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The User Network Interface of the Public ISDN

Summary

This document describes the user network interfaces at the T reference point and the coincident S and T reference point as implemented in the public ISDN of Swisscom. The description includes the physical layer and the Digital Subscriber Signalling System No. one (DSS1) protocol to support the basic and supplementary services. It is intended as a guide for manufacturers of customer premises equipment.

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1 Scope

This document is intended as a guide for manufacturers of customer premises equipment. It describes the user-network interfaces at the T reference point and the coincident S and T reference point as implemented in the public ISDN of Swisscom. The description includes the physical layer and the Digital Subscriber Signalling System No. one (DSS1) protocol to support the basic and supplementary services. In addition, the document contains some recommendations for the implementation in user equipment

The physical layer (layer 1) and the DSS1 protocol for the ISDN operated by Swisscom is fully based on European Telecommunication Standards/European Standards (ETS/EN). These standards give freedom to various options. Therefore additions are necessary to describe a specific implementation.

This document describes how specific functionalities are implemented, but it does not specify which services or functions are commercially offered.

In the ISDN operated by Swisscom (Switzerland) Ltd. different types of switching systems are in use. Therefore the functionalities are not exactly the same in the whole network. If a feature is not supported in all switching systems the text contains an indication like "not supported in some network parts" or "supported in some network parts only".

This document also contains some information about centrex accesses. However, for historical reasons the behaviour in this area is not identical in all switching systems. Therefore the actual implementations may differ from this description.

The content of referenced ETS/ENs is not reproduced in this document. Where necessary the texts of the ETS/ENs are commented, clarified or modified. The numbering and titles of the clauses and subclauses of the ETS/ENs which are modified is reproduced in the individual chapters of this document (marked with the leading character §).

ETS/ENs can be difference (delta) documents to ITU Recommendations which endorse the ITU text with some modifications. In this case the Swisscom description refers to the text that results after the ITU Recommendation has been modified with the ETSI delta ("[Q.xxx] as modified by [ETS/EN xxx xxx]").

2 References

- [ETS 300 007] Integrated Services Digital Network (ISDN); Support of packet mode terminal equipment by an ISDN; ETS 300 007, November 1991
- [ETS 300 011] Integrated Services Digital Network (ISDN); Primary rate user-network interface (UNI); Part 1: Layer 1 specification; ETS 300 011-1, second edition, March 1998
- [ETS 300 012] Integrated Services Digital Network (ISDN); Basic user-network interface (UNI); Part 1: Layer 1 specification; ETS 300 012-1, second edition, October 1998
- [ETS 300 048] Integrated Services Digital Network (ISDN); ISDN Packet Mode Bearer Service (PMBS) ISDN Virtual Call (VC) and Permanent Virtual Call (PVC) bearer services provided by the B-channel of the user access - basic and primary rate; ETS 300 048, January 1992
- [ETS 300 049] Integrated Services Digital Network (ISDN); ISDN Packet Mode Bearer Service (PMBS) ISDN Virtual Call (VC) and Permanent Virtual Call (PVC) bearer services provided by the D-channel of the user access - basic and primary rate; ETS 300 049, January 1992
- [EN 300 052] Integrated Services Digital Network (ISDN); Multiple Subscriber Number (MSN) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 052-1, V1.2.4 (1998-06)
- [EN 300 055] Integrated Services Digital Network (ISDN); Terminal Portability (TP) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 055-1, V1.2.4 (1998-06)
- [EN 300 058] Integrated Services Digital Network (ISDN); Call Waiting (CW) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 058-1, V1.2.4 (1998-06)
- [EN 300 061] Integrated Services Digital Network (ISDN); Subaddressing (SUB) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 061-1, V1.2.4, (1998-06)
- [EN 300 064] Integrated Services Digital Network (ISDN); Direct Dialling In (DDI) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 064-1, V1.3.4 (1998-06)
- [EN 300 092] Integrated Services Digital Network (ISDN); Calling Line Identification Presentation (CLIP) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 092-1, V2.2.1 (2001-02)
- [EN 300 093] Integrated Services Digital Network (ISDN); Calling Line Identification Restriction (CLIR) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 093, V1.2.4 (1998-06)
- [EN 300 097] Integrated Services Digital Network (ISDN); Connected Line Identification Presentation (COLP) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 097-1, V1.2.4 (1998-06)

[EN 300 098]	Integrated Services Digital Network (ISDN); Connected Line Identification Restriction (COLR) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 098-1, V1.2.4 (1998-06)
[EN 300 130]	Integrated Services Digital Network (ISDN); Malicious Call Identification (MCID) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 130-1, V1.2.4 (1998-06)
[EN 300 138]	Integrated Services Digital Network (ISDN); Closed User Group (CUG) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 138-1, V1.3.4 (1998-06)
[ETS 300 141]	Integrated Services Digital Network (ISDN); Call Hold (HOLD) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; ETS 300 141-1, May 1992
[EN 300 182]	Integrated Services Digital Network (ISDN); Advice of Charge (AOC) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 182-1, V1.3.6 (1999-09)
[EN 300 188]	Integrated Services Digital Network (ISDN); Three-Party (3PTY) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 188-1, V1.2.4 (1998-06)
[EN 300 195]	Integrated Services Digital Network (ISDN); Supplementary services interactions; Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 195-1, V1.4.3 (1998-10)
[EN 300 196]	Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 196-1, V1.3.2 (2001-6)
[EN 300 207]	Integrated Services Digital Network (ISDN); Diversion supplementary services (CDIV); Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 207-1, V3.1.1(2001-06)
[EN 300 267]	Integrated Services Digital Network (ISDN); Telephony 7 kHz and Videotelephony teleservices; Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 267-1, V1.2.2, (1998-04)
[EN 300 286]	Integrated Services Digital Network (ISDN); User-to-User Signalling (UUS) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 286-1, V1.2.4 (1998-06)
[EN 300 359]	Integrated Services Digital Network (ISDN); Completion of Calls to Busy Subscriber (CCBS); Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 359-1, V1.2.4 (1998-06)
[EN 300 369]	Integrated Services Digital Network (ISDN); Explicit call transfer (ECT) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 369-1, V1.2.4 (1998-10)

[ETS 300 402-2]	Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Data link layer; Part 2: General protocol specification; ETS 300 402-2, November 1995
[EN 300 403-1]	Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 1: Protocol specification; EN 300 403-1, V.1.3.2 (1999-11)
[EN 300 403-2]	Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 2: Specification and Description Language (SDL) diagrams; EN 300 403-2, V1.3.1 (2000-11)
[ETS 300 485]	Integrated Services Digital Network (ISDN); Definition and usage of cause and location in Digital Subscriber Signalling System No. one (DSS1) and Signalling System No.7 ISDN User Part (ISUP); ETS 300 485, January 1996
[EN 300 745]	Integrated Services Digital Network (ISDN); Message waiting indication (MWI) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; EN 300 745-1, V1.2.4 (1998-06)
[EG 201 018]	Integrated Services Digital Network (ISDN); Application of the Bearer Capability (BC), High Layer Compatibility (HLC) and Low Layer Compatibility (LLC) information elements by terminals supporting ISDN services; EG 201 018, V1.5.1 (1998-03)
[EN 60950]	Sicherheit von Einrichtungen der Informationstechnik; EN 60590 + A1 + A2 + A3 + A4, 08-1992
[ES 201970]	Access and Terminal (AT); Public Switched Telephone Network (PSTN); Harmonized specification of physical characteristic at 2-wire analogue presented Network Termination Point (NTP); ES 201 970 (2002 08)
[G.704]	Synchronous frame structures used at 1544, 6312, 2048, 8448 and 44736 kbit/s hierarchical levels; ITU-T Recommendation G.704, Edition 10-1998
[G.706]	Frame alignment and cyclic redundancy check (CRC) procedures related to basic frame structures defined in Recommendation G.704; ITU-T Recommendation G.703, Edition 04-1991
[Q.850]	Usage of cause and location in the digital subscriber signalling System No. 1 and the signalling system No. 7 ISDN user part; ITU-T Recommendation Q.850, Edition 05/98
[Q.921]	Digital Subscriber signalling system No. 1 - ISDN user-network interface - data link layer specification; ITU-T Recommendation Q.921, Edition 03/93
[Q.931]	Digital subscriber signalling system No. 1 (DSS1) - ISDN user-network interface - layer 3 specification for basic call control; ITU-T Recommendation Q.931, Edition 03/93
[X.208]	Specification of Abstract Syntax Notation One (ASN.1); CCITT Recommendation X.208 (1988)
[X.219]	Remote Operations: Model, Notation and Service Definitions; CCITT Recommendation X.219 (1988)

3 Physical layer (layer 1)

The network supports the basic and primary rate accesses.

3.1 Basic access

Layer 1 of the basic rate interface is implemented according to [ETS 300 012].

The network supports the "short passive bus" wiring configuration according to [ETS 300 012], subclause A.2.1.1 for both the point-to-multipoint and the point-to-point access configuration.

In the point-to-multipoint configuration layer 1 is normally not permanently activated. The user is responsible for the activation in case of outgoing calls. For incoming calls the network activates layer 1.

Note: In special cases the network may keep layer 1 permanently activated.

In the point-to-point configuration layer 1 is permanently activated.

§9.7 Isolation from external voltages

Valid with the following addition:

Safety requirements have to be implemented according to [EN 60950] + A1 + A2 + A3 + A4.

3.2 Primary rate access

Layer 1 of the primary rate interface is implemented according to [ETS 300 011].

§4.4 Interface connector

Valid with the following addition:

The shielded connector (RJ-45) is claimed.

§6.6 Allocation of time slots

Valid with the following addition:

H0 and H1 channels are not supported.

§6.8.1.1 Loss of basic frame alignment

Valid with the following addition:

Basic frame alignment is also lost when bit 2 in time slot 0 in frames not containing the frame alignment signal has been received with an error on three consecutive occasions.

§6.8.3.2 Monitoring for false basic frame alignment

Valid with the following addition:

Note 1 in §4.3.2 in [G.706] should be considered.

§6.8.3.3 Error performance monitoring using CRC-4

Valid with the following addition:

Option b) "integrated information" is not supported.

§7.2.2.2 CRC processing in the digital transmission link

Supported.

§9.1 Provision of power

Valid with the following addition:

Power feeding from UNI to NT1 and NT1 to UNI is not supported.

§9.4 Safety requirements

Valid with the following addition:

TE: galvanic isolation is prescribed.

4 Layer 2: Application of ETS 300 402-2 (Q.921) by the public network

The data link layer is supported by the public network according to [ETS 300 402-2]. In addition the following specifications are applied:

Relating to layer 2 of DSS1 different types of interfaces as indicated in the table below are supported by the public network:

Parameter	Type of interface			Notes
	1	2	3	
Access type	Basic access		Primary rate access	
Access configuration	pt-mpt	pt-pt	pt-pt	4.1
Broadcastlink SAPI=0 / TEI = 127	yes	no	no	4.2
SAPI=0 point-to-point links established permanently by the network	no	yes	yes	4.3
Max. supported SAPI=0 point-to-point links per interface	8	1	1	4.4
Max. supported point-to-point links per interface with SAPI=16	4	4	see Note 4.5	4.5

The significance of the individual parameters used in the table above shall be as follows:

- 4.1 pt-mpt: Point-to-Multipoint
pt-pt: Point-to-Point
- 4.2 On interface type 1 the SETUP message is delivered by the public network to the user by using the UI-frame. In all other situations I-frames are used for conveying layer 3 messages.
- 4.3 For interface type 1 the user is responsible for establishing and releasing SAPI=0 point-to-point data links.

Recommendation: User equipment connected to interface type 1 should always release the layer 2 connection within 2 .. 8 seconds after releasing the last call reference.

For interface types 2 and 3 the public network establishes the SAPI=0 link and keeps it permanently in the state "multiple frame established". The public network also accepts establishment attempts of the user.

- 4.4 On interface type 1 the public network supports the multiple frame operation of up to 8 SAPI=0 links simultaneously. This in addition to possible SAPI=16 links.
- 4.5 Links with SAPI=16 are supported only if the corresponding services are allocated to the user access (i.e. packet mode bearer services on the D-channel according to chapter 8).
- On interface type 1 the public network supports the multiple frame operation of up to 4 links with SAPI=16. This in addition to possible SAPI=0 links.
- On interface type 2 the public network supports the multiple frame operation of up to 4 links with SAPI=16. This in addition to the SAPI=0 link.
- On interface type 3 the public network need not to support the multiple frame operation of any links with SAPI not equal to 0. This in addition to the SAPI=0 link.
- Depending on subscription options, point-to-point links with SAPI=16 may be established and maintained by the public network on each type of interface. See also chapter 8 of this document.
- 4.6 The value TEI=0 is used for interface types 2 and 3. For these interface types a possible SABME frame from the user indicating a TEI value not equal to 0 in combination with SAPI=0 may be rejected by the public network with a DM response frame.
- For interface type 1 the public network need not be able to support the multiple frame operation, if requested by the user with a SABME frame indicating SAPI=0 / TEI=0.
- 4.7 In conjunction with the packet switched data transmission service on the D-channel (see chapter 8.4) the TEI value is assigned by Swisscom (TEI range: 0 ... 63).

5 Layer 3, Basic call: Application of EN 300 403-1 (Q.931) by the public network

Layer 3 circuit mode basic call is supported by the public network according to [EN 300 403-1], which is based on [Q.931]. The following additional information relates to the individual paragraphs of [Q.931] as modified by [EN 300 403-1].

§3 Message functional definitions and content

§3.1 Messages for circuit mode connection control

§3.1.3 CONNECT

If received from the called user, the public networks conveys the low layer compatibility information element to the calling access.

The Date/Time information element is always included by the public network.

§4 General message format and information elements coding

§4.5 Other information elements

§4.5.1 Coding rules

The public network does not use information elements belonging to codesets other than 0.

The public network treats received information elements belonging to codesets other than 0 according to §5.8.7.1 (Unrecognized information element).

§4.5.5 Bearer capability

Regarding octets 3 and 4 the public network accepts all values which correspond to the basic services specified in [EG 201 018]. However the following exception applies: The information transfer rate value "multirate" is not accepted.

Octets 5 to 7 are accepted without checking. However the following exceptions apply:

Exception 1: If the information transfer capability is set to one of the values "speech" or "3.1 kHz audio", then the call may be rejected if the user information layer 1 protocol-field (octet 5) is received with a value other than 00011 (Recommendation G.711 A-law).

