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## Foreword

This ETSI Technical Report (ETR) has been produced by the Network Aspects (NA) Technical Committee of the European Telecommunications Standards Institute (ETSI).

This ETR is the result of the work performed during the period September 1993 to February 1994 by ETSI Project Team 40V. The background for the ETR is that the Commission of the European Communities (DGXIII/DI) mandated ETSI to produce a report and a work plan for further actions relating to call forwarding facilities.

It is important to note that this ETR applies the principle a) of the set of principles adopted by STC NA1 in the specification activity on Public Switched Telephone Network (PSTN) services:

- a) no European Telecommunication Standard (ETS) will be provided for existing PSTN services i.e. for services commercially provided and/or already specified by CEPT;
- b) for new PSTN services having no impact on generic network capabilities (User-Network Interface (UNI)), an ETR will be provided;
- c) in the case where a new service has an impact on the UNI, an ETS will be provided.

## Executive summary

This ETR gives an overview of the functionality of the call forwarding supplementary services as provided by ETSI Public Network Operators (PNOs) members.

Following analysis of the result of a questionnaire sent to all European PNOs members, a number of technical recommendations and observations are made.

Finally, a set of ETSI actions (establishment of an ETR on CFU) and the corresponding work plan are proposed.

## Introduction

Call forwarding is a general term applied to any functionality whereby a call is redirected automatically by the PNO to another user. The different forms of call forwarding are as follows:

- a) unconditional whereby all calls are redirected;
- b) on busy, whereby calls encountering busy are redirected;
- c) no reply, whereby calls which are not answered within a time period are redirected.

This ETR contains a report that identifies a set of technical recommendations and observations and areas for further investigations to be used to base further actions in ETSI.

The actions identified concern the type and status of the specification to be provided, its content and structure. The work plan associated is presented.

NOTE 1: It is assumed that the reader of this document is familiar with the call forwarding facility as mentioned above. However, further details concerning call forwarding is provided in annex B (background information).

NOTE 2: This document is structured in such a way that the subclauses in the questionnaire (annex C); the results of the questionnaire (annex E); and the synthesis have common numbering scheme. As an example, the subclause entitled "Subscriber notifications", is numbered 5.5 in the synthesis; C.5 in the questionnaire and E.5 in the results.

## 1 Scope

The Commission of the European Communities (DGXIII/D) has mandated ETSI to produce a report and a work plan related to "call forwarding facility in the fixed public telephone network".

In order for ETSI to complete this work, it was necessary to determine certain details with respect to the fixed telephone network in each of ETSI PNO member. This ETR contains a report that identifies a set of technical recommendations, observations and areas for further investigations to be used to base further actions in ETSI.

The following PSTN aspects are within the scope of PT40V:

- a) network capabilities;
- b) signalling capabilities;
- c) supplementary service provisioning;
- d) activation/deactivation/verification/interrogation;
- e) subscriber notifications;
- f) supplementary service operation/execution;
- g) interactions with the following supplementary services (of which some are currently investigated by ETSI):
  - 1) call forwarding;
  - 2) Outgoing Call Barring (OCB);
  - 3) Call Waiting (CW);
  - 4) Call Transfer (CT);
  - 5) Call Hold (CH);
  - 6) Three Party service (3PTY);
  - 7) Advice Of Charge (AOC);
  - 8) Calling Line Identification Presentation (CLIP);
  - 9) Calling Line Identification Restriction (CLIR);
  - 10) Malicious Call Identification (MCID);
- h) interworking with Integrated Services Digital Networks (ISDNs) and mobile networks.

NOTE 1: The CEPT term for call forwarding as defined in the CEPT Handbook of Services and Facilities within the Public Network, Family 7.11 [13] is outside the scope of this ETR.

NOTE 2: Operation of Terminal Equipment (TE) is outside the scope of this ETR. When reference is made to TE in this ETR, the interface between the public network and the TE is being referred to.

Issues that are outside the scope of this ETR are listed in annex F.

## 2 References

This ETR incorporates by dated and undated reference, provisions from other publications. These references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETR only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] ETS 300 121 (1992): "Integrated Services Digital Network (ISDN); Application of the ISDN User Part (ISUP) of CCITT Signalling System No.7 for international ISDN interconnections (ISUP version 1)".
- [2] ETS 300 180 (1992): "Integrated Services Digital Network (ISDN); Advice Of Charge: charging information at the end of the call (AOC-E) supplementary service; Service description".
- [3] ETS 300 199 (1994): "Integrated Services Digital Network (ISDN); Call Forwarding Busy (CFB) supplementary service; Service description".
- [4] ETS 300 200 (1994): "Integrated Services Digital Network (ISDN); Call Forwarding Unconditional (CFU) supplementary service; Service description".
- [5] ETS 300 201 (1994): "Integrated Services Digital Network (ISDN); Call Forwarding No Reply (CFNR) supplementary service; Service description".
- [6] prETS 300 334 (1995): "Integrated Services Digital Network (ISDN); Routing in support of ISDN User Part (ISUP) version 2 services".
- [7] ETS 300 356-15 (1995): "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP) version 2 for the international interface; Part 15: Diversion supplementary services [ITU-T Recommendation Q.732, clauses 2 to 5 (1993), modified]".
- [8] ETS 300 360 (1995): "Integrated Services Digital Network (ISDN); Signalling System No.7; Signalling interworking specification for ISDN User Part (ISUP) version 2".
- [9] Commission of the European Communities (1993): "Common Position on Application of ONP to Voice Telephony".
- [10] Council decision (29-07-1993) on the introduction of a single European call number: 91/396/EEC.
- [11] CEPT Handbook of Services and Facilities within the Public Network (1981): "Family 4.1; Absent subscriber service".
- [12] CEPT Handbook of Services and Facilities within the Public Network (1981): "Family 6.3; Call diversion on busy".
- [13] CEPT Handbook of Services and Facilities within the Public Network (1981): "Family 7.11; Call forwarding service".
- [14] CEPT Recommendation T/S 43-02 E (1989): "Signalling System Telephone User Part "plus" (TUP+)".
- [15] CEPT Recommendation T/SF 2 (T/CAC 02) (1992): "Subscriber control procedures for supplementary services in modern telecommunications systems".
- [16] CCITT Recommendation E.105 (1992): "International Telephone Service".

- [17] CCITT Recommendation E.131 (1988): "Subscriber control procedures for supplementary telephone services".
- [18] CCITT Recommendation E.161 (1988): "Arrangement of figures, letters and symbols on telephones and other devices that can be used for gaining access to a telephone network".
- [19] CCITT Recommendation Q.441 (1988): "Signalling code".
- [20] CCITT Fascicle VI.4 - System R2 (1988): "Specifications of Signalling System R1 and R2".
- [21] CCITT Recommendation Q.700 (1988): "Introduction to CCITT signalling System No.7".
- [22] CCITT Recommendation Q.723 (1988): "Formats and codes".
- [23] CCITT Recommendation Q.724 (1988): "Signalling procedures".
- [24] CCITT Recommendation Q.730 (1988): "ISDN supplementary services".
- [25] CCITT Recommendation Q.767 (1991): "Application of the ISDN User Part of CCITT signalling system No.7 for international ISDN interconnections".
- [26] CCITT Recommendation Q.9 (1988): "Vocabulary of switching and signalling terms".

### 3 Definitions and abbreviations

#### 3.1 Definitions

For the purposes of this ETR, the following definitions apply:

**activate:** An action which is executed by the served user to enable the supplementary service.

**A subscriber:** Originating subscriber.

**B subscriber:** Subscriber having the call forwarding supplementary service.

**basic access:** See CCITT Recommendation Q.9 [26], § 1, definition 1551.

**bearer service:** A type of telecommunication service that provides the capability for the transmission of signals between user-network interfaces.

**bearer service group:** A group of one or more ISDN bearer services.

**C subscriber:** The subscriber to which the call is forwarded.

**call forwarding served user:** The user having the call forwarding supplementary services (i.e. the B subscriber).

**deactivate:** An action which is executed by the served user to disable the supplementary service.

**flat-rate charge:** A fixed telephone charge that is independent of the call duration and may be added to the normal telephone charge.

**general provisioning:** Providing the service to the subscriber without previous arrangement between the subscriber and the PNO.

**general withdrawal:** Cancellation of the service for all subscribers with one action by the PNO.

**interrogation:** The action of the served user in checking status of the supplementary service (the status can be active or not active). This is also referred to as "interrogation: status check".

**intra-exchange:** Within the same exchange.

**inter-exchange:** Between different exchanges.

**invocation of supplementary service:** Execution of the service (e.g. when a call is forwarded).

**notification:** Indication to the subscriber indicating the status of a call.

**Open Network Provisioning (ONP):** A programme of regulation being undertaken by the Commission of the EU designated to ensure non-discriminatory access to and use of public telecommunications network.

**sequential forwarding:** When a single call is forwarded multiple times.

**served user:** The subscriber having the supplementary service. If no service is specified the call forwarding supplementary service is meant.

**trunk:** Inter-exchange line.

**trunk group:** Group of inter-exchange lines (defined by the PNO).

**verification:** Checking procedure executed by the served user on the forwarded to number. This is also referred to as "interrogation - data check".

### 3.2 Abbreviations

For the purposes of this ETR, the following abbreviations apply:

AOC	Advice Of Charge
AOC-S	Advice Of Charge: charging information at call Setup time
AOC-D	Advice Of Charge: charging information during the call
AOC-E	Advice Of Charge: charging information at the end of the call
BA	Basic Access
CFU	Call Forwarding Unconditional
CFB	Call Forwarding Busy
CFNR	Call Forwarding No Reply
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
CPE	Customer Premises Equipment
CW	Call Waiting
DDI	Direct Dialling In
DN	Directory Number (the Subscriber Number)
DTMF	Dual Tone Multi Frequency
FWDN	ForWard to Directory Number
ICB	Incoming Call Barring
ICBCF	Incoming Call Barring for Call Forwarding
IPI	ISDN Preference Indicator
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
MCID	Malicious Call Identification
MFC	Multi Frequency Code
NA	Not Applicable
NA1	Network Access Sub Technical Committee No.1
NP	Not Provided
OCB	Outgoing Call Barring
OCB-F	Outgoing Call Barring - Fixed
OCB-UC	Outgoing Call Barring - User Controlled
ONP	Open Network Provision
PBX	Private Branch eXchange
PNO	Public Network Operator

PRA	Primary Rate Access
PSTN	Public Switched Telephone Network
PT	Project Team
SDT	Special Dial Tone
SPS	Signalling Protocols and Switching
SS5	Signalling System No.5
SS7	Signalling System No.7
STC	Sub Technical Committee
TUP	Telephone User Part

## **4 Methodology**

### **4.1 General**

A "Terms of Reference" is a document produced by ETSI when a Project Team is proposed. Among others it contains: "Reasons for proposed Project Team", "Duration", "Scope of the Terms of Reference and relevant study items" and "Reference specification(s) and existing documents including member contributions". The Terms of Reference is used as an input for each Project Team.

In the terms of reference for PT40V the following is stated:

#### **3.9 Scope and terms of reference and relevant study items:**

A report including a work plan for the production of the standards and detailing the stage 2 work required shall be produced. The standards shall be based on ETSI standards, CCITT and CEPT recommendations, in particular compatibility with ISDN service description must be considered. The standards shall support call forwarding within the Community. The standards shall cover the user network interface (including invocation procedures) and also inter network interfaces".

### **4.2 Phases**

In order to cover the items as mentioned in the previous subclause, it was decided to work to the following plan:

- a) production and distribution of a questionnaire to obtain information from PNOs (or their representatives) about current implementations of PSTN call forwarding;
- b) review standards relevant to call forwarding;
- c) compilation and analysis of the completed questionnaires;
- d) production of the recommendations and work plan.

### **4.3 Production and distribution of the questionnaire**

The Heads of Delegation for all the twenty-seven ETSI member states were contacted and invited to appoint contact persons that would co-operate with the Project Team. The questionnaires were then sent to the contact persons (representing the PNOs) who were then asked to fill in and return them to the Project Team.

The objectives of the questionnaire were as follows:

- a) to obtain a good overview of call forwarding for PSTN;
- b) to identify problem areas related to call forwarding support within the community.

The questionnaire can be found in annex C of this ETR. It should be pointed out that some minor changes have been made to the questionnaires as reproduced in annex C and that these changes are only changes in presentation and style.

#### 4.4 Investigation of current standards/recommendations

The standards/recommendations mentioned in the reference clause have been investigated with special attention to the following:

- ETS 300 121 [1];
- ETS 300 199 [3];
- ETS 300 200 [4];
- ETS 300 201 [5];
- ETS 300 334 [6];
- ETS 300 356-15 [7];
- ETS 300 360 [8];
- CEPT Handbook of Services and Facilities within the Public Network, Family 4.1 [11];
- CEPT Handbook of Services and Facilities within the Public Network, Family 6.3 [12];
- CCITT Recommendation Q.441 [19];
- CCITT Fascicle VI.4 - System R2 [20];
- CCITT Recommendation Q.700 [21];
- CCITT Recommendation Q.724 [23];
- CCITT Recommendation Q.730 [24];
- CCITT Recommendation Q.767 [25];
- CEPT Recommendation T/S 43-02 [14].

## 5 Synthesis

Although it is assumed that the reader is familiar with call forwarding, a brief description of the topic is given in annex B (Background information).

The synthesis is based on answers provided by the ETSI members to the questionnaires which the PT has send out. The answers can be found in annex E.

NOTE: There are different levels of answers in annex E. It can either be a reflection of the current situation, a desired near future implementation or they may only reflect the situation supported by digital exchanges. Also, in countries where different PNOs are operating some answers could not be given because the answers are different for different PNOs.

### 5.1 Network capabilities

The purpose of investigating network capabilities is to determine the following:

- a) the support for call forwarding through the network;
- b) the interworking situations;
- c) to have a more extensive view of the interworking/interactions than indicated in current standards.



### 5.1.1 Dual Tone Multi-Frequency (DTMF) support

Activation, deactivation, verification and interrogation of a PSTN supplementary service via the TE as recommended by CEPT is carried out via DTMF digits (including the \* and # digits). This means that subscribers having rotary dial (dial pulse) equipment cannot use the procedures as defined by CEPT. In order to determine the feasibility in using the CEPT procedures, the extent to which DTMF telephone equipment is used within the ETSI member states needs to be determined.

Based on the information provided by the different member states it seems feasible to use \* and # digits for activation, deactivation, verification and/or interrogation of call forwarding. Full details concerning the answers to questions relating to these points can be found in annex E, subclause E.1.1.

### 5.1.2 Exchange support

This subclause gives an overview of the type of exchanges used in the different member states. Also indicated are call forwarding interworking aspects within the different ETSI member states.

The following exchange types are considered:

- a) exchanges supporting only PSTN;
- b) exchanges supporting only ISDN;
- c) exchanges supporting only mobile networks;
- d) exchanges supporting PSTN and ISDN;
- e) exchanges supporting PSTN and mobile networks;
- f) exchanges supporting ISDN and mobile networks;
- g) exchanges supporting PSTN, ISDN and mobile networks.

It appears that the most commonly used exchanges are the exchanges supporting only PSTN, only ISDN or only mobile, or supporting both PSTN and ISDN.

Full details concerning the answers to questions relating to these points can be found in annex E, subclause E.1.2.

### 5.1.3 Call forwarding support

In order to define standards for the call forwarding supplementary services (CFU, CFB and CFNR) the support of these supplementary services in the different member states needs to be determined.

In addition, the call forwarding support by rotary dial telephones needs to be determined, and if the support is PNO controlled and/or served user controlled.

From all returned questionnaires all but one support call forwarding. Some PNOs however can only support call forwarding to subscribers connected to a particular type of public exchange. For further details see annex E, subclause E.1.3.

### 5.1.4 ISDN support

Most PNOs within the member states support ISDN in the network. The protocols used to activate/deactivate supplementary services are both stimulus, functional and DTMF or a combination. There is a tendency however to upgrade from stimulus protocol to functional protocol.

## 5.2 Signalling capabilities

In order to know up to what extent the call forwarding supplementary services are supported it needs to be determined if call forwarding is supported by the local exchanges. In addition to have full call forwarding support (e.g. call forwarding notifications/indications to originating and forwarded to subscriber, passing of the call forwarding served user number, redirection counter etc.) it needs to be determined if the inter-exchange signalling systems which are involved in the call (from A to B forwarded to C) support the call forwarding signalling elements. The following signalling types were considered:

- a) national signalling systems;
- b) international signalling systems (and to which countries they are connected).

For each of these signalling systems, it was determined whether the following was supported:

- 1) call forwarding indication;
- 2) call forwarding supplementary service type indication (CFU, CFB, CFNR);
- 3) call forwarding redirection counter;
- 4) call forwarding served user number;
- 5) operator indication.

The following signalling systems were investigated:

- c) signalling system No.7 with questions relating to the use of the following user parts:
  - 1) Telephone User Part (TUP);
  - 2) ISDN User Part (ISUP);
- d) signalling system R2.

NOTE: There are different recommendations on TUP (TUP, TUP+) and different versions of ISUP standards (ISUP version 1 and ISUP version 2).

The reasons for choosing these signalling systems are as follows:

- signalling systems No.7 and R2 are the only commonly used signalling systems within the member states that supports call forwarding information;
- most international calls within the member states make use of signalling system No.7 or R2;
- signalling system No.7 and R2 cover a large amount of the traffic within the member states.

The following subclauses describe the support of the signalling systems related to the call forwarding support and what information is supported in the forward and backward direction.

### **5.2.1 Signalling system No.7**

For a general description of the signalling system No.7, see CCITT Recommendation Q.700 [21].

For the call forwarding aspects of the telephone user part see CCITT Recommendation Q.724 [23], § 10.4.

For details about call forwarding support by ISUP see ETS 300 356-15 [7].

NOTE 1: CEPT Recommendation T/S 43-02 [14] does not contain any reference to call forwarding, call diversion or redirection of calls.

NOTE 2: ETS 300 121 [1] does not support call forwarding.

Within the scope of this ETR the information related to call forwarding carried forward (to the call forwarding destination exchange) and passed backwards (to the call forwarding served user exchange and the originating exchange) of the Telephone User Part (TUP) and the ISDN User Part (ISUP) need further attention.

The next subclasses indicate the call forwarding information that is recommended to be passed. This however does not mean that the signalling systems in use by the different PNOs also support the call forwarding elements. The tables in subclause E.2 indicate that in general there is no support of call forwarding elements on the international interfaces.

#### **5.2.1.1 Telephone user part**

For a general description of the telephone user part see CCITT Recommendation Q.724 [23] and for a description of TUP+ see CEPT Recommendation T/S 43-02 [14].

#### 5.2.1.1.1 Information carried forward

CCITT Recommendation Q.724 [23] describes the signalling procedures. CCITT Recommendation Q.723 [22] however, does not support all information elements described in CCITT Recommendation Q.724 [23].

When a call has undergone diversion, the CCITT recommend (in CCITT Recommendation Q.724 [23]) that the following information is set (by the served user exchange) in the Initial Address Message (IAM) to be forwarded to exchange:

- a) the redirection information:
  - 1) redirected call indicator;
  - 2) redirection of calls information prohibited indicator (not supported by CCITT Recommendation Q.723 [22]);
- b) the original called number - this is equal to the number that was called;
- c) the called party number;
- d) the redirecting number - this is equal to the number that is doing the diversion and is in this case equal to the original called number (not supported by CCITT Recommendation Q.723 [22]).

In the forward direction the (CCITT Recommendation Q.724 [23]) Telephone User Part (TUP) does not support:

- e) the redirection counter;
- f) the redirection reason (CFU, CFB, CFNR).

#### 5.2.1.1.2 Information passed backward

The CCITT recommend (in CCITT Recommendation Q.724 [23]) that the destination exchange will send an Address Complete Message (ACM) to the call forwarding served user exchange which includes:

- a) the call forwarding indicator;
- b) the redirection of calls information prohibited indicator (not supported by CCITT Recommendation Q.723 [22]).

