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Foreword

This ETSI Technical Report (ETR) has been produced by the Signalling Protocols and Switching (SPS) Technical Committee of the European Telecommunications Standards Institute (ETSI).

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1 Scope

This ETSI Technical Report (ETR) specifies the interaction between the Intelligent Network Application Protocol (INAP) and the Integrated Services Digital Network (ISDN) User Part (ISUP) of Signalling System No.7. The basis for the IN part of this ETR is the core INAP (refer to ETS 300 374-1 [8]) and the basis for the public network part is the ISUP version 2 (refer to ETS 300 356-1 [4]).

Public network signalling systems different from ISUP are not considered in this ETR. The interaction to the INAP for these signalling systems can, however, be derived from this ETR in conjunction with the interworking specification for ISUP version 2 (refer to ETS 300 360 [7]).

Although this ETR is titled "Interaction between INAP and ISUP", new protocol elements for the ISUP are defined in this ETR in order to satisfy IN specific requirements. The reason for that approach is that the protocol inherent compatibility mechanism allows for a stepwise upgrade of the ISUP functionality. However, the new function is only available for an IN call, if supported in any of the affected exchanges.

This ETR only considers the case where the Service Switching Point (SSP) is located at a transit level. As a consequence, this could lead to limitations for ISDN supplementary services.

This ETR does not specify enhancements to the Digital Subscriber Signalling System No. one (DSS1) protocol, which may be needed due to additional ISUP functions or IN requirements, respectively.

The main subjects of this interaction specification are the following:

- description of specific call control functions for IN calls;

- impacts on the ISUP basic call and the ISDN supplementary services for IN calls;

- enhancement of the ISUP protocol due to IN specific requirements.

2 References

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

[1] ITU-T Recommendation I.112 (1993): "Vocabulary of terms for ISDNs".

[2] ITU-T Recommendation I.210 (1993): "Principles of telecommunication services supported by an ISDN and the means to describe them".

[3] ITU-T Recommendation Q.1214 (1993): "Distributed functional plane for Intelligent Network CS-1".

[4] ETS 300 356-1: "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP) version 2 for the international interface; Part 1: Basic services [ITU-T Recommendations Q.761 to Q.764 (1993), modified]".

[5] ETS 300 356-2: "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP) version 2 for the international interface; Part 2: ISDN supplementary services [ITU-T Recommendation Q.730 (1993), modified]".

[6] ETS 300 356-15: "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP) version 2 for the international interface; Part 15: Diversion supplementary services [ITU-T Recommendation Q.732, clauses 2 to 5 (1993), modified]".

[7] ETS 300 360: "Integrated Services Digital Network (ISDN); Signalling System No.7; Signalling interworking specification for ISDN User Part (ISUP) version 2".

[8] ETS 300 374-1 (1993): "Intelligent Network (IN); Intelligent Network Capability wSet 1 (CS1); Core Intelligent Network Application Protocol (INAP); Part 1: Protocol specification".

[9] ETS 300 403-1: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1); User-network interface layer 3 specification for basic call control; Part 1: Protocol specification [ITU-T Recommendation Q.931 (1993), modified]".

3 Definitions

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

Call Control Function (CCF): See ITU-T Recommendation Q.1214 [3], §3.3.

Integrated Services Digital Network (ISDN): See ITU-T Recommendation I.112 [1].

service; telecommunication service; See ITU-T Recommendation I.112 [1].

Service Control Function (SCF): See ITU-T Recommendation Q.1214 [3], §3.3.

Service Switching Function (SSF): See ITU-T Recommendation Q.1214 [3], §3.3.

Specialized Resource Function (SRF): See ITU-T Recommendation Q.1214 [3], §3.3.

supplementary service: See ITU-T Recommendation I.210 [2].

4 Symbols and abbreviations

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

ACM	Address Complete Message (ISUP)
ANM	Answer Message (ISUP)
CCC	Charge Card Calling
CCF	Call Control Function
CON	Connect message (ISUP)
CPG	Call Progress message (ISUP)
CS1	Capability Set 1
DLE	Destination Local Exchange
DP	Detection Point
DSS1	Digital Subscriber Signalling System No. one
EDP	Event Detection Point
EDP-N	EDP - Notification
EDP-R	EDP - Request
FAR	Facility Request message (ISUP)
FE	Functional Entity
FOT	Forward Transfer message (ISUP)
FRJ	Facility Reject message (ISUP)
FRQ	Facility Request message (ISUP)
IAM	Initial Address Message (ISUP)
IDR	Identification Request message (ISUP)
IE	Information Element
IN	Intelligent Network
INAP	Intelligent Network Application Protocol
INR	Information Request message (ISUP)
IP	Intelligent Peripheral
IRS	Identification Response message (ISUP)
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
OLE	Originating Local Exchange
PRM	Premium Rate
REL	Release message (ISUP)
RES	Resume message (ISUP)
RLC	Release Complete message (ISUP)
SAM	Subsequent Address Message (ISUP)
SCF	Service Control Function
SCP	Service Control Point
SDL	Specification and Description Language
SGM	Segmentation Message (ISUP)
SRF	Specialized Resource Function
SS	Signalling System
SSF	Service Switching Function
SSP	Service Switching Point
SUS	Suspend message (ISUP)
TCAP	Transaction Capabilities Application Part
TDP	Trigger Detection Point
TDP-N	TDP - Notification
TDP-R	TDP - Request
TMR	Transmission Medium Requirement
UAN	Universal Access Number
UPT	Universal Personal Telecommunication
VCC	Virtual Card Calling
VOT	Televoting

5 Description

ITU-T Recommendation Q.1214 [3] provides a distributed functional plane architecture for IN Capability Set 1 (CS1). Interactions between the following Functional Entities (FEs) are relevant for this specification:

- Call Control Function (CCF);
- Service Switching Function (SSF);
- Service Control Function (SCF);
- Specialized Resource Function (SRF).

The functional entities can be implemented in one or more network elements, called physical entities. The Service Control Point (SCP) is the physical entity in the intelligent network, that implements the SCF. The CCF and SSF are realized in the Service Switching Point (SSP) and the SRF is realized in the Intelligent Peripheral (IP).

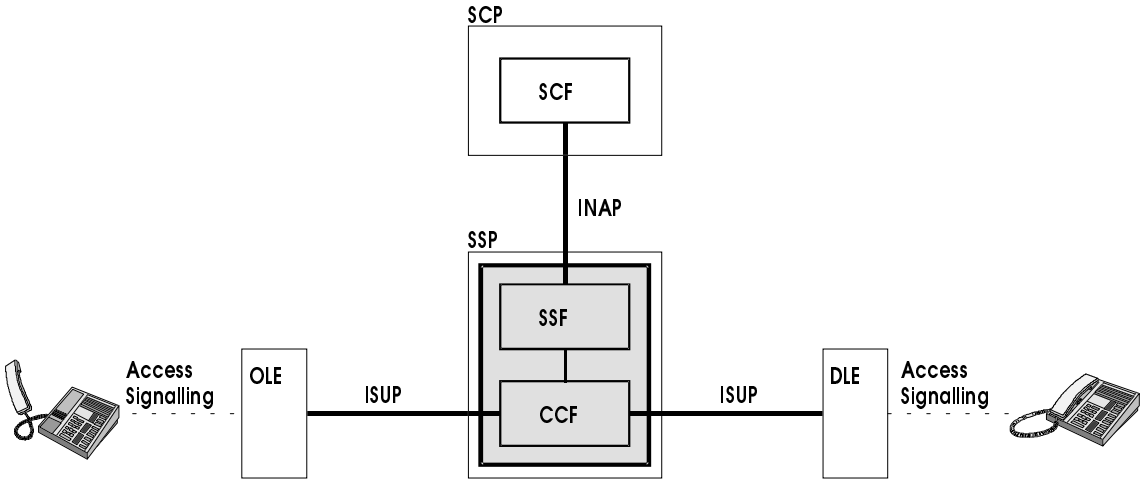


Figure 1: Signalling configuration for an IN call without SRF support

The SSF contains the capabilities beyond those that are needed for basic call control. Consequently, this ETR concentrates on the actions that are performed in the CCF.

Figure 1 illustrates in a simplified manner a signalling configuration which is to be considered in this ETR. In the configuration it is assumed, that SRF support is not needed. The network signalling system used for call set-up is the ISUP version 2 as specified in ETS 300 356-1 [4]. The interface between SSF and SCF is the core INAP as specified in ETS 300 374-1 [8].

The interaction between ISUP and INAP takes place in the CCF and SSF. The following main subjects have to be considered in this area:

- detection point processing in the CCF;
- receipt of INAP operations in the SSF.

Detection point processing

The provision of Detection Points (DPs) is required in the ISUP basic call handling in order to access IN functionality and to allow IN service logic influence the processing of IN calls. The detection points (DPs) indicate points in call (PICs) at which transfer of control can occur. If a DP is recognized an operation from the SSF to the SCF will be sent. Thus the communication towards the SCP is performed. The DPs defined in ITU-T Recommendation Q.1214 [3] are listed in table 1.

The column "Support" indicates whether the DP is supported within ISUP version 2 (see ETS 300 356-1 [4]).

Table 1: List of Detection points

DPs for the originating side		Support	DPs for the terminating side		Support
DP 1	Origination_Attempt_Authorized	No impact on ISUP	DP 12	Terminating_Attempt_Authorized	No impact on ISUP
DP 2	Collected_Information	Yes			
DP 3	Analyzed_Information	Yes			
DP 4	Route_Select_Failure	Yes			
DP 5	O_Called_Party_Busy	Yes	DP 13	T_Called_Party_Busy	Yes
DP 6	O_No_Answer	Yes	DP 14	T_No_Answer	Yes
DP 7	O_Answer	Yes	DP 15	T_Answer	Yes
DP 8	O_Mid_Call	No	DP 16	T_Mid_Call	No
DP 9	O_Disconnect	Yes	DP 17	T_Disconnect	Yes
DP 10	O_Abandon	Yes	DP 18	T_Abandon	Yes

Receipt of INAP operations

Table 2 lists the INAP operations with direction SCF-SSF and indicates which operation will influence the ISUP call handling.

Table 2: INAP operations (direction: SCF-SSF)

Operation	Influence on ISUP call handling	Reference in this ETR
ActivateServiceFiltering	Yes	9.7 "Service filtering"
ActivityTest	No	
ApplyCharging	No	
CallGap	Yes	9.6 "Call gap"
CallInformationRequest	No	
CollectInformation	Yes	9.2 "IN call with SCP request to collect further digits"
Connect	Yes	9.1.1.1.1 "Connect operation and" 9.5.3 "Hand-off method - procedure in the initiating SSP"
Continue	Yes	9.1.1.1.2 "Continue operation"
ConnectToResource	Yes	9.5.1 "SSP supports requested IP capabilities"
DisconnectForwardConnection	Yes	9.5.2 "Assist method - procedure in the initiating SSP"
EstablishTemporaryConnection	Yes	9.5.2 "Assist method - procedure in the initiating SSP"
FurnishChargingInformation	No	
InitiateCallAttempt	Yes	9.8 "SCP initiated call"
ReleaseCall	Yes	9.1.4 "ReleaseCall operation"
RequestNotificationChargingEvent	Yes	The treatment is national network specific and not described further within this ETR.
RequestReportBCSMEvent	Yes	9.3 "Detection Point processing"
ResetTimer	No	
SendChargingInformation	Yes	9.1.1.2 "SendChargingInformation operation"

Support of the SCF-SRF relationship

In ETS 300 374-1 [8], a number of scenarios for support of the SCF, SSF, and SRF functional entities as physical entities have been identified. The scenarios differ in the method to support the SCF-SRF relationship and are explained in ETS 300 374-1 [8], table 1 and figures 2 to 6. Table 3 summarizes these configurations and indicates whether the scenario can be supported with the current ISUP (see ETS 300 356-1 [4]) and the extensions made in this ETR.

Table 3: Scenarios for support of the SCF-SRF relationship

Type of signalling system between SSF/CCF and SRF	Method to support SCF-SRF relationship	
	Direct TCAP link	Relay via SSP
ISUP	supported (see figure 3)	not supported (note 1)
DSS1 (note 2) or implementation dependent	supported (note 3)	

NOTE 1: Transport of additional information in ISUP would be needed.
NOTE 2: Extensions to the DSS1 protocol may be required.
NOTE 3: The scenarios can be supported from the viewpoint of this ETR. No additional information and no additional procedures are required than for the ISUP as signalling system between SSF/CCF and SRF.

