ND1008:2007/01

TSG/SPEC/008

C7 IUP - ISUP Interworking

0.2 NORMATIVE INFORMATION

0.3   CONTENTS

ANNEX A - ISUP BC, HLC, LLC, ATP TO/FROM IUP SIC MAPPINGS

LIST OF FIGURES

LIST OF TABLES

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

0.4   HISTORY

Revision	Date of Issue	Description
Issue 1	March 1999	Approved by PNO-IG
Issue 2	July 2001	Various revisions throughout document as agreed by the PNO-ISC User Part working party, and approved by PNO-IG.
Issue 2.1	November 2004	Editorial corrections.
Issue 2.2	January 2007	Incorporation of interworking requirements for RBWF. Minor editorial corrections.

0.5   ISSUE CONTROL

PAGE	ISSUE	DATE
All	Issue 2.2	January 2007

0.6   REFERENCES

[1]   NICC ND1006:2005/02, Interconnect User Part (IUP)

[2]   NICC ND1007:2007/01, ISDN User Part (ISUP)

[3]   NICC ND1104:2004/11, Proprietary Extensions to C7 Interconnect User Part (IUP)

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

0.7   GLOSSARY OF TERMS

3PTY	Three Party
ACI	Additional Call Information
ACM	Address Complete Message
ACR	Anonymous Call Rejection
AMC	Auto-Manual Centre
ANM	Answer Message
ANS	Answer
APM	Application Transport Message
APP	Application Transport Parameter
APRI	Address Presentation Restricted Indicator
ASUI	Additional Set-Up Information
ATP	Access Transport Parameter
BC	Bearer Capability
BCI	Backward Call Indicators
BI	Network Beyond Interworking Point
C7	Signalling system number 7
CBI	CLI Blocking Indicator
CCBS	Call Completion to Busy Subscriber
CCITT	International Telegraph and Telephone Consultative Committee
CCNR	Call Completion on No Reply
CCSS	Call Completion Service Set-up
CD	Call Deflection
CdLI	Called Line Identity
CdPC	Called Party Category
CdPN	Called Party Number
CFB	Call Forwarding Busy
CFN	Confusion
CFNRc	Call Forwarding on Subscriber Not Reachable
CFNRy	Call Forwarding No Reply
CFU	Call Forwarding Unconditional
CgPN	Calling Party Number
CLI	Calling Line Identity
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
CNA	Connection Not Admitted
COLP	Connected Line Presentation
CON	Connect
CONF	Conference
CPC	Calling Party Category
CPG	Call Progress
CPI	Call Path Indicator
CTI	Call Type Indicator
CUG	Closed User Group
CW	Call Waiting
DDI	Direct Dialling In
DPNSS	Digital Private Network Signalling System
DSS1	Digital Subscriber Signalling System No. 1
DTE	Data Terminating Equipment
ECT	Explicit Call Transfer
FAM	Final Address Message
FDX	Full Duplex
FIC	Facility Information Code
GN	Generic Number
HDX	Half Duplex
HLC	High Layer Compatibility
IA5	International Alphabet number 5
IAM	Initial Address Message
ICC	Information Contained Code

IFAM	Initial and Final Address Message
IG	Interest Group
IND	International Number Dialling
INF	Information message
INR	Information Request message
INTL	International Network
IQ	Identity Qualifier
IRC	Information Requested Code
ISC	Interconnect Standards Committee
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
ITU	International Telecommunications Union
ITU-T	International Telecommunications Union - Telecommunications Standardisation sector
IUP	Interconnect User Part
IWF	Interworking Function
IWP	Interworking Point
LDLI	Last Diverting Line Identity
LLC	Low Layer Compatibility
LPN	Private Network serving the Local User
LPRI	Last Party Release Indicator
LS	Least Significant
LSB	Least Significant Bit
LSD	Least Significant Digit
MCI	Malicious Call Identification
MCID	Malicious Call Identification
MS	Most Significant
MSB	Most Significant Bit
MSN	Multiple Subscriber Number
N/A	Not Applicable
NAE	Network Address Extension
NAI	Nature of Address Indicator
NEED	Nodal End-to-End Data
NFCI	National Forward Call Indicators
NI	Network Identity
NIC	Network Independent Clock
NICC	Network Interoperability Consultative Committee
NN	Network Number
NND	National Number Dialling
NP	Network Provided
NPI	Numbering Plan Indicator
NTA	Network Translated Address
OBCI	Optional Backward Call Indicators
OSS	Operator Services System
PCLI	Partial Calling Line Identity
PI	Progress Indicator
PN	Presentation Number
PNI	Presentation Number Indicator
PNO	Public Network Operator
PNP	Presentation Number Preference indicator
PSTN	Public Switched Telephone Network
QoR	Query on Release
RA	Rate Adaptation
RBWF	Ring Back When Free
REL	Release
RES	Resume
RPI	Release Protocol Indicator
RPN	Private Network serving the Remote User
SAD	Send All Digits
SAM	Subsequent Address Message
SASUI	Send Additional Set-Up Information
SCCP	Signalling Connection Control Part

SHP	Service Handling Protocol
SIC	Service Indicator Code
SIM	Service Information Message
SND	Send N Digits
SSTV	Slow Scan Television
SUB	Subaddressing
SUS	Suspend
TCAP	Transaction Capabilities Application Part
TLI	Terminating Line Identity
TMR	Transmission Medium Requirement
TN	Transit Network
TP	Terminal Portability
TSG	Technical Steering Group
U	User
UDI	Unrestricted Digital Information
UK	United Kingdom of Great Britain and Northern Ireland
UPNV	User Provided, Not Verified
UPVP	User Provided, Verified and Passed
USI	User Service Information
UUS	User to User Signalling

0.8   SCOPE

This document specifies the interworking function to be performed between C7 IUP, as specified in [1] and the C7 ISUP, as specified in [2].

This specification is only applicable for networks where a transit capability is provided between points of interconnect where, for any particular call, one interconnect is via C7 IUP and the other is via C7 ISUP, i.e. where the transit network is providing the IUP↔ISUP protocol conversion explicitly between the two points of interconnect.

It is acknowledged that within networks similar interworking functions may be employed, e.g. for calls originating from a network that uses a variety of ISUP as its internodal signalling and inter-works this to IUP for interconnect to other networks. For such situations this specification is recommended by ISC as guidance to the network operators to assist in their network-specific solutions; however network-specific service requirements may cause variations to this.

This specification defines procedures that allow for the interworking of ISUP and IUP signalling protocols in support of the following basic and supplementary services:

Bearer Services:

TABLE 0.1   Bearer Services interworking

ISUP	IUP
Speech	Speech (Voice) Category 2 (Digital or Analogue Routeing)
3.1 kHz Audio	Speech (3.1 kHz) Category 2 (Digital or Analogue Routeing)
	Speech (Telephony) (Digital or Analogue Routeing)
64 kbits/s UDI	Speech/Data Category 1 (Fully Digital Path Required)

In conjunction with the bearer services interworking of certain low layer and high layer compatibility information is provided in support of terminal selection procedures. Interworking of high layer compatibility indications is limited to:

TABLE 0.2   High Layer interworking

ISUP	IUP
Facsimile Group 2/3 (Recommendation F.182)	Facsimile Group 2/3
Facsimile Group 4, Class 1 (Recommendation F.184)	Facsimile
Teletex service, basic mode of operation (Recommendation F.200)	Teletex
International interworking for Videotex services (Recommendations F.300 and T.101)	Videotex

Supplementary Services:

TABLE 0.3   Supplementary Services interworking status

ISUP	IUP (Note 1)	INTERWORKING STATUS
CLIP/CLIR	CLIP/CLIR	Full interworking
TP	TP	Full interworking
UK Number Portability	Number Portability	Full interworking
CUG	CUG	Full interworking
MCID	MCI	Full interworking
Diversion supplementary services (CFU, CFB, CFNRc, CFNRy and CD)	Call Diversion	Partial interworking (Note 2)
SUB	NAE	Full interworking is possible for IUP→ISUP. However, only partial interworking is possible for ISUP→IUP
CCBS	CCBS	Full interworking
Targeted Transit	Targeted Transit	Full interworking
Anonymous Call Rejection	Anonymous Call Rejection	Full interworking
Indirect Access	Indirect Access	Full Interworking
UK Carrier Pre-Selection	Carrier Pre-Selection	Full Interworking
HOLD	n/a	Cannot be mapped across the IWF (Note 2)
CW	n/a	Cannot be mapped across the IWF (Note 2)
3PTY	n/a	Cannot be mapped across the IWF (Note 2)
CONF	n/a	Cannot be mapped across the IWF (Note 2)
ECT	n/a	Cannot be mapped across the IWF (Note 4)
DDI	DDI	Full interworking
MSN	MSN	Full interworking
UK Basic Operator Services	UK Basic Operator Services	Full interworking
Enhanced Operator Services	Enhanced Operator Services	Partial interworking (Note 2)
COLP/COLR	n/a	Cannot be mapped across the IWF (Note 3)
UUS	n/a	Cannot be mapped across the IWF (Note 3)
CCNR	n/a	Cannot be mapped across the IWF (Note 5)
n/a	TLI	Cannot be mapped across the IWF (Note 3)
RBWF	RBWF	Full interworking
n/a	SWAP	Cannot be mapped across the IWF (Note 3)
n/a	UUS	Cannot be mapped across the IWF (Note 3)
n/a	Voice Messaging Service	Cannot be mapped across the IWF (Note 3)

Note 1: Although the common procedures have been written in [1], no IUP descriptions for the above exist apart from CLIP/CLIR, Number Portability, CCBS, Targeted Transit, UK Basic Operator Services and Enhanced Operator Services.

Note 2: The associated signalling indications (i.e. notifications) will be discarded without significant impact on the operation of the supplementary services.

Note 3: ISUP and IUP supplementary services which use messages or parameters which cannot be mapped across the interworking function shall be rejected in the appropriate manner for the signalling system.

Note 4: The ECT call transfer will be rejected by the local node if a Loop Prevention (request) results in unsatisfactory responses from both directions. The IWF is required to return a Loop Prevention (response) indicating "insufficient information" if a Loop Prevention Request is received.

Note 5: The associated signalling indications (i.e. notifications) will be discarded with the result that the supplementary service cannot be invoked.

Other ISUP supplementary services which use messages or parameters that are unrecognised by the IWP shall be handled in accordance with ISUP message/parameter compatibility procedures or in accordance with the procedures specified for the supplementary service concerned for interworking with other networks.

Other IUP supplementary services which use messages or parameters that are unrecognised by the IWP shall be handled in accordance with the IUP error handling procedures described in [1].

The interworking requirements for IUP Proprietary Extensions, where such interworking is possible, are either included in this document or described in [3].

0.9 INTERWORKING POINT (IWP)

For the purpose of this document, an element shall be defined called the InterWorking Point. This element shall provide the necessary translation functions to convert from the IUP protocol to ISUP protocol and vice versa. The element may be realised as a switch, group of switches or a network.
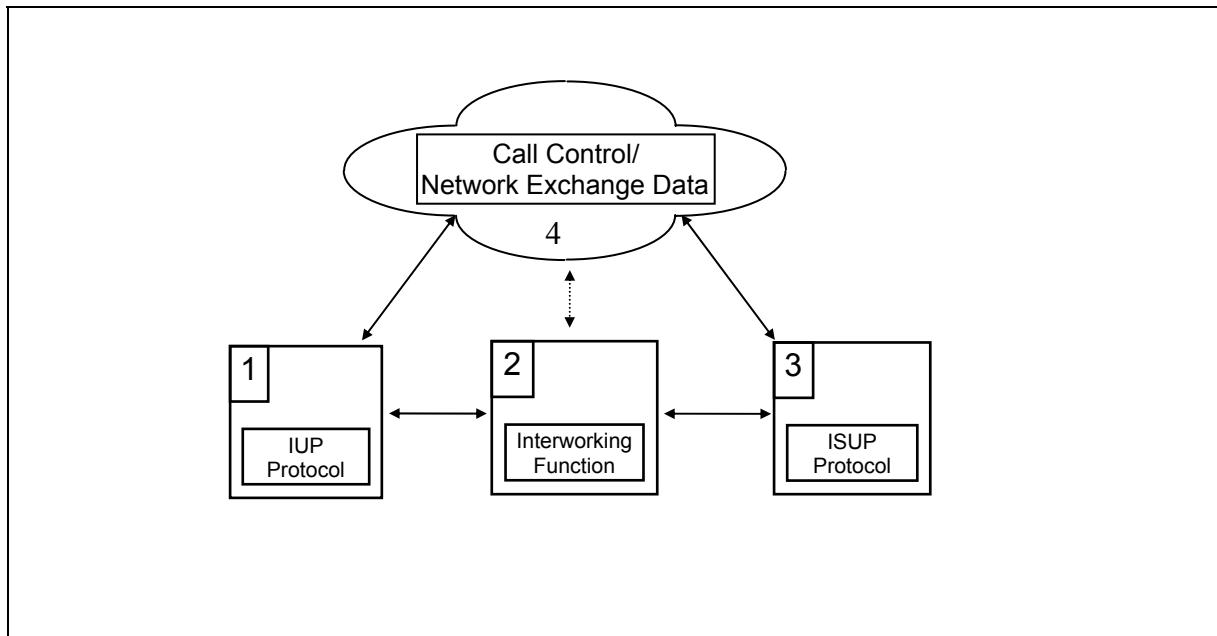
FIGURE 0.1   Internal Architectural View of IWP

In order to simplify the description of how interworking shall be performed in the interworking point, it shall be assumed that the following functional units exist.

1) IUP Protocol: This unit provides the IUP signalling interface procedures within the IWP, as described in [1].

2) InterWorking Function (IWF): This provides the necessary functions to map between the IUP and ISUP protocols.

3) ISUP Protocol: This unit provides the ISUP signalling interface procedures within the IWP, as described in [2].

4) Call Control: This unit, with the associated exchange data, manages establishment and release of calls via the appropriate signalling protocols. The Call Control functions are not covered in this document.

The IWF-IUP and IWF-ISUP interfaces are outside the scope of this document.

END OF TSG/SPEC/008§0

1 SIGNALLING PROCEDURES

This section describes the behaviour of the IWF, when call control has determined that an IWF is required between IUP and ISUP.

Sections 1.1 and 1.2 describe the procedures for call direction dependent messages.

Section 1.3 describes the procedures for call direction independent messages.

1.1 Signalling procedures for IUP to ISUP calls

The following sub-sections detail the behaviour of the IWP for an IUP to ISUP call.

1.1.1 Receipt of IUP IAM / IFAM

Figures 1.1 to 1.4 describe the mapping of IUP IAM/IFAM and SAM and/or FAM to ISUP IAM/SAM.

Note: IUP requests for additional information (such as CLI) are omitted for clarity.

FIGURE 1.1   Mapping IUP Enbloc to ISUP Enbloc signalling
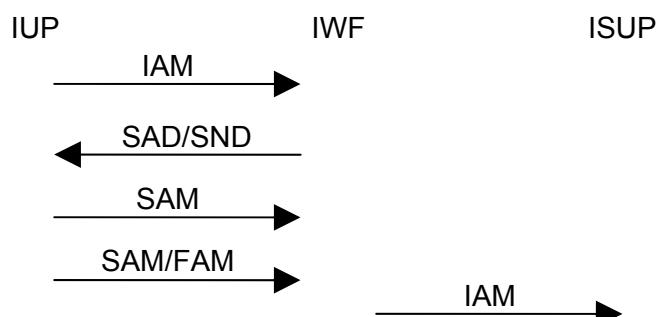
FIGURE 1.2   Mapping IUP Overlap to ISUP Enbloc signalling

Note: This illustrates that all digits are collected by appropriate IUP means before the ISUP IAM is sent.
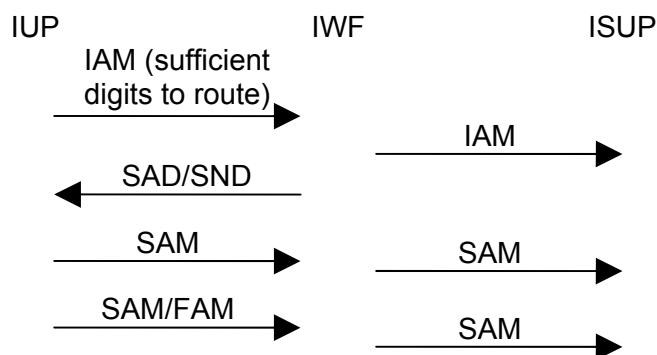
FIGURE 1.3   Mapping IUP Overlap to ISUP Overlap signalling for SHP=0

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

Note: This illustrates that digits are collected by appropriate IUP means.

IUP   IWF   ISUP

IAM →

← SAD/SND

FAM →

← SIM-A

SIM-B →

IAM →
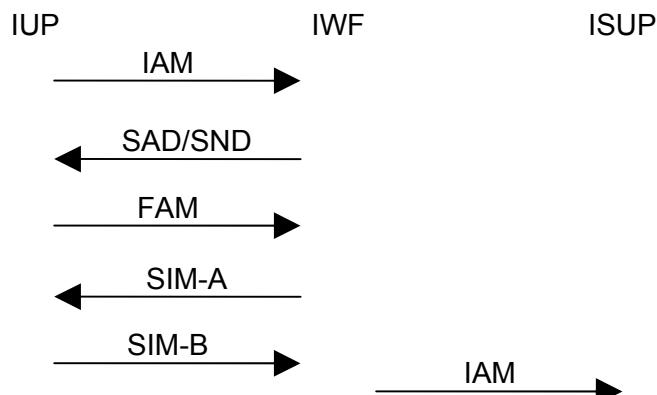
FIGURE 1.4   Mapping IUP Overlap to ISUP signalling for SHP=1

On receipt of an IUP IFAM or IAM and a number of SAMs and/or FAM, the IWF shall instruct the IUP protocol to obtain all CLI and ISDN information before instructing the ISUP protocol to send the ISUP IAM. This shall be done by using the ISDN SIM protocol, the ACI protocol and/or the SASUI protocol as defined in [1].

The information gathered shall be retained as defined in [2] in case it becomes necessary to re-route the call or perform further operations based on this information.

Note: For a call using the ISDN SIM protocol (SHP=1 call), the IWF shall first collect routeing information required for the call before initiating the ISDN SIM protocol.

Tables 1.1 and 1.2 summarise the preferred actions to be taken by the IWF given the information supplied.

TABLE 1.1   CLI Request Procedures

Complete CLI received from incoming IUP I(F)AM	SIM-B received with complete CLI	Presentation Number available	Interworking encountered	Action to take at the IWF	Response	New action to take at the IWF
No	No	No	X	Request NN	Any / none	Continue Call
		Yes	No	Request PN	Confusion	Request NN
					No Response	Request NN
					Incomplete PN	Request NN
					Incomplete NN	Continue Call
					PN	Request NN
					NN	Continue Call
					Partial CLI	Continue Call
		Yes	Request NN	Any / none	Continue Call
	Yes	X	No	Request NN	Any / none	Continue Call
			Yes	Not possible		
Yes (Note 2)	No	No	X	Continue Call		
		Yes	No	Request PN	Any / none	Continue Call
			Yes	Continue Call		
	Yes	X	No	Continue Call		
			Yes	Not possible		

Note 1: It may be necessary to loop through the table a number of times.

Note 2: The CLI was received in the IUP IAM/IFAM or by request prior to invocation of the IWF.

If the CTI Indicator in the IAM/IFAM is set to indicate a diverted call then the following procedures shall be performed:

TABLE 1.2   Diverted Call Procedures

Action to be taken	Response	New Action to be taken
Request Last Diverting Line Identity (LDLI)	Confusion	Continue Call
	No Response	Continue Call
	LDLI	Continue Call
	Incomplete LDLI	Continue Call

If the SHP is set to value 2 then the IWF shall instruct the IUP protocol to initiate the Request Service Negotiation Protocol [1] after all of the routeing information for the call has been received.

If the SHP is set to value 3 then the IWF shall, once all the digits have been collected, instruct the ISUP protocol to send an IAM containing a DPNSS Information Type 1 APP parameter (see 2.1.1.19.2).

1.1.2   Sending ISUP IAM/SAM

On completion of the above, the IWF shall continue the call by instructing the ISUP protocol to send an IAM as defined in [2].

On receipt of any further IUP SAMs or a FAM, the IWF shall instruct the ISUP protocol to send a SAM or SAMs containing the information received from IUP - see [1] and [2].

1.1.2.1   Derivation of ISUP CLI parameters

Table 1.3 describes which IUP information shall be used to derive the various ISUP CLI parameters to be included in the ISUP IAM.

TABLE 1.3   Derivation of ISUP CLI parameters

IUP	ISUP
IFAM Line Identity, ACI ICC 1 or ASUI Type 1 content	CgPN
ACI ICC 12 content (Telephony)	PN (Note 1) & GN (Notes 2 & 3)
SIM-B content (ISDN)	PN (Note 1) & GN (Notes 2 & 3) Note 4

Note 1: The Presentation Number Preference Indicator is always set to 1 (PN preferred).

Note 2: Due to limitation on Screening Indicator in GN, all numbers are marked as UPNV (Screening Indicator = 00).

Note 3: If the number in the CgPN is marked UPVP then the GN shall be omitted.

Note 4: In the case that PNI = 'PN not available' and the SIM-B is not 'user provided, not verified', it may be assumed that the caller does not have a Presentation Number and the GN and PN parameters omitted from the IAM - the SIM-B number is discarded.

As a network option, in this case, the SIM-B may instead be assumed to carry a Presentation Number.

The following rules also apply:

a) Only complete CLI information shall be included. Incomplete CLIs (i.e. Incomplete Address Indicator set to "Incomplete" or the LSD of the address signals is a HexB) from any IUP source (e.g. SIM-B) shall be discarded.

b) Partial CLI from IUP shall be mapped into the ISUP PCLI parameter as described in Section 2.1.1.17.

c) When incomplete or no CLI information is available for inclusion in the ISUP IAM, the relevant parameter shall be omitted.

d) If neither a CLI suitable for inclusion in the CgPN parameter nor a PCLI is received from the IUP protocol, then the PCLI of the IWP node shall be included in the ISUP IAM PCLI parameter.

1.1.3   Sending of SIM-C

If the ISDN SIM protocol had been used to request information, then the IWF shall instruct the IUP protocol to send a SIM-C before sending the IUP ACM or fail the call depending on information received in the ISUP backward call indicators which are present in ISUP ACM, CPG, ANM or CON message and the service requested by the IUP signalling. The decision to send SIM-C shall be delayed until the IUP ACM can be sent. In the case of call failure being indicated by Table 1.4, the call may be failed before the IUP ACM can be sent.

TABLE 1.4   Sending of SIM-C

Incoming IUP I(F)AM		Backward ISUP ISDN Access Indicator	Backward ISUP Interworking Indicator	Actions to be taken on IUP link
SHP	CPI			
1	0 or 2	0 (Non ISDN Access)	any	No SIM-C sent
1	0 or 2	1 (ISDN Access)	0 (no interworking encountered)	SIM-C sent
1	0 or 2	1 (ISDN Access)	1 (interworking encountered)	No SIM-C sent
1	1	0 (Non ISDN Access)	any	Fail call – reason (3) service unavailable
1	1	1 (ISDN Access)	0 (no interworking encountered)	SIM-C sent
1	1	1 (ISDN Access)	1 (interworking encountered)	Fail call – reason (3) service unavailable

1.1.4   Additional procedures to support Operator Services

1.1.4.1   Receipt of an ISUP ACM/CPG/CON/ANM containing a Called Subscriber's Basic Service Marks Parameter

1.1.4.1.1   Actions Before the Sending of an IUP ACM

If an ISUP ACM/CPG/ANM/CON message containing a Called Subscriber's Basic Service Marks parameter is received then the IWF shall store the information received in the parameter until an IUP ACM is to be sent (See 1.1.4.2 below).

If a subsequent message containing an ISUP Called Subscriber's Basic Service Marks parameter is received then the IWF shall store the information received in this parameter and discard any previously received information.

1.1.4.1.2   Actions After the Sending of an IUP ACM

If an ISUP CPG/ANM message containing a Called Subscriber's Basic Service Marks parameter is received then the IWF shall instruct the IUP protocol to send an ACI Type 4 message.

The contents of the ACI Type 4 message shall be mapped from the contents of the last received Called Subscriber's Basic Service Marks parameter.

1.1.4.2   Sending of an IUP ACI Type 4 before an IUP ACM

If the IWF has stored information received in an ISUP Called Subscriber's Basic Service Marks parameter, then the IWF shall instruct the IUP protocol to send an ACI Type 4 message before sending an ACM. The decision to send an ACI Type 4 message shall be delayed until an IUP ACM can be sent.

The contents of the ACI Type 4 message shall be mapped from the contents of the last received Called Subscriber's Basic Service Marks parameter.

1.1.4.3   Receipt of an ISUP APM containing an APP with Application Context ID = 125

If an ISUP APM is received, containing an APP with Application Context ID = 125, then the IWF shall perform the following actions depending upon the value of the OSS Information Type:

OSS Information Type	Action
4 (Action Invocation)	The IWF shall inspect the OSS Message Type.
	If the OSS Message Type is set to 00000100 (Extend Call), then the IWF shall instruct the IUP Protocol to send an EXTEND CALL message.

1.1.4.4 Receipt of an IUP SERVICE Message

The IWF shall instruct the ISUP Protocol to send an IAM containing an APP.

1.1.4.5 Receipt of an IUP OPERATOR OVERRIDE Message

The IWF shall instruct the ISUP Protocol to send an APM message.

1.1.4.6 Receipt of an IUP HOWLER Message

The IWF shall instruct the ISUP Protocol to send an APM message.

1.1.5 Call Establishment

The following sub-sections state the behaviour of the IWF on receipt of the backward ISUP ACM, CPG, ANM and CON messages.

Table 1.5 summarises when an IUP ACM message is to be sent in the case when the first ISUP message received is ACM.

TABLE 1.5   When to send an IUP ACM

ISUP ACM Backward Call Indicators			ISUP ACM Optional Backward Call Indicators (if received) (Note 2)	
ISDN Access Indicator	Called Party Status Indicator	Interworking Indicator	In-band Information Indicator	When to Send IUP ACM
X	X	X	1	On receipt of ISUP ACM
X	X	1	X	On receipt of ISUP ACM
X	1	X	X	On receipt of ISUP ACM
0	X	X	X	On receipt of ISUP ACM
1	0,2,3	0	0	On receipt of any of the following: • ISUP ACM/CPG and the Access Transport Parameter contains DSS1 progress indicators 1 or 8, • CPG and in the Event Information parameter the Event indicator is set to 1 or 3, • CPG with BCI ISDN Access Indicator set to 0, • CPG with BCI Interworking Indicator set to 1, • CPG with OBCI In-band Information indicator set to 1, • ANM, Or on expiry of the Early ACM Timer

Note 1: X represents any admissible value.

Note 2: If the Optional Backward Call Indicators parameter is not received in the ISUP ACM, then the value '0' should be assumed for the In-band Information Indicator.

1.1.5.1 Receipt of an ISUP Address Complete Message (ACM)

On receipt of an ISUP ACM the IWF shall examine the contents and proceed as specified in either Section 1.1.5.1.1 or Section 1.1.5.1.2.

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

If the received ISUP ACM message contains a Called Subscriber's Basic Service Marks parameter the procedure described in Section 1.1.4.1 shall apply.

> Note: If the IWF is required to instruct the IUP protocol to return a SIM-C message then this is described in Section 1.1.3.