In the backward direction the (CCITT Recommendation Q.724 [23]) Telephone User Part (TUP) does not support:

- c) the redirection counter;
- d) the redirection reason (CFU, CFB, CFNR);
- e) the redirection served user number.

NOTE: Telephone user part does not support sequential forwarding (see CCITT Recommendation Q.724 [23], § 10.4.2.1 and § 10.4.2.2). Therefore, there is no need to support the redirection counter.

### 5.2.1.2 ISDN user part

#### 5.2.1.2.1 Information carried forward

The following part, up to and including table 1, is taken from ETS 300 356-15 [7], subclause 9.6.1.2.

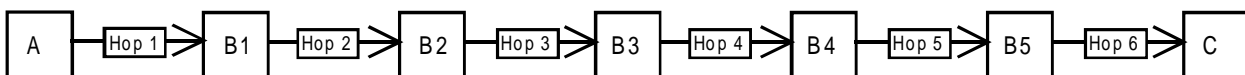
When it is the first diversion the call has undergone, there are five parameters to be set; the redirection information, the called party number, the original called number, the redirection number and the ISUP preference indicator. Their values are set as follows:

- a) the redirection information:
  - 1) the redirection counter is set to one;
  - 2) the redirection reason (set according to the diversion conditions);
  - 3) redirecting indicator (set according to the diversion conditions).
- b) the original called number - this is equal to the number that was called;
- c) the called party number - this is equal to the number that was called;
- d) the redirection number - this is equal to the number that is doing the diversion and is in this case equal to the original called number;
- e) the ISUP preference indicator - if the value "ISDN user part not required all the way" was received the ISUP preference indicator is modified to "ISUP preferred all the way", otherwise the ISUP preference indicator is left unchanged.

When this is the second or greater diversion the call has undergone, there are three parameters to be set; the redirection information, the called party number and the redirection (served user) number. Their values are set as follows:

- f) the redirection information - the redirection counter is increased by one; the redirection reason and redirecting indicators are set according to the diversion conditions;
- g) the redirecting number - this is equal to the number that is doing the redirection;
- h) the called party number - this is equal to the number that the call is to be diverted to.

When multiple diversion occur the parameters are set as in table 1. Figure 1 shows the scenario.



**Figure 1: Scenario**

A originally calls B1 and then multiple diversions occur as shown in figure 1.

The information carried in the Initial Address Message (IAM) is shown in table 1.

**Table 1: Information carried in IAM**

	Hop 1	Hop 2	Hop 3	Hop 4	Hop 5	Hop 6
<b>Number information:</b>						
Called party number	B1	B2	B3	B4	B5	C
Redirecting number		B1	B2	B3	B4	B5
Original called number		B1	B1	B1	B1	B1
<b>Redirection information:</b>						
Redirection counter		1	2	3	4	5
Redirection indicator		V	V	V	V	V
Redirection reason		W	W	W	W	W
Abbreviations:						
V	Value based on one of the following: - call diversion; - call diversion all redirection information presentation restricted.					
W	Value based on one of the following: - user busy; - no reply; - unconditional; - deflection during alerting; - deflection immediate response.					

However, as a PNO option it can be specified if signalling system No.7 inter-exchange lines will provide the call forwarding information. As an example, on international inter-exchange lines the call forwarding information may not be provided. CCITT Recommendation Q.767 [25] as well as ETS 300 121 [1] specifies that the call forwarding services are not available in the international signalling network. ETS 300 356-15 [7] specifies that the call forwarding signalling elements will be carried forward/passed backwards.

For more details see: CCITT Recommendations Q.724 [23], Q.730 [24] and Q.767 [25] and ETS 300 356-15 [7].

**5.2.1.2.2 Information passed backward**

When a call is diverted with reasons CFU or CFB the diverting exchange shall send an Address Complete Message containing the following information:

- a) the call diversion information (according to the notification subscription options of the served user and the redirection reason);
- b) the redirection number;
- c) the generic notification indicator is set to "call is diverting".

The backward call indicators will carry no called party's status.

In case of CFNR (before no reply timer time-out) an Address Complete Message is returned to the originating exchange with:

- a) a backward call indicator parameter with no indication of the called party's status field;
- b) an optional backward call indicator parameter with the indication "call diversion may occur".

When a call is diverted with reason CFNR (after no reply time-out) the following is passed backward in the Call Progress (CPG) message:

- a) the call diversion information (according the notification subscription options of the served user and the redirection reason);
- b) the redirection number;
- c) the generic notification indicator is set to "call is diverting".

The backward call indicators will carry no called party status.

For more details about diversion supported by ISUP, see ETS 300 356-15 [7].

### **5.2.2 Signalling system R2**

Signalling system R2 is sometimes referred to as "Multi Frequency Code (MFC)" signalling. For a general description of the signalling system please see CCITT Fascicle VI.4 - System R2 [20].

R2 specifications are listed in CCITT Recommendation Q.441 [19]. The version numbers of national signalling systems are PNO dependant and a particular version number of signalling system R2 can have different meanings for different PNOs.

For R2 different signal types are defined:

- a) line signalling;
- b) inter-register signalling.

The line signalling (also called supervisory signalling) can be both analogue (see CCITT Recommendation Q.411 - Q.416 [20]) and digital (see CCITT Recommendation Q.421 - Q.430 [20]) and provides general information about the status of the call (e.g. Idle, Seized, Answered, Clear Forward, Clear-back, Release, Blocked). Within the scope of this ETR, this does not need further attention. Inter-register signalling however can be applicable for call forwarding support.

The inter-register signalling is active before a speech path from originating to terminating subscriber is established, i.e. a subscriber is not able to hear or influence the signalling protocol.

Two different types of inter-register signals can be identified:

- a) forward signals:
  - 1) group I forward signals: first signals transmitted on R2 link (e.g. called party number and on international signalling, language and country code);
  - 2) group II forward signals: calling party category signals (e.g. subscriber with/without priority, maintenance equipment, operator) in reply to backward signal A-3 or A-5;
- b) backward signals:
  - 1) group A backward signals; required to acknowledge forward signals or request the next forward signal;
  - 2) group B backward signals; Last backward signal, indicating the result of the inter-register signalling (e.g. B subscriber is idle and to be charged, out of service, busy, connection not possible).

Below the "group II forward" and "group A backward" signals as defined in tables 7 and 8 respectively, of CCITT Recommendation Q.441 [19], are listed.

**Table 2: Table 7/Q.441 "group II forward signals"**

Designation of the signal	Meaning of the signal	Remarks
II-1	Subscriber without priority	National
II-2	Subscriber with priority	National
II-3	Maintenance equipment	National
II-4	Spare	National
II-5	Operator	National
II-6	Data transmission	National
II-7	Subscriber (or operator without forward transfer facility)	International
II-8	Data transmission	International
II-9	Subscriber with priority	International
II-10	Operator with forward transfer facility	International
II-11	Spare for national use	
II-12	Spare for national use	
II-13	Spare for national use	
II-14	Spare for national use	
II-15	Spare for national use	

**Table 3: Table 8/Q.441 "group A backward signals"**

Designation of the signal	Meaning of the signal
A-1	Send next digit (n+1)
A-2	Send last but one digit (n-1)
A-3	Address-complete, changeover to reception of group B signals
A-4	Congestion in the national network
A-5	Send calling party's category
A-6	Address-complete, charge, set-up speech conditions
A-7	Send last but two digits (n-2)
A-8	Send last but three digits (n-3)
A-9	Spare for national use
A-10	Spare for national use
A-11	Send country code indicator
A-12	Send language or discriminating digit
A-13	Send nature of circuit
A-14	Request for information on use of an echo suppresser (is an incoming half-echo suppresser required?)
A-15	Congestion in an international exchange or at its output

Not all PNO's use the signalling tables as recommended by CCITT. In addition, because of the different usage of the spares by different PNOs, even PNOs that do follow the CCITT recommendations may have different implementations of the national and international versions of signalling system R2.

#### 5.2.2.1 Call forwarding indication

As the table of "group II forward signals" indicates, CCITT does not have a category defined indicating that the call is forwarded (as a notification to the forwarded to exchange). The spares (II-11 to II-15) however can be used for this purpose. Different PNOs however may use the spares in a different ways. Inter-exchange signalling between different operating companies should have a mutual agreement on all signals. This also applies to international exchanges.

NOTE: Because of the number of spares it would theoretically be possible to use three categories for CFU, CFB and CFNR to indicate the forwarding condition (as in the ISDN user part of signalling system No.7). However, in that case PNOs will have to give up two or three other categories (which may already be in use).

In addition the group A backwards signals do not support a call forwarding indication, i.e. the originating exchange is not notified of the fact that the call is forwarded if R2 signalling is used.

Call failing reasons from call forwarding can be mapped to specific group B signals, for example "connection not possible" for a detected loop.

#### **5.2.2.2 Number identification**

The request of the identity of the calling user (or call forwarding served user) is not defined in the group A backwards signals. As a service provider option also here a spare can be used. Some examples of implementations are:

- a) A-10 (defined as spare by CCITT) is used for number identification;
- b) A-5 is used to identify the category, A subsequent A-5 (directly following previous) is interpreted as number identification request. A-5 will be repeated until the calling party number is complete.

As a service provider option, on request of the identity by the forward destination exchange the following situations can occur (A calls B and is forwarded to C):

- a) the A identity is provided; or
- b) the B identity is provided.

In addition some PNOs have the facility to provide both the A and the B identity, for example. via repeated A-10, to provide the B identity. A subsequent A-10 sequence (directly following the previous) will provide the A identity. Both the provisioning of the ID and which ID is however a PNO option. For international exchanges bilateral agreement is required.

As with signalling system No.7, between international exchanges no call forwarding is supported.

Identification of a calling party number (A or B) may take up to two seconds. For satellite connections it may even take up to 4 - 5 seconds.

#### **5.2.3 Selection of signalling system and user part.**

PSTN calls may select both R2 and signalling system No.7 trunks. ISDN calls may select both the ISDN user part or the telephone user part (for all bearer services) or any other signalling system (e.g. R2) for speech and 3,1 kHz calls but not 64 kbit/s.

In cases where a voice call uses TUP and the destination exchange determines that the call should be forwarded, the ISUP preference indicator can be set to "ISUP preferred all the way" e.g. when the B party is ISDN. The A-B part of the call remains using TUP.

Information about the maintenance of the different signalling systems indicate that most member states where SS7-TUP is supported will upgrade it to SS7-ISUP (annex E, subclause E.2.3). This indicates that the call forwarding support by the signalling system (SS7-ISUP) will increase, provided that the signalling system is compliant with standards ETS 300 356-15 [7].



#### 5.2.4 Signalling recommendations

The following aspects are considered:

a) disallowed destinations:

In the situation where call forwarding is provided on a national basis with only national call forwarding destinations, PNOs have the possibility to block certain destinations from being used as a call forwarding destination (e.g. emergency numbers, operators) because of a (more or less) fixed and known number plan for these type of calls. See also subclause 5.4.4.

When a subscriber is allowed to activate call forwarding to a number in an other member state, (in the current situation) no checks on the forward to number can be done at activation time. With the possibility to access operator/assistance service and directory enquiry services in other member states (see the terms of reference of PT41V: "Intra-Community access to operator/assistance services and to directory enquiry services") a call forwarding served user may/can activate call forwarding to destinations which are disallowed destinations in the network the call is forwarded to.

b) Interworking:

For PSTN calls it is not recommended to provide call forwarding notification to the calling user nor the call forwarding destination user (see subclauses 5.5.1 and 5.5.3). However, in the situations where the calling user and/or the call forwarding destination user is an ISDN subscriber, the call forwarding information is desired, e.g. to provide the notifications to the calling user and/or call forwarding destination user.

NOTE 1: Although no forwarding notifications are sent to the calling user for PSTN calls, the calling user may perceive that call forwarding has occurred, e.g. when a CFNR call meets busy at user C.

c) Sequential forwarding:

In order to:

- limit the number of sequential forwarding (see subclause 5.7.1.1) within the member states;
  - prevent looping of call forwarding between 2 different networks (e.g. A calls B1 in network X which forwards to B2 in network Y which forwards back to B1 etc.),
- the call forwarding information (redirection counter) needs to be passed.

NOTE 2: Some exchanges have the facility to prevent looping of call forwarding independent from the signalling support, for example by checking if another call for this subscriber is in build up phase and if so disallow a second forwarding request. In those cases the second issue does not apply.

d) ISUP preference indicator

Currently there are 2 ISUP version defined by ETSI, ISUP version 1 (ETS 300 121 [1]) and ISUP version 2 (ETS 300 356-15 [7]). The ISUP preference indicator specifies if the call requires or prefers the ISDN user part. Because there are now two ISUP versions it is not clear which version is preferred or required. It is even possible that because of interactions with multiple supplementary services that one service prefers ISUP version 2 while an other service requires ISUP version 1 or ISUP version 2.

e) The call forwarding service as described in the stage one standards (ETS 300 199 [3], ETS 300 200 [4] and ETS 300 201 [5]) mentions notifications to calling and forwarded to subscriber, limitations to the number of sequential forwarding, interactions with CLIP etc. Because inter-exchange functions are required to support these issues the stage 3 standards should (signalling functions) support these issues. Currently ETS 300 356-15 [7] specifies the support of these signalling issues for the international ISDN interface. However, the national signalling systems involved should also give this support. There is, however, no standard for national signalling systems to support these stage 3 aspects. In addition in the light of ONP (where different PNOs are allowed to within one country) standardization of the national signalling systems is desired.

Based on the issues mentioned in a), b) c), d) and e) above, the following proposal is suggested:

### Recommendation 1

a)	When an exchange determines that a call to an analogue user should be forwarded, the ISDN user part of signalling system No.7 should be selected (if available) and the ISUP preference indicator set to "ISUP preferred all the way". For international interfaces the ISDN user part version 2 would normally be selected. As an alternative (e.g. if the ISDN user part is not available) the telephone user part should be selected.
b)	When a forwarded call uses signalling system No.7, all call forwarding information that is available should be passed to the national and international exchanges involved.
c)	When two different signalling systems interwork, all call forwarding information supported by both signalling systems should be passed.
d)	The call forwarding indicator as is used in R2 by some PNOs can be specified as a service provider option. Since there are no ETSI standards for R2, there is no need to update or modify any standards relating to this.
e)	An investigation should be carried out as to whether it is possible to clarify or modify the use of the ISUP preference indicator with respect to the different versions of ISUP.
f)	An investigation should be carried as to whether it is feasible to have standards for national signalling systems or whether to extent the scope of ISUP version 2 to become a standard for national signalling systems.
NOTE 1:	With the increasing usage of the ISDN user part of signalling system No.7 the support of call forwarding information through the network will also increase.
NOTE 2:	ETS 300 334 [6], subclause 5.3.3 states that for calls originated in the PSTN the ISUP Preference Indicator (IPI) should be set to: "ISUP not required". A proposed solution would be to modify this standard to include that an analogue forwarded call (although originated in the PSTN) may set the IPI to "ISUP preferred all the way" (see also recommendation 1e).
NOTE 3:	ETS 300 199 [3], ETS 300 200 [4] and ETS 300 201 [5] specify notifications indications provided to the originating and terminating user when a call is forwarded, as well as a limitation on the number of sequential forwarding. This however is only feasible if the signalling system involved supports the call forwarding elements associated with these issues. It is suggested to evolve these ETSs to reference the inter exchange network capabilities.

## 5.3 Supplementary service provision and withdrawal

### 5.3.1 Provision

There are two ways of making a supplementary service available to a subscriber, as follows:

- a) via general provisioning (sometimes also referred to as "general availability");
- b) by prior arrangement with the PNO.

### 5.3.2 Withdrawal

There are three ways a PNO can withdraw a supplementary service from being used by the subscribers:

- a) general withdrawal;
- b) withdrawal of all generally provided services;
- c) individual withdrawal (also referred to as individual inhibition).

NOTE: As a telecommunication option withdrawal can be for all call forwarding supplementary services together or per supplementary service, i.e. CFU can be generally withdrawn (from the whole office) while CFB can only be withdrawn for a particular user.

### 5.3.3 Accessibility of call forwarding to subscribers

A supplementary service is only accessible to a subscriber if it is generally or individually provided and it is not generally or individually withdrawn.

In addition the service may be restricted from being used from particular subscribers (e.g. it may be desirable to restrict PBXs from using the generally provided call forwarding to prevent a malicious PBX subscriber from activating generally provided call forwarding unconditional which disables all incoming calls for the PBX).

### 5.3.4 Provisioning/withdrawal recommendation

Based on the answers provided by the different PNOs (see annex E, clause E.3 for more details) the following has been observed:

#### Observation 1

a)	All call forwarding supplementary services provided by the PNOs are provided on a prior arrangement basis and/or on a general provisioning basis.
b)	All call forwarding supplementary services provided by the PNOs to a particular subscriber can be withdrawn by the PNOs upon request of that subscriber.
c)	All individual subscribers are able to use the call forwarding supplementary service(s), (either via prior arrangement or via generally provisioning) provided there are no conflicts in the subscribers subscription options (e.g. illegal interactions).

### 5.4 Activation, deactivation, verification and interrogation

CCITT specifies three different code schemes for supplementary telephone services (see CCITT Recommendation E.131 [17]). They are:

- a) AT&T code scheme (USA);
- b) CEPT code scheme (Europe);
- c) NTT code scheme (Japan).

These code schemes are shown in table 4.

Table 4

	AT&T	CEPT	NTT
Without SI.	* or 11, NN	* or # NN(N)	1 or # NN (SDT N) #
With SI	* or 11 NN SDT SI (#)	* or # NN(N) * SI #	1 or # NN (SDT N) * SI (#)
Abbreviated dialling	N(N) #	N(N) # or ** N(N)	* NN
Abbreviations: N = a digit; SI = supplementary information; SDT = second dial tone; (...) = not always used; * = "star" button of telephone set as defined in CCITT Recommendation E.161 [18]; # = "square" button of telephone set as defined in CCITT Recommendation E.161 [18].			
NOTE: In the AT&T and NTT scheme customers are permitted to dial digits 11 and 1 respectively, or *. to access the service. This can be used for rotary dial telephones.			

## Recommendation 2

a) the CEPT code schemes should be used for call forwarding services using DTMF signalling.

NOTE: At the termination of PT40V, PT50V "Assessment and definition of a harmonised minimum Man-Machine Interface (MMI) for accessing and controlling telecommunications services" was still active. They investigate activation/deactivation/verifications/interrogations procedures as part of the human interfaces.

### 5.4.1 Procedures

#### 5.4.1.1 Activation

When a supplementary service is accessible for a subscriber (see subclause 5.2) the service needs to be activated in order to invoke or operate it. For most of the supplementary services (including call forwarding), activation is carried out from the subscribers terminal equipment (usually a telephone or a PBX) using a predefined protocol/procedure. The exchange will inform the subscriber the result of the activation request. This can be achieved by providing the subscriber with a tone or announcement.

Activation protocols/procedures defined/recommended by CEPT (CEPT Handbook of Services and Facilities within the Public Network, Family 4.1 [11] and Family 6.3 [12]):

CFU	*21*DN#
CFB	*67*DN#
CFNR	*61*DN#

#### 5.4.1.2 Deactivation

To disable the call forwarding service (i.e. to prevent it from being invoked) the subscriber can deactivate the service using similar procedures as for activation. The exchange will inform the subscriber the result of the deactivation request. This can be achieved by providing the subscriber with a tone or announcement.

Activation protocols/procedures defined/recommended by CEPT (CEPT Handbook of Services and Facilities within the Public Network, Family 4.1 [11] and Family 6.3 [12]):

CFU	#21#
CFB	#67#
CFNR	#61#

#### 5.4.1.3 Verification

If a subscriber wants to verify the supplementary information associated with a supplementary service, a predefined protocol/procedure (including the supplementary information required to be verified) can be used. The exchange will give an indication to the subscriber indicating if the supplementary information entered in the protocol was correct.