Figures 2 to 4 provide in a simplified manner some signalling configurations for IN calls needing an IP for user interaction. The figures are only included to ease the understanding and should not be seen as exhaustive representation of the various physical scenarios.

In figure 2 the IP is either integrated into the SSP, or directly attached to the SSP, that is interacting with the SCP. Whether the SRF-SCF INAP operations are relayed via the SSP or are directly exchanged between IP and SCP is not relevant for this ETR. However, in the figure only the scenario is shown, where a relay via SSP is applied. The procedure for this scenario is described in subclause 9.5.1 and a typical arrow diagram is given in annex A, figure A.3.

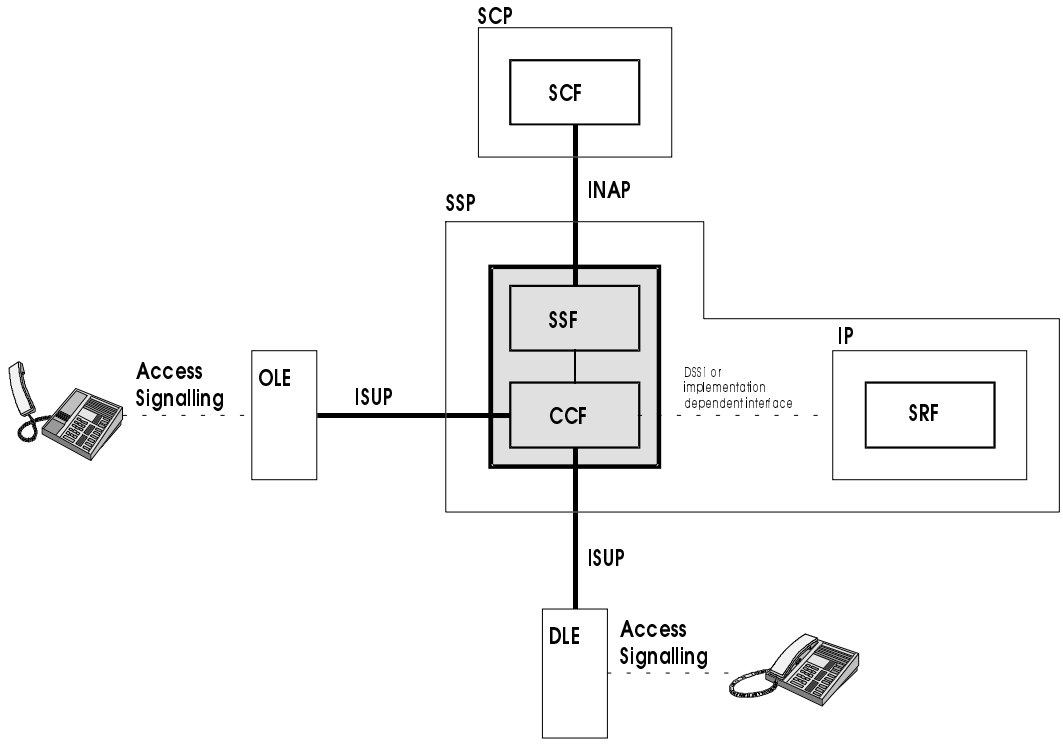


Figure 2: Connection to integrated or external IP with SSP relay of IP operations

In figure 3 the IP is connected to the SSP via ISUP. The SRF-SCF INAP operations are directly exchanged between IP and SCP.

NOTE: This method may be used in some networks. However, problems are identified regarding network integrity aspects and standardized solutions of the ISUP signalling for this type of interface.

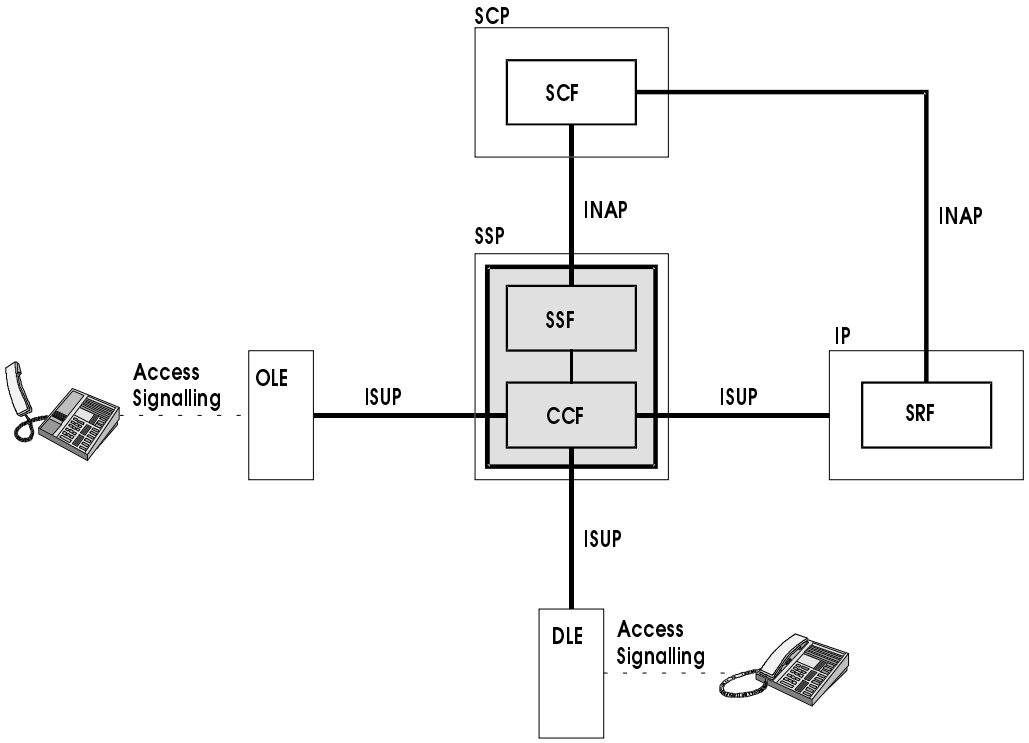


Figure 3: External IP connected via ISUP; direct TCAP link between SRF and SCF ("Assist" method)

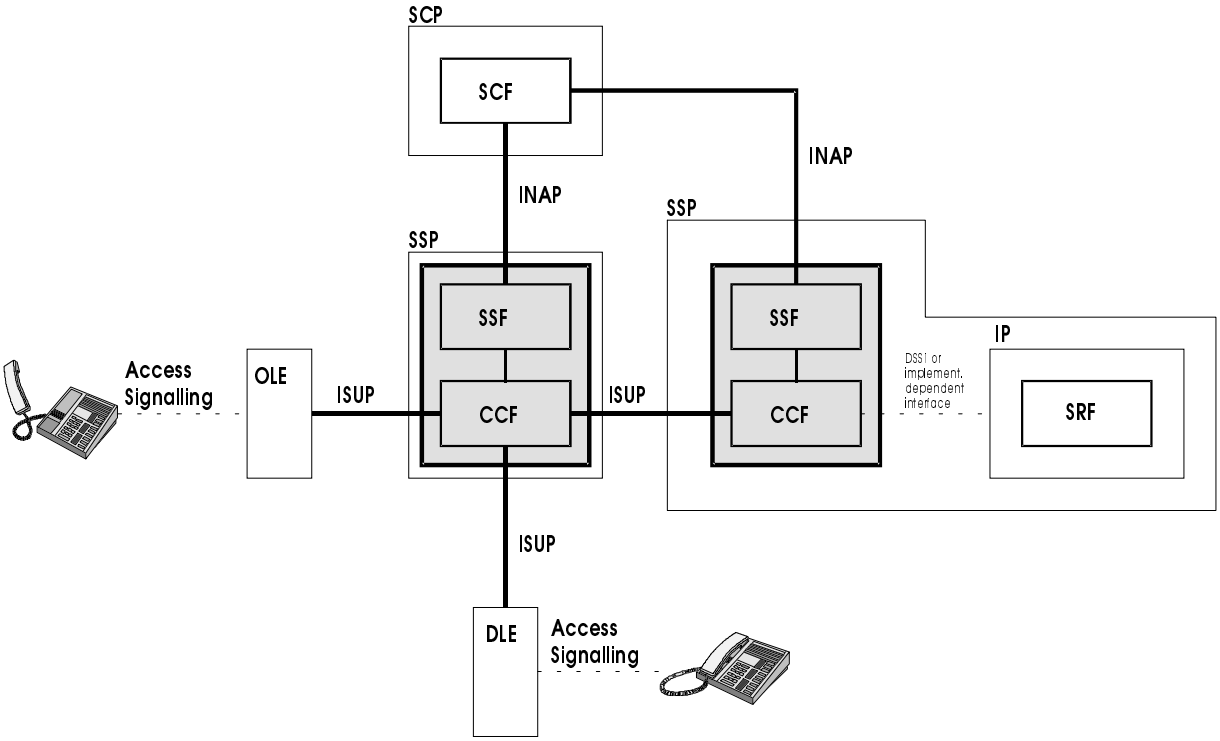


Figure 4: IP attached to an assisting SSP ("Assist" method)

In figure 4 the IP is integrated into another SSP (assisting SSP), than the one that is interacting with the SCP (initiating SSP). Whether the SRF-SCF INAP operations are relayed via the SSP or are directly exchanged between IP and SCP is not relevant for this ETR. However, in the figure only the scenario is shown, where a relay via SSP is applied.

On completion of the user interaction, control is returned to the initiating SSP. This procedure is called the "Assist" method. The procedure for this scenario is described in subclause 9.5.2 and subclause 9.5.4. Typical arrow diagrams are given in annex A, figures A.4 and A.5.

If the control of the call is retained in the assisting SSP, the "Hand-off" method is applied. This scenario is not explicitly shown in a figure. The procedure for this scenario is described in subclause 9.5.3 and a typical arrow diagram is given in annex A, figure A.6.

6 Operational requirements

Not applicable.

7 Coding requirements

7.1 Messages

none.

7.2 Parameters

7.2.1 Call diversion treatment indicators parameter

7.2.1.1 Definition

7.2.1.1.1 Call to be diverted indicator

Information sent in forward direction indicating whether diverting of the call shall be accepted.

7.2.1.2 Coding

The format of the call diversion treatment indicators parameter field is shown in figure 5.

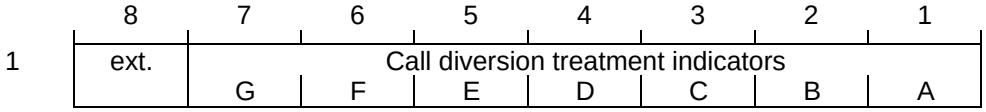


Figure 5: Call diversion treatment parameter field

The following codes are used in the call diversion treatment indicators parameter field:

a) Extension indicator (ext.)

0 octet continues through the next octet
1 last octet

b) Call diversion treatment indicators

bits BA: Call to be diverted indicator
00 no indication
01 call diversion allowed
10 call diversion not allowed
11 spare

bits C-G: spare

The code of the call diversion treatment indicators parameter is xxxx xxxx (t.b.a.).

7.2.2 Called IN number parameter

7.2.2.1 Definition

7.2.2.1.1 Called IN number

Information sent in the IAM indicating the number which was received in the SSP as called party number in IAM and SAM messages.

7.2.2.2 Coding

The format and coding the called IN number parameter corresponds to the original called number parameter defined in subclause 3.26 of ITU-T Recommendation Q.763 as modified by ETS 300 356-1 [4].

The code of the called IN number parameter is xxxx xxxx (t.b.a.).

7.2.3 Call offering treatment indicators parameter

7.2.3.1 Definition

7.2.3.1.1 Call to be offered indicator

Information sent in the forward direction indicating that the call shall be offered although the access is marked with IN specific call offering restrictions.

7.2.3.2 Coding

The format of the call offering treatment indicators parameter field is shown in figure 6.

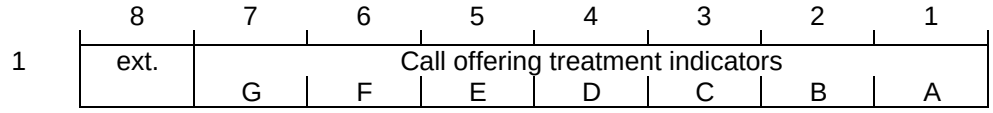


Figure 6: Call offering treatment indicators parameter field

The following codes are used in the call offering treatment indicators parameter field:

a) Extension indicator (ext.)