Exception 2: If the information transfer capability is set to the value "unrestricted digital information with tones/announcements", then the call may be rejected if the user information layer 1 protocol-field (octet 5) is received with a value other than 00101 (Recommendation H.221 and H.242) or 00110 (Recommendation H.223 and H.245).

In case of receipt of unaccepted values the public network rejects the call.

§4.5.8 Called party number

The following Numbering plan identification values are accepted by the public network: "ISDN/Telephony numbering plan" and "unknown". If "unknown" is received at a public access, the network assumes that "ISDN/Telephony numbering plan" is applicable. If "unknown" is received at a Centrex access, the network assumes that "ISDN/Telephony numbering plan" is applicable for public calls (escape code present) and that "private numbering plan" is applicable for Centrex internal calls.

Within the number digits, in addition to the digits 0-9, the character "#" is supported by the public network (sending complete indication, see §5.1.3).

With regard to the indicator "type of number" and the "number digits" the public network supports the following combinations, if received from the user in one single Called party number information element, or when assembled from more than one information element:

Comb.	type of number	number digits
1	national	national number including the area code but without prefix. Example: 31 338 5557
2	international	international number including country code and area code, but without prefixes. Example: 41 31 338 5557
3	unknown	national number with prefix 0 and including the area code. Example: 031 338 5557 or short numbers e.g. 118
4	unknown	international number with prefixes 00 and including country code and area code. Example: 00 41 31 338 5557

Combinations 1 and 3 for calls within Switzerland. Combinations 2 and 4 are applicable for calls to any destination, including calls within Switzerland (if the country code 41 is used).

If other codepoints or combinations as listed above are received from the user, then the public network rejects the call.

Note: For the network-to-user direction the use of the Called party number information element is described in chapter 9.

§4.5.15 Date/time

Octet 3 has a range from 00 to 99 (binary coded) and represents the two least significant digits of the number of the year. Octet 8 (seconds) is not included.

Note: Octet 8 may be included in later releases of the ISDN

§4.5.16 Display

Except for Centrex accesses the display information element is used for the "Gebühreninformation für den Teilnehmer" supplementary service only.

Note: In future the display information element may also be used for other purposes, e.g. for the support of IN services.

§4.5.17 High layer compatibility

The public network accepts all codepoints corresponding to the basic services specified in [EG 201 018] with the exception of "Eurofile transfer".

§4.5.19 Low Layer compatibility

The public network supports a maximum information element length of 16 octets.

§4.5.21 Network-specific facilities

This information element is not used.

§4.5.24 Repeat indicator

This information element is not used.

§4.5.29 Transit network selection

This information element is not used.

§5 Circuit-switched call control procedures

§5.1 Call establishment at the originating interface

§5.1.3 Overlap sending

The public network applies the tone option if the SETUP message is received with a bearer capability indicating "3.1 kHz audio", "unrestricted digital information with tones/announcements" or "speech" and if in addition no called party number or keypad information is included (i.e. the Called party number or Keypad facility information element is received without number digits / keypad facility information, or the SETUP message does not contain any Called party number or Keypad facility information).

The SETUP ACKNOWLEDGE message contains in this case the Progress indicator information element with the progress description value set to 8.

Both the character "#" and the Sending complete information element are considered to be "sending complete" indications.

§5.1.8 Call connected

The Date/Time information element is always included by the public network.

§5.1.10 Transit network selection

The transit network selection is not supported.

§5.2 Call establishment at the destination interface

§5.2.3 B-channel selection – Destination

It is possible to define a continuous range of B-channels which are not available for indicating an incoming call to the user, but may be seized by the user for outgoing calls

§5.2.4 Overlap receiving

The public network does not support the Overlap receiving procedure. On receipt of a SETUP ACKNOWLEDGE message the procedure of §5.8.4 is applied (Message type or message sequence errors).

§5.3 Call clearing

§5.3.4 Clearing initiated by the network

On clearing of calls the public network applies the procedures of §5.3.4.1 in the following situation:

- if the SETUP message was received or sent with a bearer capability indicating "3.1 kHz audio", "unrestricted digital information with tones/announcements" or "speech",

and if in addition:

- the allocation of a B-channel is possible (or was successful).

In all other situations the public network applies the procedures of §5.3.4.2

§5.3.4.1 Clearing when tones/announcements provided

Recommendation: On receipt of a DISCONNECT message with progress indicator No. 8 user equipment should connect to the B-channel and forward the in-band information (e.g. the announcement of a new number) to the human user (e.g. at an extension of a PABX). Call clearing should be continued when the human user terminates the call (i.e. the RELEASE message should be sent by the user equipment when the user hangs up), or if optionally a supervision timer expires. Since the full length of the announcement may reach one minute, the time-out value should not be set below 60 seconds.

§5.5 Restart procedure

The public network supports the restart procedure when the interface is a primary rate access or a basic access in the point-to-point configuration.

§5.5.1 Sending RESTART message

Sending of RESTART by the public network is optional.

§5.5.2 Receipt of RESTART message

RESTART messages received on point-to-multipoint interface are handled according to §5.8.

§5.6 Call rearrangements

The public network supports the call rearrangement procedures at accesses consisting of one single basic access in the point-to-multipoint configuration.

§5.6.1 Call suspension

The public network truncates the call identity value to a maximum length of eight octets.

§5.8 Handling of error conditions

Recommendation: User equipment should fully conform to this subclause in order to ensure compatibility with future upgrades of the network. Serious problems may arise if the compatibility mechanisms are not implemented completely.

§8 Circuit-mode multirate (64 kbit/s base rate) procedures

These procedures are not supported.

§9 List of system parameters

§9.1 Timers in the network side

Except for timers T302, T306 and T310 the time-out values are as specified in the second column of Table 9.1/Q.931 (notes 1, 5, 6 and 7 deleted).

The time-out values of the network timers T302 and T306 are set to:

T302: 20 seconds

T306: 60 seconds

T310: 30...40 seconds

§Annex C Transit network selection

These procedures are not supported.

§Annex E Network specific facility selection

These procedures are not supported.

§Annex H Message segmentation procedures

The public network supports the segmentation procedure according to ANNEX H in the following cases:

- on receipt of a segmented message from the user
- on reply to a service request from the user if the message required for the provision of the service exceeded a length of 260 octets
- on establishing a call at the destination network side if the SETUP message exceeded a length of 260 octets and if in addition the ISDN access has allocated the characteristic "segmentation procedure applicable".

§Annex K Procedures for establishment of bearer connection prior to call acceptance

These procedures are not supported.

6 Layer 3, basic call, SDLs: Application of EN 300 403-2 by the public network

The SDL diagrams in [EN 300 403-2] are valid for the public network. However, not all branches are actually used. Should any conflict arise between the description text (in chapter 5) and the SDL diagrams, the textual description is definitive.

7 DSS1 protocol to support the 7 kHz Telephony and Videotelephony Teleservices

The public network supports the 7 kHz telephony and videotelephony teleservices according to [EN 300 267].

Note: The audiographic conference and the videoconference teleservices are not supported.

8 DSS1 protocol to support the packet mode services

8.1 Introduction

The D-channel protocol (DSS1) for the support of packet switched services at the reference points S/T coincident and T is basically identical to the D-channel protocol used for circuit switched ISDN services. Therefore in this chapter differences to the protocol for circuit switched services are described only. If not explicitly stated otherwise, the descriptions of chapters 4 to 6 are valid

The following abbreviations for information elements of DSS1 messages are used in this chapter:

BC	Bearer capability
Cd	Called party number
CdS	Called party subaddress
Cg	Calling party number
CgS	Calling party subaddress
CI	Channel identification
Cs	Cause
HLC	High layer compatibility
LLC	Low layer compatibility
PI	Progress indicator
SC	Sending complete
UU	User-user

8.2 Access to packet networks (X.31 Case A)

The DSS1 signalling for the access to packet networks (PSPDN) as specified below is based on [ETS 300 007] and [EG 201 018].

Access to and from packet networks through the ISDN is obtained by making use of the circuit mode bearer service "64 kbit/s unrestricted digital information". The layer 2 of the DSS1 protocol is used according to chapter 4 of this document. Without any further agreement between the user and the operator of the PSPDN, the DSS1 protocol may be used as follows (only application dependent additional requirements against chapter 5 of this document are described here):

8.2.1 Call establishment at the originating user-network interface

In order to establish a B-channel connection to the "Access Unit" (AU) in the PSPDN, the public network expects a SETUP message (DSS1) with the information elements coded as shown below:

BC: Octet 3 = 1/00/01000 (CCITT / unrestricted digital information)

Octet 4 = 1/00/10000 (Circuit mode / 64 kbit/s)

Octet 5,6,7 not contained

Cd: Octet 4 etc. E.164 Number of the interface to the PSPDN

LLC: Octet 3 = 1/00/01000 (CCITT/unrestricted digital information)

Octet 4 = 1/00/10000 (Circuit mode / 64 kbit/s)

Octet 5 = 1/01/01001 (CCITT standard. rate adaption X.31 HDLC flag stuffing)

Octet 6 = 1/10/00110 (CCITT Recommendation X.25 link layer)

Octet 7 = 1/11/00110 (CCITT Recommendation X.25 packet layer)

In addition, the following information elements will be processed by the public network (ISDN) according to normal call handling: SC, CI, Cg, CgS, CdS, CgS, PI, HLC, UU. However, for the access to the PSPDN these information elements may not be required.

Note: The receipt of further information elements may cause a call rejection

The following messages are not used: ALERTING, PROGRESS

On receipt of the CONNECT message the user may proceed with the call set-up by using the X.25 procedures in the established B-channel.

Note 1: In the same B-channel, a number of additional X.25 calls may be established by the user or the network.

Note 2: Charging information, if provided by the public network, does not include charges raised within the packet network.

8.2.2 Call establishment at the destination user-network interface

If the public network has to deliver a terminating X.25 call on an available, not yet used B-channel, then the B-channel connection will be established by using the normal DSS1 procedures. The SETUP message sent to the user will be coded as shown below:

SC: included

BC: Octet 3 = 1/00/01000 (CCITT/unrestricted digital information)

Octet 4 = 1/00/10000 (Circuit mode / 64 kbit/s)

Octet 5,6,7 not contained

CI: included, see [EN 300 403-1], §5.2.3.1

Cg: Presentation restricted indication or E.164 Number of the interface where the call has entered the ISDN (see also Note 1)

Cd: may be included, see Note 2

CdS: may be included, see Notes 3, 4 and 5

LLC: Octet 3 = 1/00/01000 (CCITT/unrestricted digital information)

Octet 4 = 1/00/10000 (Circuit mode / 64 kbit/s)

Octet 5 = 1/01/01001 (CCITT standard. rate adaption X.31 HDLC flag stuffing)

Octet 6 = 1/10/00110 (CCITT Recommendation X.25 link layer)

Octet 7 = 1/11/00110 (CCITT Recommendation X.25 packet layer)

The following information elements are not present: CgS, HLC

Note 1: The information element Cg is included only, if the supplementary service Calling line identity presentation is allocated to the access.

Note 2: The information element Cd is contained only, if one of the supplementary services Multiple Subscriber Number or Direct Dialling In are allocated to the access. The coding of the Cd information element is specified in chapters 9.2 and 9.6.

Note 3: The information element CdS is included only, if the supplementary service Subaddressing is allocated to the access

Note 4: The Packet Handler may generate the CdS information element based on information received in the X.25 Facility "Called address extension". If a new B-channel has to be established for a X.25 call, then the user may receive the called party subaddress by both protocols.

Note 5: The information element CdS is not suitable for terminal selection purposes, since the Called address extension needs not to be considered by the packet handler for the determination, whether a new B-channel has to be established or not. An X.25 call may be offered on an already established B-channel (without DSS1 signalling and therefore without terminal selection possibility) even if the information element CdS is different from that originally used on establishing the given B-channel.

The messages ALERTING and PROGRESS, if received from the called user, will be discarded (by the PSPDN). Information elements within the CALL PROCEEDING, ALERTING, PROGRESS and CONNECT messages will not be conveyed to the calling user (via PSPDN). The CI information element is processed according to [EN 300 403-1], §5.2.3.

8.2.3 Clearing or rejection of a B-channel connection

For the cases of call clearing and call rejection respectively, normal procedures according to chapter 5 apply. However the following restrictions are to be considered:

- Cause Information elements sent to the user may indicate location values "user" when a call clearing is caused by the PSPDN.
- In relation with possible call rejections after completion of a B-channel connection (i.e. after CONNECT) the public network will normally indicate Cause 16 (normal call clearing).

Note: Previous to the B-channel clearing more specific information may be provided by means of a X.25 Cause within the X.25 "clear packet"

If no X.25 call is established or is in the process of establishment, then the public network will clear any B-channel connection 30 seconds after the last DSS1 protocol event.

8.3 Packet switched data transmission on the B-channel (X.31 Case B, B-Channel)

This service is described in [ETS 300 048]. The DSS1 signalling as described below is based on [ETS 300 007].

The SAPI-field in the layer 2 frames used for the establishment of B-channel connections to and from the packet handler shall always be set to the value 0. In relation to layer 3 of the DSS1 protocol the following additions and modifications against chapter 5 of this document are valid:

8.3.1 Call establishment at the originating user-network interface

In order to establish a B-channel connection to the "Packet Handler" (PH), the public network expects a SETUP message (DSS1) with the information elements coded as shown below:

BC: Octet 3 = 1/00/01000 (CCITT / unrestricted digital information)
 Octet 4 = 1/10/00000 (Packet mode / packet)
 Octet 5 not contained
 Octet 6 = 1/10/00110 (CCITT Recommendation X.25 link layer)
 Octet 7 = 1/11/00110 (CCITT Recommendation X.25 packet layer)

 Cd: not contained

In addition, the following information elements are processed by the public network: CI, Cg.

The following optional information elements are ignored by the public network (without being conveyed to the remote user): CdS, CgS, PI, LLC, HLC, UU, SC

Note: The receipt of further information elements may cause a call rejection

The following messages are not used by the public network: ALERTING, PROGRESS, SETUP ACKNOWLEDGE

On receipt of the CONNECT message the user may proceed with the call set-up by using the X.25 procedures in the established B-channel.

Note 1: In the same B-channel, a number of additional X.25 calls may be established by the user or the network.

Note 2: Charging information, if provided by the public network, does not include charges raised within the packet network ".