CEPT does not define any verification procedure for call forwarding.

#### 5.4.1.4 Interrogation

If a subscriber wants to interrogate the exchange to determine the status (active/not active) of the supplementary service, a predefined protocol/procedure can be used. The exchange will give an indication to the subscriber indicating if the supplementary service was active or not active.

Interrogation protocols/procedures defined/recommended by CEPT (CEPT Handbook of Services and Facilities within the Public Network, Family 4.1 [11] and Family 6.3 [12]):

CFU	*#21#
CFB	*#67#
CFNR	*#61#

**5.4.1.5 Activation/deactivation/verification/interrogation recommendation**

The following procedures are recommended:

**Recommendation 3**

The following code scheme in line with CEPT is recommended:				
	<b>activation</b>	<b>deactivation</b>	<b>verification</b>	<b>interrogation</b>
<b>CFU</b>	*21*DN#	#21#	*#21*DN#	*#21#
<b>CFNR</b>	*61*DN#	#61#	*#61*DN#	*#61#
<b>CFB</b>	*67*DN#	#67#	*#67*DN#	*#67#
NOTE 1:	The interrogation and/or verification procedure can be provided as a service provider option.			
NOTE 2:	It is recommended to do further investigation on the harmonization of activation, deactivation, verification and interrogation procedures as specified in CEPT Recommendation T/SF 2 (T/CAC 02) [15].			

The reasons for this recommendation are as follows:

- a) based on the information provided by the ETSI members in the questionnaires they are the most commonly used procedures (see clause E.4);
- b) the CEPT Recommendation is followed.

**5.4.2 Acknowledgement**

When a subscriber successfully activates/deactivates/verifies/interrogates a supplementary service via a predefined procedure, the result of this request will be notified to the served user. This can be a tone or an announcement or even silence (and for ISDN this can also be a display message). Annex E, subclause E.4.6 gives an overview of the notifications provided by the exchanges of the PNOs.

The following has been observed:

**Observation 2**

When a subscriber successfully activates/deactivates/verifies/interrogates the call forwarding supplementary service, one or both of the following indications can be provided to the subscriber:	
a)	confirmation tone (see note);
b)	an announcement including one or more of the following: <ul style="list-style-type: none"> <li>- the result of the request (e.g. "your instruction has been executed");</li> <li>- status indication (e.g. active/activated/not active/deactivated);</li> <li>- the supplementary service; general (e.g. call forwarding) or specific for CFU, CFB, CFNR;</li> <li>- the forwarded to number.</li> </ul>
NOTE:	PNO announcements are normally in the language of the country in which the PNO operates (plus other languages in some cases). It is recommended that as part of the harmonisation of voice telephony services that all tones within the ETSI member states are standardised.

### 5.4.3 Overwrite

#### 5.4.3.1 Activation overwrite

Activation overwrite is a term applied when a subscriber activates a supplementary service while it is already active. For call forwarding this means that the subscriber is changing the forward to number without a need to deactivate the service first. Currently as a PNO option the request may be treated as one of the below:

- successful: the forward to number is modified, success notification is provided and the subscriber is charged for this (provided the subscriber was also charged for a normal activation);
- unsuccessful: a failure indication is provided and the subscriber is not charged for the activation overwrite request.

Based on the answers provided by the PNOs (see annex E, subclause E.4.7) the following has been observed:

#### Observation 3

Activation overwrite is in most cases treated as successful, provided that the forwarded to number is an allowed forwarding destination (see subclause 5.4.4.3).
--

#### 5.4.3.2 Deactivation overwrite

A subscriber can enter the deactivation procedure from the TE while the service is not active (i.e. there will be no status change for the supplementary service). In this case, as a PNO option, the deactivation request may either be treated as one of the below:

- successful: success notification is provided. Whether or not the subscriber is charged for the deactivation request is an issue which is left to the PNO;
- unsuccessful: a failure indication is provided and the subscriber is not charged for the deactivation request.

#### Observation 4

Deactivation procedure of call forwarding when not active is in most cases treated as successful.
---

### 5.4.4 Call forwarding destination restrictions

Certain restrictions on the forward to destination number may apply, and this is normally determined by one or both of the following:

- a) destination restriction list;
- b) forward to number screening.

#### 5.4.4.1 Destination restriction list

In order to prevent users from malicious use of the supplementary service certain numbers are restricted from being used as a forward to destination. The destination restriction list is a list of numbers to which call forwarding is prohibited. As an example, the list may contain the emergency services numbers (e.g. police, ambulance and fire services).

Based on the replies from the PNOs and the fact that national numbering plans are being viewed as a national matter no recommendation about standardization of a destination restriction list is made.

#### 5.4.4.2 Forward to number screening

The forward to number screening will restrict call forwarding to certain type of numbers. This can either be to prevent a user from using a wrong DN, or inhibit users from access to certain destinations. Examples of DNs that may be restricted, are as follows; Invalid DNs, served user DN (own DN), Operator Destinations and International Destinations.

Based on the fact that there is no common way of screening on the forwarded to number when activating call forwarding, the following has been observed:

##### Observation 5

The implementation/usage of the forward to number screening is a PNO option. The PNO however may allow activation of CFU to a destination within the ETSI member states unless the particular DN is on the destination restriction list or the call is restricted due to another screening option. This also applies to CFB and/or CFNR when provided by the PNO.

#### 5.5 Subscriber notifications

This subclause describes the notifications provided to the PSTN subscriber when a call is forwarded. For notifications provided to ISDN subscribers see ISDN call forwarding standards (CFB, ETS 300 199 [3], CFU, ETS 300 200 [4] and CFNR, ETS 300 201 [5]). For interworking of PSTN with ISDN see subclause 5.2. There may be some restrictions on the support of the notifications to the originating and forwarded to subscriber. The reason is that the originating and/or forward to subscriber may not be in the same exchange as the call forwarding served user and the inter exchange lines used for this call do not support the call forwarding indications. For more information see subclause 5.2.

##### 5.5.1 Originating user notifications

When a call from A (originating user) is forwarded via B (served user) to C (forward to user), the A subscriber can receive a notification that the call is forwarded.

Based on the returned questionnaires where the majority of the PNOs did not provide the originating user notification, the following has been observed:

##### Observation 6

As a PNO option the originating analogue subscriber can receive a notification that a call is forwarded. In most cases the subscriber does not receive a notification.

##### 5.5.2 Served user notifications

###### 5.5.2.1 Reminder notification

When a served user has activated call forwarding, subsequent notification that the service is active may be received when the subscriber originates a call. This gives the subscriber the opportunity to deactivate the service if required. As a PNO option, the reminder notification may be received, on the following basis:

- a) per call forwarding served user;
- b) per call forwarding supplementary service (CFU, CFB, CFNR).

Based on the returned questionnaires where the majority of PNOs did not provide a reminder notification to the served user, the following has been observed:

##### Observation 7

The analogue call forwarding served user can receive a reminder notification when originating a call if CFU is active. Special dial tone is the most commonly used reminder notification. Whether the reminder treatment is provided for CFB and/or CFNR is a PNO option.

### 5.5.2.2 Forwarding notification

In addition to the reminder notification the served user may also get a notification when a call is forwarded (e.g. via a short ring). It should be noted that this notification only applies to call forwarding unconditional. When CFB applies, no ringing will be provided, and when CFNR applies, the phone has already been ringing during the no reply timer. As a PNO option, the reminder notification may be received, on the following basis:

- a) per call forwarding served user;
- b) per call forwarding supplementary service (CFU, CFB, CFNR).

Based on the returned questionnaires where non of PNOs provide the call forwarding notification to the call forwarding served user the following has been observed:

#### Observation 8

The analogue call forwarding served user may not be notified when the call is forwarded.

### 5.5.3 Forwarded to user notifications

The forwarded to user may get a notification that the call terminated at the TE is a forwarded call. This can e.g. be a special ringing cadence. As a PNO option, the forwarding to user notification may be received, on the following basis:

- a) per call forwarding served user;
- b) per call forwarding supplementary service (CFU, CFB, CFNR).

Based on the returned questionnaires where non of PNOs provide a forwarding notification to the forward to user the following has been observed:

#### Observation 9

In most cases, the analogue forwarded-to user is not notified that the call is a forwarded call.

## 5.6 Supplementary service operation

This subclause contains the following aspects of supplementary service operation:

- a) no reply timer;
- b) charging;
- c) simultaneous forwarding;
- d) served user number passing;
- e) forwarding notifications.

### 5.6.1 No reply timer

For supplementary service call forwarding on no reply the call is only forwarded if the served user does not answer the phone within the no reply time. The following aspects of the timer were considered:

- a) default on no reply timer;
- b) range and interval for timer for the exchange;
- c) range and interval for timer per subscriber.



Based on the answers provided the following has been observed:

#### Observation 10

When call forwarding on no reply is provided by the PNO (either via generally provisioning or prior arrangement) the default "on no reply timer" is either 15, 20 or 30 seconds. As a PNO option the "on no reply timer" for a particular subscriber may be changed in response to a subscriber request.

### 5.6.2 Charging

#### 5.6.2.1 Forwarded calls

For a forwarded call, the charges can be split up into charges for each leg, as follows:

- a) the call from originating subscriber to the call forwarding served user;
- b) the call from the call forwarding served user to the forward to destination.

Based on the answers to the questionnaire the following has been observed:

#### Observation 11

a)	The originating subscriber is charged for the call to the call forwarding served user;
b)	The call forwarding served user is charged for the call from served user to the forward to destination. As a PNO option, if the forward to destination is in the same area as the call forwarding served user no charges should apply.

Because charging issues are left to the PNO and not reflected in ETSSs, no recommendation is made concerning the update of any ETSSs.

#### 5.6.2.2 Additional charging

Charging may apply for the following:

- a) Activation of call forwarding;
- b) deactivation of call forwarding;
- c) verification of call forwarding;
- d) interrogation of call forwarding;
- e) the time call forwarding is in an active state;
- f) every usage of call forwarding (usage sensitive charging);
- g) flat rate charging (fixed amount).

See annex E, subclause E.6.2 for the above mentioned charging details. It shows that different PNOs have a different view on how to charge for call forwarding.

Because charging issues are left to the PNOs and are not reflected in ETSSs, no updates of ETSSs are needed with respect to charging issues related to activation, deactivation, verification, interrogation, the time call forwarding is in an active state, usage sensitive charging or flat rate charging.

### 5.6.3 Simultaneous forwarding

When a subscriber has call forwarding active to C, a call from A1 to B will be forwarded to C. If during this call a new call is offered at B the call can also be forwarded. Because the forwarding to subscriber is associated with a directory number simultaneous forwarding can only occur when the forwarded to number has multiple telephones associated with it (for example a PBX). There may however be a limit on the number of simultaneous forwarded calls for one served subscriber.

### Observation 12

The limit on the number of simultaneous forwarded calls is one in most cases.

NOTE: It is suggested to do more investigation (both for PSTN and ISDN) in this area to meet the requirements, for example for subscriber on a PBX. In ISDN this issue is even more complicated because the ISDN standards allow feature provisioning per ISDN-access and per ISDN number. It may need to be determined if the number of simultaneous forwarding apply to the access or to the ISDN number.

#### 5.6.4 Served user number passing

When a call is forwarded the exchange of the B subscriber may provide the ID of the B subscriber to the C exchange. The following options apply:

- a) the B ID is not provided;
- b) the B ID is always provided;
- c) the B ID is provided depending on the call forwarding subscriber subscription option.

Based on the answers in the returned questionnaires (see annex E, subclause E.6.3) the following has been observed:

### Observation 13

As a PNO option the passing of the call forwarding served user number should be a subscriber option.

The B DN is only be provided if the call forwarding served user subscription option (if available to the subscriber) indicates that this is allowed and if one of the following applies:

- a) the C subscriber is in the same exchange; or
- b) the C subscriber is in an other exchange and the signalling system involved/selected supports passing of the call forwarding served user number (see also Recommendation 1).

#### 5.6.5 Forwarding notifications on display

Based on the answers in the returned questionnaires (see annex E, subclause E.6.3) the following has been observed:

### Observation 14

Forwarding notifications displayed at the analogue forwarding to destination is a PNO option.

#### 5.7 Supplementary service interactions

Only a few PSTN supplementary services are currently under study by ETSI.

##### 5.7.1 Call forwarding

###### 5.7.1.1 Sequential forwarding

When an exchange determines that it must forward a call, it first checks to see if forwarding the call would result in the call exceeding the number of diversions allowed within the network. The following applies:

- a) if the forwarding limit is not reached the call is forwarded to the forwarding to number;
- b) if the forwarding limit has been reached the call will not be forwarded. If the last party involved had CFB, the call will be cleared. If the last party has CFU or CFNR, the call will either be:
  - 1) cleared;
  - 2) left in its current state (ringing in the case of CFNR) or to be presented to the last forwarding user (CFU). This is to avoid having a confusing sequence of tones and announcements at the calling user. This is recommended by CCITT Recommendation Q.730 [24], § 6.3.2.2.

The ISDN standards should be followed in this matter (see subclauses 6.3.3 of ETS 300 199 [3], ETS 300 200 [4] and ETS 300 201 [5] and the above mentioned CCITT Recommendation):

**Recommendation 4**

a)	The maximum number of diversion permitted for each call is a PNO option with an upper limit of five diversions. When counting the number of diversions, all types of diversion are included. (As in ISDN standards).
b)	If the limit has been reached: <ul style="list-style-type: none"> <li>- the call should be cleared if no call forwarding on no reply supplementary service has been invoked previously;</li> <li>- if call forwarding on no reply supplementary service has been invoked previously, the call should terminate back to the (last) diverting on no reply user.</li> </ul>
c)	If the limit in the network of a destination PNO has been exceeded (e.g. because the limit in the destination network is lower than in the call forwarding served user network) the destination exchange should not abandon the call but attempt to terminate to the forwarded to subscriber. If the forwarded call in the destination network also meets the forwarding condition the call will be handled according to the issue mentioned at b) in this recommendation. Investigation whether this should be included in the existing ISDN call forwarding standards is suggested.
d)	If the maximum number of diversions permitted for each call is one and B2 has activated call forwarding, the call shall be presented to the last served user (user B1).

**5.7.1.2 Call forwarding priorities**

In addition to the number of simultaneous forwarding the priority between the different call diversion supplementary services needs to be determined. When a subscriber has both CFU (to DNcfu) and CFB (to DNcfb) active (provided the PNO allows both services to be active at the same time) and the subscriber is busy, which call forwarding supplementary service must be executed. As an example: to what forward to number will the call be forwarded, the DNcfu or the DBcfb?

**Recommendation 5**

If a subscriber has both CFU and CFB active, the CFU supplementary service should take priority. This indicates that if the served user is busy and an incoming call meets both the CFU and CFB forwarding conditions the call will be forwarded to the CFU forward to subscriber, provided that the limit of sequential forwarding has not been reached.
---

**5.7.2 Outgoing call barring**

If the call forwarding served user also has outgoing call barring, two interactions apply:

- 1) the subscriber activates call forwarding from the TE and the forwarding to destination meets the OCB blocking criteria;
- 2) the subscriber has both call forwarding and outgoing call barring and the forward to destination meets the OCB blocking criteria.

Annex E, subclause E.7.2 contains the answers provided by the contact persons.

**Recommendation 6**

a)	When a subscriber has outgoing call barring active and tries to activate the call forwarding supplementary service, the forwarded to directory should be checked against the outgoing call barring blocking criteria. If the destination meets blocking criteria the activation request should not be successful and the subscriber should receive a negative indication. In which case no charges should be applied to the served user.
b)	If a subscriber has both outgoing call barring and call forwarding active and a call to the call forwarding subscriber meets the call forwarding conditions the call should be forwarded to the forwarded to number regardless if the number meets the outgoing call barring blocking criteria (e.g. if OCB is activated after call forwarding).

### 5.7.3 Call waiting

The following interactions apply:

#### 5.7.3.1 Interactions CFU and call waiting

If a subscriber has call waiting and CFU and the subscriber is involved in a stable call, the following options apply if a new call comes in:

- a) the call will be forwarded;
- b) the call will be offered as a waiting call.

#### 5.7.3.2 Interactions CFB and call waiting

If a subscriber has call waiting and CFB and the subscriber is involved in a stable call, the following options exist if a new call comes in:

- a) the call will be forwarded;
- b) the call will be offered as a waiting call.

#### 5.7.3.3 Interactions CFNR and call waiting

If a subscriber has call waiting and CFNR and the subscriber is involved in a stable call, the following options exist if a new call comes in:

- a) call waiting takes priority (the call will be offered as a waiting call) and will not be forwarded after the on no reply timer times out;
- b) the call will be offered as a waiting call and when the on no reply timer times out, the call will be forwarded;
- c) the call will directly be forwarded.

#### 5.7.3.4 Call waiting recommendations

Based on the current ISDN standards and the answers in the returned questionnaires, the following is recommended:

#### Recommendation 7

When a subscriber has both call waiting and call forwarding the following priorities should apply:	
CFU	CFU takes priority, call will be forwarded;
CFB	CW takes priority, the call will be offered as a waiting call. If the waiting queue is full, CFB should be invoked;
CFNR	call should be offered as a waiting call, if the CFNR timer expires before the waiting call is accepted then the CFNR supplementary service should be invoked, the call should be forwarded and call waiting ceased.

#### 5.7.4 Call transfer

Because those PNOs which support call transfer allow interactions with call forwarding the following is recommended:

##### Recommendation 8

The call transfer supplementary service should have no impact on the call forwarding supplementary service or vice versa, i.e. neither supplementary service should affect the operation of the other supplementary service. This indicates that a forwarded call can be transferred and a call from a subscriber having call transfer can be forwarded after which the original called party is transferred to the forward to destination.

#### 5.7.5 Call hold

The following interactions are applicable for a call hold supplementary service subscriber (provided the subscriber is registered for the call hold supplementary service):

- a) a subscriber involved in a normal two party call, puts the party on hold and dials a new DN which has call diversion active;
- b) subscriber A calls subscriber B which has call forwarding on no reply and puts the party on hold while it is ringing and before the on no reply timer is expired.

To cover the situation in a) and b) above, the following is recommended.

##### Recommendation 9

The call hold supplementary service should have no impact on the call forwarding supplementary service or vice versa, i.e. neither supplementary service should affect the operation of the other supplementary service. This indicates that a call from a subscriber having the call hold supplementary service (while one party on hold) can be forwarded and that a forwarded call can be put on hold by a call hold subscriber.

#### 5.7.6 Three party service

The following interactions are applicable for a three party service subscriber (provided the subscriber is registered for three party service):

- a) a subscriber involved in a normal two party call, puts the party on hold and dials a new DN which has call diversion active;
- b) subscriber A calls subscriber B which has call diversion on no reply and puts the party on hold while it is ringing and before the on no reply timer is expired.

To cover the situation in a) and b) above, the following is recommended.

##### Recommendation 10

Three party service should have no impact on the call forwarding supplementary service or vice versa, i.e. neither supplementary service should affect the operation of the other supplementary service. This indicates that a call from a three party service subscriber (while one party on hold) can be forwarded and that a forwarded call can be put on hold by a three party service subscriber.

#### 5.7.7 Advice of charge

When a subscriber has advice of charge at the for last call and issues an AOC request, the charging information that could be expected to be provided could relate to, as follows:

- a) a forwarded call that is charged;
- b) an activation/deactivation request of call forwarding.

Only the last call charge activity originated by the AOC subscriber is actually provided. So in situation a) above, the forwarded charge activity will not be reported, and in b) above, the activation/deactivation/interrogation request will be reported to the AOC served user.