0 octet continues through the next octet
1 last octet

b) Call offering treatment indicators

bits BA: Call to be offered indicator
00 no indication
01 call offering not allowed
10 call offering allowed
11 spare

bits C-G: spare

The code of the call offering treatment indicators parameter is xxxx xxxx (t.b.a.).

7.2.4 Charged party identification parameter

7.2.4.1 Definition

7.2.4.1.1 Charged party identification

Information sent in the IRS message transferring the identification of the charged party, e.g. the account number.

7.2.4.2 Coding

The format of the charged party identification parameter field is national network specific. The format is similar to the format of the corresponding INAP parameter in the FurnishChargingInformation operation (see ETS 300 374-1 [8], annex B). The minimum and maximum parameter length are determined by the INAP parameter length increased by 2.

The code of the charged party identification parameter is xxxx xxxx (t.b.a.).

7.2.5 Conference treatment indicators parameter

7.2.5.1 Definition

7.2.5.1.1 Conference acceptance indicator

Information sent in both directions indicating whether a request for a multi-party call, i.e. conference or three party call, shall be accepted.

7.2.5.2 Coding

The format of the conference treatment indicators parameter field is shown in figure 7.

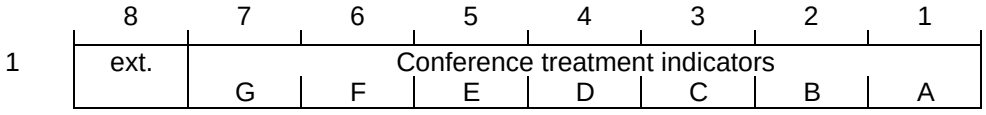


Figure 7: Conference treatment indicators parameter field

The following codes are used in the conference treatment indicators parameter field:

a) Extension indicator (ext.)

0 octet continues through the next octet
1 last octet

b) Conference treatment indicators

bits BA: Conference acceptance indicator (note)
00 no indication
01 accept conference request
10 reject conference request
11 spare

NOTE: Applicable to the Conference and Three Party supplementary services.

bits C-G: spare

The code of the conference treatment indicators parameter is xxxx xxxx (t.b.a.).

7.2.6 Correlation id parameter

7.2.6.1 Definition

7.2.6.1.1 Correlation id

Information sent in the IAM used by the SCF for correlation with a previous connection (see ETS 300 374-1 [8], subclause 6.3).

7.2.6.2 Coding

The format of the correlation id parameter field is shown in figure 8.

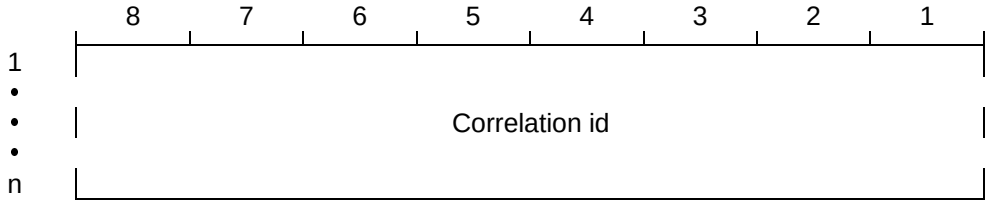


Figure 8: Correlation id parameter field

The correlation id is coded as described in ETS 300 374-1 [8], subclause 6.3. The minimum and maximum parameter length is determined by the INAP parameter length (see ETS 300 374-1 [8], subclause 6.3) increased by 2.

The code of the correlation id parameter is xxxx xxxx (t.b.a.).

7.2.7 Display information parameter

7.2.7.1 Definition

7.2.7.1.1 Display information

Information sent in either direction indicating a text string to be sent to the user.

7.2.7.2 Coding

The format of the display information parameter field is shown in figure 9.

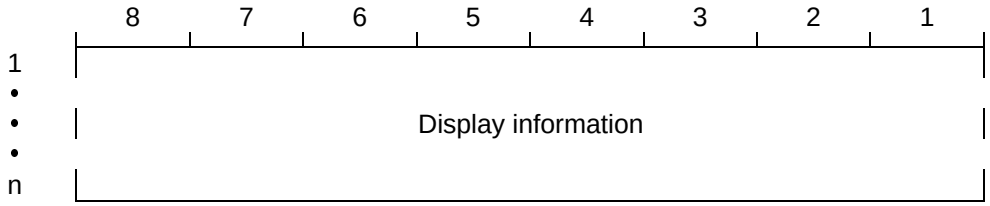


Figure 9: Display information parameter field

The display information is coded as described in ETS 300 403-1 [9], subclause 4.5.16. The minimum and maximum parameter length is determined by the DSS1 parameter length increased by 2.

The code of the display information parameter is xxxx xxxx (t.b.a.).

7.2.8 SCF id parameter

7.2.8.1 Definition

7.2.8.1.1 SCF id

Information sent in the IAM indicating the SCF identifier (see ETS 300 374-1 [8], subclause 6.3).

7.2.8.2 Coding

The format of the SCF id parameter field is shown in figure 10.

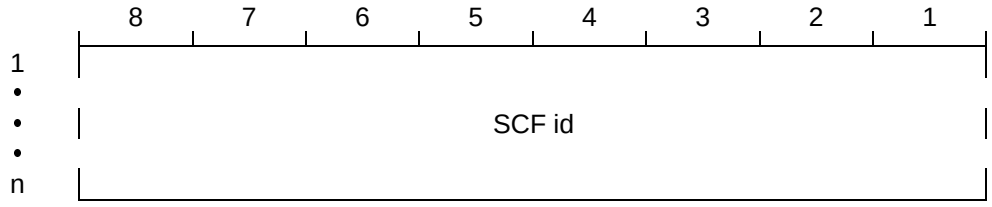


Figure 10: SCF id parameter field

The SCF id is coded as described in ETS 300 374-1 [8], subclause 6.3. The minimum and maximum parameter length is determined by the INAP parameter length increased by 2.

The code of the SCF id parameter is xxxx xxxx (t.b.a.).

8 State definitions

No specific state definitions are required.

9 Signalling procedures

9.1 IN basic call

For this ETR an "IN basic call" is considered as:

- a normal ISUP basic call invoking IN functionality in the SSP;
- that no DPs are armed dynamically in the request mode;
- that no user interaction is needed.

For an IN basic call the normal ISUP basic call procedures are applicable as described in ETS 300 356-1 [4] for national intermediate exchanges unless indicated otherwise in the subclauses below.

9.1.1 Successful call set-up

9.1.1.1 Forward address signalling

If an IAM is received in a SSP and the call is recognized as IN call, .i.e. by detecting a DP as TDP-R (see subclause 9.3), an InitialDP operation is sent from the SSF to the SCF. If the IAM had been segmented the remainder of the call set-up information is awaited (see subclause 9.1.1.7). The mapping of parameters is shown in table 4.

Table 4: Mapping of parameters from IAM to InitialDP

IAM (note)	**InitialDP**
Called party number	calledPartyNumber
Calling party number	callingPartyNumber
Calling party's category	callingPartysCategory
Location number	locationNumber
Original called number	originalCalledPartyID
User teleservice information (1st priority) High layer compatibility IE contained in access transport (2nd priority)	highLayerCompatibility
Generic number "additional calling party number"	additionalCallingPartyNumber
Forward call indicators	forwardCallIndicators
User service information prime (1st priority) User service information (2nd priority)	bearerCapability
Redirecting number	redirectingPartyID
Redirection information	redirectionInformation
NOTE: Optional parameters may be absent, i.e. they are only mapped, if received.	

9.1.1.1.1 Connect operation

On receipt of a Connect operation from the SCP the actions described in subclause 2.1.1.2 of ITU-T Recommendation Q.764 as modified by ETS 300 356-1 [4] will be performed. For routing of the call the called party number is derived from the destinationRoutingAddress (see table 11).

If no cutAndPaste parameter is received in the Connect operation an ACM is sent to the preceding exchange. The ACM shall contain the corresponding ISUP parameters, if a serviceInteractionIndicators parameter was received in the Connect operation (see below). Other optional parameter will not be sent. The backward call indicators parameter in the ACM is encoded as follows:

Charge indicator: see subclause 9.1.1.2;
Called party's status indicator: 00 (no indication);
Called party's category: 00 (no indication);
End-to-end method indicator: 00 (no end-to-end method available);
Interworking indicator: 0 (no interworking encountered);
End-to-end information indicator: 0 (no end-to-end information available);
ISDN User Part indicator: 1 (ISDN User Part used all the way);
Holding indicator: national matter;
ISDN access indicator: 1 (terminating access ISDN);
Echo Control device indicator: see subclause 2.7.2.1.2 of ITU-T Recommendation Q.764 as modified by ETS 300 356-1 [4];
SCCP method indicator: 00 (no indication).

Table 5 illustrates the mapping of parameters received in the Connect operation to parameters sent in the IAM to the succeeding exchange. Parameters which were received in the IAM and are not replaced by parameters of the Connect operation are treated according to the normal procedures.

On sending of the IAM the awaiting address complete timer T7 is started. If timer T7 expires a REL message containing cause value #31 is sent in both directions.

Table 5: Mapping of parameters from Connect to IAM

Connect (note 1)	**IAM**
destinationRoutingAddress	Called party number (note 2)
callingPartyNumber	see subclause 11.2
serviceInteractionIndicators	see subclause 9.1.1.1.3
originalCalledPartyID	Original called number
callingPartysCategory	Calling party's category
redirectingPartyID	Redirecting number
redirectionInformation.	Redirection information
NOTE 1: Optional parameters may be absent, i.e. they are only mapped, if received. NOTE 2: The treatment of the called party number in the case the cutAndPaste parameter is present in the Connect operation is described in ETS 300 374-1 [8], subclause 7.3.11.	

9.1.1.1.2 Continue operation

On receipt of a Continue operation from the SCP call processing is resumed and the call set-up will be performed as described in subclause 2.1.2.2 of ITU-T Recommendation Q.764 as modified by ETS 300 356-1 [4].

9.1.1.1.3 Mapping of the INAP serviceInteractionIndicators

The INAP serviceInteractionIndicators parameter contains information that is:

- only of local significance, i.e. to be treated in the SSP;
- relevant for the originating local exchange; or
- relevant for the destination local exchange.

Table 6 describes the mapping from the INAP to the ISUP with regard to the serviceInteractionIndicators.

Furthermore, for the IN basic call, the following rules shall apply:

a) if in the INAP serviceInteractionIndicators parameter a value has been received indicated as default in table 6, then this value is mapped to the value "no indication" in the appropriate ISUP parameter;

b) an ISUP parameter is only included in a message, if the parameter contents is unequal zero.

Table 6: Mapping of the INAP serviceInteractionIndicators

INAP serviceInteractionIndicators	ISUP parameter in	
	ACM/CPG/CON/ANM	IAM
Call to be diverted indicator - call diversion allowed **(default)** - call diversion not allowed	---	**Call diversion treatment indicators parameter** Call to be diverted indicator - no indication - call diversion allowed - call diversion not allowed
Call to be offered indicator - call offering not allowed **(default)** - call offering allowed	---	**Call offering treatment indicators parameter** Call to be offered indicator - no indication - call offering not allowed - call offering allowed
Conference at DLE accept. ind. - accept conference request **(default)** - reject conference request	---	**Conference treatment indicators parameter** Conference acceptance ind. - no indication - accept conference request - reject conference request
Conference at OLE accept. ind. - accept conference request **(default)** - reject conference request	**Conference treatment indicators parameter** Conference acceptance ind. - no indication - accept conference request - reject conference request	---

9.1.1.1.3.1 Interworking with an ISUP not supporting the parameters

No specific action is required. If the parameters can not be transferred to the local exchanges, the behaviour in these exchanges for IN calls is the same as for normal ISDN calls, i.e. no IN controlled treatment of features is possible.

9.1.1.2 SendChargingInformation operation

The treatment is national network specific and not described further within this ETR.

9.1.1.3 Address complete or connect message

The procedures described in subclause 2.1.4.2 of ITU-T Recommendation Q.764 as modified by ETS 300 356-1 [4] are applicable with the following exceptions:

- upon receipt of an ACM or CON message the awaiting address complete timer T7 is stopped. If an ACM is received the awaiting answer timer T9 is started;

- if an ACM has not been sent, the received message is passed on. The message shall contain the corresponding ISUP parameters, if a serviceInteractionIndicators parameter was received in the Connect operation (see subclause 9.1.1.1.3);

- if an ACM has already been sent, a received ACM is mapped to a CPG message and a received CON message to an ANM, respectively. The mapping of parameters will be performed as described in the Call Diversion stage 3n description (see ETS 300 356-15 [6]).