8.3.2 Call establishment at the destination user-network interface

If the public network has to deliver a terminating X.25 call on an available, not yet used B-channel, then the B-channel connection is established by using the normal DSS1 procedures. The public network sets the information elements within the SETUP message to the following values:

SC: may be included (dependent on the network part)

 BC: Octet 3 = 1/00/01000 (CCITT/unrestricted digital information)
 Octet 4 = 1/10/00000 (Packet mode / packet)
 Octet 5 not contained
 Octet 6 = 1/10/00110 (CCITT Recommendation X.25 link layer)
 Octet 7 = 1/11/00110 (CCITT Recommendation X.25 packet layer)

 CI: included, see [EN 300 403-1], §5.2.3.1 and Note 1

Cg: see Note 2

Octet 3 = 0/000/0001 (Type of number=unknown / ISDN/telephony numb.plan)

Octet 3a =1/01/000/11 (Presentation restricted / Network provided)

Octet 4 not contained

Cd: may be included, see Note 3

CdS: may be included, see Notes 4, 5 and 6

The following information elements are not present: CgS, LLC, HLC

Note 1: It is not possible for the user to receive an incoming X.25 call on an other already established B-channel or on the D-channel.

Note 2: The information element Cg is included only if the supplementary service Calling line identity presentation is allocated to the access.

Note 3: The information element Cd is contained only if one of the supplementary services Multiple Subscriber Number or Direct Dialling In are allocated to the access. The coding of the Cd information element is specified in chapters 9.2 and 9.6.

Note 4: The information element CdS is included only if the supplementary service Subaddressing is allocated to the access

Note 5: The Packet Handler may generate the CdS information element based on information received in the X.25 Facility "Called address extension". If a new B-channel has to be established for a X.25 call, then the user may receive the called party subaddress by both protocols.

Note 6: The information element CdS is not suitable for terminal selection purposes, since the Called address extension needs not to be considered by the packet handler for the determination, whether a new B-channel has to be established or not. An X.25 call may be offered on an already established B-channel (without DSS1 signalling and therefore without terminal selection possibility) even if the information element CdS were different from that originally used on establishing the given B-channel.

Optional information elements, if received within the messages CALL PROCEEDING, ALERTING or CONNECT, are ignored by the public network. Exception: The CI information element is processed according to [EN 300 403-1], §5.2.3. The messages ALERTING and PROGRESS will not be conveyed to the calling user.

8.3.3 Clearing or rejection of a B-channel connection

For the cases of call clearing and call rejection respectively, normal procedures according to chapter 5 apply. However the following restrictions are to be considered:

- Cause Information elements sent to the user may indicate location values "user" even in cases, where a call clearing is caused by the packet network.
- In relation with possible call rejections after completion of a B-channel connection (i.e. after CONNECT) the public network will normally indicate Cause 16 (normal call clearing).

Note : Previous to the B-channel clearing more specific information will be provided by means of a X.25 Cause within the X.25 "clear packet"

If no X.25 call is established or is in the process of establishment, the public network clears any B-channel connection 30 seconds after the last DSS1 protocol event.

8.4 Packet switched data transmission on the D-channel, Method 2 (on demand Layer 2 with fixed TEI values)

This service, which is also called "Permanent Logical Link" (PLL), is described in [ETS 300 049], clause 5.2.2.1.2. Any user equipment supporting this service has to use a TEI value in the range 0 ... 63 which will be assigned by Swisscom at subscription time.

8.4.1 Call establishment at the originating user-network interface

In order to originate a X.25 call on a not yet established link on the D-channel, the user has to establish a layer 2 link with SAPI=16 and with the assigned TEI value according to the procedures of chapter 4. I-frames of SAPI=16 links contain in their information field layer 3 packets according to the X.25 protocol. Call set-up, information transfer and call clearing are controlled by means of the layer 3 procedures of the X.25 protocol. No layer 3 procedures of the DSS1 protocol are used for this service.

8.4.2 Call establishment at the destination user-network interface

If the public network has to deliver a terminating X.25 call on a not yet established D-channel, then the public network establishes a layer 2 link with the procedures according to chapter 4. In doing so the public network uses the assigned TEI value and sets the SAPI value to 16. Subsequently the further call set-up and the data exchange will follow by means of the X.25 packet layer procedures on the established D-channel link.

8.4.3 Clearing or rejection of a D-channel connection

No layer 3 procedures of the DSS1 protocol are used. The clearing of connections is accomplished by X.25 packet layer procedures only. The user may disconnect the SAPI=16 link with the normal procedures of chapter 4. If no X.25 call is established or is in the process of establishment, the public network clears any SAPI=16 link 30 seconds after the last DSS1 or X.25 event.

9 Supplementary services based on the functional protocol

9.1 Application of EN 300 196 (Generic Functional protocol for the support of supplementary services)

The supplementary services of chapter 9 are based on the functional protocol. Therefore the public network supports the generic part of the functional protocol according to [EN 300 196].

Only those functions are implemented, which are required to support the selected supplementary services. Network options of [EN 300 196] are left as implementation options, unless stated otherwise in the chapters relating to the individual supplementary services.

With regard to the length octets, the requirements in [EN 300 196], subclause 11.2.2.1 apply with the following addition:

- the indefinite form of length encoding is not used.

Recommendation: Terminal equipment should support the "Generic status request procedures" according to [EN 300 196], subclause 10.3. This is a technical condition for the satisfactory operation of the Call Completion to Busy Subscribers (CCBS) supplementary service. This supplementary service may be activated by the calling user. If the generic status request procedure is not supported at the called user side, then ineffective CCBS calls may result which may cause confusion not only to the calling, but also to the called user.

The procedures used for the GAT protocol are not supported.

9.2 Application of EN 300 052-1 (Multiple Subscriber Number MSN)

The Multiple Subscriber Number supplementary service is supported by the DSS1-protocol as specified in [EN 300 052]. The following additional information relates to the individual paragraphs of [EN 300 052].

§1 Scope

The MSN supplementary service is applicable to ISDN accesses consisting of one single basic access in the point-to-multipoint configuration.

§3 Definitions

The Multiple Subscriber Number is the whole ISDN number without area code and prefix.

§6 Operational requirements

§6.1 Provision and withdrawal

It is possible to allocate up to 10 ISDN numbers to an ISDN access. These numbers need not necessarily be consecutive.

Note: Typically 3 ISDN numbers are allocated to an access.

§6.2 Requirements on the originating network side

If explicitly specified in the corresponding standards, basic or supplementary services can be allocated to individual multiple subscriber numbers (e.g. Closed user group supplementary service). In these cases the public network uses the calling party number, if provided by the user, to select the corresponding service profile.

Unless specified otherwise in the individual service descriptions the public network applies the service profile which is allocated to the "default number" in the following situations:

- if the calling user does not provide the calling party number
- if invalid calling party number information is received

Note: The coding of valid formats is described in chapter 9.7, §9.3. For the definition of "default number" see chapter 9.7, §3.

§6.3 Requirements on the destination network side

For sending of the called party number to the called user see §9.2.1.

If explicitly specified in the corresponding standards, basic or supplementary services may be allocated to individual multiple subscriber numbers. In these cases the destination network side uses the Called party number to select the relevant service profile.

§9 Signalling procedures at the coincident S and T reference point

§9.2 Delivery of multiple subscriber number

§9.2.1 Normal operation

When the multiple subscriber number is provided to the called user, the public network includes the Called party number information element in the SETUP message, sets the "numbering plan identification" to "ISDN/telephony" and "type of number" to "subscriber number" and includes in the "number digits" field the full subscriber number (without area code). In some parts of the network the called party number information element in the SETUP message is delivered to the called user with type of number set to "unknown".

In case of a Centrex subscriber

- if the call is an internal call, the network sets the numbering plan identification to "unknown" or "private numbering plan", the type of number to "unknown" and includes in the number digits field the private number; or
- if the call is not an internal call, the network sets the numbering plan identification to "ISDN/Telephony numbering plan", the type of number to "subscriber number" and includes in the number digits field the full subscriber number.

§9.3 Receipt of multiple subscriber number

§9.3.1 Normal operation

See also chapter 9.7, §9.3 and §9.4.

9.3 Application of EN 300 055-1 (Terminal Portability TP)

The Terminal Portability supplementary service is supported by the DSS1-protocol as specified in [EN 300 055]. The following additional information relates to the individual paragraphs of [EN 300 055].

§9 Signalling procedures at the coincident S and T reference point

The sending of notifications relating to the TP supplementary service is supported by the network.

9.4 Application of EN 300 058-1 (Call Waiting CW)

The Call Waiting supplementary service is supported by the DSS1-protocol as specified in [EN 300 058]. The following additional information relates to the individual paragraphs of [EN 300 058].

§1 Scope

The public network provides the CW supplementary service for all circuit switched telecommunication services

The CW supplementary service is applicable to ISDN accesses consisting of one single basic access. In some network parts it is applicable to basic accesses with a point-to-multipoint configuration only.

§9 Signalling procedures at the coincident S and T reference point

§9.4 Call offering

The maximum number of waiting calls is 1 (one) per access. The public network clears further incoming calls (network determined user busy situation).

§9.5 Call confirmation

The network option "Calling user receives notification that their call is waiting" is supported. Therefore the public network includes a Notification indicator information element in the ALERTING message sent to the calling party. There is no user option available to prevent that.

9.5 Application of EN 300 061-1 (Subaddressing SUB)

The Subaddressing supplementary service is supported by the DSS1-protocol as specified in [EN 300 061]. The following additional information relates to the individual paragraphs of [EN 300 061].

§1 Scope

The public network does not support the Subaddressing supplementary service in relation with packet mode calls (subaddress information elements, if received from the user, will be discarded. See also chapter 8).

§5 Description

The maximum size of the called party subaddress is 20 octets. Subaddresses exceeding the maximum length are discarded by the network.

9.6 Application of EN 300 064-1 (Direct Dialling In DDI)

The Direct Dialling In supplementary service is supported by the DSS1-protocol as specified in [EN 300 064]. The following additional information relates to the individual paragraphs of [EN 300 064].

§3 Definitions

Block of numbers: A block of numbers is the complete quantity of numbers which can be distinguished by the 0 ... 7 least significant digits of an ISDN number.

Examples:	31 342 5557	block of one number
	31 342 555x	block of 10 numbers
	31 342 xxxx	block of 10'000 numbers
	31 xxx xxxx	block of 10'000'000 numbers

Range of numbers: A range of numbers is the complete quantity of numbers contained in 1 to 9 adjacent blocks of numbers. The adjacent blocks of numbers must all be of the same order and must all belong to the same block of the next higher order.

Examples:	31 342 5553 - 31 342 5557	range of 4 blocks of one number
	31 342 5500 - 31 342 5799	range of 3 blocks of 100 numbers
	31 342 0000 - 31 342 9999	range of 1 block of 10'000 numbers

Set of ISDN numbers: A set of ISDN numbers is the complete quantity of numbers contained in 1 up to 16 ranges of numbers. In some network parts the maximum number of ranges is only 10.

Examples:	31 222 4444	+	set of 21 numbers in total,
	31 222 5770 - 31 222 5789		e.g. inclusion of a well rememberable number or a former directory number into the set of numbers
	31 222 4444	+	set of 121 numbers in total
	31 222 5770 - 31 222 5789	+	e.g. inclusion of a former set of numbers into a
	31 223 2100 - 31 223 2199		new larger set of numbers

§5 Description

The length of the DDI number is known to the servicing local exchange. Therefore the DDI number is always transferred en-bloc from the public to the private network.

§6 Operational requirements

Subscription to the multiple subscriber number and DDI supplementary services is mutually exclusive (no coexistence).

§10 Procedures for interworking with private ISDN

§10.2 Delivery of the DDI number

When the DDI number is provided to the private network, the public network includes the Called party number information element in the SETUP message, sets the "numbering plan identification" to "ISDN/ telephony" and includes "number digits" and set the "type of number" indicator as follows:

Combination	Type of number	Number digits
1	national number	full national number including area code, but without prefix 0
5	unknown	a part of an ISDN number allocated to the private network, i.e. the least significant digit(s) required to distinguish individual ISDN numbers within the range or set of numbers allocated to the private network.

In case of a Centrex subscriber

- if the call is an internal call, the network sets the numbering plan identification to "unknown" or "private numbering plan", the type of number to "unknown" and includes in the number digits field the private number; or
- if the call is not an internal call, the network sets the numbering plan identification to "ISDN/Telephony numbering plan", the type of number to "national number" and includes in the number digits field the full national number including the area code, but without prefix 0.

The public network transfers the DDI number to the private network en-bloc (see [EN 300 403-1], §5.2.1).

9.7 Application of EN 300 092-1 (Calling Line Identification Presentation CLIP)

The Calling Line Identification Presentation supplementary service is supported by the DSS1-protocol as specified in [EN 300 092]. The following additional information relates to the individual paragraphs of [EN 300 092].

§1 Scope

The CLIP supplementary service is not applicable to packet mode services according to chapter 8.

Note: The identification of the calling party is presented to the called user by means of the X.25 protocol.

§3 Definitions

One of the E.164 numbers within the range or set of numbers allocated to a subscriber access is determined as "Default number".

§8 Signalling procedures at the coincident S and T reference point

§8.3 Actions at the originating local exchange if a special arrangement does not apply

The public network accepts calling party subaddresses with a length of up to 20 octets. Subaddresses exceeding the maximum length will be discarded.

With regard to the indicator "type of number" and the "number digits" the public network supports the following combinations, if received from the user (no specific subscription required):

Comb.	type of number	number digits
1	national	full national number including the area code, but without prefix 0. Example: 31 338 5557
2	international	full international number including country code 41 and area code, but without prefixes 00. Example: 41 31 338 5557
3	unknown	full national number with prefix 0 and including the area code. Example: 031 338 5557
4	unknown	full international number with prefixes 00 and including country code and area code. Example: 0041 31 338 5557
5	unknown	a part of an ISDN number allocated to the user, i.e. the least significant digits required to distinguish individual numbers within the range of numbers allocated to the user. Example: 85557
6	subscriber	full subscriber number without area code. Example: 338 5557. In some parts of the network it is the full number including the area code without the prefix. Example: 31 338 5557
7	unknown	full subscriber number without area code. Example: 338 5557

The "screening function" checks whether the received digit sequence is a number allocated to the user, or - if the DDI or MSN supplementary service is subscribed to - belongs to his set of numbers. If this is not the case, or if other combinations than listed above are received, then the public network uses the default number and sets the screening indicator to "network provided".

§8.5 Actions at the destination local exchange

With regard to the indicator "type of number" and the "number digits" the public network uses the following combinations in the calling party number information element sent to the user:

Combination	Type of number	Number digits
3	unknown	full national number with prefix 0 (and including the area code).
4	unknown	full international number with prefixes 00 (and including country code and area code).