The reason for this is that the call forwarding activity was not initiated by the subscriber (but by a subscriber calling the served user) and may thus not be aware of this. A charging report indicating the charging of a forwarded call is confusing for the subscriber. In addition it may cause problems when a forwarded calls which is still in progress as a charge amount for this call, up to that time, may be reported. In addition a subscriber may have multiple forwarded calls in progress (simultaneous forwarding). This indicates that the charge activity could be any of the forwarded calls.

The activation/deactivation/interrogation request is initiated by the subscriber and can thus not cause any confusion.

NOTE 1: If a PNO does not charge the subscriber for an activation/deactivation/verification request of call forwarding is not charged a zero value should be returned to the AOC served user.

NOTE 2: In the annexes you will find answers for AOC at call Setup (AOC-S), AOC During call (AOC-D) and AOC at the End of call (AOC-E). AOC for last call is not included, and is not the same service as AOC-E.

### Recommendation 11

When a subscriber issues a AOC for last call request, only the last charge activity as a result of the AOC served user action should be reported to the served user.

The following list indicates what report the served user can receive under certain conditions:

- a) a forwarded call: this will not be reported to the user.
- b) a (de)activation request: the charging for this activity will be reported; if the action is not charged the served user would receive a zero value.

Because there is no PSTN analogue standards for AOC for last call this recommendation does not need to be reflected in a standard yet.

### 5.7.8 Calling line identification presentation

The following interactions apply:

- a) a call from A is forwarded via B to C (having the CLIP supplementary service). It is necessary to know which DN is displayed at C. Either only user A's number or only user B's number is displayed;
- b) a call from A is forwarded via B1 to B2 to C (having the CLIP supplementary service). It is necessary to know what information will be provided to the C, the B1 and the B2 subscriber.

The following recommendation addresses the issues in a) and b):

### Recommendation 12

When a call has been forwarded and the forwarded to user has been provided with the calling line identification presentation supplementary service, the forwarded to user should receive the number of the original calling user, if this calling user has not subscribed to or invoked the calling line identification restriction supplementary service. As a PNO option the forwarding served user number may also be displayed at the forwarding to destination if the forwarding user does not subscribe to an option not to release the number.

### 5.7.9 Calling line identifications restriction

The following interactions apply:

- a) a call from A having CLIR is forwarded (via B) to the C subscriber having CLIP. It is necessary to know what indication will be provided to the C subscriber, either "no indication" or "A has CLIR";
- b) a call from A is forwarded via B, having CLIR to C having CLIP. It is necessary to know whether the notification on the display of C indicates that B has CLIR.

The following recommendation addresses the issues in a) and b):

#### Recommendation 13

When the calling line identification restrictions have been invoked by any user (A or B), the related user's number should not be presented to the called user (B or C), unless this user has an override capability, where override operates on the calling number only, not on the forwarding number.

### 5.7.10 Malicious call identification

The following interactions apply:

- a) a call from A is forwarded via B to C and C issues a MCID request. It is necessary to know which subscriber identities will be registered, the A, the B or both;
- b) a call from A is forwarded via B1 and B2 and Bn to C and C issues a MCID request. It is necessary to know which subscriber identities are registered, the A, B1, Bn or a combination of them.

Based on the answers in returned questionnaires; and the current standards describing call forwarding interactions with MCID, the following is recommended:

#### Recommendation 14

For the interactions between MCID and call forwarding, the interactions subclauses as specified in the ISDN call forwarding ETSS (ETS 300 199 [3], ETS 300 200 [4] and ETS 300 201 [5]) should be observed:

"The malicious call identification supplementary service can be invoked for a forwarded call. In addition the normal operation of the malicious call identification supplementary service, the identity of the first diverting user should be registered and, as a network option, the last diverting use can be registered.

Once forwarding has taken place, the forwarding user cannot invoke the malicious call identification supplementary service."

### 5.8 Interworking

Based on the answers on the interworking questions, where all PNOs allow call forwarding interworking between all network types (PSTN, ISDN and Mobile) supported by the PNOs, the following is recommended:

#### Recommendation 15

A call from either PSTN, ISDN or Mobile network to a PSTN subscriber having a call forwarding supplementary service should be allowed to be forwarded to a forwarding destination in either the PSTN, ISDN or mobile network within the community, provided that the forwarding destination is an allowed forward to destination.

## 6 Actions and work plan

### 6.1 Actions

Considering that:

- call forwarding services are already available in most European countries;
- international call forwarding, especially CFU, is allowed by a number of countries;
- call forwarding services have been described by CEPT in the CEPT SF handbook (subclause 4.1), and the existing services description can still be used for the PSTN;
- call forwarding services have also already been specified for ISDN within the auspices of ETSI,

the provision of an ETS for call forwarding services is not supported by STC NA1.

However, in order to allow existing call forwarding services to be enhanced and possibly harmonized, three possible types of actions have been identified:

- a) to take the CEPT specification as the reference for further action without establishment of an ETSI specific text;
- b) to establish a document based on the application of the CEPT specification in the existing European context, i.e. by complementing the CEPT specification by extra ETSI application document;
- c) to establish an ETR based on an autonomous service description.

The following actions are proposed:

#### **Action 1**

STC NA1 shall establish an ETR based on the CEPT specification. This ETR will consist of a general services description (simplified stage 1) based on a set of basic requirements.

#### **Action 2**

STC NA1 will define the content and the structure of the simplified stage 1 (e.g. using the STC NA1 Guideline document).

#### **Action 3**

Only general considerations on interactions with other supplementary services will be provided based on the content of the relevant CEPT specifications.

#### **Action 4**

Charging aspects will not be considered (out the scope of the ETR).

#### **Action 5**

Based on the recommendations and observations of this ETR and on the proposed ETR relating to the call forwarding service description, relevant ETSI STCs should examine possible evolution (enhancement) of associated network capabilities.



## 6.2 Work plan

Assuming that the provision of an ETR would be required then:

- a) the provision on an ETR on call forwarding unconditional should be ensured with the highest priority;
- b) the creation of the corresponding work item should be approved by TC NA;
- c) a rapporteur should be appointed;
- d) the approval of the ETR at the STC NA1 level would be scheduled for one year after the inclusion of the work item in the STC NA1 work program has occurred;
- e) the appropriate liaison with the ETSI STCs concerned would be established.

## Annex A: Country/PNO exceptions and problem areas

### A.1 Country/PNO exceptions

Based on the returned questionnaires the following PNO additional options are identified to be acceptable because they are not in conflict with other recommendations made in this ETR but are an addition to them.

#### Observation 15

Country Code(s)	Table reference	Exception
N	E.13 E.14 E.15	An optional served user number preceded by a "*" for the activation/deactivation procedures by the served user. This is used when programming from a line group or PBX e.g. *21*DN[*SUN]# and #21[*SUN]#
S	E.14, E.15	The use of CFB and CFNR to a number of destinations in a predefined list. When the call is not answered at one forwarded to number, the call is offered at the next number in the list.
S	E.14, E.15	A served user procedure to change the time a call will be provided to the forwarded to user, before it is offered to the next subscriber in the forwarded to list.

### A.2 Problem areas

The following issues have been identified as (potential) problem areas:

- a) the ETSI mandate on voice telephony specifies: "The standards shall support call forwarding within the Community". However, how does the local exchange discriminate between European/ETSI international forwarding destinations and other international destinations? The local exchange analyses the digits and determines that the call is international. The country code however is not always analyzed in the local exchange. Therefore the local exchange does not know if the number is European or not. Even when the country code is analyzed in the local exchange than it usually determines the route it should take. There is no data in the switch available indicating what the final destinations is;

NOTE: Not all country codes of the European countries start with a 3 or 4, examples are San Marino: 295, Faroe Islands: 298 and Turkey: 90.

- b) how should the network prevent subscribers from activating call forwarding to a destination in an other network where that destination is a prohibited call forwarding destination e.g. operators, and emergency numbers. The following options apply:
- 1) allow activation of call forwarding to these destinations. (There does not seem to be a valid reason why subscribers would like to forward to these destinations.)  
 In addition, when the call forwarding information is supported by the signalling systems involved between the call forwarding served user exchange and the forwarded to destination exchange, the destination exchange may disallow termination of a forwarded call when required;
  - 2) define all inhibited international destinations as a restricted number within all exchanges. This can become easier if e.g. the standards operator numbers are used within all ETSI member states;
  - 3) before accepting the activation request, make a (pseudo) call to the international number and verify if the number is an disallowed destination. This however may not feasible because of signalling limitations, resources used to set up the international (pseudo) call etc.

Option 1 is identified as being most feasible as a short term solution (see also subclause 5.4.5.2);

- c) signalling support for the call forwarding indication, call forwarding counter, call forwarding supplementary service, call forwarding served user number. As an example, ETS 300 121 [1] (ISUP V1) does not support call forwarding while ETS 300 356-15 [7] (ISUP V2) does support this. See also note 3 of recommendation 1 (subclause 5.2.4);

- d) the ETSI MANDATE- VOICE TELEPHONY Item: BC-T-175-C1 specifies under subclause "GENERAL": "The standards shall specify which party is responsible for each charge element associated with the facility." Although NA1 stands for "User interfaces services and charging", charging is outside the scope of NA1 because this is left to each network operator. Where should the charging aspects be documented?;
- e) tones/announcements when activating/deactivating/verifying/interrogating CF in other networks may not always be clear for the subscriber. (Is the tone indicating success/failure of the request, what does the announcement tell a subscriber if it is in an other language?). See also note of observation 2.

## Annex B: Background information

Call forwarding is a general term applied to any functionality whereby a call is redirected automatically by the service provider to any other user. The different forms of call forwarding are as follows:

- a) unconditional, whereby all calls are redirected;
- b) on busy, whereby calls encountering busy are redirected;
- c) no reply, whereby calls which are not answered within a time period are redirected.

The service can be available to users connected to the public network.

The following convention is used:

<b>A subscriber</b>	the originating subscriber;
<b>B subscriber</b>	the subscriber having the call forwarding supplementary service (also referred to as the call forwarding served user);
<b>C subscriber</b>	the call forwarding destination subscriber.

NOTE: For multiple sequential forwardings the B subscribers are specified as B1, B2 etc. In other words, if the call forwarding destination (C) of the B subscriber also has call forwarding, The B subscriber is referred to as B1, and the call forwarding destination of B1 as B2. Only the final destination is referred to as the C subscriber.

A typical call forwarding scenario is shown in figure 2.

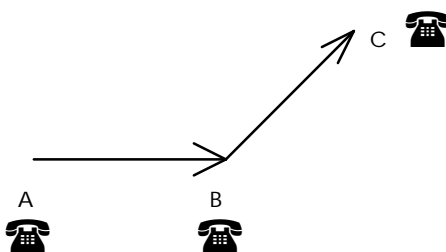


Figure 2

In this scenario A calls B. The B subscriber has call forwarding to C active. If the call meets the forwarding condition, the call will be forwarded:

<b>CFU</b>	all calls will be diverted;
<b>CFB</b>	only when B is busy calls will be diverted;
<b>CFNR</b>	call will start ringing at B first. If the call is not answered (by B) within a specific time, the call will be forwarded to C.

For sequential forwardings the scenario is shown in figure 3.

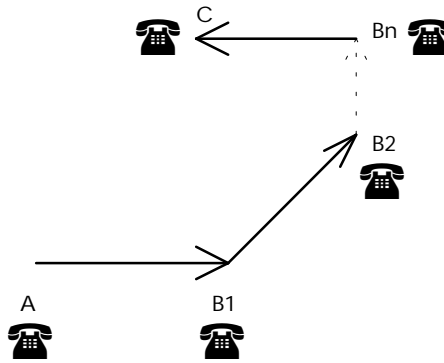


Figure 3

As a public network operator (PNO) option the service can be provided after prior arrangement between subscriber and PNO or via general provisioning. The PNO however may also have an option to withdraw the service (per subscriber or for the whole exchange).

When the service is provided to a user the user may activate/deactivate/verify/interrogate the service from the TE using a predefined digit sequence (e.g. \*21\*DNc# to activate the service to DNc).

For call forwarding specific notifications may be provided to calling - , served - , and forwarded to user (e.g. an announcement: "call is forwarded"). This, however, is a PNO option and the notifications to calling and forwarded to user depend on the call forwarding support of the signalling systems involved in the call.

Several service interactions may apply. The interactions can be:

- a) the B subscriber has multiple services active (e.g. call forwarding and call waiting) and a priority needs to set to determine which service to execute;
- b) the A or C subscriber has a feature which may interact with call forwarding. (e.g. when the C subscriber has MCT).

Depending on the PNO it can be possible that the A and/or the C subscriber is not an analogue subscriber. In that case the term "interworking" is used.

In addition the A and/or the C subscriber may not be an analogue subscriber and also has a supplementary service which interacts with call forwarding. (e.g. the C subscriber has CLIP). In that case the term "interworking interaction" is used. This however is outside the scope of this ETR.

## Annex C: Questionnaire

In this annex the questions that were sent to the contact person in each of the countries, to be filled out by the relevant PNOs are listed. The questions were sent in a questionnaire. Based on the first answers received additional clarification was given and additional questions were asked. These aspects are incorporated in the original questionnaire. Some clauses (e.g. forward, scope and how to fill in the questionnaire) are not included in this annex.

At the beginning of the questionnaire, the person who answered the questions is asked to fill in the following details:

Name:	
Company:	
Address:	
Country:	
Telephone number:	
Facsimile number:	
Date:	
Companies representing:	

### C.1 Exchange aspects

#### C.1.1 DTMF support

##### C.1.1.1 Support by network

Are Dual Tone Multi Frequency (DTMF) telephones supported in the network?

- No  
 Yes

##### C.1.1.2 DTMF users

Please specify/estimate up to what extent the PSTN users have DTMF telephones?

.....% of the PSTN users have DTMF telephones.

#### C.1.2 Exchange support

What type of exchanges are supported in your network (tick all that apply)?

- Exchanges supporting only PSTN  
 Exchanges supporting only ISDN  
 Exchanges supporting only Mobile  
 Exchanges supporting both PSTN and ISDN  
 Exchanges supporting both ISDN and Mobile  
 Exchanges supporting both PSTN and Mobile  
 Exchanges supporting PSTN, ISDN and Mobile  
 Other, please specify .....

#### C.1.3 Call forwarding support

##### C.1.3.1 Support by network

Is call forwarding supported by the network?

- No, questionnaire is complete except for signalling systems support questions (clause C.2)  
 Yes

**C.1.3.2 Support by rotary dial telephones**

Is call forwarding supported by rotary dial telephones?

- No
- Yes, fully telecommunications organisation controlled version (no served user control)
- Yes, served user controlled

**C.1.4 ISDN support**

**C.1.4.1 Support by network**

Is ISDN supported in the network?

- No, continue with clause C.3 "Supplementary service provisioning and withdrawal"
- Yes

**C.1.4.2 Protocol support**

What type of protocol is used when the served user tries to activate/deactivate a supplementary service for ISDN (tick all that apply)?

- Not Applicable
- Stimulus protocol (i.e. using a digit sequence)
- Functional protocol (i.e. using an information element indicating the type or action)
- DTMF.....
- Other, please specify .....

**C.2 Signalling systems support**

**C.2.1 National inter-exchange signalling support**

For all national inter exchange signalling (trunk signalling) systems that are supported in the network, please specify the signalling system and if it supports the following supplementary services:

- a) Amount of traffic (%);
- b) CFI "Call Forwarding Indication" (i.e. call is forwarded);
- c) CFC "Call Forwarding counter";
- d) CFR "Call Forwarding Reason (CFU, CFB, CFNR)";
- e) CFUN "Call Forwarding served User Number" (i.e. is number of call forwarding user passed to the termination subscriber);
- f) "Operator indication" (i.e. call is from an operator).

Please put "yes" or "no", as appropriate in each box for each of the signalling systems supported.

Signalling system	Traffic (%)	CFI	CFC	CFSS	CFUN	OI

**C.2.2 International exchange availability**

Does your network have international exchanges?

- No, continue with clause C.3 (Supplementary service provisioning and withdrawal)
- Yes

### C.2.3 International inter-exchange signalling support

For all international inter exchange signalling (trunk signalling) systems that are supported in the network please specify the signalling system, the country to which it is connected, if it is incoming (I), outgoing (O) or 2-way (2) and if it supports the following supplementary services:

- a) CFI "Call Forwarding Indication" (i.e. call is forwarded);
- b) CFR "Call Forwarding Reason (CFU, CFB, CFNR)";
- c) CFUN "Call Forwarding served User Number" (i.e. is number of call forwarding user passed to the termination subscriber);
- d) "Operator indication" (i.e. call is from an operator).

Please put "yes" or "no", as appropriate in each box for each of the signalling systems supported.

Signalling system	Country	I/O/2	Traffic (%)	CFI	CFC	CFSS	CFUN	OI

### C.2.4 MFC signalling

When MFC signalling is supported (e.g. R2) please send us the forward and backward signalling tables and/or answer the following questions:

- a) what signalling types are supported, e.g. 2 out of 6, 2 out of 5?
- b) is user identification request (from the terminating exchange) supported?
- c) what signal is used to request this identity (e.g. group A backward signal: A-10)?
- d) which user identity is transferred when a call from A is forwarded (via B) to the C subscriber and the C exchange request identification, A or B?
- e) can both the A and B identity be passed, and if so, what is the procedure?

MFC signalling	type of signals (e.g. 2 out of 6)	ID request (y/n)	Signal used for ID request	User ID provided	A and B ID provided?	Procedure used when both IDs provided.

## C.3 Supplementary service provisioning and withdrawal

### C.3.1 Call forwarding services support

Which of the following call forwarding supplementary services are supported by the network (tick all that apply)?

- PSTN CFU
- PSTN CFB
- PSTN CFNR
- ISDN CFU
- ISDN CFB
- ISDN CFNR



**C.3.2 Prior arrangement and general provisioning support**

Which of these supplementary services are provided by Prior Arrangement (PA) with the telecommunications organisation and which via General Provisioning (GP) (tick all that apply)?

- | PA                       | GP                       |           |
|--------------------------|--------------------------|-----------|
| <input type="checkbox"/> | <input type="checkbox"/> | PSTN CFU  |
| <input type="checkbox"/> | <input type="checkbox"/> | PSTN CFB  |
| <input type="checkbox"/> | <input type="checkbox"/> | PSTN CFNR |
| <input type="checkbox"/> | <input type="checkbox"/> | ISDN CFU  |
| <input type="checkbox"/> | <input type="checkbox"/> | ISDN CFB  |
| <input type="checkbox"/> | <input type="checkbox"/> | ISDN CFNR |

**C.3.3 Subscriber types**

What type of subscribers can use the supplementary services via prior arrangement (PA) and which via General Provisioning (GP) (tick all that apply)?

- | PA                       | GP                       |  |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | Individual (ordinary) PSTN subscribers       |
| <input type="checkbox"/> | <input type="checkbox"/> | DDI PSTN PBXs                                |
| <input type="checkbox"/> | <input type="checkbox"/> | DDI PSTN PBX exchange line                   |
| <input type="checkbox"/> | <input type="checkbox"/> | DDI PSTN PBX exchange line group             |
| <input type="checkbox"/> | <input type="checkbox"/> | Non in-dialling PSTN PBXs                    |
| <input type="checkbox"/> | <input type="checkbox"/> | Non in-dialling PSTN PBX exchange line       |
| <input type="checkbox"/> | <input type="checkbox"/> | Non in-dialling PSTN PBX exchange line group |
| <input type="checkbox"/> | <input type="checkbox"/> | Operators                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | Pay-phones                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | Green/freephone numbers                      |
| <input type="checkbox"/> | <input type="checkbox"/> | DNs within Intelligent Network               |
| <input type="checkbox"/> | <input type="checkbox"/> | Mobile subscribers                           |
| <input type="checkbox"/> | <input type="checkbox"/> | Other, please specify.....                   |

**C.3.4 Supplementary service withdrawal**

Can the supplementary service be generally withdrawn from the whole exchange (i.e. inhibit all users from supplementary service execution or activation/deactivation of the supplementary service) (and how)?