9.1.1.4 Information message (national option)

The procedure described in subclause 2.1.6 of ITU-T Recommendation Q.764 as modified by ETS 300 356-1 [4] is applicable. If call set-up information is missing an INR message should be sent by the SSP before the InitialDP operation is sent to the SCP.

9.1.1.5 Answer message

Upon receipt of an ANM the awaiting answer timer T9 is stopped and the actions described in subclause 2.1.7 of ITU-T Recommendation Q.764 as modified by ETS 300 356-1 [4] are performed.

9.1.1.6 Continuity check

If an IAM is received indicating that either a continuity check is requested or is performed on a previous circuit the normal procedures described in subclause 2.1.8 of ITU-T Recommendation Q.764 as modified by ETS 300 356-1 [4] are applicable. The sending of the InitialDP operation is delayed until a COT message indicating "successful" is received.

If the continuity check fails, no relationship between SSF and SCF will be established.

9.1.1.7 Simple segmentation

With regard to the simple segmentation procedure the SSP behaves like a local exchange. Consequently, items d), e), f) of subclause 2.1.12 of ITU-T Recommendation Q.764 as modified by ETS 300 356-1 [4] are applicable.

9.1.2 Normal call release

The CCF part of the SSP releases the call as described in item b) of subclause 2.3.1 of ITU-T Recommendation Q.764 as modified by ETS 300 356-1 [4]. For the SSF part of the SSP the general rules described in ETS 300 374-1 [8], subclause 3.1.1.5 are applicable.

9.1.3 Suspend, resume

Upon receipt of a SUS message with the indication "network initiated" the timer T_{SUS} is started to ensure that a RES message with the indication "network initiated" or a REL message is received. The received SUS message is not passed on. If the timer T_{SUS} expires, the procedures described in subclause 2.4.3 of ITU-T Recommendation Q.764 as modified by ETS 300 356-1 [4] apply. The value of timer T_{SUS} depends on the time limits received in serviceInteractionIndicators parameter.

9.1.4 ReleaseCall operation

Upon receipt of the ReleaseCall operation, the SSP sends REL messages in both directions. The cause indicators parameter contains the releaseCallArg parameter of the ReleaseCall operation. If no releaseCallArg was present, cause value #31 is sent. Furthermore, the normal procedures described in subclause 2.3.3 of ITU-T Recommendation Q.764 as modified by ETS 300 356-1 [4] are applicable.

9.1.5 Transfer of the called IN number

The calledPartyNumber parameter sent in the InitialDP operation is transferred in the called IN number parameter to the succeeding exchange. The address presentation restricted indicator is set to "presentation allowed".

9.1.5.1 Interworking with an ISUP not supporting the called IN number parameter

No specific action is required.

9.1.6 Abnormal conditions

9.1.6.1 General requirements on receipt of unrecognized signalling information messages and parameters

With regard to the handling of unrecognized signalling information a SSP behaves like an type A exchange.

9.2 IN call with SCP request to collect further digits

After sending the InitialDP operation to the SCP a RequestReportBCSMEvent operation to arm DP2 accompanied by a CollectInformation operation may be received from the SCP (see ETS 300 374-1 [8], subclause 7.3.10). In this case the specified number of digits will be collected in the SSP. Encountering DP2, i.e. the specified number of digits has been received, will result in sending an EventReportBCSM operation to the SCP.

There is no further impact on the ISUP protocol and the call handling will continue as described in subclause 9.1 unless a further RequestReportBCSMEvent operation to arm DP2 accompanied by a CollectInformation operation is received from the SCP. In this case the procedure described above is repeated.

9.3 Detection point processing

9.3.1 General

The SCF uses the RequestReportBCSMEvent operation to request the SSF to monitor for call-related events. The monitor mode is indicated in the operation as either "interrupted" or "notifyAndContinue".

In the "notifyAndContinue" mode the event is reported as EDP-N (notification mode) in the EventReportBCSM operation to the SCF and normal call processing continues as described in subclause 9.1.

In the "interrupted" mode the event is reported as EDP-R (request mode) in the EventReportBCSM operation and the SSF will wait for instructions from the SCF.

Table 7: Event detection points

EDP	EDP encountered on ...
2	see subclause 9.2
4	national network specific
5, 13	receipt of a REL message with cause value #17 (user busy)
6, 14	expiry of timer $T_{NoReply}$
7, 15	receipt of an ANM or CON message
9, 17	a) receipt of a REL message with cause value #16 (normal call clearing) in the active phase of a call b) expiry of timer T_{SUS}
10, 18	receipt of a REL message with cause value #16 (normal call clearing) from a preceding exchange before the call is answered

In the following, the differences in call processing for IN calls with dynamically armed detection points compared to the procedures described in subclauses 9.1 and 9.4 are listed.

9.3.1.1 Address complete message

On receipt of a ACM, the timer $T_{NoReply}$ is started if either DP 6 or 14 has been armed by the SCF.

9.3.1.2 Answer or connect message

The timer $T_{NoReply}$ is stopped, if applicable.

9.3.1.3 Release message

If a REL is received from either the preceding or succeeding exchange and corresponds to a DP armed as EDP-N (notification mode), the CCF part of the SSP releases the call like an ordinary transit exchange. For the SSF part of the SSP the general rules described in ETS 300 374-1 [8], subclause 7.1.1.5 are applicable.

If a REL is received from the preceding exchange and corresponds to a DP armed as EDP-R (request mode), the CCF part of the SSP releases the call like an ordinary transit exchange. For the SSF part of the SSP the general rules described in ETS 300 374-1 [8], subclause 7.1.1.5 are applicable.

If a REL is received from the succeeding exchange and corresponds to a DP armed as EDP-R (request mode), the CCF part of the SSP releases the outgoing leg of the connection and holds the incoming leg. For the SSF part of the SSP the general rules described in ETS 300 374-1 [8], subclause 7.1.1.5 are applicable. The call processing is suspended and the SSP waits for SCP instructions.

9.3.2 Actions to be performed in case of DPs armed in the request mode

9.3.2.1 Storage and release of initial address information

Initial address information is not released from memory on receipt of an ACM.

NOTE: Memory capacity in the exchange may limit the use of services requiring the storage of initial address information.

9.3.2.2 Signalling procedures for connection type allowing fallback

If:

a) an IAM was received with the TMR value set to "64 kbit/s unrestricted preferred";

b) no fallback has already been performed,

then, on receipt of the Connect operation, a fallback is performed as described in subclauses 2.5.1.2.2 and 2.5.2.2.2 of ITU-T Recommendation Q.764 as modified by ETS 300 356-1 [4].

9.3.2.3 Impact on supplementary services

9.3.2.3.1 User-to-user signalling

9.3.2.3.1.1 User-to-user signalling, service 1

If user-to-user service 1 is implicitly requested, the user-to-user information parameter will be discarded from the IAM and the user-to-user indicators parameter indicating "user-to-user information discarded by the network" is sent in the ACM.

If the user-to-user service 1 was explicitly requested as "not essential", the user-to-user indicators parameter will be discarded from the IAM and service 1 will be indicated as "not provided" in the ACM.

If the user-to-user service 1 was explicitly requested as "essential", the call is cleared with cause value #29 and diagnostics in the REL message.

9.3.2.3.1.2 User-to-user signalling, service 2

If the user-to-user service 2 was explicitly requested as "not essential", the user-to-user indicators parameter will be discarded from the IAM and service 2 will be indicated as "not provided" in the ACM.

If the user-to-user service 2 was explicitly requested as "essential", the call is cleared with cause value #29 and diagnostics in the REL message.

9.3.2.3.1.3 User-to-user signalling, service 3

a) Service request during call set-up

If the user-to-user service 3 was explicitly requested as "not essential", the user-to-user indicators parameter will be discarded from the IAM and service 3 will be indicated as "not provided" in the ACM.

If the user-to-user service 3 was explicitly requested as "essential", the call is cleared with cause value #29 and diagnostics in the REL message.

b) Service request after call set-up

A FRQ with facility indicators set to "user-to-user service" and the user-to-user indicators parameter (containing the relevant service 3 information) will be responded by a FRJ message indicating "not provided" for service 3 in the user-to-user indicators.

9.4 Set-up of an IN call to destination B

This subclause describes the set-up of an IN call to destination B after an user interactive dialogue has been performed or after the SSF has reported an EDP-R in the EventReportBCSM operation to the SCF. In these situations the call set-up differs from the normal call set-up for the "IN basic call".

9.4.1 Successful call set-up

9.4.1.1 Forward address signalling

9.4.1.1.1 Connect operation

On receipt of the Connect operation the actions described in subclause 9.1.1.1.1 are performed with the following exceptions:

- an ACM is not sent towards the originating local exchange;

- through-connection is performed as described in item d) of subclause 2.1.1.1 of ITU-T Recommendation Q.764 as modified by ETS 300 356-1 [4].

9.4.1.2 Mapping of the INAP serviceInteractionIndicators

This subclause deals with the situation that the INAP serviceInteractionIndicators is received multiple times for different connection phases. In this case the difference to the treatment as described in subclause "9.1.1.1.3. Mapping of the INAP serviceInteractionIndicators" for IN basic call is as follows:

- the indicators contained in the received INAP serviceInteractionIndicators parameter are compared one by one against the indicators that are stored in the SSP, i.e. that have been received in an earlier INAP operation;

- if the received value of an indicator differs from the one that is stored in the SSP, then this indicator is mapped to the corresponding value in the appropriate ISUP parameter;

- if the received value of an indicator is equal to the one that is stored in the SSP, then this indicator is mapped to the value "no indication" in the appropriate ISUP parameter.

9.4.1.3 Sending of backward messages

If backward messages have already been sent to preceding exchanges, it may be required:

- to map a received message into another message; or

- to generate another message instead of the message, that would normally be generated.

Table 8 describes which message is to be sent in different cases.

Table 8: Sending of backward messages

Message received or message to be sent, respectively → **Messages already sent ↓**	**ACM**	**CPG** "alerting" or "in-band info. or an appropriate pattern is now available"	**CPG** "progress"	**CON**	**ANM**
ACM/CON not sent	ACM (note 1)	not relevant	not relevant	CON (note 1)	not relevant
ACM sent, ANM not sent	CPG (note 1)	CPG	CPG	ANM (note 1)	ANM
ANM/CON sent for previous connection, but ANM/CON not received for actual connection	CPG "progress" (note 1) (note 2)	CPG "progress" (note 2)	CPG "progress"	CPG "progress" (note1) (note2)	CPG "progress" (note 2)
ANM/CON sent for previous connection and ANM/CON received for actual connection	not relevant	not relevant	CPG "progress"	not relevant	not relevant

NOTE 1: If a serviceInteractionIndicators parameter was provided in the INAP operation, this message carries the corresponding ISUP parameters, if applicable.
NOTE 2: An originating local exchange conforming to ETS 300 356-1 [4] will discard this CPG message since no generic notification parameter is contained in the message.

9.4.1.4 Address complete message

Upon receipt of an ACM the awaiting address complete timer T7 is stopped and the awaiting answer timer T9 is started.

Which message is sent to preceding exchanges is described in subclause 9.4.1.3.

9.4.1.5 Call Progress message (Basic call)

Which message is sent to preceding exchanges is described in subclause 9.4.1.3.

9.4.1.6 Connect message

Upon receipt of a CON message the awaiting address complete timer T7 is stopped and the transmission path is through-connected in forward direction, if not already connected.

Which message is sent to preceding exchanges is described in subclause 9.4.1.3.

9.4.1.7 Answer message

Upon receipt of an ANM the awaiting answer timer T9 is stopped and the transmission path is through-connected in forward direction, if not already connected.

Which message is sent to preceding exchanges is described in subclause 9.4.1.3.

9.4.2 Abnormal conditions

9.4.2.1 Handling of unexpected messages

The procedures described in subclause 2.9.5.1 of ITU-T Recommendation Q.764 as modified by ETS 300 356-1 [4] are applicable with the following exceptions:

a) if an ACM has already been sent for the incoming leg of the call, but an ACM has not been received for the outgoing leg of the call, then:

   1) a CPG received in forward direction shall be discarded, i.e. the message is not treated as an unexpected message;

   2) an unrecognized message received in forward direction shall not be passed on and the procedure described in item xi) of subclause 2.9.5.2 of ITU-T Recommendation Q.764 as modified by ETS 300 356-1 [4] shall be applied;

b) if an ANM has already been sent for the incoming leg of the call, but an ANM has not been received for the outgoing leg of the call, then the following messages received in forward direction shall be discarded, i.e. the messages are not treated as unexpected messages: SUS, RES, FAR and FOT.