Combination 4 is applicable only if the call is an incoming international call, or if the "screening indicator" is set to "user provided, not screened".

In any of these cases (i.e. the calling party number is presented to the called user) the "numbering plan indicator" is set to "ISDN/telephony".

If the called party is a Centrex subscriber and the call is an internal call, then the network sets the "numbering plan identification" to "unknown" or "private numbering plan" and the "type of number" to "unknown" and includes in the number digits field the private number.

If the calling party is a Centrex subscriber and the called party is not a Centrex subscriber or a Centrex subscriber in another Centrex group, then the network uses combination 3 for national calls and 4 for international calls.

The "override category" function is provided as a special subscription option (e.g. for police or emergency services). If presentation is restricted but the called user has the "override" category marked in the destination local exchange, the network includes the calling party number information element, and calling party subaddress information element if the subaddress was supplied by the calling user, in the SETUP message. In this case, the presentation and screening indicators are passed transparently to the called user.

§10 Interactions with other networks

The first paragraph - including the 3 hyphenated items - does not apply (the indication of calling line identity restriction is always provided).

The second paragraph applies in the situation, when a call is not fully supported by adequate signalling (Signalling System No. 7 not used all the way). However, if the user has the "override category", the public network delivers the available, possibly incomplete identification information.

The third paragraph applies in the situation, when a call from a non-ISDN subscriber is fully supported by Signalling System No. 7. In this case the network sends the Calling party number information element according to clause 9.5.1 second and fourth paragraph. No calling party subaddress is available in this situation.

The last paragraph is replaced as follows:

The originating local exchange does not restrict any address information identifying the calling user from being forwarded to another network.

§11 Interactions with other supplementary services

The Multiple subscriber number supplementary service is not provided if a special arrangement applies.

ANNEX B Two Calling party number information element delivery option

B.2 Additional procedure at the destination network side

B.2.1 Normal operations

Valid with the following addition:

The delivery of two calling party numbers to the called user is not only caused as a result of the procedures of clause 8.5 of [EN 300 092] but also as a result of procedures based on applications within the network. The delivery of the calling party numbers is therefore independent of their screening indicators.

9.8 Application of EN 300 093-1 (Calling Line Identification Restriction CLIR)

The Calling Line Identification Restriction supplementary service is supported by the DSS1-protocol as specified in [EN 300 093]. The following additional information relates to the individual paragraphs of [EN 300 093].

§1 Scope

The CLIR supplementary service does not prevent the presentation of the calling party identification by protocols other than DSS1.

Note: This applies in particular in the case of incoming packet mode calls according to chapter 8. Here the identification of the calling party is provided by means of the X.25 protocol irrespective of the CLIR supplementary service.

§11 Interactions with other networks

Note 1: On packet calls the calling party number will be forwarded to the packet network independently of the CLIR supplementary service and will be used there e.g. for charging purposes. It cannot be excluded, that the calling party number will be sent to the remote subscriber (e.g. by means of the X.25 protocol).

9.9 Application of EN 300 097-1 (Connected Line Identification Presentation COLP)

The Connected Line Identification Presentation supplementary service is supported by the DSS1-protocol as specified in [EN 300 097]. The following additional information relates to the individual paragraphs of [EN 300 097].

§3 Definitions

One of the E.164 numbers within the range or set of numbers allocated to a subscriber access is determined as "Default number". The same default number applies for the CLIP and COLP supplementary services.

§9 Signalling procedures at the coincident S and T reference point

Recommendation: User equipment should include the connected number information element in the CONNECT message even if it does not support the COLP supplementary service. This is a precondition that the COLP supplementary service functions correctly. If this number is not inserted, the network uses the "default number", which is often not identical with the number of the connected terminal.

§9.3 Actions at the destination local exchange if a special arrangement does not apply

The public network accepts connected subaddresses with a length of up to 20 octets. Subaddresses exceeding the maximum length will be discarded.

With regard to the indicator "type of number" and the "number digits" the public network supports the following combinations, if received from the user (no specific subscription required):

Combination	type of number	number digits
1	national	full national number including the area code, but without prefix 0. Example: 31 338 5557
2	international	full international number including country code 41 and area code, but without prefixes 00. Example: 41 31 338 5557
3	unknown	full national number with prefix 0 and including the area code. Example: 031 338 5557
4	unknown	full international number with prefixes 00 and including country code and area code. Example: 0041 31 338 5557
5	unknown	a part of an ISDN number allocated to the user, i.e. the least significant digits required to distinguish individual numbers within the range of numbers allocated to the user. Example: 85557
6	subscriber	full subscriber number without area code. Example: 338 5557. In some parts of the network it is the full number including the area code without the prefix. Example: 31 338 5557
7	unknown	full subscriber number without area code. Example: 338 5557

The "screening function" checks whether the received digit sequence is a number allocated to the user, or - if the DDI or MSN supplementary service is subscribed to - belongs to his set of numbers. If this is not the case or if other combinations than listed above are received, the public network uses the default number and sets the screening indicator to "network provided".

§9.4 Actions at the destination local exchange if a special arrangement applies

The special arrangement of not screening the connected number is combined with the special arrangement of not screening the calling party number.

§9.5 Actions at the originating local exchange

With regard to the indicator "type of number" and the "number digits" the public network uses the following combinations in the connected number information element sent to the user:

Combination	Type of number	Number digits
3	unknown	full national number with prefix 0 (and including the area code).
4	unknown	full international number with prefixes 00 (and including country code and area code).

Combination 4 is applicable only if the call is routed to or via the international network or if the "screening indicator" is set to "user provided, not screened".

In any of these cases (i.e. the connected number is presented to the calling user) the "numbering plan indicator" is set to "ISDN/telephony".

If the called party is a Centrex subscriber and the call is an internal call, then the network sets the "numbering plan identification" to "unknown" or "private numbering plan" and the "type of number" to "unknown" and includes in the number digits field the private number.

If the called party is a Centrex subscriber and the calling party is not a Centrex subscriber or a Centrex subscriber in another Centrex group, then the network uses combination 3 for national calls and 4 for international calls.

An "override category" is not provided in relation with the COLP supplementary service.

§11 Interactions with other networks

The first paragraph - including the 3 hyphenated items - does not apply (the indication of connected line identity restriction is always provided).

The second paragraph applies in the situation, when a call is not fully supported by Signalling System No. 7.

The third section is replaced by:

If a call is destined to a non-ISDN subscriber and all network parts involved in that call are supported by Signalling System No. 7, then the connected number may be available. In this case the public network applies the procedures of subclause 9.5.1. No connected subaddress is available in this situation.

The last paragraph is replaced as follows:

The destination local exchange does not restrict any address information identifying the called user from being forwarded to another network.

§12 Interactions with other supplementary services

The Multiple subscriber number supplementary service is not provided if a special arrangement applies.

9.10 Application of EN 300 098-1 (Connected Line Identification Restriction COLR)

The Connected Line Identification Restriction supplementary service is supported by the DSS1-protocol as specified in [EN 300 098]. The following additional information relates to the individual paragraphs of [EN 300 098].

§11 Interactions with other networks

The destination local exchange provides the information identifying the connected user towards the originating network independently of the type of originating network and independently of the allocation of the COLR supplementary service to the destination user.

9.11 Application of EN 300 130-1 (Malicious Call Identification MCID)

The Malicious Call Identification supplementary service is supported by the DSS1-protocol as specified in [EN 300 130]. The following additional information relates to the individual paragraphs of [EN 300 130].

§6 Operational requirements

On calls to the served user that are not answered the MCID supplementary service is invoked automatically by the public network.

9.12 Application of EN 300 141-1 (Call Hold , HOLD)

The Call Hold supplementary service is supported by the DSS1-protocol as specified in [EN 300 141]. The following additional information relates to the individual paragraphs of [EN 300 141].

§1 Scope

The HOLD supplementary service is applicable to ISDN accesses consisting of one single basic access in the point-to-multipoint configuration.

§5 Description

The public network allows up to 4 calls to be held on one basic access.

§9 Signalling procedures at the coincident S and T reference point

The public network does not support the HOLD supplementary service in the Call Delivered State (U4).

§9.1 Holding a call - procedures at the interface of user A

§9.1.1 Normal operation

The explicit channel reservation function is not supported by the network.

§9.1.2 Exceptional Procedures

The following row is added to Table 3:

Error	Value
User A has already reached the maximum allowed number of calls in the held call state.	Cause value #47 "resource unavailable, unspecified" and a location of "public network serving the local user"

§10 Procedures for interworking with private ISDN

§10.1 User A is on private ISDN

§10.1.1 Normal operation

The procedures according to clause 9 are not supported when interworking with private ISDNs.

§10.1.2 Exceptional Procedures

If a HOLD or RETRIEVE message is received on a point-to-point data link connection, then the network rejects the message by sending a HOLD REJECT or RETRIEVE REJECT message respectively, containing a Cause information element indicating cause #29 "Facility rejected".

9.13 Application of EN 300 182-1 (Advice of Charge AOC)

The Advice of Charge supplementary service is supported by the DSS1-protocol as specified in [EN 300 182]. The following additional information relates to the individual paragraphs of [EN 300 182].

§1 Scope

The indicated charging amount does not include charges for the use of supplementary services.

No charging information is available in relation with packet mode calls.

All requirements in [EN 300 182] which relate to the Advice of charge at call set-up time (AOC-S) supplementary service are not applicable.

All requirements in [EN 300 182] which relate to the activation of to Advice of charge during the call (AOC-D) or Advice of charge at the end of a call (AOC-E) supplementary service on a per call basis are not applicable.

AOC-D and AOC-E are activated for all calls.

§5 Operational requirements

§5.1 Provision and withdrawal

The subscription option "for all calls" is provided within the whole network.

§5.2 Requirements on the originating network side

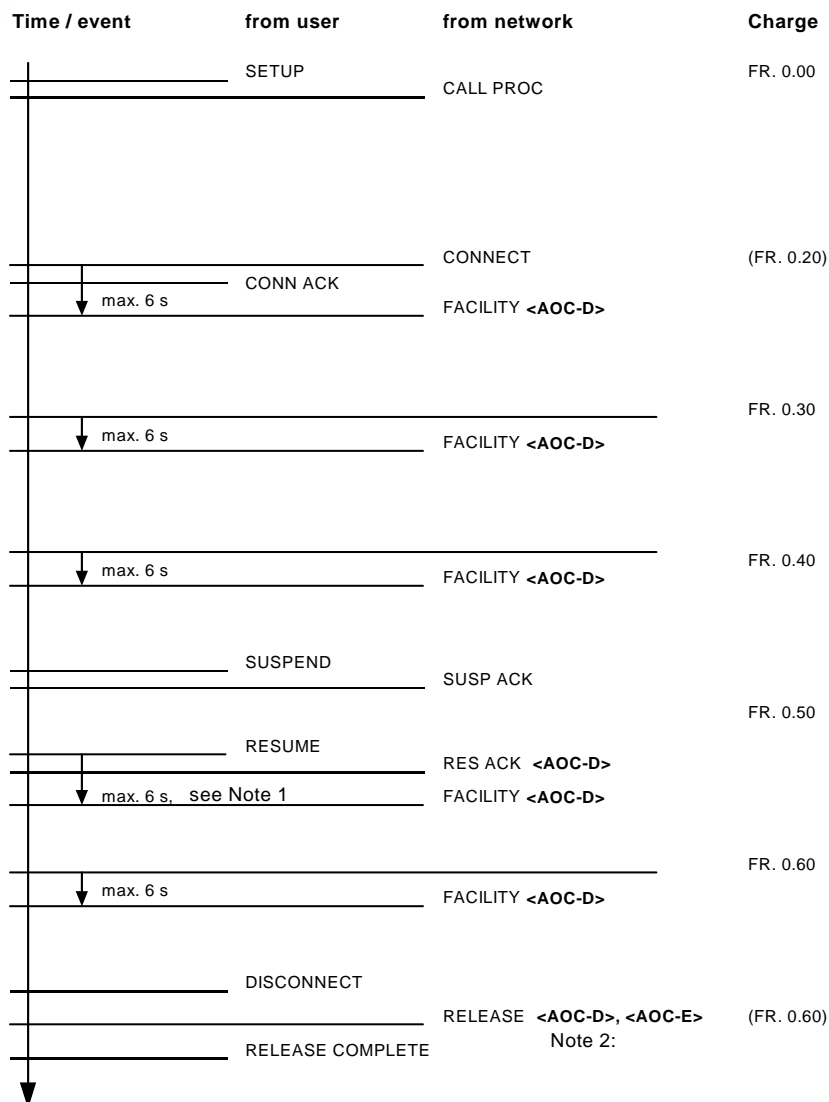
The public network on the originating side transfers charging information to the served user within 6 seconds on the following events:

- the call is answered (i.e. on CONNECT)
- a cost increment has occurred in the Active state
- the call is resumed, either in the RESUME ACKNOWLEDGE message or in a separate FACILITY message (implementation option)
- the call is cleared (including the case where the charged amount is zero)
- a diverted or transferred call is cleared, i.e. a call for which charges are incurred to the served user without a bearer being established (in some network parts only).

The rate of sending charging information during the Active state is limited such that information is not sent more frequently than every 5 seconds

See also figures 9.14-1 to 9.14-4.