- No withdrawal procedure provided
- Withdrawal provided for all call forwarding services (together)
- Separate withdrawal per application (PSTN and ISDN)
- Withdrawal per supplementary service (CFU, CFB, CFNR)
- Withdrawal per application and supplementary service
- Withdrawal per application and supplementary service and bearer service (group)
- Withdrawal per supplementary service and bearer service (group)
- Other, please specify.....

**C.3.5 Supplementary service inhibiting**

Can the supplementary service be inhibited individually (per subscriber) (and how)?

- No individual inhibition procedure provided
- Individual inhibition of all call forwarding supplementary services (together)
- Individual Inhibition per call forwarding supplementary service
- Individual Inhibition per call forwarding supplementary service and BSG (ISDN only)
- Other, please specify.....

## C.4 Subscriber activation/deactivation/verification/interrogation

For the following 4 questions please specify the general principles used in the user-network protocol. A suggestion for notation to use is:

<DT> Dial Tone  
<2DT> Second Dial Tone  
<SDT> Special Dial Tone  
<GA> Guidance Announcement (e.g. to request the user to enter the forwarding number)

NOTE: DN refers to the Directory Number of the forwarded to subscriber, \* and # are DTMF digits.

### C.4.1 Activation procedures

What are the activation procedures for call forwarding (e.g. \*21\*DN#, or \*21\*<DT>DN#) (Provide all that apply)?

PSTN CFU.....  
PSTN CFB.....  
PSTN CFNR.....

### C.4.2 Deactivation procedures

What are the deactivation procedures for call forwarding (e.g. #21#) (Provide all that apply)?

PSTN CFU.....  
PSTN CFB.....  
PSTN CFNR.....

### C.4.3 Verification procedures

What are the verification procedures for call forwarding (e.g. \*#21\*DN# or \*#21\*<2DT>DN#) (Provide all that apply)?

PSTN CFU.....  
PSTN CFB.....  
PSTN CFNR.....

### C.4.4 Interrogation procedures

What are the interrogation procedures for call forwarding (e.g. \*#21#) (Provide all that apply)?

PSTN CFU.....  
PSTN CFB.....  
PSTN CFNR.....

### C.4.5 PBX authorisation

How is authorisation for a call forwarding activation/deactivation request for a group of lines (PBX) validated/guaranteed if the group of lines (PBX) is subscribed to the call forwarding facility (tick all that apply)?

- This is not supported
- This is allowed from all accesses, i.e. no authorisation checks in Local exchange done
- This is allowed from (a) certain authorised line(s) only
- This is guaranteed otherwise (please specify) .....

**C.4.6 Notifications**

What notification(s) is (are) provided to the PSTN call forwarding subscriber when activation/deactivation/verification/interrogation of the service is successful. If it is a tone please specify what tone, If it is an announcement please specify what announcement reports to the user. In the latter case please specify in English, and specify the language(s) in which it is reported to the user?

Action	Tone/announcement
CFU activation	
CFB activation	
CFNR activation	
CFU deactivation	
CFB deactivation	
CFNR deactivation	
CFU verification	
CFB verification	
CFNR verification	
CFU interrogation	
CFB interrogation	
CFNR interrogation	

**C.4.7 Activation via overwrite**

Is activation of call forwarding via overwrite allowed?

Overwrite: activating of call forwarding when it is already active, i.e. without deactivating it first.

- Yes
- No, notification provided to subscriber is .....

**C.4.8 Deactivation when not active**

Is deactivation of call forwarding when not active treated as successful?

- Yes, successful treatment provided to subscriber and charging applied
- Yes, successful treatment provided to subscriber but no charging applied
- No, notification provided to subscriber is .....

**C.4.9 Call forwarding destination restrictions**

Are there any forwarding destination (C-party) restrictions?

- Yes
- No, continue with clause C.5 (subscriber notifications)

**C.4.10 Destination restriction list**

Is there a forwarding destination restriction list (i.e. a list of Directory numbers which are prohibited from being used as a forwarding destination)?

- No
- Yes, notification provided when forwarding DN is on restriction list.....

**C.4.11 Forwarding to number screening**

Are there screening options on the forwarded to number which can be specified per served user (e.g. on international destinations)?

- No
- Yes, please specify .....

**C.4.12 Local number general screening**

What types of general screening on the forward to number (on all subscribers) are carried out to validate if the number is an allowed destination when forward to number is a local number (tick all that apply)?

- No screening carried out
- Invalid DN (does not pass the digit analysis tables) not allowed
- Forwarded to number can not be own number
- Forwarded to number can not be an Operator
- Forwarded to number can not be an emergency number
- Forwarded to number can not be an International number
- Forwarded to number can not be a Pay-Phone
- Forwarded to ISDN number should support speech (voice) bearer service
- Forwarded to number may not be mobile number
- Forwarded to mobile number (if allowed) should support speech (voice) bearer service
- Forwarded to number is blocked due to outgoing call barring supplementary service of served user
- Other, please specify.....

**C.4.13 Non-local number general screening**

What types of screening on the forward to number are carried out to validate if the number is an allowed destination when forward to number is a not local number (tick all that apply)?

- No screening carried out
- Forwarded to number can not be an Operator
- Forwarded to number can not be an emergency
- Forwarded to number can not be a Pay-Phone
- Forwarded to ISDN number should support speech (voice) bearer service
- Forwarded to number may not be mobile number
- Forwarded to mobile number (if allowed) should support speech (voice) bearer service
- Other, please specify.....

**C.5 Subscriber notifications**

**C.5.1 Call forwarding subscriber notifications**

What notification(s) is (are) provided to the PSTN call forwarding subscriber when activation/deactivation/verification/interrogation of the service is unsuccessful. If it is a tone please specify what tone, If it is an announcement please specify what announcement reports to the user. In the latter case please specify in English, and specify the language(s) in which it is reported to the user?

Reason/Cause	Tone/announcement

Other comments related to these notifications:

.....  
 .....

**C.5.2 Reminder notification**

Will the service user receive a reminder notification that call forwarding is active when originating a call?

- No, continue with subclause C.5.4
- Yes, reminder notification provided is

**C.5.3 Notification selection**

How can the notification mentioned at previous question be selected/set/specified (tick all that apply)?

- Per subscriber
- Per call forwarding supplementary service
- Per bearer service (group) (ISDN only)

**C.5.4 Served user notifications**

Can the served user receive a notification that a call has been forwarded (e.g. via a short ring), and if so, what is the notification?

- No, continue with subclause C.5.6
- Yes, notification provided is .....

**C.5.5 Notification selection**

How can the notification mentioned at previous question be selected/set/specified (tick all that apply)?

- Per subscriber
- Per call forwarding supplementary service
- Per bearer service (group) (ISDN only)

**C.5.6 Forwarding notification**

Can the calling user receive a notification that the call is forwarded, and if so, what is the notification?

- No, continue with subclause C.5.8
- Yes, notification provided is.....

**C.5.7 Calling user notification selection**

How can the notification mentioned at previous question be selected/set/specified (tick all that apply)?

- Per subscriber
- Per call forwarding supplementary service
- Per bearer service (group) (ISDN only)

**C.5.8 Forwarded to user notifications**

Can the forwarded to user receive a notification that the call is forwarded, and if so, what is the notification?

- No, continue with clause C.6 (supplementary service operation)
- Yes, notification provided is.....

**C.5.9 Forwarded to user notification selection**

How can the notification mentioned at previous question be selected/set/specified (tick all that apply)?

- Per subscriber
- Per call forwarding supplementary service
- Per bearer service (group) (ISDN only)

## C.6 Supplementary service operation

### C.6.1 No reply timer

What is the (default) timer before a call forwarding call on no reply will be diverted (in seconds) (from now on referred to as "forwarding timer")?

.....

### C.6.2 Forwarding timer exchange variations

Can the forwarding timer be changed for the whole (local) exchange (if so please specify the range and interval (e.g. from 0 - 60 seconds with interval of 5 seconds)?)

- No
- Yes, range and interval of timer is.....

### C.6.3 Forwarding timer user variations

Can the forwarding timer be changed per (individual) subscriber (if so please specify the range and interval (e.g. from 0 - 60 seconds with interval of 5 seconds)?)

- No
- Yes, range and interval of timer is.....

### C.6.4 Charging forwarded calls (A-B leg)

Which subscriber is charged for the A-B leg of a forwarded call?

- The A subscriber
- The B subscriber
- Other, please specify.....

### C.6.5 Charging forwarded calls (B-C leg)

Which subscriber is charged for the B-C leg of a forwarded call?

- None
- The A subscriber
- The B subscriber
- The C subscriber
- Other, please specify.....

### C.6.6 Additional charging

Is the subscriber charged for the following (tick all that apply)?

- Activation of call forwarding
- Deactivation of call forwarding
- Verification of call forwarding
- Interrogation of call forwarding
- The time call forwarding is active (period the supplementary service is active)
- Every usage of the call (usage sensitive charging, independent from B-C leg charging)
- Flat rate

**C.6.7 Simultaneous forwarding**

What is the maximum number of simultaneous forwardings per subscriber (I.e. A1 calls B and is forwarded to C1, A2 calls B and is forwarded to C2, e.g. when C is a PBX destination) (please answer both)?

- a) Within the same (local) exchange,.....
- b) To a different (local) exchange,.....

**C.6.8 Served user number passing**

Is the served user's DN passed to the forwarded to number?

- No
- Yes

**C.6.9 Forwarding notifications**

Will a notification on the display of subscriber C appear (provided C has subscription to the display supplementary service) indicating that the call has been forwarded?

- No, continue with clause C.7 (Supplementary service interactions)
- Yes

**C.6.10 Notification of forwarded call type**

Will a notification on the display appear about the call forwarding supplementary service involved (CFU, CFB or CFNR)?

- No
- Yes

**C.6.11 Forwarding of operators**

What will happen if a call from an operator to a call forwarding subscriber meets the forwarding condition?

- Call will terminate to the CF served user (i.e. will not be forwarded)
- Call will be forwarded unconditionally
- Call will be forwarded. under special conditions (please specify).....
- Other, please specify .....

**C.7 Supplementary service interactions**

**C.7.1 Call forwarding**

**C.7.1.1 Sequential local exchange forwarding**

What is the maximum number of sequential intra (local) exchange forwardings (i.e. A calls B1 is forwarded to B2 which is forwarded to B3, etc.)?

.....

**C.7.1.2 Sequential inter-exchange forwarding**

What is the maximum number of sequential inter exchange forwardings, provided that the (trunk) signalling supports call forwarding information?

.....

**C.7.1.3 Sequential forwarding when last party forwarding is CFNR**

What will happen when call forwarding reaches its limit for sequential forwardings and the last call is a CFNR (i.e. after CFNR time-out)? Please also answer this question if the limit of sequential forwardings is 1.

- Call will be cleared
- Call will keep ringing at the CFNR subscriber

**C.7.1.4 Sequential forwarding when last but one forwarding is CFNR**

What will happen when call forwarding reaches its limit for sequential forwardings and the last but one call is forwarded on no reply?

- Sequential forwardings is not supported
- Call will be cleared
- Call will terminate back to the last CFNR subscriber and continue ringing

**C.7.2 Outgoing call barring**

NOTE : In the context of this questionnaire the Outgoing Call Barring (OCB) service can both be Fixed OCB (OCB-F) and User Controlled OCB (OCB-UC).

**C.7.2.1 Network support**

Is Outgoing Call Barring (OCB) supported in the network?

- No, continue with subclause C.7.3
- Yes

**C.7.2.2 Forwarding with outgoing call barring**

If a subscriber has both call forwarding and OCB, is the subscriber allowed to activate call forwarding if the forwarding destination meets the OCB blocking criteria?

- No, notification provided to use is .....
- Yes

**C.7.2.3 Forwarding with outgoing call barring on incoming call**

If a subscriber has both call forwarding and OCB active and an incoming call meets the call forwarding criteria will the destination also be checked against the OCB criteria?

- No
- Yes, notification provided to use is .....

**C.7.3 Call waiting**

**C.7.3.1 Network support**

Is call waiting supported in the network?

- No, continue with subclause C.7.4
- Yes



**C.7.3.2 Interaction with CFU**

If a subscriber has both CW and call forwarding unconditional active and the subscriber is involved in a stable standing call what will happen when a new call comes in?

- Situation can not occur (CW and call forwarding can not be both active)
- CW takes priority, call will be offered as a waiting call
- Call forwarding takes priority, call will be forwarded

**C.7.3.3 Interaction with CFB**

If a subscriber has both CW and call forwarding on busy active and the subscriber is involved in a stable standing call what will happen when a new call comes in?

- Situation can not occur (CW and call forwarding can not be both active)
- CW takes priority, call will be offered as a waiting call
- Call forwarding takes priority, call will be forwarded

**C.7.3.4 Interaction with CFNR**

If a subscriber has both CW and call forwarding on no reply active and the subscriber is involved in a stable standing call what will happen when a new call comes in?

- Situation can not occur (CW and call forwarding can not be both active)
- CW takes priority, call will be offered as a waiting call
- Call will be offered as a waiting call and if not accepted within the no reply timer of call forwarding the call will be forwarded
- Call forwarding takes priority, call will be forwarded

**C.7.3.5 Activation of call forwarding**

If a subscriber has CW active and tries to activate call forwarding will the request be successful?

- Yes
- No, notification provided is .....

**C.7.3.6 Call waiting on forwarded call**

Can a forwarded call be offered as a waiting call (provided the forward to destination has call waiting active)?

- Yes
- No, the following happens.....

**C.7.4 Call transfer**

**C.7.4.1 Network support**

Is call transfer supported in the network?

- No, continue with subclause C.7.5
- Yes

**C.7.4.2 Transfer of forwarded call**

Can a forwarded call be transferred?

- Yes
- No, the following happens .....

**C.7.5 Call hold**

**C.7.5.1 Network support**

Is call hold supported in the network?

- No, continue with subclause C.7.6
- Yes

**C.7.5.2 Diversion of call**

If a subscriber involved in a normal 2 party call, puts the party on hold (provided the subscriber is registered for the call Hold) and dials a new DN, can the call to this DN be diverted to an other DN (Scenario: subscriber A calls B, A puts B on hold and dials C. C has call forwarding to D)?

- Allowed for if C has CFU
- Allowed if C has CFB
- Allowed if C has CFNR
- Not allowed, and following happens.....

**C.7.5.3 Call set up on hold**

Can a subscriber having the call Hold service set up a call and put the call on hold before it is answered?

- No only calls in talking state can be put on hold, continue with subclause C.7.6
- Yes this is allowed

**C.7.5.4 Interaction with CFNR**

Subscriber A calls subscriber B which has call forwarding on no reply and puts B on hold before it has answered (i.e. B is ringing). Will the call be diverted if the on no reply timer expires?

- No, calls on hold are not diverted
- Yes this is allowed

**C.7.5.5 Diversion notification**

Will the A subscriber from previous question receive a notification that the call is diverted?

- No
- Yes, please specify how the subscriber is notified.....

**C.7.6 Three party service**

**C.7.6.1 Network support**

Is Three Party service supported in the network?

- No, continue with subclause C.7.7
- Yes

**C.7.6.2 Diversion of call**

If a subscriber involved in a normal 2 party call, puts the party on hold (provided the subscriber is registered for three party service) and dials a new DN, can the call to this DN be diverted to an other DN (scenario is that, subscriber A calls B, A puts B on hold and dials C. C has call forwarding to D)?

- Allowed for if C has CFU
- Allowed if C has CFB
- Allowed if C has CFNR
- Not allowed, and following happens.....

**C.7.6.3 Call set up on hold**

Can a subscriber having three party service set up a call and put the call on hold before it is answered?

- No, only calls in talking state can be put on hold, continue with subclause C.7.7
- Yes this is allowed

**C.7.6.4 Interaction with CFNR**

Subscriber A calls subscriber B which has call forwarding on no reply and puts B on hold before it has answered (i.e. B is ringing). Will the call be diverted if the on no reply timer expires?

- No, calls on hold are not diverted
- Yes this is allowed

**C.7.6.5 Diversion notification**

Will the A subscriber from previous question receive a notification that the call is diverted?

- No
- Yes, please specify how the subscriber is notified .....

**C.7.7 Advice of charge**

**C.7.7.1 Network support**

Which type(s) of Advice Of Charge (AOC) is/are supported in the network?

- No AOC supported, continue with subclause C.7.8
- AOC at call setup (from now on referred to as AOC-C)
- AOC during call (from now on referred to as AOC-D)
- AOC at the end of the call (from now on referred to as AOC-E)
- Other please specify.....

**C.7.7.2 Charge information on forwarded call**

If a subscriber has call forwarding and AOC-E active, and the subscriber issues a AOC request, what charge information will be provided to the user when the last charge activity for the subscriber was a forwarded call (tick only one)?

- AOC for last call is not supported
- Charge information about the forwarding call provided
- Charge information about the last originated call provided
- No charge information provided
- Other, please specify.....

**C.7.7.3 Charge information on activation or deactivation request**

If a subscriber has call forwarding active and AOC-E, and the subscriber issues a AOC request what charge information will be provided to the user If the last charge activity for the subscriber was a call forwarding (de)activation request?

- AOC for last call is not supported
- Charge information about the forwarding call (de)activation provided
- Charge information about the last originated PSTN call provided
- No charge information provided
- Other, please specify.....

**C.7.8 Calling line identification presentation**

**C.7.8.1 Network support**

Is calling line identification presentation supported in the network?

- No, continue with subclause C.7.9
- Yes

**C.7.8.2 Display of directory number on forwarded call**

If a call (from A) is forwarded (via B) to the C subscriber and the C subscriber has calling line identification, what directory number will be presented at the C subscriber?

- The A DN
- No DN displayed
- Other please specify.....

**C.7.8.3 Display of supplementary service information**

If a call (from A) is forwarded multiple times (via B1 and B2) to C and the C subscriber has calling line identification, what forwarding supplementary service is presented at the C subscriber?

- Multiple forwardings is not supported
- The forwarding supplementary service from B1 to B2
- The forwarding supplementary service from B2 to D
- No forwarding supplementary service displayed
- Other please specify.....

**C.7.9 Calling line identification restriction**

**C.7.9.1 Network support**

Is calling line identification restriction supported in the network?

- No, continue with subclause C.7.10
- Yes

**C.7.9.2 Display of directory number on forwarded call**

If a call from subscriber A having calling line identification restriction, is forwarded (via B) to the C subscriber and the C subscriber has calling line identification, what indication will be provided to the C subscriber?

- No indication
- An indication that A subscriber has CLIR
- Other, please specify.....

**C.7.9.3 CLIP and CLIR on forwarded call**

Do specific conditions exist in order to provide CLIP to the C subscriber even if the A subscriber has invoked CLIR (e.g. via overwrite)?

- No
- Yes, please specify.....

#### **C.7.9.4 Display notification of forwarded call**

Will a notification on the display of the C subscriber appear indicating that the call has been forwarded if the B subscriber has calling line identification restrictions?

- No
- Yes

#### **C.7.10 Malicious call identification**

##### **C.7.10.1 Network support**

Is malicious call identification supported in the network?

- No, continue with clause C.8 (Interworking)
- Yes

##### **C.7.10.2 Subscriber identities on forwarded call**

If a call from A is forwarded via B to C and C issues a malicious call identification request, which subscriber identities will be registered (provided the C subscriber has subscription to malicious call identification) (tick all that apply)?

- This is not supported
- The A identity
- The B identity

##### **C.7.10.3 Subscriber identities on multiple forwarded call**

If a call from A is forwarded multiple times via B1, B2 and Bn to C and C issues a MALICIOUS CALL IDENTIFICATION request, which subscriber identities will be registered (provided the C subscriber has subscription to malicious call identification) (tick all that apply)?