1.1.5.1.1   Normal receipt of ISUP ACM

If any of the following conditions are true then the IWF shall instruct the IUP protocol to send an ACM immediately and await further backward ISUP messages.

  a)   The Called Party Status Indicator in the Backward Call Indicators parameter is set to "Subscriber free".

  b)   The Interworking Indicator in the Backward Call Indicators parameter is set to "Interworking encountered".

  c)   The In-band information Indicator in the Optional Backward Call Indicators parameter is set to "In-band information or an appropriate pattern is now available".

  d)   The DSS1 Progress Indicator in the Access Transport parameter is set to:

  "Call is not end to end ISDN; further call progress information may be available in-band" (value 1).

  Or:

  "In-band information or an appropriate pattern is now available" (value 8)

  e)   The ISDN access Indicator in the Backward Call Indicators parameter is set to "terminating access non-ISDN".

If the above conditions do not exist the IWF shall act as in Section 1.1.5.1.2.

1.1.5.1.2   Receipt of ISUP "early" ACM

If none of the conditions set out in Section 1.1.5.1.1 are met then the IWF shall store the information received in the ISUP ACM and proceed as specified in either Section 1.1.5.1.2.1 or Section 1.1.5.1.2.2.

1.1.5.1.2.1   Speech or 3.1kHz Audio Call

If the call is a speech or 3.1kHz Audio call then the IWF shall start a timer of 12 seconds duration and await further backward ISUP messages. The IWF shall proceed in one of the following ways:

  a)   If bearer release occurs then the procedures detailed in Section 1.1.7 shall be followed.

  b)   If the timer expires then the IWF shall instruct the IUP protocol to send an ACM. If an indication is now received from the ISUP protocol that the call cannot be connected then the IWF shall proceed as in Section 1.1.7.2.2.2.

  c)   If an ISUP CPG or ANM message is received act as described in Section 1.1.5.2 or 1.1.5.3.

1.1.5.1.2.2   Non Speech and Non 3.1 kHz Audio Call

If the call is neither a speech nor a 3.1kHz Audio call then the IWF shall await further backward ISUP messages. The IWF shall proceed in one of the following ways.

  a)   If bearer release occurs then the procedures detailed in Section 1.1.7 shall be followed.

  b)   If an ISUP CPG or ANM message is received act as described in Section 1.1.5.2 or 1.1.5.3.

1.1.5.2 Receipt of an ISUP Call Progress (CPG) Message

On receipt of an ISUP CPG message the IWF shall use the values of the indicators received in the message to update/overwrite any previously received indicator values unless the value received is "no indication", with the exception of the Holding Indicator in the ISUP Backward Call Indicators parameter, which shall only be updated/overwritten if the received value is greater than the value stored.

If the received ISUP CPG message contains a Called Subscriber's Basic Service Marks parameter the procedure described in Section 1.1.4.1 shall apply.

If the IWF has not instructed the IUP protocol to send an ACM, then the IWF shall proceed as specified in either Section 1.1.5.2.1 or Section 1.1.5.2.2.

> Note: If the IWF is required to instruct the IUP protocol to return a SIM-C message then this is described in Section 1.1.3.

If IWF has instructed the IUP protocol to send an ACM then the CPG shall be discarded.

1.1.5.2.1 ISUP CPG message received for Speech or 3.1kHz Audio Call

If an ISUP CPG message is received and the 12 seconds timer has not expired then the IWF shall examine its contents and proceed as follows:

If any of the following conditions exist then the IWF shall cancel the 12 seconds timer and instruct the IUP protocol to send an ACM.

i) The Event indicator in the Event Information parameter is set to 1 (alerting) or 3 (in-band information or an appropriate pattern is now available)

ii) The Interworking Indicator in the Backward Call Indicators parameter is set to "Interworking encountered".

iii) The ISDN access Indicator in the Backward Call Indicators parameter is set to "terminating access non-ISDN".

iv) The In-band information Indicator in the Optional Backward Call Indicators parameter is set to "In-band information or an appropriate pattern is now available".

v) The DSS1 Progress Indicator in the Access Transport parameter is set to:

"Call is not end to end ISDN; further call progress information may be available in-band" (value 1).

Or:

"In-band information or an appropriate pattern is now available" (value 8)

Otherwise the IWF shall await further backward messages.

| | | |
| IUP | IWF | ISUP |

Timer starts ←────── ACM ──────

Timer stopped by CPG
that causes an IUP ACM ←────── CPG ──────

←────── ACM ──────

FIGURE 1.5   IUP ACM sent as a result of an ISUP CPG message

1.1.5.2.2   ISUP CPG message received for a Non Speech and Non 3.1kHz Audio Call

If an ISUP CPG message is received the IWF shall examine its contents and proceed as follows:

If any of the following conditions exist then the IWF shall instruct the IUP protocol to send an ACM:

i)   The Event indicator in the Event Information parameter is set to 1 (alerting) or 3 (in-band information or an appropriate pattern is now available).

ii)   The Interworking Indicator in the Backward Call Indicators parameter is set to "Interworking encountered".

iii) The ISDN access Indicator in the Backward Call Indicators parameter is set to "terminating access non-ISDN".

iv)   The In-band information Indicator in the Optional Backward Call Indicators parameter is set to "In-band information or an appropriate pattern is now available".

v)   The DSS1 Progress Indicator in the Access Transport parameter is set to:

"Call is not end to end ISDN; further call progress information may be available in-band" (value 1).

Or:

"In-band information or an appropriate pattern is now available" (value 8)

Otherwise the IWF shall await further backward messages.

1.1.5.3   Receipt of an ISUP Answer Message (ANM)

On receipt of an ISUP ANM the IWF shall take the following actions:

a)   Cancel the 12 seconds timer if active.

b)   Use the values of the indicators received in the ANM message to update/overwrite any previously received indicator values unless the value received is "no indication", with the exception of the Holding Indicator contained in the ISUP Backward Call Indicators parameter, which shall only be updated/overwritten if the value received is greater than the value stored.

c)   If the received ISUP ANM message contains a Called Subscriber's Basic Service Marks parameter, the procedure described in section 1.1.4.1 shall apply.

d)   Instruct the IUP protocol to send an ACM, if not already sent, followed by an ANS message.

Note: If the IWF is required to instruct the IUP protocol to return a SIM-C message then this is described in Section 1.1.3.

IUP   IWF   ISUP

                              Timer starts   ◄─────── ACM ───────

                    Timer stopped by ANM   ◄─────── ANM ───────

                              ◄─────── ACM ───────

                              ◄─────── ANS ───────
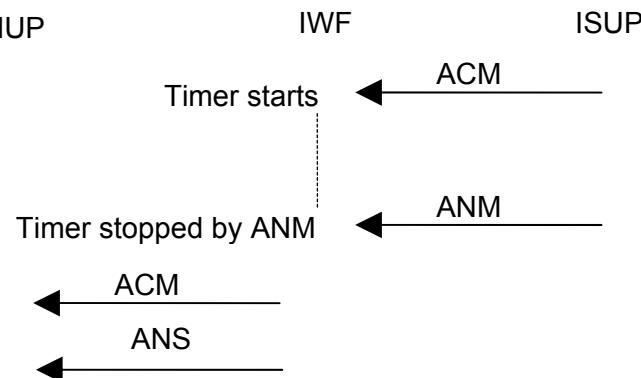
FIGURE 1.6   IUP ACM and ANS sent as a result of an ISUP ANM message

1.1.5.4   Receipt of an ISUP Connect (CON) Message

On receipt of an ISUP CON message the IWF shall instruct the IUP protocol to send an ACM followed by an Answer message.

If the received ISUP CON message contains a Called Subscriber's Basic Service Marks parameter, the procedure described in section 1.1.4.1 shall apply.

Note: If the IWF is required to instruct the IUP protocol to return a SIM-C message then this is described in Section 1.1.3.

IUP   IWF   ISUP

                                                      ◄─────── CON ───────

                    ◄─────── ACM ───────

                    ◄─────── ANS ───────
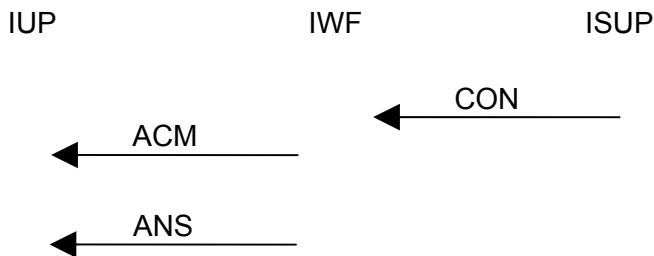
FIGURE 1.7   IUP ACM and ANS sent as a result of an ISUP CON message

1.1.6   Call Supervision

1.1.6.1   Suspend and Resume

1.1.6.1.1   ISDN case

This section describes the behaviour of the IWF when a full SIM interchange has been completed.

1.1.6.1.1.1   IUP initiated (forward) action

If the IWF receives a CLEAR or RE-ANSWER message from IUP then this shall be discarded.

If the IWF receives an IUP User Initiated SUSPEND message or RESUME message then this shall be mapped to the ISUP SUS or RES (User Initiated) message respectively.

IUP   IWF   ISUP

User Initiated
SUSPEND   SUS (User Initiated)

User Initiated
RESUME   RES (User Initiated)
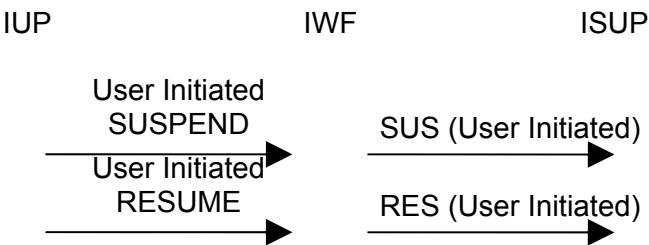
FIGURE 1.8   Mapping of IUP User Initiated SUSPEND and RESUME to ISUP

1.1.6.1.1.2   ISUP initiated (backward) action

If the IWF receives an ISUP SUS or RES (Network Initiated) message then this shall be discarded.

If the IWF receives an ISUP SUS or a RES (User Initiated) message then this shall be mapped into IUP User Initiated SUSPEND or RESUME respectively.

If the IWF receives an ISUP CPG (Generic Notification, User Suspended or Resumed) then this shall be discarded.

IUP   IWF   ISUP

User Initiated
SUSPEND   SUS (User Initiated)

User Initiated
RESUME   RES (User Initiated)
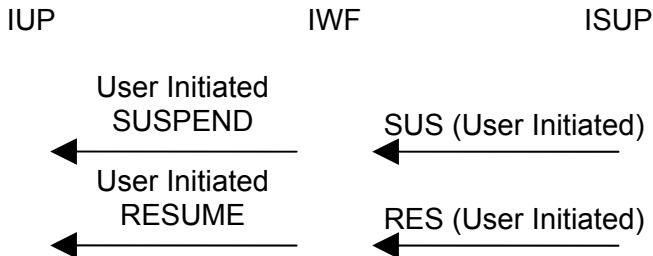
FIGURE 1.9   Mapping of ISUP SUS and RES (User Initiated) to IUP

1.1.6.1.2   Non-ISDN case

This section describes the behaviour of the IWF if no, or an incomplete SIM interchange has taken place.

1.1.6.1.2.1   IUP initiated (forward) action

If the IWF receives an IUP CLEAR message or RE-ANSWER message, then this shall be mapped to the ISUP SUS or RES (Network Initiated) message respectively.

IUP   IWF   ISUP

CLEAR   SUS (Network Initiated)

RE-ANSWER   RES (Network Initiated)
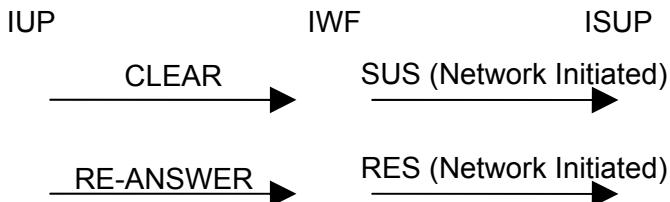
FIGURE 1.10   Mapping of IUP CLEAR and RE-ANSWER to ISUP

If the IWF receives an IUP User initiated SUSPEND or RESUME message then this shall be discarded.

1.1.6.1.2.2 ISUP initiated (backward) action

If the IWF receives an ISUP SUS or RES (Network Initiated) message then this shall be mapped to an IUP CLEAR or RE-ANSWER message respectively.

If the IWF receives an ISUP SUS or a RES (User Initiated) message or CPG (Generic Notification, User Suspended or Resumed) message then this shall be discarded.

IUP   IWF   ISUP

<--------- CLEAR ---------   <--------- SUS (Network Initiated) ---------

<--------- RE-ANSWER ---------   <--------- RES (Network Initiated) ---------
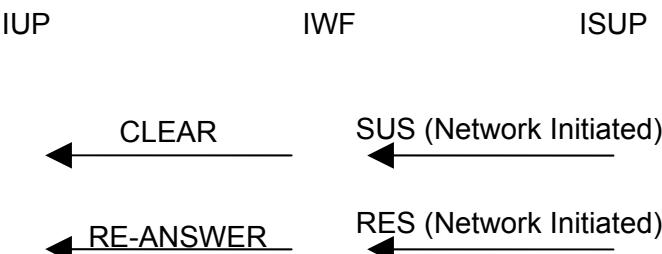
FIGURE 1.11   Mapping of ISUP SUS and RES (Network Initiated) to IUP

1.1.7   Bearer Release

On initiation of bearer release, any timer being run by the IWF shall be cancelled.

1.1.7.1   Forward IUP Release

On receipt of an IUP RELEASE message, the IWF shall instruct the ISUP protocol to initiate the ISUP Release procedure, mapping the received IUP Release Reason to an ISUP Cause value, as described in Section 2.1.7.3 (pre ACM) and Section 2.1.7.4 (post ACM).

The IUP and ISUP Release procedures will continue independently.

1.1.7.2   Backward ISUP Release

1.1.7.2.1   Backward ISUP Release pre IUP ACM

On receipt of an ISUP REL message, prior to the sending of an IUP ACM, the IWF shall instruct the IUP protocol to initiate the IUP Unsuccessful Call Establishment procedure based on the ISUP Cause value received, mapping the received Release Cause Value to an IUP CNA/Release Reason value as described in Section 2.1.7.1.

The IUP and ISUP Release procedures will continue independently.

1.1.7.2.2   Backward ISUP Release post-IUP ACM

1.1.7.2.2.1   Non Speech and non 3.1 kHz Audio call

On receipt of an ISUP REL message, subsequent to the sending of an IUP ACM, the IWF shall instruct the IUP protocol to initiate the IUP Release procedure, mapping the received ISUP Release Cause Value to an IUP Release Reason value as described in Section 2.1.7.2.

The IUP and ISUP Release procedures will continue independently.

1.1.7.2.2.2   Speech or 3.1 kHz Audio call

On receipt of an ISUP REL message, subsequent to the sending of an IUP ACM, the IWF shall instruct the IUP protocol to initiate the IUP Release procedure, mapping the received Release Cause Value to an IUP

Release Reason value as described in Section 2.1.7.2. Alternatively, if the IUP ACM has been sent and the received ISUP Release cause value indicates a failure in call setup, the IWF shall return a suitable tone or announcement as determined by call control.

The IUP and ISUP Release procedures will continue independently.

1.1.8   Additional procedures to support Ring Back When Free

1.1.8.1   Receipt of an ISUP message containing an APP with ACI = 126

If an ISUP message is received containing an APP with the Application Context Identifier set to "126, DPNSS Legacy Services" then the IWF shall proceed in either (a) or (b) below depending on the value of the DPNSS Information Type indicator.

If the APP is received in an ISUP message (e.g. ACM which also contains other contents which can be mapped into IUP then the IWF shall send the IUP DPNSS NEED message which results from the actions specified in this section first then map the remaining contents.

> (a) If the DPNSS Information Type Indicator is set to 2 in the received APP then the IWF shall instruct the IUP protocol to send an IUP ACI Type 8 message. The IUP ACI Type 8 message shall be as specified in section 2.1.9.1.

> (b) If the DPNSS Information Type Indicator is set to 3 in the received APP parameter then the IWF shall instruct the IUP protocol to send an IUP NEED message. The NEED message shall be as specified in section 2.1.9.2.

1.1.8.2   Receipt of an IUP NEED message

If an IUP NEED message is received then the IWF shall instruct the ISUP protocol to send an Application Transport Parameter (APP). The APP shall be included in an ISUP message as described in [2].

The APP shall be coded as specified in section 2.1.6.2.

1.1.8.3   Receipt of an IUP Confusion Message

If an IUP CONFUSION message is received then the IWF shall

> (a) Instruct the ISUP protocol to send a Release message with cause #111, Protocol error, unspecified.

> (b) Instruct the IUP protocol to send a CNA/Release message with Reason #2, Network Termination.

1.2   Signalling procedures for ISUP to IUP calls

1.2.1   Receipt of an ISUP IAM and the sending of an IUP I(F)AM

On receipt of an ISUP IAM and possibly SAMs, the IWF shall instruct the IUP protocol to initiate the bearer establishment protocol, indicating that a complete destination address is available if an ST address signal has been received by the ISUP protocol.

As IUP ACI requests may be received at any time up to call release, any ISUP IAM information which may be required to satisfy an ACI request shall be retained at the IWP until a release message is received or sent by the IWP.

1.2.2   CLI Request Procedures

The CLI contained in the ISUP IAM CgPN shall be mapped to the IUP I(F)AM Line Identity field if supported by the IUP functionality.

The IWF shall respond to IUP requests for CLI information.

Table 1.6 specifies the order of preference that each available ISUP Line Identity takes in each of the IUP responses for each form of request mechanism. The priority shall be in descending order i.e. the CLI at the top is highest priority whilst the one at the bottom the lowest.

A Line Identity shall be deemed not usable for mapping to IUP and shall be passed over in the priority list in the following circumstances:

  a) The Line Identity information is too long to be included in the appropriate ACI, ASUI or SIM message.

  b) The ISUP Line Identity parameter is not present.

  c) The ISUP Line Identity parameter has the Address Presentation Restricted Indicator set to "not available".

  Note: Address Presentation Restricted Indicator value "not available" is not valid in some ISUP Line Identity parameters. In these cases, the ISUP protocol will default the APRI to "restricted" before passing it to the IWF, and so this circumstance will not occur for these parameters.

  d) The ISUP Line Identity parameter has the Number Incomplete Indicator set to "incomplete".

TABLE 1.6   Possible IUP CLI request mechanisms and the ISUP parameters to be used for the response

	Possible IUP request mechanisms				
	SASUI	**SIM-A**	**ACI 7 IRC=1, 5 (see Note 1)**	**ACI 7, IRC=11**	**ACI 7, IRC=12**
ISUP parameter to be used or other content	CgPN	PN (if PNP=1)	CgPN	LDLI	PN (if PNP=1) (ICC=12)
	PCLI (see Note 2)	GN (see Note 3)	PCLI (see Note 2)	Confusion	GN (ICC=12) (see Note 4)
		CgPN (see Note 5)	Confusion		CgPN (ICC=1)
		SIM-B containing Line Identity with no digits			PCLI (see Note 2)
					Confusion

  Note 1: Refer to Section 1.1.4 for Operator Services request procedures.

  Note 2: If PCLI is not available, the IWF shall instruct the IUP procedures to generate PCLI of the IWP node if supported by the IUP functionality.

  Note 3: The ISUP Generic Number shall only be used for mapping into the IUP SIM-B if the number qualifier is set to 'Additional Calling Party Number' (00000110).

  Note 4: The ISUP Generic Number shall only be used for mapping into the IUP ACI(ICC=12) if the number qualifier is set to 'Additional Calling Party Number' (00000110).

  Note 5: The CgPN parameter shall not be used for mapping into the IUP SIM-B if its APRI is = 3, or the NFCI parameter is present with the CBI bit = 0.

1.2.3   Receipt of an IUP SIM-C

On receipt of an IUP SIM-C the IWF shall note that a complete SIM exchange has taken place.

1.2.4 Additional procedures to support Operator Services

1.2.4.1 Receipt of an IUP ACI Type 4 message

If a backward IUP ACI Type 4 message is received and the ACI Response Resolution Timer is not running, then the IWF shall instruct the ISUP protocol to include a Called Subscriber's Basic Service Marks parameter in either the ISUP ACM if not previously sent or an ISUP CPG message. The contents of the Called Subscriber's Basic Service Marks parameter shall be mapped from the contents of the ACI Type 4 message.

If a backward IUP ACI Type 4 message is received and the ACI Response Resolution Timer is running, then it shall be mapped in accordance with section 1.3.1.1.2.

1.2.4.2 Receipt of an ISUP APM containing an APP with Application Context ID = 125

If an ISUP APM is received, containing an APP with Application Context ID = 125, then the IWF shall perform the following actions depending upon the value of the OSS Information Type:

OSS Information Type	Action
4 (Action Invocation)	The IWF shall inspect the OSS Message Type.
	If the OSS Message Type is set to 00000010 (Operator Override), then the IWF shall instruct the IUP Protocol to send an OPERATOR OVERRIDE message.
	If the OSS Message Type is set to 00000011 (Howler), then the IWF shall instruct the IUP Protocol to send a HOWLER message.

1.2.4.3 Receipt of an IUP SEND SERVICE Message

The IWF shall instruct the IUP Protocol to send a Service message.

1.2.4.4 Receipt of an IUP EXTEND CALL Message

The IWF shall instruct the ISUP Protocol to send an APM message.

1.2.5 Receipt of an IUP ACM

On receipt of an IUP ACM message, the IWF shall instruct the ISUP protocol to send an ISUP ACM.

If the ACM is received without having received a SIM-C then the IWF shall note that a complete SIM exchange has not taken place.

ISUP   IWF   IUP

                                              ◄────── SIM-C ──────

        ◄────── ACM ──────   ◄────── ACM ──────
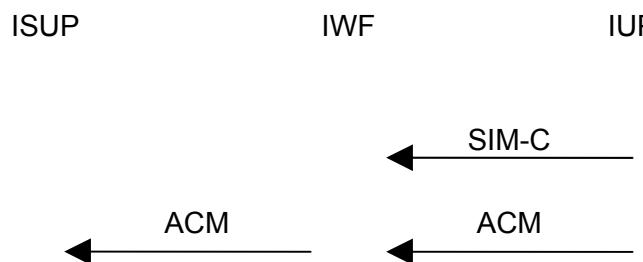
FIGURE 1.12   Mapping IUP ACM to ISUP ACM

Note: The SIM-C may be omitted under certain circumstances on category 2 calls.

1.2.6   Receipt of an IUP ANS

On receipt of an IUP ANS message, the IWF shall instruct the ISUP protocol to return an ANM message.

1.2.7   Call Supervision

1.2.7.1   Suspend and Resume

1.2.7.1.1   ISDN Case

This section describes the behaviour of the IWF when a full SIM interchange has been completed.

1.2.7.1.1.1   ISUP initiated (forward) action

If the IWF receives an ISUP SUS or RES (Network Initiated) message then this shall be discarded.

If the IWF receives an ISUP SUS or RES (User Initiated) message then this shall be mapped into IUP User Initiated SUSPEND or RESUME respectively.

If the IWF receives an ISUP CPG (Generic Notification, User Suspended or Resumed) then this shall be discarded.

ISUP	IWF	IUP

SUS (User Initiated) →   User Initiated SUSPEND →

RES (User Initiated) →   User Initiated RESUME →
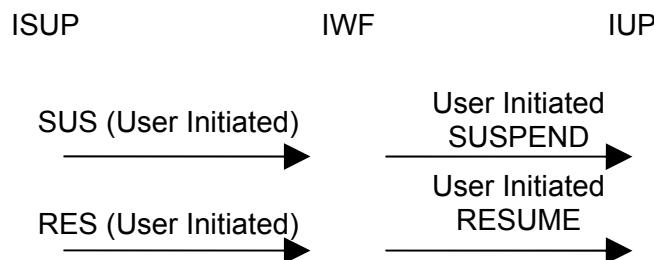
FIGURE 1.13   Mapping of ISUP SUS and RES (User Initiated) to IUP

1.2.7.1.1.2   IUP initiated (backward) action

If the IWF receives an IUP CLEAR message, then IUP and ISUP release procedures shall be initiated.

ISUP	IWF	IUP

← CLEAR

REL ←   RELEASE →
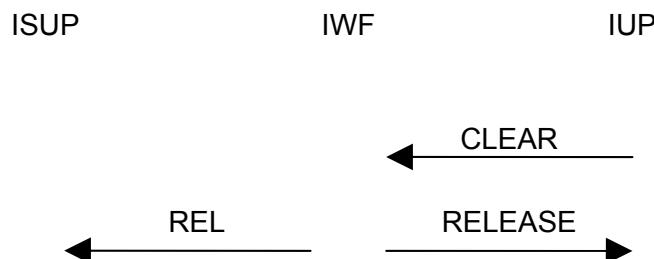
FIGURE 1.14   Mapping of IUP CLEAR message to ISUP

If the IWF receives an IUP RE-ANSWER message then it shall be discarded.

If the IWF receives an IUP User Initiated SUSPEND or RESUME message then it shall be mapped into ISUP SUS or RES (User Initiated) respectively.

ISUP   IWF   IUP

SUS (User Initiated)   User Initiated
                              SUSPEND

RES (User Initiated)   User Initiated
                              RESUME
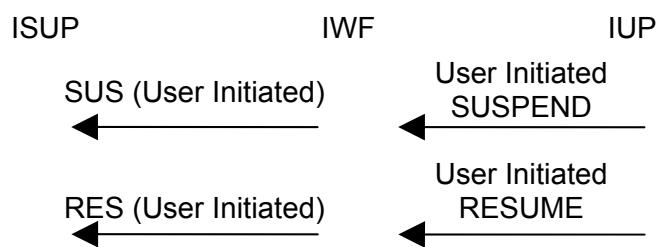
FIGURE 1.15   Mapping of IUP User Initiated SUSPEND and RESUME to ISUP

1.2.7.1.2   Non-ISDN case

This Section describes the behaviour of the IWF when a full SIM interchange has not been completed.

1.2.7.1.2.1   ISUP initiated (forward) action

If the IWF receives an ISUP SUS or RES (Network Initiated) message then it shall be mapped into IUP CLEAR or RE-ANSWER respectively.

If the IWF receives an ISUP SUS or RES (User Initiated) message or CPG (Generic Notification, User Suspended or Resumed) message then it shall be discarded.

ISUP   IWF   IUP

SUS (Network Initiated)   CLEAR

RES (Network Initiated)   RE-ANSWER
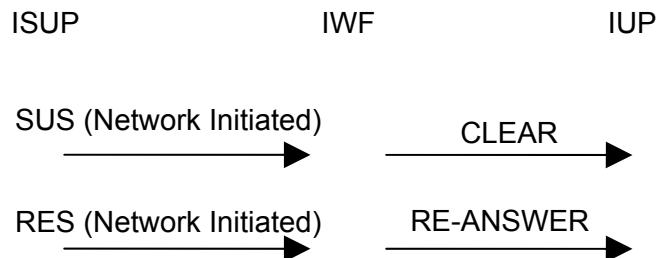
FIGURE 1.16   Mapping of ISUP SUS and RES (Network Initiated) to IUP

1.2.7.1.2.2   IUP initiated (backward) action

If the IWF receives an IUP CLEAR and RE-ANSWER message then it shall be mapped into ISUP SUS or RES (Network Initiated) respectively.

If the IWF receives an IUP User Initiated SUSPEND or RESUME message then it shall be discarded.