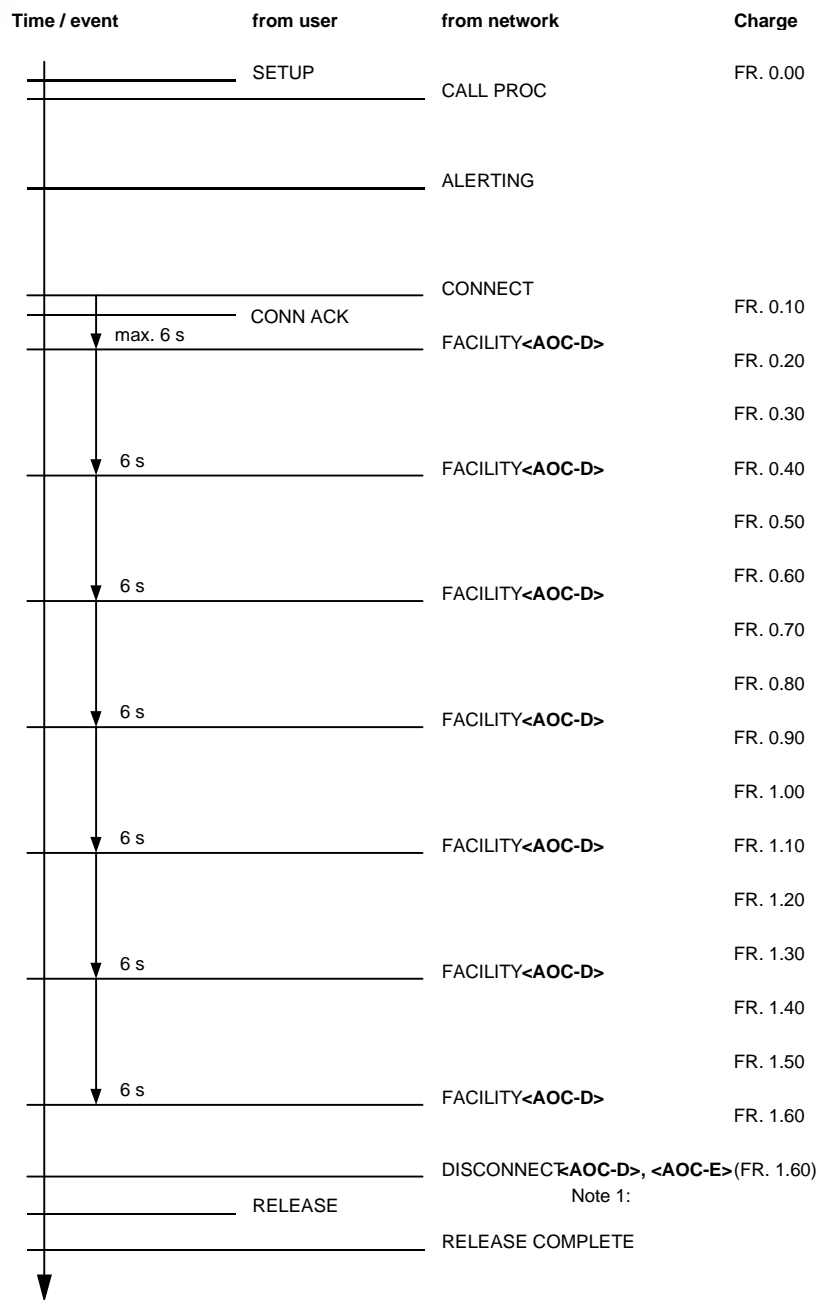
If the served user suspends a call, then the originating network retains the charging information for the suspended call as long as the network retains the call identity of the suspended call for the served user (network option provided).



Note 1: Including of <AOC-D> in the RESUME ACKNOWLEDGE message is optional. However if not included, the charging information has to be conveyed in an extra FACILITY message within 6 seconds on receipt of the RESUME message.

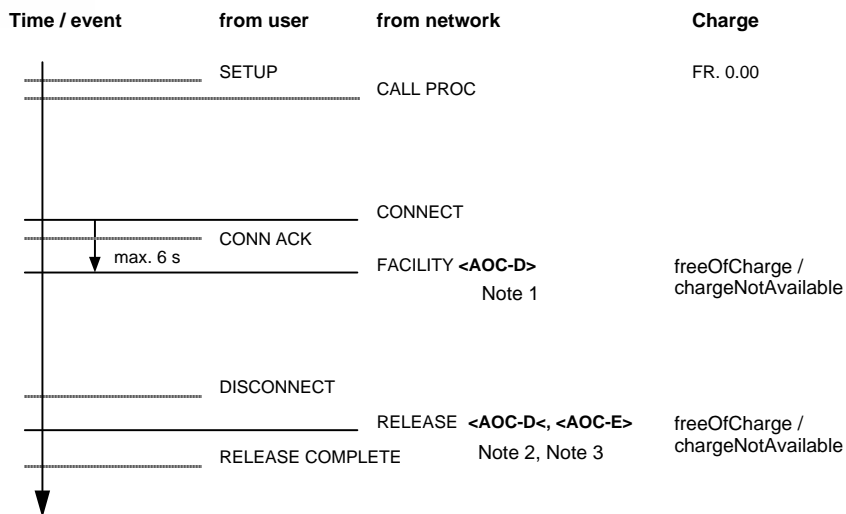
Note 2: <AOC-D> is included only, if the AOC-E supplementary service is not activated

Figure 9.14-1 Example of charging information transfer: normal circuit switched call, with suspension of the call, with cost incrementing interval greater than 6 seconds



Note 1: <AOC-D> is included only, if the AOC-E supplementary service is not activated

Figure 9.14-2 Example of charging information transfer: normal circuit switched call, with cost incrementing interval lower than 6 seconds

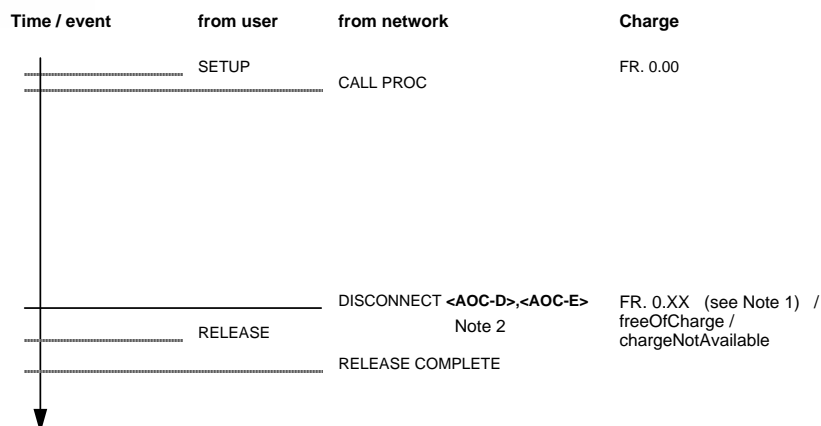


Note 1 This message is optional if charging information is not available

Note 2: <AOC-D> is included only, if the AOC-E supplementary service is not activated

Note 3: If charging information is not available then <AOC-D>, <AOC-E> need not be present

Figure 9.14-3 Transfer of charging information for calls to free-of-charge destinations and for calls for which charging information is not available



Note 1: XX = 00 on normal circuit switched calls in this case

Note 2: <AOC-D> is included only, if the AOC-E supplementary service is not activated

Figure 9.14-4 Transfer of charging information for calls without call connection

§6 Coding requirements

Only component structures as specified in §8 are supported or used by the public network.

§8 Signalling procedures at the coincident S and T reference point

§8.1 Activation, deactivation and registration

AOC-D and AOC-E are activated for all calls. The subscription option "activation on a per call basis" is not supported.

§8.2 Invocation and operation

§8.2.2 Transfer of charging information in the Active state

§8.2.2.1 Normal operation

In the case of normal circuit switched calls the AOCDCurrency component contains AOCDCurrencyInfo CHOICE: specificCurrency

The IA5String in the Currency content and the Multiplier content is set to:

IA5String: 01000110 (F) Multiplier: 00000001 (oneHundredth)
01010010 (R)
00101110 (.)

In the case of calls to free-of-charge destinations the AOCDCurrency component contains AOCDCurrencyInfo CHOICE: freeOfCharge



In cases where charging information is not available the AOCDCurrency component contains chargeNotAvailable. Alternatively - as a network option - no charging information at all is sent to the user, i.e. no AOCDCurrency invoke component.

§8.2.3 Transfer of charging information in the call clearing phase

§8.2.3.1 Normal operation

In the case of normal circuit switched calls the AOCDCurrency and AOCECurrency components respectively contains the following information:

AOCDCurrencyInfo CHOICE: specificCurrency

AOCECurrencyInfo CHOICE: specificCurrency

The IA5String in the Currency content and the Multiplier content is set to:

IA5String: 01000110 (F) Multiplier: 00000001 (oneHundredth)
01010010 (R)
00101110 (.)

In the case of calls to free-of-charge destinations the AOCDCurrency component contains AOCDCurrencyInfo/AOCECurrencyInfo CHOICE: freeOfCharge

In cases where charging information is not available the AOCDCurrency and AOCECurrency components respectively contains chargeNotAvailable. Alternatively - as a network option - no charging information at all is sent to the user, i.e. no AOCDCurrency or AOCECurrency invoke component.

§8.2.4 Transfer of charging information independent of a bearer at the user-network interface

§8.2.4.1 Normal operation

In the case of normal circuit switched calls the AOCECurrency component contains AOCECurrencyInfo CHOICE:
specificCurrency

The IA5String in the Currency content and the Multiplier content is set to:

IA5String: 01000110 (F) Multiplier: 00000001 (oneHundredth)
 01010010 (R)
 00101110 (.)

In the case of calls to free-of-charge destinations the AOCDCurrency component contains AOCDCurrencyInfo/AOCECurrencyInfo CHOICE: freeOfCharge

§8.2.4.2 Exceptional procedures

In cases where charging information is not available the AOCDCurrency component contains chargeNotAvailable. Alternatively - as a network option - no charging information at all is sent to the user, i.e. no AOCDCurrency invoke component.

The public network supports the ChargingAssociation parameter.

9.14 Application of EN 300 188-1 (Three-party 3PTY)

The Three-party supplementary service is supported by the DSS1-protocol as specified in [EN 300 188]. The following additional information relates to the individual paragraphs of [EN 300 188].

§1 Scope

The 3PTY supplementary service is applicable to ISDN accesses consisting of one single basic access in the point-to-multipoint configuration.

9.15 Application of EN 300 207-1 (Diversion Supplementary Services CDIV)

The Diversion supplementary services are supported by the DSS1-protocol as specified in [EN 300 207]. The following additional information relates to the individual paragraphs of [EN 300 207].

Alternative procedures for programming, activation, deactivation, and interrogation of the call forwarding unconditional supplementary service using the keypad facility information element are described in chapter 10.3.

§5 Description

For accesses with MSN (see chapter 9.2, §3) the diversion supplementary services (including options) are provided on a per ISDN number basis.

§6 Operational requirements

§6.1 Provision and withdrawal

The network supports the following subscription options (the subscription options can not be chosen, they have given values):

Number	Subscription option	Value	Appli- cabi- lity
1	Provision of call diversion services	Yes	CFU CFB CFNR CD
2	Provision of selective call forwarding services	No	SCFU SCFB SCFNR
3	Choice of basic services for which the call forwarding supplementary services are subscribed to (multiple choice possible)	all services	CFU CFB CFNR
4	Served user receives notification that a call has been forwarded (Note 1)	Yes, with call offering information	CFU CFB CFNR

Number	Subscription option	Value	Appli- cabi- lity
5	Calling user is notified of diversion (forwarded or deflected) (Note 1)	Yes, with diverted-to number	CFU CFB CFNR CD
6	Served user receives reminder notification on outgoing calls that forwarding is currently activated (Note 1)	Yes	CFU CFB CFNR
7	Diverting number is released to the diverted-to user (Note 1)	Yes	CFU CFB CFNR CD
8	Activation, deactivation and interrogation for all ISDN-numbers on the same access (Note 2)	Yes	CFU CFB CFNR
9	Provision of the diversion supplementary services either on a per ISDN number basis or on a per access basis	per ISDN number for accesses with MSN	CFU CFB CFNR CD
10	Value of no reply timer	25s	CFNR
<p>Note 1: These options apply separately to each instance of the supplementary service that the user has subscribed to.</p> <p>Note 2: This option applies to all instances subscribed to on the access of the served user for the related supplementary service</p>			

The network supports the following network provider options (the network options can not be chosen, they have given values):

Number	Network provider option	Value	Appli- cabi- lity
1	Provision of subscription option number 9	yes	CFU CFB CFNR CD
2	Subscription of the call forwarding supplementary services on a per basic service basis	yes	CFU CFB CFNR
3	Served user call retention on invocation of diversion (forwarding or deflection)	Clear call on invocation of diversion	CFNR CD (Note 1)
4	The maximum number of diversions for a single call	5	CFU CFB CFNR CD
5	Call forwarding on no reply timer	25 s	CFNR
6	Modification of the call forwarding timer value	No	CFNR
7	Partial rerouteing provided at the T reference point (Note 2)	Yes	CFU CFB CFNR CD
8	The call-by-call indication overrides the value of the subscription option "Diverting number is released to the diverted-to-user"	Yes	CD
9	Provision of Diversion services based on DDI Number ranges	No	CFU CFB CFNR CD

Number	Network provider option	Value	Appli- cabi- lity
<p>Note 1: This option also applies for call diversion by partial rerouteing</p> <p>Note 2: Partial rerouteing can be invoked by the private network towards the public network when the CFU, CFB, CFNR or CD supplementary services are invoked in the private network.</p>			

Network provider options related to interactions with other supplementary services are contained in §12.

§7 Coding requirements

§7.1 Coding of the facility information element components

Valid with the following additions:

Additional information for Centrex subscribers

The network accepts in the ASN.1 component "PartyNumber" the choice "unknownPartyNumber" with the number digits containing the private number if the PartyNumber is an internal number.

The network encodes the ASN.1 type "PartyNumber" for internal numbers as "unknownPartyNumber". The numberDigits contain the private number.

If a diversion takes place within the same Centrex group, then the network encodes the "Redirection number" and the "Redirecting number" information element" as follows:

- The numbering plan identification is set to "unknown" or "private numbering plan";
- the type of number is set to "unknown"; and
- the number digits field contain the private number.

§9 Signalling procedures at the coincident S and T reference point

§9.1 Activation, deactivation and interrogation

§9.1.1 Activation

§9.1.1.3 Normal operation for the selective call forwarding services

Not supported.

§9.1.1.4 Exceptional procedures for the selective call forwarding services

Not supported.

§9.1.2 Deactivation

§9.1.2.3 Normal operation for the selective call forwarding services

Not supported.

§9.1.2.4 Exceptional procedures for the selective call forwarding services

Not supported.

§9.1.4 Interrogation of a single or multiple instances of the supplementary

§9.1.4.2 Exceptional procedures

If the FACILITY message exceeds a length of 260 octets then the public network applies the message segmentation procedure (see also chapter 5, ANNEX H).

§9.1.5 Procedures for interrogation of specific screening list

Not supported

§9.2 Invocation and operation

§9.2.3 Identification of the diverted-to user to the calling user

§9.2.3.1 Normal operation

If the diverted-to number is available and presentation is allowed according to the presentation indicator received from the diverted-to network, the network encodes the Redirection number information element as follows:

The numbering plan identification field is set to "ISDN/telephony numbering plan (Rec. E.164/E.163)". The type of number field is set to "unknown".