- This is not supported
- The A identity
- The B1 identity
- The Bn identify
- Other, please specify

### **C.8 Interworking**

#### **C.8.1 Network support**

Does your network allow the following interworking (tick all that apply)?

- PSTN (voice) call to ISDN subscriber
- ISDN (voice) call to PSTN subscriber
- PSTN (voice) call to Mobile subscriber
- Mobile (voice) call to PSTN subscriber
- None of the above interworking

**C.8.2 Call forward interworking**

What type of call forwarding interworking is allowed in your network (provided the bearer service used is speech/voice) (tick all that apply)?

	Originating subscriber	Served (call forwarding) user	Forwarded to subscriber
<input type="checkbox"/>	PSTN	PSTN	PSTN
<input type="checkbox"/>	PSTN	PSTN	ISDN
<input type="checkbox"/>	PSTN	PSTN	Mobile
<input type="checkbox"/>	ISDN	PSTN	PSTN
<input type="checkbox"/>	ISDN	PSTN	ISDN
<input type="checkbox"/>	ISDN	PSTN	Mobile
<input type="checkbox"/>	Mobile	PSTN	PSTN
<input type="checkbox"/>	Mobile	PSTN	ISDN
<input type="checkbox"/>	Mobile	PSTN	Mobile

**C.8.3 Support of sequential forwarding**

Does your network support sequential forwardings across different networks?

- Yes, this is fully supported
- Yes, this is partly supported. The limitation(s)/restriction(s) is/are (please specify).....  
 .....
- No, not supported because (please specify).....

**C.9 Additional comments**

Please use this form if you have additional comments and/or information to provide.

.....  
 .....  
 .....

**Annex D: Extract NA1-SPS3 meeting, November 1993 in Turin**

The following table shows the proposed service information supported by CLIP:

Status	Service information	Interface protocol parameters	Comment
M	CLI	Bellcore coding (1)	Basic CLIP requirement
M	or presentation restricted indicator	Bellcore coding (1)	Basic CLIP requirement
M	or identity not available	Bellcore coding (1)	Basic CLIP requirement
O	CLI qualifier (the CLI qualifier shall be introduced if the CLI does not comprise the prefix	Extension (ETSI)	Basic CLIP requirement
O	Date and time	Bellcore coding (1)	
O	Other type of information (2) (3), e.g. - type of forwarding - forwarding to number - Etc.	Extension (ETSI) Extension (ETSI)	
O	Network operator defined information e.g.: - user provided number (not screened) - type of calling party - etc.	Extension (national) Extension (national)	
M:	Mandatory.		
O:	Optional (subdivision of optional information between ETSI standardization and not standardized is for further study).		
(1)	The alternate solution is to provide an ETSI coding.		
(2)	Generally based in ISDN information.		
(3)	Bellcore coding are not precluded in this case e.g. for "Name" and "Reason for the absence of the name".		

## Annex E: Results of questionnaire

In this annex is summarised the results of the questionnaire by country (and in some cases by Public Telecommunication Organisation). In many cases the original questions are reproduced for clarity. Table E.1 shows the countries and PNOs from which replies have been received, and the country codes (and PTO codes, where appropriate) that are used throughout this annex.

The following indications are used:

- ?? indicates that the answer was not known, not provided or will take too much time to find the answer to the question.
- the issues does not apply because this option is not provided by or not applicable for this PNO

NOTE: Where a particular country has more than one PTO, the country code with the appropriate PTO code appear in the country code column in the tables of this annex.



Table E.1: Countries, with country codes, and PNOs from which replies have been received

Country	Country code	Public Telecommunication Organisations	Notes
AUSTRIA	A	No answers provided	
BELGIUM	B	Belgacom	
BULGARIA	BG	No answers provided	
CYPRUS	CY	Cyprus Telecommunications Authority	
CZECH REPUBLIC	CZ	TESTCOM	
DENMARK	DK	Tele Danmark	(note 1)
FINLAND	SF	Telecomms Administration Centre	(note 2)
FRANCE	F	France Telecom	
GERMANY	D	Telekom Germany	
GREECE	GR	No answers provided	
HUNGARY	H	HTC PKI-FI	
ICELAND	IS	General Directorate of post and telecomm.	(note 3)
IRELAND	IR	Telecom Eireann	(note 4)
ITALY	I	SIP - STET	
LUXEMBOURG	L	No answers provided	
MALTA	M	Telemalta Corporation	
NETHERLANDS	NL	PTT telecom, NWB-NWO-TP	
NORWAY	N	Norwegian Telecom	
POLAND	PL	Institute of telecommunications	(note 5)
PORTUGAL	P-TP	Telecom Portugal	
PORTUGAL	P-TLP	Telefones de Lisboa e Porto	
ROMANIA	RO	National communications research centre	(note 6)
SLOVAK REPUBLIC	SK	No answers provided	
SPAIN	E	Telefonica de españa	
SWEDEN	S	Telia AB	
SWITZERLAND	CH	Telecom PTT	
TURKEY	TR	No answers provided	
UK	UK-I	IONICA	(note 7)
UK	UK-M	Mercury	
NOTE 1:	Different PNOs with different implementations are operating in Denmark. The answers provided by the contact person are not always a reflection of the current situations but sometimes the desired (future) implementation.		
NOTE 2:	For Finland several call forwarding aspects depend on the PNOs providing the service or the switch manufacturer. Therefore not all questions could be answered.		
NOTE 3:	In Iceland about 40 % of the PSTN users are connected to an analogue exchange. These exchanges do not support call transfer, call hold or three party service. Other 60 % of the PSTN users are connected to a digital exchange where these services are supported.		
NOTE 4:	The current call forwarding position for both PSTN and ISDN is under review and may change in the near future.		
NOTE 5:	For Poland, different manufactures have different implementations. The technical requirements for supplementary services are under preparation. Some answers reflect the desired and not the current implementation.		
NOTE 6:	For Romania different manufactures have different implementations. Therefore, not all questions could be answered. In addition, only the digital public exchanges were taken into account.		
NOTE 7:	A reply from IONICA, a new PNO in the UK was received as well. However, they will not offer a service until 1995. The answers given by them indicated no service is provided, therefore, IONICA will not be listed in the results.		

## E.1 Network capabilities

### E.1.1 DTMF support

Are DTMF telephones supported in the network, and specify/estimate up to what extent the PSTN users have DTMF telephones?

**Table E.2: DTMF support by each country or PTO**

Country code	Supported	% of phones
B	yes	50
CY	yes	~60 (100% end 1996)
CZ	yes	< 10
DK	yes	95
SF	yes	50
F	yes	> 95
D	yes	60
H	yes	20
IS	yes	90
IR	yes	50
I	yes	56,7
M	yes	unknown
NL	yes	(note 1)
N	yes	90
PL	yes	15
P-TP	yes	15 (note 2)
P-TLP	yes	20
RO	yes	01
E	yes	10
S	yes	70
CH	yes	??
UK-M	yes	75
NOTE 1:	Actual number unknown. The figure indicates the percentage of users that have access by lines accepting DTMF.	
NOTE 2:	Corresponding to the total amount of lines connected to both analogue exchanges (which do not support call forwarding) and digital exchanges.	

**E.1.2 Exchange support**

What type of exchanges are supported in your network?

**Table E.3: Exchange types in each country or PTO**

Country code	Only PSTN	Only ISDN	Only mobile	PSTN & ISDN	ISDN & mobile	PSTN & mobile	PSTN, ISDN & mobile
B	x	x	x	x			
CY	x		x	(1994)	(1994)		
CZ	x		x	(1996)			
DK	x	x	x	x			
SF	x	x	x	x			
F	x		x	x			
D	x		x	x			
H	x		x	x			
IS	x		x				
IR	x	x	x	x			x
I	x	x	x	x			
L							
M	x		x				
NL	x	(note)	x	x			
N	x	x	x	x			
PL	x		x	x			
P-TP	x			x			
RO						x	
E	x		x	x			
S	x	x	x				
CH	x		x	x			
UK-M				x			

NOTE: Will disappear within 4 years.

**E.1.3 Call forwarding support**

Is call forwarding supported by the network, and is it available to subscribers with rotary dial telephones?

**Table E.4: Call forwarding support by network and support of rotary dial telephones**

Country code	Network support of call forwarding	Support of rotary dial telephones PTO controlled	Support of rotary dial telephones subscriber controlled	Notes
B	yes	yes	no	
CY	yes	yes	no	
CZ	yes	no	yes	
DK	yes	yes	no	(note 1)
SF	yes	no	no	
F	yes	no	no	
D	yes	no	no	
H	yes	no	no	
IS	yes	no	no	
IR	yes	no	no	
I	yes	no	no	
M	yes	no	no	
NL	yes	no		(note 2)
N	yes	yes	no	
PL	yes	no	yes	
P-TP	yes	yes	no	
P-TLP	yes	no	no	
RO	yes	no	no	
E	yes	no	no	
S	yes	no	no	
CH	yes	no	no	
UK-M	no	-	-	

NOTE 1: In analogue crossbar exchanges call forwarding is provided by means of special equipment per individual subscriber.

NOTE 2: CFU and CFNR call forwarding is also supported by means of special diverting equipment in the PSTN exchanges.

### E.1.4 ISDN support

Is ISDN supported by the network, and what type of protocol is used when the served user tries to activate/deactivate a supplementary service for ISDN?

**Table E.5: ISDN support and protocol type used**

Country code	ISDN Support	Protocol type
B	yes	stimulus & DTMF
CY	no (end 1994)	
CZ	no (1996)	
DK	yes	not yet
SF	yes	stimulus & functional
F	yes	functional
D	yes	functional
H	yes	stimulus & DTMF
IS	no	-
IR	yes	stimulus & DTMF
I	yes	stimulus & functional
M	no	-
NL	yes	stimulus (see note)
N	yes	stimulus (see note)
PL	no	-
P-TP	yes	stimulus & DTMF
P-TLP	yes	stimulus & functional
RO	no	-
E	yes	stimulus
S	yes	stimulus & DTMF
CH	yes	stimulus
NOTE:	Will be upgraded to functional protocol on a relatively short term.	

## E.2 Signalling support

### E.2.1 National signalling support

For national signalling systems that are supported, please specify the signalling system and if it supports the following supplementary services:

- a) % - Percentage of the traffic over the link/trunk;
- b) CFI - Call Forwarding Indication;
- c) CFC - Call Forwarding Counter
- d) FR - Forwarding Reason (CFU, CFB, CFNR);
- e) CFUN - Call Forwarding served User Number;
- f) OI - Operator Indication.

NOTE: For signalling system R2, the signal to request the calling party ID and what party ID is provided (A or B) is given between brackets when available.

Table E.6a: National signalling support for supplementary services

Country code	Signalling system	%	CFI	CFC	FR	CFUN	OI
B	R2		no	no	no	no	no
	SS7		yes	yes	yes	yes	no
CY	SS7-TUP yellow book		no		no	no	no
	SS7 TUP red book		no		no	no	no
CZ	R2 (A-5, B)		no	no	yes	no	yes
	DEC		no	no	yes	no	no
DK	R2 (D-5, A)	48	yes	no	no	no	no
	SS7-TUP	52	yes	no	yes	no	yes
SF	N2	<10	no	no	no	no	no
	R2 (A-9, ??)	<10	yes	no	no	no	yes
	SS7-TUP	>80	yes	yes	yes	yes	yes
	SS7-ISUP	<10	yes	yes	yes	yes	yes
F	National MFC		yes	no	no	no	no
	National TUP + SS7		yes	no	no	yes	no
D	SS7	80	yes		yes	yes	yes
	IK 50	20	no		no	no	no
H	R2	80	no	no	no	no	yes
	SS7-ISUP V1	10	no	no	no	no	yes
	Rotary reverive pulsing	10	no	no	no	no	no
IS	R2 (A-6, ??)	55	yes	no	no	no	no
	SS7-TUP	45	yes		no	no	no
IR	R2		yes		no	no	no
	SS7-TUP		yes		no	no	no
	SS7-ISUP		yes		no	no	no
I	CAS		no		no	no	no
	SS7-TUP		yes		no	no	yes
	SS7-ISUP		yes		yes	no	yes
M	R2		yes		yes	yes	yes
NL	R2		yes	no	no	no	no
	SS7-ISUP (NL)		yes	no	no	yes	no
	others		no	no	no	no	no
N	SS7-ISUP	~1	yes	yes	yes	yes	no
	SS7-TUP	~70	yes	yes	no	no	no
	R2 (not supported)	~30	no	no	no	no	no
PL	R2 (A5, A)	?	yes	no	no	no	no
P-TP	Decadic 1 bit E & M	-	no	no	no	no	no
	R2-1 bit	-	no	no	no	no	no
	R2-National 2 bit	-	no	no	no	no	no
	R2-CCITT 2 bit	-	no	no	no	no	no
	Loop BTM	-	no	no	no	no	no
	SS7	-	no	yes	yes	no	no
P-TLP	R2 (digital)	50	no	no	yes	no	no
	SS7	50	yes	yes	yes	yes	no
RO	R2 (??, ??)		no		no	no	no
	digital R2 (??, ??)		yes		yes	no	no
E	E & M / MFE (--,--)	60	no	no		no	no
	SS7-TUP	39	yes	no		yes	no
	SS7-ISUP	1	yes	yes		yes	no
S	SS7-TUP	98	yes	no	no	yes	yes
	SS7-ISUP (blue book)	2	yes	yes	yes	yes	yes
CH	SS7-ISUP (blue book)	50	yes	yes	yes	no	yes
	SS7-TUP	3	no	no	no	no	yes
	R2 (A-9, B)	40	no	no	no	no	yes
	Pulse	7	no	no	no	no	no
UK-M	R1		no		no	no	no
	SS7 BTNUP		no		no	no	no

### E.2.2 International signalling support

For international signalling systems that are supported, please specify; the signalling system, the country to which it is connected, if it is incoming (I), outgoing (O) or 2-way (2) - i.e. its direction - and if it supports the following supplementary services:

- a) % - Percentage of the traffic over the link/trunk;
- b) CFI - Call Forwarding Indication;
- c) CFC - Call Forwarding Counter;
- d) FR - Forwarding Reason (CFU, CFB, CFNR);
- e) CFUN - Call Forwarding served User Number;
- f) OI - Operator Indication.

**Table E.6b: International signalling support for supplementary services**

Country code	Signalling system	%	CFI	CFC	FR	CFUN	OI
B	R2		no	no	no	no	no
	SS5		no	no	no	no	no
	SS7		no	no	no	no	no
CY	R2 digital		no		no	no	no
	R2-analogue		no		no	no	no
	SS5		no		no	no	no
	SS7-??UP		no		no	no	no
CZ	R2	90/40	no	no	yes	no	yes
	SS5	10/60	no	no	yes	no	yes
DK	SS5		no		no	no	no
	R2		no		no	no	yes
	SS7-TUP		no		no	no	yes
	SS7-TUP+		no		no	no	yes
	SS7-ISUP (Q.767)		no		no	no	yes
SF	??						
F	SS7 ISUP V1 (Q.767)		no				
	SS7 TUP+		no				
	SS7 TUP		no				
	R2 TUP		no				
	SS5		no				
D	SS7-ISUP-MoU		no		yes	yes	no
	SS7-TUP+		no		no	no	no
	SS5		no		no	no	no
	R2 analogue		no		no	no	no
	R2 digital		no		no	no	no
H	R2		no	no	no	no	yes
	R1 manual		no	no	no	no	no
	SS5		no	no	no	no	no
	SS7 ISUP V1		no	no	no	no	yes
IS	SS7-TUP	40	no	no	no	no	no
	SS5	60	no	no	no	no	no

(continued)

Table E.6b (concluded): International signalling support for supplementary services

Country code	Signalling system	%	CFI	CFC	FR	CFUN	OI
IR	R2		no		no	no	no
	C5		no		no	no	no
	SS7 BTUP		no		no	no	no
	SS7 TUP		no		no	no	no
	SS7 ISUP		no		no	no	no
I	??						
M	??						
NL	SS5		no	no	no	no	no
	R2		no	no	no	no	no
	SS7-TUP		no	no	no	no	no
	SS7-ISUP (Q.767)		no	no	no	no	no
N	R2 (not supported)	?	no	no	no	no	yes
	SS5	?	no	no	no	no	yes
	SS7-TUP	>50	no	no	no	no	yes
	SS7-ISUP	?	no	no	no	no	yes
PL	??						
P-TP	CCITT SS7	no	no	no	no	no	no
	R2 CCITT	no	no	no	no	no	no
P-TLP	??						
RO	MFC	??	no		no	no	no
	digital R2	??	yes		yes	no	no
	SS5	??	yes		yes	no	no
SK		??	??	??	??	??	??
E	R2	??	??	??	??	??	??
	SS5	??	??	??	??	??	??
	SS7-TUP	??	??	??	??	??	??
	SS7-ISUP	??	??	??	??	??	??
S	SS5		no	no	no	no	yes
	R2		no	no	no	no	yes
	SS7-TUP (red book)		yes	no	no	no	yes
	SS7-ISUP V1		no	no	no	no	yes
CH	SS7-ISUP Q.767	40	no	no	no	no	yes
	SS7-TUP (red book)	40	no	no	no	no	yes
	R2	17	no	no	no	no	yes
	SS5	3	no	no	no	no	yes
UK-M	SS7-TUP		no		no	no	no
	SS7-TUP+		no		no	no	no
	SS7-ISUP		no		no	no	no
	SS5		no		no	no	no
	SS6		no		no	no	no
NOTE:	For CZ the percentage of the traffic is provided for toll and local traffic respectively.						
Q.767:	CCITT Recommendation Q.767 [25]						



**E.2.3 Signalling system maintenance**

This subclause provides information about the expected maintenance of the signalling systems (if known).

**Table E.7: Signalling system maintenance**

<b>Country code</b>	<b>Signalling system</b>	<b>Maintenance</b>
DK	R2	Phased out in 2000
	SS7-TUP	Upgraded to ISUP in 1995/1996
SF	N2	Phased out in 2000
	R2	Phased out in 2000
	SS7-TUP	New version 1995
	SS7-ISUP	national ISUP2 in 1995
IS	R2	Phased out in 1994/1995
	SS5 (International)	Phased out in 1994/1995
N	SS7-ISUP	Gradually upgraded
	SS7-TUP	Phased out in 1998 (?)
	R2 (not supported)	Phased out in 1998 (?)
P-TLP	R2	replaced by SS7
	SS7	upgraded but not before 1996
RO	R2 and N5	Upgraded to support monitoring elements and International Network Management System
	digital R2	Upgraded to support monitoring elements and International Network Management System
E	E & M / MFE	Will be upgraded by 1996 to support A number transport
CH	SS7-ISUP (blue book)	Upgraded to ISUP V2 in 1995
	SS7-TUP	Phased out at the end of 1994

### E.3 Supplementary service provisioning

#### E.3.1 Network support

Which of the following call forwarding supplementary services, shown in the table, are supported by the network?

**Table E.8: Network support**

Country code	PSTN			ISDN		
	CFU	CFB	CFNR	CFU	CFB	CFNR
B	yes	no	no	yes	no	no
CY	yes	yes	yes	no (end 1994)	no (end 1994)	no (end 1994)
CZ	yes	no	no	no	no	no
DK	yes	yes	yes	no (1995)	no (1995)	no (1995)
SF	yes	yes	yes	yes	yes	yes
F	yes	yes	yes	yes	no	yes
D	yes	yes	yes	yes	yes	yes
H	yes	yes	yes	yes	yes	yes
IS	yes	yes	yes	no	no	no
IR	yes	no	no	no	no	no
I	yes	no	no	yes	no	no
M	yes	(note 2)	(note 2)	no	no	no
NL	yes	(note 1)	(note 1)	yes	(note 1)	(note 1)
N	yes	yes	yes	yes	yes	yes
PL	yes	yes	no	no	no	no
P-TP	yes	no	no	yes	no	no
P-TLP	yes	yes	yes	yes	yes	yes
RO	yes	yes	yes	no	no	no
E	yes	yes	yes	yes	no	no
S	yes	yes	yes	no	no	no
CH	yes	no	no	yes	no	no

NOTE 1: PSTN and ISDN CFB and CFNR services are being implemented and/or supported in the future.  
 NOTE 2: On AXE10 (Ericsson) only.