ISUP   IWF   IUP

SUS (Network Initiated)   CLEAR

RES (Network Initiated)   RE-ANSWER
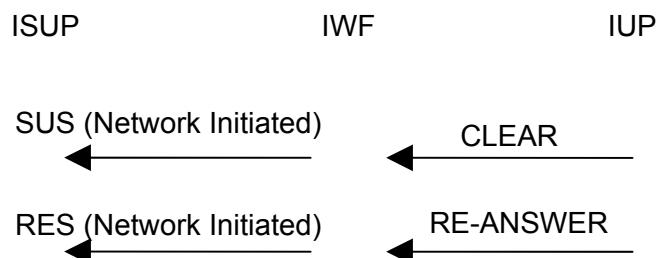
FIGURE 1.17   Mapping of IUP CLEAR and RE-ANSWER to ISUP

1.2.8   Bearer Release

1.2.8.1   Forward ISUP Release

On receipt of an ISUP REL message, the IWF shall instruct the IUP protocol to initiate the IUP release procedure, mapping the received ISUP Cause Value to an IUP Release reason, as described in section 2.2.10.1 (pre ACM) and section 2.2.10.2 (post ACM).

The IUP and ISUP Release procedures will continue independently.

1.2.8.2   Backward IUP Release

1.2.8.2.1   Backward IUP Release/CNA/Discrete failure message pre-IUP ACM

On receipt of an IUP Release/CNA/discrete failure message, prior to IUP ACM, the IWF shall instruct the ISUP protocol to initiate the unsuccessful call set-up procedure, mapping the received Release/CNA reason/discrete failure message to an ISUP Release cause value as described in section 2.2.10.3.

The IUP and ISUP Release procedures will continue independently.

1.2.8.2.2   Backward IUP Release post-IUP ACM

On receipt of an IUP Release message, subsequent to IUP ACM, the IWF shall instruct the ISUP protocol to initiate the ISUP Release procedure, mapping the received IUP reason value to an ISUP Cause value as described in section 2.2.10.4.

The IUP and ISUP Release procedures will continue independently.

1.2.9   Additional procedures to support Ring Back When Free

1.2.9.1   Receipt of an IUP ACI Type 8

If an IUP ACI Type 8 message is received then the IWF shall examine the IRC and proceed as in (a) or (b) below.

(a)   IRC = 0

If the IUP ACI Type 8 message contains an IRC = 0 then the IWF shall instruct the ISUP protocol to send an APM containing an APP coded as specified in section 2.2.8.2.1.

(b)   IRC = 1 or 12

If the IUP ACI Type 8 message contains an IRC = 1 or 12 then the IWF shall act as though an ACI Type 7 containing an IRC = 1 ot 12 had been received and then continue as in (a) above.

1.2.9.2   Receipt of an ISUP Message (other than IAM) Containing an APP with ACI = 126

If an ISUP message is received containing an APP with the Application Context Identifier set to "126, DPNSS Legacy Services" and the DPNSS Information Type Indicator set to 00000011 (Type 3 – transparent transfer) then the IWF shall instruct the IUP protocol to send an IUP NEED message. The NEED message shall be as specified in section 2.2.12.

If the APP is received in an ISUP message (e.g. ACM) which also contains other contents which can be mapped into IUP then the IWF shall send the IUP DPNSS NEED message which results from the actions specified in this section first then map the remaining contents.

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

1.2.9.3   Receipt of an IUP NEED Message

If an IUP NEED message is received then the IWF shall instruct the ISUP protocol to send an Application Transport Parameter. The APP shall be included in an ISUP Message as described in [2].

The APP shall be coded as specified in section 2.2.8.2.2.

1.2.9.4   Receipt of an IUP Confusion Message

If an IUP CONFUSION message is received then the IWF shall

    (a)   Instruct the ISUP protocol to send a Release message with cause #111, Protocol error, unspecified.

    (b)   Instruct the IUP protocol to send a CNA/Release message with Reason #2, Network Termination.

1.3   Signalling procedures for call direction independent messages

The messages in this section are capable of functioning in both directions and are hence independent of call direction.

1.3.1   Interworking Between IUP ACI and ISUP Information and Information Request Messages

This section describes the interworking procedures between IUP ACI Messages and ISUP Information and Information Request messages after the sending of an Initial Address Message by the IWF. This section only describes the procedures for ACI messages which are not responded to by utilising information which is already available at the IWF.

1.3.1.1   Receipt of an IUP ACI Message

If an IUP ACI Message is received then the IWF shall examine the IRC/ICC values and proceed as described in Sections 1.3.1.1.1 or 1.3.1.1.2.

1.3.1.1.1   ACI Type 7 Message

If the IRC value indicates that the received ACI message is a Type 7 then the IWF shall further examine the IRC/ICC values and proceed in either (a), (b) or (c) below.

    (a)   If the IUP ACI Type 7 message contains an IRC value which can be mapped, as described in Section 2.3, to an ISUP National Information Request Indicators parameter and also requires the use of CLI information stored at the IWP then the IWF shall ascertain if the requested CLI information is available. If the CLI information is available then the IWF shall proceed as in (b) below. If the CLI information is not available then the IWF shall respond to the IUP ACI type 7 message with an IUP ACI Type 2 message containing either a previously received Partial CLI or if one has not been received the PCLI of the node.

    (b)   If the IUP ACI Type 7 message contains an IRC value which can be mapped, as described in Section 2.3, to an ISUP National Information Request Indicators parameter then the IWF shall instruct the ISUP protocol to send an Information Request message containing a National Information Request Indicators parameter. The setting of the values in the National Information Request Indicators parameter shall be derived from the received ACI Type 7 IRC values.

    (c)   If the IUP ACI Type 7 message contains an IRC value which can not be mapped, as described in Section 2.3, to an ISUP National Information Request Indicators parameter then the IWF shall instruct the IUP protocol to send a Confusion message.

1.3.1.1.2   Other ACI Message Types

If the IRC/ICC values indicate that the received ACI message is not a type 7 then the IWF shall further examine the IRC/ICC values and proceed in either (a) or (b) below.

(a) If the IUP message, other than a backward IUP ACI Type 4 message, contains an IRC/ICC value which can be mapped, as described in Section 2.3, to an ISUP National Information Indicators parameter then the IWF shall instruct the ISUP protocol to send an Information message containing a National Information Indicators parameter. The setting of the values in the National Information Indicators parameter shall be derived from the received ACI IRC/ICC values. The contents of the ISUP Information message shall be derived from the contents of the received ACI message.

If the IUP message is an ACI Type 4 and the ACI Response Resolution Timer is running then the IWF shall instruct the ISUP protocol to send an Information message containing a National Information Indicators parameter, and shall cancel the ACI Response Resolution Timer. The setting of the values in the National Information Indicators parameter shall be derived from the received ACI IRC/ICC values. The contents of the ISUP Information message shall be derived from the contents of the received ACI message.

If the IUP message is an IUP ACI Type 4 message and the ACI Response Resolution Timer is not running then the IWF shall act in accordance with section 1.2.4.1.

(b) If the IUP ACI message contains an IRC/ICC value which can not be mapped, as described in Section 2.3, to an ISUP National Information Indicators parameter then the IWF shall:

(i)   Instruct the IUP protocol to send a Confusion message.

(ii) Instruct the ISUP protocol to send an Information message containing a National Information Indicators parameter with the bits in the range A-P set to 0.

1.3.2   Interworking between ISUP Information and Information Request and IUP ACI messages

1.3.2.1   Receipt of an ISUP Information Request message

If an ISUP Information Request message containing a National Information Request Indicators parameter is received and interworking has not been indicated on the IUP leg of the call, either in the IUP I(F)AM or IUP ACM as appropriate, then the IWF shall instruct the IUP protocol to send an ACI message Type 7. The ACI Type 7 message IRC/ICC values shall be derived from the settings of the A-D bits in the received National Information Request Indicators parameter as described in Section 2.3.

If the ISUP INR is received in the forward direction of the call, and if the resulting ACI IRC value is 7, then the ACI Response Resolution Timer is started.

Note: The ACI Response Resolution Timer shall take the same value as the ACI Response timer. No action shall be taken upon expiry of the ACI Response Resolution Timer.

If an ISUP INR is received by the interworking function and the ACI Response Resolution Timer is running, then the INR message shall be discarded.

If an IUP CFN message is received by the IWF whilst the ACI Response Resolution Timer is running then the IWF shall:

a)   cancel the ACI response Resolution Timer; and

b)   instruct the ISUP protocol to send an ISUP INF message with the National Information Indicators parameter included and all the indicators (A-P) set to value "0".

If interworking has been indicated on the IUP leg of the call which precludes use of ACI procedures, then, on receipt of the ISUP INR message, an ISUP INF message shall be returned in response containing a National

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

Information Indicators parameter with the bits in the range A-P set to 0, indicating the requested information is not available.

1.3.2.2   Receipt of an ISUP Information Message

If an ISUP Information message containing a National Information Indicators parameter is received then the IWF shall instruct the IUP protocol to send an ACI or Confusion message. The ACI message Type, and whether Confusion should be sent instead of ACI, shall be determined by the contents of the ISUP Information message as described in Section 2.3. The contents of the ACI message shall also be derived from the contents of the ISUP Information message as described in Section 2.3.

END OF TSG/SPEC/008§1

2 MESSAGES AND PARAMETERS DERIVATION AND MAPPING

Note: In the tables in this section, "X" represents any admissible value, and "-" indicates that the parameter/field may or may not be present, but this is insignificant in the mapping.

2.1 Messages and Parameters Derivation and Mapping for IUP to ISUP call

This section describes the derivation and mapping of messages and parameters for an IUP to ISUP call.

Only those parameters specifically identified by this specification shall be generated by the IWF.

Note: The IUP and ISUP protocols will set all reserved fields to zero.

2.1.1 ISUP IAM

The following sections describe the derivation of the ISUP IAM from IUP.

2.1.1.1 ISUP Nature of Connection Indicators

The derivation of the ISUP Nature of Connection Indicators is shown in Table 2.1.

TABLE 2.1   ISUP Nature of Connection indicators derivation

ISUP Nature of Connection Indicators subfield	Derivation
Satellite Indicator	Set as IUP IAM/IFAM Long Propagation Delay Indicator
Continuity Check	Set to 0
Echo Control Device Indicator	Set as IUP IAM/IFAM Echo Control Device Indicator

2.1.1.2 ISUP Forward Call Indicators

The derivation of the ISUP Forward Call Indicators is shown in Table 2.2.

TABLE 2.2   ISUP Forward Call Indicators derivation

ISUP Forward Call Indicators subfield	Derivation
National / International Call Indicator	Set as IUP IAM/IFAM International Indicator
End-to-end method indicator	Set to 0
Interworking indicator	Set as IUP IAM/IFAM Interworking Indicator
End-to-end information indicator	Set to 0
ISDN user part indicator	See Section 2.1.1.2.1
ISDN user part preference indicator	See Section 2.1.1.2.1
ISDN access indicator	See Section 2.1.1.2.2
SCCP method indicator	Set to 0

2.1.1.2.1 ISUP ISDN User Part Indicator and ISDN User Part Preference Indicator

The setting of the ISUP ISDN User Part Indicator and ISDN User Part Preference Indicator is shown in Table 2.3.

TABLE 2.3   ISUP ISDN User Part Indicator and ISDN User Part Preference Indicator settings

| IUP | | | | ISUP | |
| I(F)AM | | | CUG type (see Table 2.4) | ISDN user part indicator | ISDN user part preference indicator |
Interworking indicator	CTI = 7 (CCBS call)	SHP			
1	No	0	N/A	0	1 (not required)
0	Yes	X	X	1	2 (required)
	No	0	N/A	1	1 (not required)
		1	No CUG	1	0 (preferred)
			With outgoing access	1	0 (preferred)
			Without outgoing access	1	2 (required)
		2	N/A	1	2 (required)
		3	N/A	1	2 (required)

The type of CUG shall be derived from the SIM-B Type and the settings of the Facility Indicator Code (FIC) in the SIM-B message, as shown in the Table 2.4.

TABLE 2.4   CUG Type derivation

| IUP Input | | CUG Type |
SIM-B Type	FIC	
2 or 5	0, 3 or 4	No CUG
3 or 6	2, 5 or 6	With outgoing access
3 or 6	0, 3 or 4	Without outgoing access

2.1.1.2.2   ISUP ISDN Access Indicator

The setting of the ISUP ISDN Access Indicator is shown in Table 2.5.

TABLE 2.5   ISUP ISDN Access Indicator setting

| IUP | | ISUP ISDN Access Indicator |
CPC values	SHP values	
0	0	0
0	1	1
0	2	0
0	3	0
1-5	X	0
6-7	X	1
8-63	X	0

2.1.1.3   ISUP Calling Party's Category

The mapping of IUP I(F)AM CPC to ISUP IAM CPC is shown in Table 2.6.

TABLE 2.6   IUP I(F)AM CPC to ISUP IAM CPC mapping

IUP I(F)AM			ISUP IAM CPC value
CPC value		**Protection Indicator**	
0 unknown		X	0 CPC unknown at this time
1 ordinary (residential)		0	10 ordinary calling subscriber
		1	11 calling subscriber with priority
2 ordinary (business)		0	10 ordinary calling subscriber
		1	11 calling subscriber with priority
3 payphone (general)		0	15 payphone
		1	11 calling subscriber with priority
4 administration diverted ordinary		0	254 admin. diversion - ordinary
		1	251 admin. diversion - ordinary with priority
5 administration Diverted payphone		0	253 admin. diversion - payphone
		1	250 admin. diversion - payphone with priority
6 ISDN (residential)		0	10 ordinary calling subscriber
		1	11 calling subscriber with priority
7 ISDN (business)		0	10 ordinary calling subscriber
		1	11 calling subscriber with priority
8 pre-payment payphone (public)		0	15 payphone
		1	11 calling subscriber with priority
9 pre-payment payphone (renter's residential)		0	15 payphone
		1	11 calling subscriber with priority
10 pre-payment payphone (renter's business)		0	15 payphone
		1	11 calling subscriber with priority
11 service line		0	10 ordinary calling subscriber
		1	11 calling subscriber with priority
12 centrex		0	10 ordinary calling subscriber
		1	11 calling subscriber with priority
13 operator services operator		X	252 OSS operator
14 AMC Operator (NND/IND)		X	9 national operator
15 AMC Operator (NND)		X	9 national operator
16 DPNSS 1		0	10 ordinary calling subscriber
		1	11 calling subscriber with priority
17 -– 32 reserved		0	10 ordinary calling subscriber
		1	11 calling subscriber with priority
33 operator, language French		X	1 operator, language French
34 operator, language English		X	2 operator, language English
35 operator, language German		X	3 operator, language German
36 operator, language Russian		X	4 operator, language Russian
37 operator, language Spanish		X	5 operator, language Spanish
38 reserved for other ITU languages		X	6 available to administrations for selecting a particular language by mutual agreement
39 reserved for other ITU languages		X	7 available to administrations for selecting a particular language by mutual agreement
40 reserved for other ITU languages		X	8 available to administrations for selecting a particular language by mutual agreement
41 -– 63 reserved		0	10 ordinary calling subscriber
		1	11 calling subscriber with priority

2.1.1.4   ISUP Transmission Medium Requirement

The setting of the ISUP IAM Transmission Medium Requirement parameter is shown in Table 2.7.

TABLE 2.7   ISUP IAM Transmission Medium Requirement parameter setting

IUP I(F)AM Indicators		ISUP IAM
SHP	CPI	TMR
0	0	3
0	1	3
0	2	3
1	0	0
1	1	2
1	2	3
2	0	3
2	1	3
2	2	3
3	0	0
3	1	2
3	2	3

2.1.1.5   ISUP Called Party Number

The derivation of the ISUP Called Party Number parameter is shown in Table 2.8.

TABLE 2.8   ISUP Called Party Number parameter derivation

ISUP Called Party Number subfield	Derivation
Odd/Even Indicator	Set according to the number of digits in the address
Nature of Address Indicator	See 2.1.1.5.1
Internal Network Number Indicator	Set to 1
Numbering Plan Indicator	Set to 1
Address Signal	Address signals, as received from the incoming IUP signalling with the international prefix (00) or national prefix (0) removed if received, and with ST signal added if all digits are present as determined by call control.

2.1.1.5.1   ISUP Called Party Number Nature of Address Indicator

The setting of the ISUP Called Party Number Nature of Address Indicator is shown in Table 2.9.

TABLE 2.9   ISUP Called Party Number Nature of Address Indicator setting

IUP Called Address		ISUP CdPN NAI
first digit	second digit	
0	1-9	0000011 (National (significant) number)
0	0	0000100 (International number)
1-9	X	1111110 (UK specific address)

2.1.1.6   ISUP Calling Party Number

If a CLI can be obtained from IUP, the actual CLI used to derive this parameter shall be as specified in Section 1.1.2.1 and derived as shown in Table 2.10. If no CLI information is received then the CgPN parameter shall be omitted.

TABLE 2.10   ISUP Calling Party Number parameter derivation

ISUP Calling Party Number subfield	Derivation
Odd/Even Indicator	Set according to the number of digits to be sent
Nature of Address Indicator	See Section 2.1.1.6.1
Number Incomplete Indicator	Set to 0 (Complete)
Numbering Plan Indicator	Set to 1 (E.164)
Address Presentation Restricted Indicator	See Section 2.1.1.6.2
Screening Indicator	See Section 2.1.1.6.3
Address Signals	The Line Identity address signals received from IUP shall be manipulated as follows: (a) Any HexB shall be removed (if present); (b) If the first digit is '0' and the IUP Nature of Address indicator is set to "National Significant Number", then the leading '0' shall be removed.

2.1.1.6.1 ISUP Calling Party Number Nature of Address Indicator

The setting of the ISUP Calling Party Number Nature of Address Indicator is shown in Table 2.11.

TABLE 2.11   ISUP Calling Party Number Nature of Address Indicator setting

IUP		ISUP
NAI	**Initial Address Signal**	**CgPN NAI**
10 (National)	1 to 9	0000011 (National)
	0	0000100 (International)
11 (International)	Any	0000100 (International)

2.1.1.6.2 ISUP Calling Party Number Address Presentation Restricted Indicator

The setting of the ISUP Calling Party Number Address Presentation Restricted Indicator is shown in Table 2.12.

TABLE 2.12   ISUP Calling Party Number Address Presentation Restricted Indicator setting

IUP		ISUP IAM
CBI	**CLI IQ Received in I(F)AM / ACI or ASUI**	**CgPN APRI**
0	X	11
1	0	00
	1	01

2.1.1.6.3 ISUP Screening Indicator

The setting of the ISUP Screening Indicator is shown in Table 2.13.

TABLE 2.13   ISUP Screening Indicator setting

IUP		ISUP
Hex B Present in CLI	**Hex B Position**	**Screening Indicator**
No	N/A	11
Yes	Neither MS nor LS digit	01
	MS	00
	LS	N/A (see Section 1.1.2.1)

2.1.1.7 ISUP Access Transport Parameter

The derivation of the ISUP Access Transport parameter is shown in Tables 2.14 and 2.15.

TABLE 2.14   ISUP Access Transport parameter derivation

ISUP Access Transport subfield	Derivation
High Layer Compatibility	Mapped from IUP SIM-B SIC field (see Annex A)
Low Layer Compatibility	Mapped from IUP SIM-B SIC field (see Annex A)
Called Party Sub-address	This Information Element shall be included if the received SIM-B is of Type 5 or 6 and is mapped from the NAE information. The Called Party Subaddress shall be set as shown in Table 2.15.
Progress Indicator	See Annex A

TABLE 2.15   Called Party Sub-address Information Element derivation

Called Party Subaddress	Derivation
DSS1 Called Party Subaddress Information Element Identifier	01110001
Length of Called Party Subaddress contents	Number of NAE characters + 1
Odd/Even Indicator	0 (not applicable for this coding)
Type of subaddress	010 ("User Specified")
Subaddress Information	Direct from NAE characters

2.1.1.8 ISUP User Service Information

The information in this parameter shall be derived as described in Annex A.

2.1.1.9   ISUP Optional Forward Call Indicators

This parameter is only included if the received SIM-B was of Type 3 or 6 (indicating a CUG call). The derivation of this parameter is shown in Table 2.16.

TABLE 2.16   ISUP Optional Forward Call Indicators derivation

ISUP Optional Forward Call Indicators subfield	Derivation
Closed User Group Indicator	Set to 2, if the IUP SIM-B FIC = 2,5,6 Set to 3, if the IUP SIM-B FIC = 0,3,4
Simple Segmentation Indicator	Set to 0
Connected Line Identity Request Indicator	Set to 0

2.1.1.10   Closed User Group Interlock Code

This parameter shall only be present if the SIM-B received from the incoming IUP route indicates that the call is a CUG call.

Table 2.17 shows a representation of IUP and ISUP CUG Interlock Code. In both cases, the octets are shown in the order transmitted. The LSB of each is at the right.

TABLE 2.17   ISUP and IUP Closed User Group Interlock Code

Figure 2.1 describes the CUG interlock Code mapping from ISUP to IUP and vice versa.

```
                NI code part                           Binary code part
        ISUP                  IUP          ISUP                        IUP
     1st NI digit    <----------->    D1    (msb)    <----------->    (msb)
     2nd NI digit    <----------->    D2     |       <----------->      |
     3rd NI digit    <----------->    D3     |       <----------->      |
     4th NI digit    <----------->    D4    (lsb)    <----------->    (lsb)
```
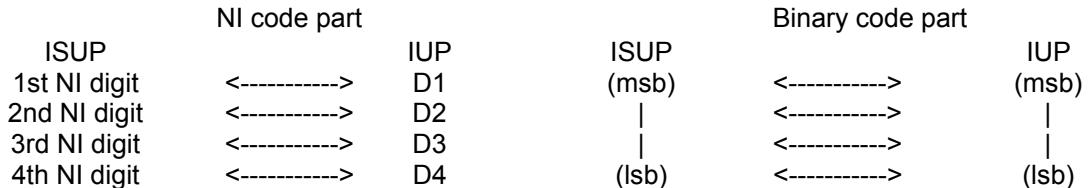
FIGURE 2.1   Mapping action for CUG Interlock Code

2.1.1.11   ISUP Redirection Information

The parameter will only be present if the incoming I(F)AM from the IUP route indicates that the call has been diverted. The derivation of this parameter is shown in Table 2.18.

TABLE 2.18   ISUP Redirection information parameter derivation

ISUP Redirection Information subfield	Derivation
Redirecting Indicator	Set to 3 (Call Diverted)
Original redirecting reason	Set to 0 (unknown / not available)
Redirection counter	Set to 1
Redirecting reason	Set to 0 (unknown / not available)

2.1.1.12   ISUP Redirecting Number

The parameter shall only be included in the ISUP IAM if an LDLI has been received from the IUP protocol. The derivation of the parameter is shown in Table 2.19.

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

TABLE 2.19   ISUP Redirecting Number parameter derivation

ISUP Redirecting Number subfield	Derivation
Odd/Even Indicator	Set according to the number of digits to be sent
Nature of Address Indicator	As Section 2.1.1.6.1
Numbering Plan Indicator	Set to 1 (E.164)
Address Presentation Restricted Indicator	See Section 2.1.1.12.1
Address Signals	The Line Identity address signals received from IUP shall be manipulated as follows: (a) Any HexB shall be removed (if present); (b) If the first digit is '0' and the IUP Nature of Address indicator is set to "National Significant Number", then the leading '0' shall be removed.

2.1.1.12.1   ISUP Redirecting Number Address Presentation Restricted Indicator

The setting of the ISUP Redirecting Number Address Presentation Restricted Indicator is shown in Table 2.20.

TABLE 2.20   ISUP Redirecting Number Address Presentation Restricted Indicator setting

CLI IQ Received in IUP ACI	ISUP APRI
0	00
1	01

2.1.1.13   ISUP National Forward Call Indicators

This parameter shall always be present in the ISUP IAM and derived as shown in Table 2.21.

TABLE 2.21   ISUP National Forward Call Indicators derivation

ISUP National Forward Call Indicators subfield	Derivation
CLI Blocking Indicator	Set as IUP I(F)AM CLI Blocking Indicator
Network Translated Address Indicator	Set as IUP I(F)AM Network Translated Address Indicator
Priority Access Indicator (IUP)	Set as IUP I(F)AM Priority Access Indicator
Protection Indicator (IUP)	Set as IUP I(F)AM Protection Indicator

2.1.1.14   ISUP Generic Number

The CLI used to derive this parameter shall be as specified in Section 1.1.2.1. The derivation of the parameter is shown in Table 2.22.

TABLE 2.22   ISUP Generic Number parameter derivation

ISUP Generic Number subfield	Derivation
Number Qualifier Indicator	Set to 00000110 for Additional Calling Party Number
Odd/Even Indicator	Set according to the number of digits to be sent
Nature of Address Indicator	As Section 2.1.1.6.1
Number Incomplete Indicator	Set to 0 (Complete)
Numbering Plan Indicator	Set to 1 (E.164)
Address Presentation Restricted Indicator	See Section 2.1.1.14.1
Screening Indicator	Set to 00 (UPNV)
Address Signals	The Line Identity address signals received from IUP shall be manipulated as follows: (a) Any HexB shall be removed (if present); (b) If the first digit is '0' and the IUP Nature of Address indicator is set to "National Significant Number", then the leading '0' shall be removed.

2.1.1.14.1   ISUP Generic Number and Presentation Number Address Presentation Restricted Indicator

The setting of the ISUP Generic Number and Presentation Number Address Presentation Restricted Indicator is shown in Table 2.23.

TABLE 2.23   ISUP Address Presentation Restricted Indicator setting

CLI IQ Received in IUP ACI or SIM-B	ISUP GN & PN APRI
0	00
1	01

2.1.1.15   ISUP Presentation Number

The CLI used to derive this parameter shall be as specified in Section 1.1.2.1. The derivation of the parameter is shown in Table 2.24.

TABLE 2.24   ISUP Presentation Number parameter derivation

ISUP Presentation Number subfield	Derivation
Odd/Even Indicator	Set according to the number of digits to be sent
Nature of Address Indicator	As Section 2.1.1.6.1
Presentation Number Preference Indicator	Set to 1 (PN preferred for mapping to legacy (IUP) ISDN services)
Numbering Plan Indicator	Set to 1 (E.164)
Address Presentation Restricted Indicator	See Section 2.1.1.14.1
Screening Indicator	See Section 2.1.1.6.3
Address Signals	The Line Identity address signals received from IUP shall be manipulated as follows: (a) Any HexB shall be removed (if present); (b) If the first digit is '0' and the IUP Nature of Address indicator is set to "National Significant Number", then the leading '0' shall be removed.

2.1.1.16   ISUP Last Diverting Line Identity

The parameter shall only be included if an LDLI has been received from the IUP protocol. The derivation of this parameter is shown in Table 2.25.

TABLE 2.25   ISUP Last Diverting Line Identity parameter derivation

ISUP Last Diverting Line Identity subfield	Derivation
Odd/Even Indicator	Set According to the number of digits to be sent
Nature of Address Indicator	As Section 2.1.1.6.1
Number Incomplete Indicator	Set to 0 (Complete)
Numbering Plan Indicator	Set to 1 (E.164)
Address Presentation Restricted Indicator	See Section 2.1.1.12.1
Screening Indicator	See Section 2.1.1.6.3
Address Signals	The Line Identity address signals received from IUP shall be manipulated as follows: (a) Any HexB shall be removed (if present); (b) If the first digit is '0' and the IUP Nature of Address indicator is set to "National Significant Number", then the leading '0' shall be removed.