The number digits field contains the full national number with prefix 0 (and including the area code), if the diverted-to number is in the national network, or the full international number with prefixes 00 (and including country code and area code), if the diverted-to number is in a foreign network.

§9.2.4 Operation at the served user

§9.2.4.1 Procedures for the CFU supplementary service

§9.2.4.1.1 Normal operation

The Called party number information element, which has to be sent within the FACILITY message carrying the DiversionInformation invoke component (if the forwarding user has subscribed to the multiple subscriber number supplementary service) is coded as specified in chapter 9.2, §9.2.1 (MSN).

§9.2.4.2 Network Determined User Busy (NDUB) procedures for the CFB supplementary service

§9.2.4.2.1 Normal operation

The Called party number information element, which has to be sent within the FACILITY message carrying the DiversionInformation invoke component (if the forwarding user has subscribed to the multiple subscriber number supplementary service) is coded as specified in chapter 9.2, §9.2.1 (MSN).

§9.2.4.3 User Determined User Busy (UDUB) procedures for the CFB supplementary service

§9.2.4.3.1 Normal operation

The Called party number information element, which has to be sent within the FACILITY message carrying the DiversionInformation invoke component (if the forwarding user has subscribed to the multiple subscriber number supplementary service) is coded as specified in chapter 9.2, §9.2.1 (MSN).

§9.2.4.4 Procedures for the CFNR supplementary service

§9.2.4.4.1 Normal operation

The value of the timer T-CFNR is specified in §13.

The Called party number information element, which has to be sent within the FACILITY message carrying the DiversionInformation invoke component (if the forwarding user has subscribed to the multiple subscriber number supplementary service) is coded as specified in chapter 9.2, §9.2.1 (MSN).

§9.2.4.5 Procedures for the CD supplementary service

§9.2.4.5.1 Normal operation

The network does not enter the Overlap Receiving state (N25).

§9.2.4.6 Procedures for the SCF supplementary service

Not supported.

§9.2.5 Operation at the diverted-to user

§9.2.5.1 Normal operation

If the redirecting number is available and presentation is allowed according to the presentation indicator supplied together with the number information, the network encodes the Redirecting number information element as follows:

The numbering plan identification field is set to "ISDN/telephony numbering plan (Rec. E.164/E.163)". The type of number field is set to "unknown".

The number digits field contains the full national number with prefix 0 (and including the area code), if the redirecting number is in the national network, or the full international number with prefixes 00 (and including country code and area code), if the redirecting number is in a foreign network.

§9.3 Reminder notification to the served user

§9.3.1 Normal operation

If the bearer capability is "speech", "3,1 kHz audio", or "unrestricted digital information with tones/announcements ("7 kHz audio") the special dial tone is sent instead of the normal dial tone according to [ETS 300 403-1] clause 5.1.3.

§10 Procedures for interworking with private ISDNs

The public network accepts the PartyNumber (in divertedToNumber, divertingNr, originalCalledNr, or lastReroutingNr) if it corresponds to one of the following choices:

- unknownPartyNumber. The NumberDigits parameter contains either the national number including the prefix 0, or the international number including the prefixes 00; or
- publicPartyNumber. The publicTypeOfNumber is either
 - unknown. In this case the publicNumberDigits parameter contains either the national number including the prefix 0, or the international number including the prefixes 00; or
 - internationalNumber. In this case the publicNumberDigits parameter contains the international number without prefix; or
 - nationalNumber. In this case the publicNumberDigits parameter contains the national number without prefix.

If other choices are received from the private network then the public network discards the divertedToNumber, divertingNr, originalCalledNr, or lastReroutingNr respectively.

§10.4 Presentation of a diverted call from a private ISDN to the public ISDN

§10.4.1 Normal operation

If the public network has discarded the divertingNr or originalCalledNr respectively received from the private network, it replaces it by the "default number" allocated to the private network access with presentation set to restricted ("default number" see chapter 9.7, §3).

§10.5 Procedures where a call from the public ISDN is diverted within or beyond the private ISDN and partial rerouting takes place in the public ISDN

§10.5.1 Normal operation

Addition to point g):

If the public network has discarded the lastReroutingNr received from the private network, it replaces it by the "default number" allocated to the private network access with presentation set to restricted ("default number" see chapter 9.7, §3).

§10.6 Procedures where a call from the public ISDN to the private ISDN is diverted by the public ISDN when Diversion service enhancements based on DDI ranges do not apply

The first sentence of the last paragraph is replaced by the following sentence:

For invocation and operation of the call diversion supplementary services at the T reference point, the procedures of subclause 9.2.4 apply except that, if the forwarding user has subscribed to the direct dialling in supplementary service the forwarding network includes the Called party number information element containing the called user's number in the FACILITY message.

Addition to §10.6:

The Called party number information element, which has to be sent within the FACILITY message carrying the DiversionInformation invoke component (if the forwarding user has subscribed to the direct dialling in supplementary service) is coded as specified in chapter 9.6, §5 (DDI). The same combination (1 or 5) as for the DDI supplementary service are used.

§10.7 Procedures where a call from the public ISDN to the private ISDN is diverted by the public ISDN when Diversion service enhancements based on DDI ranges apply

Not supported.

§12 Interaction with other supplementary services

Interactions with the Advice Of Charge (AOC) supplementary service

The network supports the following network option:

Network option	Value	Service	[ETS 300 195] subclauses
The network sends charging information to the diverting user, when a diverted call is released, if the AOC-E supplementary service is activated for all calls	yes	CFU	5.7
		CFB	5.5
		CFNR	5.6
		CD	5.4

Interactions with the User-to-User Signalling (UUS) supplementary service

The network supports the following network options:

Network option	Value	Service	[ETS 300 195] subclauses
The diversion of the UUI and/or UUS supplementary service request is restricted to diverting users who subscribe to the relevant UUS supplementary service.	no	CFU CFB CFNR CD	5.29.2.1 5.23.2.1 5.26.2 5.20.2
If the explicitly requested service 1 is requested as preferred and if the served user accepts the service request in the ALERTING message, then the service acceptance, received from the served user, is delivered to the calling user and the diversion is invoked.	yes	CFNR CD	5.26.2.2.1b 5.20.2.2.2.1b

§13 Parameter values (timers)

The duration of the timer T-CFNR is 25 s.

§14 Dynamic description (SDL diagrams)

The note in the figures 7.1 to 8.4 is replaced by the following note:

Note: The SDL diagram for the coincident S and T reference point is also applicable at the T reference point (i.e. as referenced in subclause 10.6).

9.16 Application of EN 300 286-1 (User-to-User Signalling UUS)

The User-to-User Signalling supplementary service is supported by the DSS1-protocol as specified in [EN 300 286]. The following additional information relates to the individual paragraphs of [EN 300 286].

§5 Description

The NOTE in this paragraph is not relevant.

§9 Signalling procedures at the coincident S and T reference point

Note: Due to restrictions of the current intra network signalling (ISUP according to ETS 300 356-8) the calling user may not always receive the cause and return error values as specified in §9.

§9.1 Service 1

§9.1.1 Activation, deactivation and registration

§9.1.1.1 Service 1 - implicitly requested

§9.1.1.1.2 Exceptional procedures

If the SETUP message to be sent to the called user exceeds a length of 260 octets and if this ISDN access has not allocated the characteristic "segmentation procedure applicable", then the public network discards the User-user information element and sends the SETUP message without User-user information. No indication is given to the calling user.

§9.1.1.2 Service 1 - explicitly requested

UUS Service 1 - explicitly requested is not supported in some network parts.

§9.1.1.2.2 Exceptional procedures

If the SETUP message to be sent to the called user exceeds a length of 260 octets and if this ISDN access has not allocated the characteristic "segmentation procedure applicable", then the public network discards the User-user information element and sends the SETUP message without User-user information. No indication is given to the calling user.

Note: A successful service 1 activation does not confirm that User-user information contained in the SETUP message of the calling user has been delivered to the called user.

Supplement to the 4th section :

In some situations (e.g. interaction with non-ISDN) Cause values #29 (facility rejected), #69 (requested facility not implemented) or #88 (incompatible destination) may be used.

§9.2 Service 2

The network does not support Service 2.

§9.3 Service 3

Not supported.

9.17 Application of EN 300 359-1 (Completion of Calls to Busy Subscriber CCBS)

The Call Completion to Busy Subscriber supplementary service is supported by the DSS1-protocol as specified in [EN 300 359]. The following additional information relates to the individual paragraphs of [EN 300 359].

§6 Operational requirements

§6.1 Provision and withdrawal

In conjunction with the CCBS supplementary service the public network supports the following subscription options (see also §9):

Subscription option	Values
Recall mode	specific recall
Limit of queue B Note 1	1 or 0
Status request subscription parameter Note 1	status request procedures supported for existing services / status request procedures not supported for existing services
Note 1: at network B, independent of subscription to the CCBS supplementary service	

The following network options are selected (see also §9 and §10):

Network option	Value
Check for identical calls	no
CCBS request retention	no
Limit of queue A	1
Support of originationAddress and presentationAllowedIndicator in the CCBS-T-Request invoke component (§10.1.2.1, Note 2)	no

§7 Coding requirements

In the cases where according to [EN 300 195-1] § 5.41 (interaction of CCBS and MSN) the network has to include the Called party number information element in the FACILITY message the Called party number is coded as specified in chapter 9.2, §9.2.1 (MSN).

§9 Signalling procedures at the coincident S and T reference point

§9.7 Basic call information and compatibility checking at user A

On encoding the ASN.1 type addressOfB the public network always uses the choice unknownPartyNumber. The NumberDigits contains the full national number with prefix 0 (and including the area code) if the indicated number is in the national network, or the full international number with prefixes 00 (and including the country code and the area code) if the indicated number is in a foreign network. This is not valid for all network parts. If the called party is a Centrex subscriber and the call is an internal call, then the network includes in the NumberDigits the private number.

§10 Procedures for interworking with private ISDNs

§10.1 Procedures for the originating T reference point

§10.1.2 CCBS supplementary service request

§10.1.2.1 Normal operation

The public network accepts the destinationAddress parameter, if it is either coded as unknownPartyNumber or as publicPartyNumber where the combination publicTypeOfNumber / publicNumberDigits corresponds to one of the combinations 1 to 4 of chapter 5, §4.5.8.

If received from the private network the originationAddress and/or presentationAllowedIndicator components is discarded (network option not supported).

§10.2 Procedures for the destination T reference point

§10.2.1 CCBS available indication

§10.2.1.1 Normal operation

The public network accepts and conveys the CCBS available indication towards the calling subscriber if the call failure cause value is either 17 or 34.

§10.2.1.2 Exceptional procedures

If the conditions of §10.2.1.1 are not fulfilled, then the public network discards any received CCBS-T-Available invoke component.

§10.2.2 CCBS supplementary service request

§10.2.2.1 Normal operation

The public network does not send the originationAddress and presentationAllowedIndicator components to the private network (network option not supported).

On encoding the ASN.1 type destinationAddress the public network always uses the choice unknownPartyNumber. The NumberDigits contain the national number with prefix 0 and the area code.

§10.2.2.2 Exceptional procedures

Note: If CCBS is not available to the destination (e.g. interworking with a non CCBS network, or CCBS not subscribed within the private network), then the private network should not send a CCBS-T-Available invoke component to the public network. This avoids the activation and subsequent rejection of the CCBS supplementary service.

§13 Parameter values (Timers)

Valid, the public network timers are set to the following values:

T-RETENTION:	20 seconds
T-CCBS1:	4 seconds
T-CCBS2:	30 minutes
T-CCBS3:	15 seconds
T-CCBS4:	10 seconds
T-CCBS5:	60 minutes
T-CCBS6:	60 minutes
T-ACTIVATE:	10 seconds
T-DEACTIVATE:	4 seconds
T-INTERROGATE:	4 seconds
T-STATUS:	4 seconds 1)

- 1) The use of this timer is defined in the Generic status request procedures (ETS 300 196, subclause 10.3)

9.18 Application of ETS 300 745-1 (Message Waiting Indication MWI)

The Message waiting indication supplementary service is supported by the DSS1-protocol as specified in [ETS 300 745]. The following additional information relates to the individual paragraphs of [ETS 300 745].

§6 Operational requirements

§6.1 Provision and withdrawal

The network supports the following network options:

Number	Network option	Value
1	Support of subscription option for registration of the ISDN number(s) of the controlling user(s)	yes
2	Provide additional information during deferred invocation	no (yes in some network parts)
3	Maximum number of controlling users' ISDN numbers registered by the network	minimum 5
4	Maximum number of active instances per receiving user	minimum 3, if invocation mode = deferred mode, minimum=1 if invocation mode = immediate mode

The invocation mode "deferred mode" is not supported in some network parts.

The "override of invocation mode by controlling user allowed" is not supported in some network parts.

§9 Signalling procedures at the coincident S and T reference point

§9.5 Invocation of the MWI to the receiving user

If the deferred mode applies and the MWI supplementary service has been activated for any basic service and an outgoing call is made with bearer capability "speech", "3,1 kHz audio", or "unrestricted digital information with tones/announcements" a special dial tone according to [ES 201 970] is sent instead of the normal dial tone according to [ETS 300 403-1], subclause 5.1.3.

§10 Procedures for interworking with private ISDNs

The procedures for interworking with private ISDNs are not supported in some network parts.

9.19 Application of EN 300 195 (Supplementary service interactions protocol)

The public network supports protocol interaction between the various supplementary services according to [EN 300 195]. Network options of [EN 300 195] are left as implementation options, unless stated otherwise in the chapters relating to the individual supplementary services.

10 Supplementary Services supported by stimulus protocols

In addition to the supplementary services described in chapter 9, the network offers some supplementary services supported by a stimulus protocol. The first group includes "Gebühreninformation für den Teilnehmer" (Charging information for the user) and "Anrufumleitung" (Call forwarding). The supplementary services in this group had been implemented before the corresponding services "Advice of charge" and "Call diversion" was defined in ETSI and therefore are not compatible with the corresponding ETSI protocols. In order to offer continuation of the service to already existing user equipment the network supports both protocols in parallel.

The second group contains supplementary services which are not (yet) standardized by ETSI. This group includes the supplementary services "Sperrung für bestimmte erzeugte Verbindungen" (Barring of certain calls), "Vorbestimmte Verbindung" (Predetermined connection), "General deactivation" and "Anonymous call rejection".

The supplementary service "Gebühreninformation für den Teilnehmer" (Charging information for the user), which makes use of the display information element, is described in subclause 10.1.