**E.3.2 Provisioning via prior arrangement or general provisioning**

Which of the following call forwarding supplementary services, shown in the table, are provided by Prior Arrangement (PA) with the PTO, and which via General Provisioning (GP)?

**Table E.9: Prior arrangement and general provisioning support of supplementary services**

Country code	Prior arrangement						Generally provided					
	PSTN			ISDN			PSTN			ISDN		
	CFU	CFB	CFNR	CFU	CFB	CFNR	CFU	CFB	CFNR	CFU	CFB	CFNR
B	yes	-	-	yes	-	-	no	-	-	no	-	-
CY	yes	yes	yes	-	-	-	no	no	no	-	-	-
CZ	yes	-	-	-	-	-	no	-	-	-	-	-
DK	yes	yes	yes	-	-	-	no	no	no	-	-	-
SF	yes	yes	yes	yes	yes	yes	no	no	no	no	no	no
F	yes	yes	yes	yes	-	yes	no	no	no	no	-	no
D	yes	yes	yes	yes	yes	yes	no	no	no	no	no	no
H	yes	yes	yes	yes	yes	yes	no	no	no	no	no	no
IS	yes	yes	yes	-	-	-	no	no	no	-	-	-
IR	yes	-	-	-	-	-	no	-	-	-	-	-
I	yes	-	-	yes	-	-	no	-	-	no	-	-
M	yes	yes	yes	-	-	-	no	no	no	-	-	-
NL	no	-	-	yes	-	-	yes	-	-	no	-	-
N	no	no	no	no	no	no	yes	yes	yes	yes	yes	yes
PL	yes	yes	-	no	no	-	yes	yes	-	no	no	-
P-TL	yes	-	-	yes	-	-	-	-	-	-	-	-
P-TLP	yes	yes	yes	yes	yes	yes	no	no	no	no	no	no
RO	yes	yes	yes	-	-	-	no	no	no	-	-	-
E	yes	yes	yes	yes	-	-	no	no	no	no	-	-
S	no	yes	no	-	-	-	yes	no	yes	-	-	-
CH	yes	-	-	no	-	-	no	-	-	yes	-	-

NOTE: For Poland different manufactures have different implementations.

### E.3.3 Subscriber types

What type of subscribers, listed in the table below, can use the supplementary services via prior arrangement (PA) and which via General Provisioning (GP)?

**Table E.10a: Prior arrangement and general provisioning support of subscriber types**

	B	CY	CZ	DK	SF	F	D	H	IS	IR	I	M	NL	N	PL	P-TP	P-TLP	RO	E	S	CH	
Individual PSTN subscribers	PA	PA	PA	PA	?	PA	PA	PA	PA	PA	PA	PA	GP	GP	GP	PA	PA	GP	PA	GP	PA	
DDI PSTN PBX							PA					PA		PA		PA	PA	PA				
DDI PSTN PBX exchange line				PA					PA			PA						PA				
DDI PSTN PBX exchange line group						PA						PA						PA		PA		
Non in-dialling PSTN PBXs								PA				PA		PA		PA	PA	PA			PA	
Non in-dialling PSTN PBX exchange line				PA				PA				PA						PA		PA	PA	
Non in-dialling PSTN PBX exchange line group								PA				PA	PA					PA		PA	PA	
Operators				PA			PA					PA						GP				
Pay-phones				PA													PA					
Green/freephone numbers		PA		PA				PA			PA					PA	PA			PA		
DNs within Intelligent Network				PA							PA											
Mobile subscribers	PA	GP	PA	PA		PA		PA	PA	PA	PA		GP	GP	GP						GP	PA
NOTE 1:	For SF (Finland) this depends on manufacturer and PTO.																					
NOTE 2:	For IS (Iceland) mobile subscribers CFU and CFNR are GP while CFB is available through prior arrangement.																					
NOTE 3:	In the Netherlands the service is provided in exceptional cases only to non in-dialling PSTN PBX exchange line groups.																					

### E.3.4 Supplementary service withdrawal

Can the supplementary service be generally withdrawn? If so, please indicate the possible methods.

**Table E.11: Supplementary service withdrawal**

Country code	General withdrawal procedure	All call forwarding services	Per application	Per call forwarding supplementary service	Per bearer service group
B	yes			x	
CY	no				
CZ					
DK	yes	x	x	x	x
SF	yes			x	
F	no			x	
D	no				
H	no				
IS	yes			x	
IR	no				
I	no				
M	yes		x	x	
NL	yes		x		
N	yes		x	x	
PL	yes			x	
P-TP	yes		x		
P-TLP	no				
RO	yes	x	x	x	
E	no				
S	no				
CH	no				

### E.3.5 Supplementary service inhibiting

Can the supplementary service be inhibited individually? If so, please indicate the possible methods.

**Table E.12: Supplementary service inhibiting**

Country code	Individual withdrawal procedure	All call forwarding services	Per call forwarding supplementary service	Per bearer service group
B	yes		x	
CY	yes		x	
CZ	yes		x	
DK	yes	x	x	x
SF	yes		x	
F	yes	x		
D	yes		x	x
H	yes	x	x	x
IS	yes		x	
IR	yes		x	
I	yes		x	
M	yes		x	
NL	yes		x	x
N	yes		x	
PL	no			
P-TP	yes		x	x
P-TLP	yes		x	
RO	yes	x	x	
E	yes		x	
S	yes		x	
CH	no			

## E.4 Subscriber activation/deactivation/verification/interrogation

### E.4.1 Notation used

For the subclauses E.4.2, E.4.3 and E.4.4, the following notation is used:

- <DT> Dial Tone
- <2DT> Second Dial Tone
- <SDT> Special Dial Tone
- <GA> Guidance Announcement
- [ ... ] Optional part of procedure

**E.4.2 Procedures for PSTN CFU**

What are the procedures for subscriber activation, deactivation, verification and interrogation for PSTN CFU?

**Table E.13: Procedures for PSTN CFU**

Country code	Activation	Deactivation	Verification	Interrogation
B	*21*DN#	#21#	N.P.	N.P.
CY	*21DN#	#21#	*#21DN#	*#21#
CZ	*21*DN	#21#		
CZ	1721DN	1921DN	*#21*DN#	N.P.
DK	*21*DN#	#21#	*#21*DN#	*#21#
SF	*21*DN#	#21#	N.P.	*#21#
F	*21*DN#	#21#	*#21*DN#	N.P.
D	*21*DN#	#21#	*#21*DN#	*#21#
H	*21*DN#	#21#	#21*DN#	*#21#
IS	*21*DN	#21#	N.P.	N.P.
IR	*21*DN#	#21#	*#21*DN#	N.P.
I	*21*DN#	#21#	N.P.	*#21#
M	*21*DN#	#21#	*#21*DN#	*#21#
	926DN	926 Own DN	-	-
NL	*21*DN#	#21#	*#21*DN#	N.P.
N	*21*DN[*SUN]#	#21[*SUN]#	N.P.	N.P.
PL	*21*DN#	#21#	*#21*DN#	*#21#
P-TP	*21*DN#	#21#	N.P.	N.P.
P-TLP	*21*DN#	#21#	N.P.	N.P.
RO	(note 1)	(note 1)	(note 1)	(note 1)
E	*21*DN#	#21#	*#21*DN#	#21#
S	*21*DN#	#21#	*#21*DN#	*#21#
	*22#	#22#		*#22#
CH	*21[*]DN#	#21#	N.P.	*#21#

NOTE 1: Depends on switch manufacturer.  
NOTE 2: [\*SUN] is optional served user number to identify the hunt group.  
NOTE 3: In Sweden the service can also be activated to a fixed DN programmed by the PNO.

**E.4.3 Procedures for PSTN CFB**

What are the procedures for subscriber activation, deactivation, verification and interrogation for PSTN CFB?

**Table E.14: Procedures for PSTN CFB**

Country code	Activation	Deactivation	Verification	Interrogation
CY	*22DN#	#22#	*#22DN#	*#22#
DK	*67*DN#	#67#	*#67*DN#	*#67#
SF	*67*DN#	#67#	N.P.	*#67#
D	*67*DN#	#67#	*#67*DN#	*#67#
H	*67*DN#	#67#	#67*DN#	*#67#
IS	*69*DN#	#69#	N.P.	N.P.
M	**67*DN#	#67#	*#67*DN#	*#67#
N	*67*DN[*SUN]#	#67#	N.P.	N.P.
PL	*18*DN#	#18#	*#18*DN#	*#18#
P-TLP	*67*DN#	#67#	N.P.	N.P.
RO	(note 1)	(note 1)	(note 1)	(note 1)
E	*67*DN#	#67#	*#67*DN#	*#67#
S	*67*DN#	#67#	*#67*DN#	*#67#
	*68[*time]#	#68#	-	*#68#
F	*67*DN#	#67#	*#67*DN#	N.P.

NOTE 1: Depends on switch manufacturer.  
 NOTE 2: [\*SUN] is optional served user number to identify the hunt group.  
 NOTE 3: In Sweden the service can also be activated to a list of up to 32 forwarded to numbers which is activated via \*68#. If the forwarded to subscriber does not answer within a specified time the call will be routed to the next forwarding to subscriber in the list Also, the ringing timer for the C subscriber can be programmed using \*68\*time#.



**E.4.4 Procedures for PSTN CFNR**

What are the procedures for subscriber activation, deactivation, verification and interrogation for PSTN CFNR?

**Table E.15: Procedures for PSTN CFNR**

Country code	Activation	Deactivation	Verification	Interrogation
CY	*24DN#	#24#	*#24DN#	*#24#
DK	*61*DN#	#61#	*#61*DN#	*#61#
SF	*61*DN#	#61#	N.P.	*#61#
D	*61*DN#	#61#	*#61*DN#	*#61#
H	*61*DN#	#61#	#61*DN#	*#61#
IS	*61*DN#	#61#	N.P.	N.P.
M	*61*DN#	#61#	*#61*DN#	*#61#
N	*61*DN#	#61#	*#61*DN#	N.P.
P-TLP	*61*DN#	#61#	N.P.	N.P.
RO	(note 1)	(note 1)	(note 1)	(note 1)
E	*61*DN#	#61#	*#61*DN#	*#61#
S	*61*DN[*time]#	#61#	*#61*DN#	*#61#
	*62[*time]#	#62#	-	*#62#
F	*61*DN#	#61#	*#61*DN#	N.P.
NOTE 1:	Depends on switch manufacturer.			
NOTE 2:	[*SUN] is optional served user number to identify the hunt group.			
NOTE 3:	In Sweden the service can also be activated to a list of up to 32 forwarded to numbers which is activated via *62#. If the forwarded to subscriber does not answer within a specified time the call will be routed to the next forwarding to subscriber in the list Also, the answer timer for the C subscriber can be programmed using *62*time# or by including the timer in the activation procedure using *61*DN*time#.			

#### E.4.5 PBX authorisation

How is authorisation for a call forwarding activation/deactivation request for a group of lines (PBX) validated/guaranteed if the group of lines (PBX) is subscribed to the call forwarding facility?

**Table E.16: PBX authorisation**

Country code	Supported	Allowed from all accesses	Allowed from certain authorised lines only
B	yes	x	
CY	no		
CZ	no		
DK	yes	x	
SF	no		
F	yes	x	
D	no		
H	yes		x
IS	no		
IR	no		
I	no		
M	yes	x	
NL	no		
N	yes		x
PL	Unknown		
P-TP	yes		x
P-TLP	no		x
RO	yes		x
E	no		
S	yes	x	
CH	yes		x

#### E.4.6 Notifications

What notification(s) is (are) provided to the PSTN call forwarding subscriber when activation, deactivation, verification and interrogation of the service is successful. If it is a tone please specify what tone, If it is an announcement please specify what announcement reports to the user. In the latter case please specify in English, and specify the language(s) in which it is reported to the user?

NOTE Between brackets the languages are listed. (UK is used for English).

**Table E.17a: Notifications**

B	
CFU activation	Special confirmation tone
CFB activation	Special confirmation tone

**Table E.17b: Notifications**

CZ	
CFU activation	Your activity is confirmed (CZ)
CFU deactivation	Your activity is confirmed (CZ)
CFU verification	Your activity is confirmed (CZ)

**Table E.17c: Notifications**

	<b>DK</b>
CFU activation	The order is registered (DK)
CFB activation	The order is registered (DK)
CFNR activation	The order is registered (DK)
CFU deactivation	The order is registered (DK)
CFB deactivation	The order is registered (DK)
CFNR deactivation	The order is registered (DK)
CFU verification	The data is the same as dialled (DK)
CFB verification	The data is the same as dialled (DK)
CFNR verification	The data is the same as dialled (DK)
CFU interrogation	Yes, the service is activated (DK)
CFB interrogation	Yes, the service is activated (DK)
CFNR interrogation	Yes, the service is activated (DK)

**Table E.17d: Notifications**

	<b>F</b>
CFU activation	dial tone
CFB activation	dial tone
CFNR activation	dial tone
CFU deactivation	dial tone
CFB deactivation	dial tone
CFNR deactivation	dial tone
CFU verification	dial tone
CFB verification	dial tone
CFNR verification	dial tone

**Table E.17e: Notifications**

	<b>IS</b>
CFU activation	The request for the services has been made (IS)
CFB activation	The request for the services has been made (IS)
CFNR activation	The request for the services has been made (IS)
CFU deactivation	The request for the services has been made (IS)
CFB deactivation	The request for the services has been made (IS)
CFNR deactivation	The request for the services has been made (IS)

**Table E.17f: Notifications**

	<b>M</b>
CFU activation	Special information tone
CFB activation	Special information tone
CFNR activation	Special information tone
CFU deactivation	Special information tone
CFB deactivation	Special information tone
CFNR deactivation	Special information tone
CFU verification	Your specified service is activated (M, UK)
CFB verification	Your specified service is activated (M, UK)
CFNR verification	Your specified service is activated (M, UK)
CFU interrogation	Your specified service is activated (M, UK)
CFB interrogation	Your specified service is activated (M, UK)
CFNR interrogation	Your specified service is activated (M, UK)

**Table E.17g: Notifications**

	<b>NL</b>
CFU activation	Positive indication tone (equal to special dial tone)
CFU deactivation	Positive indication tone (equal to special dial tone)
CFU verification	Positive indication tone (equal to special dial tone)

**Table E.17h: Notifications**

	<b>N</b>
CFU activation	confirmation tone
CFB activation	confirmation tone
CFNR activation	confirmation tone
CFU deactivation	confirmation tone
CFB deactivation	confirmation tone
CFNR deactivation	confirmation tone

**Table E.17i: Notifications**

	<b>PL</b>
CFU activation	Confirmation tone or announcement
CFB activation	Confirmation tone or announcement
CFU deactivation	Confirmation tone or announcement
CFB deactivation	Confirmation tone or announcement
CFU verification	Confirmation tone or announcement
CFB verification	Confirmation tone or announcement
CFU interrogation	Confirmation tone or announcement
CFB interrogation	Confirmation tone or announcement

**Table E.17j: Notifications**

	<b>P-TP</b>
CFU activation	Your instruction has been executed (P)
CFU deactivation	Your instruction has been executed (P)

**Table E.17k: Notifications**

	<b>P-TLP</b>
CFU activation	Special Dial Tone (soon changed to announcement)
CFB activation	Special Dial Tone (soon changed to announcement)
CFNR activation	Special Dial Tone (soon changed to announcement)
CFU deactivation	Special Dial Tone (soon changed to announcement)
CFB deactivation	Special Dial Tone (soon changed to announcement)
CFNR deactivation	Special Dial Tone (soon changed to announcement)

**Table E.17l: Notifications**

	<b>SF</b>
CFU activation	SDT or announcement "service is activated" (SF, S, UK)
CFB activation	SDT or announcement "service is activated" (SF, S, UK)
CFNR activation	SDT or announcement "service is activated" (SF, S, UK)
CFU deactivation	DT or announcement "service is deactivated" (SF, S, UK)
CFB deactivation	DT or announcement "service is deactivated" (SF, S, UK)
CFNR deactivation	DT or announcement "service is deactivated" (SF, S, UK)
CFU interrogation	announcement with C number (SF, S, UK)
CFB interrogation	announcement with C number (SF, S, UK)
CFNR interrogation	announcement with C number (SF, S, UK)

**Table E.17m: Notifications**

	<b>RO</b>
CFU activation	??
CFB activation	??
CFNR activation	??
CFU deactivation	??
CFB deactivation	??
CFNR deactivation	??
CFU verification	Announcement (RO)
CFB verification	Announcement (RO)
CFNR verification	Announcement (RO)
CFU interrogation	Announcement (RO)
CFB interrogation	Announcement (RO)
CFNR interrogation	Announcement (RO)

**Table E.17n: Notifications**

	<b>E</b>
CFU activation	Dial tone
CFB activation	Dial tone
CFNR activation	Dial tone
CFU deactivation	Dial tone
CFB deactivation	Dial tone
CFNR deactivation	Dial tone
CFU verification	Dial tone
CFB verification	Dial tone
CFNR verification	Dial tone
CFU interrogation	Dial tone
CFB interrogation	Dial tone
CFNR interrogation	Dial tone

**Table E.17o: Notifications**

	<b>S</b>
CFU activation	Your order has been received, please replace the handset (S)
CFB activation	Your order has been received, please replace the handset (S)
CFNR activation	Your order has been received, please replace the handset (S)
CFU deactivation	Your order has been received, please replace the handset (S)
CFB deactivation	Your order has been received, please replace the handset (S)
CFNR deactivation	Your order has been received, please replace the handset (S)
CFU verification	The answer is yes
CFB verification	The answer is yes
CFNR verification	The answer is yes
CFU interrogation	The answer is yes
CFB interrogation	The answer is yes
CFNR interrogation	The answer is yes

**Table E.17p: Notifications**

	<b>CH</b>
CFU activation	"The service is activated. The registered C number is: <DNc>" (D, F, I)
CFU deactivation	"The service is deactivated" (D, F, I)
CFU interrogation	Either one of the above mentioned announcements

#### E.4.7 Call forwarding via overwrite and restrictions

Is activation of call forwarding via overwrite allowed; if not please provide details of notification to subscriber? Is deactivation of call forwarding when not active treated as successful; is it charged for, or not; and what notification is given to the subscriber if deactivation is not treated as successful? Is there a forwarding destination restriction list; and if so, what notification is provided to the subscriber when the forwarding DN is on the restriction list? Are there screening options on the forwarded to number which can be specified per served user?

**Table E.18: Call forwarding via overwrite and restrictions**

Country code	Activation via overwrite (put <i>yes</i> , or <i>no</i> , and notification)	Deactivation of call forwarding (put <i>no</i> , and notification or <i>yes</i> and <i>charge</i> or <i>no charge</i> )	Forwarding destination restriction list (put <i>no</i> or <i>yes</i> and notification)
B	no, special information tone	no, special information tone	??
CY	yes	yes, no charge	no
CZ	yes	??	yes, congestion tone
DK	yes	yes, no charge	no
SF	(note)	(note)	yes, congestion or announcement
F	yes, dial tone	yes, dial tone	yes, busy tone
D	yes	yes, no charge	yes, announcement
H	yes	yes, no charge	no
IS	yes	yes, no charge	no
IR	no, busy	??	no
I	yes	yes, no charge	no
M	yes	yes, no charge	yes, busy tone
NL	yes	yes, no charge	yes, rejection tone
N	yes	yes, no charge	no
PL	yes	yes, no charge	yes, treatment not known
P-TP	yes	yes, charge	no
P-TLP	yes	yes, no charge	no
RO	yes	(note)	yes: dependent on note
E	yes	yes, no charging	yes, congestion tone
S	yes	yes, no charging	yes
CH	yes	yes, no charge	yes, congestion

NOTE: Depends on PNO and/or switch manufacturer.

