAMBIA	425

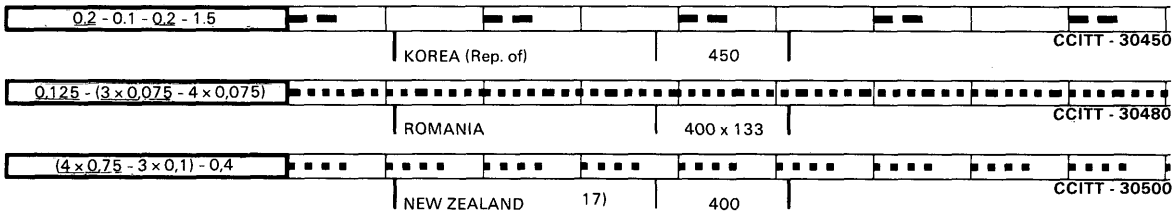
0.2 - 0.2 — CCITT - 30440

		MOZAMBIQUE	400	PORTUGAL	400

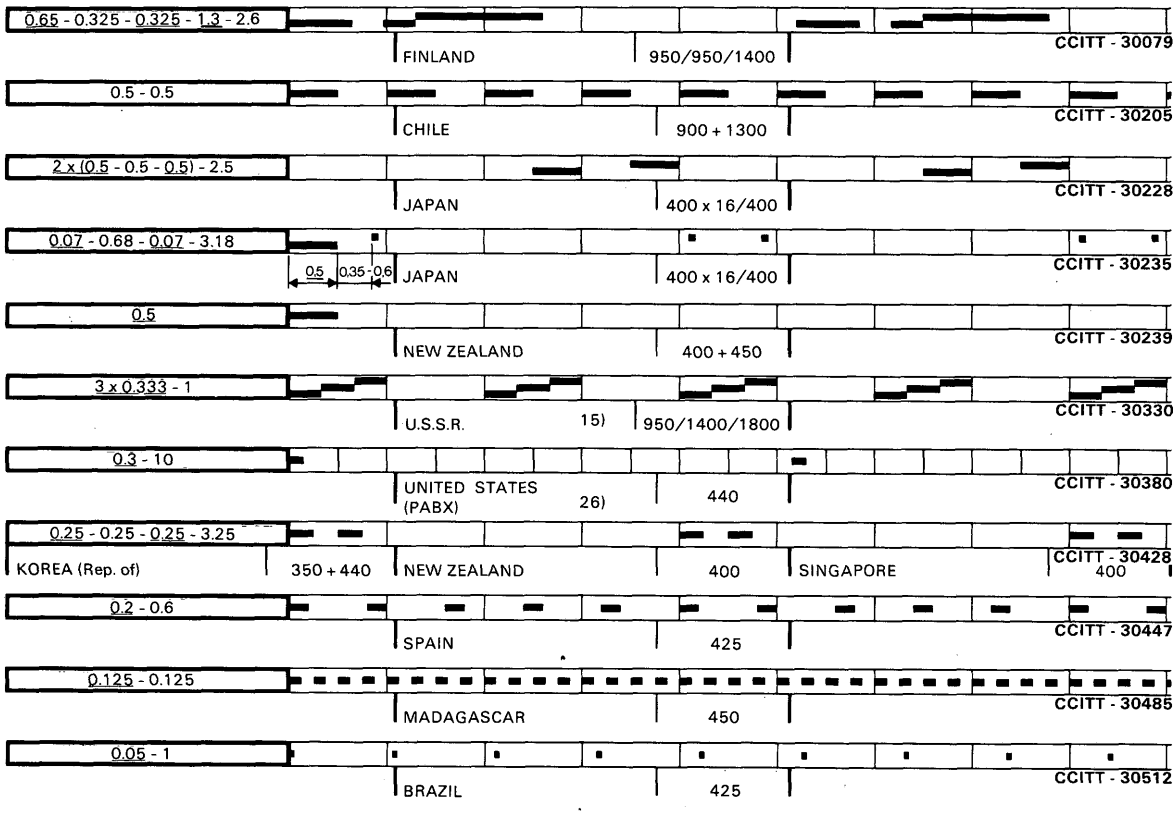
0.2 - 0.3 — CCITT - 30443

		CAYMAN ISLANDS	425	OMAN	425

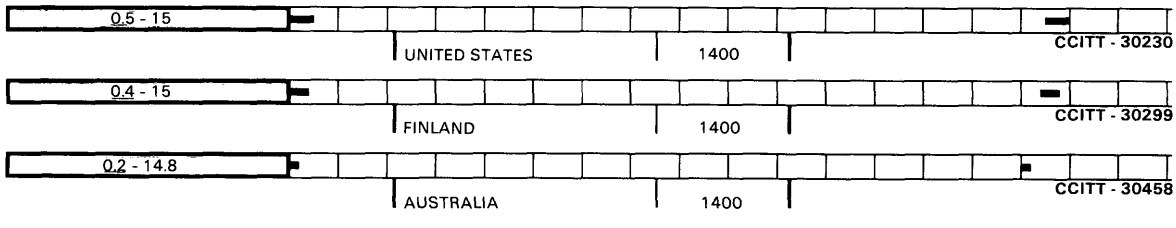
NUMBER UNOBTAINABLE TONE *(cont'd)*



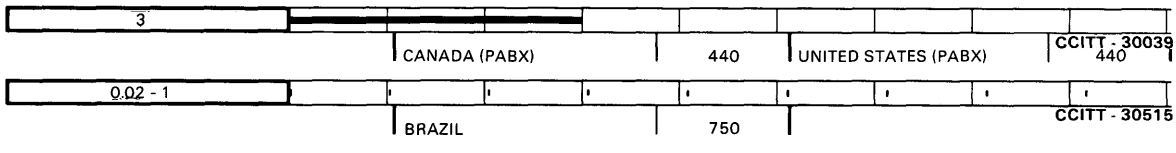
WAITING TONE



RECORDING TONE

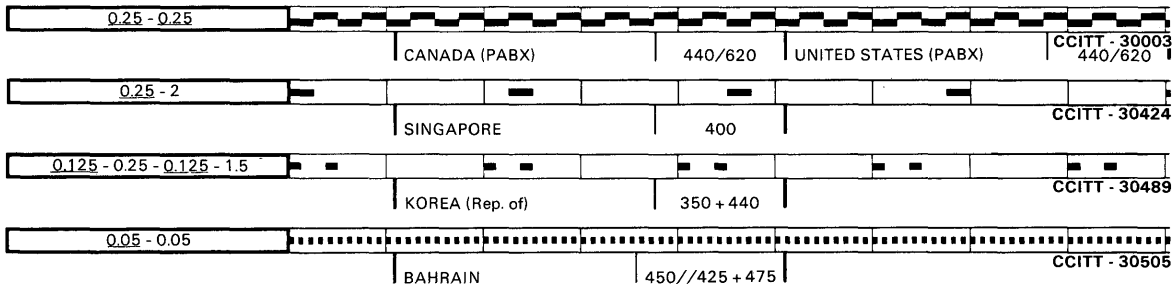


EXECUTIVE OVERRIDE TONE