2.1.1.17   ISUP Partial CLI

This parameter shall only be included in the ISUP IAM if the Calling Party Number parameter is not present. If a Partial Calling Line Identity has been received from IUP then it shall be used to derive the ISUP PCLI as shown in Table 2.26. If no PCLI has been received from the IUP protocol, the IWF shall instruct the ISUP protocol to generate a PCLI.

TABLE 2.26   ISUP Partial Calling Line Identity parameter derivation

ISUP Partial CLI subfield	Derivation
Type of Switch	Set from IUP PCLI Type of Switch
PNO Identity	Set from IUP PCLI PNO Identity
Switch Number	Set from IUP PCLI Switch Number
"For bilateral agreement"	The five octets marked as "for bilateral agreement" are copied octet-wise from the equivalent subfields in the IUP PCLI.

2.1.1.18   ISUP CCSS

This parameter shall only be included in the ISUP IAM if the IUP I(F)AM Call Type Indicator subfield is set to 7 (CCBS Call).

TABLE 2.27   ISUP CCSS parameter derivation

ISUP CCSS subfield	Derivation
CCSS Call Indicator	Set to 1 (CCSS Call)

2.1.1.19   Application Transport Parameter

2.1.1.19.1   APP for Operator Services

This parameter is included in the ISUP IAM if the IUP SHP is set to 2. The derivation of this parameter is shown in Table 2.28.

TABLE 2.28   ISUP IAM Application Transport Parameter derivation

ISUP Application Transport Parameter subfield	Derivation
Application Context ID	Set to 125 (Operator Services)
Release Call Indicator	Set to 1
Send Notification Indicator	Set to 1
APM Segmentation Indicator	Set by APP procedures
Sequence Indicator	Set by APP procedures
Segmentation Local Reference	Set by APP procedures
Encapsulated Application Information	The OSS Information Type shall be set to 00000011 (Service Request). The Service subfield shall be set from the corresponding subfield of the IUP Service message.

2.1.1.19.2   APP for DPNSS

This Application Transport Parameter is included in the ISUP IAM if the IUP SHP = 3. The derivation of this parameter is shown in Table 2.29.

TABLE 2.29   ISUP IAM Application Transport Parameter derivation

ISUP Application Transport Parameter subfield	Derivation
Application Context ID	Set to 126 (DPNSS Legacy Services)
Release Call Indicator	Set to 1
Send Notification Indicator	Set to 1
APM Segmentation Indicator	Set by APP procedures
Sequence Indicator	Set by APP procedures
Segmentation Local Reference	Set by APP procedures
Encapsulated Application Information	The DPNSS Information Type Indicator shall be set to 00000001 (forward negotiation). The CTI value shall be set unchanged from the IUP CTI value.

2.1.2   IUP ACM

The contents of the IUP ACM shall be derived from the contents of the ISUP Backward Call Indicators parameter as shown in Table 2.30.

TABLE 2.30   IUP ACM derivation

IUP ACM field	Derivation
CdPC	See Section 2.1.2.1.
Charge Indicator	Set to 0 (no charge) if received Charge Indicator is set to 01 (no charge), otherwise set to 1 (charge). As a network option this indicator may be set to the default value 1 (charge) regardless of the received Charge Indicator value.
Last Party Release Indicator	Set as Holding Indicator
Interworking Indicators	See Section 2.1.2.2
Echo Control Device Indicator	Set as Echo Control Device indicator

The information contained in the ISUP Backward Call Indicators parameter shall be stored at the IWF until an IUP ANS is to be sent. The stored information shall be updated whenever an ISUP message containing the Backward Call Indicators parameter is received, unless the value received is "no indication", with the exception of the Holding Indicator which shall be only updated if the value received is greater than the value stored.

2.1.2.1 IUP Called Party Category

The setting of the IUP ACM CdPC is shown in Table 2.31.

TABLE 2.31   IUP ACM CdPC setting

ISUP		IUP
CdPC values	ISDN Access Indicator	CdPC value
0 No Indication	X	0 Unknown
1 Ordinary subscriber	0	2 Ordinary (Business)
	1	7 ISDN (Business)
2 Payphone	X	3 Payphone (General)

2.1.2.2 IUP ACM Interworking Indicators

The derivation of the IUP ACM Interworking Indicators is shown in Table 2.32.

TABLE 2.32   IUP ACM Interworking Indicators derivation

ISUP				IUP
Backward Call Indicators			ATP	
Interworking indicator	ISDN User Part Indicator	ISDN Access Indicator	pi=#1 loc=#5	Interworking Indicator
1	X	X	-	0 C7 not available all the way
0	0	X	-	0 C7 not available all the way
	1	0	-	2 C7 all the way in the PSTN
		1	N	1 C7 all the way to the ISDN
			Y	18 C7 all the way to digital private network; analogue part of private network encountered (early backward transmission path requested).

2.1.3 IUP ACI Type 4

The derivation of the IUP ACI Type 4 is shown in Table 2.33.

TABLE 2.33   IUP ACI Type 4 derivation from ISUP ACM/CPG/CON/ANM messages

IUP ACI Type 4 field	Derivation
Information Contained Code	Set to 7
Information Requested Code	Set to 0
Calling/Called Subscriber's Basic service Marks	ISUP ACM/CPG/CON/ANM Called Subscriber's Basic Service marks parameter
ACI Type 4 Message Indicator	ISUP ACM/CPG/CON/ANM Called Subscriber's Basic Service marks parameter

2.1.4 IUP ANS

2.1.4.1 IUP Type of ANS

The setting of the IUP ANS Type of Answer is shown in Table 2.34.

TABLE 2.34   IUP ANS Type of Answer setting

ISUP Charge Indicator (Note)	IUP Type of Answer
0	1
1	0
2	1

Note: ISUP Charge Indicator value as derived from the procedures of 1.1.5.

2.1.5 IUP SIMs

2.1.5.1 IUP SIM-A Type 7

The derivation of the IUP SIM-A Type 7 is shown in Table 2.35.

TABLE 2.35   IUP SIM-A Type 7 derivation

IUP SIM-A Type 7 field	Derivation
Information Contained Code	Set to 6 (FIC contained)
Information Requested Code	Set to 5 (FIC, SIC, CLI, NAE requested)
Facility Indicator Code	Set to 0 (No information)

2.1.5.2   IUP SIM-C Type 8

The derivation of the fields and subfields contained in this message is shown in Table 2.36.

TABLE 2.36   IUP SIM-C Type 8 derivation

IUP SIM-C Type 8 field	subfield	Derivation
Information Contained Code	N/A	Set to 7 (FIC and CLI contained)
Information Requested Code	N/A	Set to 0 (No information)
Facility Indicator Code	N/A	Set to 0 (No information)
Called Line Message Indicators	Nature of Address Indicator	Set to 0
	Incomplete Address Indicator	Set to 0
	Identity Qualifier	Set to 0
Number of Called Line Address Digits	N/A	Set to 0
Called Line Address Digits	N/A	None included

2.1.6   Application Transport Message

The following sections describe the derivation of the ISUP APM from IUP.

2.1.6.1   Application Transport Parameter for Operator Services

If the received IUP message which caused the generation of the APM was OPERATOR OVERRIDE or HOWLER, then the derivation of the Application Transport Parameter shall be as shown in Table 2.37.

TABLE 2.37   ISUP Application Transport Parameter derivation

ISUP Application Transport Parameter subfield	Derivation
Application Context ID	Set to 125 (Operator Services)
Release Call Indicator	Set to 1
Send Notification Indicator	Set to 1
APM Segmentation Indicator	Set by APP procedures
Sequence Indicator	Set by APP procedures
Segmentation Local Reference	Set by APP procedures
Encapsulated Application Information	The OSS Information Type shall be set to 00000100 (Action Invocation).
	The OSS Message Type shall be set to 00000010 (Operator Override) if the received IUP message was OPERATOR OVERRIDE, or 00000011 (Howler) if the received IUP message was HOWLER.

2.1.6.2   Application Transport Parameter for DPNSS

If the received IUP message which caused the generation of the APM was a NEED, then the derivation of the APP shall be as shown in Table 2.38.

TABLE 2.38   ISUP Application Transport Parameter derivation

ISUP Application Transport Parameter subfield	Derivation
Application Context ID	Set to 126 (DPNSS Legacy Services)
Release Call Indicator	Set to 1
Send Notification Indicator	Set to 1
APM Segmentation Indicator	Set by APP procedures
Sequence Indicator	Set by APP procedures
Segmentation Local Reference	Set by APP procedures
Encapsulated Application Information Content qualifier Reserved Data count parameter DPNSS message	The DPNSS Information Type Indicator shall be set to 00000011 (transparent transfer). Set unchanged from IUP NEED Content qualifier Set as received in IUP NEED parameter Set unchanged from IUP NEED Data octet count field of the IUP NEED Parameter Set unchanged from IUP NEED field (Octets 2-n of the IUP NEED Parameter)

2.1.7   Release Reason

Sections 2.1.7.1 to 2.1.7.4 describe the mapping of Release reasons received from IUP to ISUP and vice-versa.

2.1.7.1   Backward ISUP Release Reasons (pre-ACM)

Table 2.39 describes the mapping of IUP Release/CNA message reason values from ISUP RELEASE message cause/location values (backward, pre-ACM).

TABLE 2.39   Backward ISUP Release reason (pre IUP ACM) mapping

ISUP RELEASE Cause indicators parameter (ITU-T standardised coding)			IUP Release/CNA/Congestion	
cause value	cause name	location	reason value	reason name
1	Unallocated (unassigned) number	any	57	Spare number/code
2	No route to specified transit network	any	0	Number unobtainable
3	No route to destination	any	0	Number unobtainable
4	Send special information tone	any	0	Number unobtainable
5	Misdialled trunk prefix	any	0	Number unobtainable
8	Pre-emption	U, LPN, RPN	8	Subscriber engaged
		others	-	Congestion (discrete)
9	Pre-emption - circuit reserved for re-use	U, LPN, RPN	8	Subscriber engaged
		others	-	Congestion (discrete)
14	QoR: ported number	any	0	Number unobtainable
16	Normal call clearing	U, LPN, RPN	48	Subscriber call termination
		others	0	Number unobtainable
17	User busy (see Note)	TN	12	Network protective controls
		others	8	Subscriber engaged
18	No user responding	any	46	DTE uncontrolled not ready
19	No answer from user (user alerted)	any	0	Number unobtainable
20	Subscriber absent	any	9	Subscriber out of order
21	Call rejected	U, LPN, RPN	45	DTE controlled not ready
		others	10	Subscriber controlled incoming calls barred
22	Number changed	U, LPN, RPN	57	Spare number/code
		others	5	Subscriber transferred
23	Redirection to new destination	any	0	Number unobtainable
24	Call rejected due to ACR supplementary service	any	58	Anonymous call rejection
25	Exchange routing error	U, LPN, RPN	9	Subscriber out of order
		others	2	Network termination
27	Destination out of order	any	9	Subscriber out of order
28	Invalid number format (incomplete number)	U, LPN, RPN	0	Number unobtainable
		others	1	Address incomplete
29	Facility rejected	U, LPN, RPN	19	Service incompatible
		others	4	Subscriber incompatible
31	Normal, unspecified	any	0	Number unobtainable
class 0/1 default	others in range #0 to #31	any	0	Number unobtainable

ISUP RELEASE Cause indicators parameter (ITU-T standardised coding)			IUP Release/CNA/Congestion	
cause value	cause name	location	reason value	reason name
34	No circuit / channel available (see Note)	U, LPN, RPN	8	Subscriber engaged
		TN, INTL	-	Congestion (discrete)
		others	7	Congestion, re-routeing not permitted
38	Network out of order	U, LPN, RPN	9	Subscriber out of order
		TN, INTL	-	Congestion (discrete)
		others	2	Network termination
41	Temporary failure	U, LPN, RPN	9	Subscriber out of order
		others	2	Network termination
42	Switching equipment congestion	U, LPN, RPN	8	Subscriber engaged
		TN, INTL	-	Congestion (discrete)
		others	7	Congestion, re-routeing not permitted
43	Access information discarded	U, LPN, RPN	18	Remote procedure error
		others	2	Network termination
44	Requested circuit / channel not available	U, LPN, RPN	8	Subscriber engaged
		TN, INTL	-	Congestion (discrete)
		others	7	Congestion, re-routeing not permitted
46	Precedence call blocked	U, LPN, RPN	8	Subscriber engaged
		TN, INTL	-	Congestion (discrete)
		others	7	Congestion, re-routeing not permitted
47	Resource unavailable, unspecified	any	0	Number unobtainable
class 2 default	others in range #32 to #47	any	0	Number unobtainable
50	Requested facility not subscribed	U, LPN, RPN	19	Service incompatible
		others	3	Service unavailable
53	Outgoing call barred within CUG	U, LPN, RPN	45	DTE controlled not ready
		others	3	Service unavailable
55	Incoming call barred within CUG	U, LPN, RPN	45	DTE controlled not ready
		others	10	Subscriber controlled incoming calls barred
57	Bearer capability not authorised	U, LPN, RPN	19	Service incompatible
		others	3	Service unavailable
58	Bearer capability not presently available	U, LPN, RPN	19	Service incompatible
		others	3	Service unavailable
62	Inconsistency in designated outgoing access information and subscriber class	U, LPN, RPN	19	Service incompatible
		others	3	Service unavailable
63	Service or option not available, unspecified	U, LPN, RPN	19	Service incompatible
		others	3	Service unavailable
class 3 default	others in range #48 to #63	U, LPN, RPN	19	Service incompatible
		others	3	Service unavailable
65	Bearer capability not implemented	U, LPN, RPN	19	Service incompatible
		others	3	Service unavailable
69	Requested facility not implemented	U, LPN, RPN	19	Service incompatible
		others	3	Service unavailable
70	Only restricted digital information bearer capability is available	U, LPN, RPN	19	Service incompatible
		others	3	Service unavailable
79	Service or option not implemented, unspecified	U, LPN, RPN	19	Service incompatible
		others	3	Service unavailable
class 4 default	others in range #64 to #79	U, LPN, RPN	19	Service incompatible
		others	3	Service unavailable
87	User not member of CUG	U, LPN, RPN	45	DTE controlled not ready
		others	41	CUG access barred
88	Incompatible destination	U, LPN, RPN	19	Service incompatible
		others	4	Subscriber incompatible
90	Non-existent CUG	U, LPN, RPN	45	DTE controlled not ready
		others	41	CUG access barred
91	Invalid transit network selection	U, LPN, RPN	18	Remote procedure error
		others	34	Protocol violation
95	Invalid message, unspecified	U, LPN, RPN	18	Remote procedure error
		others	34	Protocol violation
class 5 default	others in range #80 to #95	U, LPN, RPN	18	Remote procedure error
		others	34	Protocol violation
97	Message type non-existent or not implemented	U, LPN, RPN	18	Remote procedure error
		others	34	Protocol violation
99	Information element / parameter non-existent or not implemented	U, LPN, RPN	18	Remote procedure error
		others	34	Protocol violation
102	Recovery on timer expiry	U, LPN, RPN	18	Remote procedure error
		others	2	Network termination

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

ISUP RELEASE Cause indicators parameter (ITU-T standardised coding)			IUP Release/CNA/Congestion	
cause value	cause name	location	reason value	reason name
103	Parameter non-existent or not implemented, passed on	U, LPN, RPN	18	Remote procedure error
		others	34	Protocol violation
110	Message with unrecognised parameter, discarded	U, LPN, RPN	18	Remote procedure error
		others	34	Protocol violation
111	Protocol error, unspecified	U, LPN, RPN	18	Remote procedure error
		others	34	Protocol violation
class 6 default	others in range #96 to #111	U, LPN, RPN	18	Remote procedure error
		others	34	Protocol violation
127	Interworking, unspecified	any	0	Number unobtainable
class 7 default	others in range #112 to #127	any	0	Number unobtainable

Note: See also Section 2.1.8 for CNA Diagnostics derivation

2.1.7.2   Backward ISUP Release Reasons (post-ACM)

Table 2.40 describes the mapping of IUP RELEASE message reason values from ISUP RELEASE message cause/location values, (backward, post-ACM).

TABLE 2.40   Backward ISUP Release reason (post IUP ACM) mapping

ISUP RELEASE Cause indicators parameter (ITU-T standardised coding)			IUP RELEASE	
cause value	cause name	location	reason value	reason name
8	Pre-emption	U, LPN, RPN	48	Subscriber call termination
		others	36	Operator priority access
16	Normal call clearing	U, LPN, RPN	48	Subscriber call termination
		others	32	Service termination
19	No answer from user (user alerted)	any	31	No reply
31	Normal, unspecified	U, LPN, RPN	48	Subscriber call termination
		others	47	Null
41	Temporary failure	U, LPN, RPN	48	Subscriber call termination
		others	2	Network termination
111	Protocol error, unspecified	U, LPN, RPN	48	Subscriber call termination
		others	34	Protocol violation
others		U, LPN, RPN	48	Subscriber call termination
		others	47	Null

2.1.7.3   Forward IUP Release Reasons (pre-ACM)

Table 2.41 describes the mapping of ISUP (forward) RELEASE cause/location values from IUP (forward) RELEASE (pre-ACM).

TABLE 2.41   Forward IUP Release reason (pre- IUP ACM) mapping

IUP RELEASE		ISUP RELEASE Cause indicators parameter (ITU-T standardised coding)		
reason value	Reason name	cause value	cause name	location
none		31	Normal, unspecified	BI
2	Network termination	41	Temporary failure	BI
34	Protocol violation	111	Protocol error, unspecified	BI
36	Operator priority access	8	Pre-emption	BI
47	Null	31	Normal, unspecified	BI
48	Subscriber call termination	16	Normal call clearing	U
others		31	Normal, unspecified	BI

2.1.7.4   Forward IUP Release Reasons (post-ACM)

Table 2.42 describes the mapping of ISUP (forward) RELEASE cause/location values from IUP (forward) RELEASE (post-ACM).

TABLE 2.42   Forward IUP Release reason (post- IUP ACM) mapping

IUP RELEASE		ISUP RELEASE Cause indicators parameter (ITU-T standardised coding)		
reason value	reason name	cause value	cause name	location
none		31	Normal, unspecified	BI
2	Network termination	41	Temporary failure	BI
31	No reply	19	No answer from user (user alerted)	BI
34	Protocol violation	111	Protocol error, unspecified	BI
36	Operator priority access	8	Pre-emption	BI
47	Null	31	Normal, unspecified	BI
48	Subscriber call termination	16	Normal call clearing	U
others		31	Normal, unspecified	BI

2.1.8   IUP CNA Diagnostics Derivation

If an ISUP Release message (pre IUP ACM) has Cause No. 17 "User Busy" with diagnostic or Cause No. 34 "no circuit/channel available" with diagnostic, then the IWF shall derive the appropriate Reason value from the Cause/location combination as described in Table 2.39. If the output of the mapping is Reason 8 "Subscriber engaged" or Reason 7 "Congestion, re-routeing not permitted" then the Reason shall be included in a CNA message (regardless of the RPI value in the IUP I(F)AM) and the CCBS indicator in the Cause diagnostics field shall be mapped into the CNA diagnostics field as follows:

TABLE 2.43   IUP CNA Diagnostics setting

CCBS Indicator in the ISUP Release cause diagnostics field	IUP CNA Diagnostics field
CCBS possible	CCBS using SCCP/TCAP possible
CCBS not possible	CCBS not possible
other values	Set to "0" (no information)

In all other cases, if the IUP message to be sent is CNA, then the diagnostics field shall be set to "0" (no information)

2.1.9   Coding of ACI Type 8 & NEED Messages

2.1.9.1   Coding of ACI Type 8

If the received APP contained a DPNSS Information Type Indicator set to 2 then the IUP ACI Type 8 message shall be as specified in Table 2.44.

TABLE 2.44   IUP ACI Type 8 derivation

IUP ACI Type 8 field	Derivation
Information Requested Code	Set to default 0000
Information Contained Code	Set to default 1010
Message indicators: Reserved	Set to 0000
ISI	Set to 0000
Called party category	Set to 000000 (unknown)
Interworking indicator	Set to 0 (no interworking)
NEED indicator	Set as received in Legacy Data indicator
Line Identity Nature of Address Indicator	Set to 00 (Reserved)
Incomplete Address Indicator	Set to 0 (Complete address)
Identity Qualifier	Set to 0 (May be released for display purposes)
Number of Address Signals	Set to 0000 (No address signals)

2.1.9.2 Coding of NEED

If the received APP contained a DPNSS Information Type Indicator set to 3 then the NEED message shall be as specified in Table 2.45.

TABLE 2.45   IUP NEED derivation

IUP NEED Message	Derivation
Content Qualifier	Set unchanged from the APP Content Qualifier.
Reserved	Set as received
Nodal End to End Data:	
Octet count (bits 1-6)	Set unchanged from ISUP APP DPNSS message octet count
Reserved (bits 7-8)	Set as received in ISUP APP
NEED (octets 2-n)	Set unchanged from ISUP APP DPNSS message

2.2   Messages and Parameters Derivation and Mapping for ISUP to IUP call

This section describes the derivation and mapping of messages and parameters for an ISUP to IUP call.

> Note: The IUP and ISUP protocols will set all reserved fields to zero.

2.2.1   IUP I(F)AM

The derivation of the IUP I(F)AM is shown in Table 2.46.

TABLE 2.46   IUP I(F)AM derivation

IUP I(F)AM field	Derivation
Calling Party Category	See Section 2.2.1.1
Calling Line Identity Indicator	Set to 1 if Line Identity is present, else set to 0
CLI Blocking Indicator	See section 2.2.1.7
International Indicator	Set as ISUP International indicator
Interworking Indicator	Set as ISUP Interworking indicator unless LDLI parameter is present in ISUP IAM, in which case it shall be set to 0
Priority Access Indicator	Set as Priority Access Indicator (IUP) in ISUP National Forward Call Indicators parameter if present, else set to 0
Meter Delay Guard Time-out Indicator	Set to 1
Protection Indicator	If ISUP CPC=11, 250 or 251 set to 1, otherwise set as Protection Indicator (IUP) in ISUP National Forward Call Indicators parameter if present, else set to 0
Service Handling Protocol	See Section 2.2.1.4
Release Protocol Indicator	Set by IUP protocol
Long Propagation Delay Indicator	If the ISUP Satellite indicator has any value other than 0 then set to 1
Call Type Indicator	See Section 2.2.1.6
Echo Control Device Indicator	Set as ISUP Echo control device indicator
Network Translated Address Indicator	Set as NTA Indicator in ISUP National Forward Call Indicators Parameter if present, else set to 0
Interconnect Specific Information	Set by IUP protocol
Routeing Control Indicator	Set by IUP protocol
Call Path Indicator	See Section 2.2.1.5
Presentation Number Indicator	If the ISUP IAM contains a Presentation Number parameter or Generic Number (Additional Calling Party Number) parameter that is usable for mapping to IUP as described in section 1.2.2 then set to 1, else set to 0
Number of Called Address Signals	Set according to the number of digits in the derived address. See "Address Signals" field.
Address Signals	Set as the ISUP IAM Called Party Number Parameter, with the 'ST' signal (if any) removed and an appropriate prefix added according to the NAI as shown in 2.2.1.2
Line Identity	See Section 2.2.1.3.

2.2.1.1   IUP Calling Party Category

The mapping of the IUP I(F)AM Calling Party Category is shown in Table 2.47.

TABLE 2.47   ISUP IAM CPC to IUP I(F)AM mapping

ISUP IAM		ISDN Access Indicator value	IUP I(F)AM
CPC value			**CPC value**
0	CPC unknown at this time	X	0 unknown
1	operator, language French	X	33 operator, language French
2	operator, language English	X	34 operator, language English
3	operator, language German	X	35 operator, language German
4	operator, language Russian	X	36 operator, language Russian
5	operator, language Spanish	X	37 operator, language Spanish
6	Available to administrations for selecting a particular language by mutual agreement	X	38 reserved for other ITU languages
7	Available to administrations for selecting a particular language by mutual agreement	X	39 reserved for other ITU languages
8	Available to administrations for selecting a particular language by mutual agreement	X	40 reserved for other ITU languages
9	national operator	X	15 AMC Operator (NND)
10	ordinary calling subscriber	0	2 ordinary (business)
		1	7 ISDN (business)
11	calling subscriber with priority	0	2 ordinary (business)
		1	7 ISDN (business)
12	voice band data call	0	2 ordinary (business)
		1	7 ISDN (business)
13	test call	0	2 ordinary (business)
		1	7 ISDN (business)
14	spare	0	2 ordinary (business)
		1	7 ISDN (business)
15	payphone	X	3 payphone (general)
16 - 223 spare		0	2 ordinary (business)
		1	7 ISDN (business)
224 - 249 reserved for national use		0	2 ordinary (business)
		1	7 ISDN (business)
250 admin diversion - payphone with priority		X	5 administration diverted payphone
251 admin. diversion - ordinary with priority		X	4 administration diverted ordinary
252 OSS operator		X	13 operator services operator
253 admin diversion – payphone		X	5 administration diverted payphone
254 admin. diversion – ordinary		X	4 administration diverted ordinary
255 spare		0	2 ordinary (business.)
		1	7 ISDN (business)

2.2.1.2   IUP Called Address signal prefix

The setting of the IUP Called Address signal prefix is shown in Table 2.48.

TABLE 2.48   IUP Called Address signal prefix setting

ISUP CdPN NAI	IUP Called Address Signal prefix
0000011 (National (Significant) Number)	0
0000100 (International Number)	00
1111110 (UK Specific Number)	None

2.2.1.3   IUP Line Identity

The CLI to be included shall be as specified in Section 1.2.2. If no CLI is to be included, the contents of the IUP Line Identity shall be set as described in Table 2.49. Otherwise, the derivation of the IUP Line Identity subfields shall be as described in Table 2.50.

TABLE 2.49   IUP Line Identity setting - default case

IUP Line Identity subfield	Derivation
Nature Of Address Indicator	Set to 00
Incomplete Address Indicator	Set to 0
Identity Qualifier	Set to 0
Number of Address Signals	Set to 0
Address Signals	None included.

TABLE 2.50   IUP Line Identity derivation

IUP Line Identity subfield	Derivation
Nature Of Address Indicator	See Section 2.2.1.3.1
Incomplete Address Indicator	Set to 0
Identity Qualifier	See Section 2.2.1.3.2
Number of Address Signals	Set according to the number of digits received and insertion of Hex B and leading '0's if necessary
Address Signals	See Section 2.2.1.3.3

2.2.1.3.1   IUP Nature of Address Indicator

The setting of the ISUP NAI to IUP NAI shall be as specified in Table 2.51 for ISUP CLI NPI = E.164.

TABLE 2.51   IUP Nature of Address setting

ISUP NAI	IUP NAI	
0000011 (National (Significant) Number)	10 (National)	
0000100 (International Number)	11 (International)	If IUP International value of NAI is supported
	10 (National)	If IUP International value of NAI is not supported

2.2.1.3.2   IUP Identity Qualifier

The setting of the IUP Identity Qualifier is shown in Table 2.52.

TABLE 2.52   IUP Identity Qualifier setting

ISUP APRI	IUP I(F)AM/SIM-B/ACI/ASUI IQ
00	0
01	1
11 (Note 1)	0

Note 1: This value is only valid in the ISUP Calling Party Number parameter.