The other supplementary services described in this chapter are supported by a keypad protocol. The general procedures for programming, activation, deactivation and interrogation are described in subclause 10.2. The detailed descriptions of the specific supplementary services are contained in subclauses 10.3 to 10.7.

10.1 Gebühreninformation für den Teilnehmer (Charging information for the user)

10.1.1 Description

This supplementary service enables a calling user to receive information on the recorded charges during and at the end of a call by means of the Display information element.

This supplementary service is applicable to all circuit switched telecommunication services. The indicated charging amount does not include charges for packet calls (X.31 Case A and Case B) and for the use of supplementary services.

10.1.2 Provision and withdrawal

The supplementary service "Gebühreninformation für den Teilnehmer" can be subscribed to either stand alone, or in combination with any of the Advice or charges supplementary services according to chapter 9.14.

10.1.3 Activation and deactivation

This supplementary service is activated by the service provider at provision and deactivated at withdrawal.

10.1.4 Invocation and operation

The public network sends charging information to the calling user indicating the actual amount of recorded charges. This information is contained in Display information elements sent to the user within 6 seconds after the following events:

- when a call is answered, included in the CONNECT or an INFORMATION message
- when a call is resumed, included in the RESUME ACKNOWLEDGE message or an INFORMATION message
- each time when a further cost increment has occurred, but not more frequent than every 5 seconds, included in INFORMATION messages

Alternatively the public network may send the charging information in regular intervals of 5 to 6 seconds, starting within 6 seconds after the event which causes the begin of charging. In this case the Display information elements is included in INFORMATION messages.

In addition the first call clearing message sent to the calling user (i.e. DISCONNECT or RELEASE respectively) contains the Display information element, irrespective on whether the call has been successful or not and independent on whether the recorded charge is 0 or greater than 0.

The coding of the Display information element is shown below:

								Octet	IA5-Character
0	1	0	0	0	1	1	0	3	F
0	1	0	1	0	0	1	0	4	R
0	0	1	0	1	1	1	0	5	.
0	0	1	0	0	0	0	0	6	<blank>
0	0	1	1	x	x	x	x	7	0 ... 9
0	0	1	1	x	x	x	x	8	0 ... 9
.									
.									
0	0	1	1	x	x	x	x	n	0 ... 9
0	0	1	0	1	1	1	0	n+1	.
0	0	1	1	x	x	x	x	n+2	0 ... 9
0	0	1	1	x	x	x	x	n+3	0 ... 9

Octets 7 to n represent Swiss Francs, Octets n+2 and n+3 represent Swiss Cents (Rappen). The IA5-character in Octet 7 is set to 0 only if the total amount is below one Swiss Franc. The possible values of n is: 7, 8, 9, 10, 11 (i.e. the maximum amount is 99999.99 Swiss Francs).



10.2.1 Introduction

10.2.2 Actions of the user

- Bearer capability / Information transfer capability:	speech, or 3.1 kHz audio, or unrestricted digital information with tones/announcements, or unrestricted digital information
- Channel identification:	as for normal call set-up
- Keypad facility / Keypad information:	sequence of IA5 characters, dependent on the specific supplementary service (see specifications of individual supplementary services below)

10.2.3 Acceptance of the request by the public network

- a) send a DISCONNECT message with cause = 16 (normal clearing) to the user. Only if the information transfer capability of the Bearer capability information element was set to speech, 3.1 kHz audio or unrestricted digital information with tones/announcements, then a Progress indicator information element will be included with the progress description set to the value 8 (In-band information or appropriate pattern now available) and a specific announcement will be provided in the selected B-channel (see specifications of individual supplementary services below).
- b) start timer T305 or T306 respectively
- c) move to the call state N12 (Disconnect indication)

If the public network has to reject the requested function, it will:

- a) send a DISCONNECT message to the user. Only if the information transfer capability of the Bearer capability information element was set to speech, 3.1 kHz audio or unrestricted digital information with tones/announcements, then a Progress indicator information element will be included with the progress description value set to 8 (In-band information or appropriate pattern now available) and the congestion tone (Gassenbesetztton) will be provided in the selected B-channel
- b) start timer T305 or T306 respectively
- c) move to the call state N12 (Disconnect indication)

Depending on the specific situation the DISCONNECT message contains one of the following Cause values:

- 29 (facility rejected)
- 50 (requested facility not subscribed)
- 69 (requested facility not implemented)

10.2.5 End of the procedure

The clearing procedure according to chapter 5 §5.3 applies.

10.2.6 Overlap sending

In addition to the en-bloc sending, the user may divide up the keypad information and send it in more than one Keypad facility information element (contained in the SETUP and/or in INFORMATION messages). In this case the public network supports the "overlap sending" procedure of chapter 5 §5.1.3 accordingly.

If timer T302 expires before the public network has received the complete keypad information, it invokes the clearing procedure according to chapter 10.2.4. Alternatively the public network may first send the CALL PROCEEDING message, move to the call state N3 and then proceed according to chapter 10.2.4).

10.2.7 Premature release by the user

The public network will not carry out any management function, if the user clears the connection prior to the regular completion of the procedure. The following user actions cause a premature release: Sending of one of the messages DISCONNECT, RELEASE, RELEASE COMPLETE, RESTART, STATUS with Call state=0, or by interrupting Layer 1 or 2 . In these cases the public network reacts with the specific protocol functions according to chapter 5.

10.3 Anrufumleitung (Call forwarding)

In addition to the functional procedures of chapter 9.16 the user may manage the supplementary services Call Forwarding Unconditional (CFU), Call Forwarding Busy (CFB) and Call Forwarding No Reply (CFNR) with the keypad protocol as specified in this chapter by using the generic keypad functions of chapter 10.2.

The coding of the Keypad facility information element and the specific reaction of the public network is shown in Table 10-1.

Table 10-1

Function	Service	Keypad information (IA5 characters)	Content of announcement (if to be provided)
Programming and Activation	CFU CFB CFNR	*21 TNC # *67 TNC # *61 TNC #	service activated, the registered number is ...
Activation	CFU CFB CFNR	* 21 # * 67 # * 61 #	service activated, ...
Deactivation	CFU CFB CFNR	# 21 # # 67 # # 61 #	service deactivated
Interrogation	CFU CFB CFNR	* # 21 # * # 67 # * # 61 #	service activated, ..., or service deactivated
CFU: Call Forwarding Unconditional CFB: Call Forwarding Busy CFNR: Call Forwarding No Reply TNC: Forwarded-to-number			

The public network interprets the character sequence TNC (forwarded-to-number) in the same way as specified for the "unknown" called party number (see chapter 5, §4.5.8, combinations 3 and 4).

Besides the specified exceptions (see below), the public network treats a keypad protocol request identically as a request according to the functional protocol. An activation by the keypad protocol can be cancelled with a functional protocol deactivation, and vice versa. Invocation and operation of the Call Forwarding supplementary service is independent of the method of service activation.

10.3.1 Programming and activation

The keypad programming and activation request will be interpreted like an ActivationDiversio invoke component with the attributes as listed in Table 10-2 (see also chapter 9.16, §6.1 and §9.1.1):

Instead of returning a return result, return error or reject component respectively, the public network responds as specified in chapter 10.2 and Table 10-1. The public network stores the forwarded-to-number (if accepted) which has been received either by the functional or the keypad protocol. Any forwarded-to-number gained by a former use of the programming procedure will be released. If a multipoint terminal configuration exists at the served users interface (interface type 1 according to chapter 4), then - on successful activation - the public network may additionally send to all users an ActivationStatusNotificationDiv invoke component as specified in chapter 9.16, §9.1.1.1.

Table 10-2

	Attributes of the request (dependent on the subscription option of the user):	
	if the request is applicable to all ISDN numbers of the same access (subscription option number 7 = per access, see §6.1 of chapter 9.16)	if the request is applicable to the individual ISDN numbers of the access (subscription option number 7 = per ISDN number, see §6.1 of chapter 9.16)
procedure:	cfu or cfb or cfnr see 1)	cfu or cfb or cfnr see 1)
basicService:	allServices, see 2)	allServices, see 2)
forwardedToAddress:	PartyNumber, see 3)	PartyNumber, see 3)
servedUserNr:	allNumbers, see 4)	individualNumber, see 5)
1) dependent on the service code, i.e. 21, 67 or 61 2) the significance of "allServices" is: all basic services to which the user has subscribed to the CFU, CFB or CFNR supplementary services 3) Number TNC as provided in the keypad information element 4) the significance of "allNumbers" is: all multiple subscriber numbers to which the user has subscribed to the CFU, CFB or CFNR supplementary services 5) the individualNumber corresponds to the Multiple subscriber number provided by the user in the service request (Calling party number information element within the SETUP message used for requesting the service). If no (valid) number has been received from the user, then the network either rejects the service request or uses the default number.		

10.3.2 Deactivation

The keypad deactivation request will be interpreted like a DeactivationDiversion invoke component with the following attributes (see also Table 10-2):

procedure:	cfu or cfb or cfnr (dependent on the service code, i.e. 21, 67 or 61)
basicService :	allServices
servedUserNr:	allNumbers / individual number (according to subscription option number 7)

Instead of returning a return result, return error or reject component respectively, the public network responds as specified in chapter 10.2 and Table 10-1. If the served user has a multipoint configuration (interface type 1 according to chapter 4), then - on successful deactivation - the public network may additionally send to all users a DeactivationStatusNotificationDiv invoke component as specified in chapter 9.16, §9.1.2.1.

10.3.3 Interrogation

The keypad interrogation request will be interpreted like an InterrogationDiversion invoke component with the following attributes (see also Table 10-2):

procedure:	cfu or cfb or cfmr (dependent on the service code, i.e. 21, 67 or 61)
basicService :	allServices
servedUserNr:	allNumbers / individual number (according to the subscription option)

Instead of returning a return result, return error or reject component respectively, the public network responds as specified in chapter 10.2 and Table 10-1. Specifically it will

- a) include cause16 in the DISCONNECT message and - for speech/audio calls - provide the announcement " service activated, the registered number is ... ", if the corresponding supplementary service is activated to one single forwarded-to-number for all basic services for the served user who has been identified by the Calling party number information element received in the SETUP message initiating the interrogation request. If no (valid) number has been received from the user, then the service request will be rejected.
- b) include cause16 in the DISCONNECT message and - for speech/audio calls - provide the announcement " service deactivated ", if the corresponding supplementary service is not activated for any service for the served user who has been identified by the Calling party number information element received in the SETUP message initiating the interrogation request.

In addition the network may

- a) include cause 69 (requested facility not implemented) in the DISCONNECT message if the information transfer capability of the Bearer capability information element was set to other values than speech, 3.1 kHz audio or unrestricted digital information with tones/announcements
- b) include cause 29 (facility rejected) in the DISCONNECT message if the corresponding supplementary service is subscribed to, but none of the conditions listed above apply.

10.3.4 Activation (without programming of a new diverted-to-number)

This function is not supported in some network parts.

On receiving a (valid) keypad activation request the public network will:

- a) take the forwarded-to-number gained by the latest use of the programming procedure and activate the corresponding supplementary service for all basic services and, dependent on the subscription option number 7, for all served user numbers, or for the served user who has been identified by the Calling party number information element received in the SETUP message initiating the activation request.
- b) respond as specified in chapter 10.2 and Table 10-1.

- c) on successful activation but only if a multipoint terminal configuration exists at the served users interface (interface type 1 according to chapter 4): send to all users an `ActivationStatusNotificationDiv` invoke component as specified in chapter 9.16, §9.1.1.1.

10.4 Sperre für bestimmte erzeugte Verbindungen (Barring of certain calls)

10.4.1 Description

This supplementary service enables a user to bar outgoing calls to be set-up at his access. Depending on subscription options this supplementary service is effective to certain categories of circuit switched calls (e.g. intercontinental or international calls)

10.4.2 Activation, Deactivation, Interrogation, Keyword modification

The user may manage this supplementary service with the keypad protocol as specified in this chapter by using the generic keypad functions of chapter 10.2.

The coding of the Keypad facility information element and the specific reaction of the public network is shown in Table 10-3.

Table 10-3

Function	Keypad information (IA5 characters)	Content of announcement (if to be provided)
Activation	* 33 K1 K2 K3 K4 # (Note 1)	service activated
Deactivation	# 33 K1 K2 K3 K4 # (Note 1)	service deactivated
Interrogation	*# 33 #	service activated or service deactivated
Modification of Keyword (Note 2)	* 17 K1 K2 K3 K4 * k1 k2 k3 k4 * k1 k2 k3 k4 # (Note 3)	Keyword modified
Note 1: K1 K2 K3 K4: Keyword (4 digits IA5) Note 2: The keyword modification function is supported only if it is allocated to the ISDN access. Note 3: K1 K2 K3 K4: old keyword (4 digits IA5) k1 k2 k3 k4: new keyword (4 digits IA5)		

The public network accepts an activation, a deactivation or a keyword modification request only, if the keyword received in the keypad information matches with a pre-programmed 4 digit number (Keyword). In case of no match the public network clears the connection with cause 29 (facility rejected).



If a keypad interrogation was requested with the information transfer capability of the Bearer capability information element set to other values than speech, 3.1 kHz audio or 7kHz audio, then the public network clears the connection with cause 69 (requested facility not implemented) or 29 (facility rejected).

10.4.3 Invocation and operation

If the service is activated and the user tries to establish a call to a barred destination, then the public network rejects the call with Cause 21 (call rejected). If the information transfer capability of the Bearer capability information element was set to speech, 3.1 kHz audio or unrestricted digital information with tones/announcements, then the DISCONNECT message of the public network contains a Progress indicator information element with the progress description value set to 8 (In-band information or appropriate pattern now available) and an announcement is provided in the selected B-channel.

10.5 Vorbestimmte Verbindung (Predetermined connection)

This supplementary service enables a calling user to set-up a call to a predetermined destination without including any called party number information in his call set-up request. The supplementary service is programmed and activated/deactivated by Swisscom. Only the programmed destination can be reached from an access for which this supplementary service is activated. However, incoming calls will be delivered according to the normal procedures.

For outgoing calls the normal call establishment procedures apply (see chapter 5, §5.1) with the following exceptions:

- the public network discards any Called party number or Keypad information element if received from the user
- on receiving a (valid) SETUP message the public network sets up the connection to the predetermined destination.