9.4.3 Impact on supplementary services

9.4.3.1 Call hold

On receipt of a CPG message with the generic notification indicator set to "remote hold" a note in memory shall be set. The note shall be reset on receipt of a CPG message with the generic notification indicator set to "remote retrieval".

If the note is set on receipt of a connect operation, then an artificial CPG message with the generic notification indicator set to "remote retrieval" shall be generated.

9.4.3.2 Malicious call identification

On receipt of an IDR message two cases exist:

a) if an IDR was already sent to the preceding exchange, then the IDR message is not passed on and is immediately responded by an IRS message;

b) if an IDR was not sent to the preceding exchange, then the IDR message is passed on transparently towards the originating local exchange.

If bit A of the MCID request indicators was set to 1, then in addition to the normal procedure the service switching point includes the charged party identification parameter, if available, into the IRS message.

9.5 User interactive dialogue (in-band)

If in response to the InitialDP or EventReportBCSM operation a ConnectToResource or EstablishTemporaryConnection operation is received from the SCF the incoming call shall be connected to a physical entity containing the SRF, i.e. IP. In case of ConnectToResource the SSP, that interacts with the SCP, supports the requested IP capabilities and the IP is therefore either integrated or co-located in the SSP. In case of EstablishTemporaryConnection the IP is available in another network element. Consequently, the Assist method is applied.

9.5.1 SSP supports requested IP capabilities

9.5.1.1 Successful call set-up

9.5.1.1.1 Forward address signalling

9.5.1.1.1.1 ConnectToResource operation

On receipt of the ConnectToResource operation the IP is connected to the incoming call, if the TMR value received in the IAM is set to either "speech" or "3.1 kHz audio" or "64 kbit/s unrestricted preferred". For the latter case see also subclause 9.5.1.3. If other TMR values are received, the call is released using cause value #65.

9.5.1.1.2 Address complete message or call progress message

An ACM containing an optional backward call indicators parameter indicating "in-band information or an appropriate pattern is now available" is sent. The backward call indicators parameter in the ACM is encoded as described in subclause 9.1.

If backward messages have already been sent to preceding exchange, then instead of ACM a different message may be sent. This is described in subclause 9.4.1.3.

9.5.1.1.3 Answer message

When the IP answers, an ANM is sent to the preceding exchange, if the bothway through-connect indicator in the serviceInteractionIndicators parameter of the ConnectToResource operation was set to "required".

If backward messages have already been sent to preceding exchange, then instead of ANM a different message may be sent. This is described in subclause 9.4.1.3.

NOTE 1: The user interactive dialogue requires symmetrical through-connection in the originating local exchange. Furthermore, the ANM supervision timer T9 running in the originating local exchange has to be stopped. This is achieved by sending the ANM from the SSP prior to the beginning of the dialogue. However, the operation of basic call procedures and supplementary services may be affected.

NOTE 2: The sending of an ANM may also be required, if a chargeable announcement is to be connected. However, charging aspects are outside the scope of this ETR.

9.5.1.2 Storage and release of initial address information

Initial address information is retained in memory to allow a call set-up to a new destination after disconnecting the IP.

NOTE: Memory capacity in the exchange may limit the use of services requiring the storage of initial address information.

9.5.1.3 Signalling procedures for connection type allowing fallback

If:

a) the TMR value received in the IAM is set to "64 kbit/s unrestricted preferred";

b) no fallback has already been performed;

c) an ANM is to be sent, i.e. the bothway through-connect indicator in the serviceInteractionIndicators parameter of the ConnectToResource operation was set to "required",

then, on receipt of the ConnectToResource operation, a fallback is performed as described in subclauses 2.5.1.2.2 and 2.5.2.2.2 of ITU-T Recommendation Q.764 as modified by ETS 300 356-1 [4].

9.5.1.4 DisconnectForwardConnection operation

When the DisconnectForwardConnection operation is received the IP will be disconnected.

9.5.1.5 Impact on supplementary services

9.5.1.5.1 Connected line identification presentation

The following text is only applicable if an ANM is to be sent for the IP connection and if an ANM was not sent before.

If the connected line identity was requested by the calling user, the SSP behaves as follows:

If "no impact" was received in the INAP serviceInteractionIndicators (connected number treatment indicator), then two cases exist:

a) if a connected number is available for the IP, then the procedure as described in subclause 5.5.2.5 of ITU-T Recommendation Q.731 as modified by ETS 300 356-2 [5] will be performed;

b) if a connected number is not available for the IP, then the SSP sends a connected number parameter in the ANM encoded as follows:

nature of address indicator:	0000000;
numbering plan indicator:	000;
address presentation restricted indicator:	10 (address not available);
screening indicator:	11 (network provided);
no address signals.	

If "presentation restricted" was received in the INAP serviceInteractionIndicators (connected number treatment indicator), then two cases exist:

- if a connected number is available for the IP, then the procedure as described in subclause 6.5.2.5 of ITU-T Recommendation Q.731 as modified by ETS 300 356-2 [5] will be performed;

- if a connected number is not available for the IP, then the SSP sends a connected number parameter in the ANM encoded as shown in case b) above.

If "present called IN number" was received in the INAP serviceInteractionIndicators, then:

- a connected number parameter is generated as follows:

  nature of address indicator and numbering plan indicator are encoded as received in the called party number of the IAM;
  address presentation restricted indicator: 00 (presentation allowed);
  address signals are encoded as received in called party number or subsequent number parameters, respectively, until ACM was sent;

- a generic number parameter "additional connected number" is not sent.

9.5.1.5.2 User-to-user signalling

The text in subclauses 9.5.1.5.2.1 to 9.5.1.5.2.3 is only applicable if an ANM is to be sent for the IP connection and if an ANM was not sent before.

9.5.1.5.2.1 User-to-user signalling, service 1

If user-to-user service 1 is implicitly requested, the user-to-user information parameter will be discarded from the IAM and the user-to-user indicators parameter indicating "user-to-user information discarded by the network" is sent in the ACM,

If the user-to-user service 1 was explicitly requested as "not essential", the user-to-user indicators parameter will be discarded from the IAM and service 1 will be indicated as "not provided" in the ACM.

If the user-to-user service 1 was explicitly requested as "essential", the call is cleared with cause value #29 and diagnostics in the REL message.

9.5.1.5.2.2 User-to-user signalling, service 2

If the user-to-user service 2 was explicitly requested as "not essential", the user-to-user indicators parameter will be discarded from the IAM and service 2 will be indicated as "not provided" in the ACM.

If the user-to-user service 2 was explicitly requested as "essential", the call is cleared with cause value #29 and diagnostics in the REL message.

9.5.1.5.2.3 User-to-user signalling, service 3

a) Service request during call set-up

If the user-to-user service 3 was explicitly requested as "not essential", the user-to-user indicators parameter will be discarded from the IAM and service 3 will be indicated as "not provided" in the ACM.

If the user-to-user service 3 was explicitly requested as "essential", the call is cleared with cause value #29 and diagnostics in the REL message.

b) Service request after call set-up

A FRQ with facility indicators set to "user-to-user service" and the user-to-user indicators parameter (containing the relevant service 3 information) will be responded by a FRJ message indicating "not provided" for service 3 in the user-to-user indicators.

9.5.2 Assist method - procedure in the initiating SSP

9.5.2.1 Successful call set-up

9.5.2.1.1 Forward address signalling

9.5.2.1.1.1 EstablishTemporaryConnection operation

On receipt of the EstablishTemporaryConnection operation from the SCP a connection to an external IP will be established, if the TMR value received in the IAM is set to either "speech" or "3.1 kHz audio" or "64 kbit/s unrestricted preferred". For the latter case see also subclause 9.5.1.3. If other TMR values are received, the call is released using cause value #65.

The IAM for set-up of the temporary connection is newly generated as in an originating local exchange.

For routing of the call the called party number is derived from the assistingSSPIPRoutingAddress.

Table 9 illustrates the mapping of parameters received in the EstablishTemporaryConnection operation to parameters sent in the IAM.

Table 9: Mapping of parameters from EstablishTemporaryConnection to IAM

EstablishTemporaryConnection (note)	**IAM**
assistingSSPIPRoutingAddress	Called party number
serviceInteractionIndicators	see subclause 9.4.1.2
correlationID	Correlation id
scfID	SCF id
NOTE: Optional parameters may be absent, i.e. they are only mapped, if received.	

Except the called party number parameter the remaining mandatory parameters of the IAM are set as follows:

a) nature of connection indicators

satellite indicator: set as in an OLE;
continuity check indicator: set as in an OLE;
echo control device indicator: set as in an OLE.

b) forward call indicators

national/international call indicator: set as in an OLE;
end-to-end method indicator: 00 (no end-to-end method available);
interworking indicator: 0 (no interworking encountered);
end-to-end information indicator: 0 (no end-to-end information available);
ISDN user part indicator: 1 (ISDN user part used all the way);
ISDN user part preference indicator: 10 (ISDN user part required all the way);
ISDN access indicator: 1 (originating access non-ISDN);
SCCP method indicator: 00 (no indication).

c) calling party's category

00001010 (ordinary subscriber)

d) transmission medium requirement

00000011 (3,1 kHz audio)

Besides the parameters listed in table 9, the IAM contains the following optional parameters:

- propagation delay counter (set as in an OLE).

On sending of the IAM an ACM is sent to the preceding exchange encoded as described in subclause 9.1 and the awaiting address complete timer T7 is started. If timer T7 expires, a REL message containing cause value #31 is sent in both directions.

9.5.2.1.1.2 Interworking with an ISUP not supporting the Correlation Id and SCF Id parameters

If the parameters can not be transferred to the assisting SSP, the set-up of the connection will fail.

9.5.2.1.2 Address complete message

Refer to subclause 9.4.1.4.

9.5.2.1.3 Call Progress message (Basic call)

Refer to subclause 9.4.1.5.

9.5.2.1.4 Connect message

Refer to subclause 9.4.1.6.

9.5.2.1.5 Answer message

Refer to subclause 9.4.1.7.

9.5.2.2 Storage and release of initial address information

In the initiating SSP initial address information is retained to allow a call set-up to a new destination after disconnecting the IP.

NOTE: Memory capacity in the exchange may limit the use of services requiring the storage of initial address information.

9.5.2.3 DisconnectForwardConnection operation

When the DisconnectForwardConnection operation is received from the SCP the normal release procedures are applied for the outgoing circuit. The REL message sent in forward direction contains cause value #31.

9.5.2.4 Abnormal conditions

9.5.2.4.1 Handling of unexpected messages

Refer to subclause 9.4.2.

9.5.2.5 Impact on supplementary services

The actions as described in subclause 9.5.1.5 are applicable.

9.5.3 Hand-off method - procedure in the initiating SSP

On receipt of a Connect operation from the SCP, the actions described in subclause 9.1 or in subclause 9.4 will be performed. The INAP correlationID and scfID parameters are mapped to the corresponding ISUP parameters in the IAM.

9.5.4 Assist/Hand-off method - procedure in the assisting SSP

9.5.4.1 Successful call set-up

9.5.4.1.1 Forward address signalling

If an IAM is received in a SSP and the call is recognized as a call which is to be routed to an IP, an AssistReqInstructions operation is sent from the SSF to the SCF. The mapping of parameters is shown in table 10.

Table 10: Mapping of parameters from IAM to AssistRequestInstruction

IAM	AssistRequestInstruction
Correlation id	correlationID

9.5.4.1.1.1 ConnectToResource operation

The procedure to be performed after receipt of the ConnectToResource operation is identical to the procedure described in subclause 9.5.1.

9.6 Call gapping

When receiving the CallGap operation, the SSF reduces the rate at which specific service requests are sent to the SCF. The detailed procedure is described in ETS 300 374-1 [8], subclause 7.3.6:

a) if a call is to be gapped and the "informationToSend" indicates announcement or tone, then the ACM contains an optional backward call indicators parameter indicating "in-band information or an appropriate pattern is now available".