2.2.1.3.3   IUP Address Signal

The following rules apply to the IUP Address Signal derivation:

a)   If the ISUP Nature of Address Indicator is set to International and the IUP international value of NAI is not supported then the IWF shall instruct the IUP protocol to prefix the Address Signals with '0'.

b)   If the ISUP Screening Indicator = upvp [01] then an address separator (Hex B digit) shall be inserted between the 6th and the 7th digits from the least significant end. If there are less than 7 digits, then the HexB shall be inserted following the most significant digit. Optionally, in the case where the international value of the IUP NAI is not supported, then the Hex B may be inserted between the prefixed '0' and the country code.

c)   If the ISUP Screening Indicator = upnv [00] then an address separator (Hex B digit) shall be placed at the most significant digit position.

This is summarised in Tables 2.53 and 2.54.

TABLE 2.53   IUP Address Signal setting, where the IUP International value of NAI is supported

ISUP		IUP		
Nature of Address Indicator	Screening Indicator	Leading '0' requirements	Hex B requirements	Examples
0000011 (National)	00 (upnv)	Not required	Rule (c)	HexB1632960009
	01 (upvp)	Not required	Rule (b)	1632HexB960009
	11 (np)	Not required	Not required	1632960009
0000100 (International)	00 (upnv)	Not required	Rule (c)	HexB441632960009
	01 (upvp)	Not required	Rule (b)	441632HexB960009
	11 (np)	Not required	Not required	441632960009

TABLE 2.54   IUP Address Signal setting, where the IUP International value of NAI is not supported

ISUP		IUP		
Nature of Address Indicator	Screening Indicator	Leading '0' requirements	Hex B requirements	Examples
0000011 (National)	00 (upnv)	Not required	Rule (c)	HexB1632960009
	01 (upvp)	Not required	Rule (b)	1632HexB960009
	11 (np)	Not required	Not required	1632960009
0000100 (International)	00 (upnv)	Rule (a)	Rule (c)	HexB0441632960009
	01 (upvp)	Rule (a)	Rule (b)	0441632HexB960009 or 0HexB441632960009
	11 (np)	Rule (a)	Not required	0441632960009

2.2.1.4   IUP SHP

The setting of the IUP SHP is shown in Table 2.55.

TABLE 2.55   IUP SHP setting

ISUP					Forward Call Indicators		IUP
Any unrecognised parameters in ISUP IAM not marked as "may be discarded"? (Note 1)	Any APP parameter in IAM with unrecognised Application Context Identifier and Release Call Indicator set to 1 (Release call)?	Any recognised service other than CUG, CCSS, Operator Services or DPNSS Legacy Services requiring ISUP all the way?	Is an APP parameter present in the IAM with Application Context Identifier = 125 (Operator Services) and OSS Information Type = 3?	Is an APP parameter present in the IAM with Application Context identifier =126 (DPNSS Legacy Services) and DPNSS Information Type = 1?	Interworking Indicator (bit D)	Preference Indicator (bits HG)	SHP Value
Y	X	X	X	X	X	X	Note 2
N	Y	X	X	X	X	X	Note 4
	N	Y	X	X	X	X	Note 3
		N	Y	Y	X	X	Note 2
				N	X	X	Request Service (2)
			N	Y	X	X	NEED (3)
				N	Encountered (1)	X	Telephony (0)
					Not encountered (0)	ISUP not required (01)	Telephony (0)
						ISUP preferred (00)	ISDN (1)
						ISUP required (10)	ISDN (1)

Note 1: If there are any unrecognised parameters in the ISUP IAM, then the IWF shall examine the Instruction indicators in the associated Parameter Compatibility Information parameter. For the purposes of this table the term "may be discarded" shall mean bits G.....A are in the format XX10X0X or 1000X0X.

Note 2: The IWF shall instruct the ISUP protocol to fail the call by sending a Release message with Cause #63.

Note 3: The IWF shall instruct the ISUP protocol to fail the call by sending a Release message with the appropriate Cause value or default to Cause #63

Note 4: The IWF shall instruct the ISUP protocol to fail the call by sending a Release message with Cause #79.

2.2.1.5   IUP CPI

The setting of the IUP CPI is shown in Table 2.56.

TABLE 2.56   IUP CPI setting from ISUP TMR

ISUP TMR	IUP CPI
0	Set to 0
2	Set to 1
3	Set to 0 if SHP = 0 or 2, else set to 2
other	routeing procedures will prevent interworking to IUP

2.2.1.6   IUP CTI

The setting of the IUP CTI is shown in Table 2.57.

TABLE 2.57   IUP CTI setting

ISUP			IUP CTI value
Is an APP parameter present in the ISUP IAM with Application Context = 126 and DPNSS information type = 1	**Redirection Information parameter, Redirecting Indicator**	**CCSS Parameter, CCSS Call Indicator**	
No	3	X	1
	4	X	1
	other values, or parameter not present	0, or parameter not present	0
		1	7
Yes	X	X	Note 1

Note 1: Set from the CTI value indicator contained in octet 4b of the Encapsulated Application Information field of the APP carried in the ISUP IAM.

2.2.1.7   IUP CBI

The setting of the IUP CBI is shown in Table 2.58.

TABLE 2.58   IUP CBI setting

ISUP		IUP CBI value
National Forward Call Indicators CLI Blocking Indicator	**CgPN APRI**	
0	X	0
1 (or NFCI parameter not present)	00	1
	01	1
	11 (or CgPN parameter not present)	0

2.2.2   ISUP ACM

2.2.2.1   ISUP ACM Backward Call Indicators

The derivation of the ISUP ACM Backward Call Indicators is shown in Table 2.59.

TABLE 2.59   ISUP ACM Backward Call Indicators derivation

ISUP ACM subfield	Derivation
Charge Indicator	See Section 2.2.2.1.1
Called Party's Status Indicator	See Section 2.2.2.1.2
Called Party's Category Indicator	See Section 2.2.2.1.3
Interworking Indicator	See Section 2.2.2.1.2
ISDN User Part Indicator	See Section 2.2.2.1.2
Holding Indicator	Set as IUP LPRI
ISDN Access Indicator	See Section 2.2.2.1.2
Echo Control Device Indicator	Set as IUP Echo Control Device Indicator.

2.2.2.1.1   ISUP Charge Indicator

The setting of the ISUP Charge Indicator is shown in Table 2.60.

TABLE 2.60   ISUP Charge Indicator setting

IUP Charge Indicator	ISUP Charge Indicator
0	1
1	2

2.2.2.1.2 ISUP ACM Called Party Status, Interworking Indicator, ISDN Access Indicator, ISDN User Part Indicator and Progress Indicator

The setting of the ISUP ACM Called Party Status, Interworking Indicator, ISDN Access Indicator, ISDN User Part Indicator and Progress Indicator is shown in Table 2.61.

TABLE 2.61   ISUP ACM Called Party Status, Interworking Indicator, ISDN Access Indicator, ISDN User Part Indicator and Progress Indicator setting

IUP		ISUP ACM				
ACM Interworking Indicator	Has a complete SIM interchange taken place?	Called Party's Status Indicator	Interworking Indicator	ISDN Access Indicator	ISDN User Part Indicator	DSS1 Progress Indicator in ATP
0	-	0	1	0	0	-
1	-	1	0	1	1	-
2	-	1	0	0	1	-
3-15	Y	as IUP ACM interworking indicator = 1				
	N	as IUP ACM interworking indicator = 2				
16	-	as IUP ACM interworking indicator = 0				
17	-	1	0	1	1	-
18	-	0	0	1	1	pi=#1 loc=#5
19-31	Y	as IUP ACM interworking indicator = 17				
	N	as IUP ACM interworking indicator = 18				

2.2.2.1.3 ISUP ACM Called Party's Category

The setting of the ISUP ACM Called Party's Category is shown in Table 2.62.

TABLE 2.62   ISUP ACM CdPC setting

IUP ACM CdPC Value	ISUP ACM CdPC Value
0 Unknown	0 No indication
1, 2, 4, 6, 7, 11, 12, 13, 14, 15, 16, 17-63	1 Ordinary subscriber
3 Payphone (general)	2 Payphone
5 Administration Diverted payphone	
8 Pre-payment Payphone (public)	
9 Pre-payment Payphone (renter's residential)	
10 Pre-payment Payphone (renter's business)	

2.2.2.2 ISUP ACM Called Subscriber's Basic Service Marks parameter

The setting of the ISUP ACM Called Subscriber's Basic Service Marks parameter is shown in Table 2.63.

TABLE 2.63   ISUP ACM Called Subscriber's Basic Service Marks parameter setting

IUP ACI Type 4	ISUP ACM
Information Contained = 7	ACM with Called Subscriber's Basic Service Marks
Information Requested = 0	
Calling/Called Subscriber's Basic Service Marks parameter	Called Subscriber's Basic Service Marks parameter
ACI Type 4 Message Indicators	

2.2.2.3 ISUP ACM Access Transport parameter

The ATP shall be included to convey the DSS1 Progress Indicator information element if required by 2.2.2.1.2. The Progress Indicator information element shall be coded as in Table 2.64.

TABLE 2.64   Progress indicator information element derivation

Progress Indicator information element	Derivation
DSS1 Progress Indicator information element identifier	00011110
Length of progress indicator contents	Set to "2".
Coding standard	Set to "00" (CCITT standardised coding)
Location	Set to "5" (private network serving the remote user)
Progress description	Set to "1" (Call is not end to end ISDN)

2.2.3 ISUP CPG

2.2.3.1 ISUP CPG Event Information parameter

The Event Indicator field shall be set to "2" (Progress).

2.2.3.2 ISUP CPG Called Subscriber's Basic Service Marks parameter

The setting of the ISUP CPG Called Subscriber's Basic Service Marks parameter is shown in Table 2.65.

TABLE 2.65   ISUP CPG Called Subscriber's Basic Service Marks parameter setting

IUP ACI Type 4	ISUP CPG
Information Contained = 7	CPG with Called Subscriber's Basic Service Marks
Information Requested = 0	
Calling/Called Subscriber's Basic Service Marks parameter	Called Subscriber's Basic Service Marks parameter
ACI Type 4 Message Indicators	

2.2.4 ISUP ANM message

2.2.4.1 ISUP ANM Backward Call Indicators

The derivation of the ISUP ANM Backward Call Indicators is shown in Table 2.66.

TABLE 2.66   ISUP ANM Backward Call Indicators derivation

ISUP ANM BCI subfield	Derivation
Charge Indicator	See Section 2.2.4.1.1
Called Party's Status Indicator	Same as Section 2.2.2.1
Called Party's Category Indicator	Same as Section 2.2.2.1
Interworking Indicator	Same as Section 2.2.2.1
ISDN User Part Indicator	Same as Section 2.2.2.1
Holding Indicator	Same as Section 2.2.2.1
ISDN Access Indicator	Same as Section 2.2.2.1
Echo Control Device Indicator	Same as Section 2.2.2.1

2.2.4.1.1 ISUP ANM Charge Indicator

The setting of the ISUP ANM Charge Indicator is shown in Table 2.67.

TABLE 2.67   ISUP ANM Charge Indicator setting

IUP Type of Answer	ISUP ANM Charge Indicator
0	1
1-15	2

2.2.5 IUP SIM-B

An IUP SIM-B shall only be sent if a SIM-A was received by the IWP. The derivation of the information contained in the SIM-B can be found in the following sub-sections.

2.2.5.1 Derivation of SIM-B Type and FIC

The type of SIM-B to be sent, and the FIC contained within it shall be derived from the following information:

a)   The information requested by the SIM-A, identified by the IRC value.

b)   The value of the Closed User Group Call indicator within the Optional Forward Call Indicators parameter contained in the ISUP IAM. If the Optional Forward Call Indicators parameter is not present then a value of "0" Non CUG call shall be assumed.

c) Whether an ATP parameter containing a valid Called Party Subaddress information element is present in the ISUP IAM. See below for definition of "valid".

TABLE 2.68   IUP SIM-B Type and FIC setting

IUP SIM-A Type 7 IRC	ISUP IAM Optional Forward Call Indicators parameter CUG Call Indicator	ISUP IAM Valid Called Party Sub-address element (see Note 1)	IUP SIM-B Type	FIC
3	0	-	2	0
3	2	-	3	2
3	3	-	3	0
5	0	N	2	0
5	0	Y	5	0
5	2	N	3	2
5	2	Y	6	2
5	3	N	3	0
5	3	Y	6	0

Note 1: The entries in this column have the following meanings:

"Y" The ATP parameter in the ISUP IAM contains a valid Called Party Subaddress information element

"N" The ATP parameter in the ISUP IAM does not contain a valid Called Party Subaddress information element or there is no ATP parameter in the ISUP IAM.

" -" Presence or absence of a valid Called Party Subaddress information element is not significant.

The Called Party Subaddress information element contained in the ISUP IAM shall be deemed to be valid if the following conditions are met:

a) there are no more than six octets of Subaddress information (i.e. starting from octet 4 of the Called Party Subaddress information element); and

b) the Subaddress information octets do not include any octet(s) with the IA5 coding for "∗" and "#".

Note: IA5 characters are held in the least significant 7 bits of the octet. The 8th is not examined.

If the above conditions are not met then the Called Party Subaddress information element shall be discarded.

2.2.5.1.1   Derivation of IUP NAE from ISUP Called Party Subaddress information element

Table 2.69 shows the derivation of the IUP NAE from ISUP Called Party Subaddress information element, for the maximum 6 characters. For instances where there are less than this number then the mapping shall be foreshortened as appropriate.

TABLE 2.69   IUP NAE derivation

IUP NAE	Derivation
NAE Character count	Derived from count of ISUP Called Party Subaddress Information octets (those octets in the range 4 – 9 of the information element)
1st NAE Character	Transferred unchanged from octet 1 of ISUP Called Party Subaddress Information
2nd NAE Character	Transferred unchanged from octet 2 of ISUP Called Party Subaddress Information
3rd NAE Character	Transferred unchanged from octet 3 of ISUP Called Party Subaddress Information
4th NAE Character	Transferred unchanged from octet 4 of ISUP Called Party Subaddress Information
5th NAE Character	Transferred unchanged from octet 5 of ISUP Called Party Subaddress Information
6th NAE Character	Transferred unchanged from octet 6 of ISUP Called Party Subaddress Information

2.2.5.2   IUP SIM-B Type 2

The derivation of the IUP SIM-B Type 2 message is shown in Table 2.70.

TABLE 2.70   IUP SIM-B Type 2 derivation

IUP SIM-B Type 2 field	Derivation
Information Contained Code	Set to 3 (FIC, CLI, SIC contained)
Information Requested Code	Set to 7 (FIC and CdLI requested)
Facility Indicator Code	See Section 2.2.5.1.
Service Indicator Code	See Section 2.2.5.7
Line Identity	See Section 2.2.1.3

2.2.5.3   IUP SIM-B Type 3

The derivation of the IUP SIM-B Type 3 message is shown in Table 2.71.

TABLE 2.71   IUP SIM-B Type 3 derivation

IUP SIM-B Type 3 field	Derivation
Information Contained Code	Set to 2 (FIC, CLI, SIC, CUG contained)
Information Requested Code	Set to 7 (FIC and CdLI requested)
Facility Indicator Code	See Section 2.2.5.1.
Service Indicator Code	See Section 2.2.5.7
Closed User Group Interlock Code	See Section 2.2.5.6
Line Identity	See Section 2.2.1.3

2.2.5.4   IUP SIM-B Type 5

The derivation of the IUP SIM-B Type 5 message is shown in Table 2.72.

TABLE 2.72   IUP SIM-B Type 5 derivation

IUP SIM-B Type 5 field	Derivation
Information Contained Code	Set to 5 (FIC, CLI, SIC, NAE contained)
Information Requested Code	Set to 7 (FIC and CdLI requested)
Facility Indicator Code	See Section 2.2.5.1
Service Indicator Code	See Section 2.2.5.7
Line Identity	See Section 2.2.1.3
NAE Character Count	See Table 2.69
NAE Characters	See Table 2.69

2.2.5.5   IUP SIM-B Type 6

The derivation of the IUP SIM-B Type 6 message is shown in Table 2.73.

TABLE 2.73   IUP SIM-B Type 6 derivation

SIM-B Type 6 field	Derivation
Information Contained Code	Set to 4 (FIC, CLI, SIC, CUG, NAE contained)
Information Requested Code	Set to 7 (FIC and CdLI requested)
Facility Indicator Code	See Section 2.2.5.1
Service Indicator Code	See Section 2.2.5.7
Closed User Group Interlock Code	See Section 2.2.5.6
Line Identity	See Section 2.2.1.3
NAE Character Count	See Table 2.69
NAE Characters	See Table 2.69

2.2.5.6   Mapping of CUG Interlock Code from ISUP to IUP

See Section 2.1.1.10.

2.2.5.7   Derivation of SIC in IUP SIM-B

If the ISUP IAM contains USI(BC) with the optional ATP(HLC, LLC) parameters, then these shall be used to derive the SIC (See Annex A). Otherwise, if there is no USI(BC) present, the SIC shall be determined from the ISUP IAM TMR parameter as follows:

TABLE 2.74   IUP SIC derivation

ISUP		IUP
TMR	ISDN Access Indicator	SIC
0	X	00010000 (Category 2 (voice))
2	X	10100000 (Category 1) 00000100
3	0 (Non ISDN)	00000000 (Telephony)
	1 (ISDN)	00011000 (Category 2 (3.1kHz))

Note 1: If the ISDN Access Indicator is ISDN, there will normally be a USI, and thus Annex A will apply. A1.2.5(a) performs the corresponding function of generating a SIC=00000000 when the ATP Progress Indicator is value 1 or 3.

2.2.6   Derivation of ACI

Shown below is the derivation of ACI message types 1 and 2. For ACI message types 3, 4, 5, 6 and 7, see section 2.3.

2.2.6.1   Derivation of ACI Type 1

The derivation of the ACI Type 1 message with an ICC = 1, 11 or 12 is shown in Table 2.75.

TABLE 2.75   IUP ACI Type 1 (ICC = 1, 11 or 12) derivation

ACI Type 1 Contents	Derivation
ACI Type 1 Message Indicators	See 2.2.6.1.1
Line Identity	As specified in 1.2.2 and mapped in 2.2.1.3.

The derivation of the ACI Type 1 message with an ICC = 2 is shown in Table 2.76.

TABLE 2.76   IUP ACI Type 1 (ICC = 2) Derivation

ACI Type 1 Contents	Derivation
ACI Type 1 Message Indicators	See 2.2.6.1.1
Line Identity	ISUP Generic Number parameter (coded as Intercepted Line Identity) mapped as in 2.2.1.3.

2.2.6.1.1   Derivation of IUP ACI Type 1 Message Indicators

The setting of the IUP ACI Type 1 or 3 Operator Indicator is shown in Table 2.77.

TABLE 2.77   IUP ACI Type 1 Operator Indicator setting

ISUP IAM CPC	Operator Indicator
1 to 9, 252	1
other	0

2.2.6.2   Derivation of ACI Type 2

The derivation of the ACI Type 2 message with an ICC = 3 is shown in Table 2.78.

TABLE 2.78   IUP ACI Type 2 (ICC = 3) derivation

ACI Type 2 Contents	Derivation
Partial Calling Line Identity	Partial Calling Line Identity parameter as specified in 1.2.2 and mapped as in 2.2.6.2.1

Note: An ACI Type 2 message with ICC=4 cannot be derived from ISUP.

2.2.6.2.1   Derivation of IUP PCLI

The derivation of the IUP PCLI is shown in Table 2.79.

TABLE 2.79   IUP PCLI Derivation

IUP PCLI subfield	Derivation
Type of Switch	Set from ISUP PCLI Type of Switch
PNO Identity	Set from ISUP CLI PNO Identity
Switch Number	Set from ISUP PCLI Switch Number
"For bilateral agreement"	The five octets marked as "for bilateral agreement" are copied octet-wise from the equivalent subfields in the ISUP PCLI.

2.2.7   Derivation of ASUI

The derivation of the ASUI message with Information Contained = 1 is shown in Table 2.80.

TABLE 2.80   IUP ASUI (IC=1) Derivation

ASUI Contents	Derivation
Line Identity	As specified in 1.2.2 and mapped as in 2.2.1.3.

The derivation of the ASUI message with Information Contained = 2 is shown in Table 2.81.

TABLE 2.81   IUP ASUI (IC=2) Derivation

ASUI Contents	Derivation
Partial Calling Line Identity	Partial Calling Line Identity parameter as specified in 1.2.2 and mapped as in 2.2.6.2.1.

2.2.8   Application Transport Message

The following section describes the derivation of the ISUP APM from IUP.

2.2.8.1   Application Transport Parameter for Operator Services

If the received IUP message which caused the generation of the APM was EXTEND CALL, then the derivation of the Application Transport Parameter shall be as shown in Table 2.82.

TABLE 2.82   ISUP Application Transport Parameter derivation

ISUP Application Transport Parameter subfield	Derivation
Application Context ID	Set to 125 (Operator Services)
Release Call Indicator	Set to 1
Send Notification Indicator	Set to 1
APM Segmentation Indicator	Set by APP procedures
Sequence Indicator	Set by APP procedures
Segmentation Local Reference	Set by APP procedures
Encapsulated Application Information	The OSS Information Type shall be set to 00000100 (Action Invocation). The OSS Message Type shall be set to 00000100 (Extend Call) if the received IUP message was EXTEND CALL.

2.2.8.2   Application Transport Parameter for DPNSS

2.2.8.2.1   Receipt of ACI Type 8

If the received IUP message that caused the generation of the APM was an ACI Type 8 then the derivation of the APP shall be as specified in Table 2.83.

TABLE 2.83   ISUP Application Transport Parameter derivation for DPNSS Information Type 2

ISUP Application Transport Parameter subfield	Derivation
Application Context Identifier	Set to 126 (DPNSS Legacy Services)
Release Call Indicator	Set to 1
Send Notification Indicator	Set to 1
APM Segmentation Indicator	Set by APP procedures
Sequence Indicator	Set by APP procedures
Segmentation Local Reference	Set by APP procedures
Encapsulated Application Information	The DPNSS Information Type Indicator shall be set to 00000010 (backward negotiation). The Legacy Data Indicator shall be mapped unchanged from the NEED indicator in the ACI Type 8 message indicators.

2.2.8.2.2   Receipt of NEED Message

If the received IUP message that caused the generation of the APM was a NEED then the derivation of the APP shall be as specified in Table 2.84.

TABLE 2.84   ISUP APM Application Transport Parameter derivation for DPNSS Information Type 3

ISUP Application Transport Parameter subfield	Derivation
Application Context Identifier	Set to 126 (DPNSS Legacy Services)
Release Call Indicator	Set to 1
Send Notification Indicator	Set to 1
APM Segmentation Indicator	Set by APP procedures
Sequence Indicator	Set by APP procedures
Segmentation Local Reference	Set by APP procedures
Encapsulated Application Information:	The DPNSS Information Type Indicator shall be set to 00000011 (transparent transfer).
Content qualifier	Set unchanged from IUP NEED Content qualifier
Reserved	Set as received in IUP NEED Parameter
DPNSS message octet count	Set unchanged from IUP NEED octet count field of the IUP NEED Parameter
DPNSS message	Set unchanged from IUP NEED field (Octets 2-n of the NEED Parameter)

2.2.9   Service Message

The derivation of the IUP Service message is shown in Table 2.85.

TABLE 2.85   IUP Service Message derivation

IUP Service Message	Derivation
Service Code	Set from the Service Sub field contained in the APP when the OSS Information Type = 3 (Service Request)

2.2.10   Release, CNA and Discrete Messages

2.2.10.1   Forward ISUP Release Received (pre-ACM)

Derivation of IUP (forward) RELEASE message reason values from ISUP release message (pre IUP ACM) cause/location values shall be as shown in the Table 2.86.

TABLE 2.86   Forward ISUP Release reason (pre IUP ACM) mapping

cause value	Cause name	location	reason value	reason name
	ISUP RELEASE Cause indicators parameter (ITU-T standardised coding)		**IUP RELEASE**	
8	Pre-emption	U, LPN, RPN	48	Subscriber call termination
		others	36	Operator priority access
16	Normal call clearing	U, LPN, RPN	48	Subscriber call termination
		others	47	Null
31	Normal, unspecified	U, LPN, RPN	48	Subscriber call termination
		others	47	Null
41	Temporary failure	U, LPN, RPN	48	Subscriber call termination
		others	2	Network termination
111	Protocol error, unspecified	U, LPN, RPN	48	Subscriber call termination
		others	34	Protocol violation
others		U, LPN, RPN	48	Subscriber call termination
		others	47	Null

2.2.10.2   Forward ISUP Release Received (post-ACM)

Derivation of IUP (forward) RELEASE message reason values from ISUP release message (post- IUP ACM) cause/location values shall be as shown in Table 2.87.

TABLE 2.87   Forward ISUP Release reason (post IUP ACM) mapping

cause value	Cause name	location	reason value	reason name
	ISUP RELEASE Cause indicators parameter (ITU-T standardised coding)		**IUP RELEASE**	
8	Pre-emption	U, LPN, RPN	48	Subscriber call termination
		others	36	Operator priority access
16	Normal call clearing	U, LPN, RPN	48	Subscriber call termination
		others	47	Null
19	No answer from user (user alerted)	any	31	No reply
31	Normal, unspecified	U, LPN, RPN	48	Subscriber call termination
		others	47	Null
41	Temporary failure	U, LPN, RPN	48	Subscriber call termination
		others	2	Network termination
111	Protocol error, unspecified	U, LPN, RPN	48	Subscriber call termination
		others	34	Protocol violation
others		U, LPN, RPN	48	Subscriber call termination
		others	47	Null

2.2.10.3   Backward IUP Release/CNA/Discrete Failures Messages Received (pre-ACM)

Derivation of (backward) ISUP RELEASE message cause/location values from IUP RELEASE message reason values or discrete failure messages shall be as shown in Tables 2.88 to 2.90.

TABLE 2.88   Backward IUP Discrete messages mappings

IUP discrete message name	cause value	cause name	location
	ISUP RELEASE Cause indicators parameter (ITU-T standardised coding)		
Congestion	34	No circuit / channel available	TN
Terminal congestion	34	No circuit / channel available	BI
Subscriber engaged	17	User busy	BI
Subscriber out of order	27	Destination out of order	BI
Subscriber transferred	22	Number changed	BI
Repeat attempt	34	No circuit / channel available	TN
Blocking	34	No circuit / channel available	TN
Overload	34	No circuit / channel available	TN

TABLE 2.89   Backward IUP Release/CNA reason (pre IUP ACM) mapping

IUP RELEASE/CNA		ISUP RELEASE Cause indicators parameter (ITU-T standardised coding)		
reason value	reason name	cause value	cause name	location
none (see Note 3)		31	Normal, unspecified	BI
0	Number unobtainable	31	Normal, unspecified	BI
1	Address incomplete	28	Invalid number format (incomplete number)	BI
2	Network termination	41	Temporary failure	BI
3	Service unavailable	63	Service or option not available, unspecified	BI
4	Subscriber incompatible	88	Incompatible destination	BI
5	Subscriber transferred	22	Number changed	BI
7	Congestion, re-routeing not permitted (see Note 1)	34	No circuit / channel available	BI
8	Subscriber engaged (see Note 1)	17	User busy	BI
9	Subscriber out of order	27	Destination out of order	BI
10	Subscriber controlled incoming calls barred	21	Call rejected	BI
12	Network protective controls	17	User busy	TN
13	Rejected diverted calls	21	Call rejected	BI
14	Selective call barring	21	Call rejected	BI
15 (see Note 2)	Congestion, re-routeing not permitted (discrete equivalent)	34	No circuit / channel available	BI
16 (see Note 2)	Subscriber engaged (discrete equivalent)	17	User busy	BI
17 (see Note 2)	Subscriber out of order (discrete equivalent)	27	Destination out of order	BI
18	Remote procedure error	111	Protocol error, unspecified	U
19	Service incompatible	88	Incompatible destination	U
24	Facility not registered	21	Call rejected	BI
30	NAE error	21	Call rejected	U
33	Temporary out of service	27	Destination out of order	BI
34	Protocol violation	111	Protocol error, unspecified	BI
36	Operator priority access	34	No circuit / channel available	TN
41	CUG access barred	87	User not member of CUG	BI
45	DTE controlled not ready	21	Call rejected	U
46	DTE uncontrolled not ready	18	No user responding	BI
48	Subscriber call termination	16	Normal call clearing	U
53	Flow controlled	17	User busy	TN
54	Out of catchment area	31	Normal, unspecified	BI
55	Translation out of service	31	Normal, unspecified	BI
56	Permanent incoming calls barred	31	Normal, unspecified	BI
57	Spare number/code	1	Unallocated (unassigned) number	BI
58	Anonymous call rejection	24	Call rejected due to ACR supplementary service	BI
others		31	Normal, unspecified	BI

Note 1: See also Section 2.2.11 for ISUP Diagnostics derivation.