### E.4.8 Forwarded to number screening

What types of general screening on the forward to number are carried out to validate if the number is an allowed destination?

**Table E.19: Forwarded to number screening**

Country code	Screening	Invalid DN screening	Own DN not allowed	Operator not allowed	International not allowed	Payphone not allowed	OCB not allowed	Emergency not allowed	Special services not allowed	mobile not allowed	Voice BSG supported
B	yes	x	x				x	x			
CY	yes	x		x	x		x				
CZ							x	x			
DK	yes			x			x	x			x
SF	(note 1)							x			
F	yes	x	x	x	(note 4)		(note 5)	x	x		
D	yes			x	x		x	x	x		
H	yes	x	x	x			x				
IS	no										
IR	(note 2)	x	x	x	x					x	
I	yes		x					x			
M	yes			x	x					x	
NL	yes	x	x	x	x						
N	(note 3)	x	x	x			x	x			
PL	yes	x	x		x	x		x			
P-TP	no										
P-TLP	no										
RO	yes	x	x	x	x		x	x			
E	yes			x	x		x	x			
S	yes		x	x					x		
CH	yes			x			x	x			
NOTE 1: Depending on PNO and/or Manufacturer. NOTE 2: Call can only be forwarded within own region. NOTE 3: Specific call forwarding barring programmes supported. NOTE 4: Screening with P.A. NOTE 5: Screening of the forwarded number at activation if OCB is activated before CF, or at invocation if OCB is activated after CF.											



## E.5 Subscriber notifications

### E.5.1 Calling user notifications

Can the calling user receive a notification that the call is forwarded, and if so, what is the notification and how can the notification be selected/specified?

Table E.21: Calling user notification

Country code	Supported	Fixed	How selected/specified if not fixed		
			Per subscriber	Per call forwarding supplementary service	Per bearer service group
B	no				
CY	no				
CZ	no				
DK	no				
SF	yes	no	x		
F	no				
D	no				
H	no				
IS	no				
IR	no				
I	yes	yes			
M	no				
NL	no				
N	no				
PL	no				
P-TP	no				
P-TLP	no				
RO	unknown				
SK					
E	no				
S	yes (CFNR)	no		x	
CH	no				

## E.5.2 Served user notifications

### E.5.2.1 Reminder notification

Will the served user receive a reminder notification that call forwarding is active when originating a call, and if so, what is the notification and how can the notification be selected/specified?

**Table E.22: Served user reminder notification**

Country code	Supported	Notification	If supported, how specified/selected		
			Per subscriber	Per call forwarding supplementary service	Per bearer service group
B	yes	SDT	x		
CY	yes	SDT		x	
CZ	yes	SDT		x	
DK	no				
SF	yes	SDT	x		
F	yes	SDT		x	
D	yes	??		x	
H	yes	??	x		
IS	yes	SDT	x		
IR	no				
I	yes	SDT			
M	(note)		x		
NL	yes	SDT			
N	yes	SDT			
PL	yes	SDT		x	
P-TP	yes	SDT		x	x
P-TLP	yes	SDT		x	
RO	??				
E	yes	SDT		x	
S	yes	SDT		x	
CH	no				

Where:

SDT = Special Dial Tone.

NOTE: Depending on the switch manufacturer.

### E.5.2.2 Served user call forwarding indication

Can the served user receive a notification that a call has been forwarded (e.g. via a short ring)? If so, what is the notification and how can it be selected/specified?

All replies (when answered) indicated this was not supported.

### E.5.3 Forwarded to user notifications

Can the forwarded to user receive a notification that the call is forwarded. If so what is the notification and how can be selected/specified?

All replies (when answered) indicated this was not supported.

## E.6 Supplementary service operation

### E.6.1 No reply timer

Table E.23 No reply timer

Country code	Timer	Office range	Interval	Subscriber range	Interval
CY	30	0 - 127	1	-	-
CZ					
DK	15	5 - 60	1	5 - 60	1
SF	15/30 (note)	15 - 30			
D	15	0 - 120	4	-	-
H	30	0 - 60	5	0 - 60	5
IS	20	20	-	-	-
M	30	0 - 60	??	-	-
N	20	5 - 60	1	-	-
P-TLP	15	0 - 60	5	-	
RO	(note)	(note)			
E	15	-	-	-	-
S	30	5 - 60	-	5 - 60	-
F	20	10 - 40	-	-	-

NOTE: Depends on PNO and/or manufacturer.

### E.6.2 Charging

Table E.24: Charging

Country code	A-B leg	B-C leg	Activation	Deactivation	Verification	Interrogation	Periodic charging	Usage sensitive	Flat rate
B	A	B	x						
CY	A	B	x						
CZ	A	B							
DK	A	B						x	
SF	A	B							
F	A	B	x						
D	A	B							x
H	A	B							
IS	A	B							
IR	A	I*	x						
I	A	B	x	x		x			
M	A	B	x						
NL	A	B	x		x				
N	A	B*							
PL	A	B	x	x	x	x	x	x	
P-TP	A	B							x
P-TLP	A	B							x
RO	??	??							x
E	A	B							x
S	A	B							
CH	A	B							

I\* In Ireland forwarding can only be done within own region. There are no charges for the B-C leg of the call.  
B\* B subscriber is charged. If C is within same charging zone no charges apply.

E.6.3 Simultaneous forwarding, served user number passing and forwarding notification

Table E.25: Simultaneous forwarding, served user number passing and forwarding notification

Country code	Same exchange	Different exchange	Served user number passing	Forwarding notification on destination display	
				Support	Per service
B	??	??	no	no	-
CY	no restrictions	no restrictions	no	no	-
CZ	1	1	no	no	-
DK	3	3	no	no	-
SF	(note 1)	(note 1)	yes	no	-
F	no restrictions	no restrictions	(note 5)	no	-
D	1	1	no	no	-
H	no restrictions	no restrictions	no	no	-
IS	(note 4)				
IR	1	1	no	no	-
I	1	1	no	no	-
M	(note 4)		no	no	-
NL	no restrictions	no restrictions	no	no	
N	5 (note 2)	5 (note 2)	(note 3)	yes	yes
PL	1	1	no	no	-
P-TP	no restrictions	no restrictions	no	no	-
P-TLP	1	1	yes	??	-
RO	??	??	??	no	
E	1	1	no	-	-
S	no restrictions	no restrictions	yes	no	-
CH	(note 1)	(note 1)	no	no	-
NOTE 1: Depending on PNO and/or Manufacturer. NOTE 2: Can also be set to unlimited. NOTE 3: Depends on call forwarding served user subscription option (default the number is passed). NOTE 4: Limited by number of lines in the PBX or between the exchanges. NOTE 5: Yes, if provided by the used network signalling system.					

**E.6.4 Forwarding of call from an operator**

What will happen if a call from an operator to a call forwarding subscriber meets the forwarding condition?

**Table E.26: Operator interaction**

<b>Country code</b>	<b>interaction</b>
B	??
CY	??
CZ	??
DK	Depending on operators A category
SF	Call is forwarded
F	Call is forwarded
D	??
H	Ringling is applied to CF subscriber
IS	Call is forwarded
IR	??
I	??
M	??
NL	??
N	Call is forwarded
PL	Ringling is applied to CF subscriber
P-TP	Call is forwarded
P-TLP	Call is forwarded
RO	??
E	Call is forwarded
S	Depending on Operator choice
CH	Ringling is applied to CF subscriber

## E.7 Supplementary service interaction

### E.7.1 Call forwarding

Next table gives the (maximum) number of sequential forwardings intra - and interexchange. In addition it specifies what will be done of the limit is reached and the last forwarding is CFNR as well as if the last but one party was CFNR: clear call, keep ringing at last party call will terminate back to last CFNR party.

**Table E.27: Call forwarding**

Country code	Intra-exchange	Inter exchange	Last party CFNR	Last but 1 party CFNR
B	5	5		
CY	1	no restrictions		
CZ				
DK	(note 1)	(note 1)	ringing	ringing at last CFNR
SF	(note 2)	5	ringing	cleared
F	1	1	ringing	-
D	1	1	??	??
H	1	1 - 2	cleared	cleared
IS	1	1	ringing	-
IR	1	1	??	??
I	2	1		
M	1	1	??	??
NL	1	1	-	-
N	5	5	ringing	ringing at last CFNR
PL	1	1	cleared	-
P-TP	5	5	-	-
P-TLP	5	5	cleared	cleared
RO	(note 2)	(note 2)		
E	unlimited	unlimited	-	-
S	2	2	ringing	ringing at last CFNR
CH	5	5	-	-
NOTE 1:	Today there is no limit. Limit will be set to 6 in 1995/1996.			
NOTE 2	Depending on PNO and/or Manufacturer.			

**E.7.2 Outgoing call barring**

Is outgoing call barring supported in the network and if so, what service has priority when activating call forwarding and on invocations of call forwarding if the forward to destinations meet OCB blocking criteria?

**Table E.28: Outgoing call barring**

Country code	OCB support	Activation of CF		Invocation of CF		
		Priority	Notification	Priority OCB-F	Priority OCB-UC	Notification when OCB has priority
B	yes	OCB	special information tone	OCB-F	OCB-UC	special information tone
CY	yes	OCB	congestion tone or announcement	CF	CF	-
CZ		OCB	congestion tone	CF	CF	-
DK	yes	OCB	announcement	OCB-F	OCB-UC	announcement
SF	yes	OCB	(note)	OCB-F	OCB-UC	(note 1)
F	yes	OCB	busy tone	OCB-F	CF	busy tone
D	yes	OCB	announcement	OCB-F	CF	announcement
H	yes	OCB	??	CF	CF	-
IS	yes	OCB	??	CF	CF	-
IR	yes	OCB	??	OCB-F	OCB-UC	busy tone
I	yes	CF	-	OCB-F	OCB-UC	??
M	yes	OCB	??	??	??	??
NL	yes	OCB	rejection tone	CF	CF	-
N	yes	OCB	announcement	CF	CF	-
PL	yes	OCB	??	OCB-F	OCB-UC	not answered
P-TP	yes	OCB	??	CF	CF	-
P-TLP	yes	CF		OCB-F	OCB-UC	congestion tone
RO	yes	OCB				
E	yes	OCB	congestion tone	OCB-F	OCB-UC	congestion tone
S	yes	OCB	announcement	-	-	-
CH	yes	CF	announcement	OCB-F	OCB-UC	

NOTE: Depending on PNO and/or manufacturer.

**E.7.3 Call waiting**

Is call waiting supported by the network. If so can a forwarded call be offered as a waiting call. Can both call forwarding and call waiting be active for a subscriber, and if so what are the priorities?

**Table E.29: Call waiting**

Country code	Support	As waiting call	Both active	Priority		
				CFU	CFB	CFNR
B	no					
CY	yes	yes	yes	CFU	CFB	CW
CZ	no					
DK	yes	yes	yes	CFU	CW	CW_CFNR
SF	yes	yes	yes	CFU	CW	CW_CFNR
F	yes	yes	yes	CFU	CFB	CW
D	yes	yes	yes	CFU	CFB	CW_CFNR
H	yes	yes	yes	CFU	CFB	CFNR
IS	yes	yes	yes	CFU	CW	CW
IR	yes	yes	no	-	-	-
I	yes	yes	yes	CFU	-	-
M	(note 1)	yes	yes	CFU	CW	CW_CFNR
NL	not yet	yes	yes	CFU	-	-
N	yes	yes	yes	CFU	CW	CW_CFNR
PL	yes	yes	yes	CFU	CFB	CW
P-TP	yes	yes	yes	CFU	-	-
P-TLP	yes	yes	yes	CFU	CW	CW_CFNR
RO	yes	??				
E	yes	yes	yes	CFU	-	CW_CFNR
S	yes	yes	yes	CFU	CW	(note 2)
CH	no	-	-	-	-	-

NOTE 1: Depends on switch manufacturer.  
 NOTE 2: Call will at first be offered as a waiting call. When CFNR timer is less than acceptance timer of CW call will be forwarded. If the CW timer is less than CFNR timer, subscriber will receive busy tone.



**E.7.4 Call transfer**

Is call transfer supported by the network and if so can a forwarded call be transferred.

**Table E.30: Call transfer**

<b>Country code</b>	<b>Support</b>	<b>Transfer forwarded call</b>
B	no	-
CY	yes	yes
CZ	no	-
DK	yes	yes
SF	yes	yes
F	no	-
D	no	-
H	no	-
IS	no	-
IR	no	-
I	no	-
M	no	-
NL	no	-
N	yes	yes
PL	unknown	unkown
P-TP	no	-
P-TLP	yes	yes
RO	yes	unknown
E	no	-
S	yes (corporate customers)	yes
CH	no	-

**E.7.5 Call hold**

Is call hold supported by the network and if so can the newly dialled number forwarded (CFU, CFB, CFNR). Can a call be put on hold before it is answered, and if so what will happen when number has CFNR and no reply timer times out?

**Table E.31: Call hold**

Country code	Support	CFU	CFB	CFNR	On hold before answered	On hold and diverted on no reply	Notification
B	no						
CY	yes	x	x	x	no	-	-
CZ	no						
DK	yes	x	x	x	no	-	-
SF	yes	(note)			no	-	-
F	yes	-	-	-	no	-	-
D	yes	x	x	x	no	-	-
H	no						
IS	yes	x	x	x	no	-	-
IR	no						
I	yes	x	-	-	no	-	-
M	no						
NL	no						
N	yes	x	x	x	yes	yes	none
PL	no						
P-TP	no						
P-TLP	yes	x	x	x	no	-	-
RO	yes	??	??	??	??	??	??
E	yes	x	x	x	??	??	??
S	yes	x	x	x	no	-	-
CH	no						

**E.7.6 Three party service**

Is three party service supported by the network and if so can a call set up by the three party service subscriber be diverted? Can a call be put on hold before it is answered? Can a call on hold be forwarded on no reply?

**Table E.32: Three party service**

Country code	Support	CFU	CFB	CFNR	On hold before answered	On hold and diverted on no reply	Notification
B	no						
CY	yes	x	x	x	no	-	-
CZ	no						
DK	yes	x	x	x	no	-	-
SF	yes	(note)			no	-	-
F	yes	x	x	x	no	-	-
D	yes	x	x	x	no	-	-
H	yes	x	x	x	no	-	-
IS	yes	x	x	x	no	-	-
IR	yes	x	-	-	no	-	-
I	yes	x	-	-	no	-	-
M	(note)	x	x	x	no	-	-
NL	no						
N	yes	x	x	x	yes	yes	none
PL	yes	x	x	-	no	-	-
P-TP	yes	x	-	-	no	-	-
P-TLP	yes	x	x	x	no	-	-
RO	yes	??	??	??	??	??	??
E	yes	x	x	x	??	??	??
S	yes	x	x	x	no	-	-
CH	no						
NOTE: Depends on manufacturer.							

E.7.7 Advice of charge

Table E.33: Advice of charge

Country code	Support	AOC-S	AOC-D	AOC-E
B	no			
CY	no			
CZ	no			
DK	no			
SF	yes		x	
F	yes		x	
D	no			
H	no			
IS	no			
IR	no			
I	yes		x	
M	no			
NL	yes		x	
N	no			
PL	no			
P-TP	no			
P-TLP	yes	x	x	x
RO	no			
E	no			
S	no			
CH	yes		x	

E.7.8 Calling line identification presentation

Table E.34: Calling line identification presentation

Country code	Support	PSTN	
		DN displayed	Fowarding service displayed
B	no		
CY	no		
CZ	no		
DK	yes	none	-
SF	yes	(note 1)	(note 2)
F	1996	A	Bn (1998)
D	yes	A & B	-
H	yes	A	none
IS	no		
IR	no		
I	yes	B	none
M	no		
NL	no		
N	yes	none	none
PL	no		
P-TP	no		
P-TLP	yes	A	??
RO	no		
E	no		
S	1994/1995	B	Last forwarding
CH	no		
NOTE 1: If both A and B are available A is presented. If only B is available B is presented.			
NOTE 2: Depends on PNO.			

### E.7.9 Calling line identification restriction

If a call (from A) is forwarded (via B) to the C subscriber and the C subscriber has calling line identification presentation, what directory number will be presented at C?

**Table E.35: Calling line identification restriction**

Country code	Support	Indication when A CLIR
B	no	
CY	no	
CZ	no	
DK	yes	none
SF	yes	none
F	yes	none
D	yes	none
H	yes	none
IS	no	
IR	no	
I	yes	B
M	no	
NL	no	
N	yes	none
PL		
P-TP	no	
P-TLP	yes	A has CLIR
RO	no	
E	no	
S	1994/1995	B
CH	yes	
NOTE In Switzerland CLIR is provided by law.		

### E.7.10 Malicious call identification

**Table E.36: Malicious call identification**

Country code	Support	Single call forwarding to MCID subscriber	Sequential call forwarding to MCID subscriber
B			
CY	yes	A & B	-
CZ	yes	A & B	-
DK	yes	A & B	A & Bn
SF	yes	A & B	A & Bn
F	yes	A	A & Bn (1998)
D	yes	A & B	-
H	yes	A	A
IS	yes	A & B	-
IR	no		
I	yes	A	-
M	yes	A	-
NL	yes	A & B	-
N	yes	A & B	A & B1 & Bn
PL	yes	A	
P-TP	yes	B	Bn
P-TLP	yes	A & B	A & B1 & Bn
RO	no		
E	yes	??	??
S	yes	B	Bn
CH	yes	A & B	A & B1 & Bn

## E.8 Interworking

Table E.37: Interworking

Country code	PSTN PSTN PSTN	PSTN PSTN ISDN	PSTN PSTN Mobile	ISDN PSTN PSTN	ISDN PSTN ISDN	ISDN PSTN Mobile	Mobile PSTN PSTN	Mobile PSTN ISDN	Mobile PSTN Mobile	Sequential forwarding support
B	x	x	x	x	x	x	x	x	x	??
CY	x	1994	x	1994	1994	1994	x	1994	x	full support
CZ	x		x				x		x	no
DK	x	x	x	x	x	x	x	x	x	full support
SF	x	x	x	x	x	x	x	x	x	full support
F	x	x	x	x	x	x	(note)	(note)	-	no
D	x	x	x	x	x	x	x	x	x	partly supported.
H	x	x	x	x	x	x	x	x	x	full support
IS	x		x				x		x	-
IR	x	x		x	x		x	x		-
I	x	x	x	x	x	x	x	x	x	partly supported
M	x						x			no
NL	x	x	x	x	x	x	x	x	x	-
N	x	x	x	x	x	x	x	x	x	full support
PL	x		x				x			no
P-TP	x	x	x							??
P-TLP	x	x	x	x	x	x	x	x	x	full support
RO	x		x				x			no
E	x	x	x	x	x	x	x	x	x	full support
S	x	x	x	x	x	x	x	x	x	full support
CH	x	x	x	x	x	x	x	x	x	full support

NOTE: No for analogue mobile, yes for GSM mobile.

## Annex F: Scope exclusions

The following aspects are excluded from the scope of this ETR:

- a) call forwarding of mobile subscribers, leased lines and non-voice calls;
- b) interactions with supplementary services:
  - call deflection;
  - call forwarding to number in group;
  - partial call barring;
  - incoming call barring + incoming call barring for call forwarding;
  - abbreviated dialling;
  - bypass number;
  - CLIP interaction with call waiting;
  - COLP;
  - COLR;
  - closed user group;
  - user to user information;
- c) remote subscriber control;
- d) measurements;
- e) provisioning/repair time;
- f) quality of service;
- g) contract issues.



## History

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