   After the calling user has received the "informationToSend" the call is released and the cause indicators parameter contains the releaseCause parameter of the CallGap operation. If no releaseCause was present, cause value #31 is sent;

b) if a call is to be gapped and the "informationToSend" indicates display information, then the call is released and a display information parameter is included in the REL message. The cause indicators parameter contains the releaseCause parameter of the CallGap operation. If no releaseCause was present, cause value #31 is sent.

9.7 Service filtering

When receiving the ActivateServiceFiltering operation, the SSF handles calls which are to be filtered in a specified manner without request for instructions to the SCF. The detailed procedure is described in ETS 300 374-1 [8], subclause 7.3.1:

a) if a call is to be filtered and the "informationToSend" indicates announcement or tone, then an ACM is sent to the preceding exchange with an optional backward call indicators parameter indicating "in-band information or an appropriate pattern is now available". In the case of a chargeable in-band information an ANM is sent in addition.

   After the calling user has received the "informationToSend" the call is released and the cause indicators parameter contains the releaseCause parameter of the ServiceFiltering operation. If no releaseCause was present, cause value #31 is sent.

b) if a call is to be filtered and the "informationToSend" indicates display information, then:

- if the "informationToSend" is free of charge, the call is released and a display information parameter is included in the REL message. The cause indicators parameter contains the releaseCause parameter of the ServiceFiltering operation. If no releaseCause was present, cause value #31 is sent;

- if the "informationToSend" is not free of charge, an ANM containing the display information parameter is sent. Then the call is released and the cause indicators parameter contains the releaseCause parameter of the ServiceFiltering operation. If no releaseCause was present, cause value #31 is sent.

9.7.1 Impact on supplementary services

9.7.1.1 Closed user group

If the call is a CUG call with outgoing access not allowed, then the "informationToSend" is not provided and the call is released using cause value #29 with diagnostics. The diagnostics field contains the CUG interlock code parameter name.

9.8 SCP initiated call

For a SCP initiated call the SSP behaves like an originating local exchange with the exception that no information is received/sent from/to the access protocol. The call set-up information needed for the generation of the IAM is partly provided with the InitiateCallAttempt operation. The remaining mandatory fields of the IAM are supplied with default values. This is described in the subclauses below.

9.8.1 Successful call set-up

9.8.1.1 Forward address signalling

On receipt of an InitiateCallAttempt operation from the SCP the contents is stored and call processing is suspended.

9.8.1.1.1 Continue operation

The actions described in subclause 2.1.1.1 of ITU-T Recommendation Q.764 as modified by ETS 300 356-1 [4] will be performed. For routing of the call the called party number is derived from the destinationRoutingAddress (see table 11).

Table 11 illustrates the mapping of parameters received in the InitiateCallAttempt operation to parameters sent in the IAM.

Table 11: Mapping of parameters from InitiateCallAttempt to IAM

InitiateCallAttempt (note)	**IAM**
destinationRoutingAddress	Called party number
callingPartyNumber	Calling party number
serviceInteractionIndicators	see subclause 9.1.1.1.3
NOTE: Optional parameters may be absent, i.e. they are only mapped, if received.	

Except the called party number parameter the remaining mandatory parameters of the IAM are set as follows:

a) nature of connection indicators

satellite indicator:	set as in an OLE;
continuity check indicator:	set as in an OLE;
echo control device indicator:	set as in an OLE.

b) forward call indicators

national/international call indicator:	set as in an OLE;
end-to-end method indicator:	00 (no end-to-end method available);
interworking indicator:	0 (no interworking encountered);
end-to-end information indicator:	0 (no end-to-end information available);
ISDN user part indicator:	1 (ISDN user part used all the way);
ISDN user part preference indicator:	00 (ISDN user part preferred all the way);
ISDN access indicator:	1 (originating access non-ISDN);
SCCP method indicator:	00 (no indication).

c) calling party's category

00001010 (ordinary subscriber)

d) transmission medium requirement

00000011 (3,1 kHz audio)

Besides the parameters listed in table 11, the IAM contains the following optional parameters:

- propagation delay counter (set as in an OLE).

9.9 Actions to be performed in local exchanges

9.9.1 Actions in the originating local exchange

For an IN basic call the normal ISUP basic call procedures are applicable as described in ETS 300 356-1 [4] for originating local exchanges unless indicated otherwise in the subclauses below.

9.9.1.1 Successful call set-up

9.9.1.1.1 Address complete, call progress, connect or answer message

If received in these messages, the conference treatment indicators parameter shall be stored in the exchange. If the parameter have already been stored, then the stored information will be overwritten. The application of this parameter is described in subclause 11.

9.9.2 Actions in the destination local exchange

9.9.2.1 Successful call set-up

9.9.2.1.1 Forward address signalling

If received in the IAM, the following parameters shall be stored:

- conference treatment indicators;
- call diversion treatment indicators;
- called IN number.

The application of these parameters is described in subclause 11.

9.9.2.1.1.1 Preventing of call offering for calls not routed via IN at a destination access

Upon receipt of an IAM for an access which is marked as "prevent call offering for non-authorized calls" the following actions are performed:

- if the IAM contains the call to be offered indicator set to "call offering allowed" in the call offering treatment indicators parameter field, the call will be set-up as described in subclause 2.1.1.6 of ITU-T Recommendation Q.764 as modified by ETS 300 356-1 [4];

- if the IAM contains either the call to be offered indicator set to "call offering not allowed" in the call offering treatment indicators parameter field or no call offering treatment parameter field at all, the call will be released using cause value #21 (call rejected) without diagnostics in the REL message.

  NOTE: If the functionality required for this procedure is not implemented in the DLE the call to be offered indicator will be regarded as an unknown parameter value and treated as described in subclause 2.9.5.3.3 of ITU-T Recommendation Q.764 as modified by ETS 300 356-1 [4]. The compatibility information for the call offering treatment indicators parameter field is given in annex B of this ETR.

10 Interaction with other networks

For further study.

11 Interaction between IN basic call and ISDN supplementary services

The description in this clause assumes that the SCF controls IN service(s) dependent whether ISDN supplementary services are influenced for a call.

An overview on the interactions between IN services and ISDN supplementary services is given in table 12. For the table contents, the following IN services have been considered:

- Universal Personal Telecommunication (UPT) Phase 1;
- Universal Access Number (UAN);
- Charge Card Calling (CCC);
- Virtual Card Calling (VCC);
- Premium Rate (PRM);
- Televoting (VOT).

The second column of the table marked "possibly impacted by IN services" identifies the ISDN supplementary services for which SCF control is needed. As a consequence indications "impact/no impact" are required for these supplementary services which are to be sent via the INAP in an appropriate operation (see annex C).

The third column contains the reference to the subclause describing the action to be taken in case of "impact".

The fourth column identifies the exchange where the action is to be performed. In the case the affected exchange is not the SSP itself, a new instruction indicator is needed which is to be transferred in an ISUP message to the originating or destination local exchange, or both respectively.

Table 12: Interactions between IN basic call and ISDN supplementary services

ISDN Supplementary service	ISUP protocol possibly impacted by IN services	The following action will be performed if impacted by IN service(s)	Affected exchange
Advice of charge at call set-up	No		
Advice of charge during the call	No		
Advice of charge at the end of the call	No		
Call deflection	Yes	see subclause 11.1	SSP/DLE
Call forwarding on busy	Yes	see subclause 11.1	SSP/DLE
Call forwarding on no reply	Yes	see subclause 11.1	SSP/DLE
Call forwarding unconditional	Yes	see subclause 11.1	SSP/DLE
Calling line identification presentation Calling line identification restriction	Yes	see subclause 11.2	SSP
Call hold	No		
Call waiting	No		
Closed user group	No		
Completion of calls to busy subscribers	Yes	see subclause 11.3	SSP
Conference call, add-on	Yes	see subclause 11.4	OLE/DLE
Connected line identification presentation Connected line identification restriction	Yes	see subclause 11.5	SSP
Direct dialling in	No		
Explicit call transfer	Yes	see subclause 11.6	SSP
Malicious call identification	Yes	see subclause 11.7	SSP/DLE
Meet-me conference	No		
Multiple subscriber number	No		
Subaddressing	No		
Terminal portability	No		
Three party	Yes	see subclause 11.8	OLE/DLE
User-to-user service 1 implicit	No		
User-to-user service 1 explicit	No		
User-to-user service 2 explicit	No		
User-to-user service 3 explicit	No		

11.1 Call diversion

11.1.1 Actions in the service switching point

If "suppress information" was received in the INAP serviceInteractionIndicators (call diversion notification treatment indicator), then the following parameters shall be discarded, if received:

- generic notification indicator parameter with "call is diverting";
- call diversion information parameter;
- redirection number parameter;
- redirection number restriction parameter.

11.1.2 Actions in the destination local exchange

11.1.2.1 Call forwarding unconditional

Call forwarding unconditional activated by the ISDN subscriber is suppressed, if "call diversion not allowed" was received in the call diversion treatment indicators (call to be diverted indicator). The call is offered to the subscriber.

11.1.2.2 Call forwarding busy

Call forwarding busy activated by the ISDN subscriber is not performed, if "call diversion not allowed" was received in the call diversion treatment indicators (call to be diverted indicator). The call is released using the appropriate cause in the REL message.

11.1.2.3 Call forwarding on no reply

Call forwarding on no reply activated by the ISDN subscriber is not performed, if "call diversion not allowed" was received in the call diversion treatment indicators (call to be diverted indicator). Call offering to the subscriber continues.

11.1.2.4 Call deflection

Call deflection requested by the ISDN subscriber is rejected, if "call diversion not allowed" was received in the call diversion treatment indicators (call to be diverted indicator). Call offering to the subscriber continues.

11.2 Calling line identification presentation/restriction

11.2.1 Actions in the service switching point

If a callingPartyNumber parameter has been received in the Connect operation:

a) a generic number parameter "additional calling party number" will be deleted from the IAM, if applicable;

b) the callingPartyNumber parameter received in the Connect operation will be sent as generic number parameter "additional calling party number" in the IAM.

11.3 Completion of calls to busy subscriber

11.3.1 Actions in the service switching point

In a REL message "CCBS possible" received in the diagnostics field of the cause indicators is replaced with "CCBS not possible".

11.4 Conference

11.4.1 Actions in the originating or destination local exchange

A request from an ISDN subscriber to add a call to a conference is rejected, if "reject conference request" was received in the conference treatment indicators (conference acceptance indicator).

11.5 Connected line identification presentation/restriction

11.5.1 Actions in the service switching point

If "no impact" was received in the INAP serviceInteractionIndicators (connected number treatment indicator), then a connected number parameter and a generic number parameter "additional connected number" are passed on unchanged.

If "presentation restricted" was received in the INAP serviceInteractionIndicators, then:

- if a connected number parameter has been received in the ANM or CON message, the address presentation restricted indicator is set to "presentation restricted";

- if a generic number parameter "additional connected number" has been received in the ANM or CON message, the address presentation restricted indicator is set to "presentation restricted";

- if a redirection number parameter has been received, a redirection number restriction parameter is sent in the ANM with bits AB set to "presentation restricted".

If "present called IN number" was received in the INAP serviceInteractionIndicators, then:

- if a connected number parameter has been received in the ANM or CON message, the connected number parameter is modified as follows:

  nature of address indicator and numbering plan indicator are encoded as received in the called party number of the IAM;
  address presentation restricted indicator: 00 (presentation allowed);
  address signals are encoded as received in called party number or subsequent number parameters, respectively, until ACM was sent;

- a generic number parameter "additional connected number" is deleted from the message, if applicable;

- a redirection number parameter is deleted from the relevant messages, if applicable.

11.6 Explicit call transfer

11.6.1 Actions in the service switching point

If "suppress information" was received in the INAP serviceInteractionIndicators (call transfer notification treatment indicator), then the following parameter shall be discarded, if received:

- generic notification indicator parameter with either "call transfer, alerting" or "call transfer, active";
- call transfer number parameter.

11.7 Malicious call identification

11.7.1 Actions in the service switching point

The service switching point shall pass a received IDR message transparently to the preceding exchange. The subsequent IRS message is passed transparently to the succeeding exchange. If bit A of the MCID request indicators was set to 1, then in addition to the normal procedure the service switching point shall include the charged party identification parameter, if available, into the IRS message.

11.7.2 Actions in the destination local exchange

If the MCID supplementary service is invoked by the called user, the registration of call information is extended by the registration of the called IN number and the charged party identification, if these parameters were received in the IAM or IRS message, respectively.

11.8 Three party

11.8.1 Actions in the originating or destination local exchange

A request from an ISDN subscriber to establish a three way conference is rejected, if for one call or both, respectively, "reject conference request" was received in the conference treatment indicators (conference acceptance indicator).