Note 2: This reason value is not defined for use in IUP CNA. If received in an IUP CNA these shall be treated as "other" values.

Note 3: The input of "none" for reason value is applicable only to the Release message.

TABLE 2.90   Backward IUP Release reason (pre IUP ACM) mapping (Release protocol not supported pre IUP ACM)

IUP RELEASE	ISUP RELEASE Cause indicators parameter (ITU-T standardised coding)		
reason indicated	cause value	cause name	location
no reason	31	Normal, unspecified	BI
any reason	31	Normal, unspecified	BI

2.2.10.4   Backward IUP Release Received (post-ACM)

Derivation of (backward) ISUP RELEASE message cause/location values from IUP RELEASE message reason values shall be as shown in Table 2.91.

TABLE 2.91   Backward IUP Release reason (post IUP ACM) mappings

IUP RELEASE		ISUP RELEASE Cause indicators parameter (ITU-T standardised coding)		
reason value	Reason name	cause value	cause name	location
none		31	Normal, unspecified	BI
2	Network termination	41	Temporary failure	BI
31	No reply	19	No answer from user (user alerted)	BI
32	Service termination	16	Normal call clearing	BI
34	Protocol violation	111	Protocol error, unspecified	BI
36	Operator priority access	8	Pre-emption	BI
47	Null	31	Normal, unspecified	BI
48	Subscriber call termination	16	Normal call clearing	U
others		31	Normal, unspecified	BI

2.2.11 ISUP Diagnostics Derivation

If an IUP CNA message has Reason 8 "Subscriber Engaged" with diagnostic or Reason 7 "Congestion, re-routeing not permitted" with diagnostic, then the IWF shall derive the appropriate Cause/location combination from the Reason value as described in Table 2.89. If the output of the mapping is Cause No. 17 "User Busy" or Cause No. 34 "No circuit/channel available", then the CNA diagnostics field shall be mapped into the ISUP CCBS indicator in the Cause diagnostics field as follows:

TABLE 2.92   ISUP Diagnostics CCBS Indicator setting

IUP CNA Diagnostics field	CCBS Indicator in the ISUP Release cause diagnostics field
CCBS using SCCP/TCAP possible	CCBS possible
CCBS not possible	CCBS not possible
other values	diagnostics field not included

2.2.12 Receipt of APP with DPNSS Information Type 3

If the received APP contains a DPNSS Information Type Indicator set to 3 then the resultant NEED message shall be coded as specified in Table 2.93.

TABLE 2.93   IUP NEED Message derivation

IUP NEED Message	Derivation
Content Qualifier	Set unchanged from the APP Content Qualifier
Reserved	Set as received

Nodal End to End Data:
    Octet count (bits 1-6)
    Reserved (bits 7-8)
    NEED (octets 2-n)
	
	Set unchanged from ISUP APP DPNSS message octet count
	Set as received in ISUP APP
	Set unchanged from ISUP APP DPNSS message

2.3 Messages and Parameters Derivation and Mapping for Call Direction Independent Messages

2.3.1 IUP to ISUP

2.3.1.1 ISUP Information Request Message

The derivation of the ISUP Information Request Message is shown in Table 2.94.

TABLE 2.94   ISUP Information Request Message derivation

ISUP Information Request Message Parameter	Derivation
Information Request Indicators	Set all to 0
National Information Request Indicators	See Section 2.3.1.1.1

2.3.1.1.1 ISUP National Information Request Indicators parameter

The setting of the ISUP National Information Request Indicators parameter is shown in Table 2.95.

TABLE 2.95   ISUP National Information Request Indicators parameter setting

IUP IRC Value	ISUP National Information Request Indicators					
	A	B	C	D	E	F
5	1	0	0	0	0	0
7	0	1	0	0	0	0
8	0	0	1	0	0	0
9	0	0	0	1	0	0
2	0	0	0	0	1	0
6	0	0	0	0	0	1

2.3.1.2 ISUP Information Message

The derivation of the ISUP Information Message is shown in Table 2.96.

TABLE 2.96   ISUP Information Message derivation

	ISUP Parameter Combinations	Derivation
	Information indicators	Set all to 0
	National Information indicators	See Section 2.3.1.2.1
⊕	Calling Subscriber's Basic Service Marks	See Section 2.3.1.2.2
⊕	Called Subscriber's Basic Service Marks	See Section 2.3.1.2.3
⊕	Calling Subscriber's Originating Facility Marks	See Section 2.3.1.2.4
⊕	Called Subscriber's Terminating Facility Marks	See Section 2.3.1.2.5
⊕	Generic Number (coded as Intercepted Line Id)	See Section 2.3.1.2.6
⊕	Called Subscriber's Basic Service Marks + Generic Number (coded as Intercepted Line Id)	See Section 2.3.1.2.7

Note: Only one of the parameters or parameter combinations marked ⊕ shall be included in any message.

2.3.1.2.1 ISUP National Information Indicators mapping from IUP ACI ICC Codes

The setting of the ISUP National Information Indicators is shown in Table 2.97.

TABLE 2.97   ISUP National Information Indicators setting

IUP		ISUP National Information Indicators					
ACI Type	ICC	A	B	C	D	E	F
3	5	1	0	0	0	0	0
4	7	0	1	0	0	0	0
5	8	0	0	1	0	0	0
6	9	0	0	0	1	0	0
1	2	0	0	0	0	1	0
3	6	0	0	0	0	0	1

2.3.1.2.2 ISUP Calling Subscriber's Basic Service Marks Parameter

The derivation of the ISUP Calling Subscriber's Basic Service Marks parameter is shown in Table 2.98.

TABLE 2.98   ISUP Calling Subscriber's Basic Service Marks parameter derivation

ISUP	Derivation
Calling Subscriber's Basic Service Marks parameter	Calling/Called Subscriber's Basic Service Marks contained in an IUP ACI Type 3 with ICC=5
	IUP ACI Type 3 Message Indicators

2.3.1.2.3 ISUP Called Subscriber's Basic Service Marks Parameter

The derivation of the ISUP Called Subscriber's Basic Service Marks parameter is shown in Table 2.99.

TABLE 2.99   ISUP Called Subscriber's Basic Service Marks parameter derivation

ISUP	Derivation
Called Subscriber's Basic Service Marks parameter	Calling/Called Subscriber's Basic Service Marks contained in an IUP ACI Type 4
	IUP ACI Type 4 Message Indicators

2.3.1.2.4 ISUP Calling Subscriber's Originating Facility Marks Parameter

The derivation of the ISUP Calling Subscriber's Originating Facility Marks parameter is shown in Table 2.100.

TABLE 2.100   ISUP Calling Subscriber's Originating Facility Marks parameter derivation

ISUP	Derivation
Calling Subscriber's Originating Facility Marks parameter	Calling Subscriber's Originating Facility Marks contained in an IUP ACI Type 5

2.3.1.2.5 ISUP Called Subscriber's Terminating Facility Marks Parameter

The derivation of the ISUP Called Subscriber's Terminating Facility Marks parameter is shown in Table 2.101.

TABLE 2.101   ISUP Called Subscriber's Terminating Facility Marks parameter derivation

ISUP	Derivation
Called Subscriber's Terminating Facility Marks parameter	Called Subscriber's Terminating Facility Marks contained in an IUP ACI Type 6

2.3.1.2.6 ISUP Generic Number (coded Intercepted Line Identity) parameter

The derivation of the ISUP Generic Number (coded Intercepted Line Identity) parameter is shown in Table 2.102.

TABLE 2.102 ISUP Generic Number (Intercepted Line Identity) derivation

ISUP	Derivation
Generic Number (coded Intercepted Line Identity) parameter	Full Called Line Identity contained in an ACI Type 1

2.3.1.2.7 ISUP Generic Number (coded Intercepted Line Identity) parameter and ISUP Called Subscriber's Basic Service Marks parameter

The derivation of the ISUP Generic Number (coded Intercepted Line Identity) parameter and ISUP Called Subscriber's Basic Service Marks parameter is shown in Table 2.103.

TABLE 2.103 ISUP Generic Number (Intercepted Line Identity) & Called Subscriber's Basic Service Marks derivation

ISUP	Derivation
Called Subscriber's Basic Service Marks parameter	Calling/Called Subscriber's Basic Service Marks contained in an ACI Type 3 with ICC=6
Generic Number (coded Intercepted Line Identity) parameter	Full Called Line Identity contained in an ACI Type 3

2.3.2 ISUP to IUP

2.3.2.1 IUP ACI Type 7 Message (request)

The setting of the IUP IRC value is shown in Table 2.104.

TABLE 2.104 IUP ACI Type 7 message IRC values setting

ISUP National Information Request Indicators						IUP IRC value
A	B	C	D	E	F	
1	0	0	0	0	0	5
0	1	0	0	0	0	7
0	0	1	0	0	0	8
0	0	0	1	0	0	9
0	0	0	0	1	0	2
0	0	0	0	0	1	6

2.3.2.2 IUP ACI Messages (information)

The setting of the IUP ACI Message (information) Type and ICC is shown in Table 2.105.

TABLE 2.105 IUP ACI Message (information) Type and ICC value setting

ISUP parameters present in INF message					IUP ACI		
Calling Subscriber's Basic Service Marks	Called Subscriber's Basic Service Marks	Calling Subscriber's Originating Facility Marks	Called Subscriber's Terminating Facility Marks	Generic Number (coded Intercepted Line Identity)	Type	ICC	
Y	N	N	N	N	3	5	
N	Y	N	N	N	4	7	
N	N	Y	N	N	5	8	
N	N	N	Y	N	6	9	
N	N	N	N	Y	1	2	
N	Y	N	N	Y	3	6	
any other combination					-	-	Note 1

Note 1: The IWF shall instruct the IUP Protocol to send a Confusion message, or, based on the received IUP request, an alternative message permitted by ND1006 [1].

2.3.2.3   IUP ACI Type 3 Message

The derivation of the ACI Type 3 Message with an ICC = 5 is shown in Table 2.106.

TABLE 2.106   ACI Type 3 Message derivation

IUP	Derivation
Calling/Called Subscriber's Basic Service Marks	ISUP Calling Subscriber's Basic Service Marks parameter
ACI Type 3 Message Indicators	
Line Identity	Reconstituted from stored information at the IWF.

The derivation of the ACI Type 3 Message with an ICC = 6 is shown in Table 2.107.

TABLE 2.107   IUP ACI Type 3 derivation

IUP	Derivation
Calling/Called Subscriber's Basic Service Marks	ISUP Called Subscriber's Basic Service Marks parameter
ACI Type 3 Message Indicators	
Line Identity	ISUP Generic Number (coded Intercepted Line Identity)

2.3.2.4   IUP ACI Type 4 Message

The derivation of the ACI Type 4 message is shown in Table 2.108.

TABLE 2.108   ACI Type 4 Message derivation

IUP	Derivation
Calling/Called Subscriber's Basic Service Marks	ISUP Called Subscriber's Basic Service Marks parameter
ACI Type 4 Message Indicators	

2.3.2.5   IUP ACI Type 5 Message

The derivation of the ACI Type 5 message is shown in Table 2.109.

TABLE 2.109   ACI Type 5 Message derivation

IUP	Derivation
Calling Subscriber's Originating Facility Marks	ISUP Calling Subscriber's Originating Facility Marks

2.3.2.6   IUP ACI Type 6 Message

The derivation of the ACI Type 6 message is shown in Table 2.110.

TABLE 2.110   ACI Type 6 Message derivation

IUP	Derivation
Called Subscriber's Terminating Facility Marks	ISUP Called Subscriber's Terminating Facility Marks

2.3.2.7   IUP ACI Type 1 Message

The derivation of the ACI Type 1 message is shown in Table 2.111.

TABLE 2.111   ACI Type 1 derivation

IUP	Derivation
Full Called Line Identity contained in an ACI Type 1	ISUP Generic Number (coded Intercepted Line Identity)

END OF TSG/SPEC/008§2

ANNEX A (normative)
ISUP BC, HLC, LLC, ATP TO/FROM IUP SIC MAPPINGS

The Sections A1.1 to A1.5 show the mapping between the ISUP:

   a)   USI parameter (BC),

   b)   ATP parameter Low Layer Compatibility (LLC) information element,

   c)   ATP parameter High Layer Compatibility (HLC) information element,

   and,

   d)   ATP parameter Progress Indicator (PI) information element,

and the IUP ISDN Composite SIM-B Service Indicator Code (SIC) parameter.

If the USI parameter is absent from the ISUP IAM then the IUP SIM-B SIC values shall be determined in accordance with Section 2.2.5.7 of the main text.

In the following tables, when only a single-octet SIM-B SIC is indicated, the 2nd octet will always be present in the SIM-B but will be coded 00000000. Nothing is inferred from the coding of this 2nd octet. (The SIM-B SIC field is a two-octet, fixed length field).

In the mapping, apart from the letter "X", if the same upper case letter(s) are used in both ISUP (BC) and SIC contents this signifies that the bit value(s) are transferred without change. If the same letter occurs in upper case (possibly in italics) in the ISUP message and lower case in the SIC contents this signifies a bit mapping which may be found in the KEY following the mapping tables (see A1.5). The letter "X" indicates a "don't care" bit.

If an exact mapping match is not provided then the "catch all" condition shall apply as described in the final mapping tables given in A1.4.

   Note: To avoid confusion between the mappings indicated in this Annex and similar requirements when mapping ISUP (Q.931) BC information directly to IUP, the tables in this Annex refer to the BC and the BC octet numbering applicable to Q.931. Within ISUP this information is carried in the USI parameter using identical formats to Q.931, however, the ISUP octet numbering begins with octet "1" instead of octet "3".

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

A1.1   ISUP SPEECH ◄─────► IUP SPEECH (voice) Category 2 (Digital or Analogue routeing)

A1.1(a)   ISUP ─────►   IUP

BC
3	`10000000`	speech
4	`10010000`	64kbit/s
5	`10100011`	G711 A-law

SIC
1	`00010000`	Cat 2 (voice)
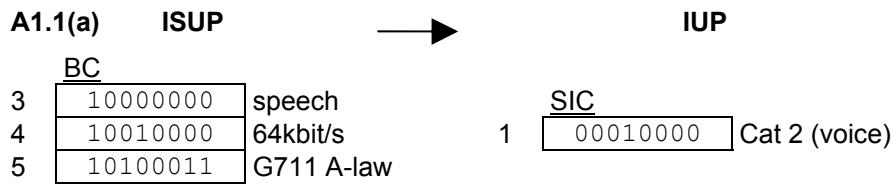
Discard octet(s) 4a/b if present
ATP LLC   - discard if present
ATP HLC   - discard if present
ATP PI   - discard if present

A1.1(b)   IUP ─────►   ISUP

SIC
1	`00010000`	Cat 2 (voice)

BC
3	`10000000`	speech
4	`10010000`	64kbit/s
5	`10100011`	G711 A-law

ATP LLC   - none
ATP HLC   - none
ATP PI   - none
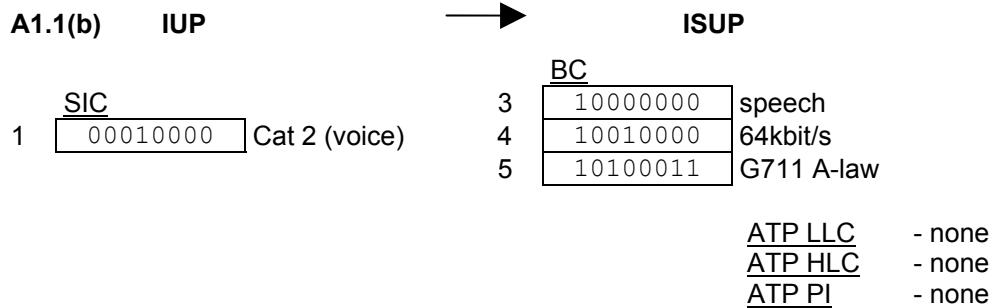
A1.2   ISUP 3.1kHz AUDIO ⟷   IUP SPEECH (3.1 kHz Audio) Category 2
(Digital or Analogue routeing)

> Note: For this range of mappings a composite BC/LLC shall be constructed if the BC does not include octet 5d but it is present in LLC. To make the composite BC/LLC the necessary LLC octets 5a/b/c/d shall be appended to the BC with the extension bit in the last BC octet 5/a/b/c correctly modified. The remainder of the LLC shall be discarded for the purposes of SIC mapping.

A1.2.1   No BC/LLC octet 5d
No HLC #4 (Gp2/3 fax)
No PI #1 or #3 (analogue interworking)

A1.2.1(a)   ISUP   ⟶   IUP

BC
3	`10010000`	3.1kHz
4	`10010000`	64kbit/s
5	`10100011`	G711 A-law

SIC
1	`00011000`	Cat 2 (3.1kHz)

Discard octet(s) 4a/b if present
ATP LLC   - not present or present without octet 5d
ATP HLC   - not present or present but not Gp2/3 fax (#4)
ATP PI   - not present or present but not analogue interworking (#1 or #3)

A1.2.1(b)   IUP   ⟶   ISUP

SIC
1	`00011000`	Cat 2 (3.1kHz)

BC
3	`10010000`	3.1kHz
4	`10010000`	64kbit/s
5	`10100011`	G711 A-law

ATP LLC   - copy of BC
ATP HLC   - none
ATP PI   - none
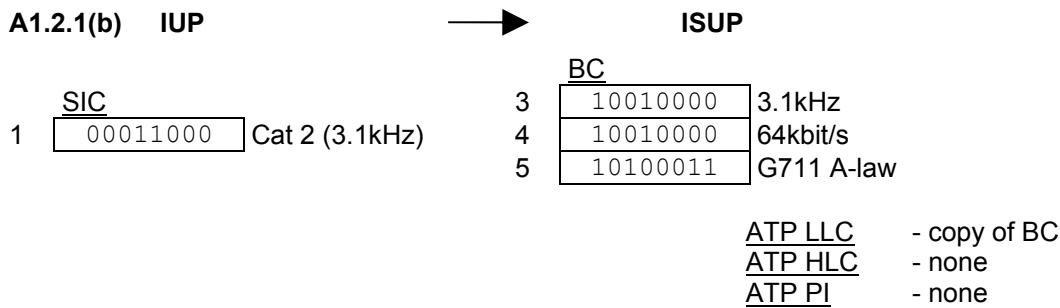
The following alternative single-octet SIC codings shall cause the same mapping:

```
00011001
00011010
00011011
00011100
00011101
00011110
```

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

A1.2.2   BC/LLC includes octet 5d
No HLC #4 (Gp2/3 fax)
PI normally absent but not considered in mapping

A1.2.2 (a)   ISUP ⟶ **IUP**

BC or composite BC/LLC

3	10010000	3.1kHz			SIC	
4	10010000	64kbit/s		1	10011000	Cat 2 (3.1kHz)
5	00100011	G711 A-law		2	0ABBBBBB	duplex mode, modem
5a	0XXXXXXX					
5b	0XXXXXXX					
5c	0XXXXXXX					
5d	1ABBBBBB	duplex mode, modem				
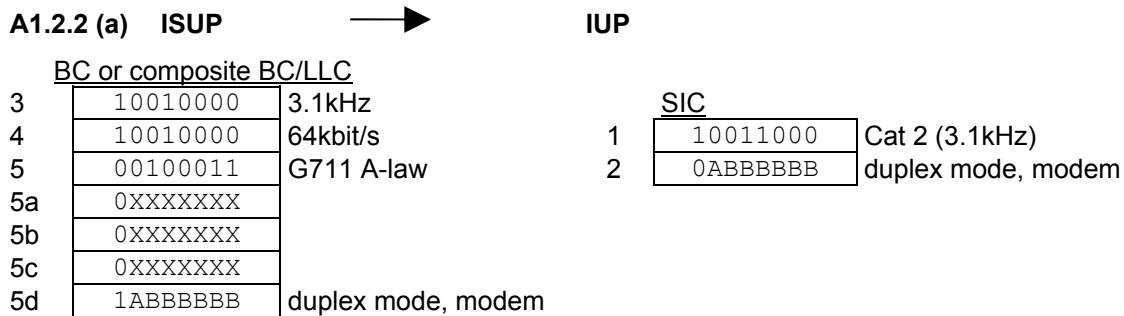
Discard octet(s) 4a/b if present
ABBBBBB are transferred without change
ATP HLC   - not present or present but not Gp2/3 fax (#4)
ATP PI   - discard if present

A1.2.2 (b)   IUP ⟶ **ISUP**

BC

	SIC			3	10010000	3.1kHz
1	10011000	Cat 2 (3.1kHz)		4	10010000	64kbit/s
2	0ABBBBBB	duplex mode, modem		5	00100011	G711 A-law
				5a	00000000	
				5b	00000000	
				5c	00000000	
				5d	1ABBBBBB	duplex mode, modem

ATP LLC   - copy of BC
ATP HLC   - none
ATP PI   - none
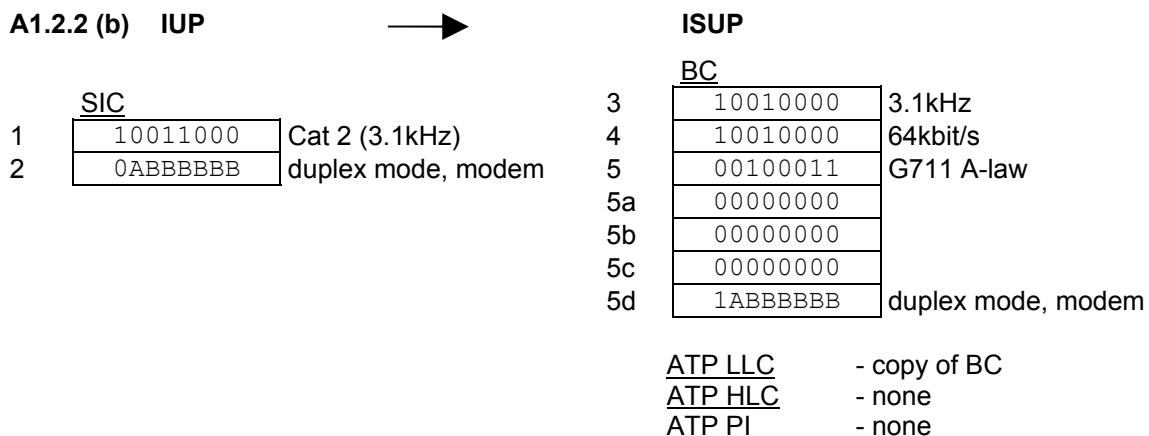
The following alternative first octet SIC codings shall cause the same mapping:
```
10011001
10011010
10011011
10011100
10011101
10011110
```

ABBBBBB are transferred without change

A1.2.3   **No BC/LLC octet 5d**
           HLC #4 (Gp2/3 fax) present
                  PI normally absent but not considered in mapping

A1.2.3(a)   **ISUP** ➡️ **IUP**

BC
3 | 10010000 | 3.1kHz   SIC
4 | 10010000 | 64kbit/s   1 | 00011111 | Cat 2 (3.1kHz)
5 | 10100011 | G711 A-law

Discard octet(s) 4a/b if present
ATP LLC   - not present or present without octet 5d
ATP HLC   - Gp 2/3 fax (#4)
ATP PI   - discard if present

A1.2.3(b)   **IUP** ➡️ **ISUP**

                                      BC
SIC   3 | 10010000 | 3.1kHz
1 | 00011111 | Cat 2 (3.1kHz)   4 | 10010000 | 64kbit/s
                                 5 | 10100011 | G711 A-law

                    ATP LLC   - copy of BC
                    ATP HLC   - Gp 2/3 fax (#4)
                    ATP PI   - none

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

A1.2.4   BC/LLC includes octet 5d
**   HLC #4 (Gp2/3 fax) present**
**   PI normally absent but not considered in mapping**

A1.2.4 (a)   ISUP   ⟶   IUP

BC or composite BC/LLC

3	`10010000`	3.1kHz
4	`10010000`	64kbit/s
5	`00100011`	G711 A-law
5a	`0XXXXXXX`	
5b	`0XXXXXXX`	
5c	`0XXXXXXX`	
5d	`1ABBBBBB`	duplex mode, modem

SIC

1	`10011111`	Cat 2 (3.1kHz)
2	`0ABBBBBB`	duplex mode, modem

Discard octet(s) 4a/b if present
ABBBBBB are transferred without change
ATP HLC   - Gp2/3 fax (#4)
ATP PI   - discard if present

A1.2.4 (b)   IUP   ⟶   ISUP

SIC

1	`10011111`	Cat 2 (3.1kHz)
2	`0ABBBBBB`	duplex mode, modem

BC

3	`10010000`	3.1kHz
4	`10010000`	64kbit/s
5	`00100011`	G711 A-law
5a	`00000000`	
5b	`00000000`	
5c	`00000000`	
5d	`1ABBBBBB`	duplex mode, modem

ATP LLC   - copy of BC
ATP HLC   - Gp2/3 fax (#4)
ATP PI   - none

ABBBBBB are transferred without change

A1.2.5   **ISUP 3.1 kHz AUDIO IUP SPEECH (Telephony)**
          No BC/LLC octet 5d
          No HLC #4 (Gp2/3 fax)
          PI #1 or #3 (analogue interworking) present
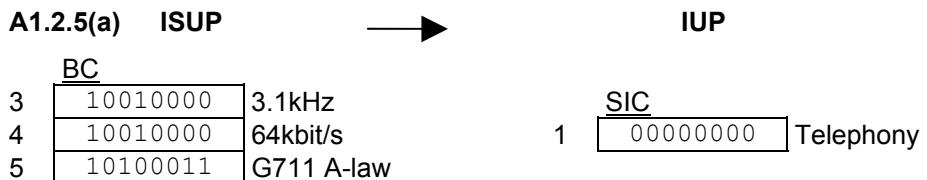
A1.2.5(a)   **ISUP**   ⟶   **IUP**

BC

3	`10010000`	3.1kHz
4	`10010000`	64kbit/s
5	`10100011`	G711 A-law

SIC

1	`00000000`	Telephony

Discard octet(s) 4a/b if present
ATP LLC   - not present or present without octet 5d
ATP HLC   - not present or present but not Gp 2/3 fax (#4)
ATP PI   - analogue interworking (#1 or #3)

A1.2.5(b)   **IUP**   ⟶   **ISUP**

SIC

1	`00000000`	Telephony

or
no SIC - (no SIMs)

(i) if ISDN Access Indicator in ISUP IAM will be "originating access non-ISDN".
BC   - none
ATP LLC   - none
ATP HLC   - none
ATP PI   - none

(ii) if ISDN Access Indicator in ISUP IAM will be "originating access ISDN".