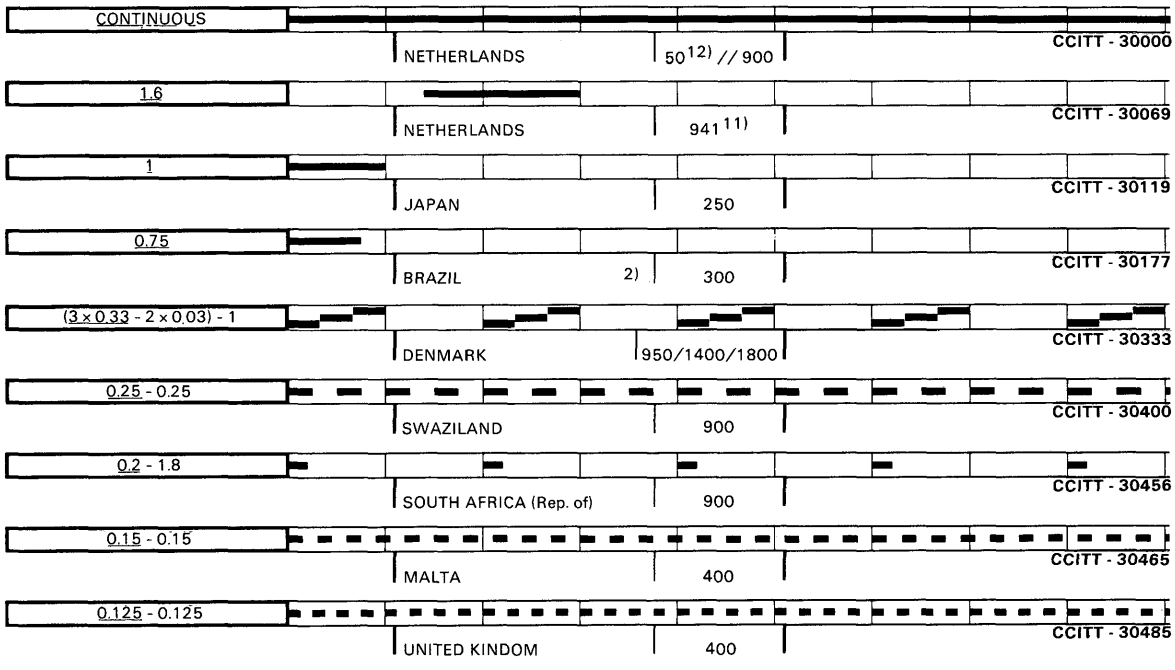


	FREQUENCY (Hz)				

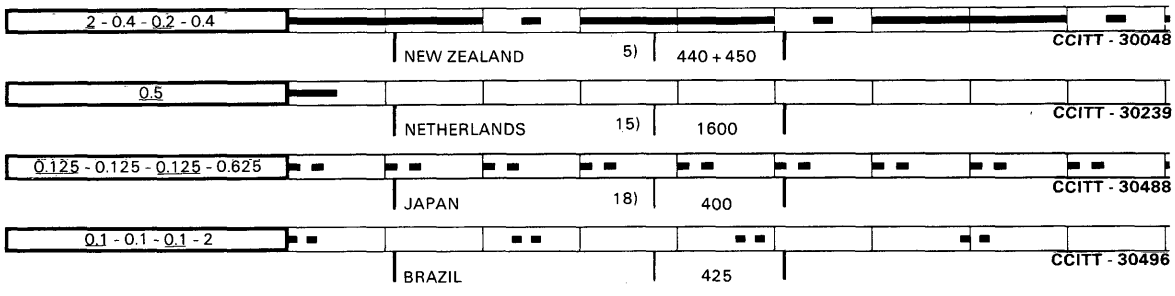
INTERCEPT TONE



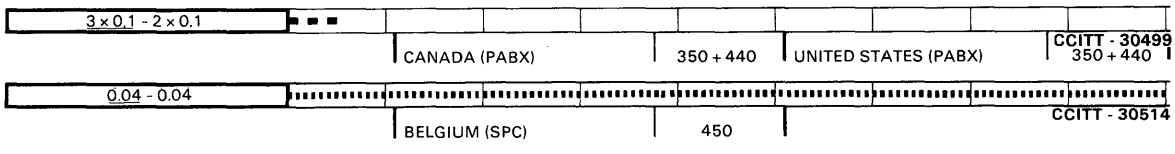
PAY TONE



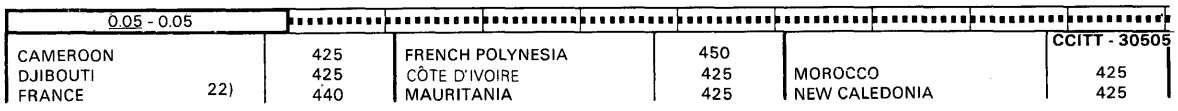
FUNCTION ACKNOWLEDGEMENT TONE



CONFIRMATION TONE



ROUTE TONE

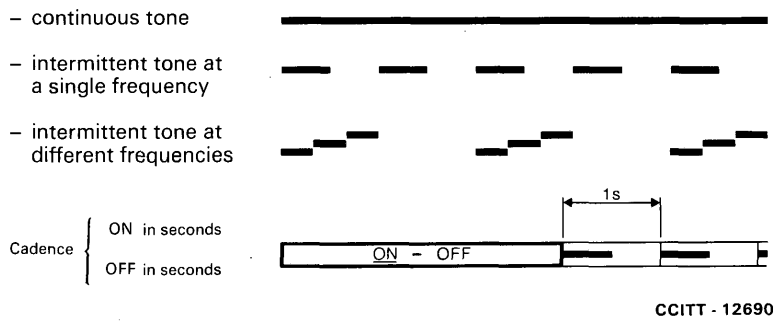


CAMEROON	425	FRENCH POLYNESIA	450		
DJIBOUTI	425	CÔTE D'IVOIRE	425	MOROCCO	425
FRANCE 22)	440	MAURITANIA	425	NEW CALEDONIA	425