12 Interactions between IN services

No signalling is provided in the ETSI Core INAP (CS1) and ISUP to support interactions between IN services. This topic will be discussed in future capability sets.

13 Parameter values (timers)

Table 13: ISUP timers for the SSP

Symbol	Time-out value	Cause for initiation	Normal termination	At expiry	Reference
T_{SUS}	SCF controlled	When SUS "network initiated" message is received.	At receipt of RES "network initiated" or REL message.	Initiate release procedure or inform SCF.	subclause 9.1.3, subclause 9.3
$T_{NoReply}$	SCF controlled	At receipt of ACM when DP 6 or 14 has been armed.	At receipt of ANM or REL message.	Inform SCF.	

Annex A: Signalling flows

This annex contains arrow diagrams showing different types of IN calls. The signal flows on the access protocol are also indicated, but in a simplified manner for illustrative purposes only.

The following abbreviations and notations are used in the figures:

A-SSP	Assisting SSP
AssReqInstr	AssistRequestInstruction operation
(DPx)	arm DP x
DPx !	DP x encountered
DFC	DisconnectForwardConnection
CTR	ConnectToResource operation
EstTempConn	EstablishTemporaryConnection operation
I-SSP	Initiating SSP
P&C	PromptAndCollectUserInformation operation
ReqReportBCSMEv	RequestReportBCSMEvent operation


Switchpath completed in backward direction


Switchpath completed in forward direction


Switchpath completed in both directions


Release switchpath

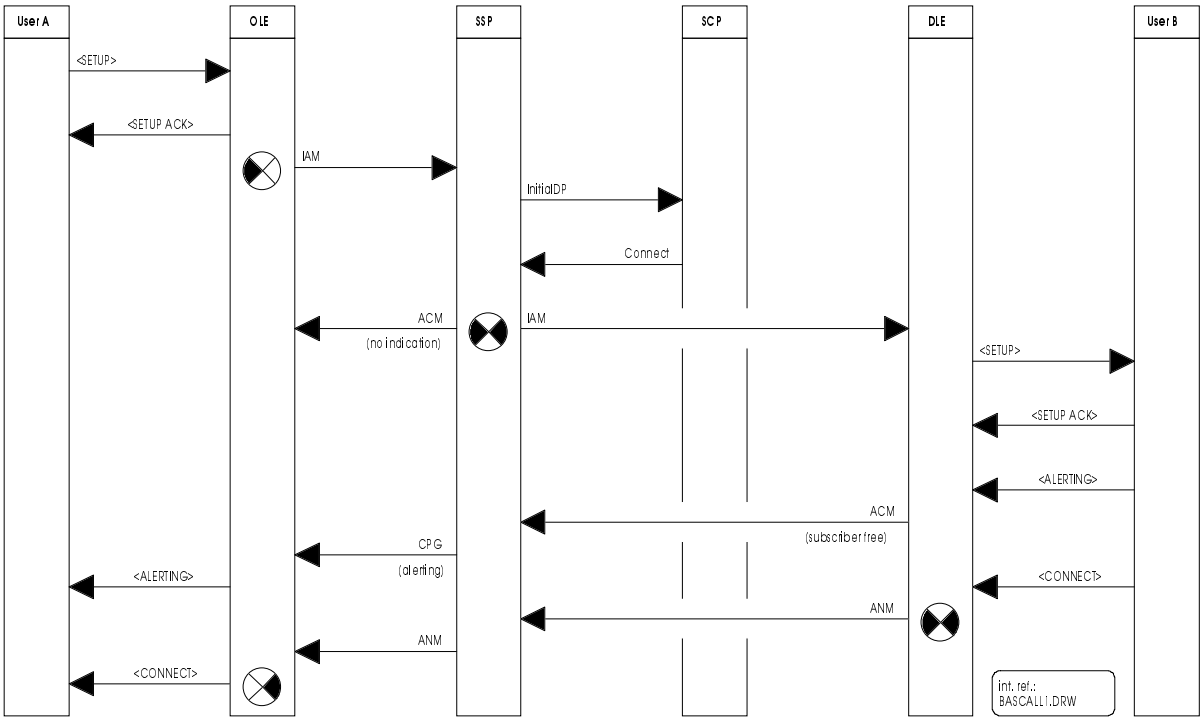


Figure A.1: IN basic call

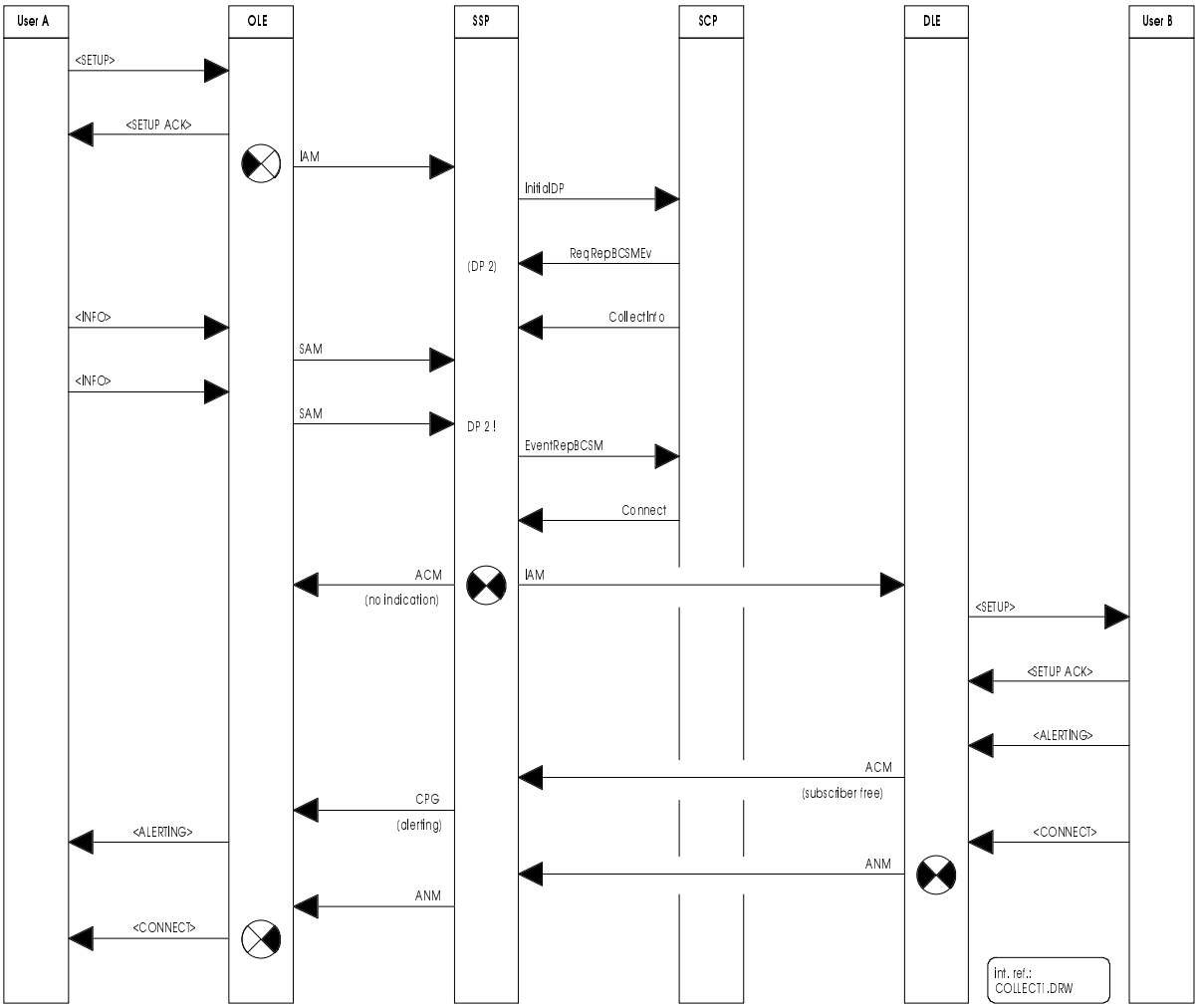


Figure A.2: IN call with SCP request to collect further digits

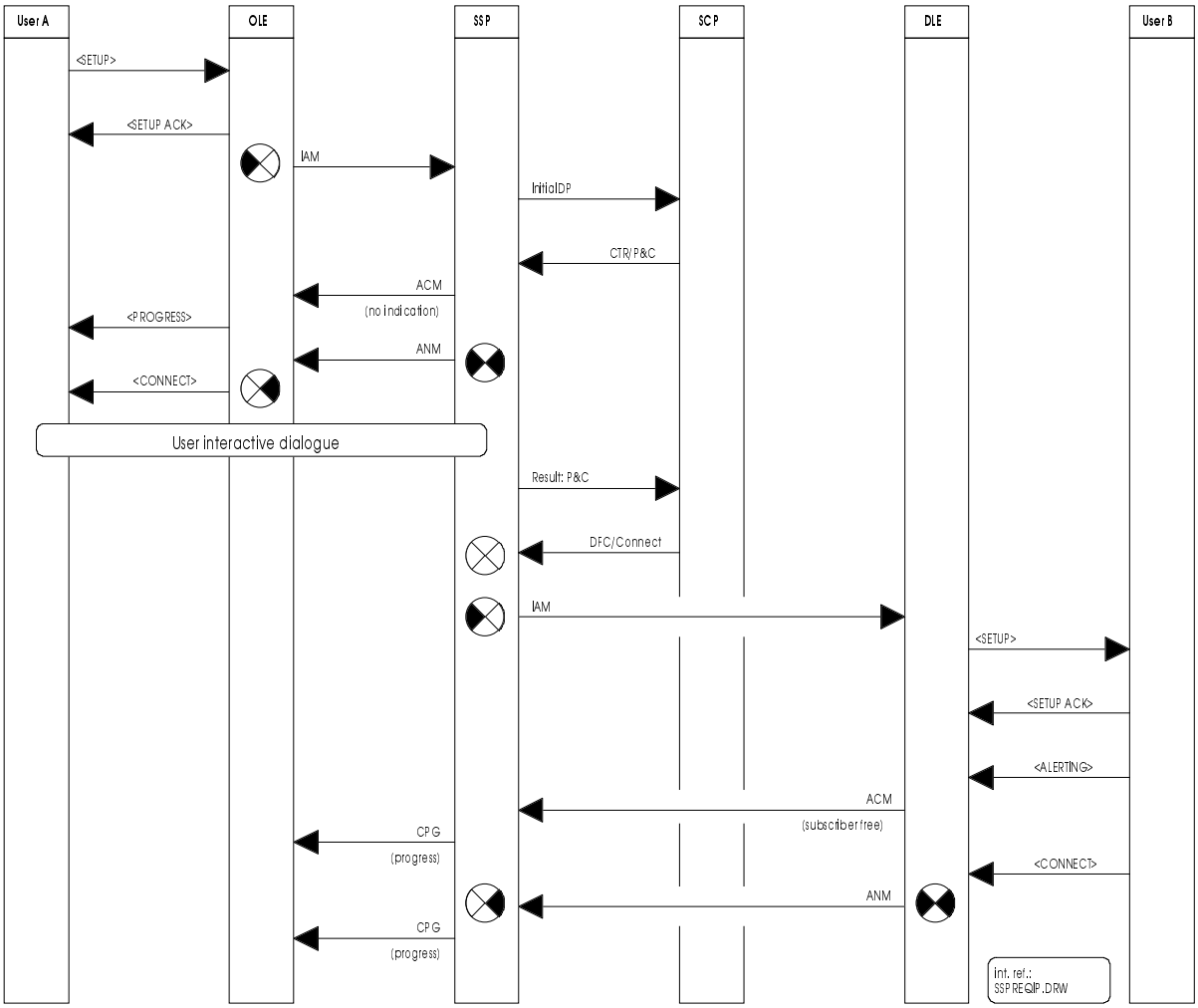
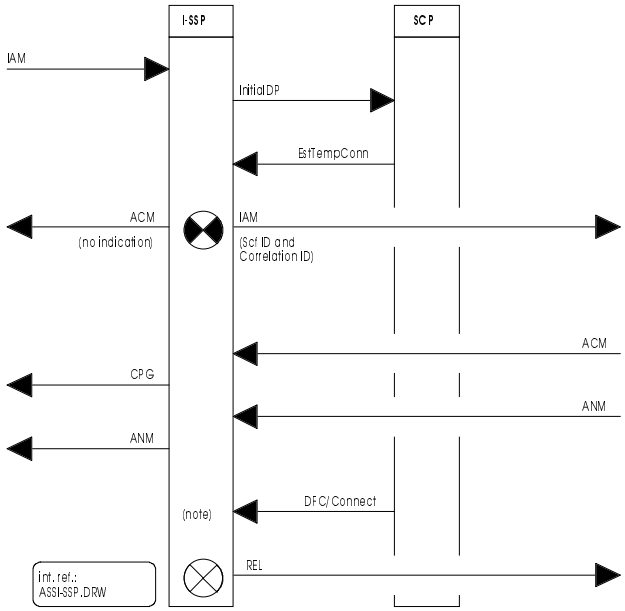


Figure A.3: IN call with user interactive dialogue (in-band)
SSP supports requested IP capabilities



NOTE: Instead of Connect other operations may be received. If Connect is received, a normal call set-up as shown in figure A.3 will be performed.