BC

3	`10010000`	3.1kHz
4	`10010000`	64kbit/s
5	`10100011`	G711 A-law

ATP LLC   - none
ATP HLC   - none
ATP PI   - PI #1, loc #5 (private/remote)

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

A1.3 ISUP 64k bit/s UNRESTRICTED ◄──► IUP (Voice/Data) Category 1 (Fully Digital path required)

Note: For this range of mappings a composite BC/LLC shall be constructed if the BC does not include some or all of octet 5 up to and including octet 5d but corresponding octet(s) is (are) present in LLC. To make the composite BC/LLC the necessary LLC octets 5/a/b/c/d shall be appended to the BC (with the extension bit in the last BC octet 5/a/b/c correctly modified if octet group 5 has already been started in BC). Furthermore, irrespective of the need to append any LLC octet group 5 to BC, if octet(s) 6 and/or 7 are not present in BC but the corresponding octet(s) is (are) present in LLC, then the octet(s) shall be added to the composite BC/LLC. The remainder of the LLC shall be discarded for the purposes of SIC mapping.

A1.3.1 64kbit/s (A-law) to/from CAT 1 (voice)

A1.3.1(a) ISUP ──────► IUP

BC or composite BC/LLC

3	10001000	unrestricted
4	10010000	64kbit/s
5	10100011	G711 A-law

SIC

1	00010010	Cat 1 (voice)

Discard octet(s) 4a/b if present
ATP HLC   - discard if present
ATP PI   - discard if present

A1.3.1(b) IUP ──────► ISUP

SIC

1	00010010	Cat 1 (voice)

BC

3	10001000	unrestricted
4	10010000	64kbit/s
5	10100011	G711 A-law

ATP LLC   - copy of BC
ATP HLC   - none
ATP PI   - none
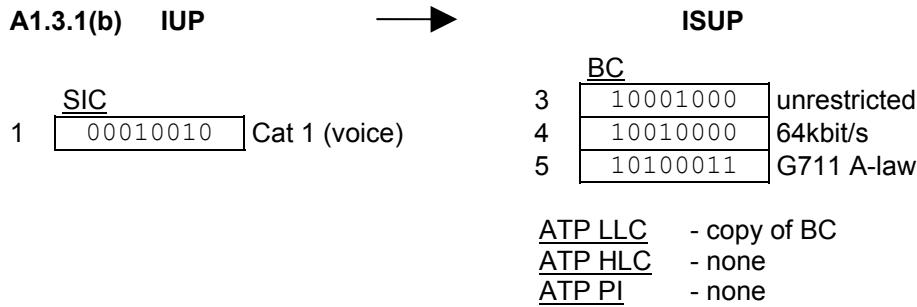
A1.3.2   **ISUP 64k bit/s UNRESTRICTED** ◄──► **IUP DATA (Rate) Category 1 (Fully digital path required)**

A1.3.2.1   **Synchronous rate 64kbit/s**

A1.3.2.1 (a)   **ISUP** ──► **IUP**

BC or composite BC/LLC   SIC
3 | 10001000 | unrestricted   1 | 1ttt0000 | 64kbit/s
4 | 10010000 | 64kbit/s   2 | 00000100 | synchronous

Discard octet(s) 4a/b if present
ATP HLC   - mapped to ttt if #33, #49 or #50;
              otherwise discard if present
ATP PI   - discard if present

A1.3.2.1 (b)   **IUP** ──► **ISUP**

SIC   BC
1 | 1ttt0000 | 64kbit/s   3 | 10001000 | unrestricted
2 | 000X0100 | synchronous   4 | 10010000 | 64kbit/s
Note: if ttt = 000, 001 or 011 see other mappings

ATP LLC   - copy of BC
ATP HLC   - mapped from ttt if
               010, 100, 101, 110 or 111
ATP PI   - none

A1.3.2.2   Synchronous rate 64kbit/s with X.25 protocol
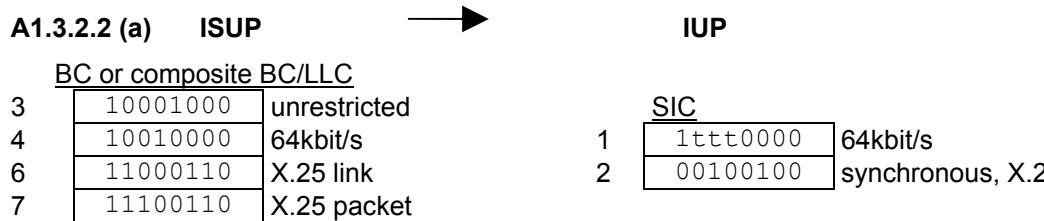
A1.3.2.2 (a)   ISUP   ⟶   IUP

BC or composite BC/LLC

3	`10001000`	unrestricted		SIC		
4	`10010000`	64kbit/s	1	`1ttt0000`	64kbit/s
6	`11000110`	X.25 link	2	`00100100`	synchronous, X.25
7	`11100110`	X.25 packet			

Note: - octets 6 and 7 must both be present
Discard octet(s) 4a/b if present
<u>ATP HLC</u>   - mapped to ttt if #33, #49 or #50;
               otherwise discard if present
<u>ATP PI</u>   - discard if present

A1.3.2.2 (b)   IUP   ⟶   ISUP

				BC		
	SIC		3	`10001000`	unrestricted
1	`1ttt0000`	64kbit/s	4	`10010000`	64kbit/s
2	`001X0100`	synchronous, X.25	6	`11000110`	X.25 link
			7	`11100110`	X.25 packet
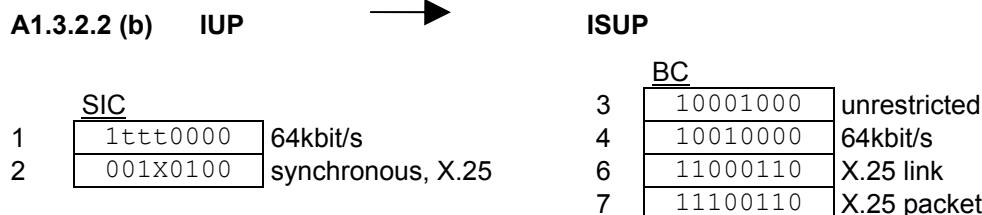
Note: -if ttt = 000, 001 or 011 see other mappings

<u>ATP LLC</u>   - copy of BC
<u>ATP HLC</u>   - mapped from ttt if
               010, 100, 101, 110 or 111;
<u>ATP PI</u>   - none

A1.3.3   **Synchronous 64kbit/s > rate >= 600bit/s (excluding split rates 75/1200)**

A1.3.3.1   **Synchronous rate 64kbit/s > rate >= 600 with V.110 / X.30 rate adaptation**

A1.3.3.1 (a)   ISUP ⟶ IUP

BC or composite BC/LLC

3	10001000	unrestricted
4	10010000	64kbit/s
5	00100001	V.110 / X.30 RA
5a	10XRRRRR	synchronous, rate

SIC

1	1tttrrrr	rate
2	00000100	synchronous

Discard octet(s) 4a/b if present

ATP HLC   - mapped to ttt if #33, #49 or #50;
             otherwise discard if present
ATP PI   - discard if present

A1.3.3.1 (b)   IUP ⟶ ISUP

SIC

1	1tttrrrr	rate
2	000X0100	synchronous

BC

3	10001000	unrestricted
4	10010000	64kbit/s
5	00100001	V.110 / X.30 RA
5a	100RRRRR	synchronous, rate

Note 1:   - if ttt = 000, 001 or 011 see other mappings
Note 2:   - if rrrr = 0000 see A1.3.2.1(b)

ATP LLC   - copy of BC
ATP HLC   - mapped from ttt if
              010, 100, 101, 110 or 111;
ATP PI   - none

A1.3.3.2   **Synchronous 64k $\geq$ rate $\geq$ 600 with V.110 / X.30 rate adaptation and explicit NIC indication**
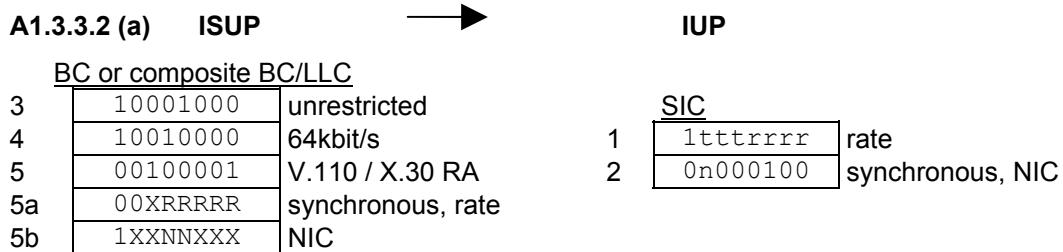
A1.3.3.2 (a)   **ISUP**   ⟶   **IUP**

BC or composite BC/LLC

3	`10001000`	unrestricted			SIC	
4	`10010000`	64kbit/s		1	`1tttrrrr`	rate
5	`00100001`	V.110 / X.30 RA		2	`0n000100`	synchronous, NIC
5a	`00XRRRRR`	synchronous, rate				
5b	`1XXNNXXX`	NIC				

Discard octet(s) 4a/b if present

ATP HLC   - mapped to ttt if #33, #49 or #50;
           otherwise discard if present
ATP PI   - discard if present

A1.3.3.2 (b)   **IUP**   ⟶   **ISUP**

					BC	
	SIC		3	`10001000`	unrestricted	
1	`1tttrrrr`	rate	4	`10010000`	64kbit/s	
2	`010X0100`	synchronous, NIC	5	`00100001`	V.110 / X.30 RA	
			5a	`000RRRRR`	synchronous, rate	
			5b	`1RR11000`	intermediate rate, NIC	
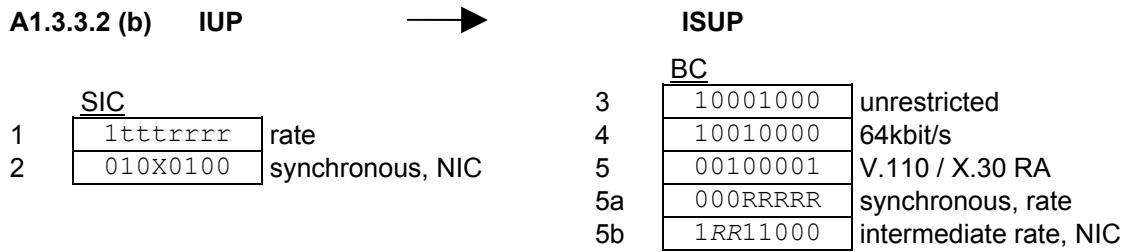
Note 1:   - if ttt = 000, 001 or 011 see other mappings
Note 2:   - if octet 2, bit 7 = 0 (no NIC), see A 1.3.3.1 (b)

ATP LLC   - copy of BC
ATP HLC   - mapped from ttt if
           010, 100, 101, 110 or 111
ATP PI   - none

A1.3.3.3   **Synchronous 64k >= rate >= 600 with V.110 / X.30 rate adaptation, explicit NIC indication and explicit Duplex mode indication**

A1.3.3.3 (a)   **ISUP**   ⟶   **IUP**

<u>BC or composite BC/LLC</u>

3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100001`	V.110 / X.30 RA
5a	`00XRRRRR`	synchronous, rate
5b	`0XXNNXXX`	NIC
5c	`0XXXXXXX`	
5d	`1MXXXXXX`	duplex mode

<u>SIC</u>

1	`1tttrrrr`	rate
2	`0n00m100`	synchronous, NIC, duplex mode

Discard octet(s) 4a/b if present

<u>ATP HLC</u>   - mapped to ttt if #33, #49 or #50;
                    otherwise discard if present
<u>ATP PI</u>   - discard if present

A1.3.3.3 (b)   **IUP**   ⟶   **ISUP**

<u>SIC</u>

1	`1tttrrrr`	rate
2	`010X1100`	synchronous, NIC, duplex mode [HDX]

<u>BC</u>

3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100001`	V.110 / X.30 RA
5a	`000RRRRR`	synchronous, rate
5b	`0RR11000`	intermediate rate, NIC
5c	`00000000`	
5d	`10000000`	HDX
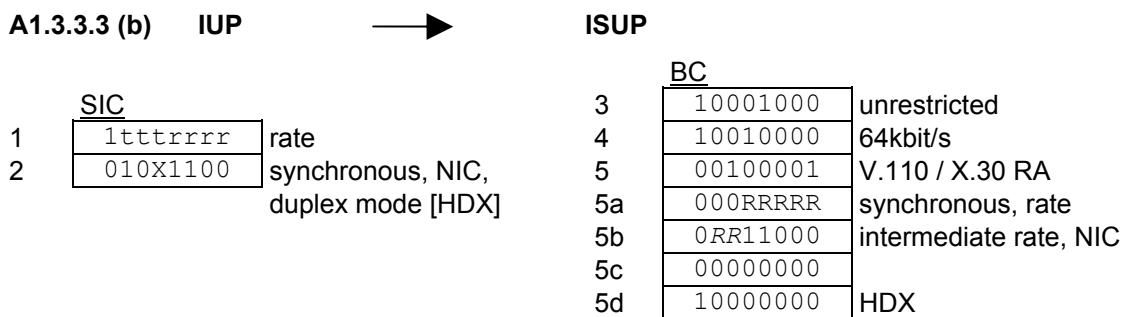
Note 1:   - if ttt = 000, 001 or 011 see other mappings
Note 2:   - if octet 2, bit 4 = 0 (FDX) see A1.3.3.2 (b)
Note 3:   - if octet 2, bits 4&7 = 0 (FDX, no NIC) see A1.3.3.1 (b)

<u>ATP LLC</u>   - copy of BC
<u>ATP HLC</u>   - mapped from ttt if
                010, 100, 101, 110 or 111
<u>ATP PI</u>   - none

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

A1.3.3.4   Synchronous 64k > rate >= 600 with V.110 / X.30 rate adaptation with X.25 protocol

A1.3.3.4 (a)   ISUP   ⟶   IUP

BC or composite BC/LLC

3	`10001000`	unrestricted		
4	`10010000`	64kbit/s	SIC	
5	`00100001`	V.110 / X.30 RA	1	`1tttrrrr`	rate
5a	`10XRRRRR`	synchronous, rate	2	`00100100`	synchronous, NIC,
6	`11000110`	X.25 link			duplex mode
7	`11100110`	X.25 packet		

Note: - octets 6 and 7 must both be present
Discard octet(s) 4a/b if present
ATP HLC   - mapped to ttt if #33, #49 or #50;
                   otherwise discard if present
ATP PI   - discard if present

A1.3.3.4 (b)   IUP   ⟶   ISUP

BC

	SIC		
1	`1tttrrrr`	rate	3	`10001000`	unrestricted
2	`001X0100`	synchronous	4	`10010000`	64kbit/s
			5	`00100001`	V.110 / X.30 RA
			5a	`100RRRRR`	synchronous, rate
			6	`11000110`	X.25 link
			7	`11100110`	X.25 packet

Note 1:   - if ttt = 000, 001 or 011 see other mappings
Note 2:   - if rrrr = 0000 see A1.3.2.2 (b)

ATP LLC   - copy of BC
ATP HLC   - mapped from ttt if
                   010, 100, 101, 110 or 111
ATP PI   - none

A1.3.3.5 **Synchronous 64k >= rate >= 600 with V.110 / X.30 rate adaptation and explicit NIC indication and X.25 protocol**

A1.3.3.5 (a) **ISUP** ➡ **IUP**

BC or composite BC/LLC

3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100001`	V.110 / X.30 RA
5a	`00XRRRRR`	synchronous, rate
5b	`1XXNNXXX`	NIC
6	`11000110`	X.25 link
7	`11100110`	X.25 packet

SIC

1	`1tttrrrr`	rate
2	`0n100100`	synchronous, NIC, X.25

Note: - octets 6 and 7 must both be present
Discard octet(s) 4a/b if present
<u>ATP HLC</u>   - mapped to ttt if #33, #49 or #50;
                otherwise discard if present
<u>ATP PI</u>   - discard if present

A1.3.3.5 (b) **IUP** ➡ **ISUP**

SIC

1	`1tttrrrr`	rate
2	`011X0100`	synchronous

BC

3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100001`	V.110 / X.30 RA
5a	`000RRRRR`	synchronous, rate
5b	`1RR11000`	intermediate rate, NIC
6	`11000110`	X.25 link
7	`11100110`	X.25 packet

Note 1:   - if ttt = 000, 001 or 011 see other mappings
Note 2:   - if octet 2, bit 7 = 0 (no NIC) see A1.3.3.4 (b)

<u>ATP LLC</u>   - copy of BC
<u>ATP HLC</u>   - mapped from ttt if
                010, 100, 101, 110 or 111
<u>ATP PI</u>   - none

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

A1.3.3.6 **Synchronous 64k >= rate >= 600 with V.110 / X.30 rate adaptation, explicit NIC indication, explicit Duplex mode indication and X.25 protocol**

A1.3.3.6 (a) **ISUP** ⟶ **IUP**

BC or composite BC/LLC

3	10001000	unrestricted
4	10010000	64kbit/s
5	00100001	V.110 / X.30 RA
5a	00XRRRRR	synchronous, rate
5b	0XXNNXXX	NIC
5c	0XXXXXXX	
5d	1MXXXXXX	duplex mode
6	11000110	X.25 link
7	11100110	X.25 packet

SIC

1	1tttrrrr	rate
2	0n10m100	synchronous, NIC, duplex mode, X.25

Note: - octets 6 and 7 must both be present
Discard octet(s) 4a/b if present
<u>ATP HLC</u> - mapped to ttt if #33, #49 or #50;
 otherwise discard if present
<u>ATP PI</u> - discard if present

A1.3.3.6 (b) **IUP** ⟶ **ISUP**

SIC

1	1tttrrrr	rate
2	011X1100	synchronous, NIC, HDX

BC

3	10001000	unrestricted
4	10010000	64kbit/s
5	00100001	V.110 / X.30 RA
5a	000RRRRR	synchronous, rate
5b	0RR11000	intermediate rate, NIC
5c	00000000	
5d	10000000	HDX
6	11000110	X.25 link
7	11100110	X.25 packet

Note 1: - if ttt = 000, 001 or 011 see other mappings
Note 2: - if octet 2, bit 4 = 0 (FDX) see A1.3.3.5 (b)
Note 3: - if octet 2, bits 4 & 7 = 0 (FDX, no NIC) see A1.3.3.4 (b)

<u>ATP LLC</u> - copy of BC
<u>ATP HLC</u> - mapped from ttt if
 010, 100, 101, 110 or 111
ATP PI - none

A1.3.4   Synchronous 600bit/s > rate (including split rates 75 / 1200 and H0 rate)

A1.3.4.1   Synchronous 600 > rate with V.110 / X.30 rate adaptation

A1.3.4.1 (a)   ISUP   ⟶   IUP

BC or composite BC/LLC

3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100001`	V.110 / X.30 RA
5a	`10XDDDDD`	synchronous, rate

SIC

1	`1011dddd`	rate
2	`00000100`	synchronous

Discard octet(s) 4a/b if present
ATP HLC   - discard if present
ATP PI   - discard if present

A1.3.4.1 (b)   IUP   ⟶   ISUP

SIC

1	`1011dddd`	rate
2	`000X0100`	synchronous

BC

3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100001`	V.110 / X.30 RA
5a	`100DDDDD`	synchronous, rate

ATP LLC   - copy of BC
ATP HLC   - none
ATP PI   - none

A1.3.4.2   Synchronous 600 > rate with V.110 / X.30 rate adaptation and explicit NIC indication

A1.3.4.2 (a)   ISUP ———————▶ IUP

   BC or composite BC/LLC
3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100001`	V.110 / X.30 RA
5a	`00XDDDDD`	synchronous, rate
5b	`1XXNNXXX`	NIC

   SIC
1	`1011dddd`	rate
2	`0n000100`	synchronous, NIC

Discard octet(s) 4a/b if present
ATP HLC   - discard if present
ATP PI   - discard if present

A1.3.4.2 (b)   IUP ———————▶ ISUP

   SIC
1	`1011dddd`	rate
2	`010X0100`	synchronous, NIC

   BC
3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100001`	V.110 / X.30 RA
5a	`000DDDDD`	synchronous, rate
5b	`1DD11000`	intermediate rate, NIC

Note: if octet 2, bit 7 = 0 (no NIC) see A 1.3.4.1 (b)

ATP LLC   - copy of BC
ATP HLC   - none
ATP PI   - none

A1.3.4.3   **Synchronous 600 > rate with V.110 / X.30 rate adaptation, explicit NIC indication and explicit Duplex mode indication**

A1.3.4.3 (a)   **ISUP**   ⟶   **IUP**

BC or composite BC/LLC

3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100001`	V.110 / X.30 RA
5a	`00XDDDDD`	synchronous, rate
5b	`0XXNNXXX`	NIC
5c	`0XXXXXXX`	
5d	`1MXXXXXX`	duplex mode

SIC

1	`1011dddd`	rate
2	`0n00m100`	synchronous, NIC, duplex mode

Discard octet(s) 4a/b if present
<u>ATP HLC</u>   - discard if present
<u>ATP PI</u>   - discard if present

A1.3.4.3 (b)   **IUP**   ⟶   **ISUP**

SIC

1	`1011dddd`	rate
2	`010X1100`	synchronous, NIC HDX

BC

3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100001`	V.110 / X.30 RA
5a	`000DDDDD`	synchronous, rate
5b	`0DD11000`	intermediate rate, NIC
5c	`00000000`	
5d	`10000000`	HDX
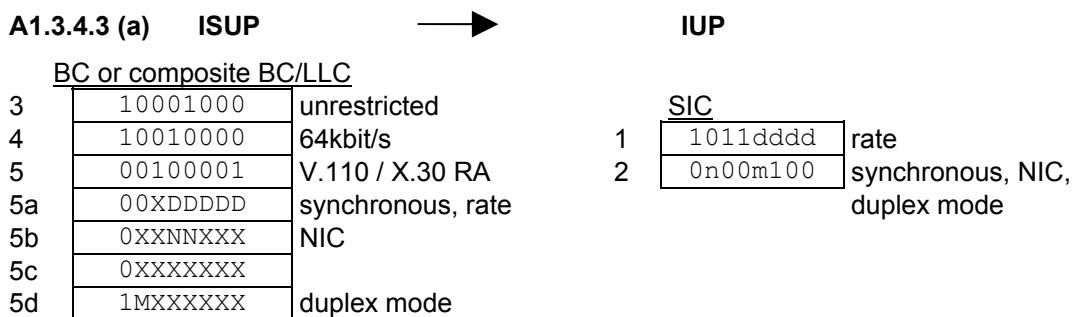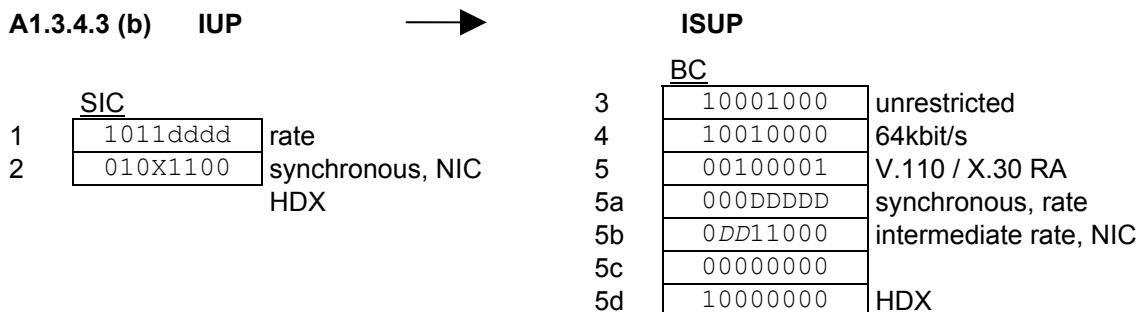
Note 1:   - if octet 2, bit 4 = 0 (FDX) see A1.3.4.2 (b)
Note 2:   - if octet 2, bits 4 & 7 = 0 (no NIC) see A1.3.4.1 (b)

<u>ATP LLC</u>   - copy of BC
<u>ATP HLC</u>   - none
<u>ATP PI</u>   - none

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

A1.3.4.4   **Synchronous 600** > **rate with V.110 / X.30 rate adaptation with X.25 protocol**

A1.3.4.4 (a)   **ISUP**   ⟶   **IUP**

BC or composite BC/LLC

3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100001`	V.110 / X.30 RA
5a	`10XDDDDD`	synchronous, rate
6	`11000110`	X.25 link
7	`11100110`	X.25 packet

SIC

1	`1011dddd`	rate
2	`00100100`	synchronous, X.25

Note: - octets 6 and 7 must both be present
Discard octet(s) 4a/b if present
ATP HLC   - discard if present
ATP PI   - discard if present

A1.3.4.4 (b)   **IUP**   ⟶   **ISUP**

SIC

1	`1011dddd`	rate
2	`001X0100`	synchronous

BC

3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100001`	V.110 / X.30 RA
5a	`100DDDDD`	synchronous, rate
6	`11000110`	X.25 link
7	`11100110`	X.25 packet

ATP LLC   - copy of BC
ATP HLC   - none
ATP PI   - none

A1.3.4.5 **Synchronous 600 > rate with V.110 / X.30 rate adaptation and explicit NIC indication and X.25 protocol**

A1.3.4.5 (a) **ISUP** ➞ **IUP**

BC or composite BC/LLC

3	10001000	unrestricted
4	10010000	64kbit/s
5	00100001	V.110 / X.30 RA
5a	00XDDDDD	synchronous, rate
5b	1XXNNXXX	NIC
6	11000110	X.25 link
7	11100110	X.25 packet

SIC

1	1011dddd	rate
2	0n100100	synchronous, NIC, X.25

Note: - octets 6 and 7 must both be present
Discard octet(s) 4a/b if present
ATP HLC   - discard if present
ATP PI   - discard if present

A1.3.4.5 (b) **IUP** ➞ **ISUP**

SIC

1	1011dddd	rate
2	011X0100	synchronous

BC

3	10001000	unrestricted
4	10010000	64kbit/s
5	00100001	V.110 / X.30 RA
5a	000DDDDD	synchronous, rate
5b	1DD11000	intermediate rate, NIC
6	11000110	X.25 link
7	11100110	X.25 packet

Note: - if octet 2, bit 7 = 0 (no NIC) see A1.3.4.4 (b)

ATP LLC   - copy of BC
ATP HLC   - none
ATP PI   - none

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

A1.3.4.6   **Synchronous 600 > rate with V.110 / X.30 rate adaptation, explicit NIC indication, explicit Duplex mode indication and X.25 protocol**

A1.3.4.6 (a)   **ISUP**   ➡   **IUP**

BC or composite BC/LLC

3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100001`	V.110 / X.30 RA
5a	`00XDDDDD`	synchronous, rate
5b	`0XXNNXXX`	NIC
5c	`0XXXXXXX`	
5d	`1MXXXXXX`	duplex mode
6	`11000110`	X.25 link
7	`11100110`	X.25 packet

SIC

1	`1011dddd`	rate
2	`0n10m100`	synchronous, NIC, duplex mode, X.25

Note: - octets 6 and 7 must both be present
Discard octet(s) 4a/b if present
ATP HLC   - discard if present
ATP PI   - discard if present

A1.3.4.6 (b)   **IUP**   ➡   **ISUP**

SIC

1	`1011dddd`	rate
2	`011X1100`	synchronous, NIC HDX

BC

3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100001`	V.110 / X.30 RA
5a	`000DDDDD`	synchronous, rate
5b	`0DD11000`	intermediate rate, NIC
5c	`00000000`	
5d	`10000000`	duplex mode
6	`11000110`	X.25 link
7	`11100110`	X.25 packet