FOOTNOTES TO TONE TABLES

1) With harmonics applied every 30 ms.
2) Announces that the call is to terminate in a specified time unless the user inserts anther coin in the coin box.
3) The second dial tone is given after dialling the national prefix /06/ or after dialling the international prefix /00/.
4) Disconnect tone / Overflow tone.
5) Switching complete tone.
6) 425 Hz is used in pushbutton («touchtone») application, currently being introduced in Australia.
7) Standardized version.
8) In most equipment installed up to 1970.
9) In certain equipment only.
10) In newer exchanges which do not distinguish between «busy» and «congestion» condition.
11) In the newest equipment, this tone burst is given 15 seconds before the paid speech time expires.
12) In older equipment.
13) In PABXs which do not distinguish between «busy» and «congestion» condition.
14) Only to be sent onto public exchange lines from a PABX with DDI, in combination with a recorded announcement.
15) With a recorded announcement.
16) Standard in all public network exchanges as from 1985.
17) This tone is also used in private automatic branch exchanges (PABX).
18) Positive indication tone.
19) In new equipment.
20) Reduced by 10 dB every other time.
21) New precise tone plan.
22) This tone is generally not retransmitted outside the French network. It can be retransmitted, however, in the case of calls arriving in Paris, which have to go through certain long-distance connections in the national network and in the case of certain neighbouring international relations. The French Administration is considering the study of a device to bring this situation to an end.
23) Not North American precise tone plan ; however it is possible that these tones may be received from certain electromechanical switching systems.
24) Busy verification.
25) One application of 1.5 to 2 seconds before PABX user intervenes ; followed by repeated applications of 0.5 to 0.8 seconds, at intervals of 8 to 20 seconds.
26) Modern PABXs may have one of the following arrangements using 400 Hz :
    a) single burst tone: 0.3 seconds
    b) two burst tone : 0.1 - 0.1 - 0.1 seconds
    c) three burst tone : 0.1 - 0.1 - 0.1 - 0.1 - 0.1 seconds.
27) Will be in use in a few exchanges for the next 5 years (will be abolished in a few years).
28) Exchange.

Symbols used in compiling tone tables



$f_1 \times f_2$ means that f_1 is modulated by f_2.

$f_1 + f_2$ means the juxtaposition of two frequencies f_1 and f_2 without modulation.

f_1 / f_2 means that f_1 is followed by f_2.

$f_1 // f_2$ means that in some exchanges frequency f_1 is used and in others frequency f_2 is used.

Supplement No. 3

NORTH AMERICAN PRECISE AUDIBLE TONE PLAN

Table 1 is a description of the audible tone plan in operation in the North American network to:

1) achieve uniformity in the quality of audible tones;
2) minimize customer and operator confusion as to meaning of audible tones;
3) enable machine recognition of audible tones for purposes of service observing, etc.

Basically, the plan provides four frequencies that are used, singly or in combination with particular cadences, to form the audible tone signals shown in Table 1 as well as some other special purpose, limited use signals.

TABLE 1

Tones	Frequencies [a] (Hz)				Power per frequency at exchange [b] where tone is applied [c]	Cadence
	350	440	480	620		
Dial tone	●	●			– 13 dBm0	Continuous tone
Dial tone – Modern PABX only	●	●			– 16 dBm0 [d]	Continuous tone
Recall dial tone	●	●			– 13 dBm0	3 bursts of 0.1 s followed by a continuous tone [e]
Recall dial tone – Modern PABX only [g]	●	●			– 16 dBm0	3 bursts of 0.1 s followed by a continuous tone [e]
Busy tone			●	●	– 24 dBm0	Burst 0.5 s/silence 0.5 s
Busy tone – Modern PABX only			●	●	– 21 dBm0	Burst 0.5 s/silence 0.5 s
Reorder tone			●	●	– 24 dBm0	Burst 0.25 s/silence 0.25 s
Reorder tone – Modern PABX only			●	●	– 21 dBm0	Burst 0.25 s/silence 0.25 s
Audible ringing tone		●	●		– 19 dBm0	Burst 2 s/silence 4 s
Audible ringing tone – Modern PABX only		●	●		– 16 dBm0	Burst 1 s/silence 3 s
Call waiting tone		●			– 13 dBm0	Burst of 0.3 s every 10 s
Call waiting tone – Modern PABX only [g]		●			– 16 dBm0	A burst of 0.3 s Station call waiting
					– 16 dBm0	2 bursts of 0.1 s [e] Outside call waiting
					– 16 dBm0	3 bursts of 0.1 s [e] Urgent call waiting
Busy verification		●			– 13 dBm0	A 2.0 s burst followed by 0.5 s bursts every 10 s
Busy verification – Modern PABX only [g]		●			– 14 dBm0	Burst of 1.5 to 2.0 s followed by . . . [f]
Executive override – Modern PABX only [g]		●			– 14 dBm0	Burst of 3.0 s
Confirmation tone	●	●			– 13 dBm0	Burst 0.1 s/silence 0.1 s/Burst 0.3 s
Confirmation tone – Modern PABX only [g]	●	●			– 16 dBm0	3 bursts 0.1 s [e]

[a] Frequency limits are ± 0.5% of the nominal frequency.
[b] PABX tone levels are measured at the PABX interfaces (typically at customer premises). Power levels are 2 dB lower for private line interfaces.
[c] Power level tolerances are +1.5 dB.
[d] Tolerance level for PABX dial tone is +0.75 dB.
[e] Bursts are separated by 0.1 s.
[f] Burst of 1.5 to 2.0 s before attendant intervenes, followed by repeated bursts of 0.5 to 0.8 s, 8 to 20 s apart.
[g] Tones applied at PABX station or private line interfaces and not at the exchange interfaces.