10.6 Anonymous call rejection (ACR)

10.6.1 Description

The Anonymous Call Rejection (ACR) supplementary service enables a user to have the network forward calls that do not provide the calling Party Number (anonymous calls) to an announcement. The served users ability to originate calls is unaffected by the ACR supplementary service. As a subscription option the served user may define the rejection condition. Therefore the ACR supplementary service may operate on all anonymous calls or just on those anonymous calls that fulfill the conditions. In addition, the subscriber can select whether the service can be user controlled or not.

The ACR supplementary service is applicable to voice band services only.

The ACR service is available to served users connected to the network via the basic access or the primary rate access.

10.6.2 Operational requirements

10.6.2.1 Provision and withdrawal

The ACR supplementary service is offered with the subscription options in table 10-6 (in some network parts only).

Table 10-6

Subscription option	Value
Provision on an ISDN number basis	<ul style="list-style-type: none"> – yes – no
Incoming anonymous <u>international</u> calls are accepted	<ul style="list-style-type: none"> – yes – no
Default value of the rejection condition	<ul style="list-style-type: none"> – Calls with complete and restricted calling party number (CLIR) – Every call whose calling party number can not be presented (i.e. unavailable, incomplete and/or restricted)
User controlled service	<ul style="list-style-type: none"> – yes – no

10.6.3 Signalling procedures at the coincident S and T reference point

10.6.3.1 Activation, deactivation and interrogation

If the subscription option "user controlled service" is "no", then the ACR supplementary service is activated at provision and deactivated at withdrawal.

If the subscription option "user controlled service" is "yes", then the user may activate, deactivate, or interrogate the ACR supplementary service with the keypad protocol as specified in this subclause by using the generic keypad functions of chapter 10.2.

The coding of the Keypad facility information element and the specific reaction of the public network is as shown in table 10-7.

Table 10-7

Function	Keypad information (IA5 characters)	Content of announcement
Activation	* 99 #	service activated
Deactivation	# 99 #	service deactivated
Interrogation	*# 99 #	service activated or service deactivated

10.6.3.1.1 Activation

10.6.3.1.1.1 Normal operation

The served user may activate the ACR supplementary service according to the procedures of subclause 10.2.2 using the keypad information for "activation" in table 10-7.

If the served user has subscribed to the Multiple Subscriber Number supplementary service and has subscribed to the ACR supplementary service per ISDN number, the user should include the calling party number in the SETUP message.

If in the SETUP message used to activate the ACR supplementary service the bearer capability/information transfer capability is "speech", "3,1 kHz audio" or "unrestricted digital information with tones/announcements"; and

- if the served user has subscribed to the Multiple Subscriber Number supplementary service and the subscription option "Provision on a per ISDN number basis" is "yes" and the user has included a calling party number which is a valid number assigned to the served user, then the network activates the ACR

supplementary service for the requested ISDN number and informs the served user according to the procedures of subclause 10.2.3 and table 10-7.

- if the served user has subscribed to the Multiple Subscriber Number supplementary service and the subscription option "Provision on a per ISDN number basis" is "no", then the network activates the ACR supplementary service for all ISDN numbers allocated to the access and informs the served user according to the procedures of subclause 10.2.3 and table 10-7.
- if the served user has not subscribed to the Multiple Subscriber Number supplementary service, then the network activates the ACR supplementary service and informs the served user according to the procedures of subclause 10.2.3 and table 10-7.

10.6.3.1.1.2 Exceptional procedures

If the served user has not subscribed to the ACR supplementary service, then the network rejects the request for the activation according to the procedures of subclause 10.2.4.

If the served user has subscribed to the Multiple Subscriber Number supplementary service and the subscription option "Provision on a per ISDN number basis" is "yes" and the request to activate the ACR supplementary service includes a calling party number which is not allocated to that access, then the network either rejects the request for the activation according to the procedures of subclause 10.2.4 or accepts the request assuming the default number as calling party number.

If the served user has subscribed to the Multiple Subscriber Number supplementary service and the subscription option "Provision on a per ISDN number basis" is "yes" and the request to activate the ACR supplementary service does not contain a calling party number information element, then the network either rejects the request for the activation according to the procedures of subclause 10.2.4 or accepts the request assuming the default number as calling party number.

If the bearer capability/information transfer capability is other than "speech", "3,1 kHz audio" or "unrestricted digital information with tones/announcements", then the network rejects the request for the activation according to the procedures of subclause 10.2.4.

10.6.3.1.2 Deactivation

10.6.3.1.2.1 Normal operation

The served user may deactivate the ACR supplementary service according to the procedures of subclause 10.2.2 by sending the keypad information for "deactivation" according to table 10-7.

If the served user has subscribed to the Multiple Subscriber Number supplementary service and has subscribed to the ACR supplementary service per ISDN number, the user should include the calling party number in the SETUP message.

If in the SETUP message used to deactivate the ACR supplementary service the bearer capability/information transfer capability is "speech", "3,1 kHz audio" or "unrestricted digital information with tones/announcements"; and

- if the served user has subscribed to the Multiple Subscriber Number supplementary service and the subscription option "Provision on a per ISDN number basis" is "yes" and the user has included a calling party number which is a valid number assigned to the served user, then the network deactivates the ACR supplementary service for the requested ISDN number and informs the served user according to the procedures of subclause 10.2.3 and table 10-7.
- if the served user has subscribed to the Multiple Subscriber Number supplementary service and the subscription option "Provision on a per ISDN number basis" is "no", then the network deactivates the ACR supplementary service for all ISDN numbers allocated to the access and informs the served user according to the procedures of subclause 10.2.3 and table 10-7.
- if the served user has not subscribed to the Multiple Subscriber Number supplementary service, then the network deactivates the ACR supplementary service and informs the served user according to the procedures of subclause 10.2.3 and table 10-7.

10.6.3.1.2.2 Exceptional procedures

If the served user has not subscribed to the ACR supplementary service, then the network rejects the request for the deactivation according to the procedures of subclause 10.2.4.

If the served user has subscribed to the Multiple Subscriber Number supplementary service and the subscription option "Provision on a per ISDN number basis" is "yes" and the request to deactivate the ACR supplementary service includes a calling party number which is not allocated to that access, then the network either rejects the request for the deactivation according to the procedures of subclause 10.2.4 or accepts the request assuming the default number as calling party number.

If the served user has subscribed to the Multiple Subscriber Number supplementary service and the subscription option "Provision on a per ISDN number basis" is "yes" and the request to deactivate the ACR supplementary service does not contain a calling party number information element, then the network either rejects the request for the deactivation according to the procedures of subclause 10.2.4 or accepts the request assuming the default number as calling party number.

If the bearer capability/information transfer capability is other than "speech", "3,1 kHz audio" or "unrestricted digital information with tones/announcements", then the network rejects the request for the deactivation according to the procedures of subclause 10.2.4.

If the served user requests to deactivate the ACR supplementary service and this is not activated for the served user's number indicated, then the network rejects the request for the deactivation according to the procedures of subclause 10.2.4.

10.6.3.1.3 Interrogation

10.6.3.1.3.1 Normal operation

The served user may interrogate the status of the ACR supplementary service according to the procedures of subclause 10.2.2 by sending the keypad information for "interrogation" in table 10-7.

If the served user has subscribed to the Multiple Subscriber Number supplementary service and has subscribed to the ACR supplementary service per ISDN number, the user should include the calling party number in the SETUP message.

If in the SETUP message used to interrogate the ACR supplementary service the bearer capability/information transfer capability is "speech", "3,1 kHz audio" or "unrestricted digital information with tones/announcements"; and

- if the served user has subscribed to the Multiple Subscriber Number supplementary service and the subscription option "Provision on a per ISDN number basis" is "yes" and the user has included a calling party number which is a valid number assigned to the served user, then the network informs the served user on the status of the ACR supplementary service according to the procedures of subclause 10.2.3 and table 10-7.
- if the served user has subscribed to the Multiple Subscriber Number supplementary service and the subscription option "Provision on a per ISDN number basis" is "no", then the network informs the served user on the status of the ACR supplementary service according to the procedures of subclause 10.2.3 and table 10-7.
- if the served user has not subscribed to the Multiple Subscriber Number supplementary service, then the network informs the served user on the status of the ACR supplementary service according to the procedures of subclause 10.2.3 and table 10-7.

10.6.3.1.3.2 Exceptional procedures

If the served user has not subscribed to the ACR supplementary service, then the network rejects the interrogation request according to the procedures of subclause 10.2.4.

If the served user has subscribed to the Multiple Subscriber Number supplementary service and the subscription option "Provision on a per ISDN number basis" is "yes" and the interrogation request includes a calling party number which is not allocated to that access, then the network either rejects the interrogation request according to the procedures of subclause 10.2.4 or accepts the request assuming the default number as calling party number.

If the served user has subscribed to the Multiple Subscriber Number supplementary service and the subscription option "Provision on a per ISDN number basis" is "yes" and the interrogation request does not contain a calling party number information element, then the network either rejects the interrogation request according to the procedures of subclause 10.2.4 or accepts the request assuming the default number as calling party number.

If the bearer capability/information transfer capability is other than "speech", "3,1 kHz audio" or "unrestricted digital information with tones/announcements", then the network rejects the interrogation request according to the procedures of subclause 10.2.4.

10.6.3.2 Invocation and operation

10.6.3.2.1 Operation at the calling user

The normal procedures for basic call according to chapter 5, §5.1 applies. If the call is forwarded as result of the invocation of the ACR supplementary service, the network will:

- send a CONNECT message; and
- send in-band an announcement to the calling user.

10.6.3.2.2 Operation at the served user

10.6.3.2.2.1 Normal operation

If the ACR supplementary service has been activated for the ISDN number provided in the Called party number information element in the SETUP message and the information transfer capability in the bearer capability information element in the SETUP message is "speech", "3,1 kHz audio" or "unrestricted digital information with tones/announcements", the network checks the calling party number for incoming calls.

If the number is complete and presentation is allowed, then the network delivers the call according to the procedures in [EN 300 403-1], subclause 5.2.

If the number is complete and presentation is not allowed and the call is an international call and the subscription option "Incoming anonymous international calls are accepted" is "yes", then the network delivers the call according to the procedures in [EN 300 403-1], subclause 5.2.

If the number is complete and presentation is not allowed and the call is an international call and the subscription option "Incoming anonymous international calls are accepted" is "no", then the network forwards the call according to subclause 10.7.3.2.1.

If the number is complete and presentation is not allowed and the call is not an international call, then the network forwards the call according to subclause 10.7.3.2.1.

If the number is not complete and the subscription option "Default value of the rejection condition" is "Calls with complete and restricted calling party number", then the network delivers the call according to the procedures in [EN 300 403-1], subclause 5.2.

If the number is not complete and the subscription option "Default value of the rejection condition" is "Every call whose calling party number can not be presented", then the network forwards the call according to subclause 10.7.3.2.1.

10.6.3.2.2.2 Exceptional procedures

If the ACR supplementary service has been activated and the information transfer capability in the bearer capability information element in the SETUP message is other than "speech", "3,1 kHz audio" or "unrestricted digital information with tones/announcements", then the network delivers the call according to the procedures in [EN 300 403-1], subclause 5.2.

10.6.4 Procedures for interworking with private ISDNs

The procedures of subclause 10.7.3 apply with the restriction that the ACR supplementary service is provided on a per access basis only.

11 CENTREX ISDN accesses

11.1 Feature "Distinctive Ringing" (DR)

11.1.1 Description

The "Distinctive Ringing" (DR) feature allows to distinguish between internal and external terminating calls at a CENTREX ISDN access.

11.1.2 Abbreviations

ASN.1	Abstract Syntax Notation Number One
DR	Distinctive Ringing
DSB-ISDN	Digital Switchboard ISDN

11.1.3 Coding

In the Facility information element the following proprietary value for the protocol profile is defined:

Protocol profile

Bits

54321

01000 DSB-ISDN Features

Note: This value is not defined in ETSI.

Table 11-1 shows the definition of the operation required for the DR feature using Abstract Syntax Notation one (ASN.1) as defined in [X.208] and using the OPERATION macro as defined in [X.219], figure 4/X.219.

Table 11-1

CTX ISDN Feature: Distinctive Ringing

DEFINITIONS IMPLICIT TAGS ::=

BEGIN

EXPORTS CtxBasicCall

```

IMPORTS      OPERATION
              FROM Remote-Operation-Notation
              {joint-iso-ccitt remote-operations (4) notation (0)}

CtxBasicCall ::= OPERATION
              ARGUMENT SEQUENCE{
              callTypeIndex [1]CallTypeIndex}

CallTypeIndex ::= INTEGER (0..255)

ctxBasicCall  CtxBasicCall ::= 1

END

```

11.1.4 Signalling procedures

In order to distinguish an external call from an internal call the network includes in the SETUP message a Facility information element with a protocol profile value "DSB-ISDN Feature" containing a CtxBasicCall invoke component.

callTypeIndex is set to

- 0 for an external call; and
- 19 for an internal call

The network does not expect a return result or a return error component

11.2 Application of EN 300 369-1 (Explicit Call Transfer ECT)

The Explicit Call Transfer supplementary service is supported by the DSS1-protocol as specified in [EN 300 369]. The following additional information relates to the individual paragraphs of [EN 300 369].

§6 Operational requirements

§6.1 Provision and withdrawal

The network supports the following network options:

Number	Network option	Value
1	ECT supported if one call is in the alerting phase	yes Note 1
2	Mechanism to avoid looping of uncontrolled circuit. Note 2	yes
3	Support of the explicit linkage mechanism	no
Note 1: The held call must be in the active call state		
Note 2: Not supported in some network parts		

§9 Signalling procedures at the coincident S and T reference point

The procedures of this clause are applicable to ISDN accesses consisting of one single basic access in the point-to-multipoint configuration.

§9.2 Invocation and operation

In table 4 the last combination "call A-B (active, idle) and call A-C (call delivered, held)" does not apply.

Table 5 does not apply.

§9.3 Content of notification information

If presentation of user B's or user C's number is allowed, the network encodes the Redirection number information element as follows:

The numbering plan identification field is set to "ISDN/telephony numbering plan (Rec. E.164/E.163)". The type of number field is set to "unknown". The number digits field contains the full national number with prefix 0 (and including the area code) if user B's or user C's number is in the national network, or the full international number with prefixes 00 (and including country code and area code) if user B's or user C's number is in a foreign network.

If the served user is a Centrex subscriber and user B's and user C's number is an internal number, then the network sets the "numbering plan identification" to "unknown" or "private numbering plan" and the "type of number" to "unknown" and includes in the number digits field the private number.

§10 Procedures for interworking with private ISDNs

The procedures of subclause 10.4 are not provided.