Note: 1   - if octet 2, bit 4 = 0 (FDX) see A1.3.4.5 (b)
Note: 2   - if octet 2, bits 4 & 7 = 0 (FDX, no NIC) see A1.3.4.4 (b)

ATP LLC   - copy of BC
ATP HLC   - none
ATP PI   - none

A1.3.5   **Asynchronous 64kbit/s > = rate > = 600bit/s (excluding split rates 75 / 1200) with V.110 / X.30 rate adaptation**

A1.3.5.1   **Asynchronous 64k > = rate > = 600 with V.110 / X.30 rate adaptation**
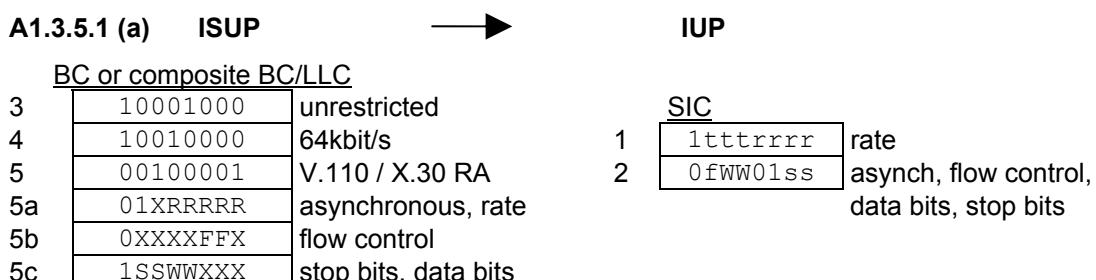
A1.3.5.1 (a)   ISUP ⟶ IUP

BC or composite BC/LLC

3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100001`	V.110 / X.30 RA
5a	`01XRRRRR`	asynchronous, rate
5b	`0XXXXFFX`	flow control
5c	`1SSWWXXX`	stop bits, data bits

SIC

1	`1tttrrrr`	rate
2	`0fWW01ss`	asynch, flow control, data bits, stop bits

Discard octet(s) 4a/b if present
WW transferred without change

ATP HLC   - mapped to ttt if #33, #49 or #50;
                    otherwise discard if present
ATP PI   - discard if present

A1.3.5.1 (b)   IUP ⟶ ISUP

SIC

1	`1tttrrrr`	rate
2	`0fWW01ss`	asynch, flow control, data bits, stop bits

BC

3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100001`	V.110 / X.30 RA
5a	`010RRRRR`	asynchronous, rate
5b	`0RR00FF0`	intermediate rate, flow control
5c	`1SSWW011`	stop bits, data bits
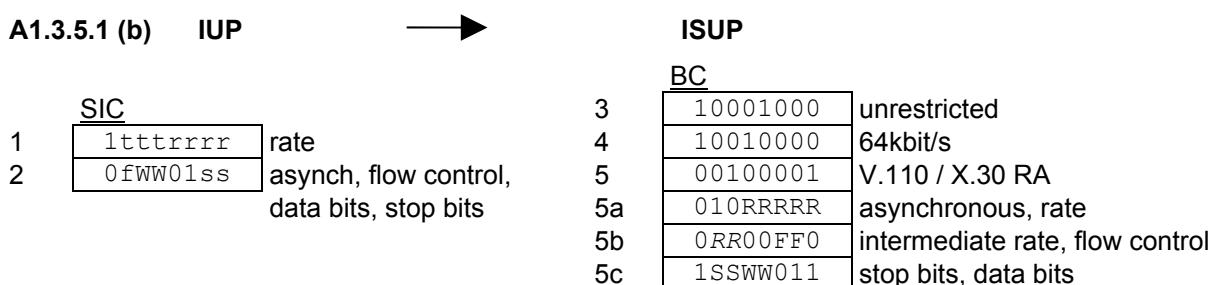
Note 1:   - if ttt = 000, 001 or 011 see other mappings
Note 2:   - WW transferred without change

ATP LLC   - copy of BC
ATP HLC   - mapped from ttt if
                      010, 100, 101, 110 or 111
ATP PI   - none

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

A1.3.5.2   **Asynchronous 64k $>=$ rate $>=$ 600 with V.110 / X.30 rate adaptation and explicit Duplex mode indication**

A1.3.5.2 (a)   **ISUP**   ⟶   **IUP**

<u>BC or composite BC/LLC</u>

3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100001`	V.110 / X.30 RA
5a	`01XRRRRR`	asynchronous, rate
5b	`0XXXXFFX`	flow control
5c	`0SSWWXXX`	stop bits, data bits
5d	`1MXXXXXX`	duplex mode

<u>SIC</u>

1	`1tttrrrr`	rate
2	`0fWWm1ss`	asynch, flow control, data bits, duplex mode stop bits

Discard octet(s) 4a/b if present
WW transferred without change
<u>ATP HLC</u>   - mapped to ttt if #33, #49 or #50;
                    otherwise discard if present
<u>ATP PI</u>   - discard if present

A1.3.5.2 (b)   **IUP**   ⟶   **ISUP**

<u>SIC</u>

1	`1tttrrrr`	rate
2	`0fWW11ss`	asynch, flow control, data bits, HDX, stop bits

<u>BC</u>

3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100001`	V.110 / X.30 RA
5a	`010RRRRR`	asynchronous, rate
5b	`0RR00FF0`	intermediate rate, flow control
5c	`0SSWW011`	stop bits, data bits
5d	`10000000`	duplex mode

Note 1:   - if ttt = 000, 001 or 011 see other mappings
Note 2:   - if octet 2, bit 4 = 0 (FDX) see A1.3.5.1 (b)
WW transferred without change

<u>ATP LLC</u>   - copy of BC
<u>ATP HLC</u>   - mapped from ttt if
           010, 100, 101, 110 or 111
<u>ATP PI</u>   - none

A1.3.6   **Asynchronous 600bit/s $>$ rate**
                  (including split rates 75 / 1200 and H0 rate)

A1.3.6.1   **Asynchronous 600 > rate with V.110 / X.30 rate adaptation**

A1.3.6.1 (a)   **ISUP**   ➡   **IUP**

    BC or composite BC/LLC

3	`10001000`	unrestricted		SIC		
4	`10010000`	64kbit/s	1	`1011dddd`	rate	
5	`00100001`	V.110 / X.30 RA	2	`0fWW01ss`	asynch, flow control,	
5a	`01XDDDDD`	asynchronous, rate			data bits, stop bits	
5b	`0XXXXFFX`	flow control				
5c	`1SSWWXXX`	stop bits, data bits				

Discard octet(s) 4a/b if present
WW transferred without change
<u>ATP HLC</u>   - discard if present
<u>ATP PI</u>   - discard if present

A1.3.6.1 (b)   **IUP**   ➡   **ISUP**

                                      BC

	SIC		3	`10001000`	unrestricted	
1	`1011dddd`	rate	4	`10010000`	64kbit/s	
2	`0fWW01ss`	asynch, flow control,	5	`00100001`	V.110 / X.30 RA	
		data bits, stop bits	5a	`010DDDDD`	asynchronous, rate	
			5b	`0DD00FF0`	intermediate rate, flow control	
			5c	`1SSWW011`	stop bits, data bits	

WW transferred without change

<u>ATP LLC</u>   - copy of BC
<u>ATP HLC</u>   - none
<u>ATP PI</u>   - none

SEE PAGE 2 FOR THE NORMATIVE INFORMATION
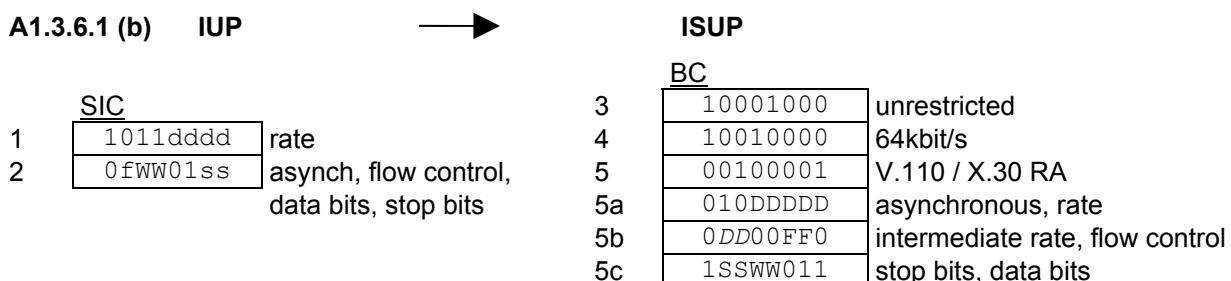
A1.3.6.2   **Asynchronous 600 > rate with V.110 / X.30 rate adaptation and explicit Duplex mode indication**

A1.3.6.2 (a)   **ISUP**   ⟶   **IUP**

BC or composite BC/LLC

3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100001`	V.110 / X.30 RA
5a	`01XDDDDD`	asynchronous, rate
5b	`0XXXXFFX`	flow control
5c	`0SSWWXXX`	stop bits, data bits
5d	`1MXXXXXX`	duplex mode

SIC

1	`1011dddd`	rate
2	`0fWWm1ss`	asynch, flow control, data bits, duplex mode stop bits

Discard octet(s) 4a/b if present
WW transferred without change
ATP HLC   - discard if present
ATP PI   - discard if present

A1.3.6.2 (b)   **IUP**   ⟶   **ISUP**

SIC

1	`1011dddd`	rate
2	`0fWW11ss`	asynch, flow control, data bits, HDX, stop bits

BC

3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100001`	V.110 / X.30 RA
5a	`010DDDDD`	asynchronous, rate
5b	`0DD00FF0`	intermediate rate, flow control
5c	`0SSWW011`	stop bits, data bits
5d	`10000000`	HDX

Note: - if octet 2, bit 4 = 0 (FDX) see A1.3.6.1 (b)
WW transferred without change

ATP LLC   - copy of BC
ATP HLC   - none
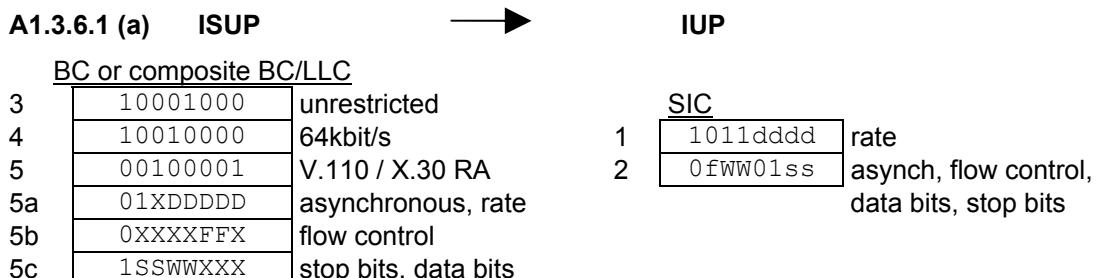ATP PI   - none

A1.3.7　　Multi-sampled asynchronous

A1.3.7.1　　Multi-sampled asynchronous 64k >= rate >= 600 with 2-octet SIC
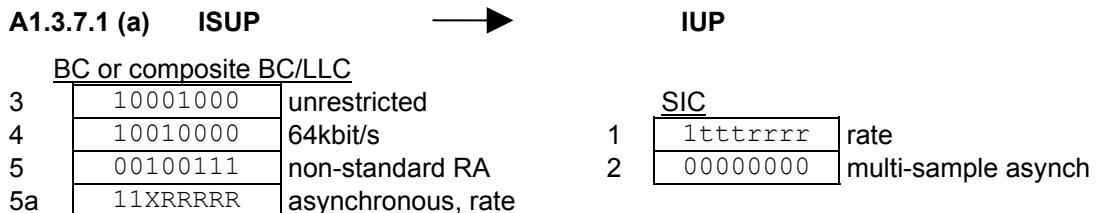
A1.3.7.1 (a)　ISUP　　⟶　　IUP

BC or composite BC/LLC

3	10001000	unrestricted
4	10010000	64kbit/s
5	00100111	non-standard RA
5a	11XRRRRR	asynchronous, rate

SIC

1	1tttrrrr	rate
2	00000000	multi-sample asynch

Discard octet(s) 4a/b if present
<u>ATP HLC</u>　　- mapped to ttt if #33, #49 or #50;
　　　　　　　　　otherwise discard if present
<u>ATP PI</u>　　　- discard if present

A1.3.7.1 (b)　IUP　　⟶　　ISUP

SIC

1	1tttrrrr	rate
2	XXXXX000	multi-sample asynch

BC

3	10001000	unrestricted
4	10010000	64kbit/s
5	00100111	non-standard RA
5a	110RRRRR	asynchronous, rate

Note:　　　　- if ttt = 000, 001 or 011 see other mappings

<u>ATP LLC</u>　　- copy of BC
<u>ATP HLC</u>　　- mapped from ttt if
　　　　　　　　010, 100, 101, 110 or 111
<u>ATP PI</u>　　　- none

SEE PAGE 2 FOR THE NORMATIVE INFORMATION
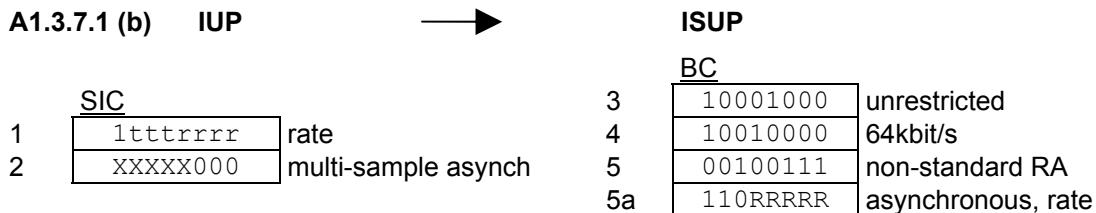
A1.3.7.2   Multi-sampled asynchronous 600 > rate with 2-octet SIC

A1.3.7.2 (a)   ISUP ⟶ IUP

BC or composite BC/LLC

3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100111`	non-standard RA
5a	`11XDDDDD`	asynchronous, rate

SIC

1	`1011dddd`	rate
2	`00000000`	multi-sample asynch

Discard octet(s) 4a/b if present
ATP HLC   - discard if present
ATP PI   - discard if present

A1.3.7.2 (b)   IUP ⟶ ISUP

SIC

1	`1011dddd`	rate
2	`XXXXX000`	multi-sample asynch

BC

3	`10001000`	unrestricted
4	`10010000`	64kbit/s
5	`00100111`	non-standard RA
5a	`110DDDDD`	asynchronous, rate

ATP LLC   - copy of BC
ATP HLC   - none
ATP PI   - none

A1.3.7.3   Multi-sampled asynchronous with 1-octet SIC

A1.3.7.3 (a)   ISUP   ⟶   IUP

   Not applicable

A1.3.7.3 (b)   IUP   ⟶   ISUP

<u>BC</u>

     <u>SIC</u>

1	`00101110`	8kbit/s multi-sampled	3	`10001000`	unrestricted	
or			4	`10010000`	64kbit/s	
1	`00101111`	64kbit/s multi-sampled	5	`00100111`	non-standard RA	
			5a	`11000000`	asynchronous	

        <u>ATP LLC</u>   - copy of BC
        <u>ATP HLC</u>   - none
        <u>ATP PI</u>   - none

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

A1.4. "CATCH ALL" MAPPINGS

The following mappings shall apply if no exact match is found in the preceding mapping tables (A1.1 to A1.3).

A1.4.1 Speech

ISUP ➞ **IUP**

BC   SIC
Any BC which indicates "CCITT" and   1 | 00010000 | Cat 2 (voice)
"speech" information transfer capability in
octet 3

ATP LLC   -discard if present
ATP HLC   -discard if present
ATP PI   -discard if present

A1.4.2 3.1kHz Audio

ISUP ➞ **IUP**

BC   SIC
Any BC which indicates "CCITT" and   1 | 00011000 | Cat 2 (3.1kHz)
"3.1kHz audio" information transfer
capability in octet 3

ATP LLC   -discard if present
ATP HLC   -discard if present
ATP PI   -discard if present

A1.4.3 Unrestricted digital

ISUP ➞ **IUP**

BC   SIC
Any BC which indicates "CCITT" and   1 | 1ttt0000 | 64kbit/s
"unrestricted digital" information transfer 2 | 00000100 | synchronous
capability in octet 3

ATP LLC   -discard if present
ATP HLC   - mapped to ttt if #33, #49 or #50;
                otherwise discard if present
ATP PI   -discard if present

A1.4.4   Telephony

IUP ⟶ **ISUP**

SIC

| 1 | 0000XXXX | Telephony |

or

| 1 | 1000XXXX | Telephony |
| 2 | 0XXXXXXX | |

(i) if ISDN Access Indicator in ISUP IAM will be "originating access non-ISDN".

BC   - none
ATP LLC   - none
ATP HLC   - none
ATP PI   - none

(ii) if ISDN Access Indicator in ISUP IAM will be "originating access ISDN".

BC

3	10010000	3.1kHz
4	10010000	64kbit/s
5	10100011	G711 A-law

ATP LLC   - none
ATP HLC   - none
ATP PI   - PI #1, loc #5 (private/remote)

A1.4.5   Category 2 (voice)

IUP ⟶ **ISUP**

SIC

| 1 | 10010000 | Cat 2 (voice) |
| 2 | 0XXXXXXX | |

BC

3	10000000	speech
4	10010000	64kbit/s
5	10100011	G711 A-law

Note: one-octet SIC case covered by mapping table A1.1(b)

ATP LLC   - none
ATP HLC   - none
ATP PI   - none

A1.4.6   Category 2 (3.1kHz)

IUP ⟶ **ISUP**

Case covered completely by specific mapping tables A1.2.1(b), A1.2.2(b), A1.2.3(b) and A1.2.4(b)

A1.4.7   Category 1

IUP ➝ **ISUP**

A1.4.7.1   HLC not mappable

(a)

BC

SIC
1 | `00010XXX` | Cat 1   3 | `10001000` | unrestricted
or   4 | `10010000` | 64kbit/s
1 | `10010YYY` | Cat 1   ATP LLC   - copy BC
2 | `0XXXXXXX` | ATP HLC   - none
                           ATP PI   - none

(b)

SIC
1 | `0tttXXXX` | Cat 1
or
1 | `1tttXXXX` | Cat 1
2 | `0XXXXXXX` |

YYY = 001, 010, 011, 100, 101, 110 or 111
ttt = 010, 011 or 111

A1.4.7.2   HLC mappable

BC
3 | `10001000` | unrestricted
4 | `10010000` | 64kbit/s

ATP LLC   - copy BC
ATP HLC   - mapped from ttt
ATP PI   - none

SIC
1 | `0tttXXXX` | Cat 1
or
1 | `1tttXXXX` | Cat 1
2 | `0XXXXXXX` |
ttt = 100, 101 or 110

A1.5   KEY

DDDDD, dddd   The "lower" data rates (includes split rates and H0)

BC / LLC		SIC	
DDDDD	⟷	dddd	
11110	⟷	0000	300 bit/s
11101	⟷	0001	200 bit/s
11100	⟷	0010	150 bit/s
10101	⟷	0011	134.5 bit/s
11011	⟷	0100	110 bit/s
10110	⟷	0101	100 bit/s
11010	⟷	0110	75 bit/s
11001	⟷	0111	50 bit/s
10111	⟷	1000	75 / 1200 bit/s
11000	⟷	1001	1200 / 75 bit/s
see Note	⟵	1010	384kbit/s

Note: If the SIC code-point 1010 (384000bits/s) is received for mapping into BC/LLC this shall cause IUP call failure (service unavailable) rather than invoking the "catch all" mapping.

DD, dddd

BC / LLC			SIC	
DD		⟵	dddd	
01	8 kbits/s	⟵	0000	300 bits/s
01	8 kbits/s	⟵	0001	200 bits/s
01	8 kbits/s	⟵	0010	150 bits/s
00	not used	⟵	0011	134.5 bits/s
01	8 kbits/s	⟵	0100	110 bits/s
00	not used	⟵	0101	100 bits/s
01	8 kbits/s	⟵	0110	75 bits/s
01	8 kbits/s	⟵	0111	50 bits/s
01	8 kbits/s	⟵	1000	75 / 1200 bits/s
01	8 kbits/s	⟵	1001	1200 / 75 bits/s
see Note		⟵	1010	384k bits/s

Note: If the SIC code-point 1010 (384kbits/s) is received for mapping into BC/LLC this shall cause IUP call failure (service unavailable) rather than invoking the "catch all" mapping.

FF, f   Flow control indication

BC / LLC		SIC	
FF	⟷	f	
00	⟷	0	
11	⟷	1	
01	⟶	invoke "catch all"	
10	⟶	invoke "catch all"	

SEE PAGE 2 FOR THE NORMATIVE INFORMATION

M, m   Duplex mode indication

BC / LLC   SIC

  M   ◄────►   m

0	◄────►	1	half duplex
1	◄────►	0	full duplex

NN, n   NIC indication

BC / LLC   SIC

  NN   ◄────►   n

00	◄────►	0
11	◄────►	1
01	─────►	invoke "catch all"
10	─────►	invoke "catch all"
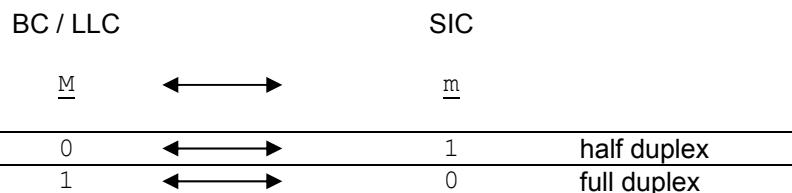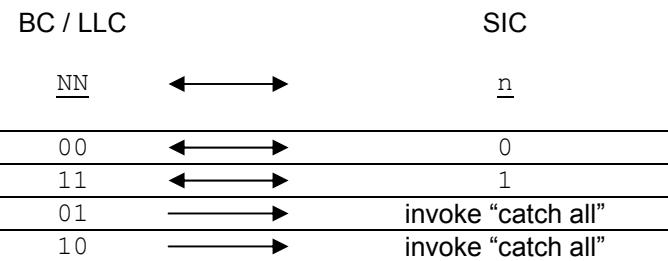
RRRRR, rrrr   The "higher" data rates

BC / LLC   SIC

  RRRRR   ◄────►   rrrr

10000	◄────►	0000	64 kbits/s
01111	◄────►	0001	56 kbits/s
01110	◄────►	0010	48 kbits/s
01100	◄────►	0011	32 kbits/s
01011	◄────►	0100	19.2 kbits/s
01010	◄────►	0101	16 kbits/s
01001	◄────►	0110	14.4 kbits/s
11111	◄────►	0111	12 kbits/s
01000	◄────►	1000	9.6 kbits/s
00111	◄────►	1001	8 kbits/s
00110	◄────►	1010	7.2 kbits/s
00101	◄────►	1011	4.8 kbits/s
00100	◄────►	1100	3.6 kbits/s
00011	◄────►	1101	2.4 kbits/s
00010	◄────►	1110	1.2 kbits/s
00001	◄────►	1111	0.600 kbits/s

RR, rrrr

BC / LLC			SIC	
RR	←		rrrr	
00	not used	←	0000	64 kbits/s
00	not used	←	0001	56 kbits/s
00	not used	←	0010	48 kbits/s
00	not used	←	0011	32 kbits/s
11	32 kbits/s	←	0100	19.2 kbits/s
00	not used	←	0101	16 kbits/s
11	32 kbits/s	←	0110	14.4 kbits/s
11	32 kbits/s	←	0111	12 kbits/s
10	16 kbits/s	←	1000	9.6 kbits/s
00	not used	←	1001	8 kbits/s
10	16 kbits/s	←	1010	7.2 kbits/s
01	8 kbits/s	←	1011	4.8 kbits/s
01	8 kbits/s	←	1100	3.6 kbits/s
01	8 kbits/s	←	1101	2.4 kbits/s
01	8 kbits/s	←	1110	1.2 kbits/s
01	8 kbits/s	←	1111	0.600 kbits/s

SS, ss   Number of stop bits

BC / LLC		SIC
SS	↔	ss
00	→	invoke "catch all"
01	↔	01
10	↔	10
11	↔	11

ttt   SIC "teleservice" bits

ISUP   SIC

HLC octet 4   ⟶   ttt

absent/discarded	⟶	010	data
#33	⟶	110	Gp4 fax
#49	⟶	100	Teletex
#50	⟶	101	Videotex

SIC   ISUP

ttt   ⟶   HLC octet 4

000			see Note 1
001			see Note 1
010	data	⟶	no HLC generated
011			see Note 1
100	Teletex	⟶	10110001 (#49)
101	Videotex	⟶	10110010 (#50)
110	Gp4 fax	⟶	10100001 (#33)
111	SSTV	⟶	no HLC generated
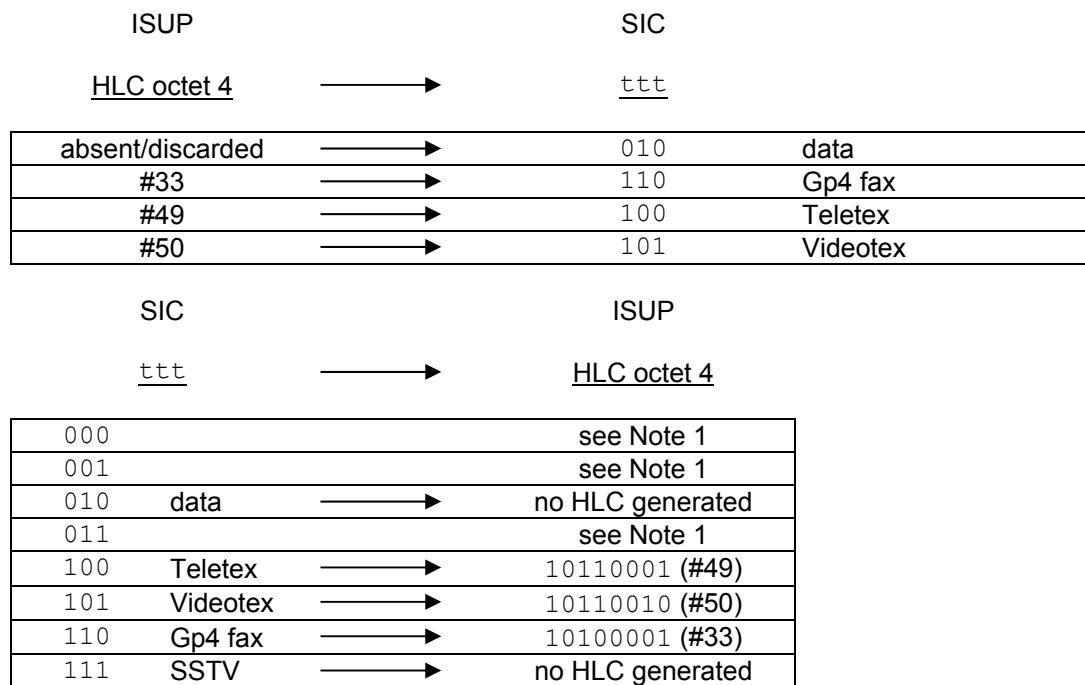
Note 1: if ttt has this value it indicates that an attempt is being made to use an inappropriate mapping table.

Note 2: MSB of HLC octet 4 is an extension bit.

END OF TSG/SPEC/008 Annex A

END OF TSG/SPEC/008