Supplement No. 4

TREATMENT OF CALLS CONSIDERED AS "TERMINATING ABNORMALLY"

Country of destination	Ceased line	Line out of service	Changed number	Line connected to absent subscribers service	Faulty line	Spare numbers (no subscriber)	Spare level or spare code	Congestion in the inland automatic system
Afghanistan	Ringing tone							Busy tone
Algeria	Operator or ringing tone Recorded announcement proposed		Busy tone	Operator	Operator or busy tone or ringing tone			Busy tone
Argentina	Ringing tone		Normally operator; exceptionally, ringing tone	–	Ringing tone		Busy tone	
Australia	Operator, recorded announcement or number unobtainable tone		Operator or recorded announcement		Ringing tone, busy tone or recorded announcement	Number unobtainable tone, ringing tone or recorded announcement	Recorded announcement or number unobtainable tone	Congestion tone or recorded announcement
Austria	Operator or busy tone or special information tone, the latter if necessary also at the initiative of the operator	Busy tone or special information tone	Operator of recorded announcement or busy tone or special information tone; the latter may also be transmitted during the intervals of the announcement or if necessary on the initiative of the operator	Operator or recorded announcement or special information tone to be transmitted during the intervals of the announcement or on the initiative of the operator	Ringing tone or busy tone	Busy tone or special information tone	Busy tone	

Country of destination	Ceased line	Line out of service	Changed number	Line connected to absent subscribers service	Faulty line	Spare numbers (no subscriber)	Spare level or spare code	Congestion in the inland automatic system
Bahamas	Recorded announcement	Recorded announcement or unobtainable tone	–	Operator intercepted	–	Recorded announcement or unobtainable tone		Fast busy tone
Belgium	Operator. In certain cases, ringing tone (information tone complemented by a recorded announcement is proposed)	Ringing tone. In certain cases operator	Operator for individual cases; recorded announcement in case of transfer of groups of subscribers	Operator	Ringing tone. In certain cases information tone or operator	Ringing tone. In certain cases recorded announcement	Information tone with or without recorded announcement	In certain cases congestion tone
Brazil	Number unobtainable tone or recorded announcement		Operator or number unobtainable tone or recorded announcement		Busy tone or ringing tone	Number unobtainable tone or recorded announcement or operator		Busy tone
Burundi	Information tone			Operator	Ringing tone or busy tone			
Cameroon	Ringing tone or recorded announcement			Ringing tone or operator	Ringing tone or busy tone	Recorded announcement or ringing tone		Recorded announcement or busy tone
Canada	Operator or recorded announcement * * In many cases, the recorded announcement is followed by cut-through to an operator		New number from operator or automatic intercept system	Service usually provided by persons not in the employ of the Telephone Company	Operator, busy tone or ringing tone	Operator or recorded announcement	Operator, recorded announcement, busy tone, or re-order (congestion tone)	Re-order (congestion) tone or recorded announcement
Chile	Ringing tone	Ringing tone or recorded announcement	Operator or recorded announcement	Service not provided	Ringing tone or busy tone	Ringing tone	Busy tone	

Country of destination	Ceased line	Line out of service	Changed number	Line connected to absent subscribers service	Faulty line	Spare numbers (no subscriber)	Spare level or spare code	Congestion in the inland automatic system
Côte d'Ivoire	Information tone with recorded announcement			Service not provided. Ringing tone	Information tone with recorded announcement			
Cuba	Ringing tone		Operator for individual cases; operator or recorded announcement in case of transfer of groups of subscribers	Service not provided	Ringing tone or busy tone	Ringing tone	Number unobtainable tone or congestion tone	Busy tone
Cyprus	Number unobtainable tone	Ringing tone	Operator	–	Busy tone or ringing tone	Number unobtainable tone		Busy tone
Denmark	Information tone or ringing tone, or operator or recorded announcement			Operator or recorded announcement	Ringing tone	Information tone or ringing tone	Information tone	Busy tone
Djibouti	Ringing tone of low level		–	Service not provided	Ringing tone or busy tone	Ringing tone of low level	Busy tone	–
El Salvador	Busy tone	Ringing tone		Operator or ringing tone	Busy tone or ringing tone	Ringing tone	Busy tone	
Fiji	Operator or number unobtainable tone	Number unobtainable tone	Operator or number unobtainable tone	Service not provided	Number unobtainable tone. Continuous, busy or ringing tone	Ringing tone	Number unobtainable tone	Busy tone
Finland	Ringing tone or operator or recorded announcement	Ringing tone or busy tone or recorded announcement	Operator or recorded announcement or ringing tone	Operator or recorded announcement	Ringing tone or busy tone	Ringing tone or busy tone	Busy tone or information tone	Busy tone. In certain cases no tone

Country of destination	Ceased line	Line out of service	Changed number	Line connected to absent subscribers service	Faulty line	Spare numbers (no subscriber)	Spare level or spare code	Congestion in the inland automatic system
France	Operator or recorded announcement			Operator	Operator or recorded announcement or busy tone or ringing tone	Operator or recorded announcement or busy tone or ringing tone		Busy tone or recorded announcement
Germany (Federal Republic of)	Special information tone, alone or with a recorded announcement (use according to Recommendation E.180)			Operator or recorded announcement	Ringing tone or busy tone	Ringing tone (alone without any other indication) or special information tone, alone or with recorded announcement	Special information tone, alone or with a recorded announcement (use according to Recommendation E.180)	Busy tone, congestion tone
Ghana	Number unobtainable tone		Ringing tone and operator	Number unobtainable tone	Ringing tone or busy tone	Number unobtainable tone		Busy tone
Guinea	Ringing tone			Operator	Busy tone or ringing tone	Number unobtainable tone		–
Hungary	Operator or ringing tone		Ringing tone or recorded announcement	Operator	Busy tone or ringing tone	Ringing tone	Special information tone (Recommendation E.180)	Busy tone
India	Number unobtainable tone		Operator or recorded announcement or number unobtainable tone	Service not provided	Number unobtainable tone			Busy tone
Ireland	Number unobtainable tone		Operator	Service not provided		Number unobtainable tone		Busy tone