Figure A.4: IN call with user interactive dialogue (in-band)
Assist method; procedure in initiating SSP

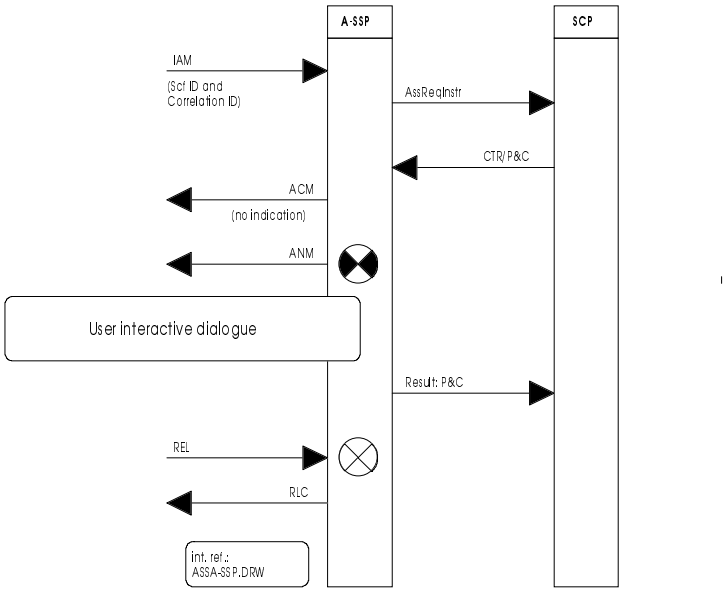


Figure A.5: IN call with user interactive dialogue (in-band)
Assist method; procedure in assisting SSP

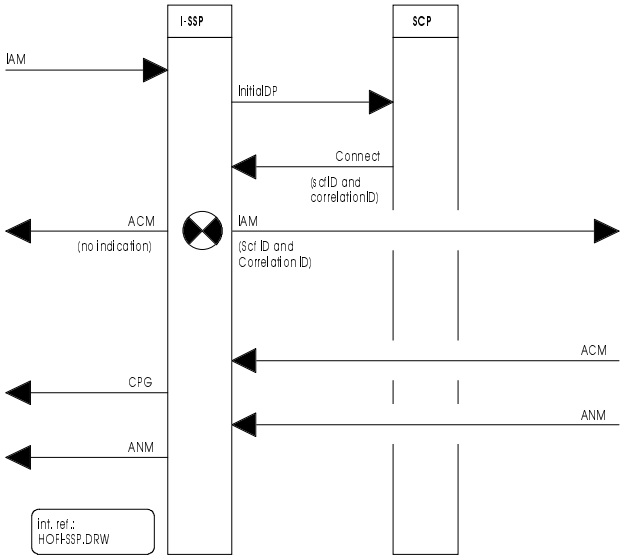


Figure A.6: IN call with user interactive dialogue (in-band)
Hand-off method; procedure in initiating SSP

Annex B: Coding of the compatibility Information for new information elements

B.1 New parameters

B.1.1 Call diversion treatment indicators

a) N^{th} upgraded parameter
xxxx xxxxcall diversion treatment indicators

b) Instruction indicators

bit	A:	Transit at intermediate exchange indicator
	0	transit interpretation
bit	B:	Release call indicator
	0	do not release call
bit	C:	Send notification indicator
	0	do not send notification
bit	D:	Discard message indicator
	0	do not discard message (pass on)
bit	E:	Discard parameter indicator
	0	do not discard parameter (pass on)
bits	GF:	Pass on not possible indicator
	10	discard parameter

c) Extension indicator
1 last octet

B.1.2 Called IN number

a) N^{th} upgraded parameter
xxxx xxxxcalled IN number

b) Instruction indicators

bit	A:	Transit at intermediate exchange indicator
	0	transit interpretation
bit	B:	Release call indicator
	0	do not release call
bit	C:	Send notification indicator
	0	do not send notification
bit	D:	Discard message indicator
	0	do not discard message (pass on)
bit	E:	Discard parameter indicator
	0	do not discard parameter (pass on)
bits	GF:	Pass on not possible indicator
	10	discard parameter

c) Extension indicator
1 last octet

B.1.3 Call offering treatment indicators

a) N^{th} upgraded parameter
xxxx xxxx call offering treatment indicators

b) Instruction indicators

bit A: Transit at intermediate exchange indicator
0 transit interpretation

bit B: Release call indicator
0 do not release call

bit C: Send notification indicator
0 do not send notification

bit D: Discard message indicator
0 do not discard message (pass on)

bit E: Discard parameter indicator
0 do not discard parameter (pass on)

bits GF: Pass on not possible indicator
10 discard parameter

c) Extension indicator
1 last octet

B.1.4 Charged party identification

a) N^{th} upgraded parameter
xxxx xxxx charged party identification

b) Instruction indicators

bit A: Transit at intermediate exchange indicator
0 transit interpretation

bit B: Release call indicator
0 do not release call

bit C: Send notification indicator
0 do not send notification

bit D: Discard message indicator
0 do not discard message (pass on)

bit E: Discard parameter indicator
0 do not discard parameter (pass on)

bits GF: Pass on not possible indicator
10 discard parameter

c) Extension indicator
1 last octet

B.1.5 Conference treatment indicators

a) N^{th} upgraded parameter
xxxx xxxxconference treatment indicators

b) Instruction indicators

bit A: Transit at intermediate exchange indicator
0 transit interpretation

bit B: Release call indicator
0 do not release call

bit C: Send notification indicator
0 do not send notification

bit D: Discard message indicator
0 do not discard message (pass on)

bit E: Discard parameter indicator
0 do not discard parameter (pass on)

bits GF: Pass on not possible indicator
10 discard parameter

c) Extension indicator
1 last octet

B.1.6 Correlation id

a) N^{th} upgraded parameter
xxxx xxxxcorrelation id

b) Instruction indicators

bit A: Transit at intermediate exchange indicator
0 transit interpretation

bit B: Release call indicator
0 do not release call

bit C: Send notification indicator
0 do not send notification

bit D: Discard message indicator
0 do not discard message (pass on)

bit E: Discard parameter indicator
0 do not discard parameter (pass on)

bits GF: Pass on not possible indicator
00 release call

c) Extension indicator
1 last octet

B.1.7 Display information

a) N^{th} upgraded parameter
xxxx xxxx display information

b) Instruction indicators

bit A: Transit at intermediate exchange indicator
0 transit interpretation

bit B: Release call indicator
0 do not release call

bit C: Send notification indicator
0 do not send notification

bit D: Discard message indicator
0 do not discard message (pass on)

bit E: Discard parameter indicator
0 do not discard parameter (pass on)

bits GF: Pass on not possible indicator
10 discard parameter

c) Extension indicator
1 last octet

B.1.8 SCF id

a) N^{th} upgraded parameter
xxxx xxxx SCF id

b) Instruction indicators

bit A: Transit at intermediate exchange indicator
0 transit interpretation

bit B: Release call indicator
0 do not release call

bit C: Send notification indicator
0 do not send notification

bit D: Discard message indicator
0 do not discard message (pass on)

bit E: Discard parameter indicator
0 do not discard parameter (pass on)

bits GF: Pass on not possible indicator
00 release call

c) Extension indicator
1 last octet

Annex C: Contents of the Core INAP serviceInteractionIndicators

The annex contains a list of indicators which are to be transferred in the serviceInteractionIndicators via the Core INAP in order to allow the SCF to control the network behaviour for IN calls. This annex should be considered as a proposal for the INAP to transfer this type of information and not as a requirement for the detailed encoding of the serviceInteractionIndicators.

Table C.1: Basic call related control information

Control information	Values
Call to be offered indicator	- call offering allowed - call offering not allowed **(default)**
Time limits for timer T_{SUS}	- as in ETS 300 356-1 [4] for timer T6 - 4 to 10 seconds - 0 seconds **(default)**
Bothway through-connect indicator (note)	- required **(default)** - not required
NOTE: The indicator should be set to "required" in the ConnectToResource or EstablishTemporary Connection operation, if user interaction has to be performed. If an announcement is to be connected or in other operations the indicator should be set to "not required".	

Table C.2: Supplementary service related control information

Control information	Values
Call to be diverted indicator	- call diversion allowed **(default)** - call diversion not allowed
Conference at DLE acceptance indicator	- accept conference request **(default)** - reject conference request
Conference at OLE acceptance indicator	- accept conference request **(default)** - reject conference request
Connected number treatment indicator	- no impact - set "presentation restricted" - present called IN number **(default)**
Call transfer notification treatment indicator	- no impact **(default)** - suppress information
Call diversion notification treatment indicator	- no impact **(default)** - suppress information

Annex D: Limitations for ISUP basic call procedures and supplementary services for different types of IN calls

The annex provides an overview on the limitations for ISUP basic call procedures and supplementary services for different types of IN calls.

The CCBS supplementary service is in general not available for IN calls. Additional limitations are listed in table D.1.

Table D.1: Limitations for ISUP basic call procedures and supplementary services

Type of IN call → ↓ ISUP feature	**IN call with DPs armed in the request mode (except DP 2)**	**IP connection without sending of ANM**	**IP connection with sending of ANM**	**IN call set-up after an ANM was sent for a previous connection**
Basic call				
Access delivery information				not supported
Connection types allowing fallback capability	not supported	not supported	not supported	not supported
Propagation delay determination				In the OLE only the accumulated delay from the OLE to the first answered destination is available.
Supplementary services				
Call diversion				The OLE does not receive the following parameters: call diversion information, generic notification indicator, redirection number and redirection number restriction indicator.
Call waiting				The generic notification indicator can not be delivered to the calling user.
COLP				The connected number and generic number received from the destination local exchange can not be delivered to the calling user.
UUS1 implicit	not supported		not supported	
UUS1 explicit	not supported		not supported	
UUS2 explicit	not supported		not supported	
UUS3 explicit	not supported		not supported	

Annex E: Bibliography

1) ITU-T Recommendation Q.730 (1993): "Signalling System No.7 - ISDN supplementary services".

2) ITU-T Recommendation Q.763 (1993): "Formats and codes of the ISDN user part of Signalling System No.7".

3) ITU-T Recommendation Q.764 (1993): "Signalling System No.7 - ISDN user part signalling procedures".

4) ITU-T Recommendation Q.1218 (1993): "Interface Recommendation for Intelligent Network CS-1".

5) ITU-T Recommendation Q.1290 (1993): "Glossary of terms used in the definition of Intelligent Networks".

6) ETS 300 121 (1992): "Integrated Services Digital Network (ISDN); Application of the ISDN User Part (ISUP) of CCITT Signalling System No.7 for international ISDN interconnections (ISUP version 1)".

7) DTR/SPS-03011-1: "Intelligent Network (IN); Interaction between IN Application Protocol (INAP) and Integrated Services Digital Network (ISDN) signalling protocols; Part 1: Switching signalling requirements for IN Capability Set 1 (CS1) service support in a Narrowband ISDN (N-ISDN) environment".

8) DTR/NA-10010: "Universal Personal Telecommunication (UPT) Phase 1; Service description".

9) DE/NA-10011: "Universal Access Number (UAN); Service description".

10) DE/NA-10012: "Charge Card Calling (CCC); Service description".

11) DE/NA-10013: "Virtual Card Calling (VCC); Service description".

12) DE/NA-10014: "Premium Rate (PRM); Service description".

13) DE/NA-10015: "Televoting (VOT); Service description".

History

Document history	
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