Country of destination	Ceased line	Line out of service	Changed number	Line connected to absent subscribers service	Faulty line	Spare numbers (no subscriber)	Spare level or spare code	Congestion in the inland automatic system
Israel		Information tone with a recorded announcement			Busy tone or ringing tone	Information tone with a recorded announcement	Busy tone	Busy tone alone or with a recorded announcement
Italy	Busy tone or ringing tone		Operator or recorded announcement	Operator or recorded announcement	Busy tone or ringing tone	Ringing tone	Busy tone	
Jamaica	Number unobtainable tone or congestion tone or recorded announcement		Operator or recorded announcement	Call answered by a private answering service	Number unobtainable tone or congestion tone or busy tone or ringing tone	Number unobtainable tone or congestion tone or recorded announcement		Congestion tone or busy tone
Japan	Recorded announcement or operator			Recorded announcement or ringing tone	Recorded announcement or busy tone or ringing tone	Recorded announcement or operator	Recorded announcement	Busy tone or recorded announcement
Kenya	Number unobtainable tone		Operator		Number unobtainable tone			Busy tone
Korea (Rep. of)	Ringing tone or recorded announcement	Ringing tone or busy tone	Automatic intercept system or ringing tone	Recorded announcement or ringing tone	Busy tone or ringing tone	Ringing tone or recorded announcement	Busy tone or recorded announcement	Busy tone or congestion tone
Lebanon	Ringing tone (recorded announcement proposed)			Operator	Ringing tone (recorded announcement proposed)	Ringing tone	Special tone	Busy tone

Country of destination	Ceased line	Line out of service	Changed number	Line connected to absent subscribers service	Faulty line	Spare numbers (no subscriber)	Spare level or spare code	Congestion in the inland automatic system
Liberia	Ringing tone			Service not provided	Busy tone or ringing tone	Ringing tone	Number unobtainable tone	Busy tone
Luxembourg	Ringing tone or recorded announcement or congestion tone			Operator	Ringing tone or busy tone	Ringing tone or congestion tone	Busy tone or recorded announcement	Busy tone or congestion tone
Madagascar	Ringing tone			Operator	Ringing tone		Busy tone	
Malawi	Ringing tone or number unobtainable tone		Service not provided			Ringing tone or number unobtainable tone	Number unobtainable tone	Busy tone
Maldives	Ringing tone				Busy tone or ringing tone	Ringing tone	Number unobtainable tone	Busy tone
Malta	Operator or number unobtainable tone	Number unobtainable tone	Operator	Call answered by an operator or a private answering service or a call transferred to another subscriber	Number unobtainable tone			Busy tone
Mauritania	Ringing tone or operator			Operator	Ringing tone or busy tone	Ringing tone	Busy tone	
Mexico	Recorded announcement or ringing tone		Recorded announcement	Ringing tone or recorded announcement	Ringing tone or busy tone	Ringing tone	Recorded announcement or busy tone	Recorded announcement or busy tone

Country of destination	Ceased line	Line out of service	Changed number	Line connected to absent subscribers service	Faulty line	Spare numbers (no subscriber)	Spare level or spare code	Congestion in the inland automatic system
Morocco	Ringing tone or recorded announcement			Operator	Busy tone or ringing tone	Ringing tone or recorded announcement	Busy tone or recorded announcement	Busy tone
Mozambique	Ringing tone	Busy tone	Service not provided		Busy tone or ringing tone	Ringing tone	Busy tone	
Nauru	Ringing tone		Service not provided		Ringing tone or busy tone	Ringing tone	Number unobtainable tone	Busy tone
Norway	Operator or recorded announcement or special information tone or busy tone or ringing tone			Operator or recorded announcement or special information tone or busy tone	Ringing tone or busy tone	Ringing tone or busy tone or special information tone	Special information tone or busy tone	Congestion tone or busy tone
Netherlands	Special information tone or recorded announcement	Special information tone	Special information tone or recorded announcement	Special information tone (Manual service); recorded announcement (Automatic service)	Ringing tone or busy tone	Special information tone or ringing tone	Special information tone or congestion or recorded announcement	Congestion tone
New Caledonia	Operator or recorded announcement			Operator	Operator or recorded announcement or busy tone or ringing tone			Busy tone or recorded announcement
New Zealand	Number unobtainable tone or ringing tone	Number unobtainable tone	Operator or recorded announcement	Service not provided	Busy tone or ringing tone	Number unobtainable tone or ringing tone	Number unobtainable tone	Disconnect or recorded announcement
Oman	Number unobtainable tone	Busy tone	Number unobtainable tone		Busy tone	Ringing tone	Number unobtainable tone	Busy tone

Country of destination	Ceased line	Line out of service	Changed number	Line connected to absent subscribers service	Faulty line	Spare numbers (no subscriber)	Spare level or spare code	Congestion in the inland automatic system
Philippines	Ringing tone or busy tone; operator or recorded announcement			Operator	Ringing tone or busy tone	Busy tone; operator recorded announcement		Busy tone
Poland	Ringing tone					Ringing tone or busy tone or special information tone followed by recorded announcement		Special information tone or busy tone
Polynesia	Operator				Ringing tone or busy tone according to the fault	Ringing tone	Busy tone	
Portugal	Busy tone or number unobtainable tone	Busy tone or number unobtainable tone	Operator or busy tone for individual cases; recorded announcement in case of groups of subscribers	Service not provided	Ringing tone or busy tone	Busy tone or number unobtainable tone	Operator or busy tone or number unobtainable tone	Busy tone
Qatar	Number unobtainable tone		Operator		Number unobtainable tone			Busy tone
Roumania	"Spare line tone" or operator			Service not provided	Busy tone or ringing tone	"Spare line tone"		Busy tone
Singapore	Number unobtainable tone		Operator or recorded announcement		Ringing tone or busy tone	Number unobtainable tone		Busy tone or congestion tone
South Africa	Number unobtainable tone		Operator or recorded announcement		Ringing tone or busy tone	Number unobtainable tone		Busy tone
Spain	Special tone		Operator or recorded announcement	Operator or recorded announcement		Ringing tone	Special tone	Congestion tone

Country of destination	Ceased line	Line out of service	Changed number	Line connected to absent subscribers service	Faulty line	Spare numbers (no subscriber)	Spare level or spare code	Congestion in the inland automatic system
Swaziland	Number unobtainable tone		Operator or recorded announcement		Ringing tone or busy tone or number unobtainable tone	Number unobtainable tone		Busy tone
Sweden	Operator or information tone or recorded announcement with information tone				Ringing tone, busy tone or information tone or recorded announcement with information tone	Operator, or recorded announcement with information tone or information tone		Congestion tone or no tone
Switzerland	Operator or recorded announcement			Operator	Ringing tone		Busy tone	
Suriname	Service not provided				Busy tone or ringing tone	Ringing tone or information tone	Recorded announcement or busy tone	Busy tone
Syria	Ringing tone. Operator (proposed)	Number unobtainable tone	Operator or ringing tone or recorded announcement	Ringing tone. Operator (proposed)	Ringing tone		"Barred level" tone	Busy tone
Tanzania	Number unobtainable tone		Operator		Number unobtainable tone			Busy tone
Uganda	Number unobtainable tone		Operator		Number unobtainable tone			Busy tone
USSR	Ringing tone – recorded announcement proposed		Operator or recorded announcement proposed	Recorded announcement proposed	Busy tone or ringing tone	Ringing tone	Recorded announcement proposed	Busy tone

Country of destination	Ceased line	Line out of service	Changed number	Line connected to absent subscribers service	Faulty line	Spare numbers (no subscriber)	Spare level or spare code	Congestion in the inland automatic system
United Kingdom	Number unobtainable tone		Operator or recorded announcement	Call answered by an operator or a private answering service or a call transferred to another subscriber	Number unobtainable tone or busy tone	Number unobtainable tone		Equipment engaged tone or recorded announcement
United States	Operator or recorded announcement *		New number from operator or recorded announcement *	Recorded announcement	Operator or recorded announcement	Operator or recorded announcement *	Operator or recorded announcement	Recorder (congestion) tone or recorded announcement
	* In many cases, the recording is followed by cut-through to an operator							
Uruguay	Ringing tone			Operator	Ringing tone or busy tone	Ringing tone	Busy tone	
Yugoslavia	Ringing tone; exceptionally special information tone		Normally ringing tone; exceptionally, operator or recorded announcement		Ringing tone or busy tone	Ringing tone; exceptionally special information tone	Busy tone or special information tone	Busy tone
Zambia	Number unobtainable tone	Number unobtainable tone or information tone	Operator or special information tone	Service not provided	Ringing tone or busy tone	Number unobtainable tone		Congestion tone

Supplement No. 5

MODELLING OF AN EXPERIMENTAL TEST DESIGN FOR THE DETERMINATION OF INEXPERIENCED USER DIFFICULTIES IN SETTING UP INTERNATIONAL CALLS USING NATIONALLY AVAILABLE INSTRUCTIONS, OR TO COMPARE DIFFERENT SETS OF INSTRUCTIONS

During the Study Periods 1973-1977 and 1978-1980, a method was developed for identifying the most important difficulties encountered by inexperienced subscribers in dialing their own international calls. The same method was then shown to be a good way to compare the effectiveness of different sets of instructions.

A full description of this method can be found in Supplement No. 5 in the *Red Book*, Volume II, Fascicle II.2 published by the CCITT in 1985.

Supplement No. 6

PREPARATION OF INFORMATION TO CUSTOMERS TRAVELLING ABROAD

Considering that some Administrations have found it desirable to provide information, usually in the form of a pamphlet, for the guidance of their customers who are planning to travel abroad, it is suggested that such information should include:

i) information enabling the visitor to identify suitable payphones from which international telephone calls may be made in those countries where not all payphones afford international call facilities;

ii) operating procedure for payphones in the country visited including dialling instructions for automatic calls, with an example of the composition of the digits to be dialled, i.e. international prefix, country code, trunk code (if necessary) and subscriber's number. Special reference should be made to unfamiliar procedures and particularly to the need to omit the trunk prefix used in the destination country;

iii) reference to the possibility that unfamiliar tones and recorded announcements may be encountered (see Annex A to Recommendation E.121 which gives guidance in identifying such tones);

iv) an indication when an additional dialling tone may be encountered and definition of the point in the dialling sequence at which it must be awaited;

v) description of the paid-time expiration warning signal.

Other useful information that may be considered desirable for inclusion is the following:

a) time differences between home country and the country to be visited;

b) the advantage of writing down the required international telephone number before starting the call to minimize the risk of a dialling error;

c) information on how the traveller may be called from his home country.

Methods by which pamphlets may be distributed include provision of supplies at airport departure lounges, through telecommunications publicity, information points and travel agencies.

It should be noted that no evidence is yet available to indicate whether the production of pamphlets does or does not contribute to the successful completion of international telephone calls.

DESCRIPTION OF INMARSAT EXISTING AND PLANNED SYSTEMS

1 Standard A system

The INMARSAT Standard A communications system has enabled INMARSAT to provide maritime communications following the organization's inception in February 1982. The primary function of the Standard A system is to provide telephone, telex and some data services together with distress and safety-related traffic.

1.1 The Standard A system consists of the following major elements in an ocean region:

a) the network coordination (NCS);

b) coast earth station (CES);

c) ship earth station (SES); and

d) the space segment.

1.1.1 Three network coordination stations are provided in the Standard A system, one in each ocean region, managing central resources such as allocating traffic channels on a demand assigned basis and coordinating signalling and control traffic.

1.1.2 Each coast earth station serves as a gateway to and from the terrestrial network to ship earth stations within the coverage area of the satellite. The types of terrestrial network interfaces at a coast earth station are provided at the discretion of the coast earth station operator.

1.1.3 The ship earth station interfaces the CES via the space segment at L-Band, and consists of two portions: above-deck equipment and below-deck equipment. The above-deck equipment consists of an antenna with stabilization and automatic steering equipment enabling the antenna beam to remain pointed at a satellite, regardless of course and ship movements. The below-deck equipment consists of an antenna control unit, communications electronics used for transmission, reception, access control and signalling, and telephone and teleprinter equipment. Optional equipment for low-speed data, high-speed data, facsimile, etc., can be installed with the below-deck equipment. Before joining the Network, SESs have to successfully complete the prescribed commissioning tests.

1.1.4 The space segment consists of three operational satellites, one in each ocean region, together with three spare satellites provided on a 1-for-1 basis. The operational satellites are in a geostationary orbit and provide global coverage up to 75° latitude.

1.2 The satellite channels needed to establish communication services and associated signalling in the Standard A system are described below:

1.2.1 *Common TDM carrier*

The common TDM carrier (or common signalling channel) is transmitted by the NCS and is received by all CESs amd SESs in the respective ocean region for the reception of signalling messages from the NCS.

1.2.2 *Coast earth station TDM carrier*

Each coast earth station transmits a TDM carrier at a frequency which is uniquely associated with the station. The TDM carrier carries signalling messages to the NCS and telegraph channels to ship earth stations. Twenty-two 50-baud telex channels and an out-of-band signalling channel are time-division multiplexed on the TDM carrier in the shore-to-ship link.

1.2.3 *Ship earth station TDMA channel*

There is a ship-to-shore TDMA channel, paired to the CES TDM carrier, for the corresponding ship-to-shore twenty-two 50-baud channels. SESs transmit their telex channels in bursts in this channel, with burst timing derived from the "unique word" in the CES TDM carrier.

1.2.4 *Request channels*

Request messages are transmitted by ship earth stations as random access bursts. Each coast earth station monitors the two ship-to-shore channels and processes only those call requests addressed to it.

1.2.5 *FM/SCPC channels*

Frequency modulated single channel per carrier channels are used for the transmission of voice, data and analog and digital facsimile. Telephone channels are assigned on demand by the network coordination station.

1.2.6 *High Speed Data (HSD) channels*

High-speed 56 kbit/s data transmission is also possible, but in the ship-to-shore direction only, from specially equipped SESs to specially equipped CESs.

1.3 The following services are provided by each CES:

a) telephone calls on a ship-to-shore, shore-to-ship and ship-to-ship basis; the channels may be used for facsimile or data at the user's discretion;

b) telex calls on a ship-to-shore, shore-to-ship and ship-to-ship basis;

c) optional services which may be provided at the discretion of the respective CES operator:

i) group calls, i.e., calls to groups of SESs, using only a shore-to-ship channel (telephony or telegraphy). The SESs in the group may be selected on the basis of:

- national identity,
- fleet,
- ocean area,
- similar interest;

ii) high-speed data 56 kbit/s ship-to-shore direction only.

2 Standard B system

2.1 The Standard B system has been designed to provide more efficient utilisation of satellite power and bandwidth resources for INMARSAT's mainstream services (telephone and telex), to provide digital data services, and to provide the capability of fulfilling future maritime ISDN service requirements.

2.2 The Standard B system consists of the following major elements in an ocean region, in addition to the satellites:

a) the network coordination station (NCS);

b) coast earth stations (CESs); and

c) ship earth stations (SESs).

2.2.1 Three network coordination stations are provided in the Standard B system, one in each region, managing central resources such as SCPC traffic channels when demand assigned operation is used, and coordinating signalling and control traffic.

2.2.2 Each coast earth station provides the interface between the terrestrial network and the mobile ship earth stations within the coverage area of the satellite. Coast earth stations operate at C-band (although an L-band capability is also required for NCS signalling purposes). The terrestrial network interfaces provided at CESs are at the discretion of each CES operator.

2.2.3 The mobile ship earth station interfaces with the CES via the space segment at L-band; multi-channel ship earth stations are planned as an addition to the baseline system.

2.3 SESs wishing to operate in a particular ocean region do not have to register with a particular CES on a log-on/log-off basis once they have met the requirements of the commissioning tests. All relevant SES and service information is provided to the CES during initialisation signalling procedures.

2.4 The satellite channels used for communication services and signalling in the Standard B system are described below:

2.4.1 *Voice (V) channels* are single-channel-per-carrier (SCPC) digital channels supporting a voice coding rate of 16 kbit/s with Adaptive Predictive Coding (APC). These channels also support voice band data (including facsimile) up to 2400 kbit/s information rate, and sub-band signalling (for service address and, in the future, ISDN signalling).

2.4.2 The *Data (D) channel* is an SCPC digital channel supporting a data information rate of 9.6 kbit/s. These channels also support Group 3 facsimile and sub-band signalling.

2.4.3 *CES TDM channel* are used to carry CES signalling messages to SESs, including channel assignments, telex (ITA2) and data (IA5 asynchronous) at 300 bit/s information rate.

2.4.4 *NCS TDM channels* are used to carry NCS signalling messages to SESs and CESs including call announcements and channel assignments and Bulletin Board information so that additional or alternate signalling channels can be implemented to meet operational needs.

2.4.5 *SES TDMA channels* are used to carry SES telex (ITA2) or data (IA5) at 300 bit/s information rate.

2.4.6 *SES Request channel (SESRQ)* is a random access (Aloha) channel used to carry SES signalling information, specifically the request signals which initiate a ship-originated call transaction to CESs (including satellite spot-beam identification).

2.4.7 *SES Response channel (SESRP)* provides SES signalling information to CESs, specifically the SES response information required to facilitate a shore-originated call (including satellite spot-beam identification).

2.4.8 *CES/NCS Inter-Station Signalling channel (ISS)* enables signalling information to be exchanged between CESs and NCSs for call and network management purposes.

2.5 The following services are available at each CES:

a) telephone calls on a ship-to-shore, shore-to-ship and ship-to-ship basis;

b) telex calls on a ship-to-shore, shore-to-ship and ship-to-ship basis;

c) broadcast of shore originated telephone or telex calls when addressed with any of the following:

- the SES's unique mobile ship earth staion number,
- an "all ships" identity,

- a national identity,
- a fleet group identity,
- a general group identity;

d) voice band data services, including facsimile;

e) digital data services, including Group 3 facsimile.

2.6 Further services determined in the future for ISDN applications will be added as a feature of this system once they have been clearly defined.

3 Standard C system

3.1 The Standard C communications system has been designed allowing the operation of the smallest ship earth station in the INMARSAT system and thus enabling the smallest vessels to avail themselves with satellite communications. Its primary communications function is text and data transmission to and from ships. It has been designed to interface with the International Telex Network on a store-and-forward basis as well as a range of terrestrial data networks. It is also able to carry an oceanwide broadcast only service known as the Enhanced Call group (EGC).

3.2 The Standard C system consists of the following main elements in an ocean region:

a) the network coordination station (NCS);

b) coast earth station (CES); and

c) ship earth station (SES).

3.2.1 Three network coordination stations are initially provided in the Standard C system, one in each ocean region, managing central resources such as traffic channels and coordinating signalling and control traffic.

3.2.2 Each coast earth station serves as a gateway to and from the terrestrial network to ship earth stations within the coverage area of the satellite. The types of terrestrial network interfaces at a coast earth station are a national matter.

3.2.3 The ship earth station consists of a DTE which provides the user interface and a DCE which provides the interface to the satellite network. In the ship-to-shore direction, a message is formatted in the DTE and then transferred to the DCE for transmission. In the shore-to-ship direction, the DCE receives the complete message from the radio channel before passing it to the DTE. The mobile ship earth station may be equipped for access to marine safety information carried by the enhanced group call service, or a separate receive-only terminal for EGC calls may be used. Using the distress priority message, a ship operator may transmit a ship-to-shore distress alert. Upon receipt of this message, the addressed coast earth station will immediately provide confirmation of the message being received. This distress alert message provides the ability to include the position of the vessel. A ship earth station wishing to operate in a particular ocean region must log in to the NCS in that region.

3.3 The Standard C system consists of 5 main channel types which are described below.

3.3.1 The *NCS common channel* is transmitted continuously by the NCS. All mobile ship earth stations registered as operational in a particular ocean region must tune to this channel when not engaged in message transfer. This channel provides the following functions: message announcements, message confirmations, frequency reference for all ship earth stations and EGC message transmission.

3.3.2 *NCS-CES signalling links* pass information between the NCS and CESs concerning the operational status of the network. This link is used to transfer EGC messages from a CES to the NCS for subsequent transmission on the NCS common channel. It also relays signalling information to ship earth stations and CESs.

3.3.3 *Message channels* are used by SESs to transfer their message traffic to a CES. The message channel is assigned by the CES.

3.3.4 *Signalling channels* are used by SESs to transmit signalling information to a CES. Each CES has one or more of these channels assigned to it.

3.3.5 The *NCS-NCS signalling channel* is an inter-ocean-region data connection between the three NCSs. This link is used for updating SES log-in status.

3.4 The following services are provided on a mandatory basis by each CES:

a) store-and-forward telex;

b) Enhanced Group Call message handling and distress message handling.

4 Aeronautical system (Initial system)

4.1 The INMARSAT aeronautical satellite communications system will provide two-way voice and data communications for aircraft operating within the coverage area of a set of geostationary satellites. Since the system capabilities will evolve with time, the initial set of capabilities and functions are designated "Initial system". The additional capabilities and functions which may be added due to traffic demand and technological evolution will form the "Enhanced system".

4.2 The Aeronautical system consists of the following major elements in an ocean region:

a) the network coordination station (NCS);

b) the aeronautical ground earth station (GES); and

c) the mobile aircraft earth station (AES).

4.2.1 Network coordination stations will be provided as part of the "Enhanced system" to manage central resources such as allocating traffic channels on a demand assigned basis. Due to the limited number of GESs involved in the initial aeronautical system the provision of NCS facilities has not been considered necessary.

4.2.2 Aeronautical ground earth stations interface to and from the terrestrial network to mobile aircraft earth stations within the coverage area of a specific satellite. The types of terrestrial network interfaces at the GES are provided at the discretion of the GES operator.

4.2.3 The mobile aircraft earth station (AES) interfaces with the space segment at L-band, and interfaces within the aircraft with the Aircraft Communications Addressing and Report System (ACARS) and other data equipment and with aircraft crew and passenger voice equipment.

4.3 An AES wishing to operate in a particular ocean region must register with a GES in the Initial system. The procedure known as the log-on/log-off of an AES provides the GES with the ability to manage the number of AESs receiving one forward P-Channel (Pd) and transmitting on each R-Channel (Rd), thus controlling the queueing delays and burst collision probabilities. Provision exists in the Initial system for the log-on handover of a particular AES to another GES which may work to a different satellite ocean region. The handover can be initiated on an automatic or manual basis depending on the type of AES and the specific requirements of the aircraft at that time.

4.4 The aeronautical Initial system is configured with the following main channel types:

4.4.1 *P-channel (ground earth station-mobile aircraft earth station)*

The P-channel is a TDM channel which is used to provide system management and medium speed data services in the ground-to-air direction. Once the AES has logged on, it is directed to tune to this P-channel over which both system management information and other data can be passed. In the Initial system, the communication links between GESs in the same ocean area will be by means of P channels.

4.4.2 *R-channels (mobile aircraft earth station-ground earth station)*

The R-channels are a set of randpm access channels which are used for log-on, system management and some short user messages.

4.4.3 *T-channels (mobile aircraft earth station-ground earth station)*

The T-channel which is a TDMA channel is used to pass longer messages from the aircraft.

4.4.4 *C-channel (ground earth station-mobile aircraft earth station)*

The C-channels are established and cleared by circuit switching signalling procedures, to provide voice traffic capabilities between the GES and AESs. The channel format allocates the bulk of the channel capacity for circuit switched voice or data service, and also provides a low-rate "sub-band" channel for signalling and some data.

4.4.5 *NCS-GES links*

Plans to provide NCSs under the Enhanced system will require the provision of NCS-GES channels which will be based on the P-channels used for inter-GES communications in the Initial system.

4.5 The four main application areas for the Aeronautical system are:

i) air traffic services;

ii) aeronautical operations control;

iii) aeronautical administrative communications;

iv) aeronautical passenger communications.

The availability of a particular service in a given area will be dependent upon the facilities offered by the respective GESs.

4.5.1 Voice services in the Initial system will be primarily in the air-to-ground direction and will enable passengers and air crew to set up telephone calls through GESs which offer the telephony service.

4.5.2 For data, connection mode and connectionless mode, open systems interconnection (OSI) network layer services will be provided, based on a connectionless link layer protocol. Circuit mode data service may be provided as an option.

4.5.3 Telex service will be available as an option in the aeronautical system.

ISBN 92-61-03261-3